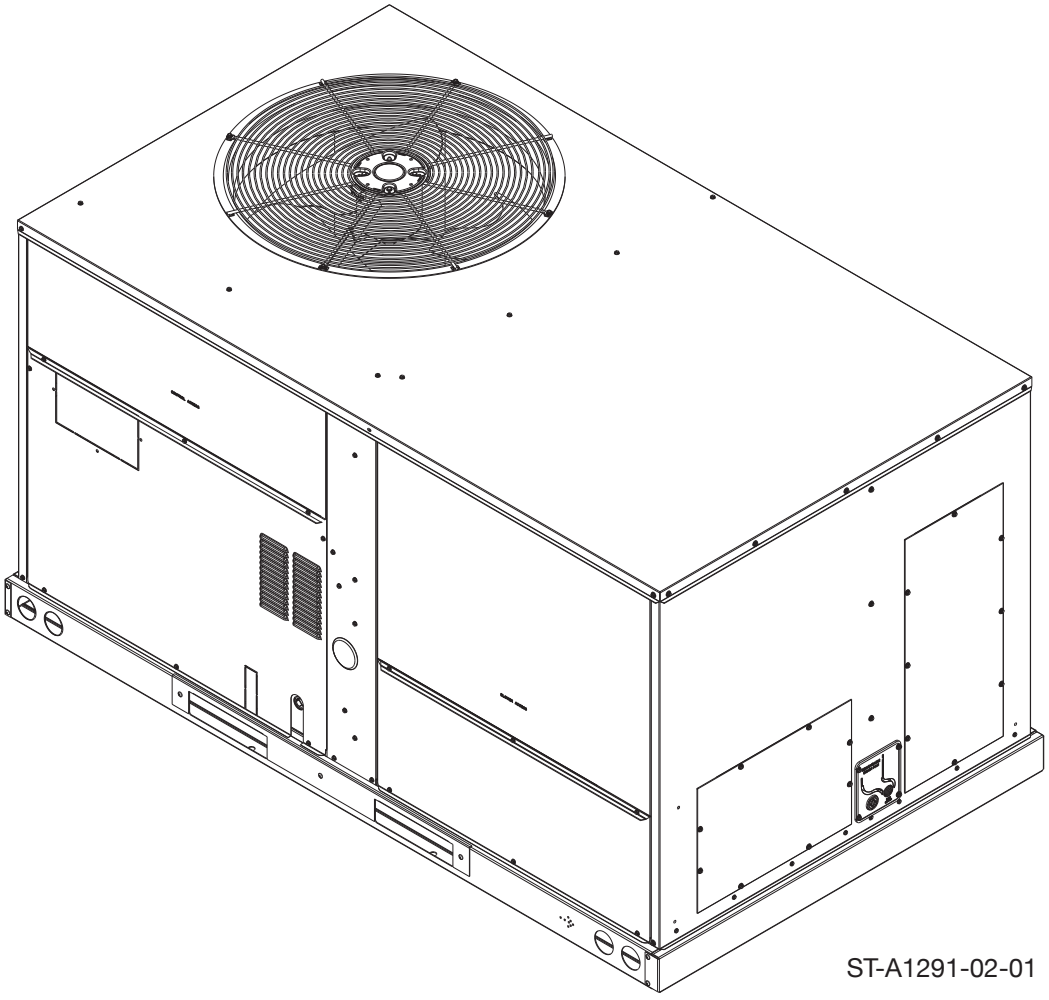
INSTALLATION INSTRUCTIONS

FOR RENAISSANCE™ PACKAGED HEAT PUMP UNITS

(-)HPC SERIES 3.0, 4.0, 5.0 & 6.0 TON [10.6, 14.1, 17.6 & 21.1 KW] 60 HZ MODELS WITH R-454B REFRIGERANT



ST-A1291-02-01

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DO NOT DESTROY THIS MANUAL. PLEASE READ CAREFULLY AND KEEP IN A SAFE PLACE FOR FUTURE REFERENCE BY A SERVICEMAN.

92-107219-03-00









RECOGNIZE THIS SYMBOL AS AN INDICATION OF IMPORTANT SAFETY INFORMATION!

⚠WARNING

THESE INSTRUCTIONS ARE INTENDED AS AN AID TO QUALIFIED SERVICE PERSONNEL FOR PROPER INSTALLATION, ADJUSTMENT AND OPERATION OF THIS UNIT. READ THESE INSTRUCTIONS THOROUGHLY BEFORE ATTEMPTING INSTALLATION OR OPERATION. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN IMPROPER INSTALLATION, ADJUSTMENT, SERVICE OR MAINTENANCE, POSSIBLY RESULTING IN FIRE, ELECTRICAL SHOCK, CARBON MONOXIDE POISONING, EXPLOSION, PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

⚠WARNING

PROPOSITION 65 WARNING: THIS PRODUCT CONTAINS CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER, BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

BA01-102

DO NOT DESTROY THIS MANUAL. PLEASE READ CAREFULLY AND KEEP IN A SAFE PLACE FOR FUTURE REFERENCE BY A SERVICEMAN.

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A. IMPORTANT SAFETY AND GENERAL INFORMATION

A.1 Introduction

This booklet contains the installation and operating instructions for your 3 ton, 4 ton, 5 ton, or 6 ton packaged heat pump unit. There are some precautions that should be taken to ensure proper operation. Improper installation can result in unsatisfactory operation or dangerous conditions.

Read this booklet and any instructions packaged with separate equipment required to make up the system prior to installation. Give this booklet to the owner and explain its provisions. The owner should retain this booklet for future reference.

The images contained within this document may not be an exact representation of every unit, accessory, installation, etc. All dimensions contained i this document are approximations. We reserve the right to change the content of this document at any time.

⚠WARNING: The manufacturer's warranty does not cover any damage or defect to the heat pump caused by the attachment or use of any components, accessories, or devices (other than those authorized by the manufacturer) into, onto or in conjunction with the air conditioner.

You should be aware that the use of unauthorized components, accessories or devices may adversely affect the operation of the air conditioner and may also endanger life and property. The manufacturer disclaims any responsibility for such loss or injury resulting from the use of such unauthorized components, accessories, or devices.

A.2 Agency Performance Audit and Efficiency Testing Notice

NOTICE: BREAK-IN PERIOD

Prior to agency testing, run the compressor for 16 hours at 115°f outdoor ambient temperature and 80° dry bulb / 75° wet bulb indoor ambient temperature.

NOTICE: EFFICIENCY TESTING NOTICE

For purposes of verifying or testing efficiency ratings, the test procedure in Title 10 Appendix M1 to Subpart B of Part 430 (Uniform Test Method for Measuring the Energy Consumption of Central Air Conditioners and Heat Pumps), and the clarifying provisions provided in the standards listed below that were applicable at the date of manufacture should be used for test set up and performance.

SETUP

- ASHRAE 37 - 2009 (RA 2019)

PERFORMANCE:

- ANSI/ASHRAE 90.1 - 2022
- ANSI/ASHRAE 103 (2022)
- Standards for Unitary Small AC Equipment AHRI 210/240 (2023) for 3-5T
- Standards for Unitary Large AC Equipment AHRI 340/360 (2022) for 6T

SAFETY

- UL 60335-2-40 4th edition

QUALITY

- ISO 9001: 2015

A.3. Importance of a Quality Installation

Optimal system performance and longevity depend upon a quality and proper installation. Failure to properly setup and commission this unit could result in undesirable operation and subsequent faults and potential failures.

Carefully follow all guidelines listed in the manual and industry best practices. Conform to all local code requirements. Contact your local technical representative with any questions or concerns.

If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment must be on site. A dry power CO2 fire extinguisher must be near the charging area at all times during installation, commissioning, service, and decommissioning.

IMPORTANT: Check the unit model number, heating size, electrical characteristics, and accessories to determine if they are correct.

A. IMPORTANT SAFETY AND GENERAL INFORMATION

A.3.1 Working Personnel Qualifications

Every installation, maintenance, service, and repair working procedure must be conducted by qualified personnel who have been trained in operating and servicing units that employ flammable refrigerants such as R-454B.

Examples of working procedures include but are not limited to:

- Breaking into the refrigeration circuit
- Opening sealed components
- Opening ventilated enclosures

This appliance is not intended for use by persons (including children) when reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning the use of the appliance by a person responsible for their safety.

Children should be supervised to ensure that they do not play with the appliance.

A.4. Importance of Air Flow and Setup

Optimal system performance is also dependent upon having the ideal airflow across the condensing and evaporating coils, and upon matching the charge weight to the manufacturer's spec for the unit. Improper or restricted air flow, and incorrect charge weight, will hinder the performance of the unit. Please refer to the manufacturer's recommended clearances for setting the unit and the included guide for setting air flow. Refer to the rating plate for the charge weight.

A.5. Checking Product and Inspection

Upon receiving the unit, inspect it for any damage from shipment. Claims for damage, either shipping or concealed, should be filed immediately with the shipping company. IMPORTANT: Check the unit model number, heating size, electrical characteristics, and accessories to determine if they are correct.

B. GENERAL SPECIFICATIONS

B.1 Safety Warnings

⚠WARNING: The manufacturer's warranty does not cover any damage or defect to the air conditioner caused by the attachment or use of any components, accessories, or devices (other than those authorized by the manufacturer) into, onto or in conjunction with the air conditioner. You should be aware that the use of unauthorized components, accessories, or devices may adversely affect the operation of the air conditioner and may also endanger life and property. The manufacturer disclaims any responsibility for such loss or injury resulting from the use of such unauthorized components, accessories, or devices.

⚠WARNING: Disconnect all power to the unit before starting maintenance. Failure to do so can result in severe electrical shock or death

⚠WARNING: Do not, under any circumstances, connect return ductwork to any other heat producing device such as a fireplace insert, stove, etc. Unauthorized use of such devices may result in fire, carbon monoxide poisoning, explosion, property damage, severe personal injury, or death.

⚠WARNING: The unit must be permanently grounded. A grounding lug is provided in the electric heat access area for a ground wire.

Failure to ground this unit can result in fire or electrical shock causing property damage, severe personal injury or death.

⚠WARNING: Only electric heater kits supplied by this manufacturer as described in this publication have been designed, tested, and evaluated for use with this unit. Use of any other manufactured electric heaters installed within this unit may cause hazardous conditions resulting in property damage, fire, bodily injury, or death.

⚠DANGER: : Risk of fire or explosion. Flammable refrigerant used. To be repaired only by trained service personnel. Do not puncture refrigerant tubing.

⚠WARNING: Risk of fire or explosion. Dispose of properly in accordance with Federal Or Local Regulations. Flammable refrigerant used.

⚠DANGER: Risk of fire or explosion. Flammable refrigerant used. Consult the repair manual/owner's guide before attempting to service this product. All safety precautions must be followed.

⚠DANGER: Risk of fire or explosion due to flammable refrigerant used. Follow handling instructions carefully in compliance with National Regulations.

⚠WARNING: Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

⚠WARNING: The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance, or an operating electric heater).

⚠WARNING: Do not pierce or burn.

⚠WARNING: Be aware that refrigerants may not contain an odor.

⚠WARNING: If this unit is connected via an air duct system to one or more rooms with an area less than the specified minimum area, that room shall be without continuously operating flames or other potential ignition sources. See ***Appendix F – A2L Refrigerant Installation Safety Data.***

⚠WARNING: Auxiliary devices which may be a potential ignition source shall not be installed in the ductwork.

⚠WARNING: If this unit is connected via a duct to one or more rooms, only auxiliary devices approved by the manufacturer that are declared suitable with A2L refrigerants shall be installed in the connecting ductwork.

⚠WARNING: Appliance shall be installed, operated, and stored in a room with a floor area larger than 'X'm^2. See ***Appendix F –A2L Refrigerant Installation Safety Data.***

B. GENERAL SPECIFICATIONS

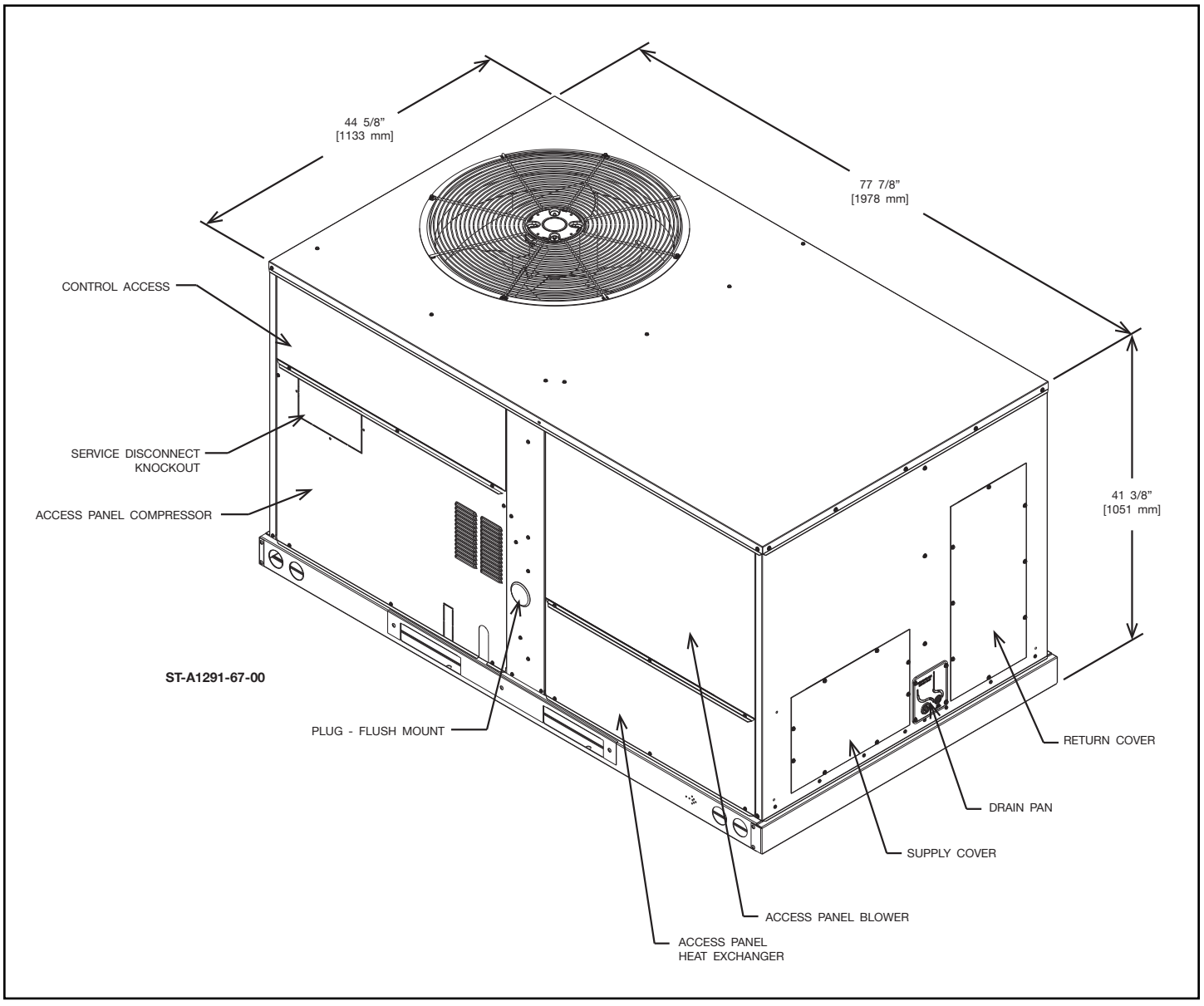
B.2. Major Components

The unit includes a hermetically-sealed refrigerating system consisting of a scroll compressor, condenser coil, evaporator coil with TXV, a reversing valve, a circulation air blower, a condenser fan, and all necessary internal electrical wiring. The refrigeration system of these units is factory evacuated, charged, and performance tested. Refrigerant amount and type are indicated on rating plate.

B.3. Product Data Information

B.3.1. Dimensional Information

IMPORTANT: This unit must be mounted level in both directions to allow water to drain from the condenser section and condensate pan.

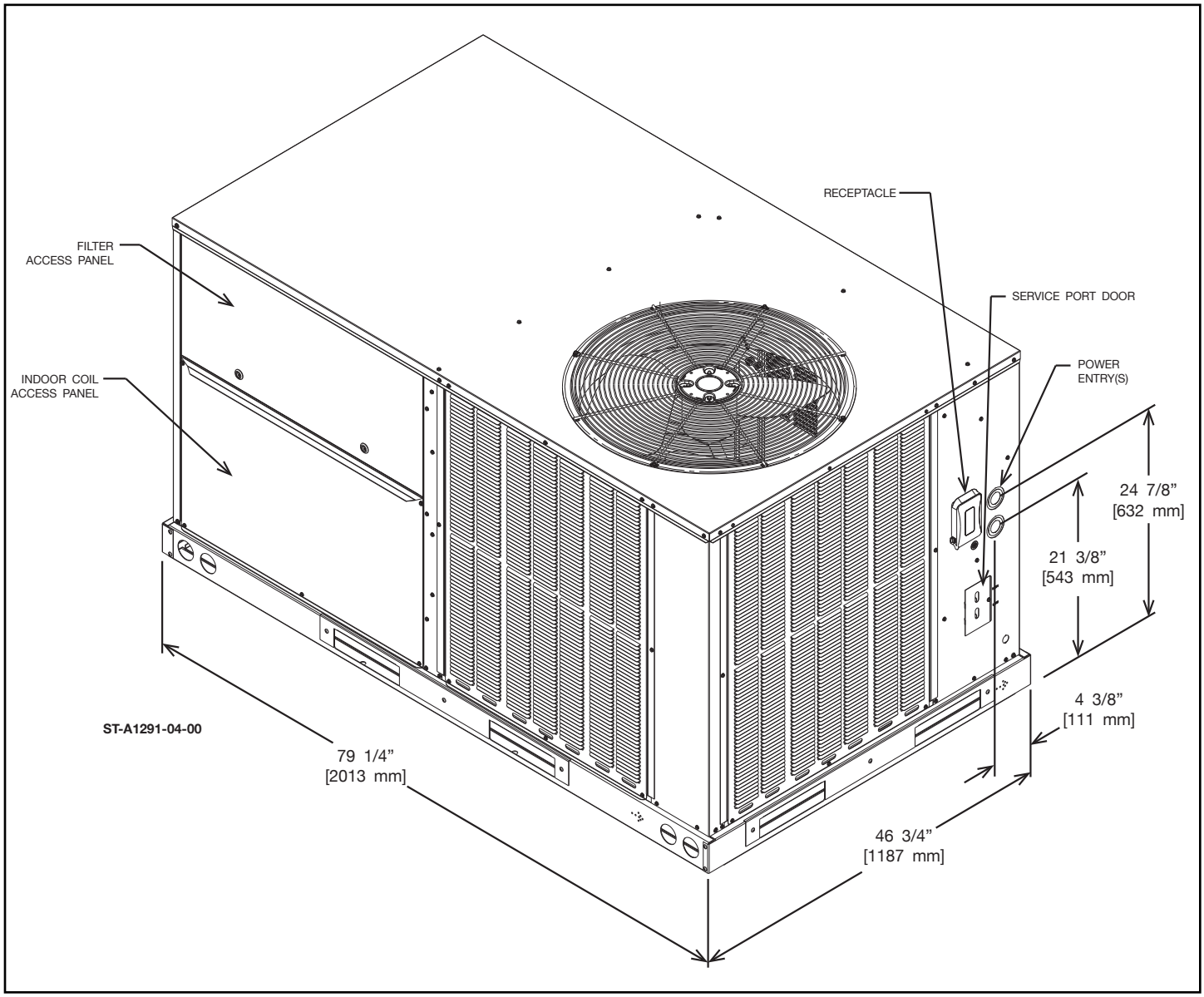


B. GENERAL SPECIFICATIONS

B.3. Product Data Information

B.3.1. Dimensional Information (Cont.)

IMPORTANT: This unit must be mounted level in both directions to allow water to drain from the condenser section and condensate pan.



B.3.2. Product Specifications

The packaged Heat pump rooftop unit is available both without auxiliary heat or with 10, 15, 20, or 24 KW electric heat input (either factory installed or field installed). Cooling capacity is 3.0, 4.0, 5.0, and 6.0 nominal tons. Units are convertible from downflow supply/return to sideflow supply/return by relocation of supply/return cover panels. See section ***C.3.5. Downflow to Horizontal Conversion*** for more details.

The units are weatherized for mounting outside of the building.

⚠WARNING: Units are not design certified to be installed inside the structure. Doing so can cause inadequate unit performance as well as property damage.

B.3. Product Data Information

B.3.3. General Data

See ***Appendix A*** towards the end of this manual for General Data.

B.3.4. Electrical Data Reference

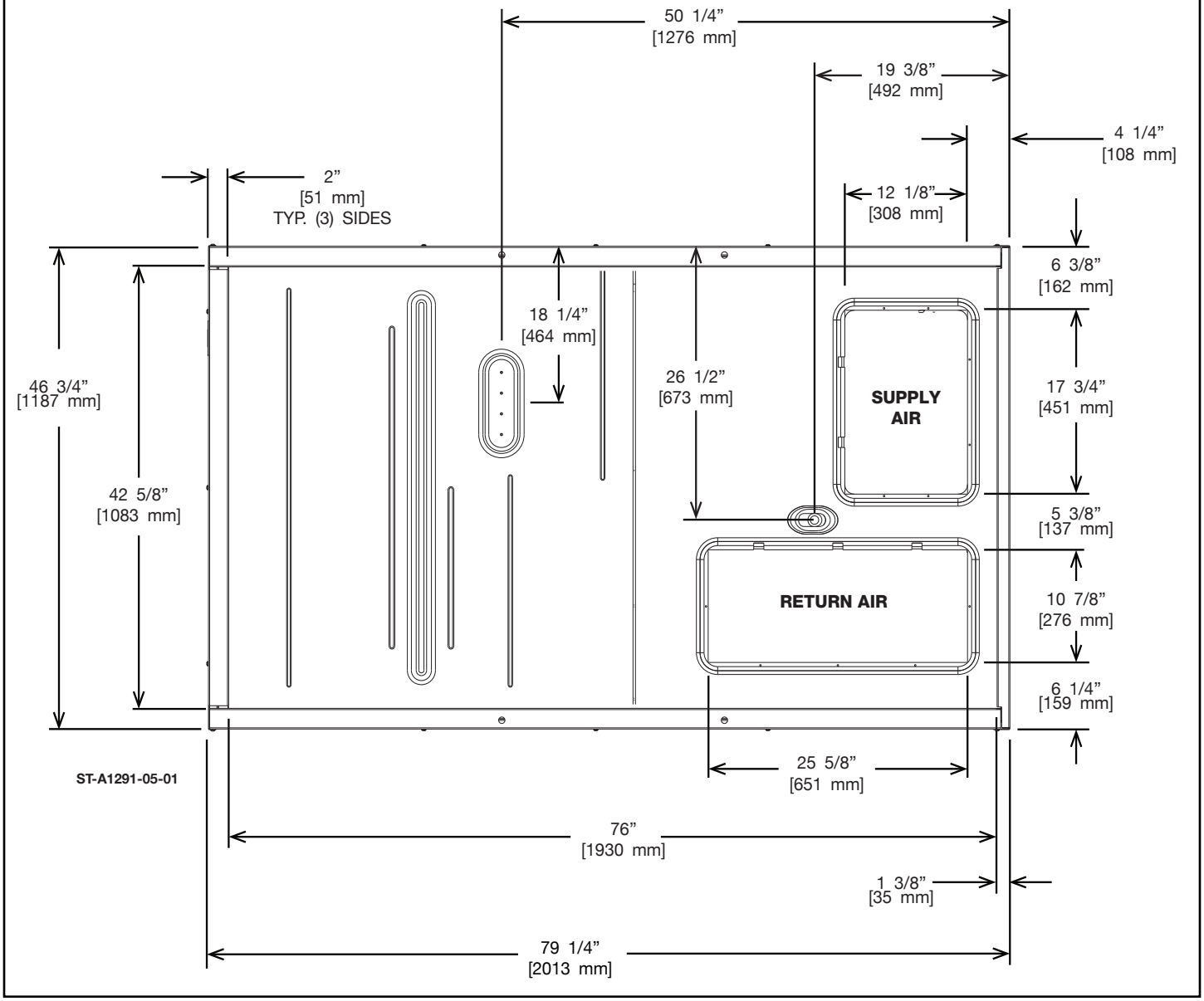
See ***Appendix B*** towards the end of this manual for Electrical Data.

B.3.5. Air Flow Performance Data

See ***Appendix C*** towards the end of this manual for Air Flow Performance Data.

B.3.6. Supply and Return Duct Dimensions

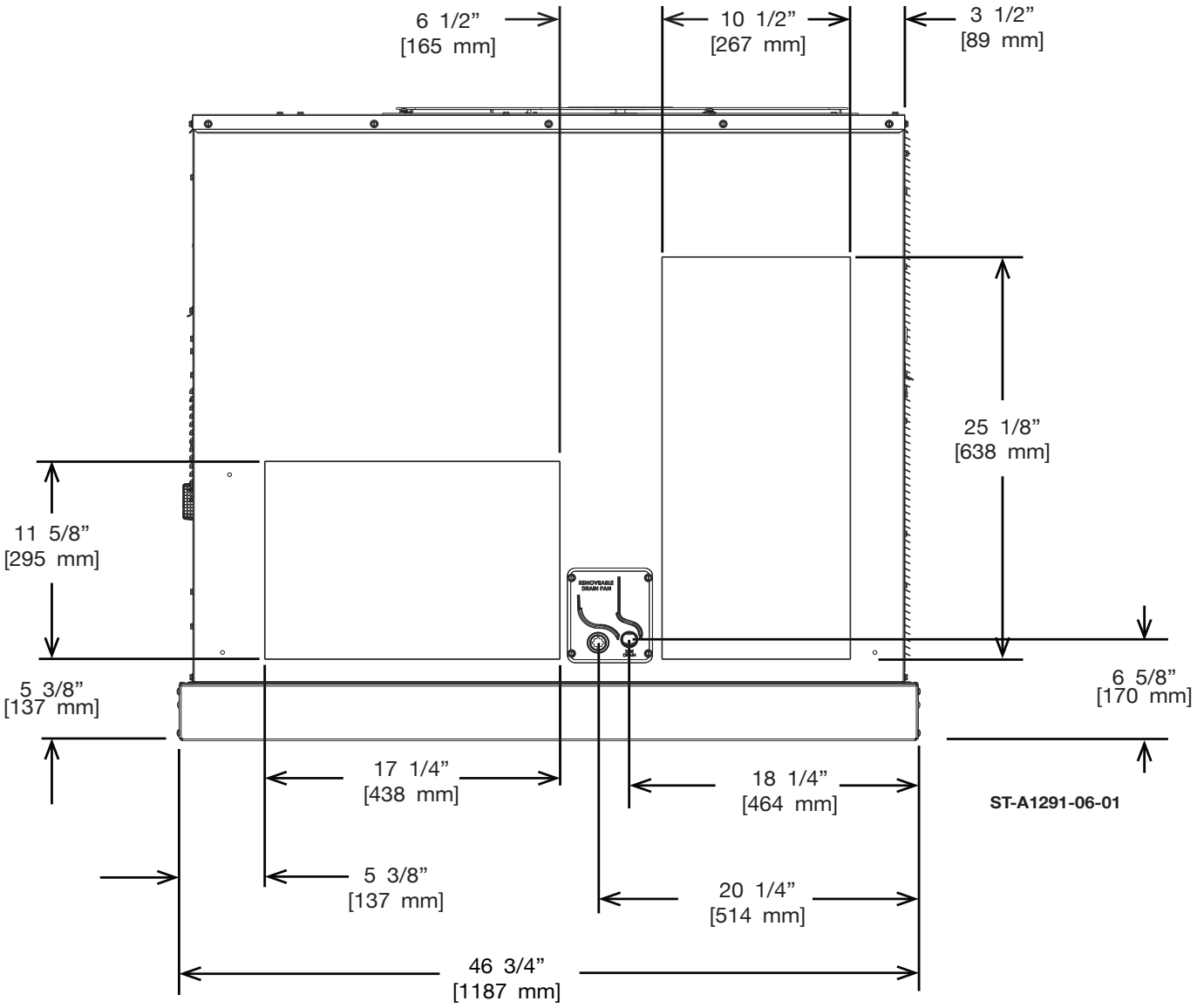
Figure B.3.6. - A: Supply And Return Dimensions For Downflow Applications (Bottom View Looking Up)



B. GENERAL SPECIFICATIONS

B.3.6. Supply and Return Duct Dimensions

Figure B.3.6. - B: Supply And Return Dimensions For Horizontal Applications

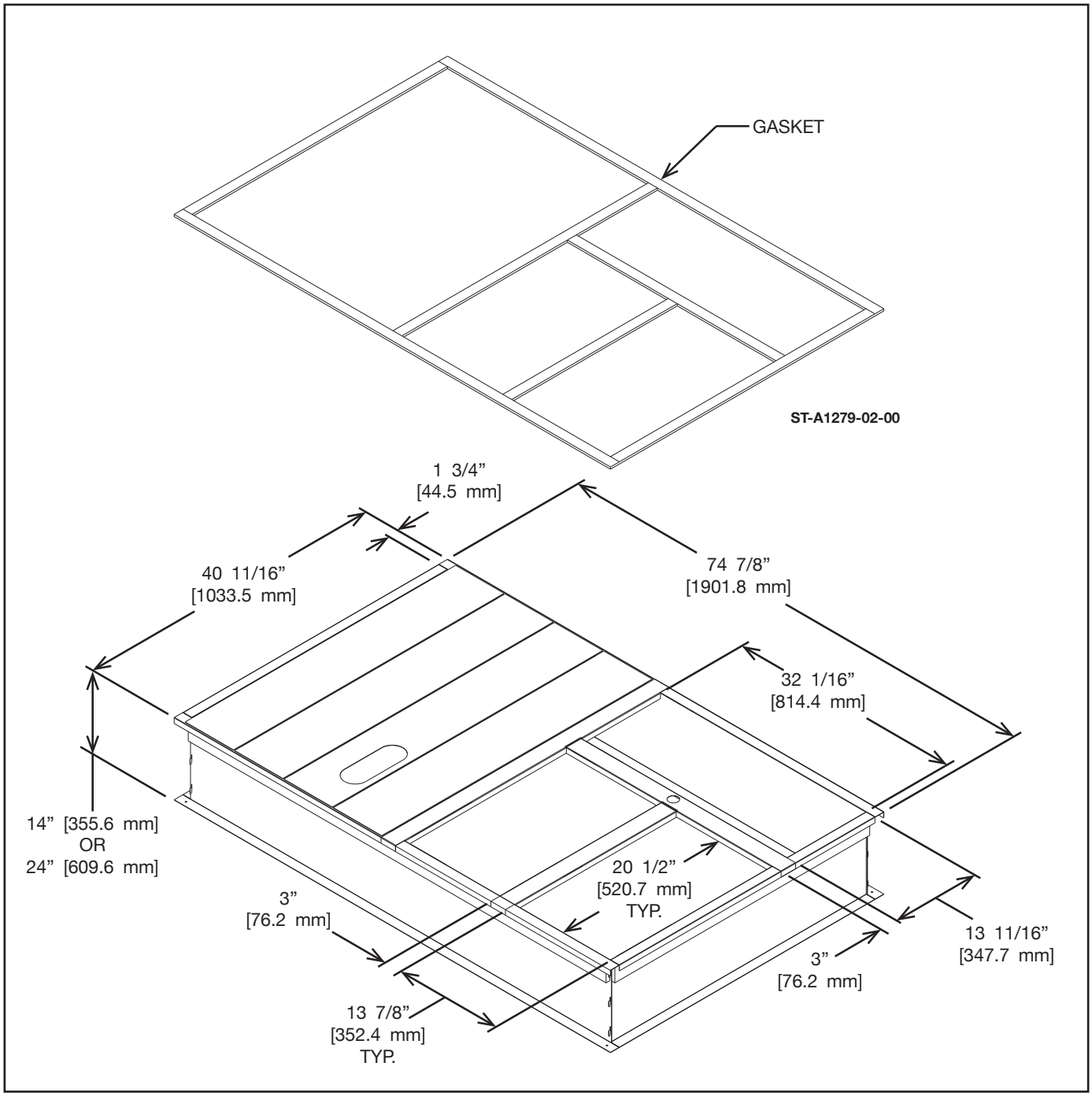


B.3. Product Data Information

B.3.7. Curb Dimensions

NOTE: See section ***C.3.3. Rooftop Installation*** for more information for installing the unit on a curb.

Figure B.3.7. – A: Roofcurb Complete Assembly



C. INSTALLATION OF THE UNIT

C.1. General

C.1.1. Installation

Install this unit in accordance with local and national standards. Any and all work must be done by authorized personnel.

C.1.2. Pre-Installation Checkpoints

Before attempting any installation, carefully consider the following points:

- Structural strength of supporting members (Rooftop Installation)
- Clearances and provision for servicing
- Power supply and wiring
- Air duct connections and sizing
- Drain facilities and connections
- Location for minimum noise and vibration - away from bedroom windows

C.2. Tool and Refrigerant

A leak detection system is installed in this unit. The unit must be powered at all times except during service.

This unit is equipped with electrically powered safety measures to be effective, the unit must be electrically powered at all times after installation, other than when servicing.

C.2.1. Tools Required for Installing and Servicing R-454B Models

Manifold Sets:

- Up to 800 PSIG High Side
- Up to 250 PSIG Low Side
- 550 PSIG Low Side Retard

Manifold Hoses:

- Service Pressure Rating of 800 PSIG
- Zero-loss fittings

Recovery Cylinders:

- 400 PSIG Pressure Rating

Dept. of Transportation

- 4BA400 or BW400

C.2.2. Specifications of R-454B

All units are factory charged with R-454B Refrigerant.

Application: R-454B is not a drop-in replacement for R-410A. Equipment designs must accommodate the safety group A2L of R-454B. It cannot be retrofitted into R-410A units.

Physical Properties: R-454B has an atmospheric bubble point of 59.6ºF [50.9ºC] and an atmospheric dew point of -58.0ºF [-50.0ºC]. Its bubble point saturation pressure at 77ºF [25ºC] is 213 psig [1469 kPa] and dew point saturation pressure at 77ºF [25ºC] is 205 psig [1415 kPa].

Pressure: The pressure of R-454B is similar to that of R-410A. Recovery and recycling equipment, pumps, hoses, and the like must have design pressure ratings appropriate for R-454B. Manifold sets need to range up to 800 psig [5,516 kPa] high-side and 250 psig [1,724 kPa] low-side with a 550 psig [3,792 kPa] low-side retard. Hoses need to have a service pressure rating of 800 psig [5,516 kPa]. Recovery cylinders need to have a 400 psig [2,758 kPa] service pressure rating, DOT 4BA400 or DOT BW400.

Flammability: R-454B is classified as safety group A2L, where the 2L flammability class indicated flammability.

R-454B is classified as safety group A2L, where the 2L flammability class indicated flammability.

C.2.3. Quick Reference Guide for R-454B

Ensure that servicing equipment is designed to operate with R-454B.

• Refrigerant R-454B operates at pressure similar to R-410A. However, it is classified in safety group A2L. Ensure that servicing equipment is compatible with R-454B.

• Refrigerant cylinders are no longer color-coded. R-454B refrigerant cylinders are light green grey in color with a red band on the shoulder or top of the cylinder to indicate flammability.

• R-454B, as with other HFCs is only compatible with POE oils.

• Vacuum pumps will not remove moisture from POE oil

• R-454B systems are to be charged with liquid refrigerants.

• Do not install a suction line filter drier in the liquid line.

• A liquid line filter drier is standard on every unit.

• Desiccant (drying agent) must be compatible for POE oils and R-454B.

C.2.4. Evaporator Coil/TXV

The thermostatic expansion valve is specifically designed to operate with R- 454B. If required, **the existing TXV and/or evaporator coil must be replaced with the factory specified components specifically designed for R-454B.**

⚠WARNING: Disconnect all power to the unit before starting service. Failure to do so can cause electrical shock resulting in personal injury or death. Regular maintenance will reduce the buildup of contaminants and help protect the unit's finish.

C.2.5. Minimum Room Area

Because this unit uses refrigerant R-454B, UL requires a minimum room area for the total conditioned space (TAmin) that is supplied by this equipment.

The UL Safety Standard defines an individual room area as the room area enclosed by floors, walls, partitions, and doors of the space where the unit is installed, also as the room area into which refrigerant can leak. Each room/ conditioned space will need to be considered for the total area requirements.

The minimum room area of the total conditioned space for each base model is listed in ***Appendix F – A2L Refrigerant Installation Safety Data***.

C.2.6. No Ignition Sources

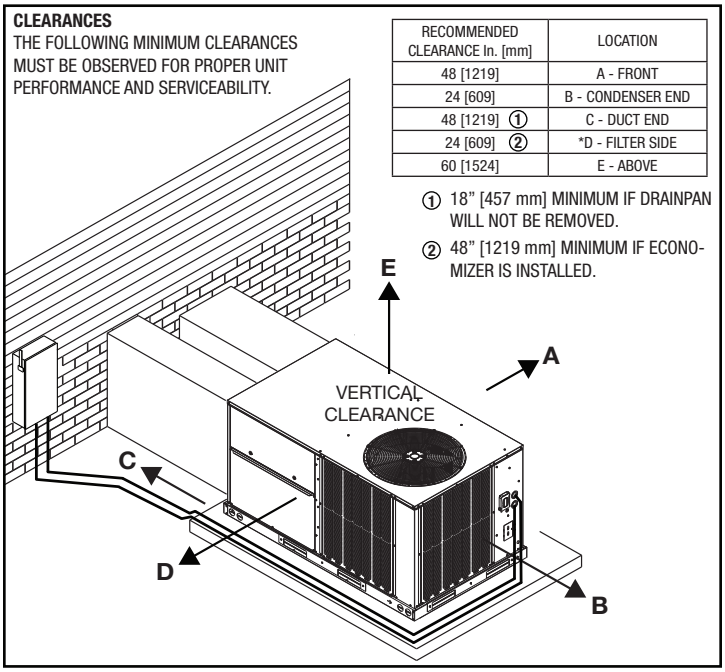
When performing work that involves exposing any pipework, no person working on or near the refrigerant system may use any ignition sources that could lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept far away from the site during installation, repair, removal, or disposal, during which refrigerant can possibly be released into surrounding space. Before work takes place, the area around the equipment must be surveyed to ensure that there are no flammable hazards or ignition risks. Additionally, "No Smoking" signs must be displayed.

C.3. Choosing a Location

C.3.1.Unit Location: Allowable Clearances and Operational Issues

The unit location must comply with the allowable clearances listed in ***Figure C.3.1. - A.*** Failure to comply with the recommended clearances may result in operational issues such as decreased capacity, restricted condenser airflow, and condenser motor fatigue.

Figure C.3.1. - A: Allowable Clearances



C.3.2. Outside Installation

⚠WARNING: These units are designed certified for outdoor installation only. Installation inside any part of a structure can result in inadequate unit performance as well as property damage.

1. Select a location where external water drainage cannot collect around unit.

2. Provide a level slab sufficiently high enough above grade to prevent surface water from entering the unit

3. Locate the unit to provide proper access for inspection and servicing as shown in ***Figure C.3.1. - A.***

4. Locate unit where operating sounds will not disturb owner or neighbors.

5. Locate unit so roof runoff water does not pour directly on the unit. Provide gutter or other shielding at roof level. Do not locate unit in an area where excessive snow drifting may occur or accumulate.

6. Where snowfall is anticipated, the height of the unit above the ground level must be considered. Mount unit high enough to be above anticipated maximum area snowfall.

7. Select an area which will keep the areas of the vent, air intake, and A/C condenser fins free and clear of obstructions such as weeds, shrubs, vines, snow, etc. Inform the user accordingly.

C. INSTALLATION OF THE UNIT

C.3.3. Rooftop Installation

1. Before locating the unit on the roof, make sure that the roof structure is adequate to support the weight involved. (See Electrical & Physical Tables in this manual.) **THIS IS VERY IMPORTANT AND IS THE INSTALLER'S RESPONSIBILITY.**

2. For rigging and roofcurb details, see section ***C.4.3.***

3. The location of the unit on the roof should be such as to provide proper access for inspection and servicing.

IMPORTANT: If unit will not be put into service immediately, block off supply and return air openings to prevent excessive condensation.

C.3.4. Corrosive Environments

The metal parts of this unit may be subject to rust or deterioration in adverse environmental conditions. This oxidation could shorten the equipment's useful life. Salt spray, fog or mist in seacoast areas, sulfur or chlorine from lawn watering systems, and various chemical contaminants from industries such as paper mills and petroleum refineries are especially corrosive.

If the unit is to be installed in an area where contaminants are likely to be a problem, give special attention to the equipment location and exposure.

1. Avoid having lawn sprinkler heads spray directly on the unit cabinet.

2. In coastal areas, install the unit on the side of the building away from the waterfront.

3. In some situations, fencing or shrubs may give some protection against contaminants. Be mindful of the allowable clearances.

4.Frequent washing of the cabinet, fan blade and coil with fresh water will remove most of the salt or other contaminants that build up on the unit.

5. Regular cleaning and waxing of the cabinet with an automobile polish will provide some protection.

6. A good liquid cleaner may be used several times a year to remove matter that will not wash off with water.

Several different types of protective coatings are offered in some areas. These coatings may provide some benefit, but the effectiveness of such coating materials cannot be verified by the equipment manufacturer. The best protection is frequent cleaning, maintenance and minimal exposure to contaminants.

Regular service will reduce the buildup of contaminants and help to protect the unit's finish.

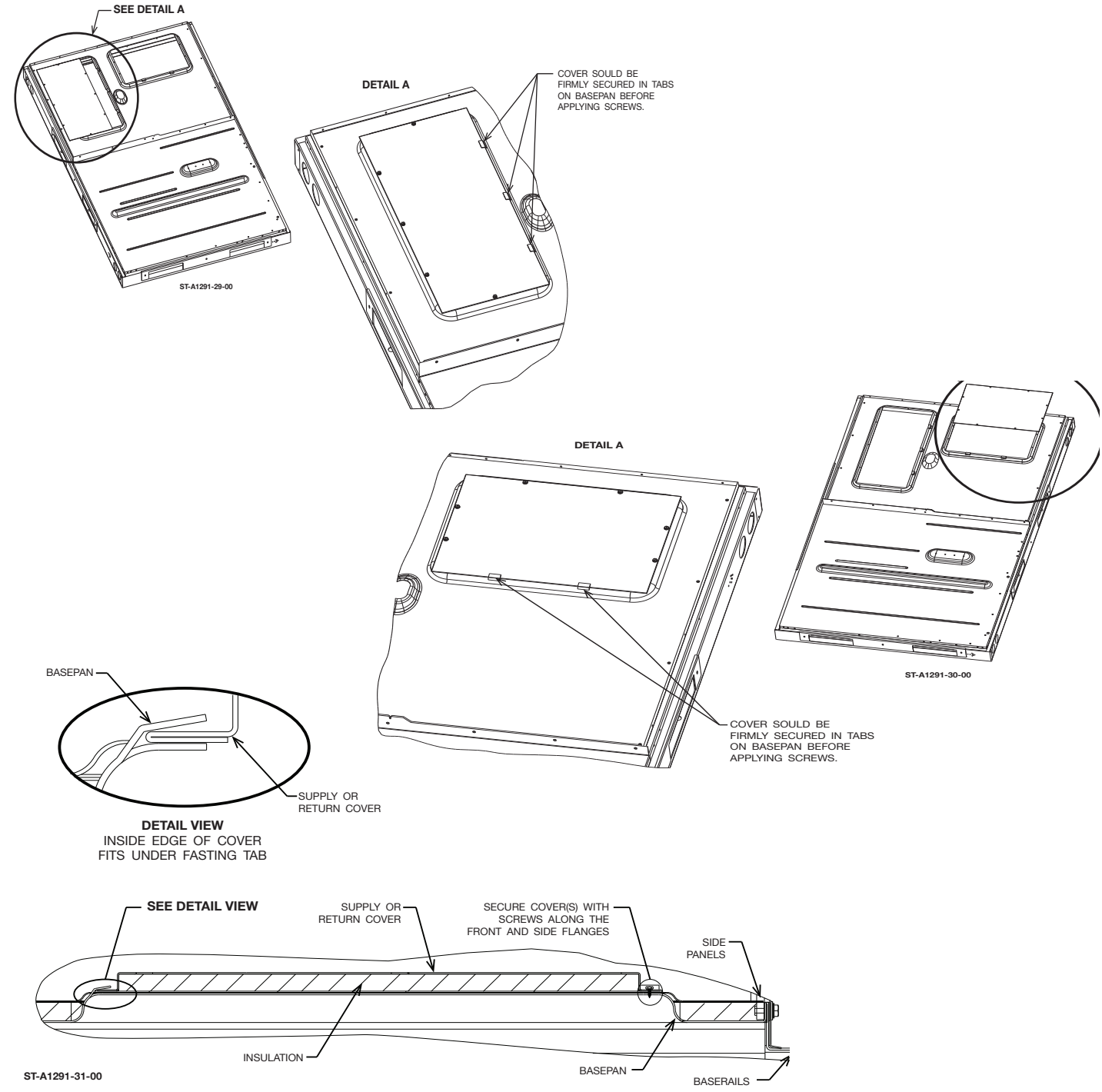
⚠**WARNING:** Disconnect all power to unit before starting maintenance. Failure to do so can cause electrical shock resulting in personal injury or death. Regular maintenance will reduce the buildup of contaminants and help to protect the unit's finish.

C.3.5. Cover Panel Installation/Conversion Procedure

FROM DOWNFLOW TO HORIZONTAL

1. Remove the covers from the supply and return openings on the unit. ***See Figure B.3.6. – B*** for reference.
2. Install the covers over the supply and return openings in the basepan, painted side up, inserting the leading flange under the bracket provided. Place the back flange to top of the front bracket provided. ***See Figure C.3.5. –A*** for reference.
3. Secure the return and supply cover to front bracket with screws.

Figure C.3.5. – A: Downflow to Horizontal Conversion



C. INSTALLATION OF THE UNIT

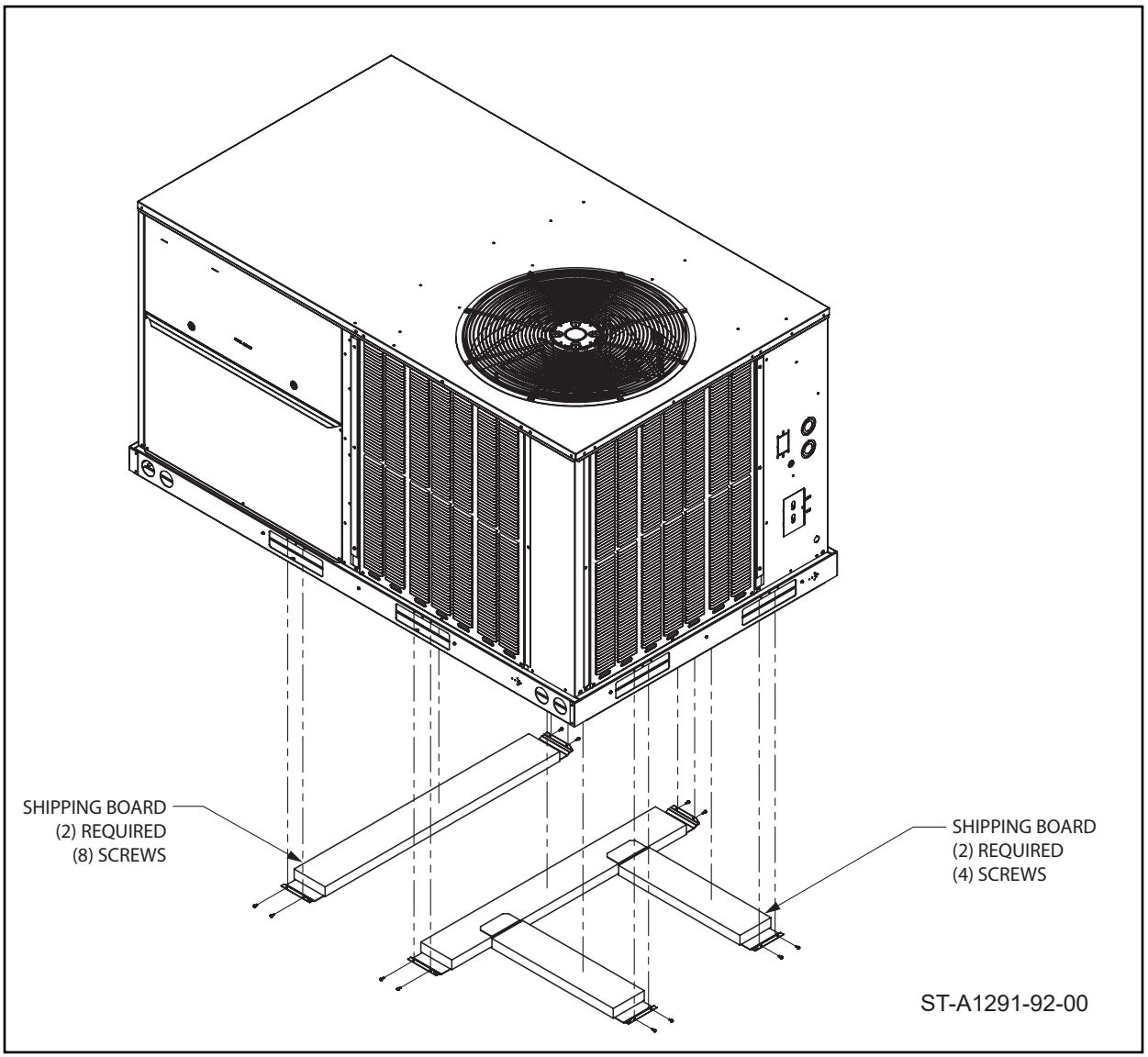
C.4.Setting the Unit

C.4.1. Removing Shipping Material

There will be three types of shipping material that will need to be removed: The wood board basepan protection underneath, the wooden skid on the top, and the condenser coil protection (on non-louver panel units).

• **Wooden Board Basepan Protection –** Remove the screws that attach the metal brackets for each of the forklift fork=entry points and remove the brackets. This will release the protection boards from underneath, and it may be removed when the unit is lifted.

Figure C.4.1. – A: Basepan Protection Assembly

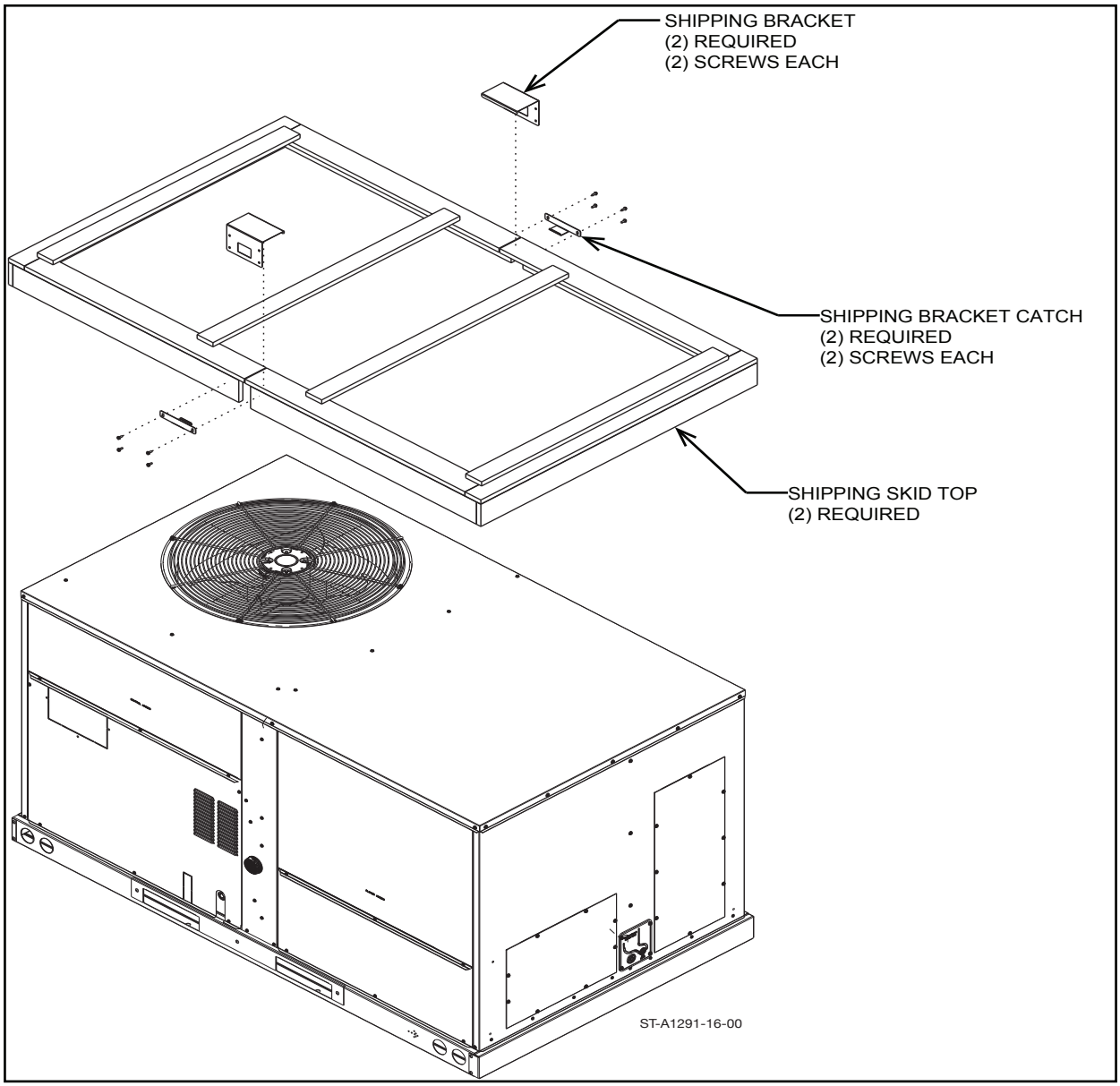


• **Shipping Screws –** Shipping screws are type #2 square head screws.

• **Wooden Skid –** Remove the screws from the metal brackets located in the middle along both long sides of the unit. This will detach the two sections of the wooden skid and allow them to be lifted off.

If the unit is to be lifted by a crane, it is recommended to leave the top skid on until after the unit is on the roof to provide extra protection if spreader bars are not used.

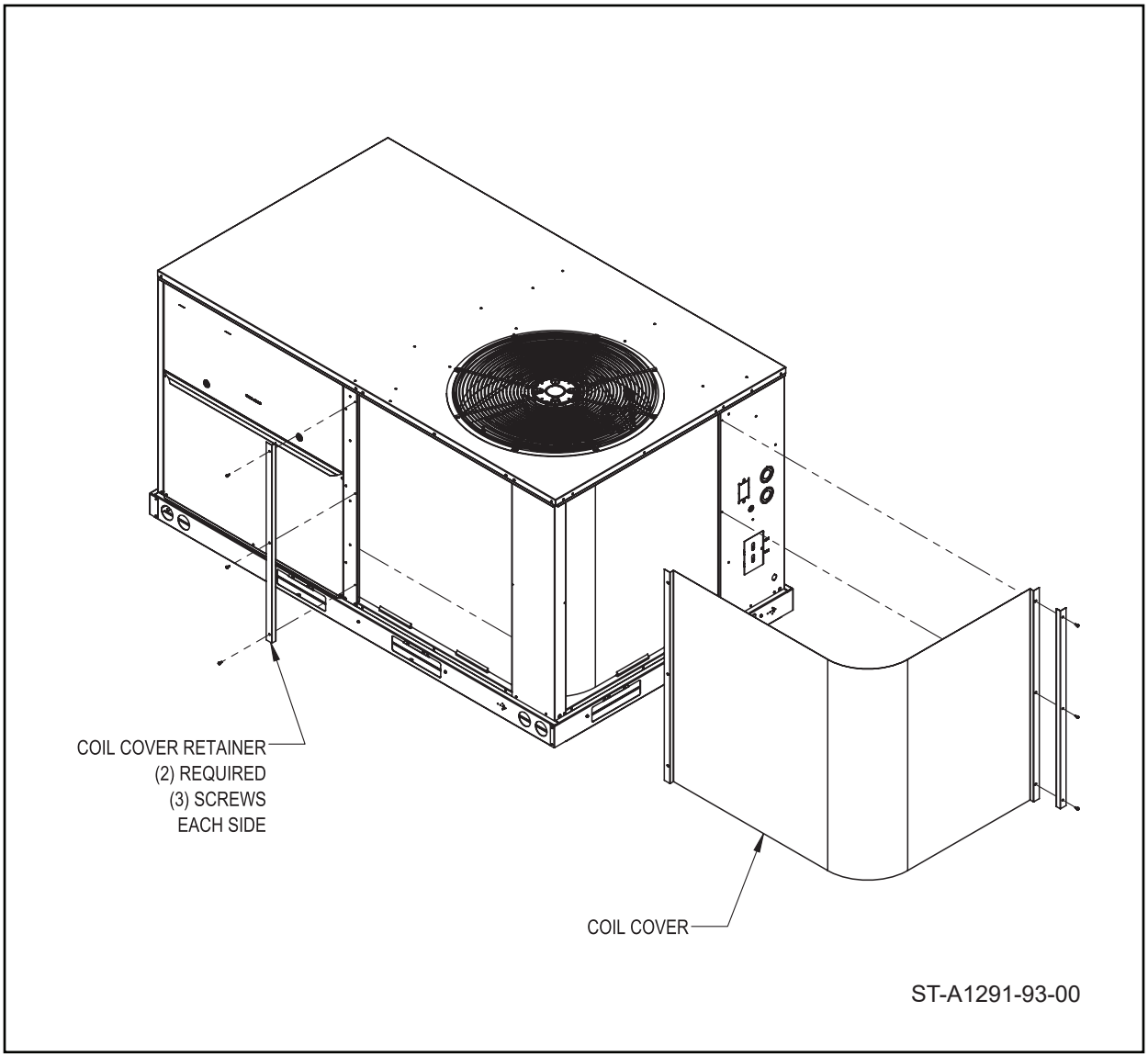
Figure C.4.1. – B: Wooden Skid Assembly



C. INSTALLATION OF THE UNIT

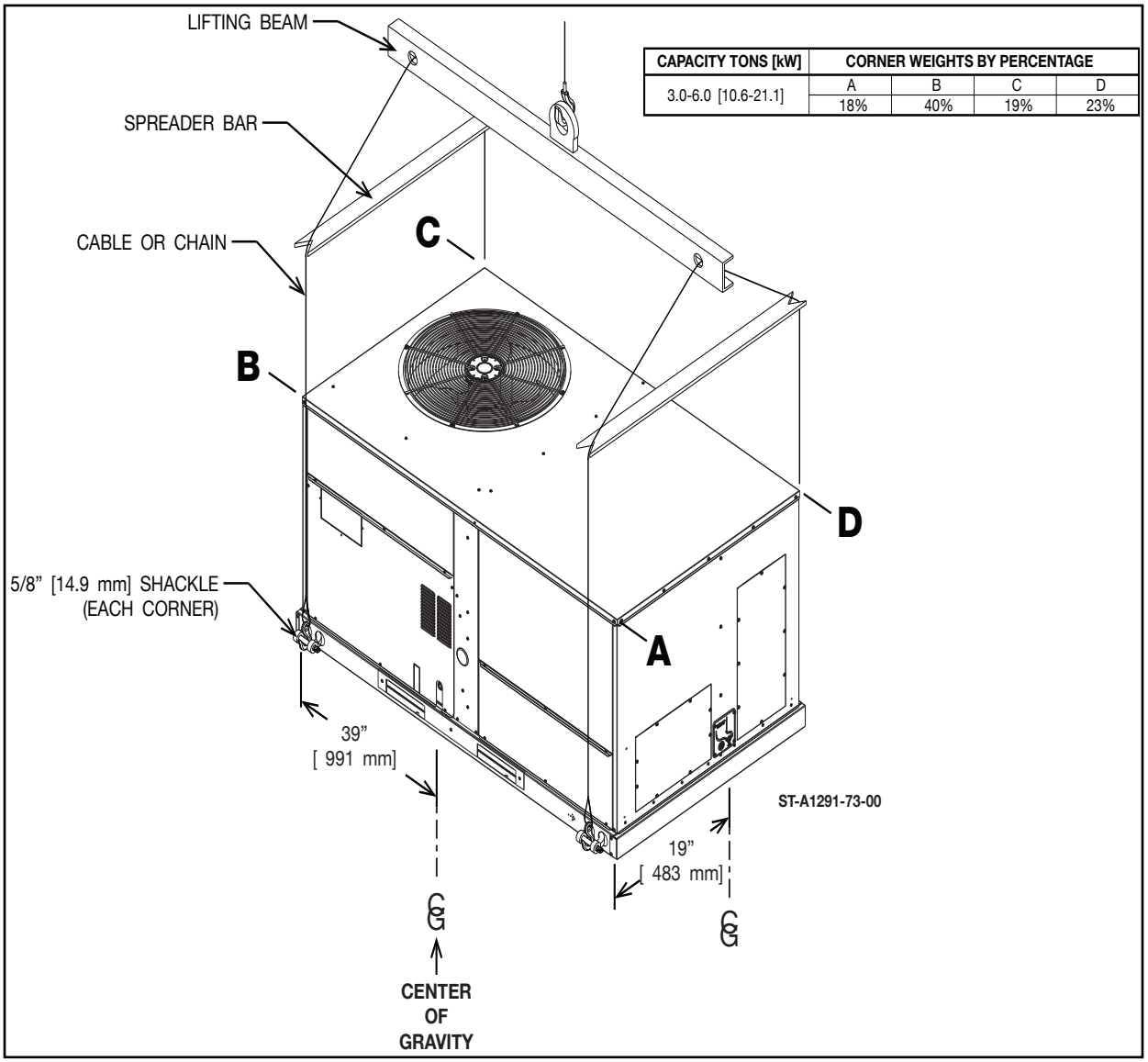
• **Condenser Coil Protection –** Remove the screws along the perimeter of the coil protector. This will allow the protector to be removed. If the unit has louver panels, it will not have the condenser coil protection.

Figure C.4.1. – C: Condenser Coil Protection Assembly



C.4.2. Lifting the Unit

Figure C.4.2. – A : Lifting Detail



CAPACITY TONS [kW]	CORNER WEIGHTS BY PERCENTAGE			
	A	B	C	D
3.0-6.0 [10.6-21.1]	18%	40%	19%	23%

C. INSTALLATION OF THE UNIT

C.4.3. On a Roof Curb

Refer to ***Figure C.3.1. - A*** in section ***C.3.1. "Unit Location: Allowable Clearances and Operational Issues"*** before installing the unit on a roof curb.

Only use manufacturer-approved roofcurb products for the unit.

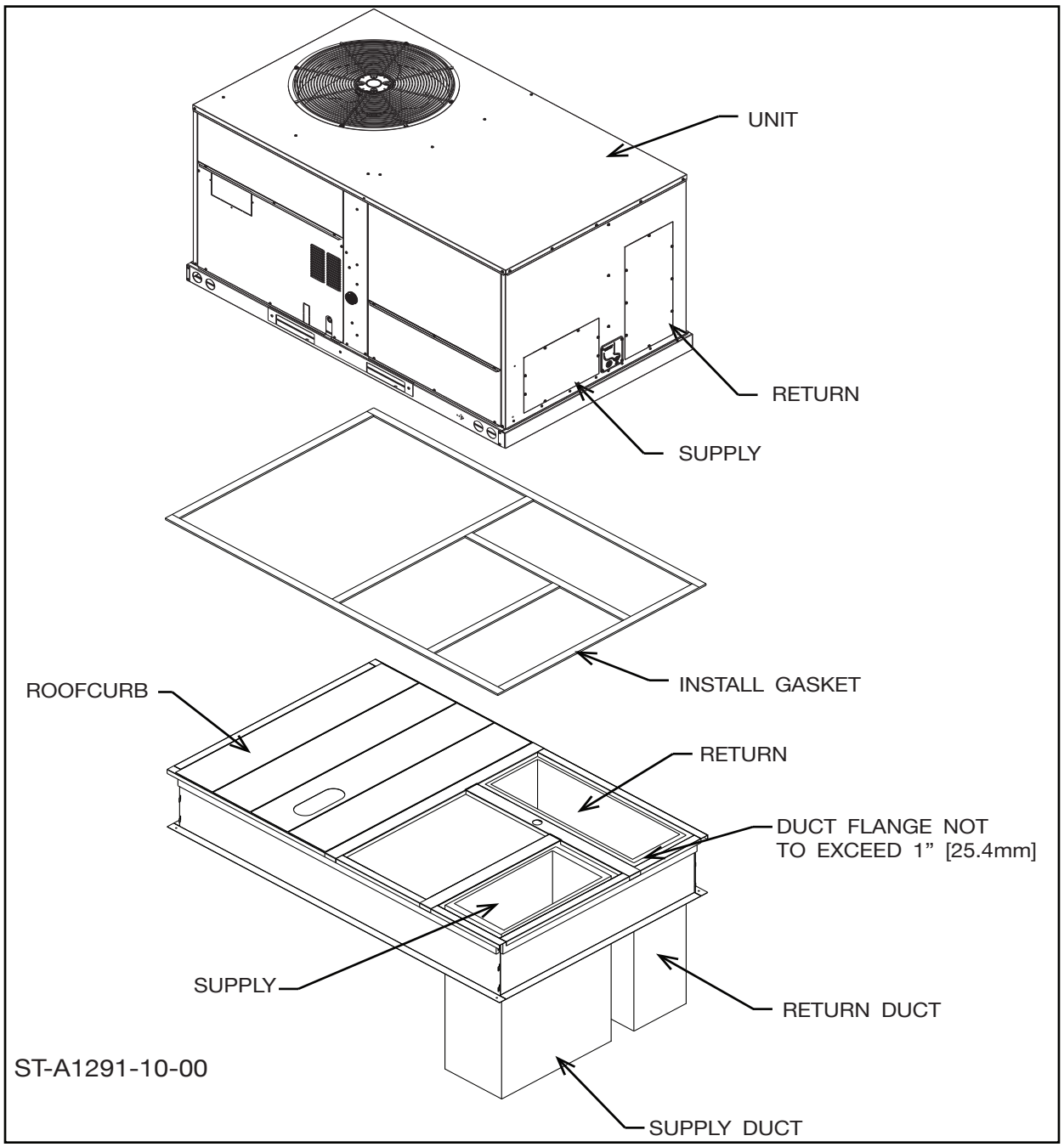
C.4.3.1. Installing the Roof Curb

Refer to the separate Installation Instructions for installing a roof curb. The accessory part numbers for the following accessories can be found in the product specification sheet.

- 14" and 21" Roofcurb
- Roofcurb Adapter

C.4.3.2. Setting the Unit

Figure C.4.3.2. - A: Setting the unit on Roofcurb Assembly



C.4.3.3. High Wind and Seismic Tie-Down Methods

The units must be secured in compliance with ASCE 7-10 and the latest Florida Building Code, where applicable. Please refer to ***Appendix J: Unit Tie-Down Methods.***

C.4.4. On a slab

C.4.4.1. Setting the Unit

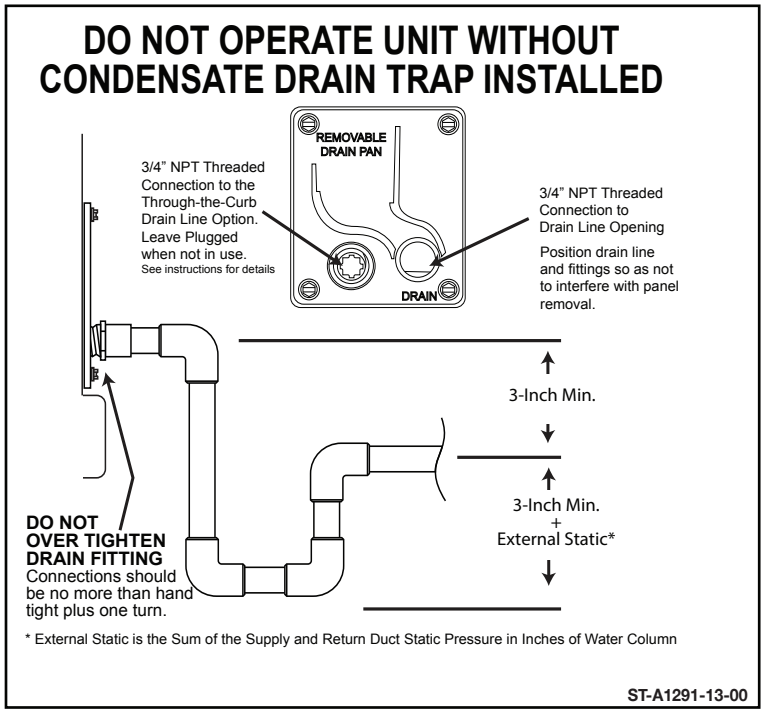
Set the unit on a stable concrete pad with adequate clearances around the sides of the unit, and make sure the unit is level before securing.

Before setting/securing the unit, use this opportunity to convert the unit from a downflow configuration to a sideflow configuration if necessary. Refer to section ***C.3.5. Cover Panel Installation/Conversion Procedure.***

C.4.4.2. High Wind and Seismic Tie-Down Methods

Slab-installed units must also be secured in compliance with ASCE 7-10 and the latest Florida Building Code. Please refer to ***Appendix J: Unit Tie-Down Methods.***

Figure C.5.1 – A: Condensate Drain Tap



C.5. Installing Condensate Drain

IMPORTANT: Install a condensate trap to ensure proper condensate drainage. See ***Figure C.5.1 - A*** for reference.

The condensate drain pan has a threaded female 3/4 inch NPT (11.5 TPI) connection. Drain line must be no smaller than drain pan outlet and adequately sized to accommodate the condensate discharge from the unit. Drain line must be routed to an acceptable drain or outdoors in accordance with local codes. Consult local codes or ordinances for specific requirements of condensate drain piping and disposal.

DO NOT connect condensate drain line to a closed sewer pipe.

C.5.1. Determine Drain Trap Height Requirement

The drain line should be a minimum of 3 inches deep, plus 1 inch for every inch of external static pressure from the blower and duct system. For Example, if the external duct static is 1 inch of water column, the drain trap from the bottom of the trap to the bottom of the drain outlet should be 4 inches, the drain outlet should be 3 inches below the drain connection on the condensate pan. Ensure the outlet of the trap is routed to a suitable drain location as required by local code. See ***Figure C.5.1 - A*** for reference.

C.5.2. Keeping the Condensate Drain Pan Serviceable

To use the removable drain pan feature of this unit, some of the condensate line joints should assembled for easy removal and cleaning. Drain line **MUST NOT** block service access panels.

C.5.3. Connecting the Drain Trap

- Use a thin layer of Teflon tape or paste on drain pan connections and install only hand tight.
- Do not over tighten drain pan connections as damage to the drain pan may occur.
- Drain line must be routed to an acceptable drain or outdoors in accordance with local codes.
- Drain line should slope away from unit a minimum of 1/8" per foot to ensure proper drainage.

C.5.3.1. Connecting the Drain to the Through the Curb Option

The through the curb drain option is available for installations in freezing conditions or that do not want water draining on the roof. Use adapters and elbows to turn out of the drain opening on the right and into the curb drain opening on the left. Under the unit connect a ¾" male treaded fitting, use thread sealant, into the opening between the supply and return duct openings under the unit. Install a properly sized drain trap in the conditioned space of the building and route to a suitable drain location as code requires.

C. INSTALLATION OF THE UNIT

C.5.4. Freezing Condition considerations

• Drain line may need insulation or freeze protection in certain applications.

• Drain line should slope away from unit a minimum of 1/8” per foot to ensure proper drainage.

C.6. Final Installation Inspection

C.6.1. Remove Shipping Material

Before the unit is secured to the slab/roofcurb, check that all shipping material has been removed. See section ***C.4.1.*** for how to remove shipping material.

NOTE: Failure to remove the condenser coil protector on non-louver panel units will negatively impact performance and be harmful to system components. Failure to remove the cardboard basepan protector will block all indoor airflow for downflow configurations.

Open all compartments to ensure there are no tools or other misc parts remaining in the unit from setup. This is most important on the blower section to avoid damage to the blower assembly.

C.6.2. Checking Level and Slope

This unit must be mounted level in both directions to allow water to properly drain from the condenser section and condensate pan.

C.6.3. Condensation and Sweating

In certain regions or climates, portions of the exterior of the unit may condensate or sweat during cooling operation. This is normal and expected.

D. DUCT AND VENTING

D.1. Air Flow and Static Pressure

See ***Appendix C*** towards the end of this manual for Air Flow Performance Data. For Air Flow adjustment and set up, see section ***J.3. “Checking and Adjusting Air Flow”.***

D.2. Duct Requirements and Best Practices

The installation contractor should fabricate ductwork in accordance with local codes.

Use industry manuals as a guide when sizing and designing the duct system.

Contact Air Conditioning Contractors of America at www.acca.org

⚠WARNING: DO NOT, under any circumstances, connect return ductwork to any other heat producing device such as fireplace insert, stove, etc. Unauthorized use of such devices may result in fire, carbon monoxide poisoning, explosion, personal injury, property damage or death.

⚠WARNING: Only auxiliary devices approved by the appliance manufacturer or declared suitable with the refrigerant shall be installed in connecting ductwork.

Place the unit as close to the conditioned space as possible allowing clearances as indicated. Run ducts as directly as possible to supply and return outlets. Use of non-flammable weatherproof flexible connectors on both supply and return connections at unit to reduce noise transmission is recommended.

On ductwork exposed to outside temperature and humidity, use a minimum of 2” of insulation and a vapor barrier. Distribution system in attic, furred space or crawl space should be insulated with at least 2” of insulation. Half-inch to 1” thick insulation is usually sufficient for ductwork inside the air-conditioned space.

Provide balancing dampers for each branch duct in the supply system.

Properly support ductwork from the structure.

IMPORTANT: In the event that the return air ducts must be run through an “unconfined” space containing other fuel burning equipment, it is imperative that the user must be informed against future changes in construction which might change this to a “confined space.” Also, caution the user against any future installation of additional equipment (such as power ventilators, clothes dryers, etc.), within the existing unconfined and/or confined space which might create a negative pressure within the vicinity of other solid, liquid, or gas fueled appliances.

D. DUCT AND VENTING

D.2.1. Supply Duct Systems

A properly designed supply duct system, meeting all local codes and best practices, must be installed to ensure proper air flow and minimize the static pressure on the blower.

The supply duct opening for roof curb installations is 17 3/4” x 16 3/8”, the supply duct opening for horizontal ducted installations is 18 5/8” x 13 1/8”. See ***Figure B.3.6. – A and – B*** for reference.

D.2.2. Return Duct Systems

A properly designed return duct system, meeting all local codes and best practices, must be installed to ensure proper air flow and minimize the static pressure on the blower.

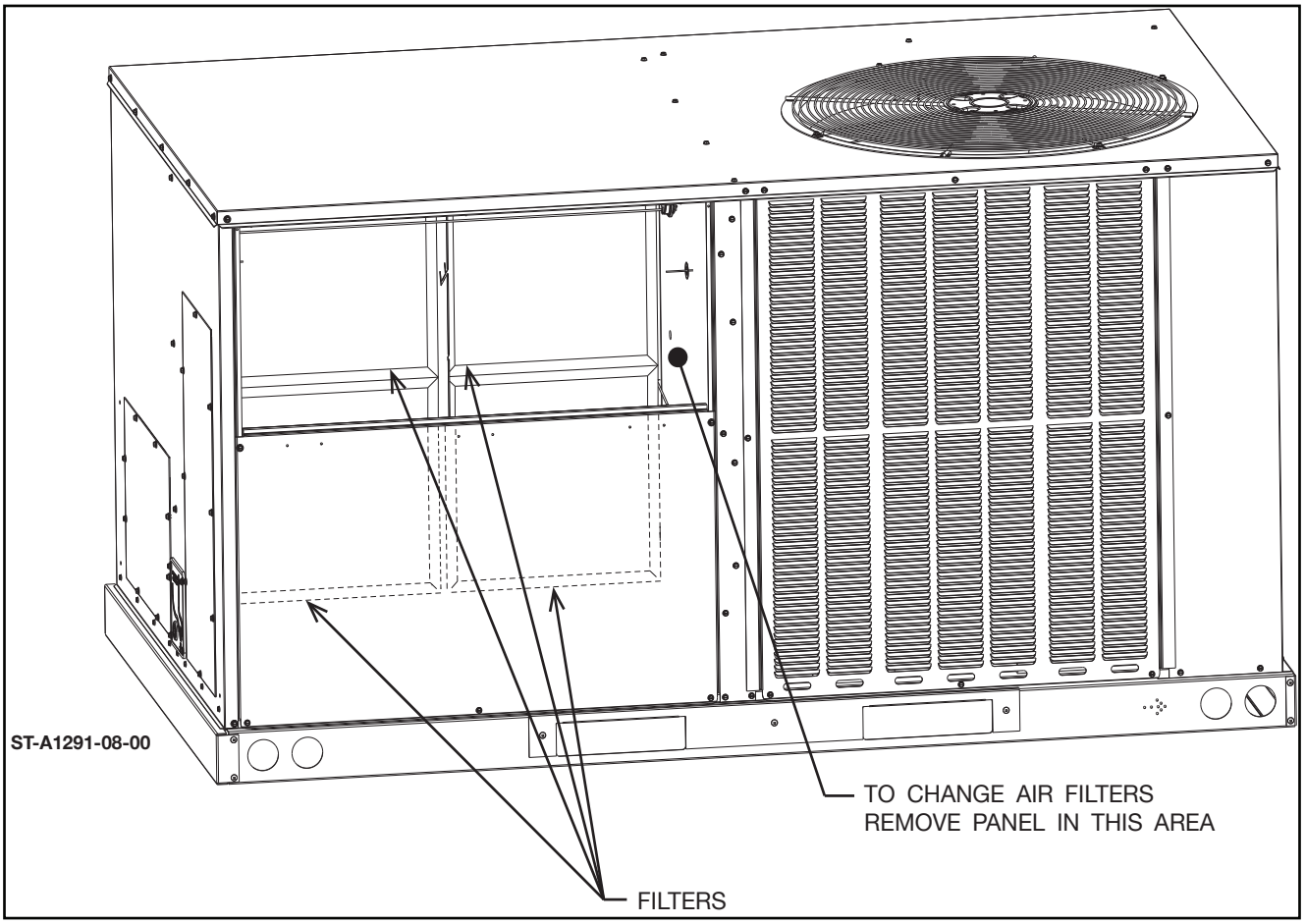
The return duct opening for roof curb installations is 25 5/8” x 12 1/8”, the return duct opening for horizontal ducted installations is 26 5/8” x 12”. See ***Figure B.3.6. – A and – B*** for reference.

D.2.3. Isolation for Noise abatement

Noise from operational vibration can occur with this equipment, the use of flexible duct adapters and vibration damping curb adapters maybe required depending upon the building type and use. Consult with a local mechanical engineer on the duct and building design to determine if any noise abatement solutions need to be considered before installation.

D.3. Filters

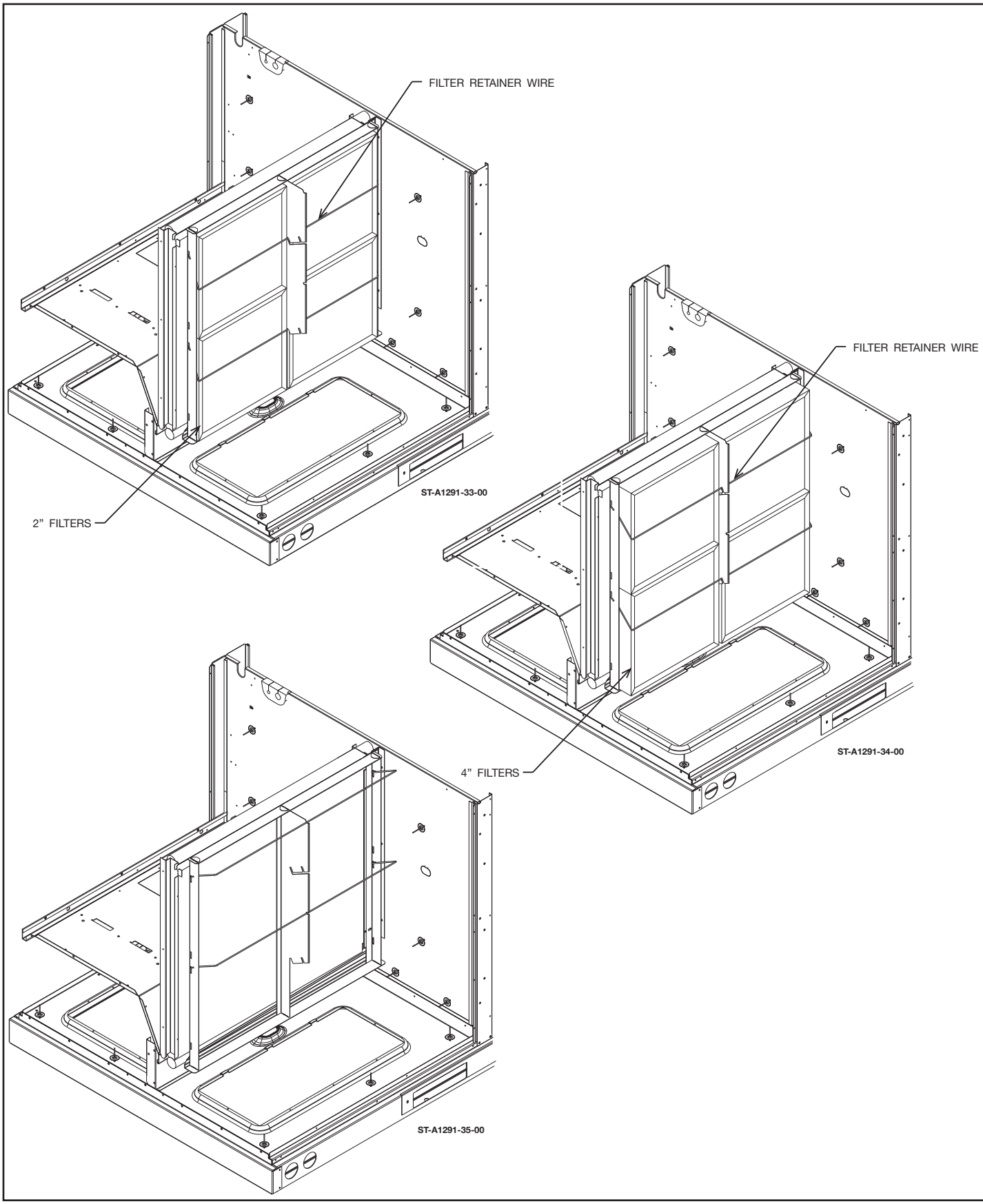
D.3.1. Installing Filters



D. DUCT AND VENTING

D.3. Filters

D.3.1. Installing Filters (Cont.)



This product will accept both 2” and 4” filters. A new unit ships with four 2” x 16” x 16” filters. For units with an economizer, only use 2” filters due to fitment clearances. To replace filters, follow these steps:

1. Remove “Filter Access” panel.
2. Pull downwards on retainer wire and rotate upwards to unlock filters.
3. Secure retainer wire in notch.
4. Remove and discard current filters.
5. Install new filters with airflow arrow pointing towards evaporator coil.
6. Rotate retainer wire downward to original position and secure in notch.
7. Install “Filter Access” panel.

D.4. Economizers and Fresh Air Dampers

D.4.1. Economizer Information

ECONOMIZERS - Mechanical devices used to make the Heating Ventilation and Air Conditioning (HVAC) unit more efficient by regulating the return air and outside air. Economizers for this product come in several configurations.

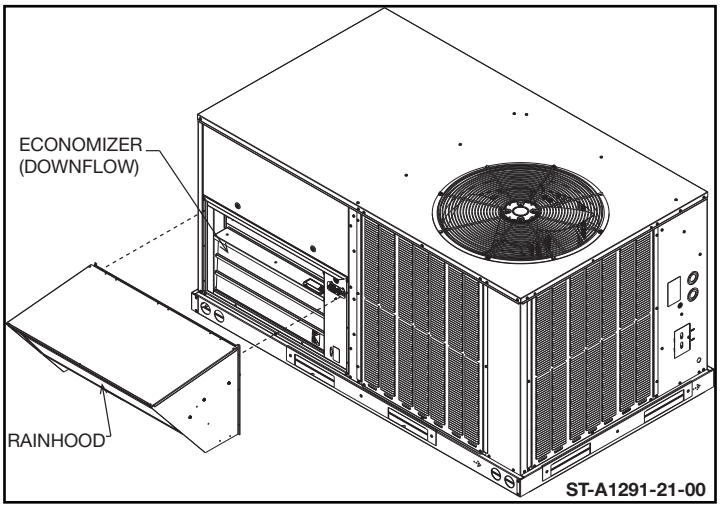
The Downflow Economizer is designed specifically for units setup in a downflow configuration. The downflow economizer fits inside the package unit and sits over the return-air opening along the bottom of the unit. All economizers are equipped with horizontal gear driven blades and a gravity relief damper (Barometric Relief).

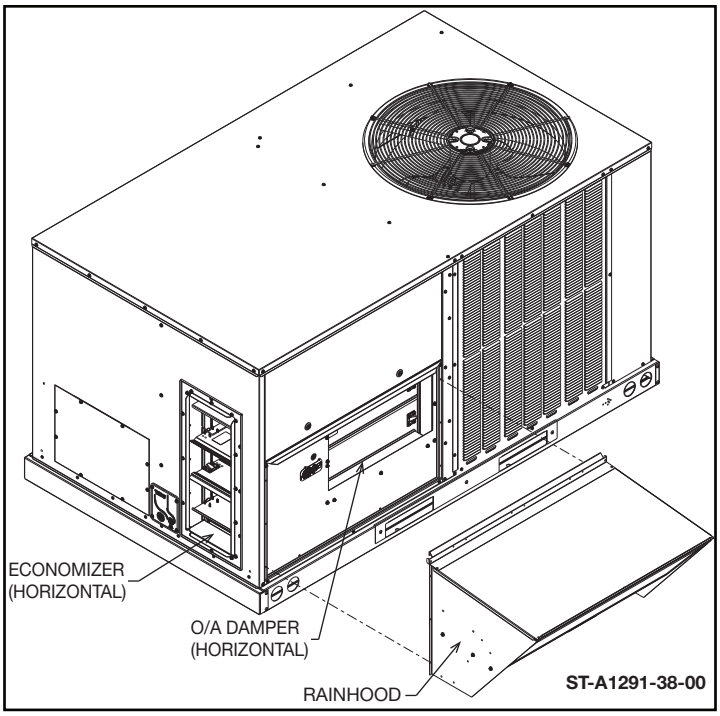
The Horizontal Economizer is designed specifically for units setup in a horizontal flow configuration. The horizontal economizer utilizes independently actuated return-air and fresh air dampers to enable the most efficient handling of air achievable with this platform. The horizontal economizer also includes an externally-mounted (to the duct work) gravity relief damper.

All units with economizers come shipped from the factory with a parts bag and a separate document for Economizer Installation & Operation instructions. Refer to that document for information on how to install the economizer, connect the controls, and adjust the airflow. Accessory economizers purchased separately will also come with the parts bag and instructional document.

For reference, the Installation Instructions for economizers may be found in the parts bag of the unit for factory installed economizers, in the box with the field installed economizers, or on the manufacturer’s website.

Figure D.4.1. – A: Downflow Economizer with Hood





D. DUCT AND VENTING

D.4.2. Fresh Air Dampers

MANUAL DAMPER HOODS – Manual damper hoods are often installed as a low cost substitute for an economizer.

The idea is to manually set the blade located inside the hood to restrict the opening by introducing Static Pressure, thereby balancing the outside air with the return air entering the RTU.

The drawback to a manual damper is that it is open 24 hours a day, 365 days a year. Therefore they introduce outside air during occupied and unoccupied modes increasing the load on the rooftop unit.

MOTORIZED DAMPER HOODS – A motorized damper is economical, and provides more comfort than a manually adjusted hood damper.

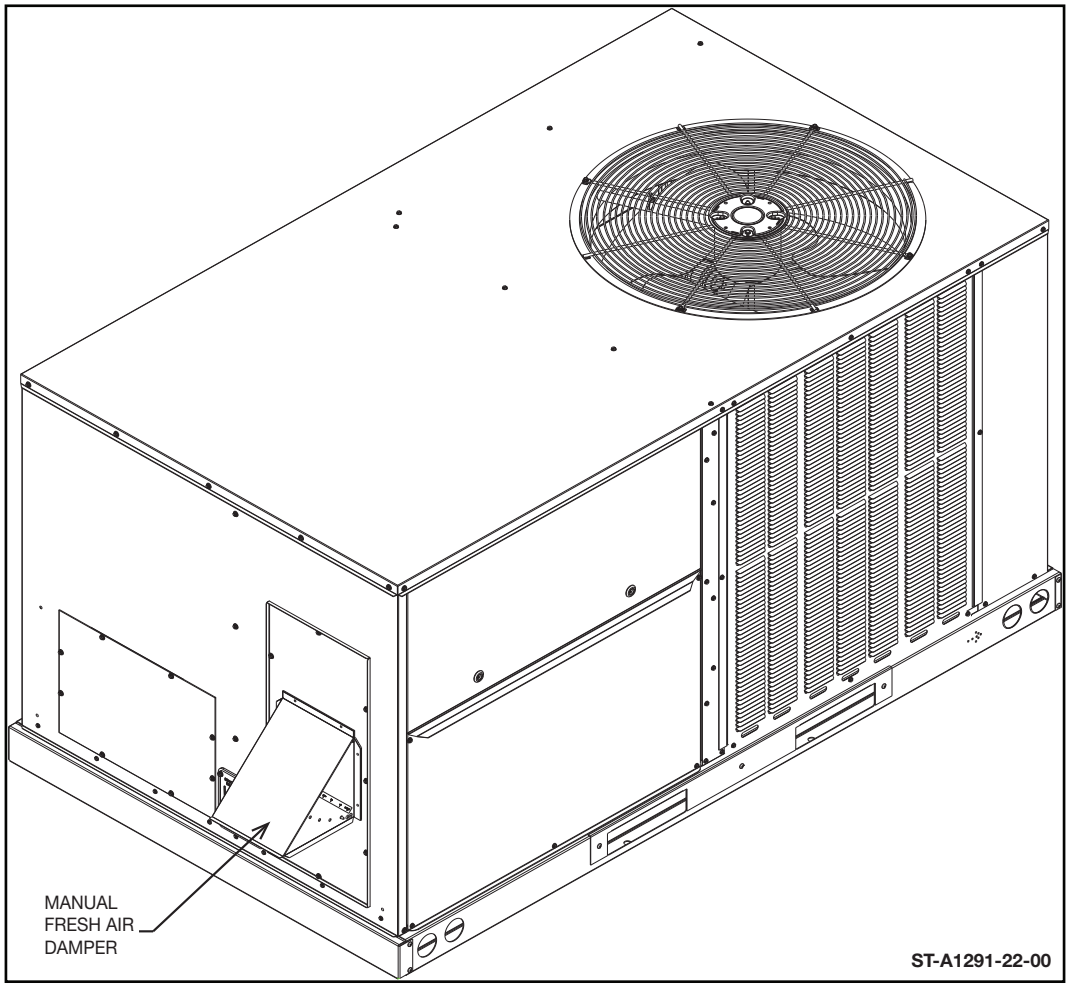
The motorized damper is coupled to an actuator, and designed to open when the RTU fan is running, and close when the fan is off. The advantage of the motorized damper is that the outside air is no longer a factor once the RTU fan is cycled off.

By connecting a Timer, CO2 Sensor or Smoke Detector in series between the RTU fan ("G" on the Thermostat) and actuator, the damper can be controlled during "Unoccupied" hours, or allow the damper to only introduce outside air during "On-Demand Occupancy."

Fresh Air Dampers come shipped with a separate document for Installation & Operation instructions. Refer to that document for information on how to install and adjust the dampers.

For reference, the Installation Instructions for Fresh Air Dampers may be found in the parts bag for the factory installed dampers, in the box for field installed dampers, or on the manufacturer's website.

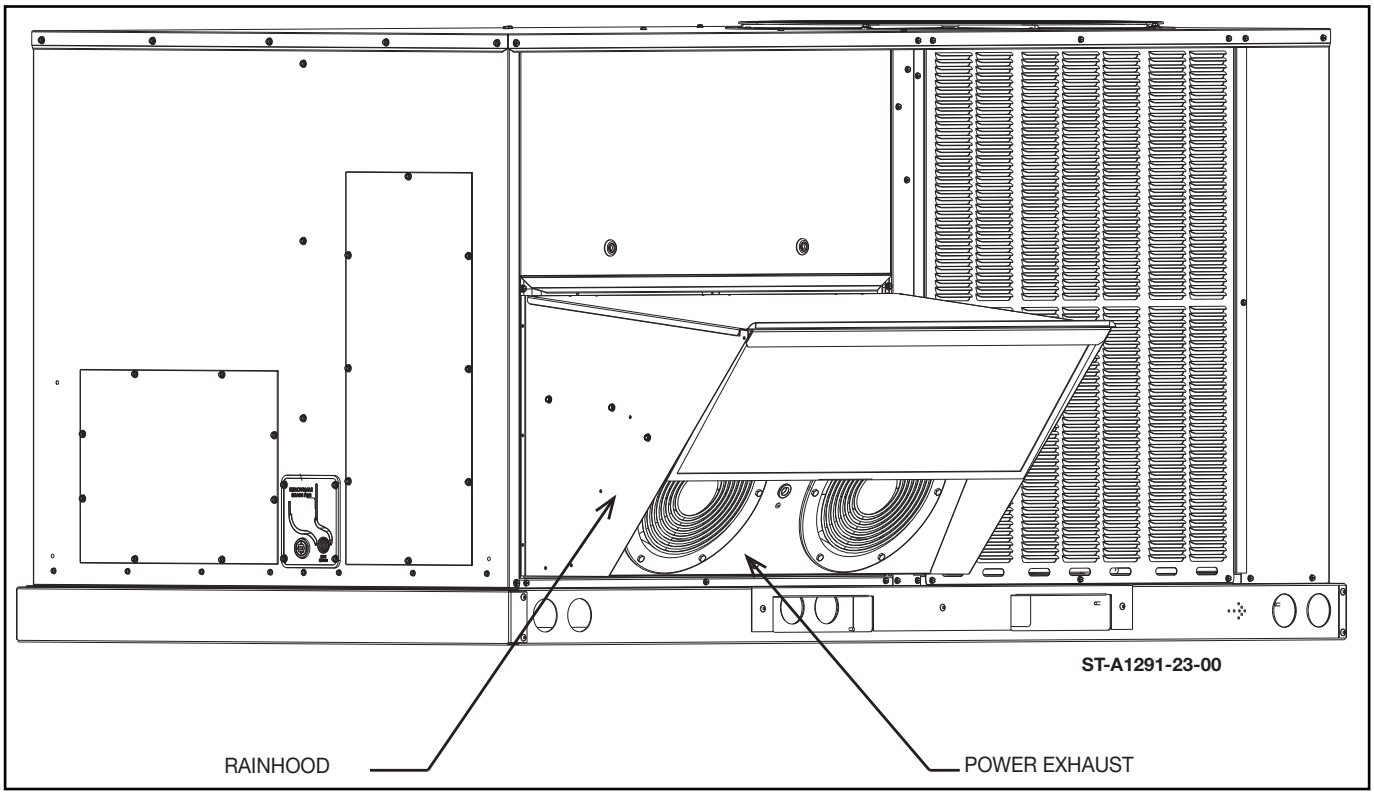
Figure D.4.2. – A: Fresh Air Damper



D.4.3. Powered Exhaust

POWER EXHAUST - This accessory is a motorized fan designed to remove air from the conditioned space efficiently. While this is useful for removing a high positive pressurization, caution must be taken in the setup of the system to avoid creating a negative pressure within the conditioned space. If negative pressure occurs, leaky windows, doors, and electrical fixtures will allow the outside air to creep in causing drafts or hot sports within a room.

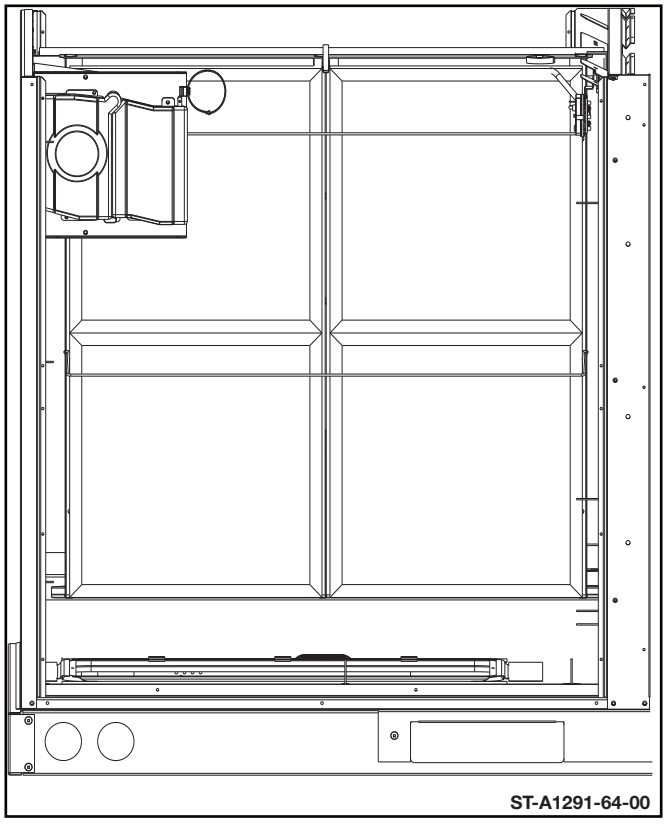
Figure D.4.3. – A: Powered Exhaust

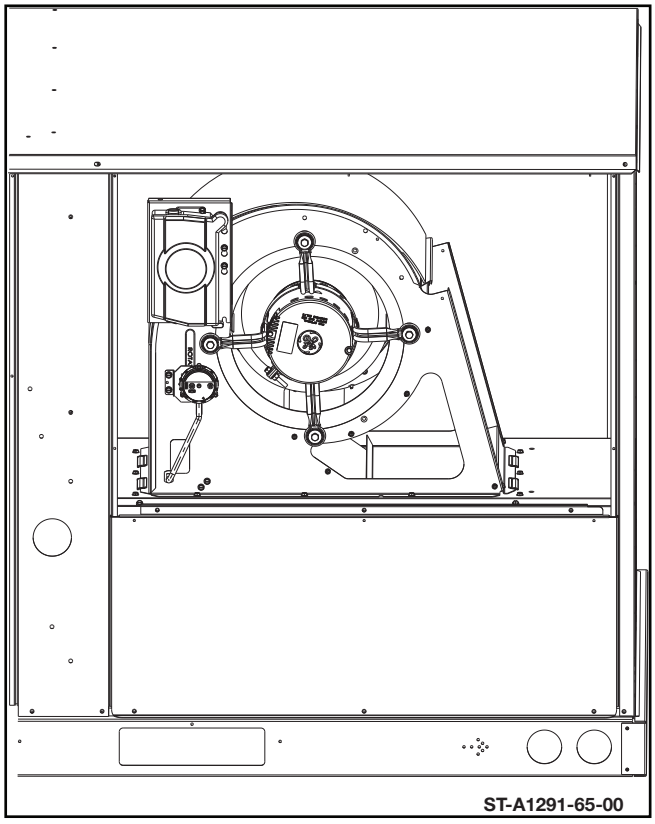


D. DUCT AND VENTING

D.5. Smoke Detectors

Figure D.5. – A: Smoke Detector Assembly





D.5.1. Supply Duct Smoke Detectors

D.5.1.1. Field Installed – Installation, Wiring and setup

Field install Supply and Return Duct Smoke Detectors come shipped with a separate document for Installation & Operation instructions. Refer to the separate Installation Instructions for installing, wiring, and setup of a supply and return smoke detector.

D.5.1.2. Factory Installed – Inspection and setup

Inspect the smoke detector assembly for any damage during shipping. Use ***Figure D.5. – A*** for reference. Confirm that all wiring connections are still secure. Refer to the separate Installation Instructions, for smoke detector wiring diagrams and additional assembly instructions.

D.5.1.3. Field Installed 3rd Party Smoke Detectors or Fire Control Panels

See ***Section F.1.2.*** for the proper connection points for a remote smoke detector. **DO NOT** break 24VAC to the Thermostat: shutdown will not occur. **DO NOT** break 24VAC from the transformer: it can overload the smoke detector controls.

Note: Accessory appearance may vary.

D.5.2. Remote Smoke Detectors Reference

Refer to ***Section F.1.2.-A Occupancy and Remote Smoke Detector Connections*** for non-DDC connections.

Refer to ***Section F.2.5.2. Remote Smoke Detector/Fire Control Connection*** for DDC connections.

E.1. Electrical Safety Information

E.1.1. Information on Power Supply

⚠WARNING: Turn off the main electrical power at the branch circuit disconnect closest to the unit before attempting any wiring. Failure to do so can cause electrical shock resulting in personal injury or death.

1. All wiring should be made in accordance with the **National Electrical Code**. Consult the local power company to determine the availability of sufficient power to operate the unit. Check the voltage at power supply to make sure it corresponds to the unit's RATED VOLTAGE REQUIREMENT. Install a branch circuit disconnect near the rooftop, in accordance with the N.E.C., C.E.C. or local codes.

2. It is important that proper electrical power is available at the unit. Voltage should not vary more than 10% from that stamped on the unit nameplate. On **three phase units**, phases must be balanced within 3%.

3. For branch circuit wiring (main power supply to unit disconnect), the minimum wire size for the length of run can be determined from the **N.E.C.** using the circuit ampacity found on the unit rating plate. Use the smallest wire size allowable in ***Figure F. – A*** from the unit disconnect to unit.

4. For through the base wiring entry reference ***Figure F.3. – A: Electrical and Piping Routing***. All fittings and conduit are field supplied for this application. Reference the chart with ***Figure F.3. – B: Hole Sizing for Conduit*** for proper hole and conduit size.

NOTES:

1. For branch circuit wiring (main power supply to unit disconnect), the minimum wire size for the length of run can be determined from ***Appendix B "Electrical Data"*** or the unit rating plate for circuit ampacity and the National Electrical Code to determine proper wire sizing. From the unit disconnect to unit, the smallest wire size allowable in ***Figure F.2.1. – A*** for the circuit ampacity may be used, as the disconnect must be in sight of the unit.

2. Wire size based on 75°C rated wire insulation for 1% voltage drop.

3. For more than 3 conductors in a raceway or cable, see the National Electrical Code (or C.E.C. in Canada) for derating the ampacity of each conductor.

IMPORTANT: This unit is approved for use with copper conductors only connected to unit contactor.

WARRANTY MAY BE JEOPARDIZED IF ALUMINUM WIRE IS CONNECTED TO UNIT CONTACTOR.

E. ELECTRICAL

Special instructions apply for power wiring with aluminum conductors:

Warranty is void if connections are not made per instructions.

Attach a length (6” or more) of recommended size copper wire to the unit contactor terminals L1, L2 and L3 for three phase.

Refer to the National Electric Code (NEC) for sizing wire to elec heat / single point. See ***Appendix E - Heater Kit Characteristics*** for additional info.

Select the equivalent aluminum wire size from the tabulation below:

Splice copper wire pigtails to aluminum wire with U.L. recognized connectors for copper-aluminum splices. Please exercise the following instructions very carefully to obtain a positive and lasting connection:

1. Strip insulation from aluminum conductor.

2. Coat the stripped end of the aluminum wire with the recommended inhibitor, and wire brush the aluminum surface through inhibitor. INHIBITORS: Brundy-Pentex “A”; Alcoa-No. 2EJC; T & B-KPOR Shield.

3. Clean and recoat aluminum conductor with inhibitor.

4. Make the splice using the above listed wire nuts or split bolt connectors.

5. Coat the entire connection with inhibitor and wrap with electrical insulating tape.

NOTE: Wiring to be done in the field between the unit and devices not attached to the unit, or between separate devices which are field installed and located, shall conform with the temperature limitation for Type T wire [63°F rise (35°C)] when installed in accordance with the manufacturer’s instructions.

E.1.2. 208/240 Volt Operation and Required Adjustments

E.1.2.1.Low Voltage Transformer Tap Adjustment for 208 Volt

Transformer is factory wired for 230 volts on 208-230 volt models and must be changed for 208 volt applications. See unit wiring diagram for 208 volt wiring.

E.1.3. 460 Volt Operation

Setup for 460V units will not require any additional setup.

E.1.4. 575 Volt Operation

575V operation is not available in this model.

E.1.5.Potential Ignition Sources

The UL safety standard defines potential ignition sources as hot surfaces, flames, and current carrying devices which can be the source of arcing or sparking.

In case any internal electrical components need to be replaced, those replacement parts must be ordered from the unit manufacturer’s website to ensure that the internal electrical components are not potential ignition sources.

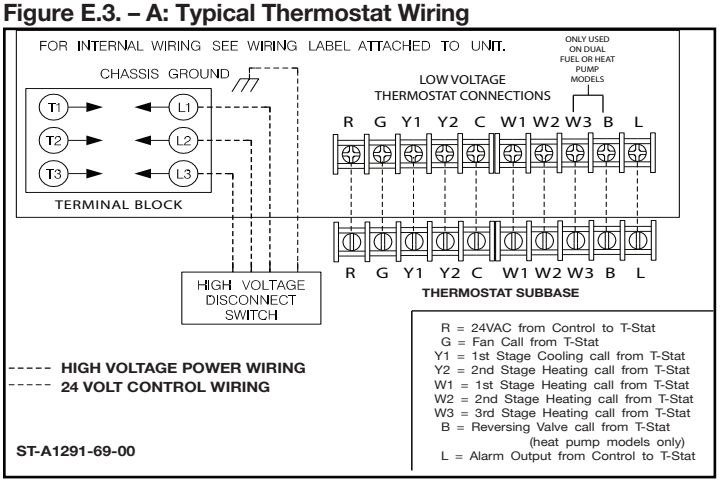
Examples of internal electrical components include contractors, relays, and control boards. This is not an exhaustive list. For the safety of customers and technicians, refer to the unit manufacturer’s website for proper unit component replacement.

E.2. Electrical Data

See ***Appendix B*** towards the end of this manual for Electric Data.

E.3. Electrical Connections

Figure E.3. – A: Typical Thermostat Wiring



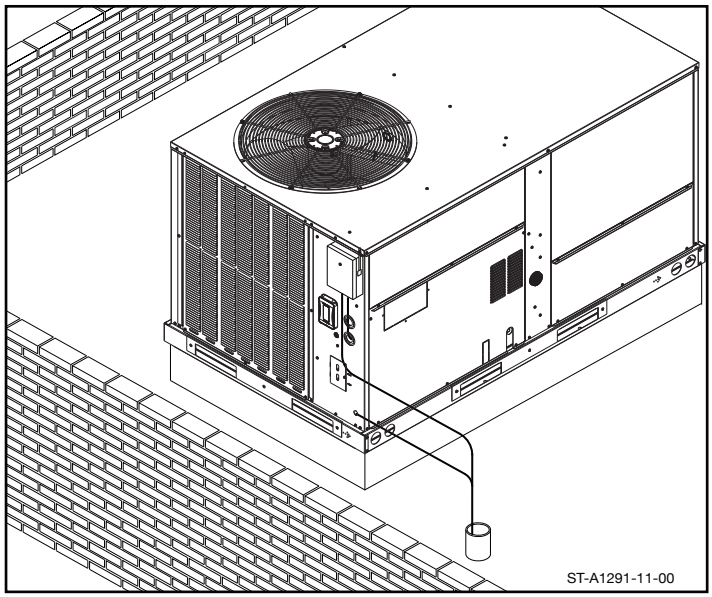
Use to ***Appendix B*** "Electrical Data" and National Electrical Code for circuit ampacity to determine proper wire sizing.

Refer to ***Figure F.3. – A: Power and Control Routing*** for location of wiring entrances, and ***Figure F.3. – B: Hole Sizing for Conduit.***

E.3.1. Field Supplied Disconnect

The field supplied service disconnect will come with a separate Installation Instruction document. Please refer to that document.

Figure E.3.1.1. – A: Standard Location for Mounting Disconnect



E.3.1.1. Mounting Disconnect on Cabinet

Attach the disconnect to the top of the left hand side of the control box, above the knockouts and refrigerant test ports. Do not use screws above or below the label specifying "TO PREVENT COIL DAMAGE – DO NOT ADD SCREWS HERE, ABOVE, OR BELOW LABEL" as hidden coil and tubing could be damaged. An example of this label is shown below.

Figure E.3.1.1. – B: Label Showing Where to NOT Use Screws



E.3.1.2. Routing Wires into Cabinet

See ***Figure F.3. – A: Electrical and Piping Routing*** for conduit entry points and routing locations for wiring into the control box.

See ***Figure E.3. – A: Typical Thermostat Wiring*** for wiring to the contactor and thermostat in the control box.

E. ELECTRICAL

E.3.1.3. Routing Wires through Curb (Option)

Use liquid tight connectors and tubing to connect the electrical and low voltage control cables between the base of the cabinet at the raised section (See ***Figure B.3.6. - A: Supply And Return Dimensions For Downflow Applications*** for location of raised section) and bottom of the control panel. Conduit and fittings must meet all applicable codes.

Use Silicon and gaskets to seal the connection at the base pan.

E.3.1.4. Connecting to Contactor Terminal Blocks

The recommended torque for securing wiring to the contactor is **40 in-lb**.

See ***Figure E.3. – A: Typical Thermostat Wiring*** for wiring to the contactor.

E.3.2. Factory Installed Disconnect

Refer to ***Appendix H*** for the unit wiring diagrams, and to ***Figure F.3. – A*** for locations to route wires into the cabinet or through the curb/ basepan of the unit.

E.3.2.1. Routing Wires into Cabinet

Refer to section ***E.3.1.1.*** and/or section ***F.3.*** for routing wires into the cabinet with a factory installed disconnect.

E.3.2.2. Routing wires through Curb (Option)

Refer to section ***E.3.1.3.*** for routing wires through the curb with a factory installed disconnect.

E.3.3. Connecting the Convenience Outlet

E.3.3.1. Non-powered

The non-powered convenience outlet, if purchased as an option for the unit, will come shipped in a box within the blower compartment of the unit. It will need to be removed and installed into its proper configuration.

For connecting the non-powered convenience outlet and all other information, refer to the installation instructions for the accessory.

E.3.3.2. Powered

The powered convenience outlet, if purchased as an option for the unit, will come shipped pre-installed into the unit. No additional hook-up will be needed, but ensure the connections remained secure from shipping before powering the unit.

For connecting the powered convenience outlet and all other information, refer to the installation instructions for the accessory.

E.3.4. Checking Phase and Motor Rotation

When using 3 phase power the only device that is rotation dependent is the compressor. The outdoor fan and indoor blower do not require any adjustment and will turn backwards if the phase is incorrect. Verify the direction of rotation for the indoor blower motor before starting up the compressors.

E.3.4.1. Checking Phase with VFD Drive

On any models equipped with an ECM Direct Drive Blower Motor or belt drive units with a Variable Frequency Drive, VFD, the motor will always rotate in the correct direction. Correction phase must be checked by the operation of the compressor.

E.3.5. Grounding Requirements

Refer to local codes as required. Must be grounded to a common earth ground.

National Electric Code (NEC) / International Building Code / Canadian Electrical Code

A diagram of the internal wiring of this unit is located on the inside of control access panel and in this manual. If any of original wire as supplied with the appliance must be replaced, the wire gauge and insulation must be same as original wiring.

The low voltage wiring should be sized as shown in ***Figure F. – A: Field Wire Size for 24v Thermostat Circuits.***

F. CONTROL / THERMOSTAT WIRING

F.1. Non-DDC Control Inputs

Figure F.1. - A

FIELD WIRE SIZE FOR 24 VOLT THERMOSTAT CIRCUITS							
		SOLID COPPER WIRE - AWG.					
THERMOSTAT LOAD - AMPS	3.0	16	14	12	10	10	10
	2.5	16	14	12	12	12	10
	2.0	16	16	14	12	12	10
		50	100	150	200	250	300
		LENGTH OD RUN - FEET (1)					

ST-A1291-14-00

(1) THE TOTAL WIRE LENGTH IS THE DISTANCE FROM THE FURNACE TO THE THERMOSTAT AND BACK TO THE FURNACE.

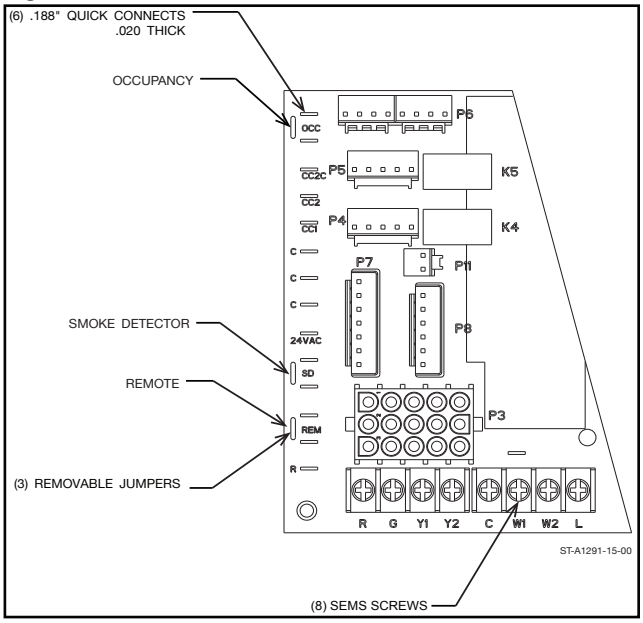
NOTE: DO NOT USE CONTROL WIRING SMALLER THAN NO. 18 AWG.

F.1.1. T-Stat field connections

Refer to ***Appendix H*** for the unit wiring diagrams and to ***Figure E.3. – A: Typical Thermostat Wiring.***

Install the room thermostat in accordance with the instruction sheet packed in the box with the thermostat. Run the thermostat lead wires through the control entry opening ***(Figure F.3. – A: Electrical and Piping Routing)*** and connect to the low voltage thermostat connections (see ***Appendix H*** for wiring diagrams and ***Section F.1.1.*** for T-Stat field connections). Never install the thermostat on an outside wall or where it will be influenced by drafts, concealed hot or cold water pipes or ducts, lighting fixtures, radiation from fireplace, sun rays, lamps, televisions, radios or air streams from registers. Refer to instructions packed with the thermostat for “heater” selection or adjustment.

Figure F.1.1. - A: Core Command Terminal Locations



F.1.2. Occupancy and Remote Smoke Detector Connections

Figure F.1.2. – A: Occupancy and Remote Connections

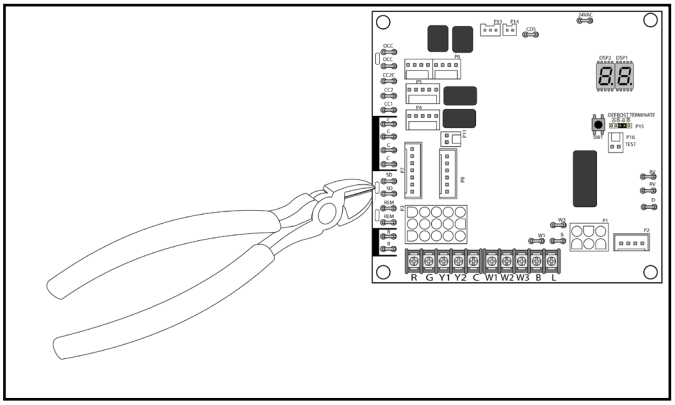


Figure F.1.2. - B: Non-DDC Board

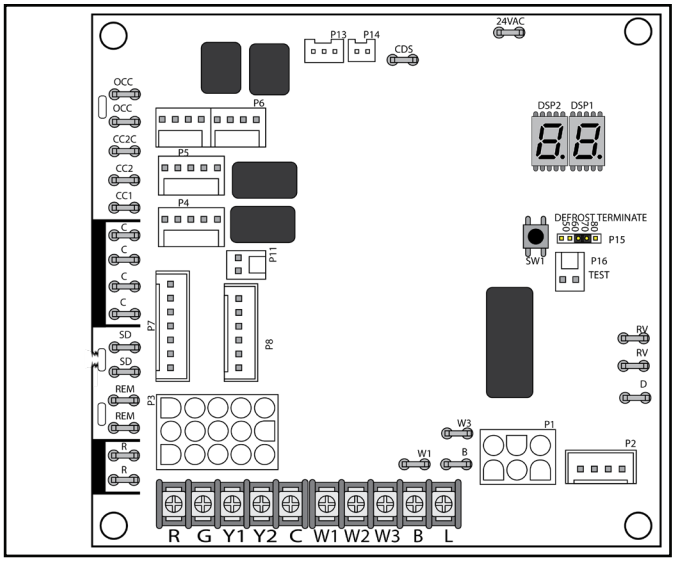
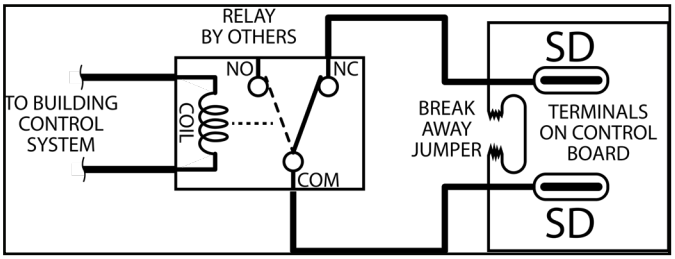


Figure F.1.2. - C: Using a Dry-Contact Relay



NOTE: This is an example of breaking the jumper for Smoke Detector connections, apply the same process for the Occupancy and/or Remote connections.

These features are only available on the Non-DDC Furnace, Heat pump, or cooling only control boards.

F. CONTROL / THERMOSTAT WIRING

OCC – Occupancy Control. This feature shuts down the dampers on the economizer or motorized damper option when outdoor/fresh air is not required for the building. Locate the terminals at the left side of the board mark "OCC". See Figure ***F.1.2. – A: Occupancy and Remote Connections*** for reference.

For connecting Remote Smoke Detectors or Fire Control Panels to this control DO NOT break the 24VAC to the thermostat or from the power supply transformer. Either could cause an undesirable operating condition that would not shut the unit down in the event of an emergency situation. See the instructions for the type of control board this unit is equipped with.

Using cutters or a small screw driver, break the edge of the board between the to terminals marked with "OCC". Use 3/16" blade connector, and a minimum of 18AWG wire to connect to a Normally Closed Dry Contact Relay or Switch. Do not connect multiple control boards to the same dry contact relay or switch.

REM – Remote Shutdown Control. This feature allows the unit to be turned off remotely ignoring the thermostat calls for cooling or heat. Locate the terminals at the left side of the board mark "REM". See Figure ***F.1.2. – A: Occupancy and Remote Connections*** for reference.

Using cutters or a small screw driver, break the edge of the board between the to terminals marked with "REM". Use 3/16" blade connector, and a minimum of 18AWG wire to connect to a Normally Closed Dry Contact Relay or Switch. Do not connect multiple control boards to the same dry contact relay or switch.

F.1.3. Connecting a Smoke Detector

F.1.3.1. Core Command Connection

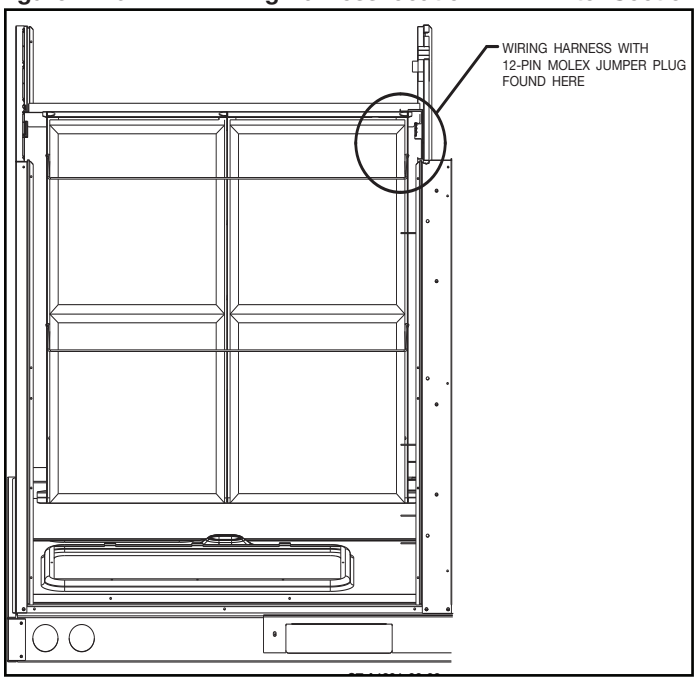
SD – Remote Smoke Detection. This feature allows for the proper shutdown of the controls in the event of an emergency situation. Locate the terminals at the left side of the board mark "SD". See ***Figure F.1.2. – A: Occupancy and Remote Connections*** for reference.

Using cutters or a small screw driver, break the edge of the board between the to terminals marked with "SD". Use 3/16" blade connector, and a minimum of 18AWG wire to connect to a Normally Closed Dry Contact Relay or Switch. Do not connect multiple control boards to the same dry contact relay or switch.

F.1.3.2. DDC Control Connection

In the air-filter section or on the side economizer, locate the 12-pin Molex jumper plug with the long Red, short Yellow and Orange wire loops; see ***Figure F.1.3.2. - A*** for reference. Cut the Red wire loop and connect these to a minimum of 18AWG wire that will be connected to a Normally Closed Dry Contact Relay, or in common Fire Control Panels and Smoke Detectors, the Auxiliary Connections for C and NC. See the instructions for the remote devices. Do not connect multiple control boards to the same dry contact relay.

Figure F.1.3.2. – A: Wiring Harness location in Air-Filter Section



F.1.4. Building Management / Control Connections using DDC –

In an application where a third party building management / controls are in use or will be incorporated, units with the integral Rooftop Unit Controller (RTU-C) are communication compatible with the system that supports the BACnet Application Specific Controller device profile, LonMark Space Comfort Controller functional profile, or LonMark Discharge Air Controller functional profile. This is accomplished with a field installed BACnet or LonMark communication module. Refer to the Clear control/DDC manual for more detail.

F.2. DDC Control Inputs

Figure F.2.1. - A 24VAC Thermostat Circuits

FIELD WIRE SIZE FOR 24 VOLT THERMOSTAT CIRCUITS							
THERMOSTAT LOAD - AMPS		SOLID COPPER WIRE - AWG.					
	3.0	16	14	12	10	10	10
	2.5	16	14	12	12	12	10
	2.0	16	16	14	12	12	10
		50	100	150	200	250	300
		LENGTH OD RUN - FEET (1)					

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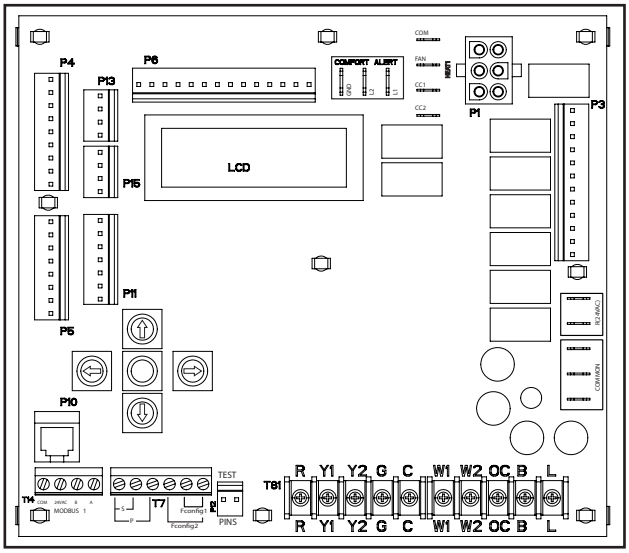
(1) THE TOTAL WIRE LENGTH IS THE DISTANCE FROM THE FURNACE TO THE THERMOSTAT AND BACK TO THE FURNACE.

NOTE: DO NOT USE CONTROL WIRING SMALLER THAN NO. 18 AWG.

F.2.1. 24VAC Thermostat Control/ Operation

Install the room thermostat in accordance with the instruction sheet packed in the box with the thermostat. Run the thermostat lead wires through the control entry opening ***(Figure F.3. – A: Electrical and Piping Routing)*** and connect to the low voltage thermostat connections (see ***Appendix H*** for wiring diagrams). Never install the thermostat on an outside wall or where it will be influenced by drafts, concealed hot or cold water pipes or ducts, lighting fixtures, radiation from fireplace, sun rays, lamps, televisions, radios or air streams from registers. Refer to instructions packed with the thermostat for "heater" selection or adjustment.

Figure F.2.1. - B: Clear Control Terminal Locations



F.2.2. DDC Automated Stand-Alone Operation.

F.2.2.1. Setting the Unit Up: Mode Settings

The unit will need to be configured as follows.

1. The Mode must be set to Auto. This will allow the unit to automatically switch between heating and cooling operation based on the return air temperature or space temperature sensor, if installed (See Section ***F.2.3. External Sensor Connections***).

The following Automatic Modes can be selected:

AUTO - run both heating and cooling.

Cool Only - run only cooling.

Heat Only - run only heating.

Fan Only - will only run the fan with no heating or cooling.

2. To select the Mode, use the right arrow key to navigate to "MODE," press the middle button and use the up and down arrow keys to select the desired operating mode for the unit, and then press the middle button to confirm. Control by Thermostat (Crtl by Tstat) is not an automatic operation mode.
3. Next the Occupancy Control must be set up. While in the Mode Menu, use the down arrow key to navigate to the Occupancy Menu option. Press the middle button to change the setting and use the up and down arrows to select the option required by the application. Then, press the middle button to confirm the setting.
   - If the system is going to run in stand-alone mode with no external inputs for Occupancy control (refer to section ***F.2.2. DDC Automated Stand-Alone Operation***), set the occupancy to "occupied." In this setting, the system will run in a continuous occupied state and the operation of the fan will be based on the indoor fan mode. Refer to section ***F.2.2.2. Indoor Fan Mode***.

- If “unoccupied” is selected, the unit will run in a continuous state of unoccupied, and only turning on the fan when heating or cooling for the unoccupied setpoint is needed. In this mode, if a zone sensor with an override button is installed (refer to section ***F.2.3.2. Zone Sensor Occupancy Override***), then the unit can be triggered to run in an occupied mode based on the tenant override timer. The zone sensor occupancy button will also trigger an occupied state for all occupancy control modes.
- If “local switch” is selected, then the unit will look for an external 24VAC input on the OC terminal of the T8 terminal strip. This 24VAC source can be from an external time clock or building occupancy controller. When 24VAC is applied to the OC terminal, the unit will enter an occupied state of operation.
- If “network” is selected, the unit will look for an occupancy command coming from a Building Management System through the Modbus interface of the control board. Optional BACnet or LonTalk translator cards will carry this function as well.

For information on setting up the system for stand-alone operation, including preparing the unit for Building Management Control, refer to section ***F.2.2. DDC Automated Stand-Alone Operation*** and ***F.2.4. Building Management/Control Connections Using DDC***.

F.2.2.2. Indoor Fan Mode

If the unit is running in an occupied state, the system does not have to continuously run the fan. In the Mode Menu, use the down arrow to navigate to “Indoor Fan Mode.” There are two selectable options: continuous and auto-mode. Continuous will run the fan continually in the occupied more, while auto-mode will only run the fan when there is a call for heating or cooling.

F.2.2.3. Occupancy Control External Input 24VAC

Occupancy can be triggered externally to the unit via a 24VAC input on the OC terminal of the T8 thermostat terminal strip. To connect, run the wire from the “R” 24VAC terminal and the “OC” terminal to an occupancy controller in the building. The control needs to have a dry contact relay. When the relay is closed, 24VAC will be passed to the OC terminal and trigger the unit into an occupied operating mode. When the relay is open, the 24VAC to the OC terminal will be lost and the unit will run in an unoccupied state.

F.2.2.4. Temperature Setpoints

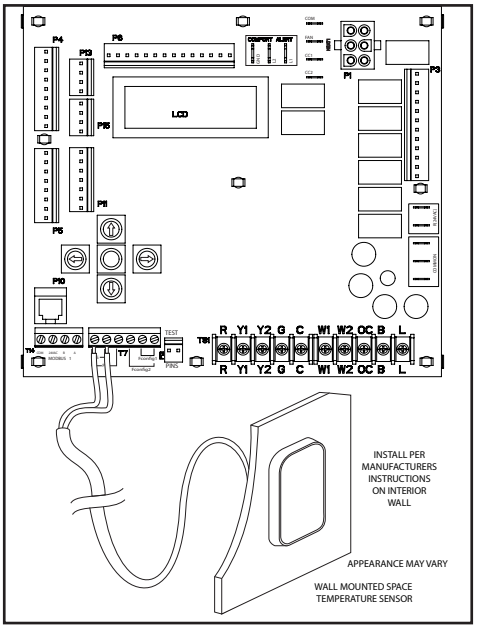
There are two temperature setpoints for occupied and unoccupied modes, heating and cooling. Using the control board’s navigation buttons, proceed to the Setpoints Menu and use the down arrow key to select “occupied or unoccupied cool and heat setpoints.” Press the middle button to select the first setpoint and use the up and down arrow to adjust the setpoint as required for the application. Then, press the middle button to confirm the setting and advance to the second setpoint. Again, use the up and down arrow keys to adjust the setting, and press the middle button to confirm this setpoint and the settings for the occupancy mode.

There is an automatic temperature differential between heating and cooling. This is adjusted and set in the “Cool Diff” and “Heat Diff” menu items.

F.2.3. External Sensor Connections

F.2.3.1. Space Temperature Sensor

Figure F.2.3.1. - A: Space Temperature Sensor



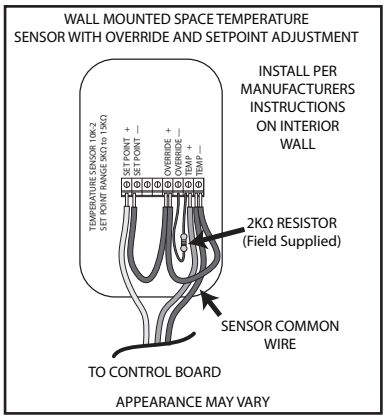
1. When using a DDC unit with Clear Control in conjunction with a Building Management System or an Automated Operational Mode, the use of a Space Temperature Sensor can greatly improve the accuracy and operation of the unit in maintaining the comfort in the space in both cooling and heating.
2. The space temperature sensor requirements is a 10k type II sensor.
3. Install the sensor on an interior wall in the space served by the packaged unit and connect the wires according to the manufacturer's instructions of the sensor type and style selected.
4. Run these wires from the sensor to the control panel of the unit.
5. After routing the sensor wires through the control panel and to the control board, strip 1/4" of insulations off the ends of the wires.
6. At the control board, locate the T7 green terminal strip. Loosen the two screw terminals marked with "S" (the two left most terminals), insert one of each of the two wires into the terminal opening on the bottom of the strip, and tighten the screw terminal. The connections are not polarity specific, either wire can be connected to either terminal, unless a setpoint adjustment option is used, they will use a shared common, the left most terminal. See the sensor manufacturer's instructions for details.
7. Verify the sensor is reading properly, power up the unit, use the left arrow key to navigate to the Temperatures Menu. Use the down arrow key to go to the space temp option, it should be showing a temperature reading. Use a test instrument to verify the air temperature at the sensor is within 1 to 3 degrees of the reading on the control board. An incorrect type sensor, excessive wire length, or bad connections will cause a significant discrepancy in the readings.
8. For more accurate operation, use the Space Temp Offset menu option to adjust the sensor reading on the Clear Control by +/-3 degrees to match the reading on the test instrument.
9. If the Clear Control is in the control by Thermostat Mode, the Space Temperature sensor will not be used for the operation of the unit.

F.2.3.2. Zone Sensor Occupancy Override

If the wall sensor has an override button for triggering occupancy, the override button needs to be set up as follows. The override trigger is looking for a 1.2 to 1.6 Ohm resistance across the space temperature sensor input.

1. Depending on the design of the sensor, some provide separate connections for the override output. If this is the case, use a short piece of wire to connect one side of the override output to one side of the temperature sensor output, and then use a 2k Ohm resistor (field-supplied) as the jumper from the other leg of the override output and the other temperature output wire.
2. Prerequisites: Occupancy Control must be set to Unoccupied, Network when controlled through a BMS or Local Switch and there is a 24VAC Input on the OCC terminal, such as using a time based controller. Units set to "Occupied" in the Occupancy Menu, the override button will have no effect, since the button triggers occupancy.
3. To adjust how long the override lasts, navigate to the Time Delays Menu and use the down arrow to select the Tenant Override Timer (Ten Ovr. Time), press the middle button to adjust the time between the required range of 2 to 6 hours.

Figure F.2.3.2. - A: Common Sensor Back Plane - Setpoint and 2k Override.



F. CONTROL / THERMOSTAT WIRING

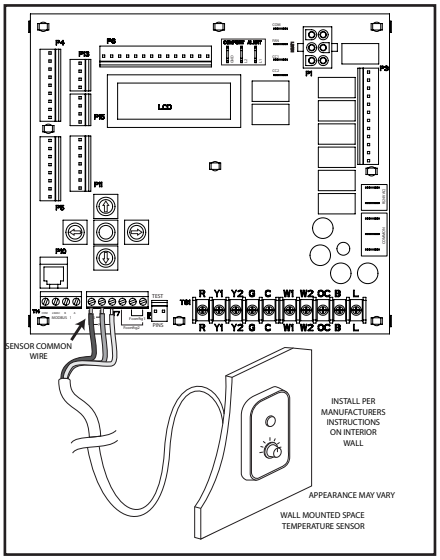
F.2.3.3. Set-Point Adjustment

In an Automatic Operation Mode or controlled by a BMS, a zone sensor with a setpoint adjustment is can be used to vary or adjust the setpoint temperature for the space that the unit is serving. This does require some specific setup to configure the operation and limitations for the adjustment range.

The zone sensor must have a setpoint adjustment range of 5k or 15k Ohms of resistance to provide the 55°F to 90°F set point adjustment range. Zone control devices with other resistance ranges are not compatible and will not function properly with the Clear Control and can cause operational errors or shutdown.

At the control board, locate the T7 green terminal strip. Loosen the two screw terminals marked with “P” (the left most and third from the left terminals), insert one of each of the two wires into the terminal opening on the bottom of the strip and tighten the screw terminal. The connections are polarity specific, and commonly connected with a temperature sensor. The setpoint adjustment and temperature sensor will use a shared common, the left most terminal. Refer to the sensor manufacturer’s instructions for details for connections at the sensor.

Figure F.2.3.3. - A: Space Temperature with Setpoint



Once the sensor is connected and installed, power up the unit. The following menu items need to be setup and adjusted according to the requirements for the application.

Prerequisites, the unit must be set up in Automatic Mode or configured to operate with a Building Management System. The setpoint adjustment will not function if the unit is set to “Control by Thermostat.”

1. Power on the unit and proceed to the Setpoints Menu. Use the down arrow key to navigate to the Setpoint Adjust Enable (Stpnt Adj Enable) menu item, press the middle button, and use the up or down arrow key to select “Enable,” press the middle button again to confirm.
2. At the remote sensor, adjust the setting to the middle position and notate the temperature value. Commonly, it is 76°F, but this reading may vary by manufacturer. See their instructions on determining the middle temperature value.
3. At the Clear Control, navigate to the Setpoint Adjust menu item, press the middle button, and use the up and down arrows to select the temperature that the remote sensor is set to. Then, press the middle button to confirm the setting. This set is important to ensure that adjustment and control setpoint temperature align, especially with remote sensors that have a display or marked temperature value.
4. Navigate to the Set Cool Limit menu item. This setting allows the installer to limit the lowest cooling setpoint allowed. Press the middle button and use the up and down arrows to adjust as required by the application, press the middle button to confirm the setting. The range is 55°F to 89°F.
5. Navigate to the Set Heat Limit menu item, this setting allows the installer to limit the highest heating setpoint allowed. Press the middle button and use the up and down arrows to adjust as required by the application. Then, press the middle button to confirm the setting. The range is 56°F to 90°F.

F.2.4. Building Management/ Control Connections Using DDC

In an application where a third party building management/controls are in use or will be incorporated, units with the integral Rooftop Unit Controller (RTU-C) are communication compatible with the system that supports the BACnet Application Specific Controller device profile, LonMark Space Comfort Controller functional profile, or LonMark Discharge Air Controller functional profile. This is accomplished with a field installed BACnet or LonMark communication module. Refer to the Clear control/DDC manual for more detail.

F.2.5. Smoke Detection Shutdown

The DDC system is designed with an option to trigger and shutdown the unit during a Smoke Fault Condition, as triggered by a factory smoke detector. See the following two sections for more information.

The operation of the smoke fault system can be changed dependent on what is required by the application. Navigate to the Economizer Menu and use the down arrow key to select the Smoke Detection option. The passcode, 5555, is required. Enter the password, press the middle button, use the up arrow to set the first digit to 5, then press the middle button to confirm and move to the next character. Repeat until all 4 characters are entered. If successful, “Access Granted” will display. Then press the down arrow to select Smoke Options. These options will change the operation as follows:

Shutdown - Stops all operations and turns off the indoor fan.

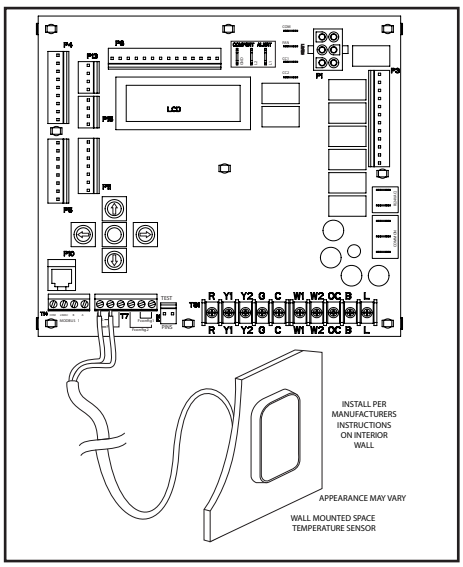
Pressurize - Ramps the VFD to full speed, opens the economizer up 100%, stops all heating and cooling functions.

Purge - Ramps the VFD to full speed, opens the economizer up 100%, turns on the power exhaust, stops all heating and cooling functions.

Purge with Heat - Ramps the VFD to full speed, opens the economizer up 100%, turns the heating system on full capacity.

Exhaust - Stops all operations, cooling, heating, and indoor fan, opens the economizer up 100% and turns on the power exhaust system.

Figure F.2.3.5. - A: Remote Duct Sensor



F. CONTROL / THERMOSTAT WIRING

F.2.5.1. Factory Smoke Detector Kit

If a field or factory installed factory smoke detector kit is used, the kit contains a wiring harness that connects to the 12-Molex plug in the economizer section in place of the 3-wire jumper plug. Retain the jumper plug for future service or maintenance. Use a zip tie to secure the jumper plug to the main wiring harness. Remote fire control panels or other options for the smoke detector will connect directly to the smoke detector controls. Refer to the instructions with those accessories for more information.

F.2.5.2. Remote Smoke Detector/Fire Control Connection

In the air-filter section or on the side economizer, locate the 12-pin Molex jumper plug with the long Red, short Yellow and Orange wire loops; see ***Figure F.2.5.2. - B*** for reference. Cut the Red wire loop and connect these to a minimum of 18AWG wire that will be connected to a Normally Closed Dry Contact Relay, or in common Fire Control Panels and Smoke Detectors, the Auxiliary Connections for C and NC. See the instructions for the remote devices. Do not connect multiple control boards to the same dry contact relay.

Figure F.2.5.2. – A: Wiring Harness location in Air-Filter Section

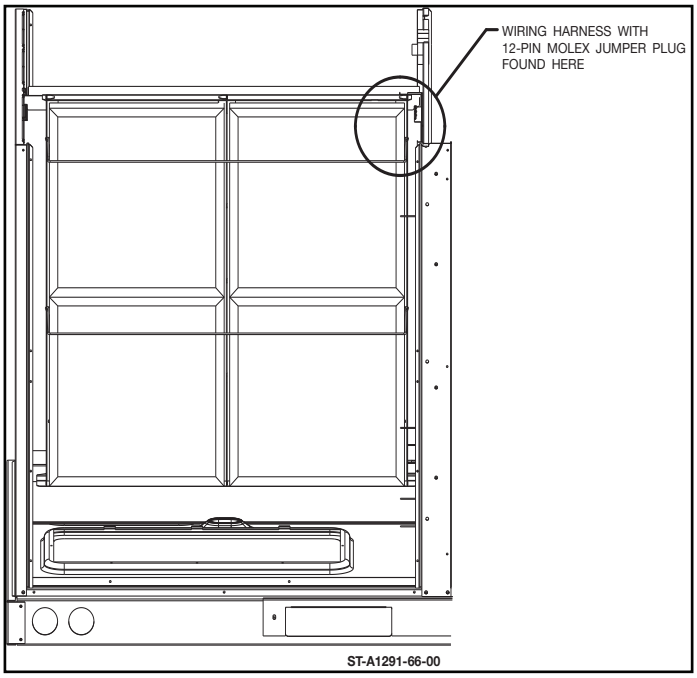
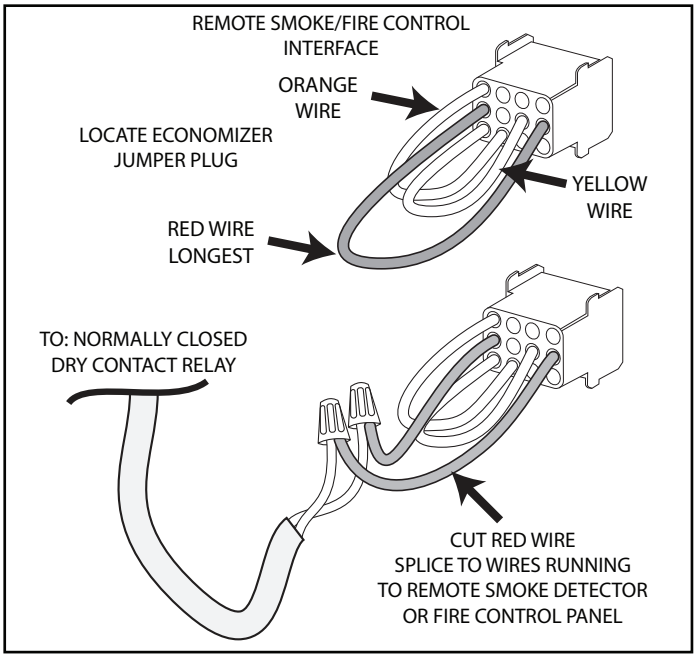


Figure F.2.5.2. – B: Smoke Detector Connection (DDC)



F.3. Routing Control wiring

Figure F.3. – A: Electrical and Piping Routing

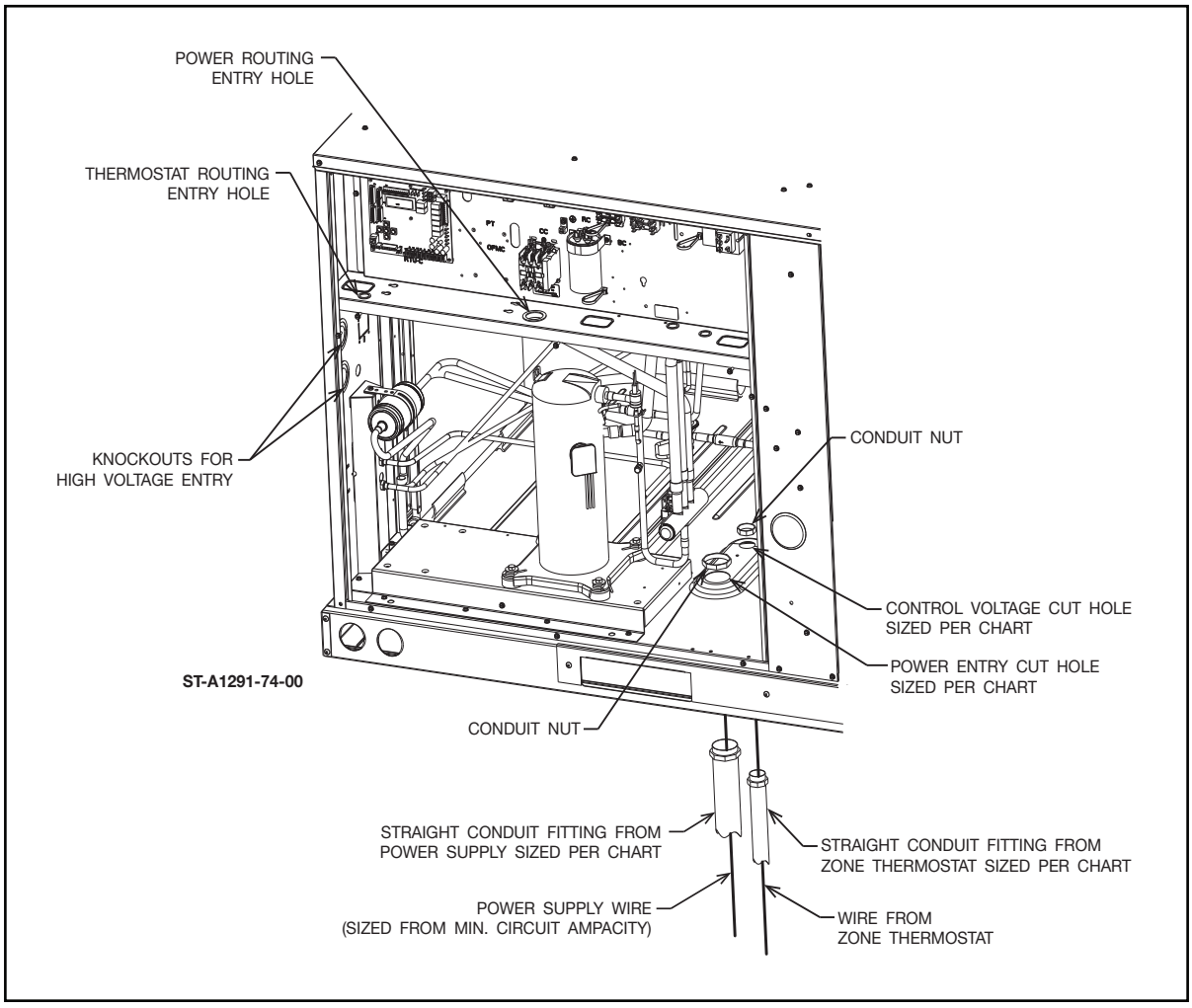


Figure F.3. – B: Hole Sizing for Conduit

	WIRE SIZE, AWG											
	14	12	10	8	6	4	3	2	1	0	00	000
CONDUIT SIZE	1/2”	1/2”	1/2”	3/4”	1”	1”	1-1/4”	1-1/4”	1-1/2”	1-1/2”	2”	2”
HOLE SIZE	7/8”	7/8”	7/8”	1-31/32”	1-23/64”	1-23/64”	1-23/32”	1-23/32”	1-31/32”	1-31/32”	2-15/32”	2-15/32”

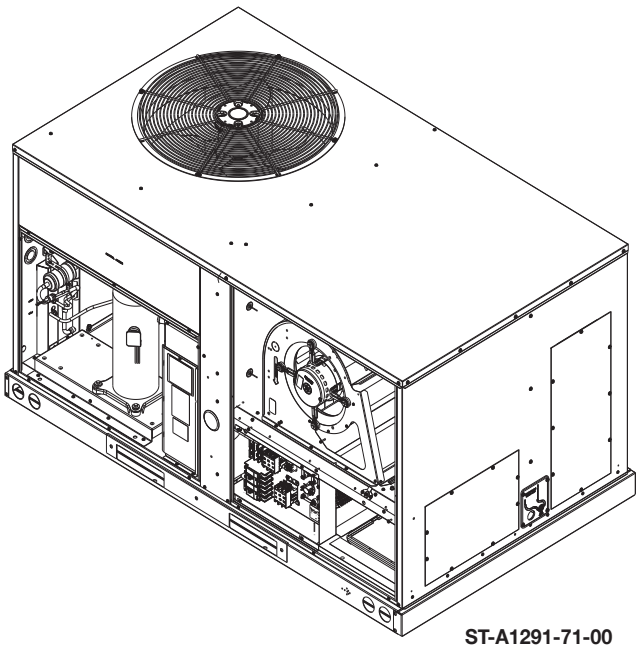
NOTES: 1. DETERMINE REQUIRED WIRE SIZE FROM MINIMUM CIRCUIT AMPACITY SHOWN IN INSTALLATION & OPERATING INSTRUCTION.
2. BOTTOM POWER ENTRY WILL NOT ACCOMMODATE WIRE LARGER THAN #2 AWG (SHADED AREA).

F.4. Measuring Control Voltage Loads

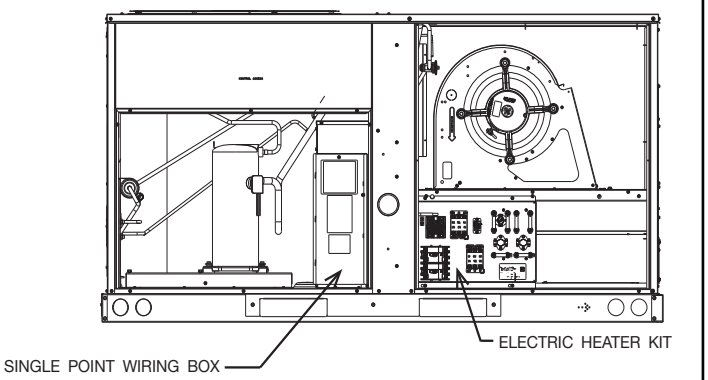
Use a voltmeter to measure the low voltage and low voltage amp draws during operation. Accessories such as remote smoke detectors and excessive wire length can increase the amp draw on the low voltage wiring. Verify that the total amp draw on the 24VAC side is less than 0.3A in full operation.

H. ELECTRIC HEAT

Figure H. - A: Electric Heat with Single Point Wiring



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H.1. FACTORY INSTALLED ELECTRIC HEAT

Units shipped with factory installed electric heat will come with a separate document (included in the parts bag) with details regarding the electric heater kits. Refer to this document for diagrams and additional info. Refer to ***Appendix E*** for heater kit characteristics such as Minimum Circuit Ampacity and Max Fuse sizes.

H.2. FIELD INSTALLED ELECTRIC HEAT

Electric heater kits will be shipped with their own installation document in the box. Use the instructions supplied with the kit for best practice. Install all electric heat kits in accordance with the National Electric Code. Refer to ***Appendix E*** for manufacturer-approved heater kit characteristics such as Minimum Circuit Ampacity and Max Fuse sizes.

J. STARTUP AND OPERATION

J.1. Final Inspection

J.1.1. Check for Refrigerant Leaks

Before beginning any work on the system or conducting any hot work, ensure that the area is in the open or that is adequately ventilated. Ventilation must continue while the unit is being worked on. Ventilation is required to safety disperse any released refrigerant into the atmosphere.

Inspect the unit for any damage to the coils and tubing that could cause a leak.

Under no circumstances shall potential sources of ignition be used to search for or detect refrigerant leaks. A halide torch or any other detector using a naked flame must not be used

Electronic leak detectors may be used to detect refrigerant leaks, but the sensitivity may not be accurate and may need recalibration to accurately detect R454-B. Before use, ensure that the detector is not potential ignition source and is suitable for R-454B.

Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and must be calibrated to R-454B.

Lek detection fluids are also suitable but do not use detergents containing chlorine. Examples of leak detection fluids are the bubble method and fluorescent method agents.

If a leak is suspected, all naked flames must be extinguished.

If a refrigerant leak is found that requires brazing, all of the refrigerants must be removed from the system.

J.1.1.1. Refrigerant Leak Detection System

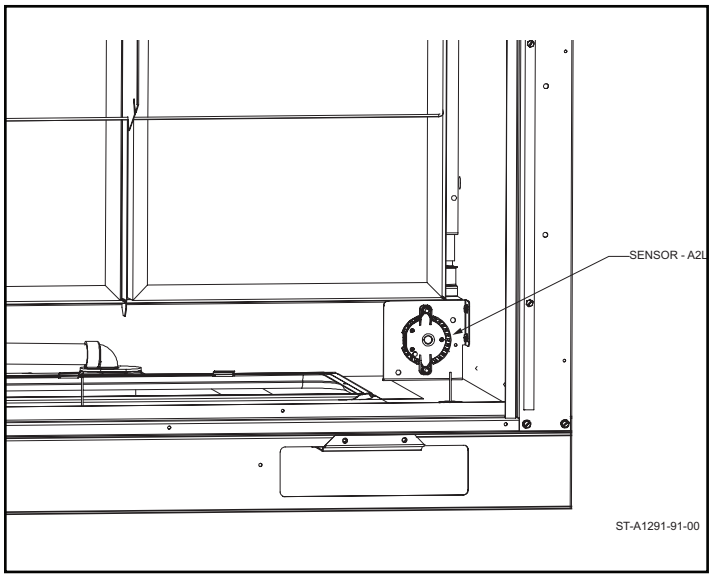
The refrigerant leak detection system will continuously monitor the air for a refrigerant leak. If the leak detection system detects a leak, the system will begin mitigation procedures: the blower will turn on and the compressors will shut down. Note: Gas or electric heat functions may continue during mitigation.

At the end of 15 years of if the refrigerant leak detection system becomes inoperable, the leak detection system must be replaced with components specified by the unit's manufacturer. Refer to the manufacturer's website for replacement components. Refer to the alarm code diagnostics section for the refrigerant leak detection system error codes.

Figure J.1.1.1. - A: A2L Sensor Location shows the location of the sensor on the bracket in the filter compartment.

Please note that the sensor is mounted on the backside of the bracket, facing the filters

Figure J.1.1.1. - A: A2L Sensor Location



J.1.1.2. Operation When a Leak is Detected

When the unit receives a signal from the A2L sensor, circulation airflow is activated, and the control board will display an error (for DDC units) or a fault code (for non-DDC units). The following mitigation actions will also be activated:

a. Energize the fan(s) of the appliance to deliver indoor airflow at or above the minimum airflow. See ***Appendix F—A2L Refrigerant Installation Safety Data.***
    i. The fans will be energized following the input signal to turn on the fan(s)
b. The system de-energizes compressor operation.
c. Activate additional mechanical ventilation, if applicable.

The above-mentioned actions will continue for at least 5 minutes after the leak detection system begins mitigation. If the leak is no longer detected, the leak detection system will reset. If the leak is still present, mitigation actions will continue for another 5 minutes. This cycle will repeat until no leak is detected.

For DCC units, user-selectable Fan Off Delay will remain in effect after the A2L sensor triggers the mitigation procedure.

J. STARTUP AND OPERATION

J.1.1.3. Removal and Evacuation of Refrigerant

The refrigerant charge must be recovered into R-454B recovery cylinders. The unit system must be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants, such as R-454B, again. DO NOT USE compressed air or oxygen for purging R-454B refrigerant systems.

Refrigerant purging is achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to the atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system shall be vented down to the atmospheric pressure to enable work to take place.

The outlet for the vacuum pump must not be close to any potential ignition sources.

Ventilation is required during removal and evacuation.

When breaking into the refrigeration circuit for any reason, this procedure must be followed:

1. Ensure there is no power to the unit.
2. With an accurate scale, 1/2 oz., set the refrigerant recovery cylinder in the upright position.
3. Connect the recovery cylinder to the unit using the service valves.
4. Evacuate refrigerant from the unit until the vacuum pumps reads a minimum of 500 microns.
5. Purge the refrigeration circuit with inert gas until there is no refrigerant within the system.
6. Evacuate the circuit again.
7. Once all inert gas is removed, pull a vacuum on the unit to check for any leaks in the system.
8. If any leaks are present, spray a soapy substance over the refrigeration circuit. Bubbles will help locate the leak.
    a. Patch the leak and pull a vacuum again.
    b. If leaks are still detected, repeat steps seven and eight.
9. If no leaks are present, charge the system as directed in the next section.
10. Remove the vacuum pump from suction, discharge, and liquid shut-off.

J.1.2. Check Level of Unit

Refer to ***Section C.6.2.*** for setting/checking the level of the unit.

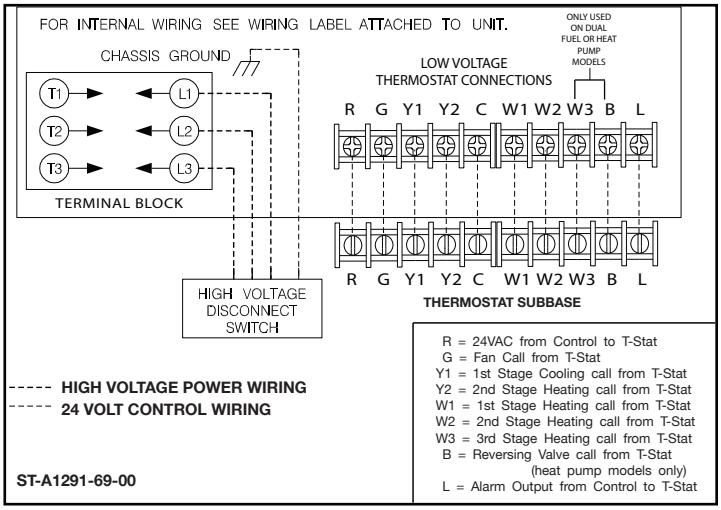
J.1.3. Check Electrical Connections For Proper Torque

Use an Inch Pound rated torque wrench to ensure proper torque. DO NOT CONFUSE THIS WITH A FOOT POUND RATED WRENCH, Damage will occur.

Recommended torques for securing wiring:

- To the contactor: 40 in-lb.
- From the T-stat to the control board: 8.0 in-lb.

Figure J.1.3. – A: Where to Wire for Thermostat



J.1.4. Check Control Cables For Proper Connection

Verify all cables are seated and connected in the unit as some might come loose during shipping and transport.

J.1.5. Check Filter Installation

Verify that filters are seated and oriented correctly in the unit as some might come displaced during shipping and transport. Refer to ***Section D.3.*** for more information on filters and filter installation.

J.1.6. Check Condensate Drain installation

Verify the Condensate Drain Trap is a minimum of 3 inches deep, plus the Blower Fan Static Pressure. Verify the Outlet of the drain trap is a minimum of 3 inches below the outlet of the drain pan. Ensure the outlet of the trap is routed to a suitable drain location as required by local code. Refer to ***Section C.5*** and ***Figure C.5.1 – A*** for more information.

J.1.7. Check Blower Compartment for Accessories

Open all compartments to ensure there are no tools or other misc parts remaining in the unit from setup. This is most important on the blower section to avoid damage to the blower assembly.

J.1.8. Check Wiring

After completing refrigerant removal, evacuation, and charging, check that all the internal and field wiring will no t be subject to wear, corrosion, excessive pressure, vibration, sharp edges, or any other adverse environmental effects, taking into account the effects of aging or continual vibration from sources such as compressors or fans.

J.2. Turning on Power for the First time

J.2.1. Checking for Proper 3-Phase Voltage

Verify that proper power has been supplied to the unit. This is critical for correct operation of the compressor.

J.2.2. Check For Proper Phase

Verify that the compressor is running correctly.

J.2.2.1. Standard Blower Rotation

As a reminder, all units with an ECM-drive blower motor will have the correct rotation even if the phase to the unit is wired incorrectly. See ***Section E.3.4. Checking Phase and Motor Rotation*** for more information.

J.2.2.2. VFD Blower Rotation

As a reminder, all units with VFD driven blower motor will have the correct rotation even if the phase to the unit is wired incorrectly. See ***Section E.3.4.1. Checking Phase with VFD Drive*** for more information.

J.2.3. Checking Low (Control) Voltage

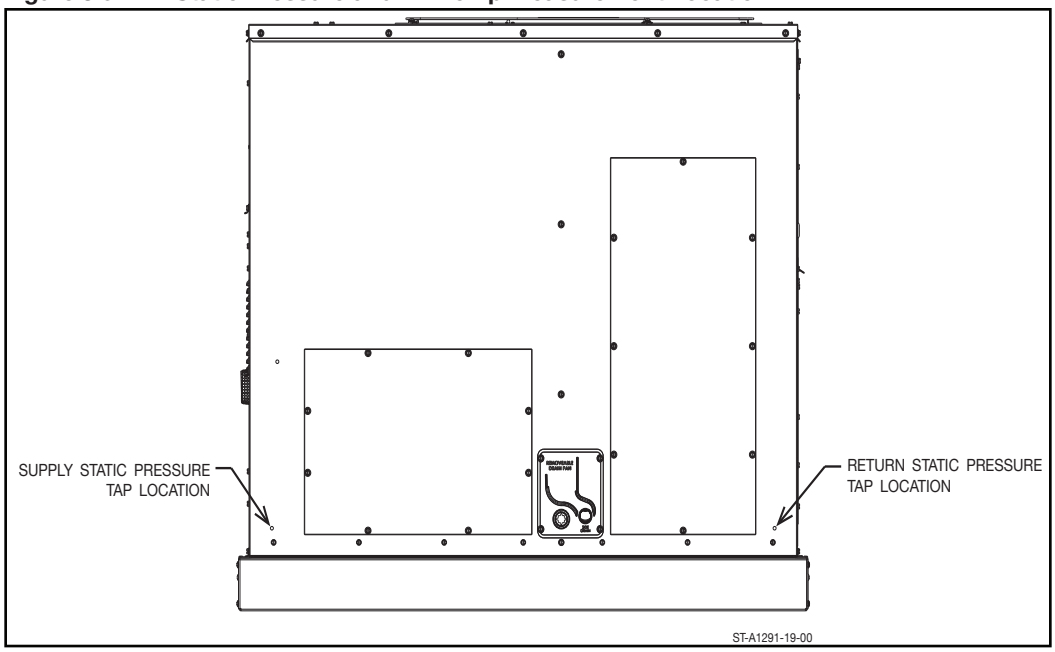
Use a voltmeter to measure the low voltage and low voltage amp draws during operation. Accessories such as remote smoke detectors and excessive wire length can increase the amp draw on the low voltage wiring. Verify that the total amp draw on the 24VAC side is less than 0.3A in full operation. Refer to ***Figure F. – A*** for proper low voltage wire lengths.

J. STARTUP AND OPERATION

J.3. Checking and Adjusting Air Flow

For Economizer and Diffuser Pressure Drop Data, please refer to the end of ***Appendix C: Airflow Performance Data.***

Figure J.3. – A: Static Pressure and Air Temp Measurement Location



J.3.1.Static Pressures and Measurements

•To measure the static pressure of the system, locate the locating dimples near the supply/ return duct openings, and drill a hole to the size necessary for the test probe. The location of these dimples are shown in ***Figure J.3. - A***.

• NOTE: After taking airflow measurements, seal these openings per best practice to prevent airflow leakage and water entry into the unit.

• NOTE: Drilling test tap locations in other panels or doors could put the test probe in a turbulent zone providing false readings.

J.3.1.1. Using Tools

Use a water manometer to measure the static pressure of the blower. Insert the meter probe into the tap location. Make sure any economizer or outside air dampers are closed and run the fan at the maximum, full speed setting. Record the reading for the return air and supply air separately.

J.3.2. Air Flow Measurements and Adjustments

•Measure the supply/return static to get the unit static pressure by drilling out the dimple locations shown in ***Figure J.3. - A***.

• Take the measured static pressure and match to the static listed on the airflow table to find your CFM.

Use the charts and guide provided in the Installation and Operation instructions provided with the unit to calculate the airflow, against the measured static pressures and number of turns on the adjustable blower sheave. Verify the measured air flow against the charts.

If adjustment is needed, turn off the power to the entire system, and adjust the adjustable blower sheave. To do this, loosen the belt tension and remove the belt. Using an Allen wrench to loosen the set screw on the end of the adjustable blower sheave, turn the blower sheave in until it is full closed.

Using the charts determine the total number of turns needed on the sheave. Make those turns in half turn increments. Once set, align the set screw with the flat section on the sheave threads. Tighten the set screw to secure the sheave.

Reinstall the belt and tension properly and power on the system. Allow the thermostat to call for a fan, make sure the VFD ramps the blower to 100% or 60hz.

Once the fan is at speed, measure the air flow and static pressure, compare against the charts. If additional adjustment is needed repeat the adjustment procedure.

Figure J.3.2. – A: How to Increase Airflow for All Single-Stage Units

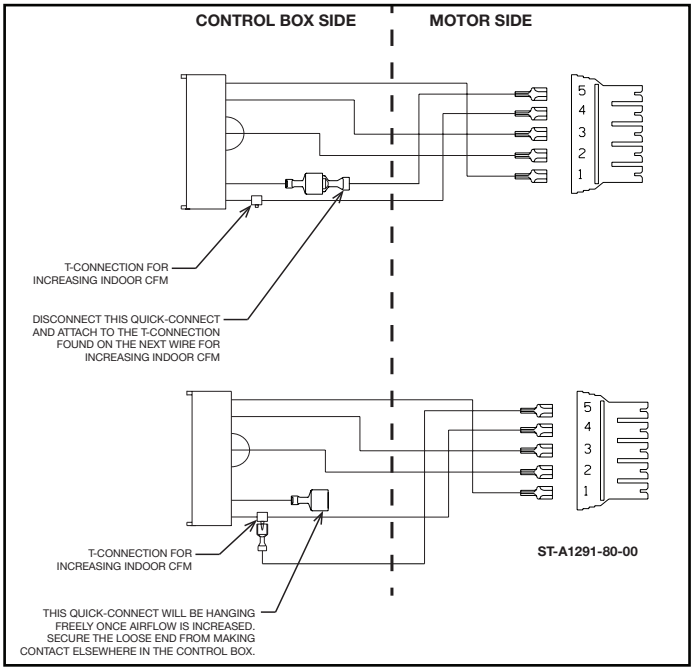
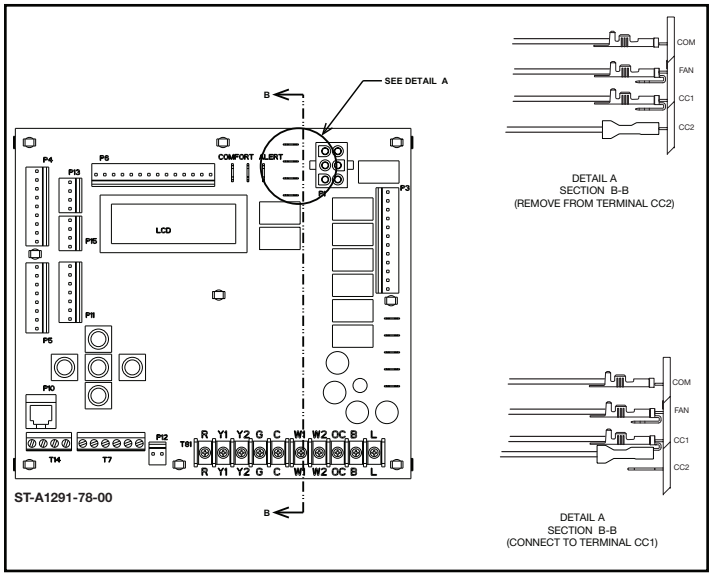


Figure J.3.2. – B: How to Increase Airflow for 3 to 5 ton DDC Units



J.3.2.2. 6 ton Models - High or Low Static Drive

This adjustment only affects the fan speed during second stage cooling operation, and does not change the airflow for fan only, any heating stage, or the first stage cooling call.

For non-DDC units, the unit ships standard with the purple wire with a quick-connect toward the control board-end of the harness, disconnected.

If more airflow is needed, attach the purple wire to the T-connection on the orange wire (wire 607). Refer to ***Figure J.3.2.-C.***

For DDC units, the units ships standard with the purple wire with a quick connect toward the control board-end of the harness, disconnected.

If more airflow is needed, connect the purple wire to the piggyback connection of the orange wire on CC2. Refer to ***Figure J.3.2.-D***.

Figure J.3.2. – C: How to Increase Airflow for All Two-Stage Units

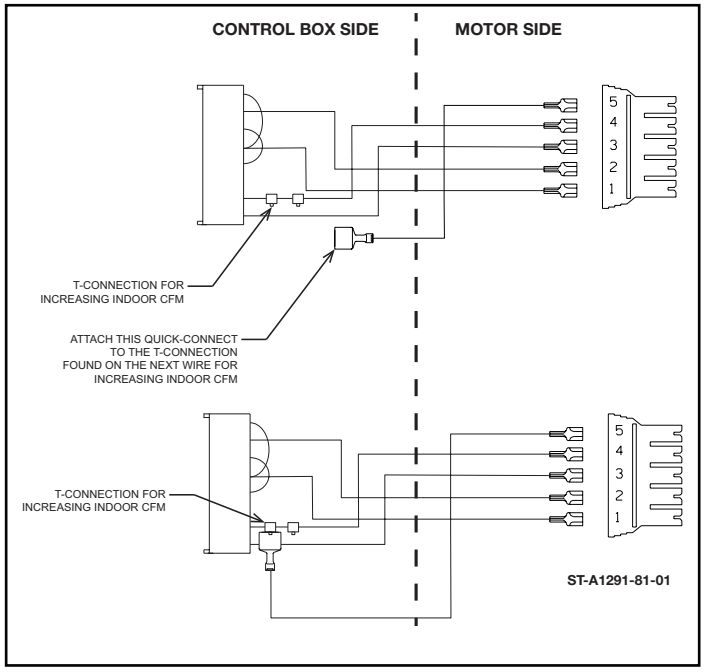
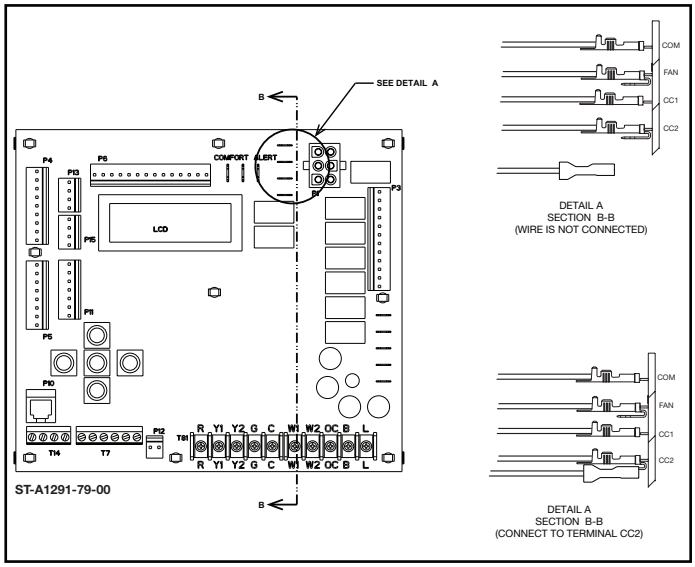


Figure J.3.2. – D: How to Increase Airflow for 6 ton DDC Units



J. STARTUP AND OPERATION

J.3.2.3. Adjusting Fresh Air Flow with Economizer

See the above sections for measuring airflow, and refer to the I&O included with the Economizer for more information on adjusting airflow.

J.3.2.4. Adjusting Fresh Air Flow with Damper

All dampers are field install accessories. See the above sections for measuring airflow, and refer to the I&O included with the fresh air damper for more information on adjusting airflow. Refer to local building codes for any fresh air requirements.

J.4. Checking Cooling Operation

Note: In the below section, first and second stage cooling applies to ONLY the 6 ton units. For 3-5T units, only first stage applies.

COOLING SEQUENCE OF OPERATION

A. Call for cooling

1. The zone thermostat contacts close, and a call for cooling is initiated.

2. Inputs 'Y1' and 'G' to the control are energized.

3. The control senses input to 'Y1' and 'G'. After a 1sec delay, the control energizes both the indoor blower and first stage compressor.

4. The control enters normal operating loop were all inputs are continuously checked.

5. Zone thermostat is satisfied.

6. The blower will continue to run for a preset period of time after the zone thermostat is satisfied.

7. The control goes into standby mode displaying "O".

B. Call for second stage cooling. After first stage cooling established; starting from A6.

1. If a call for second stage cooling is initiated after a call for first stage cooling is established, the control energizes 'Y2' and energizes the second stage compressor.

2. Then the control enters the normal operating loop where all inputs are continuously checked.

C. Second stage satisfied and first stage still called for; starting from B2.

1. 'Y2' is de-energized and the second compressor stage is de-energized.

D. First stage and second stage called simultaneously.

1. The zone thermostat contacts close, and a call for first and second stage cooling is initiated.

2. Inputs 'Y1', 'Y2' and 'G' to the control are energized.

3. The control senses 'Y1', 'Y2' and 'G'. After a 1sec delay, the control energizes the indoor blower, and the first and second compressor stages.

E. First stage and second stage removed simultaneously.

1. Upon a loss of 'Y1' and 'Y2', the compressor is de-energized. The control de-energizes the indoor blower relay, and cuts off the blower after an indoor blower delay.

2. The control goes into standby mode displaying "O".

CONTINUOUS FAN MODE

A 'G' input only indicates a zone thermostat call for continuous indoor blower operation.

TIME DELAY BYPASS for non-DDC units

The Time Delay Bypass resets the ICC (Integrated Compressor Control) from any lockout mode or bypasses compressor anti-short cycle delay timer. To bypass the time delay, press the SW1 button with an insulated probe for 1sec and then release.

FAULT RECALL OPERATION for non-DDC units

To enter FAULT RECALL mode, press the SW1 button with an insulated probe for 2sec and release. Upon entering and exiting the FAULT RECALL mode, the top bottom segments of the 7-segment display will be activated. The ICC will automatically scroll through the stored faults on the 7-segment display. Each fault is displayed one time with the top segment of the 7-segment display activated between faults. Each fault is displayed with the most recent fault displayed first. An "O" will be displayed when no faults are stored. The ICC will automatically exit the FAULT RECALL mode after displaying stored faults.

An example of one LPC fault and one HPC fault scrolled on the display is shown as: ¯21¯23¯

CLEAR FAULT HISTORY for non-DDC units

To clear FAULT HISTORY, press the SW1 button with an insulated probe for 5sec and release. The top and bottom segments of the 7-segment display will be activated and flash to indicate the history has been cleared.

TEST MODE for DDC Units

For units with DDC, there is a "Run Test" mode that will aid in diagnostics during installation. Please refer to the CLEAR CONTROL MANUAL for more information.

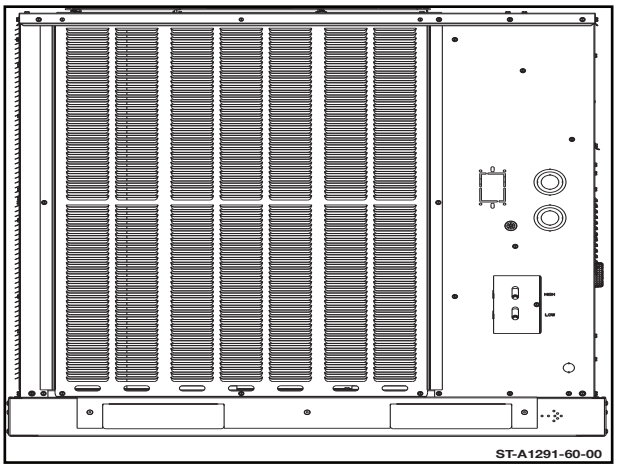
J.4.1. Checking Refrigerant Pressures

This unitary packaged system comes fully charged and tested with R-454B refrigerant from the factory. Adjustment of the refrigerant charge is not required. If the unit is suspected of not having the proper refrigerant charge, any adjustment must not exceed 2% of the total refrigerant weight listed on the rating plate of the unit and should not supersede correctly weighed-in refrigerant.

Note: Factory charge chart and/or design target subcooling are for gross charge verification.

See section ***C.2.1.Tools Required for Installing and Servicing R-454B Models.***

Figure J.4.1. –A: Service Port Location



J.4.1.1. Refrigerant Pressure Charts

See ***Appendix G*** towards the end of this manual for Refrigerant Pressure Charts.

J.4.2. Checking Sub Cooling for Adjusting Charge Weight

When breaking into the refrigeration circuit for any reason, the procedure included in section ***J.1.1.3. Removal and Evacuation of Refrigerant*** must be followed.

Prior to recharging the system, complete a leak check and purge the system with inert gas as detailed in ***J.1.1.3. Removal and Evacuation of Refrigerant.***

See ***Appendix G*** towards the end of this manual for Refrigerant Charging Charts.

Charge verification instructions:

1. Allow the unit to operate for 15 minutes before checking or adjusting the charge.
2. Ensure that the contamination of different refrigerants does not occur when using charging equipment. Hoses of lines must be as short as possible to minimize the amount of refrigerant contained in them.
3. Ensure that the unit is properly grounded.
4. Return air temperature must be within comfort conditions (72°F - 82°F).
5. Remove caps from the high-side and low-side pressure service fittings.
6. Cylinders must be kept in an upright position for the entirety of the testing and charging procedure.
7. Record the following measurements:
    a. High-side pressure at the service fitting
    b. Liquid line temperature
8. Using R-454B refrigerant saturation T-P tables, find the corresponding refrigerant saturation temperature relative to the measured high-side pressure.
9. To determine subcooling, subtract the liquid line temperature measured in Step 7 from the saturation temperature found in Step 8.
10. Compare the subcooling result from Step 9 to the subcooling table located on the unit or in the I&O manual.
11. If the subcooling value from Step 9 is more than 1°F above the value listed in the subcooling table, remove charge to match the value listed in the table, ± 0.5°F.
    a. Take extreme care not to overfill the refrigerating system.
12. If the subcooling value from Step 9 is more than 1°F below the value listed in the subcooling table, add charge to match the value listed in the table, ± 0.5°F.
    a. Take extreme care not to overfill the refrigerating system.

After charging is complete, a leak test must be done. Before leaving the site an additional leak test must also be done at the end of the installation. Refer to ***J.1.1.3. Removal and Evacuation of Refrigerant.***

J. STARTUP AND OPERATION

J.4.2.1. Measuring Air Temperature and Liquid Line Temperature

Measuring air temperature:

1. Insert a thermometer in the supply air duct as close to the unit as possible.

2. Insert a thermometer in the return air duct as close to the filters as possible.

3. If preferred, use the locations shown in ***Figure J.3. – A: Static Pressure and Air Temp Measurement Location*** instead of the supply/ return ductwork.

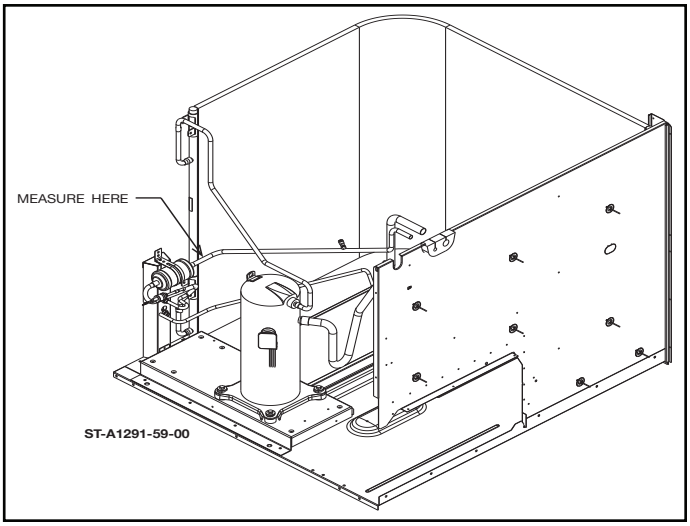
4. Operate the unit for a minimum of 15 minutes in cooling mode.

5. When the thermometer in the supply air duct stops changing (approximately five minutes), subtract the return air temperature from the supply air temperature. This is the cooling mode temperature difference.

If the measured temperature difference is not reducing, or if the return air is not reaching the thermostat set point, the air flow is too low. Airflow must be increased by either removing the restrictions in the duct system, or by changing the air flow. See ***Section J.3.2. Air Flow Measurements and Adjustments*** for changing air flow.

IMPORTANT: Some high-efficiency filters have a greater than normal resistance to airflow. This can negatively affect airflow. BE SURE TO CHECK THE AIRFLOW if using any filter other than the factory-provided filter.

Figure J.4.2.1. – A: Line Temperature Measurement Location



Measuring line temperature:

1. Attach a thermometer or thermocouple to the liquid refrigerant line right after the filter-dryer. See ***Figure J.4.2.1. - A***.

2. Operate the unit for a minimum of 15 minutes in cooling mode.

3. When the measurement of the temperature stops changing (approximately five minutes), record the temperature.

J.4.3. Measuring Compressor Electrical Loads

See ***Appendix B*** towards the end of this manual for Compressor Electrical Data.

J.5. Checking Electric Heat Operation

Electric heater kits will have their own separate instructional document. For factory installed heater kits the document will be found in the parts bag, and for field installed heater kits the document will be found in the box. Refer to these documents for any info regarding checking electric heat operation.

J.5.1. Heating Mode

With thermostat in the heat mode, fan auto and the room temperature lower than the thermostat setting:

A. Indoor blower contactor is energized through thermostat contact (G).

B. Compressor contactor is energized through thermostat contact (Y1). A 5 minute short cycle delay is standard on this unit. Compressor will start immediately if test pins on the defrost board are shorted and released.

C. Reversing valve is energized in the heating mode through thermostat contact (B).

D. Economizer enthalpy control (if installed) is electrically bypassed with the heat pump control relay during heating operation.

E. Should the heat requirement be more than the heat pump can supply, a portion of the electric heat accessory (if supplied) is energized through thermostat contact (W3).

F. The system will continue in heating operation as long as all safety controls are closed, until the thermostat is satisfied.

G. The unit will function in a defrost mode, reversing the refrigerant cycle to cooling and energizing the electric heat (if supplied) as required through the defrost relay.

H. If the refrigerant system becomes inoperable during a need for heating, the thermostat may be set to emergency heat which will energize the electric heat (if supplied).

At initial start-up or after extended shutdown periods make sure the crankcase heater is energized for at least 12 hours before the compressor is started.

J.5.2. Demand Defrost Control And High/Low Pressure Controls

The demand defrost control monitors the outdoor ambient temperature, outdoor coil temperature and the compressor run time to determine when a defrost cycle is required.

Enhanced Feature Demand Defrost Control: This defrost control has high and low pressure control inputs with unique pressure switch logic built into the microprocessor to provide compressor and system protection without nuisance lockouts. The control cycles the compressor off for 30 seconds at the beginning and the end of the defrost cycle to eliminate the increased compressor noise caused by rapidly changing system pressures when the reversing valve switches. See next page for diagnostic flash codes and sensor resistance values at various temperatures.

DEFROST INITIATION

A defrost will be initiated when the three conditions below are satisfied:

1. The outdoor coil temperature is below 35°F as measured by a good coil sensor,

2. The compressor has operated for at least 34 minutes with the outdoor coil temperature below 35°F and

3. The measured difference between the ambient temperature and the outdoor coil temperature is greater than the calculated difference determined by the defrost control microprocessor.

DEFROST TERMINATION

Once a defrost is initiated, the defrost will continue until fourteen minutes has elapsed or the coil temperature has reached the selected termination temperature. The factory setting is 70°F but can be changed to 50°F, 60°F, or 80°F by relocating the jumper on the control board.

TEMPERATURE SENSORS

The coil sensor is located on the outdoor coil near the point fed by the distribution tubes from the expansion device, on the top most cross-over tube. The ambient air sensor is located outside the control box so it can sense outdoor temperatures.

If the ambient sensor fails, the defrost control will initiate a defrost every 34 minutes of compressor run time with the coil temperature below 35°F.

If the coil sensor fails, the defrost control will not initiate a defrost.

J. STARTUP AND OPERATION

TEST MODE

The test mode is initiated by shorting the TEST pins. The unit must have an active heat pump heating call to enter the test mode. In this mode of operation, the enable temperature is ignored and all timers are sped up. To initiate a manual defrost, short and hold the TEST pins. Remove the short when the system switches to defrost mode after the compressor noise abatement delay. The defrost will terminate on time (14 minutes) or when the termination temperature has been reached.

Test Sequence of Operation:

1) Provide a heating call to the heat pump.

2) Short test pins to bypass anti-short cycle timer. (If unit is running, this step is not necessary.)

3) Short test pins and hold them shorted to enter defrost mode.

4) Release test pins once control exits noise abatement delay.

5) Monitor coil temperature when control exits defrost.

6) Unit should return to heating mode.

TROUBLESHOOTING DEMAND DEFROST

During the test mode the coil temperature should be monitored. If the system exits defrost at approximately the termination temperature, the control is operating normally. If not, check the coil and ambient temperature sensor resistances, using the sensor temperature vs. resistance table at the end of this section.

Immerse the sensor in water and measure the resistance of the sensor. At 35°F the resistance of the sensor should be approximately 30,000 ohms.

Ensure that the coil sensor is properly installed that is not loose or touching the cabinet.

HIGH/LOW PRESSURE CONTROL MONITORING - ENHANCED DEFROST CONTROL

Status of high and low pressure controls is monitored by the enhanced feature demand defrost control and the following actions are taken.

High Pressure Control – Provides active protection in both cooling and heating modes at all outdoor ambient temperatures. The high pressure control is an automatic reset type and opens at approximately 610 psig and closes at approximately 420 psig. The compressor and fan motor will stop when the high pressure control opens and will start again if the high side pressure drops to approximately 420 psig where the automatic reset high pressure control resets. If the high pressure control opens 3 times within a particular call for heating or cooling operation, the defrost control will lock out compressor and outdoor fan operation.

Low Pressure Control – Provides active protection in both heating and cooling modes at all outdoor ambient temperatures. The low pressure control is an automatic reset type and opens at approximately 15 psig and closes at approximately 40 psig. Operation is slightly different between cooling and heating modes.

Cooling Mode: The compressor and fan motor will stop when the low pressure control opens and will start again when the low side pressure rises to approximately 40 psig after the low pressure control automatically resets. If the low pressure switch opens 3 times within a particular call for cooling operation, the defrost control will lock out compressor and outdoor fan operation.

Heating Mode: The compressor and outdoor fan motor will stop when the low pressure control opens and will start again when the low side pressure rises to approximately 40 psig when the low pressure control automatically resets. If the low pressure switch trips 3 times within 120 minutes of operation during a particular call for heating operation, the defrost control will lock out compressor and outdoor fan operation. If the lock-out due to low pressure occurs at an outdoor ambient temperature below 5°F, the defrost control will automatically exit the lock-out mode when the outdoor ambient temperature rises to 5°F. This feature is necessary since the low pressure control could possibly have opened due to the outdoor ambient being very low rather than an actual system fault.

Exiting Lock-Out Mode: To exit the lock-out mode, remove 24 volts to the defrost control by removing power to the unit or by shorting the two defrost control pins together.

DIAGNOSTIC CODES

SENSOR TEMPERATURE VS. RESISTANCE

LED 1	LED 2	Control Board Status
OFF	OFF	No Power
ON	ON	Coil Sensor Failure
OFF	ON	Ambient Sensor Failure
FLASH	FLASH	Normal
OFF	FLASH	Low Pressure Lockout (short test pins to reset)
FLASH	OFF	High Pressure Lockout (short test pins to reset)
ON	FLASH	Low Pressure Control Open
FLASH	ON	High Pressure Control Open
Alternate Flashing		5 Minute Time Delay

TABLE REPLACEMENT PARTS

Degrees C	Degrees F	Ohms
-20	-4	96,974
-10	14	55,298
0	32	32,650
10	50	19,903
20	68	12,493
25	77	10,000
30	86	8,056
40	104	5,324

J.6. Safety Checks

At all times the manufacturer's maintenance and service guidelines must be followed. If in doubt, contact the manufacturer's technical support for assistance.

Before leaving the installation site the following safety checks must be completed:

1. Ensure all electrical components in this system are approved by the manufacturer.
2. Confirm the actual refrigerant charge complies with the minimum room size requirements outlined in Appendix H. A2L Refrigerant Installation Safety Data
3. Ensure that the ventilation machinery and outlets are operating correctly and are not obstructed.
4. If an indirect refrigerant circuit is being used, the secondary circuit must be checked for the presence of refrigerant.
5. Ensure that all the equipment labels and markings are visible and legible. Markings, labels, and signs that are illegible must be corrected.
6. Confirm that any refrigerating pipe or components are installed in a position where they are unlikely to be exposed to corrosion, unless the refrigerant-containing components are constructed of corrosion-resistant materials or are protected from corrosion.

K. TEST AND BALANCE

K.1. Air Flow Charts and Information

See ***Appendix C*** towards the end of this manual for Air Flow Performance Data.

K.2. Air Flow Adjustments

K.2.1. Blower Speed for 3-5 Ton Units

See ***Section J.3.2. Air Flow Measurements and Adjustments*** on how to increase the blower speed and increase airflow for the 3-5T units.

K.2.2. Blower Motor Controller for 5 ton High Static 460V and all 6 ton units.

See ***Section J.3.2. Air Flow Measurements and Adjustments*** on how to increase the blower speed and increase airflow on the 5 Ton High Static 460V and 6 Ton units that use a Blower Motor Controller.

K.2.3. Economizer Adjustments

Do not fix a minimum position on an economizer, set the minimum position through the control board only. See the instructions provided with the economizer for more info. The part numbers for these instructions are listed in section ***D.4.1. Economizer Information.***

N.1. Diagnostics Chart

N.1.1.Cooling Diagnostics Chart

⚠ WARNING

DISCONNECT ALL POWER TO UNIT BEFORE SERVICING. CONTACTOR MAY BREAK ONLY ONE SIDE. FAILURE TO SHUT OFF POWER CAN CAUSE ELECTRICAL SHOCK RESULTING IN PERSONAL INJURY OR DEATH.

SYMPTOM	POSSIBLE CAUSE	REMEDY
Unit will not run	• Power off or loose electrical connection	• Check for correct voltage at compressor contactor in control box
	• Thermostat out of calibration-set too high	• Reset
	• Failed contactor	• Check for 24 volts at contactor coil - replace if contacts are open
	• Blown fuses	• Replace fuses
	• Transformer defective	• Check wiring-replace transformer
	• High pressure control open (if provided)	• Reset-also see high head pressure remedy-The high pressure control opens at 450 PSIG
	• Interconnecting low voltage wiring damaged	• Replace thermostat wiring
Condenser fan runs, compressor doesn't	• Loose connection	• Check for correct voltage at compressor - check & tighten all connections
	• Compressor stuck, grounded or open motor winding open internal overload.	• Wait at least 2 hours for overload to reset. If still open, replace the compressor.
	• Low voltage condition	At compressor terminals, voltage must be within 10% of rating plate volts when unit is operating.
	• Low voltage condition	• Add start kit components
Insufficient cooling	• Improperly sized unit	• Recalculate load
	• Improper airflow	• Check - should be approximately 400 CFM per ton.
	• Incorrect refrigerant charge	• Charge per procedure attached to unit service panel.
	• Air, non-condensibles or moisture in system	• Recover refrigerant, evacuate & recharge, add filter drier
	• Incorrect voltage	• At compressor terminals, voltage must be within 10% of rating plate volts when unit is operating.
Compressor short cycles	• Incorrect voltage	• At compressor terminals, voltage must be ± 10% of nameplate marking when unit is operating.
	• Defective overload protector	• Replace - check for correct voltage
	• Refrigerant undercharge	• Add refrigerant
Registers sweat	• Low evaporator airflow	• Increase speed of blower or reduce restriction - replace air filter
High head-low vapor pressures	• Restriction in liquid line, expansion device or filter drier	• Remove or replace defective component
	• Flow check piston size too small	• Change to correct size piston
	• Incorrect capillary tubes	• Change coil assembly
	• TXV does not open	• Replace TXV
High head-high or normal vapor pressure - Cooling mode	• Dirty condenser coil	• Clean coil
	• Refrigerant overcharge	• Correct system charge
	• Condenser fan not running	• Repair or replace
	• Air or non-condensibles in system	• Recover refrigerant, evacuate & recharge
Low head-high vapor pressures	• Defective Compressor valves	• Replace compressor
	• Incorrect capillary tubes	• Replace coil assembly
Low vapor - cool compressor - iced evaporator coil	• Low evaporator airflow	• Increase speed of blower or reduce restriction - replace air filter
	• Operating below 65°F outdoors	• Add Low Ambient Kit
	• Moisture in system	• Recover refrigerant - evacuate & recharge - add filter drier
High vapor pressure	• Excessive load	• Recheck load calculation
	• Defective compressor	• Replace
Fluctuating head & vapor pressures	• TXV hunting	• Check TXV bulb clamp - check air distribution on coil - replace TXV
	• Air or non-condensibles in system	• Recover refrigerant, evacuate & recharge
Gurgle or pulsing noise at expansion device or liquid line	• Air or non-condensibles in system	• Recover refrigerant, evacuate & recharge

N. DIAGNOSTICS

N.2. Alarm Codes – Full List

Alarm Codes		
CODE	**Description**	**FAULT LEVEL**
0	STAND BY	None
c	COMPRESSOR ON - Low (Flashing if in time delay)	None
C	COMPRESSOR ON - High (Flashing if in time delay)	None
E	Economizer Cooling - No Compressor	None
F	CONTINUOUS FAN	None
h	GAS HEAT ON - LOW-FIRE	None
H	GAS HEAT ON -HIGH-FIRE	None
4	Comfort Alert Code 4 for Compressor Circuit 1	Shutdown
5	Comfort Alert Code 5 for Compressor Circuit 1	Shutdown
6	Comfort Alert Code 6 for Compressor Circuit 1	Shutdown
7	Comfort Alert Code 7 for Compressor Circuit 1	Shutdown
8	Comfort Alert Code 8 for Compressor Circuit 1	Shutdown
9	Comfort Alert Code 9 for Compressor Circuit 1	Shutdown
11	FAILED IGNITION	Problem
12	LO FLAME SENSE	Warning
13	FLAME LOST	Problem
14	UNEXPECTED FLAME	Shutdown
15	HIGH-FIRE GAS VALVE IMPROPER VOLTAGE	Problem
20	REFRIGERANT LOW PRESSURE SWITCH OPEN - CIRCUIT 1	Problem
21	REFRIGERANT LOW PRESSURE SWITCH OPEN - CIRCUIT 2	Problem
22	MAIN LIMIT OPEN	Problem
29	REFRIGERANT HIGH PRESSURE SWITCH OPEN - CIRCUIT 1	Problem
30	REFRIGERANT HIGH PRESSURE SWITCH OPEN - CIRCUIT 2	Problem
33	MRLC (Rollout Limit) OPEN	Problem
34	Comfort Alert Code 4 for Compressor Circuit 2	Shutdown
35	Comfort Alert Code 5 for Compressor Circuit 2	Shutdown
36	Comfort Alert Code 6 for Compressor Circuit 2	Shutdown
37	Comfort Alert Code 7 for Compressor Circuit 2	Shutdown
38	Comfort Alert Code 8 for Compressor Circuit 2	Shutdown
39	Comfort Alert Code 9 for Compressor Circuit 2	Shutdown
40	Refrigerant Leak Detection System	Shutdown
42	Invalid Thermostat Selection	Warning
44	LOW-FIRE NEGATIVE PRESSURE CONTROL CLOSED	Problem
46	LOW-FIRE NEGATIVE PRESSURE CONTROL OPEN	Problem
49	FREEZE SWITCH OPEN - CIRCUIT 1	Problem
50	FREEZE SWITCH OPEN - CIRCUIT 2	Problem
55	2nd stage COMBUSTION PRESSURE SWITCH CLOSED	Problem
57	HIGH-FIRE NEGATIVE PRESSURE CONTROL CLOSED	Problem
59	Condensate Drain Plugged	Shutdown
61	HIGH-FIRE NEGATIVE PRESSURE CONTROL OPEN	Problem, Shutdown
83	Condenser Coil Temp Sensor Fail-OAT	Problem
84	Outdoor Air Temperature Sensor Fail-OAT	Problem
88	Emergency Stop Fault	Shutdown
93	CONTROL Fault	Shutdown
97	Smoke Detection	Shutdown

N.2.1. Cooling Alarm Codes and Diagnostics

All Core Command come standard with a 7-segment diagnostic display. During standby mode with no fault codes present, the display will read “0” (zero). During normal thermostat heating, cooling or continuous fan operation, a letter will be displayed to describe the mode of operation as follows:

C = Cooling

F = Continuous Fan Operation

When the control senses a fault present, it will display a code to help in diagnoses. A list of normal operating codes and potential fault codes follows:

Alarm Codes - Cooling Only		
CODE	**DESCRIPTION**	**FAULT LEVEL**
0	Standby	None
c	Compressor On – Low (Flashing If In Time Delay)	None
C	Compressor On – High (Flashing If In Time Delay)	None
E	Economizer Cooling – No Compressor	None
F	Continuous Fan	None
4	Comfort Alert Code 4 For Compressor Circuit 1	Shutdown
5	Comfort Alert Code 5 For Compressor Circuit 1	Shutdown
6	Comfort Alert Code 6 For Compressor Circuit 1	Shutdown
7	Comfort Alert Code 7 For Compressor Circuit 1	Shutdown
8	Comfort Alert Code 8 For Compressor Circuit 1	Shutdown
9	Comfort Alert Code 9 For Compressor Circuit 1	Shutdown
20	Refrigerant Low Pressure Switch Open – Circuit 1	Problem
29	Refrigerant High Pressure Switch Open – Circuit 1	Problem
49	Freeze Switch Open – Circuit 1	Problem
59	Condensate Drain Plugged	Shutdown
83	Condenser Coil Temp Sensor Fail-Oct	Problem
84	Outdoor Air Temperature Sensor Fail-Oat	Problem
88	Emergency Stop Fault	Shutdown
93	Control Fault	Shutdown
97	Smoke Detection	Shutdown

The method for displaying a two-digit fault is to display the first digit for one second immediately followed by the second digit – which is also displayed for a duration of one second. A ½ second pause is then displayed. Cycle repeats until the fault is cleared. Each fault is flashed (displayed) a minimum of two times even if the fault condition has cleared before the fault can be displayed twice.

Normal Operation Mode:

0	Displayed anytime there is no fault present and no thermostat call present
c	COMPRESSOR ON - Low (Flashing if in time delay)
C	COMPRESSOR ON - High (Flashing if in time delay)
E	When the system uses Economizer Cooling with No Compressor
F	Displayed anytime thermostat calls for continuous fan

N. DIAGNOSTICS

Fault Codes with Descriptions and Solutions:

Alarm Codes - Cooling Only		
CODE	**DESCRIPTION**	**FAULT LEVEL**
0	STANDBY	None
c	COMPRESSOR ON – Low (Flashing if in time delay)	None
C	COMPRESSOR ON – High (Flashing if in time delay)	None
E	Economizer Cooling – No Compressor	None
F	CONTINUOUS FAN	None
4	**Comfort Alert Code 4 for Compressor Circuit 1**	Shutdown
	ALARM Designation: Locked Rotor Circuit 1	
	DESCRIPTION:	
	1. Circuit 1 shutdown and retry after Anti-Short Cycle Delay (ASCD) Maximum is 3 attempts.	
	SOLUTION/STATUS/Possible - Troubleshooting Information	
	1. Low line voltage	
	2. Excessive Refrigerant in compressor	
	3. Seized bearings in compressor	
5	**Comfort Alert Code 5 for Compressor Circuit 1**	Shutdown
	ALARM Designation: Open Circuit 1	
	DESCRIPTION:	
	1. Circuit 1 shutdown and retry after ASCD. Note: This alarm is sent by the Comfort Alert Module only after the fault has been sensed for a minimum of 4 hours.	
	SOLUTION/STATUS/Possible - Troubleshooting Information	
	1. Condensing unit power disconnect is open	
	2. Compressor circuit breaker or fuses are open	
	3. Compressor contactor has failed open High pressure switch is open and requires manual reset	
	4. Broken supply wires or connector is not making contact	
	5. Unusually long compressor protector reset time due to extreme ambient temperature	
	6. Compressor windings are damaged	
6	**Comfort Alert Code 6 for Compressor Circuit 1**	Shutdown
	ALARM Designation: Missing Phase Circuit 1	
	DESCRIPTION:	
	1. Circuit 1 shutdown	
	SOLUTION/STATUS/Possible - Troubleshooting Information	
	1. Compressor fuse is open on one phase	
	2. Broken wire or connector on one phase	
	3. Compressor motor winding is damaged	
	4. Utility supply has dropped one phase	

Fault Codes with Descriptions and Solutions:

Alarm Codes - Cooling Only		
CODE	**DESCRIPTION**	**FAULT LEVEL**
7	**Comfort Alert Code 7 for Compressor Circuit 1**	Shutdown
	ALARM Designation: Reverse Phase Circuit 1	
	DESCRIPTION:	
	1. Run outdoor and indoor fans continuously for circuit 1 and change mode of operation to Unoccupied Auto. This procedure prevents the Space Temperature from reaching extreme values.	
	SOLUTION/STATUS/Possible - Troubleshooting Information	
	1. Compressor running backward due to supply phase reversal	
8	**Comfort Alert Code 8 for Compressor Circuit 1**	Shutdown
	ALARM Designation: Welded Contactor Circuit 1	
	DESCRIPTION:	
	1. Circuit 1 shutdown	
	SOLUTION/STATUS/Possible - Troubleshooting Information	
	1. Compressor contactor has failed closed	
	2. Thermostat demand signal not connected to module	
9	**Comfort Alert Code 9 for Compressor Circuit 1**	Shutdown
	ALARM Designation: Low Voltage Circuit 1	
	DESCRIPTION:	
	1. Circuit 1 Shutdown and wait for voltage to return to operational levels.	
	SOLUTION/STATUS/Possible - Troubleshooting Information	
	1. Control circuit transformer is overloaded	
	2. Low line voltage to compressor	
20	**DESCRIPTION:** REFRIGERANT LOW PRESSURE SWITCH OPEN – CIRCUIT 1	Problem
	CAUSE:	
	1. Low evaporator airflow	
	2. Refrigerant undercharge	
	3. Restriction in liquid line, expansion device or filter drier	
	4. Operating below 65°F outdoors	
	5. Moisture in system	
	SOLUTION: The solution will depend on the cause.	
	1. Increase speed of blower or reduce restriction - replace air filter	
	2. Check for leaks - add refrigerant	
	3. Remove or replace defective component	
	4. Add Low Ambient Kit	
	5. Recover refrigerant - evacuate & recharge - add or replace filter drier	

N. DIAGNOSTICS

Fault Codes with Descriptions and Solutions:

Alarm Codes - Cooling Only		
CODE	**DESCRIPTION**	**FAULT LEVEL**
29	**DESCRIPTION:** REFRIGERANT HIGH PRESSURE SWITCH OPEN – CIRCUIT 1	Problem
	CAUSE:	
	1. Restriction in liquid line, expansion device or filter drier	
	2. Refrigerant overcharge	
	3. Condenser fan not running	
	4. Air or non-condensibles in system	
	SOLUTION: The solution will depend on the cause.	
	1. Recover refrigerant - evacuate & recharge remove or replace defective component	
	2. Remove refrigerant	
	3. Check voltage, Run Capacitor & Outdoor Motor Repair or replace	
	4. Recover refrigerant, evacuate & recharge	
40	**REFRIGERANT LEAK DETECTION SYSTEM**	Shutdown
	DESCRIPTION:	
	1. The refrigerant leak detection system detects an event and mitigation procedure occurs.	
	2. The mitigation procedure is triggered when no event occurs.	
	SOLUTION: The solution will depend on the cause.	
	1. Check for refrigerant leaks	
	2a. Organic compounds could be falsely triggering mitigation procedure. Check the installation location for potential contaminants.	
	2b. The sensor is faulty; replace the sensor	
49	**FREEZE SWITCH OPEN – CIRCUIT 1**	Problem
	DESCRIPTION:	
	1. Occurs when sensors are either open or shorted.	
	SOLUTION: The solution will depend on the cause.	
	1. Replace the sensor	
	2. Check sensor Is installed correctly on control	
59	**Condensate Drain Plugged**	Shutdown
	DESCRIPTION:	
	1. Condensate line is blocked water inside of unit	
	SOLUTION: The solution will depend on the cause.	
	1. Remove blockage	
	2. Remove condensate pan and clean	

Fault Codes with Descriptions and Solutions:

Alarm Codes - Cooling Only		
CODE	**DESCRIPTION**	**FAULT LEVEL**
83	**Condenser Coil Temp Sensor Fail-OCT**	Problem
	DESCRIPTION:	
	1. No defrost operation, but unit continues to operate in either heating or cooling.	
	SOLUTION: The solution will depend on the cause.	
	1. Extreme temperatures	
	2. Replace the sensor	
	3. Check that sensor is installed correctly on control	
84	**Outdoor Air Temperature Sensor Fail-OAT**	Problem
	DESCRIPTION:	
	1. No defrost operation, but unit continues to operate in either heating or cooling.	
	2. The heat source continues to be heat pump, independently of the outdoor air temperature	
	SOLUTION: The solution will depend on the cause.	
	1. Extreme temperatures	
	2. Replace the sensor	
	3. Check that sensor is installed correctly on control	
88	**Emergency Stop Fault**	Shutdown
	DESCRIPTION:	
	1. Complete shutdown	
	SOLUTION: The solution will depend on the cause.	
	1. Cannot be cleared by the 'Clear All Alarms" command. Must be cleared by changing the Emergency Stop Fault network value.	
93	**CONTROL Fault**	Shutdown
	DESCRIPTION:	
	1. Internal Control fault.	
	SOLUTION: The solution will depend on the cause.	
	1. Replace Control	
91	**Smoke Detection**	Shutdown
	DESCRIPTION:	
	1. RTU-C reads the smoke detection input as open -- complete shutdown.	
	SOLUTION: The solution will depend on the cause.	
	1. If not due to a fire, Replace the sensor, Check sensor is in stalled correctly on control	
	2. Check Smoke Detection Circuit, if no Smoke Detector is installed, ensure Economizer Smoke Bypass plug is installed	

N. DIAGNOSTICS

N.2.2. Non-applicable Fault Codes

The controls used in this product are common with a few other product families. Because of this, there are several fault codes that are programmed into the controls but DO NOT APPLY to this product. If one of these fault codes appear, clear the fault and continue diagnostics. If the code persists, power down the unit and reapply power before continuing diagnostics.

These non-applicable fault codes are listed below:

Alarm Codes - NON-APPLICABLE FAULT CODES		
CODE	Description	FAULT LEVEL
h	GAS HEAT ON - LOW-FIRE	None
H	GAS HEAT ON -HIGH-FIRE	None
11	FAILED IGNITION	Problem
12	LO FLAME SENSE	Warning
13	FLAME LOST	Problem
14	UNEXPECTED FLAME	Shutdown
15	HIGH-FIRE GAS VALVE IMPROPER VOLTAGE	Problem
21	REFRIGERANT LOW PRESSURE SWITCH OPEN - CIRCUIT 2	Problem
22	MAIN LIMIT OPEN	Problem
30	REFRIGERANT HIGH PRESSURE SWITCH OPEN - CIRCUIT 2	Problem
33	MRLC (Rollout Limit) OPEN	Problem
34	Comfort Alert Code 4 for Compressor Circuit 2	Shutdown
35	Comfort Alert Code 5 for Compressor Circuit 2	Shutdown
36	Comfort Alert Code 6 for Compressor Circuit 2	Shutdown
37	Comfort Alert Code 7 for Compressor Circuit 2	Shutdown
38	Comfort Alert Code 8 for Compressor Circuit 2	Shutdown
39	Comfort Alert Code 9 for Compressor Circuit 2	Shutdown
42	Invalid Thermostat Selection	Warning
44	LOW-FIRE NEGATIVE PRESSURE CONTROL CLOSED	Problem
46	LOW-FIRE NEGATIVE PRESSURE CONTROL OPEN	Problem
50	FREEZE SWITCH OPEN - CIRCUIT 2	Problem
55	2nd stage COMBUSTION PRESSURE SWITCH CLOSED	Problem
57	HIGH-FIRE NEGATIVE PRESSURE CONTROL CLOSED	Problem
61	HIGH-FIRE NEGATIVE PRESSURE CONTROL OPEN	Problem, Shutdown

N.3. Common Mistakes

- These are a list of common mistakes made during installation.
- Drain Pan Connections, drain trap connected to the wrong outlet side, not connected at all, or insufficient trap depth.
- Connecting a W2 call only to try and get full heat all the time, Connect both W1 and W2 together if the job requirement or thermostat is setup for single stage heating.
- Connecting a Y2 call only to try and get full cooling all the time, Connect both Y1 and Y2 together if the job requirement or thermostat is setup for single stage cooling.
- Economizer connections, not installing the 3-wire jumper plug into the economizer wiring harness. If a factory option smoke detector is not used, this will cause a Smoke Detection Fault.

Appendix A – General Product Data

Model (-)HPCYB Series	036ACT 036ADT 036AJT	036ACU	036ADU
Cooling Performance[A]			
Gross Cooling Capacity Btu [kW]	36,000 [10.55]	36,000 [10.55]	36,000 [10.55]
EER2[B]	10.6	10.6	10.6
SEER2	13.4	13.4	13.4
Nominal CFM [L/s]	1200 [566]	1200 [566]	1200 [566]
AHRI Rated CFM [L/s]	1175 [555]	1175 [555]	1175 [555]
AHRI Net Cooling Capacity Btu [kW]	34200 [10.02]	34200 [10.02]	34200 [10.02]
Net Sensible Capacity Btu [kW]	25600 [7.5]	25600 [7.5]	25600 [7.5]
Net Latent Capacity Btu [kW]	8600 [2.52]	8600 [2.52]	8600 [2.52]
Net System Power kW	3.2	3.2	3.2
Heating Performance (Heat Pumps)			
High Temp. Btuh [kW] Rating	34200 [10.02]	34200 [10.02]	34200 [10.02]
System Power KW / COP	2.64/3.8	2.64/3.8	2.64/3.8
Low Temp. Btuh [kW] Rating	21600 [6.33]	21600 [6.33]	21600 [6.33]
System Power KW / COP	2.53/2.5	2.53/2.5	2.53/2.5
HSPF2 (Btu/Watts-hr)	6.7	6.7	6.7
Compressor			
No./Type	1/Scroll	1/Scroll	1/Scroll
No. Stages	1	1	1
Outdoor Sound Rating (dB)[D]	79	79	79
Outdoor Coil - Fin Type	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	0.63 [16]	0.63 [16]	0.63 [16]
Face Area sq. ft. [sq. m]	15.75 [1.46]	15.75 [1.46]	15.75 [1.46]
Rows / FPI [FPcm]	1 / 16 [6]	1 / 16 [6]	1 / 16 [6]
Refrigerant Control	TX Valves	TX Valves	TX Valves
Indoor Coil - Fin Type	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	1.00 [25.4]	1.00 [25.4]	1.00 [25.4]
Face Area sq. ft. [sq. m]	7.48 [0.7]	7.48 [0.7]	7.48 [0.7]
Rows / FPI [FPcm]	1 / 20 [8]	1 / 20 [8]	1 / 20 [8]
Refrigerant Control	TX Valves	TX Valves	TX Valves
Drain Connection No./Size in. [mm]	1/0.75 [19.05]	1/0.75 [19.05]	1/0.75 [19.05]
Outdoor Fan - Type	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	1/26 [660.4]	1/26 [660.4]	1/26 [660.4]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1
CFM [L/s]	5100 [2407]	5100 [2407]	5100 [2407]
No. Motors/HP	1 at 1/5 HP	1 at 1/5 HP	1 at 1/5 HP
Motor RPM	850	850	850
Indoor Fan - Type	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	1/11x11 [279x279]	1/11x11 [279x279]	1/11x11 [279x279]
Drive Type	Direct	Direct	Direct
No. Speeds	Multiple	Multiple	Multiple
No. Motors	1	1	1
Motor HP	3/4	1 1/2	1
Motor RPM	1050	1050	1050
Motor Frame Size	48	48	48
Filter - Type	Disposable	Disposable	Disposable
Furnished	Yes	Yes	Yes
(NO.) Size Recommended in. [mm x mm x mm]	(4)2x16x16 [51x406x406]	(4)2x16x16 [51x406x406]	(4)2x16x16 [51x406x406]
Refrigerant Charge Oz. [g]	84 [2381]	84 [2381]	84 [2381]
Weights			
Net Weight lbs. [kg]	532 [232]	538 [235]	538 [235]
Ship Weight lbs. [kg]	570 [249]	576 [251]	576 [251]

P. APPENDICES

Appendix A – General Product Data

Model (-)HPCYB Series	048ACT 048ADT 048AJT	048ACU	048ADU
Cooling Performance[A]			
Gross Cooling Capacity Btu [kW]	48000 [14.07]	48000 [14.07]	48000 [14.07]
EER2[B]	10.6	10.6	10.6
SEER2	13.4	13.4	13.4
Nominal CFM [L/s]	1600 [755]	1600 [755]	1600 [755]
AHRI Rated CFM [L/s]	1460 [689]	1460 [689]	1460 [689]
AHRI Net Cooling Capacity Btu [kW]	45500 [13.34]	45500 [13.34]	45500 [13.34]
Net Sensible Capacity Btu [kW]	34200 [10.02]	34200 [10.02]	34200 [10.02]
Net Latent Capacity Btu [kW]	11300 [3.31]	11300 [3.31]	11300 [3.31]
Net System Power kW	4.3	4.3	4.3
Heating Performance (Heat Pumps)			
High Temp. Btuh [kW] Rating	45500 [13.34]	45500 [13.34]	45500 [13.34]
System Power KW / COP	3.92/3.4	3.92/3.4	3.92/3.4
Low Temp. Btuh [kW] Rating	26600 [7.8]	26600 [7.8]	26600 [7.8]
System Power KW / COP	3.54/2.2	3.54/2.2	3.54/2.2
HSPF2 (Btu/Watts-hr)	6.7	6.7	6.7
Compressor			
No./Type	1/Scroll	1/Scroll	1/Scroll
No. Stages	1	1	1
Outdoor Sound Rating (dB)[D]	86	86	86
Outdoor Coil - Fin Type	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	1.26 [32]	1.26 [32]	1.26 [32]
Face Area sq. ft. [sq. m]	15.52 [1.44]	15.52 [1.44]	15.52 [1.44]
Rows / FPI [FPcm]	1 / 16 [6]	1 / 16 [6]	1 / 16 [6]
Refrigerant Control	TX Valves	TX Valves	TX Valves
Indoor Coil - Fin Type	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	1.26 [32]	1.26 [32]	1.26 [32]
Face Area sq. ft. [sq. m]	7.13 [0.7]	7.13 [0.7]	7.13 [0.7]
Rows / FPI [FPcm]	1 / 20 [8]	1 / 20 [8]	1 / 20 [8]
Refrigerant Control	TX Valves	TX Valves	TX Valves
Drain Connection No./Size in. [mm]	1/0.75 [19.05]	1/0.75 [19.05]	1/0.75 [19.05]
Outdoor Fan - Type	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	1/26 [660.4]	1/26 [660.4]	1/26 [660.4]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1
CFM [L/s]	5900 [2784]	5900 [2784]	5900 [2784]
No. Motors/HP	1 at 1/2 HP	1 at 1/2 HP	1 at 1/2 HP
Motor RPM	1075	1075	1075
Indoor Fan - Type	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	1/11x11 [279x279]	1/11x11 [279x279]	1/11x11 [279x279]
Drive Type	Direct	Direct	Direct
No. Speeds	Multiple	Multiple	Multiple
No. Motors	1	1	1
Motor HP	3/4	1 1/2	1
Motor RPM	1050	1050	1050
Motor Frame Size	48	48	48
Filter - Type	Disposable	Disposable	Disposable
Furnished	Yes	Yes	Yes
(NO.) Size Recommended in. [mm x mm x mm]	(4)2x16x16 [51x406x406]	(4)2x16x16 [51x406x406]	(4)2x16x16 [51x406x406]
Refrigerant Charge Oz. [g]	143 [4054]	143 [4054]	143 [4054]
Weights			
Net Weight lbs. [kg]	559 [244]	565 [246]	565 [246]
Ship Weight lbs. [kg]	597 [260]	603 [263]	603 [263]

Appendix A – General Product Data

Model (-)HPCYB Series	060ACT 060ADT 060AJT	060ACU	060ADU
Cooling Performance[A]			
Gross Cooling Capacity Btu [kW]	60000 [17.58]	60000 [17.58]	60000 [17.58]
EER2[B]	10.6	10.6	10.6
SEER2	13.4	13.4	13.4
Nominal CFM [L/s]	2000 [944]	2000 [944]	2000 [944]
AHRI Rated CFM [L/s]	1925 [908]	1925 [908]	1925 [908]
AHRI Net Cooling Capacity Btu [kW]	57000 [16.71]	57000 [16.71]	57000 [16.71]
Net Sensible Capacity Btu [kW]	43000 [12.6]	43000 [12.6]	43000 [12.6]
Net Latent Capacity Btu [kW]	14000 [4.1]	14000 [4.1]	14000 [4.1]
Net System Power kW	5.4	5.4	5.4
Heating Performance (Heat Pumps)			
High Temp. Btuh [kW] Rating	57000 [16.71]	57000 [16.71]	57000 [16.71]
System Power KW / COP	4.4/3.8	4.4/3.8	4.4/3.8
Low Temp. Btuh [kW] Rating	26200 [7.68]	26200 [7.68]	26200 [7.68]
System Power KW / COP	3.34/2.3	3.34/2.3	3.34/2.3
HSPF2 (Btu/Watts-hr)	6.7	6.7	6.7
Compressor			
No./Type	1/Scroll	1/Scroll	1/Scroll
No. Stages	1	1	1
Outdoor Sound Rating (dB)[D]	84	84	84
Outdoor Coil - Fin Type	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	1.26 [32]	1.26 [32]	1.26 [32]
Face Area sq. ft. [sq. m]	15.52 [1.44]	15.52 [1.44]	15.52 [1.44]
Rows / FPI [FPcm]	1 / 16 [6]	1 / 16 [6]	1 / 16 [6]
Refrigerant Control	TX Valves	TX Valves	TX Valves
Indoor Coil - Fin Type	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	1.26 [32]	1.26 [32]	1.26 [32]
Face Area sq. ft. [sq. m]	7.13 [0.7]	7.13 [0.7]	7.13 [0.7]
Rows / FPI [FPcm]	1 / 20 [8]	1 / 20 [8]	1 / 20 [8]
Refrigerant Control	TX Valves	TX Valves	TX Valves
Drain Connection No./Size in. [mm]	1/0.75 [19.05]	1/0.75 [19.05]	1/0.75 [19.05]
Outdoor Fan - Type	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	1/26 [660.4]	1/26 [660.4]	1/26 [660.4]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1
CFM [L/s]	5900 [2784]	5900 [2784]	5900 [2784]
No. Motors/HP	1 at 1/2 HP	1 at 1/2 HP	1 at 1/2 HP
Motor RPM	1075	1075	1075
Indoor Fan - Type	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	1/11x11 [279x279]	1/11x11 [279x279]	1/11x11 [279x279]
Drive Type	Direct	Direct	Direct
No. Speeds	Multiple	Multiple	Multiple
No. Motors	1	1	1
Motor HP	1	1 1/2	1 1/5
Motor RPM	1050	1050	1050
Motor Frame Size	48	48	48
Filter - Type	Disposable	Disposable	Disposable
Furnished	Yes	Yes	Yes
(NO.) Size Recommended in. [mm x mm x mm]	(4)2x16x16 [51x406x406]	(4)2x16x16 [51x406x406]	(4)2x16x16 [51x406x406]
Refrigerant Charge Oz. [g]	146 [4139]	146 [4139]	146 [4139]
Weights			
Net Weight lbs. [kg]	562 [245]	568 [248]	568 [248]
Ship Weight lbs. [kg]	600 [262]	606 [264]	606 [264]

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Appendix A – General Product Data

Model (-)HPCYB Series	072ACT	072ACU	072ADT	072ADU
Cooling Performance[A]				
Gross Cooling Capacity Btu [kW]	72,000 [21.10]	72,000 [21.10]	72,000 [21.10]	72,000 [21.10]
EER[B]	11	11	11	11
IEER[C]	14.1	14.1	14.1	14.1
Nominal CFM [L/s]	2400 [1133]	2400 [1133]	2400 [1133]	2400 [1133]
AHRI Rated CFM [L/s]	2360 [1114]	2360 [1114]	2360 [1114]	2360 [1114]
AHRI Net Cooling Capacity Btu [kW]	68500 [20.08]	68500 [20.08]	68500 [20.08]	68500 [20.08]
Net Sensible Capacity Btu [kW]	51500 [15.09]	51500 [15.09]	51500 [15.09]	51500 [15.09]
Net Latent Capacity Btu [kW]	17000 [4.98]	17000 [4.98]	17000 [4.98]	17000 [4.98]
Net System Power kW	6.18/6.18	6.18/6.18	6.18/6.18	6.18/6.18
Heating Performance (Heat Pumps)				
High Temp. Btuh [kW] Rating	68000 [19.93]	68000 [19.93]	68000 [19.93]	68000 [19.93]
System Power KW / COP	5.86/3.4	5.86/3.4	5.86/3.4	5.86/3.4
Low Temp. Btuh [kW] Rating	38500 [11.28]	38500 [11.28]	38500 [11.28]	38500 [11.28]
System Power KW / COP	5.01/2.25	5.01/2.25	5.01/2.25	5.01/2.25
HSPF2 (Btu/Watts-hr)	N/A	N/A	N/A	N/A
Compressor				
No./Type	1/Scroll	1/Scroll	1/Scroll	1/Scroll
No. Stages	2	2	2	2
Outdoor Sound Rating (dB)[D]	84	84	84	84
Outdoor Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	1.26 [32]	1.26 [32]	1.26 [32]	1.26 [32]
Face Area sq. ft. [sq. m]	15.52 [1.44]	15.52 [1.44]	15.52 [1.44]	15.52 [1.44]
Rows / FPI [FPcm]	1 / 16 [6]	1 / 16 [6]	1 / 16 [6]	1 / 16 [6]
Refrigerant Control	TX Valves	TX Valves	TX Valves	TX Valves
Indoor Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	1.26 [32]	1.26 [32]	1.26 [32]	1.26 [32]
Face Area sq. ft. [sq. m]	7.52 [0.7]	7.52 [0.7]	7.52 [0.7]	7.52 [0.7]
Rows / FPI [FPcm]	1 / 20 [8]	1 / 20 [8]	1 / 20 [8]	1 / 20 [8]
Refrigerant Control	TX Valves	TX Valves	TX Valves	TX Valves
Drain Connection No./Size in. [mm]	1/0.75 [19.05]	1/0.75 [19.05]	1/0.75 [19.05]	1/0.75 [19.05]
Outdoor Fan - Type	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	1/26 [660.4]	1/26 [660.4]	1/26 [660.4]	1/26 [660.4]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	5900 [2784]	5900 [2784]	5900 [2784]	5900 [2784]
No. Motors/HP	1 at 1/2 HP	1 at 1/2 HP	1 at 1/2 HP	1 at 1/2 HP
Motor RPM	1075	1075	1075	1075
Indoor Fan - Type	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	1/11x11 [279x279]	1/11x11 [279x279]	1/11x11 [279x279]	1/11x11 [279x279]
Drive Type	Direct	Direct	Direct	Direct
No. Speeds	Multiple	Multiple	Multiple	Multiple
No. Motors	1	1	1	1
Motor HP	1 1/5	1 1/5	1 1/5	1 1/5
Motor RPM	1300	1300	1300	1300
Motor Frame Size	48	48	48	48
Filter - Type	Disposable	Disposable	Disposable	Disposable
Furnished	Yes	Yes	Yes	Yes
(NO.) Size Recommended in. [mm x mm x mm]	(4)2x16x16 [51x406x406]	(4)2x16x16 [51x406x406]	(4)2x16x16 [51x406x406]	(4)2x16x16 [51x406x406]
Refrigerant Charge Oz. [g]	142 [4026]	142 [4026]	142 [4026]	142 [4026]
Weights				
Net Weight lbs. [kg]	583 [264]	583 [264]	583 [264]	583 [264]
Ship Weight lbs. [kg]	621 [282]	621 [282]	621 [282]	621 [282]

Appendix A – General Product Data

A. Cooling Performance is rated at 95°F ambient, 80°F entering dry bulb, 67°F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to • 20% of nominal CFM. Units are certified in accordance with the Unitary Air Conditioner Equipment certification program, which is based on AHRI Standard 210/240.

B. EER/EER2 and/or SEER2 are rated at AHRI conditions and in accordance with DOE test procedures.

C. Integrated Energy Efficiency Ration (IEER) is rated in accordance with AHRI Standard 340/360.

D. Outdoor Sound Rating shown is tested in accordance with AHRI Standard 270.

Unit Size - Series	Standard Rating (dBA)	TYPICAL OCTAVE BAND SPECTRUM (dBA without tone adjustment)							
		63	125	250	500	1000	2000	4000	8000
(-)HPCYB036	78.0	55.2	58.2	64.0	68.4	69.3	65.7	61.0	56.3
(-)HPCYB048	86.0	61.0	66.8	76.2	75.6	75.2	71.9	67.9	60.8
(-)HPCYB060	84.0	57.1	65.9	71.5	73.1	74.8	70.4	66.7	60.2
(-)HPCYB072	84.0	56.5	59.6	71.9	73.1	75.0	71.2	66.8	60.0

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Appendix B – Electrical Data

See Appendix E for Electrical Data and Fuse Sizing specific to the Manufacturer's approved Electric Heater Kits.

ELECTRICAL DATA – (-)HPC SERIES WITHOUT POWERED EXHAUST						
		036ACT	**036ACU**	**036ADT**	**036ADU**	**036AJT**
Unit Information	Unit Operating Voltage Range	187-253	187-253	414-506	414-506	187-253
	Volts	208/230	208/230	460	460	208/230
	Phase	3	3	3	3	1
	Hz	60	60	60	60	60
	Minimum Circuit Ampacity	23	28	11	12	29
	Minimum Overcurrent Protection Device Size	30	35	15	15	35
	Maximum Overcurrent Protection Device Size	30	40	15	15	40
Compressor Motor	No.	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230
	Phase	3	3	3	3	1
	Amps (RLA), Comp. 1	12.2	12.2	5.8	5.8	16.7
	Amps (LRA), Comp. 1	97.5	97.5	44.3	44.3	93.5
Condenser Motor	No.	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230
	Phase	1	1	1	1	1
	HP	1/5	1/5	1/5	1/5	1/5
	Amps (FLA, each)	1.2	1.2	0.8	0.8	1.2
	Amps (LRA, each)	2.3	2.3	1.4	1.4	2.3
Evaporator Fan	No.	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230
	Phase	1	1	1	1	1
	HP	3/4	1 1/2	3/4	1	3/4
	Amps (FLA, each)	6	11.5	2.7	3.5	6
	Amps (LRA, each)	N/A	N/A	N/A	N/A	N/A

Appendix B – Electrical Data (Cont.)

See Appendix E for Electrical Data and Fuse Sizing specific to the Manufacturer's approved Electric Heater Kits.

ELECTRICAL DATA – (-)HPC SERIES WITH POWERED EXHAUST						
		036ACT	036ACU	036ADT	036ADU	036AJT
Unit Information	Unit Operating Voltage Range	187-253	187-253	414-506	414-506	187-253
	Volts	208/230	208/230	460	460	208/230
	Phase	3	3	3	3	1
	Hz	60	60	60	60	60
	Minimum Circuit Ampacity	26	32	13	14	32
	Minimum Overcurrent Protection Device Size	30	35	15	20	40
	Maximum Overcurrent Protection Device Size	35	40	15	20	45
Compressor Motor	No.	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230
	Phase	3	3	3	3	1
	Amps (RLA), Comp. 1	12.2	12.2	5.8	5.8	16.7
	Amps (LRA), Comp. 1	97.5	97.5	44.3	44.3	93.5
Condenser Motor	No.	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230
	Phase	1	1	1	1	1
	HP	1/5	1/5	1/5	1/5	1/5
	Amps (FLA, each)	1.2	1.2	0.8	0.8	1.2
	Amps (LRA, each)	2.3	2.3	1.4	1.4	2.3
Evaporator Fan	No.	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230
	Phase	1	1	1	1	1
	HP	3/4	1 1/2	3/4	1	3/4
	Amps (FLA, each)	6	11.5	2.7	3.5	6
	Amps (LRA, each)	N/A	N/A	N/A	N/A	N/A

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Appendix B – Electrical Data

See Appendix E for Electrical Data and Fuse Sizing specific to the Manufacturer's approved Electric Heater Kits.

ELECTRICAL DATA – (-)HPC SERIES WITHOUT POWERED EXHAUST						
		048ACT	**048ACU**	**048ADT**	**048ADU**	**048AJT**
Unit Information	Unit Operating Voltage Range	187-253	187-253	414-506	414-506	187-253
	Volts	208/230	208/230	460	460	208/230
	Phase	3	3	3	3	1
	Hz	60	60	60	60	60
	Minimum Circuit Ampacity	25	30	12	13	37
	Minimum Overcurrent Protection Device Size	30	35	15	15	45
	Maximum Overcurrent Protection Device Size	35	40	15	15	50
Compressor Motor	No.	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230
	Phase	3	3	3	3	1
	Amps (RLA), Comp. 1	12.8	12.8	6	6	22.4
	Amps (LRA), Comp. 1	120.4	120.4	49.4	49.4	126
Condenser Motor	No.	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230
	Phase	1	1	1	1	1
	HP	1/2	1/2	1/2	1/2	1/2
	Amps (FLA, each)	2.3	2.3	1.5	1.5	2.3
	Amps (LRA, each)	5.1	5.1	3.1	3.1	5.1
Evaporator Fan	No.	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230
	Phase	1	1	1	1	1
	HP	3/4	1 1/2	3/4	1	3/4
	Amps (FLA, each)	6	11.5	2.7	3.5	6
	Amps (LRA, each)	N/A	N/A	N/A	N/A	N/A

Appendix B – Electrical Data (Cont.)

See Appendix E for Electrical Data and Fuse Sizing specific to the Manufacturer's approved Electric Heater Kits.

ELECTRICAL DATA – (-)HPC SERIES WITH POWERED EXHAUST						
		048ACT	048ACU	048ADT	048ADU	048AJT
Unit Information	Unit Operating Voltage Range	187-253	187-253	414-506	414-506	187-253
	Volts	208/230	208/230	460	460	208/230
	Phase	3	3	3	3	1
	Hz	60	60	60	60	60
	Minimum Circuit Ampacity	28	33	14	15	40
	Minimum Overcurrent Protection Device Size	35	40	20	20	45
	Maximum Overcurrent Protection Device Size	40	45	20	20	60
Compressor Motor	No.	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230
	Phase	3	3	3	3	1
	Amps (RLA), Comp. 1	12.8	12.8	6	6	22.4
	Amps (LRA), Comp. 1	120.4	120.4	49.4	49.4	126
Condenser Motor	No.	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230
	Phase	1	1	1	1	1
	HP	1/2	1/2	1/2	1/2	1/2
	Amps (FLA, each)	2.3	2.3	1.5	1.5	2.3
	Amps (LRA, each)	5.1	5.1	3.1	3.1	5.1
Evaporator Fan	No.	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230
	Phase	1	1	1	1	1
	HP	3/4	1 1/2	3/4	1	3/4
	Amps (FLA, each)	6	11.5	2.7	3.5	6
	Amps (LRA, each)	N/A	N/A	N/A	N/A	N/A

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Appendix B – Electrical Data

See Appendix E for Electrical Data and Fuse Sizing specific to the Manufacturer's approved Electric Heater Kits.

ELECTRICAL DATA – (-)HPC SERIES WITHOUT POWERED EXHAUST						
		060ACT	**060ACU**	**060ADT**	**060ADU**	**060AJT**
Unit Information	Unit Operating Voltage Range	187-253	187-253	414-506	414-506	187-253
	Volts	208/230	208/230	460	460	208/230
	Phase	3	3	3	3	1
	Hz	60	60	60	60	60
	Minimum Circuit Ampacity	33	37	15	15	43
	Minimum Overcurrent Protection Device Size	40	45	20	20	50
	Maximum Overcurrent Protection Device Size	45	50	20	20	60
Compressor Motor	No.	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230
	Phase	3	3	3	3	1
	Amps (RLA), Comp. 1	16	16	7.1	7.1	23.7
	Amps (LRA), Comp. 1	156.4	156.4	58.1	58.1	157
Condenser Motor	No.	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230
	Phase	1	1	1	1	1
	HP	1/2	1/2	1/2	1/2	1/2
	Amps (FLA, each)	5.3	5.3	2.3	2.3	5.3
	Amps (LRA, each)	N/A	N/A	N/A	N/A	N/A
Evaporator Fan	No.	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230
	Phase	1	1	1	1	1
	HP	1	1 1/2	1	1 1/5	1
	Amps (FLA, each)	7.6	11.5	3.5	3.7	7.6
	Amps (LRA, each)	N/A	N/A	N/A	N/A	N/A

Appendix B – Electrical Data (Cont.)

See Appendix E for Electrical Data and Fuse Sizing specific to the Manufacturer's approved Electric Heater Kits.

ELECTRICAL DATA – (-)HPC SERIES WITH POWERED EXHAUST						
		060ACT	060ACU	060ADT	060ADU	060AJT
Unit Information	Unit Operating Voltage Range	187-253	187-253	414-506	414-506	187-253
	Volts	208/230	208/230	460	460	208/230
	Phase	3	3	3	3	1
	Hz	60	60	60	60	60
	Minimum Circuit Ampacity	36	40	17	17	46
	Minimum Overcurrent Protection Device Size	40	45	20	20	60
	Maximum Overcurrent Protection Device Size	50	50	20	20	60
Compressor Motor	No.	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230
	Phase	3	3	3	3	1
	Amps (RLA), Comp. 1	16	16	7.1	7.1	23.7
	Amps (LRA), Comp. 1	156.4	156.4	58.1	58.1	157
Condenser Motor	No.	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230
	Phase	1	1	1	1	1
	HP	1/2	1/2	1/2	1/2	1/2
	Amps (FLA, each)	5.3	5.3	2.3	2.3	5.3
	Amps (LRA, each)	N/A	N/A	N/A	N/A	N/A
Evaporator Fan	No.	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230
	Phase	1	1	1	1	1
	HP	1	1 1/2	1	1 1/5	1
	Amps (FLA, each)	7.6	11.5	3.5	3.7	7.6
	Amps (LRA, each)	N/A	N/A	N/A	N/A	N/A

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Appendix B – Electrical Data

See Appendix E for Electrical Data and Fuse Sizing specific to the Manufacturer's approved Electric Heater Kits.

ELECTRICAL DATA – (-)HPC SERIES WITHOUT POWERED EXHAUST					
		072ACT	**072ACU**	**072ADT**	**072ADU**
Unit Information	Unit Operating Voltage Range	187-253	187-253	414-506	414-506
	Volts	208/230	208/230	460	460
	Phase	3	3	3	3
	Hz	60	60	60	60
	Minimum Circuit Ampacity	38	38	18	18
	Minimum Overcurrent Protection Device Size	45	45	20	20
	Maximum Overcurrent Protection Device Size	50	50	25	25
Compressor Motor	No.	1	1	1	1
	Volts	208-230	208-230	460	460
	Phase	3	3	3	3
	Amps (RLA), Comp. 1	19.2	19.2	9.1	9.1
	Amps (LRA), Comp. 1	162	162	70.8	70.8
Condenser Motor	No.	1	1	1	1
	Volts	208-230	208-230	460	460
	Phase	1	1	1	1
	HP	1/2	1/2	1/2	1/2
	Amps (FLA, each)	5.3	5.3	2.3	2.3
	Amps (LRA, each)	N/A	N/A	N/A	N/A
Evaporator Fan	No.	1	1	1	1
	Volts	208-230	208-230	460	460
	Phase	1	1	1	1
	HP	1 1/5	1 1/5	1 1/5	1 1/5
	Amps (FLA, each)	8.5	8.5	3.7	3.7
	Amps (LRA, each)	N/A	N/A	N/A	N/A

Appendix B – Electrical Data (Cont.)

See Appendix E for Electrical Data and Fuse Sizing specific to the Manufacturer's approved Electric Heater Kits.

ELECTRICAL DATA – (-)HPC SERIES WITH POWERED EXHAUST					
		072ACT	072ACU	072ADT	072ADU
Unit Information	Unit Operating Voltage Range	187-253	187-253	414-506	414-506
	Volts	208/230	208/230	460	460
	Phase	3	3	3	3
	Hz	60	60	60	60
	Minimum Circuit Ampacity	41	41	20	20
	Minimum Overcurrent Protection Device Size	50	50	25	25
	Maximum Overcurrent Protection Device Size	60	60	25	25
Compressor Motor	No.	1	1	1	1
	Volts	208-230	208-230	460	460
	Phase	3	3	3	3
	Amps (RLA), Comp. 1	19.2	19.2	9.1	9.1
	Amps (LRA), Comp. 1	162	162	70.8	70.8
Condenser Motor	No.	1	1	1	1
	Volts	208-230	208-230	460	460
	Phase	1	1	1	1
	HP	1/2	1/2	1/2	1/2
	Amps (FLA, each)	5.3	5.3	2.3	2.3
	Amps (LRA, each)	N/A	N/A	N/A	N/A
Evaporator Fan	No.	1	1	1	1
	Volts	208-230	208-230	460	460
	Phase	1	1	1	1
	HP	1 1/5	1 1/5	1 1/5	1 1/5
	Amps (FLA, each)	8.5	8.5	3.7	3.7
	Amps (LRA, each)	N/A	N/A	N/A	N/A

3-6T - Low Static - Sideflow (208/230V/575V)												
Unit Model (Tonnage)	Manufacturer Recommended Airflow Range (Min/Max) CFM	Motor HP [W]	Motor Speed	CFM/WATTS	External Static Pressure - Inches W.C. [kPa]							
					0.1 [.02]	0.2 [.05]	0.3 [.07]	0.4 [.10]	0.5 [.12]	0.6 [.15]	0.7 [.17]	0.8 [.20]
(-HPCYB036 (3T)	1050/1350	3/4 HP [559]	Fan - Tap 1	CFM	1444	1204	909	823	732	622	514	448
				WATTS	190	158	124	127	134	143	149	155
		3/4 HP [559]	Tap 2	CFM	1592	1512	1441	1386	1315	1257	1198	1140
				WATTS	238	253	266	276	289	300	311	324
		3/4 HP [559]	Tap 3	CFM	1827	1757	1687	1622	1571	1517	1447	1393
				WATTS	335	351	368	380	394	405	421	435
		3/4 HP [559]	Cooling - Tap 4 *	CFM	1492	1414	1342	1283	1212	1147	1079	1023
				WATTS	208	220	231	241	252	263	274	284
		3/4 HP [559]	High Speed - Tap 5	CFM	1737	1663	1585	1531	1478	1415	1354	1301
				WATTS	293	309	324	336	348	362	375	386
(-)HPCYB048 (4T)	1400/1800	3/4 HP [559]	Fan - Tap 1	CFM	1409	1170	969	891	828	740	668	602
				WATTS	177	145	129	137	144	154	160	168
		3/4 HP [559]	Tap 2	CFM	1858	1803	1741	1676	1622	1572	1516	1456
				WATTS	348	363	379	392	404	417	432	445
		3/4 HP [559]	Tap 3	CFM	1935	1870	1810	1752	1695	1645	1587	1540
				WATTS	381	400	413	430	443	455	471	484
		3/4 HP [559]	Cooling - Tap 4 *	CFM	1759	1686	1627	1575	1530	1482	1418	1366
				WATTS	321	337	350	362	375	387	401	412
		3/4 HP [559]	High Speed - Tap 5	CFM	2113	2059	2007	1948	1893	1844	1793	1748
				WATTS	491	507	524	541	557	570	586	600
(-)HPCYB060 (5T)	1750/2250	1 HP [745]	Fan - Tap 1	CFM	1186	1107	1015	953	881	809	714	636
				WATTS	122	131	141	148	157	164	174	180
		1 HP [745]	Tap 2	CFM	1719	1665	1597	1541	1482	1425	1360	1301
				WATTS	292	304	319	331	344	355	369	382
		1 HP [745]	Tap 3	CFM	1944	1897	1827	1769	1717	1661	1609	1552
				WATTS	394	409	425	440	452	467	483	495
		1 HP [745]	Cooling - Tap 4 *	CFM	2218	2161	2110	2060	2015	1969	1924	1877
				WATTS	584	606	623	638	654	672	684	699
		1 HP [745]	High Speed - Tap 5	CFM	2365	2291	2241	2204	2161	2111	2065	2026
				WATTS	694	723	741	757	773	794	810	825
(-)HPCYB072 (6T)	2100/2700	1.2 HP [895]	Fan/Low Heat - Tap 1	CFM	1384	1319	1249	1188	1127	1066	1006	947
				WATTS	192	204	215	225	240	245	255	265
		1.2 HP [895]	High Heat - Tap 2	CFM	1874	1833	1778	1730	1680	1630	1584	1539
				WATTS	421	435	450	466	480	495	510	525
		1.2 HP [895]	Low Cool - Tap 3	CFM	1546	1488	1427	1372	1316	1261	1203	1149
				WATTS	258	270	282	298	310	318	330	338
		1.2 HP [895]	High Cool - Tap 4	CFM	2456	2415	2336	2279	2280	2181	2158	2062
				WATTS	738	755	794	808	827	847	877	904
		1.2 HP [895]	High Speed - Tap 5	CFM	2363	2330	2280	2237	2198	2164	2110	2071
				WATTS	771	792	808	824	843	860	875	890

NOTES

*Factory tap settings are marked with an asterisk**

Pressure drops across the 3-5T CFM range (1050 -2250). Pressure drops across the 6T CFM range (2100 - 2700). Wet coil: ~0.09 inches W.C. Downflow: ~0.1 inches W.C. Reheat coil: ~0.09 inches W.C.

Appendix C – Air Flow Performance Data (Cont.)

3-6T - Low Static - Sideflow (460V)												
Unit Model (Tonnage)	Manufacturer Recommended Airflow Range (Min/Max) CFM	Motor HP [W]	Motor Speed	CFM/WATTS	External Static Pressure - Inches W.C. [kPa]							
					0.1 [.02]	0.2 [.05]	0.3 [.07]	0.4 [.10]	0.5 [.12]	0.6 [.15]	0.7 [.17]	0.8 [.20]
(-HPCYB036 (3T)	1050/1350	3/4 HP [559]	Fan - Tap 1	CFM	957	867	777	686	562	477	388	313
				WATTS	94	102	110	117	125	130	135	140
		3/4 HP [559]	Tap 2	CFM	1172	1095	1019	942	865	789	696	621
				WATTS	145	155	164	174	182	190	199	206
		3/4 HP [559]	Tap 3	CFM	1697	1641	1586	1530	1473	1413	1364	1314
				WATTS	365	378	390	404	418	432	444	457
		3/4 HP [559]	Cooling - Tap 4 *	CFM	1472	1393	1331	1265	1181	1123	1065	1007
				WATTS	195	208	219	231	243	253	264	273
		3/4 HP [559]	High Speed - Tap 5	CFM	1612	1551	1493	1435	1373	1316	1261	1205
				WATTS	316	329	341	353	367	379	392	404
(-)HPCYB048 (4T)	1400/1800	3/4 HP [559]	Fan - Tap 1	CFM	1061	965	882	801	707	545	445	359
				WATTS	114	124	132	140	148	154	160	166
		3/4 HP [559]	Tap 2	CFM	1319	1247	1172	1105	1039	962	884	807
				WATTS	189	200	211	221	231	242	250	259
		3/4 HP [559]	Tap 3	CFM	1737	1684	1624	1564	1509	1453	1400	1345
				WATTS	374	391	404	417	430	445	458	471
		3/4 HP [559]	Cooling - Tap 4 *	CFM	1644	1579	1518	1456	1392	1335	1278	1222
				WATTS	321	335	348	360	373	386	398	411
		3/4 HP [559]	High Speed - Tap 5	CFM	1923	1862	1813	1763	1711	1657	1610	1556
				WATTS	485	500	514	532	545	563	576	594
(-)HPCYB060 (5T)	1750/2250	1 HP [745]	Fan - Tap 1	CFM	1107	1017	936	865	793	711	592	527
				WATTS	126	135	143	151	158	166	174	181
		1 HP [745]	Tap 2	CFM	1244	1171	1103	1024	956	893	825	747
				WATTS	168	177	186	195	203	212	221	230
		1 HP [745]	Tap 3	CFM	1827	1770	1718	1664	1607	1556	1497	1455
				WATTS	428	442	455	469	482	494	506	518
		1 HP [745]	Cooling - Tap 4 *	CFM	2078	2041	1991	1925	1867	1827	1780	1731
				WATTS	606	620	635	651	667	680	695	709
		1 HP [745]	High Speed - Tap 5	CFM	2192	2151	2105	2056	2005	1961	1923	1874
				WATTS	720	737	752	767	784	801	815	830
(-)HPCYB072 (6T)	2100/2700	1.2 HP [895]	Fan/Low Heat - Tap 1	CFM	1384	1319	1249	1188	1127	1066	1006	947
				WATTS	192	204	215	225	240	245	255	265
		1.2 HP [895]	High Heat - Tap 2	CFM	1863	1821	1765	1717	1650	1617	1571	1526
				WATTS	413	428	442	459	474	488	503	518
		1.2 HP [895]	Low Cool - Tap 3	CFM	1546	1488	1427	1372	1316	1261	1203	1149
				WATTS	258	270	282	298	310	318	330	338
		1.2 HP [895]	High Cool - Tap 4	CFM	2368	2304	2267	2191	2126	2042	2033	1921
				WATTS	677	701	710	729	752	770	785	806
		1.2 HP [895]	High Speed - Tap 5	CFM	2363	2330	2280	2237	2198	2164	2110	2071
				WATTS	771	792	808	824	843	860	875	890

NOTES

*Factory tap settings are marked with an asterisk**

Pressure drops across the 3-5T CFM range (1050 -2250). Pressure drops across the 6T CFM range (2100 - 2700). Wet coil: ~0.09 inches W.C. Downflow: ~0.1 inches W.C. Reheat coil: ~0.09 inches W.C.

3-6T - High Static - Sideflow (208/230V/575V)												
Unit Model (Tonnage)	Manufacturer Recommended Airflow Range (Min/Max) CFM	Motor HP [W]	Motor Speed	CFM/WATTS	External Static Pressure - Inches W.C. [kPa]							
					0.8 [.02]	0.9 [.22]	1.0 [.25]	1.1 [.27]	1.2 [.3]	1.3 [.32]	1.4 [.35]	1.5 [.37]
(-HPCYB036 (3T)	1050/1350	1.5 HP [1119]	Fan - Tap 1	CFM	636	561	490	419	366	305	247	175
				WATTS	224	231	237	243	249	256	261	268
		1.5 HP [1119]	Tap 2	CFM	1103	1044	981	920	860	797	738	682
				WATTS	371	382	392	403	412	420	428	437
		1.5 HP [1119]	Tap 3	CFM	1304	1247	1195	1140	1082	1020	965	908
				WATTS	463	476	487	497	510	521	533	540
		1.5 HP [1119]	Cooling - Tap 4 *	CFM	688	614	543	466	411	349	295	218
				WATTS	237	244	250	256	263	270	275	282
		1.5 HP [1119]	High Speed - Tap 5	CFM	1091	1032	967	906	846	784	724	669
				WATTS	366	377	387	397	406	415	423	431
(-)HPCYB048 (4T)	1400/1800	1.5 HP [1119]	Fan - Tap 1	CFM	1088	1026	956	888	828	770	711	657
				WATTS	363	371	383	394	404	415	423	430
		1.5 HP [1119]	Tap 2	CFM	1378	1328	1281	1231	1178	1124	1069	1010
				WATTS	504	516	527	540	550	563	578	594
		1.5 HP [1119]	Tap 3	CFM	1437	1384	1336	1286	1232	1184	1130	1069
				WATTS	534	547	559	572	584	595	611	624
		1.5 HP [1119]	Cooling - Tap 4 *	CFM	1022	955	880	813	754	694	633	580
				WATTS	338	345	357	367	376	385	394	401
		1.5 HP [1119]	High Speed - Tap 5	CFM	1490	1438	1389	1339	1287	1242	1190	1133
				WATTS	564	578	592	604	617	628	643	655
(-)HPCYB060 (5T)	1750/2250	1.5 HP [1119]	Fan - Tap 1	CFM	1227	1168	1107	1054	992	930	855	792
				WATTS	422	431	447	453	469	477	484	500
		1.5 HP [1119]	Tap 2	CFM	1227	1168	1107	1054	992	930	855	792
				WATTS	422	431	447	453	469	477	484	500
		1.5 HP [1119]	Tap 3	CFM	1545	1502	1463	1417	1370	1319	1266	1212
				WATTS	604	618	633	648	658	672	686	702
		1.5 HP [1119]	Cooling - Tap 4 *	CFM	1456	1416	1371	1321	1267	1215	1161	1113
				WATTS	547	561	575	589	601	613	626	639
		1.5 HP [1119]	High Speed - Tap 5	CFM	1686	1642	1605	1564	1523	1479	1428	1380
				WATTS	707	721	736	750	765	781	795	807
(-)HPCYB072 (6T)	2100/2700	1.2 HP [895]	Fan/Low Heat - Tap 1	CFM	1237	1182	1137	1076	996	961	906	853
				WATTS	364	373	386	396	405	409	421	431
		1.2 HP [895]	High Heat - Tap 2	CFM	2043	2004	1953	1917	1879	1828	1783	1750
				WATTS	834	850	861	876	891	906	925	938
		1.2 HP [895]	Low Cool - Tap 3	CFM	1149	1082	1030	969	891	837	781	728
				WATTS	338	345	357	365	374	383	393	403
		1.2 HP [895]	High Cool - Tap 4	CFM	2062	2026	2004	1945	1907	1873	1836	1804
				WATTS	904	926	946	967	1008	1030	1057	1082
		1.2 HP [895]	High Speed - Tap 5	CFM	2462	2416	2371	2337	2294	2251	2214	2165
				WATTS	1053	1063	1078	1085	1100	1113	1121	1135

NOTES

*Factory tap settings are marked with an asterisk**

Pressure drops across the 3-5T CFM range (1050 -2250). Pressure drops across the 6T CFM range (2100 - 2700). Wet coil: ~0.09 inches W.C. Downflow: ~0.1 inches W.C. Reheat coil: ~0.09 inches W.C.

Appendix C – Air Flow Performance Data (Cont.)

3-6T - High Static - Sideflow (460V)												
Unit Model (Tonnage)	Manufacturer Recommended Airflow Range (Min/Max) CFM	Motor HP [W]	Motor Speed	CFM/WATTS	External Static Pressure - Inches W.C. [kPa]							
					0.8 [.02]	0.9 [.22]	1.0 [.25]	1.1 [.27]	1.2 [.3]	1.3 [.32]	1.4 [.35]	1.5 [.37]
(-HPCYB036 (3T)	1050/1350	1 HP [745]	Fan - Tap 1	CFM	729	644	554	499	438	386	329	278
				WATTS	226	233	240	245	252	257	262	267
		1 HP [745]	Tap 2	CFM	729	644	554	499	438	386	329	278
				WATTS	226	233	240	245	252	257	262	267
		1 HP [745]	Tap 3	CFM	1465	1421	1372	1320	1272	1226	1176	1122
				WATTS	535	547	559	571	583	593	603	615
		1 HP [745]	Cooling - Tap 4 *	CFM	930	860	783	718	643	586	530	476
				WATTS	286	294	304	311	319	326	333	339
		1 HP [745]	High Speed - Tap 5	CFM	1345	1292	1239	1184	1135	1082	1016	947
				WATTS	460	472	483	493	503	513	525	537
(-)HPCYB048 (4T)	1400/1800	1 HP [745]	Fan - Tap 1	CFM	871	794	722	654	580	526	466	413
				WATTS	267	275	283	290	297	303	310	315
		1 HP [745]	Tap 2	CFM	1344	1292	1239	1192	1138	1084	1007	953
				WATTS	458	470	481	490	500	510	525	534
		1 HP [745]	Tap 3	CFM	1514	1464	1415	1374	1323	1275	1228	1184
				WATTS	561	576	589	600	611	622	633	645
		1 HP [745]	Cooling - Tap 4 *	CFM	1235	1182	1132	1079	1019	950	886	828
				WATTS	407	418	427	437	448	459	469	478
		1 HP [745]	High Speed - Tap 5	CFM	1589	1545	1497	1463	1413	1367	1317	1275
				WATTS	618	633	647	660	672	683	695	705
(-)HPCYB060 (5T)	1750/2250	1.2 HP [895]	Fan - Tap 1	CFM	1091	1034	983	924	865	790	724	666
				WATTS	343	353	359	371	380	387	396	404
		1.2 HP [895]	Tap 2	CFM	1091	1034	983	924	865	790	724	666
				WATTS	343	353	359	371	380	387	396	404
		1.2 HP [895]	Tap 3	CFM	1841	1794	1748	1703	1657	1615	1578	1538
				WATTS	794	809	826	836	847	859	870	878
		1.2 HP [895]	Cooling - Tap 4 *	CFM	1762	1714	1669	1624	1580	1538	1496	1459
				WATTS	736	749	763	774	786	797	807	816
		1.2 HP [895]	High Speed - Tap 5	CFM	2046	2004	1970	1921	1880	1835	1801	1753
				WATTS	980	997	1003	1025	1045	1059	1072	1090
(-)HPCYB072 (6T)	2100/2700	1.2 HP [895]	Fan/Low Heat - Tap 1	CFM	1237	1182	1137	1076	996	961	906	853
				WATTS	364	373	386	396	405	409	421	431
		1.2 HP [895]	High Heat - Tap 2	CFM	2043	2004	1953	1917	1879	1828	1783	1750
				WATTS	834	850	861	876	891	906	925	938
		1.2 HP [895]	Low Cool - Tap 3	CFM	1149	1082	1030	969	891	837	781	728
				WATTS	338	345	357	365	374	383	393	403
		1.2 HP [895]	High Cool - Tap 4	CFM	1921	1873	1780	1709	1739	1626	1598	1593
				WATTS	806	809	827	853	864	882	886	896
		1.2 HP [895]	High Speed - Tap 5	CFM	2462	2416	2371	2337	2294	2251	2214	2165
				WATTS	1053	1063	1078	1085	1100	1113	1121	1135

NOTES

*Factory tap settings are marked with an asterisk**

Pressure drops across the 3-5T CFM range (1050 -2250). Pressure drops across the 6T CFM range (2100 - 2700). Wet coil: ~0.09 inches W.C. Downflow: ~0.1 inches W.C. Reheat coil: ~0.09 inches W.C.

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Appendix C – Air Flow Performance Data (Cont.)

FLUSH MOUNT CONCENTRIC DIFFUSER PERFORMANCE INFORMATION								
Diffuser Model Number	**CFM**	**Minimum Throw (feet)**	**Maximum Throw (feet)**	**Static Pressure Drop (Diffuser)**	**Static Pressure Drop (Adapter)**	**Sound (in Db)**	**Diffuser Face Return Area (sq. ft.)**	**Diffuser Face Supply Area (sq. ft.)**
					CN-1805-142			
1017-0200A-00010	1000	9	12	0.14	0.057	20	2.1	3.37
	1200	12	16	0.2	0.08	25	2.1	3.37
	1400	15	20	0.26	0.105	30	2.1	3.37
	1600	17	23	0.33	0.134	30	2.1	3.37
	1800	20	26	0.41	0.17	35	2.1	3.37
	2000	22	29	0.5	0.21	40	2.1	3.37
	2400	25	32	0.68	0.29	45	2.1	3.37

DROP CONCENTRIC DIFFUSER PERFORMANCE INFORMATION								
Diffuser Model Number	**CFM**	**Minimum Throw (feet)**	**Maximum Throw (feet)**	**Static Pressure Drop (Diffuser)**	**Static Pressure Drop (Adapter)**	**Sound (in Db)**	**Diffuser Face Return Area (sq. ft.)**	**Diffuser Face Supply Area (sq. ft.)**
					CN-1805-142			
1018-0200A-00010	1000	9	23	0.07	0.057	12	4.06	2.82
	1200	10	24	0.11	0.08	15	4.06	2.82
	1400	12	26	0.15	0.105	19	4.06	2.82
	1600	13	28	0.19	0.134	21	4.06	2.82
	1800	15	30	0.24	0.17	26	4.06	2.82
	2000	17	32	0.3	0.21	30	4.06	2.82
	2400	19	34	0.43	0.29	32	4.06	2.82

FLUSH MOUNT CONCENTRIC DIFFUSER PERFORMANCE INFORMATION								
Diffuser Model Number For	**CFM**	**Minimum Throw (feet)**	**Maximum Throw (feet)**	**Static Pressure Drop (Diffuser)**	**Static Pressure Drop (Adapter)**	**Sound (in Db)**	**Diffuser Face Return Area (sq. ft.)**	**Diffuser Face Supply Area (sq. ft.)**
					CN-1805-141			
1017-300A-00010	2600	17	24	0.49	0.21	30	3.48	3.76
	2800	18	28	0.55	0.24	35	3.48	3.76
	3000	20	30	0.62	0.27	35	3.48	3.76
	3200	22	33	0.69	0.31	40	3.48	3.76
	3400	23	37	0.77	0.34	40	3.48	3.76

DROP CONCENTRIC DIFFUSER PERFORMANCE INFORMATION								
Diffuser Model Number	**CFM**	**Minimum Throw (feet)**	**Maximum Throw (feet)**	**Static Pressure Drop (Diffuser)**	**Static Pressure Drop (Adapter)**	**Sound (in Db)**	**Diffuser Face Return Area (sq. ft.)**	**Diffuser Face Supply Area (sq. ft.)**
					CN-1805-141			
1018-300A-00010	2600	22	39	0.34	0.21	32	5.69	3.1
	2800	23	40	0.39	0.24	38	5.69	3.1
	3000	25	42	0.45	0.27	40	5.69	3.1
	3200	26	43	0.53	0.31	41	5.69	3.1
	3400	27	45	0.61	0.34	42	5.69	3.1

Appendix C – Air Flow Performance Data (Cont.)

Airflow (cfm)	Downflow dP (inH20)	Horizontal dP (inH20)
1050	0.06	0.01
1150	0.07	0.01
1250	0.09	0.01
1350	0.10	0.01
1450	0.12	0.01
1550	0.13	0.02
1650	0.15	0.02
1750	0.17	0.02
1850	0.19	0.02
1950	0.21	0.02
2050	0.23	0.03
2150	0.26	0.03
2250	0.28	0.03
2350	0.31	0.04

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Appendix D – Performance Data for 3 Ton

COOLING PERFORMANCE DATA - (-)HPCYB036													
Entering Indoor Air @ 80°F [26.7°C] dbE													
Outdoor Dry Bulb Temperature	wbE		71°F [21.7°C]			67°F [19.4°C]			63°F [17.2°C]				
	CFM [L/s]		1425 [673]	1175 [555]	1025 [484]	1425 [673]	1175 [555]	1025 [484]	1425 [673]	1175 [555]	1025 [484]
	DR		.05	.09	.12	.05	.09	.12	.05	.09	.12
75°F [23.9°C]		Total BTUH [kW]	46.7 [13.7]	45 [13.2]	44 [12.9]	44.5 [13]	42.8 [12.5]	41.8 [12.3]	42.2 [12.4]	40.7 [11.9]	39.7 [11.6]
		Sens BTUH [kW]	27.7 [8.1]	25.2 [7.4]	23.7 [6.9]	32.4 [9.5]	29.4 [8.6]	27.7 [8.1]	37 [10.8]	33.6 [9.8]	31.6 [9.3]
		Power	2.3	2.2	2.2	2.3	2.2	2.2	2.3	2.2	2.2
80°F [26.7°C]		Total BTUH [kW]	45.5 [13.3]	43.8 [12.8]	42.8 [12.5]	43.3 [12.7]	41.7 [12.2]	40.7 [11.9]	41 [12]	39.5 [11.6]	38.6 [11.3]
		Sens BTUH [kW]	27.3 [8]	24.8 [7.3]	23.4 [6.9]	31.9 [9.3]	29 [8.5]	27.3 [8]	36.5 [10.7]	33.2 [9.7]	31.2 [9.1]
		Power	2.4	2.4	2.3	2.4	2.4	2.3	2.4	2.4	2.3
85°F [29.4°C]		Total BTUH [kW]	44.3 [13]	42.6 [12.5]	41.7 [12.2]	42.1 [12.3]	40.5 [11.9]	39.5 [11.6]	39.8 [11.7]	38.3 [11.2]	37.4 [11]
		Sens BTUH [kW]	26.9 [7.9]	24.4 [7.2]	23 [6.7]	31.5 [9.2]	28.6 [8.4]	26.9 [7.9]	36.1 [10.6]	32.8 [9.6]	30.9 [9.1]
		Power	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
90°F [32.2°C]		Total BTUH [kW]	43.1 [12.6]	41.5 [12.2]	40.5 [11.9]	40.8 [12]	39.3 [11.5]	38.4 [11.3]	38.6 [11.3]	37.2 [10.9]	36.3 [10.6]
		Sens BTUH [kW]	26.4 [7.7]	24 [7]	22.6 [6.6]	31 [9.1]	28.2 [8.3]	26.6 [7.8]	35.7 [10.5]	32.4 [9.5]	30.5 [8.9]
		Power	2.7	2.6	2.6	2.7	2.6	2.6	2.7	2.6	2.6
95°F [35.0°C]		Total BTUH [kW]	41.9 [12.3]	40.3 [11.8]	39.4 [11.5]	39.6 [11.6]	38.1 [11.2]	37.3 [10.9]	37.4 [11]	36 [10.6]	35.1 [10.3]
		Sens BTUH [kW]	26 [7.6]	23.6 [6.9]	22.2 [6.5]	30.6 [9]	27.8 [8.1]	26.2 [7.7]	35.2 [10.3]	32 [9.4]	30.1 [8.8]
		Power	2.9	2.8	2.8	2.9	2.8	2.8	2.8	2.8	2.8
100°F [37.8°C]		Total BTUH [kW]	40.6 [11.9]	39.1 [11.5]	38.2 [11.2]	38.4 [11.3]	37 [10.8]	36.1 [10.6]	36.1 [10.6]	34.8 [10.2]	34 [10]
		Sens BTUH [kW]	25.6 [7.5]	23.2 [6.8]	21.9 [6.4]	30.2 [8.9]	27.4 [8]	25.8 [7.6]	34.8 [10.2]	31.6 [9.3]	29.8 [8.7]
		Power	3	3	2.9	3	3	2.9	3	3	2.9
105°F [40.6°C]		Total BTUH [kW]	39.4 [11.5]	38 [11.1]	37.1 [10.9]	37.2 [10.9]	35.8 [10.5]	35 [10.3]	34.9 [10.2]	33.6 [9.8]	32.8 [9.6]
		Sens BTUH [kW]	25.1 [7.4]	22.8 [6.7]	21.5 [6.3]	29.7 [8.7]	27 [7.9]	25.4 [7.4]	34.3 [10.1]	31.2 [9.1]	29.4 [8.6]
		Power	3.2	3.2	3.1	3.2	3.2	3.1	3.2	3.2	3.1
110°F [43.3°C]		Total BTUH [kW]	38.2 [11.2]	38.2 [11.2]	35.9 [10.5]	36 [10.6]	34.6 [10.1]	33.8 [9.9]	33.7 [9.9]	32.5 [9.5]	31.7 [9.3]
		Sens BTUH [kW]	24.7 [7.2]	24.7 [7.2]	21.1 [6.2]	29.3 [8.6]	26.6 [7.8]	25.1 [7.4]	33.7 [9.9]	30.8 [9]	29 [8.5]
		Power	3.4	3.4	3.3	3.4	3.4	3.3	3.4	3.4	3.3
115°F [46.1°C]		Total BTUH [kW]	37 [10.8]	35.6 [10.4]	34.8 [10.2]	34.7 [10.2]	33.4 [9.8]	32.7 [9.6]	32.5 [9.5]	31.3 [9.2]	30.6 [9]
		Sens BTUH [kW]	24.2 [7.1]	22 [6.4]	20.7 [6.1]	28.9 [8.5]	26.2 [7.7]	24.7 [7.2]	32.5 [9.5]	30.4 [8.9]	28.6 [8.4]
		Power	3.6	3.6	3.5	3.6	3.6	3.5	3.6	3.6	3.5
120°F [48.9°C]		Total BTUH [kW]	35.8 [10.5]	34.4 [10.1]	33.6 [9.8]	33.5 [9.8]	32.3 [9.5]	31.5 [9.2]	31.3 [9.2]	30.1 [8.8]	29.4 [8.6]
		Sens BTUH [kW]	23.8 [7]	21.7 [6.4]	20.4 [6]	28.4 [8.3]	25.8 [7.6]	24.3 [7.1]	31.3 [9.2]	30 [8.8]	28.3 [8.3]
		Power	3.9	3.8	3.7	3.9	3.8	3.7	3.9	3.8	3.7
125°F [51.7°C]		Total BTUH [kW]	34.5 [10.1]	33.3 [9.8]	32.5 [9.5]	32.3 [9.5]	31.1 [9.1]	30.4 [8.9]	30 [8.8]	28.9 [8.5]	28.3 [8.3]
		Sens BTUH [kW]	23.4 [6.9]	21.3 [6.2]	20 [5.9]	28 [8.2]	25.4 [7.4]	23.9 [7]	30 [8.8]	28.9 [8.5]	27.9 [8.2]
		Power	4.1	4	4	4.1	4	4	4.1	4	4

DR —Depression ratio Total —Total capacity x 1000 BTUH NOTES:
dbE —Entering air dry bulb Sens —Sensible capacity x 1000 BTUH. When the entering air dry bulb is other than 80°F [27°C], adjust the sensible
wbE—Entering air wet bulb Power—KW input capacity from the table by adding [1.10 x CFM x (1 – DR) x (dbE – 80)].

Appendix D – Performance Data for 3 Ton

HEATING PERFORMANCE DATA - (-)HPCYB036													
Outdoor Dry Bulb Temperature	IDB		60°F [15.5°C]			70°F [21.1°C]			80°F [26.7°C]				
	CFM [L/s]		1350 [637]	1175 [555]	975 [460]	1350 [637]	1175 [555]	975 [460]	1350 [637]	1175 [555]	975 [460]		
0°F [-17.8°C]	Total BTUH [kW]		14.6 [4.3]	14.4 [4.2]	14.2 [4.2]	14.1 [4.1]	14 [4.1]	13.8 [4]	13.7 [4]	13.6 [4]	13.4 [3.9]		
	Power		2	2.1	2.1	2.3	2.4	2.4	2.6	2.7	2.7		
5°F [-15.0°C]	Total BTUH [kW]		16.9 [5]	16.7 [4.9]	16.5 [4.8]	16.5 [4.8]	16.3 [4.8]	16.1 [4.7]	16.1 [4.7]	15.9 [4.7]	15.7 [4.6]		
	Power		2.1	2.1	2.1	2.3	2.4	2.4	2.6	2.7	2.7		
10°F [-12.2°C]	Total BTUH [kW]		19.3 [5.7]	19 [5.6]	18.8 [5.5]	18.8 [5.5]	18.6 [5.5]	18.4 [5.4]	18.4 [5.4]	18.2 [5.3]	18 [5.3]		
	Power		2.1	2.1	2.2	2.4	2.4	2.5	2.7	2.7	2.8		
15°F [-9.4°C]	Total BTUH [kW]		21.6 [6.3]	21.4 [6.3]	21.1 [6.2]	21.2 [6.2]	21 [6.2]	20.7 [6.1]	20.8 [6.1]	20.5 [6]	20.3 [5.9]		
	Power		2.1	2.1	2.2	2.4	2.4	2.5	2.7	2.7	2.8		
20°F [-6.7°C]	Total BTUH [kW]		23.9 [7]	23.7 [6.9]	23.4 [6.9]	23.5 [6.9]	23.3 [6.8]	23 [6.7]	23.1 [6.8]	22.9 [6.7]	22.6 [6.6]		
	Power		2.1	2.2	2.2	2.4	2.5	2.5	2.7	2.8	2.8		
25°F [-3.9°C]	Total BTUH [kW]		26.3 [7.7]	26 [7.6]	25.7 [7.5]	25.9 [7.6]	25.6 [7.5]	25.3 [7.4]	25.5 [7.5]	25.2 [7.4]	24.9 [7.3]		
	Power		2.2	2.2	2.2	2.4	2.5	2.5	2.7	2.8	2.8		
30°F [-1.1°C]	Total BTUH [kW]		28.6 [8.4]	28.3 [8.3]	28 [8.2]	28.2 [8.3]	27.9 [8.2]	27.6 [8.1]	27.8 [8.1]	27.5 [8.1]	27.2 [8]		
	Power		2.2	2.2	2.3	2.5	2.5	2.6	2.8	2.8	2.9		
35°F [1.7°C]	Total BTUH [kW]		31 [9.1]	30.7 [9]	30.3 [8.9]	30.6 [9]	30.3 [8.9]	29.9 [8.8]	30.2 [8.9]	29.8 [8.7]	29.5 [8.6]		
	Power		2.2	2.2	2.3	2.5	2.5	2.6	2.8	2.8	2.9		
40°F [4.4°C]	Total BTUH [kW]		33.3 [9.8]	33 [9.7]	32.6 [9.6]	32.9 [9.6]	32.6 [9.6]	32.2 [9.4]	32.5 [9.5]	32.2 [9.4]	31.8 [9.3]		
	Power		2.2	2.3	2.3	2.5	2.6	2.6	2.8	2.9	2.9		
45°F [7.2°C]	Total BTUH [kW]		35.7 [10.5]	35.3 [10.3]	34.9 [10.2]	35.3 [10.3]	34.9 [10.2]	34.5 [10.1]	34.9 [10.2]	34.5 [10.1]	34.1 [10]		
	Power		2.2	2.3	2.3	2.5	2.6	2.6	2.8	2.9	2.9		
50°F [10.0°C]	Total BTUH [kW]		38 [11.1]	37.6 [11]	37.2 [10.9]	35.3 [10.3]	37.2 [10.9]	36.8 [10.8]	37.2 [10.9]	36.8 [10.8]	36.4 [10.7]		
	Power		2.3	2.3	2.4	2.5	2.6	2.7	2.9	2.9	3		

IDB—Indoor air dry bulb [ ] Designates Metric Conversions

P. APPENDICES

Appendix D – Performance Data for 4 Ton

COOLING PERFORMANCE DATA - (-)HPCYB048														
Entering Indoor Air @ 80°F [26.7°C] dbE														
Outdoor Dry Bulb Temperature	wbE		71°F [21.7°C]			67°F [19.4°C]			63°F [17.2°C]					
	CFM [L/s]		1900 [897]	1450 [684]	1375 [649]	1900 [897]	1450 [684]	1375 [649]	1900 [897]	1450 [684]	1375 [649]			
	DR		.05	.09	.12	.05	.09	.12	.05	.09	.12			
75°F [23.9°C]	Total BTUH [kW]		63.4 [18.6]	60 [17.6]	59.5 [17.4]	59.2 [17.4]	56.1 [16.4]	55.6 [16.3]	55.7 [16.3]	52.7 [15.4]	52.2 [15.3]			
	Sens BTUH [kW]		36.8 [10.8]	32.1 [9.4]	31.4 [9.2]	41.7 [12.2]	36.4 [10.7]	35.6 [10.4]	47.3 [13.9]	41.3 [12.1]	40.3 [11.8]			
	Power		3.1	3	3	3.2	3.1	3.1	3.3	3.2	3.2			
80°F [26.7°C]	Total BTUH [kW]		62.1 [18.2]	58.8 [17.2]	58.2 [17.1]	57.9 [17]	54.8 [16.1]	54.3 [15.9]	54.3 [15.9]	51.4 [15.1]	50.9 [14.9]			
	Sens BTUH [kW]		36.4 [10.7]	31.8 [9.3]	31 [9.1]	41.3 [12.1]	36.1 [10.6]	35.2 [10.3]	46.9 [13.7]	41 [12]	40 [11.7]			
	Power		3.4	3.3	3.3	3.5	3.4	3.4	3.6	3.5	3.5			
85°F [29.4°C]	Total BTUH [kW]		60.7 [17.8]	57.4 [16.8]	56.9 [16.7]	56.5 [16.6]	53.5 [15.7]	53 [15.5]	52.9 [15.5]	50.1 [14.7]	49.6 [14.5]			
	Sens BTUH [kW]		35.9 [10.5]	31.4 [9.2]	30.6 [9]	40.9 [12]	35.7 [10.5]	34.8 [10.2]	46.4 [13.6]	40.6 [11.9]	39.6 [11.6]			
	Power		3.7	3.6	3.6	3.8	3.7	3.7	3.9	3.8	3.7			
90°F [32.2°C]	Total BTUH [kW]		59.2 [17.4]	56.1 [16.4]	55.5 [16.3]	55 [16.1]	52.1 [15.3]	51.6 [15.1]	51.5 [15.1]	48.7 [14.3]	48.3 [14.2]			
	Sens BTUH [kW]		35.4 [10.4]	30.9 [9.1]	30.2 [8.9]	40.3 [11.8]	35.2 [10.3]	34.4 [10.1]	45.9 [13.5]	40.1 [11.8]	39.1 [11.5]			
	Power		4	3.9	3.9	4.1	3.9	3.9	4.1	4	4			
95°F [35.0°C]	Total BTUH [kW]		57.7 [16.9]	54.6 [16]	54.1 [15.9]	53.5 [15.7]	50.7 [14.9]	50.2 [14.7]	50 [14.7]	47.3 [13.9]	46.8 [13.7]			
	Sens BTUH [kW]		34.8 [10.2]	30.4 [8.9]	29.7 [8.7]	39.7 [11.6]	34.7 [10.2]	33.9 [9.9]	45.3 [13.3]	39.6 [11.6]	38.6 [11.3]			
	Power		4.2	4.1	4.1	4.3	4.2	4.2	4.4	4.3	4.3			
100°F [37.8°C]	Total BTUH [kW]		56.1 [16.4]	53.1 [15.6]	52.6 [15.4]	51.9 [15.2]	49.2 [14.4]	48.7 [14.3]	48.4 [14.2]	45.8 [13.4]	45.4 [13.3]			
	Sens BTUH [kW]		34.2 [10]	29.9 [8.8]	29.1 [8.5]	39.1 [11.5]	34.2 [10]	33.3 [9.8]	44.7 [13.1]	39 [11.4]	38.1 [11.2]			
	Power		4.5	4.4	4.3	4.6	4.4	4.4	4.6	4.5	4.5			
105°F [40.6°C]	Total BTUH [kW]		54.5 [16]	51.6 [15.1]	51.1 [15]	50.3 [14.7]	47.6 [14]	47.2 [13.8]	46.7 [13.7]	44.2 [13]	43.8 [12.8]			
	Sens BTUH [kW]		33.5 [9.8]	29.2 [8.6]	28.5 [8.4]	38.4 [11.3]	33.5 [9.8]	32.7 [9.6]	44 [12.9]	38.4 [11.3]	37.5 [11]			
	Power		4.7	4.6	4.6	4.8	4.7	4.6	4.9	4.7	4.7			
110°F [43.3°C]	Total BTUH [kW]		52.8 [15.5]	50 [14.7]	49.5 [14.5]	48.6 [14.2]	46 [13.5]	45.6 [13.4]	45 [13.2]	42.6 [12.5]	42.2 [12.4]			
	Sens BTUH [kW]		32.7 [9.6]	28.6 [8.4]	27.9 [8.2]	37.6 [11]	32.8 [9.6]	32.1 [9.4]	43.2 [12.7]	37.7 [11]	36.8 [10.8]			
	Power		4.9	4.8	4.8	5	4.9	4.9	5.1	5	4.9			
115°F [46.1°C]	Total BTUH [kW]		51 [14.9]	48.3 [14.2]	47.9 [14]	46.9 [13.7]	44.4 [13]	43.9 [12.9]	43.3 [12.7]	41 [12]	40.6 [11.9]			
	Sens BTUH [kW]		31.9 [9.3]	27.8 [8.1]	27.2 [8]	36.8 [10.8]	32.1 [9.4]	31.3 [9.2]	42.3 [12.4]	37 [10.8]	36.1 [10.6]			
	Power		5.1	5	5	5.2	5.1	5.1	5.3	5.2	5.1			
120°F [48.9°C]	Total BTUH [kW]		49.2 [14.4]	46.6 [13.7]	46.2 [13.5]	45.1 [13.2]	42.6 [12.5]	42.2 [12.4]	41.5 [12.2]	39.3 [11.5]	38.9 [11.4]			
	Sens BTUH [kW]		30.9 [9.1]	27 [7.9]	26.4 [7.7]	35.9 [10.5]	31.3 [9.2]	30.6 [9]	41.4 [12.1]	36.2 [10.6]	35.3 [10.3]			
	Power		5.3	5.2	5.2	5.4	5.3	5.2	5.5	5.3	5.3			
125°F [51.7°C]	Total BTUH [kW]		47.4 [13.9]	44.8 [13.1]	44.4 [13]	43.2 [12.7]	40.9 [12]	40.5 [11.9]	39.6 [11.6]	37.5 [11]	37.1 [10.9]			
	Sens BTUH [kW]		30 [8.8]	26.2 [7.7]	25.6 [7.5]	34.9 [10.2]	30.5 [8.9]	29.7 [8.7]	39.6 [11.6]	35.3 [10.3]	34.5 [10.1]			
	Power		5.5	5.4	5.4	5.6	5.5	5.4	5.7	5.5	5.5			

DR —Depression ratio Total —Total capacity x 1000 BTUH NOTES:
dbE —Entering air dry bulb Sens —Sensible capacity x 1000 BTUH. When the entering air dry bulb is other than 80°F [27°C], adjust the sensible
wbE—Entering air wet bulb Power—KW input capacity from the table by adding [1.10 x CFM x (1 – DR) x (dbE – 80)].

Appendix D – Performance Data for 4 Ton

HEATING PERFORMANCE DATA - (-)HPCYB048													
Outdoor Dry Bulb Temperature	IDB		60°F [15.6°C]			70°F [21.1°C]			80°F [26.7°C]				
	CFM [L/s]		1725 [814]	1450 [684]	1250 [590]	1725 [814]	1450 [684]	1250 [590]	1725 [814]	1450 [684]	1250 [590]		
0°F [-17.8°C]	Total BTUH [kW]		21.3 [6.2]	21 [6.2]	20.8 [6.1]	20.1 [5.9]	19.8 [5.8]	19.6 [5.7]	18.8 [5.5]	18.6 [5.5]	18.4 [5.4]		
	Power		3	3.1	3.1	3.4	3.5	3.5	3.7	3.8	3.9		
5°F [-15.0°C]	Total BTUH [kW]		24.1 [7.1]	23.8 [7]	23.6 [6.9]	22.9 [6.7]	22.6 [6.6]	22.4 [6.6]	21.6 [6.3]	21.4 [6.3]	21.1 [6.2]		
	Power		3.1	3.1	3.2	3.4	3.5	3.6	3.8	3.9	3.9		
10°F [-12.2°C]	Total BTUH [kW]		26.9 [7.9]	26.6 [7.8]	26.3 [7.7]	25.7 [7.5]	25.4 [7.4]	25.1 [7.4]	24.5 [7.2]	24.1 [7.1]	23.9 [7]		
	Power		3.1	3.2	3.2	3.5	3.5	3.6	3.8	3.9	4		
15°F [-9.4°C]	Total BTUH [kW]		29.7 [8.7]	29.3 [8.6]	29.1 [8.5]	28.5 [8.4]	28.1 [8.2]	27.9 [8.2]	27.3 [8]	26.9 [7.9]	26.6 [7.8]		
	Power		3.1	3.2	3.3	3.5	3.6	3.7	3.9	4	4		
20°F [-6.7°C]	Total BTUH [kW]		32.6 [9.6]	32.1 [9.4]	31.8 [9.3]	31.3 [9.2]	30.9 [9.1]	30.6 [9]	30.1 [8.8]	29.7 [8.7]	29.4 [8.6]		
	Power		3.2	3.3	3.3	3.6	3.6	3.7	3.9	4	4.1		
25°F [-3.9°C]	Total BTUH [kW]		35.4 [10.4]	34.9 [10.2]	34.6 [10.1]	34.1 [10]	33.7 [9.9]	33.4 [9.8]	32.9 [9.6]	32.5 [9.5]	32.1 [9.4]		
	Power		3.2	3.3	3.4	3.6	3.7	3.7	4	4.1	4.1		
30°F [-1.1°C]	Total BTUH [kW]		38.2 [11.2]	37.7 [11]	37.3 [10.9]	37 [10.8]	36.5 [10.7]	36.1[10.6]	35.7 [10.5]	35.2 [10.3]	34.9 [10.2]		
	Power		3.3	3.4	3.4	3.6	3.7	3.8	4	4.1	4.2		
35°F [1.7°C]	Total BTUH [kW]		41 [12]	40.5 [11.9]	40.1 [11.8]	39.8 [11.7]	39.2 [11.5]	38.9 [11.4]	38.5 [11.3]	38 [11.1]	37.6 [11]		
	Power		3.3	3.4	3.5	3.7	3.8	3.8	4.1	4.2	4.2		
40°F [4.4°C]	Total BTUH [kW]		43.8 [12.8]	43.2 [12.7]	42.8 [12.5]	42.6 [12.5]	42 [12.3]	41.6 [12.2]	41.3 [12.1]	40.8 [12]	40.4 [11.8]		
	Power		3.4	3.5	3.5	3.7	3.8	3.9	4.1	4.2	4.3		
45°F [7.2°C]	Total BTUH [kW]		46.6 [13.7]	46 [13.5]	45.6 [13.4]	45.4 [13.3]	44.8 [13.1]	44.3 [13]	44.2 [13]	43.6 [12.8]	43.1 [12.6]		
	Power		3.4	3.5	3.6	3.8	3.9	3.9	4.2	4.3	4.3		
50°F [10.0°C]	Total BTUH [kW]		49.4 [14.5]	48.8 [14.3]	48.3 [14.2]	48.2 [14.1]	47.6 [14]	47.1 [13.8]	47 [13.8]	46.3 [13.6]	45.9 [13.5]		
	Power		3.5	3.6	3.6	3.8	3.9	4	4.2	4.3	4.4		

IDB—Indoor air dry bulb [ ] Designates Metric Conversions

COOLING PERFORMANCE DATA - (-)HPCYB060												
Entering Indoor Air @ 80ºF [26.7ºC] dbE												
wbE			71ºF [21.7ºC]			67ºF [19.4ºC]			63ºF [17.2ºC]			
CFM [L/s]			2250 [1062]	1925 [908]	1625 [767]	2250 [1062]	1925 [908]	1625 [767]	2250 [1062]	1925 [908]	1625 [767]	
DR			.05	.09	.12	.05	.09	.12	.05	.09	.12	
Outdoor Dry Bulb Temperature	75ºF [23.9ºC]	Total BTUH [kW] Sens BTUH [kW] Power	73.7 [21.6] 42.3 [12.4] 3.8	71.5 [21] 39.2 [11.5] 3.8	69.5 [20.4] 36.3 [10.6] 3.7	70 [20.5] 50.7 [14.9] 3.9	67.9 [19.9] 47 [13.8] 3.8	66 [19.3] 43.6 [12.8] 3.8	66.2 [19.4] 59.1 [17.3] 3.9	64.2 [18.8] 54.8 [16.1] 3.8	62.4 [18.3] 50.8 [14.9] 3.7	
	80ºF [26.7ºC]	Total BTUH [kW] Sens BTUH [kW] Power	71.7 [21] 41.3 [12.1] 4.1	69.6 [20.4] 38.2 [11.2] 4.1	67.6 [19.8] 35.5 [10.4] 4	67.9 [19.9] 49.7 [14.6] 4.1	65.9 [19.3] 46 [13.5] 4.1	64 [18.8] 42.7 [12.5] 4	64.2 [18.8] 58.1 [17] 4.1	62.3 [18.3] 53.8 [15.8] 4.1	60.5 [17.7] 49.9 [14.6] 4	
	85ºF [29.4ºC]	Total BTUH [kW] Sens BTUH [kW] Power	69.7 [20.4] 40.2 [11.8] 4.4	67.6 [19.8] 37.3 [10.9] 4.3	65.7 [19.3] 34.6 [10.1] 4.3	65.9 [19.3] 48.6 [14.2] 4.4	63.9 [18.7] 45.1 [13.2] 4.4	62.1 [18.2] 41.8 [12.3] 4.3	62.1 [18.2] 57.1 [16.7] 4.4	60.3 [17.7] 52.9 [15.5] 4.3	58.6 [17.2] 49 [14.4] 4.3	
	90ºF [32.2ºC]	Total BTUH [kW] Sens BTUH [kW] Power	67.6 [19.8] 39.2 [11.5] 4.7	65.6 [19.2] 36.3 [10.6] 4.6	63.8 [18.7] 33.7 [9.9] 4.5	63.9 [18.7] 47.6 [14] 4.7	62 [18.2] 44.1 [12.9] 4.6	60.2 [17.6] 40.9 [12] 4.6	60.1 [17.6] 56 [16.4] 4.7	58.3 [17.1] 51.9 [15.2] 4.6	56.6 [16.6] 48.2 [14.1] 4.6	
	95ºF [35.0ºC]	Total BTUH [kW] Sens BTUH [kW] Power	65.6 [19.2] 38.2 [11.2] 5	63.6 [18.6] 35.4 [10.4] 4.9	61.8 [18.1] 32.8 [9.6] 4.8	61.8 [18.1] 46.6 [13.7] 5	60 [17.6] 43.2 [12.7] 4.9	58.3 [17.1] 40 [11.7] 4.8	58.1 [17] 55 [16.1] 5	56.3 [16.5] 51 [14.9] 4.9	54.7 [16] 47.3 [13.9] 4.8	
	100ºF [37.8ºC]	Total BTUH [kW] Sens BTUH [kW] Power	63.5 [18.6] 37.1 [10.9] 5.2	61.7 [18.1] 34.4 [10.1] 5.2	59.9 [17.6] 31.9 [9.3] 5.1	59.8 [17.5] 45.6 [13.4] 5.2	58 [17] 42.2 [12.4] 5.2	56.4 [16.5] 39.2 [11.5] 5.1	56 [16.4] 54 [15.8] 5.2	54.3 [15.9] 50 [14.7] 5.2	52.8 [15.5] 46.4 [13.6] 5.1	
	105ºF [40.6ºC]	Total BTUH [kW] Sens BTUH [kW] Power	61.5 [18] 36.1 [10.6] 5.5	59.7 [17.5] 33.5 [9.8] 5.4	58 [17] 31 [9.1] 5.4	57.7 [16.9] 44.5 [13] 5.5	56 [16.4] 41.3 [12.1] 5.4	54.4 [15.9] 38.3 [11.2] 5.4	54 [15.8] 52.9 [15.5] 5.5	52.4 [15.4] 49.1 [14.4] 5.4	50.9 [14.9] 45.5 [13.3] 5.4	
	110ºF [43.3ºC]	Total BTUH [kW] Sens BTUH [kW] Power	59.5 [17.4] 35.1 [10.3] 5.8	57.7 [16.9] 32.5 [9.5] 5.7	56.1 [16.4] 30.2 [8.9] 5.6	55.7 [16.3] 43.5 [12.7] 5.8	54 [15.8] 40.3 [11.8] 5.7	52.5 [15.4] 37.4 [11] 5.6	51.9 [15.2] 51.9 [15.2] 5.8	50.4 [14.8] 48.1 [14.1] 5.7	49 [14.4] 44.6 [13.1] 5.6	
	115ºF [46.1ºC]	Total BTUH [kW] Sens BTUH [kW] Power	57.4 [16.8] 34.1 [10] 6.1	55.7 [16.3] 31.6 [9.3] 6	54.1 [15.9] 29.3 [8.6] 5.9	53.7 [15.7] 42.5 [12.5] 6.1	52.1 [15.3] 39.4 [11.5] 6	50.6 [14.8] 36.5 [10.7] 5.9	49.9 [14.6] 49.9 [14.6] 6.1	48.4 [14.2] 47.2 [13.8] 6	47 [13.8] 43.7 [12.8] 5.9	
	120ºF [48.9ºC]	Total BTUH [kW] Sens BTUH [kW] Power	55.4 [16.2] 33 [9.7] 6.3	53.7 [15.7] 30.6 [9] 6.2	52.2 [15.3] 28.4 [8.3] 6.2	51.6 [15.1] 41.4 [12.1] 6.4	50.1 [14.7] 38.4 [11.3] 6.3	48.7 [14.3] 35.6 [10.4] 6.2	47.9 [14] 47.9 [14] 6.3	46.4 [13.6] 46.2 [13.5] 6.3	45.1 [13.2] 42.9 [12.6] 6.2	
	125ºF [51.7ºC]	Total BTUH [kW] Sens BTUH [kW] Power	53.4 [15.7] 32 [9.4] 6.6	51.8 [15.2] 29.7 [8.7] 6.5	50.3 [14.7] 27.5 [8.1] 6.4	49.6 [14.5] 40.4 [11.8] 6.6	48.1 [14.1] 37.5 [11] 6.5	46.8 [13.7] 34.7 [10.2] 6.4	45.8 [13.4] 45.8 [13.4] 6.6	44.5 [13] 44.5 [13] 6.5	43.2 [12.7] 42 [12.3] 6.4	

DR —Depression ratio Total —Total capacity x 1000 BTUH NOTES:
dbE —Entering air dry bulb Sens —Sensible capacity x 1000 BTUH. When the entering air dry bulb is other than 80°F [27°C], adjust the sensible
wbE—Entering air wet bulb Power—KW input capacity from the table by adding [1.10 x CFM x (1 – DR) x (dbE – 80)].

Appendix D – Performance Data for 5 Ton

HEATING PERFORMANCE DATA - (-)HPCVB060												
Outdoor Dry Bulb Temperature	IDB		60°F [15.5°C]			70°F [21.1°C]			80°F [26.7°C]			
	CFM [L/s]		2000 [944]	1925 [908]	1450 [684]	2000 [944]	1925 [908]	1450 [684]	2000 [944]	1925 [908]	1450 [684]	
0°F [-17.8°C]		Total BTUH [kW]	17 [5]	17 [5]	16.7 [4.9]	20.7 [6.1]	20.6 [6]	20.3 [5.9]	24.4 [7.2]	24.3 [7.1]	23.9 [7]	
		Power	3.4	3.5	3.6	4	4	4.2	4.6	4.6	4.7	
5°F [-15.0°C]		Total BTUH [kW]	20.5 [6]	20.4 [6]	20.1 [5.9]	24.2 [7.1]	24.1 [7.1]	23.7 [6.9]	27.8 [8.1]	27.7 [8.1]	27.3 [8]	
		Power	3.5	3.5	3.6	4.1	4.1	4.2	4.6	4.6	4.8	
10°F [-12.2°C]		Total BTUH [kW]	24 [7]	23.9 [7]	23.5 [6.9]	27.6 [8.1]	27.6 [8.1]	27.1 [7.9]	31.3 [9.2]	31.2 [9.1]	30.7 [9]	
		Power	3.5	3.5	3.6	4.1	4.1	4.2	4.6	4.6	4.8	
15°F [-9.4°C]		Total BTUH [kW]	27.4 [8]	27.4 [8]	26.9 [7.9]	31.1 [9.1]	31 [9.1]	30.5 [8.9]	34.8 [10.2]	34.7 [10.2]	34.1 [10]	
		Power	3.6	3.6	3.7	4.1	4.1	4.3	4.7	4.7	4.8	
20°F [-6.7°C]		Total BTUH [kW]	30.9 [9.1]	30.8 [9]	30.3 [8.9]	34.6 [10.1]	34.5 [10.1]	33.9 [9.9]	38.2 [11.2]	38.1 [11.2]	37.4 [11]	
		Power	3.6	3.6	3.7	4.2	4.2	4.3	4.7	4.7	4.9	
25°F [-3.9°C]		Total BTUH [kW]	34.4 [10.1]	34.3 [10.1]	33.7 [9.9]	38 [11.1]	37.9 [11.1]	37.3 [10.9]	41.7 [12.2]	41.6 [12.2]	0.8 [12]	
		Power	3.6	3.6	3.8	4.2	4.2	4.4	4.7	4.8	4.9	
30°F [-1.1°C]		Total BTUH [kW]	37.8 [11.1]	37.7 [11]	37.1 [10.9]	41.5 [12.2]	41.4 [12.1]	40.7 [11.9]	45.2 [13.2]	45 [13.2]	44.2 [13]	
		Power	3.7	3.7	3.8	4.2	4.3	4.4	4.8	4.8	4.9	
35°F [1.7°C]		Total BTUH [kW]	41.3 [12.1]	41.2 [12.1]	40.5 [11.9]	45 [13.2]	44.8 [13.1]	44.1 [12.9]	48.6 [14.2]	48.5 [14.2]	47.6 [14]	
		Power	3.7	3.7	3.8	4.3	4.3	4.4	4.8	4.8	5	
40°F [4.4°C]		Total BTUH [kW]	44.8 [13.1]	44.7 [13.1]	43.9 [12.9]	48.4 [14.2]	48.3 [14.2]	47.5 [13.9]	52.1 [15.3]	52 [15.2]	51 [14.9]	
		Power	3.7	3.8	3.9	4.3	4.3	4.5	4.8	4.9	5	
45°F [7.2°C]		Total BTUH [kW]	48.2 [14.1]	48.1 [14.1]	47.3 [13.9]	51.9 [15.2]	51.8 [15.2]	50.9 [14.9]	55.6 [16.3]	55.4 [16.2]	54.4 [15.9]	
		Power	3.8	3.8	3.9	4.3	4.4	4.5	4.9	4.9	5.1	
50°F [10.0°C]		Total BTUH [kW]	51.7 [15.2]	51.6 [15.1]	50.7 [14.9]	55.4 [16.2]	55.2 [16.2]	54.2 [15.9]	59 [17.3]	58.9 [17.3]	57.8 [16.9]	
		Power	3.8	3.8	4	4.4	4.4	4.5	4.9	4.9	5.1	

IDB—Indoor air dry bulb [ ] Designates Metric Conversions

COOLING PERFORMANCE DATA - (-)HPCYB072												
Entering Indoor Air @ 80ºF [26.7ºC] dbE												
wbE			71ºF [21.7ºC]			67ºF [19.4ºC]			63ºF [17.2ºC]			
CFM [L/s]			2850 [1345]	2350 [1109]	2050 [967]	2850 [1345]	2350 [1109]	2050 [967]	2850 [1345]	2350 [1109]	2050 [967]	
DR			.05	.09	.12	.05	.09	.12	.05	.09	.12	
Outdoor Dry Bulb Temperature	75ºF [23.9ºC]	Total BTUH [kW] Sens BTUH [kW] Power	81.9 [24] 48 [14.1] 4.3	78.9 [23.1] 43.6 [12.8] 4.3	77.1 [22.6] 41 [12] 4.2	78.7 [23.1] 57.9 [17] 4.2	75.7 [22.2] 52.7 [15.4] 4.1	74 [21.7] 49.5 [14.5] 4.1	75.4 [22.1] 62.7 [18.4] 4.3	72.6 [21.3] 57 [16.7] 4.2	70.9 [20.8] 53.6 [15.7] 4.2	
	80ºF [26.7ºC]	Total BTUH [kW] Sens BTUH [kW] Power	82.3 [24.1] 48.8 [14.3] 4.7	79.2 [23.2] 44.4 [13] 4.6	77.4 [22.7] 41.8 [12.3] 4.6	79 [23.2] 58.8 [17.2] 4.6	76.1 [22.3] 53.5 [15.7] 4.5	74.3 [21.8] 50.3 [14.7] 4.4	75.8 [22.2] 63.6 [18.6] 4.7	73 [21.4] 57.8 [16.9] 4.6	71.3 [20.9] 54.4 [15.9] 4.5	
	85ºF [29.4ºC]	Total BTUH [kW] Sens BTUH [kW] Power	82.5 [24.2] 49.5 [14.5] 5.1	79.4 [23.3] 45.1 [13.2] 5	77.6 [22.7] 42.4 [12.4] 5	79.2 [23.2] 59.5 [17.4] 5	76.3 [22.4] 54.1 [15.9] 4.9	74.5 [21.8] 50.9 [14.9] 4.8	76 [22.3] 64.3 [18.8] 5.1	73.2 [21.5] 58.5 [17.1] 5	71.5 [21] 55 [16.1] 4.9	
	90ºF [32.2ºC]	Total BTUH [kW] Sens BTUH [kW] Power	82.5 [24.2] 50.1 [14.7] 5.5	79.4 [23.3] 45.5 [13.3] 5.4	77.6 [22.7] 42.8 [12.5] 5.3	79.2 [23.2] 60 [17.6] 5.3	76.3 [22.4] 54.6 [16] 5.2	74.5 [21.8] 51.3 [15] 5.2	76 [22.3] 64.8 [19] 5.4	73.2 [21.5] 58.9 [17.3] 5.3	71.5 [21] 55.4 [16.2] 5.3	
	95ºF [35.0ºC]	Total BTUH [kW] Sens BTUH [kW] Power	82.3 [24.1] 50.4 [14.8] 5.9	79.3 [23.2] 45.8 [13.4] 5.8	77.4 [22.7] 43.1 [12.6] 5.7	79.1 [23.2] 60.3 [17.7] 5.7	76.1 [22.3] 54.9 [16.1] 5.6	74.3 [21.8] 51.6 [15.1] 5.6	75.8 [22.2] 65.1 [19.1] 5.8	73 [21.4] 59.2 [17.4] 5.7	71.3 [20.9] 55.7 [16.3] 5.7	
	100ºF [37.8ºC]	Total BTUH [kW] Sens BTUH [kW] Power	82 [24] 50.5 [14.8] 6.3	78.9 [23.1] 46 [13.5] 6.1	77.1 [22.6] 43.2 [12.7] 6.1	78.7 [23.1] 60.5 [17.7] 6.1	75.8 [22.2] 55 [16.1] 6	74 [21.7] 51.7 [15.2] 5.9	75.5 [22.1] 65.3 [19.1] 6.2	72.7 [21.3] 59.4 [17.4] 6.1	71 [20.8] 55.8 [16.4] 6	
	105ºF [40.6ºC]	Total BTUH [kW] Sens BTUH [kW] Power	81.5 [23.9] 50.5 [14.8] 6.6	78.4 [23] 46 [13.5] 6.5	76.6 [22.5] 43.2 [12.7] 6.4	78.2 [22.9] 60.4 [17.7] 6.5	75.3 [22.1] 55 [16.1] 6.4	73.5 [21.5] 51.7 [15.2] 6.3	75 [22] 65.2 [19.1] 6.6	72.2 [21.2] 59.3 [17.4] 6.5	70.5 [20.7] 55.8 [16.4] 6.4	
	110ºF [43.3ºC]	Total BTUH [kW] Sens BTUH [kW] Power	80.8 [23.7] 50.3 [14.7] 7	77.7 [22.8] 45.8 [13.4] 6.9	75.9 [22.2] 43 [12.6] 6.8	77.5 [22.7] 60.2 [17.6] 6.9	74.6 [21.9] 54.8 [16.1] 6.7	72.9 [21.4] 51.5 [15.1] 6.7	74.3 [21.8] 65 [19.1] 7	71.5 [21] 59.1 [17.3] 6.8	69.8 [20.5] 55.6 [16.3] 6.8	
	115ºF [46.1ºC]	Total BTUH [kW] Sens BTUH [kW] Power	79.9 [23.4] 49.9 [14.6] 7.4	76.9 [22.5] 45.4 [13.3] 7.3	75.1 [22] 42.7 [12.5] 7.2	76.6 [22.5] 59.8 [17.5] 7.2	73.7 [21.6] 54.4 [15.9] 7.1	72 [21.1] 51.2 [15] 7	73.4 [21.5] 64.6 [18.9] 7.3	70.6 [20.7] 58.8 [17.2] 7.2	69 [20.2] 55.3 [16.2] 7.1	
	120ºF [48.9ºC]	Total BTUH [kW] Sens BTUH [kW] Power	78.8 [23.1] 49.3 [14.4] 7.8	75.9 [22.2] 44.8 [13.1] 7.6	74.1 [21.7] 42.2 [12.4] 7.6	75.5 [22.1] 59.2 [17.4] 7.6	72.7 [21.3] 53.9 [15.8] 7.5	71 [20.8] 50.7 [14.9] 7.4	72.3 [21.2] 64 [18.8] 7.7	69.6 [20.4] 58.2 [17.1] 7.6	68 [19.9] 54.8 [16.1] 7.5	
	125ºF [51.7ºC]	Total BTUH [kW] Sens BTUH [kW] Power	77.6 [22.7] 48.5 [14.2] 8.2	74.7 [21.9] 44.1 [12.9] 8	73 [21.4] 41.5 [12.2] 7.9	74.3 [21.8] 58.5 [17.1] 8	71.5 [21] 53.2 [15.6] 7.9	69.9 [20.5] 50 [14.7] 7.8	71.1 [20.8] 63.2 [18.5] 8.1	68.4 [20] 57.5 [16.9] 8	66.8 [19.6] 54.1 [15.9] 7.9	

DR —Depression ratio Total —Total capacity x 1000 BTUH NOTES:
dbE —Entering air dry bulb Sens —Sensible capacity x 1000 BTUH. When the entering air dry bulb is other than 80°F [27°C], adjust the sensible
wbE—Entering air wet bulb Power—KW input capacity from the table by adding [1.10 x CFM x (1 – DR) x (dbE – 80)].

Appendix D – Performance Data for 6 Ton

HEATING PERFORMANCE DATA - (-)HPCYB072												
Outdoor Dry Bulb Temperature	IDB	60°F [15.5°C]			70°F [21.1°C]			80°F [26.7°C]				
	CFM [L/s]	2700 [1274]	2350 1109]	1950 [920]	2700 1274]	2350 1109]	1950 [920]	2700 1274]	2350[1109]	1950 [920]		
0°F [-17.8°C]	Total BTUH [kW]	34.9 [10.2]	34.6 [10.1]	34.2 [10]	27.5 [8.1]	27.2 [8]	26.9 [7.9]	20.1 [5.9]	19.9 [5.8]	19.7 [5.8]		
	Power	3.9	4	4.1	4.3	4.4	4.5	4.6	4.7	4.8		
5°F [-15.0°C]	Total BTUH [kW]	39.7 [11.6]	39.3 [11.5]	38.8 [11.4]	32.3 [9.5]	32 [9.4]	31.6 [9.3]	24.9 [7.3]	24.7 [7.2]	24.4 [7.2]		
	Power	4	4.1	4.2	4.4	4.4	4.5	4.7	4.8	4.9		
10°F [-12.2°C]	Total BTUH [kW]	44.5 [13]	44 [12.9]	43.5 [12.7]	37.1 [10.9]	36.7 [10.8]	36.3 [10.6]	29.7 [8.7]	29.4 [8.6]	29 [8.5]		
	Power	4.1	4.2	4.3	4.4	4.5	4.6	4.8	4.9	5		
15°F [-9.4°C]	Total BTUH [kW]	49.3 [14.4]	48.8 [14.3]	48.2 [14.1]	41.9 [12.3]	41.4 [12.1]	40.9 [12]	34.5 [10.1]	34.1 [10]	33.7 [9.9]		
	Power	4.2	4.3	4.3	4.5	4.6	4.7	4.9	5	5.1		
20°F [-6.7°C]	Total BTUH [kW]	54.1 [15.9]	53.5 [15.7]	52.9 [15.5]	46.7 [13.7]	46.2 [13.5]	45.6 [13.4]	39.3 [11.5]	38.9 [11.4]	38.4 [11.3]		
	Power	4.3	4.3	4.4	4.6	4.7	4.8	5	5.1	5.2		
25°F [-3.9°C]	Total BTUH [kW]	58.9 [17.3]	58.2 [17.1]	57.5 [16.9]	51.5 [15.1]	50.9 [14.9]	50.3 [14.7]	4 [12.9]	43.6 [12.8]	43.1 [12.6]		
	Power	4.3	4.4	4.5	4.7	4.8	4.9	5.1	5.2	5.3		
30°F [-1.1°C]	Total BTUH [kW]	63.6 [18.6]	63 [18.5]	62.2 [18.2]	56.2 [16.5]	55.6 [16.3]	55 [16.1]	48.8 [14.3]	48.3 [14.2]	47.7 [14]		
	Power	4.4	4.5	4.6	4.8	4.9	5	5.1	5.2	5.4		
35°F [1.7°C]	Total BTUH [kW]	68.4 [20]	67.7 [19.8]	66.9 [19.6]	61 [17.9]	60.4 [17.7]	59.6 [17.5]	53.6 [15.7]	53.1 [15.6]	52.4 [15.4]		
	Power	4.5	4.6	4.7	4.9	5	5.1	5.2	5.3	5.4		
40°F [4.4°C]	Total BTUH [kW]	73.2 [21.5]	72.4 [21.2]	71.6 [21]	65.8 [19.3]	65.1 [19.1]	64.3 [18.8]	58.4 [17.1]	57.8 [16.9]	57.1 [16.7]		
	Power	4.6	4.7	4.8	5	5.1	5.2	5.3	5.4	5.5		
45°F [7.2°C]	Total BTUH [kW]	78 [22.9]	77.2 [22.6]	76.2 [22.3]	70.6 [20.7]	69.8 [20.5]	69 [20.2]	63.2 [18.5]	62.5 [18.3]	61.8 [18.1]		
	Power	4.7	4.8	4.9	5	5.1	5.2	5.4	5.5	5.6		
50°F [10.0°C]	Total BTUH [kW]	82.8 [24.3]	81.9 [24]	80.9 [23.7]	75.4 [22.1]	74.6 [21.9]	73.7 [21.6]	68 [19.9]	67.2 [19.7]	66.4 [19.5]		
	Power	4.8	4.9	5	5.1	5.2	5.3	5.5	5.6	5.7		

IDB—Indoor air dry bulb [ ] Designates Metric Conversions

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Appendix E – Heater Kit Characteristics

208/230V, THREE PHASE, 60 Hz, AUXILIARY ELECTRIC HEATER KIT CHARACTERISTICS AND APPLICATION

UNIT MODEL NUMBER (-)HPCYB	Single Power Supply for Both Unit and Heater Kit							Separate Power Supply for Both Unit and Heater Kit					
	Heater Kit			Air Conditioner				Heater Kit		Air Conditioner			
	MODEL NO. RXJJ-	Rated Heater KW @ 208/230	FLA	UNIT MIN. CKT. AMPACITY	UNIT MIN. CKT. AMPACITY WITH OPTIONAL POWERED EXHAUST	MAX FUSE OR CKT. BKR. SIZE	MAX FUSE OR CKT. BKR. SIZE WITH OPTIONAL POWERED EXHAUST	HEATER KIT MIN. CKT. AMPACITY	HEATER KIT MAX FUSE OR CKT. BKR. SIZE	AIR COND. MIN. CKT. AMPACITY	AIR COND. MIN. CKT.AMPACITY WITH OPTIONAL POWERED EXHAUST	AIR COND. MAX. FUSE OR CKT. BKR. SIZE	AIR COND. MAX. FUSE OR CKT. BKR. SIZE WITH OPTIONAL POWERED EXHAUST
036ACT HEATER KW	NONE	—	—	23/23	26/26	30/30	35/35	—	—	23/23	26/26	30/30	35/35
	DC10CP	7.5/10	20.9/24.1	49/53	52/56	50/60	60/60	27/31	30/35	23/23	26/26	30/30	35/35
	DC15CP	11.3/15	31.4/36.2	62/68	65/71	70/70	70/80	40/46	40/50	23/23	26/26	30/30	35/35
	DC20CP	15/20	41.7/48.1	75/83	78/86	80/90	80/90	53/61	60/70	23/23	26/26	30/30	35/35
036ACU HEATER KW	NONE	—	—	28/28	32/32	40/40	40/40	—	—	28/28	32/32	40/40	40/40
	DC10CP	7.5/10	20.9/24.1	55/59	58/62	60/60	60/70	27/31	30/35	28/28	32/32	40/40	40/40
	DC15CP	11.3/15	31.4/36.2	68/74	71/77	70/80	80/80	40/46	40/50	28/28	32/32	40/40	40/40
	DC20CP	15/20	41.7/48.1	81/89	84/92	90/90	90/100	53/61	60/70	28/28	32/32	40/40	40/40
048ACT HEATER KW	NONE	—	—	25/25	28/28	35/35	40/40	—	—	25/25	28/28	35/35	40/40
	DC10CP	7.5/10	20.9/24.1	51/55	54/58	60/60	60/60	27/31	30/35	25/25	28/28	35/35	40/40
	DC15CP	11.3/15	31.4/36.2	64/70	67/73	70/70	70/80	40/46	40/50	25/25	28/28	35/35	40/40
	DC20CP	15/20	41.7/48.1	77/85	80/88	80/90	80/90	53/61	60/70	25/25	28/28	35/35	40/40
048ACU HEATER KW	NONE	—	—	30/30	33/33	40/40	45/45	—	—	30/30	33/33	40/40	45/45
	DC10CP	7.5/10	20.9/24.1	56/60	60/64	60/60	60/70	27/31	30/35	30/30	33/33	40/40	45/45
	DC15CP	11.3/15	31.4/36.2	70/76	73/79	70/80	80/80	40/46	40/50	30/30	33/33	40/40	45/45
	DC20CP	15/20	41.7/48.1	82/90	86/94	90/90	90/100	53/61	60/70	30/30	33/33	40/40	45/45
060ACT HEATER KW	NONE	—	—	33/33	36/36	45/45	50/50	—	—	33/33	36/36	45/45	50/50
	DC10CP	7.5/10	20.9/24.1	60/64	63/67	60/70	70/70	27/31	30/35	33/33	36/36	45/45	50/50
	DC15CP	11.3/15	31.4/36.2	73/83	76/82	80/80	80/90	40/46	40/50	33/33	36/36	45/45	50/50
	DC20CP	15/20	41.7/48.1	89/97	89/97	90/100	90/100	53/61	60/70	33/33	36/36	45/45	50/50
060ACU HEATER KW	NONE	—	—	37/37	40/40	50/50	50/50	—	—	37/37	40/40	50/50	50/50
	DC10CP	7.5/10	20.9/24.1	63/67	67/71	70/70	70/80	27/31	30/35	37/37	40/40	50/50	50/50
	DC15CP	11.3/15	31.4/36.2	77/83	80/86	80/90	80/90	40/46	40/50	37/37	40/40	50/50	50/50
	DC20CP	15/20	41.7/48.1	89/97	93/101	90/100	100/110	53/61	60/70	37/37	40/40	50/50	50/50
072ACT HEATER KW	NONE	—	—	38/38	41/41	50/50	60/60	—	—	38/38	41/41	50/50	60/60
	DC15CP	11.3/15.0	31.4/36.2	78/84	81/87	80/90	90/90	40/46	40/50	38/38	41/41	50/50	60/60
	DC20CP	15.0/20.0	41.7/48.1	90/98	94/102	90/100	100/110	53/61	60/70	38/38	41/41	50/50	60/60
	DC24CP	18.0/24.0	50.0/57.7	101/110	104/114	110/110	110/125	63/73	70/80	38/38	41/41	50/50	60/60
072ACU HEATER KW	NONE	—	—	38/38	41/41	50/50	60/60	—	—	38/38	41/41	50/50	60/60
	DC15CP	11.3/15.0	31.4/36.2	78/84	81/87	80/90	90/90	40/46	40/50	38/38	41/41	50/50	60/60
	DC20CP	15.0/20.0	41.7/48.1	90/98	94/102	90/100	100/110	53/61	60/70	38/38	41/41	50/50	60/60
	DC24CP	18.0/24.0	50.0/57.7	101/110	104/114	110/110	110/125	63/73	70/80	38/38	41/41	50/50	60/60

Appendix E – Heater Kit Characteristics

460V, THREE PHASE, 60 Hz, AUXILIARY ELECTRIC HEATER KIT CHARACTERISTICS AND APPLICATION

UNIT MODEL NUMBER (-)HPCCYB	Single Power Supply for Both Unit and Heater Kit							Separate Power Supply for Both Unit and Heater Kit				
	Heater Kit			Air Conditioner				Heater Kit		Air Conditioner		
	MODEL NO. RXJJ-	Rated Heater KW @ 460	FLA	UNIT MIN. CKT. AMPACITY	UNIT MIN. CKT. AMPACITY WITH OPTIONAL POWERED EXHAUST	MAX FUSE OR CKT. BKR. SIZE	MAX FUSE OR CKT. BKR. SIZE WITH OPTIONAL POWERED EXHAUST	HEATER KIT MIN. CKT. AMPACITY	HEATER KIT MAX FUSE OR CKT. BKR. SIZE	AIR COND. MIN. CKT. AMPACITY	AIR COND. MIN. CKT.AMPACITY WITH OPTIONAL POWERED EXHAUST	AIR COND. MAX. FUSE OR CKT. BKR. SIZE	AIR COND. MAX. FUSE OR CKT. BKR. SIZE WITH OPTIONAL POWERED EXHAUST
036ADT HEATER KW	NONE	—	—	11	13	15	15	—	—	11	13	15	15
	DC10DNV	10.0	12.0	26	28	30	30	15	15	11	13	15	15
	DC15DNV	15.0	18.1	34	36	35	40	23	25	11	13	15	15
	DC20DNV	20.0	24.1	41	43	45	45	31	35	11	13	15	15
036ADU HEATER KW	NONE	—	—	12	14	15	20	—	—	12	14	15	15
	DC10DNV	10.0	12.0	27	29	30	30	15	15	12	14	15	15
	DC15DNV	15.0	18.1	35	37	35	40	23	25	12	14	15	15
	DC20DNV	20.0	24.1	42	44	45	45	31	35	12	14	15	15
048ADT HEATER KW	NONE	—	—	12	14	15	20	—	—	12	14	15	15
	DC10DNV	10.0	12.0	27	29	30	30	15	15	12	14	15	15
	DC15DNV	15.0	18.1	35	37	35	40	23	25	12	14	15	15
	DC20DNV	20.0	24.1	42	44	45	45	31	35	12	14	15	15
048ADU HEATER KW	NONE	—	—	13	15	15	20	—	—	13	15	15	20
	DC10DNV	10.0	12.0	28	30	30	30	15	15	13	15	15	20
	DC15DNV	15.0	18.1	36	38	40	40	23	25	13	15	15	20
	DC20DNV	20.0	24.1	43	45	45	45	31	35	13	15	15	20
060ADT HEATER KW	NONE	—	—	15	17	20	20	—	—	15	17	20	20
	DC10DNV	10.0	12.0	30	32	30	35	15	15	15	17	20	20
	DC15DNV	15.0	18.1	38	40	40	40	23	25	15	17	20	20
	DC20DNV	20.0	24.1	45	47	45	50	31	35	15	17	20	20
060ADU HEATER KW	NONE	—	—	15	17	20	20	—	—	15	17	20	20
	DC10DNV	10.0	12.0	30	32	30	35	15	15	15	17	20	20
	DC15DNV	15.0	18.1	38	40	40	40	23	25	15	17	20	20
	DC20DNV	20.0	24.1	45	48	45	50	31	35	15	17	20	20
072ADT HEATER KW	NONE	—	—	18	20	25	25	—	—	18	20	25	25
	DC15DNV	15.0	18.1	40	43	40	45	23	25	18	20	25	25
	DC20DNV	20.0	24.1	48	50	50	50	31	35	18	20	25	25
	DC24DNV	24.0	28.9	54	56	60	60	37	40	18	20	25	25
072ADU HEATER KW	NONE	—	—	18	20	25	25	—	—	18	20	25	25
	DC15DNV	15.0	18.1	40	43	40	45	23	25	18	20	25	25
	DC20DNV	20.0	24.1	48	50	50	50	31	35	18	20	25	25
	DC24DNV	24.0	28.9	54	56	60	60	37	40	18	20	25	25

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Appendix E – Heater Kit Characteristics

208/230V, THREE PHASE, 60 Hz, AUXILIARY ELECTRIC HEATER KIT CHARACTERISTICS AND APPLICATION														
	Single Power Supply for Both Unit and Heater Kit							Separate Power Supply for Both Unit and Heater Kit						
	Heater Kit			Air Conditioner				Heater Kit			Air Conditioner			
UNIT MODEL NUMBER (-)HPCYB	MODEL NO. RXJJ-	Rated Heater KW @ 208/230	FLA	UNIT MIN. CKT. AMPACITY	UNIT MIN. CKT. AMPACITY WITH OPTIONAL POWERED EXHAUST	MAX FUSE OR CKT. BKR. SIZE	MAX FUSE OR CKT. BKR. SIZE WITH OPTIONAL POWERED EXHAUST	HEATER KIT MIN. CKT. AMPACITY	HEATER KIT MAX FUSE OR CKT. BKR. SIZE	AIR COND. MIN. CKT. AMPACITY	AIR COND. MIN. CKT. AMPACITY WITH OPTIONAL POWERED EXHAUST	AIR COND. MAX. FUSE OR CKT. BKR. SIZE	AIR COND. MAX. FUSE OR CKT. BKR. SIZE WITH OPTIONAL POWERED EXHAUST
036AJT HEATER KW	NONE	—	—	29/29	32/32	40/40	45/45	—	—	29/29	32/32	40/40	45/45
	DC10JT	7.5/10	36.2/41.7	74/81	77/84	80/90	80/90	46/53	50/60	29/29	32/32	40/40	45/45
	DC15JT	11.3/15	54.3/62.7	96/107	100/110	100/110	100/110	68/79	70/80	29/29	32/32	40/40	45/45
	DC20JT	15/20	72.2/83.3	119/133	122/136	125/150	125/150	91/105	100/110	29/29	32/32	40/40	45/45
048AJT HEATER KW	NONE	—	—	37/37	40/40	50/50	60/60	—	—	37/37	40/40	50/50	60/60
	DC10JT	7.5/10	36.2/41.7	82/89	85/92	90/100	90/100	46/53	50/60	37/37	40/40	50/50	60/60
	DC15JT	11.3/15	54.3/62.7	105/115	108/118	110/125	110/125	68/79	70/80	37/37	40/40	50/50	60/60
	DC20JT	15/20	72.2/83.3	127/141	130/144	150/150	150/150	91/105	100/110	37/37	40/40	50/50	60/60
060AJT HEATER KW	NONE	—	—	43/43	46/46	60/60	60/60	—	—	43/43	46/46	60/60	60/60
	DC10JT	7.5/10	36.2/41.7	88/95	91/98	100/100	100/110	46/53	50/60	43/43	46/46	60/60	60/60
	DC15JT	11.3/15	54.3/62.7	111/121	114/124	125/125	125/125	68/79	70/80	43/43	46/46	60/60	60/60
	DC20JT	15/20	72.2/83.3	133/147	136/150	150/150	150/150	91/105	100/110	43/43	46/46	60/60	60/60

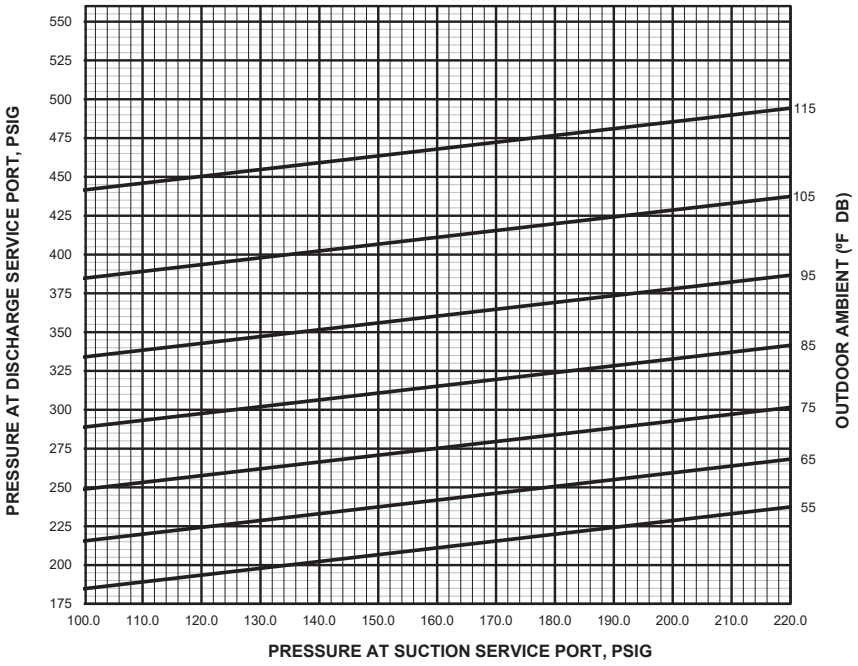
Appendix F – A2L Refrigerant Installation Safety Data

		(-)HPCYB036	(-)HPCYB048	(-)HPCYB060	(-)HPCYB072
Refrigerant Charge Weight (oz)		84	143	146	142
Minimum Circulation Airflow, Qmin (cfm)		142	242	247	240
Installed Altitude (ft above sea level)	Altitude Adjustment Factor	Minimum Total Conditioned Room Area, TAmin (sq ft)			
0	1.000	79	134	137	133
1000	1.025	81	137	140	136
2000	1.051	83	141	144	140
3000	1.078	85	145	148	144
4000	1.107	87	148	151	147
5000	1.138	90	152	156	151
6000	1.170	92	157	160	156
6500	1.187	93	159	162	158

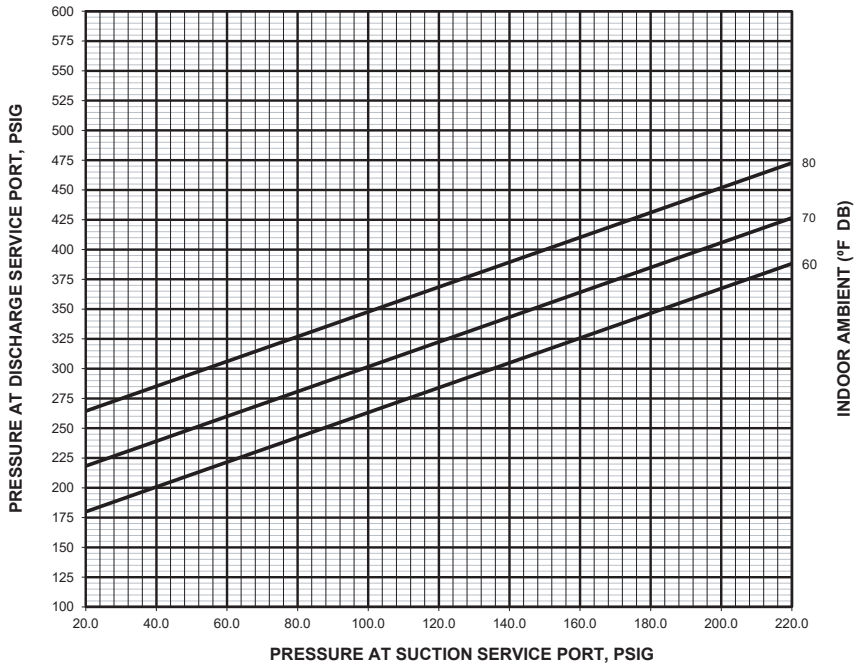
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Appendix G — Refrigerant Charging Charts

3 TON COOLING CHARGE CHART



3 TON HEATING CHARGE CHART



CAUTION: RETURN AIR TEMPERATURE MUST BE WITHIN COMFORT CONDITIONS BEFORE FINAL REFRIGERANT CHECK!

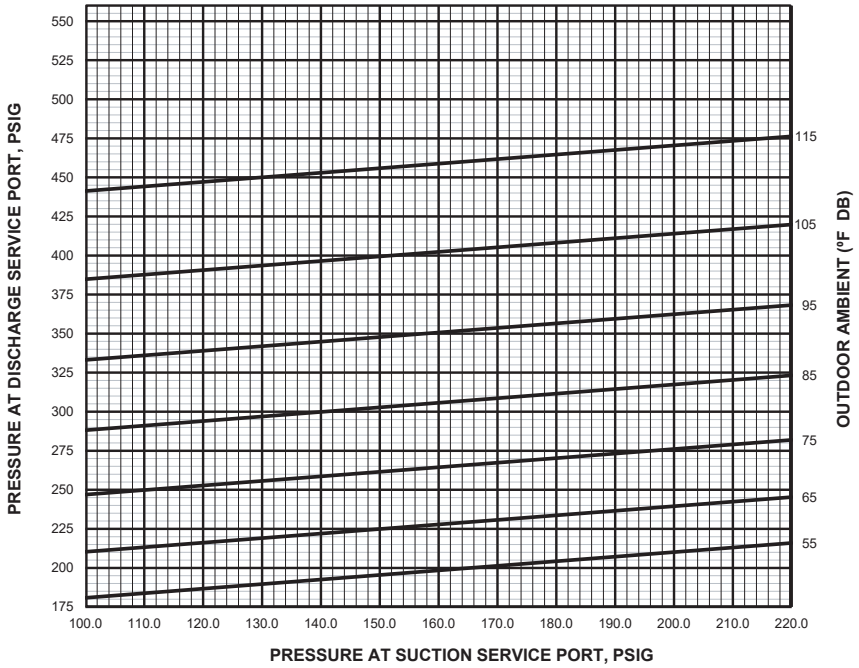
NOTE: DESIGN SUBCOOLING (AT SERVICE PORT) @ 95°F OUTDOOR = 11°F

NOTE: FACTORY CHARGE CHART AND/OR DESIGN TARGET SUBCOOLING ARE FOR GROSS CHARGE VERIFICATION. ANY ADJUSTMENT SHALL NOT EXCEED 2% OF THE TOTAL REFRIGERANT WEIGHT LISTED ON THE RATING PLATE OF THE UNIT AND SHOULD NOT SUPERSEDE CORRECTLY WEIGHED-IN REFRIGERANT. REFER TO THE REFRIGERANT CHARGE VERIFICATION AND ADJUSTMENT SECTION IN THE I&O MANUAL FOR INSTRUCTIONS ON USING THIS CHARGE CHART.

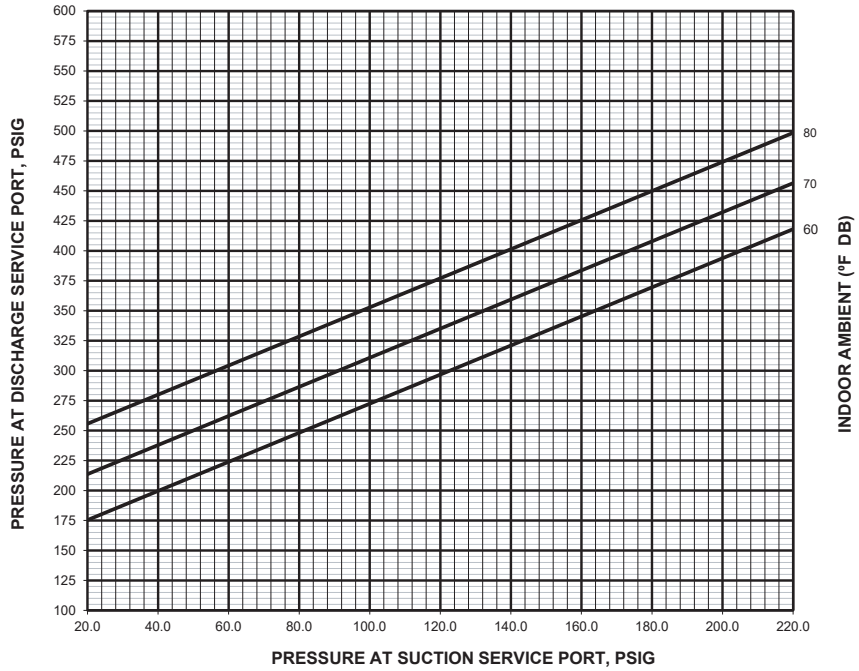
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Appendix G — Refrigerant Charging Charts (Cont.)

4 TON COOLING CHARGE CHART



4 TON HEATING CHARGE CHART



CAUTION: RETURN AIR TEMPERATURE MUST BE WITHIN COMFORT CONDITIONS BEFORE FINAL REFRIGERANT CHECK!

NOTE: DESIGN SUBCOOLING (AT SERVICE PORT) @ 95°F OUTDOOR = 12°F.

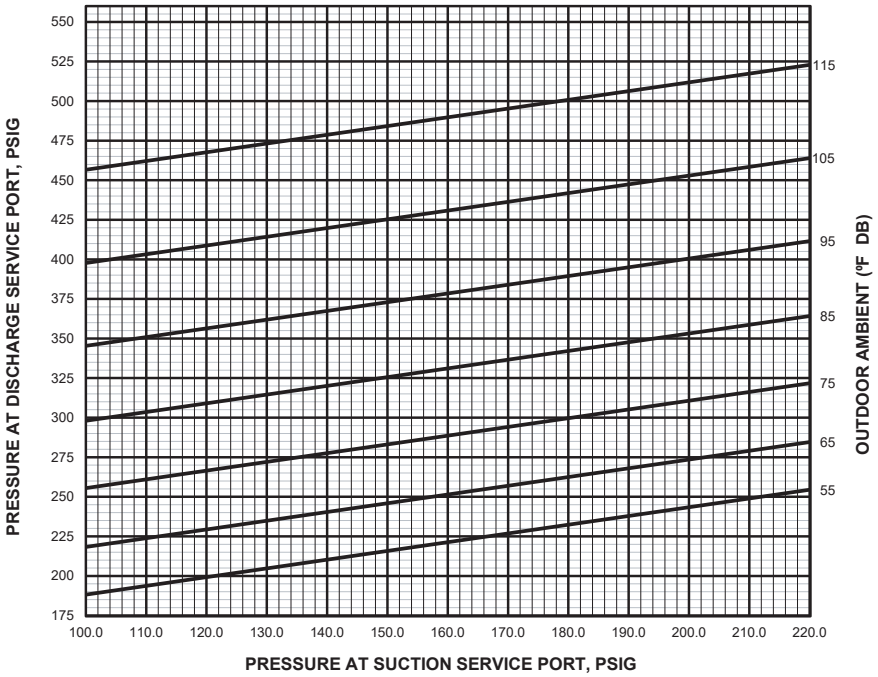
NOTE: FACTORY CHARGE CHART AND/OR DESIGN TARGET SUBCOOLING ARE FOR GROSS CHARGE VERIFICATION. ANY ADJUSTMENT SHALL NOT EXCEED 2% OF THE TOTAL REFRIGERANT WEIGHT LISTED ON THE RATING PLATE OF THE UNIT AND SHOULD NOT SUPERSEDE CORRECTLY WEIGHED-IN REFRIGERANT. REFER TO THE REFRIGERANT CHARGE VERIFICATION AND ADJUSTMENT SECTION IN THE I&O MANUAL FOR INSTRUCTIONS ON USING THIS CHARGE CHART.

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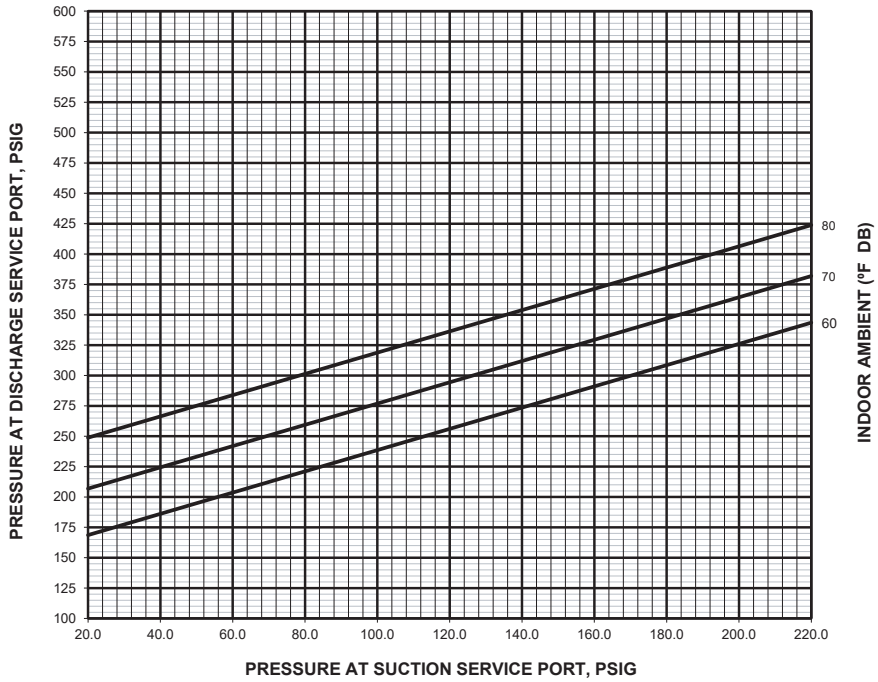
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Appendix G — Refrigerant Charging Charts (Cont.)

5 TON COOLING CHARGE CHART



5 TON HEATING CHARGE CHART



CAUTION: RETURN AIR TEMPERATURE MUST BE WITHIN COMFORT CONDITIONS BEFORE FINAL REFRIGERANT CHECK!

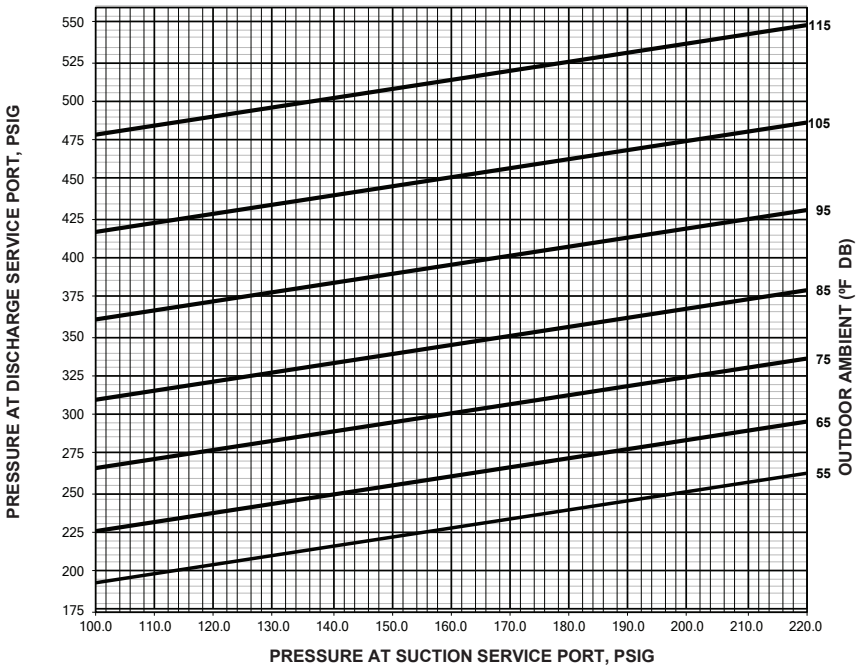
NOTE: DESIGN SUBCOOLING (AT SERVICE PORT) @ 95°F OUTDOOR = 12°F.

NOTE: FACTORY CHARGE CHART AND/OR DESIGN TARGET SUBCOOLING ARE FOR GROSS CHARGE VERIFICATION. ANY ADJUSTMENT SHALL NOT EXCEED 2% OF THE TOTAL REFRIGERANT WEIGHT LISTED ON THE RATING PLATE OF THE UNIT AND SHOULD NOT SUPERSEDE CORRECTLY WEIGHED-IN REFRIGERANT. REFER TO THE REFRIGERANT CHARGE VERIFICATION AND ADJUSTMENT SECTION IN THE I&O MANUAL FOR INSTRUCTIONS ON USING THIS CHARGE CHART.

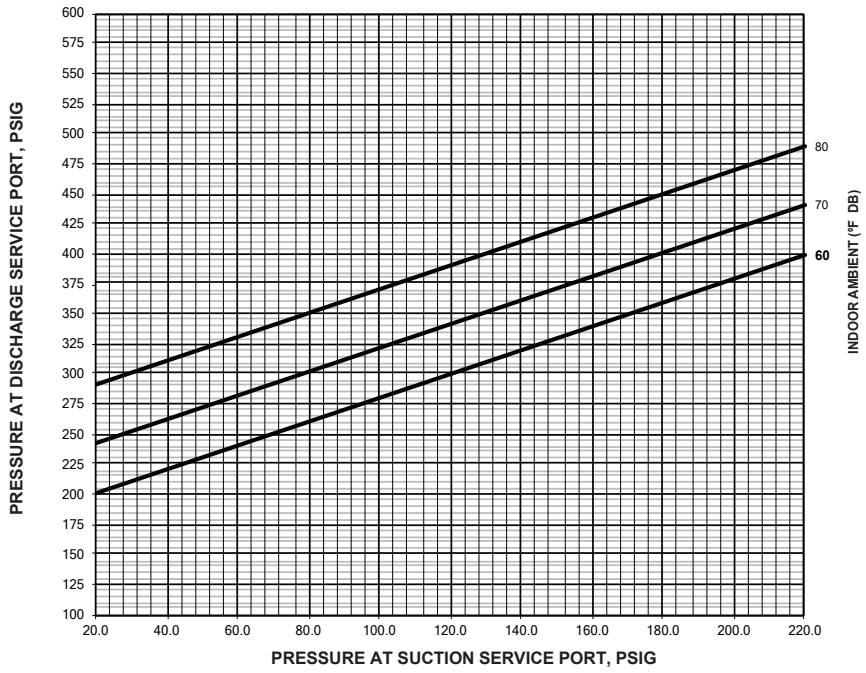
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Appendix G — Refrigerant Charging Charts (Cont.)

6 TON COOLING CHARGE CHART



6 TON HEATING CHARGE CHART



CAUTION: RETURN AIR TEMPERATURE MUST BE WITHIN COMFORT CONDITIONS BEFORE FINAL REFRIGERANT CHECK!

NOTE: DESIGN SUBCOOLING (AT SERVICE PORT) @ 95°F OUTDOOR = 17°F

NOTE: FACTORY CHARGE CHART AND/OR DESIGN TARGET SUBCOOLING ARE FOR GROSS CHARGE VERIFICATION. ANY ADJUSTMENT SHALL NOT EXCEED 2% OF THE TOTAL REFRIGERANT WEIGHT LISTED ON THE RATING PLATE OF THE UNIT AND SHOULD NOT SUPERSEDE CORRECTLY WEIGHED-IN REFRIGERANT. REFER TO THE REFRIGERANT CHARGE VERIFICATION AND ADJUSTMENT SECTION IN THE I&O MANUAL FOR INSTRUCTIONS ON USING THIS CHARGE CHART.

92-106696-29-00

P. APPENDICES

Appendix G — Refrigerant Charging Charts (Cont.)

SYSTEM CHARGE CHART – REFRIGERANT R-454B

SUB COOLING REQUIREMENTS – FINAL CHARGE VERIFICATION

OUTDOOR DRY BULB (°F)	3 -TON	4 -TON	5 -TON	6 -TON
	SUBCOOLING (°F)			
115	15	14	15	21
105	13	13	14	19
95	11	12	13	17
85	9	11	11	15
75	8	9	10	13
65	12	8	8	11
55	13	10	10	11

Note: Factory charge chart and/or design target subcooling are for gross charge verification.

Charge verification instructions:

1. Allow the unit to operate for 15 minutes before checking or adjusting the charge.

2. Ensure that the contamination of different refrigerants does not occur when using charging equipment. Hoses of lines must be as short as possible to minimize the amount of refrigerant contained in them.

3. Ensure that the unit is properly grounded.

4. Return air temperature must be within comfort conditions (72°F - 82°F).

5. Remove caps from the high-side and low-side pressure service fittings.

6. Cylinders must be kept in an upright position for the entirety of the testing and charging procedure.

7.Record the following measurements:

   a. High-side pressure at service fitting

   b. Liquid line temperature

8. Using R-454B refrigerant saturation T-P tables, find the corresponding refrigerant saturation temperature relative to the measured high-side pressure.

9. To determine subcooling, subtract the liquid line temperature measured in Step 7 from the saturation temperature found in Step 8.

10. Compare the subcooling result from Step 9 to the subcooling table located on the unit or in the I&O manual.

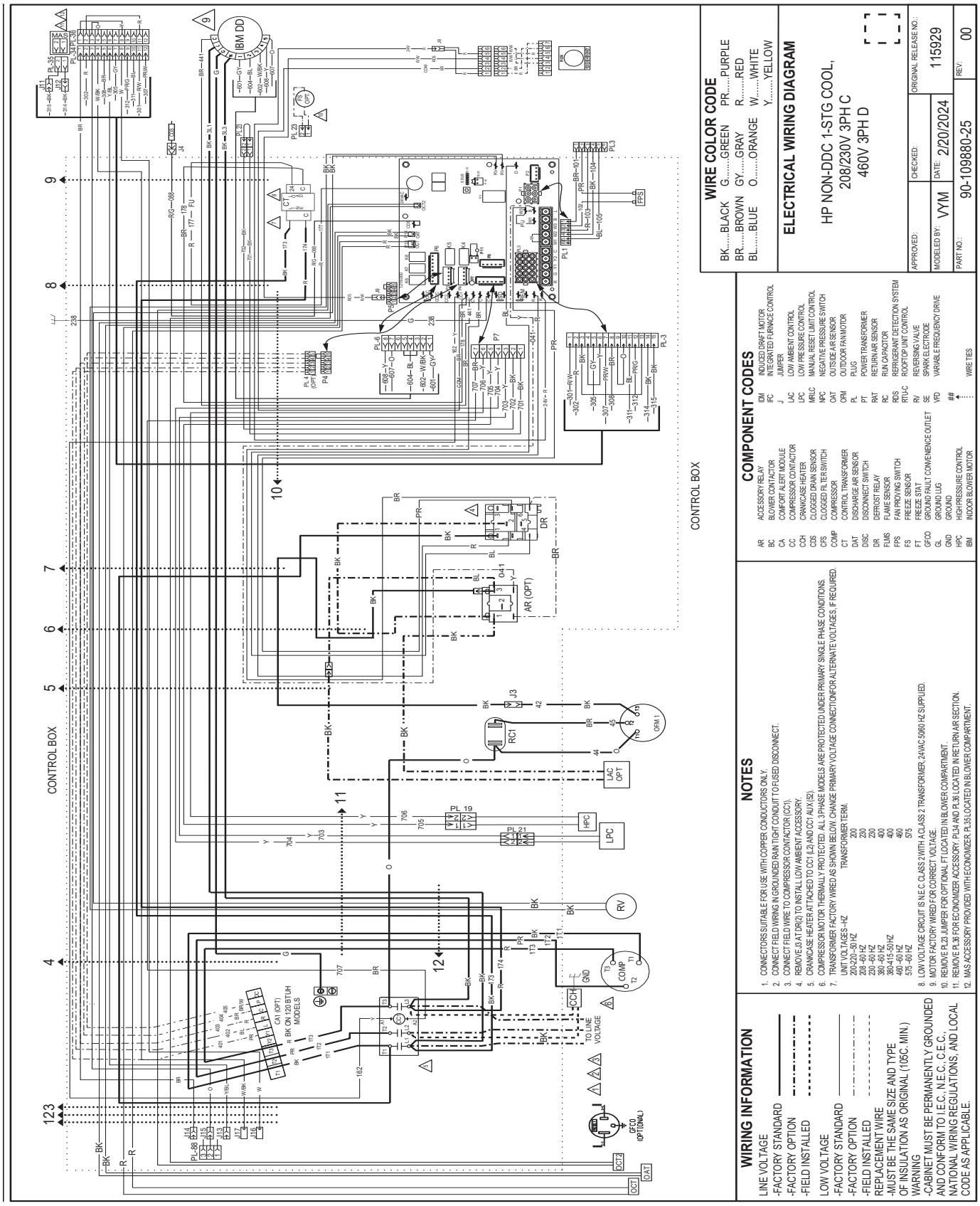
11. If the subcooling value from Step 9 is more than 1°F above the value listed in the subcooling table, remove charge to match the value listed in the table, ± 0.5°F.

   a. Take extreme care not to overfill the refrigerating system.

12. If the subcooling value from Step 9 is more than 1°F below the value listed in the subcooling table, add charge to match the value listed in the table, ± 0.5°F.

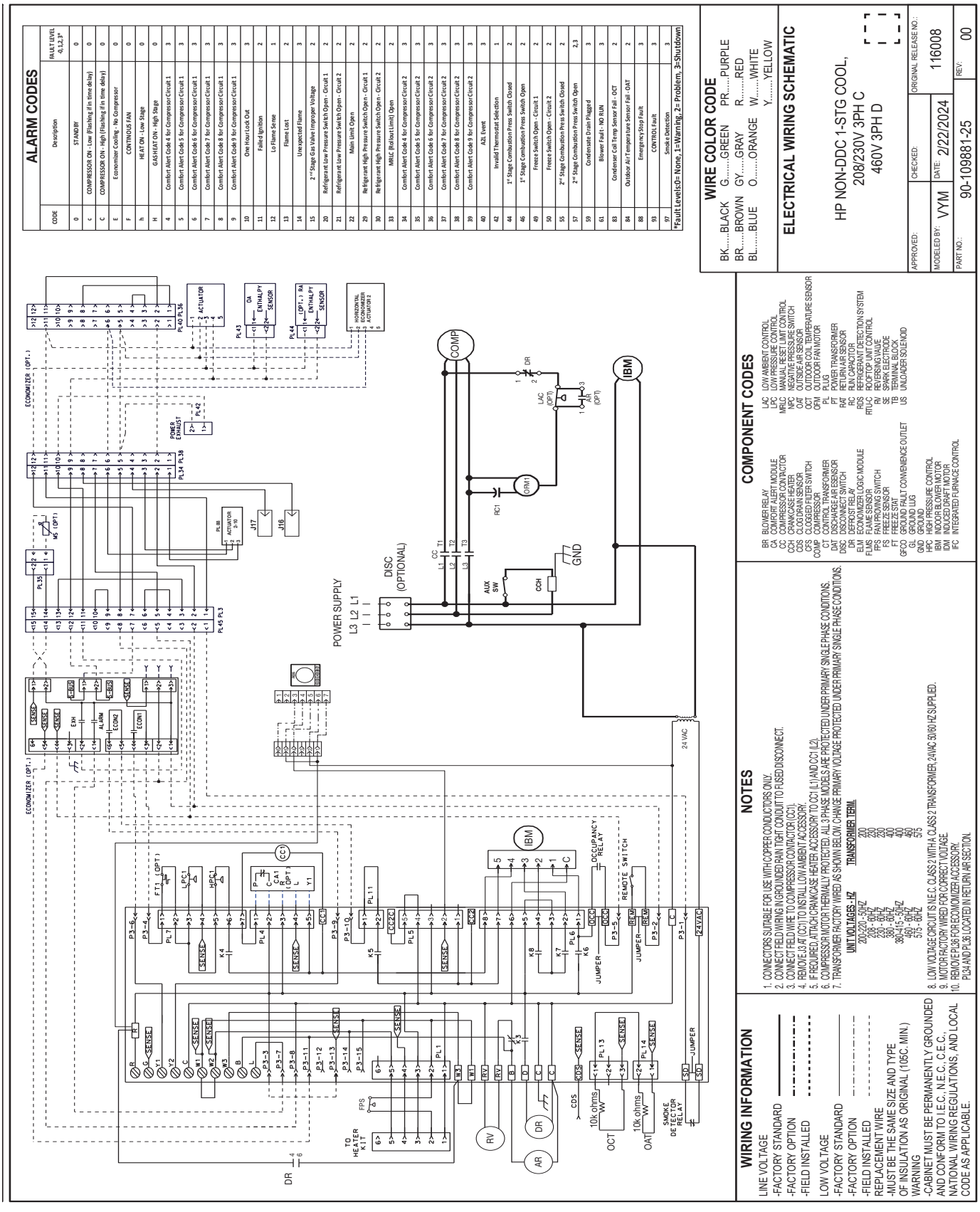
   a. Take extreme care not to overfill the refrigerating system.

Appendix H — Wiring Diagrams & Schematics

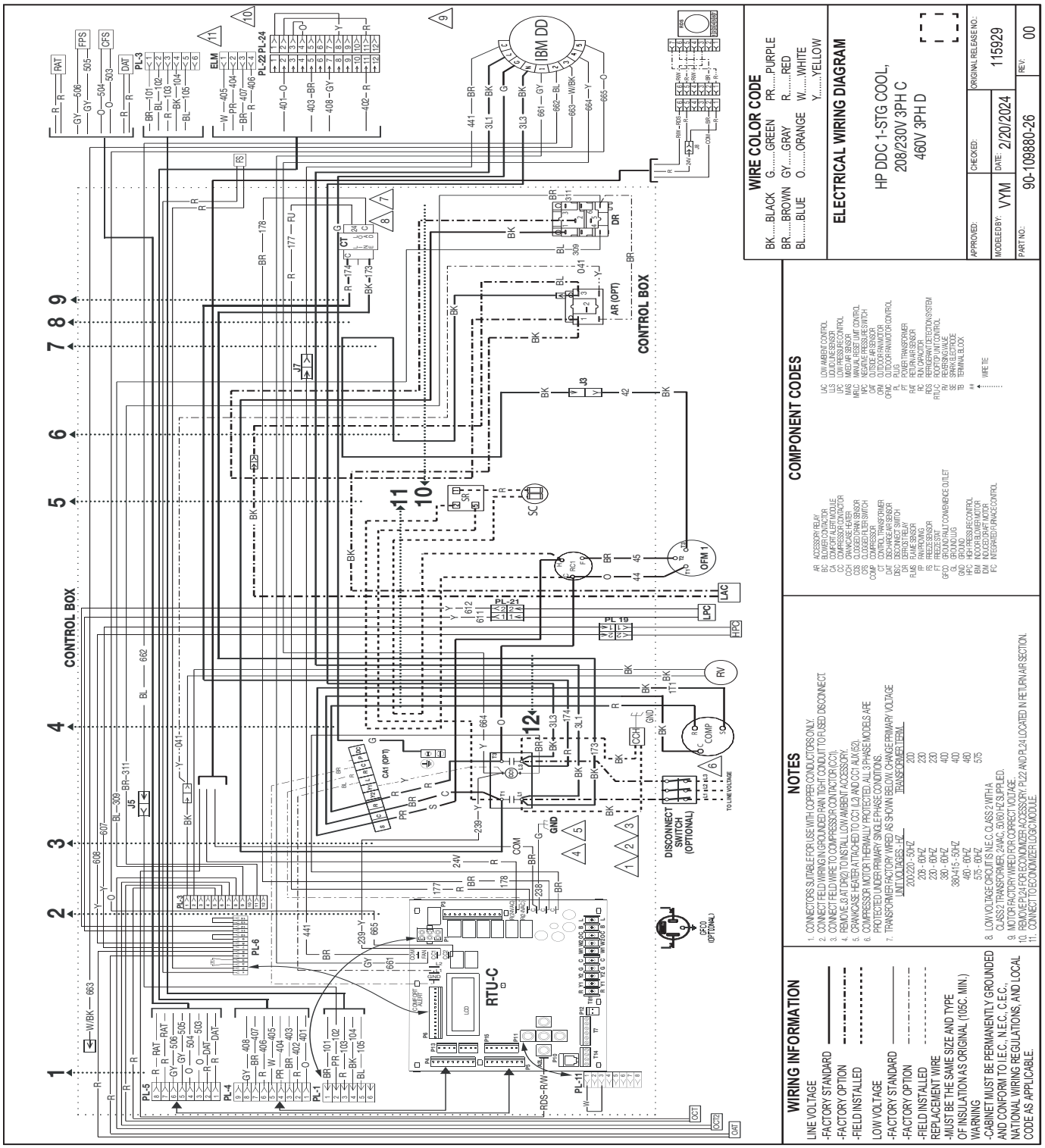


P. APPENDICES

Appendix H — Wiring Diagrams & Schematics (Cont.)

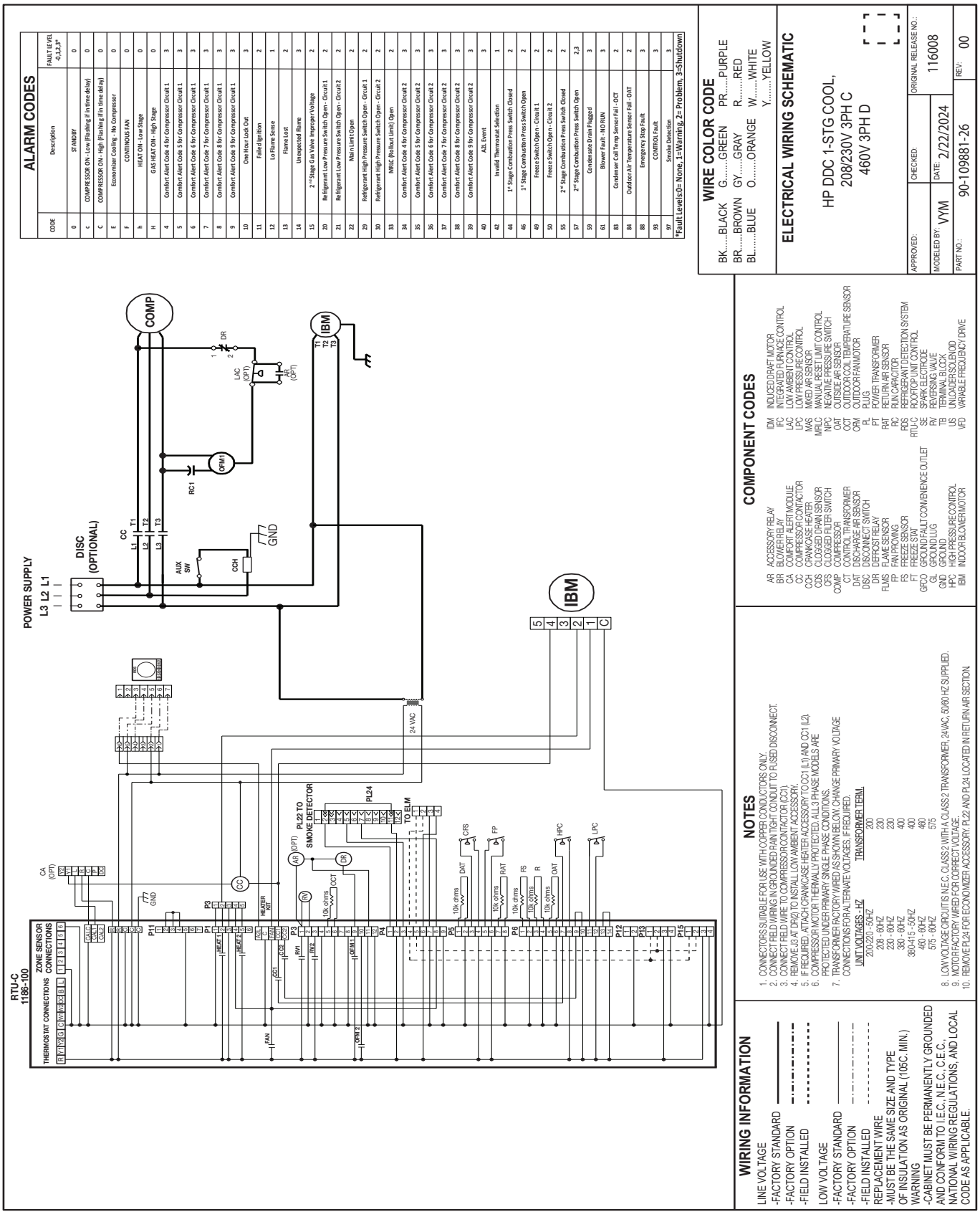


Appendix H — Wiring Diagrams & Schematics (Cont.)

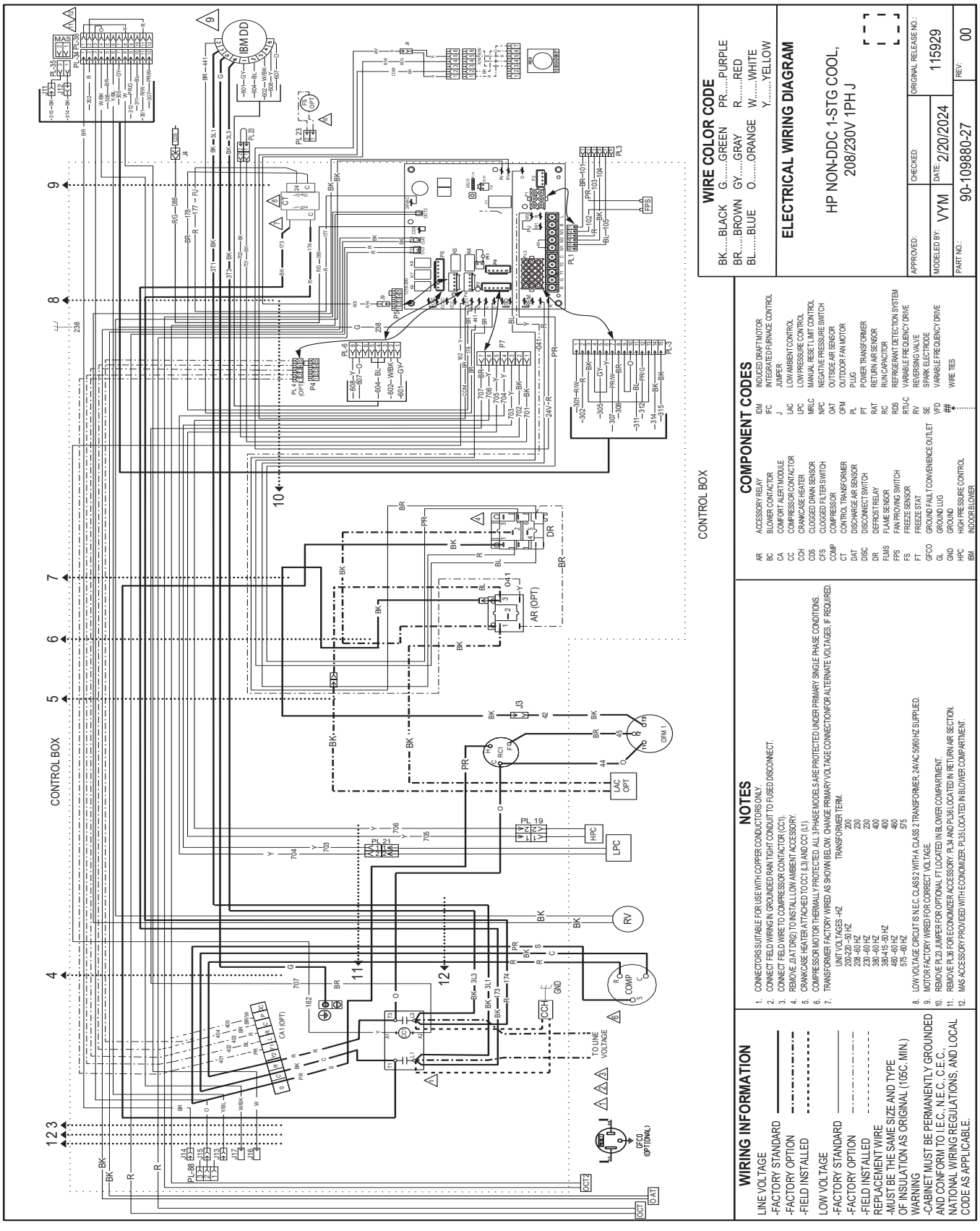


P. APPENDICES

Appendix H — Wiring Diagrams & Schematics (Cont.)

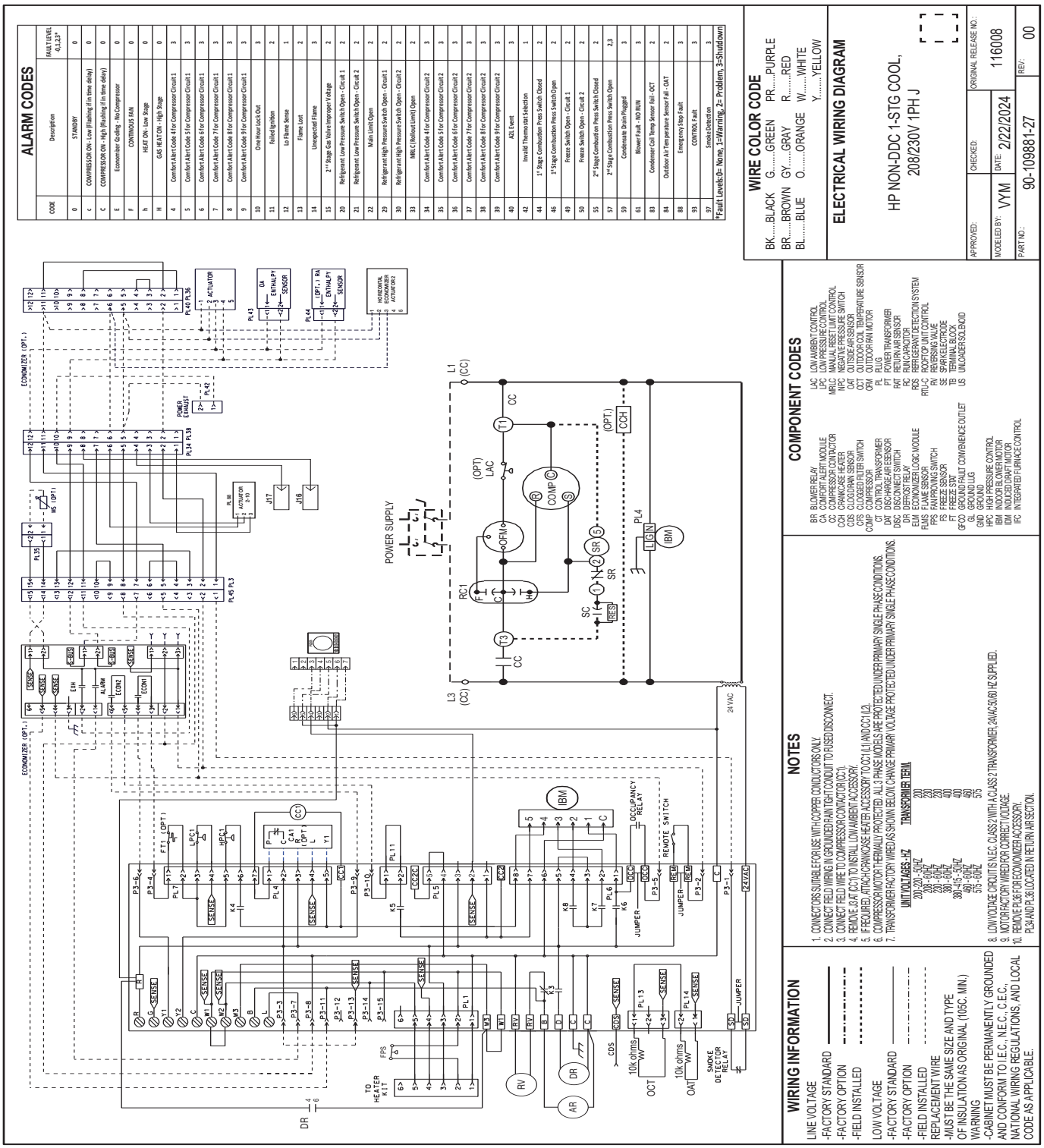


Appendix H — Wiring Diagrams & Schematics (Cont.)

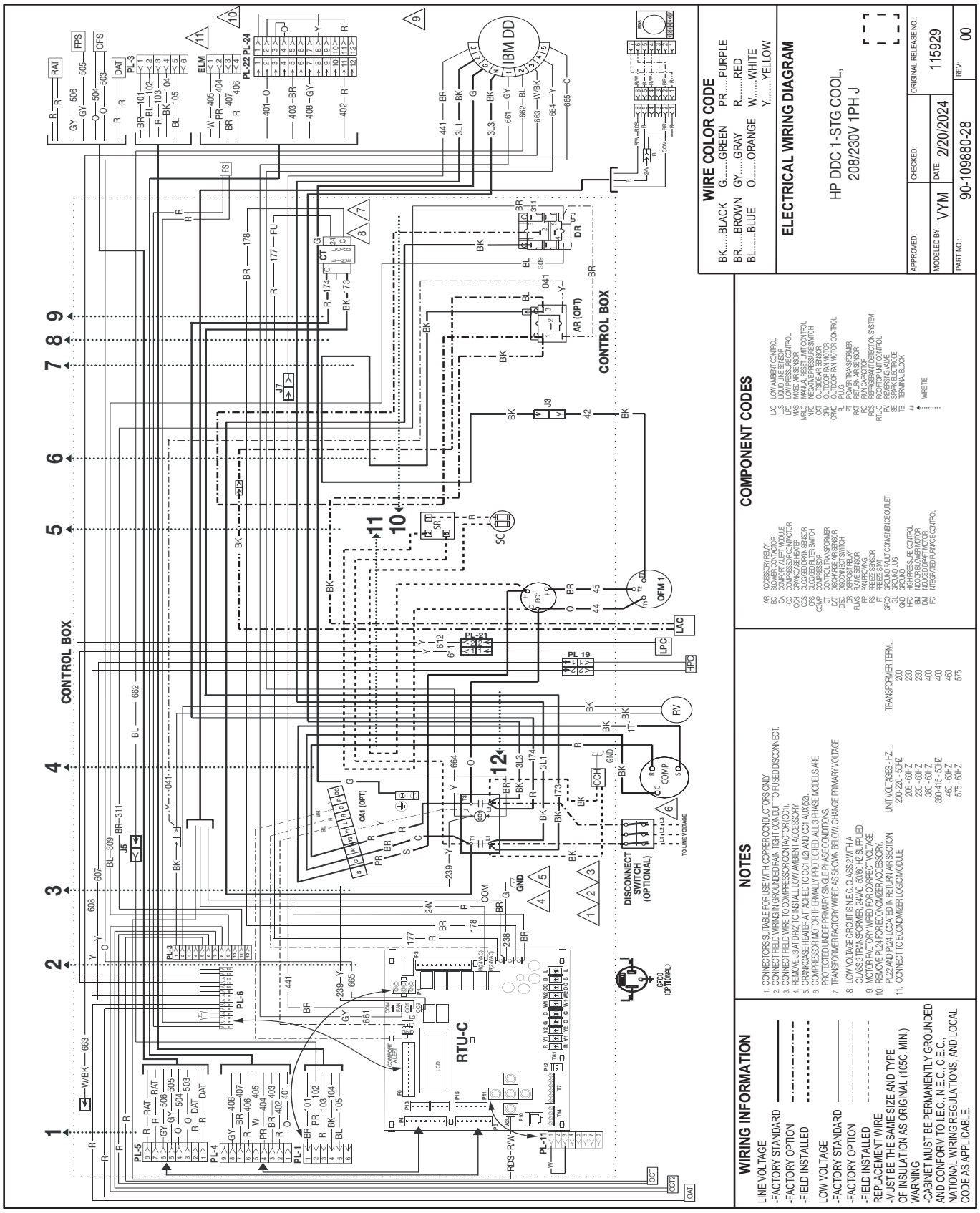


P. APPENDICES

Appendix H — Wiring Diagrams & Schematics (Cont.)

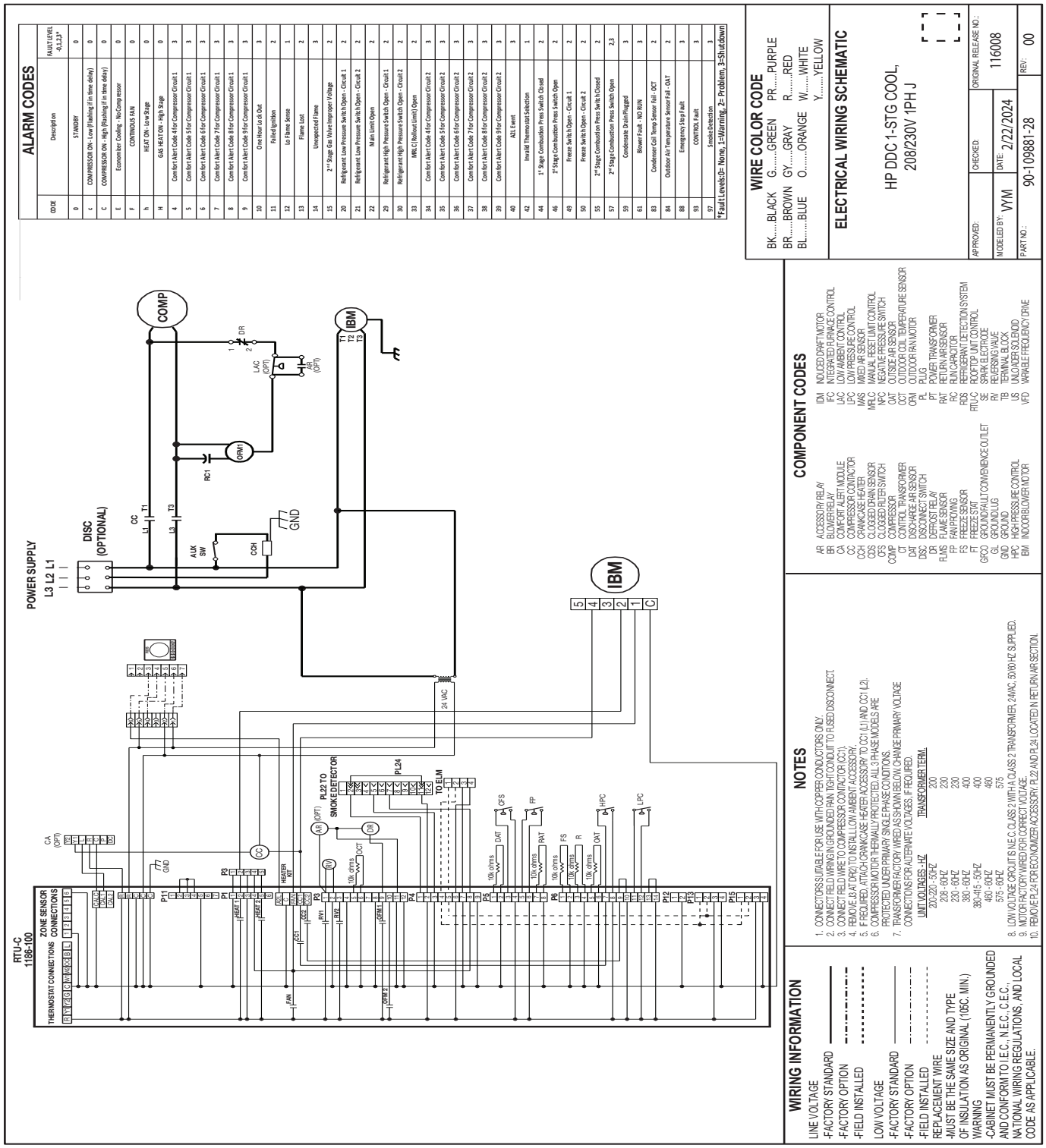


Appendix H — Wiring Diagrams & Schematics (Cont.)

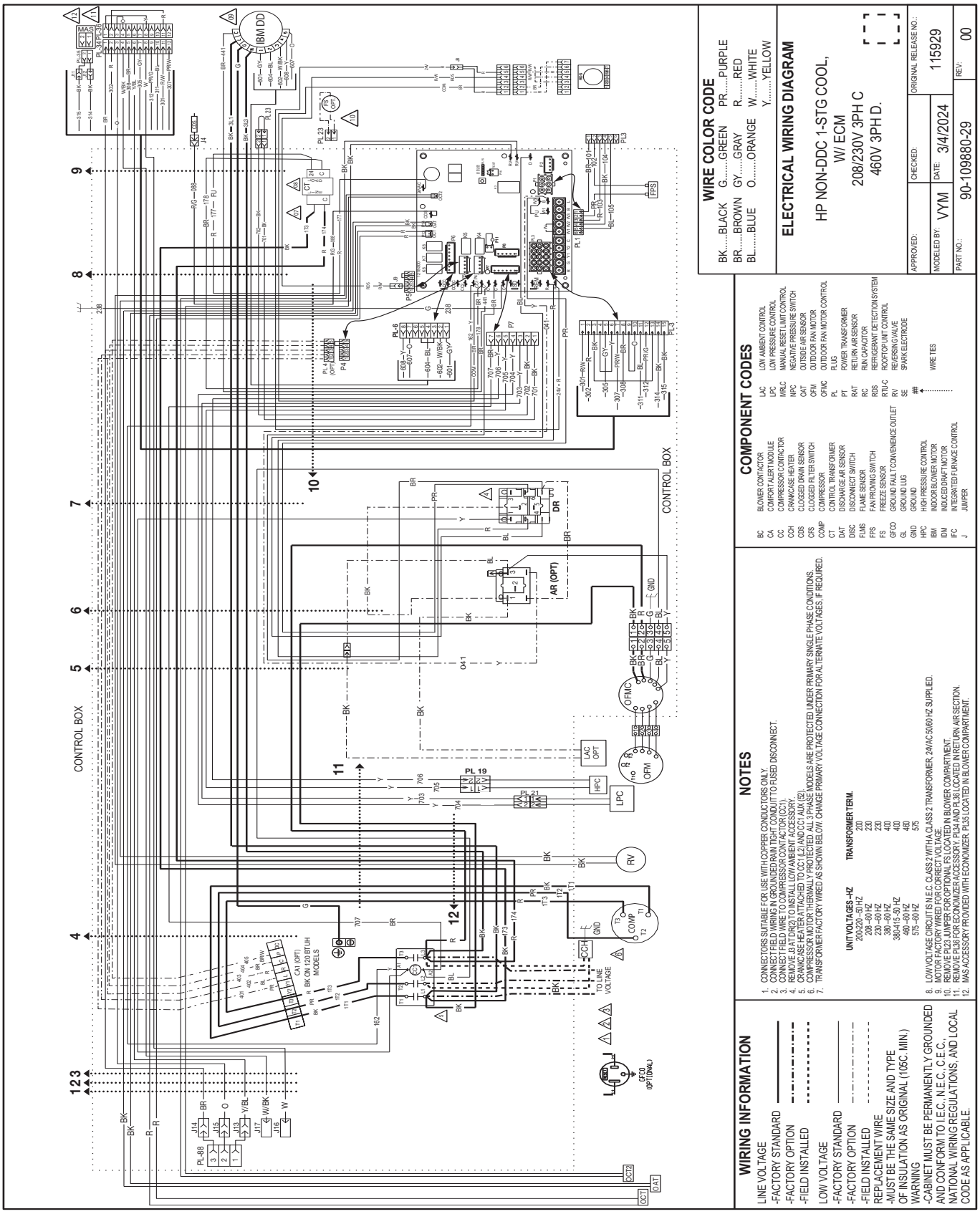


P. APPENDICES

Appendix H — Wiring Diagrams & Schematics (Cont.)

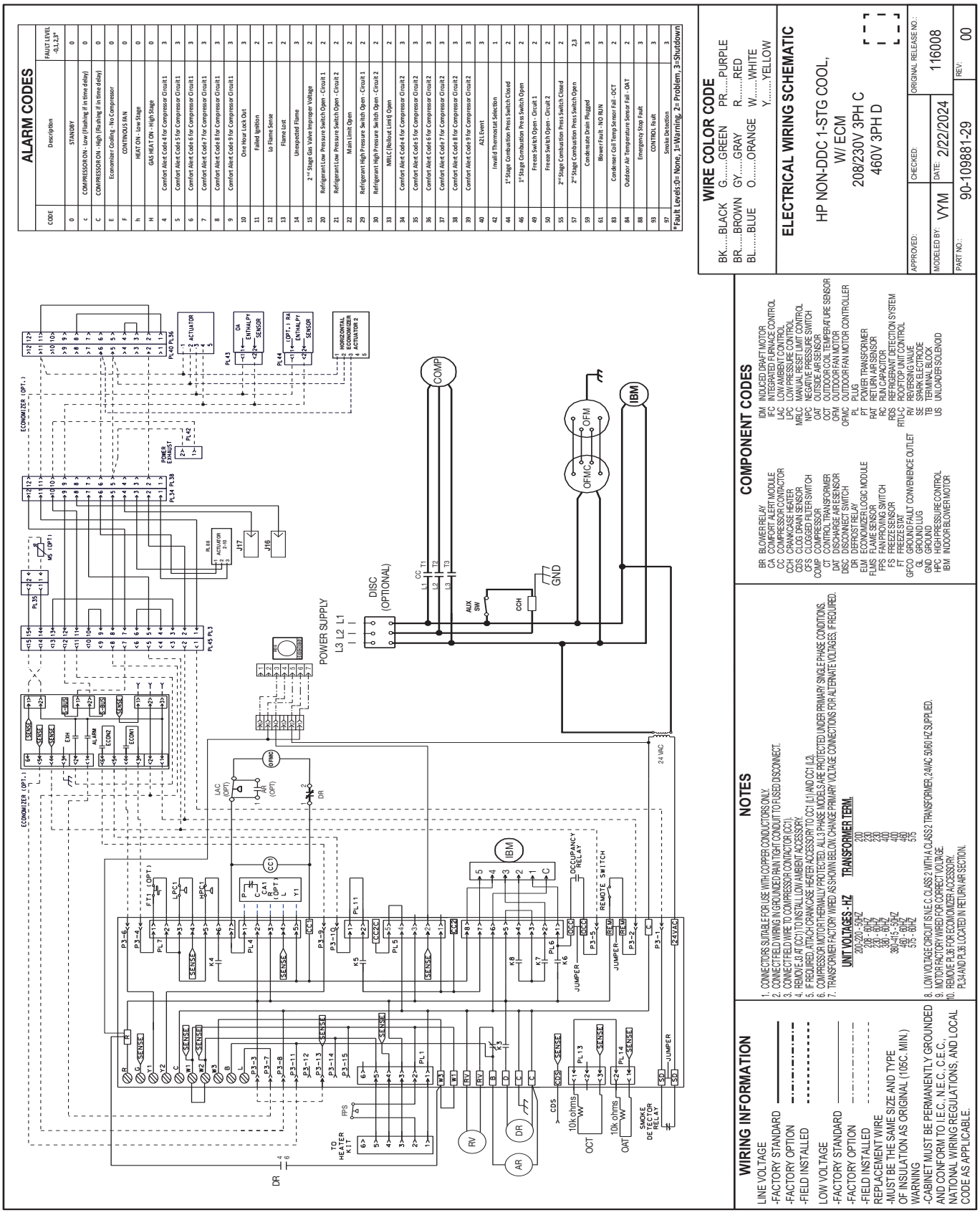


Appendix H — Wiring Diagrams & Schematics (Cont.)

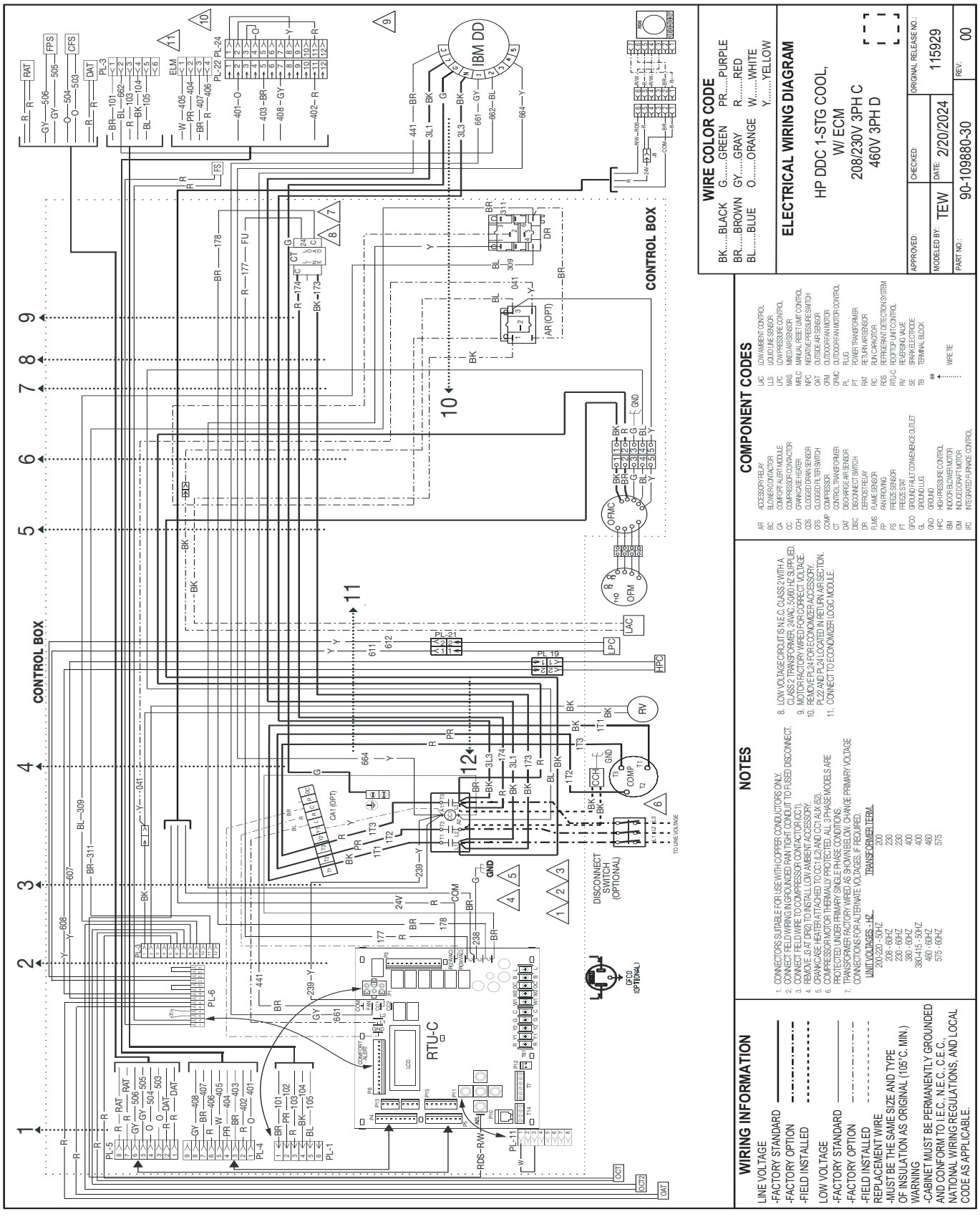


P. APPENDICES

Appendix H — Wiring Diagrams & Schematics (Cont.)

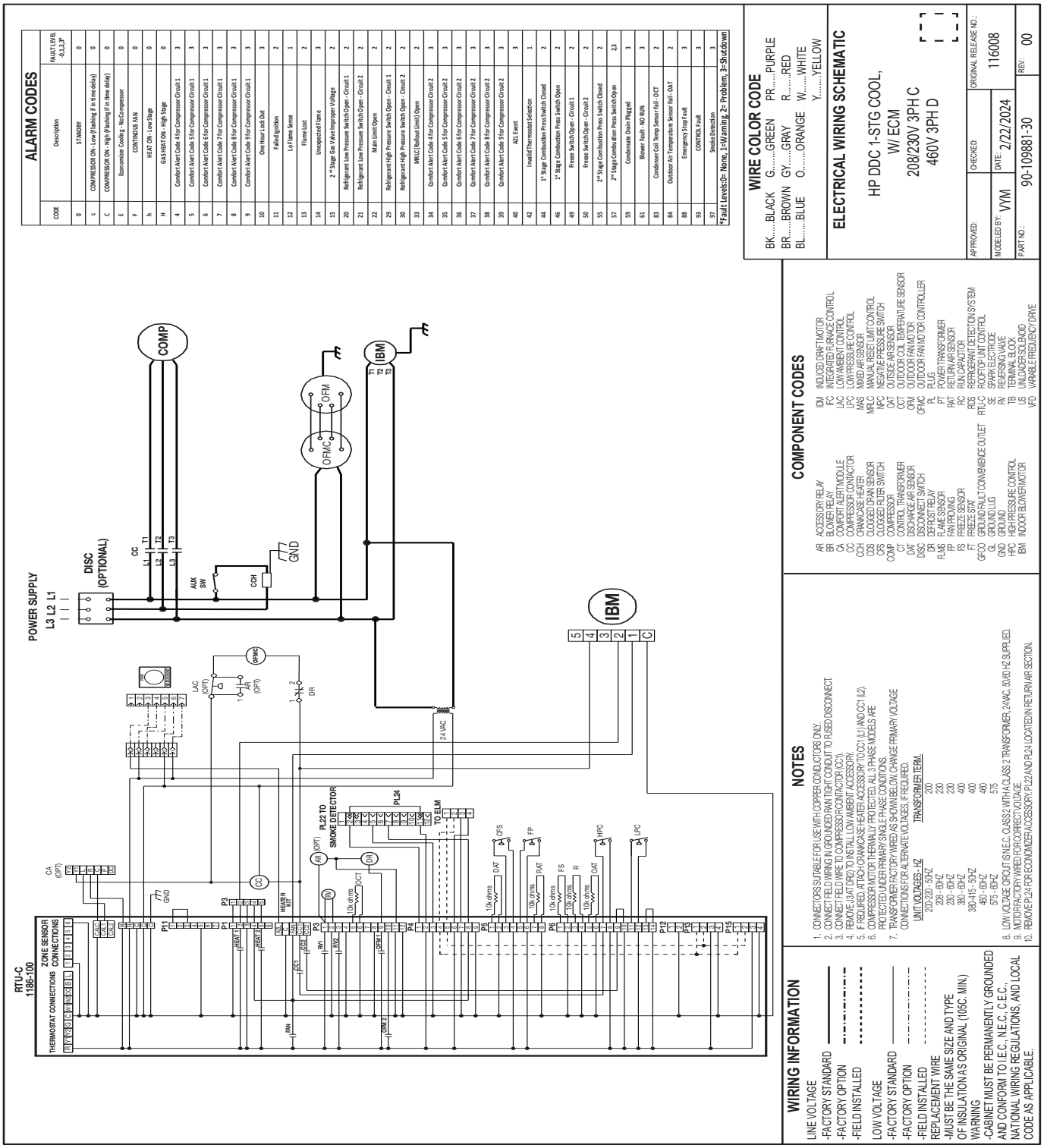


Appendix H — Wiring Diagrams & Schematics (Cont.)

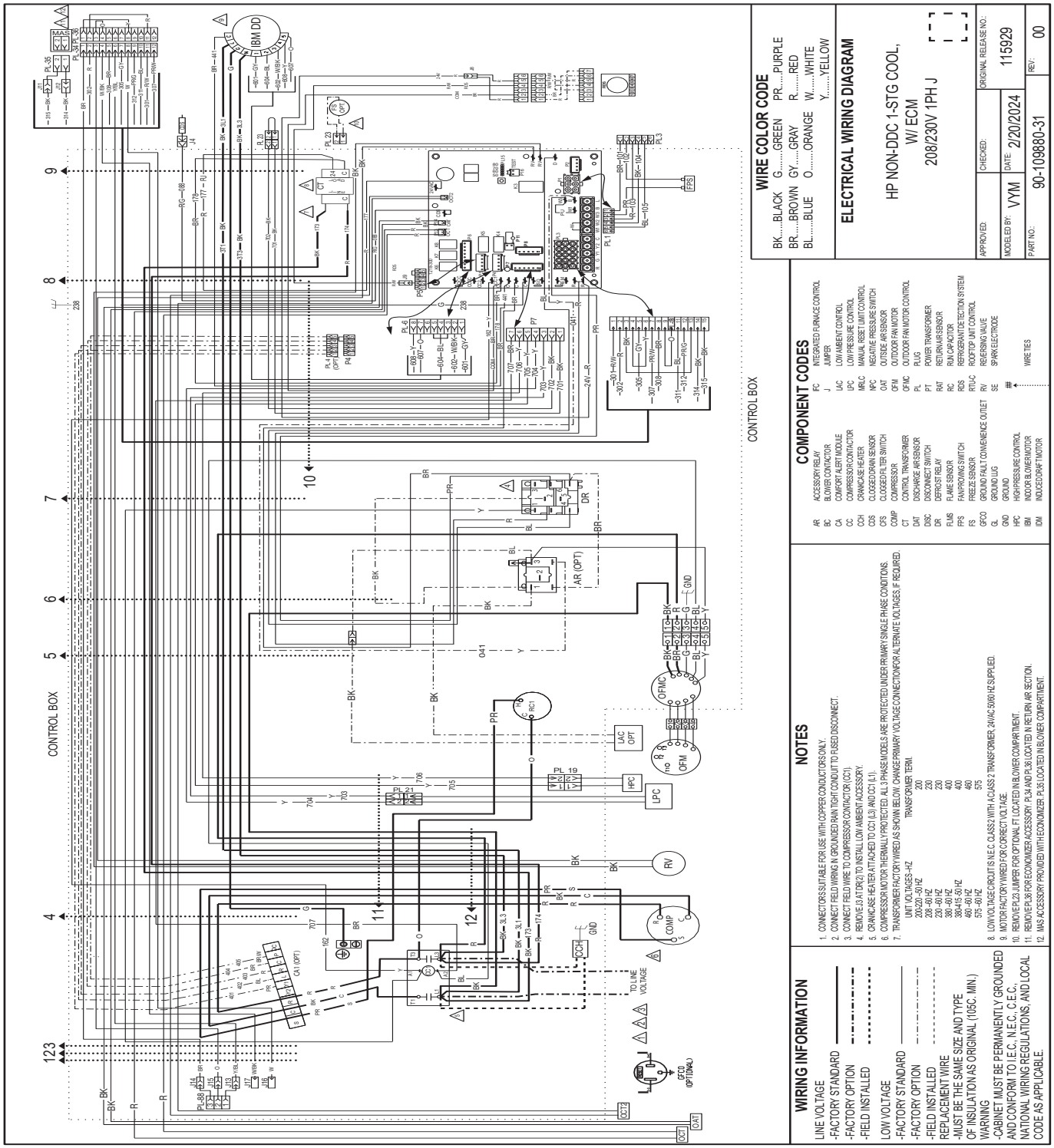


P. APPENDICES

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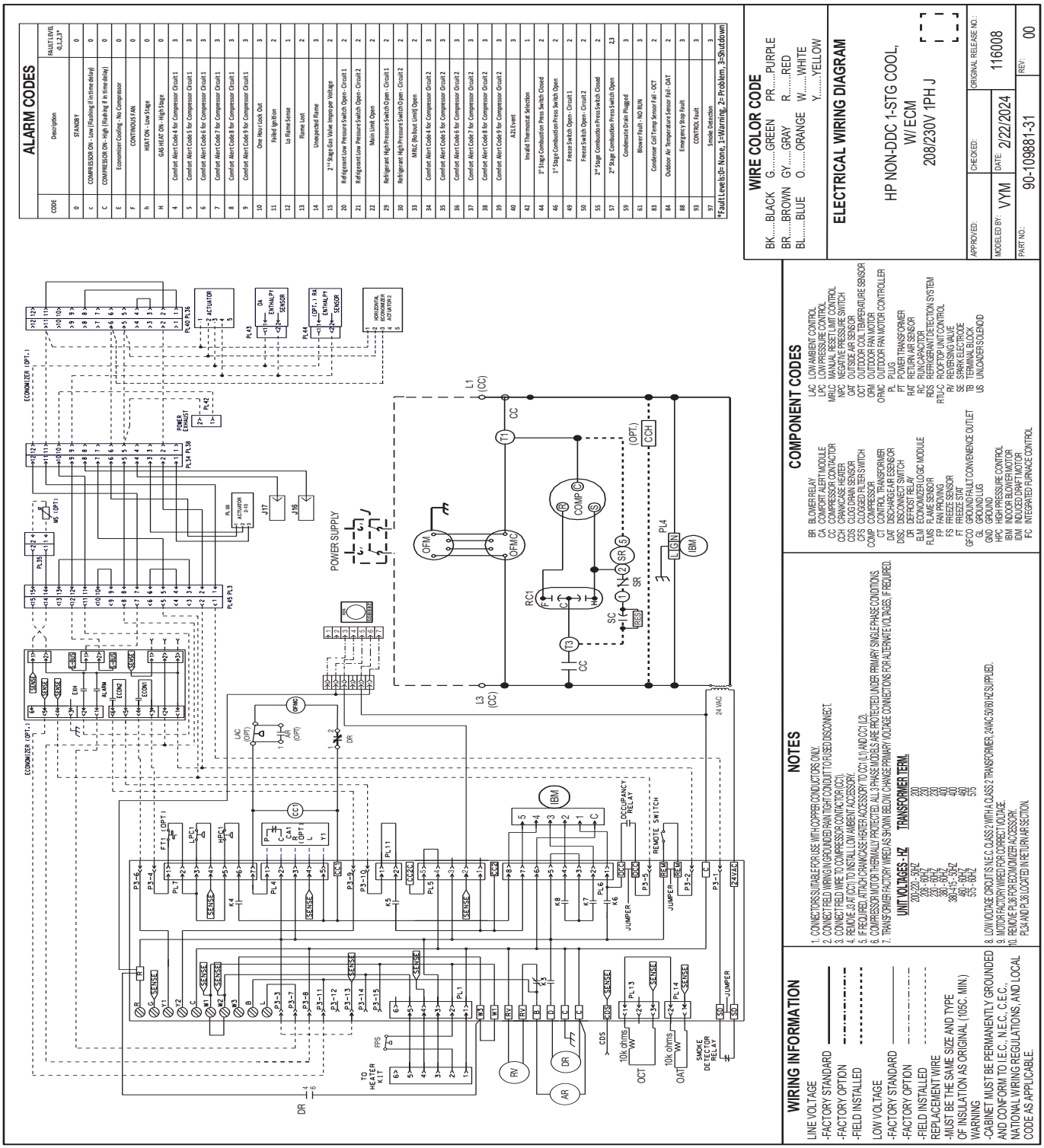


Appendix H — Wiring Diagrams & Schematics (Cont.)

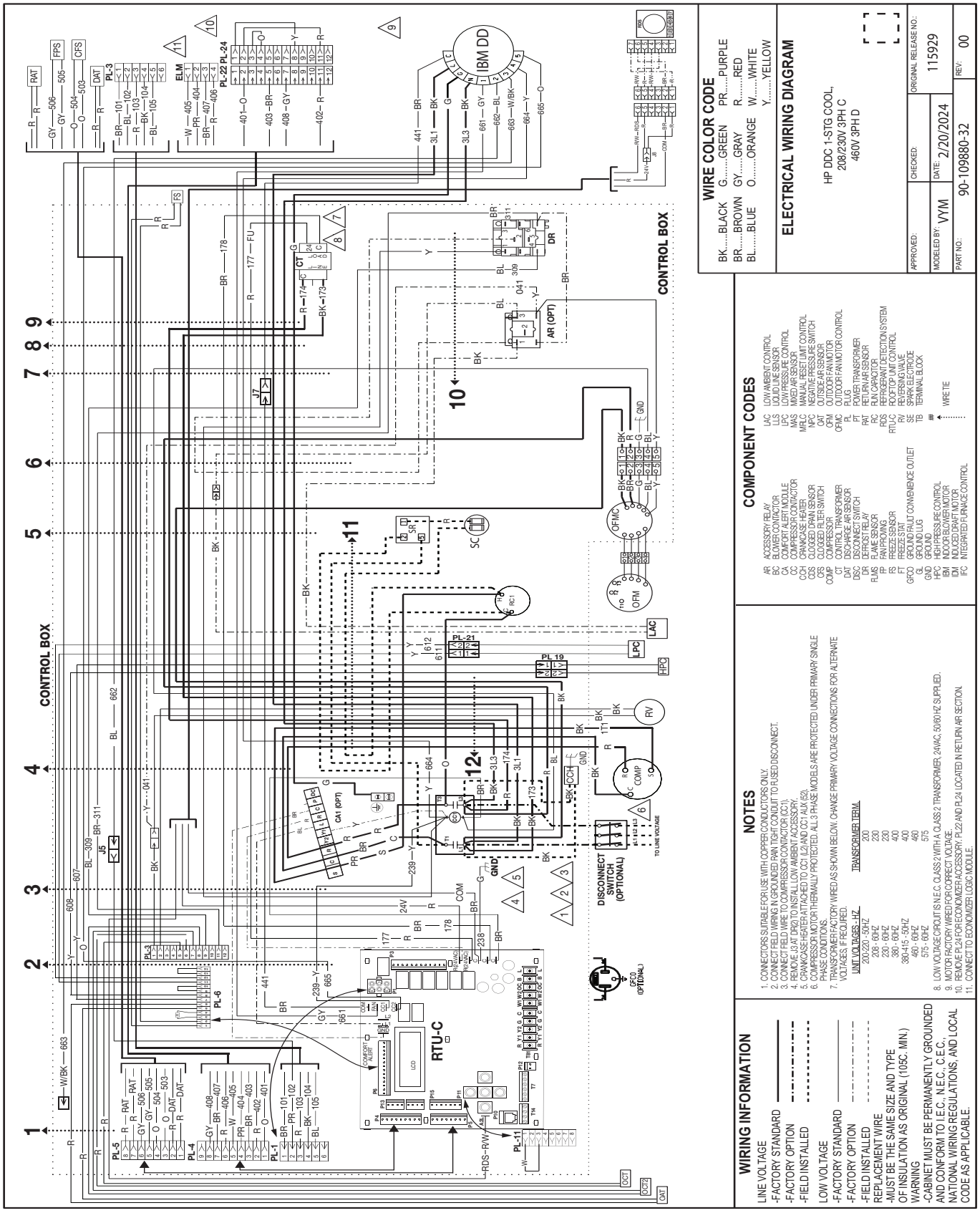


P. APPENDICES

Appendix H — Wiring Diagrams & Schematics (Cont.)

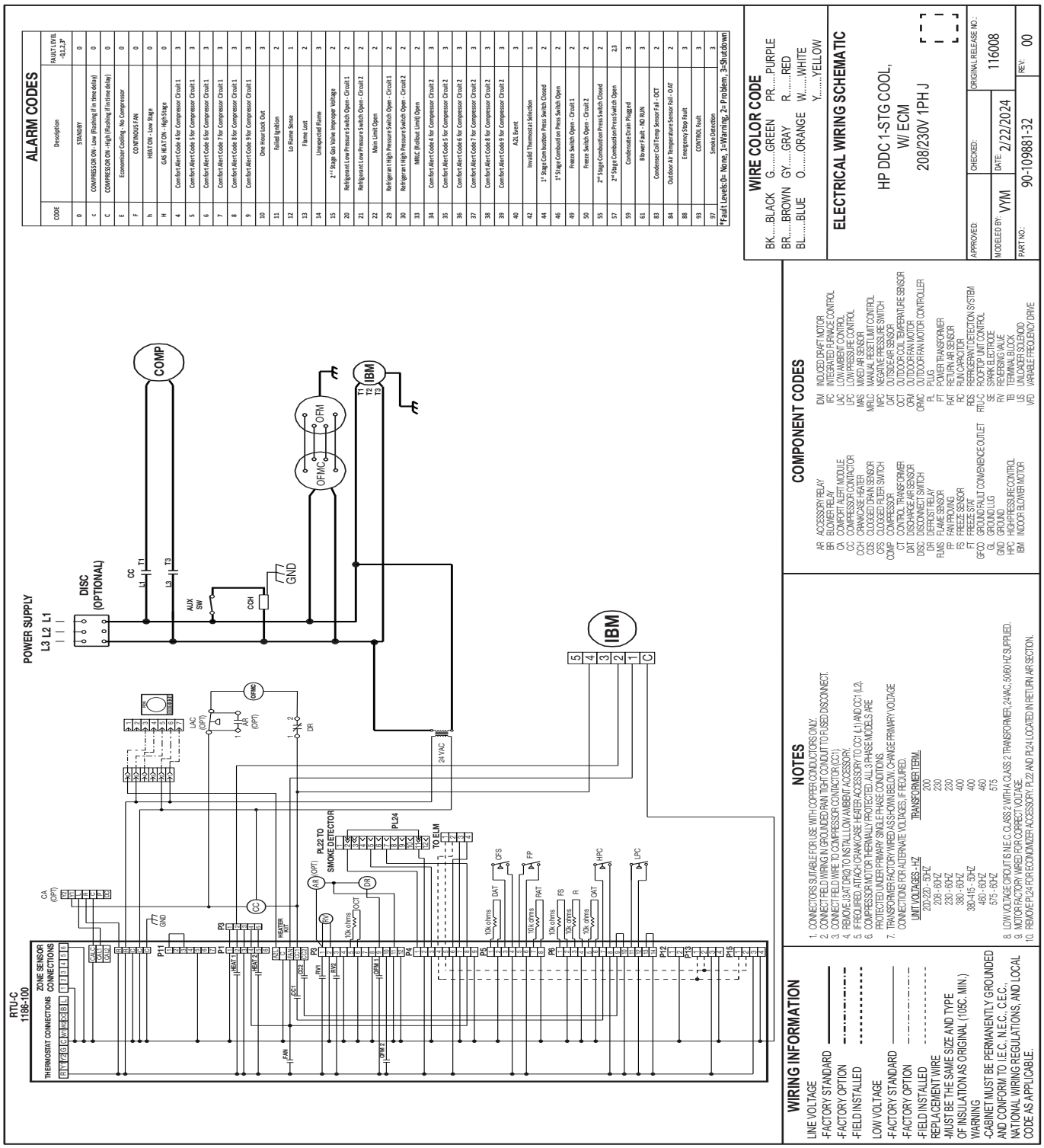


Appendix H — Wiring Diagrams & Schematics (Cont.)

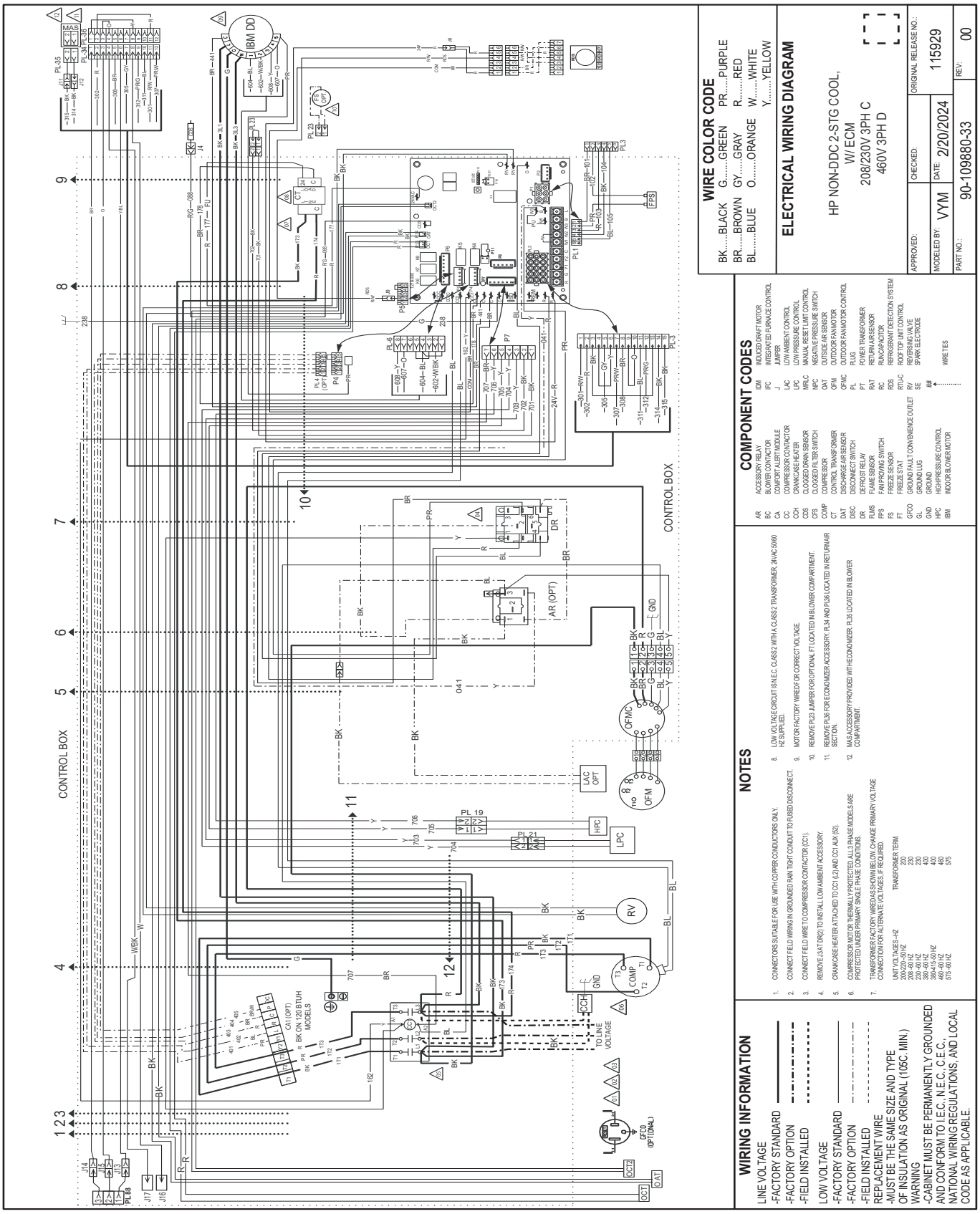


P. APPENDICES

Appendix H — Wiring Diagrams & Schematics (Cont.)

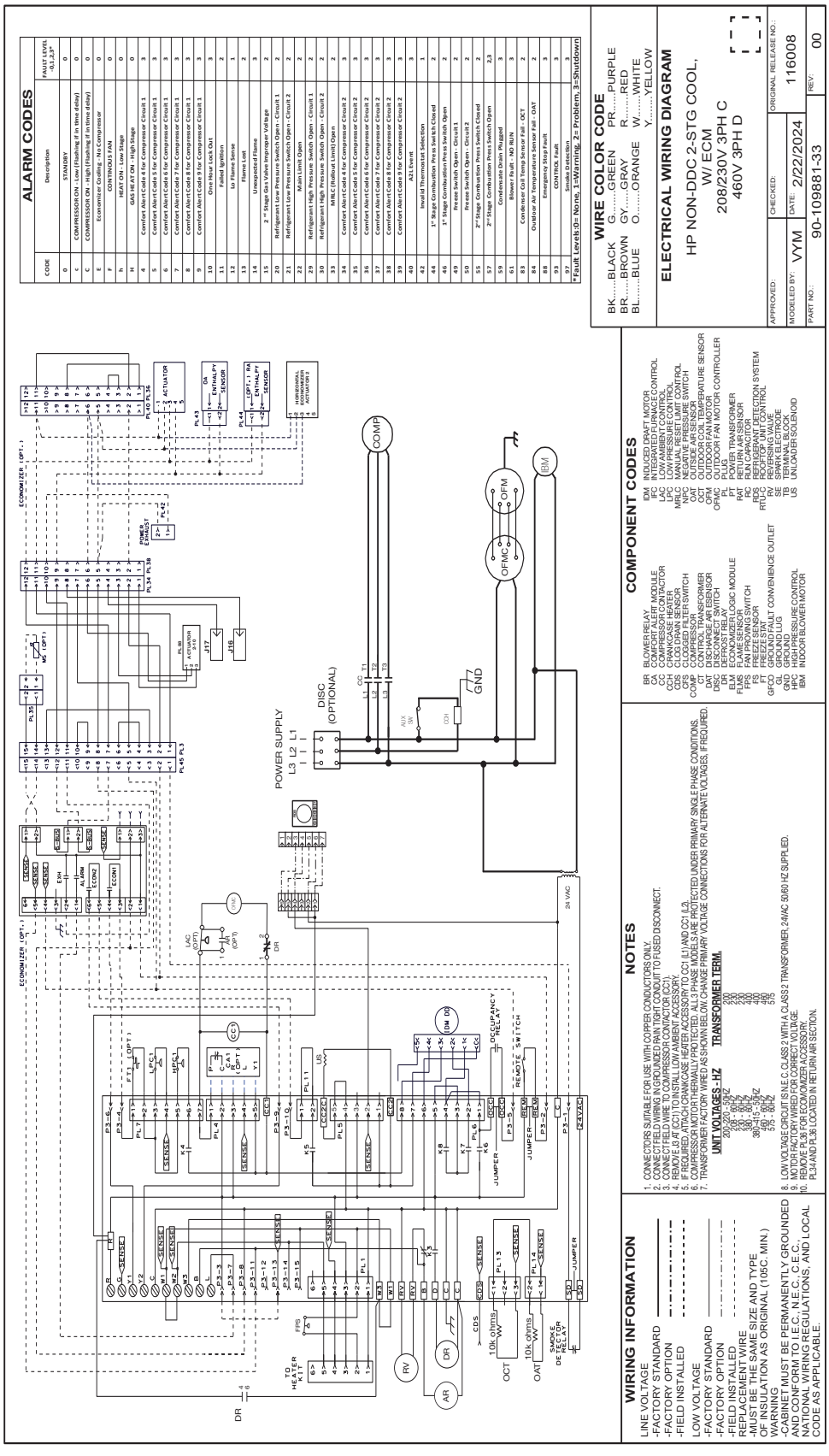


Appendix H — Wiring Diagrams & Schematics (Cont.)

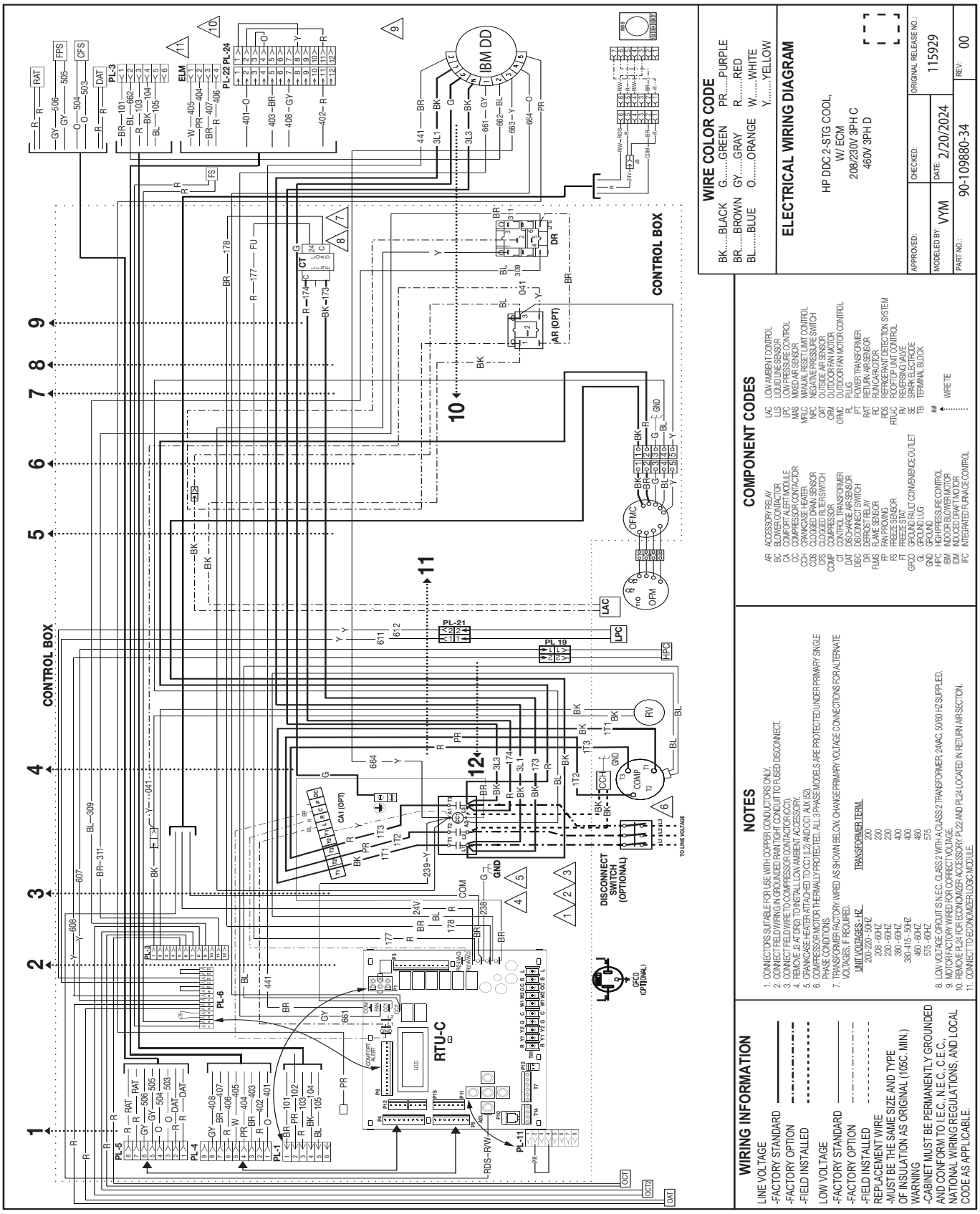


P. APPENDICES

Appendix H — Wiring Diagrams & Schematics (Cont.)

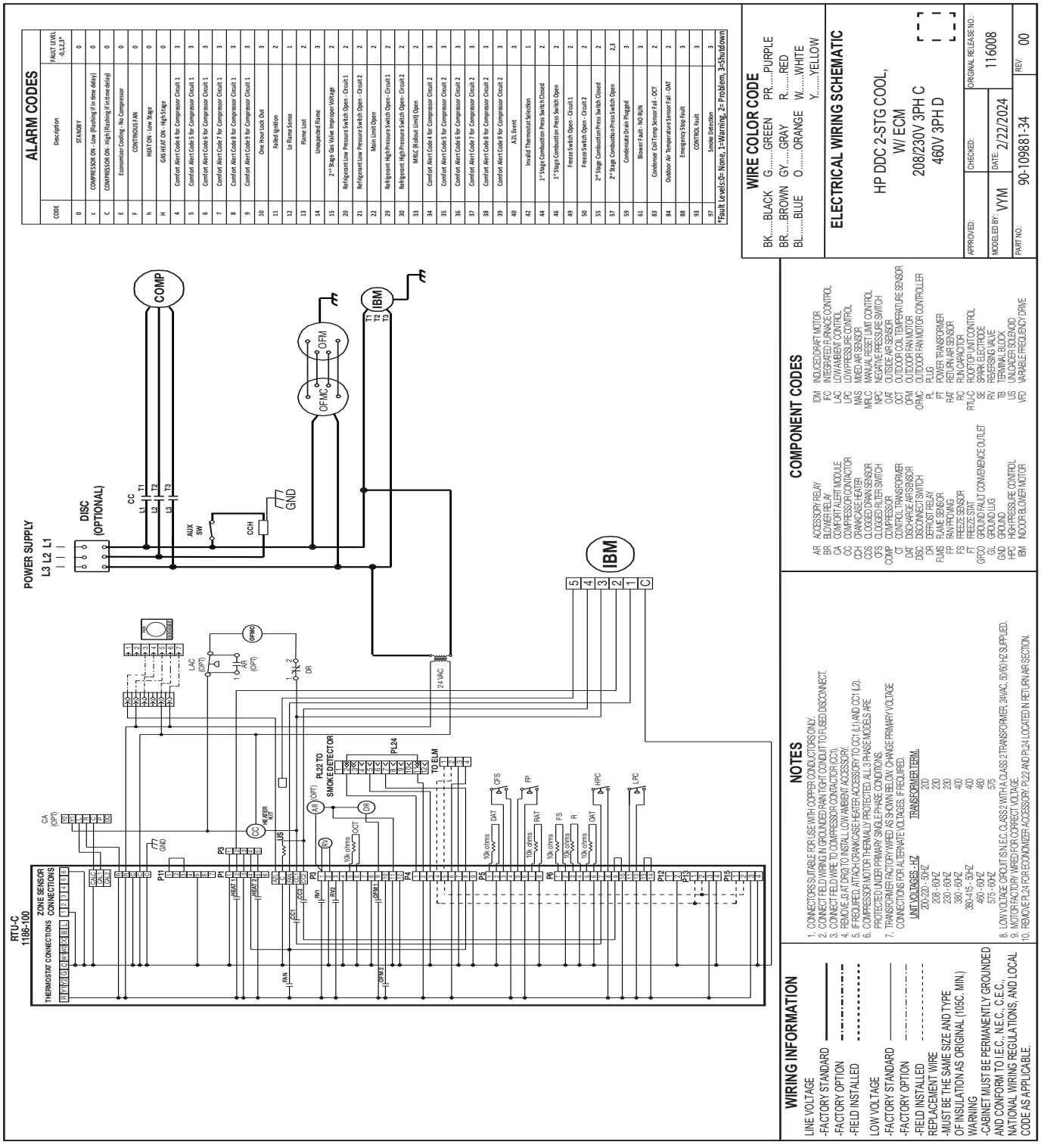


Appendix H — Wiring Diagrams & Schematics (Cont.)



P. APPENDICES

Appendix H — Wiring Diagrams & Schematics (Cont.)



J. Unit Tie-Down

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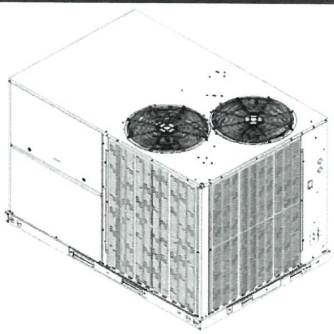
Technical Evaluation Report

DIVISION: 23 08 00–COMMISSIONING OF HVAC

FL 26981.1
THIS DOCUMENT CONTAINS (5) PAGES

EVALUATION SUBJECT: **RHEEM PACKAGED UNITS** 17-4893

REPORT HOLDER:
RHEEM MANUFACTURING COMPANY, INC.
1100 ABERNATHY ROAD SUITE 1400
ATLANTA, GA, USA
770-351-3000 | RHEEM.COM



NOTE: GRAPHICAL DEPICTIONS IN THIS REPORT ARE FOR ILLUSTRATIVE PURPOSES ONLY AND MAY DIFFER IN APPEARANCE

SCOPE OF EVALUATION (compliance with the following codes):

THIS IS A STRUCTURAL (WIND) PERFORMANCE EVALUATION ONLY. NO ELECTRICAL OR TEMPERATURE PERFORMANCE RATINGS OR CERTIFICATIONS ARE OFFERED OR IMPLIED HEREIN.

This Product Evaluation Report is being issued in accordance with the requirements of the **Florida Building Code Sixth Edition (2017)** per FBC Section 104.11, FMC 301.15, FBC Building Ch. 16, ASCE-7-10, FBC Existing Building sections 707.1, 707.2, FBC Building 1522.2, FBC Residential M1202.1, M1301.1, & FS 471.025. The product noted on this report has been tested and evaluated as summarized herein.

SUBSTANTIATING DATA:

• Product Evaluation Documents Test Reports
Substantiating documentation has been submitted to provide this TER and is summarized in the sections below.
Test Report: 0320.01-18 (American Test Lab of South FL)

• Structural Engineering Calculations
Structural engineering calculations have been prepared which evaluate the product based on comparative and/or rational analysis to qualify the following design criteria:

- Maximum allowable uplift, sliding, & overturning moment for ground and roof applications
- Maximum unit anchorage to steel curb

NOTE: No 33% increase in allowable stress has been used in the design of this product.

INSTALLATION:
The product(s) listed above shall be installed in strict compliance with this product evaluation & manufacturer-provided model specifications.
The product components shall be of the material specified in the manufacturer-provided product specifications. All screws must be installed in accordance with the applicable provisions & anchor manufacturer's published installation instructions.

LIMITATIONS & CONDITIONS OF USE:
Use of this product shall be in strict accordance with this product evaluation as noted herein. The supporting host structure shall be designed to resist all superimposed loads as determined by others on a site-specific basis as may be required by the Authority Having Jurisdiction. Host structure conditions which are not accounted for in this product's respective anchor schedule shall be designed for on a site-specific basis by a registered professional engineer. No evaluation is offered for the host supporting structure by use of this document; Adjustment factors noted herein and the applicable codes must be considered, where applicable.
All supporting components which are permanently installed shall be protected against corrosion, contamination, and other such damage at all times.

OPTIONS:
This evaluation is valid for models shown in the last page

FINISH:
Baked Enamel

UNIT CASING MATERIAL:
20ga galv. sheet steel ASTM A653 Type B.
Removable Top & side covers secured with #10 Sheet metal Hex Head Screws
Knockouts provided for utility & control connections.

INSTALLATION:
Shall follow manufacturer specifications as well as information provided herein

STRUCTURAL PERFORMANCE:
Models referenced herein are subject to the following design limitations:
ASCE-710 Exposure Categories C & D (HVHZ)
Maximum Mean Roof Height (MRH) = 400ft
Up to and including 175mph (Vult) for the following Design Pressures:

Maximum Rated Wind Pressure:

200psf Lateral 133psf Uplift (ASD)

Site specific wind analysis may produce alternate limitations provided maximum rated wind pressure is not exceeded.

For more information and deviations to this evaluation visit ecalc.io/197799 or scan the QR code
ECALC.IO/197799

FRANK L. BENNARDO ★ LICENSE NO PE0046549 ★ STATE OF FLORIDA ★ PROFESSIONAL ENGINEER

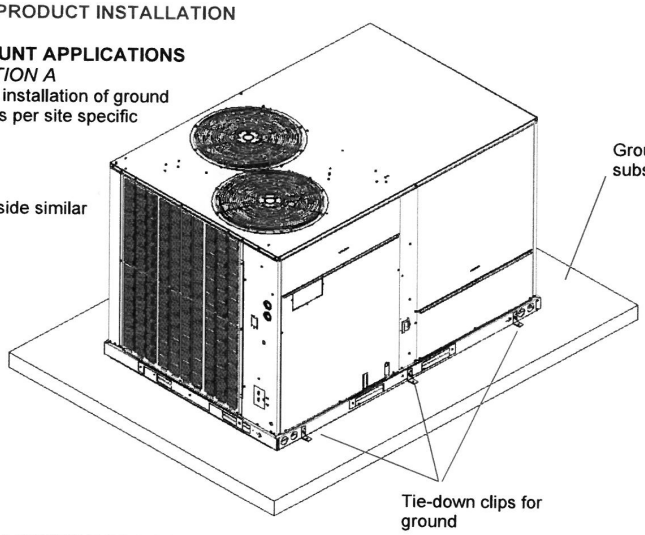
Engineer Signature & Seal:
February 12, 2020
Frank L. Bennardo, P.E., SECB
ENGINEERING EXPRESS®
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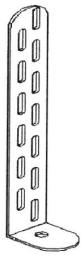
P. APPENDICES

J. Unit Tie-Down

SECTION 2 PRODUCT INSTALLATION

GROUND MOUNT APPLICATIONS
CONFIGURATION A
Note: Design & installation of ground host is by others per site specific conditions





TIE-DOWN CLIP
(GROUND APPLICATION)

Miami Tech CUTD 1" wide ASTM A653 galvanized steel 0.07" thick of varying length (FL19731.2) or *equivalent* for all cabinets tied down to a ground structure; fasten clip to structure using anchor from Anchor Schedule A to Host Structure Table and (3) #12 SAE Gr 2 self-drilling screw to fasten clip to unit base rail. Install in unit with quantities shown ((3) per side). Locate clips at 8.5" min away from the appropriate corner using three clips per side and three clips opposite side in the same configuration.

ANCHOR SCHEDULE TO HOST STRUCTURE

Pressure Lateral (Uplift) (psf)	Concrete	Steel Curb With Clip	Steel Curb Screw
Ground	A	-	-
Up to 81 (64)	-	-	C
Up to 200 (133)	-	B	-

A. – 5/16" ELCO ULTRACON Anchor embedded 2" in 3,515 psi concrete. 3 1/8" from edge minimum & 5" spacing minimum. NOA No. 17-1227.22

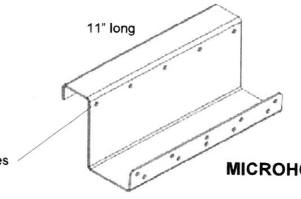
B. – #12 TEK Screws, (14) screws per clip, (5) top front side, (4) top back side and (5) bottom front side.

C. – 3/8" SAE Grade 5 Self-Drilling Screw at 6" O.C, (15) per long side and (10) per short side.

STEEL CURB
(ROOF APPLICATION)

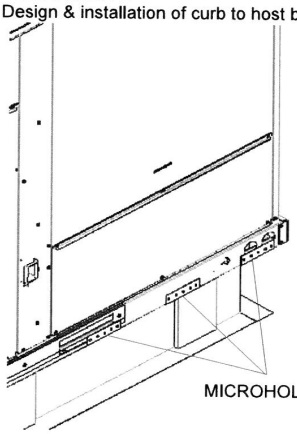
Steel curb to be a minimum of 16ga ASTM A653 steel

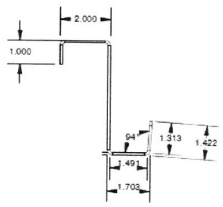
Curb Clip to be 14ga ASTM A653 steel min (Microhold)



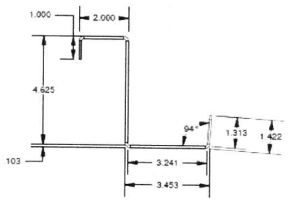
MICROHOLDS

CURB MOUNT APPLICATIONS
CONFIGURATION B
Note: Design & installation of curb to host by others per site specific conditions

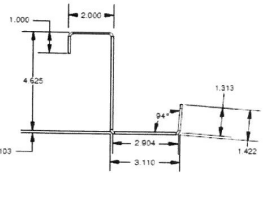




Curb Clip A



Curb Clip C

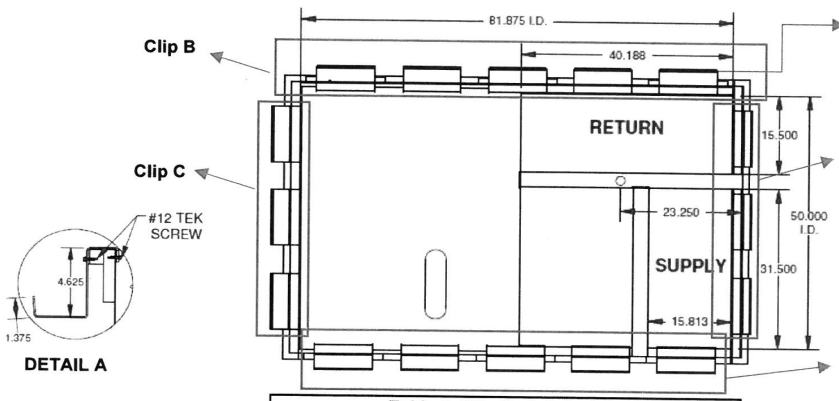


Curb Clip B

IN ALL CONDITIONS IT IS THE RESPONSIBILITY OF THE PERMIT HOLDER TO ENSURE THE HOST STRUCTURE IS CAPABLE OF WITHSTANDING FORCES BY SITE-SPECIFIC DESIGN. NO WARRANTY OF ANY KIND, EXPRESSED OR IMPLIED, IS OFFERED BY RHEEM MANUFACTURING COMPANY, OR ENGINEERING EXPRESS AS TO THE INTEGRITY OF THE HOST STRUCTURE TO CARRY LOADS INCURRED BY THIS UNIT.

J. Unit Tie-Down

CURB CLIP LOCATION



DETAIL A:
Applies for all clips and anchors type B

RGEDZR – 150 Clip Configuration:
(5) clips to each long side, 3" away from corners, spaced at 5.22".

(3) clips to each short side, 3" away from corners. Spaced at 5.50"

See note (3) page (4)

Table 1: Clip Curb Schedule

Unit Model			Number of Clips (Pcs)
(-)GEC - 036	(-)ACC - 036	(-)HPC - 036	4 LS - 2 SS
(-)GEC - 048	(-)ACC - 048	(-)HPC - 048	4 LS - 2 SS
(-)GEC - 060	(-)ACC - 060	(-)HPC - 060	4 LS - 2 SS
(-)GEC - 072	(-)ACC - 072	(-)HPC - 072	4 LS - 2 SS
(-)GED - 090	(-)ACD - 090	(-)HPD - 090	5 LS - 3 SS
(-)GED - 102	(-)ACD - 102	(-)HPD - 102	5 LS - 3 SS
(-)GED - 120	(-)ACD - 120	(-)HPD - 120	5 LS - 3 SS
(-)GED - 150	(-)ACD - 150		5 LS - 3 SS

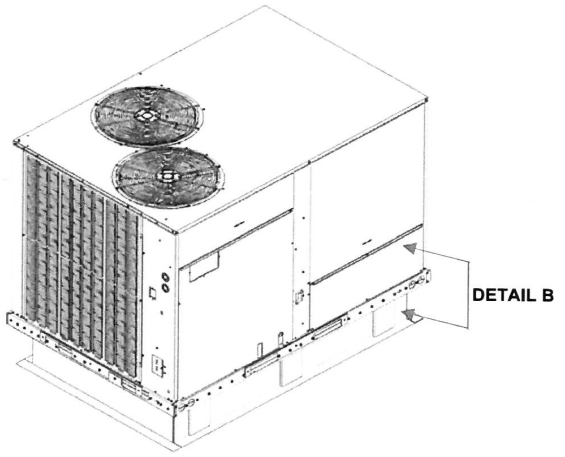
#Clip Designation (5 LS= 5 clips each Long Side; 3 SS= 3 clips each Short Side) equally spaced

Unit Model Note: '(-)' designates equivalent trade brands with similar cabinetry and may vary depending on brand

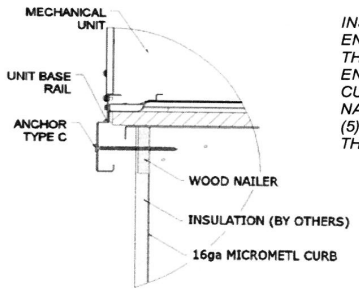
See pressures on page (2) for alternative anchor limitations

ALTERNATIVE ANCHORAGE TO CURB

STEEL CURB WITH SCREW
CONFIGURATION C



Mechanical Unit Curb Mounted



INSTALLER TO ENSURE THAT THREADED PORTION ENGAGES STEEL CURB BEYOND WOOD NAILER WITH MINIMUM (5) PITCHES PAST THE THREAD PLANE

DETAIL B

P. APPENDICES

J. Unit Tie-Down

SECTION 3 MODELS SUMMARY, DIMENSION & NOTES

TABLE 2: Qualified Tested Unit Construction Metal Cabinetry				
Unit Model	Operating Dimensions w/ screw heads			Operating Weight (lbs)
	Width (in)	Length (in)	Height (in)	
RGEDZR - 150	59 1/2	90 1/10	59 7/10	1070

TESTED UNIT LIMITATIONS

1. The unit model listed above was tested and designed as worst-case configurations of model units listed in *Evaluation Model Series Matrix,* remaining unit models are certified by this approval as long as they have identical construction as those listed above and are of equal or lesser dimensions (length, width, height).
2. Dimensions shown are measured from outermost points of unit, including screw heads.
3. Curb clips shall be as close as possible from the shown locations; installers shall verify any interference between clip attachment and internal components of the unit and move clip within the tolerance allowed.

REQUIRED WIND PRESSURES

Design pressures calculated for use with these units shall be determined by others on a job-specific basis in accordance with the governing code. Site specific load requirements for wind load shall be determined in accordance with ASCE 7 and the codes referenced herein by separate engineering certification and shall be less or equal to design pressures capacity values listed herein for any assembly as shown.

TEST REPORTS UTILIZED

Design and certification of the unit cabinetry is approved through *American Test Lab of South Florida*
Report #: 0320.01-18
Tested according ASTM E330-05 and TAS 202-94.

TABLE 3: Evaluation Model Sereis Matrix (Unit Construction Metal Cabinetry)				
Unit Model	Operating Dimensions w/ screw heads			Operating Weight (lbs)
	Width (in)	Length (in)	Height (in)	
(-)ACC - 036	46 3/4	78 3/8	41 3/8	453
(-)ACC - 048	46 3/4	78 3/8	41 3/8	477
(-)ACC - 060	46 3/4	78 3/8	41 3/8	482
(-)ACC - 072	46 3/4	78 3/8	41 3/8	689
(-)ACD - 090	59 15/32	89 5/16	49 1/4	722
(-)ACD - 102	59 15/32	89 5/16	49 1/4	748
(-)ACD - 120	59 15/32	89 5/16	49 1/4	777
(-)ACD - 150	59 1/2	90 1/10	59 7/10	946

TABLE 3.1: Evaluation Model Sereis Matrix (Unit Construction Metal Cabinetry)				
Unit Model	Operating Dimensions w/ screw heads			Operating Weight (lbs)
	Width (in)	Length (in)	Height (in)	
(-)GEC - 036	46 3/4	78 3/8	41 3/8	453
(-)GEC - 048	46 3/4	78 3/8	41 3/8	477
(-)GEC - 060	46 3/4	78 3/8	41 3/8	482
(-)GEC - 072	46 3/4	78 3/8	41 3/8	689
(-)GED - 090	59 15/32	89 5/16	49 1/4	846
(-)GED - 102	59 15/32	89 5/16	49 1/4	872
(-)GED - 120	59 15/32	89 5/16	49 1/4	901

TABLE 3.2: Evaluation Model Series Matrix (Unit Construction Metal Cabinetry)				
Unit Model	Operating Dimensions w/ screw heads			Operating Weight (lbs)
	Width (in)	Length (in)	Height (in)	
(-)HPC - 036	78 3/8	46 3/4	41 3/8	528
(-)HPC - 048	78 3/8	46 3/4	41 3/8	551
(-)HPC - 060	78 3/8	46 3/4	41 3/8	553
(-)HPC - 072	78 3/8	46 3/4	41 3/8	553
(-)HPD - 090	89 5/16	59 1/2	49 1/4	786
(-)HPD - 102	89 5/16	59 1/2	49 1/4	822
(-)HPD - 120	89 5/16	59 1/2	59 7/10	874

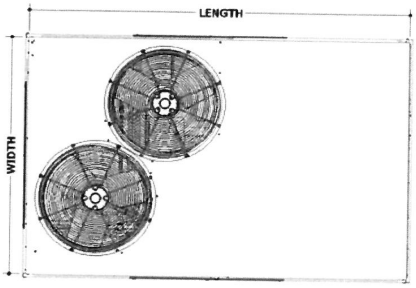
Unit Model Note: '(-)' designates equivalent trade brands with similar cabinetry and may vary depending on brand

J. Unit Tie-Down

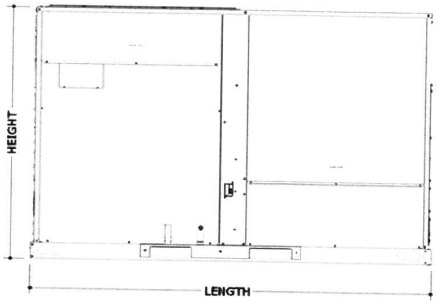
RHEEM PACKAGED UNITS

Engineering Express® | 17-4893

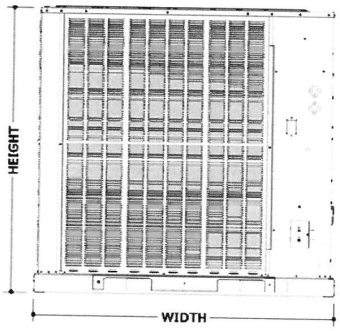
UNIT VIEWS & ELEVATIONS



TOP VIEW



ELEVATION VIEW



SIDE VIEW

Note: RGEDZR-150 illustration selected for dimensional purposes

Q. DECOMMISSIONING

Q.1. Before Beginning Decommissioning

Before carrying out decommissioning, the technician performing decommissioning must be familiar with the equipment and its safety procedures, and ensure electrical power is available to the unit. See ***Section A.3.1. Working Personnel Qualifications*** for more information.

Before recovering the refrigerant, an oil and refrigerant sample must be taken if the technician intends to reuse the recovered refrigerant to have a record.

Before beginning any work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimized. See ***C.2.6. No Ignition Sources***.

Before beginning any work on the system or conducting any hot work, ensure that the area is in the open or that it is adequately ventilated. Ventilation must continue while the unit is being worked on. Ventilation is required to safely disperse any released refrigerant into the atmosphere.

Work shall be undertaken under a controlled procedure so as to minimize the risk of flammable gas or vapor being present while work is being performed. See ***A.3. Importance of a Quality Installation***.

All maintenance staff and others working in the local area shall be instructed on the nature of the work being performed. Work in confined spaces shall be avoided.

The area shall be checked with an appropriate refrigerant detector before and during work to ensure the technician is aware of potentially toxic or flammable atmospheres.

Q.2. Decommissioning Procedure

Follow the decommissioning procedure outlined below:

READ ALL STEPS BEFORE BEGINNING.

1. Become familiar with the equipment, its operation, and its safety procedures.
2. Isolate the system electrically.
3. Ensure that mechanical handling equipment for the refrigerant cylinders is at hand, if required.
4. Ensure personal, protective equipment is being used correctly.
5. A competent supervisor must be present during the refrigerant recovery process. Ensure such a person is available on site.
6. Confirm that the recovery equipment and cylinders are correct for the equipment and its refrigerant.
7. Follow the steps outlines in ***Section J.1.1. Check for Refrigerant Leaks*** and ***Section J.1.1.3. Removal and Evacuation of Refrigerant.***
8. If possible, pump down the refrigerant system.
9. If a vacuum is not possible, make a manifold so that the refrigerant can be removed from various parts of the system.
10. Make sure that the recovery cylinder is situated on the scale before recovery begins.
11. Start the recovery machine and operate it in accordance with its instructions.
12. Do not overflow the cylinders. No more than 80% volume liquid charge is allowed.
13. Do not exceed the maximum working pressure of the cylinder, even temporarily.
14. When the cylinders have been filled correctly and the process is complete, make sure that the cylinders and the recovery equipment are removed from the site promptly.
15. Verify all isolation valves on the unit are closed (off).
16. Recovered refrigerant shall not be charged into another unit unless a sample was taken prior to recovering the refrigerant and its been cleaned and checked.

Q.3. Labeling

When performing any maintenance or troubleshooting on the refrigerating equipment or associated parts, a dry powder or CO2 fire extinguisher shall be nearby for emergency use.

Equipment must be labeled stating that is has been decommissioned and emptied of refrigerant. The label must be dated and signed. Ensure that there are label(s) on the unit stating that this equipment contains **flammable refrigerant**.

R. INFORMATION FOR THE OWNER

R.1. Product Model and Serial Number

The product model and serial number are both located on the rating plate found on the supply/return panel of the unit.

R.2. Information for the Owner: Maintenance and service

For routine maintenance, general diagnostics for cooling and heating, and other generalized information regarding filter changing, cleaning the condensate pan, cleaning the coils, and general inspections, refer to the User's Information Manual which can be found on the manufacturer's website.

At least once a year, scheduled service checks must be made to verify the safety systems in this unit are working as intended.

R.2.1. Filter Changing

WARNING: DISCONNECT THE MAIN POWER TO THE OUTDOOR UNIT BEFORE ATTEMPTING ANY MAINTENANCE OPERATION. FAILURE TO DO SO CAN RESULT IN SEVERE ELECTRICAL SHOCK OR DEATH.

1. Keep air filters clean. There are several types of material used in air filters and there are many possible locations for air filters. Consult with your contractor as to the locations of the filters and type of material in use.

2. How To Clean:

Glass Fiber (Throwaway) — This is a disposable type of filter. Inspect monthly and replace when necessary. A new building will normally require more frequent attention to the filters.

Aluminum Mesh — Wash with detergent and water. Air dry thoroughly and renew the coating in compliance with the manufacturer's instructions.

Pleated or MERV Filters (Throwaway) —There are various types and levels of filtration available. These may require more frequent inspection or replacement. Consult with the filter manufacturer.

IMPORTANT: Do not operate your system for extended periods without filters, as the dust contained in the air may pack into the fin area of the evaporator coil creating a condition which could require extensive repairs.

WARNING: A PORTION OF THE DUST CONTAINED IN THE AIR MAY TEMPORARILY LODGE IN THE AIR DUCT RUNS AND AT THE SUPPLY REGISTERS. ANY RECIRCULATED DUST PARTICLES WILL BE HEATED AND CHARRED BY CONTACT WITH THE ELECTRIC HEATING ELEMENTS. THIS RESIDUE WILL SOIL CEILINGS, WALLS, FLOORING, AND OTHER BUILDING ARTICLES.

R.2.2. Cleaning Condensate Pan

Check annually and, if necessary, clean drain pan and drain line. In winter, keep drain and trap dry or protect against freezeup. If this unit is installed with proper clearances, then the drain pan on most units is removable (check unit Specification Sheet to determine whether or not your unit is equipped with a slide-out drain pan). Refer to the unit Installation and Operation Manual for specific instruction on clearances and how to clean the drain pan.

R.2.3. Cleaning Coils

NOTE: Clean the Microchannel using only water. Due to the aluminum construction, do not use cleaners or detergents because they may cause corrosion to the Microchannel, leading to refrigerant leaks.

Directions to clean the Microchannel coils are as follows:

1. Disconnect power to the unit.

2. Wear proper personal protection equipment such as a face shield, gloves, and waterproof clothing.

3. Remove panels from the unit to gain safe access to the microchannel coils.

NOTE: Clean the coil from the inside out, in the opposite direction of normal airflow, allowing the debris to be pushed out rather than further in.

4. Use a soft brush or vacuum to remove base debris or surface-loaded fibers from both sides of the coil.

R. INFORMATION FOR THE OWNER

R.2.3. Cleaning Coils (Cont.)

5. Using a sprayer and water ONLY, clean the coil following the guidelines below:

a. Use a 90º sprayer nozzle attachment to aid in cleaning the closely spaced coils. Sprayer nozzle pressure should not exceed 600 psi. Use a flat fan spray nozzle with an angle of at least 15 degrees.

b. Spray perpendicular to the face of the coil. The maximum source angle should not exceed 25 degrees to the face of the coil.

c. Spray approximately 1”-3” from the coil surface.

6. Do not allow the sprayer to come in contact with the tube and fin as it may damage the coil.

R.2.4. Checking Electrical Components

Repair and maintenance of electrical components must include safety checks and component inspections.

If a fault exists that could compromise safety, then no electrical supply can be connected to the unit until the error causing the fault is repaired. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution must be used. The temporary solution must be communicated to the owner.

Initial safety checks include:

- Confirming that the capacitors are discharged. This must be done safely to avoid the possibility of sparking.
- Ensure that no live electrical components or wiring are exposed while charging, recovering, or purging the system.
- Confirm that the unit grounding is constant and secure.

R.3. Refrigerant Recovery

When removing refrigerant from a unit, either for service or decommissioning, the following practices are required to safely remove the refrigerant.

When transferring the refrigerant into cylinders, ensure that only the appropriate recovery cylinders are employed.

- Ensure that the correct number of recovery cylinders are available to hold the total system charge.
- All cylinders used must be designed for recovering R-454B refrigerant.
- Cylinders shall be complete with a pressure-relief valve and shut-off valves, all in working order.
- Empty recovery cylinders must be evacuated and cooled before refrigerant recovery occurs.

The following equipment is required to be on site and in good working condition prior to and during refrigerant recovery:

- The technician’s recovery equipment
- The recovery equipment’s instructions that details the proper recovery of flammable refrigerant.
- A set of calibrated weighing scales
- Hoses, which much be complete with leak-free disconnect couplings.

If in doubt, contact the manufacturer about recovering flammable refrigerant.

The recovered refrigerant must be processed according to local legislation in the correct recovery cylinder, and the relevant waste transfer note arranged. DO NOT MIX REFRIGERANTS IN RECOVERY UNITS OR RECOVERY CYLINDERS.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to make certain that the flammable refrigerant, R-454B, does not remain within the lubricant. The compressor body must not be heated by an open flame or other ignition sourced to accelerate this process. When oil is drained from a system, it shall be carried out safely.

R.4. Warranty Information

For more information on this unit’s factory warranty, see the warranty card shipped with the unit. The warranty card is also provided on the manufacturer’s website.

S. INSTALLATION CHECKLIST AND JOB SITE SHEET

Commercial Job Site Information

Site Information and Application Details:

Business Name : _____
Address : _____
City : _____ State : _____ Zip : _____
Site Contact : _____
Phone : _____ Mobile : _____
Email : _____

Model Number : _____
(Please include all letters and digits of the model number)
Serial Number : _____
(Please include all letters and digits of the serial number)
Date of Install : _____
(When was the unit installed, month, day, and year)

Dealer/Contractor Information:

Business Name : _____
Address : _____
City : _____ State : _____ Zip : _____
Site Contact : _____
Phone : _____ Mobile : _____
Email : _____

Technician Name : _____
Visit Date: _____
Technician Name : _____
Visit Date: _____
Technician Name : _____
Visit Date: _____

Distributor and Support Details:

Distributor Name : _____
City : _____ State : _____

Rep Name : _____
Visit Date: _____

Unit Setup and Operational Information

Voltage and Amperage Information :

Line Voltage Measurements :

Base Voltage : 208 240 460 (Circle one) Phase : 1 3 (Circle one)
Measured Line Voltage :
Phase A to B : _____ Phase A to Ground : _____
Phase B to C : _____ Phase B to Ground : _____
Phase C to A : _____ Phase C to Ground : _____
Breaker Size : _____ Conductor Size: _____

24VAC Low Voltage Measurements :

Transformer Tap : 208 240 460 (Circle one)
24VAC Measured Voltage : R to C : _____
24VAC Measured Amp Load :
Transformer Load: _____
T-stat Load: _____

Amperage and Power Measurements :

	Full Running Load	Blower	Compressor 1	Compressor 2	Outdoor Fans
Phase A :					
Phase B :					
Phase C :					

Refrigerant Circuit Information :

Circuit 1 :

Suction Line	Liquid Line
Pressure (PSI) :	Pressure (PSI) :
Temperature (°F) :	Temperature (°F) :
Superheat (°F) :	Sub-cooling (°F) :

Circuit 2 :

Suction Line	Liquid Line
Pressure (PSI) :	Pressure (PSI) :
Temperature (°F) :	Temperature (°F) :
Sub-cooling (°F) :	Sub-cooling (°F) :

Outdoor Air Temperature (°F) : _____ Return Air Temperature (°F) : _____ Supply Air Temperature (°F) : _____
Outdoor Air Wet Bulb (°F) : _____ Return Air Wet Bulb (°F) : _____ Supply Air Wet Bulb (°F) : _____

S. INSTALLATION CHECKLIST AND JOB SITE SHEET

Commercial Job Site Information

Site Information and Application Details:

Business Name : _____
Address : _____
City : _____ State : _____ Zip : _____
Site Contact : _____
Phone : _____ Mobile : _____
Email : _____

Model Number : _____
(Please include all letters and digits of the model number)
Serial Number : _____
(Please include all letters and digits of the serial number)
Date of Install : _____
(When was the unit installed, month, day, and year)

Dealer/Contractor Information:

Business Name : _____
Address : _____
City : _____ State : _____ Zip : _____
Site Contact : _____
Phone : _____ Mobile : _____
Email : _____

Technician Name : _____
Visit Date: _____
Technician Name : _____
Visit Date: _____
Technician Name : _____
Visit Date: _____

Distributor and Support Details:

Distributor Name : _____
City : _____ State : _____

Rep Name : _____
Visit Date: _____

Unit Setup and Operational Information

Voltage and Amperage Information :

Line Voltage Measurements :

Base Voltage : 208 240 460 (Circle one) Phase : 1 3 (Circle one)

Measured Line Voltage :

Phase A to B : _____ Phase A to Ground : _____
Phase B to C : _____ Phase B to Ground : _____
Phase C to A : _____ Phase C to Ground : _____
Breaker Size : _____ Conductor Size: _____

24VAC Low Voltage Measurements :

Transformer Tap : 208 240 460 (Circle one)

24VAC Measured Voltage : R to C : _____
24VAC Measured Amp Load :
Transformer Load: _____
T-stat Load: _____

Amperage and Power Measurements :

	Full Running Load	Blower	Compressor 1	Compressor 2	Outdoor Fans
Phase A :					
Phase B :					
Phase C :					

Refrigerant Circuit Information :

Circuit 1 :

Suction Line		Liquid Line	
Pressure (PSI) :		Pressure (PSI) :	
Temperature (°F) :		Temperature (°F) :	
Superheat (°F) :		Sub-cooling (°F) :	

Circuit 2 :

Suction Line		Liquid Line	
Pressure (PSI) :		Pressure (PSI) :	
Temperature (°F) :		Temperature (°F) :	
Sub-cooling (°F) :		Sub-cooling (°F) :	

Outdoor Air Temperature (°F) : _____ Return Air Temperature (°F) : _____ Supply Air Temperature (°F) : _____
Outdoor Air Wet Bulb (°F) : _____ Return Air Wet Bulb (°F) : _____ Supply Air Wet Bulb (°F) : _____