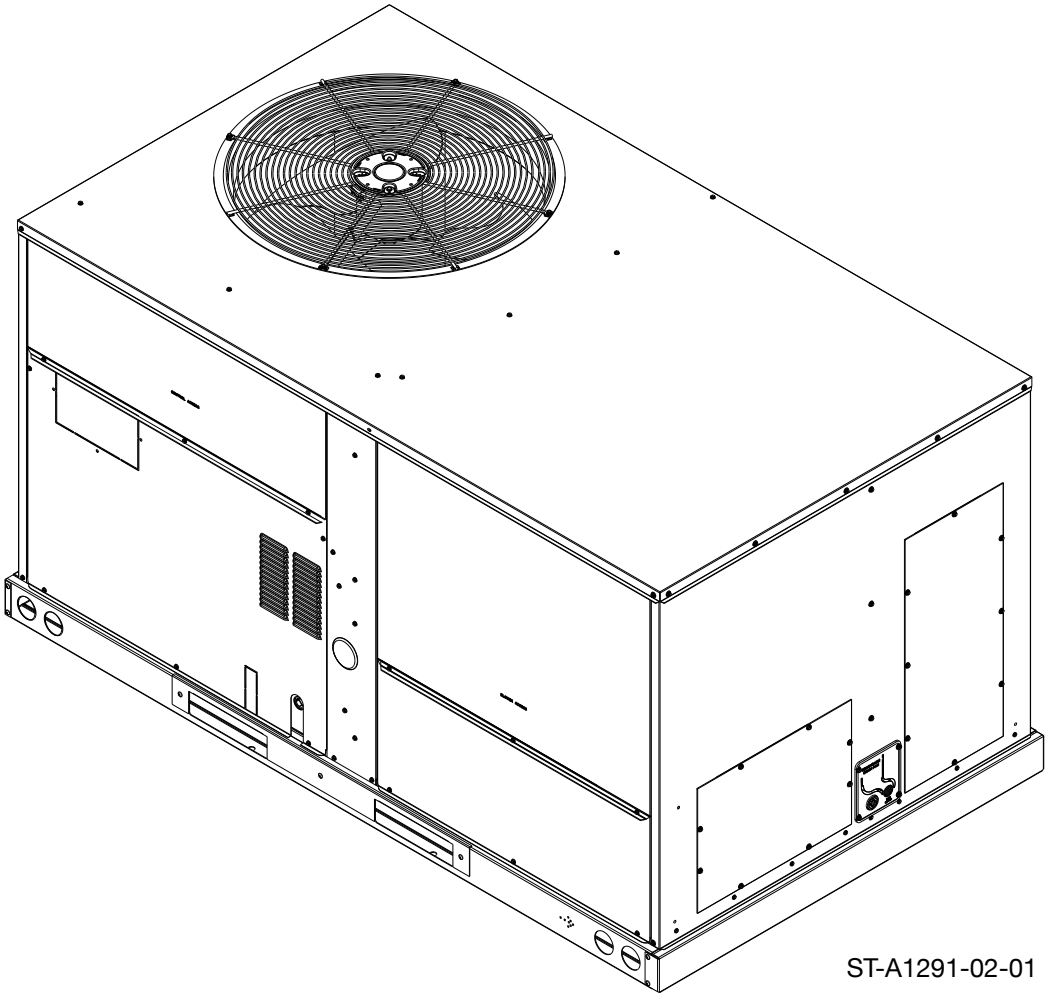
# INSTALLATION INSTRUCTIONS

## FOR PACKAGED HEAT PUMP UNITS

### (-)HPCYB 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

# CONTENTS


**A. Important Safety and General Information ..... 4**
**B. General Specifications ..... 6**
**C. Installation of the Unit ..... 12**
**D. Duct and Vending ..... 23**
**E. Electrical ..... 30**
**F. Control / Thermostat Wiring ..... 34**
**H. Electrical Heating ..... 43**
**J. Startup and Operation ..... 44**
**K. Test and Balance ..... 55**
**N. Diagnostics ..... 56**

**P. Appendices ..... 64**
A - General Product Data ..... 64
B - Electrical Data ..... 69
C - Air Flow Performance Data ..... 77
D - Performance Data ..... 83
E - Heater Kit Characteristics ..... 91
F - A2L Refrigerant Installation Safety Data..... 94
G - Refrigerant Charging Charts ..... 95
H - Wiring Diagrams & Schematics ..... 100
J - Unit Tie-Down ..... 120
**Q. Decommissioning..... 125**
**R. Information For The Owner ..... 126**
**S. Installation Checklist and Job Site Sheet ..... 128**


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












**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.**

BA01-02

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

# CONTENTS (DETAILED)


**A. IMPORTANT SAFETY AND GENERAL INFORMATION ..... 4**

A.2 Agency Performance Audit and Efficiency Testing Notice ..... 4

A.3. Importance of a Quality Installation ..... 4

A.4. Importance of Air Flow and Setup ..... 5

A.5. Checking Product and Inspection ..... 5

**B. GENERAL SPECIFICATIONS ..... 6**

B.1 Safety Warnings ..... 6

B.2. Major Components ..... 7

B.3. Product Data Information ..... 7

**C. INSTALLATION OF THE UNIT ..... 12**

C.1. General ..... 12

C.2. Tool and Refrigerant ..... 12

C.3. Choosing a Location ..... 13

C.4. Setting the Unit ..... 16

C.5. Installing Condensate Drain ..... 21

C.6. Final Installation Inspection ..... 22

**D. DUCT AND VENTING ..... 23**

D.1. Air Flow and Static Pressure ..... 23

D.2. Duct Requirements and Best Practices ..... 23

D.3. Filters ..... 24

D.4. Economizers and Fresh Air Dampers ..... 26

D.5. Smoke Detectors ..... 29

**E. ELECTRICAL ..... 30**

E.1. Electrical Safety Information ..... 30

E.2. Electrical Data ..... 32

E.3. Electrical Connections ..... 32

**F. CONTROL / THERMOSTAT WIRING ..... 34**

F.1. Non-DDC Control Inputs ..... 34

F.2. DDC Control Inputs ..... 36

F.3. Routing Control wiring ..... 42

F.4. Measuring Control Voltage Loads ..... 42

**H. ELECTRIC HEAT ..... 43**

**J. STARTUP AND OPERATION ..... 44**

J.1. Final Inspection ..... 44

J.2. Turning on Power for the First Time ..... 46

J.3. Checking and Adjusting Air Flow ..... 47

J.4. Checking Cooling Operation ..... 49

J.5. Checking Electric Heat Operation ..... 52

J.6. Safety Checks ..... 54

**K. TEST AND BALANCE ..... 55**

K.1. Air Flow Charts and Information ..... 55

K.2. Air Flow Adjustments ..... 55

**N. DIAGNOSTICS ..... 56**

N.1. Diagnostics Chart ..... 56

N.2. Alarm Codes – Full List ..... 57

N.3. Common Mistakes ..... 63

**P. APPENDICES ..... 64**

Appendix A – General Product Data ..... 64

Appendix B – Electrical Data ..... 69

Appendix C – Air Flow Performance Data ..... 77

Appendix D – Performance Data ..... 83

Appendix E – Heater Kit Characteristics ..... 91

Appendix F – A2L Refrigerant Installation Safety Data ..... 94

Appendix G – Refrigerant Charging Charts ..... 95

Appendix H – Wiring Diagrams & Schematics ..... 100

Appendix J – Unit Tie-Down ..... 120

**Q. DECOMMISSIONING ..... 125**

**R. INFORMATION FOR THE OWNER ..... 126**

**S. INSTALLATION CHECKLIST AND JOB SITE SHEET ..... 128**

# 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 in 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 20 hours at 115°F outdoor ambient temperature and 80°F dry bulb / 75°F 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 for 3-5 ton single-phase equipment), Title 10 Appendix F1 of subpart F to 10 CFR part 431 (for 3-5 ton three-phase equipment), Title 10 Appendix A to Subpart F of Part 431 (Uniform Test Method for the Measurement of Energy Consumption of Air-Cooled Small (≥65,000 Btu/h, 6-ton equipment) 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
- 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 set up 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) with 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

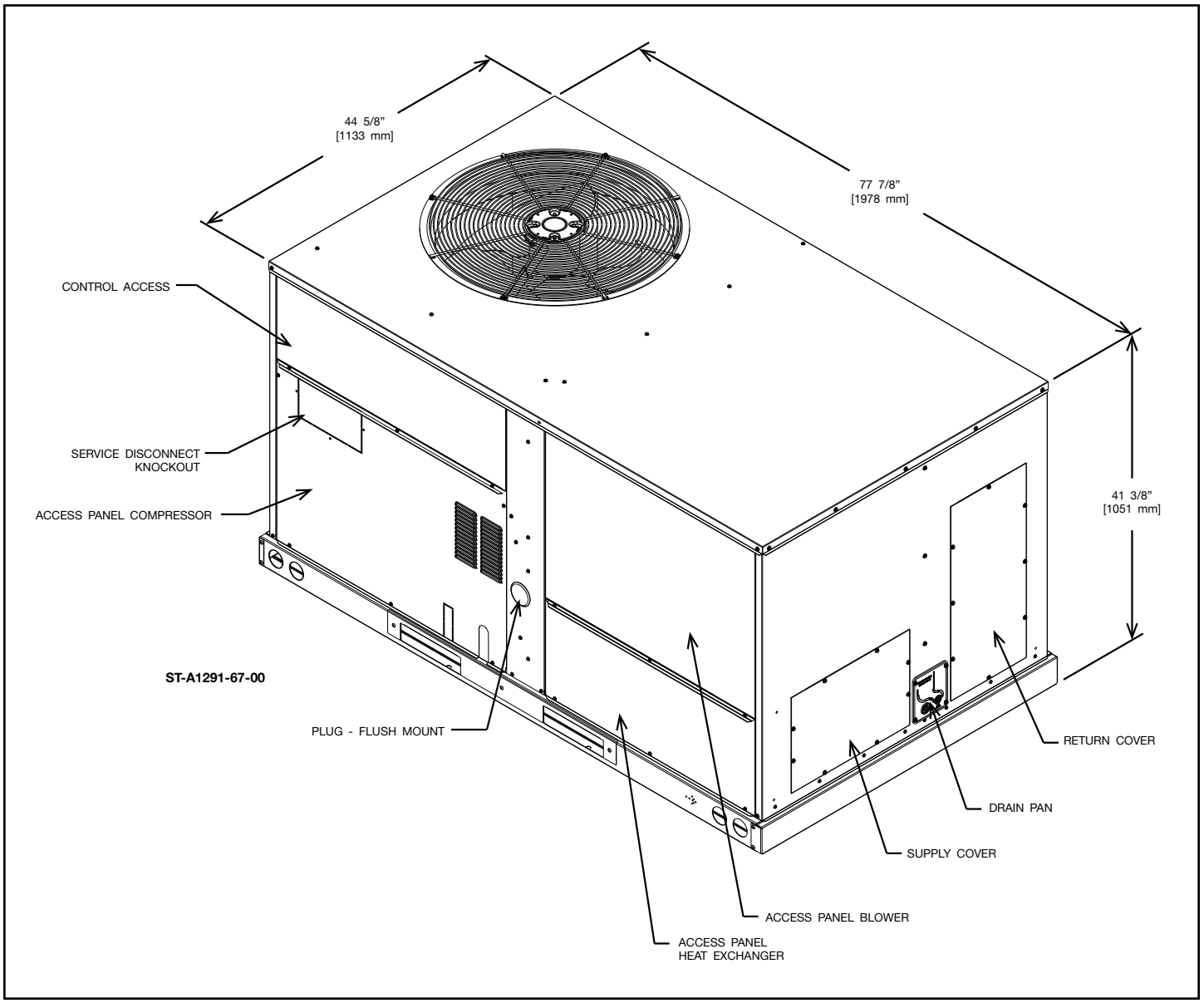
## B.2. Major Components

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.**

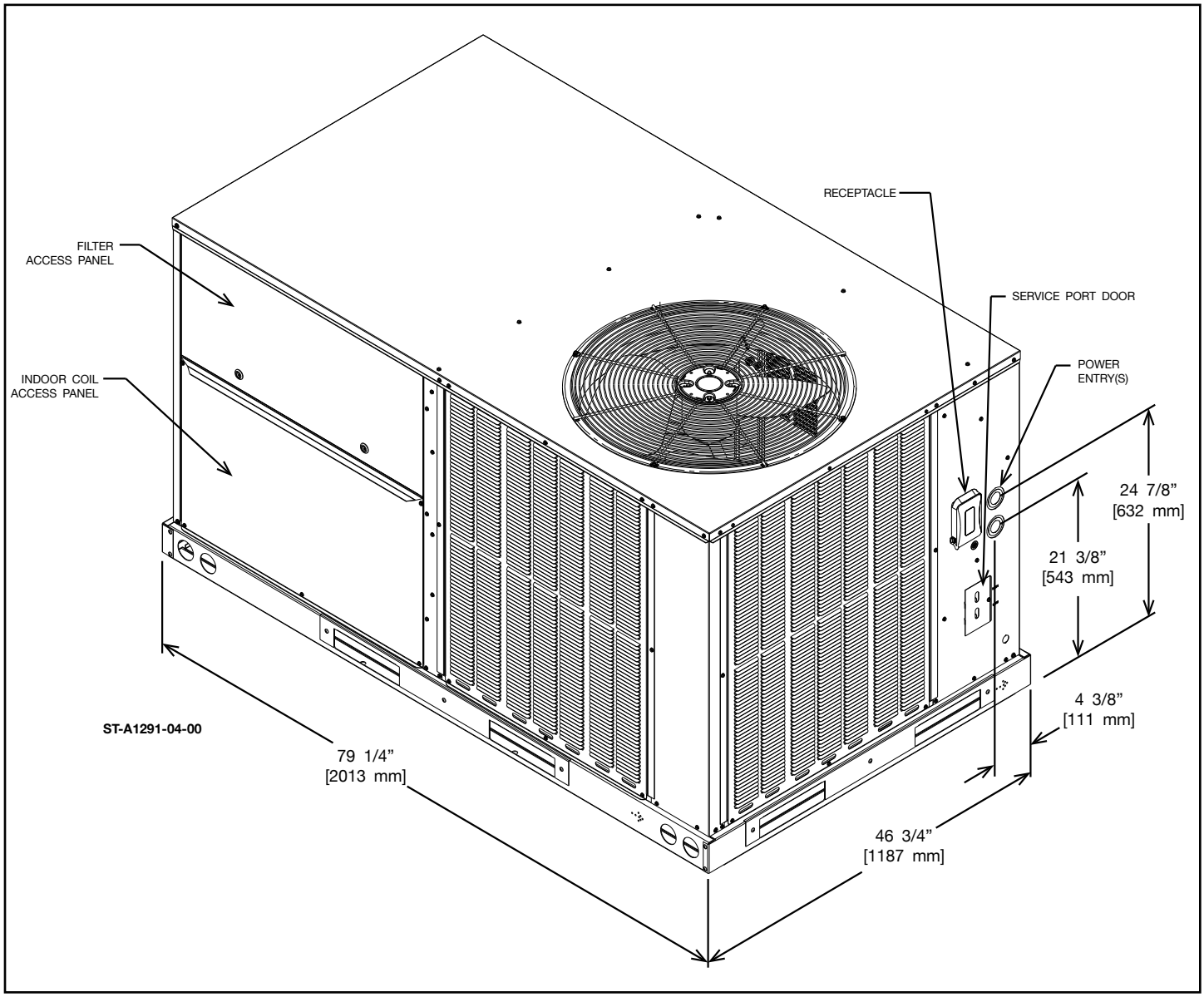


# B. GENERAL SPECIFICATIONS

## 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, or 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

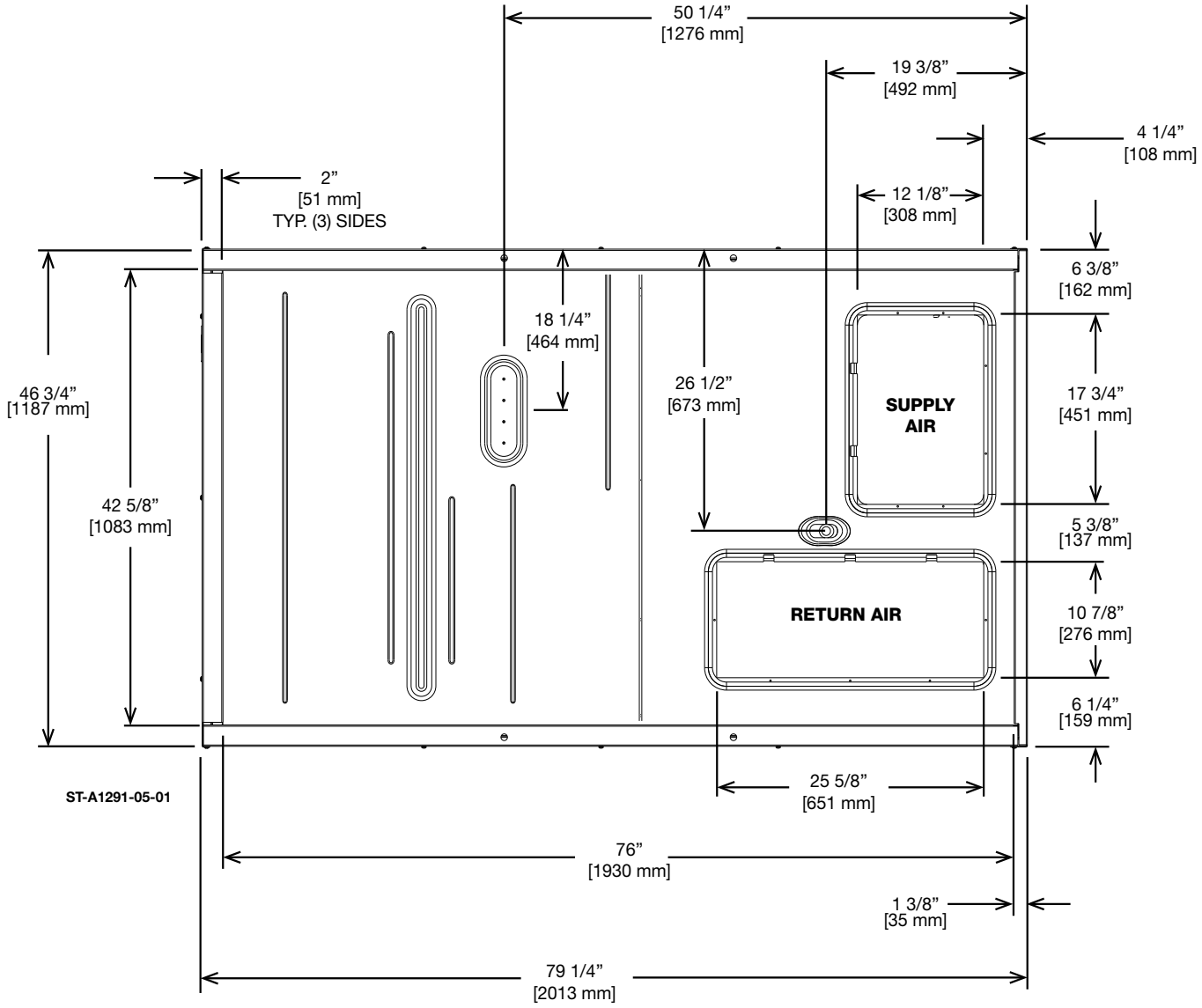
See ***Appendix B*** towards the end of this manual for Electrical Data.

### 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

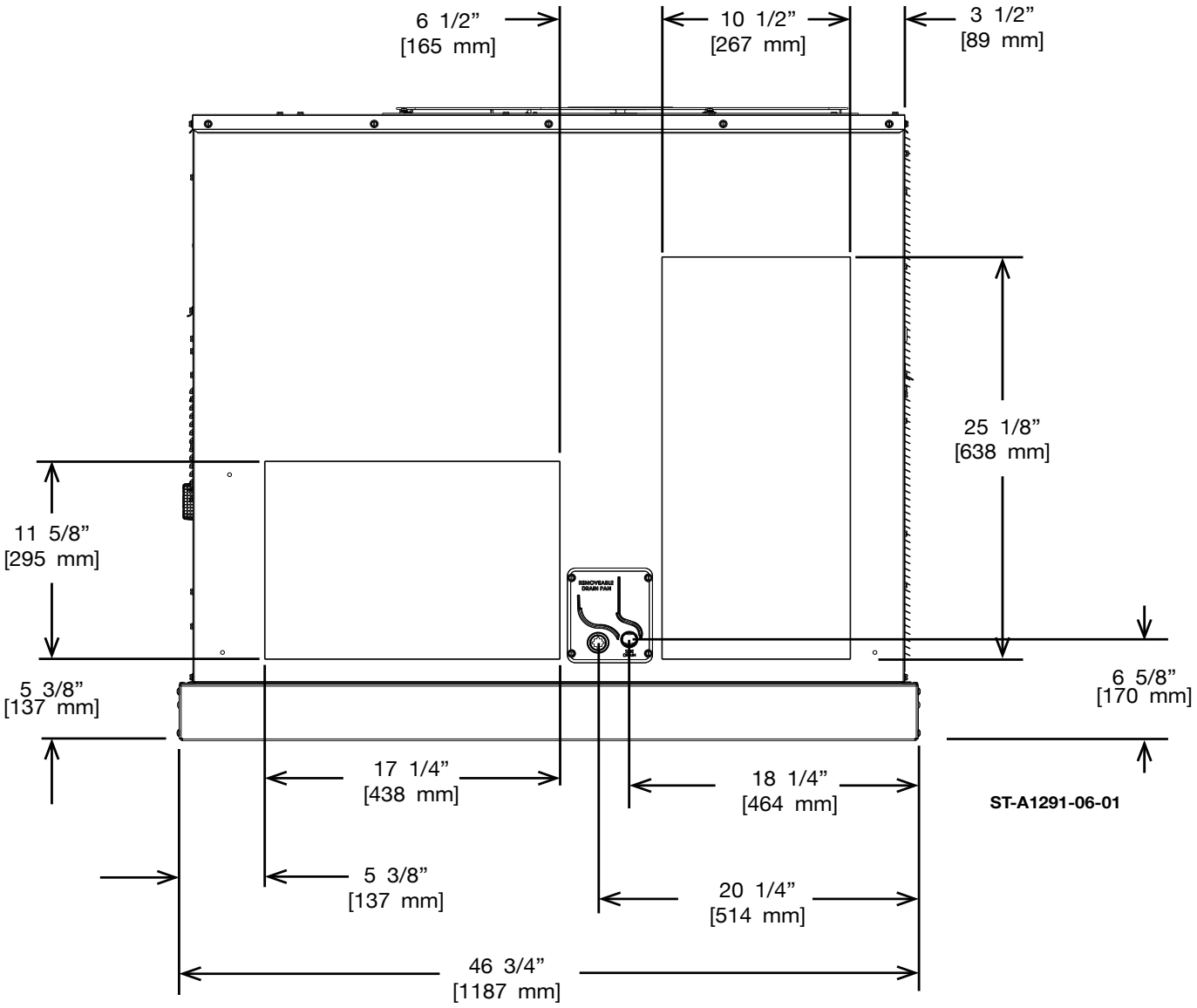
**Figure B.3.6. - A:** Supply And Return Dimensions For Downflow Applications (Bottom View Looking Up)



# B. GENERAL SPECIFICATIONS

## B.3.6. Supply and Return Duct Dimensions

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

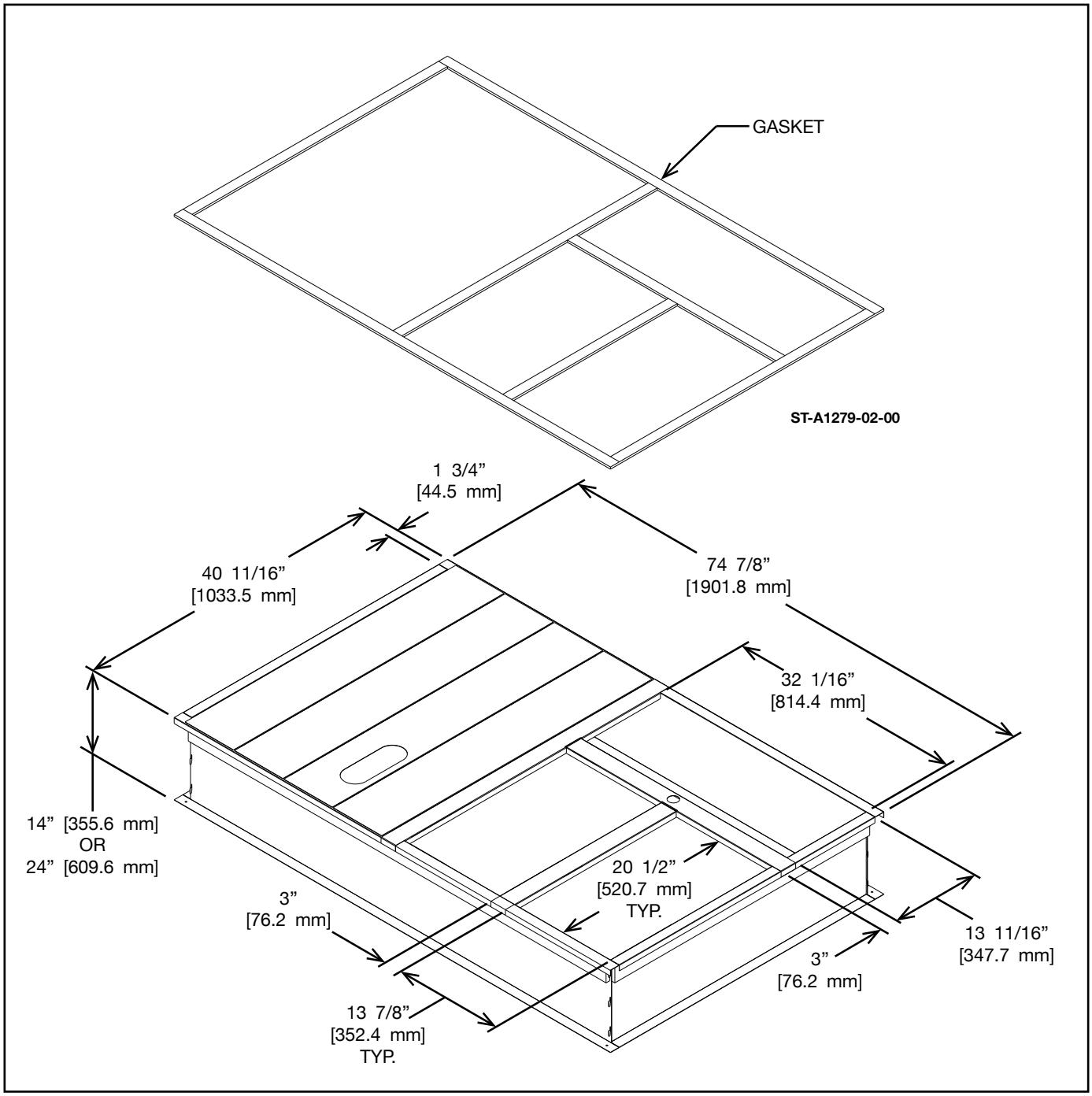


## B.3. Product Data Information

### 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

## 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 indicates flammability class.

**R-454B and air should never be mixed in cylinders or supply lines or be allowed to accumulate in storage cylinders. Leak checking should never be done with a mixture of R-454B and air.**

### 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 R-454B refrigerant, 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

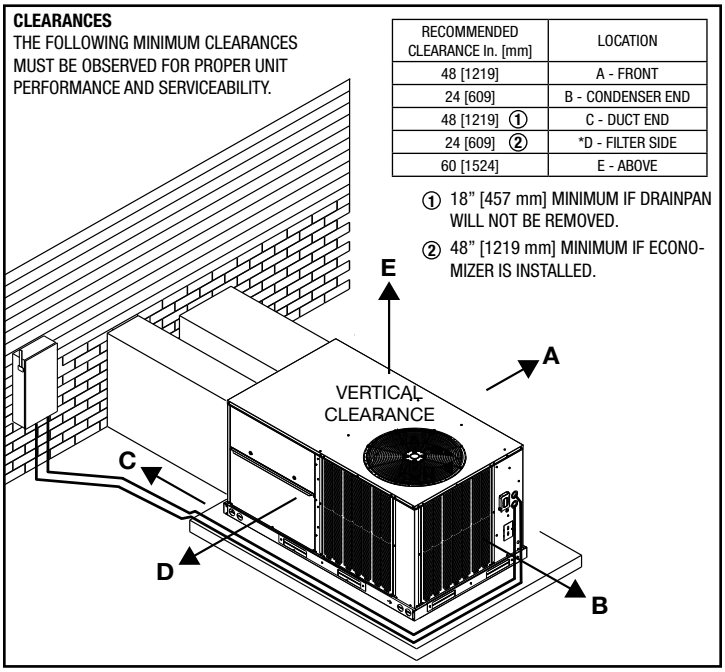
When performing work that involves exposing any pipework, no person working on or near the refrigerant system may use any ignition sources that could lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept far away from the site during installation, 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 ***Appendix A – General Data*** 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 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 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

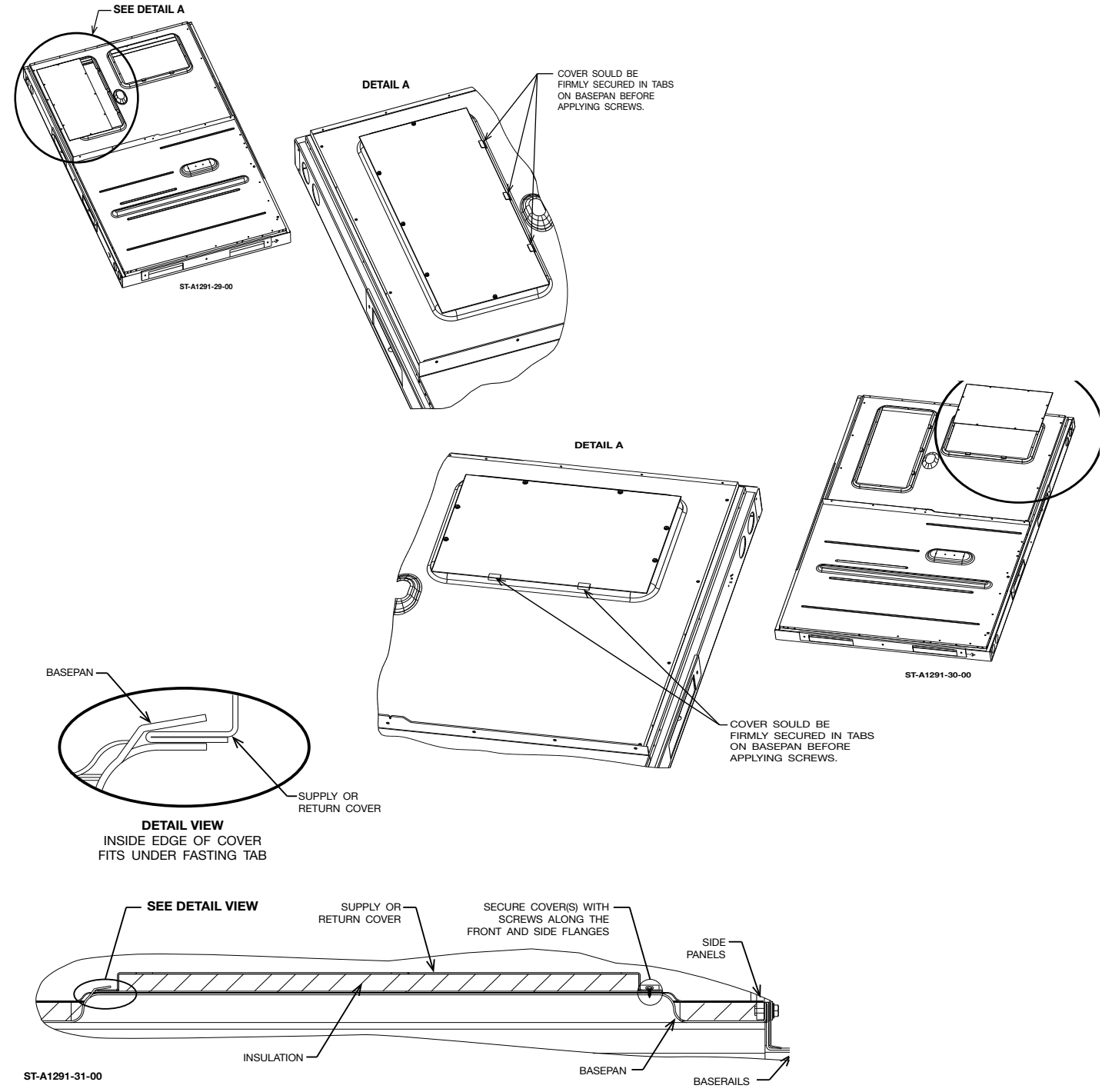
FROM DOWNFLOW TO HORIZONTAL

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

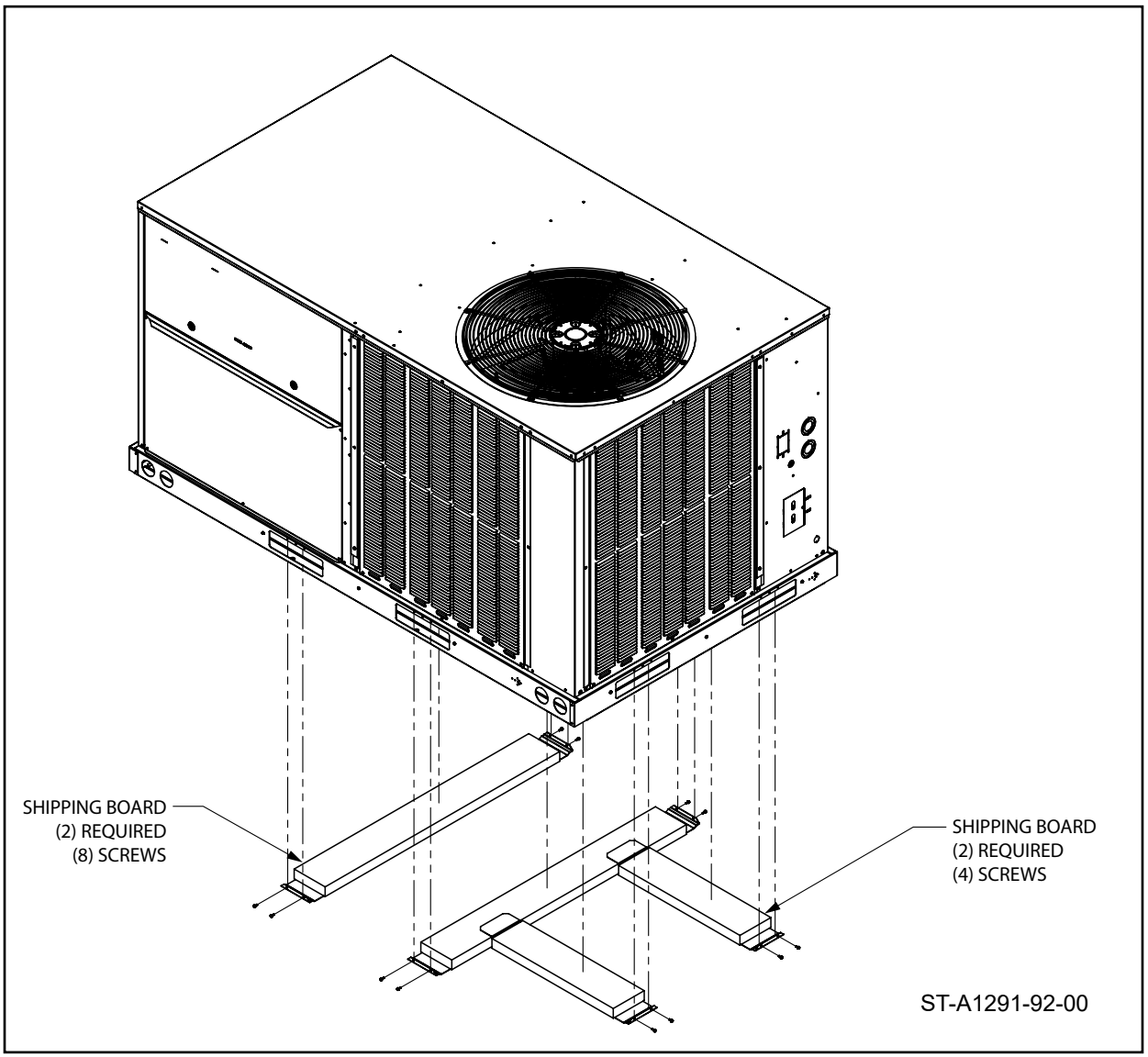
## C.4.Setting the Unit

### 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**

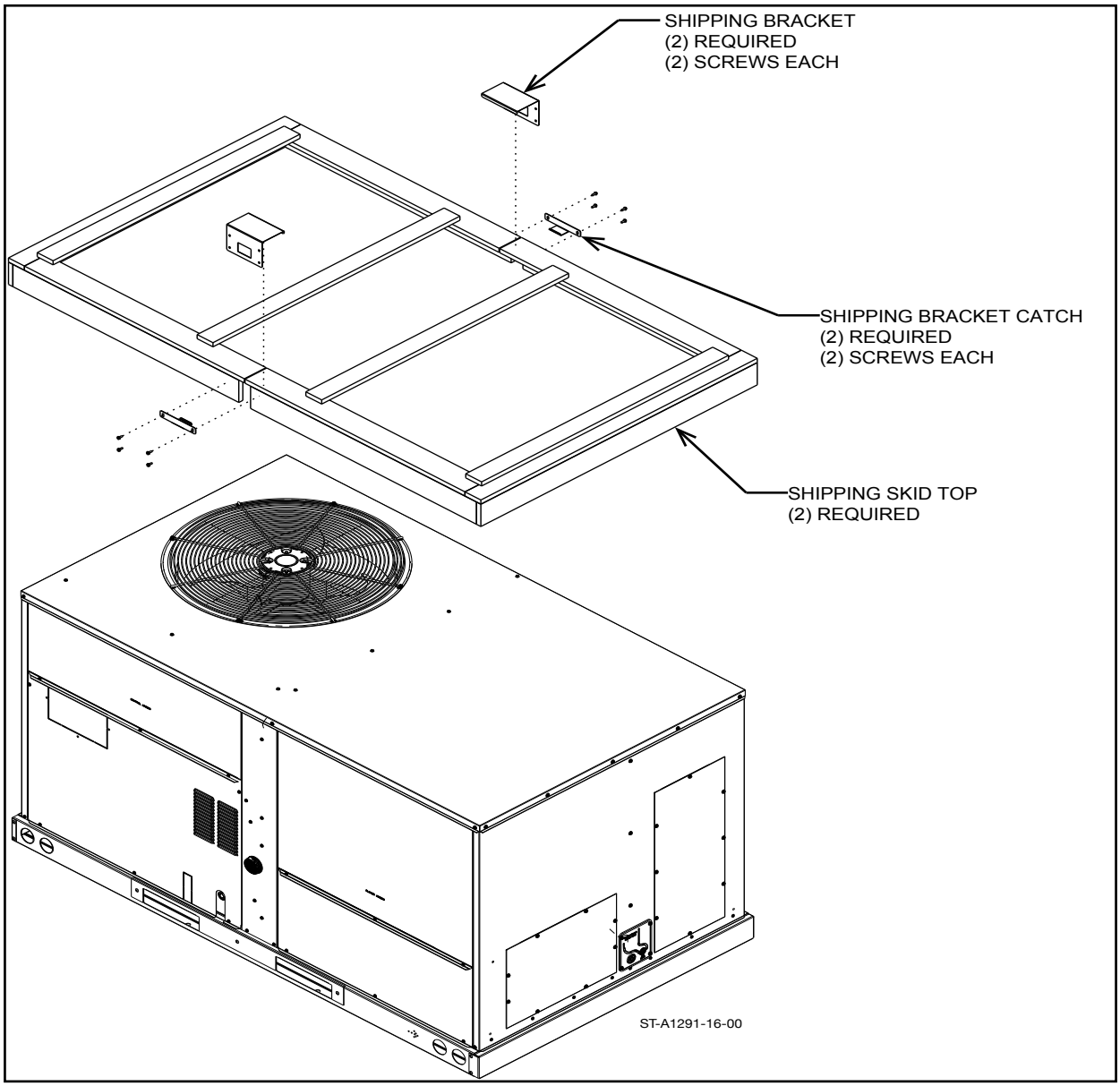


• **Shipping Screws –** Shipping screws are type #2 square head screws.

• **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.

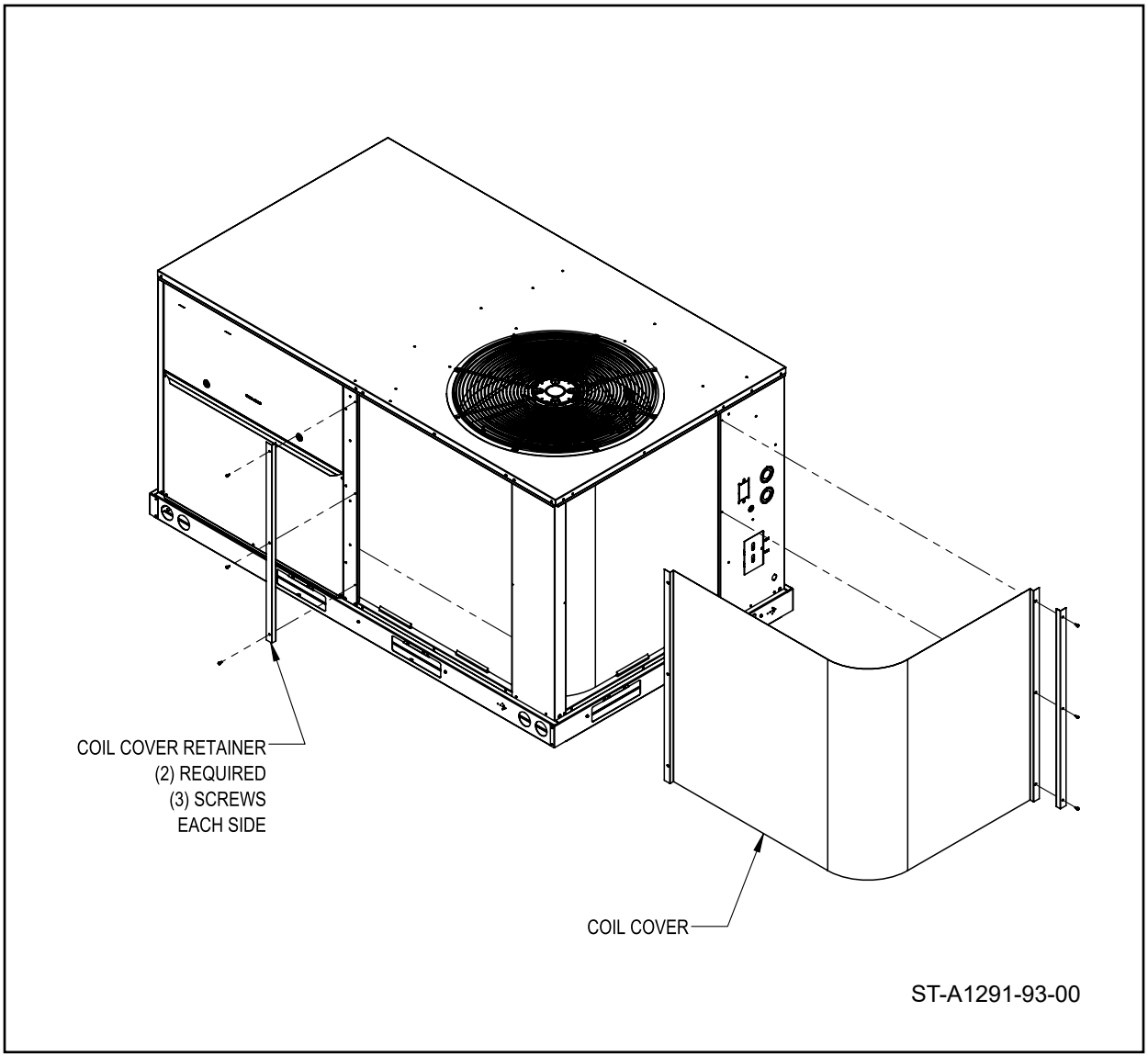
**Figure C.4.1. – B: Wooden Skid Assembly**



# C. INSTALLATION OF THE UNIT

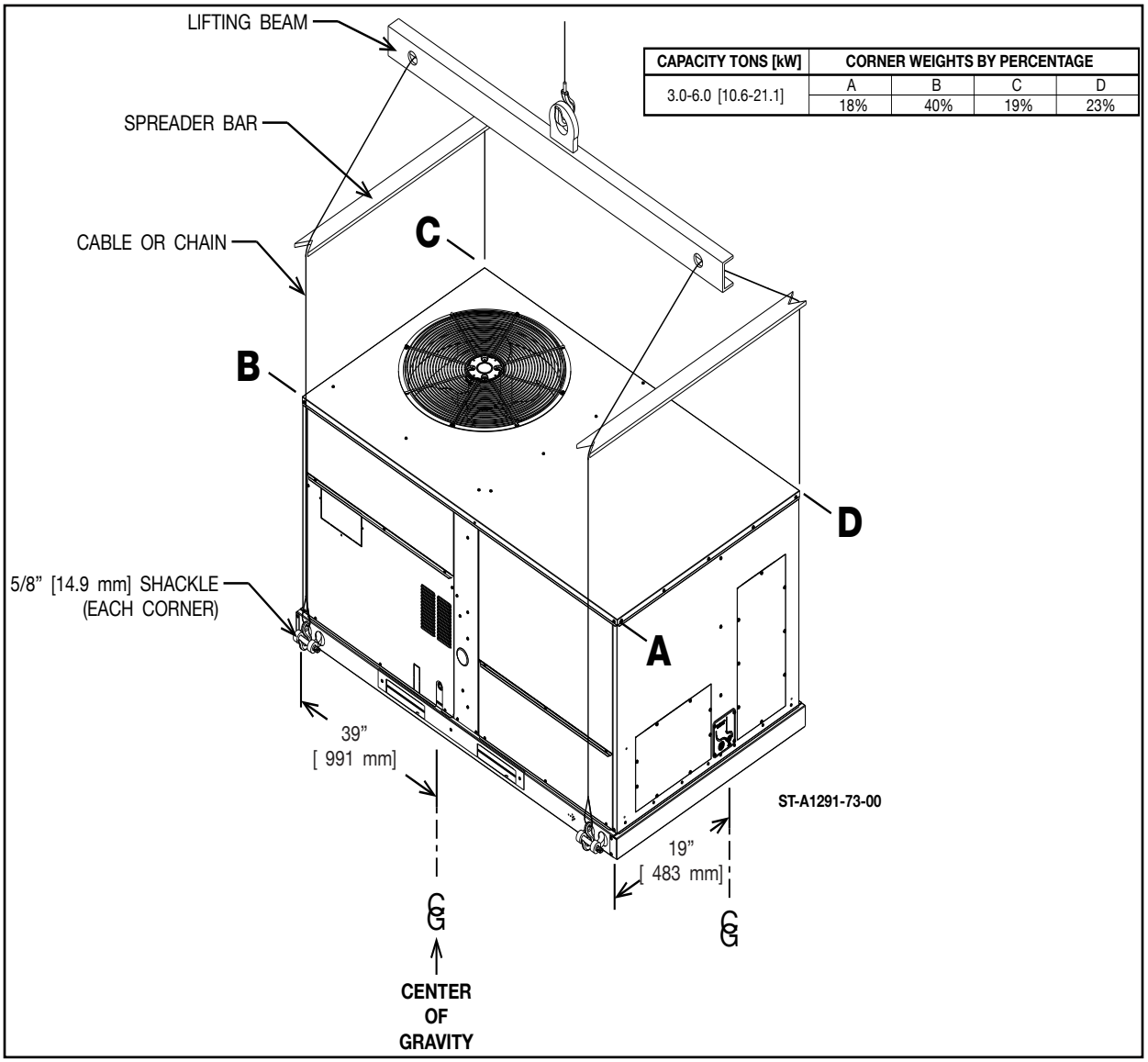
• **Condenser Coil Protection –** Remove the screws along the perimeter of the coil protector. This will allow the protector to be removed. If the unit has louver panels, it will not have the condenser coil protection.

**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.

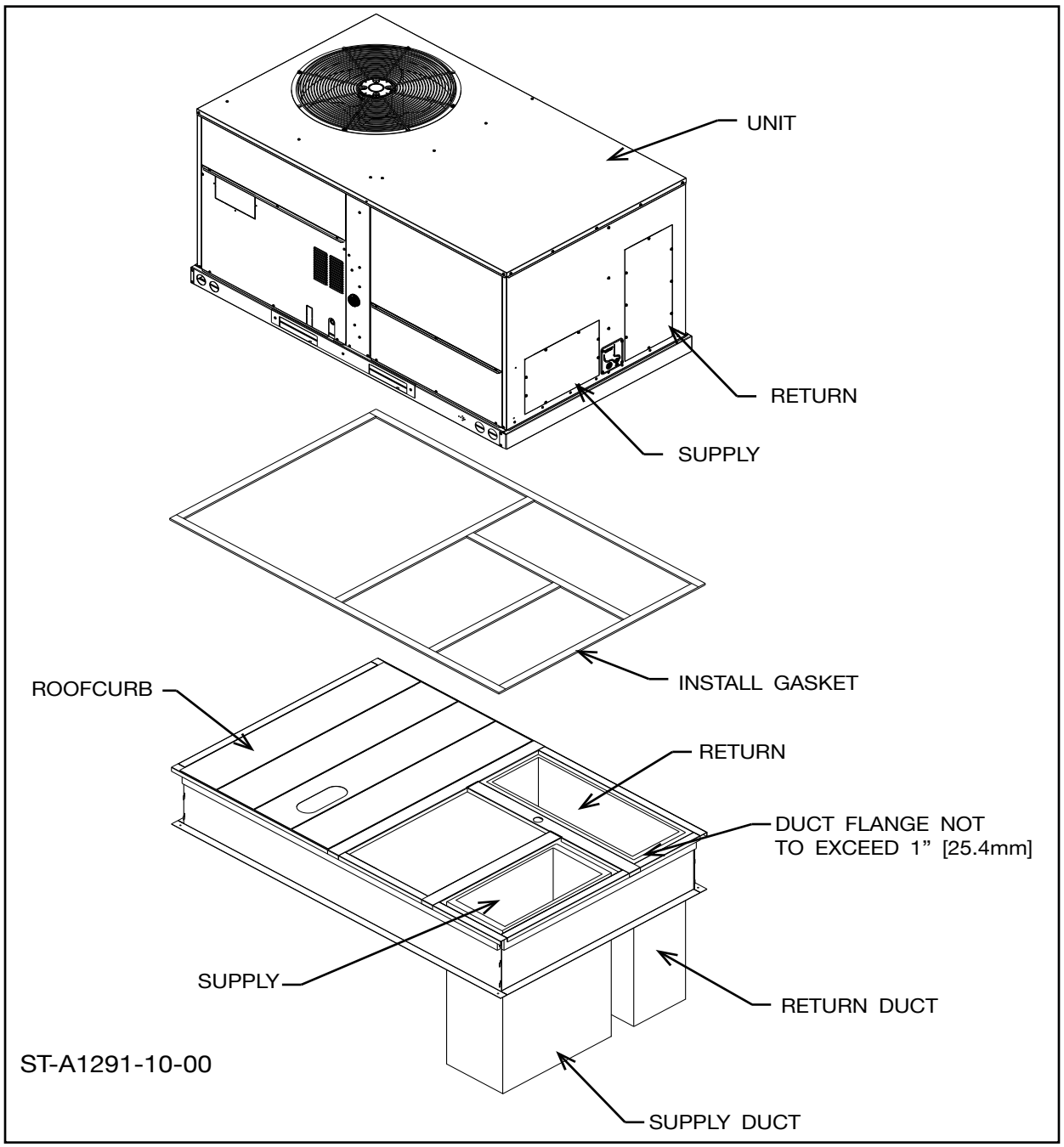
### C.4.3.1. Installing the Roof Curb

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.***

## C.5. Installing Condensate Drain

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

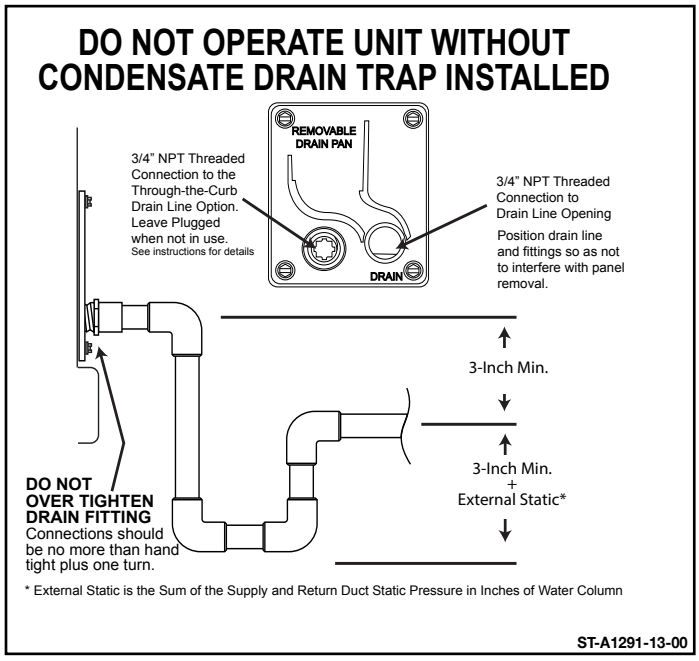
The condensate drain pan has a threaded female ¾ inch NPT (11.5 TPI) connection. Drain line must be no smaller than drain pan outlet and adequately sized to accommodate the condensate discharge from the unit. Drain line must be routed to an acceptable drain or outdoors in accordance with local codes. 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.

**Figure C.5.1 – A: Condensate Drain Tap**




### 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 ⅛" 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 threaded 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.

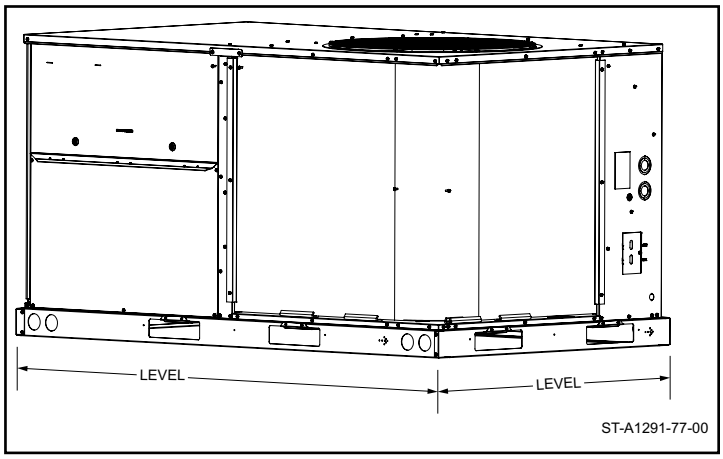
**NOTE:** Failure to remove the condenser coil protector on non-louver panel units will negatively impact performance and be harmful to system components. Failure to remove the cardboard basepan protector will block all indoor airflow for downflow configurations.

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.

**Figure C.6.2. – A: Level Unit**




### 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 for more information.

**⚠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.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.

Note: The installer is responsible for verifying all dimensions.

### 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 10 7/8", the return duct opening for horizontal ducted installations is 26 5/8" x 12". See ***Figure B.3.6. – A and – B*** for reference.

Note: The installer is responsible for verifying all dimensions.

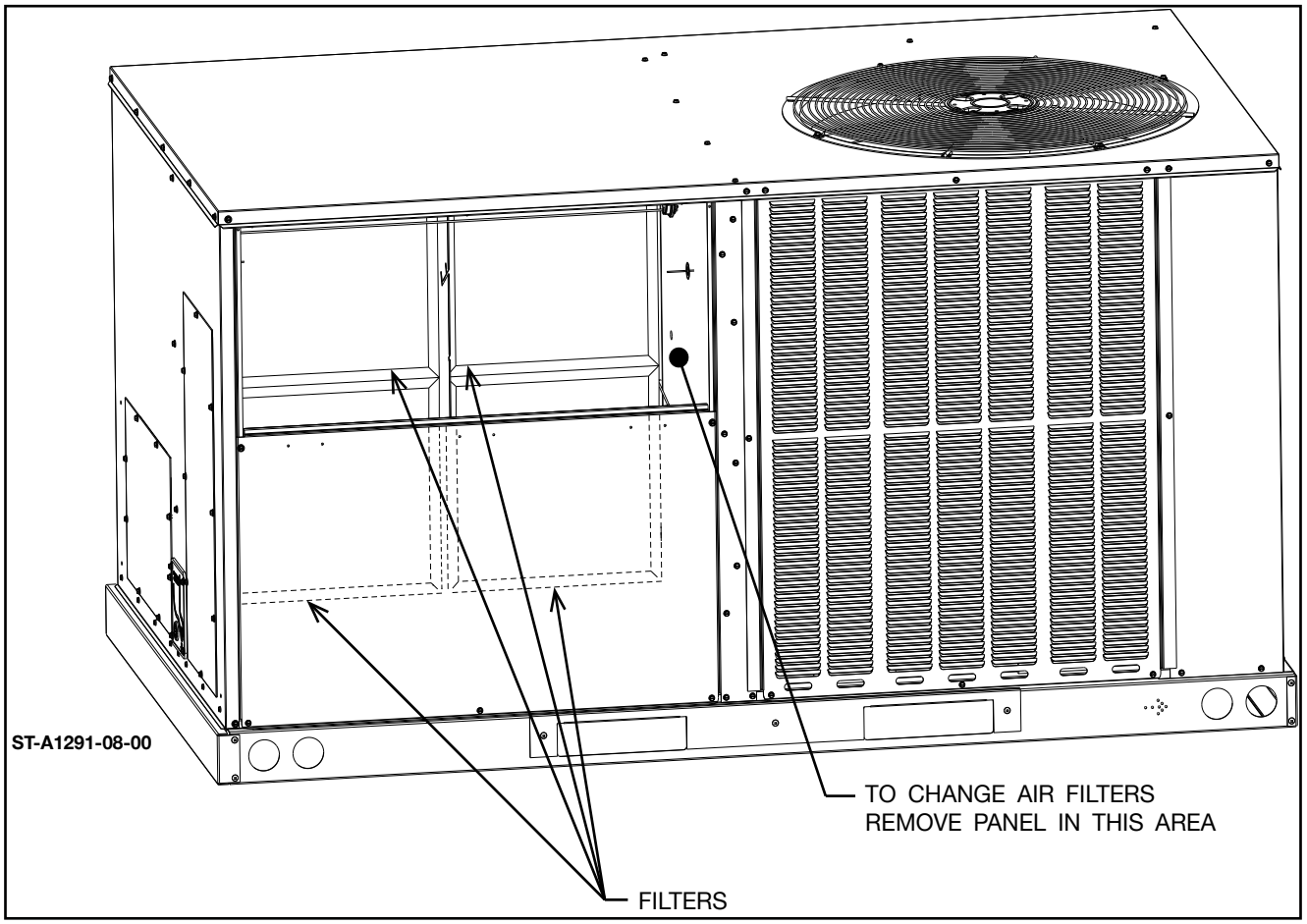
# D. DUCT AND VENTING

### 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.

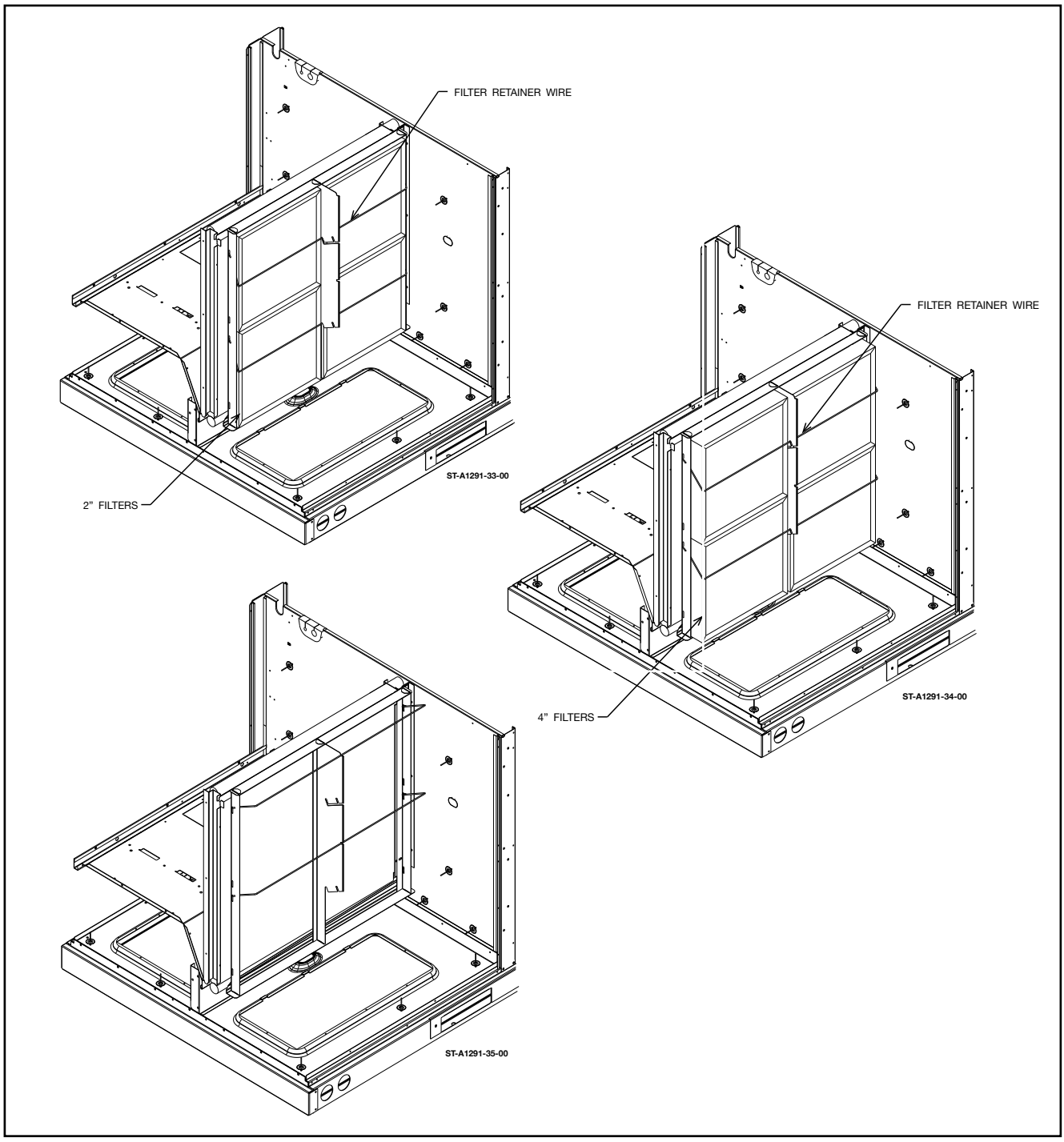
## D.3. Filters

### D.3.1. Installing Filters



## D.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 the 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. Reinstall the filter access panel.

# D. DUCT AND VENTING

## 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.

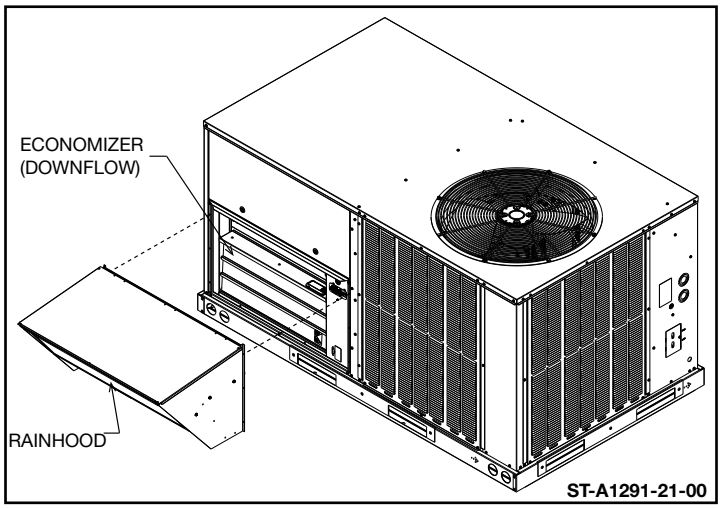
**The Downflow Economizer** is designed specifically for units set up in a downflow configuration. The downflow economizer fits inside the package unit and sits over the return-air opening along the bottom of the unit. All economizers are equipped with horizontal gear driven blades and a gravity relief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

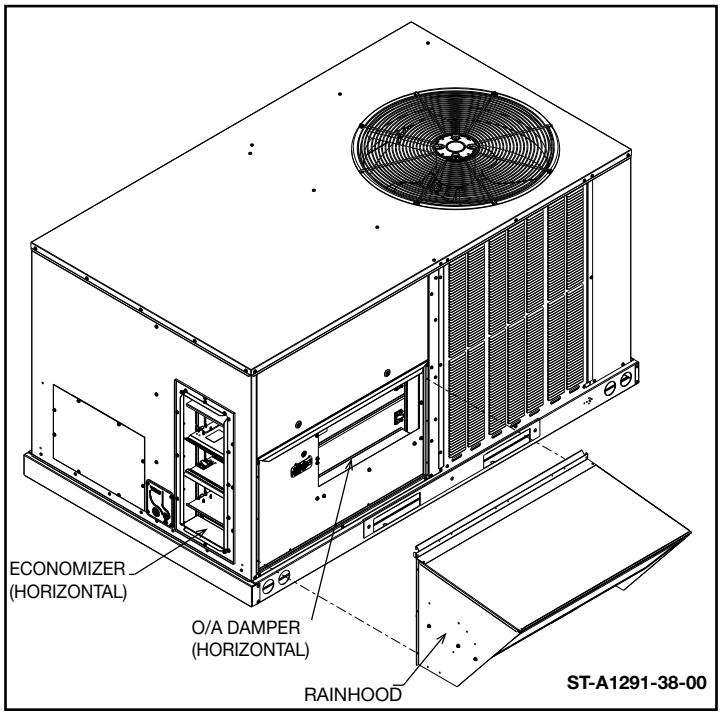
**The Horizontal Economizer** is designed specifically for units set up in a horizontal flow configuration. The horizontal economizer utilizes independently actuated return-air and fresh air dampers to enable the most efficient handling of air achievable with this platform. The horizontal economizer also includes an externally mounted (to the duct work) barometric 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.4.2. Fresh Air Dampers

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

The blade inside the hood is manually set 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, it introduces 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.

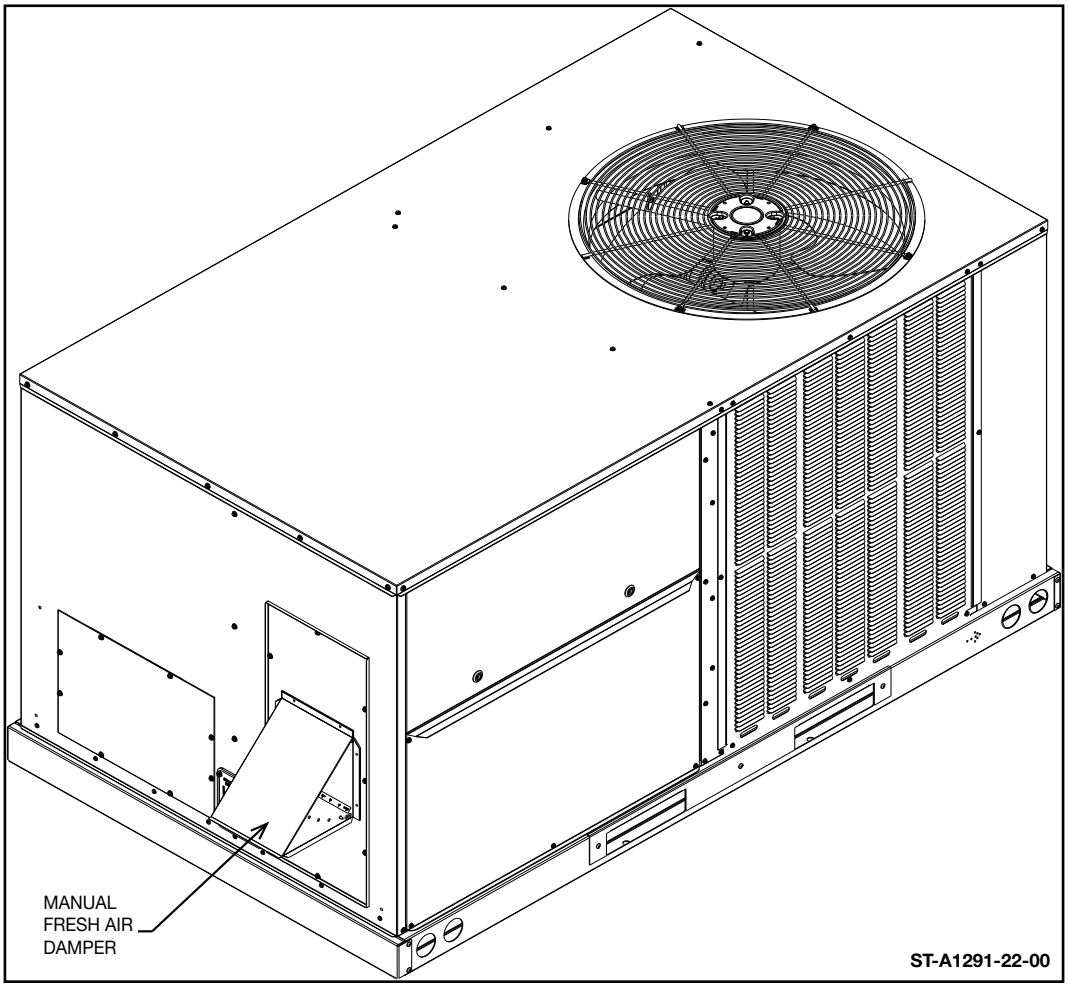
The advantage of the motorized damper is that the outside air is no longer a factor once the RTU fan is cycled off.

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. DUCT AND VENTING

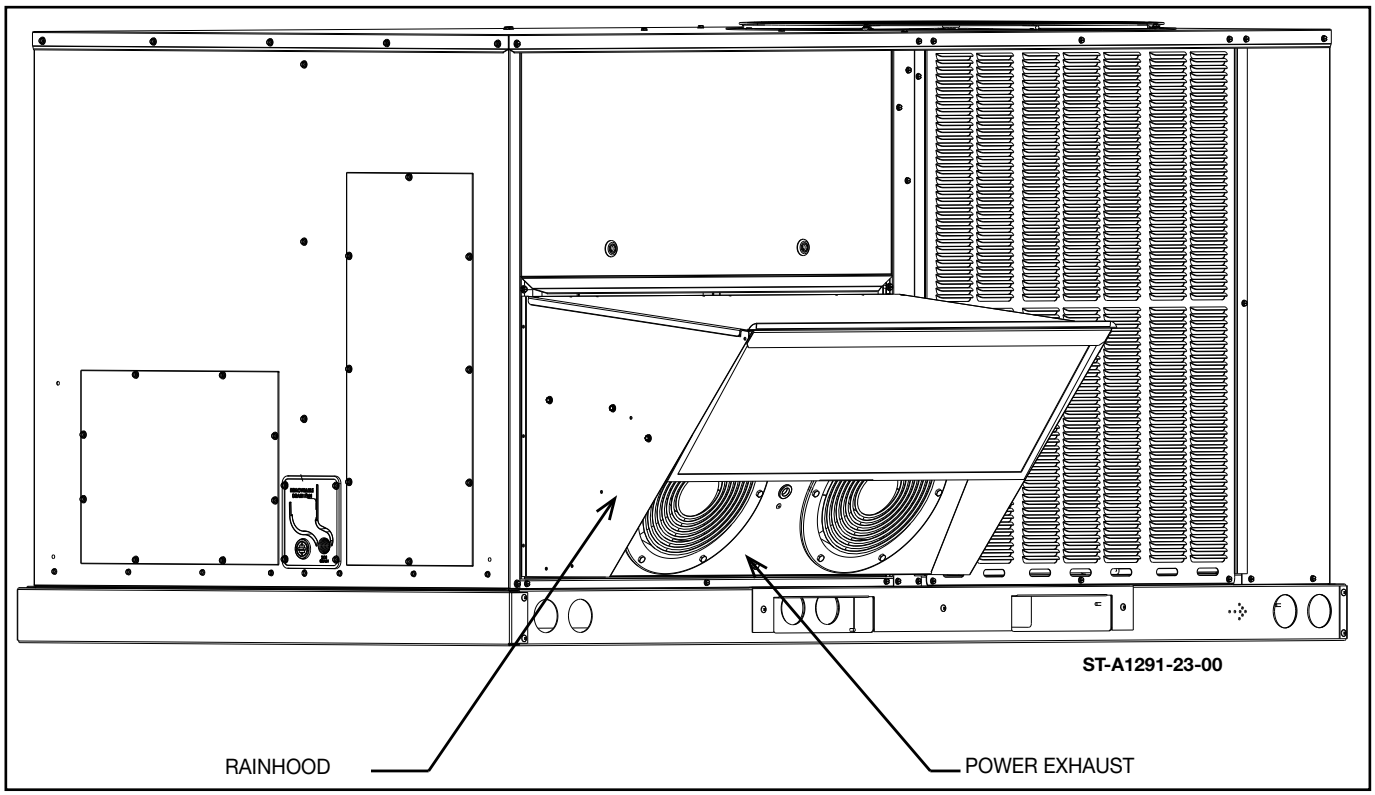
## D.4.3. Powered Exhaust

POWER EXHAUST - This field-installed 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 spots within a room.

Accessory appearance may vary.

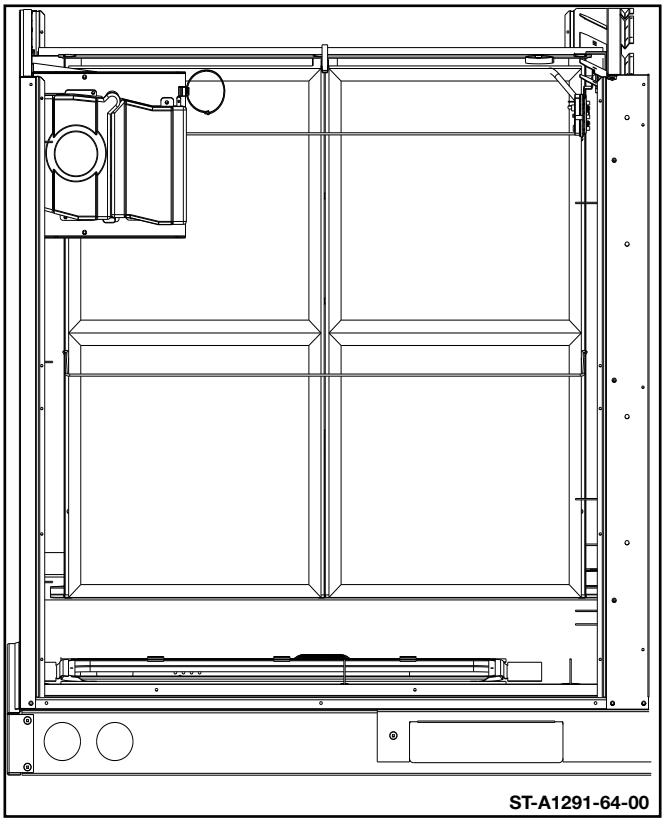
Note: For horizontal applications the accesory is mounted in the ductwork.

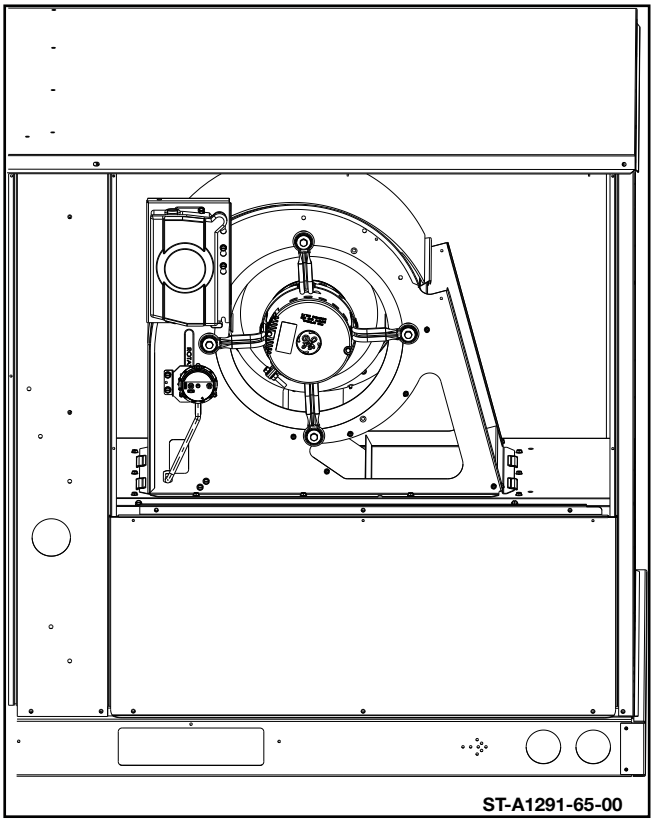
**Figure D.4.3. – A: Powered Exhaust**



## 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 installed 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.2.5.2.*** 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. ELECTRICAL

## 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.3. – 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.**

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.

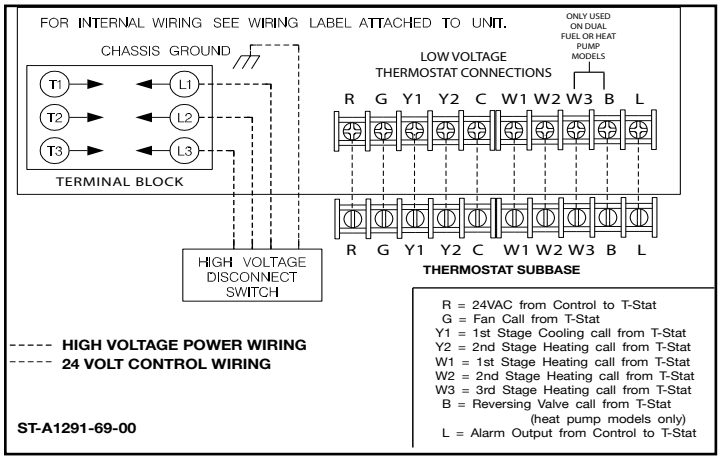
# E. ELECTRICAL

## 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**



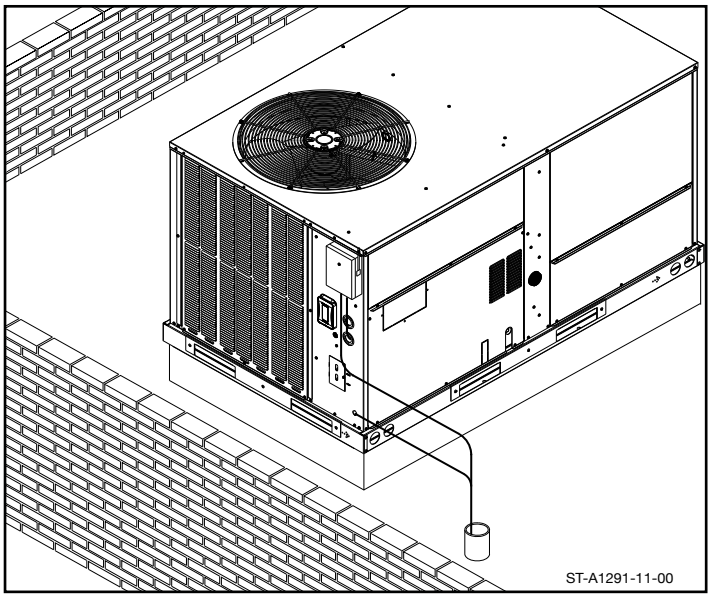

Use to ***Appendix B – Electrical Data*** and National Electrical Code for circuit ampacity to determine proper wire sizing.

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.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. It is recommended that a phase rotation meter be used to verify the system is connected properly to the three-phrase power. This helps prevent compressor damage.

### 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 the 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.2.1. – A: 24VAC Thermostat Circuits.***

# F. CONTROL / THERMOSTAT WIRING

## F.1. Non-DDC Control Inputs

**Figure F.1. - A: Field Wire Size for 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) | | | | | |

ST-A1291-14-00

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

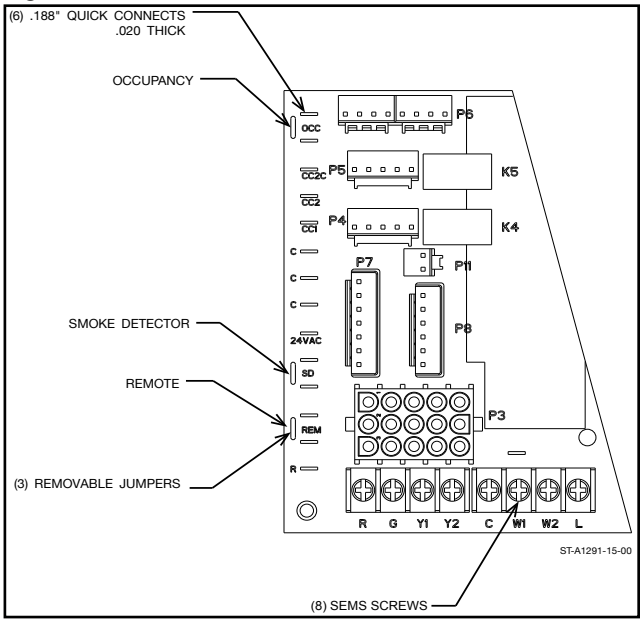
**NOTE: DO NOT USE CONTROL WIRING SMALLER THAN NO. 18 AWG.**

### 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**

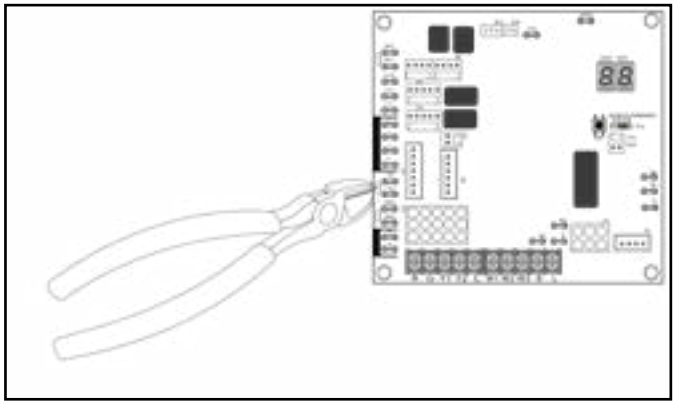


**Figure F.1.2. - B: Non-DDC Board**

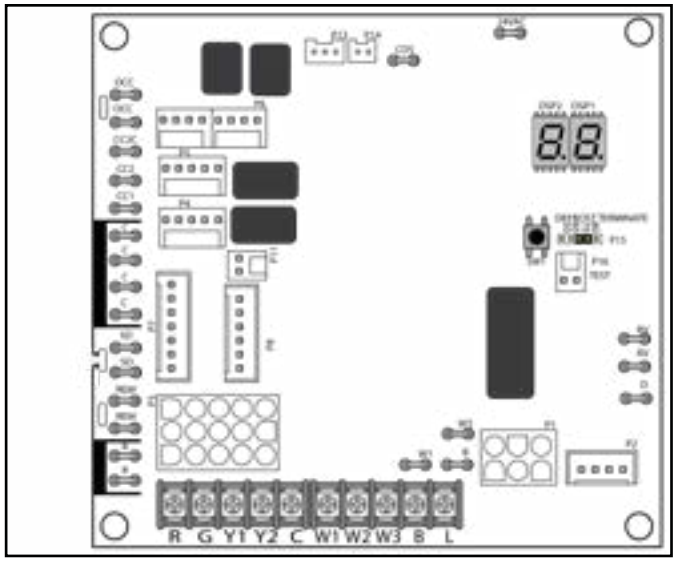
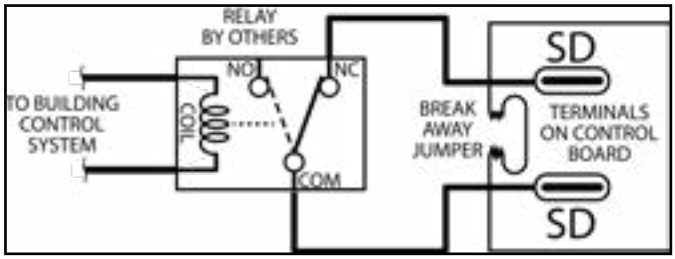



**Figure F.1.2. - C: Using a Dry-Contact Relay**




**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.

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 marked "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

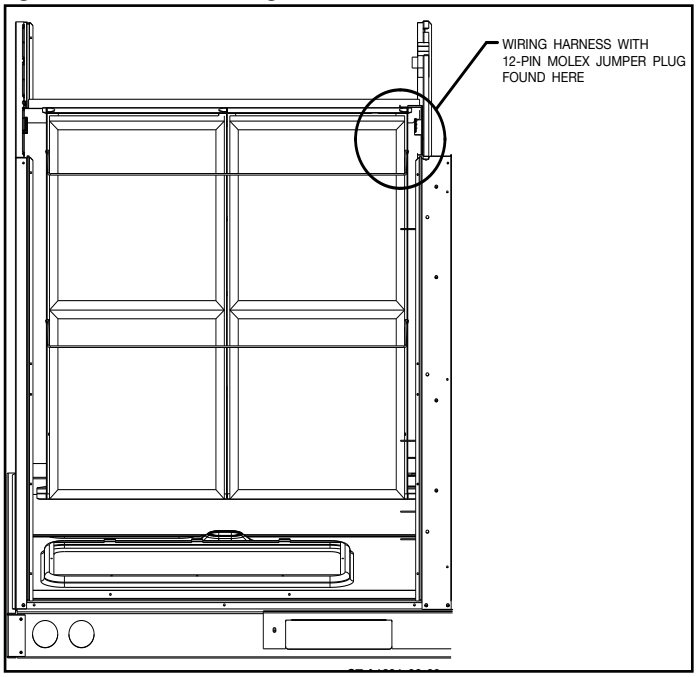
SD – Remote Smoke Detection. This feature allows for the proper shutdown of the controls in the event of an emergency situation. Locate the terminals at the left side of the board marked "SD." See ***Figure F.1.2. – A: Occupancy and Remote Connections*** for reference.

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 ClearControl™/DDC manual for more detail.

# F. CONTROL / THERMOSTAT WIRING

## F.2. DDC Control Inputs

**Figure F.2.1. - A: 24VAC Thermostat Circuits**

| 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

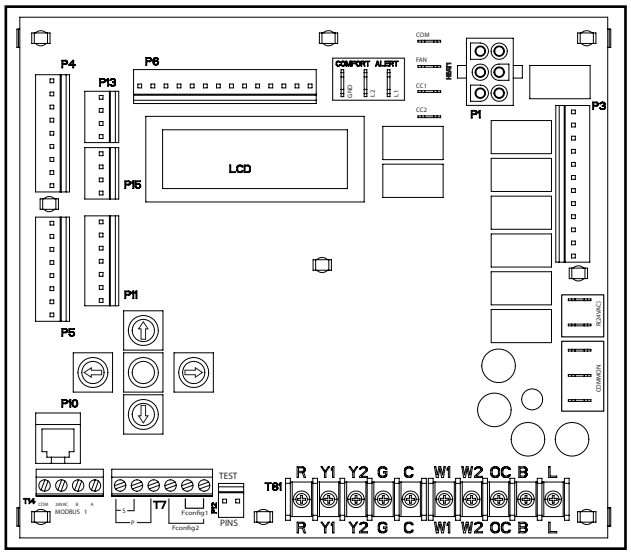
(1) THE TOTAL WIRE LENGTH IS THE DISTANCE FROM THE FURNACE TO THE THERMOSTAT AND BACK TO THE FURNACE.

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

### F.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: ClearControl 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 - run only 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 arrow keys 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 sections ***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 mode, 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

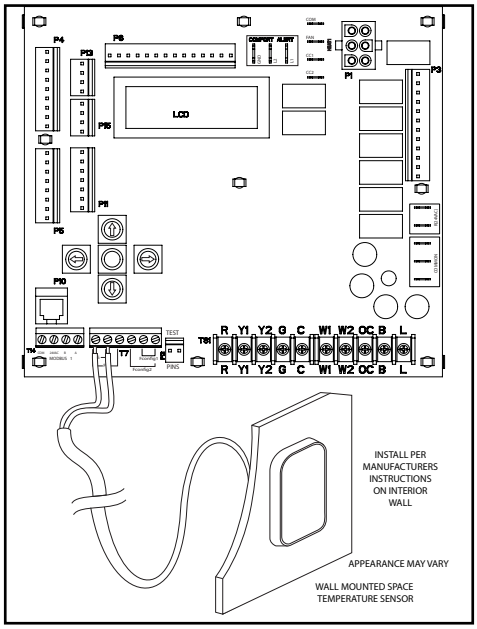
There are two temperature setpoints for occupied and unoccupied modes, heating and cooling. Using the control board’s navigation buttons, proceed to the Setpoints Menu and use the down arrow key to select “occupied or unoccupied cool and heat setpoints.” Press the middle button to select the first setpoint and use the up and down arrow keys 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**



# F. CONTROL / THERMOSTAT WIRING

When using a DDC unit with ClearControl 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.

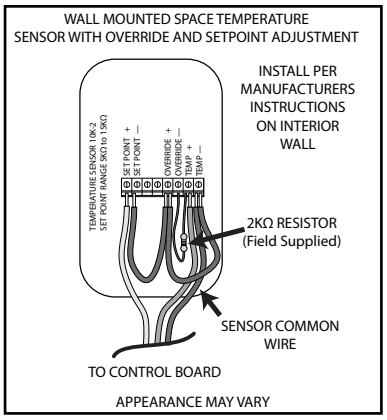
1. The space temperature sensor requirements is a 10k type II sensor.
2. Install the sensor on an interior wall in the space served by the packaged unit and connect the wires according to the manufacturer's instructions of the sensor type and style selected.
3. Run these wires from the sensor to the control panel of the unit.
4. 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.
5. 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, and they will use a shared common, the left most terminal. See the sensor manufacturer's instructions for details.
6. 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.
7. For more accurate operation, use the Space Temp Offset menu option to adjust the sensor reading on the ClearControl by +/-3 degrees to match the reading on the test instrument.
8. If the ClearControl 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.**



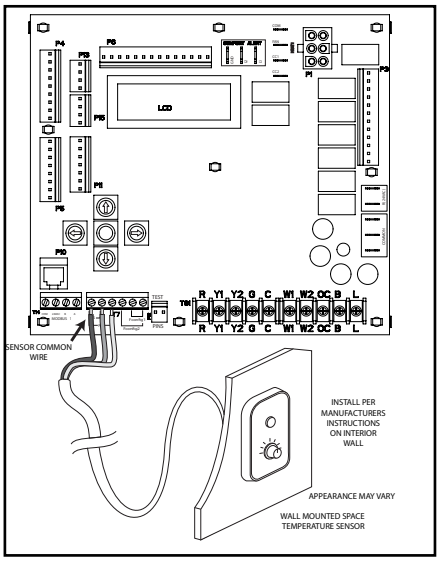
### F.2.3.3. Set-Point Adjustment

In Automatic Operation Mode or controlled by a BMS, a zone sensor with a setpoint adjustment 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 ClearControl 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 ClearControl, navigate to the Setpoint Adjust menu item, press the middle button, and use the up and down arrow keys 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 arrow keys 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 arrow keys 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. CONTROL / THERMOSTAT WIRING

### F.2.3.4. Humidity Sensor

Field Configurable Input #2 can be used to connect an indoor relative humidity sensor that has a 0-10 VDC output for a 0-100% indoor relative humidity input. Models with the reheat option require this indoor relative humidity sensor to determine humidity control demand. Because this is a “powered” sensor, an additional wire to the 24VAC power supply from the unit is required. The “R” thermostat input can be used for this purpose. The indoor relative humidity sensor can be used along with thermostat control or a zone sensor in combination with a building management system (BAS) that will be controlled from a central location. Some models of the indoor relative humidity sensor also have a space temperature sensor included, eliminating the need for a separate zone sensor.

## 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 ClearControl/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 key 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 key to select Smoke Options. These options will change the operation as follows:

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

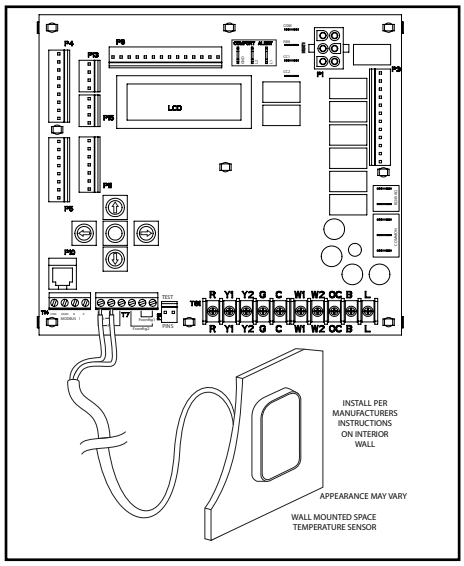
Pressurize - Ramps the VFD to full speed, opens the economizer up 100%, stops all heating and cooling functions.

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.2.5.1. Factory Smoke Detector Kit

If a field or factory installed 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**

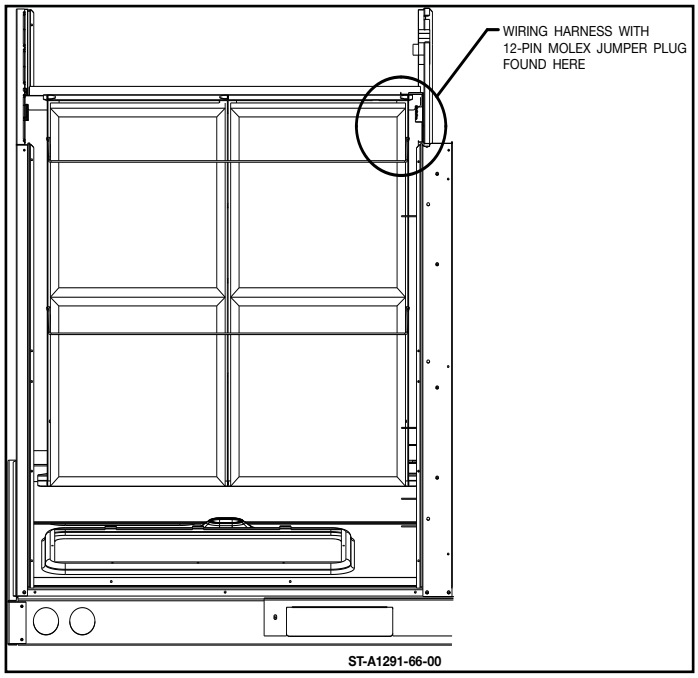
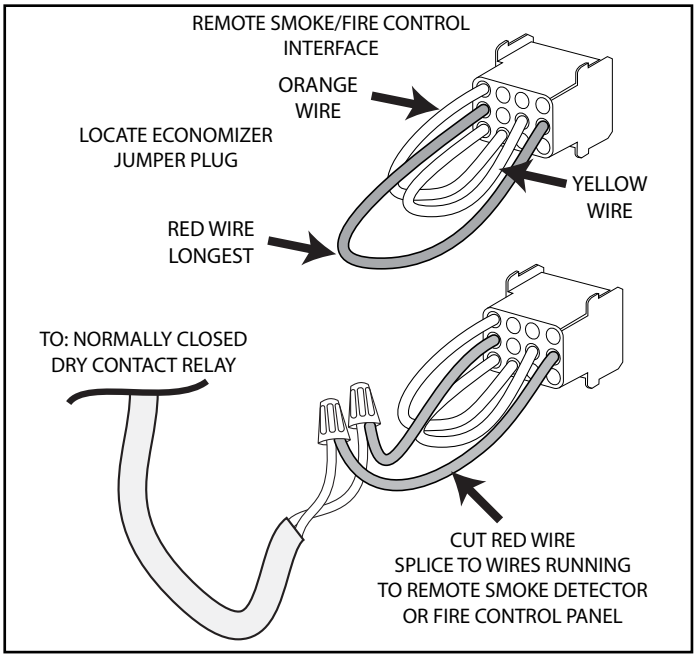



**Figure F.2.5.2. – B: Smoke Detector Connection (DDC)**



# F. CONTROL / THERMOSTAT WIRING

## F.3. Routing Control Wiring

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

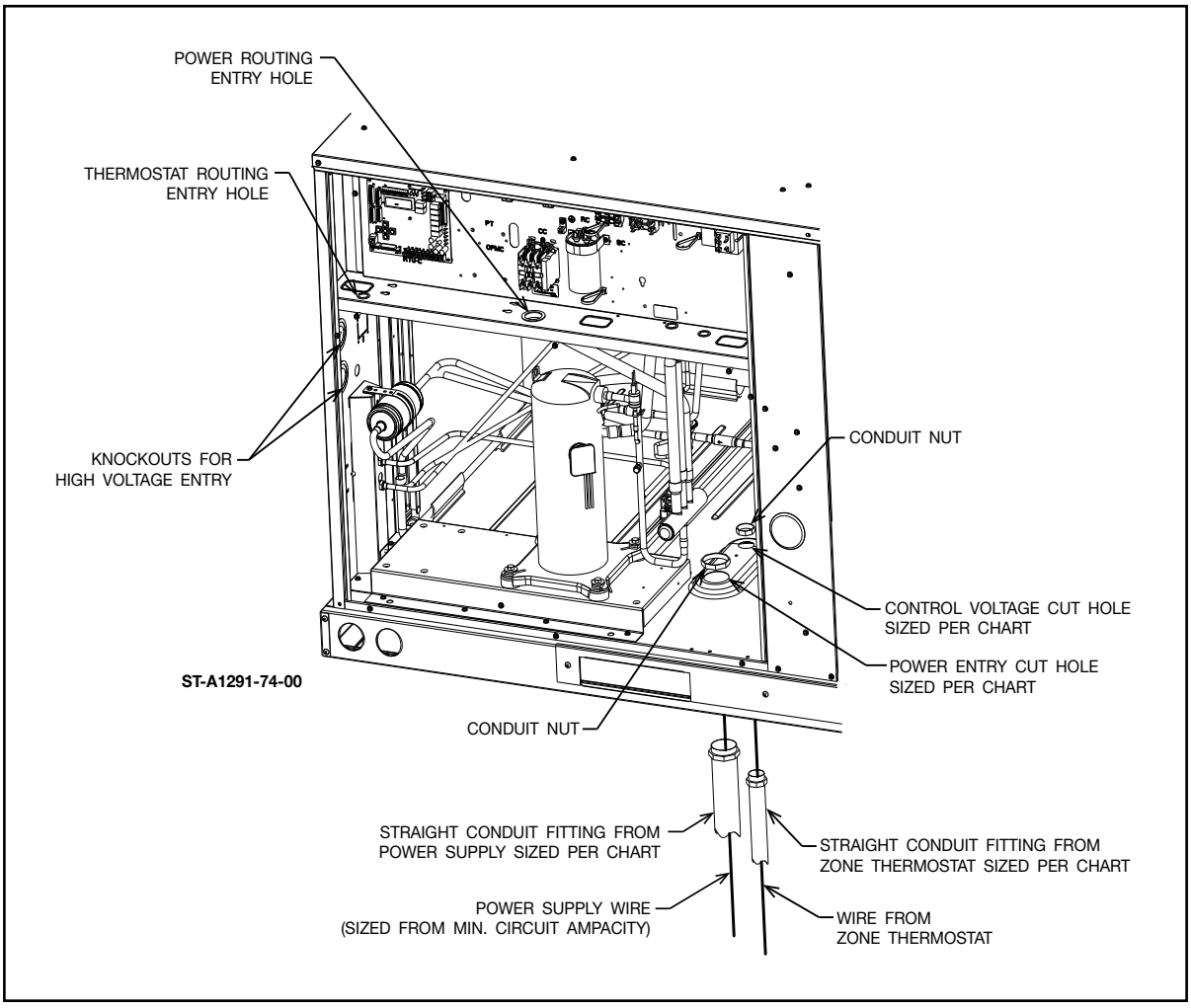



**Figure F.3. – B: Hole Sizing for Conduit**

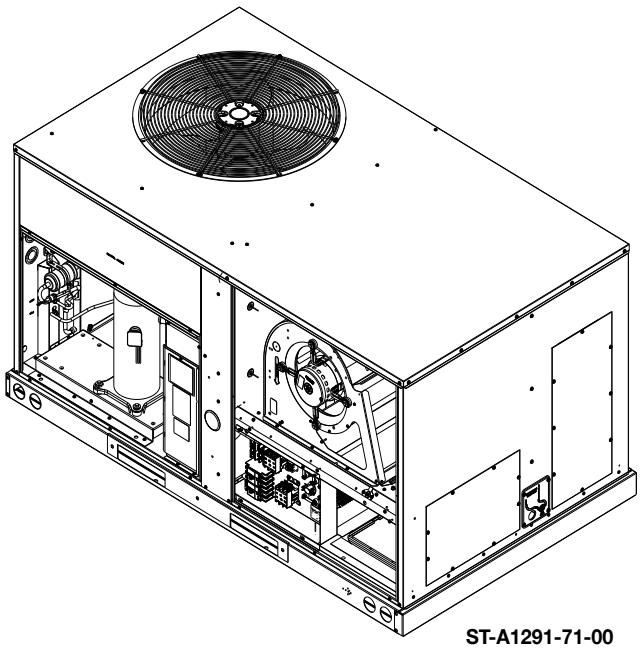
| | WIRE SIZE, AWG | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 14 | 12 | 10 | 8 | 6 | 4 | 3 | 2 | 1 | 0 | 00 | 000 |
| CONDUIT SIZE | 1/2" | 1/2" | 1/2" | 3/4" | 1" | 1" | 1-1/4" | 1-1/4" | 1-1/2" | 1-1/2" | 2" | 2" |
| HOLE SIZE | 7/8" | 7/8" | 7/8" | 1-31/32" | 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).

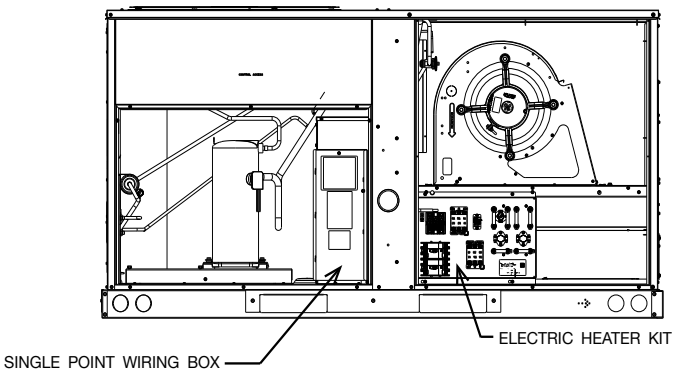
## F.4. Measuring Control Voltage Loads

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.

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



ST-A1291-71-00




ST-A1291-71-00

## 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 a 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.

Leak 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.

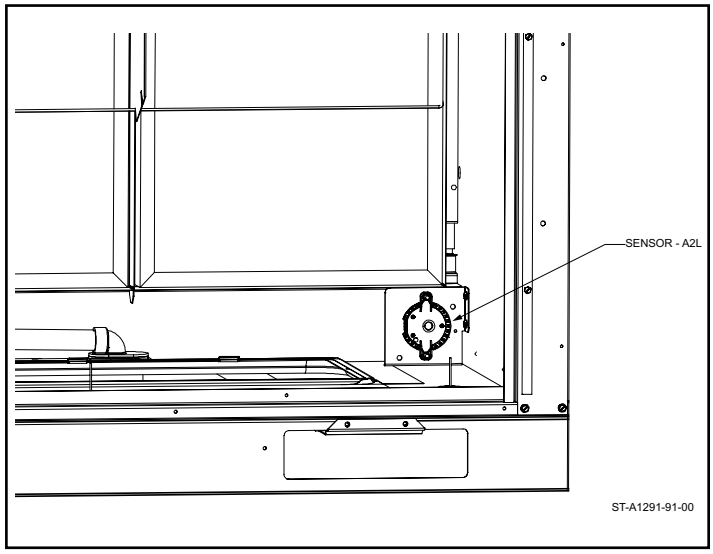
#### J.1.1.1. Refrigerant Leak Detection System

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 or 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.

**Figure J.1.1.1. - A: A2L Sensor Location**




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

#### J.1.1.2. Operation When a Leak is Detected

When the unit receives a signal from the A2L refrigerant detection system (RDS), 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 indoor blower 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 RDS triggers the mitigation procedure.

### 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.

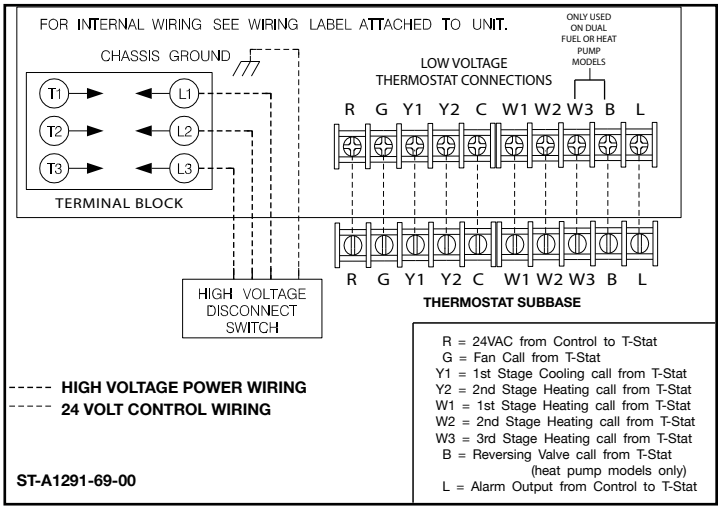
## J.1.3. Check Electrical Connections For Proper Torque

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. STARTUP AND OPERATION

### J.1.6. Check Condensate Drain Installation

Verify the condensate drain trap is a minimum of 3 inches deep. 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 miscellaneous 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 not 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 a 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.

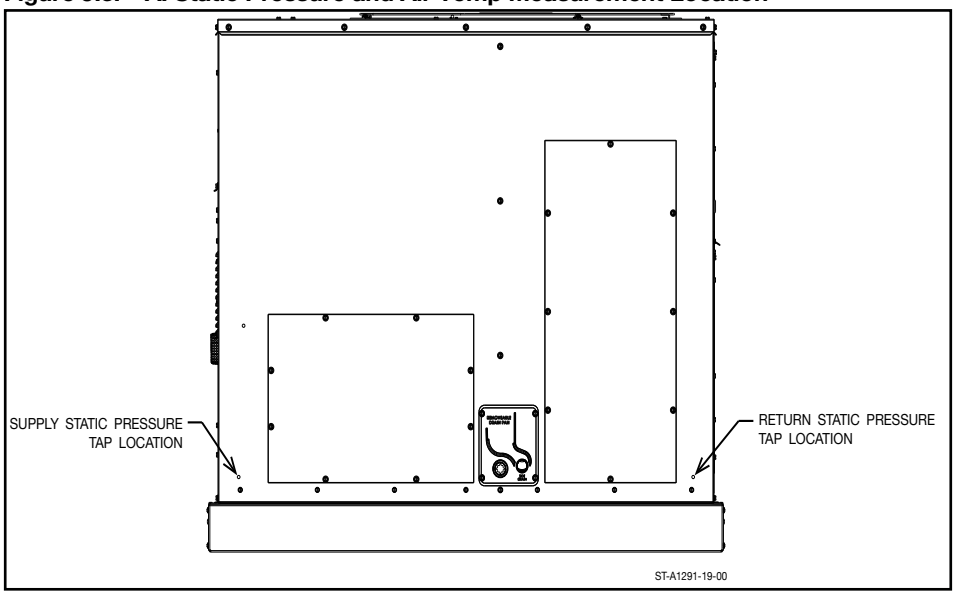
### J.2.3. Checking Low (Control) Voltage

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.2.1. – A: 24VAC Thermostat Circuits*** for proper low voltage wire lengths.

## 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 is 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.

For non-DDC units, the unit ships standard with the orange wire (wire 607) having a quick-connect towards the control board-end of the harness.

- If more airflow is needed, unplug the orange wire and reattach to the T-connection on the yellow wire (yellow 608).

For DDC units, the unit ships with the orange wire for the indoor fan connected to the CC2 terminal on the board.

- If more airflow is needed, remove the wire from CC2 and connect it to the CC1 terminal.

If adjustment is needed, turn off the power to the entire system, and adjust the adjustable blower motor 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 cooling or heating, make sure the VFD ramps the blower to the correct speed.

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

# J. STARTUP AND OPERATION

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

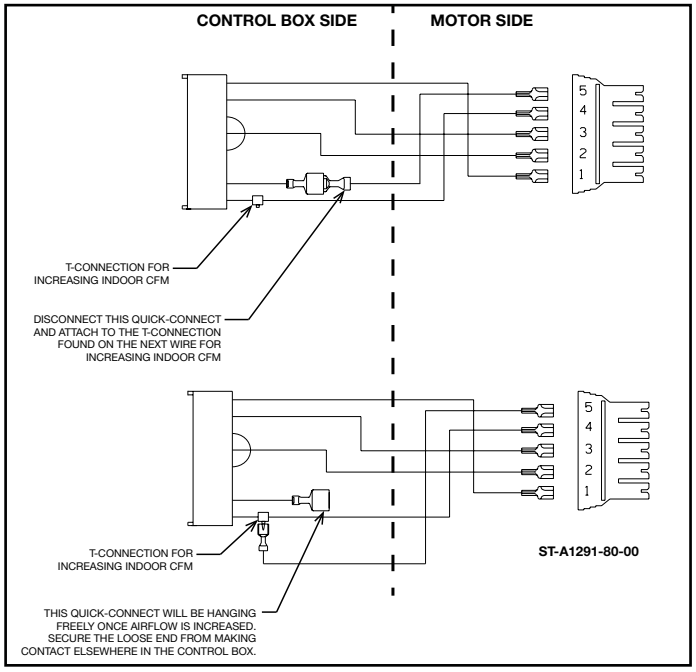
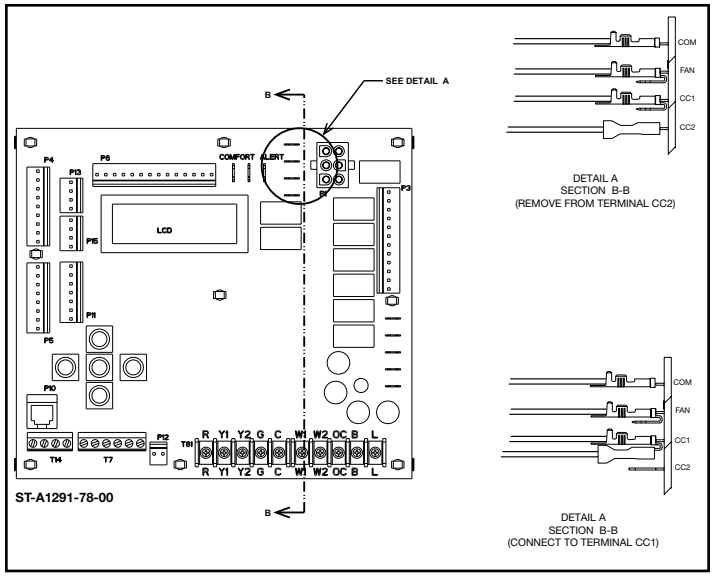



**Figure J.3.2. – B: How to Increase Airflow for 3 to 5 ton DDC Units**




## 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**

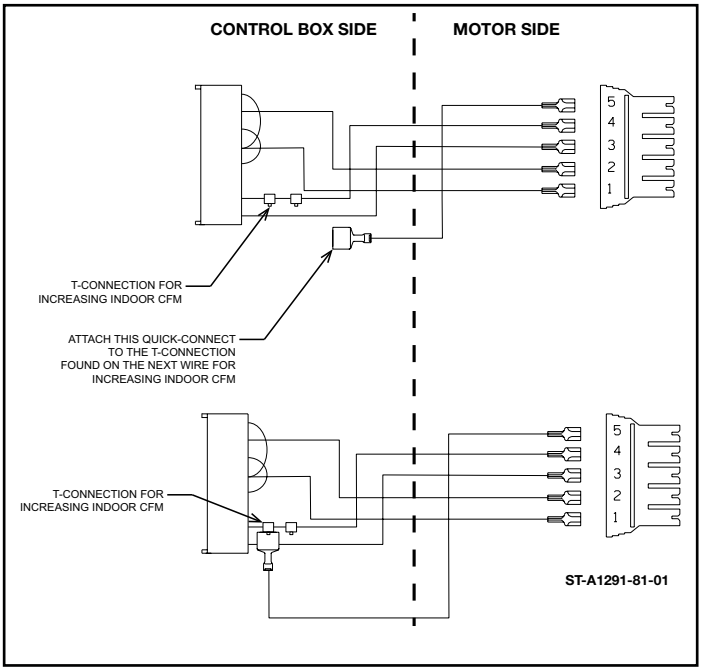
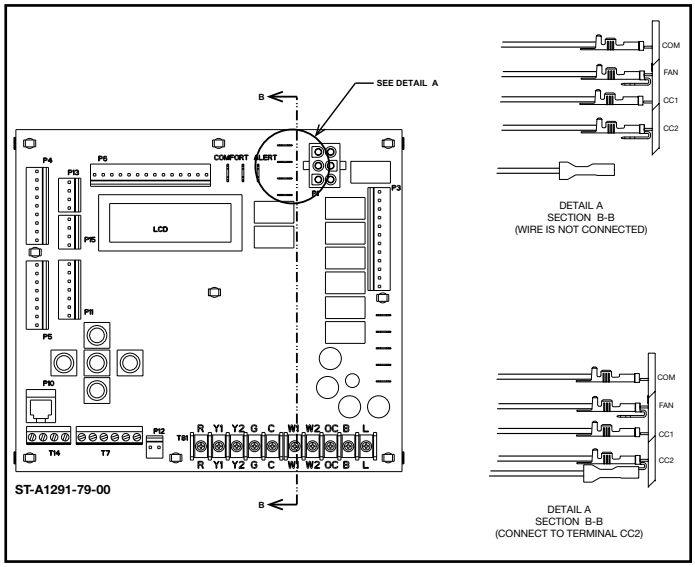



**Figure J.3.2. – D: How to Increase Airflow for 6 ton DDC Units**



### J.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 this 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 first-stage cooling**

1. The zone thermostat contacts close, and a call for first-stage cooling is initiated.
2. Inputs 'Y1' and 'G' to the control are energized.
3. The control senses input to 'Y1' and 'G.' After a 1 second delay, the control energizes both the indoor blower and first-stage compressor.
4. The control enters the normal operating loop where 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-stage compressor 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 1 second delay, the control energizes the indoor blower, and the first and second-stage compressors.

**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 the compressor anti-short cycle delay timer. To bypass the time delay, press the SW1 button with an insulated probe for 1 second and then release.

**FAULT RECALL OPERATION for non-DDC units**

To enter FAULT RECALL mode, press the SW1 button with an insulated probe for 2 seconds 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 5 seconds 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 ClearControl manual for more information.

# J. STARTUP AND OPERATION

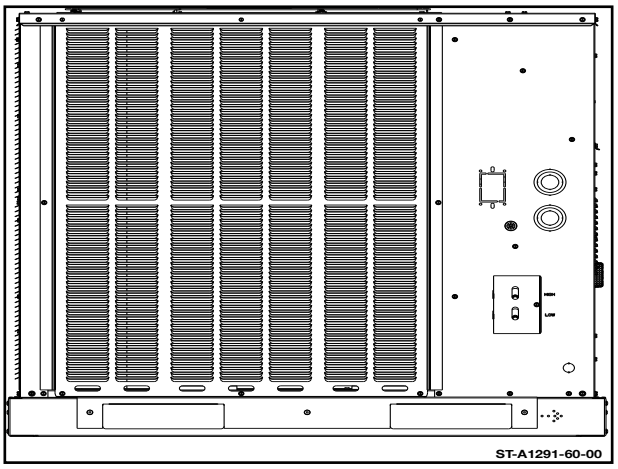
## J.4.1. Checking Refrigerant Pressures

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.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.

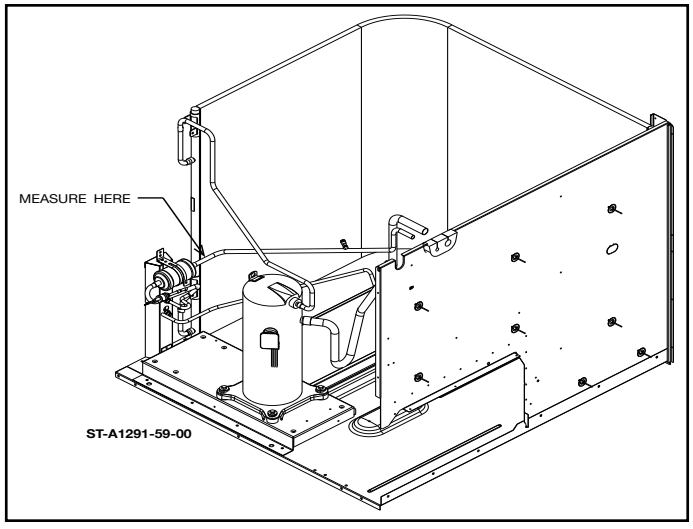
4. Operate the unit for a minimum of 15 minutes in cooling mode.

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. STARTUP AND OPERATION

## J.5. Checking Electric Heat Operation

### J.5.1. 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.5.2. Checking Heating Mode Operation

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.5.3. 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 the ***Diagnostic Codes Table*** 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.

**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.

# J. STARTUP AND OPERATION

## 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 F – 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.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.***

## K.3. Economizer Adjustments

An economizer is designed to provide fresh air into the building and offer the potential for “free” cooling when the outdoor temperature and humidity conditions are favorable to help save energy in the overall operation of the unit.

Having a properly operating economizer is important. See the instructions provided with the Economizer for the proper setup and operation of the system. Some models will feature a self-contained control module for programming and setup, others may use the control board, such as the ClearControl DDC, for managing the operation of the economizer.

Do not bypass the economizer or “fix” the dampers blades in an open position when the unit is off, this will cause the potential for undesired operations and conditions in the space.

# N. DIAGNOSTICS

## 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.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. DIAGNOSTICS

## 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 |

**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.<br>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 | |

# N. DIAGNOSTICS

**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 | |

**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 | |

# N. DIAGNOSTICS

**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.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

This is 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.

# P. APPENDICES

## Appendix A – General Product Data

| Model (-)HPCYB Series | 036ACT<br>036ADT<br>036AJT | 036ACU | 036ADU |
|---|---|---|---|
| **Cooling Performance[A]** | | | |
| Gross Cooling Capacity Btu/h [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] | 1,200 [566] | 1,200 [566] | 1,200 [566] |
| AHRI Rated CFM [L/s] | 1,175 [555] | 1,175 [555] | 1,175 [555] |
| AHRI Net Cooling Capacity Btu/h [kW] | 34,200 [10.02] | 34,200 [10.02] | 34,200 [10.02] |
| Net Sensible Capacity Btu/h [kW] | 25,600 [7.5] | 25,600 [7.5] | 25,600 [7.5] |
| Net Latent Capacity Btu/h [kW] | 8,600 [2.52] | 8,600 [2.52] | 8,600 [2.52] |
| Net System Power kW | 3.2 | 3.2 | 3.2 |
| **Heating Performance (Heat Pumps)** | | | |
| High Temp. Btu/hh [kW] Rating @ 47oF | 34,200 [10.02] | 34,200 [10.02] | 34,200 [10.02] |
| System Power KW / COP @ 47oF | 2.64/3.8 | 2.64/3.8 | 2.64/3.8 |
| Low Temp. Btu/hh [kW] Rating @ 17oF | 21,600 [6.33] | 21,600 [6.33] | 21,600 [6.33] |
| System Power KW / COP @ 17oF | 2.53/2.5 | 2.53/2.5 | 2.53/2.5 |
| HSPF2 (Btu/h/Watts-hr) | 6.7 | 6.7 | 6.7 |
| **Compressor** | | | |
| No./Type | 1/Scroll | 1/Scroll | 1/Scroll |
| Number of 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] | 5,100 [2,407] | 5,100 [2,407] | 5,100 [2,407] |
| No. Motors at 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 | 1,050 | 1,050 | 1,050 |
| 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 [2,381] | 84 [2,381] | 84 [2,381] |
| **Weights** | | | |
| Net Weight lbs. [kg] | 532 [232] | 538 [235] | 538 [235] |
| Ship Weight lbs. [kg] | 570 [249] | 576 [251] | 576 [251] |

## Appendix A – General Product Data

| Model (-)HPCYB Series | 048ACT<br>048ADT<br>048AJT | 048ACU | 048ADU |
|---|---|---|---|
| **Cooling Performance[A]** | | | |
| Gross Cooling Capacity Btu/h [kW] | 48,000 [14.07] | 48,000 [14.07] | 48,000 [14.07] |
| EER2[B] | 10.6 | 10.6 | 10.6 |
| SEER2 | 13.4 | 13.4 | 13.4 |
| Nominal CFM [L/s] | 1,600 [755] | 1,600 [755] | 1,600 [755] |
| AHRI Rated CFM [L/s] | 1,460 [689] | 1,460 [689] | 1,460 [689] |
| AHRI Net Cooling Capacity Btu/h [kW] | 45,500 [13.34] | 45,500 [13.34] | 45,500 [13.34] |
| Net Sensible Capacity Btu/h [kW] | 34,200 [10.02] | 34,200 [10.02] | 34,200 [10.02] |
| Net Latent Capacity Btu/h [kW] | 11,300 [3.31] | 11,300 [3.31] | 11,300 [3.31] |
| Net System Power kW | 4.3 | 4.3 | 4.3 |
| **Heating Performance (Heat Pumps)** | | | |
| High Temp. Btu/hh [kW] Rating | 45,500 [13.34] | 45,500 [13.34] | 45,500 [13.34] |
| System Power KW / COP | 3.92/3.4 | 3.92/3.4 | 3.92/3.4 |
| Low Temp. Btu/hh [kW] Rating | 26,600 [7.8] | 26,600 [7.8] | 26,600 [7.8] |
| System Power KW / COP | 3.54/2.2 | 3.54/2.2 | 3.54/2.2 |
| HSPF2 (Btu/h/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] | 5,900 [2784] | 5,900 [2784] | 5,900 [2784] |
| No. Motors at 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 | 1,050 | 1,050 | 1,050 |
| 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 [4,054] | 143 [4,054] | 143 [4,054] |
| **Weights** | | | |
| Net Weight lbs. [kg] | 559 [244] | 565 [246] | 565 [246] |
| Ship Weight lbs. [kg] | 597 [260] | 603 [263] | 603 [263] |

# P. APPENDICES

## Appendix A – General Product Data

| Model (-)HPCYB Series | 060ACT<br>060ADT<br>060AJT | 060ACU | 060ADU |
|---|---|---|---|
| **Cooling Performance[A]** | | | |
| Gross Cooling Capacity Btu/h [kW] | 60,000 [17.58] | 60,000 [17.58] | 60,000 [17.58] |
| EER2[B] | 10.6 | 10.6 | 10.6 |
| SEER2 | 13.4 | 13.4 | 13.4 |
| Nominal CFM [L/s] | 2,000 [944] | 2,000 [944] | 2,000 [944] |
| AHRI Rated CFM [L/s] | 1,925 [908] | 1,925 [908] | 1,925 [908] |
| AHRI Net Cooling Capacity Btu/h [kW] | 57,000 [16.71] | 57,000 [16.71] | 57,000 [16.71] |
| Net Sensible Capacity Btu/h [kW] | 43,000 [12.6] | 43,000 [12.6] | 43,000 [12.6] |
| Net Latent Capacity Btu/h [kW] | 14,000 [4.1] | 14,000 [4.1] | 14,000 [4.1] |
| Net System Power kW | 5.4 | 5.4 | 5.4 |
| **Heating Performance (Heat Pumps)** | | | |
| High Temp. Btu/hh [kW] Rating | 57,000 [16.71] | 57,000 [16.71] | 57,000 [16.71] |
| System Power KW / COP | 4.4/3.8 | 4.4/3.8 | 4.4/3.8 |
| Low Temp. Btu/hh [kW] Rating | 26,200 [7.68] | 26,200 [7.68] | 26,200 [7.68] |
| System Power KW / COP | 3.34/2.3 | 3.34/2.3 | 3.34/2.3 |
| HSPF2 (Btu/h/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] | 5,900 [2784] | 5,900 [2784] | 5,900 [2784] |
| No. Motors at 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 | 1,050 | 1,050 | 1,050 |
| 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 [4,139] | 146 [4,139] | 146 [4,139] |
| **Weights** | | | |
| Net Weight lbs. [kg] | 562 [245] | 568 [248] | 568 [248] |
| Ship Weight lbs. [kg] | 600 [262] | 606 [264] | 606 [264] |

## Appendix A – General Product Data

| Model (-)HPCYB Series | 072ACT | 072ACU | 072ADT | 072ADU |
|---|---|---|---|---|
| **Cooling Performance[A]** | | | | |
| Gross Cooling Capacity Btu/h [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] | 2,400 [1,133] | 2,400 [1,133] | 2,400 [1,133] | 2,400 [1,133] |
| AHRI Rated CFM [L/s] | 2,360 [1,114] | 2,360 [1,114] | 2,360 [1,114] | 2,360 [1,114] |
| AHRI Net Cooling Capacity Btu/h [kW] | 68,500 [20.08] | 68,500 [20.08] | 68,500 [20.08] | 68,500 [20.08] |
| Net Sensible Capacity Btu/h [kW] | 51,500 [15.09] | 51,500 [15.09] | 51,500 [15.09] | 51,500 [15.09] |
| Net Latent Capacity Btu/h [kW] | 17,000 [4.98] | 17,000 [4.98] | 17,000 [4.98] | 17,000 [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. Btu/hh [kW] Rating | 68,000 [19.93] | 68,000 [19.93] | 68,000 [19.93] | 68,000 [19.93] |
| System Power KW / COP | 5.86/3.4 | 5.86/3.4 | 5.86/3.4 | 5.86/3.4 |
| Low Temp. Btu/hh [kW] Rating | 38,500 [11.28] | 38,500 [11.28] | 38,500 [11.28] | 38,500 [11.28] |
| System Power KW / COP | 5.01/2.25 | 5.01/2.25 | 5.01/2.25 | 5.01/2.25 |
| HSPF2 (Btu/h/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] | 5,900 [2,784] | 5,900 [2,784] | 5,900 [2,784] | 5,900 [2,784] |
| No. Motors at 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 | 1,300 | 1,300 | 1,300 | 1,300 |
| 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 [4,026] | 142 [4,026] | 142 [4,026] | 142 [4,026] |
| **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] |

# P. APPENDICES

## 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 |

## 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 |

# P. APPENDICES

## 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 |

## 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 |

# P. APPENDICES

## 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 |

## 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 |

# P. APPENDICES

## 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 |

## 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 |

# P. APPENDICES

## 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 |

## Appendix C – Air Flow Performance Data

| 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 Only - Tap 1 | CFM | 1339 | 1044 | 830 | 747 | 656 | 554 | 481 | 408 |
| | | | | WATTS | 152 | 116 | 104 | 112 | 119 | 126 | 131 | 138 |
| | | 3/4 HP [559] | Low Heat - Tap 2 | CFM | 1627 | 1542 | 1469 | 1399 | 1315 | 1254 | 1186 | 1127 |
| | | | | WATTS | 233 | 246 | 260 | 272 | 285 | 297 | 309 | 320 |
| | | 3/4 HP [559] | High Heat - Tap 3 | CFM | 1887 | 1817 | 1731 | 1673 | 1611 | 1533 | 1476 | 1422 |
| | | | | WATTS | 338 | 354 | 367 | 380 | 395 | 412 | 424 | 440 |
| | | 3/4 HP [559] | Rated Cool - Tap 4 * | CFM | 1520 | 1440 | 1361 | 1273 | 1200 | 1130 | 1060 | 997 |
| | | | | WATTS | 199 | 210 | 223 | 236 | 247 | 258 | 268 | 278 |
| | | 3/4 HP [559] | Max Speed - Tap 5 | CFM | 1787 | 1704 | 1632 | 1568 | 1494 | 1424 | 1371 | 1306 |
| | | | | WATTS | 295 | 308 | 322 | 337 | 353 | 366 | 378 | 391 |
| (-)HPCYB048 (4T) | 1400/1800 | 3/4 HP [559] | Fan Only - Tap 1 | CFM | 1160 | 1080 | 966 | 887 | 811 | 690 | 580 | 517 |
| | | | | WATTS | 106 | 116 | 128 | 136 | 144 | 154 | 160 | 166 |
| | | 3/4 HP [559] | Low Heat - Tap 2 | CFM | 1880 | 1822 | 1759 | 1699 | 1645 | 1568 | 1497 | 1437 |
| | | | | WATTS | 329 | 345 | 363 | 379 | 394 | 413 | 429 | 443 |
| | | 3/4 HP [559] | High Heat - Tap 3 | CFM | 1943 | 1886 | 1826 | 1769 | 1715 | 1651 | 1576 | 1511 |
| | | | | WATTS | 361 | 379 | 396 | 414 | 429 | 447 | 464 | 479 |
| | | 3/4 HP [559] | Rated Cool - Tap 4 * | CFM | 1818 | 1753 | 1686 | 1623 | 1566 | 1485 | 1413 | 1357 |
| | | | | WATTS | 303 | 318 | 336 | 351 | 365 | 383 | 396 | 409 |
| | | 3/4 HP [559] | Max Speed - Tap 5 | CFM | 2128 | 2073 | 2020 | 1961 | 1901 | 1850 | 1808 | 1734 |
| | | | | WATTS | 460 | 479 | 497 | 517 | 537 | 555 | 570 | 593 |
| (-)HPCYB060 (5T) | 1750/2250 | 1 HP [745] | Fan Only - Tap 1 | CFM | 1361 | 1146 | 1040 | 955 | 880 | 795 | 698 | 620 |
| | | | | WATTS | 155 | 132 | 144 | 152 | 161 | 171 | 180 | 187 |
| | | 1 HP [745] | Low Heat - Tap 2 | CFM | 1772 | 1704 | 1642 | 1592 | 1533 | 1441 | 1376 | 1320 |
| | | | | WATTS | 288 | 303 | 318 | 332 | 347 | 364 | 377 | 391 |
| | | 1 HP [745] | High Heat - Tap 3 | CFM | 1984 | 1923 | 1873 | 1821 | 1765 | 1718 | 1644 | 1571 |
| | | | | WATTS | 390 | 407 | 423 | 439 | 456 | 471 | 491 | 508 |
| | | 1 HP [745] | Rated Cool - Tap 4 * | CFM | 2298 | 2237 | 2192 | 2143 | 2092 | 2047 | 2004 | 1960 |
| | | | | WATTS | 571 | 592 | 611 | 631 | 651 | 670 | 690 | 709 |
| | | 1 HP [745] | Max Speed - Tap 5 | CFM | 2416 | 2360 | 2320 | 2263 | 2223 | 2172 | 2138 | 2088 |
| | | | | WATTS | 668 | 689 | 709 | 730 | 750 | 771 | 789 | 811 |
| (-)HPCYB072 (6T) | 2100/2700 | 1.2 HP [895] | Fan/Low Heat - Tap 1 | CFM | 1476 | 1410 | 1341 | 1266 | 1169 | 1105 | 1040 | 979 |
| | | | | WATTS | 168.7 | 179.7 | 191.3 | 203.8 | 216.4 | 227 | 236.5 | 245 |
| | | 1.2 HP [895] | High Heat - Tap 2 | CFM | 2017 | 1967 | 1915 | 1861 | 1809 | 1756 | 1705 | 1639 |
| | | | | WATTS | 362.1 | 377.2 | 392.7 | 407.7 | 422.8 | 438.8 | 454.3 | 473 |
| | | 1.2 HP [895] | Low Cool - Tap 3 | CFM | 1654 | 1592 | 1531 | 1470 | 1401 | 1311 | 1250 | 1191 |
| | | | | WATTS | 220.6 | 233.3 | 245.7 | 258.4 | 272.5 | 287.4 | 298.9 | 310.3 |
| | | 1.2 HP [895] | High Cool - Tap 4 | CFM | 2410 | 2370 | 2332 | 2290 | 2248 | 2205 | 2163 | 2120 |
| | | | | WATTS | 583.5 | 602.3 | 620.7 | 639.6 | 658.6 | 678.1 | 696.5 | 716.1 |
| | | 1.2 HP [895] | Max Speed - Tap 5 | CFM | 2497 | 2459 | 2417 | 2377 | 2334 | 2294 | 2253 | 2212 |
| | | | | WATTS | 642.3 | 661.7 | 681.8 | 701.1 | 721.4 | 740.7 | 760 | 780.7 |

**NOTES**

*Factory tap settings are marked with an asterisk**

*Pressure drops across the 3-6T CFM range (1050 -2250). Wet coil: ~0.09 inches W.C.*

*Downflow: ~0.1 inches W.C. Reheat coil: ~0.09 inches W.C.*

| 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 Only - Tap 1 | CFM | 1008 | 892 | 801 | 707 | 614 | 512 | 393 | 323 |
| | | | | WATTS | 108 | 117 | 124 | 132 | 139 | 145 | 153 | 157 |
| | | 3/4 HP [559] | Low Heat - Tap 2 | CFM | 1245 | 1160 | 1068 | 988 | 913 | 827 | 740 | 655 |
| | | | | WATTS | 157 | 166 | 176 | 186 | 194 | 205 | 214 | 222 |
| | | 3/4 HP [559] | High Heat - Tap 3 | CFM | 1848 | 1779 | 1712 | 1646 | 1584 | 1516 | 1456 | 1398 |
| | | | | WATTS | 357 | 373 | 388 | 403 | 416 | 431 | 445 | 459 |
| | | 3/4 HP [559] | Rated Cool - Tap 4 * | CFM | 1495 | 1413 | 1332 | 1245 | 1172 | 1103 | 1032 | 964 |
| | | | | WATTS | 219 | 231 | 243 | 254 | 264 | 275 | 286 | 294 |
| | | 3/4 HP [559] | Max Speed - Tap 5 | CFM | 1755 | 1673 | 1611 | 1540 | 1472 | 1405 | 1346 | 1282 |
| | | | | WATTS | 314 | 328 | 340 | 356 | 368 | 381 | 396 | 409 |
| (-)HPCYB048 (4T) | 1400/1800 | 3/4 HP [559] | Fan Only - Tap 1 | CFM | 1125 | 1045 | 944 | 866 | 794 | 716 | 618 | 541 |
| | | | | WATTS | 103 | 113 | 123 | 132 | 141 | 150 | 159 | 166 |
| | | 3/4 HP [559] | Low Heat - Tap 2 | CFM | 1421 | 1351 | 1286 | 1196 | 1126 | 1060 | 999 | 939 |
| | | | | WATTS | 176 | 189 | 201 | 214 | 225 | 237 | 247 | 256 |
| | | 3/4 HP [559] | High Heat - Tap 3 | CFM | 1878 | 1824 | 1758 | 1698 | 1652 | 1583 | 1519 | 1464 |
| | | | | WATTS | 351 | 367 | 385 | 402 | 416 | 435 | 451 | 466 |
| | | 3/4 HP [559] | Rated Cool - Tap 4 * | CFM | 1753 | 1694 | 1632 | 1573 | 1519 | 1442 | 1391 | 1338 |
| | | | | WATTS | 296 | 310 | 326 | 342 | 357 | 373 | 388 | 403 |
| | | 3/4 HP [559] | Max Speed - Tap 5 | CFM | 2045 | 1995 | 1929 | 1879 | 1826 | 1784 | 1733 | 1659 |
| | | | | WATTS | 442 | 462 | 483 | 501 | 517 | 535 | 552 | 573 |
| (-)HPCYB060 (5T) | 1750/2250 | 1 HP [745] | Fan Only - Tap 1 | CFM | 1169 | 1084 | 986 | 905 | 823 | 725 | 630 | 527 |
| | | | | WATTS | 114 | 124 | 133 | 142 | 149 | 159 | 166 | 174 |
| | | 1 HP [745] | Low Heat - Tap 2 | CFM | 1332 | 1251 | 1166 | 1088 | 1007 | 931 | 847 | 760 |
| | | | | WATTS | 150 | 160 | 172 | 182 | 192 | 201 | 213 | 221 |
| | | 1 HP [745] | High Heat - Tap 3 | CFM | 1964 | 1905 | 1850 | 1799 | 1741 | 1681 | 1619 | 1567 |
| | | | | WATTS | 395 | 412 | 428 | 443 | 458 | 475 | 491 | 505 |
| | | 1 HP [745] | Rated Cool - Tap 4 * | CFM | 2262 | 2211 | 2159 | 2110 | 2059 | 2023 | 1974 | 1907 |
| | | | | WATTS | 578 | 597 | 617 | 635 | 653 | 671 | 689 | 711 |
| | | 1 HP [745] | Max Speed - Tap 5 | CFM | 2406 | 2358 | 2303 | 2256 | 2212 | 2165 | 2125 | 2078 |
| | | | | WATTS | 681 | 702 | 725 | 745 | 764 | 783 | 801 | 820 |
| (-)HPCYB072 (6T) | 2100/2700 | 1.2 HP [895] | Fan/Low Heat - Tap 1 | CFM | 1479 | 1403 | 1318 | 1232 | 1156 | 1095 | 1026 | 945 |
| | | | | WATTS | 166.9 | 177.7 | 189.6 | 201.8 | 211 | 221.9 | 231.4 | 241.3 |
| | | 1.2 HP [895] | High Heat - Tap 2 | CFM | 2075 | 2022 | 1960 | 1904 | 1843 | 1785 | 1716 | 1652 |
| | | | | WATTS | 386.7 | 401.2 | 414.3 | 427 | 442.3 | 457.8 | 472.1 | 484.6 |
| | | 1.2 HP [895] | Low Cool - Tap 3 | CFM | 1685 | 1617 | 1556 | 1484 | 1403 | 1333 | 1272 | 1221 |
| | | | | WATTS | 228 | 240.8 | 254.4 | 267.6 | 279.9 | 290.3 | 301.9 | 315.8 |
| | | 1.2 HP [895] | High Cool - Tap 4 | CFM | 2493 | 2448 | 2408 | 2356 | 2310 | 2262 | 2213 | 2160 |
| | | | | WATTS | 629.1 | 645.9 | 665.6 | 678.7 | 694.1 | 713.8 | 732.9 | 749.5 |
| | | 1.2 HP [895] | Max Speed - Tap 5 | CFM | 2574 | 2529 | 2487 | 2438 | 2397 | 2348 | 2302 | 2249 |
| | | | | WATTS | 688.8 | 706.3 | 720.7 | 735.2 | 754.6 | 773 | 790.7 | 808.4 |

**NOTES**

*Factory tap settings are marked with an asterisk**

*Pressure drops across the 3-6T CFM range (1050 -2250). 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 (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 Only - Tap 1 | CFM | 953 | 882 | 806 | 734 | 658 | 605 | 531 | 480 |
| | | | | WATTS | 264 | 274 | 283 | 291 | 301 | 301 | 312 | 318 |
| | | 1.5 HP [1119] | Low Heat - Tap 2 | CFM | 1506 | 1445 | 1388 | 1339 | 1288 | 1231 | 1179 | 1127 |
| | | | | WATTS | 476 | 490 | 504 | 516 | 529 | 538 | 550 | 562 |
| | | 1.5 HP [1119] | High Heat - Tap 3 | CFM | 1803 | 1749 | 1697 | 1643 | 1593 | 1521 | 1480 | 1438 |
| | | | | WATTS | 641 | 656 | 672 | 688 | 703 | 704 | 719 | 735 |
| | | 1.5 HP [1119] | Rated Cool - Tap 4 * | CFM | 1391 | 1335 | 1277 | 1230 | 1166 | 1114 | 1050 | 977 |
| | | | | WATTS | 426 | 438 | 451 | 463 | 472 | 481 | 493 | 504 |
| | | 1.5 HP [1119] | Max Speed - Tap 5 | CFM | 1660 | 1611 | 1556 | 1503 | 1454 | 1413 | 1364 | 1317 |
| | | | | WATTS | 563 | 577 | 592 | 606 | 621 | 633 | 648 | 662 |
| (-)HPCYB048 (4T) | 1400/1800 | 1.5 HP [1119] | Fan Only - Tap 1 | CFM | 1093 | 1033 | 962 | 881 | 810 | 737 | 669 | 595 |
| | | | | WATTS | 304 | 315 | 326 | 337 | 346 | 353 | 361 | 362 |
| | | 1.5 HP [1119] | Low Heat - Tap 2 | CFM | 1834 | 1784 | 1738 | 1690 | 1646 | 1600 | 1554 | 1511 |
| | | | | WATTS | 655 | 672 | 689 | 705 | 721 | 739 | 756 | 772 |
| | | 1.5 HP [1119] | High Heat - Tap 3 | CFM | 1910 | 1855 | 1814 | 1765 | 1717 | 1677 | 1627 | 1582 |
| | | | | WATTS | 704 | 721 | 737 | 755 | 772 | 787 | 805 | 821 |
| | | 1.5 HP [1119] | Rated Cool - Tap 4 * | CFM | 1763 | 1714 | 1663 | 1617 | 1569 | 1517 | 1469 | 1423 |
| | | | | WATTS | 614 | 629 | 644 | 660 | 675 | 690 | 705 | 721 |
| | | 1.5 HP [1119] | Max Speed - Tap 5 | CFM | 1816 | 1833 | 1868 | 1965 | 1925 | 1887 | 1849 | 1809 |
| | | | | WATTS | 844 | 865 | 884 | 905 | 924 | 944 | 964 | 983 |
| (-)HPCYB060 (5T) | 1750/2250 | 1.5 HP [1119] | Fan Only - Tap 1 | CFM | 1152 | 1097 | 1047 | 951 | 884 | 809 | 743 | 680 |
| | | | | WATTS | 325 | 336 | 350 | 359 | 367 | 376 | 384 | 390 |
| | | 1.5 HP [1119] | Low Heat - Tap 2 | CFM | 1710 | 1667 | 1618 | 1570 | 1525 | 1477 | 1427 | 1384 |
| | | | | WATTS | 585 | 599 | 615 | 631 | 647 | 663 | 679 | 694 |
| | | 1.5 HP [1119] | High Heat - Tap 3 | CFM | 1933 | 1879 | 1836 | 1792 | 1744 | 1703 | 1659 | 1615 |
| | | | | WATTS | 723 | 740 | 757 | 775 | 793 | 810 | 826 | 843 |
| | | 1.5 HP [1119] | Rated Cool - Tap 4 * | CFM | 2383 | 2349 | 2310 | 2254 | 2211 | 2166 | 2134 | 2094 |
| | | | | WATTS | 1100 | 1118 | 1138 | 1165 | 1187 | 1210 | 1230 | 1251 |
| | | 1.5 HP [1119] | Max Speed - Tap 5 | CFM | 2259 | 2219 | 2163 | 2113 | 2073 | 2036 | 2000 | 1960 |
| | | | | WATTS | 971 | 991 | 1014 | 1036 | 1056 | 1077 | 1097 | 1118 |
| (-)HPCYB072 (6T) | 2100/2700 | 1.2 HP [895] | Fan/Low Heat - Tap 1 | CFM | 1384 | 1332 | 1277 | 1225 | 1170 | 1111 | 1032 | 962 |
| | | | | WATTS | 378.9 | 391.7 | 404.4 | 415.8 | 427.2 | 438.5 | 449.5 | 459.8 |
| | | 1.2 HP [895] | High Heat - Tap 2 | CFM | 2036 | 1991 | 1943 | 1888 | 1831 | 1781 | 1741 | 1706 |
| | | | | WATTS | 667.5 | 685.9 | 708.2 | 731.9 | 754.4 | 777.2 | 795.5 | 816.7 |
| | | 1.2 HP [895] | Low Cool - Tap 3 | CFM | 1674 | 1596 | 1548 | 1501 | 1455 | 1410 | 1361 | 1315 |
| | | | | WATTS | 486.5 | 505.3 | 521 | 536.8 | 551.7 | 566.2 | 580.8 | 593.5 |
| | | 1.2 HP [895] | High Cool - Tap 4 | CFM | 2395 | 2356 | 2317 | 2279 | 2240 | 2208 | 2172 | 2138 |
| | | | | WATTS | 916 | 938.6 | 961.3 | 986.2 | 1013.5 | 1041.3 | 1077.9 | 1114.5 |
| | | 1.2 HP [895] | Max Speed - Tap 5 | CFM | 2480 | 2443 | 2407 | 2371 | 2337 | 2302 | 2275 | 2246 |
| | | | | WATTS | 984.2 | 1008.7 | 1033.9 | 1061.5 | 1089.5 | 1120.9 | 1156.1 | 1195.2 |

**NOTES**

*Factory tap settings are marked with an asterisk**

*Pressure drops across the 3-6T CFM range (1050 -2250). 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 (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 Only - Tap 1 | CFM | 910 | 845 | 762 | 694 | 632 | 584 | 522 | 471 |
| | | | | WATTS | 282 | 290 | 299 | 307 | 316 | 323 | 332 | 340 |
| | | 1 HP [745] | Low Heat - Tap 2 | CFM | 1171 | 1114 | 1052 | 989 | 924 | 858 | 788 | 739 |
| | | | | WATTS | 367 | 379 | 390 | 400 | 410 | 419 | 431 | 438 |
| | | 1 HP [745] | High Heat - Tap 3 | CFM | 1790 | 1736 | 1684 | 1625 | 1575 | 1519 | 1474 | 1436 |
| | | | | WATTS | 672 | 690 | 704 | 720 | 735 | 750 | 766 | 779 |
| | | 1 HP [745] | Rated Cool - Tap 4 * | CFM | 1387 | 1341 | 1268 | 1216 | 1164 | 1104 | 1043 | 981 |
| | | | | WATTS | 457 | 466 | 482 | 494 | 507 | 519 | 531 | 541 |
| | | 1 HP [745] | Max Speed - Tap 5 | CFM | 1720 | 1667 | 1615 | 1561 | 1474 | 1415 | 1364 | 1321 |
| | | | | WATTS | 623 | 641 | 658 | 677 | 672 | 681 | 696 | 710 |
| (-)HPCYB048 (4T) | 1400/1800 | 1 HP [745] | Fan Only - Tap 1 | CFM | 871 | 798 | 721 | 644 | 567 | 490 | 413 | 336 |
| | | | | WATTS | 249 | 259 | 270 | 281 | 292 | 302 | 313 | 324 |
| | | 1 HP [745] | Low Heat - Tap 2 | CFM | 1344 | 1292 | 1239 | 1192 | 1138 | 1084 | 1007 | 953 |
| | | | | WATTS | 458 | 470 | 481 | 490 | 500 | 510 | 525 | 534 |
| | | 1 HP [745] | High Heat - Tap 3 | CFM | 1907 | 1867 | 1819 | 1770 | 1721 | 1673 | 1624 | 1575 |
| | | | | WATTS | 711 | 728 | 746 | 765 | 784 | 802 | 821 | 840 |
| | | 1 HP [745] | Rated Cool - Tap 4 * | CFM | 1567 | 1510 | 1453 | 1396 | 1339 | 1282 | 1225 | 1169 |
| | | | | WATTS | 505 | 522 | 537 | 553 | 569 | 584 | 600 | 616 |
| | | 1 HP [745] | Max Speed - Tap 5 | CFM | 2078 | 2027 | 1981 | 1934 | 1887 | 1840 | 1793 | 1747 |
| | | | | WATTS | 820 | 841 | 861 | 881 | 900 | 920 | 940 | 960 |
| (-)HPCYB060 (5T) | 1750/2250 | 1.2 HP [895] | Fan Only - Tap 1 | CFM | 1127 | 1073 | 1018 | 932 | 841 | 775 | 720 | 678 |
| | | | | WATTS | 303 | 311 | 321 | 335 | 345 | 354 | 360 | 367 |
| | | 1.2 HP [895] | Low Heat - Tap 2 | CFM | 1242 | 1192 | 1140 | 1088 | 1021 | 926 | 853 | 803 |
| | | | | WATTS | 345 | 354 | 366 | 376 | 388 | 400 | 410 | 419 |
| | | 1.2 HP [895] | High Heat - Tap 3 | CFM | 1917 | 1844 | 1778 | 1732 | 1681 | 1639 | 1595 | 1553 |
| | | | | WATTS | 653 | 670 | 687 | 704 | 716 | 729 | 741 | 754 |
| | | 1.2 HP [895] | Rated Cool - Tap 4 * | CFM | 2236 | 2192 | 2123 | 2062 | 2009 | 1950 | 1903 | 1861 |
| | | | | WATTS | 845 | 869 | 893 | 918 | 940 | 950 | 966 | 979 |
| | | 1.2 HP [895] | Max Speed - Tap 5 | CFM | 2378 | 2313 | 2257 | 2196 | 2133 | 2077 | 2028 | 1974 |
| | | | | WATTS | 942 | 968 | 990 | 1017 | 1041 | 1055 | 1073 | 1082 |
| (-)HPCYB072 (6T) | 2100/2700 | 1.2 HP [895] | Fan/Low Heat - Tap 1 | CFM | 1388 | 1335 | 1283 | 1222 | 1153 | 1075 | 999 | 911 |
| | | | | WATTS | 379 | 390.3 | 403.1 | 413.7 | 423.3 | 434 | 445.7 | 455.9 |
| | | 1.2 HP [895] | High Heat - Tap 2 | CFM | 2081 | 2025 | 1966 | 1908 | 1857 | 1810 | 1763 | 1719 |
| | | | | WATTS | 703.1 | 720.7 | 734.9 | 750.7 | 766.1 | 782.6 | 798 | 811.5 |
| | | 1.2 HP [895] | Low Cool - Tap 3 | CFM | 1638 | 1583 | 1529 | 1478 | 1422 | 1362 | 1303 | 1239 |
| | | | | WATTS | 481.9 | 494.6 | 508 | 519 | 529.5 | 540.2 | 550.5 | 564.5 |
| | | 1.2 HP [895] | High Cool - Tap 4 | CFM | 2517 | 2468 | 2420 | 2374 | 2317 | 2268 | 2220 | 2164 |
| | | | | WATTS | 1010.5 | 1029.5 | 1051.3 | 1070.9 | 1086 | 1104.4 | 1123.7 | 1139.8 |
| | | 1.2 HP [895] | Max Speed - Tap 5 | CFM | 2676 | 2630 | 2592 | 2533 | 2487 | 2417 | 2344 | 2271 |
| | | | | WATTS | 1153.9 | 1173.6 | 1202.8 | 1217.3 | 1238.4 | 1239.1 | 1237.7 | 1234.1 |

**NOTES**

*Factory tap settings are marked with an asterisk**

*Pressure drops across the 3-6T CFM range (1050 -2250). 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.)

| 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** | **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 |

# P. APPENDICES

## 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 |

# Appendix D – Performance Data for 3 Ton

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

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

# P. APPENDICES

## Appendix D – Performance Data for 3 Ton

| HEATING PERFORMANCE DATA - (-)HPCYB036 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Outdoor Dry Bulb Temperature | IDB | 60ºF [15.5ºC] | | | 70ºF [21.1ºC] | | | 80ºF [26.7ºC] | | | | | |
| | CFM [L/s] | 1350 [637] | 1175 [555] | 975 [460] | 1350 [637] | 1175 [555] | 975 [460] | 1350 [637] | 1175 [555] | 975 [460] | | | |
| 0ºF [-17.8ºC] | Total kBtu/h [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 | | | |
| 5ºF [-15.0ºC] | Total kBtu/h [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 | | | |
| 10ºF [-12.2ºC] | Total kBtu/h [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 | | | |
| 15ºF [-9.4ºC] | Total kBtu/h [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 | | | |
| 20ºF [-6.7ºC] | Total kBtu/h [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 | | | |
| 25ºF [-3.9ºC] | Total kBtu/h [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 | | | |
| 30ºF [-1.1ºC] | Total kBtu/h [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 | | | |
| 35ºF [1.7ºC] | Total kBtu/h [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 | | | |
| 40ºF [4.4ºC] | Total kBtu/h [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 | | | |
| 45ºF [7.2ºC] | Total kBtu/h [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 | | | |
| 50ºF [10.0ºC] | Total kBtu/h [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 | | | |

**DR — Depression ratio**
**dbE — Entering air dry bulb**
**wbE — Entering air wet bulb**
**Power — kW input**
**NOTES: When the entering air dry bulb is other than 80ºF [27ºF], adjust the sensible capacity from the table by adding [1.10 x CFM x (1 – DR) x (dbE – 80)].**

# Appendix D – Performance Data for 4 Ton

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

DR — Depression ratio
dbE — Entering air dry bulb
wbE — Entering air wet bulb
Power — kW input
NOTES: When the entering air dry bulb is other than 80ºF [27ºF], adjust the sensible capacity from the table by adding [1.10 x CFM x (1 – DR) x (dbE – 80)].

# P. APPENDICES

## Appendix D – Performance Data for 4 Ton

| HEATING PERFORMANCE DATA - (-)HPCYB048 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IDB | | | 60°F [15.5°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] |
| Outdoor Dry Bulb Temperature | 0°F [-17.8°C] | Total kBtu/h [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 kBtu/h [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 kBtu/h [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 kBtu/h [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 kBtu/h [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 kBtu/h [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 kBtu/h [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 kBtu/h [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 kBtu/h [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 kBtu/h [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 kBtu/h [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 |

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

# Appendix D – Performance Data for 5 Ton

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

DR — Depression ratio
dbE — Entering air dry bulb
wbE — Entering air wet bulb
Power — kW input
NOTES: When the entering air dry bulb is other than 80ºF [27ºF], adjust the sensible capacity from the table by adding [1.10 x CFM x (1 – DR) x (dbE – 80)].

# P. APPENDICES

## Appendix D – Performance Data for 5 Ton

| HEATING PERFORMANCE DATA - (-)HPCYB060 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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] | | |
| Outdoor Dry Bulb Temperature | 0°F [-17.8°C] | Total kBtu/h [kW] Power | 17 [5] 3.4 | 17 [5] 3.5 | 16.7 [4.9] 3.6 | 20.7 [6.1] 4 | 20.6 [6] 4 | 20.3 [5.9] 4.2 | 24.4 [7.2] 4.6 | 24.3 [7.1] 4.6 | 23.9 [7] 4.7 | |
| | 5°F [-15.0°C] | Total kBtu/h [kW] Power | 20.5 [6] 3.5 | 20.4 [6] 3.5 | 20.1 [5.9] 3.6 | 24.2 [7.1] 4.1 | 24.1 [7.1] 4.1 | 23.7 [6.9] 4.2 | 27.8 [8.1] 4.6 | 27.7 [8.1] 4.6 | 27.3 [8] 4.8 | |
| | 10°F [-12.2°C] | Total kBtu/h [kW] Power | 24 [7] 3.5 | 23.9 [7] 3.5 | 23.5 [6.9] 3.6 | 27.6 [8.1] 4.1 | 27.6 [8.1] 4.1 | 27.1 [7.9] 4.2 | 31.3 [9.2] 4.6 | 31.2 [9.1] 4.6 | 30.7 [9] 4.8 | |
| | 15°F [-9.4°C] | Total kBtu/h [kW] Power | 27.4 [8] 3.6 | 27.4 [8] 3.6 | 26.9 [7.9] 3.7 | 31.1 [9.1] 4.1 | 31 [9.1] 4.1 | 30.5 [8.9] 4.3 | 34.8 [10.2] 4.7 | 34.7 [10.2] 4.7 | 34.1 [10] 4.8 | |
| | 20°F [-6.7°C] | Total kBtu/h [kW] Power | 30.9 [9.1] 3.6 | 30.8 [9] 3.6 | 30.3 [8.9] 3.7 | 34.6 [10.1] 4.2 | 34.5 [10.1] 4.2 | 33.9 [9.9] 4.3 | 38.2 [11.2] 4.7 | 38.1 [11.2] 4.7 | 37.4 [11] 4.9 | |
| | 25°F [-3.9°C] | Total kBtu/h [kW] Power | 34.4 [10.1] 3.6 | 34.3 [10.1] 3.6 | 33.7 [9.9] 3.8 | 38 [11.1] 4.2 | 37.9 [11.1] 4.2 | 37.3 [10.9] 4.4 | 41.7 [12.2] 4.7 | 41.6 [12.2] 4.8 | 0.8 [12] 4.9 | |
| | 30°F [-1.1°C] | Total kBtu/h [kW] Power | 37.8 [11.1] 3.7 | 37.7 [11] 3.7 | 37.1 [10.9] 3.8 | 41.5 [12.2] 4.2 | 41.4 [12.1] 4.3 | 40.7 [11.9] 4.4 | 45.2 [13.2] 4.8 | 45 [13.2] 4.8 | 44.2 [13] 4.9 | |
| | 35°F [1.7°C] | Total kBtu/h [kW] Power | 41.3 [12.1] 3.7 | 41.2 [12.1] 3.7 | 40.5 [11.9] 3.8 | 45 [13.2] 4.3 | 44.8 [13.1] 4.3 | 44.1 [12.9] 4.4 | 48.6 [14.2] 4.8 | 48.5 [14.2] 4.8 | 47.6 [14] 5 | |
| | 40°F [4.4°C] | Total kBtu/h [kW] Power | 44.8 [13.1] 3.7 | 44.7 [13.1] 3.8 | 43.9 [12.9] 3.9 | 48.4 [14.2] 4.3 | 48.3 [14.2] 4.3 | 47.5 [13.9] 4.5 | 52.1 [15.3] 4.8 | 52 [15.2] 4.9 | 51 [14.9] 5 | |
| | 45°F [7.2°C] | Total kBtu/h [kW] Power | 48.2 [14.1] 3.8 | 48.1 [14.1] 3.8 | 47.3 [13.9] 3.9 | 51.9 [15.2] 4.3 | 51.8 [15.2] 4.4 | 50.9 [14.9] 4.5 | 55.6 [16.3] 4.9 | 55.4 [16.2] 4.9 | 54.4 [15.9] 5.1 | |
| | 50°F [10.0°C] | Total kBtu/h [kW] Power | 51.7 [15.2] 3.8 | 51.6 [15.1] 3.8 | 50.7 [14.9] 4 | 55.4 [16.2] 4.4 | 55.2 [16.2] 4.4 | 54.2 [15.9] 4.5 | 59 [17.3] 4.9 | 58.9 [17.3] 4.9 | 57.8 [16.9] 5.1 | |

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

# Appendix D – Performance Data for 6 Ton

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

DR — Depression ratio
dbE — Entering air dry bulb
wbE — Entering air wet bulb
Power — kW input
NOTES: When the entering air dry bulb is other than 80ºF [27ºF], adjust the sensible capacity from the table by adding [1.10 x CFM x (1 – DR) x (dbE – 80)].

# P. APPENDICES

## Appendix D – Performance Data for 6 Ton

| HEATING PERFORMANCE DATA - (-)HPCYB072 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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] | | | |
| Outdoor Dry Bulb Temperature | 0°F [-17.8°C] | Total kBtu/h [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 kBtu/h [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 kBtu/h [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 kBtu/h [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 kBtu/h [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 kBtu/h [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 kBtu/h [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 kBtu/h [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 kBtu/h [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 kBtu/h [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 kBtu/h [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 | | |

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

## 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 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 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 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 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 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 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 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 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 |

| 460V, 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 | | | | | |
| UNIT MODEL NUMBER (-)HPCCYB | 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 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 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 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 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 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 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 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 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 |

## Appendix E – Heater Kit Characteristics

208/230V, ONE 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. | AIR COND. MAX. FUSE OR CKT. BKR. SIZE WITH OPTIONAL POWERED EXHAUST |
| 036AJT HEATER 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 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 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 |

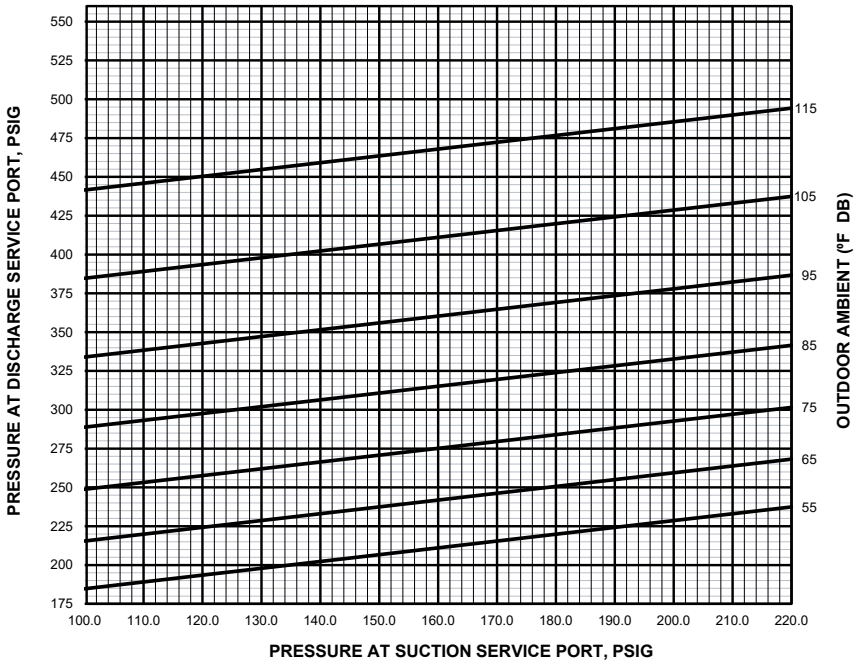
# P. APPENDICES

## Appendix F – A2L Refrigerant Installation Safety Data

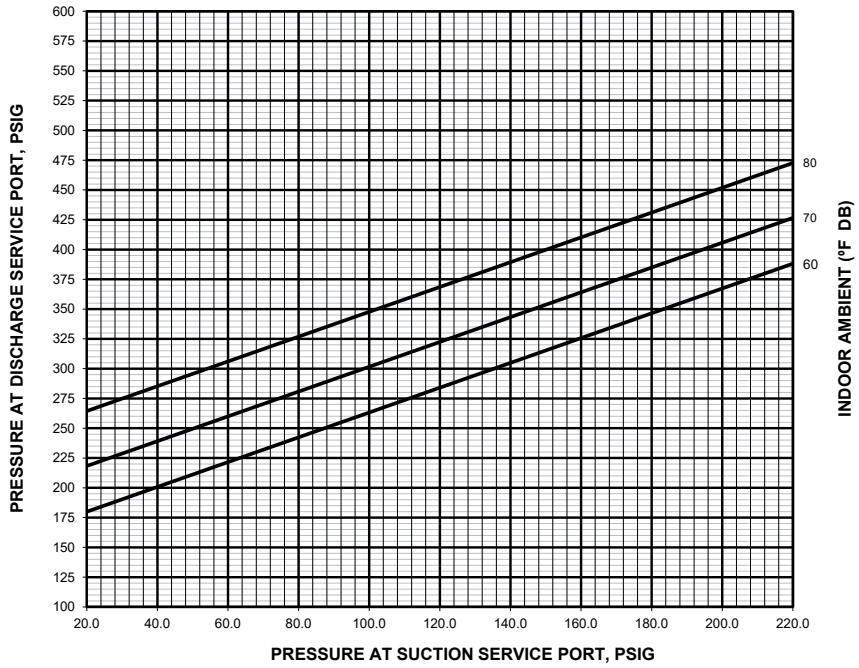
| | | (-)HPCYB036 | (-)HPCYB048 | (-)HPCYB060 | (-)HPCYB072 |
|---|---|---|---|---|---|
| Refrigerant Charge Weight (oz) | | 84 | 143 | 146 | 142 |
| Minimum Circulation Airflow, Qmin (cfm) | | 279 | 476 | 486 | 472 |
| Installed Altitude (ft above sea level) | Altitude Adjustment Factor | Minimum Total Conditioned Room Area, TAmin (sq ft) | | | |
| 0 | 1.000 | 155 | 264 | 269 | 262 |
| 1000 | 1.025 | 159 | 270 | 276 | 268 |
| 2000 | 1.051 | 163 | 277 | 283 | 275 |
| 3000 | 1.078 | 167 | 284 | 290 | 282 |
| 4000 | 1.107 | 171 | 292 | 298 | 290 |
| 5000 | 1.138 | 176 | 300 | 306 | 298 |
| 6000 | 1.170 | 181 | 308 | 315 | 306 |
| 6500 | 1.187 | 184 | 313 | 319 | 311 |

## 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**

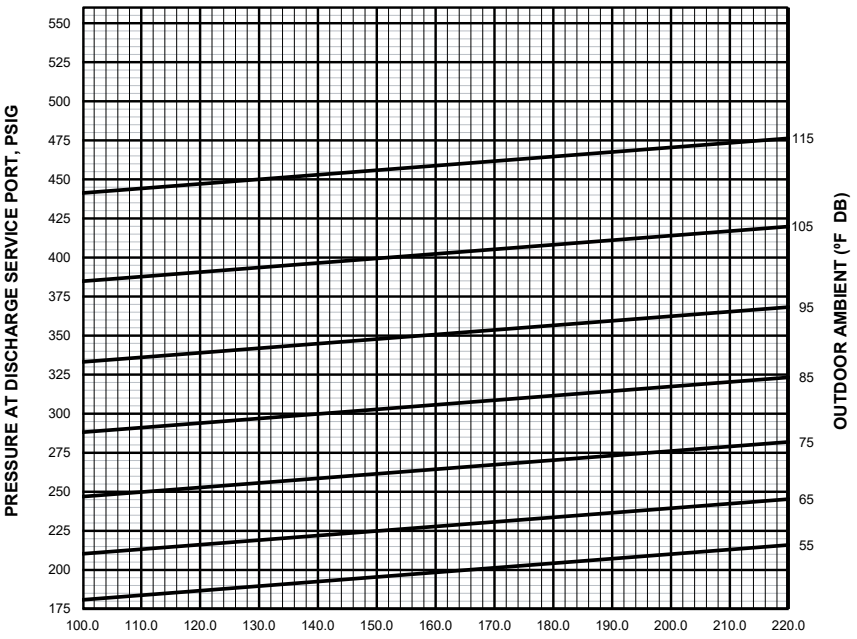
**NOTE:** FACTORY CHARGE CHART AND/OR DESIGN TARGET SUBCOOLING ARE FOR GROSS CHARGE VERIFICATION. ANY ADJUSTMENT SHALL NOT EXCEED 2% OF THE TOTAL REFRIGERANT WEIGHT LISTED ON THE RATING PLATE OF THE UNIT AND SHOULD NOT SUPERSEDE CORRECTLY WEIGHED-IN REFRIGERANT. REFER TO THE REFRIGERANT CHARGE VERIFICATION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

92-106696-27-00

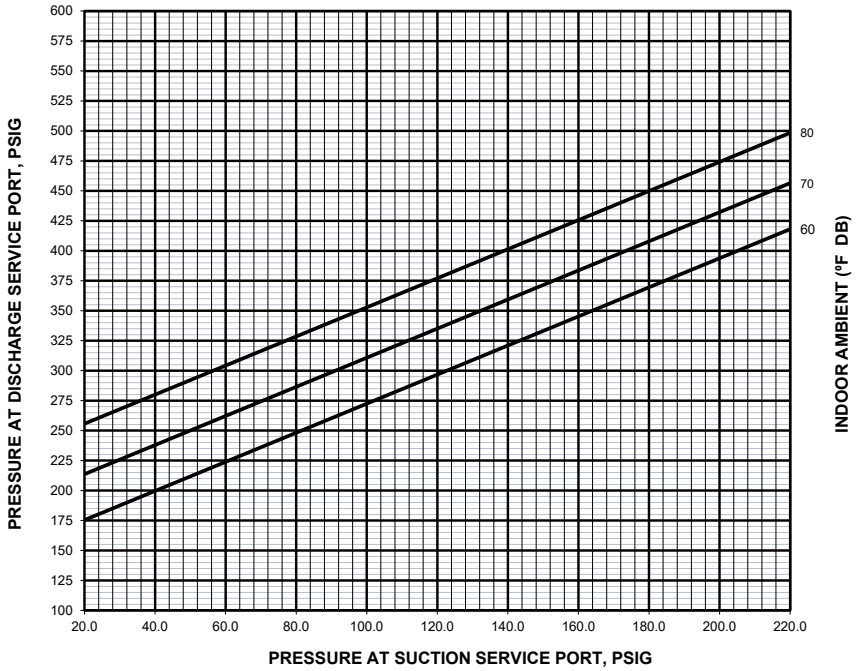
# P. APPENDICES

## 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!**

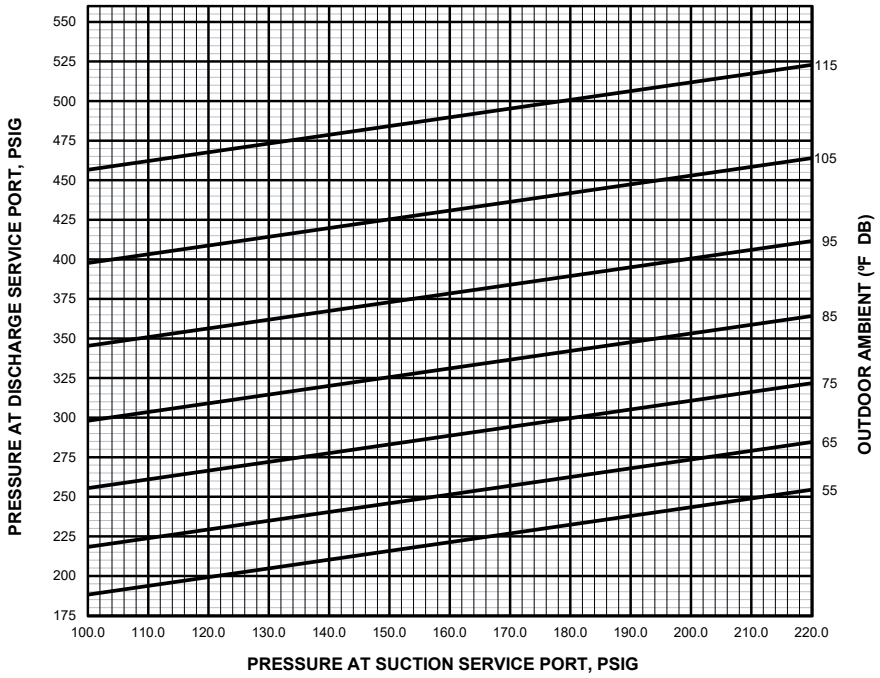
**NOTE: DESIGN SUBCOOLING (AT SERVICE PORT) @ 95°F OUTDOOR = 12°F.**

**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.

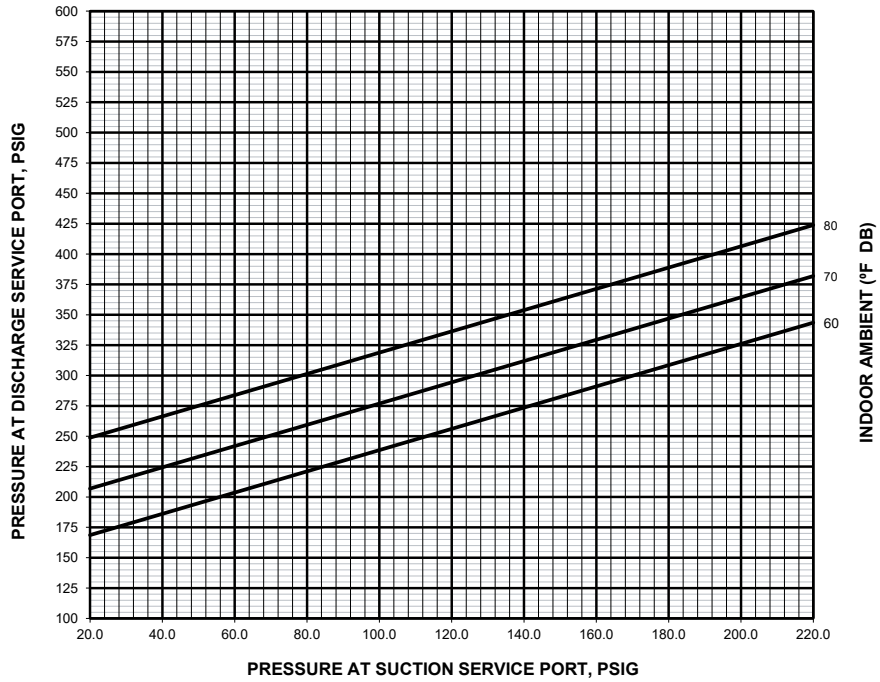
92-106696-28-00

## 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.**

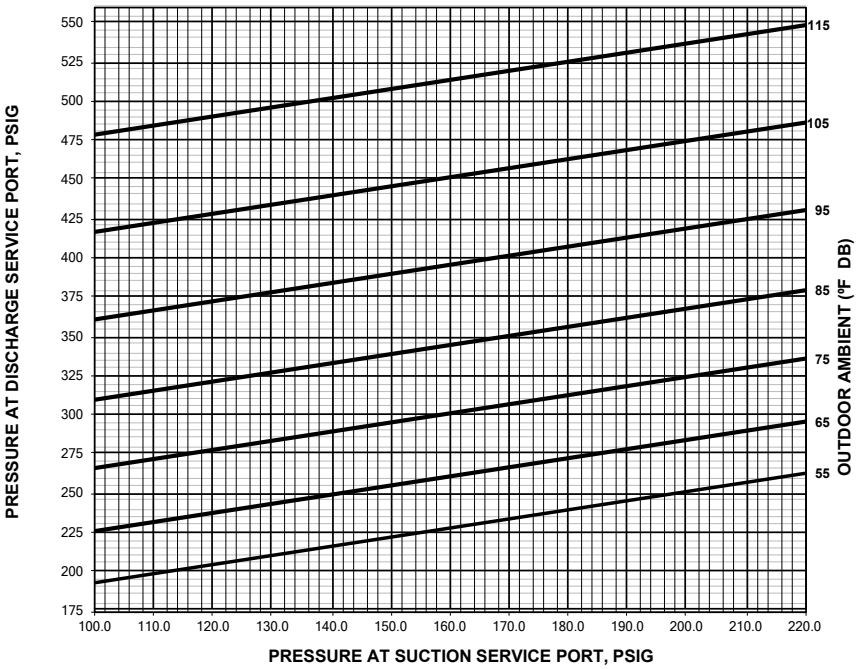
**NOTE:** FACTORY CHARGE CHART AND/OR DESIGN TARGET SUBCOOLING ARE FOR GROSS CHARGE VERIFICATION. ANY ADJUSTMENT SHALL NOT EXCEED 2% OF THE TOTAL REFRIGERANT WEIGHT LISTED ON THE RATING PLATE OF THE UNIT AND SHOULD NOT SUPERSEDE CORRECTLY WEIGHED-IN REFRIGERANT. REFER TO THE REFRIGERANT CHARGE VERIFICATION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

92-106696-26-00

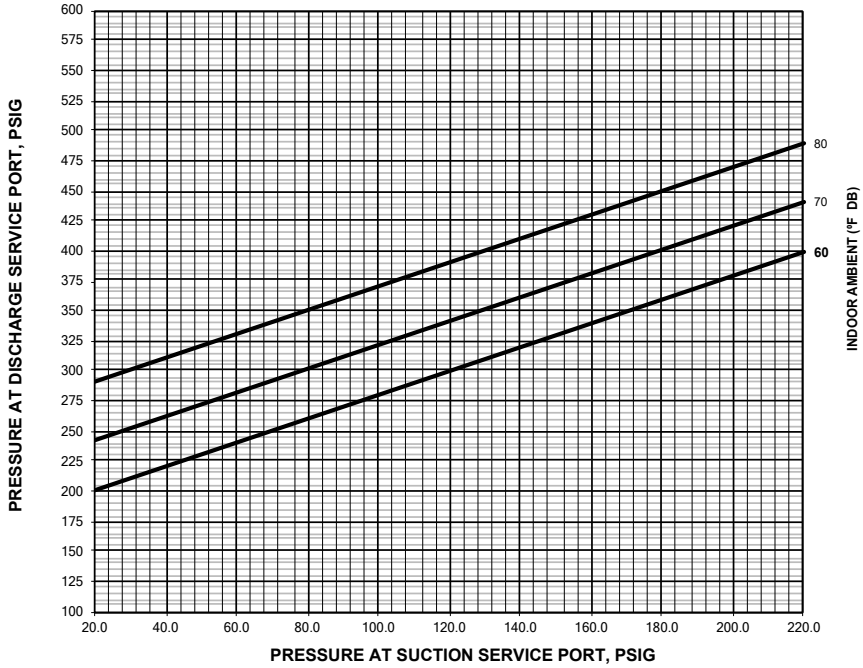
# P. APPENDICES

## 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

## 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 | 11 | 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.

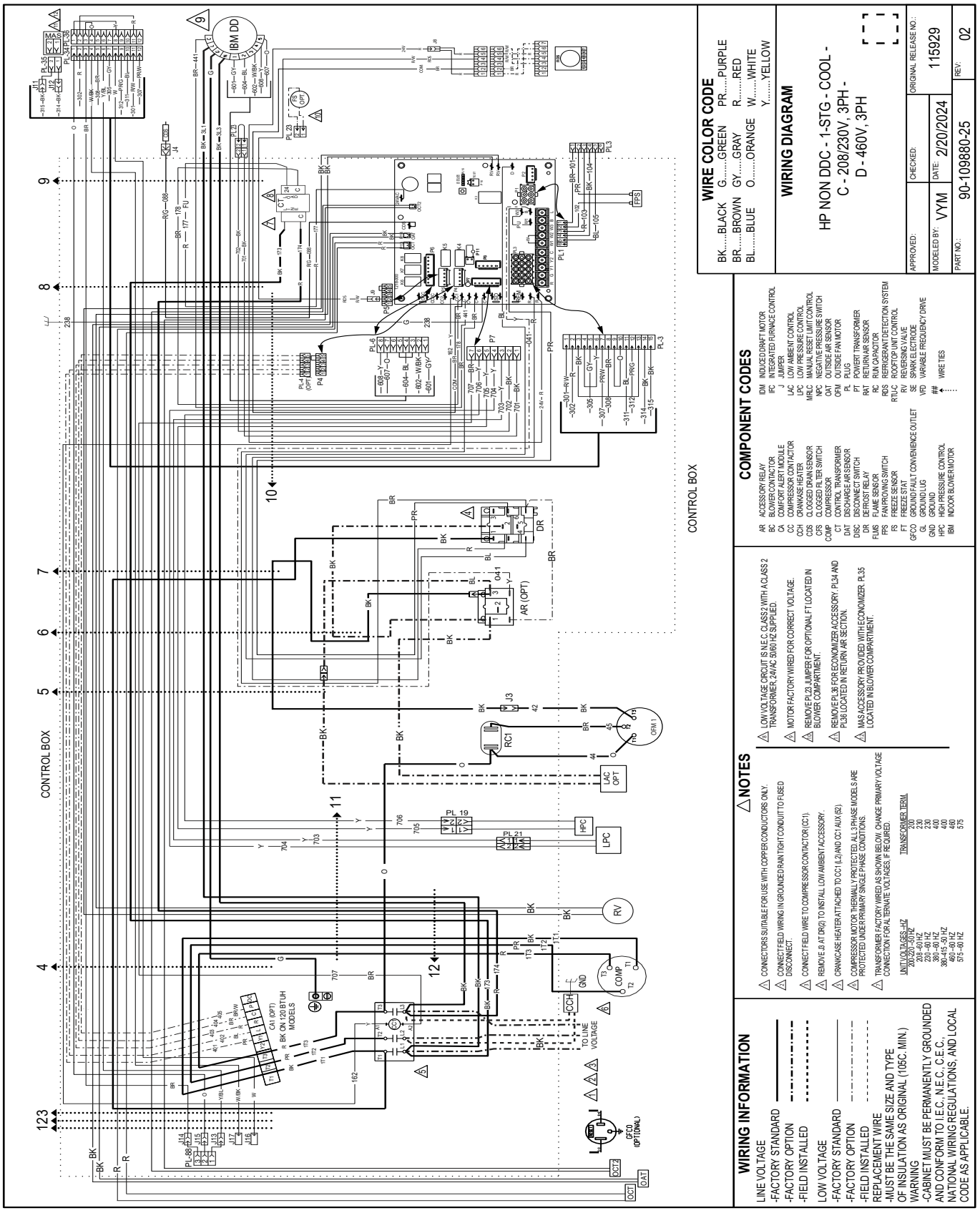
   a. Take extreme care not to overfill the refrigerating system.

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.

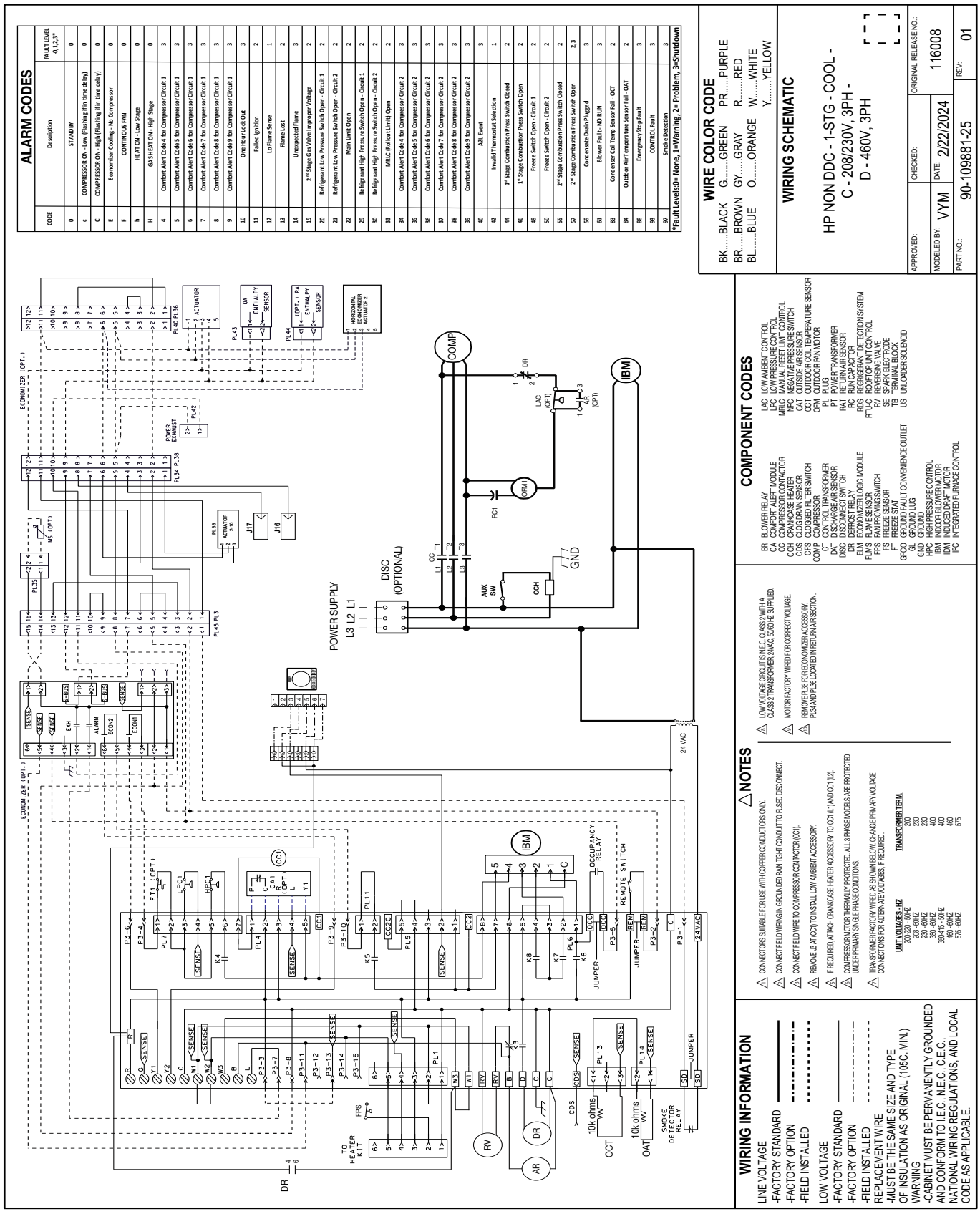
   a. Take extreme care not to overfill the refrigerating system.

# P. APPENDICES

## Appendix H — Wiring Diagrams & Schematics

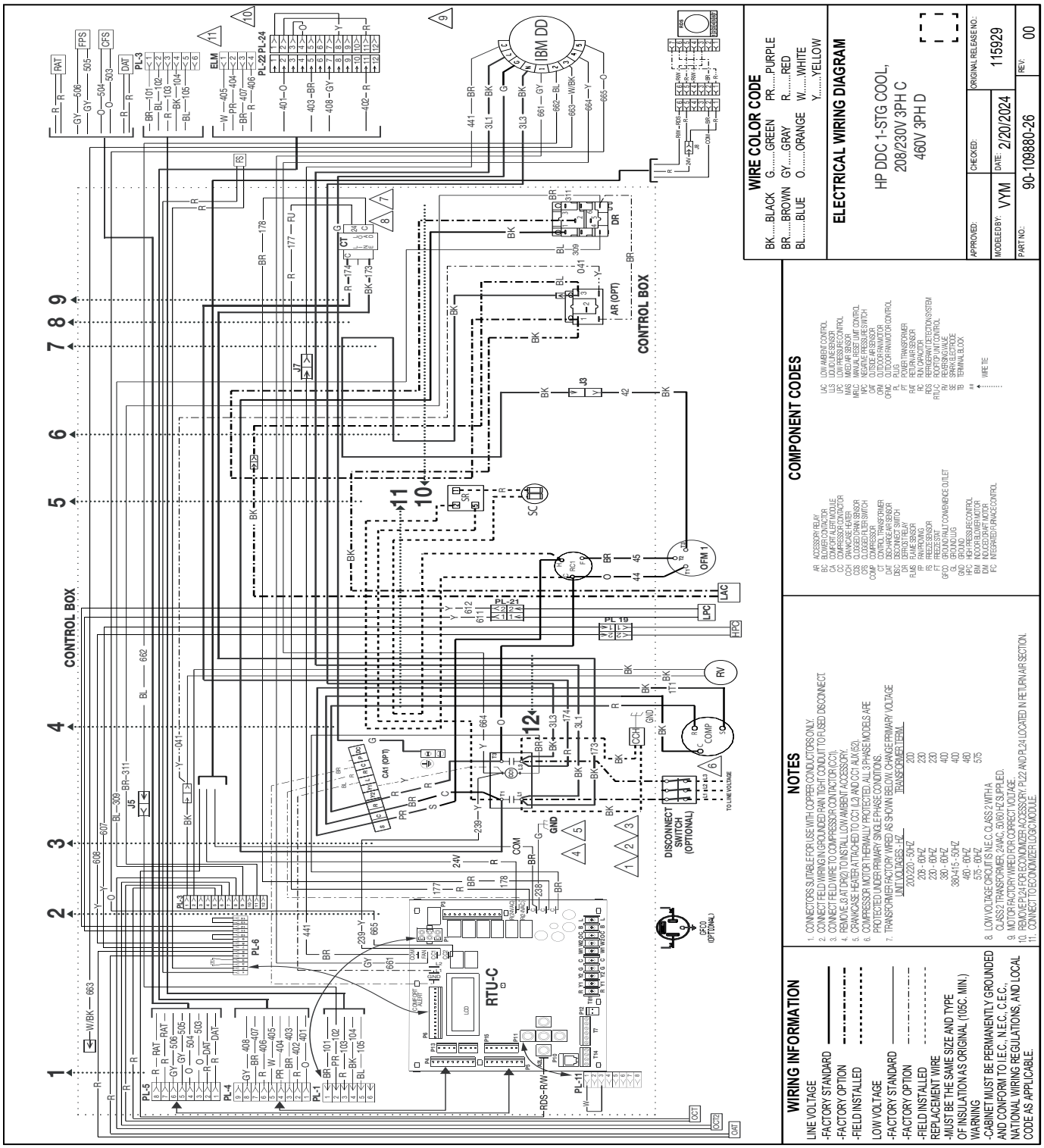


## Appendix H — Wiring Diagrams & Schematics (Cont.)

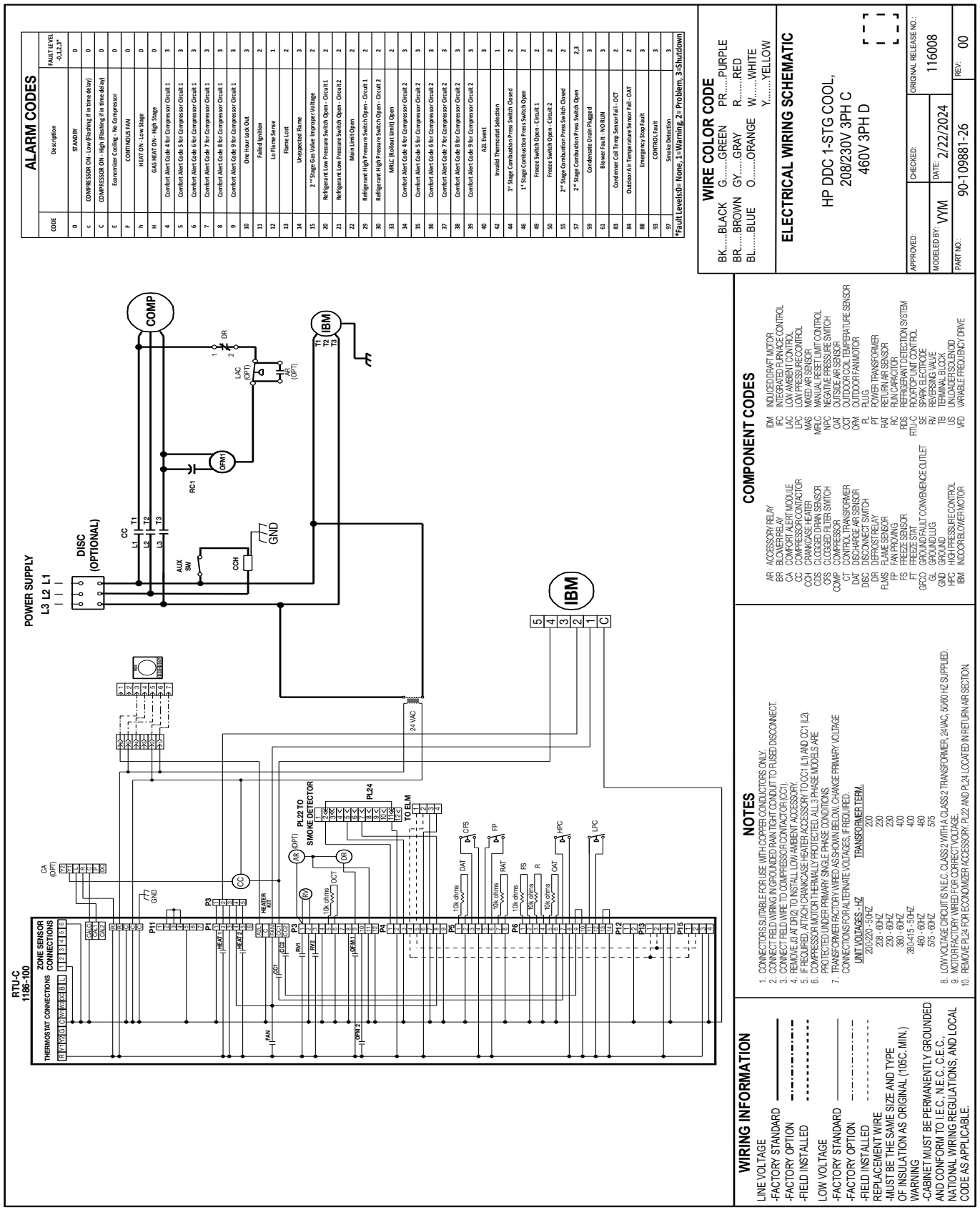


# P. APPENDICES

## Appendix H — Wiring Diagrams & Schematics (Cont.)

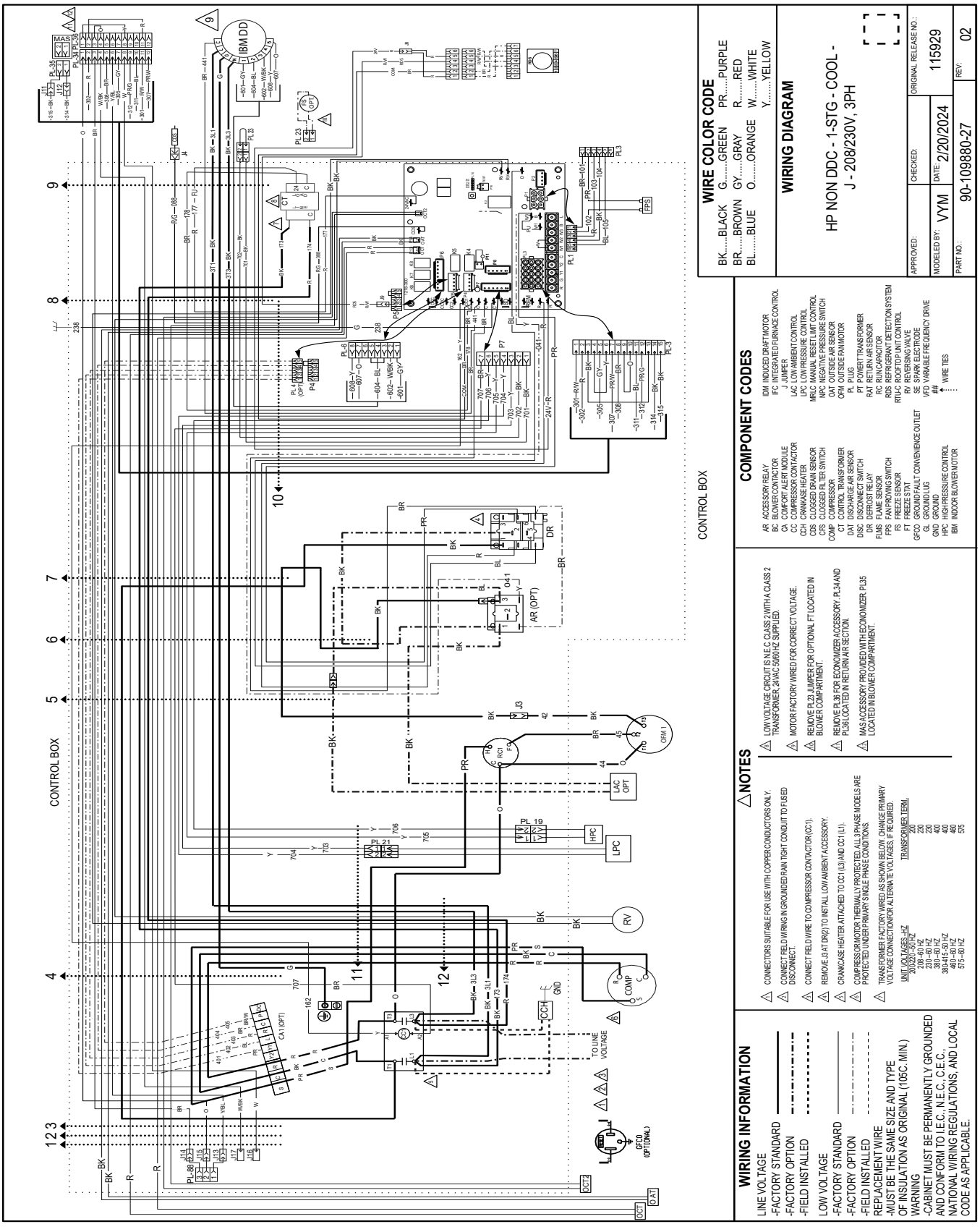


## Appendix H — Wiring Diagrams & Schematics (Cont.)

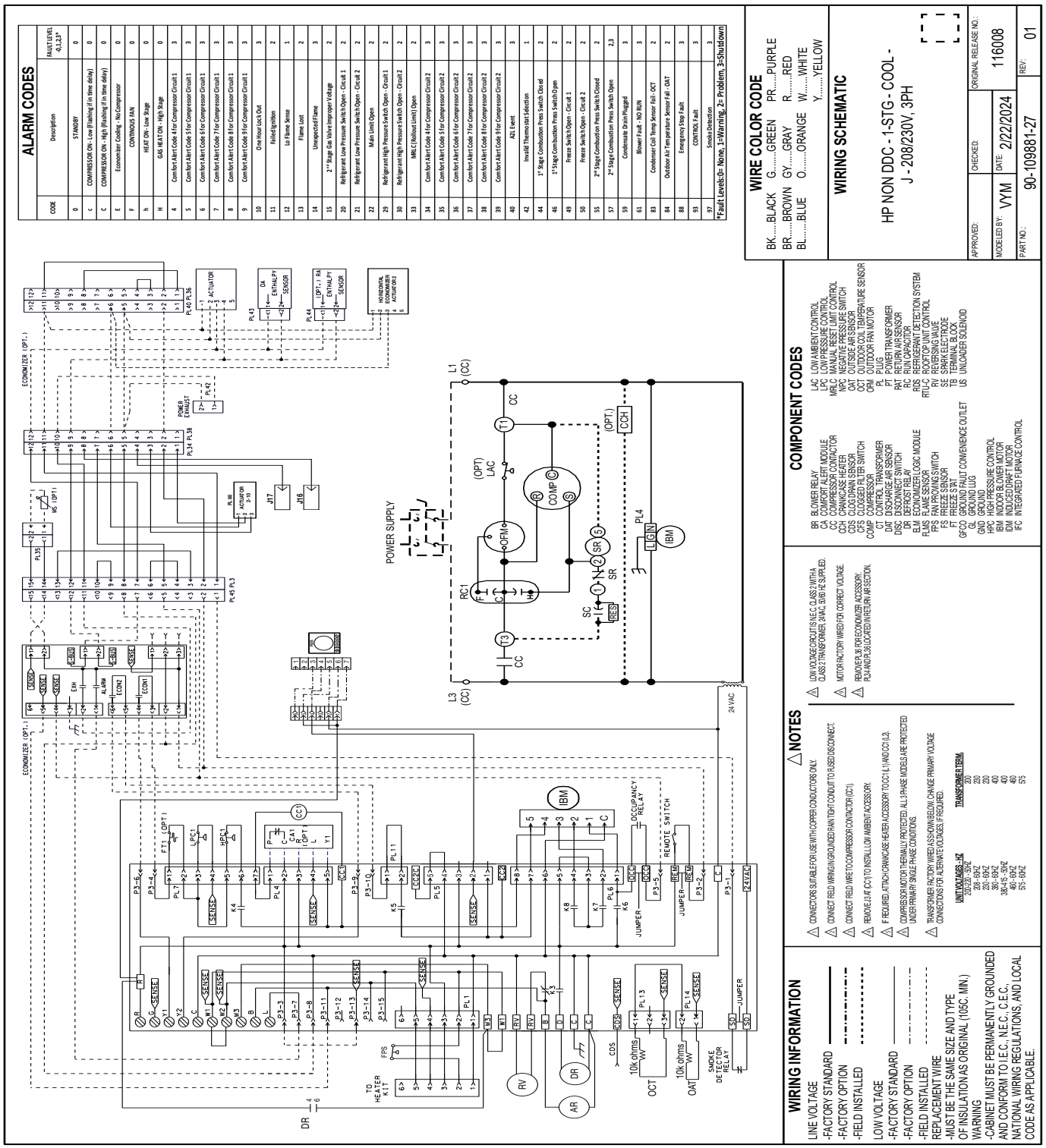


# P. APPENDICES

## Appendix H — Wiring Diagrams & Schematics (Cont.)

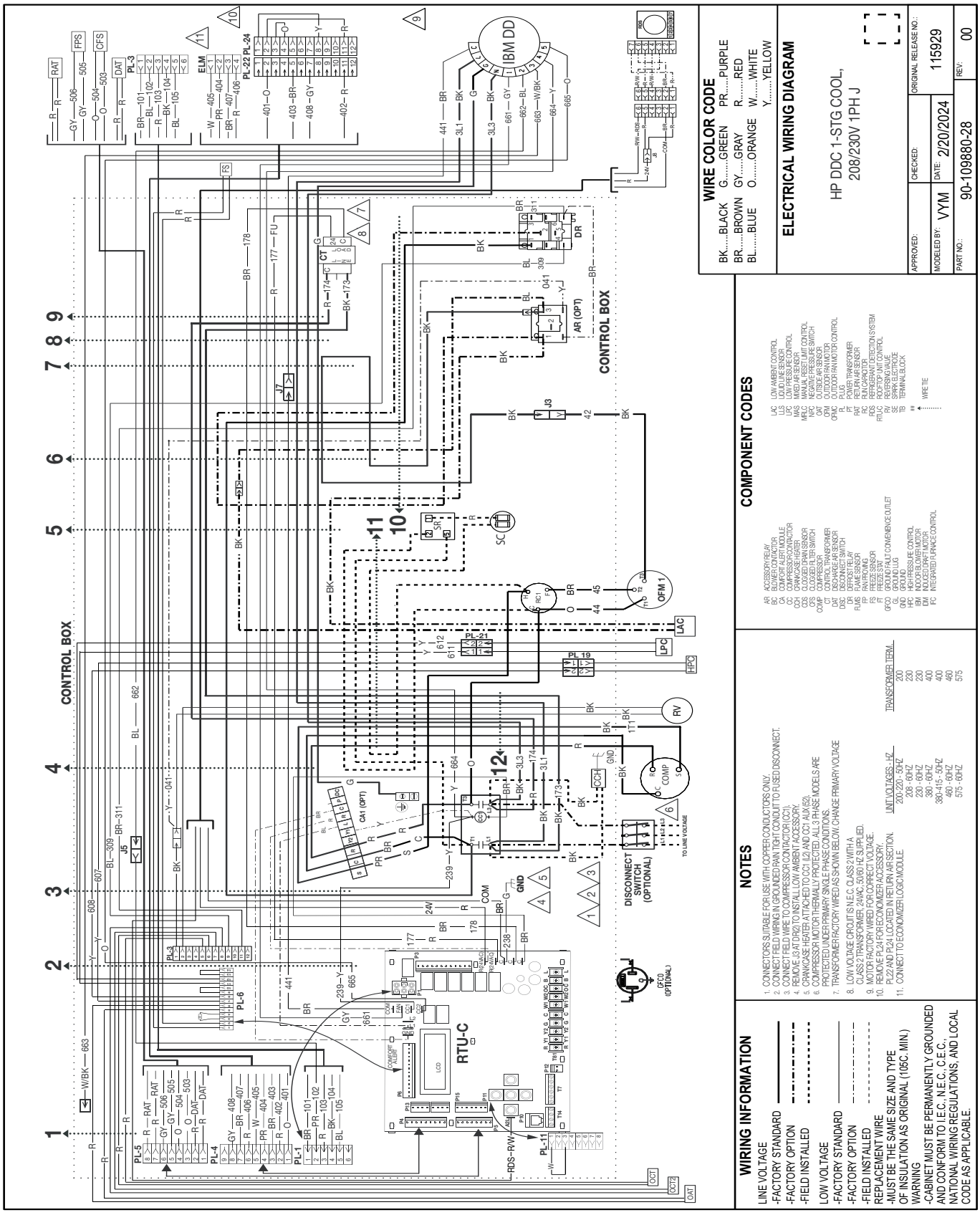


## Appendix H — Wiring Diagrams & Schematics (Cont.)

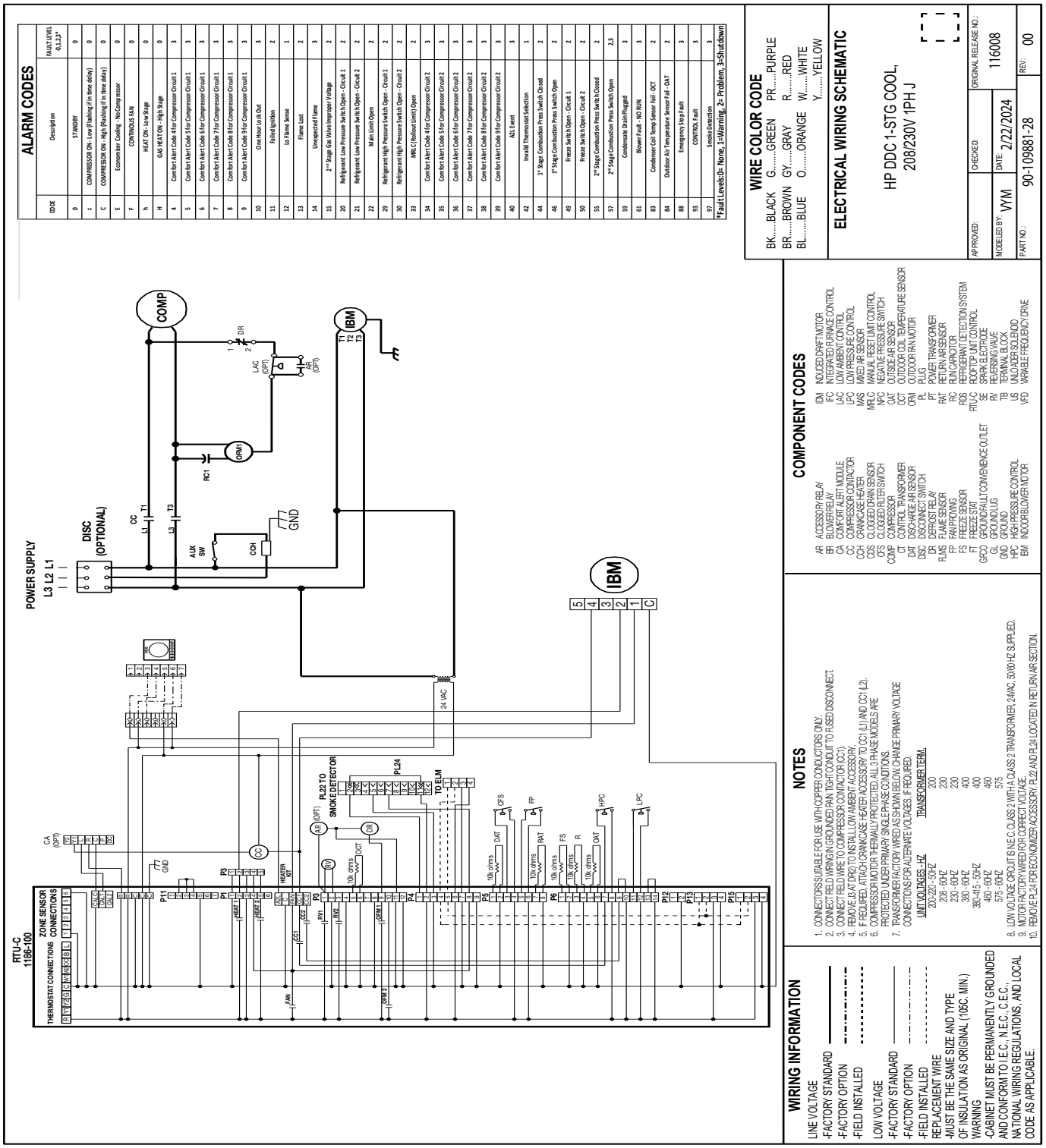


# P. APPENDICES

## Appendix H — Wiring Diagrams & Schematics (Cont.)

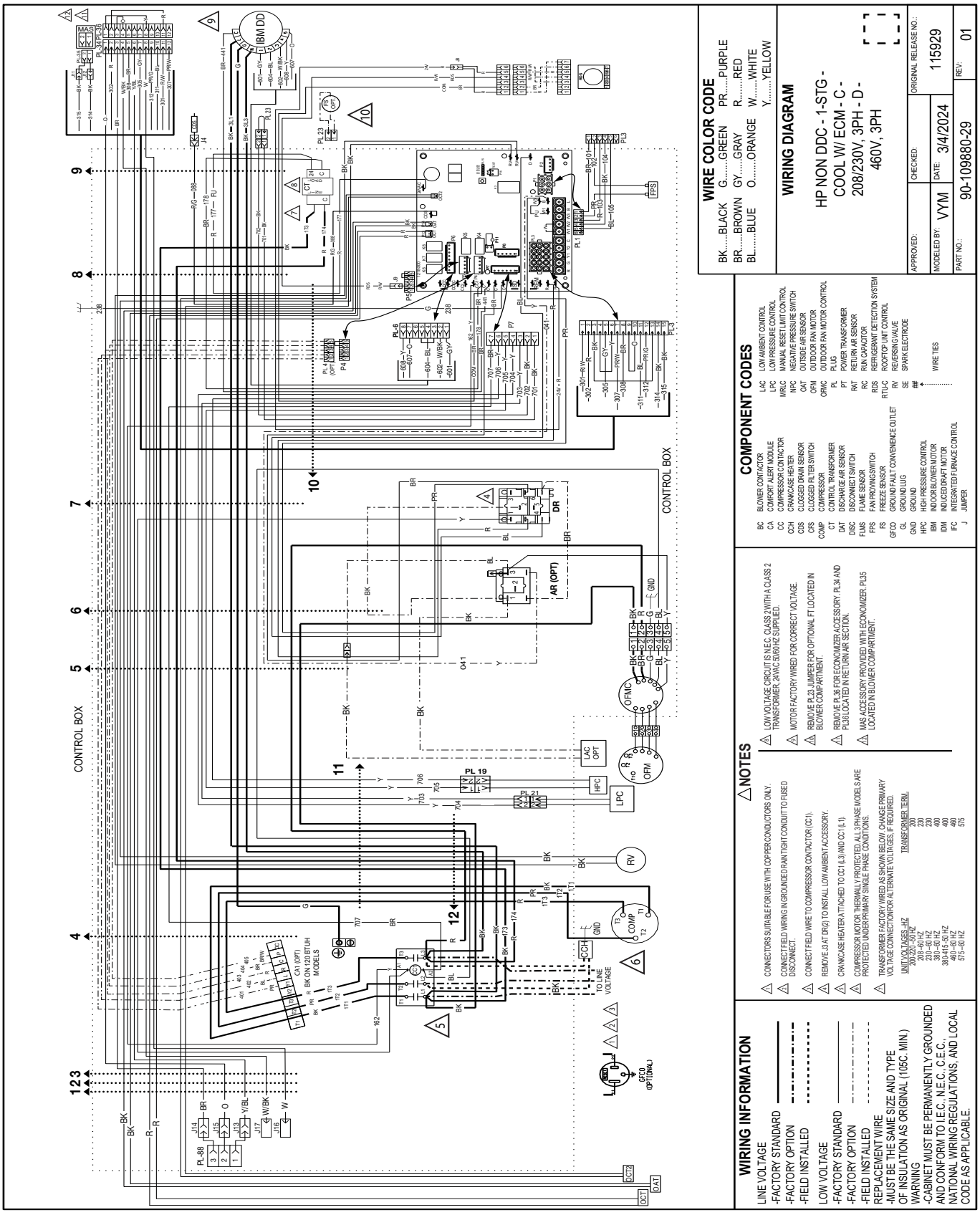


## Appendix H — Wiring Diagrams & Schematics (Cont.)

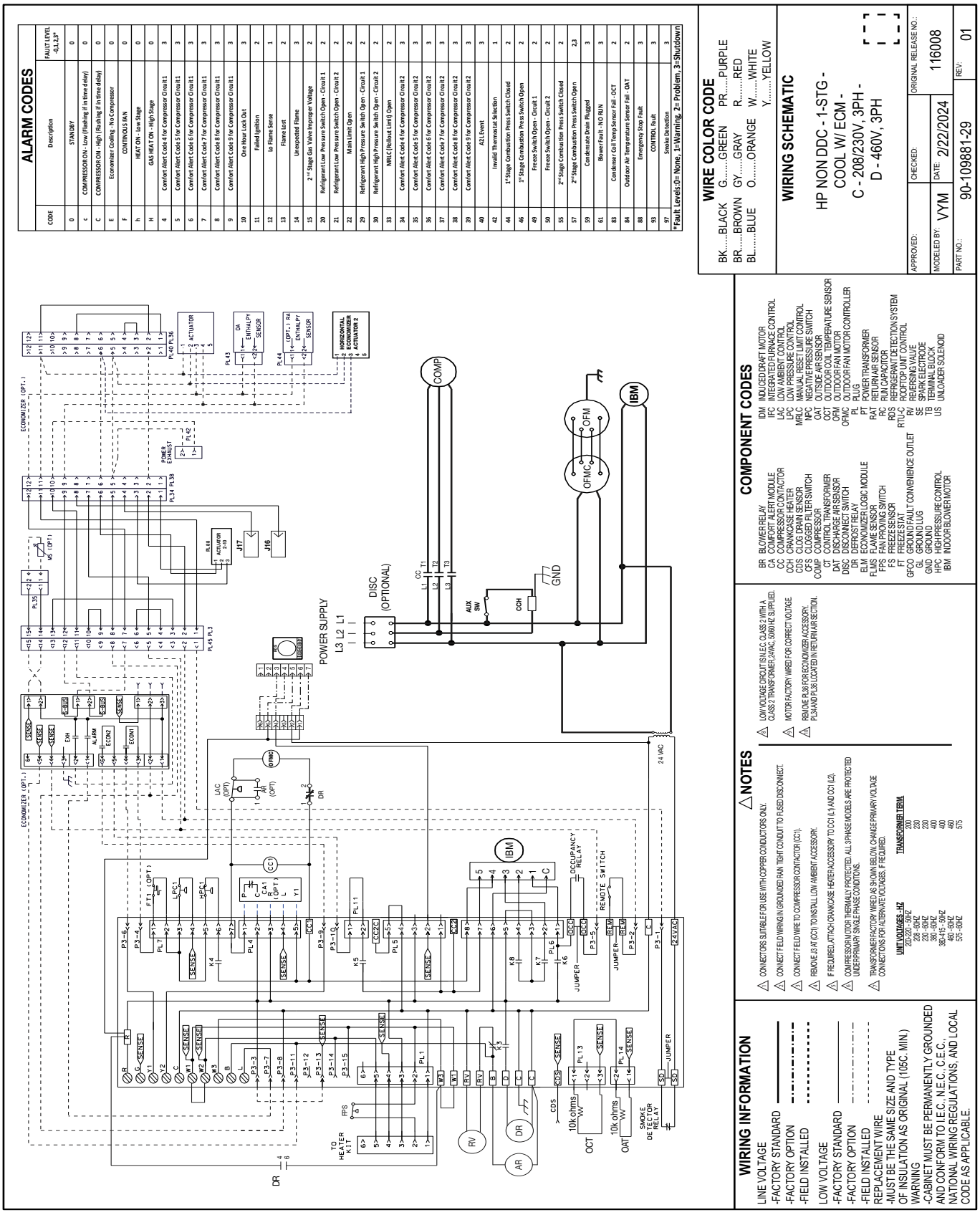


# P. APPENDICES

## Appendix H — Wiring Diagrams & Schematics (Cont.)

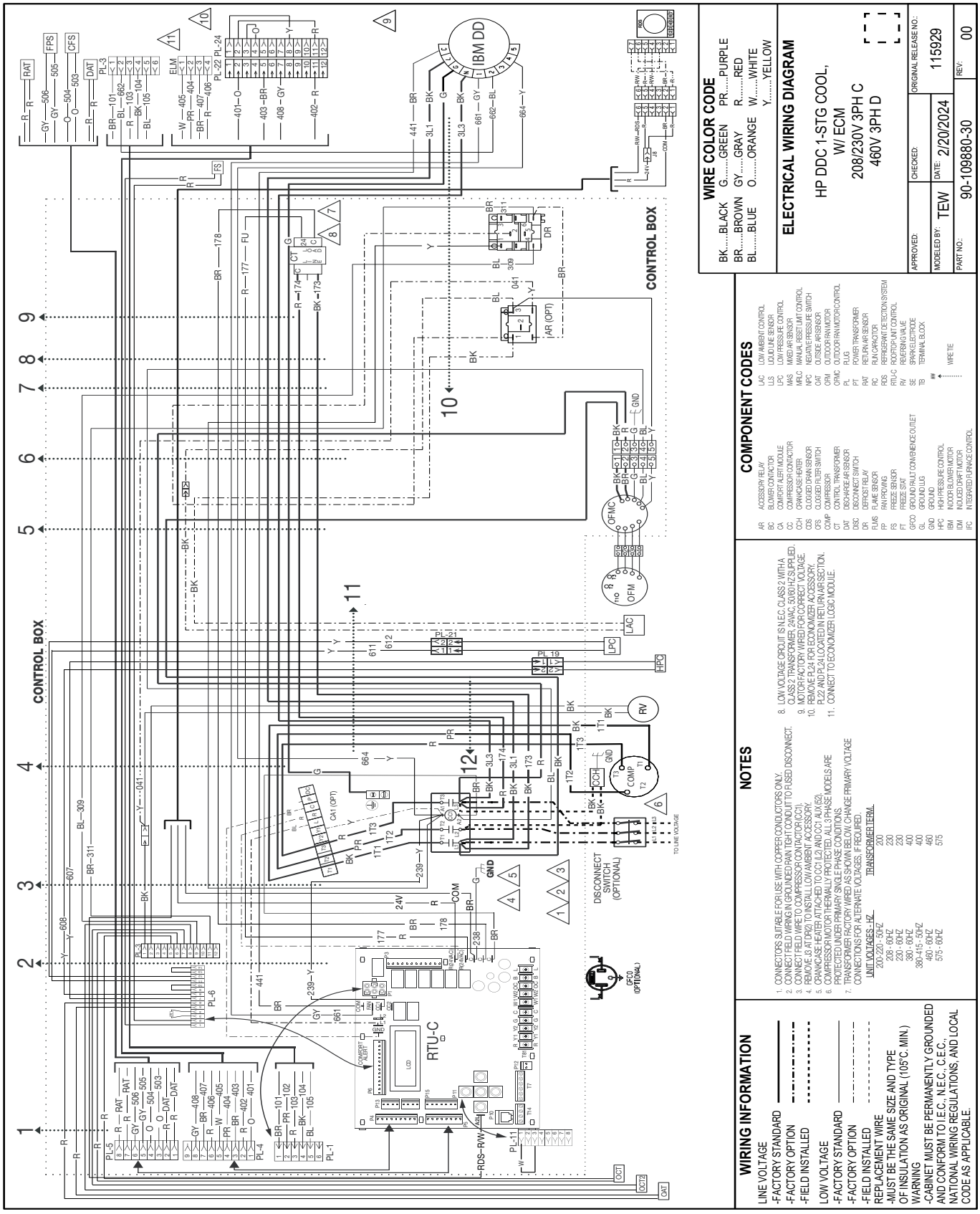


## Appendix H — Wiring Diagrams & Schematics (Cont.)

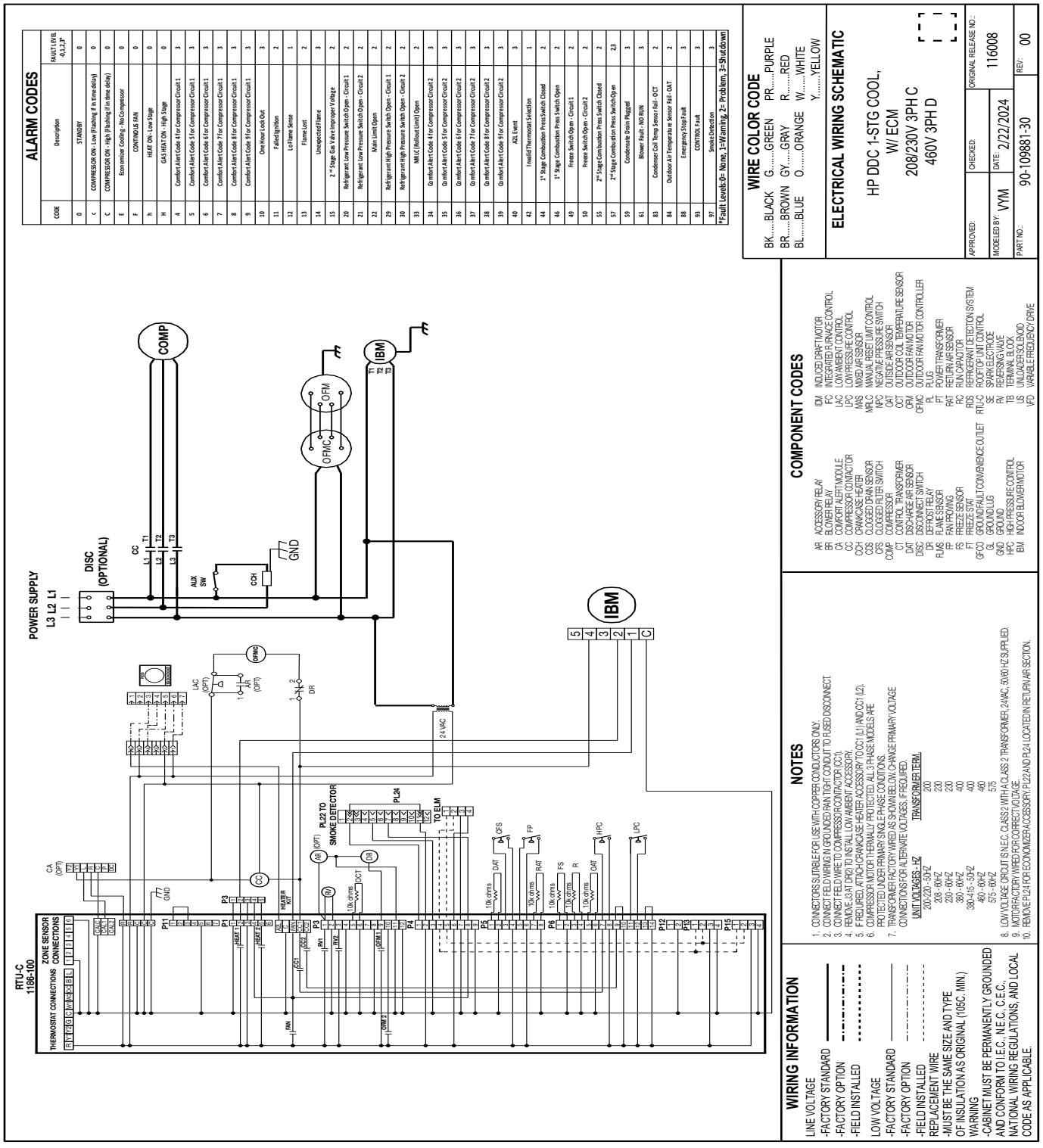


# P. APPENDICES

## Appendix H — Wiring Diagrams & Schematics (Cont.)

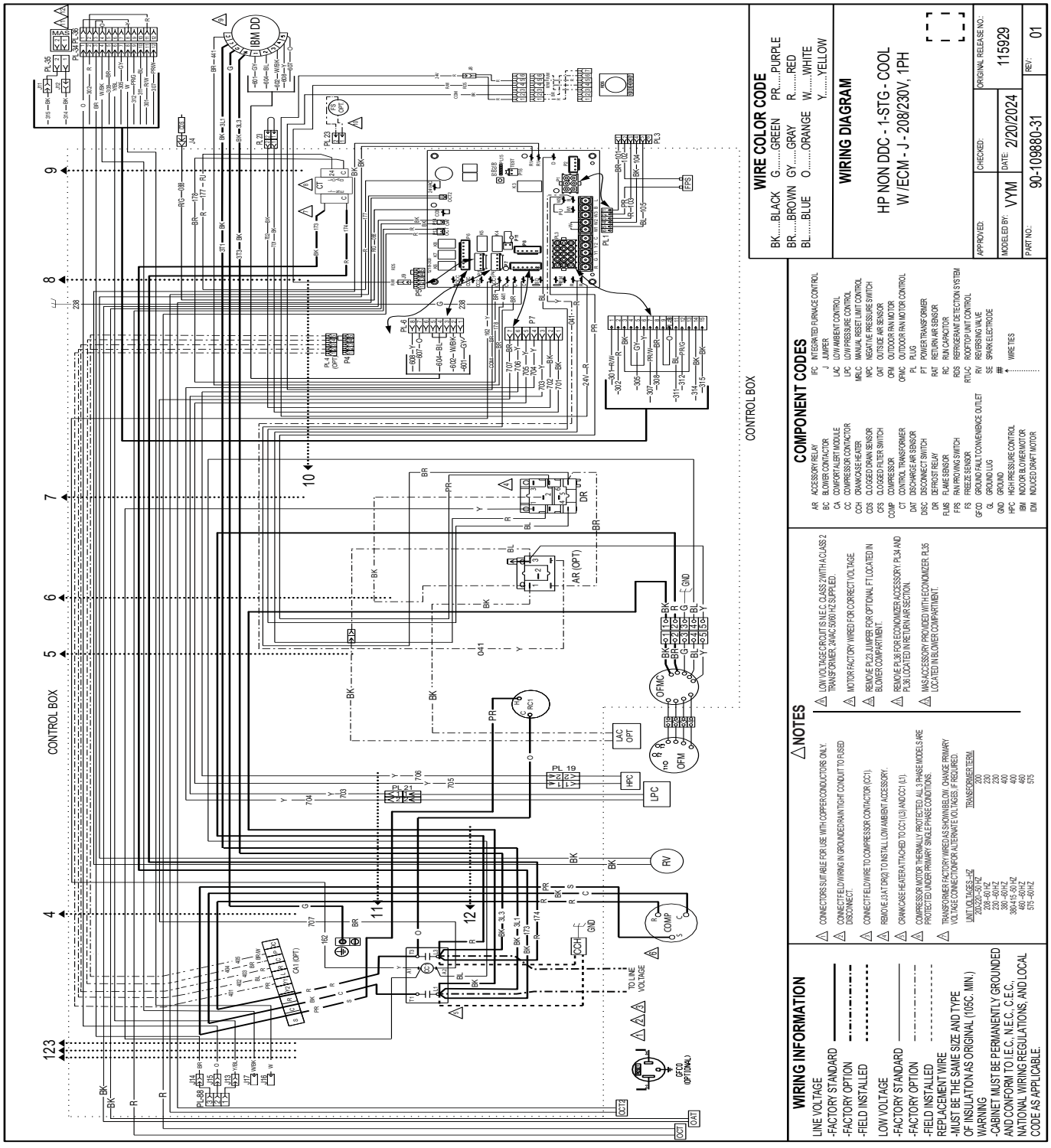


## Appendix H — Wiring Diagrams & Schematics (Cont.)

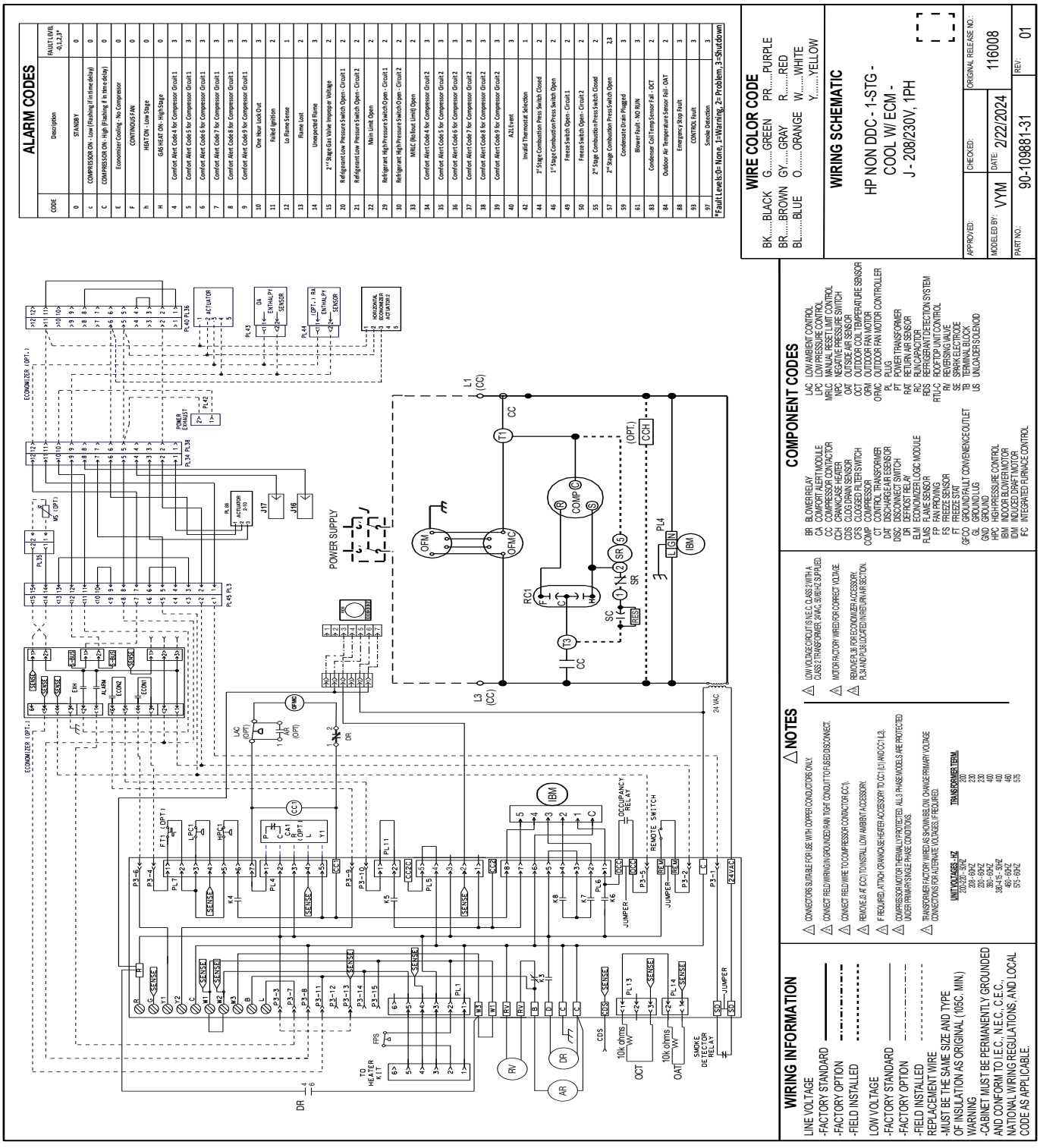


# P. APPENDICES

## Appendix H — Wiring Diagrams & Schematics (Cont.)

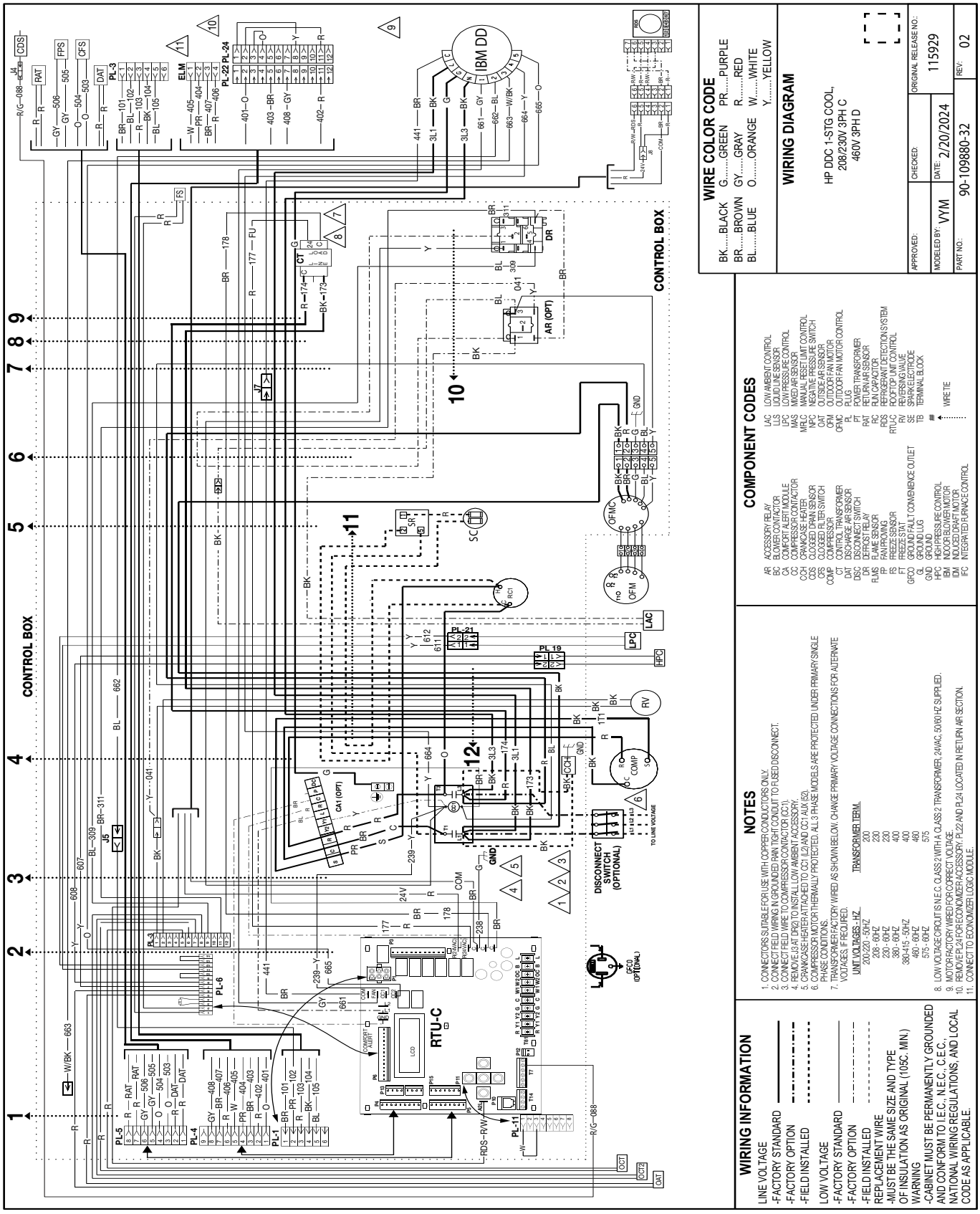


## Appendix H — Wiring Diagrams & Schematics (Cont.)

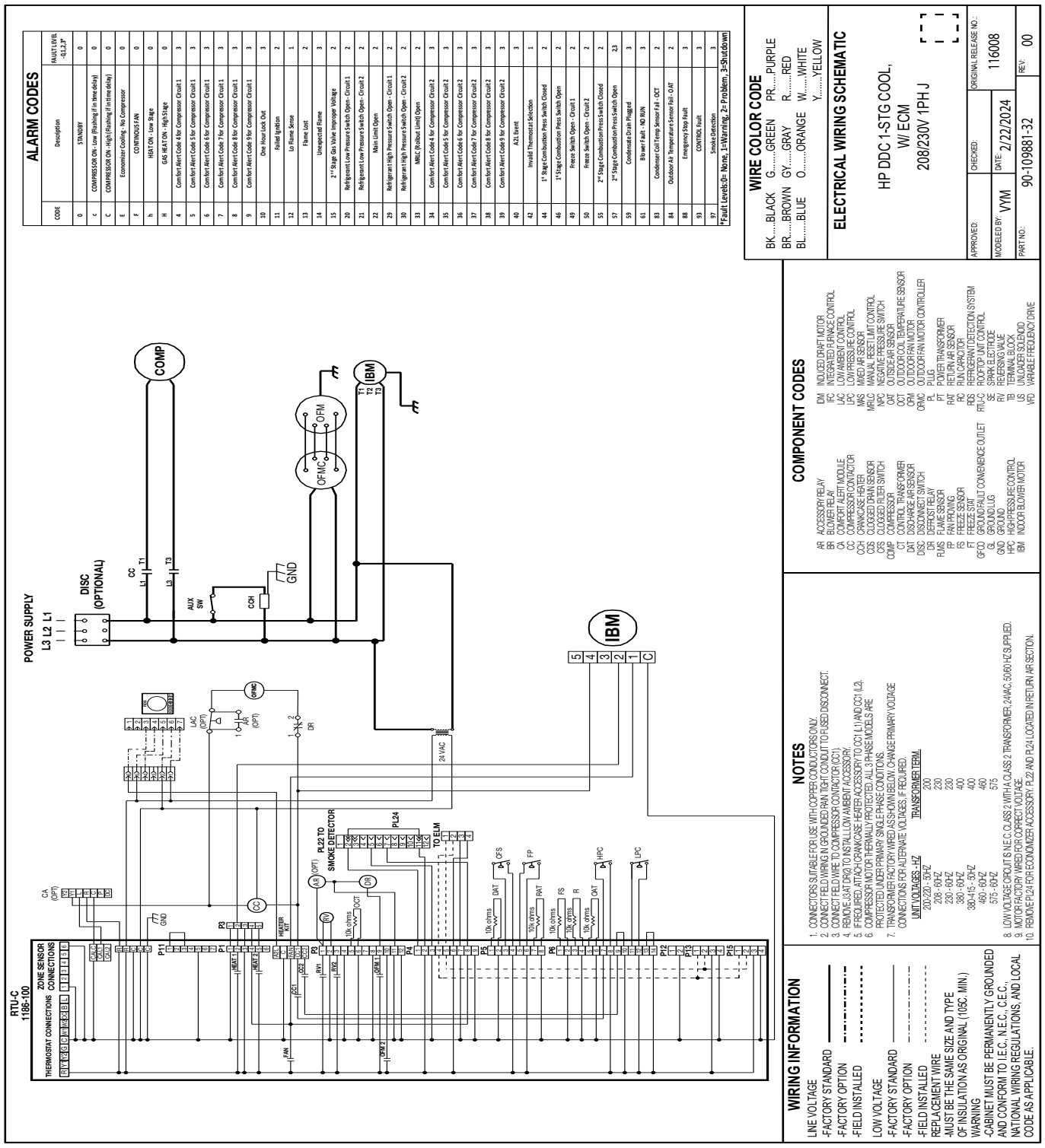


# P. APPENDICES

## Appendix H — Wiring Diagrams & Schematics (Cont.)

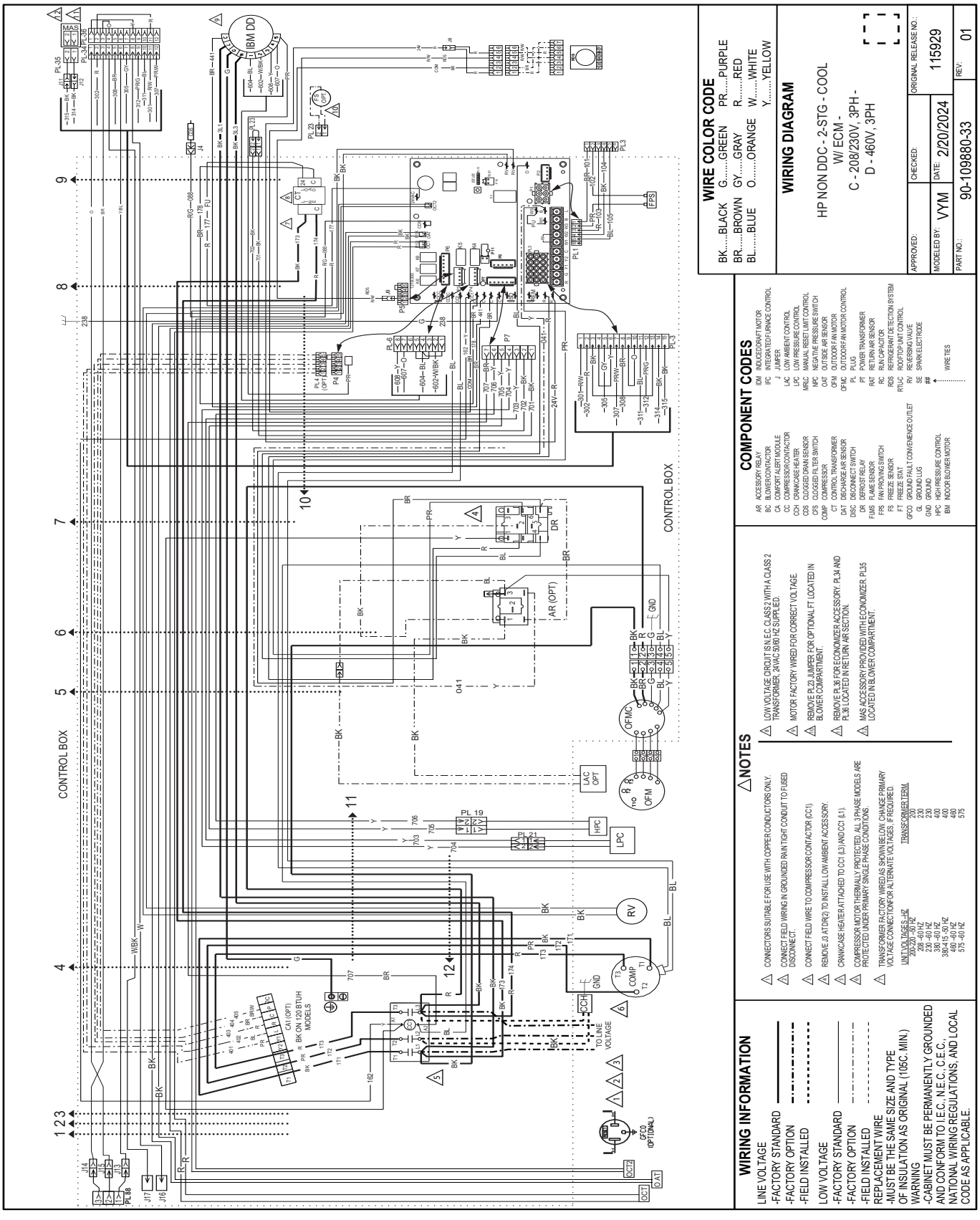


## Appendix H — Wiring Diagrams & Schematics (Cont.)

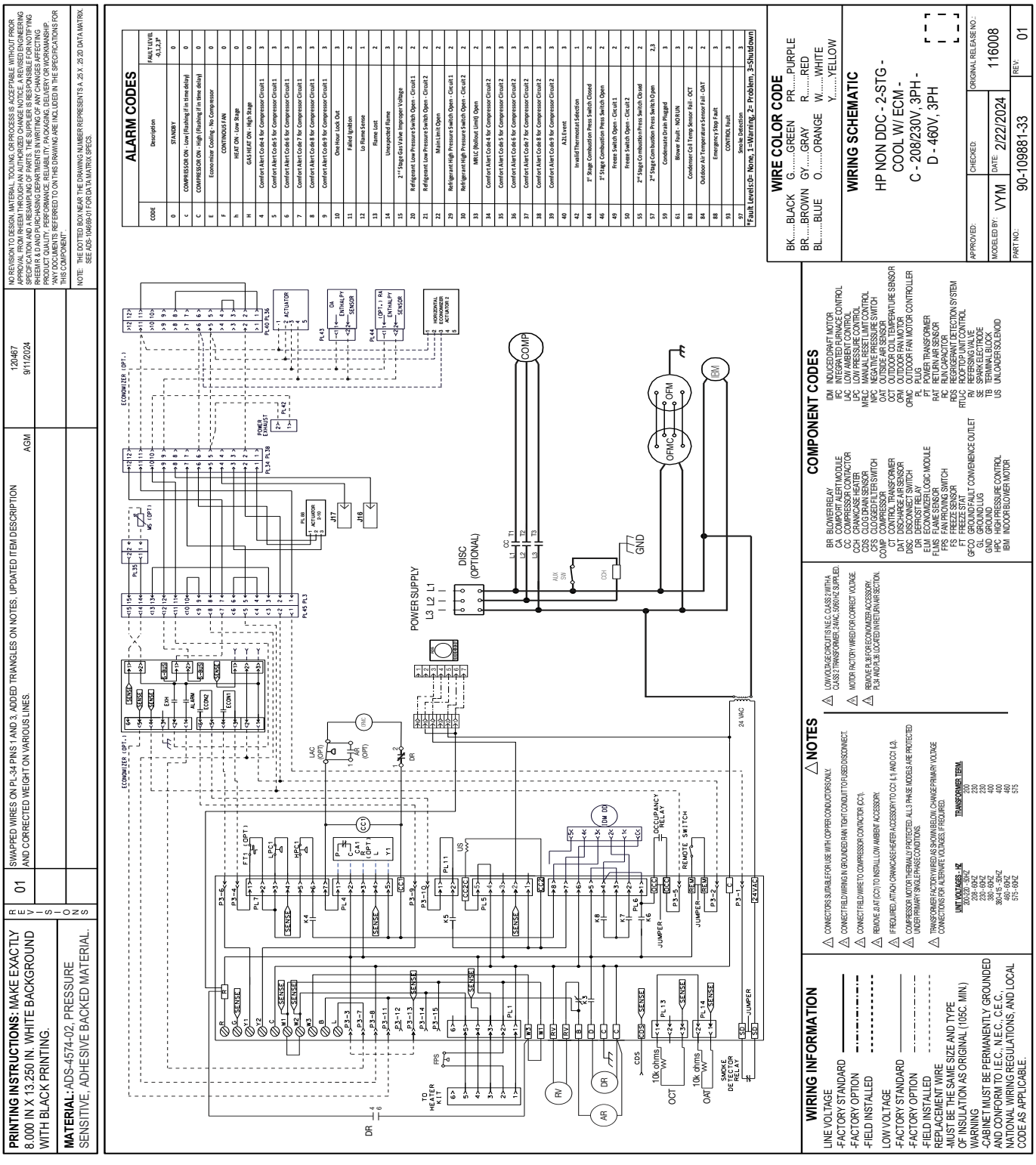


# P. APPENDICES

## Appendix H — Wiring Diagrams & Schematics (Cont.)

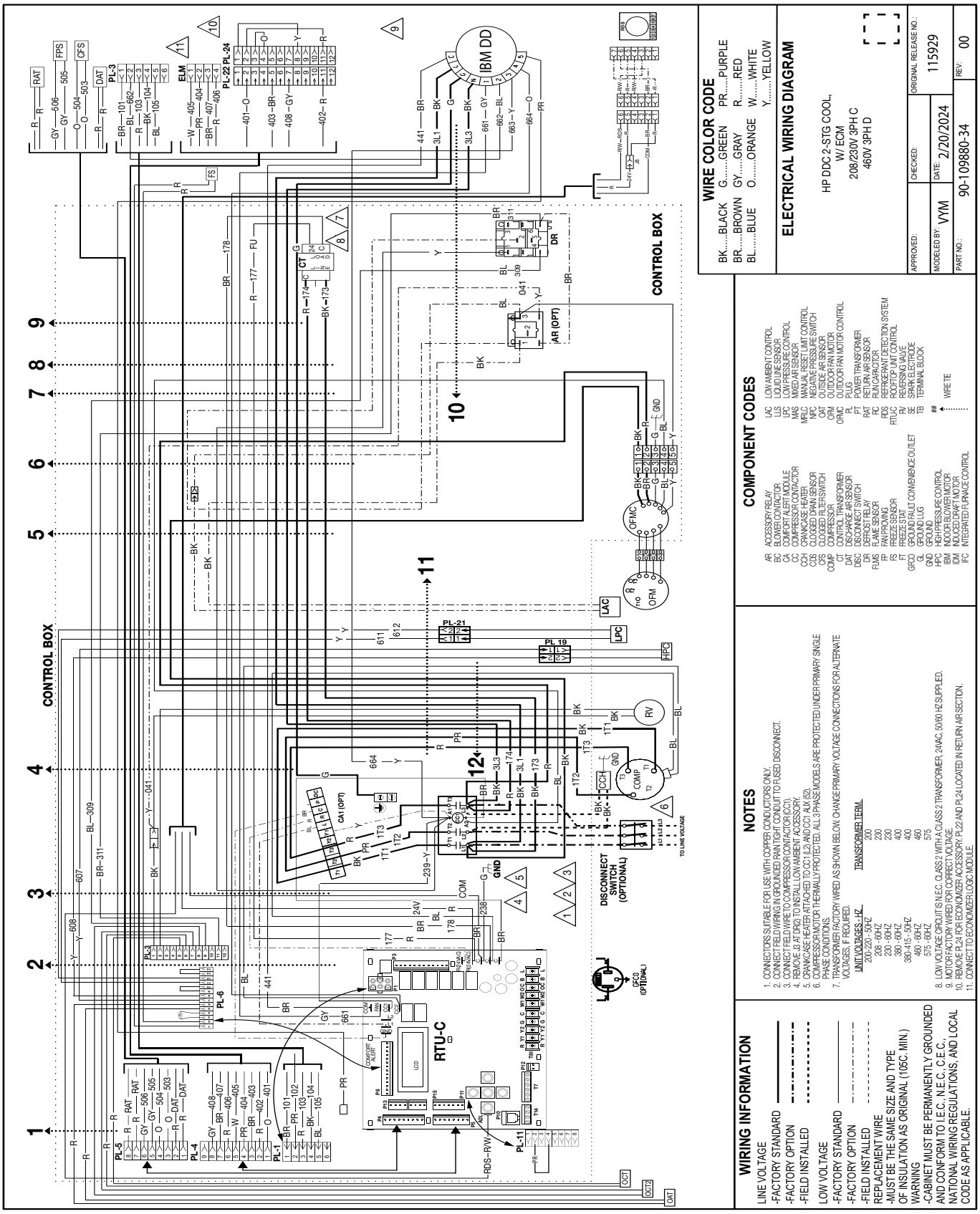


## Appendix H — Wiring Diagrams & Schematics (Cont.)

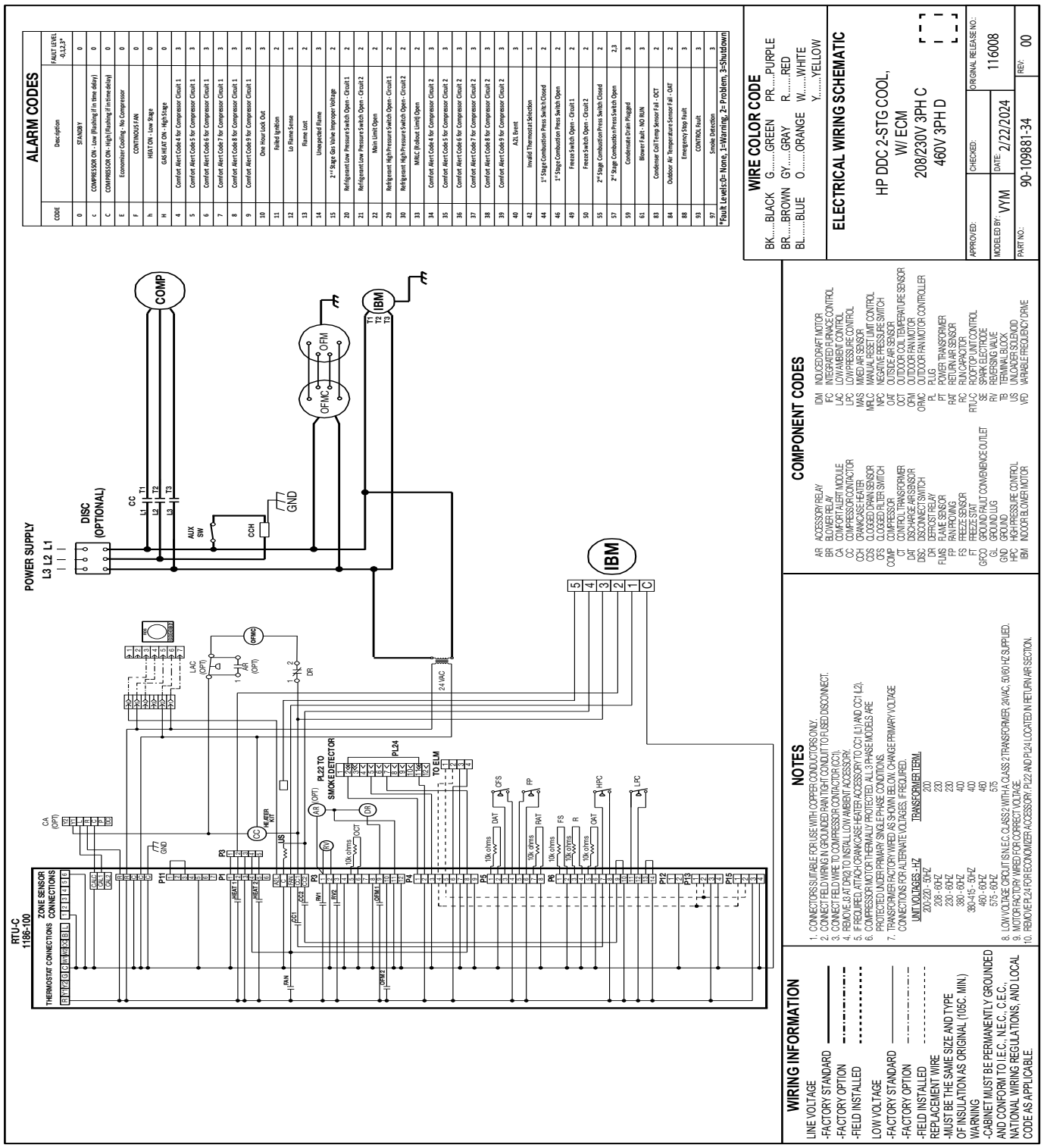


# P. APPENDICES

## Appendix H — Wiring Diagrams & Schematics (Cont.)



## Appendix H — Wiring Diagrams & Schematics (Cont.)



# P. APPENDICES

## J. Unit Tie-Down

ENGINEERING EXPRESS™
160 SW 12TH AVE SUITE 106, DEERFIELD BEACH, FL 33442
(954) 354-0660 | ENGINEERINGEXPRESS.COM

# 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

**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

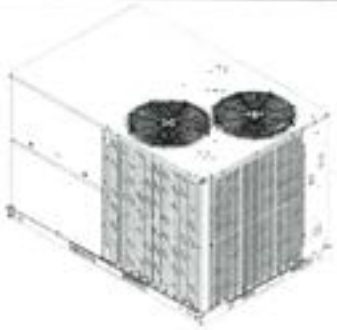
NOTE: No 33% increase in allowable stress has been used in the design of this product.

**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



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

**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. BERNARDO LICENSE PE0046548 STATE OF FLORIDA PROFESSIONAL ENGINEER

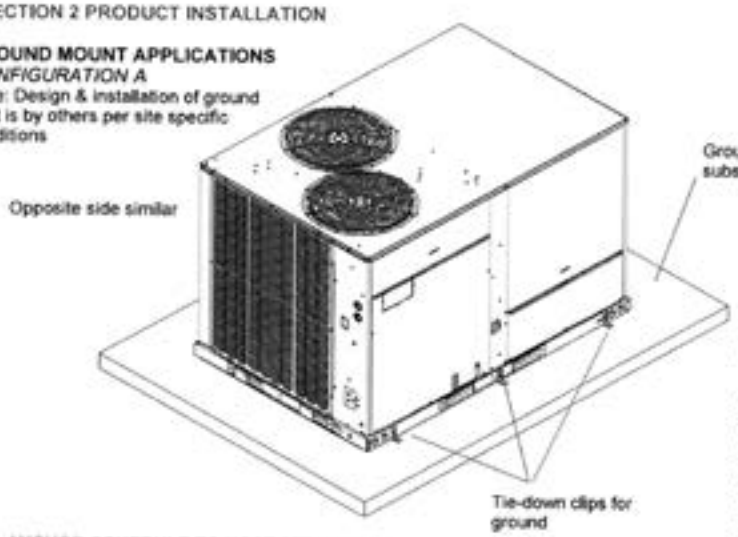
Engineer Signature & Seal:
February 12, 2020
Frank L. Bernardo, P.E., SECB
Engineering Express®
PE #0046548 CA #9885

## 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 equivalevir 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.

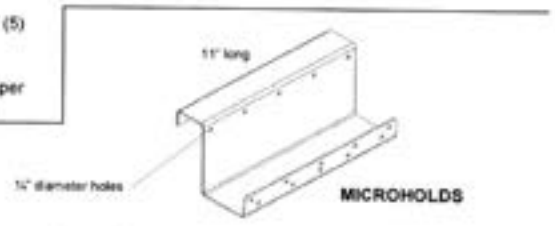
**STEEL CURB**
(ROOF APPLICATION)

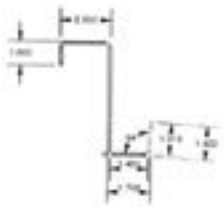
Steel curb to be a minimum of 16ga ASTM A653 steel

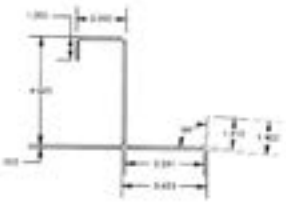
Curb Clip to be 14ga ASTM A653 steel min (Microhold)

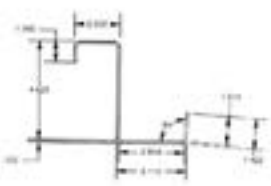
**CURB MOUNT APPLICATIONS**
*CONFIGURATION B*
Note: Design & installation of curb to host by others per site specific conditions





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.**

# P. APPENDICES

## J. Unit Tie-Down



**CURB CLIP LOCATION**

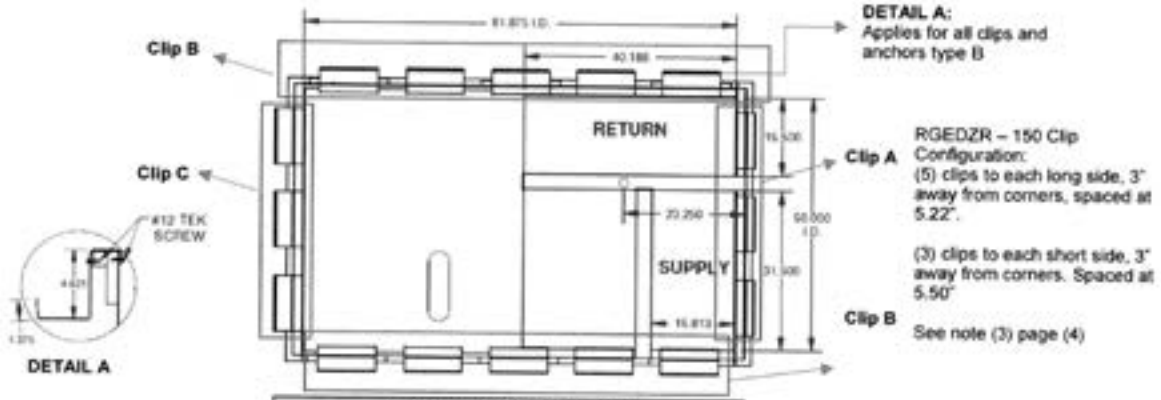



**Table 1: Clip Curb Schedule**

| 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 |

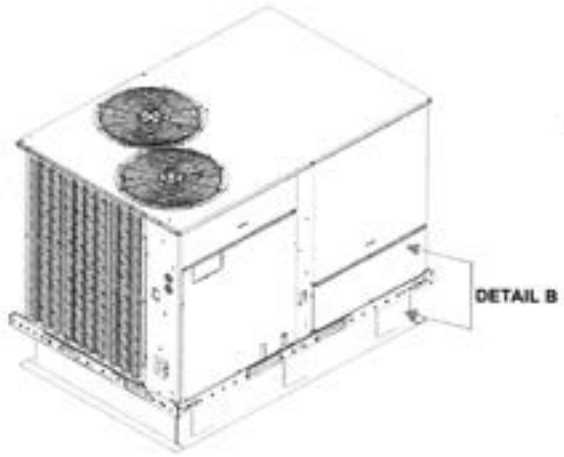
*#Clip Designation (5 LS= 5 clips each Long Side; 3 SS= 3 clips each Short Side) equally spaced*

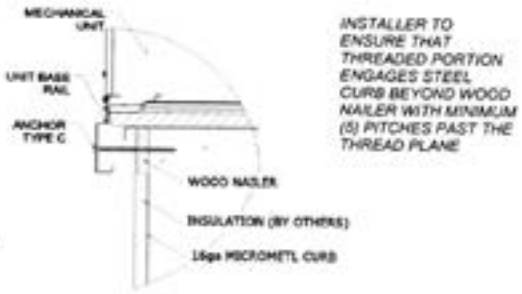
Unit Model Note: '(-)' designates equivalent trade brands with similar cabinetry and may vary depending on brand

See pressures on page (2) for alternative anchor limitations

**ALTERNATIVE ANCHORAGE TO CURB**

STEEL CURB WITH SCREW
*CONFIGURATION C*




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

**DETAIL B**

**Mechanical Unit Curb Mounted**

## 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 Series 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 Series 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 |

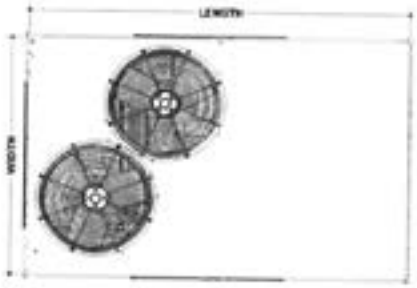
Unit Model Note: '(-)' designates equivalent trade brands with similar cabinetry and may vary depending on brand

# P. APPENDICES

## J. Unit Tie-Down



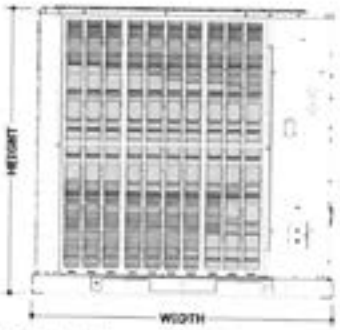
UNIT VIEWS & ELEVATIONS




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.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 to 3 inches 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) : _____