

# AcuDew

4-20mA & Modbus RTU

Dewpoint Transmitter

## Instruction Manual

Issue 2.2



## EU Declaration of Conformity

We                                Shaw Moisture Meters  
Of                                   Network House, 5 Lister Hill, Leeds LS18 5AZ, England

Declare that  
Model Name:                AcuDew

Description:                AcuDew 2 wire, 4-20 mA loop powered transmitter

Conforms to the following Directives:

2014/30/EU: The Electromagnetic Compatibility Directive and its amending Directives

2014/35/EU: The Low Voltage Directive and its amending Directives

And has been designed and manufactured to the following standards:

BS EN 61326-1:2013 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.



Andrew Coulton  
**Calibration & QA Manager**

25<sup>th</sup> November 2025

## UK Declaration of Conformity

We                               Shaw Moisture Meters  
Of                                 Network House, 5 Lister Hill, Leeds LS18 5AZ, England

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**Calibration & QA Manager**

25<sup>th</sup> November 2025

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## 1.0 Unpacking Your Shaw Moisture Meters AcuDew

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 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.**

### 1.1 General Description

Shaw Moisture Meters AcuDew is a 2-wire, 4-20 mA loop powered transmitter, now available with a 4-wire cable configuration for Modbus RTU Serial Line RS485 capability. Used for continuous measurement of moisture in process gas or compressed air. The AcuDew transmitter is factory configured to output a 4-20 mA linear signal or Modbus RTU Serial Line RS485 digital communication data for any of the following moisture units: °C or °F dewpoint, ppm(V), ppb(v), g/m<sup>3</sup> and lb/MMSCF.

The ultra high capacitance SHAW sensing element is long lasting and offers excellent sensitivity, repeatability and response speed. Each unit is calibrated, traceable to National & International Humidity Standards and supplied with a Certificate of Calibration guaranteeing accuracy to  $\pm 2$  °C dewpoint.

The transmitter also incorporates an automatic calibration (AutoCal) function, which allows the user to carry out field calibration/span check. The AutoCal function is operated by means of a small potentiometer built into the transmitter body. To avoid accidental adjustment, the potentiometer is covered by a weatherproof seal in normal use.

It is recommended that the AcuDew is calibrated at regular intervals to maintain accuracy. Annual laboratory calibration is recommended.

The RISC microprocessor circuitry of the AcuDew transmitter allows high resolution with advanced self-diagnostics for fault conditions, enabling periodic recalibration of the dewpoint sensor and storing calibration data within the fully self-contained unit. Loop powered, by a 12 to 28V DC source, the AcuDew transmitter provides the user with a linear, 4-20 mA signal over the chosen range.

The mechanics of the AcuDew transmitter have been designed to cope with extreme environmental conditions. The rugged stainless steel and aluminium construction offers protection to IP66 NEMA 4X, with the transmitter electrical connections made via secure industrial type connector - M12 5 pin cable connector.

The AcuDew transmitter can withstand 35,000kPa (350bar) maximum pressure and by employing low resistance cable, the transmitter can be located at significant distances, up to 1,000 metres (3,280 feet) from the data collection point.

Designed with the operator in mind, for reliable and accurate measurements, the AcuDew is extremely easy to install and operate, requiring little or no maintenance.

## 1.2 Ranges

<b>ZD:</b>	-100 °C to +20 °C	(-148 °F to +68 °F) dewpoint	
<b>HD:</b>	-65 °C to +20 °C	(-85 °F to +68 °F) dewpoint	
<b>P (Purple):</b>	-100 °C to 0 °C	(-148 °F to +32 °F) dewpoint	0 - 6,000 ppm(V)
<b>S (Silver):</b>	-100 °C to -20 °C	(-148 °F to -4 °F) dewpoint	0 - 1,000 ppm(V)
<b>G (Grey):</b>	-80 °C to 0 °C	(-112 °F to +32 °F) dewpoint	0 - 6,000 ppm(V)
<b>R (Red):</b>	-80 °C to -20 °C	(-112 °F to +4 °F) dewpoint	0 - 1,000 ppm(V)
<b>B (Blue):</b>	-80 °C to +20 °C	(-112 °F to +68 °F) dewpoint	0 - 23,000 ppm(V)
<b>MP:</b>	0.1 to 100.0 ppm(V)	0.1 ppm resolution	
<b>LP:</b>	0.01 to 10.00 ppm(V)	0.01 ppm resolution	
<b>GH:</b>	0.01 to 10.00 g/m <sup>3</sup>	0.01 g/m <sup>3</sup> resolution	
<b>LB:</b>	0.1 to 100.0 lb/MMSCF	0.1 lb/MMSCF resolution	

## 2.0 Gas Compatibilities

The AcuDew sensing element is Al<sub>2</sub>O<sub>3</sub> and therefore suitable for many different industrial and research applications.

Most gases can be checked for their moisture content with no need for the calibration to be altered when changing between different gases, as the sensor operates only with reference to the water vapour content. However, some gases must be avoided, as they are not compatible with the material used in the construction of the sensor. Ammonia (NH<sub>3</sub>) and Chlorine (Cl<sub>2</sub>) must be avoided at all times, even in small quantities. Hydrogen Chloride (HCl) also attacks the sensors very quickly. Some, less aggressive, acidic gases, such as Sulphur Dioxide (SO<sub>2</sub>), can be monitored, as long as the moisture content is low, generally less than 100 ppm(V).

**If in doubt, please ask your supplier.**

Sulfur hexafluoride (SF<sub>6</sub>) has no effect on the sensor. If the gas has been exposed to arcing, however, it is possible that various acidic species will have been formed that will corrode the sensor. When testing SF<sub>6</sub> that may have been arced, therefore, an acidity test should be carried out first; if the gas proves to be acidic then the moisture test should not be carried out.

It is strongly recommended that the sample should not contain particulate matter, oil or other heavy hydrocarbon condensate. If these components contaminate the sample system and/or the measuring sensor, the system response time will be lengthened, although the sensor calibration will not be effected.

## 2.1 Installing the AcuDew in an Air/Gas Sampling System

The piping installation schematic diagram shows all components, which could be used in a gas measurement application. Not all items shown will be required for every installation.

The flow rate, although not critical, 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 two and five litres/min at normal temperature and pressure, should 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 dewpoint/frost point temperature.

The measuring transmitter can be installed directly into the process line but this creates 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 total loss sample system where the transmitter is accessible without interrupting the main process flow line.

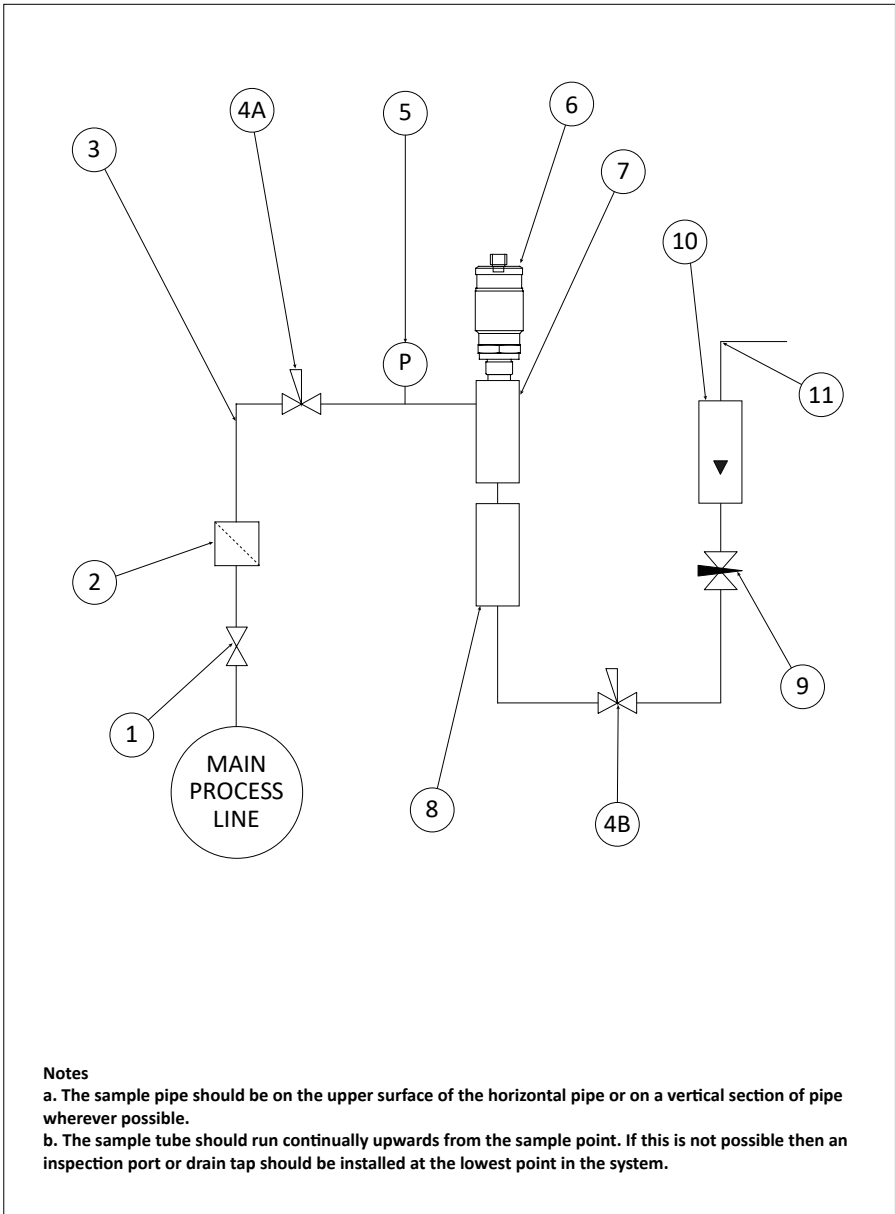
The AcuDew transmitter is suitable for use with:

- AcuTrak inline hygrometer
- AcuVu single channel dewpoint hygrometer
- AcuLoop, a self-contained, 4-20 mA loop powered plug in dewpoint display module
- SU4 sample system

The following accessories are also available for the AcuDew transmitter:

- Sensor holder for installation of the AcuDew into a process line or sample system

## 2.2 Piping Installation Schematic



## 2.3 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 ( $\frac{1}{8}$ "") is sufficient as it provides good system response time within minimum flow. 6 mm OD ( $\frac{1}{4}$ "") 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 “Appendix C – AcuDew with Connector, General Arrangement”.
7. **Transmitter Holder**, see “Appendix E – Transmitter Holder General Arrangement”.
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 per minute.
11. **Sample Exhaust** – The exhaust can be vented to atmosphere or returned to the process line as discussed above.

## 2.4 Installing and Commissioning

The AcuDew dewpoint transmitter can be installed in three general ways:

1. Directly in to the process line.
2. As part of a sample conditioning system using a Shaw Moisture Meters sensor holder.
3. Using the AcuLoop display module with a sensor holder.

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

Refer to the sample system schematic in section 2.2. Open the inlet isolation valve slowly, until a small flow of air/gas at atmospheric pressure flows through the inlet pipe work to the transmitter holder and exhausts through the sensor entry port of the transmitter holder.

Allow this purge to continue for approximately 15-20 minutes to remove any residual moisture from the sample pipe work and components.

Close the inlet isolation valve and install the transmitter into the transmitter holder. Locate and secure the M12 5 pin cable connector positioned on the transmitter. Align the keyed groove in the connector with the keyed notch in the AcuDew. Push inwards and screw the locking ring clockwise in order to affect a weatherproof seal.

**NOTE: The M12 connector is a single direction keyed groove.**

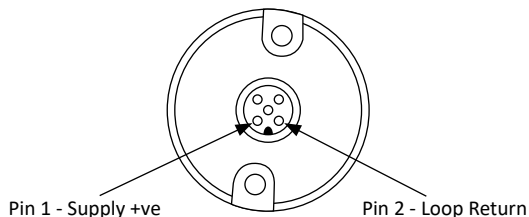
Slowly open the inlet valve again and by opening all valves after the transmitter holder, allow a low pressure purge through the whole sample system.

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.

## 3.0 Connecting the AcuDew

### Connector Pins



### 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 D.

#### 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.

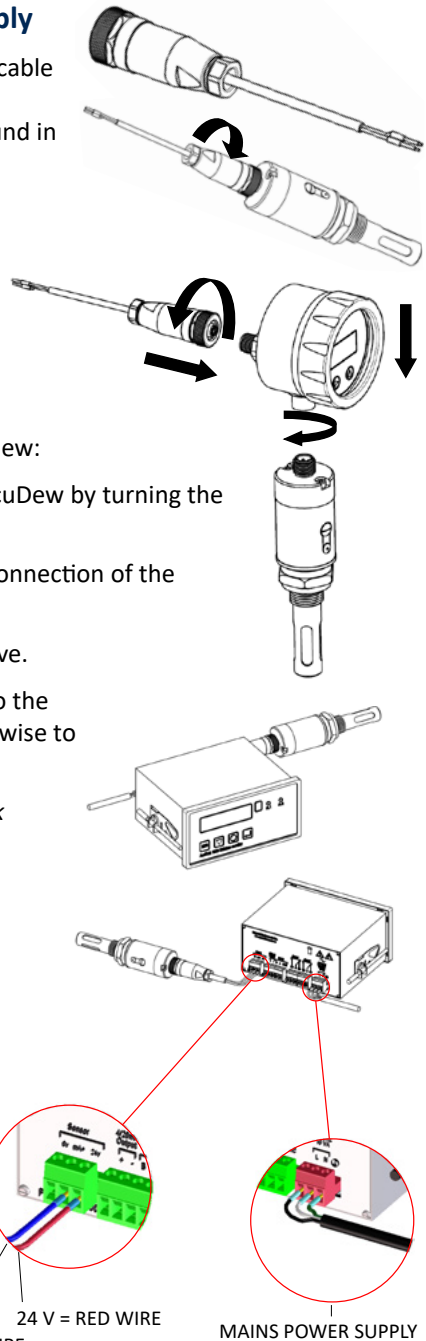
#### 3.1.3 Connecting the AcuDew to an AcuTrak

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 and relay ON/OFF indication.
- Process control via 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

### 3.2 Wiring the AcuDew

The AcuDew is a 2-wire, 4-20mA transmitter. For wiring and configuration to displays or logging devices please consult the device’s user manual. Typical electrical connection to generate a voltage output is shown below in *Fig. 1 Analogue Output Connection*.

**Note:** the maximum value for  $R_s$  in this circuit can be calculated by the formula:  $R_s \text{ max} = [40 \times (V_s - 7)]\Omega$

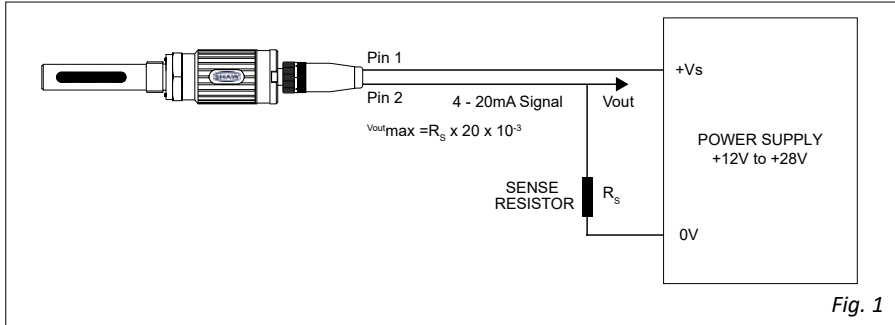
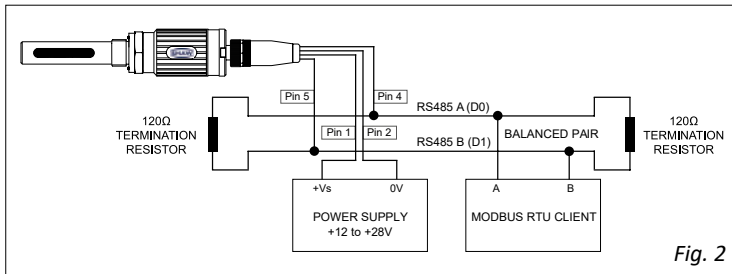


Fig. 1

If the wiring resistance is expected to be more than a few percent of the value of  $R_s$ , then this resistance must be taken away from the answer to get the maximum usable value of  $R_s$ .

Alternatively, the device can be wired for Modbus communication according to *Fig. 2 Modbus RTU Output Connection*, below. In this case, +Vs and 0V supply the power to the device and pins A and B provide the communications.



**NOTE:**  
The 4-20 mA signal is not available when operating in Modbus mode

Fig. 2

### 3.3 Electrical Connection

**Output signal:** 2-wire analogue output and Modbus RTU.

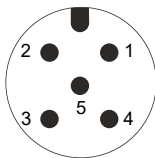


Fig. 3

	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5
4-20mA	+ve	4-20mA	N/c		
Modbus	12-24vdc	0v	N/c	RS485 DATA-/A/D0	RS485 DATA+/B/D1

**NOTE:** Please see *Appendix D & E* for wiring details of SHAW supplied cable.

### 3.4 Modbus RTU

Dewpoint transmitters with a Modbus RTU output can be connected to a Modbus Client device. This Client can be a gateway or any third-party Modbus RTU Client.

### 3.5 Modbus RTU Cable Connection

The Modbus RTU link should be operated within the constraints below in order to ensure stable communications (*please see Fig. 4 for details*):

- The maximum total bus length must not exceed 1,000 m.
- The stub length to each node must not exceed 30 cm.

### 3.6 Modbus RTU Wiring and Cable Type

To ensure a stable communication, a twisted-pair bus cable is strongly recommended (*please see Fig. 4*).

- Bus cable specifications should follow the EIA485 Standard; shielded twisted pair is recommended, for example 2 x 2 x 0.22 mm<sup>2</sup>, Li-2YCY.
- Cable screen/shield is not required for modbus communication, but is recommended for long distances or noisy environments. When in use, connect the screen to a local chassis or earth point at the control system end of the cable. Leave the screen unconnected at the transmitter end.
- At each end of the bus, a 120 Ohm termination resistor should be fitted.

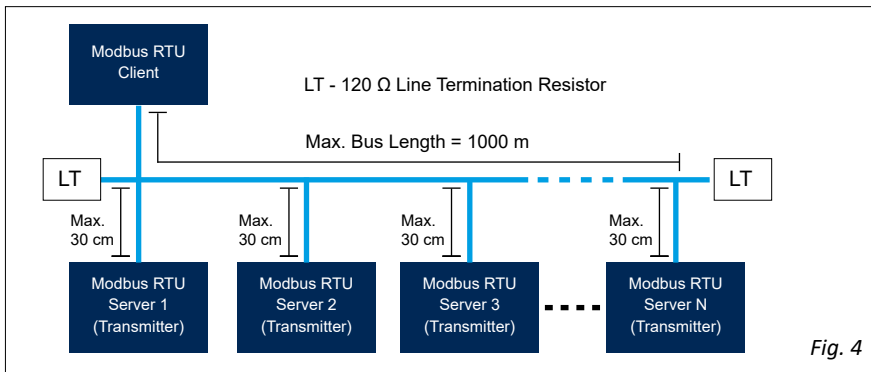


Fig. 4

## 4 Modbus RTU Communication

### 4.1 Communication Parameters

Please see the table opposite for the AcuDew communication parameters. The default communication settings are **19200 Baud, Even Parity**.

Parameter	Value
Communication Speed	4800 / 9600 / <b>19200</b> / 38400 Baud
Start bit	1
Data bits	8
Stop bits	1
Parity	<b>Even/Odd/No</b>

## 4.2 Modbus RTU Protocol

A Modbus message from Client to Server consists of: address, function (read or write) data and checksum (CRC). The following table shows the structure of a complete command:

ADDRESS	FUNCTION	DATA	CRC
1 BYTE	1 BYTE	0 ... 256 BYTES	2 BYTES

- ADDRESS

Valid addresses are in the range of 1...247, default is 10 (0x0A). A broadcast to all devices with address 0 results in no answer from instruments.

- FUNCTION

Function 03 Read Holding Register  
 Function 04 Read Input Register  
 Function 06 Write Single Register  
 Function 16 Write Multiple Registers

- DATA

16-bit Integer	
Hi-byte	Lo-byte

32-bit float, according to IEEE-754			
Hi-word		Lo-word	
Hi-byte	Lo-byte	Hi-byte	Lo-byte

**NOTE:** Data structure is command dependant. Please see Modbus Application Protocol Specification for details <http://www.modbus.org>

- CRC

The cyclic redundancy check is calculated over the whole command (excluding CRC).

CRC (16-bit Integer)	
Lo-byte	Hi-byte

- DATA TYPES

Data Type	Description	Length [bytes]
float32	floating point, according to IEEE-754	4
uint16	unsigned integer, 16 bits	2

## 4.3 Function Codes Supported

### 03 Read Holding Registers

Description: Read the contents of holding registers.

Addresses available are: 4001, 4004, 5001. For a full register listing, see *Appendix F - Transmitters Modbus Registers Layout*.

16-bit Integer		Units Register, Address 4004
Hi-byte	Lo-byte	<i>The register is READ ONLY.</i>

The value in the Units Register exposes the units of the dewpoint measurement. The register can be read by issuing a Read Holding Register Command with Holding register address #4004.

There are 7 possible responses:

- |                                  |   |
|----------------------------------|---|
| 0 or 6 - Dewpoint value is in °C | 3 - Dewpoint value is in ppb(v)           |
| 1 - Dewpoint value is in °F      | 4 - Dewpoint value is in g/m <sup>3</sup> |
| 2 - Dewpoint value is in ppm(V)  | 5 - Dewpoint value is in lb/MMSCF         |

The TAG ID can be read by using command 03 to read register address 5001, with 16 bit register count 10.

**NOTE:** The number of 16-bit registers in the request can be 1, 2, 3, ... 10. The number of 16-bit registers in the request must not be more than specified in the table, otherwise an exception with the code "Illegal Data Address" (0x02) will be returned.

### 04 Read Input Registers

Description: Reads the contents of input registers, see table in *Appendix F - Transmitters Modbus Registers Layout* for details.

For example: Read dewpoint value in IEEE754 32 bit format.

Client sends: 0A 04 0B B9 00 02 A3 71

0A = Device Address

04 = Command

0B B9 = Register Address (#3001)

00 02 = registers count

A3 71 = CRC

Server responds: 0A 04 04 C1 61 D9 14 76 F9

Dew point value float: -14.1154975891

**NOTE:** An exception response with code 0x02 "Illegal Data Address" will be returned in the following scenarios:

- If the register address is outside of the range 3001...3020
- If the register address is 3020 and the number of registers to read is more than 4.
- Not a valid address e.g.. 4002

## 06 Write Single Holding Register

Description: Write data to a single 16-bit register.

Three 16-bit registers are available:

Transmitter Address Register	4001
Baud Rate Register	4002
Parity Register	4003

Register 4001 is Read/Write

Registers 4002 and 4003 are Write only

Response: The normal response is an echo of the query or exception response if an error is encountered.

After altering Control Registers 4001...4003, re-establish communication with the client, with the new device address, baud rate and parity settings as required.

Device Address Register, Address 4001

*The register is Read/Write. Address range 1 to 247, default is 10.*

16-bit Integer	
Hi-byte	Lo-byte

Baud Rate Register, Address 4002

*The register is Write only. Possible baud rates are 4800, 9600, 19200 and 38400. The default is 19200.*

16-bit Integer	
Hi-byte	Lo-byte

Modbus Parity Register, Address 4003

*The register is Write only. Possible parity is 0 – None, 1 - Odd and 2 - Even. The default is Even.*

16-bit Integer	
Hi-byte	Lo-byte

## 16 Write Multiple Holding Registers

Description: Write data as a sequence of 16-bit registers.

Device TAG ID registers. Ten 16-bit registers are available.

Default TAG ID is "123456789+987654321-"

Register Address 5001

Register Address 5010

16-bit Integer	
Hi-byte	Lo-byte

16-bit Integer	
Hi-byte	Lo-byte

**Note:** *The Modbus TAG ID, written by this command, can be read in the Holding register from address 5001.*

Please refer to *Appendix F - Transmitters Modbus Registers Layout* table for details.

## **4.4 Multi Device Communication**

It is possible to communicate with multiple devices on the same modbus RTU bus, including more than one AcuDew transmitter, or 3rd party modbus devices. In order to do this, each AcuDew must be assigned a unique device address, so that no two devices on the same bus share an address. To change the device address,

write to register address 4001. All modbus devices on the same bus must have identical baud rate and parity settings. In addition, for best results we recommend:

- Configure each device in isolation and verify 1-to-1 communication before connecting it to the bus.
- A maximum of 8 devices on one bus.
- Adding a delay of 50ms between finishing communication with one device and starting communication with the next device.

## 4.5 Communications Settings Recovery

If the communication settings become unknown, connection with the transmitter can be lost. To resolve the issue, a sequence of commands can be sent to reset the communication parameters to default values. To reset parameters, the client must send a recovery command to all valid baud rates and parities.

**Please note:** The recovery sequence should only be performed while connected equipment is offline and in a safe state. Subsequent changes to the device address must be carried out with a single transmitter connected (point to point connection).

1. **Command:** Use the “Write Single Register” command.
2. **Broadcast Address:** Set the device address to 0.
3. **Register Address:** Use register address 4004.
4. **Value:** Set the value to 21059.

There are 12 possible baud rate/parity combinations which must be sent:

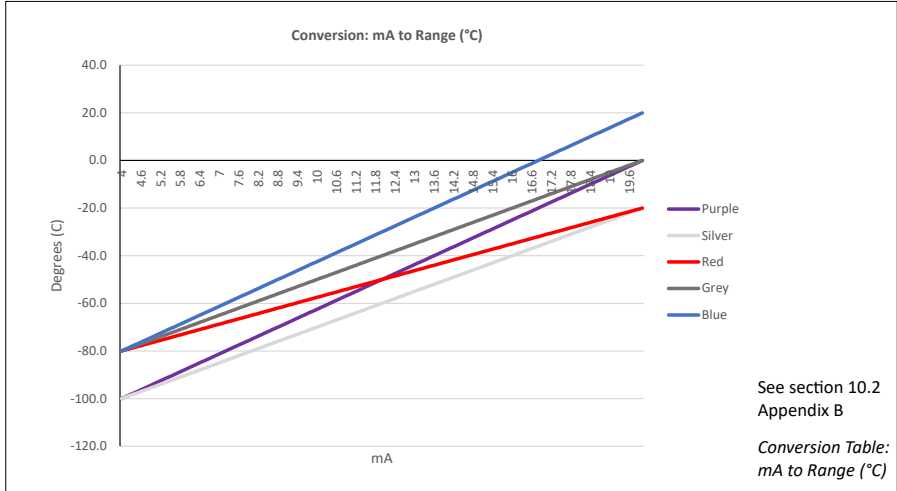
BR=4800, Parity=Even	Send write single register to address 0, register 4004, value 21059
BR=4800, Parity=Odd	Send write single register to address 0, register 4004, value 21059
BR=4800, Parity=None	Send write single register to address 0, register 4004, value 21059
BR=9600, Parity=Even	Send write single register to address 0, register 4004, value 21059
BR=9600, Parity=Odd	Send write single register to address 0, register 4004, value 21059
BR=9600, Parity=None	Send write single register to address 0, register 4004, value 21059
BR=19200, Parity=Even	Send write single register to address 0, register 4004, value 21059
BR=19200, Parity=Odd	Send write single register to address 0, register 4004, value 21059
BR=19200, Parity=None	Send write single register to address 0, register 4004, value 21059
BR=38400, Parity=Even	Send write single register to address 0, register 4004, value 21059
BR=38400, Parity=Odd	Send write single register to address 0, register 4004, value 21059
BR=38400, Parity=None	Send write single register to address 0, register 4004, value 21059

When the matching communication parameters are used, the transmitter will be set back to default values. After performing the above sequence, please check for correct communication using the default settings: Device address = 10, Baud rate = 19200, Parity = Even

## 5.0 Normal Operation

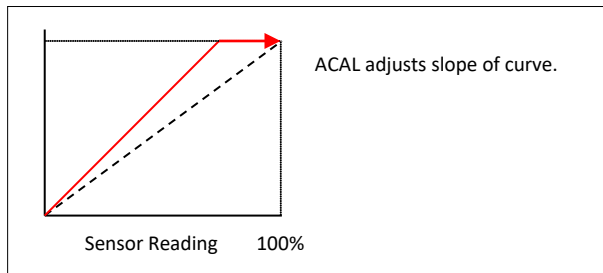
### 5.1 Analogue 4-20 mA Mode (2-wire)

In normal operation, the transmitter will produce a 4-20 mA signal, which is proportional to the level of moisture in the gas being monitored. The moisture reading is sampled and updated more than once per second. The AcuDew has 3,020 distinct steps over the 4-20 mA range corresponding to a resolution of 0.005 mA.



## 6.0 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 two to three months or can be used to verify operation of the AcuDew transmitter if confirmation of an unexpected result is required.



**Note:**

The AcuDew must be connected to an indicator or a device that is able to supply an accurate measurement of the mA output.

## 6.1 Pre-conditioning the Transmitter

To perform AutoCal, the transmitter needs to be removed from the process gas at which point the display/indicator will read the ambient dewpoint or full scale (if the ambient dewpoint level is above the range of the AcuDew). Expose the transmitter to the known AutoCal moisture level and allow the transmitter to attain equilibrium.

*(For technical questions and advice on the time taken to attain equilibrium contact your AcuDew supplier.)*

**Method 1:** Expose to a known moisture level

(Applicable to all versions of AcuDew transmitters.)

If a known gas is available within the range of the transmitter, then the AcuDew can be autocaled against this value.

**Method 2:** Saturating method

(Only applicable to 0 °C (+32 °F) and -20 °C (-4 °F) top end range AcuDew transmitters.)

When the AcuDew sensing element is exposed to dewpoint levels above the top end range of the transmitter, the sensor will saturate and the transmitter can be autocaled to 0 °C or -20 °C. For both 0 °C and -20 °C transmitters, ambient dewpoint is usually adequate to saturate the sensor.

**Method 3:** Set against ambient moisture level

(Only applicable to +20 °C (+68 °F) top end range AcuDew transmitters.)

When the ambient dewpoint is known, then the AcuDew can be autocaled to the ambient value.

## 6.2 Adjusting the AutoCal

### WARNING

**Do NOT** power down while the AutoCal is active as this can lead to corruption of the AcuDew's memory.

The AcuDew is supplied with an adjustable potentiometer to perform AutoCal, which allows the calibration span of the transmitter to be adjusted. This potentiometer is located under the weatherproof guard and can be accessed by undoing the large silver coloured screw on the side of the transmitter body. The AutoCal is adjusted by turning the potentiometer with the small screwdriver supplied.

Once the transmitter has been pre-conditioned the potentiometer can be adjusted. **ONLY ADJUST THE POTENTIOMETER IF THE SENSOR IS PROPERLY PRE-CONDITIONED. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY CORRUPT THE TRANSMITTERS CALIBRATION.**

**Note:** The AcuDew must be connected to a properly configured indicator so that readings can be taken or where no indicator is employed, an accurate measurement of the mA output must be taken.

Use the potentiometer to move the reading up or down so that the desired dewpoint is displayed.

**Method 1:** Adjust the AcuDew reading until the indicator reads the known moisture level.

**Method 2:** Adjust the AcuDew reading until the indicator reads 0 °C or -20 °C whichever is applicable to the AcuDew being autocalled.

**Method 3:** Adjust the AcuDew reading until the indicator reads the known ambient moisture reading.

### 6.3 Completing the AutoCal

Once the desired value is reached and the AutoCal process complete, remove the screwdriver from the potentiometer and replace and fasten the weatherproof guard using the large silver coloured screw.

The AcuDew will now output the corrected dewpoint and can be reinserted into the process.

### 6.4 AcuDew Range AutoCal Method Lookup Table

Use the table below to decide which AutoCal methods are appropriate for your AcuDew transmitter.

	Range		Methods Appropriate
-80 °C to -20 °C	-112 °F to -4 °F		1 & 2
-110 °C to -20 °C	-166 °F to -4 °F		1 & 2
-120 °C to -20 °C	-184 °F to -4 °F		1 & 2
-65 °C to 0 °C	-85 °F to +32 °F		1 & 2
-80 °C to 0 °C	-112 °F to +32 °F		1 & 2
-100 °C to 0 °C	-148 °F to +32 °F		1 & 2
-65 °C to +20 °C	-85 °F to +68 °F		1 & 3
-100 °C to +20 °C	-148 °F to +68 °F		1 & 3
-120 °C to +20 °C	-184 °F to +68 °F		1 & 3
1 - 1000 ppm(V)	0.1 - 100 ppm(V)	0.01 - 10 ppm(V)	1
1 - 1000 ppb(V)			1
0.01 - 10 g/m³	0.001 to 1 g/m³		1
0.1 - 10 lb/MMSCF	0.1 - 25 lb/MMSCF	0.1 - 50 lb/MMSCF	1

## 6.5 Faults/Errors

- If the sensor is short-circuited, the transmitter will produce a constant 20.75 mA output.
- If the sensor is open-circuited, the transmitter will produce a constant 20.50 mA output.

## 6.6 Troubleshooting AutoCal

FAULT	ACTION
AcuDew fails to perform an ambient AutoCal. It is possible that the potentiometer has entered into the dead band area at the end of the pot.	Power down the AcuDew, turn the potentiometer two turns clockwise. Then power up and perform AutoCal again.
The AcuDew cannot achieve the desired moisture level when performing a “known moisture level”. The dew/frost point required is outside the set AcuDew limits.	The AcuDew is no longer within calibration and should be returned to your Agent or Shaw Moisture Meters for calibration.

# 7.0 AcuDew Specification

<b>Sensing Element:</b>	Shaw Ultra High Capacitance - Aluminium Oxide Sensor	
<b>Display:</b>	Compatible with the 4-20 mA loop powered indicator	
<b>Ranges:</b>	Dewpoint = 0.1 °C / 0.2 °F resolution	
	<b>ZD:</b>	-100 °C to +20 °C (-148 °F to +68 °F) dewpoint
	<b>HD:</b>	-65 °C to +20 °C (-85 °F to +68 °F) dewpoint
	<b>Go (Gold)</b>	-120 to -20 °C (-184 to -4 °F) dewpoint      0.1 ppb - 1,000 ppm(V)
	<b>P (Purple):</b>	-100 to 0 °C (-148 to +32 °F) dewpoint      0 - 6,000 ppm(V)
	<b>S (Silver):</b>	-100 to -20 °C (-148 to -4 °F) dewpoint      0 - 1,000 ppm(V)
	<b>G (Grey):</b>	-80 to 0 °C (-112 to +32 °F) dewpoint      0 - 6,000 ppm(V)
	<b>R (Red):</b>	-80 to -20 °C (-112 to -4 °F) dewpoint      0 - 1,000 ppm(V)
	<b>B (Blue):</b>	-80 to +20 °C (-112 to +68 °F) dewpoint      0 - 23,000 ppm(V)
	<b>MP:</b>	0.1 to 100.0 ppm(V)      0.1 ppm resolution
	<b>LP:</b>	0.01 to 10.00 ppm(V)      0.01 ppm resolution
	<b>GH:</b>	0.01 to 10.00 g/m <sup>3</sup> 0.01 g/m <sup>3</sup> resolution
	<b>LB:</b>	0.1 to 100.0 lb/MMSCF      0.1 lb/MMSCF resolution

**Approvals:**



<b>AutoCal:</b>	Field calibration/span check facility. Activated and operated via the potentiometer on the transmitter body
<b>Factory Calibration:</b>	Supplied with Certificate of Calibration traceable to National Physical Laboratory (NPL)
<b>Accuracy:</b>	± 2 °C (±3.6 °F) dewpoint NPL traceable -90 °C to +20 °C (-130 °F to +68 °F)
<b>Communications:</b>	Modbus RTU capable, baud rate=4800, 9600, 19200 or 38400
<b>Resolution:</b>	0.005 mA
<b>Repeatability:</b>	Better than ±0.3 °C (±0.54 °F) dewpoint
<b>Operating Temperature:</b>	-20 °C to +60 °C (-4 °F to +140 °F)
<b>Storage Temperature:</b>	-20 °C to +70 °C (-4 °F to +158 °F)
<b>Response Times:</b>	Wet to dry: -20 °C to -60 °C - less than 120 secs Dry to wet: -100 °C to -20 °C - less than 20 secs
<b>Sample Flow Rate:</b>	Flow independent but ideally 2 to 5 litres per minute. Max: 25 litres/min
<b>Calibration Warranty:</b>	12 months from date of dispatch
<b>Electromagnetic Compatibility (EMC):</b>	Immunity & Emissions: Complies with EN 61326
<b>Warm Up Time:</b>	10 seconds
<b>Fault Conditions:</b>	Open circuit: output drives to 20.5 mA Short circuit: output drives to 20.75 mA
<b>Isolation:</b>	Sensing element connected to the 4-20 mA loop but isolated from transmitter body
<b>Output Signal:</b>	4-20 mA Linear/Modbus RTU
<b>Operating Voltage:</b>	12-28 V DC reverse polarity protected
<b>Maximum Series Resistance:</b>	= {40 x (Supply Voltage – 7)} Ω
<b>Operating Pressure:</b>	From 1kPa (0.01 barA) to maximum 35,000kPa (350 barA)
<b>Operating Humidity (External):</b>	Maximum - 95% RH non-condensing
<b>Cable Terminations:</b>	IP66/NEMA 4X rated, M12 five pin cable connector at the transmitter and the other end terminated with bootlace ferrules
<b>Cable:</b>	4-20mA: supplied with 2m 2-wire cable. Nominal diameter 3.4mm, 92 Ω/km at 20°C Modbus: supplied with 2m 4-wire cable. Nominal diameter 4.5mm, 92 Ω/km at 20°C
<b>Transmitter Enclosure:</b>	Wetted parts 316 stainless steel with aluminium body
<b>Sensor Protection:</b>	316 sintered stainless steel filter - 50 micron
<b>Probe Material (Wetted Parts):</b>	316 stainless steel
<b>Weatherproof Classification:</b>	IP66 (NEMA 4X) when connector mated to transmitter
<b>Mechanical Connection:</b>	¾" UNF (16tpi) with integral Viton "O" ring seal
<b>Mechanical Warranty:</b>	24 months in case of faulty workmanship and defective parts
<b>Weight:</b>	215 grams (0.474 lb) includes connector

## 8.0 Guarantee

All Shaw Moisture Meters products are guaranteed for two years from the date of purchase. Some exclusions are as follows:

- Removal of the protective guard from any sensor
- Subjecting the sensor to shock or black list gases e.g. caustic and acidic gases like ammonia and chlorine
- Tampering with any internal electronics
- Applying incorrect supply voltage to transmitter
- Subjecting to excessive flow rate and/or contaminants
- General misuse

If you suspect a fault which you feel needs to be attended to under guarantee please contact us for assistance hopefully to help fault find and effect a remedy and if this is not successful to give precise instructions for the return for inspection.

No equipment will be replaced or repaired without having been returned for inspection either to ourselves or an authorised distributor.

## 9.0 Basic Definitions

**WATER VAPOUR PRESSURE:** the pressure exerted by the water vapour contained in any mixture of gases. The total pressure exerted by the gas mixture is the sum of the pressures exerted by its components - including the water vapour. Water Vapour Pressure varies in direct proportion to the total gas.

**DEWPOINT TEMPERATURE:** the temperature to which the gas must be cooled in order that it should be saturated with water vapour (i.e. 100% relative humidity). For practical reasons it is referred to as dew point above 0 °C and frost point below 0 °C.

**PARTS PER MILLION BY VOLUME:** ppm(V) is the ratio of the water vapour pressure to the total gas pressure.

**PARTS PER MILLION BY WEIGHT:** ppm(w) is the ratio of the molecular weight of water vapour to the molecular weight of the carrier gas mixture.

**RELATIVE HUMIDITY:** the ratio of the actual water vapour pressure in the gas to the saturation water vapour pressure at the same temperature.

# 10.0 Appendix

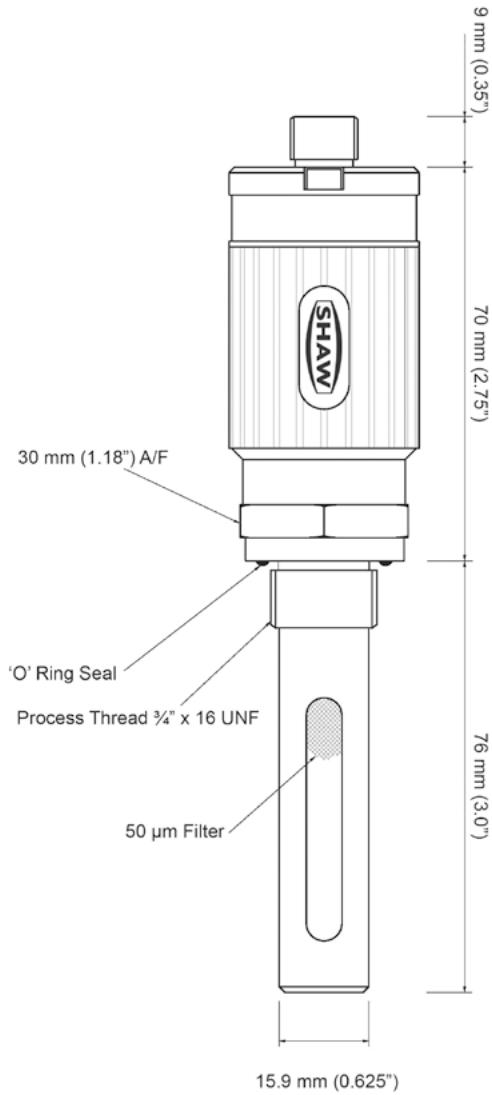
## 10.1 Appendix A - Hygrometric Equivalents

DEWPOINT ° C	DEWPOINT ° F	VAPOUR PRESSURE mmHG	PARTS PER MILLION by VOLUME	DEWPOINT ° C	DEWPOINT ° F	VAPOUR PRESSURE mmHG	PARTS PER MILLION by VOLUME
-150	-238	7 x 10 (-15)	9.2 x 10 (-12)	-52	-62	.02305	30.329
-140	-220	3 x 10 (-10)	3.9 x 10 (-7)	-50	-58	.02961	38.961
-130	-202	7 x 10 (-9)	9.2 x 10 (-6)	-48	-54	.03786	49.816
-120	-164	9 x 10 (-8)	1.2 x 10 (-4)	-46	-51	.04819	63.408
-118	-180	.00000015	.00020	-44	-47	.06108	80.368
-116	-177	.00000025	.00033	-42	-44	.07709	101.43
-114	-173	.00000041	.00054	-40	-40	.09691	127.51
-112	-170	.00000066	.00087	-38	-36	.12133	159.64
-110	-166	.00000107	.00141	-36	-33	.15133	199.12
-108	-162	.00000169	.00222	-34	-29	.1880	247.37
-106	-159	.00000266	.00350	-32	-26	.2328	306.32
-104	-155	.00000413	.00543	-30	-22	.2871	377.76
-102	-152	.00000636	.00837	-28	-18	.3529	464.34
-100	-148	.00000968	.0127	-26	-15	.4323	568.82
-98	-144	.00001459	.0192	-24	-11	.5277	694.34
-96	-141	.00002178	.0287	-22	-8	.6422	845.00
-94	-137	.00003224	.0424	-20	-4	.7790	1025.00
-92	-134	.00004729	.0622	-18	0	.9421	1239.61
-90	-130	.00006879	.0905	-16	+3	1.136	1494.74
-88	-126	.00009924	.1305	-14	+7	1.365	1796.05
-86	-123	.00014205	.1869	-12	+10	1.636	2152.63
-84	-119	.0002018	.2655	-10	+14	1.956	2573.68
-82	-116	.0002844	.3742	-8	+18	2.331	3067.11
-80	-112	.0003981	.5238	-6	+21	2.771	3646.05
-78	-108	.0005533	.7208	-4	+25	3.285	4322.37
-76	-105	.0007638	1.005	-2	+28	3.884	5110.53
-74	-101	.0010476	1.378	0	+32	4.581	6027.63
-72	-98	.0014275	1.878	+2	+36	5.292	6963.16
-70	-94	.001933	2.543	+4	+39	6.099	8025.00
-68	-90	.002603	3.425	+6	+43	7.012	9226.32
-66	-87	.003483	4.583	+8	+46	8.045	10585.53
-64	-83	.004635	6.099	+10	+50	9.209	12117.10
-62	-80	.006135	8.072	+12	+54	10.518	13839.47
-60	-76	.008076	10.626	+14	+57	11.988	15773.68
-58	-72	.010576	13.916	+16	+61	13.635	17940.79
-56	-69	.013780	18.132	+18	+64	15.478	20365.79
-54	-65	.01787	23.513	+20	+68	17.535	23072.37

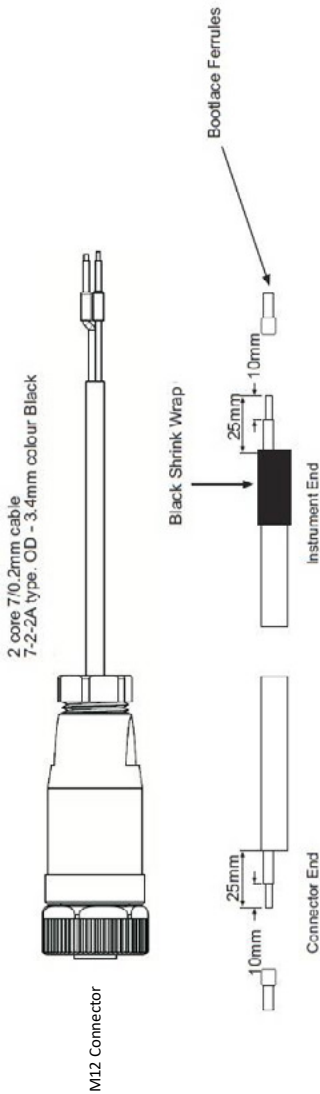
## 10.2 Appendix B - Conversion Table: mA to Range (°C)

mA	Purple	Silver	Red	Grey	Blue	mA	Purple	Silver	Red	Grey	Blue	mA	Purple	Silver	Red	Grey	Blue
	-100 to 0 °C	-100 to -20 °C	-80 to -20 °C	-80 to 0 °C	-80 to 20 °C		-100 to 0 °C	-100 to -20 °C	-80 to -20 °C	-80 to 0 °C	-80 to 20 °C		-100 to 0 °C	-100 to -20 °C	-80 to -20 °C	-80 to 0 °C	-80 to 20 °C
4	-100.0	-100.0	-80.0	-80.0	-80.0	9.4	-66.2	-73.0	-59.7	-53.0	-46.2	14.8	-32.5	-46.0	-39.5	-26.0	-12.5
4.1	-99.4	-99.5	-79.6	-79.5	-79.4	9.5	-65.6	-72.5	-59.4	-52.5	-45.6	14.9	-31.9	-45.5	-39.1	-25.5	-11.9
4.2	-98.8	-99.0	-79.3	-79.0	-78.8	9.6	-65.0	-72.0	-59.0	-52.0	-45.0	15	-31.2	-45.0	-38.7	-25.0	-11.2
4.3	-98.1	-98.5	-78.9	-78.5	-78.1	9.7	-64.4	-71.5	-58.6	-51.5	-44.4	15.1	-30.6	-44.5	-38.4	-24.5	-10.6
4.4	-97.5	-98.0	-78.5	-78.0	-77.5	9.8	-63.7	-71.0	-58.2	-51.0	-43.7	15.2	-30.0	-44.0	-38.0	-24.0	-10.0
4.5	-96.9	-97.5	-78.1	-77.5	-76.9	9.9	-63.1	-70.5	-57.9	-50.5	-43.1	15.3	-29.4	-43.5	-37.6	-23.5	-9.4
4.6	-96.3	-97.0	-77.8	-77.0	-76.3	10	-62.5	-70.0	-57.5	-50.0	-42.5	15.4	-28.7	-43.0	-37.2	-23.0	-8.7
4.7	-95.6	-96.5	-77.4	-76.5	-75.6	10.1	-61.9	-69.5	-57.1	-49.5	-41.9	15.5	-28.1	-42.5	-36.9	-22.5	-8.1
4.8	-95.0	-96.0	-77.0	-76.0	-75.0	10.2	-61.3	-69.0	-56.8	-49.0	-41.3	15.6	-27.5	-42.0	-36.5	-22.0	-7.5
4.9	-94.4	-95.5	-76.6	-75.5	-74.4	10.3	-60.6	-68.5	-56.4	-48.5	-40.6	15.7	-26.9	-41.5	-36.1	-21.5	-6.9
5	-93.8	-95.0	-76.3	-75.0	-73.8	10.4	-60.0	-68.0	-56.0	-48.0	-40.0	15.8	-26.2	-41.0	-35.7	-21.0	-6.2
5.1	-93.1	-94.5	-75.9	-74.5	-73.1	10.5	-59.4	-67.5	-55.6	-47.5	-39.4	15.9	-25.6	-40.5	-35.4	-20.5	-5.6
5.2	-92.5	-94.0	-75.5	-74.0	-72.5	10.6	-58.8	-67.0	-55.3	-47.0	-38.8	16	-25.0	-40.0	-35.0	-20.0	-5.0
5.3	-91.9	-93.5	-75.1	-73.5	-71.9	10.7	-58.1	-66.5	-54.9	-46.5	-38.1	16.1	-24.4	-39.5	-34.6	-19.5	-4.4
5.4	-91.2	-93.0	-74.8	-73.0	-71.2	10.8	-57.5	-66.0	-54.5	-46.0	-37.5	16.2	-23.7	-39.0	-34.2	-19.0	-3.7
5.5	-90.6	-92.5	-74.4	-72.5	-70.6	10.9	-56.9	-65.5	-54.1	-45.5	-36.9	16.3	-23.1	-38.5	-33.9	-18.5	-3.1
5.6	-90.0	-92.0	-74.0	-72.0	-70.0	11	-56.3	-65.0	-53.8	-45.0	-36.3	16.4	-22.5	-38.0	-33.5	-18.0	-2.5
5.7	-89.4	-91.5	-73.6	-71.5	-69.4	11.1	-55.6	-64.5	-53.4	-44.5	-35.6	16.5	-21.9	-37.5	-33.1	-17.5	-1.9
5.8	-88.7	-91.0	-73.3	-71.0	-68.7	11.2	-55.0	-64.0	-53.0	-44.0	-35.0	16.6	-21.2	-37.0	-32.7	-17.0	-1.2
5.9	-88.1	-90.5	-72.9	-70.5	-68.1	11.3	-54.4	-63.5	-52.6	-43.5	-34.4	16.7	-20.6	-36.5	-32.4	-16.5	-0.6
6	-87.5	-90.0	-72.5	-70.0	-67.5	11.4	-53.8	-63.0	-52.3	-43.0	-33.8	16.8	-20.0	-36.0	-32.0	-16.0	0.0
6.1	-86.9	-89.5	-72.1	-69.5	-66.9	11.5	-53.1	-62.5	-51.9	-42.5	-33.1	16.9	-19.4	-35.5	-31.6	-15.5	0.6
6.2	-86.2	-89.0	-71.8	-69.0	-66.2	11.6	-52.5	-62.0	-51.5	-42.0	-32.5	17	-18.7	-35.0	-31.2	-15.0	1.3
6.3	-85.6	-88.5	-71.4	-68.5	-65.6	11.7	-51.9	-61.5	-51.1	-41.5	-31.9	17.1	-18.1	-34.5	-30.9	-14.5	1.9
6.4	-85.0	-88.0	-71.0	-68.0	-65.0	11.8	-51.3	-61.0	-50.8	-41.0	-31.3	17.2	-17.5	-34.0	-30.5	-14.0	2.5
6.5	-84.4	-87.5	-70.6	-67.5	-64.4	11.9	-50.6	-60.5	-50.4	-40.5	-30.6	17.3	-16.9	-33.5	-30.1	-13.5	3.1
6.6	-83.7	-87.0	-70.3	-67.0	-63.7	12	-50.0	-60.0	-50.0	-40.0	-30.0	17.4	-16.2	-33.0	-29.7	-13.0	3.8
6.7	-83.1	-86.5	-69.9	-66.5	-63.1	12.1	-49.4	-59.5	-49.6	-39.5	-29.4	17.5	-15.6	-32.5	-29.4	-12.5	4.4
6.8	-82.5	-86.0	-69.5	-66.0	-62.5	12.2	-48.8	-59.0	-49.3	-39.0	-28.8	17.6	-15.0	-32.0	-29.0	-12.0	5.0
6.9	-81.9	-85.5	-69.1	-65.5	-61.9	12.3	-48.1	-58.5	-48.9	-38.5	-28.1	17.7	-14.4	-31.5	-28.6	-11.5	5.6
7	-81.2	-85.0	-68.8	-65.0	-61.2	12.4	-47.5	-58.0	-48.5	-38.0	-27.5	17.8	-13.7	-31.0	-28.2	-11.0	6.3
7.1	-80.6	-84.5	-68.4	-64.5	-60.6	12.5	-46.9	-57.5	-48.1	-37.5	-26.9	17.9	-13.1	-30.5	-27.9	-10.5	6.9
7.2	-80.0	-84.0	-68.0	-64.0	-60.0	12.6	-46.3	-57.0	-47.8	-37.0	-26.3	18	-12.5	-30.0	-27.5	-10.0	7.5
7.3	-79.4	-83.5	-67.6	-63.5	-59.4	12.7	-45.6	-56.5	-47.4	-36.5	-25.6	18.1	-11.9	-29.5	-27.1	-9.5	8.1
7.4	-78.7	-83.0	-67.2	-63.0	-58.7	12.8	-45.0	-56.0	-47.0	-36.0	-25.0	18.2	-11.2	-29.0	-26.7	-9.0	8.8
7.5	-78.1	-82.5	-66.9	-62.5	-58.1	12.9	-44.4	-55.5	-46.6	-35.5	-24.4	18.3	-10.6	-28.5	-26.4	-8.5	9.4
7.6	-77.5	-82.0	-66.5	-62.0	-57.5	13	-43.8	-55.0	-46.3	-35.0	-23.8	18.4	-10.0	-28.0	-26.0	-8.0	10.0
7.7	-76.9	-81.5	-66.1	-61.5	-56.9	13.1	-43.1	-54.5	-45.9	-34.5	-23.1	18.5	-9.4	-27.5	-25.6	-7.5	10.6
7.8	-76.2	-81.0	-65.7	-61.0	-56.2	13.2	-42.5	-54.0	-45.5	-34.0	-22.5	18.6	-8.7	-27.0	-25.2	-7.0	11.3
7.9	-75.6	-80.5	-65.4	-60.5	-55.6	13.3	-41.9	-53.5	-45.1	-33.5	-21.9	18.7	-8.1	-26.5	-24.9	-6.5	11.9
8	-75.0	-80.0	-65.0	-60.0	-55.0	13.4	-41.3	-53.0	-44.8	-33.0	-21.3	18.8	-7.5	-26.0	-24.5	-6.0	12.5
8.1	-74.4	-79.5	-64.6	-59.5	-54.4	13.5	-40.6	-52.5	-44.4	-32.5	-20.6	18.9	-6.9	-25.5	-24.1	-5.5	13.1
8.2	-73.7	-79.0	-64.2	-59.0	-53.7	13.6	-40.0	-52.0	-44.0	-32.0	-20.0	19	-6.2	-25.0	-23.7	-5.0	13.8
8.3	-73.1	-78.5	-63.9	-58.5	-53.1	13.7	-39.4	-51.5	-43.6	-31.5	-19.4	19.1	-5.6	-24.5	-23.4	-4.5	14.4
8.4	-72.5	-78.0	-63.5	-58.0	-52.5	13.8	-38.7	-51.0	-43.2	-31.0	-18.7	19.2	-5.0	-24.0	-23.0	-4.0	15.0
8.5	-71.9	-77.5	-63.1	-57.5	-51.9	13.9	-38.1	-50.5	-42.9	-30.5	-18.1	19.3	-4.4	-23.5	-22.6	-3.5	15.6
8.6	-71.2	-77.0	-62.7	-57.0	-51.2	14	-37.5	-50.0	-42.5	-30.0	-17.5	19.4	-3.7	-23.0	-22.2	-3.0	16.3
8.7	-70.6	-76.5	-62.4	-56.5	-50.6	14.1	-36.9	-49.5	-42.1	-29.5	-16.9	19.5	-3.1	-22.5	-21.9	-2.5	16.9
8.8	-70.0	-76.0	-62.0	-56.0	-50.0	14.2	-36.3	-49.0	-41.8	-29.0	-16.3	19.6	-2.5	-22.0	-21.5	-2.0	17.5
8.9	-69.4	-75.5	-61.6	-55.5	-49.4	14.3	-35.6	-48.5	-41.4	-28.5	-15.6	19.7	-1.9	-21.5	-21.1	-1.5	18.1
9	-68.7	-75.0	-61.2	-55.0	-48.7	14.4	-35.0	-48.0	-41.0	-28.0	-15.0	19.8	-1.2	-21.0	-20.7	-1.0	18.8
9.1	-68.1	-74.5	-60.9	-54.5	-48.1	14.5	-34.4	-47.5	-40.6	-27.5	-14.4	19.9	-0.6	-20.5	-20.4	-0.5	19.4
9.2	-67.5	-74.0	-60.5	-54.0	-47.5	14.6	-33.7	-47.0	-40.2	-27.0	-13.7	20	0.0	-20.0	-20.0	0.0	20.0
9.3	-66.9	-73.5	-60.1	-53.5	-46.9	14.7	-33.1	-46.5	-39.9	-26.5	-13.1						

### 10.3 Appendix C - AcuDew with Connector, General Arrangement



# 10.4 Appendix D - AcuDew Cable Assembly - 4-20 mA



- Connector End**
- 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.

- Instrument End**
- 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 PIN	WIRE	SIGNAL
PIN 1	RED	+ 4-20 mA CURRENT
PIN 2	BLUE	CURRENT RETURN
PIN 3		N/C
PIN 4	N/C	N/C
PIN 5	N/C	N/C

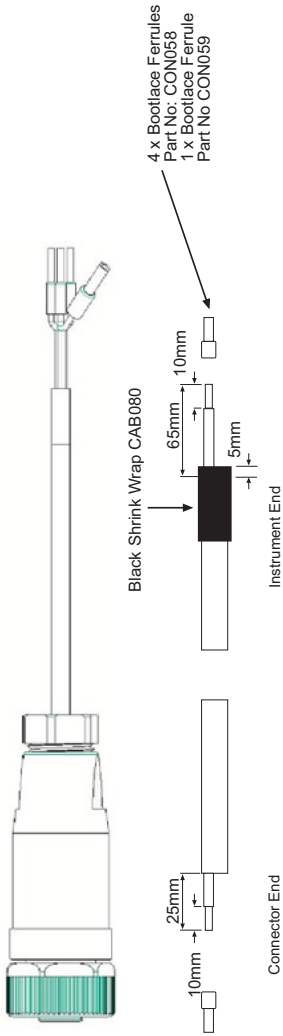


**PLEASE NOTE:** Wire colours refer to SHAW supplied cable assembly only.

# 10.5 Appendix E - AcuDew Cable Assembly - Modbus

Binder M12-A Series 713  
 Connector  
 Part No: 99 0436 14 05  
 CAB203

4 core 7/0.2mm screened cable  
 7-2-4C type. OD - 4.4mm colour Black  
 CAB007

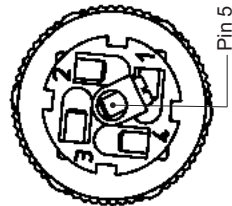


Connector End

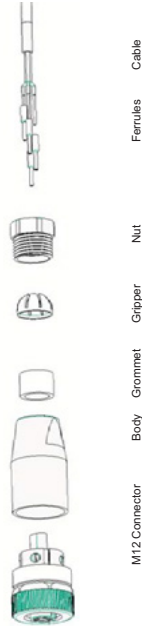
- 1) Strip back 25mm of outer sleeve. Remove screen.
- 2) Strip back 10mm of sleeve from each core.
- 3) Place the ferrules over the wire core & solder, trim the excess wire.
- 4) Put the wire through the nut, gripper, grommet and into the body of the connector.
- 5) Locate ferrules in contacts and tighten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

Instrument End

- 1) Strip back 65mm of outer sleeve.
- 2) Untwine the screening from the 4 cores and twist into a single core.
- 3) Protect the twisted screen with 50mm of heat shrink (RS398-206) leaving 15mm of wire exposed
- 4) Place Ferrule CON059 over the exposed twisted screen and solder.
- 5) Place 30mm of Black shrink wraps over outer sleeve, overlap 5 cores by 5mm.
- 6) Strip back 10mm of sleeve from the 4 inner cores.
- 7) Place 4 x Ferrules (CON058) over the 4 inner cores and solder.

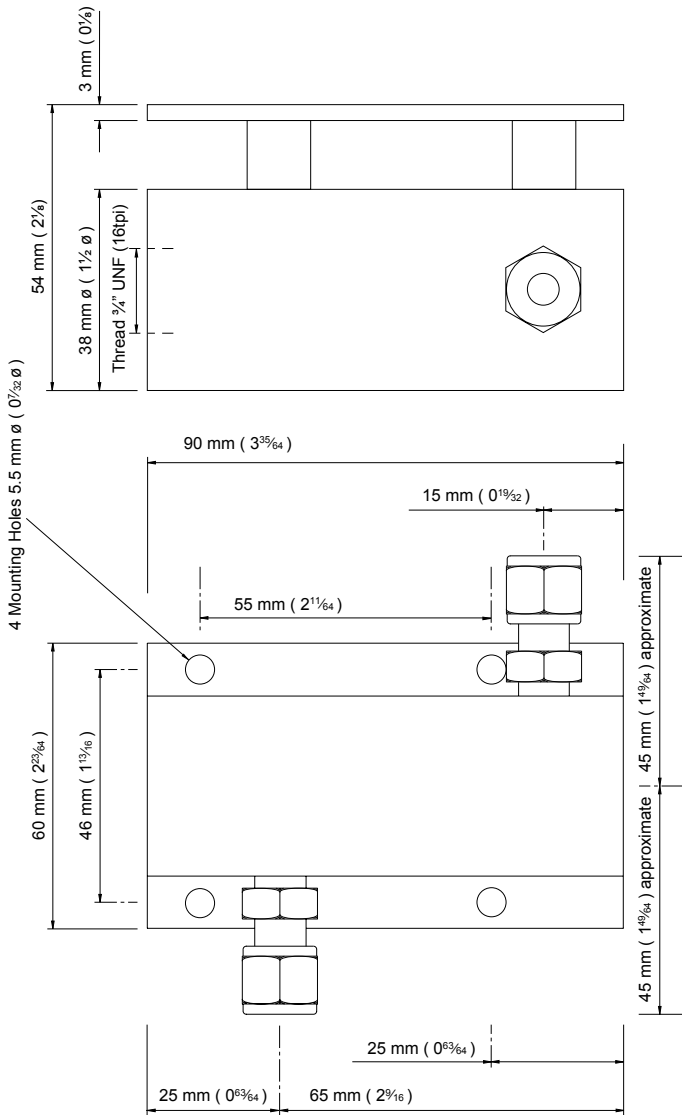


Connector Pin	Wire	Signal
1	Red	+ve
2	Blue	4-20mA
3	Nc	
4	Yellow	RS485 (Data-)
5	Green	RS485 (Data+)



**PLEASE NOTE:** Wire colours refer to SHAW supplied cable assembly only.

## 10.6 Appendix F - Transmitter Holder General Arrangement



**NOTE:** The assembly is shown with 6.35 mm (1/4 inch) OD tube fittings. The dimension across the tube fittings will vary for all other size fittings.

# 10.7 Appendix G - Transmitter Modbus Registers Layout

AcuDew Transmitter Modbus Register Map (FW v4.08)										Rev. 2.7 (20.05.2025)	
Offset	Register Address	Address Type	Name	Description	Data Type	Data Length (16bit Registers)	Bytes Order			Read/Write	Notes
Read Input Registers (CMD = 04)											
0	3001	Input	Process Variable	Measured dewpoint	float32	2	H-(B1)	L-(B2)	Lo-W H-(B3)   L-(B4)	R/O	IEEE 754 Format, Byte sequence as in PDU, HI-W LO-W - most/least significant word
2	3003	Input	AutoCal Multiplier	Sensor amplification coefficient	float32	2	H-(B1)	L-(B2)	Lo-W H-(B3)   L-(B4)	R/O	IEEE 754 Format
4	3005	Input	Range Low	Lower limit of dewpoint range for this instrument in degrees C	float32	2	H-(B1)	L-(B2)	Lo-W H-(B3)   L-(B4)	R/O	IEEE 754 Format
6	3007	Input	Range High	Upper limit of dewpoint range for this instrument in degrees C	float32	2	H-(B1)	L-(B2)	Lo-W H-(B3)   L-(B4)	R/O	IEEE 754 Format
8	3009	Input	Test Float	A constant floating point value used to assist debugging communications = -123.43	float32	2	H-(B1)	L-(B2)	Lo-W H-(B3)   L-(B4)	R/O	IEEE 754 Format
10	3011	Input	Calibration Date	Calibration Date in BCD format DD-MM-YYYY	uint32	2	H-(B1)	L-(B2)	Lo-W H-(B3)   L-(B4)	R/O	Byte sequence as in PDU, B1-B2-B3-B4 BCD format DD-MM-YYYY e.g. 17-Apr-2025 => 0x17, 0x04, 0x20, 0x25
12	3013	Input	MB Serial Number	Unique identifier for this instrument	uint32	2	H-(B1)	L-(B2)	Lo-W H-(B3)   L-(B4)	R/O	Set up by factory setup/calibration software
14	3015	Input	POT ADC	Position of potentiometer	uint16	1	H-(B1)	L-(B2)	L-(B2)	R/O	Calibration potentiometer position (for diagnostic purposes).
15	3016	Input	Hardware Version	Hardware version of product	uint16	1	H-(B1)	L-(B2)	L-(B2)	R/O	Firmware version e.g. 408 indicates v4.08
16	3017	Input	Firmware Version	Firmware version	uint16	1	H-(B1)	L-(B2)	L-(B2)	R/O	Transmitter Configuration bits
17	3018	Input	Configuration Bits	Configuration bits (see Appendix I)	uint16	1	H-(B1)	L-(B2)	L-(B2)	R/O	H-(B1) = 0, L-(B2) = Status bits
18	3019	Input	Status	Live status of transmitter (see Appendix G)	uint16	1	H-(B1)	L-(B2)	L-(B2)	R/O	8 bytes ASCII string "-123,456"
19	3020	Input	Test String	A constant ASCII value used to assist debugging communications	uint16x4	4	hex (2d-31)-(32-33)-(2e-34)-(35-36)			R/O	
Read (CMD = 03) / Write (CMD = 06) / Write Multiple (CMD = 16) Holding Registers											
0	4001	Holding	Device Address	DEVICE_ADDRESS	uint16	1	H-(B1)	L-(B2)	L-(B2)	R/W	Low byte of the 16-bit value
1	4002	Holding	Baud Rate	RS485_BAUD_RATE	uint16	1	H-(B1)	L-(B2)	L-(B2)	W/O	4800/9600/19200/38400, Default = 19200
2	4003	Holding	RS485 Parity	RS485_PARITY	uint16	1	H-(B1)	L-(B2)	L-(B2)	W/O	NO = 0; ODD = 1 EVEN = 2 (Default)
3	4004	Holding	Dewpoint Units	DEWPOINT UNITS	uint16	1	H-(B1)	L-(B2)	L-(B2)	R/O	1, Index 0.6 = C, 1 = F, 2 = ppm, 3 = ppb, 4 = g/m <sup>3</sup> , 5 = lb/MMSCF
0	5001	Holding	TAG ID	TAG_ID [20]	uint16x10	10	(H1-Lor1), (H1-Lor1) ... (H10-Lor10)			R/W	BYTE [20] "Write Multiple Holding Registers" command

## 10.8 Appendix H - Transmitter Status Register 3019

Code	Meaning
00	No Error
01	Dewpoint under range
02	Dewpoint over range
03	Measurement period overflow
04	Sensor open circuit
05	Sensor short circuit
06	Sensor AC outside range
07	CCP pre-scaler error
08	Temperature outside range
09	Output current under range
10	Internal temperature sensor error
11	Internal temperature sensor no results
128	EEPROM checksum error

## 10.9 Appendix I - Modbus Exception Response Codes

Code (hex)	Name	Meaning
02	Illegal Data Address	The data address received in the query is not an allowable address for the server/device. More specifically, the combination of reference number and transfer length is invalid.
03	Illegal Data Value	A value contained in the query data field is not an allowable value for server/device.

