RHEEM MANUFACTURING CO.			RESEARCH & DEVELOPMENT DEPARTMENT			
REV	01	REVISED TO REPLACE ILLUSTRATIONS ON PAGES 8 AND 10. REVISED SECTION 12.1. ADDED WIRING DIAGRAM SECTION AND MISCELLANEOUS TEXT REVISIONS. MJM	H-0043S003 10-12-17			
	02	REVISED FOR MISCELLANEOUS TEXT REVISIONS. VYM	Y-0699S065 05-30-19			

STANDARD TOLERANCE UNLESS OTHERWISE NOTED: -FRACTIONAL ± 1/32 -ANGULAR +1° -3° -DECIMAL ± .030 -REFERENCE ( )

NOTE: ALL BRAKES ARE 90° UNLESS OTHERWISE SPECIFIED

R&D DEPARTMENT PRINTED MATERIAL

NOTE:

WHEN PRINTED MATERIAL IS RECEIVED ON THIS PART NUMBER, CHECK THAT THE REVISION IS CORRECT AND THAT ANY SPECIAL INSTRUCTIONS LISTED BELOW WERE FOLLOWED.

SPECIAL INSTRUCTIONS

(3) 5/16" DIA. HOLES (TO FIT 3-RING BINDER) REQUIRED ALONG LEFT EDGE OF BOOKLET

NOTE: ALL CHANGES MADE TO THIS MANUAL MUST ALSO BE MADE TO 92-20521-109.

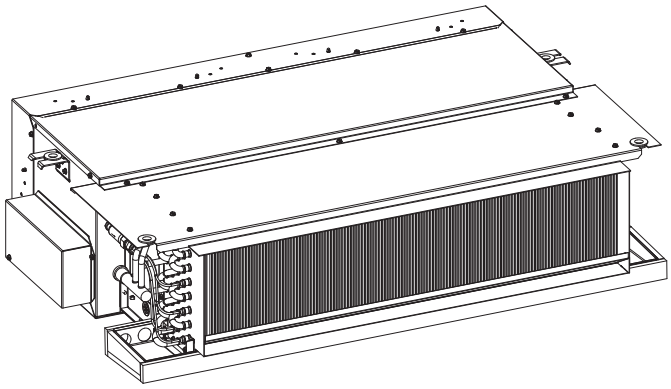
CHECKED BY:	APPROVED BY:	RELIAB. ENGR.:	VENDOR APPROVAL:	DR. BY: MJM DATE : 06-30-17	ORIGINAL RELEASE No.:	NL-1010S036	
TGJW	PJ						

INSTALLATION INSTRUCTIONS FOR EL3T- AIR HANDLERS - ENGLISH	PART NO. 92-20521-108	REV. 02

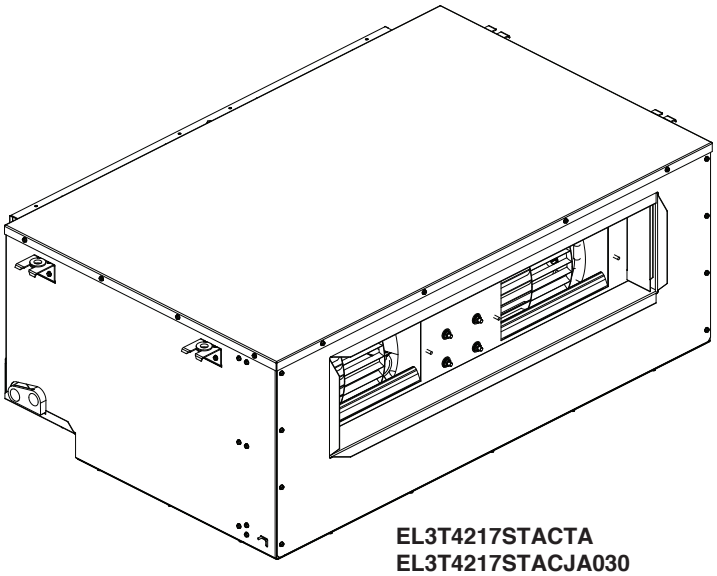
INSTALLATION INSTRUCTIONS

EL3T HIGH EFFICIENCY AIR HANDLERS

FEATURING INDUSTRY STANDARD R-410A REFRIGERANT



EL3T1812SPBCTA
EL3T1812SPBCJA030
EL3T2412SPBCTA
EL3T2212SPBCJA030
EL3T3012SPBCTA
EL3T2812SPBCJA030
EL3T3612SPBCTA
EL3T3212SPBCJA030



EL3T4217STACTA
EL3T4217STACJA030
EL3T4817STACTA
EL3T4817STACJA030
EL3T6017STACTA
EL3T5517STACJA030
EL3T6518STACTA
EL3T6518STACJA030

RECOGNIZE THIS SYMBOL AS AN INDICATION OF IMPORTANT SAFETY INFORMATION!

WARNING

These instructions are intended as an aid to qualified licensed service personnel for proper installation, adjustment and operation of this unit. Read these instructions thoroughly before attempting installation or operation. Failure to follow these instructions may result in improper installation, adjustment, service or maintenance possibly resulting in fire, electrical shock, property damage, personal injury or death.

SASO
الهيئة السعودية للمواصفات والمقاييس والجودة
Saudi Standards, Metrology and Quality Org.

Accredited by the RvA
ABS Quality Evaluations, Inc. Management System Certification
ANAB ACCREDITED
ISO 9001:2008
Certificate Number: 30164

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

92-20521-108-02
SUPERSEDES 92-20521-108-01

TABLE OF CONTENTS

⚠ WARNING (SEE SECTION 4.0: ELECTRICAL WIRING)

Disconnect all power to unit before installing or servicing. More than one disconnect switch may be required to de-energize the equipment. Hazardous voltage can cause severe personal injury or death.

⚠ WARNING (SEE SECTION 12.5: BLOWER ASSEMBLY REMOVAL & REPLACEMENT)

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 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.

⚠ WARNING

Because of possible damage to equipment or personal injury, installation, service, and maintenance should be performed by a trained, qualified service personnel. Consumer service is recommended only for filter cleaning/replacement. Never operate the unit with the access panels removed.

1.0 SAFETY INFORMATION

⚠ WARNING

Duct leaks can create an unbalanced system and draw pollutants such as dirt, dust, fumes and odors into the home 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 living space through leaking ducts and unbalanced duct systems causing personal injury or death (see Figure 1).

- **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 living space.**

⚠ 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.

⚠ WARNING

Make sure hands, tools or other objects do not come in contact with any rotating component(s) such as the blower wheel(s) or motor shaft. Personal injury or damage to equipment can occur.

⚠ WARNING (SEE SECTION 4.3: GROUNDING)

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

⚠ WARNING (SEE SECTION 12.0: MAINTENANCE)

Units with circuit breaker(s) meet requirements as a service disconnect switch, however, if access is required to the line side (covered) of the circuit breaker, this side of the breaker(s) will be energized with the breaker(s) de-energized. Contact with the line side can cause electrical shock resulting in personal injury or death.

⚠ WARNING (SEE SECTION 5.0: DUCTWORK)

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.

⚠ CAUTION

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 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.

Continued on next page ›

⚠ WARNING (SEE SECTION 12.6: MOTOR REPLACEMENT)

To avoid electrical shock which can result in personal injury or death, use only the screws furnished in the motor shell mounting holds. Screws are #8-18 × .25 in. long blunt nose thread forming. Screws longer than 1/4 in. may contact the motor winding.

⚠ WARNING (SEE SECTION 7.0: AIR FILTER)

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 air handler elements. This residue could soil ceilings, walls, drapes, carpets and other articles in the house.

Soot damage may occur with filters in place, when certain types of candles, oil lamps or standing pilots are burned.

⚠ WARNING

The first 36 inches of supply air plenum and ductwork must be constructed of sheet metal as required by NFPA 90B. The supply air plenum or duct must have a solid sheet metal bottom directly under the unit with no openings, registers or flexible air ducts located in it. 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. Metal plenum or duct may be connected to the combustible floor base, if not, it must be connected to the unit supply duct flanges such that combustible floor or other combustible material is not exposed to the supply air opening from the downflow unit. Exposing combustible (non-metal) material to the supply opening of a downflow unit can cause a fire resulting in property damage, personal injury or death.

Exceptions to downflow warnings:

• Installations on concrete floor slab with supply air plenum and ductwork completely encased in not less than 2 inches of concrete (See NFPA 90B).

⚠ CAUTION (SEE SECTION 3.3: HORIZONTAL)

Horizontal units must be configured for right hand air supply or left hand air supply. Horizontal drain pan must be located under indoor coil. Failure to use the drain pan can result in property damage.

⚠ CAUTION (SEE SECTION 2.1: RECEIVING)

In compliance with recognized codes, it is recommended that an auxiliary drain pan be installed under all evaporator coils or units 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. See accessories for auxiliary horizontal overflow pan RXBM.

⚠ NOTICE

When used in cooling applications, excessive sweating may occur when unit is installed in an unconditioned space. This can result in property damage.

⚠ NOTICE

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.

⚠ NOTICE

In compliance with recognized codes, it is recommended that an auxiliary drain pan be installed under all evaporator coils or units 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. See accessories section of these instructions for auxiliary horizontal overflow pan information (model RXBM).

⚠ NOTICE

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**
- **Removing the coil and storing it in a clean safe place is highly recommended until construction is completed and the outdoor unit is installed.**
- **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.**

2.0 GENERAL INFORMATION

2.1 IMPORTANT INFORMATION ABOUT EFFICIENCY AND INDOOR AIR QUALITY

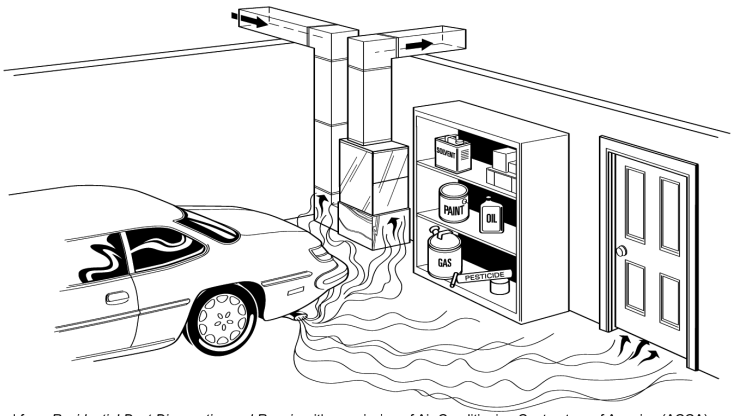
Reference the model nameplate on the unit for the following product information:

- Model Number
- Serial Number
- Country of Origin
- Rated Voltage and Frequency
- Rated T1 and T3 conditions for:
  - ◯ Rated Current
  - ◯ Rated Power (kW)
  - ◯ Rated Capacity
  - ◯ Rated EER

The Estimated Annual Energy Consumption of this product is calculated using the following formula:

Estimated Annual Energy Consumption = Rated Power (kW) at T1 conditions multiplied by 2700 working hours.

FIGURE 1
MIGRATION OF DANGEROUS SUBSTANCES, FUMES, AND ODORS INTO LIVING SPACES



Adapted from *Residential Duct Diagnostics and Repair,* with permission of Air Conditioning Contractors of America (ACCA).

⚠WARNING

Carbon Monoxide (CO) Poisoning Can Cause Severe Injury or Death.

Carbon Monoxide from the exhaust of motor vehicles and other fuel burning devices can be drawn into the living space by the operation of the central heating and air conditioning system.

Exhaust from motor vehicles, generators, garden tractors, mowers, portable heaters, charcoal and gas grills, gasoline powered tools, and outdoor camping equipment contains carbon monoxide, a poisonous gas that can kill you. You cannot see it, smell it, or taste it.

- **Do NOT operate an automobile or any engine in a garage for more than the few seconds it takes to enter or exit the garage.**
- **Do NOT operate any fuel-burning device in an enclosed or partly enclosed space, or near building windows, doors or air intakes.**

The U.S. Consumer Product Safety Commission (CPSC) and Health Canada recommend the installation of UL or CSA certified Carbon Monoxide Alarm(s) in every home.

⚠ WARNING

Duct leaks can create an unbalanced system and draw pollutants such as dirt, dust, fumes and odors into the home 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 living space through leaking ducts and unbalanced duct systems causing personal injury or death (see Figure 1).

- **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 living space.**

⚠ NOTICE

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.

Central cooling and heating equipment is only as efficient as the duct system that carries the cooled or heated air. To maintain efficiency, comfort and good indoor air quality, it is important to have the proper balance between the air being supplied to each room and the air returning to the cooling and heating equipment.

Proper balance and sealing of the duct system improves the efficiency of the heating and air conditioning system and improves the indoor air quality of the home by reducing the amount of airborne pollutants that enter homes from spaces where the ductwork and/or equipment is located. The manufacturer and the U.S. Environmental Protection Agency's Energy Star Program recommend that central duct systems be checked by a qualified contractor for proper balance and sealing.

⚠ NOTICE

In compliance with recognized codes, it is recommended that an auxiliary drain pan be installed under all evaporator coils or units 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. See accessories section of these instructions for auxiliary horizontal overflow pan information (model RXBM).

2.2 RECEIVING

Immediately upon receipt, all cartons and contents should be inspected for transit damage. Units with damaged cartons should be opened immediately. If damage is found, it should be noted on the delivery papers, and a damage claim filed with the last carrier.

- After unit has been delivered to job site, remove carton taking care not to damage unit.
- Check the unit rating plate for unit size, electric heat, coil, voltage, phase, etc. to be sure equipment matches what is required for the job specification.
- Read the entire instructions before starting the installation.
- Some building codes require extra cabinet insulation and gasketing when unit is installed in attic applications.
- If installed in an unconditioned space, apply caulking around the 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. Caulking is required to pre-vent air leakage into and condensate from forming inside the unit, control box, and on electrical controls.
- Install the unit in such a way as to allow necessary access to the coil/filter rack and blower/control compartment.
- Install the unit in a level position to ensure proper condensate drainage. Make sure unit is level in both directions within 1/8".

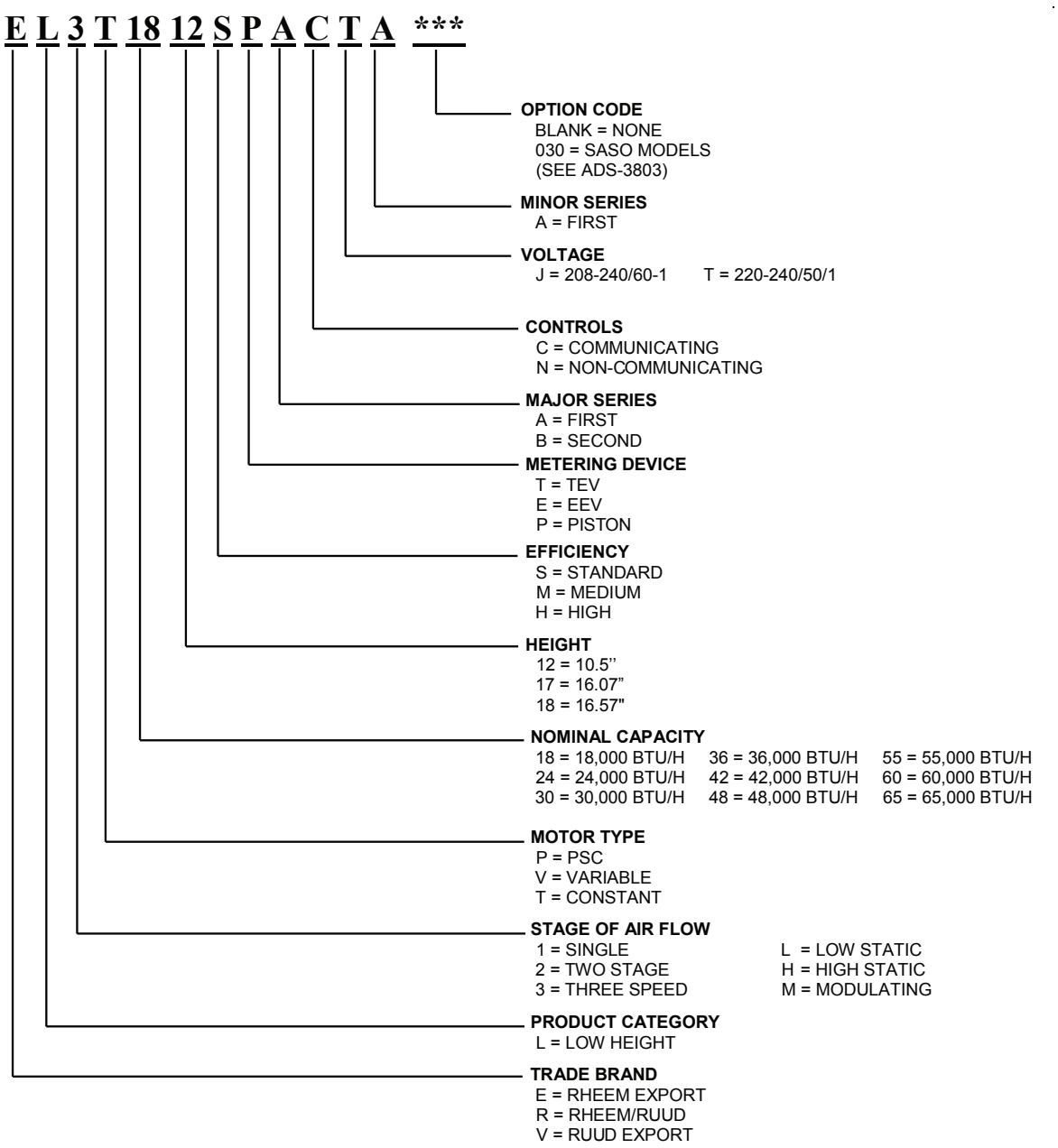
- Install the unit in accordance with any local code which may apply and the national codes. Latest editions are available from: “National Fire Protection Association, Inc., Batterymarch Park, Quincy, MA 02269.” These publications are:
  - ANSI/NFPA No. 70-(Latest Edition) National Electrical Code.
  - NFPA90A Installation of Air Conditioning and Ventilating Systems.
  - NFPA90B Installation of warm air heating and air conditioning systems.
- The equipment has been evaluated in accordance with the Code of Federal Regulations, Chapter XX, Part 3280.

2.3 CLEARANCES

- All units are designed for “0” inches clearance to combustible material on all cabinet surfaces.
- Units with electric heat require a one inch clearance to combustible material for the first three feet of supply plenum and ductwork.
- All units require 24 inches minimum access to the front of the unit for service.
- These units may be installed in either ventilated or nonventilated spaces.

2.4 MODEL NUMBER EXPLANATION

FIGURE 2
MODEL NUMBER EXPLANATION



2.4A AVAILABLE MODELS

AVAILABLE MODELS AT J VOLTAGE

(-)L3T1812SPBCJA030
(-)L3T2212SPBCJA030
(-)L3T2812SPBCJA030
(-)L3T3212SPBCJA030
(-)L3T4217STACJA030
(-)L3T4817STACJA030
(-)L3T5517STACJA030
(-)L3T6518STACJA030

AVAILABLE MODELS AT T VOLTAGE

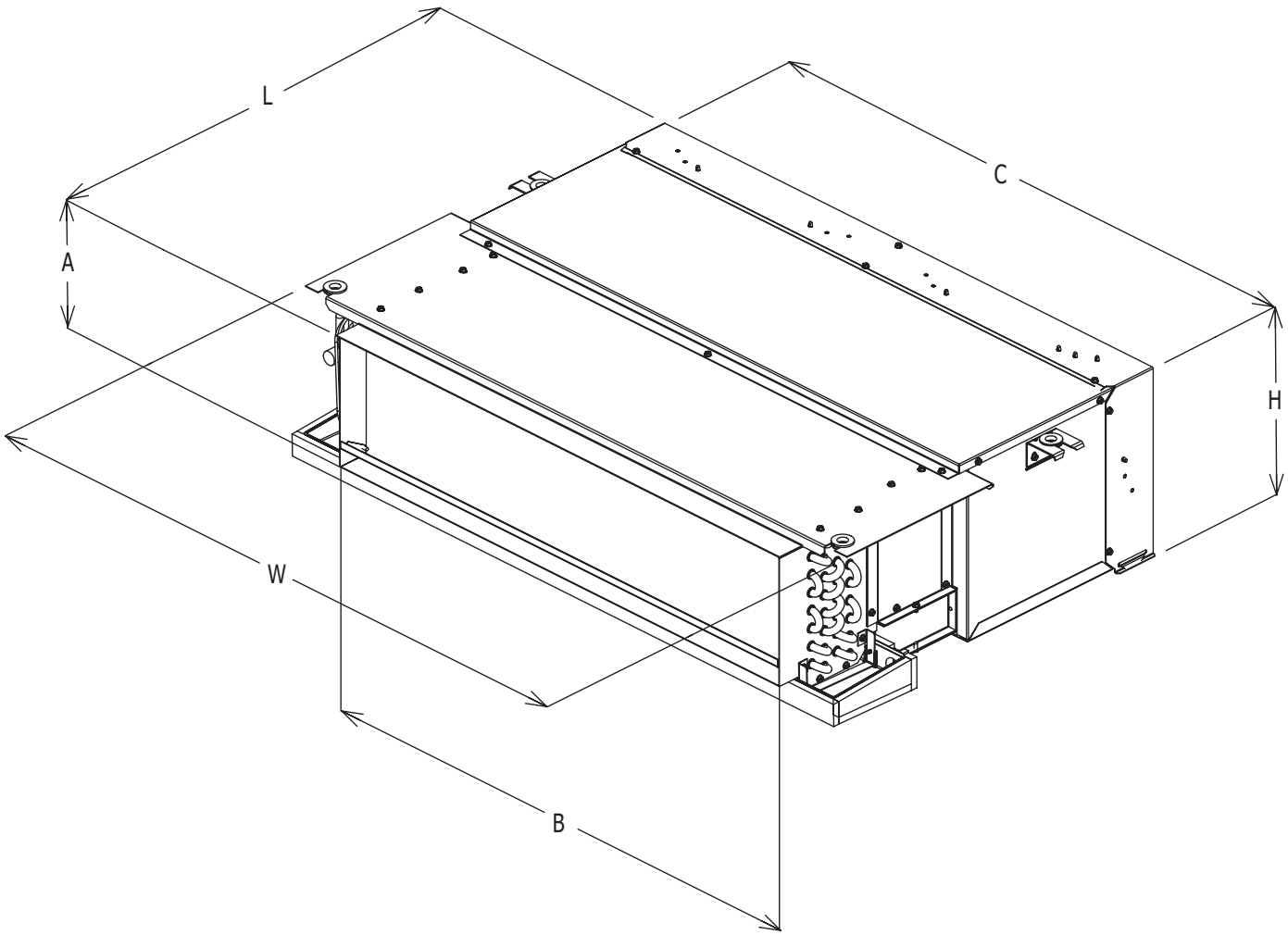
(-)L3T1812SPBCTA	(-)L3T4217STACTA
(-)L3T2412SPBCTA	(-)L3T4817STACTA
(-)L3T3012SPBCTA	(-)L3T6017STACTA
(-)L3T3612SPBCTA	(-)L3T6517STACTA

Notes:

- Supply circuit protective devices may be fuses or “HACR” type circuit breakers.
- Largest motor load is included in single circuit and multiple circuit 1.
- If non-standard fuse size is specified, use next size larger fuse size.
- The air handlers are shipped from the factory with the proper indoor coil installed, and cannot be ordered without a coil.

2.5 DIMENSIONS & WEIGHTS

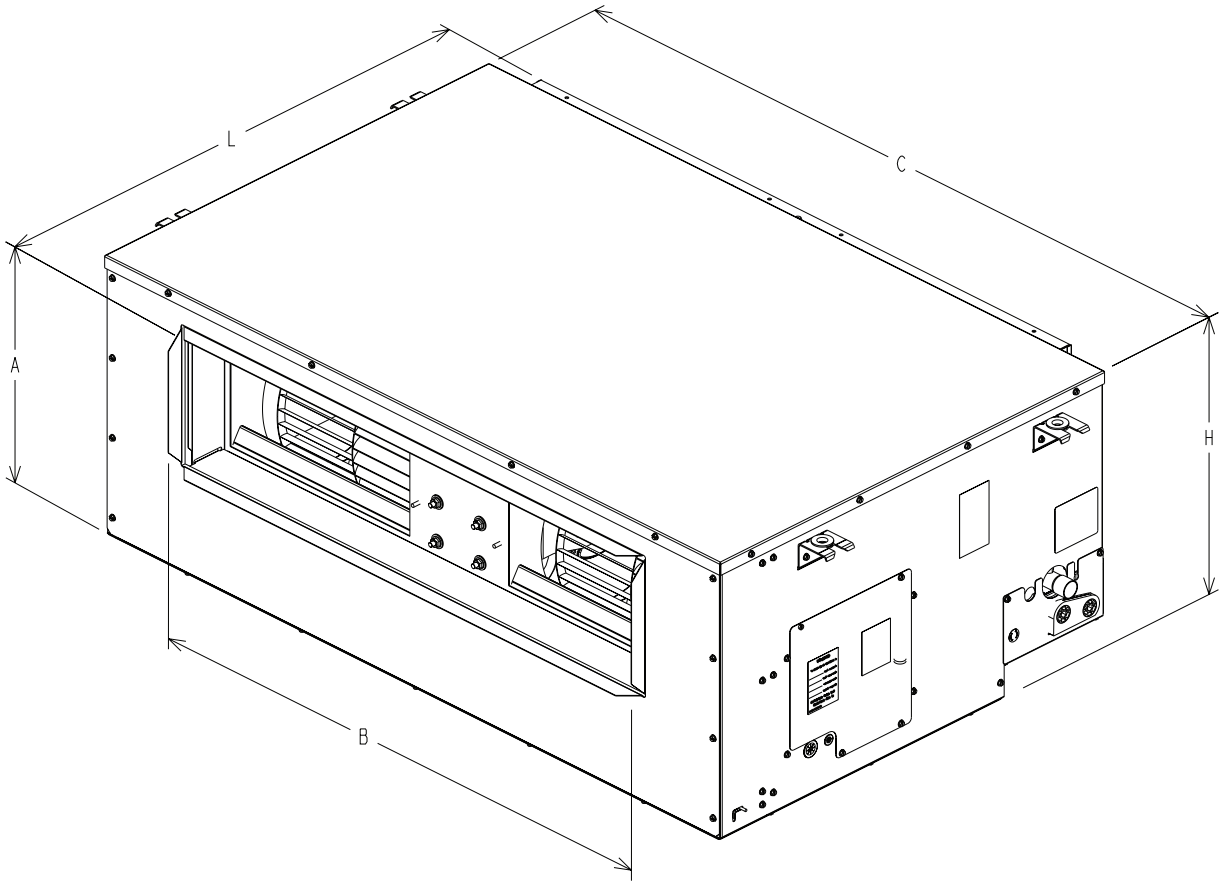
FIGURE 3
DIMENSIONS AND WEIGHTS (1.5 - 3 Ton Models)



MODEL (EL3T)	REFRIGERANT CONNECTIONS SWEAT (IN.) [mm] ID		UNIT HEIGHT IN. [mm]	UNIT WIDTH IN. [mm]	SUPPLY DUCT		RETURN DUCT	UNIT WEIGHT/ SHIPPING WEIGHT LBS. [KG]
					A In. [mm]	B In. [mm]	C In. [mm]	
	LIQUID	VAPOR						
1812, 2212, 2412	⅜ " [9.53]	¾" [19.05]	10.5 " [264.54]	37" [939.80]	7.25 " [183.90]	30" [763.73]	33.5 " [850.95]	78/84.62 [35.38/38.38]
2812, 3012, 3212, 3612	⅜" [9.53]	¾" [19.05]	10.5 " [264.54]	49" [1244.60]	7.25" [183.90]	42" [1066.80]	45.5" [1155.70]	98/104.60 [44.45/47.45]

2.5 DIMENSIONS & WEIGHTS

FIGURE 4
DIMENSIONS AND WEIGHTS (3.5 - 5.5 Ton Models)



MODEL (EL3T)	REFRIGERANT CONNECTIONS SWEAT IN. (mm) ID		UNIT HEIGHT IN (mm)	UNIT WIDTH IN. (mm)	SUPPLY DUCT		RETURN DUCT	UNIT WEIGHT/ SHIPPING WEIGHT LBS. [KG]
	LIQUID	VAPOR			A IN. (mm)	B IN. (mm)	C IN. (mm)	
4217	3/8"[9.53]	3/4"[19.05]	16.07 [408.2]	47.1 [1196]	11.65 [296]	37.63 [956]	32.556	126.5/134.0 [57.38/60.78]
4817, 5517, 6017	3/8"[9.53]	3/4"[19.05]	16.07 [408.2]	60.2 [1530]	11.69 [297]	50.68 [1287]	34.090	147.5/155.0 [66.9/70.3]
6518	3/8"[9.53]	3/4"[19.05]	16.57 [420.9]	61.6 [1564]	12.99 [330]	52.38 [1330]	34.090	176.5/184.5 [80/83.6]

3.0 APPLICATIONS/INSTALLATION

3.1 HORIZONTAL RETURN (ALL MODELS)

- Horizontal return is the factory configuration for all models (see Figure 3 & 4).
- A minimum of 24 inches (62 centimeters) clearance directly below the bottom control box is required for service access.
- A minimum of 24 inches (62 centimeters) clearance directly below the filter frame door is required to service the return air filters (see Figure 5).

Note: The clearances mentioned may be achieved by removing a ceiling panel or some other type of ceiling access panel beneath the unit.

FIGURE 5
CLEARANCE FOR SERVICE ACCESS

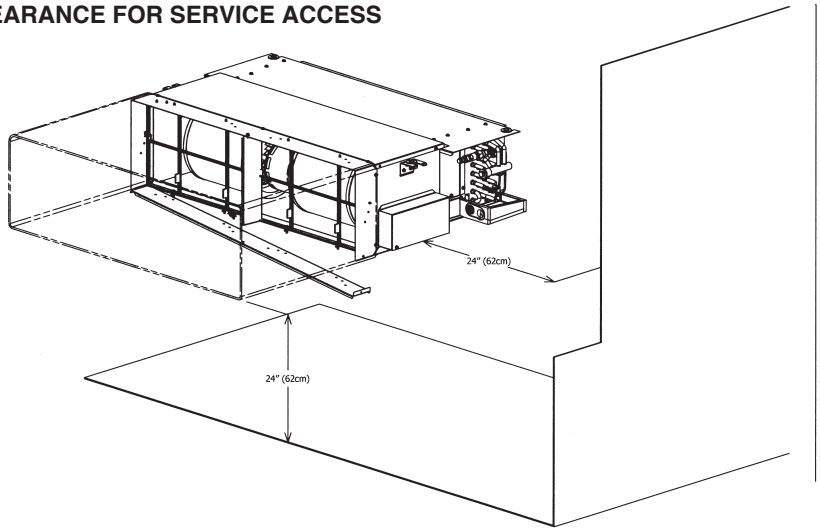
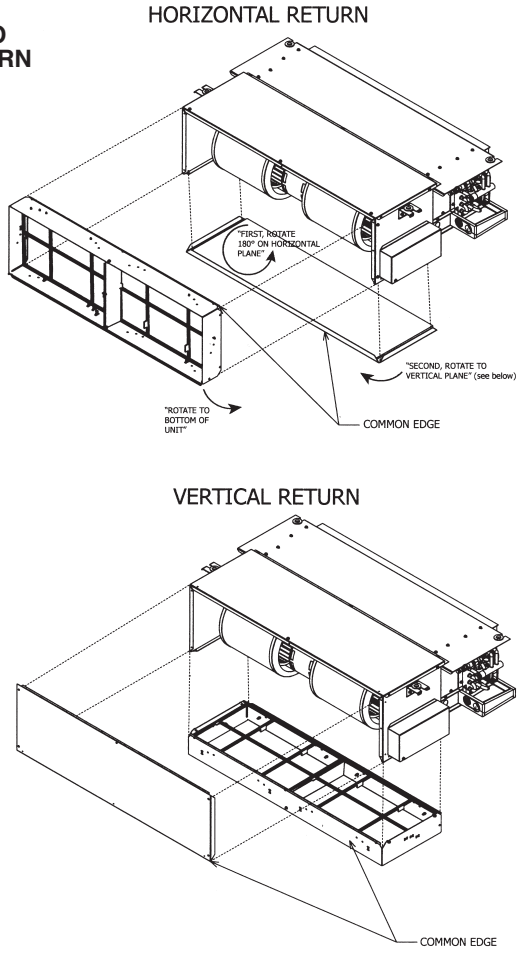


FIGURE 6
CONVERSION TO VERTICAL RETURN



3.2 VERTICAL RETURN (1.5 - 3 Ton Models Only)

Conversion to Vertical Return: For ease of installation, it is preferred that the user convert the return air configuration prior to installing the air handler. A horizontal return unit may be converted to vertical return before or after installation. If such conversion is expected after installation, the user should consider that sufficient top, bottom and side clearance is required to remove screws fastening the filter frame and the bottom panel. See Figure 6 for conversion instructions.

- Allow a minimum of 24 inches (62 centimeters) bottom clearance for access to bottom control box.
- Allow a minimum of 24 inches (62 centimeters) rear clearance for filter access if return air is to be ducted.

Note: The clearances mentioned may be achieved by removing a ceiling panel or some other type of ceiling access panel beneath the unit.

3.3 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, we recommend the following for all air handler applications, but special attention should be paid to those installed in unconditioned spaces:

- Duct sizing and airflow are critical and 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.
- No perimeter supply flanges are provided. If a full perimeter supply duct is used, it is the responsibility of the installer to provide duct flanges as needed, to secure and seal the supply duct to prevent air leakage and the sweating that will result.
- All wire penetrations should be sealed. Take care not to damage, remove or compress insulation in those cases.
- 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.
- As required, use a secondary pan that will protect the structure from excessive sweating or a restricted coil drain line.
- If a heater kit is installed, be sure the breaker or disconnect cover is sealed tightly to the door panel.

3.4 UNIT INSTALLATION

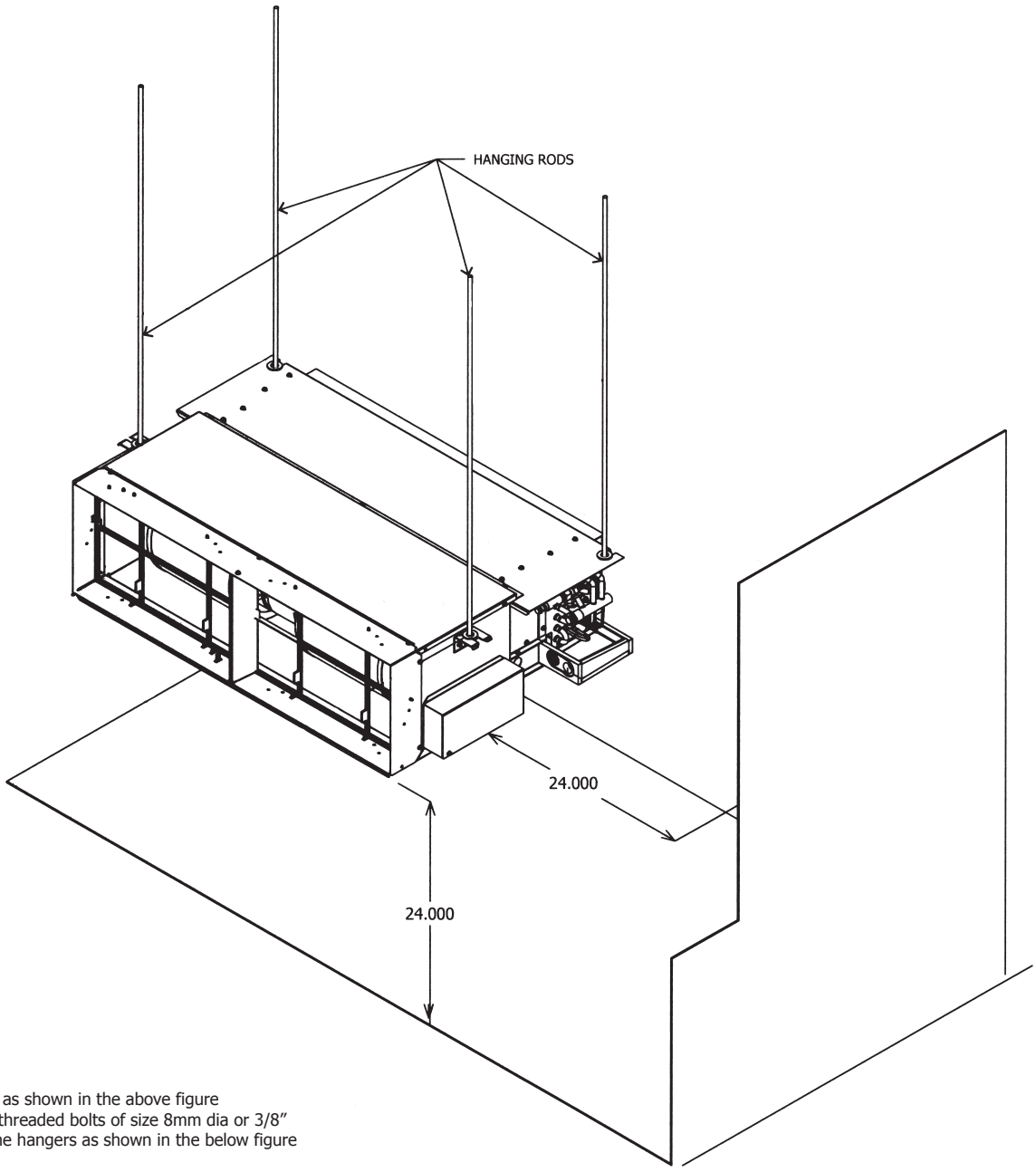
- Choose desired return air configuration and convert if necessary (refer to sections 3.1 and 3.2).
- Use template on the inside top piece of the box that the unit came in to space the hanging rods (use either 8mm or ⅜ inch diameter threaded rod).
- Ensure that the hanging rods are secure and will be sufficient to support the weight of the air handler.
- Locate the unit as shown in Figure 7 and hang on threaded rods.
- Lock the unit on the hangers using appropriate sized washers and nuts on top and bottom of the hanging brackets as shown in Figure 8.
- Ensure unit is level to allow for proper condensate drainage during operation.

3.5 FREE RETURN (NON-DUCTED) APPLICATIONS

The (-)L3T air handler series can be installed in non-ducted applications. The return plenum must be completely sealed except for the return grille so that all return air will be pulled from the conditioned space.

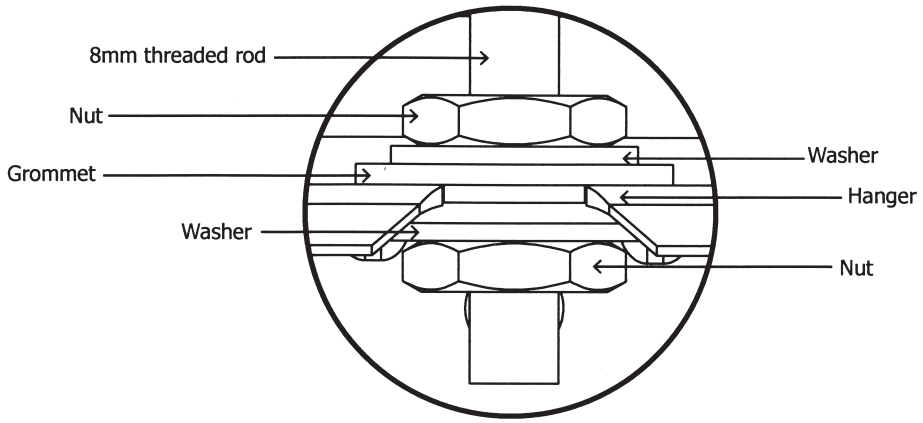
Note: For ducted applications refer to section 6.0 of this manual.

FIGURE 6
HANGING RODS POSITION



*Locate the unit as shown in the above figure
*Hang it on the threaded bolts of size 8mm dia or 3/8”
*Lock the unit the hangers as shown in the below figure

FIGURE 8



4.0 ELECTRICAL WIRING

Field wiring must comply with any applicable national and local codes.

⚠ WARNING

Disconnect all power to unit before installing or servicing. More than one disconnect switch may be required to de-energize the equipment. Hazardous voltage can cause severe personal injury or death.

4.1 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.

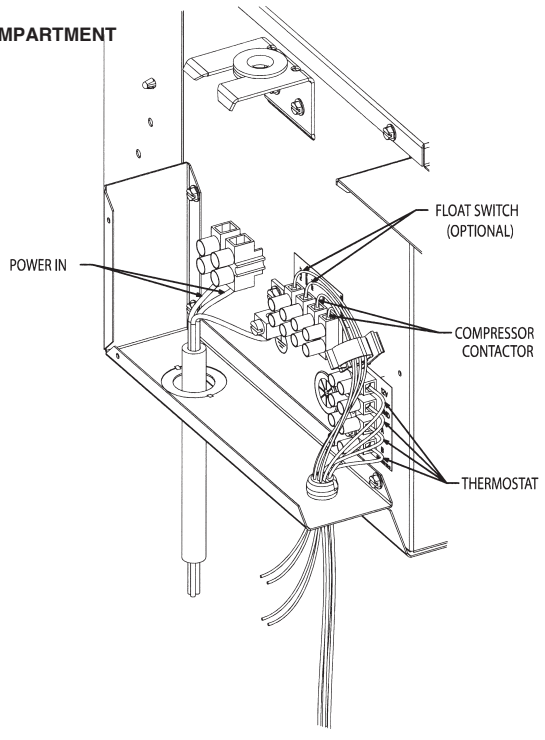
- If required, install a branch circuit disconnect of adequate size, located within sight of, and readily accessible to the unit.
- **IMPORTANT:** After the Electric Heater is installed, units may be equipped with one, two, or three 30/60 amp. circuit breakers. These breaker(s) protect the internal wiring in the event of a short circuit and serve as a disconnect. Circuit breakers installed within the unit do not provide over-current protection of the supply wiring and therefore may be sized larger than the branch circuit protection.
- Supply circuit power wiring must be 75°C minimum copper conductors only. See Electrical Data in this section for ampacity, wire size and circuit protector requirement. Supply circuit protective devices may be either fuses or “HACR” type circuit breakers.
- Power wiring is connected to the power terminal block in unit side control compartment.

4.2 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.

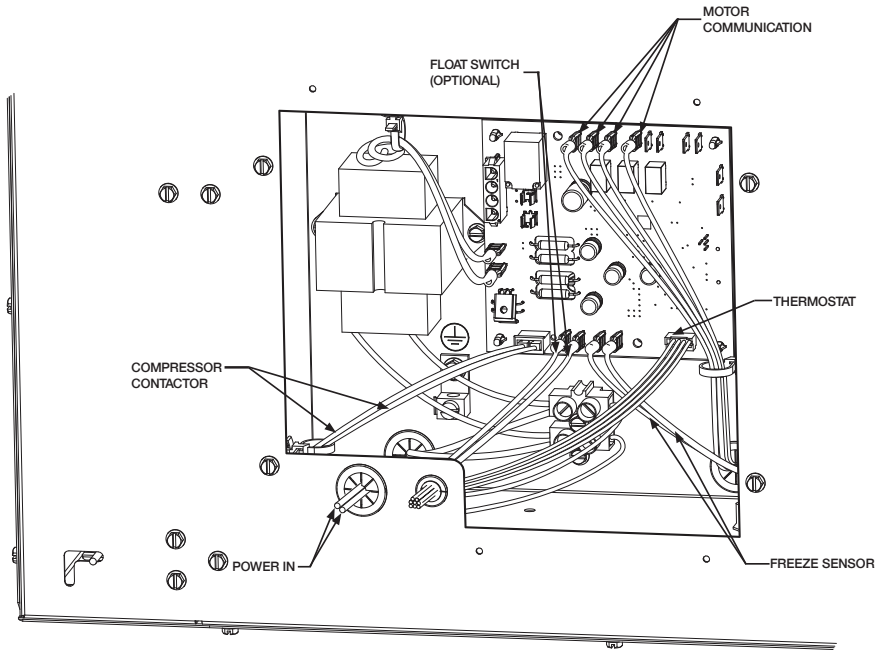
- Low voltage control wiring is color coded 20 Awg.
- Low voltage control connections are made to low voltage terminal block in unit side control compartment.
- See wiring diagrams attached to indoor and outdoor sections to be connected.
- Install plastic strain relief bushing in control box with thermostat wires as shown in Figure 9 (1.5 - 3 Ton Models Only).
- Make sure, after installation, separation of control wiring and power wiring has been maintained.

FIGURE 9
CONTROL BOX COMPARTMENT
(1.5 - 3 Ton Models)



SEE WIRING DIAGRAM 90-106418-01 FOR CORRECT COLOR CODE

FIGURE 10
CONTROL BOX COMPARTMENT
(3.5 - 5.5 Ton Models)



SEE WIRING DIAGRAM 90-106418-01 FOR CORRECT COLOR CODE

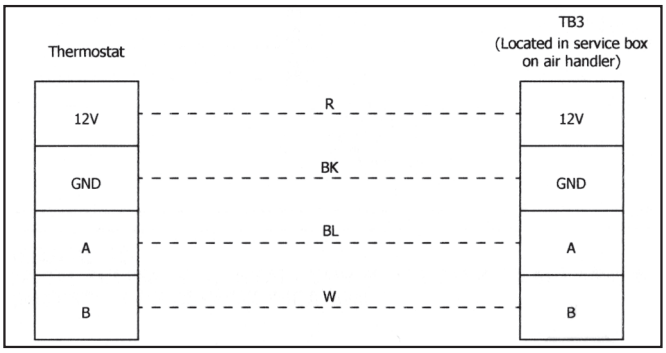
4.2B THERMOSTAT CONNECTIONS (-)L3T

NOTE: These low voltage application diagrams are generic. Your indoor/outdoor units may not have all the characteristics shown or may not wire exactly as shown. Refer to the diagrams and information sent with your indoor/outdoor sections.

WIRE COLOR CODE:

BK - BLACK	G - GREEN	PR - PURPLE	Y - YELLOW	GL - BLUE
BR - BROWN	GY - GRAY	R - RED	O - ORANGE	W - WHITE

FIGURE 11
TYPICAL THERMOSTAT: STD COOLING



4.3 GROUNDING

- 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(s) to ground lug(s) provided in the unit wiring compartment.
- Ground lug(s) are located inside service access control box on side of unit.
- Use of multiple supply circuits require grounding of each circuit to lug(s) provided in unit.

⚠ WARNING

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

4.4 ELECTRICAL WIRING

POWER WIRING

- Field wiring must comply with the National Electrical Code (C.E.C. in Canada) and any applicable local ordinance.
- Supply wiring must be 75°C minimum copper conductors only.
- See electrical data for product Ampacity rating and Circuit Protector requirement.

GROUNDING

- This product must be sufficiently grounded in accordance with National Electrical Code (C.E.C. in Canada) and any applicable local ordinance.
- A grounding lug is provided.

4.5 ELECTRICAL DATA – BLOWER MOTOR ONLY – NO ELECTRIC HEAT (-)L3T

MODEL (-)L3T	VOLTAGE	PHASE*	FREQUENCY (HERTZ)	HP	RPM	SPEEDS	CIRCUIT AMPS	MINIMUM CIRCUIT AMPACITY	MAXIMUM CIRCUIT PROTECTOR
1812, 2212, 2412	208-240	1	50/60	1/3	300-1800	5	3.0	4	15
2812, 3012, 3212, 3612			50/60	1/2		5	4.1	5	15
4217, 4817			50/60	3/4		5	5.7	6	15
5517, 6017			50/60	1		5	7.0	8	15
6518			50/60	1		5	7.0	8	15

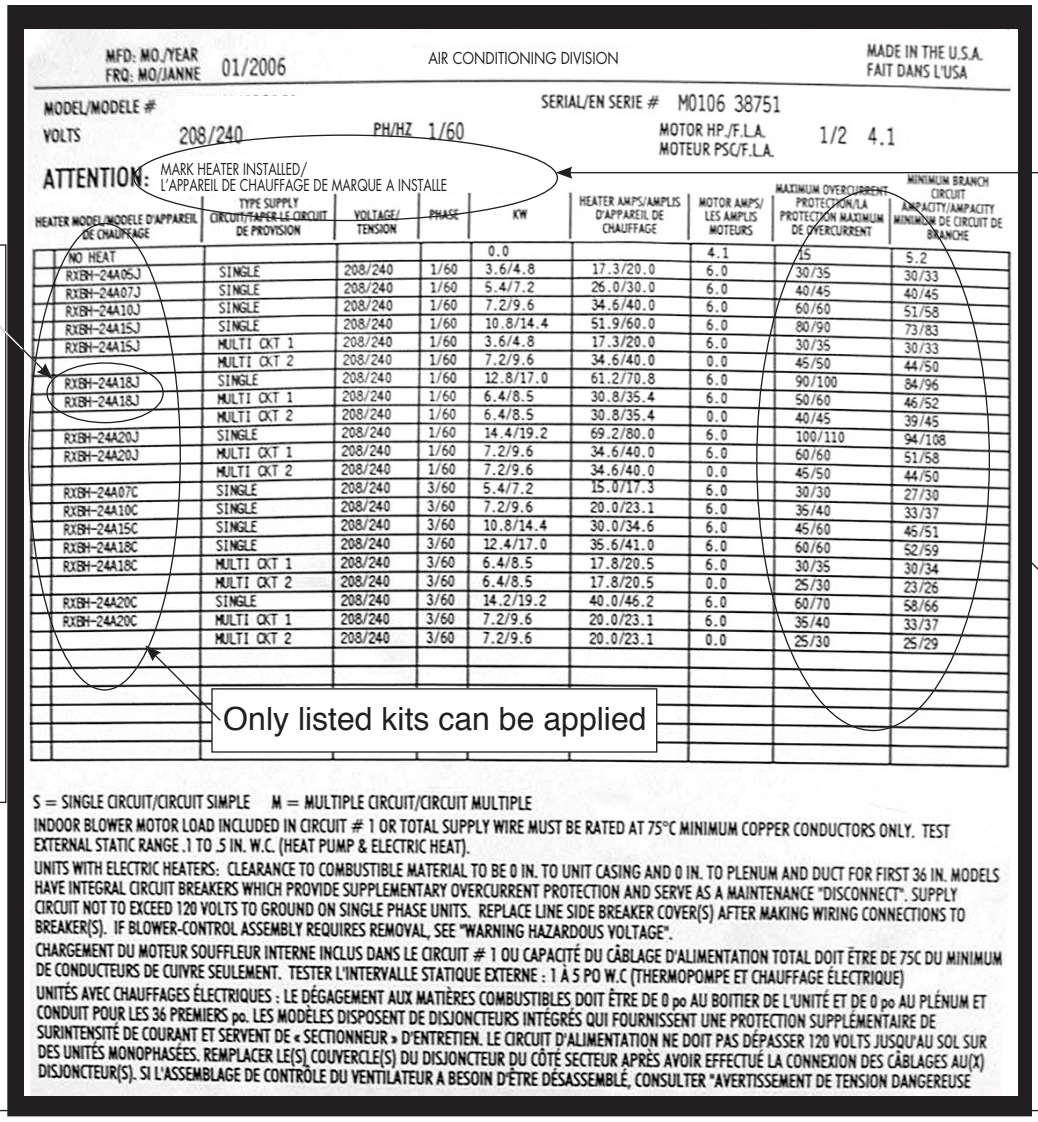
*Blower motors are all single phase motors.

4.6 COPPER WIRE SIZE - AWG. (3% VOLTAGE DROP)

SUPPLY WIRE LENGTH FEET																		
200 [61]	12	10	8	8	8	6	6	6	4	4	3	3	2	2	1	0	00	
150 [46]	12	10	10	10	8	8	6	6	6	4	4	3	3	2	1	0	00	
100 [30]	14	12	10	10	8	8	8	6	6	4	4	3	3	2	1	0	00	
50 [15]	14	12	10	10	8	8	8	6	6	4	4	3	3	2	1	0	00	
	15	20	25	30	35	40	45	50	60	70	80	90	100	110	125	150	175	
SUPPLY CIRCUIT AMPACITY																		

NOTE: WIRE BASED ON COPPER CONDUCTORS 75°C MINIMUM RATING.
FOR MORE THAN 3 CONDUCTORS IN A RACEWAY OR CABLE, SEE N.E.C. FOR DERATING THE AMPACITY OF EACH CONDUCTOR.

4.7 HEATER KIT SUPPLEMENTAL INFORMATION



MFD: MO./YEAR 01/2006 — AIR CONDITIONING DIVISION — MADE IN THE U.S.A. FAIT DANS L'USA

MODEL/MODELE # — SERIAL/EN SERIE # M0106 38751

VOLTS 208/240 — PH/HZ 1/60 — MOTOR HP./F.L.A. 1/2 4.1 — MOTEUR PSC/F.L.A.

ATTENTION: MARK HEATER INSTALLED/ L'APPAREIL DE CHAUFFAGE DE MARQUE A INSTALLE

HEATER MODEL/MODELE D'APPAREIL DE CHAUFFAGE	TYPE SUPPLY CIRCUIT/TAPER LE CIRCUIT DE PROVISION	VOLTAGE/ TENSION	PHASE	KW	HEATER AMPS/AMPLIS D'APPAREIL DE CHAUFFAGE	MOTOR AMPS/ LES AMPLIS MOTEURS	MAXIMUM OVERCURRENT PROTECTION/LA PROTECTION MAXIMUM DE OVERCURRENT	MINIMUM BRANCH CIRCUIT AMPACITY/AMPACITY MINIMUM DE CIRCUIT DE BRANCHE
NO HEAT				0.0		4.1	15	5.2
RXBH-24A05J	SINGLE	208/240	1/60	3.6/4.8	17.3/20.0	6.0	30/35	30/33
RXBH-24A07J	SINGLE	208/240	1/60	5.4/7.2	26.0/30.0	6.0	40/45	40/45
RXBH-24A10J	SINGLE	208/240	1/60	7.2/9.6	34.6/40.0	6.0	60/60	51/58
RXBH-24A15J	SINGLE	208/240	1/60	10.8/14.4	51.9/60.0	6.0	80/90	73/83
RXBH-24A15J	MULTI CKT 1	208/240	1/60	3.6/4.8	17.3/20.0	6.0	30/35	30/33
	MULTI CKT 2	208/240	1/60	7.2/9.6	34.6/40.0	0.0	45/50	44/50
RXBH-24A18J	SINGLE	208/240	1/60	12.8/17.0	61.2/70.8	6.0	90/100	84/96
RXBH-24A18J	MULTI CKT 1	208/240	1/60	6.4/8.5	30.8/35.4	6.0	50/60	46/52
	MULTI CKT 2	208/240	1/60	6.4/8.5	30.8/35.4	0.0	40/45	39/45
RXBH-24A20J	SINGLE	208/240	1/60	14.4/19.2	69.2/80.0	6.0	100/110	94/108
RXBH-24A20J	MULTI CKT 1	208/240	1/60	7.2/9.6	34.6/40.0	6.0	60/60	51/58
	MULTI CKT 2	208/240	1/60	7.2/9.6	34.6/40.0	0.0	45/50	44/50
RXBH-24A07C	SINGLE	208/240	3/60	5.4/7.2	15.0/17.3	6.0	30/30	27/30
RXBH-24A10C	SINGLE	208/240	3/60	7.2/9.6	20.0/23.1	6.0	35/40	33/37
RXBH-24A15C	SINGLE	208/240	3/60	10.8/14.4	30.0/34.6	6.0	45/60	46/51
RXBH-24A18C	SINGLE	208/240	3/60	12.4/17.0	35.6/41.0	6.0	60/60	52/59
RXBH-24A18C	MULTI CKT 1	208/240	3/60	6.4/8.5	17.8/20.5	6.0	30/35	30/34
	MULTI CKT 2	208/240	3/60	6.4/8.5	17.8/20.5	0.0	25/30	23/26
RXBH-24A20C	SINGLE	208/240	3/60	14.2/19.2	40.0/46.2	6.0	60/70	58/66
RXBH-24A20C	MULTI CKT 1	208/240	3/60	7.2/9.6	20.0/23.1	6.0	35/40	33/37
	MULTI CKT 2	208/240	3/60	7.2/9.6	20.0/23.1	0.0	25/30	25/29

Only listed kits can be applied

S = SINGLE CIRCUIT/CIRCUIT SIMPLE M = MULTIPLE CIRCUIT/CIRCUIT MULTIPLE

INDOOR BLOWER MOTOR LOAD INCLUDED IN CIRCUIT # 1 OR TOTAL SUPPLY WIRE MUST BE RATED AT 75°C MINIMUM COPPER CONDUCTORS ONLY. TEST EXTERNAL STATIC RANGE .1 TO .5 IN. W.C. (HEAT PUMP & ELECTRIC HEAT).

UNITS WITH ELECTRIC HEATERS: CLEARANCE TO COMBUSTIBLE MATERIAL TO BE 0 IN. TO UNIT CASING AND 0 IN. TO PLENUM AND DUCT FOR FIRST 36 IN. MODELS HAVE INTEGRAL CIRCUIT BREAKERS WHICH PROVIDE SUPPLEMENTARY OVERCURRENT PROTECTION AND SERVE AS A MAINTENANCE "DISCONNECT". SUPPLY CIRCUIT NOT TO EXCEED 120 VOLTS TO GROUND ON SINGLE PHASE UNITS. REPLACE LINE SIDE BREAKER COVER(S) AFTER MAKING WIRING CONNECTIONS TO BREAKER(S). IF BLOWER-CONTROL ASSEMBLY REQUIRES REMOVAL, SEE "WARNING HAZARDOUS VOLTAGE".

CHARGEMENT DU MOTEUR SOUFFLEUR INTERNE INCLUS DANS LE CIRCUIT # 1 OU CAPACITÉ DU CÂBLAGE D'ALIMENTATION TOTAL DOIT ÊTRE DE 75C DU MINIMUM DE CONDUCTEURS DE CUIVRE SEULEMENT. TESTER L'INTERVALLE STATIQUE EXTERNE : 1 À 5 PO W.C (THERMOPOMPE ET CHAUFFAGE ÉLECTRIQUE)

UNITÉS AVEC CHAUFFAGES ÉLECTRIQUES : LE DÉGAGEMENT AUX MATIÈRES COMBUSTIBLES DOIT ÊTRE DE 0 po AU BOITIER DE L'UNITÉ ET DE 0 po AU PLÉNUM ET CONDUIT POUR LES 36 PREMIERS po. LES MODÈLES DISPOSENT DE DISJONCTEURS INTÉGRÉS QUI FOURNISSENT UNE PROTECTION SUPPLÉMENTAIRE DE SURINTENSITÉ DE COURANT ET SERVENT DE « SECTIONNEUR » D'ENTRETIEN. LE CIRCUIT D'ALIMENTATION NE DOIT PAS DÉPASSER 120 VOLTS JUSQU'AU SOL SUR DES UNITÉS MONOPHASÉES. REMPLACER LE(S) COUVERCLE(S) DU DISJONCTEUR DU CÔTÉ SECTEUR APRÈS AVOIR EFFECTUÉ LA CONNEXION DES CÂBLAGES AU(X) DISJONCTEUR(S). SI L'ASSEMBLAGE DE CONTRÔLE DU VENTILATEUR A BESOIN D'ÊTRE DÉSASSEMBLÉ, CONSULTER "AVERTISSEMENT DE TENSION DANGEREUSE

If a heater kit is listed both Single and Multi-circuit, the kit is shipped as a Multi-circuit and will require a single point kit.

Contractor should "mark or check" the left column for the kit installed.

These are the required maximum and minimum circuit breaker sizes for overcurrent protection and should not be confused with the size of the breakers installed in the heater kit.

Heater Kit Supplemental Information: What allows the manufacturer to use standard Circuit Breakers up to 60 amps inside the air handler, when using an approved Heater Kit?

National Electric Code (Section 424-22b) and our UL requirements allow us to subdivide heating element circuits, of less than 48 amps, using breakers of not more than 60 amps and, additionally by, NEC 424-3b, a rating not less than 125 percent of the load and NEC 424-22c, which describes the supplementary overcurrent protection required to be factory-installed within, or on the heater. The breakers in the heater kit are not, and have never been, by NEC, intended to protect power wiring leading to the air handler unit. The breakers in the heating kit are for short circuit protection. All internal unit wiring, where the breakers apply, has been UL approved for short circuit protection.

Ampacity, (not breaker size), determines supply circuit wire size. The ampacity listed on the unit rating plate and the Maximum and Minimum circuit breaker size (noted above) or in the units specification sheet or installation instructions provides the information to properly select wire and circuit breaker/protector size. The National Electric Code (NEC) specifies that the supply or branch circuit must be protected at the source.

5.0 AIRFLOW PERFORMANCE

Airflow performance data is based on cooling performance with a coil and no filter in place. Select performance table for appropriate unit size, voltage and number of electric heaters to be used. Make sure external static applied to unit allows operation within the minimum and maximum limits shown in table below for both cooling and electric heat operation. For optimum blower performance, operate the unit in the .3 to .7 in W.C. external static range.

5.2 AIRFLOW PERFORMANCE DATA - EL3T----SPACTA (50HZ WITH CONSTANT TORQUE MOTOR)

Model No. EL3T	Tonnage Application	Blower Size/ Motor HP [W] # of Speeds	Speed Tap	Torque Value lb*in [N*m]		CFM [L/s] Air Delivery/RPM/Watts -- 220-230 Volts				
						External Static Pressure -- Inches W.C. [kPa]				
						0.1 [.02]	0.2 [.05]	0.3 [.07]	0.4 [.10]	0.5 [.12]
1812SP	1.5 Ton	6x8 1/3HP [249] 5 Speed	1	2.6 [.294]	SCFM	350	276	199	-	-
					RPM	872	990	1118	-	-
					Watts	36.1	41.1	45.6	-	-
			2	3.4 [.384]	SCFM	450	380	306	-	-
					RPM	983	1070	1182	-	-
					Watts	52.3	55.2	59.5	-	-
			3	3.8 [.429]	SCFM	490	429	354	-	-
					RPM	1018	1114	1216	-	-
					Watts	57.8	63.7	69.2	-	-
			4	4.2 [.475]	SCFM	525	472	407	-	-
					RPM	1074	1150	1245	-	-
					Watts	68.2	72.8	78.6	-	-
			5	6.5 [.735]	SCFM	700	638	583	-	-
					RPM	1288	1348	1423	-	-
					Watts	119.8	125.5	130.3	-	-
2412SP	2 Ton	6x8 1/3HP [249] 5 Speed	1	3.1 [.350]	SCFM	400	316	237	-	-
					RPM	937	1061	1154	-	-
					Watts	45.3	50.8	55.6	-	-
			2	5.2 [.588]	SCFM	600	531	472	-	-
					RPM	1161	1240	1312	-	-
					Watts	88.9	93.8	99	-	-
			3	6 [.678]	SCFM	650	597.8	542	-	-
					RPM	1250	1306	1380	-	-
					Watts	109.2	112.3	118.2	-	-
			4	6.5 [.735]	SCFM	700	638	583	-	-
					RPM	1288	1348	1423	-	-
					Watts	119.8	125.5	130.3	-	-
			5	8.0 [.904]	SCFM	783	728	676	-	-
					RPM	1406	1466	1521	-	-
					Watts	162.6	166.8	175.7	-	-

NOTE:

All constant torque air handlers are shipped from the factory at speed taps 2, 3, & 4. Tap 1 should be used for extremely low static applications (0.1 inches W.C. or less). Tap 5 should be used for high static applications or to achieve rated capacity.

5.2 AIRFLOW PERFORMANCE DATA - EL3T----SPACTA (50HZ WITH CONSTANT TORQUE MOTOR) - continued

Model No. EL3T	Tonnage Application	Blower Size/ Motor HP [W] # of Speeds	Speed Tap	Torque Value lb*in [N*m]		CFM [L/s] Air Delivery/RPM/Watts -- 220-230 Volts				
						External Static Pressure -- Inches W.C. [kPa]				
						0.1 [.02]	0.2 [.05]	0.3 [.07]	0.4 [.10]	0.5 [.12]
3012SP	2.5 Ton	7x8 1/2HP [373] 5 Speed	1	7.8 [.881]	SCFM	765	700	641	-	-
					RPM	1110	1188	1252	-	-
					Watts	126.2	134.9	139.9	-	-
			2	11.0 [1.243]	SCFM	958	900	837	-	-
					RPM	1300	1386	1412	-	-
					Watts	203.1	209.2	217.5	-	-
			3	12.3 [1.389]	SCFM	1021	960	907	-	-
					RPM	1358	1413	1468	-	-
					Watts	233.4	242.5	250.6	-	-
			4	13.5 [1.526]	SCFM	1077	1020	961	-	-
					RPM	1412	1464	1522	-	-
					Watts	265.1	273.6	283.8	-	-
			5	15.0 [1.694]	SCFM	1174.8	1132.4	1088.9	1049.5	1007.1
					RPM	1412	1468	1520	1561	1615
					Watts	302.4	313.3	320.1	329.9	336.2
3612SP	3 Ton	7x8 1/2HP [373] 5 Speed	1	7.8 [.881]	SCFM	765	700	641	573	520
					RPM	1110	1188	1252	1332	1402
					Watts	126.2	134.9	139.9	147.1	154.4
			2	11.0 [1.243]	SCFM	958	900	837	786	732
					RPM	1300	1386	1412	1468	1531
					Watts	203.1	209.2	217.5	225.7	232.8
			3	12.3 [1.389]	SCFM	1021	960	907	851	798
					RPM	1358	1413	1468	1526	1575
					Watts	233.4	242.5	250.6	258.9	266.7
			4	13.5 [1.526]	SCFM	1077	1020	961	911	862
					RPM	1412	1464	1522	1568	1626
					Watts	265.1	273.6	283.8	289.1	298.9
			5	15.0 [1.694]	SCFM	1174.8	1132.4	1088.9	1049.5	1007.1
					RPM	1412	1468	1520	1561	1615
					Watts	302.4	313.3	320.1	329.9	336.2

NOTE:

All constant torque air handlers are shipped from the factory at speed taps 2, 3, & 4. Tap 1 should be used for extremely low static applications (0.1 inches W.C. or less). Tap 5 should be used for high static applications or to achieve rated capacity.

5.1 AIRFLOW PERFORMANCE DATA - EL3T----SPACJA (60HZ WITH CONSTANT TORQUE MOTOR)

Model No. EL3T	Tonnage Application	Blower Size/ Motor HP [W] # of Speeds	Speed Tap	Torque Value lb*in [N*m]		CFM [L/s] Air Delivery/RPM/Watts -- 220-230 Volts				
						External Static Pressure -- Inches W.C. [kPa]				
						0.1 [.02]	0.2 [.05]	0.3 [.07]	0.4 [.10]	0.5 [.12]
1812SP	1.5 Ton	6x8 1/3HP [249] 5 Speed	1	2.6 [.294]	SCFM	350	276	199	-	-
					RPM	872	990	1118	-	-
					Watts	36.1	41.1	45.6	-	-
			2	3.4 [.384]	SCFM	450	380	306	-	-
					RPM	983	1070	1182	-	-
					Watts	52.3	55.2	59.5	-	-
			3	3.8 [.429]	SCFM	490	429	354	-	-
					RPM	1018	1114	1216	-	-
					Watts	57.8	63.7	69.2	-	-
			4	4.2 [.475]	SCFM	525	472	407	-	-
					RPM	1074	1150	1245	-	-
					Watts	68.2	72.8	78.6	-	-
			5	4.6 [.519]	SCFM	570	507	451	-	-
					RPM	1122	1194	1274	-	-
					Watts	77	81.1	86.8	-	-
2212SP	2 Ton	6x8 1/3HP [249] 5 Speed	1	3.1 [.350]	SCFM	400	316	237	-	-
					RPM	937	1061	1154	-	-
					Watts	45.3	50.8	55.6	-	-
			2	5.2 [.588]	SCFM	600	531	472	-	-
					RPM	1161	1240	1312	-	-
					Watts	88.9	93.8	99	-	-
			3	6.0 [.678]	SCFM	650	597.8	542	-	-
					RPM	1250	1306	1380	-	-
					Watts	109.2	112.3	118.2	-	-
			4	6.5 [.735]	SCFM	700	638	583	-	-
					RPM	1288	1348	1423	-	-
					Watts	119.8	125.5	130.3	-	-
			5	7.0 [.791]	SCFM	733	681	622.8	-	-
					RPM	1340	1400	1454	-	-
					Watts	134.6	138.7	143.8	-	-

NOTE:

All constant torque air handlers are shipped from the factory at speed taps 2, 3, & 4. Tap 1 should be used for extremely low static applications (0.1 inches W.C. or less). Tap 5 should be used for high static applications or to achieve rated capacity.

5.3 AIRFLOW PERFORMANCE DATA - EL3T----SPACJA (60HZ WITH CONSTANT TORQUE MOTOR) - continued

Model No. EL3T	Tonnage Application	Blower Size/ Motor HP [W] # of Speeds	Speed Tap	Torque Value lb*in [N*m]		CFM [L/s] Air Delivery/RPM/Watts -- 220-230 Volts				
						External Static Pressure -- Inches W.C. [kPa]				
						0.1 [.02]	0.2 [.05]	0.3 [.07]	0.4 [.10]	0.5 [.12]
2812SP	2.5 Ton	7x8 1/2HP [373] 5 Speed	1	6.1 [.689]	SCFM	650	579.5	518	-	-
					RPM	996	1075	1156	-	-
					Watts	88.9	96	102.6	-	-
			2	7.9 [.893]	SCFM	750	673	604	-	-
					RPM	1116	1190	1244	-	-
					Watts	127.2	134.5	140.3	-	-
			3	8.8 [.994]	SCFM	800	725	656	-	-
					RPM	1165	1225	1280	-	-
					Watts	146.3	152.6	160.3	-	-
			4	10.2 [1.153]	SCFM	875	803	738	-	-
					RPM	1235	1282	1347	-	-
					Watts	177.1	184.2	191.3	-	-
			5	11.4 [1.288]	SCFM	939	863	796	-	-
					RPM	1293	1393	1400	-	-
					Watts	207.2	215.1	220.4	-	-
3212SP	3 Ton	7x8 1/2HP [373] 5 Speed	1	7.8 [.881]	SCFM	765	700	641	573	520
					RPM	1110	1188	1252	1332	1402
					Watts	126.2	134.9	139.9	147.1	154.4
			2	11.0 [1.243]	SCFM	958	900	837	786	732
					RPM	1300	1386	1412	1468	1531
					Watts	203.1	209.2	217.5	225.7	232.8
			3	11.4 [1.288]	SCFM	984	928	859	822	751
					RPM	1326	1399	1436	1498	1556
					Watts	218.6	222.5	233.4	239.2	241.3
			4	12.3 [1.389]	SCFM	1021	960	907	851	798
					RPM	1358	1413	1468	1526	1575
					Watts	233.4	242.5	250.6	258.9	266.7
			5	13.5 [1.526]	SCFM	1077	1020	961	911	862
					RPM	1412	1464	1522	1568	1626
					Watts	265.1	273.6	283.8	289.1	298.9

NOTE:

All constant torque air handlers are shipped from the factory at speed taps 2, 3, & 4. Tap 1 should be used for extremely low static applications (0.1 inches W.C. or less). Tap 5 should be used for high static applications or to achieve rated capacity.

5.1 AIRFLOW PERFORMANCE DATA -EL3T----SPACTA (50 HZ WITH CONSTANT TORQUE MOTOR) - continued

Model No. EL3T	Tonnage Applica-tion	Blower size/ Motor HP [W] # of Speeds	Speed Tap	Torque Value lb*in [N*m]		CFM [L/s] Air Delivery/RPM/Watts -- 220-230 Volts						
						External Static Pressure -- Inches W.C. [kPa]						
						0.2 [.05]	0.3 [.07]	0.4 [.10]	0.5 [.12]	0.6 [.15]	0.7 [.17]	0.8 [.19]
4217ST	3.5 Ton	10X10 3/4HP [559] 5 Speed	1	12.1	SCFM	850	776	700	621	554	487	415
					RPM	840	880	925	964	1010	1060	1095
					Watts	136.5	143	150	156	162	168	174
			2	14.8	SCFM	1000	928	857	783	713	648	584
					RPM	901	936	957	1013	1050	1088	1130
					Watts	178	185	192	198	205	211	218
			3	17.3	SCFM	1130	1054	984	918	846	779	718
					RPM	953	990	1023	1060	1094	1130	1160
					Watts	221	227	234	242	247	255	260
			4	20.5	SCFM	1280	1208	1130	1067	1002	940	874
					RPM	1011	1042	1070	1100	1135	1168	1210
					Watts	273	280	287	294	303	310	321
			5	23.8	SCFM	1420	1352	1281	1208	1148	1090	1030
					RPM	1073	1100	1130	1153	1182	1211	1243
					Watts	336	344	351	358	366	374	382
4817ST	4 Ton	10x10 3/4HP [559] 5 Speed	1	14.9	SCFM	1045	897	776	672	573	481	400
					RPM	763	820	882	938	985	1044	1110
					Watts	127	136	138	145	156	165	171
			2	17.9	SCFM	1200	1107	960	845	746	650	570
					RPM	807	856	920	970	1016	1066	1120
					Watts	160	168	174	186	192	197	209
			3	20	SCFM	1300	1212	1070	966	860	767	680
					RPM	840	886	940	992	1045	1088	1133
					Watts	184	193	205	215	220	230	239
			4	23.5	SCFM	1450	1370	1286	1142	1047	950	863
					RPM	890	930	976	1028	1076	1120	1167
					Watts	228	240	250	263	273	280	290
			5	27.9	SCFM	1609	1535	1463	1385	1243	1155	1062
					RPM	950	990	1030	1068	1122	1163	1203
					Watts	291	300	312	325	333	347	355

NOTE:
All Constant torque air handlers re shipped from the factory taps 2,3 & 4. Tap 1 should be used for extremely low static applications (0.1 inches W.C or less). Tap 5 should be used for high static applications or to achieve rated capacity.

5.1 AIRFLOW PERFORMANCE DATA -EL3T----SPACTA (50 HZ WITH CONSTANT TORQUE MOTOR) - continued

Model No. EL3T	Tonnage Applica-tion	Blower size/ Motor HP [W] # of Speeds	Speed Tap	Torque Value lb*in [N*m]		CFM [L/s] Air Delivery/RPM/Watts -- 220-230 Volts						
						External Static Pressure -- Inches W.C. [kPa]						
						0.2 [.05]	0.3 [.07]	0.4 [.10]	0.5 [.12]	0.6 [.15]	0.7 [.17]	0.8 [.19]
6017ST	5 Ton	10x10 1 HP [746] 5 speed	1	25	SCFM	1411	1349	1262	1171	1106	1047	989
					RPM	951	988	1078	1108	1129	1172	1211
					Watts	350	365	390	400	406	425	446
			2	30	SCFM	1593	1537	1473	1372	1298	1240	1179
					RPM	1104	1041	1082	1130	1176	1210	1244
					Watts	440	453	467	486	503	514	526
			3	35	SCFM	1750	1690	1630	1568	1454	1390	1324
					RPM	1067	1097	1130	1183	1238	1262	1286
					Watts	542	555	570	592	609	619	634
			4	40	SCFM	1873	1815	1774	1724	1659	1556	1456
					RPM	1132	1151	1180	1212	1250	1310	1357
					Watts	650	659	675	685	703	736	757
			5	45	SCFM	2015	1952	1900	1856	1807	1742	1650
					RPM	1180	1207	1229	1262	1287	1330	1375
					Watts	756	770	780	796	814	838	862
6518ST	5.5 Ton	10x10 1 HP [746] 5 speed	1	20.3	SCFM	1614	1563	1515	1462	1407	1358	1312
					RPM	951	917	956	983	1020	1053	1088
					Watts	250	210	237	266	294	321	349
			2	27.5	SCFM	1862	1804	1748	1687	1623	1567	1514
					RPM	1004	997	1033	1058	1092	1123	1155
					Watts	391	373	395	419	440	462	486
			3	31.1	SCFM	1986	1925	1864	1799	1731	1671	1614
					RPM	1031	1037	1072	1096	1128	1158	1189
					Watts	462	454	474	495	514	533	555
			4	38.3	SCFM	2235	2165	2097	2024	1948	1880	1816
					RPM	1084	1118	1150	1171	1200	1228	1256
					Watts	603	618	632	647	660	675	691
			5	45	SCFM	2483	2405	2330	2249	2164	2089	2018
					RPM	1133	1160	1186	1211	1242	1271	1304
					Watts	736	751	763	775	790	802	819

NOTE:
All Constant torque air handlers re shipped from the factory taps 2,3 & 4. Tap 1 should be used for extremely low static applications (0.1 inches W.C or less). Tap 5 should be used for high static applications or to achieve rated capacity.

5.1 AIRFLOW PERFORMANCE DATA -EL3T----SPACTA (60 HZ WITH CONSTANT TORQUE MOTOR) - continued

Model No. EL3T	Tonnage Applica-tion	Blower size/ Motor HP [W] # of Speeds	Speed Tap	Torque Value lb*in [N*m]		CFM [L/s] Air Delivery/RPM/Watts -- 220-230 Volts						
						External Static Pressure -- Inches W.C. [kPa]						
						0.2 [.05]	0.3 [.07]	0.4 [.10]	0.5 [.12]	0.6 [.15]	0.7 [.17]	0.8 [.19]
4217ST	3.5 Ton	10x10 3/4 HP [559] 5 speed	1	9.1	SCFM	850	776	700	621	554	487	415
					RPM	840	880	925	964	1010	1060	1095
					Watts	136.5	143	150	156	162	168	174
			2	11.1	SCFM	1000	928	857	783	713	648	584
					RPM	901	936	975	1013	1050	1088	1130
					Watts	178	185	192	198	205	211	218
			3	13	SCFM	1130	1054	984	918	846	779	718
					RPM	953	990	1023	1060	1094	1130	1160
					Watts	221	227	234	242	247	255	260
			4	15.4	SCFM	1280	1208	1130	1067	1002	940	874
					RPM	1011	1042	1070	1100	1135	1168	1210
					Watts	273	280	287	294	303	310	321
			5	17.9	SCFM	1420	1352	1281	1208	1148	1090	1030
					RPM	1073	1100	1130	1153	1182	1211	1243
					Watts	336	344	351	358	366	374	382
4817ST	4 Ton	10x10 3/4 HP [559] 5 speed	1	14.5	SCFM	1045	900	778	670	567	480	393
					RPM	750	808	870	920	975	1034	1098
					Watts	113	123	128	136	142	155	160
			2	17.8	SCFM	1200	1110	970	850	750	653	570
					RPM	798	847	904	960	1010	1057	1110
					Watts	146	156	165	175	182	192	200
			3	20	SCFM	1300	1218	1110	977	872	776	688
					RPM	830	880	930	983	1030	1080	1122
					Watts	175	184	193	202	214	218	230
			4	23.5	SCFM	1450	1363	1291	1161	1054	932	870
					RPM	885	923	973	1021	1065	1110	1164
					Watts	218	226	238	248.6	260	270.5	283
			5	26.7	SCFM	1590	1513	1425	1330	1210	1118	1024
					RPM	923	960	995	1045	1092	1134	1175
					Watts	260	270	285	293	300	320	330

NOTE:
All Constant torque air handlers re shipped from the factory taps 2,3 & 4. Tap 1 should be used for extremely low static applications (0.1 inches W.C or less). Tap 5 should be used for high static applications or to achieve rated capacity.

5.1 AIRFLOW PERFORMANCE DATA -EL3T----SPACJA (60 HZ WITH CONSTANT TORQUE MOTOR) - continued

Model No. EL3T	Tonnage Application	Blower size/ Motor HP [W] # of Speeds	Speed Tap	Torque Value lb*in [N*m]		CFM [L/s] Air Delivery/RPM/Watts -- 220-230 Volts						
						External Static Pressure -- Inches W.C. [kPa]						
						0.2 [.05]	0.3 [.07]	0.4 [.10]	0.5 [.12]	0.6 [.15]	0.7 [.17]	0.8 [.19]
5517ST	5 Ton	10x10 1 HP [746] 5 speed	1	13.9	SCFM	1236	1112	1105	1029	974	930	884
					RPM	926	886	914	948	840	1060	1085
					Watts	209	252	274	308	335	356	385
			2	15.9	SCFM	1318	1186	1178	1098	1038	992	943
					RPM	953	911	938	971	862	1081	1105
					Watts	266	303	324	354	379	398	424
			3	20.1	SCFM	1483	1334	1326	1235	1168	1116	1061
					RPM	1007	960	988	1017	1090	1123	1144
					Watts	379	403	424	447	467	482	504
			4	22.5	SCFM	1593	1537	1473	1372	1298	1240	1179
					RPM	1104	1041	1082	1130	1176	1210	1244
					Watts	440	453	467	486	503	514	526
			5	25.2	SCFM	1689	1531	1498	1442	1326	1319	1221
					RPM	1121	1063	1106	1151	1204	1229	1263
					Watts	502	513	494	526	556	576	578
6518ST	5.5 Ton	10x10 1 HP [746] 5 speed	1	18.2	SCFM	1535	1485	1440	1390	1340	1290	1250
					RPM	953	902	940	970	1005	1040	1075
					Watts	208	166	195	225	252	280	309
			2	20.3	SCFM	1614	1563	1515	1462	1407	1358	1312
					RPM	951	917	956	983	1020	1053	1088
					Watts	250	210	237	266	294	321	349
			3	23.1	SCFM	1705	1655	1600	1545	1490	1435	1388
					RPM	972	950	990	1015	1050	1080	1115
					Watts	304	275	300	326	350	375	402
			4	27.5	SCFM	1862	1804	1748	1687	1623	1567	1514
					RPM	1004	997	1033	1058	1092	1123	1155
					Watts	391	373	395	419	440	462	486
			5	33	SCFM	2050	1990	1930	1860	1790	1730	1670
					RPM	1045	1050	1085	1109	1140	1170	1205
					Watts	501	494	512	532	550	570	590

NOTE:
All Constant torque air handlers re shipped from the factory taps 2,3 & 4. Tap 1 should be used for extremely low static applications (0.1 inches W.C or less). Tap 5 should be used for high static applications or to achieve rated capacity.

6.0 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, special filters, accessories, etc. are accounted for in total resistance. See airflow performance tables in this manual.

- Design the duct system in accordance with “ACCA” Manual “D” Design for Residential Winter and Summer Air Conditioning and Equipment Selection. 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. Attach flanges around the supply opening.

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:** Take special precaution to ensure that any screw used to secure ductwork to the unit do not enter the control box or any areas where power wiring is located. Drills or sharp screw points can damage insulation on wires located inside the unit.
- Secure the supply and return ductwork to the unit flanges, using proper fasteners for the type of duct used and tape the duct-to-unit joint as required to prevent air leaks.

FIGURE 12
DRAIN & REFRIGERANT CONNECTIONS WITH DIMENSIONS (1.5 - 3 Ton Models)

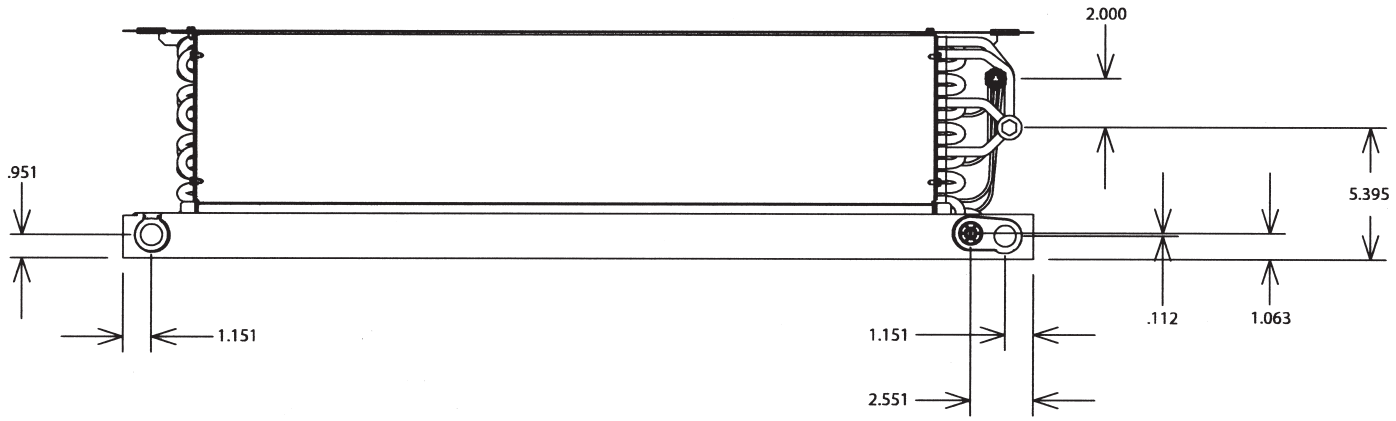


FIGURE 13
DRAIN & REFRIGERANT CONNECTIONS WITH DIMENSIONS (3.5 - 5.5 Ton Models)

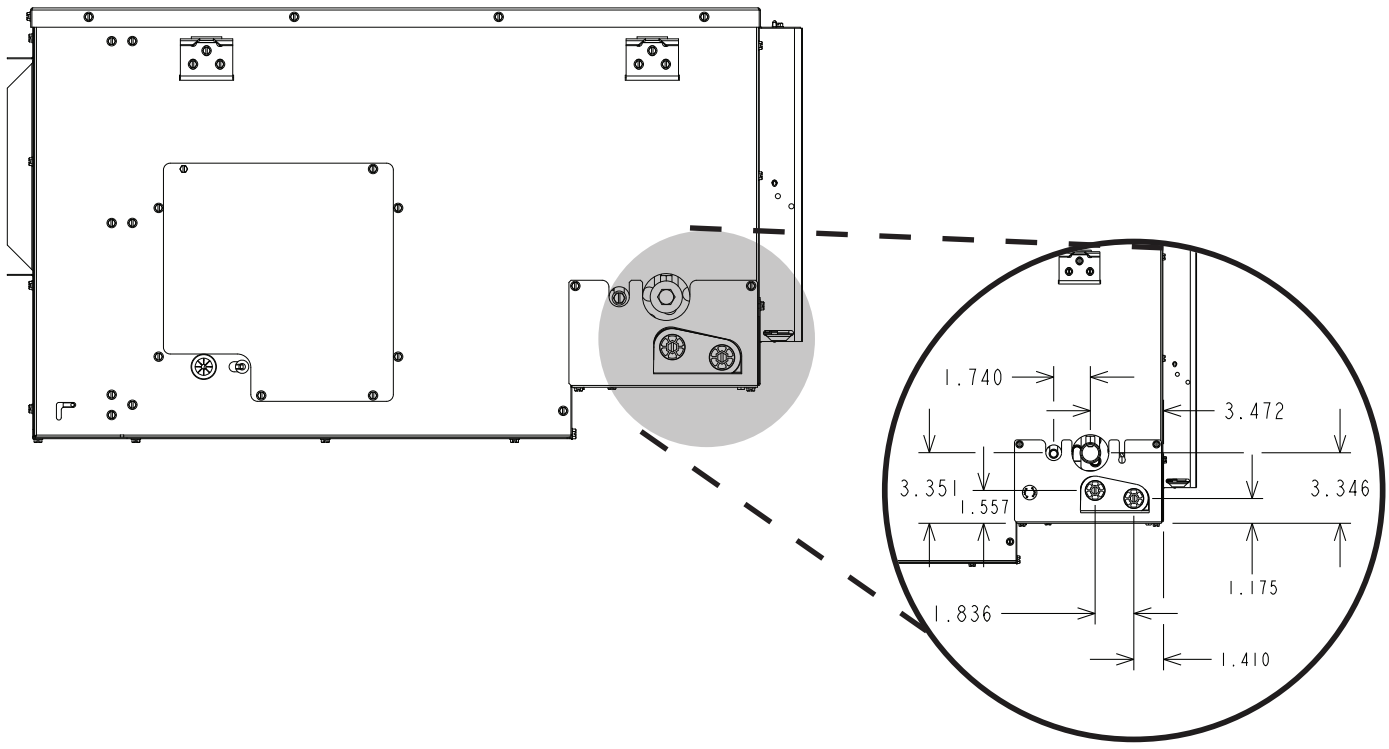


FIGURE 14
BULB LOCATION

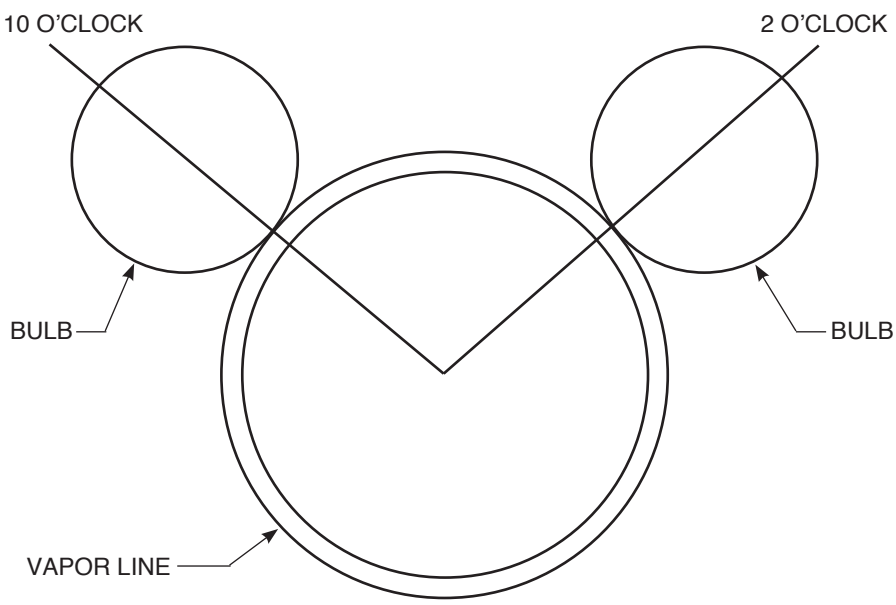
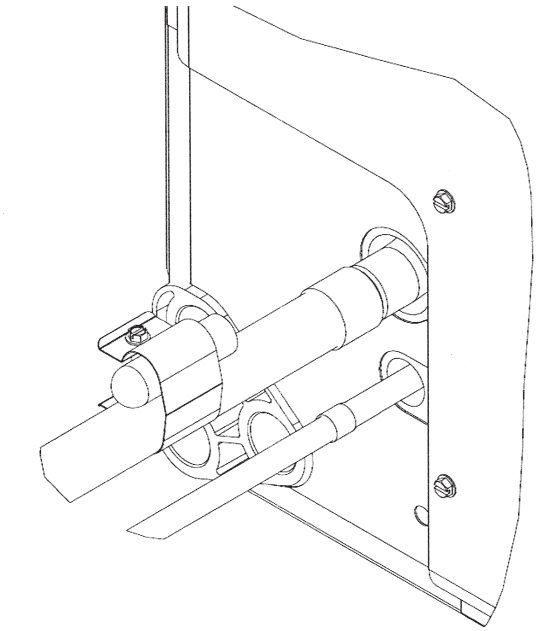


FIGURE 15
BULB LOCATION



7.0 REFRIGERANT CONNECTIONS

Keep the coil connections sealed until refrigerant connections are to be made. See the Installation Instructions for the outdoor unit for details on line sizing, tubing installation, and charging information.

Coil is shipped with a low (5 - 10 PSIG) pressure charge of dry nitrogen. Evacuate the system before charging with refrigerant. If it is found that the coil no longer contains a nitrogen charge due to an apparent leak, contact your local distributor.

Install refrigerant tubing so that it does not block service access to the unit.

Nitrogen should flow through the refrigerant lines while brazing.

Make sure to protect TXV, copper to aluminum joint (if applicable), and service valves from overheating by use of wet rag or some type of shielding. Double tip torches are not recommended.

Use a brazing shield to protect the cabinet's paint from being damaged by torch flames.

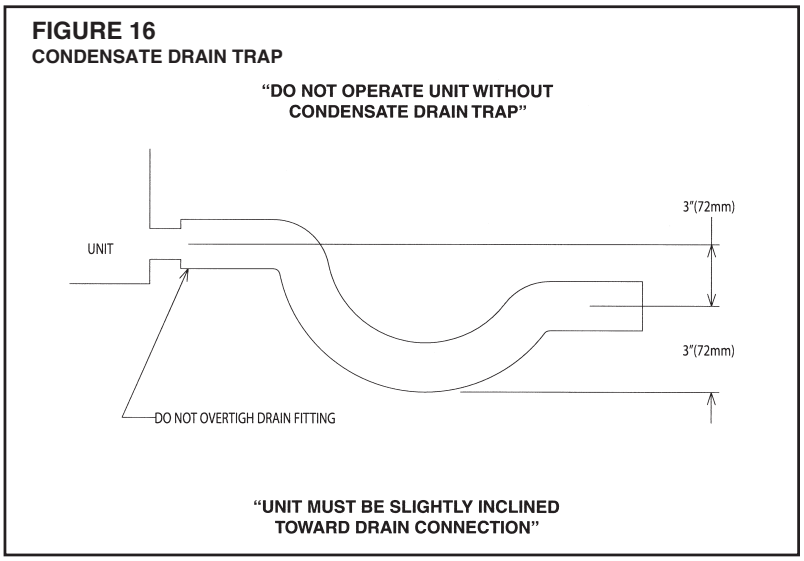
After the refrigerant connections are made, seal the gap around the connections with pressure sensitive gasket. If necessary, cut the gasket into two pieces for a better seal.

7.1 TEV SENSING BULB (IF APPLICABLE)

IMPORTANT: DO NOT perform any soldering with the TEV bulb attached to any line. After soldering operations have been completed, clamp the TEV bulb securely on the suction line at the 10 to 2 o'clock position with the strap provided in the parts bag. Insulate the TEV sensing bulb and suction line with the provided pressure sensitive insulation (size 4" × 7") and secure with provided wire ties.

IMPORTANT: TEV sensing bulb should be located on a horizontal section of suction line, just outside of coil box.

FIGURE 16
CONDENSATE DRAIN TRAP



7.2 CONDENSATE DRAIN TUBING

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 overtighten. Overtightening 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.
- Make sure unit is level or pitched slightly toward primary drain connection so that water will drain completely from the pan.
- 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 10.5 mm per meter 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 7.62 cm 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.
- Auxiliary drain line should be run to a place where it will be noticeable if it becomes operational. Occupant should be warned that a problem exists if water should begin running from the auxiliary drain line.
- Plug the unused drain connection with the plugs provided in the parts bag, using a thin layer of teflon paste, silicone or teflon tape to form a water tight seal.
- Test 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 termination of the primary drain line.

8.0 AIR FILTER (factory-installed)

- External filter or other means of filtration is required. Units should be sized for a maximum of 91 m/min. air velocity or that recommended for the type filter installed.

Filter application and placement are critical to airflow, which may affect the heating and cooling system performance. Reduced airflow can shorten the life of the system's major components, such as motor, limits, elements, heat relays, evaporator coil or compressor. Consequently, we recommend that the return air duct system have only one filter location. For systems with a return air filter grill or multiple filter grills, can have a filter installed at each of the return air openings.

If high efficiency filters or electronic air cleaners are used in the system, it is important that the airflow is not reduced to maximize system performance and life. Always verify that the system's airflow is not impaired by the filtering system that has been installed, by performing a temperature rise and temperature drop test.

IMPORTANT: DO NOT DOUBLE FILTER THE RETURN AIR DUCT SYSTEM. DO NOT FILTER THE SUPPLY AIR DUCT SYSTEM.

⚠ WARNING

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 air handler elements. This residue could soil ceilings, walls, drapes, carpets and other articles in the house.

Soot damage may occur with filters in place, when certain types of candles, oil lamps or standing pilots are burned.

9.0 SEQUENCE OF OPERATION

9.1 COOLING (COOLING ONLY)

- When the thermostat "calls for cooling," the circuit between R and G is completed, causing the blower relay (BR) to energize. The N.O. contacts will close, causing the indoor blower motor (IBM) to operate. The circuit between R and Y is also completed: This circuit closes the contactor (CC) in the outdoor unit starting the compressor (COMP) and outdoor fan motor (OFM).

9.2 HEATING (ELECTRIC HEAT ONLY)

- When the thermostat "calls for heat," the circuit between R and W is completed, and the heater sequencer (HR_1) is energized. The heating elements (HE) and the indoor blower motor (IBM) will come on. Units with a second heater sequencer (HR_2) can be connected with the first sequencer (HR_1) to W on the thermostat sub-base or connected to a second stage W_2 on the sub-base.

9.3 BLOWER TIME DELAY (HEATING OR COOLING)

- All models are equipped with a blower time delay (BTD) in lieu of a blower relay (BR) (see wiring diagram). The blower will run for 30 seconds after the blower time delay (BTD) is de-energized.

9.4 ROOM THERMOSTAT (ANTICIPATOR SETTING)

See instructions with outdoor section, condensing unit or heat pump for recommended room thermostats.

- On units with one electric heat sequencer (HR_1) (see wiring diagram on unit), heat anticipator setting should be .16.
- On units with two electric heat sequencers (HR_1 & HR_2) (see wiring diagram on unit), heat anticipator setting should be .32 if both are connected to same stage on thermostat. Setting should be .16 if (HR_1 & HR_2) are connected to separate stages.

  NOTE: Some thermostats contain a fixed, non-adjustable heat anticipator. Adjustment is not permitted.
- The thermostat should be mounted 4 to 5 feet above the floor on an inside wall of the

living room 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.

10.0 CALCULATIONS

10.1 CALCULATING TEMPERATURE RISE

- The formula for calculating air temperature rise for electric resistance heat is:

$$\text{Temperature Rise °F} = \frac{3.16 \times \text{Watts}}{\text{CFM}}$$

Where: 3.16 = Constant, CFM = Airflow

10.2 CALCULATING BTUH HEATING CAPACITY

- The formula for calculating BTUH heating capacity for electric resistance heat is:

BTUH Heating = Watts × 3.412

Where: 1 kW = 1000 Watts, 3.412 = Btuh/Watt

10.3 CALCULATING AIRFLOW CFM

- The formula for calculating airflow using temperature rise and heating BTUH for units with electric resistance heat is:

$$\text{CFM} = \frac{\text{Heating BTUH}}{1.08 \times \text{Temp. Rise}}$$

10.4 CALCULATING CORRECTION FACTOR

- For correction of electric heat output (kW or BTUH) or temperature rise at voltages other than rated voltage multiply by the following correction factor:

$$\text{Correction Factor} = \frac{\text{Applied Voltage}^2}{\text{Rated Voltage}^2}$$

11.0 PRE-START CHECKLIST

PRE-START CHECKLIST	
☐ YES ☐ NO	Is unit properly located, level, secure and serviceable?
☐ YES ☐ NO	Has auxiliary pan been provided under the unit with separate drain? (Units installed above a finished ceiling).
☐ YES ☐ NO	Is condensate line properly sized, run, trapped, pitched and tested?
☐ YES ☐ NO	Is ductwork correctly sized, run, taped and insulated?
☐ YES ☐ NO	Have all cabinet openings and wiring been sealed with caulking?
☐ YES ☐ NO	Is the filter clean, in place and of adequate size?
☐ YES ☐ NO	Is the wiring tight, correct and to the wiring diagram?
☐ YES ☐ NO	Is the unit properly grounded and protected (fused)?
☐ YES ☐ NO	Is the thermostat heat anticipator been set properly?
☐ YES ☐ NO	Is the unit circuit breaker(s) rotated properly “on” up - “off” down?
☐ YES ☐ NO	Are the unit circuit breaker(s) line lug cover(s) in place?
☐ YES ☐ NO	Are all access panels in place and secure?
Refer to outdoor unit installation instructions for system start-up instructions and refrigerant charging instructions.	

12.0 MAINTENANCE

For continuing high performance, and to minimize possible equipment failure, it is essential that periodic maintenance be performed on this equipment. Consult your local dealer as to the proper frequency of maintenance and the availability of a maintenance contract.

⚠ WARNING

Units with circuit breaker(s) meet requirements as a service disconnect switch, however, if access is required to the line side (covered) of the circuit breaker, this side of the breaker(s) will be energized with the breaker(s) de-energized. Contact with the line side can cause electrical shock resulting in personal injury or death.

IMPORTANT: Before performing any service or maintenance procedures, see the “Safety Information” section at the front of this manual.

12.1 AIR FILTER (FACTORY-INSTALLED)

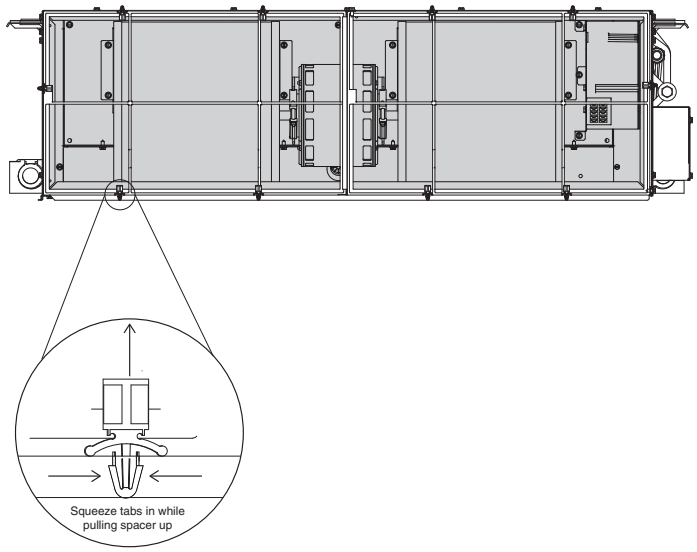
Check the system filter every ninety days or as often as found to be necessary and if obstructed, clean or replace at once.

FILTER REMOVAL

For non-ducted applications where the filters are exposed as shown in Figure 17, remove the white plastic filter retention clips so that the filters can be removed without the need of any tools (see Figure 17 on how to remove the filter retention clips).

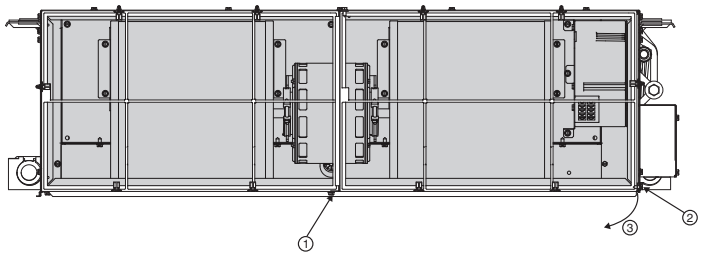
IMPORTANT: Do not operate the system without a filter in place.

FIGURE 17
FILTER REMOVAL



For ducted applications where the filters are not exposed, it will be necessary to remove the filter access panel on the bottom of the unit (or back of the unit for vertical return applications). In order to remove this panel you will need to remove the 2 screws shown in Figure 18, then the panel will be free to swing open. At this point, the filters can be removed by sliding them out the bottom of the unit (or back of the unit for vertical return applications). The 3-step process to remove the filter access panel is illustrated in Figure 18.

FIGURE 18
FILTER REMOVAL



12.2 INDOOR COIL - DRAIN PAN - DRAIN LINE

Inspect the indoor coil once each year for cleanliness and clean as necessary. In some cases, it may be necessary to remove the filter and check the return side of the coil with a mirror and flashlight.

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

12.3 BLOWER MOTOR AND WHEEL

Inspect the blower motor and wheel for cleanliness. It should be several years before it would become necessary to clean the blower motor and wheel.

- If it becomes necessary to remove the blower assembly from the unit, see instructions on removal and disassembly of motor, blower and heater parts.
- The blower motor and wheel may be cleaned by using a vacuum with a soft brush attachment. Remove grease with a mild solvent such as hot water and detergent. Be careful not to disturb the balance weights (clips) on the blower wheel blades. Do not drop or bend wheel as balance will be affected.

12.4 LUBRICATION

The blower motor sleeve bearings are pre-lubricated by the motor manufacturer and do not have oiling ports. Motor should be run for an indefinite period of time without additional lubrication.

12.5 BLOWER ASSEMBLY REMOVAL AND REPLACEMENT (1.5-3 TON MODELS)

Removing the blower assembly is not required for normal service and maintenance. Removal is necessary for replacement of defective parts such as motor, blower wheel. After extended use, removal of the blower assembly may become necessary for a thorough cleaning of the blower motor and wheel.

⚠ WARNING

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 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.

- Mark field power supply wiring (for replacement) attached to terminal block in service compartment on side of unit. Remove wiring from terminal block.
- Mark low voltage control wiring (for replacement) attached to terminal block in service compartment on side of unit. Remove wiring from terminal block.
- Refer to Figure 6 for removal of filter frame and bottom panel.
- Once filter frame and bottom panel are removed, disconnect power and control wiring from motor control module.
- Remove bottom control box partition and then the blower deck assembly (see Figure 19).
- In order to remove the right side blower housing, the motor control bracket will need to first be removed (see Figure 21).
- Once the motor control bracket is out of the way, loosen the set screw(s) holding the blower wheel(s) to the motor shaft, remove the screws fastening the blower housing(s) to the blower deck, then slide the blower assemblies off of the motor shaft (see Figure 22).
- Reassemble in reverse order.

12.6 BLOWER ASSEMBLY REMOVAL AND REPLACEMENT (3.5-5.5 TON MODELS)

- Mark field power supply wiring (for replacement) attached to terminal block in control box on side of unit. Remove wiring from terminal block.
- Refer to figure 20 for removal or bottom panel.
- Once bottom panel is removed, disconnect power and control wiring from motor control module.
- Refer again to figure 20 for removal of blower deck.
- In order to remove the right side blower housing, the motor control bracket will need to first be removed (Figure 21).
- Once the motor control bracket is out of the way, loosen the set screw(s) holding the blower wheel(s) to the motor shaft, remove the screws fastening the blower housing(s) to the blower deck, then slide the blower assemblies of the motor shaft (see Figure 22).
- Reassemble in reverse order.

12.7 MOTOR REPLACEMENT

With the blower assembly removed, the indoor blower motor can be removed and replaced using the following procedure:

- Loosen the 2 screws located on the left and right side motor bearing clamps until the clamps can be removed and the motor as well (see Figure 23).
- Reassemble in reverse order.

12.8 BLOWER WHEEL REPLACEMENT

With the blower assembly removed and the motor assembly removed (see above instructions), remove the set screw(s) located at the blower wheel hub(s), then slide the blower wheel(s) off of the motor shaft.

FIGURE 19
BLOWER DECK REMOVAL
(1.5 - 3 Ton Models)

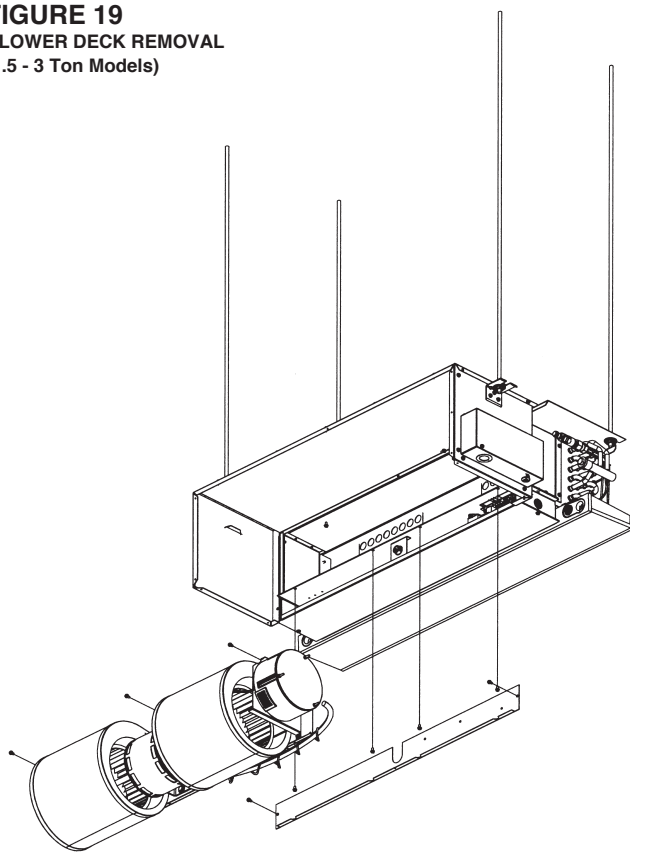


FIGURE 20

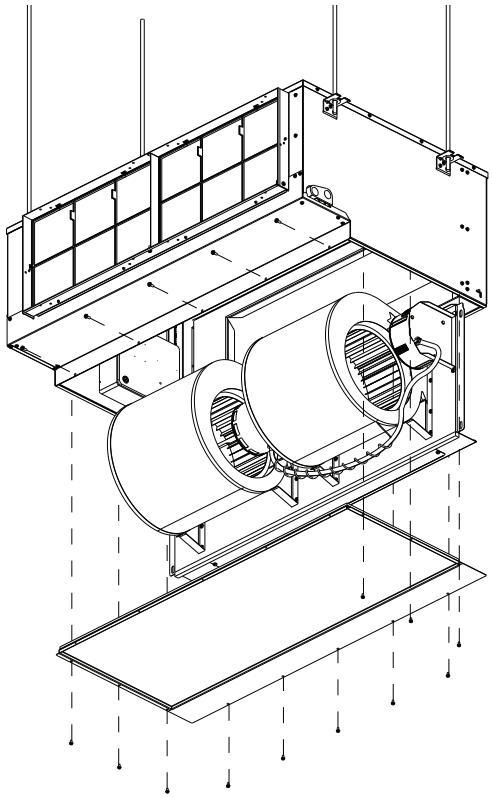


FIGURE 21

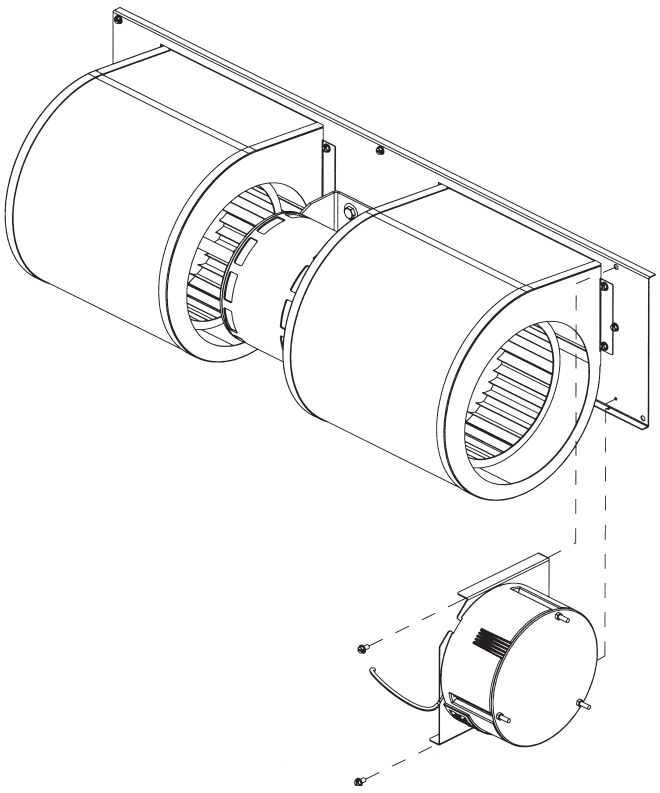


FIGURE 22

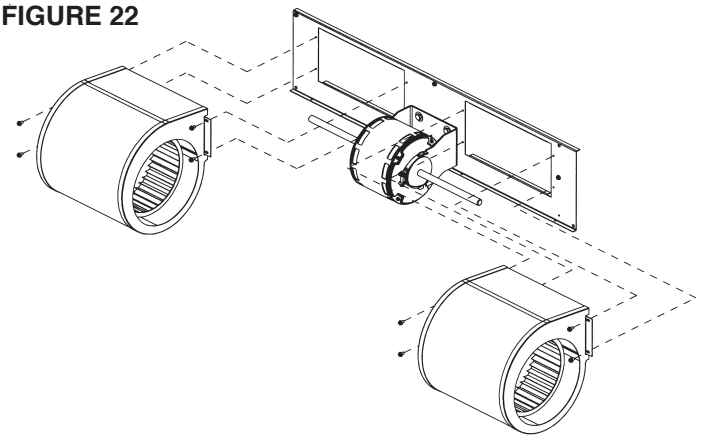
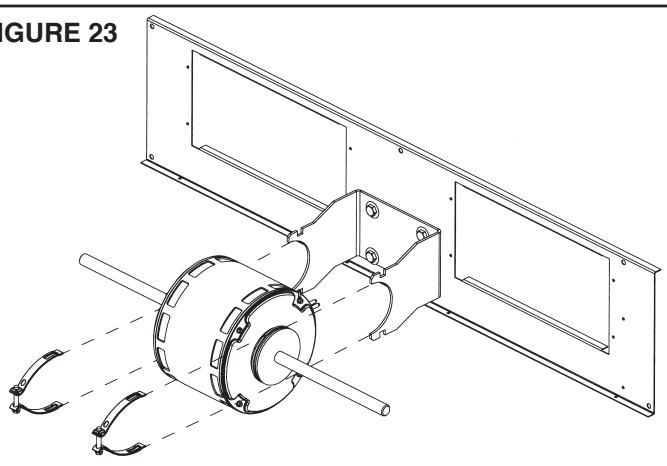


FIGURE 23



13.0 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: Circuit breakers, heater controls, heater limit controls, heater elements, motor, motor capacitor, blower relay, control transformer, blower wheel, filter, indoor coil 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).

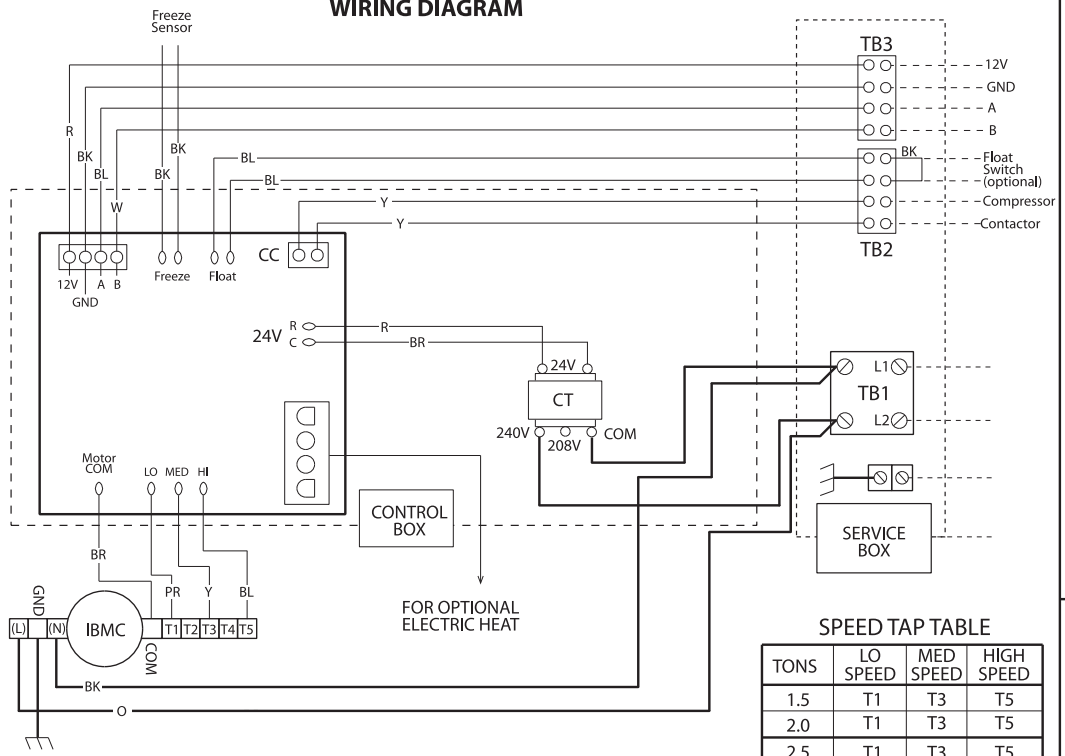
14.0 ACCESSORIES-KITS-PARTS

- Electric Heater (Field Installed Kits – 60hz models only)

Model Number	Available Electric Heater Model Numbers RXHN-
(-)L3T1812SPBCJA030	1111N03J, 1110N05J, 1110N06J, 1111N08J
(-)L3T2212SPBCJA030	1111N03J, 1110N05J, 1110N06J, 1111N08J, 0100N10J
(-)L3T2812SPBCJA030	1111N03J, 1110N05J, 1110N06J, 1111N08J, 0100N10J
(-)L3T3212SPBCJA030	1111N03J, 0001N05J, 0001N06J, 1111N08J, 0001N10J

15.1 WIRING DIAGRAMS FOR 1.5-3 TON MODELS

WIRING DIAGRAM

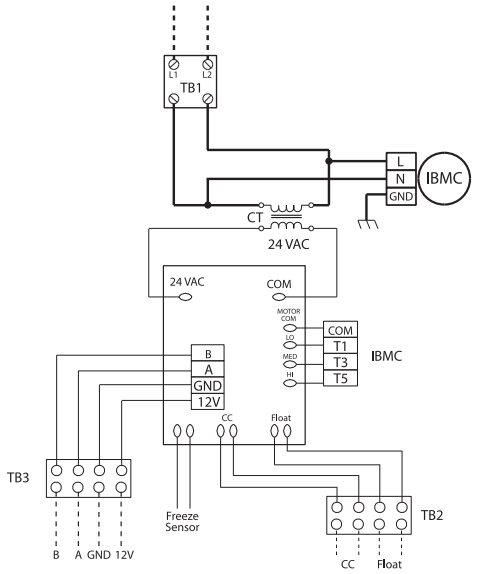


CONTROL BOX

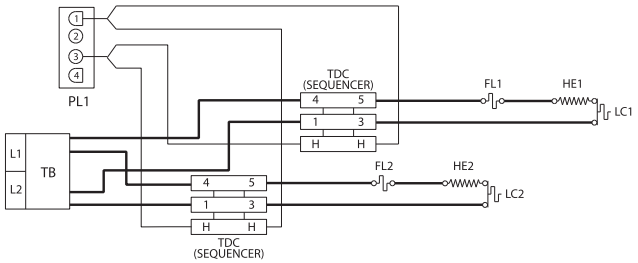
SPEED TAP TABLE

TONS	LO SPEED	MED SPEED	HIGH SPEED
1.5	T1	T3	T5
2.0	T1	T3	T5
2.5	T1	T3	T5
3.0	T1	T3	T5
3.5	T1	T3	T5
4.0	T1	T3	T5
5.0	T1	T3	T5
6.0	T1	T3	T5

SCHEMATIC DIAGRAM



OPTIONAL ELECTRIC HEAT DIAGRAM



WIRING INFORMATION

LINE VOLTAGE
-FACTORY STANDARD
-FACTORY OPTION
-FIELD INSTALLED

LOW VOLTAGE
-FACTORY STANDARD
-FIELD INSTALLED

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

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

NOTES

1. CONNECT SUPPLY WIRING FOR VOLTAGE, PHASE AND HERTZ SHOWN ON RATING PLATE.
2. SUPPLY WIRE MUST BE RATED AT 75°C MIN. SEE INSTRUCTIONS FOR SIZE.
3. CT FACTORY WIRED FOR 240 VOLTS. MOVE WIRES FROM 240V TO 208 V FOR 208 V OPERATION.
4. CONTROL WIRING TO THERMOSTAT.
5. FOR USE WITH COPPER CONDUCTORS ONLY.
6. THE DOTTED BOX NEAR THE DRAWING TITLE REPRESENTS A .25 X .25 2D DATA MATRIX. SEE ADS 104669-01 FOR DATA MATRIX SPECS.

COMPONENT CODES

CC	COMPRESSOR / CONTACTOR
CT	CONTROL TRANSFORMER
DN	DISCONNECT, NON-FUSED
FL	FUSE LINK
GND	GROUND
HE	HEATING ELEMENT
LC	LIMIT CONTROL
TB1	TERMINAL BLOCK (HI VOLT)
TB2	TERMINAL BLOCK (LO VOLT)
TB3	TERMINAL BLOCK (LO VOLT)
TDC	TIME DELAY CONTROL
IBMC	INDOOR BLOWER MOTOR CONTROL

WIRE COLOR CODE

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

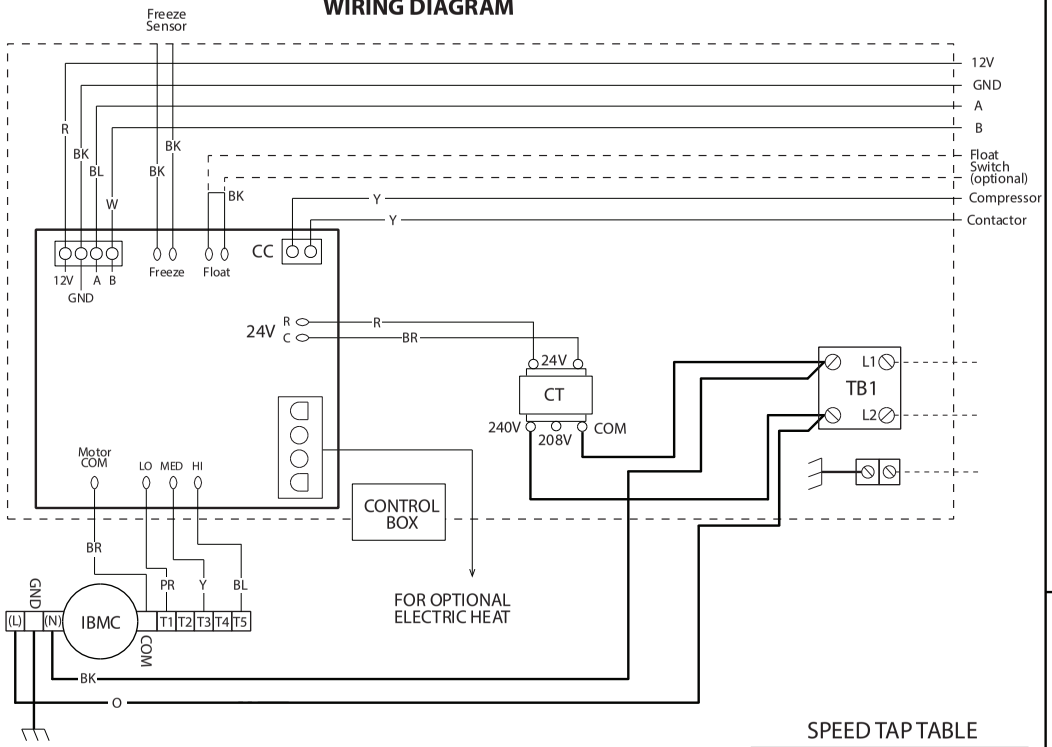
ELECTRICAL WIRING DIAGRAM

ELECTRICAL AIR HANDLER
230 V SelecTech MOTOR

APPROVED:	CHECKED:	ORIGINAL RELEASE NO.: NL-101
MODELED BY: CRS	DATE: 10-11-16	
PART NO.: 90-106418-01		REV: 05

15.1 WIRING DIAGRAMS FOR 3.5-5.5 TON MODELS

WIRING DIAGRAM

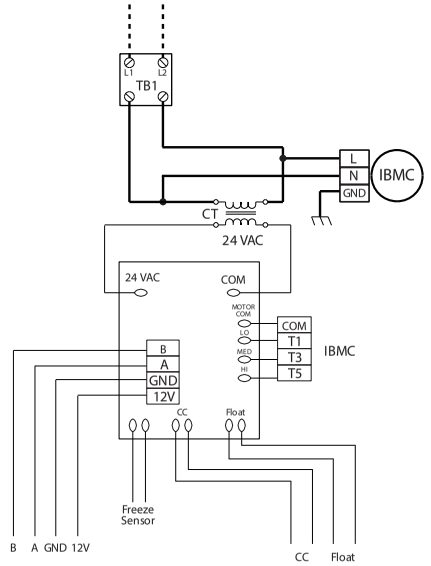


CONTROL BOX

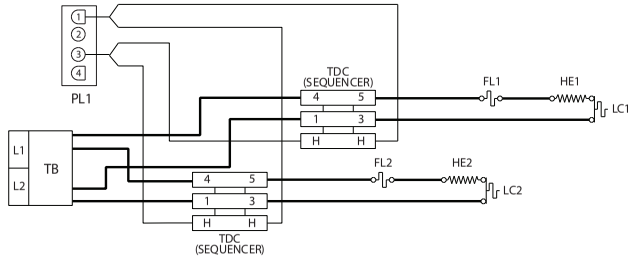
SPEED TAP TABLE

TONS	LO SPEED	MED SPEED	HIGH SPEED
3.5	T1	T3	T5
4.0	T1	T3	T5
5.0	T1	T3	T5
6.0	T1	T3	T5

SCHEMATIC DIAGRAM



OPTIONAL ELECTRIC HEAT DIAGRAM



WIRING INFORMATION

LINE VOLTAGE
-FACTORY STANDARD
-FACTORY OPTION
-FIELD INSTALLED

LOW VOLTAGE
-FACTORY STANDARD
-FIELD INSTALLED

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

WARNING
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COMPONENT CODES

CC	COMPRESSOR / CONTACTOR
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HE	HEATING ELEMENT
LC	LIMIT CONTROL
TB1	TERMINAL BLOCK (HI VOLT)
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TDC	TIME DELAY CONTROL
IBMC	INDOOR BLOWER MOTOR CONTROL

WIRE COLOR CODE

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

ELECTRICAL WIRING DIAGRAM

ELECTRICAL AIR HANDLER
230 V SelecTech MOTOR

APPROVED:	CHECKED:	ORIGINAL RELEASE NO.: H-1034S002
MODELED BY: CCG	DATE: 10-03-17	
PART NO.: 90-106418-02		REV: 00

RHEEM MANUFACTURING CO.		RESEARCH & DEVELOPMENT DEPARTMENT					
REV	--	REVISED DESCRIPTION. (-)AGN-/(-)AHM-/(-)AGL- WAS SAGN-/SAHM-/SAGL-. NO CHANGE TO PART. ACG	A-1095S005 02-22-18	04	REPLACED SECTIONS 5 THRU 8 AND MISCELLANEOUS REVISIONS. MJM	Y-0520S258 04-06-17
	07	REVISED DATA CHARTS. PSM	Y-0699S014 11-09-18	05	REVISED TO UPDATE DATA IN TABLES ON PAGES 5, 7, 15 & 31 AND REPLACED ILLUSTRATION ON PAGE 16. MJM	A-1089S007 07-25-17
	08	REVISED FOR MISCELLANEOUS TEXT AND DELETED SECTION 12.5. VYM	Y-0699S033 02-14-19	06	ADDED ELECTRICAL NOTES REQUIRED BY SASO AND REQUESTED BY UL. MJM	Y-0520S274 10-13-17

STANDARD TOLERANCE UNLESS OTHERWISE NOTED: -FRACTIONAL ± 1/32 -ANGULAR +1° -3° -DECIMAL ± .030 -REFERENCE ( )

NOTE: ALL BRAKES ARE 90° UNLESS OTHERWISE SPECIFIED

R&D DEPARTMENT PRINTED MATERIAL

NOTE:

WHEN PRINTED MATERIAL IS RECEIVED ON THIS PART NUMBER, CHECK THAT THE REVISION IS CORRECT AND THAT ANY SPECIAL INSTRUCTIONS LISTED BELOW WERE FOLLOWED.

SPECIAL INSTRUCTIONS

(3) 5/16" DIA. HOLES (TO FIT 3-RING BINDER) REQUIRED ALONG LEFT EDGE OF BOOKLET.

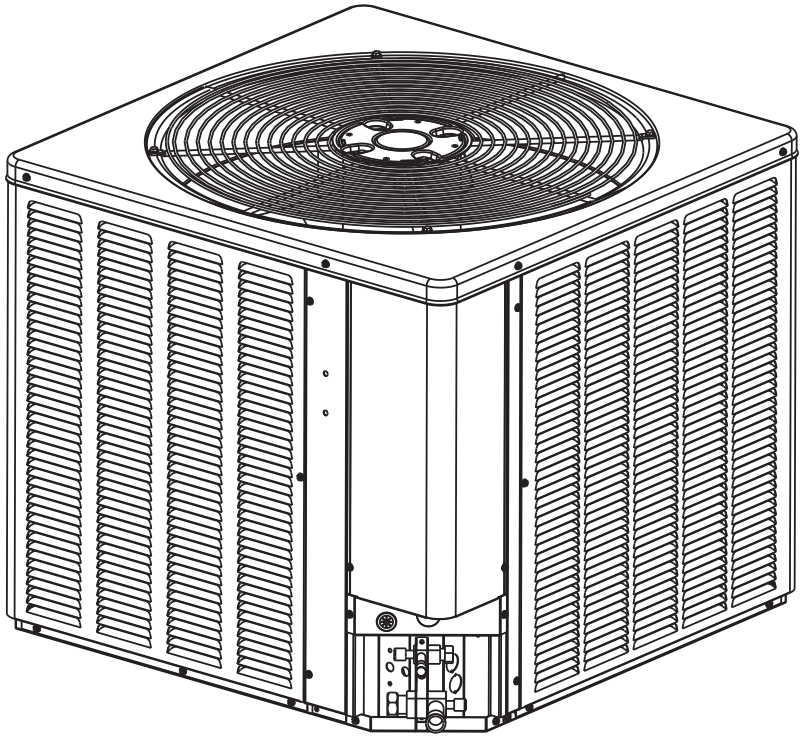
NOTE: ALL CHANGES MADE TO THIS MANUAL MUST ALSO BE MADE TO 92-21354-91.

CHECKED BY:	APPROVED BY:	RELIAB. ENGR.:	VENDOR APPROVAL:	DR. BY: MJM DATE: 11-08-13	ORIGINAL RELEASE No.: Y-0520S150	
TW	MBA					

INSTALLATION INSTRUCTIONS FOR (-)AGN-/(-)AHM-/(-)AGL- ENGLISH	PART NO. 92-21354-95	REV. 08

INSTALLATION INSTRUCTIONS

R410A/60HZ CONDENSING UNITS
*AGN – SERIES
*AHM – SERIES
R410A/50HZ CONDENSING UNITS
*AGL – SERIES
*AGN – SERIES



*S or V

NOTE: Appearance of unit may vary.

RECOGNIZE THIS SYMBOL AS AN INDICATION OF IMPORTANT SAFETY INFORMATION!

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.

Accredited by the RvA

ISO 9001:2008
Certificate Number: 30164

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

92-21354-95-08
SUPERSEDES 92-21354-95-07

TABLE OF CONTENTS

1.0 SAFETY INFORMATION

⚠ WARNING

THESE INSTRUCTIONS ARE INTENDED AS AN AID TO QUALIFIED LICENSED SERVICE PERSONNEL FOR PROPER INSTALLATION, ADJUSTMENT AND OPERATION OF THIS UNIT. READ THESE INSTRUCTIONS THOROUGHLY BEFORE ATTEMPTING INSTALLATION OR OPERATION. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN IMPROPER INSTALLATION, ADJUSTMENT, SERVICE OR MAINTENANCE POSSIBLY RESULTING IN FIRE, ELECTRICAL SHOCK, PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

⚠ WARNING

THE MANUFACTURER'S WARRANTY DOES NOT COVER ANY DAMAGE OR DEFECT TO THE HEAT PUMP CAUSED BY THE ATTACHMENT OR USE OF ANY COMPONENTS. ACCESSORIES OR DEVICES (OTHER THAN THOSE AUTHORIZED BY THE MANUFACTURER) INTO, ONTO OR IN CONJUNCTION WITH THE 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.

⚠ WARNING

DISCONNECT ALL POWER TO UNIT BEFORE STARTING MAINTENANCE. FAILURE TO DO SO CAN CAUSE ELECTRICAL SHOCK RESULTING IN SEVERE PERSONAL INJURY OR DEATH.

⚠ WARNING

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.

⚠ WARNING

THE UNIT MUST BE PERMANENTLY GROUNDED. FAILURE TO DO SO CAN CAUSE ELECTRICAL SHOCK RESULTING IN SEVERE PERSONAL INJURY OR DEATH.

⚠ WARNING

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

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

⚠ CAUTION

The filter drier is located inside the control box. The filter drier must be installed externally in the liquid line or the Warranty will be VOID!

⚠ CAUTION

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 use of the appliance by a person responsible for their safety.

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

⚠ WARNING

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

2.0 GENERAL

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

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

To achieve optimum efficiency and capacity, the indoor cooling coils or air handler listed in the condensing unit specification sheet should be used.

IMPORTANT: We recommend replacement of any HVAC equipment that has been subjected to flooding in order to avoid any risk of injury or harm.

IMPORTANT: Use all available safety precautions during the installation and servicing of any HVAC equipment.

Reference the model nameplate and brand label on the unit for the followinig product information:

- Model Number
- Serial Number
- Country of Origin
- Rated Voltage and Frequency

-Rated T1 and T3 conditions for:

  - ○ Rated Current
  - ○ Rated Power (kW)
  - ○ Rated Capacity
  - ○ Rated EER

The Estimated Annual Energy Consumption of this product is calculated using the following formula:

Estimated Annual Energy Consumption = Rated Power (kW) at T1 conditions multiplied by 2700 working hours.

2.1 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 condensing unit model number, electrical characteristics and accessories to determine if they are correct and match the original order from the local distributor. Check system components (evaporator coil, condensing unit, evaporator blower, etc.) to make sure they are properly matched.

2.2 APPLICATION

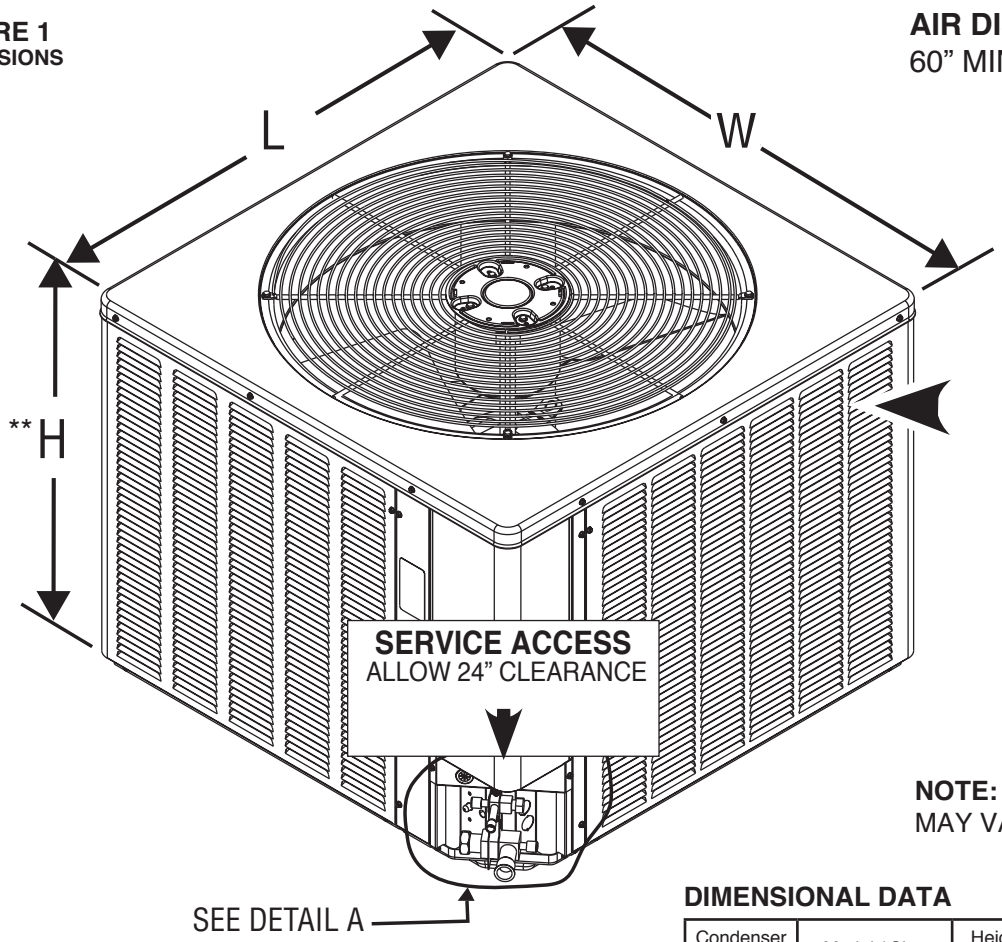
Before installing any air conditioning equipment, a duct analysis of the structure and a heat gain calculation must be made. A heat gain calculation begins by measuring all external surfaces and openings that gain heat from the surrounding air and quantifying that heat gain. A heat gain calculation also calculates the extra heat load caused by sunlight and by humidity removal.

There are several factors that the installers must consider:

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

2.3 (SEE FIGURE 1)

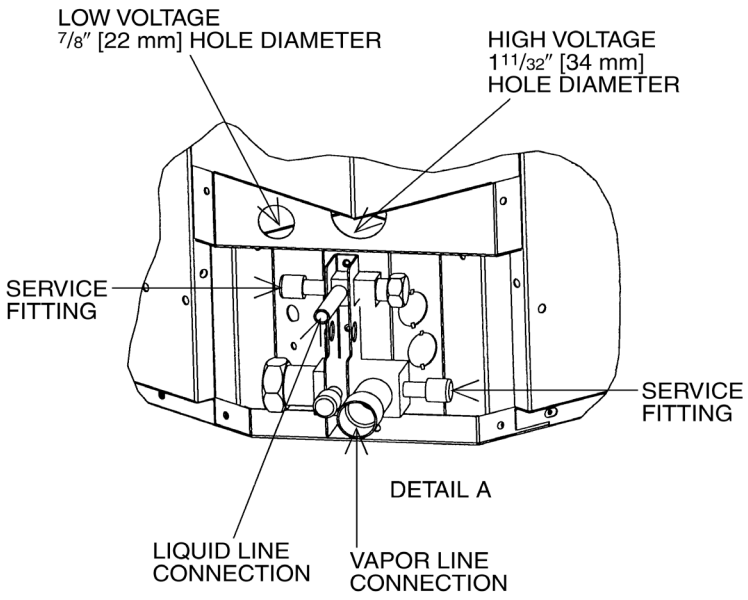
FIGURE 1
DIMENSIONS



AIR DISCHARGE: ALLOW 60" MINIMUM CLEARANCE.

AIR INLETS (LOUVERED PANELS) ALLOW 12" MINIMUM CLEARANCE FOR SINGLE UNIT APPLICATIONS 24" MINIMUM CLEARANCE FOR MULTIPLE UNIT APPLICATIONS

NOTE: GRILLE APPEARANCE MAY VARY.



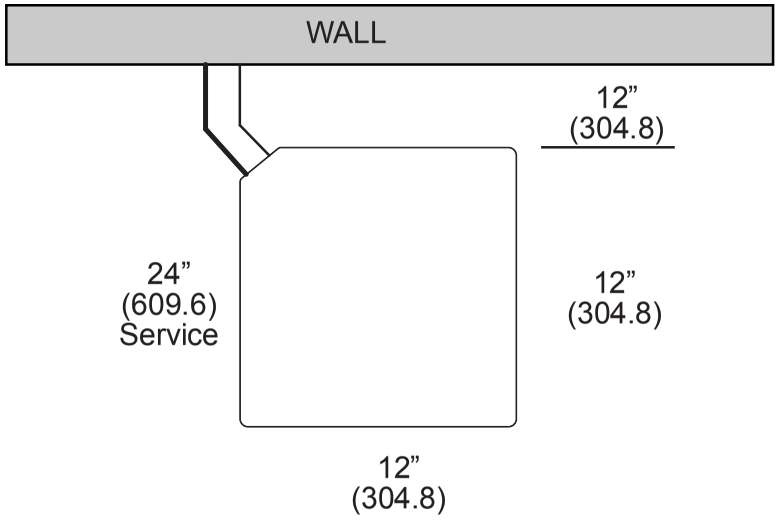
DIMENSIONAL DATA

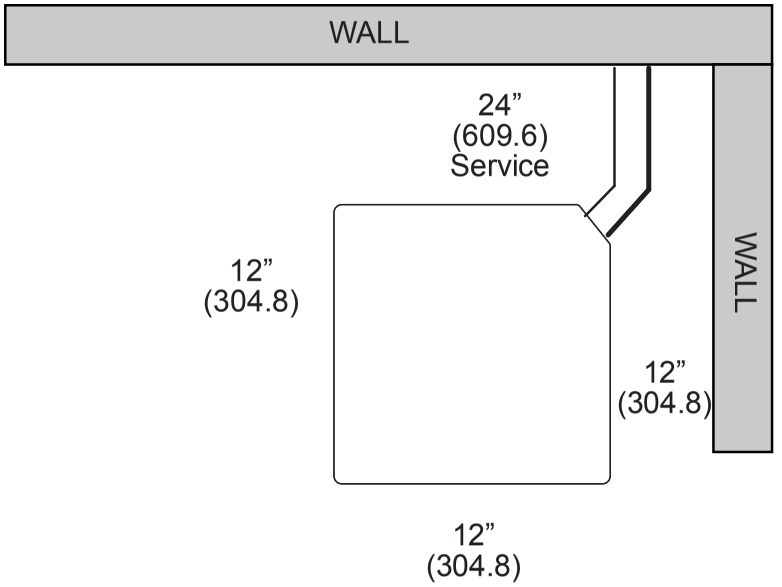
Condenser series	Model / Size	Height "H" in. [mm]	Length "L" in. [mm]	Width "W" in. [mm]
*AGL	18, 24	24 1/4 [616]	23 5/8 [600]	23 5/8 [600]
*AGN	18, 24	24 1/4 [616]	23 5/8 [600]	23 5/8 [600]
*AGL	30	24 1/4 [616]	23 5/8 [600]	23 5/8 [600]
*AGN	30J, 36J, 42J	24 1/4 [616]	23 5/8 [600]	23 5/8 [600]
*AHM	19, 25	24 1/4 [616]	23 5/8 [600]	23 5/8 [600]
*AGL	36, 42	27 3/8 [710]	31 5/8 [803]	31 5/8 [803]
*AGN	48J	27 3/8 [710]	31 5/8 [803]	31 5/8 [803]
*AHM	30	27 3/8 [710]	31 5/8 [803]	31 5/8 [803]
*AGL	48, 60, 65	35 3/8 [913]	31 5/8 [803]	31 5/8 [803]
*AGN	30T, 36, 42N, 48N, 60J, 60N, 65N	35 3/8 [913]	31 5/8 [803]	31 5/8 [803]
*AHM	36, 42, 48, 49, 56, 60	35 3/8 [913]	31 5/8 [803]	31 5/8 [803]

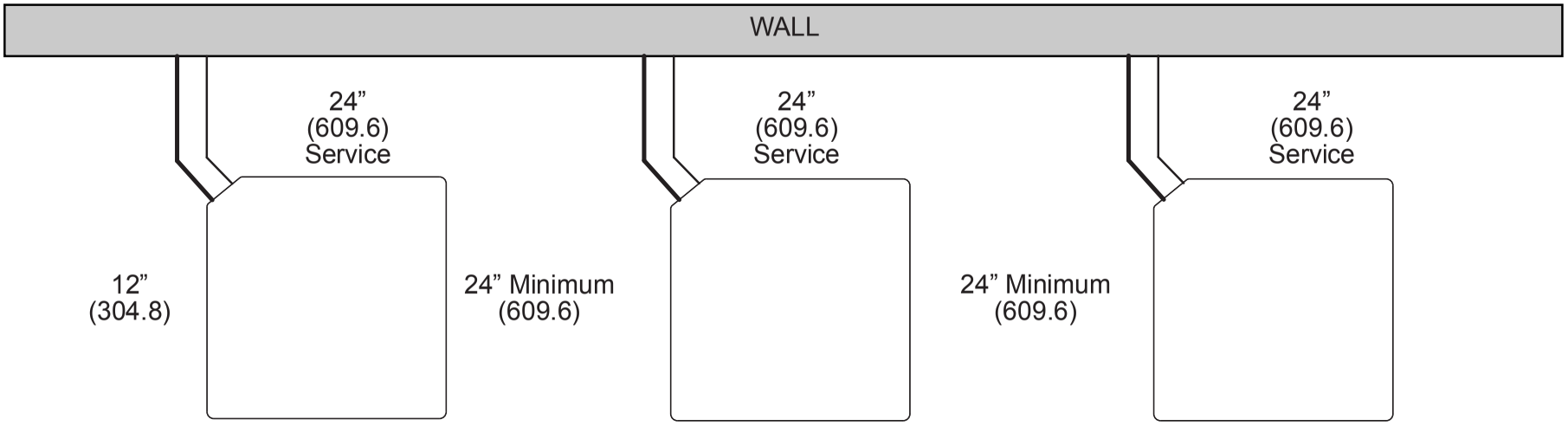
NOTE: "**H" dimension includes baserails and/or basepan.

*S or V

2.4 CLEARANCES







NOTE: NUMBERS IN () = mm

IMPORTANT: When installing multiple units in an alcove, roof well or partially enclosed area, ensure there is adequate ventillation to prevent re-circulation of discharge air.

2.5 ELECTRICAL & PHYSICAL DATA (SEE TABLE 1)

TABLE 1
ELECTRICAL AND PHYSICAL DATA – *AGN

Model Number	Electrical							Physical					
	Phase Frequency (Hz) Voltage (Volts)	Compressor		Fan Motor Full Load Amperes (FLA)	Minimum Circuit Ampacity Amperes	Fuse or HACR		Outdoor Coil			Refrigerant Included Oz. [kg]	Weight	
		Rated Load Amperes (RLA)	Locked Rotor Amperes (LRA)			Minimum Amperes	Maximum Amperes	Face Area Sq. Ft. [m^2]	No. Rows	CFM [L/s]		Net Lbs. [kg]	Shipping lbs. [kg]
*AGN-018J**	1-60-220-230	9/9	46	0.6	12/12	15/15	20/20	7.13 [0.66]	1	1415 [668]	67.4 [1.911]	120 [54.4]	128 [58.1]
*AGN-024J**	1-60-220-230	13.5/13.5	58.3	0.6	18/18	25/25	30/30	8.43 [0.78]	1	1665 [786]	67.8 [1.922]	121 [54.9]	129 [58.5]
*AGN-030J**	1-60-220-230	12.8/12.8	64	0.8	17/17	20/20	25/25	8.7 [0.81]	1	2075 [979]	75 [2.126]	139 [63.1]	147 [66.7]
*AGN-036J**	1-60-220-230	16.7/16.7	79	0.9	22/22	30/30	35/35	13.72 [1.27]	1	2540 [1199]	90.6 [2.569]	149 [67.6]	157 [71.2]
*AGN-042J**	1-60-220-230	17.9/17.9	112	1.2	24/24	30/30	40/40	13.72 [1.27]	1	2540 [1199]	106 [3.005]	149 [67.6]	157 [71.2]
*AGN-048J**	1-60-220-230	21.8/21.8	117	1.2	29/29	35/35	50/50	16.39 [1.52]	1	3290 [1553]	116.1 [3.291]	188 [85.3]	192 [87.1]
*AGN-060J**	1-60-220-230	26.4/26.4	134	1.2	35/35	45/45	60/60	19.17 [1.78]	1	3380 [1595]	157.2 [4.457]	223 [101.2]	234 [106.1]
*AGN-018T**	1-50-220-240	10/10	52	0.5	12/12	15/15	20/20	8.43 [0.78]	1	1600 [755]	69 [1.956]	121 [54.9]	129 [58.5]
*AGN-024T**	1-50-220-240	10.9/10.9	60	0.5	15/15	20/20	25/25	8.43 [0.78]	1	1600 [755]	82.9 [2.350]	121 [54.9]	129 [58.5]
*AGN-030T**	1-50-220-240	15/15	67	0.68	18/18	25/25	30/30	19.28 [1.79]	1	2517 [1188]	124.8 [3.538]	184 [83.5]	195 [88.5]
*AGN-036T**	1-50-220-240	17.9/17.9	87	2.8	23/23	30/30	35/35	21.85 [2.03]	1	3666 [1730]	176 [4.989]	207 [93.9]	218 [98.9]
*AGN-036N**	3-50-380-415	6.6/6.6	44	0.6	9/9	15/15	15/15	21.85 [2.03]	1	3666 [1730]	176 [4.989]	207 [93.9]	218 [98.9]
*AGN-042N**	3-50-380-415	6.9/6.9	41	0.9	9/9	15/15	15/15	21.85 [2.03]	1	3295 [1555]	125 [3.544]	222 [100.7]	233 [105.7]
*AGN-048N**	3-50-380-415	7.1/7.1	55	1.0	9/9	15/15	15/15	21.85 [2.03]	1	3550 [1675]	129 [3.657]	205 [93]	225 [102.1]
*AGN-060N**	3-50-380-415	8.7/8.7	66.1	1.0	12/12	15/15	20/20	21.85 [2.03]	2	4310 [2034]	243 [6.889]	249 [112.9]	269 [122.1]
*AGN-065N**	3-50-380-415	10.9/10.9	64	1.5	14/14	20/20	20/20	21.85 [2.03]	2	4310 [2034]	243 [6.889]	249 [112.9]	269 [122.1]

NOTE: Factory Refrigerant Charge includes refrigerant for 15 feet of standard line set.

TABLE 1 - continued
ELECTRICAL AND PHYSICAL DATA – *AHM

Model Number	Electrical							Physical					
	Phase Frequency (Hz) Voltage (Volts)	Compressor		Fan Motor Full Load Amperes (FLA)	Minimum Circuit Ampacity Amperes	Fuse or HACR Circuit Breaker		Outdoor Coil			Refrig. Per Circuit Oz. [g]	Weight	
		Rated Load Amperes (RLA)	Locked Rotor Amperes (LRA)			Minimum Amperes	Maximum Amperes	Face Area Sq. Ft. [m^2]	No. Rows	CFM [L/s]		Net Lbs. [kg]	Shipping Lbs. [kg]
Rev. 3/11/2010													
19	1-60-208/230	9/9	46	0.5	12/12	15/15	20/20	11.819 [1.10]	1	2805 [1324]	87 [2466]	154 [69.9]	171 [77.6]
25	1-60-208/230	13.5/13.5	58.3	0.36	18/18	25/25	30/30	8.5 [.78]	1	2805 [1324]	91 [2580]	154 [69.9]	171 [77.6]
30	1-60-208/230	12.8/12.8	64	1.4	18/18	25/25	30/30	16.39 [1.52]	1	2915 [979]	112 [2126]	157 [63.1]	175 [66.7]
36	1-60-208/230	16.7/16.7	79	1.9	23/23	30/30	35/35	21.85 [2.03]	1	3435 [1621]	130.4 [3697]	181 [82.1]	201 [91.2]
42	1-60-208/230	17.9/17.9	112	2.8	26/26	30/30	40/40	21.85 [2.03]	1	3550 [1675]	145.12 [4114]	205 [93]	225 [102.1]
48	1-60-208/230	21.8/21.8	117	2.8	31/31	40/40	50/50	21.85 [2.03]	2	4310 [2034]	216 [6124]	249 [112.9]	269 [122]
49	1-60-208/230	19.9/19.9	109	1.9	27/27	35/35	45/45	21.85 [2.03]	2	3615 [1706]	213 [6039]	249 [112.9]	269 [122]
56	1-60-208/230	21.4/21.4	135	1.9	29/29	35/35	50/50	21.85 [2.03]	2	3615 [1706]	241 [6832]	254 [115.2]	274 [124.3]
60	1-60-208/230	26.4/26.4	134	2.8	36/36	45/45	60/60	21.85 [2.03]	2	4105 [1937]	240 [6804]	254 [115.2]	274 [124.3]

TABLE 1 - continued
ELECTRICAL AND PHYSICAL DATA – *AGL

Model Number	Phase-Hertz-Voltage	Comp RLA	Comp LRA	Motor FLA	Minimum Circuit Ampacity	Calc. Fuse Sizes		Outdoor Coil		CFM [L/s]	R-410A Charge Weight (Oz.) [kg]
						Min. (Amps)	Max. (Amps)	Area Sq. Ft. [m^2]	Rows		
*AGL-018T**	1-50-220-240	7.9	44	0.6	12	15	15	11.06 [1.03]	1	1645 [776]	61 [1.73]
*AGL-024T**	1-50-220-240	10	52	0.6	17	20	20	11.06 [1.03]	1	1700 [802]	70 [1.98]
*AGL-030T**	1-50-220-240	12.5	60	0.8	19	25	25	13.72 [1.27]	1	2370 [1118]	78 [2.21]
*AGL-036T**	1-50-220-240	15	67	0.8	23	30	30	16.39 [1.52]	1	2805 [1324]	95 [2.69]
*AGL-036N**	3-50-380/415	6.4	38	1	10	15	15	16.39 [1.52]	1	2805 [1324]	102 [2.89]
*AGL-042T**	1-50-220-240	17.9	87	1.2	2.9	35	35	16.39 [1.52]	1	2805 [1324]	101 [2.86]
*AGL-042N**	3-50-380/415	6.6	44	1	12	15	15	16.39 [1.52]	1	2805 [1324]	104 [2.95]
*AGL-048T**	1-50-220-240	17.7	98	1.2	29	35	35	21.85 [2.03]	1	3295 [1555]	149 [4.22]
*AGL-048N**	3-50-380/415	6.9	41	1	12	15	15	21.85 [2.03]	1	3295 [1555]	142 [4.02]
*AGL-060N**	3-50-380/415	8.9	52	1	15	20	20	21.85 [2.03]	1	3295 [1555]	172 [4.88]
*AGL-065N**	3-50-380/415	11.8	75	1	15	20	20	21.85 [2.03]	1	3295 [1555]	180 [5.10]

*S or V

NOTE: Factory Refrigerant Charge includes refrigerant for 15 feet [4.5 m] of standard line set.

** - May be followed by additional suffix indicating factory installed options and/or specific energy label models.

MATCH ALL COMPONENTS:

- **OUTDOOR UNIT**
- **INDOOR COIL/METERING DEVICE**
- **INDOOR AIR HANDLER/FURNACE**
- **REFRIGERANT LINES**

3.0 LOCATING UNIT

3.1 CORROSIVE ENVIRONMENT

The metal parts of this unit may be subject to rust or deterioration if exposed to a corrosive environment. This oxidation could shorten the equipment's useful life. Corrosive elements include, but are not limited to, salt spray, fog or mist in seacoast areas, sulphur or chlorine from lawn watering systems, and various chemical contaminants from industries such as paper mills and petroleum refineries.

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

- Avoid having lawn sprinkler heads spray directly on the unit cabinet.
- In coastal areas, locate the unit on the side of the building away from the waterfront.
- Shielding provided by a fence or shrubs may give some protection, but cannot violate minimum airflow and service access clearances.
- Elevating the unit off its slab or base enough to allow air circulation will help avoid holding water against the basepan.

Regular maintenance will reduce the build-up of contaminants and help to protect the unit's finish.

⚠ WARNING

DISCONNECT ALL POWER TO UNIT BEFORE STARTING MAINTENANCE. FAILURE TO DO SO CAN CAUSE ELECTRICAL SHOCK RESULTING IN SEVERE PERSONAL INJURY OR DEATH.

- Frequent washing of the cabinet, fan blade and coil with fresh water will remove most of the salt or other contaminants that build up on the unit.
- Regular cleaning and waxing of the cabinet with an automobile polish will provide some protection.
- A liquid cleaner may be used several times a year to remove matter that will not wash off with water.

Several different types of protective coatings are offered in some areas. These coatings may provide some benefit, but the effectiveness of such coating materials cannot be verified by the equipment manufacturer.

3.2 CONDENSER LOCATION

Consult local and national building codes and ordinances for special installation requirements. Following location information will provide longer life and simplified servicing of the outdoor condenser.

3.3 OPERATIONAL ISSUES

- **IMPORTANT:** Locate the condenser in a manner that will not prevent, impair or compromise the performance of other equipment horizontally installed in proximity to the unit. Maintain all required minimum distances to gas and electric meters, dryer vents, exhaust and inlet openings. In the absence of National Codes, or manaufacturers' recommendations, local code recommendations and requirements will take presidence.
- Refrigerant piping and wiring should be properly sized and kept as short as possible to avoid capacity losses and increased operating costs.
- Locate the condenser where water run off will not create a problem with the equipment. Position the unit away from the drip edge of the roof whenever possible. Units are weatherized, but can be affected by water pouring into the unit from the junction of rooflines, without protective guttering.

3.4 FOR CONDENSERS WITH SPACE LIMITATIONS

In the event that a space limitation exists, we will permit the following clearances:

Single Unit Applications: One condenser inlet air grille side may be reduced to no less than a 6-inch clearance. Clearances below 6 inches will reduce unit capacity and efficiency. Do not reduce the 60-inch discharge, or the 24-inch service clearances.

Multiple Unit Applications: When multiple condenser grille sides are aligned, a 6-inch per unit clearance is recommended, for a total of 12 inches between two units. Two combined clearances below 12 inches will reduce capacity and efficiency. Do not reduce the 60-inch discharge, or 24-inch service, clearances.

3.5 CUSTOMER SATISFACTION ISSUES

- The condenser should be located away from the living, sleeping and recreational spaces of the owner and those spaces on adjoining property.
- To prevent noise transmission, the mounting pad for the outdoor unit should not be connected to the structure, and should be located sufficient distance above grade to prevent ground water from entering the unit.

3.6 PROPER INSTALLATION

Proper sizing and installation of equipment is critical to achieve optimal performance. Use the information in this Installation Instruction Manual and reference the applicable Engineering Specification Sheet when installing this product.

3.7 UNIT MOUNTING

If elevating the condensing unit, either on a flat roof or on a slab, observe the following guidelines.

- The base pan provided elevates the condenser coil 3/4" above the base pad.
- If elevating a unit on a flat roof, use 4" × 4" (or equivalent) stringers positioned to distribute unit weight evenly and prevent noise and vibration.

4.0 REFRIGERANT CONNECTIONS

All units are factory charged with Refrigerant 410A. All models are supplied with service valves. Keep tube ends sealed until connection is to be made to prevent system contamination.

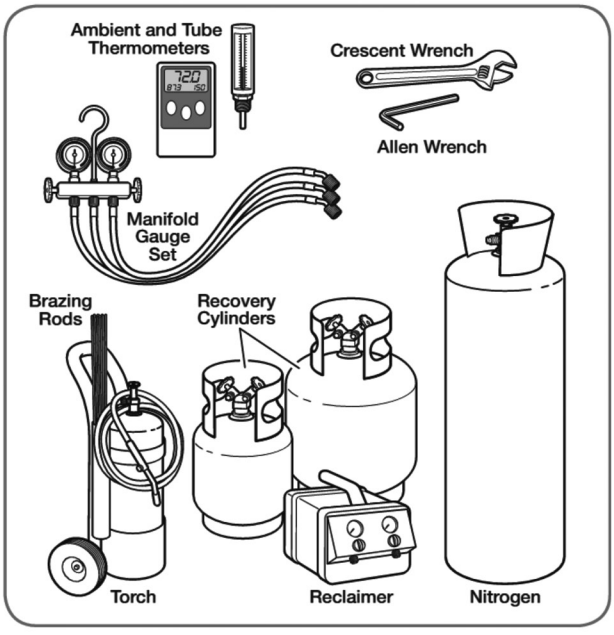
5.0 TOOLS AND REFRIGERANT [(*) AGL-AGN-AHM MODELS]

TOOLS REQUIRED FOR INSTALLING AND SERVICING R-410A MODELS

Manifold Sets:
- Up to 800 PSIG High Side
- Up to 250 PSIG Low Side
- 550 PSIG Low Side Retard

Manifold Hoses:
- Service Pressure Rating of 800 PSIG

Recovery Cylinders:
- 400 PSIG Pressure Rating
- Dept. Of Transportation ABA400 or BW400



⚠ CAUTION

R-410A systems operate at higher pressures than R-22 systems. Do not use R-22 service equipment or components on R-410A equipment.

5.1 SPECIFICATIONS OF R-410A

Application: R-410A is not a drop in replacement for R-22. Equipment designs must accommodate its higher pressures. It cannot be retrofitted into R-22 heat pumps.

Physical Properties: R-410A has an atmospheric boiling point of -62.9°F [-52.7°C] and its saturation pressure at 77°F [25°C] is 224.5 PSIG.

Composition: R-410A is a near-azeotropic mixture of 50% by weight difluoromethane (HFC-32) and 50% by weight pentalfluoroethane (HFC-125).

Pressures: The Pressure of R-410A is approximately 60% (1.6 times) greater than R-22. Recovery and recycle equipment, pumps, hoses and the like must have design pressure ratings appropriate for R-410A.

Combustibility: At pressures above 1 atmosphere, a mixture of R-410A and air can become combustible.

R-410A and air should never be mixed in tanks or supply lines, or be allowed to accumulate in storage tanks. Leak checking should never be done with a mixture of R-410A and air. Leak checking can be performed safely with nitrogen or a mixture of R410A and nitrogen.

5.2 QUICK REFERENCE GUIDE FOR R-410A

- R-410A refrigerant operates at approximately 60% higher pressure (1.6 times) than R-22. Ensure that servicing equipment is designed to operate with R-410A.
- R-410A refrigerant cylinders are light rose in color.
- R-410A, as with other HFC's, is only compatible with POE oils.
- Vacuum pumps will not remove moisture from POE oil used in R-410A systems.
- R-410A systems are to be charged with liquid refrigerant. Prior to March, 1999, R-410A refrigerant cylinders had a dip tube. These cylinders should be kept upright for equipment charging. Post-March 1999 cylinders do not have a dip tube and should be inverted to ensure liquid charging of the equipment.
- Do not install a suction line filter drier in the liquid line.
- A factory approved liquid line filter drier is shipped with every unit and must be installed in the liquid line at the time of installation. 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-410A Refrigerant.

6.0 REPLACEMENT UNITS

To prevent failure of a new unit, the existing line set must be correctly sized and cleaned or replaced. Care must be exercised that the expansion device is not plugged. For new and replacement units, a liquid line filter drier must be installed and refrigerant tubing must be properly sized. Test the oil for acid. If positive, a suction line filter drier is mandatory.

IMPORTANT: If replacing an R-22 unit with an R-410A unit, either replace the line set or ensure that residual mineral oil is drained from the existing lines, including oil trapped in low spots.

7.0 INDOOR COIL

⚠ CAUTION

Only use evaporators approved for use on R-410A systems that are specifically matched with the outdoor unit per the manufacturer's specifications. Use of existing R-22 evaporators can introduce mineral oil into the R-410A refrigerant, forming two different liquids and decreasing oil return to the compressor. This can result in compressor failure.

REFER TO INDOOR AIR HANDLER MANUFACTURER'S INSTALLATION INSTRUCTIONS.

IMPORTANT: The manufacturer is not responsible for the performance and operation of a mismatched system, or for a match listed with another manufacturer's coil.

The thermostat expansion valve (TXV or TEV) in the matching coil is specifically designed to operate with R-410A.

DO NOT use an R-22 TXV or evaporator. The existing evaporator must be replaced with the factory specified TXV evaporator specifically designed for R-410A.

7.1 LOCATION

Do not install the indoor evaporator coil in the return duct system of a gas or oil furnace. Provide a service inlet to the coil for inspection and cleaning. Keep the coil pitched toward the drain connection.

⚠ CAUTION

When a coil, air handler or condensing gas furnace is installed over a finished ceiling and/or living area, it is strongly recommended that a secondary condensaste pan be installed under the entire unit. Failure to do so can result in property damage.

8.0 SELECTING AND SIZING LINE SETS [(*)AGL-AGN-AHM MODELS]

8.1 LINE SETS AND FITTING LOSSES

Refrigerant lines are measured in terms of actual length and equivalent length. Actual length is used for refrigerant charge applications and is the measurement of all of the vertical and horizontal lines from the indoor and outdoor units. Equivalent length takes into account pressure losses from line lengths, fittings, vertical separations, accessories, and filter dryers. Table 2 Equivalent Lengths below provides equivalent lengths for different commonly used parts in refrigerant lines. Equivalent length is the sum of the actual length of the line set plus the equivalent length of all fittings, accessories, and filter dryers. Equivalent length is used in determining proper line sizing and installation.

TABLE 2

Equivalent Length for Fittings (ft)							
Line Size (in)	90° Short Radius Elbow	90° Long Radius Elbow	45° Elbow	Solenoid Valve	Check Valve	Site Glass	Filter Dryer
3/8	1.3	0.8	0.3	6	4	0.4	6
1/2	1.4	0.9	0.4	9	5	0.6	6
5/8	1.5	1	0.5	12	6	0.8	6
3/4	1.9	1.3	0.6	14	7	0.9	6
7/8	2.3	1.5	0.7	15	8	1	6
1-1/8	2.7	1.8	0.9	22	12	1.5	6

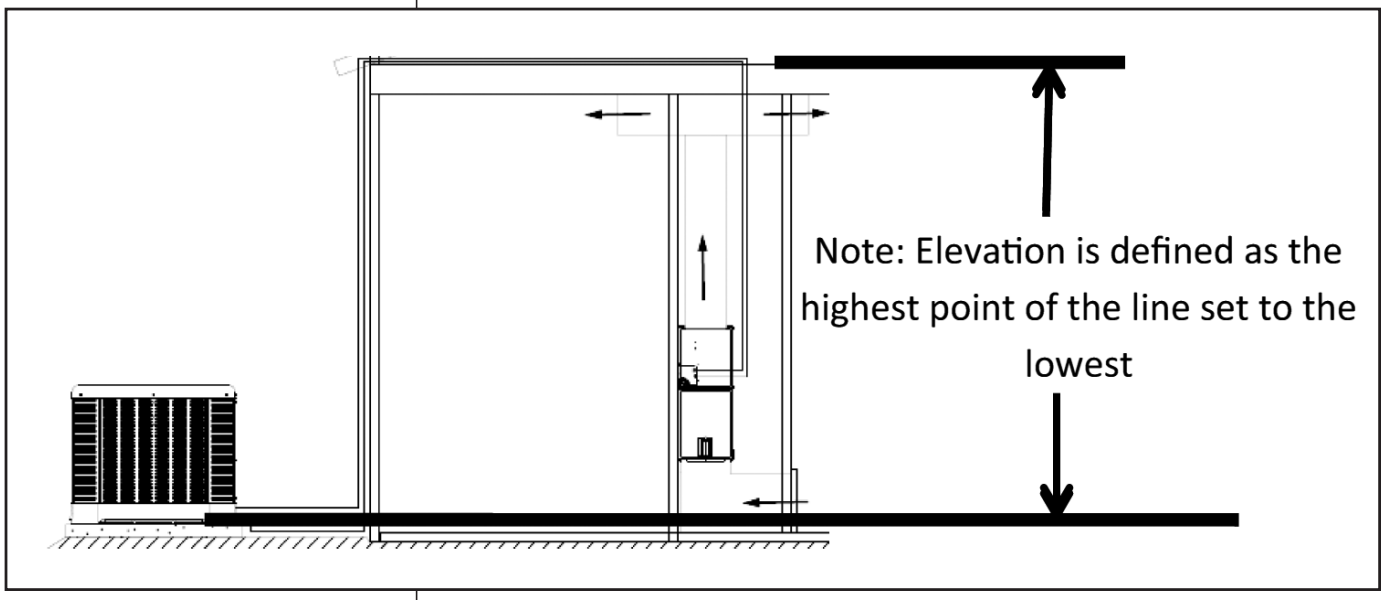
8.2 LIQUID LINE SELECTION

The purpose of the liquid line is to transport warm sub-cooled liquid refrigerant from the outdoor unit to the indoor unit. It is important to maintain a column of liquid all the way to the expansion device and not to allow the refrigerant to flash into super-heated vapor. The flashing of refrigerant can occur for the following reasons:

- Low refrigerant charge
- Improperly selected liquid line size
- Absorption of heat prior to expansion device
- Excessive vertical rise between the condenser and evaporator

The procedure for selecting the proper liquid line size and length is as follows:

- Measure the total amount of vertical rise (elevation).
- Measure the actual amount of liquid line required.
- Add all of the equivalent lengths associated with any fittings or accessories.
- Add the actual length and equivalent lengths. This will equal your total equivalent length.
- Reference the Line Sizing Chart that matches the application (e.g. ODU above, ODU below, ODU same elevation as the IDU3) and the capacity size of the equipment.



LIQUID LINE SELECTION (CONT.)

- Verify that the value of the calculated total equivalent length is compatible with the applications vertical rise and diameter of the liquid line.
- Using the equivalent length total and the vertical rise in the application (if required) to determine the size and allowable lengths of the liquid line piping.

Liquid Line General Notes:

- Regardless of equivalent length, the actual linear length of the tubing shall not exceed 200’.
- Design of the liquid line must not exceed 400 FPM and must have a minimum of 100 FPM.
- Liquid lines must be sized to minimize refrigerant pressure change.
- Sufficient refrigerant sub-cooling must be maintained at the expansion device for proper system operation.
- R-410A loses 0.43 PSI for every foot of vertical lift as a liquid. Length of pipe, fittings, liquid line filter drier also add pressure drop thus limiting applications where the outdoor unit is below the indoor unit to much shorter distances than when the outdoor unit is above the indoor unit.
- When the outdoor unit is above the indoor unit, the vertical line experiences an increase in PSIG (Static Gain) which will also lead to changes in subcooling at the metering device.
- The total pressure drop allowed for the liquid line is 50 PSI.

8.3 VAPOR SUCTION LINE SELECTION

The purpose of the suction line is to return superheated vapor to the compressor from the evaporator. Suction line sizing and refrigerant velocity is important as they have a role in ensuring the return of oil to the compressor. An improperly sized suction line can reduce performance of the system.

The procedure for selecting the proper liquid line size is as follows:

Measure the total amount of vertical rise (elevation).

- Measure the actual amount of suction line required.
- Add all of the equivalent lengths associated with any fittings or accessories using Table 1.
- Add the actual length and equivalent lengths. This will equal your total equivalent length of suction line.
- Reference the Line Sizing Charts that matches the application (e.g. ODU above, below, or same elevation as the IDU) and the capacity size of the equipment.
- Verify that the value of the calculated total equivalent length is compatible with the applications vertical rise and diameter of the liquid line.
- Using the equivalent length total and the vertical rise in the application (if required) to determine the size and allowable lengths of the liquid line piping.

Suction Line General Notes:

- The Manufacturer does NOT require traps in the suction line when the condenser is above the evaporator, and recommends they not be used. The combination of miscibility of the POE oil and R-410A, along with compliance to the refrigerant line design instructions will ensure oil is properly returned without exceeding pressure drop limits in the vapor line. Traps will add to the pressure drop and therefore are counterproductive when the suction line is sized according to these guidelines.
- Refrigerant velocity for vertical suction risers must be maintained at 1100 FPM to ensure oil return. Horizontal suction lines must maintain 800 FPM. This will often result in different size refrigerant lines between horizontal and vertical applications. While gravity has very little effect on the gas itself, oil and pressure drop are still key factors.
- It is acceptable to use the larger size suction line for shorter horizontal runs and in applications where the indoor unit is above the outdoor unit to prevent capacity losses.
- Pressure drop within the suction line should be limited to 5 psi for R410A systems although the longest lines may slightly exceed this limit in an effort to maintain velocity. The maximum pressure is 7 psi.
- Suction line pressure loss reduces capacity by 0.6% for R-410A per psi. In order to minimize capacity loss suction pressure loss must be minimized.

8.4 REFRIGERANT LEVEL ADJUSTMENT

The residential outdoor units (ODU) are R-410A factory charged. The factory charge amount accounts for the ODU volume and an additional 15 feet of refrigerant tubing with a liquid line diameter of 3/8”. This factory charge does not account for the volume of the factory supplied, field installed liquid line filter drier. Final adjustment of the refrigerant charge may be necessary during the system commissioning even if the application has exactly 15 feet of line set due to other installation variables such as the filter drier and pressure drops due to vertical separation. If additional refrigerant charge is needed it should be added before opening the ODU valves.

Adjust the refrigerant charge by using the actual liquid line length and the table below that indicates refrigerant charge in ounces per foot of the indicated liquid line size:

- 1/4” line diameter uses 0.3 ounces per foot of line (6.4 mm uses 8.5g per .30 m)
- 5/16”line diameter uses 0.4 ounces per foot of line (7.9mm uses 11.3g per .30m)
- 3/8” line diameter uses 0.6 ounces per foot of line (9.5mm uses 17.0g per .30 m)
- 1/2” line diameter uses 1.2 ounces per foot of line (12.7mm uses 34.0g per .30 m)
- **NOTE:** The factory provided filter drier requires an additional 6.0 ounces of refrigerant.
- **NOTE:** The factory provided charge to account for the 15 feet of line set is 9 oz. (based on 3/8” line, 0.6 oz. per foot)

Charge Adjustment = (Line Diameter oz. per ft.) × Total Actual Length) – Factory Charge + Filter Drier

Example:

A 3 ton unit with 50' of 5/16' liquid line (actual length) and the factory provided filter drier. In this case 5/16" diameter line requires 0.4 ounces per foot of liquid line length.

1. Multiply 50 ft. × 0.4 ounces per foot = 20 ounces
2. Add 6.0 ounces needed for the field installed drier
3. Subtract the 9.0 ounces of the factory charge that is already in the system and was designated for the 15' of refrigerant line.

Answer: 20 oz. + 6.0 oz. – 9.0 oz. = 17 ounces of additional refrigerant charge is required.

8.5 ADDITIONAL OIL ADJUSTMENT

All refrigerant in the system will carry a small amount of oil. As more refrigerant is added to the system, additional oil will also need to be added.

The formula for determining how much oil to add to the system is as follows:

Oil to be Added = [(Charge Adjustment + OD Unit Name Plate Charge (oz.)) × (0.022) – [(0.10) × (Compressor Name Plate Oil Charge (oz.))]

(See Tables 3, 4, and 5 – Crankcase Heaters for Unit Nameplate Charge (oz.) values)

Example:

- Charge adjustment: 17 ounces
- Unit Name Plate Charge: 107 ounces
- Nameplate Oil charge: 25 ounces
  - o [(17+170) × (0.022)] – [(0.10 x 25)]
  - o [187 × 0.022] – [2.5]
  - o 4.1 – 2.5
  - o 1.6

Add 1.6 ounces of POE oil to system.

8.6 LONG LINE SET APPLICATIONS

This section is intended for long line applications as noted in the light grey shaded areas in the Line Sizing Charts. Long line set applications require accessories, unit specific requirements, and long line set installation considerations. The following are special considerations required when installing a line set that is considered to be a long line set.

- Long line Set Accessories
- Long Line Set Unit Requirements
- Long Line Installations Considerations
- Additional Refrigerant Charge
- Additional Oil Level Adjustment
- Fitting losses and maximum equivalent length considerations.
- Refrigerant Migration in the off cycle
- Oil Return to the compressor
- Capacity losses

8.7 LONG LINE SET ACCESSORIES

Crankcase Heater

Some models come from the factory with crankcase heaters already installed. See the Crankcase Heater table to determine if the accessory needs to be ordered and field installed.

Hard Start Kit (SK-A1)

In applications with long line sets, one characteristic will be added refrigerant. Hard Start components will increase the starting torque of the compressor in order to overcome the pressure differential on the compressor. See the Hard Start Kit Accessory Part number SK-A1 to order and field install.

TABLE 3
COMPRESSOR/FACTORY OIL CHARGE/CRANKCASE HEATERS

SAGN Model	Compressor Part Number Compressor Model	Compressor Name Plate Factory Oil Charge (Oz.)	Factory Installed CCH (Yes or No)	Crankcase Heater Part Number
*AGN-018JA	55-102045-82 ZP14K5E-PFV-130	25	N	44-103663-08
*AGN-024JA	55-102045-24 ZP20K5E-PFV-130	25	N	44-103663-08
*AGN-030JA	55-102045-31 ZP24K5E-PFV-130	25	N	44-103663-08
*AGN-036JA	55-102045-03 ZP31K5E-PFV-130	25	N	44-103663-08
*AGN-042JA	55-102045-15 ZP34K5E-PFV-130	42	N	44-103663-13
*AGN-048JA	55-102045-09 ZP42K5E-PFV-130	42	N	44-103663-13
*AGN-060JA	55-102045-56 ZP51K5E-PFV-130	42	N	44-103663-13
*AGN-018TA	55-102045-56 ZP20K5E-PFJ-130	25	N	44-103663-08
*AGN-024TA	55-102045-51 ZP24K5E-PFJ-130	25	N	44-103663-08
*AGN-030TA	55-102045-50 ZP31K5E-PFJ-130	25	N	44-103663-08
*AGN-036TA	55-102045-51 ZP36K5E-PFJ-130	42	N	44-103663-13
*AGN-036NA	55-102045-136 ZP36K5E-TFD-13R	42	N	44-103663-13
*AGN-042NA	55-102045-10 ZP42K5E-TFD-130	42	N	44-101884-16
*AGN-048NA	55-102045-94 ZP44K5E-TFD	42	N	44-101884-16
*AGN-060NA	55-102045-169 ZP57K5E-TFD	42	N	44-101884-16
*AGN-065NA	55-102471-16 ZP61KCE-TFD-130	56	N	44-101884-16

TABLE 4
COMPRESSOR/FACTORY OIL CHARGE/CRANKCASE HEATERS

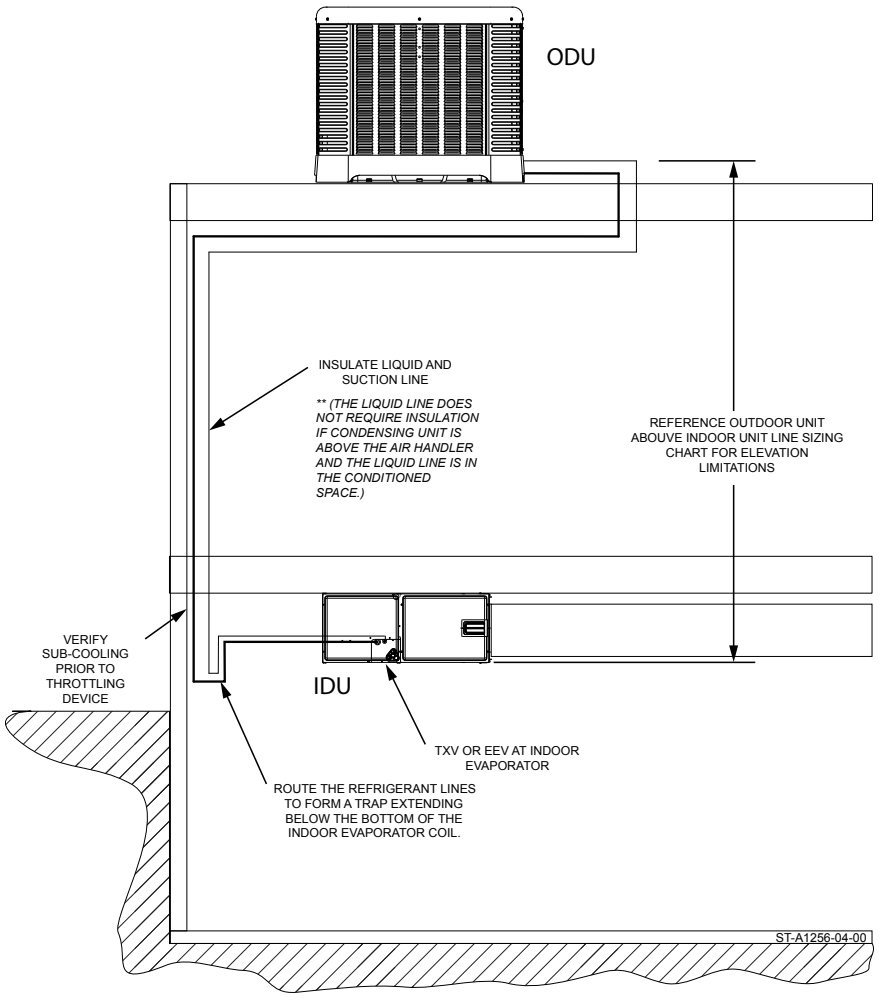
SAHM 60 Hz Model	Compressor Part Number/ Compressor Model	Compressor Name Plate Factory Oil Charge (oz)	Factory Installed CCH (Yes or No)	Cranckcase Heater Part Number
*AHM-019JA030	55-102045-82/ ZP14K5E-PFV-130	25	N	44-103663-08
*AHM-019JS030	55-102045-82/ ZP14K5E-PFV-130	25	N	44-103663-08
*AHM-025JA030	55-102045-97/ ZP20KAE-PFV-130	21	N	44-103663-08
*AHM-025JS030	55-102045-97/ ZP20KAE-PFV-130	21	N	44-103663-08
*AHM-030JA030	55-102045-31/ ZP24K5E-PFV-130	25	N	44-103663-08
*AHM-030JS030	55-102045-31/ ZP24K5E-PFV-130	25	N	44-103663-08
*AHM-036JA030	55-102045-03/ ZP31K5E-PFV-130	25	N	44-103663-08
*AHM-036JS030	55-102045-03/ ZP31K5E-PFV-130	25	N	44-103663-08
*AHM-042JA030	55-102045-15/ ZP34K5E-PFV-130	42	N	44-103663-13
*AHM-042JS030	55-102045-15/ ZP34K5E-PFV-130	42	N	44-103663-13
*AHM-048JA030	55-102045-09/ ZP42K5E-PFV-130	42	Y	44-101884-13
*AHM-048JS030	55-102045-09/ ZP42K5E-PFV-130	42	Y	44-103663-13
*AHM-060JA030	55-102045-26/ ZP51K5E-PFV-130	42	Y	44-103663-13
*AHM-060JS030	55-102045-26/ ZP51K5E-PFV-130	42	Y	444-103663-13

TABLE 5
COMPRESSOR/FACTORY OIL CHARGE/CRANKCASE HEATERS

(*)AGL 50 Hz Model	Compressor Part Number/ Compressor Model	Compressor Name Plate Factory Oil Charge (oz)	Factory Installed CCH (Yes or No)	Cranckcase Heater Part Number	Factory Installed Oil Separator
*AGL-018TA	55-102045-47/ ZP16K5E-PFJ-130	25	N	44-103663-08	--
*AGL-018TS	55-102045-47/ ZP16K5E-PFJ-130	25	N	44-103663-08	Y
*AGL-024TA	55-102045-48/ ZP21K5E-PFJ-130	25	N	44-103663-08	--
*AGL-024TS	55-102045-48/ ZP21KAE-PFJ-130	25	Y	44-103663-08	Y
*AGL-030TA	55-102045-49/ ZP25K5E-PFJ-130	25	N	44-103663-08	--
*AGL-030TS	55-102045-49/ ZP25K5E-PFJ-130	25	Y	44-103663-08	Y
*AGL-036NA	55-102045-04/ ZP31K5E-TFD-130	25	N	44-103663-09	--
*AGL-036TA	55-102045-50/ ZP31K5E-PFJ-130	25	N	44-103663-08	--
*AGL-036TS	55-102045-50/ ZP31K5E-PFJ-130	25	Y	44-103663-08	Y
*AGL-042NA	55-102045-25/ ZP36K5E-TFD-130	42	N	44-103663-06	--
*AGL-042NS	55-102045-25/ ZP36K5E-TFD-130	42	Y	44-103663-06	Y
*AGL-042TA	55-102045-51/ ZP36K5E-PFJ-130	42	N	44-103663-13	--
*AGL-048NA	55-102045-10 ZP42K5E-TFD-130	42	N	44-103663-06	--
*AGL-048NS	55-102045-10 ZP42K5E-TFD-130	42	N	44-103663-06	Y
*AGL-048TA	55-102045-52/ ZP42K5E-PFJ-130	42	N	44-103663-13	--
*AGL-060NA	55-102045-16/ ZP36K5E-TF5-130	56	N	44-103663-08	--
*AGL-060NS	55-102045-16/ ZP36K5E-TF5-130	56	N	44-103663-08	Y
*AGL-065NA	55-102045-45/ ZP72KCE-TFD-130	60	N	44-101884-06	--
*AGL-065NS	55-102045-45/ ZP72KCE-TFD-130	60	Y	44-101884-06	Y

OUTDOOR UNIT ABOVE THE INDOOR UNIT

LONG LINE SET INSTRUCTIONS
OUTDOOR UNIT ABOVE INDOOR AIR HANDLER.
MIDDLE EAST EXPORT UNIT ONLY

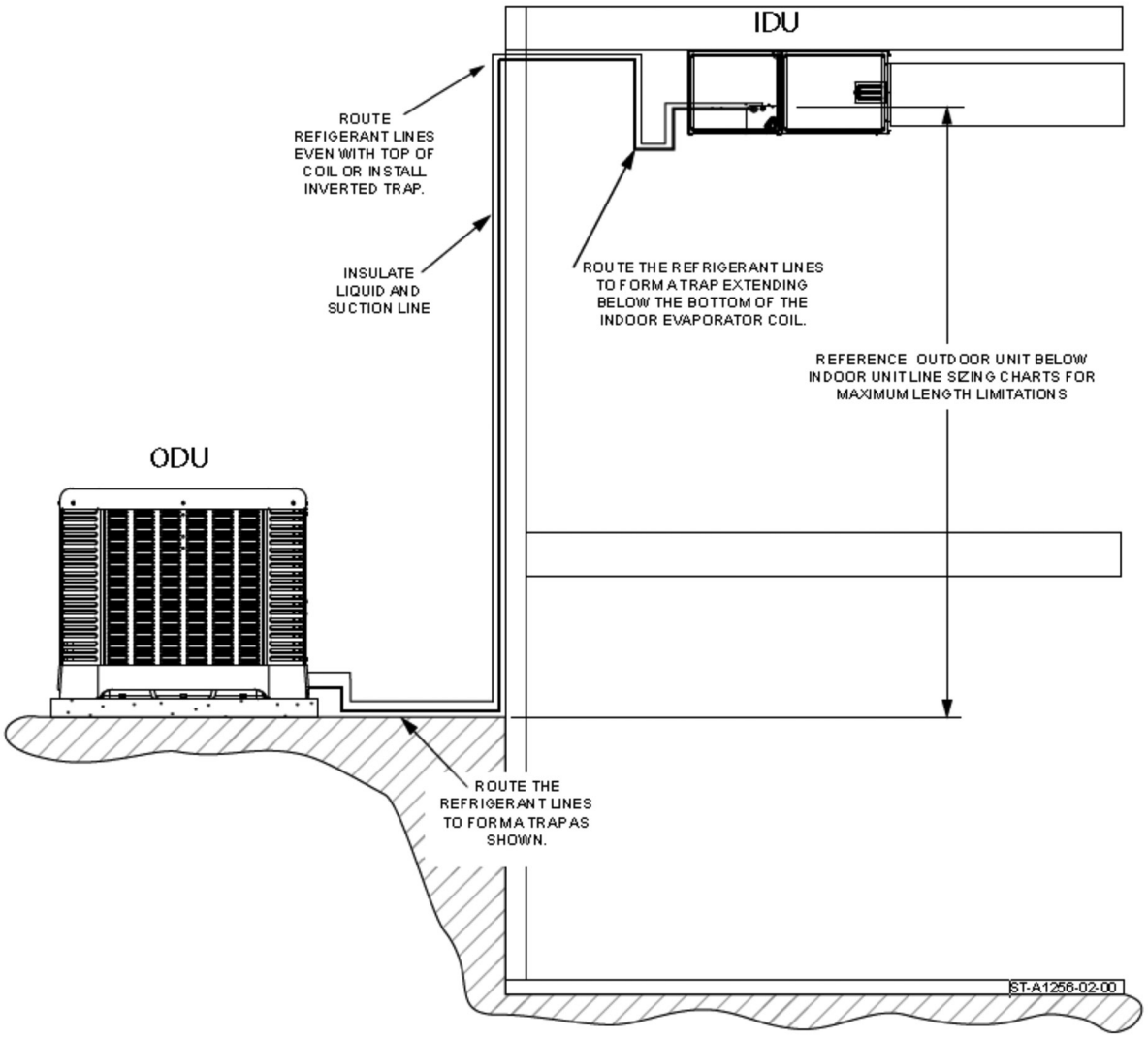


NOTE: Following is the chart specific to applications where the outdoor unit is **above** the indoor coil. Do not confuse charts designated with outdoor unit **below** indoor coil, with charts designated with outdoor unit **above** indoor coil.

Single Stage	Liquid Line Size [mm]	Suction Line Size [mm]	Outdoor Unit ABOVE Indoor Unit											
			Condition - A			Condition - B			Condition - C					
			Equivalent Length in Meters											
			<15	15.5-22.5	23-45	38-45	45-75	75-90	45.5-52.5	53-60	61.5-67.5	68-75	75.5-82.5	83-90
			Maximum Vertical Separation / Capacity Multiplier											
1.5 Ton	1/4" [6.35]	5/8" [15.88]	15 / 1.00	22.5 / 0.99	33.5 / 0.99	40 / 0.98			52.5 / 0.97					
	5/16" [7.94]	5/8" [15.88]	15 / 1.00	22.5 / 0.99	33.5 / 0.98	40 / 0.98	45 / 0.96	45 / 0.95	52.5 / 0.97	58 / 0.97	56 / 0.96	55 / 0.96	52.5 / 0.96	52.5 / 0.95
	3/8" [9.52.5]	5/8" [15.88]	15 / 1.00	22.5 / 0.99	33.5 / 0.98	40 / 0.98	45 / 0.96	45 / 0.95	52.5 / 0.97	60 / 0.97	60 / 0.96	60 / 0.96	60 / 0.96	60 / 0.95
2 Ton	1/4" [6.35]	5/8" [15.88]	15 / 1.00	22.5 / 0.99	33.5 / 0.98									
	5/16" [7.94]	5/8" [15.88]	15 / 1.00	22.5 / 0.99	33.5 / 0.98	40 / 0.97	45 / 0.95		52 / 0.97	55 / 0.96	50 / 0.95	47 / 0.95		
	3/8" [9.52.5]	5/8" [15.88]	15 / 1.00	22.5 / 0.99	33.5 / 0.98	40 / 0.97	45 / 0.95	45 / 0.94	52.5 / 0.97	60 / 0.96	60 / 0.95	60 / 0.95	60 / 0.95	60* / 0.94
2.5 Ton	5/16" [7.94]	5/8" [15.88]	15 / 0.98	22.5 / 0.97	33.5 / 0.97	40 / 0.95								
	3/8" [9.52.5]	5/8" [15.88]	15 / 0.98	22.5 / 0.97	33.5 / 0.97	40 / 0.95	45 / 0.92	45 / 0.91	52.5 / 0.94	60 / 0.93	60 / 0.93	60 / 0.92	60* / 0.92	60* / 0.91
	5/16" [7.94]	3/4" [19.06]	15 / 1.00	22.5 / 0.99	33.5 / 0.99	40 / 0.98								
	3/8" [9.52.5]	3/4" [19.06]	15 / 1.00	22.5 / 0.99	33.5 / 0.99	40 / 0.98	45 / 0.97	45 / 0.96	52.5 / 0.98	60 / 0.98	60 / 0.97	60 / 0.97	60* / 0.97	60* / 0.96
3 Ton	5/16" [7.94]	5/8" [15.88]	15 / 0.98	22.5 / 0.97	33.5 / 0.96	40 / 0.93								
	3/8" [9.52.5]	5/8" [15.88]	15 / 0.98	22.5 / 0.97	33.5 / 0.96	40 / 0.93	45 / 0.90	45 / 0.88	52.5 / 0.93	60 / 0.91	60 / 0.90	60 / 0.90	60* / 0.89	60* / 0.88
	5/16" [7.94]	3/4" [19.06]	15 / 1.00	22.5 / 0.99	33.5 / 0.99	40 / 0.98								
	3/8" [9.52.5]	3/4" [19.06]	15 / 1.00	22.5 / 1.00	33.5 / 0.99	40 / 0.97	45 / 0.97	45 / 0.96	52.5 / 0.96	60 / 0.98	60 / 0.97	60 / 0.97	60* / 0.96	60* / 0.96
3.5 Ton	5/16" [7.94]	3/4" [19.06]	15 / 1.00	22.5 / 0.99	33.5 / 0.99									
	3/8" [9.52.5]	3/4" [19.06]	15 / 1.00	22.5 / 0.99	33.5 / 0.99	40 / 0.98	45 / 0.96	45 / 0.95	52.5 / 0.98	60 / 0.97	60 / 0.97	60* / 0.96	60* / 0.96	60* / 0.95
	5/16" [7.94]	7/8" [22.22.5]	15 / 1.00	22.5 / 1.00	33.5 / 1.00									
	3/8" [9.52.5]	7/8" [22.22.5]	15 / 1.00	22.5 / 1.00	33.5 / 1.00	40 / 1.00	45 / 0.96	45 / 0.95	52.5 / 0.99	60 / 0.99	60 / 0.99	60* / 0.96	60* / 0.96	60* / 0.95
4 Ton	3/8" [9.52.5]	3/4" [19.06]	15 / 0.98	22.5 / 0.97	33.5 / 0.96	40 / 0.95	45 / 0.92	45 / 0.91	52.5 / 0.94	60* / 0.93	60* / 0.92	58* / 0.92	52* / 0.92	47* / 0.91
	1/2" [12.71]	3/4" [19.06]	15 / 0.98	22.5 / 0.97	33.5 / 0.96	40 / 0.95	45 / 0.92	45 / 0.91	52.5 / 0.94	60 / 0.93	60 / 0.92	60 / 0.92	60* / 0.92	60* / 0.91
	3/8" [9.52.5]	7/8" [22.22.5]	15 / 1.00	22.5 / 0.98	33.5 / 0.98	40 / 0.97	45 / 0.96	45 / 0.96	52.5 / 0.97	60* / 0.97	60* / 0.96	58* / 0.96	52* / 0.96	47* / 0.96
	1/2" [12.71]	7/8" [22.22.5]	15 / 1.00	22.5 / 0.98	33.5 / 0.98	40 / 0.97	45 / 0.96	45 / 0.96	52.5 / 0.97	60 / 0.97	60 / 0.96	60 / 0.96	60* / 0.96	60* / 0.96
5 Ton	3/8" [9.52.5]	3/4" [19.06]	15 / 0.98	22.5 / 0.96	33.5 / 0.95	40 / 0.93	45 / 0.90		52.5 / 0.92	60* / 0.92	55* / 0.91	49* / 0.90		
	1/2" [12.71]	3/4" [19.06]	15 / 0.98	22.5 / 0.96	33.5 / 0.95	40 / 0.93	45 / 0.90	45 / 0.89	52.5 / 0.92	60 / 0.92	60 / 0.91	60 / 0.90	60* / 0.90	60* / 0.89
	3/8" [9.52.5]	7/8" [22.22.5]	15 / 1.00	22.5 / 0.99	33.5 / 0.98	40 / 0.97	45 / 0.95		52.5 / 0.97	60* / 0.96	55* / 0.96	49* / 0.95		
	1/2" [12.71]	7/8" [22.22.5]	15 / 1.00	22.5 / 0.99	33.5 / 0.98	40 / 0.97	45 / 0.95	45 / 0.94	52.5 / 0.97	60 / 0.96	60 / 0.96	60 / 0.95	60* / 0.95	60* / 0.94

	Condition:		Total Equivalent Length	Max. Vertical Separation
	A	Standard unit	3 ~ 45	<33.5
Light Gray - (<45m vertical separation)	B	Use Oil Separator recommended and Crank case heater.	38 ~ 90	34 ~ 45
Dark Gray	C	Use Oil Separator, Crank case heater, Hard Start Kit and Non-bleed TXV.	45.5 ~ 90	45.1 ~ 60
Black		Not Recommended		
	*	* Applications with asterisks (*) require a minimum of 15m vertical separation.		

OUTDOOR UNIT BELOW THE INDOOR UNIT



NOTE: Following is the chart specific to applications where the outdoor unit is **below** the indoor coil. Do not confuse charts designated with outdoor unit **above** indoor coil, with charts designated with outdoor unit **below** indoor coil.

Single Stage	Liquid Line Size [mm]	Suction Line Size [mm]	Outdoor Unit BELOW Indoor Unit										
			Equivalent Length in Meter										
			<15	15.5-22.5	23-30	30.5-37.5	38 - 45	45.5-52.5	53-60	61.5-67.5	68-75	75.6-82.5	83-90
			Maximum vertical Separation / Capacity Multiplier										
1.5 Ton	5/16" [7.94]	5/8" [15.88]	15/0.99	21.0/0.99	18/0.98	13.5/0.98	10.5/0.98	6/0.97	3/0.97				
	3/8" [9.52.5]	5/8" [15.88]	15/0.99	22.5/0.99	24.5/0.98	24.5/0.98	24.5/0.98	24.5/0.97	24.5/0.97	24.5/0.96	24.5/0.96	18/0.96	15/0.95
	5/16" [7.94]	3/4"[19.06]	15/1.00	21.0/1.00	18/1.00	13.5/1.00	10.5/0.99	6/0.99	3/0.99				
	3/8" [9.52.5]	3/4"[19.06]	15/1.00	22.5/1.00	24.5/1.00	24.5/1.00	24.5/0.99	24.5/0.99	24.5/0.99	24.5/0.99	24.5/0.99	18/0.99	15/0.99
2 Ton	5/16" [7.94]	5/8" [15.88]	15/1.00	13.5/0.99	25/0.98								
	3/8" [9.52.5]	5/8" [15.88]	15/1.00	22.5/0.99	24.5/0.98	24.5/0.97	24.5/0.97	24.5/0.96	24.5/0.95	24.5/0.94	24.5/0.94	9/0.94	3/0.93
	5/16" [7.94]	3/4"[19.06]	15/1.00	13.5/1.00	25/1.00								
	3/8" [9.52.5]	3/4"[19.06]	15/1.00	22.5/1.00	24.5/1.00	24.5/1.00	24.5/0.99	24.5/0.99	24.5/0.99	24.5/0.99	24.5/0.98	9/0.98	3/0.98
2.5 Ton	5/16" [7.94]	5/8" [15.88]	12/09.8	3/0.97									
	3/8" [9.52.5]	5/8" [15.88]	15/0.98	22.5/0.97	24.5/0.97	24.5/0.96	24.5/0.96	24.5/0.95	24.5/0.94	24.5/0.93	24.5/0.93	15/0.92	
	5/16" [7.94]	3/4"[19.06]	12/1.00	3/0.99									
	3/8" [9.52.5]	3/4"[19.06]	15/1.00	22.5/0.99	24.5/0.99	24.5/0.99	24.5/0.98	24.5/0.98	24.5/0.98	24.5/0.98	24.5/0.97	15/0.97	
3 Ton	5/16" [7.94]	3/4"[19.06]	10.5/1.00	10/0.99									
	3/8" [9.52.5]	3/4"[19.06]	15/1.00	22.5/0.99	24.5/0.98	24.5/0.98	24.5/0.98	24.5/0.97	24.5/0.97	24.5/0.97	24.5/0.96	10/0.96	
	1/2"[12.71]	3/4"[19.06]	15/1.00	22.5/0.99	24.5/0.98	24.5/0.98	24.5/0.98	24.5/0.97	24.5/0.97	24.5/0.97	24.5/0.96	24.5/0.96	24.5/0.95
	3/8"[9.52.5]	7/8"[22.23]	15/1.00	22.5/1.00	24.5/1.00	24.5/1.00	24.5/0.99	24.5/0.99	24.5/0.99	24.5/0.99	24.5/0.98	10/0.98	
	1/2"[12.71]	7/8"[22.23]	15/1.00	22.5/1.00	24.5/1.00	24.5/1.00	24.5/0.99	24.5/0.99	24.5/0.99	24.5/0.99	24.5/0.98	24.5/0.98	24.5/0.98
3.5 Ton	3/8" [9.52.5]	3/4"[19.06]	15/0.99	22.5/0.99	24.5/0.98	24.5/0.98	24.5/0.97	24.5/0.97	24.5/0.96	24.5/0.96	21.0/0.95		
	1/2"[12.71]	3/4"[19.06]	15/0.99	22.5/0.99	24.5/0.98	24.5/0.98	24.5/0.97	24.5/0.97	24.5/0.96	24.5/0.96	24.5/0.95	21.0/0.95	18/0.94
	3/8"[9.52.5]	7/8"[22.23]	15/1.00	22.5/1.00	24.5/1.00	24.5/1.00	24.5/1.00	24.5/0.99	24.5/0.99	24.5/0.99	21.0/0.98		
	1/2"[12.71]	7/8"[22.23]	15/1.00	22.5/1.00	24.5/1.00	24.5/1.00	24.5/1.00	24.5/0.99	24.5/0.99	24.5/0.99	24.5/0.98	21.0/0.98	18/0.97
4 Ton	3/8" [9.52.5]	3/4"[19.06]	15/0.99	22.5/0.99	24.5/0.98	24.5/0.98	24.5/0.97	24.5/0.97	24.5/0.96	21.0/0.96	15/0.95		
	1/2"[12.71]	3/4"[19.06]	15/0.99	22.5/0.99	24.5/0.98	24.5/0.98	24.5/0.97	24.5/0.97	24.5/0.96	24.5/0.96	24.5/0.95	18/0.95	12/0.94
	3/8"[9.52.5]	7/8"[22.23]	15/1.00	22.5/1.00	24.5/1.00	24.5/1.00	24.5/1.00	24.5/0.99	24.5/0.99	21.0/0.99	15/0.98		
	1/2"[12.71]	7/8"[22.23]	15/1.00	22.5/1.00	24.5/1.00	24.5/1.00	24.5/1.00	24.5/0.99	24.5/0.99	24.5/0.99	24.5/0.98	18/0.98	12/0.97
5 Ton	3/8" [9.52.5]	3/4"[19.06]	15/0.98	22.5/0.98	24.5/0.97	24.5/0.96	24.5/0.96	24.5/0.95	12/0.94	6/0.94			
	1/2"[12.71]	3/4"[19.06]	15/0.98	22.5/0.98	24.5/0.97	24.5/0.96	24.5/0.96	24.5/0.95	21.0/0.94	15/0.94	9/0.93		
	3/8"[9.52.5]	7/8"[22.23]	15/1.00	22.5/0.99	24.5/0.99	24.5/0.98	24.5/0.98	18/0.97	12/0.97	6/0.96			
	1/2"[12.71]	7/8"[22.23]	15/1.00	22.5/0.99	24.5/0.99	24.5/0.98	24.5/0.98	24.5/0.97	21.0/0.97	15/0.96	9/0.96		

Notes:

	Always use the smallest Liquid Line allowable to keep system charge to a minimum
	Additional refrigerant and oil may be required (see Application Notes)
	Vertical separation cannot Exceed 24.5 meter of length.
	Light grey shaded areas require long line set application (Oil Separator, Crank Case Heater, Hard Start Kit and Non-bleed TXV).
	These areas in the chart are not applicable for installation.

8.8 LONG LINE SET UNIT REQUIREMENTS

Non-Bleed TXV's on Indoor Coils

All air handler coils are shipped with factory installed non-bleed TXV's. If this TXV is replaced it will require a non-bleed type.

8.9 LONG LINE INSTALLATION CONSIDERATIONS

Liquid Line Sizing

Reference the Selection and Sizing Line Sets section, Liquid Lines in this guide.

- Minimize pressure change
- Ensure sub-cooled liquid at the expansion device
- Size as small as possible without exceeding the recommended maximum pressure drop

Liquid Line Insulation

When the liquid line is run through an unconditioned space for any significant length, it is subject to losing or gaining heat from the ambient air. This can cause refrigerant to flash in the liquid line prior to the TXV.

Suction Line Sizing

Reference the Selection and Sizing Line Sets section, Suction Lines in this guide.

- Minimize pressure loss
- In applications where ODU is Above IDU maintain refrigerant gas velocity to ensure oil return

Suction Line Insulation

Insulation may be required on the vapor line if it is traveling through, at extended distances, an unconditioned space. Insulation slows the transfer of heat absorbed by the cool vapor line preventing excess superheat by the time the refrigerant gets to the compressor.

Inverted Trap

When the system is installed with the outdoor unit below the indoor coil, an inverted trap, installed at the indoor coil will prevent oil and refrigerant drainage to the outdoor unit in the off cycle. An inverted trap is simply a matter of making sure the refrigerant lines exit the indoor coil and go upward to a height above the top of the coil before going back down toward the outdoor unit.

Refrigerant Level Adjustment

Longline sets will require the refrigerant charge level to be adjusted. Reference the Refrigerant Level Adjustment section to determine the amount of R-410A refrigerant is required.

- Always recheck and readjust system refrigerant charge levels as needed during the final commissioning phase.

Additional Oil

With long line sets as more refrigerant is added to the system, additional oil will need to be added. Reference the Additional Oil Adjustment section to determine the quantity of POE oil to add.

Capacity

Use the capacity multiplier in the Line Sizing Charts to determine the impact to the system capacity based on long line set applications. Determine that the capacity meets the application requirements.

8.10 SUMMARY OF IMPORTANT NOTES:

- The Maximum Actual Linear Length of the refrigerant lines shall not exceed 200 ft. [61 m].
- Equivalent Length shall not exceed 300 ft. [91.4 m].
- Maximum Vertical Separation may not exceed 200 ft. [61 m].
- Maximum Vertical Separation may not exceed 90% of the total actual length.
- Maximum Vertical Lift on liquid line may not exceed 80 ft. [24.5 m] (Outdoor Unit Below and all Heat Pumps).

- Follow Refrigerant Line Sizing Charts, do not exceed lengths, vertical separation, line diameters or total actual length described in these charts.
- Understand the difference between Actual and Equivalent Lengths. Refrigerant lines are measured in terms of actual length and equivalent length. Actual length is used for refrigerant charge applications. This is the actual line set distance between the indoor and outdoor units. Equivalent length takes into account pressure losses from refrigerant line lengths, fittings, vertical separation, accessories, and filter dryers. Table 2 Equivalent Lengths references different commonly used equivalent lengths for fittings and parts.
- Heat pump line sizing charts only apply to Heat Pumps. Because refrigerant flows both directions, depending on operating mode or defrost, vertical separation is limited to 80 ft. [24.5 m]. DO NOT attempt to install a heat pump using the cooling only charts.
- Applications in the grey shaded areas of the Line Size Charts (Long Line Set) require the use of appropriate accessories, unit requirements, and installation considerations.
- Applications in the blacked out areas on the liquid line tables exceed manufacture recommendations.
- Additional refrigerant may be required depending on the system application.
- Additional Oil will be required when the refrigerant volume is increased.
- Additional refrigerant line insulation may be required on the vapor line and/or liquid line.
- Inverted Traps are used when the indoor coil is above the outdoor coil. This prevents oil from draining out of the evaporator in the off cycle which can accumulate near the compressor.
- See Models Compressor/Factory Oil Charge/Crankcase Heaters Tables for information regarding factory oil charge and factory installed crankcase heaters and oil separators.

9.0 INTERCONNECTING TUBING

Installation of split-systems should be performed by qualified service technicians with proper training in the installation, service and repair of such systems.

The following serves as a guideline for proper piping and installation. Be sure to read these instructions along with the equipment installation instructions carefully and adhere to all cautions, warnings, and general practice guidelines. Consult local building and mechanical codes for special requirements.

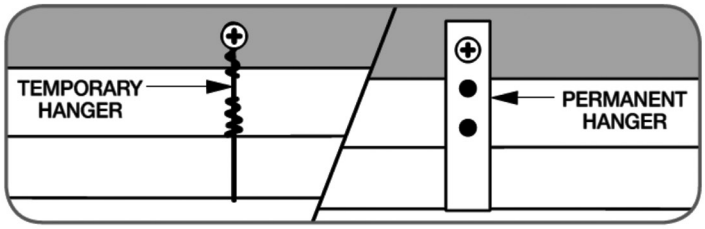
The tables and application data in this document will assist to better apply ducted split systems to achieve maximum efficiency, performance and reliability.

9.1 GENERAL GUIDELINES LINE INSTALLATION

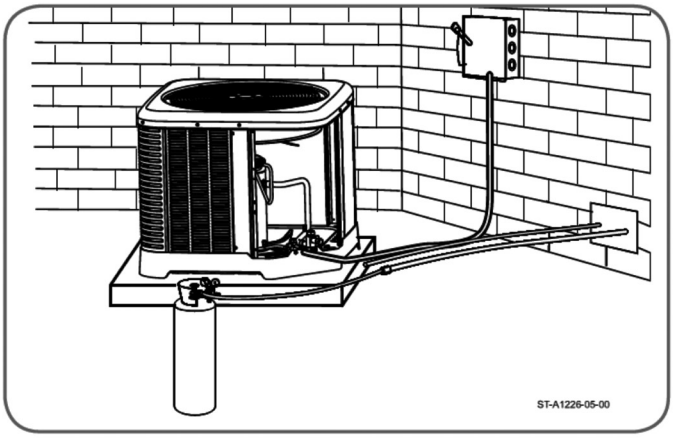
Observe the following when installing correctly sized type “L” refrigerant lines between the indoor coil and outdoor unit.

- Use the correct Line Sizing Charts based on the system capacity and application to determine the appropriate suction and liquid line sizes.
- If a portion of the liquid line passes through an unconditioned space that can cause a temperature change in the refrigerant, the liquid line must be insulated separately from the suction line.
- Use clean, dehydrated, sealed refrigeration grade tubing.
- Always keep lines sealed until they are in place and connections are being made.
- A factory provided filter drier is included with these R-410A units and must be field installed in the liquid line upon unit installation.
- If replacing an R-22 system with an R-410A system, and the line set is not being replaced, drain the oil from the line set paying special attention to low spots in the tubing. Flush kits are not recommended due to the risk of residual chemical agents being left in the system which are incompatible with POE oil or internal components. A maximum of 5% mineral oil remaining in the system is considered acceptable.
- If tubing is cut, be sure to de-burr the ends while holding in a position to prevent the chips from falling back into the tubing. Burrs such as those caused by the tubing cutters can affect system performance significantly.

- For best system operation, keep tubing runs as short as possible with a minimum number of elbows or bends.
- Location where the tubing is exposed to mechanical damage should be avoided. If refrigerant tubing must be run through these areas, it should be housed in a protective sleeve.
- Many service problems can be avoided by taking adequate precautions to provide an internally clean and dry system, and by using procedures and materials that conform to established standards.
- The lines should be installed so they do not obstruct service access to the equipment or indoor coil. Care must be taken not to kink or damage the tubing. Care must also be taken to minimize noise transmission from the line sets and equipment to the structure.
- Never solder liquid and vapor lines together. Make sure the liquid and vapor lines do not touch each other. They may be strapped or taped together but must be insulated from each other.
- Copper to Copper solder connections require 5% silver minimum. Copper to Brass connections require 15% silver minimum.
- Use long radius elbows whenever possible.
- Support all refrigerant lines at regular intervals with suitable hangers and brackets. DO NOT allow metal to metal contact between hangers and lines or part of the structure and lines.



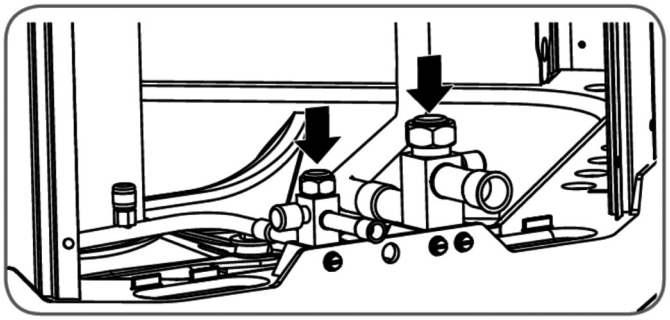
- Insulate vapor lines with minimum ½" foam insulation
- Liquid lines exposed to direct sunlight or installed in extreme temperatures, such as an attic, must be insulated as well.
- During brazing operations, lines should be purged with nitrogen to prevent oxidation and internal scaling of the inside walls of the copper tubing which can restrict refrigerant flow in small strainers, expansion valves and reversing valves.



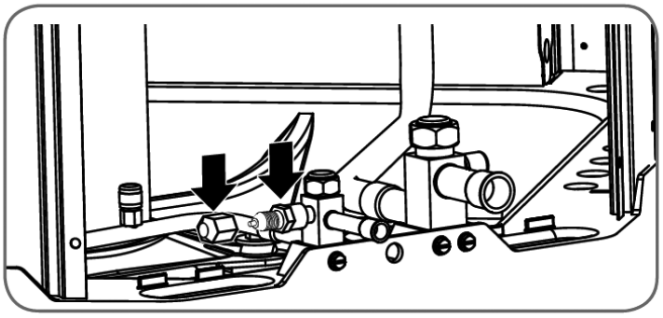
- Oil traps are not required when refrigerant lines are properly sized. Follow line sizing charts to ensure velocity, oil return and acceptable pressure drops are maintained. These charts have been developed with this critical design criteria in mind.

9.2 LINE SET CONNECTIONS - ODU

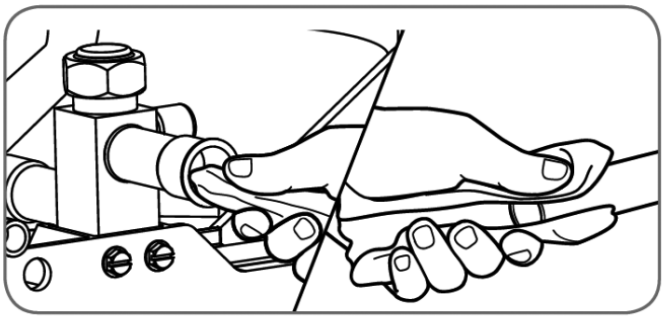
- Be certain both refrigerant shut off valves at the outdoor unit are closed.



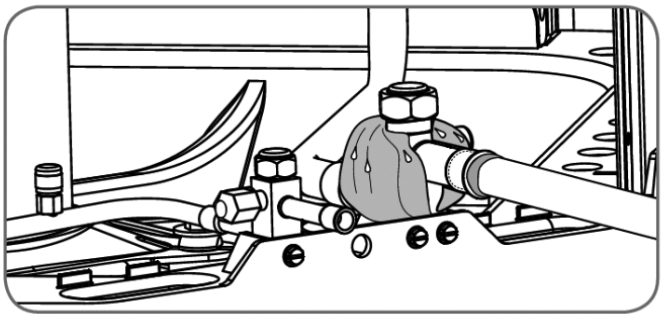
- Remove the caps and Schrader cores from the pressure ports to protect seals from heat damage. Both Schrader cores and service valves have seals that may be damaged by excessive heat.



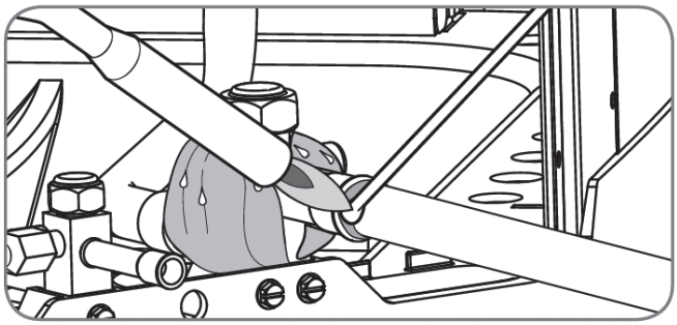
- Clean the inside of the fittings and outside of the tubing with a clean, dry cloth before soldering. Clean out debris left by chips, dirt, etc., that enters tubing or service valve connections.



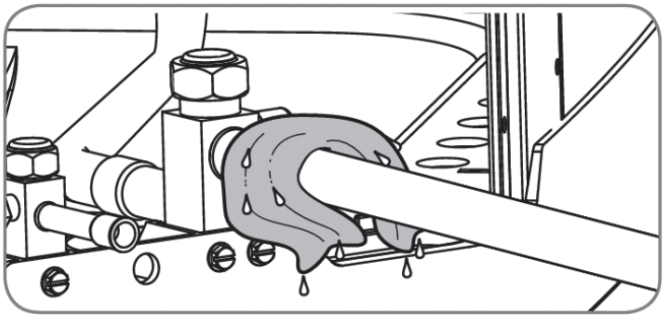
- Wrap the service valves with a wet rag or thermal barrier before applying heat.



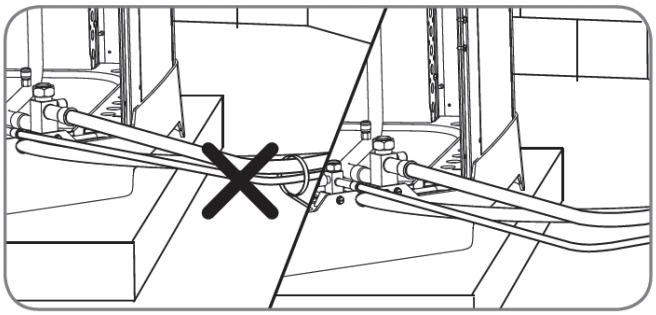
- Braze the tubing between the outdoor unit and indoor coil. Flow dry nitrogen into a pressure port and through the tubing while brazing, but do not allow pressure inside the tubing which may result in leaks. Once the system is full of nitrogen, the nitrogen regulator should be turned off to avoid pressurizing the system.



- After brazing, use an appropriate heatsink material to cool the joint.



- Reinstall the Schrader cores into both pressure ports.
- Do not allow the vapor line and liquid line to be in contact with each other. This causes and undesirable heat transfer resulting in capacity loss and increased power consumption.

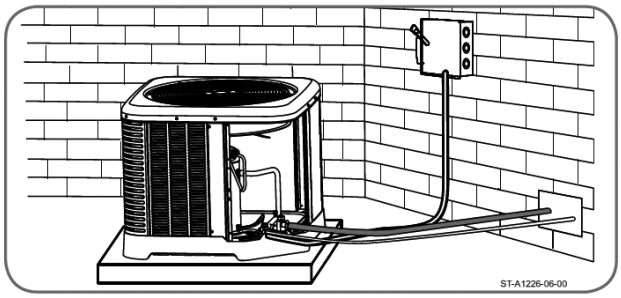


9.3 LINE SET LEAK TESTING

NOTE: Indoor coils have only a holding charge of dry nitrogen. Keep all tube ends sealed until connections are to be made.

> **⚠ WARNING**
>
> **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.**

- Pressurize line set and coil through service fittings with dry nitrogen to 150 PSIG maximum. Close nitrogen tank valve, let system sit for at least 15 minutes, and check to see if the pressure has dropped. If the pressure has dropped, check for leaks at the line set braze joints with soap bubbles and repair leak as necessary. Repeat pressure test. If line set and coil hold pressure, proceed with line set and coil evacuation.
- The vapor line must be insulated for its entire length to prevent dripping (sweating) and prevent performance losses. Closed-cell foam insulation such as Armaflex and Rubatex® are satisfactory insulations for this purpose. Use 1/2” [12.7 mm] minimum insulation thickness. Additional insulation may be required for long runs.



10.0 START-UP – CHECKING AIRFLOW

The air distribution system has the greatest effect on airflow. The duct system is totally controlled by the contractor. For this reason, the contractor should use only industry-recognized procedures. The correct air quantity is critical to air conditioning systems. Proper operation, efficiency, compressor life, and humidity control depend on the correct balance between indoor load and outdoor unit capacity. Excessive indoor airflow increases the possibility of high humidity problems. Low indoor airflow reduces total capacity and causes coil icing. Serious harm can be done to the compressor by low airflow, such as that caused by refrigerant flooding. Each ton of cooling requires between 375 and 450 cubic feet of air per minute (CFM). See the manufacturer's spec sheet for rated airflow for the system being installed. Duct design and construction should be carefully done. System performance can be lowered dramatically through bad planning or workmanship. Air supply diffusers must be selected and located carefully. They must be sized and positioned to deliver treated air along the perimeter of the space. If they are too small for their intended airflow, they become noisy. If they are not located properly, they cause drafts. Return air grilles must be properly sized to carry air back to the blower. If they are too small, they also cause noise. The installers should balance the air distribution system to ensure proper quiet airflow to all rooms in the home. This ensures a comfortable living space.

These simple mathematical formulas can be used to determine the CFM in a residential or light commercial system. Electric resistance heaters can use:

$$CFM = \frac{volts \times amps \times 3.413}{SHC \times temp\ rise}$$

Gas furnaces can use:

$$CFM = \frac{Output\ Capacity\ in\ BTUH^*}{SHC \times temp\ rise}$$

*Refer to furnace data plate for furnace output capacity. SHC = Sensible Heat Constant (see table below), An air velocity meter or airflow hood can give a more accurate reading of the system CFM. The measurement for temperature rise should be performed at the indoor coil inlet and near the outlet, but out of direct line of sight of the heater element or heat exchanger. For best results, measure air temperature at multiple points and average the measurements to obtain coil inlet and outlet temperatures.

Altitude (feet)	SENSIBLE HEAT CONSTANT (SHC)	ALTITUDE (FEET)	SENSIBLE HEAT CONSTANT (SHC)
Sea Level	1.08	6000	0.87
500	1.07	7000	0.84
1000	1.05	8000	0.81
2000	1.01	9000	0.78
3000	0.97	10000	0.75
4000	0.94	15000	0.61
5000	0.90	20000	0.50

11.0 EVACUATION AND LEAK TESTING

11.1 EVACUATION PROCEDURE

Evacuation is the most important part of the entire service procedure. The life and efficiency of the equipment is dependent upon the thoroughness exercised by the serviceman when evacuating air and moisture from the system.

Air or nitrogen in the system causes high condensing temperatures and pressure, resulting in increased power input and non-verifiable performance.

Moisture chemically reacts with the refrigerant and oil to form corrosive hydrofluoric acid. This attacks motor windings and parts, causing breakdown.

- After the system has been leak-checked and proven sealed, connect the vacuum pump and evacuate system to 500 microns and hold 500 microns or less for at least 15 minutes. The vacuum pump must be connected to both the high and low sides of the system by connecting to the two pressure ports. Use the largest size connections available since restrictive service connections may lead to false readings because of pressure drop through the fittings.
- After adequate evacuation, open both service valves by removing both brass service valve caps with an adjustable wrench. Insert a 3/16" [5 mm] or 5/16" [8 mm] hex wrench into the stem and turn counterclockwise until the wrench stops.
- At this time gauges must be connected to the access fitting on the liquid line (small) service valve and the common suction port connected to the common suction line between the reversing valve and compressor to check and adjust charge.

IMPORTANT: Compressors (especially scroll type) should never be used to evacuate the air conditioning system because internal electrical arcing may result in a damaged or failed compressor. Never run a scroll compressor while the system is in a vacuum or compressor failure will occur.

11.2 FINAL LEAK TESTING

After the unit has been properly evacuated and service valves opened, a halogen leak detector should be used to detect leaks in the system. If a leak is detected, the refrigerant should be recovered before repairing the leak. The Clean Air Act prohibits releasing refrigerant into the atmosphere.

12.0 CHECKING REFRIGERANT CHARGE

⚠ WARNING

The top of the scroll compressor shell is hot. Touching the compressor top may result in serious personal injury.

Charge for all systems should be checked against the Charging Chart inside the access panel cover.

IMPORTANT: Use factory-approved charging method as outlined on the next 4 pages to ensure proper system charge.

⚠ NOTICE

The optimum refrigerant charge for any outdoor unit matched with a CFL/CFM/H*L indoor coil/air handler is affected by the application. Therefore, charging data has been developed to assist the field technician in optimizing the charge for all mounting configurations (UF – Upflow, DF – downflow, LH – Left Hand Discharge, and RH – Right Hand Discharge). Refer to the charging chart inside the access panel cover on the unit and choose the appropriate column for the specific application being installed or serviced. New installations utilizing either a CFL/CFM indoor coil installed on a gas furnace or an H*L air handler in the downflow or horizontal right hand discharge may require removal of refrigerant since the factory charge could result in an overcharge condition.

12.1 CHARGING UNITS WITH R-410A REFRIGERANT

⚠ CAUTION

R-410A pressures are approximately 60% higher (1.6 times) than R-22 pressures. Use appropriate care when using this refrigerant. Failure to exercise care may result in equipment damage or personal injury.

Charge for all systems should be checked against the Charging Chart inside the access panel cover.

IMPORTANT: Do not operate the compressor without charge in the system.

⚠ WARNING

THE UNIT MUST BE PERMANENTLY GROUNDED. FAILURE TO DO SO CAN CAUSE ELECTRICAL SHOCK RESULTING IN SEVERE PERSONAL INJURY OR DEATH.

Addition of R-410A will raise high-side pressures (liquid, and discharge).
The following method is used for charging systems in the cooling and heating mode. All steps listed should be performed to insure proper charge has been set. For measuring pressures, the service valve port on the liquid valve (small valve) and the service port on the suction line between the reversing valve and compressor are to be used.

CONFIRM ID AIR FLOW & COILS ARE CLEAN

Confirm adequate Indoor supply air flow prior to starting the system. See the Technical Specification sheet for rated air flow for each ID/OD unit match. Air filter(s) and coils (indoor & outdoor) are to be clean and free of frost prior to starting the system. Supply Air flow must be between 375 and 450 cfm per rated cooling ton prior to adjusting system charge. If a humidification system is installed disengage it from operating prior to charge adjustment. Refer to the “Checking Airflow” section of this manual for further instruction.

⚠ NOTICE

Verify system components are matched according to the outdoor unit Specification Sheet.

12.2 MEASUREMENT DEVICE SETUP

Step 1. With an R410A gauge set, attach the high pressure hose to the access fitting on the liquid line (small) service valve at the OD unit.

Step 2. Attach the low pressure hose to the common suction port connected to the common suction line between the reversing valve and compressor.

Step 3. Attach a temperature probe within 6” outside of the unit on the copper liquid line (small line). For more accurate measurements clean the copper line prior to measurement and use a calibrated clamp on temperature probe or an insulated surface thermocouple.

12.3 CHARGING BY WEIGHT

⚠ NOTICE

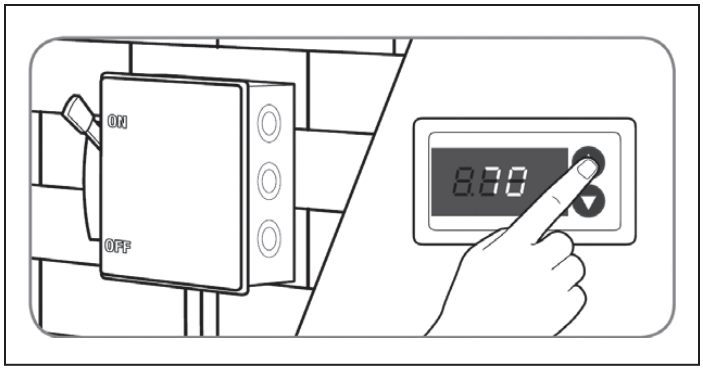
ADJUST THE SYSTEM CHARGE BY WEIGHT FOR THE STRAIGHT LENGTH OF THE REFRIGERANT LINE SET.

For a new installation, evacuation of interconnecting tubing and indoor coil is adequate; otherwise, evacuate the entire system. Use the factory charge shown in *“Electrical and Physical Data”* on page 6 of these instructions or on the unit data plate. Note that the charge value includes charge required for 15 ft. [4.6 m] of standard-size inter-connecting liquid line without a filter drier. Calculate actual charge required with installed liquid line size and length using:

1/4” [6.4 mm] O.D. = .3 oz./ft. [8.5 g/.30 m]
5/16” [7.9 mm] O.D. = .4 oz./ft. [11.3 g/.30 m]
3/8” [9.5 mm] O.D. = .6 oz./ft. [17.0 g/.30 m]
1/2” [12.7 mm] O.D. = 1.2 oz./ft. [34.0 g/.30 m]
Add 6 oz. for field-installed filter drier.

With an accurate scale (+/– 1 oz. [28.3 g]) or volumetric charging device, adjust charge difference between that shown on the unit data plate and that calculated for the new system installation. If the entire system has been evacuated, add the total calculated charge.

IMPORTANT: Charging by weight is not always accurate since the application can affect the optimum refrigerant charge. Charging by weight is considered a starting point ONLY. Always check the charge by using the charging chart and adjust as necessary. CHARGING BY LIQUID SUB-COOLING MUST BE USED FOR FINAL CHARGE ADJUSTMENT.



With thermostat in the “Off” position, turn the power on to the furnace or air handler. Start the furnace or air handler with the thermostat.

12.4 GROSS CHARGING BY PRESSURES

Step 1. Following air flow verification and charge weigh in, run the unit for a minimum of 15 minutes prior to noting pressures and temperature.

IMPORTANT: Indoor conditions as measured at the indoor coil must be within 2°F of the following during gross charge (pressure) evaluation:

Cooling Mode: 80°F Dry Bulb

⚠ NOTICE

If the Indoor temperature is above or below this range, run the system to bring the temperature down or run the electric heat/furnace to bring the temperature within this range. System pressure values provided in the Charge Chart for outdoor dry bulbs corresponding to conditions outside of ranges listed below, are provided as reference ONLY.

Step 2. Note the Outdoor Dry Bulb Temperature, ODDB°F = _____°F. Unit charging is recommended under the following outdoor conditions ONLY:

Cooling Mode ONLY: 55°F outdoor dry bulb and above

Step 3. Locate and note the design pressures. The correct liquid and vapor pressures are found at the intersection of the Installed system and the outdoor ambient temperature on the Charging Chart located on the inside of the control box cover of the outdoor unit.

Liquid Pressure: = _____psig; Vapor Pressure = _____psig

⚠ NOTICE

The refrigerant pressures provided are for gross charge check ONLY. These pressure values are typical, but may vary due to application. Evaporator (indoor coil in cooling mode) load will cause pressures to deviate. Notice that all systems have unique pressure curves. The variation in the slope and value is determined by the component selection for that indoor/outdoor matched system. The variation from system to system seen in the table is normal. The values listed are for the applicable indoor coil match ONLY!

Step 4. If the measured liquid pressure is below the listed requirement for the given outdoor and indoor conditions, add charge. If the measured liquid pressure is above the listed requirement for the given Outdoor and Indoor conditions remove charge.

12.5 FINISHING UP INSTALLATION

- Disconnect pressure gauges from pressure ports; then replace the pressure port caps and tighten adequately to seal caps. **Do not over tighten.**
- Replace the service valve caps finger-tight and then tighten with an open-end wrench adequately to seal caps. **Do not over tighten.**
- Replace control box cover and service panel and install screws to secure service panel.
- Restore power to unit at disconnect if required.
- Configure indoor thermostat per the thermostat installation instructions and set thermostat to desired mode and temperature.

⚠ NOTICE

If the Indoor temperature is above or below the recommended range, run the system to bring the temperature down or run the electric heat/furnace to bring the temperature up. System sub-cooling values provided in the Charge Chart for outdoor dry bulbs corresponding to conditions outside of the above range, are provided as reference ONLY.

13.0 ELECTRICAL WIRING

Field wiring must comply with any applicable national and local codes.

13.1 GROUNDING

A grounding lug is provided near the line voltage power entrance for a ground wire.

⚠ WARNING

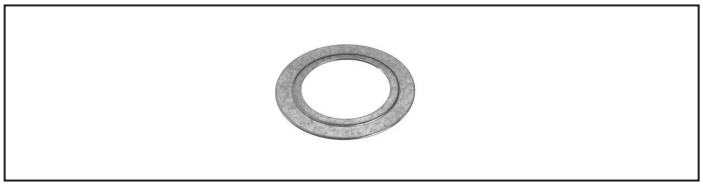
THE UNIT MUST BE PERMANENTLY GROUNDED. FAILURE TO DO SO CAN CAUSE ELECTRICAL SHOCK RESULTING IN SEVERE PERSONAL INJURY OR DEATH.

13.2 POWER WIRING

It is important that proper electrical power from a commercial utility is available at the condensing unit contactor. Required voltage is shown on the unit rating nameplate.

Install a branch circuit disconnect within sight of the unit and adequate size to handle the starting current. (See “Electrical Data” on page 7.)

Power wiring must be run in a rain-tight conduit. Conduit must be run through the connector panel below the control box and attached to the bottom of the control box. An electrical reducing washer similar to the one shown below may be needed to reduce the size of the conduit access hole to accommodate different sizes of conduit. A Conduit-Reducing Washer is designed to reduce the size of the knockout in a steel outlet box or other metal enclosure. It is made of galvanized steel and can be used for indoor or exterior applications.



Consult national and local electrical codes to determine the required field wiring physical characteristics. A recommended typical field provided power wiring is an Armored Insulated Stranded Copper Cable that follows the typical specifications outlined below:

Manufacturing standard: BS 5467
Conductors: Stranded plain annealed copper wire (class 2) to BS EN 60228
Insulation: XLPE
Bedding: PVC
Armor: Galvanized Steel Wire Armor
Sheath: PVC

Following is from IEC Standard 60335-1. The table provides information for the minimum nominal cross-sectional area required for the field provided power conductors based on the rated current. Again consult national and local electrical codes for proper power wire conductor size.

Connect the power wiring to the contactor line voltage terminals located in the outdoor condensing unit control box (See wiring diagram attached to unit control boaccess panel).

Rated Current of Appliance A			Nominal Cross-Sectional Area mm²
		≤0.2	Tinsel cord[a]
>0.2	and	≤3	0.5[a]
>3	and	≤6	0.75
>6	and	≤10	1.0 (0.75)[b]
>10	and	≤16	1.5 (1.0)[b]
>16	and	≤25	2.5
>25	and	≤32	4
>32	and	≤40	6
>40	and	≤63	10

Check all electrical connections, including factory wiring within the unit and make sure all connections are tight.

DO NOT connect aluminum field wire to the contactor terminals.

13.3 CONTROL WIRING (24 VAC)

If the low voltage control wiring is run in the same conduit with the power wiring Class 1 insulation is required on the control wiring. Class II insulation is required if run separate from the power wiring. Control wiring may be run through the insulated bushing provided in the 7/8" (22mm) hole in the base panel and up to and attached to the factory pigtail control wires in the control box. Conduit can be run to the base panel if desired by removing the bushing and attaching to the 7/8" (22mm) hole.

A zone thermostat and a 24VAC, 40VA minimum transformer is required for the control circuit of the system. Determine if a 24VAC transformer is provided in the indoor unit. See the unit wiring diagram for connection references. Use a minimum 18 gage flexible color coded thermostat wire.

14.0 FIELD INSTALLED ACCESSORIES

14.1 COMPRESSOR CRANKCASE HEAT (CCH)

While scroll compressors usually do not require crankcase heaters, there are instances when a heater should be added. Refrigerant migration during the off cycle can result in a noisy start up. Add a crankcase heater to minimize refrigerate migration, and to help eliminate any start up noise or bearing "wash out."

NOTE: The installation of a crankcase heater is recommended if the system charge exceeds the values listed in Table 5 or in case of long line set requirements.

All heaters are located on the lower half of the compressor shell. Its purpose is to drive refrigerant from the compressor shell during long off cycles, thus preventing damage to the compressor during start-up.

At initial start-up or after extended shutdown periods, make sure the heater is energized for at least 12 hours before the compressor is started. (Disconnect switch on and wall thermostat off.)

TABLE 6
MAXIMUM SYSTEM CHARGE VALUES – *AGN

SAGN Model	Compressor Model Number	System Charge Limit Without Crankcase Heat.
*AGN-018JA	ZP14K5E-PFV-130	9.6 lbs.
*AGN-024JA	ZP20K5E-PFV-130	9.6 lbs.
*AGN-030JA	ZP24K5E-PFV-130	9.6 lbs.
*AGN-036JA	ZP31K5E-PFV-130	9.6 lbs.
*AGN-042JA	ZP34K5E-PFV-130	12 lbs.
*AGN-048JA	ZP42K5E-PFV-130	12 lbs.
*AGN-060JA	ZP51K5E-PFV-130	12 lbs.
*AGN-018TA	ZP20K5E-PFJ-130	9.6 lbs.
*AGN-024TA	ZP24K5E-PFJ-130	9.6 lbs.
*AGN-030TA	ZP31K5E-PFJ-130	9.6 lbs.
*AGN-036TA	ZP36K5E-PFJ-130	12 lbs.
*AGN-036NA	ZP36K5E-TFD-13R	12 lbs.
*AGN-042NA	ZP42K5E-TFD-130	12 lbs.
*AGN-048NA	ZP44K5E-TFD-130	12 lbs.
*AGN-060NA	ZP57K5E-TFD-130	12 lbs.
*AGN-065NA	ZP61KCE-TFD-130	12 lbs.

TABLE 6 - continued
MAXIMUM SYSTEM CHARGE VALUES – *AHM

14.5 SEER Model Size	Compressor Model Number	Charge Limit Without Crankcase Heat (1 Phase)
18	ZP16K5E	9.6 lbs.
24	ZP20K5E	9.6 lbs.
30	ZP24K5E	9.6 lbs.
36	ZP31K5E	9.6 lbs.
42	ZP34K5E	12 lbs.

NOTE: Model sizes 48, 49, 56 and 60 have a factory installed crankcase heater.

TABLE 6 - continued
MAXIMUM SYSTEM CHARGE VALUES – *AGL

Model Size	Compressor Manufacturer	Compressor Model Number	System Charge Limit Without Crankcase Heat
18T	Copeland	ZP16K5E-PFJ	8 lbs.
24T	Copeland	ZP21K5E-PFJ	8 lbs.
30T	Copeland	ZP25K5E-PFJ	8 lbs.
36T	Copeland	ZP31K5E-PFJ	8 lbs.
36N	Copeland	ZP31K5E-TFD	8 lbs.
42T	Copeland	ZP36K5E-PFJ	10 lbs.
42N	Copeland	ZP36K5E-TFD	10 lbs.
48T	Copeland	ZP42K5E-PFJ	10 lbs.
48N	Copeland	ZP42K5E-TFD	10 lbs.
60N	Copeland	ZP61KCE-TFD	12 lbs.
65N	Copeland	ZP72KCE-TFD	12 lbs.

14.2 TIME DELAY CONTROL RXMD-B01 (TDC)

The time delay (TDC) is in the low voltage control circuit. When the compressor shuts off due to a power failure or thermostat operation, this control keeps it off at least 5 minutes which allows the system pressure to equalize, thus not damaging the compressor or blowing fuses on start-up.

15.0 SERVICE

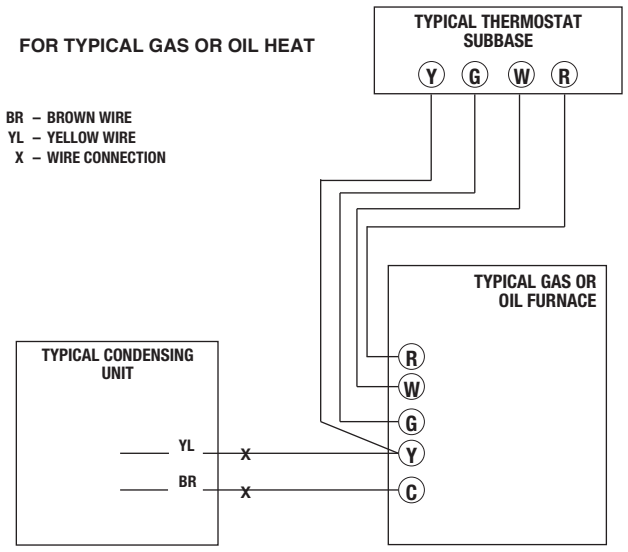
15.1 OPERATION

Single phase units are operated PSC (no starting components). It is important that such systems be off for a minimum of 5 minutes before restarting to allow equalization of pressure. The thermostat should not be moved to cycle unit without waiting 5 minutes. To do so may cause the compressor to go off on an automatic overload device or blow a fuse. Poor electrical service can also cause nuisance tripping on overloads, trip a breaker, or cause light dimming. This generally can be corrected by adding start components. Check with factory for recommended start components, if required. For PSC type operation, refrigerant metering must be done with fixed orifice, cap tubes or bleed type expansion valves because of low starting torque. If non-bleed expansion valve coils (supplied by factory) are used, start components are required.

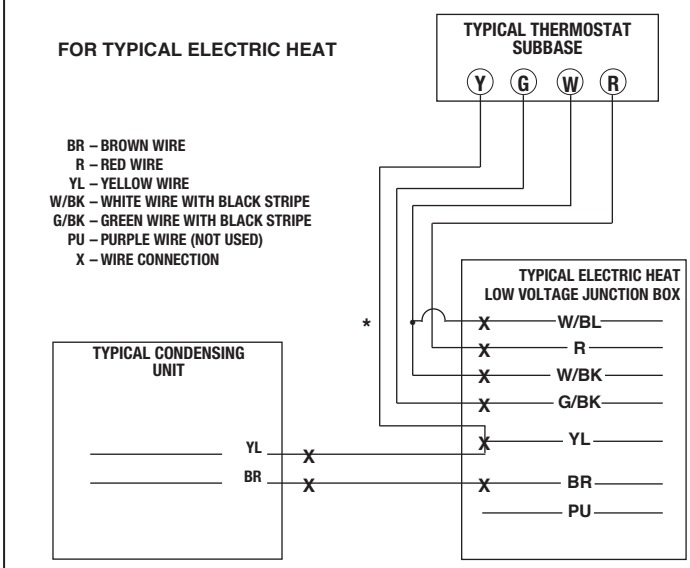
15.2 SINGLE-POLE COMPRESSOR CONTACTOR (CC)

Single-pole contactors are used on all standard single phase units up through 5 tons. Caution must be exercised when servicing as only one leg of the power supply is broken with the contactor.

FIGURE 2
CONTROL WIRING FOR GAS OR OIL FURNACE



*IF MAXIMUM OUTLET TEMPERATURE RISE IS DESIRED, IT IS RECOMMENDED THAT W1 (W/BK) AND W2 (W/BL) BE JUMPERED TOGETHER.

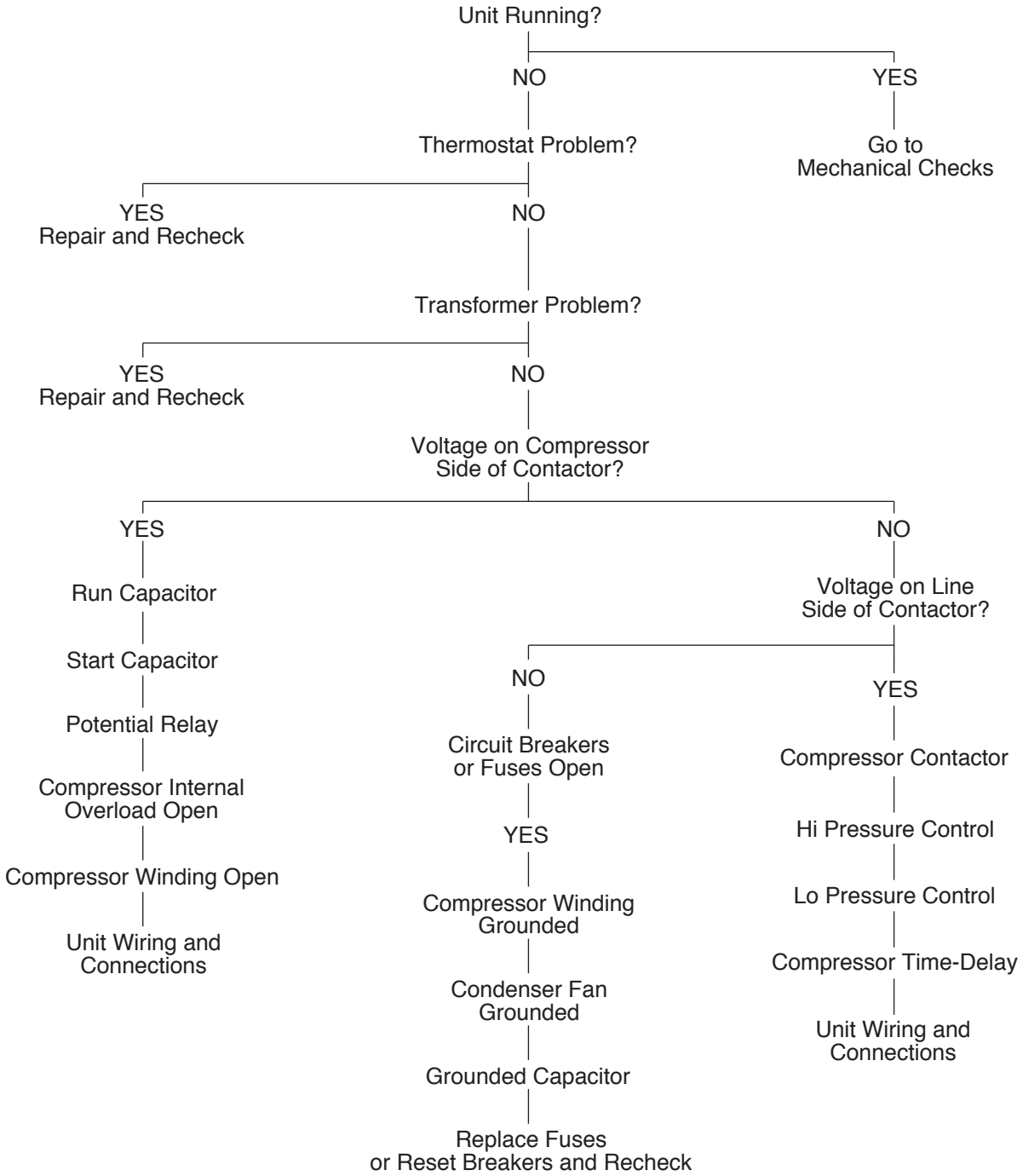


16.0 TROUBLESHOOTING

In diagnosing common faults in the air conditioning system, it is useful to present the logical pattern of thought that is used by experienced technicians. The charts which follow are not intended to be an answer to all problems, but only to guide your thinking as you attempt to decide on your course of action. Through a series of yes and no answers, you will follow the logical path to a likely conclusion.

Use these charts as you would a road map, if you are a beginning technician. As you gain experience, you will learn where to establish the shortcuts. Remember that the chart will help clarify the logical path to the problem.

16.1 ELECTRICAL CHECKS FLOW CHART



16.2 MECHANICAL CHECKS FLOW CHART

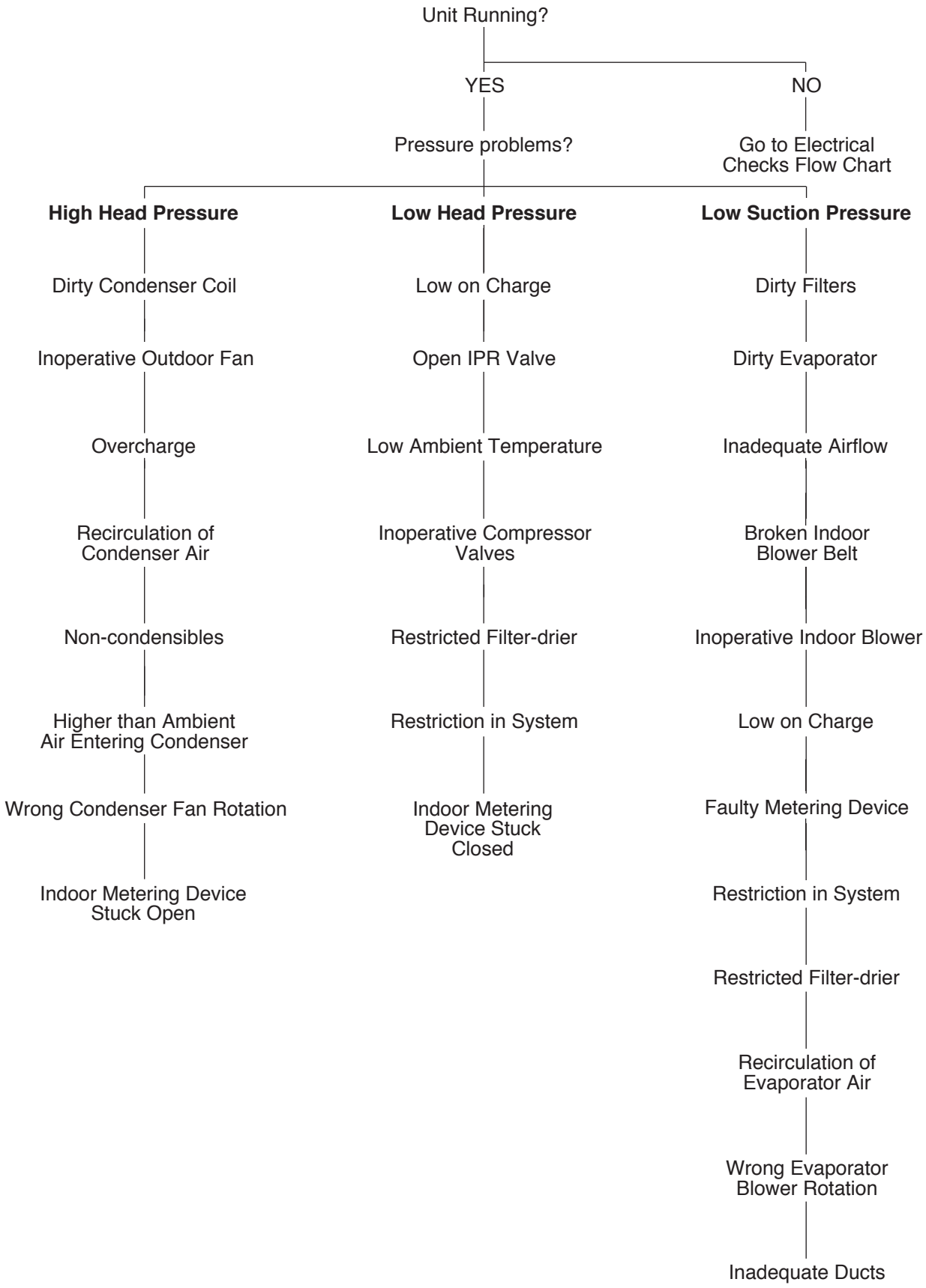


TABLE 7
TEMPERATURE PRESSURE CHART

TEMP (Deg. F)	R-410A PSIG
-150	—
-140	—
-130	—
-120	—
-110	—
-100	—
-90	—
-80	—
-70	—
-60	0.4
-50	5.1
-40	10.9
-35	14.2
-30	17.9
-25	22.0
-20	26.4
-15	31.3
-10	36.5
-5	42.2
0	48.4
5	55.1
10	62.4
15	70.2
20	78.5
25	87.5
30	97.2
35	107.5
40	118.5
45	130.2
50	142.7
55	156.0
60	170.1
65	185.1
70	201.0
75	217.8
80	235.6
85	254.5
90	274.3
95	295.3
100	317.4
105	340.6
110	365.1
115	390.9
120	418.0
125	446.5
130	476.5
135	508.0
140	541.2
145	576.0
150	612.8

16.3 SUPERHEAT CALCULATION

1.Measure the suction pressure at the suction line service valve.

2.Convert the suction pressure to saturated temperature. See Table 8.

3.Measure the temperature of the suction line at the suction line service valve.

4.Compare the temperature of the suction line to the saturated temperature.

5.The difference between saturated temperature and suctin line temperature is the superheat. Superheat normal range 12° to 15°.

16.4 SUBCOOLING CALCULATION

1.Measure the liquid pressure at the liquid line service valve.

2.Convert the liquid line pressure to saturated temperature. See Table 8.

3.Measure the liquid line temperature at the liquid line service valve.

4.Compare the liquid line temperature to the saturated temperature.

5.The difference between saturated temperature and liquid line temperature is the subcooling. Subcooling normal range 9° to 12°.

TABLE 8
AIR CONDITIONING SYSTEM TROUBLESHOOTING TIPS

AIR CONDITIONING SYSTEM TROUBLESHOOTING TIPS					
SYSTEM PROBLEM	INDICATORS				
	DISCHARGE PRESSURE	SUCTION PRESSURE	SUPERHEAT	SUBCOOLING	COMPRESSOR AMPS
Overcharge	High	High	Low	High	High
Undercharge	Low	Low	High	Low	Low
Liquid Restriction (Drier)	Low	Low	High	High	Low
Low Evaporator Airflow	Low	Low	Low	Low	Low
Dirty Condenser	High	High	Low	Low	High
Low Outside Ambient Temperature	Low	Low	High	High	Low
Inefficient Compressor	Low	High	High	High	Low
TXV Feeler Bulb Charge Lost	Low	Low	High	High	Low
Poorly Insulated Sensing Bulb	High	High	Low	Low	High

TROUBLESHOOTING CHART

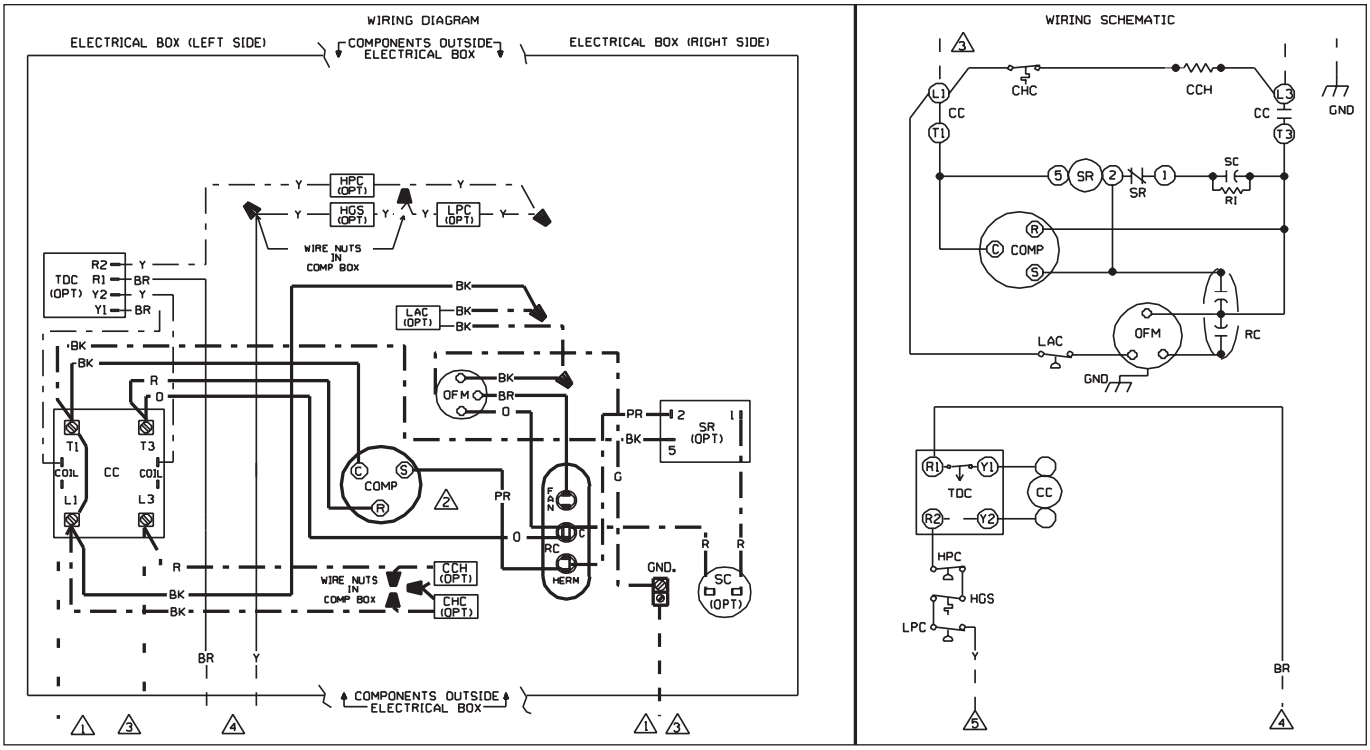
⚠ WARNING

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

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

17.0 WIRING DIAGRAMS

FIGURE 3
16.1 PSC OD FAN MOTOR
SINGLE-PHASE WIRING DIAGRAM



COMPONENT CODE

CC	COMPRESSOR CONTACTOR
CCH	CRANKCASE HEATER
CHC	CRANKCASE HEATER CONTROL
COMP	COMPRESSOR
GND	GROUND, CHASSIS
HPC	HIGH PRESSURE CUT-OUT CONTROL
LAC	LOW AMBIENT COOLING CONTROL
LPC	LOW PRESSURE CUT-OUT CONTROL
OFM	OUTDOOR FAN MOTOR
OPT	OPTIONAL
RC	RUN CAPACITOR
SC	START CAPACITOR
SR	START RELAY
TDC	TIME DELAY CONTROL
HGS	HOT GAS SENSOR
PTCR	POSITIVE TEMPERATURE COEFFICIENT RELAY

NOTES: △

1. CONNECTORS SUITABLE FOR USE WITH COPPER CONDUCTORS ONLY.
2. MOTOR COMPRESSOR THERMALLY PROTECTED AND ALL 3 PHASE ARE PROTECTED UNDER PRIMARY SINGLE PHASE CONDITIONS.
3. CONNECT FIELD WIRING IN GROUNDED RAINTIGHT CONDUIT TO 60 HERTZ DISCONNECT, VOLTAGE AND PHASE PER RATING PLATE. USE 60° C WIRE.
4. LOW VOLTAGE CIRCUIT TO BE N.E.C. CLASS 2 WITH A CLASS 2 TRANSFORMER 24 VOLT, 60 HERTZ.
5. TO THERMOSTAT SUB-BASE, REFER TO SYSTEM SCHEMATICS OR SCHEMATICS ON INDOOR SECTION FOR LOW VOLTAGE CONTROL WIRING.

WIRING INFORMATION

LINE VOLTAGE
- -FACTORY STANDARD
- -FACTORY OPTION
- -FIELD INSTALLED

LOW VOLTAGE
- -FACTORY STANDARD
- -FACTORY OPTION
- -FIELD INSTALLED

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

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

WIRE COLOR CODE

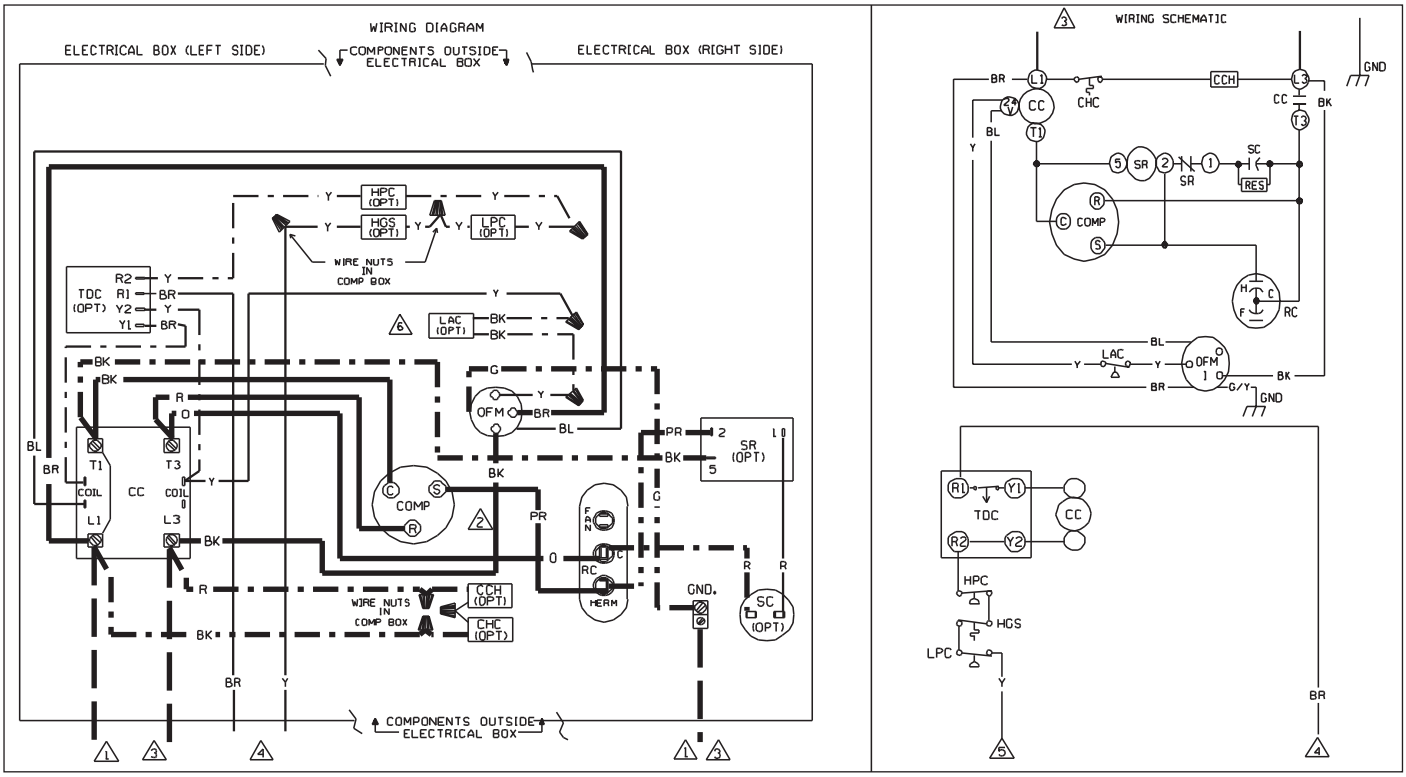
BK__BLACK	O___ORANGE
BR__BROWN	PR__PURPLE
BL___BLUE	R___RED
G___GREEN	W___WHITE
GY__GRAY	Y___YELLOW

WIRING DIAGRAM

REMOTE AIR CONDITIONER
208/230 VOLT SINGLE PHASE

DR. BY	DATE	DWG. NO.	REV
JHB	01-19-04	90-101229-01	04

FIGURE 4
16.2 ECM OD FAN MOTOR



COMPONENT CODE

CC	COMPRESSOR CONTACTOR
CCH	CRANKCASE HEATER
CHC	CRANKCASE HEATER CONTROL
COMP	COMPRESSOR
GND	GROUND, CHASSIS
HPC	HIGH PRESSURE CUT-OUT CONTROL
LAC	LOW AMBIENT COOLING CONTROL
LPC	LOW PRESSURE CUT-OUT CONTROL
OFM	OUTDOOR FAN MOTOR
OPT	OPTIONAL
RC	RUN CAPACITOR
SC	START CAPACITOR
SR	START RELAY
TDC	TIME DELAY CONTROL
HGS	HOT GAS SENSOR
PTCR	POSITIVE TEMPERATURE COEFFICIENT RELAY

NOTES: △

1. CONNECTORS SUITABLE FOR USE WITH COPPER CONDUCTORS ONLY.
2. MOTOR COMPRESSOR THERMALLY PROTECTED AND ALL 3 PHASE ARE PROTECTED UNDER PRIMARY SINGLE PHASE CONDITIONS.
3. CONNECT FIELD WIRING IN GROUNDED RAINTIGHT CONDUIT TO 60 HERTZ DISCONNECT, VOLTAGE AND PHASE PER RATING PLATE. USE 60° C WIRE.
4. LOW VOLTAGE CIRCUIT TO BE N.E.C. CLASS 2 WITH A CLASS 2 TRANSFORMER 24 VOLT, 60 HERTZ.
5. TO THERMOSTAT SUB-BASE. REFER TO SYSTEM SCHEMATICS OR SCHEMATICS ON INDOOR SECTION FOR LOW VOLTAGE CONTROL WIRING.
6. IF LAC/LAR IS NOT USED, CONNECT YELLOW WIRE FROM OFM TO 24V CC.

WIRING INFORMATION

LINE VOLTAGE
- -FACTORY STANDARD
- -FACTORY OPTION
- -FIELD INSTALLED

LOW VOLTAGE
- -FACTORY STANDARD
- -FACTORY OPTION
- -FIELD INSTALLED

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

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

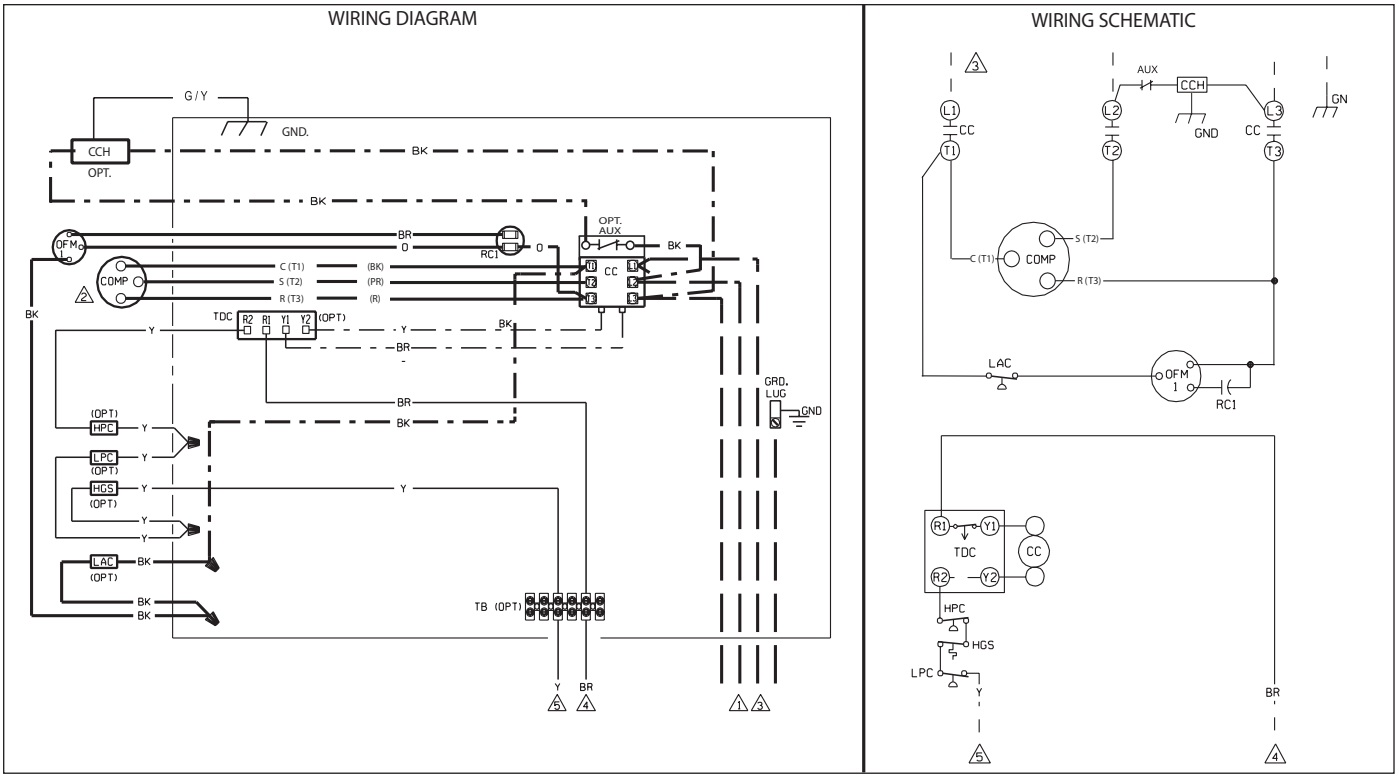
WIRE COLOR CODE

BK__BLACK	O___ORANGE
BR__BROWN	PR__PURPLE
BL__BLUE	R___RED
G___GREEN	W___WHITE
GY__GRAY	Y___YELLOW

WIRING DIAGRAM
REMOTE AIR CONDITIONER
WITH OUTDOOR ECM MOTOR
208/230 VOLT SINGLE PHASE

DR. BY	DATE	DWG. NO.	REV
MGR	10-8-08	90-101229-21	03

FIGURE 5
16.3 PSC OD FAN MOTOR
THREE-PHASE WIRING DIAGRAM



COMPONENT CODE	
CC	COMPRESSOR CONTACTOR
CCH	CRANKCASE HEATER
COMP	COMPRESSOR
GND	GROUND, CHASSIS
HGS	HOT GAS SENSOR
HPC	HIGH PRES. CUT-OUT CONTROL
LAC	LOW AMBIENT COOLING CONTROL
LPC	LOW PRESSURE CONTROL
OFM	OUTDOOR FAN MOTOR
OPT	OPTIONAL
RC	RUN CAPACITOR
RES	RESISTOR
SC	START CAPACITOR
SR	START RELAY
TB	TERMINAL BLOCK
TDC	TIME DELAY CONTROL

NOTES:

1. CONNECTORS SUITABLE FOR USE WITH COPPER CONDUCTORS ONLY.
2. COMPRESSOR MOTOR THERMALLY PROTECTED AND ALL 3 PHASE ARE PROTECTED UNDER PRIMARY SINGLE PHASE CONDITIONS.
3. CONNECT FIELD WIRING IN GROUNDED RAINTIGHT CONDUIT TO FUSED DISCONNECT, VOLTAGE, HERTZ AND PHASE PER RATING PLATE.
4. LOW VOLTAGE CIRCUIT TO BE N.E.C. CLASS 2 WITH A CLASS 2 TRANSFORMER 24 VOLT, 50 OR 60 HERTZ.
5. TO THERMOSTAT SUB-BASE, REFER TO SYSTEM SCHEMATICS OR SCHEMATICS ON INDOOR SECTION FOR LOW VOLTAGE CONTROL WIRING.

WIRING INFORMATION

LINE VOLTAGE
-FACTORY STANDARD
-FACTORY OPTION
-FIELD INSTALLED

LOW VOLTAGE
-FACTORY STANDARD
-FACTORY OPTION
-FIELD INSTALLED

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

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

WIRE COLOR CODE

BK__BLACK	O___ORANGE
BR__BROWN	PR__PURPLE
BL__BLUE	R___RED
G___GREEN	W___WHITE
GY__GRAY	Y___YELLOW

ELECTRICAL WIRING DIAGRAM

REMOTE AIR CONDITIONER
THREE PHASE

DR. BY	APP. BY	DATE	DWG. NO.	REV
JHB		6-01-07	90-101229-11	07

⚠ ATTENTION

This appliance can be connected only to a supply with system impedance no more than Zmax. In case it is necessary, please consult your supply authority for system impedance information.

Zmax L1 = 0.120 Ohm + j 0.075 Ohm
Zmax L2 = 0.104 Ohm + j 0.065 Ohm
Zmax L3 = 0.095 Ohm + j 0.059 Ohm

Remark: Manufacturer shall declare on the equipment instruction manual and instruct the user to determine in consultation with the supply authority, if necessary, that the equipment is connected only to a supply of that impedance or less.