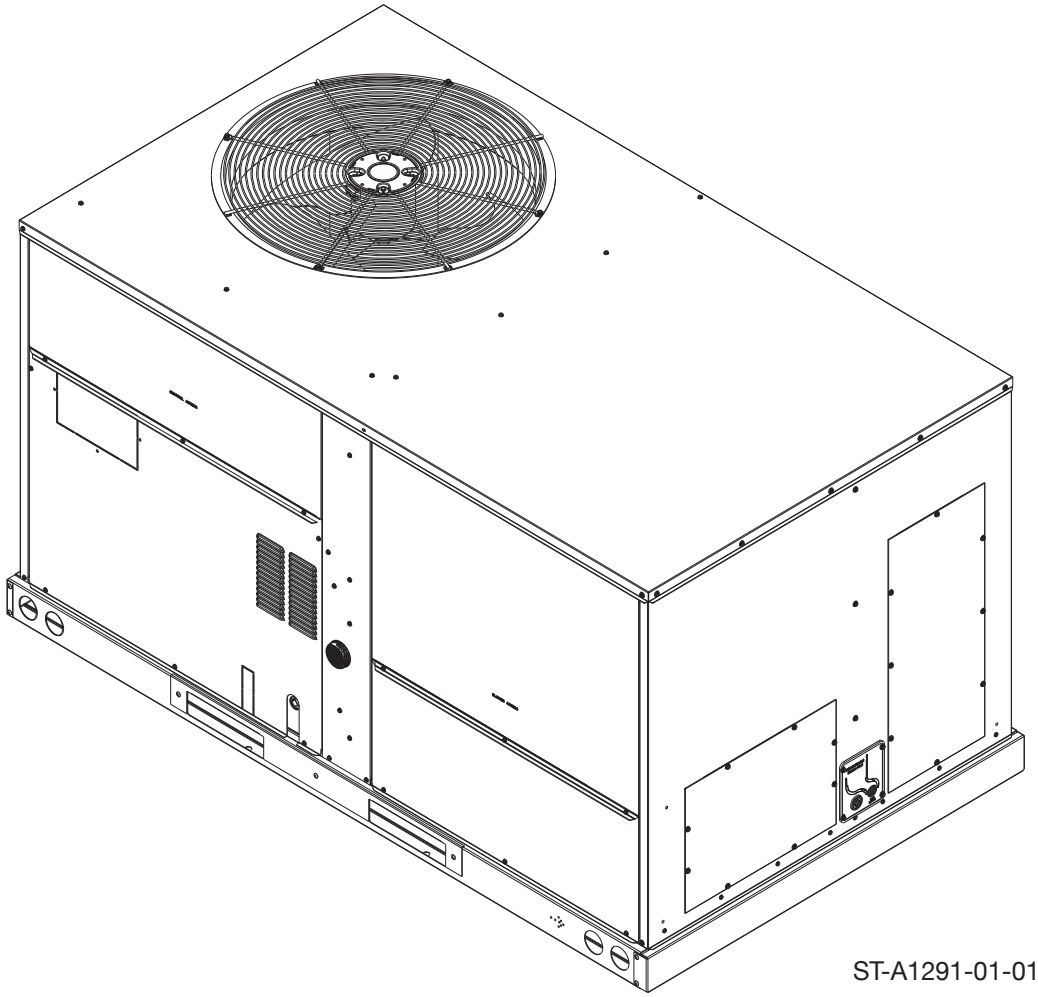
INSTALLATION INSTRUCTIONS

FOR RENAISSANCE™ PACKAGED GAS ELECTRIC UNITS

(-)GEC 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-A1291-01-01

CONTENTS

A. Important Safety and General Information 4
B. General Specifications 6
C. Installation of the Unit 13
D. Duct and Vending 24
E. Electrical 31
F. Control / Thermostat Wiring 35
G. Gas 44
J. Startup and Operation 56
K. Test and Balance 67
M. Reheat 68
N. Diagnostics 71
P. Appendices 88
A – General Product Data 88
B – Electrical Data 93
C – Air Flow Performance Data 101
D – System Performance Data 107
E – Heating Performance Data 115
F – A2L Refrigerant Installation Safety Data..... 117
G – Refrigerant Charging Charts 118
H – Wiring Diagrams & Schematics 127
J – Unit Tie–Down 165
Q.Decommissioning..... 170
R. Information For The Owner 171
S. Installation Check List and Job Site Sheet 173

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

92–106691–05–01

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.

B400142

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

AHRI CERTIFIED®
www.ahridirectory.org
Unitary Large AC
AHRI Standard 340/360
Certification applies only when the complete system is listed with AHRI.

AHRI CERTIFIED™
www.ahridirectory.org
Unitary Small AC
AHRI Standard 210/240
Certification applies only when the complete system is listed with AHRI.

c UL® us LISTED

CONTENTS (DETAILED)

A. Important Safety and General Information 4
A.1 Introduction 4
A.2 Agency Performance Audit and Efficiency Testing Notice 4
A.3 Importance of a Quality Installation 4
A.4 Importance of a 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 8
B.3 Product Data Information 8
C. Installation of the Unit 13
C.1 General 13
C.2 Tool and Refrigerant 13
C.3 Choosing Location 14
C.4 Setting the Unit 17
C.5 Installing Condensate Drain 22
C.6 Final Installation Inspection 23
D. Duct and Vending 24
D.1 Air Flow and Static Pressure 24
D.2 Ducts Requirements and Best Practices 24
D.3 Filters 25
D.4 Economizers and Fresh Air Dampers 27
D.5 Smoke Detectors 30
E. Electrical 31
E.1 Electrical Safety Information 31
E.2 Electrical Data 33
E.3 Electrical Connections 33
F. Control / Thermostat Wiring 35
F.1 Non– DDC Control Inputs 35
F.2 DDC Control Inputs 37
F.3 Routing Control Wiring 43
F.4 Measuring Control Voltage Loads 43
G. Gas 44
G.1 Gas Piping Requirements 44
G.2 Procedure: Connecting Gas Lines to Gas Valve 48
G.3 LP Conversion 49
G.4 Operation and Testing 51
J. Startup and Operation 56
J.1 Final Inspection 56
J.2 Turning on Power for the First time 58
J.3 Checking and Adjusting Air Flow 59
J.4 Checking Cooling Operation 61
J.5 Checking Heating Operation 64
J.6. Safety Checks..... 66
K. Test and Balance 67
K.1 Air Flow Charts and Information 67
K.2 Air Flow Adjustments 67
M. Reheat 68
M.1 Dehumidification System Information 68
M.2 Humidity Sensor Installation 69
M.3 Humidity Control Settings and Configuration 70
N. Diagnostics 71
N.1 Diagnostics Charts 71
N.2 Alarm Codes – Full List 73
N.3 Common Mistakes 87
P. Appendices 88
A – General Product Data 88
B – Electrical Data 93
C – Air Flow Performance Data 101
D – Cooling Data 107
E – Heating Performance Data 115
F – A2L Refrigerant Installation Safety Data..... 117
G – Refrigerant Charging Charts 118
H – Wiring Diagrams & Schematics 127
J – Unit Tie–Down 165
Q. Decommissioning..... 170
R. Information For The Owner 171
R.1 Maintenance and service 171
R.2 Product Model and Serial Number 171
R.3 Refrigerant Recovery 172
R.4. Warranty Information..... 172
S. Installation Check List and Job Site Sheet 173

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 combination gas heating/electric cooling 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. 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 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.

A.2. Agency Performance Audit and Efficiency Testing Notice

NOTICE: BREAK–IN PERIOD

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

NOTICE: EFFICIENCY TESTING NOTICE

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

SETUP:

- ASHRAE 37 – 2009 (RA 2019)

PERFORMANCE:

- ANSI/ASHRAE 90.1 – 2022
- ANSI/ASHRAE 103 (2022)
- AHRI Operations for Unitary Small AC Equipment 210/240 (2023) for 3–5T
- AHRI Operations for Unitary Large AC Equipment 340/360 (2022) for 6T
- CSA/ANSI Z21.47 (2021)

SAFETY:

- UL 60335–2–40 4th Edition
- CSA/ ANSI Z21.47 (2021)
- CSA C22.2 No. 60335–2–40 4th Edition

QUALITY:

- ISO 9001: 2015

A.3. Importance of a Quality Installation

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

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

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

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: Use only with type of gas approved for this unit. Refer to the unit rating plate.

⚠WARNING: Install this unit only in a location and position as specified in the location requirements and considerations section of these instructions. Provide adequate combustion and ventilation air to the unit space as specified in the venting section of these instructions.

⚠WARNING: Provide adequate combustion and ventilation air to the unit space as specified in the combustion and ventilation air section of these instructions.

⚠WARNING: Combustion products must be discharged outdoors. Refer to local building codes for ducting combustion exhaust.

⚠WARNING: Never test for gas leaks with an open flame. Use a commercially available soap solution made specifically for the detection of leaks to check all connections, as specified in gas supply and piping section of these instructions.

⚠WARNING: Always install unit to operate within the unit's intended temperature–rise range with a duct system which has an external static pressure within the allowable range, as specified in ducting section of these instructions. See also unit rating plate.

⚠WARNING: When a unit is installed so that supply ducts carry air circulated by the unit to areas outside the space containing the unit, the return air shall also be handled by duct(s) sealed to the unit casing and terminating outside the space containing the unit.

⚠WARNING: This unit may be used to heat the building or structure during construction if the following installation requirements are met. Installation must comply with all installation instructions including:

- Furnace operating under thermostatic control;
- Return air duct sealed to the furnace;
- Air filters in place;
- Set furnace input rate and temperature rise per rating plate marking;
- Return air temperature maintained between 55°F (13°C) and 80°f (27°C);
- Clean furnace, duct work and components upon substantial completion of the construction process, and verify furnace operating conditions including ignition input rate, temperature rise and venting, according to the instructions.

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

⚠WARNING: If this unit is connected via 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.

B. GENERAL SPECIFICATIONS

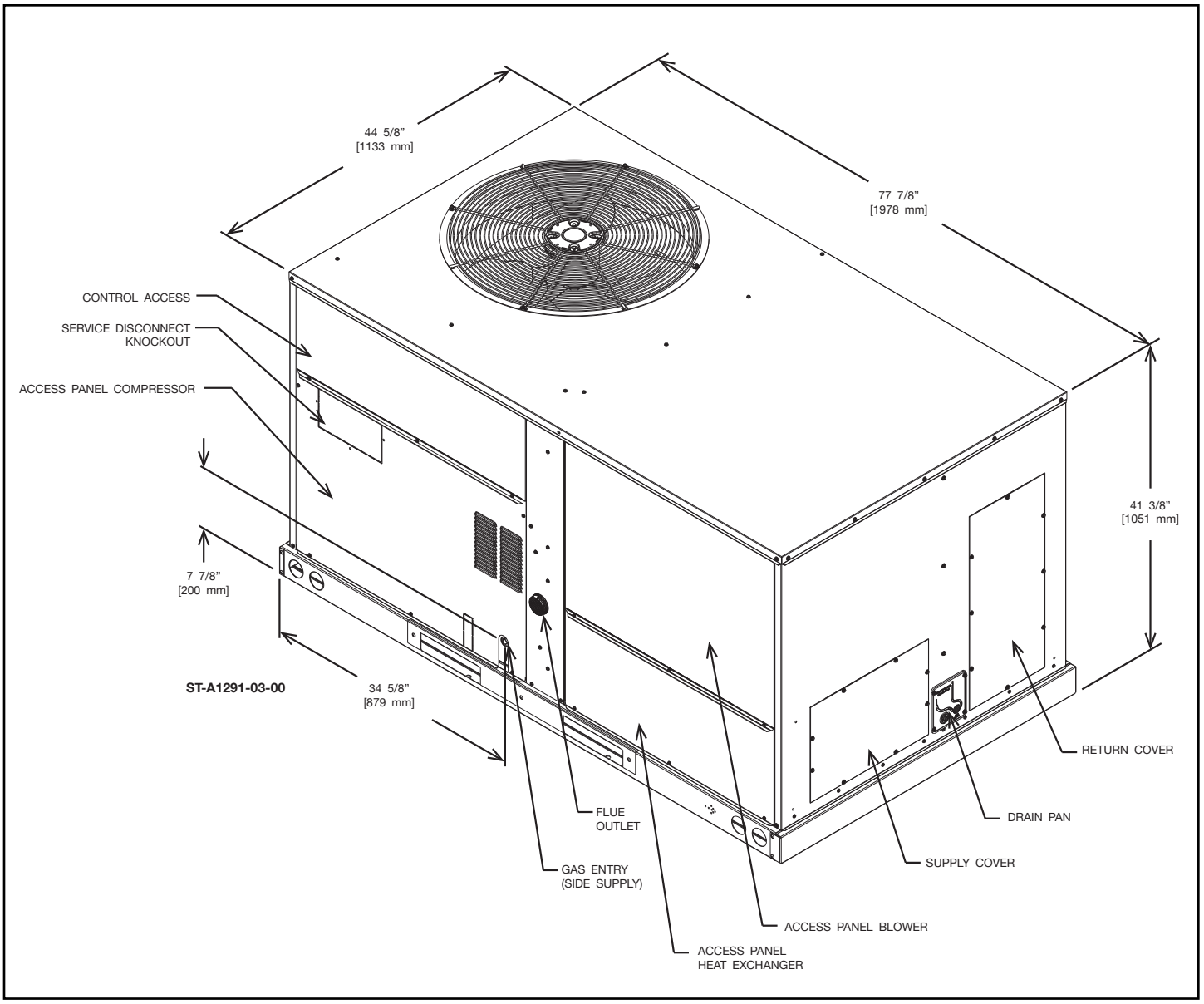
B.2. Major Components

The unit includes a hermetically–sealed refrigerating system consisting of a scroll compressor, condenser coil, evaporator coil with TXV, a circulation air blower, a condenser fan, a heat exchanger assembly, gas burner and control assembly, combustion air motor and fan, and all necessary internal electrical wiring. The cooling 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

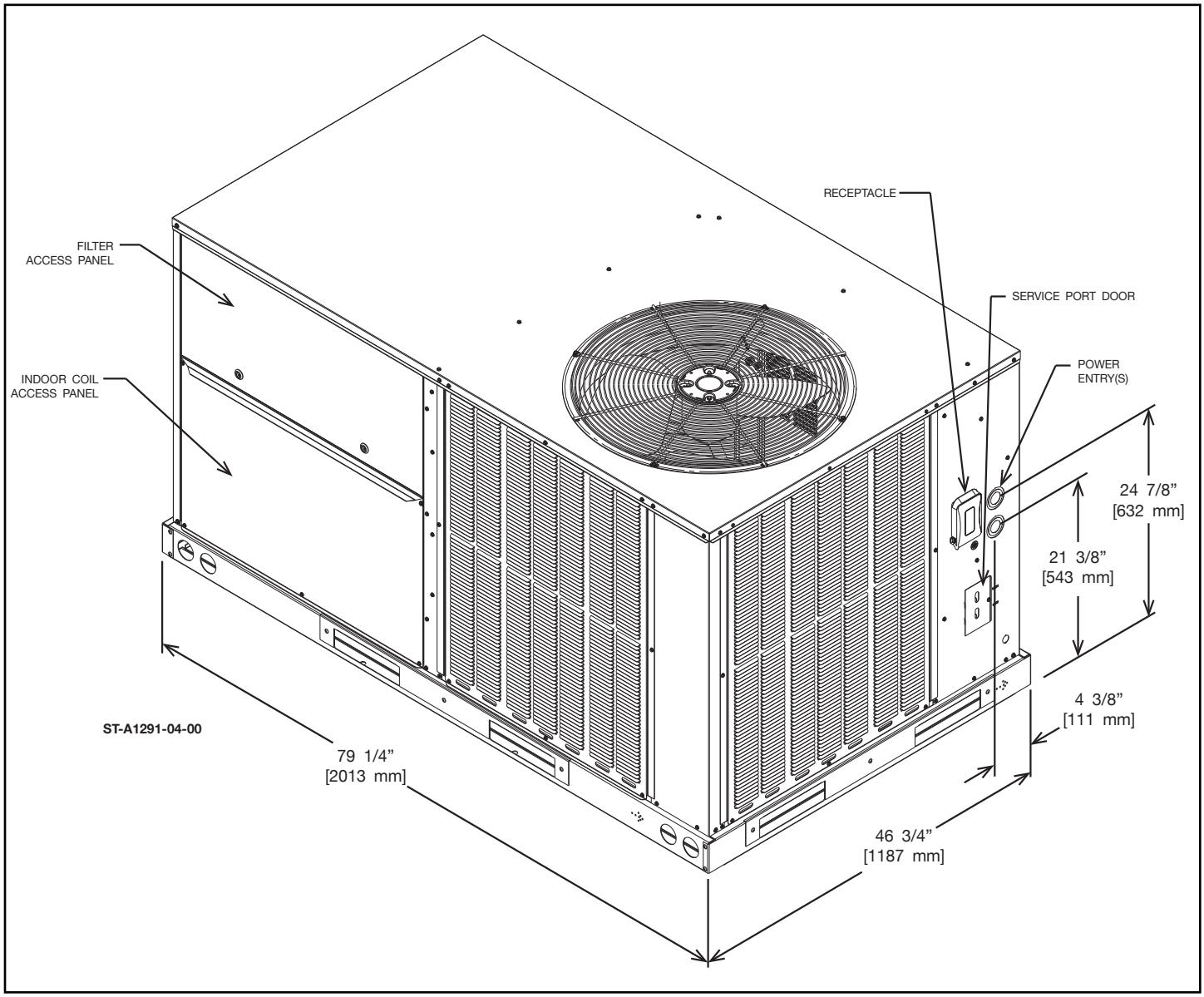
IMPORTANT: This unit must be mounted level in both directions to allow water to drain from the condenser section and condensate pan.



B.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 combination Gas Heating/Electric cooling rooftop unit is available in 75,000, 100,000, or 120,000 BTUH heating input. Cooling capacity is 3.0, 4.0, 5.0, and 6.0 nominal tons. Units are convertible from downflow supply/return to sideflow supply/return by relocation of supply/return cover panels. See section ***C.3.5. Cover Panel Installation/Conversion Procedure*** 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 and carbon monoxide poisoning resulting in personal injury or death.

B. GENERAL SPECIFICATIONS

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

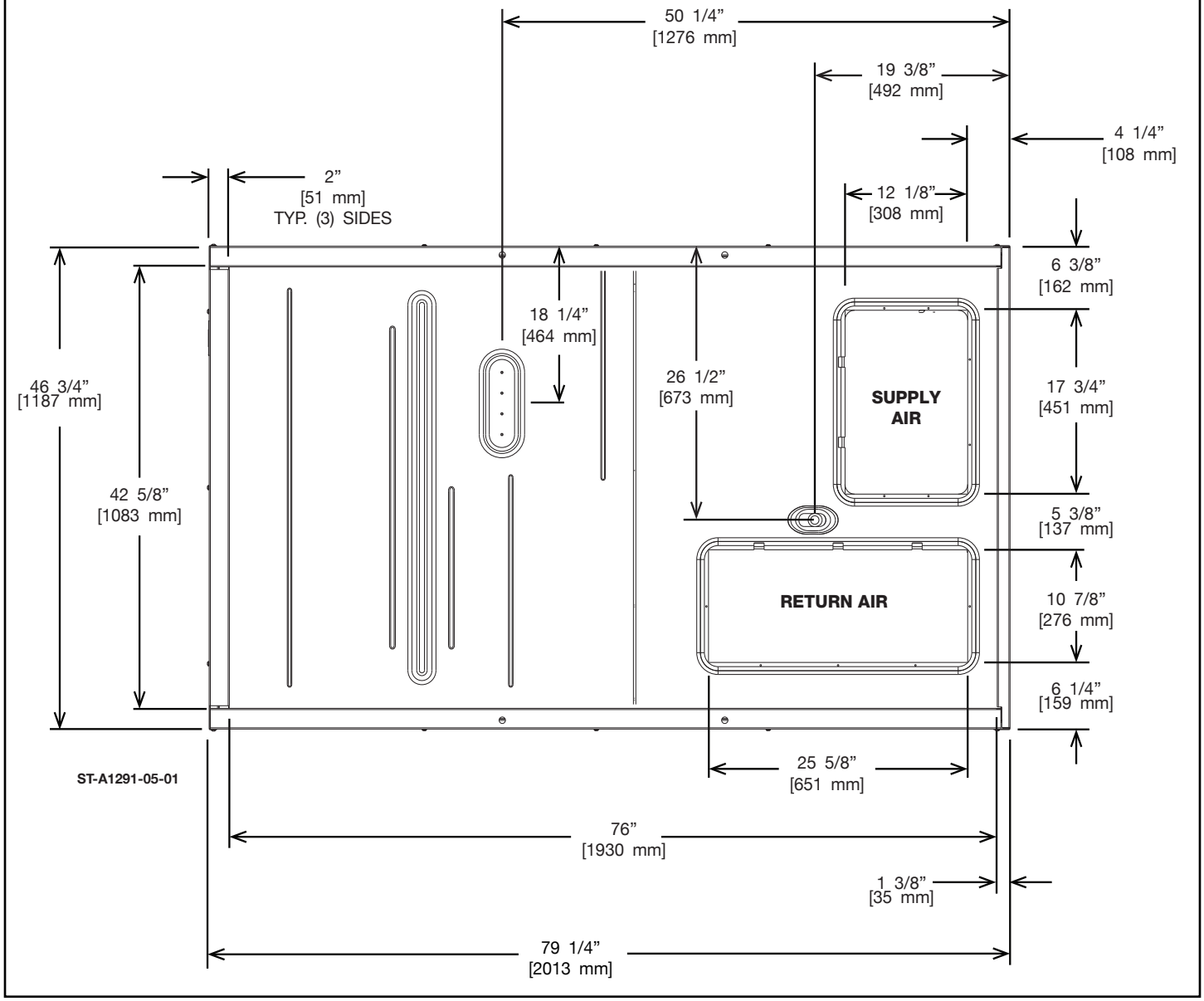
See ***Appendix B*** towards the end of this manual for Electrical Data.

B.3.5. Air Flow Performance Data

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

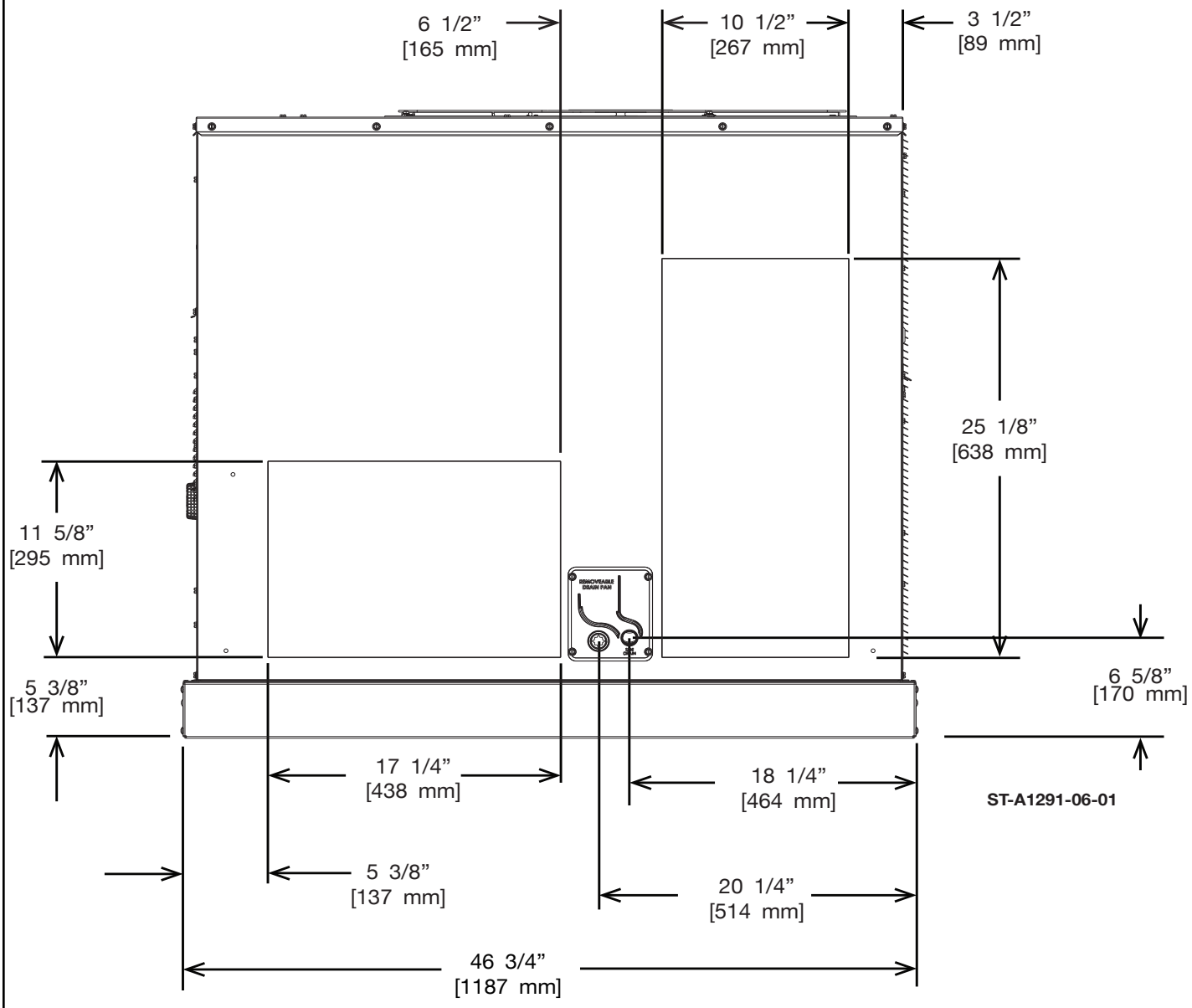
B.3.6. Supply and Return Duct Dimensions

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



B.3.6. Supply and Return Duct Dimensions

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



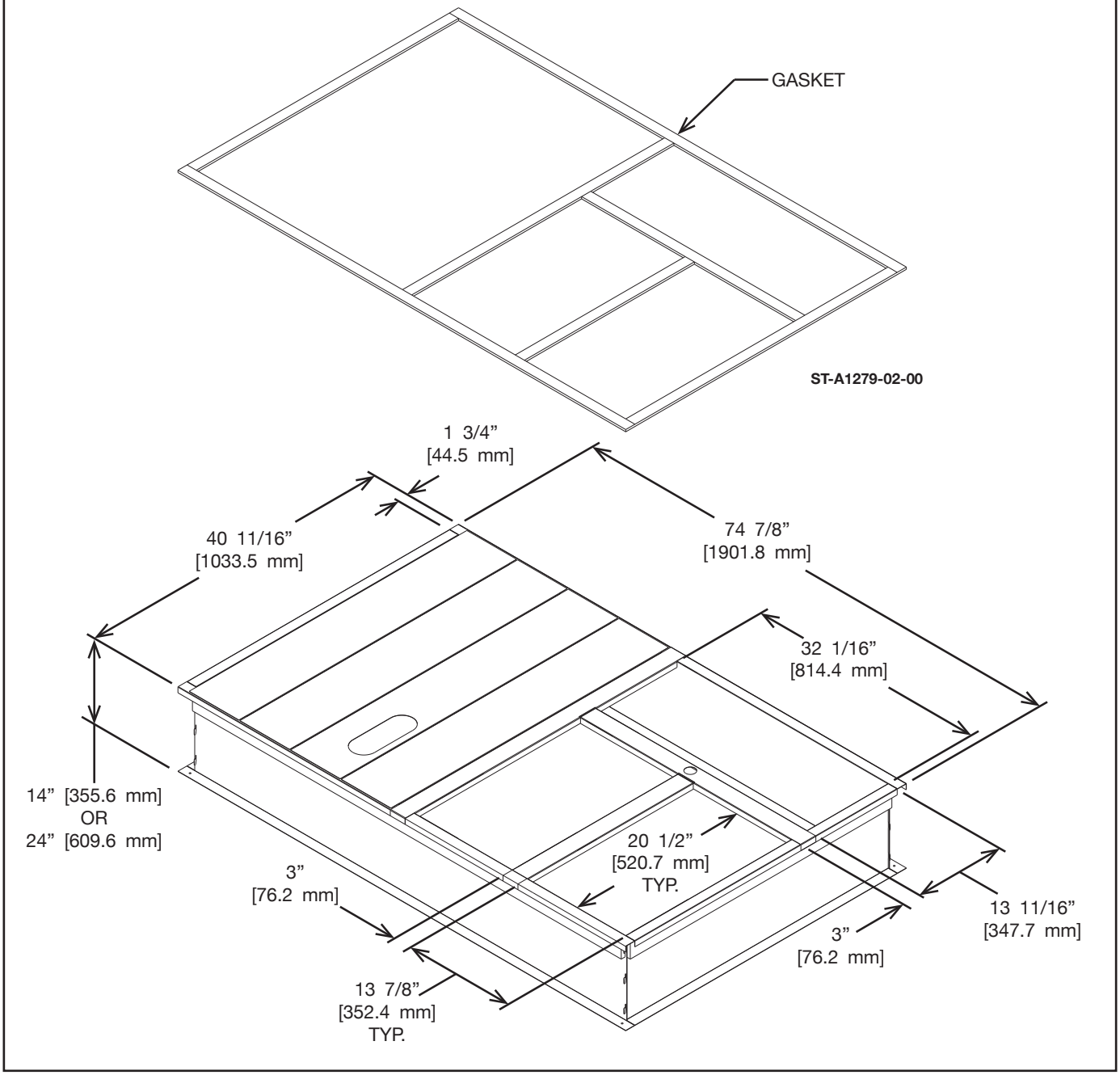
B. GENERAL SPECIFICATIONS

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 The American National Standard Z223.1–latest edition booklet entitled “National Fuel Gas Code”, and the requirements or codes of the local utility or other authority having jurisdiction. Additional helpful publications available from the “National Fire Protection Association” are:

- NFPA–90A – Installation of Air Conditioning and Ventilating Systems 2018 or latest edition.
- NFPA–90B – Warm Air Heating and Air Conditioning Systems 2018 or latest edition.

These publications are available from:

National Fire Protection

Association, Inc.

NFPA.ORG

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
- Gas supply and piping
- Air duct connections and sizing
- Drain facilities and connections
- Location for minimum noise and vibration
- If the unit will be installed in an unventilated area, the area or space must not allow refrigerant to stagnate, creating a fire or explosion hazard in case of a leak

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 59.6F [50.9C] and an atmospheric dew point of –58.0F [–50.0C]. Its bubble point saturation pressure at 77F [25C] is 213 psig [1469 kPa] and dew point saturation pressure at 77F [25C] is 205 psig [1415 kPa].

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

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

R–454B 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. INSTALLATION OF THE UNIT

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 pressures 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 HFC's 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 (TXV) 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.

C.2.5. Minimum Room Area

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

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

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

C.2.6. No Ignition Sources

When performing work that involves exposing any pipework, no person working on or near the refrigerating 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 the 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

Figure C.3.1. – A: Allowable Clearances

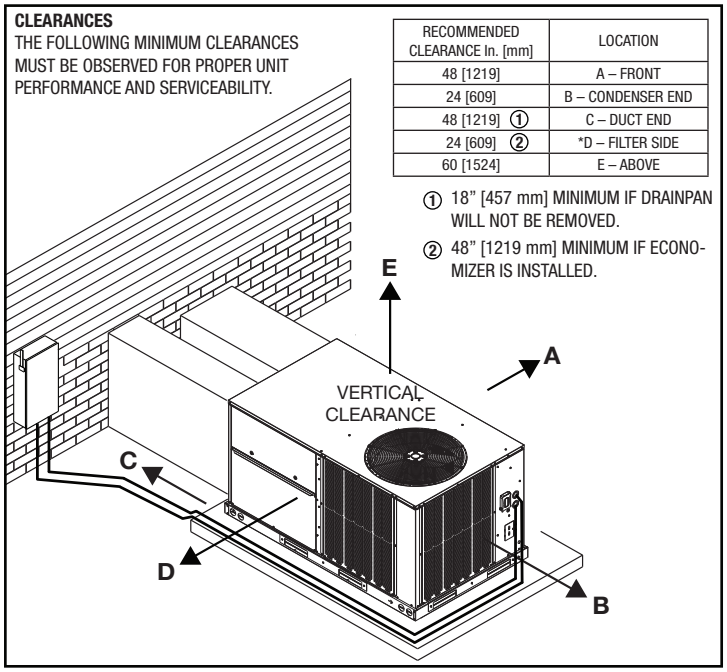
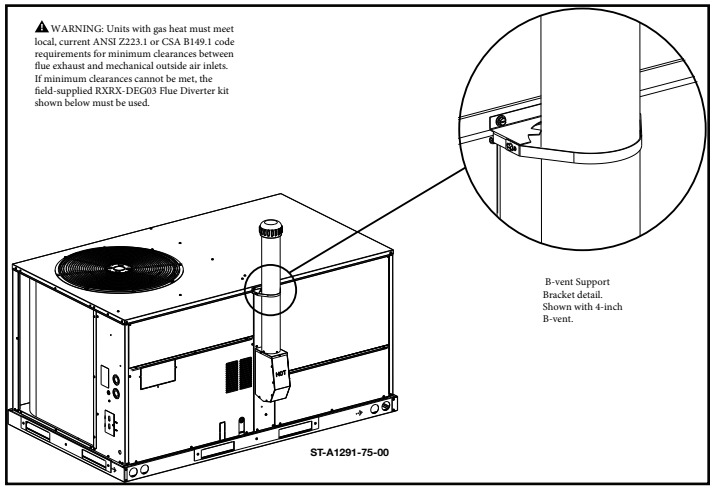


Figure C.3.1. – B: Allowable Clearances



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.

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. Installation inside can also cause recirculation of flue products into the conditioned space resulting in personal injury or death.

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 and to allow combustion air to enter the combustion air inlet.

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.3.3. Rooftop Installation

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

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

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

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

C.3.4. Corrosive Environments

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

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

1. Avoid having lawn sprinkler heads spray directly on the unit cabinet.
2. In coastal areas, install the unit on the side of the building away from the waterfront.
3. In some situations, fencing or shrubs may give some protection against contaminants. Be mindful of the allowable clearances.
4. Frequent washing of the cabinet, fan blade and coil with fresh water will remove most of the salt or other contaminants that build up on the unit. 5. Regular cleaning and waxing of the cabinet with an automobile polish will provide some protection.
5. 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. INSTALLATION OF THE UNIT

C.3.5. Cover Panel Installation/ Conversion Procedure

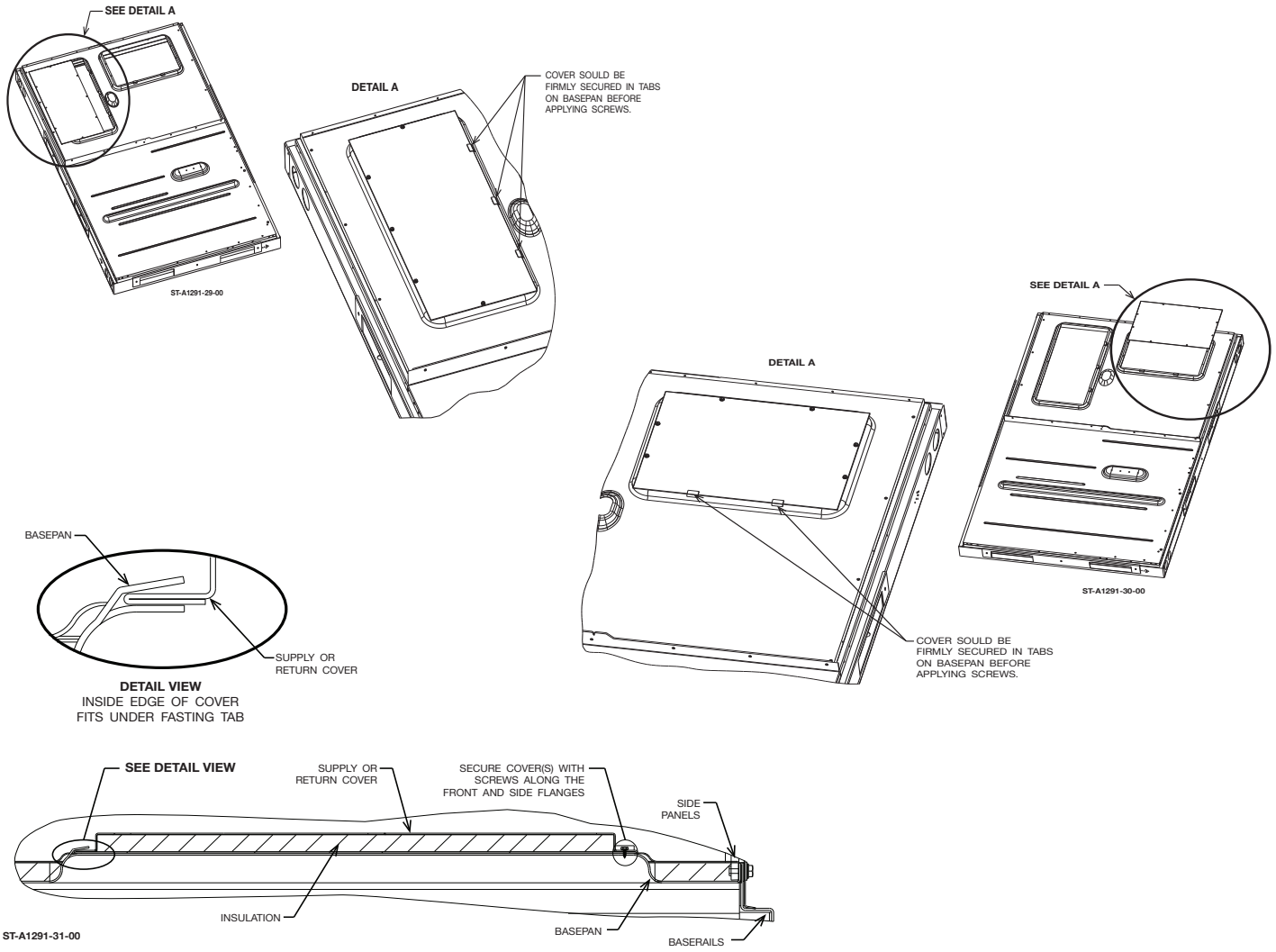
FROM DOWNFLOW TO HORIZONTAL

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



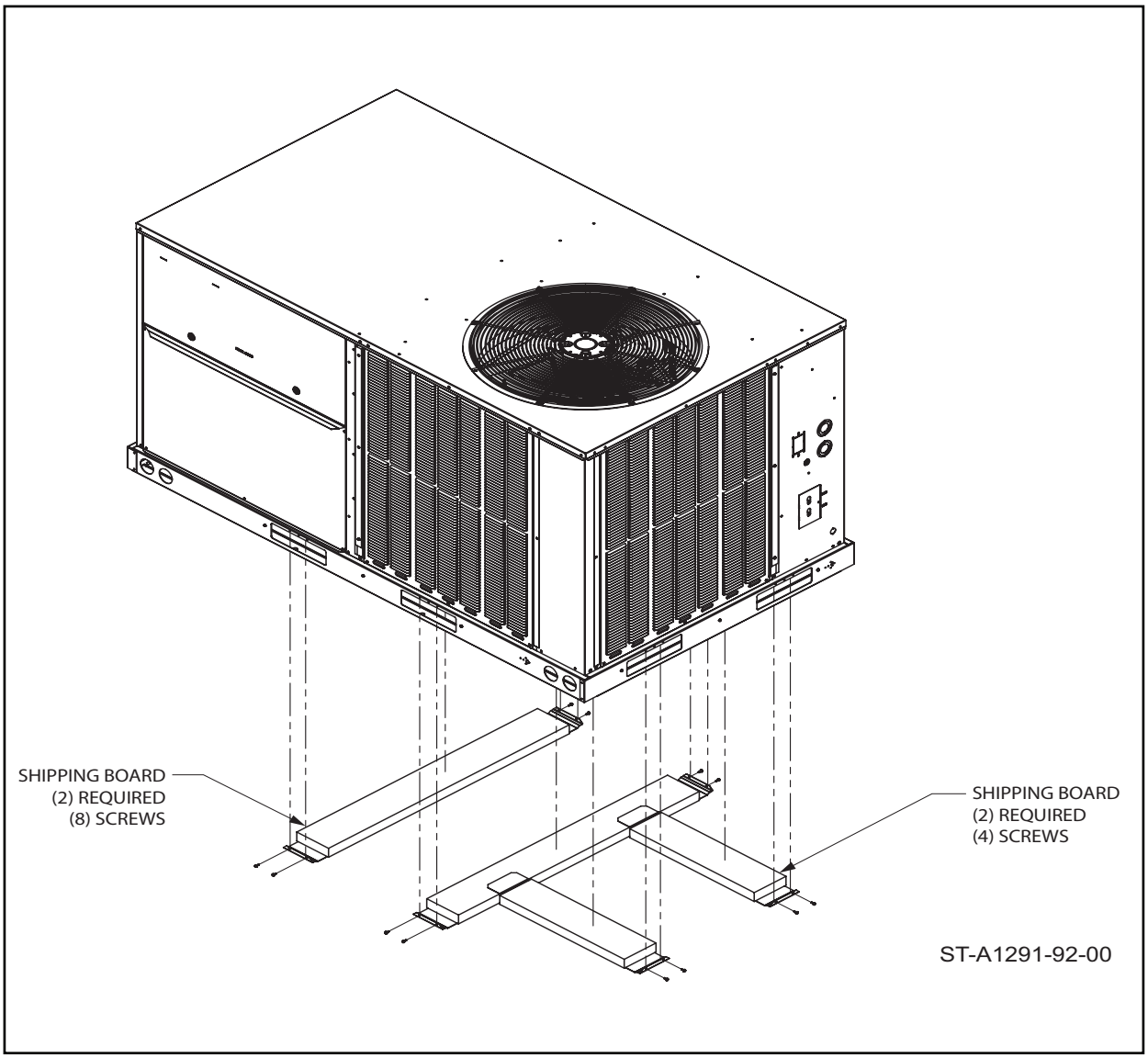
C.4.Setting the Unit

C.4.1. Removing Shipping material

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

• **Woodboard 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 cardboard from underneath, and it may be removed when the unit is lifted.

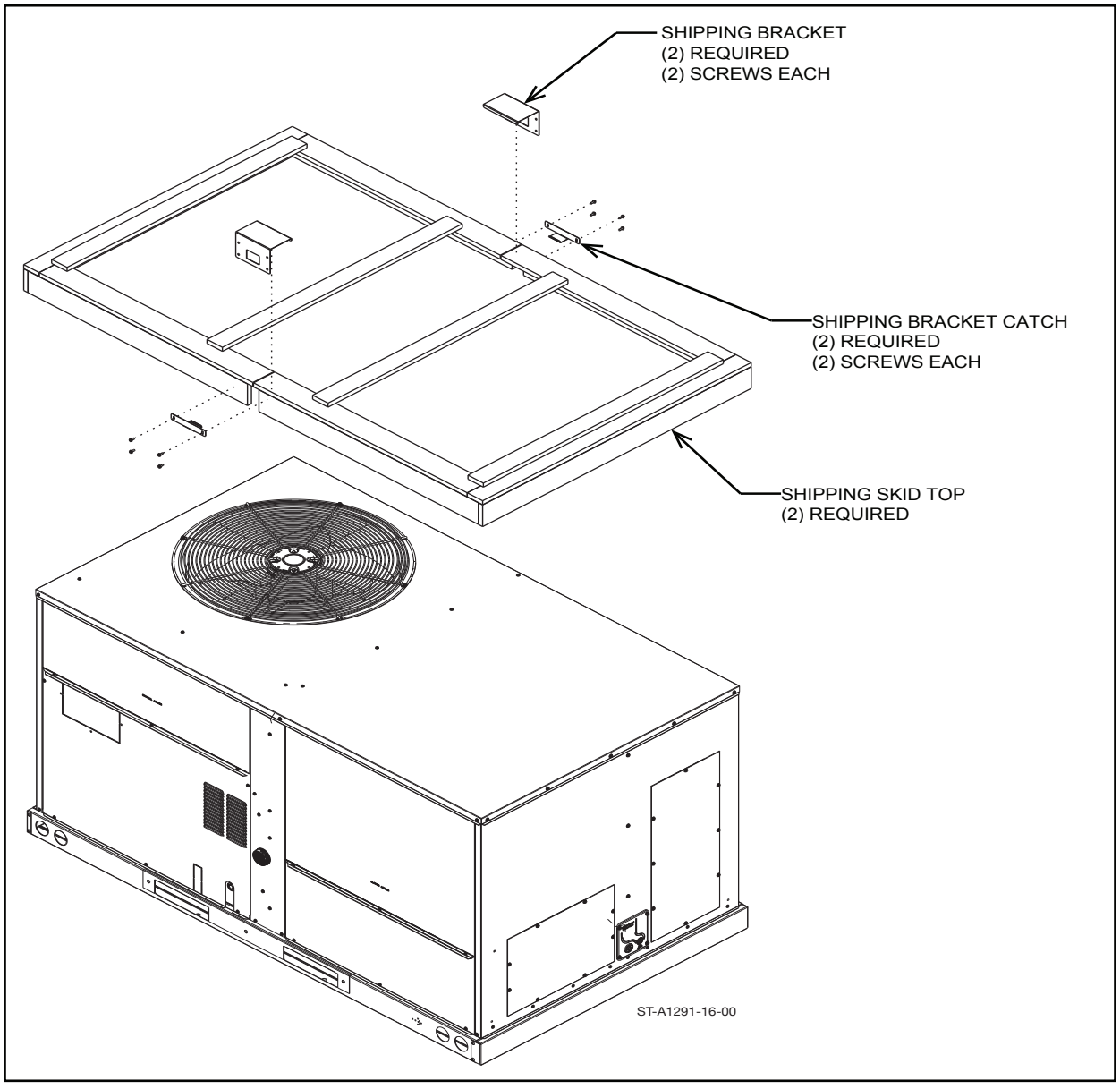
Figure C.4.1. – A: Basepan Protection Assembly



C. INSTALLATION OF THE UNIT

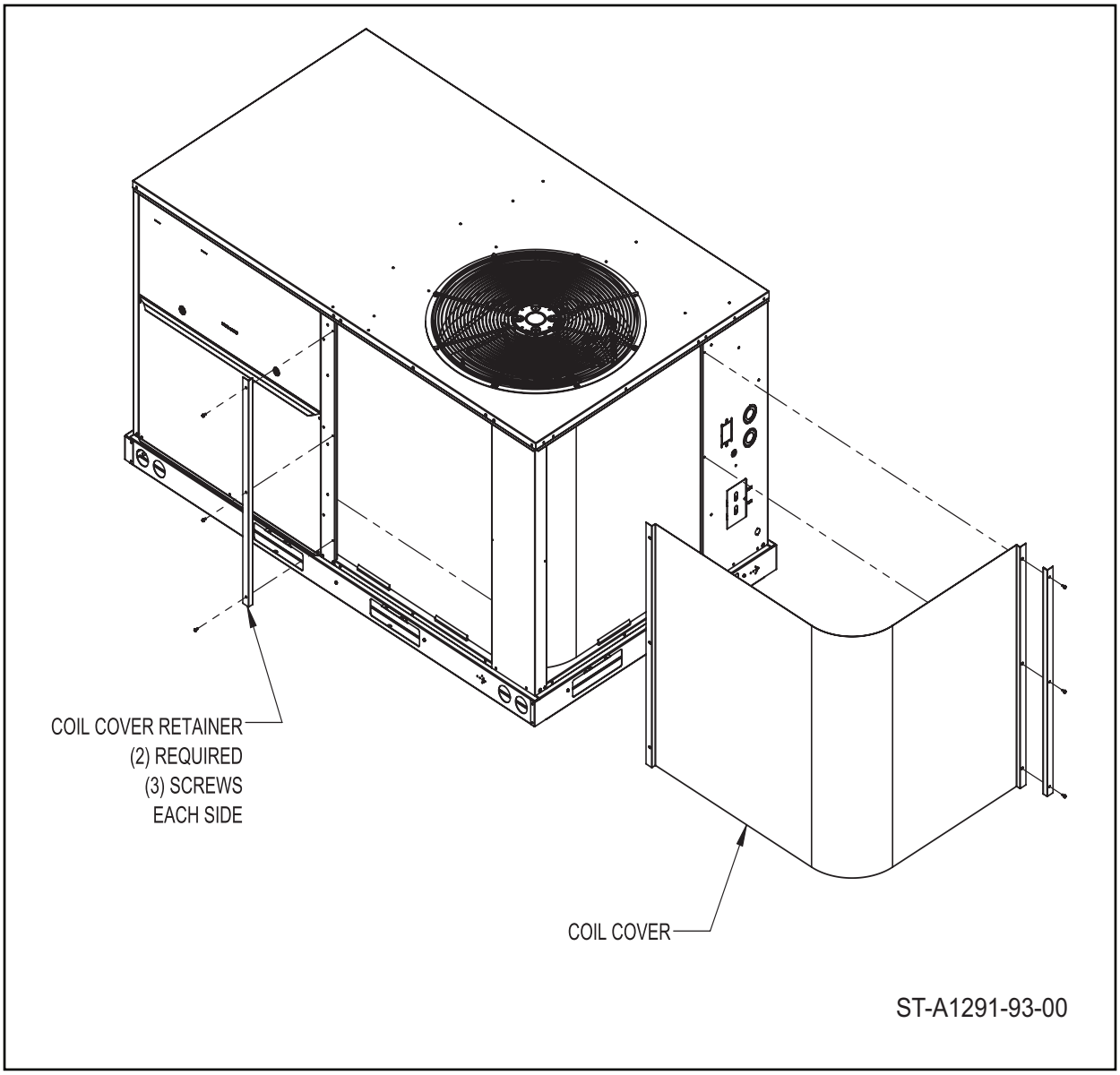
• **Wooden Skid –** Remove the screws from the metal brackets located in the middle along both long sides of the unit. This will detach the two sections of the wooden skid and allow them to be lifted off. If the unit is to be lifted by a crane, it is recommended to leave the top skid on until after the unit is on the roof to provide extra protection if spreader bars are not used.

Figure C.4.1. – B: Wooden Skid Assembly



• **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.

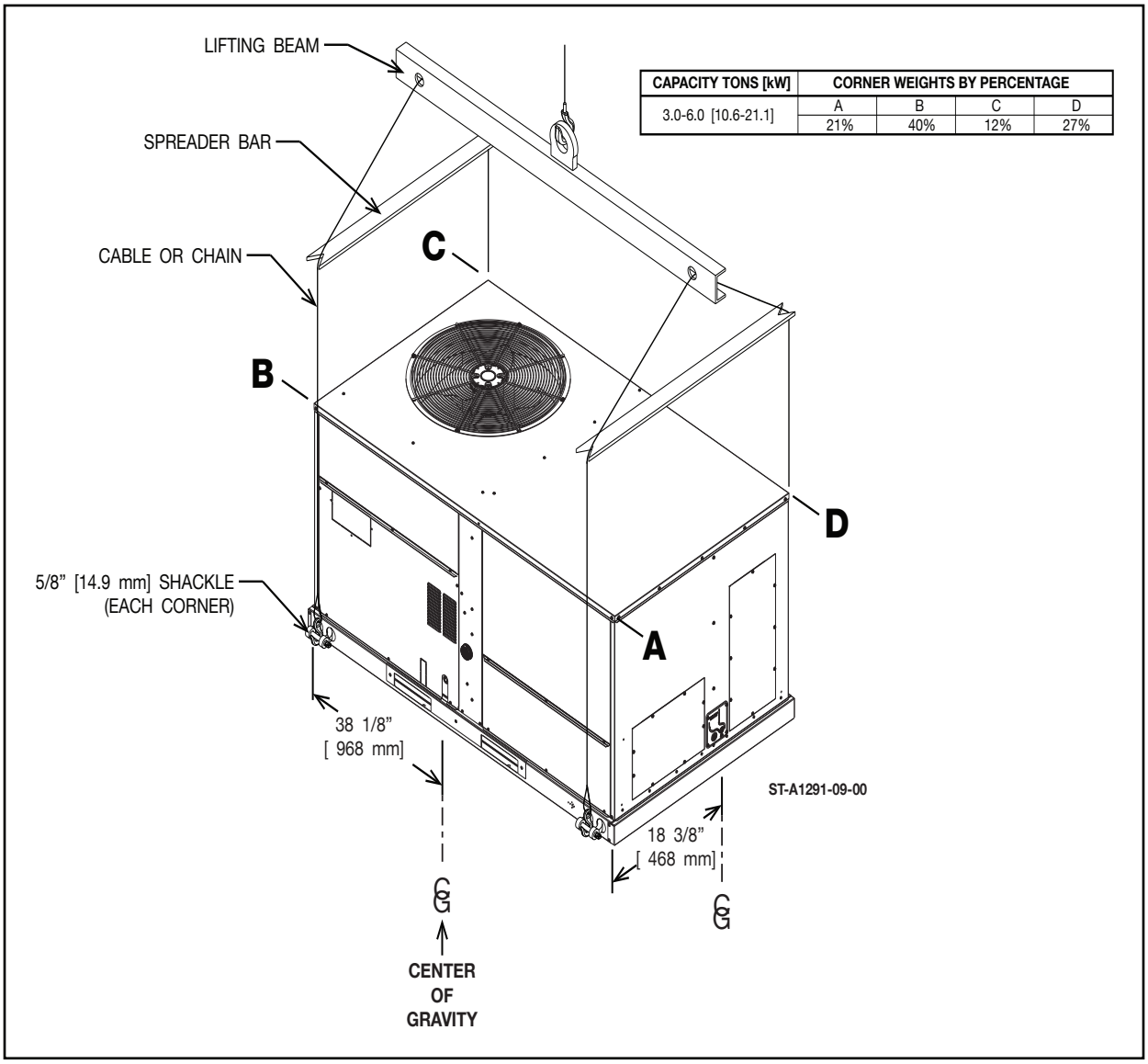
Figure C.4.1. – C: Condenser Coil Protection Assembly



C. INSTALLATION OF THE UNIT

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]	21%	40%	12%	27%

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.

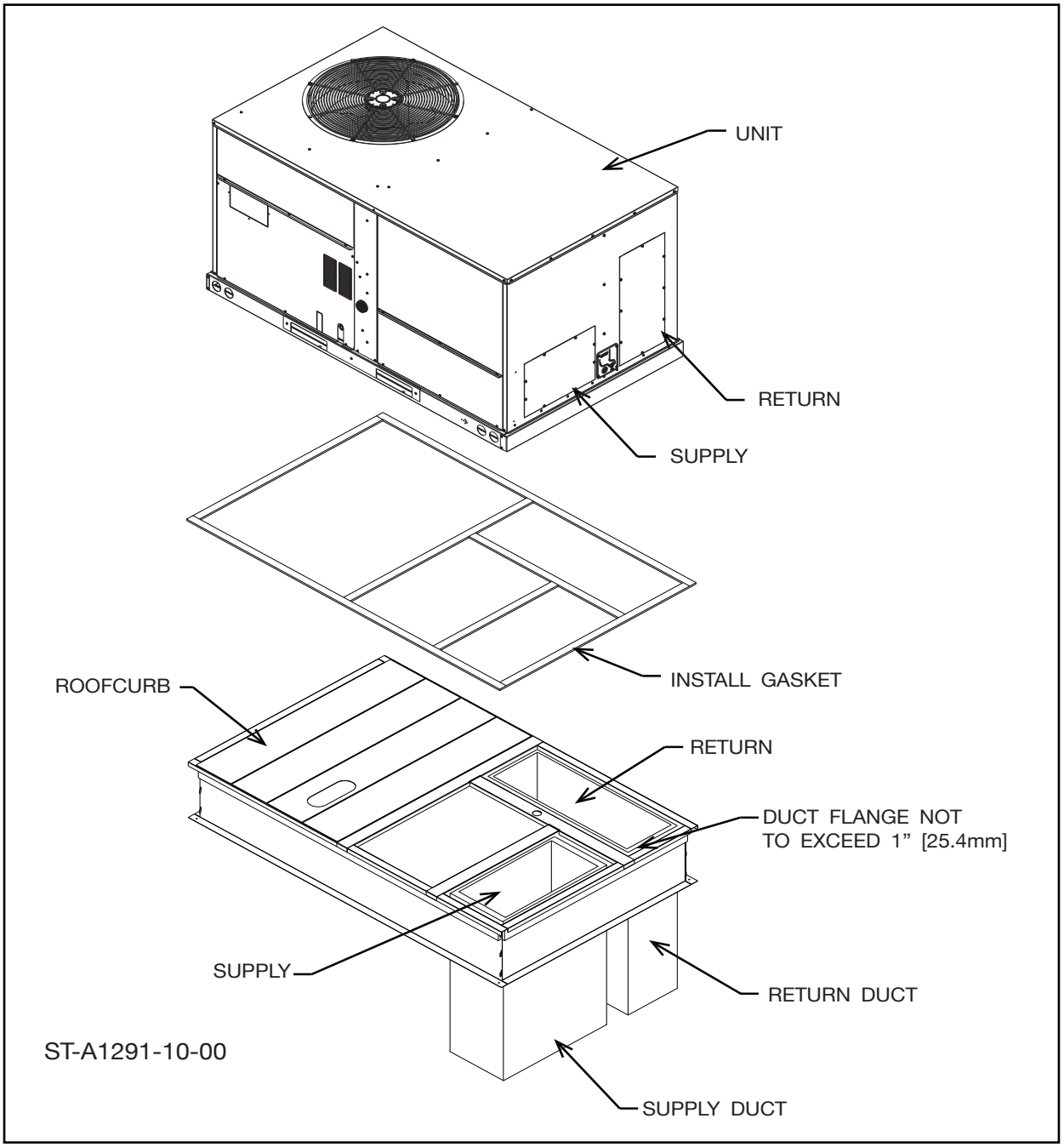
C.4.3.1. Installing the Roof Curb

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. INSTALLATION OF THE UNIT

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

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

C.4.4. On a slab

C.4.4.1. Setting the Unit

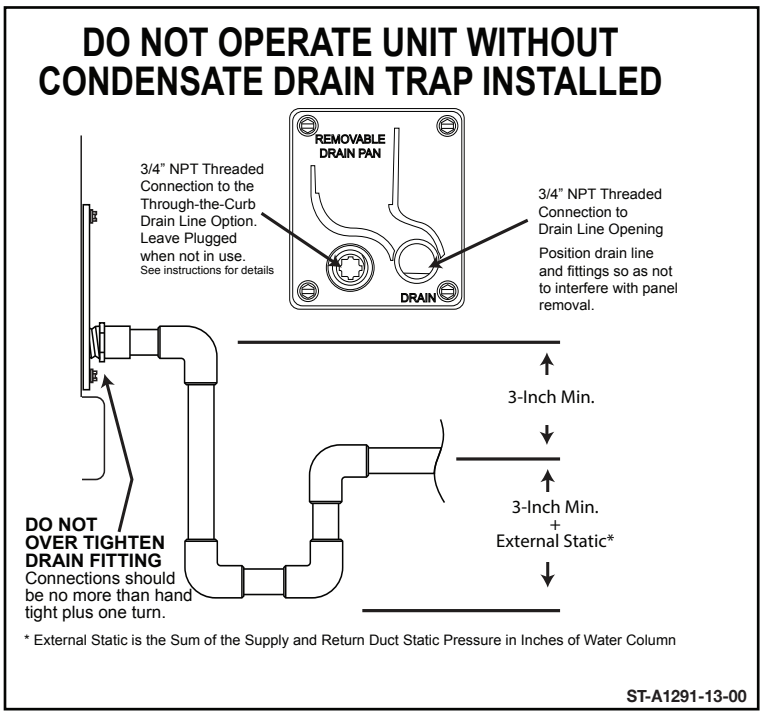
Set the unit on a stable concrete pad with adequate clearances around the sides of the unit, and make sure the unit is level before securing.

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

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

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

Figure C.5.1 – A: Condensate Drain Tap



C.5. Installing Condensate Drain

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

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

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

C.5.1. Determine Drain Trap Height Requirement

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

C.5.2. Keeping the condensate drain pan serviceable

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

C.5.3. Connecting the Drain trap

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

C.5.4. Connecting the Drain to the through the curb option

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

C.5.5. 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.

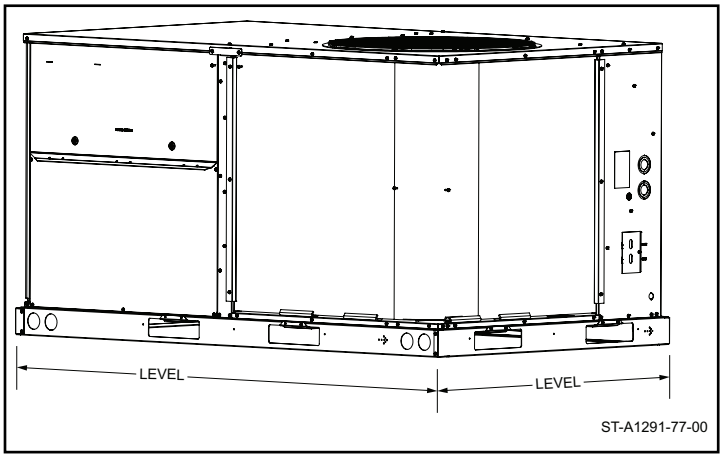
NOTE: Failure to remove the condenser coil protector on non–louver panel units will negatively impact performance and be harmful to system components. Failure to remove the shipping boards will interfere with duct installation and mounting for downflow configurations.

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. See section ***J.3. Checking and Adjusting Air Flow*** for more information.

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.

Note: Maximum air flow could either be heating or cooling speed, dependent on tonnage. See air flow table for all duct sizing.

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

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

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

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/business owner must be informed against future changes in construction which might change this to a "confined space." Also, caution the user/business owner 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.

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

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 following dimensions are approximations.

The supply duct opening for roof curb installations is 12 1/8" x 17 3/4", the supply duct opening for horizontal ducted installations is 11 5/8" x 17 1/4". 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 following dimensions are approximations.

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 25 1/8" x 10 1/2". See ***Figure B.3.6. – A and – B*** for reference.

Note: The installer is responsible for verifying all dimensions.

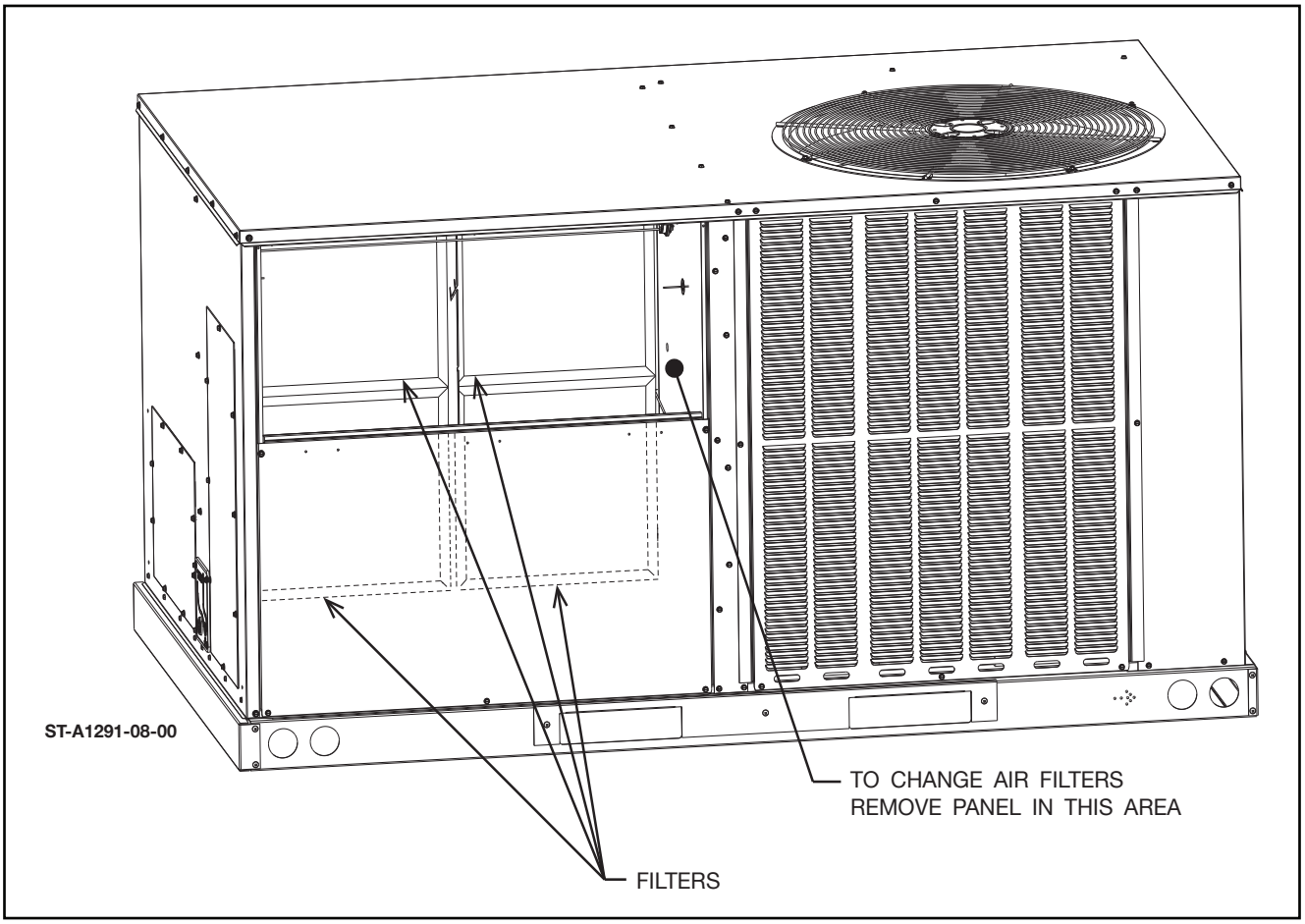
⚠WARNING: Never allow products of combustion or the flue products to enter the return air ductwork, or the circulating air supply. All return ductwork must be adequately sealed and secured to the furnace with sheet metal screws, and joints taped. All other duct joints must be secured with approved connections and sealed airtight. Failure to prevent products of combustion from being circulated into the living space can create potentially hazardous conditions, including carbon monoxide poisoning that could result in personal injury or death.

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 may be required depending upon the building type and use. Consult with a local mechanical engineer on the duct and building design to determine if any noise abatement solutions need to be considered before installation.

D.3. Filters

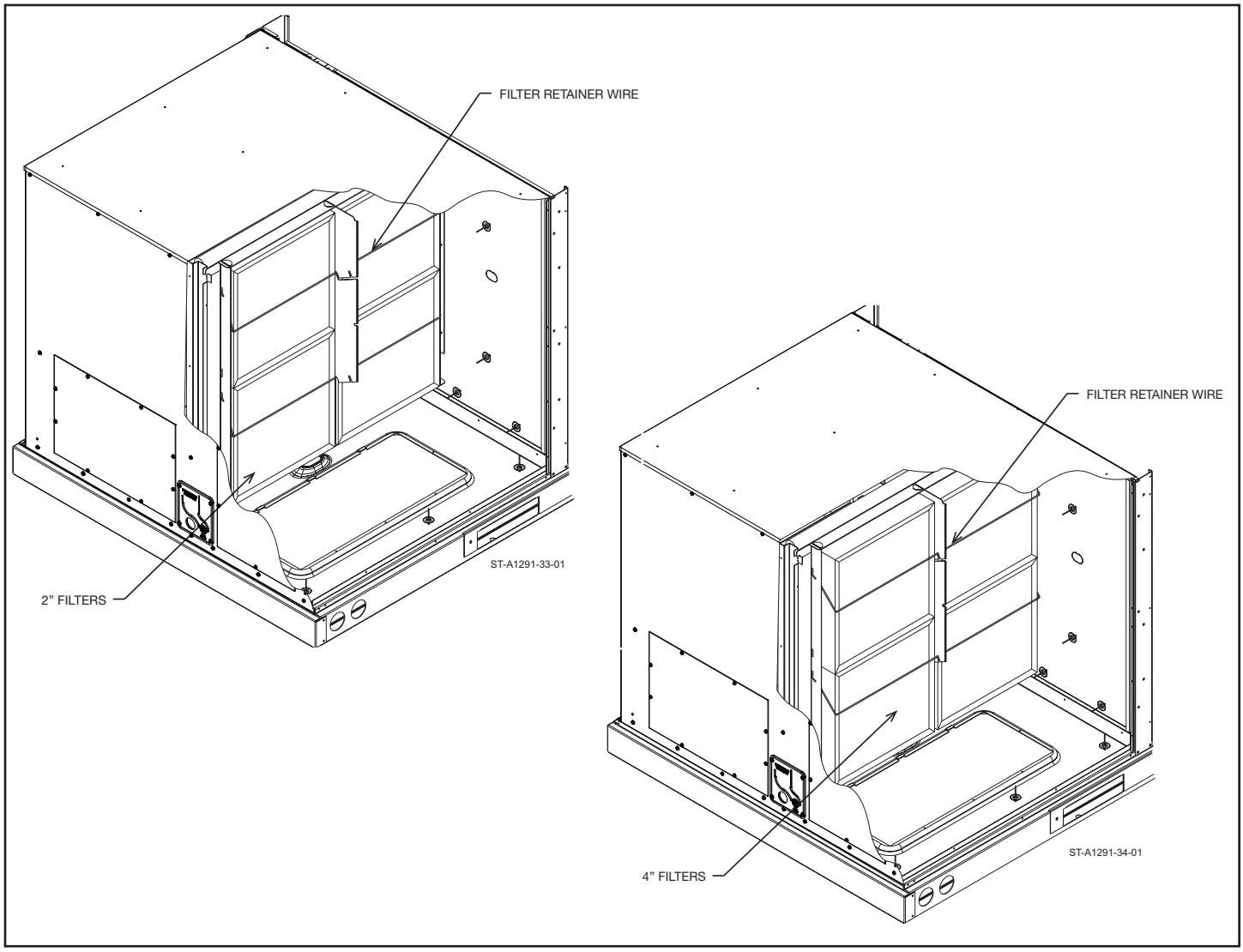
D.3.1. Installing Filters



D. DUCT AND VENTING

D.3. Filters

D.3.1. Installing Filters (Cont.)



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

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

D.4. Economizers and Fresh Air Dampers

D.4.1. Economizer Information

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

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

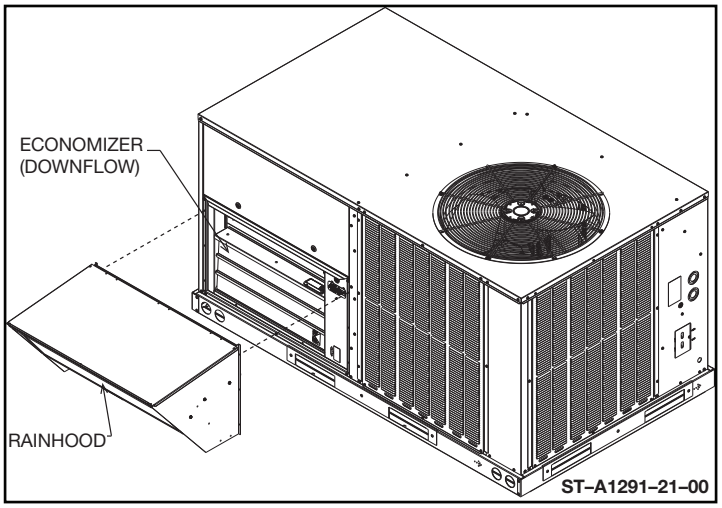
The Horizontal Economizer is designed specifically for units setup in a horizontal flow configuration. The horizontal economizer utilizes independently actuated return–air and fresh air dampers to enable the most efficient handling of air achievable with this platform. The horizontal economizer also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

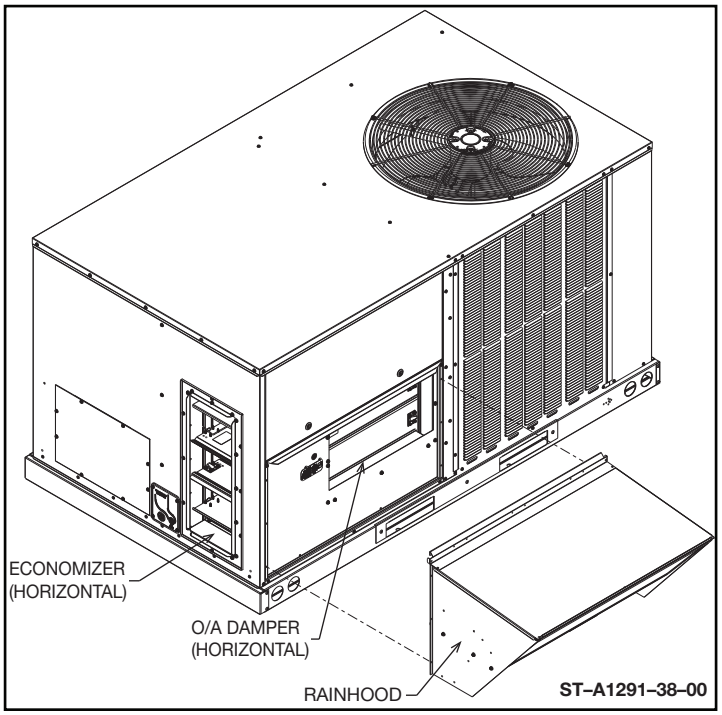
All units with economizers come shipped from the factory with a parts bag and a separate document for Economizer Installation & Operation instructions. Refer to that document for information on how to install the economizer, connect the controls, and adjust the airflow. Accessory economizers purchased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

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

The wall mounted CO2 sensor with LED display is field installed accessory. It measures the CO2 level in the occupied space as an indirect measure of occupancy and is used in conjunction with a Demand Controlled Ventilation (DCV) economizer scheme. For more information on the CO2 sensor, reference the manufacturer's website and the Installation and Operation Manual shipped with the kit.

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





Note: Economizer appearance may vary.

D. DUCT AND VENTING

D.4.2. Fresh Air Dampers

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

The 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 they introduce outside air during occupied and unoccupied modes increasing the load on the rooftop unit.

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

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

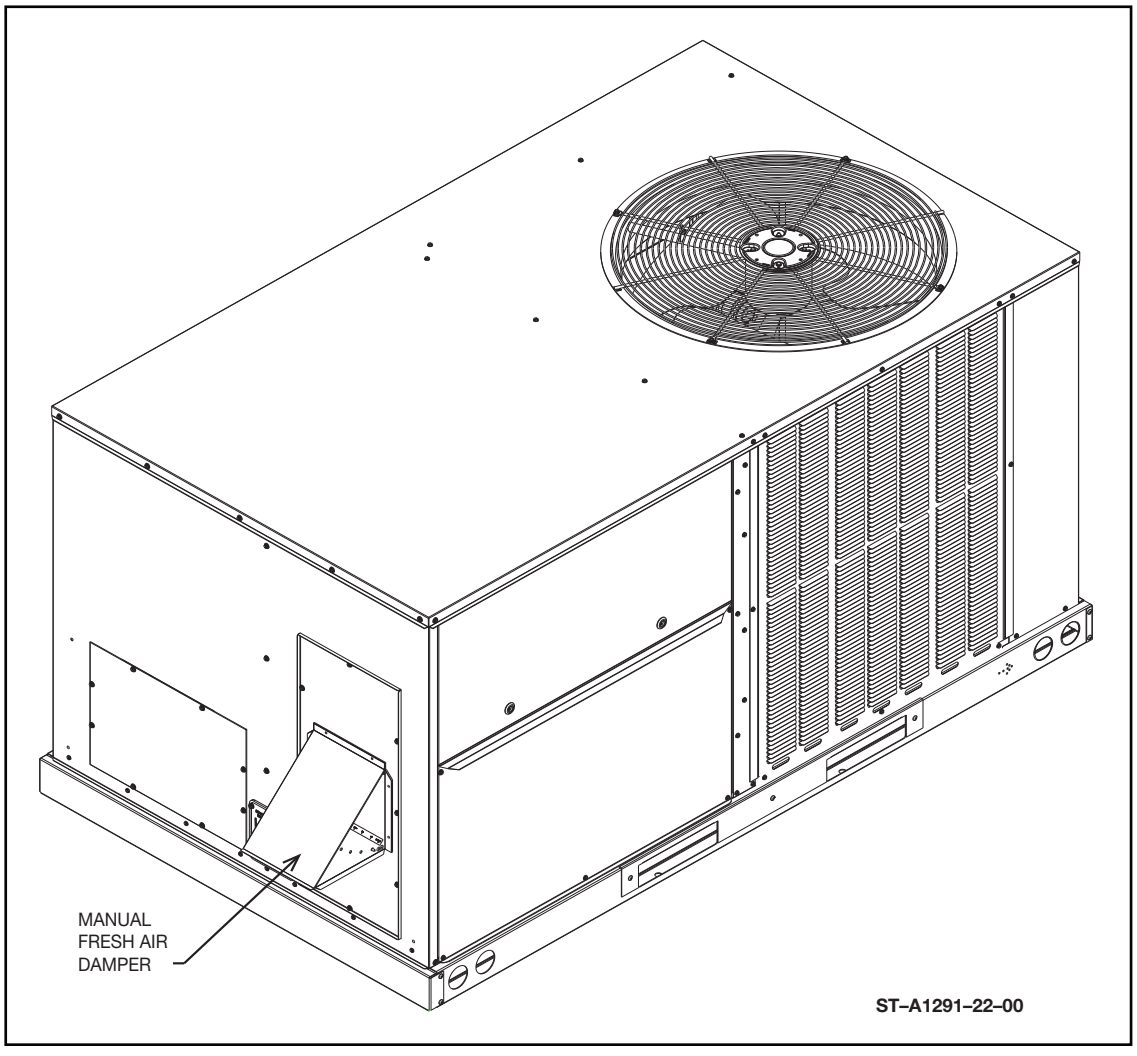
By connecting a Timer, CO2 Sensor or Smoke Detector in series between the RTU fan ("G" on the Thermostat) and actuator, the damper can be controlled during "Unoccupied" hours, or allow the damper to only introduce outside air during "On–Demand Occupancy."

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

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

Note: Damper appearance may vary.

Figure D.4.2. – A: Fresh Air Damper

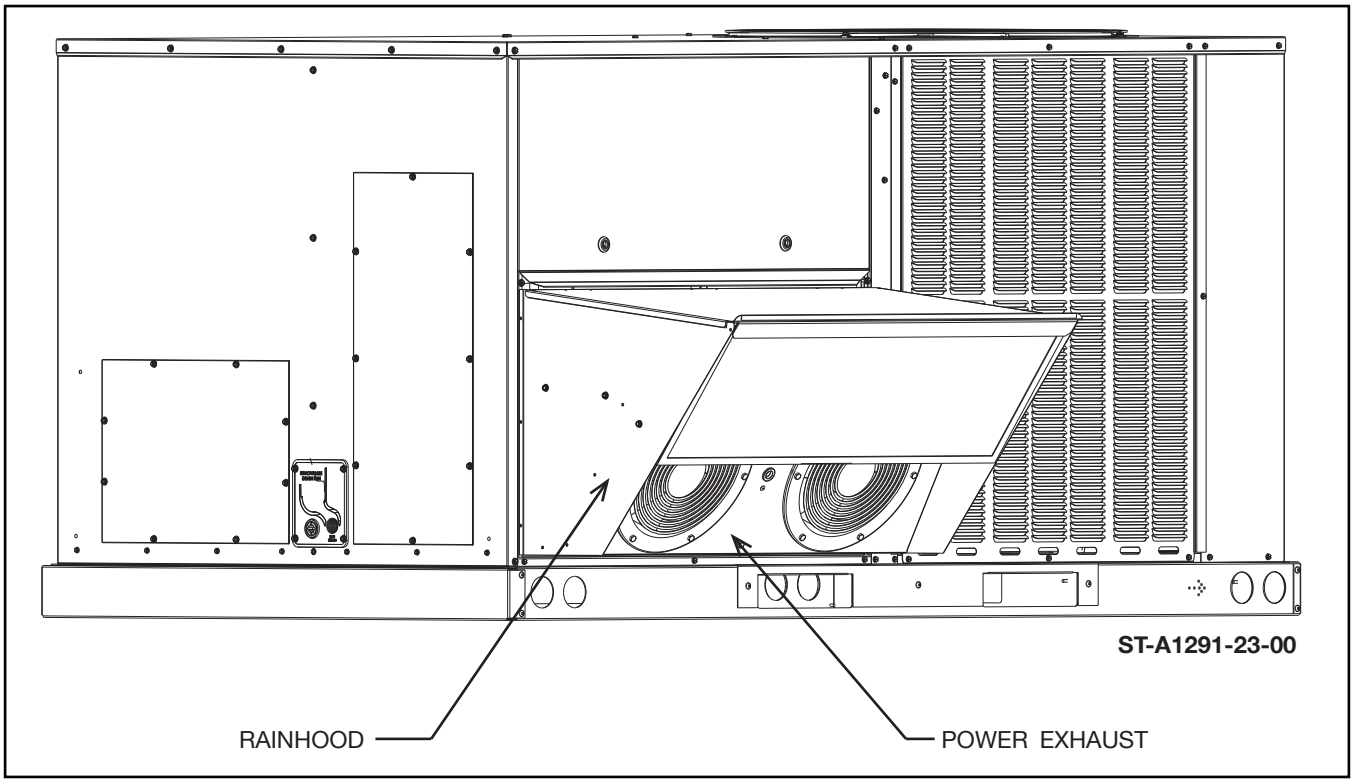


D.4.3. Powered Exhaust

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

Note: Accessory appearance may vary.

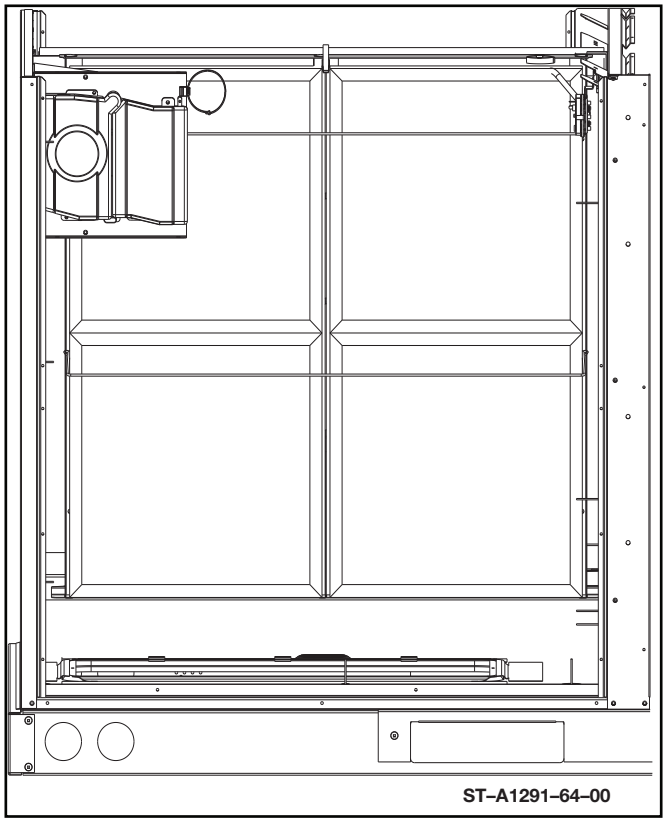
Figure D.4.3. – A: Powered Exhaust

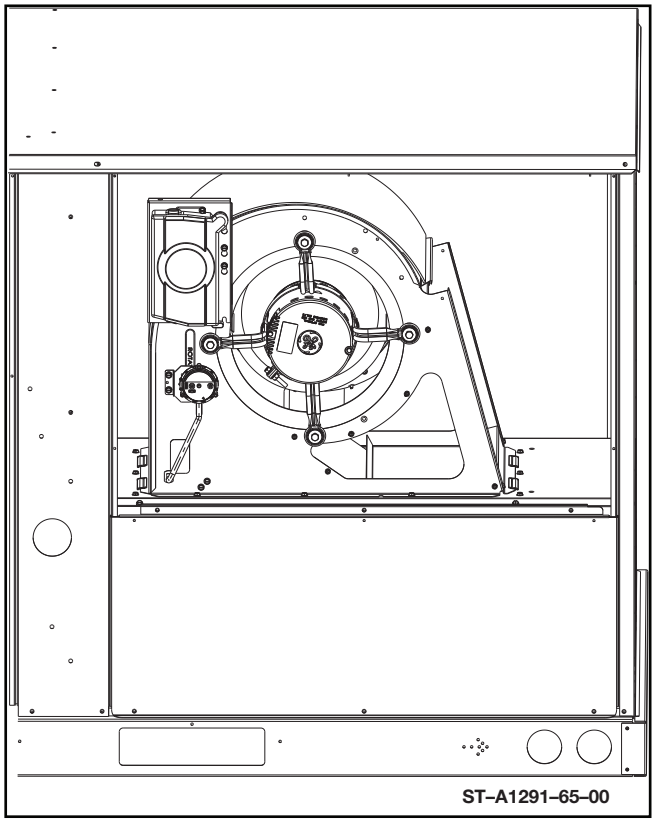


D. DUCT AND VENTING

D.5. Smoke Detectors

Figure D.5. – A: Smoke Detector Assembly





D.5.1. Supply Duct Smoke Detectors

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

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

D.5.1.2. Factory Installed – Inspection and setup

Inspect the smoke detector assembly for any damage during shipping. Use ***Figure D.5. – A*** for reference. Confirm that all wiring connections are still secure. Refer to the separate Installation Instructions shipped with the smoke detector for wiring diagrams and additional assembly instructions. These instructions may be found in the parts bag in the unit or on the manufacturer's website.

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

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

Note: Smoke Detector appearance may vary.

D.5.2. Remote Smoke Detectors Reference

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

Refer to ***Section F.2.5.1. Remote Smoke Detector/Fire Control Connection*** for DDC connections.

E.1. Electrical Safety Information

E.1.1. Information on Power Supply

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

1. All wiring should be made in accordance with the **National Electrical Code**. Consult the local power company to determine the availability of sufficient power to operate the unit. Check the voltage at power supply to make sure it corresponds to the unit's RATED VOLTAGE REQUIREMENT. Install a branch circuit disconnect near the rooftop, in accordance with the N.E.C., C.E.C. or local codes.
2. It is important that proper electrical power is available at the unit. Voltage should not vary more than 10% from that stamped on the unit nameplate. On **three phase units**, phases must be balanced within 3%.

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

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

NOTES:

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

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. ELECTRICAL

E.1.2. 208/230 Volt Operation and Required Adjustments

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

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

Setup for 575V units will not require any additional setup. There will be an additional transformer in the unit that is stored in a metal box and mounted next to the compressor. It will be pre–wired from the factory and no setup will be needed.

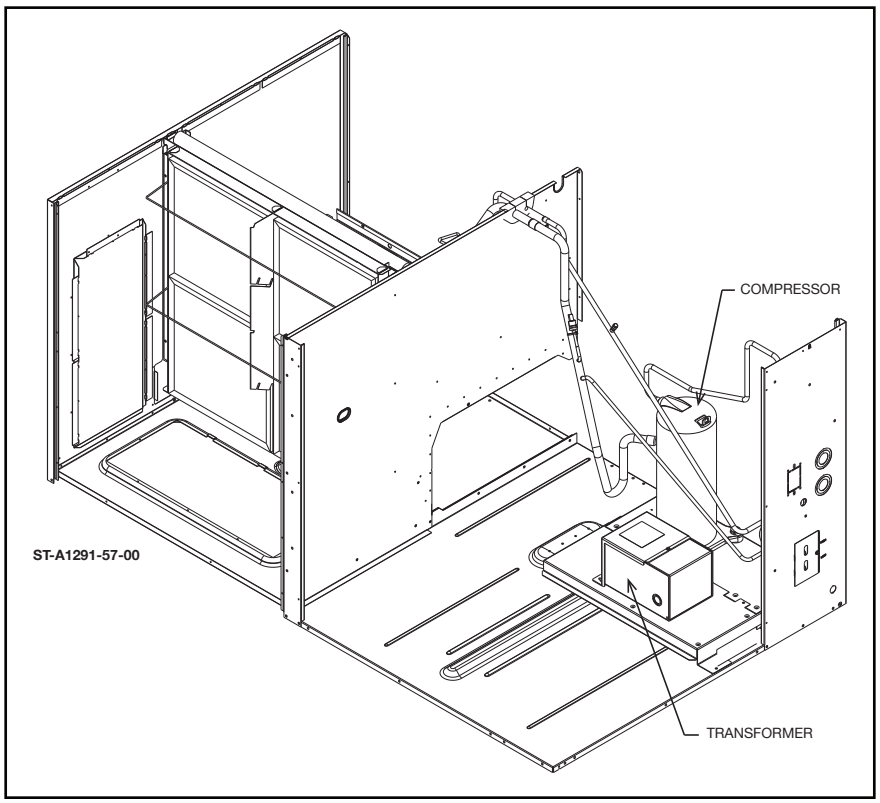
E.1.5. Potential Ignition Sources

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 contactors, 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.

Figure E.1.3. – A: 575 Volt Transformer Location

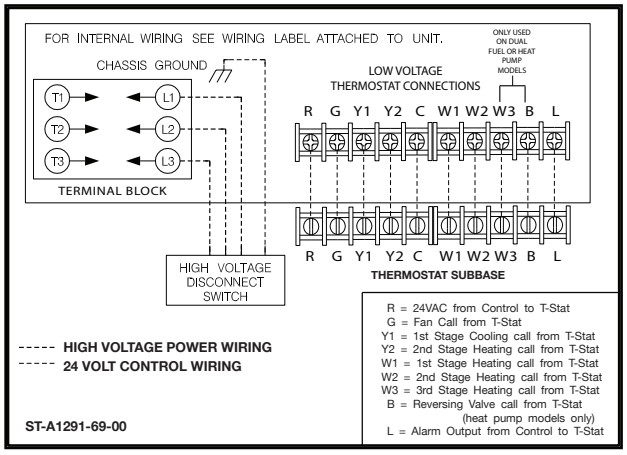


E.2. Electrical Data

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

E.3. Electrical Connections

Figure E.3. – A: Typical Thermostat Wiring



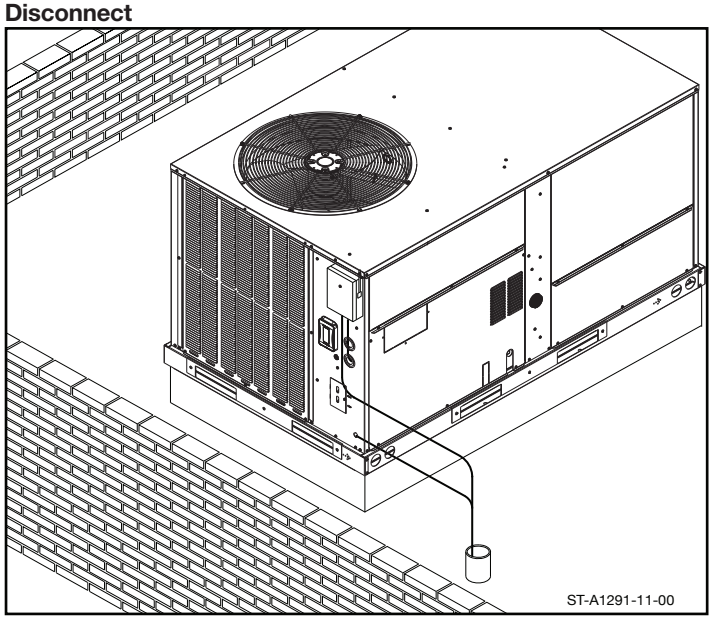
Use to ***Appendix B*** "Electrical Data" and National Electrical Code for circuit ampacity to determine proper wire sizing.

Refer to ***Figure F.3. – A: Electrical and Piping 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 for more information.

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–ups 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

In applications with 3–phase power, the compressor rotation can be affected and potentially run backwards depending on the wiring phase. It is recommended to use a phase rotation meter to verify the proper wiring of the supply power. Do not rely on the rotation of the blower because models equipped with a VFD or ECM drive motor will always run in the correct rotation.

E.3.4.1. Checking Phase with VFD Drive and/or Direct Drive

On any models equipped with an ECM Direct Drive Blower Motor, the motor will always rotate in the correct direction. Correction phase must be checked by the operation of the compressor.

E.3.5. Grounding Requirements

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

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

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

The room thermostat must be compatible with the spark ignition control on the unit. Generally, all thermostats that are not of the “current robbing” type are compatible with the integrated furnace control. The low voltage wiring should be sized as shown in ***Figure F. – A: Field Wire Size for 24v Thermostat Circuits.***

F. CONTROL / THERMOSTAT WIRING

F.1. Non–DDC Control Inputs

Figure F. – A

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

ST-A1291-14-00

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

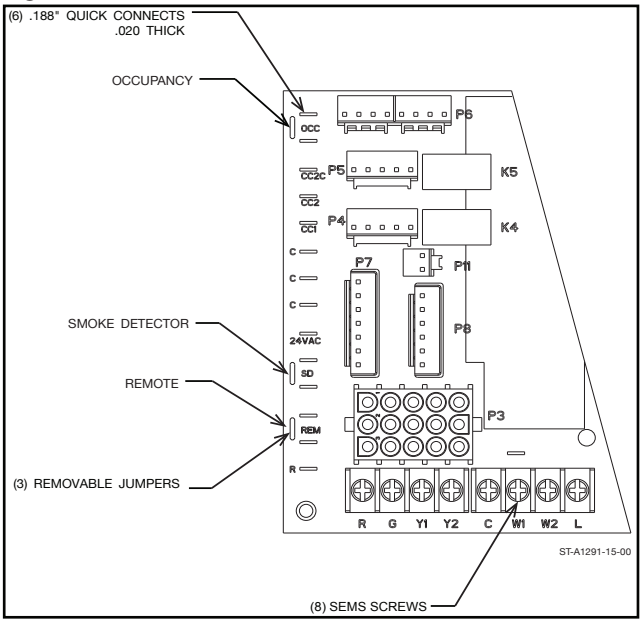
NOTE: DO NOT USE CONTROL WIRING SMALLER THAN NO. 18 AWG.

F.1.1. T–Stat Field Connections

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.*** 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.

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

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



F.1.2. Occupancy connections / Remote connections / Etc

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

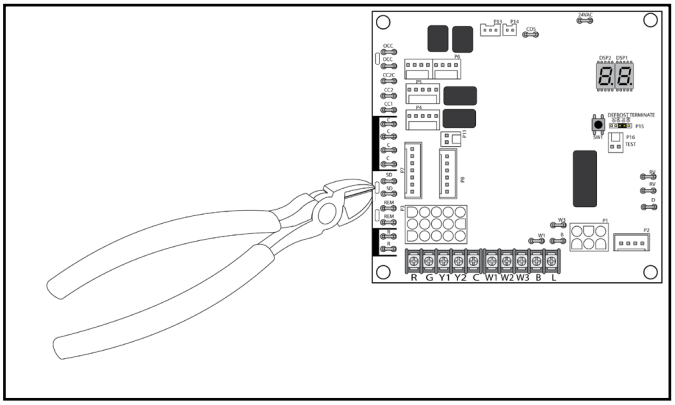


Figure F.1.2. – B: Non–DDC Board

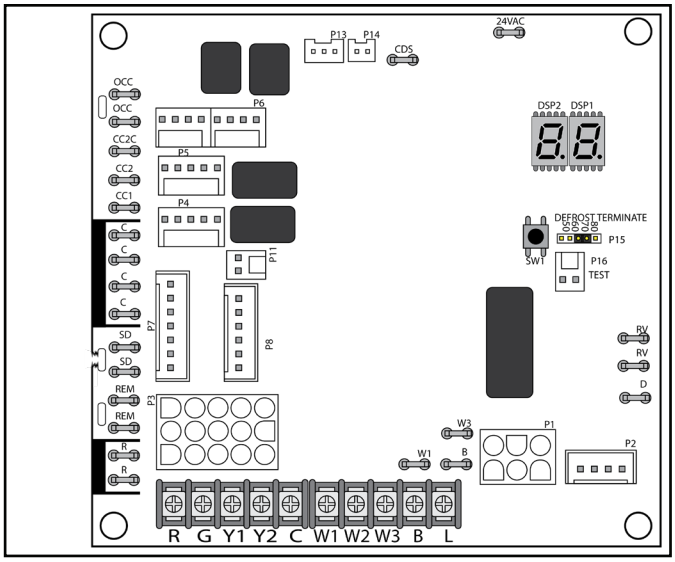
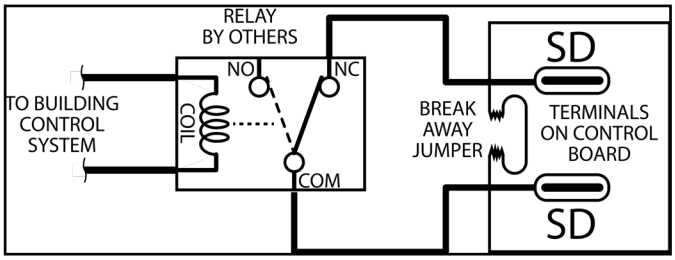


Figure F.1.2. – C: Using a Dry–Contact Relay



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

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

F. CONTROL / THERMOSTAT WIRING

F.1.2. Continued

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

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

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

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

F.1.3. Connecting a Smoke Detector

F.1.3.1. Core Command Connection

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

Using cutters or a small screw driver, break the edge of the board between the to terminals marked with "SD". Use 3/16" blade connector, and a minimum of 18AWG wire to connect to a Normally Closed Dry Contact Relay, or 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.

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.

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.2.5.2. – 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.

F.1.4. Building Management / Control Connections Using DDC

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

F.2. DDC Control Inputs

Figure F.2.1. – A 24VAC Thermostat Circuits

FIELD WIRE SIZE FOR 24 VOLT THERMOSTAT CIRCUITS							
		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

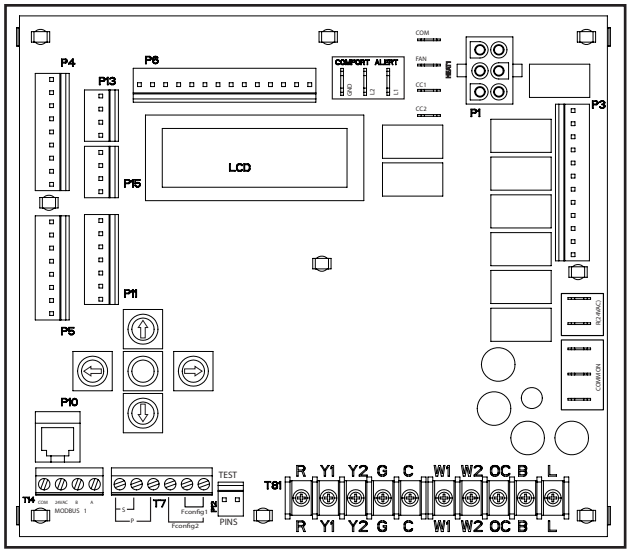
(1) THE TOTAL WIRE LENGTH IS THE DISTANCE FROM THE FURNACE TO THE THERMOSTAT AND BACK TO THE FURNACE.

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: Clear Control Terminal Locations



F.2.2. DDC Automated Stand–Alone Operation

F.2.2.1. Setting the Unit Up: Mode Settings

The unit will need to be configured as follows.

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

The following Automatic Modes can be selected:

AUTO – run both heating and cooling.

Cool Only – run only cooling.

Heat Only – run only heating.

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

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

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

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

F.2.2.2. Indoor Fan Mode

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

In VAV installations, it is recommended that this setting remain “continuous” when occupied.

F.2.2.3. Occupancy Control External Input 24VAC

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

F.2.2.4. Temperature Setpoints

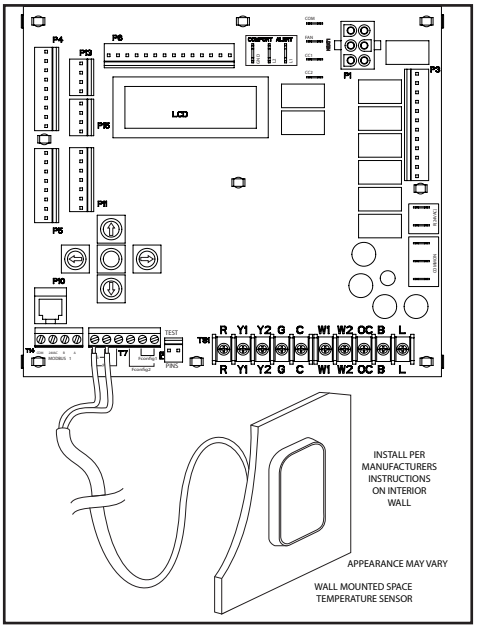
There are two temperature setpoints for occupied and unoccupied modes, heating and cooling. Using the control board’s navigation buttons, proceed to the Setpoints Menu and use the down arrow key to select “occupied or unoccupied cool and heat setpoints.” Press the middle button to select the first setpoint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

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

F.2.3. External Sensor Connections

F.2.3.1. Space Temperature Sensor

Figure F.2.3.1. – A: Space Temperature Sensor



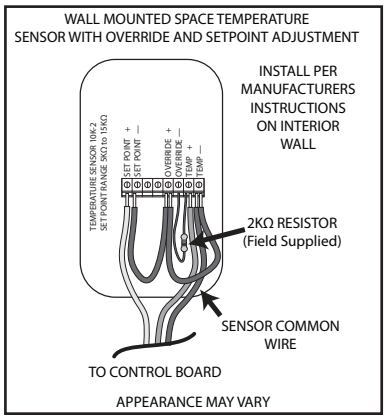
1. When using a DDC unit with Clear Control in conjunction with a Building Management System or an Automated Operational Mode, the use of a Space Temperature Sensor can greatly improve the accuracy and operation of the unit in maintaining the comfort in the space in both cooling and heating.
2. The space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

F.2.3.2. Zone Sensor Occupancy Override

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

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

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



F. CONTROL / THERMOSTAT WIRING

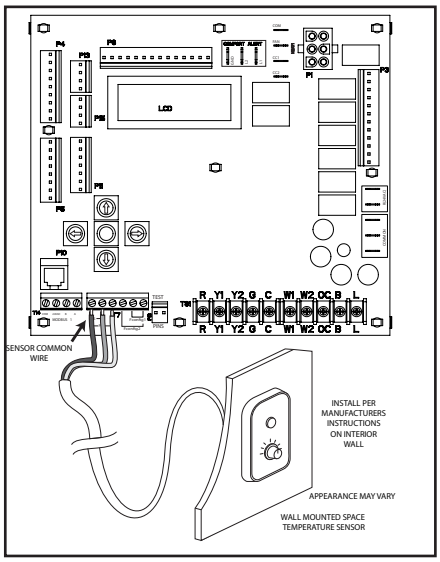
F.2.3.3. Set–Point Adjustment

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

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

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

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



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

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

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

F.2.3.4. 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 24 Vac 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 Clear control/DDC manual for more detail.

F.2.5. Smoke Detection Shutdown

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

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

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

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

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

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

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

F. CONTROL / THERMOSTAT WIRING

F.2.5.1. Factory Smoke Detector Kit

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

F.2.5.2. Remote Smoke Detector/Fire Control Connection

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

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

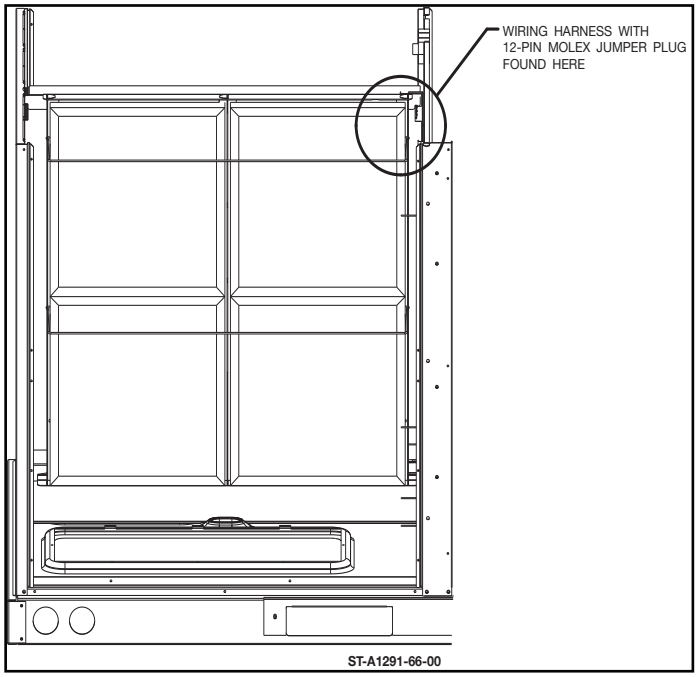
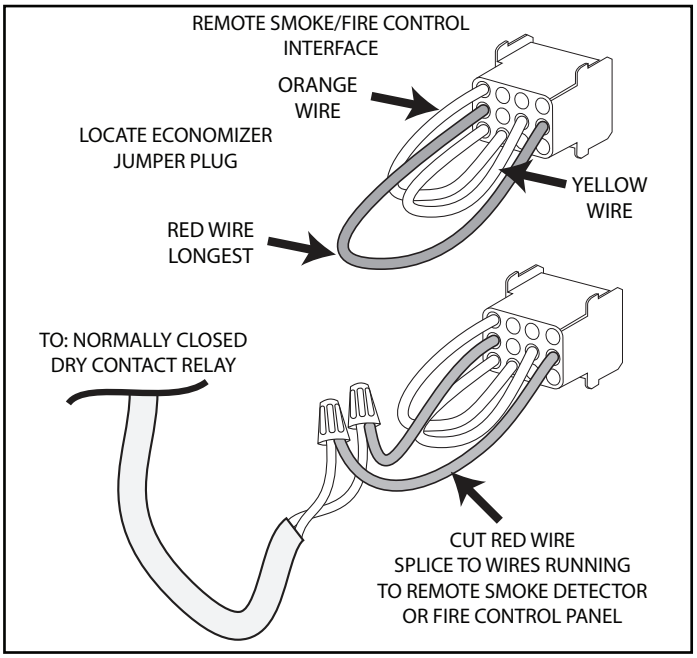


Figure F.2.5.2. – B: Smoke Detector Connection (DDC)



F.3. Routing Control wiring

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

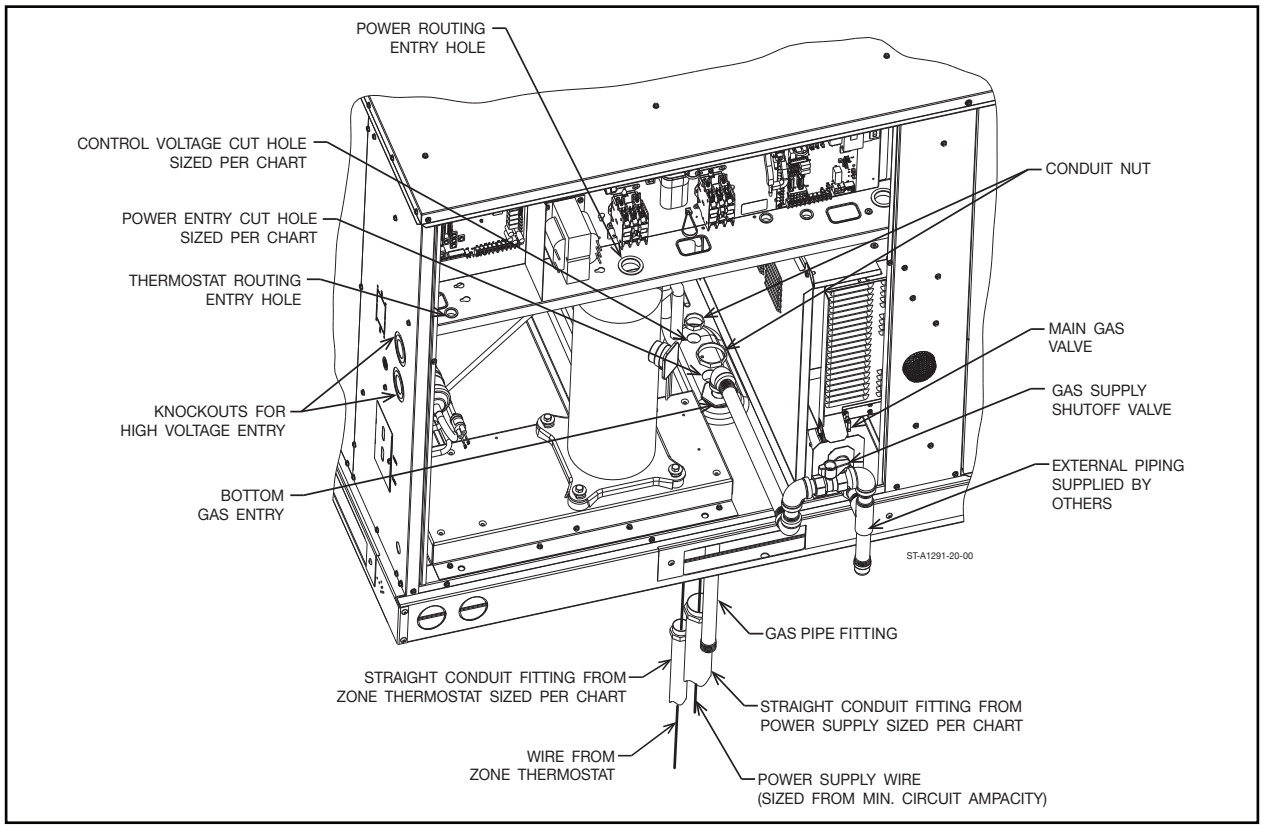


Figure F.3. – B: Hole Sizing for Conduit

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

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

F.4. Measuring Control Voltage Loads

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

G. GAS

G.1. Gas Piping Requirements

Install gas piping in accordance with local codes and regulations of the local utility company. In the absence of local codes, the installation must conform to the specifications of the latest edition of the National Fuel Gas Code.

IMPORTANT: Connect this unit only to gas supplied by a commercial utility.

G.1.1. Pipe Material Requirements

Ridged black iron pipe and fittings are recommended for the gas lines, or other materials as local codes allow or considered best practice. The use of flexible connectors is not recommended. Install a Union joint near the unit, after the cut off valve, for service.

G.1.2. Tools Required

Pipe wrenches, Pliers, gas rated thread sealant, and leak detection fluid or soap and water is required.

G.1.3. Code Requirements

Local codes should be followed for the installation and marking of the gas piping. In the absence of local codes follow the latest edition of the National Fuel Gas Code, International Field Gas Code, or the Canadian B149.1HB–00, must be followed.

G.1.4. Gas Pressures and Regulations

IMPORTANT: ENSURE that the furnace gas valve is not to be subjected to high gas line supply pressures.

DISCONNECT the furnace and its individual manual gas stop from the gas supply piping during any pressure testing that exceeds 1/2 PSIG (3.48 kPa). Natural gas supply pressure must be 5” to 10.5” w.c. LP gas supply pressure must be 11” to 13” w.c. This pressure must be maintained with all other gas–fired appliances in operation. The minimum gas supply pressure to the gas valve for proper furnace input adjustments is 5” w.c. for natural gas, however 6” to 7” is recommended. The minimum gas supply pressure is 11” w.c. for LP gas.

See sections ***J.5.1.1. “Measuring and Adjusting Supply Gas Pressures” and J.5.1.2. “Measuring and Adjusting Manifold Gas Pressures”*** for more details.

⚠WARNING

ELEVATIONS ABOVE 2000 FT. REQUIRE THAT THE FURNACE INPUT RATING BE ADJUSTED AND THAT THE SIZE OF THE BURNER ORIFICES BE RECALCULATED BASED ON ELEVATION AND GAS HEATING VALUE. THE BURNER ORIFICES MAY (OR MAY NOT) NEED TO BE CHANGED. SEE THE SECTION TITLED “HIGH ALTITUDE INSTALLATIONS” OF THIS BOOK FOR INSTRUCTIONS.

G.1.5. Flue Diverter

Flue diverter and inlet air diverter are pictured at the bottom of this page. See ***Figure G.1.5.***

G.1.5.1. Flue Diverter Installation

Using integrated hooks, insert into the appropriate slots on post to the right of the furnace access door. The opening should be facing up towards the top of the unit. Once slots and hooks are mated, secure with one (1) screw (included) in topmost flange, and installation is complete.

The door hood is secured onto the furnace access door with six (6) screws (included). There are four (4) key holes cut into the air hood for easy mounting. Insert screws into the door and the left and right edges leaving enough space to put on the hood. Then place the door hood onto the door and finish by securing the screws tightly. Secure the final two (2) screws at the tops of the hood to complete the installation.

⚠WARNING

NEVER PURGE A GAS LINE INTO THE COMBUSTION CHAMBER. NEVER USE MATCHES, FLAME OR ANY IGNITION SOURCE FOR CHECKING LEAKAGE. FAILURE TO ADHERE TO THIS WARNING CAN CAUSE A FIRE OR EXPLOSION RESULTING IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH. TO CHECK FOR GAS LEAKAGE, USE AN APPROVED CHLORIDE–FREE SOAP AND WATER SOLUTION, OR OTHER APPROVED METHOD.

GAS VALVE

This furnace has a 24–volt gas valve. It has ports for measuring supply and manifold gas pressure. The valve body contains a pressure regulator to maintain proper manifold gas pressure. A control switch is on the valve body. It can be set to only the **"ON"** or **"OFF"** positions. The gas valve is a slow–opening valve. See Figure ***G.1.4. – A.***

When energized, it takes 2 to 3 seconds to fully open.

Figure G.1.4. – A White–Rodgers Two–Stage Gas Valve

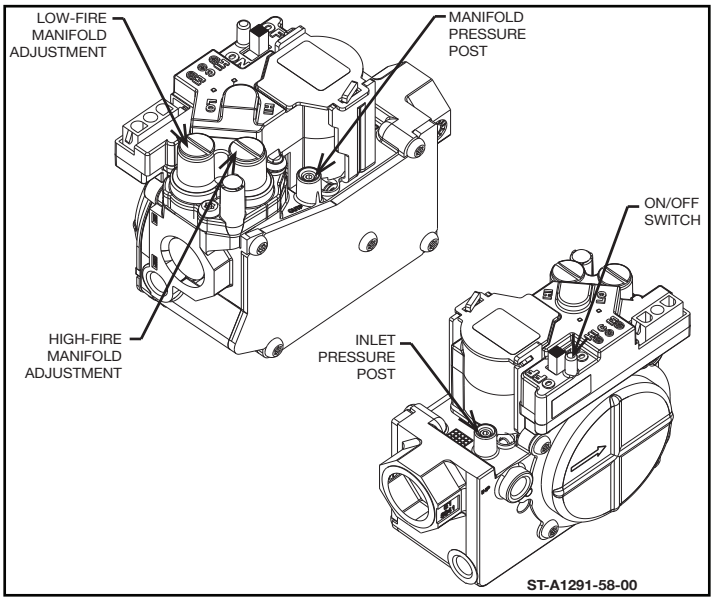


Figure G.1.4. – B: Burner Assembly Front View

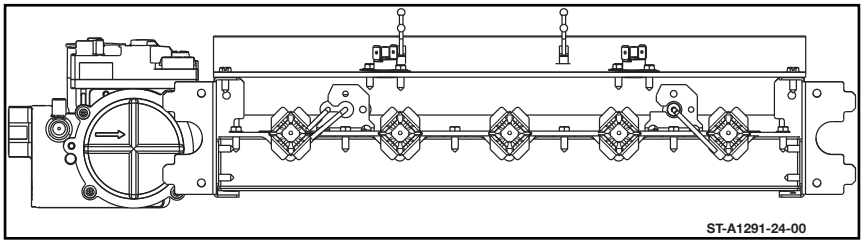
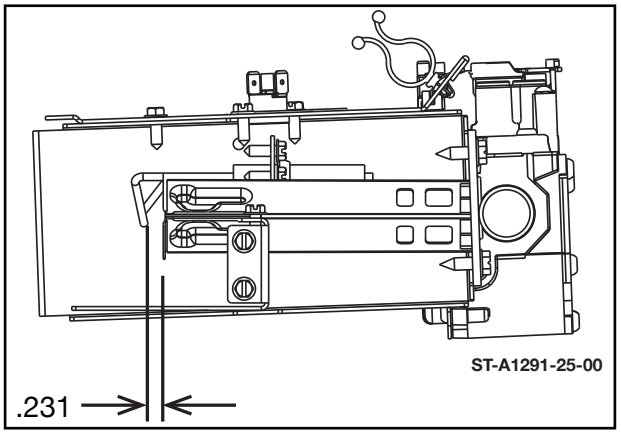


Figure G.1.4. – C: Burner Assembly Side View

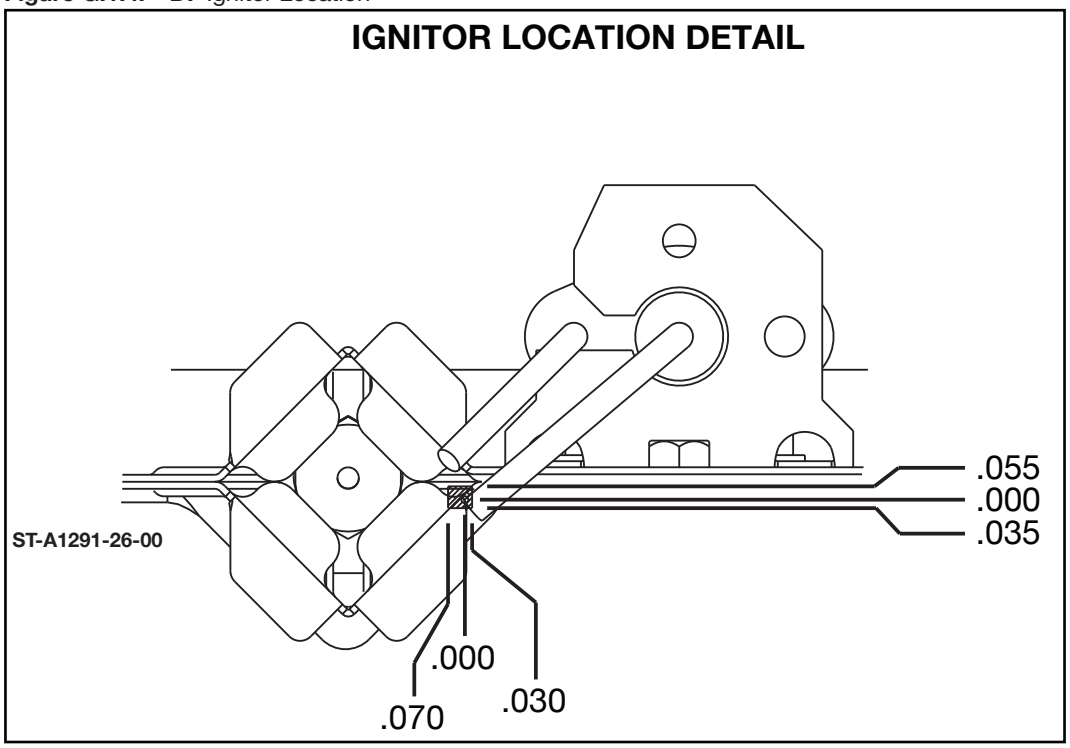


G. GAS

For 75,000 BTU input furnaces, the outside manifold orifice taps are plugged. The ignitor and flame sense are located on the outside of the center burner.

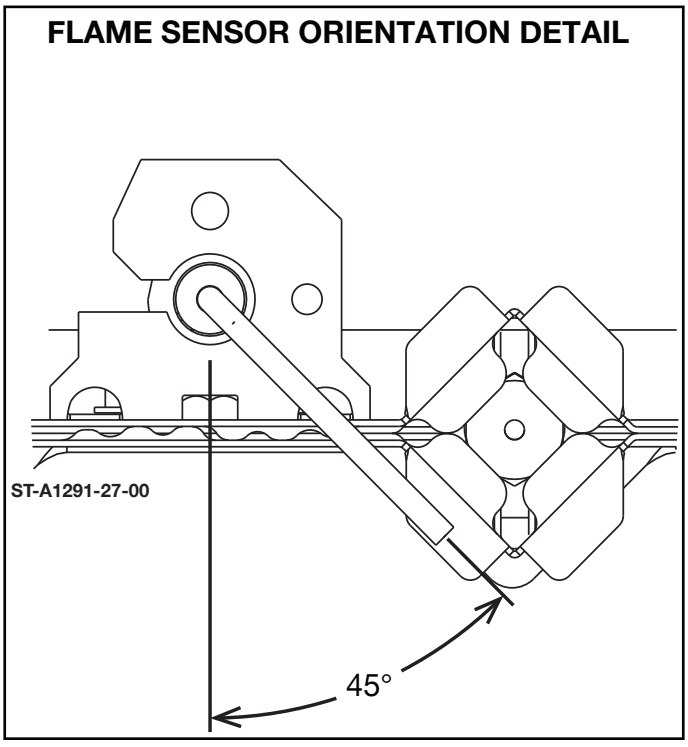
Ignitor location is critical for insuring a consistent carryover of the burner flame during ignition. The top of the electrode at dimension (0,0) must remain inside the hatched area

Figure G.1.4. – D: Ignitor Location



Correct location of the flame sensor will help to eliminate weak or no flame sense issues.

Figure G.1.4. – E: Flame Sense Location



G.1.6. Sealing Threaded Connections – Best Practice

Use a gas rated and approved liquid, paste, or tape thread sealant on all threaded connections. Apply sealant to the male threads and tighten the fitting using wrenches to hold both the fitting and the pipe. DO NOT OVERTIGHTEN THE PIPE GOING INTO THE GAS VALVE, DAMAGE MAY OCCUR. Test all threaded connections with leak test fluid or soap and water.

G.1.7. Gas Pipe Sizing and Capacity

Size the gas line to the furnace adequate enough to prevent undue pressure drop and never less than 3/4" pipe.

See ***Table G.1.1. – A*** for Gas Pipe Capacity. The capacities of gas pipe of different diameters and lengths in Cubic Ft/hr with pressure drop of 0.3 in. and specific gravity of 0.60 (natural gas) are shown in ***Table G.1.1/. – A.*** After determining the pipe length, select the pipe size which will provide the minimum cubic foot/hour required for the gas input rating of the furnace.

By formula:

$$\frac{ft^3}{hr}\ \text{required} = \frac{\text{Gas Input of Furnace } \frac{BTU}{hr}}{\text{Heating Value of Gas } \frac{BTU}{hr}}$$

The gas input of the furnace is marked on the furnace rating plate. The heating value of the gas (BTU/FT3) may be determined by consulting the local natural gas utility or the L.P. gas supplier.

Table G.1.1 – A

NATURAL GAS PIPE CAPACITY TABLE (CU FT/HR)
Maximum capacity of pipe in thousands of BTU/hr of natural gas
Inlet pressure: less than 2 psi
Pressure Drop: 0.3 in. W.C.
Specific Gravity: 0.60

Nominal Iron Pipe* Size, Inches	Length of Pipe, Feet									
	10	20	30	40	50	60	70	80	90	100
1/2	131	90	72	62	55	50	46	42	40	38
3/4	273	188	151	129	114	104	95	89	83	79
1.0	514	353	284	243	215	195	179	167	157	148
1-1/4	1,060	726	583	499	442	400	368	343	322	304
1-1/2	1,580	1,090	873	747	662	600	552	514	484	455

After the length of pipe has been determined, select the pipe size which will provide the minimum cubic feet per hour reqired for the gas input rating of the furnace. By formula:

$$\text{Cubic feet per hour required} = \frac{\text{Gas Input of Furnace (BTU/HR)}}{\text{Heating Value of Gas (BTU/FT}^3\text{)}}$$

The gas input of the furnace is marked on the furnace rating plate. Call your local natural gas utility for the heating value of the gas (BTU/FT^3).

*Schedule 40 metallic pipe.

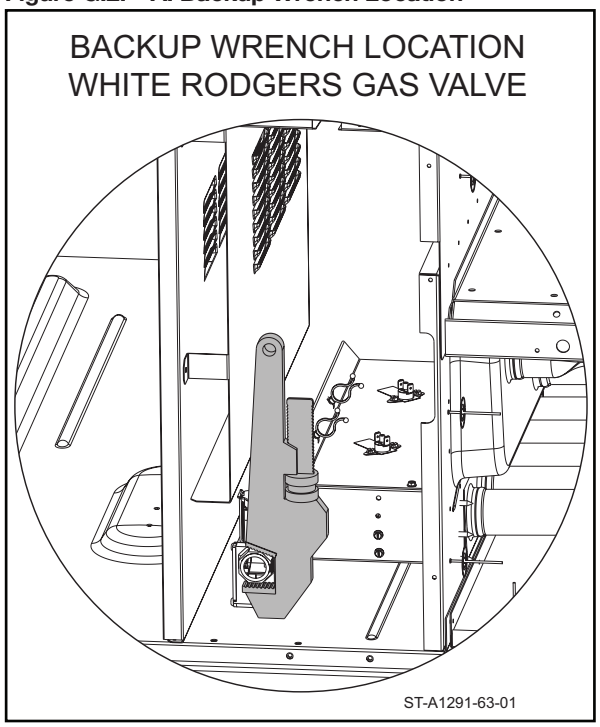
Reference the **National Fuel Gas Code NFPA 54, ANSI Z223.1- Pipe Sizing** for more information.

G. GAS

G.2. Procedure: Connecting Gas Lines to Gas Valve

1. Place backup wrench on valve, shown below in ***Figure G.2. – A.***

Figure G.2. – A: Backup Wrench Location



2. Connect the gas line to the gas valve supplied with unit. Routing can be through the gas pipe opening shown in ***Figure G.2.1.*** or through the base as shown in ***Figure F.3. – A: Electrical and Piping Routing***.

In making gas connections, avoid strains as they may cause noise and damage the controls. A backup wrench is required to be used on the valve to avoid damage.

3. Size the gas line to the furnace adequate enough to prevent undue pressure drop and never less than 3/4" pipe. See ***Section G.1.6*** on Gas Pipe Sizing and Capacity.

4. Install a drip leg or sediment trap in the gas supply line as close to the unit as possible. See ***Section G.2.1*** on Drip Leg Requirements.

5. Install a gas–rated union to connect the gas supply to the control assembly at the gas valve.

6. Gas valves have been factory installed. Install a manual gas valve where local codes specify a shut–off valve outside the unit casing. ***(See Figure G.2.1.)***

7. Make sure piping is tight. **A pipe compound resistant to the action of liquefied petroleum gases must be used at all threaded pipe connections.**

8. **IMPORTANT:** Any additions, changes or conversions required for the furnace to satisfactorily meet the application should be made by a qualified installer, service agency or the gas supplier, using factory specified or approved parts. In the Commonwealth of Massachusetts, installation must be performed by a licensed plumber or gas fitter for appropriate fuel.

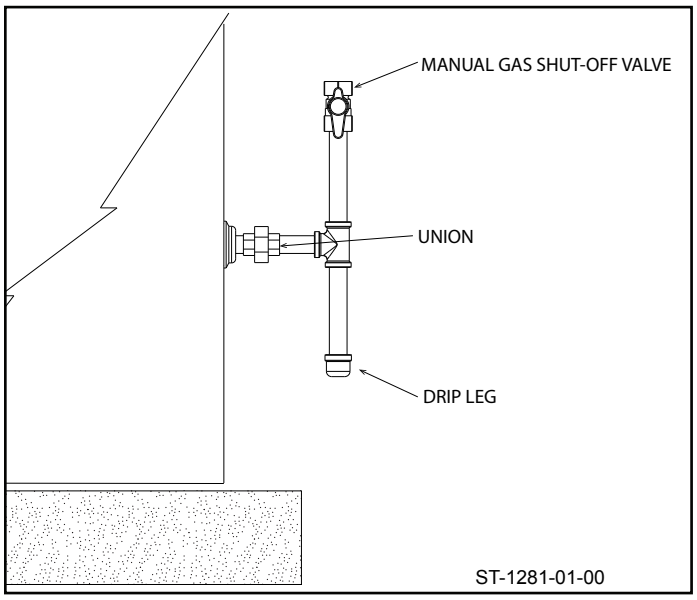
IMPORTANT: Disconnect the furnace and its individual shutoff valve from the gas supply piping during any pressure testing of that system at test pressures in excess of 1/2 pound per square inch gauge or isolate the system from the gas supply piping system by closing its individual manual shutoff valve during any pressure testing of this gas supply system at pressures equal to or less than 1/2 PSIG.

IMPORTANT: Check the rating plate to make certain the appliance is equipped to burn the type of gas supplied. Care should be taken after installation of this equipment that the gas control valve not be subjected to high gas supply line pressure.

G.2.1. Drip Leg Requirement

When connecting the supply gas to the gas valve, install a drip leg/sediment trap in compliance with the latest edition of the National Fuel Gas Code.

Figure G.2.1. – A: Drip Leg



G.2.2. Purging Gas Lines

It may be necessary to purge any air from the gas lines prior to operation. This can be done through the gas pressure tap on the gas valve or at a union in the gas line. Follow best practices to purge the gas line. Ensure all fittings are sealed and tight after purging.

G.2.3. Leak Testing

To check for gas leaks, use a soap and water solution or other approved method. **DO NOT USE AN OPEN FLAME.**

⚠WARNING: DO NOT use an open flame to check for leaks. The use of an open flame can result in fire, explosion, property damage, personal injury or death.

⚠WARNING: This unit is equipped at the factory for use on natural gas only. Conversion to LP gas requires a special kit supplied by the distributor or manufacturer. Mailing addresses are listed on the furnace rating plate, parts list, and warranty. Failure to use the proper conversion kit can cause fire, carbon monoxide poisoning, explosion, personal injury, property damage or death.

NOTE: The valve can be converted to use liquefied petroleum (LP) gas by replacing the high and low fire pressure regulator springs with the conversion kit springs. The LP kit springs allow the regulator to maintain the proper manifold pressure at high and low fire for LP gas.

NOTE: Order the correct LP conversion kit from the furnace manufacturer.

See Conversion Kit Index shipped with unit and table below for proper LP kit number.

A qualified technician must perform furnace conversion to LP gas.

G.2.4. Orifice Installation

LP Gas is a manufactured gas that has consistent heating value across most regions. The Sea Level input should still be reduced by 4% per thousand ft. above 2,000 feet and the orifice size must be selected based on the reduced input selection chart in High Alt. Instruction Section.

To change orifice spuds for conversion to LP:

1. Shut off the gas supply and remove gas connection to the gas valve.
2. Remove the gas manifold.
3. Replace the natural gas orifices with LP orifices.
4. Reassemble in reverse order.
5. Refer to section ***J.5.1.1. Measuring and Adjusting Supply Gas Pressures*** for confirming inlet pressure and adjusting manifold pressure.

G.3. LP Conversion

When connecting the supply gas to the gas valve, install a drip leg/sediment trap in compliance with the latest edition of the National Fuel Gas Code.

⚠WARNING: This unit is equipped at the factory for use on natural gas only. Conversion to LP gas requires a special kit supplied by the distributor or manufacturer. Mailing addresses are listed on the furnace rating plate, parts list and warranty. Failure to use the proper conversion kit can cause fire, carbon monoxide poisoning, explosion, personal injury, property damage or death.

NOTE: The valve can be converted to use liquefied petroleum (LP) gas by replacing the high and low fire pressure regulator springs with the conversion kit springs. The LP kit springs allow the regulator to maintain the proper manifold pressure at high and low fire for LP gas.

NOTE: Order the correct LP conversion kit from the furnace manufacturer.

See Conversion Kit Index shipped with unit and table below for proper LP kit number.

A qualified technician must perform furnace conversion to LP gas.

G.3.1. Using Conversion Kit Table

1. Find the control system code: 3G
2. Find the model number and BTU input listed in the left hand column.
3. From your model number and BTU input, go across to associated Gas Code, and finally LP Conversion Kit part number.

CONVERSION KITS – NATURAL GAS TO PROPANE

Model Number	Number of Burners	BTU/HR Per Burner	Valve Brand	Gas Code	Kit Number U.S./ Canadian
(–)GEC 75K	3	25,000	W–R	3G, 3H	RXGJ–FP40
(–)GEC 100K	5	20,000	W–R	3G, 3H	RXGJ–FP41
(–)GEC 120K	5	24,000	W–R	3G, 3H	RXGJ–FP40

G. GAS

Table G.3 – A

LP GAS PIPE CAPACITY TABLE (CU FT/HR)
Maximum capacity of pipe in thousands of BTU/hr of undiluted liquified petroleum gases (at 11.0" W.C. inlet pressure)

(Based on a Pressure Drop of 0.5" W. C.)

Nominal Iron Pipe* Size, Inches	Length of Pipe, Feet											
	10	20	30	40	50	60	70	80	90	100	125	150
1/2	275	189	152	129	114	103	96	89	83	78	69	63
3/4	567	393	315	267	237	217	196	182	173	162	146	132
1.0	1,071	732	590	504	448	409	378	346	322	307	275	252
1-1/4	2,205	1,496	1,212	1,039	913	834	771	724	677	630	567	511
1-1/2	3,307	2,299	1,858	1,559	1,417	1,275	1,181	1,086	1,023	976	866	787
2.0	6,221	4,331	3,465	2,992	2,646	2,394	2,205	2,047	1,921	1,811	1,606	1,496

Example (LP): Input BTU requirement of unit, 120,000
Equivalent length of pipe, 60 ft. = 3/4" Inside Diameter required
*Schedule 40 metallic pipe.
Reference the **National Fuel Gas Code NFPA 54, ANSI Z223.1- Pipe Sizing** for more information.

⚠WARNING: LP tanks from local LP supplier must not be used to store anything (such as fertilizer) except LP gas. This includes all delivery vessels (LP trucks). If material other than LP gas is used in the same vessels/tank as the LP gas, the LP gas can become contaminated and damage the furnace. This will void the manufacturer's warranty. Contact the supplier to make sure fertilizer is not used in the same tanks used to store and deliver LP gas.

G.4. Operation and Testing

G.4.1. Warnings

⚠WARNING: DO NOT attempt to manually light this furnace with a match or any open flame. Attempting to do so can cause an explosion or fire resulting in property damage, personal injury or death.

⚠WARNING: The spark ignitor and ignition lead from the ignition control are high voltage.

Keep hands or tools away to prevent electrical shock. Shut off electrical power before servicing any of the controls. Failure to adhere to this warning can result in personal injury or death.

⚠WARNING: Should overheating occur or the gas supply fail to shut off, turn off the manual gas control valve to the furnace. Failure to do so can result in an explosion or fire causing severe personal injury or death!

G.4.2. First time operation

G.4.2.1. 230V & 575V – Normal Furnace Sequence Of Operation

1. Thermostat initiates call for heat.

2. Core Command runs self–diagnostic. Core Command confirms the Main Limit Control (MLC) is closed; the low fire Negative Pressure Control (NPC) is open and checks Manual Reset Limit Controls (MRLC) for continuity.

3. Core Command energizes Induced Draft Motor (IDM) low–speed tap.

4. Core Command confirms low fire NPC is closed.

5. If the low fire NPC is closed, the Core Command starts a 30–second prepurge.

6. Following 30 second prepurge, the Core Command energizes the Spark Electrode (SE) up to 7 seconds or until the Remote Flame Sensor proves burner flame. Core Command de–energizes the SE and begins the 20–second blower ON delay.

7. The furnace will respond to thermostat command following 20–second blower ON delay.

Second Stage Heat (high fire) After First Stage Heat (low fire) is Established

1. Call for second stage heat initiated by thermostat.

2. Core Command energizes IDM high–speed tap and confirms high fire NPC is closed.

3. Core Command energizes second stage of the gas valve.

Call for Heat Satisfied

1. When the thermostat call for heat is satisfied, the thermostat de–energizes the gas valve.

2. The IDM is de–energized after a 20–second post–purge period.

3. The Indoor Blower Motor (IBM) continues to run for an additional three minutes.

Sequences– system doesn't light or doesn't sense flame (Fault Code 11 – Failed ignition):

• Low Fire NPC Remains Open After the IDM is Energized:

1. The IDM will run for 60 seconds in an attempt to close the low fire NPC. IDM is de–energized then energized and the ignition attempt is repeated.

2. After two attempts to close the low fire NPC, the Core Command will energize the IDM high–speed tap and two ignition sequences attempted at high fire.

3. If ignition fails at high fire, the system will enter a 1–hour lockout period.

• Failed Ignition or Core Command Doesn't Sense Flame:

1. Following the 30–second prepurge period, the Spark Igniter and gas valve are energized up to 8 seconds.

2. If flame is not sensed during the 8–second period after the gas valve is energized, the gas valve and Spark Igniter are de–energized.

3. IDM is de–energized and the Core Command verifies that the low fire NPC is open. Once the low fire NPC is confirmed open, the Core Command will begin a second ignition attempt.

4. After two failed ignition attempts at low fire, the Core Command will energize the IDM high–speed tap and an ignition sequence attempted at high fire.

5. If ignition fails after an attempts at high fire, the system will enter a 1–hour lockout period.

G. GAS

G.4.2.2. 460V – Normal Furnace Sequence Of Operation

1. Thermostat initiates call for heat.

2. Integrated Furnace Control (IFC) runs self–diagnostic. Core Command confirms the Main Limit Control (MLC) is closed; the Negative Pressure Control (NPC) is open and checks Manual Reset Limit Controls (MRLC) for continuity.

3. IFC energizes Induced Draft Motor (IDM).

4. IFC confirms NPC is closed.

5. If NPC is closed, the IFC starts a 30–second prepurge.

6. Following 30 second prepurge, the IFC energizes the Spark Electrode (SE) up to 7 seconds or until the Remote Flame Sensor proves burner flame. IFC de–energizes the SE and begins the 20–second blower ON delay.

7. The furnace will respond to thermostat command following 20–second blower ON delay.

Sequences– system doesn't light or doesn't sense flame:

• NPC Remains Open After the IDM is Energized:

1. The IDM will run for 60 seconds in an attempt to close the NPC. IDM is de–energized then energized and the ignition attempt is repeated.

2. After four attempts to close the NPC, the system will enter a 1–hour lockout period.

• Failed Ignition or Core Command Doesn't Sense Flame:

1. Following the 30–second prepurge period, the SE and gas valve are energized up to 8 seconds.

2. If flame is not sensed during the 8–second period after the gas valve is energized, the gas valve and SE are de–energized.

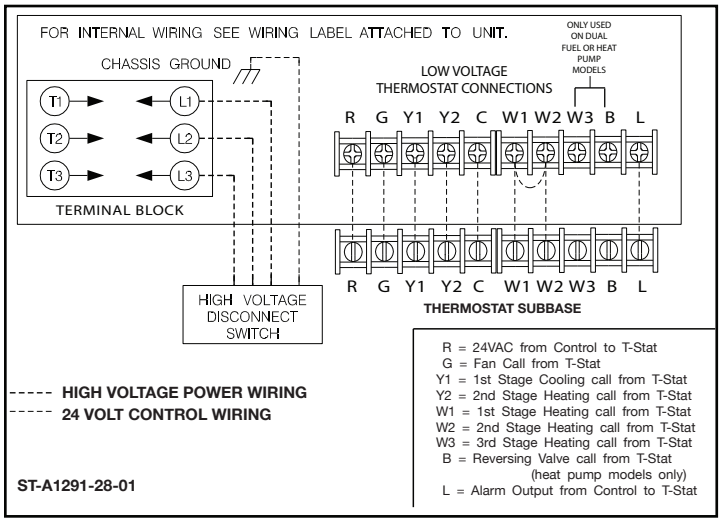
3. IDM is de–energized and the IFC verifies that the NPC is open. Once the NPC is confirmed open, the IFC will begin a second ignition attempt.

4. The system will attempt three tries at ignition. Following a third failed attempt the system will enter a 1–hour lockout period.

G.4.2.3. Single–Stage Thermostat and Auto–Staging: 208/230V, 460V & 575V

Application where a single–stage thermostat is used with this two–stage furnace. Furnace will run at low–fire input for a 15 minute period. If thermostat demand is not satisfied, Integrated Furnace Control will automatically stage to high–fire until thermostat demand is met. To accommodate auto–staging, simply secure a jumper wire between W1 and W2 on the non–DDC furnace control board. See ***Figure G.4.2.3. – A*** for details.

Figure G.4.2.3. – A: Thermostat Connections



G.4.2.4. Gas Pressure Testing And Adjustment

Refer to ***Section J.5.1.1***. for detailed instructions on testing and adjusting gas pressure.

G.4.2.5. Flame inspection

Inspect burner flame after the indoor blower motor is energized. Burner flame should be directed down the center of primary heat exchanger tube. Any flame turbulence could be an indication of an air leak between the burner and heat exchanger compartment or a partially blocked burner orifice.

Natural Gas Flame: almost completely blue with some yellow in the center of the flame.

LP Gas Flame: predominantly a blue flame with some yellow tipping.

G.4.2.6. Orifice Selection and High Altitude Adjustments

Notice: derating of the heating input for high altitude in the field is unlawful in Canada (refer to CAN/CGA 2.17). Units installed in altitudes greater than 2,000 feet (610 meters) must be shipped from the factory or from a factory authorized conversion station with the heating input derated by 10% so as to operate properly in altitudes from 2,000 – 4,500 feet (610 – 1,373 meters).

NATURAL GAS AT HIGH ALTITUDES

Furnaces installed above 2,000 feet require the furnace to be de–rated 4% per thousand feet above sea level.

IMPORTANT: Factory installed orifices are calculated and sized based on a sea level Natural Gas heating value of 1050 BTU per cubic ft.

NOTE: Orifices are available through your local distributor. Reference the following tables for approximate orifice sizing.

The following are examples of orifice sizing using the “Flow of Gas Through Fixed Orifices” section in the National Fuel Gas Code.

For a simplified estimation of orifice size based on gas heating value and elevation, the following tables may be used. However, calculations are the best method.

Example: 900 BTU/ft3 Regional Natural Gas Heating Value

I/H = Q

25000 / 900 = 27.78 ft3

I = Sea Level input (per burner): 25000

H = Sea Level Heating Value: 900

Q = 27.78 ft3 Natural Gas per hour.

From Table E1.1a of National Fuel Gas Code, 2015 (3.5” w.c.).

Orifice required at Sea Level: #40

from the National Fuel Gas Code. Orifice required

at 5000 ft. elevation (4% de–rate per thousand ft): #42

Orifice required at 8000 ft. elevation (4% de–rate per thousand ft.): #44

Example: 1050 BTU/ft3 Regional Natural Gas Heating Value

I / H = Q

25000 / 1050 = 23.81ft3

I = Sea Level input (per burner): 25000

H = Sea Level Heating Value: 1050

Q = 23.81 ft3 Natural Gas per hour.

From the National Fuel Gas Code, (3.5” w.c.).

Orifice required at Sea Level: #43 From the National Fuel Gas Code,

Orifice required at 5000 ft. elevation (4% de–rate per thousand ft.): #45

Orifice required at 8000 ft elevation (4% de–rate per thousand ft): #47

ORIFICE ORDERING INFORMATION

Orifice sizes are selected by adding the 2–digit drill size required in the orifice part number. Drill sizes available are 39 through 64; metric sizes available 1.10mm (–90) and 1.15mm (–91):

Orifice Part Number 62–22175–(drill size)

Example 1:

60 drill size orifice required

Part # 62–22175–60

Example 2:

1.15mm drill size orifice required

Part # 62–22175–91

NATURAL GAS ORIFICE SELECTION BASED ON HEATING VALUE & ELEVATION*

Reference tables on the following page for more information.

HIGH ALTITUDE

Notes:

1. Furnaces are factory equipped with orifices sized for 1050 sea level heating value gas.

2. Installer must be aware of the local heating value (sea level standard) to use the chart below.

3. This chart is based on the National Fuel Gas Code (NFGC) and based on natural gas with a specific gravity of 0.60

4. The recommended orifices below allow the furnace to operate within 10% of design rate. However, NFGC calculations are the best method.

5. Furnace operation is optimized when operating at design rate. Installer is responsible to verify rate.

G. GAS

NATURAL GAS ORIFICE SELECTION BASED ON HEATING VALUE & ELEVATION*

25,000 BTU/Burner

		ELEVATION								
Grey Cells Indicate Factory Orifice Size		Sea Level to 2,000'	2001' to 3,000'	3,001' to 4,000'	4,001' to 5,000'	5,001' to 6,000'	6,001 to 7,000'	7,001' to 8,000'	8,001' to 9,000'	9,001' to 10,000'
Gas Heating Value (BTU's/ ft3) @ Sea Level**	1,100	2.30 mm	43	43	44	44	45	46	47	47
	1,050	42	42	43	43	44	44	45	46	47
	1,000	41	42	42	43	43	44	44	45	47
	950	40	40	41	**42**	43	43	44	44	45
	900	38	39	**40**	**41**	42	2.30 mm	43	44	45
	850	37	38	39	40	41	42	42	43	44
	800	36	36	37	38	40	41	42	2.30 mm	43
	750	34	35	36	37	38	39	40	42	2.30 mm
	700	33	33	35	36	37	38	39	40	42

24,000 BTU/Burner

		ELEVATION								
Grey Cells Indicate Factory Orifice Size		Sea Level to 2,000'	2001' to 3,000'	3,001' to 4,000'	4,001' to 5,000'	5,001' to 6,000'	6,001 to 7,000'	7,001' to 8,000'	8,001' to 9,000'	9,001' to 10,000'
Gas Heating Value (BTU's/ ft3) @ Sea Level**	1,100	43	44	44	45	45	46	47	48	49
	1,050	43	43	43	44	45	45	47	48	48
	1,000	43	43	43	44	44	45	46	47	48
	950	42	42	42	**43**	43	44	45	46	47
	900	41	41	**42**	**42**	43	43	44	45	45
	850	39	40	41	41	42	43	43	44	45
	800	38	39	39	40	41	42	43	43	44
	750	36	37	37	38	38	41	42	42	43
	700	35	35	36	37	38	39	41	42	42

20,000 BTU/Burner

		ELEVATION								
Grey Cells Indicate Factory Orifice Size		Sea Level to 2,000'	2001' to 3,000'	3,001' to 4,000'	4,001' to 5,000'	5,001' to 6,000'	6,001 to 7,000'	7,001' to 8,000'	8,001' to 9,000'	9,001' to 10,000'
Gas Heating Value (BTU's/ ft3) @ Sea Level**	1,100	47	47	47	48	49	48	50	50	51
	1,050	45	46	47	47	48	49	49	50	51
	1,000	45	45	46	47	47	48	49	49	50
	950	44	44	45	**46**	46	47	48	49	50
	900	43	43	**44**	**45**	45	46	47	48	49
	850	2.30 mm	43	43	44	2.10 mm	45	46	47	48
	800	42	42	2.30 mm	43	44	44	45	46	47
	750	40	41	42	2.30 mm	43	43	44	45	46
	700	38	39	41	41	42	43	43	44	45

Note: Grey cells indicate the factory recommendation for specific elevations.

* Tables are derived from the National Fuel Gas Code. To determine the correct orifice for your installation consult the National Fuel Gas Code.

** Be sure to use sea level heating value. Heating value may be obtained from a local utility, heating value must be converted to sea level equivalent sea level equivalent in order to use this table.

LP GAS AT HIGH ALTITUDES

NOTICE: The conversion shall be carried out by a manufacturer's authorized representative, in accordance with the requirements of the manufacturer, provincial, or territorial authorities having jurisdiction and in accordance with the requirements of the CSA b149.1 Or CSA b149.2 Installation codes.

NOTE: Keep any parts removed during LP conversion procedure stored with the product literature for future use.

LP Gas is a manufactured gas that has consistent heating value across most regions.

The NFGC guidelines calculate LP orifice size based on 11.0" W.C. manifold pressure. When converted to LP gas, the unit operates at 10.0" W.C. manifold pressure.

The sea level input should be reduced by 4% per thousand feet at altitudes greater than 2,000 feet. The orifice size must be selected based on the BTU/hr per burner input noted in the following tables.

LP Gas BTU/hr per Burner based on Orifice Size & Elevation

Orifice Pressure: 10" W.C.

	ELEVATION								
BTU/hr per burner	Sea Level to 2,000'	2001' to 3,000'	3,001' to 4,000'	4,001' to 5,000'	5,001' to 6,000'	6,001 to 7,000'	7,001' to 8,000'	8,001' to 9,000'	9,001' to 10,000'
20,000 BTU/hr	55	55	56	56	56	56	57	57	57
24,000 BTU/hr	54	54	54	54	55	55	56	56	56
25,000 BTU/hr	54	54	54	54	55	55	56	56	56

LP Gas BTU/hr per Burner based on Orifice Size & Elevation

Orifice Pressure: 10" W.C.

	ELEVATION	
BTU/hr per burner	Sea Level to 2,000'	2001' to 4,500'
20,000 BTU/hr	55	56
24,000 BTU/hr	54	54
25,000 BTU/hr	54	54

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 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.

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 R–454B. 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

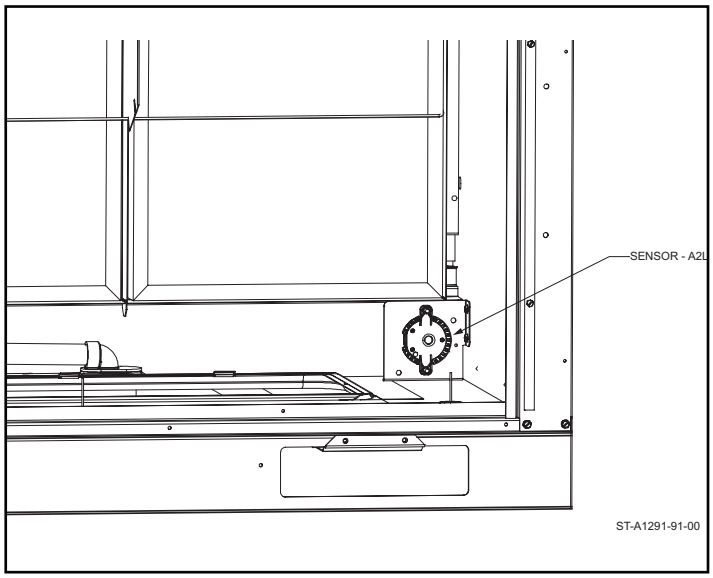
The refrigerant leak detection system will continuously monitor the air for a refrigerant leak. If the leak detection system detects a leak, the system will begin mitigation procedures: the blower will turn on and the compressors will shut down. Note: Gas or electric heat functions may continue during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

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

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

Figure J.1.1.1. – A: A2L Sensor Location



J.1.1.2. Operation When a Leak is Detected

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

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

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

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

J. STARTUP AND OPERATION

J.1.1.3. Removal and Evacuation of Refrigerant

The refrigerant charge shall 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. This process might need to be repeated several times. DO NOT USE compressed air or oxygen for purging R–454B refrigerant systems.

Refrigerant purging shall be 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, ½ 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 pump 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 leaks are present, spray a soapy substance over the refrigeration circuit. Bubbles will help locate the leak.
   a. Patch the leak and pull a vacuum again.
   b. If leaks are still detected, repeat steps seven and eight.
9. If no leaks are present, charge the system as directed in the next section.
10. Remove the vacuum pump from suction, discharge, and liquid shut–off.

J.1.2. Check Level of Unit

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

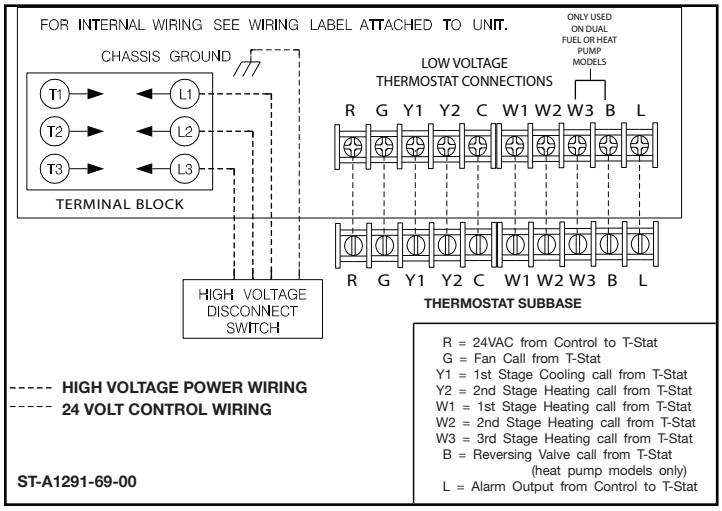
J.1.3. Check Electrical Connections For Proper Torque

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

Recommended torques for securing wiring:

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

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



J.1.4. Check Control Cables For Proper Connection

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

J.1.5. Check Filter Installation

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

J.1.6. Check Condensate Drain installation

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

J. STARTUP AND OPERATION

J.1.7. Check Blower Compartment for Accessories

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

J.1.8. Check Wiring

After completing refrigerant removal, evacuation, and charging, check that 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.1.9. Check for Gas Leaks

Double–check for any gas leaks on the installed piping. Refer to ***Section G.2.3.*** for more information.

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

In applications with 3–phase power, the compressor rotation can be affected and potentially run backwards depending on the phase wiring. It is recommended to use a phase rotation meter to verify the proper wiring of the supply power. Do not rely on the rotation of the blower because models equipped with a VFD or ECM drive motor will always run in the correct direction.

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.

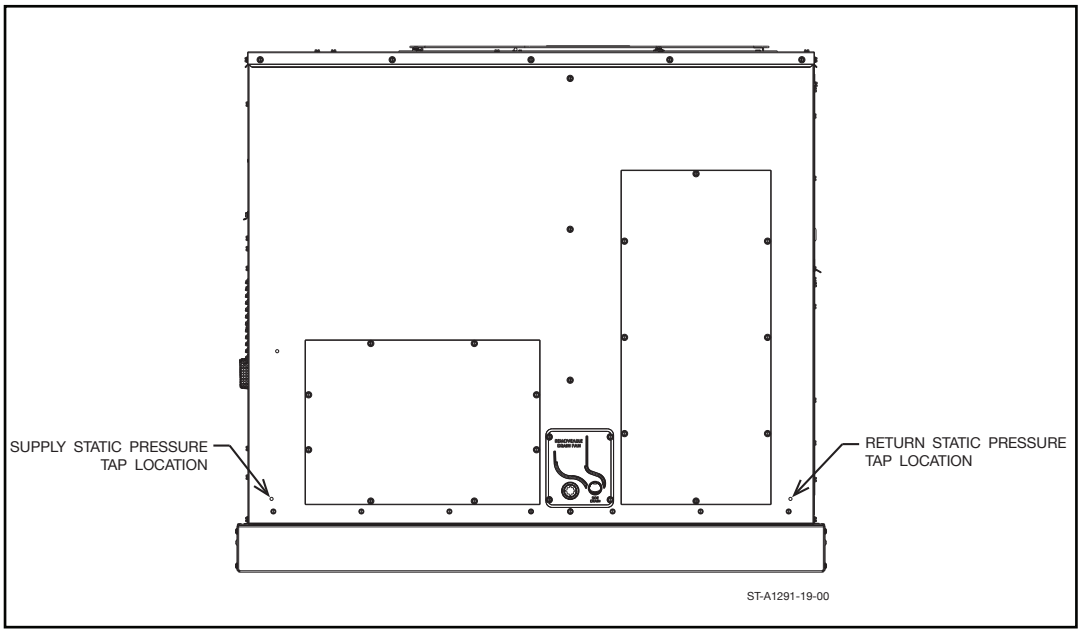
J.2.3. Checking Low (Control) Voltage

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

J.3. Checking and Adjusting Air Flow

For Economizer and Diffuser Pressure Drop Data, please refer to the end of ***Appendix C: Airflow Performance Data.*** For the minimum rated airflows for this unit's base models, see ***Appendix F: A2L Refrigerant Installation Safety 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 static pressure testing dimples near the supply/return duct openings, and drill a hole to the size necessary for the test probe. The location of these dimples are shown in ***Figure J.3. – A.***

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

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

J.3.1.1. Using Tools

Use a 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). Refer to ***Figure J.3.2. – A.***

J.3.2.1. 3 to 5 ton Models – High or Low Static Drive

This adjustment only affects the fan speed during cooling operation and does not change the airflow for fan only or heating.

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

If more airflow is needed, unplug the orange wire, and reattach it to the T–connection on the yellow wire (wire 608). Refer to ***Figure J.3.2.–A***.

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. Reconnect the yellow CC1 wire to the piggyback connection of the orange wire now on CC1. Refer to ***Figure J.3.2. –B***.

J. STARTUP AND OPERATION

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

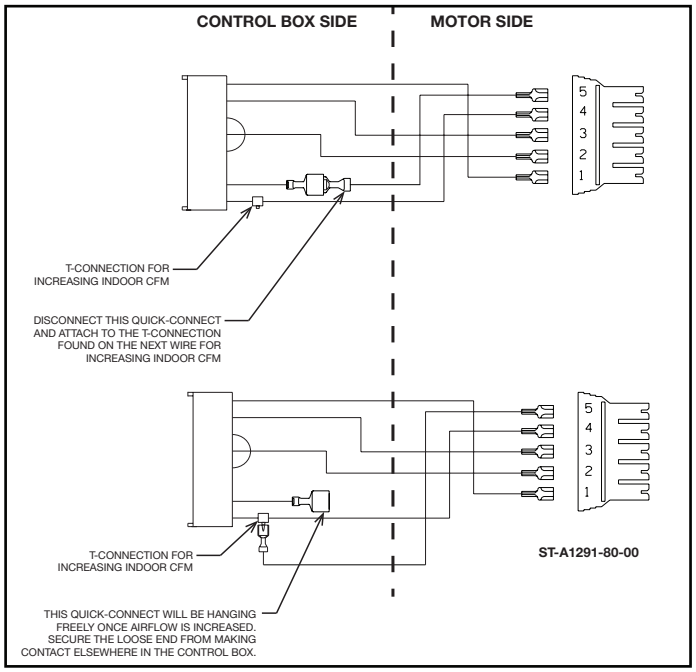
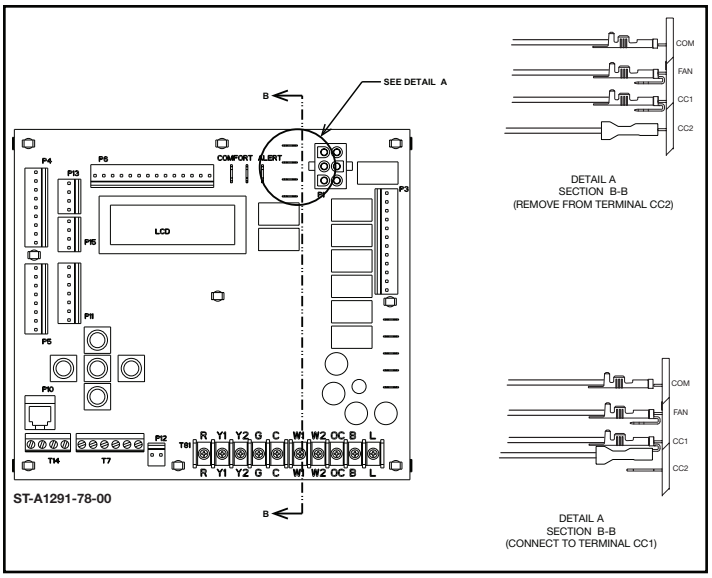


Figure J.3.2. – B: How to Increase Airflow for 3 to 5 ton DDC Units



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

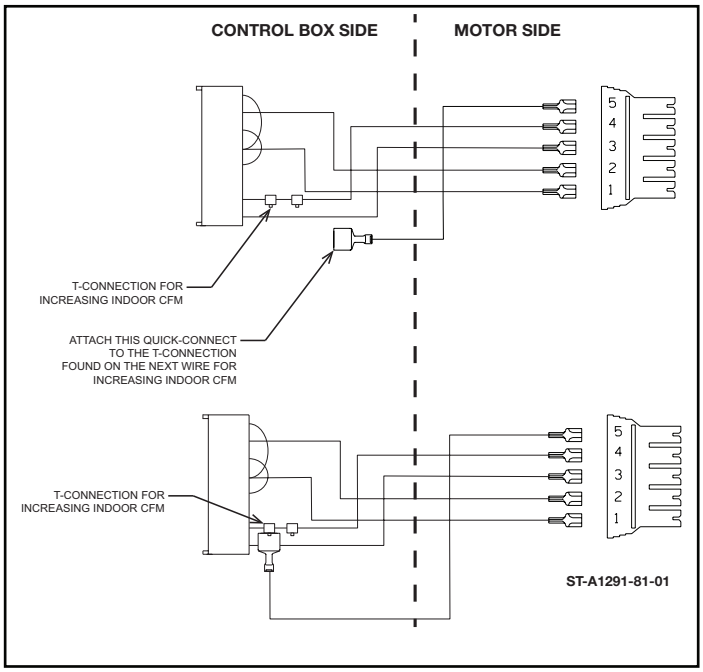
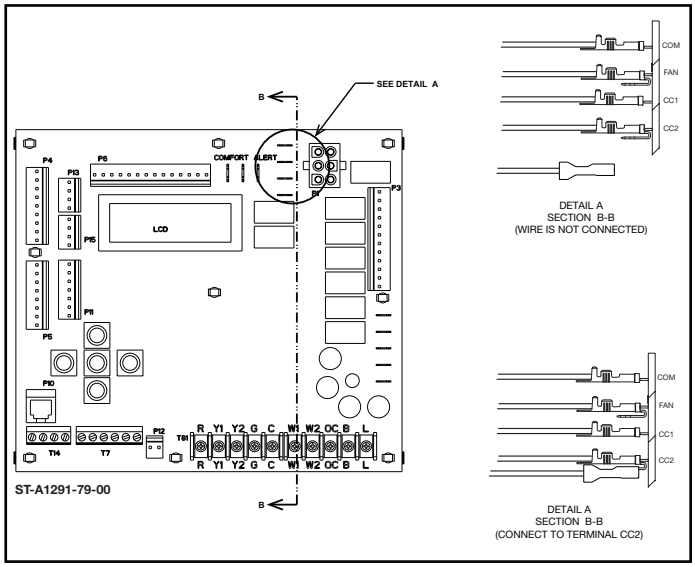


Figure J.3.2. – D: How to Increase Airflow for 6 ton DDC Units



J.3.2.3. Adjusting Fresh Air Flow with Economizer

See section ***J.3. Checking and Adjusting Air Flow*** for measuring airflow, and refer to the I&O included with the Economizers 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 dampers for more information on adjusting airflow. Refer to local building codes for any fresh air requirements.

These accessory I&Os can also be found on the manufacturer's website.

J.4. Checking Cooling Operation

Note: In this section, first and second stage cooling applies ONLY to the two stage (YB072 and all YC) units. For all other units, only first stage cooling applies.

COOLING SEQUENCE OF OPERATION

A. Call for cooling

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

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

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

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

5. Zone thermostat is satisfied.

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

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

B. Call for second stage cooling. After first stage cooling established; starting from A4.

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

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

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

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

D. First stage and second stage called simultaneously.

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

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

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

E. First stage and second stage removed simultaneously.

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

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

CONTINUOUS FAN MODE

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

TIME DELAY BYPASS for non–DDC units

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

FAULT RECALL OPERATION for non–DDC units

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

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

CLEAR FAULT HISTORY for non–DDC units

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

Example: ======

TEST MODE for DDC Units

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

J. STARTUP AND OPERATION

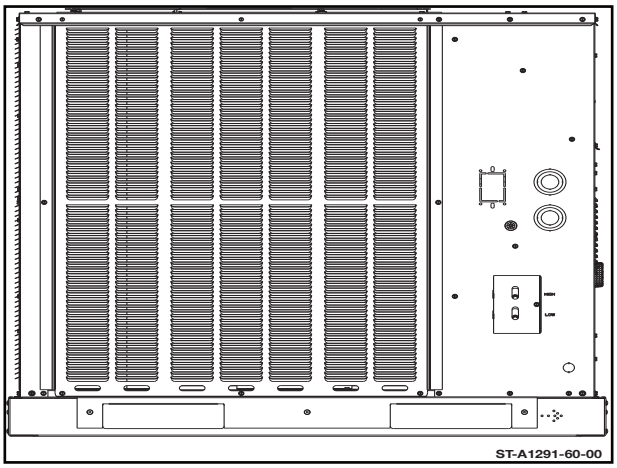
J.4.1. Checking Refrigerant Pressures

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 shall 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 shall 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 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 system.

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.4.2.1. – A: Line Temperature 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.

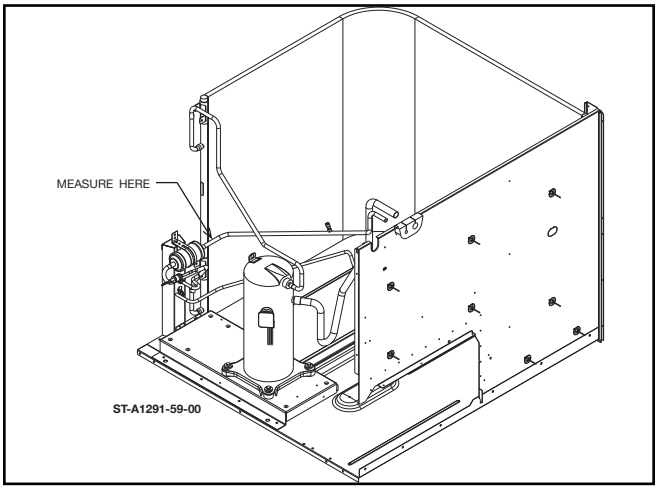
Measuring line temperature:

1. Attach a thermometer or thermocouple to the liquid refrigerant line right after the filter–dryer. See ***Figure J.4.2.1. – A: Line Temperature Measurement Location.***

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.

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



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 Heating Operation

J.5.1. Gas Furnace

J.5.1.1. Measuring and Adjusting Supply Gas Pressures

The maximum gas supply pressure to the furnace should be 10.5” WC for natural gas and 13.0” WC for LP gas the minimum gas supply pressure for purposes of input adjustments to the furnace should be 5.0” WC for natural gas and 11.0” WC for LP gas.

The inlet pressure tap is on the input side of the gas valve. A calibrated manometer is required to measure gas pressure readings accurately.

1. Ensure the gas is shut off to the furnace at the manual gas valve installed outside the unit.

2. Loosen (do NOT remove) the inlet pressure tap using a 3/32” allen–head wrench; see ***Figure G.1.4. –A.***

3. Connect a manometer to the pressure tap. The pressure tap requires a 5/16” I.D. hose

A kit is available from Prostock Replacement Parts which includes the following:

A. 3/32” allen–head wrench

B. 5/16” to 1/4” I.D. hose reducer fitting

C. Short piece of 5/16” I.D. hose

Kit part number is: **F0092–100300S1**

4. Turn on the gas supply and operate the furnace and all other gas–fire units on the same gas line as the furnace.

5. Note or adjust the line gas pressure to give:

A. 5” – 10.5”W.C. for natural gas

B. 11” – 13”W.C. for LP gas

6. Shut off the gas at the manual gas–valve and remove the manometer and hose.

7. Tighten the allen–head screw in the inlet pressure tap using a 3/32” allen–head wrench.

8. Turn ON the gas supply and check for gas leaks using an approved leak detector. Do NOT use a flame of any kind to check for leaks. Repair any leaks and repeat.

If the supply gas line pressure is above the specified ranges, install an in–line gas regulator to the furnace for the natural gas units. For LP gas furnace, have the LP supplier reduce the line pressure at the regulator.

If the supply gas line pressure is below the specified ranges, either remove the restrictions in the gas supply piping or enlarge the gas pipe for a natural gas furnace; see ***Table G.1.6. – A.*** For LP gas furnaces have the LP supplier adjust the line pressure at the regulator; see ***Table G.3. – A.***

J.5.1.2. Measuring and Adjusting Manifold Gas Pressures

The manifold pressure should be set at 3.5” WC high fire, 1.8” WC low fire, for natural gas and 10.0” W.C. high fire and 4.9” W.C. low fire for LP gas. Only small variations in the gas flow should be made by means of the pressure regulator adjustment. In no case should the final manifold pressure vary more than ± 0.3” WC for natural gas and ± 0.5” WC for LP gas from the above specified pressures.

1. Ensure the gas is shut off to the furnace at the manual gas valve installed outside the unit.

2. Loosen (do NOT remove) the manifold pressure tap using a 3/32” allen–head wrench; see ***Figure G.1.4. –A.***

3. Connect a manometer to the pressure tap. The pressure tap requires a 5/16” I.D. hose

A kit is available from Prostock Replacement Parts which includes the following:

D. 3/32” allen–head wrench

E. 5/16” to 1/4” I.D. hose reducer fitting

F. Short piece of 5/16” I.D. hose

Kit part number is: **F0092–100300S1**

4. Turn on the gas supply and operate the furnace by applying a heat call

5. Note or adjust the line gas pressure to give:

	High Fire	Low Fire
Natural Gas	3.50” (±0.3”) W.C.	1.80” (±0.3”) W.C.
LP Gas	10.0” (±0.5”) W.C.	4.90” (±0.5”) W.C.

6. To adjust the manifold pressure regulators, remove the regulator caps.

7. Turn the adjustment screw clockwise to increase pressure, or counterclockwise to decrease the outlet pressure.

8. Securely replace the regulator caps.

9. Shut off the gas at the manual gas–valve and remove the manometer and hose.

10. Tighten the allen–head screw in the outlet pressure tap using a 3/32” allen–head wrench.

11. Turn ON the gas supply and apply a heat call to the furnace. Then check for gas leaks using an approved leak detector. Do NOT use a flame of any kind to check for leaks. Repair any leaks and repeat.

METER TIME IN MINUTES AND SECONDS FOR NORMAL INPUT RATING OF FURNACE QUIPPED FOR NATURAL GAS									
INPUT (BTU/HR)	METER SIZE (FT^3/REV)	HEATING VALUE OF GAS (BTU/FT^3)							
		900		1000		1050		1100	
		MIN	SEC	MIN	SEC	MIN	SEC	MIN	SEC
75,000	ONE	0	43	0	48	0	50	0	53
	TEN	7	12	8	0	8	24	8	48
100,000	ONE	0	32	0	36	0	38	0	40
	TEN	5	24	6	0	6	18	6	36
120,000	ONE	0	27	0	30	0	32	0	33
	TEN	4	30	5	0	5	15	5	30
RATE (BTU/HR) = HEATING VALUE OF GAS X 3600 / TIME (IN SECONDS) FOR 1 CUBIC FOOT OF GAS									

J.5.1.3. Verifying BTU Performance and Capacity

Checking furnace input is important to prevent over–firing beyond its design rated input. **NEVER SET INPUT ABOVE THAT SHOWN ON THE RATING PLATE FOR ELEVATIONS UP TO 2,000 FT.** Use the following table or formula to determine input rate. Start the furnace and measure the time required to burn on cubic foot of gas. Prior to checking the furnace input, make certain that all other gas appliances are shut of, with the except for pilot burners. Time the meter with only the furnace in operation.

The factory installed orifice on a furnace are sized for natural gas having a heating value of 1050 BTU/cu.ft and a specific gravity of 0.60.

Since heating values vary geographically, the manifold pressure and/or gas orifice size may need to be changed to adjust the furnace to its nameplate input. Consult the local gas utility to obtain the yearly average heating value. Refer to section ***G.4.2.6. Orifice Selection and High Altitude Adjustments*** for more information.

NOTE: Refer to the High Altitude Section of this manual and the National Fuel Gas Code for high altitude rate adjustment above 2,000 ft.

To change the orifice spuds, shut the manual gas–valve and remove the gas manifold. Replace all the orifice with correct sizes based on the Orifice Selection Charts, and carefully replace the manifold in its position.

J.5.1.4. To Shut Down Furnace

1. Set the thermostat to the lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Remove control door.
4. Move control switch/knob on the gas valve to the “OFF” position.
5. Replace control door.

⚠WARNING: SHOULD OVERHEATING OCCUR OR THE GAS SUPPLY FAIL TO SHUT OFF, SHUT OFF THE MANUAL GAS VALVE TO THE APPLIANCE BEFORE SHUTTING OFF THE ELECTRICAL SUPPLY. FAILURE TO DO SO CAN RESULT IN AN EXPLOSION OR FIRE CAUSING PROPERTY DAMAGE, SEVERE PERSONAL INJURY OR DEATH!

J. STARTUP AND OPERATION

J.5.1.5. Checking Air Temperatures

The importance of proper air flow over the heat exchanger cannot be over emphasized. One of the most common causes of heat exchanger failure is over–heating due to low air flow.

To determine whether the heating air flow is correct, follow the steps to check the temperature rise.

1. Insert a thermometer in the supply air duct as close to the furnace as possible yet out of a direct line from the heat exchanger. (See ***Figure J.3. – A: Static Pressure and Air Temp Measurement Location***)

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

3. Operate the furnace for a minimum of 15 minutes in the gas heat mode.

4. When the thermometer in the supply air duct stops rising (approximately five minutes), subtract the return air temperature from the supply air temperature. The difference is the temperature rise.

5. Compare the measured temperature rise to the approved temperature rise range listed on the furnace name plate or in ***Appendix E: Heating Performance***.

If the measured temperature rise is above the approved range, the air flow is too low. Airflow must be increased by removing the restrictions in the duct system, or by changing the air flow. If the measured temperature rise is below the approved range, the air flow is too much. Check the duct sizing or see Section ***J.3.2. Air Flow Measurements and Adjustments***.

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

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:

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

K. TEST AND BALANCE

K.1. Air Flow Charts and Information

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

K.2. Air Flow Adjustments

K.2.1. Blower Speed for 3–5 Ton Units

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

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

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

K.2.3. Economizer Adjustments

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

M. REHEAT

M.1 Dehumidification System Information

With the factory installed dehumidification option, in addition to a thermostat or space temperature sensor that is normally present, an indoor relative humidity sensor is installed in the occupied space and connected to the Rooftop Unit Controller (RTU–C) which then controls the capacity of the cooling coil to remove moisture from the supply air and maintain space relative humidity below an adjustable limit visible on the RTU–C display.

The default value is the ASHRAE recommended limit of 60% RH. With this option, a refrigerant reheat coil is installed downstream from the evaporator coil. When the space humidity is too high and reheat is energized, this coil uses some of the heat that is normally rejected to the outside by the condenser coil to instead reheat the cold air from the evaporator coil just enough to avoid overcooling the space. Providing “neutral air” to the occupied space.
On a two–stage system, it is possible for both a thermostat and humidistat to register readings above set point. Under this condition, the system runs in the high stage dehumidification cycle, and the motor operates on high speed. This provides dry conditioned air.

Because the demand for dehumidification can be different from the cooling demand, the unit will first satisfy the demand for cooling and then if the space humidity is still too high, dehumidification mode is energized. When in dehumidification mode, the supply air leaving the unit will be near the entering air temperature, but at a much lower humidity. The unit will exit the dehumidification mode when the humidity set point is satisfied; or if the load is increased, it will return to normal cooling mode.

Reheat is not available during the gas–heating mode.

Figure M.1. – A

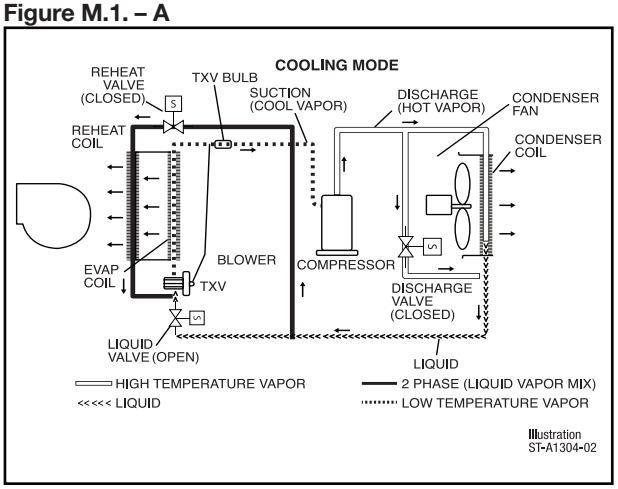


Figure M.1. – A shows the refrigerant path during the normal cooling mode. The liquid refrigerant leaves the TXV with the sudden pressure drop causing the liquid to expand to a vapor and absorbing the heat from the supply air going through the evaporator coil. The refrigerant vapor then travels to the compressor where it is elevated to a higher pressure and temperature.

The superheated refrigerant vapor next carries the heat to the outside coil where the heat is then rejected and the refrigerant condenses into a subcooled liquid where the process repeats itself.

Figure M.1. – B

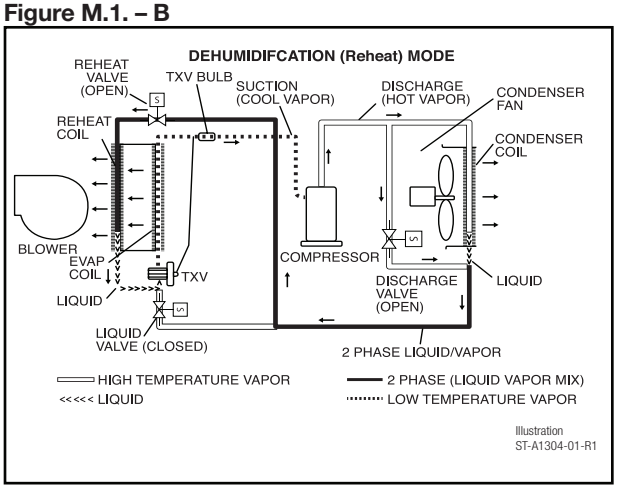


Figure M.1. – B shows the refrigerant path during the reheat mode. When the reheat cycle is energized by the RTU–C, the reheat solenoid valve, upstream of the reheat coil opens. The liquid solenoid valve ahead of the TXV, closes. The discharge solenoid valve, in the compressor discharge line, opens. The liquid refrigerant leaves the TXV with the sudden pressure drop causing the liquid to expand to a vapor and absorbing the heat from the supply air going through the evaporator coil. The refrigerant vapor then travels to the compressor where it is elevated to a higher pressure and temperature. The refrigerant next carries the heat to a parallel path between the outside condenser coil and a bypass circuit. Some of the heat is rejected outdoor. The ratio of heat rejected outdoors versus indoors is controlled by an outdoor fan motor controller (OFMC) that monitors the two phase temperature and varies the fan speed. This 2–phase refrigerant vapor is then sent to the reheat coil. As the refrigerant travels through the reheat coil is condenses into a subcooled liquid where the process repeats itself.

M.2 Humidity Sensor Installation

The Humidity control unit requires the use of a zone mounted humidity sensor. The sensor should be located in the conditioned space, approximately 5ft from the floor, on an interior wall. Take care to locate it away from direct sunlight and away from air flow from vents or drafts from doors. The humidity sensors output is a 0–10VDC signal and will be connected to the DDC Control.

The Rheem ZNS–5 meets the requirement and includes an optional space temperature sensor. The control wiring should be a minimum of 18AWG Solid Copper wire with 5 Conductors and is connected from the DDC Control to the sensor as follows:

RED = R to V+ (+24VAC)

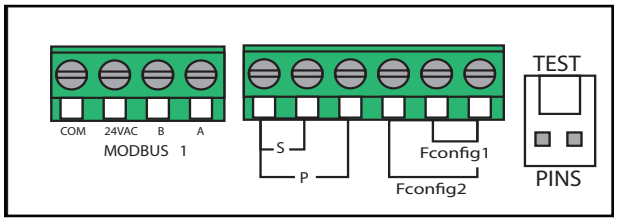
GREEN = Field Config 1 & 2 (Right most terminal) to GROUND

BLUE = Field Config 2 (3rd terminal from right) to VOut

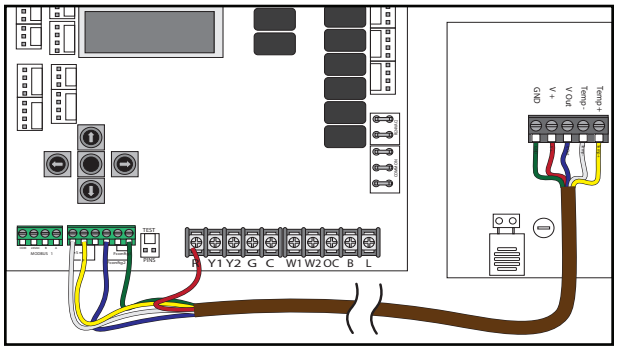
WHITE = S & P (Left most terminal) to Temp –

YELLOW = S (2nd terminal from left) to Temp+

See the installation instructions for additional details.



ZNS–5 HUMIDITY/TEMPERATURE SENSOR



HONEYWELL DUCT MOUNTED HUMIDITY SENSOR

This optional wires the same except the temperature sensor connects

directly to a Honeywell Thermostat.

RED = R to V+ (+24VAC)

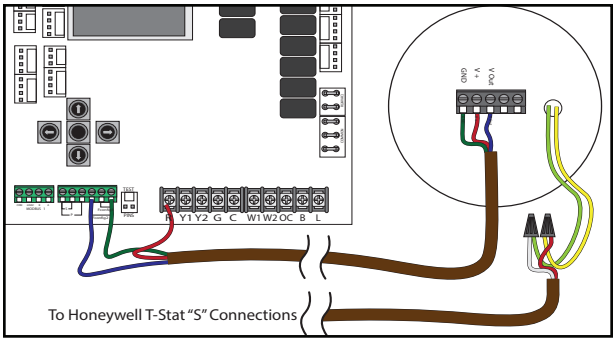
GREEN = Field Config 1 & 2 (Right most terminal) to GROUND

BLUE = Field Config 2 (3rd terminal from right) to VOut

Other = Honeywell S– Terminal to Yellow Wire

Other = Honeywell S+ Terminal to Green Wire

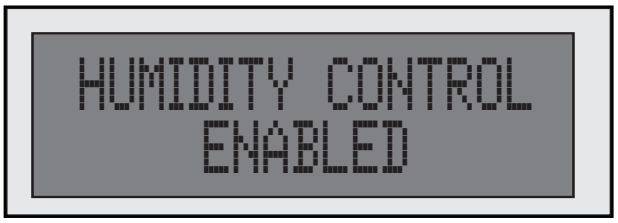
See the installation instructions for additional details.



M. REHEAT

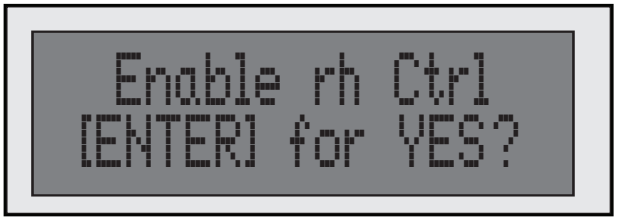
M.3 Humidity Control Settings and Configuration

The Clear Control is designed to operate in conjunction with the zone sensor discussed earlier in the guide. These are the steps to verify the zone sensor and adjust the humidity set–point and operating modes. The system can be programmed to a humidity level as low as 35%, and can be set to run dehumidification as part of the cooling cycle or as a stand alone system regardless of the cooling or fan call status from the thermostat, recommended.



NOTICE: The system will not operate the humidity control when the outdoor ambient temperature is below 60°F, this is because the humidity control uses hot refrigerant bypassed from the outdoor coil,. When the ambient temperature is too low, insufficient heat will be retained in the refrigerant to properly operate the Reheat system for proper dehumidification. The Reheat system in this packaged unit is not designed for industrial or process applications, it is intended for human comfort zones.

Navigate through the Clear Control menu to “Humidity Control” it should say Enabled. If it says “Disabled” press the Enter button twice to Enable rh Control.



Next set the desired Relative Humidity Set–point. This set–point will be where the control will run the associated dehumidification cycles to bring the humidity in the zone down to this percentage.



Now set the Reheat Mode, there are three functions to choose from, Reheat in Occupied, will only run dehumidification when there is a Fan or Cooling Call. Reheat in Unoccupied, will on run dehumidification when there is no fan or cooling call; Reheat ALL, (recommended) will run reheat based on the humidity reading regardless of the thermostat operation.



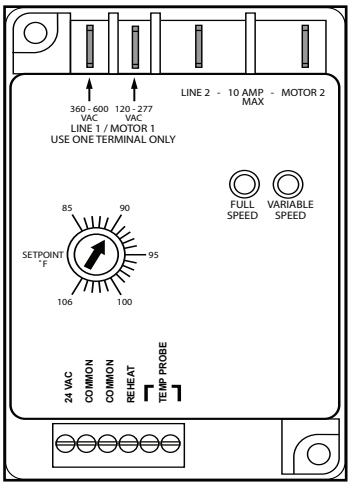
Checking the Humidity Sensor reading, Navigate to Humidity Control then down to Indoor rh, this will display the reading from the humidity zone sensor. If this shows “4%” then it means that the zone sensor is not connected properly or malfunctioning.

Verify a 0–10VDC signal across the Field Config 2 terminals on the control board. 10VDC = 100%, 5VDC – 50%.



The humidity control system is also equipped with an Outdoor Fan Motor Controller, OFMC, this controller changes the speed of the outdoor fans to allow for more or less heat in the bypassed refrigerant used to operate the reheat system. Adjustments to the OFMC are not needed unless undesirable operation occurs.

Consult the Installation instructions provided with the system for details on the OFMC operation and adjustments.



N.1. Diagnostics Chart

N.1.1.Cooling Diagnostics Chart

⚠ WARNING

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

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

N. DIAGNOSTICS

N.1. Diagnostics Chart

N.1.2. Heating 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
Induced draft blower motor (IDM) does not start	• No 208/230 Vac to IDM	• Check the wiring from the board to the motor - check for power at the motor - replace the IFC
	• Faulty low voltage transformer	• Replace transformer
	• Wired incorrectly	• Check wiring per the diagram in the I&O
	• No line voltage to integrate furnace control (IFC)	• Check unit power connect - check power at L1 and L2 - Replace the IFC
	• Faulty IDM	• If IDM is receiving power and will not start, replace the IDM
Ignitor will not spark	• Bad wire or corroded ignitor	• Check wire for damage - check the connection to the high voltage spark tower - replace corroded ignitor
	• Negative pressure switch not closing	• Check for blocked hose – check for exhaust blockage - check that the negative pressure on the IDM is enough to close pressure switch - replace pressure switch
	• Open rollout limit	• Check for blockage in the intake, heat exchanger, and exhaust - clear blockage and reset limit
	• Open limit control	• Check temperature rise (see general data in I&O) - check for proper airflow – check for proper gas pressure - replace the limit
	• Ignitor is not grounded	• Check that ignitor is firmly secured to burner assembly
	• Ignitor wired incorrectly	• Check wiring per the diagram in the I&O
	• Faulty IFC	• Replace IFC
No ignition/burner will not light	• No inlet pressure	• Check for gas pressure
	• Gas valve is not receiving 24 V	• Check wiring from IFC to gas valve - check for power at the gas valve - replace IFC
	• Gas valve is not opening	• Replace valve
	• Orifice is blocked	• Remove orifice and clean - replace orifice if it is damaged
Flame not sustained	• Flame sense wired incorrectly	• Check wiring per the diagram in the I&O
	• Flame sense damage or not in correct position	• Check flame sense position - replace flame sense
	• Flame sense dirty or corroded	• Clean flame sense with steel wool
	• Microamps are low or not present	• Check for 4 microamps - replace flame sensor
	• Unit is not properly grounded	• Check unit grounding - correct bad grounding
	• Faulty IFC	• Replace IFC
Indoor blower motor (IBM) does not start after 30 seconds	• No 208/230 Vac across IBM motor terminals on the IFC	• Check the wiring per the diagram in the I&O - replace IFC
	• Dead capacitor	• Replace capacitor
	• Faulty IBM	• Replace IBM
Heating does not stop after call for heat has been satisfied	• Thermostat wired incorrectly/faulty thermostat	• Check thermostat wiring is correct - check that thermostat is operating correctly - replace thermostat
	• Faulty valve	• Remove gas valve lead and check if valve closes - replace valve
After 5 second post-purge, IDM stops, or IBM does not stop running after off delay (specified in furnace section of I&O)	• Open limit control	• Check temperature rise (see general data in I&O) - check for proper airflow – check for proper gas pressure - replace the limit
	• Open rollout limit	• Check for blockage in the intake, heat exchanger, and exhaust - clear blockage and reset limit

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

H = Gas Heating 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. 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 opera–tional 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. Heating Alarm Codes and Diagnostics

All Core Commands 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

H = Gas Heating 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 – Heating Only		
CODE	**DESCRIPTION**	**FAULT LEVEL**
0	STANDBY	None
F	CONTINUOUS FAN	None
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
22	MAIN LIMIT OPEN	Problem
33	MRLC (Rollout Limit) OPEN	Problem
42	INVALID THERMOSTAT SELECTION	Warning
44	LOW–FIRE NEGATIVE PRESSURE CONTROL CLOSED	Problem
46	LOW–FIRE NEGATIVE PRESSURE CONTROL OPEN	Problem
55	High–Fire NEGATIVE PRESSURE CONTROL CLOSED	Problem
57	HIGH–FIRE NEGATIVE PRESSURE CONTROL OPEN	Problem, Shutdown
61	BLOWER FAULT – NO RUN	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
F	Displayed anytime thermostat calls for continuous fan
h	Lower–case “h” displayed anytime thermostat calls for low–fire heat
H	Upper–case “H” displayed anytime thermostat calls for high–fire heat

N. DIAGNOSTICS

Fault Codes with Descriptions and Solutions:

Alarm Codes – Heating Only		
CODE	**FAILED IGNITION**	**FAULT LEVEL**
11	**DESCRIPTION:** This fault is displayed when a failed ignition has occurred three times in a row. The Core Command will enter a one–hour lockout following the third ignition attempt.	Problem
	CAUSE:	
	1. Flame sense rod is unable to sense flame	
	2. Gas valve is turned OFF.	
	3. The ignitor is not working properly.	
	4. The Core Command is not working properly	
	5. Burner flame is not carrying over from first burner to the last.	
	SOLUTION: the solution will depend on the cause.	
	1. Clean or replace flame sense rod. Confirm flame sense is in burner flame. Check wire and all connections between flame sense and Core Command. Make sure furnace is prop–erly grounded.	
	2. Turn gas valve ON.	
	3. Replace or reposition the ignitor. Refer to section G.1.4 for proper ignitor location. Check wire and all connections between ignitor and Core Command.	
	4. Replace furnace Core Command.	
	5. Check manifold pressure during ignition (see Measuring and Adjusting Manifold Gas Pressures section). Watch the burner during ignition if the first burner lights but the second, third and so on do not light (incomplete carry–over), the burner may need to be replaced.	
12	**LOW FLAME SENSE**	Warning
	DESCRIPTION: Furnace operation will continue in low and high–fire modes. This problem may be elevated to the level of fault code “13” or “11” if flame cannot be sensed at all.	
	CAUSE:	
	1. Most common cause is that the flame sense rod may need cleaning.	
	2. Flame sense rod may not be properly connected.	
	3. Wiring between the rod and furnace control may be shorted or opened.	
	SOLUTION:	
	1. Clean or replace flame sense rod.	
	2. Check wire and all connections between the flame sense and Core Command.	
	3. Make sure the furnace is properly grounded.	

Fault Codes with Descriptions and Solutions:

Alarm Codes – Heating Only		
CODE	**FLAME LOST**	**FAULT LEVEL**
13	**DESCRIPTION:** If flame is lost after it is established, subsequent ignition attempts will follow and normal operation should re-sume.	Problem
	CAUSE:	
	1. Most common cause is that the flame sense rod may need cleaning.	
	2. My not be properly connected.	
	3. Wiring between flame sense and Core Command may be shorted or opened.	
	4. Improperly mounted	
	5. Improperly grounded.	
	6. Burner flame pattern may be unstable.	
	SOLUTION:	
	1. Clean or replace the flame sense rod.	
	2. Check wire and all connections between the flame sense and Core Command.	
	3. Confirm flame sense rod is in the flame. See section G.1.4 for proper flame sense location.	
	4. Confirm furnace is properly grounded.	
	5. Check that all burner assembly components are properly in–stalled. Confirm that burner flame is steady and directed down the center of tube. If turbulence is noted, check for air leaks between the burner and blower compartment.	
14	**UNEXPECTED FLAME**	Shutdown
	DESCRIPTION: this fault should rarely if ever be seen in the field. Furnace will not operate with this fault present.	
	CAUSE:	
	1. Field mis–wiring of 24VAC to the gas valve main solenoid.	
	2. Faulty gas valve stuck in the “OPEN” position.	
	3. Faulty furnace Core Command (signal improperly sensed when it should not be sensed at all).	
	SOLUTION:	
	1. Correct wiring	
	2. Replace the gas valve.	
	3. Replace the Core Command.	
15	**HIGH–FIRE GAS VALVE IMPROPER VOLTAGE**	Problem
	DESCRIPTION: High–fire coil energized during call for low–fire heat. This fault should rarely if ever be seen in the field.	
	CAUSE: Gas valve relay contacts on Core Command welded shut. Hi and low–fire miswired.	
	SOLUTION:	
	1. Replace Core Command if gas valve wiring is correct	
	2. Turn off power to unit. Use a pin remover to reverse locations for BLUE and WHITE/BLACK wires in 3–pin connector.	

N. DIAGNOSTICS

Fault Codes with Descriptions and Solutions:

Alarm Codes – Heating Only		
CODE	**MAIN LIMIT OPEN**	**FAULT LEVEL**
22	**DESCRIPTION:** The furnace will not operate in gas heat mode.	Problem
	CAUSE:	
	1. No airflow or dead blower	
	2. Insufficient airflow	
	3. Faulty limit control	
	4. Loose or faulty wiring.	
	5. Incorrect blower tap	
	6. Furnace input is too high.	
	SOLUTION:	
	1. Check for proper blower operation. If a blower motor fault has occurred fault code “61” should also be present. Check the wiring to the motor then the motor.	
	2. Check filters and ductwork. Determine static pressure and confirm it is not above published values found in the Checking and Adjusting Airflow section.	
	3. Replace the limit control	
	4. Check wiring and connections.	
	5. Confirm proper blower speed taps for high and low–fire.	
	6. Insure properly sized burner orifices are installed. Check manifold pressure at high and low–fire and compare to val–ues found in Measuring and Adjusting Manifold Gas Pres–sures section. Check rate and compare to nameplate input, high and low–fire. Adjust as necessary.	

Fault Codes with Descriptions and Solutions:

	MRLC (Manual Reset Limit Control) OPEN	FAULT LEVEL
33	**DESCRIPTION:** The MRLC is also known as the rollout limit. There are two rollout limits on (–)GEC gas units. When one or more of these limits open, they must be manually reset to the closed position. This fault can occur when burner flames are not directed down the center of the burner tube and roll out into the burner assembly. This fault indicates a serious problem that must be repaired before furnace operation can continue.	Problem
	CAUSE:	
	1. Faulty limit.	
	2. Loose or faulty wiring.	
	3. Damaged heat exchanger	
	4. Insufficient combustion air or blocked flue pipe.	
	5. Overfired condition.	
	6. Air leak between burner and blower compartment.	
	SOLUTION:	
	1. Replace limit if limit will not reset. Observe flame pattern for normal operation after limit has been replaced.	
	2. Check wiring and connections. Replace and/or repair as nec–essary	
	3. Confirm that burner flame is steady and directed down center of burner tube. If flame turbulence is evident, note if turbulence began when indoor blower motor was ener–gized. This could be an indication of a damaged heat ex–changer, i.e. breached primary tube or loose wedge joint.	
	4. Confirm louvered panels are unobstructed. Confirm flue pipe is unobstructed.	
	5. Insure properly sized burner orifices are installed. Check manifold pressure at high and low–fire and compare to val–ues found in Measuring and Adjusting Manifold Gas Pres–sures section. Check rate and compare to nameplate input, high and low–fire. Adjust as necessary.	
	6. Check that all burner assembly components are properly installed. Confirm that burner flame is steady and directed down the center of tube. If turbulence is noted, check for air leaks between the burner and blower compartment.	
40	**REFRIGERANT LEAK DETECTION SYSTEM**	Shutdown
	DESCRIPTION:	
	1. The refrigerant leak detection system detects an event and mitiga-tion 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 proce-dure. Check the installation location for potential contaminants.	
	2b. The sensor is faulty; replace the sensor	

N. DIAGNOSTICS

Fault Codes with Descriptions and Solutions:

44	**LOW FIRE NEGATIVE PRESSURE CONTROL (NPC) CLOSED (230V & 575V ONLY)**	**FAULT LEVEL**
	DESCRIPTION: The low–fire NPC should be open when the inducer is not operating. Before any heat cycle can begin, the NPC is tested to confirm the contacts are open. An ignition sequence will not occur if the low–fire NPC remains closed.	Problem
	CAUSE:	
	1. NPC contacts are welded shut/faulty switch.	
	2. Loose or faulty wiring	
	SOLUTION:	
	1. Replace low fire NPC.	
	2. Check wiring or connections, replace or repair as necessary.	
46	**LOW FIRE NEGATIVE PRESSURE CONTROL (NPC) OPEN (230V & 575V ONLY)**	Problem
	DESCRIPTION: Core Command will energize the inducer for 30 seconds (pre–purge) in an attempt to close the low fire NPC. The Core Command will make four attempts to close the low–fire NPC before declaring a fault and entering a one hour lockout.	
	CAUSE:	
	1. Faulty inducer.	
	2. Faulty Core Command	
	3. Loose or faulty wiring.	
	4. Disconnected, blocked, split or cut pressure switch hose.	
	5. Severe wind gusts (sporadic)	
	6. Faulty low fire pressure switch	
	SOLUTION:	
	1. Repair or replace inducer. Check inducer pressure to confirm negative pressure is adequate to close pressure switch.	
	2. Replace Core Command after confirming that NPC contacts are closed while inducer is running.	
	3. Check NPC wiring and connections to Core Command.	
	4. Confirm pressure switch hose is attached to pressure port on IDM and port on pressure switch. Confirm there is no split or cut in hose.	
	5. Consider using the flue "snorkel" accessory.	
	6. Replace pressure switch.	

	HIGH–FIRE NEGATIVE PRESSURE CONTROL (NPC) CLOSED	FAULT LEVEL
55	**DESCRIPTION:** The high–fire NPC should be open when the inducer is not operating. Before any heat cycle can begin, the NPC is tested to confirm the contacts are open. An ignition sequence will not occur if the high–fire NPC remains closed.	Problem
	CAUSE:	
	1. NPC contacts are welded shut/faulty switch.	
	2. Loose or faulty wiring	
	SOLUTION:	
	1. Replace high–fire NPC.	
	2. Check wiring or connections, replace or repair as necessary	
57	**High–Fire NEGATIVE PRESSURE CONTROL (NPC) OPEN (230V & 575V ONLY)**	Problem, Shutdown
	DESCRIPTION: Furnace will ignite and operate in low–fire mode. Fault display established when thermostat calls for high–fire mode. Inducer high speed is energized and will remain on high speed for 60 seconds in an attempt to close high fire pressure switch. If pressure switch does not close after 60 seconds the inducer will drop to low speed and furnace will continue operation at low fire until high fire pressure switch closes or thermostat demand is satisfied.	
	CAUSE:	
	1. Faulty inducer or tap pressure inadequate to close high–fire NPC.	
	2. Faulty Core Command.	
	3. Loose or faulty wiring.	
	4. Disconnected, blocked, split or cut pressure switch hose.	
	5. Severe wind gusts (sporadic)	
	6. Faulty high fire pressure switch	
	SOLUTION:	
	1. Repair or replace inducer. Check inducer pressure to con–firm negative pressure is adequate to close pressure switch.	
	2. Replace Core Command after confirming that NPC contacts are closed while inducer is running.	
	3. Check NPC wiring and connections to Core Command.	
	4. Confirm pressure switch hose is attached to pressure port on IDM and port on pressure switch. Confirm there is no split or cut in hose.	
	5. Consider using the flue hood accessory.	
	6. Replace pressure switch.	

N. DIAGNOSTICS

Fault Codes with Descriptions and Solutions:

	BLOWER FAULT – MOTOR CANNOT RUN	FAULT LEVEL
61	**DESCRIPTION:** This is a critical blower fault– such as an internal thermal overload that prevents the motor from running. Furnace will shut down if this fault occurs during heating operation. No other operations, including thermostat calls, will occur until this fault is cleared. This fault will occur during heating operation after the main limit control has been open for more than 150 seconds (2 min:30 sec.). If this happens, the Core Command determines that the motor is not functional and enters a hard lockout condition requiring repair of the motor and manual reset of power to the furnace.	Shutdown
	CAUSE:	
	1. The motor has tripped on thermal overload because of a restriction or bearing failure.	
	2. Wiring to the motor has become compromised.	
	3. The blower wheel has become damaged or is not properly attached to the motor shaft.	
	4. The motor has failed catastrophically.	
	SOLUTION:	
	1. Remove restriction or replace motor	
	2. Inspect and replace or repair wiring and/or connections to the motor	
	3. Replace blower wheel and/or attach wheel to motor shaft properly.	
	4. Replace motor.	

Fault Codes with Descriptions and Solutions:

460V NEGATIVE PRESSURE CONTROL FAULTS	
	NEGATIVE PRESSURE CONTROL (NPC) CLOSED
55 & 44	460V furnace uses a single–speed inducer and one pressure switch for low and high–fire operation. The NPC should be open when the inducer is not operating.
	DESCRIPTION: Before any heat cycle can begin, the NPC is tested to confirm the contacts are open. An ignition sequence will not occur if the NPC remains closed. Core Command will flash a “55” & “44” fault code (230V & 460V units use same Core Command, “44” is normal under this scenario).
	See **CAUSE** and **SOLUTION** for fault code “55” above.
	NEGATIVE PRESSURE CONTROL (NPC) OPEN
57 & 46	**DESCRIPTION:** The inducer will run for 20 seconds in an attempt to close the pressure switch. At that time the Core Command will flash a “57” & “46” fault code (230V & 460V units use same Core Command, “46” is normal under this scenario). Inducer will continue to run an additional 40 seconds before being de–energized. After a five minute period the Core Command will make another attempt to close the pressure switch. This cycle will repeat until the pressure switch closes or call for heat is removed.
	See **CAUSE** and **SOLUTION** for fault code “57” above.

N.2.3. 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		
21	REFRIGERANT LOW PRESSURE SWITCH OPEN – CIRCUIT 2	Problem
30	REFRIGERANT HIGH PRESSURE SWITCH OPEN – CIRCUIT 2	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
50	FREEZE SWITCH OPEN – CIRCUIT 2	Problem

N.3. Common Mistakes

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

P. APPENDICES

Appendix A – General Product Data

GENERAL DATA –

Model (-)GECYB Series	036ACT 036ADT 036AJT	036ACU	036ADU	036AYT	036AYU
Cooling Performance[A]					
Gross Cooling Capacity Btu [kW]	36,000 [10.55]	36,000 [10.55]	36,000 [10.55]	36,000 [10.55]	36,000 [10.55]
EER2/SEER2[B]	10.6/13.4	10.6/13.4	10.6/13.4	10.6/13.4	10.6/13.4
Nominal CFM/ AHRI Rated CFM [L/s]	1200/1175 [566/555]	1200/1175 [566/555]	1200/1175 [566/555]	1200/1175 [566/555]	1200/1175 [566/555]
AHRI Net Cooling Capacity Btu [kW]	34,200 [10.02]	34,200 [10.02]	34,200 [10.02]	34,200 [10.02]	34,200 [10.02]
Net Sensible Capacity Btu [kW]	25,600 [7.5]	25,600 [7.5]	25,600 [7.5]	25,600 [7.5]	25,600 [7.5]
Net Latent Capacity Btu [kW]	8,600 [2.52]	8,600 [2.52]	8,600 [2.52]	8,600 [2.52]	8,600 [2.52]
Net System Power kW	2.7	2.7	2.7	2.7	2.7
Compressor					
No./Type	1/Scroll	1/Scroll	1/Scroll	1/Scroll	1/Scroll
Outdoor Sound Rating (dB)	78	78	78	78	78
Outdoor Coil – Fin Type	Louvered	Louvered	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	0.71 [18]	0.71 [18]	0.71 [18]	0.71 [18]	0.71 [18]
Face Area sq. ft. [sq. m]	16.46 [1.53]	16.46 [1.53]	16.46 [1.53]	16.46 [1.53]	16.46 [1.53]
Rows / FPI [FPcm]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]
Indoor Coil – Fin Type	Louvered	Louvered	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	1 [25.4]	1 [25.4]	1 [25.4]	1 [25.4]	1 [25.4]
Face Area sq. ft. [sq. m]	7.48 [0.69]	7.48 [0.69]	7.48 [0.69]	7.48 [0.69]	7.48 [0.69]
Rows / FPI [FPcm]	1 / 20 [50.80]	1 / 20 [50.80]	1 / 20 [50.80]	1 / 20 [50.80]	1 / 20 [50.80]
Refrigerant Control	TX Valves	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]	1/0.75 [19.05]
Outdoor Fan – Type	Propeller	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]	1/26 [660.4]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	4250 [2006]	4250 [2006]	4250 [2006]	4250 [2006]	4250 [2006]
No. Motors/HP	1 at 1/5	1 at 1/5	1 at 1/5	1 at 1/5	1 at 1/5
Motor RPM	850	850	850	850	850
Indoor Fan – Type	FC Centrifugal	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]	1/11x11 [279x279]
Drive Type	Direct	Direct	Direct	Direct	Direct
No. Speeds	Multiple	Multiple	Multiple	Multiple	Multiple
No. Motors	1	1	1	1	1
Motor HP	3/4	1 1/2	1	3/4	1 1/2
Motor RPM	1050	1050	1050	1050	1050
Motor Frame Size	48	48	48	48	48
Filter – Type	Disposable	Disposable	Disposable	Disposable	Disposable
Furnished	Yes	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]	(4)2x16x16 [51x406x406]
Refrigerant Charge Oz. [g]	72 [2041]	72 [2041]	72 [2041]	72 [2041]	72 [2041]
Weights					
Net Weight lbs. [kg]	556 [252]	562 [255]	562 [255]	606 [275]	612 [278]
Ship Weight lbs. [kg]	594 [269]	600 [272]	600 [272]	644 [292]	650 [295]

Note: Please look at the rating plates pasted on the side of the unit to understand the model number of your unit.

Appendix A – General Product Data (Cont.)

GENERAL DATA –

Model (-)GECYB Series	048ACT 048ADT 048AJT	048ACU	048ADU	048AYT	048AYU
Cooling Performance[A]					
Gross Cooling Capacity Btu [kW]	48,000 [14.07]	48,000 [14.07]	48,000 [14.07]	48,000 [14.07]	48,000 [14.07]
EER2/SEER2[B]	10.6/13.4	10.6/13.4	10.6/13.4	10.6/13.4	10.6/13.4
Nominal CFM/ AHRI Rated CFM [L/s]	1600/1570 [755/741]	1600/1570 [755/741]	1600/1570 [755/741]	1600/1570 [755/741]	1600/1570 [755/741]
AHRI Net Cooling Capacity Btu [kW]	45,500 [13.33]	45,500 [13.33]	45,500 [13.33]	45,500 [13.33]	45,500 [13.33]
Net Sensible Capacity Btu [kW]	34,200 [10.02]	34,200 [10.02]	34,200 [10.02]	34,200 [10.02]	34,200 [10.02]
Net Latent Capacity Btu [kW]	11,300 [3.31]	11,300 [3.31]	11,300 [3.31]	11,300 [3.31]	11,300 [3.31]
Net System Power kW	3.8	3.8	3.8	3.8	3.8
Compressor					
No./Type	1/Scroll	1/Scroll	1/Scroll	1/Scroll	1/Scroll
Outdoor Sound Rating (dB)	85.3	85.3	85.3	85.3	85.3
Outdoor Coil – Fin Type	Louvered	Louvered	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	0.71 [18]	0.71 [18]	0.71 [18]	0.71 [18]	0.71 [18]
Face Area sq. ft. [sq. m]	16.46 [1.53]	16.46 [1.53]	16.46 [1.53]	16.46 [1.53]	16.46 [1.53]
Rows / FPI [FPcm]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]
Indoor Coil – Fin Type	Louvered	Louvered	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	1.26 [32]	1.26 [32]	1.26 [32]	1.26 [32]	1.26 [32]
Face Area sq. ft. [sq. m]	8.41 [0.78]	8.41 [0.78]	8.41 [0.78]	8.41 [0.78]	8.41 [0.78]
Rows / FPI [FPcm]	1 / 20 [50.80]	1 / 20 [50.80]	1 / 20 [50.80]	1 / 20 [50.80]	1 / 20 [50.80]
Refrigerant Control	TX Valves	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]	1/0.75 [19.05]
Outdoor Fan – Type	Propeller	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]	1/26 [660.4]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	5900 [2784]	5900 [2784]	5900 [2784]	5900 [2784]	5900 [2784]
No. Motors/HP	1 at 1/2 HP	1 at 1/2 HP	1 at 1/2 HP	1 at 1/2 HP	1 at 1/2 HP
Motor RPM	1075	1075	1075	1075	1075
Indoor Fan – Type	FC Centrifugal	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]	1/11x11 [279x279]
Drive Type	Direct	Direct	Direct	Direct	Direct
No. Speeds	Multiple	Multiple	Multiple	Multiple	Multiple
No. Motors	1	1	1	1	1
Motor HP	3/4	1 1/2	1	3/4	1 1/2
Motor RPM	1050	1050	1050	1050	1050
Motor Frame Size	48	48	48	48	48
Filter – Type	Disposable	Disposable	Disposable	Disposable	Disposable
Furnished	Yes	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]	(4)2x16x16 [51x406x406]
Refrigerant Charge Oz. [g]	67 [1899]	67 [1899]	67 [1899]	67 [1899]	67 [1899]
Weights					
Net Weight lbs. [kg]	583 [264]	589 [267]	589 [267]	633 [287]	639 [290]
Ship Weight lbs. [kg]	621 [282]	627 [284]	627 [284]	671 [304]	677 [307]

Note: Please look at the rating plates pasted on the side of the unit to understand the model number of your unit.

P. APPENDICES

Appendix A – General Product Data (Cont.)

GENERAL DATA –

Model (-)GECYB Series	060ACT 060ADT 060AJT	060ACU	060ADU	060AYT	060AYU
Cooling Performance[A]					
Gross Cooling Capacity Btu [kW]	60,000 [17.58]	60,000 [17.58]	60,000 [17.58]	60,000 [17.58]	60,000 [17.58]
EER2/SEER2[B]	10.6/13.4	10.6/13.4	10.6/13.4	10.6/13.4	10.6/13.4
Nominal CFM/ AHRI Rated CFM [L/s]	2000/1825 [944/861]	2000/1825 [944/861]	2000/1825 [944/861]	2000/1825 [944/861]	2000/1825 [944/861]
AHRI Net Cooling Capacity Btu [kW]	57,000 [16.71]	57,000 [16.71]	57,000 [16.71]	57,000 [16.71]	57,000 [16.71]
Net Sensible Capacity Btu [kW]	43,000 [12.6]	43,000 [12.6]	43,000 [12.6]	43,000 [12.6]	43,000 [12.6]
Net Latent Capacity Btu [kW]	14,000 [4.1]	14,000 [4.1]	14,000 [4.1]	14,000 [4.1]	14,000 [4.1]
Net System Power kW	5.0	5.0	5.0	5.0	5.0
Compressor					
No./Type	1/Scroll	1/Scroll	1/Scroll	1/Scroll	1/Scroll
Outdoor Sound Rating (dB)	86	86	86	86	86
Outdoor Coil – Fin Type	Louvered	Louvered	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	0.63 [16]	0.63 [16]	0.63 [16]	0.63 [16]	0.63 [16]
Face Area sq. ft. [sq. m]	16.46 [1.53]	16.46 [1.53]	16.46 [1.53]	16.46 [1.53]	16.66 [1.55]
Rows / FPI [FPcm]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]
Indoor Coil – Fin Type	Louvered	Louvered	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	1.26 [32]	1.26 [32]	1.26 [32]	1.26 [32]	1.26 [32]
Face Area sq. ft. [sq. m]	8.41 [0.78]	8.41 [0.78]	8.41 [0.78]	8.41 [0.78]	7.47 [0.69]
Rows / FPI [FPcm]	1 / 20 [50.80]	1 / 20 [50.80]	1 / 20 [50.80]	1 / 20 [50.80]	1 / 20 [8]
Refrigerant Control	TX Valves	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]	1/0.75 [19.05]
Outdoor Fan – Type	Propeller	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]	1/26 [660.4]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	5900 [2784]	5900 [2784]	5900 [2784]	5900 [2784]	5900 [2784]
No. Motors/HP	1 at 1/2	1 at 1/2	1 at 1/2	1 at 1/2	1 at 1/2 HP
Motor RPM	1075	1075	1075	1075	1075
Indoor Fan – Type	FC Centrifugal	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]	1/11x11 [279x279]
Drive Type	Direct	Direct	Direct	Direct	Direct
No. Speeds	Multiple	Multiple	Multiple	Multiple	Multiple
No. Motors	1	1	1	1	1
Motor HP	1	1 1/2	1 1/5	1	1 1/2
Motor RPM	1050	1050	1050	1050	1050
Motor Frame Size	48	48	48	48	48
Filter – Type	Disposable	Disposable	Disposable	Disposable	Disposable
Furnished	Yes	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]	(4)2x16x16 [51x406x406]
Refrigerant Charge Oz. [g]	80 [2268]	80 [2268]	80 [2268]	80 [2268]	80 [2268]
Weights					
Net Weight lbs. [kg]	586 [266]	592 [269]	592 [269]	636 [288]	642 [291]
Ship Weight lbs. [kg]	624 [283]	630 [286]	630 [286]	674 [306]	680 [308]

Note: Please look at the rating plates pasted on the side of the unit to understand the model number of your unit.

Appendix A – General Product Data (Cont.)

GENERAL DATA –

Model (-)GECYB Series	072ACT 072ADT	072ACU 072ADU	072ADU	072AYT	072AYU
Cooling Performance[A]					
Gross Cooling Capacity Btu [kW]	72000 [21.1]	72000 [21.1]	72000 [21.1]	72000 [21.1]	72000 [21.1]
EER/IEER[B]	11.2/14.8	11.2/14.8	11.2/14.8	11.2/14.8	11.2/14.8
Nominal CFM/ AHRI Rated CFM [L/s]	2400/2400 [1133/1133]	2400/2400 [1133/1133]	2400/2400 [1133/1133]	2400/2400 [1133/1133]	2400/2400 [1133/1133]
AHRI Net Cooling Capacity Btu [kW]	68500 [20.08]	68500 [20.08]	68500 [20.08]	68500 [20.08]	68500 [20.08]
Net Sensible Capacity Btu [kW]	51500 [15.09]	51500 [15.09]	51500 [15.09]	51500 [15.09]	51500 [15.09]
Net Latent Capacity Btu [kW]	17000 [4.98]	17000 [4.98]	17000 [4.98]	17000 [4.98]	17000 [4.98]
Net System Power kW	6.2	6.2	6.2	6.2	6.2
Compressor					
No./Type	1/Scroll	1/Scroll	1/Scroll	1/Scroll	1/Scroll
Outdoor Sound Rating (dB)	85	85	85	85	85
Outdoor Coil – Fin Type	Louvered	Louvered	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	0.71 [18]	0.71 [18]	0.71 [18]	0.71 [18]	0.71 [18]
Face Area sq. ft. [sq. m]	16.46 [1.53]	16.46 [1.53]	16.46 [1.53]	16.46 [1.53]	16.46 [1.53]
Rows / FPI [FPcm]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]
Indoor Coil – Fin Type	Louvered	Louvered	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	1.26 [32]	1.26 [32]	1.26 [32]	1.26 [32]	1.26 [32]
Face Area sq. ft. [sq. m]	8.41 [0.78]	8.41 [0.78]	8.41 [0.78]	8.41 [0.78]	7.47 [0.69]
Rows / FPI [FPcm]	1 / 20 [50.80]	1 / 20 [50.80]	1 / 20 [50.80]	1 / 20 [50.80]	1 / 20 [8]
Refrigerant Control	TX Valves	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]	1/0.75 [19.05]
Outdoor Fan – Type	Propeller	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]	1/26 [660.4]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	5900 [2784]	5900 [2784]	5900 [2784]	5900 [2784]	5900 [2784]
No. Motors/HP	1 at 3/4	1 at 3/4	1 at 3/4	1 at 3/4	1 at 3/4
Motor RPM	1100	1100	1100	1100	1100
Indoor Fan – Type	FC Centrifugal	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]	1/11x11 [279x279]
Drive Type	Direct	Direct	Direct	Direct	Direct
No. Speeds	Multiple	Multiple	Multiple	Multiple	Multiple
No. Motors	1	1	1	1	1
Motor HP	1 1/5	1 1/5	1 1/5	1 1/5	1 1/5
Motor RPM	1300	1300	1300	1300	1300
Motor Frame Size	48	48	48	48	48
Filter – Type	Disposable	Disposable	Disposable	Disposable	Disposable
Furnished	Yes	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]	(4)2x16x16 [51x406x406]
Refrigerant Charge Oz. [g]	85 [2410]	85 [2410]	85 [2410]	85 [2410]	85 [2410]
Weights					
Net Weight lbs. [kg]	586 [266]	592 [269]	592 [269]	636 [288]	642 [291]
Ship Weight lbs. [kg]	624 [283]	630 [286]	630 [286]	674 [306]	680 [308]

Note: Please look at the rating plates pasted on the side of the unit to understand the model number of your unit.

P. APPENDICES

Appendix A – General Product Data (Cont.)

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 (3-5T) and AHRI Standard 360 (6T).

B. EER2, EER, and/or SEER2 are rated at AHRI conditions and in accordance with DOE test procedures. Integrated Energy Efficiency Ratio (IEER) is rated in accordance with AHRI Standard 340/360.

C. 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
(-)GECYB036	78.0	48.7	58.1	63.9	67.0	67.8	64.7	60.6	54.7
(-)GECYB048	85.3	58.2	64.7	75.1	74.7	75.5	72.3	67.8	61.0
(-)GECYB060	86.0	58.2	62.5	76.7	75.0	75.2	77.0	69.0	60.0
(-)GECYB072	85.0	54.9	67.3	69.4	73.8	73.4	71.2	69.6	65.3

Appendix B – Electrical Data Without Powered Exhaust

ELECTRICAL DATA – (-)GECYB SERIES								
		036ACT07 036ACT10	**036ACU07 036ACU10**	**036ADT07 036ADT10**	**036ADU07 036ADU10**	**036AJT07 036AJT10**	**036AYT07 036AYT10**	**036AYU07 036AYU10**
Unit Information	Unit Operating Voltage Range	187-253	187-253	414-506	414-506	187-253	518-633	518-633
	Volts	208/230	208/230	460	460	208/230	575	575
	Phase	3	3	3	3	1	3	3
	Hz	60	60	60	60	60	60	60
	Minimum Circuit Ampacity	24	29	10	11	25	9	11
	Minimum Overcurrent Protection Device Size	30	35	15	15	30	15	15
	Maximum Overcurrent Protection Device Size	35	40	15	15	35	15	15
Compressor Motor	No.	1	1	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230	575	575
	Phase	3	3	3	3	1	3	3
	Amps (RLA), Comp. 1	12.8	12.8	5.1	5.1	13.5	4.5	4.5
	Amps (LRA), Comp 1.	97.5	97.5	44.3	44.3	82.5	27.1	27.1
Condenser Motor	No.	1	1	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230	575	575
	Phase	1	1	1	1	1	1	1
	HP	1/5	1/5	1/5	1/5	1/5	1/5	1/5
	Amps (FLA, each)	1	1	0.8	0.8	1	0.55	0.55
	Amps (LRA, each)	2.3	2.3	1.4	1.4	2.3	1.1	1.1
Evaporator Fan	No.	1	1	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230	208-230	208-230
	Phase	1	1	1	1	1	1	1
	HP	3/4	1 1/2	3/4	1	3/4	3/4	1 1/2
	Amps (FLA, each)	6	11.5	2.7	3.5	6	2.4	4.6
	Amps (LRA, each)	N/A	N/A	N/A	N/A	N/A	N/A	N/A

P. APPENDICES

Appendix B – Electrical Data With Powered Exhaust

ELECTRICAL DATA – (-)GECYB SERIES								
		036ACT07 036ACT10	**036ACU07 036ACU10**	**036ADT07 036ADT10**	**036ADU07 036ADU10**	**036AJT07 036AJT10**	**036AYT07 036AYT10**	**036AYU07 036AYU10**
Unit Information	Unit Operating Voltage Range	187-253	187-253	414-506	414-506	187-253	518-633	518-633
	Volts	208/230	208/230	460	460	208/230	575	575
	Phase	3	3	3	3	1	3	3
	Hz	60	60	60	60	60	60	60
	Minimum Circuit Ampacity	27	32	12	13	28	10	12
	Minimum Overcurrent Protection Device Size	30	40	15	15	35	15	15
	Maximum Overcurrent Protection Device Size	35	40	15	15	40	15	15
Compressor Motor	No.	1	1	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230	575	575
	Phase	3	3	3	3	1	3	3
	Amps (RLA), Comp. 1	12.8	12.8	5.1	5.1	13.5	4.5	4.5
	Amps (LRA), Comp 1.	97.5	97.5	44.3	44.3	82.5	27.1	27.1
Condenser Motor	No.	1	1	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230	575	575
	Phase	1	1	1	1	1	1	1
	HP	1/5	1/5	1/5	1/5	1/5	1/5	1/5
	Amps (FLA, each)	1	1	0.8	0.8	1	0.55	0.55
	Amps (LRA, each)	2.3	2.3	1.4	1.4	2.3	1.1	1.1
Evaporator Fan	No.	1	1	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230	208-230	208-230
	Phase	1	1	1	1	1	1	1
	HP	3/4	1 1/2	3/4	1	3/4	3/4	1 1/2
	Amps (FLA, each)	6	11.5	2.7	3.5	6	2.4	4.6
	Amps (LRA, each)	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Appendix B – Electrical Data Without Powered Exhaust

ELECTRICAL DATA – (-)GECYB SERIES								
		048ACT07 048ACT12	**048ACU07 048ACU12**	**048ADT07 048ADT12**	**048ADU07 048ADU12**	**048AJT07 048AJT12**	**048AYT07 048AYT12**	**048AYU07 048AYU12**
Unit Information	Unit Operating Voltage Range	187-253	187-253	414-506	414-506	187-253	518-633	518-633
	Volts	208/230	208/230	460	460	208/230	575	575
	Phase	3	3	3	3	1	3	3
	Hz	60	60	60	60	60	60	60
	Minimum Circuit Ampacity	24	30	13	13	30	10	12
	Minimum Overcurrent Protection Device Size	30	35	15	15	35	15	15
	Maximum Overcurrent Protection Device Size	35	40	15	15	45	15	15
Compressor Motor	No.	1	1	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230	575	575
	Phase	3	3	3	3	1	3	3
	Amps (RLA), Comp. 1	12.2	12.2	6.4	6.4	17.3	5.1	5.1
	Amps (LRA), Comp 1.	120.4	120.4	48.5	48.5	126	41	41
Condenser Motor	No.	1	1	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230	575	575
	Phase	1	1	1	1	1	1	1
	HP	1/2	1/2	1/2	1/2	1/2	1/2	1/2
	Amps (FLA, each)	2.3	2.3	1.5	1.5	2.3	1	1
	Amps (LRA, each)	5.1	5.1	3.1	3.1	5.1	2.2	2.2
Evaporator Fan	No.	1	1	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230	208-230	208-230
	Phase	1	1	1	1	1	1	1
	HP	3/4	1 1/2	3/4	1	3/4	3/4	1 1/2
	Amps (FLA, each)	6	11.5	2.7	3.5	6	2.4	4.6
	Amps (LRA, each)	N/A	N/A	N/A	N/A	N/A	N/A	N/A

P. APPENDICES

Appendix B – Electrical Data With Powered Exhaust

ELECTRICAL DATA – (-)GECYB SERIES								
		048ACT07 048ACT12	**048ACU07 048ACU12**	**048ADT07 048ADT12**	**048ADU07 048ADU12**	**048AJT07 048AJT12**	**048AYT07 048AYT12**	**048AYU07 048AYU12**
Unit Information	Unit Operating Voltage Range	187-253	187-253	414-506	414-506	187-253	518-633	518-633
	Volts	208/230	208/230	460	460	208/230	575	575
	Phase	3	3	3	3	1	3	3
	Hz	60	60	60	60	60	60	60
	Minimum Circuit Ampacity	27	33	15	16	34	11	14
	Minimum Overcurrent Protection Device Size	30	40	20	20	40	15	15
	Maximum Overcurrent Protection Device Size	35	40	20	20	50	15	15
Compressor Motor	No.	1	1	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230	575	575
	Phase	3	3	3	3	1	3	3
	Amps (RLA), Comp. 1	12.2	12.2	6.4	6.4	17.3	5.1	5.1
	Amps (LRA), Comp 1.	120.4	120.4	48.5	48.5	126	41	41
Condenser Motor	No.	1	1	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230	575	575
	Phase	1	1	1	1	1	1	1
	HP	1/2	1/2	1/2	1/2	1/2	1/2	1/2
	Amps (FLA, each)	2.3	2.3	1.5	1.5	2.3	1	1
	Amps (LRA, each)	5.1	5.1	3.1	3.1	5.1	2.2	2.2
Evaporator Fan	No.	1	1	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230	208-230	208-230
	Phase	1	1	1	1	1	1	1
	HP	3/4	1 1/2	3/4	1	3/4	3/4	1 1/2
	Amps (FLA, each)	6	11.5	2.7	3.5	6	2.4	4.6
	Amps (LRA, each)	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Appendix B – Electrical Data Without Powered Exhaust

ELECTRICAL DATA – (-)GECYB SERIES								
		060ACT07 060ACT12	**060ACU07 060ACU12**	**060ADT07 060ADT12**	**060ADU07 060ADU12**	**060AJT07 060AJT12**	**060AYT07 060AYT12**	**060AYU07 060AYU12**
Unit Information	Unit Operating Voltage Range	187-253	187-253	414-506	414-506	187-253	518-633	518-633
	Volts	208/230	208/230	460	460	208/230	575	575
	Phase	3	3	3	3	1	3	3
	Hz	60	60	60	60	60	60	60
	Minimum Circuit Ampacity	30	34	15	15	38	13	14
	Minimum Overcurrent Protection Device Size	35	40	20	20	45	15	20
	Maximum Overcurrent Protection Device Size	45	45	20	20	50	15	20
Compressor Motor	No.	1	1	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230	575	575
	Phase	3	3	3	3	1	3	3
	Amps (RLA), Comp. 1	16	16	7.7	7.7	21.8	6.4	6.4
	Amps (LRA), Comp 1.	156.4	156.4	58.1	58.1	143	47.8	47.8
Condenser Motor	No.	1	1	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230	575	575
	Phase	1	1	1	1	1	1	1
	HP	1/2	1/2	1/2	1/2	1/2	1/2	1/2
	Amps (FLA, each)	2.3	2.3	1.5	1.5	2.3	1	1
	Amps (LRA, each)	5.1	5.1	3.1	3.1	5.1	2.2	2.2
Evaporator Fan	No.	1	1	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230	208-230	208-230
	Phase	1	1	1	1	1	1	1
	HP	1	1 1/2	1	1 1/5	1	1	1 1/2
	Amps (FLA, each)	7.6	11.5	3.5	3.7	7.6	3.04	4.6
	Amps (LRA, each)	N/A	N/A	N/A	N/A	N/A	N/A	N/A

P. APPENDICES

Appendix B – Electrical Data With Powered Exhaust

ELECTRICAL DATA – (-)GECYB SERIES								
		060ACT07 060ACT12	**060ACU07 060ACU12**	**060ADT07 060ADT12**	**060ADU07 060ADU12**	**060AJT07 060AJT12**	**060AYT07 060AYT12**	**060AYU07 060AYU12**
Unit Information	Unit Operating Voltage Range	187-253	187-253	414-506	414-506	187-253	518-633	518-633
	Volts	208/230	208/230	460	460	208/230	575	575
	Phase	3	3	3	3	1	3	3
	Hz	60	60	60	60	60	60	60
	Minimum Circuit Ampacity	33	37	17	17	41	14	15
	Minimum Overcurrent Protection Device Size	40	45	20	20	50	15	20
	Maximum Overcurrent Protection Device Size	45	50	20	20	60	15	20
Compressor Motor	No.	1	1	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230	575	575
	Phase	3	3	3	3	1	3	3
	Amps (RLA), Comp. 1	16	16	7.7	7.7	21.8	6.4	6.4
	Amps (LRA), Comp 1.	156.4	156.4	58.1	58.1	143	47.8	47.8
Condenser Motor	No.	1	1	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230	575	575
	Phase	1	1	1	1	1	1	1
	HP	1/2	1/2	1/2	1/2	1/2	1/2	1/2
	Amps (FLA, each)	2.3	2.3	1.5	1.5	2.3	1	1
	Amps (LRA, each)	5.1	5.1	3.1	3.1	5.1	2.2	2.2
Evaporator Fan	No.	1	1	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230	208-230	208-230
	Phase	1	1	1	1	1	1	1
	HP	1	1 1/2	1	1 1/5	1	1	1 1/2
	Amps (FLA, each)	7.6	11.5	3.5	3.7	7.6	3.04	4.6
	Amps (LRA, each)	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Appendix B – Electrical Data Without Powered Exhaust

ELECTRICAL DATA – (-)GECYB SERIES											
		072ACT07 072ACT12	072ACU07 072ACU12	072ADT07 072ADT12	072ADU07 072ADU12	072AYT07 072AYT12	072AYU07 072AYU12	072ACT07 072ACT12	072ACU07 072ACU12	072ADT07 072ADT12	072ADU07 072ADU12
								with REHEAT			
Unit Information	Unit Operating Voltage Range	187-253	187-253	414-506	414-506	518-633	518-633	187-253	187-253	414-506	414-506
	Volts	208/230	208/230	460	460	575	575	208/230	208/230	460	460
	Phase	3	3	3	3	3	3	3	3	3	3
	Hz	60	60	60	60	60	60	60	60	60	60
	Minimum Circuit Ampacity	38	38	18	18	13	13	39	39	18	18
	Minimum Overcurrent Protection Device Size	45	45	20	20	15	15	45	45	20	20
	Maximum Overcurrent Protection Device Size	50	50	25	25	15	15	50	50	25	25
Compressor Motor	No.	1	1	1	1	1	1	1	1	1	1
	Volts	208-230	208-230	460	460	575	575	208-230	208-230	460	460
	Phase	3	3	3	3	3	3	3	3	3	3
	Amps (RLA), Comp. 1	19.2	19.2	9.1	9.1	6.2	6.2	19.2	19.2	9.1	9.1
	Amps (LRA), Comp 1.	162	162	70.8	70.8	58.2	58.2	162	162	70.8	70.8
Condenser Motor	No.	1	1	1	1	1	1	1	1	1	1
	Volts	208-230	208-230	460	460	575	575	208-230	208-230	460	460
	Phase	1	1	1	1	1	1	1	1	1	1
	HP	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
	Amps (FLA, each)	4.2	4.2	2.3	2.3	1.2	1.2	5.3	5.3	2.3	2.3
	Amps (LRA, each)	10.1	10.1	4.9	4.9	3.4	3.4	N/A	N/A	N/A	N/A
Evaporator Fan	No.	1	1	1	1	1	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230	208-230	208-230	208-230	460	460
	Phase	1	1	1	1	1	1	1	1	1	1
	HP	1 1/5	1 1/5	1 1/5	1 1/5	1 1/5	1 1/5	1 1/5	1 1/5	1 1/5	1 1/5
	Amps (FLA, each)	9.6	9.6	3.7	3.7	3.8	3.8	9.6	9.6	3.7	3.7
	Amps (LRA, each)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

P. APPENDICES

Appendix B – Electrical Data With Powered Exhaust

ELECTRICAL DATA – (-)GECYB SERIES											
		072ACT07 072ACT12	072ACU07 072ACU12	072ADT07 072ADT12	072ADU07 072ADU12	072AYT07 072AYT12	072AYU07 072AYU12	072ACT07 072ACT12	072ACU07 072ACU12	072ADT07 072ADT12	072ADU07 072ADU12
								with REHEAT			
Unit Information	Unit Operating Voltage Range	187-253	187-253	414-506	414-506	518-633	518-633	187-253	187-253	414-506	414-506
	Volts	208/230	208/230	460	460	575	575	208/230	208/230	460	460
	Phase	3	3	3	3	3	3	3	3	3	3
	Hz	60	60	60	60	60	60	60	60	60	60
	Minimum Circuit Ampacity	41	41	20	20	14	14	42	42	20	20
	Minimum Overcurrent Protection Device Size	50	50	25	25	20	20	50	50	25	25
	Maximum Overcurrent Protection Device Size	60	60	25	25	20	20	60	60	25	25
Compressor Motor	No.	1	1	1	1	1	1	1	1	1	1
	Volts	208-230	208-230	460	460	575	575	208-230	208-230	460	460
	Phase	3	3	3	3	3	3	3	3	3	3
	Amps (RLA), Comp. 1	19.2	19.2	9.1	9.1	6.2	6.2	19.2	19.2	9.1	9.1
	Amps (LRA), Comp 1.	162	162	70.8	70.8	58.2	58.2	162	162	70.8	70.8
Condenser Motor	No.	1	1	1	1	1	1	1	1	1	1
	Volts	208-230	208-230	460	460	575	575	208-230	208-230	460	460
	Phase	1	1	1	1	1	1	1	1	1	1
	HP	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
	Amps (FLA, each)	4.2	4.2	2.3	2.3	1.2	1.2	5.3	5.3	2.3	2.3
	Amps (LRA, each)	10.1	10.1	4.9	4.9	3.4	3.4	N/A	N/A	N/A	N/A
Evaporator Fan	No.	1	1	1	1	1	1	1	1	1	1
	Volts	208-230	208-230	460	460	208-230	208-230	208-230	208-230	460	460
	Phase	1	1	1	1	1	1	1	1	1	1
	HP	1 1/5	1 1/5	1 1/5	1 1/5	1 1/5	1 1/5	1 1/5	1 1/5	1 1/5	1 1/5
	Amps (FLA, each)	9.6	9.6	3.7	3.7	3.8	3.8	9.6	9.6	3.7	3.7
	Amps (LRA, each)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Appendix C – Air Flow Performance Data

3–5T – 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]
(-)GECYB036 (3T)	1050/1350	3/4 HP [559]	Fan – Tap 1	CFM	1187	981	780	686	562	485	399	321
				WATTS	149	126	111	117	123	128	133	137
		3/4 HP [559]	Low Heat – Tap 2	CFM	1504	1435	1370	1304	1239	1176	1108	1047
				WATTS	269	281	293	302	314	326	335	344
		3/4 HP [559]	High Heat – Tap 3	CFM	1731	1668	1610	1554	1498	1444	1386	1336
				WATTS	394	408	421	432	447	459	472	485
		3/4 HP [559]	Cooling – Tap 4 *	CFM	1504	1435	1370	1304	1239	1176	1108	1047
				WATTS	269	281	293	302	314	326	335	344
		3/4 HP [559]	High Speed – Tap 5	CFM	1642	1575	1517	1457	1400	1341	1287	1231
				WATTS	340	353	366	377	390	402	413	425
(-)GECYB048 (4T)	1400/1800	3/4 HP [559]	Fan – Tap 1	CFM	1204	1021	893	813	729	618	519	451
				WATTS	157	136	133	140	147	157	163	169
		3/4 HP [559]	Low Heat – Tap 2	CFM	1702	1639	1579	1516	1459	1400	1345	1297
				WATTS	364	376	389	402	413	425	436	447
		3/4 HP [559]	High Heat – Tap 3	CFM	1765	1700	1646	1591	1529	1472	1419	1366
				WATTS	402	415	427	439	452	464	474	488
		3/4 HP [559]	Cooling – Tap 4 *	CFM	1830	1786	1731	1677	1623	1573	1511	1465
				WATTS	449	460	472	487	500	515	529	540
		3/4 HP [559]	High Speed – Tap 5	CFM	1942	1886	1838	1774	1722	1670	1618	1575
				WATTS	524	540	552	568	578	592	606	619
(-)GECYB060 (5T)	1750/2250	1 HP [745]	Fan – Tap 1	CFM	1247	1055	973	890	817	733	620	552
				WATTS	158	137	145	151	160	168	172	180
		1 HP [745]	Low Heat – Tap 2	CFM	1650	1590	1527	1467	1415	1357	1307	1248
				WATTS	318	331	347	351	366	378	388	402
		1 HP [745]	High Heat – Tap 3	CFM	1804	1753	1694	1646	1598	1539	1482	1432
				WATTS	416	427	442	453	466	479	490	504
		1 HP [745]	Cooling – Tap 4 *	CFM	2087	2040	1991	1944	1903	1864	1824	1771
				WATTS	658	673	688	702	718	733	748	742
		1 HP [745]	High Speed – Tap 5	CFM	2236	2179	2142	2093	2049	1997	1953	1896
				WATTS	759	777	789	808	823	844	854	851
(-)GECYB072 (6T)	2100/2700	1.2 HP [895]	Fan/Low Heat - Tap 1	CFM	1384	1319	1249	1188	1127	1066	1006	947
				WATTS	192	204	215	225	240	245	255	265
		1.2 HP [895]	High Heat - Tap 2	CFM	1874	1833	1778	1730	1680	1630	1584	1539
				WATTS	421	435	450	466	480	495	510	525
		1.2 HP [895]	Low Cool - Tap 3	CFM	1546	1488	1427	1372	1316	1261	1203	1149
				WATTS	258	270	282	298	310	318	330	338
		1.2 HP [895]	High Cool - Tap 4	CFM	2435	2402	2376	2328	2287	2256	2220	2197
				WATTS	986	1010	1030	1058	1091	1125	1144	1166
		1.2 HP [895]	High Speed - Tap 5	CFM	2515	2476	2436	2415	2383	2339	2282	2221
				WATTS	1070	1103	1139	1163	1187	1215	1219	1221

NOTES

*Factory tap settings are marked with an asterisk**

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

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

FER Testing: 3 ton model, 100K heating input, use Tap 3 as Q max.

3–5T – 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]
(-)GECYB036 (3T)	1050/1350	3/4 HP [559]	Fan – Tap 1	CFM	957	867	777	686	562	477	388	313
				WATTS	94	102	110	117	125	130	135	140
		3/4 HP [559]	Low Heat – Tap 2	CFM	1155	1076	1001	922	843	767	669	597
				WATTS	140	150	159	168	176	184	193	200
		3/4 HP [559]	High Heat – Tap 3	CFM	1697	1641	1586	1530	1473	1413	1364	1314
				WATTS	365	378	390	404	418	432	444	457
		3/4 HP [559]	Cooling – Tap 4 *	CFM	1499	1436	1370	1309	1253	1190	1128	1073
				WATTS	254	266	279	291	301	313	322	332
		3/4 HP [559]	High Speed – Tap 5	CFM	1612	1551	1493	1435	1373	1316	1261	1205
				WATTS	316	329	341	353	367	379	392	404
(-)GECYB048 (4T)	1400/1800	3/4 HP [559]	Fan – Tap 1	CFM	1061	965	882	801	707	545	445	359
				WATTS	114	124	132	140	148	154	160	166
		3/4 HP [559]	Low Heat – Tap 2	CFM	1319	1247	1172	1105	1039	962	884	807
				WATTS	189	200	211	221	231	242	250	259
		3/4 HP [559]	High Heat – Tap 3	CFM	1737	1684	1624	1564	1509	1453	1400	1345
				WATTS	374	391	404	417	430	445	458	471
		3/4 HP [559]	Cooling – Tap 4 *	CFM	1805	1749	1698	1650	1602	1557	1504	1452
				WATTS	420	435	449	461	475	490	504	516
		3/4 HP [559]	High Speed – Tap 5	CFM	1923	1862	1813	1763	1711	1657	1610	1556
				WATTS	485	500	514	532	545	563	576	594
(-)GECYB060 (5T)	1750/2250	1 HP [745]	Fan – Tap 1	CFM	1107	1017	936	865	793	711	592	527
				WATTS	126	135	143	151	158	166	174	181
		1 HP [745]	Low Heat – Tap 2	CFM	1216	1140	1075	993	922	859	790	706
				WATTS	159	168	177	185	193	202	211	220
		1 HP [745]	High Heat – Tap 3	CFM	1770	1714	1658	1598	1545	1485	1432	1389
				WATTS	394	407	420	434	447	459	471	482
		1 HP [745]	Cooling – Tap 4 *	CFM	2078	2041	1991	1925	1867	1827	1780	1731
				WATTS	606	620	635	651	667	680	695	709
		1 HP [745]	High Speed – Tap 5	CFM	2192	2151	2105	2056	2005	1961	1923	1874
				WATTS	720	737	752	767	784	801	815	830
(-)GECYB0672 (6T)	2100/2700	1.2 HP [895]	Fan/Low Heat - Tap 1	CFM	1384	1319	1249	1188	1127	1066	1006	947
				WATTS	192	204	215	225	240	245	255	265
		1.2 HP [895]	High Heat - Tap 2	CFM	1863	1821	1765	1717	1650	1617	1571	1526
				WATTS	413	428	442	459	474	488	503	518
		1.2 HP [895]	Low Cool - Tap 3	CFM	1546	1488	1427	1372	1316	1261	1203	1149
				WATTS	258	270	282	298	310	318	330	338
		1.2 HP [895]	High Cool - Tap 4	CFM	2395	2349	2295	2250	2199	2151	2108	2054
				WATTS	928	943	961	976	987	1001	1016	1032
		1.2 HP [895]	High Speed - Tap 5	CFM	2441	2398	2367	2320	2276	2218	2170	2118
				WATTS	989	1008	1035	1046	1055	1075	1089	1094

NOTES

*Factory tap settings are marked with an asterisk**

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

Appendix C – Air Flow Performance Data (Cont.)

3–5T – 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 [.2]	0.9 [.22]	1 [.25]	1.1 [.27]	1.2 [.3]	1.3 [.32]	1.4 [.35]	1.5 [.37]
(-)GECYB036 (3T)	1050/1350	1.5 HP [1119]	Fan – Tap 1	CFM	580	502	431	367	316	257	195	127
				WATTS	210	217	223	228	234	240	246	252
		1.5 HP [1119]	Low Heat – Tap 2	CFM	1105	1047	984	923	863	800	740	684
				WATTS	372	383	393	404	413	421	429	438
		1.5 HP [1119]	High Heat – Tap 3	CFM	1302	1245	1193	1138	1080	1018	963	906
				WATTS	462	475	486	497	509	520	532	539
		1.5 HP [1119]	Cooling – Tap 4 *	CFM	1068	1008	953	888	824	767	719	670
				WATTS	320	328	337	345	355	363	373	380
		1.5 HP [1119]	High Speed – Tap 5	CFM	1105	1047	984	923	863	800	740	684
				WATTS	372	383	393	404	413	421	429	438
(-)GECYB048 (4T)	1400/1800	1.5 HP [1119]	Fan – Tap 1	CFM	1055	991	916	847	788	734	671	617
				WATTS	349	357	369	380	389	399	408	414
		1.5 HP [1119]	Low Heat – Tap 2	CFM	1360	1311	1264	1214	1162	1105	1050	992
				WATTS	495	507	517	530	540	554	568	585
		1.5 HP [1119]	High Heat – Tap 3	CFM	1421	1369	1321	1271	1217	1167	1114	1053
				WATTS	526	539	550	563	575	586	602	616
		1.5 HP [1119]	Cooling – Tap 4 *	CFM	1188	1128	1073	1009	948	883	828	775
				WATTS	406	415	428	439	449	462	471	480
		1.5 HP [1119]	High Speed – Tap 5	CFM	1495	1443	1394	1345	1292	1248	1195	1140
				WATTS	567	581	596	607	620	631	646	658
(-)GECYB060 (5T)	1750/2250	1.5 HP [1119]	Fan – Tap 1	CFM	1244	1187	1125	1074	1016	956	878	812
				WATTS	431	439	456	461	477	486	492	510
		1.5 HP [1119]	Low Heat – Tap 2	CFM	1244	1187	1125	1074	1016	956	878	812
				WATTS	431	439	456	461	477	486	492	510
		1.5 HP [1119]	High Heat – Tap 3	CFM	1537	1496	1455	1409	1362	1310	1257	1206
				WATTS	599	613	627	642	653	667	680	696
		1.5 HP [1119]	Cooling – Tap 4 *	CFM	1472	1432	1388	1338	1285	1233	1180	1134
				WATTS	557	570	585	599	610	623	636	649
		1.5 HP [1119]	High Speed – Tap 5	CFM	1686	1642	1605	1564	1523	1479	1428	1380
				WATTS	707	721	736	750	765	781	795	807
(-)GECYB072 (6T)	2100/2700	1.2 HP [895]	Fan/Low Heat - Tap 1	CFM	1237	1182	1137	1076	996	961	906	853
				WATTS	364	373	386	396	405	409	421	431
		1.2 HP [895]	High Heat - Tap 2	CFM	2043	2004	1953	1917	1879	1828	1783	1750
				WATTS	834	850	861	876	891	906	925	938
		1.2 HP [895]	Low Cool - Tap 3	CFM	1149	1082	1030	969	891	837	781	728
				WATTS	338	345	357	365	374	383	393	403
		1.2 HP [895]	High Cool - Tap 4	CFM	2197	2155	2081	2034	1995	1940	1881	1791
				WATTS	1166	1190	1198	1203	1203	1203	1200	1160
		1.2 HP [895]	High Speed - Tap 5	CFM	2221	2169	2115	2061	1997	1937	1873	1788
				WATTS	1221	1226	1227	1227	1223	1225	1208	1160

NOTES

*Factory tap settings are marked with an asterisk**

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

FER Testing: 3 ton model, 100K heating input, use Tap 3 as Q max.

3–5T – 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 [.2]	0.9 [.22]	1 [.25]	1.1 [.27]	1.2 [.3]	1.3 [.32]	1.4 [.35]	1.5 [.37]
(-)GECYB036 (3T)	1050/1350	1 HP [745]	Fan – Tap 1	CFM	729	644	554	499	438	386	329	278
				WATTS	226	233	240	245	252	257	262	267
		1 HP [745]	Low Heat – Tap 2	CFM	729	644	554	499	438	386	329	278
				WATTS	226	233	240	245	252	257	262	267
		1 HP [745]	High Heat – Tap 3	CFM	1465	1421	1372	1320	1272	1226	1176	1122
				WATTS	535	547	559	571	583	593	603	615
		1 HP [745]	Cooling – Tap 4 *	CFM	1012	951	873	808	740	679	623	573
				WATTS	313	322	332	340	349	357	363	371
		1 HP [745]	High Speed – Tap 5	CFM	1345	1292	1239	1184	1135	1082	1016	947
				WATTS	460	472	483	493	503	513	525	537
(-)GECYB048 (4T)	1400/1800	1 HP [745]	Fan – Tap 1	CFM	871	794	722	654	580	526	466	413
				WATTS	267	275	283	290	297	303	310	315
		1 HP [745]	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	1514	1464	1415	1374	1323	1275	1228	1184
				WATTS	561	576	589	600	611	622	633	645
		1 HP [745]	Cooling – Tap 4 *	CFM	1423	1376	1328	1277	1227	1184	1139	1067
				WATTS	509	521	533	544	555	565	576	589
		1 HP [745]	High Speed – Tap 5	CFM	1589	1545	1497	1463	1413	1367	1317	1275
				WATTS	618	633	647	660	672	683	695	705
(-)GECYB060 (5T)	1750/2250	1.2 HP [895]	Fan – Tap 1	CFM	1091	1034	983	924	865	790	724	666
				WATTS	343	353	359	371	380	387	396	404
		1.2 HP [895]	Low Heat – Tap 2	CFM	1091	1034	983	924	865	790	724	666
				WATTS	343	353	359	371	380	387	396	404
		1.2 HP [895]	High Heat – Tap 3	CFM	1841	1794	1748	1703	1657	1615	1578	1538
				WATTS	794	809	826	836	847	859	870	878
		1.2 HP [895]	Cooling – Tap 4 *	CFM	1762	1714	1669	1624	1580	1538	1496	1459
				WATTS	736	749	763	774	786	797	807	816
		1.2 HP [895]	High Speed – Tap 5	CFM	2046	2004	1970	1921	1880	1835	1801	1753
				WATTS	980	997	1003	1025	1045	1059	1072	1090
(-)GECYB072 (6T)	2100/2700	1.2 HP [895]	Fan/Low Heat - Tap 1	CFM	1237	1182	1137	1076	996	961	906	853
				WATTS	364	373	386	396	405	409	421	431
		1.2 HP [895]	High Heat - Tap 2	CFM	2043	2004	1953	1917	1879	1828	1783	1750
				WATTS	834	850	861	876	891	906	925	938
		1.2 HP [895]	Low Cool - Tap 3	CFM	1149	1082	1030	969	891	837	781	728
				WATTS	338	345	357	365	374	383	393	403
		1.2 HP [895]	High Cool - Tap 4	CFM	2054	2002	1952	1901	1852	1817	1778	1734
				WATTS	1032	1045	1061	1081	1097	1110	1128	1134
		1.2 HP [895]	High Speed - Tap 5	CFM	2118	2068	2010	1965	1924	1884	1829	1790
				WATTS	1094	1110	1131	1151	1166	1189	1181	1189

NOTES

*Factory tap settings are marked with an asterisk**

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

Appendix C – Air Flow Performance Data (Cont.)

Economizer Pressure Drop per CFM		
	Downflow	Horizontal
Airflow (cfm)	dP (inH20)	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

P. APPENDICES

Appendix C – Air Flow Performance Data (Cont.)

FLUSH MOUNT CONCENTRIC DIFFUSER PERFORMANCE INFORMATION								
Diffuser Model Number For Rheem	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			
RXRN–AEF1800	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 For Rheem	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			
RXRN–AED1800	1000	9	23	0.07	0.057	12	4.06	2.82
	1200	10	24	0.11	0.08	15	4.06	2.82
	1400	12	26	0.15	0.105	19	4.06	2.82
	1600	13	28	0.19	0.134	21	4.06	2.82
	1800	15	30	0.24	0.17	26	4.06	2.82
	2000	17	32	0.3	0.21	30	4.06	2.82
	2400	19	34	0.43	0.29	32	4.06	2.82

FLUSH MOUNT CONCENTRIC DIFFUSER PERFORMANCE INFORMATION								
Diffuser Model Number For Rheem	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			
RXRX–AEF2000	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 For Rheem	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			
RXRX–AED2000	2600	22	39	0.34	0.21	32	5.69	3.1
	2800	23	40	0.39	0.24	38	5.69	3.1
	3000	25	42	0.45	0.27	40	5.69	3.1
	3200	26	43	0.53	0.31	41	5.69	3.1
	3400	27	45	0.61	0.34	42	5.69	3.1

Appendix D – Cooling Data for 3 Ton

COOLING PERFORMANCE DATA – (-)GECYB036											
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]			1325 [625]	1175 [555]	950 [448]	1325 [625]	1175 [555]	950 [448]	1325 [625]	1175 [555]	950 [448]
DR			.05	.09	.12	.05	.09	.12	.05	.09	.12
Outdoor Dry Bulb Temperature	75°F [23.9°C]	Total BTUH [kW] Sens BTUH [kW] Power	44.3 [13] 26 [7.6] 2.2	43.3 [12.7] 24.6 [7.2] 2.2	41.8 [12.3] 22.4 [6.6] 2.2	41.5 [12.2] 29.6 [8.7] 2.3	40.5 [11.9] 27.9 [8.2] 2.2	39.1 [11.5] 25.4 [7.4] 2.2	39.1 [11.5] 33.7 [9.9] 2.2	38.2 [11.2] 31.8 [9.3] 2.2	36.9 [10.8] 28.9 [8.5] 2.2
	80°F [26.7°C]	Total BTUH [kW] Sens BTUH [kW] Power	43 [12.6] 25.5 [7.5] 2.4	42 [12.3] 24 [7] 2.3	40.6 [11.9] 21.9 [6.4] 2.3	40.2 [11.8] 29 [8.5] 2.4	39.3 [11.5] 27.4 [8] 2.4	37.9 [11.1] 24.9 [7.3] 2.3	37.8 [11.1] 33.1 [9.7] 2.4	37 [10.8] 31.3 [9.2] 2.3	35.7 [10.5] 28.5 [8.4] 2.3
	85°F [29.4°C]	Total BTUH [kW] Sens BTUH [kW] Power	41.7 [12.2] 24.8 [7.3] 2.5	40.7 [11.9] 23.4 [6.9] 2.5	39.3 [11.5] 21.3 [6.2] 2.4	38.8 [11.4] 28.4 [8.3] 2.5	37.9 [11.1] 26.8 [7.9] 2.5	36.6 [10.7] 24.4 [7.2] 2.4	36.5 [10.7] 32.5 [9.5] 2.5	35.7 [10.5] 30.6 [9] 2.5	34.4 [10.1] 27.9 [8.2] 2.4
	90°F [32.2°C]	Total BTUH [kW] Sens BTUH [kW] Power	40.2 [11.8] 24.1 [7.1] 2.6	39.3 [11.5] 22.7 [6.7] 2.6	38 [11.1] 20.7 [6.1] 2.5	37.4 [11] 27.7 [8.1] 2.6	36.5 [10.7] 26.1 [7.6] 2.6	35.3 [10.3] 23.8 [7] 2.6	35 [10.3] 31.7 [9.3] 2.6	34.3 [10.1] 30 [8.8] 2.6	33.1 [9.7] 27.3 [8] 2.6
	95°F [35.0°C]	Total BTUH [kW] Sens BTUH [kW] Power	38.7 [11.3] 23.3 [6.8] 2.7	37.9 [11.1] 22 [6.4] 2.7	36.5 [10.7] 20 [5.9] 2.7	35.9 [10.5] 26.9 [7.9] 2.8	35.1 [10.3] 25.3 [7.4] 2.7	33.8 [9.9] 23.1 [6.8] 2.7	33.5 [9.8] 31 [9.1] 2.8	32.8 [9.6] 29.2 [8.6] 2.7	31.6 [9.3] 26.6 [7.8] 2.7
	100°F [37.8°C]	Total BTUH [kW] Sens BTUH [kW] Power	37.2 [10.9] 22.4 [6.6] 2.9	36.3 [10.6] 21.2 [6.2] 2.8	35 [10.3] 19.3 [5.7] 2.8	34.3 [10.1] 26 [7.6] 2.9	33.5 [9.8] 24.5 [7.2] 2.9	32.4 [9.5] 22.3 [6.5] 2.8	32 [9.4] 30.1 [8.8] 2.9	31.2 [9.1] 28.4 [8.3] 2.9	30.2 [8.9] 25.9 [7.6] 2.8
	105°F [40.6°C]	Total BTUH [kW] Sens BTUH [kW] Power	35.5 [10.4] 21.5 [6.3] 3	34.7 [10.2] 20.3 [5.9] 3	33.5 [9.8] 18.5 [5.4] 2.9	32.7 [9.6] 25 [7.3] 3	31.9 [9.3] 23.6 [6.9] 3	30.8 [9] 21.5 [6.3] 2.9	30.3 [8.9] 29.1 [8.5] 3	29.6 [8.7] 27.5 [8.1] 3	28.6 [8.4] 25 [7.3] 2.9
	110°F [43.3°C]	Total BTUH [kW] Sens BTUH [kW] Power	33.8 [9.9] 20.5 [6] 3.1	33 [9.7] 19.3 [5.7] 3.1	31.9 [9.3] 17.6 [5.2] 3.1	30.9 [9.1] 24 [7] 3.2	30.2 [8.9] 22.7 [6.7] 3.1	29.2 [8.6] 20.6 [6] 3.1	28.6 [8.4] 28.1 [8.2] 3.2	27.9 [8.2] 26.5 [7.8] 3.1	27 [7.9] 24.2 [7.1] 3.1
	115°F [46.1°C]	Total BTUH [kW] Sens BTUH [kW] Power	32 [9.4] 19.4 [5.7] 3.3	31.3 [9.2] 18.3 [5.4] 3.2	30.2 [8.9] 16.6 [4.9] 3.2	29.1 [8.5] 22.9 [6.7] 3.3	28.5 [8.4] 21.6 [6.3] 3.3	27.5 [8.1] 19.7 [5.8] 3.2	26.8 [7.9] 26.8 [7.9] 3.3	26.2 [7.7] 25.5 [7.5] 3.2	25.3 [7.4] 23.2 [6.8] 3.2
	120°F [48.9°C]	Total BTUH [kW] Sens BTUH [kW] Power	30.1 [8.8] 18.2 [5.3] 3.4	29.4 [8.6] 17.2 [5] 3.4	28.4 [8.3] 15.6 [4.6] 3.3	27.3 [8] 21.7 [6.4] 3.4	26.7 [7.8] 20.5 [6] 3.4	25.7 [7.5] 18.7 [5.5] 3.3	24.9 [7.3] 24.9 [7.3] 3.4	24.4 [7.2] 24.4 [7.2] 3.4	23.5 [6.9] 22.2 [6.5] 3.3
	125°F [51.7°C]	Total BTUH [kW] Sens BTUH [kW] Power	28.2 [8.3] 16.9 [5] 3.5	27.5 [8.1] 16 [4.7] 3.5	26.6 [7.8] 14.6 [4.3] 3.4	25.3 [7.4] 20.5 [6] 3.6	24.8 [7.3] 19.3 [5.7] 3.5	23.9 [7] 17.6 [5.2] 3.5	23 [6.7] 23 [6.7] 3.5	22.5 [6.6] 22.5 [6.6] 3.5	21.7 [6.4] 21.1 [6.2] 3.4

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

COOLING PERFORMANCE DATA – (-)GECYB048											
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]			1775 [838]	1575 [743]	1275 [602]	1775 [838]	1575 [743]	1275 [602]	1775 [838]	1575 [743]	1275 [602]
DR			.05	.09	.12	.05	.09	.12	.05	.09	.12
Outdoor Dry Bulb Temperature	75°F [23.9°C]	Total BTUH [kW] Sens BTUH [kW] Power	57.1 [16.7] 33.2 [9.7] 3.4	55.8 [16.4] 31.4 [9.2] 3.4	53.9 [15.8] 28.6 [8.4] 3.3	54.2 [15.9] 38.6 [11.3] 3.4	53 [15.5] 36.5 [10.7] 3.4	51.2 [15] 33.2 [9.7] 3.3	51.4 [15.1] 44 [12.9] 3.4	50.2 [14.7] 41.5 [12.2] 3.3	48.5 [14.2] 37.8 [11.1] 3.3
	80°F [26.7°C]	Total BTUH [kW] Sens BTUH [kW] Power	55.7 [16.3] 32.4 [9.5] 3.5	54.4 [15.9] 30.6 [9] 3.5	52.5 [15.4] 27.9 [8.2] 3.4	52.8 [15.5] 37.8 [11.1] 3.6	51.6 [15.1] 35.7 [10.5] 3.5	49.9 [14.6] 32.5 [9.5] 3.5	50 [14.7] 43.2 [12.7] 3.5	48.9 [14.3] 40.7 [11.9] 3.5	47.2 [13.8] 37.1 [10.9] 3.4
	85°F [29.4°C]	Total BTUH [kW] Sens BTUH [kW] Power	54.3 [15.9] 31.6 [9.3] 3.7	53.1 [15.6] 29.8 [8.7] 3.6	51.2 [15] 27.2 [8] 3.6	51.4 [15.1] 36.9 [10.8] 3.7	50.3 [14.7] 34.9 [10.2] 3.7	48.5 [14.2] 31.8 [9.3] 3.6	48.6 [14.2] 42.3 [12.4] 3.7	47.5 [13.9] 40 [11.7] 3.6	45.8 [13.4] 36.4 [10.7] 3.6
	90°F [32.2°C]	Total BTUH [kW] Sens BTUH [kW] Power	52.9 [15.5] 30.7 [9] 3.8	51.7 [15.2] 29 [8.5] 3.8	49.9 [14.6] 26.4 [7.7] 3.7	50 [14.7] 36.1 [10.6] 3.8	48.9 [14.3] 34.1 [10] 3.8	47.2 [13.8] 31.1 [9.1] 3.7	47.2 [13.8] 41.5 [12.2] 3.8	46.1 [13.5] 39.2 [11.5] 3.7	44.5 [13] 35.7 [10.5] 3.7
	95°F [35.0°C]	Total BTUH [kW] Sens BTUH [kW] Power	51.5 [15.1] 29.9 [8.8] 3.9	50.3 [14.7] 28.2 [8.3] 3.9	48.6 [14.2] 25.7 [7.5] 3.8	48.6 [14.2] 35.3 [10.3] 4	47.5 [13.9] 33.3 [9.8] 3.9	45.9 [13.5] 30.3 [8.9] 3.9	45.8 [13.4] 40.7 [11.9] 3.9	44.8 [13.1] 38.4 [11.3] 3.9	43.2 [12.7] 35 [10.3] 3.8
	100°F [37.8°C]	Total BTUH [kW] Sens BTUH [kW] Power	50.1 [14.7] 29.1 [8.5] 4.1	49 [14.4] 27.4 [8] 4	47.3 [13.9] 25 [7.3] 4	47.2 [13.8] 34.5 [10.1] 4.1	46.2 [13.5] 32.5 [9.5] 4.1	44.6 [13.1] 29.6 [8.7] 4	44.4 [13] 39.8 [11.7] 4.1	43.4 [12.7] 37.6 [11] 4	41.9 [12.3] 34.3 [10.1] 4
	105°F [40.6°C]	Total BTUH [kW] Sens BTUH [kW] Power	48.7 [14.3] 28.2 [8.3] 4.2	47.6 [14] 26.7 [7.8] 4.2	45.9 [13.5] 24.3 [7.1] 4.1	45.8 [13.4] 33.6 [9.8] 4.2	44.8 [13.1] 31.7 [9.3] 4.2	43.3 [12.7] 28.9 [8.5] 4.1	43 [12.6] 39 [11.4] 4.2	42 [12.3] 36.8 [10.8] 4.2	40.6 [11.9] 33.5 [9.8] 4.1
	110°F [43.3°C]	Total BTUH [kW] Sens BTUH [kW] Power	47.3 [13.9] 27.4 [8] 4.4	46.2 [13.5] 25.9 [7.6] 4.3	44.6 [13.1] 23.6 [6.9] 4.2	44.4 [13] 32.8 [9.6] 4.4	43.4 [12.7] 31 [9.1] 4.3	41.9 [12.3] 28.2 [8.3] 4.3	41.6 [12.2] 38.2 [11.2] 4.3	40.6 [11.9] 36 [10.6] 4.3	39.2 [11.5] 32.8 [9.6] 4.2
	115°F [46.1°C]	Total BTUH [kW] Sens BTUH [kW] Power	45.9 [13.5] 26.6 [7.8] 4.5	44.9 [13.2] 25.1 [7.4] 4.4	43.3 [12.7] 22.9 [6.7] 4.4	43 [12.6] 32 [9.4] 4.5	42.1 [12.3] 30.2 [8.9] 4.5	40.6 [11.9] 27.5 [8.1] 4.4	40.2 [11.8] 37.3 [10.9] 4.5	39.3 [11.5] 35.2 [10.3] 4.4	37.9 [11.1] 32.1 [9.4] 4.4
	120°F [48.9°C]	Total BTUH [kW] Sens BTUH [kW] Power	44.5 [13] 25.7 [7.5] 4.6	43.5 [12.7] 24.3 [7.1] 4.6	42 [12.3] 22.1 [6.5] 4.5	41.6 [12.2] 31.1 [9.1] 4.7	40.7 [11.9] 29.4 [8.6] 4.6	39.3 [11.5] 26.8 [7.9] 4.5	38.8 [11.4] 36.5 [10.7] 4.6	37.9 [11.1] 34.5 [10.1] 4.6	36.6 [10.7] 31.4 [9.2] 4.5
	125°F [51.7°C]	Total BTUH [kW] Sens BTUH [kW] Power	43.1 [12.6] 24.9 [7.3] 4.8	42.1 [12.3] 23.5 [6.9] 4.7	40.7 [11.9] 21.4 [6.3] 4.6	40.2 [11.8] 30.3 [8.9] 4.8	39.3 [11.5] 28.6 [8.4] 4.7	38 [11.1] 26.1 [7.6] 4.7	37.4 [11] 35.7 [10.5] 4.8	36.5 [10.7] 33.7 [9.9] 4.7	35.3 [10.3] 30.7 [9] 4.6

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

Appendix D – Cooling Data for 5 Ton

COOLING PERFORMANCE DATA – (-)GECYB060											
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]			2200 [1038]	1825 [861]	1600 [755]	2200 [1038]	1825 [861]	1600 [755]	2200 [1038]	1825 [861]	1600 [755]
DR			.05	.09	.12	.05	.09	.12	.05	.09	.12
Outdoor Dry Bulb Temperature	75°F [23.9°C]	Total BTUH [kW] Sens BTUH [kW] Power	72.1 [21.1] 43.2 [12.7] 4.2	69.5 [20.4] 39.4 [11.5] 4.1	67.9 [19.9] 37.2 [10.9] 4.1	68.4 [20] 48.5 [14.2] 4.2	66 [19.3] 44.2 [13] 4.2	64.5 [18.9] 41.7 [12.2] 4.1	64.9 [19] 53.9 [15.8] 4.2	62.6 [18.3] 49.2 [14.4] 4.1	61.1 [17.9] 46.3 [13.6] 4.1
	80°F [26.7°C]	Total BTUH [kW] Sens BTUH [kW] Power	70.4 [20.6] 42.4 [12.4] 4.4	67.9 [19.9] 38.7 [11.3] 4.4	66.4 [19.5] 36.5 [10.7] 4.3	66.8 [19.6] 47.7 [14] 4.5	64.4 [18.9] 43.5 [12.7] 4.4	62.9 [18.4] 41 [12] 4.4	63.2 [18.5] 53.1 [15.6] 4.5	60.9 [17.8] 48.4 [14.2] 4.4	59.6 [17.5] 45.6 [13.4] 4.3
	85°F [29.4°C]	Total BTUH [kW] Sens BTUH [kW] Power	68.6 [20.1] 41.5 [12.2] 4.7	66.1 [19.4] 37.9 [11.1] 4.6	64.7 [19] 35.7 [10.5] 4.6	64.9 [19] 46.7 [13.7] 4.7	62.6 [18.3] 42.7 [12.5] 4.6	61.2 [17.9] 40.2 [11.8] 4.6	61.4 [18] 52.1 [15.3] 4.7	59.2 [17.4] 47.6 [14] 4.6	57.9 [17] 44.8 [13.1] 4.6
	90°F [32.2°C]	Total BTUH [kW] Sens BTUH [kW] Power	66.7 [19.5] 40.4 [11.8] 4.9	64.3 [18.8] 36.9 [10.8] 4.8	62.8 [18.4] 34.7 [10.2] 4.8	63 [18.5] 45.6 [13.4] 5	60.7 [17.8] 41.7 [12.2] 4.9	59.4 [17.4] 39.3 [11.5] 4.8	59.5 [17.4] 51 [14.9] 4.9	57.3 [16.8] 46.6 [13.7] 4.8	56 [16.4] 43.9 [12.9] 4.8
	95°F [35.0°C]	Total BTUH [kW] Sens BTUH [kW] Power	64.6 [18.9] 39.2 [11.5] 5.2	62.2 [18.2] 35.7 [10.5] 5.1	60.8 [17.8] 33.7 [9.9] 5	60.9 [17.8] 44.4 [13] 5.2	58.7 [17.2] 40.5 [11.9] 5.1	57.4 [16.8] 38.2 [11.2] 5	57.4 [16.8] 49.8 [14.6] 5.2	55.3 [16.2] 45.4 [13.3] 5.1	54.1 [15.9] 42.8 [12.5] 5
	100°F [37.8°C]	Total BTUH [kW] Sens BTUH [kW] Power	62.3 [18.3] 37.8 [11.1] 5.4	60.1 [17.6] 34.5 [10.1] 5.3	58.7 [17.2] 32.5 [9.5] 5.2	58.7 [17.2] 43 [12.6] 5.4	56.6 [16.6] 39.3 [11.5] 5.3	55.3 [16.2] 37 [10.8] 5.3	55.1 [16.1] 48.4 [14.2] 5.4	53.1 [15.6] 44.2 [13] 5.3	52 [15.2] 41.6 [12.2] 5.2
	105°F [40.6°C]	Total BTUH [kW] Sens BTUH [kW] Power	60 [17.6] 36.2 [10.6] 5.6	57.8 [16.9] 33.1 [9.7] 5.5	56.5 [16.6] 31.2 [9.1] 5.5	56.3 [16.5] 41.5 [12.2] 5.7	54.3 [15.9] 37.9 [11.1] 5.6	53.1 [15.6] 35.7 [10.5] 5.5	52.8 [15.5] 46.9 [13.7] 5.6	50.9 [14.9] 42.8 [12.5] 5.5	49.7 [14.6] 40.3 [11.8] 5.5
	110°F [43.3°C]	Total BTUH [kW] Sens BTUH [kW] Power	57.5 [16.9] 34.6 [10.1] 5.9	55.4 [16.2] 31.5 [9.2] 5.8	54.2 [15.9] 29.7 [8.7] 5.7	53.8 [15.8] 39.8 [11.7] 5.9	51.9 [15.2] 36.3 [10.6] 5.8	50.7 [14.9] 34.2 [10] 5.7	50.3 [14.7] 45.2 [13.2] 5.9	48.4 [14.2] 41.2 [12.1] 5.8	47.4 [13.9] 38.9 [11.4] 5.7
	115°F [46.1°C]	Total BTUH [kW] Sens BTUH [kW] Power	54.8 [16.1] 32.7 [9.6] 6.1	52.8 [15.5] 29.9 [8.8] 6	51.7 [15.2] 28.2 [8.3] 5.9	51.2 [15] 38 [11.1] 6.1	49.3 [14.4] 34.7 [10.2] 6	48.2 [14.1] 32.7 [9.6] 6	47.6 [14] 43.4 [12.7] 6.1	45.9 [13.5] 39.6 [11.6] 6	44.9 [13.2] 37.3 [10.9] 5.9
	120°F [48.9°C]	Total BTUH [kW] Sens BTUH [kW] Power	52 [15.2] 30.8 [9] 6.3	50.2 [14.7] 28.1 [8.2] 6.2	49 [14.4] 26.5 [7.8] 6.2	48.4 [14.2] 36 [10.6] 6.4	46.6 [13.7] 32.9 [9.6] 6.3	45.6 [13.4] 31 [9.1] 6.2	44.8 [13.1] 41.4 [12.1] 6.3	43.2 [12.7] 37.8 [11.1] 6.2	42.2 [12.4] 35.6 [10.4] 6.2
	125°F [51.7°C]	Total BTUH [kW] Sens BTUH [kW] Power	49.1 [14.4] 28.6 [8.4] 6.6	47.3 [13.9] 26.1 [7.6] 6.5	46.3 [13.6] 24.6 [7.2] 6.4	45.4 [13.3] 33.9 [9.9] 6.6	43.8 [12.8] 30.9 [9.1] 6.5	42.8 [12.5] 29.2 [8.6] 6.4	41.9 [12.3] 39.3 [11.5] 6.6	40.4 [11.8] 35.8 [10.5] 6.5	39.5 [11.6] 33.8 [9.9] 6.4

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

COOLING PERFORMANCE DATA – (-)GECYB072											
Entering Indoor Air @ 80ºF [26.7ºC] dbE											
wbE			71ºF [21.7ºC]			67ºF [19.4ºC]			63ºF [17.2ºC]		
CFM [L/s]			2525 [1192]	2400 [1133]	1825 [861]	2525 [1192]	2400 [1133]	1825 [861]	2525 [1192]	2400 [1133]	1825 [861]
DR			.05	.09	.12	.05	.09	.12	.05	.09	.12
Outdoor Dry Bulb Temperature	75ºF [23.9ºC]	Total BTUH [kW] Sens BTUH [kW] Power	79.7 [23.4] 44.6 [13.1] 4.8	78.9 [23.1] 43.5 [12.7] 4.8	75.5 [22.1] 38.6 [11.3] 4.7	73.8 [21.6] 49.7 [14.6] 4.7	73.1 [21.4] 48.5 [14.2] 4.7	70 [20.5] 43.1 [12.6] 4.6	68 [19.9] 54.9 [16.1] 4.9	67.4 [19.8] 53.6 [15.7] 4.8	64.4 [18.9] 47.6 [14] 4.7
	80ºF [26.7ºC]	Total BTUH [kW] Sens BTUH [kW] Power	78.2 [22.9] 44.4 [13] 5.2	77.4 [22.7] 43.4 [12.7] 5.1	74.1 [21.7] 38.5 [11.3] 5	72.3 [21.2] 49.6 [14.5] 5.1	71.6 [21] 48.4 [14.2] 5	68.5 [20.1] 43 [12.6] 4.9	66.5 [19.5] 54.7 [16] 5.2	65.9 [19.3] 53.4 [15.7] 5.2	63 [18.5] 47.5 [13.9] 5.1
	85ºF [29.4ºC]	Total BTUH [kW] Sens BTUH [kW] Power	76.6 [22.5] 44.3 [13] 5.5	75.9 [22.2] 43.2 [12.7] 5.5	72.6 [21.3] 38.4 [11.3] 5.4	70.8 [20.8] 49.4 [14.5] 5.4	70.1 [20.5] 48.3 [14.2] 5.4	67.1 [19.7] 42.9 [12.6] 5.2	65 [19.1] 54.6 [16] 5.5	64.4 [18.9] 53.3 [15.6] 5.5	61.6 [18.1] 47.4 [13.9] 5.4
	90ºF [32.2ºC]	Total BTUH [kW] Sens BTUH [kW] Power	75.1 [22] 44.2 [13] 5.8	74.4 [21.8] 43.1 [12.6] 5.8	71.2 [20.9] 38.3 [11.2] 5.7	69.3 [20.3] 49.3 [14.4] 5.7	68.6 [20.1] 48.1 [14.1] 5.7	65.7 [19.3] 42.8 [12.5] 5.6	63.5 [18.6] 54.5 [16] 5.8	62.9 [18.4] 53.2 [15.6] 5.8	60.1 [17.6] 47.2 [13.8] 5.7
	95ºF [35.0ºC]	Total BTUH [kW] Sens BTUH [kW] Power	73.6 [21.6] 44 [12.9] 6.1	72.9 [21.4] 43 [12.6] 6.1	69.8 [20.5] 38.2 [11.2] 6	67.8 [19.9] 49.2 [14.4] 6	67.1 [19.7] 48 [14.1] 6	64.2 [18.8] 42.6 [12.5] 5.9	61.9 [18.1] 54.3 [15.9] 6.2	61.4 [18] 53 [15.5] 6.1	58.7 [17.2] 47.1 [13.8] 6
	100ºF [37.8ºC]	Total BTUH [kW] Sens BTUH [kW] Power	72.1 [21.1] 43.9 [12.9] 6.5	71.4 [20.9] 42.8 [12.5] 6.4	68.3 [20] 38 [11.1] 6.3	66.3 [19.4] 49 [14.4] 6.4	65.6 [19.2] 47.9 [14] 6.3	62.8 [18.4] 42.5 [12.5] 6.2	60.4 [17.7] 54.2 [15.9] 6.5	59.9 [17.6] 52.9 [15.5] 6.4	57.3 [16.8] 47 [13.8] 6.3
	105ºF [40.6ºC]	Total BTUH [kW] Sens BTUH [kW] Power	70.6 [20.7] 43.7 [12.8] 6.8	69.9 [20.5] 42.7 [12.5] 6.7	66.9 [19.6] 37.9 [11.1] 6.6	64.8 [19] 48.9 [14.3] 6.7	64.1 [18.8] 47.7 [14] 6.6	61.4 [18] 42.4 [12.4] 6.5	58.9 [17.3] 54 [15.8] 6.8	58.4 [17.1] 52.8 [15.5] 6.8	55.8 [16.4] 46.9 [13.7] 6.6
	110ºF [43.3ºC]	Total BTUH [kW] Sens BTUH [kW] Power	69.1 [20.3] 43.6 [12.8] 7.1	68.4 [20] 42.6 [12.5] 7.1	65.4 [19.2] 37.8 [11.1] 6.9	63.2 [18.5] 48.7 [14.3] 7	62.6 [18.3] 47.6 [14] 7	59.9 [17.6] 42.3 [12.4] 6.8	57.4 [16.8] 53.9 [15.8] 7.1	56.9 [16.7] 52.6 [15.4] 7.1	54.4 [15.9] 46.7 [13.7] 6.9
	115ºF [46.1ºC]	Total BTUH [kW] Sens BTUH [kW] Power	67.6 [19.8] 43.4 [12.7] 7.4	66.9 [19.6] 42.4 [12.4] 7.4	64 [18.8] 37.7 [11] 7.2	61.7 [18.1] 48.6 [14.2] 7.3	61.1 [17.9] 47.5 [13.9] 7.3	58.5 [17.1] 42.1 [12.3] 7.1	55.9 [16.4] 53.8 [15.8] 7.4	55.4 [16.2] 52.5 [15.4] 7.4	53 [15.5] 46.6 [13.7] 7.2
	120ºF [48.9ºC]	Total BTUH [kW] Sens BTUH [kW] Power	66 [19.3] 43.3 [12.7] 7.7	65.4 [19.2] 42.3 [12.4] 7.7	62.6 [18.3] 37.6 [11] 7.5	60.2 [17.6] 48.5 [14.2] 7.6	59.6 [17.5] 47.3 [13.9] 7.6	57 [16.7] 42 [12.3] 7.4	54.4 [15.9] 53.6 [15.7] 7.8	53.9 [15.8] 52.4 [15.4] 7.7	51.5 [15.1] 46.5 [13.6] 7.6
	125ºF [51.7ºC]	Total BTUH [kW] Sens BTUH [kW] Power	64.5 [18.9] 43.2 [12.7] 8.1	63.9 [18.7] 42.1 [12.3] 8	61.1 [17.9] 37.4 [11] 7.9	58.7 [17.2] 48.3 [14.2] 8	58.1 [17] 47.2 [13.8] 7.9	55.6 [16.3] 41.9 [12.3] 7.8	52.9 [15.5] 52.9 [15.5] 8.1	52.4 [15.4] 52.2 [15.3] 8	50.1 [14.7] 46.4 [13.6] 7.9

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

Appendix D – Reheat Data for 3 Ton

GROSS SYSTEMS PERFORMANCE DATA (HIGH REHEAT MODE) – (-)GECYB036												
Entering Indoor Air @ 75ºF [23.9ºC] dbE 1												
wbE			65.3°F [18.5°C]			64°F [17.8°C]			62.5°F [16.9°C]			
CFM [L/s]			1350 [637]	1168 [551]	1050 [496]	1350 [637]	1168 [551]	1050 [496]	1350 [637]	1168 [551]	1050 [496]	
Outdoor Dry Bulb Temperature	60ºF [15.6ºC]	Total BTUH [kW]	18.7 [5.5]	18.1 [5.3]	17.8 [5.2]	18.4 [5.4]	17.9 [5.3]	17.6 [5.2]	17.3 [5.1]	16.8 [4.9]	16.5 [4.8]	
		Sens BTUH [kW]	2.8 [0.8]	2.6 [0.8]	2.5 [0.7]	4.7 [1.4]	4.4 [1.3]	4.2 [1.2]	5.9 [1.7]	5.5 [1.6]	5.3 [1.5]	
		Power	2	2	2	2	2	2	2.1	2	2	
	70ºF [21.1ºC]	Total BTUH [kW]	16.9 [5]	16.5 [4.8]	16.2 [4.7]	16.7 [4.9]	16.3 [4.8]	16 [4.7]	15.6 [4.6]	15.2 [4.4]	14.9 [4.4]	
		Sens BTUH [kW]	1.8 [0.5]	1.7 [0.5]	1.6 [0.5]	3.7 [1.1]	3.5 [1]	3.3 [1]	4.9 [1.4]	4.6 [1.3]	4.4 [1.3]	
		Power	2.1	2	2	2.1	2	2	2.1	2.1	2	
	80ºF [26.7ºC]	Total BTUH [kW]	15 [4.4]	14.6 [4.3]	14.3 [4.2]	14.8 [4.3]	14.4 [4.2]	14.1 [4.1]	13.7 [4]	13.3 [3.9]	13 [3.8]	
		Sens BTUH [kW]	0.4 [0.1]	0.4 [0.1]	0.4 [0.1]	2.4 [0.7]	2.2 [0.7]	2.1 [0.6]	3.6 [1.1]	3.3 [1]	3.2 [0.9]	
		Power	2.2	2.1	2.1	2.2	2.1	2.1	2.2	2.2	2.1	
	90ºF [32.2ºC]	Total BTUH [kW]	12.8 [3.8]	12.5 [3.7]	12.3 [3.6]	12.6 [3.7]	12.3 [3.6]	12 [3.5]	11.5 [3.4]	11.2 [3.3]	11 [3.2]	
		Sens BTUH [kW]	–1.2 [–0.4]	–1.2 [–0.3]	–1.1 [–0.3]	0.7 [0.2]	0.7 [0.2]	0.6 [0.2]	1.9 [0.6]	1.8 [0.5]	1.7 [0.5]	
		Power	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	
	100ºF [37.8ºC]	Total BTUH [kW]	10.4 [3.1]	10.1 [3]	10 [2.9]	10.2 [3]	9.9 [2.9]	9.8 [2.9]	9.1 [2.7]	8.8 [2.6]	8.7 [2.5]	
		Sens BTUH [kW]	–3.2 [–0.9]	–3 [–0.9]	–2.9 [–0.8]	–1.3 [–0.4]	–1.2 [–0.4]	–1.1 [–0.3]	–0.1 [0]	–0.1 [0]	–0.1 [0]	
		Power	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
	110ºF [43.3ºC]	Total BTUH [kW]	7.8 [2.3]	7.6 [2.2]	7.4 [2.2]	7.6 [2.2]	7.4 [2.2]	7.2 [2.1]	6.5 [1.9]	6.3 [1.8]	6.2 [1.8]	
		Sens BTUH [kW]	–5.6 [–1.6]	–5.2 [–1.5]	–5 [–1.5]	–3.6 [–1.1]	–3.4 [–1]	–3.2 [–0.9]	–2.4 [–0.7]	–2.3 [–0.7]	–2.1 [–0.6]	
		Power	2.8	2.7	2.7	2.8	2.7	2.7	2.8	2.8	2.7	
	120ºF [48.9ºC]	Total BTUH [kW]	4.9 [1.4]	4.8 [1.4]	4.7 [1.4]	4.7 [1.4]	4.6 [1.3]	4.5 [1.3]	3.6 [1.1]	3.5 [1]	3.4 [1]	
		Sens BTUH [kW]	–8.2 [–2.4]	–7.7 [–2.3]	–7.3 [–2.1]	–6.3 [–1.8]	–5.9 [–1.7]	–5.6 [–1.6]	–5.1 [–1.5]	–4.7 [–1.4]	–4.5 [–1.3]	
		Power	3.1	3.1	3	3.1	3	3	3.1	3.1	3	

P. APPENDICES

Appendix D – Reheat Data for 4 Ton

GROSS SYSTEMS PERFORMANCE DATA (HIGH REHEAT MODE) – (-)GECYB048											
Entering Indoor Air @ 75ºF [23.9ºC] dbE 1											
wbE			65.3°F [18.5°C]			64°F [17.8°C]			62.5°F [16.9°C]		
CFM [L/s]			1800 [850]	1519 [717]	1400 [661]	1800 [850]	1519 [717]	1400 [661]	1800 [850]	1519 [717]	1400 [661]
Outdoor Dry Bulb Temperature	60ºF [15.6ºC]	Total BTUH [kW]	25.5 [7.5]	24.7 [7.2]	24.3 [7.1]	24.3 [7.1]	23.5 [6.9]	23.2 [6.8]	22.6 [6.6]	21.8 [6.4]	21.5 [6.3]
		Sens BTUH [kW]	2.6 [0.8]	2.4 [0.7]	2.3 [0.7]	5.2 [1.5]	4.8 [1.4]	4.6 [1.4]	6.7 [2]	6.1 [1.8]	5.9 [1.7]
		Power	2.5	2.4	2.4	2.5	2.5	2.5	2.4	2.4	2.4
	70ºF [21.1ºC]	Total BTUH [kW]	24.1 [7.1]	23.3 [6.8]	23 [6.7]	22.9 [6.7]	22.2 [6.5]	21.8 [6.4]	21.2 [6.2]	20.5 [6]	20.2 [5.9]
		Sens BTUH [kW]	1.9 [0.6]	1.8 [0.5]	1.7 [0.5]	4.5 [1.3]	4.2 [1.2]	4 [1.2]	6 [1.8]	5.5 [1.6]	5.3 [1.6]
		Power	2.6	2.5	2.5	2.7	2.6	2.6	2.6	2.5	2.5
	80ºF [26.7ºC]	Total BTUH [kW]	22.1 [6.5]	21.4 [6.3]	21.1 [6.2]	20.9 [6.1]	20.2 [5.9]	20 [5.8]	19.2 [5.6]	18.6 [5.4]	18.3 [5.4]
		Sens BTUH [kW]	0.4 [0.1]	0.4 [0.1]	0.4 [0.1]	3 [0.9]	2.8 [0.8]	2.7 [0.8]	4.5 [1.3]	4.1 [1.2]	4 [1.2]
		Power	2.8	2.7	2.7	2.8	2.8	2.8	2.7	2.7	2.7
	90ºF [32.2ºC]	Total BTUH [kW]	19.5 [5.7]	18.9 [5.5]	18.6 [5.5]	18.3 [5.4]	17.7 [5.2]	17.5 [5.1]	16.6 [4.9]	16.1 [4.7]	15.8 [4.6]
		Sens BTUH [kW]	–1.9 [–0.5]	–1.7 [–0.5]	–1.7 [–0.5]	0.7 [0.2]	0.7 [0.2]	0.6 [0.2]	2.2 [0.6]	2 [0.6]	1.9 [0.6]
		Power	3	2.9	2.9	3	3	3	3	2.9	2.9
	100ºF [37.8ºC]	Total BTUH [kW]	16.4 [4.8]	15.8 [4.6]	15.6 [4.6]	15.2 [4.4]	14.7 [4.3]	14.5 [4.2]	13.4 [3.9]	13 [3.8]	12.8 [3.8]
		Sens BTUH [kW]	–5 [–1.5]	–4.6 [–1.4]	–4.4 [–1.3]	–2.4 [–0.7]	–2.2 [–0.7]	–2.1 [–0.6]	–0.9 [–0.3]	–0.9 [–0.3]	–0.8 [–0.2]
		Power	3.3	3.2	3.2	3.3	3.3	3.3	3.2	3.2	3.2
	110ºF [43.3ºC]	Total BTUH [kW]	12.6 [3.7]	12.2 [3.6]	12 [3.5]	11.4 [3.3]	11 [3.2]	10.9 [3.2]	9.7 [2.8]	9.4 [2.7]	9.2 [2.7]
		Sens BTUH [kW]	–9 [–2.6]	–8.3 [–2.4]	–8 [–2.3]	–6.4 [–1.9]	–5.9 [–1.7]	–5.6 [–1.7]	–4.9 [–1.4]	–4.5 [–1.3]	–4.3 [–1.3]
		Power	3.6	3.6	3.5	3.7	3.6	3.6	3.6	3.5	3.5
	120ºF [48.9ºC]	Total BTUH [kW]	8.2 [2.4]	8 [2.3]	7.9 [2.3]	7.1 [2.1]	6.8 [2]	6.7 [2]	5.3 [1.6]	5.2 [1.5]	5.1 [1.5]
		Sens BTUH [kW]	–13.7 [–4]	–12.7 [–3.7]	–12.2 [–3.6]	–11.1 [–3.3]	–10.3 [–3]	–9.9 [–2.9]	–9.7 [–2.8]	–8.9 [–2.6]	–8.6 [–2.5]
		Power	4	4	3.9	4.1	4	4	4	3.9	3.9

Appendix D – Reheat Data for 5 Ton

GROSS SYSTEMS PERFORMANCE DATA (HIGH REHEAT MODE) – (-)GECYB060												
Entering Indoor Air @ 75ºF [23.9ºC] dbE 1												
wbE			65.3°F [18.5°C]			64°F [17.8°C]			62.5°F [16.9°C]			
CFM [L/s]			2250 [1062]	1825 [861]	1750 [826]	2250 [1062]	1825 [861]	1750 [826]	2250 [1062]	1825 [861]	1750 [826]	
Outdoor Dry Bulb Temperature	60ºF [15.6ºC]	Total BTUH [kW]	29.1 [8.5]	27.9 [8.2]	27.7 [8.1]	28.5 [8.3]	27.3 [8]	27.1 [7.9]	26.6 [7.8]	25.5 [7.5]	25.3 [7.4]	
		Sens BTUH [kW]	1.9 [0.5]	1.7 [0.5]	1.7 [0.5]	5.1 [1.5]	4.6 [1.3]	4.5 [1.3]	7.9 [2.3]	7.1 [2.1]	7 [2.1]	
		Power	3.5	3.5	3.5	3.5	3.5	3.4	3.5	3.5	3.5	
	70ºF [21.1ºC]	Total BTUH [kW]	27.5 [8]	26.3 [7.7]	26.2 [7.7]	26.8 [7.9]	25.7 [7.5]	25.5 [7.5]	24.9 [7.3]	23.9 [7]	23.7 [7]	
		Sens BTUH [kW]	0.6 [0.2]	0.6 [0.2]	0.6 [0.2]	3.8 [1.1]	3.4 [1]	3.4 [1]	6.7 [2]	6 [1.8]	5.9 [1.7]	
		Power	3.6	3.6	3.6	3.6	3.6	3.5	3.6	3.6	3.6	
	80ºF [26.7ºC]	Total BTUH [kW]	25.2 [7.4]	24.2 [7.1]	24 [7]	24.5 [7.2]	23.5 [6.9]	23.4 [6.8]	22.6 [6.6]	21.7 [6.4]	21.6 [6.3]	
		Sens BTUH [kW]	–1.2 [–0.4]	–1.1 [–0.3]	–1.1 [–0.3]	2 [0.6]	1.8 [0.5]	1.8 [0.5]	4.8 [1.4]	4.4 [1.3]	4.3 [1.3]	
		Power	3.8	3.8	3.7	3.8	3.7	3.7	3.8	3.8	3.7	
	90ºF [32.2ºC]	Total BTUH [kW]	22.3 [6.5]	21.4 [6.3]	21.2 [6.2]	21.6 [6.3]	20.8 [6.1]	20.6 [6]	19.7 [5.8]	18.9 [5.5]	18.8 [5.5]	
		Sens BTUH [kW]	–3.6 [–1.1]	–3.3 [–1]	–3.2 [–0.9]	–0.4 [–0.1]	–0.4 [–0.1]	–0.4 [–0.1]	2.4 [0.7]	2.2 [0.6]	2.1 [0.6]	
		Power	4.1	4	4	4.1	4	4	4.1	4	4	
	100ºF [37.8ºC]	Total BTUH [kW]	18.7 [5.5]	18 [5.3]	17.8 [5.2]	18.1 [5.3]	17.4 [5.1]	17.2 [5.1]	16.2 [4.7]	15.5 [4.6]	15.4 [4.5]	
		Sens BTUH [kW]	–6.7 [–1.9]	–6 [–1.8]	–5.9 [–1.7]	–3.5 [–1]	–3.1 [–0.9]	–3.1 [–0.9]	–0.6 [–0.2]	–0.6 [–0.2]	–0.5 [–0.2]	
		Power	4.5	4.4	4.4	4.5	4.4	4.4	4.5	4.4	4.4	
	110ºF [43.3ºC]	Total BTUH [kW]	14.6 [4.3]	14 [4.1]	13.9 [4.1]	13.9 [4.1]	13.4 [3.9]	13.3 [3.9]	12 [3.5]	11.6 [3.4]	11.5 [3.4]	
		Sens BTUH [kW]	–10.3 [–3]	–9.3 [–2.7]	–9.1 [–2.7]	–7.1 [–2.1]	–6.4 [–1.9]	–6.2 [–1.8]	–4.2 [–1.2]	–3.8 [–1.1]	–3.7 [–1.1]	
		Power	5	4.9	4.9	5	4.9	4.8	5	4.9	4.9	
	120ºF [48.9ºC]	Total BTUH [kW]	9.8 [2.9]	9.4 [2.8]	9.3 [2.7]	9.2 [2.7]	8.8 [2.6]	8.7 [2.6]	7.3 [2.1]	7 [2]	6.9 [2]	
		Sens BTUH [kW]	–14.5 [–4.2]	–13 [–3.8]	–12.8 [–3.7]	–11.3 [–3.3]	–10.2 [–3]	–10 [–2.9]	–8.4 [–2.5]	–7.6 [–2.2]	–7.4 [–2.2]	
		Power	5.6	5.4	5.4	5.5	5.4	5.4	5.5	5.4	5.4	

P. APPENDICES

Appendix D – Reheat Data for 6 Ton

GROSS SYSTEMS PERFORMANCE DATA (LOW REHEAT MODE) – (-)GECYB072											
Entering Indoor Air @ 75ºF [23.9ºC] dbE 1											
wbE			65.3°F [18.5°C]			64°F [17.8°C]			62.5°F [16.9°C]		
CFM [L/s]			1710 [807]	1523 [719]	1330 [628]	1710 [807]	1523 [719]	1330 [628]	1710 [807]	1523 [719]	1330 [628]
Outdoor Dry Bulb Temperature	60ºF [15.6ºC]	Total BTUH [kW]	35.8 [10.5]	35 [10.3]	34.2 [10]	32.5 [9.5]	31.8 [9.3]	31 [9.1]	31.4 [9.2]	30.7 [9]	30 [8.8]
		Sens BTUH [kW]	12.8 [3.7]	12.1 [3.5]	11.4 [3.3]	12.6 [3.7]	12 [3.5]	11.3 [3.3]	16.2 [4.8]	15.3 [4.5]	14.4 [4.2]
		Power	2.3	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.2
	70ºF [21.1ºC]	Total BTUH [kW]	34.3 [10.1]	33.6 [9.8]	32.8 [9.6]	31 [9.1]	30.3 [8.9]	29.6 [8.7]	30 [8.8]	29.3 [8.6]	28.6 [8.4]
		Sens BTUH [kW]	11.5 [3.4]	10.8 [3.2]	10.2 [3]	11.3 [3.3]	10.7 [3.1]	10.1 [3]	14.9 [4.4]	14.1 [4.1]	13.3 [3.9]
		Power	2.4	2.4	2.4	2.5	2.4	2.4	2.4	2.3	2.3
	80ºF [26.7ºC]	Total BTUH [kW]	32.6 [9.6]	31.9 [9.4]	31.2 [9.1]	29.4 [8.6]	28.7 [8.4]	28.1 [8.2]	28.3 [8.3]	27.7 [8.1]	27 [7.9]
		Sens BTUH [kW]	10 [2.9]	9.4 [2.8]	8.9 [2.6]	9.8 [2.9]	9.3 [2.7]	8.8 [2.6]	13.4 [3.9]	12.7 [3.7]	11.9 [3.5]
		Power	2.6	2.6	2.5	2.6	2.6	2.6	2.5	2.5	2.5
	90ºF [32.2ºC]	Total BTUH [kW]	30.8 [9]	30.1 [8.8]	29.4 [8.6]	27.5 [8.1]	26.9 [7.9]	26.3 [7.7]	26.4 [7.7]	25.8 [7.6]	25.2 [7.4]
		Sens BTUH [kW]	8.3 [2.4]	7.9 [2.3]	7.4 [2.2]	8.2 [2.4]	7.7 [2.3]	7.3 [2.1]	11.8 [3.4]	11.1 [3.3]	10.5 [3.1]
		Power	2.8	2.8	2.7	2.8	2.8	2.8	2.7	2.7	2.7
	100ºF [37.8ºC]	Total BTUH [kW]	28.7 [8.4]	28.1 [8.2]	27.4 [8]	25.4 [7.4]	24.8 [7.3]	24.3 [7.1]	24.3 [7.1]	23.8 [7]	23.3 [6.8]
		Sens BTUH [kW]	6.5 [1.9]	6.1 [1.8]	5.8 [1.7]	6.4 [1.9]	6 [1.8]	5.7 [1.7]	10 [2.9]	9.4 [2.8]	8.9 [2.6]
		Power	3	2.9	2.9	3	3	2.9	2.9	2.9	2.9
	110ºF [43.3ºC]	Total BTUH [kW]	26.4 [7.7]	25.8 [7.6]	25.2 [7.4]	23.1 [6.8]	22.6 [6.6]	22.1 [6.5]	22 [6.5]	21.6 [6.3]	21.1 [6.2]
		Sens BTUH [kW]	4.5 [1.3]	4.3 [1.3]	4 [1.2]	4.4 [1.3]	4.2 [1.2]	3.9 [1.1]	8 [2.3]	7.5 [2.2]	7.1 [2.1]
		Power	3.2	3.1	3.1	3.2	3.2	3.1	3.1	3.1	3.1
	120ºF [48.9ºC]	Total BTUH [kW]	23.9 [7]	23.4 [6.9]	22.8 [6.7]	20.6 [6]	20.2 [5.9]	19.7 [5.8]	19.6 [5.7]	19.1 [5.6]	18.7 [5.5]
		Sens BTUH [kW]	2.4 [0.7]	2.2 [0.7]	2.1 [0.6]	2.2 [0.7]	2.1 [0.6]	2 [0.6]	5.8 [1.7]	5.5 [1.6]	5.2 [1.5]
		Power	3.4	3.3	3.3	3.4	3.4	3.3	3.3	3.3	3.3

GROSS SYSTEMS PERFORMANCE DATA (HIGH REHEAT MODE) – (-)GECYB072											
Entering Indoor Air @ 75ºF [23.9ºC] dbE 1											
wbE			65.3°F [18.5°C]			64°F [17.8°C]			62.5°F [16.9°C]		
CFM [L/s]			2700 [1274]	2404 [1135]	2100 [991]	2700 [1274]	2404 [1135]	2100 [991]	2700 [1274]	2404 [1135]	2100 [991]
Outdoor Dry Bulb Temperature	60ºF [15.6ºC]	Total BTUH [kW]	44.6 [13.1]	43.6 [12.8]	42.6 [12.5]	43 [12.6]	42.1 [12.3]	41.1 [12.1]	39.3 [11.5]	38.4 [11.3]	37.5 [11]
		Sens BTUH [kW]	13.3 [3.9]	12.6 [3.7]	11.8 [3.5]	15.5 [4.5]	14.7 [4.3]	13.8 [4]	20.2 [5.9]	19.1 [5.6]	18 [5.3]
		Power	3.8	3.7	3.7	3.7	3.7	3.6	3.7	3.6	3.6
	70ºF [21.1ºC]	Total BTUH [kW]	42.4 [12.4]	41.5 [12.2]	40.6 [11.9]	40.9 [12]	40 [11.7]	39.1 [11.5]	37.1 [10.9]	36.3 [10.6]	35.5 [10.4]
		Sens BTUH [kW]	11.3 [3.3]	10.7 [3.1]	10.1 [3]	13.6 [4]	12.8 [3.8]	12.1 [3.5]	18.3 [5.4]	17.3 [5.1]	16.3 [4.8]
		Power	3.9	3.9	3.8	3.9	3.8	3.8	3.8	3.8	3.7
	80ºF [26.7ºC]	Total BTUH [kW]	38.9 [11.4]	38.1 [11.2]	37.2 [10.9]	37.4 [11]	36.6 [10.7]	35.7 [10.5]	33.6 [9.9]	32.9 [9.6]	32.1 [9.4]
		Sens BTUH [kW]	8.2 [2.4]	7.8 [2.3]	7.3 [2.1]	10.4 [3.1]	9.9 [2.9]	9.3 [2.7]	15.1 [4.4]	14.3 [4.2]	13.5 [4]
		Power	4.2	4.1	4.1	4.1	4.1	4.1	4.1	4	4
	90ºF [32.2ºC]	Total BTUH [kW]	34.1 [10]	33.3 [9.8]	32.6 [9.5]	32.5 [9.5]	31.8 [9.3]	31.1 [9.1]	28.8 [8.4]	28.1 [8.2]	27.5 [8.1]
		Sens BTUH [kW]	3.9 [1.1]	3.7 [1.1]	3.5 [1]	6.1 [1.8]	5.8 [1.7]	5.5 [1.6]	10.8 [3.2]	10.2 [3]	9.6 [2.8]
		Power	4.5	4.5	4.4	4.5	4.5	4.4	4.4	4.4	4.4
	100ºF [37.8ºC]	Total BTUH [kW]	27.8 [8.2]	27.2 [8]	26.6 [7.8]	26.3 [7.7]	25.7 [7.5]	25.1 [7.4]	22.5 [6.6]	22 [6.5]	21.5 [6.3]
		Sens BTUH [kW]	-1.6 [-0.5]	-1.5 [-0.4]	-1.4 [-0.4]	0.6 [0.2]	0.6 [0.2]	0.6 [0.2]	5.3 [1.6]	5 [1.5]	4.7 [1.4]
		Power	5	4.9	4.9	5	4.9	4.9	4.9	4.9	4.8
	110ºF [43.3ºC]	Total BTUH [kW]	20.2 [5.9]	19.8 [5.8]	19.3 [5.7]	18.7 [5.5]	18.3 [5.4]	17.9 [5.2]	14.9 [4.4]	14.6 [4.3]	14.2 [4.2]
		Sens BTUH [kW]	-8.3 [-2.4]	-7.8 [-2.3]	-7.4 [-2.2]	-6.1 [-1.8]	-5.7 [-1.7]	-5.4 [-1.6]	-1.4 [-0.4]	-1.3 [-0.4]	-1.2 [-0.4]
		Power	5.6	5.5	5.4	5.5	5.5	5.4	5.5	5.4	5.3
	120ºF [48.9ºC]	Total BTUH [kW]	11.2 [3.3]	11 [3.2]	10.7 [3.1]	9.7 [2.8]	9.5 [2.8]	9.3 [2.7]	5.9 [1.7]	5.8 [1.7]	5.7 [1.7]
		Sens BTUH [kW]	-16.2 [-4.7]	-15.3 [-4.5]	-14.4 [-4.2]	-14 [-4.1]	-13.2 [-3.9]	-12.4 [-3.6]	-9.3 [-2.7]	-8.8 [-2.6]	-8.2 [-2.4]
		Power	6.2	6.1	6.1	6.2	6.1	6	6.1	6	6

Appendix E – Heating Performance

Models: (–)GEC **Gas Heat Performance Specifications**

208–230V & 575V								
Tonnage	**3–Ton**		**4–Ton**		**5–Ton**		**6–Ton**	
Heating Input BTU [kW] (High–Fire / Low–Fire)	75,000/52,500	100,000/70,000	75,000/52,500	120,000/84,000	75,000/52,500	120,000/84,000	75,000/52,500	120,000/84,000
	[21.98/115.39]	[29.31/20.52]	[21.98/115.39]	[35.17/24.62]	[21.98/115.39]	[35.17/24.62]	[21.98/115.39]	[35.17/24.62]
Heating Output BTU [kW] (High–Fire / Low–Fire)	60,750/42,525	81,000/56,700	60,750/42,525	97,200/68,040	60,750/42,525	97,200/68,040	60,750/42,525	97,200/68,040
	[17.80/12.46]	[23.74/16.62]	[17.80/12.46]	[28.49/19.94]	[17.80/12.46]	[28.49/19.94]	[17.80/12.46]	[28.49/19.94]
High–Fire Rise Range °F [°C]	25–55	35–65	25–55	40–70	25–55	35–65	25-55	35-65
	[13.9–30.6]	[19.4–36.1]	[13.9–30.6]	[22.2–38.9]	[13.9–30.6]	[22.2–38.9]	[13.9-30.6]	[22.2-38.9]
Low–Fire Rise Range °F [°C]	20–50	25–55	20–50	30–60	20–50	25–55	20-50	30-60
	[11.1–27.8]	[13.9–30.6]	[11.1–27.8]	[16–33]	[11.1–27.8]	[13.9–30.6]	[11.1-27.8]	[16.7-33.3]
Main Limit Temp °F	145	125	145	125	145	125	145	125
Rollout Temp. °F	250	250	250	250	250	250	250	250
Rating ESP In. W.C.	0.33	0.28	0.33	0.28	0.33	0.28	0.33	0.28
Maximum ESP In. W.C.	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Max Outlet Air Temp °F [°C]	180 [82.2]	190 [87.8]	180 [82.2]	180 [82.2]	180 [82.2]	180 [82.2]	180 [82.2]	180 [82.2]
% AFUE	81.0	81.0	81.0	81.0	81.0	81.0	81.0	81.0
% Steady State Efficiency	81.0	81.0	81.0	81.0	81.0	81.0	81.0	81.0

P. APPENDICES

Appendix E – Heating Performance

Models: (–)GEC **Gas Heat Performance Specifications**

460V										
Tonnage	**3–Ton**		**4–Ton**		**5–Ton**		**6-Ton**			
Heating Input BTU [kW] (High–Fire / Low–Fire)	75,000/52,500	100,000/70,000	75,000/52,500	120,000/84,000	75,000/52,500	120,000/84,000	75,000/52,500	120,000/84,000		
	[21.98/115.39]	[29.31/20.52]	[21.98/115.39]	[35.17/24.62]	[21.98/115.39]	[35.17/24.62]	[21.98/115.39]	[35.17/24.62]		
Heating Output BTU [kW] (High–Fire / Low–Fire)	60,750/42,525	81,000/56,700	60,750/42,525	97,200/68,040	60,750/42,525	97,200/68,040	60,750/42,525	97,200/68,040		
	[17.80/12.46]	[23.74/16.62]	[17.80/12.46]	[28.49/19.94]	[17.80/12.46]	[28.49/19.94]	[17.80/12.46]	[28.49/19.94]		
High–Fire Rise Range °F [°C]	30–60	35–65	30–60	40–70	30–60	35–65	30–60	35-65		
	[16.7–33.3]	[19.4–36.1]	[16.7–33.3]	[22.2–38.9]	[16.7–33.3]	[19.4–36.1]	[16.7–33.3]	[19.4-36.1]		
Low–Fire Rise Range °F [°C]	25–55	30–60	20–50	35–65	20–50	30–60	20-50	30-60		
	[13.9–30.6]	[16.7–33.3]	[11.1–27.8]	[19.4–36.1]	[11.1–27.8]	[16.7–33.3]	[11.1-27.8]	[16.7-33.3]		
Main Limit Temp °F	145	125	145	125	145	125	145	125		
Rollout Temp. °F	250	250	250	250	250	250	250	250		
Rating ESP In. W.C.	0.33	0.28	0.33	0.28	0.33	0.28	0.33	0.28		
Maximum ESP In. W.C.	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80		
Max Outlet Air Temp °F [°C]	180 [82.2]	190 [87.8]	180 [82.2]	180 [82.2]	180 [82.2]	180 [82.2]	180 [82.2]	180 [82.2]		
% Steady State Efficiency	81.0	81.0	81.0	81.0	81.0	81.0				

Gas Valve Connection Pipe Size: **0.50 in.[12.7 mm]**

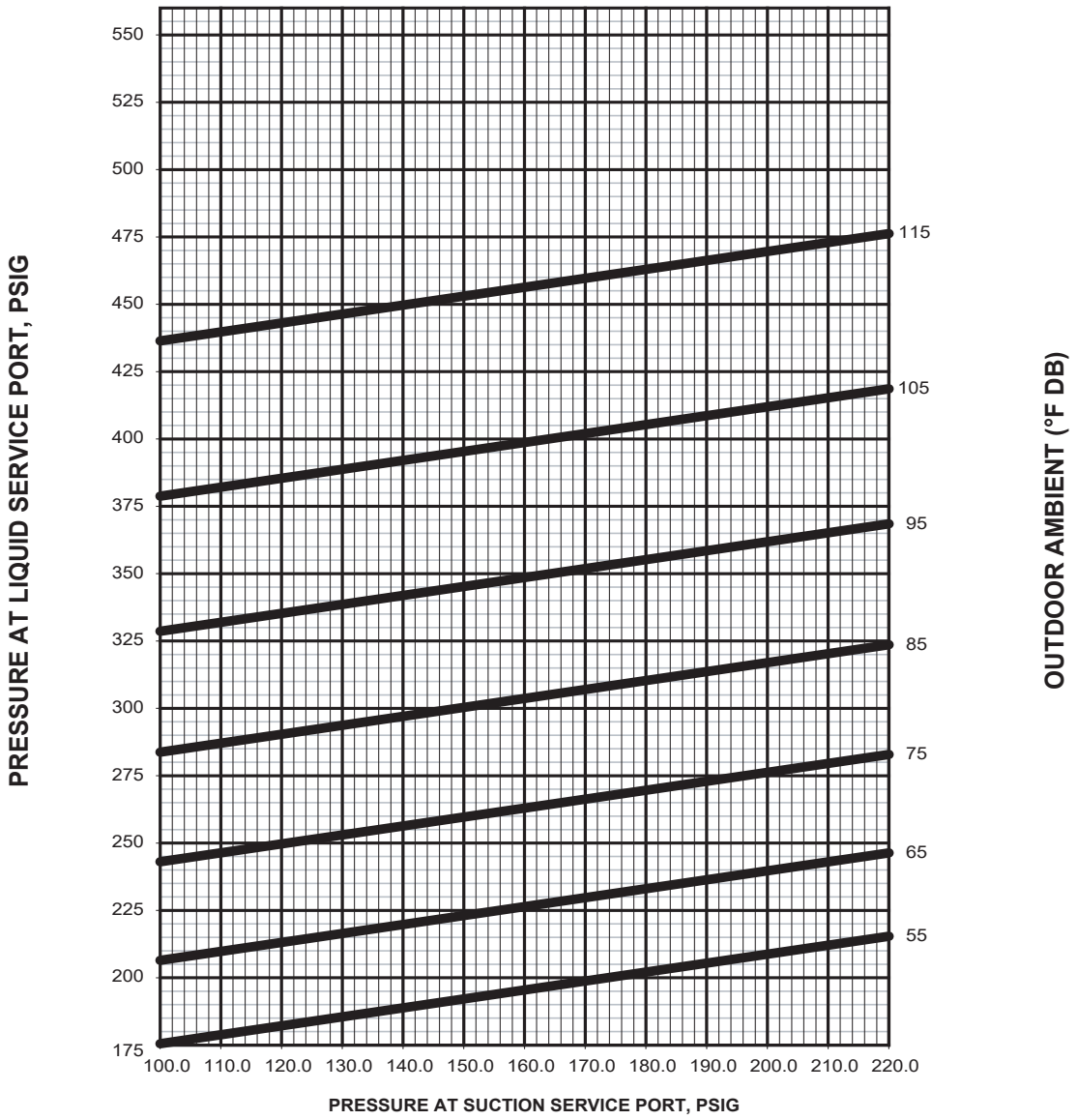
Appendix F. A2L Refrigerant Installation Safety Data

		(-)GECYB036	(-)GECYB036 w/ Reheat	(-)GECYB048	(-)GECYB048 w/ Reheat	(-)GECYB060	(-)GECYB060 w/ Reheat	(-)GECYB072	(-)GECYB072 w/ Reheat
Refrigerant Charge Weight (oz)		72	101	67	110	80	105	85	123
Minimum Circulation Airflow, Qmin (cfm)		122	171	113	186	135	178	144	208
Installed Altitude (ft above sea level)	Altitude Adjustment Factor	Minimum Total Conditioned Room Area, TAmin (sq ft)							
0	1.000	67	95	63	103	75	98	80	115
1000	1.025	69	97	64	106	77	101	82	118
2000	1.051	71	99	66	108	79	103	84	121
3000	1.078	73	102	68	111	81	106	86	124
4000	1.107	75	105	70	114	83	109	88	128
5000	1.138	77	108	71	117	85	112	91	131
6000	1.170	79	111	73	121	88	115	93	135
6500	1.187	80	112	75	122	89	117	95	137

P. APPENDICES

Appendix G – Refrigerant Charging Charts

COOLING CHARGE CHART - REFRIGERANT 454B
3 TON



CAUTION: RETURN AIR TEMPERATURE MUST BE WITHIN COMFORT CONDITIONS BEFORE FINAL REFRIGERANT CHECK!
DESIGN SUBCOOLING (AT SERVICE PORT) @ 95°F OUTDOOR = 12.5°F

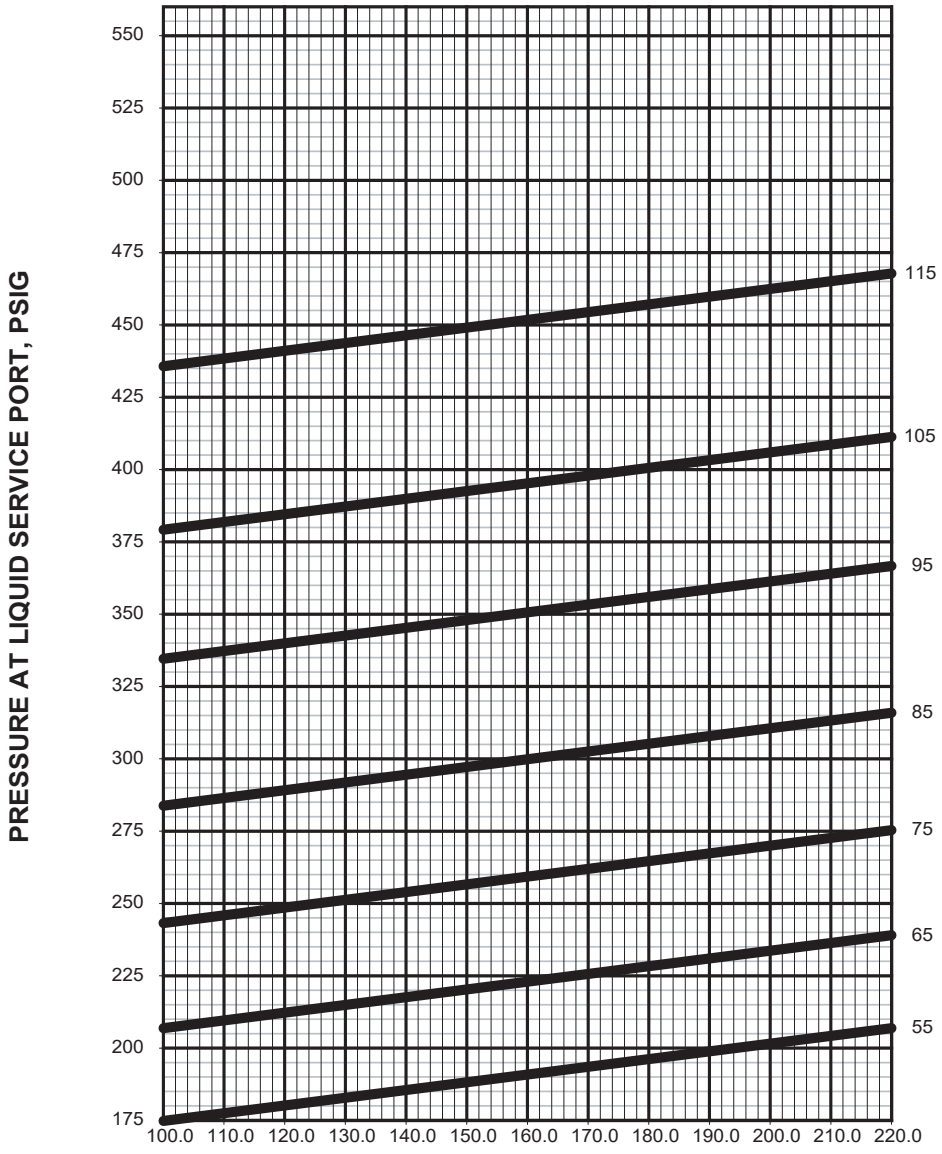
NOTE: FACTORY CHARGE CHART AND/OR DESIGN TARGET SUBCOOLING ARE FOR GROSS CHARGE VERIFICATION. ANY ADJUSTMENT SHALL NOT EXCEED 2% OF THE TOTAL REFRIGERANT WEIGHT LISTED ON THE RATING PLATE OF THE UNIT AND SHOULD NOT SUPERSEDE CORRECTLY WEIGHED-IN REFRIGERANT.

REFER TO THE REFRIGERANT CHARGE VERIFICATION AND ADJUSTMENT SECTION IN THE I&O MANUAL FOR INSTRUCTIONS ON USING THIS CHARGE CHART.

92-106696-16-01

Appendix G – Refrigerant Charging Charts (Cont.)

COOLING CHARGE CHART - REFRIGERANT 454B
4 TON



CAUTION: RETURN AIR TEMPERATURE MUST BE WITHIN COMFORT CONDITIONS BEFORE FINAL REFRIGERANT CHECK! DESIGN SUBCOOLING (AT SERVICE PORT) @ 95°F OUTDOOR = 9.5°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.

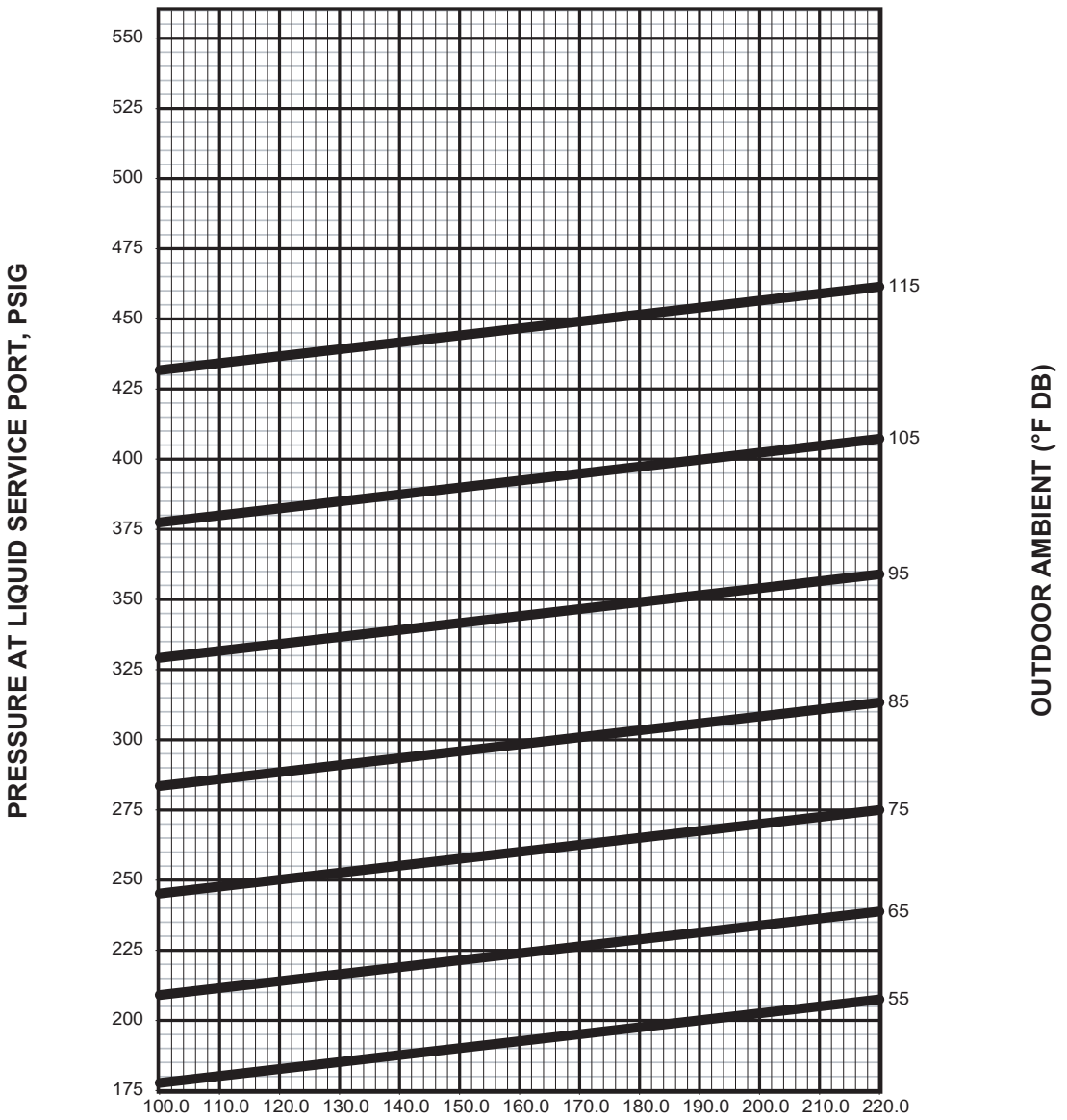
REFER TO THE REFRIGERANT CHARGE VERIFICATION AND ADJUSTMENT SECTION IN THE I&O MANUAL FOR INSTRUCTIONS ON USING THIS CHARGE CHART.

92-106696-17-01

P. APPENDICES

Appendix G – Refrigerant Charging Charts (Cont.)

COOLING CHARGE CHART - REFRIGERANT 454B
3 TON



CAUTION: RETURN AIR TEMPERATURE MUST BE WITHIN COMFORT CONDITIONS BEFORE FINAL REFRIGERANT CHECK!
DESIGN SUBCOOLING (AT SERVICE PORT) @ 95°F OUTDOOR = 12.3°F

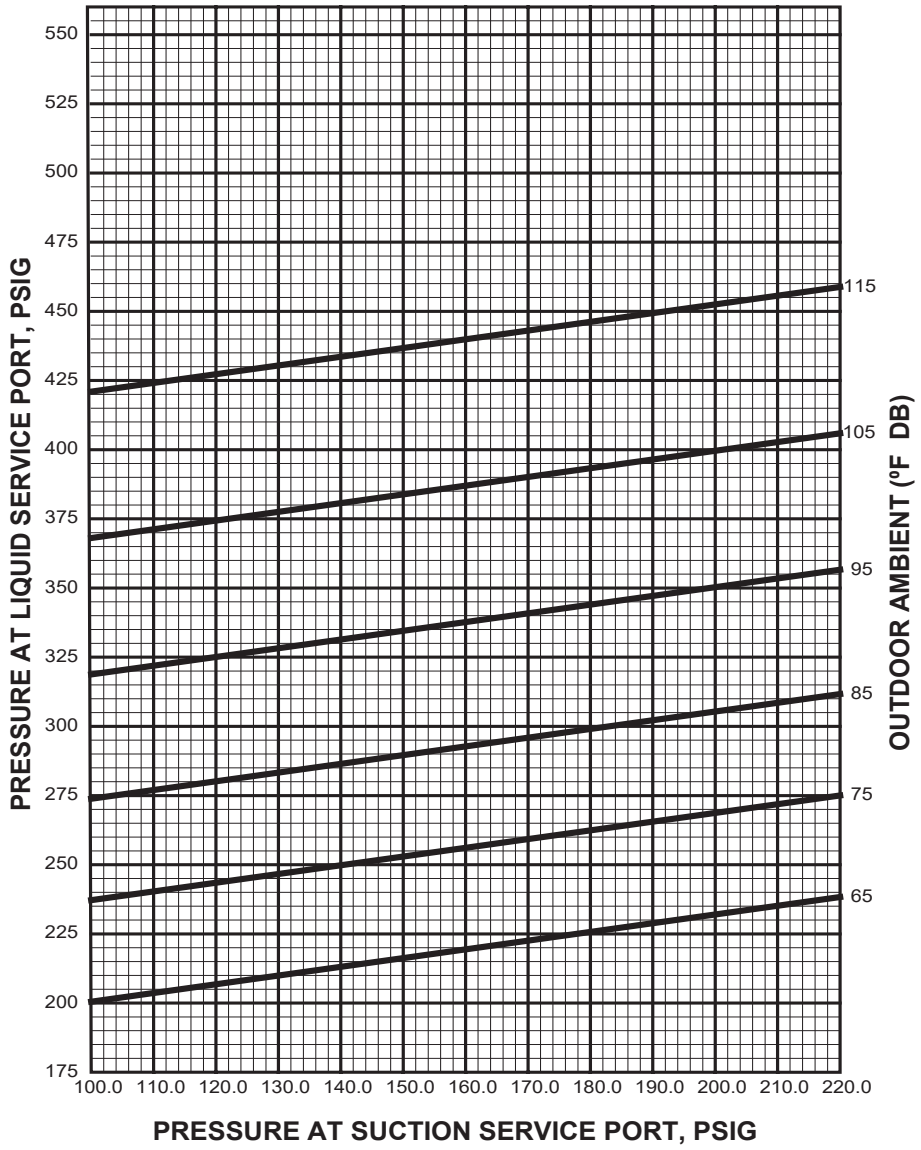
NOTE: FACTORY CHARGE CHART AND/OR DESIGN TARGET SUBCOOLING ARE FOR GROSS CHARGE VERIFICATION. ANY ADJUSTMENT SHALL NOT EXCEED 2% OF THE TOTAL REFRIGERANT WEIGHT LISTED ON THE RATING PLATE OF THE UNIT AND SHOULD NOT SUPERSEDE CORRECTLY WEIGHED-IN REFRIGERANT.

REFER TO THE REFRIGERANT CHARGE VERIFICATION AND ADJUSTMENT SECTION IN THE I&O MANUAL FOR INSTRUCTIONS ON USING THIS CHARGE CHART.

92-106696-18-01

Appendix G – Refrigerant Charging Charts (Cont.)

COOLING CHARGE CHART - REFRIGERANT 454B
4 TON



CAUTION: RETURN AIR TEMPERATURE MUST BE WITHIN COMFORT CONDITIONS BEFORE FINAL REFRIGERANT CHECK! DESIGN SUBCOOLING (AT SERVICE PORT) @ 95°F OUTDOOR = 8°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.

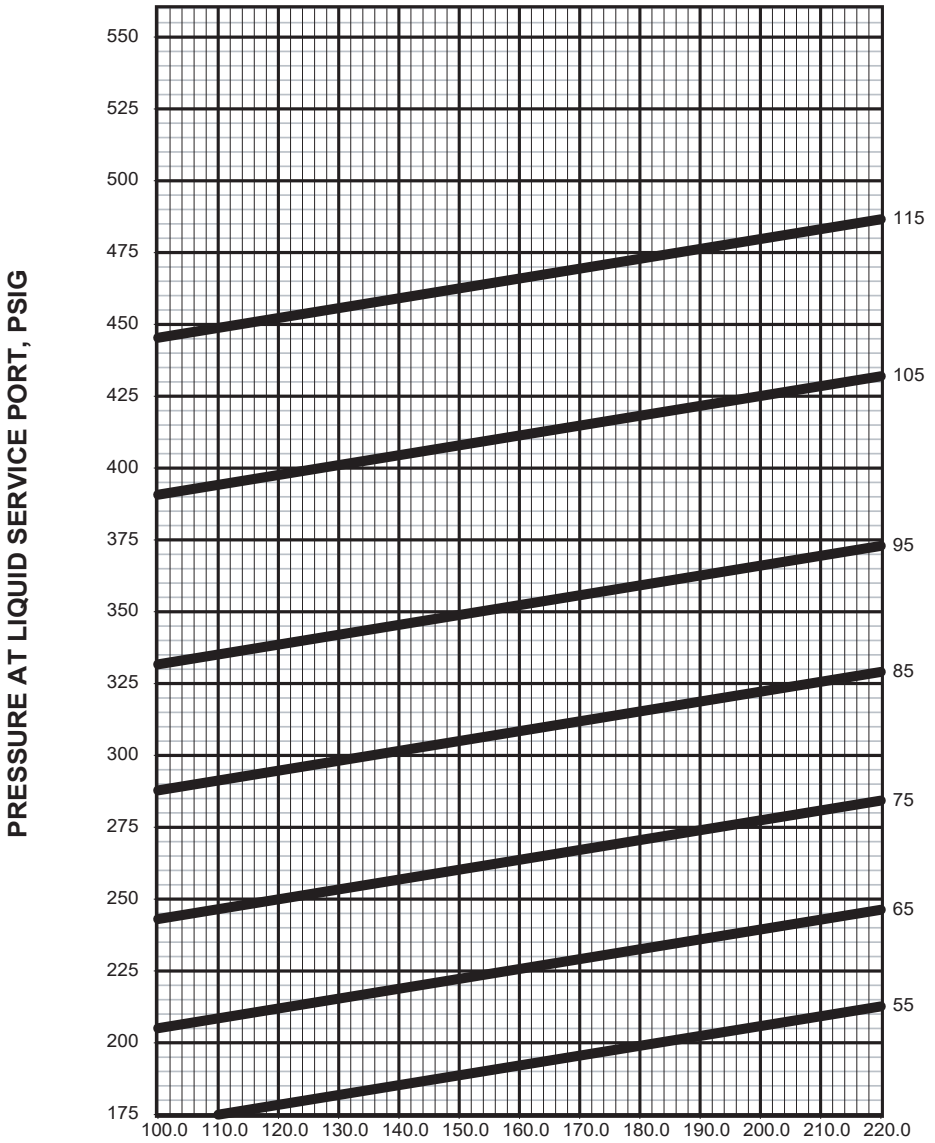
REFER TO THE REFRIGERANT CHARGE VERIFICATION AND ADJUSTMENT SECTION IN THE I&O MANUAL FOR INSTRUCTIONS ON USING THIS CHARGE CHART.

92-106696-19-01

P. APPENDICES

Appendix G – Refrigerant Charging Charts (Cont.)

COOLING CHARGE CHART - REFRIGERANT 454B
5 TON



CAUTION: RETURN AIR TEMPERATURE MUST BE WITHIN COMFORT CONDITIONS BEFORE FINAL REFRIGERANT CHECK!
DESIGN SUBCOOLING (AT SERVICE PORT) @ 95°F OUTDOOR = 10.2°F

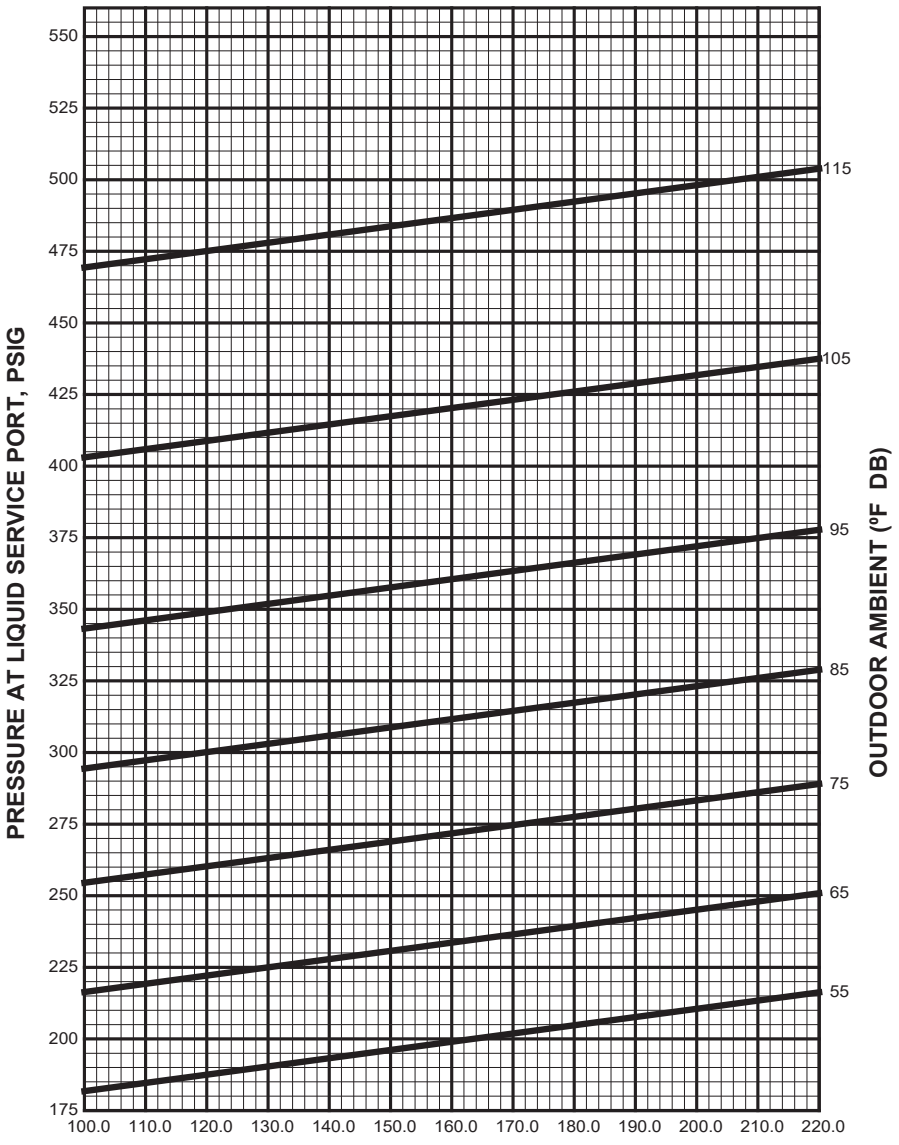
NOTE: FACTORY CHARGE CHART AND/OR DESIGN TARGET SUBCOOLING ARE FOR GROSS CHARGE VERIFICATION. ANY ADJUSTMENT SHALL NOT EXCEED 2% OF THE TOTAL REFRIGERANT WEIGHT LISTED ON THE RATING PLATE OF THE UNIT AND SHOULD NOT SUPERSEDE CORRECTLY WEIGHED-IN REFRIGERANT.

REFER TO THE REFRIGERANT CHARGE VERIFICATION AND ADJUSTMENT SECTION IN THE I&O MANUAL FOR INSTRUCTIONS ON USING THIS CHARGE CHART.

92-106696-20-01

Appendix G – Refrigerant Charging Charts (Cont.)

COOLING CHARGE CHART - REFRIGERANT 454B
5 TON



CAUTION: RETURN AIR TEMPERATURE MUST BE WITHIN COMFORT CONDITIONS BEFORE FINAL REFRIGERANT CHECK! DESIGN SUBCOOLING (AT SERVICE PORT) @ 95°F OUTDOOR = 11.7°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.

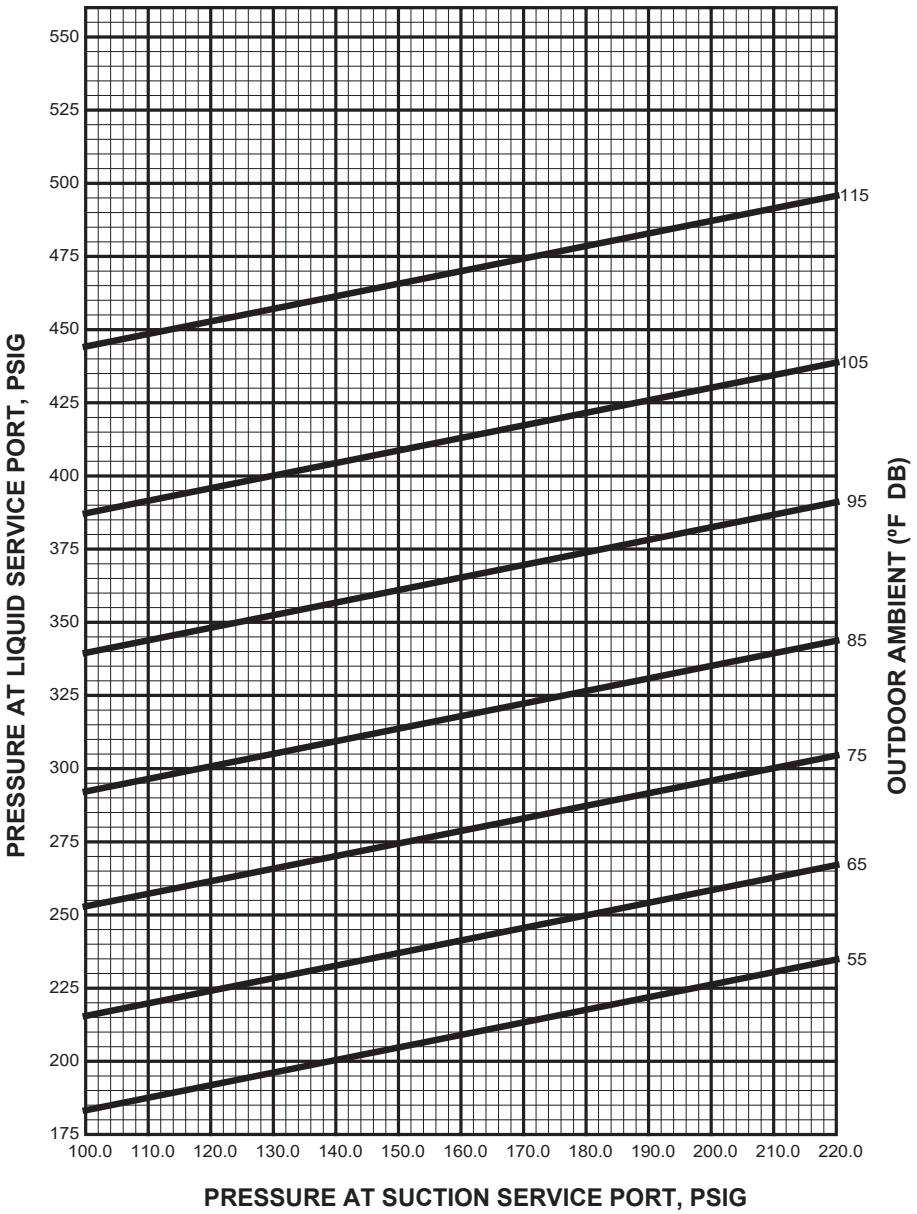
REFER TO THE REFRIGERANT CHARGE VERIFICATION AND ADJUSTMENT SECTION IN THE I&O MANUAL FOR INSTRUCTIONS ON USING THIS CHARGE CHART.

92-106696-21-01

P. APPENDICES

Appendix G – Refrigerant Charging Charts (Cont.)

COOLING CHARGE CHART - REFRIGERANT 454B
6 TON



CAUTION: RETURN AIR TEMPERATURE MUST BE WITHIN COMFORT CONDITIONS BEFORE FINAL REFRIGERANT CHECK! DESIGN SUBCOOLING (AT SERVICE PORT) @ 95°F OUTDOOR = 11 °F.

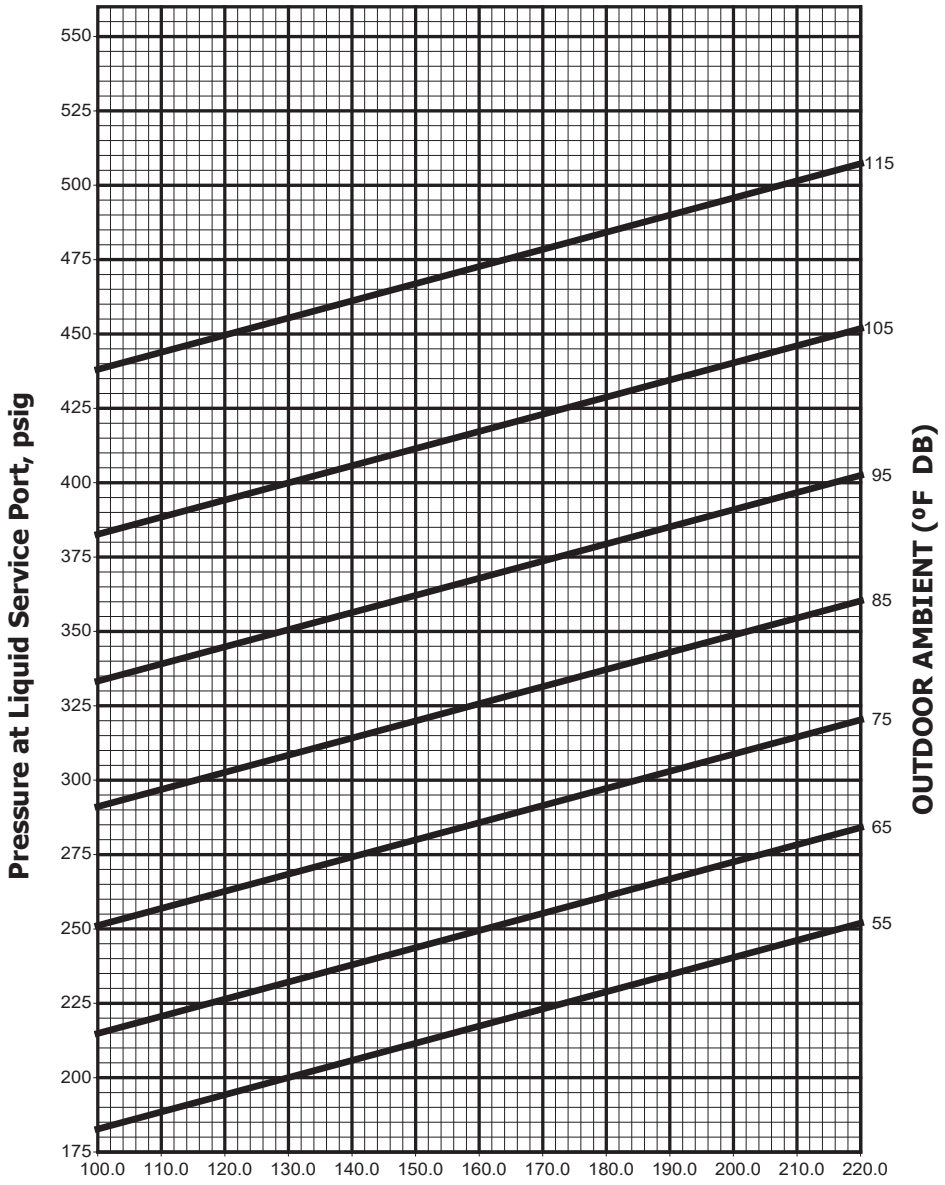
NOTE: FACTORY CHARGE CHART AND/OR DESIGN TARGET SUBCOOLING ARE FOR GROSS CHARGE VERIFICATION. ANY ADJUSTMENT SHALL NOT EXCEED 2% OF THE TOTAL REFRIGERANT WEIGHT LISTED ON THE RATING PLATE OF THE UNIT AND SHOULD NOT SUPERSEDE CORRECTLY WEIGHED-IN REFRIGERANT.

REFER TO THE REFRIGERANT CHARGE VERIFICATION AND ADJUSTMENT SECTION IN THE I&O MANUAL FOR INSTRUCTIONS ON USING THIS CHARGE CHART.

92-106696-24-01

Appendix G – Refrigerant Charging Charts (Cont.)

COOLING CHARGE CHART - REFRIGERANT 454B
6 TON



CAUTION: RETURN AIR TEMPERATURE MUST BE WITHIN COMFORT CONDITIONS BEFORE FINAL REFRIGERANT CHECK!
DESIGN SUBCOOLING (AT SERVICE PORT) @ 95°F OUTDOOR = 15.8°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.

92-106696-25-01

P. APPENDICES

Appendix G – Refrigerant Charging Charts (Cont.)

SYSTEM CHARGE CHART – REFRIGERANT R-454B

(-)GECYB
SUB COOLING REQUIREMENTS – FINAL CHARGE VERIFICATION

OUTDOOR DRY BULB (°F)	3 –TON	4 –TON	5 –TON	6 –TON
	SUBCOOLING (°F)			
115	13	13	14	15
105	13	12	12	12
95	12	9	9	11
85	12	7	9	7
75	12	5	6	5
65	12	5	3	3
55	12	4	2	3

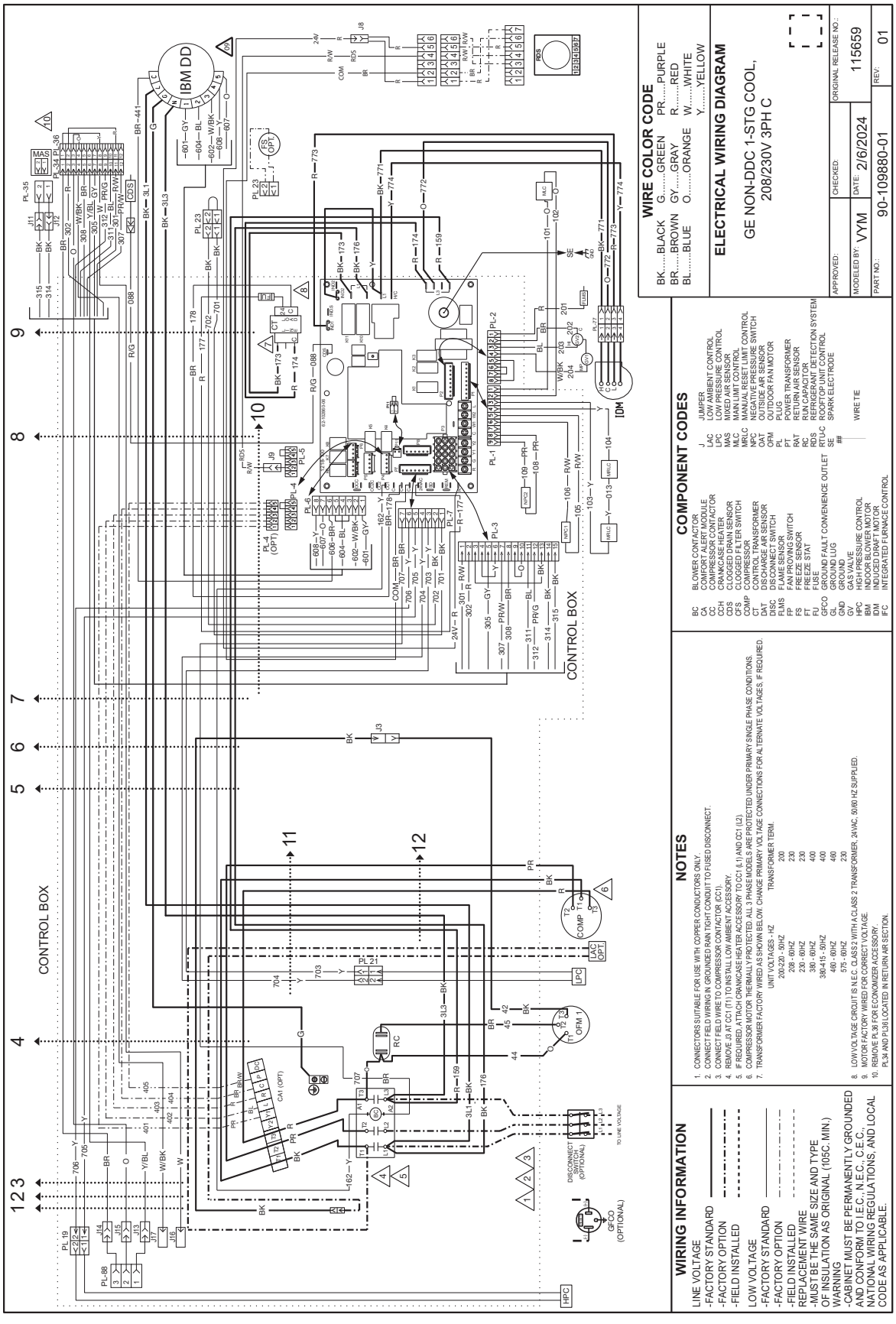
(-)GECYB WITH REHEAT
SUB COOLING REQUIREMENTS – FINAL CHARGE VERIFICATION

OUTDOOR DRY BULB (°F)	3 –TON	4 –TON	5 –TON	6 –TON
	SUBCOOLING (°F)			
115	14	13	18	20
105	13	10	15	18
95	13	8	12	16
85	12	5	10	15
75	11	4	9	14
65	10	3	8	12
55	9	3	5	10

Charge verification instructions:

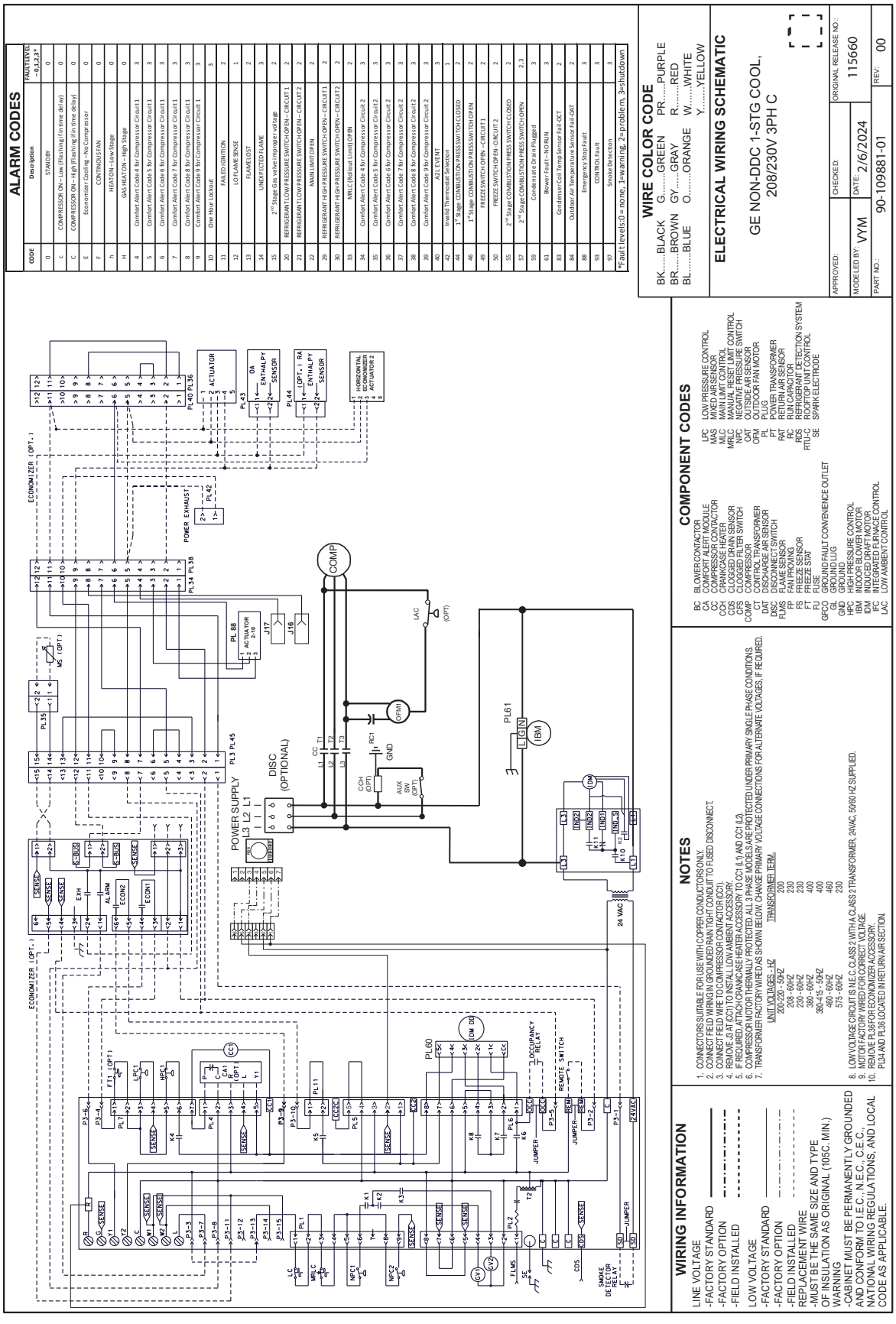
1. Allow the unit to operate for 15 minutes before checking or adjusting the charge.
2. Ensure that the contamination of different refrigerants does not occur when using charging equipment. Hoses of lines shall be as short as possible to minimize the amount of refrigerant contained in them.
3. Ensure 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 shall 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.
2. If the subcooling value from Step 9 is more than 1°F below the value listed in the subcooling table, add charge to match the value listed in the table, ± 0.5°F.
    a. Take extreme care not to overfill the refrigerating system.

Appendix H – Wiring Diagrams & Schematics

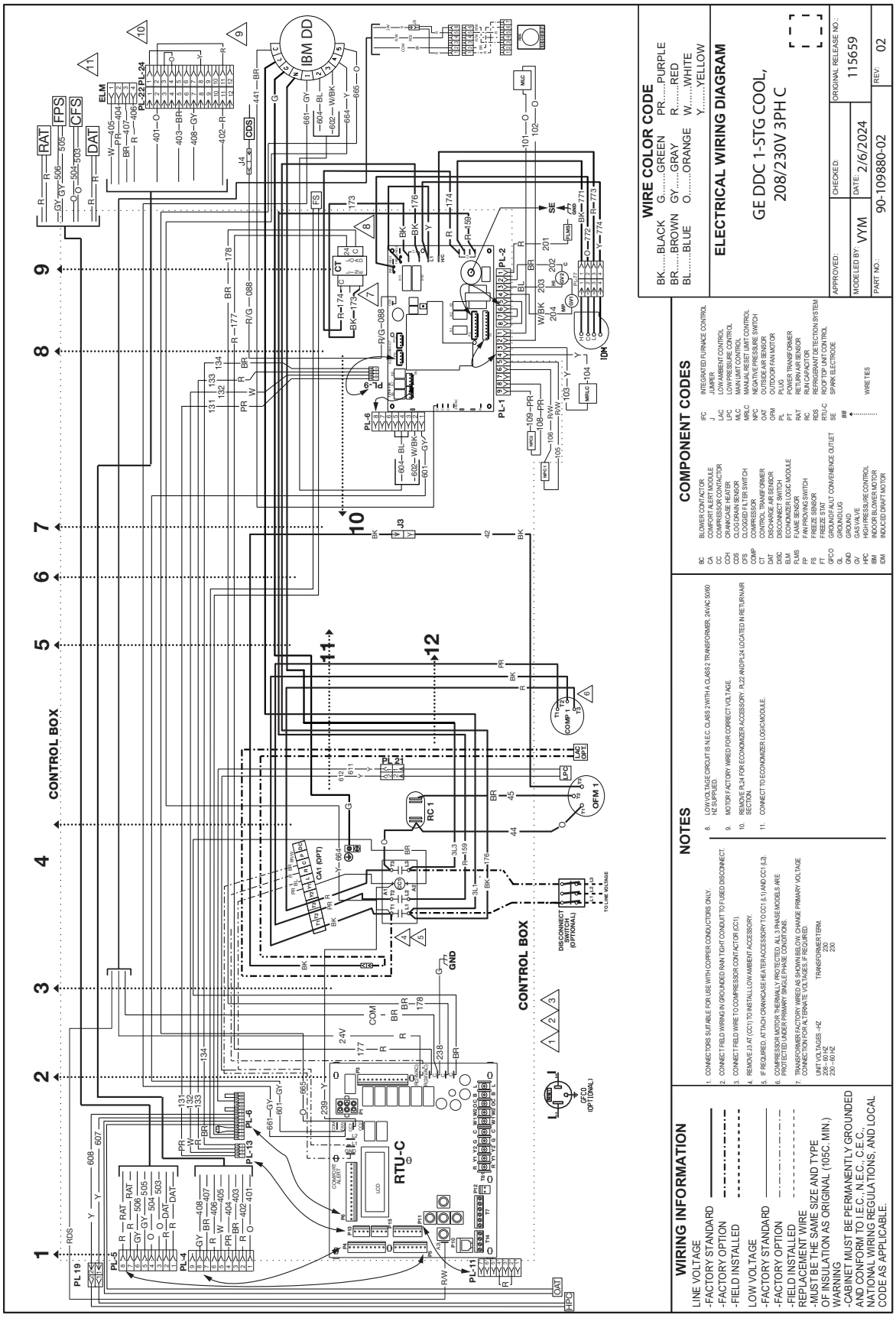


P. APPENDICES

Appendix H – Wiring Diagrams & Schematics (Cont.)

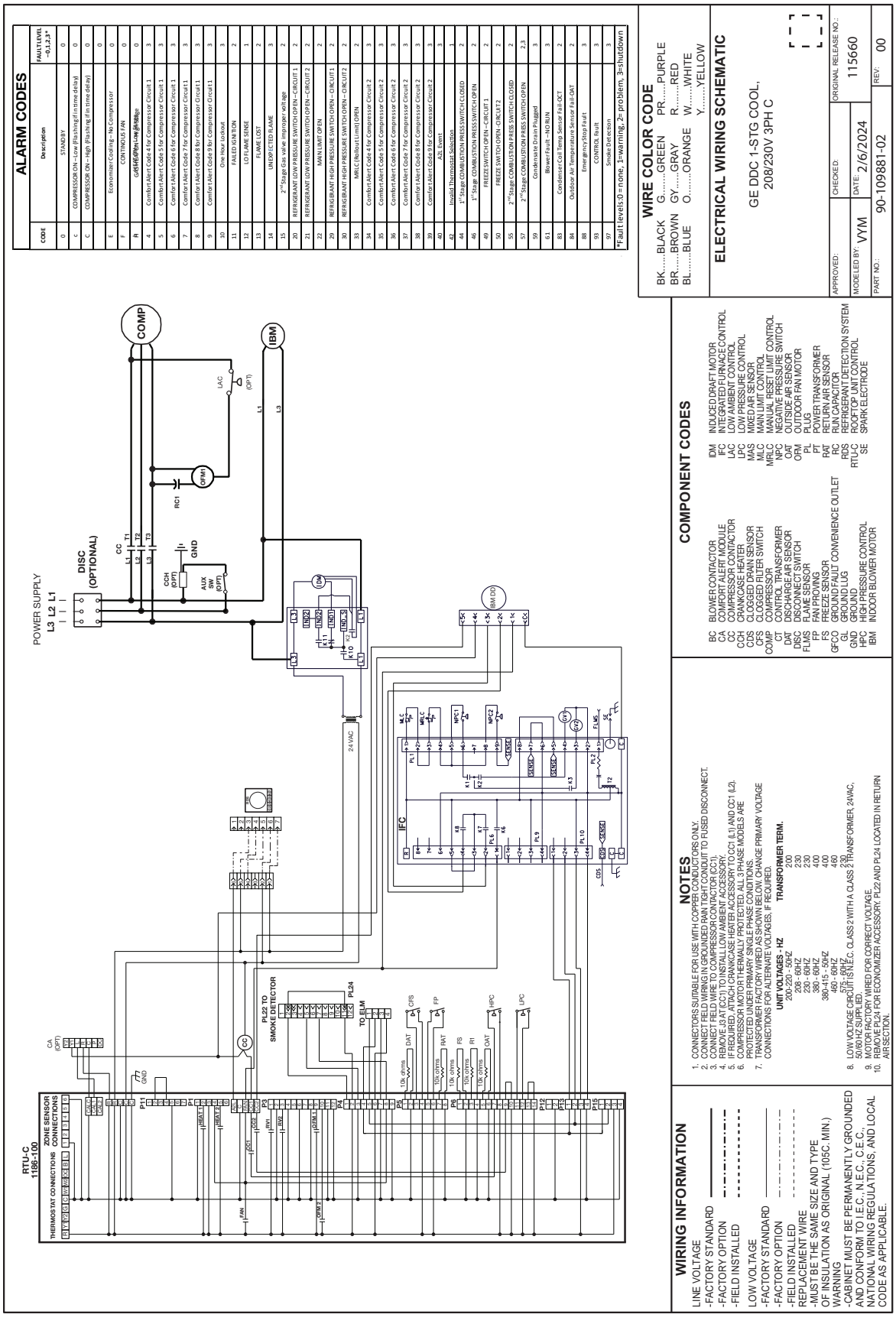


Appendix H – Wiring Diagrams & Schematics (Cont.)

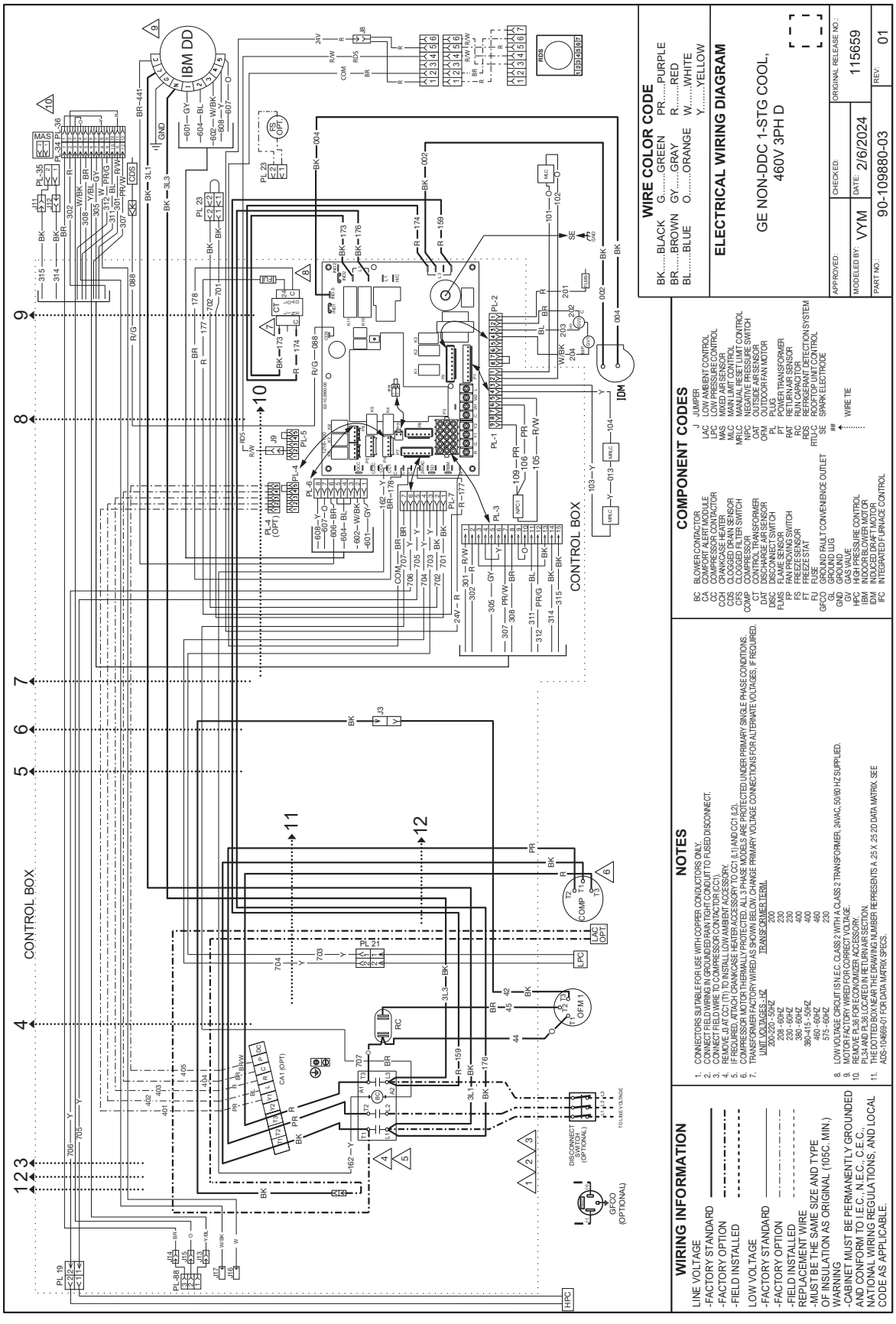


P. APPENDICES

Appendix H – Wiring Diagrams & Schematics (Cont.)

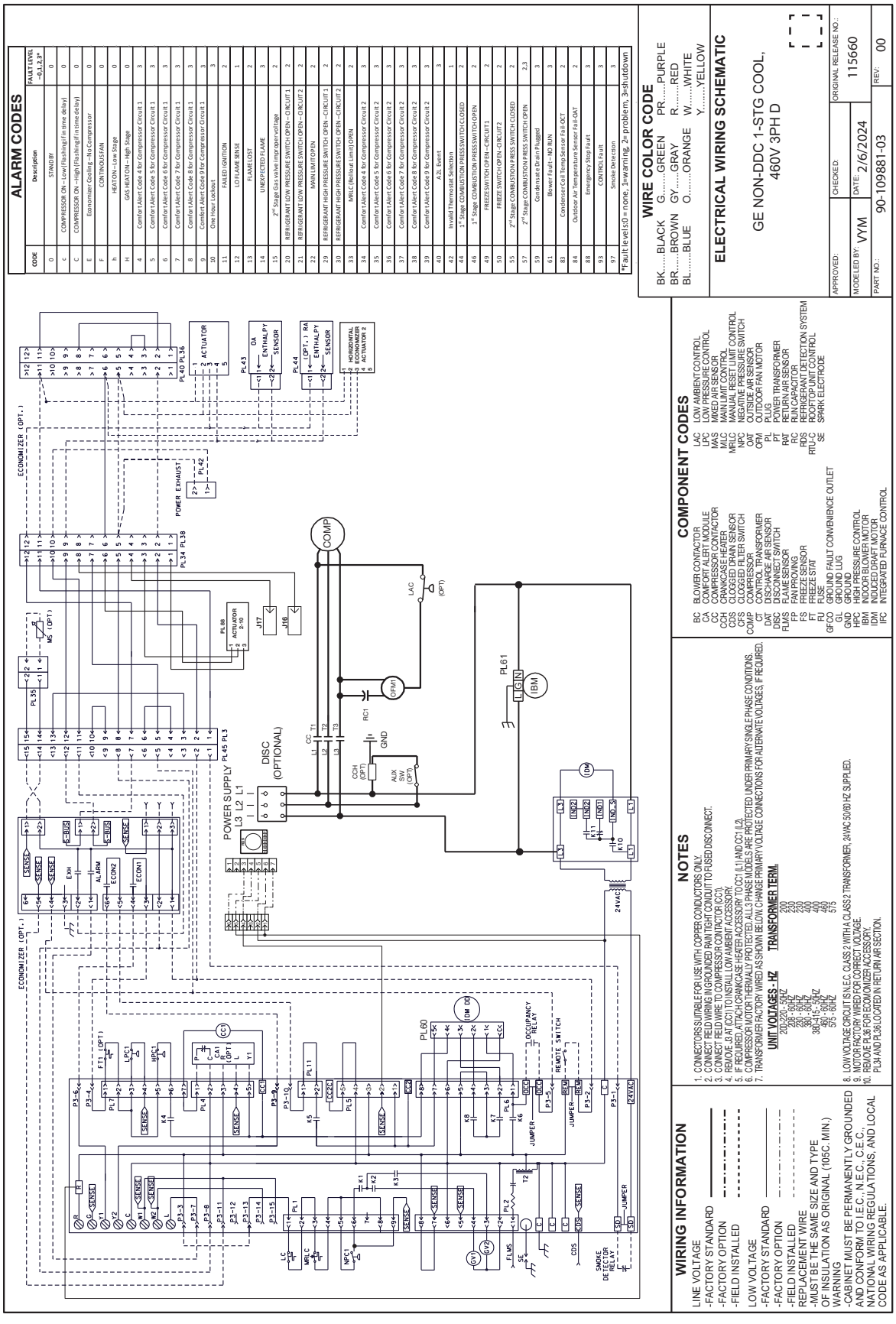


Appendix H – Wiring Diagrams & Schematics (Cont.)

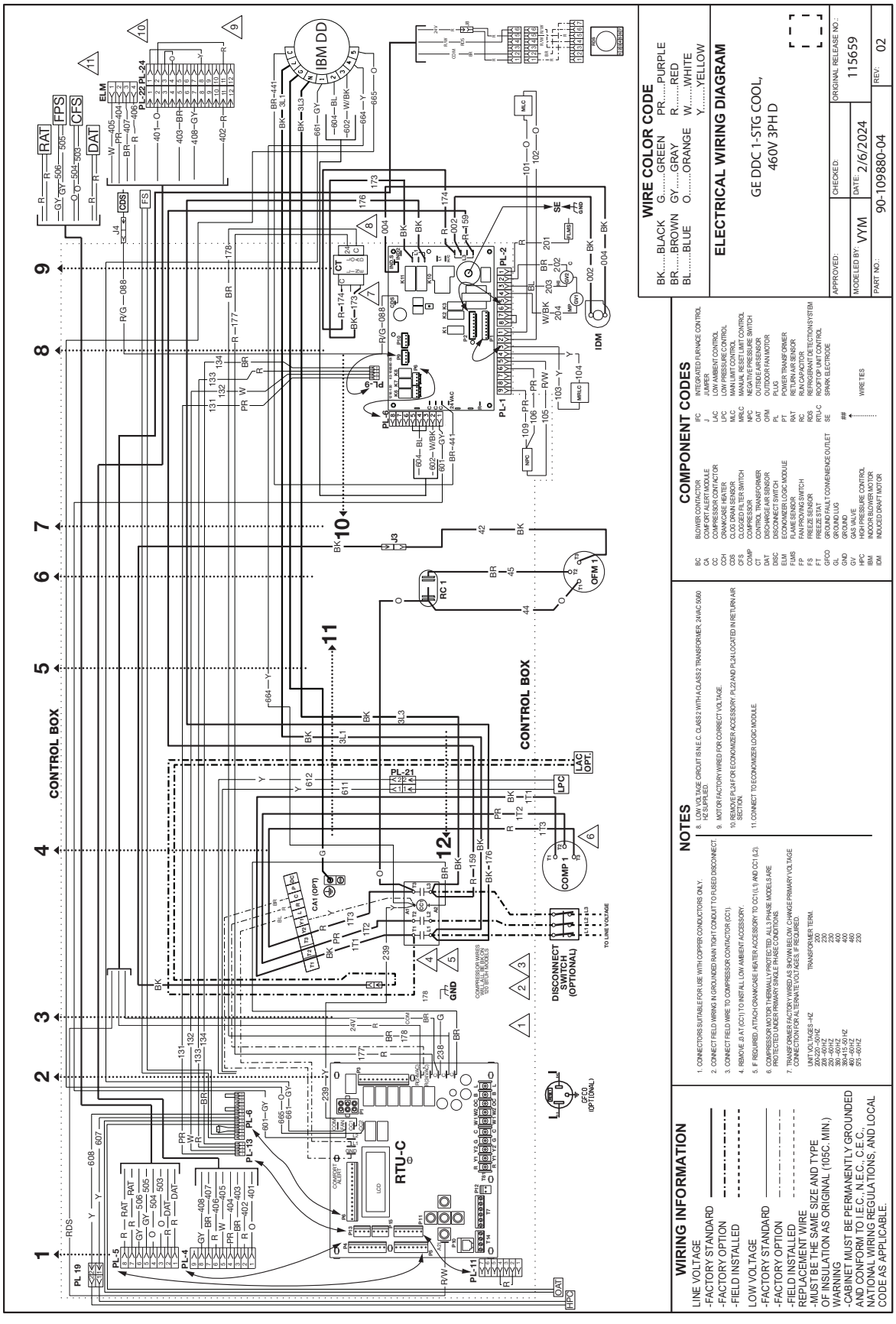


P. APPENDICES

Appendix H – Wiring Diagrams & Schematics (Cont.)

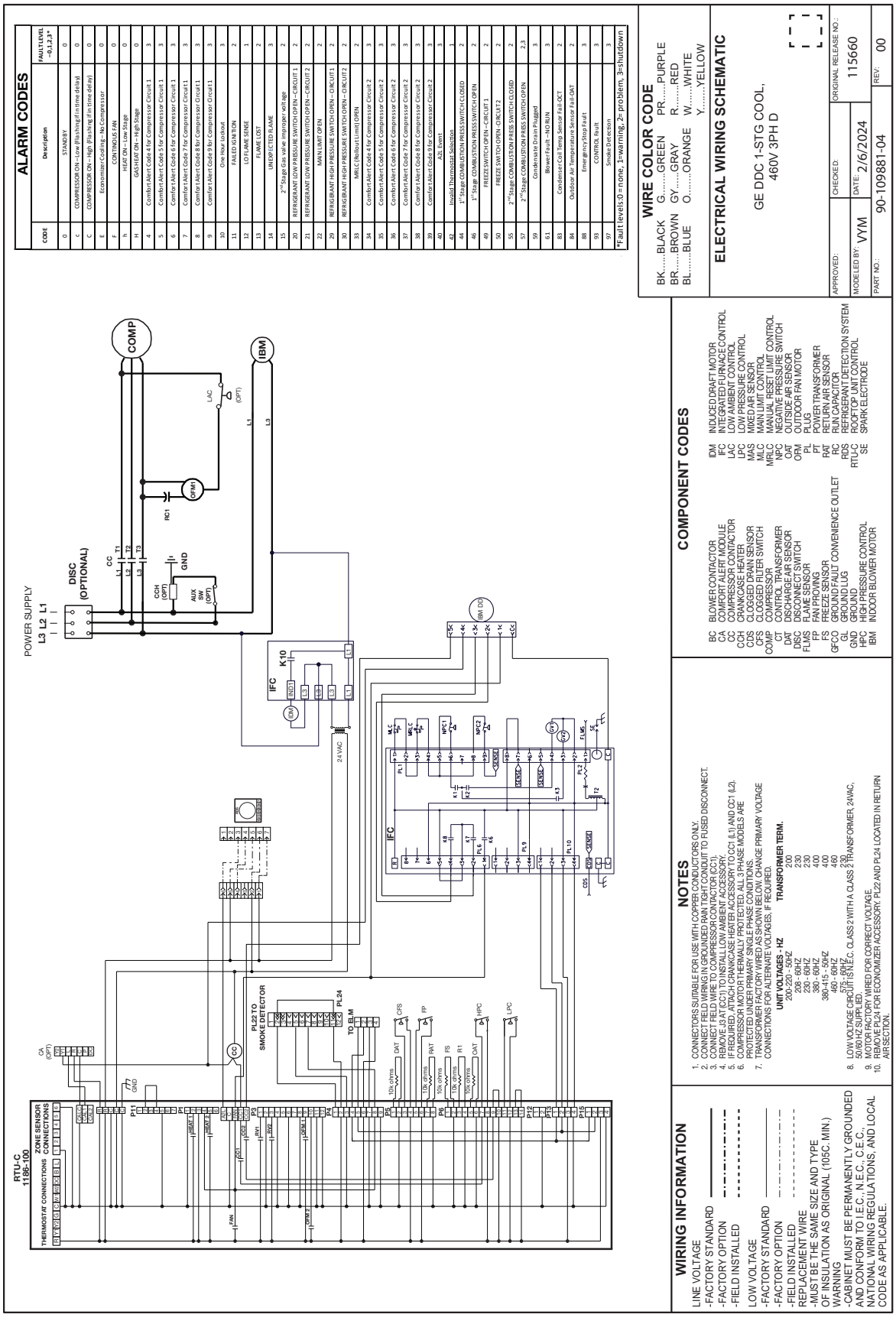


Appendix H – Wiring Diagrams & Schematics (Cont.)

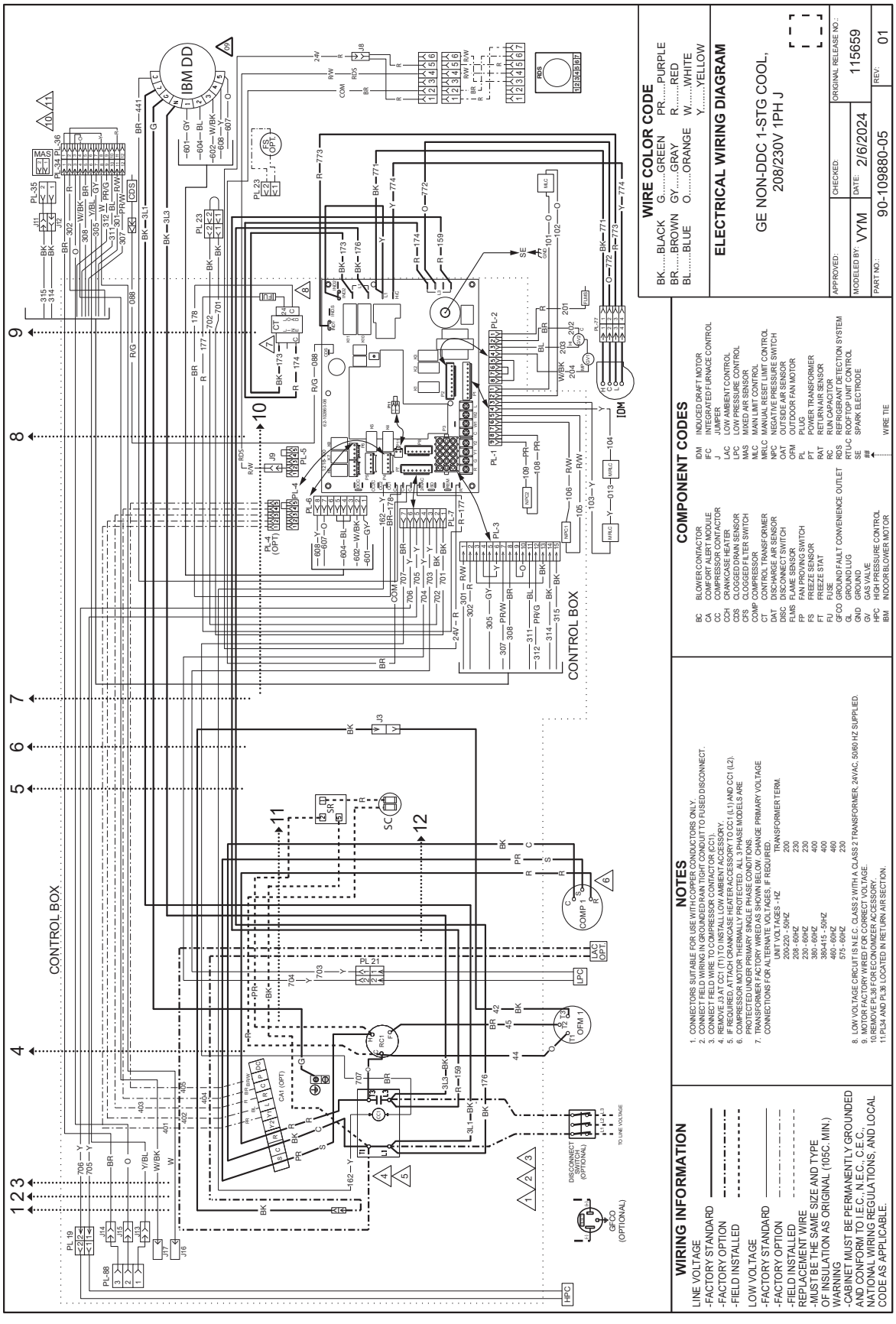


P. APPENDICES

Appendix H – Wiring Diagrams & Schematics (Cont.)

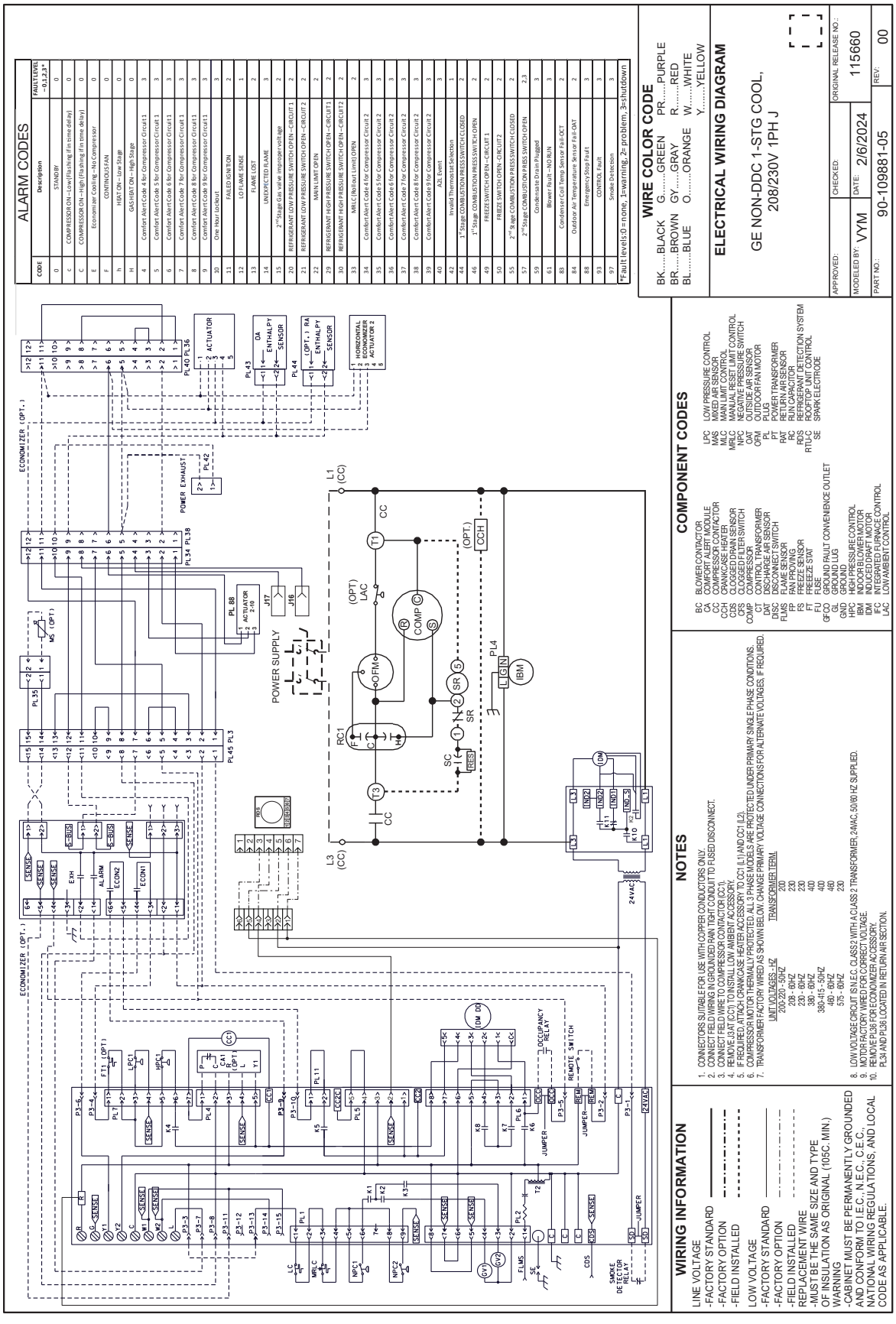


Appendix H – Wiring Diagrams & Schematics (Cont.)

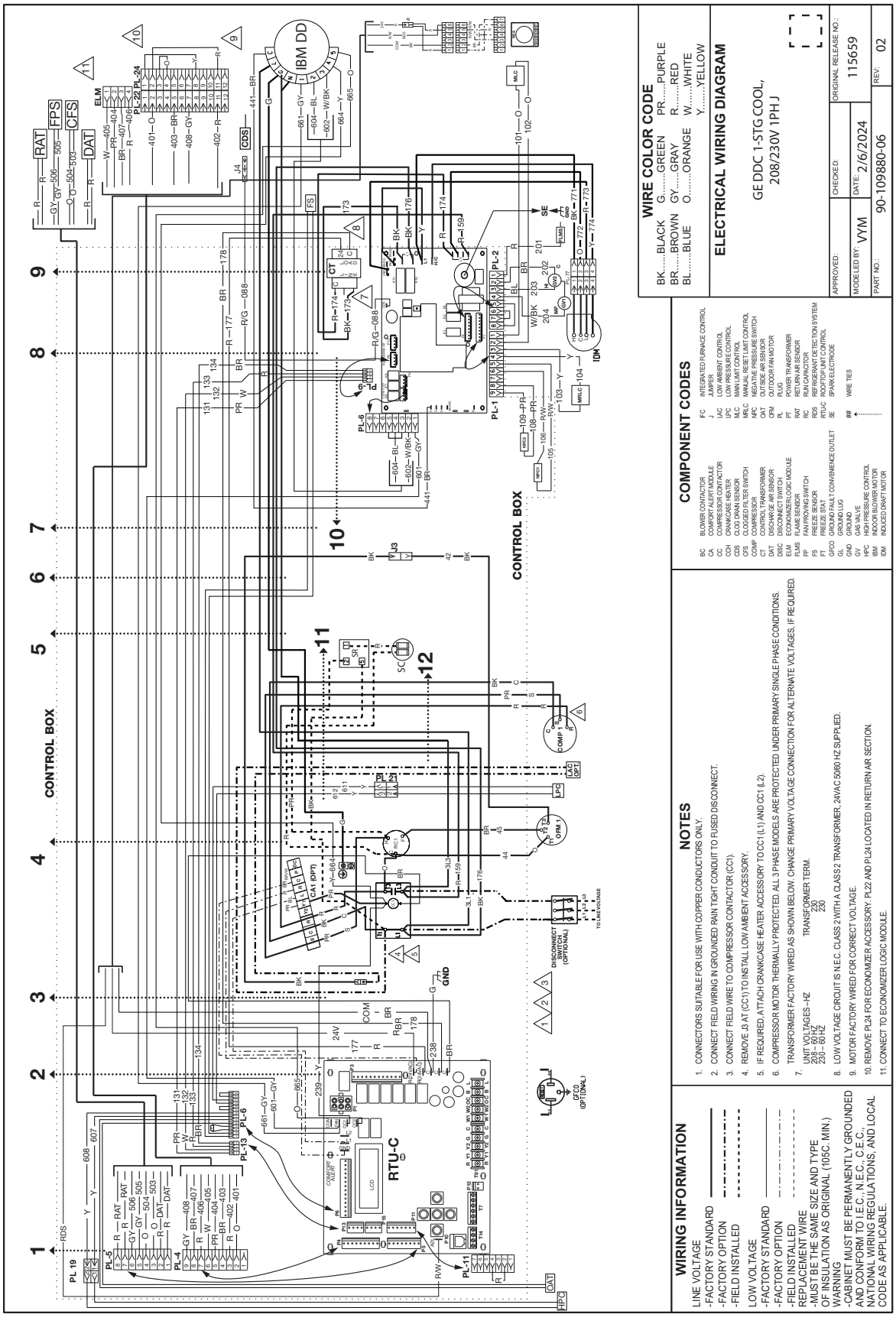


P. APPENDICES

Appendix H – Wiring Diagrams & Schematics (Cont.)

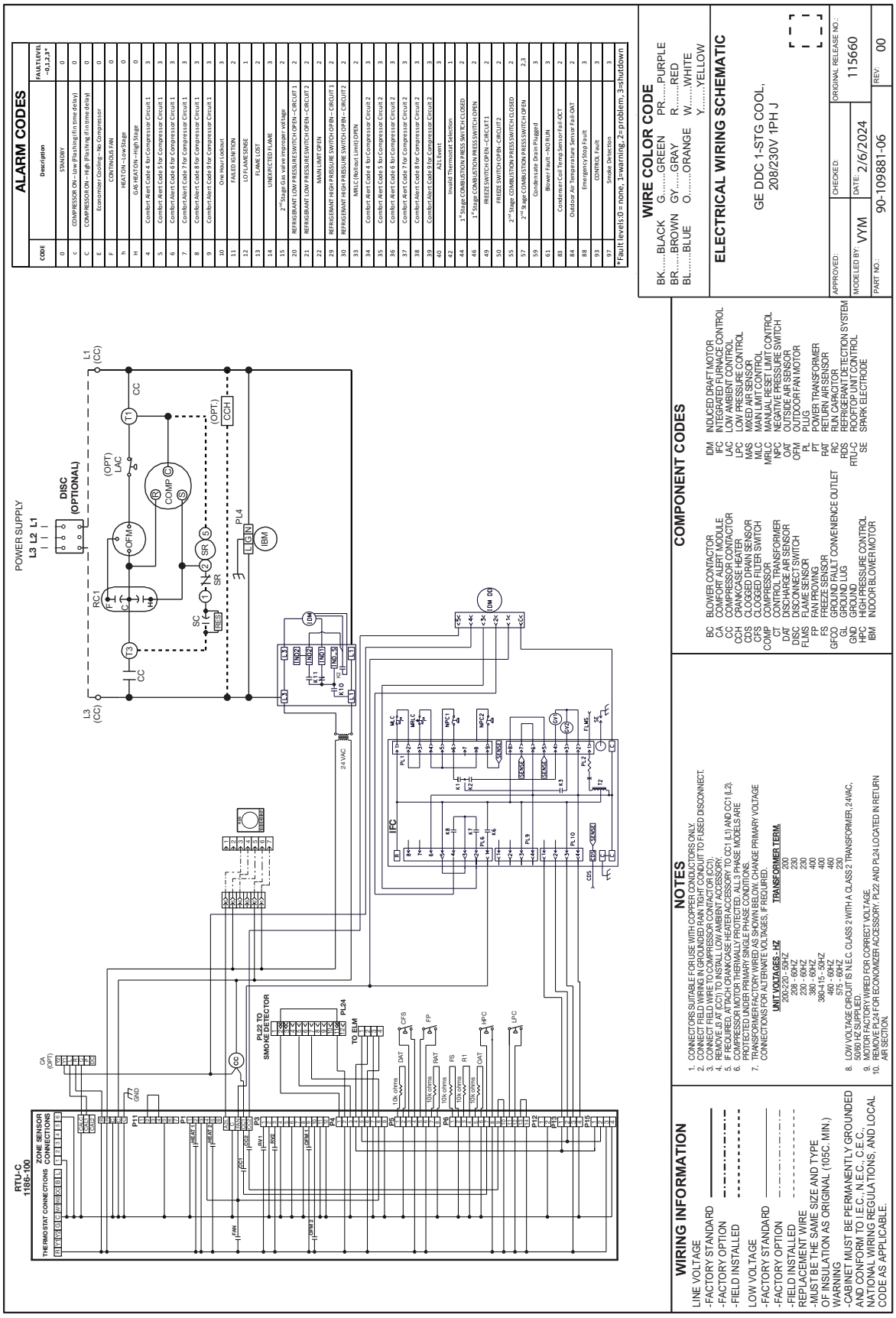


Appendix H – Wiring Diagrams & Schematics (Cont.)

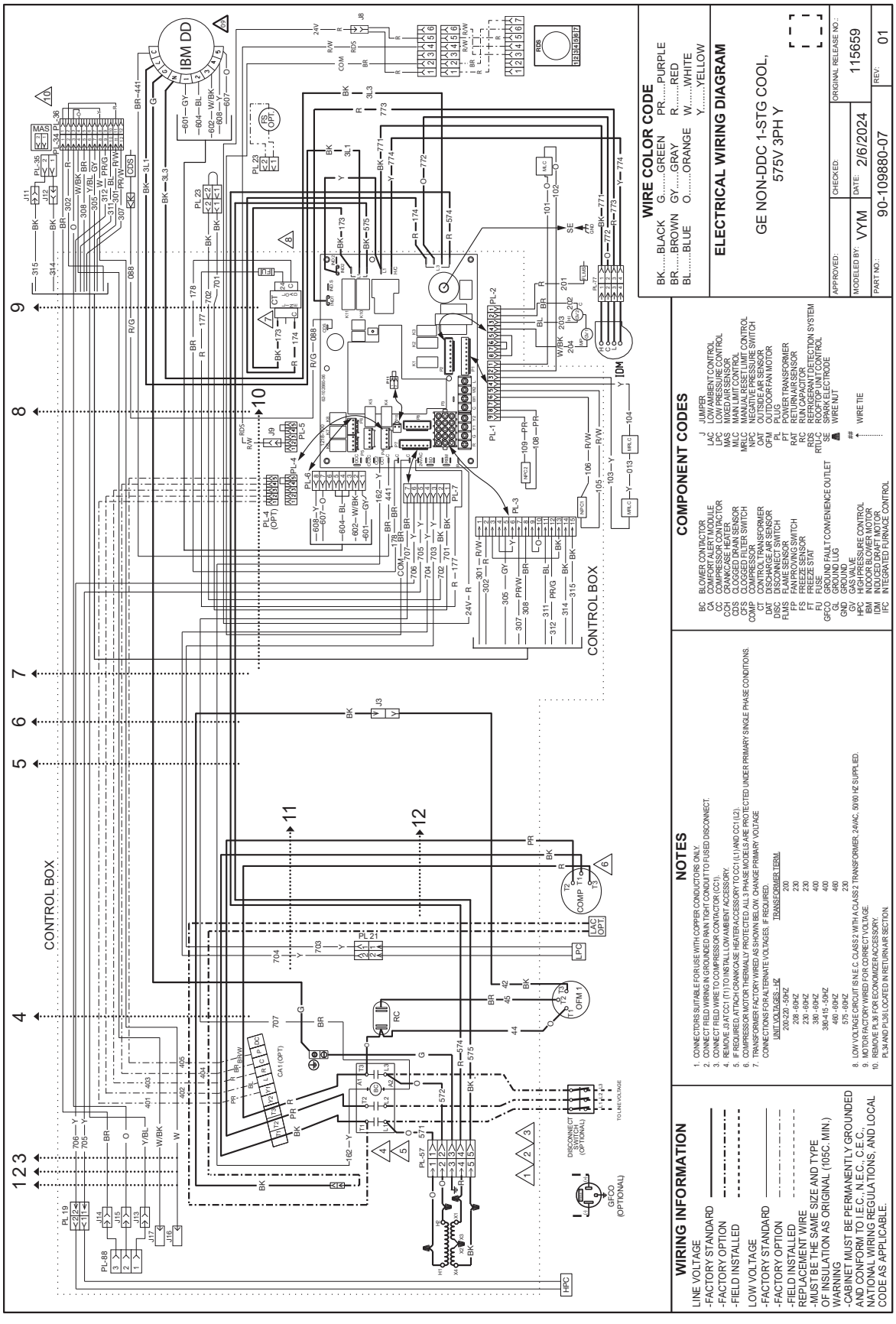


P. APPENDICES

Appendix H – Wiring Diagrams & Schematics (Cont.)

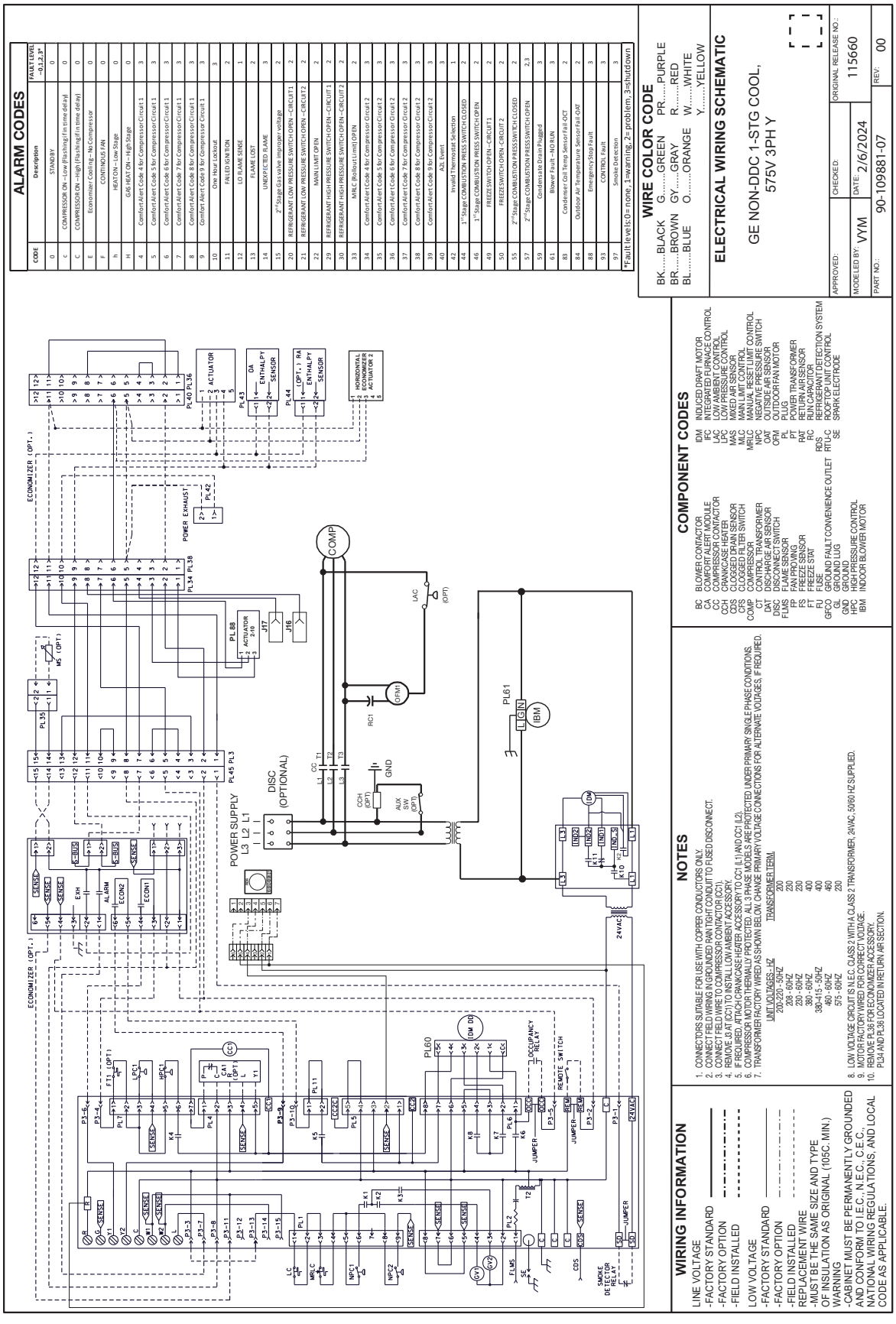


Appendix H – Wiring Diagrams & Schematics (Cont.)

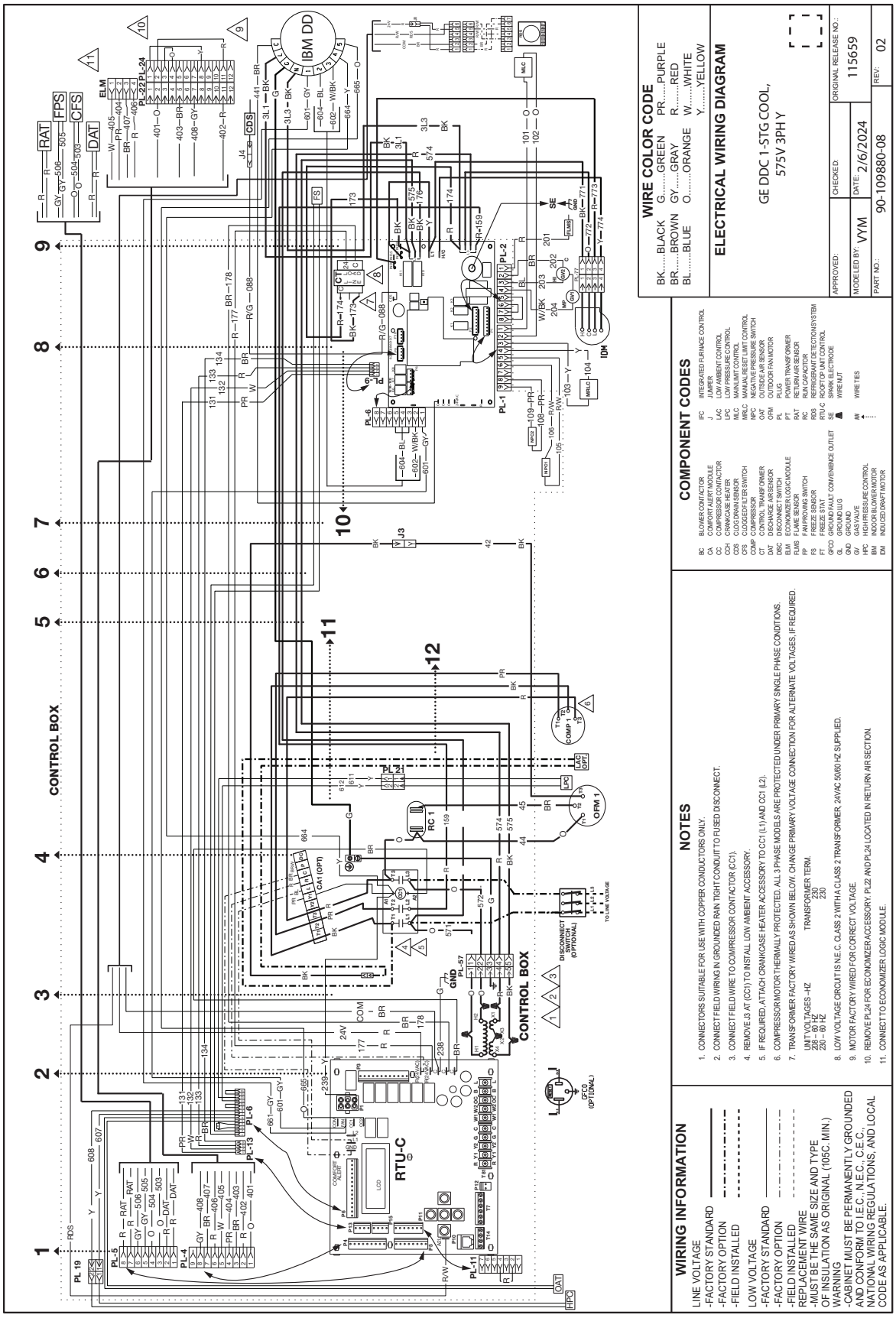


P. APPENDICES

Appendix H – Wiring Diagrams & Schematics (Cont.)

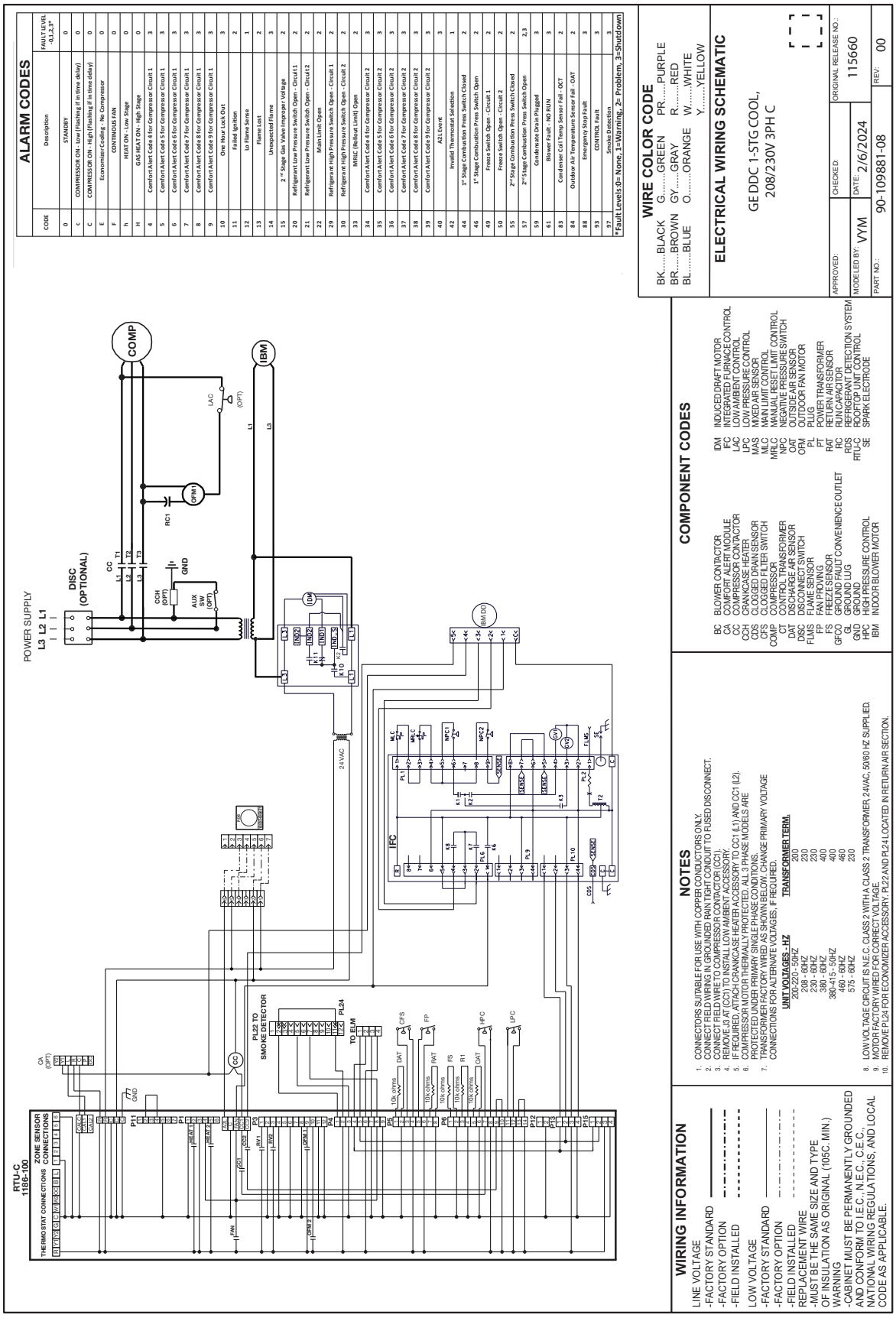


Appendix H – Wiring Diagrams & Schematics (Cont.)

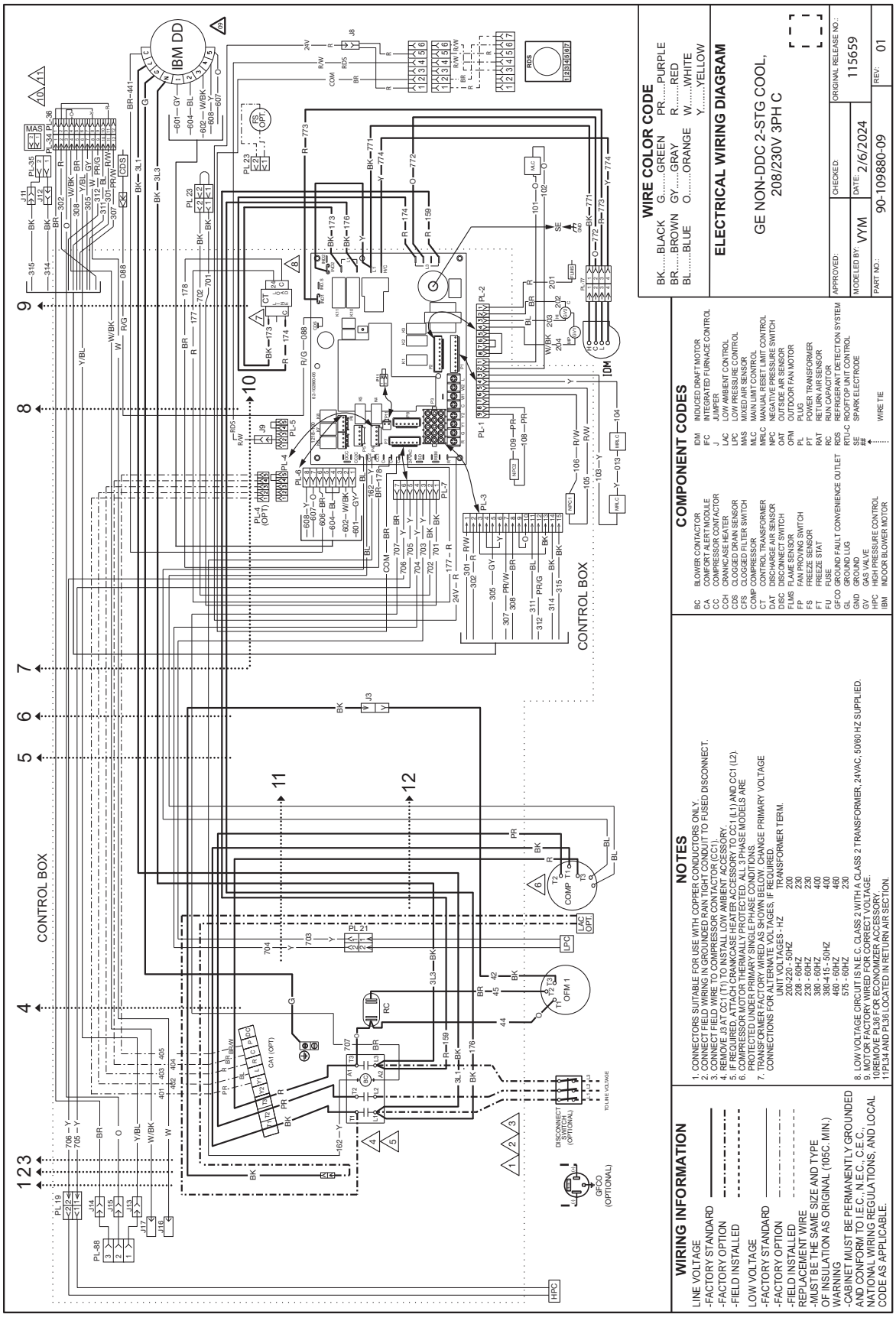


P. APPENDICES

Appendix H – Wiring Diagrams & Schematics (Cont.)

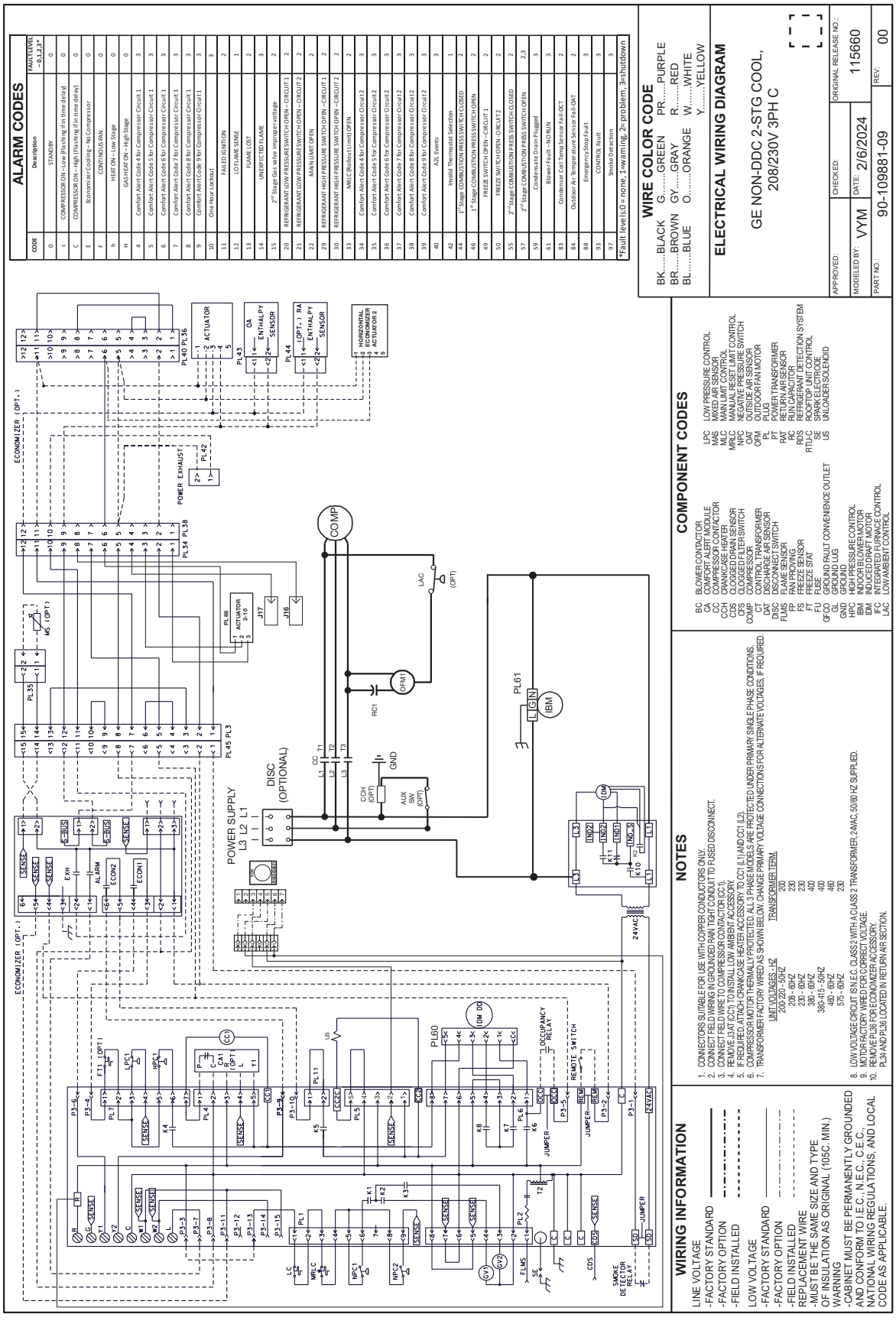


Appendix H – Wiring Diagrams & Schematics (Cont.)

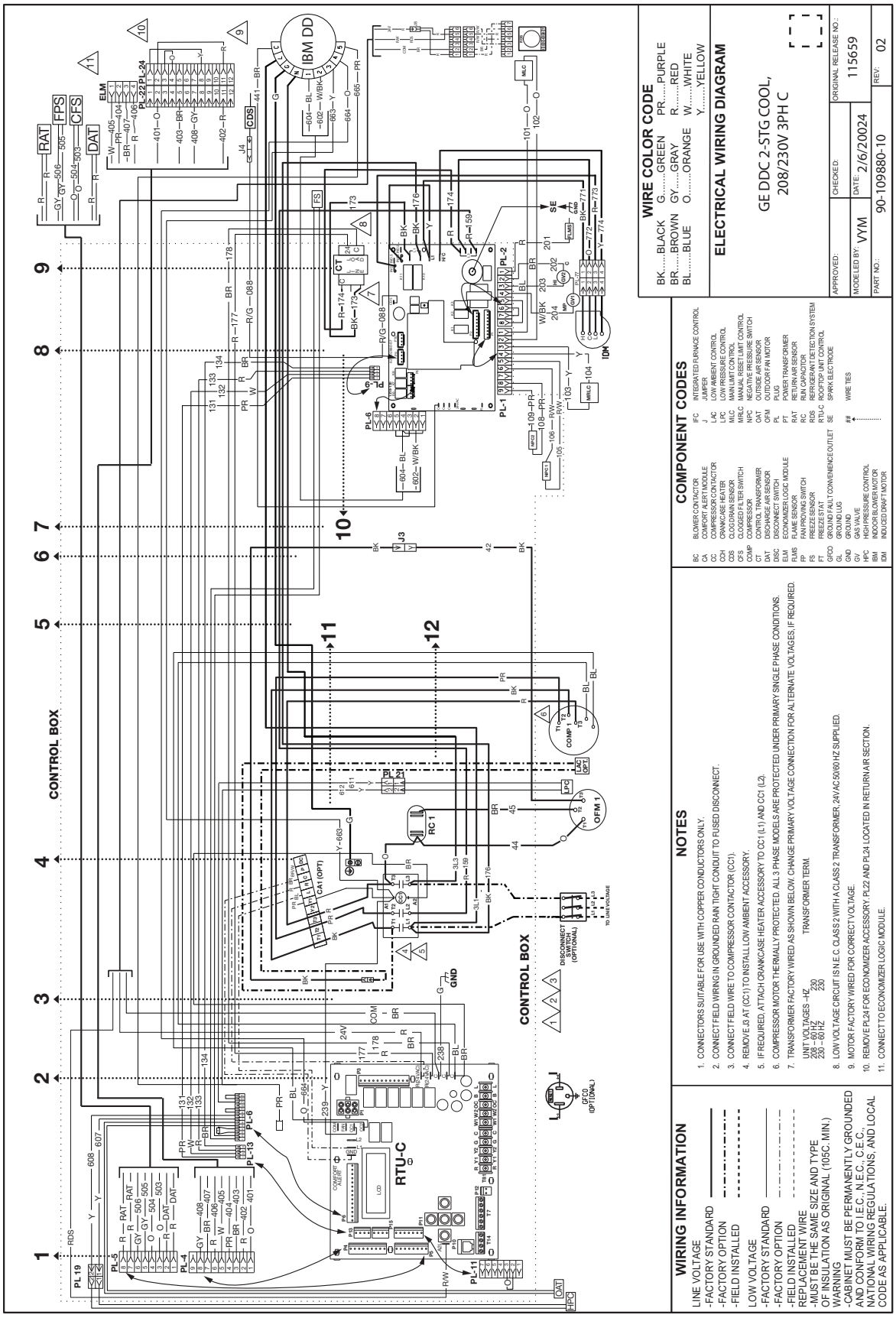


P. APPENDICES

Appendix H – Wiring Diagrams & Schematics (Cont.)

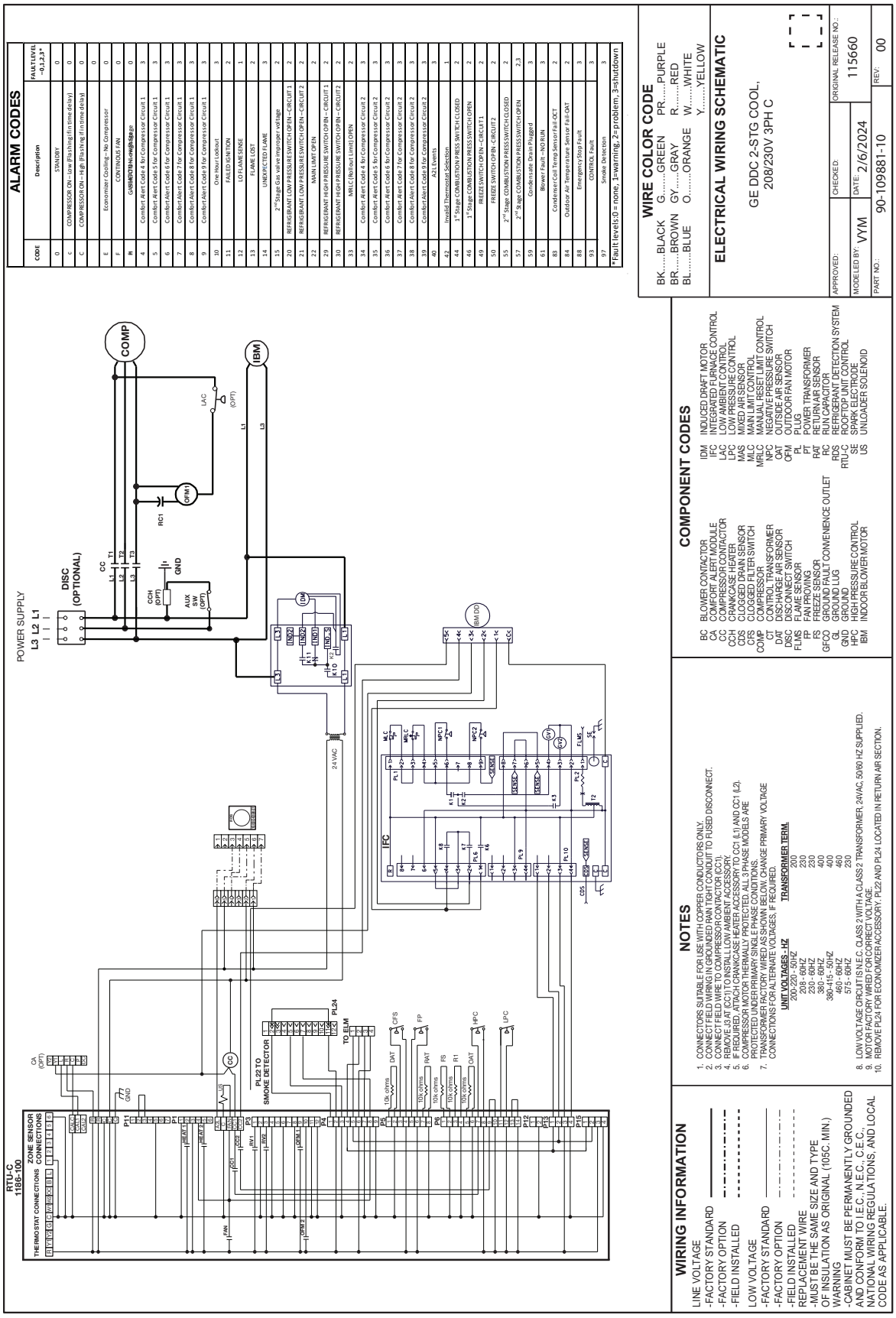


Appendix H – Wiring Diagrams & Schematics (Cont.)

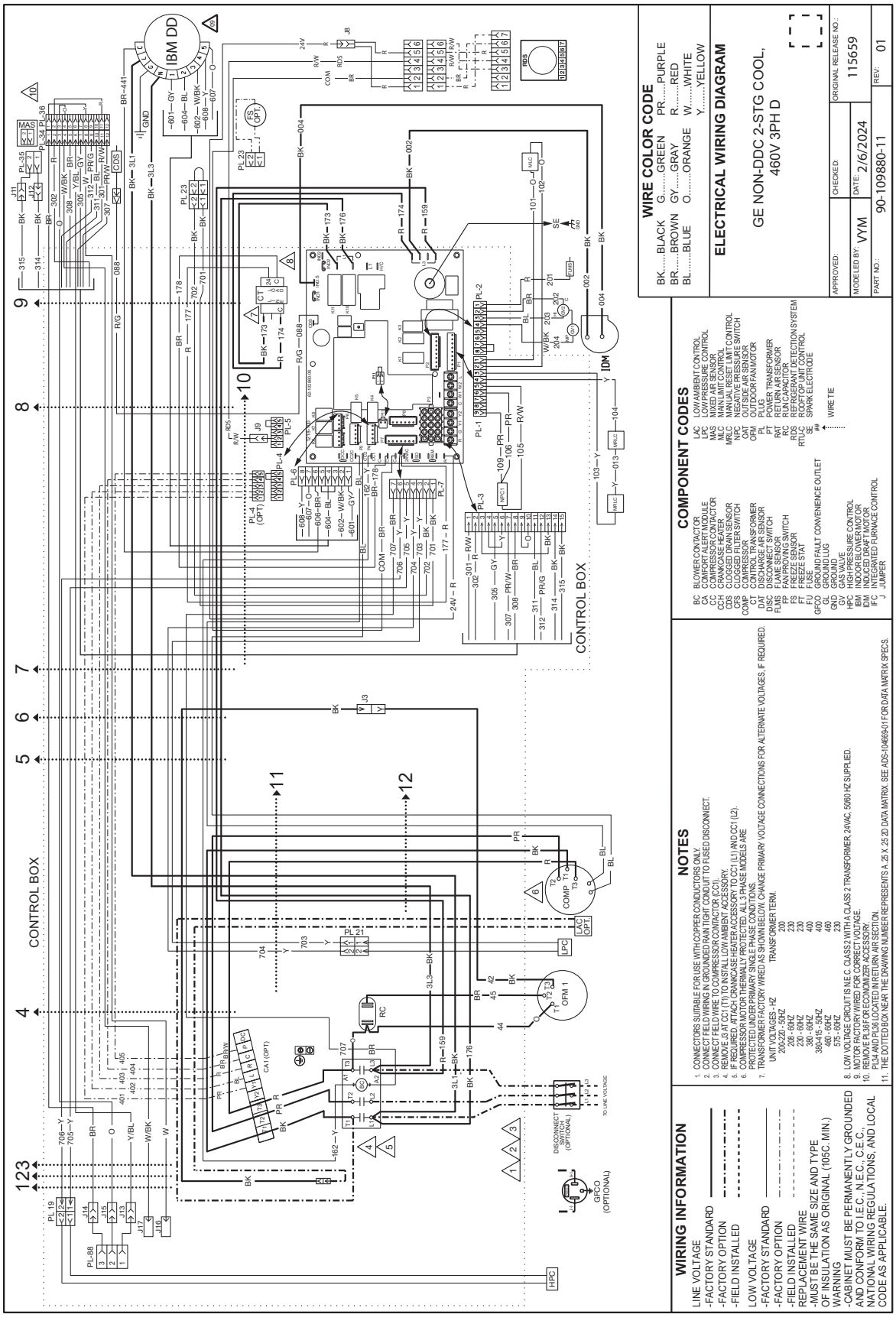


P. APPENDICES

Appendix H – Wiring Diagrams & Schematics (Cont.)

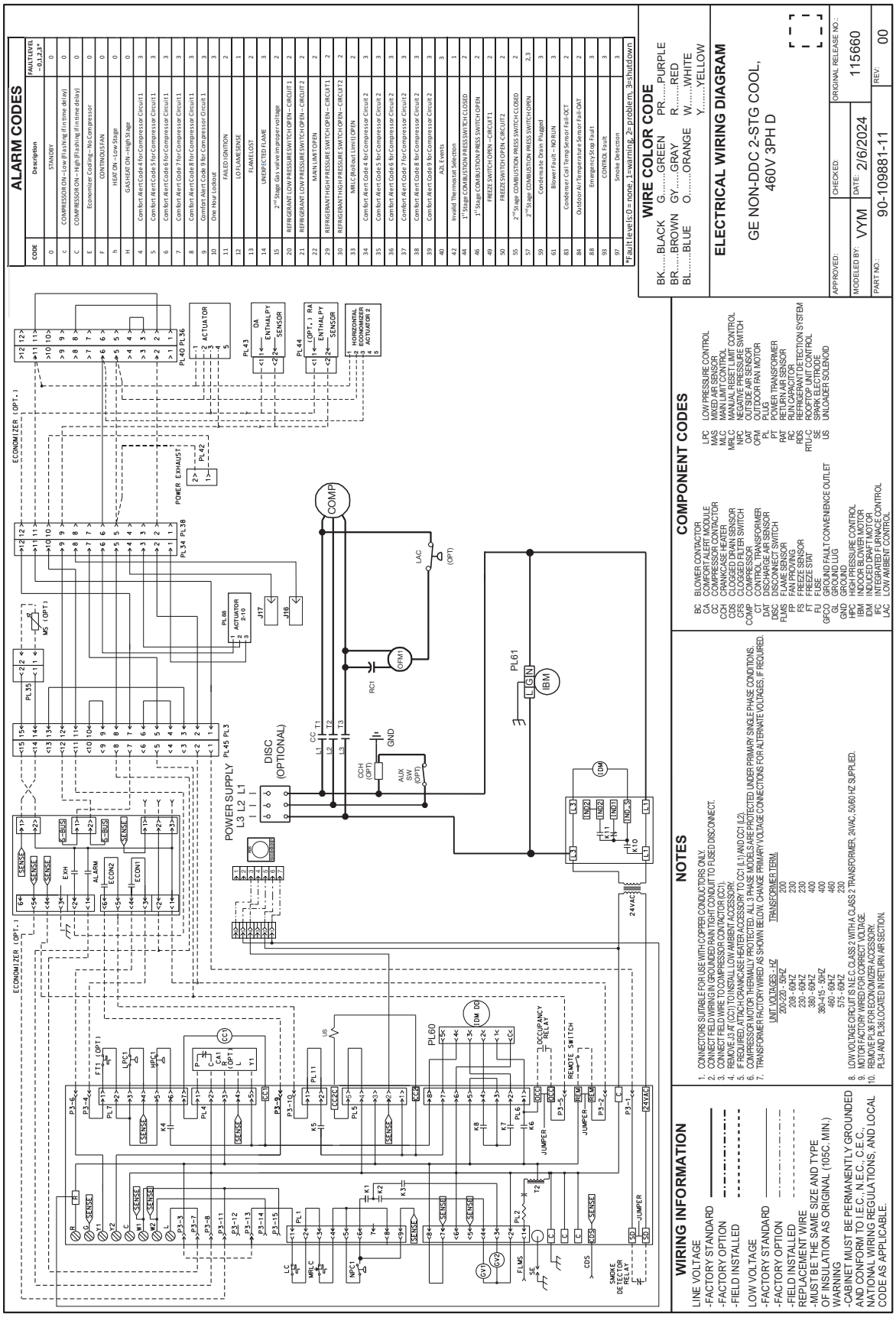


Appendix H – Wiring Diagrams & Schematics (Cont.)

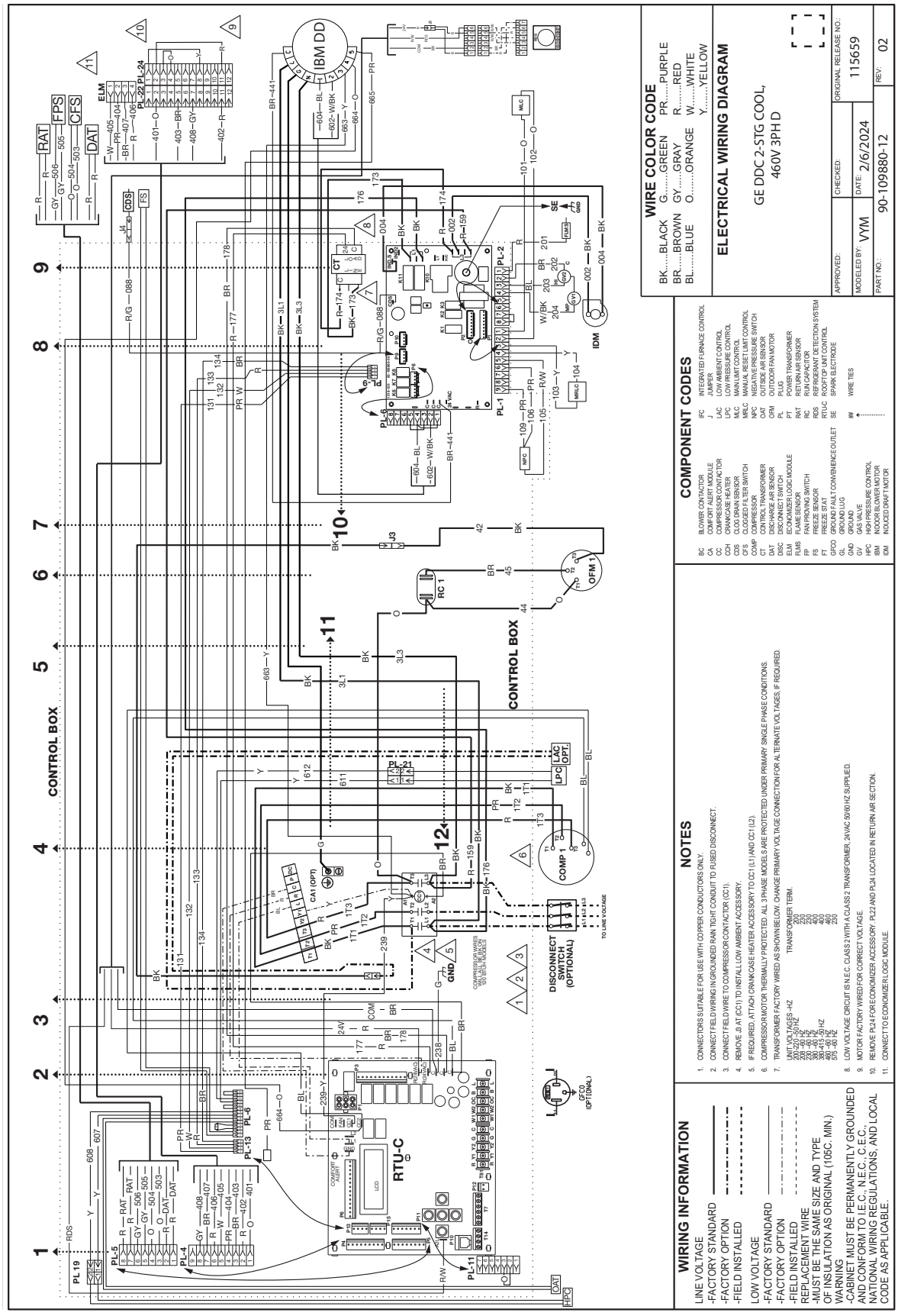


P. APPENDICES

Appendix H – Wiring Diagrams & Schematics (Cont.)

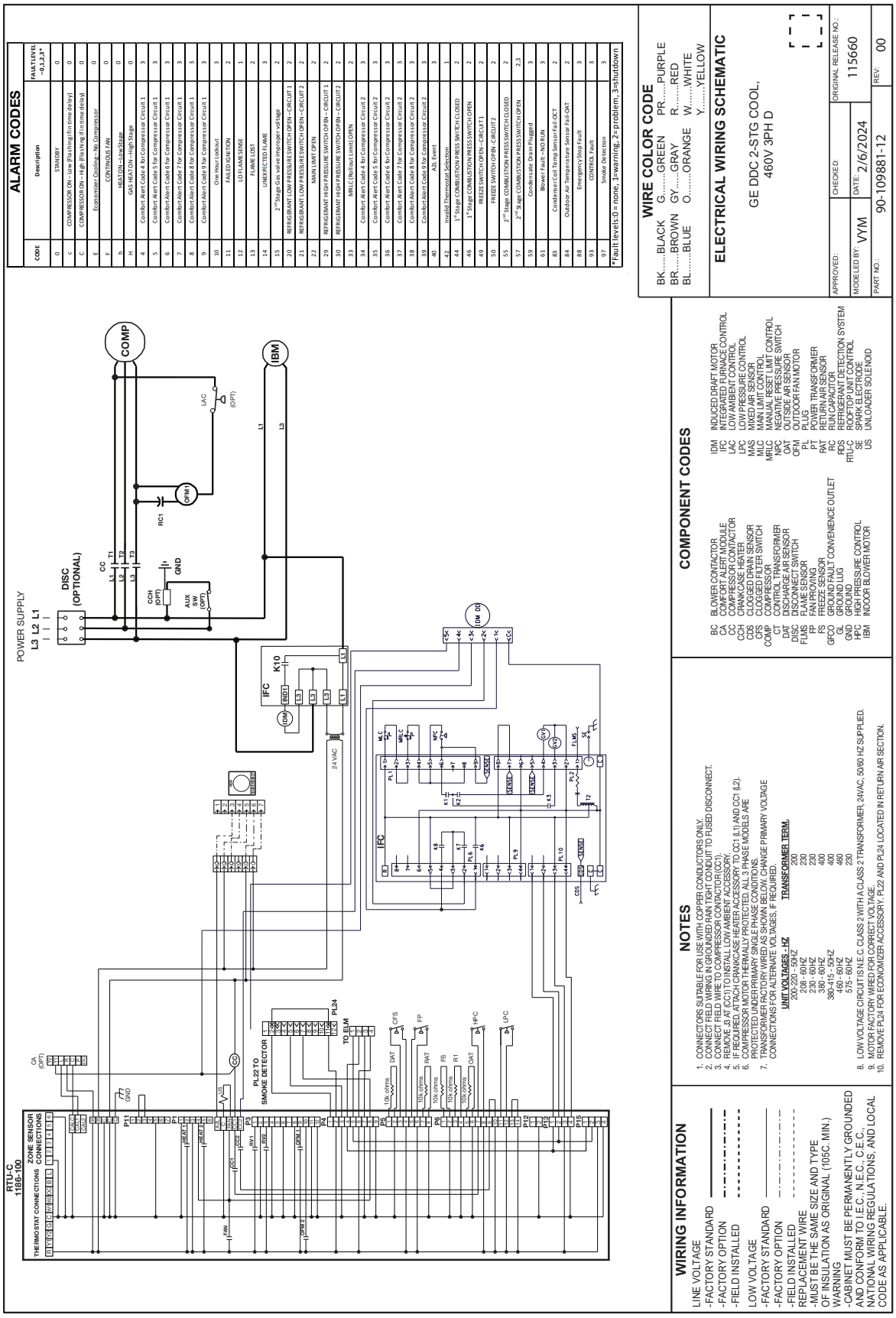


Appendix H – Wiring Diagrams & Schematics (Cont.)

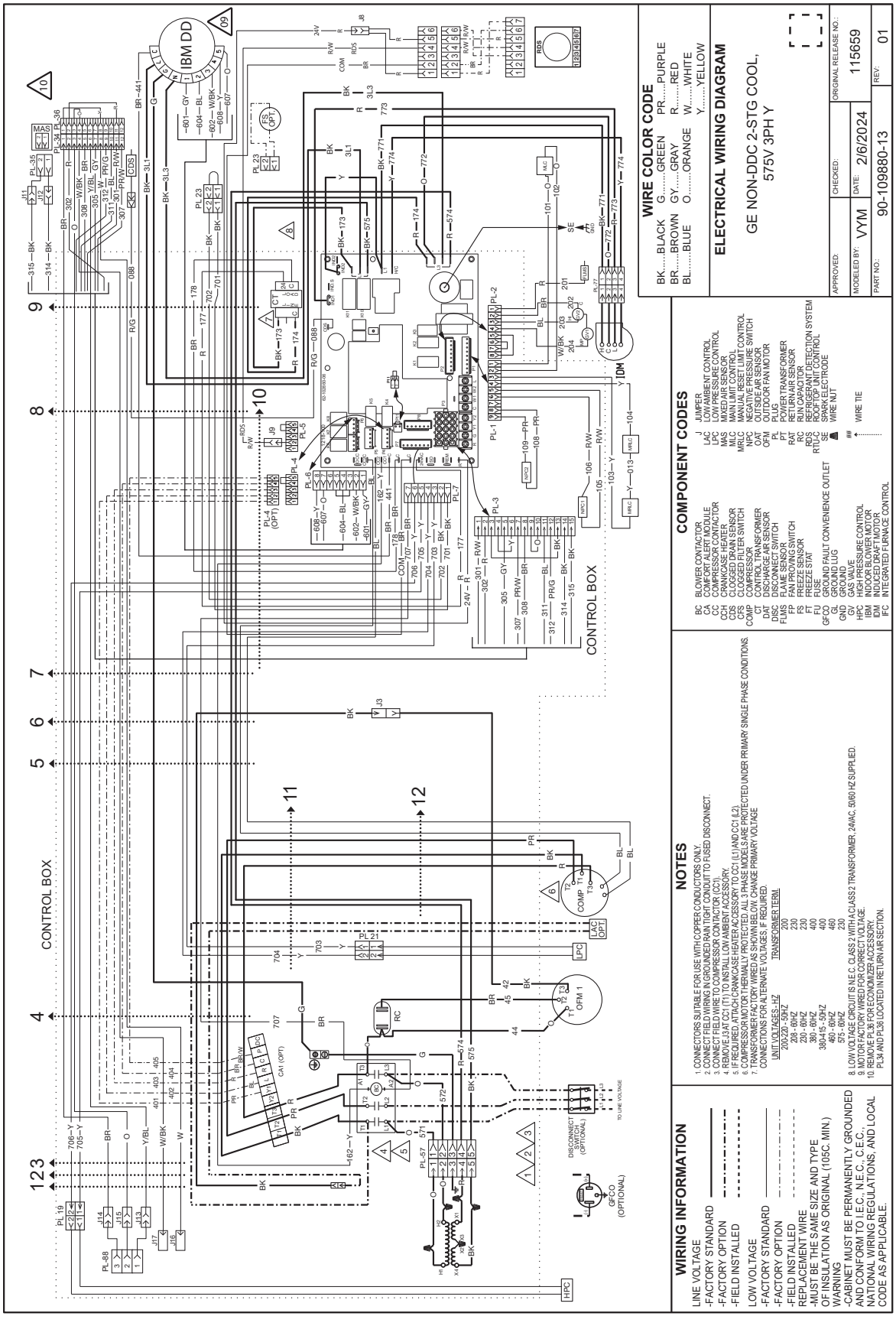


P. APPENDICES

Appendix H – Wiring Diagrams & Schematics (Cont.)

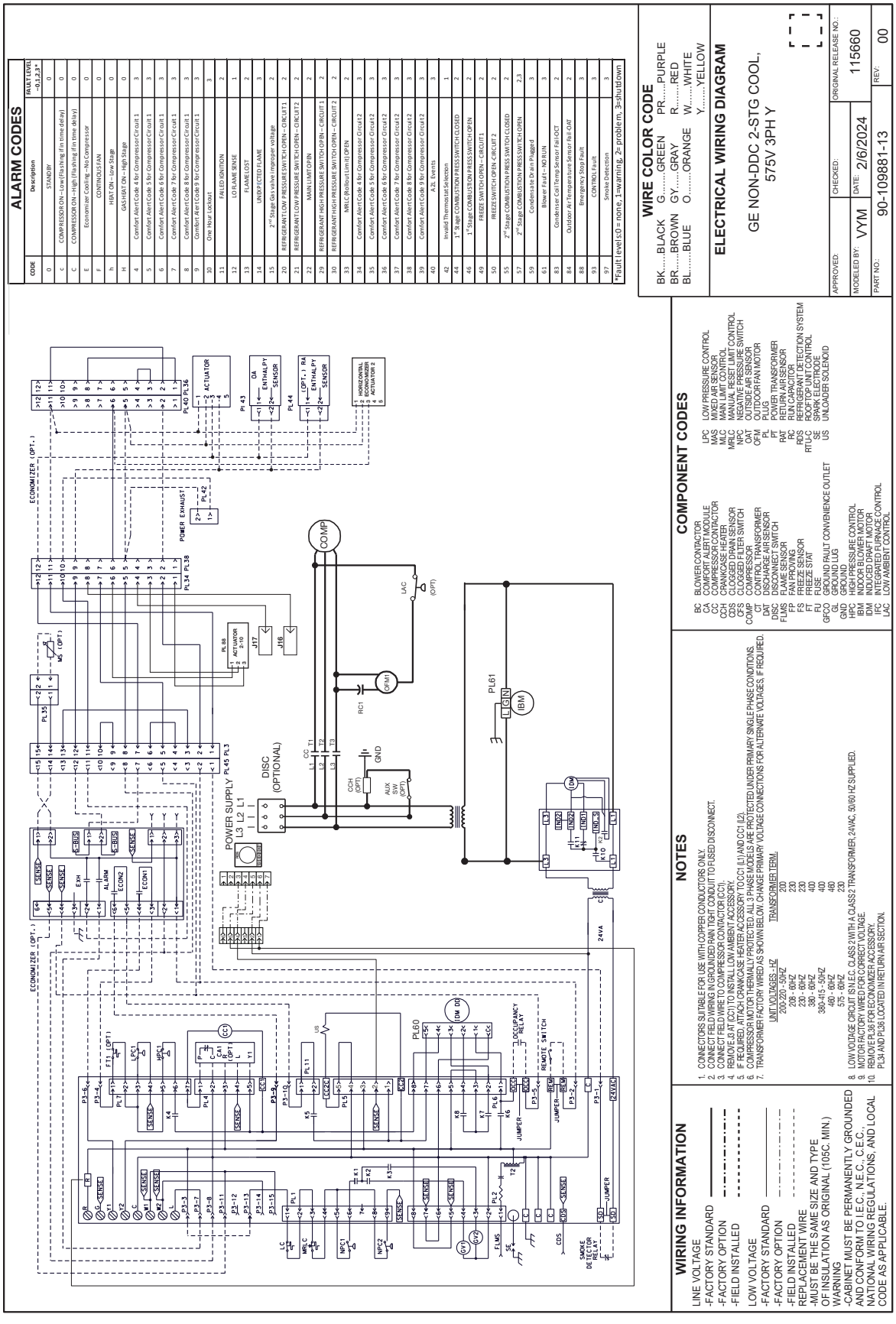


Appendix H – Wiring Diagrams & Schematics (Cont.)

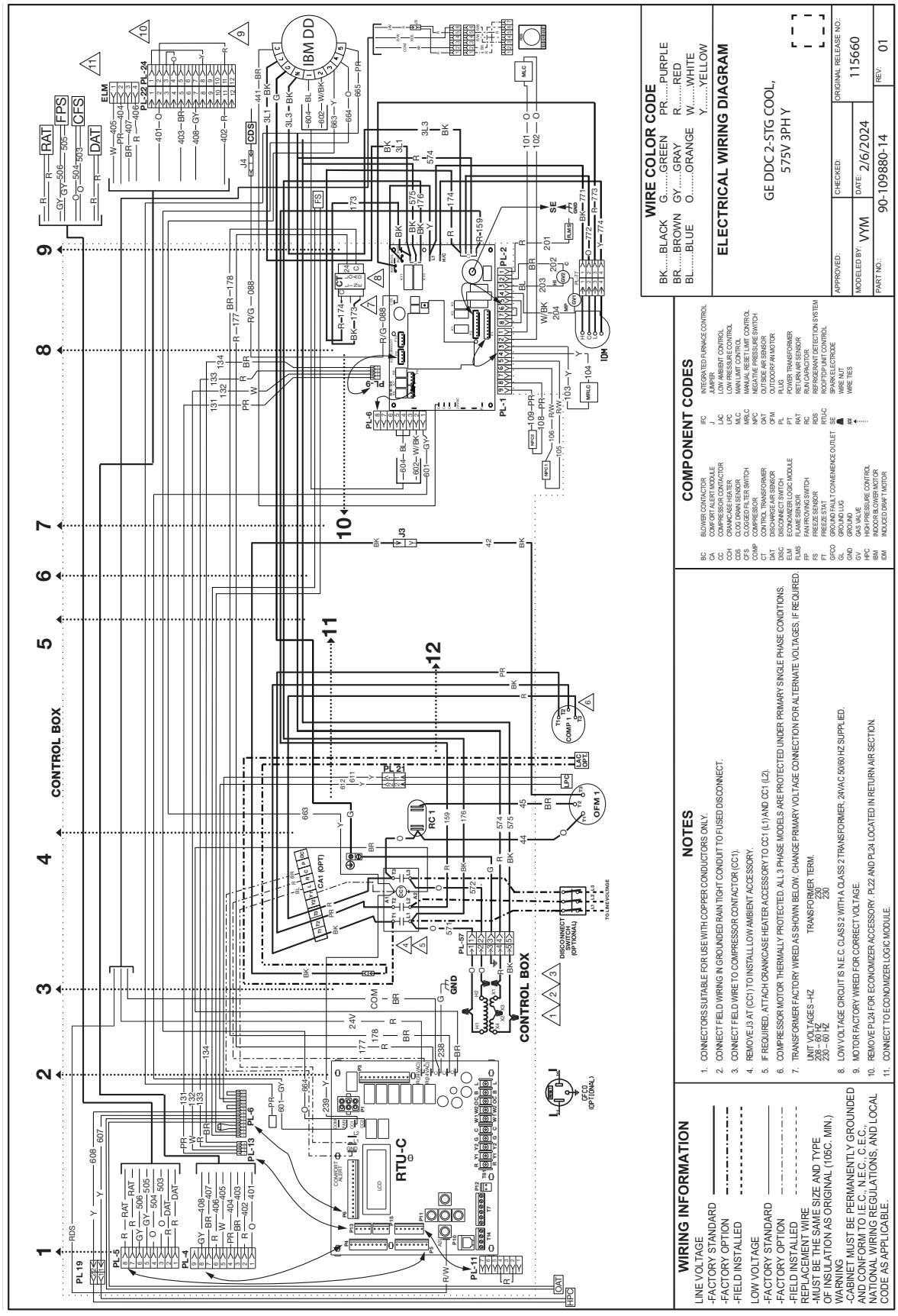


P. APPENDICES

Appendix H – Wiring Diagrams & Schematics (Cont.)

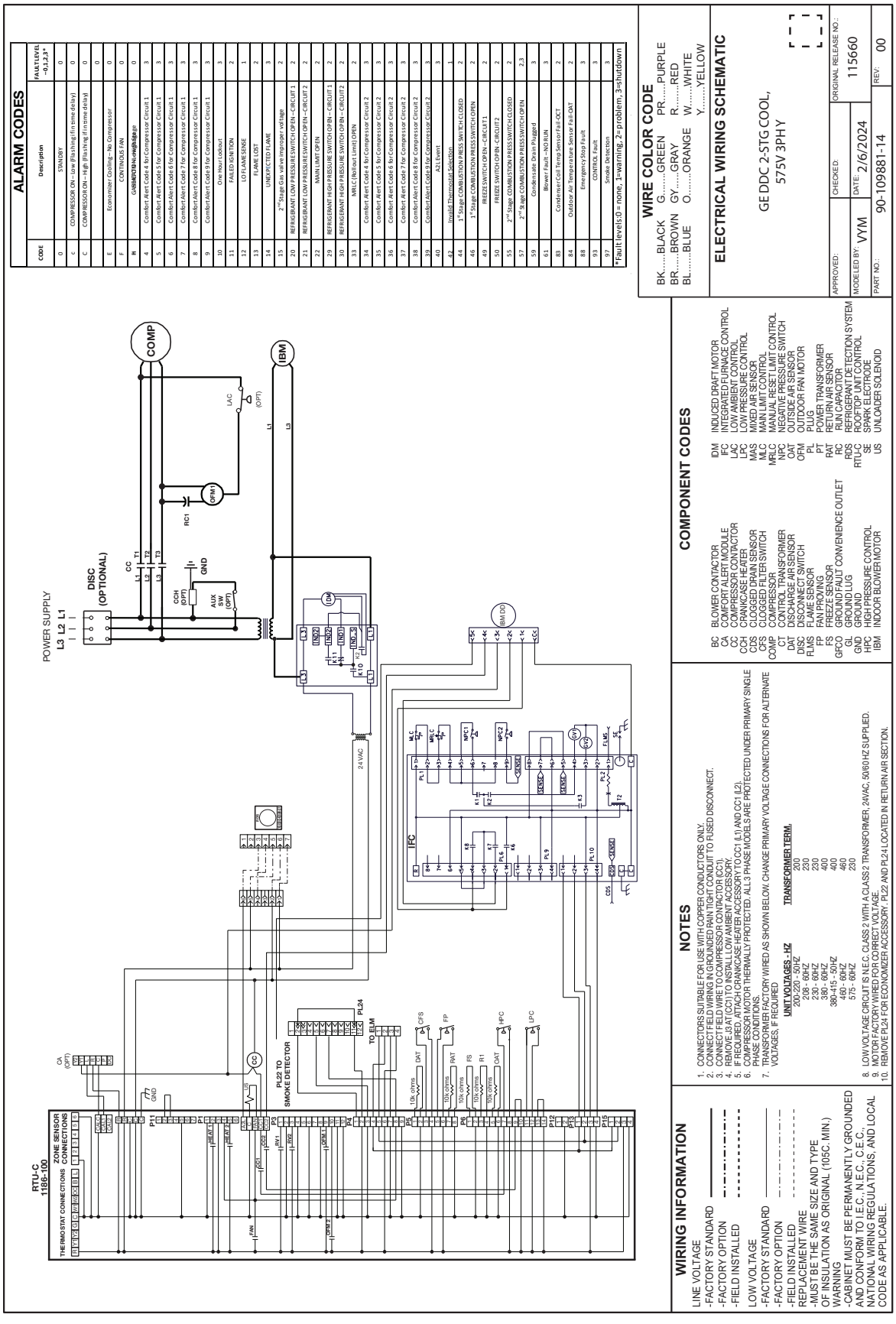


Appendix H – Wiring Diagrams & Schematics (Cont.)

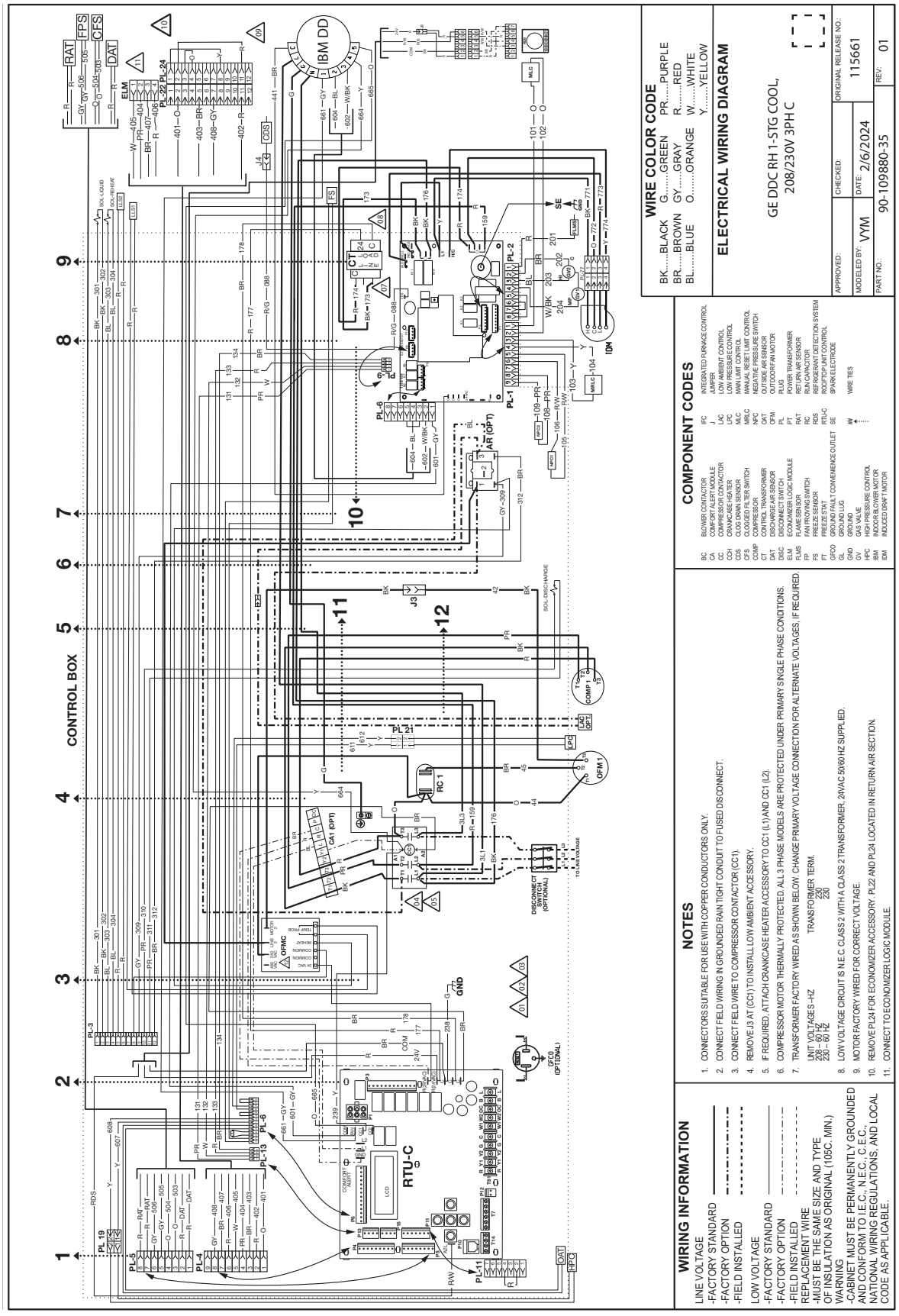


P. APPENDICES

Appendix H – Wiring Diagrams & Schematics (Cont.)

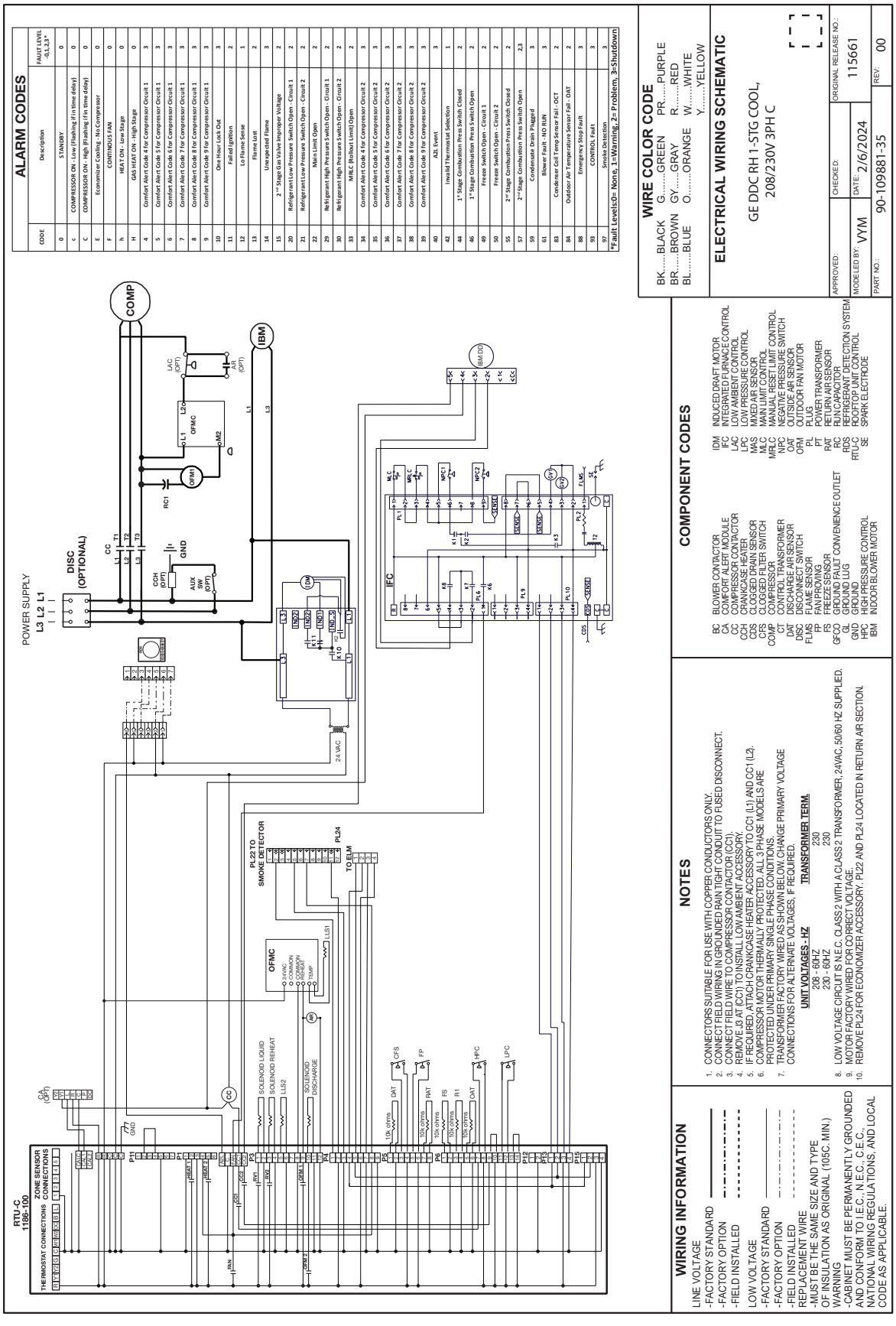


Appendix H – Wiring Diagrams & Schematics (Cont.)

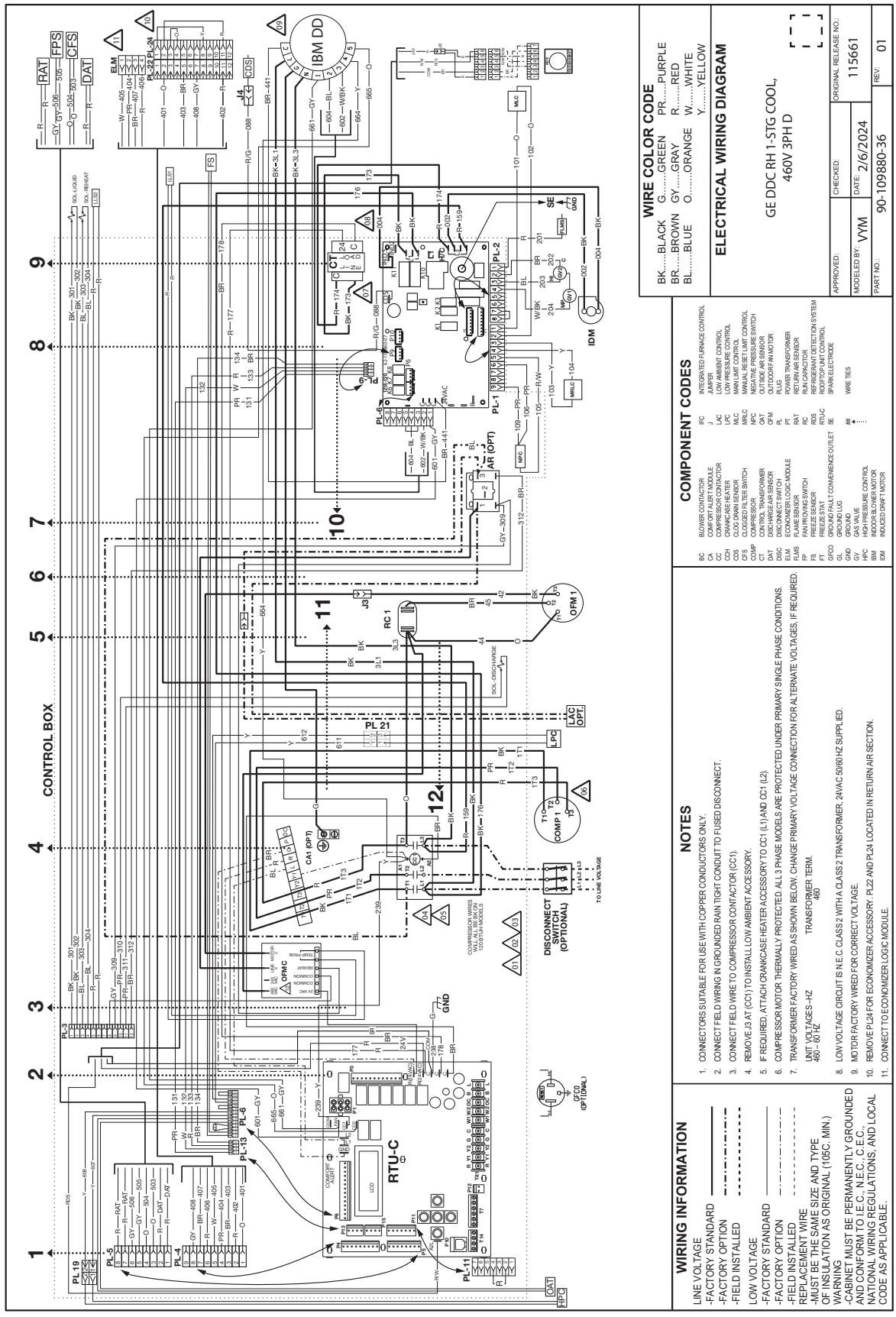


P. APPENDICES

Appendix H – Wiring Diagrams & Schematics (Cont.)

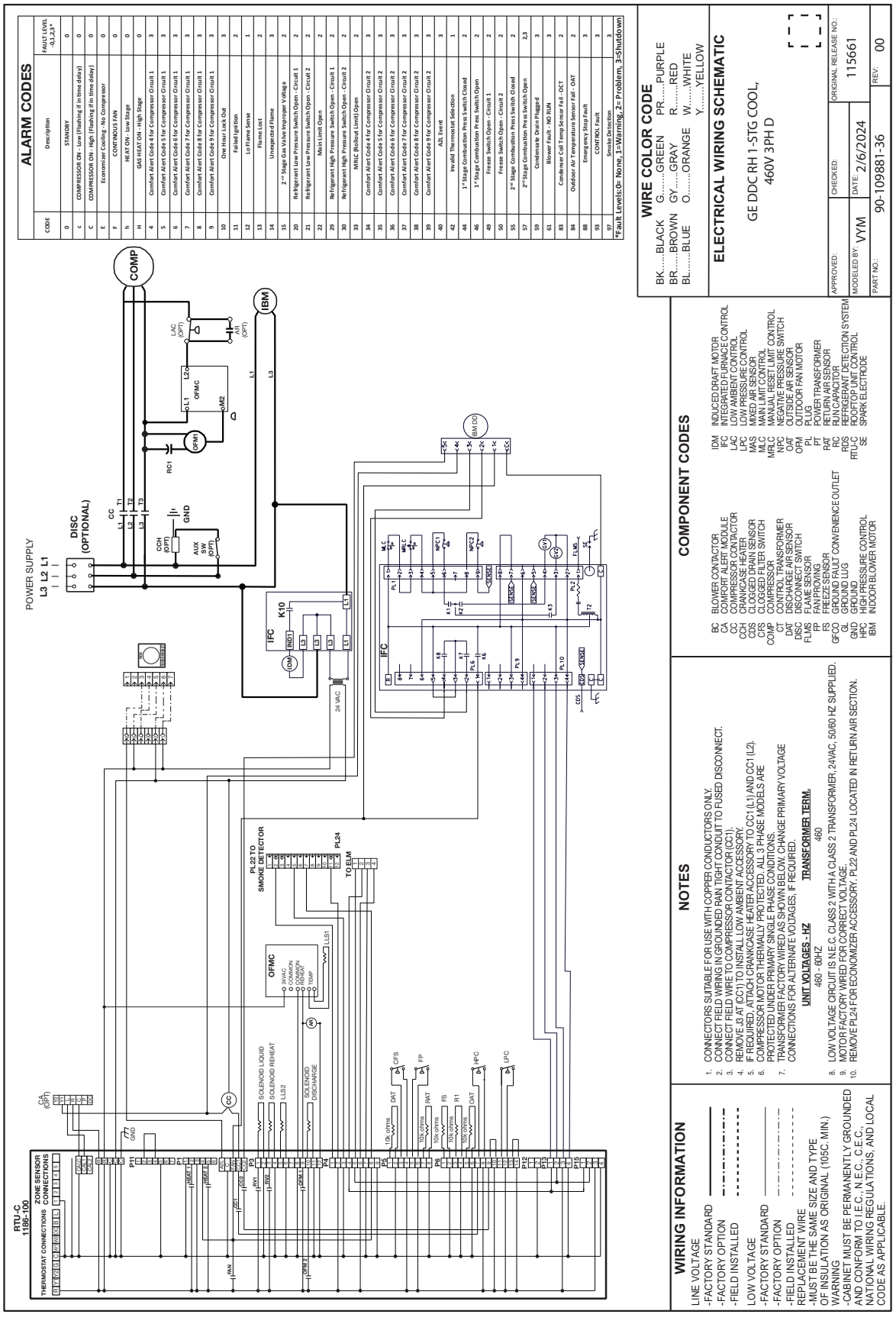


Appendix H – Wiring Diagrams & Schematics (Cont.)

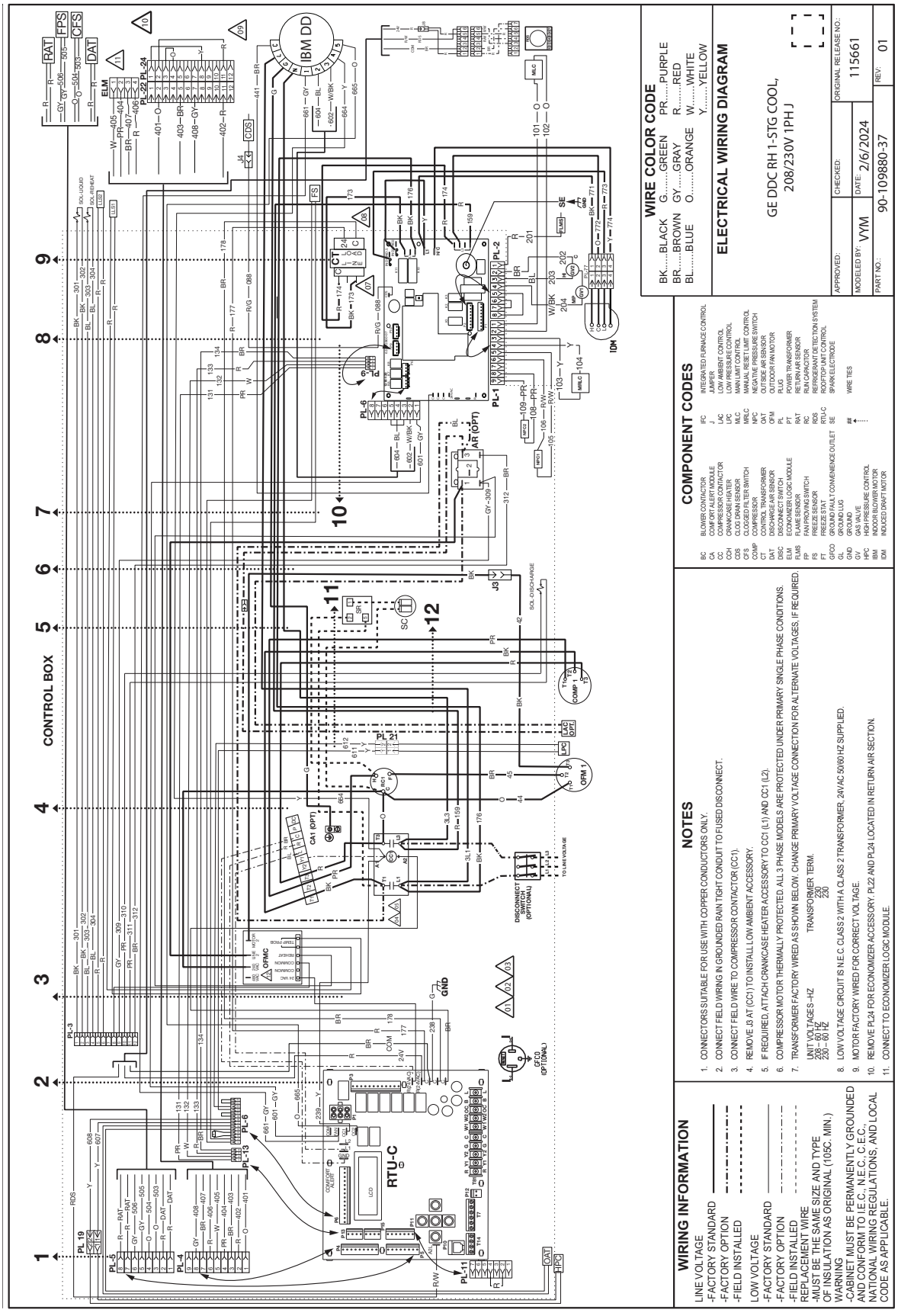


P. APPENDICES

Appendix H – Wiring Diagrams & Schematics (Cont.)

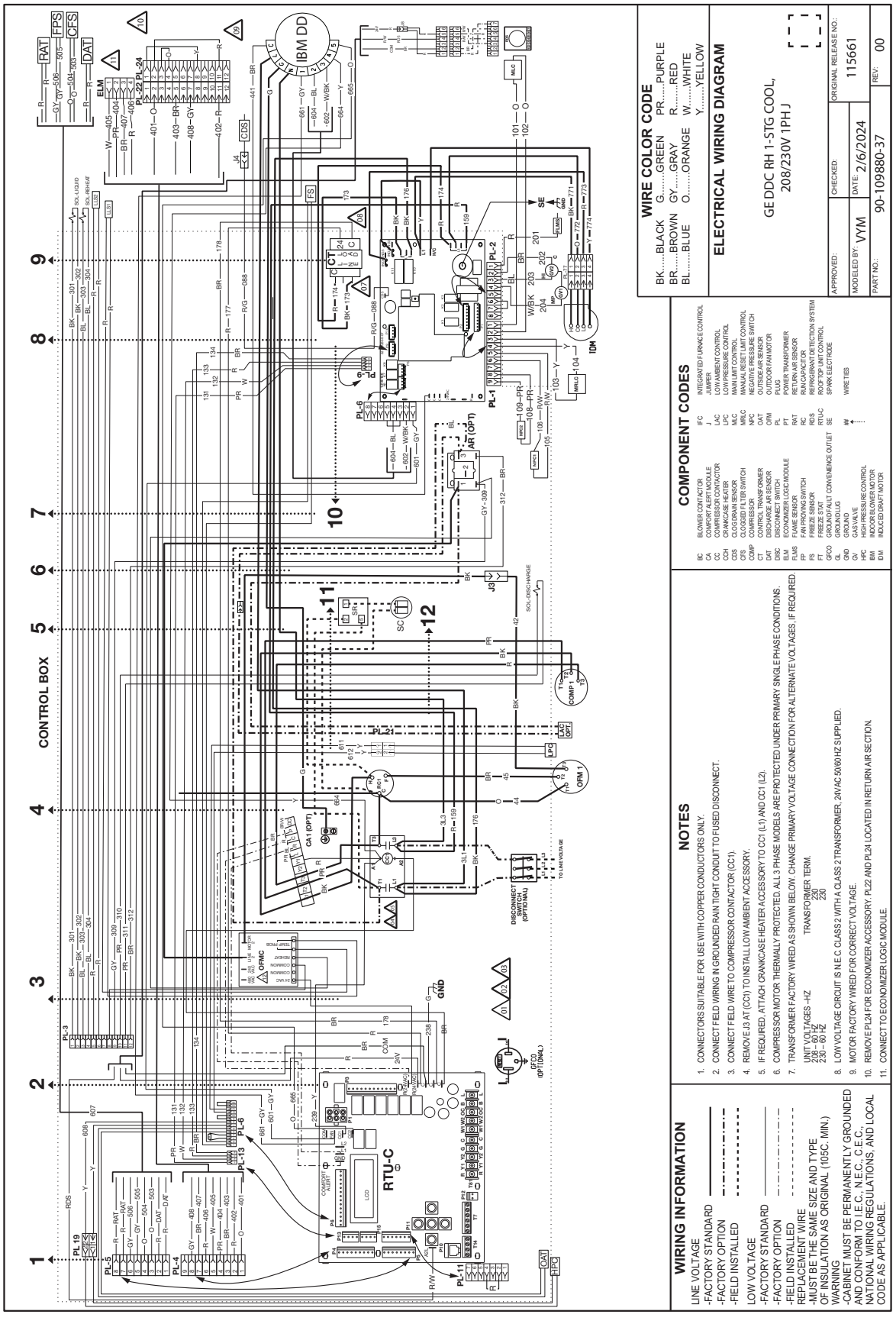


Appendix H – Wiring Diagrams & Schematics (Cont.)

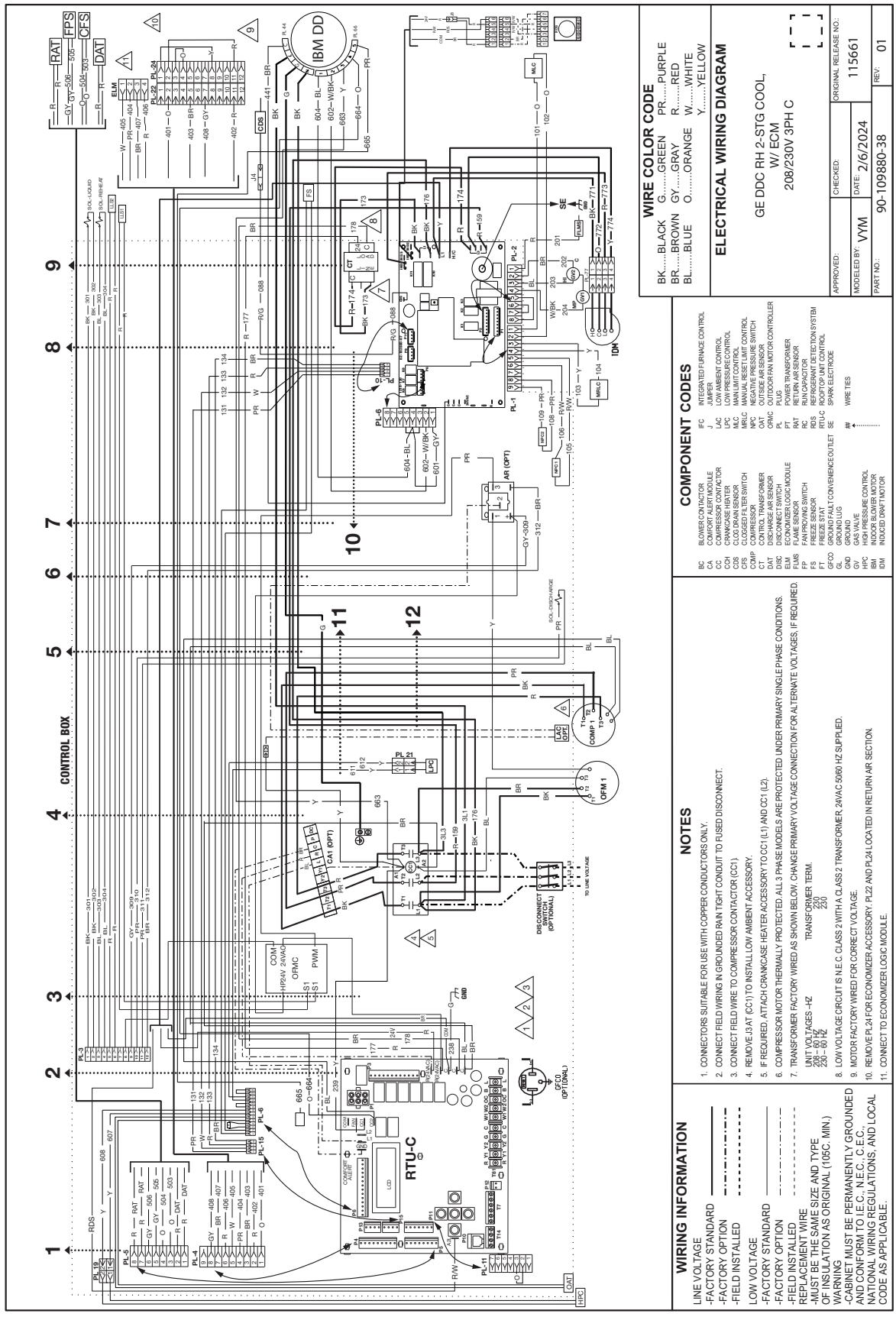


P. APPENDICES

Appendix H – Wiring Diagrams & Schematics (Cont.)

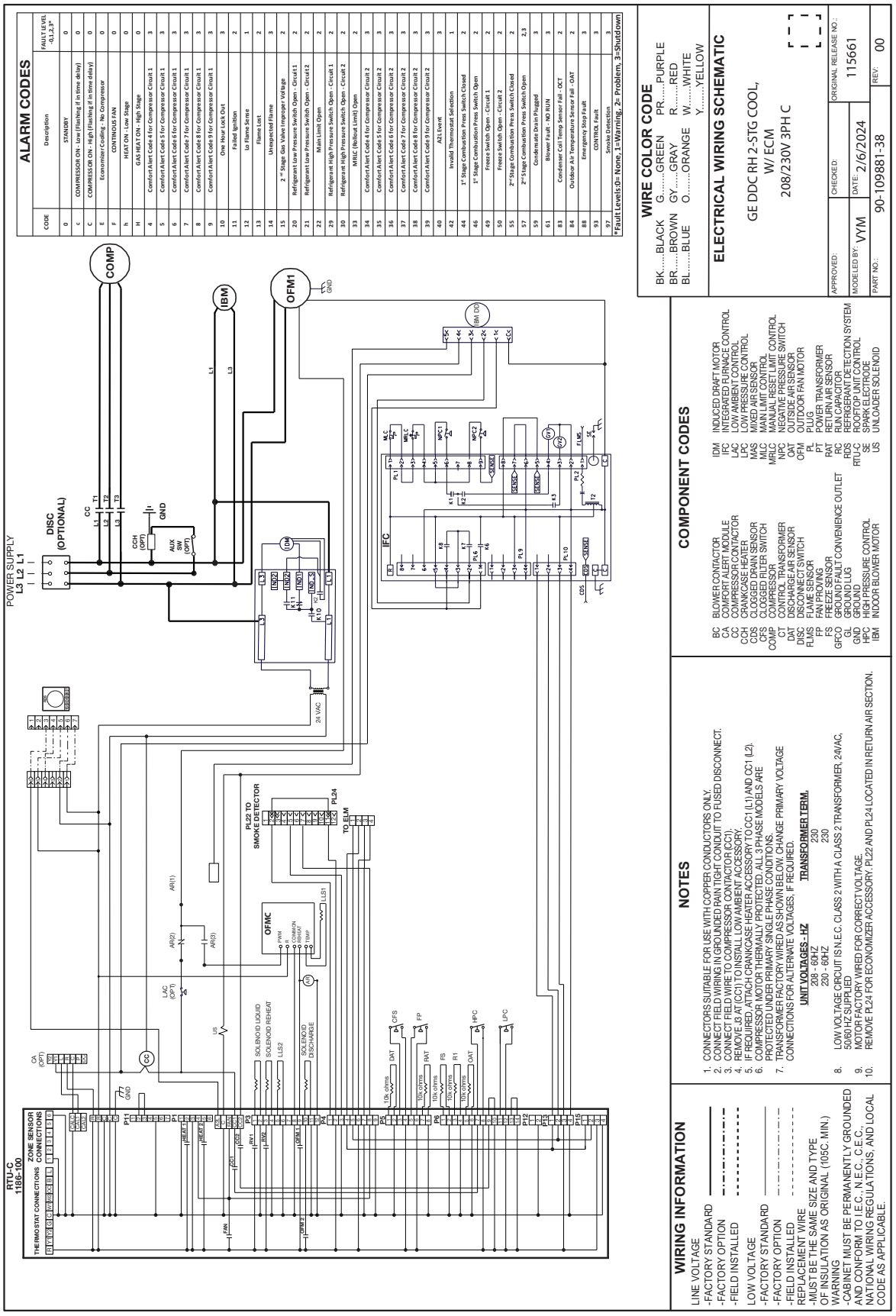


Appendix H – Wiring Diagrams & Schematics (Cont.)

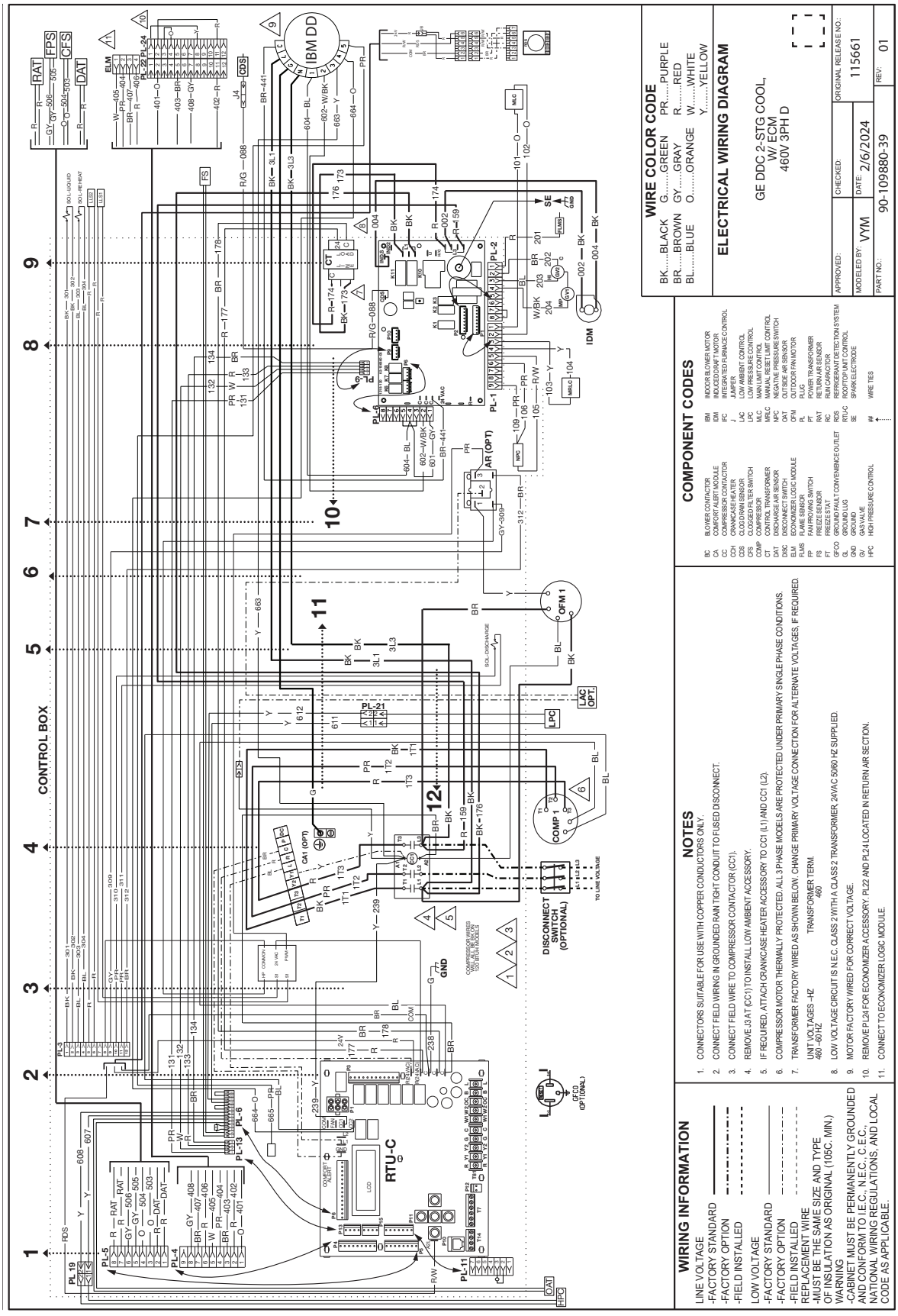


P. APPENDICES

Appendix H – Wiring Diagrams & Schematics (Cont.)

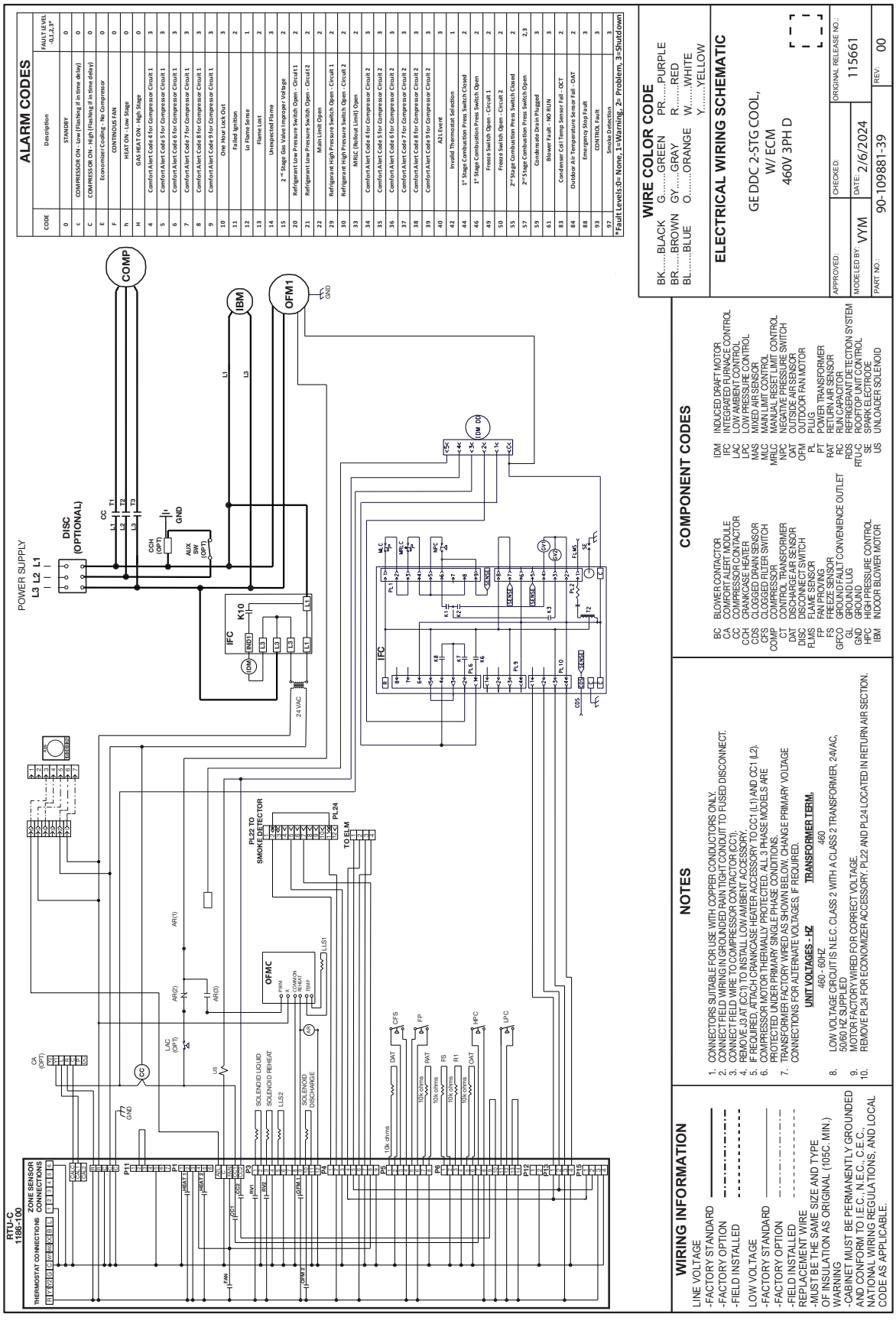


Appendix H – Wiring Diagrams & Schematics (Cont.)



P. APPENDICES

Appendix H – Wiring Diagrams & Schematics (Cont.)



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.

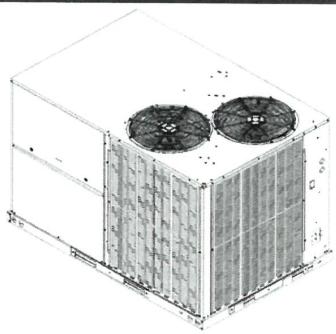
INSTALLATION:
The product(s) listed above shall be installed in strict compliance with this product evaluation & manufacturer-provided model specifications.
The product components shall be of the material specified in the manufacturer-provided product specifications. All screws must be installed in accordance 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. BENNARDO ★ LICENSE NO PE0046549 ★ STATE OF FLORIDA ★ PROFESSIONAL ENGINEER

Engineer Signature & Seal:

February 12, 2020

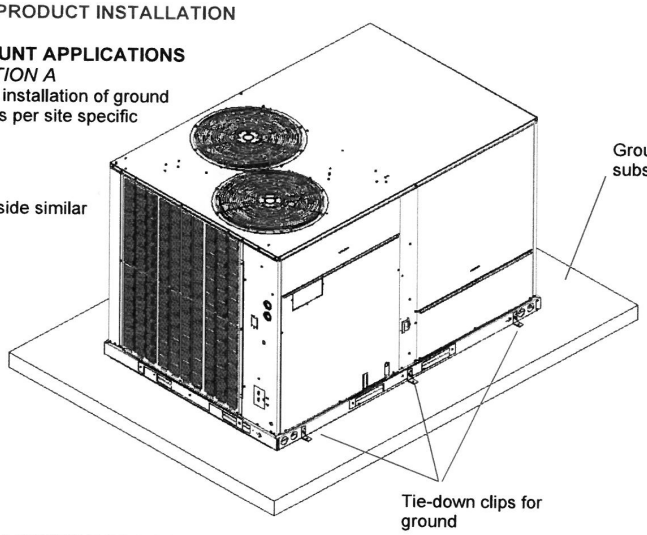
Frank L. Bennardo, P.E., SECB
ENGINEERING EXPRESS®
PE #0046549 CA #9885

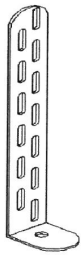
P. APPENDICES

J. Unit Tie–Down

SECTION 2 PRODUCT INSTALLATION

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





TIE-DOWN CLIP
(GROUND APPLICATION)

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

ANCHOR SCHEDULE TO HOST STRUCTURE

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

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

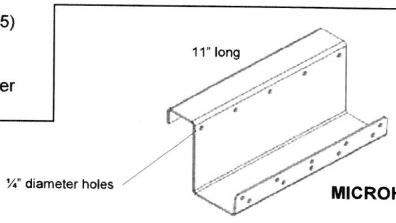
B. – #12 TEK Screws, (14) screws per clip, (5) top front side, (4) top back side and (5) bottom front side.

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

STEEL CURB
(ROOF APPLICATION)

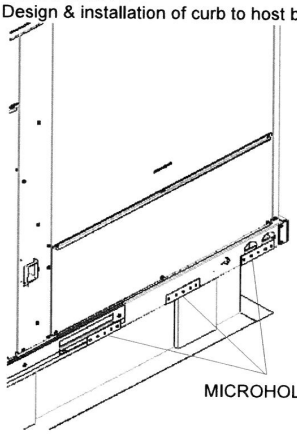
Steel curb to be a minimum of 16ga ASTM A653 steel

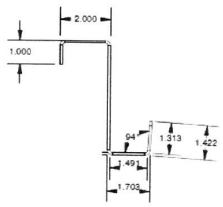
Curb Clip to be 14ga ASTM A653 steel min (Microhold)



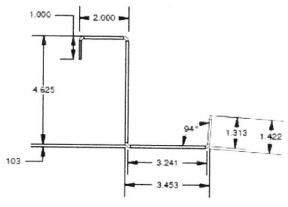
MICROHOLDS

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

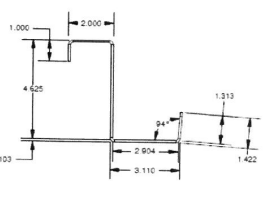




Curb Clip A



Curb Clip C

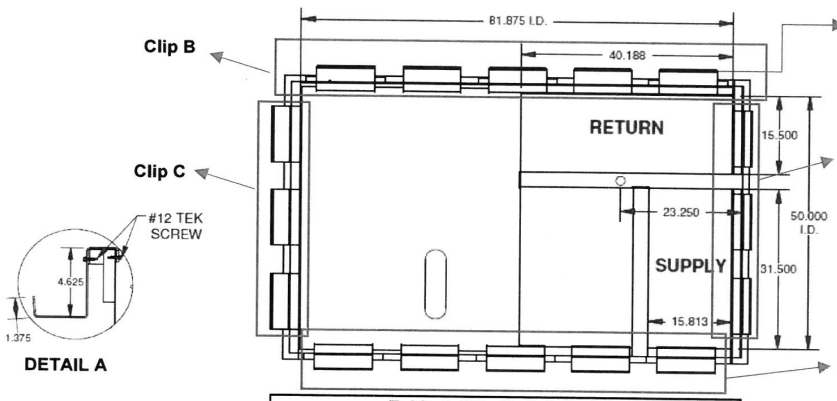


Curb Clip B

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

J. Unit Tie–Down

CURB CLIP LOCATION



DETAIL A:
Applies for all clips and anchors type B

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

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

See note (3) page (4)

Table 1: Clip Curb Schedule

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

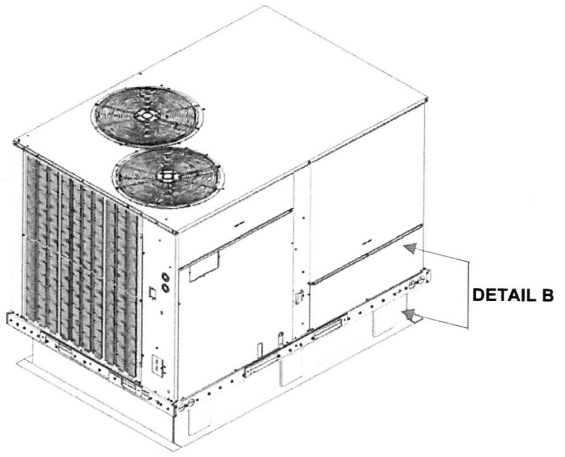
#Clip Designation (5 LS= 5 clips each Long Side; 3 SS= 3 clips each Short Side) equally spaced

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

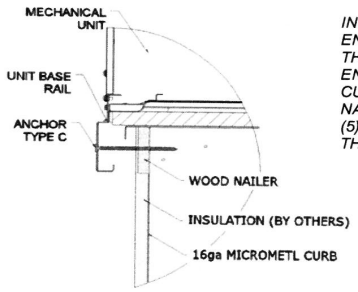
See pressures on page (2) for alternative anchor limitations

ALTERNATIVE ANCHORAGE TO CURB

STEEL CURB WITH SCREW
CONFIGURATION C



Mechanical Unit Curb Mounted



DETAIL B

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

SECTION 3 MODELS SUMMARY, DIMENSION & NOTES

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

TESTED UNIT LIMITATIONS

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

REQUIRED WIND PRESSURES

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

TEST REPORTS UTILIZED

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

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

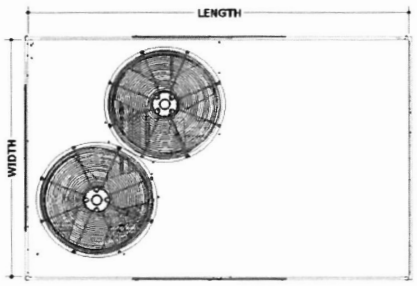
TABLE 3.1: Evaluation Model Sereis Matrix (Unit Construction Metal Cabinetry)				
Unit Model	Operating Dimensions w/ screw heads			Operating Weight (lbs)
	Width (in)	Length (in)	Height (in)	
(-)GEC - 036	46 3/4	78 3/8	41 3/8	453
(-)GEC - 048	46 3/4	78 3/8	41 3/8	477
(-)GEC - 060	46 3/4	78 3/8	41 3/8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

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

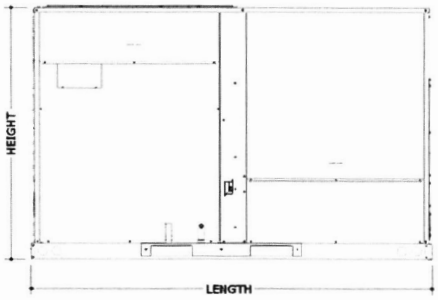
Unit Model Note: '(-)' designates equivalent trade brands with similar cabinetry and may vary depending on brand

J. Unit Tie–Down

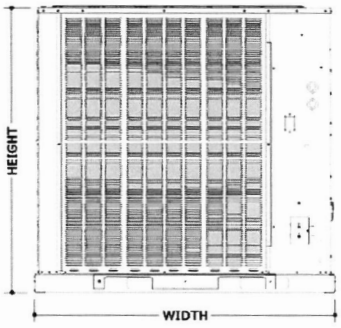
UNIT VIEWS & ELEVATIONS



TOP VIEW



ELEVATION VIEW



SIDE VIEW

Note: RGEDZR-150 illustration selected for dimensional purposes

Q. DECOMMISSIONING

Q.1. Before Beginning Decommissioning

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

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

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

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

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

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

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

Q.2. Decommissioning Procedure

Follow the decommissioning procedure outlined below:

READ ALL STEPS BEFORE BEGINNING.

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

Q.3. Labeling

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

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

R. INFORMATION FOR THE OWNER

R.1. Product Model and Serial Number

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

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

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

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

R.2.1. Filter Changing

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

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

2. How To Clean:

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

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

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

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

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

R.2.2. Cleaning Condensate Pan

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

R.2.3. Cleaning Coils

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

Directions to clean the Microchannel coils are as follows:

1. Disconnect power to the unit.

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

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

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

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

R. INFORMATION FOR THE OWNER

R.2.3. Cleaning Coils (Cont.)

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

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

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

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

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

R.2.4. Checking Electrical Components

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

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

Initial safety checks include:

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

R.3. Refrigerant Recovery

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

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

- Ensure that the correct number of recovery cylinders are available to hold the total system charge.
- All cylinders used must be designed for recovering R–454B refrigerant.
- Cylinders shall be complete with a pressure–relief valve and shut–off valves, all in working order.
- Empty recovery cylinders must be evacuated and cooled before refrigerant recovery occurs.
- The following equipment is required to be on site and in good working condition prior to and during refrigerant recovery:
- The technician’s recovery equipment
- The recovery equipment’s instructions that details the proper recovery of flammable refrigerant.
- A set of calibrated weighing scales
- Hoses, which much be complete with leak–free disconnect couplings.

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

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

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

R.4. Warranty Information

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

S. INSTALLATION CHECKLIST AND JOB SITE SHEET

Commercial Job Site Information

Site Information and Application Details:

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

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

Dealer/Contractor Information:

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

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

Distributor and Support Details:

Distributor Name : _____
City : _____ State : _____

Rep Name : _____
Visit Date: _____

Unit Setup and Operational Information

Voltage and Amperage Information :

Line Voltage Measurements :

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

24VAC Low Voltage Measurements :

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

Amperage and Power Measurements :

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

Refrigerant Circuit Information :

Circuit 1 :

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

Circuit 2 :

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

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

S. INSTALLATION CHECKLIST AND JOB SITE SHEET

Commercial Job Site Information

Blower and Air Flow Information :

Air Flow CFM :

Building Design CFM : _____

Operating System CFM : _____

Blower Speed :

Motor RPM : _____

Blower RPM : _____

Blower Sheave Turns : _____

(Turns are measured from a fully closed position)

Static Pressure :

Return Static Pressure : _____

Supply Static Pressure : _____

Total Static Pressure : _____

Economizer Setup and Information :

Outdoor Air:

Design CFM : _____

Design % : _____

Measured CFM : _____

Measured % : _____

Blade Position and Settings:

Minimum Position - Low : _____

Minimum Position- High : _____

Min Position Shaft Angle : _____

Measured % : _____

Program Settings:

Enthalpy Zone Setting : A B C D E (Circle one)

Mixed Air Temperature : _____

Min Position Shaft Angle : _____

Measured % : _____

Heat or Furnace Information :

Gas Heat :

Fuel Type : Natural LP (Circle one)

Input BTU : _____

Measured BTU : _____

Line Gas Pressure : _____

Manifold Pressure - Low : _____

Manifold Pressure - High : _____

Number of Orifices : _____

Orifice Size : _____

Flame Signal - microamp (s) : _____

	Voltage: Line 1	Voltage: Line 2	Amperage: Line 1	Amperage: Line 2	RPM	Pressure Switches (measured in inches w.c.) Low	High	Close	Open
Inducer 1:									
Inducer 2:									
Inducer 3:									
Inducer 4:									

Main Limit Closed: Yes No (Circle one)

Over Temp Limit Closed: Yes No (Circle one)

Spark Visible at Igniter : Yes No (Circle one)

Burner Flames Blue : Yes No (Circle one)

Electric Heat :

System Voltage : 208 240 460 (Circle one)

Total Kw input Rating : _____

	Stage 1 Amps:	Stage 2 Amps:	Stage 1 Watts:	Stage 2 Watts:
Phase A :				
Phase B :				
Phase C :				

Notes and Comments :