

# AIRIC

## 1090 Series Dew Point Hygrometer



Newport Scientific, Inc  
8246 Sandy Court Suite E  
Jessup, MD 20794  
USA

newport-scientific.com  
P 301-498-6700  
F 301-490-2313  
email [sales@newport-scientific.com](mailto:sales@newport-scientific.com)  
[hygrotechnical@newport-scientific.com](mailto:hygrotechnical@newport-scientific.com)

# Manual Revisions

<b>Rev</b>	<b>Date</b>	<b>Changes</b>
A	5/2020	Initial release
B	6/2020	Product revision update. Dew point ranges updated.
C	7/2020	Added 1098 model.

# Product Revisions

When device is powered on, a product revision code will be displayed on the LED display for 2 seconds.

<b>Revision</b>	<b>Date</b>	<b>Description</b>
R2.01	5/2020	Initial release supports range A only.
R2.10	6/2020	Added support for ranges B, C, and E models.

# Contents

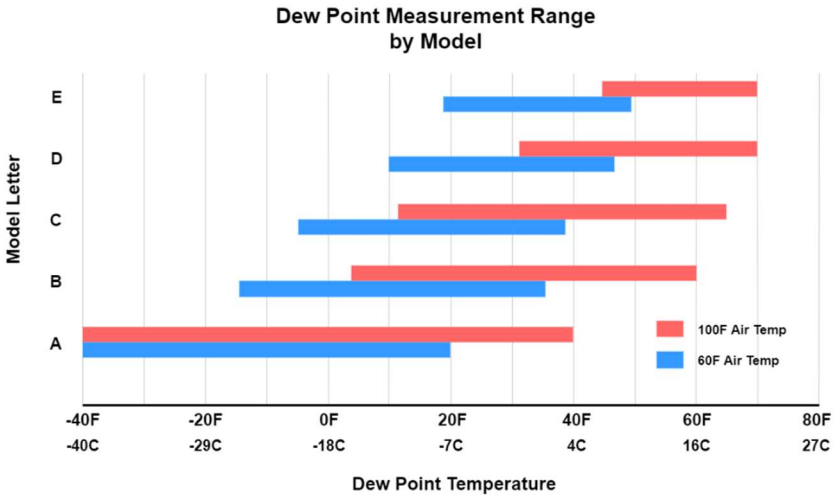
Manual Revisions .....	1
Product Revisions.....	1
Contents.....	1
Overview .....	2
Installation .....	5
Configuration .....	8
Operation .....	14
Maintenance.....	15
Troubleshooting Hints.....	18
Specifications .....	20
Spare Parts & Accessories.....	21
Warranty.....	22

# Overview

The 1090 AIRIC series dew point hygrometers are used to measure moisture content of industrial process air while providing various control and monitoring functions.

The AIRIC is offered in several measurement ranges, suitable for different applications. The measurement range is determined by the sensor installed in the unit, and is reflected in the letter suffix of the hygrometer model number. The supplied Narrow Range Hygrosensor provides fast response to changes in dew point.

The dew point measurement is temperature compensated, so the useful range of each model is dependent upon air temperature at the sensor. Refer to the chart below for a summary of the different model ranges available.



## Air Sampling Options

The hygrometer models provide different ways of sampling your process air. Select the model based on your application needs.

**1098** models have vacuum assisted sampling and are used to measure air at atmospheric pressure. The built-in vacuum pump is designed for long-term continuous operation.

**1092** models are for compressed air monitoring- sample air is supplied to the hygrometer through 1/4" tubing. An internal bleed orifice maintains sample air flow and pressure within the internal sensor housing.

**1097** models are supplied with a 1" NPT male pipe plug that contains the sensor. This fitting is installed directly into a compressed air distribution pipe. A 9' cable connects the sensor fitting to the hygrometer.

## Compressed Air Sampling Comparison

	1092	1097
Process air temperature	(Limited by sample tubing)*	60°F to 120°F
Process air pressure	20-150psi	0-300psi
Air connection	1/8" NPT X 1/4" OD tube push-to-connect	1" NPT male plug
Features	Sensor is more protected from contamination & temperature extremes.  Continuously sampled air, even with no process demand.	Simplified connection- no air tubing needed.  Can be used in non-pressurized systems.  Doesn't bleed any process air.

\* Temperature at sensor will be close to ambient temperature, regardless of process air temperature. The sample tubing provided is rated to 180°F, but higher temperatures can be supported by using metal tubing and connectors.

Generally, the 1092 is recommended for most industrial compressed air applications. The 1097 should only be used where the process air is free of oil and particulates since the sensor is mounted directly in the air pipeline.

## Model Selection Guide

<b>Application</b>	<b>Typical Model</b>	<b>Recommended Alarm Range*</b>	<b>Default Alarm Setting</b>
Compressed air desiccant dryers	1092A or 1097A	-20°F to +20°F	-10°F
Desiccant dryers for plastics molding	1098A	-20°F to +20°F	-10°F
Limited dew point desiccant dryers	1092B or 1097B	+5°F to +35°F	+20°F
Medical air monitoring per NFPA99	1092C	+10°F to +40°F	+35°F
Refrigerated dryers	1092D	+30°F to +50°F	+45°F
Refrigerated dryers	1092E	+40°F to +53°F	+50°F

\* Recommended alarm range accounts for the full measurement capability of the hygrometer over a sensor temperature span of 65°F to 95°F. Confirm the measurement limits of each hygrometer if your application will expose the sensor to temperatures beyond this range.

# Installation

The hygrometer is typically located near the source of process air, downstream of the dryer. At this point, the hygrometer will react quickly to changes in moisture level due to dryer problems.

Brackets are provided on the back of the enclosure for surface mounting. Use the mounting dimension information stamped on the enclosure for reference.



## Process Air Connection

In all applications, the sensor must be protected from oil mist, condensation, and temperature extremes.

### Model 1092

When using model 1092, it is recommended to install a suitable air filter ahead of the sample tubing. Avoid hygroscopic filter media and choose sintered metal or mesh filters instead.

This model is supplied with 6 feet of semi-rigid tubing. The tubing includes a swivel elbow with a 1/8" NPT male end for connecting to the compressed air line.

Push sample tubing into the sample air inlet elbow on the bottom of the enclosure. Test for a secure connection by pulling on the tubing- it should not come out of the connector!

### Model 1097

NOTE: On model 1097, the sample air inlet is replaced by the sensor connecting cable, and there are no vents in the enclosure.

Install the sensor pipe mount with sensor into a tee fitting in your air distribution line. Connect the sensor cable to the pipe mount.

NOTE: Avoid installing the pipe mount at the end of a long tee branch. The sensor might not get a good sample of the process air. If this type of installation is required, install a bleed valve after the pipe mount location to ensure constant air flow across the sensor.

## Model 1098

The sample air inlet on model 1098 is a barbed fitting for 3/16" ID tubing. This model is supplied with 6' of flexible rubber tubing with a small filter installed in-line. This tubing is rated for operation up to 275°F. If your process air temperature exceeds this, add a few feet of 1/4" copper or stainless tubing at the sampling point to pre-cool the air before the connection point of the 1098.

NOTE: Model 1098 includes a short piece of tubing on the sample air outlet port. This is used for connecting the supplied desiccant for testing sensor response as describe in the Maintenance section.

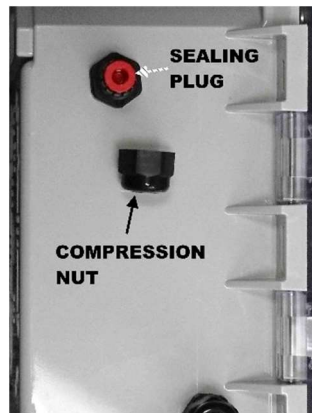
## Wiring

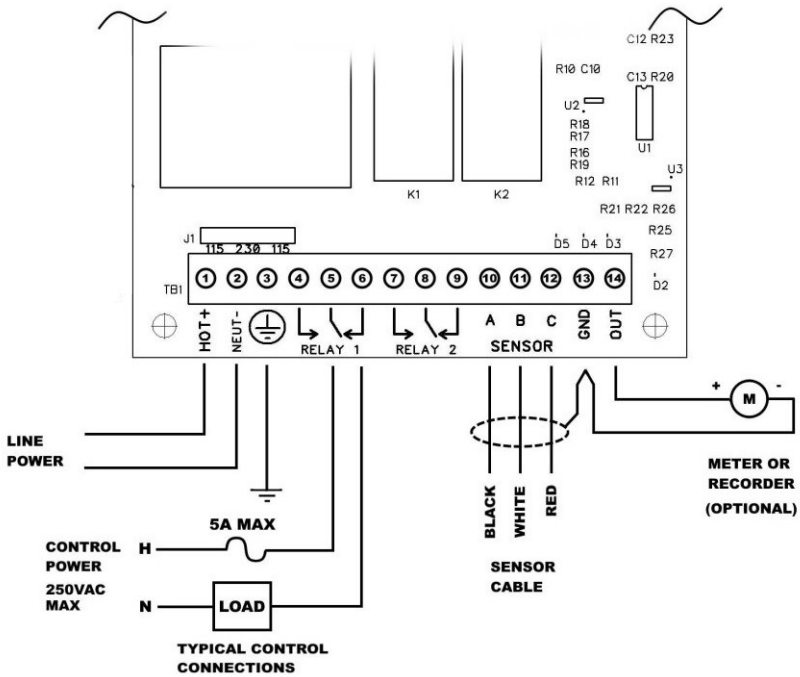
The hygrometer is supplied with a 6' line cord for connecting to power. No other connections are required for basic applications.

Optionally, access to relay contacts and the analog output is available on a terminal block inside the hygrometer. A liquid-tight strain relief fitting is pre-installed in the enclosure to allow wiring access.

NOTE: The liquid-tight fitting is supplied with a sealing plug installed to maintain ingress protection. Remove this plug before passing wires through the fitting. To remove, unscrew the compression nut completely and pull plug from the fitting.

Shown below is a typical wiring diagram including relay and analog output connections.





## Terminal Block Connections

No.	ID	Function
1	HOT+	Board power voltage
2	NEUT-	Board power return
3	⏚	Protective ground
4	RELAY 1 NO	Dry contacts for control. Diagram on PCB
5	RELAY 1 COM	depicts relay unenergized. Operational state
6	RELAY 1 NC	depends on relay settings
7	RELAY 2 NO	Dry contacts for control. Diagram on PCB
8	RELAY 2 COM	depicts relay unenergized. Operational state
9	RELAY 2 NC	depends on relay settings
10	SENSOR A	Sensor excitation signal (black)
11	SENSOR B	Sensor humidity signal (white)
12	SENSOR C	Sensor temperature signal (red)
13	GND	Sensor cable shield & ground for OUT
14	OUT	0 to 5 volt linear output



# Configuration

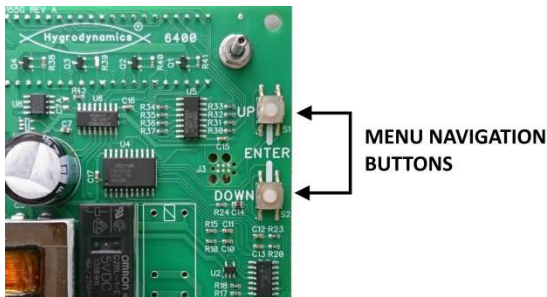
Configuration options are accessed through menu buttons mounted on the PC board inside the hygrometer.

**WARNING:** Menu navigation is performed with power applied to the hygrometer. Avoid touching other parts of the PC board while using the button interface.

Open the enclosure front cover, and unscrew the two knurled panel retainer screws. The panel will swing open allowing access to the PC board.

Two buttons are used to navigate through the menu options. Scroll through options using the **UP** and **DOWN** buttons, and press both buttons together to select (this is the **ENTER** command).

- ↑ **UP** button: increase value or scroll through menu
- **ENTER** (press **UP** and **DOWN** together)
- ↓ **DOWN** button: decrease value or scroll through menu

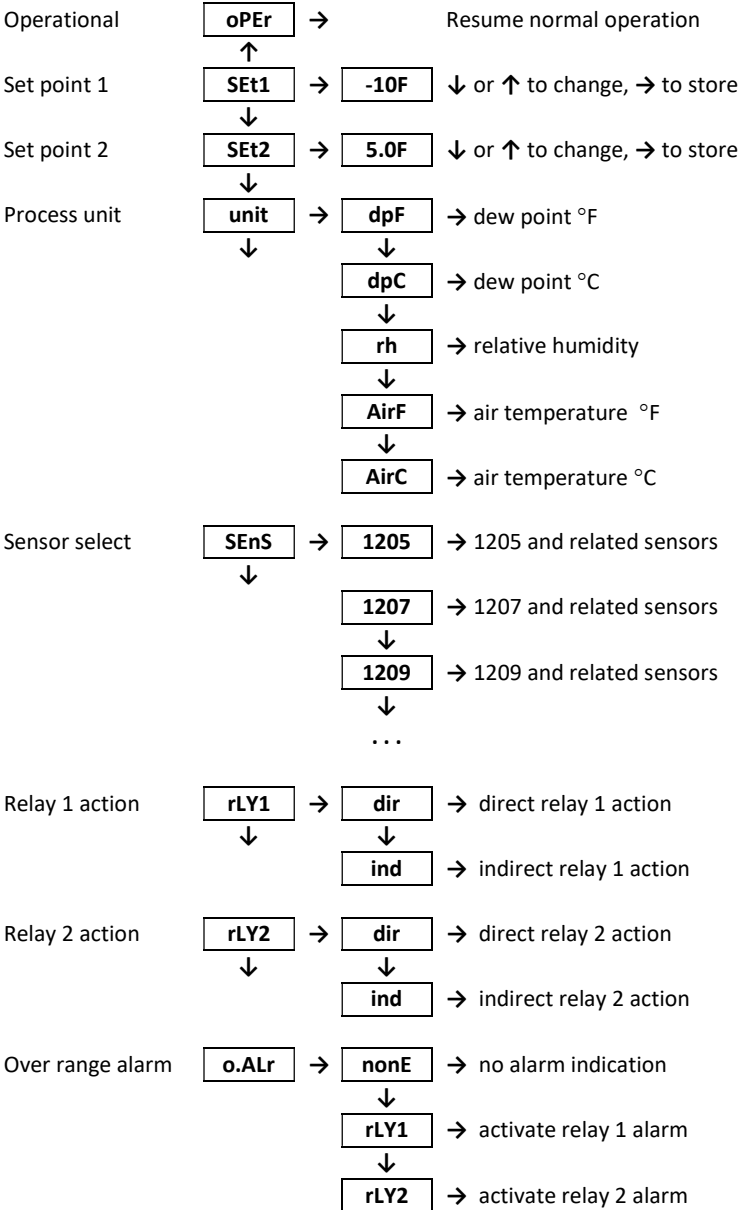


With the hygrometer power on, observe the LED display while navigating the menu. Enable *configuration* mode by pressing **ENTER**. Note that all control functions and linear output are locked in their current state when in *configuration* mode. If no buttons are pressed for some time, the unit will automatically revert to *operational* mode.

Menu enters at **Set1** option. Use **UP** or **DOWN** to navigate from there. When finished making selections, scroll back to **oPEr** and press **ENTER**, or wait for the hygrometer to automatically revert to **oPEr** mode after several seconds.

## Configuration Mode

## Menu Options



# Configuration Options

## Set Point

Factory default: **(model dependent)**

- Options:
- 39°F to +70°F dew point
  - 39°C to +21°C dew point
  - 1 – 99 % RH
- (set point resolution is 1.0 units)

Relay 1 is controlled by set point 1. Relay 2 is controlled by set point 2. The set point units displayed will depend on the process unit currently selected (**unit** menu option). Separate values are stored for °F dew point, °C dew point, or % RH. Because of this, make sure to update set point values when reconfiguring the board's process unit selection.

Attempting to adjust **SEt2** on models with one relay will display an error message **Err**.

Attempting to adjust **SEt1** or **SEt2** while the process unit is **AirF** or **AirC** will display an error message **Err**.

Control around the set point has a fixed hysteresis band of 1.0 units. Relay action above and below the set point is determined by the **rLY1** and **rLY2** setting.

## Process Unit

Factory default: **dpF**

Options:	<b>dpF</b>	Dew point °F
	<b>dpC</b>	Dew point °C
	rh	Relative humidity
	<b>AirF</b>	Air temperature °F (display only)
	<b>AirC</b>	Air temperature °C (display only)

*The 1090 hygrometers are optimized for dew point measurement. Readings of relative humidity may have errors and should be for reference only. It is recommended to only use the device in dew point mode.*

**Note:** If operating in **AirF** or **AirC** units, the control relays will revert to a state as if the process variable is below the set point (a non-alarm condition). Air temperature information is for reference only- this product is not intended to control temperature.

## Sensor Select

Factory Default: **(model dependent)**

Options:	<b>1205</b>	Setting for model 'A'
	<b>1207</b>	Setting for model 'B'
	<b>1209</b>	Setting for model 'C'
	<b>1211</b>	Setting for model 'D'
	<b>1213</b>	Setting for model 'E'

*Sensor selection should not be changed. Incorrect readings will result.*

Sensor selection determines the measurement range of the Hygrometer. For correct readings, the sensor selection must agree with the hygrometer model code letter (refer to the options listed above).

Although only 1200 series sensor models are shown in the menu options, the corresponding 1400 series sensors will automatically be detected by the board.

## Relay Action

Factory Default: **ind**

Options:     **dir**         Direct action  
              **ind**         Indirect action

Relay action defines the behavior of the control relay as the set point and process variable are compared to each other.

Relay Action	Behavior
Direct	Relay is un-energized when measured parameter is below set point.
Indirect	Relay is energized when measured parameter is below set point (this is default behavior).

When set to *direct action*, the relay contact state is as shown on the terminal block legend when the process variable is *below* the set point.

When set to *indirect action*, the relay contact state is reversed. The contacts are connected as shown on the terminal block legend when the process variable is *above* the set point. If your application considers this an ‘alarm’ condition (such as a high dew point alarm on a dryer), this setting will also indicate an ‘alarm’ when the hygrometer is powered off. *Indirect action* is the default setting in order to be compatible with legacy 8092 and 8097 installations.

Note that *indirect action* is typically required in ‘failsafe’ applications, such as medical air monitoring, so that an alarm is indicated when board power is turned off.

Attempting to adjust **rLY2** action on models with one relay will display an error message **Err**.

Relay 1 and Relay 2 action can be configured independently.

## Over Range Action

Factory Default: **none**

Options:	<b>none</b>	No action taken
	<b>rLY1</b>	Relay 1 alarm
	<b>rLY2</b>	Relay 2 alarm

Sensor over range condition can be indicated by forcing an alarm on either of the control relays. Over range detection only applies to dew point parameters, NOT to sensor air temperature.

The alarm indication will simulate a high moisture condition, as if the RH or dew point is above the set point.

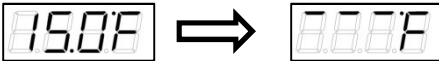
Over range detection occurs when the moisture sensor is at its maximum usable range. It can also indicate certain sensor failures such as contamination, physical damage, or a shorted sensor cable.

**rLY2** selection is not available on models with one relay.

## Operation

During use, the 1090 will indicate if the Hygrosensor is detecting a dew point outside of its measurement range. Intermittent dashes in place of the dew point reading on the LED display will flash when this occurs.

### Sensor Over Range



### Sensor Under Range



# Maintenance

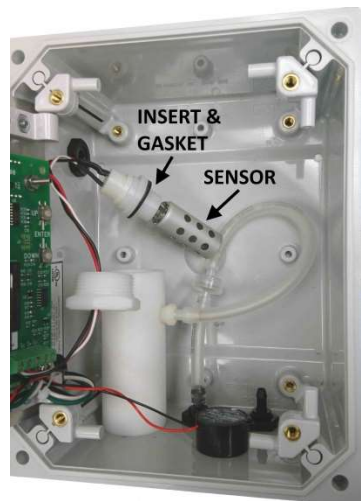
## Sensor Replacement

The sensor should be replaced on a yearly basis. It is difficult to verify the accuracy of the sensor in the field. For most users, an annual sensor replacement can assure good operation of the hygrometer.

### Model 1092 and 1098

**WARNING: Depressurize the air system and disconnect the hygrometer from power before attempting to access the sensor!**

Open the enclosure front cover, and unscrew the two knurled panel retainer screws. The panel will swing open to reveal the sensor housing.



Unscrew the hex nut from the top of the sensor housing. With the hex nut removed, pull the insert & gasket along with the sensor out of the housing. The sensor can be unplugged from the insert. Replace sensor and inspect gasket for damage. Reassemble all parts, hand tighten the hex nut, and plug in the cable connector.

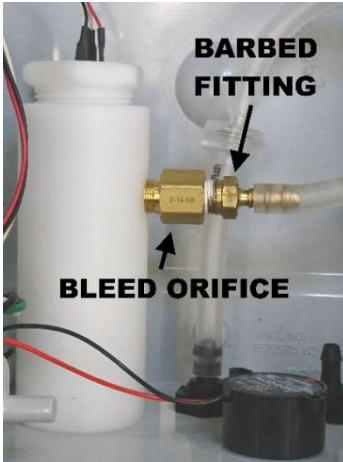


## Model 1097

**WARNING: Depressurize the air system and disconnect the hygrometer from power before attempting to access the sensor!**

Remove the sensor pipe mount from the process air line, make sure to act on the large hex body of the mount, not the smaller packing nut! Unplug the old sensor from the mount and firmly plug in the replacement sensor. Install the pipe mount using thread tape or sealing compound.

## 1092 Bleed Orifice Inspection



For model 1092, the bleed orifice should be inspected when changing the sensor. With compressed air connected to the hygrometer, it should be noticed that air is coming out of the air outlet port on the bottom of the enclosure (the additional port is an enclosure vent and shouldn't have air flow). If no air flow can be felt, remove and clean or replace the orifice. Disconnect the tubing from the barbed fitting and unscrew the orifice and fitting from the sensor manifold.

Hold orifice and fitting up to a light and confirm a clear opening. Use compressed air or a solvent to clean orifice if needed.

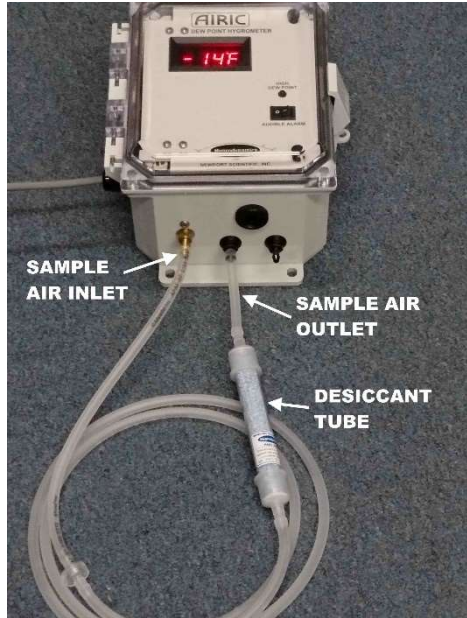
Install orifice and fitting into manifold port without using thread tape or sealing compound. Avoid overtightening plastic fittings!

## 1098 Sensor Response Test

NOTE: Make sure the desiccant tube is blue colored. A pink desiccant tube won't produce dry air!

Included with model 1098 ranges A, B, and C is a desiccant tube that can be used to produce dry air for checking sensor response. If you suspect your sensor is providing a false high dew point reading, perform this response test.

Disconnect the sample tube from your process air and connect it to one end of the desiccant tube. Connect the other end of the desiccant tube to the sample air outlet port of the hygrometer. This will provide a closed loop of dry air to the sensor, forcing a low dew point reading.



Allow the hygrometer to run for some time, up to 30 minutes. If it doesn't provide a low dew point reading, the sensor or air sampling system might be defective.

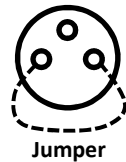
# Troubleshooting Hints

## Hygrometer always indicates over range.

Possible Cause	Corrective Action
Sensor damaged or contaminated	Replace sensor.
Sampled air is not dry	Sampled air must have a dew point within the measurement range of your hygrometer to respond. Check the product Overview section for proper model selection.

## Hygrometer always indicates under range.

Possible Cause	Corrective Action
Sensor cable disconnected	Make sure sensor cable is plugged into the 3 pin sensor insert.
Sensor missing or damaged	Visually check sensor condition and replace if damaged.
Circuit board defective	Unplug the sensor cable and short the 2 outer cable terminals together with a jumper wire. Turn hygrometer on. If display still indicates under-range, the hygrometer needs factory service.



## Hygrometer is slow to respond

Possible Cause	Corrective Action
Sample tubing or air filter is dirty	Inspect sample tubing and air filter and replace if loaded with contaminants.
Inadequate sample air flow	1092- check for airflow out of the air outlet port. Clean internal bleed orifice if needed.  1097- make sure sensor pipe plug location is receiving some degree of air flow.
Sensor is old	Yearly sensor replacement is recommended. On model 1098, perform a sensor response test using supplied desiccant tube.

# Specifications

MODEL LETTER	SENSOR	DEW POINT RANGE (at nominal 80°F air temp.)	DEFAULT ALARM SET
A	1405DM	-40°F to +30°F (-40°C to -1.1°C)	10°F (-23°C)
B	1407	-6°F to +48°F (-14.4°C to 8.9°C)	+20°F (-7°C)
C	1409	+2°F to +53°F (-16.7°C to 11.7°C)	+35°F (2°C)
D	1411	+20°F to +60°F (-6.7°C to 15.6°C)	+45°F (7°C)
E	1413	+32°F to +65°F (0°C to 18.3°C)	+50°F (10°C)

**TYPICAL ACCURACY**                      ±3°F (±1.7°C)

**ANALOG OUTPUT SCALING**      0 - 5VDC scaled as -40°F to +70°F dew point  
(-40°C to 23°C)

**POWER REQUIREMENTS**            115VAC 50/60HZ 0.15A max  
(230VAC optional)

**DIMENSIONS**                            8.5" X 6.5" X 5.2"

**NET WEIGHT**                            3.6lbs

# Spare Parts & Accessories

<b>Item</b>	<b>Part No.</b>
Push to connect sample elbow	3300741
9' sensor cable for 1097	6030-120
8" sensor cable for 1092	6030-8
3 pin sensor insert	0900110C
Sensor mount for 1097	6147C
Gasket for insert	1000613G
Bleed orifice	3300761
Desiccant tube for 1098	6245
Sample tubing with filter for 1098	4100200

# Warranty

NEWPORT SCIENTIFIC, INC. warrants that all equipment manufactured by NSI shall be free from defects in material and workmanship which might impair its usefulness. SELLER DOES NOT WARRANT THAT THE EQUIPMENT IS FIT FOR ANY PARTICULAR USE. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF; the obligation under this warranty is limited to repairing or replacing, at Seller's factory, any defective parts which, when returned by the buyer, **TRANSPORTATION PREPAID**, examination discloses to have been factory defective. The time limit of this warranty is ONE YEAR from date of shipment of new equipment, SIX MONTHS from date of shipment of Hygrodynamics Wide-Range Sensors and THREE MONTHS from date of shipment of Hygrodynamics Narrow-Range Sensors and repaired equipment. THIS WARRANTY IS EXPRESSLY IN LIEU OF OTHER WARRANTIES. Seller shall not be held liable for any special, indirect, consequential damages arising out of this warranty or any breach thereof, of any defect in or failure or malfunction of the equipment and materials are further subject to tolerances and variations consistent with usages of trade. This warranty shall run in favor only of the purchaser from Seller and may not be passed on or represented on behalf of Seller to any subsequent purchaser.

## **WARRANTIES: OTHER PRODUCTS**

NEWPORT SCIENTIFIC, INC. makes no express or implied warranty as to items, which are the products of other manufacturers. Seller shall use its best efforts to obtain from the manufacturer, in accordance with its customary practice, the repair or replacement of such products may prove defective in workmanship or material. The foregoing states the entire liability in respect to such products, except as an authorized executive of the corporation may otherwise agree in writing.

In the case of special equipment or modifications to standard equipment manufactured at the request of the buyer, under buyer-approved specifications, buyer will indemnify Seller against the risk damages due to patent infringement

**Newport Scientific, Inc**  
**8246 Sandy Court Suite E**  
**Jessup, MD 20794**  
**USA**

newport-scientific.com  
P 301-498-6700  
F 301-490-2313  
email [sales@newport-scientific.com](mailto:sales@newport-scientific.com)  
[hygrotechnical@newport-scientific.com](mailto:hygrotechnical@newport-scientific.com)