



**PDRM2**

# **REFRIGERANT MONITOR**

## **OPERATION & MAINTENANCE MANUAL**

Model PDRM2

Doc. Ref. MNPDRM2 REV. 4

reliability ° efficiency ° performance

**PDRM2  
Refrigerant Monitor**

**Models PDRM2**

**Approvals**

• EN61010:2010 • UL61010-1 • CSA C22.2 61010-1

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'Caution, Risk of Electric Shock' Please isolate elsewhere before opening Monitor door.



Please read this manual before installing or servicing the equipment.

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Revision	Details	Checked
1-1: July 2015	New issue	N/A
2-1: 8 <sup>th</sup> Feb 2017	Photos and drawings updated to latest build spec. This table added. Stepwise branding removed.	JW
2-2: 14 <sup>th</sup> Sep 2017	Changes made following external testing. Change made to Windows 10 access method.	JW
3-0: 29 <sup>th</sup> Nov 2017	Power socket changed and on/off switch removed in line with final Metlabs safety report.	JB
3-1: 28 <sup>th</sup> March 2018	Product branding and drawings updated.	JB
5 March 2020	Updated addresses	JH

## IMPORTANT INFORMATION

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### PLEASE NOTE

Please read these instructions carefully and examine the equipment in order to familiarize yourself with the device before installing and operating it.

There are no user serviceable components inside the PDRM2 Monitor. Please refer any service or repair to Parasense if necessary. Parasense offers a wide range of Service and Maintenance contracts, Remote Access software and Management Reporting packages. Details and cost of Service Exchange Units can be obtained from Parasense or an approved distributor

The following special messages that you will come across in this document or on the device are designed to warn you about potential risks:



This symbol indicates that there is an electrical risk that will result in injury if the instructions are not followed.



This symbol warns you of the potential risk of injury. You must comply with all safety messages that follow this symbol in order to avoid the risk of injury or death.



**DANGER**

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death, serious injury or equipment damage.



**WARNING**

WARNING indicates a potentially hazardous situation which, if not avoided, can result in death, serious injury or equipment damage.

The following special symbols are found inside the device enclosure and mark:



This symbol marks the terminal of a circuit breaker intended for connecting a live conductor of the power cord



This symbol marks the terminal of a circuit breaker intended for connecting a neutral conductor of the power cord



This symbol indicates the terminal for connecting a protective earth conductor of the power cord

# 1 INTRODUCTION

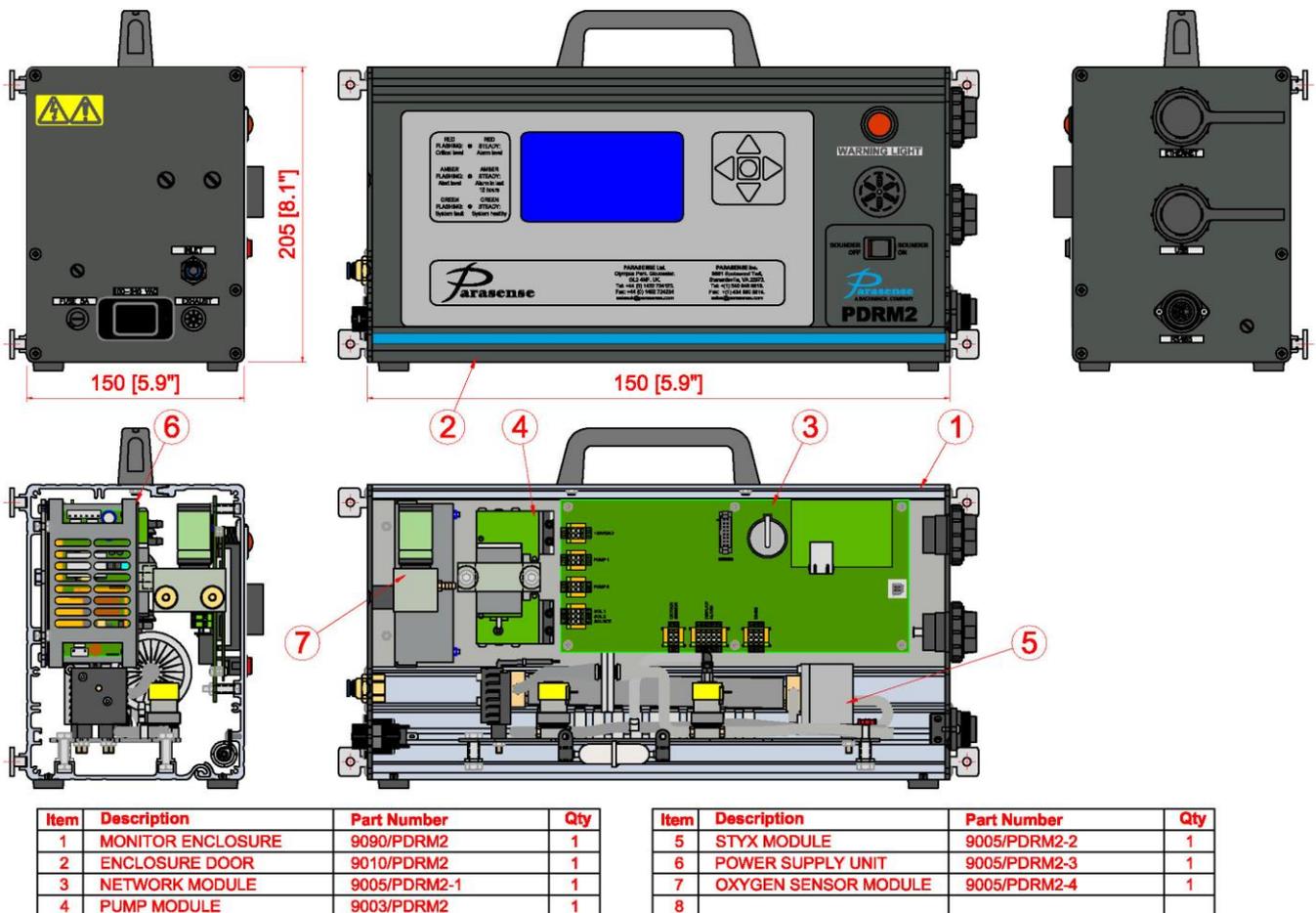
The Parasense PDRM2 Monitor is an advanced Refrigerant Leak Detection device. Utilising an infrared absorption sensor, the PDRM2 automatically collects and analyses samples of air to report and record the time, presence and concentration of refrigerant in accordance with the system configuration. Oxygen level monitoring utilises a galvanic cell type sensor mounted inside the PDRM2.

The Monitor has up to 2 individual Pumps for operational redundancy in order to achieve enhanced reliability. The pumps are connected to the location to be sampled by semi-rigid nylon pipework, referred to as Freeway. The specific location can then be further subdivided into small regions using a manifold and multiple sampling pipes known as spur kits (refer to the [Installation Guide](#) within this manual).

The PDRM2 can be used to monitor refrigerant gas in one of two ways. Option 1 is to configure the PDRM2 to monitor the overall area where refrigeration equipment is contained. Option 2 is to configure the PDRM2 to monitor a specific piece of refrigeration equipment, directly targeting the source of any refrigerant leaks.

Alarms can be generated at three different levels described as 'Alert', 'Alarm' and 'Critical'. These alarms can be signalled to other devices using Parasense remote cluster modules. The current alarm status is indicated on the 169mm (6.1/2") TFT LCD display.

## GENERAL ARRANGEMENT



## 2 INSTALLATION GUIDE

### WARNING

#### HAZARD OF ELECTRIC SHOCK

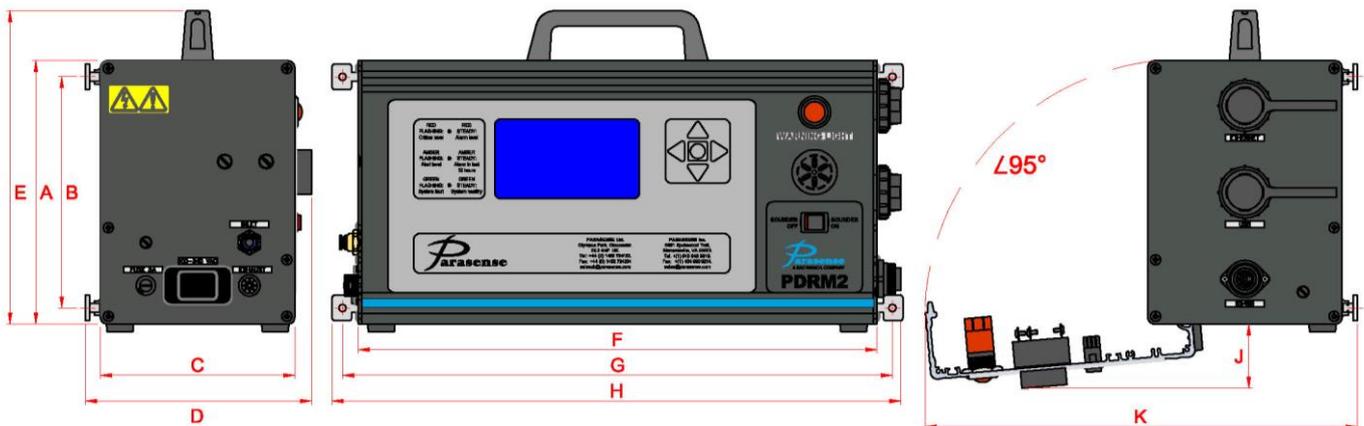
- Do not operate or install any equipment that appears damaged.
  - Check that the mains voltage and available power are compatible with the supply range of the equipment.
- Failure to follow these instructions can result in death, serious injury, or equipment damage.**

**Important:** All installation and maintenance work must be carried out by suitably qualified personnel only. All wiring must be carried out in accordance with NEC, CEC or IEC requirements and current local regulations.

The device must be positioned so that an easy access to the power cord is provided for quick power disconnection.

When relocating the PDRM2 it must be switched off, unplugged and the carrying handle utilised, preferably in its case. It is recommended that gloves and protective footwear be used.

### MONITOR FITTING INSTRUCTIONS



PDRM2	A	B	C	D	E	F	G	H	J	K	WEIGHT
Metric (mm)	205	180	150	175	244	401	425	440	50	334	6.0Kg
Imperial (In)	8.1	7.1	5.9	6.9	9.6	15.8	16.7	17.3	2.0	13.1	13.2lb

Although the PDRM2 leak detector is designed as a mobile unit which may be relocated to a particular area of monitoring as and when required, the unit may also operate as a stationary unit. In this case the PDRM2 should be fixed onto a solid vertical surface by means of the four wall mounting brackets:



The unit should be installed in a position where the monitor's LCD can be easily accessed. Space should be left around the monitor to allow the opening of the monitor door and fitting of Freeway, power and communications cables. Please refer to the appendix at the back of this manual for the mounting details drawing.

The PDRM2 may be used in the same area as toxic/noxious gases. Ensure adequate ventilation exists before entering these areas and during use.

## ELECTRICAL REQUIREMENTS

### WARNING

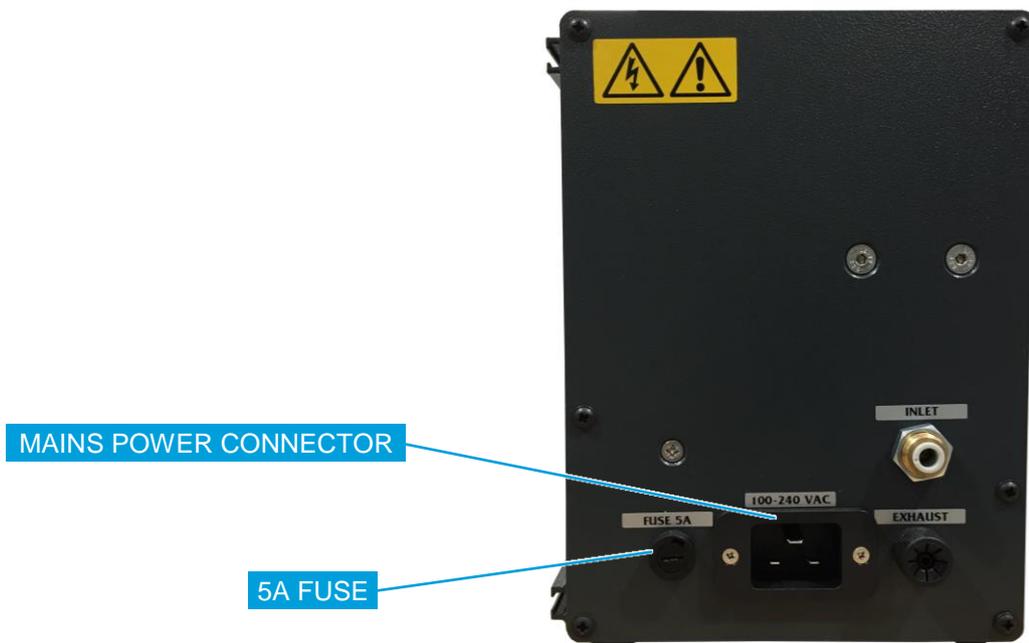
#### HAZARD OF ELECTRIC SHOCK

- Do not operate or install any equipment that appears damaged.
- Check that the mains voltage and available power are compatible with the supply range of the equipment.
- Ensure an external RCD is used at all times during operation of the PDRM2

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

Each monitor requires an earthed, AC single phase mains supply in the range 100-240V AC, 140VA, 50-60Hz.

**Important: As a protective measure against a fault current, an automatic disconnection of the supply shall be provided by means of an external RCD. The RCD to have a rated current of 10A or more, and a fault current of 30mA is to trip the RCD within 40ms. The short-circuit protection is provided by a 5A fuse, fitted on the end plate next to the mains power connector:**



The power cord is supplied as a part of the PDRM2 kit and incorporates a suitably rated earthed power cable, the PDRM2 power connector and a mains plug depending on the country of use. The power cord must not be rewired with a different type of cable if damaged – please contact Parasense for more information.



IEC60320 C19 CONNECTOR



UK PLUG



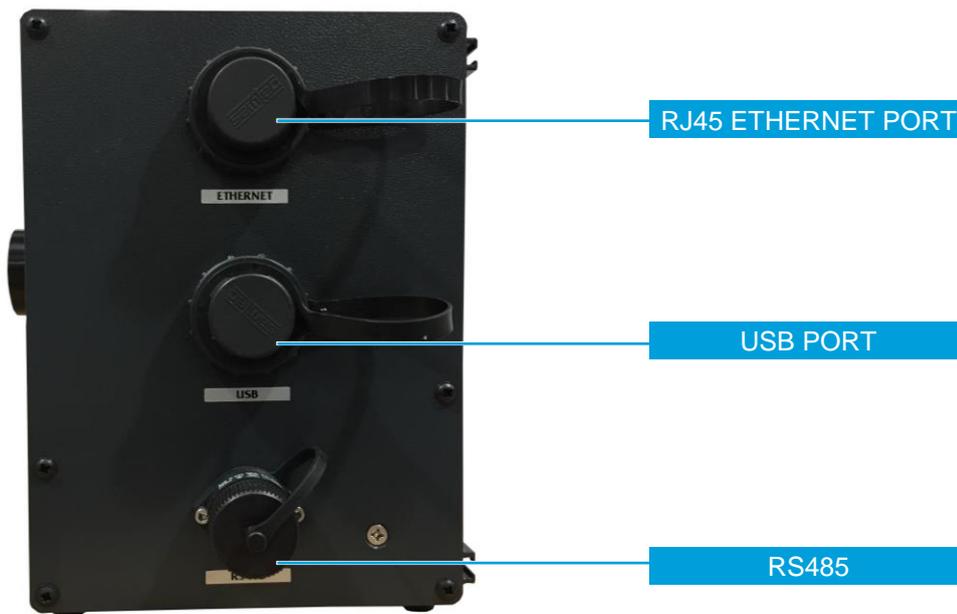
US PLUG

## EXTERNAL COMMS

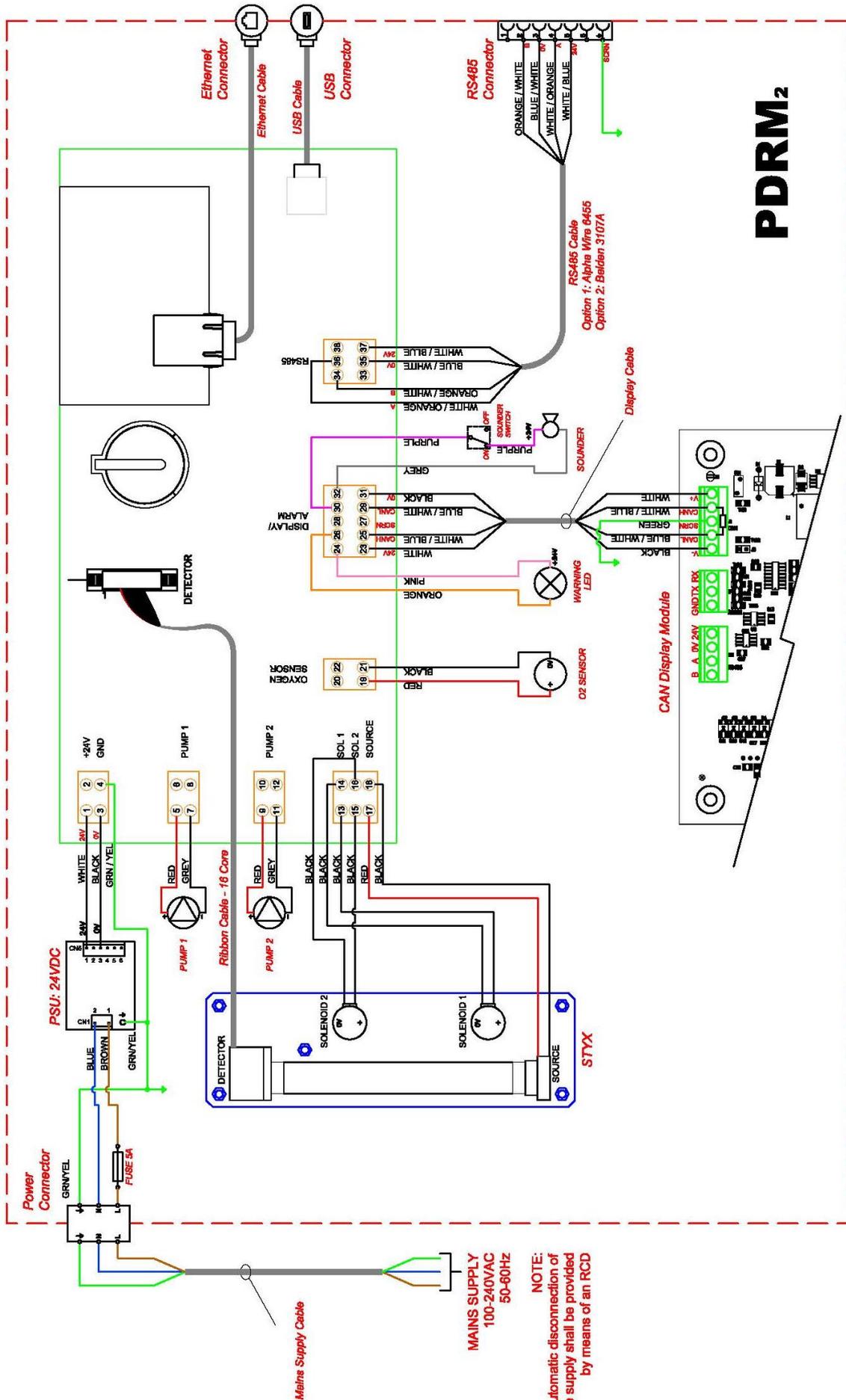
---

There are three sockets mounted onto the end plate of the PDRM2, which include:

- RJ45 Ethernet socket. This provides access to a Local Area Network (LAN) or Wide Area Network (WAN).
- USB socket (type B). This connector facilitates system maintenance and software updates.
- RS485 connector. The RS485 port is used to attach Parasense RS485 cluster modules, which can be used to extend the functionality of the PDRM2



# PDRM2 ELECTRICAL CONNECTIONS



**NOTE:**  
Automatic disconnection of the supply shall be provided by means of an RCD

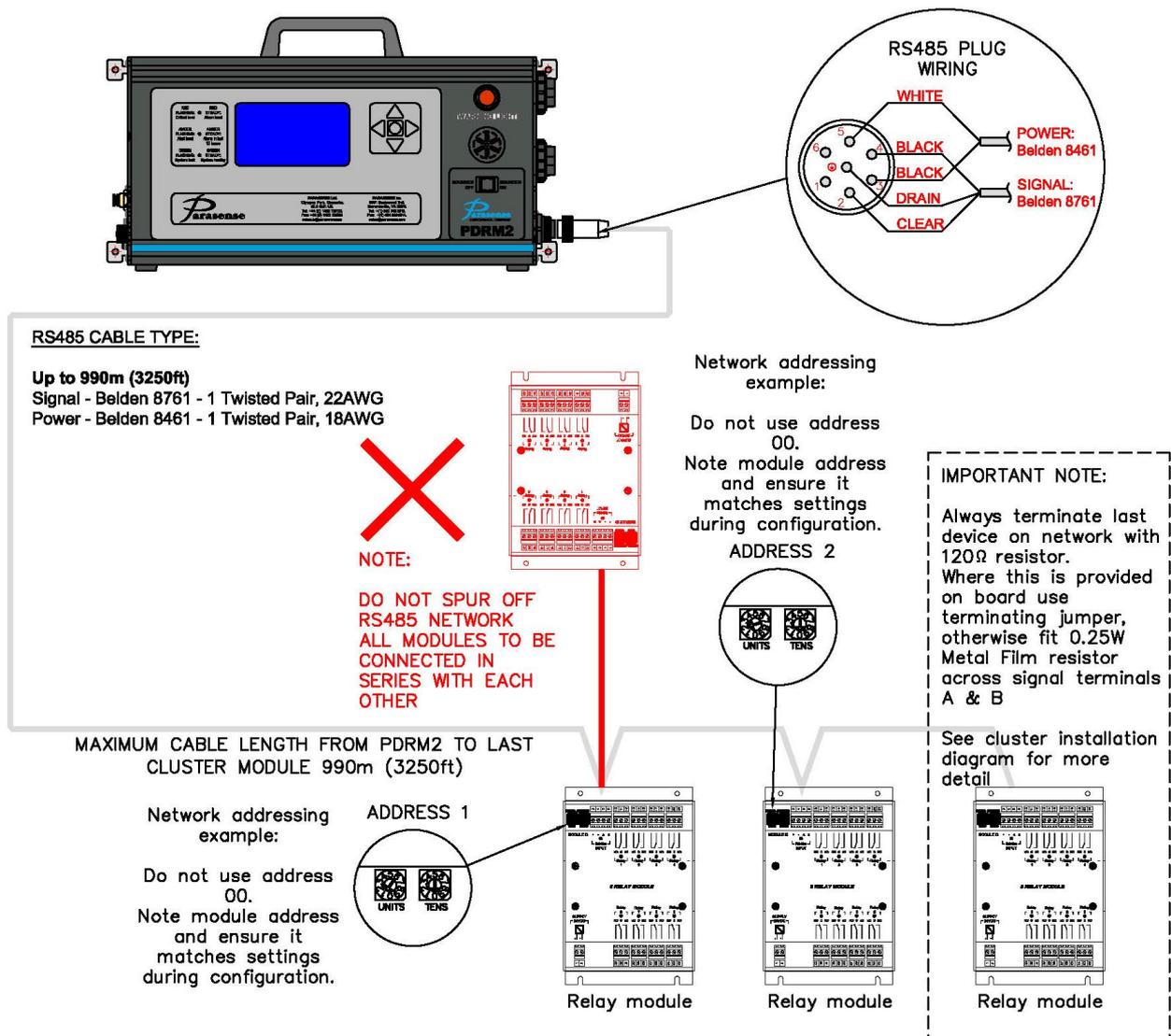
# CLUSTER POINT NETWORKING

Functionality of the PDRM2 can be further enhanced by connecting a cluster module network to the RS485 port. The alarms generated by the PDRM2 can be signalled to other devices using Parasense remote cluster modules.

The RS485 network can accommodate up to 4 relay cluster modules. Each cluster module has 2 rotary switches enabling you to assign a unique ID number. It is recommended that ID numbers from 25 to 29 are assigned to the relay cluster modules (Note: 00 should never be used as an ID). ID numbers do not need to follow a sequential pattern, they can be assigned in any order that you wish, but is suggested that the ID's are assigned in sequence in order to make the installation easier to understand.

Network installations must always be installed in series with no spur connections. The maximum possible network length is 990m (3250ft), provided that the specified cables are used and the cables are properly terminated. The diagram below outlines the method to be used when creating a network of Relay Cluster Points.

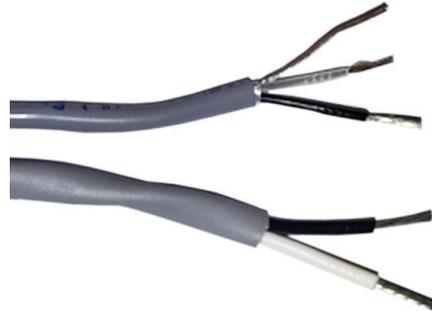
## Cluster Point Network Diagram



## RS485 CONNECTOR WIRING

A 7-pin RS485 connector plug is supplied in the case with each PDRM2 and may be used for connecting the PDRM2 to the Parasense cluster network. Please use following steps to wire up the RS485 plug:

1. Prepare the signal and power network cables (Belden 8761 and Belden 8461 respectively). Strip back the outer PVC jacket by about 25mm/1" on both cables; strip back the aluminium-foil shield of the signal cable (leave the drain wire in place). Strip back the insulation on each core by about 10mm/0.4":



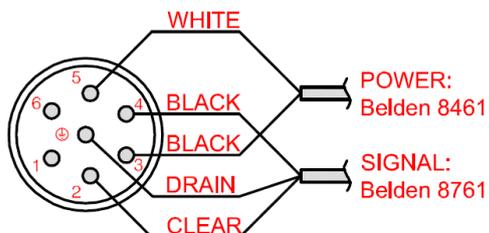
2. Take apart the RS485 plug:



3. Put both cables through the nut (3), the O-ring & the washer (4), the connector housing (1) and the cable clamp (5):



4. Connect the cores to the plug (2) using a small flat screwdriver according with the diagram:



- Fit the cable clamp (5) into the connector plug and tighten the clamping screws:



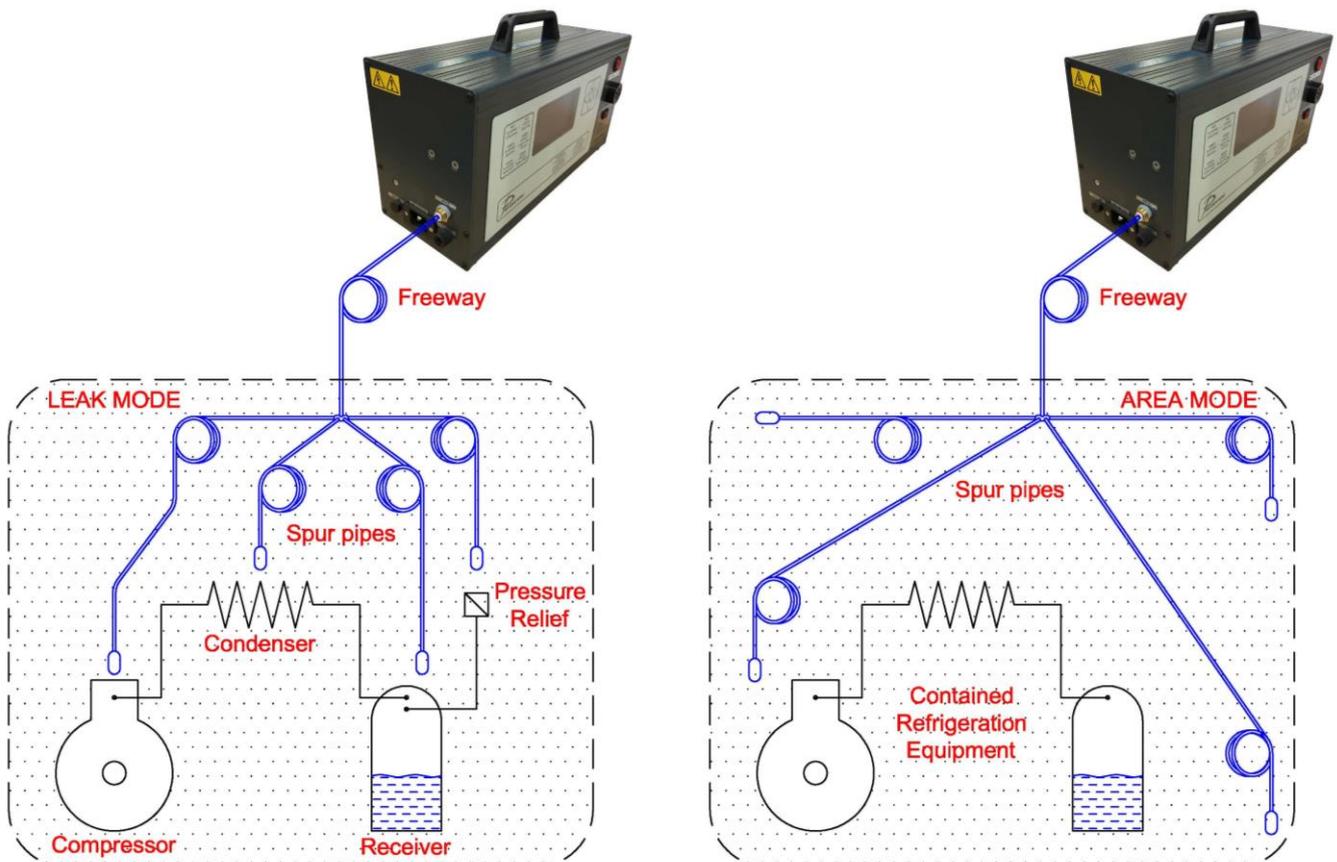
- Screw the connector housing (1) into the plug (2), fit the O-ring & the washer (4) into the housing (1) and tighten the nut (3):



## SAMPLING PIPEWORK INSTALLATION

Parasense sampling pipework, known as Freeway, is used to draw samples of air from areas of potential leakage to the PDRM2 monitor. Typical system installations are shown below. Two modes of sampling are available: "leak" and "area". For more details see page 4-25.

Note: the leak mode sample points should be located as close as possible to the potential leakage point. The area mode sample points should be located in general airflow of space at heights of between 1.5m/5ft and 2.4m/8ft, preferably away from potential leakage points.



### **Installation Do's**

- Ensure that the sampling pipes are pushed right into the connectors on the SAMM and Spur kit branch connectors.
- Support and clip all pipework and the spur kit branch connectors.
- Ensure that the spur kit sample pipe filters always point downwards.
- Attach identity markers to both ends of the FREEWAY
- Use continuous lengths of FREEWAY (DON'T JOIN).
- Locate sample fittings as closely as possible to the potential leakage areas.
- Cut the FREEWAY straight using the correct cutter.
- Make sure that all cables and freeway are secured so not to create a trip hazard.

### **Installation Don'ts**

- Flatten or kink the FREEWAY or spur pipe.
- Bend the FREEWAY or spur pipe at a radius of less than 150mm/6".
- Run the FREEWAY from a warm place through a very cold space.
- Expose the FREEWAY or spur to temperatures in excess of 60°C or less than -30°C.
- Let the spur kit filters ever be immersed in water, or any other liquids
- Mix spur kit pipes of different lengths on the same FREEWAY.
- Run pipework or cabling in areas where they may be stood on or where they may restrict access to other equipment.

## SETTING A WINDOWS PC TO COMMUNICATE WITH A PDRM2

Communication with the PDRM2 utilises the external Ethernet socket. Remove the socket cover to gain access. A Cat5/Ethernet cable can then be plugged into the Ethernet socket, with the other end plugged into the Ethernet port of a PC running Windows XP or later.

The PC must have its Local Area Network information configured to a range that will allow it to communicate with the PDRM2. The exact terminology varies slightly between different versions of the Windows operating system. The instructions below are for Windows 10, 8 & 7 with variations as necessary. Windows XP is covered separately.

### WINDOWS 10, 8 and WINDOWS 7

1) Take a note of the current network settings of the PDRM2 system (please refer to the [Network Settings](#) menu of the [Monitor Setup/Management Menu](#) section for information).

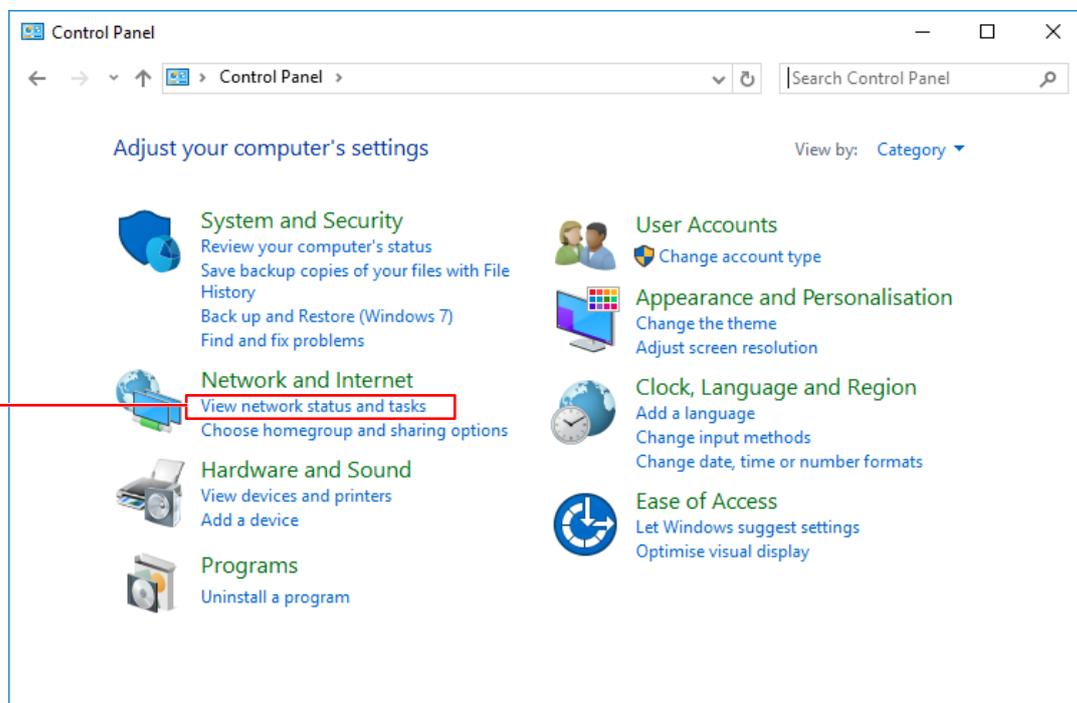
2) From the PC Desktop, access the Control Panel:

Using Windows 10. Press and release both the 'Ctrl' key and 'Esc' key at the same time. Type 'Control Panel' and click the shortcut shown.

Using Windows 8: Press and release both the 'Windows' key and 'X' key at the same time. Click 'Control Panel'.

Using Windows 7: Click 'Start', 'Control Panel'.

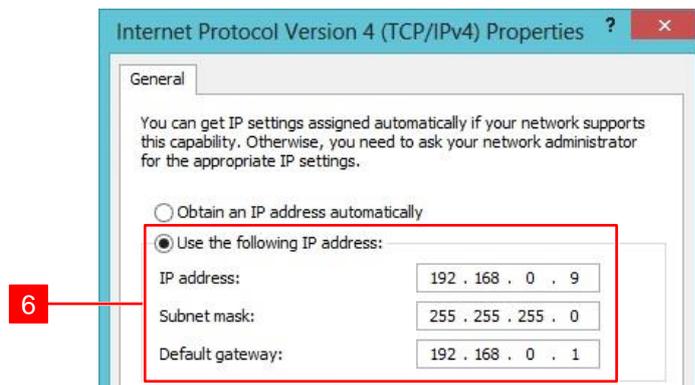
3) Under 'Network and Internet' of the Control Panel, click 'View network status and tasks'.



4) Click 'Change adapter settings' in the left hand menu. Right-click 'Ethernet' or 'Local Area Connection' and choose 'Properties' from the pop up menu.

5) From the list shown, select 'Internet Protocol Version 4 (TCP/IPv4)' then click the 'Properties' button.

- 6) The existing settings for your PC will be shown. If the option 'Use the following IP address' is set, take a note of the values that are shown onscreen. This information will be required at step 9 of these instructions.
- 7) Click on 'Use the following IP address'. Enter the Gateway setting noted in step 1 into the Default Gateway field. Enter the first 3 parts of the Address setting noted in step 1 into the first 3 parts of the IP address field (e.g. if the Address noted was 192.168.0.50, then enter 192.168.0). In the 4<sup>th</sup> IP address field, enter a value which is different to the 4<sup>th</sup> value of the Address noted in step 1 (e.g. if the Address noted in step 1 was 192.168.0.50, then enter any value other than 50).

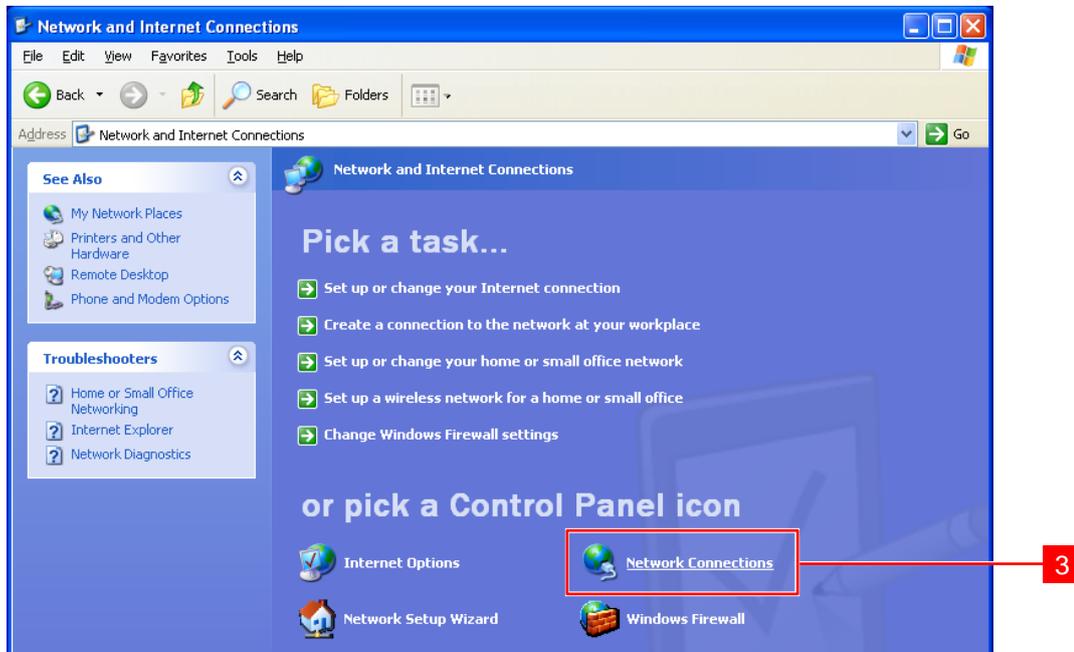


**Note: there must be no other device connected to the same network with the same IP address you have used (i.e. following the above screenshot, there must be no other device already using the address 192.168.0.9).**

- 8) Click 'OK', and close all previously opened windows.
- 9) Once all communication with the PDRM2 is complete, change the PC settings back to the previous settings by following the instructions above from step 2 to 7. The information noted in step 6 must replace the data in step 7.
- 10) When the Cat5 cable has been unplugged from the PDRM2, ensure that the protective cover is closed and pushed fully home.

## WINDOWS XP

- 1) Take a note of the current network settings of the GRM2 system (please refer to the Network Settings menu of the Monitor Setup/Management Menu section for information).
- 2) From the PC Desktop, access the control panel by clicking 'Start', 'Control Panel'.
- 3) Click 'Network and Internet Connections' followed by 'Network Connections'.



- 4) Right-click the 'Local Area Connection' option and choose 'Properties' from the popup menu.
- 5) Scroll down the list in the middle of the form and click on 'Internet Protocol (TCP/IP)' then click the 'Properties' button.

Continue with steps 5 to 10 of the Windows 10, 8 and 7 instructions.

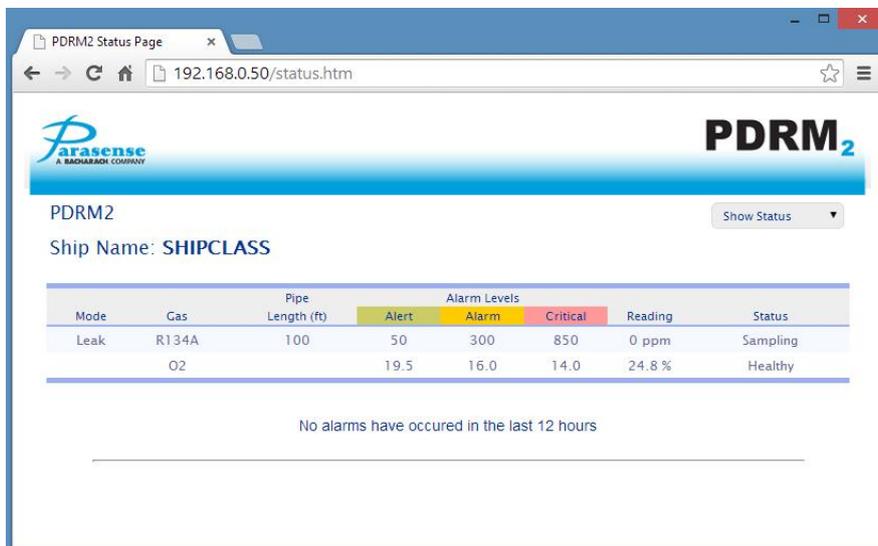
## PDRM2 STATUS WEBSITE

The PDRM2 Status website offers remote access to the monitor's current status. The status pages are automatically refreshed every 10 seconds, ensuring up to date information is available.

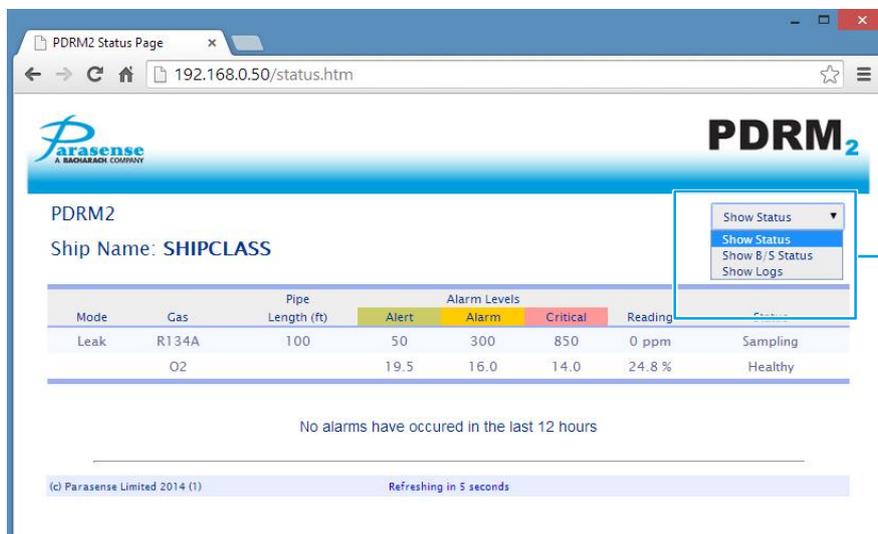
To access the status website, first open a web browser. In the address bar, enter the IP address of the monitor, followed by /status.htm. For example, using the monitor's factory default IP address, you would enter 192.168.0.50/status.htm.



The following screen will be displayed. This page shows the current status of all channels currently being monitored by the PDRM2. If a channel has encountered an alert, alarm or critical event, it will be highlighted using the relevant colour.



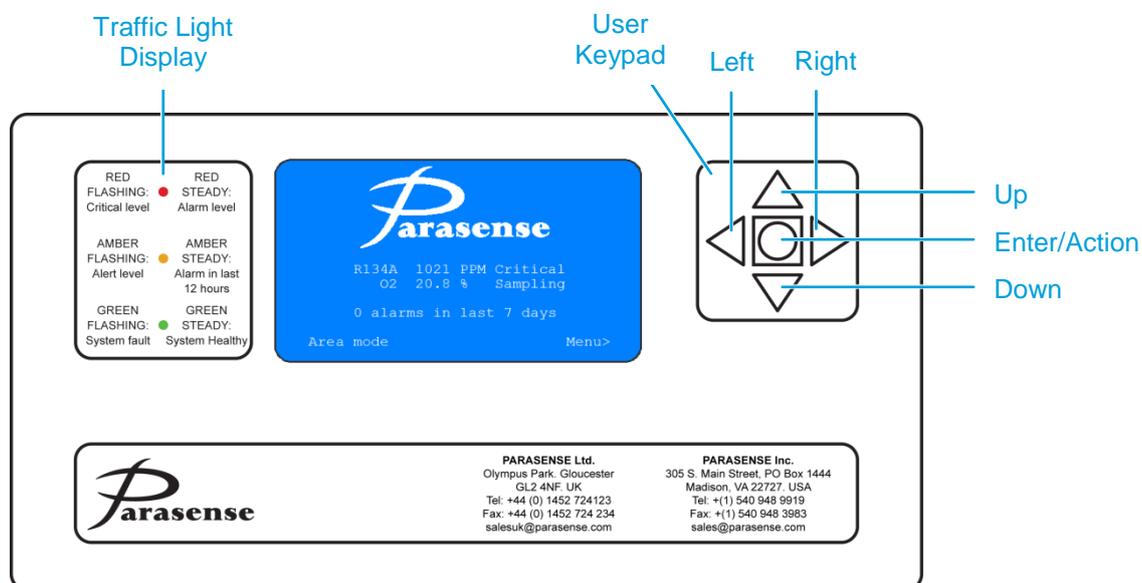
The drop-down menu to the right of the screen gives access to the monitors Relay status and configuration. You can also view the monitor's Alarms, Events, and Alerts Log pages. To return to the Status page from the Logs page, select Show Status from the drop-down menu.



Return to the Status page

## 3 USER GUIDE

The PDRM2 monitor is operated via a door mounted user interface. This includes a display, a 5 button Keypad and a traffic light alarm system.



### POWER UP

On power up of the monitor, self-diagnostics are carried out. This will cause the traffic lights to flash and some messages may appear on the screen. If the monitor is starting from cold, it is suggested that it is left to warm up for 24 hours to ensure correct readings. Following power up, you are presented with the Home screen where the current status of the monitor is shown.

### KEYPAD FUNCTIONS

Navigate the information on screen by use of the 5 button keypad. There are four directional buttons and one action button. Use the 'Up/Down' buttons to highlight the required item. Press the 'Action' button of the Keypad to select. The 'Left/Right' buttons will move the cursor to the left and right where applicable, but can also be used to view the previous and next page of data where available.

If the keypad is inactive for 3 minutes or longer, the LCD backlight will deactivate and the screen will go black. Keypad activity will reactivate the backlight.

### CONTRAST ADJUSTMENT

To adjust the LCD contrast, simultaneously press and hold the 'Up' & 'Down' buttons. All three of the display LED's will flash to indicate that you are in contrast mode. Using the 'Up' & 'Down' buttons, you may now adjust the contrast of the LCD to the desired level. If the screen is completely blue, press the 'Up' button until text is visible. If the screen is white, press the 'Down' button. Once complete, press the 'Action' button to confirm and close the contrast menu.

## SYSTEM ALARM OR FAULT INDICATION

---

The traffic light display gives an 'at a glance' system status of the monitor. This will indicate any alarm conditions that arise. The significance of each traffic light is shown below:

Traffic Light Reference	
<b>Red Flashing Light:</b>	A measurement of gas from the most recent cycle has breached the 'Critical' threshold.
<b>Red Steady Light:</b>	A measurement of refrigerant from the most recent cycle has exceeded the 'Alarm' threshold.
<b>Amber Flashing Light:</b>	A measurement of refrigerant from the most recent cycle has exceeded the 'Alert' threshold.
<b>Amber Steady Light:</b>	A measurement of refrigerant exceeding one of the alarm thresholds has been detected during the last 12 hours.
<b>Green Steady Light:</b>	The refrigerant monitor is operating to design specification.
<b>No Green Light or Flashing:</b>	A fault exists on the refrigerant monitor.

If a reading has been detected in breach of the configured Alarm thresholds, the traffic light display will indicate the level of that alarm. The alarm count on the Home screen will be incremented, and the alarm will be logged.

If multiple alarms have been triggered, the traffic lights will indicate the most significant alarm level. Individual alarm information can be obtained from the Alarms Log.

## FACTORY DEFAULT CONFIGURATION SETTINGS

Monitors are supplied programmed with Default Configuration Data. Modification can only be carried out via the Management menu of the door-mounted display.

### Network settings:

<b>IP Address</b>	192.168.0.50
<b>Netmask</b>	255.255.255.0
<b>Server</b>	192.168.0.1
<b>Gateway</b>	192.168.0.1

### SAMM settings:

<b>HFC Alert Level</b>	50ppm
<b>HFC Alarm</b>	300ppm
<b>HFC Critical</b>	850ppm
<b>O2 Alert Level</b>	19.5%
<b>O2 Alarm</b>	16.0%
<b>O2 Critical</b>	14.0%
<b>Pipe Length</b>	100ft
<b>Refrigerant</b>	R134A

### Beacon/Sounder

#### Settings:

<b>Source</b>	Either
<b>HFC Type</b>	Critical
<b>O2 Type</b>	Alert

### Daylight Savings:

<b>DST</b>	Enabled
<b>DST Begins</b>	2 <sup>nd</sup> Sunday in March
<b>DST Ends</b>	1st Sunday in November

### SAMM Name/State:

<b>SAMM 1</b>	Leak Mode
---------------	-----------

### General Settings:

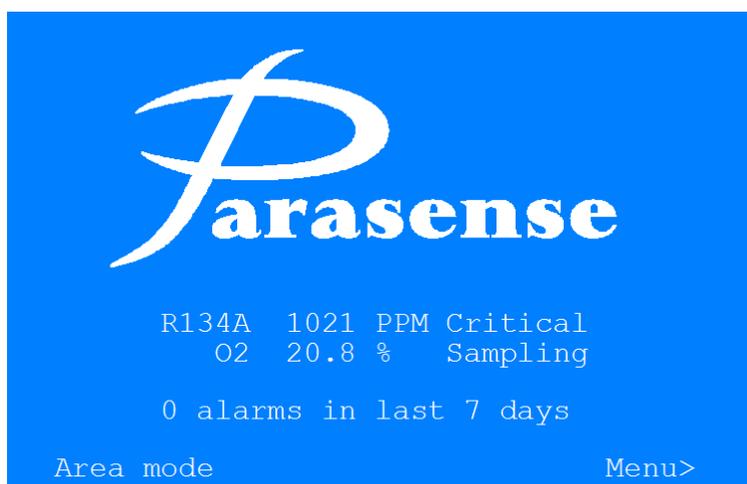
<b>Units</b>	Imperial
<b>Sample Interval</b>	5 minutes

## 4 MONITOR SETUP

### HOME SCREEN

The home screen is shown when the system is first accessed, or if no buttons have been pressed for 3 minutes. The type of gas along with the most recent measured concentration is displayed. The number of alarms (maximum 510) detected over a 7 day period is shown, as well as the Sampling status/Alarm status/Fault status of the HFC and the Oxygen detectors as follows:

- If the system is idle and there is no active fault and no active alert/alarm/critical threshold breach, then the text displayed will be “Healthy”.
- If the system is idle and there is an active fault (regardless of whether there is an active alert/alarm/critical condition or not), the associated fault text will be displayed (see fault table below).
- If the system is idle and there is no active fault, but there is an active alert/alarm/critical threshold breach, the associated threshold text “Alert”, “Alarm” or “Critical” will be displayed.
- If the system is performing a sample cycle, the current operating state (such as “Purging” or “Sampling”) will be displayed, regardless of whether there is an active fault or alert/alarm/critical threshold breach.



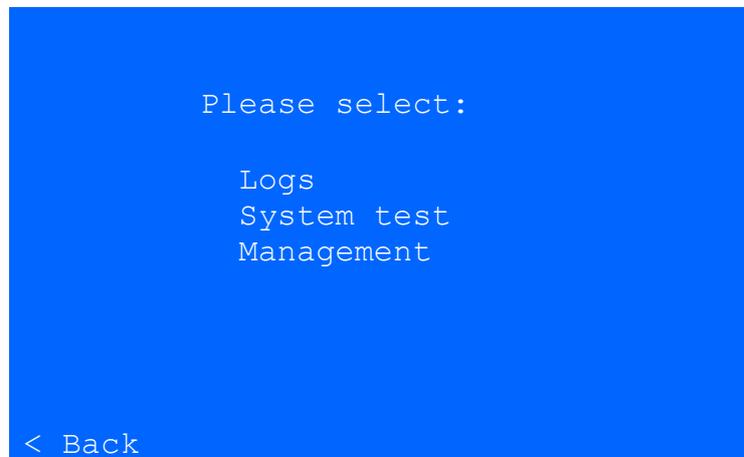
Pressing the action button on the keypad causes the “Manual Sample: Yes/No” question to be displayed. If the user selects Yes, then a manual sample is initiated for HFC and O2.

Pressing the ‘>’ button on the keypad displays the main menu as follows.

## MAIN MENU

---

There are three menu options available:

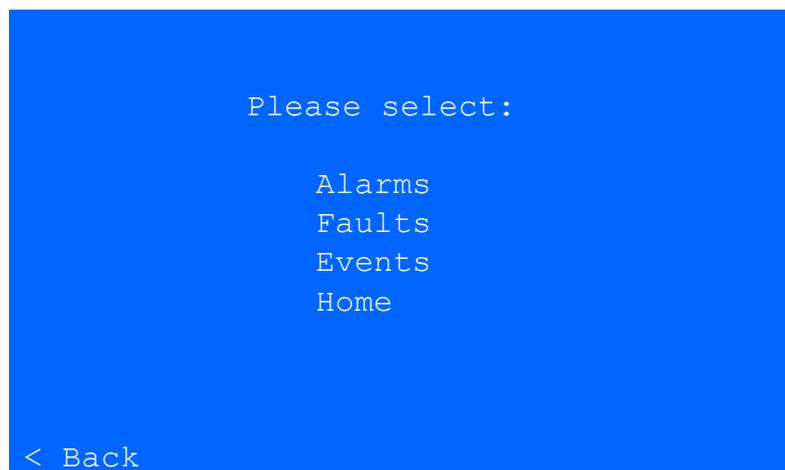


The up and down buttons enable the items in the list to be highlighted for selection.

- **Logs:** Allows you to view Alarms, Faults and Events logs of the PDRM2.
- **System Test:** Enables you to carry out a system test.
- **Management:** Gives access to system configuration.

## LOGS

---



The logs menu enables you to view all logs that are held on the PDRM2. There are 3 types of log; Alarms, Faults, and Events. Use the Up and Down arrows to select the log to view, then press the action button to access the information.

## ALARMS LOG

---

ALARMS LOG			
Time	Date	PPM	O2%
15:03	10-Mar-14	875	-
15:00	10-Mar-14	927	-
10:05	10-Mar-14	-	17.2
09:44	10-Mar-14	850	-
16:14	01-Mar-14	-	18.9
16:14	01-Mar-14	876	-

< Back Next page >

This screen shows a combined view of HFC and O2 log data. The last 100 alarm events may be viewed through this menu. Up to eight entries are displayed on each page in most recent first order. 'Next page' displays the next most recent Alarms log entries. 'Back' always returns you to the Logs Menu.

## FAULTS LOG

---

FAULTS LOG		
Time	Date	Fault
15:03	10-Mar-14	PrsrFlt1

< Back Next page >

This screen shows a combined view of HFC and O2 fault log data. The most recent 100 faults may be viewed. Function buttons perform in the same way as the Alarms log.

## FAULTS MESSAGES

---

Because of the restricted space available, the fault description is given in an abbreviated form. A full list of fault abbreviations and their description is listed below:

Abbreviation	Full Description
<b>PrsrLeak</b>	System pressure leak
<b>OverTemp</b>	Ambient temperature too high (>50°C)
<b>Src Flt</b>	Styx source fault (no output)
<b>Overheat</b>	Styx above operating temperature (>57°C)
<b>STYXExch</b>	Styx exchange required
<b>STYXCold</b>	Styx not at working temperature (<40°C)
<b>STYX Flt</b>	Styx detector fault
<b>PrsrFlt1</b>	Styx did not reach target pressure via Pump 1
<b>PrsrFlt2</b>	Styx did not reach target pressure via Pump 2
<b>O2Exch</b>	Oxygen detector exchange required
<b>O2OvRnge</b>	Oxygen detector over-range
<b>O2PrFlt1</b>	Oxygen sample skipped due to possible pump 1 fault
<b>O2PrFlt2</b>	Oxygen sample skipped due to possible pump 2 fault
<b>O2SenFlt</b>	Oxygen sensor not connected or faulty

## EVENTS LOG

EVENTS LOG		
Time	Date	Event
15:03	10-Mar-10	Power ON
16:58	12-Mar-10	HFC Alrm ON
17:12	12-Mar-10	HFC Alrm OFF
18:21	14-Mar-10	O2 Crit ON
18:42	14-Mar-10	O2 Crit OFF

< Back Next page >

This screen shows a combined view of HFC and O2 log data. The most recent 100 events may be viewed. Function buttons perform in the same way as the Alarms log. Because of the restricted space available on-screen, each event description is shown in an abbreviated format. A full list of event abbreviations and their description is listed below:

Abbreviation	Full Description
<b>Power ON</b>	
<b>HFC Cal</b>	Calibration initiated
<b>HFC Cal Fail</b>	Calibration failed
<b>HFC Cal OK</b>	Calibration successful
<b>Management</b>	Management menu entered
<b>HFC Verify</b>	HFC sample automatic verification started
<b>HFC Ver stop</b>	HFC sample automatic verification cancelled
<b>Manual Sample</b>	Manual sample initiated
<b>Stopped</b>	Sampling cancelled (an engineer operation only)
<b>HFC Sys Test</b>	System test initiated
<b>HFC SAMM Test</b>	SAMM test initiated (engineer operation only)
<b>HFC Flt ON</b>	A fault condition relating to HFC measurement is present
<b>HFC Flt OFF</b>	Fault condition relating to HFC measurement has been cleared

<b>HFC Alrt ON</b>	HFC sample equalled or exceeded the configured Alert threshold
<b>HFC Alrt OFF</b>	While the Alert condition was present, the HFC sample measured below the configured Alert threshold, so the condition has been cleared
<b>HFC Alrm ON</b>	HFC sample equalled or exceeded the configured Alarm threshold
<b>HFC Alrm OFF</b>	While the Alarm condition was present, the HFC sample measured below the configured Alarm threshold, so the condition has been cleared
<b>HFC Crit ON</b>	HFC sample equalled or exceeded the configured Critical threshold
<b>HFC Crit OFF</b>	While the Critical condition was present, the HFC sample measured below the configured Critical threshold, so the condition has been cleared
<b>O2 Flt ON</b>	A fault condition relating to O2 measurement is present
<b>O2 Flt OFF</b>	Fault condition(s) relating to O2 measurement has now cleared
<b>O2 Alrt ON</b>	O2 sample was below or equalled the configured Alert threshold
<b>O2 Alrt OFF</b>	While the Alert condition was present, the O2 sample measured above the configured Alert threshold, so the condition has been cleared
<b>O2 Alrm ON</b>	O2 sample was below or equalled the configured Alarm threshold
<b>O2 Alrm OFF</b>	While the Alarm condition was present, the O2 sample measured above the configured Alarm threshold, so the condition has been cleared
<b>O2 Crit ON</b>	O2 sample was below or equalled the configured Critical threshold
<b>O2 Crit OFF</b>	While the Critical condition was present, the O2 sample measured above the configured Critical threshold, so the condition has been cleared
<b>Pump1 Flt Lim</b>	Pump1 exceeded the configured rolling fault limit
<b>Pump2 Flt Lim</b>	Pump2 exceeded the configured rolling fault limit

## SYSTEM TEST

---

System Test will enable you to carry out a test sample, this function requires a Parasense Service Kit. The purpose of the system test is to check the correct operation of the system.

Selecting this option from the main menu will forward you to the System Test screen. Use 'Up' & 'Down' buttons to select the sampling gas, either HFC or O2. Pressing the action button will start a sample sequence lasting up to 90 seconds. During the sample process the buttons have no effect. When the sample is complete, the '< Back' function re-appears and the sample value is displayed. If the sample exceeds the associated thresholds or a fault occurs, any associated beacon/sounder condition will be actioned. For in-depth instructions for system test, refer to the [Service & Maintenance section](#) of this manual.

**NOTE:** From initial switch on of the PDRM2, no system test can be carried out until the system has warmed up.

### HFC Test Screen:

```
SYSTEM TEST
Select HFC or O2
using up/down buttons
Press 'Action' to test

Gas: HFC
Status: Sampling

Sample:      0 PPM

< Back
```

### Oxygen Test Screen:

```
SYSTEM TEST
Select HFC or O2
using up/down buttons
Press 'Action' to test

Gas: O2
Status: Sampling

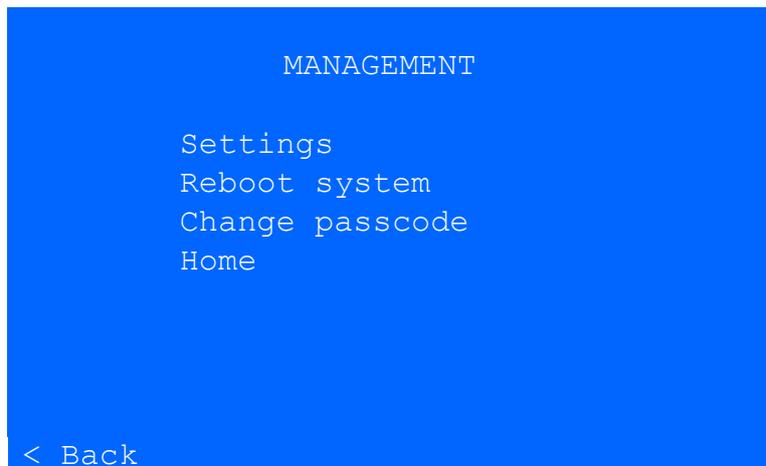
Sample:      0.0 %

< Back
```

## MANAGEMENT MENU

---

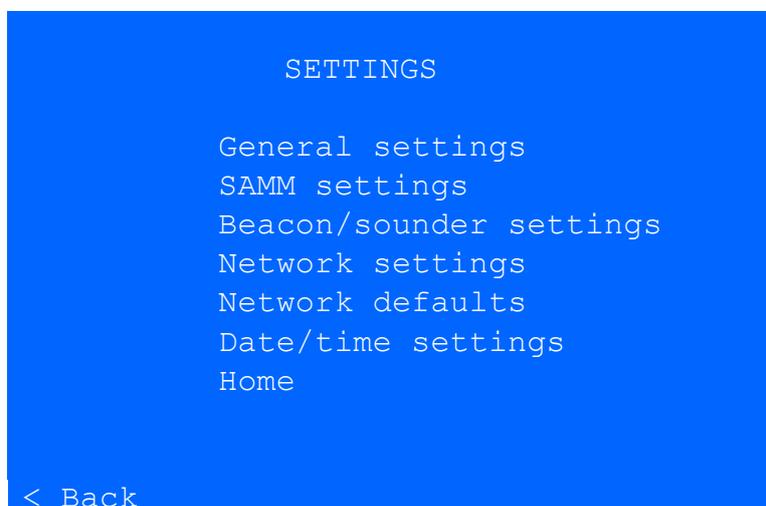
The Management Menu provides configuration facilities for the system. Access to the management menu is restricted and the user must enter a passcode in order to gain access. If the correct passcode has not been entered in the last 10 minutes, then the 'ENTER PASSCODE' screen will be displayed. Enter the passcode by highlighting each character using the 'Up/Down' and 'Left/Right' buttons. Select a number by pressing the 'action' key. If you wish to delete the characters, highlight 'C' (clear) and press the 'action' button. All characters entered will be deleted. Once you have entered the passcode, highlight 'E' and press the 'action' button. You will now have access to the management menu.



## MANAGEMENT MENU - SETTINGS

---

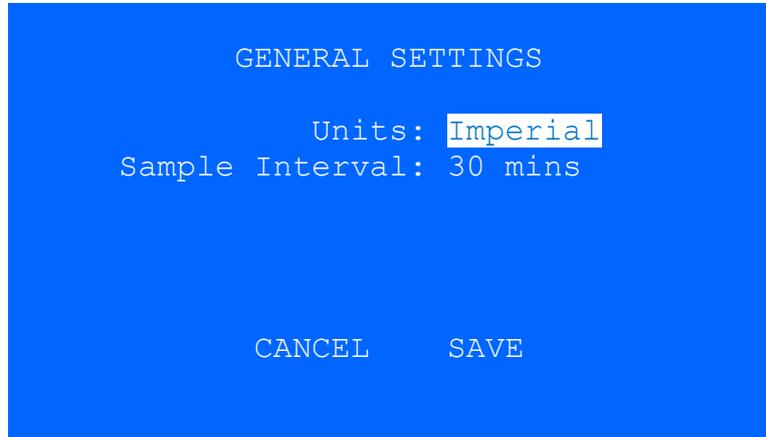
From here you can view and adjust settings for the PDRM2.



## MANAGEMENT MENU - SETTINGS - GENERAL SETTINGS

---

The General Settings screen displays the current units and sample interval settings.



Highlight the field to be edited and press the 'action' button. Use the 'Up/Down' and 'Left/Right' buttons to change the values, pressing the 'action' button again to set and exit edit mode of that field.

**Units:** Choose between Metric and Imperial.

**Sample Interval:** Set the frequency at which samples are taken.

The Sample Interval can be set from 0 to 60 minutes. The default setting is 5 minutes. When setting Sample Interval, you can adjust the time in 1 and 10 minute increments:

- 'Left' key - decrease value by 1
- 'Right' key - increase value by 1
- 'Up' key - increase value by 10
- 'Down' key - decrease value by 10

Changes are only confirmed to the RM device when the SAVE field is highlighted and the 'action' button is pressed. The display will return to the Settings menu. If CANCEL is highlighted and the 'action' button pressed, any changes made will be discarded and the display will return to the Settings menu.

## MANAGEMENT MENU - SETTINGS - SAMM SETTINGS

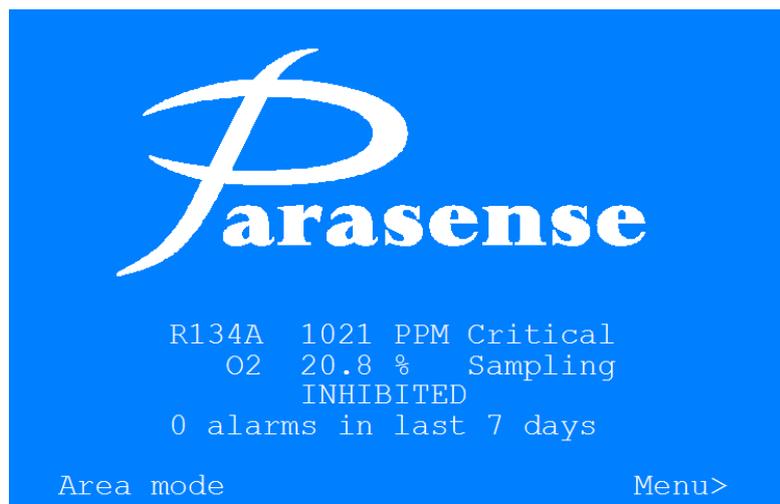
---

Within this menu, you can change the settings of the SAMM to suit your requirements.



Highlighting 'Configure' and pressing the 'action' button will confirm the alarm selection and continue to the configuration screen where the SAMM settings can be edited.

Highlighting 'Alarm Inhibit' and pressing the 'action' button will prevent the SAMM from activating the Beacon/Sounder upon an alarm or fault condition. The inhibit remains in place for a maximum of 12 hours, after which the SAMM returns to the enabled state. The inhibited state can be cancelled at any time by selecting 'Alarm Enable'. Whilst inhibited, the SAMM will continue to sample as normal and both the display and the log files will continue to show the measured PPM & % and any threshold/fault conditions. An inhibited SAMM is indicated by the text "INHIBITED" centred horizontally on the home screen between the O2 and alarms count lines:



## MANAGEMENT MENU - SETTINGS - SAMM SETTINGS - CONFIGURE

---

Selecting “Configure” displays the Configure SAMM screen as follows:

```
SAMM CONFIGURATION
Floor 2 compressor lp5

Name: Floor 2~or lp5
HFC Gas Type: R134A
Freeway Length: 0024 ft
HFC Mode: Leak
Thresholds: HFC (ppm) O2 (%)
Alert: 0100 19.5
Alarm: 0300 16.0
Critical: 0850 14.0
CANCEL SAVE
```

To edit the settings, use the ‘Up/Down’ buttons to highlight a field then press the ‘action’ key to access. For fields where a menu selection is to be made, use the ‘Up/Down’ buttons to highlight the required setting then press ‘action’ key to confirm. For fields where text is to be entered, an alphanumeric keyboard will be displayed upon accessing the field (as shown below), allowing you to input the information:

### Primary keyboard

```
SAMM NAME
Compressor 1_

1 2 3 4 5 6 7 8 9 0 - =
q w e r t y u i o p [ ]
a s d f g h j k l ; ' #
\ z x c v b n m , . /

SHIFT SPACE CLEAR

CANCEL DONE BSP
```

Use the ‘Up’, ‘Down’, ‘Left’ and ‘Right’ buttons to highlight a character, press ‘action’ key to make the selection. Selecting SHIFT will display an additional keyboard:

### Additional keyboard



Selecting SHIFT again will return to the primary keyboard.

Once all details have been entered, highlight DONE and press the 'action' key to close the keyboard. You will see the Configuration screen as before. Select SAVE to confirm all changes. Selecting CANCEL will discard any changes made. While saving, the text "Saving... please wait" will be displayed the beneath the cancel/save 'buttons', as this operation can take 5 - 10 seconds.

**Name:** Set a name to identify the SAMM. The name of the SAMM can be up to 22 characters in length.

**HFC Gas Type:** Choose the gas to be monitored by the selected SAMM. Selecting 'Custom' allows you to configure the monitor to recognise a gas that is not currently listed within the Gas Type menu. Should you need to set a custom gas, contact Parasense for further information. To change the gas type press enter/action on the field (should place the field in a blinking mode) and use up arrow/down arrow to select a different gas type, then enter/action to confirm the change.

**Freeway Length:** Set the length of the Freeway connected to the PDRM2. The length is limited to a maximum of 150m or 500ft (including all spur Freeway; E.g. for an installation with 100m of Freeway + 4-way 5m spur kit, the length would be 120m/394ft).

**Sampling Mode:** There are 2 sampling modes available for monitoring; Area mode and Leak mode. The functionality of each sampling mode is described below:

***Area Mode*** is used to monitor the area where refrigerant equipment is contained, to ensure that the atmosphere within that area has a concentration of refrigerant below the relevant threshold. When set to Area Mode, the SAMM will calculate the average gas concentration over a configurable number of samples (between 1 and 9). The number of samples chosen will be taken over a period of time governed by the configured Sample Interval period (Refer to Management – General Settings), and Freeway length.

*If the rolling average sample of the Area reaches or exceeds the Alert level, the amber traffic light on the monitor will continuously flash and the event will show as Alert, along with the corresponding sample reading.*

*If the rolling average sample of the Area reaches or exceeds the Alarm level, the red traffic light on the monitor will illuminate and the event will show as Alarm, along with the corresponding sample reading.*

*If the rolling average sample of the Area reaches or exceeds the Critical level, the red traffic light on the monitor will continuously flash and the event will show as Critical, along with the corresponding sample reading.*

*During the rolling averaging, if any one of the individual samples exceeds the Critical level, a verification sample will be taken. If the verification sample also exceeds the Critical level, the red traffic light on the monitor will continuously flash and the event will show as Critical, along with the corresponding sample reading.*

**Leak Mode** is used to directly target the source of a refrigerant leak, helping to quickly respond and resolve the issue causing the leak. Resolving these issues quickly and efficiently is essential in preventing future operational, maintenance and safety issues.

*When set to Leak mode, the SAMM will take one sample during the system sampling sequence.*

*If the SAMM sample reaches or exceeds the Alert level, the amber traffic light on the monitor will continuously flash and the event will show as Alert, along with the corresponding sample reading.*

*If the SAMM sample reaches or exceeds the Alarm level, a verification sample will be taken. If the verification sample also reaches or exceeds the Alarm level, the red traffic light on the monitor will illuminate and the event will show as Alarm, along with the corresponding sample reading.*

*If the SAMM sample reaches or exceeds the Critical level, a verification sample will be taken. If the verification sample also reaches or exceeds the Critical level, the red traffic light on the monitor will continuously flash and the event will show as Critical, along with the corresponding sample reading.*

**Alert, Alarm, Critical:** These fields allow for editing of the HFC and O2 thresholds. Set the thresholds for each of the alarm types.

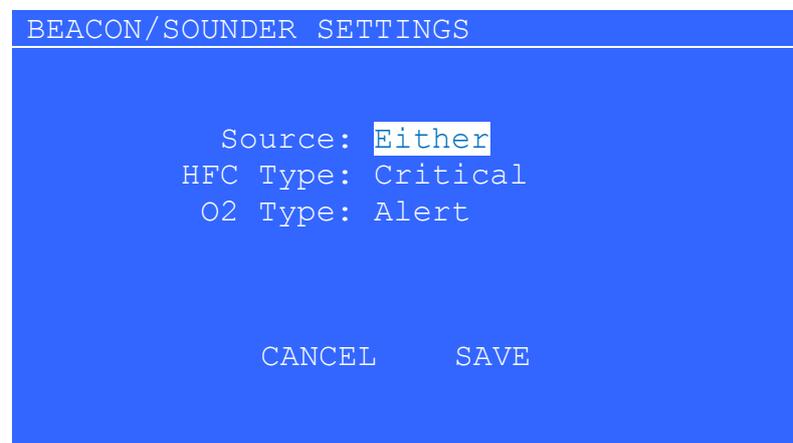
## **MANAGEMENT MENU - SETTINGS - BEACON/SOUNDER SETTINGS**

Within the Relay Settings menu, you can test and configure the Beacon/Sounder function.

**Test:** use the 'Up/Down' buttons to highlight the field then press the 'action' key to perform the test.



**Configure:** use the 'Up/Down' buttons to highlight this field then press the 'action' key to enter into the edit mode. To edit the settings, use the 'Up/Down' buttons to highlight a field then press the 'action' key to access (the field will blink to indicate edit mode). Use Up/Down to change the value, then pressing the Action button again to exit edit mode on that field.



**Source:** Can be set to *None* (for no Beacon/Sounder operation), *HFC* (for Beacon/Sounder operation in relation to HFC conditions only), *O2* (for Beacon/Sounder operation in relation to O2 conditions only) or *Either* (for Beacon/Sounder operation in relation to HFC or O2 related conditions).

**Type:** This defines the Beacon/Sounder trigger type, which can be set to *Alert*, *Alarm*, *Critical* or *Fault*.

Once all the settings have been entered, highlight SAVE and press the 'action' key to confirm all changes. Selecting CANCEL will discard any changes made.

While saving, the text "Saving... please wait" will be displayed the beneath the cancel/save 'buttons', as this operation can take 5 - 10 seconds.

## MANAGEMENT MENU - SETTINGS - NETWORK SETTINGS

---

'Network Settings' will display the current IP network settings of the PDRM2. Select 'Network Settings' from the Management - Settings menu. The following Page will display the IP network settings. By pressing the 'Left' button, you will return to the Management - Settings menu.

```
NETWORK SETTINGS

Address:  192.168.  0. 50
Netmask:  255.255.255. 0
Server:   192.168.  0. 1
Gateway:  192.168.  0. 1

< Back
```

If the PDRM2 is to be connected to a network, it must be configured with the correct parameters for that particular network. It is recommended that the system is NOT connected to the network until this configuration has been done, so that there is no danger of a network conflict.

```
SETTINGS

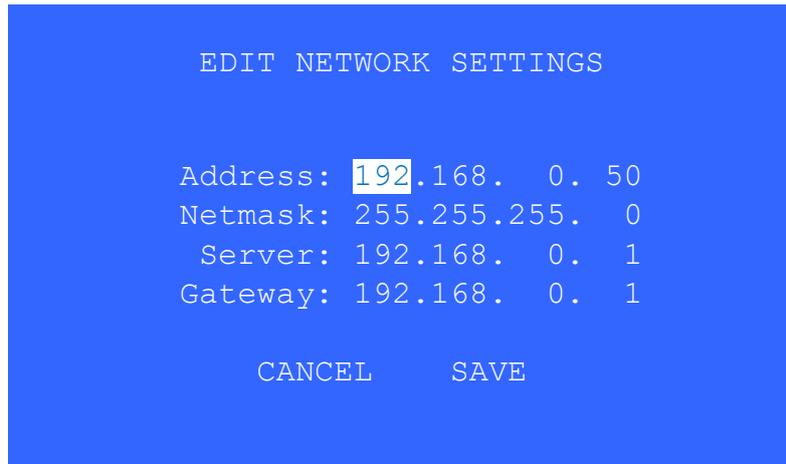
General settings
SAMM settings
Beacon/sounder settings
Network settings
Network defaults
Date/time settings
Home

< Back
```

From the Management menu, highlight the 'Network settings' option. Press the 'action' and 'Right' buttons at the same time to display the current network settings. Notice that the IP address is highlighted.

Each field can be highlighted by using the 'Up' & 'Down' buttons. To edit a highlighted field, press the 'action' button. The selected field will start to blink. The arrow buttons can be used to increase/decrease the value of the chosen field in the following fashion:

- 'Left' key - decrease value by 1
- 'Right' key - increase value by 1
- 'Up' key - increase value by 10
- 'Down' key - decrease value by 10



Press the 'action' key again to close the editing function. When all values have been set up, scroll to the SAVE option and press the 'action' button. The display will show 'please wait' and the PDRM2 will be rebooted to apply the new network settings. If you do not wish to save the changes, highlight CANCEL and press the 'action' button, any changes made will not be saved to the PDRM2 and the display will return to the previous screen.

## MANAGEMENT MENU - SETTINGS - NETWORK DEFAULTS

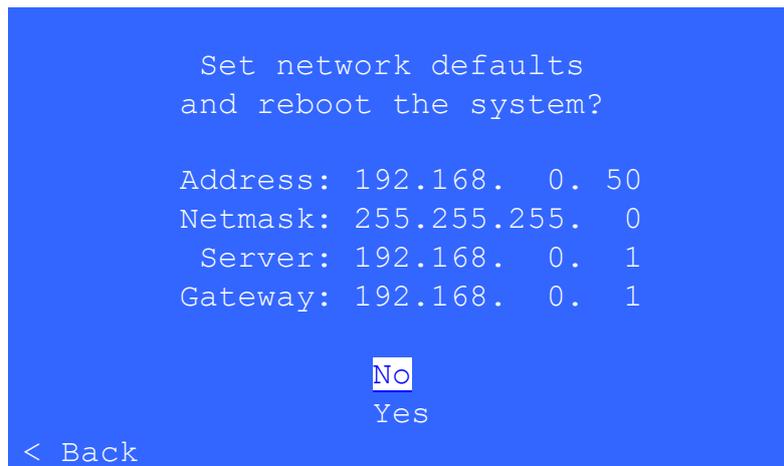
---

Resetting the Network Defaults reverts the PDRM2 to its default network settings and reboots the system. Default settings can be found in the 'Factory Default Configuration Settings' page.

From the Management-Settings menu, select 'Network Defaults'. Confirm that you want to change the network settings as displayed on the screen by selecting 'Yes'. The network settings will be reset to:

Address: 192.168.0.50  
Netmask: 255.255.255.0  
Server: 192.168.0.1  
Gateway: 192.168.0.1

If you wish to abort this function, select No and press the 'action' button to return to the Management - Settings menu, leaving the network settings unchanged. Pressing the 'Left' button will also abort this function and return to the Management-Settings menu without making any changes to the network settings.

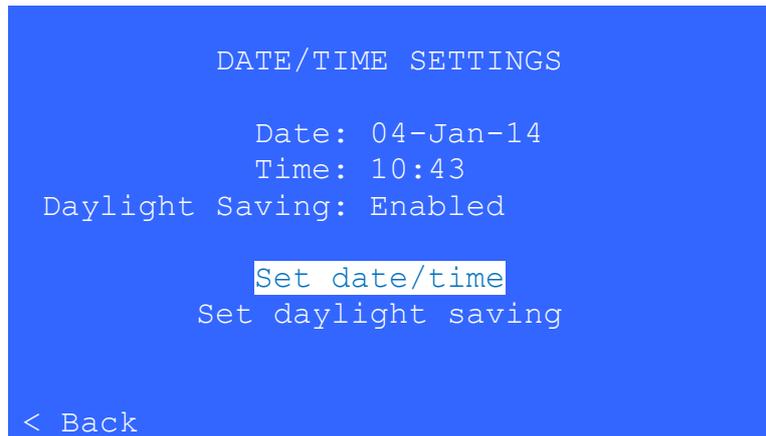


## MANAGEMENT MENU - SETTINGS - DATE/TIME SETTINGS

---

This screen displays the current date and time settings for the PDRM2. From this screen you can adjust these settings to suit your location, as well as daylight saving settings.

Use the 'Up' & 'Down' buttons to highlight 'Set Date/Time' or 'Set Daylight Saving' and press the 'action' button to access.



Use the 'Up/Down' & 'Left/Right' buttons to select a field, press the 'action' button to access edit mode (the field will blink to indicate edit mode). Use the 'Up' & 'Down' buttons to increment / decrement in steps of 10 and 'Left' & 'Right' buttons to decrement / increment in steps of 1 (on numeric fields, otherwise simply use 'Up' & 'Down' to change the value). Press the 'action' button to exit edit mode on that field.



Once all details have been entered, highlight SAVE and press the 'action' key to save and return to the Date/Time Settings page. Pressing CANCEL will discard any changes made.

Selecting 'Set Daylight Saving' displays the current daylight saving time settings. Editing is carried out in the same way as Date/Time settings.



## **MANAGEMENT MENU – REBOOT SYSTEM**

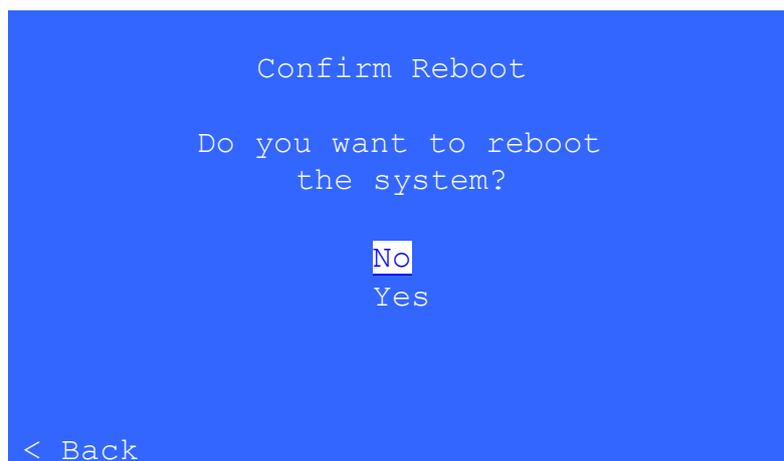
---

If required, you can reboot the PDRM2 from here (note: this function does not change any settings, but simply reboots the PDRM2).

**NOTE: If you have made changes to any settings, you should exit the management menus to ensure those changes are applied before rebooting the system.**

From the management menu, select 'Reboot system'. Highlight 'Yes' using the 'Up' and 'Down' buttons and press the 'action' button. The PDRM2 will now reboot. Upon completion, the display will return to the Home Screen.

If you do not wish to continue with this function, highlight No and press the 'action' button, or press the 'Left' button. This will cancel the reboot and return to the Management menu.

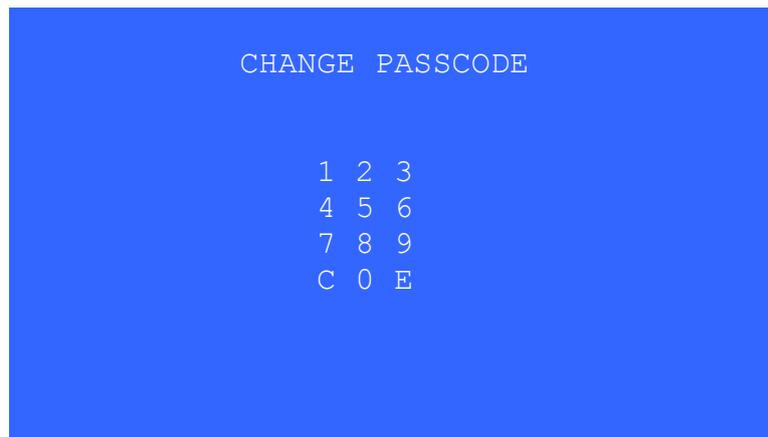


## CHANGE PASSCODE

---

From the management menu, select 'Change Passcode'.

On the 'Change Passcode' keypad, set the new passcode by highlighting each character and pressing the 'action' button to select. If you wish to delete the characters, highlight 'C' (clear) and press the 'action' button. All characters entered will be deleted.



Once you have entered the new passcode, highlight 'E' and press the Action button. From now on, the new passcode will be used to access the Management menu.

If it is decided not to continue with the passcode change, simply enter the current passcode and highlight 'E' to confirm.

## 5 SERVICE AND MAINTENANCE



### HAZARD OF ELECTRIC SHOCK

- Read and understand this user manual before performing any procedure with this equipment.
- There ARE NOT user serviceable parts inside PDRM2
- DO NOT open the PDRM2 unless completely disconnected from mains supply. PDRM2 should be installed, operated, serviced, and maintained only by qualified personnel.

**Failure to follow these instructions will result in death or serious injury**

Parasense warrants the monitor for a period of one year from the date of purchase against defects in materials and workmanship. This warranty will not apply to defects resulting from non-compliance with this manual, over voltage, physical abuse, ingress of water or tampering with individual items. Use of equipment in a manner not specified by the manufacturer may impair the protection afforded by the equipment.

Parasense offers a wide range of Service and Maintenance contracts, Remote Access software and Management Reporting packages. Details and cost of Service Exchange Units can be obtained from Parasense or an approved distributor.

The monitor has no user serviceable components, but comprises of seven basic building blocks:-

- 1) **Monitor Enclosure** incorporating electric and pneumatic connectors, a 5A fuse and a handle
- 2) **Enclosure Door** incorporating operator keypad, LCD display, sounder, sounder ON/OFF switch and a warning light
- 3) **Network Module** incorporating a mounting plate and a PCB
- 4) **PUMP Module** incorporating two pumps for increased reliability
- 5) **Styx Module** incorporating a mounting plate, an Infrared absorption sensor, pneumatic solenoids with associated pipework and a filter
- 6) **Power Supply Unit**



## GENERAL

---

When used in the specified environmental conditions and under normal operating conditions, the PDRM2 monitor is largely maintenance-free and requires minimum care. There are some points, which should be observed, to ensure fault-free operation of PDRM2 monitor. Among these are regular cleaning and checking as described below, depending on the pollution level of the environment and the length of time the unit is in use.

In order to ensure full functionality, Parasense recommends that a System Test be carried out after initial installation of the equipment and annually thereafter.

Prior to each use of the monitor, please perform visual inspection of the following components for any signs of damage and deterioration:

- Power cord
- Electrical connectors, including the mains power connector
- Sampling tubes (Freeway) and spurs
- LCD screen

Any damaged component must be replaced by qualified authorised personnel in accordance with the relevant instructions in this manual. The system test should also be carried out at the time of any remedial maintenance. Please refer to the [System Test](#) chapter for detailed instructions.

## CLEANING THE PDRM2:

---

When required, cleaning of the PDRM2 should be performed in following steps:

1. Unplug the PDRM2 monitor prior to cleaning.
2. Clean the enclosure of the monitor with a soft, clean, lint free, dry cloth.
3. Clean the LCD screen by wiping gently with the soft, clean, lint free, dry cloth. If detritus remains, spray a generic screen cleaner, such as 10% alcohol solution, onto the cleaning cloth so that it's only slightly damp, and repeat the cleaning operation. Never spray it directly onto the PDRM2 monitor.
4. Wipe the screen with the cloth as gently as possible, as the LCD screen is fragile and can be damaged if you press too hard.
5. Let the cleaning solution dry completely before you reconnect the power cord to the PDRM2.

## LITHIUM COIN BATTERY

---

Lithium coin battery type CR2450 is installed on the PDRM2 network module and is used to store the current configuration of the PDRM2 when the monitor is not connected to the mains power. The coin battery has a significant lifetime, typically at least five years, and should only be replaced by a fully trained Parasense technician.

## SYSTEM FAULT DIAGNOSIS

---

In the event of a fault occurring with the system, the Green LED will flash. The Faults Log will also show faults with the most recent shown first. During the course of checking the system it may be necessary to switch off the system.

**For all faults:** A visual check on all terminals, ribbon cables and pneumatic hoses may provide the solution.

The pneumatic hoses within the monitor should be clean and clear. Should there be excessive dark-coloured contamination within the pneumatic hoses, there may be a problem with contamination. Water ingress will also have a detrimental effect on the Styx Module. In either case, this will need to be investigated.

Prior to carrying out these checks, switch off the external mains supply to the monitor and wait for a few seconds while the power supply discharges. Having checked all connections are secure, reinstate the mains power supply.

If the fault does not clear, refer to the following Fault Messages and Procedures;

Note:

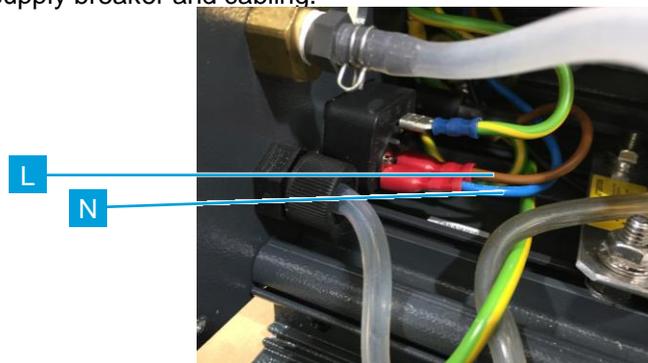
- Prior to performing any maintenance or fault finding tasks, please ensure an automatic disconnection of the supply is provided by means of an external RCD specified in the [Electrical requirements](#) chapter.
- Only a suitably qualified person observing the relevant safety precautions should carry out work on this equipment.

### **The Green “Healthy” Display LED is not on or flashing/the Display does not illuminate**

It is possible that no flashing Green LED is indicated on the Display due to a failure of the electrical supply to the display. This can first be identified if none of the LEDs are illuminated.

Fault finding steps:

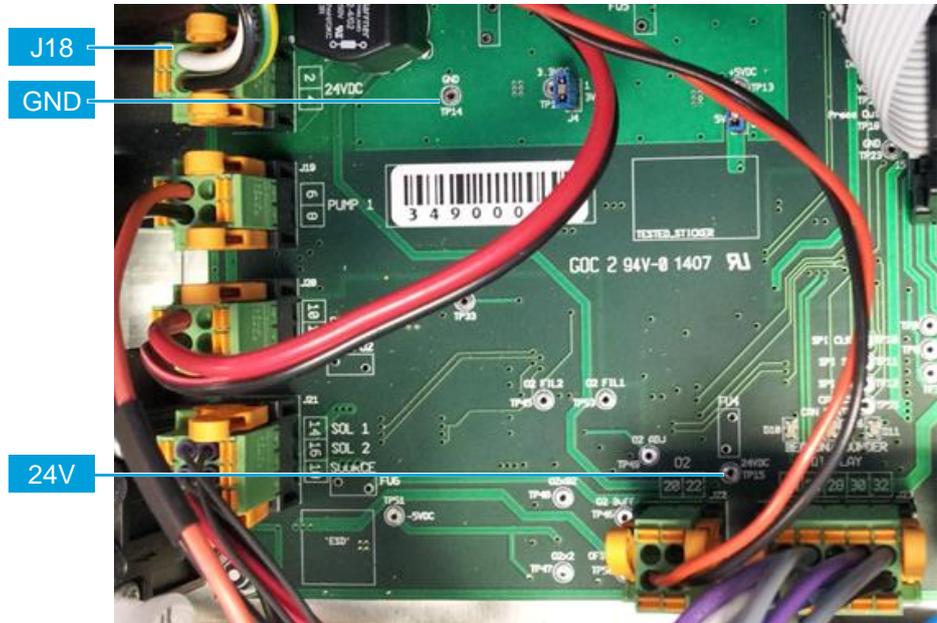
- 1) Press the Action key (round central button on the display). The display backlight should normally come on. If the backlight does not come on then follow the steps below with external power still present to the monitor. If the backlight does come on cycle the power to the monitor and check the monitor.
- 2) With the power cord connected to the Detector, open the door to the monitor and measure the Voltage between L & N on the internal side of the Mains Power Connector. If the voltage is less than 100VAC, check the external RCD, supply breaker and cabling.



- 3) If the incoming voltage across L & N of the Mains Connector corresponds to the supply voltage and is between 100~240VAC, measure the VAC between the output terminal of the 5A Fuse and

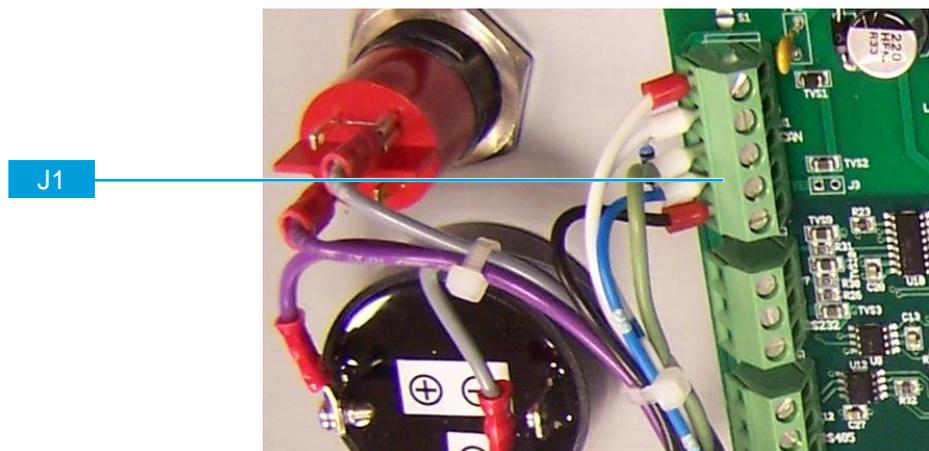
N on the internal side of the Mains Power Connector. If the supply voltage is not present, check the 5A Fuse and its connections, replace or rectify if necessary. Fuse description: 5A/250V Anti-surge; 5mmx20mm, Parasense P/N: **FUS20X5AS5A**.

- 4) Check the supply voltage to the Network Module from the Power Supply Unit; measure the DC voltage between 24VDC and GND test points of the Network Module:

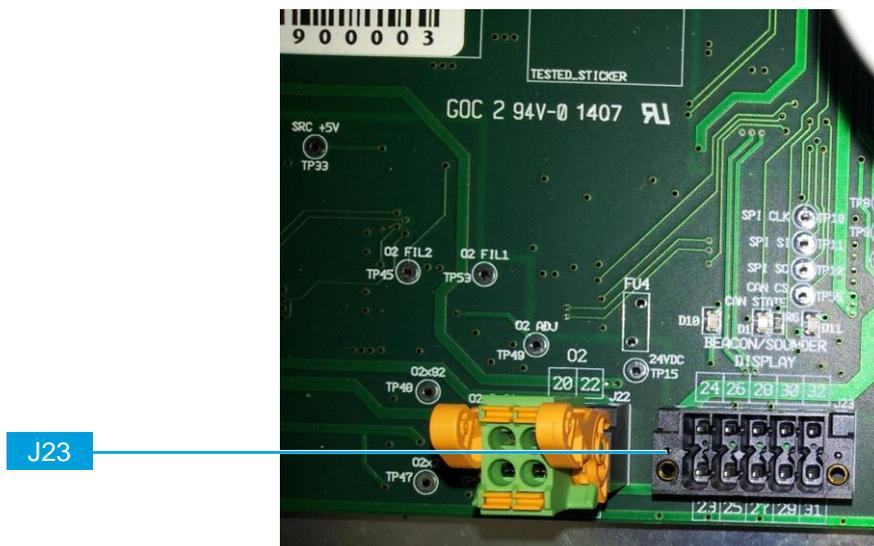


If measured value is 24VDC  $\pm$ 0.5V then proceed to the next step. If the supply DC voltage is not present on the test points, disconnect the connector J18 at the lower left of the Network module and measure the Voltage on the plug side between Pin1 & Pin2. If 24V DC is not found then replace the Power Supply Unit. If voltage of 24VDC is present on the plug but not on the test points, replace the Network Module.

- 5) Measure the DC voltage on the Display Module across J1 [V+ & V-] at the top left of the PCB:



If 24V DC is found then the Display Module will need to be replaced. If the voltage is less than 24VDC  $\pm 0.5V$  then switch off power to the monitor and disconnect the connector J23. Power on the monitor and measure the DC voltage across J23 Terminals 23 (24V) & 31 (GND):



If the voltage is still less than 24VDC  $\pm 0.5V$  replace the Network Module. If 24V DC is found the problem is with the wiring from the Network Module to the Display Module.

## FAULT MESSAGES

In the event of a fault occurring as well as the flashing green LED, a Fault Message will be displayed on the LCD screen. The Faults List will show all fault messages with the most recent first.

### Overrange

'Overrange' is not shown in the Faults Log as it is a result of a HFC/CFC refrigerant reading. If the upper limit has been reached 'Overrange' will be logged in the Alarm log indicating the measured HFC/CFC refrigerant concentration was beyond the measuring range of the Monitor. If the Detector is showing 'Overrange' then that area has a higher refrigerant leak than the system is designed to monitor. In exceptional circumstances it is possible that the Network Module AND the PSU have developed a fault. All Fault finding steps must be followed to confirm the exact nature of the problem.

Fault finding steps:

- 1) Check all terminals and ribbon cable connections are secure.
- 2) Check that 5V DC exists across J21 Terminals 17 (5V) & 18 (0V) at the bottom left of the Network Module. This may modulate between 4.5V DC and 5.5V DC, this is expected.
- 3) If 5V DC is present then the Styx Module will require replacement.
- 4) If there is no 5V DC then the Network Module will require replacing.

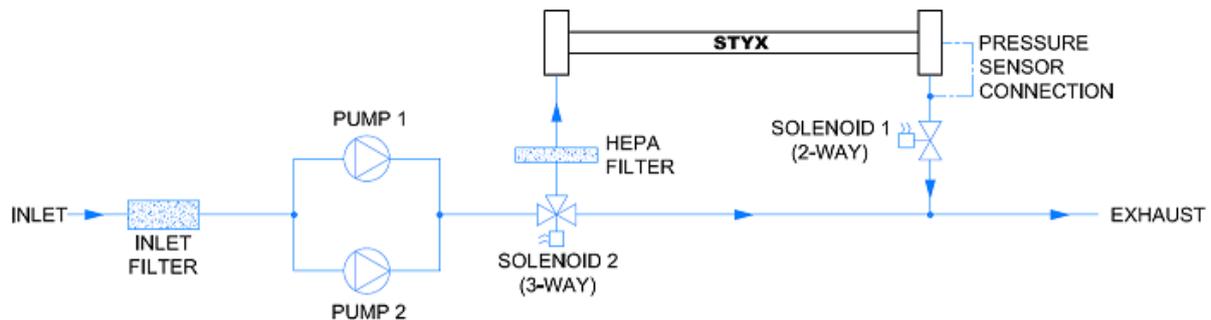
### PrsrLeak

This message is shown if the Styx was successfully pressurised to the required high pressure, but within 15-20 seconds the pressure had dropped by more than 60mBar.

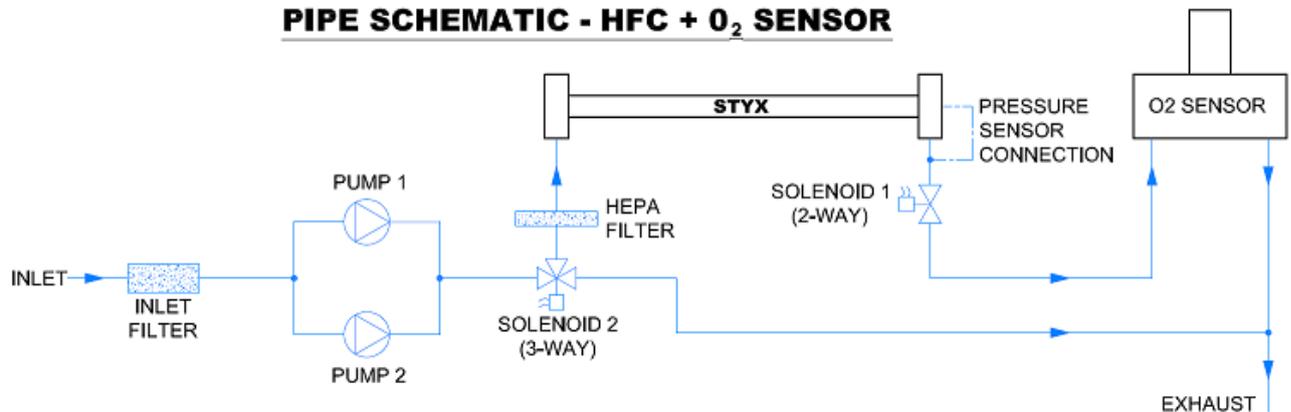
If the message is shown for a specific pump, the pump may be faulty. If both pumps indicate 'PrsrLeak' then check all internal pipework/clamps within the Detector for leaks. If none can be found then the problem is probably with the Styx Module.

Please refer to the PDRM2 piping schematics for fault finding:

### **PIPE SCHEMATIC - HFC ONLY**



### **PIPE SCHEMATIC - HFC + O<sub>2</sub> SENSOR**



Fault finding steps:

- 1) Check all screw-in terminals and ribbon cable connections are secure.
- 2) If no internal leaks can be found clamp the pipe just after the pump outlet T-junction as soon as the pump stops.  
If this solves the problem the Pump Module will need to be replaced. Otherwise clamp the Styx outlet pipe just before the Oxygen Sensor manifold (exhaust port on HFC only version of the PDRM2) as soon as the pump stops. If this solves the problem the Styx Module will need to be replaced.
- 3) If only one pump is showing a fault, clamp the outlet pipe of the 'healthy' pump whilst a full sample is taking place. If the fault clears then the clamped pump is faulty.
- 4) Check that Solenoid 1 is energised (24V DC) from the beginning of a sample until the pump stops (The Styx is pressurised). It should then remain de-energised (0V DC) for approximately 30seconds before energising (24V DC) for approximately 3 seconds at the end of the sample cycle. If this does not occur then the Network Module will require replacing.
- 5) Check that Solenoid 2 is only energised (24V DC) for 5-10 seconds at the end of the Purge stage (the pump should be heard to struggle just prior to it stopping and the voltage returns to 0V DC). If this is not the case then the Network Module will require replacing. If it is being energised correctly then the Styx Module will need to be replaced.

### **PrsrFlt1 / PrsrFlt2**

This message is shown if the Styx could not be pressurised to the required high pressure.

If both pumps are affected it is probably the Styx, the Network Module or a blockage in the Freeway. If an individual pump is showing a fault it could be that individual pump could be the cause.

Fault finding steps:

- 1) Check all terminals and ribbon cable connections are secure.
- 2) Remove the Freeway and initiate a Manual Sample. If this rectifies the problem check/replace the Freeway or Spur for kinks or blockages.
- 3) With the Freeway disconnected use the airflow gauge to check the airflow for the pump. If it is <3 l/min, measure across the relevant pump terminals [J19 - J20] to confirm 24V DC is present when the pump is requested. If 24V DC is not found the Network Module will need to be replaced. If 24V DC is found but the pump is not running the fault is with the pump.
- 4) If only one pump is showing a fault, clamp the outlet pipe of the 'healthy' pump whilst a full sample is taking place. If the fault clears then the clamped pump is faulty.
- 5) If the airflow gauge is showing >5 l/min check the internal pipework for leaks. If none can be found it will be necessary to initiate a Manual Sample with the door open before making the following additional checks.
- 6) Confirm Solenoid 1 has 24V DC across it when the pump is running and that Solenoid 2 is only energised for 5-10 seconds at the end of the Purge stage (the tone of the pump should lower just prior to it stopping and the voltage returns to 0V DC). If the voltages are incorrect then the Network Module will need to be replaced. If the voltages are correct then the Styx Module will need to be replaced.

### **Src Flt**

'Src Flt' is shown if the infrared source on the Styx Module is operating incorrectly. All Fault finding steps must be followed to confirm the exact nature of the problem.

Fault finding steps:

- 1) Check all terminals and ribbon cable connections are secure.
- 2) Check that 5V DC exists across the 'SOURCE', Terminals J21 Pin17 (5V) & Pin18 (0V) at the bottom left of the Network Module. This may modulate between 4.5V DC and 5.5V DC, this is expected.
- 3) If 5V DC is present then the Styx Module will require replacement.
- 4) If there is no 5V DC across the Terminal 17 (5V) & 18 (0V) at the bottom left of the Network Module then the Network Module will require replacing.

### **STYXExch & O2Exch**

These are shown when both the Styx and the oxygen sensor need replacing.

**NOTE: The Styx module and oxygen detector modules should always be replaced at the same time.**

Rectification steps:

- 1) Replace STYX and the oxygen sensor
- 2) Reboot the system
- 3) If the fault persists please contact Parasense for assistance.

### **STYXCold / Warming**

The Monitor is not at its minimum operating temperature (40°C). This will normally appear if the unit has been switched off for a while. When the Monitor is operating correctly, this fault will clear once the required temperature is achieved.

**Note:** The Monitor door must be kept closed to maintain the correct operating temperature.

Fault finding steps:

- 1) Check all terminals and ribbon cable connections are secure.
- 2) If the fault persists the Styx Module will need to be replaced.

### **OverTemp**

The Monitor is above its maximum operating temperature (50°C). This will normally appear if the unit has been in operation at an ambient temperature above the maximum permitted of 43°C. When the ambient temperature returns into the permitted range of -9°C to 43°C, this fault will clear.

Fault finding steps:

- 4) Check all terminals and ribbon cable connections are secure.
- 5) If the fault persists please contact Parasense for assistance.

### **Overheat**

The Styx is above its maximum operating temperature (57°C).

Fault finding steps:

- 1) Check all terminals and ribbon cable connections are secure.
- 2) If the fault persists please contact Parasense for assistance.

### **STYX Flt**

The Styx assembly is not functioning.

Fault finding steps:

- 1) Check all terminals and ribbon cable connections are secure.
- 2) If the fault persists, the Styx Module will need to be replaced.

### **O2OvRnge**

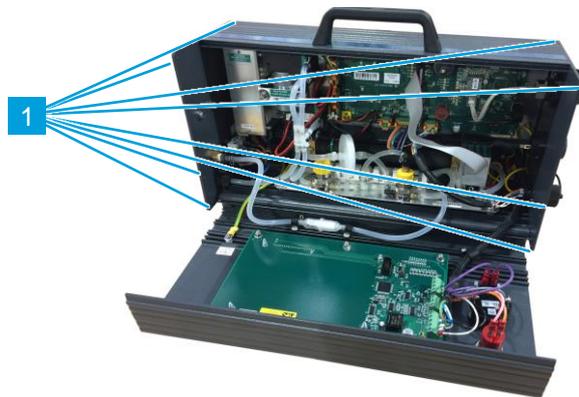
The oxygen sensor signal is out of the operational range

Fault finding steps:

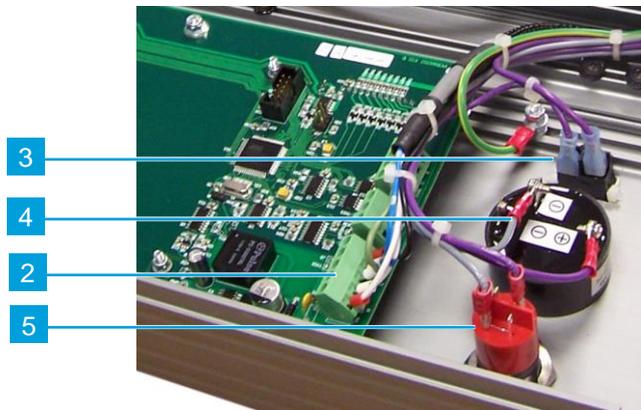
- 1) Check all terminals and ribbon cable connections are secure.
- 2) If the fault still present, replace the oxygen sensor module
- 3) If the fault persists please contact Parasense for assistance.

## REPLACING THE ENCLOSURE DOOR

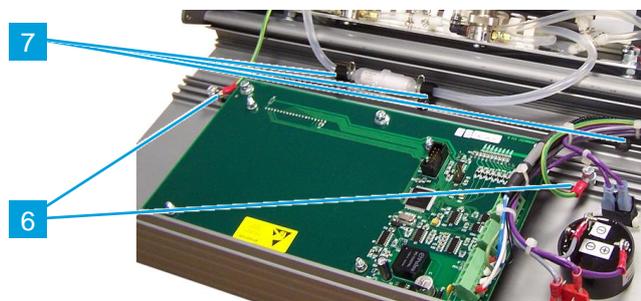
Switch off the mains supply to the PDRM2, disconnect the power cord and wait for a few seconds while the power supply discharges. Unscrew the twelve end plate screws **(1)** (six screws on each side) and open the door.



Disconnect the display **(2)**, the switch **(3)**, the sounder **(4)** and the warning light **(5)** wires.



Disconnect the two earth straps **(6)** from each side of the door. Unscrew the three clips **(7)** holding the air filter and the cable in position and remove the filter pipes and cabling from the PDRM2 door. The detector door can now be slid along and taken out of the detector.

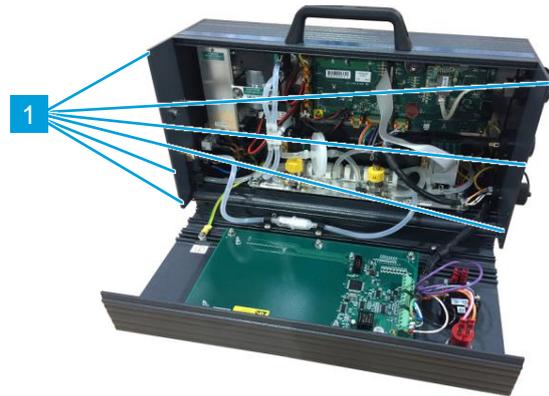


Slide the door back into its original position in the PDRM2. Reconnect the earth straps **(6)**, mount the air filter and the cable with three clips **(7)**. Reconnect the display **(2)**, the switch **(3)**, the sounder **(4)** and the warning light **(5)** wires. Close the door and secure the end plates with screws **(1)**, 6 screws on each side. Reconnect the power cord and reinstate the mains supply

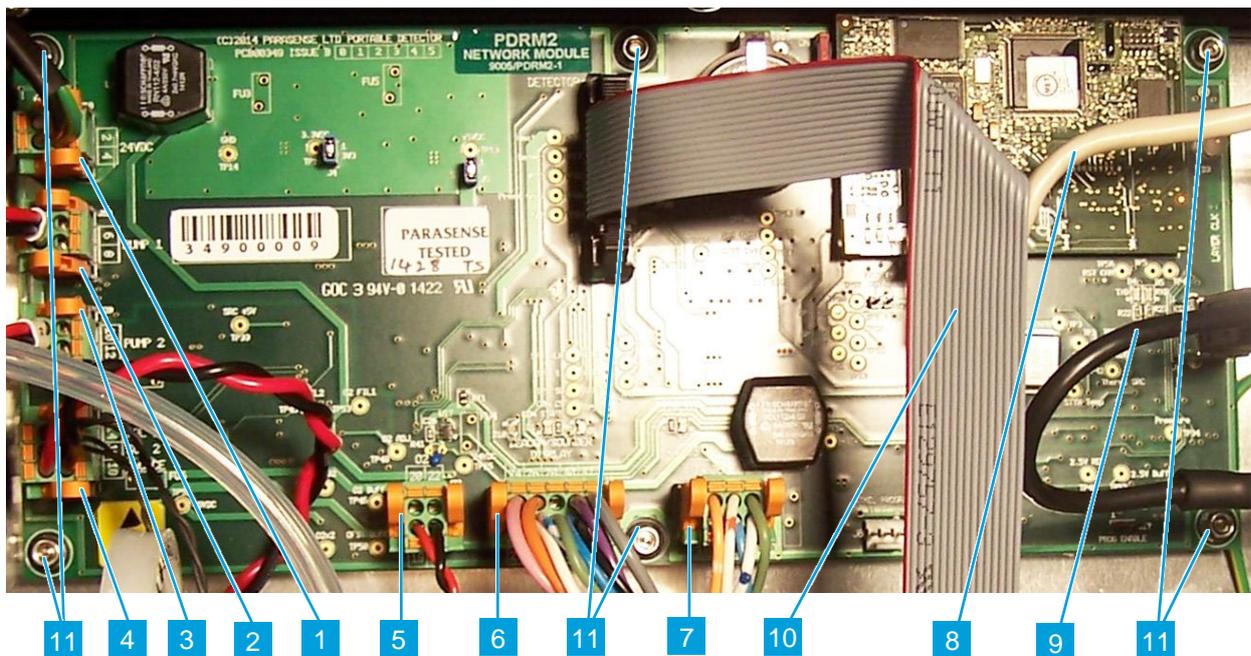
In order to ensure full functionality, Parasense recommends that a system test be carried out (using the calibration gases provided) at the time of remedial maintenance to verify the correct operation of the system. Refer to the [System Test](#) section of this manual.

## REPLACING THE NETWORK MODULE

Switch off the mains supply to the PDRM2, disconnect the power cord and wait for a few seconds while the power supply discharges. Unscrew the six front screws (1) (3 screws on each side) and open the Door.



*Noting the sequence* - Disconnect the power supply connector J18 (1), connectors to the Pumps J19 (2) & J20 (3), the Styx Module connector J21 (4), the Oxygen Sensor connector J22 (5), the Display Cable connector J23 (6) and the RS485 connector J24 (7). Disconnect the Ethernet (8), the USB (9) and the STYX Ribbon (10) cables. Undo the six nuts holding the Network Module in position (11), located around the edge of the insert plate. Remove the Network Module.



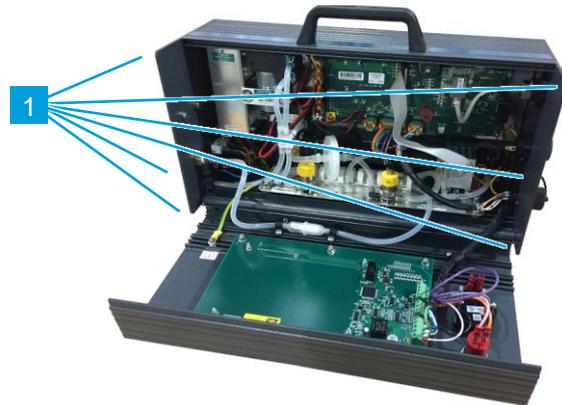
Position the new network module assembly and tighten the securing nuts (11). Reconnect all cables previously disconnected. Check all connections are secure. Close the detector door and tighten the six front end plate screws (1). Reconnect the power cord and reinstate the mains supply.

In order to ensure full functionality, Parasense recommends that a system test be carried out (using the calibration gases provided) at the time of remedial maintenance to verify the correct operation of the system. Refer to the [System Test](#) section of this manual.

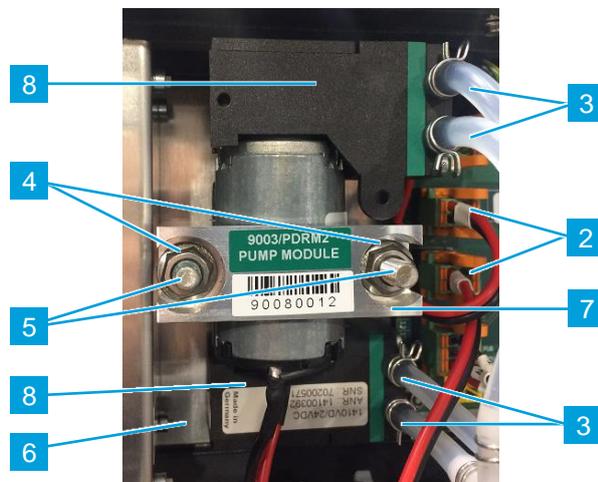
## REPLACING THE PUMP MODULE

Please note: it is necessary to replace both pumps simultaneously every time any single pump needs replacement.

Switch off the mains supply to the PDRM2, disconnect the power cord and wait for a few seconds while the power supply discharges. Unscrew the six front screws **(1)** (3 screws on each side) and open the door.



Disconnect the pump wiring from the network module by unclipping the relevant connectors J19 & J20 **(2)**. Remove the fixing clips and disconnect the pneumatic pipes **(3)** taking a note of the order. Undo the two nuts **(4)** and slide the pump module off the two studs **(5)** holding it on the mounting plate **(6)**. Take apart the pump brackets **(7)** and remove the pumps **(8)**.



To install the new pumps, insert both pumps **(8)** into the respective brackets **(7)**, mount the pump module onto the two studs **(5)** and secure in position with two fixing nuts **(4)**. Connect the pneumatic pipes **(3)** to the pumps in accordance with the previously noted order and fix them with the clips. Plug the electrical connectors J19 & J20 **(2)** onto the network module. Check all connections are secure. Close the detector door and tighten the six front end plate screws **(1)**. Reconnect the power cord and reinstate the mains supply.

In order to ensure full functionality, Parasense recommends that a system test be carried out (using the calibration gases provided) at the time of remedial maintenance to verify the correct operation of the system. Refer to the [System Test](#) section of this manual.

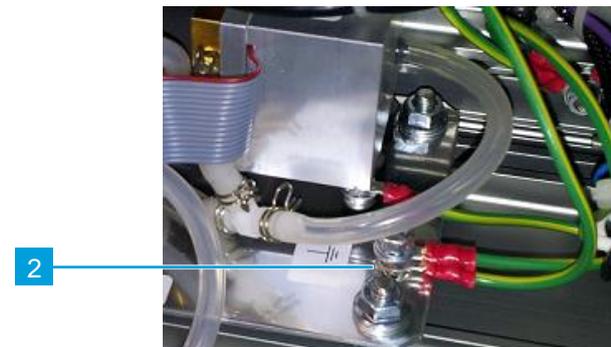
## REPLACING THE STYX MODULE

Please note: it is necessary to replace both the Styx and the oxygen modules simultaneously every time the Styx module needs replacement.

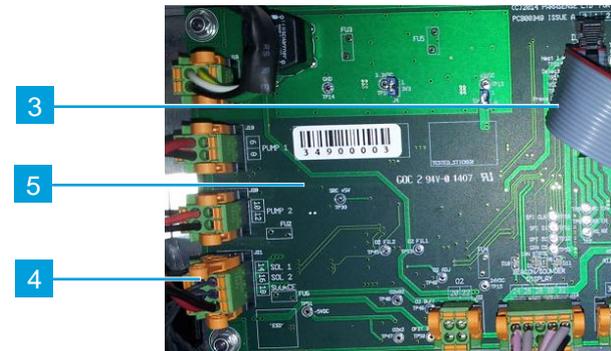
Switch off the mains supply to the PDRM2, disconnect the power cord and wait for a few seconds while the power supply discharges. Unscrew the six front screws **(1)** (3 screws on each side) and open the door.



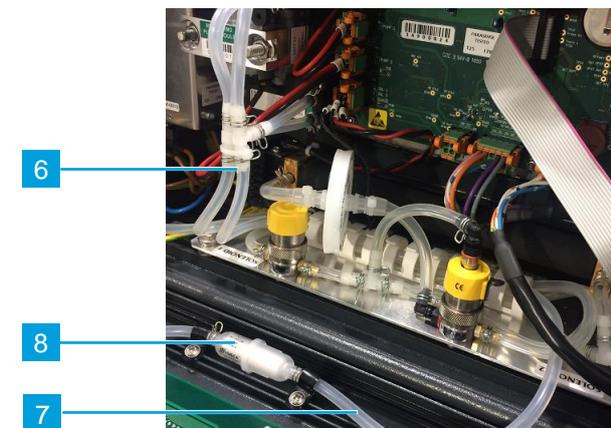
Disconnect the earth cable from the Styx module **(2)**.



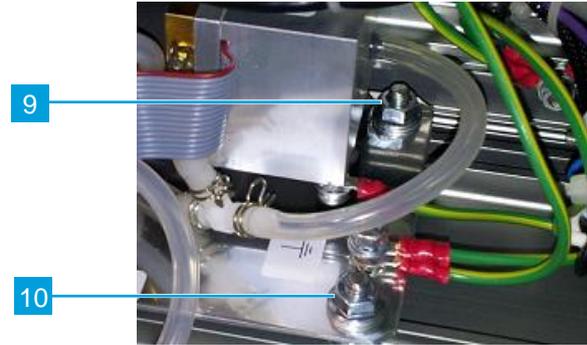
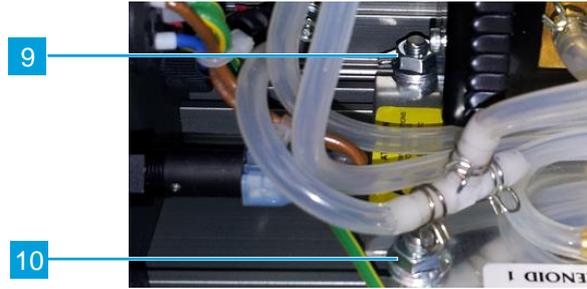
Unplug the ribbon cable **(3)** and wired connector J21 **(4)** from the network module **(5)**.



Disconnect the two hoses from T-connections of the pump module **(6)** and disconnect the hose **(7)** from the outlet of the air filter **(8)**.



Loosen the two fixing nuts at the back of the Styx module **(9)** and remove the remaining two fixing nuts **(10)**. Slide the Styx module out of the monitor.

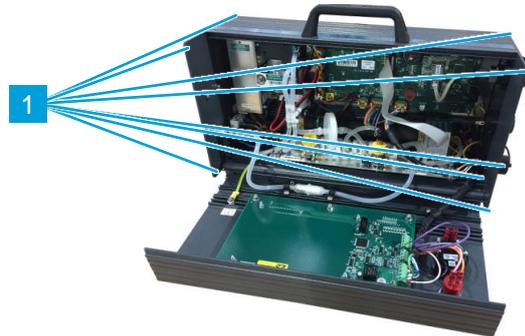


Fit the new Styx module in the vacant position by sliding under the loose fixing nuts **(9)** and refit the two fixing nuts **(10)**. Securely reconnect all cables and hoses previously disconnected. Close the detector door and tighten the six front end plate screws **(1)**. Reconnect the power cord and reinstate the mains supply.

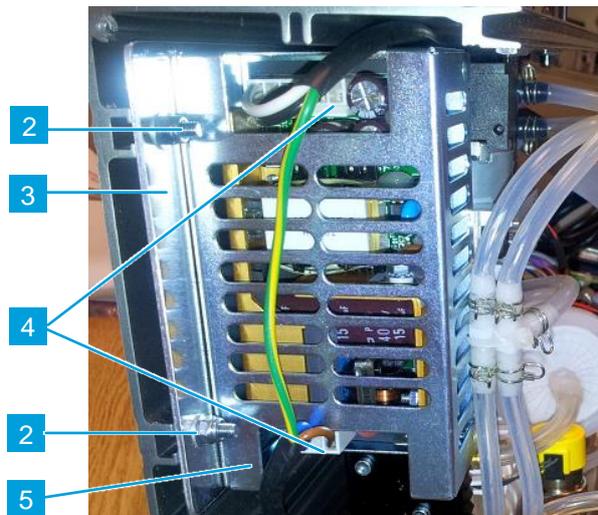
In order to ensure full functionality, Parasense recommends that a system test be carried out (using the calibration gases provided) at the time of remedial maintenance to verify the correct operation of the system. Refer to the [System Test](#) section of this manual.

## REPLACING THE POWER SUPPLY UNIT

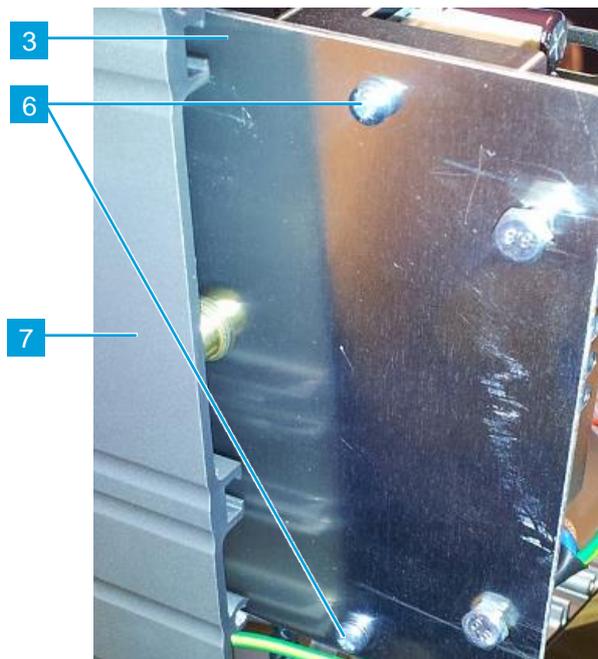
Switch off the mains supply to the PDRM2, disconnect the power cord and wait for a few seconds while the power supply discharges. Unscrew the twelve end plate screws **(1)** (6 screws on each side) and open the door.



Move the end plates out of the way to get easy access to the fixing nuts **(2)** of the mounting plate **(3)**, including ones on the far side (not shown). Disconnect the wiring connectors **(4)**. Loosen the nuts **(2)**.



Slide the mounting plate about 50mm (2in) sideways, so that the power supply fixing screws **(6)** on the back side of the mounting plate **(3)** are accessible. Undo the two screws holding the power supply unit **(5)** and remove it.



Secure the new power supply unit in place with fixing screws **(6)**, including new shake-proof washers. Slide the mounting plate **(3)** back into its original position within the extrusion **(7)** and tighten the nuts **(2)**. Plug the connectors **(4)** and check all connections are secure. Close the door and secure the end plates in position with screws **(1)**, 6 screws on each side. Reconnect the power cord and reinstate the mains supply.

In order to ensure full functionality, Parasense recommends that a system test be carried out (using the calibration gases provided) at the time of remedial maintenance to verify the correct operation of the system. Refer to the [System Test](#) section of this manual.

## REPLACING THE OXYGEN SENSOR MODULE

*Please note: it is necessary to replace both the Styx and the oxygen modules simultaneously every time the oxygen sensor module needs replacement.*

Switch off the mains supply to the PDRM2, disconnect the power cord and wait for a few seconds while the power supply discharges. Unscrew the six front screws **(1)** (3 screws on each side) and open the door.



Disconnect the oxygen sensor connector J22 **(2)** from the network module **(6)**. Remove the fixing clips **(4)** and disconnect the pneumatic pipes taking a note of the order. Undo the two screws, fixing the oxygen sensor manifold **(3)** to the end plate **(5)**, located on the outside of it (not shown on the picture below). Remove the oxygen sensor module.



Secure the new oxygen sensor module **(3)** to the end plate **(5)** with two screws from the outside of the End Plate **(5)**, use a medium strength thread lock agent to secure the screws, such as Loctite 2400 or equivalent. Connect the pneumatic pipes to the pumps in accordance with the previously noted order and fix them with the clips **(4)**. Plug the oxygen sensor connector J22 **(2)** into the network module **(6)**. Check all connections are secure. Close the detector door and tighten the six front end plate screws **(1)**. Reconnect the power cord and reinstate the mains supply.

In order to ensure full functionality, Parasense recommends that a system test be carried out (using the calibration gases provided) at the time of remedial maintenance to verify the correct operation of the system. Refer to the [System Test](#) section of this manual.

## TESTING MODES

The test equipment described in the following tests is available in the Parasense Service Kit.

### SYSTEM TEST

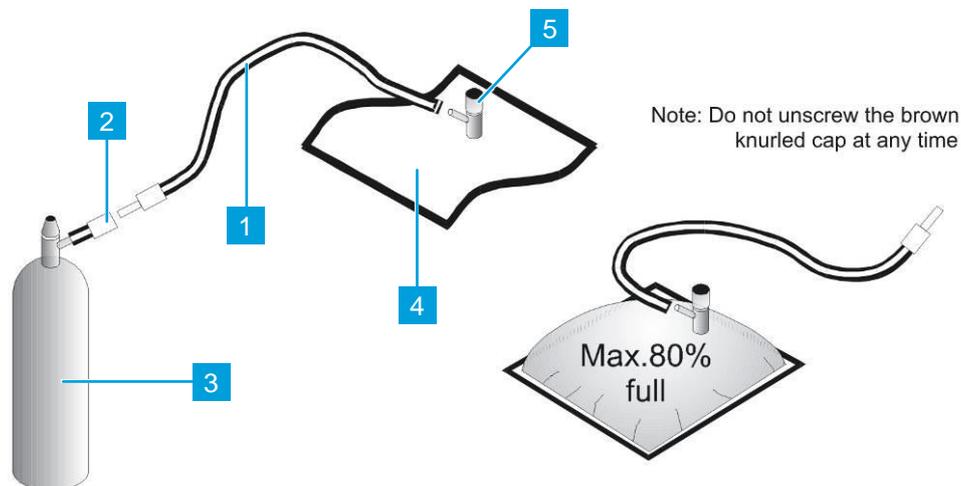
In order to ensure full functionality, Parasense recommends that a System Test be carried out after initial installation of the equipment and annually thereafter. The system test should also be carried out at the time of any remedial maintenance. The PDRM2 Monitor shall successfully measure a sample of calibration gas and then immediately indicate a critical alarm condition and activate any associated relays.

Information regarding maintenance packages and replacement modules is available from Parasense.

The reservoir bag should be filled with the specified calibration gas only, either R134 or Oxygen, and attached to the inlet port of the PDRM2. When the type of the sampling gas is selected and 'Start' selection is made the monitor will start sampling. During this test the Styx Module is automatically configured for the relevant sampling gas and the appropriate freeway length, to suit the calibration gas sample tube and reservoir within the service kit.

**NOTE:** From initial energising of the PDRM2, no system test can be carried out until the system has warmed up (as shown on the screen).

The routine is as follows:



Either a 1000ppm R134a refrigerant or 17% Oxygen calibration gas cylinder provided by Parasense must be used for a system test. Before commencing the system test, confirm that the Monitor has been running continuously for a period of at least four hours, this will ensure that the system is operating at the correct temperature.

Remove the plastic cap from the Parasense calibration gas cylinder (3). Ensure the knurled knob on valve (2) is fully unwound (anti-clockwise) and screw valve on to the gas cylinder.

Open the calibration reservoir (4) by unwinding the upper white section of valve (5) two revolutions anticlockwise and expel any air present, then close (note: do not unscrew the brown knurled cap at any time).

Connect the open end of hose **(1)** to the stem of valve **(5)**, insert the plug end of hose **(1)** into the socket attached to valve **(2)**. Unwind the upper white section of valve **(5)** two revolutions, anticlockwise.

Open valve **(2)** clockwise on the Parasense calibration gas cylinder and allow sufficient gas flow to inflate the reservoir to approximately 80% capacity. Close valve **(2)** anti-clockwise. Turn the upper section of valve **(5)** clockwise to close. Disconnect hose **(1)** from the gas cylinder valve **(3)**, unscrew valve **(2)** from the gas cylinder and safely store the gas cylinder in the service kit case.

From the main menu on the PDRM2 monitor, use the 'Up' & 'Down' buttons to highlight and select System Test.

Disconnect the Freeway from the PDRM2 inlet using the pipe release tool and insert the plug end of the pipe from the Parasense calibration reservoir. Unwind the upper section of valve **(5)** two revolutions, anticlockwise.

At the System Test screen use the 'Up' & 'Down' buttons select the sample gas type, either HFC or O2 and then press the Action button to activate the test. The monitor will start to sample the gas from the connected calibration reservoir.

If the concentration breaches the associated threshold (Critical for HFC, Alert for O2) the beacon & sounder will be activated. The beacon & sounder will be de-activated when: (a) The user navigates away from the "System test" page; (b) The display inactivity timeout expires and the display automatically returns to the home page; (c) The user performs another System test which results in a measured concentration which does not breach the associated threshold.

When the test is complete, remove the Parasense Calibration Reservoir and reconnect the Freeway to the inlet.

## AIR FLOW

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Remove the Freeway from the PDRM2 inlet using the Parasense pipe release tool. Insert the disconnected Freeway into the connector on the pipe from the lower port of the gauge supplied with the 'Parasense Air Flow Kit'. Insert the pipe from the upper port on the gauge into the PDRM2 inlet. Attach the gauge in a vertical position on the monitor using the magnetic pad.

Initiate a manual sample of the PDRM2 inlet (refer to the [Monitor Setup](#) section of this manual for instructions). This will cause the monitor to start sampling from the PDRM2 inlet. The gauge should indicate air flow greater than 3 litres per minute. If the reading is satisfactory, disconnect the gauge and reconnect the Freeway to the monitor.

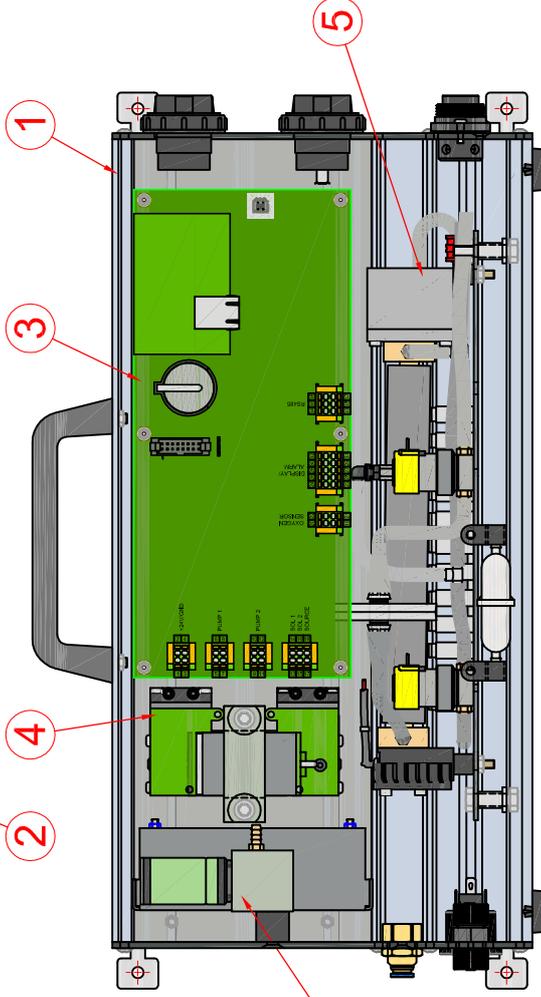
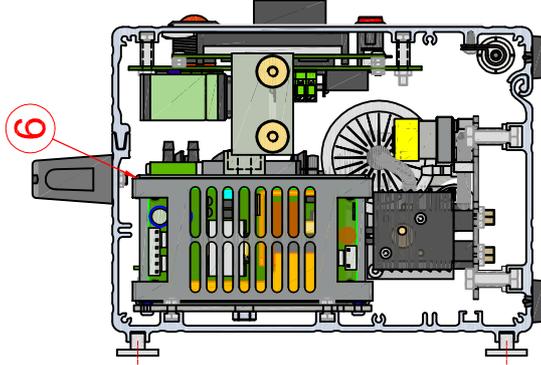
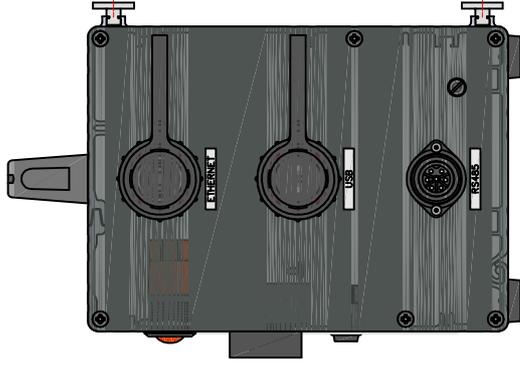
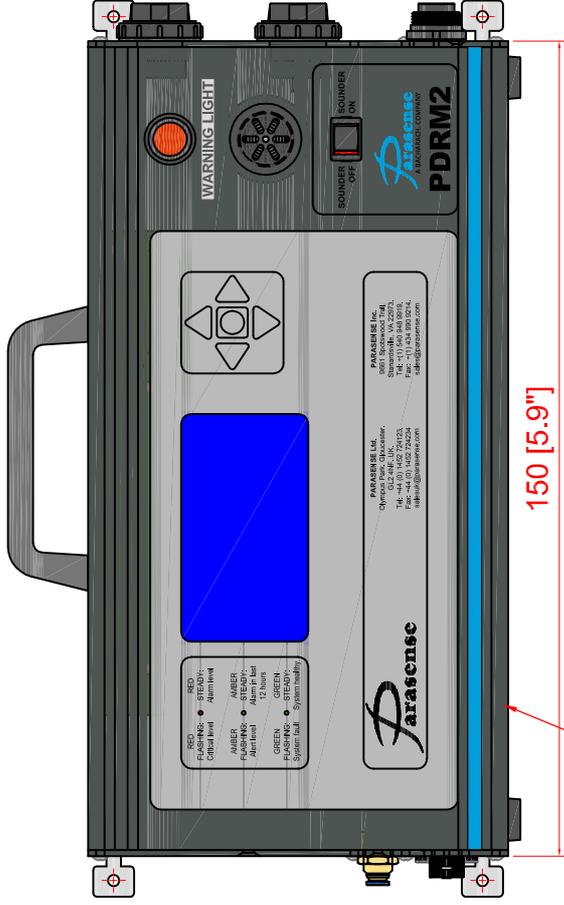
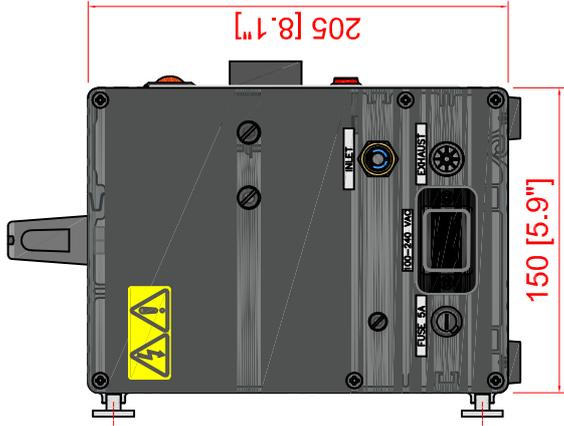
If the pump is running but the air flow reading is less than 3 litres per minute, disconnect the Freeway from the lower port on the gauge and repeat the test. If the gauge now reads in excess of 5 litres per minute, check the Freeway for kinks or blockage. If lower readings persist with Freeway connected, the Pump Module should be changed.

## 6 SPECIFICATION

Model PDRM2	
<b>Power</b>	100-240VAC, 140VA, 50-60Hz
<b>Ethernet</b>	10 Base-T RJ45 Socket
<b>USB</b>	USB2.0, Type B Socket
<b>Display &amp; Operator Control Options</b>	Traffic lights, LCD status display & navigation keypad
<b>Sensor, CFC, HCFC, HFC</b>	Styx infrared absorption sensor Resolution: 1ppm Accuracy: better than 15% (species dependant)
<b>Sensor, O2</b>	Galvanic cell sensor Range: 0-100% Resolution: 1% of measured range
<b>Sample Pumps</b>	2 pumps 24V DC, 360mA
<b>Freeway</b>	150m / 500ft length max (including all Spur Freeway) 1 spur kit/4 way split max. All spur lengths to be 5m/16ft (coil excess Freeway)
<b>Max available Power Output for add-on RS485 cluster modules</b>	0.9A @ 24VDC up-to 35°C ambient temperature 0.6A @ 24VDC between 35-43°C ambient temperature No spare capacity above 43°C ambient temperature
<b>Environmental Conditions</b>	Operating temperature: -9°C to 43°C (15°F to 110°F) Storage temperature: -23°C to 65°C (-10°F to 150°F) Relative Humidity: 0 to 95% RH (non-condensing) Max altitude: 2000m Indoor use only
<b>Approvals</b>	EN61010:2010 UL61010-1 CSA C22.2 61010-1

## 7 APPENDIX

### PDRM2 GENERAL ARRANGEMENT (PM2159)



Item	Description	Part Number	Qty
1	MONITOR ENCLOSURE	9090/PDRM2	1
2	ENCLOSURE DOOR	9010/PDRM2	1
3	NETWORK MODULE	9005/PDRM2-1	1
4	PUMP MODULE	9003/PDRM2	1

Item	Description	Part Number	Qty
5	STYX MODULE	9005/PDRM2-2	1
6	POWER SUPPLY UNIT	9005/PDRM2-3	1
7	OXYGEN SENSOR MODULE	9005/PDRM2-4	1
8			

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title:

**Portable Detector  
 General Arrangement**

drawing number:

**PM2159**

revision:

**4**

part number:

PDRM2

date:

26/06/2014

drawn:

ANK

revision:

**1 of 1**

sheet:

**4**

revision:

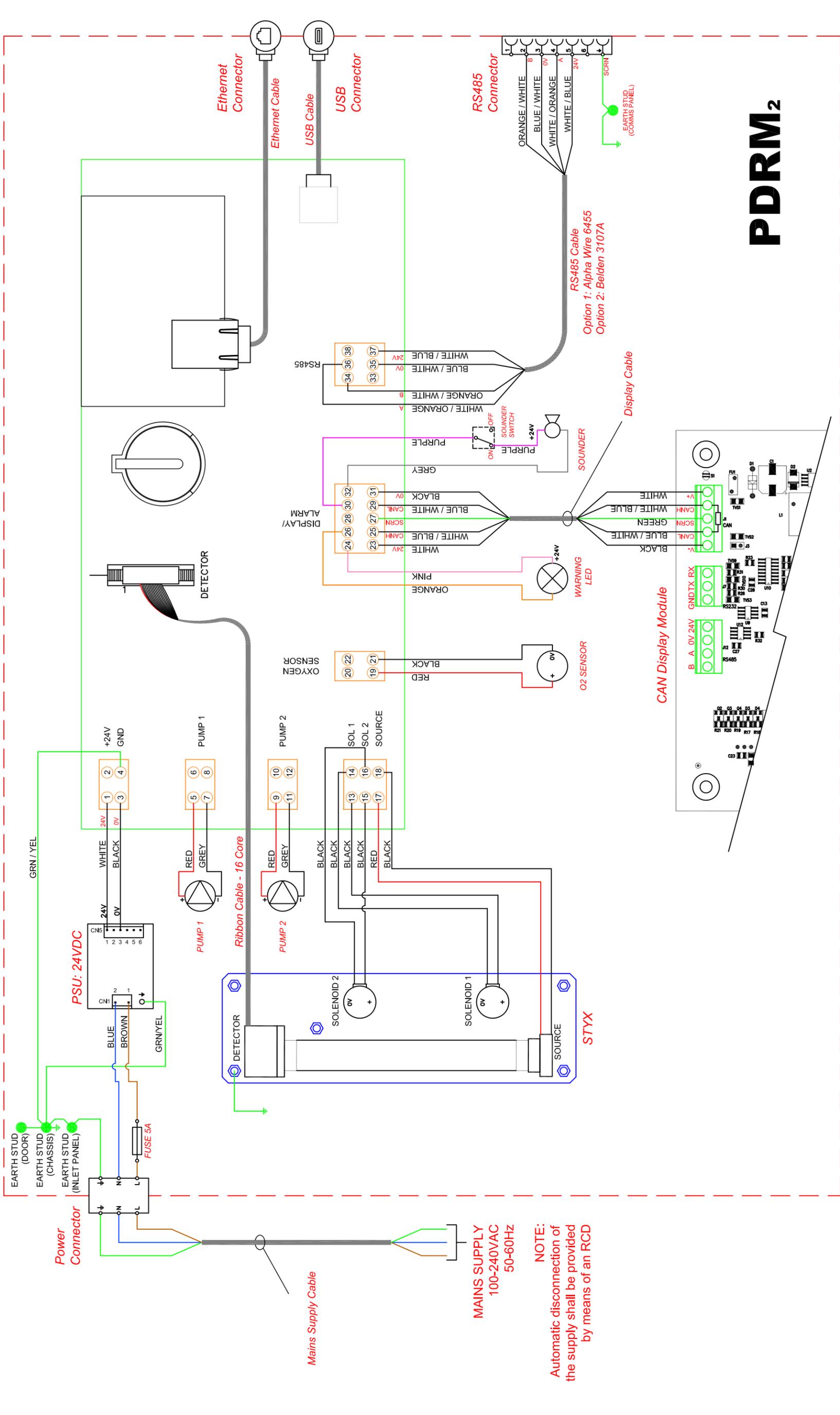
- 2. Arrangement updated in line with latest build spec. ANK 12/01/2016
- 3. Power socket changed. On/off switch removed JW 27th November 2017
- 4. Branding and border updated. JW 28th March 2018

checked:

JW  
 JB  
 JB

## **PDRM2 WIRING SCHEMATIC (PS0758)**

---



# PDRM2

revision:	checked:
4. Power connector updated. On/off switch removed. JW 28th Nov 2017	JB
5. Drawing border updated. JW 28th March 2018	JB
6. Drawing border updated. JH 26th Sept 2018 Earth scheme updated	PJ

drawing number:	sheet:
<b>PS0758</b>	<b>6</b>
revision:	1 of 1

title:		part number:	
<b>PDRM2 HFC + O2 WIRING SCHEMATIC</b>		PDRM2	
drawn:	date:	date:	part number:
ANK	29/01/2014		PDRM2

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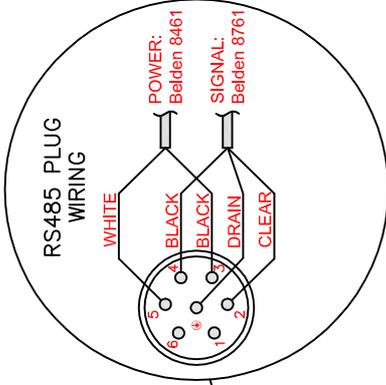
**Parasense**  
 A BACHARACH COMPANY

Doc. Ref: H105-5.10/05/18

**NOTE:**  
 Automatic disconnection of the supply shall be provided by means of an RCD

## **RS485 CLUSTER MODULE NETWORK (PS0767)**

---



**RS485 CABLE TYPE:**

**Up to 990m (3250ft)**

Signal - Belden 8761 - 1 Twisted Pair, 22AWG  
 Power - Belden 8461 - 1 Twisted Pair, 18AWG



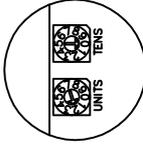
**NOTE:**

**DO NOT SPUR OFF  
 RS485 NETWORK  
 ALL MODULES TO BE  
 CONNECTED IN  
 SERIES WITH EACH  
 OTHER**

Network addressing  
 example:

Do not use address  
 00.

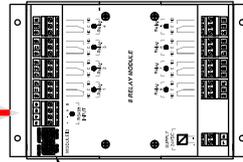
Note module address  
 and ensure it  
 matches settings  
 during configuration.  
 ADDRESS 2



**MAXIMUM CABLE LENGTH FROM PDRM2 TO LAST  
 CLUSTER MODULE 990m (3250ft)**

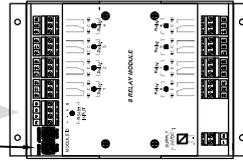
Network addressing  
 example:

Do not use address  
 00.  
 Note module address  
 and ensure it  
 matches settings  
 during configuration.



ADDRESS 1

Relay module

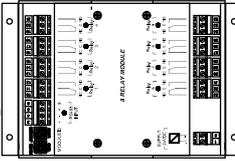


Relay module

**IMPORTANT NOTE:**

Always terminate last  
 device on network with  
 120Ω resistor.  
 Where this is provided  
 on board use  
 terminating jumper,  
 otherwise fit 0.25W  
 Metal Film resistor  
 across signal terminals  
 A & B

See cluster installation  
 diagram for more  
 detail



Relay module

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title:  
**PDRM2 to RS485  
 Cluster Module Network**

drawn:  
 ANK

date:  
 09/07/2014

part number:  
 PDRM2

drawing number:

**PS0767**

revision:

**3**

sheet:

**1 of 1**

revision:

1. Arrangement updated in line with latest build spec. Drawing border updated - ANK 19/01/2017
2. Arrangement updated in line with latest build spec. JW 28th November 2017
3. Branding and drawing border updated. JW 28th March 2018

checked:

**JW**

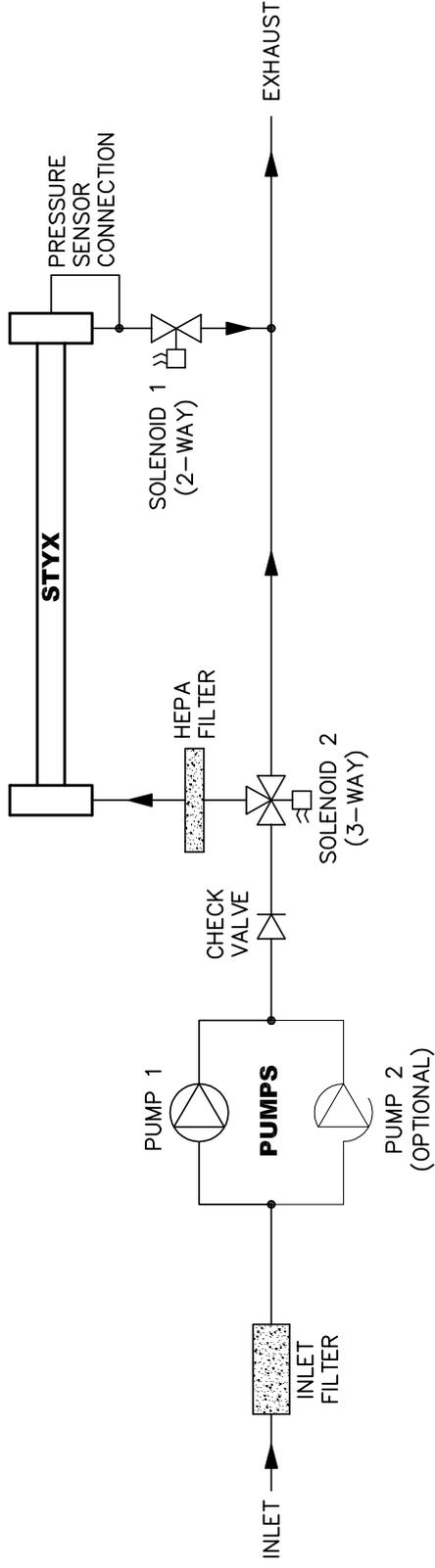
**JB**

**JB**

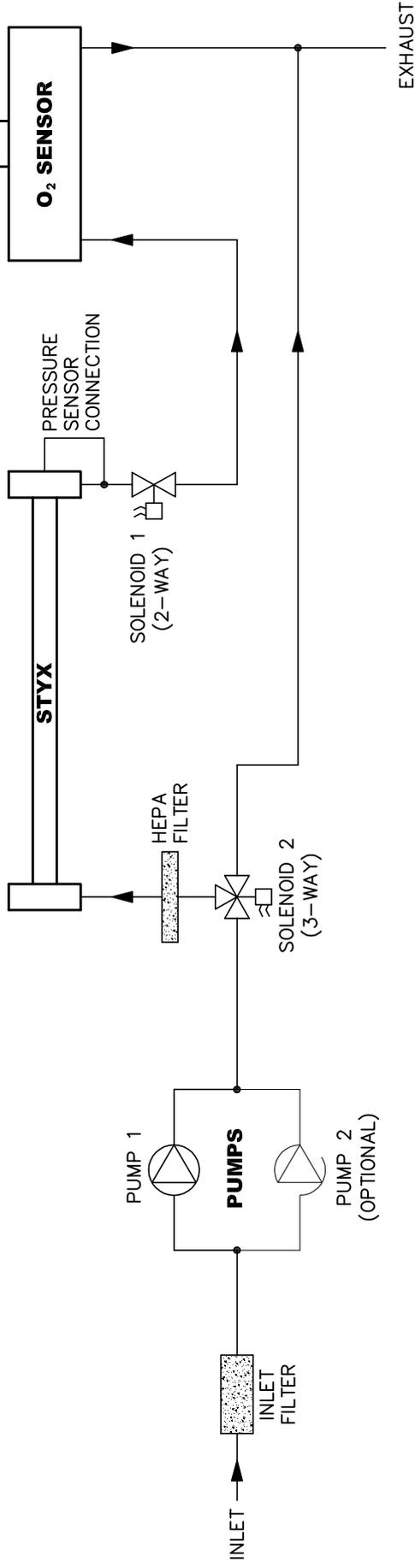
## **PDRM2 PIPING SCHEMATIC (PS0757)**

---

# PIPE SCHEMATIC - HFC ONLY



# PIPE SCHEMATIC - HFC + O<sub>2</sub> SENSOR



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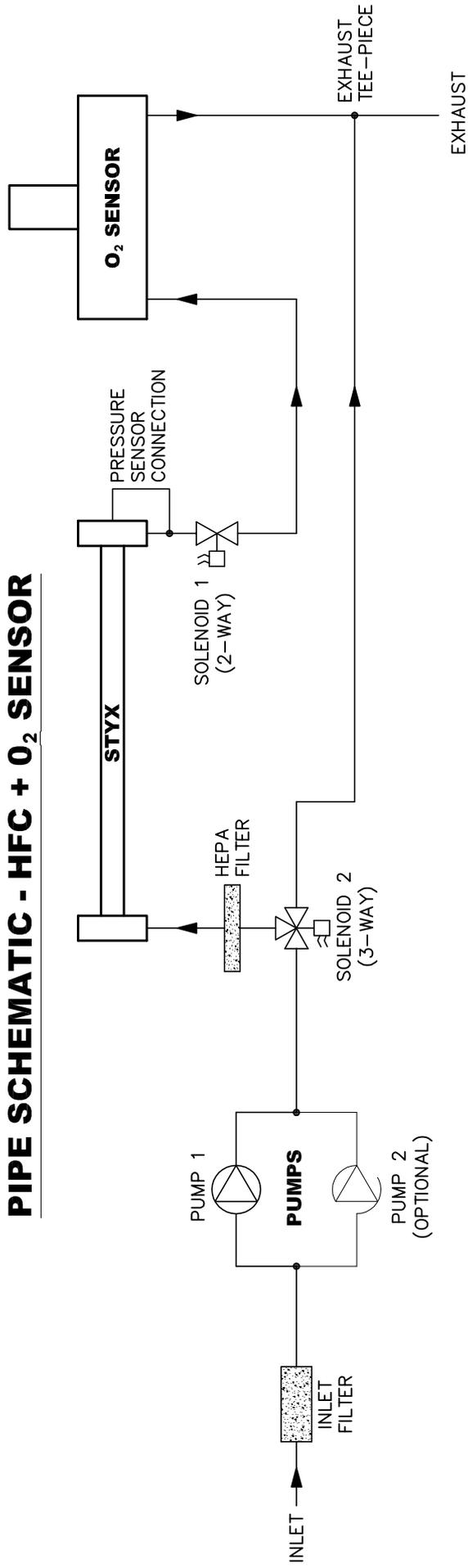
Doc. Ref: H105-4\_09/03/18

title: **PDRM2 HFC + O2 WIRING SCHEMATIC**  
 drawn: J WILKINSON  
 date: 24th Jan 2014  
 part number: PDRM2-101

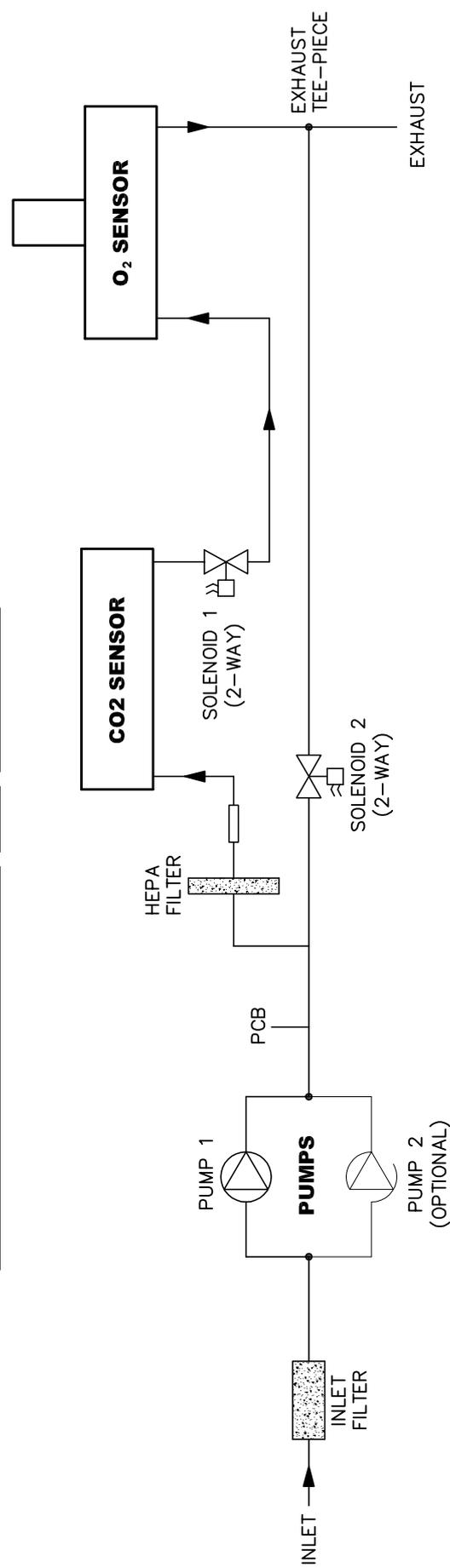
drawing number: **PS0757**  
 revision: **3** sheet: **1 of 2**

revision:  
 2. Drawing border updated - ANK 23/01/2017  
 3. Drawing border updated - JW 28th March 2018  
 checked: AK  
 JB

# PIPE SCHEMATIC - HFC + O<sub>2</sub> SENSOR

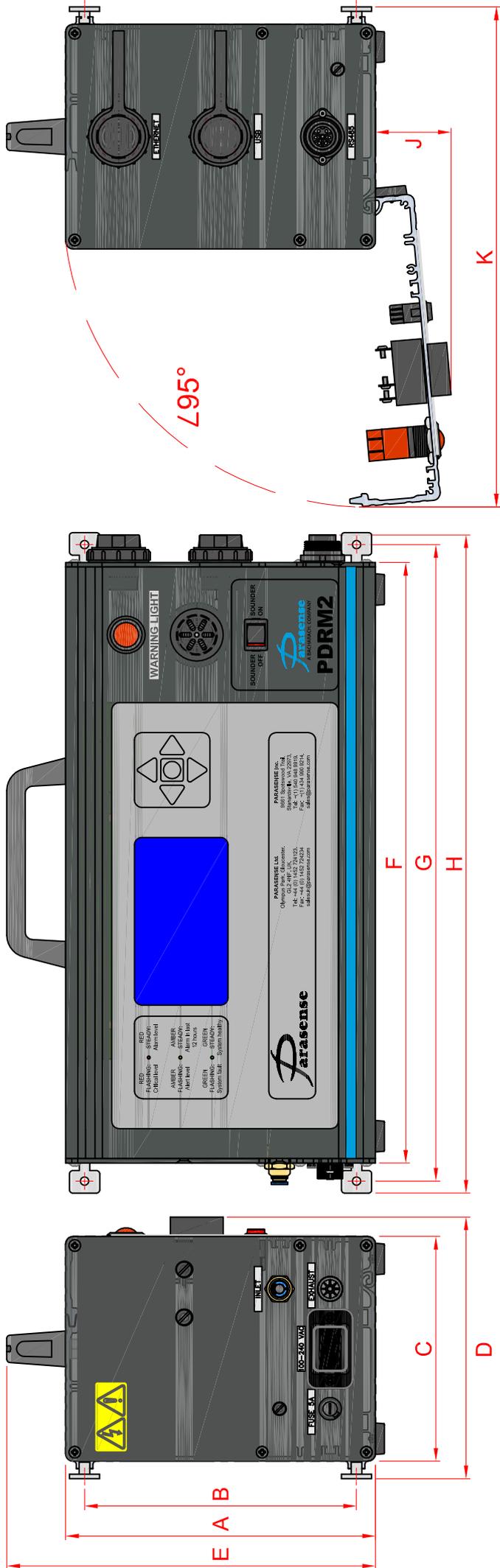


# PIPE SCHEMATIC - CO<sub>2</sub> + O<sub>2</sub> SENSOR



## **PDRM2 MOUNTING DETAILS (PM2152)**

---



PDRM2	A	B	C	D	E	F	G	H	J	K	WEIGHT
Metric (mm)	205	180	150	175	244	401	425	440	50	334	6.0kg
Imperial (In)	8.1	7.1	5.9	6.9	9.6	15.8	16.7	17.3	2.0	13.1	13.2lb

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title: **Portable Detector  
 General Arrangement**

drawing number: **PM2152**

revision: **4** sheet: **1 of 1**

checked: **JB**

3. Power socket changed. On/off switch removed  
 JW 27th November 2017

4. Branding and drawing border updated. JW 28th  
 March 2018

## APPLICABLE REFRIGERANT GASES

---

The PDRM2 and its variants have the capability to sense refrigerant gases from the following categories: H, HFC, HCFC, CFC and HFO. Below is a list of the specific gas types:

<b>H (Halogens)</b>
R13B1, R12B1
<b>HFC (Hydrofluorocarbons)</b>
R134A, R404A, R407A, R407B, R407C, R507, R236FA, R227AE, R442A, R422B, R453A, R434A, R437A, R438A, R423A, R424A, R426A, R427A, R428A, R417A
<b>HCFC (Hydrochlorofluorocarbons)</b>
R22, R401B, R408, R123, R500, R409A, R402A, R402B
<b>CFC (Chlorofluorocarbons)</b>
R12, R502, R11, R114, R113
<b>HFO (Hydrofluoroolefins)</b>
R1234YF, R1234ZE, R448A

There is no risk of liberating dangerous amount of poisonous and/or injurious gasses during normal operation of the PDRM2 when used according with this manual.



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