AcuTrak & AcuDew

Inline Hygrometer   **Dewpoint Transmitter**

Instruction Manual

Issue 1

EU Declaration of Conformity

We	Shaw Moisture Meters
Of	Len Shaw Building, Bolton Lane, Bradford, England, BD2 1AF
Declare that	
Model Name:	Shaw AcuTrak
Description:	Mains powered single channel moisture analyser with two alarms and 4-20mA output

Conforms to the following Directives:
2014/30/EU The Electromagnetic Compatibility Directive and its amending Directives
93/68/EEC The Low Voltage Directive and its amending Directives

And has been designed and manufactured to the following standards:
EN 61326-1:2013 & EN 61326-2:2006 Electrical Equipment for measurement, control and Laboratory use- EMC Requirements
BS EN 61010-1:2010 Safety Requirements for Electrical Equipment for Measurement, control and laboratory use-General Requirements

I hereby declare that the aforementioned equipment has been designed to comply with the relevant sections of the above referenced specifications.

10TH February 2021

Andrew Coulton
Calibration & QA Manager

CP12A Issue 8

Unpacking Your Shaw Moisture Meters AcuDew & AcuTrak

Please examine the AcuDew package for any damage or mishandling. If any damage is evident please notify the carrier and the Shaw Moisture Meters representative from where this unit was purchased.

You should have received (if ordered):

- 1 AcuDew 4-20 mA dewpoint transmitter
- 1 AcuTrak instrument
- 1 connecting cable of the length specified on your order or two metres as
- standard
- 1 instruction manual
- 1 pressure dewpoint circular calculator
- 1 small screwdriver

If anything is missing please contact your distributor immediately.

1 Safety Instructions

1.1 Safety First

Local health and safety regulations should be obeyed, as should the safety critical prohibitions, warnings and notes highlighted in this user manual.

Symbol Key used in this manual.

⚠️	Do Not – Prohibited actions or behaviours.
⚠️	Warning – Danger to personnel and/ or damage to equipment.
ℹ️	Additional useful information.

⚠️ **Warning**
- The AcuDew Transmitter delivered to you has been tested for safety, calibrated and approved as shipped from the factory. Note the following precautions:
  - Do not modify the unit. Improper modification can damage the product or lead to malfunction.
  - The transmitter body does not have user serviceable parts inside and is not designed to be opened. Opening the transmitter will void the warranty.

⚠️ **Warning**
- This AcuTrak is designed for connection to hazardous electric voltages. Ignoring this warning can result in severe personal injury or physical damage. To avoid the risk of electric shock and fire, the safety instructions of this manual must be observed and the guidelines followed. The specifications must not be exceeded, and the AcuTrak must only be applied as described in the following pages. Prior to the commissioning of the AcuTrak, this manual must be examined carefully. Only qualified personnel (technicians) should install this AcuTrak.
- If the AcuTrak is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

⚠️ **Warning**
- Until the AcuTrak is installed, do not connect hazardous voltages to the AcuTrak.

- Trouble shooting of the AcuDew - AcuTrak system should only be carried out on a disconnected AcuDew - AcuTrak and under safe conditions.
- Do not modify the unit. Repairs to the AcuTrak must be done by Shaw Moisture Meters or authorized distributors only.

Warning

- Before mounting the AcuDew Transmitter into any system ensure the system is safe to work on. Depressurize and verify that all power connections are isolated in the off position.
- Installation should be carried out by trained technicians and following local safety protocols.

1.2 Definitions

Hazardous voltages have been defined as the ranges: 75 to 1500 volt DC and 50 to 1000 volt AC.

Technicians are qualified persons educated or trained to mount, operate, troubleshoot and validate operation, in accordance with safety regulations.

Operators are persons, being familiar with the content of this manual, able to adjust and operate the AcuTrak during normal operation.

1.3 Receipt and Unpacking

Unpack the AcuDew/AcuTrak without damaging it and make sure that the manual always follows the AcuDew/AcuTrak, and is always available. The packaging materials should always follow the AcuDew/AcuTrak until this has been permanently mounted.

Check the receipt of the AcuDew/AcuTrak to ensure the type corresponds to the one ordered.

1.4 Environment

Avoid direct sunlight, dust, high temperatures, mechanical vibrations and shock, as well as rain and heavy moisture. If avoidance of high moisture is not possible, employ ventilation, rather than increased temperature, to prevent condensation.

1.5 Normal Operation

Operators are only allowed to adjust and operate the AcuTrak when it is safely fixed to a panel, thus avoiding the danger of personal injury and damage. This means there is no electrical shock hazard and the AcuTrak front panel is easily accessible.

1.6 Cleaning

When disconnected, the AcuTrak may be cleaned with a cloth moistened with distilled water or ethyl alcohol.

1.7 Maintenance

Always ensure the AcuTrak is "switched off" before removing or replacing the AcuDew.

2 AcuTrak and AcuDew Transmitter Quick Start Guide

The **AcuDew Dewpoint Transmitter** is a 2 wire, 4 to 20mA loop powered device, used for continuous measurement of moisture in process gases, including the most common application, compressed air. The AcuDew transmitter is configured to output a 4 to 20mA linear signal for the following moisture units:
- Dewpoint temperature, °C
- Dewpoint temperature, °F
- Parts water vapour per million in a gas (PPMV)
- Parts water vapour per billion in a gas (PPBV)

Note: Check the AcuDew Transmitter label for its factory programmed range.

3.0 Connecting the AcuDew

Connector Pins

Pin 1 - Supply +ve   Pin 2 - Loop Return
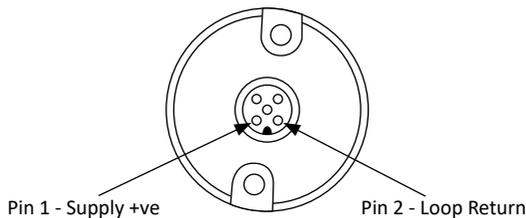
3.1 AcuDew 4 - 20 mA Cable Assembly

The cable assembly consists of a M12 5 pin cable connector used in conjunction with a 2 core 7/0.2 mm cable. Details of wiring can be found in Appendix F.

3.1.1 Connecting the AcuDew Cable
Align the keyed groove in the connector with the keyed notch in the AcuDew, push inwards and screw the locking ring clockwise finger tight.
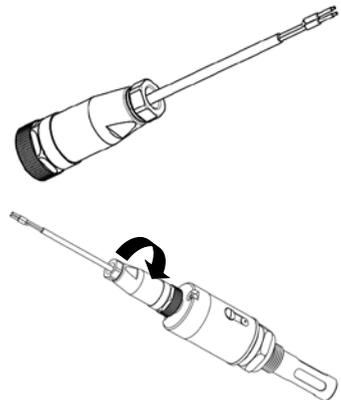
3.1.2 Connecting the AcuLoop

To connect the AcuLoop display to the AcuDew:

1. Disconnect the connector from the AcuDew by turning the locking ring counter-clockwise.
2. Screw this connector on to the back connection of the AcuLoop display.
3. Align the keyed notch and keyed groove.
4. Gently push the AcuLoop display on to the AcuDew turning the locking ring clockwise to secure.
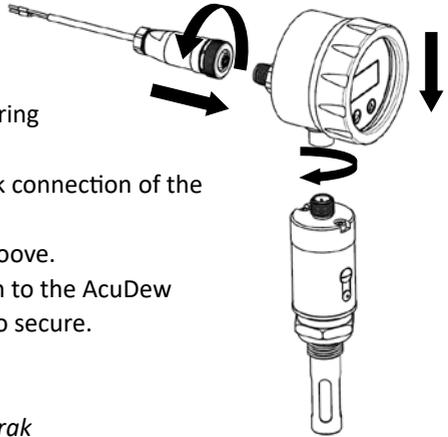
3.1.3 Connecting the AcuDew to an AcuTrak

The AcuTrak displays a digital readout of the 4-20 mA input signal derived from an attached AcuDew.

The AcuTrak indicator has:

- A five digit, red LED display, relay ON/OFF indication.
- Process control with two adjustable alarm set points.
- An analogue output.
- RS485 serial communications.

Alarm set points can be adjusted via the keys on the front panel.

mA+ = BLUE WIRE

24 V = RED WIRE

MAINS POWER SUPPLY
(WHITE, BLACK AND GREEN)
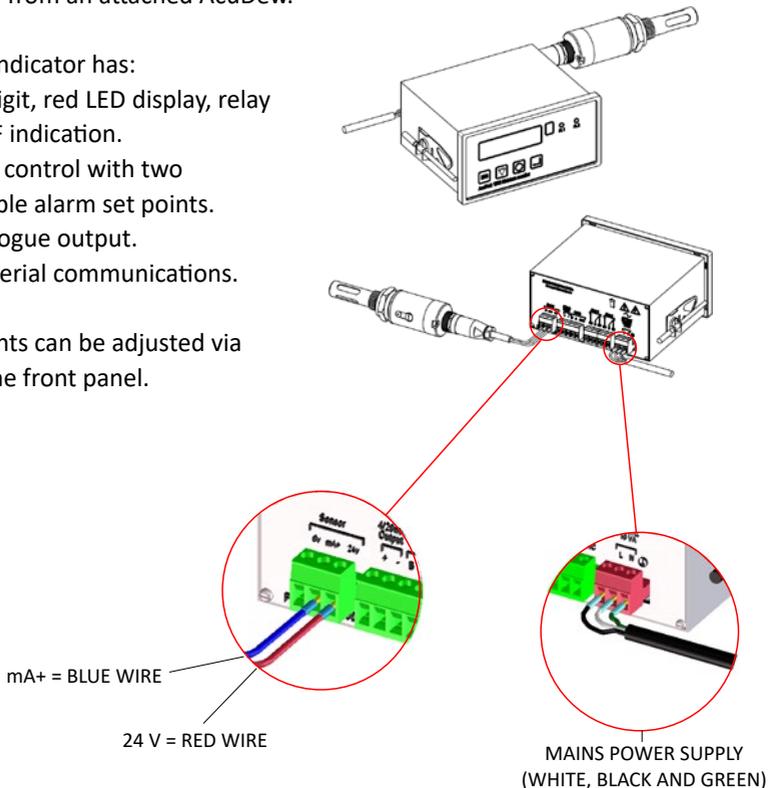
3.2 Wiring the AcuDew

The AcuDew is a 2-wire, 4-20 mA transmitter. Typical electrical connection to generate a voltage output is shown below.

Note: the maximum value for Rs in this circuit can be calculated by the formula:

Rs max = [40 x (Vs – 7)]Ω
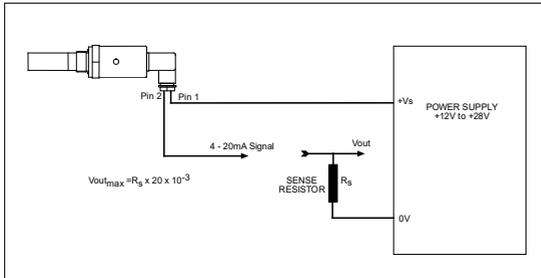
If the wiring resistance is expected to be more than a few percent of the value of Rs, then this resistance must be taken away from the answer to get the maximum usable value of Rs.

3.3 AcuDew - Normal Operation

Note: Review the complete manual for further information if necessary.

Once the AcuDew is properly installed per the instructions contained in this manual, use of the AcuDew moisture transmitter is extremely simple. There are no controls to operate during normal use, as these devices are designed for long term unattended operation. With the analogue output, connected to a data acquisition system, recorder or process controller, the user has only to periodically monitor the system for normal operation.

4 System Components

4.1 AcuDew

The AcuDew Dewpoint Transmitter is a 2 wire, 4 to 20mA loop powered device, used for continuous measurement of moisture in process gases, including the most common application, compressed air. The AcuDew transmitter is configured to output a 4 to 20mA linear signal for the following moisture units:
- Dewpoint temperature, °C
- Dewpoint temperature, °F
- Parts water vapour per million in a gas (PPMV)
- Parts water vapour per billion in a gas (PPBV)

In normal operation, the transmitter will produce a 4 to 20mA signal, which is proportional to the level of moisture in the gas being monitored. The moisture reading is sampled and updated once per second. The AcuDew has 3020 distinct steps over the 4 to 20mA range corresponding to a resolution of 0.005mA.

The sensing element is a robust sensor designed for process applications with high sensitivity and excellent speed of response. Each sensor/transmitter is calibrated against standards that are traceable to the NPL.

The "state-of-the-art" microprocessor circuitry of the AcuDew transmitter drives its high resolution and provides advanced self-diagnostics. The transmitter stores the calibration data onboard and provides a linear 4 to 20mA signal over the moisture range, making the AcuDew truly "plug-and-play".

The transmitter also incorporates the unique AutoCal function, only applicable due to the highly sophisticated sensor design. Because the sensor is so linear in its response to moisture and due to a "capped 4 to 20mA" sensor output, the transmitter can be accurately recalibrated by exposing its sensing element to typical ambient air. The AutoCal feature of the AcuDew allows users to easily verify/correct changes in the sensor response in between normal NPL traceable recalibrations, providing improved performance over other moisture sensors and technologies. If a calibration gas of known moisture content is available, this can be used instead of ambient air when performing an AutoCal.

Section 9 of this operating manual details the available methods offered by the AutoCal feature.

The rugged mechanical design and the industrial type transmitter cable connector of the AcuDew, including its stainless-steel construction, provide outdoor environmental protection to NEMA 4X (IP66). The AcuDew transmitter can withstand maximum process pressures of 350 bar (5000 psig) and support cable lengths up to 1000 meters (3200 feet).

Designed for easy installation and operation, the AcuDew requires little or no maintenance and will provide reliable and accurate measurements in most non-hazardous (general purpose) applications.

4.1.1   AcuDew Moisture Transmitter

Dew Point Range:	Standard dewpoint ranges are:
	-80 °C to +20 °C
	-100 °C to 0 °C
	-120 °C to -20 °C
	NPL traceable for ranges between -80 °C to +10°C
	Note: Additional ranges include:
	PPMv
	PPBv
Analogue Outputs:	4 to 20 mA (2-wire current loop)
Power Supply:	24 V DC (7 to 28 V DC)
Dew Point Accuracy:	± 2°C
Operating Temperature:	-20 to +60°C
Operating Pressure:	7.5 mm Hg to 5000 psig
Ingress Protection:	NEMA 4X (IP66)
Process Thread:	¾" UNF (16 tpi)
Dimensions:	Length: 5¼ inches (7⅛ inches including cable connector)
	Diameter: $1^3/_{16}$ inches

4.1.2 Available AcuDew Dewpoint Measurement Ranges

ZD:	-100 °C to +20 °C (-148 °F to +68 °F) dewpoint	
HD:	-65 °C to +20 °C (-85 °F to +68 °F) dewpoint	
P (Purple):	-100 °C to 0 °C (-148 °F to +32 °F) dewpoint	0 - 6,000 ppm(v)
S (Silver):	-100 °C to -20 °C (-148 °F to -4 °F) dewpoint	0 - 1,000 ppm(v)
G (Grey):	-80 °C to 0 °C (-112 °F to +32 °F) dewpoint	0 - 6,000 ppm(v)
R (Red):	-80 °C to -20 °C (-112 °F to +4 °F) dewpoint	0 - 1,000 ppm(v)
B (Blue):	-80 °C to +20 °C (-112 °F to +68 °F) dewpoint	0 - 23,000 ppm(v)
MP:	0.1 to 100.0 ppm(v)	0.1 ppm resolution
LP:	0.01 to 10.00 ppm(v)	0.01 ppm resolution
GH:	0.01 to 10.00 g/m³	0.01 g/m³ resolution
LB:	0.1 to 100.0 lb/MMSCF	0.1 lb/MMSCF resolution

4.2 AcuTrak

- AcuTrak has a 5-digit 8 segment LED display
- Powered or loop powered transmitter input
- 6 predefined AcuDew ranges
- 2 alarm relays
- RS485 communications
- 4-20 or 0-20mA output
- Password protection
- Quick key operation
- 3 moisture reading units (°C, °F and PPMv)
- 3 pressure correction units (Barg, Pascal and Psig)
- 2 temperature units (°C and °F)
- 7 standard gases and 1 variable
- Natural gas
- AC or DC voltage supply versions available

4.3 AcuTrak/AcuDew System Application

The AcuTrak displays a digital readout of moisture content, derived from the AcuDew. 5-digit, 8 segment, Red LED indicator, relay ON/OFF indication. Programmed to the range of the AcuDew. Process control with 2 adjustable alarm set points and an analogue output.

Alarm set points can be adjusted by use of the front panel keys.

5 Mounting the AcuTrak

i Only technicians who are familiar with the technical terms, warnings, and instructions in the manual and who are able to follow these should connect the AcuTrak.

Should there be any doubt as to the correct handling of the AcuTrak, please contact your local dealer.

Mounting and connection of the AcuTrak should comply with the National Electric Code for the mounting of electric materials, i.e. wire cross-section, protective fuse, and location. Descriptions of input, output and supply connections are shown in section 7.

The maximum size of the protective fuse is 10A and, when used together with the power switch, both should be easily accessible and close to the AcuTrak. The power switch should be marked with a label indicating it will turn OFF the voltage to the AcuTrak.

When mounted in front panels, the rubber gasket (included) must be mounted between the panel cut out and the display front to obtain NEMA 4 (IP65) ingress protection.

5.1 Installing the AcuTrak into a Panel

Make a cut-out in the panel (DIN 43700): 138mm (w) x 68mm (h). The maximum panel thickness is 8mm and, if an effective IP65 weatherproof seal is required, the minimum recommended panel thickness is 2.5mm.

Pass the instrument cabinet through the cut-out in the donor panel and fit the panel clamps to the case from the back.

Turn both the panel clamps screws until the instrument is clamped in position. The screws must be tightened sufficiently to create a seal between the front of the mounting panel and the back of the instrument bezel, but never over tightened to the point of fracturing the panel clamp or instrument case.

⚠️ **Note: The wires are retained using the locking screws. Ensure that the exposed section of the wire is fully inserted and that no loose strands are exposed.**

6 AcuDew System Installation

6.1 AcuDew Installation: Sample Cell/Sample System*

⚠️ Before mounting the transmitter into any system, ensure the system is safe to work on. Depressurize and verify that all power connections are isolated, in the off position.

Installation should be carried out by trained technicians and following local safety protocols.

1. Ensure that the selected location for the sample cell or sample system provides adequate working space and safe clearance for the proper installation and removal of the transmitter.
2. Check that all pipe/tube connections and fittings are tightly secure. Leak testing prior to the installation of the transmitter is recommended.
3. It is advisable to carry out an initial purge routine of the sample loop, before installing the transmitter, to remove the possibility of sensor damage on start up.
4. Ensure upstream/inlet isolation valves, as well as any downstream isolation valves are closed prior to the installation of the transmitter.
5. Remove the shipping tube cover from the AcuDew before installing the transmitter.
6. Install the AcuDew transmitter into the sample cell/transmitter holder and tighten firmly to properly compress the O-ring seal.
7. Ensure there is adequate transmitter cable length to make connection to the data acquisition system.
8. Orient the cable connector such that the transmitter pins correctly mate with the cable connector.
9. The AcuDew is a 2-wire 4 to 20mA transmitter, loop powered by 12 to 28V DC. Notes:
   a. Pin 1 connects to the power supply (red wire in a Shaw Moisture Meters supplied transmitter cable).
   b. Pin 2 connects to the 4 to 20 mA current loop return (blue wire in a Shaw Moisture Meters supplied transmitter cable).
   c. See Section 5 for the transmitter's wiring details.

ℹ️ *** If using the AcuDew Transmitter in conjunction with a sample system, consult the sample system instructions for proper start-up procedure and use.**
⚠️ **Do not apply power until all wiring is completed and checked.**

6.2 AcuDew Installation: Direct into Process Line

Shaw Moisture Meters recommend the use of a sample system rather than a direct insertion into the process line. Installation of the AcuDew on the sample line or sample system allows for easy isolation of the AcuDew during installation and removal. A sample system further allows for sample conditioning when necessary.

6.3 Sample Systems

A typical sample system used for compressed instrument air is detailed in section 6.4. Other sample systems are available through Shaw Moisture Meters as well as custom sample system design.

The process thread on the AcuDew is ¾"-16 UNF straight thread. The process seal is a Viton O-ring, so pipe thread tape should not be used on the threads. SHAW offers a standard sensor holder for installation of the AcuDew, typically on a sample line or sample system. A ¾" NPT adaptor is also offered for installation of the AcuDew into a ¾" NPT fitting, possibly for a direct insertion type installation.

Most applications are for the moisture measurement of pressurized gas. Regardless of the installation type, care must be taken during installation, operation, and decommissioning of the AcuDew Transmitter. Be sure that the process line (or sample system if installed) is depressurized when installing or uninstalling the AcuDew Transmitter.

As stated above, the AcuDew Transmitter can be installed directly into the process line, but this does create problems with access for maintenance and calibration. It is for these reasons that we recommend that the transmitter be installed in a bypass, fast loop, or sample system where the transmitter is accessible without interrupting the main process flow line.

The flow rate, although not critical to the sensor measurement, should be low enough to avoid abrasion to the sensor surface, without being so low as to extend the system response time to an unacceptable level. In general, a flow rate of between 2 - 5 litres/min will give the right balance.

The sensor is a variable capacitor, which is directly affected by changes in partial pressure of water vapour. These changes are proportional to the dew/frost point temperature.

Partial pressure of water vapour is directly affected by total pressure and, this being the case, the instrument will display the dew/frost point temperature at whatever total pressure the sensor is exposed, therefore care should be taken to ensure that the sample pressure at the sensor is that at which the dew/frost point readings are required.

6.4 Instrument Air / Inert Gas Sampling System

The piping installation schematic diagram shows all components which could be used in a dry gas measurement application, although not all the items shown will be required for every installation.
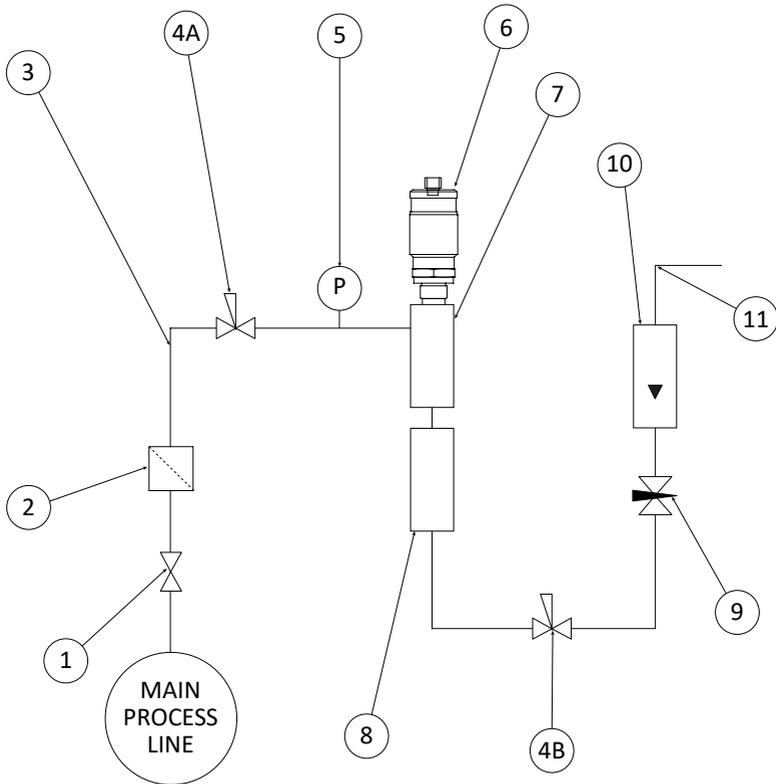
Notes
a. The sample pipe should be on the upper surface of the horizontal pipe or on a vertical section of pipe wherever possible.
b. The sample tube should run continually upwards from the sample point. If this is not possible then an inspection port or drain tap should be installed at the lowest point in the system.

6.5 Piping Schematic Component Index

1. **Sample Isolation Valve** - This is a recommended item as it allows access to the sample system without interrupting the main process line.
2. **Filter Unit** – A filter unit is recommended when the samples are likely to contain particulate matter. If the air/gas sample contains heavy hydrocarbon condensate, the filter must be of the coalescing type with a drain. The filter unit should be positioned as close to the sample point as practical.
3. **Sample Tube** – This should be stainless steel for dry air or gas applications but copper or carbon steel can be used where wetter gases are to be measured. If any section of the sample tube must be flexible then PTFE should be used. In most cases, 3 mm OD (⅛") is sufficient as it provides good system response time within minimum flow. 6 mm OD (¼") tube can be used where pressure drops across the 3 mm tube are too high.
4. **Pressure Reduction Valve or Pressure Regulator** – If the sample is to be measured at atmospheric pressure then the valve 4A should be fitted and 4B omitted from the system. If the sample is to be measured, at full line pressure and the exhaust vented to atmosphere, then valve 4B should be fitted and 4A omitted from the system. If measurements are to be taken at full line pressure and the sample is to be returned to a part of the main line or a vent, which is at a pressure higher than atmospheric and the input to that line needs a controlled pressure then both 4A and 4B will be required.
5. **Sample Pressure Gauge** – This is not a critical part of the moisture measurement but may be required if dew point/frost point measurements are to be made at higher than atmospheric pressure.
6. **Measuring Transmitter**, see "Section 19 – Transmitter Diagram".
7. **Transmitter Holder**, see "Section 20 – Sensor Holder Diagram".
8. **Desiccant Chamber** – This item is required when the sampling is to be intermittent. When installed, it prevents the ingress of wet air to the sample system while the sample is not flowing, improving the response time.
9. **Flow Control Valve** – This can be a separate item or combined with the flow indicator.
10. **Flow Indicator** – The recommended sample flow is 2-5 litres/min.
11. **Sample Exhaust** – The exhaust can be vented to atmosphere or returned to the process line as discussed above.

6.6 Installing and Commissioning the AcuDew Transmitter

It is advisable to carry out an initial purge routine of the sample loop, before installing the sensor, in order to remove the possibility of sensor damage on start-up.

Refer to the sample system schematic on page 18 of this manual and open the inlet isolation valve slowly, until a small flow of air/gas at atmospheric pressure flows through the inlet pipework to the sensor holder and exhausts through the sensor entry port of the sensor holder.

Allow this purge to continue for about 15 to 20 minutes to remove any residual moisture from the sample pipework and components.

Close the inlet isolation valve, install the sensor into the sensor holder and ensure that the sensor cable connector is correctly positioned, that the sealing cup is in place and the retaining screw is screwed down securely to create a weatherproof seal.

Open the inlet valve slowly again and, by opening all valves after the sensor holder, allow a low-pressure purge through the whole sample system.

Note: If a closed by-pass loop is installed, this section of the procedure is not possible.

Set the required pressures and flows within the sample loop.

This completes the installation and commissioning but, on initial start-up, it could take several hours for the system to reach equilibrium, depending on the number and type of components used in the sample loop.

The instrument will now indicate the dew/frost point of the air/gas surrounding the sensor, at sensor pressure and the analogue output will be giving a mA signal proportional to the indicated dew/frost point or other engineering units.

6.7 Operation

The system is designed to operate continuously, with a minimum amount of operator input.

It is, however, advisable to inspect the sample loop periodically to ensure that the required pressures and flows are being maintained.

The number and type of items employed in the sample loop will determine what, if any, other routine checks should be made. If, for instance, a filter is used, the filter element should be inspected periodically and changed when necessary.

The instrument should not require any routine maintenance but if any malfunction is suspected it is advisable to contact your local dealer.

Should it be necessary, at any time or for whatever reason, to change either the AcuTrak or AcuDew, it should be noted that the components of the system are fully and completely interchangeable provided that the same 4 to 20mA range is maintained. The only adjustment necessary would be the alarm set points in the case of the display.

While the sensor should give several years of operation, it is advisable to confirm the calibration, from time to time, to ensure accurate operation of the system. Shaw Moisture Meters recommends annual recalibration. In between annual calibrations, the AcuDew has a standard feature called AutoCal. Section 9 of this manual describes the AutoCal feature in detail.

7 Wiring the AcuDew and AcuTrak

7.1 AcuTrak Power Supply

See 7.5 rear connections. Connect the power supply cable to the 3 terminals of connector C4.

7.2 AcuDew Sensor Cable

Connect the AcuDew to connector C1, route the sensor cable to the intended site of the sensor.

7.3 Alarm Cable

Make the appropriate connections, noting the normally open and normally closed relay contact positions on connector C3.

7.4 Analogue Output and Serial Communications Cable

Make the appropriate connections, ensuring that the correct polarity and the maximum load specification are strictly observed on connector 2.

7.5 Rear Connections:

Viewed from the rear and on the left is the AcuDew sensor input.
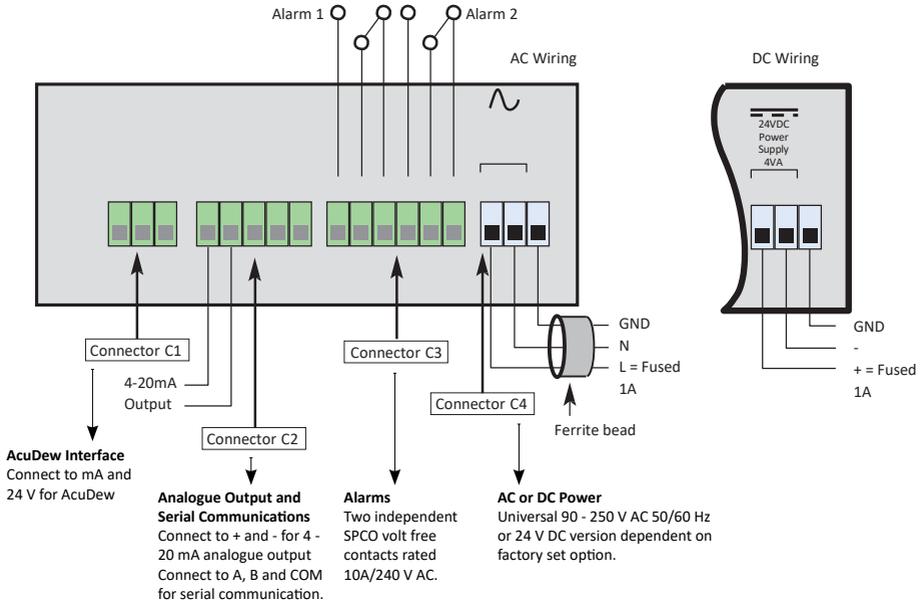
There are four banks of wiring connections points organized into groups named here as C1, C2, C3 and C4.

Connector C1 – AcuDew interface
- Connect to mA and 24 V for AcuDew

Connector C2 - Analogue Output and Serial Communications
- Connect to + and – for 4-20 mA Analogue Output.
- Connect to A, B and COM for Serial Communication.

Connector C3 - Alarms
- Alarms: Two independent SPCO volt free contacts rated 10 A/240 V AC.

Connector C4 – AC or DC Power
- Universal 90 – 250 V AC 50/60 Hz, or, 24 V DC version dependent on factory set option.

Important Notes for Both AC and DC Powered Units
- The power supply to the instrument must be protected by a 1A fuse.
- A local isolation switch is advisable for ease of isolation during maintenance to reduce the possibility of electric shock or damage to the instrument.
- The power supply ground GND terminal must be wired to a suitable permanent ground point.
- For European CE compliance on AC wiring only, the supplied ferrite bead must be installed on the power supply cable approximately 50 mm from the connector using the tool supplied with the instrument.
- The power supply wires are retained by screws and care should be taken to ensure that the exposed section of the wire is fully inserted and that no loose strands are exposed.
- Cables should be properly supported and segregated.

7.6 Connecting an AcuDew to a AcuTrak

The AcuTrak display available from Shaw Moisture Meters, displays a digital readout of the 4 to 20mA input signal derived from an attached AcuDew.
The AcuTrak has a 5 digit, 8 segment, red LED indicator, characters size 15mm, relay ON/OFF indication. Process control with 2 adjustable alarm set points and an analogue output.

Alarm set points can be adjusted by use of the front panel keys.

Please refer to Section 3 for information regarding the Connector Pins, the AcuDew cable assembly and connecting the AcuDew cable.

8 AcuTrak User Interface and Controls

Consists of a membrane keyboard with four user input keys and also four visual indication elements or windows: the primary five character LED, a single character secondary LED for units indication and two alarm LEDs.
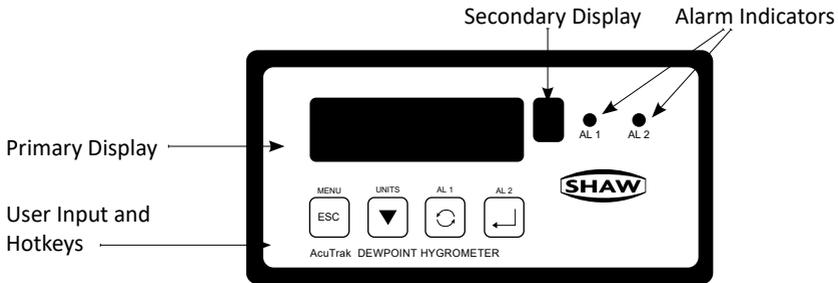
Every key on the AcuTrak has two functions, the control function (ESC , ▼ , ↻ & ↵) and the hotkey function (menu, units, alarm 1 and alarm 2). The use of these commands is described in the following table:

Key	Control Function	Hotkey Function
The ESC (Menu) key	Returns the user to the previous screen, often without changing any variables.	Used to enter the 'setup' menu by pressing and holding for more than five seconds.
The ▼ (Units) key	Used to decrease the selected digit when setting a numerical variable.	Used to enter the 'units' menu.
The ↻ (AL1) key	Used to select the next digit when setting a numerical variable or to scroll through the options available.	Used to enter the 'alarm 1' menu.
The ↵ (AL 2) key	Used to confirm a numerical variable or the selection of a chosen option.	Used to enter the 'alarm 2' menu.

- The AcuTrak is a DIN style, panel mount, moisture monitoring device, designed to work in conjunction with the SHAW AcuDew Dewpoint Transmitter.
- The readout of moisture content is displayed on a backlit, five digit, eight segment LED and available in any one of five selectable engineering units. The selected unit is indicated on a separate eight segment LED.
- The instrument is available in AC or DC option.
- The AcuTrak operation is controlled by a four button membrane keypad. The user friendly software uses a simple menu selection process and

incorporates three hotkeys to enable moisture levels to be read in different units and this allows quick access to both alarm settings.

- A user controllable security system.
- The AcuTrak has two full range alarms that can be set as rising or falling edge triggered. These alarms have visual indication (LEDs) and activate changeover relays for remote indication or control.
- The AcuTrak has a fully controllable linear 4 - 20 mA output.
- The AcuTrak also has RS485 capabilities, outputs the process variable and unit status when polled.
- Details of normal operation, engineering unit selection and configuration of the instrument are described within this manual.

In normal operation, the AcuTrak will display the current moisture value of the connected AcuDew in the Primary Display.

The engineering units are indicated in the Secondary Display.

The Alarm LED's (AL 1 & AL 2) will light RED whenever an alarm condition occurs and turn off when the alarm condition clears, unless the alarms are latched.

Remote signalling of an alarm condition is provided by separate internal changeover relays that trigger at the same time as the Alarm indicators.

When a numerical value has to be entered into the AcuTrak the following procedure should be used.

The right most character of the main display flashes to indicate it is active for editing. If required press the 🔄 key repeatedly to select the number or sign which needs to change.
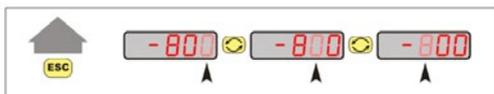
The ESC key allows the user to leave a part of the menu without changing any settings. Use the ▼ key to change the required number between 0 and 9.
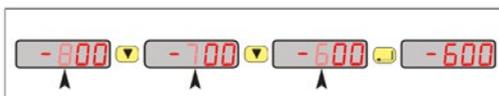
Pressing the ⏎ key at any point sets the numerical value. Continue this process until all characters are entered.

In the case of numbers associated with units which use non integer numbers such as ppm(v), pressing the 🔄 key repeatedly beyond the fifth character makes the decimal point (".") flash and therefore active.

For example in order to change the alarm level from 0.843 to 8.43 ppm(v).
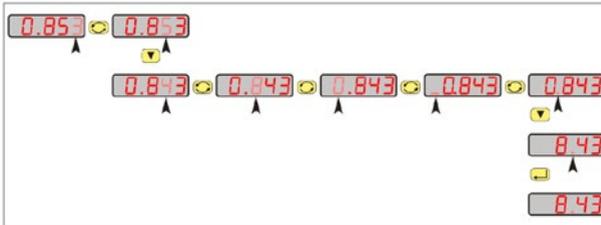
Use the ▼ key to position the dp in the required position. Pressing the ↵ key at any point confirms the numerical value. °C and °F are fixed to 1 decimal place.

Note: The Password used within the AcuTrak is made of four integers and does not use the dp.

Note: To leave the numerical part of this routine without saving, simply press the ESC key.

8.1 Hot Keys

Panel Function

The 'Units' and 'Alarms' Hot Keys can be restricted using the 'Panel' function in the Setup Menu so that the Units and Alarms settings may only be inspected rather than adjusted using the Hot Keys. If the user tries to set an Alarm when the 'Panel' function is set of 'OFF' the user will set the message *r0nLY* to indicate that the parameter is "Read Only"

While *PAnEL* is displayed, press the ↵ key to enter the subroutine. The main display will now display *0n* or *0FF*. Use the 🔄 key to select *0n* or *0FF*.
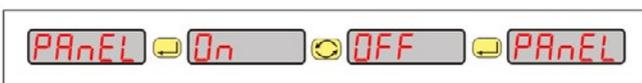
Press the ↵ key to confirm selection.

Units Hot Key

The ▼ 'Units' hot key allows the user to view and alter the displayed units. To review the moisture in alternative units, press the ▼ (Units) key for longer than 3 seconds. The main display will then show the message $Uni\ t5$. Press the ↵ key to enter the routine. Pressing the ⟳ key displays the current moisture level in each of the moisture units in turn. Press the ↵ key at any time sets the currently displayed units as the AcuTrak active unit.

For example: To change from a 'dewpoint °C' to a 'dewpoint °F', whilst $Uni\ t5$ is displayed press the ↵ key to enter the subroutine.
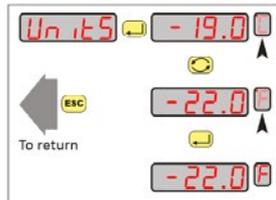
The secondary display now shows the unit type flashing. Use the ⟳ key to scroll through to the next unit type is displayed e.g. °F

Press the ↵ key to select the new unit.

Note: Pressing the ESC key at any time escapes the hot key function and returns to the measurement display without saving any changes.

Alarms Hot Keys

The two alarm hot keys 'AL 1' and 'AL 2' allow the user to review and set the alarm trigger points.

To review the alarm trip point press the ⟳ (AL1) or ↵ (AL2) key momentarily. The primary display will show the set trip point for 1 second before reverting back to the moisture reading.

To alter the trip point press and hold the ⟳ (AL1) or ↵ (AL2) keys for longer than 3 seconds. The main display will then show the message $AL\ 1$ or $AL\ 2$. Press the ↵ key to enter the routine. Use the ▼ and ⟳ keys to display the required alarm trip point.

Press the ↵ key to set the trip point.

8.2 Using the AcuTrak Setup Menu

To enter the Setup Menu press and hold the ⎋ key for 3 seconds. This displays the 𝖲𝖤𝖳𝗎𝖯 message on the main display.

Pressing the ⏎ key takes the user to the 𝗋𝖠𝗇𝗀𝖤 function in the Setup menu structure.

Note 1: If the user has a setup menu password, then the user is prompted to enter the correct password before continuing to the 𝗋𝖠𝗇𝗀𝖤 function

Note 2: Most of the screens within the menu have an active 10 second time out. Therefore, if no keys are pressed within this period the unit reverts automatically to normal operation. In most cases where the 10 second time out occurs, changes will not have been saved.

Table 1 Setup Menu contents

Sensor Range	Contains a list of available ranges.
Configuration	Contains submenus for choosing engineering units and choice of gas types.
Analogue output	Contains submenus to allow the user to fully configure the Analogue output.
Alarms	Contains submenus to fully control behaviour of two independent alarms.
Communications	Contains submenus for changing baud rate and address of the instrument's RS485 communication port.
Security	Contains submenus to set up passwords to control or limit access certain features from unauthorized changes.

8.3 Sensor Range

The 𝗋𝖠𝗇𝗀𝖤 option allows the user to select the required sensor range. This option is used to match the AcuTrak to the sensor connected to the unit. Press the ⏎ key while 𝗋𝖠𝗇𝗀𝖤 is displayed to enter the submenu. The currently selected range is displayed. Select a different range by pressing the ↻ key to scroll through each of the available ranges. Please see *Section 4.1.2 Available AcuDew Dewpoint Measurement Ranges*.

8.4 Configuration Parameters (See Appendix B Configuration Sub Menu)

8.4.1 Choosing Moisture Units
The $Uni\ t5$ sub menu allows the user to alter the displayed units. While $Uni\ t5$ is displayed press the ⏎ key to enter the sub menu. The currently selected unit is displayed. Select a different moisture unit by repeatedly pressing the ⟳ key to scroll through each of the moisture units.

Press the ⏎ key to set the chosen moisture units.

For example, to change from a 'dewpoint °C' to a 'dewpoint °F'
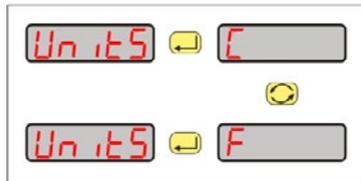
Note: Pressing the ESC key at any time reverts to the Hot key function back to the measurement display without saving any changes.

8.4.2 Choosing the Pressure Units
The $PUni\ t$ sub menu within $5EtuP$ allows the user to alter the units for the pressure parameters

The choices are:

Pascal x 10³	$PA\ E3$
psi gauge	$P5\ i\ 9$
bar gauge	$bAr\ 9$

8.4.3 Choosing the Temperature Units
The $tUni\ t$ sub menu allows the user to alter the units for the temperature parameters.

°F	F
°C	C

8.4.4 Entry of Pressure at Sensor
The $P5En$ sub menu allows entry of pressure at sensor

8.4.5 Entry of Pressure at Display
$Pdi\ 5P$ allows entry of pressure at which to display the dewpoint.

8.4.6 Entry of Standard Pressure
PStd allows entry of standard pressure (Default 101.3 x 103 Pa, 0 psig, 0 barg)

8.4.7 Entry of Standard Temperature
tStd allows entry of standard temperature. (Default 60°F, 15.56°C)

8.4.8 Entry of Gas Type
gAS allows entry of type of gas at sensor for ppm(w) calculations.

Air	*Air*
Argon, Ar	*Ar*
Methane, CH4	*CH4*
Carbon Dioxide, CO2	*CO2*
Hydrogen, H2	*H2*
Nitrogen, N2	*n2*
Sulphur hexafluoride, SF6	*SF6*
Custom molar mass	*VALUE*

8.4.9 Enabling and disabling the model for Natural Gas measurements
ntgAS requires a Yes or No response to turn on or off the Natural Gas correlation. If Yes, then the sensor linearisation follows a modified curve defined in the Natural Gas correlation. If No, the sensor follows the ideal gas linearisation.

8.5 Analogue Output

The AcuTrak features an analogue output port which the user may use to retransmit the moisture reading to another system. The output benefits from galvanic isolation and segregation by isolated electrical circuits.

The analogue output is a current output. It is always enabled and care should be exercised therefore to ensure that during installation the two terminals are not shorted and have a load attached more than 200 Ω for optimum performance.

The mA output is linear over the range selected.

OUTPUT - Linear in °C   OUTPUT - Linear in ppm(v)

OUTPUT - Linear in °C
Also linear in °F

OUTPUT - Linear in ppm(v)
Also linear in
g/m³ or lb/MMSCF
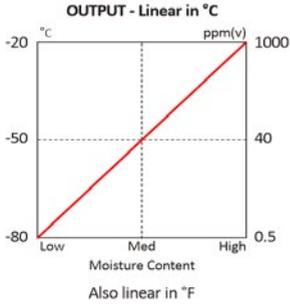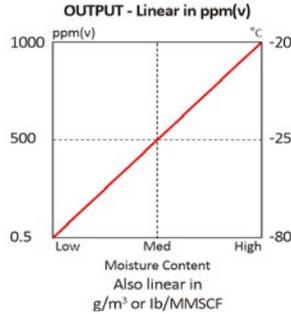
For example:

For a range of -80°C to + 20°C dewpoint the analogue output will be at its minimum when the reading is at -80°C dewpoint and at its maximum when the reading is at +20°C dewpoint.

Furthermore the factory default configuration is that the output current ranges from 4 to 20 mA. Therefore using the above example the port will output 4mA when the AcuTrak displays -80°C dewpoint.
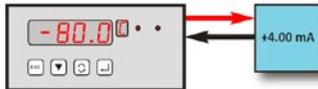
And 20mA when the AcuTrak displays +20°C dewpoint.
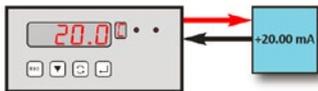
If a sensor is detected as short circuit then the current output will rise to +20.25mA.
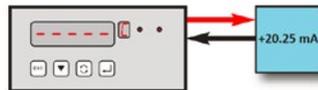
If required there is facility to change the output current calibration points at either end of the scale to attain a more focused signal.

8.5.1 Spanning the mA Output
It is possible to change the output current calibration points at either end of the range to attain a more focused retransmitted signal.

For example:
Moving the lower scale point from -80°C dewpoint to –60°C may be desirable and can be achieved by the following entry to the instrument configuration.

When *OutPt* is displayed press the ⏎ key to enter the routine displaying *SPAn*. Use the 🔄 key to select either the *Hi* or *Lo* mA setting. Press the ⏎ key to display the current set point, use the 🔄 and ▼ keys to display the new value and ⏎ key to set the value.
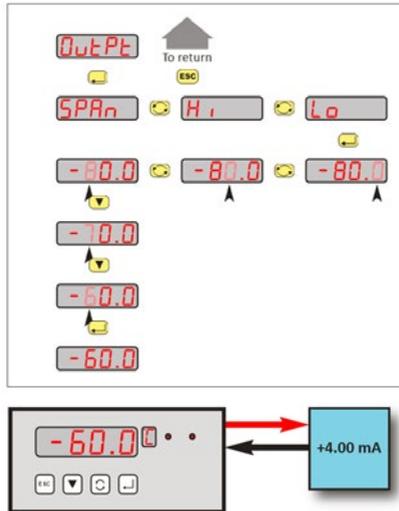
It is also possible to select a 0-20mA output range instead of the standard 4–20mA.
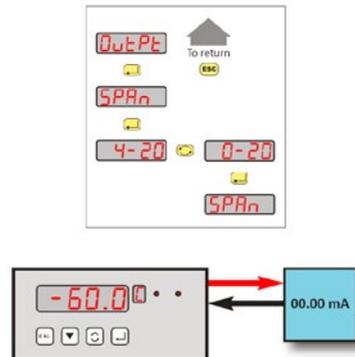
8.5.2 Voltage Output
Selecting this range is useful to provide a convenient method of providing a 0-5 V DC voltage output to the remote equipment when used in conjunction with a suitable 250 Ω resistor.

8.6 Alarms

The two independent alarms options (1 and 2) allow the user to setup configurable alarm events by setting the trip points, direction of trigger, relay enable energized-on-event command, latching on-event command and hysteresis. While RL I or $RL2$ are displayed press the ⏎ key to enter the sub menu. The unit displays $SEtPt$. Use the ⟳ key to select the required function and then press the ⏎ key.

Note: Pressing the ᴱˢᶜ key reverts back to the display RL I or $RL2$ message screen.

The following functions can be performed:-

      $SEtPt$ Enter the alarm set point.

      $tYPE$ Select if the alarm is to activate on a rising signal HI , falling signal Lo or OFF .

      $rELRY$ Select if the relays are Energized En or de-energized dE-En

      $LRtch$ Set if the alarm is Latch YES or not latching no.

      $HYSt$ Enter the hysteresis value.

Note: Pressing the ⏎ key sets any of the alarm parameter will not revert to the previous value even if the 10 second time-out occurs or the ᴱˢᶜ key is pressed.

8.7 Digital Communication

The $r5485$ sub menu allows the user to set the address and baud rate used in communicating with a PC using RS485 communications. See Appendix E.

A RS485 interface and cable are required.

All transmission are binary NOT ASCII characters.

A single instrument may be connected using the universal address of 0.

Up to 32 instruments may be connected using addresses 1 to 32
Note: Do not use the universal address 0 when 2 or more AcuTrak are connected together. The instrument is the slave and must be poled for data.

There is only one command that returns the process value in the units set in the secondary display.

While $r5485$ is displayed press the ⏎ key to enter the sub menu and $Rddr$ is displayed. Use the ⟳ key to select either $Rddr$ or $bRUd$ then press the ⏎ key.

If the $Addr$ option is selected the screen will display the current address value. Use the ⟳ & ▼ keys to enter the new value. Press the ⏎ key to set the new address.

Legal addresses are 1 to 32.

Note: Once the key is pressed to set the address or baud rate, that value is committed and will not revert to the previous value even if the 10 second timeout occurs or the ᴱˢᶜ key is pressed.

If the $bAUd$ option is selected, use the ⟳ key to select the required baud rate. Select between:

> 9600
> 4800
> 2400
> 1200

Press the ⏎ key to confirm selection.

Refer to Appendix E for communications protocol.

8.8 Security Passwords

The $PASS$ function allows the user to protect certain functions within the AcuTrak.

While $PASS$ is displayed press the ⏎ key to enter the sub menu. The unit displays $SEtPt$. Use the ⟳ key to select the required function and then press the ⏎ key. The unit will display 0000 and the secondary display will show a 0. The user must enter the current password using the ⟳ & ▼ keys. Pressing the key then displays 0000 while the secondary display will show a 1. Enter the new password pressing ⏎ to confirm.

8.8.1 Password to control access to the Setup Menu
The user may set a password to secure the $SEtUP$ menu. The default password is 0000.

8.8.2 Password to control access to the Reset Command
The user may set a password to secure the $rESEt$ menu. The default password is 9000.

To return
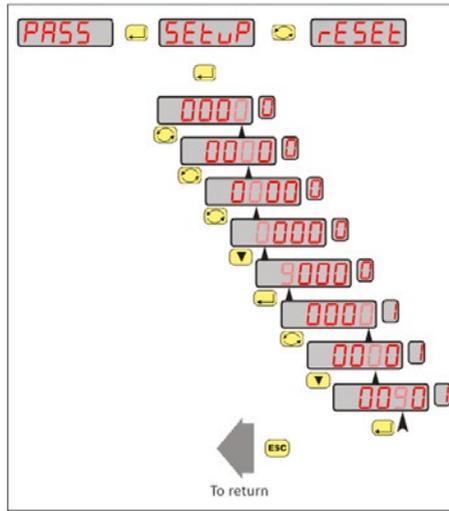
8.9 Panel

The panel option allows the user to restrict the function of the front panel Hot Keys. If the option is selected, the Hot Keys are restricted.

While panel is displayed press the ⏎ to enter the sub menu. The main display now displays either on or oFF. Use the ⟳ key to select the required status. Press ⏎ to confirm selection.

8.10 Reset

The $rESEt$ sub menu allows the user to reset the instrument back to the default settings. If the option is protected the user will be required to enter the password.

9 AcuDew - AutoCal

9.1 Benefit of AutoCal

AutoCal allows the user to ensure accuracy to the laboratory calibration by checking the span of the transmitter and correcting for any deviation. It should be operated periodically, every 2 to 3 months, or when verification of the AcuDew Transmitter is required.

ACAL adjusts slope of curve.

Sensor Reading   100%
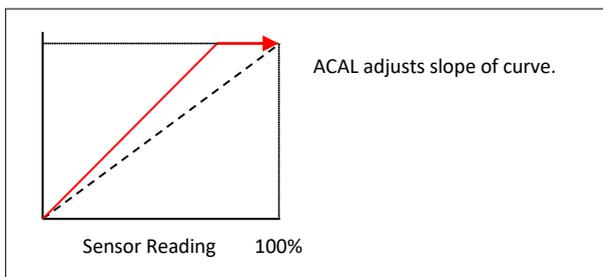
The AcuDew is supplied with an AutoCal feature, which allows the calibration span of the transmitter to be adjusted. The AutoCal feature is controlled by an adjustable potentiometer located under the weatherproof guard.

Note: The AcuDew must be powered by an AcuTrak or AcuVu or some other device able to supply 4 to 20mA loop power.

Note: For pressure compensated AcuDew Transmitters (i.e. PPMv ranges) contact Shaw Moisture Meters for assistance.

9.2 Types of AutoCal

There are 2 different types of AutoCal that can be performed on the AcuDew. These are: -

> 1. Method 1 = Ambient AutoCal.
> *Not available on AcuDews with an upper range (wet-end) above 0°C, 32°F or 6032ppm(v).*
> 2. Method 2 = Known Moisture Level AutoCal.

9.3 Ambient AutoCal – Method 1

Not available on AcuDews with an upper range (wet end) above 0°C, 32°F or 6032ppm(v).

9.3.1 Pre-conditioning the AcuDew for ambient AutoCal

To perform an ambient AutoCal, the AcuDew sensing element needs to be stable with reference to the ambient moisture levels. To ensure this is the case it is necessary to remove the AcuDew from its normal location and place in an ambient location that is not subject to turbulent air flow. Leave the AcuDew powered up in this location for at least 10 minutes.

9.3.2 Performing an AutoCal in ambient

Not available on AcuDews with an upper range (wet-end) above 0°C, 32°F or 6032ppm(v). After allowing the sensing element to stabilize, the following sequence should be followed:

1. Locate and remove the large screw from the side of the AcuDew. The screw is retained by the sealing gasket.
2. Power down the AcuDew by removing the connector from the top of the AcuDew.
3. Re-apply power to the AcuDew.
4. Within 90 seconds of re-applying power turn the potentiometer clockwise. This action will start the automatic AutoCal process.
   Note: There is no need to turn the potentiometer any further. The process is fully automatic.
5. The AutoCal will be completed almost immediately and the upper range (either -20°C or 0°C) will be displayed depending upon the range of the AcuDew being verified.
6. Return the screw covering the potentiometer.

9.4 Known Moisture Level AutoCal – Method 2

Note: The only AutoCal method available to AcuDews with a mA upper range (wet-end) above 0°C, 32°F or 6032ppm(v).

Pre-conditioning the AcuDew for Known Moisture Level AutoCal

There are 2 types of "Known Moisture Level" AutoCals that can be performed. The only difference is at the pre-conditioning stage of the AutoCal procedure.
1. AutoCal against known gas or salt solutions.
2. AutoCal in normal location.

9.4.1 Pre-conditioning against a known gas or salt solutions
To perform this type of AutoCal, the AcuDew sensing element needs to be stable with reference to the known gas/salts moisture levels. To ensure this is the case it is necessary to remove the AcuDew from its normal location and place in known gas/salts solution. Leave the AcuDew powered up in this location until equilibrium is achieved.

9.4.2 Performing an AutoCal against a known gas or salt solutions
This type of AutoCal is used when the customer has the ability to correct the AcuDew calibration against a known gas or salt solutions.

1. Locate and remove the large screw from the side of the AcuDew. The screw is retained by the sealing gasket.
2. Ensure that the AcuDew has been powered up for longer than 90 seconds.
Note: Because the AcuDew has been pre-conditioning for a period of time, the power supply is not likely to be have been recently interrupted.
3. Rotate the potentiometer counter-clockwise to reduce the read moisture level, or clockwise to increase the read moisture level. Keep turning until the indicator displays the correct reading.
Note: If ambient air is being used for the AutoCal, the user will need to use the best available estimate of the ambient moisture level to complete the AutoCal procedure.
Note: It is possible, when the potentiometer is first moved, that the displayed moisture value may jump significantly. This is not a problem: simply move the potentiometer until the indicator reads the required value.
4. Approximately 20 seconds after the last movement of the potentiometer the indicator will read low range for a second before returning to the corrected reading, indicating the AutoCal is complete.
5. Return the screw covering the potentiometer.

9.4.3 Pre-conditioning in normal location
No pre-conditioning of the sensors is required: leave the AcuDew powered up.

9.4.4 Performing an AutoCal in normal location
This type of AutoCal is used when the customer needs to modify the moisture level reported by the AcuDew.
1. Locate and remove the large screw from the side of the AcuDew. The screw is retained by the sealing gasket.
2. Ensure that the AcuDew has been powered up for longer than 90 seconds.
Note: As the AcuDew is still in its normal location the power supply is not likely to be have been interrupted.
3. Rotate the potentiometer counter-clockwise to reduce the read moisture level or clockwise to increase the read moisture level. Keep turning until the indicator displays the correct reading.
Note: It is possible when the potentiometer is first moved, that the displayed moisture value may jump significantly. This is not a problem: simply move the potentiometer until the indicator reads the required value.
4. Approximately 20 seconds after the last movement of the potentiometer the indicator will read low range for a second before returning to the corrected reading, indicating the AutoCal is complete.
5. Return the screw covering the potentiometer.

9.5 Trouble shooting AutoCal

Fault	Action
AcuDew fails to perform an "ambient AutoCal". It is possible that the potentiometer has entered into the dead band.	Power down the AcuDew, turn the potentiometer 2 turns clockwise. Then power up and perform AutoCal again.
The AcuDew cannot achieve the desired moisture level when performing a "Known Moisture Level". The dewpoint required is outside the set AcuDew limits.	The AcuDew is no longer within calibration and should be returned to Shaw Moisture Meters for calibration.

10 Monitoring the System

The system is designed to operate continuously with a minimum amount of operator input.

It is, however, advisable to inspect the sample loop periodically to ensure that the required flows are being maintained.

The number and type of items employed in the sample loop will determine what, if any, routine checks should be made. If, for instance, a filter is used, the filter element should be inspected periodically and changed when necessary.

The instrument should not require any routine maintenance, but if any malfunction is suspected, it is advisable to contact your local dealer.

Should it be necessary at any time or for whatever reason, to change either the AcuTrak or AcuDew, it should be noted that they are both completely interchangeable.

11 Error Messages

Message	Description
- - - - -	Sensor or sensor cable is short-circuited. The current output will drive to 20.25 mA. Please contact your local dealer.
rOnLY	Attempt was made to change displayed units or Alarm Set point when Hot Key settings editing is prevented by PANEL submenu. Refer to Section 7 for more information.
ALOFF	Attempt was made to enter alarm hotkey when alarm is switched off.
Error	High priority unspecified error during value entry. Limit a float of invalid subtype. Set a float with invalid sign.
OuEr	Attempted to adjust a value over its high range calculation limit.
UndEr	Attempted to adjust a value under its low range calculation limit.
SPAn-	Set loop current range with Hi Lo end points reversed.
SPAn0	Set loop current range with Hi Lo end points too close.

12 Appendix A - AcuTrak Setup Menu
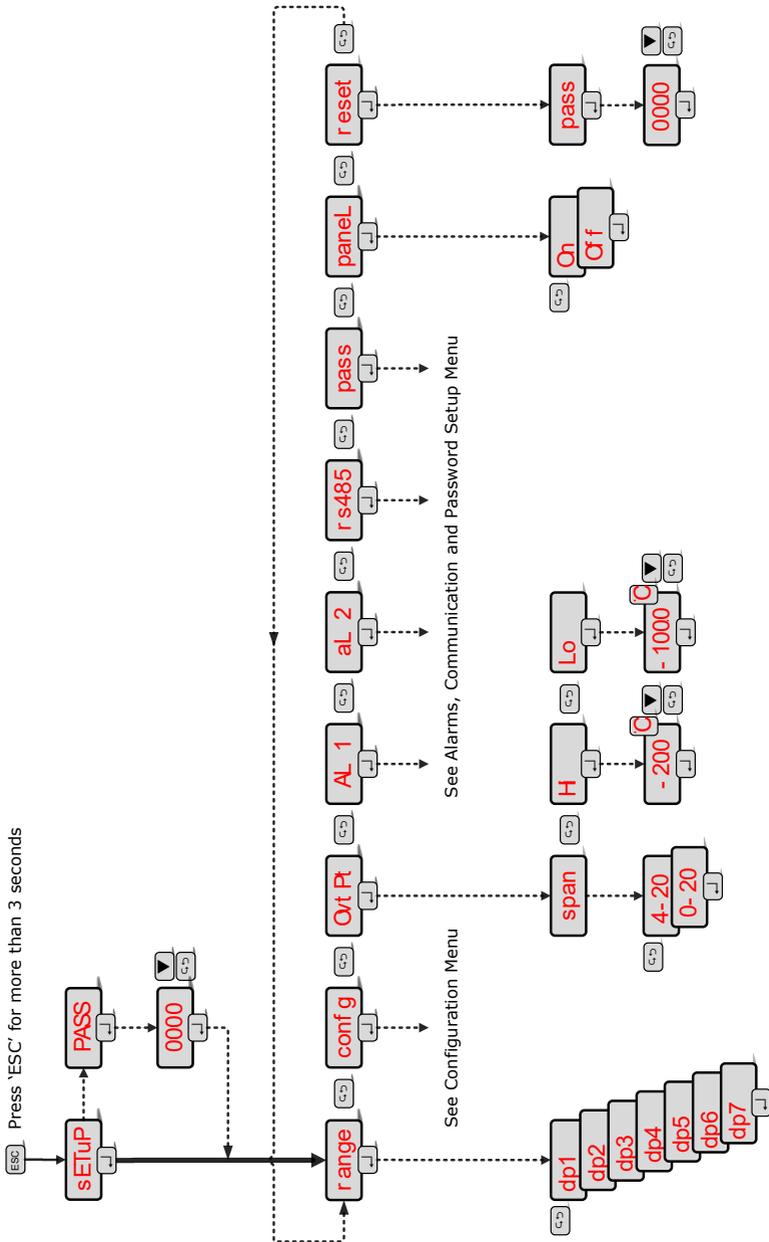
13 Appendix B - AcuTrak Configuration Sub Menu

Press 'ESC' to return to Setup Menu

Config → Units

Units: C, F, P

PUnit: bar g, PA E3, PSi g, L, b, P

TUnit: C, F

PSEN: 000, b

PD sp: 000, b

PSt d: 000, b

t st d: 1556, C

gas: Air, Ar, CH4, CO2, H2, n2, sf6, UaLue, 2897

nt gas: no, yes
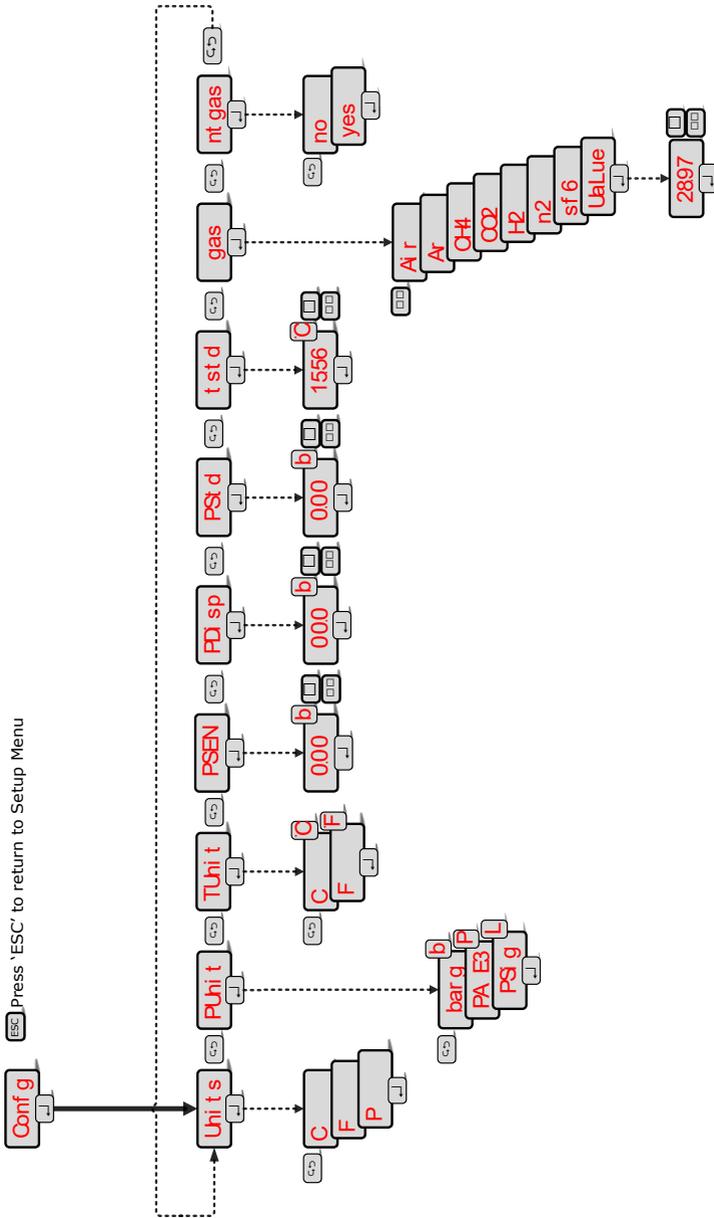
14 Appendix C
AcuTrak Alarm, RS485 and Password Setup Sub Menu

Press 'ESC' to return to Setup Menu
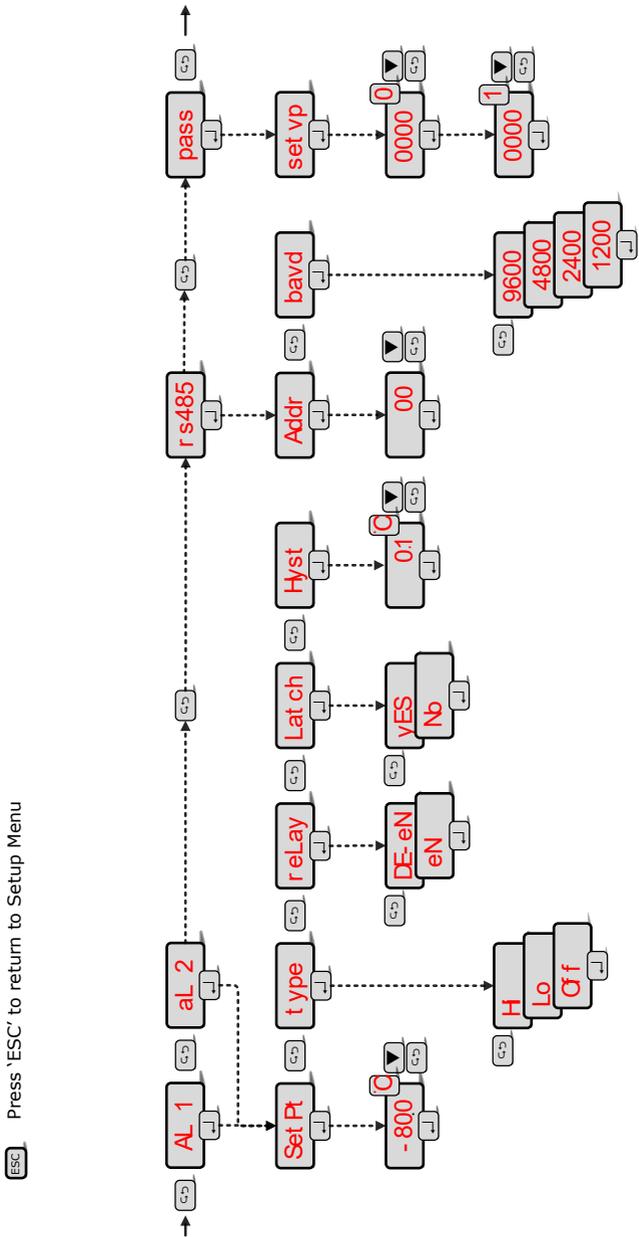
15 Appendix D - Default Instrument Configuration

Configuration	Contains submenus for choosing engineering units, choice of gas types: Defaults are: • the moisture content in °C dewpoint • the ppm(w) calculations use the gas type as Air • the model for natural gas is disabled • the pressure units are bar g • the temperature units are °C • the standard temperature and pressures are reset to 15.56 °C (60 °F) and 0 barg
Sensor Range	Contains submenus to choose the range of sensor. Defaults are: • dp1 (-100/0 °C)
Analogue Output	Contains submenus to allow the user to fully configure the analogue output. Defaults are: • Output span is set to 4 - 20 mA • Output range is set to the full span of the selected moisture range e.g. 4 mA = -100 °C and 20 mA = 0 °C for dp1
Alarms	Contains submenus to fully control behaviour of two independent alarms. Defaults are: • Both alarms set-points are set to 0 °C • Both alarms are set to trigger when rising above the upper limit • The relays are de-energized in a non-event state • The alarms events are not latching • The alarm hysteresis is set to 0.1 °C or the equivalent in other units
RS485 Communications	Contains submenus for changing baud rate and address of the instrument's RS485 communication port: Defaults are: • The instrument will communicate with a baud rate of 9600 • The address will be 00
Password	Contains submenus to set up passwords to control or limit access certain features from unauthorised changes. Defaults are: • Setup password is set to 0000 and as such is not requested unless changed • Reset password is set to 9000 and as such is not requested unless changed
Panel	Panel submenu is enabled allowing changes via hot keys. Defaults are: • Hot keys are fully active

16 Appendix E – Communications Protocol

Byte	RS485 Request Protocol (as seen by AcuTrak)
Byte	**Description**	
0, first	Preamble	255
1		255
2		255
3		255
4		255
5	Master-to-Slave	2
6	Address	0 to 32
7	Command	24
8	Data Length	1
9	Data Bytes	0
10, last	Checksum	8-bit Arithmetic Exclusive-Or of bytes 5 to 9

Byte	RS485 Reply Protocol (as seen by AcuTrak)
Byte	**Description**	
0, first	Preamble	255
1		255
2		255
3		255
4		255
5	Slave-to-Master	6
6	Return Address	(128 for Address 0) 8-bit Arithmetic OR of Address with 128
7	Command	24
8	Data Length	6
9	Status	Bits 15 - 8
10		Bits 7 - 0
11	Data	Process Value
12		Single Precision (4-Byte Float)
12		IEEE 754 Format
14		Big-endian (first byte = msb)
15, last	Checksum	8-bit Arithmetic XOr of bytes 5 onwards

Reply Status	
Bit	**Description**
15, first (ms)	Not defined
14	
13	
12	
11	Alarm 2: user to clear
10	Alarm 1: user to clear
9	Alarm 2
8	Alarm 1
7	Not defined
6	Sensor short
5	Not defined
4	
3	
2	
1	
0, last (ls)	

17 Appendix F – AcuDew Cable Assembly

2 core 7/0.2mm cable
7-2-2A type. OD - 3.4mm colour Black

M12 Connector

Bootlace Ferrules

Black Shrink Wrap

Instrument End

10mm

25mm

1) Strip back 25 mm of outer sleeve.
2) Place 30 mm of Black shrink sleeve over outer sleeve, overlap 2 inner cores.
3) Strip back 10 mm of sleeve from each core.
4) Place the Ferrules over the wire core and solder.

Connector End
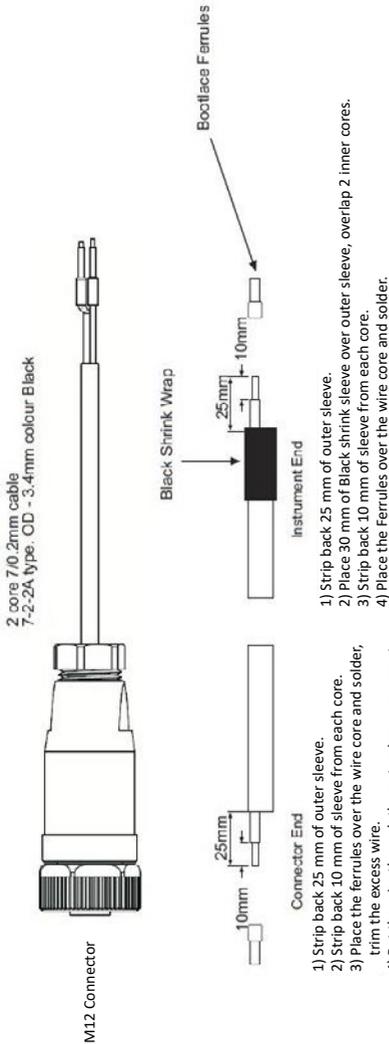
25mm

10mm

1) Strip back 25 mm of outer sleeve.
2) Strip back 10 mm of sleeve from each core.
3) Place the ferrules over the wire core and solder, trim the excess wire.
4) Put the wire through the nut, gripper, grommet and into the body of the connector.
5) Locate Ferrules in contacts and tighten screws as per table below.

M12 Connector   Body   Grommet   Gripper   Nut   Cable

Connector Pin	Wire	Signal
1	Red	+ve
2	Blue	4-20mA
3	Nc	
4	Nc	

47
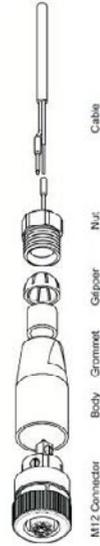
18 AcuTrak General Assembly Diagram

FRONT
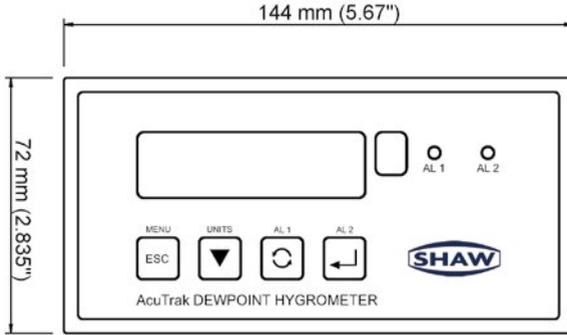
SIDE

REAR

19 Transmitter Diagram

9 mm (0.35")   70 mm (2.75")   76 mm (3.0")

SHAW

15.9 mm (0.625")

50 μm Filter

Process Thread ¾" x 16 UNF

30 mm (1.18") A/F   'O' Ring Seal

20 Sensor Holder Diagram

4 Mounting Holes 5.5 mm ø (0⁷⁄₃₂" ø)

60 mm (2²³⁄₆₄")

46 mm (1¹³⁄₁₆")

54 mm (2⅛")

38 mm ø (1½" ø)   3 mm (0⅛")

90 mm (3¹⁹⁄₃₂")

80 mm (3⅛")

65 mm (2⁹⁄₁₆")

15 mm (0¹⁹⁄₃₂")

25 mm (0¹⁵⁄₁₆")

45 mm (1⁴⁹⁄₆₄")   45 mm (1⁴⁹⁄₆₄")
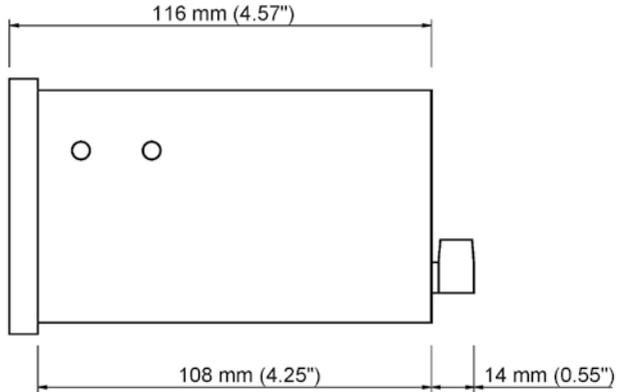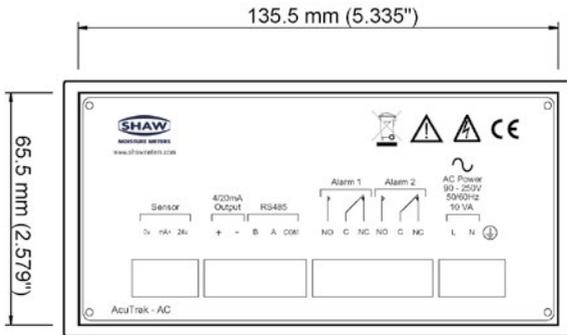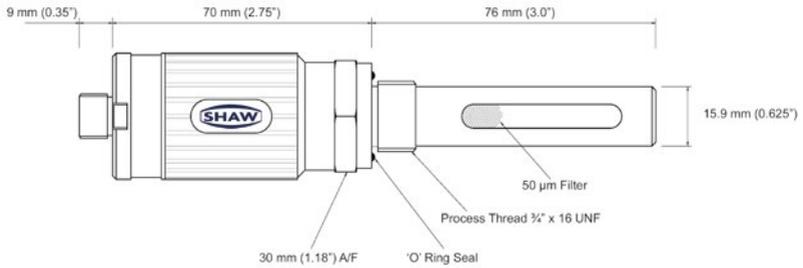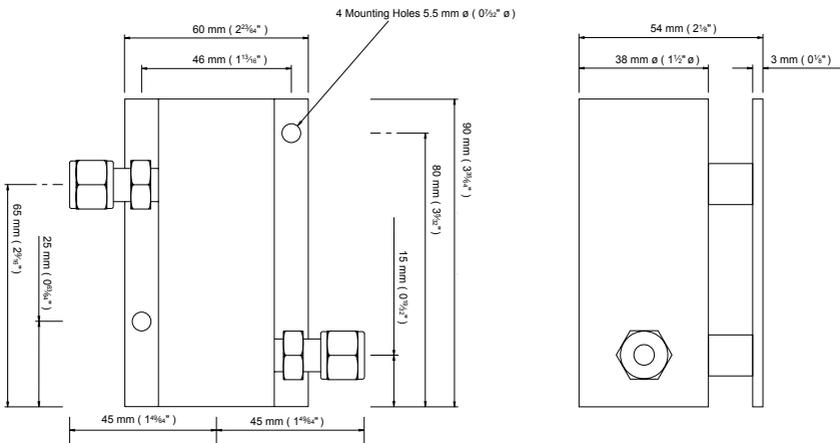
NOTE:
The assembly is shown with 6.35 mm (¼ inch) OD tube fittings.
The dimension across the tube fittings will vary for all other size fittings.

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