

INSTALLATION INSTRUCTIONS

R-410A Single-Package Rooftop Gas Heating/Electric Cooling RGS036-072

RGS072 units for installation in the United States contain use of a 2-Speed Indoor Fan Motor System. This complies with the U.S. Department of Energy (DOE) efficiency standard of 2018.
RGS072 units for installation outside the United States may or may not contain use of the 2-Speed Indoor Fan Motor System as they are not required to comply with the U.S. Department of Energy (DOE) efficiency standard of 2018.
For specific details on operation of the 2-Speed Indoor Fan Motor System refer to the Variable Frequency Drive (VFD) Factory-Installed Option 2-Speed Motor Control Installation, Setup, and Troubleshooting manual.

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GENERAL

These installation instructions cover the RGS units with gas heat and electric cooling. Units are pre-wired and pre-charged with environmentally balanced Puron® (R-410A) refrigerant at the factory. See Fig. 1 for model number nomenclature. See Fig. 2 for unit dimensions. See Fig. 3 for service clearances.

SAFETY CONSIDERATIONS

Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock or other conditions which may cause personal injury or property damage. Consult a qualified installer, service agency, or your distributor or branch for information or assistance. The qualified installer or agency must use factory-authorized kits or accessories when modifying this product. Refer to the individual instructions packaged with the kits or accessories when installing.

Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloths for brazing operations and have a fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions attached to the unit. Consult local building codes and appropriate national electrical codes (in USA, ANSI/NFPA70, National Electrical Code (NEC); in Canada, CSA C22.1) for special requirements.

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

Failure to follow this warning could result in personal injury or death. Disconnect gas piping from unit when leak testing at pressure greater than 0.5 psig (3450 Pa). Pressures greater than 0.5 psig (3450 Pa) will cause gas valve damage resulting in hazardous condition. If gas valve is subjected to pressure greater than 0.5 psig (3450 Pa), it must be replaced before use. When pressure testing field-supplied gas piping at pressures of 0.5 psig (3450 Pa) or less, a unit connected to such piping must be isolated by closing the manual gas valve.

⚠ WARNING

Failure to follow this warning could cause personal injury or death. Before performing service or maintenance operations on 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.

⚠ WARNING

Failure to follow this warning could cause personal injury, death and/or equipment damage.
Puron (R-410A) refrigerant systems operate at higher pressures than standard R-22 systems. Do not use R-22 service equipment or components on Puron refrigerant equipment.

⚠ WARNING

Failure to follow this warning could cause personal injury or death.
Relieve pressure and recover all refrigerant before system repair or final unit disposal.
Wear safety glasses and gloves when handling refrigerants. Keep torches and other ignition sources away from refrigerants and oils.

⚠ CAUTION

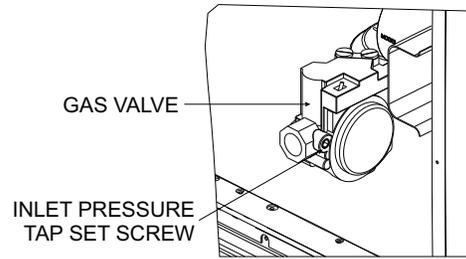
Failure to follow this caution may result in personal injury. Sheet metal parts may have sharp edges or burrs. Use care and wear appropriate protective clothing, safety glasses and gloves when handling parts and servicing air conditioning equipment.

⚠ WARNING

FIRE HAZARD

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

Inlet pressure tap set screw must be tightened and 1/8 in. NPT pipe plug must be installed to prevent gas leaks.

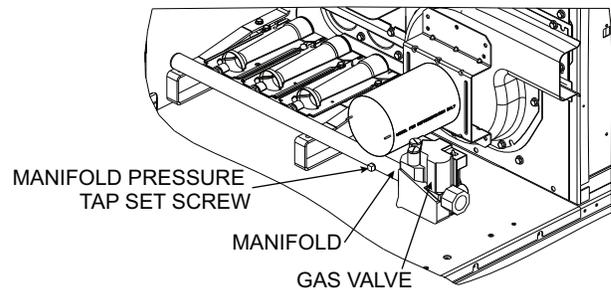


⚠ WARNING

FIRE HAZARD

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

Manifold pressure tap set screw must be tightened and 1/8 in. NPT pipe plug must be installed to prevent gas leaks.



⚠ WARNING

CARBON-MONOXIDE POISONING HAZARD

Failure to follow instructions could result in severe personal injury or death due to carbon-monoxide poisoning, if combustion products infiltrate into the building.

Check that all openings in the outside wall around the vent (and air intake) pipe(s) are sealed to prevent infiltration of combustion products into the building.

Check that furnace vent (and air intake) terminal(s) are not obstructed in any way during all seasons.

Rated Indoor Airflow (cfm) — Table 1 lists the rated indoor airflow used for the AHRI efficiency rating for the units covered in this document.

Table 1 — AHRI Efficiency — Rated Indoor Airflow

MODEL NUMBER	FULL LOAD AIRFLOW (CFM)
RGS036	1275
RGS048	1400
RGS060	1800
RGS072	2200

MODEL SERIES	R	G	S	0	3	6	H	D	A	A	0	A	A	T
Position Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
R = Rooftop														
G = Gas/Electric	Type													
S = Standard ASHRAE 90.1-2010 Efficiency	Efficiency													
036 = 3 Tons 048 = 4 Tons 060 = 5 Tons 072 = 6 Tons	Nominal Cooling Capacity													
K = 208/230-1-60 H = 208/230-3-60 L = 460-3-60 S = 575-3-60	Voltage													
D = Low Heat E = Medium Heat F = High Heat L = Low Heat, Low NO _x M = Medium Heat, Low NO _x N = High Heat, Low NO _x	S = Low Heat, Stainless Steel Heat Exchanger R = Medium Heat, Stainless Steel Heat Exchanger T = High Heat, Stainless Steel Heat Exchanger													
														Heating Capacity
A = Belt Drive, Standard Static Motor B = Belt Drive, High Static Motor C = Belt Drive, Medium Static Motor X = Direct Drive, Standard Static (3, 4, and 5 ton models only)	Motor Option (Indoor Fan)													
A = None B = Economizer w/Baro-relief, OA Temp sensor E = Economizer w/Baro-relief + CO ₂ Sensor, OA Temp sensor H = Economizer w/Baro-relief, enthalpy sensor L = Economizer w/Baro-relief + CO ₂ Sensor, enthalpy sensor U = Temp Ultra Low Leak Economizer w/Baro-relief W = Enthalpy Ultra Low Leak Economizer w/Baro-relief P = 2-Position damper														Outdoor Air Options / Control
0A = No Options AT = Non-powered 115v C.O. 4B = Non-Fused Disconnect BR = Supply Air Smoke Detector AA = Easy Access Hinged Panels														Factory Installed Options ¹
A = Aluminum / Copper Cond & Evap Coil B = Precoat Alum/Copper Cond with Alum / Copper Evap (3 phase only) C = E-Coated Alum/Copper Cond with Alum / Copper Evap (3 phase only) D = E-Coated Alum / Copper Cond & Evap (3 phase only) E = Copper/Copper Cond & Alum/Copper Evap (3 phase only) F = Copper/Copper Cond & Evap (3 phase only)														Condenser / Evaporator Coil Configuration
A = Single Speed Indoor Fan Motor. For W7212 Controls B = Single Speed Indoor Fan Motor. For W7220 Controls T = Two Speed Indoor Fan Motor with Variable Frequency Drive (VFD)														Motor Type Option

NOTE: Factory installed options are NOT available on single phase models. This includes economizers and 2 position dampers.

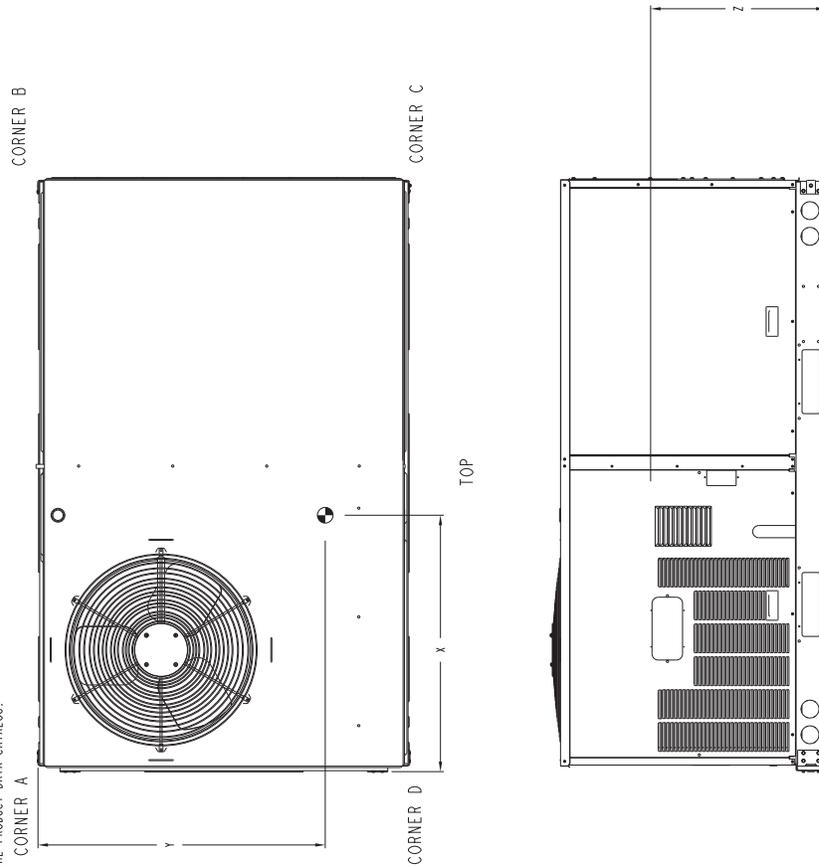
¹Combinations of FIOPS are available.

Fig. 1 — Model Number Nomenclature

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UNIT	STD. UNIT WEIGHT*		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.			HEIGHT			
	LBS.	KG.	X	Y	Z												
RGSD36	480	218	102	46	117	53	139	63	122	55	39	[991]	25	[635]	16	3/8	[416]
RGSD48	528	239	127	58	125	57	137	62	139	63	37	[940]	24	[610]	17	1/4	[432]
RGSD60	560	254	126	57	136	62	155	70	144	65	38	[965]	24	[610]	17	1/4	[438]
RGSD72	652	296	150	68	169	76	176	80	157	71	39	[991]	23	[584]	20	1/8	[511]

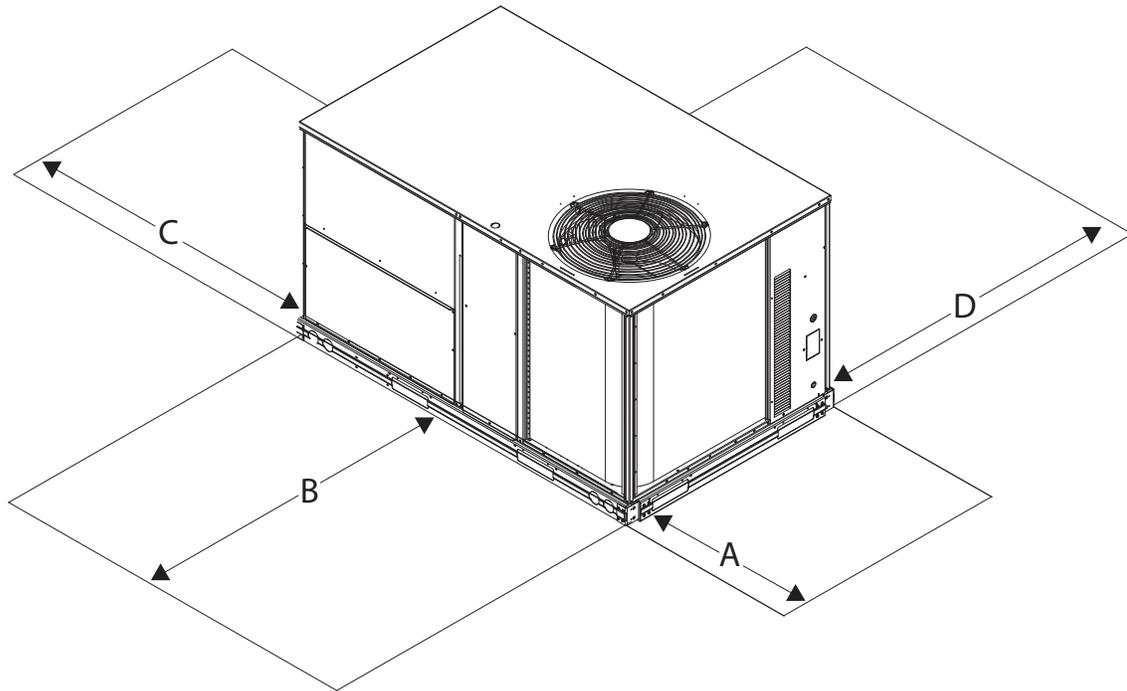
* STANDARD UNIT WEIGHT IS WITH LOW GAS HEAT AND WITHOUT PACKAGING FOR OTHER OPTIONS AND ACCESSORIES. REFER TO THE PRODUCT DATA CATALOG.



FRONT

SHEET 2 OF 2	DATE 03-16-15	SUPERCEDES 3-02-15	RGSD 036 - 072 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	48TM501209	REV G.2
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Fig. 2 — Unit Dimensional Drawing (cont)



LOCATION	DIMENSION in. (mm)	CONDITION
A	48 (1219) 18 (457) 18 (457) 12 (305)	Unit disconnect is mounted on panel. No disconnect, convenience outlet option. Recommended service clearance. Minimum clearance.
B	42 (1067) 36 (914) Special	Surface behind servicer is grounded (e.g., metal, masonry wall). Surface behind servicer is electrically non-conductive (e.g., wood, fiberglass). Check for sources of flue products within 10-ft (3 m) of unit fresh air intake hood.
C	36 (914) 18 (457)	Side condensate drain is used. Minimum clearance.
D	48 (1219) 42 (1067) 36 (914) Special	No flue discharge accessory installed, surface is combustible material. Surface behind servicer is grounded (e.g., metal, masonry wall, another unit). Surface behind servicer is electrically non-conductive (e.g., wood, fiberglass). Check for adjacent units or building fresh air intakes within 10-ft (3 m) of this unit's flue outlet.

Fig. 3 — Service Clearances — RGS 036-072 Units

NOTE: Unit is not designed to have overhead obstruction. Contact Application Engineering for guidance on any application planning overhead obstruction or for vertical clearances.

INSTALLATION

Job-Site Survey — Complete the following checks before installation.

1. Consult local building codes and the NEC (National Electrical Code) ANSI/NFPA 70 for special installation requirements.
2. Determine unit location (from project plans) or select unit location.
3. Check for possible overhead obstructions which may interfere with unit lifting or rigging.

Step 1 — Plan for Unit Location — Select a location for the unit and its support system (curb or other) that provides for the minimum clearances required for safety. This includes the clearance to combustible surfaces, unit performance and service access below, around and above unit as specified in unit drawings. See Fig. 2.

NOTE: Consider also the effect of adjacent units. Be sure that unit is installed such that snow will not block the combustion intake or flue outlet.

Unit may be installed directly on wood flooring or on Class A, B, or C roof-covering material when roof curb is used.

Do not install unit in an indoor location. Do not locate air inlets near exhaust vents or other sources of contaminated air. For proper unit operation, adequate combustion and ventilation air must be provided in accordance with Section 5.3 (Air for Combustion and Ventilation) of the National Fuel Gas Code, ANSI Z223.1 (American National Standards Institute) and NFPA (National Fire Protection Association) 54 TIA-54-84-1. In Canada, installation must be in accordance with the CAN1-B149 installation codes for gas burning appliances.

Although unit is weatherproof, avoid locations that permit water from higher level runoff and overhangs to fall onto the unit.

Locate mechanical draft system flue assembly at least 4 ft (1.2 m) from any opening through which combustion products could enter the building, and at least 4 ft (1.2 m) from any adjacent building (or per local code). Locate the flue assembly at least 10 ft (3.05 m) from an adjacent unit's fresh air intake hood if within 3 ft (0.91 m) of same elevation (or per local code). When unit is located adjacent to public walkways, flue assembly must be at least 7 ft (2.1 m) above grade.

Select a unit mounting system that provides adequate height to allow installation of condensate trap per requirements. Refer to Step 11 — Install External Condensate Trap and Line — for required trap dimensions.

ROOF MOUNT — Check building codes for weight distribution requirements. Unit operating weight is shown in Table 2.

Step 2 — Plan for Sequence of Unit Installation —

The support method used for this unit will dictate different sequences for the steps of unit installation. For example, on curb-mounted units, some accessories must be installed on the unit before the unit is placed on the curb. Review the following for recommended sequences for installation steps.

CURB-MOUNTED INSTALLATION

1. Install curb
2. Install field-fabricated ductwork inside curb
3. Install accessory thru-base service connection package (affects curb and unit) (refer to accessory installation instructions for details)
4. Prepare bottom condensate drain connection to suit planned condensate line routing (refer to Step 11 for details)
5. Rig and place unit
6. Install outdoor air hood
7. Install flue hood
8. Install gas piping
9. Install condensate line trap and piping
10. Make electrical connections
11. Install other accessories

PAD-MOUNTED INSTALLATION

1. Prepare pad and unit supports
2. Check and tighten the bottom condensate drain connection plug
3. Rig and place unit
4. Convert unit to side duct connection arrangement
5. Install field-fabricated ductwork at unit duct openings
6. Install outdoor air hood
7. Install flue hood
8. Install gas piping
9. Install condensate line trap and piping
10. Make electrical connections
11. Install other accessories

FRAME-MOUNTED INSTALLATION — Frame-mounted applications generally follow the sequence for a curb installation. Adapt as required to suit specific installation plan.

Step 3 — Inspect Unit — Inspect unit for transportation damage. File any claim with transportation agency. Confirm before installation of unit that voltage, amperage and circuit protection requirements listed on unit data plate agree with power supply provided.

Step 4 — Provide Unit Support

ROOF CURB MOUNT — Curb should be level. This is necessary for unit drain to function properly. Unit leveling tolerances are shown in Fig. 4. Refer to Accessory Roof Curb Installation Instructions for additional information as required.

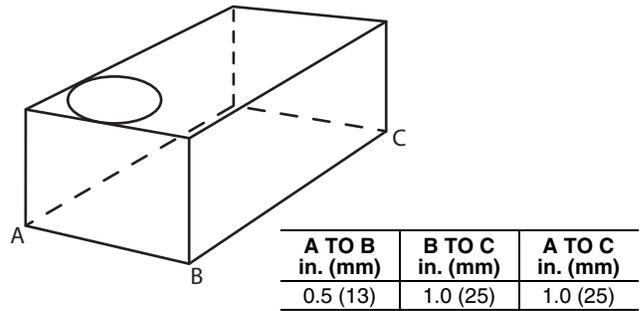


Fig. 4 — Unit Leveling Tolerances

Accessory roof curb details and dimensions are shown in Fig. 5. Assemble and install accessory roof curb in accordance with instructions shipped with the curb.

NOTE: The gasketing of the unit to the roof curb is critical for a watertight seal. Install gasket supplied with the roof curb as shown in Fig. 5. Improperly applied gasket can also result in air leaks and poor unit performance.

Install insulation, cant strips, roofing felt, and counter flashing as shown. Ductwork must be attached to curb and not to the unit. The accessory thru-the-base power and gas connection package must be installed before the unit is set on the roof curb. If field-installed thru-the-roof curb gas connections are desired, use factory-supplied 1/2-in. pipe coupling and gas plate assembly to mount the thru-the-roof curb connection to the roof curb. Gas connections and power connections to the unit must be field installed after the unit is installed on the roof curb.

If electric and control wiring is to be routed through the basepan, attach the accessory thru-the-base service connections to the basepan in accordance with the accessory installation instructions.

SLAB MOUNT (HORIZONTAL UNITS ONLY) — Provide a level concrete slab that extends a minimum of 6 in. (150 mm) beyond unit cabinet. Install a gravel apron in front of condenser coil air inlet to prevent grass and foliage from obstructing airflow.

NOTE: Horizontal units may be installed on a roof curb if required.

ALTERNATE UNIT SUPPORT (IN LIEU OF CURB OR SLAB MOUNT) — A non-combustible sleeper rail can be used in the unit curb support area. If sleeper rails cannot be used, support the long sides of the unit with a minimum of three equally spaced 4-in. x 4-in. (102 mm x 102 mm) pads on each side.

Table 2 — Operating Weights

RGS	UNITS — lb (kg)			
	036	048	060	072
Base Unit	438 (199)	494 (224)	524 (238)	607 (275)
Economizer	35 (16)	35 (16)	35 (16)	35 (16)
Hot Gas Reheat System	15 (7)	15 (7)	15 (7)	24 (7)
Cu Fins	25 (11)	43 (20)	56 (25)	73 (33)
Powered Outlet	32 (15)	32 (15)	32 (15)	32 (15)
Curb				
14-in. (356 mm)	110 (50)	110 (50)	110 (50)	110 (50)
16-in. (610 mm)	145 (66)	145 (66)	145 (66)	145 (66)

Step 5 — Field Fabricate Ductwork — Cabinet return-air static pressure (a negative condition) shall not exceed 0.35 in. wg (87 Pa) with economizer or 0.45 in. wg (112 Pa) without economizer. For vertical ducted applications, secure all ducts to roof curb and building structure. *Do not connect ductwork to unit.* Fabricate supply ductwork so that the cross sectional dimensions are equal to or greater than the unit supply duct opening dimensions for the first 18 in. (458 mm) of duct length from the unit basepan. Insulate and weatherproof all external ductwork, joints, and roof openings with counter flashing and mastic in accordance with applicable codes.

Ducts passing through unconditioned spaces must be insulated and covered with a vapor barrier. If a plenum return is used on a vertical unit, the return should be ducted through the roof deck to comply with applicable fire codes.

A minimum clearance is not required around ductwork.

CAUTION

Failure to follow this caution may result in damage to roofing materials.
Membrane roofs can be cut by sharp sheet metal edges. Be careful when placing any sheet metal parts on such roof.

Step 6 — Rig and Place Unit — Keep unit upright and do not drop. Spreader bars are required. Rollers may be used to move unit across a roof. Level by using unit frame as a reference. See Table 1 and Fig. 6 for additional information.

Lifting holes are provided in base rails as shown in Fig. 6. Refer to rigging instructions on unit.

Rigging materials under unit (cardboard or wood to prevent base pan damage) must be removed **PRIOR** to placing the unit on the roof curb. When using the standard side drain connection, ensure the red plug in the alternate bottom connection is tight. Do this before setting the unit in place. The red drain pan can be tightened with a 1/2-in. square socket drive extension.

For further details see Step 11 — Install External Condensate Trap and Line on page 14.

Before setting the unit onto the curb, recheck gasketing on curb.

CAUTION

Failure to follow this caution may result in equipment damage.
All panels must be in place when rigging. Unit is not designed for handling by fork truck.

POSITIONING ON CURB — Position unit on roof curb so that the following clearances are maintained: 1/4 in. (6.4 mm) clearance between the roof curb and the base rail inside the front and back, 0.0 in. clearance between the roof curb and the base rail inside on the duct end of the unit. This will result in the distance between the roof curb and the base rail inside on the condenser end of the unit being approximately 1/4 in. (6.4 mm).

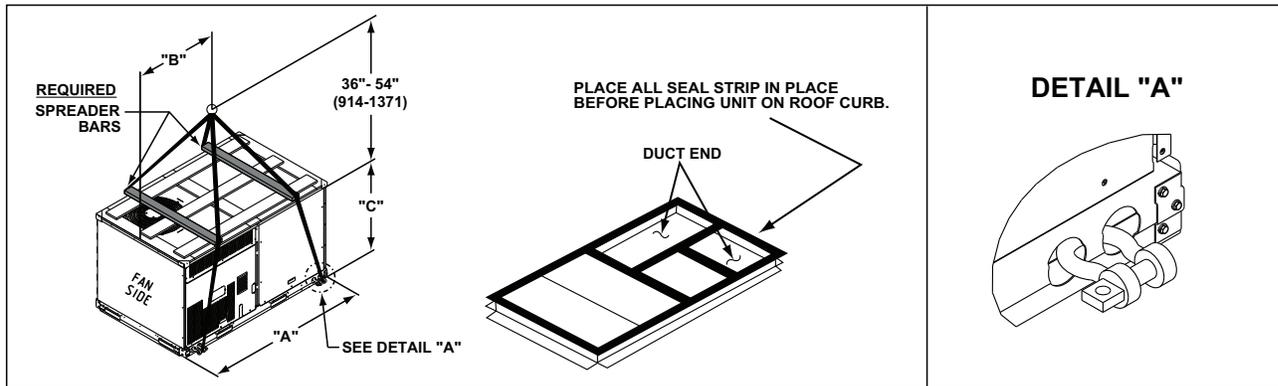
Although unit is weatherproof, guard against water from higher level runoff and overhangs.

Flue vent discharge must have a minimum horizontal clearance of 4 ft (1220 mm) from electric and gas meters, gas regulators, and gas relief equipment. Minimum distance between unit and other electrically live parts is 48 inches (1220 mm).

Flue gas can deteriorate building materials. Orient unit such that flue gas will not affect building materials. Locate mechanical draft system flue assembly at least 48 in. (1220 mm) from an adjacent building or combustible material.

NOTE: Installation of accessory flue discharge deflector kit will reduce the minimum clearance to combustible material to 18 in. (460 mm).

After unit is in position, remove rigging skids and shipping materials.



UNIT	MAX WEIGHT		DIMENSIONS					
			A		B		C	
	LB	KG	LB	KG	LB	KG	LB	KG
RGS036	772	350	74.5	1890	39.0	990	33.5	850
RGS048	826	375	74.5	1890	39.0	990	33.5	850
RGS060	896	406	74.5	1890	39.0	990	33.5	850
RGS072	1075	489	74.5	1890	39.0	990	41.5	1055

NOTES:

- SPREADER BARS REQUIRED — Top damage will occur if spreader bars are not used.
- Dimensions in () are in millimeters.
- Hook rigging shackles through holes in base rail, as shown in detail "A." Holes in base rails are centered around the unit center of gravity. Use wooden top to prevent rigging straps from damaging unit.
- Max weight includes the base unit plus shipping pallet plus all available FIOPs which could be on that size unit.

Fig. 6 — Rigging Details

Step 7 — Convert to Horizontal and Connect Ductwork (when required) — Unit is shipped in the vertical duct configuration. Unit without factory-installed economizer or return air smoke detector option may be field-converted to horizontal ducted configuration. To convert to horizontal configuration, remove screws from side duct opening covers and remove covers. Using the same screws, install covers on vertical duct openings with the insulation-side down. Seals around duct openings must be tight. See Fig. 7.

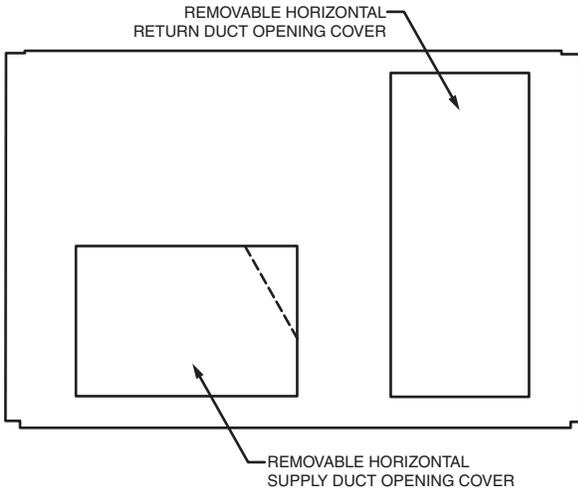


Fig. 7 — Horizontal Conversion Panels

Field-supplied flanges should be attached to horizontal duct openings and all ductwork should be secured to the flanges. Insulate and weatherproof all external ductwork, joints, and roof or building openings with counter flashing and mastic in accordance with applicable codes.

Do not cover or obscure visibility to the unit's informative data plate when insulating horizontal ductwork.

Step 8 — Install Outside Air Hood

ECONOMIZER AND TWO POSITION DAMPER HOOD PACKAGE REMOVAL AND SETUP — FACTORY OPTION

NOTE: Economizer and two position damper are not available as factory installed options for single phase (-K voltage code) models.

1. The hood is shipped in knock-down form and must be field assembled. The indoor coil access panel is used as the hood top while the hood sides, divider and filter are packaged together, attached to a metal support tray using plastic stretch wrap, and shipped in the return air compartment behind the indoor coil access panel. The hood assembly's metal tray is attached to the basepan and also attached to the damper using two plastic tie-wraps.
2. To gain access to the hood, remove the filter access panel. See Fig. 8.

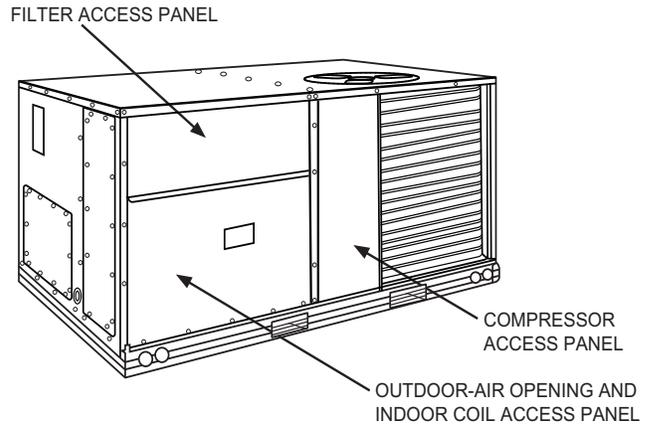


Fig. 8 — Typical Access Panel Locations

3. Locate the (2) screws holding the metal tray to the basepan and remove. Locate and cut the (2) plastic tie-wraps securing the assembly to the damper. (See Fig. 9.) Be careful to not damage any wiring or cut tie-wraps securing any wiring.

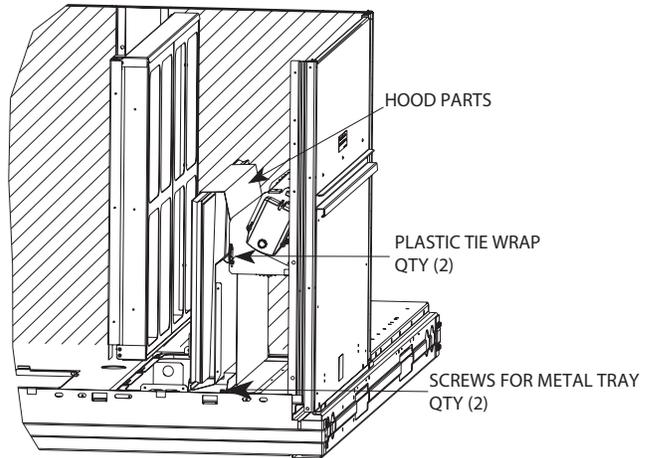


Fig. 9 — Economizer and Two-Position Damper Hood Parts Location

4. Carefully lift the hood assembly (with metal tray) through the filter access opening and assemble per the steps outlined in *Economizer Hood and Two-Position Hood*, below.

ECONOMIZER HOOD AND TWO-POSITION HOOD

NOTE: If the power exhaust accessory is to be installed on the unit, the hood shipped with the unit will not be used and must be discarded. Save the aluminum filter for use in the power exhaust hood assembly.

1. The indoor coil access panel will be used as the top of the hood. Remove the screws along the sides and bottom of the indoor coil access panel. See Fig. 10.

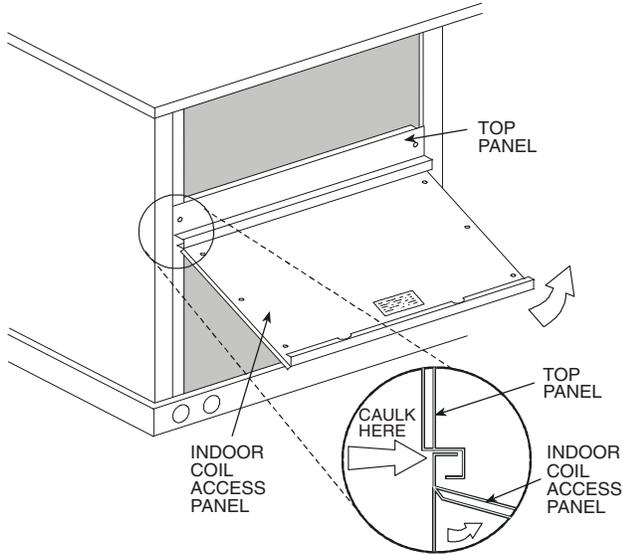


Fig. 10 — Indoor Coil Access Panel Relocation

2. Swing out indoor coil access panel and insert the hood sides under the panel (hood top). Use the screws provided to attach the hood sides to the hood top. Use screws provided to attach the hood sides to the unit. See Fig. 11.

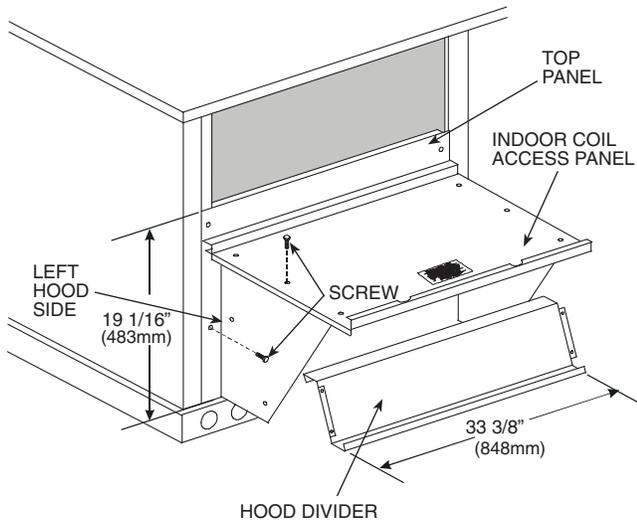


Fig. 11 — Economizer Hood Construction

3. Remove the shipping tape holding the economizer barometric relief damper in place (economizer only).
4. Insert the hood divider between the hood sides. See Fig. 11 and 12. Secure hood divider with 2 screws on each hood side. The hood divider is also used as the bottom filter rack for the aluminum filter.
5. Open the filter clips which are located underneath the hood top. Insert the aluminum filter into the bottom filter rack (hood divider). Push the filter into position past the open filter clips. Close the filter clips to lock the filter into place. See Fig. 12.
6. Caulk the ends of the joint between the unit top panel and the hood top.
7. Replace the filter access panel.

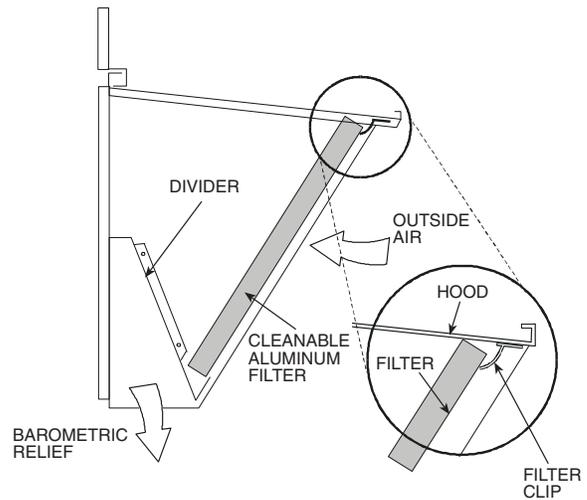


Fig. 12 — Economizer Filter Installation

Step 9 — Install Flue Hood

Flue hood is shipped screwed to the basepan beside the burner compartment access panel. Remove from shipping location and using screws provided, install flue hood and screen in location shown in Fig. 13.

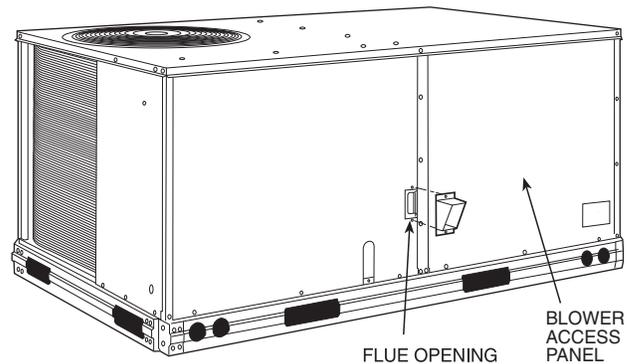


Fig. 13 — Flue Hood Details

Step 10 — Install Gas Piping

Installation of the gas piping must be accordance with local building codes and with applicable national codes. In U.S.A., refer to NFPA 54/ANSI Z223.1 National Fuel Gas Code (NFGC). In Canada, installation must be accordance with the CAN/CSA B149.1 and CAN/CSA B149.2 installation codes for gas burning appliances. This unit is factory equipped for use with Natural Gas fuel at elevations up to 2000 ft (610 m) above sea level. Unit may be field converted for operation at elevations above 2000 ft (610 m) and/or for use with liquefied petroleum fuel. See accessory kit installation instructions regarding these accessories.

NOTE: Furnace gas input rate on rating plate is for installation up to 2000 ft (610 m) above sea level. In U.S.A. the input rating for altitudes above 2000 ft (610 m) must be derated by 4% for each 1000 ft (305 m) above sea level. In Canada the input rating must be derated by 10% for altitudes of 2000 ft (610 m) to 4500 ft (1372 m) above sea level.

For natural gas applications, gas pressure at unit gas connection must not be less than 4 in. wg (996 Pa) or greater than 13 in. wg (3240 Pa) while the unit is operating, see Table 3. For liquefied petroleum applications, the gas pressure must not be less than 11 in. wg (2740 Pa) or greater than 13.0 in. wg (3240 Pa) at the unit connection, see Table 4.

Table 3 — Natural Gas Supply Line Pressure Ranges

UNIT MODEL	UNIT SIZE	MIN.	MAX.
RGS	036, 048, 060, 072	4.0 in. wg (996 Pa)	13.0 in. wg (3240 Pa)

Table 4 — Liquid Propane Supply Line Pressure Ranges

UNIT MODEL	UNIT SIZE	MIN.	MAX.
RGS	036, 048, 060, 072	11.0 in. wg (2740 Pa)	13.0 in. wg (3240 Pa)

The gas supply pipe enters the unit at the burner access panel on the front side of the unit, through the long slot at the bottom of the access panel. The gas connection to the unit is made to the 1/2-in. FPT gas inlet port on the unit gas valve.

Manifold pressure is factory-adjusted for NG fuel use. Adjust as required to obtain best flame characteristics. See Table 5 for ranges.

Table 5 — Natural Gas Manifold Pressure Ranges

UNIT MODEL	UNIT SIZE	HIGH FIRE.	LOW FIRE
RGS	036, 048, 060, 072	3.5 in. wg (872 Pa)	1.7 in. wg (423 Pa)

Manifold pressure for LP fuel use must be adjusted to specified range, see Table 6. Follow instructions in the accessory kit to make initial readjustment.

Table 6 — Liquid Propane Manifold Pressure Ranges

UNIT MODEL	UNIT SIZE	HIGH FIRE.	LOW FIRE
RGS	036, 048, 060, 072	10.0 in. wg (2490 Pa)	5.0 in. wg (1245 Pa)

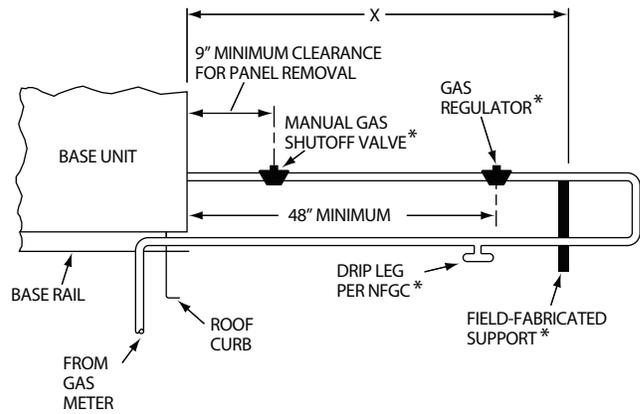
⚠ CAUTION

Failure to follow this caution may result in damage to equipment.

When connecting the gas line to the unit gas valve, the installer **MUST** use a backup wrench to prevent damage to the valve.

Install a gas supply line that runs to the unit heating section. Refer to the NFPA 54/NFPA or equivalent code for gas pipe sizing data. Do not use a pipe size smaller than 1/2-in. Size the gas supply line to allow for a maximum pressure drop of 0.5-in.wg (124 Pa) between gas regulator source and unit gas valve connection when unit is operating at high-fire flow rate.

The gas supply line can approach the unit in three ways: horizontally from outside the unit (across the roof), thru-curb/under unit basepan (accessory kit required) or through unit basepan (factory-option or accessory kit required). Consult accessory kit installation instructions for details on these installation methods. Observe clearance to gas line components per Fig. 14.



STEEL PIPE NOMINAL DIAMETER (in.)	SPACING OF SUPPORTS X DIMENSIONS (FT)
1/2	6
3/4 or 1	8
1 1/4 or larger	10

LEGEND

NFPA — National Fuel Gas Code
* Field-Supplied.

Fig. 14 — Gas Piping Guide (with Accessory Thru-the-Curb Service Connections)

FACTORY-OPTION THRU-BASE CONNECTIONS (GAS CONNECTIONS)

This service connection kit consists of a 1/2-in. NPT gas adapter fitting (brass), a 1/2-in. electrical bulkhead connector and a 3/4-in. electrical bulkhead connector, all factory-installed in the embossed (raised) section of the unit basepan in the condenser section. See Fig. 15.

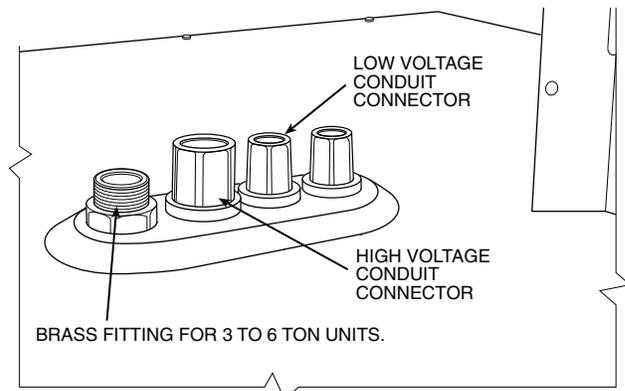


Fig. 15 — Thru-Base Connection Fittings

The thru-base gas connector has male and female threads. The male threads protrude above the basepan of the unit; the female threads protrude below the basepan.

Check tightness of connector lock nuts before connecting gas piping.

Install a 1/2-in. NPT street elbow on the thru-base gas fitting. Attach a 1/2-in. pipe nipple with minimum length of 16-in. (406 mm) (field-supplied) to the street elbow and extend it through the access panel at the gas support bracket. See Fig. 16.

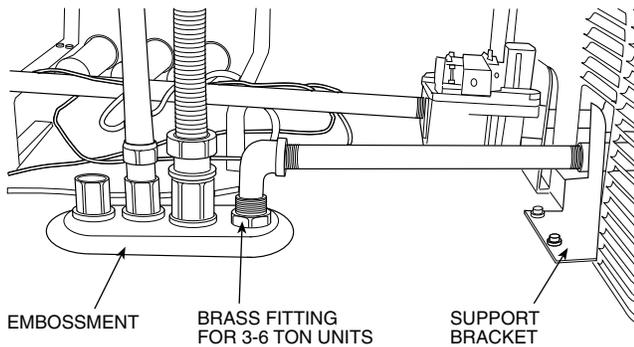


Fig. 16 — Gas Line Piping (3 to 6 Ton Units Only)

Other hardware required to complete the installation of the gas supply line will include a manual shutoff valve, a sediment trap (drip leg) and a ground-joint union. A pressure regulator valve may also be required (to convert gas pressure from pounds to inches of pressure). The manual shutoff valve must be located within 6-ft (1.83 m) of the unit. The union, located in the final leg entering the unit, must be located at least 9-in. (230 mm) away from the access panel to permit the panel to be removed for service. If a regulator valve is installed, it must be located a minimum of 4-ft (1220 mm) away from the unit's flue outlet. Some municipal codes require that the manual shutoff valve be located upstream of the sediment trap. See Fig. 17 and 18 for typical piping arrangements for gas piping that has been routed through the sidewall of the curb. See Fig. 19 for typical piping arrangement when thru-base is used. Ensure that all piping does not block access to the unit's main control box or limit the required working space in front of the control box.

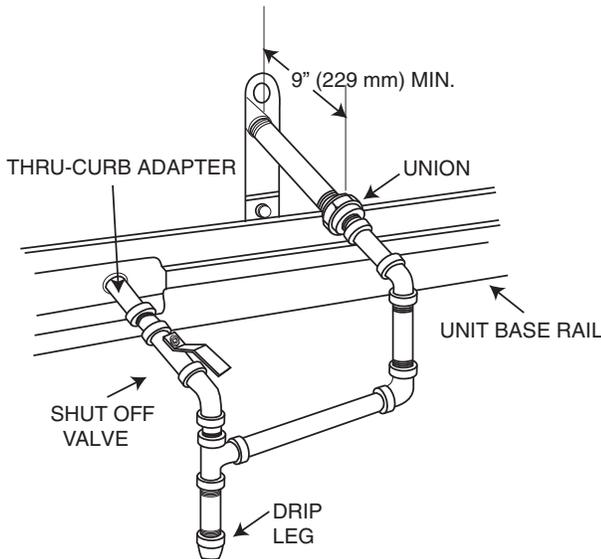


Fig. 17 — Gas Piping with Thru-Curb Accessory

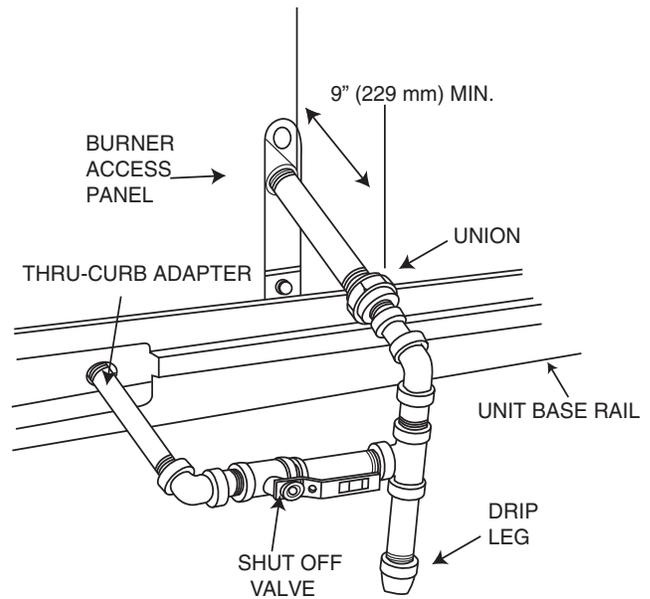


Fig. 18 — Gas Piping with Thru-Curb Accessory (Alternate Layout)

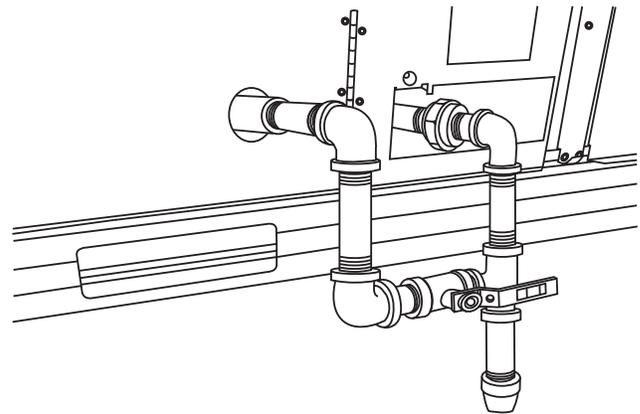


Fig. 19 — Gas Piping Thru-Base Connections

When installing the gas supply line, observe local codes pertaining to gas pipe installations. Refer to the NFPA 54/ANSI Z223.1 NFGC latest edition (in Canada, CAN/CSA B149.1). In the absence of local building codes, adhere to the following pertinent recommendations:

1. Avoid low spots in long runs of pipe. Grade all pipe $\frac{1}{4}$ -in. in every 15 ft (7 mm in every 5 m) to prevent traps. Grade all horizontal runs downward to risers. Use risers to connect to heating section and to meter.
2. Protect all segments of piping system against physical and thermal damage. Support all piping with appropriate straps, hangers, etc. Use a minimum of one hanger every 6 ft (1.8 m). For pipe sizes larger than $\frac{1}{2}$ -in., follow recommendations of national codes.
3. Apply joint compound (pipe dope) sparingly and only to male threads of joint when making pipe connections. Use only pipe dope that is resistant to action of liquefied petroleum gases as specified by local and/or national codes. If using PTFE (Teflon¹) tape, ensure the material is Double Density type and is labeled for use on gas lines. Apply tape per manufacturer's instructions.

1. Teflon is a registered trademark of DuPont.

- Pressure-test all gas piping in accordance with local and national plumbing and gas codes before connecting piping to unit.

NOTE: Pressure test the gas supply system after the gas supply piping is connected to the gas valve. The supply piping must be disconnected from the gas valve during the testing of the piping systems when test pressure is in excess of 0.5 psig (3450 Pa). Pressure test the gas supply piping system at pressures equal to or less than 0.5 psig (3450 Pa). The unit heating section must be isolated from the gas piping system by closing the external main manual shutoff valve and slightly opening the ground-joint union.

Check for gas leaks at the field-installed and factory-installed gas lines after all piping connections have been completed. Use soap-and-water solution (or method specified by local codes and/or regulations).

⚠ WARNING

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

- Connect gas pipe to unit using a backup wrench to avoid damaging gas controls.
- Never purge a gas line into a combustion chamber.
- Never test for gas leaks with an open flame. Use a commercially available soap solution made specifically for the detection of leaks to check all connections.
- Use proper length of pipe to avoid stress on gas control manifold.

NOTE: If orifice hole appears damaged or it is suspected to have been re-drilled, check orifice hole with a numbered drill bit of correct size. Never re-drill an orifice. A burr-free and squarely aligned orifice hole is essential for proper flame characteristics. See Fig. 20.

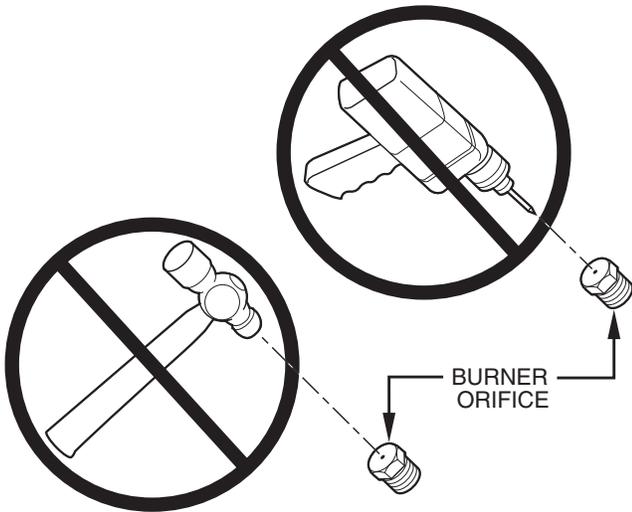


Fig. 20 — Orifice Hole

Step 11 — Install External Condensate Trap and Line — The unit has one 3/4-in. condensate drain connection on the end of the condensate pan and an alternate connection on the bottom. See Fig. 21. Unit airflow configuration does not determine which drain connection to use. Either drain connection can be used with vertical or horizontal applications.

To use the alternate bottom drain connection, remove the red drain plug from the bottom connection (use a 1/2-in. square socket drive extension) and install it in the side drain connection.

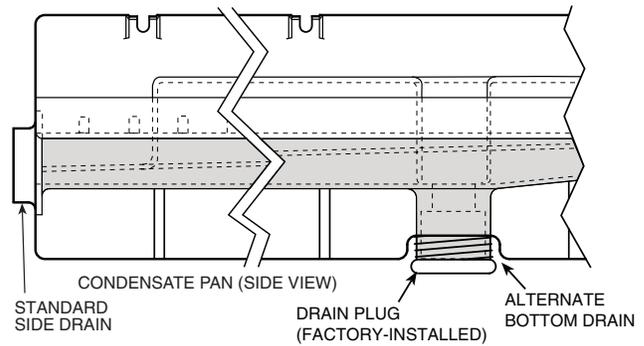


Fig. 21 — Condensate Drain Pan (Side View)

The piping for the condensate drain and external trap can be completed after the unit is in place. See Fig. 22.

NOTE: If the alternate bottom drain is not used check the drain plug for tightness prior to setting the unit on the roof curb.

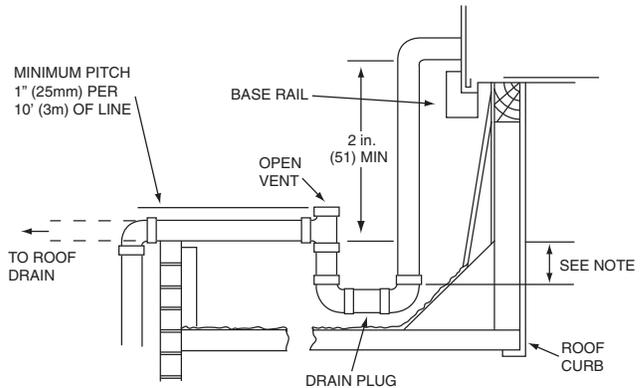


Fig. 22 — Condensate Drain Piping Details

All units must have an external trap for condensate drainage. Install a trap at least 4-in. (102 mm) deep and protect against freeze-up. If drain line is installed downstream from the external trap, pitch the line away from the unit at 1-in. per 10 ft (25 mm in 3 m) of run. Do not use a pipe size smaller than the unit connection (3/4-in.).

Step 12 — Make Electrical Connections

⚠ WARNING

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

Do not use gas piping as an electrical ground. Unit cabinet must have an uninterrupted, unbroken electrical ground to minimize the possibility of personal injury if an electrical fault should occur. This ground may consist of electrical wire connected to unit ground lug in control compartment, or conduit approved for electrical ground when installed in accordance with NEC (National Electrical Code); ANSI/NFPA 70, latest edition (in Canada, Canadian Electrical Code CSA [Canadian Standards Association] C22.1), and local electrical codes.

NOTE: Field-supplied wiring shall conform with the limitations of minimum 63°F (33°C) rise.

FIELD POWER SUPPLY — If equipped with optional Powered Convenience Outlet: The power source leads to the convenience outlet's transformer primary are not factory connected. Installer must connect these leads according to required operation of the convenience outlet. If an always-energized convenience outlet operation is desired, connect the source leads to the line side of the unit-mounted disconnect. (Check with local codes to ensure this method is acceptable in your area.) If a de-energize via unit disconnect switch operation of the convenience outlet is desired, connect the source leads to the load side of the unit disconnect. On a unit without a unit-mounted disconnect, connect the source leads to compressor contactor C and indoor fan contactor IFC pressure lugs with unit field power leads.

Refer to Fig. 23 for power transformer connections and the discussion on connecting the convenience outlet on page 16.

Field power wires are connected to the unit at line-side pressure lugs on compressor contactor C and indoor fan contactor IFC (see wiring diagram label for control box component arrangement) or at factory-installed option non-fused disconnect switch. Max wire size is #2 AWG (copper only). (See Fig. 23.)

NOTE: TEST LEADS - Unit may be equipped with short leads (pigtailed) on the field line connection points on contactor C or optional disconnect switch. These leads are for factory run-test purposes only; remove and discard before connecting field power wires to unit connection points. Make field power connections directly to line connection pressure lugs only.

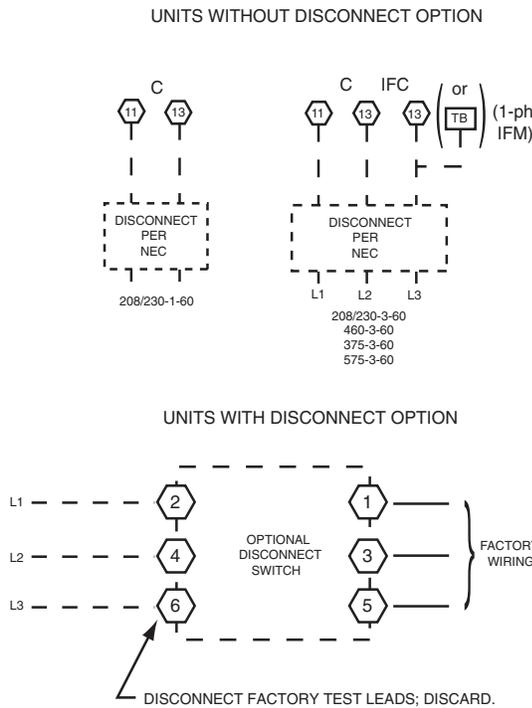


Fig. 23 — Power Wiring Connections

⚠ WARNING

Failure to follow this warning could result in intermittent operation or performance satisfaction.

Do not connect aluminum wire between disconnect switch and RGS unit. Use only copper wire. (See Fig. 24.)

UNITS WITH FACTORY-INSTALLED NON-FUSED DISCONNECT — The factory-installed option non-fused disconnect (NFD) switch is located in a weatherproof enclosure located under the main control box. The manual switch handle and shaft are shipped in the disconnect enclosure.

Assemble the shaft and handle to the switch at this point. Discard the factory test leads (see Fig. 24).

Connect field power supply conductors to LINE side terminals when the switch enclosure cover is removed to attach the handle.

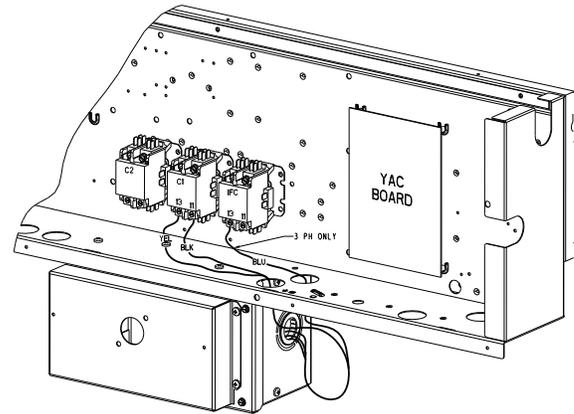


Fig. 24 — Location of Non-Fused Disconnect Enclosure

To field install the NFD shaft and handle

1. Remove the unit front panel (see Fig. 2).
2. Remove (3) hex screws on the NFD enclosure - (2) on the face of the cover and (1) on the left side cover (see Fig. 25).
3. Remove the front cover of the NFD enclosure.
4. Make sure the NFD shipped from the factory is at OFF position (the arrow on the black handle knob is at OFF).
5. Insert the shaft with the cross pin on the top of the shaft in the horizontal position.
6. Measure from the tip of the shaft to the top surface of the black pointer; the measurement should be 3.75 to 3.88 in. (95 to 99 mm).
7. Tighten the locking screw to secure the shaft to the NFD.
8. Turn the handle to the OFF position with red arrow pointing at OFF.
9. Install the handle on to the painted cover horizontally with the red arrow pointing to the left.
10. Secure the handle to the painted cover with (2) screws and lock washers supplied.
11. Engaging the shaft into the handle socket, re-install (3) hex screws on the NFD enclosure.
12. Re-install the unit front panel.

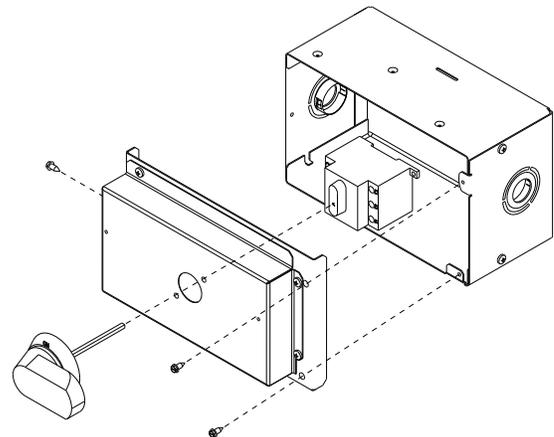


Fig. 25 — Handle and Shaft Assembly for NFD

UNITS WITHOUT FACTORY-INSTALLED NON-FUSED DISCONNECT — When installing units, provide a disconnect switch per NEC (National Electrical Code) of adequate size. Disconnect sizing data is provided on the unit informative plate. Locate on unit cabinet or within sight of the unit per national or local codes. Do not cover unit informative late if mounting the disconnect on the unit cabinet.

All Units — Field wiring must comply with NEC and all local codes. Size wire based on MCA (Minimum Circuit Amps) on the unit informative plate. See Fig. 23 and the unit label diagram for power wiring connections to the unit power terminal blocks and equipment ground. Maximum wire size is #2 ga AWG per pole.

Provide a ground-fault and short-circuit over-current protection device (fuse or breaker) per NEC Article 440 (or local codes). Refer to unit informative data plate for MOCP (Maximum Over-current Protection) device size.

All units except 208/230-v units are factory wired for the voltage shown on the nameplate. *If the 208/230-v unit is to be connected to a 208-v power supply, the control transformer must be rewired by moving the black wire with the 1/4-in. female spade connector from the 230-v connection and moving it to the 200-v 1/4-in. male terminal on the primary side of the transformer. Refer to unit label diagram for additional information.*

NOTE: Check all factory and field electrical connections for tightness.

CONVENIENCE OUTLETS

⚠ WARNING
Failure to follow this warning could result in personal injury or death.
Units with convenience outlet circuits may use multiple disconnects. Check convenience outlet for power status before opening unit for service. Locate its disconnect switch, if appropriate, and open it. Lock-out and tag-out this switch, if necessary.

Two types of convenience outlets are offered on RGS models: Non-powered and unit-powered. Both types provide a 125-volt GFCI (ground-fault circuit-interrupter) duplex receptacle rated at 15-A behind a hinged waterproof access cover, located on the end panel of the unit. See Fig. 26 for amp limitations. See Fig. 27 for convenience outlet location.

NOTICE
Convenience Outlet Utilization
Maximum Continuous use: 15 Amps for receptacle outlets, and 8 Amps for factory supplied transformers
50HJ542739 C

Fig. 26 — Convenience Outlet Utilization Notice Label

NOTE: Unit powered convenience outlets are not available as factory installed options for single phase (-K voltage code) models.

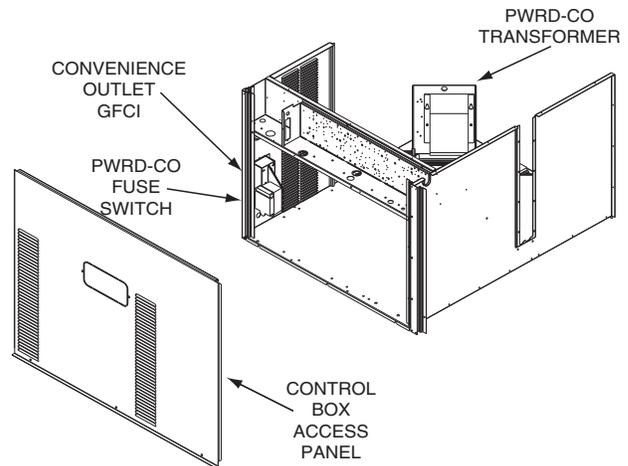


Fig. 27 — Convenience Outlet Location

Installing Weatherproof Cover — A weatherproof while-in-use cover for the factory-installed convenience outlets is now required by UL standards. This cover cannot be factory-mounted due its depth; it must be installed at unit installation. For shipment, the convenience outlet is covered with a blank cover plate.

The weatherproof cover kit is shipped in the unit's control box. The kit includes the hinged cover, a backing plate and gasket.

IMPORTANT: DISCONNECT ALL POWER TO UNIT AND CONVENIENCE OUTLET. LOCK-OUT AND TAG-OUT ALL POWER PRIOR TO INSTALLATION.
--

Remove the blank cover plate at the convenience outlet.

Loosen the two screws at the GFCI duplex outlet, until approximately 1/2-in. (13 mm) under screw heads are exposed. Press the gasket over the screw heads. Slip the backing plate over the screw heads at the keyhole slots and align with the gasket; tighten the two screws until snug (do not over-tighten).

Mount the weatherproof cover to the backing plate as shown in Fig. 28. Remove two slot fillers in the bottom of the cover to permit service tool cords to exit the cover. Check for full closing and latching.

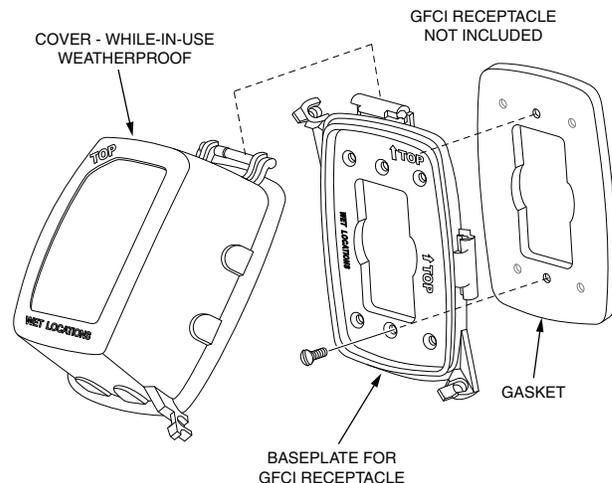


Fig. 28 — Weatherproof Cover Installation

Test the GFCI receptacle by pressing the TEST button on the face of the receptacle to trip and open the receptacle. Check for proper grounding wires and power line phasing if the GFCI receptacle does not trip as required. Press the RESET button to clear the tripped condition.

FACTORY-OPTION THRU-BASE CONNECTIONS (ELECTRICAL CONNECTIONS) — This service connection kit consists of a 1/2-in. electrical bulkhead connector and a 1 1/4-in. electrical bulkhead connector, all factory-installed in the embossed (raised) section of the unit basepan in the condenser section. The 1/2-in. bulkhead connector enables the low-voltage control wires to pass through the basepan. The 1 1/4-in. electrical bulkhead connector allows the high-voltage power wires to pass through the basepan. See Fig. 29.

Check tightness of connector lock nuts before connecting electrical conduits.

Field-supplied and field-installed liquid tight conduit connectors and conduit may be attached to the connectors on the basepan. Pull correctly rated high voltage and low voltage through appropriate conduits. Connect the power conduit to the internal disconnect (if unit is so equipped) or to the external disconnect (through unit side panel). A hole must be field cut in the main control box bottom on the left side so the 24-v control connections can be made. Connect the control power conduit to the unit control box at this hole.

Units Without Thru-Base Connections

1. Install power wiring conduit through side panel openings. Install conduit between disconnect and control box.
2. Install power lines to terminal connections as shown in Fig. 23.

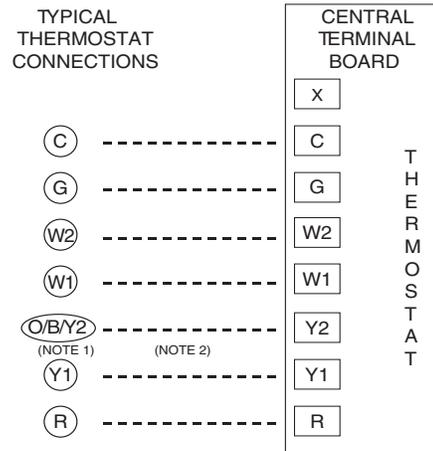
Voltage to compressor terminals during operation must be within voltage range indicated on unit nameplate. On 3-phase units, voltages between phases must be balanced within 2% and the current within 10%. Operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components. Such operation would invalidate any applicable ICP warranty.

Field Control Wiring — The RGS unit requires an external temperature control device. This device can be a thermostat emulation device provided as part of a third-party Building Management System.

Thermostat — Install a approved accessory thermostat according to installation instructions included with the accessory. Locate the thermostat accessory on a solid wall in the conditioned space to sense average temperature in accordance with the thermostat installation instructions.

If the thermostat contains a logic circuit requiring 24-v power, use a thermostat cable or equivalent single leads of different colors with minimum of seven leads. If the thermostat does not require a 24-v source (no “C” connection required), use a thermostat cable or equivalent with minimum of six leads. Check the thermostat installation instructions for additional features which might require additional conductors in the cable.

For wire runs up to 50 ft (15 m), use no. 18 AWG (American Wire Gage) insulated wire [35 C (95 F) minimum]. For 50 to 75 ft (15 to 23 m), use no. 16 AWG insulated wire [35 C (95 F) minimum]. For over 75 ft (23 m), use no. 14 AWG insulated wire [35 C (95 F) minimum]. All wire sizes larger than no. 18 AWG cannot be directly connected to the thermostat and will require a junction box and splice at the thermostat.



- NOTES:
1. Typical multi-function marking. Follow manufacturer's configuration instructions to select Y2. Do not configure for O output.
 2. Y2 to Y2 connection required on single-stage cooling units when integrated economizer function is desired.

--- Field-Wiring

Fig. 29 — Low-Voltage Connections

Unit Without Thru-Base Connection Kit — Pass the thermostat control wires through the hole provided in the corner post; then feed the wires through the raceway built into the corner post to the control box. Pull the wires over to the terminal strip on the upper-left corner of the Controls Connection Board. See Fig. 30.

NOTE: If thru-the-bottom connections accessory is used, refer to the accessory installation instructions for information on routing power and control wiring.

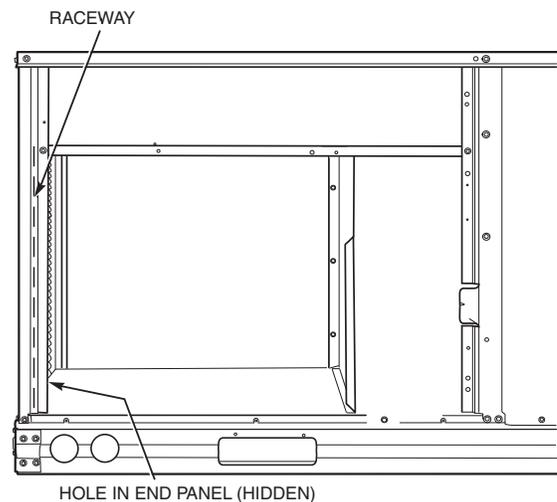


Fig. 30 — Field Control Wiring Raceway

Heat Anticipator Settings — Set heat anticipator settings at 0.14 amp for the first stage and 0.14 amp for second-stage heating, when available.

Hot Gas Re-Heat Control Connections

Hot Gas Reheat – Space RH Controller

NOTE: Hot Gas Re-Heat is a factory installed option which is available for 072 models only.

The Hot Gas Re-Heat dehumidification system requires a field-supplied and installed space relative humidity control device. This device may be a separate humidistat control (contact closes on rise in space RH above control setpoint) or a combination thermostat-humidistat control device with isolated contact set for dehumidification control. The humidistat is normally used in applications where temperature control is already provided.

To Connect the field-installed humidistat

1. Route the humidistat 2-conductor cable (field-supplied) through the hole provided in the unit corner post.
2. Feed wires through the raceway built into the corner post (see Fig. 30) to the 24-v barrier located on the left side of

the control box. The raceway provides the UL-required clearance between high-voltage and low-voltage wiring.

3. Use wire nuts to connect humidistat cable to two PINK leads in the low-voltage wiring as shown in Fig. 31.

To connect the Thermidistat device:

1. Route the Thermostat multi-conductor cable (field-supplied) through the hole provided in the unit corner post.
2. Feed wires through the raceway built into the corner post (see Fig. 30) to the 24-v barrier located on the left side of the control box. The raceway provides the UL-required clearance between high-voltage and low-voltage wiring.
3. The Thermostat has dry contacts at terminals D1 and D2 for dehumidification operation. The dry contacts must be wired between CTB terminal R and the PINK lead to the LTLO switch with field-supplied wire nuts.

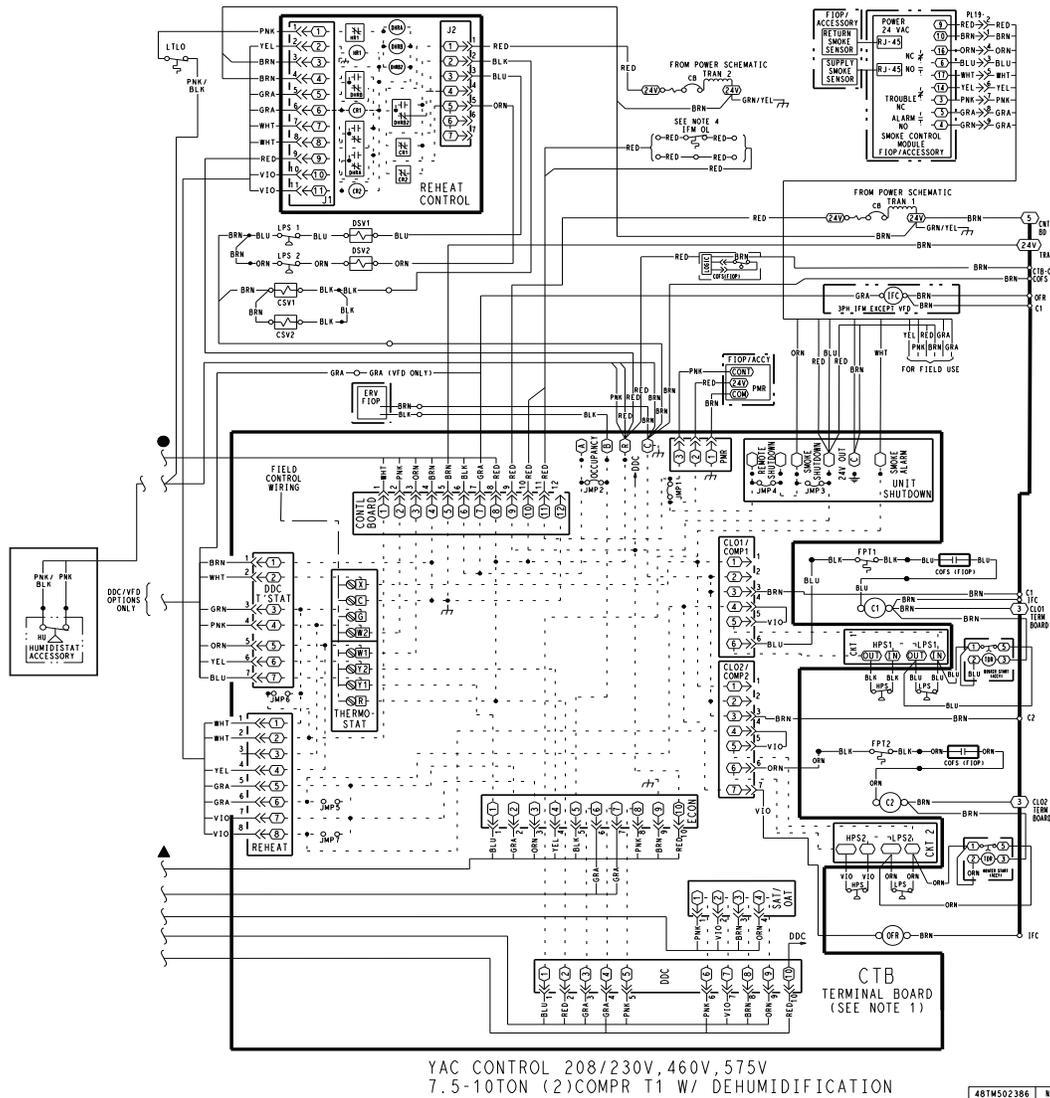


Fig. 31 — RGS Size 072 (Unit with Hot Gas Re-Heat Dehumidification System) Humidistat Wiring

ECONOMISER® X (FACTORY-INSTALLED OPTION)

Product Description — The EconoMiSer X system is an expandable economizer control system, which includes a W7220 economizer module (controller) with an LCD and keypad (see Fig. 32). The W7220 can be configured with optional sensors.



Fig. 32 — W7220 Economizer Module

The W7220 economizer module can be used as a stand-alone economizer module wired directly to a commercial setback space thermostat and sensors to provide outside air dry-bulb economizer control.

Economizer Module — The economizer module is the core of the EconoMiSer X system. The module is mounted in the unit's control box, and includes the user interface for the system. The W7220 economizer module provides the basic inputs and outputs to provide simple economizer control. When used with the optional sensors, the economizer module provides more advanced economizer functionality.

S-Bus Enthalpy Control Sensors — This sensor is a combination temperature and humidity sensor which is powered by and communicates on the S-Bus. Up to three sensors may be configured with the W7220 economizer module. See page 20 for details.

CO₂ Sensor (optional) — A CO₂ sensor can be added for Demand Controlled Ventilation (DCV).

Specifications

W7220 Economizer Module — The module is designed for use with 2 to 10 Vdc or bus communicating actuator. The module includes terminals for CO₂ sensor, mixed air sensor, and an outdoor dry bulb sensor. Enthalpy and other options are available with bus sensors.

User Interface — Provides status for normal operation, setup parameters, checkout tests, and alarm and error conditions with a 2-line 16 character LCD display and four button keypad.

Electrical

Rated Voltage — 20 to 30 Vac RMS, 50/60 Hz

Transformer — 100 va maximum system input

Nominal Power Consumption (at 24 Vac, 60 Hz) — 11.5 VA without sensors or actuators

Relay Digital Output Rating at 30 Vac (maximum power from Class 2 input only) — 1.5A run:

3.5A inrush at 0.45PF (200,000 cycles) or

7.5A inrush at 0.45PF (100,000 cycles)

External Sensors Power Output — 21 Vdc ± 5% at 48mA

IMPORTANT: All inputs and outputs must be Class 2 wiring.

Inputs

Sensors

NOTE: A Mixed Air (MA) analog sensor is required on all W7220 units; either an Outdoor Air (OA) sensor for dry bulb change over or an OA bus sensor for outdoor enthalpy change over is required in addition to the MA sensor. An additional Return Air (RA) bus sensor can be added to the system for differential enthalpy or dry bulb changeover. For differential dry bulb changeover a 20k ohm sensor is required in the OA and a bus sensor in the RA. DIP switch on RA bus sensor must be set in the RA position.

Dry Bulb Temperature (optional) and Mixed Air (required), 20k NTC

2-wire (18 to 22 AWG);

Temperature range -40 to 150°F (-40 to 65°C)

Temperature accuracy -0°F/+2°F

Temperature and Humidity, C7400S1000 (optional)

S-Bus; 2-wire (18 to 22 AWG)

Temperature: range -40 to 150°F (-40 to 65°C)

Temperature accuracy -0°F/+2°F

Humidity: range 0 to 100% RH with 5% accuracy.

NOTE: Up to three (3) S-Bus sensors may be connected to the W7220 economizer module. For outdoor air (OA), return air (RA) and discharge (supply) air (DA).

4 Binary Inputs

1-wire 24 Vac + common GND (see page 21 for wiring details).

24 Vac Power Supply

20 to 30 Vac 50/60Hz;

100 VA Class 2 transformer.

Outputs

Actuator Signal

2-10 Vdc; minimum actuator impedance is 2k ohm; bus two-wire output for bus communicating actuators.

Exhaust fan, Y1, Y2 and AUX1

All Relay Outputs (at 30 Vac):

Running: 1.5A maximum

Inrush: 7.5A maximum

Environmental

Operating Temperature

-40 to 150°F (-40 to 65°C).

Exception of display operation down to -4°F with full recovery at -4°F from exposure to -40°F

Storage Temperature

-40 to 150°F (-40 to 65°C)

Shipping Temperature

-40 to 150°F (-40 to 65°C)

Humidity

5% to 95% RH non-condensing

ECONOMIZER MODULE WIRING DETAILS —

Use Fig. 33 and Tables 7 and 8 to locate the wiring terminals for the Economizer module.

NOTE: The four terminal blocks are removable. Slide out each terminal block, wire it, and then slide it back into place.

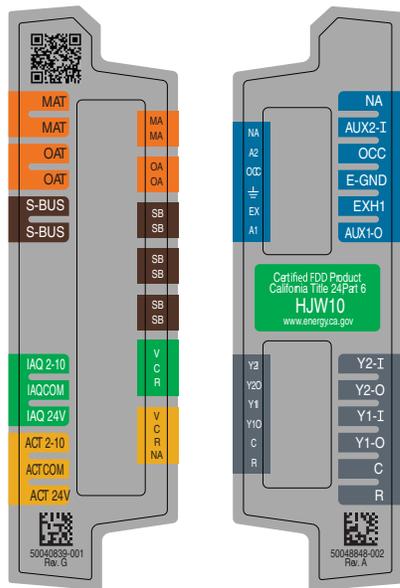


Fig. 33 — W7220 Wiring Terminals

Table 7 — Economizer Module - Left Hand Terminal Blocks

LABEL	TYPE	DESCRIPTION
Top Left Terminal Block		
MAT MAT	20k NTC and COM	Mixed Air Temperature Sensor (Polarity Insensitive Connection)
OAT OAT	20k NTC and COM	Outdoor Air Temperature Sensor (Polarity Insensitive Connection)
S-BUS S-BUS	S-BUS (Sylk* Bus)	Enthalpy Control Sensor (Polarity Insensitive Connection)
Bottom Left Terminal Block		
IAQ 2-10	2-10 vdc	Air Quality Sensor Input (e.g. CO ₂ sensor)
IAQ COM	COM	Air Quality Sensor Common
IAQ 24V	24 vac	Air Quality Sensor 24 vac Source
ACT 2-10	2-10 vdc	Damper Actuator Output (2-10 vdc)
ACT COM	COM	Damper Actuator Output Common
ACT 24v	24 vac	Damper Actuator 24 vac Source

* Sylk is a trademark of Honeywell International Inc.

Table 8 — Economizer Module - Right Hand Terminal Blocks

LABEL	TYPE	DESCRIPTION
Top Right Terminal Blocks		
AUX2 I	24 vac IN	The first terminal is not used.
OCC	24 vac IN	Shut Down (SD) or HEAT (W) Conventional only and Heat Pump Changeover (O-B) in Heat Pump mode.
E-GND	E-GND	Occupied/Unoccupied Input
EXH1	24 vac OUT	Exhaust Fan 1 Output
AUX1 O	24 vac OUT	Programmable: Exhaust fan 2 output or ERV or System alarm output
Bottom Right Terminal Blocks		
Y2-I	24 vac IN	Y2 in - Cooling Stage 2 Input from space thermostat
Y2-O	24 vac OUT	Y2 out - Cooling Stage 2 Output to stage 2 mechanical cooling
Y1-I	24 vac IN	Y1 in - Cooling Stage 2 Input from space thermostat
Y1-O	24 vac OUT	Y1 out - Cooling Stage 2 Output to stage 2 mechanical cooling
C	COM	24 vac Common
R	24 vac	24 vac Power (hot)

S-Bus Sensor Wiring — The labels on the sensors and controller are color coded for ease of installation. Orange labeled sensors can only be wired to orange terminals on the controller. Brown labeled sensors can only be wired to S-bus (brown) terminals. Use Fig. 34 and Table 9 to locate the wiring terminals for each S-Bus sensor.

Use Fig. 34 and Table 10 to set the DIP switches for the desired use of the sensor.

Use Fig. 34 and Table 9 to locate the wiring terminals for each enthalpy control sensor.

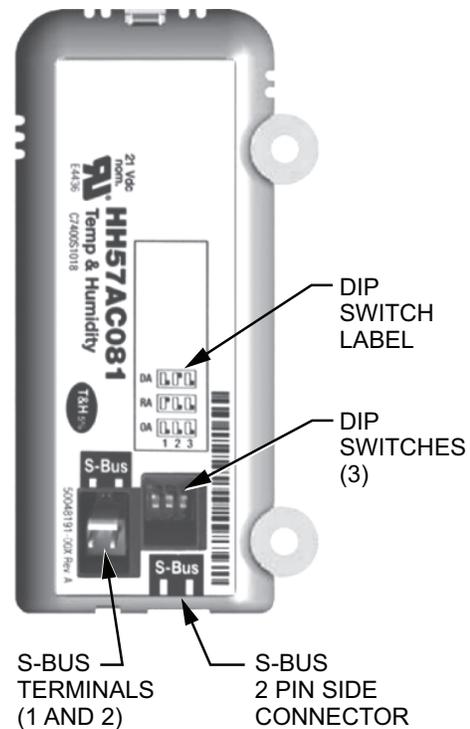


Fig. 34 — S-Bus Sensor DIP Switches

Table 9 — HH57AC081 Sensor Wiring Terminations

TERMINAL		TYPE	DESCRIPTION
NUMBER	LABEL		
1	S-BUS	S-BUS	S-BUS Communications (Enthalpy Control Sensor Bus)
2	S-BUS	S-BUS	S-BUS Communications (Enthalpy Control Sensor Bus)

Use Fig. 34 and Table 10 to set the DIP switches for the desired use of the sensor.

Table 10 — HH57AC081 Sensor DIP Switch

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

NOTE: When a S-bus sensor is connected to an existing network, it will take 60 minutes for the network to recognize and auto-configure itself to use the new sensor.

During the 60-minute setup period, no alarms for sensor failures (except SAT) will be issued and no economizing function will be available.

CO₂ Sensor Wiring — When using a CO₂ sensor the black and brown common wires are internally connected and only one is connected to “IAQ COM” on the W7220. Use the power from the W7220 to power the CO₂ sensor OR make sure the ground for the power supplies are common. See Fig. 35 for CO₂ sensor wiring.

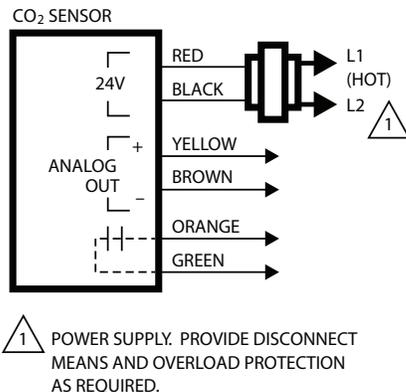


Fig. 35 — CO₂ Sensor Wiring

INTERFACE OVERVIEW — This section describes how to use the Economizer’s user interface for:

- Keypad and menu navigation
- Settings and parameter changes
- Menu structure and selection

User Interface — The user interface consists of a 2-line LCD display and a 4-button keypad on the front of the economizer controller.

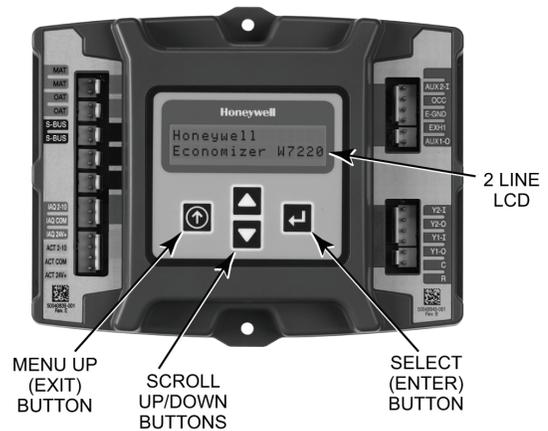


Fig. 36 — W7220 Controller Button Description

Keypad — The four navigation buttons (see Fig. 36) are used to scroll through the menus and menu items, select menu items, and to change parameter and configuration settings.

To use the keypad when working with menus:

- Press the ▲ (Up arrow) button to move to the previous menu.
- Press the ▼ (Down arrow) button to move to the next menu.
- Press the ← (Enter) button to display the first item in the currently displayed menu.

Press the ⏪ (Menu Up/Exit) button to exit a menu’s item and return to the list of menus. To use the keypad when working with Setpoints, System and Advanced Settings, Checkout tests and Alarms:

1. Navigate to the desired menu.
2. Press the ← (Enter) button to display the first item in the currently displayed menu.
3. Use the ▲ (Up arrow) and ▼ (Down arrow) buttons to scroll to the desired parameter.
4. Press the ← (Enter) button to display the value of the currently displayed item.
5. Press the ▲ button to increase (change) the displayed parameter value.
6. Press the ▼ button to decrease (change) the displayed parameter value.

NOTE: When values are displayed, pressing and holding the or button causes the display to automatically increment.

7. Press the ← (Enter) button to accept the displayed value and store it in nonvolatile RAM. “CHANGE STORED” displays.
8. Press the ← (Enter) button to return to the current menu parameter.
9. Press the ⏪ (MENU Up/Exit) button to return to the previous menu.

Menu Structure — Table 11 illustrates the complete hierarchy of menus and parameters for the EconoMiSer® X system.

The Menus in display order are:

- STATUS
- SETPOINTS
- SYSTEM SETUP
- ADVANCED SETUP
- CHECKOUT
- ALARMS

IMPORTANT: Table 11 illustrates the complete hierarchy. Menu parameters may be different depending on the configuration.

For example if there is no DCV (CO₂) sensor, then none of the DCV parameters appear and only MIN POS will display. If a CO₂ sensor is used, the DCV MIN and DCV MAX will appear AND if there is a 2 speed fan DCV MIN (high and low speed) and DCV MAX (high and low speed) will appear.

NOTE: Some parameters in the menus use the letters MA or MAT, indicating a mixed air temperature sensor location before the cooling coil. This unit application has the control sensor located after the cooling coil, in the fan section, where it is designated as (Cooling) Supply Air Temperature or SAT sensor.

Setup and Configuration — Before being placed into service, the W7220 Economizer module must be setup and configured for the installed system.

IMPORTANT: During setup, the Economizer module is live at all times.

The setup process uses a hierarchical menu structure that is easy to use. Press the and arrow buttons to move forward and backward through the menus and press the button to select and confirm setup item changes.

See Table 12 for damper minimum position settings and readings on the checkout menus.

Time-Out and Screen-Saver — When no buttons have been pressed for 10 minutes, the LCD displays a screen saver, which cycles through the Status items. Each Status items displays in turn and cycles to the next item after 5 seconds.

1 and 2 Speed Fan Operation — For 1-speed fan dry bulb and enthalpy operation see Tables 13-16. For 2-speed fan operation see Tables 17-20.

Table 11 — Menu Structure

MENU	PARAMETER	PARAMETER DEFAULT VALUE	PARAMETER RANGE AND INCREMENT	NOTES
STATUS	ECONO AVAIL	NO	YES/NO	FIRST STAGE COOLING DEMAND (Y1-IN) YES = economizing available; the system can use outside air for free cooling when required
	ECONOMIZING	NO	YES/NO	FIRST STAGE COOLING RELAY OUTPUT YES = outside air being used for 1 stage cooling
	OCCUPIED	NO	YES/NO	OCCUPIED YES = OCC signal received from space thermostat or unitary controller YES = 24 Vac on terminal OCC NO = 0 Vac on terminal OCC
	HEAT PUMP	N/A	COOL HEAT	HEAT PUMP MODE Displays COOL or HEAT when system is set to heat pump (Non-conventional)
	COOL Y1—IN	OFF	ON/OFF	FIRST STAGE COOLING DEMAND (Y1-IN) Y1-I signal from space thermostat or unitary controller for cooling stage 1. ON = 24 Vac on terminal Y1-I OFF = 0 Vac on terminal Y1-I
	COOL Y1—OUT	OFF	ON/OFF	FIRST STAGE COOLING RELAY OUTPUT Cool stage 1 Relay Output to stage 1 mechanical cooling (Y1—OUT terminal)
	COOL Y2—IN	OFF	ON/OFF	SECOND STAGE COOLING DEMAND (Y2-IN) Y2-I signal from space thermostat our unitary controller for second stage cooling. ON = 24 Vac on terminal Y2-I OFF = 0 Vac on terminal Y2-I
	COOL Y2—OUT	OFF	ON/OFF	SECOND STAGE COOLING RELAY OUTPUT Cool Stage 2 Relay Output to mechanical cooling (Y2—OUT terminal)
	MA TEMP	__ . __ F	0 to 140°F	SUPPLY AIR TEMPERATURE, Cooling Mode Displays value of measured mixed air from MAT sensor. Displays __ . __ F if not connected, short or out-of-range.
	DA TEMP	__ . __ F	0 to 140°F	DISCHARGE AIR TEMPERATURE, after Heating section Displays when Discharge Air sensor is connected and displays measured discharge temperature. Displays __ . __ F if sensor sends invalid value, if not connected, short or out-of-range.
	OA TEMP	__ . __ F	-40 to 140°F	OUTSIDE AIR TEMP Displays measured value of outdoor air temperature. Displays __ . __ F if sensor sends invalid value, short or out-of-range.
	OA HUM	__ %	0 to 100%	OUTSIDE AIR RELATIVE HUMIDITY Displays measured value of outdoor humidity from OA sensor. Displays __ % if not connected short, or out-of-range.
	RA TEMP	__ . __ F	0 to 140°F	RETURN AIR TEMPERATURE Displays measured value of return air temperature from RAT sensor. Displays __ . __ F if sensor sends invalid value, if not connected, short or out-of-range
	RA HUM	__ %	0 to 100%	RETURN AIR RELATIVE HUMIDITY Displays measured value of return air humidity from RA sensor. Displays __ % if sensor sends invalid value, if not connected, short or out-of-range
	IN CO2	___ ppm	0 TO 2000 ppm	SPACE/RETURN AIR CO ₂ Displays value of measured CO ₂ from CO ₂ sensor. Invalid if not connected, short or out-of-range
	DCV STATUS	N/A	ON/OFF	DEMAND CONTROLLED VENTILATION STATUS Displays ON if above setpoint and OFF if below setpoint, and ONLY if a CO ₂ sensor is connected.
	DAMPER OUT	2.0v	2.0 TO 10.0v	Displays voltage output to the damper actuator.
	ACT POS	N/A	0 to 100%	Displays actual position of outdoor air damper actuator

Table 11 — Menu Structure (cont)

MENU	PARAMETER	PARAMETER DEFAULT VALUE	PARAMETER RANGE AND INCREMENT	NOTES
STATUS (CONT)	ACT COUNT	N/A	1 to 65535	Displays number of times actuator has cycled. 1 cycles equals 180 deg. of actuator movement in any direction.
	ACTUATOR	N/A	OK/Alarm (on Alarm menu)	Displays ERROR if voltage or torque is below actuator range.
	EXH1 OUT	OFF	ON/OFF	EXHAUST STAGE 1 RELAY OUTPUT Output of EXH1 terminal: ON = relay closed OFF = relay open
	EXH2 OUT	OFF	ON/OFF	EXHAUST STAGE 2 RELAY OUTPUT Output of AUX terminal; displays only if AUX = EXH2
	ERV	OFF	ON/OFF	ENERGY RECOVERY VENTILATOR Output of AUX terminal; displays only if AUX = ERV
	MECH COOL ON or HEAT STAGES ON	0	0, 1, or 2	Displays stage of mechanical cooling that is active. Displays the stage of heat pump heating that is active.
	FAN SPEED	N/A	LOW or HIGH	SUPPLY FAN SPEED Displays speed setting of fan on a 2-speed fan unit.
	W (HEAT ON)	N/A	ON/OFF	HEAT DEMAND STATUS Displays status of heat demand on a 2-speed fan unit.
SETPOINTS	MAT SET	53°F	38 to 65°F; increment by 1	SUPPLY AIR SETPOINT Setpoint determines where the economizer will modulate the OA damper to maintain the mixed air temperature.
	LOW T LOCK	32°F	-45 to 80°F; increment by 1	COMPRESSOR LOW TEMPERATURE LOCKOUT Setpoint determines outdoor temperature when the mechanical cooling cannot be turned on. Commonly referred to as the Compressor lockout.
	DRYBLB SET	63°F	48 to 80°F; increment by 1	OA DRY BULB TEMPERATURE CHANGEOVER SETPOINT Setpoint determines where the economizer will assume outdoor air temperature is good for free cooling; e.g.; at 63°F unit will economize at 62°F and below and not economize at 64°F and above. There is a 2°F deadband.
	ENTH CURVE	ES3	ES1,ES2,ES3,ES4, or ES5	ENTHALPY CHANGEOVER CURVE Enthalpy boundary "curves" for economizing using single enthalpy.
	DCV SET	1100ppm	500 to 2000ppm; increment by 100	DEMAND CONTROLLED VENTILATION Displays only if CO ₂ sensor is connected. Setpoint for Demand Control Ventilation of space. Above the setpoint, the OA dampers will modulate open to bring in additional OA to maintain a space ppm level below the setpoint.
	MIN POS	2.8 V	2 to 10 Vdc	VENTILATION MINIMUM POSITION Displays ONLY if a CO ₂ sensor is NOT connected.
	VENTMAX With 2-speed fan units VENTMAX L (low speed fan) and VENTMAX H (high speed fan) settings are required	2.8 V	2 to 10 Vdc	DCV MAXIMUM DAMPER POSITION Displays only if a CO ₂ sensor is connected. Used for Vbz (ventilation max cfm) setpoint. Displays 2 to 10 V if <3 sensors (RA,OA, and MA). Va is only set if DCV is used. This is the ventilation for less than maximum occupancy of the space. In AUTO mode dampers controlled by CFM.
			100 to 9990 cfm; increment by 10	If OA, MA, RA, and CO ₂ sensors are connected and DCV CAL ENABLE is set to AUTO mode, the OA dampers are controlled by CFM and displays from 100 to 9990 CFM.
			2 to 10 Vdc	With 2-speed fan units VENT L (low speed fan) and MIN POS H (high speed fan) settings are required. Default for VENTMAX L is 3.2V and VENTMAX H is 2.8V
	VENTMIN With 2-speed fan units VENTMIN L (low speed fan) and VENTMIN H (high speed fan) set	2.25 V	2 to 10 Vdc or 100 to 9990 cfm increment by 10	DCV MINIMUM DAMPER POSITION Displays only if a CO ₂ sensor is connected. Used for Ba (ventilation min cfm) setpoint. Displays 2 to 10 V if <3 sensors (RA, OA, and MA). Va is only set if DCV is used. This is the ventilation for less than maximum occupancy of the space. In AUTO mode dampers controlled by CFM.
			100 to 9990 cfm; increment by 10	If OA, MA, RA, and CO ₂ sensors are connected and DCV CAL ENABLE is set to AUTO mode, the OA dampers are controlled by CFM and displays from 100 to 9990 CFM.
			2 to 10 Vdc	With 2-speed fan units VENTMIN L (low speed fan) and MIN POS H (high speed fan) settings are required. Default for VENTMIN L is 3.2V and VENTMIN H is 2.8V
	ERV OAT SP	32°F	0 to 50F; increment by 1	ENERGY RECOVERY VENTILATOR UNIT OUTDOOR AIR TEMPERATURE SETPOINT Only when AUX1 O = ERV
EXH1 SET With 2-speed fan units Exh1 L (low speed fan) and Exh1 H (high speed fan) settings are required	50%	0 to 100%;increment by 1	EXHAUST FAN STAGE 1 SETPOINT Setpoint for OA damper position when exhaust fan 1 is powered by the economizer. With 2-speed fan units Exh1 L (low speed fan) and Exh1 H (high speed fan) settings are required. Default for Exh1 L is 65% and Exh1 H is 50%	
EXH2 SET With 2-speed fan units Exh2 L (low speed fan) and Exh2 H (high speed fan) settings are required	75%	0 to 100%; increment by 1	EXHAUST FAN STAGE 2 SETPOINT Setpoint for OA damper position when exhaust fan 2 is powered by the economizer. Only used when AUX1 O is set to EXH2. With 2-speed fan units Exh2 L (low speed fan) and Exh2 H (high speed fan) settings are required. Default for Exh2 L is 80% and Exh2 H is 75%	

Table 11 — Menu Structure (cont)

MENU	PARAMETER	PARAMETER DEFAULT VALUE	PARAMETER RANGE AND INCREMENT	NOTES
SYSTEM SETUP	INSTALL	01/01/10	N/A	Display order = MM/DD/YY Setting order = DD, MM, then YY.
	UNITS DEG	F	F or C	Sets economizer controller in degrees Fahrenheit or Celsius
	EQUIPMENT	CONV	Conventional or HP	CONV = conventional; HP O/B = Enable Heat Pump mode. Use AUX2 1 for Heat Pump input from thermostat or controller. See Menu Note 7.
	AUX2 IN	W	SD/W or HP(O)/HP(B)	In CONV mode: SD + Enables configuration of shutdown (default); W = Informs controller that system is in heating mode. NOTE: If using 2-speed fan mode, CONV mode must be programmed for W. Shutdown is not available in 2-speed fan mode. See Menu Note 7. In HP O/B mode: HP(O) = energize heat pump on Cool (default); HP(B) = energize heat pump on heat.
	FAN SPEED	2-speed	1-speed/2-speed	Sets the economizer controller for operation of 1-speed or 2-speed supply fan. NOTE: 2-speed fan option also needs Heat (W1) programmed in AUX 2 In. See Menu Note 7.
	FAN CFM	5000cfm	100 to 15000 cfm; increment by 100	UNIT DESIGN AIRFLOW (CFM) Enter only if using DCVAL ENA = AUTO The value is found on the nameplate label for the specific unit.
	AUX1 OUT	NONE	NONE ERV EXH2 SYS	Select OUTPUT for AUX1 O relay • NONE = not configured (output is not used) • ERV = Energy Recovery Ventilator • EXH2 = second damper position relay closure for second exhaust fan • SYS = use output as an alarm signal
	OCC	INPUT	INPUT or ALWAYS	OCCUPIED MODE BY EXTERNAL SIGNAL When using a setback thermostat with occupancy out (24 vac), the 24 vac is input "INPUT" to the OCC terminal. If no occupancy output from the thermostat then change program to "ALWAYS" OR add a jumper from terminal R to OCC terminal.
	FACTORY DEFAULT	NO	NO or YES	Resets all set points to factory defaults when set to YES. LCD will briefly flash YES and change to NO but all parameters will change to the factory default values. NOTE: RECHECK AUX2 IN and FANTYPE for required 2-speed values.
ADVANCED SETUP	MA LO SET	45°F	35 to 55°F; Incremented by 10	SUPPLY AIR TEMPERATURE LOW LIMIT Temperature to achieve Freeze Protection (close damper and alarm if temperature falls below setup value).
	FREEZE POS	CLO	CLO or MIN	FREEZE PROTECTION DAMPER POSITION Damper position when freeze protection is active (closed or MIN POS).
	CO2 ZERO	0ppm	0 to 500 ppm; Increment by 10	CO ₂ ppm level to match CO ₂ sensor start level.
	CO2 SPAN	2000ppm	1000 to 3000 ppm; Increment by 10	CO ₂ ppm span to match CO ₂ sensor.
	STG3 DLY	2.0h	0 min, 5 min, 15 min, then 15 min intervals. Up to 4 hrs or OFF	COOLING STAGE 3 DELAY Delay after stage 2 cool has been active. Turns on second stage of cooling when economizer is first stage and mechanical cooling is second stage. Allows three stages of cooling, 1 economizer and 2 mechanical. OFF = no Stage 3 cooling
	SD DMPR POS	CLO	CLO or OPN	Indicates shutdown signal from space thermostat or unitary controller. When controller receives 24 Vac input on the SD terminal in conventional mode, the OA damper will open if programmed for OPN and OA damper will close if programmed for CLO. All other controls, e.g., fans, etc. will shut off.
	DA LO ALM	45°F (7°C)	35 to 65°F; (2 to 18° C) Incremented by 5 deg.	Used for alarm for when the DA air temperature is too low. Set lower range of alarm, below this temperature the alarm will show on the display.
	DA HI ALM	80°F (27°C)	70 to 80°F; (21 to 82°C) Incremented by 5 deg.	Used for alarm for when the DA air temperature is too high. Set upper range of alarm, above this temperature the alarm will show on the display.
	DCV CAL ENA	MAN	MAN (manual) AUTO	Turns on the DCV automatic control of the dampers. Resets ventilation based on the RA, OA, and MA sensor conditions. Requires all 3 RA, OA, and MA sensors.

Table 11 — Menu Structure (cont)

MENU	PARAMETER	PARAMETER DEFAULT VALUE	PARAMETER RANGE AND INCREMENT	NOTES
ADVANCED SETUP (CONT)	MAT T CAL	0.0°F	±2.5°F	SUPPLY AIR TEMPERATURE CALIBRATION Allows for the operator to adjust for an out of calibration temperature sensor.
	OAS T CAL	0.0°F	±2.5°F	OUTSIDE AIR TEMPERATURE CALIBRATION Allows for the operator to adjust for an out of calibration temperature sensor.
	OA H CAL	0% RH	±10% RH	OUTSIDE AIR HUMIDITY CALIBRATION Allows for operator to adjust for an out of calibration humidity sensor.
	RA T CAL	0.0°F	±2.5°F	RETURN AIR TEMPERATURE CALIBRATION Allows for the operator to adjust for an out of calibration temperature sensor.
	RA H CAL	0% RH	±10% RH	RETURN AIR HUMIDITY CALIBRATION Allows for operator to adjust for an out of calibration humidity sensor.
	DA T CAL	0.0°F	±2.5°F	DISCHARGE AIR TEMPERATURE CALIBRATION Allows for the operator to adjust for an out of calibration temperature sensor.
	2SP FAN DELAY	5 Minutes	0 to 20 minutes in 1 minute increments	TIME DELAY ON 2nd STAGE ECONOMIZING When in economizing mode this is the delay for the high speed fan to try to satisfy the call for second stage cooling before the first stage mechanical cooling is enabled.
CHECKOUT	DAMPER MINIMUM POSITION	N/A	N/A	The checkout for the damper minimum position is based on the system. See Table 12.
	DAMPER OPEN	N/A	N/A	Position damper to the full open position. Exhaust fan contacts enable during the DAMPER OPEN test. Pause in the mode to allow exhaust contacts to energize due to the delay in the system.
	DAMPER CLOSE	N/A	N/A	Positions damper to the fully closed position
	CONNECT Y1-O	N/A	N/A	Closes the Y1-O relay (Y1-O)
	CONNECT Y2-O	N/A	N/A	Closes the Y2-O relay (Y2-O)
	CONNECT AUX1-O	N/A	N/A	Energizes the AUX output. If Aux setting is: • NONE — not action taken • ERV — 24 Vac out. Turns on or signals an ERV that the conditions are not good for economizing but are for ERV operation. • SYS — 24 Vac out. Issues a system alarm
	CONNECT EXH1	N/A	N/A	Closes the power exhaust fan 2 relay (EXH1)
ALARMS	Alarms display only when they are active. The menu title "ALARMS(#)" includes the number of active alarms in parenthesis (.). When using SYLK bus sensors, "SYLK" will appear on the screen, and when using 20k OA temperature sensors, "SENS T" will appear on the screen			
	MA T SENS ERR	N/A	N/A	SUPPLY AIR TEMPERATURE SENSOR ERROR Mixed air sensor has failed or become disconnected - check wiring then replace sensor if the alarm continues.
	CO2 SENS ERR	N/A	N/A	CO ₂ SENSOR ERROR CO ₂ sensor has failed, gone out of range or become disconnected - check wiring then replace sensor if the alarm continues.
	OA SYLK T ERR	N/A	N/A	OUTSIDE AIR S-BUS SENSOR ERROR Outdoor air enthalpy sensor has failed or become disconnected - check wiring then replace sensor if the alarm continues.
	OA SYLK H ERR	N/A	N/A	
	RA SYLK T ERR	N/A	N/A	RETURN AIR S-BUS SENSOR ERROR Return air enthalpy sensor has failed or become disconnected - check wiring then replace sensor if the alarm continues.
	RA SYLK H ERR	N/A	N/A	
	DA SYLK T ERR	N/A	N/A	DISCHARGE AIR S-BUS SENSOR ERROR Discharge air sensor has failed or become disconnected - check wiring then replace sensor if the alarm continues.
	OA SENS T ERR	N/A	N/A	OUTSIDE AIR TEMPERATURE SENSOR ERROR Outdoor air temperature sensor has failed or become disconnected - check wiring then replace if the alarm continues.
	ACT ERROR	N/A	N/A	ACTUATOR ERROR Actuator has failed or become disconnected - check for stall, over voltage, under voltage and actuator count. Replace actuator if damper is movable and supply voltage is between 21.6 V and 26.4 V. Check actuator count on STATUS menu.
	FREEZE ALARM	N/A	N/A	Check if outdoor temperature is below the LOW Temp Lockout on setpoint menu. Check if mixed air temperature on STATUS menu is below the Lo Setpoint on Advanced menu. When conditions are back in normal range then the alarm will go away.

Table 11 —Menu Structure (cont)

MENU	PARAMETER	PARAMETER DEFAULT VALUE	PARAMETER RANGE AND INCREMENT	NOTES
ALARMS (CONT)	SHUTDOWN ACTIVE	N/A	N/A	AUX2 IN is programmed for SHUTDOWN and 24 V has been applied to AUX2 IN terminal.
	DMP CAL RUNNING	N/A	N/A	DAMPER CALIBRATION ROUTINE RUNNING If DCV Auto enable has been programmed, when the W7220 is completing a calibration on the dampers, this alarm will display. Wait until the calibration is completed and the alarm will go away. Must have OA, MA and RA sensors for DCV calibration; set up in the Advanced setup menu.
	DA SENS ALM	N/A	N/A	DISCHARGE AIR TEMPERATURE SENSOR ALARM Discharge air temperature is out of the range set in the ADVANCED SETUP Menu. Check the temperature of the discharge air.
	SYS ALARM	N/A	N/A	When AUX1-0 is set to SYS and there is any alarm (e.g., failed sensors, etc.), the AUX1-0 terminal has 24 Vac out.
	ACT UNDER V	N/A	N/A	ACTUATOR VOLTAGE LOW Voltage received by actuator is above expected range.
	ACT OVER V	N/A	N/A	ACTUATOR VOLTAGE HIGH Voltage received by actuator is below expected range.
	ACT STALLED	N/A	N/A	ACTUATOR STALLED Actuator stopped before achieving commanded position.

LEGEND

- CLO** — Compressor Lockout
- DCV** — Demand Controlled Ventilation
- ERV** — Energy Recovery Ventilator
- LCD** — Liquid Crystal Display
- MA** — Mixed Air
- MAT** — Mixed Air Temperature
- N/A** — Not Applicable
- OA** — Outdoor Air
- OAT** — Outdoor Air Temperature
- OCC** — Occupied
- RA** — Return Air
- RAT** — Return Air Temperature
- RTU** — Rooftop Unit
- SYS** — System

3. ERV Operation: When in cooling mode AND the conditions are NOT OK for economizing - the ERV terminal will be energized. In the Heating mode, the ERV terminal will be energized when the OA is below the ERV OAT setpoint in the setpoint menu.
4. STATUS → OCCUPIED — The factory-standard Occupancy signal originates with a thermostat or other controller call for indoor fan operation at CTB terminal G. This signal passes through the Central Terminal Board's OCCUPIED jumper JMP1 to the ECONO connector and to the W7220's OCC input terminal. An external timeclock or relay is required to implement an Occupancy schedule on the economizer damper position.
5. STATUS → MA TEMP, SETPOINTS → MAT SET — The W7220 menu parameters and labels include designations MA, MAT and Mixed Air for the economizer cooling control sensor. On these rooftop units, the economizer control sensor is located downstream of the evaporator/indoor coil in the supply fan section where this sensor is designated as Supply Air Temperature (SAT) sensor.
6. SETPOINTS → DRYBLB SET — This point is not displayed if a Return Air (differential) temperature sensor or an Outdoor Air enthalpy sensor is connected.
7. SYSTEM SETUP parameters must be configured as noted for 2-Speed unit operation:
EQUIPMENT = CONV
AUX2 IN = W
FAN SPEED = 2SPEED

NOTES:

1. Table 11 illustrates the complete hierarchy. Your menu parameters may be different depending on your configuration. For example if you do not have a DCV (CO₂) sensor, then none of the DCV parameters appear.
2. When values are displayed, pressing and holding the ▲ or ▼ button causes the display to automatically increment.

Table 12 — Damper Minimum Position Settings and Readings on Checkout Menu

DEMAND CONTROLLED VENTILATION (CO ₂ SENSOR)	FAN SPEED	SETPOINTS	CHECKOUT
NO	1	MIN POS	VMAX-HS
		N/A	N/A
	2	MIN POS H	VMAX-HS
		MIN POS L	VMAX-LS
YES	1	VENT MIN	VMAX-HS
		VENT MAX	VMAX-HS
	2	VENT MIN H	VMAX-HS
		VENT MAX H	VMAX-LS
		VENT MIN L	N/A
		VENT MAX L	N/A

Table 13 — Dry Bulb Operation No DCV (CO₂ Sensor) — 1-Speed Fan

DEMAND CONTROLLED VENTILATION (DCV)	OUTSIDE AIR GOOD TO ECONOMIZE	Y1-I	Y2-I	FAN SPEED	Y1-O	Y2-O	OCCUPIED	UNOCCUPIED
NONE	No	OFF	OFF	HIGH	0v/Off	0v/Off	MIN POS	Closed
		ON	OFF	HIGH	24v/On	0v/Off	MIN POS	Closed
		ON	ON	HIGH	24v/On	24v/On	MIN POS	Closed
NONE	Yes	OFF	OFF	HIGH	0v/Off	0v/Off	MIN POS	Closed
		ON	OFF	HIGH	0v/Off	0v/Off	MIN POS to Full Open	Closed to Full-Open
		ON	ON	HIGH	24v/On	0v/Off*	MIN POS to Full Open	Closed to Full-Open

*With stage 3 delay (STG3 DLY) in Advanced setup menu can turn on second stage of mechanical cooling Y2-O after the delay if the call for Y1-I and Y2-I have not been satisfied.

Table 14 — Dry Bulb Operation with DCV (CO₂ Sensor) — 1-Speed Fan

DEMAND CONTROLLED VENTILATION (DCV)	OUTSIDE AIR GOOD TO ECONOMIZE	Y1-I	Y2-I	FAN SPEED	Y1-O	Y2-O	OCCUPIED	UNOCCUPIED
Below CO ₂ Set	No	OFF	OFF	HIGH	0v/Off	0v/Off	VENTMIN	Closed
		ON	OFF	HIGH	24v/On	0v/Off	VENTMIN	Closed
		ON	ON	HIGH	24v/On	24v/On	VENTMIN	Closed
	Yes	OFF	OFF	HIGH	0v/Off	0v/Off	VENTMIN	Closed
		ON	OFF	HIGH	0v/Off	0v/Off	VENTMIN to Full-Open	Closed to Full-Open
		ON	ON	HIGH	24v/On	0v/Off	VENTMIN to Full-Open	Closed to Full-Open
Above CO ₂ Set	No	OFF	OFF	HIGH	0v/Off	0v/Off	VENTMIN to VENTMAX	Closed
		ON	OFF	HIGH	24v/On	0v/Off	VENTMIN to VENTMAX	Closed
		ON	ON	HIGH	24v/On	24v/On	VENTMIN to VENTMAX	Closed
	Yes	OFF	OFF	HIGH	0v/Off	0v/Off	VENTMIN to VENTMAX	Closed
		ON	OFF	HIGH	0v/Off	0v/Off	VENTMIN to Full-Open	Closed to Full-Open
		ON	ON	HIGH	24v/On	0v/Off*	VENTMIN to Full-Open	Closed to Full-Open

*With stage 3 delay (STG3 DLY) in Advanced setup menu can turn on second stage of mechanical cooling Y2-O after the delay if the call for Y1-I and Y2-I have not been satisfied.

Table 15 — Enthalpy Operation No DCV (CO₂ Sensor) — 1-Speed Fan

DEMAND CONTROLLED VENTILATION (DCV)	OUTSIDE AIR GOOD TO ECONOMIZE	Y1-I	Y2-I	FAN SPEED	Y1-O	Y2-O	OCCUPIED	UNOCCUPIED
NONE	No	OFF	OFF	HIGH	0v/Off	0v/Off	MIN POS	Closed
		ON	OFF	HIGH	24v/On	0v/Off	MIN POS	Closed
		ON	ON	HIGH	24v/On	24v/On	MIN POS	Closed
NONE	Yes	OFF	OFF	HIGH	0v/Off	0v/Off	MIN POS	Closed
		ON	OFF	HIGH	0v/Off	0v/Off	MIN POS to Full Open	Closed to Full-Open
		ON	ON	HIGH	24v/On	0v/Off*	MIN POS to Full Open	Closed to Full-Open

*With stage 3 delay (STG3 DLY) in Advanced setup menu can turn on second stage of mechanical cooling Y2-O after the delay if the call for Y1-I and Y2-I have not been satisfied.

Table 16 — Enthalpy Operation with DCV (CO₂ Sensor) — 1-Speed Fan

DEMAND CONTROLLED VENTILATION (DCV)	OUTSIDE AIR GOOD TO ECONOMIZE	Y1-I	Y2-I	FAN SPEED	Y1-O	Y2-O	OCCUPIED	UNOCCUPIED
Below CO ₂ Set	No	OFF	OFF	HIGH	0v/Off	0v/Off	VENTMIN	Closed
		ON	OFF	HIGH	24v/On	0v/Off	VENTMIN	Closed
		ON	ON	HIGH	24v/On	24v/On	VENTMIN	Closed
	Yes	OFF	OFF	HIGH	0v/Off	0v/Off	VENTMIN	Closed
		ON	OFF	HIGH	0v/Off	0v/Off	VENTMIN to Full-Open	Closed to Full-Open
		ON	ON	HIGH	24v/On	0v/Off	VENTMIN to Full-Open	Closed to Full-Open
Above CO ₂ Set	No	OFF	OFF	HIGH	0v/Off	0v/Off	VENTMIN to VENTMAX	Closed
		ON	OFF	HIGH	24v/On	0v/Off	VENTMIN to VENTMAX	Closed
		ON	ON	HIGH	24v/On	24v/On	VENTMIN to VENTMAX	Closed
	Yes	OFF	OFF	HIGH	0v/Off	0v/Off	VENTMIN to VENTMAX	Closed
		ON	OFF	HIGH	0v/Off	0v/Off	VENTMIN to Full-Open	Closed to Full-Open
		ON	ON	HIGH	24v/On	0v/Off*	VENTMIN to Full-Open	Closed to Full-Open

*With stage 3 delay (STG3 DLY) in Advanced setup menu can turn on second stage of mechanical cooling Y2-O after the delay if the call for Y1-I and Y2-I have not been satisfied.

Table 17 — Dry Bulb Operation No DCV (CO₂ Sensor) — 2-Speed Fan

DEMAND CONTROLLED VENTILATION (DCV)	OUTSIDE AIR GOOD TO ECONOMIZE	Y1-I	Y2-I	FAN SPEED	Y1-O	Y2-O	OCCUPIED	UNOCCUPIED
NONE	No	OFF	OFF	LOW	0v/Off	0v/Off	MIN POS	Closed
		ON	OFF	LOW	24v/On	0v/Off	MIN POS	Closed
		ON	ON	HIGH	24v/On	24v/On	MIN POS	Closed
NONE	Yes	OFF	OFF	LOW	0v/Off	0v/Off	MIN POS	Closed
		ON	OFF	LOW	0v/Off	0v/Off	MIN POS to Full Open	Closed to Full-Open
		ON	ON	HIGH	24v/On	0v/Off*	MIN POS to Full Open	Closed to Full-Open

*With stage 3 delay (STG3 DLY) in Advanced setup menu can turn on second stage of mechanical cooling Y2-O after the delay if the call for Y1-I and Y2-I have not been satisfied.

Table 18 — Dry Bulb Operation with DCV (CO₂ Sensor) — 2-Speed Fan

DEMAND CONTROLLED VENTILATION (DCV)	OUTSIDE AIR GOOD TO ECONOMIZE	Y1-I	Y2-I	FAN SPEED	Y1-O	Y2-O	OCCUPIED	UNOCCUPIED
Below CO ₂ Set	No	OFF	OFF	LOW	0v/Off	0v/Off	VENTMIN	Closed
		ON	OFF	LOW	24v/On	0v/Off	VENTMIN	Closed
		ON	ON	HIGH	24v/On	24v/On	VENTMIN	Closed
	Yes	OFF	OFF	LOW	0v/Off	0v/Off	VENTMIN	Closed
		ON	OFF	LOW	0v/Off	0v/Off	VENTMIN to Full-Open	Closed to Full-Open
		ON	ON	HIGH	24v/On	0v/Off	VENTMIN to Full-Open	Closed to Full-Open
Above CO ₂ Set	No	OFF	OFF	LOW	0v/Off	0v/Off	VENTMIN to VENTMAX	Closed
		ON	OFF	LOW	24v/On	0v/Off	VENTMIN to VENTMAX	Closed
		ON	ON	HIGH	24v/On	24v/On	VENTMIN to VENTMAX	Closed
	Yes	OFF	OFF	LOW	0v/Off	0v/Off	VENTMIN to VENTMAX	Closed
		ON	OFF	LOW	0v/Off	0v/Off	VENTMIN to Full-Open	Closed to Full-Open
		ON	ON	HIGH	24v/On	0v/Off*	VENTMIN to Full-Open	Closed to Full-Open

*With stage 3 delay (STG3 DLY) in Advanced setup menu can turn on second stage of mechanical cooling Y2-O after the delay if the call for Y1-I and Y2-I have not been satisfied.

Table 19 — Enthalpy Operation No DCV (CO₂ Sensor) — 2-Speed Fan

DEMAND CONTROLLED VENTILATION (DCV)	OUTSIDE AIR GOOD TO ECONOMIZE	Y1-I	Y2-I	FAN SPEED	Y1-O	Y2-O	OCCUPIED	UNOCCUPIED
No CO ₂ Sensor	No	OFF	OFF	LOW	0v/Off	0v/Off	MIN POS	Closed
		ON	OFF	LOW	24v/On	0v/Off	MIN POS	Closed
		ON	ON	HIGH	24v/On	24v/On	MIN POS	Closed
	Yes	OFF	OFF	LOW	0v/Off	0v/Off	MIN POS	Closed
		ON	OFF	LOW	0v/Off	0v/Off	MIN POS to Full Open	Closed to Full-Open
		ON	ON	HIGH	24v/On	0v/Off*	MIN POS to Full Open	Closed to Full-Open

*With stage 3 delay (STG3 DLY) in Advanced setup menu can turn on second stage of mechanical cooling Y2-O after the delay if the call for Y1-I and Y2-I have not been satisfied.

Table 20 — Enthalpy Operation with DCV (CO₂ Sensor) — 2-Speed Fan

DEMAND CONTROLLED VENTILATION (DCV)	OUTSIDE AIR GOOD TO ECONOMIZE	Y1-I	Y2-I	FAN SPEED	Y1-O	Y2-O	OCCUPIED	UNOCCUPIED
Below CO ₂ Set	No	OFF	OFF	LOW	0v/Off	0v/Off	VENTMIN	Closed
		ON	OFF	LOW	24v/On	0v/Off	VENTMIN	Closed
		ON	ON	HIGH	24v/On	24v/On	VENTMIN	Closed
	Yes	OFF	OFF	LOW	0v/Off	0v/Off	VENTMIN	Closed
		ON	OFF	LOW	0v/Off	0v/Off	VENTMIN to Full-Open	Closed to Full-Open
		ON	ON	HIGH	24v/On	0v/Off	VENTMIN to Full-Open	Closed to Full-Open
Above CO ₂ Set	No	OFF	OFF	LOW	0v/Off	0v/Off	VENTMIN to VENTMAX	Closed
		ON	OFF	LOW	24v/On	0v/Off	VENTMIN to VENTMAX	Closed
		ON	ON	HIGH	24v/On	24v/On	VENTMIN to VENTMAX	Closed
	Yes	OFF	OFF	LOW	0v/Off	0v/Off	VENTMIN to VENTMAX	Closed
		ON	OFF	LOW	0v/Off	0v/Off	VENTMIN to Full-Open	Closed to Full-Open
		ON	ON	HIGH	24v/On	0v/Off*	VENTMIN to Full-Open	Closed to Full-Open

*With stage 3 delay (STG3 DLY) in Advanced setup menu can turn on second stage of mechanical cooling Y2-O after the delay if the call for Y1-I and Y2-I have not been satisfied.

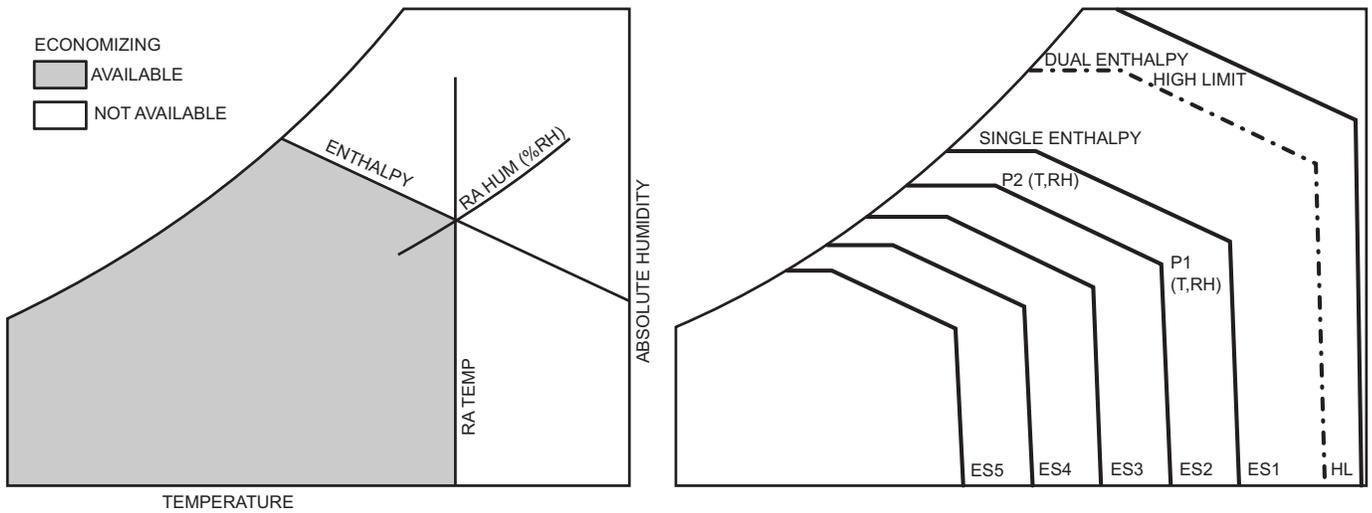


Fig. 37 — Single Enthalpy Curve Boundaries

Table 21 — Single Enthalpy and Dual Enthalpy High Limit Curves

ENTHALPY CURVE	TEMP. DRY BULB (F)	TEMP. DEWPOINT (F)	ENTHALPY (btu/lb/da)	POINT P1		POINT P2	
				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	39.6	63.3	80.0
ES3	70	54	24.0	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

Enthalpy Settings — When the OA temperature, enthalpy and dew point are below the respective setpoints, the outdoor air can be used for economizing. Figure 37 shows the new single enthalpy boundaries in the W7220. There are 5 boundaries (setpoints ES1 through ES5), which are defined by dry bulb temperature, enthalpy and dew point.

Refer to Table 21 for ENTH CURVE setpoint values.

The W7220 calculates the enthalpy and dew point using the OA temperature and humidity input from the OA enthalpy sensor. When the OA temperature, OA humidity and OA dew point are all below the selected boundary, the economizer sets the economizing mode to YES, economizing is available.

When all of the OA conditions are above the selected boundary, the conditions are not good to economize and the mode is set to NO.

Fig. 37 shows the 5 current boundaries. There is also a high limit boundary for differential enthalpy. The high limit boundary is ES1 when there are no stages of mechanical cooling energized and HL (high limit) when a compressor stage is energized.

Table 21 provides the values for each boundary limit.

Two-Speed Fan Operation

NOTE: Two-Speed Fan operation does not apply to RGS 04-06 units.

The W7220 controller has the capability to work with a system using a 2-speed supply fan. The W7220 does not control the supply directly but uses the following input status to determine the speed of the supply fan and controls the OA damper to the required position, see Table 22.

Table 22 — Fan Speed

STATE	FAN SPEED
OCC	Low
Y1	Low
Y2	High
W	High

The W (heating mode) is not controlled by the W7220 but it requires the status to know where to position the OA damper for minimum position for the fan speed.

The 2-speed fan delay is available when the system is programmed for 2-speed fan (in the System Setup menu item). The 2-speed fan delay is defaulted to 5 minutes and can be changed in the Advanced Setup menu item. When the unit has a call for Y1 In and in the free cooling mode and there is a call for Y2 In, the 2-speed fan delay starts and the OA damper will modulate 100% open, the supply fan should be set to high speed by the unit controller.

After the delay one of two actions will happen:

- The Y2-In call will be satisfied with the damper 100% open and fan on high speed and the call will turn off OR
- If the call for additional cooling in the space has not been satisfied then the first stage of mechanical cooling will be enabled through Y1 Out or Y2 Out.

Checkout

Inspect all wiring connections at the Economizer module's terminals, and verify compliance with the installation wiring diagrams.

For checkout, review the Status of each configured parameter and perform the Checkout tests.

NOTE: See Interface Overview on page 21 for information about menu navigation and use of the keypad.

⚠ WARNING

Failure to follow this warning could result in personal injury, property damage, or death.

Before performing service or maintenance operations on 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.

If any wiring changes are required, first be sure to remove power from the economizer module before starting work. Pay particular attention to verifying the power connection (24 Vac).

Power Up — After the W7220 module is mounted and wired, apply power.

Initial Menu Display — On initial start up, Honeywell displays on the first line and Economizer W7220 on the second line. After a brief pause, the revision of the software appears on the first line and the second line will be blank.

Power Loss (Outage or Brownout) — All setpoints and advanced settings are restored after any power loss or interruption.

NOTE: All settings are stored in non-volatile flash memory.

Status — Use the Status menu (see Table 11) to check the parameter values for the various devices and sensors configured.

NOTE: See Interface Overview on page 21 for information about menu navigation and use of the keypad.

Checkout Tests — Use the Checkout menu (on page 26) to test the damper operation and any configured outputs. Only items that are configured are shown in the Checkout menu.

NOTE: See Interface Overview on page 21 for information about menu navigation and use of the keypad.

To perform a Checkout test:

1. Scroll to the desired test in the Checkout menu using the ▲ and ▼ buttons.
2. Press the ⏏ button to select the item. RUN? appears.
3. Press the ⏏ button to start the test. The unit pauses and then displays IN PROGRESS. When the test is complete, DONE appears.
4. When all desired parameters have been tested, press the ⏶ (Menu Up) button to end the test.

The Checkout tests can all be performed at the time of installation or at any time during the operation of the system as a test that the system is operable.

Troubleshooting

Alarms — The Economizer module provides alarm messages that display on the 2-line LCD.

NOTE: Upon power up, the module waits 60 minutes before checking for alarms. This allows time for all the configured devices (e.g. sensors, actuator) to become operational. The exception is the SAT sensor which will alarm immediately.

If one or more alarms are present and there has been no keypad activity for at least 5 minutes, the Alarms menu displays and cycles through the active alarms.

It is possible to navigate to the Alarms menu at any time.

Clearing Alarms — Once the alarm has been identified and the cause has been removed (e.g. replaced faulty sensor), the alarm can be cleared from the display.

To clear an alarm, perform the following:

1. Navigate to the desired alarm.
2. Press the button. ERASE? displays.
3. Press the button. ALARM ERASED displays.
4. Press the (Menu up/Exit) button to complete the action and return to the previous menu.

NOTE: If the alarm still exists after it is cleared it is redisplayed within 5 seconds.

CAUTION

Failure to follow this caution may result in damage to equipment. Be sure to allow enough time for compressor startup and shutdown between checkout tests so that you do not short-cycle the compressors.

SMOKE DETECTORS — Smoke detectors are available as factory-installed options on RGS models. Smoke detectors may be specified for Supply Air only without or with economizer. All components necessary for operation are factory-provided and mounted. The unit is factory-configured for immediate smoke detector shutdown operation; additional wiring or modifications to unit terminal board may be necessary to complete the unit and smoke detector configuration to meet project requirements.

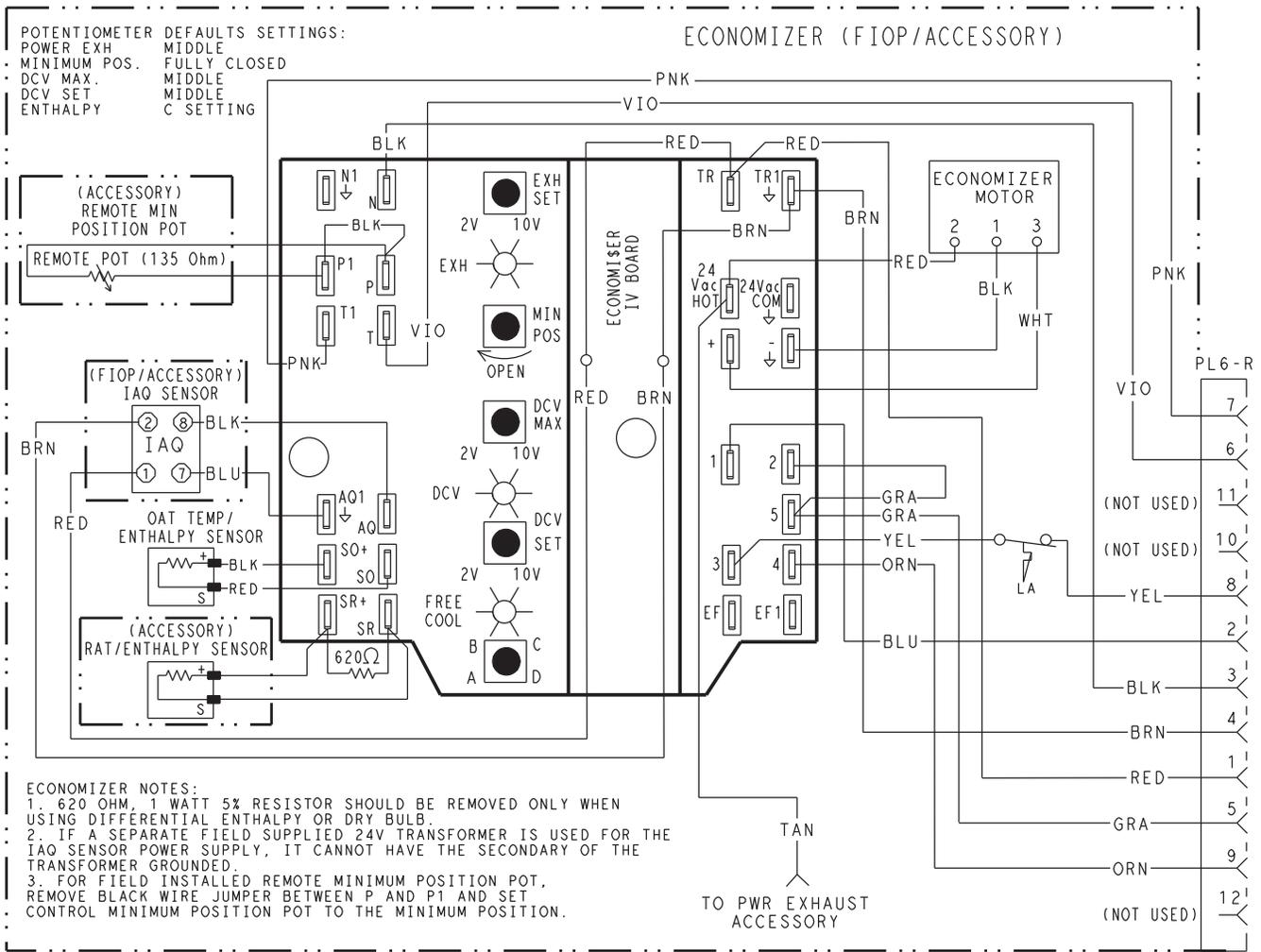


Fig. 38 — EconoMiSer® IV Wiring

Step 13 — Adjust Factory-Installed Options

SMOKE DETECTORS — Smoke detector(s) will be connected at the Controls Connections Board, at terminals marked “Smoke Shutdown”. Cut jumper JMP 3 when ready to energize unit.

ECONOMISER IV OCCUPANCY SWITCH — Refer to Fig. 38 for general EconoMiSer IV wiring. External occupancy control is managed through a connection on the Controls Connections Board.

If external occupancy control is desired, connect a time clock or remotely controlled switch (closed for Occupied, open for Unoccupied sequence) at terminals marked OCCUPANCY. Cut jumper JMP 2 to complete the installation.

Step 14 — Install Accessories

Available accessories include:

- Curb
- Thru-base connection kit (must be installed before unit is set on curb)
- Electric heaters and single-point connection kits
- Manual outside air damper
- Two-Position motorized outside air damper
- EconoMiSer IV (with control)
- Power Exhaust
- CO₂ sensor
- Louvered hail guard
- Motormaster head pressure controls
- Phase monitor control

Refer to separate installation instructions for information on installing these accessories.

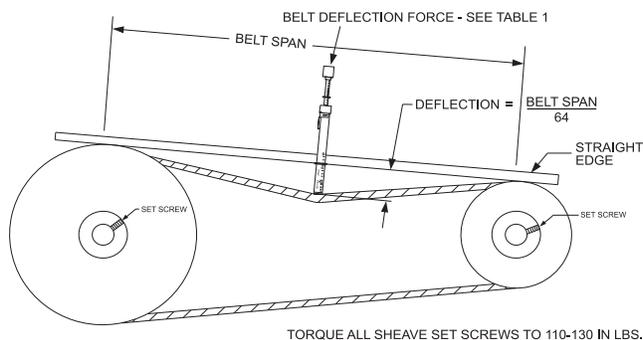
Step 15 — Check Belt Tension — Measure the belt span length as shown in Fig. 39. Calculate the required deflection by multiplying the belt span length by $\frac{1}{64}$. For example, if the belt span length is 32 inches: $32 \times \frac{1}{64} = \frac{1}{2}$ inch deflection.

BELT FORCE — DEFLECTION METHOD — Check the belt tension with a spring-force belt force deflection gauge (available from drive belt manufacturer).

1. Place a straightedge along the belt between the two pulleys. Measure the distance between the motor shaft and the blower shaft.
2. Set the tension gauge to the desired tension (see Table 1 in Fig. 39). Place the large O-ring at that point.
3. Press the tension checker downward on the belt until the large O-ring is at the bottom of the straightedge.
4. Adjust the belt tension as needed.

Adjust belt tension by loosening the motor mounting plate front bolts and rear bolt (see Fig. 40) and slide the plate towards the fan (to reduce tension) or away from the fan (to increase tension). Ensure the blower shaft and motor shaft are parallel to each other (pulleys aligned). Tighten all bolts securely when finished.

BELT TENSION METHOD — Requires belt tension gauge that measures tension in belt in units of lbs force.



BELT CROSS SECTION	SMALLEST SHEAVE DIAMETER	BELT DEFLECTION FORCE (LBS)			
		UNNOTCHED BELTS		NOTCHED BELTS	
		USED	NEW	USED	NEW
A, AX	3.0-3.6	3.7	5.5	4.1	6.1
	3.8-4.8	4.5	6.8	5.0	7.4
	5.0-7.0	5.4	8.0	5.7	8.4
B, BX	3.4-4.2	—	—	4.9	7.2
	4.4-5.6	5.3	7.9	7.1	10.5
	5.8-8.6	6.3	9.4	8.5	12.6

Table 1

BELT CONDITION	TENSION FORCE IN BELT (LBS)
New	100
Used	80

Table 2

Fig. 39 — V-Belt Force Label

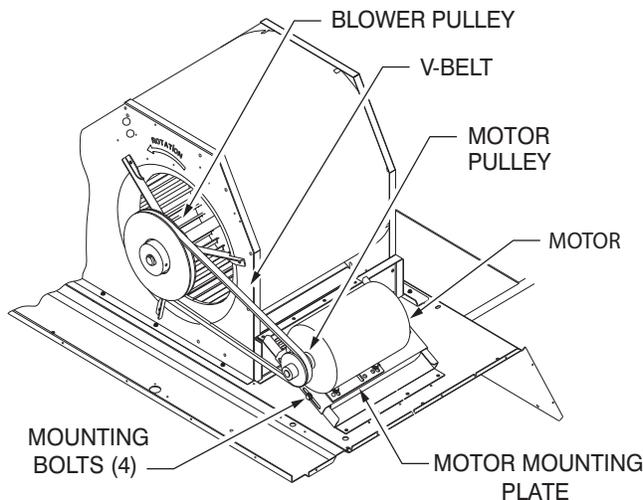


Fig. 40 — Belt Drive Motor Mounting

Pre-Start and Start-Up — This completes the mechanical installation of the unit. Refer to the unit’s Service Manual for detailed Pre-Start and Start-Up instructions.

**START-UP CHECKLIST — RGS PACKAGED ROOFTOP UNITS WITH
GAS HEAT AND ELECTRIC COOLING**

NOTE: To avoid injury to personnel and damage to equipment or property when completing the procedures listed in this start-up checklist, use good judgment, follow safe practices, and adhere to the safety considerations/information as outlined in preceding sections of this Installation Instruction document.

I. PRELIMINARY INFORMATION

MODEL NO. _____ JOB NAME _____
SERIAL NO. _____ ADDRESS _____
START-UP DATE _____
TECHNICIAN NAME _____
ADDITIONAL ACCESSORIES _____

II. PRE-START-UP

Verify that all packaging materials have been removed from unit (Y/N) _____
Verify installation of outdoor air hood (Y/N) _____
Verify installation of flue exhaust and inlet hood (Y/N) _____
Verify that condensate connection is installed per instructions (Y/N) _____
Verify that all electrical connections and terminals are tight (Y/N) _____
Verify gas pressure to unit gas valve is within specified range (Y/N) _____
Check gas piping for leaks (Y/N) _____
Check that indoor-air filters are clean and in place (Y/N) _____
Check that outdoor air inlet screens are in place (Y/N) _____
Verify that unit is level (Y/N) _____
Check fan wheels and propeller for location in housing/orifice and verify setscrew is tight (Y/N) _____
Verify that fan sheaves are aligned and belts are properly tensioned (Y/N) _____
Verify that scroll compressors are rotating in the correct direction (Y/N) _____
Verify installation of thermostat (Y/N) _____
Verify that crankcase heaters have been energized for at least 24 hours (Y/N) _____

II. START-UP

ELECTRICAL

Supply Voltage	L1-L2 _____	L2-L3 _____	L3-L1 _____
Compressor Amps 1	L1 _____	L2 _____	L3 _____
Compressor Amps 2	L1 _____	L2 _____	L3 _____
Supply Fan Amps	L1 _____	L2 _____	L3 _____

TEMPERATURES

Outdoor-air Temperature _____ °F DB (Dry Bulb)
Return-air Temperature _____ °F DB _____ °F Wb (Wet Bulb)
Cooling Supply Air Temperature _____ °F
Gas Heat Supply Air _____ °F

PRESSURES

Gas Inlet Pressure in. wg
 Gas Manifold Pressure STAGE 1 _____ in.wg
 STAGE 2 _____ in.wg
 Refrigerant Suction CIRCUIT A _____ PSIG
 CIRCUIT B _____ PSIG
 Refrigerant Discharge CIRCUIT A _____ PSIG
 CIRCUIT B _____ PSIG
 Verify refrigerant charge using charging charts (Y/N) _____

GENERAL

Economizer minimum vent and changeover settings to job requirements (if equipped) (Y/N) _____
 Verify smoke detector unit shutdown by utilizing magnet test (Y/N) _____

III. HOT GAS REHEAT START-UP (RGS072 ONLY)

STEPS

1. Check CTB for jumper 5, 6, 7 (Jumper 5, 6, 7 must be cut and open) (Y/N) _____
2. Open humidistat contacts (Y/N) _____
3. Start unit In cooling (Close Y1) (Y/N) _____

OBSERVE AND RECORD

- A. Suction pressure _____ PSIG
 - B. Discharge pressure _____ PSIG
 - C. Entering air temperature _____ °F
 - D. Liquid line temperature at outlet or reheat coil _____ °F
 - E. Confirm correct rotation for compressor (Y/N) _____
 - F. Check for correct ramp-up of outdoor fan motor as condenser coil warms (Y/N) _____
4. Check unit charge per charging chart (Y/N) _____
 5. Switch unit to high-latent mode (sub-cooler) by closing humidistat with Y1 closed (Y/N) _____

OBSERVE

- A. Reduction in suction pressure (5 to 7 psi expected) (Y/N) _____
 - B. Discharge pressure unchanged (Y/N) _____
 - C. Liquid temperature drops to 50 to 55°F range (Y/N) _____
 - D. LSV solenoid energized (valve closes) (Y/N) _____
6. Switch unit to dehumid (reheat) by opening Y1 (Y/N) _____

OBSERVE

- A. Suction pressure increases to normal cooling level
 - B. Discharge pressure decreases (35 to 50 psi)
 - C. Liquid temperature returns to normal cooling level
 - D. LSV solenoid energized (valve closes)
 - E. DSV solenoid energized, valve opens
7. With unit in dehumid mode close W1 compressor and outdoor fan stop; LSV and DSV solenoids de-energized (Y/N) _____
 8. Open W1 restore unit to dehumid mode (Y/N) _____
 9. Open humidistat input compressor and outdoor fan stop; LSV and DSV solenoids de-energized (Y/N) _____
 10. Restore set-points for thermostat and humidistat (Y/N) _____

CUT ALONG DOTTED LINE

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