INSTALLATION INSTRUCTIONS
FOR PACKAGED AIR CONDITIONERS
RHPB SERIES (2-5 TONS) WITH R-454B REFRIGERANT

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

92-110313-01-02

RECOGNIZE THIS SYMBOL AS AN INDICATION OF IMPORTANT SAFETY INFORMATION!

⚠ WARNING

THESE INSTRUCTIONS ARE INTENDED AS AN AID TO QUALIFIED, LICENSED 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, PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

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

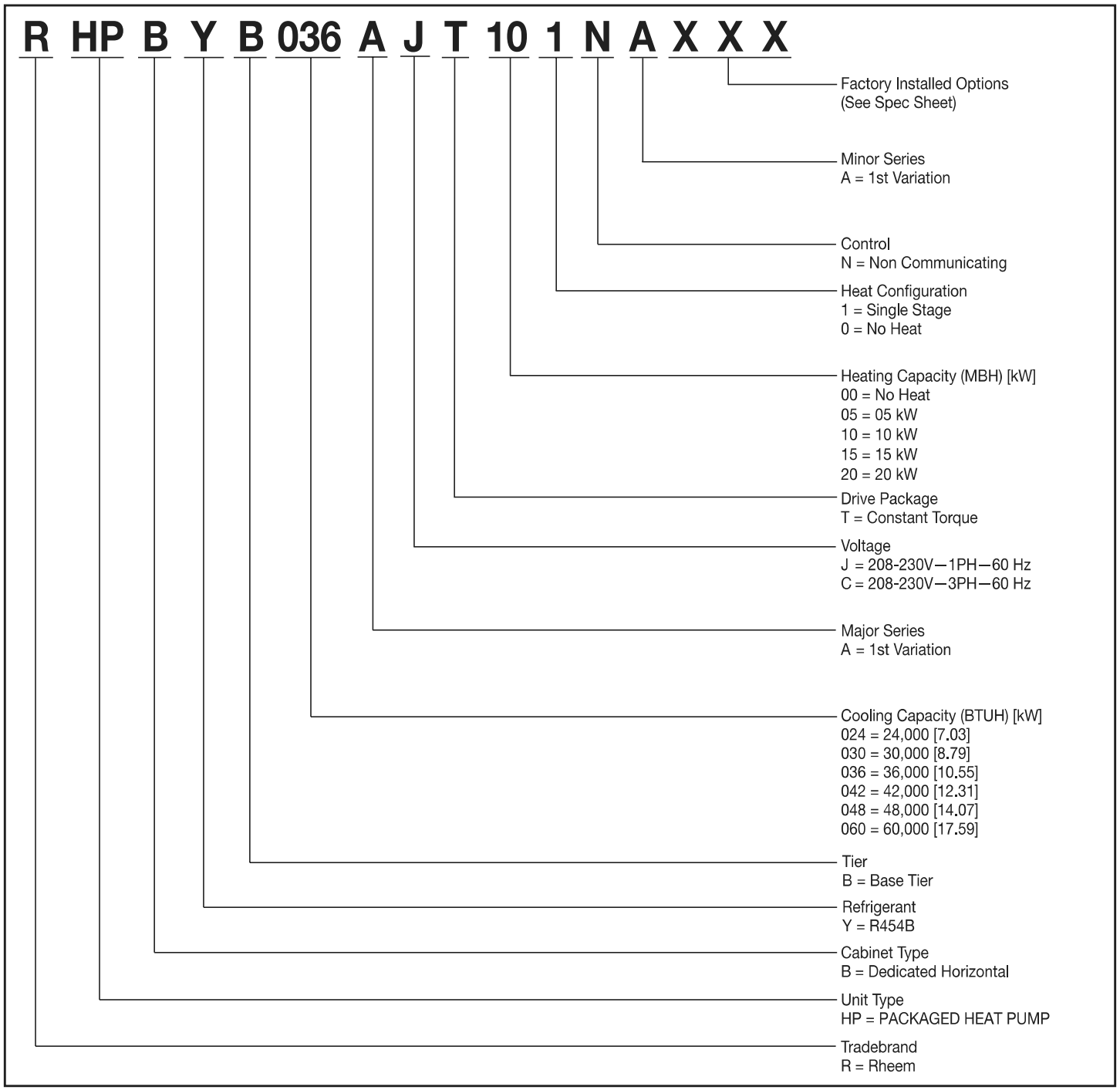
Accredited by the RvA · ABS Quality Evaluations, Inc. Management System Certification · ANAB ACCREDITED · ISO 9001:2015

c UL us LISTED

TABLE OF CONTENTS

1. Breakdown Page 3
2. Important Safety And General Information 4
2.1 Introduction 4
2.2 Agency Performance Audit and Efficiency Testing Notice 4
2.3 Importance of a Quality Installation 4
2.4 Importance of Air Flow and Setup..... 4
2.5 Checking Product and Inspection 4
2.6 Safety Information 5
3. General Specifications 7
3.1 Major Components 7
3.2 Product Data Information 7
3.2.1 Dimensional Information..... 7
4. Installation Of The Unit 10
4.1 General 10
4.1.1 Installation 10
4.1.2 Pre-Installation Checkpoints 10
4.2 Tool and Refrigerant 10
4.2.1 Tools Required For Installing And Servicing R-454B Models 10
4.2.2 R454B Refrigerant 10
4.2.3 Specifications of R-454B 10
4.2.4 Quick Reference Guide for R-454B..... 10
4.2.5 Evaporator Coil/TXV 10
4.2.6 Tools and Refrigerant..... 10
4.2.7 Refrigerant Recovery..... 10
4.3 Choosing A Location 11
4.3.1 Unit Location: Allowable Clearance And Operational Issues 11
4.3.2 Outside Installation 11
4.3.3 Rooftop Installation 11
4.3.4 Corrosive Environments 11
4.3.5 Minimum Room Area 11
4.3.6 No Ignition Sources 11
4.4 Ductwork 14
4.5 Filters 14
4.6 Condensate Drain 14
4.7 Wiring 14
4.7.1 Electrical Wiring 14
4.7.2 Power Wiring 14
4.7.3 Power Wiring And Electrical Heater Kit .. 15
4.7.4 Control Wiring (Class II) 15
4.7.5 Internal Wiring 16
4.7.6 Grounding 16
4.7.7 Thermostat 16
4.7.8 Potential Ignition Sources 16
4.7.9 Check Wiring..... 16
4.8 Indoor Airflow Data 16
4.9 Pre-Start Check 16
4.10 Pre-Start Check 16
4.11 Refrigerant Charge Verification And Adjustment Process 17
4.12 Operation 17
4.12.1 Control System Operation 17
4.13 Refrigerant Leak Inspection..... 17
4.13.1 Check for Refrigerant Leaks..... 17
4.13.2 Refrigerant Leak Detection System 18
4.13.3 Operation When a Leak is Detected..... 18
4.13.4 Removal and Evacuation of Refrigerant 18
4.14 Charging Procedure..... 18
4.15 Demand Defrost Control And High/Low Pressure Controls..... 19
4.15.1 Defrost Initiation..... 19
4.15.2 Defrost Termination..... 19
4.15.3 Temperature Sensors..... 19
4.15.4 Test Mode..... 19
4.14.5 Troubleshooting Demand Defrost..... 19
4.15.6 High/Low Pressure Control Monitoring - Enhanced Defrost Control..... 20
5. Decommisioning 21
5.1 Before Beginning Decommissioning 21
5.2 Decommissioning Procedure 21
6. General Data 22
7. Electrical Data 24
8. Airflow Performance 25
9. Heater Kit Characteristics 26
10. Wiring Diagrams 28
11. Troubleshooting Chart 30

1. BREAKDOWN PAGE



2. IMPORTANT SAFETY AND GENERAL INFORMATION

2.1 Introduction

This booklet contains the installation and operating instructions for your 2 through 5 ton combination electric heating/electric cooling unit. There are some precautions that should be taken to ensure proper operation. Improper installation can result in unsatisfactory operation or dangerous conditions.

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

⚠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.

2.2 Agency Performance Audit and Efficiency Testing Notice

NOTICE: BREAK-IN PERIOD

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

NOTICE: EFFICIENCY TESTING NOTICE

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

SETUP

- ASHRAE 37 - 2009 (RA 2019)

PERFORMANCE:

- ANSI/ASHRAE 90.1 - 2019
- ANSI/ASHRAE 103 (2017)
- AHRI Operations for Unitary Small AC Equipment 210/240 (2017) for 2-5T

SAFETY

UL 60335 4th Edition

2.3. 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.

2.4. 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.

2.5. 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.

2.6. Safety Information

⚠ WARNING

PROPOSITION 65: THIS APPLIANCE CONTAINS FIBERGLASS INSULATION. RESPIRABLE PARTICLES OF FIBERGLASS ARE KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

⚠ WARNING

THE MANUFACTURER'S WARRANTY DOES NOT COVER ANY DAMAGE OR DEFECT TO THE AIR CONDITIONER CAUSED BY THE ATTACHMENT OR USE OF ANY COMPONENTS, ACCESSORIES OR DEVICES (OTHER THAN THOSE AUTHORIZED BY THE MANUFACTURER) INTO, ONTO OR IN CONJUNCTION WITH THE AIR CONDITIONER. YOU SHOULD BE AWARE THAT THE USE OF UNAUTHORIZED COMPONENTS, ACCESSORIES OR DEVICES MAY ADVERSELY AFFECT THE OPERATION OF THE AIR CONDITIONER AND MAY ALSO ENDANGER LIFE AND PROPERTY. THE MANUFACTURER DISCLAIMS ANY RESPONSIBILITY FOR SUCH LOSS OR INJURY RESULTING FROM THE USE OF SUCH UNAUTHORIZED COMPONENTS, ACCESSORIES OR DEVICES.

⚠ WARNING

DISCONNECT ALL POWER TO THE UNIT BEFORE STARTING MAINTENANCE. FAILURE TO DO SO CAN RESULT IN SEVERE ELECTRICAL SHOCK OR DEATH.

⚠ WARNING

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.

⚠ WARNING

DO NOT, UNDER ANY CIRCUMSTANCES, CONNECT RETURN DUCTWORK TO ANY OTHER HEAT PRODUCING DEVICE SUCH AS A FIREPLACE INSERT, STOVE, ETC. UNAUTHORIZED USE OF SUCH DEVICES MAY RESULT IN FIRE, CARBON MONOXIDE POISONING, EXPLOSION, PROPERTY DAMAGE, SEVERE PERSONAL INJURY OR DEATH.

⚠ WARNING

THE UNIT MUST BE PERMANENTLY GROUNDED. A GROUNDING LUG IS PROVIDED IN THE ELECTRIC HEAT KIT FOR A GROUND WIRE. FAILURE TO GROUND THIS UNIT CAN RESULT IN FIRE OR ELECTRICAL SHOCK CAUSING PROPERTY DAMAGE, SEVERE PERSONAL INJURY OR DEATH.

⚠ WARNING

ONLY ELECTRIC HEATER KITS SUPPLIED BY THIS MANUFACTURER AS DESCRIBED IN THIS PUBLICATION HAVE BEEN DESIGNED, TESTED, AND EVALUATED BY A NATIONALLY RECOGNIZED SAFETY TESTING AGENCY FOR USE WITH THIS UNIT. USE OF ANY OTHER MANUFACTURED ELECTRIC HEATERS INSTALLED WITHIN THIS UNIT MAY CAUSE HAZARDOUS CONDITIONS RESULTING IN PROPERTY DAMAGE, FIRE, BODILY INJURY OR DEATH.

⚠ WARNING

DISCONNECT MAIN ELECTRICAL POWER TO THE UNIT BEFORE ATTEMPTING TO CHANGE BLOWER SPEEDS. FAILURE TO DO SO MAY RESULT IN ELECTRICAL SHOCK OR SEVERE PERSONAL INJURY OR DEATH.

⚠ CAUTION

DO NOT USE R-410A SERVICE EQUIPMENT OR COMPONENTS ON R-454B EQUIPMENT.

⚠ WARNING

IMPORTANT: ALL MANUFACTURER PRODUCTS MEET CURRENT FEDERAL OSHA GUIDELINES FOR SAFETY. CALIFORNIA PROPOSITION 65 WARNINGS ARE REQUIRED FOR CERTAIN PRODUCTS, WHICH ARE NOT COVERED BY THE OSHA STANDARDS.

CALIFORNIA'S PROPOSITION 65 REQUIRES WARNINGS FOR PRODUCTS SOLD IN CALIFORNIA THAT CONTAIN, OR PRODUCE, ANY OF OVER 600 LISTED CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER OR BIRTH DEFECTS SUCH AS FIBERGLASS INSULATION, LEAD IN BRASS, AND COMBUSTION PRODUCTS FROM NATURAL GAS.

ALL "NEW EQUIPMENT" SHIPPED FOR SALE IN CALIFORNIA WILL HAVE LABELS STATING THAT THE PRODUCT CONTAINS AND/OR PRODUCES PROPOSITION 65 CHEMICALS. ALTHOUGH WE HAVE NOT CHANGED OUR PROCESSES, HAVING THE SAME LABEL ON ALL OUR PRODUCTS FACILITATES MANUFACTURING AND SHIPPING. WE CANNOT ALWAYS KNOW "WHEN, OR IF" PRODUCTS WILL BE SOLD IN THE CALIFORNIA MARKET.

YOU MAY RECEIVE INQUIRIES FROM CUSTOMERS ABOUT CHEMICALS FOUND IN, OR PRODUCED BY, SOME OF OUR HEATING AND AIR-CONDITIONING EQUIPMENT, OR FOUND IN NATURAL GAS USED WITH SOME OF OUR PRODUCTS. LISTED BELOW ARE THOSE CHEMICALS AND SUBSTANCES COMMONLY ASSOCIATED WITH SIMILAR EQUIPMENT IN OUR INDUSTRY AND OTHER MANUFACTURERS.

- GLASS WOOL (FIBERGLASS) INSULATION
- CARBON MONOXIDE (CO)
- FORMALDEHYDE
- BENZENE

MORE DETAILS ARE AVAILABLE AT THE WEBSITES FOR OSHA (OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION), AT WWW.OSHA.GOV AND THE STATE OF CALIFORNIA'S OEHHA (OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT), AT WWW.OEHHA.ORG. CONSUMER EDUCATION IS IMPORTANT SINCE THE CHEMICALS AND SUBSTANCES ON THE LIST ARE FOUND IN OUR DAILY LIVES. MOST CONSUMERS ARE AWARE THAT PRODUCTS PRESENT SAFETY AND HEALTH RISKS, WHEN IMPROPERLY USED, HANDLED AND MAINTAINED.

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 Packaged Air Conditioning and Heating Equipment), Title 10 Part 431.76 Subpart D (Uniform Test Method for Measuring Energy Consumption of Commercial Warm Air Furnaces), and the clarifying provisions provided in the AHRI Operations Manuals for Unitary Large Equipment 340/360, 365 and Commercial Furnaces that were applicable at the date of manufacture should be used for test set up and performance.

2.6. Safety Information

⚠ WARNING

IF ANY HOT WORK IS TO BE CONDUCTED ON THE REFRIGERATING EQUIPMENT OR ANY ASSOCIATED PARTS, APPROPRIATE FIRE EXTINGUISHING EQUIPMENT MUST BE ON SITE. A DRY POWDER CO2 FIRE EXTINGUISHER MUST BE NEAR THE CHARGING AREA AT ALL TIMES DURING INSTALLATION, COMMISSIONING, SERVICE, AND DECOMMISSIONING.

⚠ DANGER

RISK OF FIRE OR EXPLOSION. FLAMMABLE REFRIGERANT USED. TO BE REPAIRED ONLY BY TRAINED SERVICE PERSONNEL. DO NOT PUNCTURE REFRIGERANT TUBING.

⚠ WARNING

RISK OF FIRE OR EXPLOSION. DISPOSE OF PROPERLY IN ACCORDANCE WITH FEDERAL OR LOCAL REGULATIONS. FLAMMABLE REFRIGERANT USED.

⚠ DANGER

RISK OF FIRE OR EXPLOSION. FLAMMABLE REFRIGERANT USED. CONSULT THE REPAIR MANUAL/OWNER'S GUIDE BEFORE ATTEMPTING TO SERVICE THIS PRODUCT. ALL SAFETY PRECAUTIONS MUST BE FOLLOWED.

⚠ WARNING

APPLIANCE SHALL BE INSTALLED, OPERATED, AND STORED IN A ROOM WITH A FLOOR AREA LARGER THAN 'X'M2. SEE APPENDIX H - A2L REFRIGERANT INSTALLATION SAFETY DATA.

⚠ DANGER

RISK OF FIRE OR EXPLOSION DUE TO FLAMMABLE REFRIGERANT USED. FOLLOW HANDLING INSTRUCTIONS CAREFULLY IN COMPLIANCE WITH NATIONAL REGULATIONS.

⚠ WARNING

DO NOT USE MEANS TO ACCELERATE THE DEFROSTING PROCESS OR TO CLEAN, OTHER THAN THOSE RECOMMENDED BY THE MANUFACTURER.

⚠ WARNING

AUXILIARY DEVICES WHICH MAY BE A POTENTIAL IGNITION SOURCE SHALL NOT BE INSTALLED IN THE DUCTWORK.

⚠ WARNING

THE APPLIANCE SHALL BE STORED IN A ROOM WITHOUT CONTINUOUSLY OPERATING IGNITION SOURCES (FOR EXAMPLE: OPEN FLAMES, AN OPERATING GAS APPLIANCE, OR AN OPERATING ELECTRIC HEATER).

⚠ WARNING

DO NOT PIERCE OR BURN.

⚠ WARNING

BE AWARE THAT REFRIGERANTS MAY NOT CONTAIN AN ODOR.

⚠ WARNING

IF THIS UNIT IS CONNECTED VIA AN AIR DUCT SYSTEM TO ONE OR MORE ROOMS WITH AN AREA LESS THAN AMIN, THAT ROOM SHALL BE WITHOUT CONTINUOUSLY OPERATING FLAMES OR OTHER POTENTIAL IGNITION SOURCES. SEE APPENDIX H - A2L REFRIGERANT INSTALLATION SAFETY DATA.

⚠ WARNING

IF THIS UNIT IS CONNECTED VIA DUCT TO ONE OR MORE ROOMS, ONLY AUXILIARY DEVICES APPROVED BY THE MANUFACTURER THAT ARE DECLARED SUITABLE WITH A2L REFRIGERANTS SHALL BE INSTALLED IN THE CONNECTING DUCTWORK.

3. GENERAL SPECIFICATIONS

3.1. 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 and control assembly 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.

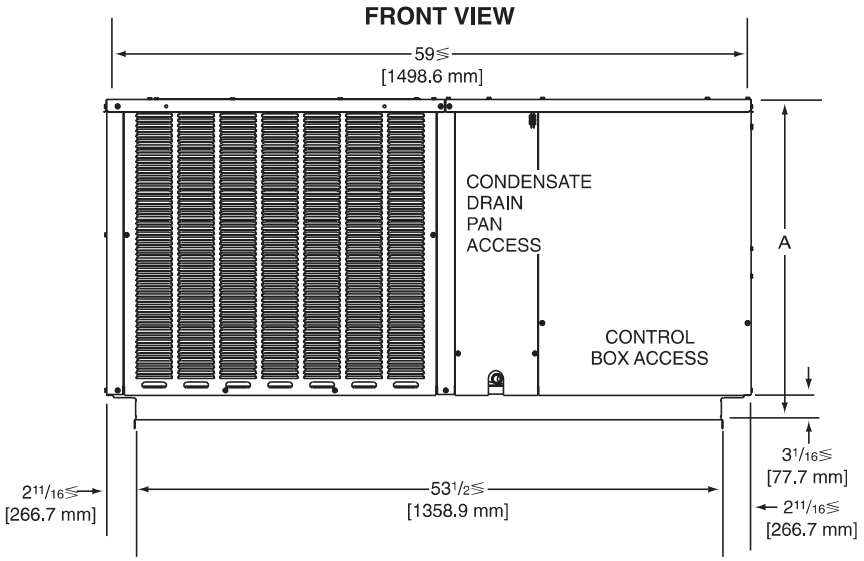
3.2. Product Data Information

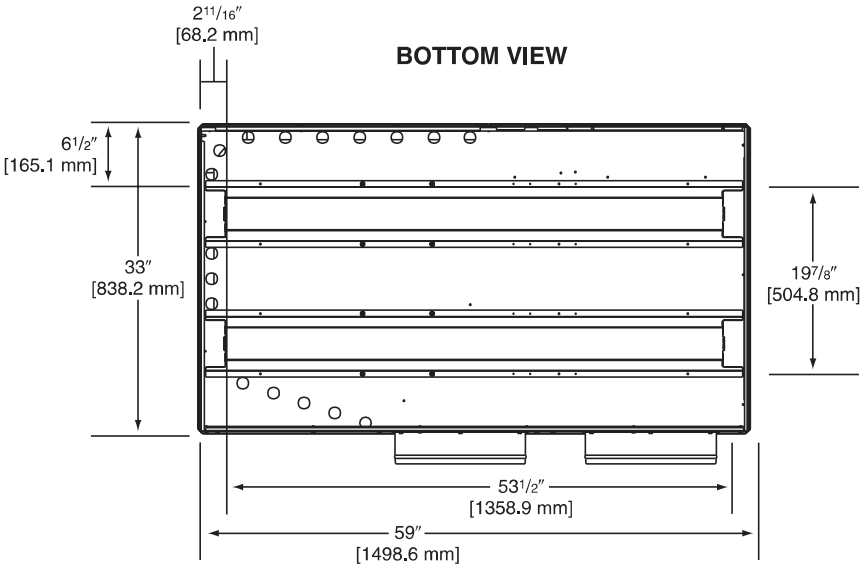
3.2.1. Dimensional Information

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

FIGURE 1
UNIT DIMENSIONS AND ACCESS LOCATIONS

Model	Height "A"
024, 030	29 1/8"
036, 042, 048, 060	37 1/8"





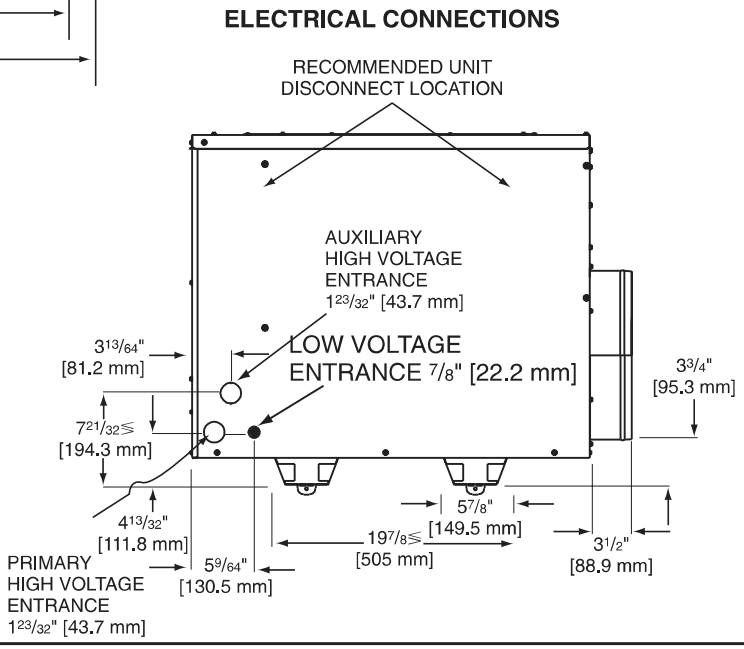
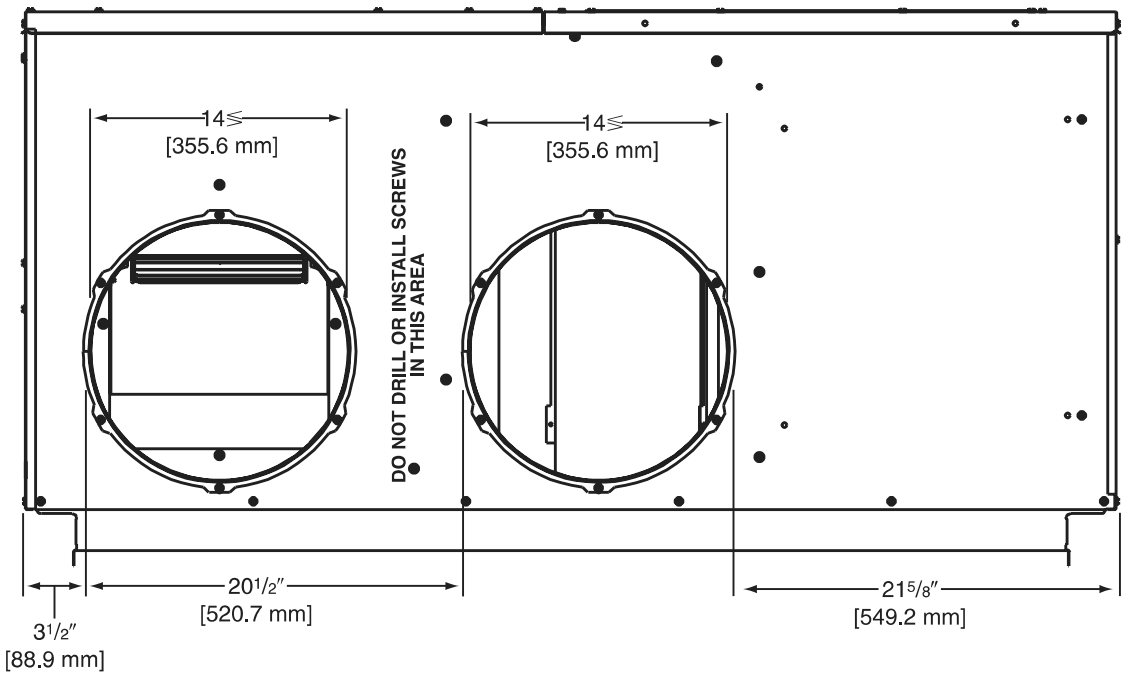
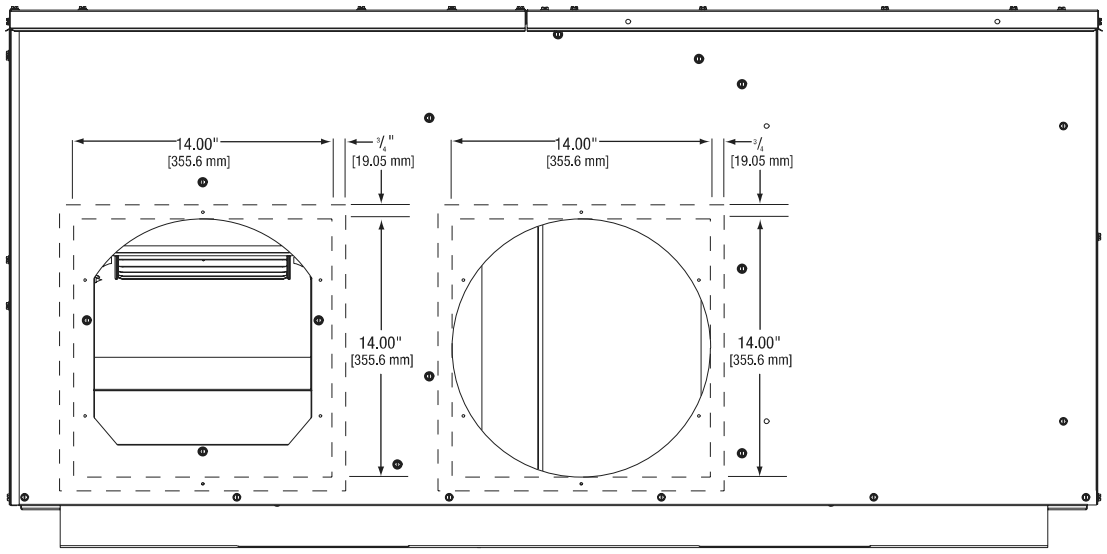


FIGURE 1 (continued)
DUCT CONNECTIONS

ROUND DUCT CONNECTIONS



SQUARE DUCT CONNECTIONS



IMPORTANT: DO NOT SCREW OR DRILL OUTSIDE THE DESIGNATED AREAS.

IMPORTANT: This product is designed to be operated with 14″ round supply and return air ducts. Square ducts may be used, provided that a minimum length of 24″ of round duct is used on the supply and return connections. This requirement is necessary to maintain blower performance.

4. INSTALLATION OF THE UNIT

4.1. General

4.1.1. 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

4.1.2. 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

4.2. Tool and Refrigerant

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

Manifold Sets:

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

Manifold Hoses:

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

Recovery Cylinders:

- 400 PSIG Pressure Rating

Dept. of Transportation

- 4BA400 or BW400

4.2.2 R-454B Refrigerant

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

4.2.3 Specification of R-454B

Application: **R-454B is not a drop-in replacement for R-410A**; equipment designs must accommodate the safety group A2L of R454B.It cannot be retrofitted into R-410A units.

Pressure: **The pressure of R-454B is similar to that of R-410A.** Recovery and recycle equipment, pumps, hoses and the like need to have design pressure ratings appropriate for R-454B. Manifold sets need to range up to 800 psig high-side and 250 psig low-side with a 550 psig low-side retard. Hoses need to have a service pressure rating of 800 psig. Recovery cylinders need to have a 400 psig ser-vice pressure rating. DOT 4BA400 or DOT BW400.

Flammability: R-454B is classified as safety group A2L, where the 2L flammability class indicated flammability. **R-454B and air should never be mixed in tanks or supply lines or be allowed to accumulate in storage tanks. Leak checking should never be done with a mixture of R-454B and air.** Leak checking should never be done with a mixture of R-454B and air.

4.2.4 Quick Reference Guide For R-454B

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

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

•R-454B, as with other HFC's is only compatible with POE oils.

•Vacuum pumps will not remove moisture from POE oil.

•R-454B systems are to be charged with liquid refrigerants. These cylinders should be kept upright for equipment charging.

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

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

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

4.2.5. Evaporator Coil/TXV

The thermostatic expansion valve is specifically designed to operate with R-454B. **The existing evaporator must be replaced with the factory specified TXV evaporator specifically designed for R-454B.**

4.2.6 Tools and Refrigerant

A Leak detection system is installed in this unit. The unit must be powered at all times except during service. This unit is equipped with electrically powered safety measures. To be effective, the unit must be electrically powered at all the times after installation, other than when servicing.

4.2.7 Refrigerant Recovery

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

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

- Ensure that the correct number of recovery cylinders are available to hold the total system charge.
- All cylinders used must be designed for recovering R-454B refrigerant.

• Cylinders shall be complete with a pressure relief valve and shut-off valves, all in working order.

• Empty recovery cylinders must be evacuated and cooled before refrigerant recovery occurs.

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

• The technician's recovery equipment

• The recovery equipment's instructions that details the proper recovery of flammable refrigerant.

• A set of calibrated weighing scales

• Hoses, which much be complete with leak free disconnect couplings.

4.3.Choosing a Location

4.3.1.Unit Location: Allowable Clearances and Operational Issues

The unit location must comply with the allowable clearances listed in **Figure 2.** Failure to comply with the recommended clearances may result in operational issues such as decreased capacity, restricted condenser airflow, and condenser motor fatigue.

4.3.2. 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 2.**

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.

4.3.3. 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. 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.*

4.3.4. 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.

4.3.5 Minimum Room Area

Because this unit uses refrigerant R-454B, UL requires a minimum room area for the total conditioned space (TAmin) that is supplied by this equipment. The UL Safety Standard defines an individual room area as the room area enclosed by floors walls, partitions, and doors of the space where the unit is installed, also as the room area into which refrigerant can leak. Each room/conditioned space will need to be considered for the total area requirements. The minimum room area of the total conditioned space for each base model is listed in Appendix H - A2L Refrigerant Installation Safety Data.

4.3.6 No Ignition Sources

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

Model		RHPBYB024	RHPBYB030	RHPBYB036	RHPBYB042	RHPBYB048	RHPBYB060
Refrigerant Charge Weight (oz)		104.5	153	121.1	169.6	156.5	206.2
Minimum circulation airflow, Qmin (cfm)		348	509	403	564	521	686
Altitude above Sea Level (ft)	Altitude Adjustment Factor	Minimum total space area, TAmin (sq-ft)					
0	1.000	193	282	223	313	288	380
1000	1.025	197	289	229	320	296	390
2000	1.051	202	296	235	329	303	399
3000	1.078	208	304	241	337	311	410
4000	1.107	213	312	247	346	319	421
5000	1.138	219	321	254	356	328	433
6000	1.170	225	330	261	366	338	445
6500	1.187	229	335	265	371	342	451

FIGURE 2
PACKAGED AIR CONDITIONER
OUTSIDE SLAB INSTALLATION, BASEMENT OR CRAWL SPACE DISTRIBUTION SYSTEM

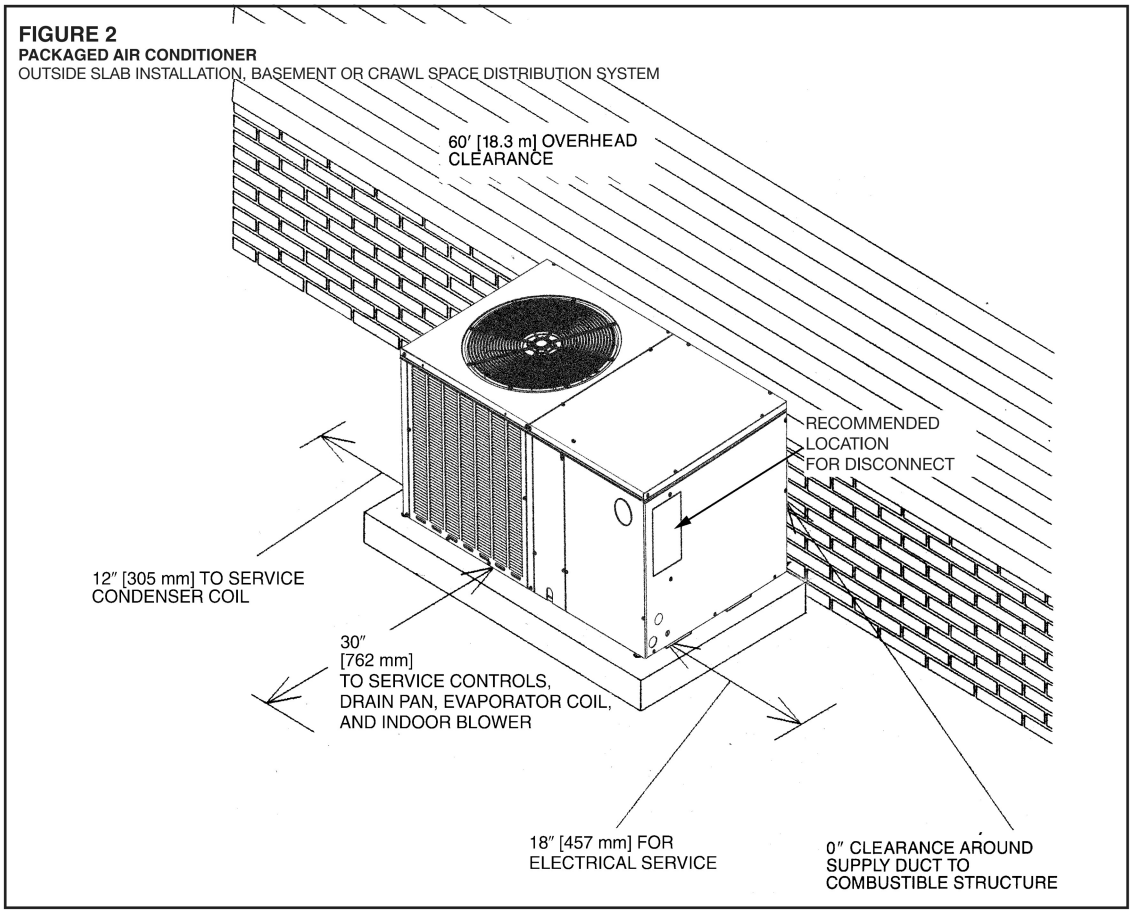
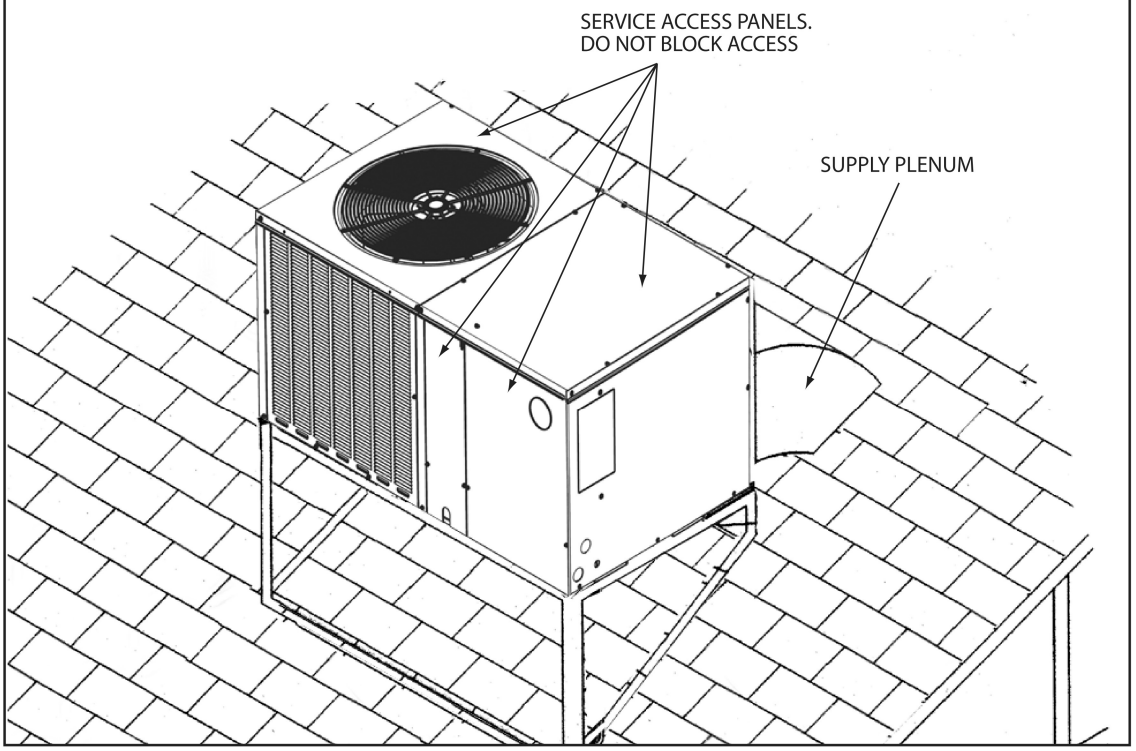


FIGURE 3
PACKAGED AIR CONDITIONER
PITCHED ROOFTOP INSTALLATION, ATTIC OR DROP CEILING DISTRIBUTING SYSTEM.
MUST BE MOUNTED LEVEL.



4.4. Ductwork

Ductwork should be fabricated by the installing contractor in accordance with local codes and NFPA90A. Industry manuals may be used 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 A FIREPLACE INSERT, STOVE, ETC. UNAUTHORIZED USE OF SUCH DEVICES MAY RESULT IN FIRE, CARBON MONOXIDE POISONING, EXPLOSION, PROPERTY DAMAGE, SEVERE PERSONAL INJURY OR DEATH.

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

It is preferable to install the unit on the roof of the structure if the registers or diffusers are located on the wall or in the ceiling. Consider a slab installation when the registers are low on a wall or in the floor.

On ductwork exposed to outside air conditions of 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 with vapor barrier. One-half to 1" thickness of insulation is usually sufficient for ductwork inside the air conditioned space.

Provide balancing dampers for each branch duct in the supply system. Properly support the ductwork from the structure.

4.5. Filters

Filters are not provided with this unit. They must be supplied and installed in the return air duct by the installer. A field installed filter grille is recommended for easy and convenient access to the filters for periodic inspection and cleaning. Filters must have adequate face area for the rated air quantity of the unit. See General Database for recommended filter size.

4.6. Condensate Drain

The indoor coil condensate drain ends with a PVC stub. A trap is provided in for proper condensate drainage and to prevent debris from being drawn into the unit. Do not connect drain to closed sewer line. It is not recommended that a PVC cement or other permanent installation be used so that the drain line and/or drain pan can be easily cleaned in the future. The drain trap is located in the control box during shipping. To install, slide clear plastic tube over drain pan connection. The white PVC trap can be oriented as required by installation.

FIGURE 4

REMOVABLE CONDENSATE DRAIN PAN AND REMOVAL PROCEDURE

A small side panel grants access to a removable, sloped drain pan, which helps to ensure indoor air quality (IAQ) throughout the life of the unit. A drain trap assembly is provided for convenience.

4.7. Wiring

4.7.1. Electrical Wiring

Field wiring must comply with the National Electrical Code* and applicable local codes.

*C.E.C. in Canada

4.7.2. Power Wiring

1. 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 rating plate. On three phase units, phases must be balanced within 3%.
2. Install a branch circuit disconnect within sight of the unit and of adequate size to handle the starting current. (See Heater Kit Tables.)
3. For branch circuit wiring (main power supply to unit disconnect), the minimum wire size can be determined from the National Electrical Code or Canadian Electrical Code or nameplate or from Heater Kit Tables.
4. This unit supports both single and dual point electrical connection for unit and electric heat accessory.
5. Power wiring must be run in grounded rain-tight conduit.

4.7.3. Power Wiring And Electrical Heater Kit

⚠ WARNING

TURN OFF ELECTRIC POWER AT THE FUSE BOX OR SERVICE PANEL BEFORE MAKING ANY ELECTRICAL CONNECTIONS.

ALSO, THE GROUND CONNECTION MUST BE COMPLETED BEFORE MAKING LINE VOLTAGE CONNECTIONS. FAILURE TO DO SO CAN RESULT IN ELECTRICAL SHOCK, SEVERE PERSONAL INJURY OR DEATH.

1. Turn off power to unit.
2. Remove control box access panel.
3. Remove unit indoor section top cover.
4. Remove wire notch cover from control bulkhead and discard. Retain screw.
5. Remove heater element cover plate from blower outlet opening and discard. Retain screws.
6. Mount heater fuse block assembly in location indicated with the three included screws.
7. Route wire harness assembly through wire notch in control bulkhead and mount element assembly in blower outlet opening with screws previously retained.
8. Center wire routing plate over notch in blower bulkhead and secure with screw previously retained.
9. Route and tie wiring as shown in **Figure 5**. Wiring must not contact moving parts or uninsulated electrical connections.
10. Replace unit indoor top cover.
11. Connect power and control wiring as indicated below:

a. Single-point wiring: Connect high voltage field power leads to heater kit fuse block and connect included unit power pigtails from heater kit fuse block to unit contactor L1 and L3 connections for single-phase or L1, L2 and L3 for three-phase. Connect ground lead to ground lug on heater kit fuse block.

b. Dual-circuit wiring: Remove unit power pigtails from heater kit fuse block and discard. Connect one set of high voltage field power circuit leads to the heater kit fuse block and connect ground lead to ground lug on heater kit fuse block. Connect the second set of high voltage field power leads to L1 and L3 for single-phase or L1, L2 and L3 for three-phase on the unit contactor. Connect ground lead to ground lug on control box bulkhead.

c. Connect heater kit control plug to receptacle in control box.

12. Replace control box access panel.
13. Restore power to unit and verify proper unit and heater kit operation.

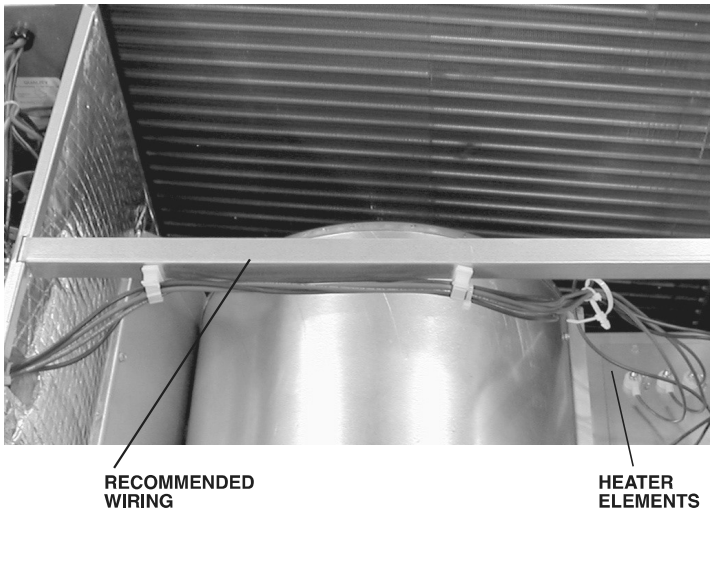
4.7.4. Control Wiring (Class II)

1. Do not run low voltage wiring in conduit with power wiring.
2. Control wiring is routed through the 7/8" hole corner adjacent to the control box. See Electrical Connections, **Figure 1**. Use a minimum #18 AWG thermostat wire. For wire lengths exceeding 50', use #16 AWG thermostat wire. The low voltage wires are connected to the unit pigtails which are supplied with the unit in the low voltage connection box located within the unit control box. See **Figure 5**.
3. **Figure 6** shows representative low voltage connection diagrams. Read your thermostat installation instructions for any special requirements for your specific thermostat.

   NOTE — Units installed in Canada require that an outdoor thermostat (30,000 min. cycles of endurance) be installed and be wired with C.E.C. Class I wiring.

FIGURE 5

HEATER KIT INSTALLATION



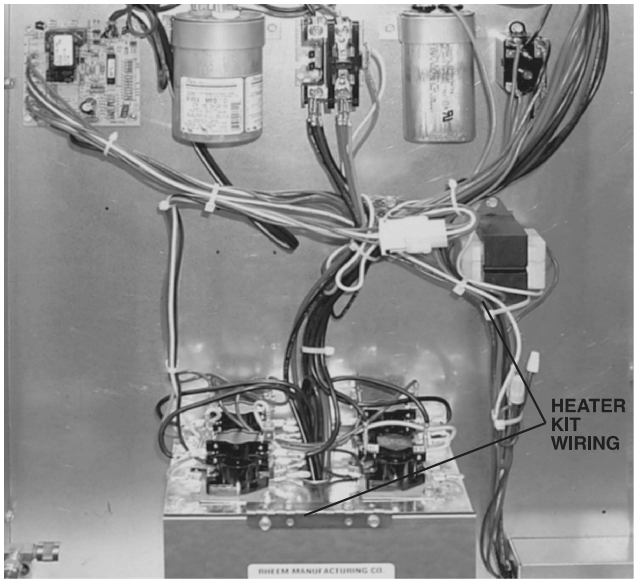
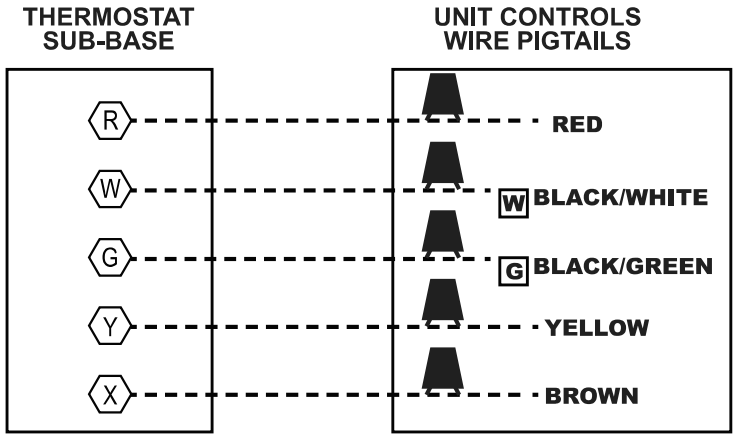


FIGURE 6
VOLTAGE CONNECTIONS DIAGRAMS - STANDARD CONTROL WIRING



ST-A1384-01

4.7.5. Internal Wiring

A diagram of the internal wiring of this unit is located on the electrical control box cover. If any of the original wire as supplied with the appliance must be replaced, the wire gauge and insulation must be the same as original wiring.

4.7.6. Grounding

⚠ WARNING

THE UNIT MUST BE PERMANENTLY GROUNDED. A GROUNDING LUG IS PROVIDED. FAILURE TO GROUND THIS UNIT CAN RESULT IN FIRE OR ELECTRICAL SHOCK CAUSING PROPERTY DAMAGE, SEVERE PERSONAL INJURY OR DEATH.

4.7.7. Thermostat

Mount the thermostat on an inside wall about five feet above the floor, in a location where it will not be affected by unconditioned air, sun, or drafts from open doors or other sources. READ installation instructions in air conditioner thermostat package CAREFULLY because each has some different wiring requirements.

4.7.8 Potential Ignition Sources

The UL safety standard defines potential ignition sources as hot surfaces, flames, and current carrying devices which can be the source of arcing or sparking. In case any internal electrical components need to be replaced, those replacement parts must be ordered from the unit manufacturer's website to ensure that the internal electrical components are not potential ignition sources. Examples of internal electrical components include contactors, relays, and control boards. This is not an exhaustive list. For the safety of customers and technicians, refer to the unit manufacturer's website for proper unit component replacement.

4.7.9 Check Wiring

After completing refrigerant removal, evacuation, and charging, check that the internal and field wiring will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges, or any other adverse environmental effects, taking into account the effects of aging or continual vibration from sources such as compressors or fans.

4.8. Indoor Airflow Data

All 208/230 volt units are equipped with multi-speed indoor blower motors. Each unit is shipped factory wired for the proper speed at a normal external static. See Airflow Performance Table for blower performance.

4.9. Pre-Start Check

1. Is unit properly located and level?
2. Is ductwork insulated, weatherproofed, with proper spacing to combustible materials?
3. Is air free to travel to and from outdoor coil? (See **Figure 1**.)
4. Is the wiring correct, tight, and according to unit wiring diagram?
5. Is unit grounded?
6. Are field supplied air filters in place and clean?
7. Do the outdoor fan and indoor blower turn freely without rubbing, and are they tight on the motor shafts?

4.10. Pre-Start Check

1. Turn thermostat to "OFF," turn "on" power supply at disconnect switch.
2. Turn temperature setting as high as it will go.
3. Turn fan switch to "ON."
4. Indoor blower should run. Be sure it is running in the right direction.
5. Turn fan switch to "AUTO." Turn system switch to "COOL" and turn temperature setting below room temperature. Unit should run in cooling mode.
6. Is outdoor fan operating correctly in the right direction?
7. Is compressor running correctly?.
8. Turn thermostat system switch to "HEAT." Unit should stop. Wait 5 minutes, then raise temperature setting to above room temperature. After about 30 to 50 seconds auxiliary heaters, if installed, should come on.
9. Check the refrigerant charge using the ***Refrigerant Charge Verification And Adjustment Process Section 4.11***. Replace service port caps. Service port cores are for system access only and will leak if not tightly capped.
10. Turn thermostat system switch to proper mode "HEAT" or "COOL" and set thermostat to proper temperature setting. Record the following after the unit has run some time.
    a. Operating Mode _____
    b. Discharge Pressure (High)_____PSIG
    c. Vapor Pressure at Compressor (Low) _____PSIG
    d. Vapor Line Temperature at Compressor_____ °F.

e. Indoor Dry Bulb _____ °F.
f. Indoor Wet Bulb _____ °F.
g. Outdoor Dry Bulb _____ °F.
h. Outdoor Wet Bulb _____ °F.
i. Voltage at Contactor _____ Volts
j. Current at Contactor _____ Amps
k. Model Number _____
l. Serial Number _____
m. Location _____
n. Owner _____
o. Date _____

11. Adjust discharge air grilles and balance system.
12. Check ducts for condensation and air leaks.
13. Check unit for tubing and sheet metal rattles.
14. Instruct the owner on operation and maintenance.
15. Leave "USE AND CARE" instructions with owner.

4.11. Refrigerant Charge Verification And Adjustment Process

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

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

Charge verification instructions:

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

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

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

4. Record the following measurements:

a. High-side pressure at service fitting

b. Low-side pressure at service fitting

c. Outdoor ambient (air temperature) near the condenser coil

5. Place an "X" on the chart where the high-side and low-side pressures intersect.

6. If the "X" is above the outdoor ambient line by more than 20 PSI, verify the airflow and check for component issues. If no issues are found, reclaim the refrigerant, evacuate the system, and weigh in the refrigerant quantity listed on the rating plate.

7. If the "X" is above the outdoor ambient line by less than 20 PSI, the system can be considered properly charged and no adjustment is necessary.

8. If the "X" is below the outdoor ambient line by more than 20 PSI, inspect the unit for potential loss of refrigerant. Recover the refrigerant and perform a leak check using nitrogen to pressurize the system. If necessary, make repairs and perform a leak check again. Then, evacuate nitrogen from the system, and weigh in the refrigerant quantity listed on the rating plate.

9. If the "X" is below the outdoor ambient line by less than 20 PSI, the refrigerant charge can be increased. If the unit requires an adjustment greater than 2% of the refrigerant quantity listed on the rating plate; follow inspection, repair, and recharge procedures in step 8.

4.12. Operation

Most single phase units are not equipped with start relay or start capacitor. It is important that such systems be off for a minimum of 5 minutes before restarting to allow equalization of pressures. Do not move the thermostat to cycle unit without waiting five minutes. To do so may cause the compressor to stop on an automatic open overload device or blow a fuse. Poor electrical service can cause nuisance tripping in overloads or blow fuses.

IMPORTANT: *The compressor has an internal overload protector. Under some conditions, it can take up to 2 hours for this overload to reset. Make sure overload has had time to reset before condemning the compressor.*

These units are equipped with a time delay control (TDC1). The control allows the blower to operate for 45 to 90 seconds after the thermostat is satisfied.

4.12.1. Control System Operation

1. In the cooling mode, the thermostat will, on a call for cooling, energize the compressor contactor and the indoor blower relay. The indoor blower can be operated continuously by setting the thermostat fan switch at the "ON" position.
2. In the heating mode, the first heat stage of the thermostat will energize one or more supplementary resistance heaters. If required or considered desirable, the resistance heat may also be controlled by outdoor thermostats. In the heating mode, the thermostat will, on a call for heating, energize the indoor blower relay.

4.13 Refrigerant Leak Inspection

4.13.1 Check for Refrigerant Leaks

Before beginning any work on the system or conducting any hot work, ensure that the area is in the open or that it is adequately ventilated. Ventilation must continue while the unit is being worked on. Ventilation is required to safely disperse any released refrigerant into the atmosphere. Inspect the unit for any damage to the coils and tubing that could cause a leak. Under no circumstances shall potential sources of ignition be used to search for or detect refrigerant leaks. A halide torch or any other detector using a naked flame must not be used. Electronic leak detectors may be used to detect refrigerant leaks, but the sensitivity may not be accurate and may need recalibration to accurately detect R-454B. Before use, ensure that the detector is not a potential ignition source and is suitable for R-454B. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and must be calibrated to R-454B. Leak detection fluids are also suitable but do not use detergents containing chlorine. Examples of leak detection fluids are the bubble method and fluorescent method agents. If a leak is suspected, all naked flames must be extinguished. If a refrigerant leak is found that requires brazing, all of the refrigerants must be removed from the system.Before beginning any work on the system or conducting any hot work, ensure that the area is in the open or that it is adequately ventilated. Ventilation must continue while the unit is being worked on. Ventilation is required to safely disperse any released refrigerant into the atmosphere. Inspect the unit for any damage to the coils and tubing that could cause a leak. Under no circumstances shall potential sources of ignition be used to search for or detect refrigerant leaks. A halide torch or any other detector using a naked flame must not be used. Electronic leak detectors may be used to detect refrigerant leaks, but the sensitivity may not be accurate and may need recalibration to accurately detect R-454B. Before use, ensure that the detector is not a potential ignition source and is suitable for R-454B. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and must be

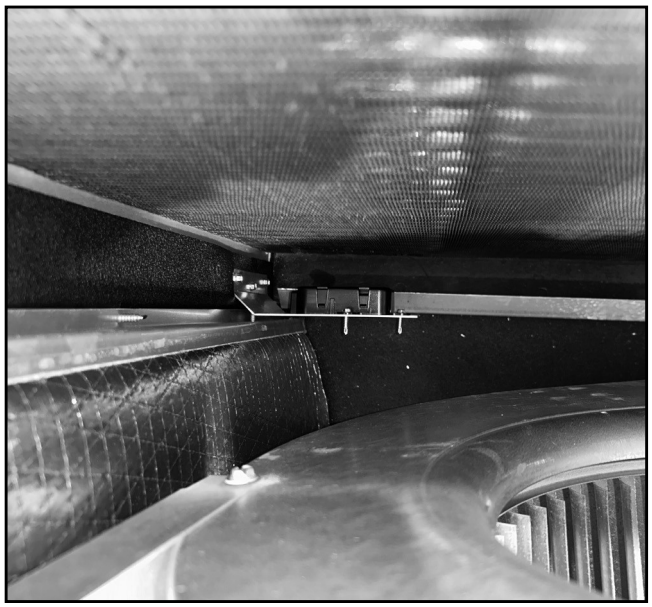
calibrated to R-454B. Leak detection fluids are also suitable but do not use detergents containing chlorine. Examples of leak detection fluids are the bubble method and fluorescent method agents. If a leak is suspected, all naked flames must be extinguished. If a refrigerant leak is found that requires brazing, all of the refrigerants must be removed from the system.

4.13.2 Refrigerant Leak Detection System

The refrigerant leak detection system will continuously monitor the air for a refrigerant leak. If the leak detection system detects a leak, the system will begin mitigation procedures: the blower will turn on and the compressors will shut down. Note: Gas or electric heat functions may continue during mitigation. At the end of 15 years or if the refrigerant leak detection system becomes inoperable, the leak detection system must be replaced with components specified by the unit's manufacturer. Refer to the manufacturer's website for replacement components. Refer to the alarm code diagnostics section for refrigerant leak detection system error codes.

4.13.3 Operation When a Leak is Detected

FIGURE 7
REFRIGERANT LEAK DETECTION SYSTEM LOCATION



When the unit receives a signal from the A2L sensor, circulation airflow is activated, and the control board will display an error (for DDC units) or a fault code (for Non-DDC units). The following mitigation actions will also be activated: 1. Energize the fan(s) of the appliance to deliver indoor airflow at or above the minimum airflow. See Appendix H, A2L Refrigerant Installation Safety Data.

• The fan(s) shall be energized following the input signal to turn on the fan(s). 2.The system de-energizes compressor operation. 3.Activate additional mechanical ventilation, if applicable. The above-mentioned actions shall continue for at least 5 minutes after the leak detection system begins mitigation. If the leak is no longer detected, the leak detection system will reset. If the leak is still present, mitigation actions will continue for another 5 minutes. This cycle will repeat until no leak is detected.

4.13.4 Removal and Evacuation of Refrigerant

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

Refrigerant purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to the atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system shall be vented down to the atmospheric pressure to enable work to take place. The outlet for the vacuum pump must not be close to any potential ignition sources. Ventilation is required during removal and evacuation. When breaking into the refrigeration circuit for any reason, this procedure must be followed:

1. Ensure there is no power to the unit.

2. With an accurate scale, ½ oz., set the refrigerant recovery cylinder in the upright position.

3. Connect the recovery cylinder to the unit using the service valves.

4. Evacuate refrigerant from the unit until the vacuum pump reads a minimum of 500 microns.

5. Purge the refrigeration circuit with inert gas until there is no refrigerant within the system.

6. Evacuate the circuit again.

7. Once all inert gas is removed, pull a vacuum on the unit to check for any leaks in the system.

8. If leaks are present, spray a soapy substance over the refrigeration circuit. Bubbles will help locate the leak.

   a. Patch the leak and pull a vacuum again.

   b. If leaks If leaks are still detected, repeat steps seven and eight.

   c. Check how sub-steps are formatted in existing I&Os.

9. If no leaks are present, charge the system as directed in the next section.

10. Remove the vacuum pump from suction, discharge and liquid shut-off.

4.14 Charging Procedure

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

The charging procedure steps are as follows:

1. Ensure that the unit is properly grounded before beginning charging.

2. Install the R-454B refrigerant cylinder to the unit service valve.

3. Before tightening, purge the cylinder and service valve hose to ensure that the contamination of different refrigerants does not occur when using the charging equipment.

a. Hoses of lines shall be as short as possible to minimize the amount of refrigerant contained in them.

4. Position the refrigerant cylinder in the upright position. The cylinder must remain in the upright position for the entire charging procedure.

5. Use the charging charts located in this manual to properly

charge the unit.

a. TAKE EXTREME CARE NOT TO OVERCHARGE THE UNIT.

b. Connect pressure gauges to suction and liquid ports on the condenser.

c. Measure the air temperature (Dry Bulb °F) entering the outdoor coil.

d. Place an "X" on the intersection of the suction and liquid pressures on the chart.

e. If "X" is below the outdoor ambient line, ADD charge and repeat step D.

f. If "X" is above the outdoor ambient line, RECOVER excess charge and repeat step D.

g. If the condenser fans are not running, the head pressure control may require jumping.

h. Conditions required at indoor and outdoor unit 80/67 (Indoor DB/WB °F) and 95 (Outdoor DB °F)

i. Connect pressure gauges to the liquid port on the condenser and install a thermocouple within 6" of the liquid port.

j. Calculate your subcooling by taking the pressure reading at the liquid port and the temperature value at the liquid port.

k. TARGET SUBCOOLING = Refer to the Charge Chart

l. Note: SUBCOOLING Tolerance = +/- 1.0 °F

m. If subcooling is below target, ADD charge and repeat step J.

n. If subcooling is above target, RECOVER excess charge and repeat step J.

6. Close the service ports on the suctions and liquid valves. Then, remove service gauges.

7. Replace service port caps and valve stern caps. These caps must be replaced to prevent leaks.

8. Label the system with the total refrigerant charge when charging is complete. This label is located on the exterior of the outdoor unit next to the rating plate.

After charging is complete, a leak test must be done. Before leaving the site, an additional leak test must also be done at the end of installation.

4.15 Demand Defrost Control And High/Low Pressure Controls

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

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

4.15.1 Defrost Initiation

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

1. The outdoor coil temperature is below 35°F as measured by a good coil sensor,
2. The compressor has operated for at least 34 minutes with the outdoor coil temperature below 35°F and
3. The measured difference between the ambient temperature and the outdoor coil temperature is greater than the calculated difference determined by the defrost control microprocessor.

4.15.2 Defrost Termination

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

4.15.3 Temperature Sensors

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

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

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

4.15.4 Test Mode

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

Test Sequence of Operation:

1. Provide a heating call to the heat pump.
2. Short test pins to bypass anti-short cycle timer. (If unit is running, this step is not necessary.)
3. Short test pins and hold them shorted to enter defrost mode.
4. Release test pins once control exits noise abatement delay.
5. Monitor coil temperature when control exits defrost.
6. Unit should return to heating mode.

4.14.5 Troubleshooting Demand Defrost

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

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

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

4.15.6 High/Low Pressure Control Monitoring - Enhanced Defrost Control

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

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

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

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

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

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

Enhanced Featured Defrost Control Diagnostic Codes Sensor Temperature Vs. Resistance Table

LED 1	LED 2	Control Board Status
OFF	OFF	No Power
ON	ON	Coil Sensor Failure
OFF	ON	Ambient Sensor Failure
FLASH	FLASH	Normal
OFF	FLASH	Low Pressure Lockout (Short Test Pins To Reset)
FLASH	OFF	High Pressure Lockout (Short Test Pins To Reset)
ON	FLASH	Low Pressure Control Open
FLASH	ON	High Pressure Control Open
Alternate Flashing		5 Minutes Time Delay

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

5. DECOMMISSIONING

5.1 Before Beginning Decommissioning

Before carrying out decommissioning, the technician performing decommissioning must be familiar with the equipment and its safety procedures, and ensure electrical power is available to the unit. See Section 4.1.2 for more information.

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

Before beginning any work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimized. See Section 4.3.6 for more information.

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

Work shall be undertaken under a controlled procedure so as to minimize the risk of flammable gas or vapor being present while work is being performed. See See Section 2.3 for more information.

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

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

5.2 Decommissioning Procedure

Follow the decommissioning procedure outlined below:

READ ALL STEPS BEFORE BEGINNING.

1. Become familiar with the equipment, its operation, and its safety procedures.
2. Isolate the system electrically.
3. Ensure that mechanical handling equipment for the refrigerant cylinders is at hand, if required.
4. Ensure personal, protective equipment is being used correctly.
5. A competent supervisor must be present during the refrigerant recovery process. Ensure such a person is available on site.
6. Confirm that the recovery equipment and cylinders are correct for the equipment and its refrigerant.
7. Follow the procedures and steps in Section 4.13.1 and Section 4.13.4.
8. If possible, pump down the refrigerant system.
9. If a vacuum is not possible, make a manifold so that the refrigerant can be removed from various parts of the system.
10. Make sure that the recovery cylinder is situated on the scale before recovery begins.
11. Start the recovery machine and operate it in accordance with its instructions.
12. Do not overflow the cylinders. No more than 80% volume liquid charge is allowed.
13. Do not exceed the maximum working pressure of the cylinder, even temporarily.
14. When the cylinders have been filled correctly and the process is complete, make sure that the cylinders and the recovery equipment are removed from the site promptly.
15. Verify all isolation valves on the unit are closed (off).
16. Recovered refrigerant shall not be charged into another unit unless a sample was taken prior to recovering the refrigerant and it's been cleaned and checked.

When performing any maintenance or troubleshooting on the refrigerating equipment or associated parts, a dry powder or CO2 fire extinguisher shall be nearby for emergency use. Equipment must be labelled stating that is has been decommissioned and emptied of refrigerant. The label must be dated and signed. Ensure that there are label(s) on the unit stating that this equipment contains flammable refrigerant.

6. GENERAL DATA

GENERAL DATA - RHPB

NOMINAL SIZES 2-5 TONS [7-17.6 kW]

Model RHPBYB Series	024AJT	030ACT	030AJT	036ACT	036AJT	042ACT CONTINUE ->
Cooling Performance[1]						
Nominal Cooling Capacity Btu/hr [kW]	24,000 [7.03]	30,000 [8.79]	30,000 [8.79]	36,000 [10.55]	36,000 [10.55]	42,000 [12.31]
EER2/SEER2[2]	10.6/13.4	10.6/13.4	10.6/13.4	10.6/13.4	10.6/13.4	10.6/13.4
Nominal CFM/AHRI Rated CFM [L/s]	800/800 [378/378]	1061/1000 [501/472]	1061/1000 [501/472]	1336/1200 [631/566]	1336/1200 [631/566]	1483/1400 [700/661]
AHRI Net Cooling Capacity Btu/hr [kW]	22800 [6.68]	28500 [8.35]	28500 [8.35]	34200 [10.02]	34200 [10.02]	39900 [11.69]
Net Sensible Capacity Btu/hr [kW]	16084 [4.71]	20105 [5.89]	20105 [5.89]	24126 [7.07]	24126 [7.07]	28147 [8.25]
Net Latent Capacity Btu/hr [kW]	6716 [1.97]	8395 [2.46]	8395 [2.46]	10074 [2.95]	10074 [2.95]	11753 [3.44]
Net System Power kW	2.15	2.69	2.69	3.23	3.23	3.76
Heating Performance (Heat Pumps)[3]						
High Temp. Btu/hr [kW] Rating	22560 [6.61]	28200 [8.26]	28200 [8.26]	33840 [9.92]	33840 [9.92]	39480 [11.57]
High Temp.System Power COP	3.59	3.69	3.69	3.56	3.56	3.47
Low Temp. Btu/hr [kW] Rating	12750 [3.74]	16300 [4.78]	16300 [4.78]	18800 [5.51]	18800 [5.51]	22700 [6.65]
Low Temp. System Power COP	2.37	2.31	2.31	2.23	2.23	2.13
HSPF2 (Btu/hr/Watts/hr)	6.7	6.7	6.7	6.7	6.7	6.7
Compressor						
No./Stg/Type	1/1/Scroll	1/1/Scroll	1/1/Scroll	1/1/Scroll	1/1/Scroll	1/1/Scroll
Outdoor Sound Rating (dB)[4]	82	82	82	76	76	85
Outdoor Coil - Fin Type	Louvered	Louvered	Louvered	Louvered	Louvered	Louvered
Tube Type	Rifled	Rifled	Rifled	Rifled	Rifled	Rifled
Rifled: Tube Size OD or MicroChannel: Depth in. [mm]	0.375 [9.53]	0.375 [9.53]	0.375 [9.53]	0.375 [9.53]	0.375 [9.53]	0.375 [9.53]
Face Area sq. ft. [sq. m]	12.65 [1.18]	20.58 [1.91]	20.58 [1.91]	16.54 [1.54]	16.54 [1.54]	26.9 [2.5]
Rows / FPI [FPcm]	1 / 20 [8]	2 / 16 [6]	2 / 16 [6]	1 / 22 [9]	1 / 22 [9]	2 / 18 [7]
Indoor Coil - Fin Type	Louvered	Louvered	Louvered	Louvered	Louvered	Louvered
Tube Type	Rifled	Rifled	Rifled	Rifled	Rifled	Rifled
Rifled: Tube Size OD or MicroChannel: Depth in. [mm]	0.375 [9.53]	0.375 [9.53]	0.375 [9.53]	0.375 [9.53]	0.375 [9.53]	0.375 [9.53]
Face Area sq. ft. [sq. m]	4.3 [0.40]	4.3 [0.40]	4.3 [0.40]	5.8 [0.54]	5.8 [0.54]	5.8 [0.54]
Rows / FPI [FPcm]	2 / 15 [6]	3 / 13 [5]	3 / 13 [5]	2 / 15 [6]	2 / 15 [6]	3 / 13 [5]
Refrigerant Control	TX Valves	TX Valves	TX Valves	TX Valves	TX Valves	TX Valves
Drain Connection No./Size in. [mm]	1 / 0.750 [19.05]	1 / 0.750 [19.05]	1 / 0.750 [19.05]	1 / 1.000 [25.40]	1 / 1.000 [25.40]	1 / 1.000 [25.40]
Outdoor Fan - Type	Propeller	Propeller	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	1/24.0 [609.6]	1/24.0 [609.6]	1/24.0 [609.6]	1/24.0 [609.6]	1/24.0 [609.6]	1/24.0 [609.6]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	3200 [1510]	3200 [1510]	3200 [1510]	3500 [1652]	3500 [1652]	4400 [2077]
No. Motors/HP	1 at 1/3	1 at 1/3	1 at 1/3	1 at 1/3	1 at 1/3	1 at 1/2
Motor RPM	825	825	825	825	825	1075
Indoor Fan - Type	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	1/10x9 [254x229]	1/10x9 [254x229]	1/10x9 [254x229]	1/11x9 [279x229]	1/11x9 [279x229]	1/11x9 [279x229]
Drive Type	Direct	Direct	Direct	Direct	Direct	Direct
No. Speeds	Multiple Speed	Multiple Speed	Multiple Speed	Multiple Speed	Multiple Speed	Multiple Speed
No. Motors	1	1	1	1	1	1
Motor HP	1/2	1/2	1/2	3/4	3/4	3/4
Motor RPM	1050	1050	1050	1050	1050	1050
Motor Frame Size	48	48	48	48	48	48
Filter - Type	Field Supplied	Field Supplied	Field Supplied	Field Supplied	Field Supplied	Field Supplied
Furnished	No	No	No	No	No	No
(NO.) Size Recommended in. [mm x mm x mm]	(1) 1x20x20 [25x508x508]	(1) 1x20x20 [25x508x508]	(1) 1x20x20 [25x508x508]	(1) 1x24x24 [25x610x610]	(1) 1x24x24 [25x610x610]	(1) 1x24x24 [25x610x610]
Refrigerant Charge Oz. [g]	104.5 [2963]	153 [4337]	153 [4337]	121.1 [3433]	121.1 [3433]	169.6 [4808]
Weights						
Net Weight lbs. [kg]	302 [137]	329 [149]	329 [149]	350 [159]	350 [159]	400 [181]
Ship Weight lbs. [kg]	327 [148]	354 [161]	354 [161]	375 [170]	375 [170]	425 [193]

NOTES:

1. Cooling Performance is rated at 95°F ambient, 80°F entering dry bulb, 67°F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Units are certified in accordance with the Unitary Air Conditioner Equipment certification program, which is based on AHRI Standard 210/240 or 360.
2. EER2 and/or SEER2 are rated at AHRI conditions and in accordance with DOE test procedures.
3. HSPF2 is rated at AHRI conditions and in accordance with DOE test procedures.
4. Outdoor Sound Rating shown is tested in accordance with AHRI Standard 270.

[ ] Designates Metric Conversions

GENERAL DATA - RHPB
NOMINAL SIZES 2-5 TONS [7-17.6 kW]

Model RHPBYB Series	042ACT	042AJT	048ACT	048AJT	060ACT	060AJT
Cooling Performance[1]						
Nominal Cooling Capacity Btu/hr [kW]	42,000 [12.31]	42,000 [12.31]	48,000 [14.06]	48,000 [14.06]	60,000 [17.58]	60,000 [17.58]
EER2/SEER2[2]	10.6/13.4	10.6/13.4	10.6/13.4	10.6/13.4	10.6/13.4	10.6/13.4
Nominal CFM/AHRI Rated CFM [L/s]	1483/1400 [700/661]	1483/1400 [700/661]	1604/1600 [757/755]	1604/1600 [757/755]	1906/1900 [900/897]	1906/1900 [900/897]
AHRI Net Cooling Capacity Btu/hr [kW]	39900 [11.69]	39900 [11.69]	45600 [13.36]	45600 [13.36]	57000 [16.7]	57000 [16.7]
Net Sensible Capacity Btu/hr [kW]	28147 [8.25]	28147 [8.25]	32168 [9.43]	32168 [9.43]	40210 [11.78]	40210 [11.78]
Net Latent Capacity Btu/hr [kW]	11753 [3.44]	11753 [3.44]	13432 [3.94]	13432 [3.94]	16790 [4.92]	16790 [4.92]
Net System Power kW	3.76	3.76	4.3	4.3	5.38	5.38
Heating Performance (Heat Pumps)[3]						
High Temp. Btu/hr [kW] Rating	39480 [11.57]	39480 [11.57]	45120 [13.22]	45120 [13.22]	56400 [16.53]	56400 [16.53]
High Temp.System Power COP	3.47	3.47	3.47	3.47	3.41	3.41
Low Temp. Btu/hr [kW] Rating	22700 [6.65]	22700 [6.65]	26250 [7.69]	26250 [7.69]	31400 [9.2]	31400 [9.2]
Low Temp. System Power COP	2.13	2.13	2.32	2.32	2.14	2.14
HSPF2 (Btu/hr/Watts/hr)	6.7	6.7	6.7	6.7	6.7	6.7
Compressor						
No./Stg/Type	1/1/Scroll	1/1/Scroll	1/1/Scroll	1/1/Scroll	1/1/Scroll	1/1/Scroll
Outdoor Sound Rating (dB)[4]	85	85	85	85	79	79
Outdoor Coil - Fin Type	Louvered	Louvered	Louvered	Louvered	Louvered	Louvered
Tube Type	Rifled	Rifled	Rifled	Rifled	Rifled	Rifled
Rifled: Tube Size OD or MicroChannel: Depth in. [mm]	0.375 [9.53]	0.375 [9.53]	0.375 [9.53]	0.375 [9.53]	0.375 [9.53]	0.375 [9.53]
Face Area sq. ft. [sq. m]	26.9 [2.5]	26.9 [2.5]	26.9 [2.5]	26.9 [2.5]	32.39 [3.01]	32.39 [3.01]
Rows / FPI [FPcm]	2 / 18 [7]	2 / 18 [7]	2 / 18 [7]	2 / 18 [7]	2 / 18 [7]	2 / 18 [7]
Indoor Coil - Fin Type	Louvered	Louvered	Louvered	Louvered	Louvered	Louvered
Tube Type	Rifled	Rifled	Rifled	Rifled	Rifled	Rifled
Rifled: Tube Size OD or MicroChannel: Depth in. [mm]	0.375 [9.53]	0.375 [9.53]	0.375 [9.53]	0.375 [9.53]	0.375 [9.53]	0.375 [9.53]
Face Area sq. ft. [sq. m]	5.8 [0.54]	5.8 [0.54]	5.8 [0.54]	5.8 [0.54]	5.8 [0.54]	5.8 [0.54]
Rows / FPI [FPcm]	3 / 13 [5]	3 / 13 [5]	3 / 13 [5]	3 / 13 [5]	4 / 13 [5]	4 / 13 [5]
Refrigerant Control	TX Valves	TX Valves	TX Valves	TX Valves	TX Valves	TX Valves
Drain Connection No./Size in. [mm]	1 / 1.000 [25.40]	1 / 1.000 [25.40]	1 / 1.000 [25.40]	1 / 1.000 [25.40]	1 / 1.000 [25.40]	1 / 1.000 [25.40]
Outdoor Fan - Type	Propeller	Propeller	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	1/24.0 [609.6]	1/24.0 [609.6]	1/24.0 [609.6]	1/24.0 [609.6]	1/24.0 [609.6]	1/24.0 [609.6]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	4400 [2077]	4400 [2077]	4400 [2077]	4400 [2077]	4500 [2124]	4500 [2124]
No. Motors/HP	1 at 1/2	1 at 1/2	1 at 1/2	1 at 1/2	1 at 1/2	1 at 1/2
Motor RPM	1075	1075	1075	1075	1075	1075
Indoor Fan - Type	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	1/11x9 [279x229]	1/11x9 [279x229]	1/11x9 [279x229]	1/11x9 [279x229]	1/11x9 [279x229]	1/11x9 [279x229]
Drive Type	Direct	Direct	Direct	Direct	Direct	Direct
No. Speeds	Multiple Speed	Multiple Speed	Multiple Speed	Multiple Speed	Multiple Speed	Multiple Speed
No. Motors	1	1	1	1	1	1
Motor HP	3/4	3/4	3/4	3/4	1	1
Motor RPM	1050	1050	1050	1050	1050	1050
Motor Frame Size	48	48	48	48	48	48
Filter - Type	Field Supplied	Field Supplied	Field Supplied	Field Supplied	Field Supplied	Field Supplied
Furnished	No	No	No	No	No	No
(NO.) Size Recommended in. [mm x mm x mm]	(1) 1x24x24 [25x610x610]	(1) 1x24x24 [25x610x610]	(1) 1x24x24 [25x610x610]	(1) 1x24x24 [25x610x610]	(1) 1x24x24 [25x610x610]	(1) 1x24x24 [25x610x610]
Refrigerant Charge Oz. [g]	169.6 [4808]	169.6 [4808]	156.5 [4437]	156.5 [4437]	206.2 [5846]	206.2 [5846]
Weights						
Net Weight lbs. [kg]	400 [181]	400 [181]	397 [180]	397 [180]	429 [195]	429 [195]
Ship Weight lbs. [kg]	425 [193]	425 [193]	422 [191]	422 [191]	454 [206]	454 [206]

NOTES:

1. Cooling Performance is rated at 95°F ambient, 80°F entering dry bulb, 67°F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Units are certified in accordance with the Unitary Air Conditioner Equipment certification program, which is based on AHRI Standard 210/240 or 360.
2. EER2 and/or SEER2 are rated at AHRI conditions and in accordance with DOE test procedures.
3. HSPF2 is rated at AHRI conditions and in accordance with DOE test procedures.
4. Outdoor Sound Rating shown is tested in accordance with AHRI Standard 270.

[ ] Designates Metric Conversions

7. ELECTRICAL DATA

ELECTRICAL DATA – RHPBYB SERIES

		024AJT	030ACT	030AJT	036ACT	036AJT	042ACT	042AJT	048ACT	048AJT	060ACT	060AJT
Unit Information	Unit Operating Voltage Range	187-253	187-253	187-253	187-253	187-253	187-253	187-253	187-253	187-253	187-253	187-253
	Volts	208/230	208/230	208/230	208/230	208/230	208/230	208/230	208/230	208/230	208/230	208/230
	Phase	1	3	1	3	1	3	1	3	1	3	1
	Hz	60	60	60	60	60	60	60	60	60	60	60
	Minimum Circuit Ampacity	20	18	22	23	29	25	30	25	37	30	40
	Minimum Overcurrent Protection	25	20	25	30	35	30	35	30	45	35	50
	Maximum Overcurrent Protection	30	25	30	30	45	35	45	35	50	45	60
Compressor Motor	No.	1	1	1	1	1	1	1	1	1	1	1
	Volts	208/230	208/230	208/230	208/230	208/230	208/230	208/230	208/230	208/230	208/230	208/230
	Phase	1	3	1	3	1	3	1	3	1	3	1
	Amps (RLA), Comp. 1	12.7	9.6	12.7	12.2	16.7	14.9	15.8	12.8	22.4	20.4	22.6
	Amps (LRA), Comp. 1	64.4	67.7	75.6	97.5	93.5	90	96	120.4	126	93	148
	Amps (RLA), Comp. 2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Amps (LRA), Comp. 2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Condenser Motor	No.	1	1	1	1	1	1	1	1	1	1	1
	Volts	208/230	208/230	208/230	208/230	208/230	208/230	208/230	208/230	208/230	208/230	208/230
	Phase	1	1	1	1	1	1	1	1	1	1	1
	HP	1/3	1/3	1/3	1/3	1/3	1/2	1/2	1/2	1/2	1/2	1/2
	Amps (FLA, each)	1.5	1.5	1.5	1.5	1.5	2.3	2.3	2.3	2.3	2.3	2.3
	Amps (LRA, each)	3	3	3	3	3	5.5	5.5	5.5	5.5	5.5	5.5
Evaporator Fan	No.	1	1	1	1	1	1	1	1	1	1	1
	Volts	208/230	208/230	208/230	208/230	208/230	208/230	208/230	208/230	208/230	208/230	208/230
	Phase	1	3	1	3	1	3	1	3	1	3	1
	HP	1/2	1/2	1/2	3/4	3/4	3/4	3/4	3/4	3/4	1	1
	Amps (FLA, each)	4.1	4.1	4.1	6	6	6	6	6	6	7.6	7.6
	Amps (LRA, each)	0	0	0	0	0	0	0	0	0	0	0

INDOOR AIRFLOW PERFORMANCE - RHPBYB - (208/230V, 1 & 3-Phase) CONSTANT TORQUE MOTOR

Nominal Cooling Capacity Tons [kW]	Motor Speed from Factory		Manufacturer Recommended Cooling Airflow (Min/Max) [Tap 2 Only]	Blower Size/ Motor HP [W] & # of Speeds	Motor Speed / Tap		External Static Pressure - Inches W.C. [kPa] (Side Discharge-Dry Coil)									
	Cool	Heat					0.1 [.02]	0.2 [.05]	0.3 [.07]	0.4 [.10]	0.5 [.12]	0.6 [.15]	0.7 [.17]	0.8 [.20]	0.9 [.22]	1.0 [.25]
2.0 [7.03]	Tap 2	Tap 1	700 CFM / 900 CFM	10X9 Blower 1/2 HP [372] 2 Speed (Constant Torque)	Tap 1 - Low Electric Heat / Fan-Only	CFM	882	818	759	650	577	512	433	368	304	241
						RPM	457	533	600	693	750	818	876	931	972	1015
						Watts	63	71	78	89	94	102	109	115	120	124
					Tap 2 - High *	CFM	-	-	-	-	1021	920	859	830	780	728
						RPM	-	-	-	-	772	864	909	946	996	1040
						Watts	-	-	-	-	165	181	189	196	205	213
2.5 [2.79]	Tap 2	Tap 1	875 CFM / 1125 CFM	10X9 Blower 1/2 HP [372] 2 Speed (Constant Torque)	Tap 1 - Low Electric Heat / Fan-Only	CFM	1143	1088	1043	989	878	836	798	750	706	656
						RPM	519	591	657	721	818	857	898	952	998	1049
						Watts	107	119	129	140	156	162	169	178	186	194
					Tap 2 - High *	CFM	-	-	-	1224	1182	1122	1028	989	957	922
						RPM	-	-	-	749	806	871	954	990	1026	1062
						Watts	-	-	-	199	211	226	244	252	260	269
3.0 [10.55]	Tap 2	Tap 1	1050 CFM / 1350 CFM	12x9 Blower 3/4 HP [559] 2 Speed (Constant Torque)	Tap 1 - Low Electric Heat / Fan-Only	CFM	1287	1212	1136	1080	1011	945	882	787	726	669
						RPM	451	504	572	623	681	733	775	838	877	941
						Watts	121	135	151	162	174	185	193	209	219	233
					Tap 2 - High *	CFM	-	-	1454	1387	1337	1286	1233	1186	1139	1103
						RPM	-	-	612	673	715	763	808	852	889	914
						Watts	-	-	235	254	268	283	298	313	324	334
3.5 [12.31]	Tap 2	Tap 1	1225 CFM / 1575 CFM	12x9 Blower 3/4 HP [559] 2 Speed (Constant Torque)	Tap 1 - Low Electric Heat / Fan-Only	CFM	1592	1526	1479	1426	1361	1307	1250	1202	1147	1101
						RPM	514	561	598	640	693	744	798	835	873	911
						Watts	197	212	223	236	253	269	286	297	309	321
					Tap 2 - High *	CFM	-	-	1655	1603	1543	1495	1446	1362	1328	1304
						RPM	-	-	633	675	718	764	805	876	905	926
						Watts	-	-	284	299	315	332	346	372	384	391
4.0 [14.07]	Tap 2	Tap 1	1400 CFM / 1800 CFM	12x9 Blower 3/4 HP [559] 2 Speed (Constant Torque)	Tap 1 - Low Electric Heat / Fan-Only	CFM	1871	1818	1766	1720	1673	1614	1573	1535	1498	1456
						RPM	591	613	657	702	742	787	826	859	896	934
						Watts	309	313	330	348	365	383	400	413	429	445
					Tap 2 - High *	CFM	1871	1818	1766	1720	1673	1614	1573	1535	1498	1456
						RPM	591	613	657	702	742	787	826	859	896	934
						Watts	309	313	330	348	365	383	400	413	429	445
5.0 [17.59]	Tap 2	Tap 1	1750 CFM / 2250 CFM	12x9 Blower 1 HP [746] 2 Speed (Constant Torque)	Tap 1 - Low Electric Heat / Fan-Only	CFM	1704	1574	1467	1422	1371	1326	1265	1225	1181	1136
						RPM	586	589	617	659	710	758	809	847	883	923
						Watts	255	224	221	232	247	260	276	288	300	311
					Tap 2 - High *	CFM	2189	2170	2144	2114	2083	2048	2014	1978	1947	1908
						RPM	722	740	757	779	809	844	874	906	941	977
						Watts	522	532	540	553	569	589	608	626	647	663

Notes: (1) * Use motor tap 2 to achieve rated airflow at AHRI minimum external static pressure.

Down Discharge Pressure Drop (Add to External Static Pressure)							
CFM [L/s]	800 [378]	1000 [472]	1200 [566]	1400 [661]	1600 [755]	1800 [849]	2000 [944]
Pressure Drop - Inches W.C. [kPa]	.02 [.005]	.05 [.012]	.07 [.017]	.1 [.025]	.12 [.030]	.15 [.037]	.17 [.042]

AUXILIARY ELECTRIC HEATER KITS CHARACTERISTICS AND APPLICATION: RHPBYB - SINGLE-PHASE

208/230 VOLT, SINGLE PHASE, 60 Hz, AUXILIARY ELECTRIC HEATER KITS CHARACTERISTICS AND APPLICATION												
Single Power Supply for Both Unit and Heater Kit								Separate Power Supply for Both Unit and Heater Kit				
UNIT MODEL NUMBER	Heater Kit				Air Conditioner			Heater Kit		Air Conditioner		
	RXQJ- Heater Kit Nominal kW	Rated Heater kW @ Rated Voltage	Heater MBH @ Rated Voltage	Heater Amps @ Rated Voltage	Unit Min. Ckt. Ampacity @ Rated Voltage	Overcurrent Protective Device Size		Min. Ckt. Ampacity @ Rated Voltage	Max. Fuse Size @ Rated Voltage	Min. Ckt. Ampacity @ Rated Voltage	Overcurrent Protective Device Size	
						Min./Max. @ Min Voltage	Min./Max. @ Max Voltage				Min./Max. @ Min Voltage	Min./Max. @ Max Voltage
RHPBYB024AJT	NONE*	-/-	-/-	-/-	20/20	25/30	25/30	-	-	20/20	25/30	25/30
	C05J	3.6/4.8	12.28/16.38	17.3/20.0	42/45	45/45	45/50	22/25	25/25	20/20	25/30	25/30
	C07J	5.4/7.2	18.42/24.56	26.0/30.0	53/58	60/60	60/60	33/38	35/40	20/20	25/30	25/30
	C10J	7.2/9.6	24.56/32.75	34.6/40.0	64/70	70/70	70/70	44/50	45/50	20/20	25/30	25/30
RHPBYB030AJT	NONE*	-/-	-/-	-/-	22/22	25/30	25/30	-	-	22/22	25/30	25/30
	C05J	3.6/4.8	12.28/16.38	17.3/20.0	44/47	45/50	50/50	22/25	25/25	22/22	25/30	25/30
	C07J	5.4/7.2	18.42/24.56	26.0/30.0	54/59	60/60	60/60	33/38	35/40	22/22	25/30	25/30
	C10J	7.2/9.6	24.56/32.75	34.6/40.0	65/72	70/70	80/80	44/50	45/50	22/22	25/30	25/30
	C15J	10.8/14.4	36.84/49.13	51.9/60.0	87/97	90/90	100/100	65/75	70/80	22/22	25/30	25/30
RHPBYB036AJT	NONE*	-/-	-/-	-/-	29/29	35/45	35/45	-	-	29/29	35/45	35/45
	C05J	3.6/4.8	12.28/16.38	17.3/20.0	50/54	50/60	60/60	22/25	25/25	29/29	35/45	35/45
	C07J	5.4/7.2	18.42/24.56	26.0/30.0	61/66	70/70	70/70	33/38	35/40	29/29	35/45	35/45
	C10J	7.2/9.6	24.56/32.75	34.6/40.0	72/79	80/80	80/80	44/50	45/50	29/29	35/45	35/45
	C15J	10.8/14.4	36.84/49.13	51.9/60.0	94/104	100/100	110/110	65/75	70/80	29/29	35/45	35/45
RHPBYB042AJT	NONE*	-/-	-/-	-/-	30/30	35/45	35/45	-	-	30/30	35/45	35/45
	C05J	3.6/4.8	12.28/16.38	17.3/20.0	52/55	60/60	60/60	22/25	25/25	30/30	35/45	35/45
	C07J	5.4/7.2	18.42/24.56	26.0/30.0	63/68	70/70	70/70	33/38	35/40	30/30	35/45	35/45
	C10J	7.2/9.6	24.56/32.75	34.6/40.0	74/80	80/80	80/80	44/50	45/50	30/30	35/45	35/45
	C15J	10.8/14.4	36.84/49.13	51.9/60.0	95/105	100/100	110/110	65/75	70/80	30/30	35/45	35/45
	C20J	14.4/19.2	49.13/65.50	69.3/80.0	117/130	125/125	150/150	87/100	90/100	30/30	35/45	35/45
RHPBYB048AJT	NONE*	-/-	-/-	-/-	37/37	45/50	45/50	-	-	37/37	45/50	45/50
	C05J	3.6/4.8	12.28/16.38	17.3/20.0	58/62	60/70	70/70	22/25	25/25	37/37	45/50	45/50
	C07J	5.4/7.2	18.42/24.56	26.0/30.0	69/74	70/80	80/80	33/38	35/40	37/37	45/50	45/50
	C10J	7.2/9.6	24.56/32.75	34.6/40.0	80/87	80/90	90/90	44/50	45/50	37/37	45/50	45/50
	C15J	10.8/14.4	36.84/49.13	51.9/60.0	102/112	110/110	125/125	65/75	70/80	37/37	45/50	45/50
	C20C	25.0/33.2	85.29/113.26	69.3/79.9	123/137	125/125	150/150	87/100	90/100	37/37	45/50	45/50
RHPBYB060AJT	NONE*	-/-	-/-	-/-	40/40	50/60	50/60	-	-	40/40	50/60	50/60
	C05J	3.6/4.8	12.28/16.38	17.3/20.0	62/65	70/80	70/80	22/25	25/25	40/40	50/60	50/60
	C07J	5.4/7.2	18.42/24.56	26.0/30.0	73/78	80/80	80/90	33/38	35/40	40/40	50/60	50/60
	C10J	7.2/9.6	24.56/32.75	34.6/40.0	83/90	90/90	90/100	44/50	45/50	40/40	50/60	50/60
	C15J	10.8/14.4	36.84/49.13	51.9/60.0	105/115	110/110	125/125	65/75	70/80	40/40	50/60	50/60
	C20J	14.4/19.2	49.13/65.50	69.3/80.0	127/140	150/150	150/150	87/100	90/100	40/40	50/60	50/60

AUXILIARY ELECTRIC HEATER KITS CHARACTERISTICS AND APPLICATION: RHPBYB - THREE-PHASE

208/230 VOLT, THREE-PHASE 60 Hz, AUXILIARY ELECTRIC HEATER KITS CHARACTERISTICS AND APPLICATION												
Single Power Supply for Both Unit and Heater Kit								Separate Power Supply for Both Unit and Heater Kit				
UNIT MODEL NUMBER	Heater Kit				Air Conditioner			Heater Kit		Air Conditioner		
	RXQJ- Heater Kit Nominal kW	Rated Heater kW @ Rated Voltage	Heater MBH @ Rated Voltage	Heater Amps @ Rated Voltage	Unit Min. Ckt. Ampacity @ Rated Voltage	Overcurrent Protective Device Size		Min. Ckt. Ampacity @ Rated Voltage	Max. Fuse Size @ Rated Voltage	Min. Ckt. Ampacity @ Rated Voltage	"Overcurrent Protective Device Size"	
						"Min./Max. @ Min Voltage	Min./Max. @ Max Voltage				Min./Max. @ Min Voltage	Min./Max. @ Max Voltage
RHPBYB030ACT	NONE*	-/-	-/-	-/-	18/18	20/25	20/25	-	-	18/18	20/25	20/25
	C10C	12.5/16.6	42.64/56.63	34.6/40.0	61/68	70/70	70/70	44/50	45/50	18/18	20/25	20/25
	C15C	18.7/24.9	63.80/84.95	52.0/60.0	83/93	90/90	100/100	65/75	70/80	18/18	20/25	20/25
RHPBYB036ACT	NONE*	-/-	-/-	-/-	23/23	30/30	30/30	-	-	23/23	30/30	30/30
	C10C	12.5/16.6	42.64/56.63	34.6/40.0	66/73	70/70	80/80	44/50	45/50	23/23	30/30	30/30
	C15C	18.7/24.9	63.80/84.95	52.0/60.0	88/98	90/90	100/100	65/75	70/80	23/23	30/30	30/30
RHPBYB042ACT	NONE*	-/-	-/-	-/-	25/25	30/35	30/35	-	-	25/25	30/35	30/35
	C10C	12.5/16.6	42.64/56.63	34.6/40.0	68/75	70/70	80/80	44/50	45/50	25/25	30/35	30/35
	C15C	18.7/24.9	63.80/84.95	52.0/60.0	90/100	90/90	100/100	65/75	70/80	25/25	30/35	30/35
	C20C	25.0/33.2	85.29/113.26	69.3/79.9	111/125	125/125	125/125	87/100	90/100	25/25	30/35	30/35
RHPBYB048ACT	NONE*	-/-	-/-	-/-	25/25	30/35	30/35	-	-	25/25	30/35	30/35
	C10C	12.5/16.6	42.64/56.63	34.6/40.0	68/75	70/70	80/80	44/50	45/50	25/25	30/35	30/35
	C15C	18.7/24.9	63.80/84.95	52.0/60.0	90/100	90/90	100/100	65/75	70/80	25/25	30/35	30/35
	C20C	25.0/33.2	85.29/113.26	69.3/79.9	111/125	125/125	125/125	87/100	90/100	25/25	30/35	30/35
RHPBYB060ACT	NONE*	-/-	-/-	-/-	30/30	35/45	35/45	-	-	30/30	35/45	35/45
	C10C	12.5/16.6	42.64/56.63	34.6/40.0	74/80	80/80	80/80	44/50	45/50	30/30	35/45	35/45
	C15C	18.7/24.9	63.80/84.95	52.0/60.0	95/105	100/100	110/110	65/75	70/80	30/30	35/45	35/45
	C20C	25.0/33.2	85.29/113.26	69.3/79.9	117/130	125/125	150/150	87/100	90/100	30/30	35/45	35/45

10. WIRING DIAGRAMS

FIGURE 8.

WIRING DIAGRAM - RHPBYB SINGLE-PHASE

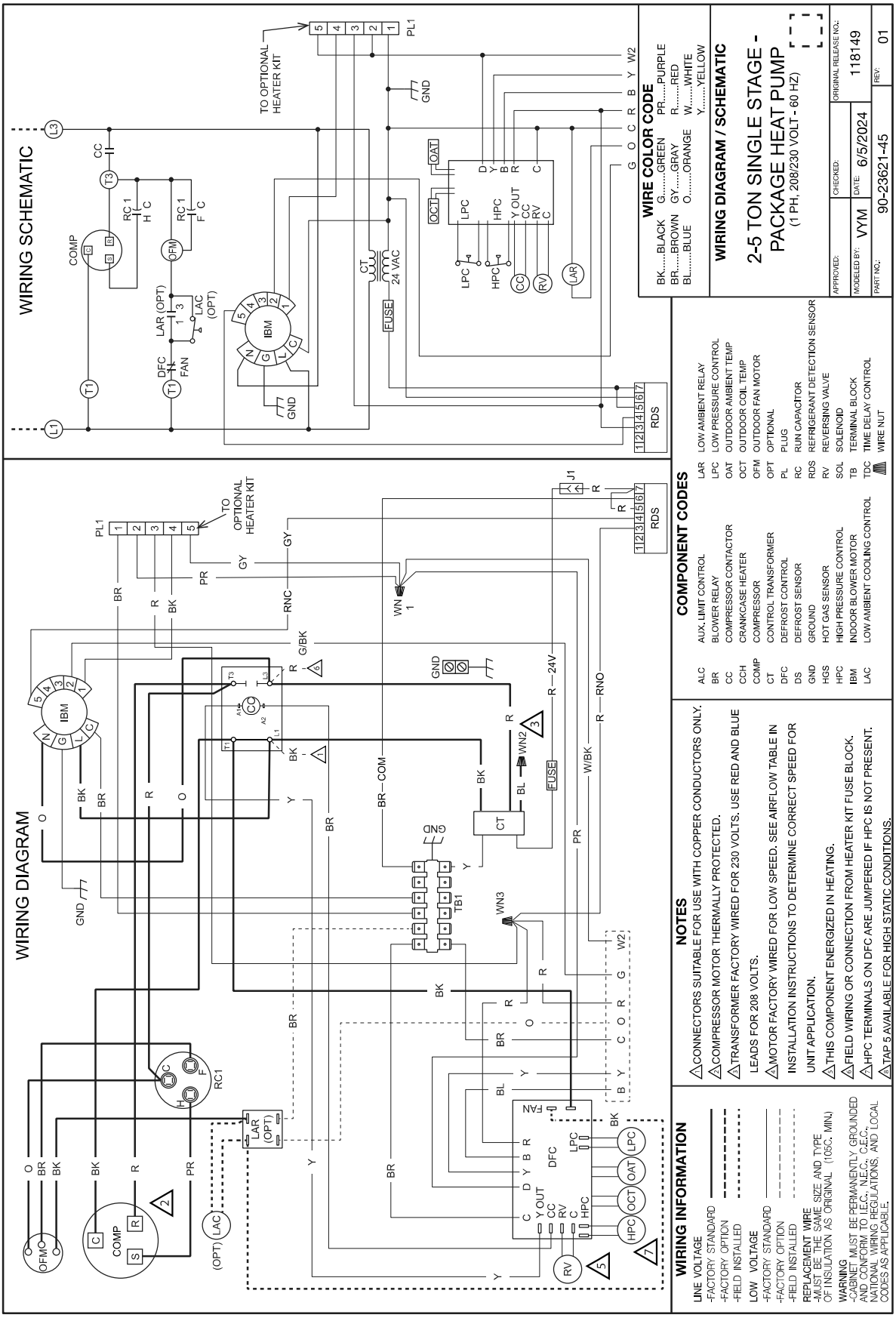
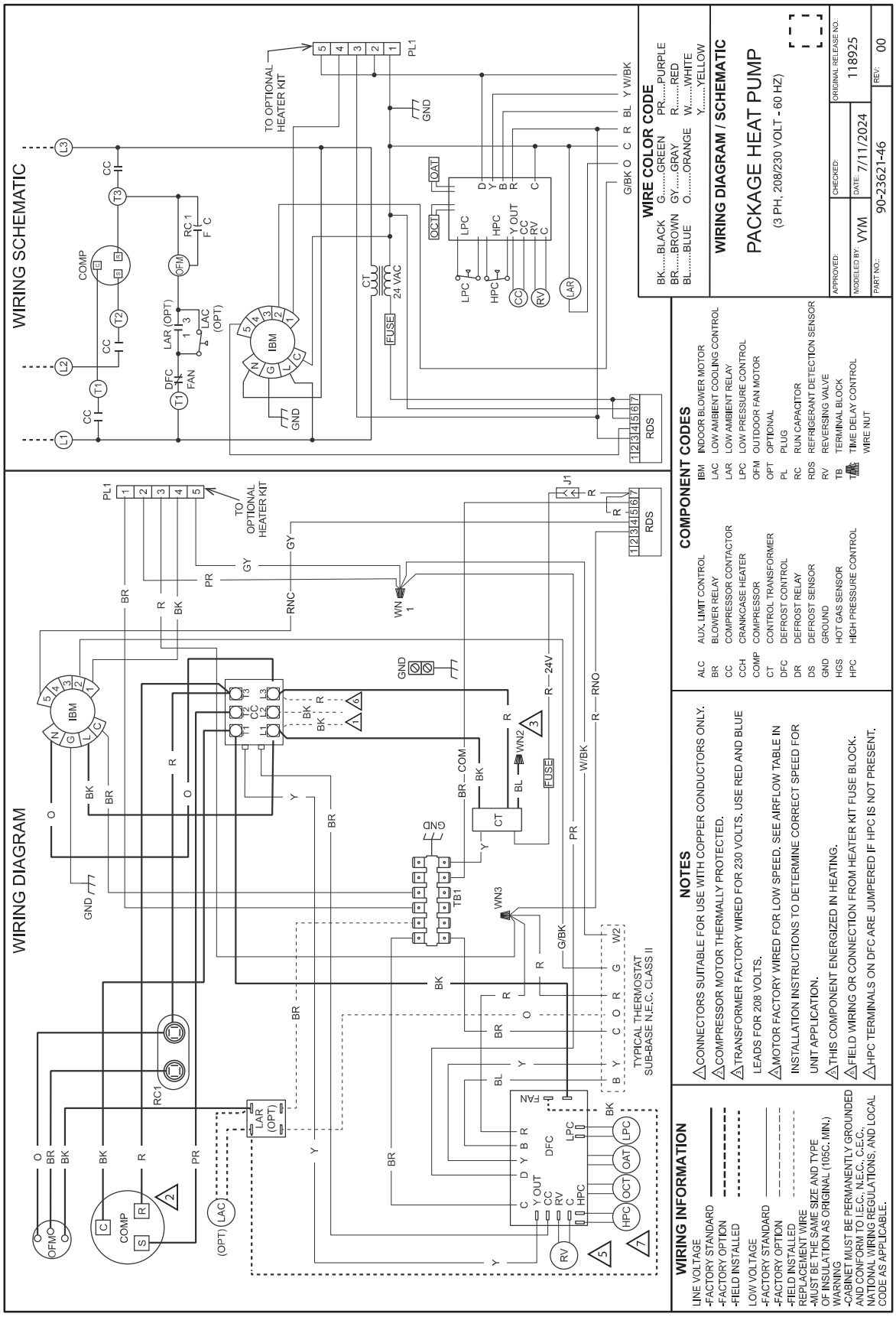


FIGURE 9.
WIRING DIAGRAM - RHPBYB THREE-PHASE



11. TROUBLESHOOTING 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
	• Defective 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	• Run or start capacitor defective (single phase only)	• Replace
	• Start relay defective (single phase only)	• Replace
	• 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
High head-high or normal vapor pressure - Heating mode	• Low air flow - condenser coil	• Check filters - correct to speed
	• Refrigerant overcharge	• Correct system charge
	• Air or non-condensibles in system	• Recover refrigerant, evacuate & recharge
	• Dirty condenser coil	• Check filter - clean coil
Low head-high vapor pressures	• Flow check piston size too large	• Change to correct size piston
	• 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
	• TXV limiting refrigerant flow	• Replace TXV
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-condensate 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