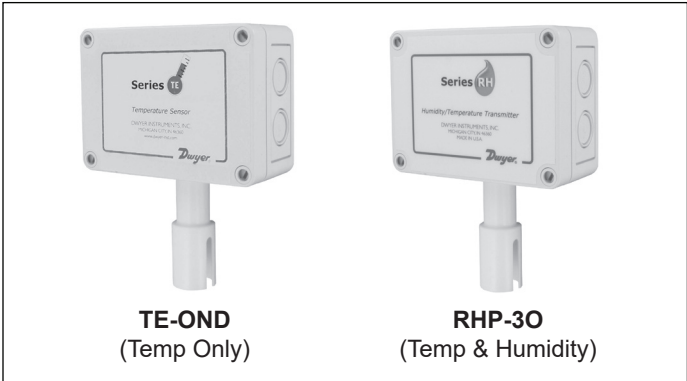


# INSTALLATION INSTRUCTIONS

## Dwyer Remote Mounted Outside Air Sensors model series "D", "H", "I", "O", and MPR (select units)

**Remote Mounted Outside Air Sensors**



### ! WARNING

1. Disconnect power supply before making wiring connections to prevent electrical shock and equipment damage.
2. All units must be wired strictly in accordance with wiring diagram furnished with the unit. Any wiring different from the wiring diagram could result in a hazard to persons and property.
3. All wiring must be done with a wiring material having a temperature rating of at least 105°C.

### ! CAUTION

As with any mechanical equipment, personal injury can result from contact with sharp sheet metal edges. Be careful when you handle this equipment.

### IMPORTANT

1. The use of this manual is specifically intended for a qualified installation and service agency. All installation and service of these kits must be performed by a qualified installation and service agency.
2. These instructions must also be used in conjunction with the Installation and Service Manual originally shipped with the unit, in addition to any other accompanying component supplier literature.

**Application**

The Dwyer temperature and temperature/humidity sensors are used in conjunction with the Carel controller used on select Model series:

- "D", "H", "I", and "O" Indirect Fired Make-Up Air Units
- "MPR" Packaged Ventilation Units

The sensors vary by unit location and application/function and are selected and added to the order specifically for the unit(s) as configured. The sensors ship loose with a packing slip identifying the Item Code and Manufacturer part numbers. The part numbers and application of the sensors can be seen in the following Tables 1.1 and 1.2:

**Table 1.1 - Outside Air Sensors**  
(Model Series "D", "H", "I", & "O" Indirect Fired Make-Up Air Units)

Applicable Model Digits ①	Item Code	Dwyer Part Number	Temp Output	Humidity Output
Digit 2=B or D, Digit 12=9	31009	TE-OND-E	PT1000	-
Digit 2=C or P, Digit 12=9	31008	RHP-301E	PT1000	4-20mA

① Applies primarily to units configured with outside air capability.

**Table 1.2 - Outside Air Sensors**  
(Model Series "MPR" Packaged Ventilation/DOAS Units)

Applicable Model Digits ②	Item Code	Dwyer Part Number	Temp Output	Humidity Output
Digit 7=A, C, R	58504	RHP-301E	PT1000	4-20mA
Digit 7= B	58505	RHP-3011	4-20mA	4-20mA

② Applies primarily to units configured with return air capability.

THIS MANUAL IS THE PROPERTY OF THE OWNER.  
PLEASE LEAVE IT WITH THE OWNER WHEN YOU LEAVE THE JOB.

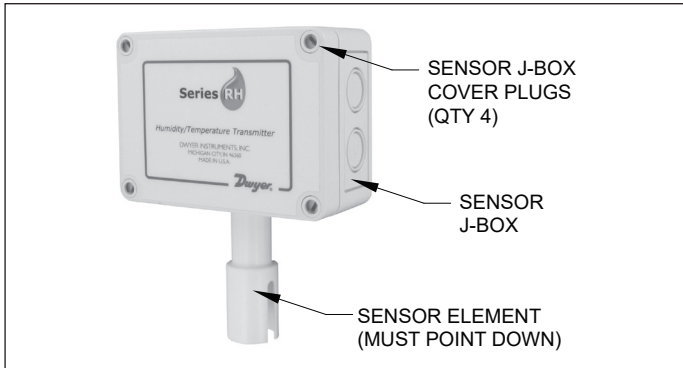
# Remote Outside Air Temperature and Temperature/Humidity Sensor Installation

## Sensor Installation

For remote mounted sensors, install as described below.

1. Locate the mounting location under an eave, shield, or in an area that is out of the elements and direct sunlight. Avoid locations where severe shock or vibration, excessive moisture or corrosive fumes are present. The sensor should be oriented with the sensor element pointing down to prevent water collection in the sensor cavity, as shown in Figure 2.1. The sensor does not need to be mounted to the unit, but should be nearby.

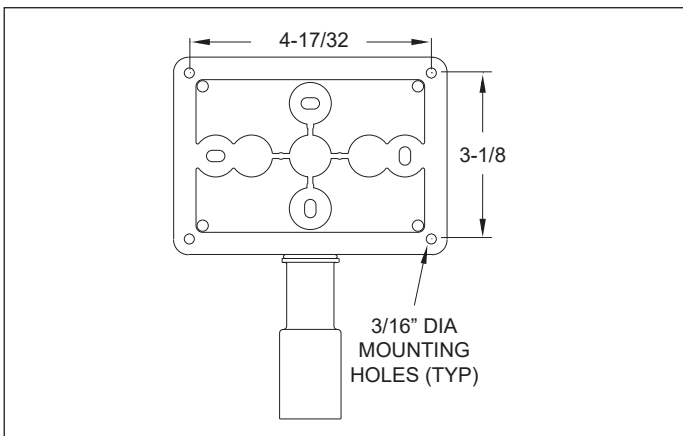
Figure 2.1 - Remote Mounted Sensor



2. Remove the cover plugs from the front cover of the sensor J-box. Position the J-box where it is to be mounted and mark where pilot holes are required to secure the sensor mounting tabs to the mounting surface (refer to Figure 2.2). Remove the sensor and drill 1/8" pilot holes.

**Note:** As noted in Figure 2.2, the holes in the outside corners where the cover is secured to the J-box are the same holes to be used for mounting the J-box to the mounting surface. This will ensure the box maintains its NEMA rating. If any other holes are used, they must be sealed to prevent water from collecting in the J-box.

Figure 2.2 - Remote Mounted Sensor - Mounting Holes



3. Secure the sensor J-box using screws included.
4. Before reinstalling the J-box cover, proceed to the section, "Wiring to the Main Unit Carel Controller".

## Wiring to the Main Unit Carel Controller

For sensor to unit wiring, follow the steps described below.

1. Remove a sensor J-box knockout for wiring entry. A bottom knockout is preferred to minimize the potential for water entry. Install a watertight wiring strain relief bushing.
2. For the temperature only sensors, connect the two red wires from the sensor to the terminal blocks included in the junction box as shown in Figure 2.3. The temperature/humidity sensors have a terminal block already installed as shown in Figure 2.4.

Figure 2.3 - Temperature Sensor Wiring Terminals

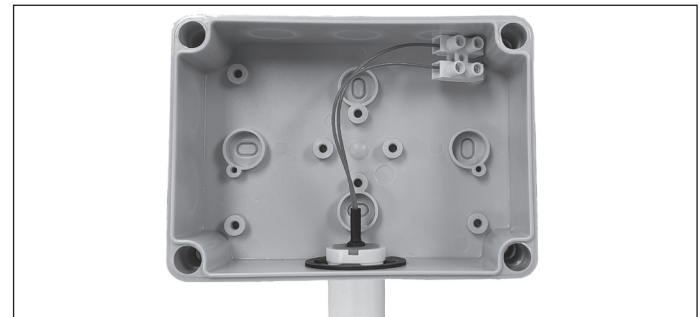
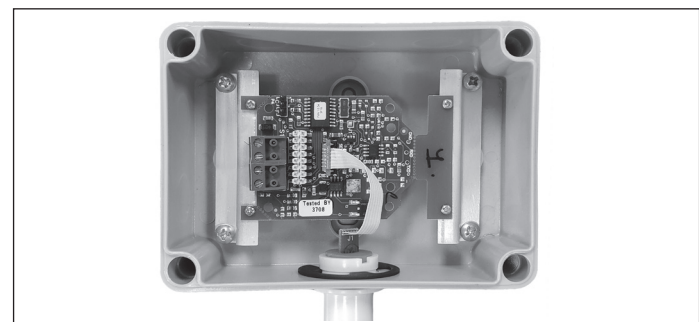


Figure 2.4 - Temp/Humidity Sensor Wiring Terminals



3. Route the control wire that will connect to the unit (minimum 24 AWG, maximum 18 AWG twisted pair shielded cable) into the sensor J-box through the bushing and wire to the terminal block.
4. At the unit, determine the entry point for the control wiring from the sensor.
  - For model series "D", "H", "I", and "O" units, review the Installation and Service Manual that shipped with the unit to determine the correct location. It is typically a drill locator dimple on a casing panel.
  - For model MPR units, it is a drill locator dimple on a casing panel near the applicable control panel compartment and identified with a sticker as shown in Figure 3.1. Refer to Table 3.2 to determine if it is near the main unit or energy recovery control panel compartment.
5. Carefully drill and clean/deburr a hole properly sized for a field supplied/installed watertight wiring strain relief bushing. Install the bushing.
6. Route the control wire from the sensor into the unit control panel compartment through the bushing installed in the previous step.

# Remote Outside Air Temperature and Temperature/Humidity Sensor Installation

**Figure 3.1**  
**Label for Preferred Entry Location of Control Wiring**



7. Wire to the control terminals on the unit per the wiring diagram on the unit and Table 3.1 for Model series “D”, “H”, “I”, and “O” or Table 3.2 for Model series MPR.
8. Reinstall the cover of the sensor J-box.

**Table 3.1 - Sensor to Unit Terminal Wiring**  
(Model Series “D”, “H”, “I”, & “O” Indirect Fired Make-Up Air Units)

Sensor Type	Terminals	
	Sensor	Unit
TE (Temp Only)	1	814
	2	800B
RHP (Temp & Humidity)	1	815
	2	515
	3	800B
	4	814

**Table 3.2 - Sensor to Unit Terminal Wiring**  
(Model Series “MPR” Packaged Ventilation/DOAS Units)

Sensor Type	Model Digit 7	Terminals		
		Sensor	Unit Control Panel Location	
			Main	Energy Recovery
RHP (Temp & Humidity)	A, C, or R	1	817	-
		2	515	-
		3	825	-
		4	814	-
	B	1	-	847
		2	-	517
		3	-	848

## Temperature Sensor Resistance Values

The sensors all include temperature sensing, however the signal is either a PT1000 resistance or a 4-20mA output, as indicated in Tables 1.1 and 1.2. For sensors with a PT1000 resistance, see Table 3.3 for the resistance values at various temperatures.

**Table 3.3 - Sensor Resistance vs. Temperature**

°F	Ω	°F	Ω	°F	Ω
0	930.3	42	1021.7	84	1112.4
2	934.7	44	1026.0	86	1116.7
4	939.0	46	1030.4	88	1121.0
6	943.4	48	1034.7	90	1125.3
8	947.8	50	1039.0	92	1129.6
10	952.1	52	1043.3	94	1133.9
12	956.5	54	1047.7	96	1138.2
14	960.8	56	1052.0	98	1142.5
16	965.2	58	1056.3	100	1146.8
18	969.5	60	1060.6	102	1151.1
20	973.9	62	1065.0	104	1155.4
22	978.3	64	1069.3	106	1159.7
24	982.6	66	1073.6	108	1164.0
26	986.9	68	1077.9	110	1168.3
28	991.3	70	1082.2	112	1172.6
30	995.6	72	1086.6	114	1176.8
32	1000.0	74	1090.9	116	1181.1
34	1004.3	76	1095.2	118	1185.4
36	1008.7	78	1099.5	120	1189.7
38	1013.0	80	1103.8	122	1194.0
40	1017.3	82	1108.1	124	1198.2

For sensors that use a 4-20mA output signal, the output is linear over the range as follows:

- Temperature (RHP-3O11 sensor only): -40 to 140 F  
(Temperature = (11.25 x mA) - 85)
- Relative Humidity (all sensors): 0 to 100%  
(Relative Humidity = (6.25 x mA) - 25)

As Modine Manufacturing Company has a continuous product improvement program, it reserves the right to change design and specifications without notice.

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