

Easidew PDP Dryer Portable Hygrometer User Manual



97122 Issue 1
January 2024

Please fill out the form(s) below for each instrument that has been purchased.

Use this information when contacting Michell Instruments for service purposes.

Product Name	
Order Code	
Serial Number	
Invoice Date	
Installation Location	
Tag Number	

Product Name	
Order Code	
Serial Number	
Invoice Date	
Installation Location	
Tag Number	

Product Name	
Order Code	
Serial Number	
Invoice Date	
Installation Location	
Tag Number	



Easidew PDP Dryer Portable Hygrometer

For Michell Instruments' contact information please go to
www.ProcessSensing.com

© 2024 Michell Instruments

This document is the property of Michell Instruments Ltd and may not be copied or otherwise reproduced, communicated in any way to third parties, nor stored in any Data Processing System without the express written authorization of Michell Instruments Ltd.

Contents

Safety	vii
Electrical Safety	vii
Pressure Safety.....	vii
Toxic Materials.....	vii
Repair and Maintenance	vii
Calibration.....	vii
Safety Conformity	vii
Abbreviations.....	viii
Warnings.....	viii
1 INTRODUCTION	1
1.1 User Controls and Case Lid Layout.....	2
1.2 Main Screen.....	3
1.3 Service Panel	4
1.4 Pressurized (PDP) Gas Portable Measurement System	5
2 INSTALLATION	6
2.1 Safety.....	6
2.2 Unpacking the Instrument.....	6
2.3 Easidew PDP Portable Accessories	6
2.4 Operational Requirements.....	7
2.4.1 Environmental Requirements – Easidew PDP Portable.....	7
2.4.2 Battery Charger Electrical Requirements	7
2.5 Gas Connections.....	7
2.5.1 Inlet and Outlet Fittings.....	8
2.6 Internal Battery Management.....	9
2.6.1 Battery Charging.....	9
2.6.2 Battery Safety.....	9
3 OPERATION	10
3.1 Preparation for Operation.....	10
3.2 User Controls	10
3.2.1 Main Screen.....	10
3.2.2 Dew-Point and Pressure Chart Plotting.....	11
3.2.3 Dew-Point, Pressure, Temperature and Time & Date Logging Setup Screen	11
3.2.4 Dew-Point, Pressure, Temperature and Time & Date Logging Interval	12
3.2.5 Start Data Logging Setup Screen.....	12
3.2.6 Accessing the Advanced Menu Functions	13
3.2.7 Security Code Protection for Advanced Menu.....	13
3.2.8 Advanced Menu Setup Screen	14
3.2.9 Parameter Scaling	14
3.2.10 Display Brightness and Power Save	15
3.2.11 Dew-Point and Pressure Chart Plotting Set Up.....	15
3.2.12 Battery Health Diagnostics.....	16
3.2.13 Date/Time Screen	16
3.2.14 Unit Firmware and Sensor Diagnostics	17
3.3 Data Logging Download	17
4 GOOD MEASUREMENT PRACTICE	18

5	MAINTENANCE	22
5.1	Inlet Filter Maintenance and Replacement	22
5.2	Moisture Sensor Maintenance and Replacement.....	23
5.3	Integral Battery Replacement	23
5.4	SD Card Replacement	23
6	SHIPPING	24

Appendices

Appendix A	Technical Specifications.....	28
A.1	Dimensions	29
Appendix B	Quality, Recycling, Compliance & Warranty Information.....	31
Appendix C	Return Document & Decontamination Declaration.....	33

Figures

Figure 1	Easidew PDP Dryer Portable Hygrometer.....	1
Figure 2	User Controls and Case Lid Layout.....	2
Figure 3	Main Operating Screen.....	3
Figure 4	Service Panel Removed.....	4
Figure 5	System Schematic and System Design Mechanics	5
Figure 6	Adaptor Fitting	8
Figure 7	3A Fast-Charger Curve.....	9
Figure 8	Main Screen.....	10
Figure 9	Dew-Point and Pressure Chart Plotting	11
Figure 10	Dew-Point, Pressure, Temperature, Time & Date Logging Setup Screen.....	11
Figure 11	Data Log Interval Selection Screen	12
Figure 12	Start Data Logging Screen	12
Figure 13	Advanced Menu Access Screen	13
Figure 14	Security Code Screen.....	13
Figure 15	Advanced Menu Setup Screen	14
Figure 16	Parameter Scaling Screen.....	14
Figure 17	Display Screen	15
Figure 18	Chart Setup Screen.....	15
Figure 19	Battery Health and Diagnostics Screens	16
Figure 20	Date/Time Screen.....	16
Figure 21	Unit Firmware and Sensor Diagnostics	17
Figure 22	Material Permeability Comparison	18
Figure 23	Service Panel Removed.....	22

This page has been left blank intentionally.

Safety

The manufacturer has designed this equipment to be safe when operated using the procedures detailed in this manual. The user must not use this equipment for any other purpose than that stated. Do not apply values greater than the maximum value stated.

This manual contains operating and safety instructions, which must be followed to ensure the safe operation and to maintain the equipment in a safe condition. The safety instructions are either warnings or cautions issued to protect the user and the equipment from injury or damage. Use competent personnel using good engineering practice for all procedures in this manual.

Electrical Safety

The instrument is designed to be completely safe when used with options and accessories supplied by the manufacturer for use with the instrument. The instrument is powered by an internally mounted rechargeable battery. The input power supply voltage limits for the battery charger supplied with the instrument are 90...264 V AC, 50/60 Hz.

Pressure Safety

DO NOT permit pressures greater than the safe working pressure to be applied to the instrument. The specified safe working pressure (SWP) for this instrument is 20 barg (290 psig).

Toxic Materials

The use of hazardous materials in the construction of this instrument has been minimized. During normal operation it is not possible for the user to come into contact with any hazardous substance which might be employed in the construction of the instrument. Care should, however, be exercised during maintenance and the disposal of certain parts.

Repair and Maintenance

The instrument must be maintained either by the manufacturer or an accredited service agent. Refer to www.ProcessSensing.com for the contact details for Michell Instruments' offices worldwide.

Calibration

The recommended calibration interval for the Easidew PDP Portable is 12 months. The instrument should be returned to the manufacturer, Michell Instruments Ltd, or one of their accredited service agents for re-calibration. Alternatively, there is the option to purchase calibrated service exchange dew-point sensors, which replace the original sensors within the unit.

Safety Conformity

This product meets the essential protection requirements of the relevant EU and UK directives. Further details of applied standards may be found in Appendix B.

Abbreviations

The following abbreviations are used in this manual:

AC	alternating current
atm	pressure unit (atmosphere)
barg	pressure unit (=100 kP or 0.987 atm) gauge
°C	degrees Celsius
°F	degrees Fahrenheit
DC	direct current
Hz	Hertz
kg	kilogram(s)
lb	pound
l/min	liters per minute
m	meter(s)
mA	milliampere
max	maximum
min	minute(s)
mm	millimeter(s)
MPa	megapascal
ppm _v	parts per million (by volume)
ppm _w	parts per million (by weight)
psig	pounds per square inch
SWP	safe working pressure
V	volts

Warnings

The following general warning listed below is applicable to this instrument. It is repeated in the text in the appropriate locations.



Where this hazard warning symbol appears in the following sections it is used to indicate areas where potentially hazardous operations need to be carried out.

1 INTRODUCTION

Moisture spot checking at the pressurized outlet of a gas dryer is crucial for ensuring the quality of compressed gas. The Easidew PDP Dryer Portable hygrometer monitors and logs key parameters like dew point, pressure and temperature in real time. It is compliant with ISO 8573-1 and effectively controls moisture contamination.



Figure 1 *Easidew PDP Dryer Portable Hygrometer*

1.1 User Controls and Case Lid Layout

The user controls and indicators associated with the Easidew PDP Portable are located on the front panel of the instrument and are explained below.

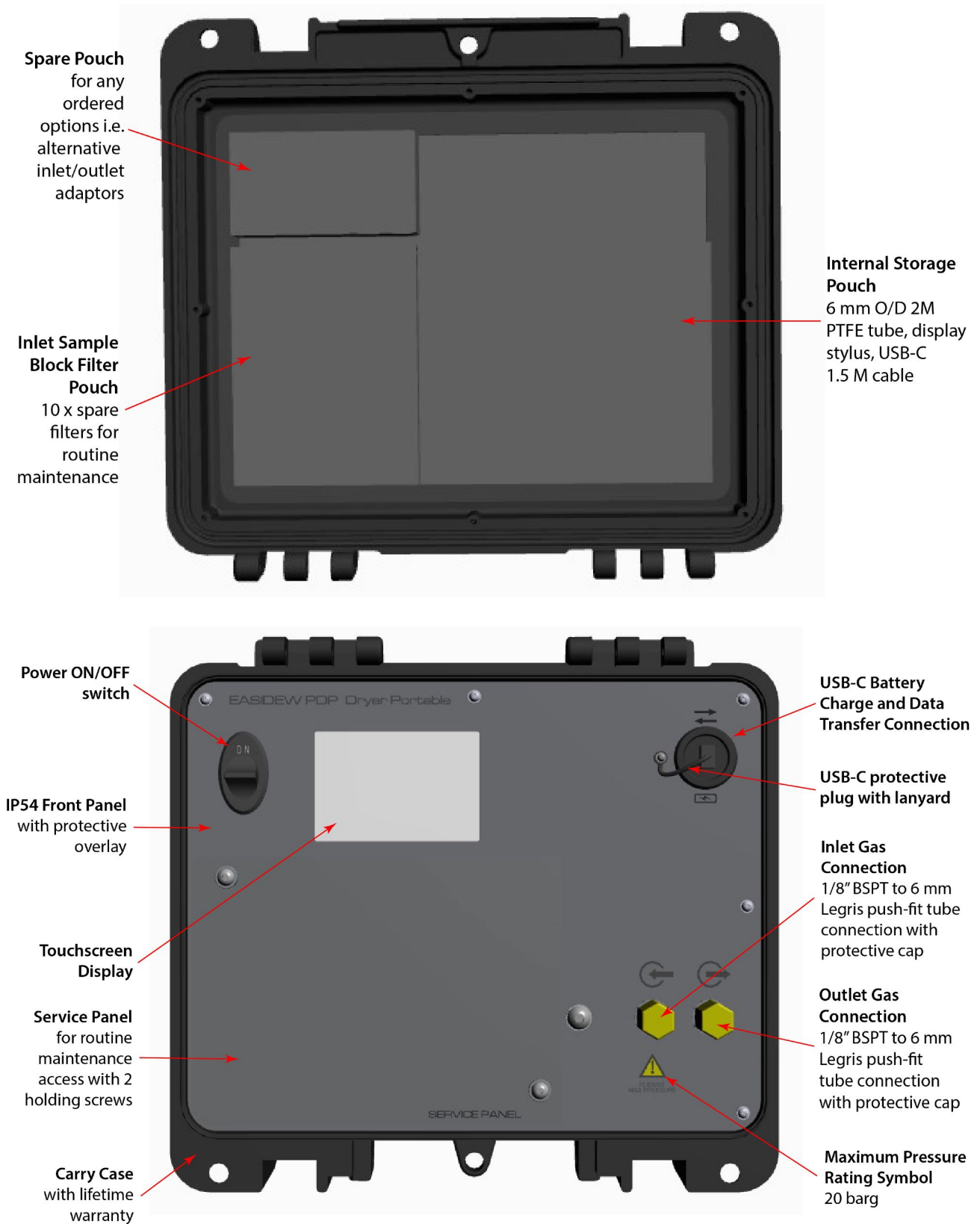


Figure 2 User Controls and Case Lid Layout

1.2 Main Screen

The HMI interface on the Easidew PDP Portable is simple and intuitive. Below is the main operating screen, which is used once the dryer test is set up and underway.

A stylus pen is provided in the right-hand pouch in the case lid, to make touchscreen operation easy. The touchscreen is designed to work even when the operator is wearing plastic gloves.

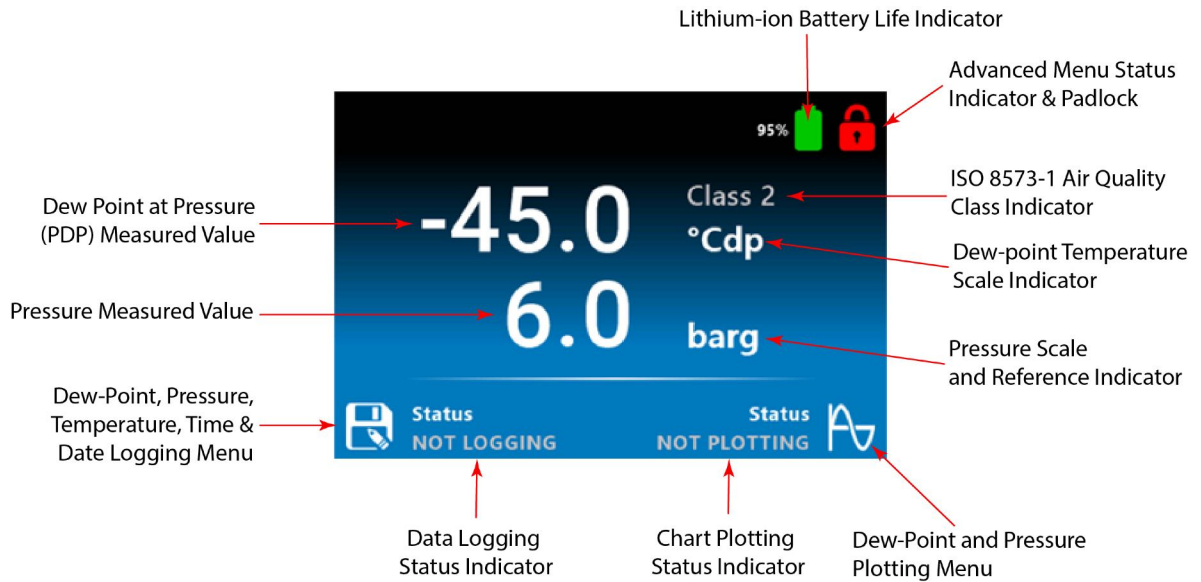


Figure 3 Main Operating Screen

1.3 Service Panel

Routine inlet filter maintenance, lithium-ion battery replacement and dew-point sensor replacement are all undertaken after removing the service panel.



Before the service panel is removed, the portable must be deactivated and depressurized. The unit pressure rating is 20 barg and operator safety is paramount.

This unit has three pressure warning labels on the front panel and within the service panel compartment, to ensure the operator services the unit in a safe manner.

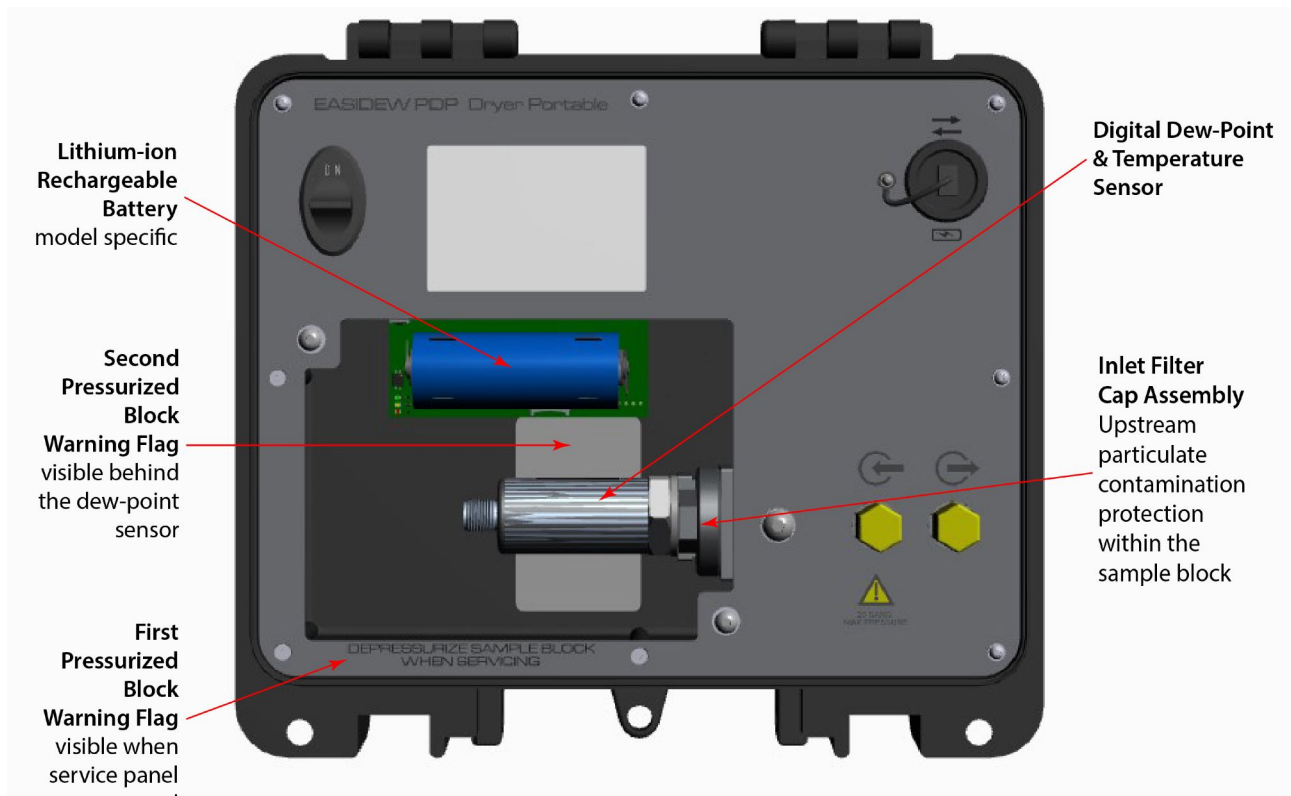


Figure 4 Service Panel Removed

1.4 Pressurized (PDP) Gas Portable Measurement System

All compressed gas dryers that require a moisture spot check work at the gas line pressure. If the dryer has optional dew-point control for improved system efficiency, the installed dew-point sensor on the dryer outlet measures and controls the dryer outlet moisture at line pressure.

Within the compressed gas sector, this is expressed as Pressure Dew Point (PDP) control. To ensure that an accurate moisture spot check is achieved, the Easidew PDP Dryer Portable replicates the measurement of dew point at line pressure. All compressed gas dryers specify a minimum achievable moisture dryness in Pressure Dew Point (PDP): for example, ISO 7573-1 Class 2, -40 °C PDP.

This means the moisture drying mechanism (dryer), the dryer control moisture sensor (if fitted) and the spot-checking moisture sensor within the portable are all used in pressurized state. This is key to obtaining an accurate, repeatable, high-quality moisture system check.

This is achieved through the use of a sample block containing a dew-point sensor and pressure sensor monitoring at line pressure.

This unit is NOT designed to measure at atmospheric (ATM) pressure.

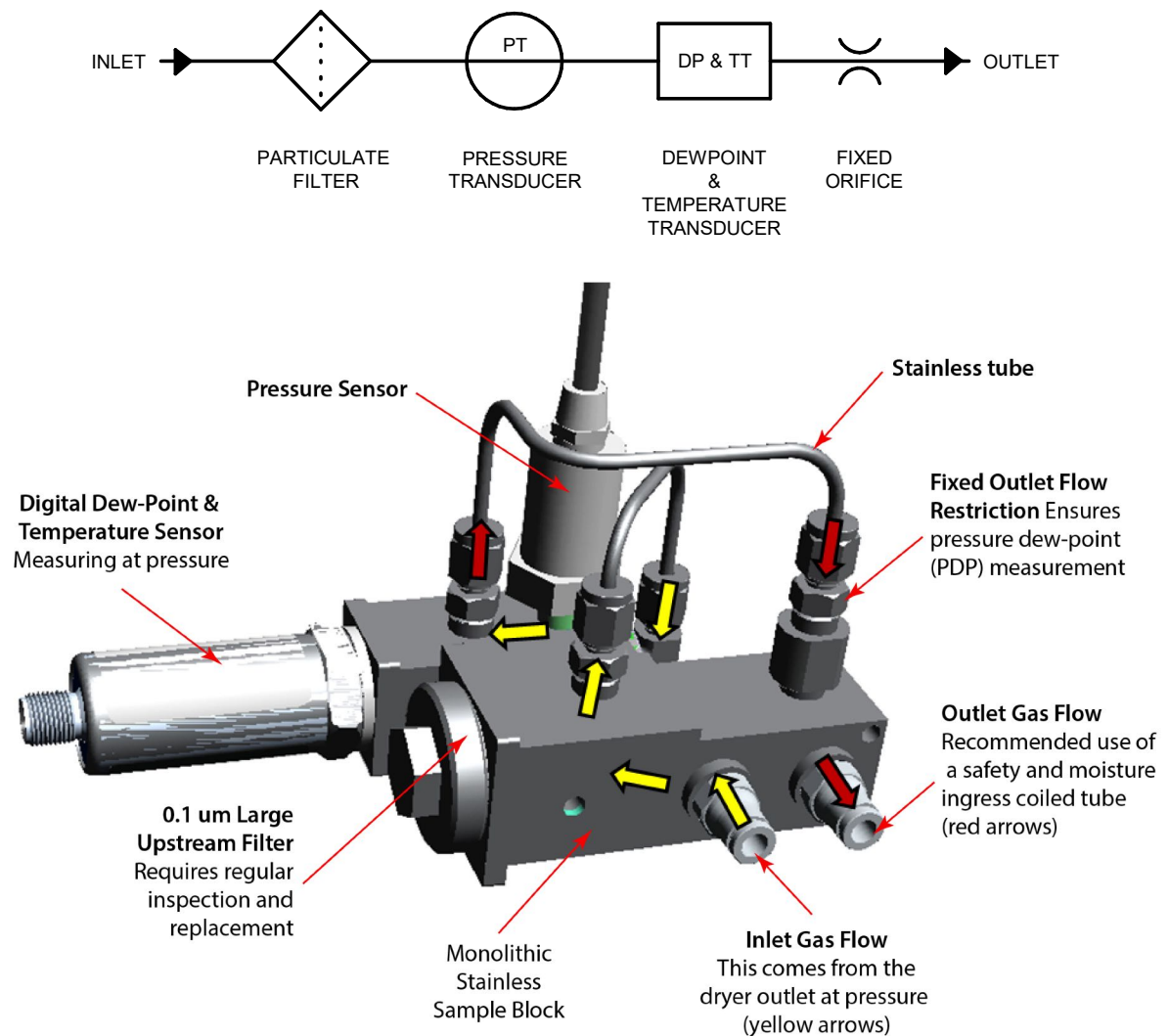


Figure 5 System Schematic and System Design Mechanics

2 INSTALLATION

2.1 Safety



It is essential that the installation of the electrical and gas supplies to this instrument are undertaken by qualified personnel.

2.2 Unpacking the Instrument

The Easidew PDP Portable is packed into a standard box. Unpack the unit and accessories carefully and save all the packing materials for the purpose of returning the instrument for re-calibration or any warranty claims.

2.3 Easidew PDP Portable Accessories

The accessories for the Easidew PDP Portable are listed below. Items 1 to 6 are supplied as standard and items 7 to 13 are optional.

Please check that all the standard components are present after unpacking. Report any shortages immediately.

1. Dew-Point Sensor
2. Calibration certificate
3. 2-meter 6-mm O.D. PTFE tube
4. 1.5-meter USB-C to USB-C battery charger and data transfer cable
5. Touchscreen stylus pen
6. 10 off spare inlet sample block filters
7. 3A fast charge with 4 global universal power connection adaptors and USB-C 1.5 meter cable (optional)
8. 6-mm Swagelok to 1/8" BSPT Adaptor x2" (optional)
9. 1/4" Swagelok to 1/8" BSPT Adaptor x2" (optional)
10. Legris Quick-Connect for 6-mm PTFE tubing to 1/8" BSPT Adaptor (optional)
11. Easidew M12 Service Exchange Sensor with 5/8" UNF -100...+20 °C DP HDPE guard (optional)
12. SF82 M12 Service Exchange Sensor with 5/8" UNF -100...+20 °C DP HMWPE guard (optional)
13. Outlet-Coiled Stainless Pigtail (rated up to 20 barg) (optional)
14. Commercial 3A fast charge with four global universal power connection adaptors and USB-C 1.5-meter cable (optional)

2.4 Operational Requirements

Operational requirements are as follows:

Moisture sensor flow rate: Recommended: 1...5 NI/min
 Maximum: 15 NI/min

Pressure range: Up to 20 barg (290 psig)

2.4.1 Environmental Requirements – Easidew PDP Portable

Operating temperature range: -20...+50 °C (-4...+122 °F)

Storage temperature range: -40...+50 °C (-40...122 °F)

2.4.2 Battery Charger Electrical Requirements

The unit is designed to work with any commercially available generic battery charge system with a USB-C connector. To ensure the battery is charged quickly and efficiently, it is recommended that the battery charger used has a 3A fast-charge capability. We provide a suitable 3A USB-C fast battery charger as an optional accessory.

2.5 Gas Connections



POSSIBLE INJURY! The tubing, valves and other apparatus attached to this instrument must be adequate for the maximum pressure which will be applied, otherwise physical injury to the operator or bystander is possible.

Sample gas connections are made via the inlet gas connection and outlet gas connection ports located on the right-hand side of the portable front panel as shown in *Figure 2*.

The portable is supplied with 1/8" NPT female threads on the inlet and outlet gas connections to allow the user to connect inlet/outlet fittings of their choice.

2.5.1 Inlet and Outlet Fittings



HIGH PRESSURE! High pressure gases are potentially hazardous. Energy stored in these gases can be released suddenly and with extreme force. High pressure systems should be assembled and operated only by personnel who have been trained in proper safety practices.

Before making a measurement, the gas fittings should be attached to the instrument as shown below.

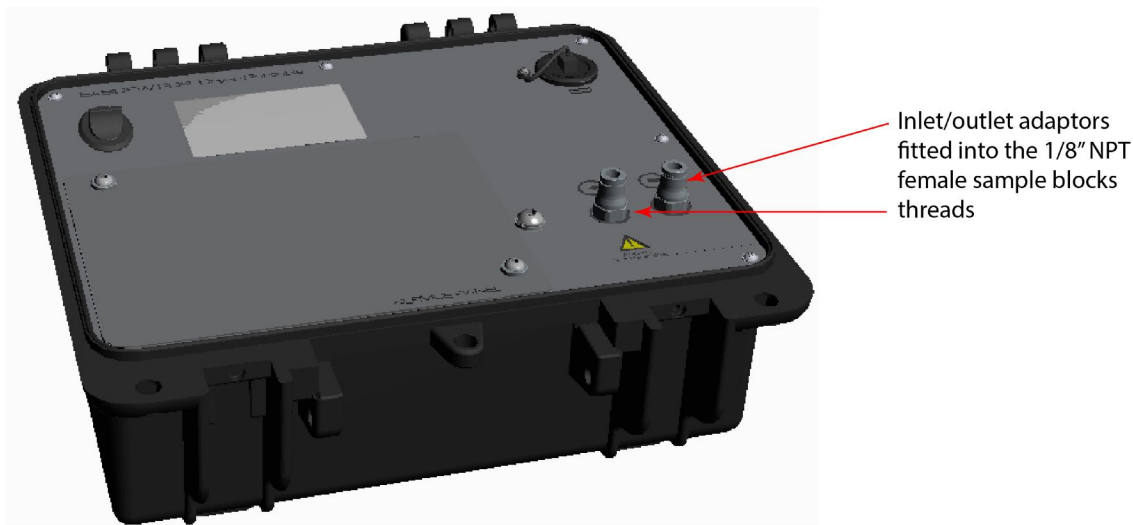


Figure 6 *Adaptor Fitting*

2.6 Internal Battery Management



A replacement battery must be of the same make and model to ensure compatibility and safety.

Replace only with Ansmann Li-Ion 26650 Protected Type-C battery, otherwise SAFETY and compatibility will be affected.

To avoid damaging the instrument, do not reverse the polarity.

2.6.1 Battery Charging

The internal lithium-ion battery should be fully charged before use. It is acceptable to use any commercially available battery charger with a USB-C connector, but it is recommendable to use a 3A battery charger for fast, efficient charging. Figure 7, below, confirms the charge curve of the system, assuming a 3A charger is used.

NOTE: With a fast charger (at least 3A), it takes <2 hours to reach 80 % and <3.5 hours to reach 100 % charge.

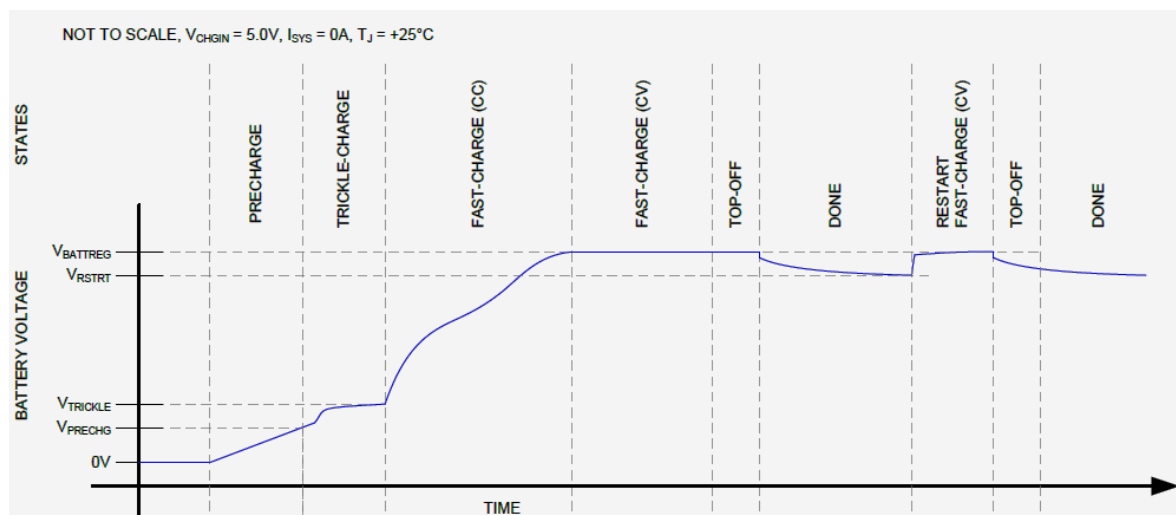


Figure 7 3A Fast-Charger Curve

2.6.2 Battery Safety



All international regulations regarding the transportation of lithium-ion batteries must be adhered to.

The lithium-ion battery, fitted and electrically connected within the portable, incorporates a smart battery charging/safety protection system and is suitable for carriage in all forms of transportation.

3 OPERATION



High pressure gases are potentially hazardous. Energy stored in these gases can be released suddenly and with extreme force. High pressure systems should be assembled and operated only by people who have been trained in proper safety practices.

POSSIBLE INJURY! The tubing, valves and other apparatus attached to this instrument must be adequate for the maximum pressure which will be applied, otherwise physical injury to the operator or bystander is possible.

3.1 Preparation for Operation

Before operation, it is recommended that the user becomes familiar with Section 1 of this manual, which describes the equipment controls and indicators, and the elements of the display.

It is recommended that the battery is charged before conducting any tests.

3.2 User Controls

3.2.1 Main Screen

The HMI interface on the Easidew PDP Portable is simple and intuitive. The main operating screen is shown below.

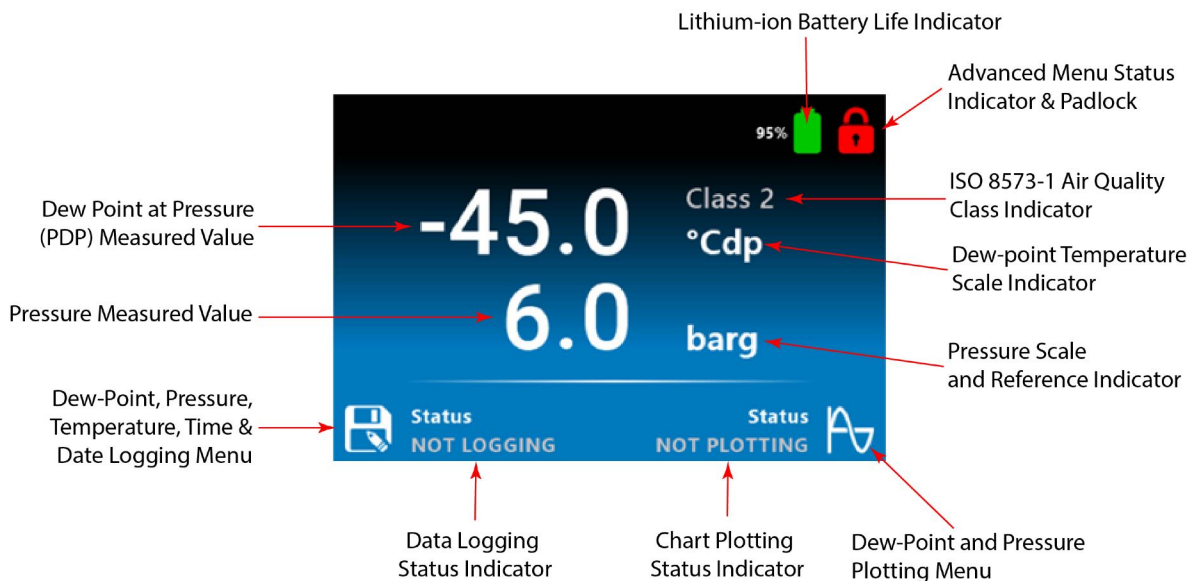


Figure 8 Main Screen

3.2.2 Dew-Point and Pressure Chart Plotting

When the graph/plot icon is pressed manually or auto-activated, the portable will chart Dew Point and Pressure against Time; this is displayed in a graph (see below). The graphing function is set up in the advanced menu shown in Section 3.2.11.

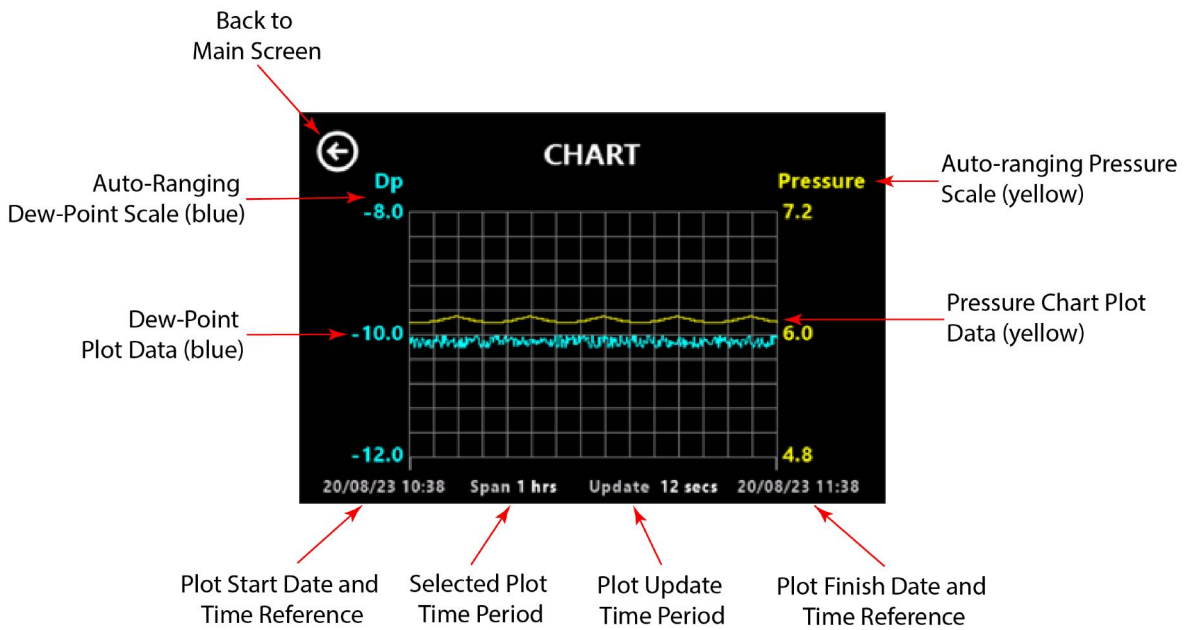


Figure 9 Dew-Point and Pressure Chart Plotting

3.2.3 Dew-Point, Pressure, Temperature and Time & Date Logging Setup Screen

When the data log icon is pressed manually or auto-activated, the portable will data log Dew Point, Pressure, Temperature and Time & Date on the internal SD card.

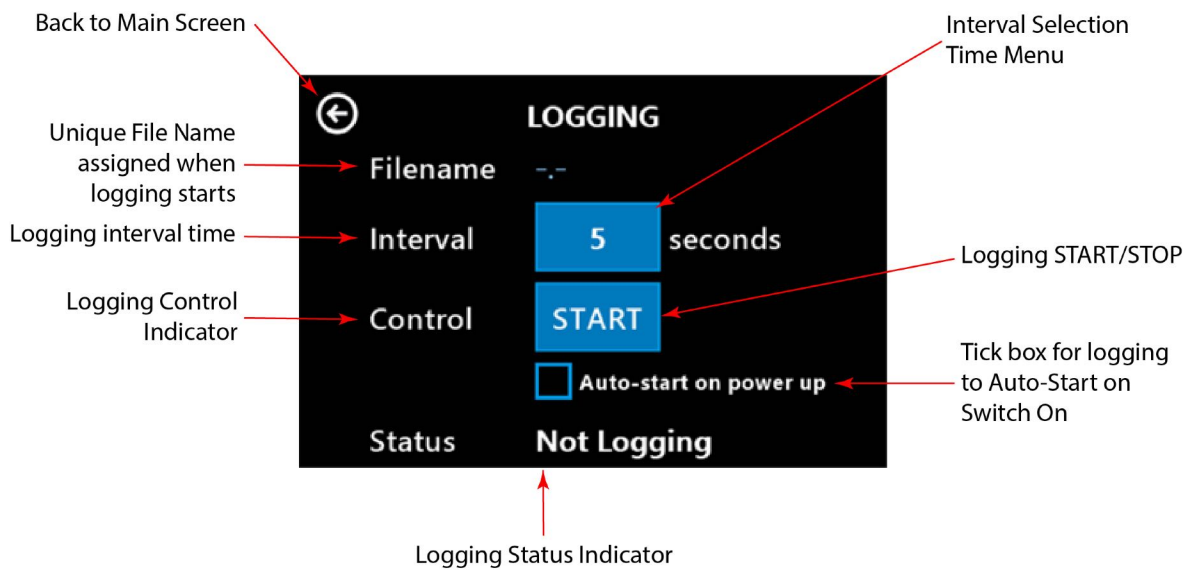


Figure 10 Dew-Point, Pressure, Temperature, Time & Date Logging Setup Screen

3.2.4 Dew-Point, Pressure, Temperature and Time & Date Logging Interval

The data log interval is selected before logging from a preset selection table, as shown below.

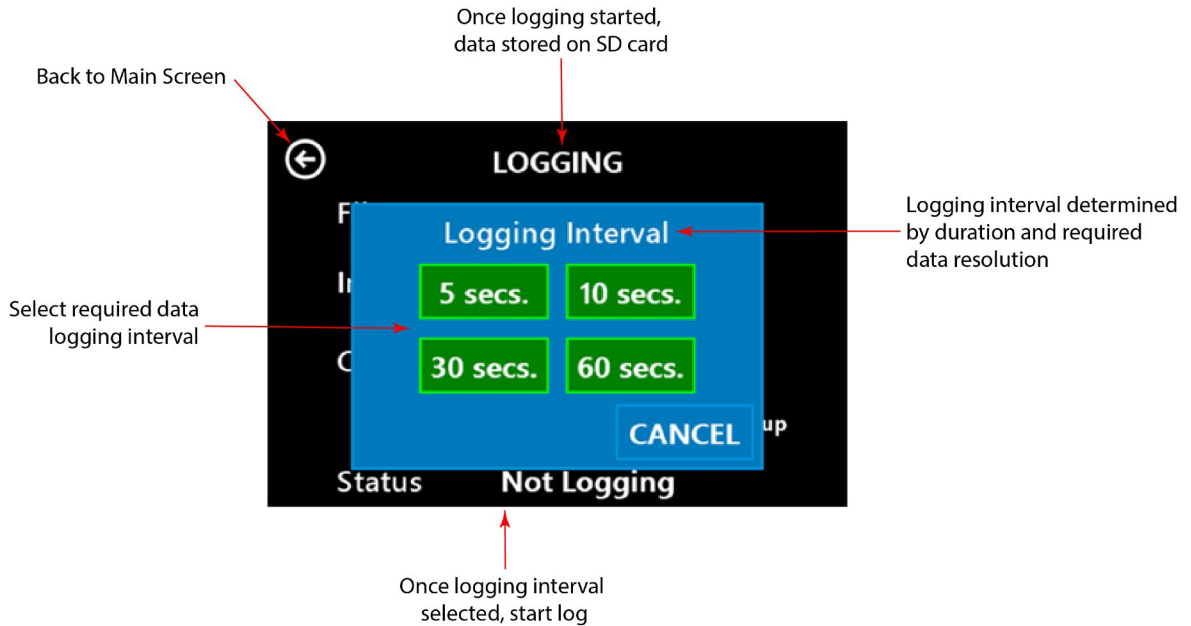


Figure 11 Data Log Interval Selection Screen

3.2.5 Start Data Logging Setup Screen

After the data log interval is selected, the screen shown below confirms the unique .txt file name where the data is stored. To enable data logging, press the Control START icon.

If you require the portable to automatically start data logging on power up, select the 'Auto-start on power up' box.

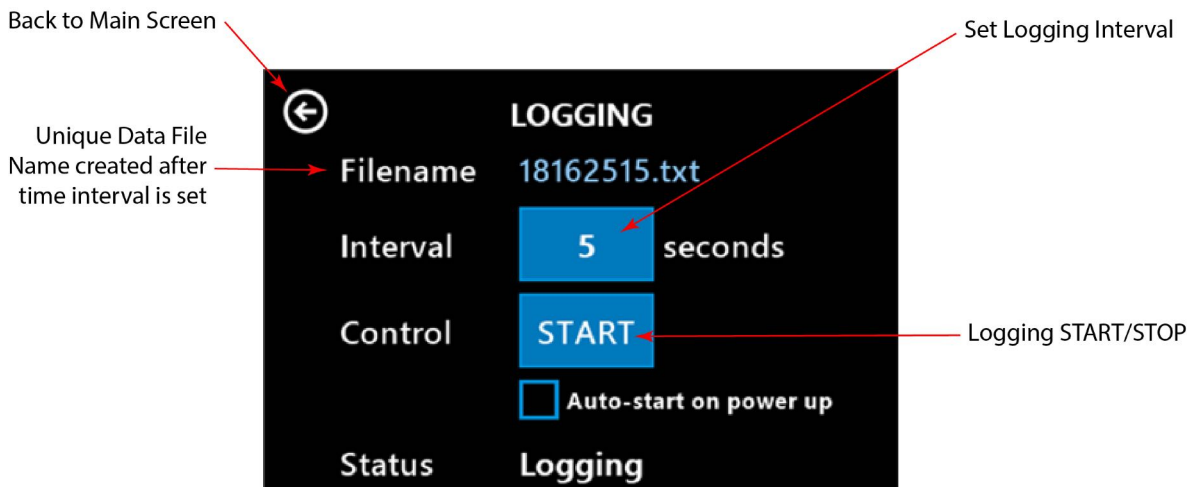


Figure 12 Start Data Logging Screen

3.2.6 Accessing the Advanced Menu Functions

The advanced functionality and graphing function setup is accessed in the Advanced menu, which is reached by selecting the red padlock.

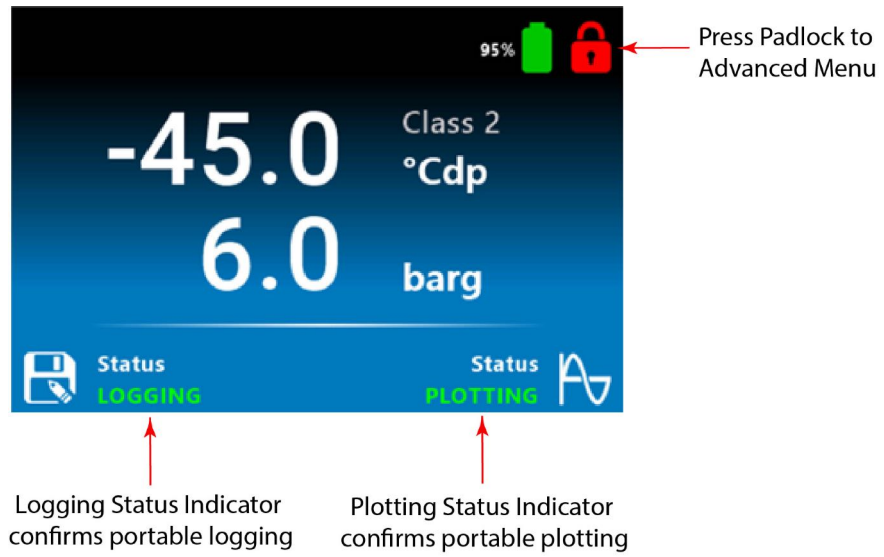


Figure 13 Advanced Menu Access Screen

3.2.7 Security Code Protection for Advanced Menu

To access the advanced menu, enter the security code 5618.

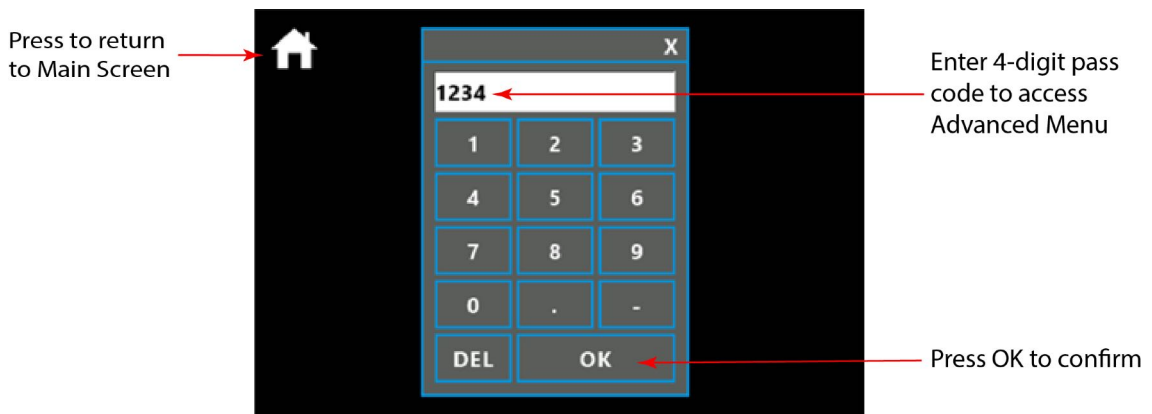


Figure 14 Security Code Screen

3.2.8 Advanced Menu Setup Screen

Once the security code has been entered, you will have access to the advanced menu.

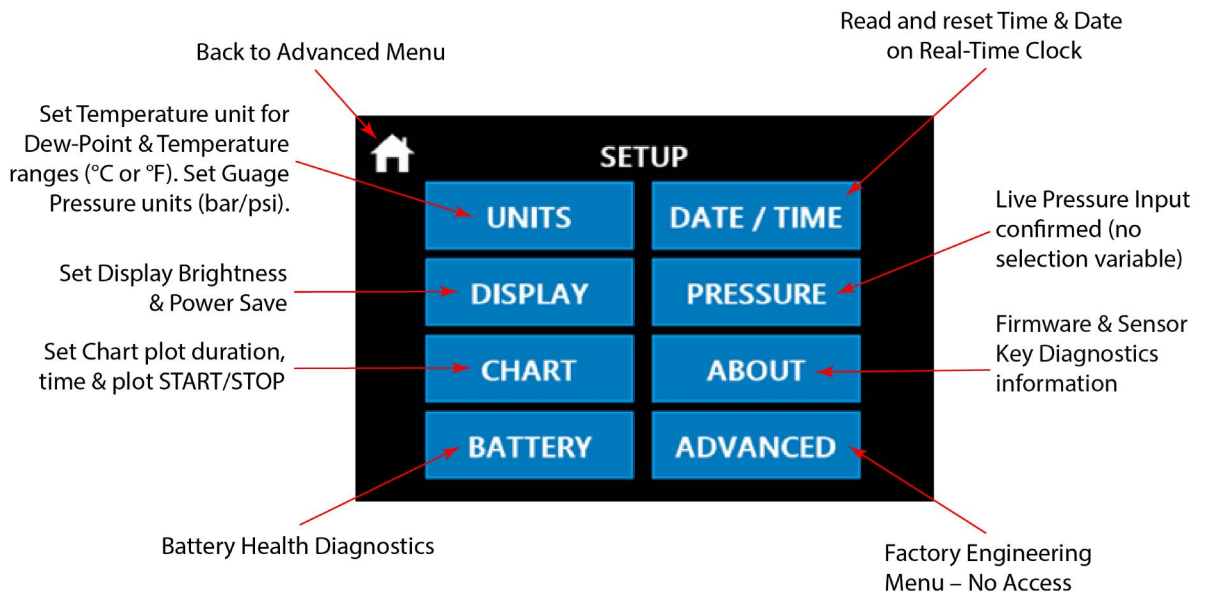


Figure 15 Advanced Menu Setup Screen

3.2.9 Parameter Scaling

The portable provides two Temperature and two Pressure scales. On the Parameter Scaling screen shown below, press the appropriate blue button to select the required scale.

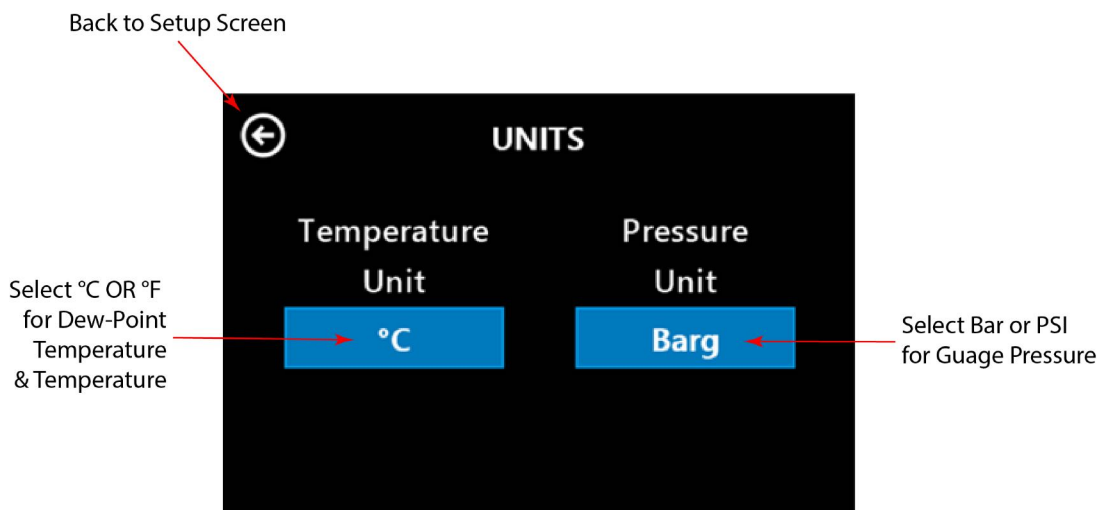


Figure 16 Parameter Scaling Screen

3.2.10 Display Brightness and Power Save

The display consumes approximately 70 % of the power drain on the rechargeable battery. Careful selection of both the display brightness and display power saving will ensure the portable battery achieves the stated life of two working days. Once the unit is installed and logging on the outlet of the dryer, the display does not need to be set in continuous operation and will go into power saving mode (showing a blank screen), only being reactivated if the screen is touched.

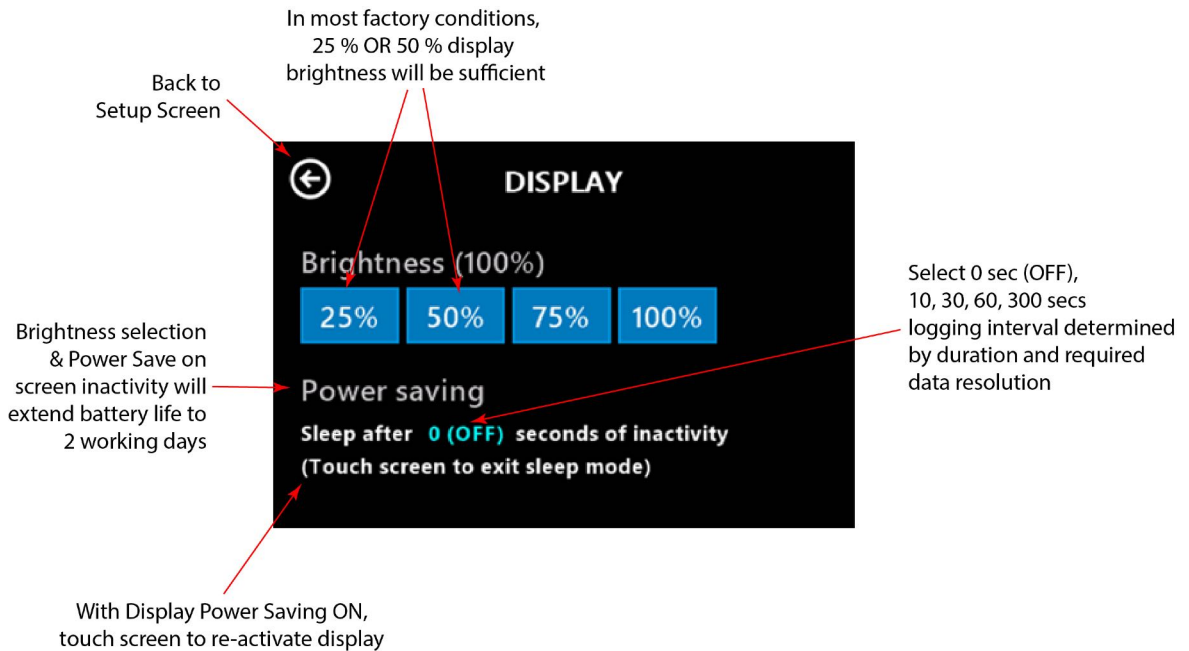


Figure 17 Display Screen

3.2.11 Dew-Point and Pressure Chart Plotting Set Up

On the screen below, the duration of the chart plotting/graphing function is defined. Use the Control button to START or STOP the chart plotting.

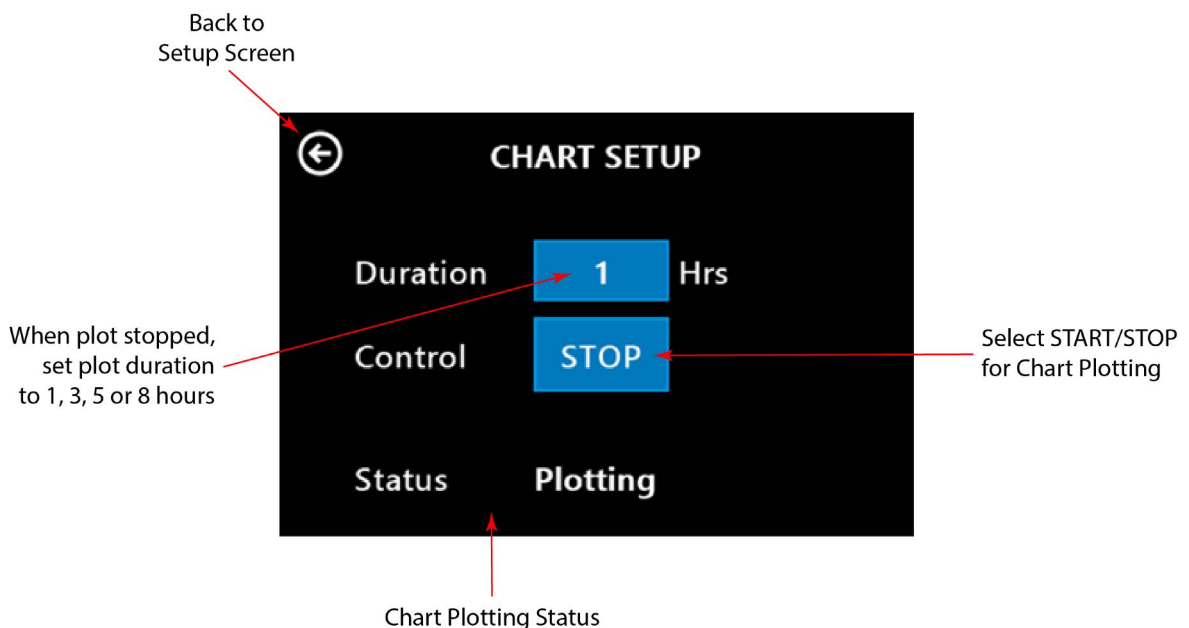


Figure 18 Chart Setup Screen

3.2.12 Battery Health Diagnostics

The two screens below provide visual confirmation of the state of the internal rechargeable battery.

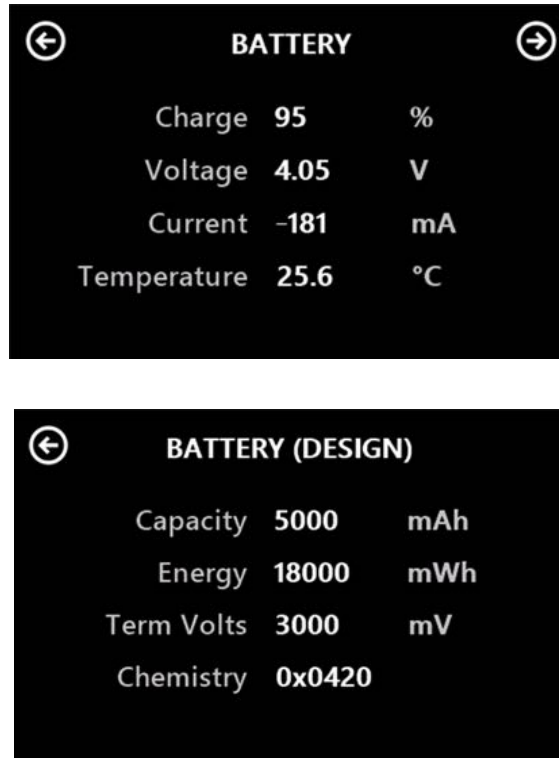


Figure 19 Battery Health and Diagnostics Screens

3.2.13 Date/Time Screen

The screen below allows the user to change the reference date and time set within the portable. This is needed if the unit is used in different time zones and allows for readjustment of the internal clock.

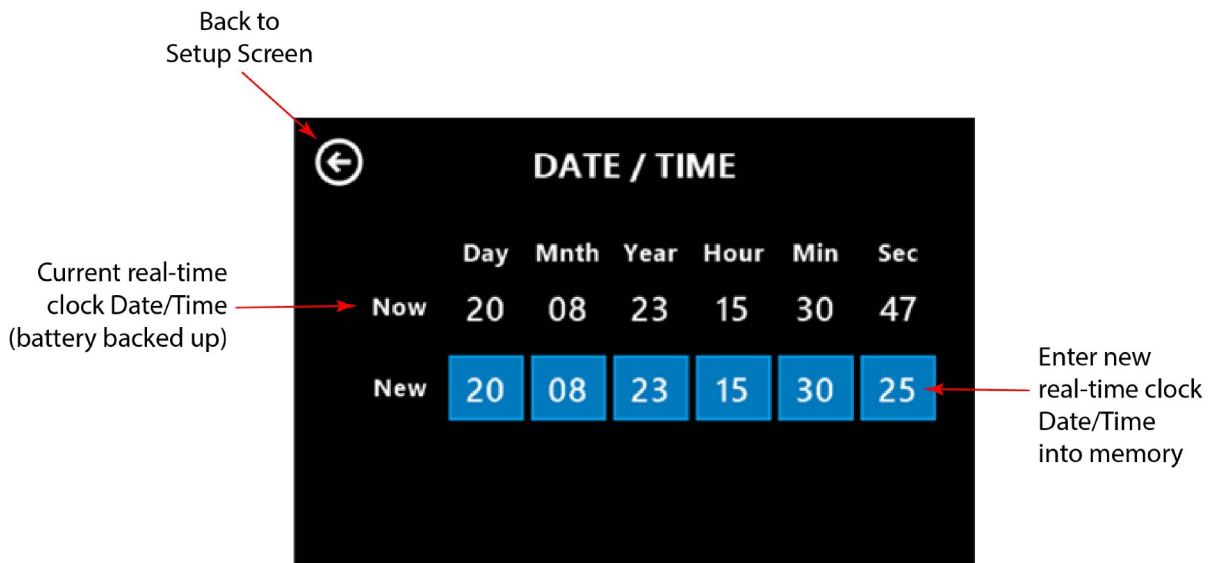


Figure 20 Date/Time Screen

3.2.14 Unit Firmware and Sensor Diagnostics

This screen confirms the firmware revision used within the portable.

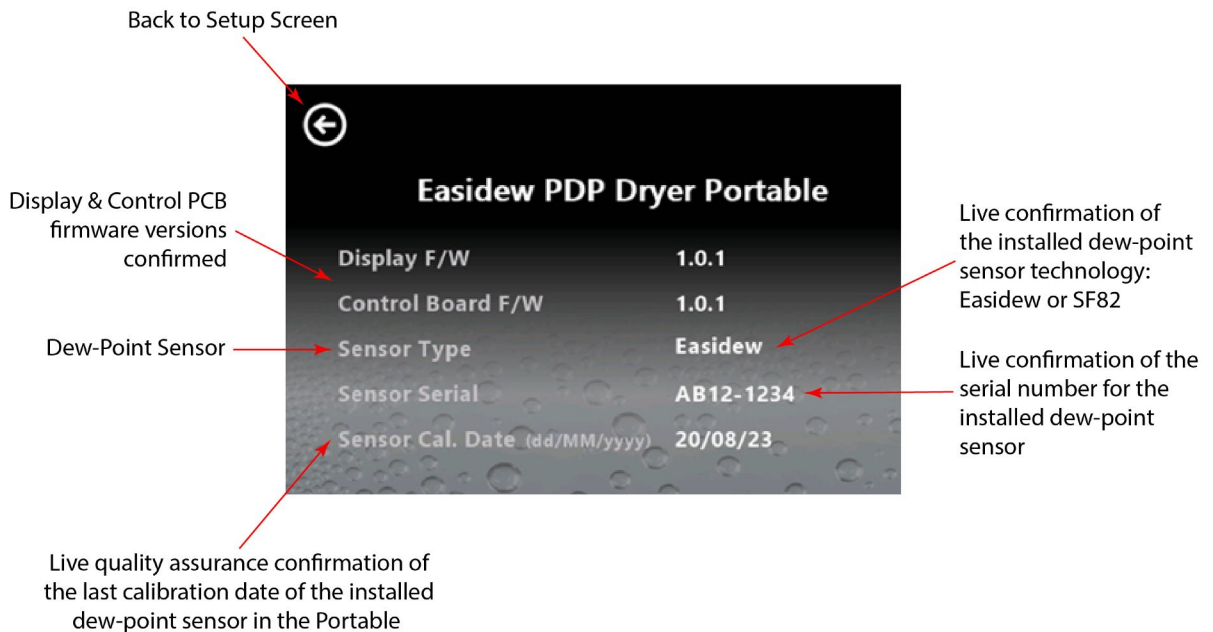


Figure 21 Unit Firmware and Sensor Diagnostics

3.3 Data Logging Download

The Easidew PDP Dryer Portable hygrometer monitors and logs key parameters like dew point, pressure and temperature in real time. The data is stored internally on the integral SD memory card.

Downloading this data is simple and requires no special application software. The process is explained below:

1. When a data logging operation is started, the portable assigns a unique file name to that data file in .txt file format.
2. When the USB-C cable is connected from the portable to any computer, the portable behaves like a normal external memory drive when connected to a laptop or PC.
3. To view the data files stored within the portable during dryer spot checking, open Windows Explorer on a laptop or PC and click on the external drive representing the portable.
4. Download the .txt data files directly to your computer and rename the files as required.
5. The .txt spot-checking data files can be imported into a spreadsheet software program and will be fully formatted into headed data columns for ongoing analysis by the user.
6. It is recommend that, after the data files are downloaded from the portable, good file management is followed and the transferred data files left on the SD memory card are deleted.

4 GOOD MEASUREMENT PRACTICE

Ensuring reliable and accurate moisture measurements requires the correct sampling techniques, and a basic understanding of how water vapor behaves. This section aims to explain the common mistakes and how to avoid them.

Sampling Materials – Permeation and Diffusion

All materials are permeable to water vapor since water molecules are extremely small compared to the structure of solids, even including the crystalline structure of metals. The graph above demonstrates this effect by showing the increase in dew point temperature seen when passing very dry gas through tubing of different materials, where the exterior of the tubing is in the ambient environment.

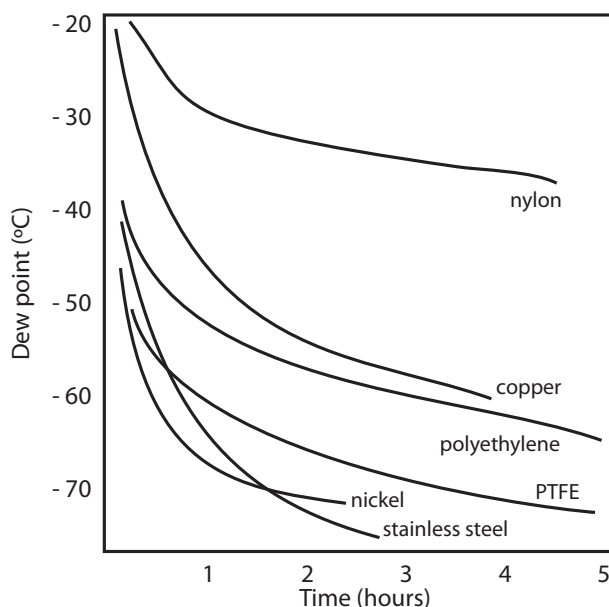


Figure 22 *Material Permeability Comparison*

What this demonstrates is the dramatic effect that different tubing materials have on the humidity levels of a gas passed through them. Many materials contain moisture as part of their structure and when these are used as tubing for a dry gas the gas will absorb some of the moisture. Always avoid using organic materials (e.g. rubber), materials containing salts and anything which has small pores which can easily trap moisture (e.g. nylon).

As well as trapping moisture, porous sampling materials will also allow moisture vapor to ingress into the sample line from outside. This effect is called diffusion and occurs when the partial water vapor pressure exerted on the outside of a sample tube is higher than on the inside. Remember that water molecules are very small so in this case the term 'porous' applies to materials that would be considered impermeable in an everyday sense – such as polyethylene or PTFE. Stainless steel and other metals can be considered as practically impermeable and it is surface finish of pipework that becomes the dominant factor. Electropolished stainless steel gives the best results over the shortest time period.

Take into consideration the gas you are measuring, and then choose materials appropriate to the results you need. The effects of diffusion or moisture trapped in materials are more significant when measuring very dry gases than when measuring a sample with a high level of humidity.

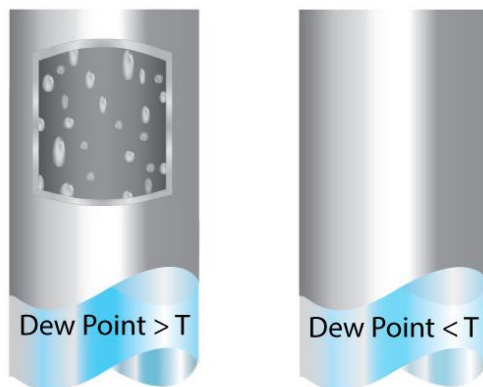
Temperature and Pressure effects

As the temperature or pressure of the environment fluctuates, water molecules are adsorbed and desorbed from the internal surfaces of the sample tubing, causing small fluctuations in the measured dew point.

Adsorption is the adhesion of atoms, ions, or molecules from a gas, liquid, or dissolved solid to the surface of a material, creating a film. The rate of adsorption is increased at higher pressures and lower temperatures.

Desorption is the release of a substance from or through the surface of a material. In constant environmental conditions, an adsorbed substance will remain on a surface almost indefinitely. However, as the temperature rises, so does the likelihood of desorption occurring.

Ensuring the temperature of the sampling components is kept at consistent levels is important to prevent temperature fluctuation (i.e. through diurnal changes) continually varying the rates of adsorption and desorption. This effect will manifest through a measured value which increases during the day (as desorption peaks), then decreasing at night as more moisture is adsorbed into the sampling equipment.



If temperatures drop below the sample dew point, water may condense in sample tubing and affect the accuracy of measurements.

Maintaining the temperature of the sample system tubing above the dew point of the sample is vital to prevent condensation. Any condensation invalidates the sampling process as it reduces the water vapor content of the gas being measured. Condensed liquid can also alter the humidity elsewhere by dripping or running to other locations where it may re-evaporate.

Although ambient pressure does not change drastically in a single location, the gas sample pressure does need to be kept constant to avoid inconsistencies introduced by adsorption or desorption. The integrity of all connections is also an important consideration, especially when sampling low dew points at an elevated pressure. If a small leak occurs in a high-pressure line, gas will leak out; however, vortices at the leak point and a negative vapor pressure differential will also allow water vapor to contaminate the flow.

Theoretically flow rate has no direct effect on the measured moisture content, but in practice it can have unanticipated effects on response speed and accuracy. An inadequate flow rate may:

- Accentuate adsorption and desorption effects on the gas passing through the sampling system.
- Allow pockets of wet gas to remain undisturbed in a complex sampling system, which will then gradually be released into the sample flow.
- Increase the chance of contamination from back diffusion. Ambient air that is wetter than the sample can flow from the exhaust back into the system. A longer exhaust tube can help alleviate this problem.
- Slow the response of the sensor to changes in moisture content.

An excessively high flow rate can:

- Introduce back pressure, causing slower response times and unpredictable changes in dew point
- Result in a reduction in depression capabilities in chilled mirror instruments by having a cooling effect on the mirror. This is most apparent with gases that have a high thermal conductivity such as hydrogen and helium.

System design for fastest response times

The more complicated the sample system, the more areas there are for trapped moisture to hide. The key pitfalls to look out for here are the length of the sample tubing and dead volumes.

The sample point should always be as close as possible to the critical measurement point to obtain a truly representative measurement. The length of the sample line to the sensor or instrument should be as short as possible. Interconnection points and valves trap moisture, so using the simplest sampling arrangement possible will reduce the time it takes for the sample system to dry out when purged with dry gas.

Over a long tubing run, water will inevitably migrate into any line, and the effects of adsorption and desorption will become more apparent.

Dead volumes (areas which are not in a direct flow path) in sample lines, hold onto water molecules which are slowly released into the passing gas. This results in increased purge and response times, and wetter than expected readings. Hygroscopic materials in filters, valves (e.g. rubber from pressure regulators) or any other parts of the system can also trap moisture.

Plan your sampling system to ensure that the sample tap point and the measurement point are as close as possible to avoid long runs of tubing and dead volumes.

Filtration

All trace moisture measurement instruments and sensors are by their nature sensitive devices. Many processes contain dust, dirt or liquid droplets. Particulate filters are used for removing dirt, rust, scale and any other solids that may be in a sample stream. For protection against liquids, a coalescing or membrane filter should be used. The membrane provides protection from liquid droplets and can even stop flow to the analyser completely when a large slug of liquid is encountered, saving the sensor from potentially irreparable damage.

Flow Rates

Theoretically flow rate has no direct effect on the measured moisture content, but in practice it can have unanticipated effects on response speed and accuracy. The optimal flow rate varies depending on the measurement technology, and can always be found in the instrument or sensor manual.

An inadequate flow rate can:

- Accentuate adsorption and desorption effects on the gas passing through the sampling system.
- Allow pockets of wet gas to remain undisturbed in a complex sampling system, which will then gradually be released into the sample flow.
- Increase the chance of contamination from back diffusion: ambient air that is wetter than the sample can flow from the exhaust back into the system. A longer exhaust (sometimes called a pigtail) can also help alleviate this problem.
- Slow the response of the sensor to changes in moisture content.

An excessively high flow rate can:

- Introduce back pressure, causing slower response times and unpredictable effects on equipment such as humidity generators.
- Result in a reduction in heating capabilities of the sensor tile during the initialization period. This is most apparent with gases that have a high thermal conductivity such as hydrogen and helium.



POSSIBLE INJURY! The tubing, valves and other apparatus attached to this instrument must be adequate for the maximum pressure which will be applied, otherwise physical injury to the operator or bystander is possible.



Before disconnecting the Easidew PDP Dryer Portable from the gas line, it is essential to vent the system to atmospheric pressure, otherwise severe injury could result.

5 MAINTENANCE

All field maintenance outlined in this section is undertaken by removing the service panel to access the replaceable parts. See figure below.

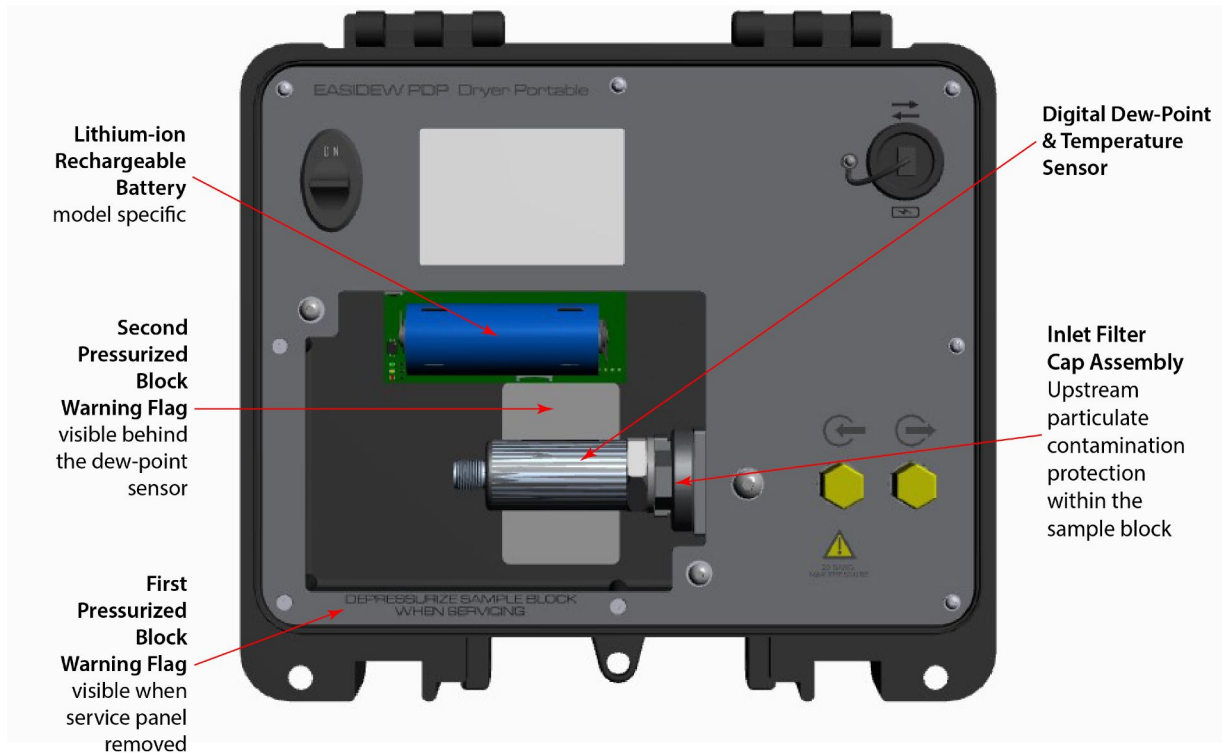


Figure 23 Service Panel Removed

5.1 Inlet Filter Maintenance and Replacement

In any gas treatment system, good upstream filtration from the measurement sensors is recommended. However, if any contamination enters the portable, there is a large inlet particulate filter upstream of the pressure, temperature and dew-point sensors. It is vital for this inlet filter to be checked regularly for signs of particulate contamination.

10 replacement filters are supplied in the bottom left-hand pocket in the case lid. The process for changing these is as follows:

1. Ensure the portable is switched off and depressurized.
2. Using a standard 2.5-mm Allen key, remove the two Allen bolts and lift the service panel away. Keep the bolts safe and clean.
3. Using a suitable spanner on the hex face of the filter cap, unscrew the assembly.
4. Inspect the filter for contamination and, if detected, change the filter.
5. Ensure the O-Ring seal on the surface of the sample block is retained.
6. Screw the filter cap assembly into the sample block by hand.
7. Using the spanner, tighten to a recommended torque of 0.4 Nm.
8. Refit the service panel.
9. It is recommendable to switch on the portable, to check it is operating correctly.

5.2 Moisture Sensor Maintenance and Replacement

To change the dew-point sensor, follow the steps below:

1. Ensure the portable is switched off and depressurized.
2. Disconnect the M12 electrical cable connector at the back of the dew-point sensor.
3. Using a suitable spanner on the hex face of the dew-point sensor, unscrew the sensor and remove.
4. Take the replacement service exchange dew-point sensor and, ensuring the newly supplied bonded seal is used, screw the dew-point sensor back into the sample block by hand.
5. Using the spanner, fully tighten to a torque setting of 30.5 Nm (22.5 ft-lbs).
6. Reconnect the M12 electrical cable connector onto the sensor.
7. Refit the service panel.
8. It is recommended to switch on the portable, to check it is operating correctly following the sensor upgrade.
9. Under the terms of the sensor exchange programme, the sensor that has been removed should be correctly packaged, documented and returned to your local Michell subsidiary or distributor for return to our factory.

5.3 Integral Battery Replacement

The rechargeable battery should not need to be replaced regularly. If replacement is required, the new battery must be of the same make and model to ensure compatibility and safety.

Replacing the battery is simple:

1. Ensure the portable is switched off and depressurized.
2. Undo the velcro strap holding the battery in its holder.
3. Using your fingers, or a very low force non-metallic lever, uncouple the old battery from its holder.
4. Insert the new battery, making sure it is fitted with the correct polarity.
5. Refit the velcro strap, ensuring the battery is held in place.

5.4 SD Card Replacement

It is very unlikely the SD memory card will ever need to be replaced; however, if a replacement is required, the process is as follows:

1. Ensure the portable is switched off and depressurized.
2. Carefully push the SD card back into its holder, withdraw and replace with the new SD card.

6 SHIPPING

For shipping purposes, the instrument should be packed in its original carton, which will provide the recommended degree of protection during transit.

To prepare the instrument for shipping, proceed as follows:

1. Switch the instrument off and remove any connections to the Gas In and Gas Out ports and any external sensors connected to it.
2. If fitted, remove the instrument from its carrying case.
3. Pack the instrument in its original carton (1) as shown below.

NOTE: It is not necessary to return any accessories unless they require repair/replacement. Any returned accessories can be packed in the box (3).

4. Create a packing list detailing all equipment contained in the box, place it inside the box and seal the box.



Before disconnecting the Easidew PDP Dryer Portable from the gas line, it is essential to vent the system to atmospheric pressure, otherwise severe injury could result.

Appendix A

Technical Specifications

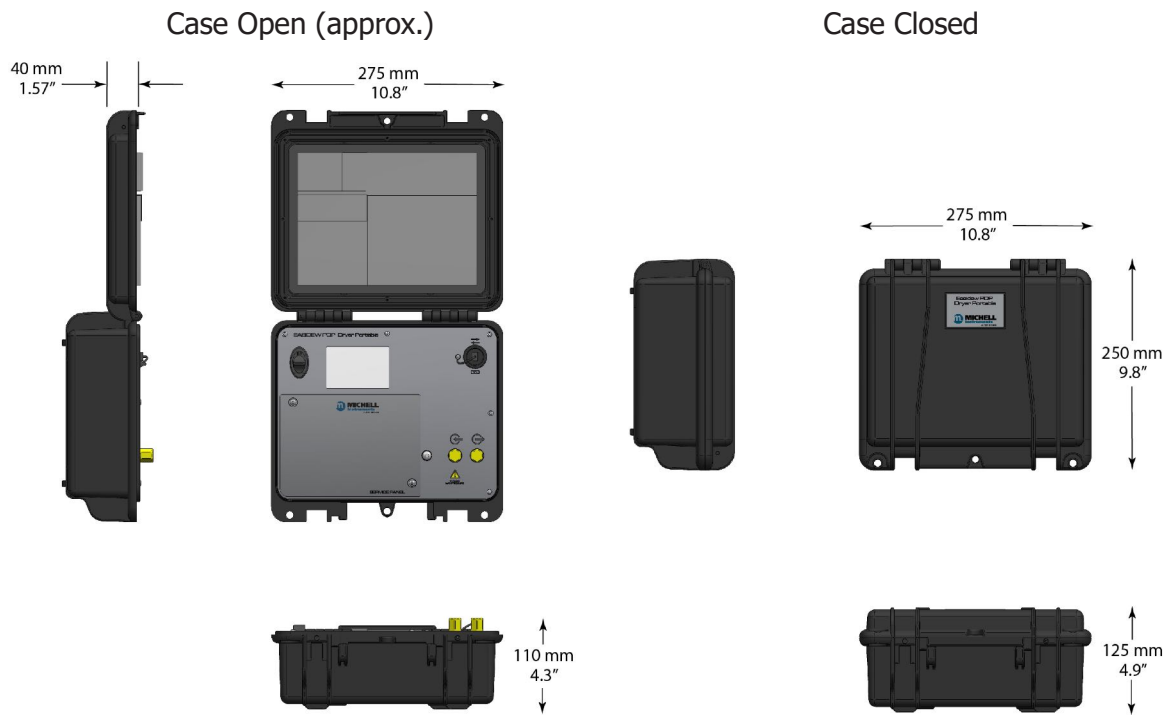
Appendix A Technical Specifications

Product	EA-PDP-B1	EA-PDP-B2
Performance Specifications		
Measurement Technology	Michell ceramic metal-oxide moisture sensor	Michell advanced thick-film fast-response dew-point sensor
Dew-Point Sensor Model	Easidew EA2-TX-M12	SF82-TX-M12
ISO 8573-1 Moisture Air Quality Class Compliant	Class 1 to Class 4	Class 2 to Class 4
Moisture Measurement Range	-100...+20 °C (-148...+68 °F) dew point	-60...+60 °C (-76...+140 °F) dew point
Accuracy	±2 °C (±3.6 °F) dew point*	
Moisture Response Time	5 mins to T95 (dry to wet) -70...+10 °C (-94...+50 °F) dew point	3 mins to T95 (dry to wet) -40...+10 °C (-40...+50 °F) dew point
Moisture Repeatability	0.5 °C (0.9 °F) dew point	
Moisture Calibration	Traceable 13-point calibration certificate	Traceable 9-point calibration certificate **
Moisture Scales	Dew point and ppm _v	
Process Pressure Measurement	Internal pressure sensor	
Pressure Range	Up to 20 barg (290 psig)	
Data Logging Parameters	Dew point, pressure, temperature, time, date	
Electrical Specifications		
Integral Battery Type	Rechargeable lithium-ion	
Integral Battery Charge Connection	USB-C	
Battery Charge Cable	1.5 meter USB-C to USB-C	
Battery Charger (optional)	Commercial 3A fast charge with 4 global universal power connection adaptors and USB-C 1.5 meter cable	
Battery Operating Life	Up to 2 working days when used in power save mode	
Safety Standard	EN 61010-1:2010+A1:2019	
Operating Specifications		
Operating Temperature Range	-20 °C...+50 °C (-4...122 °F)	
Storage Temperature Range	-40...+50 °C (-40...122 °F)	
Compensated Moisture Sensor Temperature Range	-20 °C...+50 °C (-4...122 °F)	
Moisture Sensor Flow Rate	Recommended: 1...5 NI/min Maximum: 15 NI/min	
Mechanical Specifications		
Ingress Protection	IP65 Carry Case closed IP54 Carry Case open	
Carry Case	Lifetime warranty, injection moulded polypropylene with internal storage for sample tube, filters, USB charging cable, display stylus	
Carry Case Dimensions (Closed)	275 mm x 125 mm x 250 mm (10.8"x 4.9" x 9.8")	
Weight	3.6 kg (7.9 lb)	
Integral Sample Block	Stainless-steel, fully self-contained sample system with pressure sensor, fixed orifice ports for flow control and built-in filtration using a standard drop-in cartridge	
Gas Wetted Materials	304 stainless sample block, 316 stainless tube	
Inlet Filtration on Sample Block	Removes 99.5 % of particles ≥0.1 µm supplied with cartridge installed. 10 x spare cartridges provided.	
Inlet Filter (Moisture Sensor Protection)	HDPE <10 µm	HMWPE <10 µm
Inlet/Outlet Gas Connections	1/8" BSPT to 6 mm Legris push-fit pneumatic fittings and 2 m PTFE 6 mm tube Optional: 1/8" BSPT to 6 mm Swagelok fitting, 1/8" BSPT to 1/4" Swagelok fitting	
Outlet Pigtail Pipe Assembly (optional)	Coiled stainless tube for pressure safety and Class 1 -70 °C (-94 °F) dew-point moisture ingress protection	
Service Panel	Access to dew-point sensor, SD Card, sample block filter, lithium-ion battery	
Display/Data Logging & Graphing Specifications		
Display Type	LCD 3.5" touchscreen graphics; 640 x 480 pixel with screen stylus	
Data Transfer Connection	USB-C to Laptop or PC	
Data Transfer File Type	TXT data file	
Integral SD Card Memory	2 GB	
Graphing Function	Plots dew-point and pressure response over time	

NOTES * Over Compensated Temperature Range

** Calibrated in 10 °C (18 °F) DP steps, -60...+20 °C (-76...+68 °F) DP

A.1 Dimensions



Appendix B

Quality, Recycling & Warranty Information

Appendix B Quality, Recycling, Compliance & Warranty Information

Michell Instruments is dedicated to complying to all relevant legislation and directives. Full information can be found on our website at:

www.ProcessSensing.com/en-us/compliance/

This page contains information on the following directives:

- Anti-Facilitation of Tax Evasion Policy
- ATEX Directive
- Calibration Facilities
- Conflict Minerals
- FCC Statement
- Manufacturing Quality
- Modern Slavery Statement
- Pressure Equipment Directive
- REACH
- RoHS
- WEEE
- Recycling Policy
- Warranty and Returns

This information is also available in PDF format.

Appendix C

Return Document & Decontamination Declaration

Appendix C Return Document & Decontamination Declaration

Decontamination Certificate

IMPORTANT NOTE: Please complete this form prior to this instrument, or any components, leaving your site and being returned to us, or, where applicable, prior to any work being carried out by a Michell engineer at your site.

Instrument			Serial Number	
Warranty Repair?	YES	NO	Original PO #	
Company Name			Contact Name	
Address				
Telephone #			E-mail address	
Reason for Return /Description of Fault:				
Has this equipment been exposed (internally or externally) to any of the following? Please circle (YES/NO) as applicable and provide details below				
Biohazards			YES	NO
Biological agents			YES	NO
Hazardous chemicals			YES	NO
Radioactive substances			YES	NO
Other hazards			YES	NO
Please provide details of any hazardous materials used with this equipment as indicated above (use continuation sheet if necessary)				
Your method of cleaning/decontamination				
Has the equipment been cleaned and decontaminated?			YES	NOT NECESSARY
Michell Instruments will not accept instruments that have been exposed to toxins, radio-activity or bio-hazardous materials. For most applications involving solvents, acidic, basic, flammable or toxic gases a simple purge with dry gas (dew point <-30°C) over 24 hours should be sufficient to decontaminate the unit prior to return. Work will not be carried out on any unit that does not have a completed decontamination declaration.				
Decontamination Declaration				
I declare that the information above is true and complete to the best of my knowledge, and it is safe for Michell personnel to service or repair the returned instrument.				
Name (Print)			Position	
Signature			Date	



www.ProcessSensing.com

Aufgrund laufender Weiterentwicklungen sind Änderungen der Spezifikationen vorbehalten. Alle Angaben vorbehaltlich Satz- und Druckfehler.

nbn Austria GmbH

Riesstraße 146, 8010 Graz

+43 316 40 28 05

nbn
info@nbn.at | www.nbn.at