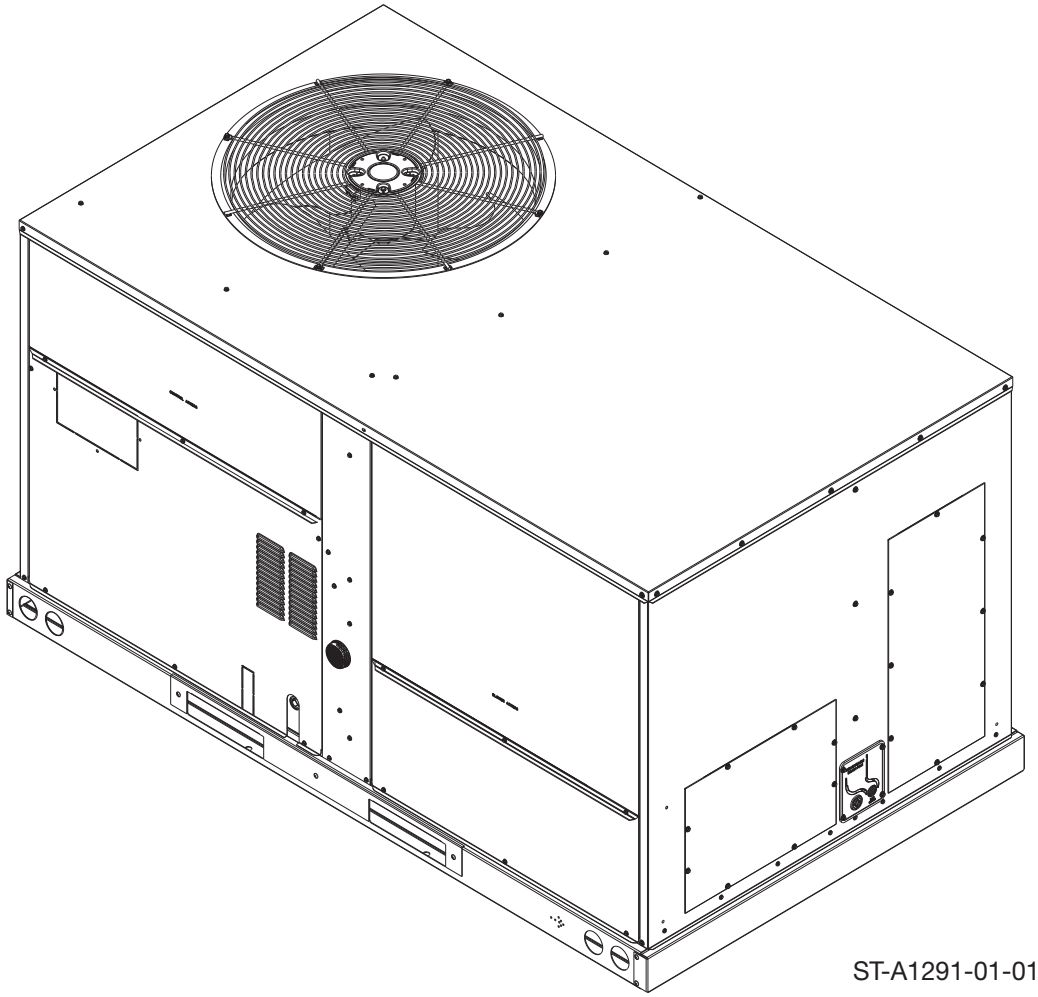
INSTALLATION INSTRUCTIONS

FOR PACKAGE GAS ELECTRIC UNITS

RGEC SERIES 3.0, 4.0, 5.0 & 6.0 TON [10.6, 14.1, 17.6 & 21.1 KW]
60 HZ MODELS
WITH R-410A REFRIGERANT



ST-A1291-01-01

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

92-106691-01-02









RECOGNIZE THIS SYMBOL AS AN INDICATION OF IMPORTANT SAFETY INFORMATION!

⚠WARNING

IF THE INFORMATION IN THESE INSTRUCTIONS IS NOT FOLLOWED EXACTLY, A FIRE OR EXPLOSION MAY RESULT, CAUSING PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

⚠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.

⚠WARNING

— Do not store or use gasoline or other flammable vapors and liquids, or other combustible materials in the vicinity of this or any other appliance.

— WHAT TO DO IF YOU SMELL GAS
- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.
- Do not return to your home until authorized by the gas supplier or fire department.

— DO NOT RELY ON SMELL ALONE TO DETECT LEAKS. DUE TO VARIOUS FACTORS, YOU MAY NOT BE ABLE TO SMELL FUEL GASES.
- U.L. recognized fuel gas and CO detectors are recommended in all applications, and their installation should be in accordance with the manufacturer's recommendations and/or local laws, rules, regulations, or customs.

— Improper installation, adjustment, alteration, service or maintenance can cause injury, property damage or death. Refer to this manual. Installation and service must be performed by a qualified installer, service agency or the gas supplier. In the commonwealth of Massachusetts, installation must be performed by a licensed plumber or gas fitter for appropriate fuel.

BA001-02

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

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A. IMPORTANT SAFETY AND GENERAL INFORMATION

A.1 Introduction

This booklet contains the installation and operating instructions for your 3 ton, 4 ton, or 5 ton combination gas heating/electric cooling unit. There are some precautions that should be taken to derive maximum satisfaction from it. 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.

NOTE: Any comments regarding the 6 ton product are for reference only. More info coming soon.

⚠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 part 431 appendix a to subpart f (uniform test method for measuring the energy consumption of small, large, and very large commercial package air conditioning and heating equipment), and the clarifying provisions provided in the standards listed below that were applicable at the date of manufacture should be used for test set up and performance.

PERFORMANCE:

- ANSI/ASHRAE 90.1 - 2016
- ANSI/ASHRAE 103 (2017)
- AHRI Operations for Unitary Small AC Equipment 210/240 (2017) for 3-5T
- AHRI Operations for Unitary Large AC Equipment 340/360 (2015) for 6T
- CSA Z21.47 (2016)

SAFETY

UL 1995 5th Edition

CSA Z21.47 (2016)

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.

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

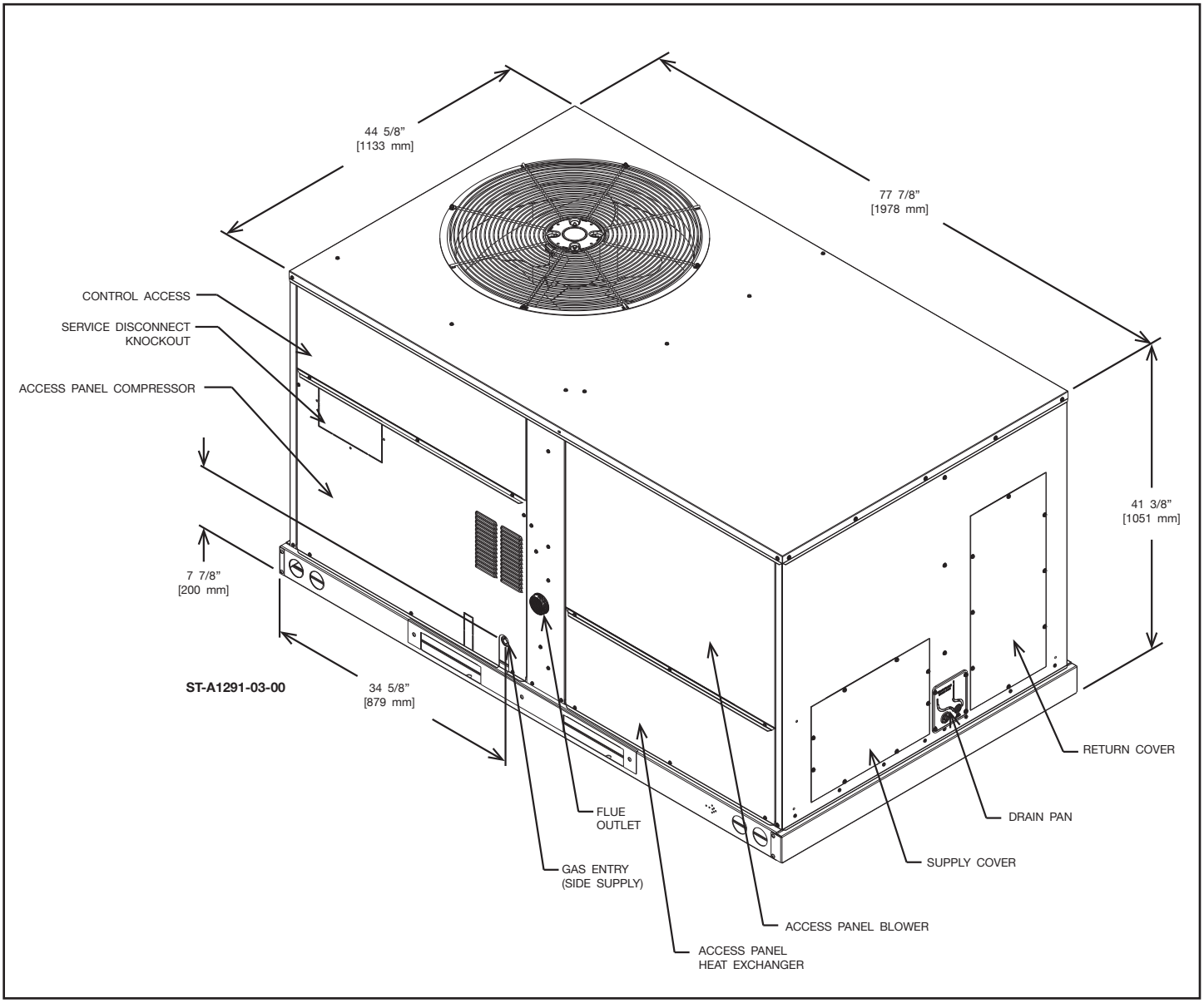
B.2. Major Components

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

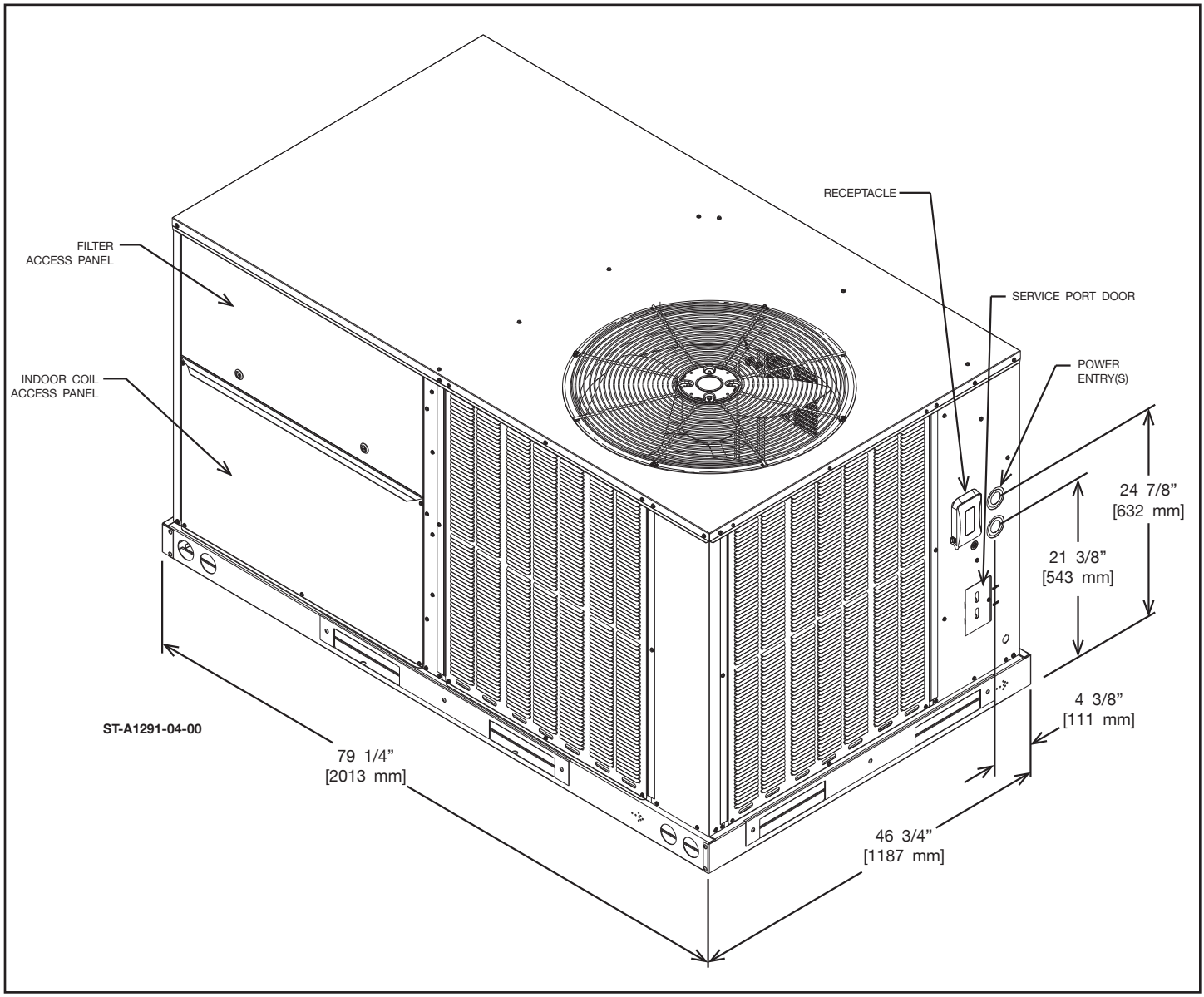
IMPORTANT: This unit must be mounted level in both directions to allow water to drain from the condenser section and condensate pan.



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

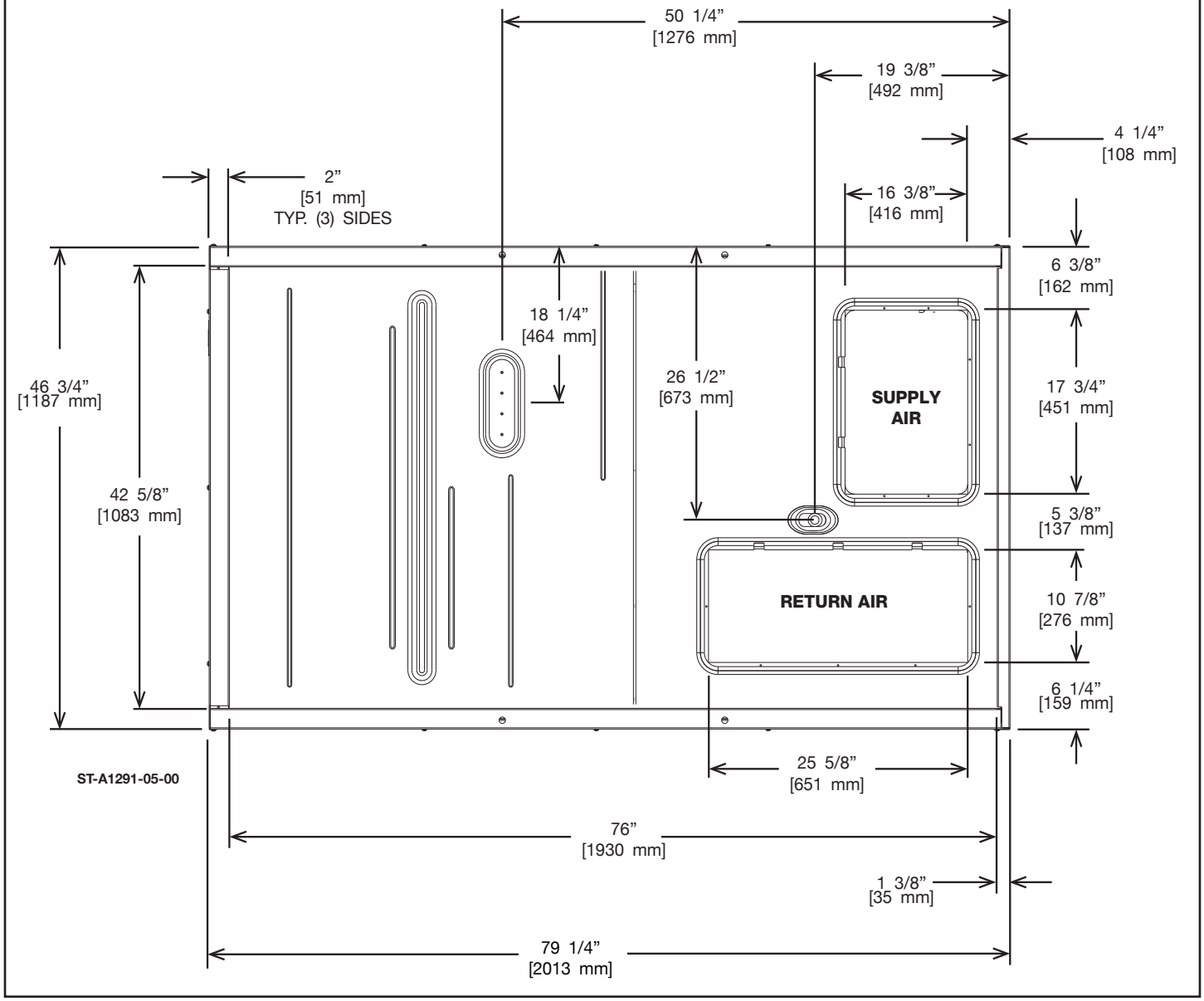
*See **Appendix B** towards the end of this manual for Electrical Data.*

B.3.5. Air Flow Performance Data

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

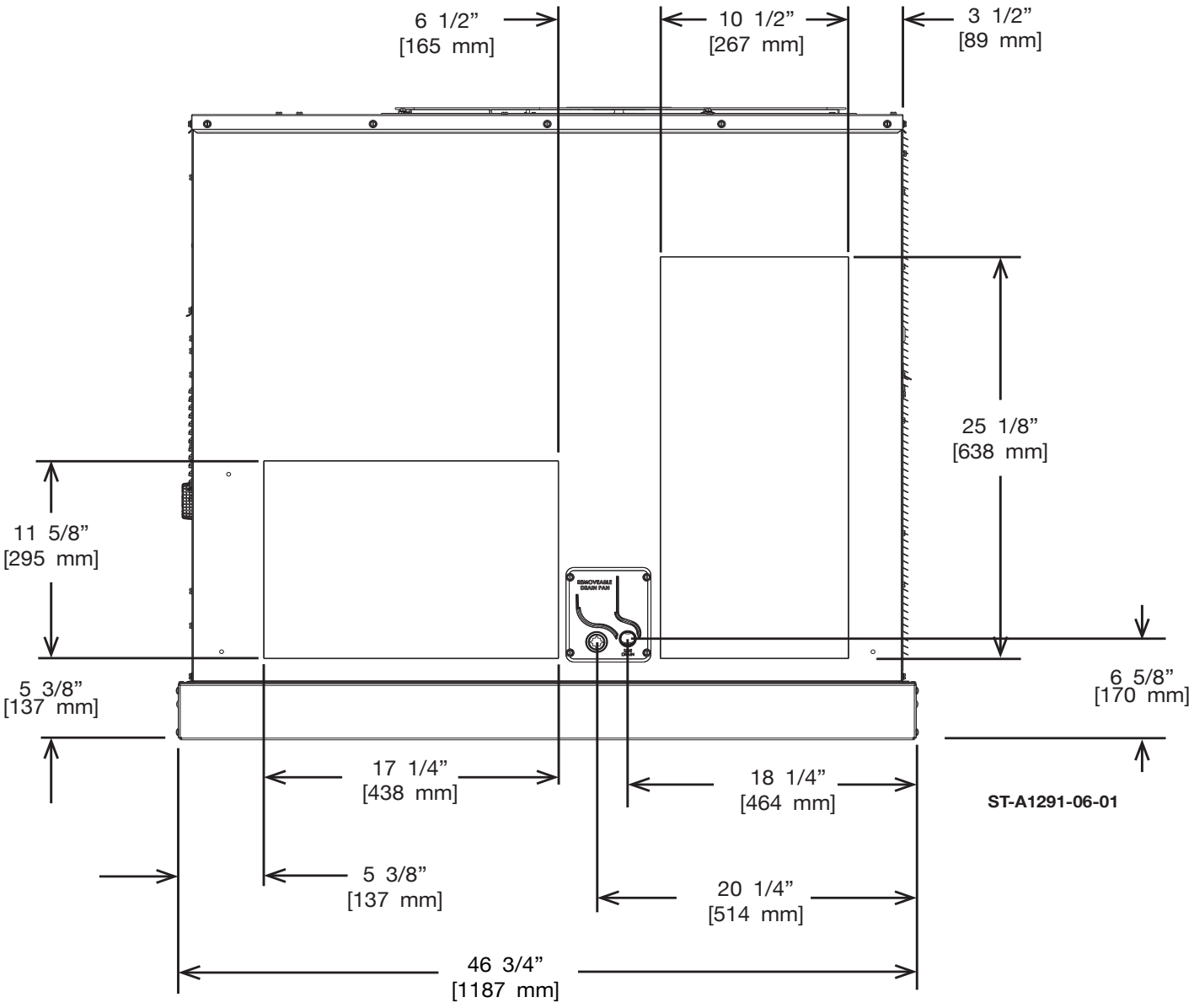
B.3.6. Supply and Return Duct Dimensions

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



B.3.6. Supply and Return Duct Dimensions

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



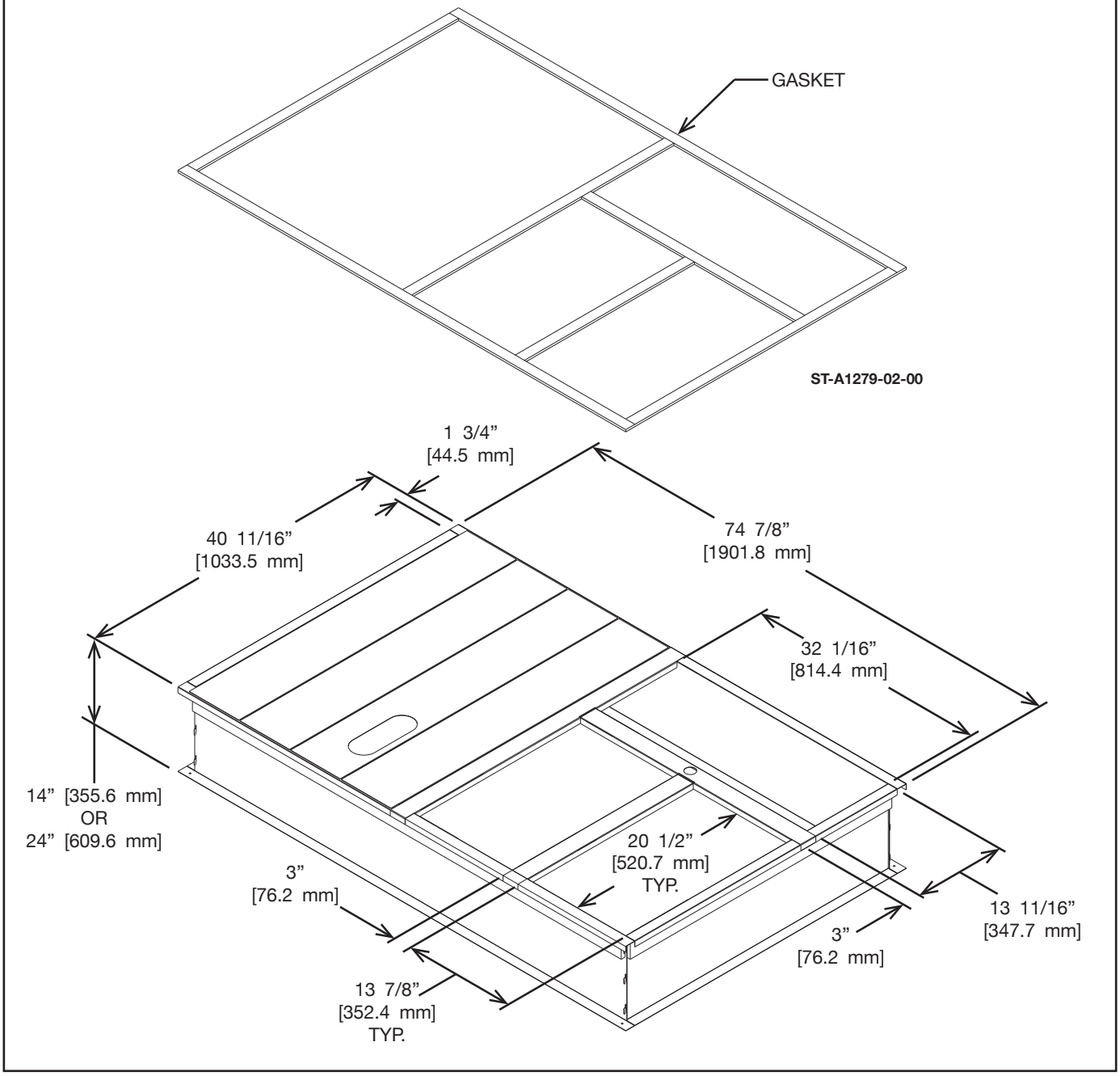
B. GENERAL SPECIFICATIONS

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 - away from bedroom windows

C.2. Tool and Refrigerant

C.2.1. Tools Required for Installing and Servicing R-410A 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-410A

All units are factory charged with R-410a Refrigerant.

Combustibility: At pressures above 1 atmosphere, mixture of R-410A and air can become combustible. **R-410A and air should never be mixed in tanks or supply lines, or be allowed to accumulate in storage tanks. Leak checking should never be done with a mixture of R-410A and air.** Leak checking can be performed safely with nitrogen or a mixture of R-410A and nitrogen.

C.2.3. Quick Reference Guide for R-410A

Ensure that servicing equipment is designed to operate with R-410A.

- R-410A refrigerant cylinders are pink.
- R-410A, as with other HFC’s is only compatible with POE oils.
- Vacuum pumps will not remove moisture from POE oil.
- R-410A 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-410A.

C. INSTALLATION OF THE UNIT

C.2. Tool and Refrigerant

C.2.4. Evaporator Coil/TXV

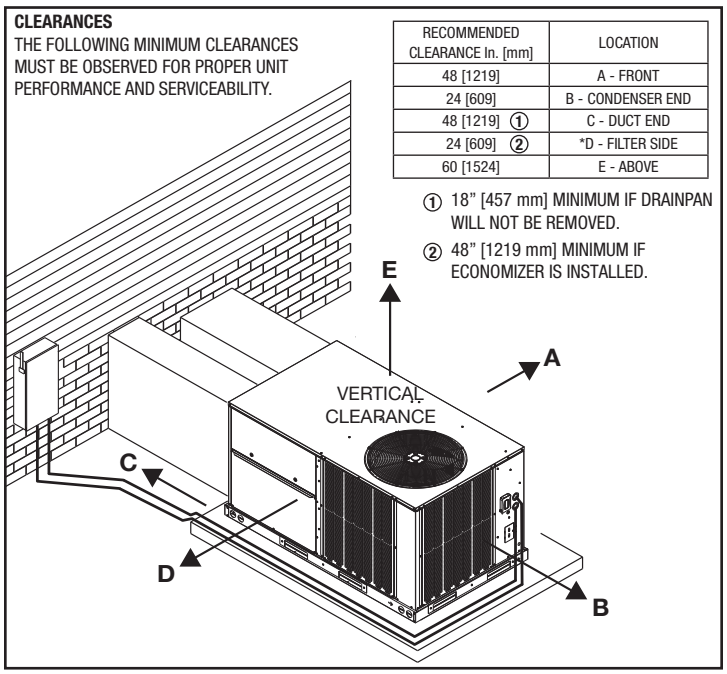
The thermostatic expansion valve is specifically designed to operate with R- 410A. **The existing evaporator must be replaced with the factory specified TXV evaporator specifically designed for R-410A.**

C.3. Choosing a Location

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

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

Figure C.3.1. - A: Allowable Clearances



C.3.2. Outside Installation

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

⚠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.

1. 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.

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

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.

C.3.5. Cover Panel Installation/ Conversion Procedure

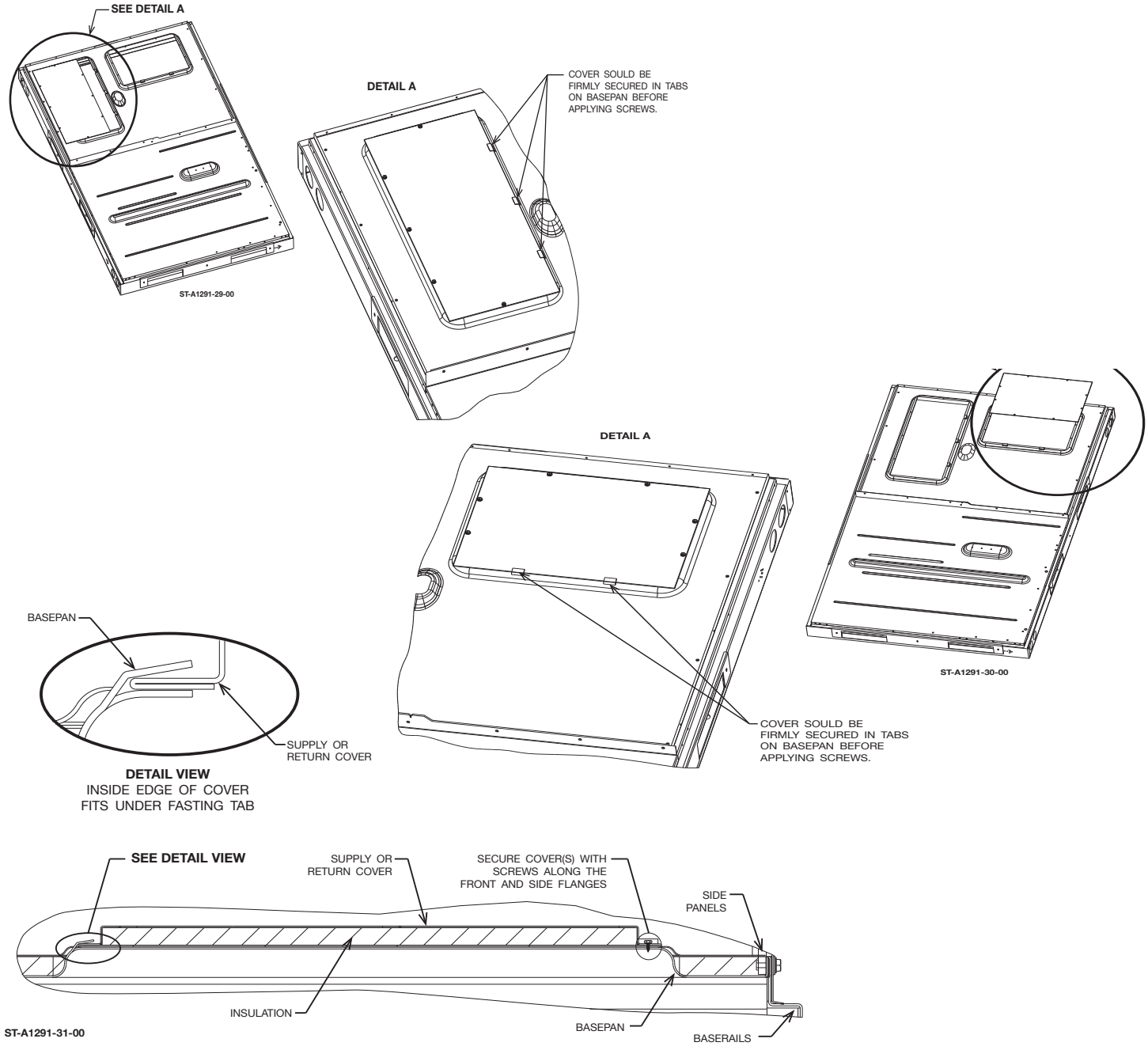
FROM DOWNFLOW TO HORIZONTAL

1. Remove the covers from the supply and return openings on the unit. ***See Figure B.3.6. – B*** for reference.

2. Install the covers over the supply and return openings in the basepan, painted side up, inserting the leading flange under the bracket provided. Place the back flange to top of the front bracket provided. ***See Figure C.3.5. –A*** for reference.

3. Secure the return and supply cover to front bracket with screws.

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



C. INSTALLATION OF THE UNIT

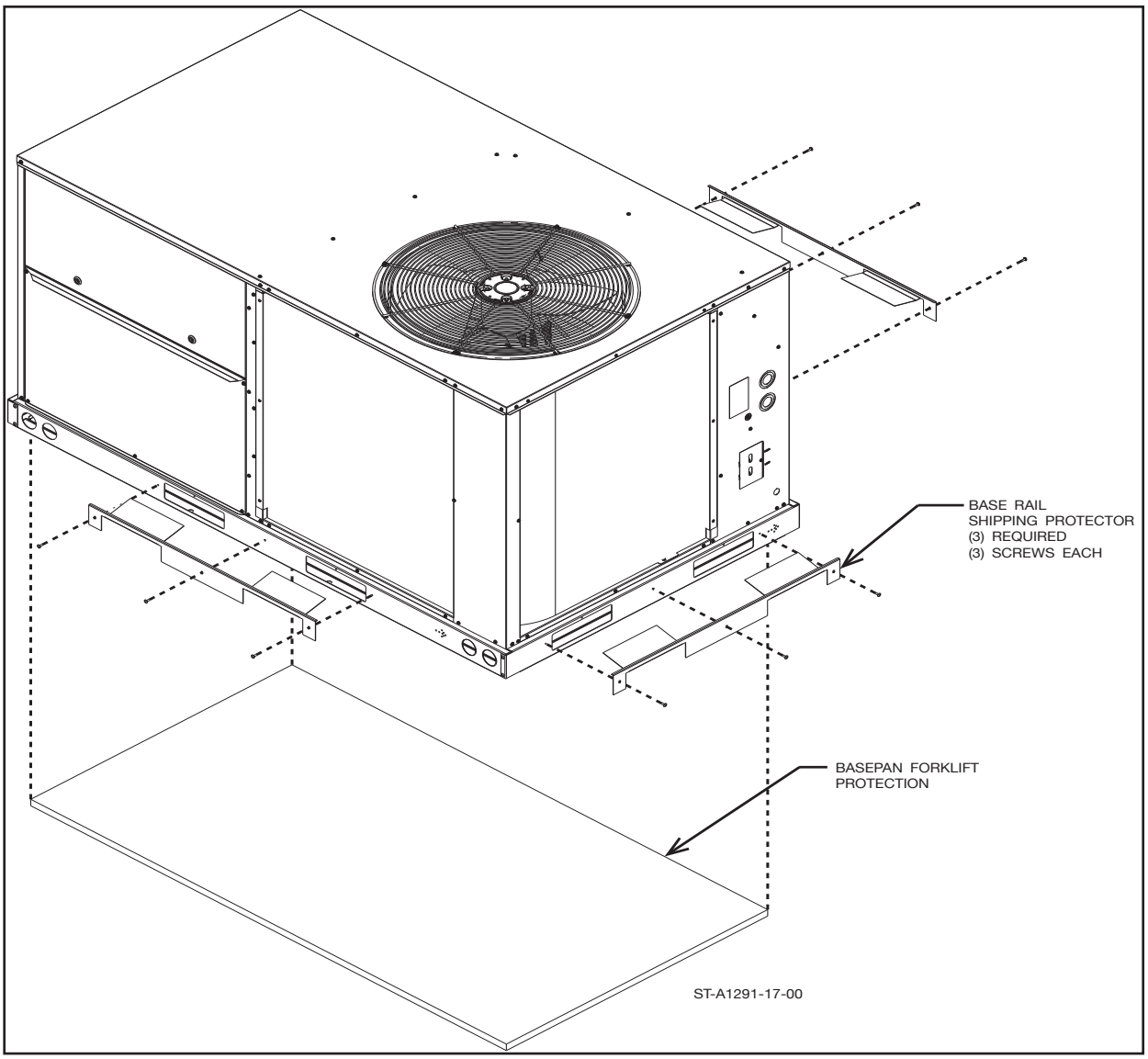
C.4.Setting the Unit

C.4.1. Removing Shipping material

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

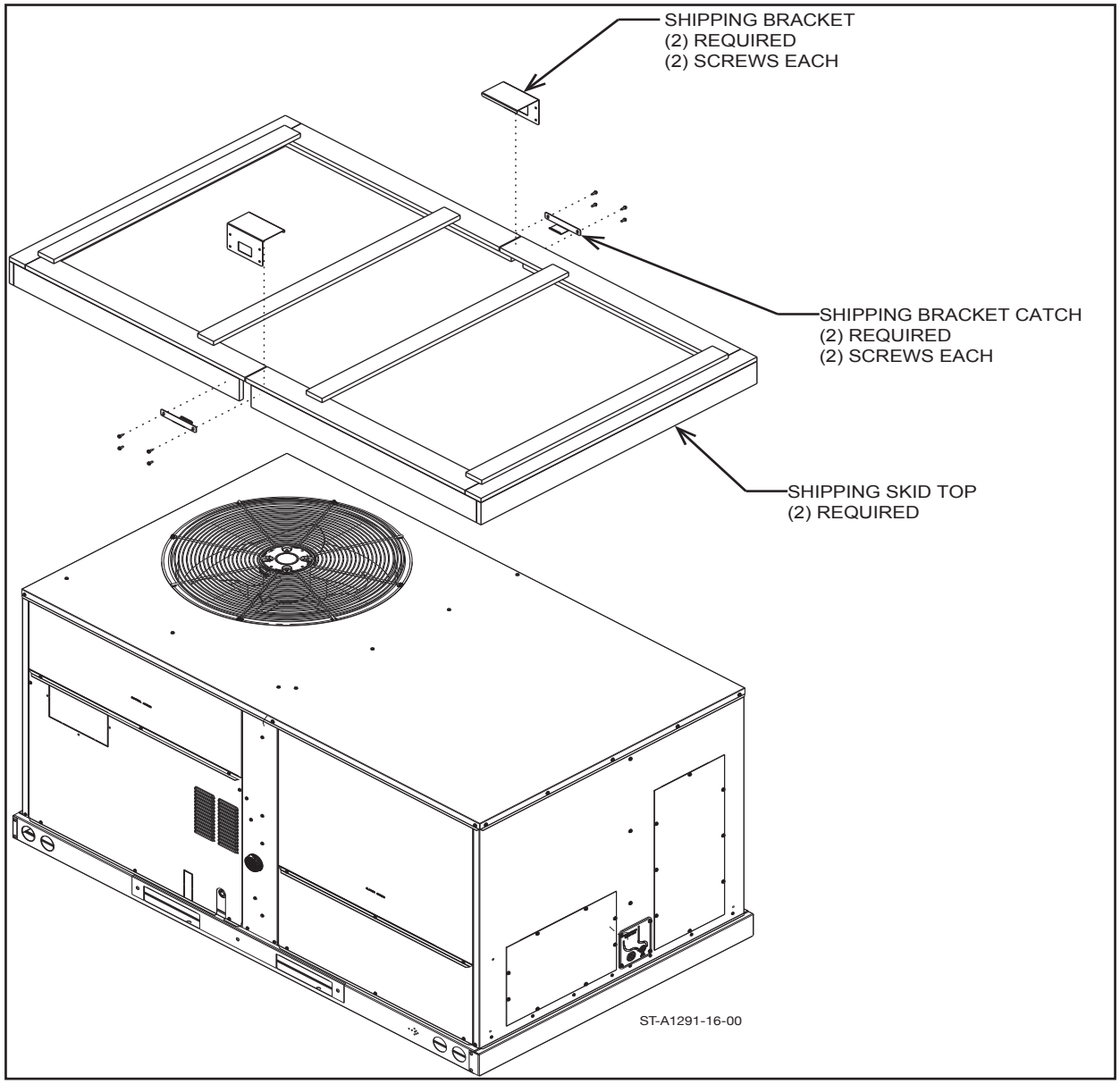
• **Cardboard Basepan Protection** – Remove the screws that attach the metal brackets for each of the forklift fork-entry points, and remove the brackets. This will release the cardboard from underneath, and it may be removed when the unit is lifted.

Figure C.4.1. – A: Basepan Protection Assembly



• **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.

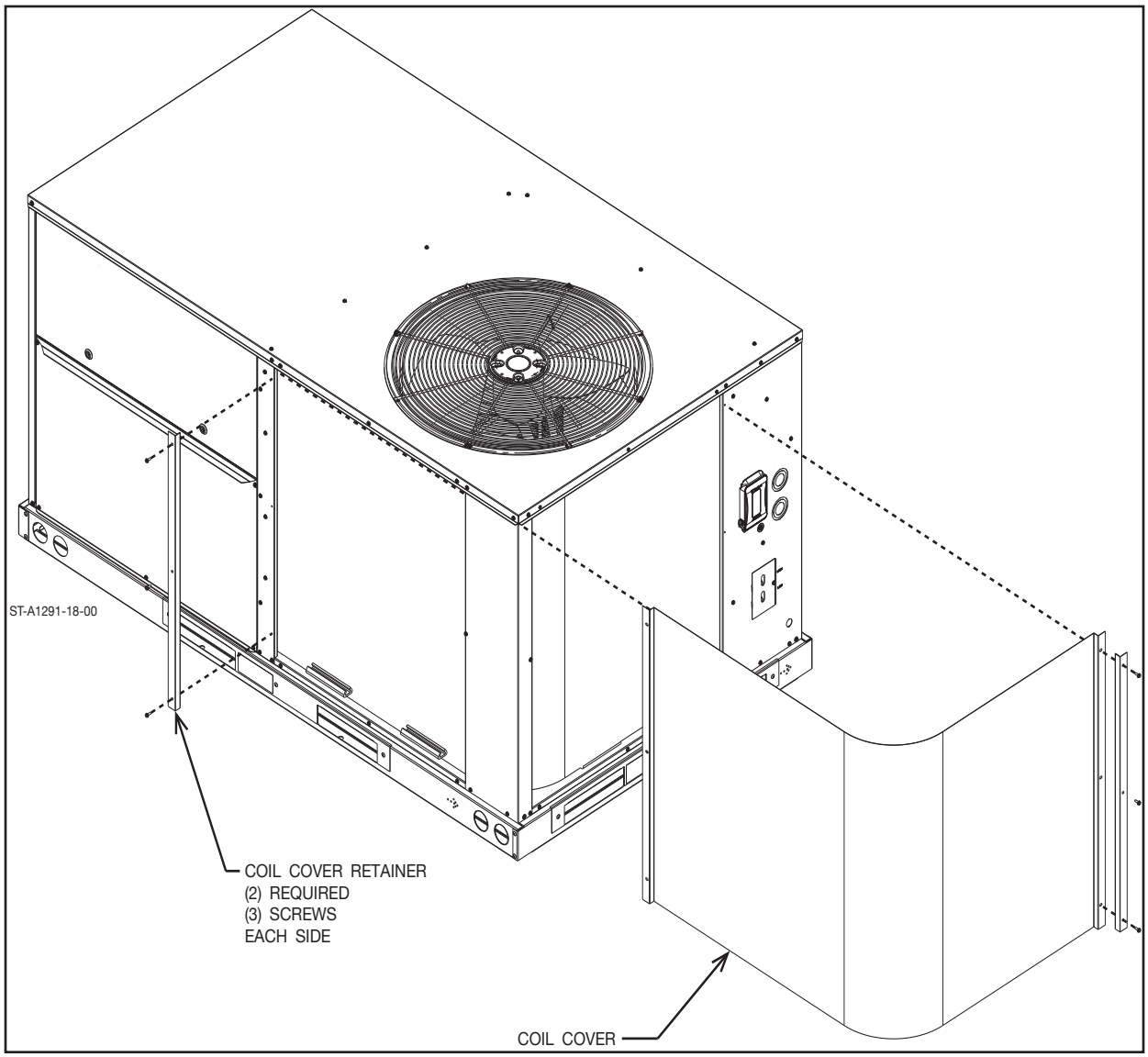
Figure C.4.1. – A: Wooden Skid Assembly



C. INSTALLATION OF THE UNIT

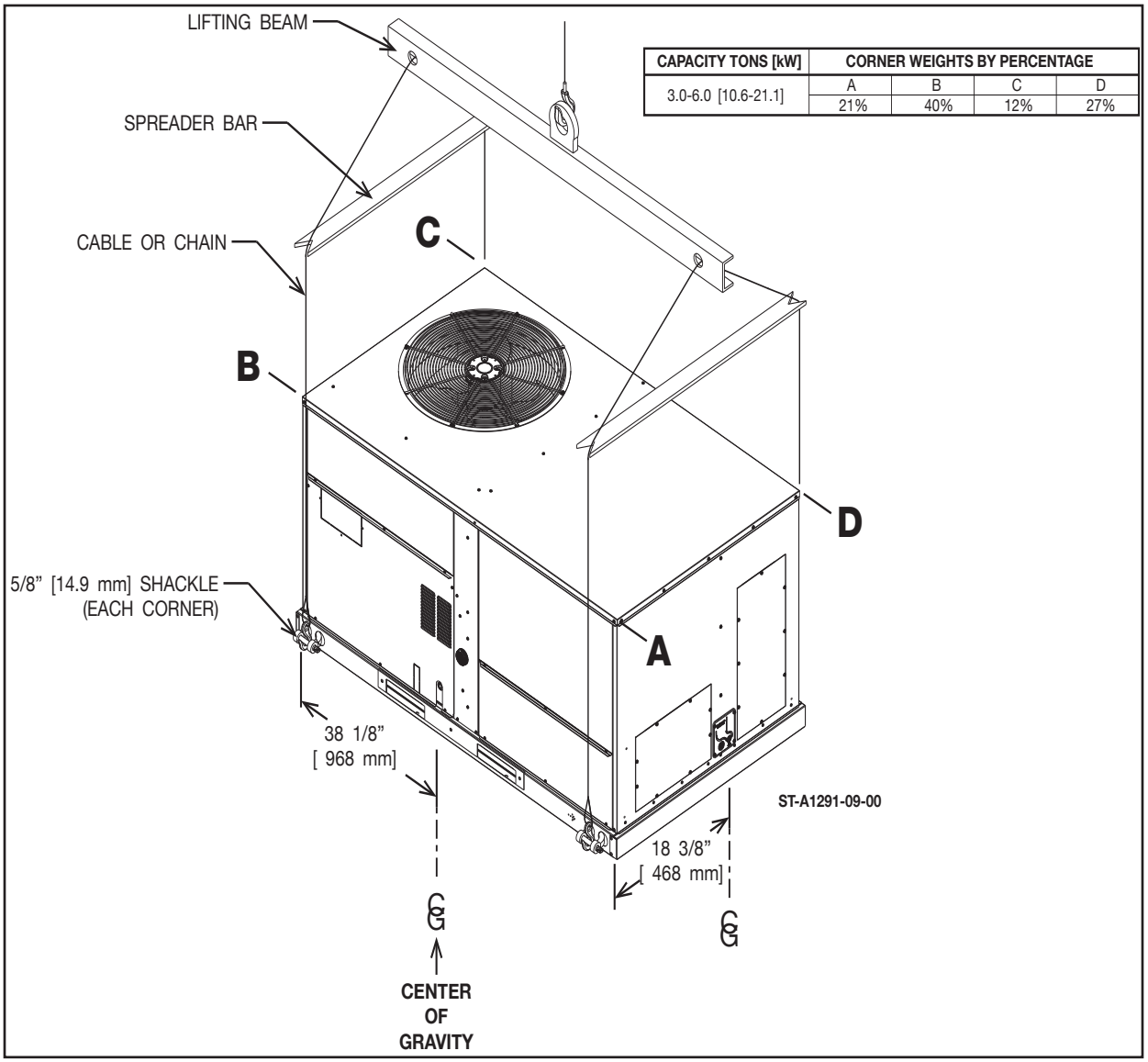
• **Condenser Coil Protection –** Remove the screws along the perimeter of the coil protector. This will allow the protector to be removed. If the unit has louver panels, it will not have the condenser coil protection.

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



C.4.2. Lifting the Unit

Figure C.4.2. – A : Lifting Detail



CAPACITY TONS [kW]	CORNER WEIGHTS BY PERCENTAGE			
	A	B	C	D
3.0-6.0 [10.6-21.1]	21%	40%	12%	27%

C. INSTALLATION OF THE UNIT

C.4.3. On a Roof Curb

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

Only use manufacturer-approved roofcurb products for the unit.

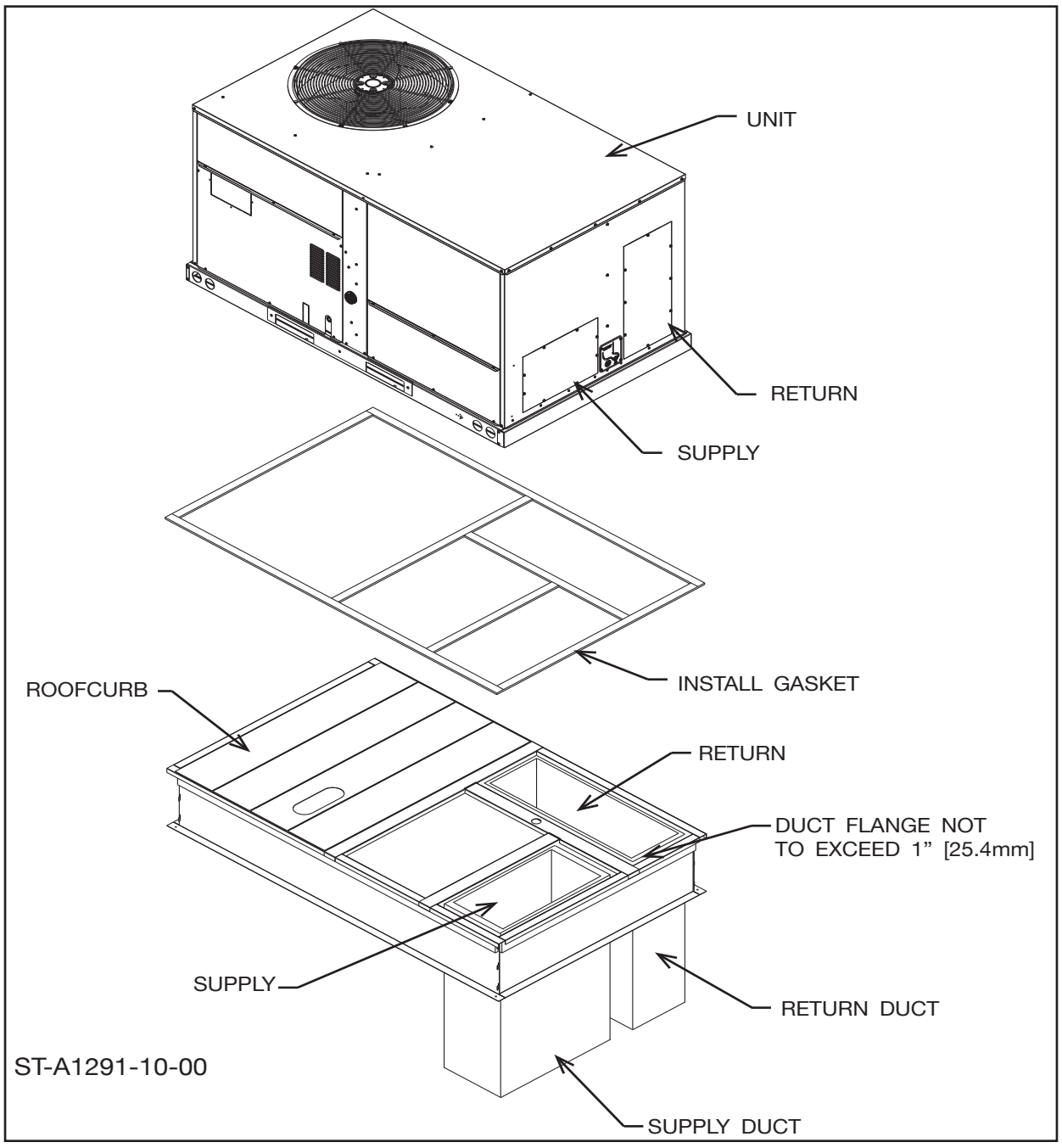
C.4.3.1. Installing the Roof Curb

Refer to the separate Installation Instructions for installing a roof curb. These instructions are listed under these Manufacturer Part numbers:

- 14" and 21" Roofcurb: 92-107192-21
- Roofcurb Adapter: 92-107192-23

C.4.3.2. Setting the Unit

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



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

The units must be secured in compliance with ASCE 7-10 and the Florida Building Code 5th Edition. 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 Florida Building Code 5th Edition. Please refer to ***Appendix J: Unit Tie-Down Methods.***

C.5. Installing Condensate Drain

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

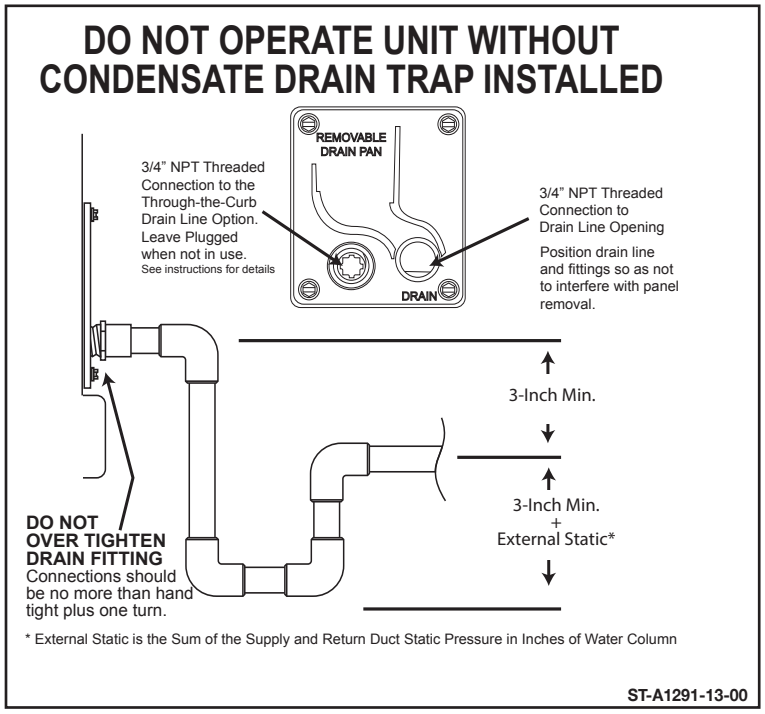
The condensate drain pan has a threaded female 3/4 inch NPT (11.5 TPI) connection. Drain line must be no smaller than drain pan outlet and adequately sized to accommodate the condensate discharge from the unit. Drain line must be routed to an acceptable drain or outdoors in accordance with local codes.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

Figure C.5.1 – A: Condensate Drain Tap



C.5.2. Keeping the condensate drain pan serviceable

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

C.5.3. Connecting the Drain trap

- Use a thin layer of Teflon tape or paste on drain pan connections and install only hand tight.
- Do not over tighten drain pan connections as damage to the drain pan may occur.
- Drain line must be routed to an acceptable drain or outdoors in accordance with local codes.
- Drain line should slope away from unit a minimum of 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. INSTALLATION OF THE UNIT

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 cardboard basepan protector will block all indoor airflow for downflow configurations.

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

C.6.2. Checking Level and Slope

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

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 installing contractor should fabricate ductwork in accordance with local codes.

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

Contact Air Conditioning Contractors of America, 1513 16th St. N.W., Washington, D.C. 20036.

⚠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/homeowner must be informed against future changes in construction which might change this to a “confined space.” Also, caution the user/homeowner against any future installation of additional equipment (such as power ventilators, clothes dryers, etc.), within the existing unconfined and/or confined space which might create a negative pressure within the vicinity of other solid, liquid, or gas fueled appliances.

D. DUCT AND VENTING

D.2.1. Supply Duct Systems

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

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

D.2.2. Return Duct Systems

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

The return duct opening for roof curb installations is 25 5/8" x 10 7/8", the return duct opening for horizontal ducted installations is 26 5/8" x 12". See ***Figure B.3.6. – A and – B*** for reference.

⚠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.

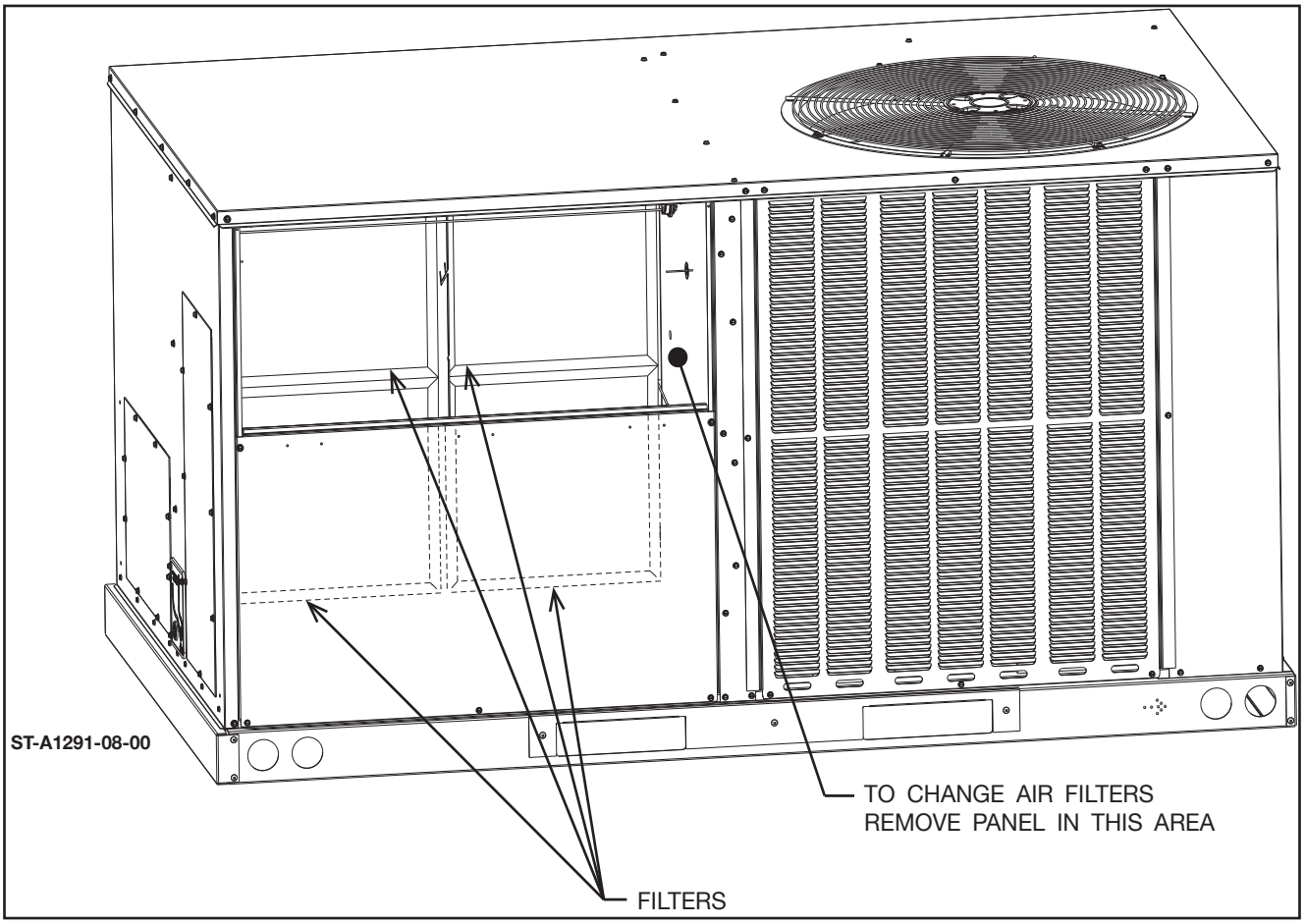
Failure to prevent products of combustion from being circulated into the living space can create potentially hazardous conditions, including carbon monoxide poisoning that could result in personal injury or death.

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

D.3. Filters

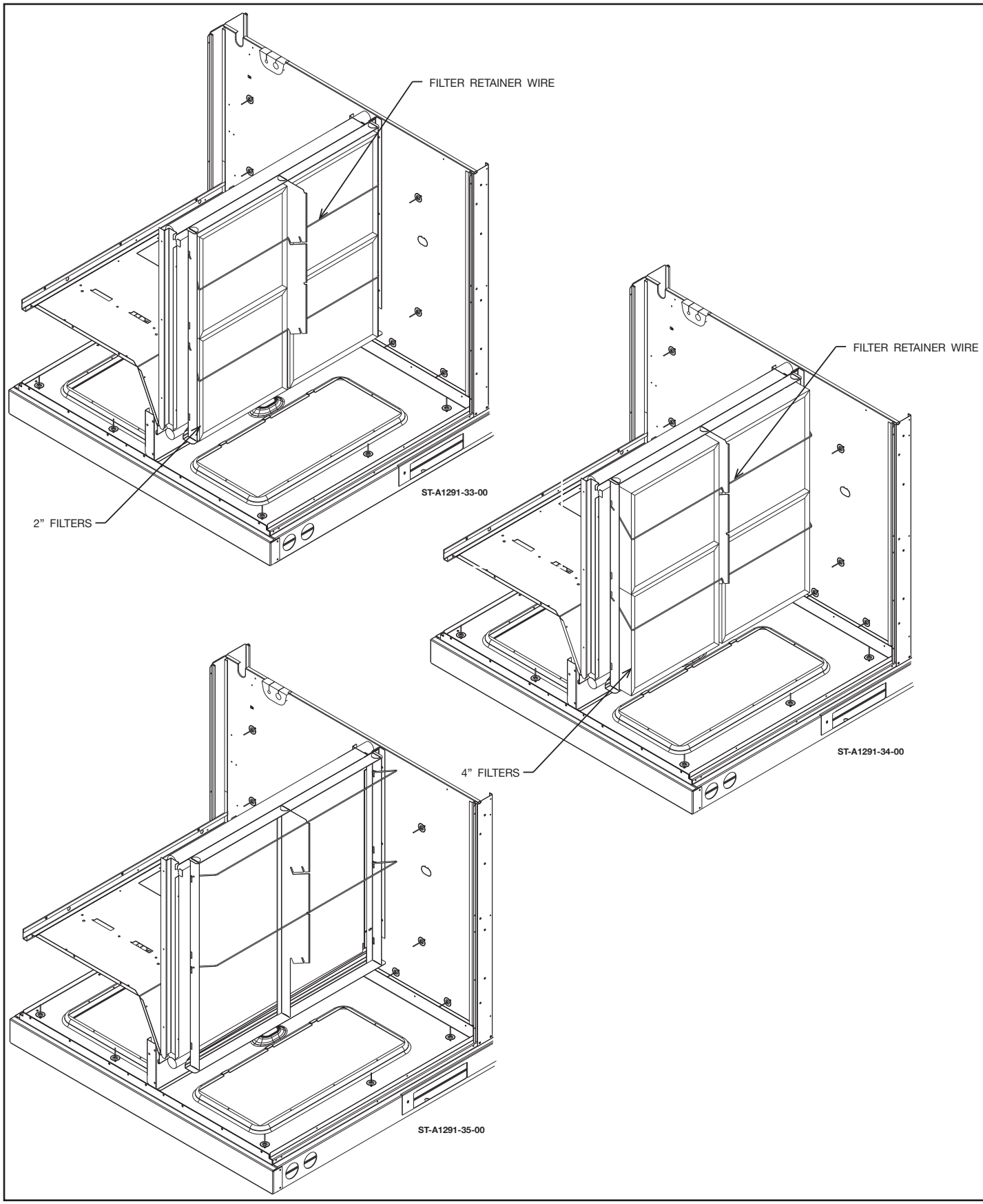
D.3.1. Installing Filters



D. DUCT AND VENTING

D.3. Filters

D.3.1. Installing Filters (Cont.)



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

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

D.4. Economizers and Fresh Air Dampers

D.4.1. Economizer Information

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

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

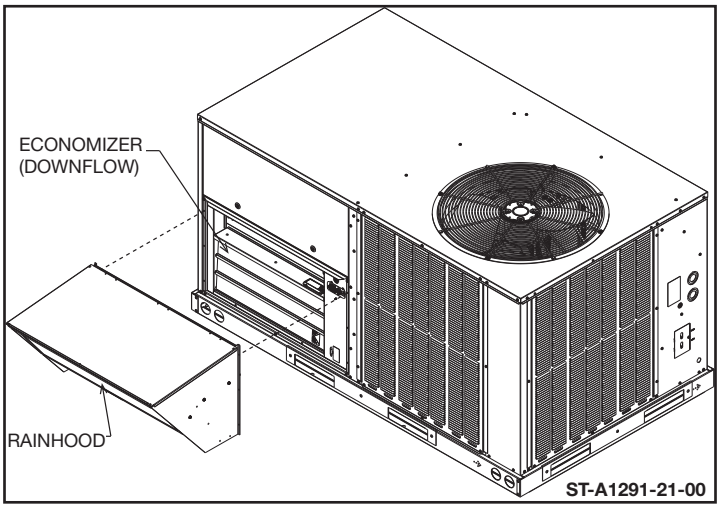
The Horizontal Economizer is designed specifically for units setup in a horizontal flow configuration. The horizontal economizer utilizes independently actuated return-air and fresh air dampers to enable the most efficient handling of air achievable with this platform. The horizontal economizer also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

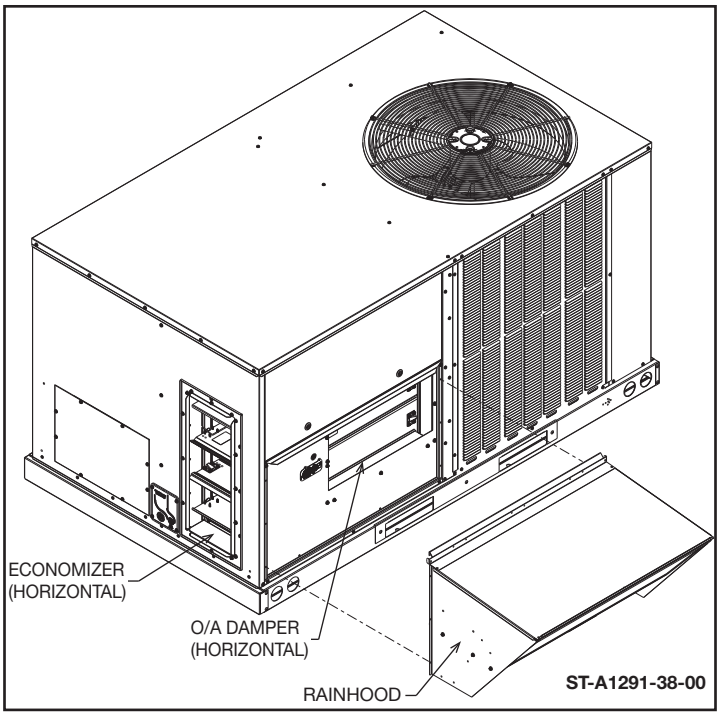
All units with economizers come shipped from the factory with a parts bag and a separate document for Economizer Installation & Operation instructions. Refer to that document for information on how to install the economizer, connect the controls, and adjust the airflow. Accessory economizers purchased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

For reference, the Installation Instructions for economizers may be found under these Manufacturer part numbers:

- Downflow Economizer: 92-107192-17
- Horizontal Economizer: 92-107192-18
- Downflow Economizer w/ DDC: 92-107192-19
- Horizontal Economizer w/ DDC: 92-107192-20

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





D. DUCT AND VENTING

D.4.2. Fresh Air Dampers

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

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

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

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

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

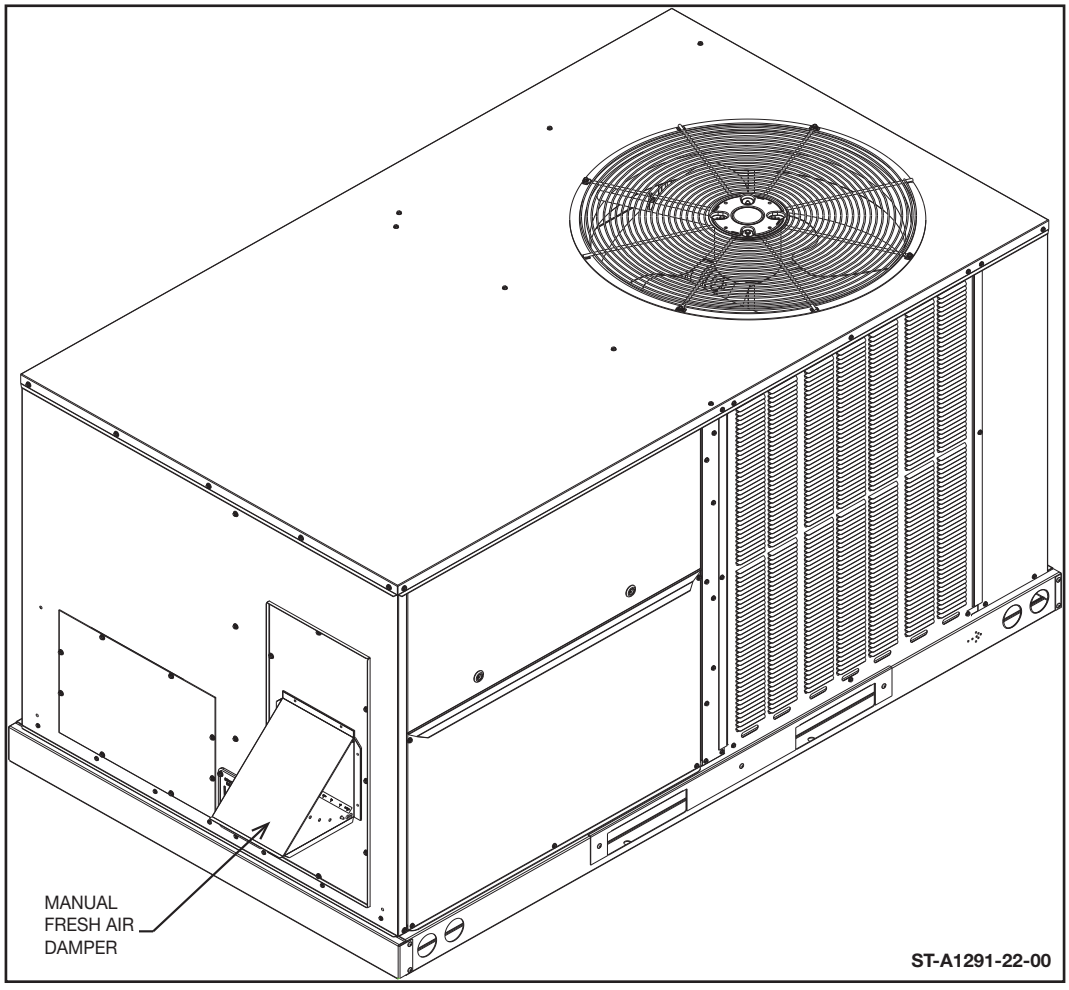
By connecting a Timer, CO2 Sensor or Smoke Detector in series between the RTU fan ("G" on the Thermostat) and actuator, the damper can be controlled during "Unoccupied" hours, or allow the damper to only introduce outside air during "On-Demand Occupancy."

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

For reference, the Installation Instructions for Fresh Air Dampers may be found under these manufacturer part numbers:

- Manual Fresh Air Damper: 92-107192-25
- Motorized Fresh Air Damper: 92-107192-26

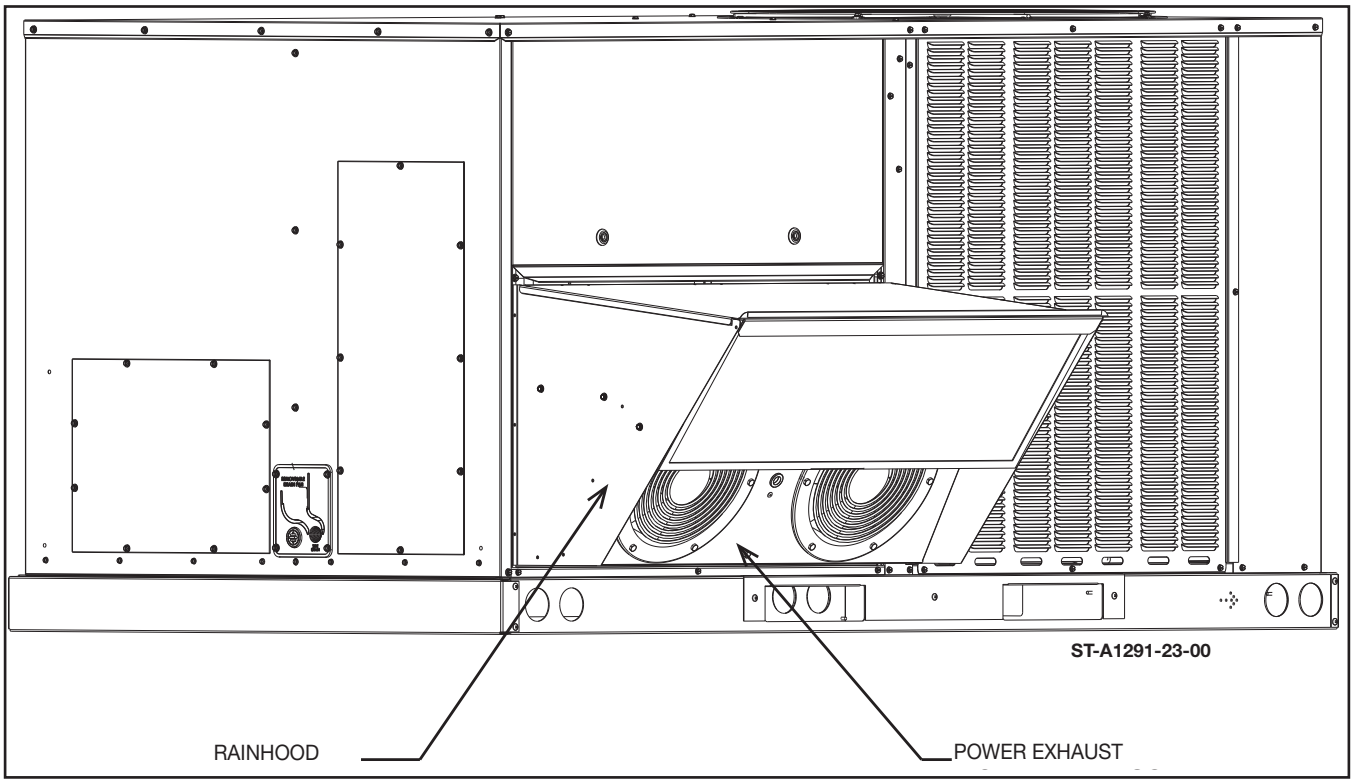
Figure D.4.2. – A: Fresh Air Damper



D.4.3. Powered Exhaust

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

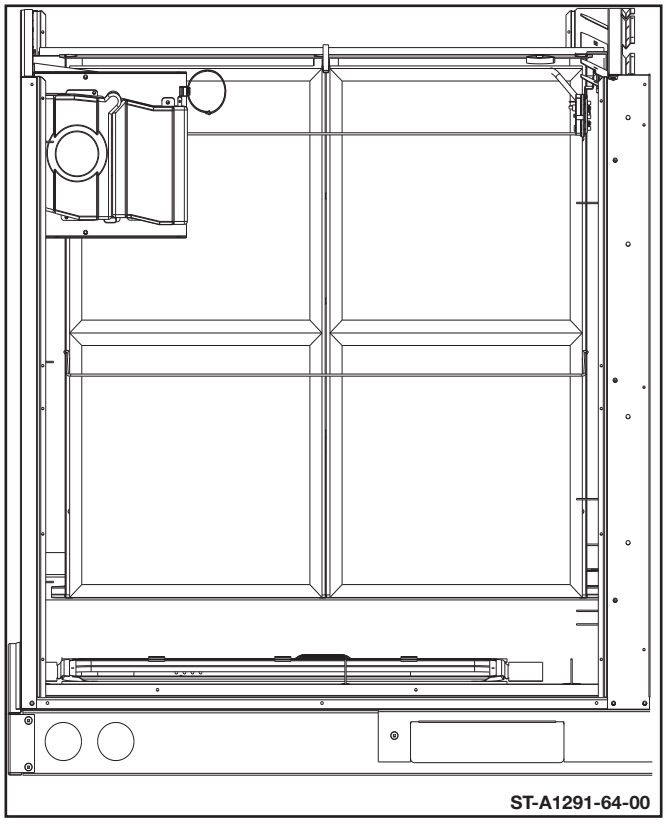
Figure D.4.3. – A: Powered Exhaust

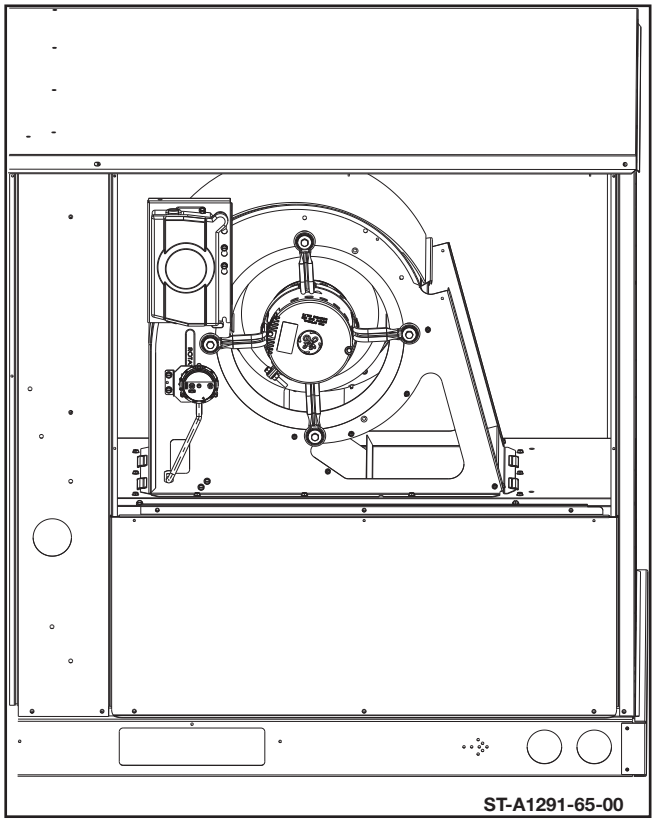


D. DUCT AND VENTING

D.5. Smoke Detectors

Figure D.5. – A: Smoke Detector Assembly





D.5.1. Supply Duct Smoke Detectors

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

Field install Supply and Return Duct Smoke Detectors come shipped with a separate document for Installation & Operation instructions. Refer to the separate Installation Instructions for installing, wiring, and setup of a supply and return smoke detector. These instructions are listed under ***Manufacturer Part number: 92-106191-03.***

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, ***Manufacturer Part Number 92-106191-03***, for smoke detector for wiring diagrams and additional assembly instructions.

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.2. – A: Power and Control Routing***. All fittings and conduit are field supplied for this application. Reference the chart with ***Figure F.2. – 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.

E. ELECTRICAL

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.1.2. 208/240 Volt Operation and Required Adjustments

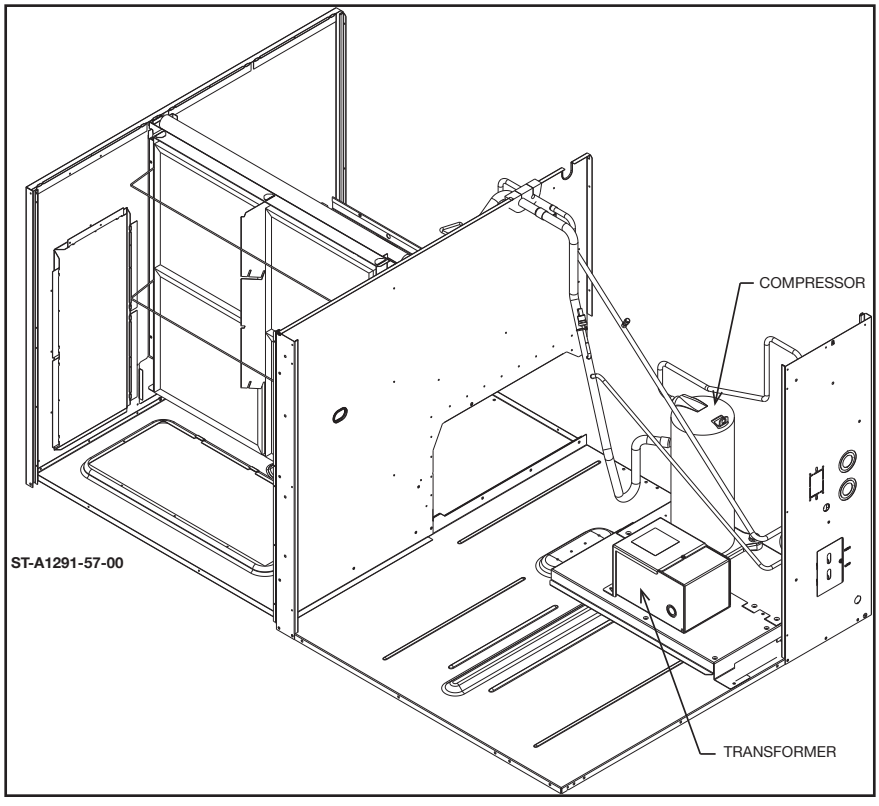
E.1.2.1.Low Voltage Transformer Tap Adjustment for 208Volt

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. 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.

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

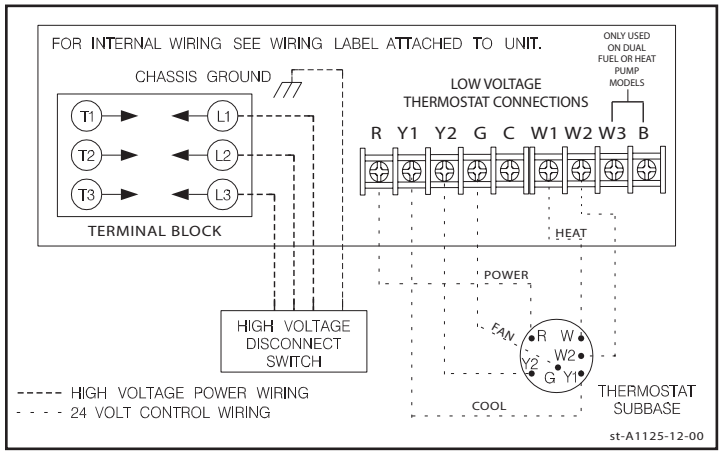


E.2. Electrical Data

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.

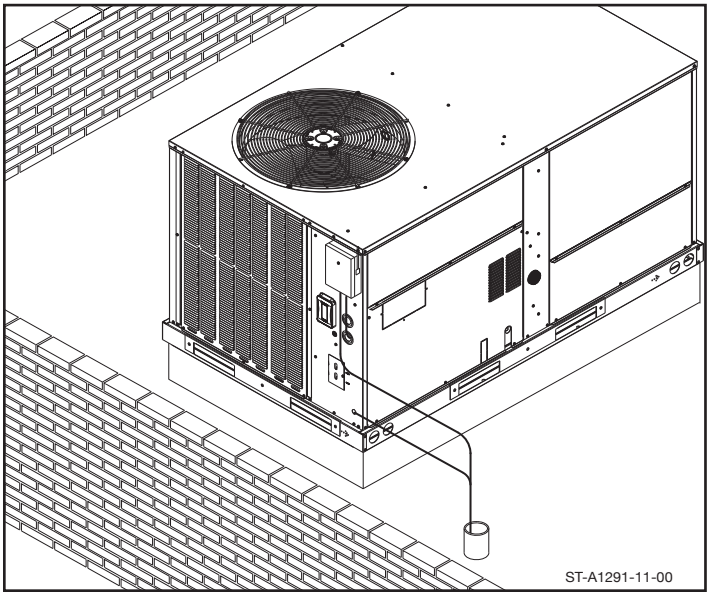
Refer to ***Figure F.2. – A: Power and Control Routing*** for location of wiring entrances, and ***Figure F.2. – B: Hole Sizing for Conduit.***

E.3.1. Field Supplied Disconnect

The field supplied service disconnect will come with a separate Installation Instruction document. Please refer to that document, or ***Manufacturer part number: 92-106191-04.***

E.3.1.1. Mounting Disconnect on Cabinet

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



Attach the disconnect to the top of the left hand side of the control box, above the knockouts and refridgerant 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.2. – 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 G*** for the unit wiring diagrams, and to ***Figure F.2. – A*** for locations to route wires into the cabinent 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.2.*** 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.

Manufacturer I&O part number: 92-42576-03

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 addional hook-up will be needed, but ensure the connections remained secure from shipping before powering the unit.

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

Manufacturer I&O part number: 92-106973-01

E.3.4. Checking Phase and Motor Rotation

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

E.3.4.1. Checking Phase with VFD Drive

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

E.3.5. Grounding Requirements

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

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

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

The 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

Figure F. - A

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

ST-A1291-14-00

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

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

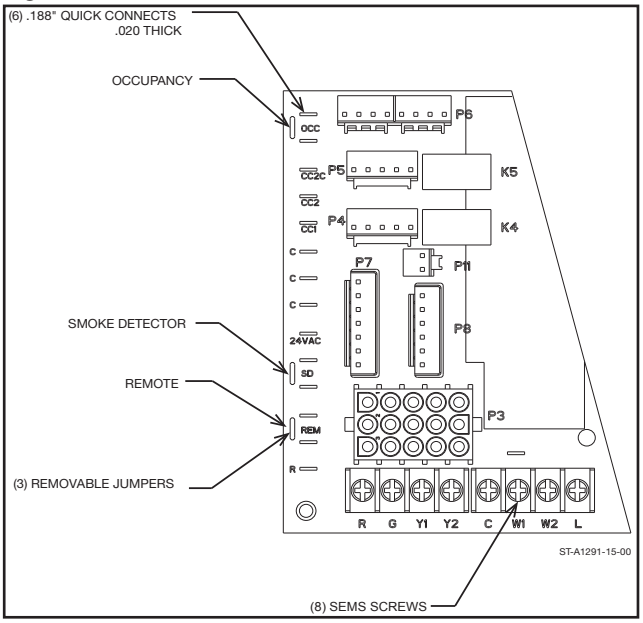
Install the room thermostat in accordance with the instruction sheet packed in the box with the thermostat. Run the thermostat lead wires through the control entry opening ***(Figure F.2. – A: Electrical and Piping Routing)*** and connect to the low voltage thermostat connections (see ***Appendix G*** 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.

F.1. T-Stat field connections

F.1.1. Misc. Connections

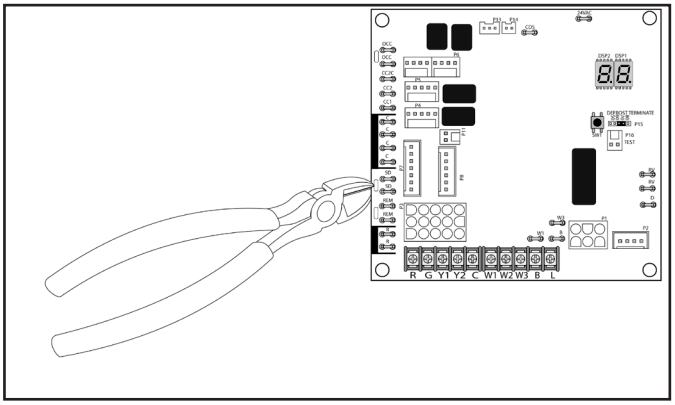
Refer to ***Appendix G*** for the unit wiring diagrams and to ***Figure E.3. – A: Typical Thermostat Wiring.***

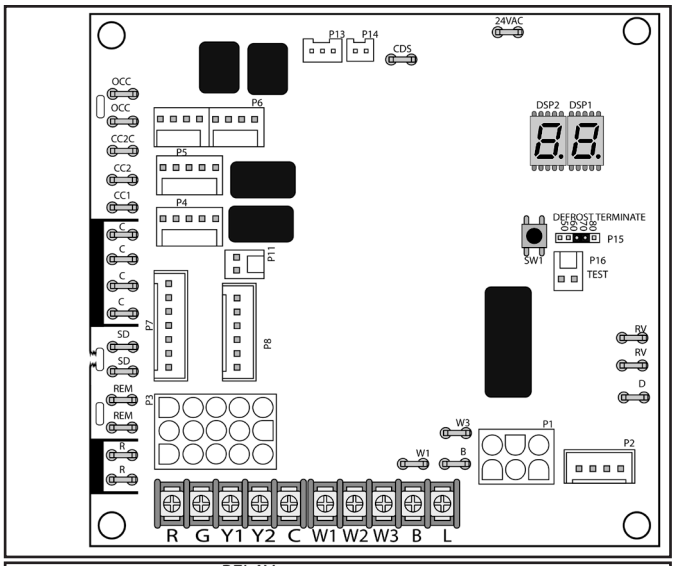
Figure F.1.1. - A: IFC Terminal Locations

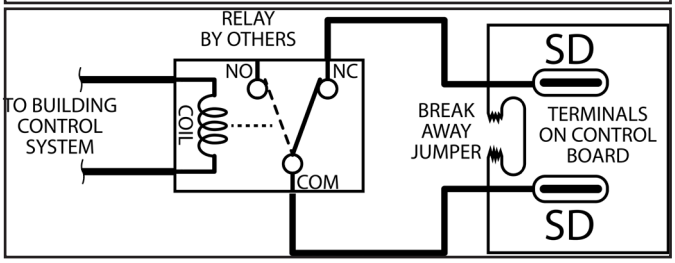


F.1.2. Occupancy connections / Remote connections / Etc

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







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

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

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

F. CONTROL / THERMOSTAT WIRING

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 undersirable operating condition that would not shut the unit down in the event of an emergency situation. See the instructions for the type of control board this unit is equipped with.

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

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

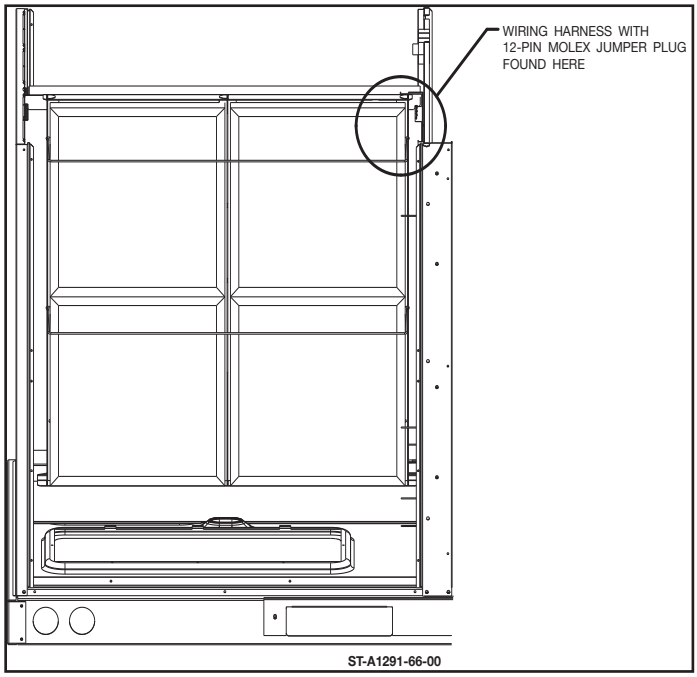
SD – Remote Smoke Detection. This feature allows for the proper shutdown of the controls in the event of an emergency situation. Locate the terminals at the left side of the board mark “SD”. See ***Figure F.1.2. – A: Occupancy and Remote Connetions*** for reference.

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 Auxilary 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.1.3.2. DDC Control Connection

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

Figure F.1.5.3. – A: Wiring Harness location in Air-Filter Section



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

In an application where a third party building management / controls are in use or will be incorporated, units with the integral Rooftop Unit Controller (RTU-C) are communication compatible with the system that supports the BACnet Application Specific Controller device profile, LonMark Space Comfort Controller functional profile, or LonMark Discharge Air Controller functional profile. This is accomplished with a field installed BACnet or LonMark communication module. Refer to the Clear control/DDC manual for more detail; **Manufacturer Part number: 92-103249-01.**

F.2. Routing Control wiring

Figure F.2. – A: Electrical and Piping Routing

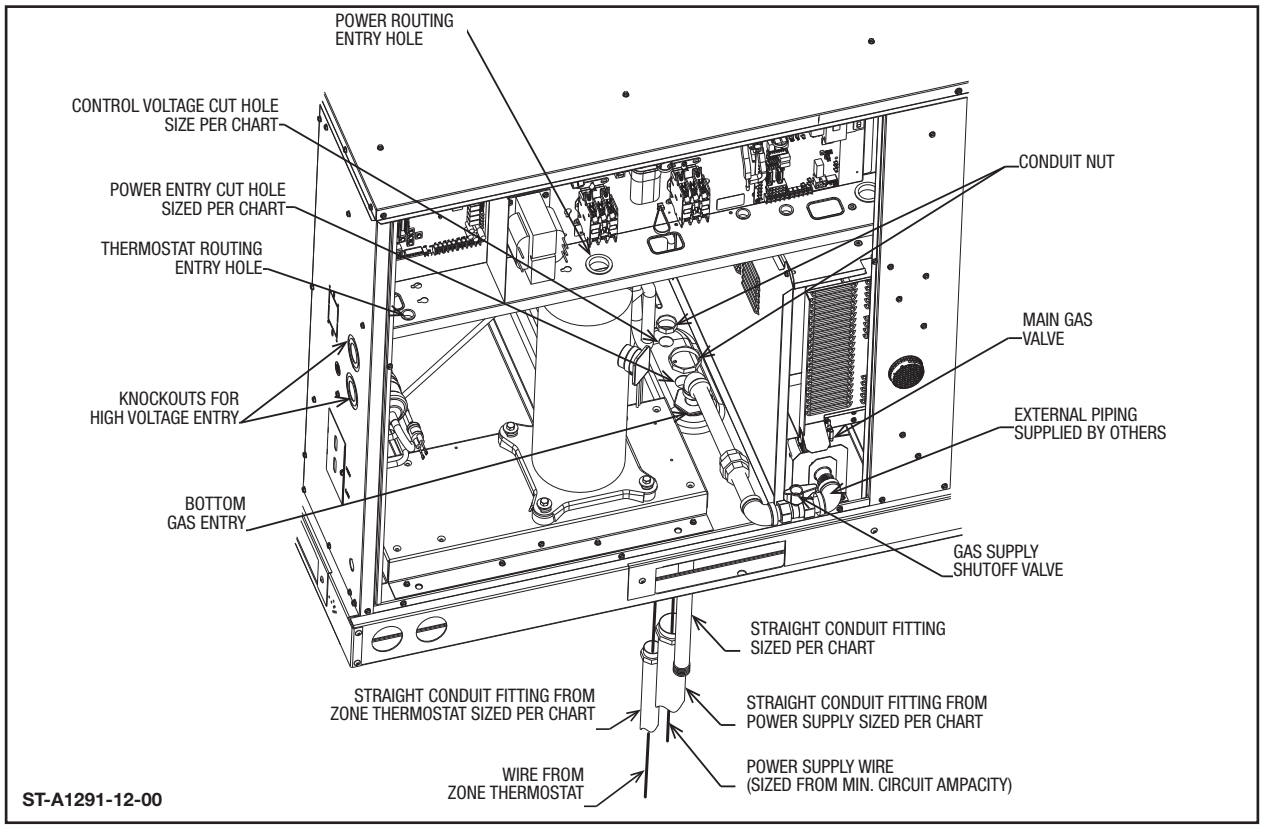


Figure F.2. – B: Hole Sizing for Conduit

	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.3. 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 national Fuel Gas Code, ANSI Z223.1 – latest edition.

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 wreches, Pliers, gas rated thread sealent, 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 National Fuel Gas Code (site the code number), International Field Gas Code (site the code number), or the Canadian B149.1HB-00 (verify code number), must be followed.

G.1.4. Gas pressures and regulation

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.

⚠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

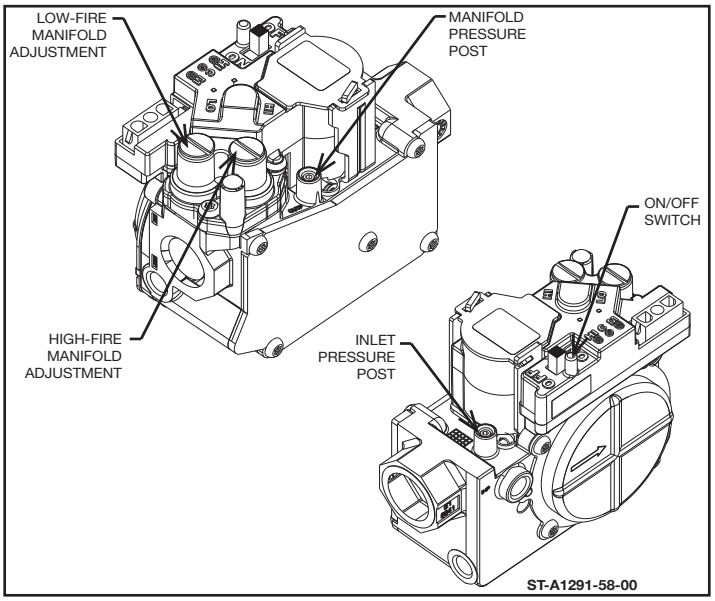


Figure G.1.4. - B: Burner Assembly Front View

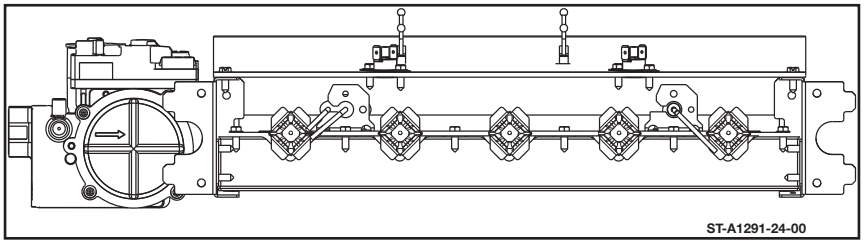
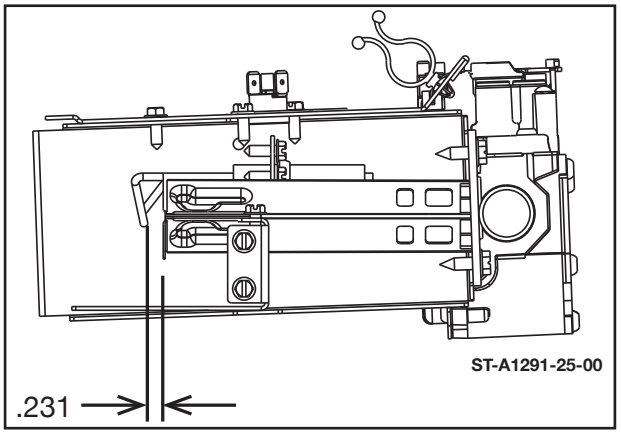


Figure G.1.4. - C: Burner Assembly Side View

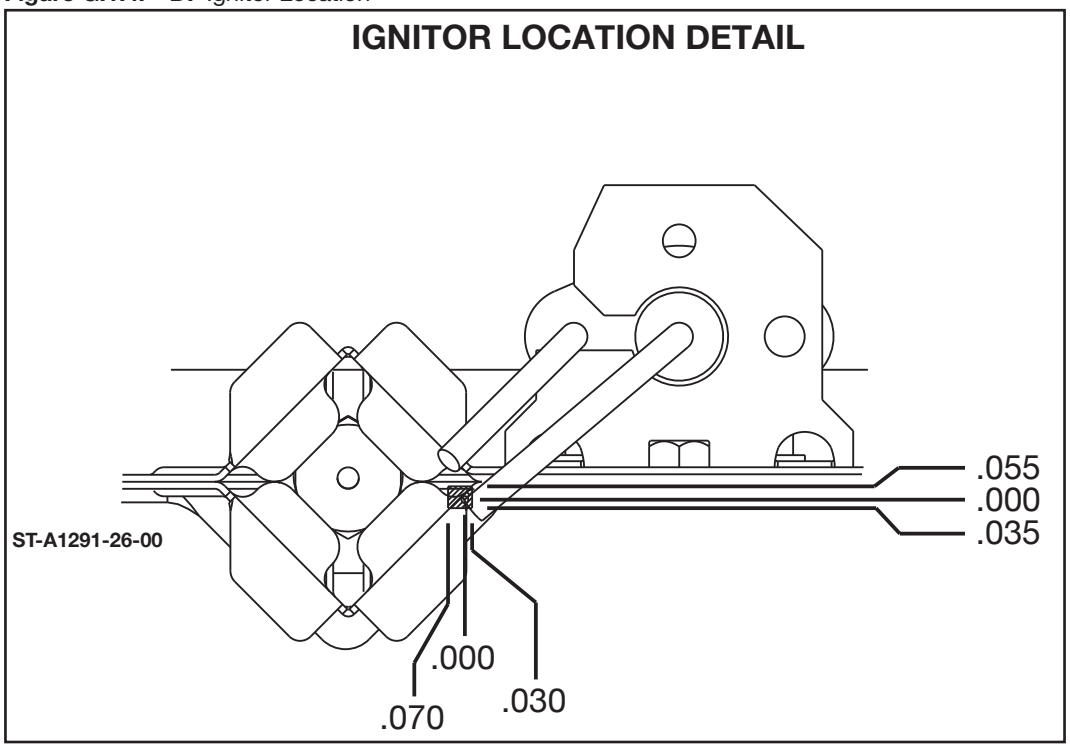


G. GAS

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.

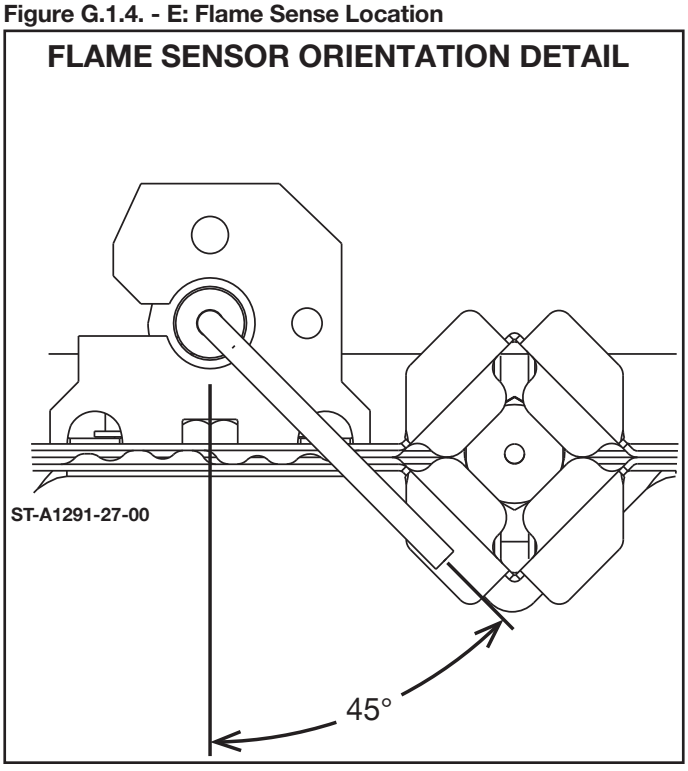
Ignitor location is critical for insuring a consistent carryover of the burner flame during ignition. The top of the electrode at dimension (0,0) must remain inside the hatched area

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.1.5. 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 wreches 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.1.6. 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.1.6. - 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.1.6. - 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.

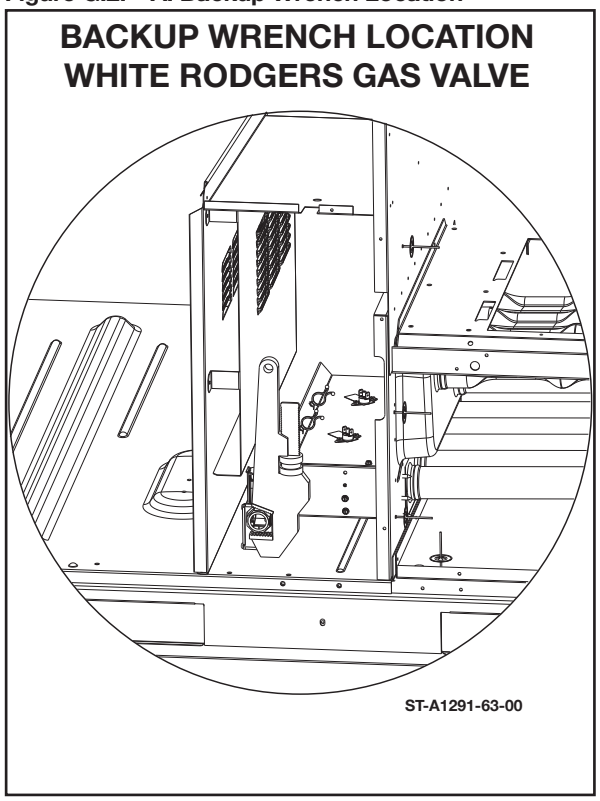
Reference the **National Fuel Gas Code NFPA 54, ANSI Z223.1- Pipe Sizing** for more information.

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.2. – 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 an outside ground joint union to connect the gas supply to the control assembly at the burner tray.

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 factoryspecified or approved parts. In the commonwealth of Massachusetts, installation must be performed by a licensed plumber or gas fitter for appropriate fuel.

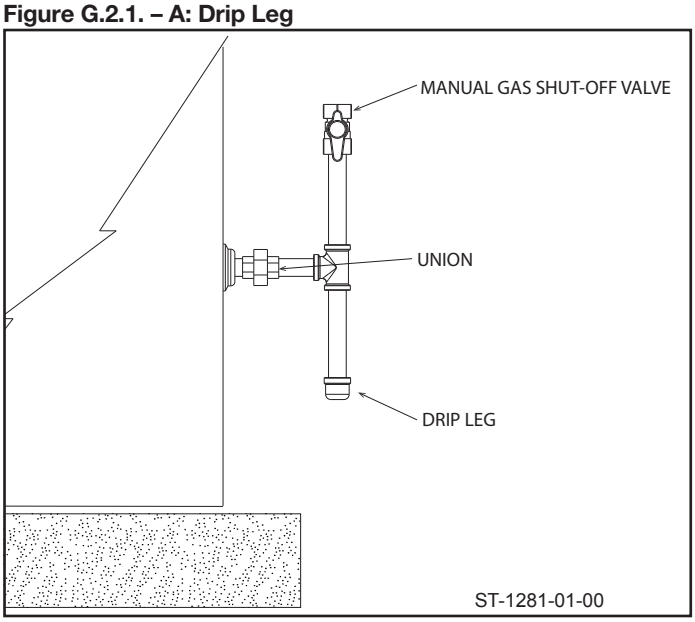
IMPORTANT: *Disconnect the furnace and its individual shutoff valve from the gas supply piping during any pressure testing of that system at test pressures in excess of 1/2 pound per square inch gauge or isolate the system from the gas supply piping system by closing its individual manual shutoff valve 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 International Residential Code G2419.4.

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.

G.3. LP Conversion

When connecting the supply gas to the gas valve, install a drip leg/sediment trap in compliance with the Interational Residential Code G2419.4.

⚠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.

Model Number	Kit Number U.S./Canadian
(-)GEC 75K, 120K	FP40
(-)GEC 100K	FP41

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.

⚠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. 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.

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. IFC (Integrated Furnace Control) runs self-diagnostic. IFC 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. IFC energizes Induced Draft Motor (IDM) low-speed tap.

4. IFC confirms low fire NPC is closed.

5. If the low fire 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.

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

1. Call for second stage heat initiated by thermostat.

2. IFC energizes IDM high-speed tap and confirms high fire NPC is closed.

3. IFC 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 IFC 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 IFC 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 IFC verifies that the low fire NPC is open. Once the low fire NPC is confirmed open, the IFC will begin a second ignition attempt.

4. After two failed ignition attempts at low fire, the IFC 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.4.2.2. 460V - Normal Furnace Sequence Of Operation

1. Thermostat initiates call for heat.

2. IFC (Integrated Furnace Control) runs self-diagnostic. IFC 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 IFC Doesn't Sense Flame:

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

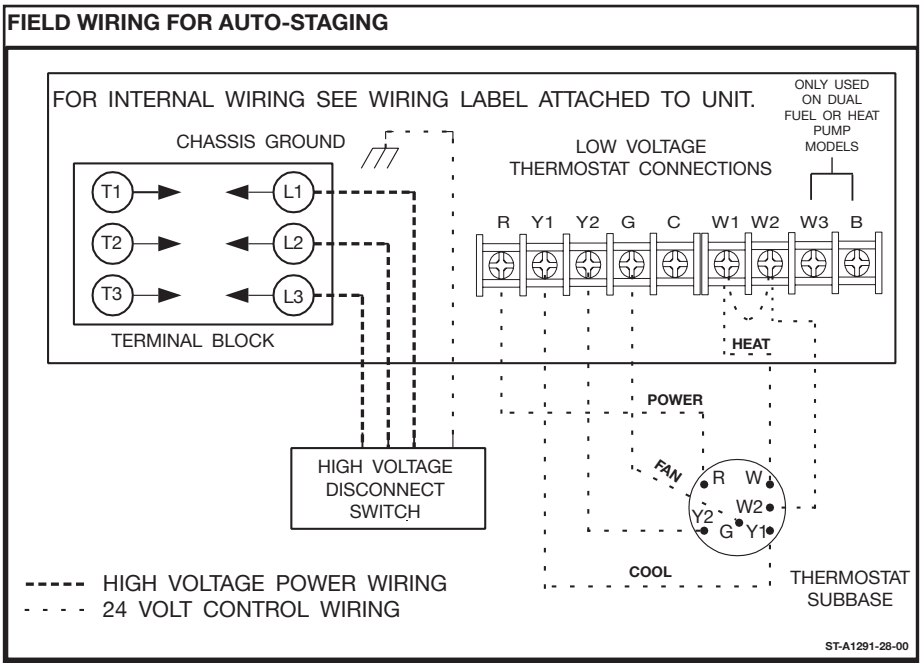
2. If flame is not sensed during the 8-second period after the gas valve is energized, the gas valve and SE are de-energized.

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, 575V & 460V

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 IFC. See ***Figure G.4.2.3. - A*** for details.



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 with little or no lifting. Carry-over flame should not impinge on center panel. 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/ft^3 Regional Natural Gas Heating Value

I/H = Q

25000 / 900 = 27.78 ft^3

I = Sea Level input (per burner): 25000

H = Sea Level Heating Value: 900

Q = 27.78 ft^3 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/ft^3 Regional Natural Gas Heating Value

I / H = Q

25000 / 1050 = 23.81ft^3

I = Sea Level input (per burner): 25000

H = Sea Level Heating Value: 1050

Q = 23.81 ft^3 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*

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/ ft^3) @ 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/ ft^3) @ 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/ ft^3) @ 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

* 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 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 are used with the following exception:

The recommended LP Gas high altitude orifice selections differ slightly in that the NFGC LP orifice chart, as they are not accurate for these products. The National Fuel Gas Code LP orifices are based on an 11" of water column pressure at the orifice, which differs from products that use 10" of water column at the orifice. This difference requires a deviation from the NFGC orifice size recommendations. The Sea Level input should still be reduced by 4% per thousand ft. and the orifice size must be selected based on the reduced input 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 3,000'
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

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

J.1.2. Check Level of Unit

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

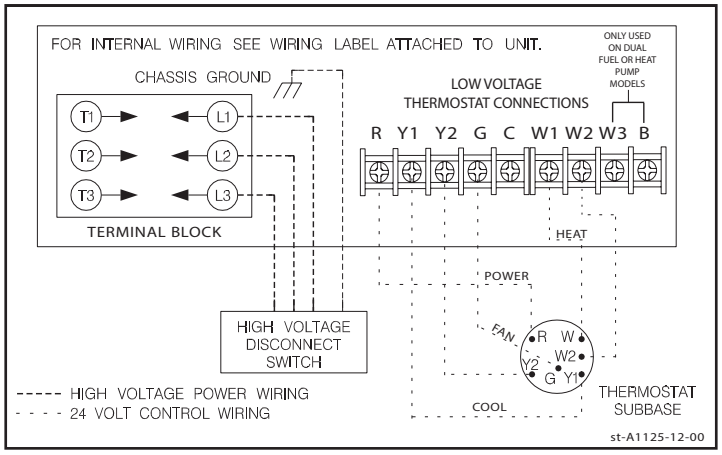
J.1.3. Check Electrical Connections For Proper Torque

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 For Gas Leaks

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

J.1.6. 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.1.7. Check Condensate Drain installation

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

J.1.8. 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.2. Turning on Power for the First time

J.2.1. Checking for Proper 3-Phase Voltage

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

J.2.2. Check For Proper Phase

Verify that the compressor is running correctly.

J.2.2.1. Standard Blower Rotation

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

J.2.2.2. VFD Blower Rotation

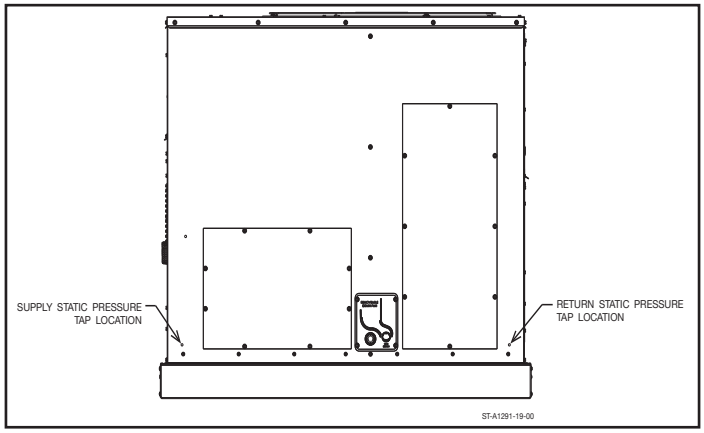
As a reminder, all units with VFD driven blower motor will have the correct rotation even if the phase to the unit is wired incorrectly. See ***Section E.3.4.1. Checking Phase with VFD Drive*** for more information.

J.2.3. Checking Low (Control) Voltage

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

J.3. Checking and Adjusting Air Flow

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, remove the washer-backed screws and drill a hole to the size necessary for the test probe. The location of these place-holder screws are shown in ***Figure J.3. - A***.
- NOTE: After taking airflow measurements, seal these openings per best practice to prevent airflow leakage and water entry into the unit.
- NOTE: Drilling test tap locations in other panels or doors could put the test probe in a turbulent zone providing false readings.

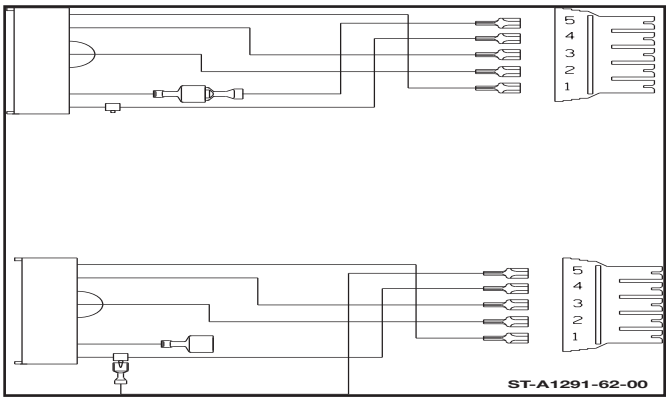
J.3.1.1. Using Tools

Use a water monometer 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

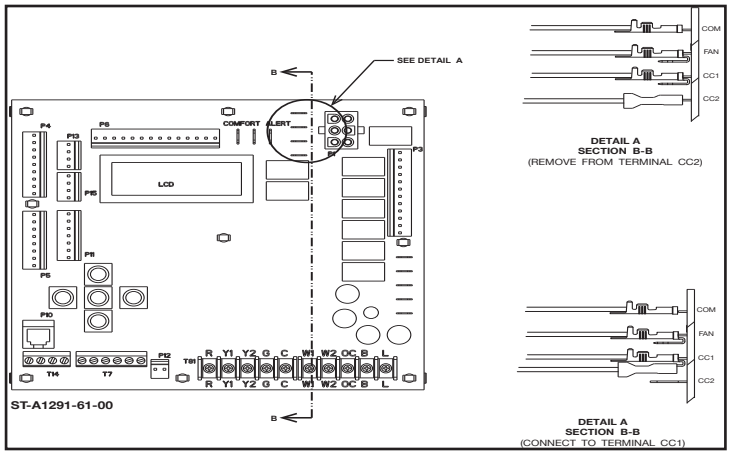
- Measure the supply/return static to get the unit static pressure by drilling out the dimple locations shown in ***Figure J.3. - A.***
- Take the measured static pressure and match to the static listed on the airflow table to find your CFM.
- For non-DDC units, the unit ships standard with the orange wire (wire 607) having a quick-connect towards the control board-end of the harness.
  - o If more airflow is needed, unplug the orange wire and reattach to the the T-connection on the yellow wire (yellow 608). Refer to ***Figure J.3.2. – A.***

Figure J.3.2. – A: How to Increase Airflow for non-DDC Units



- For DDC units, the unit ships with the orange wire for the indoor fan connected to the CC2 terminal on the board.
  - o If more airflow is needed, remove the wire from CC2 and connect to the CC1 terminal. Refer to ***Figure J.3.2. – B***.

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



J.3.2.1. Using Tools

Use a water monometer 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.3.2.2. Increasing Air Flow – Blower Motor Controller on 5 Ton High-Static 460V and all 6 Ton units.

If more airflow is needed for a 5 ton High Static 460V or any 6 ton unit, the procedure will be the same as the products without the Blower Motor Controller. See ***Section J.3.2. Airflow Measurements and Adjustments*** for details.

J. STARTUP AND OPERATION

J.3.2.3. Adjusting Fresh Air Flow with Economizer

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

Manufacturer I&O Part numbers:

- Downflow: 92-107192-17
- Downflow DDC: 92-107192-19
- Horizontal: 92-107192-18
- Horizontal DDC: 92-107192-20

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.

Manufacturer I&O Part numbers:

- Manual Fresh Air Damper: 92-107192-25
- Motorized Fresh Air Damper: 92-107192-26

J.4. Checking Cooling Operation

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

COOLING SEQUENCE OF OPERATION

A. Call for cooling

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

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

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

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

5. Zone thermostat is satisfied.

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

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

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

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

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

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

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

D. First stage and second stage called simultaneously.

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

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

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

E. First stage and second stage removed simultaneously.

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

2. The control goes into standby mode displaying a "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 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

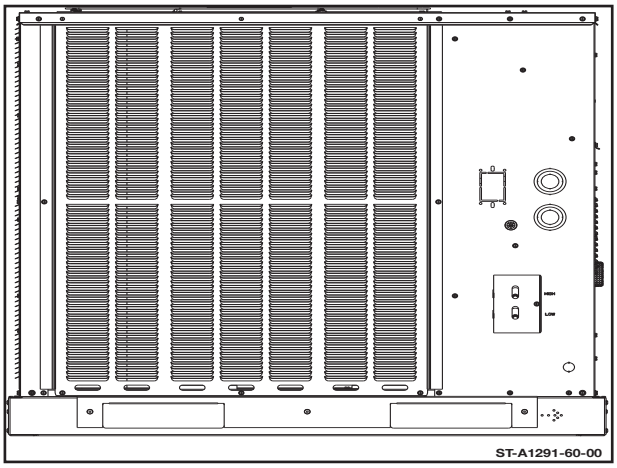
For units with DDC, there is a "Run Test" mode that will aid in dignostics during installation. Please refer to the CLEAR CONTROL MANUAL for more info; Manufacturer Part Number: 92-103249-01

J.4.1. Checking Refrigerant Pressures

To check refrigerant pressures, attach R410a manifold gauges to the high/lo service ports. The upper port is the high pressure port, and the lower is the low pressure port. **BE SURE TO USE ZERO LOSS FITTINGS WHILE MEASURING PRESSURE; ANY LOSS OF CHARGE MAY IMPACT PERFORMANCE.**

See section ***C.2.1.Tools Required for Installing and Servicing R-410A Models.***

Figure J.4.1. –A: Service Port Location



J.4.1.1. Refrigerant Pressure Charts

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

J.4.2. Checking Sub Cooling for Adjusting Charge Weight

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

NOTE: This procedure is very important for optimizing this product's performance.

How to check the unit's subcooling to fine-tune refrigerant charge:

1. The Indoor ambient temperature must be between 72 °F and 82 °F dry bulb at the indoor coil.

2. Confirm the indoor air supply is at the rated CFM listed in ***Appendix A***.

3. Allow the system to run long enough for temperatures and pressures to stabilize; at least fifteen minutes.

4. Measure liquid pressure and line temperature at the liquid line service port (refer to section ***J.4.2.1.*** below for the liquid line temperature measurement location). USE ZERO LOSS FITTINGS WHILE MEASURING PRESSURE; ANY LOSS OF CHARGE MAY IMPACT PERFORMANCE.

5. To find the saturation temperature at the measured pressure, subtract the measured liquid line temperature from the saturation pressure to get the sub-cooling.

6. Check if the Sub-Cooling is within +/- 1.5 °F tolerance.

7. If the sub-cooling values are significantly different (> 20 psig) from those listed on the table in Appendix F, there may be an airflow or component issue. Refer to section M. Diagnostics for more information.

J.4.2.1. Measuring Air Temperature and Liquid Line Temperature

Measuring air temperature:

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

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

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

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

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

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

J. STARTUP AND OPERATION

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.

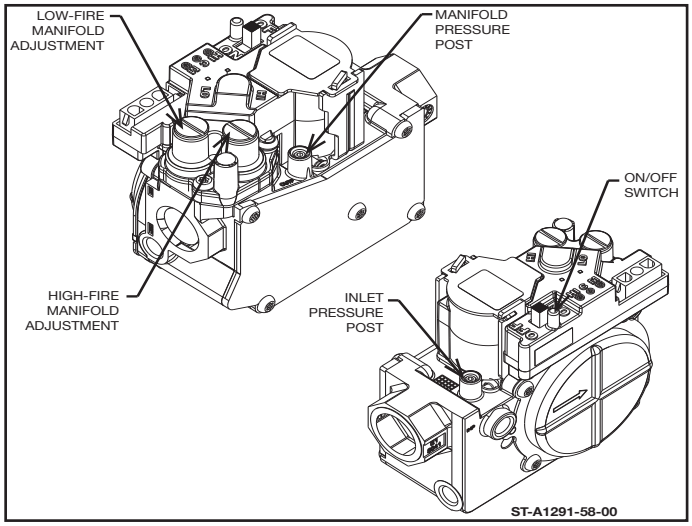
Measuring line temperature:

1. Attach a thermometer or thermocouple to the liquid refrigerant line right after the filter-dryer. See ***Figure J.3. – A***.

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

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

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.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 pressire 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:

C. 3.5” (± 0.3”) W.C. high fire, 1.8” (± 0.3”) W.C. low fire for natural gas

D. 10.0” (± 0.5”)W.C. high fire and 4.9” (± 0.5”) W.C. low fire for LP gas

6. To adjust the 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.

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 oof, with the exception of 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 nameplace 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 info.

NOTE: Refer to the High Altitute Section of this manual and the National Fuel Gas Code for high altitude rate adjustement 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.

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. STARTUP AND OPERATION

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.5.1.5. Checking Air Temperatures

The importance of proper air flow over the heat exchanger cannot be over emphasized. One of the most commom 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 (approximaterly 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.

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 postion 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. DIAGNOSTICS

M.1. Diagnostics Chart

M.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

M.2. Alarm Codes – Full List

IFC 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
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

M. DIAGNOSTICS

M.2.1. Cooling Alarm Codes and Diagnostics

All Integrated Furnace Controls (IFC) 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:

IFC 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:

IFC 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 notmaking 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	

M. DIAGNOSTICS

Fault Codes with Descriptions and Solutions:

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

IFC 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	
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	
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	

M. DIAGNOSTICS

Fault Codes with Descriptions and Solutions:

IFC Alarm Codes - Cooling Only		
CODE	**DESCRIPTION**	**FAULT LEVEL**
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	

M.2.2. Heating Alarm Codes and Diagnostics

All Integrated Furnace Controls (IFC) 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:

IFC Alarm Codes - Heating Only		
CODE	**DESCRIPTION**	**FAULT LEVEL -0, 1, 2, 3***
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

M. DIAGNOSTICS

Fault Codes with Descriptions and Solutions:

IFC Alarm Codes - Heating Only	
CODE	**FAILED IGNITION**
11	**DESCRIPTION:** This fault is displayed when a failed ignition has occurred three times in a row. The IFC will enter a one-hour lock-out following the third ignition attempt.
	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 IFC 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 IFC. Make sure furnace is properly 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 IFC.
	4. Replace furnace IFC.
	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**
	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 IFC.
	3. Make sure the furnace is properly grounded.

Fault Codes with Descriptions and Solutions:

IFC Alarm Codes - Heating Only	
CODE	**FLAME LOST**
13	**DESCRIPTION:** if flame is lost after it is established, subsequent ignition attempts will follow and normal operation should resume.
	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 IFC 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 IFC.
	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 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.
14	**UNEXPECTED FLAME**
	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 IFC (signal improperly sensed when it should not be sensed at all).
	SOLUTION:
	1. Correct wiring
	2. Replace the gas valve.
	3. Replace the IFC.
15	**HIGH-FIRE GAS VALVE IMPROPER VOLTAGE**
	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 IFC welded shut. Hi and low-fire miswired.
	SOLUTION:
	1. Replace IFC 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.

M. DIAGNOSTICS

Fault Codes with Descriptions and Solutions:

IFC Alarm Codes - Heating Only	
CODE	**MAIN LIMIT OPEN**
22	**DESCRIPTION:** The furnace will not operate in gas heat mode.
	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 values found in Measuring and Adjusting Manifold Gas Pressures section. Check rate and compare to nameplate input, high and low-fire. Adjust as necessary.
33	**MRLC (Manual Reset Limit Control) OPEN**
	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.
	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 necessary

Fault Codes with Descriptions and Solutions:

33	3. Confirm that burner flame is steady and directed down center of burner tube. If flame turbulance is evident, note if turbulance began when indoor blower motor was energized. This could be an indicaton of a damaged heat exchanger, i.e. breached primary tube.or loose swedge 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 values found in Measuring and Adjusting Manifold Gas Pressures 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.
44	**LOW FIRE NEGATIVE PRESSURE CONTROL (NPC) CLOSED (230V & 575V ONLY)**
	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.
	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

M. DIAGNOSTICS

Fault Codes with Descriptions and Solutions:

46	**LOW FIRE NEGATIVE PRESSURE CONTROL (NPC) OPEN (230V & 575V ONLY)**
	DESCRIPTION: IFC will energize the inducer for 30 seconds (pre-purge) in an attempt to close the low fire NPC. The IFC 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 IFC
	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 IFC after confirming that NPC contacts are closed while inducer is running.
46	3. Check NPC wiring and connections to IFC.
	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.
55	HIGH-FIRE NEGATIVE PRESSURE CONTROL (NPC) CLOSED
	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.
	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)**
	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 IFC
	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 confirm negative pressure is adequate to close pressure switch.
	2. Replace IFC after confirming that NPC contacts are closed while inducer is running.
	3. Check NPC wiring and connections to IFC.
	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.

M. DIAGNOSTICS

Fault Codes with Descriptions and Solutions:

61	BLOWER FAULT - MOTOR CANNOT RUN
	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 IFC 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.
	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	
55 & 44	**NEGATIVE PRESSURE CONTROL (NPC) CLOSED**
	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. IFC will flash a "55" & "44" fault code (230V & 460V units use same IFC, "44" is normal under this scenario).
	See **CAUSE** and **SOLUTION** for fault code "55" above.
57 & 46	**NEGATIVE PRESSURE CONTROL (NPC) OPEN**
	DESCRIPTION: The inducer will run for 20 seconds in an attempt to close the pressure switch. At that time the IFC will flash a "57" & "46" fault code (230V & 460V units use same IFC, "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 IFC 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.

M. DIAGNOSTICS

M.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:

IFC 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

M.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 - (-)GECZR MODELS

3.0-6.0 TON [10.6 - 21.1 kW]

Model (-)GECZR Series	036ACT 036ADU 036AJT	036ACU 036ADU	036AYT	036AYU
Cooling Performance1				
Gross Cooling Capacity Btu [kW]	36,000 [10.55]	36,000 [10.55]	36,000 [10.55]	36,000 [10.55]
EER/SEER2	11.2/14	11.2/14	11.2/14	11.2/14
Nominal CFM/AHRI Rated CFM [L/s]	1200/1300 [566/613]	1200/1300 [566/613]	1200/1300 [566/613]	1200/1300 [566/613]
AHRI Net Cooling Capacity Btu [kW]	35,400 [10.37]	35,400 [10.37]	35,400 [10.37]	35,400 [10.37]
Net Sensible Capacity Btu [kW]	27,000 [7.91]	27,000 [7.91]	27,000 [7.91]	27,000 [7.91]
Net Latent Capacity Btu [kW]	8,400 [2.46]	8,400 [2.46]	8,400 [2.46]	8,400 [2.46]
Net System Power kW	3.16	3.16	3.16	3.16
Compressor				
No./Type	1/Scroll	1/Scroll	1/Scroll	1/Scroll
Outdoor Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	0.71 [18]	0.71 [18]	0.71 [18]	0.71 [18]
Face Area sq. ft. [sq. m]	16.48 [1.53]	16.48 [1.53]	16.48 [1.53]	16.48 [1.53]
Rows / FPI [FPcm]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]
Indoor Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	1 [25.4]	1 [25.4]	1 [25.4]	1 [25.4]
Face Area sq. ft. [sq. m]	7.52 [0.7]	7.52 [0.7]	7.52 [0.7]	7.52 [0.7]
Rows / FPI [FPcm]	1 / 20 [8]	1 / 20 [8]	1 / 20 [8]	1 / 20 [8]
Refrigerant Control	TX Valves	TX Valves	TX Valves	TX Valves
Drain Connection No./Size in. [mm]	1/0.75 [19.05]	1/0.75 [19.05]	1/0.75 [19.05]	1/0.75 [19.05]
Outdoor Fan - Type	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	1/26 [660.4]	1/26 [660.4]	1/26 [660.4]	1/26 [660.4]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	4600 [2171]	4600 [2171]	4600 [2171]	4600 [2171]
No. Motors/HP	1 at 1/5 HP	1 at 1/5 HP	1 at 1/5 HP	1 at 1/5 HP
Motor RPM	820	820	820	820
Indoor Fan - Type	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	1/11x11 [279x279]	1/11x11 [279x279]	1/11x11 [279x279]	1/11x11 [279x279]
Drive Type	Direct	Direct	Direct	Direct
No. Speeds	Multiple	Multiple	Multiple	Multiple
No. Motors	1	1	1	1
Motor HP	3/4	3/4	1	1
Motor RPM	1050	1050	1050	1050
Motor Frame Size	48	48	48	48
Filter - Type	Disposable	Disposable	Disposable	Disposable
Furnished	Yes	Yes	Yes	Yes
(NO.) Size Recommended in. [mm x mm x mm]	(4)2x16x16 [51x406x406]	(4)2x16x16 [51x406x406]	(4)2x16x16 [51x406x406]	(4)2x16x16 [51x406x406]
Refrigerant Charge Oz. [g]	68 [1928]	68 [1928]	68 [1928]	68 [1928]
Weights				
Net Weight lbs. [kg]	557 [253]	557 [253]	607 [275]	607 [275]
Ship Weight lbs. [kg]	595 [270]	595 [270]	645 [293]	645 [293]

Appendix A – General Product Data (Cont.)

Model (-)GECZR Series	048ACT 048ADT 048AJT	048ACU 048ADU	048AYT	048AYU
Cooling Performance1				
Gross Cooling Capacity Btu [kW]	49,000 [14.36]	49,000 [14.36]	49,000 [14.36]	49,000 [14.36]
EER/SEER2	11.2/14	11.2/14	11.2/14	11.2/14
Nominal CFM/AHRI Rated CFM [L/s]	1600/1730 [755/816]	1600/1730 [755/816]	1600/1730 [755/816]	1600/1730 [755/816]
AHRI Net Cooling Capacity Btu [kW]	47,500 [13.92]	47,500 [13.92]	47,500 [13.92]	47,500 [13.92]
Net Sensible Capacity Btu [kW]	35,100 [10.28]	35,100 [10.28]	35,100 [10.28]	35,100 [10.28]
Net Latent Capacity Btu [kW]	12,400 [3.63]	12,400 [3.63]	12,400 [3.63]	12,400 [3.63]
Net System Power kW	4.24	4.24	4.24	4.24
Compressor				
No./Type	1/Scroll	1/Scroll	1/Scroll	1/Scroll
Outdoor Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	0.71 [18]	0.71 [18]	0.71 [18]	0.71 [18]
Face Area sq. ft. [sq. m]	16.52 [1.53]	16.52 [1.53]	16.48 [1.53]	16.48 [1.53]
Rows / FPI [FPcm]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]
Indoor Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	1 [25.4]	1 [25.4]	1 [25.4]	1 [25.4]
Face Area sq. ft. [sq. m]	7.52 [0.7]	7.52 [0.7]	7.52 [0.7]	7.52 [0.7]
Rows / FPI [FPcm]	1 / 20 [8]	1 / 20 [8]	1 / 20 [8]	1 / 20 [8]
Refrigerant Control	TX Valves	TX Valves	TX Valves	TX Valves
Drain Connection No./Size in. [mm]	1/0.75 [19.05]	1/0.75 [19.05]	1/0.75 [19.05]	1/0.75 [19.05]
Outdoor Fan - Type	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	1/26 [660.4]	1/26 [660.4]	1/26 [660.4]	1/26 [660.4]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	5900 [2784]	5900 [2784]	5900 [2784]	5900 [2784]
No. Motors/HP	1 at 1/2 HP	1 at 1/2 HP	1 at 1/2 HP	1 at 1/2 HP
Motor RPM	1075	1075	1075	1075
Indoor Fan - Type	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	1/11x11 [279x279]	1/11x11 [279x279]	1/11x11 [279x279]	1/11x11 [279x279]
Drive Type	Direct	Direct	Direct	Direct
No. Speeds	Multiple	Multiple	Multiple	Multiple
No. Motors	1	1	1	1
Motor HP	3/4	3/4	1 1/2	1 1/2
Motor RPM	1050	1050	1050	1050
Motor Frame Size	48	48	48	48
Filter - Type	Disposable	Disposable	Disposable	Disposable
Furnished	Yes	Yes	Yes	Yes
(NO.) Size Recommended in. [mm x mm x mm]	(4)2x16x16 [51x406x406]	(4)2x16x16 [51x406x406]	(4)2x16x16 [51x406x406]	(4)2x16x16 [51x406x406]
Refrigerant Charge Oz. [g]	90 [2552]	90 [2552]	90 [2552]	90 [2552]
Weights				
Net Weight lbs. [kg]	580 [263]	580 [263]	630 [286]	630 [286]
Ship Weight lbs. [kg]	618 [280]	618 [280]	668 [303]	668 [303]

P. APPENDICES

Appendix A – General Product Data (Cont.)

Model (-)GECZR Series	060ACT 060ADT 060AJT	060ACU 060ADU	060AYT	060AYU
Cooling Performance1				
Gross Cooling Capacity Btu [kW]	59,500 [17.43]	59,500 [17.43]	59,500 [17.43]	59,500 [17.43]
EER/SEER2	11.2/14	11.2/14	11.2/14	11.2/14
Nominal CFM/AHRI Rated CFM [L/s]	2000/1950 [944/920]	2000/1950 [944/920]	2000/1950 [944/920]	2000/1950 [944/920]
AHRI Net Cooling Capacity Btu [kW]	57,500 [16.85]	57,500 [16.85]	57,500 [16.85]	57,500 [16.85]
Net Sensible Capacity Btu [kW]	41,000 [12.01]	41,000 [12.01]	41,000 [12.01]	41,000 [12.01]
Net Latent Capacity Btu [kW]	16,500 [4.83]	16,500 [4.83]	16,500 [4.83]	16,500 [4.83]
Net System Power kW	5.13	5.13	5.13	5.13
Compressor				
No./Type	1/Scroll	1/Scroll	1/Scroll	1/Scroll
Outdoor Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	0.71 [18]	0.71 [18]	0.71 [18]	0.71 [18]
Face Area sq. ft. [sq. m]	16.52 [1.53]	16.52 [1.53]	16.52 [1.53]	16.52 [1.53]
Rows / FPI [FPcm]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]
Indoor Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	1 [25.4]	1 [25.4]	1 [25.4]	1 [25.4]
Face Area sq. ft. [sq. m]	7.52 [0.7]	7.52 [0.7]	7.52 [0.7]	7.52 [0.7]
Rows / FPI [FPcm]	1 / 20 [8]	1 / 20 [8]	1 / 20 [8]	1 / 20 [8]
Refrigerant Control	TX Valves	TX Valves	TX Valves	TX Valves
Drain Connection No./Size in. [mm]	1/0.75 [19.05]	1/0.75 [19.05]	1/0.75 [19.05]	1/0.75 [19.05]
Outdoor Fan - Type	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	1/26 [660.4]	1/26 [660.4]	1/26 [660.4]	1/26 [660.4]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	5900 [2784]	5900 [2784]	5900 [2784]	5900 [2784]
No. Motors/HP	1 at 1/2 HP	1 at 1/2 HP	1 at 1/2 HP	1 at 1/2 HP
Motor RPM	1075	1075	1075	1075
Indoor Fan - Type	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	1/11x11 [279x279]	1/11x11 [279x279]	1/11x11 [279x279]	1/11x11 [279x279]
Drive Type	Direct	Direct	Direct	Direct
No. Speeds	Multiple	Multiple	Multiple	Multiple
No. Motors	1	1	1	1
Motor HP	1 1/2	1 1/2	1 1/2	1 1/2
Motor RPM	1050	1050	1050	1050
Motor Frame Size	48	48	48	48
Filter - Type	Disposable	Disposable	Disposable	Disposable
Furnished	Yes	Yes	Yes	Yes
(NO.) Size Recommended in. [mm x mm x mm]	(4)2x16x16 [51x406x406]	(4)2x16x16 [51x406x406]	(4)2x16x16 [51x406x406]	(4)2x16x16 [51x406x406]
Refrigerant Charge Oz. [g]	88 [2495]	88 [2495]	88 [2495]	88 [2495]
Weights				
Net Weight lbs. [kg]	583 [264]	583 [264]	633 [287]	633 [287]
Ship Weight lbs. [kg]	621 [282]	621 [282]	671 [304]	671 [304]

Appendix B – Electrical Data

ELECTRICAL DATA - (-)GECZR SERIES										
		036ACT07 036ACT10	**036ACU07 036ACU10**	**036ADT07 036ADT10**	**036ADU07 036ADU10**	**036AJT07 036AJT10**	**036AYT07 036AYT10**	**036AYU07 036AYU10**	**048ACT07 048ACT12**	**048ACU07 048ACU12**
Unit Information	Unit Operating Voltage Range	187-253	187-253	418-506	418-506	187-253	523-632	523-632	187-253	187-253
	Volts	208/230	208/230	460	460	208/230	575	575	208/230	208/230
	Phase	3	3	3	3	1	3	3	3	3
	Hz	60	60	60	60	60	60	60	60	60
	Minimum Circuit Ampacity	19	25	11	10	25	12	19	25	31
	Minimum Overcurrent Protection Device Size	25	25	15	15	30	15	15	30	30
	Maximum Overcurrent Protection Device Size	25	35	15	15	35	15	30	35	40
Compressor Motor	No.	1	1	1	1	1	1	1	1	1
	Volts	208/230	208/230	480	480	208/230	575	575	208/230	208/230
	Phase	3	3	3	3	1	3	3	3	3
	RPM	3450	3450	3450	3450	3450	3450	3450	3450	3450
	HP, Compressor 1	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	3 1/2	3 1/2
	Amps (RLA), Comp. 1	10	10	6.3	6.3	15.7	4.2	4.2	14.6	14.6
	Amps (LRA), Comp. 1	71	71	38	38	77	36.5	36.5	83.1	83.1
	HP, Compressor 2									
	Amps (RLA), Comp. 2									
	Amps (LRA), Comp. 2									
Condenser Motor	No.	1	1	1	1	1	1	1	1	1
	Volts	208/230	208/230	480	480	208/230	575	575	208/230	208/230
	Phase	1	1	1	1	1	1	1	1	1
	HP	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/2	1/2
	Amps (FLA, each)	1.2	1.2	0.8	0.8	1.2	0.55	0.55	2.5	2.5
	Amps (LRA, each)	2.3	2.3	1.4	1.4	2.3	1.1	1.1	5.6	5.6
Evaporator Fan	No.	1	1	1	1	1	1	1	1	1
	Volts	208/230	208/230	460	460	208/230	208/230	208/230	208/230	208/230
	Phase	1	1	1	1	1	1	1	1	1
	HP	3/4	1 1/2	3/4	1	3/4	3/4	1 1/2	3/4	1 1/2
	Amps (FLA, each)	6	11.5	3.2	2.1	6	6	11.5	6	11
	Amps (LRA, each)									

P. APPENDICES

Appendix B – Electrical Data (Cont.)

ELECTRICAL DATA - (-)GECZR SERIES										
		048ADT07 048ADT12	048ADU07 048ADU12	048AJT07 048AJT12	048AYT07 048AYT12	048AYU07 048AYU12	060ACT07 060ACT12	060ACU07 060ACU12	060ADT07 060ADT12	060ADU07 060ADU12
Unit Information	Unit Operating Voltage Range	418-506	418-506	187-253	523-632	523-632	187-253	187-253	418-506	418-506
	Volts	460	460	208/230	575	575	208/230	208/230	460	460
	Phase	3	3	1	3	3	3	3	3	3
	Hz	60	60	60	60	60	60	60	60	60
	Minimum Circuit Ampacity	13	12	34	13	20	34	34	15	15
	Minimum Overcurrent Protection Device Size	15	15	40	15	15	35	35	20	20
	Maximum Overcurrent Protection Device Size	15	15	50	15	30	45	45	20	20
Compressor Motor	No.	1	1	1	1	1	1	1	1	1
	Volts	460	460	208/230	575	575	208/230	208/230	460	460
	Phase	3	3	1	3	3	3	3	3	3
	RPM	3450	3450	3450	3450	3450	3450	3450	3450	3450
	HP, Compressor 1	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	4	4	4	4
	Amps (RLA), Comp. 1	6.8	6.8	22.1	4.9	4.9	17.7	17.7	7.9	7.9
	Amps (LRA), Comp. 1	41	41	109	33	33	110	110	52	52
	HP, Compressor 2									
	Amps (RLA), Comp. 2									
	Amps (LRA), Comp. 2									
Condenser Motor	No.	1	1	1	1	1	1	1	1	1
	Volts	460	460	208/230	575	575	208/230	208/230	460	460
	Phase	1	1	1	1	1	1	1	1	1
	HP	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
	Amps (FLA, each)	1.5	1.5	2.5	1.1	1.1	2.5	2.5	1.5	1.5
	Amps (LRA, each)	3.1	3.1	5.6	2.5	2.5	5.6	5.6	3.1	3.1
Evaporator Fan	No.	1	1	1	1	1	1	1	1	1
	Volts	460	460	208/230	208/230	208/230	208/230	208/230	460	460
	Phase	1	1	1	1	1	1	1	1	1
	HP	3/4	1	3/4	3/4	1 1/2	1 1/2	1 1/2	1	1
	Amps (FLA, each)	3.2	2.1	6	6	11.5	11.5	11.5	4	4
	Amps (LRA, each)									

Appendix B – Electrical Data (Cont.)

ELECTRICAL DATA - (-)GECZR SERIES				
		060AJT07 060AJT12	060AYT07 060AYT12	060AYU07 060AYU12
Unit Information	Unit Operating Voltage Range	187-253	523-632	523-632
	Volts	208/230	575	575
	Phase	1	3	3
	Hz	60	60	60
	Minimum Circuit Ampacity	46	19	19
	Minimum Overcurrent Protection Device Size	50	15	15
	Maximum Overcurrent Protection Device Size	70	30	30
Compressor Motor	No.	1	1	1
	Volts	208/230	575	575
	Phase	1	3	3
	RPM	3450	3450	3450
	HP, Compressor 1	4	4	4
	Amps (RLA), Comp. 1	25	5.7	5.7
	Amps (LRA), Comp. 1	134	39.5	39.5
	HP, Compressor 2			
	Amps (RLA), Comp. 2			
	Amps (LRA), Comp. 2			
Condenser Motor	No.	1	1	1
	Volts	208/230	575	575
	Phase	1	1	1
	HP	1/2	1/2	1/2
	Amps (FLA, each)	2.5	1.1	1.1
	Amps (LRA, each)	5.6	2.5	2.5
Evaporator Fan	No.	1	1	1
	Volts	208/230	208/230	208/230
	Phase	1	1	1
	HP	1 1/2	1 1/2	1 1/2
	Amps (FLA, each)	11.5	11.5	11.5
	Amps (LRA, each)			

3-5T - Low Static - High Gas Heat - Sideflow (208-230V/575V)												
Unit Model (Tonnage)	"Manufacturer Recommended Airflow Range (Min/Max) CFM"	"Blower Size Motor HP [W]"	Motor Speed	CFM/ WATTS/ RPM	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]
3T	1050/1350	3/4 HP [559]	Fan - Tap 1	CFM	1110	956	870	792	709	630	549	512
				WATTS	79	78	84	91	98	104	110	111
		3/4 HP [559]	Low Heat -Tap 2	CFM	1112	959	873	795	712	633	552	514
				WATTS	80	79	85	92	99	105	111	112
		3/4 HP [559]	High Heat -Tap 3	CFM	1455	1346	1273	1203	1133	1065	997	951
				WATTS	236	242	253	263	273	282	291	298
		3/4 HP [559]	Cooling - Tap 4	CFM	1392	1276	1200	1128	1056	986	916	872
				WATTS	207	212	222	232	241	250	259	264
		3/4 HP [559]"	High Speed - Tap 5	CFM	1745	1673	1618	1549	1497	1435	1388	1334
				WATTS	341	357	370	384	396	407	418	430
4T	1400/1800	3/4 HP [559]	Fan - Tap 1	CFM	1110	956	870	792	709	630	549	512
				WATTS	79	78	84	91	98	104	110	111
		3/4 HP [559]	Low Heat -Tap 2	CFM	1253	1118	1037	963	885	811	735	694
				WATTS	144	146	154	163	171	178	185	189
		3/4 HP [559]	High Heat -Tap 3	CFM	1468	1362	1289	1219	1150	1082	1014	969
				WATTS	242	249	259	270	280	289	299	305
		3/4 HP [559]	Cooling - Tap 4	CFM	1738	1667	1604	1541	1482	1422	1365	1313
				WATTS	365	378	391	404	417	429	441	452
		3/4 HP [559]	High Speed - Tap 5	CFM	2081	2034	1981	1922	1873	1816	1769	1722
				WATTS	560	576	592	609	625	641	657	672
5T	1750/2250	1 HP [745]"	Fan - Tap 1	CFM	1235	1155	1077	1013	955	882	778	691
				WATTS	150	159	169	177	185	193	204	211
		1 HP [745]	Low Heat -Tap 2	CFM	1235	1155	1077	1013	955	882	778	691
				WATTS	150	159	169	177	185	193	204	211
		1 HP [745]	High Heat -Tap 3	CFM	1581	1515	1446	1384	1328	1272	1209	1150
				WATTS	273	286	299	310	321	330	341	351
		1 HP [745]	Cooling - Tap 4	CFM	2049	1996	1941	1887	1836	1788	1737	1687
				WATTS	591	608	625	642	657	672	686	699
		1 HP [745]	High Speed - Tap 5	CFM	2408	2367	2318	2267	2226	2177	2139	2089
				WATTS	861	884	900	921	939	957	974	996

NOTES: For 575V units, add 30W (transformer wattage) to the watt values mentioned in the table.
Pressure drops across the 3-5T CFM range (1050 - 2250)
Wet coil: ~0.09 Inches W.C.*
Downflow: ~0.1 Inches W.C.*
Reheat coil: ~0.09 Inches W.C.*

Appendix C – Air Flow Performance Data (Cont.)

3-5T - Low Static - High Gas Heat - Sideflow (208-230V/575V)												
Unit Model (Tonnage)	"Manufacturer Recommended Airflow Range (Min/Max) CFM"	"Blower Size Motor HP [W]"	Motor Speed	CFM/ WATTS/ RPM	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]
3T	1050/1350	3/4 HP [559]	Fan - Tap 1	CFM	895	809	730	642	555	497	420	367
				WATTS	52	59	66	73	79	80	85	86
		3/4 HP [559]	Low Heat -Tap 2	CFM	1052	970	895	814	733	676	603	550
				WATTS	101	109	117	125	132	135	142	145
		3/4 HP [559]	High Heat -Tap 3	CFM	1314	1239	1172	1101	1031	974	908	856
				WATTS	184	193	203	212	221	228	237	243
		3/4 HP [559]	Cooling - Tap 4	CFM	1170	1091	1020	943	867	810	740	688
				WATTS	138	147	156	164	172	177	185	189
		3/4 HP [559]"	High Speed - Tap 5	CFM	1513	1445	1389	1322	1269	1210	1153	1097
				WATTS	232	242	252	264	275	285	295	302
4T	1400/1800	3/4 HP [559]	Fan - Tap 1	CFM	895	809	730	642	555	497	420	367
				WATTS	52	59	66	73	79	80	85	86
		3/4 HP [559]	Low Heat -Tap 2	CFM	1047	965	890	808	727	670	597	544
				WATTS	100	108	116	123	130	134	140	143
		3/4 HP [559]	High Heat -Tap 3	CFM	1349	1275	1209	1139	1071	1014	949	897
				WATTS	195	204	214	224	233	240	249	256
		3/4 HP [559]	Cooling - Tap 4	CFM	1507	1438	1376	1313	1250	1193	1133	1081
				WATTS	244	255	265	276	286	296	307	316
		3/4 HP [559]	High Speed - Tap 5	CFM	1876	1817	1766	1718	1671	1614	1564	1512
				WATTS	360	373	386	399	411	427	440	454
5T	1750/2250	1 HP [745]"	Fan - Tap 1	CFM	1169	1092	1022	950	874	783	715	640
				WATTS	129	138	147	158	165	173	180	187
		1 HP [745]	Low Heat -Tap 2	CFM	1322	1247	1181	1117	1053	986	921	852
				WATTS	130	139	149	158	168	178	187	194
		1 HP [745]	High Heat -Tap 3	CFM	1611	1546	1485	1427	1367	1308	1250	1190
				WATTS	298	309	321	331	345	356	367	377
		1 HP [745]	Cooling - Tap 4	CFM	1954	1899	1845	1792	1739	1688	1639	1590
				WATTS	496	510	524	537	553	566	580	594
		1 HP [745]	High Speed - Tap 5	CFM	2298	2254	2199	2154	2106	2059	2014	1976
				WATTS	929	956	981	1001	1030	1056	1081	1105

NOTES: For 575V units, add 30W (transformer wattage) to the watt values mentioned in the table.
Pressure drops across the 3-5T CFM range (1050 - 2250)
Wet coil: ~0.09 Inches W.C.*
Downflow: ~0.1 Inches W.C.*
Reheat coil: ~0.09 Inches W.C.*

Appendix C – Air Flow Performance Data (Cont.)

3-5T - Low Static - High Gas Heat - Sideflow (208-230V/575V)												
Unit Model (Tonnage)	"Manufacturer Recommended Airflow Range (Min/Max) CFM"	"Blower Size Motor HP [W]"	Motor Speed	CFM/ WATTS/ RPM	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]
3T	1050/1350	1 HP [745]"	Fan - Tap 1	CFM	945	921	853	763	761	709	654	634
				WATTS	269	272	281	288	293	299	307	324
		1 HP [745]	Low Heat -Tap 2	CFM	991	962	895	809	802	750	694	673
				WATTS	286	290	299	307	312	318	327	343
		1 HP [745]	High Heat -Tap 3	CFM	1610	1506	1464	1431	1348	1297	1232	1190
				WATTS	514	530	543	555	568	581	592	602
		1 HP [745]	Cooling - Tap 4	CFM	945	921	853	763	761	709	654	634
				WATTS	269	272	281	288	293	299	307	324
		1 HP [745]	High Speed - Tap 5	CFM	1495	1443	1398	1352	1303	1252	1202	1147
				WATTS	493	508	519	531	542	555	563	575
4T	1400/1800	1 HP [745]	Fan - Tap 1	CFM	1196	1140	1109	1079	1029	1035	972	964
				WATTS	308	317	323	331	337	343	354	364
		1 HP [745]	Low Heat -Tap 2	CFM	1163	1106	1076	1047	997	1006	941	935
				WATTS	287	296	301	309	314	320	331	341
		1 HP [745]	High Heat -Tap 3	CFM	1462	1411	1376	1337	1291	1275	1220	1197
				WATTS	476	487	498	510	520	529	542	553
		1 HP [745]	Cooling - Tap 4	CFM	1421	1369	1334	1297	1250	1238	1181	1161
				WATTS	450	461	471	482	492	501	513	524
		1 HP [745]	High Speed - Tap 5	CFM	1800	1762	1721	1676	1641	1587	1546	1512
				WATTS	692	706	719	737	755	768	780	795
5T	1750/2250	1 HP [745]"	Fan - Tap 1	CFM	1631	1584	1565	1520	1492	1445	1469	1421
				WATTS	546	559	574	591	611	627	661	693
		1 HP [745]	Low Heat -Tap 2	CFM	1311	1258	1256	1208	1184	1133	1206	1152
				WATTS	274	284	298	316	336	350	399	441
		1 HP [745]	High Heat -Tap 3	CFM	1540	1492	1478	1432	1405	1357	1395	1345
				WATTS	469	481	496	514	533	549	587	622
		1 HP [745]	Cooling - Tap 4	CFM	1670	1624	1603	1559	1530	1483	1502	1454
				WATTS	580	593	608	625	645	661	693	724
		1 HP [745]	High Speed - Tap 5	CFM	2086	2047	2006	1965	1930	1889	1845	1803
				WATTS	934	950	968	983	1002	1020	1035	1052

NOTES: For 575V units, add 30W (transformer wattage) to the watt values mentioned in the table.
Pressure drops across the 3-5T CFM range (1050 - 2250)
Wet coil: ~0.09 Inches W.C.*
Downflow: ~0.1 Inches W.C.*
Reheat coil: ~0.09 Inches W.C.*

Appendix C – Air Flow Performance Data (Cont.)

3-5T - Low Static - High Gas Heat - Sideflow (208-230V/575V)												
Unit Model (Tonnage)	"Manufacturer Recommended Airflow Range (Min/Max) CFM"	"Blower Size Motor HP [W]"	Motor Speed	CFM/ WATTS/ RPM	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]
3T	1050/1350	1 HP [745]"	Fan - Tap 1	CFM	1037	974	913	851	795	786	729	676
				WATTS	261	270	279	287	294	298	306	312
		1 HP [745]	Low Heat -Tap 2	CFM	1393	1338	1286	1232	1183	1158	1107	1058
				WATTS	474	485	497	509	520	529	540	549
		1 HP [745]	High Heat -Tap 3	CFM	1588	1538	1491	1442	1397	1363	1314	1268
				WATTS	591	603	617	630	644	655	668	680
		1 HP [745]	Cooling - Tap 4	CFM	1037	974	913	851	795	786	729	676
				WATTS	261	270	279	287	294	298	306	312
		1 HP [745]	High Speed - Tap 5	CFM	1495	1443	1398	1352	1303	1252	1202	1147
				WATTS	493	508	519	531	542	555	563	575
4T	1400/1800	1 HP [745]	Fan - Tap 1	CFM	1371	1316	1264	1209	1160	1109	1057	1008
				WATTS	461	472	484	495	506	517	527	537
		1 HP [745]	Low Heat -Tap 2	CFM	1675	1627	1582	1535	1492	1444	1397	1352
				WATTS	643	656	671	684	699	712	725	738
		1 HP [745]	High Heat -Tap 3	CFM	1740	1693	1650	1605	1563	1516	1470	1426
				WATTS	681	695	711	725	740	754	768	781
		1 HP [745]	Cooling - Tap 4	CFM	1360	1305	1252	1198	1148	1097	1045	996
				WATTS	454	466	477	488	499	510	520	530
		1 HP [745]	High Speed - Tap 5	CFM	1800	1762	1721	1676	1641	1587	1546	1512
				WATTS	692	706	719	737	755	768	780	795
5T	1750/2250	1 HP [745]"	Fan - Tap 1	CFM	1527	1476	1427	1377	1330	1281	1232	1185
				WATTS	554	567	580	592	605	617	629	640
		1 HP [745]	Low Heat -Tap 2	CFM	1523	1471	1423	1372	1326	1277	1227	1180
				WATTS	552	564	577	590	602	614	626	637
		1 HP [745]	High Heat -Tap 3	CFM	1935	1893	1855	1814	1776	1732	1689	1647
				WATTS	798	813	831	846	864	880	895	910
		1 HP [745]	Cooling - Tap 4	CFM	1581	1531	1484	1435	1390	1341	1293	1247
				WATTS	587	599	613	626	640	652	664	676
		1 HP [745]	High Speed - Tap 5	CFM	2151	2115	2082	2046	2013	1972	1932	1893
				WATTS	928	945	964	981	1001	1020	1037	1054

NOTES: For 575V units, add 30W (transformer wattage) to the watt values mentioned in the table.
Pressure drops across the 3-5T CFM range (1050 - 2250)
Wet coil: ~0.09 Inches W.C.*
Downflow: ~0.1 Inches W.C.*
Reheat coil: ~0.09 Inches W.C.*

3-5T - Low Static - Low Gas Heat - Sideflow (460V)												
Unit Model (Tonnage)	"Manufacturer Recommended Airflow Range (Min/Max) CFM"	"Blower Size Motor HP [W]"	Motor Speed	CFM/ WATTS/ RPM	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]
3T	1050/1350	3/4 HP [559]	Fan - Tap 1	CFM	1110	956	870	792	709	630	549	512
				WATTS	79	78	84	91	98	104	110	111
		3/4 HP [559]	Low Heat -Tap 2	CFM	1112	959	873	795	712	633	552	514
				WATTS	80	79	85	92	99	105	111	112
		3/4 HP [559]	High Heat -Tap 3	CFM	1455	1346	1273	1203	1133	1065	997	951
				WATTS	236	242	253	263	273	282	291	298
		3/4 HP [559]	Cooling - Tap 4	CFM	1392	1276	1200	1128	1056	986	916	872
				WATTS	207	212	222	232	241	250	259	264
		3/4 HP [559]"	High Speed - Tap 5	CFM	1745	1673	1618	1549	1497	1435	1388	1334
				WATTS	341	357	370	384	396	407	418	430
4T	1400/1800	3/4 HP [559]	Fan - Tap 1	CFM	1110	956	870	792	709	630	549	512
				WATTS	79	78	84	91	98	104	110	111
		3/4 HP [559]	Low Heat -Tap 2	CFM	1253	1118	1037	963	885	811	735	694
				WATTS	144	146	154	163	171	178	185	189
		3/4 HP [559]	High Heat -Tap 3	CFM	1468	1362	1289	1219	1150	1082	1014	969
				WATTS	242	249	259	270	280	289	299	305
		3/4 HP [559]	Cooling - Tap 4	CFM	1738	1667	1604	1541	1482	1422	1365	1313
				WATTS	365	378	391	404	417	429	441	452
		3/4 HP [559]	High Speed - Tap 5	CFM	2081	2034	1981	1922	1873	1816	1769	1722
				WATTS	560	576	592	609	625	641	657	672
5T	1750/2250	1 HP [745]"	Fan - Tap 1	CFM	1235	1155	1077	1013	955	882	778	691
				WATTS	150	159	169	177	185	193	204	211
		1 HP [745]	Low Heat -Tap 2	CFM	1235	1155	1077	1013	955	882	778	691
				WATTS	150	159	169	177	185	193	204	211
		1 HP [745]	High Heat -Tap 3	CFM	1581	1515	1446	1384	1328	1272	1209	1150
				WATTS	273	286	299	310	321	330	341	351
		1 HP [745]	Cooling - Tap 4	CFM	2049	1996	1941	1887	1836	1788	1737	1687
				WATTS	591	608	625	642	657	672	686	699
		1 HP [745]	High Speed - Tap 5	CFM	2408	2367	2318	2267	2226	2177	2139	2089
				WATTS	861	884	900	921	939	957	974	996

NOTES: For 575V units, add 30W (transformer wattage) to the watt values mentioned in the table.
Pressure drops across the 3-5T CFM range (1050 - 2250)
Wet coil: ~0.09 Inches W.C.*
Downflow: ~0.1 Inches W.C.*
Reheat coil: ~0.09 Inches W.C.*

Appendix C – Air Flow Performance Data (Cont.)

3-5T - Low Static - Low Gas Heat - Sideflow (460V)												
Unit Model (Tonnage)	"Manufacturer Recommended Airflow Range (Min/Max) CFM"	"Blower Size Motor HP [W]"	Motor Speed	CFM/ WATTS/ RPM	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]
3T	1050/1350	3/4 HP [559]	Fan - Tap 1	CFM	1110	956	870	792	709	630	549	512
				WATTS	79	78	84	91	98	104	110	111
		3/4 HP [559]	Low Heat -Tap 2	CFM	1255	1120	1040	965	887	813	738	697
				WATTS	145	147	155	163	172	179	186	190
		3/4 HP [559]	High Heat -Tap 3	CFM	1621	1534	1467	1401	1337	1273	1212	1163
				WATTS	311	321	334	346	357	368	379	388
		3/4 HP [559]	Cooling - Tap 4	CFM	1392	1276	1200	1128	1056	986	916	872
				WATTS	207	212	222	232	241	250	259	264
		3/4 HP [559]"	High Speed - Tap 5	CFM	1745	1673	1618	1549	1497	1435	1388	1334
				WATTS	341	357	370	384	396	407	418	430
4T	1400/1800	3/4 HP [559]	Fan - Tap 1	CFM	1110	956	870	792	709	630	549	512
				WATTS	79	78	84	91	98	104	110	111
		3/4 HP [559]	Low Heat -Tap 2	CFM	1345	1222	1145	1072	998	926	854	812
				WATTS	186	190	199	208	217	225	234	239
		3/4 HP [559]	High Heat -Tap 3	CFM	1755	1686	1624	1561	1503	1443	1387	1334
				WATTS	372	386	399	413	425	437	449	461
		3/4 HP [559]	Cooling - Tap 4	CFM	1738	1667	1604	1541	1482	1422	1365	1313
				WATTS	365	378	391	404	417	429	441	452
		3/4 HP [559]	High Speed - Tap 5	CFM	2081	2034	1981	1922	1873	1816	1769	1722
				WATTS	560	576	592	609	625	641	657	672
5T	1750/2250	1 HP [745]"	Fan - Tap 1	CFM	1235	1155	1077	1013	955	882	778	691
				WATTS	150	159	169	177	185	193	204	211
		1 HP [745]	Low Heat -Tap 2	CFM	1453	1382	1311	1246	1188	1131	1064	1002
				WATTS	186	198	209	219	228	236	246	255
		1 HP [745]	High Heat -Tap 3	CFM	1975	1921	1863	1808	1756	1707	1654	1602
				WATTS	541	557	573	590	605	618	632	644
		1 HP [745]	Cooling - Tap 4	CFM	2049	1996	1941	1887	1836	1788	1737	1687
				WATTS	591	608	625	642	657	672	686	699
		1 HP [745]	High Speed - Tap 5	CFM	2408	2367	2318	2267	2226	2177	2139	2089
				WATTS	861	884	900	921	939	957	974	996

NOTES: For 575V units, add 30W (transformer wattage) to the watt values mentioned in the table.
Pressure drops across the 3-5T CFM range (1050 - 2250)
Wet coil: ~0.09 Inches W.C.*
Downflow: ~0.1 Inches W.C.*
Reheat coil: ~0.09 Inches W.C.*

3-5T - Low Static - Low Gas Heat - Sideflow (460V)												
Unit Model (Tonnage)	"Manufacturer Recommended Airflow Range (Min/Max) CFM"	"Blower Size Motor HP [W]"	Motor Speed	CFM/ WATTS/ RPM	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]
3T	1050/1350	1 HP [745]"	Fan - Tap 1	CFM	1061	1000	935	877	828	774	778	739
				WATTS	293	302	314	325	344	363	390	416
		1 HP [745]	Low Heat -Tap 2	CFM	905	841	773	713	667	615	635	609
				WATTS	192	201	212	225	248	274	309	347
		1 HP [745]	High Heat -Tap 3	CFM	1332	1276	1217	1162	1108	1049	1026	964
				WATTS	469	480	490	501	511	519	530	535
		1 HP [745]	Cooling - Tap 4	CFM	1064	1002	938	879	831	776	780	741
				WATTS	295	304	315	327	345	365	391	417
		1 HP [745]	High Speed - Tap 5	CFM	1526	1481	1440	1392	1336	1285	1231	1175
				WATTS	531	540	552	563	578	588	598	610
4T	1400/1800	1 HP [745]	Fan - Tap 1	CFM	1061	1000	935	877	828	774	778	739
				WATTS	293	302	314	325	344	363	390	416
		1 HP [745]	Low Heat -Tap 2	CFM	1073	1012	947	889	840	786	789	749
				WATTS	301	310	322	333	351	370	396	421
		1 HP [745]	High Heat -Tap 3	CFM	1452	1398	1342	1288	1232	1170	1136	1064
				WATTS	547	558	568	578	584	587	592	588
		1 HP [745]	Cooling - Tap 4	CFM	1434	1380	1323	1269	1213	1152	1120	1049
				WATTS	535	546	557	567	574	577	583	580
		1 HP [745]	High Speed - Tap 5	CFM	1795	1751	1710	1668	1629	1581	1538	1490
				WATTS	721	734	745	758	770	784	795	811
5T	1750/2250	1 HP [745]"	Fan - Tap 1	CFM	1063	1000	909	849	796	743	695	644
				WATTS	311	319	331	341	355	365	375	384
		1 HP [745]	Low Heat -Tap 2	CFM	1063	1000	909	849	796	743	695	644
				WATTS	311	319	331	341	355	365	375	384
		1 HP [745]	High Heat -Tap 3	CFM	1444	1390	1335	1279	1220	1161	1090	1035
				WATTS	468	487	488	499	505	514	513	521
		1 HP [745]	Cooling - Tap 4	CFM	1826	1795	1754	1714	1674	1636	1590	1540
				WATTS	681	700	720	738	757	774	787	799
		1 HP [745]	High Speed - Tap 5	CFM	2127	2076	2045	2000	1966	1930	1894	1871
				WATTS	906	924	941	958	977	1008	1021	1049

NOTES: For 575V units, add 30W (transformer wattage) to the watt values mentioned in the table.
Pressure drops across the 3-5T CFM range (1050 - 2250)
Wet coil: ~0.09 Inches W.C.*
Downflow: ~0.1 Inches W.C.*
Reheat coil: ~0.09 Inches W.C.*

Appendix C – Air Flow Performance Data (Cont.)

3-5T - Low Static - Low Gas Heat - Sideflow (460V)												
Unit Model (Tonnage)	"Manufacturer Recommended Airflow Range (Min/Max) CFM"	"Blower Size Motor HP [W]"	Motor Speed	CFM/ WATTS/ RPM	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]
3T	1050/1350	1 HP [745]"	Fan - Tap 1	CFM	958	895	828	768	722	669	684	653
				WATTS	226	235	247	259	280	304	337	371
		1 HP [745]	Low Heat -Tap 2	CFM	958	895	828	768	722	669	684	653
				WATTS	226	235	247	259	280	304	337	371
		1 HP [745]	High Heat -Tap 3	CFM	1591	1540	1486	1434	1375	1311	1263	1179
				WATTS	637	649	659	668	670	667	664	649
		1 HP [745]	Cooling - Tap 4	CFM	1064	1002	938	879	831	776	780	741
				WATTS	295	304	315	327	345	365	391	417
		1 HP [745]	High Speed - Tap 5	CFM	1526	1481	1440	1392	1336	1285	1231	1175
				WATTS	531	540	552	563	578	588	598	610
4T	1400/1800	1 HP [745]	Fan - Tap 1	CFM	1061	1000	935	877	828	774	778	739
				WATTS	293	302	314	325	344	363	390	416
		1 HP [745]	Low Heat -Tap 2	CFM	1438	1384	1327	1272	1217	1156	1123	1052
				WATTS	537	549	559	569	576	579	585	581
		1 HP [745]	High Heat -Tap 3	CFM	1629	1579	1526	1474	1415	1350	1298	1211
				WATTS	662	674	684	693	694	689	684	666
		1 HP [745]	Cooling - Tap 4	CFM	1434	1380	1323	1269	1213	1152	1120	1049
				WATTS	535	546	557	567	574	577	583	580
		1 HP [745]	High Speed - Tap 5	CFM	1795	1751	1710	1668	1629	1581	1538	1490
				WATTS	721	734	745	758	770	784	795	811
5T	1750/2250	1 HP [745]"	Fan - Tap 1	CFM	1063	1000	909	849	796	743	695	644
				WATTS	311	319	331	341	355	365	375	384
		1 HP [745]	Low Heat -Tap 2	CFM	1063	1000	909	849	796	743	695	644
				WATTS	311	319	331	341	355	365	375	384
		1 HP [745]	High Heat -Tap 3	CFM	1444	1390	1335	1279	1220	1161	1090	1035
				WATTS	468	487	488	499	505	514	513	521
		1 HP [745]	Cooling - Tap 4	CFM	1826	1795	1754	1714	1674	1636	1590	1540
				WATTS	681	700	720	738	757	774	787	799
		1 HP [745]	High Speed - Tap 5	CFM	2127	2076	2045	2000	1966	1930	1894	1871
				WATTS	906	924	941	958	977	1008	1021	1049

NOTES: For 575V units, add 30W (transformer wattage) to the watt values mentioned in the table.
Pressure drops across the 3-5T CFM range (1050 - 2250)
Wet coil: ~0.09 Inches W.C.*
Downflow: ~0.1 Inches W.C.*
Reheat coil: ~0.09 Inches W.C.*

Appendix D – Cooling Data for 3Ton

COOLING PERFORMANCE DATA - (-)GECZR036A																	
Entering Indoor Air @ 80ºF [26.7ºC] dbE																	
wbE		71ºF [21.7ºC]			67ºF [19.4ºC]			63ºF [17.2ºC]			61ºF [16.1ºC]			59ºF [15.0ºC]		
CFM [L/s]		1350 [637]	1300 [614]	1050 [496]	1350 [637]	1300 [614]	1050 [496]	1350 [637]	1300 [614]	1050 [496]	1350 [637]	1300 [614]	1050 [496]	1350 [637]	1300 [614]	1050 [496]
DR		0.21	0.2	0.15	0.21	0.2	0.15	0.21	0.2	0.15	0.21	0.2	0.15	0.21	0.2	0.15
Outdoor Dry Bulb Temperature																	
75ºF [23.9ºC]	Total BTUH [kW]	43.5 [12.8]	43.2 [12.7]	41.7 [12.2]	40.4 [11.9]	40.2 [11.8]	38.8 [11.4]	38.4 [11.2]	38.1 [11.2]	36.8 [10.8]	37.8 [11.1]	37.6 [11]	36.3 [10.6]	37.7 [11.1]	37.5 [11]	36.2 [10.6]
	Sens BTUH [kW]	25.7 [7.5]	25.3 [7.4]	23 [6.7]	29.9 [8.8]	29.4 [8.6]	26.8 [7.8]	33.4 [9.8]	32.9 [9.6]	29.9 [8.8]	35.1 [10.3]	34.5 [10.1]	31.4 [9.2]	36.8 [10.8]	36.1 [10.6]	32.9 [9.6]
	Power	2.4	2.4	2.3	2.4	2.4	2.3	2.4	2.4	2.3	2.4	2.4	2.3	2.4	2.4	2.3
80ºF [26.7ºC]	Total BTUH [kW]	42.2 [12.4]	41.9 [12.3]	40.4 [11.8]	39.1 [11.5]	38.8 [11.4]	37.5 [11]	37 [10.8]	36.8 [10.8]	35.5 [10.4]	36.5 [10.7]	36.2 [10.6]	35 [10.2]	36.4 [10.7]	36.2 [10.6]	34.9 [10.2]
	Sens BTUH [kW]	25 [7.3]	24.5 [7.2]	22.3 [6.5]	29.2 [8.6]	28.7 [8.4]	26.1 [7.7]	32.7 [9.6]	32.1 [9.4]	29.3 [8.6]	34.4 [10.1]	33.8 [9.9]	30.7 [9]	36 [10.6]	35.4 [10.4]	32.2 [9.4]
	Power	2.5	2.5	2.4	2.5	2.5	2.4	2.5	2.5	2.4	2.5	2.5	2.4	2.5	2.5	2.4
85ºF [29.4ºC]	Total BTUH [kW]	40.8 [12]	40.6 [11.9]	39.1 [11.5]	37.8 [11.1]	37.5 [11]	36.2 [10.6]	35.7 [10.5]	35.4 [10.4]	34.2 [10]	35.2 [10.3]	34.9 [10.2]	33.7 [9.9]	35.1 [10.3]	34.8 [10.2]	33.6 [9.9]
	Sens BTUH [kW]	24.3 [7.1]	23.8 [7]	21.7 [6.4]	28.5 [8.3]	28 [8.2]	25.5 [7.5]	32 [9.4]	31.4 [9.2]	28.6 [8.4]	33.6 [9.9]	33.1 [9.7]	30.1 [8.8]	35.1 [10.3]	34.7 [10.2]	31.6 [9.3]
	Power	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.5	2.6	2.6	2.5	2.6	2.6	2.5
90ºF [32.2ºC]	Total BTUH [kW]	39.5 [11.6]	39.2 [11.5]	37.9 [11.1]	36.4 [10.7]	36.2 [10.6]	34.9 [10.2]	34.3 [10.1]	34.1 [10]	32.9 [9.6]	33.8 [9.9]	33.6 [9.8]	32.4 [9.5]	33.7 [9.9]	33.5 [9.8]	32.3 [9.5]
	Sens BTUH [kW]	23.6 [6.9]	23.2 [6.8]	21.1 [6.2]	27.8 [8.1]	27.3 [8]	24.9 [7.3]	31.3 [9.2]	30.8 [9]	28 [8.2]	33 [9.7]	32.4 [9.5]	29.5 [8.6]	33.7 [9.9]	33.5 [9.8]	31 [9.1]
	Power	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
95ºF [35.0ºC]	Total BTUH [kW]	38.2 [11.2]	37.9 [11.1]	36.6 [10.7]	35.1 [10.3]	34.9 [10.2]	33.6 [9.9]	33 [9.7]	32.8 [9.6]	31.6 [9.3]	32.5 [9.5]	32.3 [9.5]	31.1 [9.1]	32.4 [9.5]	32.2 [9.4]	31 [9.1]
	Sens BTUH [kW]	22.9 [6.7]	22.5 [6.6]	20.5 [6]	27.1 [8]	26.7 [7.8]	24.3 [7.1]	30.6 [9]	30.1 [8.8]	27.4 [8]	32.3 [9.5]	31.7 [9.3]	28.9 [8.5]	32.4 [9.5]	32.2 [9.4]	30.4 [8.9]
	Power	2.9	2.9	2.8	2.9	2.9	2.8	2.9	2.9	2.8	2.9	2.8	2.8	2.9	2.8	2.8
100ºF [37.8ºC]	Total BTUH [kW]	36.8 [10.8]	36.6 [10.7]	35.3 [10.3]	33.8 [9.9]	33.5 [9.8]	32.3 [9.5]	31.7 [9.3]	31.4 [9.2]	30.3 [8.9]	31.1 [9.1]	30.9 [9.1]	29.8 [8.7]	31.1 [9.1]	30.8 [9]	29.8 [8.7]
	Sens BTUH [kW]	22.3 [6.5]	21.9 [6.4]	19.9 [5.8]	26.5 [7.8]	26 [7.6]	23.7 [6.9]	30 [8.8]	29.5 [8.6]	26.8 [7.9]	31.1 [9.1]	30.9 [9.1]	28.3 [8.3]	31.1 [9.1]	30.8 [9]	29.8 [8.7]
	Power	3	3	3	3	3	3	3	3	2.9	3	3	2.9	3	3	2.9
105ºF [40.6ºC]	Total BTUH [kW]	35.5 [10.4]	35.2 [10.3]	34 [10]	32.4 [9.5]	32.2 [9.4]	31.1 [9.1]	30.3 [8.9]	30.1 [8.8]	29.1 [8.5]	29.8 [8.7]	29.6 [8.7]	28.6 [8.4]	29.7 [8.7]	29.5 [8.6]	28.5 [8.3]
	Sens BTUH [kW]	21.7 [6.3]	21.3 [6.2]	19.4 [5.7]	25.9 [7.6]	25.4 [7.4]	23.1 [6.8]	29.4 [8.6]	28.9 [8.5]	26.3 [7.7]	29.8 [8.7]	29.6 [8.7]	27.7 [8.1]	29.7 [8.7]	29.5 [8.6]	28.5 [8.3]
	Power	3.2	3.2	3.1	3.2	3.2	3.1	3.2	3.2	3.1	3.2	3.1	3.1	3.2	3.1	3.1
110ºF [43.3ºC]	Total BTUH [kW]	34.1 [10]	33.9 [9.9]	32.7 [9.6]	31.1 [9.1]	30.8 [9]	29.8 [8.7]	29 [8.5]	28.8 [8.4]	27.8 [8.1]	28.4 [8.3]	28.3 [8.3]	27.3 [8]	28.4 [8.3]	28.2 [8.3]	27.2 [8]
	Sens BTUH [kW]	21.1 [6.2]	20.7 [6.1]	18.8 [5.5]	25.3 [7.4]	24.8 [7.3]	22.6 [6.6]	28.8 [8.4]	28.3 [8.3]	25.7 [7.5]	28.4 [8.3]	28.3 [8.3]	27.2 [8]	28.4 [8.3]	28.2 [8.3]	27.2 [8]
	Power	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.2
115ºF [46.1ºC]	Total BTUH [kW]	32.8 [9.6]	32.6 [9.5]	31.4 [9.2]	29.7 [8.7]	29.5 [8.6]	28.5 [8.3]	27.6 [8.1]	27.4 [8]	26.5 [7.8]	27.1 [7.9]	26.9 [7.9]	26 [7.6]	27 [7.9]	26.8 [7.9]	25.9 [7.6]
	Sens BTUH [kW]	20.5 [6]	20.1 [5.9]	18.3 [5.4]	24.7 [7.2]	24.2 [7.1]	22.1 [6.5]	27.6 [8.1]	27.4 [8]	25.2 [7.4]	27.1 [7.9]	26.9 [7.9]	26 [7.6]	27 [7.9]	26.8 [7.9]	25.9 [7.6]
	Power	3.5	3.5	3.4	3.5	3.5	3.4	3.5	3.5	3.4	3.5	3.5	3.4	3.5	3.5	3.4
120ºF [48.9ºC]	Total BTUH [kW]	31.4 [9.2]	31.2 [9.1]	30.1 [8.8]	28.4 [8.3]	28.2 [8.3]	27.2 [8]	26.3 [7.7]	26.1 [7.6]	25.2 [7.4]	25.8 [7.5]	25.6 [7.5]	24.7 [7.2]	25.7 [7.5]	25.5 [7.5]	24.6 [7.2]
	Sens BTUH [kW]	19.9 [5.8]	19.6 [5.7]	17.8 [5.2]	24.1 [7.1]	23.7 [6.9]	21.6 [6.3]	26.3 [7.7]	26.1 [7.6]	24.7 [7.2]	25.8 [7.5]	25.6 [7.5]	24.7 [7.2]	25.7 [7.5]	25.5 [7.5]	24.6 [7.2]
	Power	3.7	3.7	3.6	3.7	3.7	3.6	3.7	3.7	3.6	3.7	3.7	3.6	3.7	3.7	3.6
125ºF [51.7ºC]	Total BTUH [kW]	30.1 [8.8]	29.9 [8.8]	28.8 [8.5]	27 [7.9]	26.8 [7.9]	25.9 [7.6]	24.9 [7.3]	24.8 [7.3]	23.9 [7]	24.4 [7.2]	24.2 [7.1]	23.4 [6.9]	24.3 [7.1]	24.2 [7.1]	23.3 [6.8]
	Sens BTUH [kW]	19.4 [5.7]	19 [5.6]	17.3 [5.1]	23.6 [6.9]	23.2 [6.8]	21.1 [6.2]	24.9 [7.3]	24.8 [7.3]	23.9 [7]	24.4 [7.2]	24.2 [7.1]	23.4 [6.9]	24.3 [7.1]	24.2 [7.1]	23.3 [6.8]
	Power	3.9	3.9	3.8	3.9	3.9	3.8	3.9	3.9	3.8	3.9	3.9	3.8	3.9	3.8	3.8

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 4Ton

COOLING PERFORMANCE DATA - (-)GECZR048A																		
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]			61°F [16.1°C]			59°F [15.0°C]		
CFM [L/s]			1800 [850]	1730 [816]	1400 [661]	1800 [850]	1730 [816]	1400 [661]	1800 [850]	1730 [816]	1400 [661]	1800 [850]	1730 [816]	1400 [661]	1800 [850]	1730 [816]	1400 [661]
DR			0.23	0.22	0.18	0.23	0.22	0.18	0.23	0.22	0.18	0.23	0.22	0.18	0.23	0.22	0.18
Outdoor Dry Bulb Temperature	75°F [23.9°C]	Total BTUH [kW]	57.9 [17]	57.5 [16.8]	55.5 [16.3]	53.8 [15.8]	53.4 [15.6]	51.5 [15.1]	50.6 [14.8]	50.2 [14.7]	48.5 [14.2]	49.5 [14.5]	49.2 [14.4]	47.5 [13.9]	48.9 [14.3]	48.5 [14.2]	46.9 [13.7]
		Sens BTUH [kW]	32.7 [9.6]	32.1 [9.4]	29.3 [8.6]	39.1 [11.5]	38.4 [11.3]	35 [10.2]	44.4 [13]	43.6 [12.8]	39.7 [11.6]	46.5 [13.6]	45.7 [13.4]	41.6 [12.2]	48.1 [14.1]	47.2 [13.8]	43 [12.6]
		Power	3.1	3.1	3	3.1	3	3	3	3	3	3	3	3	3	3	3
	80°F [26.7°C]	Total BTUH [kW]	56.3 [16.5]	55.9 [16.4]	54 [15.8]	52.2 [15.3]	51.8 [15.2]	50 [14.7]	49 [14.4]	48.7 [14.3]	47 [13.8]	47.9 [14.1]	47.6 [13.9]	45.9 [13.5]	47.3 [13.9]	47 [13.8]	45.3 [13.3]
		Sens BTUH [kW]	31.9 [9.4]	31.3 [9.2]	28.5 [8.4]	38.3 [11.2]	37.6 [11]	34.2 [10]	43.6 [12.8]	42.8 [12.5]	39 [11.4]	45.7 [13.4]	44.8 [13.1]	40.8 [12]	47.2 [13.8]	46.4 [13.6]	42.2 [12.4]
		Power	3.2	3.2	3.1	3.2	3.2	3.1	3.2	3.2	3.1	3.2	3.2	3.1	3.2	3.2	3.1
	85°F [29.4°C]	Total BTUH [kW]	54.7 [16]	54.3 [15.9]	52.4 [15.4]	50.6 [14.8]	50.2 [14.7]	48.5 [14.2]	47.4 [13.9]	47.1 [13.8]	45.4 [13.3]	46.3 [13.6]	46 [13.5]	44.4 [13]	45.7 [13.4]	45.3 [13.3]	43.8 [12.8]
		Sens BTUH [kW]	31 [9.1]	30.5 [8.9]	27.8 [8.1]	37.4 [11]	36.7 [10.8]	33.5 [9.8]	42.7 [12.5]	42 [12.3]	38.2 [11.2]	44.8 [13.1]	44 [12.9]	40.1 [11.7]	45.7 [13.4]	45.3 [13.3]	41.5 [12.2]
		Power	3.4	3.3	3.3	3.4	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
	90°F [32.2°C]	Total BTUH [kW]	53 [15.5]	52.6 [15.4]	50.8 [14.9]	48.9 [14.3]	48.5 [14.2]	46.9 [13.7]	45.7 [13.4]	45.4 [13.3]	43.8 [12.8]	44.6 [13.1]	44.3 [13]	42.8 [12.5]	44 [12.9]	43.7 [12.8]	42.2 [12.4]
		Sens BTUH [kW]	30.2 [8.8]	29.6 [8.7]	27 [7.9]	36.5 [10.7]	35.9 [10.5]	32.7 [9.6]	41.9 [12.3]	41.1 [12]	37.4 [11]	43.9 [12.9]	43.1 [12.6]	39.3 [11.5]	44 [12.9]	43.7 [12.8]	40.7 [11.9]
		Power	3.5	3.5	3.5	3.5	3.5	3.4	3.5	3.5	3.4	3.5	3.5	3.4	3.5	3.5	3.4
	95°F [35.0°C]	Total BTUH [kW]	51.3 [15]	50.9 [14.9]	49.1 [14.4]	47.2 [13.8]	46.8 [13.7]	45.2 [13.2]	44 [12.9]	43.7 [12.8]	42.2 [12.4]	42.9 [12.6]	42.6 [12.5]	41.1 [12]	42.3 [12.4]	42 [12.3]	40.5 [11.9]
		Sens BTUH [kW]	29.2 [8.6]	28.7 [8.4]	26.1 [7.7]	35.6 [10.4]	35 [10.2]	31.8 [9.3]	40.9 [12]	40.2 [11.8]	36.6 [10.7]	42.9 [12.6]	42.2 [12.4]	38.5 [11.3]	42.3 [12.4]	42 [12.3]	39.9 [11.7]
		Power	3.7	3.7	3.6	3.7	3.7	3.6	3.7	3.7	3.6	3.7	3.7	3.6	3.7	3.7	3.6
	100°F [37.8°C]	Total BTUH [kW]	49.5 [14.5]	49.1 [14.4]	47.4 [13.9]	45.4 [13.3]	45.1 [13.2]	43.5 [12.7]	42.2 [12.4]	41.9 [12.3]	40.5 [11.9]	41.1 [12.1]	40.8 [12]	39.4 [11.6]	40.5 [11.9]	40.2 [11.8]	38.8 [11.4]
		Sens BTUH [kW]	28.3 [8.3]	27.8 [8.1]	25.3 [7.4]	34.7 [10.2]	34 [10]	31 [9.1]	40 [11.7]	39.3 [11.5]	35.8 [10.5]	41.1 [12.1]	40.8 [12]	37.6 [11]	40.5 [11.9]	40.2 [11.8]	38.8 [11.4]
		Power	3.9	3.9	3.8	3.9	3.9	3.8	3.9	3.9	3.8	3.9	3.9	3.8	3.9	3.9	3.8
	105°F [40.6°C]	Total BTUH [kW]	47.7 [14]	47.3 [13.9]	45.7 [13.4]	43.6 [12.8]	43.3 [12.7]	41.8 [12.2]	40.4 [11.8]	40.1 [11.8]	38.7 [11.3]	39.3 [11.5]	39 [11.4]	37.7 [11]	38.7 [11.3]	38.4 [11.3]	37.1 [10.9]
		Sens BTUH [kW]	27.3 [8]	26.8 [7.9]	24.4 [7.2]	33.7 [9.9]	33.1 [9.7]	30.1 [8.8]	39 [11.4]	38.3 [11.2]	34.9 [10.2]	39.3 [11.5]	39 [11.4]	36.8 [10.8]	38.7 [11.3]	38.4 [11.3]	37.1 [10.9]
		Power	4.1	4.1	4	4.1	4.1	4	4.1	4.1	4	4.1	4.1	4	4.1	4.1	4
	110°F [43.3°C]	Total BTUH [kW]	45.8 [13.4]	45.5 [13.3]	43.9 [12.9]	41.7 [12.2]	41.4 [12.1]	40 [11.7]	38.5 [11.3]	38.3 [11.2]	36.9 [10.8]	37.5 [11]	37.2 [10.9]	35.9 [10.5]	36.8 [10.8]	36.5 [10.7]	35.3 [10.3]
		Sens BTUH [kW]	26.3 [7.7]	25.9 [7.6]	23.6 [6.9]	32.7 [9.6]	32.1 [9.4]	29.2 [8.6]	38 [11.1]	37.3 [10.9]	34 [10]	37.5 [11]	37.2 [10.9]	35.9 [10.5]	36.8 [10.8]	36.5 [10.7]	35.3 [10.3]
		Power	4.3	4.3	4.2	4.3	4.3	4.2	4.3	4.3	4.2	4.3	4.3	4.2	4.3	4.3	4.2
	115°F [46.1°C]	Total BTUH [kW]	43.9 [12.9]	43.6 [12.8]	42.1 [12.3]	39.8 [11.7]	39.5 [11.6]	38.1 [11.2]	36.6 [10.7]	36.4 [10.7]	35.1 [10.3]	35.5 [10.4]	35.3 [10.3]	34.1 [10]	34.9 [10.2]	34.6 [10.2]	33.4 [9.8]
		Sens BTUH [kW]	25.3 [7.4]	24.8 [7.3]	22.6 [6.6]	31.7 [9.3]	31.1 [9.1]	28.3 [8.3]	36.6 [10.7]	36.3 [10.6]	33.1 [9.7]	35.5 [10.4]	35.3 [10.3]	34.1 [10]	34.9 [10.2]	34.6 [10.2]	33.4 [9.8]
		Power	4.5	4.5	4.5	4.5	4.5	4.4	4.5	4.5	4.4	4.5	4.5	4.4	4.5	4.5	4.4
	120°F [48.9°C]	Total BTUH [kW]	42 [12.3]	41.6 [12.2]	40.2 [11.8]	37.8 [11.1]	37.6 [11]	36.3 [10.6]	34.7 [10.2]	34.4 [10.1]	33.2 [9.7]	33.6 [9.8]	33.3 [9.8]	32.2 [9.4]	32.9 [9.7]	32.7 [9.6]	31.6 [9.3]
		Sens BTUH [kW]	24.3 [7.1]	23.8 [7]	21.7 [6.4]	30.6 [9]	30.1 [8.8]	27.4 [8]	34.7 [10.2]	34.4 [10.1]	32.2 [9.4]	33.6 [9.8]	33.3 [9.8]	32.2 [9.4]	32.9 [9.7]	32.7 [9.6]	31.6 [9.3]
		Power	4.8	4.8	4.7	4.8	4.8	4.7	4.8	4.7	4.7	4.8	4.7	4.7	4.8	4.7	4.7
	125°F [51.7°C]	Total BTUH [kW]	39.9 [11.7]	39.7 [11.6]	38.3 [11.2]	35.8 [10.5]	35.6 [10.4]	34.3 [10.1]	32.7 [9.6]	32.4 [9.5]	31.3 [9.2]	31.6 [9.3]	31.4 [9.2]	30.3 [8.9]	30.9 [9.1]	30.7 [9]	29.7 [8.7]
		Sens BTUH [kW]	23.2 [6.8]	22.8 [6.7]	20.7 [6.1]	29.6 [8.7]	29 [8.5]	26.4 [7.7]	32.7 [9.6]	32.4 [9.5]	31.2 [9.1]	31.6 [9.3]	31.4 [9.2]	30.3 [8.9]	30.9 [9.1]	30.7 [9]	29.7 [8.7]
		Power	5	5	4.9	5	5	4.9	5	5	4.9	5	5	4.9	5	5	4.9

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 – Cooling Data for 5Ton

COOLING PERFORMANCE DATA - (-)GECZR060A																	
Entering Indoor Air @ 80ºF [26.7ºC] dbE																	
wbE			71ºF [21.7ºC]			67ºF [19.4ºC]			63ºF [17.2ºC]			61ºF [16.1ºC]			59ºF [15.0ºC]		
CFM [L/s]			2250 [1062]	1950 [920]	1750 [826]	2250 [1062]	1950 [920]	1750 [826]	2250 [1062]	1950 [920]	1750 [826]	2250 [1062]	1950 [920]	1750 [826]	2250 [1062]	1950 [920]	1750 [826]
DR			0.21	0.18	0.16	0.21	0.18	0.16	0.21	0.18	0.16	0.21	0.18	0.16	0.21	0.18	0.16
Outdoor Dry Bulb Temperature	75ºF [23.9ºC]	Total BTUH [kW]	72.9 [21.4]	70.9 [20.8]	69.6 [20.4]	68.5 [20.1]	66.7 [19.5]	65.4 [19.2]	64.6 [18.9]	62.9 [18.4]	61.7 [18.1]	62.9 [18.4]	61.2 [17.9]	60.1 [17.6]	61.5 [18]	59.9 [17.5]	58.7 [17.2]
		Sens BTUH [kW]	41.9 [12.3]	39.1 [11.5]	37.2 [10.9]	49.9 [14.6]	46.6 [13.6]	44.4 [13]	56.8 [16.7]	53 [15.5]	50.5 [14.8]	59.7 [17.5]	55.7 [16.3]	53 [15.5]	61.5 [18]	57.8 [16.9]	55 [16.1]
		Power	4	4	4	3.5	3.5	3.5	3	3	3	2.8	2.8	2.7	2.5	2.5	2.5
	80ºF [26.7ºC]	Total BTUH [kW]	71 [20.8]	69.1 [20.2]	67.8 [19.9]	66.6 [19.5]	64.8 [19]	63.6 [18.6]	62.7 [18.4]	61 [17.9]	59.9 [17.5]	61 [17.9]	59.4 [17.4]	58.3 [17.1]	59.6 [17.5]	58 [17]	56.9 [16.7]
		Sens BTUH [kW]	41 [12]	38.2 [11.2]	36.4 [10.7]	49 [14.4]	45.7 [13.4]	43.5 [12.8]	55.9 [16.4]	52.2 [15.3]	49.7 [14.6]	58.8 [17.2]	54.8 [16.1]	52.2 [15.3]	59.6 [17.5]	56.9 [16.7]	54.2 [15.9]
		Power	4.2	4.1	4.1	3.7	3.6	3.6	3.2	3.1	3.1	2.9	2.9	2.8	2.7	2.6	2.6
	85ºF [29.4ºC]	Total BTUH [kW]	69 [20.2]	67.1 [19.7]	65.9 [19.3]	64.6 [18.9]	62.9 [18.4]	61.7 [18.1]	60.7 [17.8]	59.1 [17.3]	58 [17]	59 [17.3]	57.4 [16.8]	56.4 [16.5]	57.6 [16.9]	56 [16.4]	55 [16.1]
		Sens BTUH [kW]	40 [11.7]	37.3 [10.9]	35.5 [10.4]	48 [14.1]	44.8 [13.1]	42.7 [12.5]	54.9 [16.1]	51.3 [15]	48.8 [14.3]	57.8 [16.9]	53.9 [15.8]	51.3 [15]	57.6 [16.9]	56 [16.4]	53.3 [15.6]
		Power	4.4	4.3	4.3	3.9	3.8	3.8	3.4	3.3	3.3	3.1	3.1	3.1	2.9	2.8	2.8
	90ºF [32.2ºC]	Total BTUH [kW]	67 [19.6]	65.2 [19.1]	63.9 [18.7]	62.6 [18.3]	60.9 [17.8]	59.7 [17.5]	58.7 [17.2]	57.1 [16.7]	56 [16.4]	57 [16.7]	55.4 [16.2]	54.4 [15.9]	55.6 [16.3]	54.1 [15.8]	53.1 [15.5]
		Sens BTUH [kW]	39 [11.4]	36.4 [10.7]	34.6 [10.1]	47 [13.8]	43.9 [12.9]	41.8 [12.2]	53.9 [15.8]	50.3 [14.7]	47.9 [14]	56.7 [16.6]	52.9 [15.5]	50.4 [14.8]	55.6 [16.3]	54.1 [15.8]	52.4 [15.4]
		Power	4.7	4.6	4.6	4.2	4.1	4.1	3.7	3.6	3.6	3.4	3.4	3.4	3.2	3.2	3.1
	95ºF [35.0ºC]	Total BTUH [kW]	64.9 [19]	63.1 [18.5]	61.9 [18.1]	60.5 [17.7]	58.8 [17.2]	57.7 [16.9]	56.6 [16.6]	55 [16.1]	54 [15.8]	54.9 [16.1]	53.4 [15.6]	52.4 [15.4]	53.5 [15.7]	52 [15.2]	51 [15]
		Sens BTUH [kW]	37.9 [11.1]	35.3 [10.4]	33.6 [9.9]	45.9 [13.5]	42.8 [12.6]	40.8 [11.9]	52.8 [15.5]	49.3 [14.4]	46.9 [13.7]	54.9 [16.1]	51.9 [15.2]	49.4 [14.5]	53.5 [15.7]	52 [15.2]	51 [15]
		Power	5.1	5	5	4.6	4.6	4.5	4.1	4.1	4	3.9	3.8	3.8	3.6	3.6	3.5
	100ºF [37.8ºC]	Total BTUH [kW]	62.7 [18.4]	61 [17.9]	59.9 [17.5]	58.3 [17.1]	56.7 [16.6]	55.7 [16.3]	54.4 [15.9]	52.9 [15.5]	51.9 [15.2]	52.7 [15.5]	51.3 [15]	50.3 [14.8]	51.3 [15]	49.9 [14.6]	49 [14.4]
		Sens BTUH [kW]	36.7 [10.8]	34.3 [10]	32.6 [9.6]	44.7 [13.1]	41.7 [12.2]	39.7 [11.6]	51.7 [15.1]	48.2 [14.1]	45.9 [13.4]	52.7 [15.5]	50.8 [14.9]	48.4 [14.2]	51.3 [15]	49.9 [14.6]	49 [14.4]
		Power	5.6	5.6	5.5	5.1	5.1	5	4.6	4.6	4.5	4.4	4.3	4.3	4.1	4.1	4
	105ºF [40.6ºC]	Total BTUH [kW]	60.5 [17.7]	58.9 [17.2]	57.8 [16.9]	56.1 [16.4]	54.6 [16]	53.6 [15.7]	52.2 [15.3]	50.8 [14.9]	49.8 [14.6]	50.5 [14.8]	49.1 [14.4]	48.2 [14.1]	49.1 [14.4]	47.8 [14]	46.9 [13.7]
		Sens BTUH [kW]	35.5 [10.4]	33.1 [9.7]	31.5 [9.2]	43.5 [12.8]	40.6 [11.9]	38.7 [11.3]	50.4 [14.8]	47.1 [13.8]	44.8 [13.1]	50.5 [14.8]	49.1 [14.4]	47.3 [13.9]	49.1 [14.4]	47.8 [14]	46.9 [13.7]
		Power	6.3	6.2	6.1	5.8	5.7	5.6	5.3	5.2	5.1	5	4.9	4.9	4.8	4.7	4.7
	110ºF [43.3ºC]	Total BTUH [kW]	58.2 [17.1]	56.6 [16.6]	55.6 [16.3]	53.8 [15.8]	52.4 [15.3]	51.4 [15.1]	49.9 [14.6]	48.6 [14.2]	47.7 [14]	48.2 [14.1]	46.9 [13.8]	46.1 [13.5]	46.8 [13.7]	45.6 [13.3]	44.7 [13.1]
		Sens BTUH [kW]	34.2 [10]	31.9 [9.4]	30.4 [8.9]	42.2 [12.4]	39.4 [11.5]	37.5 [11]	49.2 [14.4]	45.9 [13.4]	43.7 [12.8]	48.2 [14.1]	46.9 [13.8]	46.1 [13.5]	46.8 [13.7]	45.6 [13.3]	44.7 [13.1]
		Power	7	6.9	6.8	6.5	6.4	6.3	6	5.9	5.9	5.7	5.7	5.6	5.5	5.4	5.4
	115ºF [46.1ºC]	Total BTUH [kW]	55.9 [16.4]	54.4 [15.9]	53.4 [15.6]	51.5 [15.1]	50.1 [14.7]	49.2 [14.4]	47.6 [13.9]	46.3 [13.6]	45.4 [13.3]	45.9 [13.5]	44.7 [13.1]	43.8 [12.8]	44.5 [13]	43.3 [12.7]	42.5 [12.4]
		Sens BTUH [kW]	32.9 [9.6]	30.7 [9]	29.2 [8.6]	40.9 [12]	38.2 [11.2]	36.3 [10.6]	47.6 [13.9]	44.6 [13.1]	42.5 [12.4]	45.9 [13.5]	44.7 [13.1]	43.8 [12.8]	44.5 [13]	43.3 [12.7]	42.5 [12.4]
		Power	7.8	7.7	7.6	7.3	7.2	7.1	6.8	6.7	6.7	6.6	6.5	6.4	6.3	6.2	6.2
	120ºF [48.9ºC]	Total BTUH [kW]	53.5 [15.7]	52.1 [15.3]	51.1 [15]	49.1 [14.4]	47.8 [14]	46.9 [13.7]	45.2 [13.2]	44 [12.9]	43.2 [12.6]	43.5 [12.8]	42.3 [12.4]	41.6 [12.2]	42.1 [12.3]	41 [12]	40.2 [11.8]
		Sens BTUH [kW]	31.5 [9.2]	29.4 [8.6]	28 [8.2]	39.5 [11.6]	36.8 [10.8]	35.1 [10.3]	45.2 [13.2]	43.3 [12.7]	41.2 [12.1]	43.5 [12.8]	42.3 [12.4]	41.6 [12.2]	42.1 [12.3]	41 [12]	40.2 [11.8]
		Power	8.7	8.6	8.5	8.2	8.1	8.1	7.7	7.6	7.6	7.5	7.4	7.3	7.2	7.1	7.1
	125ºF [51.7ºC]	Total BTUH [kW]	51.1 [15]	49.7 [14.6]	48.7 [14.3]	46.7 [13.7]	45.4 [13.3]	44.6 [13.1]	42.8 [12.5]	41.6 [12.2]	40.8 [12]	41.1 [12]	40 [11.7]	39.2 [11.5]	39.7 [11.6]	38.6 [11.3]	37.9 [11.1]
		Sens BTUH [kW]	30 [8.8]	28 [8.2]	26.6 [7.8]	38 [11.1]	35.5 [10.4]	33.8 [9.9]	42.8 [12.5]	41.6 [12.2]	39.9 [11.7]	41.1 [12]	40 [11.7]	39.2 [11.5]	39.7 [11.6]	38.6 [11.3]	37.9 [11.1]
		Power	9.8	9.6	9.6	9.3	9.1	9.1	8.8	8.7	8.6	8.5	8.4	8.3	8.3	8.2	8.1

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 E – Heating Performance

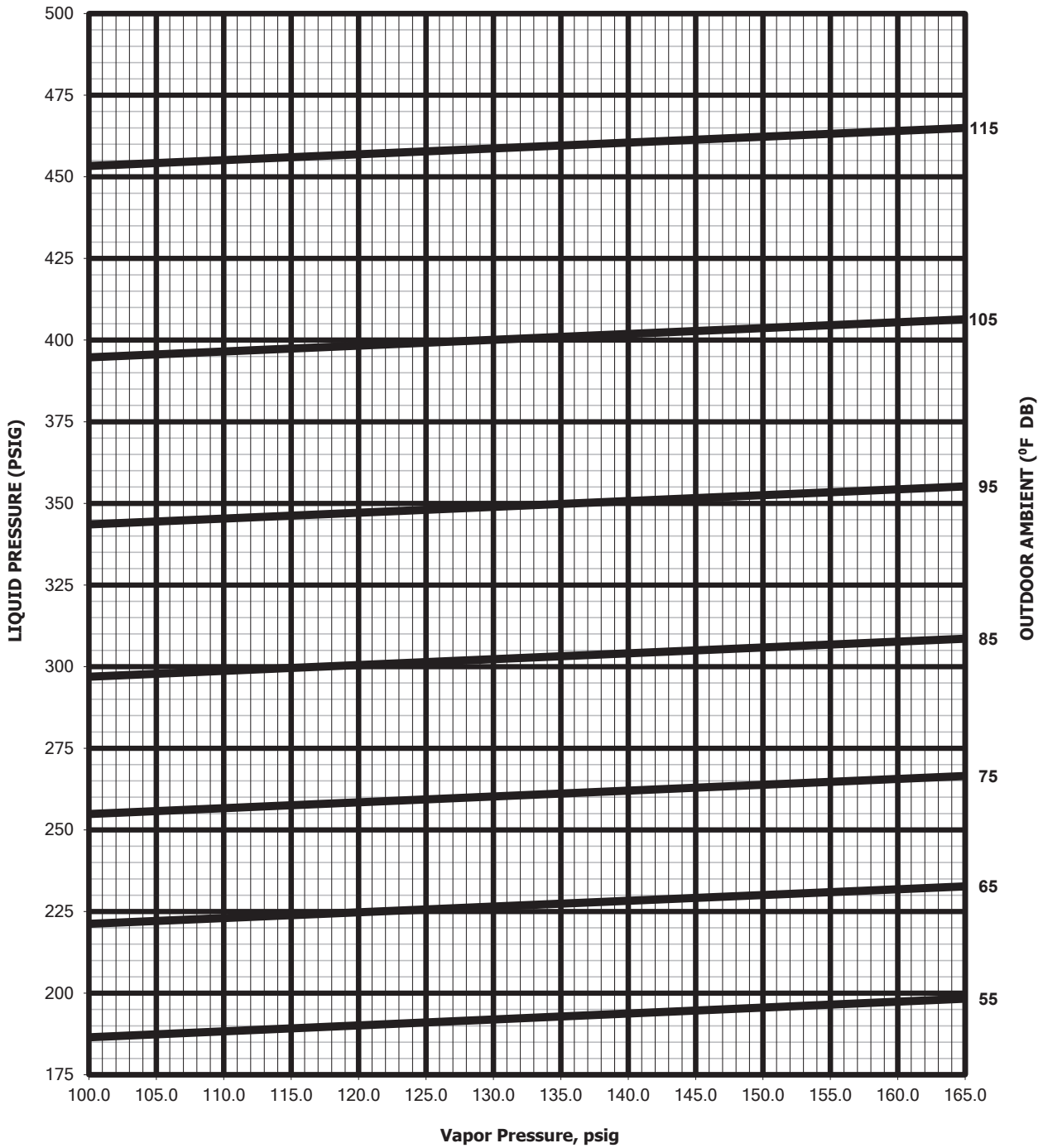
Models: (-)GEC **Gas Heat Performance Specifications**

208-230V & 575V						
Tonnage	**3-Ton**		**4-Ton**		**5-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
	[21.98/115.39]	[29.31/20.52]	[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
	[17.80/12.46]	[23.74/16.62]	[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
	[13.9-30.6]	[19.4-36.1]	[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
	[11.1-27.8]	[13.9-30.6]	[11.1-27.8]	[16-33]	[11.1-27.8]	[13.9-30.6]
Main Limit Temp °F	145	125	145	125	145	125
Rollout Temp. °F	250	250	250	250	250	250
Rating ESP In. W.C.	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
Max Outlet Air Temp °F [°C]	180 [82.2]	190 [87.8]	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
% Steady State Efficiency	81.0	81.0	81.0	81.0	81.0	81.0
460V						
Tonnage	**3-Ton**		**4-Ton**		**5-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
	[21.98/115.39]	[29.31/20.52]	[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
	[17.80/12.46]	[23.74/16.62]	[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
	[16.7-33.3]	[19.4-36.1]	[16.7-33.3]	[22.2-38.9]	[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
	[13.9-30.6]	[16.7-33.3]	[11.1-27.8]	[19.4-36.1]	[11.1-27.8]	[16.7-33.3]
Main Limit Temp °F	145	125	145	125	145	125
Rollout Temp. °F	250	250	250	250	250	250
Rating ESP In. W.C.	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
Max Outlet Air Temp °F [°C]	180 [82.2]	190 [87.8]	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
% 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]***						

P. APPENDICES

Appendix F – Refrigerant Charging Charts

3.0 Ton GE Charging Chart



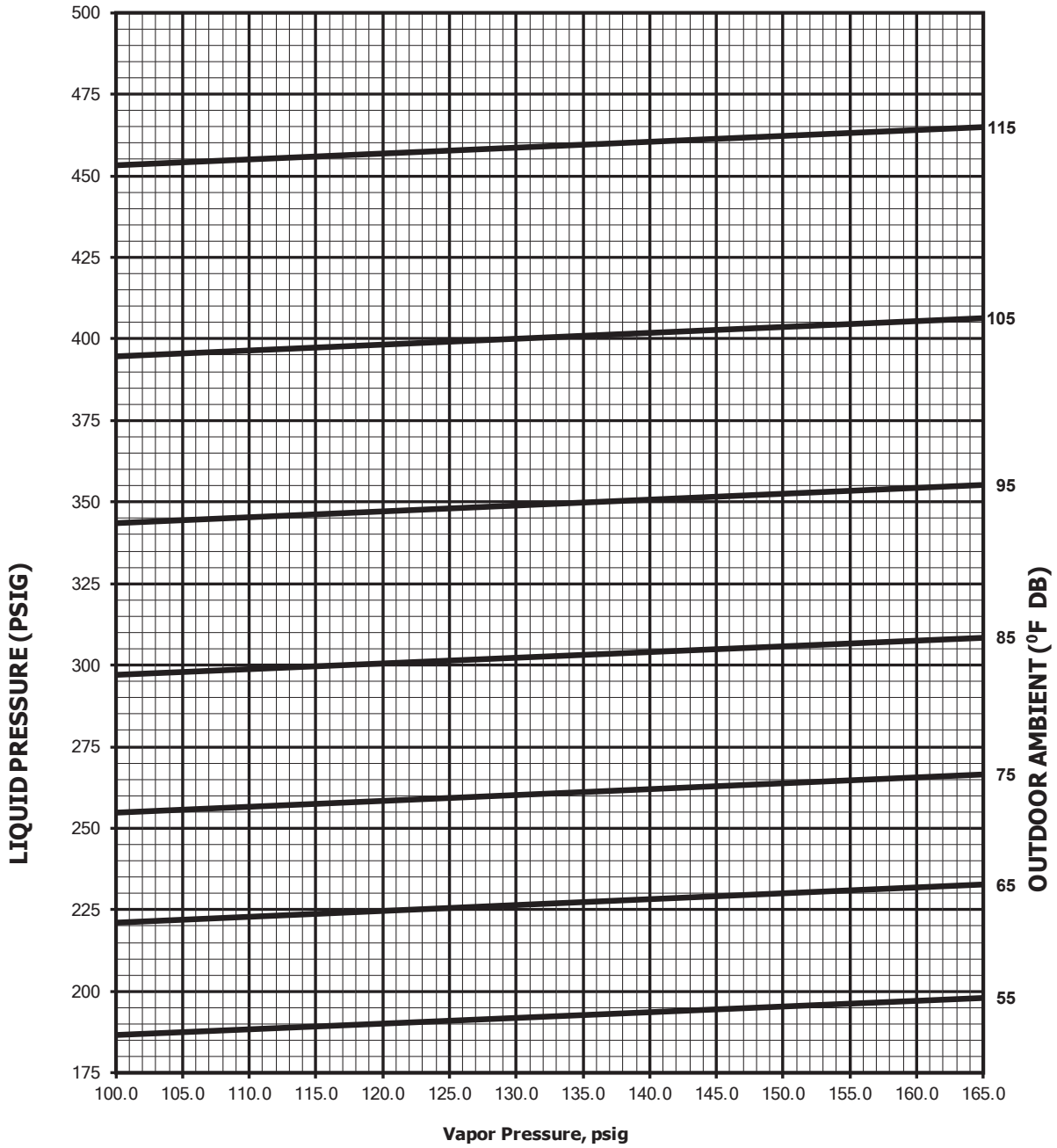
CAUTION: 1. RETURN AIR TEMPERATURE MUST BE WITHIN COMFORT CONDITIONS BEFORE FINAL REFRIGERANT CHECK!

INSTRUCTIONS:
1. MEASURE PRESSURE AT COMPRESSOR SUCTION AND LIQUID.
2. MEASURE OUTDOOR AMBIENT TO UNIT.
3. PLACE X ON CHART WHERE SUCTION AND LIQUID INTERSECT.
4. IF X IS BELOW OUTDOOR AMBIENT LINE, ADD CHARGE AND REPEAT STEPS 1-3.
5. IF X IS ABOVE OUTDOOR AMBIENT LINE, RECOVER EXCESS CHARGE AND REPEAT STEPS 1-3.

92-106696-02-00

Appendix F – Refrigerant Charging Charts (Cont.)

4.0 Ton GE Charging Chart



CAUTION: 1. RETURN AIR TEMPERATURE MUST BE WITHIN COMFORT CONDITIONS BEFORE FINAL REFRIGERANT CHECK!

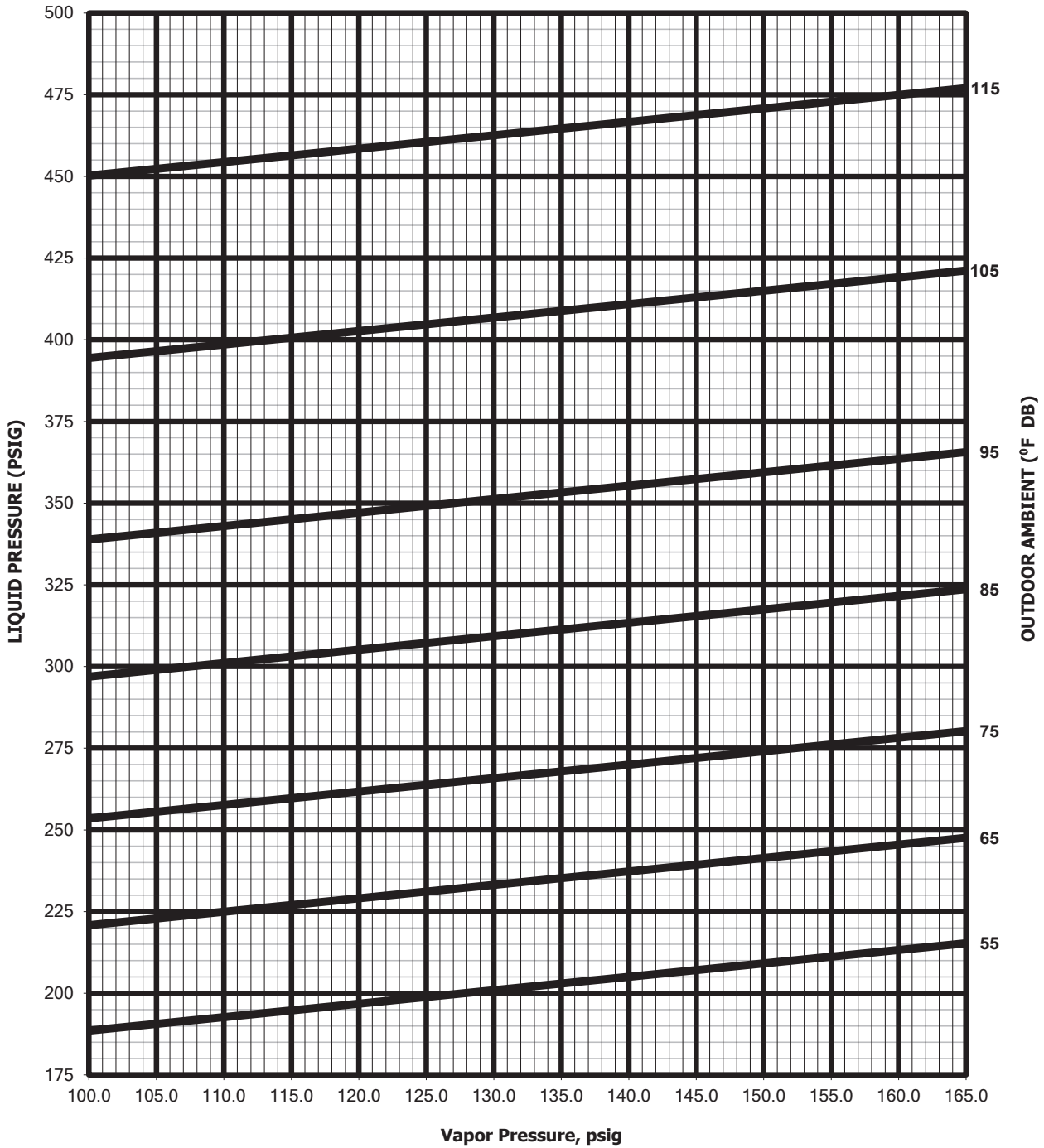
INSTRUCTIONS:
1. MEASURE PRESSURE AT COMPRESSOR SUCTION AND LIQUID.
2. MEASURE OUTDOOR AMBIENT TO UNIT.
3. PLACE X ON CHART WHERE SUCTION AND LIQUID INTERSECT.
4. IF X IS BELOW OUTDOOR AMBIENT LINE, ADD CHARGE AND REPEAT STEPS 1-3.
5. IF X IS ABOVE OUTDOOR AMBIENT LINE, RECOVER EXCESS CHARGE AND REPEAT STEPS 1-3.

92-106696-01-01

P. APPENDICES

Appendix F – Refrigerant Charging Charts (Cont.)

5.0 Ton GE Charging Chart



CAUTION: 1. RETURN AIR TEMPERATURE MUST BE WITHIN COMFORT CONDITIONS BEFORE FINAL REFRIGERANT CHECK!

INSTRUCTIONS:
1. MEASURE PRESSURE AT COMPRESSOR SUCTION AND LIQUID.
2. MEASURE OUTDOOR AMBIENT TO UNIT.
3. PLACE X ON CHART WHERE SUCTION AND LIQUID INTERSECT.
4. IF X IS BELOW OUTDOOR AMBIENT LINE, ADD CHARGE AND REPEAT STEPS 1-3.
5. IF X IS ABOVE OUTDOOR AMBIENT LINE, RECOVER EXCESS CHARGE AND REPEAT STEPS 1-3.

92-106696-03-00

Appendix F – Refrigerant Charging Charts (Cont.)

SYSTEM CHARGE CHART – REFRIGERANT 410 A

PRESSURE REQUIREMENTS – GROSS CHARGE CHECK (REFER CHARGE CHART)

OUTDOOR DRY BULB (°F)	3 -TON	4 -TON	5 -TON
	LIQUID /VAPOR PRESSURE (PSIG)		
115	464 / 156	470 / 153	478 / 150
105	408 / 154	411 / 151	422 / 148
95	358 / 152	361 / 149	366 / 146
85	312 / 150	313 / 148	324 / 143
75	272 / 148	271 / 146	279 / 140
65	238 / 147	237 / 145	245 / 138
55	205 / 145	204 / 142	213 / 133

SUB COOLING REQUIREMENTS – FINAL CHARGE VERIFICATION

OUTDOOR DRY BULB (°F)	3 -TON	4 -TON	5 -TON
	SUBCOOLING (°F)		
115	11	12	11
105	11	11	10
95	10	11	10
85	10	10	9
75	9	9	8
65	11	10	9
55	11	10	11

1. This is required to fine-tune unit charge.

2. The Indoor ambient temperature must be between 72 °F and 82 °F dry bulb at the indoor coil.

3. Confirm the indoor air supply is at the rated CFM listed in ***Appendix A.***

4. Allow the system to run long enough for temperatures and pressures to stabilize; at least fifteen minutes.

5. Measure liquid pressure and line temperature at the liquid line service port (refer to section J.4.2.1. for the liquid line temperature measurement location). BE SURE TO USE ZERO LOSS FITTINGS WHILE MEASURING PRESSURE; ANY LOSS OF CHARGE MAY IMPACT PERFORMANCE.

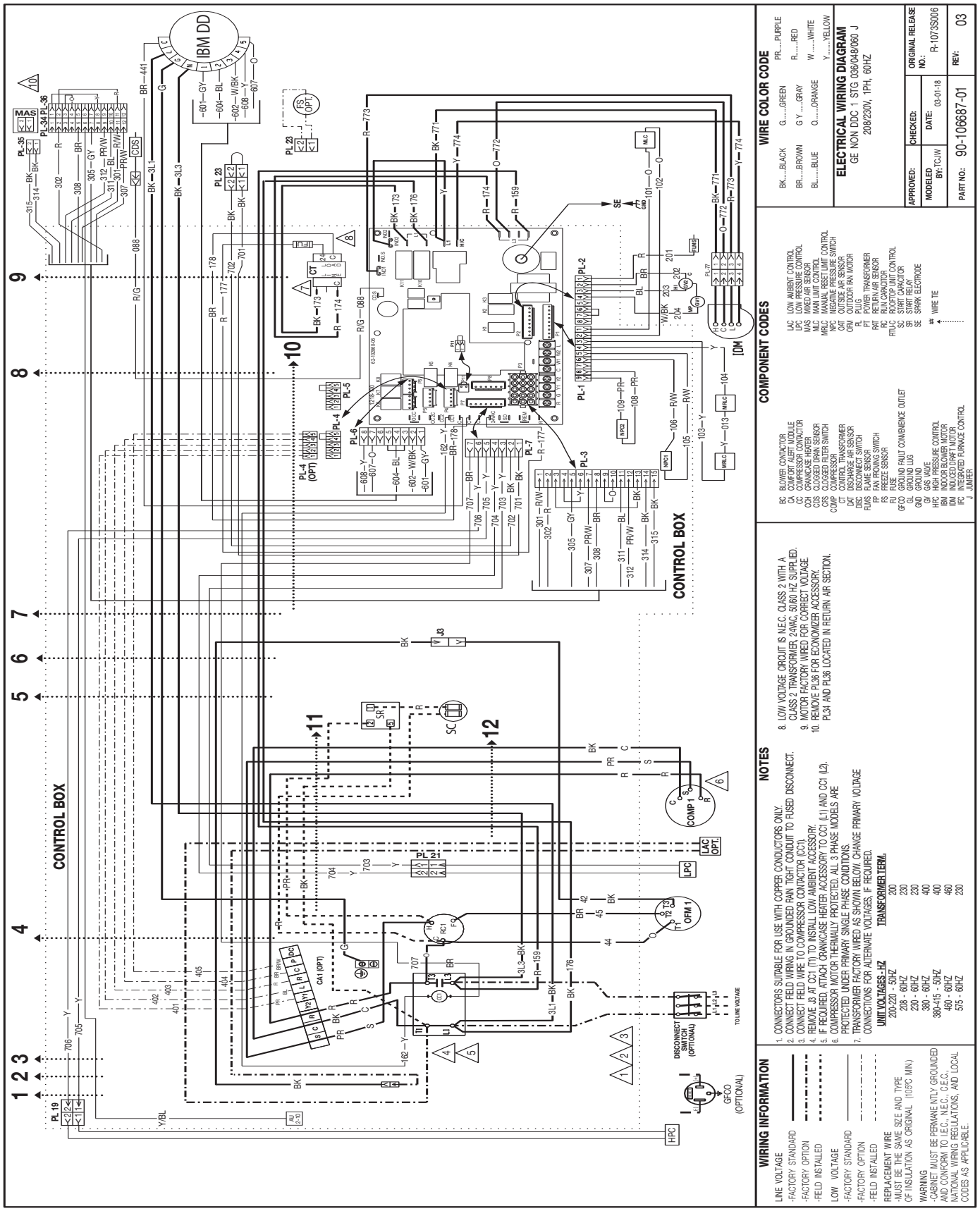
6. To find the saturation temperature at the measured pressure, subtract the measured liquid line temperature from the saturation pressure to get the sub-cooling.

7. Check if the Sub-Cooling is within +/- 2.0 °F tolerance.

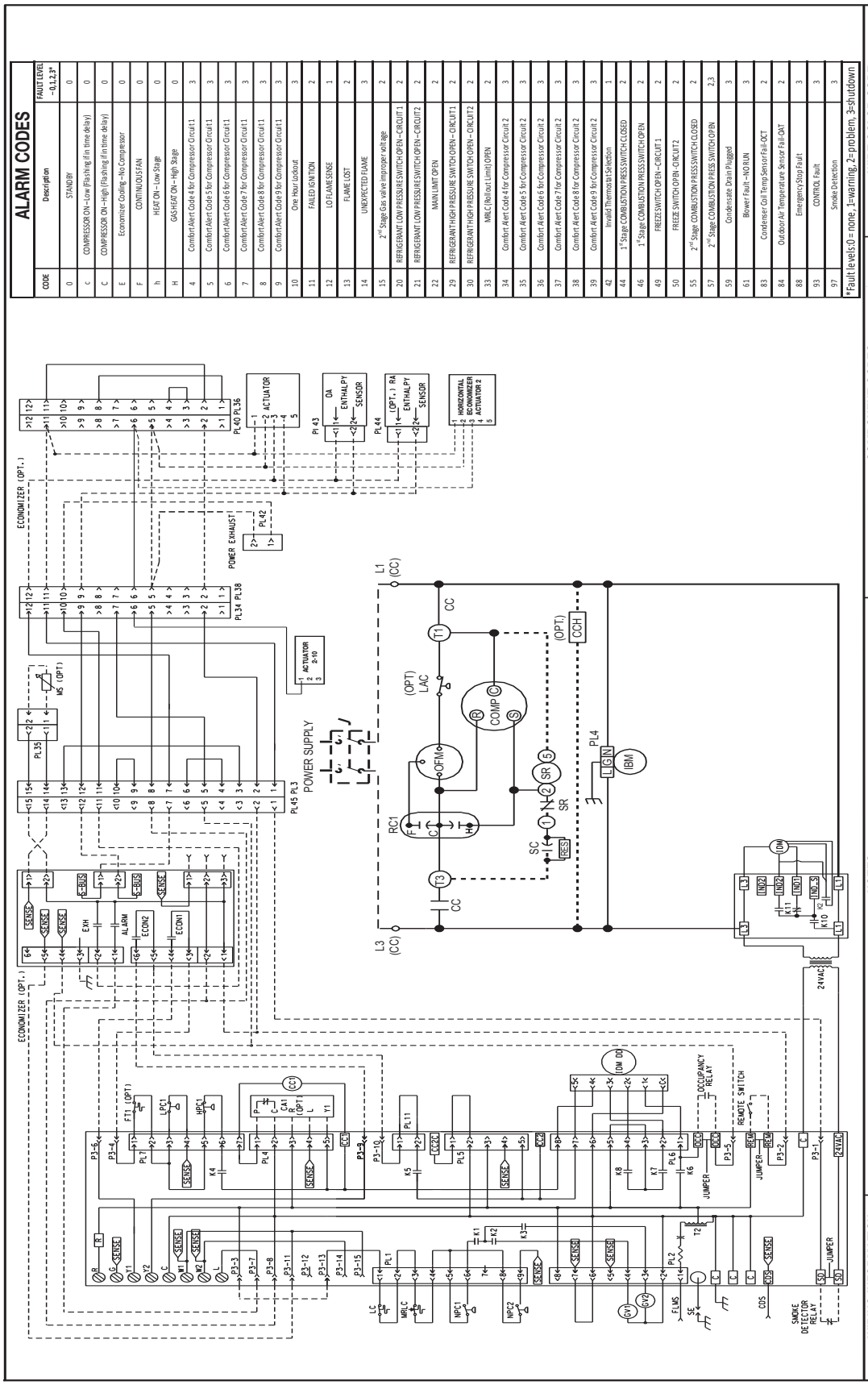
8.If the sub-cooling values are significantly different (> 20 psig) from those listed on the table in ***Appendix F***, there may be an airflow or component issue. Refer to section M. Diagnostics for more information.

P. APPENDICES

Appendix G. Wiring Diagrams & Schematics



Appendix G. Wiring Diagrams & Schematics (Cont.)



ALARM CODES		
CODE	Description	FAULT LEVEL -0,1,2,3*
0	STANDBY	0
C	COMPRESSOR ON –Low (Flashing if in time delay)	0
C	COMPRESSOR ON –High (Flashing if in time delay)	0
E	Economizer Cooling –No Compressor	0
F	CONTINUOUS FAN	0
h	HEAT ON – Low Stage	0
H	GAS HEAT ON – High Stage	0
4	Comfort Alert Code 4 for Compressor Circuit 1	3
5	Comfort Alert Code 5 for Compressor Circuit 1	3
6	Comfort Alert Code 6 for Compressor Circuit 1	3
7	Comfort Alert Code 7 for Compressor Circuit 1	3
8	Comfort Alert Code 8 for Compressor Circuit 1	3
9	Comfort Alert Code 9 for Compressor Circuit 1	3
10	One Hour Lockout	3
11	FAILED IGNITION	2
12	LO FLAME SENSE	1
13	FLAME LOST	2
14	UNEXPECTED FLAME	3
15	2nd Stage Gas valve improper voltage	2
20	REFRIGERANT LOW PRESSURE SWITCH OPEN –CIRCUIT1	2
21	REFRIGERANT LOW PRESSURE SWITCH OPEN –CIRCUIT2	2
22	MAIN LIMIT OPEN	2
29	REFRIGERANT HIGH PRESSURE SWITCH OPEN –CIRCUIT1	2
30	REFRIGERANT HIGH PRESSURE SWITCH OPEN – CIRCUIT2	2
33	MRLC (Roll out Limit) OPEN	2
34	Comfort Alert Code 4 for Compressor Circuit 2	3
35	Comfort Alert Code 5 for Compressor Circuit 2	3
36	Comfort Alert Code 6 for Compressor Circuit 2	3
37	Comfort Alert Code 7 for Compressor Circuit 2	3
38	Comfort Alert Code 8 for Compressor Circuit 2	3
39	Comfort Alert Code 9 for Compressor Circuit 2	3
42	Invalid Thermostat Selection	1
44	1st Stage COMBUSTION PRESS SWITCH CLOSED	2
46	1st Stage COMBUSTION PRESS SWITCH OPEN	2
49	FREEZE SWITCH OPEN –CIRCUIT 1	2
50	FREEZE SWITCH OPEN –CIRCUIT 2	2
55	2nd Stage COMBUSTION PRESS SWITCH CLOSED	2
57	2nd Stage COMBUSTION PRESS SWITCH OPEN	2,3
59	Condensate Drain Plugged	3
61	Blower Fault –NO RUN	3
83	Condenser Coil Temp Sensor Fail-OCT	2
84	Outdoor Air Temperature Sensor Fail-OAT	2
88	Emergency Stop Fault	3
93	CONTROL Fault	3
97	Smoke Detector	3

*Fault levels: 0 = none, 1=warning, 2=problem, 3=shutdown

WIRE COLOR CODE

BK....BLACK	G.....GREEN	PR....PURPLE
BR....BROWN	G Y ....GRAY	R.....RED
BL.....BLUE	O.....ORANGE	W .....WHITE
		Y.....YELLOW

COMPONENT CODES

BC	BLOWER CONTACTOR
CA	COMFORT ALERT MODULE
CC	COMPRESSOR CONTACTOR
CCH	CRANKCASE HEATER
CDS	CLOGGED DRAIN SENSOR
COS	CLOGGED DRAIN SWITCH
COMP	COMPRESSOR
CT	CONTROL TRANSFORMER
DAT	DISCHARGE AIR SENSOR
DISC	DISCONNECT SWITCH
FLMS	FLAME SENSOR
FP	FAN PROVING
FPS	FREEZE SENSOR
FU	FUSE
GFCO	GROUND FAULT CONVENIENCE OUTLET
GL	GROUND LUG
GND	GROUND
HPC	HIGH PRESSURE CONTROL
IBM	INDOOR BLOWER MOTOR
IDM	INDOOR BLOWER MOTOR
IFC	INTEGRATED FURNACE CONTROL
LAC	LOW AMBIENT CONTROL
LPC	LOW PRESSURE CONTROL
MAS	MIXED AIR SENSOR
MLC	MAIN LIMIT CONTROL
MRLC	MANUAL RESET LIMIT CONTROL
NPC	NEGATIVE PRESSURE SWITCH
OAT	OUTSIDE AIR SENSOR
ODM	OUTDOOR FAN MOTOR
PL	PLUG
PT	POWER TRANSFORMER
RAT	RETURN AIR SENSOR
RC	RUN CAPACITOR
RTU	ROOFTOP UNIT CONTROL
SE	SPARK ELECTRODE

NOTES

1. CONNECTORS SUITABLE FOR USE WITH COPPER CONDUCTORS ONLY.
2. CONNECT FIELD WIRING IN GROUNDED RAIN TIGHT CONDUIT TO FUSED DISCONNECT.
3. CONNECT FIELD WIRE TO COMPRESSOR CONTACTOR (CC1).
4. REMOVE J3 AT (CC1) TO INSTALL LOW AMBIENT ACCESSORY.
5. IF REQUIRED, ATTACH CRANKCASE HEATER ACCESSORY TO CC1 (L1) AND CC1 (L2).
6. COMPRESSOR MOTOR THERMALLY PROTECTED. ALL 3 PHASE MODELS ARE PROTECTED UNDER PRIMARY SINGLE PHASE CONDITIONS
7. TRANSFORMER FACTORY WIRED AS SHOWN BELOW. CHANGE PRIMARY VOLTAGE CONNECTIONS FOR ALTERNATE VOLTAGES, IF REQUIRED.

UNIT VOLTAGES - HZ	TRANSFORMER TERM.
200-220 - 50HZ	200
208 - 60HZ	208
230 - 60HZ	230
380 - 60HZ	400
380-415 - 50HZ	400
460 - 60HZ	460
575 - 60HZ	230

8. LOW VOLTAGE CIRCUIT IS N.E.C. CLASS 2 WITH A CLASS 2 TRANSFORMER, 24VAC, 50/60 HZ SUPPLIED.
9. MOTOR FACTORY WIRED FOR CORRECT VOLTAGE
10. REMOVE PL36 FOR ECONOMIZER ACCESSORY. PL34 AND PL36 LOCATED IN RETURN AIR SECTION.

WIRING INFORMATION

LINE VOLTAGE
-FACTORY STANDARD
-FACTORY OPTION
-FIELD INSTALLED

LOW VOLTAGE
-FACTORY STANDARD
-FACTORY OPTION
-FIELD INSTALLED

REPLACEMENT WIRE
-MUST BE THE SAME SIZE AND TYPE OF INSULATION AS ORIGINAL (105°C MIN.)

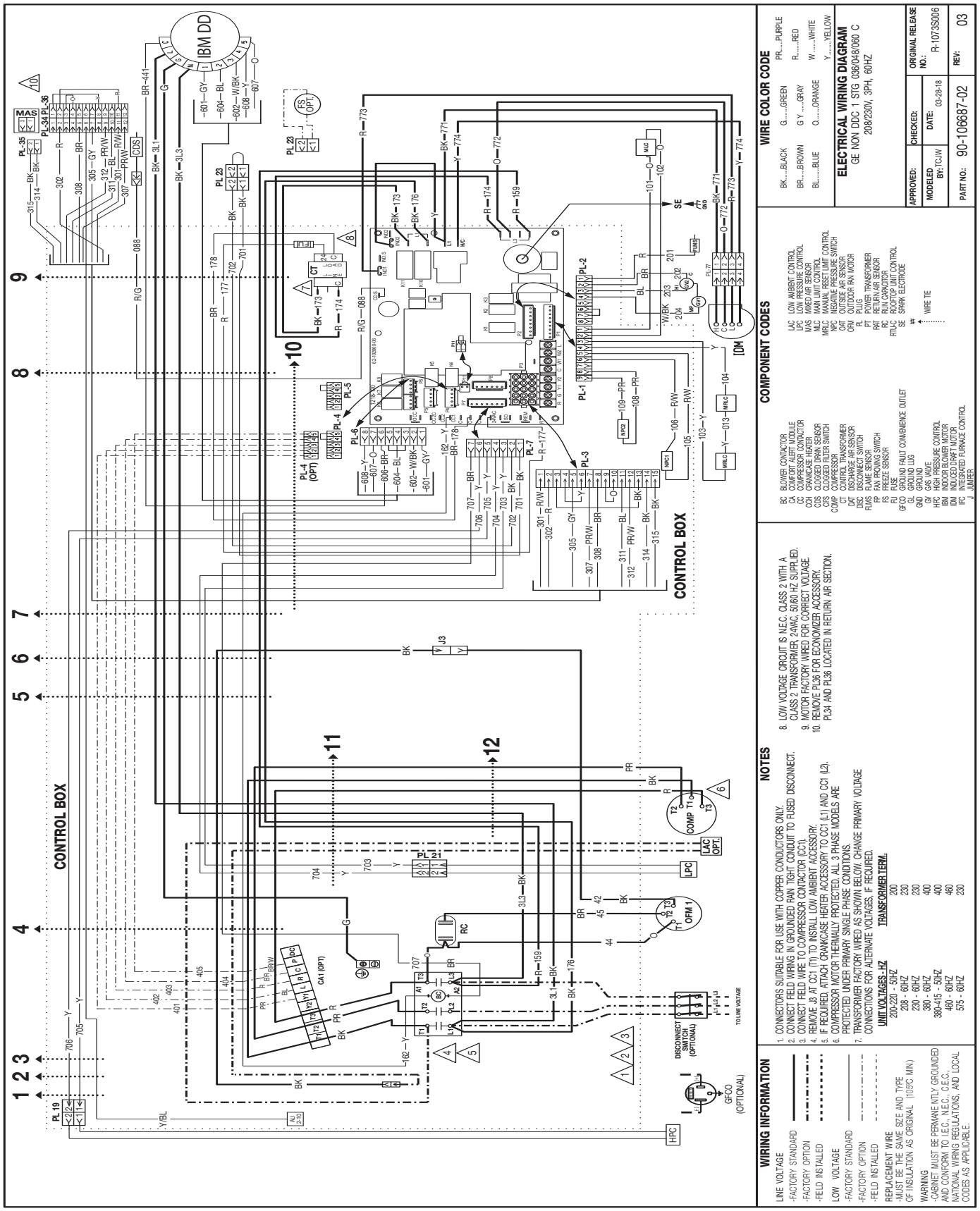
WARNING
-CABINET MUST BE PERMANENTLY GROUNDED AND CONFORM TO I.E.C., N.E.C., C.E.C., NATIONAL WIRING REGULATIONS, AND LOCAL CODES AS APPLICABLE.

ELECTRICAL WIRING SCHEMATIC
GE NON DDC 1 STG 036/048/060 J
208/230V, 1PH, 60HZ

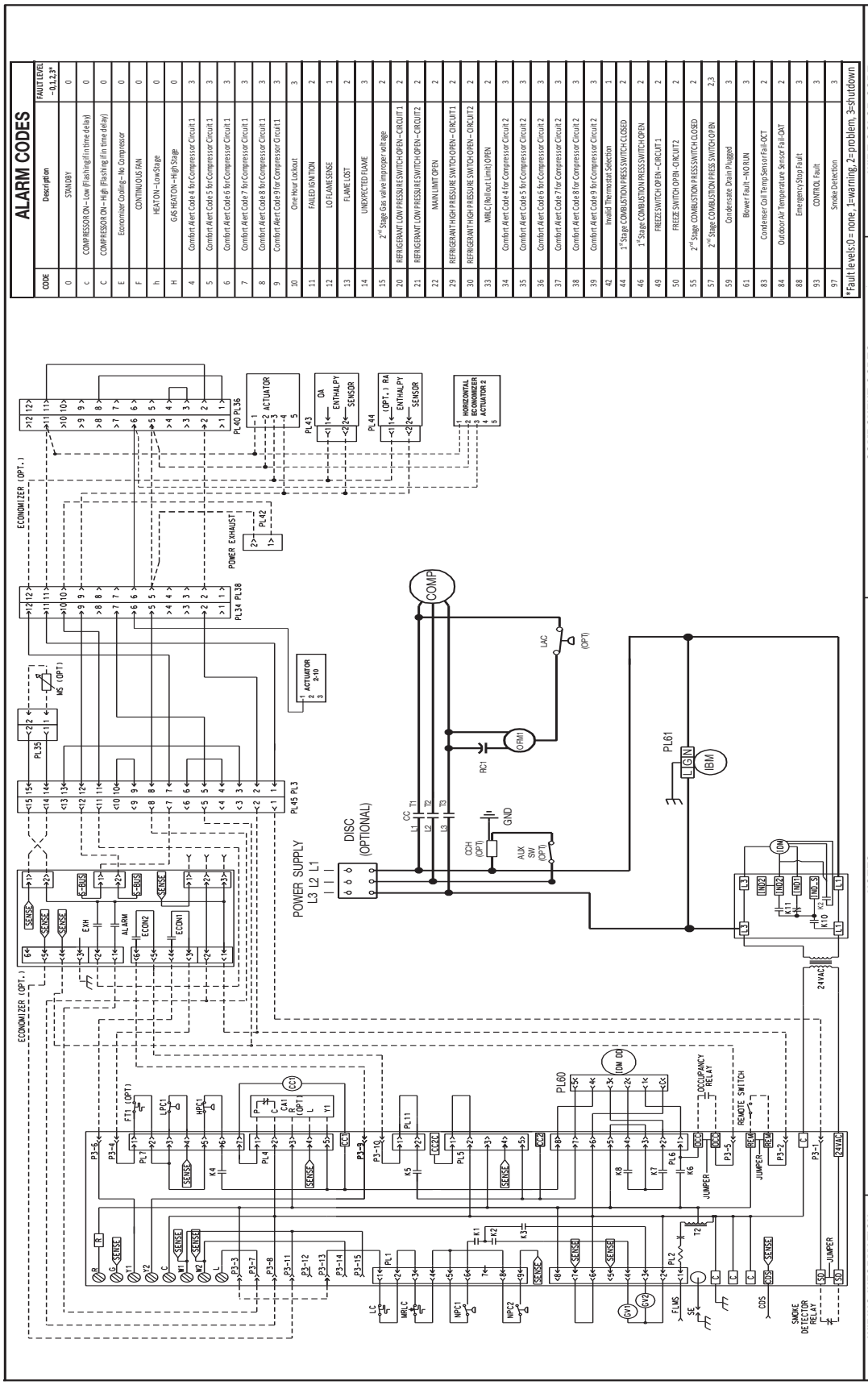
APPROVED:	CHECKED:	ORIGINAL RELEASE NO.:
MODELED BY: TGW	DATE: 03-07-18	R-1073S006
PART NO.: 90-106688-01	REV: 03	

P. APPENDICES

Appendix G. Wiring Diagrams & Schematics (Cont.)

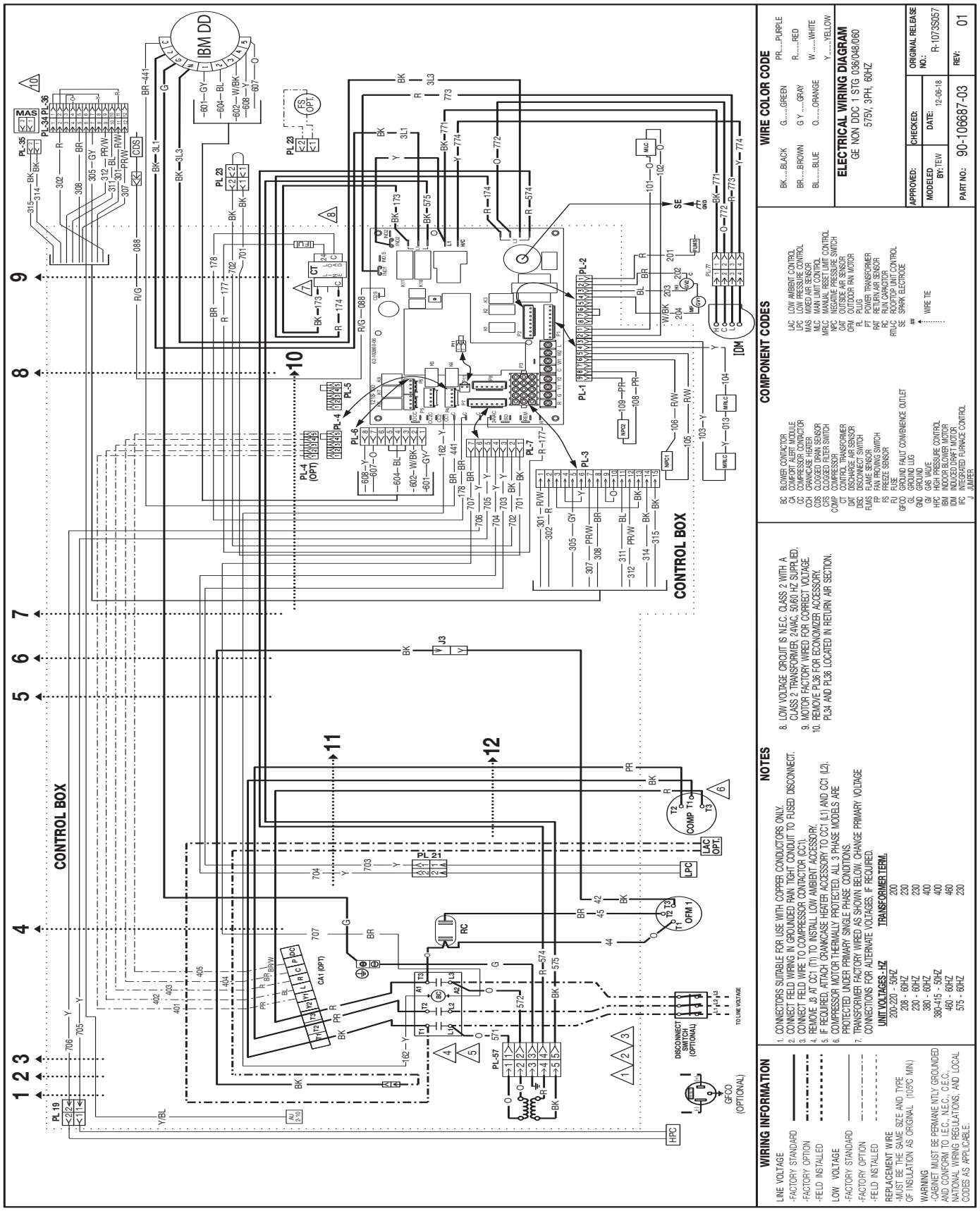


Appendix G. Wiring Diagrams & Schematics (Cont.)

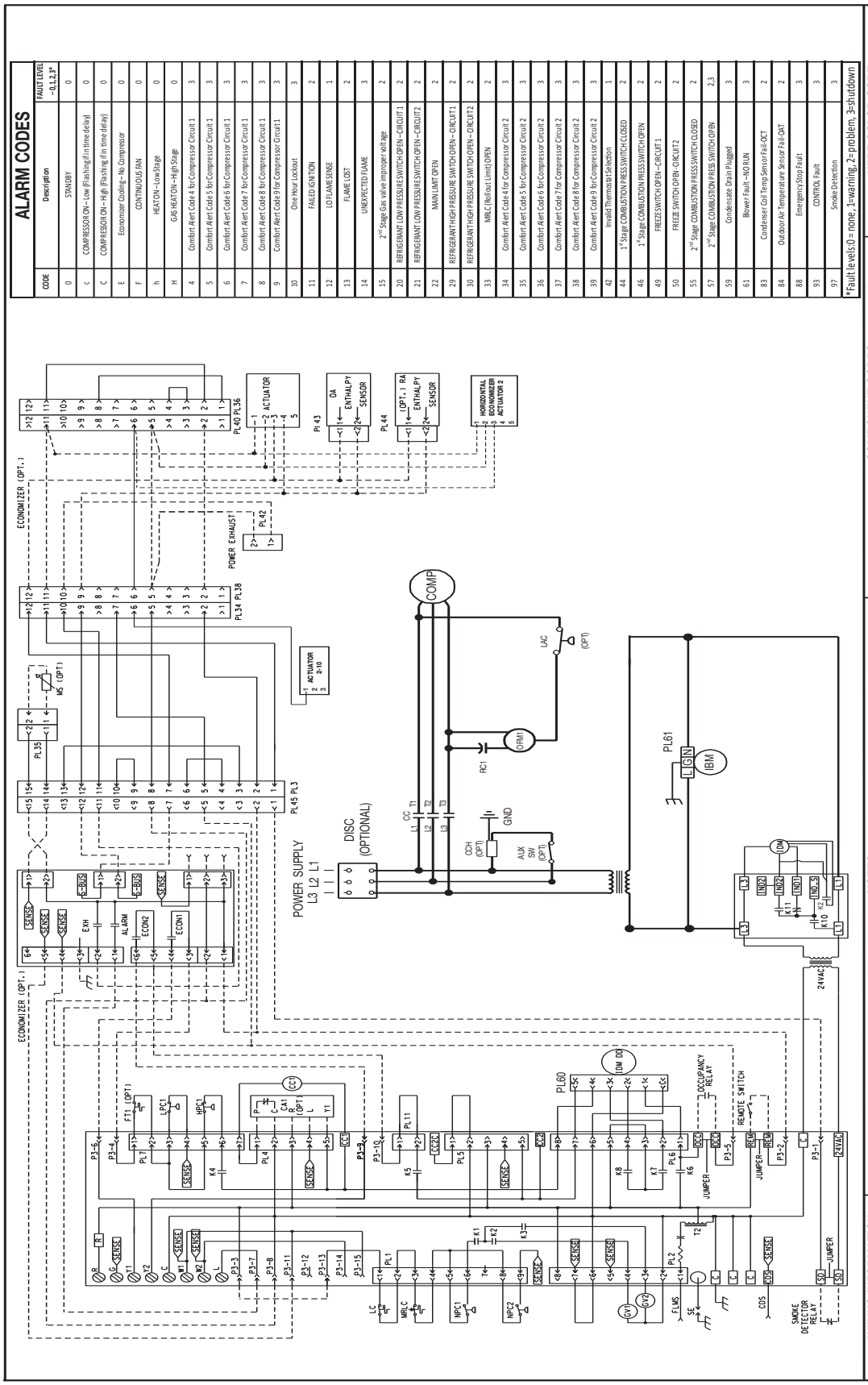


P. APPENDICES

Appendix G. Wiring Diagrams & Schematics (Cont.)

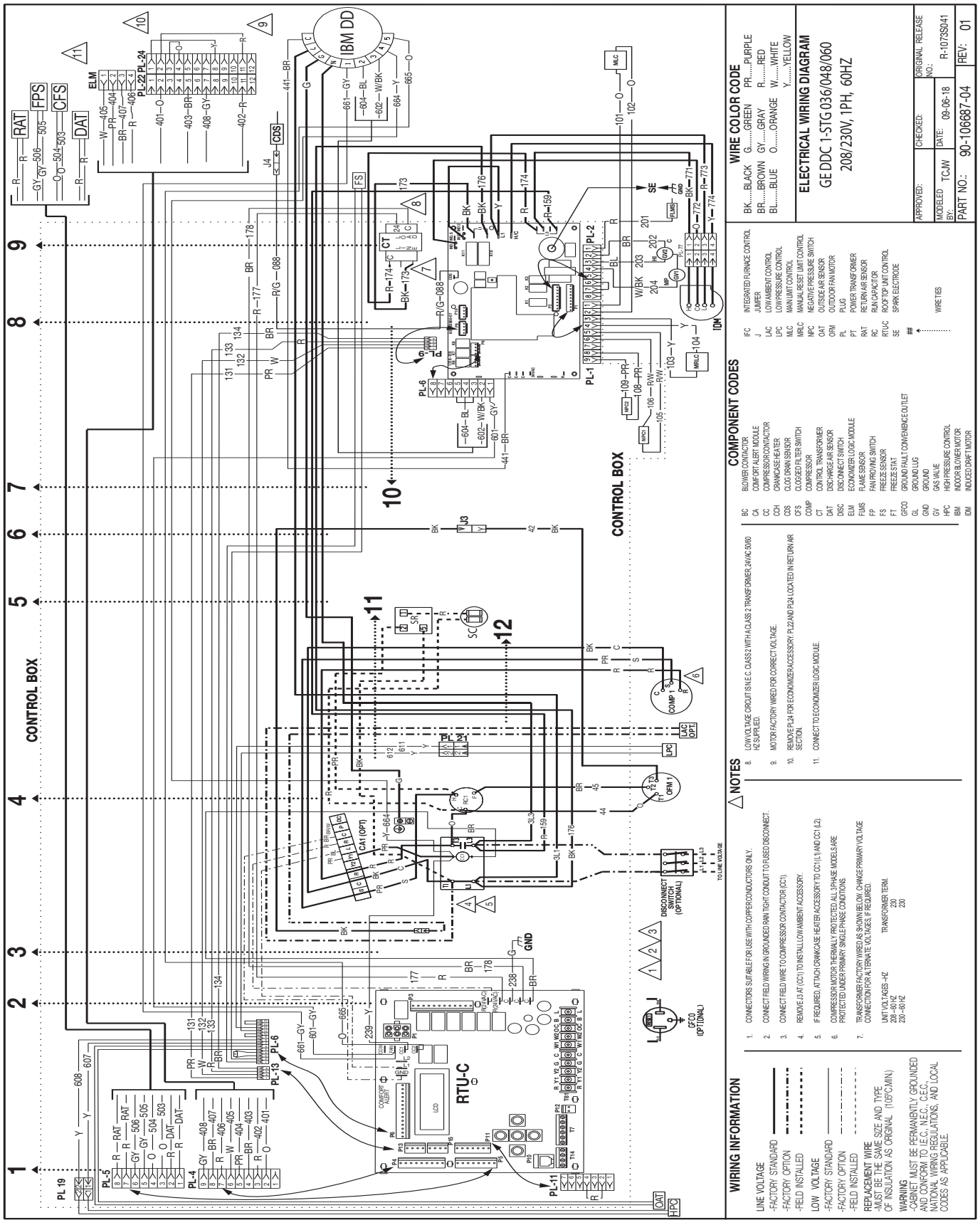


Appendix G. Wiring Diagrams & Schematics (Cont.)

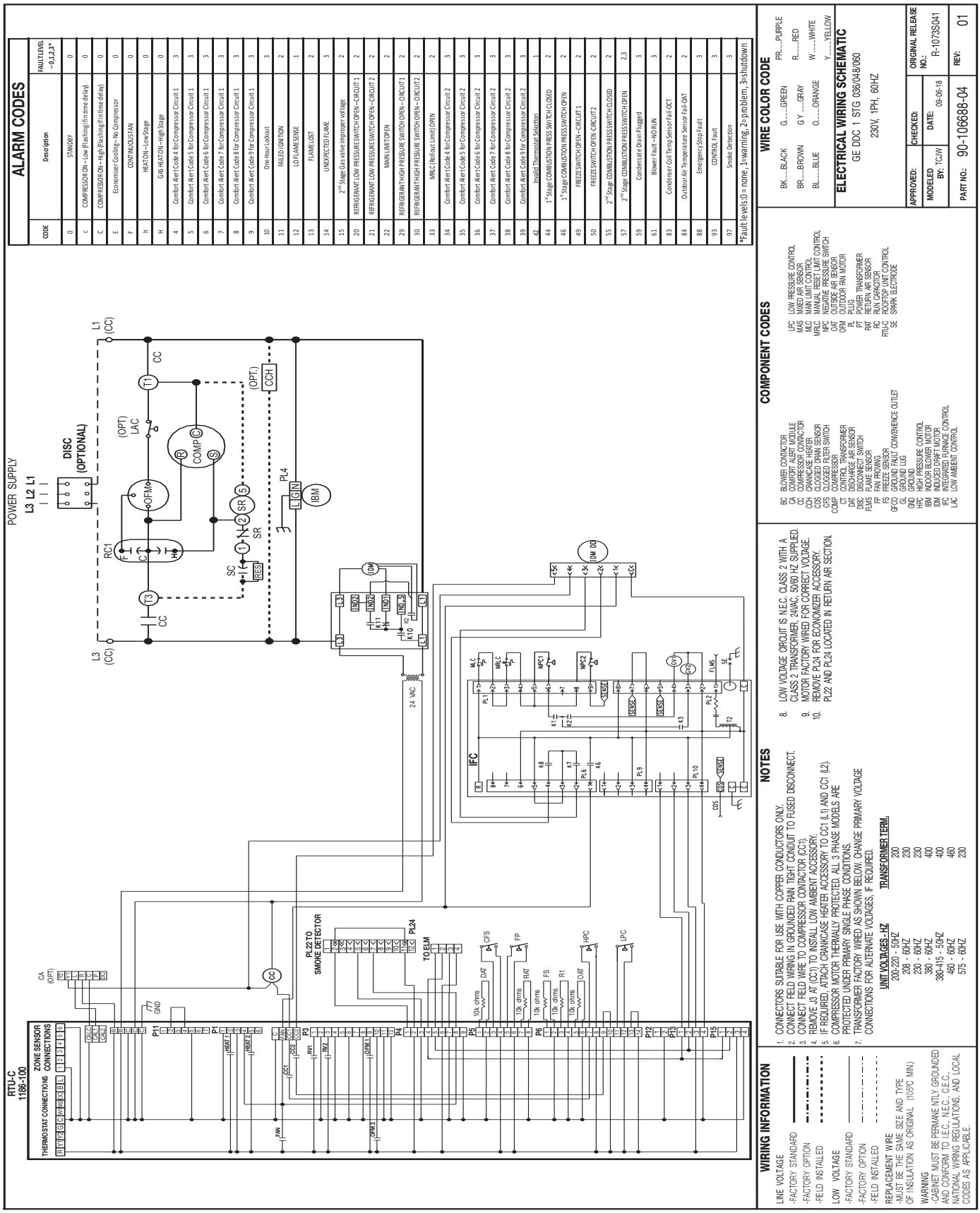


P. APPENDICES

Appendix G. Wiring Diagrams & Schematics (Cont.)

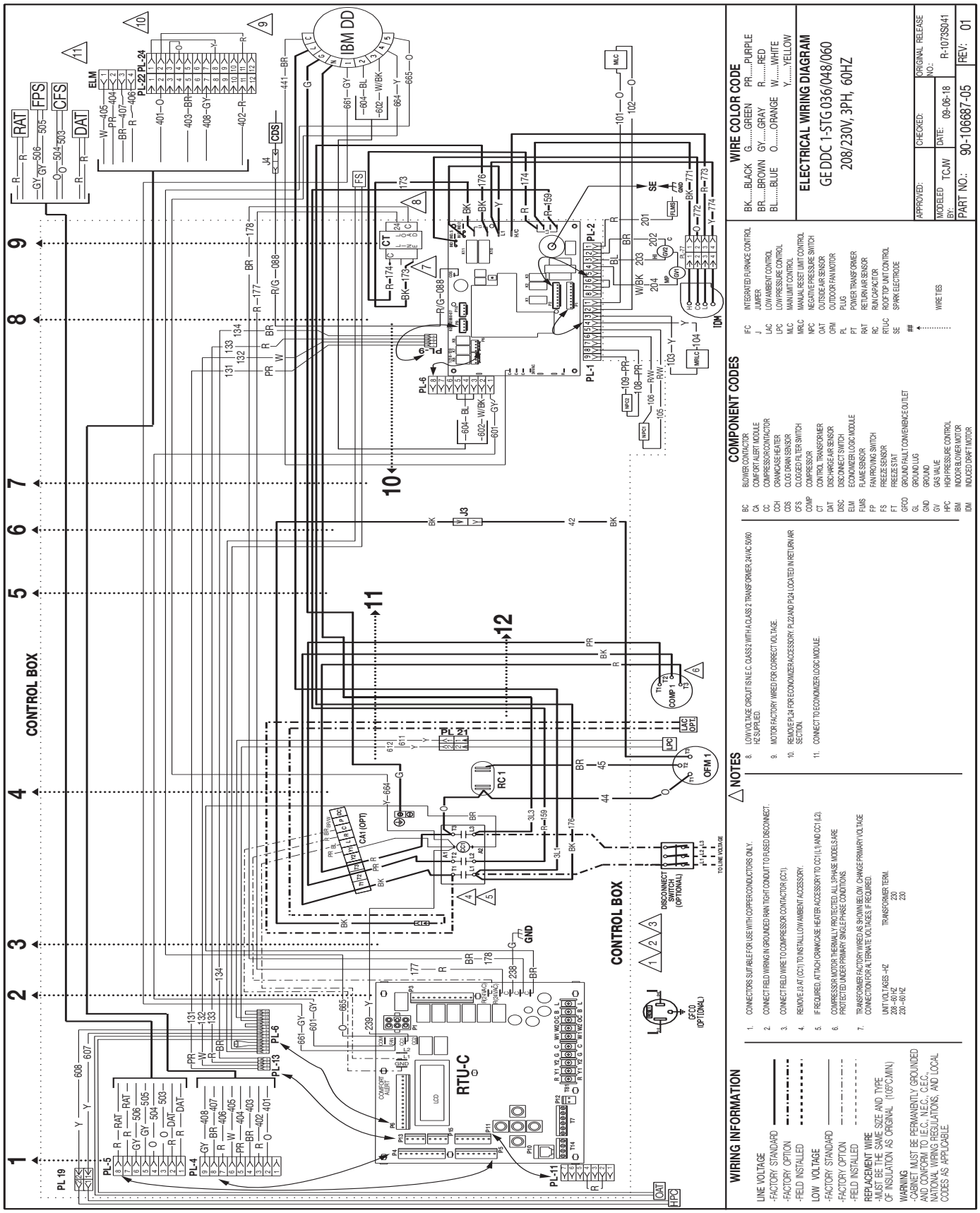


Appendix G. Wiring Diagrams & Schematics (Cont.)

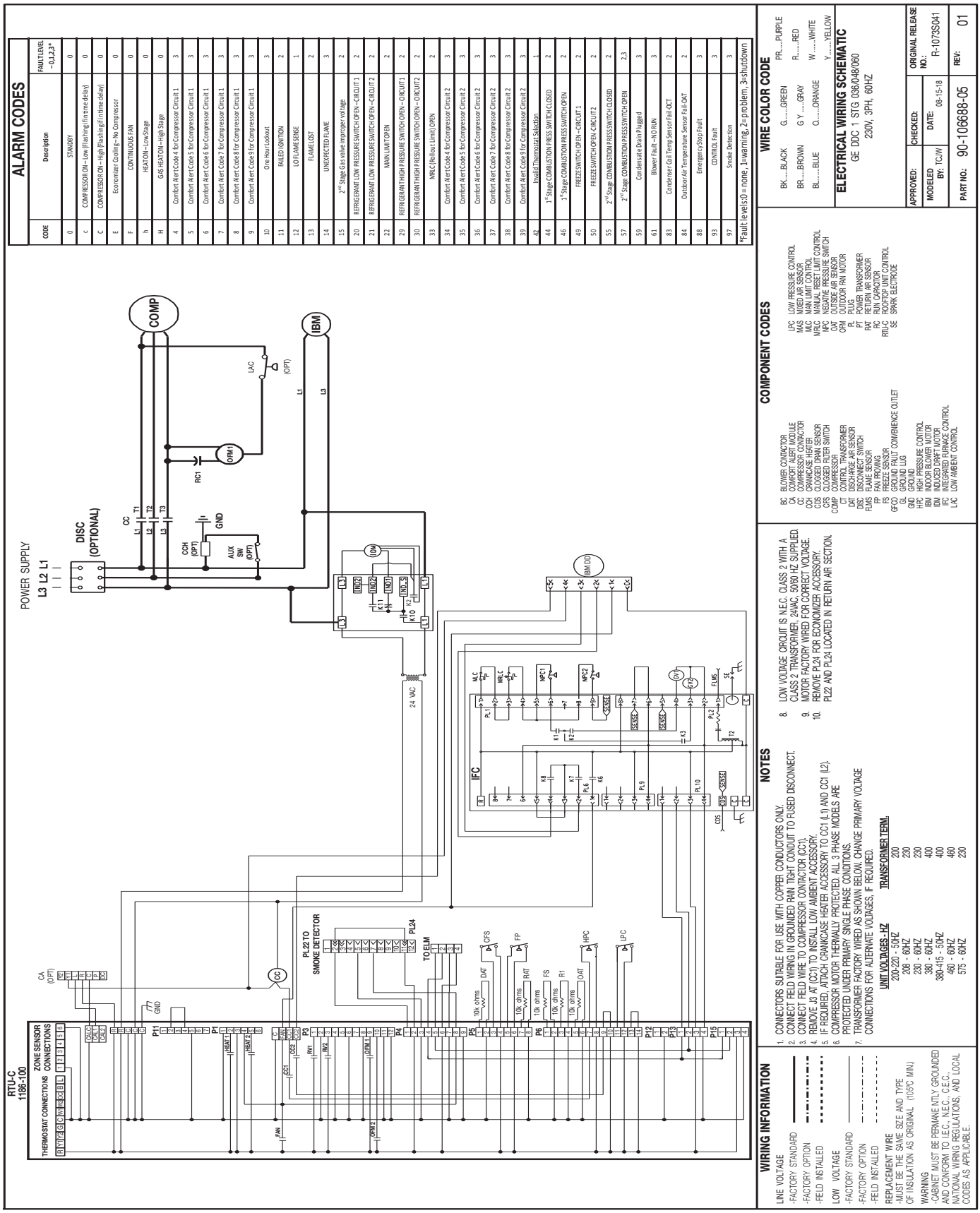


P. APPENDICES

Appendix G. Wiring Diagrams & Schematics (Cont.)

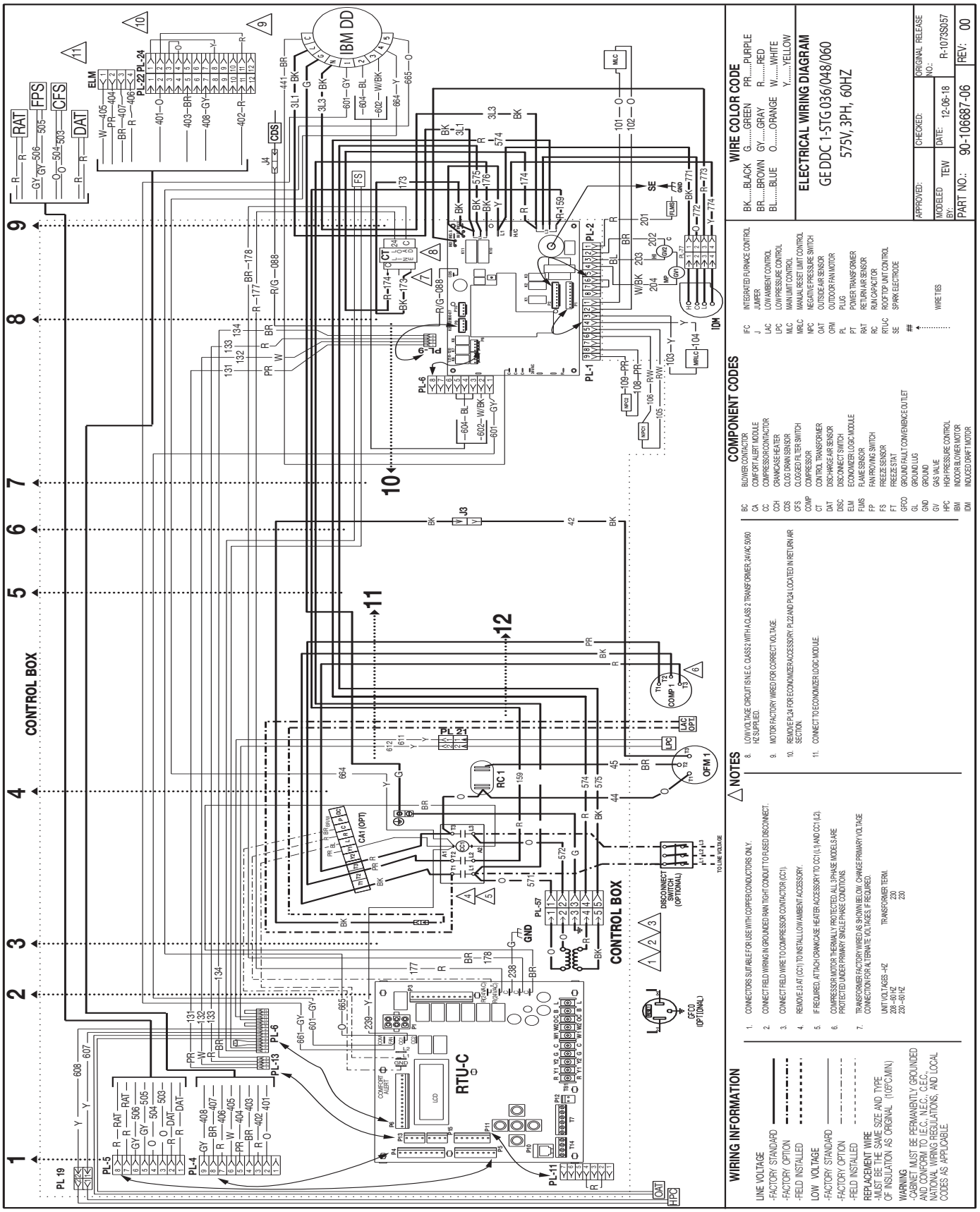


Appendix G. Wiring Diagrams & Schematics (Cont.)

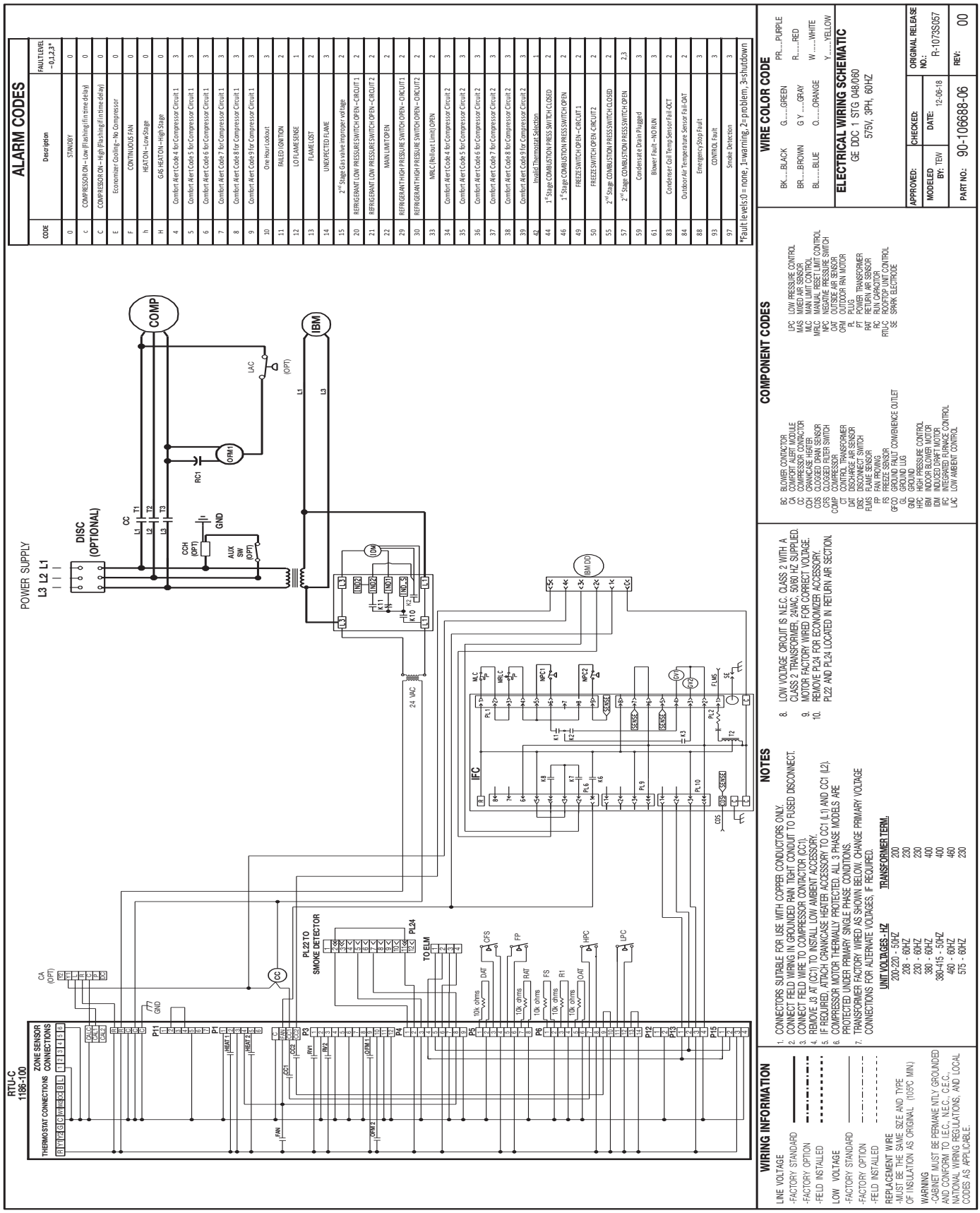


P. APPENDICES

Appendix G. Wiring Diagrams & Schematics (Cont.)

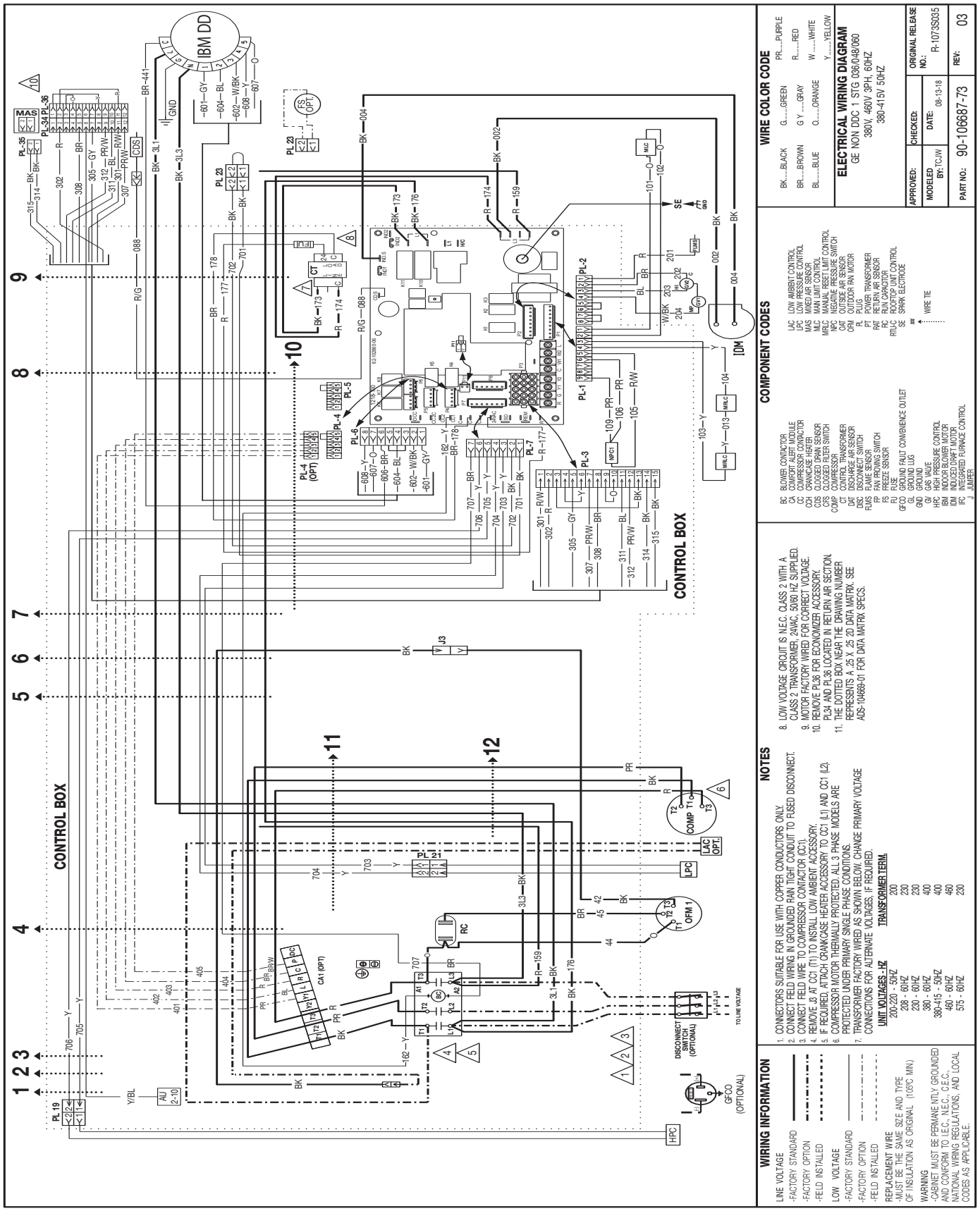


Appendix G. Wiring Diagrams & Schematics (Cont.)



P. APPENDICES

Appendix G. Wiring Diagrams & Schematics (Cont.)



WIRE COLOR CODE

BK....BLACK	G.....GREEN	PR.....PURPLE
BR....BROWN	G Y ....GRAY	R.....RED
BL.....BLUE	O.....ORANGE	W .....WHITE
		Y .....YELLOW

ELECTRICAL WIRING DIAGRAM
GE NON DDC 1 STG 036,048/060
380V, 460V 3PH, 60HZ
380-415V 50HZ

APPROVED:	CHECKED:	ORIGINAL RELEASE
MODELED BY: TC,LW	DATE: 08-13-18	NO.: R-1073S035
PART NO.: 90-106687-73	REV: 03	

COMPONENT CODES

BC	BLOWER CONTACTOR
CA	COMFORT ALERT MODULE
CC	COMPRESSOR CONTACTOR
CH	CRANKCASE HEATER
CI1S	CLOGGED DRAIN SENSOR
CI2S	CLOGGED FILTER SWITCH
COMP	COMPRESSOR
CT	CONTROL TRANSFORMER
DAT	DISCHARGE AIR SENSOR
DDS	DOOR SWITCH
FLS	FLOW SWITCH
FP	FAN PROVING SWITCH
FS	FREEZE SENSOR
FU	FUSE
GFCO	GROUND FAULT CONVENIENCE OUTLET
GL	GROUND LUG
GND	GROUND
HV	HUMIDITY VALVE
HPC	HIGH PRESSURE CONTROL
IBM	INDOOR BLOWER MOTOR
IDM	INDUCED DRAFT MOTOR
IFC	INTEGRATED FURNACE CONTROL
J	JUMPER
LAC	LOW AMBIENT CONTROL
LPC	LOW PRESSURE CONTROL
MAS	MIXED AIR SENSOR
MLC	MAIN LIMIT CONTROL
MRLC	MANUAL RESET LIMIT CONTROL
NPC	NEGATIVE PRESSURE SWITCH
OAT	OUTSIDE AIR SENSOR
OFM	OUTDOOR FAN MOTOR
P	PLUG
PT	POWER TRANSFORMER
RAT	RETURN AIR SENSOR
RC	RUN CAPACITOR
RTUC	ROOFTOP UNIT CONTROL
SE	SPARK ELECTRODE
##	WIRE TIE

NOTES

1. CONNECTORS SUITABLE FOR USE WITH COPPER CONDUCTORS ONLY.
2. CONNECT FIELD WIRING IN GROUNDED RAIN TIGHT CONDUIT TO FLSED DISCONNECT.
3. CONNECT FIELD WIRE TO COMPRESSOR CONTACTOR (CC1).
4. REMOVE J3 AT CC1 (T1) TO INSTALL LOW AMBIENT ACCESSORY.
5. IF REQUIRED, ATTACH CRANKCASE HEATER ACCESSORY TO CC1 (L1) AND CC1 (L2).
6. COMPRESSOR MOTOR THERMALLY PROTECTED. ALL 3 PHASE MODELS ARE PROTECTED UNDER PRIMARY SINGLE PHASE CONDITIONS.
7. TRANSFORMER FACTORY WIRED AS SHOWN BELOW. CHANGE PRIMARY VOLTAGE CONNECTIONS FOR ALTERNATE VOLTAGES, IF REQUIRED.

UNIT VOLTAGES - HZ	TRANSFORMER TERM.
200-220 - 50HZ	200
208 - 60HZ	230
230 - 60HZ	230
380 - 60HZ	400
380-415 - 50HZ	400
460 - 60HZ	460
575 - 60HZ	230

8. LOW VOLTAGE CIRCUIT IS N.E.C. CLASS 2 WITH A CLASS 2 TRANSFORMER, 24VAC, 50/60 HZ SUPPLIED.
9. MOTOR FACTORY WIRED FOR CORRECT VOLTAGE.
10. REMOVE PL36 FOR ECONOMIZER ACCESSORY. PL34 AND PL36 LOCATED IN RETURN AIR SECTION.
11. THE DOTTED BOX NEAR THE DRAWING NUMBER REPRESENTS A .25 X .25 2D DATA MATRIX. SEE ADS-104669-01 FOR DATA MATRIX SPECS.

WIRING INFORMATION

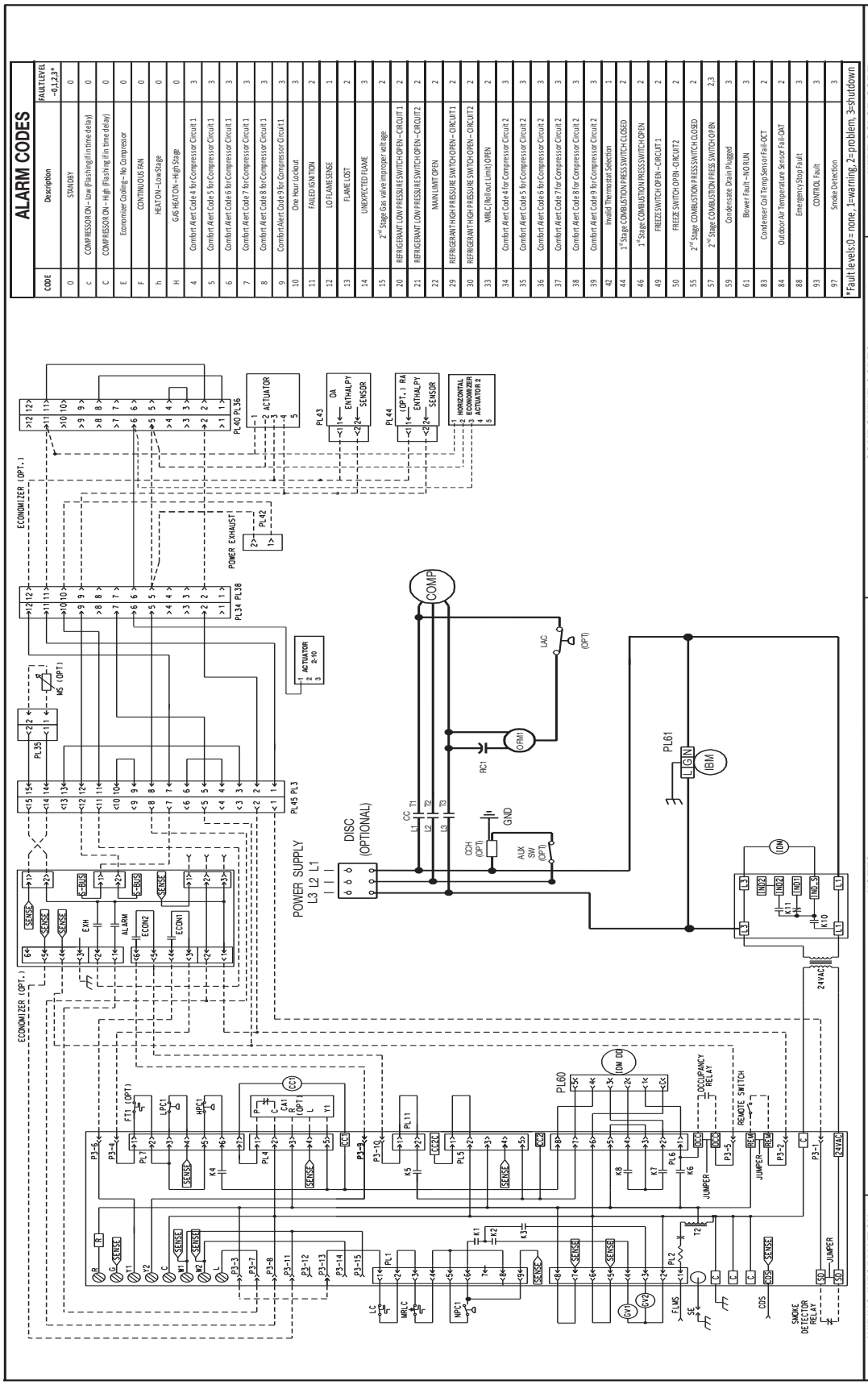
LINE VOLTAGE
-FACTORY STANDARD ———
-FACTORY OPTION - - - -
-FELD INSTALLED - - - -

LOW VOLTAGE
-FACTORY STANDARD ———
-FACTORY OPTION - - - -
-FELD INSTALLED - - - -

REPLACEMENT WIRE MUST BE THE SAME SIZE AND TYPE OR INSULATION AS ORIGINAL (105°C MIN.)

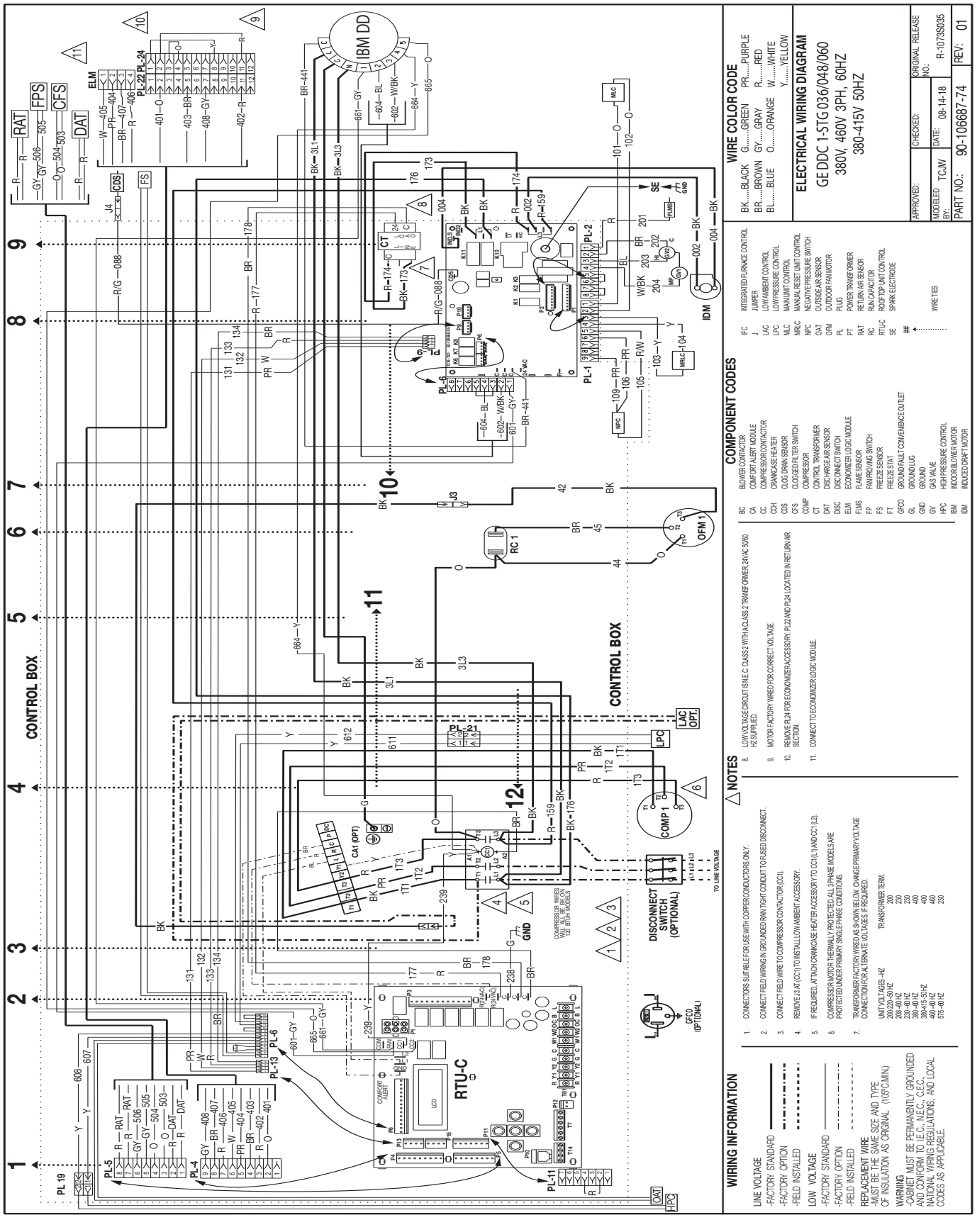
WARNING
-CABINET MUST BE PERMANENTLY GROUNDED AND CONFORM TO I.E.C., N.E.C., C.E.C., NATIONAL WIRING REGULATIONS, AND LOCAL CODES AS APPLICABLE.

Appendix G. Wiring Diagrams & Schematics (Cont.)

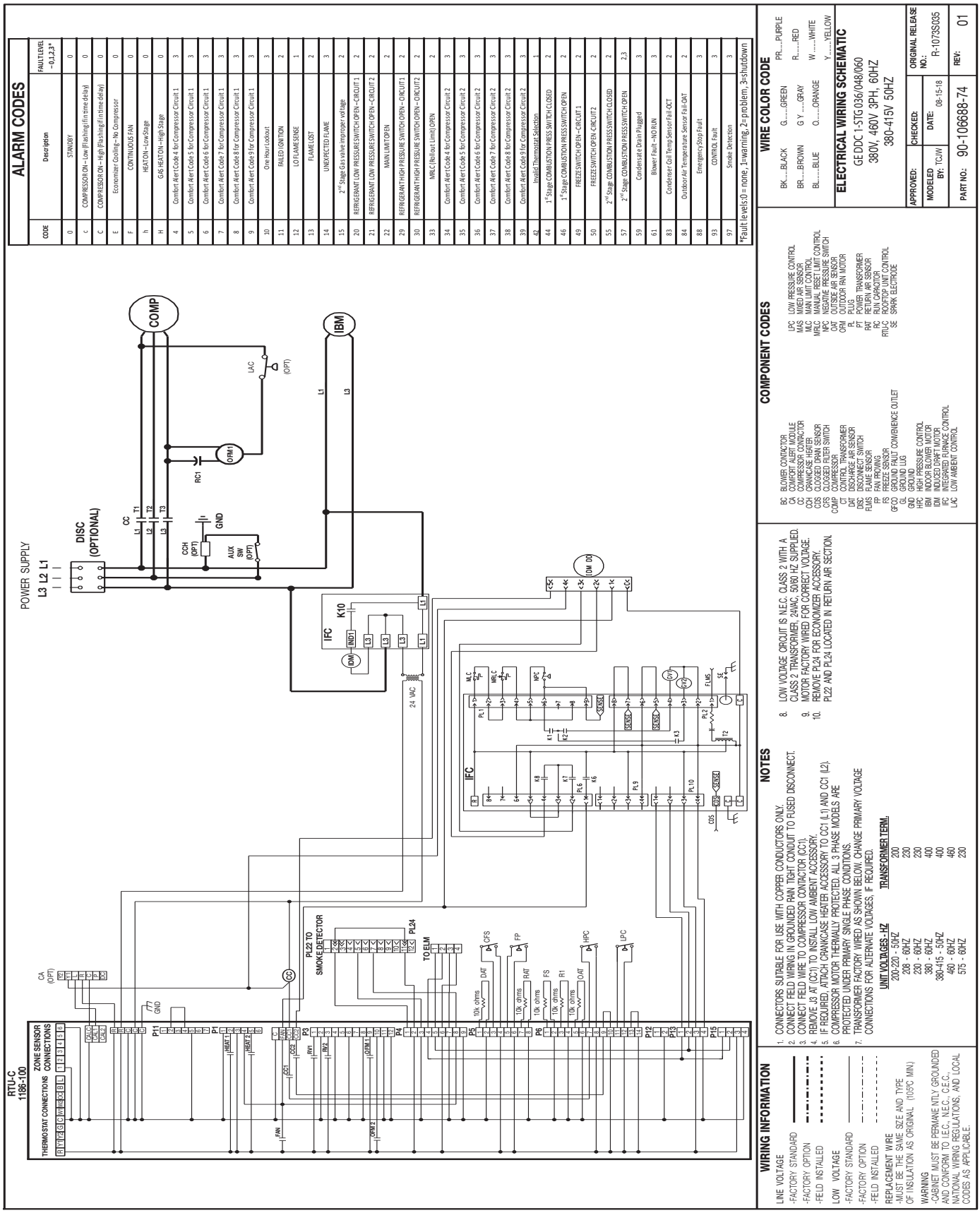


P. APPENDICES

Appendix G. Wiring Diagrams & Schematics (Cont.)



Appendix G. Wiring Diagrams & Schematics (Cont.)



P. APPENDICES

J. Unit Tie-Down

ENGINEERING EXPRESS®
E.X.P.E.R.T. (Engineering Express Product Evaluation Report)

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-R0
THIS DOCUMENT CONTAINS (4) 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 COOLING PERFORMANCE RATINGS OR CERTIFICATIONS ARE OFFERED OR IMPLIED HEREIN.

This Product Evaluation Report is being issued in accordance with the requirements of the 6th Edition Florida Building Code (2017) per FBC Section 104.11, FMC 301.15, FBC Building Ch. 16, ASCE-7-10, 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.

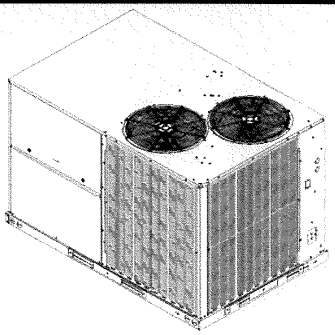
SUBSTANTIATING DATA:
• Product Evaluation Documents Test Reports
Substantiating documentation has been submitted to provide this TER and is summarized in the sections below.
Test Report: 0320.01-18 (American Test Lab of South FL)

• 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.



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

Fasteners must penetrate the supporting members such that the full length of the threaded portion is embedded within the main member. This evaluation does not offer any evaluation to meet large missile impact debris requirements which typically are not required for this type of product.

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.

FINISH:
Baked Enamel

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

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

STRUCTURAL PERFORMANCE:
Models referenced herein are subject to the following design limitations:

Maximum Rated Wind Pressure:

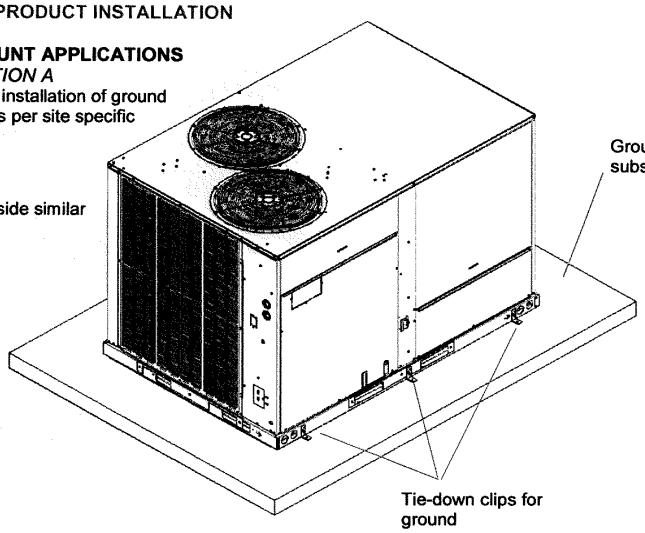
200psf Lateral 133psf Uplift

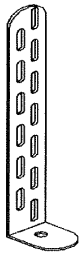
Engineer Signature & Seal:
FRANK L. BERNARDO LICENSE
April 18, 2018
No PE0046549
Frank L. Bernardo, P.E. SECB
ENGINEERING EXPRESS®
PE #0046549 CA #9885
STATE OF FLORIDA PROFESSIONAL ENGINEER

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

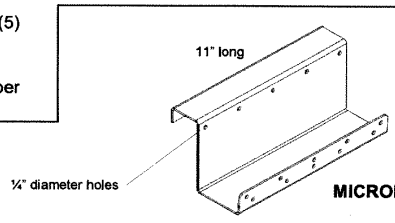
B. – #12 TEK Screws, (14) screws per clip, (5) top front side, (4) top back side and (5) bottom front side.

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

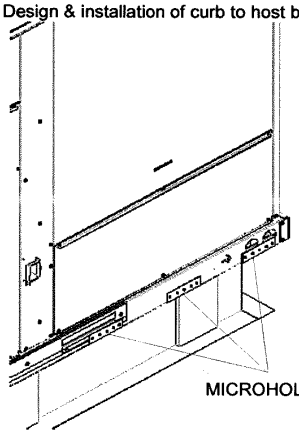
STEEL CURB
(ROOF APPLICATION)

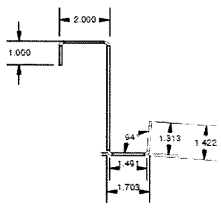
Steel curb to be a minimum of 16ga ASTM A653 steel

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

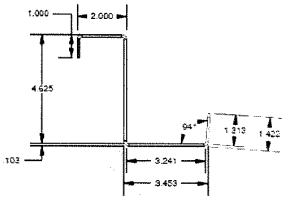


CURB MOUNT APPLICATIONS
CONFIGURATION B
Note: Design & installation of curb to host by others per site specific conditions

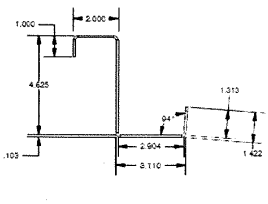




Curb Clip A



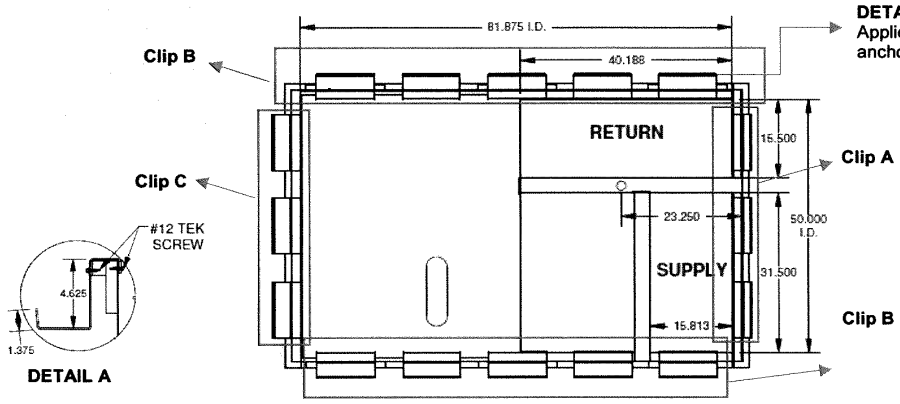
Curb Clip C



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.

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)

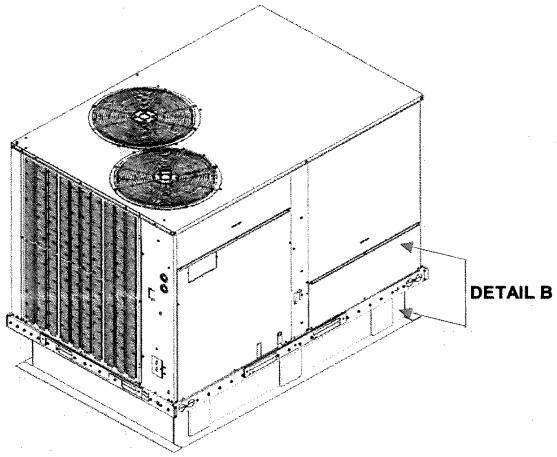
TABLE 1: Clip Curb Schedule		
Unit Model		Number of Clips (Pcs)
RGECZR - 036	RACCZR - 036	4 LS - 2 SS
RGECZR - 048	RACCZR - 048	4 LS - 2 SS
RGECZR - 060	RACCZR - 060	4 LS - 2 SS
RGECZR - 072	RACCZR - 072	4 LS - 2 SS
RGEDZR - 090	RACDZR - 090	5 LS - 3 SS
RGEDZR - 102	RACDZR - 102	5 LS - 3 SS
RGEDZR - 120	RACDZR - 120	5 LS - 3 SS
RGEDZR - 150	RACDZR - 150	5 LS - 3 SS

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

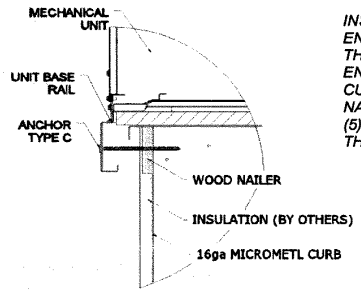
See pressures on page (2) for alternative anchor limitations

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

J. Unit Tie-Down

SECTION 3 MODELS SUMMARY, DIMENSION & NOTES

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

TESTED UNIT LIMITATIONS

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

REQUIRED WIND PRESSURES

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

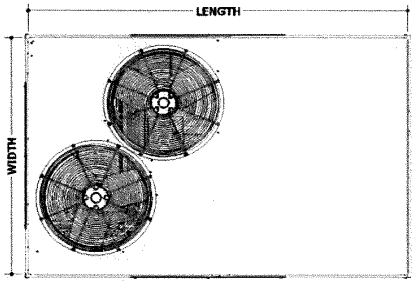
TEST REPORTS UTILIZED

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

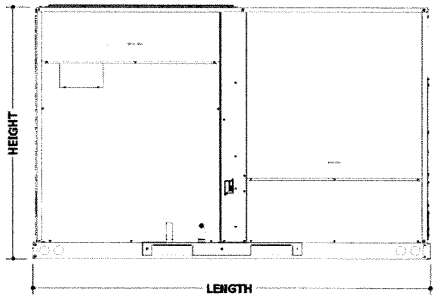
TABLE 3: Evaluation Model Sereis Matrix (Unit Construction Metal Cabinetry)				
Unit Model	Operating Dimensions w/ screw heads			Operating Weight (lbs)
	Width (in)	Length (in)	Height (in)	
RACCZR - 036	46 3/4	78 3/8	41 3/8	453
RACCZR - 048	46 3/4	78 3/8	41 3/8	477
RACCZR - 060	46 3/4	78 3/8	41 3/8	482
RACCZR - 072	46 3/4	78 3/8	41 3/8	689
RACDZR - 090	59 15/32	89 5/16	49 1/4	722
RACDZR - 102	59 15/32	89 5/16	49 1/4	748
RACDZR - 120	59 15/32	89 5/16	49 1/4	777
RACDZR - 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)	
RGECZR - 036	46 3/4	78 3/8	41 3/8	453
RGECZR - 048	46 3/4	78 3/8	41 3/8	477
RGECZR - 060	46 3/4	78 3/8	41 3/8	482
RGECZR - 072	46 3/4	78 3/8	41 3/8	689
RGEDZR - 090	59 15/32	89 5/16	49 1/4	846
RGEDZR - 102	59 15/32	89 5/16	49 1/4	872
RGEDZR - 120	59 15/32	89 5/16	49 1/4	901

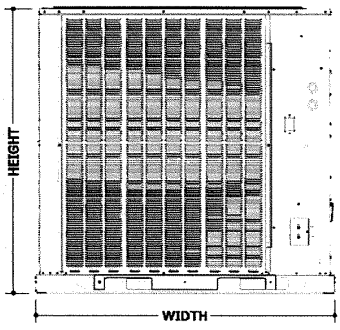
UNIT VIEWS & ELEVATIONS



TOP VIEW



ELEVATION VIEW



SIDE VIEW

Note: RGEDZR-150 illustration selected for dimensional purposes

R. INFORMATION FOR THE OWNER

R.1. 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 included User's Information Manual for the owner.

Manufacturer Part number: 92-106692-01

R.2. 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. Refer to section ***B.1. Model Number*** for the breakdown of each character in the model number.

R.3. Warranty Information

The below image of the warranty card is for **REFERENCE ONLY.** The warranty card for the unit will come separately in the parts bag.

Limited Warranty – Parts

SCOPE of WARRANTY and EQUIPMENT COVERED: The products covered by this Limited Warranty are specified below (the "Covered Equipment"). RHEEM SALES COMPANY, INC. AIR CONDITIONING DIVISION (Manufacturer of Rheem®-, Ruud®-, Sure Comfort®-, WeatherKing®- Mainline®-, Fujitsu®- and Climate Master-branded Covered Equipment), warrants the Covered Equipment to be free from defects in materials and workmanship, and will repair or replace, at its option, ANY PART of Covered Equipment installed in residential or commercial applications which fails in normal use and service within the Applicable Warranty Periods specified below in accordance with the terms, including, but not limited to, the specific exclusions set forth below, of this Limited Warranty and subject to the Manufacturer's right to inspect and validate the warranty claim as set forth below. None of the residential application warranties apply to WeatherKing®-branded Covered Equipment. If an exact replacement is not available, an equivalent unit or credit will be provided at the Manufacturer's option. The exact replacement will be warranted for only the unexpired portion of the original Applicable Warranty Period. If government regulations, industry certification or similar standards require the replacement unit to have features not found in the defective unit, you will be charged for the difference in price represented by those required features. If you pay the price difference for those required features you will also receive a complete new Limited Warranty (with the full Applicable Warranty Period) for the new replacement unit. The Manufacturer does not authorize or warranty any online/internet sale of equipment through auction websites or, unless expressly authorized by written policy of Manufacturer, any other method of online sales direct to the consumer.

THE EFFECTIVE DATE OF WARRANTY COVERAGE IS DETERMINED AS FOLLOWS: (a) If the original installation date can be verified by the installer's invoice, then the Effective Date of warranty coverage is the original installation date as shown on the installer's invoice. **For residential new construction installations, the final occupancy permit, or proof of purchase from the builder can be substituted for the installer's invoice.**

(b) If the original installation date cannot be verified by the installer's invoice, **or proof of purchase in residential new construction applications,** then the Effective Date of warranty coverage is the product's manufacture date plus ninety (90) days.

The Applicable Warranty Periods for the Manufacturer's various models and parts are specified below.

APPLICABLE WARRANTY PERIODS:

A Ten (10) year Limited Parts Warranty applies to the following Manufacturer's single-phase heating and cooling models and component parts installed in RESIDENTIAL* applications (a FIVE year Limited Warranty applies to COMMERCIAL applications) except for certain models, heat exchangers, compressors, installation locations and non-matching coils whose Applicable Warranty Periods are listed below under "Exceptions".

Package Gas Electric Units: RGEA16

A Five (5) year Limited Warranty applies to the following Manufacturer's single-phase heating and cooling models and component parts installed in RESIDENTIAL* (not commercial) applications except for certain models, heat exchangers, compressors, installation locations and non-matching coils whose applicable Warranty Periods are listed below under "Exceptions".

Package Gas Electric Units: RKPN, RKQN, RGEA14, RGEA15, RGECZR, RGECZT
Package Heat Pumps: RJPL, RQPL, RQPM, RQRM
Package Air Conditioners: RLPN, RLQN, RSPM, RACA13, RACA14, RACA15, A One (1) year Limited Warranty applies to the following Manufacturer's single-phase and three-phase heating and cooling models and components installed in COMMERCIAL applications except for certain models, heat exchangers, compressors, installation locations and non-matching coils whose applicable Warranty Periods are listed below under "Exceptions".
Commercial Coils: RCCL, RCCU
Integrated Systems: RLHL, RKHL
Package Dual Fuel: RQPW
Package Gas Electric Units: RKPN, RKQN, RKKL, RKKN, RKNL, RKRL, RKRL-C, RGEA14, RGEA15, RGEA16, RGEDZT, RGEDZS, RGECZR, RGECZT
Package Air Conditioners: RLPN, RLQN, RLKL, RLKN, RLNL, RLRL, RSPM, RACA13, RACA14, RACA15, RACDZT, RACDZS, RACDZR
Package Heat Pumps: RJNL, RJPL, RQPL, RQPM, RQRM, RHPDZT, RHPDZS
Split-System Condensing Units: RAWL
Split-System Heat Pumps: RPWL
Electric Furnace/Air Handlers: RHGL, RHGM, RHGN

EXCEPTIONS:

COMPRESSORS:
TEN (10) YEARS: Only for models: RJNL, RJPL, RKPN, RKQN, RKNL, RKRL, RLNL, RLPN, RLQN, RQPL, RQPM, RQPW, RQRM, RSPM, RACA13, RACA14, RACA15, RGEA14, RGEA15, RGEA16, RGECZR, RGECZT. The Applicable Warranty Period is TEN (10) YEARS after the Effective Date for compressors in all single and three-phase products installed in residential* applications.

For any subsequent owner (or the Original Owner where the above 10 Year Compressor Limited Warranty conditions are not met or cease being met), or if the unit is installed for non-residential use, the Manufacturer's Limited Warranty on the compressor is for an Applicable Warranty Period of FIVE (5) YEARS after the Effective Date.

FIVE (5) YEARS: The Applicable Warranty Period is FIVE (5) YEARS after the Effective Date for compressors in all single and three-phase products installed in commercial applications.

PARTS:
CONDITIONAL TEN (10) YEAR PARTS WARRANTY: Only for models: RJPL, RKPN, RKQN, RLPN, RLQN, RSPM, RQPL, RQPM, RQPW, RQRM, RACA13, RACA14, RACA15, RGEA14, RGEA15, RGECZR, RGECZT. A Conditional Parts Warranty of TEN (10) YEARS after the Effective Date applies if the following conditions are satisfied:

a) The unit is installed in a residential* application, is still owned by the original purchaser, in the original installation; AND
b) Warranty is registered with the Manufacturer within 90 days of original installation or closing of the purchase of your residence. Product registration is available online at www.RegisterMyUnit.com. Please refer to the Limited Warranty Coverage and Exclusions on this warranty card for additional information.

HEAT EXCHANGERS:
TEN (10) YEARS: The Applicable Warranty Period is TEN (10) YEARS after the Effective Date. If the factory standard heat exchanger fails during the Applicable Warranty Period, the Manufacturer will furnish a replacement factory standard heat exchanger. If a replacement is not available for any reason, the Manufacturer shall have the right instead to allow a credit in the amount of the distributor cost for an equivalent heat exchanger when applied to the purchase of any other unit from the Manufacturer.

TWENTY (20) YEARS: The Applicable Warranty Period is TWENTY (20) YEARS after the Effective Date on stainless steel heat exchangers when installed in a commercial application only for Models: RKHL, RKPN, RKQN, RKKL, RKKN, RKNL, RKRL, RQPW, RGEA14, RGEA15, RGEA16, RGEDZT, RGEDZS, RGECZR, RGECZT.

CONDITIONAL LIFETIME LIMITED WARRANTY: Only for Models: RKPN, RKQN, RGEA14 (AJA or JHA option code), RGEA15 (AJA or JHA option code), RGEA16, RQPW. The Manufacturer warrants to the original purchaser for his or her lifetime the primary stainless steel heat exchanger when installed in a residential application, provided that the unit is installed and used in the original purchaser's principal residence, subject to proof of purchase and such installation, AND if the following additional conditions are satisfied:

a) The unit is installed in a residential* application, is still owned by the original purchaser, in the original installation; AND
b) Warranty is registered with the Manufacturer within 90 days of original installation or closing of the purchase of your residence. Product registration is available online at www.RegisterMyUnit.com. Please refer to the Limited Warranty Coverage and Exclusions on this warranty card for additional information.

For any subsequent owner (or the original purchaser where the above lifetime Limited Warranty conditions are not met or cease being met), or if the unit is installed for non-residential use, the Manufacturer's warranty on the primary stainless steel heat exchanger is for an Applicable Warranty Period of TWENTY (20) YEARS after the Effective Date.

EXCLUSIONS – In addition to the specific exclusions set forth in the other sections of this Limited Warranty document, THIS Limited Warranty WILL NOT APPLY TO:

a) damages, malfunctions, or failures resulting from failure to properly install, operate or maintain Covered Equipment in accordance with the Manufacturer's instructions;
b) damages, malfunctions, or failures caused by misuse, abuse, accident, contaminated or corrosive atmosphere, vandalism, freight damage, fire, flood, freeze, lightning, acts of war, acts of God and the like;
c) damages, malfunctions, or failures caused by improper conversion from natural gas to LP gas or LP gas to natural gas fuel source;
d) parts installed with Covered Equipment or used in connection with normal maintenance, such as cleaning or replacing air filters, refrigerant, thermostats, tubing, or concrete pads;
e) Covered Equipment which is not installed in the United States or Canada;
f) Covered Equipment which is not installed by a qualified, trained HVAC professional in accordance with applicable codes, ordinances and good trade practices;
g) damages, malfunctions, or failures caused by the use of any attachment, accessory or component not authorized by the Manufacturer;
h) Covered Equipment moved from the original installation location;
i) Covered Equipment when operated with system components (indoor unit, outdoor unit, coil and refrigerant control devices) or accessories which do not match or meet the specifications recommended by the Manufacturer;
j) any Covered Equipment manufactured by the Manufacturer that has been sold to the consumer via the internet or auction website, and has not been installed by a trained, qualified HVAC professional;
k) Covered condensing units that are not part of a properly matched system as specified by the Air Conditioning, Heating & Refrigeration Institute (AHRI);
l) Covered heat pumps that are not part of a properly matched system as specified by the Air Conditioning, Heating & Refrigeration Institute (AHRI).

KEEP THIS WARRANTY FOR YOUR RECORDS DO NOT MAIL!

R. INFORMATION FOR THE OWNER

R.3. Warranty Information

***Residential Application is defined as any single-family dwelling, which includes condominiums, duplexes and homes.**

SHIPPING COSTS: This Limited Warranty does **NOT** cover shipping costs. You are responsible for the cost of shipping warranty replacement parts from our factory to the Manufacturer's distributor and from the distributor to the location of your Covered Equipment. You also are responsible for the cost of shipping failed parts to the distributor and for incidental costs incurred locally, including handling charges. (If in Alaska, Hawaii or Canada, you also must pay the shipping costs of returning the failed part to the port of entry into the continental United States.)

LABOR COSTS: This Limited Warranty does **NOT** cover any labor costs or expenses for service, **NOR** for removing or reinstalling parts. You are responsible for all labor costs or expenses, unless a labor service agreement exists between you and your contractor.

HOW TO OBTAIN WARRANTY CLAIMS ASSISTANCE: You must promptly report any failure covered by this Limited Warranty to the installing contractor or distributor. Normally, the installing contractor from whom the Covered Equipment was purchased will be able to take the necessary corrective action by obtaining through his Manufacturer's air conditioning distributor any replacement parts. If the contractor is not available, simply contact any other local contractor handling the Manufacturer's air conditioning products. The name and location of a local contractor can usually be found in your telephone directory or by contacting the Manufacturer's air conditioning distributor.

P.O. Box 17010
5600 Old Greenwood Road
Fort Smith, Arkansas 72917-7010
479-646-4311

(FOR CALIFORNIA ONLY)
14300 Alondra Boulevard
La Mirada, California 90638
866-251-4090

HOWEVER, ANY PART REPLACEMENTS ARE MADE SUBJECT TO VALIDATION BY THE MANUFACTURER OF IN-WARRANTY COVERAGE. Any part to be replaced must be made available in exchange for the replacement.

EXCLUSIVE WARRANTY – LIMITATION OF LIABILITY: This Limited Warranty is the **ONLY** warranty given by the Manufacturer. No one is authorized to make any warranties on behalf of the Manufacturer. ANY IMPLIED WARRANTIES, INCLUDING MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, SHALL NOT EXTEND BEYOND THE APPLICABLE WARRANTY PERIODS SPECIFIED IN THIS LIMITED WARRANTY. THE MANUFACTURER'S SOLE LIABILITY WITH RESPECT TO DEFECTIVE PARTS OR FAILURE SHALL BE AS SET FORTH IN THIS LIMITED WARRANTY, AND ANY CLAIMS FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES ARE EXPRESSLY EXCLUDED. Some states do not allow limitations on how long an implied warranty lasts, or for the exclusion of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

The Manufacturer does **not** authorize, recommend or receive any benefit from any **claims processing or similar fees** charged by others to process warranty claims for any unit or component part(s). The Manufacturer will **not** reimburse any party for their, or any other, fee not specifically covered in this Limited Warranty document.

This Limited Warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

The Manufacturer suggests that you immediately complete the information below on this Limited Warranty and retain this Limited Warranty Certificate in the event warranty service is needed and that you keep proper documentation.

OTHER PRODUCTS:
ONE (1) YEAR: The Applicable Warranty Period is only ONE (1) YEAR after the Effective Date for any other products, including commercial equipment and single-phase equipment installed in commercial applications.

COMPLETE THE FOLLOWING USER INFORMATION.
KEEP THIS WARRANTY FOR YOUR RECORDS – DO NOT MAIL!

Owner Name: _____

Owner Address: _____

City/State(Province)/Postal Code: _____

Date of Original Installation: _____

Installing Contractor Company Name: _____

Installing Contractor Telephone: _____

Installing Contractor Address: _____

City/State(Province)/Postal Code: _____

Model Number: _____

Serial Number: _____

KEEP THIS WARRANTY FOR YOUR RECORDS DO NOT MAIL!

S. INSTALLATION CHECK LIST 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 CHECK LIST 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 :