

AIR-MET SCIENTIFIC

AirMetER-DX

2-FRACTION PARTICULATE MONITOR

Service Guide



Before operating the unit, please read this user manual thoroughly and retain for future reference

Revision 1 | June 2023

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WARNINGS, CAUTIONARY STATEMENTS & IMPORTANT INFORMATION

Throughout this manual any warnings, cautionary statements or notes of importance are identified using the following symbols:

	IMPORTANT INFORMATION
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WARRANTY & SERVICE

Air-Met Scientific maintains instrument service facilities nationwide. Should your instrument require service, you may contact us on **1800 000 744** or at service@airmet.com.au. Alternatively, instrument service may be booked by completing our online service request form at the following URL:


<https://www.airmet.com.au/services/book-a-service>

For non-warranty repairs, you will need to provide a purchase order number. All instruments submitted for repair will undergo evaluation by a service technician and a quote for works required will be issued, for approval, before any service proceeds.

Please note that, if a service quote is declined, a small charge for instrument assessment may apply.

Air-Met Scientific's policy is to perform all repairs required to restore the instrument to full operating condition, including replacement of sensors and batteries (as applicable) that have exceeded the recommended service life and the completion of any manufacturer issued service dispositions.

The unit for repair may be sent to your local Air-Met Scientific branch office. Pack the instrument and all its accessories (preferably in its original packing). Include any special instructions, your contact and company details and a description of the fault. Repairs are warranted for 90 days from the date of shipment. Sensors and other consumables have individual warranties.

	Air-Met Scientific assumes no liability for work performed by unauthorised service facilities.
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The product specified in this manual is warranted against faulty workmanship for a period of 12 months, from the date of dispatch.

Our obligation assumed under this warranty is limited to the replacement of parts which, by our assessment, are proved to be defective and have not been misused, carelessly handled, defaced or damaged due to incorrect installation or operation. This warranty is VOID where the unit has been tampered with or if repairs have been made or attempted by anyone except an authorised representative of the manufacturing company.

Products for attention under the terms of this warranty (unless otherwise agreed) must be returned to the manufacturer, freight paid and, if accepted for free repair, will be returned to the customers address in Australia free of charge.

When returning the product for service or repair a full description of the fault and the conditions of operation when the product failed must be given. In any event the manufacturer has no other obligation or liability beyond replacement or repair of this product. Modifications may be made, by the manufacturer, to any existing or future models of the unit as it may deem necessary without incurring any obligation to incorporate such modifications in units previously sold or to which this warranty may relate.

1. FILTER EXCHANGE

The AirMetER-DX contains up to two filters (9933-05-CQ – dust filter & 121-5866 – pneumatic silencer), the pneumatic silencer is installed on AirMetER-DX instruments manufactured before February 2023, this only requires replacement when polluted or damaged. It is recommended that the dust filter be exchanged no less than annually.



Each application and location affect the filters in different ways, the filters should be monitored and inspected at regular intervals in new applications to gain an insight into how long the filters last before discolouration.

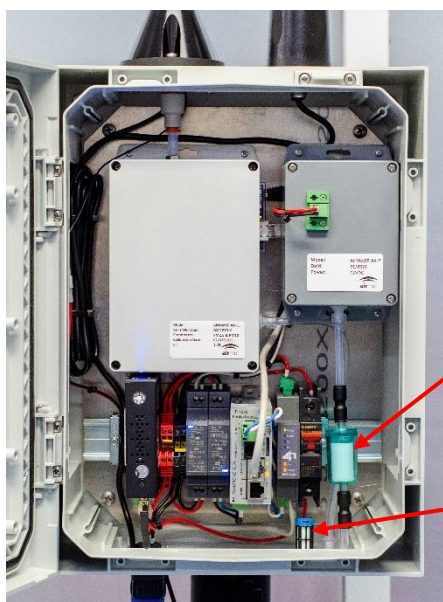


Figure 1.1 – Complete assembly



Figure 1.2 – Dust Filter



Figure 1.3 – Pneumatic Silencer

The dust filter is secured to the tubing with push fittings, compress the push fitting to release the filter from the fitting, ensure when installing the new filter to properly click the filter in place into both push fittings, keeping the directional arrow pointing towards the pump.

After completing the dust filter exchange, it is important to again validate the inlet flow rate to ensure no leaks have been created during this process, the inlet flow rate is set to $2\text{L/m} \pm 5\%$, as detailed in the [flow rate calibration](#) section below.

The pneumatic silencer can be removed by unscrewing it anti-clockwise and then replaced with the new silencer, being careful to ensure the O-ring does not fall off of the new silencer when replacing.

2. TSP HEAD & HEATED INLET CLEANING

A TSP head should be installed on all heated inlets at factory and while installed in the field, these need to be periodically cleaned. The time interval between cleaning varies depending on the application and location of the device. It is recommended to clean and check for any blockages within the TSP head and heated inlet assembly during maintenance.

Some instruments will have a PM₁₀ sharp cut cyclone (AE10-2) installed instead of the standard TSP head, these are used in applications where high levels of particulate larger than PM₁₀ is found and is needed to be filtered out as to not damage the sensor. When the sharp cut cyclone is being used it needs to be monitored and cleaned at a much higher frequency.

This process may be completed using a brush and compressed air if available.



Figure 2.1 – TSP head

3. FLOW RATE CALIBRATION

Attach a 0.4-5L/m rotameter (320-4A5) to the inlet of the AirMetER-DX, the flowmeter should indicate 2L/m \pm 5%. Should this be out of tolerance, ensure there are no leaks and that there is pressure when blocking the heated inlet. Manual adjustment of the pump flow rate may be completed to achieve the flow rate as depicted below.

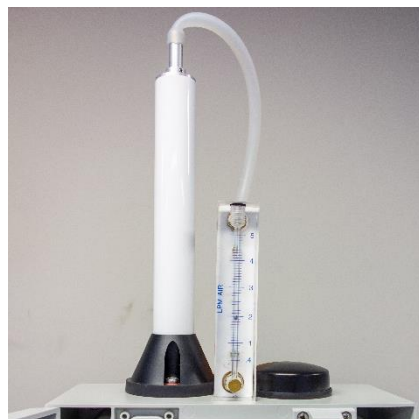


Figure 3.1 – Flowmeter

Unscrew 4x PH screws from the pump module top case (NOTE: these screws are retaining).

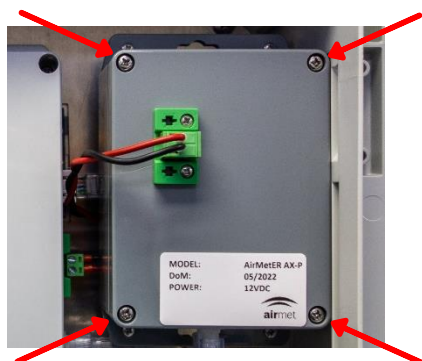


Figure 3.2 – Pump Top

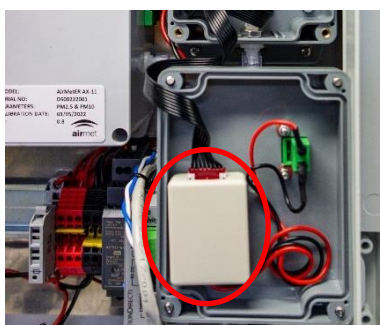


Figure 3.2 – Pump Internal



Figure 3.3 – Pump Control Internal

Using a small flat-blade driver, remove the lid from the control box within the pump module.

Adjust the potentiometer clockwise to increase the flowrate and anti-clockwise to decrease the flowrate in order to achieve 2L/m \pm 5%.

In the event the flow rate cannot maintain 2L/m \pm 5% at the inlet, losses can be diagnosed through-out the flow path: Heated inlet > particulate sensor module > dust filter > pump module > external exhaust

4. INSTALLATION

CALIBRATION OF THE PARTICULATE SENSOR MODULE MAY ONLY BE COMPLETED AT AIR-MET SCIENTIFIC'S HEAD OFFICE IN MELBOURNE.

The particulate sensor module may be removed from the instrument and shipped to Air-Met Scientific's head office in Melbourne individually. To remove the module, please follow the steps in section 5.

5. MODULE & PART REMOVAL/REPLACEMENT

PARTICULATE SENSOR MODULE REMOVAL & REPLACEMENT

Equipment Required:

- PH screwdriver
- 2mm allen key
- Verified Rotameter capable of displaying 2L/m
- 3/8" flexible tubing

WARNING:

Do not use a power drill on the particulate sensor module screws as this may cause damage to the instrument. Ensure that the AirMetER-DX is switched off and disconnected from any power source while removing and replacing the particulate sensor module.

1. Remove the outlet tubing from the particulate sensor module by twisting the luer fitting anticlockwise.
2. Using a 2mm allen key, loosen the grub screw to ensure that the heated inlet can slide to assist with step 3.
3. Unplug the tube adaptor from the heated inlet by compressing the orange section inwards. This will release the tube adaptor. Slide the heated inlet upward until there is a gap between the heated inlet and tube adaptor.
4. Remove the four screws from the top and bottom of the particulate sensor module.
5. Unplug the ethernet and power supply cables from the particulate sensor module PCB.



Figure 5.1 – Luer Fitting

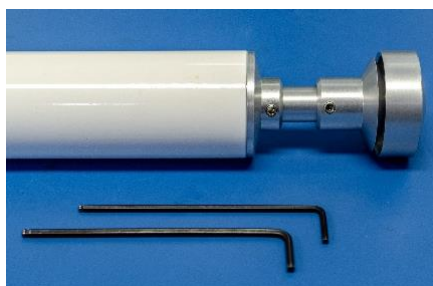


Figure 5.2 – TSP head

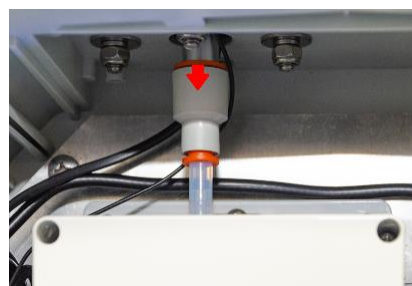


Figure 5.3 – Tube Adaptor

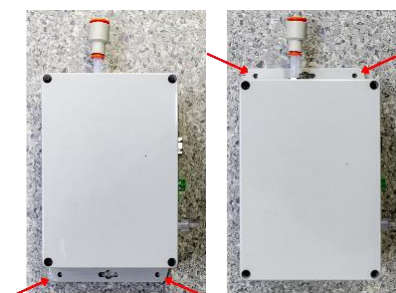


Figure 5.4 – Particulate Sensor Module Screws

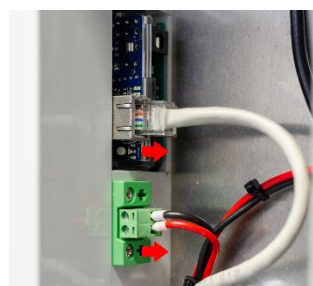


Figure 5.5 – Ethernet and Power Cables

When replacing the particulate sensor module, complete these steps in reverse.

To confirm that the instrument is not leaking after the particulate sensor module replacement, check that the flow rate is still within the required range before covering the inlet with a finger. If there is a build-up of pressure from blocking the end, the leak check has passed.

HEATED INLET REMOVAL & REPLACEMENT

Equipment Required:

- Verified Rotameter capable of displaying 2L/m
- 3/8" flexible tubing capable of connecting the heated inlet to the rotameter
- 2mm allen key
- Cabinet key



Figure 5.5 – Heated Inlet

1. Inside the AirMetER-DX unplug the heated inlet cable from the plug secured to the side of the enclosure.
2. Using a 2mm allen key loosen the grub screw to ensure the heated inlet can slide out of the tube adapter (the tube adapter is shown on the next slide).
3. Compress the orange section of the tube adapter and lift the heated inlet shaft away from the instrument to create a gap between the shaft and tube adapter.
4. Begin screwing the heated inlet anti-clockwise while using the other hand to assist the heated inlet cable to twist around the tube adapter, take care while screwing the heated inlet to not tangle the heated inlet cable as this may cause damage to the cable.
5. Once the inlet is unscrewed, pull the inlet and cable completely out of the adapter.
6. Bubble wrap the heated inlet adapter and TSP head before placing them within the instrument's enclosure ready for shipping.

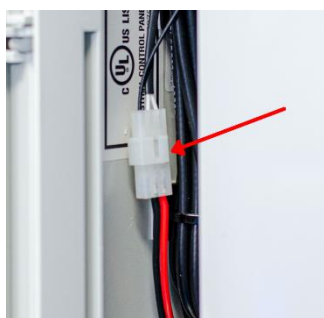


Figure 5.6 – Heated Inlet Cable

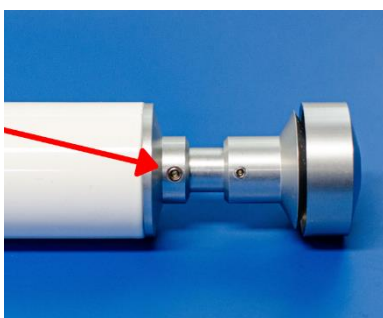


Figure 5.7 – Grub Screw

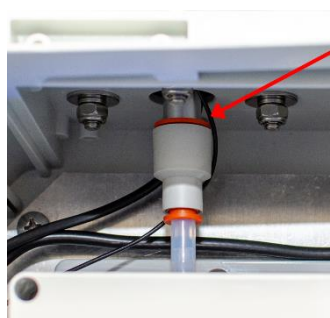


Figure 5.8 – Tube Adaptor

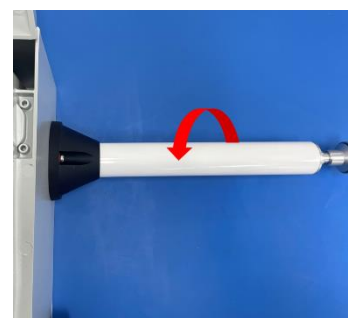


Figure 5.9 – Heated Inlet

6. FREQUENCY TABLES

CALIBRATION FREQUENCY

DESCRIPTION	CALIBRATION FREQUENCY
Particulate Sensor	Yearly
Pump Module	Anytime the dust filter is replaced or the heated inlet is removed

FILTER REPLACEMENT

FILTER DESCRIPTION	PART NUMBER	REPLACEMENT FREQUENCY
Dust Filter	9933-05-CQ	Yearly*
Pneumatic Silencer	121-5866	Only when polluted or damaged

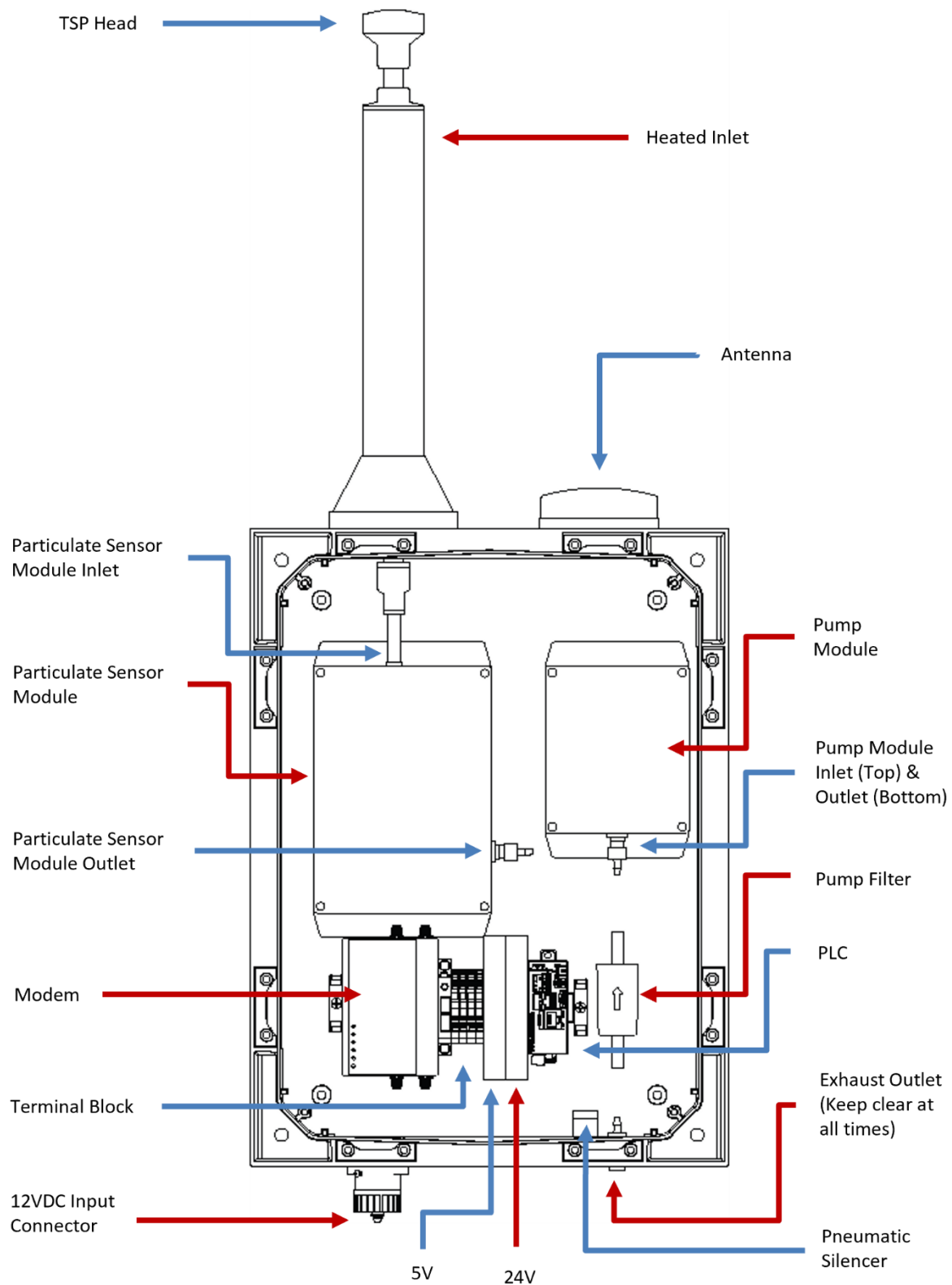
* *Dependent on the application of the instrument*

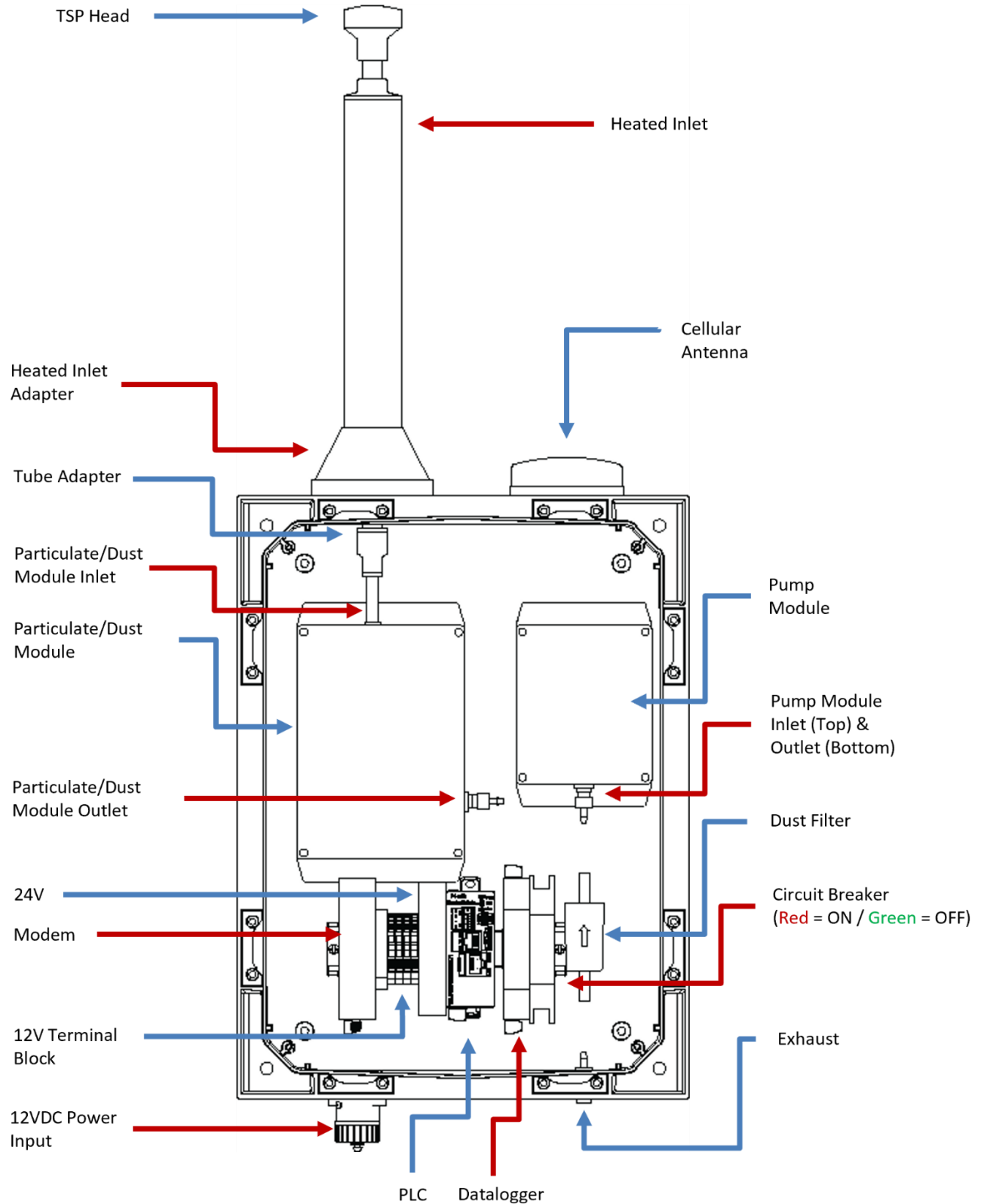
PART REPLACEMENT

PART DESCRIPTION	PART NUMBER	RECOMMENDED REPLACEMENT CYCLE
Particulate Sensor	AMS-SDS011	2 years
Pump	TM30A-D12-V7004	2 years

7. INSTRUMENT LAYOUT

HARDWARE V.2





8. TROUBLESHOOTING GUIDE

ISSUE	SOLUTIONS
I. No air flow at the exhaust	<ol style="list-style-type: none"> 1. Is the pump plugged in at the top as displayed in <i>Figure: 6.5</i>? 2. Is the dust filter blocked and need replacement? 3. Trace the tubing from the heated inlet > particulate sensor module > dust filter > pump module > external exhaust for any signs of leaks or blockages. 4. Follow the Flow Rate Calibration section (page 14) below to adjust the flow rate.
II. Air flow at the inlet not within the 2L/m $\pm 5\%$ allowable range	<ol style="list-style-type: none"> 1. Is the dust filter blocked and need replacement? 2. Is the pump plugged in at the top as displayed in <i>Figure: 6.5</i>? 3. Are the heated inlet and particulate sensor modules connected by the tube adapter? 4. Trace the tubing from the heated inlet > particulate sensor module > dust filter > pump module > external exhaust for any signs of leaks or blockages. 5. Follow the Flow Rate Calibration section (page 14) below to adjust the flow rate.
III. Readings are low	<ol style="list-style-type: none"> 1. Is the instrument due for calibration or service? 2. Is the dust filter polluted and need replacement? 3. Is the pump plugged in at the top as displayed in <i>Figure: 6.5</i>? 4. Is the heated inlet and particulate sensor module connected by the tube adapter? 5. Trace the tubing from the heated inlet > particulate sensor module > pump filter > pump module > external exhaust for any signs of leaks or blockages. 6. Follow the Flow Rate Calibration section (page 14) below to adjust the flow rate.
IV. Pump not running	<ol style="list-style-type: none"> 1. Is the pump plugged in at the top as displayed in <i>Figure: 6-5</i>? 2. Is the modem on? If both the modem and pump are not on, then the unit may not be powered on. 3. Check the fuse / circuit breaker and power supply.
V. Data not uploading to LiveSense	<ol style="list-style-type: none"> 1. Is the modem plugged in? 2. Check the fuse / circuit breaker and power supply. 3. Is the uSD card installed in the easylog? (Hardware V.3) 4. Does the instrument have connection to the internet through your specific connection method? (Cellular, Wi-Fi or ethernet) 5. Is the cellular or Wi-Fi antenna correctly installed?
VI. Instrument not turning on	<ol style="list-style-type: none"> 1. Check the fuse / circuit breaker and power supply. 2. Using a multimeter, check that the instrument is receiving 12VDC from the power supply.

9. SPARE PARTS

ITEM	PART NUMBER
Tripod	TF-TRI-AM
Remote Power System	AMS/200S/170B/15M/9C or AMS/200S/150B/15M/9C
TSP Head	10085
PM ₁₀ Cyclone Head	AE10-2
Heated Inlet	10090-2
Power Supply (240V)	LPF-60-12-AUP
Pneumatic Silencer	121-5866
Dust Filter	9933-05-CQ
Pump	TM30A-D12-V7004
Meteorological Sensors	Upon Request
Luer Fittings and Tubing	Upon Request
Particulate Sensor	AMS-SDS011
0.4L – 5L Rotameter	320-4A5

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