Installation Instructions

DNTEMPSN002A00

ACCESSORY TEMPERATURE SENSOR FOR SINGLE OR
DIFFERENTIAL DRY BULB CONTROL FOR ECONOMIZER IV
R−410A ROOFTOP UNITS, 3 to 25 Tons

TABLE OF CONTENTS

The accessory temperature sensor can be used on all rooftop units with a factory−installed or accessory Economi$er IV.

PACKAGE CONTENTS

QTY	CONTENTS
1	Temperature Sensor
2	6−20, $^3/_4$ in. Sheet Metal Screw
1	Grommet
1	Black Wire
1	Red Wire

IMPORTANT: Read these instructions completely before attempting to install the accessory temperature sensor.

The DNTEMPSN002A00 temperature sensor is used with the Economi$er IV (part numbers <u>DNECOMZR</u>, 020A02, 021A03, 024A02, 025A02, 046A00, 047A00, 052A00, 053A00, 054A00, 055A00, 062A00, 064A00) and is used on the following units:

UNIT	
RGS036−303	RGH036−150
RAS036−303	RAH036−150
RHS036−150	RHH036−120

SAFETY CONSIDERATIONS

Installation and servicing of air−conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair, or service air−conditioning equipment.

Untrained personnel can perform the basic maintenance functions of replacing filters. All other operations should be performed by trained service personnel. When working on air−conditioning equipment, observe precautions in the literature, tags and labels attached to the unit, and other safety precautions that may apply.

Follow all safety codes. Wear safety glasses and work gloves. Have fire extinguishers available for all brazing operations.

Recognize safety information. This is the safety−alert symbol ⚠. When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury.

Understand the signal words DANGER, WARNING, and CAUTION. These words are used with the safety−alert symbol. DANGER identifies the most serious hazards which **will** result in severe personal injury or death. WARNING signifies a hazard which **could** result in personal injury or death. CAUTION is used to identify unsafe practices which **may** result in minor personal injury or product and property damage. NOTE is used to highlight suggestions which **will** result in enhanced installation, reliability, or operation.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury and/or death.

Disconnect power supply and install lockout tag before attempting to install accessory.

GENERAL

An outdoor air temperature sensor (HH57AC080) is standard and is provided with the accessory Economi$er IV package. Units with factory−installed enthalpy sensor can be changed to outdoor dry bulb changeover control with a single accessory temperature sensor. Units with factory−installed enthalpy sensor can be changed to differential dry bulb control with two accessory temperature sensors. All other units come with the dry−bulb sensor as standard with the factory−installed Economi$er IV. The sensor is used for outdoor temperature control. (See Table 1.) The accessory DNTEMPSN002A00 temperature sensor is required for differential dry bulb control.

Outdoor Dry Bulb Changeover Control

For this control mode, the outdoor temperature is compared to an adjustable set point selected on the control. If the outdoor−air temperature is above the set point, the Economi$er IV will adjust the outdoor−air dampers to minimum position. If the outdoor−air temperature is below the set point, the position of the outdoor−air dampers will be controlled to provide free cooling using outdoor air.

Differential Dry Bulb Control

For differential dry bulb control, the standard outdoor dry bulb sensor is used in conjunction with an additional accessory return air sensor (part number DNTEMPSN002A00). In this mode of operation, the outdoor−air temperature is compared to the return−air temperature and the lower temperature airstream is used for cooling.

INSTALLATION

NOTE: RAS, RGS, RHS, RAH, RGH, AND RHH units have a choice of dry−bulb or enthalpy sensor with the factory−installed Economi$er IV.

Table 1 – Economi$er IV Sensor Usage

APPLICATION	Economi$er IV WITH OUTDOOR AIR DRY BULB SENSOR		
	Accessories Required		
Outdoor Air Dry Bulb	None. The outdoor air dry bulb sensor is factory installed.		
Differential Dry Bulb	DNTEMPSN002A00*		
Single Enthalpy	AXB078ENT		
Differential Enthalpy	AXB078ENT and DNENTDIF004A00*		
CO_2 for DCV Control using a Wall−Mounted CO_2 Sensor	33ZCSENCO2 or CGCDXSEN004A00†		
CO_2 for DCV Control using a Duct−Mounted CO_2 Sensor	33ZCSENCO2 or CGCDXSEN004A00† and 33ZCASPCO2 or CGCDXASP001A00**	OR	DNCBDIOX005A00††

* DNENTDIF004A00 and DNTEMPSN002A00 accessories are used on many different base units. As such, these kits may contain parts that will not be needed for installation.

† 33ZCSENCO2 and CGCDXSEN004A00 are accessory CO_2 sensors.

** 33ZCASPCO2 and CGCDXASP001A00 are accessory aspirator boxes required for duct−mounted applications.

†† DNCBDIOX005A00 is an accessory that contains both 33ZCSENCO2 and 33ZCASPCO2 accessories.

NOTE: Some RGS/RAS036−120 units may have factory−installed enthalpy sensor.

Single Outdoor Air Temperature Sensor Installation for: RGS/RAS036−303, RHS036−150, RGH/RAH036−150, RHH036−120 Units

NOTE: This section assumes you are starting with an Economi$er IV installed in the rooftop and equipped with a single enthalpy sensor (p/n AXB078ENT). If your Economi$er is already equipped with a dry bulb temperature sensor (p/n HH57AC080), **STOP**. You do not need to continue with this section.

1. Turn off power to the unit and install Lockout Tag.

2. Depending on the type of panels the unit is equipped with:

   a. Units with standard panels — Remove the Economi$er hood from the base unit and save the screws for Step 9a.

   b. Units with factory−installed hinged panels — Open the hinged panel and secure it. Since the panel is hinged, do not remove it from the unit.

3. Disconnect the black and red wires from the pre−existing single enthalpy sensor (p/n AXB078ENT) and let them hang. Remove the single enthalpy sensor and save the screws (no. 8) for use in Step 4. The wires will be used later to connect to the enthalpy sensor.

4. Use the two sheet metal screws (no. 8) from Step 3 to mount the enthalpy sensor on the front left of the Economi$er frame, as shown in Fig. 1 and 1A. Use the two screw holes in the Economi$er frame.
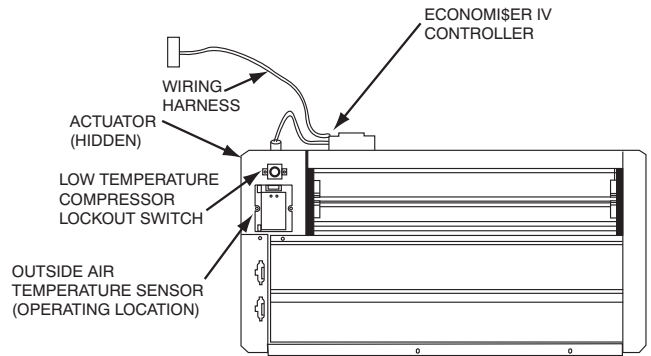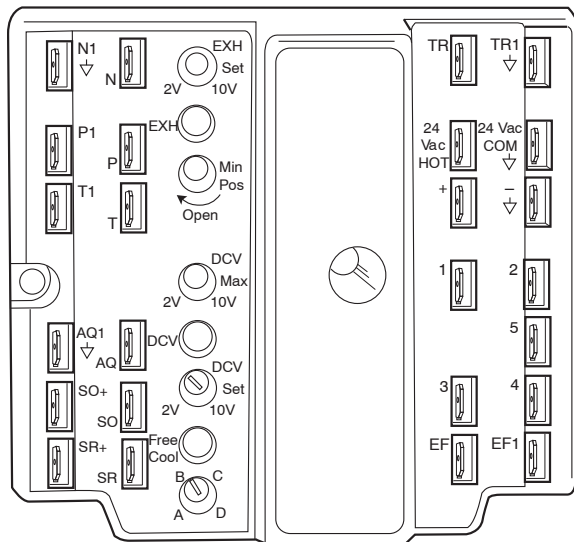

Fig. 1 – Economi$er IV Component Locations — RGS/RAS036−180, RHS036−150, RGH/RAH036−150, RHH036−120 Units
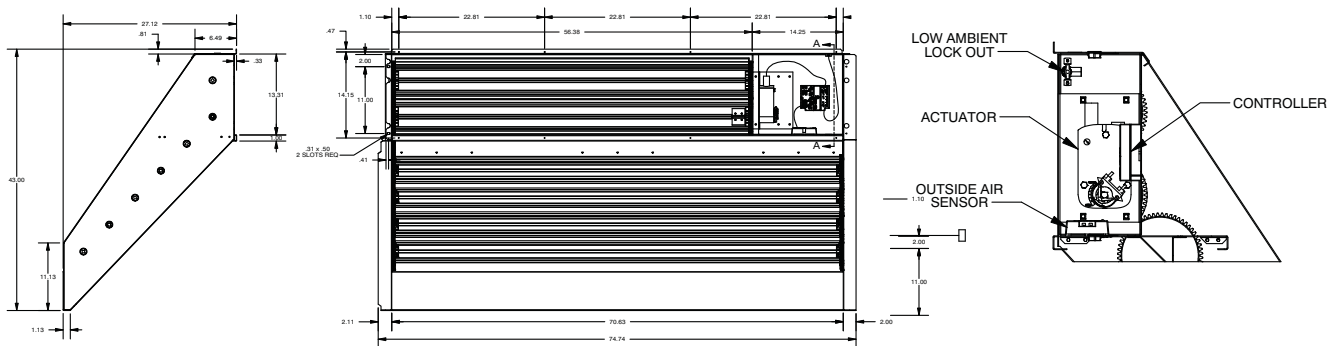


Fig 1A – RGS/RAS181−303 Size Units and Location of Sensor

Fig. 2 − Economi$er IV Controller

5. Ensure the black and red wires are connected on the Economi$er IV controller correctly. The red wire should be connected to the "SO" terminal and the black wire to the "SO+" terminal. If they are not connected this way, make the connections as described. The DNTEMPSN002A00 kit contains an extra red and black wire.

6. Pick up the black and red wires left hanging in Step 3 and connect them to the temperature sensor. Connect the red wire to the sensor's "−" terminal and the black wire to the sensor's "+" terminal. See Fig. 3 for details.

7. If installation of another dry bulb temperature sensor (for differential dry bulb temperature control) is also planned, skip to Step 3 of the Differential Temperature Sensor installation instructions on this page.

8. Restore power to the unit and configure the Economi$er IV controller per the Configuration section of this manual.

9. Depending on the type of panels the unit is equipped with:

   a. Units with standard panels —
   Re−install the Economi$er hood. Secure the hood using the screws saved from Step 2a.

   b. Units with factory−installed hinged panels —
   Close the hinged panel and latch it.
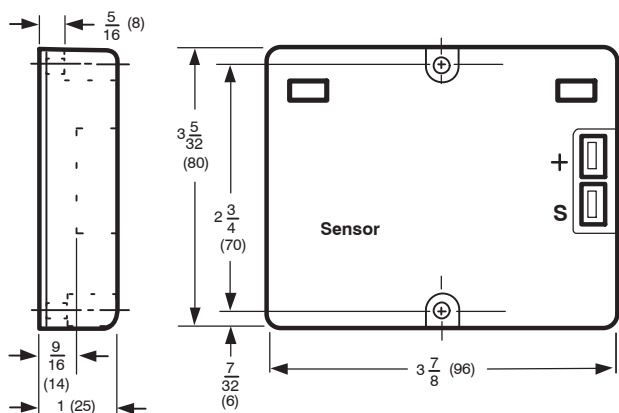

Fig. 3 − Temperature Sensor Specifications

Differential Temperature Sensor Installation for RGS/RAS036−303, RHS036−150, RGH/RAH036−150, RHH036−120 Units

NOTE: This section assumes you are starting with an Economi$er IV installed in the rooftop and equipped with dry bulb temperature sensor (p/n HH57AC080) installed, regardless of whether the Economi$er was purchased that way, or you have completed the installation of an accessory sensor. If you do not already have a dry bulb temperature sensor installed, first install the sensor as described earlier in this instruction.

1. Turn off power to unit and install Lockout Tag.

2. Depending on the type of panels the unit is equipped with:

   a. Units with standard panels —
   Remove the Economi$er hood from the base unit and save the screws for Step 9a.

   b. Units with factory−installed hinged panels —
   Open the hinged panel and secure it. Since the panel is hinged, do not remove it from the unit.

3. Using the screws provided in the DNTEMPSN002A00 kit, mount the differential

enthalpy sensor in the return air duct as shown in Fig. 4.

4. Remove the 620−ohm resistor connected to the "SR+" and the "SR" terminals on the Economi$er IV controller.

5. Route the red and black wires (provided in the DNTEMPSN002A00 kit) between the Economi$er IV controller and the installed location of the differential temperature sensor.

6. Connect the red wire to the "S" terminal and the black wire to the "+" terminal on the sensor. (See Fig.3.)

7. Connect the red wire to the "SR" terminal and the black wire to the "SR+" terminal on the Economi$er IV controller. (See Fig. 2.)

8. Restore power to the unit and configure the Economi$er IV controller per the configuration section of this man
ual.

9. Depending on the type of panels the unit is equipped with:

   a. Units with standard panels —
   Re−install the Economi$er hood. Secure the hood using the screws saved from Step 2a.

   b. Units with factory−installed hinged panels —
   Close the hinged panel and latch it.
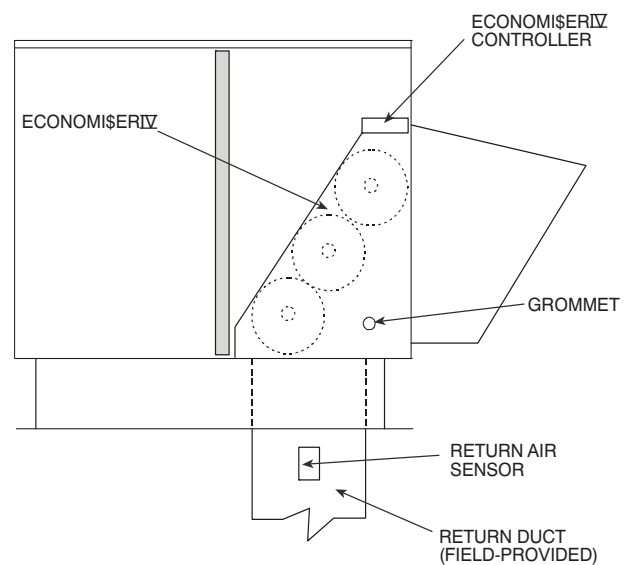
Fig. 4 − Return Air Temperature Sensor Mounting Location − RGS/RAS036−303, RHS036−150, RGH/ RAH036−150, RHH036−120 Units
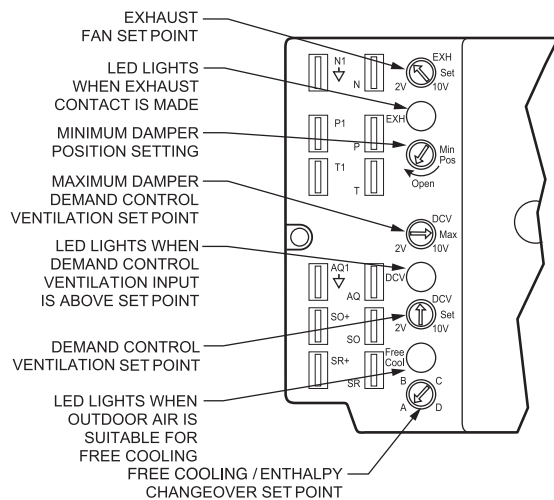
C7660 Outdoor Air Sensors

These installation instructions center around the C7650 Honeywell OA sensor. Some kits may contain this older sensor version. The newer OA Sensor version is the Honeywell C7660 sensor and can be differentiated from the C7650 by the "dip switches" on the face of the control. This control is completely backwards compatible and interchangeable with the C7650.
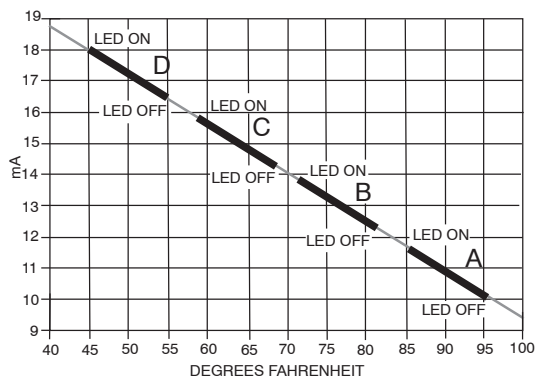
C7650 Set Up

See Fig. 3.

Once the sensor has been installed and wired in the unit, the technician will set the Economizer IV using the "FREE COOLING/ENTHALPY CHANGEOVER SETPOINT" (Fig. 5) to the appropriate Outdoor Air changeover temperature via the A-B-C-D setting shown in Fig. 6.

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Fig. 5 – Economi$er IV Controller Potentiometer and LED Locations

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Fig. 6 – Outdoor Air Changeover Temperature

C7660 Set Up

See Fig. 7.

When outdoor air temperature is below the changeover setpoint, the sensor will provide a 20 mA signal to the economizer which translates to **OK to economize** positioning the damper open on a call for cooling. When the outdoor air is above the changeover setpoint, the sensor provides a 4 mA signal to the economizer which translates to **not OK to economize** and the outdoor damper drives to minimum position.

The C7660 temperature sensors replace the control function of the temperature changeover in the economizer control.

The A–B–C–D potentiometer on the economizer does not control the changeover point when a C7660 sensor is used in place of an enthalpy sensor. For single dry bulb and differential enthalpy set the potentiometer to D.

The factory default switch setting is 63°F. The changeover temperature can be field set by changing the positions of the switches using Fig. 8.

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
Fig. 7 – C7660 Temperature Sensor

CONFIGURATION

Outdoor Dry Bulb Changeover

For this control mode, the outdoor temperature is compared to an adjustable set point selected on the control. If the outdoor–air temperature is above the set point, the Economi$er IV will adjust the outdoor–air dampers to minimum position. If the outdoor–air temperature is below the set point, the position of the outdoor–air dampers will be controlled to provide free cooling using outdoor air. When in this mode, the LED next to the free cooling set point potentiometer will be on.

Outdoor Air Sensor

The outdoor air sensor has three dip switches that are used to set the change over temperature to meet the application. The factory default setting is 63°F. There are two changeover strategies available: exclusive operation where you can have either mechanical cooling or economizer but not both simultaneously (Single Stage Thermostat) or integrated operation, where the economizer and mechanical cooling can operate simultaneously, requires the use of a two stage thermostat.

Fig. 8 lists the changeover switch set points. With the power off, set the switches to the appropriate temperature required for application.

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Fig. 8 – Changeover Switch Set Points

Set the Free Cooling/Enthalpy Changeover Set Point potentiometer to "D" located on the face of the economizer control.

Differential Dry Bulb Control

In this mode of operation, the outdoor–air temperature is compared to the return–air temperature and the lower temperature airstream is used for cooling. When using this mode of changeover control, turn the free cooling/enthalpy changeover set point potentiometer fully clockwise to the D setting.