

INSTALLATION INSTRUCTIONS FOR HEAT PUMP INDOOR UNITS

(-)HCYP SERIES 7.5 & 10 TONS
WITH R-454B REFRIGERANT



UL listing and CSA certification on some models is in process.

Contact your distributor for available models.



Recognize this symbol as an indication of Important Safety Information!

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

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.

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1.0 IMPORTANT SAFETY INFORMATION

⚠WARNINGS:

- 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.
- The unit must be permanently grounded. Failure to do so can cause electrical shock resulting in severe personal injury or death.
- Turn off electric power at the fuse box or service panel before making any electrical connections.
- Complete the ground connection before making line voltage connections. Failure to do so can result in electrical shock, severe personal injury, or death.
- Disconnect all power to unit before starting maintenance. Failure to do so can cause electrical shock resulting in severe personal injury or death.
- Never assume the unit is properly wired and/or grounded. Always test the unit cabinet with a non-contact voltage detector available at most electrical supply houses or home centers before removing access panels or coming into contact with the unit cabinet.
- Do not use oxygen to purge lines or pressurize system for leak test. Oxygen reacts violently with oil, which can cause an explosion resulting in severe personal injury or death.
- Because of possible damage to equipment or personal injury, installation, service, and maintenance should be performed by a trained, qualified, service personnel. Never operate the unit with the access panels removed.
- The manufacturer's warranty does not cover any damage or defect to the unit 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 heat pump. You should be aware that the use of unauthorized components, accessories, or devices may adversely affect the operation of the heat pump 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.
- If removal of the blower assembly is required, all disconnect switches supplying power to the equipment must be de-energized and locked (if not in sight of the unit) so the field power wires can be safely removed from the blower assembly. Failure to do so can cause electrical shock resulting in personal injury or death.
- Duct leaks can create an unbalanced system and draw pollutants such as dirt, dust, fumes and odors into the building causing property damage. Fumes and odors from toxic, volatile or flammable chemicals, as well as automobile exhaust and carbon monoxide (CO), can be drawn into the occupied space through leaking ducts and unbalanced duct systems causing personal injury or death.
- If air-moving equipment or ductwork is located in garages or off-garage storage areas - all joints, seams, and openings in the equipment and duct must be sealed to limit the migration of toxic fumes and odors including carbon monoxide from migrating into the living space.
- If air-moving equipment or ductwork is located in spaces containing fuel burning appliances such as water heaters or boilers - all joints, seams, and openings in the equipment and duct must also be sealed to prevent depressurization of the space and possible migration of combustion byproducts including carbon monoxide into the occupied space.
- 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 or property damage.
- Do not operate the system without filters. A portion of the dust entrained in the air may temporarily lodge in the duct runs and at the supply registers. Any circulated dust particles could be heated and charred by contact with the heating elements. This residue could soil ceilings, walls, drapes, carpets and other articles in the building.
- The first 36 inches of supply air plenum and ductwork must be constructed of sheet metal with no openings, registers or flexible air ducts located in it as required by NFPA 90B if an electric heater accessory is installed. If flexible supply air ducts are used they may be located only in the vertical walls of a rectangular plenum, a minimum of 6 inches from the solid bottom.

1.0 IMPORTANT SAFETY INFORMATION

⚠CAUTIONS:

- Only match this outdoor unit with a matched indoor coil or air handler approved for use with this outdoor unit per the unit manufacturer's specification sheet. The use of unmatched coils or air handler will likely result in a charge imbalance between the cooling and heating modes which can cause unsatisfactory operation including a high-pressure switch lockout condition.
- When coil is installed over a finished ceiling and/or living area, it is required that a secondary sheet metal condensate pan be constructed and installed under the entire unit. Failure to do so can result in property damage.
- In compliance with recognized codes, an auxiliary drain pan must be installed under all equipment containing evaporator coils that are located in any area of a structure where damage to the building or building contents may occur as a result of an overflow of the coil drain pan or a stoppage in the primary condensate drain piping.

⚠NOTICE:

- When used in cooling applications, excessive sweating may occur when unit is installed in an unconditioned space. This can result in property damage.
- Improper installation, or installation not made in accordance with the Underwriters Laboratory (UL) certification or these instructions, can result in unsatisfactory operation and/or dangerous conditions and are not covered by the unit warranty.

Use of this air-handler during construction is not recommended. If operation during construction is absolutely required, the following temporary installation requirements must be followed:

Installation must comply with all Installation Instructions in this manual including the following items:

- Properly sized power supply and circuit breaker/fuse
- Air-handler operating under thermostatic control;
- Return air duct sealed to the air-handler;
- Air filters must be in place;
- Correct air-flow setting for application
- Clean air-handler, duct work, and components including coil upon completion of the construction process and verify proper air-handler operating conditions according as stated in this instruction manual.
- NOTE: Electric strip heater elements tend to emit a burning odor for a few days if dust has accumulated during construction. Heater elements are easily damaged. Take great care when cleaning them. Low pressure compressed air is recommended for cleaning elements.

⚠REFRIGERANT WARNINGS:

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 due to Flammable Refrigerant Used. Follow Handling Instructions Carefully in Compliance with National Regulations.

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

WARNING: The appliance shall be stored in a room without continuously operating ignition sourced (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 **3.2: A2L Refrigerant Installation Safety Data**.

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

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

WARNING: Appliance shall be installed, operated and stores in a room with a floor area larger than 'X'm2. See **3.2: A2L Refrigerant Installation Safety Data**.

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

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.

2.0 GENERAL INFORMATION

⚠ WARNING:

Improper installation, or installation not made in accordance with these instructions, can result in unsatisfactory operation and/or dangerous conditions and can cause the related warranty not to apply.

2.1 Introduction

The information contained in this manual has been prepared to assist in the proper installation, operation, and maintenance of the air conditioning system by a qualified installer.

Read this manual and any instructions packaged with separate equipment required to make up the system prior to installation. Owner should retain this manual for future reference.

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

2.2 Importance of Quality Installation

The equipment must be stored in a way that prevents mechanical damage from occurring.

A quality installation is critical to assure safety, reliability, comfort, and customer satisfaction. Strict adherence to applicable codes, the information in this installation manual, the outdoor unit installation manual, and the thermostat installation manual are key to a quality installation. Read the entire instruction manuals before starting the installation.

IMPORTANT: This product has been designed and manufactured to meet certified AHRI capacity and efficiency ratings with the appropriate outdoor units. However, proper refrigerant charge, proper airflow, and refrigerant line sizing are critical to achieve optimum capacity and efficiency and to assure reliable operation. Installation of this product should follow the manufacturer's refrigerant charging and airflow instructions located in this installation manual and the charging chart label affixed to the outdoor unit. Failure to confirm proper charge and airflow may reduce energy efficiency and shorten equipment life.

The equipment has been evaluated in accordance with the Code of Federal Regulations, Appendix A to Subpart F of Part 431, Title 10.

Install the unit in accordance with applicable national, state, and local codes. Latest editions are available from: "National Fire Protection Association, Inc., Batterymarch Park, Quincy, MA

02269." These publications are:

- ANSI/NFPA No. 70-(Latest Edition) National Electrical Code.
- NFPA90A Installation of Air Conditioning and Ventilating Systems.
- NFPA90B Installation of warm air heating and air conditioning systems.
 - UL 60335-2-40 4th Edition
 - CSA C22.2 No. 60335-2-40 4th Edition

Manufacturer Qualifications: ISO 9001: 2015

Install the indoor unit in such a way as to allow necessary access to the coil/filter rack and blower/control compartment.

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.

2.3 System Sizing and Selection

Before specifying any air-conditioning equipment, a survey of the structure and heat gain calculation must be made. A heat gain calculation involves identifying all surfaces and openings that gain heat from the surrounding air and quantifying that heat to determine the amount of heat that needs to be removed. A heat gain calculation also calculates the extra heat load caused by sunlight and for humidity removal. These factors must be considered before selecting an air-conditioning system to provide year-round comfort. The Air Conditioning Contractors of America (ACCA) Manual N method of load calculation is one recognized procedure for determining the cooling load for commercial buildings.

After the proper equipment combination has been selected, satisfying both sensible and latent requirements, the system must be properly installed. Only then can the system provide the comfort it was designed to provide.

There are several factors that installers must consider.

- Outdoor unit location
- Indoor unit blower speed and airflow
- Proper equipment evacuation
- Supply and return air duct design and sizing
- Refrigerant charge
- System air balancing
- Diffuser and return air grille location and sizing

2.0 GENERAL INFORMATION

IMPORTANT: Excessive use of elbows in the refrigerant line set can produce excessive pressure drop. Follow industry best practices for installation. Installation and commissioning of this equipment is to be performed by trained and qualified HVAC professionals. For technical assistance, contact your Distributor Service Coordinator.

2.4 Importance of Proper Indoor/Outdoor Match-Ups

To assure many years of reliable operation and optimum customer comfort and to assure the outdoor unit warranty remains valid, an air-handler model or indoor coil should be selected that is properly matched to the outdoor unit. The recommended approach is to select an air-handler or indoor coil that has an AHRI match with the outdoor unit. Refer to the AHRI directory at www.ahridirectory.org to confirm the air-handler and outdoor unit are a certified combination in the AHRI Directory.

2.5 Checking Product Received

Upon receiving unit, inspect it for any shipping damage. Claims for damage, either apparent or concealed, should be filed immediately with the shipping company. Check model number, electrical characteristics, and accessories to determine if they are correct. Check system components (outdoor unit, air handler, etc.) to make sure they are properly matched.

2.6 Efficiency Testing Notice

For purposes of verifying or testing efficiency ratings, the test procedure in Title 10, Chapter II, Subchapter D, Part 431, Subpart F, Section 96 and the clarifying provisions provided in the AHRI Operations Manual 340/360 that were applicable at the date of manufacture should be used for test set up and performance.

2.7 Compressor Break-In Notice

Prior to agency testing, unit must be charged at 95°F [35°C] dry bulb outdoor and 80°F [26.7°C] dry bulb/67°F [19.4°C] wet bulb Indoor then unit must be run for 16 hours at 115°F [46.1°C] outdoor ambient temperature with 80°F [26.7°C] dry bulb/75°F [23.9°C] wet bulb indoor ambient temperature to break the compressor in. After the 16 hours break-in bring the rooms down to 95°F [35°C] dry bulb outdoor 80°F [26.7°C] dry bulb/67°F [19.4°C] wet bulb Indoor and preform the final charge based on sub-cooling listed on the charging chart.

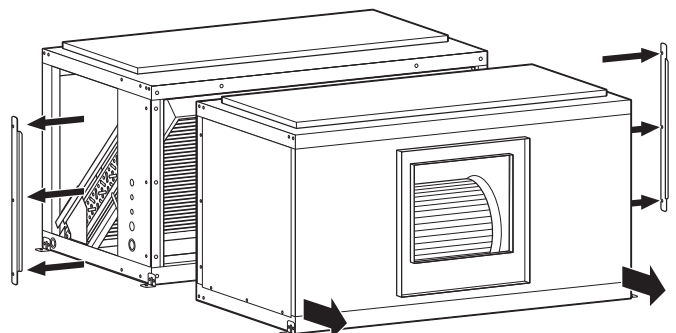
2.8 Optional Separability

For ease of installation into the indoor space, the air handler unit is separable. If required to move into the space, follow the steps below to separate and reconnect the two halves of the air handler.

NOTE: Separation and reconnection should be completed on a flat, stable surface. Do not attempt while unit is suspended from the ceiling.

1. Unscrew and remove the two metal brackets on each side of the air handler.
2. Remove access panels.
3. Remove the 3/8 inch bolts from the frame. The unit can now be pulled apart.
4. Move the air handler into place.
5. If gasketing is damaged, use included replacement gasketing to repair the unit.
6. Align the two sides. Reattach the metal brackets and access panels - these brackets should help align the connecting holes - then insert and fasten the 3/8 inch bolts. The unit can now be reconnected and installation and set-up can commence.

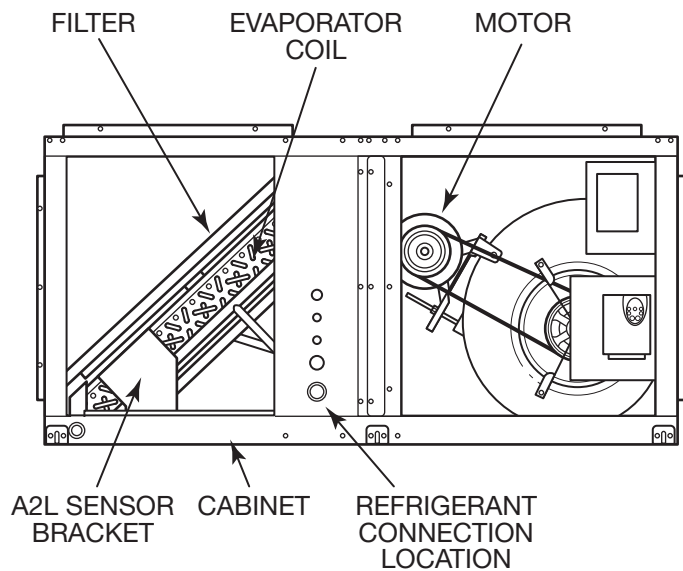
FIGURE 1
SEPARABLE AIR HANDLER



2.0 GENERAL INFORMATION

2.9 Major Components

FIGURE 2



**UNIT SHOWN WITH SIDE PANELS REMOVED FOR
COIL CONNECTIONS AND AIR FILTER ACCESS.**

3.0 UNIT SPECIFICATIONS

3.1 Electrical and Physical Data

Model (-)HCYP2 Series	090C	090D	090Y
Indoor Coil - Fin Type	Louvered	Louvered	Louvered
Tube Type	Rifled	Rifled	Rifled
Tube Size in. [mm]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]
Face Area sq. ft. [sq. m]	10.2 [0.95]	10.2 [0.95]	10.2 [0.95]
Rows / FPI [FPcm]	4 /15 [10 / 38]	4 /15 [10 / 38]	4 /15 [10 / 38]
Refrigerant Control	TX Valves	TX Valves	TX Valves
Indoor Fan - Type	FC Centrifugal	FC Centrifugal	FC Centrifugal
Diameter in. [mm]	12x12 [305x305]	12x12 [305x305]	12x12 [305x305]
Drive Type	Belt (Adjustable)	Belt (Adjustable)	Belt (Adjustable)
No. Speeds (Standard / VFD)	Single / Multiple	Single / Multiple	Single / Multiple
No. Motors	1	1	1
Motor HP			
R - Low Static Drive	2	2	2
S - Medium Static Drive	2	2	2
T - High Static Drive	3	3	3
Motor RPM	1725	1725	1725
Weights			
Net Weight lbs. [kg]			
R - Low Static Drive	409 [186]	409 [186]	409 [186]
S - Medium Static Drive	409 [186]	409 [186]	409 [186]
T - High Static Drive	419 [190]	419 [190]	419 [190]
Ship Weight lbs. [kg]			
R - Low Static Drive	429 [195]	429 [195]	429 [195]
S - Medium Static Drive	429 [195]	429 [195]	429 [195]
T - High Static Drive	439 [199]	439 [199]	439 [199]

3.0 UNIT SPECIFICATIONS

3.1 Electrical and Physical Data

Model (-)HCYP2 Series	120C	120D	120Y
Indoor Coil - Fin Type	Louvered	Louvered	Louvered
Tube Type	Rifled	Rifled	Rifled
Tube Size in. [mm]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]
Face Area sq. ft. [sq. m]	16.5 [1.5]	16.5 [1.5]	16.5 [1.5]
Rows / FPI [FPcm]	3 / 18 [8 / 46]	3 / 18 [8 / 46]	3 / 18 [8 / 46]
Refrigerant Control	TX Valves	TX Valves	TX Valves
Indoor Fan - Type	FC Centrifugal	FC Centrifugal	FC Centrifugal
Diameter in. [mm]	18x15 [457x381]	18x15 [457x381]	18x15 [457x381]
Drive Type	Belt (Adjustable)	Belt (Adjustable)	Belt (Adjustable)
No. Speeds (Standard / VFD)	Single / Multiple	Single / Multiple	Single / Multiple
No. Motors	1	1	1
Motor HP			
R - Low Static Drive	2	2	2
S - Medium Static Drive	2	2	2
T - High Static Drive	3	3	3
Motor RPM	1725	1725	1725
Weights			
Net Weight lbs. [kg]			
R - Low Static Drive	575 [261]	575 [261]	575 [261]
S - Medium Static Drive	585 [265]	585 [265]	585 [265]
T - High Static Drive	595 [270]	595 [270]	595 [270]
Ship Weight lbs. [kg]			
R - Low Static Drive	595 [270]	595 [270]	595 [270]
S - Medium Static Drive	605 [274]	605 [274]	605 [274]
T - High Static Drive	615 [279]	615 [279]	615 [279]

3.0 UNIT SPECIFICATIONS

3.1 Electrical and Physical Data

- A. Cooling Performance is rated at 95°F ambient, 80°F entering dry bulb, 67°F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to 20% of nominal CFM. Units are certified in accordance with the Unitary Air Conditioner Equipment certification program, which is based on AHRI Standard 210/240 or 360.
- B. EER and Integrated Efficiency Ratio (IEER) are rated at AHRI standards 340/360 and in accordance with DOE test procedures.
- C. Outdoor Sound Rating shown is tested in accordance with AHRI Standard 270.

Model Number	CONNECTIONS				UNIT					
	Liquid		Vapor		W (Width)		H (Height)		L (Length)	
	Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm
(-)HCYP2090	1/2	[12.70]	1 1/8	[28.58]	52	1320.8	27	685.8	52	1320.8
(-)HCYP2120	5/8	[15.88]	1 3/8	[34.93]	59.5	1511.3	34.25	869.95	72	1828.8

3.0 UNIT SPECIFICATIONS

3.1 Electrical and Physical Data (cont.)

ELECTRICAL DATA – (-)HCYP2 SERIES							
		090C	090D	090Y	120C	120D	120Y
Unit Information	Unit Operating Voltage Range	187-253	414-506	541-610	187-253	414-506	541-610
	Volts	208/230	460	575	208/230	460	575
	Minimum Circuit Ampacity						
	R - Low Static Drive	8	4	3	8	4	3
	S - Medium Static Drive	8	4	3	8	4	3
	T - High Static Drive	12	6	5	12	6	5
	Maximum Overcurrent Protection Device Size						
	R - Low Static Drive	15/15	15/15	15/15	15/15	15/15	15/15
	S - Medium Static Drive	15/15	15/15	15/15	15/15	15/15	15/15
	T - High Static Drive	15/20	15/15	15/15	15/15	15/15	15/15
Motor Information	No.	1	1	1	1	1	1
	Volts	208/230	460	575	208/230	460	575
	Phase	3	3	3	3	3	3
	Rating Plate Amps						
	R - Low Static Drive	6.2	3	2.4	6.2	3	2.4
	S - Medium Static Drive	6.2	3	2.4	6.2	3	2.4
	T - High Static Drive	9.2	4.6	3.5	9.2	4.6	3.5
	LRA (Amps)						
	R - Low Static Drive	47	24	22.72	47	24	22.72
	S - Medium Static Drive	47	24	22.72	47	24	22.72
	T - High Static Drive	74.5	38.1	30	74.5	38.1	30

3.0 UNIT SPECIFICATIONS

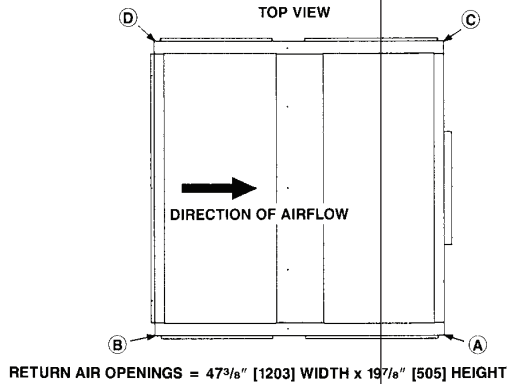
3.1 Electrical and Physical Data (cont.)

Models Number (-)HCYP2	Heater Kit Model	Rated Heater KW @208/230	Heat Kit Amps (FLA) Only	Heater Kit	
	RXHE-			HEATER KIT MIN. CKT. AMPACITY	HEATER KIT MAX FUSE OR CKT. BKR. SIZE
090CAR 090CAS	DE020CA	15.6/20.2	43.1/48.9	67/73	70/80
090CAT	DE030CA	22.0/29.6	60.8/70.2	89/100	90/100

Models Number (-)HCYP2	Heater Kit Model	Rated Heater KW @480	Heat Kit Amps (FLA) Only	Heater Kit	
	RXHE-			HEATER KIT MIN. CKT. AMPACITY	HEATER KIT MAX FUSE OR CKT. BKR. SIZE
090DAR 090DAS	DE020DA	24.7	20.2	37	40
090DAT	DE030DA	35	29.7	50	50

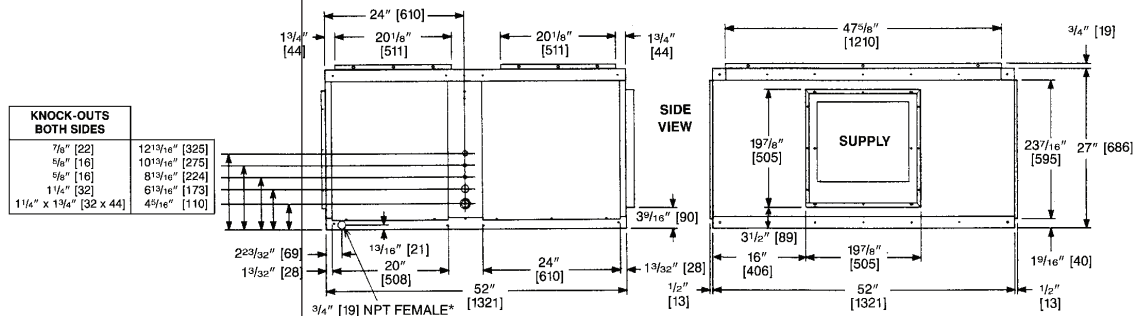
3.0 UNIT SPECIFICATIONS

3.1 Electrical and Physical Data (cont.)



MODEL	REFRIGERANT STUB SIZES, IN. [mm]			
	DUAL LIQ.	DUAL SUC.	SINGLE LIQ.	SINGLE SUC.
090	1/2, 1/2 [13, 13]	7/8, 7/8 [22, 22]	1/2 [13]	1 1/8 [29]
120	1/2, 1/2 [13, 13]	7/8, 7/8 [22, 22]	5/8 [16]	1 3/8 [35]

MODEL	CORNER WEIGHTS LBS. [kg]				TOTAL WEIGHT	GROSS WEIGHT
	A	B	C	D		
090	75.75 [34.36]	133.31 [60.47]	106.04 [48.10]	93.92 [42.60]	409 [185.52]	429 [194.59]
120	139.42 [63.24]	184.62 [83.74]	79.81 [36.20]	171.15 [77.63]	575 [260.82]	585 [265.35]



*Drain connections are provided on both sides of the drain pan. The drain can be connected to either side of the drain pan, but not both. The drain must be trapped.

3.0 UNIT SPECIFICATIONS

3.2 A2L Refrigerant Installation Safety Data

Qmin at Rating Plate Charge Weight [0' - 200' 1/2" Line Set]						
(-)HCYP2	090 [0']	090 [50']	090 [100']	090 [150']	090 [200']	
Refrigerant Chart Weight (oz)	328.5	378.5	428.5	478.5	528.5	
Minimum Total Room Area, TAmin (ft2)	308.0	355.0	402.0	448.0	495.0	
Minimum circulation airflow, Qmin (cfm)	556	640	725	809	894	
Installed Altitude (ft above sea level)	Altitude Adjustment Factor	Minimum Total Conditioned Room Area, TAmin (sq ft)				
0	1.000	308	355	402	448	495
1000	1.025	325	373	421	469	517
2000	1.051	333	382	431	481	530
3000	1.078	342	392	443	493	544
4000	1.107	351	403	454	506	558
5000	1.138	360	414	467	520	574
6000	1.170	371	425	480	535	590
6500	1.187	376	432	487	543	598

Qmin at Rating Plate Charge Weight [0' - 200' 5/8" Line Set]						
(-)HCYP2	120 [0']	120 [50']	120 [100']	120 [150']	120 [200']	
Refrigerant Chart Weight (oz)	460.0	535.0	610.0	685.0	760.0	
Minimum Total Room Area, TAmin (ft2)	431.0	478.0	525.0	572.0	619.0	
Minimum circulation airflow, Qmin (cfm)	778	862	947	1032	1116	
Installed Altitude (ft above sea level)	Altitude Adjustment Factor	Minimum Total Conditioned Room Area, TAmin (sq ft)				
0	1.000	431	501	572	642	712
1000	1.025	325	373	421	469	517
2000	1.051	333	382	431	481	530
3000	1.078	342	392	443	493	544
4000	1.107	351	403	454	506	558
5000	1.138	360	414	467	520	574
6000	1.170	371	425	480	535	590
6500	1.187	376	432	487	543	598

4.0 INSTALLATION

4.1 Tools and Refrigerant

4.1.1 Tools Required for Installing and Servicing R-454B Models

Manifold Sets:

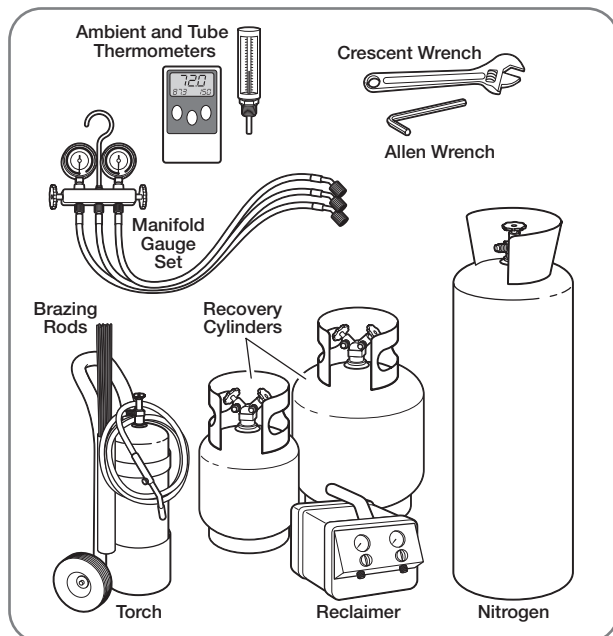
- Up to 800 PSIG High-Side
- Up to 250 PSIG Low-Side
- 550 PSIG Low-Side Retard

Manifold Hoses:

- Service Pressure Rating of 800 PSIG

Recovery Cylinders:

- 400 PSIG Pressure Rating



⚠CAUTION: Any and all equipment must be compatible with refrigerant R-454B.

⚠DANGER: Risk Of Fire Or Explosion. Flammable Refrigerant Used. Consult Repair Manual/Owner's Guide Before Attempting To Service This Product. All Safety Precautions Must Be Followed.

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

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

4.1.2 Working Personnel

DANGER: Risk of Fire or Explosion. Flammable Refrigerant Used. To Be Repaired Only By Trained Service Personnel. Do Not Puncture Refrigerant Tubing.

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

Examples of working procedures include but are not limited to:

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

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

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

4.1.3 Specifications of R-454B

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

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

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

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

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

4.0 INSTALLATION

4.1.4 Quick-Reference Guide for R-454B

- Ensure that service equipment is designed to operate with R-454B.
- Refrigerant R-454B operates at pressures similar to R-410A. However, it is classified in safety group A2L. Ensure that servicing equipment is compatible with R-454B.
- Refrigerant cylinders are no longer color-coded. R-454B refrigerant cylinders are light green grey in color with a red band on the shoulder or top of the cylinder to indicate flammability.
- R-454B is only compatible with POE oils.
- Vacuum pumps will not remove moisture from POE oil used in R-454B systems.
- R-454B systems are to be charged with liquid refrigerants.
- Do not install a suction line filter drier in the liquid line.
- A factory-approved biflow liquid line filter drier is shipped with every unit and must be installed in the liquid line at the time of installation. Only manufacturer-approved liquid line filter driers can be used. These filter driers are rated for a minimum working pressure of 600 PSIG. The filter drier will only have adequate moisture-holding capacity if the system is properly evacuated.
- Desiccant (drying agent) must be compatible for POE oils and R-454B refrigerant

4.1.5 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 **3.2 A2L Refrigerant Installation Safety Data**.

4.1.6 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.

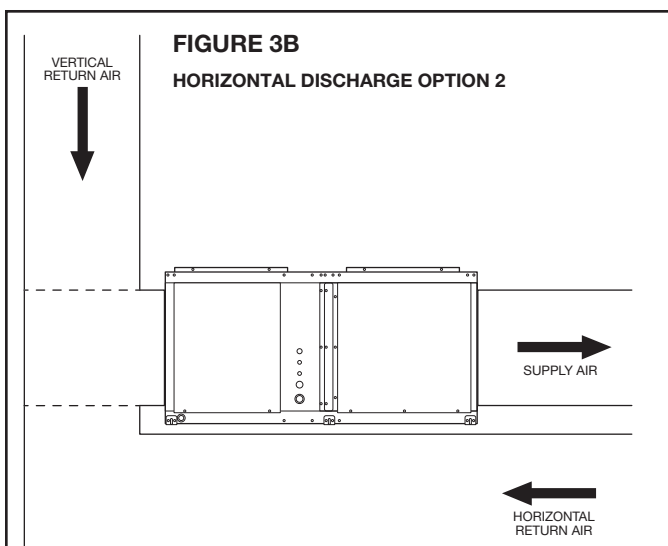
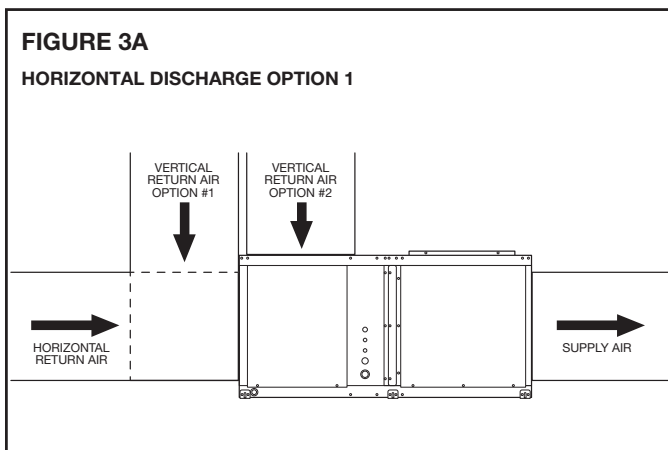
All possible ignition sources, including cigarette smoking, should be kept far away from the site during installation, repair, removal, or disposal, during which refrigerant can possibly be released into the surrounding space. Before work takes place, the area around the equipment must be surveyed to ensure that there are no flammable hazards or ignition risks. Additionally, “No Smoking” signs must be displayed.

4.0 INSTALLATION

4.2 Appliances & Orientation

IMPORTANT: The air-handler is suitable for indoor applications only.

The split air handling units can be installed in various horizontal positions. The **Figures 3A and 3B** shows the recommended suspension rigging using properly sized all-thread and metal c-channel. All components required to suspend the air handler must be field-supplied. Refer to the unit's total weight, center of gravity, and corner weight before beginning suspension rigging.

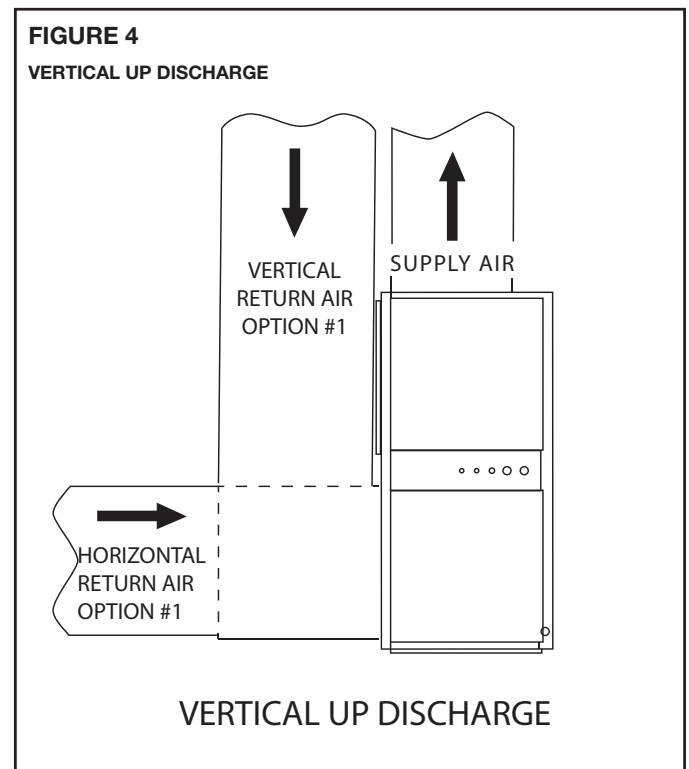


4.2.1 Horizontal Discharge

The air-handler may be installed in the horizontal discharge configuration with either a vertical or horizontal return duct as shown in **Figure 3**. For a vertical return duct, relocate the return air panel on top of the air-handler to cover the side return air opening.

4.2.2 Vertical Up Discharge

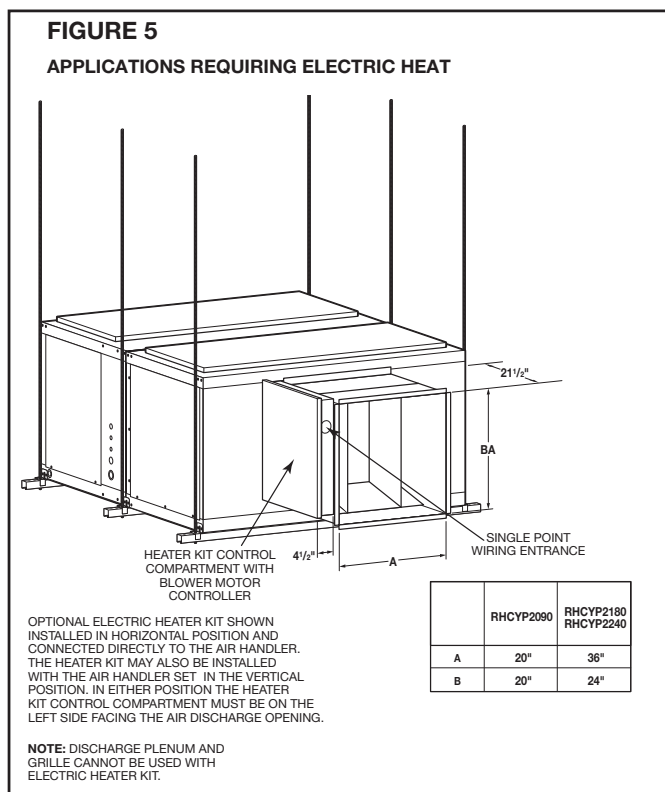
The air-handler may be installed in the vertical discharge configuration with a horizontal return duct as shown in **Figure 4**. Relocate the return air panel to cover the other return air opening to allow for the horizontal return duct.



4.0 INSTALLATION

4.2.3 Applications Requiring Electric Heat

For applications that require resistance electric heat, field installed heater kits are available that attaches to the discharge side of the air-handler. **See Figure 5.** The heater kit is compatible for both horizontal and vertical discharge applications. The supply duct must be attached to the discharge end of the heater kit. The blower motor contactor and supply wiring is provided with the heater kit. See the unit's specification sheets for information concerning the available heater kits.



4.2.4 Suspending Unit

Six heavy gauge brackets are mounted to the air handler and the pallet for shipping the air-handler. These brackets can be reused for supporting the unit on the appropriately-sized C-channel (with an aluminum host member of $\frac{1}{8}$ " is the min. recommendation for this application). $\frac{3}{8}$ " GR. 5 minimum support rods are recommended. When using "All Thread" rods, two nuts and two lock washers must be tightened securely against the suspension angles.

Fasteners shall be of a corrosion-resistant material or have a corrosion-resistant coating and/or plating, and shall comply with any applicable federal, state, and/or local codes.

Fasteners as designed herein shall be positioned with a minimum edge distance of 3x the fastener $\varnothing$ to any edges of the member(s) in contact and with a minimum spacing of 3x the fastener $\varnothing$ from adjacent fasteners.

4.2.5 Installation in an Unconditioned Space

The exterior cabinet of an air handler has a greater risk of sweating when installed in an unconditioned space than when it is installed in the conditioned space. This is primarily due to the temperature of the conditioned air moving through the air handler and the air circulating around the unit where it is installed. For this reason, the following is recommended for all air handler applications, but special attention should be paid to those installed in unconditioned spaces:

- Duct sizing and airflow are critical and must be based on the equipment selected.
- Supply and return duct attachment: If other than the factory flanges are used, the attachment of ducting must be insulated and tight to prevent sweating.
- Apply caulking around all cabinet penetrations such as power wires, control wires, refrigerant tubing and condensate line where they enter the cabinet. Seal the power wires on the inside where they exit conduit opening. Sealing is required to prevent air leakage into the unit which can result in condensate forming inside the unit, control box, and on electrical controls. Take care not to damage, remove or compress insulation when applying the caulk.
- In some cases, the entire air handler can be wrapped with insulation. This can be done as long as the unit is completely enclosed in insulation, sealed and service access is provided to prevent accumulation of moisture inside the insulation wrap.
- An auxiliary overflow pan is recommended to protect the structure from excessive cabinet sweating or a restricted coil drain line (**See Section 4.3**).

4.2.6 Installation in Unventilated Areas

If the unit is installed in an unventilated area, the area or space must not allow refrigerant to stagnate, creating a fire or explosion hazard in case of a leak.

4.2.7 Installation in Corrosive Environments

The metal parts of this unit may be subject to rust or deterioration if exposed to a corrosive environment which can shorten its life. In addition to exposure to the exterior of the cabinet, chemical contaminants inside the building that can be drawn into the unit from the return air grille and attack structural metal parts, electrical components and the indoor coil, causing premature failure of the unit. If the unit is to be installed in an area where contaminants are likely to be a problem, special attention should be given to isolate the unit and return grille from contaminants.

4.0 INSTALLATION

4.3 Auxiliary Overflow Pan

In compliance with recognized codes, an auxiliary overflow pan must be installed under all equipment containing evaporator coils that are located in any area of a structure where damage to the building or building contents may occur as a result of an overflow of the coil drain pan or a blockage in the primary condensate drain piping.

4.4 Clearances

A minimum of 24" is required on both sides of the air-handler for servicing the unit.

4.5 Ductwork

Field ductwork must comply with the National Fire Protection Association NFPA 90A, NFPA 90B and any applicable local ordinance.

⚠ 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, or property damage.

Sheet metal ductwork run in unconditioned spaces must be insulated and covered with a vapor barrier. Fibrous ductwork may be used if constructed and installed in accordance with SMACNA Construction Standard on Fibrous Glass Ducts. Ductwork must comply with National Fire Protection Association as tested by U/L Standard 181 for Class I Air Ducts. Check local codes for requirements on ductwork and insulation.

- Duct system must be designed within the range of external static pressure the unit is designed to operate against. It is important that the system airflow be adequate. Make sure supply and return ductwork, grills, filters, accessories, etc. are accounted for in total resistance. Refer to the airflow performance tables in this manual to determine the available external static pressure for the particular air-handler model being installed.
- Design the duct system in accordance with "ACCA" Manual "Q" – Low Pressure, Low Velocity Duct System Design. Latest editions are available from: "ACCA" Air Conditioning Contractors of America, 1513 16th Street, N.W., Washington, D.C. 20036. If duct system incorporates flexible air duct, be sure pressure drop information (straight length plus all turns) shown in "ACCA" Manual "D" is accounted for in system.
- Supply plenum is attached to the duct flanges supplied with the unit.
- **IMPORTANT:** If an elbow is included in the plenum close to the unit, it must not be smaller than the

dimensions of the supply duct flange on the unit.

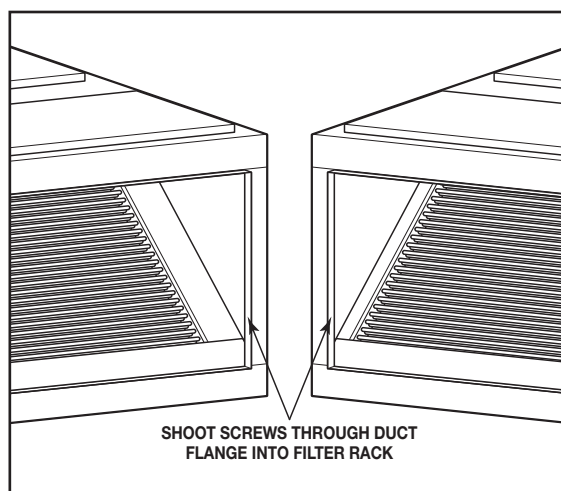
- **IMPORTANT:** If connected to the blower casing, the front flange on the return duct must not be screwed into the area where the power wiring is located.
- Secure the supply and return ductwork to the unit flanges, using proper fasteners for the type of duct used and tape or caulk the duct-to-unit joint as required to prevent air leaks.

WARNING: If appliances connected via an air duct system to one or more rooms with A2L refrigerants are installed in a room with an area less than A_{min} , or installed in a room with an effective dispersal volume less than the minimum, that room shall be without continuously operating open flames (for example an operating gas appliance) or other potential ignition sources (for example an operating electric heater or hot surfaces).

WARNING: If this unit is connected via an air duct system to one or more rooms with an area less than A_{min} , that room shall be without continuously operating flames or other potential ignition sources.

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

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



4.6 Return Air Filters

An internal filter rack is provided that can be accessed by removing one or both of the side service access panels (**See Section 2.9**). Remove the hitch pins to remove the filter retainer angles. 1" thick throw-away fiberglass filters are provided from the factory, but the filter rack can accept up to 2" thick filters.

Reduced air-flow can reduce system performance and shorten the life of the system components such as the compressor, indoor coil, heater elements, over-temperature limits, and relays. Therefore, it is important to change the filters on a regular basis to assure optimum performance and reliability of the system.

4.0 INSTALLATION

IMPORTANT: High efficiency pleated filters typically have significantly higher pressure drop than standard efficiency fiberglass filters, especially when they become dirty. The additional pressure drop of such filters must be added into the external static pressure of the duct system when adjusting the air-flow of the air-handler.

WARNING: Do not operate the air-handler without filters. A portion of the dust entrained in the air may temporarily lodge in the duct runs and at the supply registers. Any circulating dust particles could be heated and charred by contact with the electric heating elements. This residue could soil ceilings, wall, carpets, and other articles inside the building. Operating the system without a filter will also allow lint and dirt particles to accumulate on the indoor oil fins and restrict air-flow through the coil.

4.7 Refrigerant Line Connections & Charging

4.7.1 Preparation

Pipe-work including piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards and ASHRAE 15. All field joints shall be accessible for inspection prior to being covered or enclosed.

The coil is shipped with a low pressure (5-10 psig) charge of dry nitrogen which will be released when the rubber plugs are removed. Leave the rubber plugs in the refrigerant connection stubs on the air-handler until the refrigerant lines are ready to be brazed to the refrigerant connection stubs to prevent contaminants from entering the coil. Clean

the ends of the tubing and coil connection stubs (inside and outside) with an alcohol wipe before inserting the line set tubes into the coil connection stubs to assure a quality leak-free braze joint.

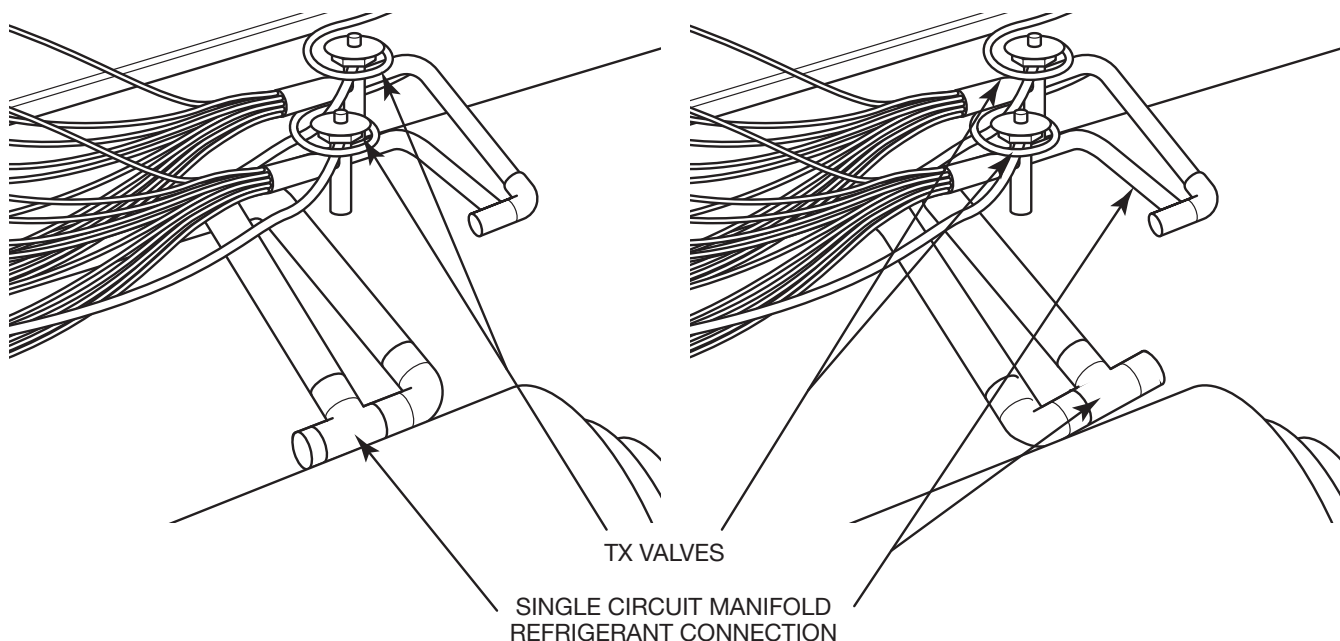
Route the refrigerant tubing in a manner than does not block service access to the front of the air-handler.

Check that internal and external unit 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.

4.7.2 Configuring Air-Handler for a Single or Dual Refrigerant Circuits

All models are provided with dual circuit coil manifolds that can be configured for dual condensing unit applications. The coil is circuited to provide full face coil operation for each system. Knock-outs are provided on both sides of the unit to allow the refrigerant tubing to enter from either side. Remove the rubber grommets from the parts bag and install them in the appropriate holes prior to running the line set tubing into the cabinet to seal around and protect the tubing. Copper fittings are provided in the parts bag to allow the two refrigerant circuits to be tied together for single condensing unit applications. The fittings may be installed to allow the tubing to enter the unit from either side as shown in **Figure 6**.

FIGURE 6



4.0 INSTALLATION

4.7.3 Refrigerant Lines

The following will be of help in accomplishing a successful installation:

1. Size liquid line for no more than 50 PSIG pressure drop.
2. Size suction lines for no more than 2°F loss which corresponds to approximately 5 PSIG pressure drop.
3. When evaporator is installed below condensing unit, do not exceed the recommended suction line O.D. This will insure adequate velocities for proper oil return.
4. Install strainer-drier and sight glass in liquid line.
5. Pitch all horizontal suction lines downward in the direction of flow.
6. When making up refrigerant piping, take every precaution to prevent dirt and moisture from entering the piping.
7. Locate the condensing unit and evaporator(s) as close together as possible to minimize piping runs.
8. See tables below for general refrigerant line sizing and equivalent length of valves and fittings.
9. Refer to the vapor and liquid line selection procedure and charts in the outdoor unit installation manual or literature for more specific refrigerant line sizing information. When dual outdoor units are matched with the air-handler using dual circuits, size the refrigerant lines for each system independently.
10. After field piping is complete, field pipework must be pressure tested first with inert gas and then vacuum tested prior to refrigerant charging.

4.7.4 Liquid Line Filter Drier

A new liquid filter drier must be installed every time any part of the system has been open to the atmosphere, even if it is for a short period of time. The filter drier should be installed close to the air-handler for a system started up in the cooling mode and near the outdoor unit for a heat pump system started up in the heating mode. This allows the filter drier to catch any contaminants in the liquid line before they can enter the indoor or outdoor TXV inlet screen. A filter drier must be installed in the liquid line of each circuit for dual circuit applications.

4.7.5 Brazing

Air inside the tubing and coil should be displaced with dry nitrogen prior to the brazing process to prevent the formation of harmful copper oxide inside the tubing. It is very important not to pressurize the system with nitrogen while brazing or pin-hole leaks will form in the braze joint. This is accomplished by removing the gauge port valve core on one of the outdoor unit service valves to allow the pressure to be relieved as the heated nitrogen expands. Fill the system with dry nitrogen through the other service valve gauge port and then turn the nitrogen flow off just before brazing is begun.

Protect the TXV's and outdoor unit service valves from overheating using a wet rag or heat sink compound. Leave the wet rag or heat sink material in place until the joint and surrounding tubing cools down to a safe temperature. Double tip torches can help minimize brazing time and heat conduction to the heat sensitive components if the flame is turned down and held on the joint just long enough to make the braze joint. With both single and double tip torches, turning the flame up too much and keeping the flame on the joint too long will damage the heat sensitive components even when a wet rag or heat sink compound is used.

REQUIRED OZ. R-454B PER FT. OF TUBING

Tube Size O.D. In. [mm]	Liquid Tube		Vapor Tube		Total		Internal volume ft ³ /ft [m ³ /m]	
	ozm /ft [g]	kg/m	ozm /ft [g]	kg/m	ozm /ft [g]	kg/m	ft ³ /ft	m ³ /m
3/8 [9.5]	0.5 [14.1]	0.05	0.0 [0.5]	0.00	0.5 [14.2]	0.05	5.55E-04	4.80E-05
1/2 [12.7]	1.0 [27.4]	0.09	0.0 [0.9]	0.00	1.0 [28.3]	0.09	1.08E-03	9.29E-05
5/8 [15.9]	1.5 [43.9]	0.14	0.1 [1.5]	0.00	1.6 [45.4]	0.15	1.73E-03	1.49E-04
3/4 [19.1]	2.2 [63.0]	0.21	0.1 [2.1]	0.01	2.3 [65.2]	0.21	2.48E-03	2.14E-04
7/8 [22.2]	3.1 [87.1]	0.29	0.1 [2.9]	0.01	3.2 [90.7]	0.30	3.43E-03	2.96E-04
1 [25.4]	4.0 [114.3]	0.37	0.1 [3.8]	0.01	4.2 [119.1]	0.39	4.50E-03	3.89E-04
1 1/8 [28.6]	5.2 [148.6]	0.49	0.2 [4.9]	0.02	5.4 [153.1]	0.50	5.85E-03	5.03E-04
1 1/4 [31.8]	6.5 [183.1]	0.60	0.2 [6.1]	0.02	6.7 [190.0]	0.62	7.21E-03	6.23E-04
1 3/8 [34.9]	7.3 [207.4]	0.68	0.2 [6.9]	0.02	7.6 [215.5]	0.70	8.17E-03	7.59E-04
1 1/2 [38.1]	9.4 [266.7]	0.87	0.3 [8.9]	0.03	9.7 [275.0]	0.90	1.05E-02	9.10E-04
1 5/8 [41.3]	11.2 [317.5]	1.04	0.4 [10.5]	0.03	11.6 [328.9]	1.08	1.25E-02	1.08E-03
2 1/8 [54.0]	19.5 [553.7]	1.82	0.6 [18.4]	0.06	20.2 [572.7]	1.88	2.18E-02	1.88E-03

Quantities based on 110°F liquid and 45°F vapor.

4.0 INSTALLATION

4.7.6 Leak Testing

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.

4.7.7 Removal and Evacuation of Refrigerant

The evacuation of any system is essential before charging. Never attempt to operate a system while it is under a vacuum.

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. 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.

NOTE: the condensing unit is shipped with a holding charge of dry nitrogen which must be purged from the unit before evacuation.

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

1. Open the suction, discharge, and liquid shut-off valves.
2. Use a refrigeration vacuum pump capable of evacuation in the 500 micron range.
3. Connect the vacuum pump to the service manifold assembly with a pressure gauge that will read 30 inches vacuum.
4. Connect the service manifold to the suction line Schrader valve port.
5. Ensure there is no power to the unit.
6. With an accurate scale, ½ oz., set the refrigerant recovery cylinder in the upright position.
7. Connect the recovery cylinder to the unit using the service valves located on the outdoor unit.
8. Connect the cylinder to the liquid shut-off valve.
9. Evacuate refrigerant from the unit until the vacuum pump reads a minimum of 500 microns.
10. Purge the refrigeration circuit with inert gas until there is no refrigerant within the system.
11. Field-made refrigerant joints indoors must be tightness tested under a pressure of at least .25 times the max allowable pressure according to the unit's nameplate. Using the inert gas in the system, pressurize the unit accordingly and check the refrigerant joints for leaks.
 - If leaks are detected, make adjustments to the joints and check for leaks again.
 - If no leaks are detected, continue to the next step.
12. Evacuate the circuit again.
13. Once all inert gas is removed, pull a vacuum on the unit to check for any leaks in the system.
14. If leaks are present, spray a soapy substance over the refrigeration circuit. Bubbles will help locate the leak.
15. Patch the leak and pull a vacuum again.
16. If leaks are still detected, repeat steps fourteen and fifteen.
17. If no leaks are present, charge the system as directed in the next section.
18. Remove the vacuum pump from suction, discharge, and liquid shut-off.

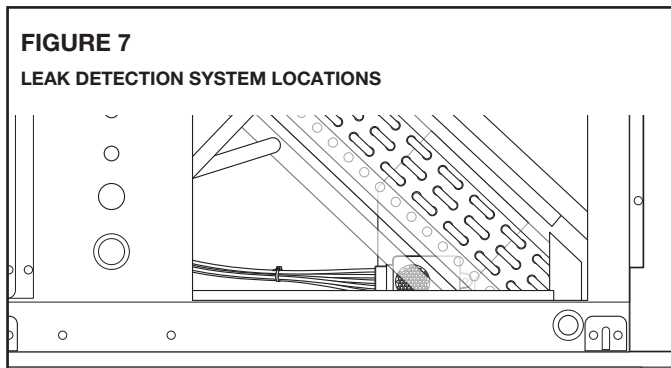
4.0 INSTALLATION

4.7.8 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.

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.

NOTE: For (-)HCYP2120, the sensor must be repositioned for vertical orientation. Move the sensor to the second hole on the bracket closest to the vertical drain pan in order to effectively sense leaking refrigerant.



4.7.9 Operation When a Leak is Detected

When the unit receives a signal from the A2L sensor, circulation airflow is activated, and the compressors will be shut off. 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 **3.2 A2L Refrigerant Installation Safety Data**.

a. The fans 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.

4.7.10 Charging Procedure

Prior to recharging the system, complete a leak check and purge the system with inert gas as detailed in **4.7.7 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 or 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 stem 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.

4.0 INSTALLATION

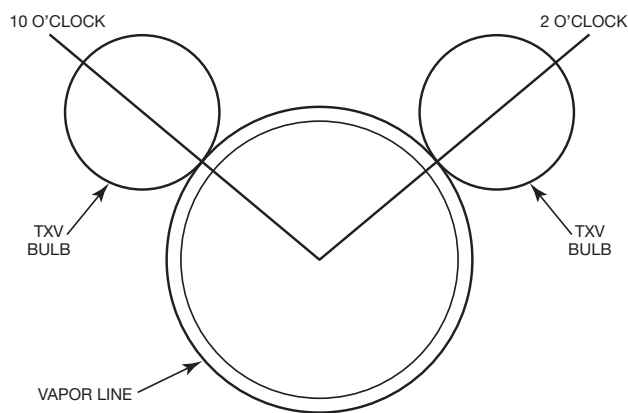
After charging is complete, a leak test must be done. Before leaving the site, an additional leak test must also be done at the end of installation.

4.8 TXV Sensing Bulb Attachment

IMPORTANT: DO NOT perform any brazing with the TXV bulb attached to the vapor line. After brazing operations have been completed and the tubing has cooled to the

FIGURE 8

BULB LOCATION – HORIZONTAL SECTION OF VAPOR LINE



touch, clamp each TXV bulb securely on a horizontal section of its corresponding vapor line at the 10 to 2 o'clock position (**See Figure 8**) with the strap provided in the parts bag.

4.9 Condensate Drain

Two drain connections are provided, one on each side of the unit. Plug the unused drain connection using the plug provided in the parts bag.

Consult local codes or ordinances for specific requirements.

IMPORTANT: When making drain fitting connections to the drain pan, use a thin layer of Teflon paste, silicone or Teflon tape and install hand tight.

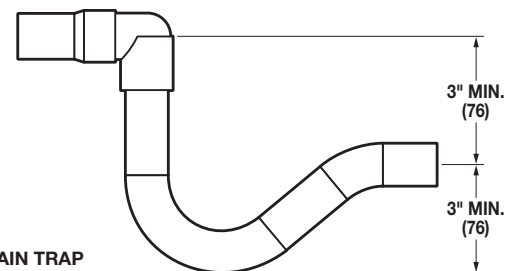
IMPORTANT: When making drain fitting connections to drain pan, do not over-tighten. Over-tightening fittings can split pipe connections on the drain pan.

- Install drain lines so they do not block service access to front of the unit. Minimum clearance of 24 inches is required for filter, coil or blower removal and service access.
- It is recommended that the air-handler cabinet be pitched slightly downward toward the primary drain connection to assure the condensate drains completely from the drain pan. The downward pitch should be approximately 1/8" per foot and in both axes.
- Do not reduce drain line size less than connection size provided on condensate drain pan.

- All drain lines must be pitched downward away from the unit a minimum of 1/8" per foot of line to ensure proper drainage.
- Do not connect condensate drain line to a closed or open sewer pipe. Run condensate to an open drain or outdoors.
- The drain line should be insulated where necessary to prevent sweating and damage due to condensate forming on the outside surface of the line.
- Make provisions for disconnecting and cleaning of the primary drain line should it become necessary. Install a 3 in. trap in the primary drain line as close to the unit as possible. Make sure that the top of the trap is below connection to the drain pan to allow complete drainage of pan (**See Figure 9**).
- Plug the unused drain connection with the plug provided in the parts bag, using a thin layer of Teflon paste, silicone or Teflon tape to form a water tight seal.
- Test the condensate drain pan and drain line after installation is complete. Pour water into drain pan, enough to fill drain trap and line. Check to make sure drain pan is draining completely, no leaks are found in drain line fittings, and water is draining from the open end of the primary drain line.

FIGURE 9

CONDENSATE DRAIN TRAP



4.0 INSTALLATION

4.10 Thermostat

See instructions for the condensing unit or heat pump for recommended room thermostats.

- Choose an appropriate thermostat for the application.
- The thermostat should be mounted 4 to 5 feet above the floor on an inside wall of the conditioned space or a hallway that has good air circulation from the other rooms being controlled by the thermostat. It is essential that there be free air circulation at the location of the same average temperature as other rooms being controlled. Movement of air should not be obstructed by furniture, doors, draperies, etc. The thermostat should not be mounted where it will be affected by drafts, hot or cold water pipes or air ducts in walls, radiant heat from fireplace, lamps, the sun, T.V. or an outside wall. See instruction sheet packaged with thermostat for mounting and installation instructions.

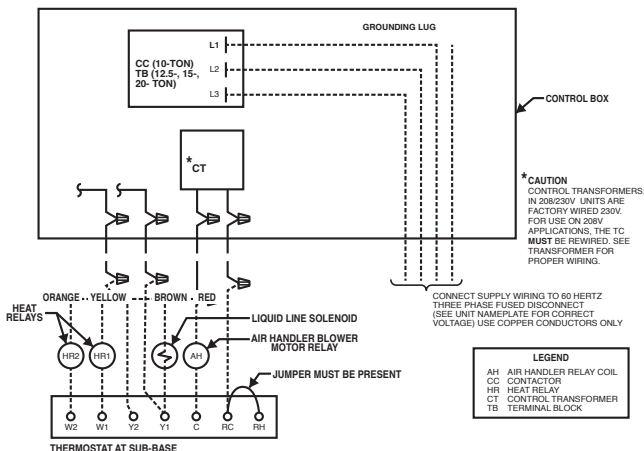
WARNING: If the thermostat turns off without any obvious explanation, this could be and is the only indication that there has been a trigger to the A2L R-454B Leak Detection System. Service is required for the unit to become operable again. Refer to **Section 7.0**.

4.11 Electrical Wiring

Field wiring must comply with the National Electric Code (C.E.C. in Canada) and any applicable local ordinance.

FIGURE 10
TYPICAL FIELD WIRING

TYPICAL FIELD WIRING



4.11.1 Power Wiring

It is important that proper electrical power is available for connection to the unit model being installed. See the unit nameplate, wiring diagram, and electrical data in the installation instructions.

- Install a circuit disconnect of adequate size, located within sight of, and readily accessible to the unit.
- **IMPORTANT:** Units with electric heater kits installed may be equipped with one or more branch circuit fuses. These fuses protect the internal wiring in the event of a short circuit.
- Supply circuit power wiring must be 75°C minimum copper conductors only. See Electrical Data in **Section 3.1** for ampacity, wire size and circuit protector requirement. Supply circuit protective devices may be either fuses or circuit breakers.

4.11.1.1 No-Heat Applications

If electric heat is not installed, connect the incoming line voltage wires to the line voltage terminal block (TB1) inside the air-handler control box.

4.11.1.2 Electric Heat Applications

If an electric heater kit is installed, the blower motor contactor is provided in the heater kit with leads that must be routed to the air-handler control box and connected to the line voltage terminal block (TB1) inside the air-handler control box.

IMPORTANT: The variable speed Drive (VFD) must be continuously powered and controlled by the thermostat signals to prevent premature failure of the VFD.

Therefore, the blower motor power supply leads from the blower contactor located in the electric heat kit must be moved from the load side of the blower contactor (T1,T2,T3) to the line side of the blower connector (L1,L2,L3).

All Electric heater kits are field installed. For information regarding the specific heater kit, refer to the Installation and Operation manual included with the accessory. To identify the heater kit, a model number should be printed on the inside of the heater kit control box.

4.11.2 Grounding

WARNING: The unit must be permanently grounded. Failure to do so can result in electrical shock causing personal injury or death.

- This product must be sufficiently grounded in accordance with National Electrical Code (C.E.C. in Canada) and any applicable local ordinance.
- Grounding may be accomplished by grounding metal conduit when installed in accordance with electrical codes to the unit cabinet.
- Grounding may also be accomplished by attaching ground wire to ground lug provided in the air-handler control box.

4.0 INSTALLATION

4.12 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.

4.13 Control Wiring

IMPORTANT: Class 2 low voltage control wire should not be run in conduit with power wiring and must be separated from power wiring unless class 1 wire of proper voltage rating is used. After installation, confirm separation of control and power wiring has been maintained. Low voltage control wiring must be 18 awg and color coded. For lengths longer than 100 ft., refer to **Table 1** below for the correct control wire sizing.

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.

TABLE 1						
FIELD WIRE SIZE FOR 24 VOLT THERMOSTAT CIRCUITS						
Thermostat Load - Amps	SOLID COPPER WIRE - AWG.					
	3.0	16	14	12	10	10
	2.5	16	14	12	12	10
	2.0	18	16	14	12	12
Length of Run - Feet (1)						
	50	100	150	200	250	300
(1) Wire length equals twice the run distance. NOTE: Do not use control wiring smaller than No. 18 AWG between thermostat and outdoor unit.						

4.13.1 No-Heat Applications

The appropriate thermostat control wires (C, G, Y2) must also be connected to the low voltage terminal block (TB2) located on the outside of the air-handler control box. Knockouts are provided on each side of the air-handler for connecting low voltage conduit or plastic bushing. Refer to the wiring diagrams in **Section 9.0** for typical wiring connections for non-electric heat applications.

4.13.2 Electric Heat Applications

The appropriate thermostat control wires must be connected to the thermostat pigtails on the heater kit and to the C, G, Y2, and W1 terminals on the low voltage terminal block located on the outside of the air handler control box. Refer to the wiring diagrams in **Section 9.0** for typical wiring connections for electric heat applications.

4.13.3 Configuring Outdoor Unit Transformer for 208V Applications

For 208V applications, the control transformer in the outdoor unit will need to be re-configured to assure adequate secondary control voltage (24V). Refer to the outdoor unit installation manual, wiring diagram, and/or the transformer label for reconfiguring the transformer for 208V applications.

The air-handler is equipped with a Variable Frequency Drive (VFD) that provides a reduction in air-flow in the continuous fan mode, first stage cooling mode, and first stage heat pump heating mode.

Full air-flow is delivered for the second stage of cooling mode, second stage of heat pump heating mode, and all stages of electric heat. The VFD output frequency and air-flow level is based on the 24VAC thermostat inputs. Energizing the G low voltage terminal located on the air-handler low voltage terminal block causes the VFD to operate at a lower input frequency. Energizing the Y2 or W1 terminals on the low voltage terminal block causes the VFD to operate at a max airflow. The VFD is programmed at the factory for optimum performance and therefore requires no adjustment when air-handler is installed.

The blower performance charts in **Section 4.14** is based on a dry coil with the factory 1" fiberglass filters in place and the VFD operating at 100%. A component resistance chart is provided in **Section 4.14** to provide the pressure drop for the various accessories that will need to be added to the external static pressure of the duct system before selecting a drive package and motor sheave setting. Keep in mind that high efficiency pleated filters will likely have more pressure drop than the factory filters, so that additional pressure drop will also need to be taken into account. Refer to the filter manufacturer's pressure drop data for more information.

4.0 INSTALLATION

4.14 Air-Flow Performance Data (Dry Coil) (-)HYCP2090

Model (-)HCP2090		Voltage 208/230, 460, 575 — 3 phase 60 Hz — Sidelow																											
Air Flow		External Static Pressure - Inches of Water [kPa]																											
CFM [L/s]	RPM	0.1 [0.02]	0.2 [0.05]	0.3 [0.07]	0.4 [0.10]	0.5 [0.12]	0.6 [0.15]	0.7 [0.17]	0.8 [0.20]	0.9 [0.22]	1.0 [0.25]	1.1 [0.27]	1.2 [0.30]	1.3 [0.32]	1.4 [0.35]	1.5 [0.37]	1.6 [0.40]	1.7 [0.42]	1.8 [0.45]	1.9 [0.47]	2.0 [0.50]								
		W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W							
2400 [1130]	526	487	581	637	681	720	760	803	844	889	924	967	1004	1035	1157	1086	1212	1086	1268	1126	1327	1156	1387	1185	1449	1214	1533	1242	1579
2450 [1156]	533	505	597	653	697	736	776	819	864	910	958	1007	1059	1111	1227	1107	1270	1144	1302	1131	1362	1160	1424	1189	1488	1218	1553	1246	1620
2500 [1180]	540	523	615	671	715	754	794	837	882	929	977	1026	1078	1130	1246	1119	1289	1164	1343	1135	1399	1164	1443	1193	1528	1222	1595	1250	1664
2550 [1205]	547	542	635	691	735	774	814	857	902	949	997	1046	1098	1150	1266	1110	1273	1139	1337	1135	1437	1169	1502	1197	1569	1226	1627	1254	1708
2600 [1227]	555	561	654	710	754	793	833	875	920	967	1015	1064	1116	1232	1208	1260	1312	1414	1476	1171	1542	1202	1611	1230	1681	1259	1753	1282	1753
2650 [1250]	562	581	674	730	774	813	853	895	940	987	1035	1084	1136	1252	1228	1280	1332	1434	1496	1153	1562	1212	1699	1238	1772	1266	1847	1286	1847
2700 [1274]	569	601	694	750	794	833	873	915	960	1007	1055	1104	1156	1272	1248	1300	1352	1454	1516	1177	1584	1206	1654	1234	1768	1282	1860	1302	1860
2750 [1298]	577	622	715	771	815	854	894	936	981	1028	1076	1125	1177	1293	1269	1321	1373	1475	1537	1182	1621	1210	1699	1238	1772	1266	1847	1302	1847
2800 [1321]	584	643	736	792	836	875	915	957	1002	1049	1097	1146	1198	1314	1290	1342	1394	1496	1558	1186	1671	1215	1744	1243	1819	1302	1847	1302	1847
2850 [1345]	592	665	758	814	858	897	937	979	1024	1071	1119	1168	1219	1335	1311	1363	1415	1517	1571	1162	1643	1191	1716	1219	1791	1327	1868	1302	1868
2900 [1369]	600	687	780	836	880	919	959	1001	1046	1093	1141	1189	1240	1356	1332	1384	1436	1538	1594	1167	1687	1195	1762	1224	1839	1351	1897	1302	1897
2950 [1392]	607	710	803	859	903	942	982	1024	1070	1117	1165	1213	1264	1380	1356	1408	1460	1562	1618	1172	1733	1200	1810	1228	1888	1356	1968	1302	1968
3000 [1416]	615	734	827	883	927	966	1006	1048	1094	1141	1189	1237	1288	1404	1380	1432	1484	1586	1642	1170	1780	1205	1858	1233	1938	1360	2020	1302	2020
3050 [1439]	623	758	851	907	951	990	1030	1072	1118	1165	1213	1261	1312	1428	1404	1456	1508	1610	1666	1178	1828	1209	1868	1237	1960	1365	2073	1302	2073
3100 [1463]	631	782	875	931	975	1014	1054	1096	1142	1189	1237	1285	1336	1452	1428	1480	1532	1634	1690	1182	1878	1214	1959	1242	2069	1381	2127	1302	2127
3150 [1486]	638	807	899	955	1000	1039	1079	1121	1167	1213	1260	1307	1358	1474	1450	1502	1554	1656	1712	1191	1928	1218	2011	1247	2086	1381	2151	1302	2151
3200 [1510]	646	833	925	981	1026	1065	1105	1147	1193	1240	1287	1334	1385	1501	1477	1529	1581	1683	1739	1196	1980	1224	2065	1251	2107	1381	2201	1302	2201
3250 [1534]	654	859	951	1007	1052	1091	1131	1173	1219	1266	1313	1360	1411	1527	1503	1555	1607	1709	1765	1197	2000	1237	2119	1256	2207	1381	2257	1302	2257
3300 [1557]	662	886	978	1034	1079	1118	1158	1199	1245	1292	1339	1386	1437	1553	1529	1581	1633	1735	1791	1197	2040	1206	2087	1233	2175	1261	2264	1302	2264
3350 [1581]	671	913	1005	1061	1106	1145	1185	1226	1272	1319	1366	1413	1464	1580	1556	1608	1660	1762	1818	1198	2081	1218	2142	1238	2231	1266	2323	1302	2323
3400 [1604]	679	940	1032	1088	1133	1172	1212	1253	1300	1347	1394	1441	1492	1608	1584	1636	1688	1790	1846	1199	2120	1218	2166	1243	2248	1302	2368	1302	2368

Drive Package	R	S	T
Motor H.P. [W]	2 [3726.5]	2.0 [1491.4]	3 [2237.1]
Blower Sheave	AK104-3/4	AK71H	AK59
Motor Sheave	VL44	VL44	1VL44
Belt	A50	A44	A42
Turns Open	0	1	2
RPM	696	661	627

Notes:

1. Factory sheave settings are shown in bold type.
2. Do not set sheave below minimum or maximum turns open shown.
3. Re-adjustment of sheave required to achieve rated airflow at AHRI minimum External Static Pressure.
4. Add component resistance (below) to duct resistance to determine total External Static Pressure.

Airflow	AIRFLOW CORRECTION FACTORS *			COMPONENT AIRFLOW RESISTANCE		
	Total MBH	Sensible MBH	Power kW	Wet Coil	MERV 8 Filter	MERV 13 Filter
CFM [L/s]				Resistance — Inches of Water [kPa]		
2400 [1133]	0.93	0.73	0.96	0.04 [0.01]	0.153	0.157
2500 [1180]	0.93	0.74	0.96	0.05 [0.01]	0.164	0.168
2600 [1227]	0.94	0.76	0.97	0.05 [0.01]	0.175	0.179
2700 [1274]	0.94	0.78	0.97	0.05 [0.01]	0.186	0.189
2800 [1321]	0.95	0.80	0.97	0.05 [0.01]	0.198	0.200
2900 [1368]	0.95	0.81	0.97	0.06 [0.01]	0.209	0.211
3000 [1416]	0.95	0.83	0.98	0.06 [0.01]	0.220	0.221
3100 [1463]	0.96	0.85	0.98	0.06 [0.01]	0.231	0.232
3200 [1510]	0.96	0.87	0.98	0.06 [0.01]	0.242	0.243
3300 [1557]	0.97	0.88	0.99	0.07 [0.02]	0.253	0.254
3400 [1604]	0.97	0.90	0.99	0.07 [0.02]	0.264	0.264
3500 [1652]	0.98	0.92	0.99	0.07 [0.02]	0.276	0.275
3600 [1711]	0.98	0.93	0.99	0.08 [0.02]	0.287	0.286
3700 [1746]	0.99	0.95	1.00	0.08 [0.02]	0.298	0.296
3800 [1793]	0.99	0.97	1.00	0.08 [0.02]	0.309	0.307
3900 [1840]	1.00	0.99	1.00	0.08 [0.02]	0.320	0.318
4000 [1888]	1.00	1.00	1.01	0.09 [0.02]	0.331	0.329

*Multiply correction factor times gross performance data resulting sensible capacity cannot exceed total capacity.

4.0 INSTALLATION

4.14 Air-Flow Performance Data (Dry Coil) (-)HYCP2120

Model (-)HYCP2120		Voltage 208/230, 460, 575 — 3 phase 60 Hz - Sidelow																																								
Air Flow CFM [L/s]	External Static Pressure - Inches of Water [kPa]																																									
	0.1 [0.02]		0.2 [0.05]		0.3 [0.07]		0.4 [1.10]		0.5 [1.32]		0.6 [1.59]		0.7 [1.77]		0.8 [2.00]		0.9 [2.22]		1.0 [2.5]		1.1 [2.7]		1.2 [3.0]		1.3 [3.2]		1.4 [3.5]		1.5 [3.7]		1.6 [4.0]		1.7 [4.2]		1.8 [4.5]		1.9 [4.7]		2.0 [5.0]			
	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W		
3100 [1463]	—	—	—	—	—	—	—	756	915	793	984	830	1055	866	1129	901	1207	945	1317	980	1376	1012	1436	1042	1468	1070	1561	1096	1625	1119	1690	1140	1756	1183	1828	1213	1895	1238	1959	1259	2021	
3200 [1510]	—	—	—	—	731	911	768	979	805	1050	841	1124	876	1202	911	1283	969	1382	993	1445	1024	1505	1586	1063	1574	1080	1640	1104	1708	1126	1777	1146	1847	1193	1921	1220	1989	1243	2055	1265	2128	
3300 [1557]	—	—	—	—	744	975	781	1046	817	1121	852	1198	887	1279	921	1362	973	1452	1005	1519	1035	1586	1063	1665	1089	1725	1112	1797	1132	1869	1172	1944	1202	2018	1227	2088	1248	2155	1265	2210		
3400 [1604]	—	—	—	—	757	1044	794	1118	829	1195	864	1276	898	1360	953	1459	986	1528	1017	1598	1046	1668	1073	1742	1087	1816	1119	1881	1139	1967	1182	2044	1210	2119	1233	2191	1253	2260	1268	2326		
3500 [1652]	—	—	734	1042	771	1116	807	1194	842	1274	876	1358	909	1444	967	1536	999	1609	1029	1683	1057	1758	1082	1834	1105	1911	1126	1990	1145	2069	1192	2146	1218	2224	1239	2298	1256	2368	1269	2436		
3600 [1699]	—	—	740	1116	785	1193	820	1274	854	1357	888	1444	921	1533	980	1619	1011	1695	1040	1773	1067	1851	1091	1881	1113	2012	1133	2094	1173	2175	1201	2256	1224	2334	1244	2409	1259	2481	1269	2436		
3700 [1746]	—	—	764	1193	789	1274	834	1357	867	1444	900	1534	961	1628	983	1707	1023	1787	1051	1868	1076	1950	1099	2034	1120	2118	1139	2204	1183	2286	1209	2369	1231	2448	1248	2525	1261	2598	1269	2436		
3800 [1793]	743	1195	779	1275	813	1359	847	1445	880	1535	913	1628	975	1718	1060	1800	1034	1884	1061	1968	1085	2054	1107	2141	1127	2229	1145	2319	1193	2402	1215	2486	1236	2567	1251	2645	1263	2720	1270	2792		
3900 [1840]	759	1278	794	1361	828	1448	861	1537	894	1630	926	1728	988	1813	1013	1888	1045	1966	1071	2074	1104	2164	1115	2254	1134	2347	1152	2431	1201	2607	1214	2689	1254	2769	1263	2846	1268	2919				
4000 [1888]	775	1365	809	1451	843	1541	876	1634	908	1729	970	1824	1013	1913	1029	2002	1056	2093	1080	2185	1122	2278	1122	2372	1140	2468	1166	2555	1210	2645	1229	2732	1245	2816	1256	2967	1264	2975	1265	3011		
4100 [1935]	791	1456	825	1545	858	1638	890	1734	921	1833	953	1926	1013	2013	1041	2111	1066	2206	1089	2301	1110	2398	1129	2496	1145	2595	1195	2681	1217	2773	1235	2862	1249	2947	1258	3030	1263	3110	1264	3166		
4200 [1982]	808	1551	841	1643	873	1739	905	1838	966	1938	996	2033	1025	2128	1051	2225	1076	2323	1098	2423	1117	2523	1135	2625	1190	2716	1204	2812	1224	2904	1250	2996	1261	3083	1259	3167	1282	3248	1281	3326		
4300 [2029]	825	1650	857	1746	889	1844	920	1946	979	2047	1009	2145	1037	2244	1062	2345	1085	2447	1106	2549	1124	2653	1141	2759	1199	2850	1212	2942	1230	3042	1244	3134	1253	3222	1259	3308	1260	3391	1257	3471		
4400 [2076]	842	1753	873	1852	905	1954	962	2060	993	2161	1021	2262	1048	2365	1072	2470	1094	2576	1119	2681	1131	2789	1146	2898	1199	2989	1220	3087	1236	3183	1247	3276	1265	3366	1258	3454	1257	3538	1257	3619		
4500 [2123]	859	1860	890	1962	921	2067	976	2176	1005	2280	1033	2385	1038	2462	1081	2600	1102	2709	1120	2819	1137	2930	1166	3026	1208	3128	1226	3230	1240	3328	1250	3423	1266	3515	1267	3603	1254	3688	1247	3772		
4600 [2171]	876	1972	907	2077	959	2190	989	2296	1018	2404	1044	2513	1068	2623	1090	2735	1110	2847	1127	2961	1142	3076	1196	3170	1216	3276	1232	3378	1244	3477	1252	3574	1266	3667	1255	3757	1250	3845	1241	3930		
4700 [2218]	894	2087	924	2195	973	2312	1003	2422	1030	2534	1055	2646	1078	2760	1099	2875	1117	2992	1134	3109	1148	3228	1205	3318	1224	3426	1238	3530	1248	3631	1254	3728	1265	3864	1252	3916	1245	4004	1234	4099		
4800 [2265]	912	2207	956	2327	987	2440	1015	2554	1041	2668	1066	2785	1087	2903	1107	3021	1124	3141	1138	3262	1193	3361	1214	3473	1230	3581	1243	3686	1251	3789	1254	3888	1264	3985	1249	4078	1240	4168	1227	4256		
4900 [2312]	934	2341	971	2456	1000	2572	1027	2680	1053	2809	1075	2929	1096	3050	1115	3172	1131	3296	1145	3420	1203	3517	1222	3630	1236	3740	1247	3847	1257	3951	1254	4052	1262	4160	1245	4245	1234	4337	1219	4448		
5000 [2359]	954	2472	985	2591	1013	2711	1039	2832	1063	2954	1085	3078	1105	3203	1122	3329	1137	3456	1150	3584	1213	3678	1229	3792	1242	3903	1250	4012	1254	4117	1254	4220	1249	4319	1240	4416	1228	4508	1210	4600		
5100 [2407]	989	2608	998	2730	1026	2854	1051	2979	1074	3105	1094	3232	1113	3361	1129	3490	1143	3621	1203	3723	1222	3842	1236	3968	1247	4071	1253	4181	1255	4298	1252	4392	1246	4493	1235	4591	1220	4686	1149	5137		
Drive Package		R										S										T																				
Motor H.P. [W]		2 [1491.4]										2.0 [1491.4]										3 [2373.1]																				
Blower Shave		AK104x3/4										AK64x3/4										AK94x3/4																				
Motor Shave		1VP56x7/8										1VP65x7/8										1VP75x7/8																				
Belt		A52										A49										A52																				
Turns Open		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
RPM		894	862	829	797	765	732	702	670	638	606	574	542	510	478	446	414	382	350	318	286	254	222	190	158	126	94	62	30	—	—	—	—	—	—	—	—	—	—	—	—	—

- Notes:
1. Factory shave settings are shown in bold type.
 2. Do not set shave below minimum or maximum turns open shown.
 3. Re-adjustment of shave required to achieve rated airflow at AHRI minimum External Static Pressure.
 4. Add component resistance (below) to duct resistance to determine total External Static Pressure.

Airflow	AIRFLOW CORRECTION FACTORS *				COMPONENT AIRFLOW RESISTANCE			
					Wet Coil	MERV 8 Filter		MERV 13 Filter
	CFM [L/s]	Total MBH	Sensible MBH	Power kW		Resistance — Inches of Water [kPa]		
3500 [1652]	0.98	0.92	0.99	0.99	0.07 [0.02]	0.091	0.098	
3600 [1699]	0.98	0.93	0.99	0.99	0.08 [0.02]	0.097	0.103	
3700 [1746]	0.99	0.95	1.00	1.00	0.08 [0.02]	0.103	0.109	
3800 [1793]	0.99	0.97	1.00	1.00	0.08 [0.02]	0.109	0.115	
3900 [1840]	1.00	0.99	1.00	1.00	0.08 [0.02]	0.115	0.121	
4000 [1888]	1.00	1.00	1.01	1.01	0.09 [0.02]	0.121	0.127	
4100 [1935]	1.00	1.02	1.01	1.01	0.09 [0.02]	0.127	0.132	
4200 [1982]	1.01	1.04	1.01	1.01	0.09 [0.02]	0.133	0.138	
4300 [2029]	1.01	1.06	1.01	1.01	0.10 [0.02]	0.139	0.144	
4400 [2076]	1.02	1.07	1.02	1.02	0.10 [0.02]	0.145	0.150	
4500 [2123]	1.02	1.09	1.02	1.02	0.10 [0.02]	0.151	0.156	
4600 [2171]	1.03	1.11	1.02	1.02	0.10 [0.02]	0.157	0.161	
4700 [2218]	1.03	1.12	1.03	1.03	0.11 [0.03]	0.163	0.167	
4800 [2265]	1.04	1.14	1.03	1.03	0.11 [0.03]	0.169	0.173	
4900 [2312]	1.04	1.16	1.03	1.03	0.11 [0.03]	0.175	0.179	
5000 [2359]	1.05	1.18	1.03	1.03	0.12 [0.03]	0.181	0.185	
5100 [2407]	1.05	1.19	1.04	1.04	0.12 [0.03]	0.188	0.190	

*Multiply correction factor times gross performance data resulting sensible capacity cannot exceed total capacity.

4.0 INSTALLATION

4.14.1 Selecting the Proper Blower Drive & Motor Sheave Setting

To select the proper blower drive, the following information is required.

- Target air-flow in CFM or L/s
- Total static pressure of the duct system in inches of water or kPa
- Component Resistance (**See Section 4.14.2**).

Add the total static pressure of the duct system to the component resistance to determine the External Static Pressure (E.S.P.) that the air-handler must work against. Locate the target CFM [L/s] row on the air-flow performance table and move to the right along that row to the correct E.S.P. column. If the target CFM and E.S.P. are between the values shown on the table, it will be necessary to interpolate between rows and lines.

There are heavy lines dividing blower drives from left to right with the “R” drive being everything left of the first heavy line, “S” drive being for everything between the 1st and 2nd heavy lines, “T” drive being for everything between the 2nd and 3rd heavy lines, and so forth.

Once the correct blower drive is determined, confirm the air-handler being installed has the correct drive package or can be converted to the correct drive with field supplied sheaves and belt(s). In some cases, a motor change is also required for field supplied blower drives.

Determine the correct blower RPM from the air-flow performance chart at the intersection of the target air-flow and E.S.P. Then refer to the Blower Package Data table to determine the correct setting in turns open for the variable pitch motor sheave. The variable pitch motor sheave can be adjusted in half turns to provide finer adjustments of the blower RPM if needed. Adjust the variable pitch motor sheave to the correct setting using the instructions found in **Section 4.14.4**.

4.14.2 Adjusting the Variable Pitch Motor Sheave

The adjustable pitch sheave which is mounted on the motor shaft controls the fan speed. To adjust the fan speed refer to **Figure 11**, proceed as follows:

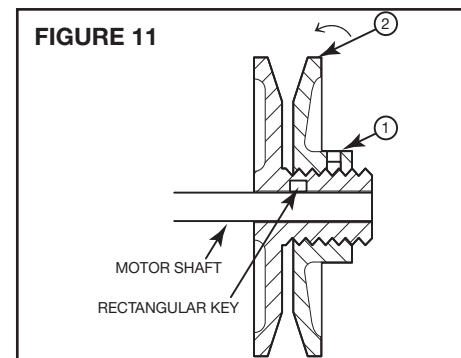
- a. Loosen the set screw, item 1.
- b. Rotate the adjustable sheave, item 2, to the desired position.
- c. Lock the adjustable sheave in place by tightening the set screw, item 1.

NOTE: The adjustable sheave is not to be used to adjust belt tension.

WARNING: BEFORE MAKING FAN ADJUSTMENTS, BE SURE THE MAIN ELECTRICAL DISCONNECT SWITCH IS IN THE “OFF” POSITION TO PREVENT POSSIBLE INJURY DUE TO ACCIDENTAL OPERATION OF THE MOTOR.

4.14.3 Drive Belt Alignment & Adjustment

Place belt on the groove of the blower sheave and motor sheave to obtain the approximate alignment and belt tension. Remove the belt and align the blower sheave and motor sheave using a straight edge. When both sheaves are properly aligned, re-install belt. Do not force or pry the belt onto the sheaves. With the belt in place, adjust so that all the slack is on one side of the drive. The belt should have from 3/4” to 1” [19 to 25 mm] of slack at 3 lbs. [21 kPa] pressure. Adjust the belt to this tension, by raising or lowering the swing base via the adjusting rods and nuts.



5.0 SYSTEM START-UP

5.1 Pre-Start Checklist

1. Leak test entire system.
2. Check motor mounting to make sure all nuts are tight.
3. Check motor and blower sheaves to make sure they are in proper alignment and set screws are tight.
4. Check belt tension—belts should be fairly tight for the initial “start-up”.
5. Check bearing—collar set screws on blower shaft to make sure they are tight.
6. Ball type bearings are factory lubricated and do not require additional grease before starting.
7. Rotate blower shaft by hand to be sure it is free.
8. Ensure VFD voltage matches supply voltage.
9. Check all screws, bolts, set screws and piping connections for tightness.
10. Check drain.
11. Insure that filters are in place.
12. Insure all outdoor unit service valves are open.
13. Be sure that electrical controls and motors are properly wired and fused in accordance with applicable codes.
14. Check wheel position in blower housing. See Figure 12.
15. Check that internal and external unit 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.

5.2 System Start-Up & Operational Check-Out

- Once everything on the Pre-Start Check-List has been confirmed, turn the electrical power disconnect on and adjust the thermostat to call for continuous fan operation. Confirm the blower has the correct rotation and is circulating air in the duct system.
- On any models with a Variable Frequency Drive, VFD, the motor will always rotate in the correct direction.
- Confirm the blower is turning the correct RPM using a strobe light or other device capable of measuring RPM.
- Confirm the full load motor amps listed on the unit data plate are not being exceeded by more than the 15% service factor rating of the motor.
- If the blower is unusually noisy, disconnect power to the unit and check for improper alignment of the blower wheel or belt or for something loose.
- If field installed accessories have been installed, confirm proper functioning of those accessories.
- When all items running properly, tape all access panel to ensure unit is sealed off completely.

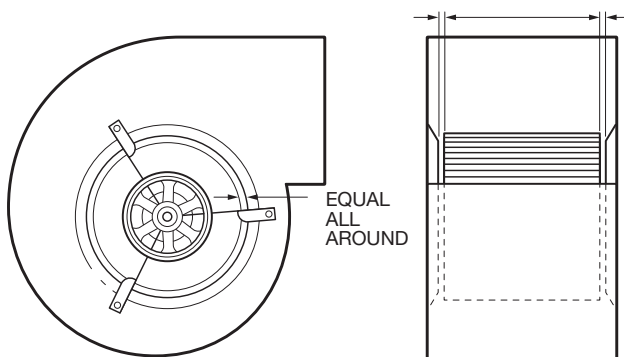
5.3 Checking Indoor Air-Flow Rate

5.3.1 Estimating Air-Flow Rate Using External Static Pressure

A common method of checking indoor is to measure the external static pressure that the air-handler is working against and then referring to the air-flow data in **Section 4.14**. Measuring external static pressure to a high degree of precision in the field is challenging, so keep in mind that the air-flow rate determined by this method is an estimate, but is accurate enough for all practical purposes.

To determine external static pressure, the static pressure should be measured in inches of water column across the air-handler using an incline manometer, digital static pressure meter, or a Magnahelic. The static pressure inside the return plenum should be measured as close to the air-handler as possible and must be measured between any external filter rack and the unit so the pressure drop across the filter is accounted for. The static pressure inside the supply plenum should be measured at a point about halfway between the air-handler and the first elbow or the end of the plenum. Total external static pressure is the sum of the return and supply plenum static pressures. Even though the return plenum static pressure is a negative pressure, it must be added to the supply plenum static pressure, ignoring the negative sign. The supply and return plenum static pressure tubing can also be connected to both pressure ports of the pressure measuring device which will automatically add the two pressures together.

FIGURE 12



5.0 SYSTEM START-UP

5.3.2 Estimating Air-Flow Rate Using Electric Heat Temperature Rise

If the air-handler is equipped with an electric heater, the air-flow can be estimated using the air temperature rise across the air-handler with the heater and blower both energized once the unit has run long enough for the temperatures to stabilize. As with determining air-flow rate using external static pressure, the air-flow rate determined by this method is an estimate, but is accurate enough for all practical purposes. Measure the return air temperature as close to the unit as possible and the supply air temperature about half way from the air-handler to the first elbow or end of the supply plenum. Use the following formula to calculate air-flow rate once the temperature rise is determined.

$$\text{CFM} = \text{Heating BTUH} / (\text{Elevation Factor} \times \text{Temp Rise } ^\circ\text{F})$$
$$\text{L/s} = (895 \times \text{Heating kW}) / (\text{Elevation Factor} \times \text{Temp Rise } ^\circ\text{C})$$

Note: Refer to [Section 5.3.4](#) to determine Heating Capacity and the following chart for Elevation Factor.

5.3.3 Correcting Electric Heat kW for Voltage

The actual electric heat kW varies with the supply voltage. Use the following formula to correct the heater rated kW at voltages other than rated voltage.

$$\text{Actual kW} = \text{Rated kW} \times (\text{Actual Voltage}^2 / \text{Rated Voltage}^2)$$

Elevation -ft [m]	Elevation Factor
Sea Level	1.08
500 [152]	0.98
1000 [305]	0.96
1500 [451]	0.95
2000 [610]	0.93
2500 [762]	0.91
3000 [914]	0.90
3500 [1067]	0.88
4000 [1219]	0.86
5000 [1524]	0.83
6000 [1829]	0.83
7000 [2134]	0.77
8000 [2438]	0.74
9000 [2743]	0.72
10000 [3048]	0.69

5.3.4 Calculating Electric Heat Capacity in BTUH

Use the following formula to convert heater kW to heating capacity in BTUH.

$$\text{BTUH Capacity} = \text{kW} \times 3412$$

(Where 3412 = BTUH per kW)

5.4 Checking Refrigerant Charge

System refrigerant charging should only be performed after the indoor air-flow is confirmed to be correct for the application. Once the air-flow is confirmed, check the refrigerant charge according to [Section 4.7.10](#).

5.5 Sequence of Operation

5.5.1 Cooling & Heat Pump Heating Modes

When the 2-stage thermostat calls for first stage of cooling or heat pump heating and the thermostat fan setting is set to the AUTO position, the G signal from the thermostat causes the Variable Frequency Drive (VFD) to ramp the motor to the low speed air-flow level. If the thermostat fan setting is set on the ON position (continuous fan), the motor will already be operating at the low speed air-flow level when there is a call for 1st stage cooling or heat pump heating.

If the 2-stage thermostat calls for second stage of cooling or heat pump heating, the Y signal from the thermostat will cause the VFD to ramp the motor to the high speed air-flow level. As the thermostat cycles between stages, the VFD and motor will cycle between the low and high speed air-flow levels.

When the call cooling or heat pump heating at the thermostat is satisfied or the thermostat is turned to the OFF position, the VFD will ramp down to 0 Hz and the motor will stop if the thermostat fan settings is set to AUTO position. If the thermostat fan setting is set to the ON position (continuous fan), the VFD will continue to drive the motor at the low speed level.

5.0 SYSTEM START-UP

5.5.2 Electric Heat Mode

When the thermostat calls for the first stage of heat, the first stage heater contactor (HC1) in the electric heater kit closes which energizes the first stage heater elements. If the thermostat fan setting is set to the AUTO position, the G signal from the thermostat causes the VFD to ramp the motor up to the high speed air-flow level. If the thermostat fan setting is set to the ON (continuous fan) position, then the VFD will ramp the motor from low speed air-flow to high speed air-flow.

If the thermostat calls for the second stage of heat, the second stage heater contactor (HC2) in the electric heater kit closes which energizes the second stage heater elements. The heater will then cycle between the first and second stages of heat at the direction of the thermostat.

When the call for heat at the thermostat is satisfied or the thermostat is turned to the OFF position, the heater contactor(s) open and de-energize the electric heater elements. If the thermostat fan setting is set to the AUTO position, the VFD will ramp down to 0 Hz and the motor will stop. If the thermostat fan setting is set to the ON (continuous fan) position, the VFD will ramp down to the low speed air-flow level until the next call for electric heat.

5.5.3 Supplemental Heating During the Heat Pump Heating & Defrost Modes

Should the room temperature continue to fall when the system is operating in the heat pump heating mode, the thermostat will energize supplemental electric heat as required if an electric heater kit has been installed.

If the purple pigtail connected to the “D” terminal on the outdoor unit defrost control is connected to the W1 input (black pigtail) on the electric heater kit, the 1st stage of electric heat will be energized during the defrost cycle. This prevents cold air from being discharged from the supply registers during the defrost cycle. For the most economical operation when discharge air temperature during defrost is not an issue, do not make this connection.

5.5.4 Emergency Heat (Heat Pump)

If heat pump thermostat is set to the “Emergency Heat” mode, the outdoor unit will be prevented from operating and heat will be provided solely by the electric heater. The electric heater elements and indoor blower motor will be energized any time there is a call for heat with no compressor and outdoor fan operation. A jumper should be installed between the W1 and E terminals on the thermostat sub-base so a call for emergency heat will be transferred to the 1st stage of heat of the thermostat. The indoor blower will cycle on and off with the electric heater elements when the thermostat fan setting is set to the “auto” mode.

5.5.5 Approved Auxiliary Devices

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

5.5.6 Thermostat Fan Setting

If the thermostat “FAN” setting is adjusted to the “AUTO” position, the indoor blower motor will only operate when there is a call for cooling or heating. If the setting is adjusted to the “ON” position, the indoor blower motor will operate continuously at the low speed air-flow level.

5.6 Safety Checks

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

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

- Ensure all electrical components in this system are approved by the manufacturer.
- Confirm the actual refrigerant charge complies with the minimum room size requirements outlined in **3.2 A2L Refrigerant Installation Safety Data**.
- Ensure that the ventilation machinery and outlets are operating correctly and are not obstructed.
- If an indirect refrigerant circuit is being used, the secondary circuit must be checked for the presence of refrigerant.
- Ensure that all the equipment labels and markings are visible and legible. Markings, labels, and signs that are illegible must be corrected.
- Confirm that any refrigerating pipe or components are installed in a position where they are unlikely to be exposed to corrosion, unless the refrigerant-containing components are constructed of corrosion-resistant materials or are protected from corrosion.

6.0 DIAGNOSTICS

Problem	Possible Cause (Suggested Fix)
Blower motor will not operate or no air-flow	Failed motor (replace) Loose wiring connection or broken wire (check connection & wiring) Failed transformer on outdoor unit (replace) Circuit breaker or fuse is turned off or has tripped due to overcurrent or shorted circuit (check for shorts, reset breaker) Belt loose, broken, or off (adjust or replace belt) Corrupted VFD program (see VFD Installation and Operation Instructions) Failed VFD (replace)
Excessive vibration	Blower out of balance (replace or clean blower wheel)
Water overflowing drainpan	Plugged drain (clean drain) Unit not level (level unit)
Electric Heater not heating properly or not heating at all, but blower motor is operating	Over temperature limit has tripped (check for low air-flow) Over temperature limit has failed (replace) Contactor has failed (replace) One or more heating elements have burned out (replace)
Coil is frozen up	System low on refrigerant charge (check for leaks and adjust charge) Dirty return air filter due to incorrect blower sheave adjustment (adjust sheave to achieve proper air-flow) or excessively restrictive duct system (correct duct system) Belt is loose, broken, or off
Excessive air-flow	Incorrect blower sheave adjustment (adjust sheave to achieve proper air-flow)
Water blow-off from coil	Excessive air-flow (adjust sheave to achieve proper air-flow) Containment on coil fans (clean coil) Damaged coil fins (comb out fins or replace coil)
TXV not controlling properly	TXV bulb not positioned correctly or clamp is not tight (check position of TXV sensing bulb and tightness of clamp) Failed TXV (replace) Plugged TXV inlet screen (clean or replace screen or replace TXV)
The refrigerant leak detection system detects an event and mitigation procedure occurs.	Check for refrigerant leaks.
The mitigation procedure is triggered when no event occurs.	Organic compounds could be falsely triggering mitigation procedure. Check the installation location for potential contaminants. The sensor is faulty; replace the sensor.

7.0 DECOMMISSIONING

7.1 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 Working Personnel** 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 **4.1.6 No Ignition Sources**.

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

Work shall be undertaken under a controlled procedure so as to minimize the risk of flammable gas or vapor being present while work is being performed. See **2.2 Importance of a Quality Installation**.

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

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

7.2 Decommissioning Procedure

Follow the decommissioning procedure outlined below:

READ ALL STEPS BEFORE BEGINNING.

1. Become familiar with the equipment, its operation, and its safety procedures.
2. Isolate the system electrically.
3. Ensure that mechanical handling equipment for the refrigerant cylinders is at hand, if required.
4. Ensure personal, protective equipment is being used correctly.
5. A competent supervisor must be present during the refrigerant recovery process. Ensure

such a person is available on site.

6. Confirm that the recovery equipment and cylinders are correct for the equipment and its refrigerant.
7. Follow the steps outlines in Section **4.7.6 Leak Testing** and Section **4.7.7 Removal and Evacuation of Refrigerant**.
8. If possible, pump down the refrigerant system.
9. If a vacuum is not possible, make a manifold so that the refrigerant can be removed from various parts of the system.
10. Make sure that the recovery cylinder is situated on the scale before recovery begins.
11. Start the recovery machine and operate it in accordance with its instructions.
12. Do not overflow the cylinders. No more than 80% volume liquid charge is allowed.
13. Do not exceed the maximum working pressure of the cylinder, even temporarily.
14. When the cylinders have been filled correctly and the process is complete, make sure that the cylinders and the recovery equipment are removed from the site promptly.
15. Verify all isolation valves on the unit are closed (off).
16. Recovered refrigerant shall not be charged into another unit unless a sample was taken prior to recovering the refrigerant and its been cleaned and checked.

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

8.0 INFORMATION FOR THE OWNER

8.1 General

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

For continuing high performance, and to minimize possible equipment failures, it is essential that periodic maintenance be performed on this equipment. This section provides general guidelines on what items require periodic maintenance and the recommended frequency for maintenance.

8.2 Cabinet Cleaning and Care

Annual cleaning of the exterior cabinet is recommended using a mild detergent, water, and cloth/sponge to remove dust, mold, and potentially corrosive contaminants that have collected on the cabinet. Do not apply wax to the cabinet since the painted surface is textured which will result in a white wax build-up.

8.3 Air Filters

Check the system filter every 30-90 days or as often as found to be necessary depending on the application. Clean or replace filters if found to be obstructed. New filters are available from a local distributor or industrial supply store.

A qualified installer, service agency, or HVAC professional should change the filters or instruct the building owner's maintenance personnel on how to access and change/clean the filters and how often this maintenance must be performed.

IMPORTANT: Do not operate the system without a filter in place as this will result in lint and contaminants accumulating on the coil resulting in reduced performance and possible icing of the coil.

8.4 Coil, Drain Pan, Drain Line

Inspect the indoor coil, drain pan, and drain line once each year for cleanliness and clean as necessary. Remove the filters and check the return side of the coil for lint and contaminants and flashlight.

IMPORTANT: Do not use caustic household drain cleaners with bleach in the condensate pan or near the indoor coil. Drain cleaners will quickly damage the indoor coil and condensate pan.

8.5 Outdoor Coil Cleaning

The outdoor fan draws air across the coil during operation which results in contaminants collecting on and between the aluminum fins. These contaminants restrict the air-

flow through the coil resulting in reduced capacity and efficiency and increases the temperature of the components that can reduce their life. Therefore, it is recommended that the outdoor coil be cleaned at least annually by a qualified service technician using a non-corrosive coil cleaner and low pressure water hose sprayer. Care must be taken not to damage or flatten out the fins by spraying the fins from an angle. Washing from the top of the coil down from the inside out is the most effective method of cleaning the coil. The exterior louver panels and unit top are easily removable to facilitate the coil cleaning task.

WARNING: Disconnect electrical power to the unit before removing the top panel or any electrical panel as the fan motor could start at any time and live electrical connections will be exposed.

8.6 Blower Lubrication & Cleaning

The ball bearing motor is pre-lubricated and does not require the addition of grease at time of installation. However, periodic cleaning out and renewing the grease in ball bearings may be necessary. Please note that extreme care must be exercised to prevent foreign matter from entering the bearing.

Over time, dust and contaminants may collect on the motor, especially if the air-filters have not been replaced or cleaned on a regular basis. The motor should be inspected annually and the exterior surface should be cleaned as needed and the air vents vacuumed out to remove any obstruction.

8.7 Blower Shaft Bearings, Bearing Collar Set Screws, Blower Wheel, Sheaves & Blower Drive Belt(s)

Inspection of the blower shaft bearings, bearing collar set screws, blower wheel, and the blower drive belt(s) is recommended every 6 months. Check bearing-collar set screws on the blower shaft to make sure they are still tight. Check the blower shaft bearings for smooth operation and lubricate or replace bearings if necessary. Inspect the blower wheel for accumulation of lint and contaminants or damage. Remove blower wheel and clean or replace if necessary. Inspect the motor and blower sheaves for excessive wear or damage and check set-screws or D bushing bolts for tightness. Replace sheaves and tighten screws and bolts as necessary. Check alignment of sheaves and adjust if necessary. Inspect the blower drive belt(s) for wear and proper tension. Replace the belt(s) and re-adjust the tension if necessary.

8.0 INFORMATION FOR THE OWNER

8.8 Motor Replacement

Only replace the blower motor with one with the equivalent voltage, horsepower rating, amp rating, and NEMA frame size to maintain factory performance and reliability.

8.9 Replacement Parts

Any replacement part used to replace parts originally supplied on equipment must be the same as or an approved alternate to the original part supplied. The manufacturer will not be responsible for replacement parts not designed to physically fit or operate within the design parameters the original parts were selected for.

These parts include but are not limited to: Heater controls, heater limit controls, heater elements, motor, motor capacitor, blower contactor, blower wheel, indoor coil, sheaves, blower shaft, bearings, and sheet metal parts.

When ordering replacement parts, it is necessary to order by part number and include with the order the complete model number and serial number from the unit data plate. (See Parts List for unit component part numbers).

All replacement parts must be compatible with R-454B refrigerant and approved by the unit manufacturer.

8.10 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 must be complete with leak-free disconnect couplings.

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

The recovered refrigerant must be processed according to local legislation in the correct recovery cylinder, and the

relevant waste transfer note arranged. DO NOT MIX REFRIGERANTS IN RECOVERY UNITS OR RECOVERY CYLINDERS.

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

8.11 Checking Electrical Components

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

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

Initial safety checks include:

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

8.12 Warranty Information

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

9.0 WIRING DIAGRAM

