# Optidew

## High Performance Optical Dewpoint Transmitter

## Users Guide

# Table of Contents

# 1    Product Overview

Optidew is a High Performance Optical Dew-point Transmitter working on proven, fundamental optical dewpoint measurement principle. It offers a wide measurement range from -76 to +194 °F dewpoint (or 0.5 to 100 % rh) at temperatures from  -40 to +194 °F. Two linear 4-20 mA outputs are provided in addition to serial communications, which allow set-up and monitoring by a suitable computer or PLC system or via specific application software. An adjustable volt-free contact alarm means that Optidew can be used for direct process control.

Optidew can be mounted in a variety of ways to suit the application - direct in-process, flange mounted, tee mounted, or via an external sample line. Two sensor versions are available: single and two stage. Both sensors are completely sealed to prevent contamination or corrosion of optical components. The single stage version has a total depression capability of 92 °F from room ambient temperature, giving an effective % rh measurement range from 2% to 100%. The two-stage version has a depression of 119 °F, giving an equivalent % rh measurement range of 0.5 % to 100%. The type of sensor is indicated by the letter after the serial number engraved on the sensor – 'S' indicates single stage, 'T' two stage.

A wide range of industrial and laboratory applications can be satisfied by the Optidew. It can be effectively deployed in any situation, where precise and continuous measurement of the dewpoint or relative humidity of a process is required.

# 2    Installation

Optidew is capable of withstanding most industrial conditions, while retaining the performance and sensitivity of a high performance reference hygrometer. Yet it is so easy to use. Simply connect the instrument, power up and Optidew is ready to operate. The sensor is designed to work hard - with a corrosion-resistant gold plated mirror and solid construction. Optidew's transmitter unit is NEMA 4 protected and suitable for outdoor use.

All of the connections to the Optidew are made to the connectors mounted on the outside of the case, as specified on the following page.

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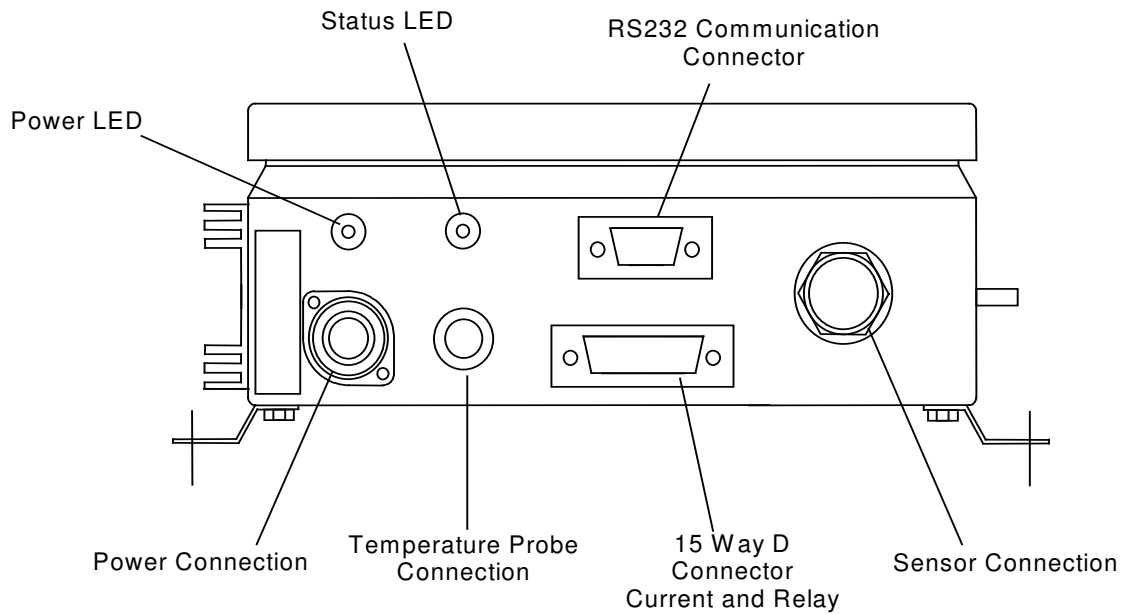
**Fig. 1** Instrument Connections

## 2.1 Electrical Power Supply

85-264 VAC, 47/440 Hz, 20 Watts max.

Provided is a fully waterproofed, power supply, cable connector and 2 meters of power cable.

The power connector supplied should be wired as follows:

Pin 1 - Live.    Pin 2 - N/C.    Pin 3 - Neutral.    ⏚ - Ground.
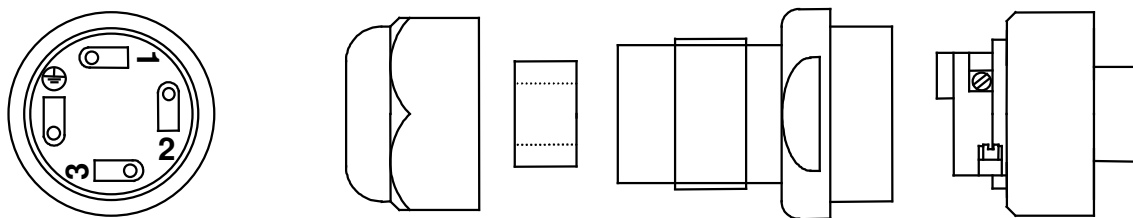


**Fig. 2** Power Connector Wiring

**WARNING:**    This instrument must be GROUNDED

NOTE: The Optidew is designed for continuous operation and therefore does not feature a power on/off switch. As soon as power is applied, the green power LED will illuminate and the transmitter will initiate a DCC cycle, illuminating the system status LED (see section 3 Operation for more details).

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### 2.2 Output Connections

#### Current Outputs

The Optidew provides two current outputs, which can be set to either 4-20 or 0-20 mA and scaled by the user over the range –200 to +1000 by use of the supplied application software (see section 5.2 Parameter setup for more details). The Channel1 mA output can be set for dewpoint, % rh, $gm^{-3}$, $gkg^{-1}$, temperature, or $\Delta(t - t_{dp})$. Channel2 outputs temperature only.

The connections for both of these outputs is via the 15-way 'D' type connector:

| mA Output | 15 way D type Pin connection |
|---|---|
| **Channel1-** dewpoint, % rh, $gm^{-3}$, $gkg^{-1}$, temperature, $\Delta(t - t_{dp})$ | Pin 1 |
| **Channel1** 0 V | Pin 2 |
| **Channel2** temperature | Pin 3 |
| **Channel2** 0 V | Pin 4 |

#### Relay Outputs

There are two sets of relay outputs available via the 15-way D type connector. They are the optics fault/alarm relay and a status relay. The optics fault/alarm relay changes state either to indicate that the sensor mirror and optics require cleaning (the red status led will flash to provide a visual indication of this fault) or when the process variable exceeds the alarm set-point value (no visual indication).

The status relay changes state when the instrument is in DCC (Dynamic Contamination Control), Data Hold, or if the system has an optics fault.

| Output | 15 way D type Pin connection |
|---|---|
| Optics Fault / Alarm Relay N/O | Pin 9 |
| Optics Fault / Alarm Relay COM | Pin 10 |
| Optics Fault / Alarm Relay N/C | Pin 11 |
| Status Relay N/O | Pin 12 |
| Status Relay COM | Pin 13 |
| Status Relay N/C | Pin 14 |

#### Communications Port

The 9 way 'D' connector is used to communicate with the Optidew via the application software, or by an ASCII terminal program. The communication interface is RS232 as standard or RS485 as a factory settable option.

| Pin No. | RS232 | RS485 |
|---|---|---|
| 2 | Tx | B |
| 3 | Rx | A |
| 5 | GND | GND |

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**Remote Temperature Probe**

The temperature probe is supplied pre-wired and simply needs to be fitted to the connector on the Optidew prior to use.

**Power LED** - Indicates power to the Optidew.

**Status LED** - If the status led is permanently lit it indicates that the instrument is either in DCC (Dynamic Contamination Control) or Data Hold mode. If the LED is flashing it indicates an optics fault.

**RS232 Communications** - The 9-way 'D' connector is used to communicate with the Optidew via the application software or an ASCII terminal program.

**Sensor Connection** - The Optidew sensor is fitted to a bayonet type connector either directly onto the case for the integral sensor configuration, or via a sensor cable for the remote sensor configuration.

**Integral sensor removal –** The sensor, when in the integral configuration, is supported by a bracket mounted on the side of the Optidew case. In order to remove the sensor, first loosen the nut holding the bracket in place (see Appendix C Integral Sensor Configuration drawing for more details). The sensor connector can now be twisted counterclockwise to release it and can be removed completely with the bracket attached. To remove the bracket from the sensor first remove the sintered guard, if fitted, and then release the locking nut.

# 3   Operation

## 3.1   Dynamic Contamination Correction (DCC)

To alleviate the problems of measurement accuracy due to contamination, the Optidew employs a totally new contamination compensation system. Dynamic Contamination Correction (DCC) automatically eliminates any error that may be caused by mirror particulate contamination. DCC is a self-learning system that adapts itself to operating conditions, predicts and reacts to the real requirements for contamination correction to achieve optimum transmitter performance at all times. Although the DCC system is fully automatic, it can be user configured to accommodate your own process conditions. As further protection in extreme conditions, sintered stainless steel or porous membrane guard options are available. Either guard can also be used as a flow limiter in high velocity direct insertion applications.

At switch-on the Optidew will enter DCC, illuminate the Status LED and energize the Status Relay. During this phase, the mirror surface is heated above the ambient dewpoint to measure mirror contamination, while Channel1 mA output is held at 23 mA until the system has made a measurement. The next time Optidew enters DCC, this output will be held at a level equivalent to the measured value before DCC is started.

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As part of the DCC system, the Optidew determines the change in contamination from the previous DCC and if above a predetermined level will initiate an enhanced boost of the heat-pump drive to ensure no residual condensation is present before determining a new contamination value. See Fig. 3 below for details.
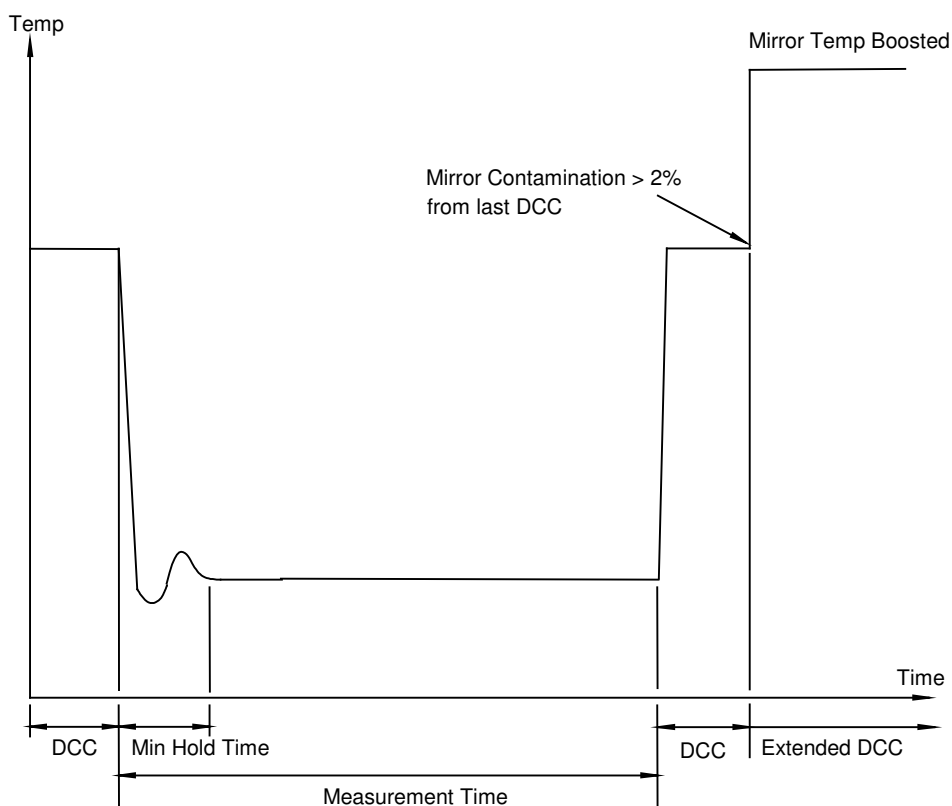


**Fig. 3** A Graphical Representation of System Phases.

## 3.2 Data Hold Phase

During Data Hold, the level of the Channel 1 mA output will be held, the Status Relay energized and Status LED illuminated, until the system has stabilized on the measured dewpoint. The Data Hold phase will finish when the following two conditions are met:

i) the minimum hold time has expired
          **and**
ii) the system is stable to within a specified stability band.

The minimum hold time is nominally set to 4 minutes, and, under most conditions, the system will be stable within this time period. However, there may be some conditions where the system may take longer to stabilize, so under these conditions an adaptive hold algorithm takes over to determine when stability is reached.

If under extreme conditions the system fails to stabilize to within the set stability band, the Data Hold phase will terminate when the maximum hold time is reached.

When the Data Hold finishes, the Status LED will turn off, the Status Relay will de-energize, and Channel 1 mA output will be set to a value, which represents the measured value of the selected measurement parameter. The system will now be in its continuous measurement phase, where it will remain until the measurement time has elapsed and the next DCC cycle initiates.
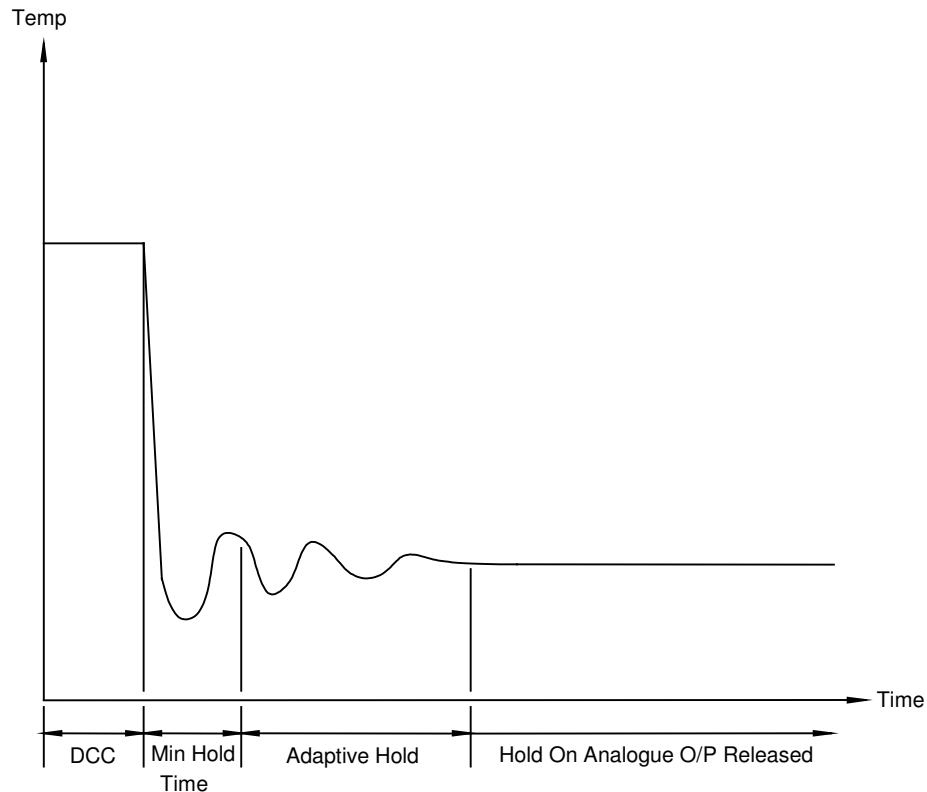


**Fig.4** A Graphical Representation of the Data Hold Phase.

# 4    Maintenance

Your Optidew instrument will arrive ready for operation. However, throughout the life of the instrument, periodic cleaning of the mirror surface and optics window may be required, depending upon operational conditions and exposure of the sensor to contamination. Sensor cleaning is mandatory if the instrument indicates an optics fault. The cleaning procedure is as follows:

a)    Switch the instrument off and remove the guard (if installed) from the sensor, or the sensor from its sampling point in the case of a remote version.

b)    Clean the mirror surface and optics window with a "Q-Tip" soaked in distilled water. If the sensor has been exposed to oil based contamination, then use one of the following solvents: methanol, ethanol, or isopropyl alcohol.

a)    When cleaning is complete, switch the instrument on and observe the mirror contamination value during the DCC phase. If this value is not 0 %, then remove the lid of the case and adjust the potentiometer until this value is reached, ensuring that the adjustments are made ONLY during the DCC phase. If this value is under-range, the display will flash 0 %, indicating that a positive adjustment is required.

**Note:** There will be a delay of approx 5 seconds between the actual adjustment and the displayed value changing.
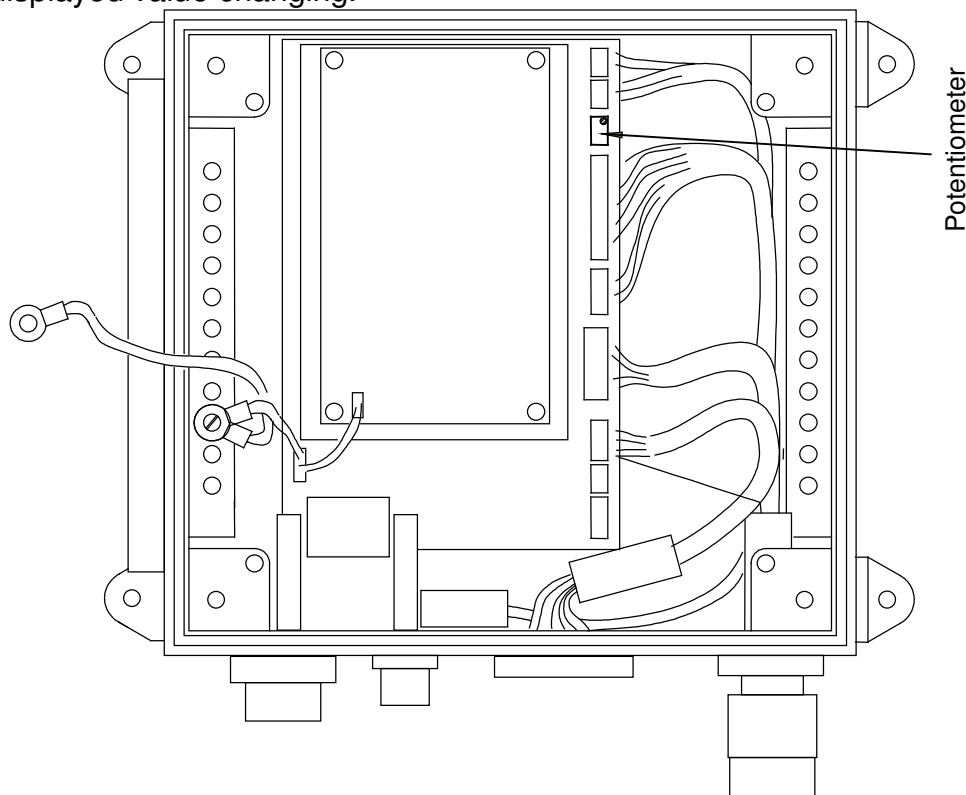


**Fig.5**  Diagram Showing Location of Potentiometer.

# 5 Application Software

The application software is an interface to the Optidew that provides a display of the measured and calculated parameters, system status, charting and logging, statistical information, and a facility to view and change the system parameters.

## 5.1 Virtual Hygrometer

The virtual hygrometer window provides a display for the instrument by showing the measured parameters and status.
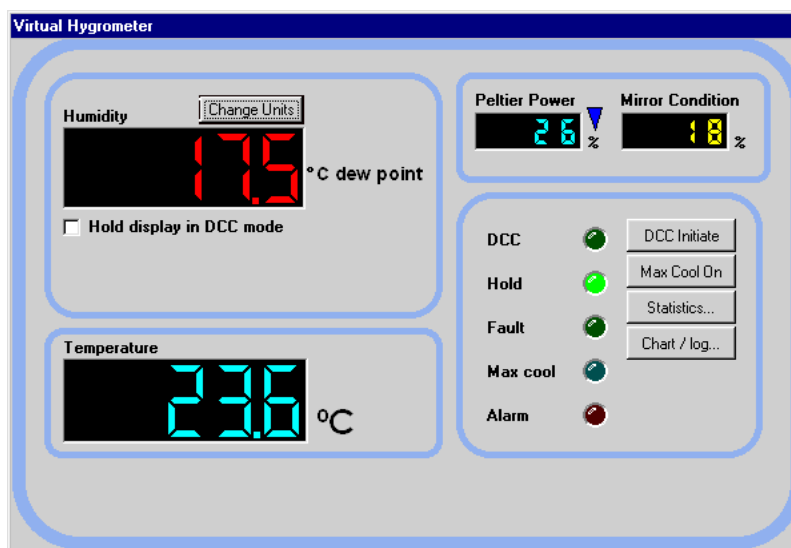


The humidity display has the ability to display dewpoint (°C/°F), % rh, gm$^{-3}$, gkg$^{-1}$, $\Delta(t - t_{dp})$, or $a_w$ by pressing the 'Change Units' button. Selecting one of these options will show the measured or calculated value, but will not change the Channel 1 mA output of the instrument, as this can only be done via the parameter setup window, see section 5.2. When the software is executed, it will default to the present setting of Channel 1 mA output. The ambient temperature is constantly shown in the lower display.

The Peltier Power indicates how much the heat-pump is depressing in order to measure the dewpoint. When the Peltier Power has a value of 100 % and does not reduce over an extended period of time, it means that the heat pump is at maximum depression. In normal operation this indicates that the dewpoint is lower than the present mirror temp and therefore cannot be measured. Reducing the sensor ambient temperature by use of additional cooling will increase the measurement range of the instrument in applications where the Peltier power > 95 %.

Along side the peltier power value is an indicator that shows the control stability. When this indicator shows a green square, it indicates the system is controlling the mirror temperature on the dewpoint. A blue down-arrow indicates the system is depressing the heat-pump in order to form dew on the mirror surface. A red up-arrow indicates a rapid increase in dew-point level whereby the system needs to increase the temperature of the mirror surface to read this new dew-point value.

The Mirror Condition indicates the amount of signal received back from the mirror, which includes both the level of moisture and contamination on the mirror surface. In DCC mode this display will only show the amount of mirror contamination and, if greater than 80% after a DCC, will initiate an optics alarm condition.

Instrument status is shown via the five LED indicators. In DCC (initiated automatically or by the DCC Initiate button), both the DCC and Hold indicators will illuminate showing the DCC status and the hold on Channel 1 mA output. When the DCC period expires, the DCC indicator will turn off leaving only the hold indicator illuminated, if there is no optics fault. If so, the Fault indicator will illuminate, signaling that cleaning of the mirror surface is required. Refer to section 4 on mirror cleaning.

The Alarm indicator will illuminate (if selected) when the measured variable exceeds the alarm set-point. Refer to section 5.2 on parameter setup.

Max Cool can be initiated by the Max Cool On button. Once initiated, the Max Cool indicator will illuminate and the system will drive the heat pump into maximum depression. This feature can be used to ascertain if the measured dewpoint is within the measurement capability of the instrument.

Pressing the Statistics button allows maximum, minimum and average values of the measured parameters to be viewed. See section 5.5

Charting and logging of the measured values can be initiated by pressing the Chart/log button. See section 5.4

The 'Hold display in DCC mode' enable, when set, stops the system from updating the display during DCC. The display is held when DCC is initiated and is not updated until both DCC and Hold periods have expired.

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## 5.2    Parameter Setup

The parameter setup window allows the setting and ranging of the Channel 1 mA output, the ranging of the Channel 2 mA output, DCC, Measurement and Minimum Hold durations, atmospheric pressure value and an alarm setting.

| | Parameter | Options | |
|---|---|---|---|
| | Display Units | **Deg C** | Deg F |
| | mA Output | **4-20** | 0-20 |
| Channel 1 | Ch1 mA Output | **$t_{dp}$**  $gm^{-3}$ / $rh$  $gkg^{-1}$ | $\Delta(t-t_{dp})$ |
| | Ch1 mA Max | **100** | $t_{dp}$ |
| | Ch1 mA Min | **0** | $t_{dp}$ |
| Channel 2 | Ch2 mA Output | (Temperature only) | |
| | Ch2 mA Max | **100** | T |
| | Ch2 mA Min | **0** | T |
| | DCC | **240** | Seconds |
| | Measurement | **240** | Mins |
| | Pressure | **1** | Bar   Not measured (User input only) |
| | Min Hold Time | **240** | Seconds |
| | Alarm Setpoint | **100**   $\Delta(t-t_{dp})$  Temp / $t_{dp}$  $rh$  $gkg^{-1}$  $gm^{-3}$  Off | |

■ = current instrument setting
■ = change underway

Defaults

CLOSE

The Display Units and Channel1 mA Output are selected by clicking the left hand mouse button in the relevant box, which will then change the settings of both the instrument and the virtual hygrometer window. Changing the mA outputs from 4-20 mA to 0-20 mA & vice versa will change both Channel 1 & Channel 2 mA outputs.

The maximum and minimum values of Channel 1 and Channel 2 Max & Min are −200 to +1000 respectively, therefore allowing the range of the outputs to be anywhere between these limits. The values for Max & Min must be integer values with a difference between them of at least 1 °C/F.

If Channel1 is to be set for % rh, $gm^{-3}$, $gkg^{-1}$ or $\Delta(t - t_{dp})$, then the minimum value of Channel1 Min should be 0, as a negative value for these parameters are not possible.

The pressure value is to correct $gm^{-3}$ and $gkg^{-1}$ for atmospheric pressure. By entering the atmospheric pressure the display and Channel 1 mA output (if either $gm^{-3}$ or $gkg^{-1}$ is selected) will both be corrected accordingly.

The Alarm can be set to OFF or set to be active on any of the process variables i.e. dewpoint, ambient temperature, temperature difference, % rh, $gm^{-3,}$ or $gkg^{-1}$ as shown above. The set-point needs to be an integer value between –200 and +1000, although negative set-points are only valid for dewpoint and ambient temperature. If the process variable exceeds the set-point, the Alarm indicator on the virtual hygrometer will illuminate and the Optics Fault/Alarm relay will change state.

To change any of the values, enter the required value and press the return key. The background of the text box will change to yellow to indicate that the change is taking place. When confirmation has been received that the instrument has accepted the change, the background will change back to green.

**NOTE: When the Parameter Setup window is open, the values in the Virtual Hygrometer window are frozen. The Parameter Setup window needs to be closed for the software to resume normal display mode.**

### 5.3    Charting and Logging

Pressing the Chart/log button on the virtual hygrometer brings up the chart / log panel window.
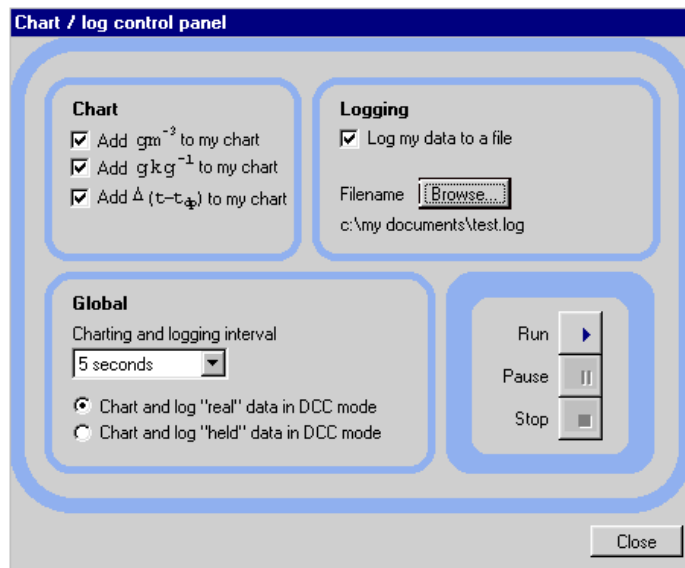


The chart in its default configuration displays dewpoint, temperature and % rh. However, $gm^{-3}$, $gkg^{-1}$ and $\Delta(t - t_{dp})$, can be added by ticking the appropriate check box.

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Within the Global group box, you can select the charting and logging interval from a minimum of 5 seconds to a maximum of 1 hour. It offers the facility to log the temperature of the mirror while in DCC and Hold, or hold the measured value while in these modes and chart the held data values accordingly.

To log the measured and calculated humidity values to a data file for further analysis, tick the check box in the Logging group box and specify a file name by pressing the Browse button. If a log file is not required simply uncheck the box.

To Run, Pause and Stop, the charting and logging facility use the chart control buttons accordingly. Pressing the Run button will bring up the chart as shown below. The chart shows the measured and calculated humidity values selected in the chart group box, with an assigned identifiable colour for each value. It is possible to scale, zoom and scroll both X and Y axis of the chart by using the controls in the chart settings window, which can be activated by pressing the Chart Settings button on the charting window.
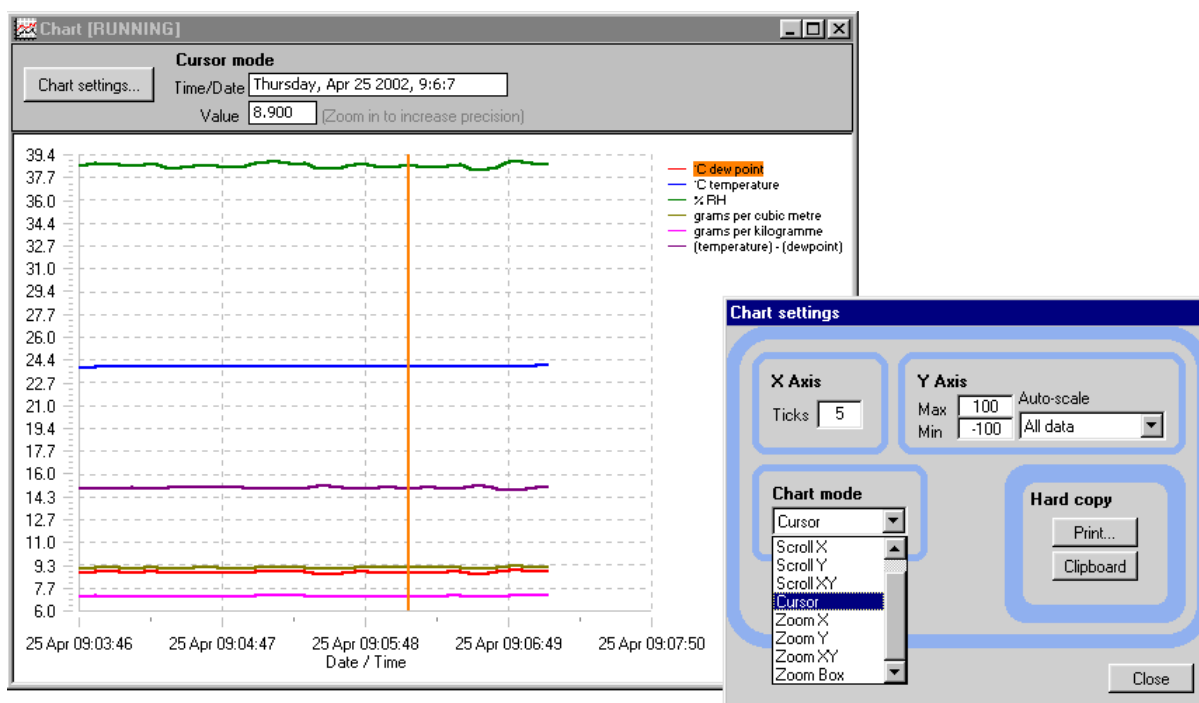


The X & Y axes can be individually scaled. The X-axis can be scaled by using the Zoom X feature, while the Y-axis can be scaled by changing the min and max values, or selecting a parameter in the auto-scale list, which scales the Y-axis to the actual values of the parameter.

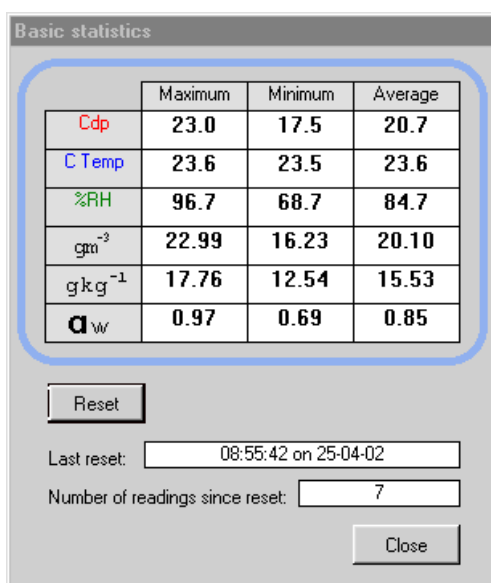There are a number of modes associated with the chart, which can be selected by the chart mode list; Plot, Scroll X,Y, & XY, Cursor, Zoom X,Y, & XY and Zoom Box. In order to use the scrolling and zooming modes, make your selection and press the

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left mouse button on the chart itself, moving the mouse across the chart accordingly with the left mouse button held down. This will zoom or scroll the chart accordingly.

Individual data points can be selected from the chart by using the cursor mode. Select the parameter in question by clicking on a legend on the right hand side of the chart (°C dewpoint is shown as selected above) and moving the cursor to the point of interest; the actual value with its time stamp will be displayed above the chart.

## 5.4    Statistics

Pressing the Statistics button on the virtual hygrometer window will display the statistics window as shown:
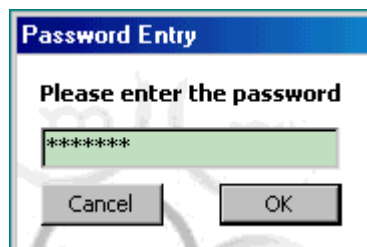


This shows the maximum, minimum and average of each parameter since the program began taking readings from the instrument, or since the reset button was pressed.

## 5.5    Control Parameters

**The control parameters should only be amended by trained personnel in order to adjust the system for operation in extreme conditions. Contact Kahn Instruments for details.**

# 6    Optidew Display Option

## 6.1    Introduction

The Optidew Display Option has an integral VFD (Vacuum Fluorescent Display) mounted within its lid. To the right of the Optidew display is a single multi-function button, which enables the user to select between 2 operation modes of the Optidew and scroll through the measured and calculated parameters such as ambient temperature or relative humidity, and indications of system status. The mode can be either LOCAL or REMOTE. In local mode, the integral display is active and data such as dew point and temperature is displayed on the VFD screen. In remote mode the display is inactive and the instrument function is exactly the same as a non-display Optidew.

## 6.2    Start Up Screen

When power is applied to the Optidew the display will initially show test characters for approximately 0.5 seconds, after which the start-up screen will be displayed for approximately 7 seconds. The banner contains the display software version number and also indicates if the instrument has been set for RS232 or RS485 communications format. The instrument will start up in local mode in which case the display is active and the RS232 or RS485 output on the Optidew is not available.

## 6.3    Switching Between LOCAL and REMOTE Modes

On start up the display is automatically in LOCAL mode. To change between the 2 modes simply hold down the multi-function button for approximately 5 seconds until the display changes mode. Mode can be changed at anytime except when display is showing the start-up screen. In remote mode, the display will show *REMOTE MODE*.

## 6.4    Selecting Which 'Screen' to View on the Display

After the start-up screen has expired, the display will show screen1, which shows the % rh and ambient temperature parameters. To scroll to the next screen, firmly but momentarily, press the multi-function button. Note that there may be a small delay before the display changes to the next screen, this is normal. Fig. 6 shows the various screens available and the order in which they may be navigated using this button.

## 6.5    Description of the Various Screens

Below is a description of the parameters and system status information shown on each screen.

**Screen1:** Humidity in % rh and ambient temperature.

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**Screen2:** Humidity in dew point and ambient temperature

**Screen3:** Humidity in g/kg and ambient temperature

**Screen4:** Humidity in g/m$^3$ and ambient temperature

**Screen5:** The first line in this screen displays $\Delta(t - t_{dp})$ which is the difference between ambient temperature and dew point. Note that this parameter will be equal to 0 if the dew point is higher than the ambient temperature (e.g. during a DCC cycle). The second line displays the ambient temperature.

**Screen6:** The first line displays $a_w$, which is equivalent to rh/100. The second line displays ambient temperature.

**Screen7:** This displays the status of the Optidew instrument. It will show DCC, DATA HOLD, OPTICS ALARM or MEASURE according to the current status of the Optidew instrument.

**Screen8:** Peltier power and the Mirror condition.

The peltier power indicates how much the heat pump is depressing in order to measure the dew point. When the peltier power has a value of 100 % and does not reduce over an extended period of time, it means that the heat pump is at maximum depression. In normal operation this indicates that the dew point is lower than the present mirror temperature and therefore cannot be measured. Reducing the sensor ambient temperature by use of additional cooling will increase the measurement range of the instrument in applications where the peltier power > 95 %.

Along side the peltier power value is an indicator that shows the control stability. When this indicator shows CNTRL, it indicates the system is controlling the mirror temperature on the dew point. COOL indicates system is depressing the heat pump, in order to form dew on the mirror surface. HEAT indicates a rapid increase in dew-point level, whereby the system needs to increase the temperature of the mirror surface to read this new dew-point value.

The Mirror Condition indicates the amount of signal received back from the mirror, which includes both the level of moisture and contamination on the mirror surface. In DCC mode, this display will only show the amount of mirror contamination and if greater than 80 % after a DCC, will initiate an optics alarm condition.

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Apply
Power

| | |
|---|---|
| Optidew Transmitter<br>Display Ver 1.0 232 | Start up<br>screen |

| | |
|---|---|
| rh    49.7    %<br>t    10.0    °C | Screen 1 |

| | |
|---|---|
| $t_{dp}$    0.0    °C<br>t    10.0    °C | Screen 2 |

| | |
|---|---|
| Y    106.00  $gkg^{-1}$<br>t    10.0    °C | Screen 3 |

| | |
|---|---|
| $d_v$    106.00 $gm^{-3}$<br>t    10.0    °C | Screen 4 |

| | |
|---|---|
| $(t-t_{dp})$    10.0    °C<br>t          10.0    °C | Screen 5 |

| | |
|---|---|
| $a_w$    0.5<br>t    10.0    °C | Screen 6 |

| | |
|---|---|
| Status=MEASURE | Screen 7 |
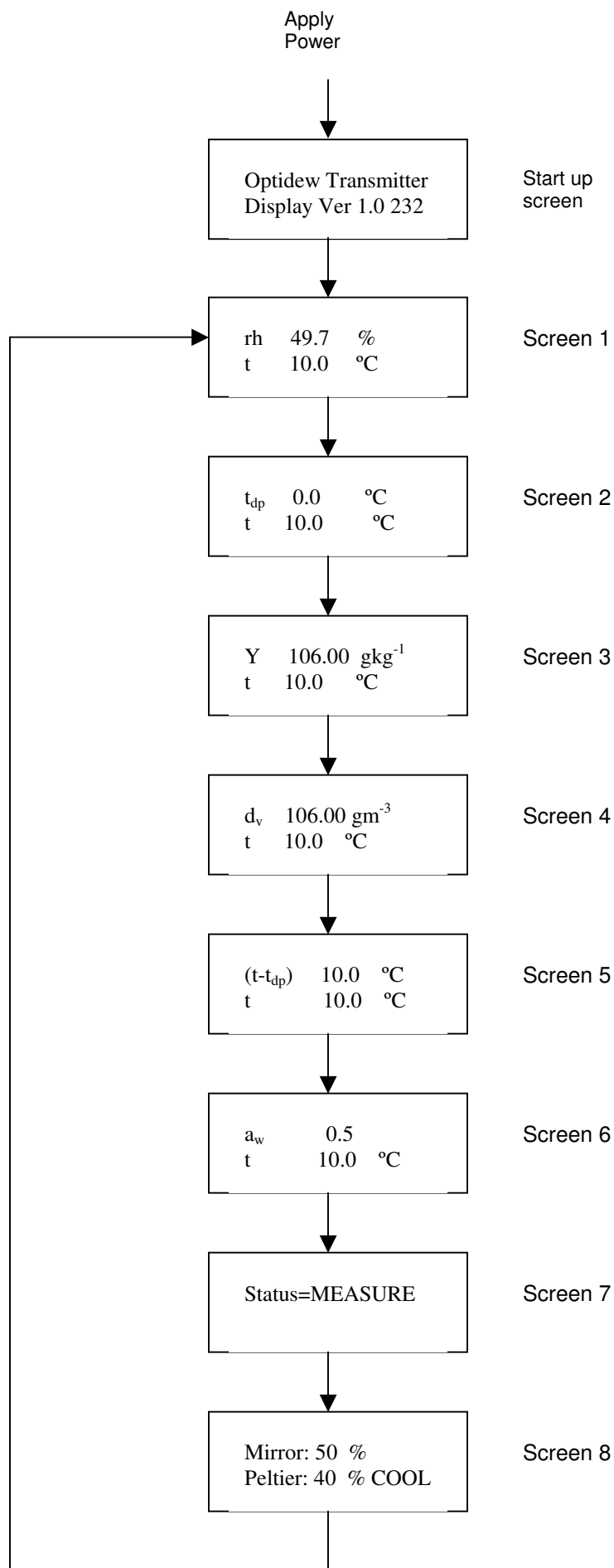
**Fig 6.** Optidew Display Screens
and Navigation.

| | |
|---|---|
| Mirror: 50  %<br>Peltier: 40  % COOL | Screen 8 |

# APPENDIX A    Optidew Technical Specification

### General

| | |
|---|---|
| Overall Accuracy | ±0.36 °F (±0.2 °C) dewpoint |
| Measurement Units | dewpoint (°F/°C), % rh, temperature (°F/°C), $g/m^3$, g/kg |
| Response Speed | 1.8 °F/sec |
| Power Supply | 90 to 264 V, 47/440 Hz, 20 W. Internally fused, 4A quick blow. |

| **Sensor** | **Single Stage** | **Dual Stage** |
|---|---|---|
| Dew-point range | -58 to +194 °F | -76 to +194 °F |
| Temp range | -40 to +194 °F | -40 to +194 °F |
| rh range | 2 to 100 % | 0.5 to 100 % |
| Depression @ 70 °F ambient | -22 °F | -49 °F |
| Mirror | Gold plated copper | |
| Temp Measurement | 4 wire 100 Ω platinum resistance thermometer | |
| Sample Flow | 0.2 to 4 SCFH (in sampling block) | |
| Max Velocity | 32.8 ft./sec.  (direct insertion) | |
| | 98.4 ft./sec. (with sintered guard) | |
| Pressure | 3000 PSI (max) | |
| Cable length | 825 feet (max) | |

| **Electronics** | |
|---|---|
| Repeatability | ±0.18 °F (±0.1 °C) |
| Resolution | 0.18 °F |
| Outputs | Analog: 4-20 mA or 0-20 mA over user settable output; Accuracy ±0.9 °C, 500 Ω maximum load resistance. Digital: RS232 @ 9600 baud rate. alarm: dry contact, 2A @ 30 V dc, 0.5 A @ 120 V ac LED: Status/Optics Alarm |
| Operating Temp | -4 to +104 °F |
| Environmental Conditions | Up to 98 % rh non-condensing, 100 % rh condensing with optional weatherproof cable pack. |
| Enclosure | 304 stainless steel (DIN 1.4301) |
| Ingress protection | NEMA 4 |
| Cable Pack | Power, RS232 cable and output connector. |

### Options
i)      Remote sensor, cable length up to 825 feet (6 feet standard).
ii)     Sintered stainless steel sensor guard.
iii)    HDPE sensor guard.
iv)    Weather proof pack.
v)     RS485 digital communications.
vi)    Sensor locking unit.
vii)   Integral Display (2 x 20 character, vacuum placement).

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**KAHN INSTRUMENTS, INC.**                    885 Wells Road, Wethersfield, CT 06109
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**Fig. 7** Optidew Dimensions (Remote Sensor Version).

Wall Mounting Brackets - 4 Off Ø M8

**KAHN INSTRUMENTS, INC.**    885 Wells Road, Wethersfield, CT 06109
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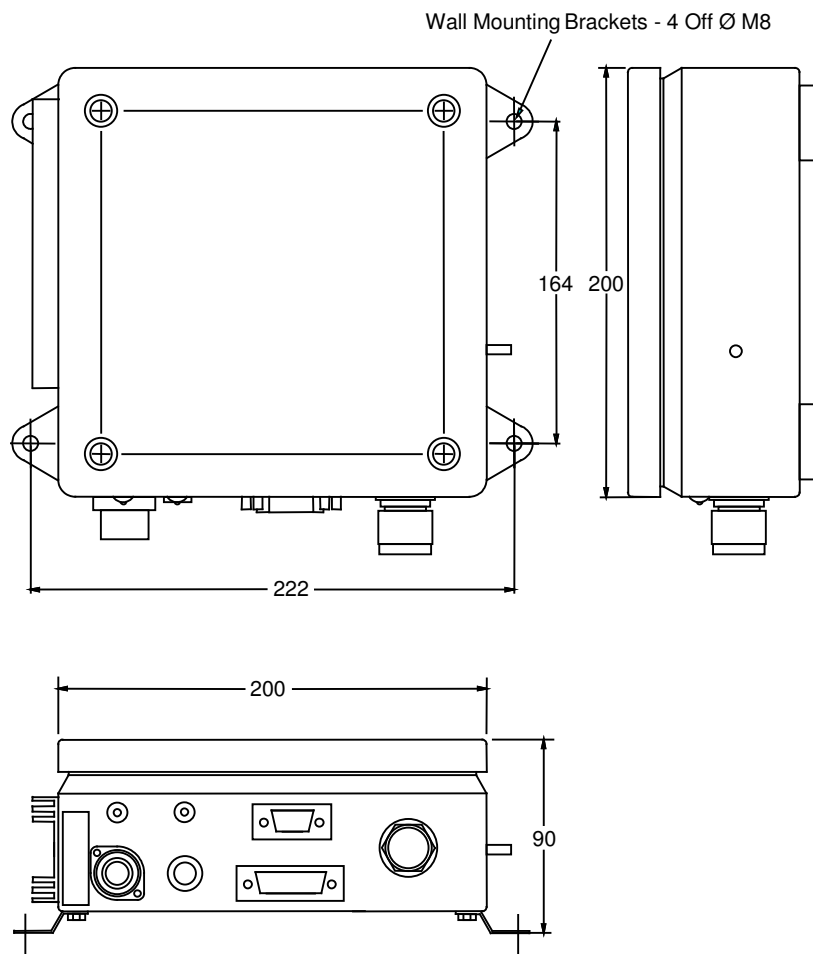**Fig. 8** Optidew Dimensions (Integral Sensor Version).

**KAHN INSTRUMENTS, INC.**                          885 Wells Road, Wethersfield, CT 06109
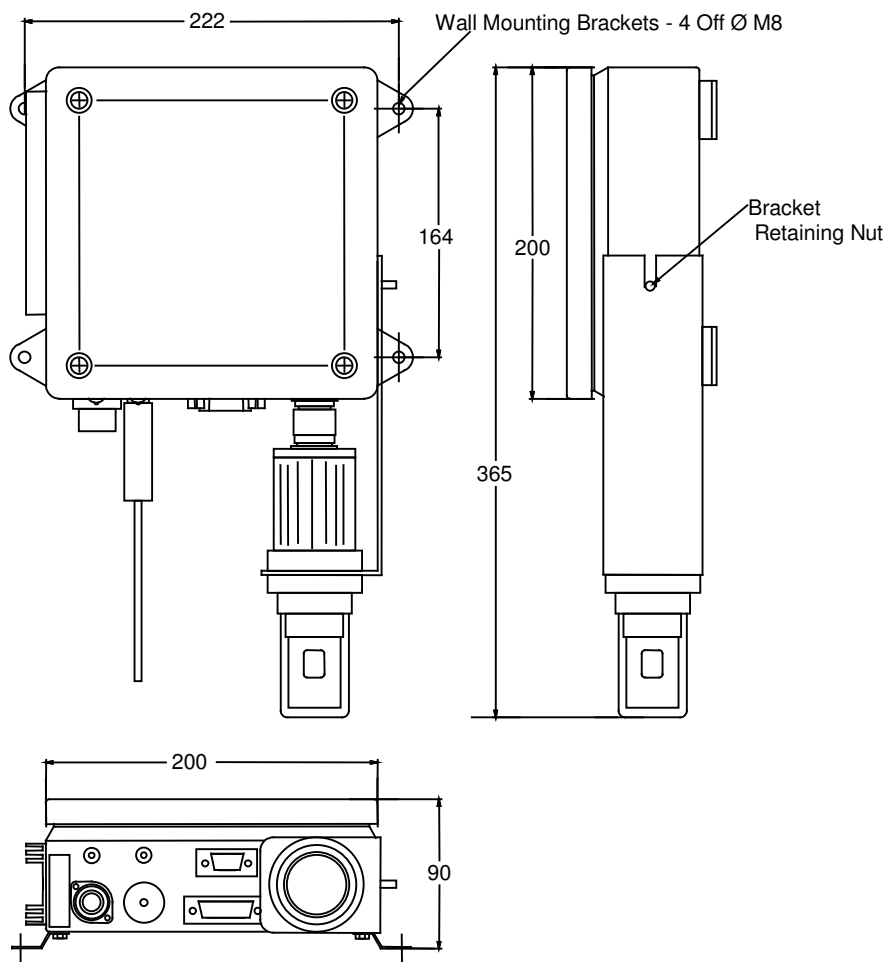Tel: 860-529-8643;  Fax: 860-529-1895
Internet: www.kahn.com
E-mail:  info@kahn.com

**Fig. 9** Sensor and Remote Temperature Probe Dimensions

74
With Sintered Guard (Optional)

M36X1.5-6g

Ø45
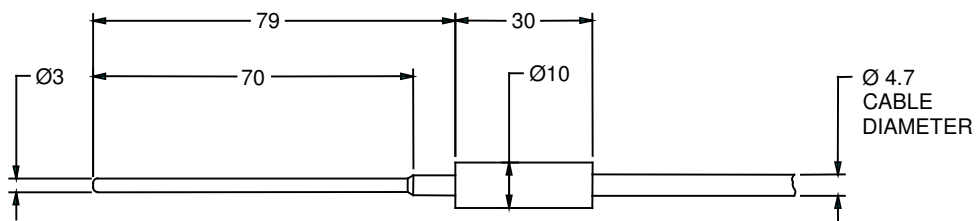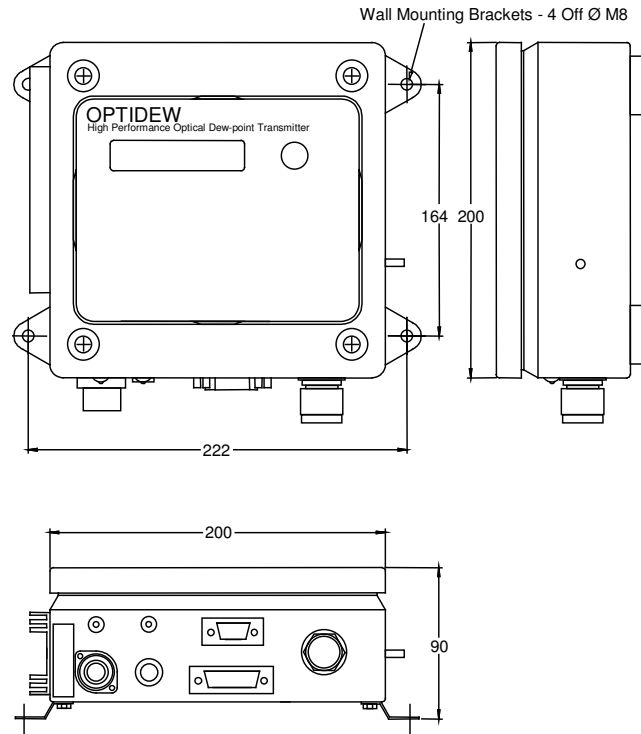
Ø28

61 (1 Stage)
63 (2 Stage)

126 (1 Stage)
128 (2 Stage)
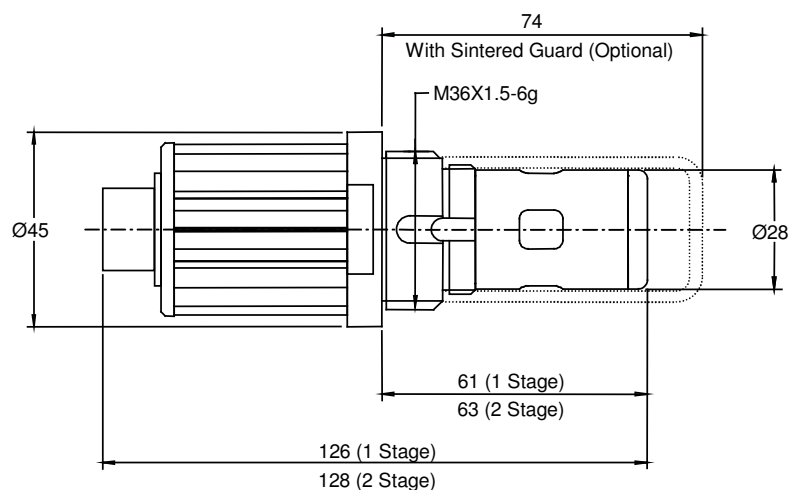
Sensor Overall Dimensions

79

30

Ø3

Ø10

70

Ø 4.7
CABLE
DIAMETER

Remote Temperature Probe Dimensions

**Fig. 10** Display Remote and Integral Versions Dimensions

**Display Remote Version**

Wall Mounting Brackets - 4 Off Ø M8

OPTIDEW
High Performance Optical Dew-point Transmitter

164    200

222

200

90

**Display Integral Version**

222

Wall Mounting Brackets - 4 Off Ø M8

OPTIDEW
High Performance Optical Dew-point Transmitter

164    200

Bracket Retaining Nut

365

200

90