Small and Medium Rooftop Units
3 to 27.5 Tons
Differential Return Sensor Accessory

Part No. CRDIFRAS001A00

CONTENTS

SAFETY CONSIDERATIONS

Installation of this accessory can be hazardous due to system pressures, electrical components and equipment, and equipment locations (such as a roof or elevated surface). Only trained qualified installers and service technicians should install, start up, and service this equipment.

When installing this accessory, observe precautions in the literature and on any labels attached to the equipment and all other safety precautions may apply.

- Follow all safety codes.
- Wear safety glasses and work gloves.
- Use care in handling and installing the accessory.

It is important to 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, CAUTION, and NOTE. 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 hazards 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 cause personal injury or death. Before performing service or maintenance operations on the unit, always turn off main power switch to unit and install lock(s) and lockout tag(s). Unit may have more than one power switch. Ensure electrical service to rooftop unit agrees with voltage and amperage listed on the unit rating plate.

⚠ CAUTION

CUT HAZARD

Failure to follow this caution may result in personal injury.

Sheet metal parts may have sharp edges or burrs. Use care and wear appropriate protective clothing, safety glasses and gloves when handling parts and servicing roof top units.

⚠ CAUTION

Failure to follow this caution may result in personal injury and damage to the unit. Cover the duct opening as a precaution so objects cannot fall into the return duct opening. Be sure to remove the cover when installation is complete.

IMPORTANT: Read these instructions completely before attempting to install accessory economizer.

GENERAL

The CRDIFRAS001A00 kit includes a return air sensor that, when installed, compares the outside air conditions to the return air conditions and uses the better of the 2 for free-cooling when cooling is required.

The CRDIFRAS001A00 kit is used in conjunction with the EconoMi$er X Honeywell Jade W7220 controller. The EconoMi$er X comes standard with either a dry bulb or enthalpy outside air sensor.

A differential return air sensor is required by some national codes including IECC 2018. Check applicable codes. See Table 1 for package contents.

Table 1 — Package Contents

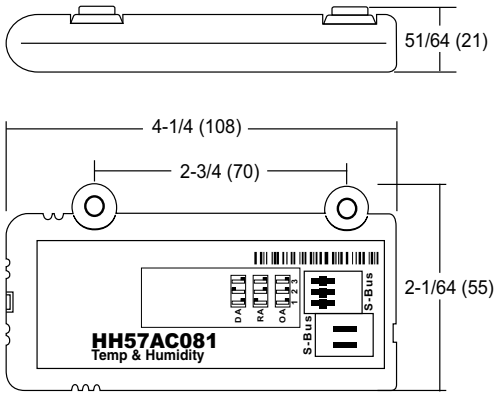
DESCRIPTION	QUANTITY
HH57AC081 Differential Return Sensor	1
Wiring Harness	1
Screws	2

INSTALLATION

The HH57AC081 sensor provided in the CRDIFRAS001A00 kit can be used for either a return air enthalpy sensor or a return air dry bulb sensor. The W7220 controller will automatically recognize whether the HH57AC081 is being used as a differential return dry bulb or a differential return enthalpy by the type of outside air sensor being used.

Step 1 — Set the Dip Switches

Set the dip switches on the HH57AC081 sensor to ON-OFF-OFF. See Fig 1 and Table 2.



NOTE: Dimensions are in inches (mm)

Fig. 1 — HH57AC081 Sensor

Table 2 — HH57AC081 Sensor Dip Switch Settings

USE	DIP SWITCH POSITIONS FOR SWITCHES 1, 2, AND 3		
	1	2	3
DA	OFF	ON	OFF
RA	ON	OFF	OFF
OA	OFF	OFF	OFF

Step 2 — Mount the Sensor

Mount the HH57AC081 differential sensor in the system's return air duct. Screw in place to duct, making sure it is in airstream.

Step 3 — Attach the Plug to the Sensor

Locate the harness shipped with the CRDIFRAS001A00 kit. One end of the harness will have a 2-pin plug on it. Attach this plug to the HH57AC081 sensor.

Step 4 — Connect the Sensor to the Economizer

ON MOST 3-12.5 TON UNITS

On the unit-side of the PL6 economizer plug, there are (2) gray wires with spade terminal connections. Unplug these spade terminals from each other. (See Fig 2.) Connect the other end of the harness provided with the CRDIFRAS001A00 to these (2) wires per Fig. 2. This will send a Sylk BUS signal from the sensor back to the EconoMi$er X controller.

ON MOST 15-27.5 TON UNITS

There are (2) loose gray wires hanging by the PL6 in the return chamber of the unit. Connect the harness provided with the CRDIFRAS001A00 to these (2) gray wires. This will send a Sylk BUS signal from the sensor back to the EconoMi$er X controller.

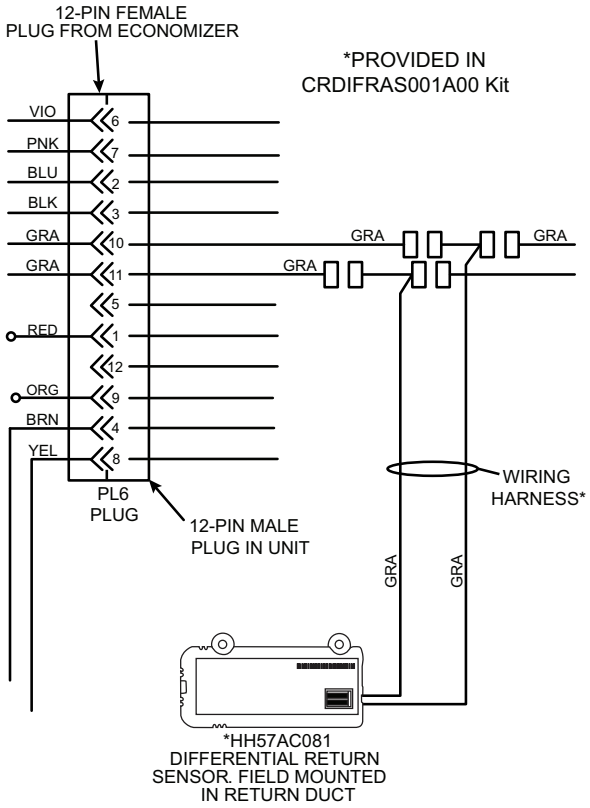


Fig. 2 — Wiring Differential Return Sensor (Typical 3 to 12.5 Ton Unit Shown)

Using HH57AC081 Sensor for Dual Dry Bulb

When using the HH57AC081 for differential dry bulb, the newer version (Firmware 1.15) W7220 economizer controller displays a "SETPOINT" called "DRYBLB DIFF".

On a call for cooling, free-cooling will be used whenever the outside air temperature is at or below the return air temperature (RAT) minus the "DRYBLB DIFF".

The DRYBLB DIFF default is 0°F, and the offset range is 0° to 6° in 2° increments.

California's Title 24 High Limit Temperature Limit Setting

When using the CRDIFRAS001A00 in California, Title 24 requires specific HIGH LIMIT temperature settings. The temperatures vary by the region within California. See Table 3 for settings.

Using HH57AC081 Sensor for Dual Enthalpy

The controller will use the outside air or return air that provides the best enthalpy for free-cooling.

There is a high limit boundary for differential enthalpy. The high limit boundary is ES1 when there are no stages of mechanical cooling, see Table 4 and Fig. 3.

When a compressor stage is energized, HL is the high limit boundary. See Table 4 and Fig. 3.

Table 3 — California Title 24 Regional High Limit Dry Bulb Temperature Settings

DEVICE TYPE*	CLIMATE ZONES	REQUIRED HIGH LIMIT (ECONOMIZER OFF WHEN): DESCRIPTION
Fixed Dry Bulb	1, 3, 5, 11-16	OAT exceeds 75°F
	2, 4, 10	OAT exceeds 73°F
	6, 8, 9	OAT exceeds 71°F
	7	OAT exceeds 69°F
Differential Dry Bulb	1, 3, 5, 11-16	OAT exceeds RA Temp
	2, 4, 10	OAT exceeds –2°F
	6, 8, 9	OAT exceeds –4°F
	7	OAT exceeds –4°F
Fixed Enthalpy† and Fixed Dry Bulb	ALL	OAT exceeds 28 Btu/lb of dry air or OAT exceeds 75°F

* Only the high limit control devices listed are allowed to be used and at the setpoints listed. Others such as Dew Point, Fixed Enthalpy, Electronic Enthalpy, and Differential Enthalpy Controls, may not be used in any climate zone for compliance with Section 140.4(e)1 unless approval for use is provided by the Energy Commission Executive Director.

† At altitudes substantially different than sea level, the Fixed Enthalpy limit value shall be set to the enthalpy value at 75°F and 50% relative humidity. As an example, at approximately 6,000 foot elevation, the fixed enthalpy limit is approximately 30.7 Btu/lb.

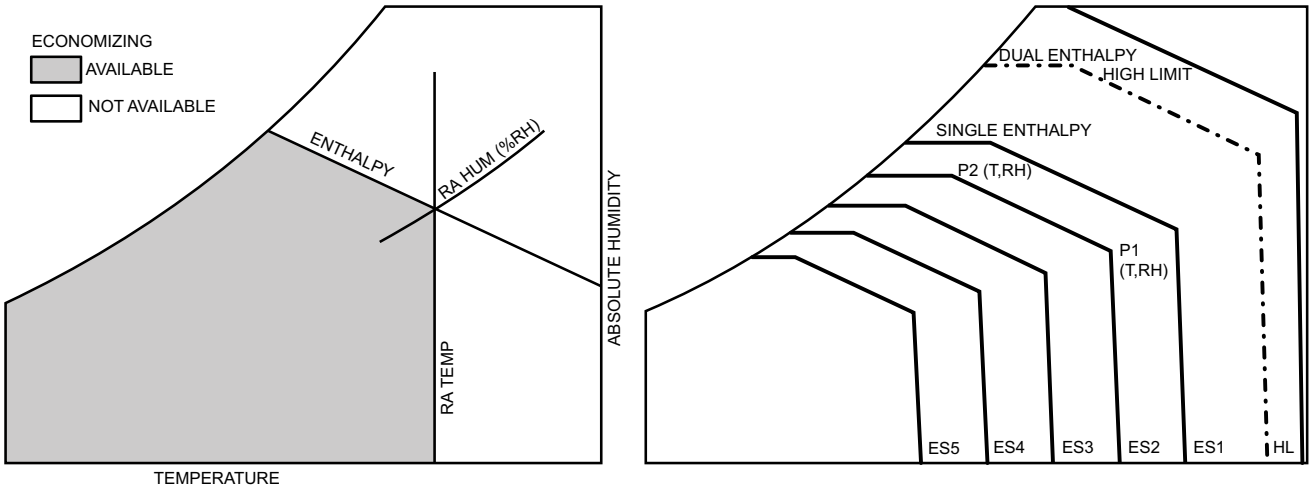


Fig. 3 — Enthalpy Curve Boundaries

Table 4 — Single Enthalpy and Dual Enthalpy High Limit Curves

ENTHALPY CURVE	TEMP. DRY BULB (F)	TEMP. DEWPOINT (F)	ENTHALPY (BTU/LB/DA)	POINT P1		POINT 2	
				TEMP. (F)	HUMIDITY (%RH)	TEMP. (F)	HUMIDITY (%RH)
ES1	80	60	28.0	80	36.8	66.3	80.1
ES2	75	57	26.0	75	39.8	63.3	80.0
ES3	70	54	34.0	70	42.3	59.7	81.4
ES4	65	51	22.0	65	44.8	55.7	84.2
ES5	60	48	20.0	60	46.9	51.3	88.5
HL	86	66	32.4	86	38.9	72.4	80.3