

Single Package Vertical R-22 A/C & HP

Supersedes: 145.20-IOM1 (708)

Form 145.20-IOM1 (908)

UNIT MODELS VPC, VPP, & VPH INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

Unit Model VPC
R-22 Single Packaged Vertical A/C Units
w/ Optional Electric Heat

Unit Model VPP
R-22 Single Packaged Vertical Heat Pumps
w/ Optional Electric Heat

Unit Model VPH
R-22 Single Packaged Vertical A/C Units
w/ Optional Hot Water Heat

Cooling Capacities
9,000, 12,000, 18,000 & 24,000 Btu/Hr.

Electric Heat Capacities
2kw, 3kw, 4kw, 5kw, 8kw, & 10kw



IMPORTANT!

READ BEFORE PROCEEDING!

GENERAL SAFETY GUIDELINES

This equipment is a relatively complicated apparatus. During installation, operation, maintenance or service, individuals may be exposed to certain components or conditions including, but not limited to: refrigerants, oils, materials under pressure, rotating components, and both high and low voltage. Each of these items has the potential, if misused or handled improperly, to cause bodily injury or death. It is the obligation and responsibility of operating/service personnel to identify and recognize these inherent hazards, protect themselves, and proceed safely in completing their tasks. Failure to comply with any of these requirements could result in serious damage to the equipment and the property in

which it is situated, as well as severe personal injury or death to themselves and people at the site.

This document is intended for use by owner-authorized operating/service personnel. It is expected that this individual possesses independent training that will enable them to perform their assigned tasks properly and safely. It is essential that, prior to performing any task on this equipment, this individual shall have read and understood this document and any referenced materials. This individual shall also be familiar with and comply with all applicable governmental standards and regulations pertaining to the task in question.

SAFETY SYMBOLS

The following symbols are used in this document to alert the reader to areas of potential hazard:



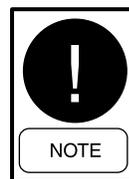
DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



CAUTION identifies a hazard which could lead to damage to the machine, damage to other equipment and/or environmental pollution. Usually an instruction will be given, together with a brief explanation.



WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



NOTE is used to highlight additional information which may be helpful to you.



All wiring must be in accordance with published specifications and must be performed **ONLY** by qualified service personnel. Johnson Controls will not be responsible for damages/problems resulting from improper connections to the controls or application of improper control signals. Failure to follow this will void the manufacturer's warranty and cause serious damage to property or injury to persons.

CHANGEABILITY OF THIS DOCUMENT

In complying with Johnson Controls policy for continuous product improvement, the information contained in this document is subject to change without notice. While Johnson Controls makes no commitment to update or provide current information automatically to the manual owner, that information, if applicable, can be obtained by contacting the nearest Johnson Controls service office.

It is the responsibility of operating/service personnel as to the applicability of these documents to the equipment in question. If there is any question in the mind of operating/service personnel as to the applicability of these documents, then, prior to working on the equipment, they should verify with the owner whether the equipment has been modified and if current literature is available.



Work on this equipment should only be done by properly trained personnel who are qualified to work on this type of equipment. Failure to comply with this requirement could expose the worker, the equipment and the building and its inhabitants to the risk of injury or property damage.

The instructions are written assuming the individual who will perform this work is a fully trained HVAC & R journeyman or equivalent, certified in refrigerant handling and recovery techniques, and knowledgeable with regard to electrical lock out/tag out procedures. The individual performing this work should be aware of and comply with all national, state and local safety and environmental regulations while carrying out this work. Before attempting to work on any equipment, the individual should be thoroughly familiar with the equipment by reading and understanding the associated service literature applicable to the equipment. If you do not have this literature, you may obtain it by contacting a Johnson Controls Service Office.

Should there be any question concerning any aspect of the tasks outlined in this instruction, please consult a Johnson Controls Service Office prior to attempting the work. Please be aware that this information may be time sensitive and that Johnson Controls reserves the right to revise this information at any time. Be certain you are working with the latest information.

VPC / VPP, and VPH models provide a complete air-conditioning and optional heating system as an all-in-one package, capable of providing total heating and cooling functions for a single zone or multiple rooms. Specifically designed for convenient through-the-wall installation in residential high rise and hospitality industry applications. The all-indoor design eliminates the need for unsightly exterior equipment, thereby maintaining architectural esthetics.

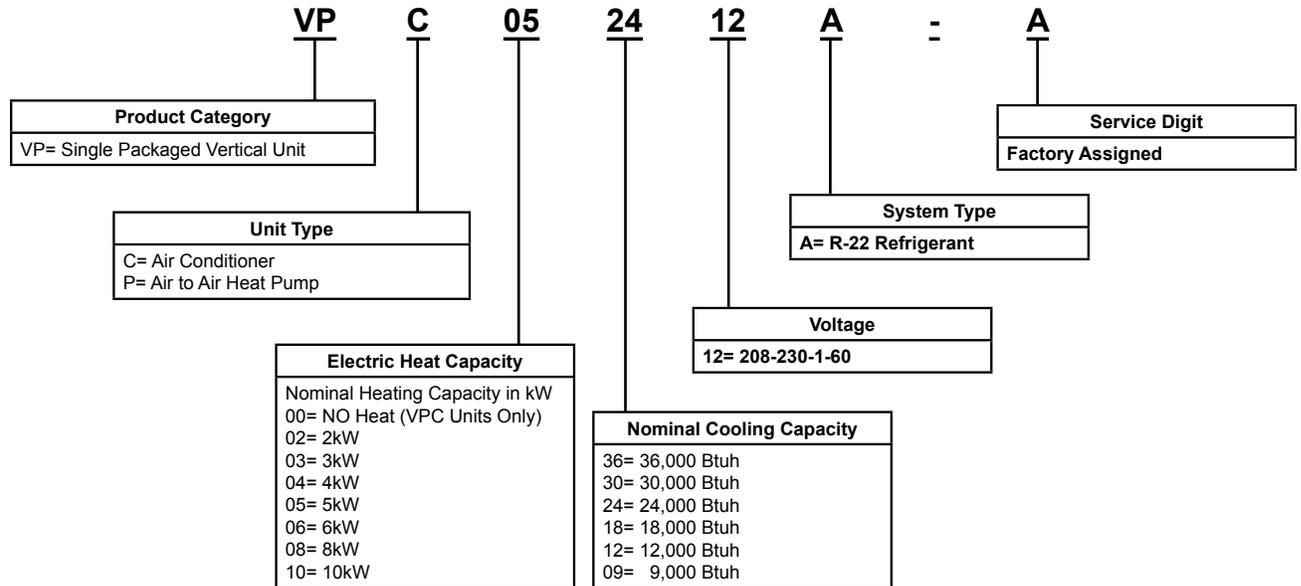
All units are shipped completely wired and factory tested. The refrigeration section features enhanced refrigeration coils, a bi-flow thermostatic expansion valve for refrigerant control, and a high efficiency Scroll or rotary compressor. The VPP units incorporate a reversing valve to allow operation on a heat pump cycle. Air circulating fans are centrifugal, direct driven. The indoor fan motor allows operation at three different fan speeds.

The standard VPC & VPH units may be operated on the cooling cycle to an outdoor ambient of 40°F. The low ambient cooling package will cycle the compressor to prevent frosting of the evaporator at low outdoor ambient temperatures. The VPP unit locks out compressor operation (refrigerant heating) at outdoor ambient temperatures below 40°F.

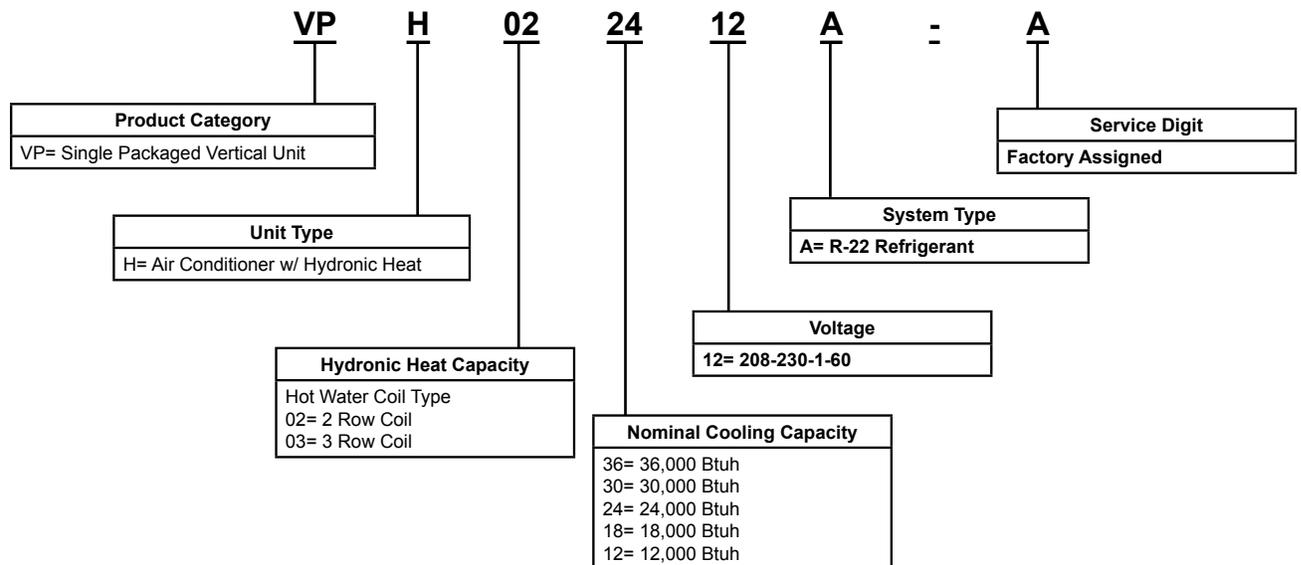
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VPC & VPP UNIT NOMENCLATURE



VPH UNIT NOMENCLATURE





After installing the unit, show the user how to turn off the electricity to unit. Point out control and switch locations for turning off the electricity.

Make sure user understands the importance of following all safety precautions.

1. PREPARING TO INSTALL UNIT

A. Literature

Review this Manual and the Users' Manual Information.

After installing the unit; give this Installer's Information Manual to the end user. If you need help on any of the installation instructions or other matters relating to the unit, contact the office where you bought the unit. You may also refer to the unit rating plate for a contact name.

2. IMPORTANT SAFETY RULES



Read and exactly follow these rules. Failure to do so could cause improper unit operation, resulting in damage, injury or death.

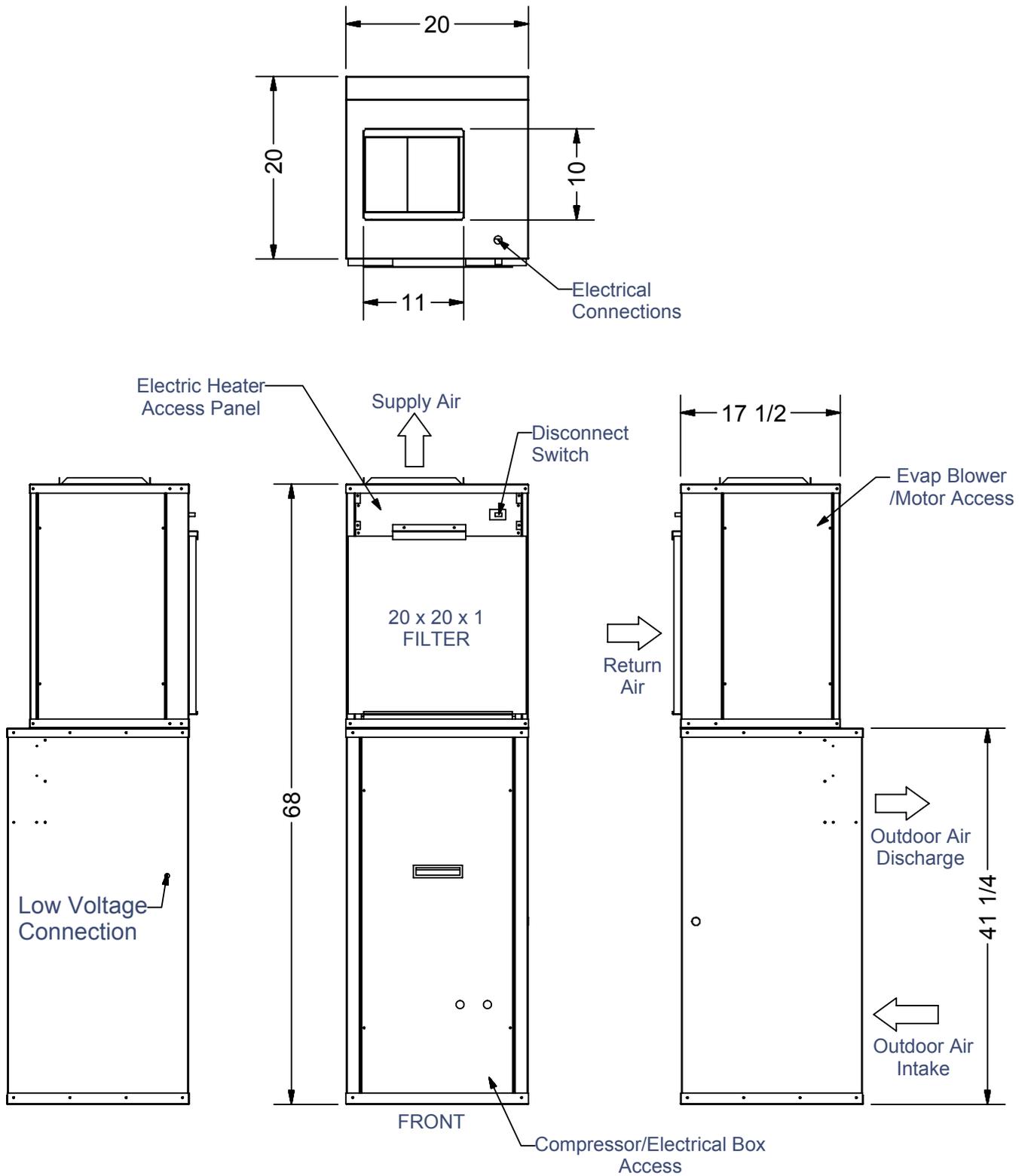
a) Signal words: To alert you to potential hazards, we use the signal words "WARNING" and "CAUTION" throughout this manual. "WARNING" alerts you to situations that could cause serious injury or death. "CAUTION" alerts you to situations that could cause minor or moderate injury or property damage. To help you, we use the words "must" and "should" in this manual. "Must" is mandatory. "Should" is advisory.

b) DO NOT install this unit outdoors.

3. MEETING CODES

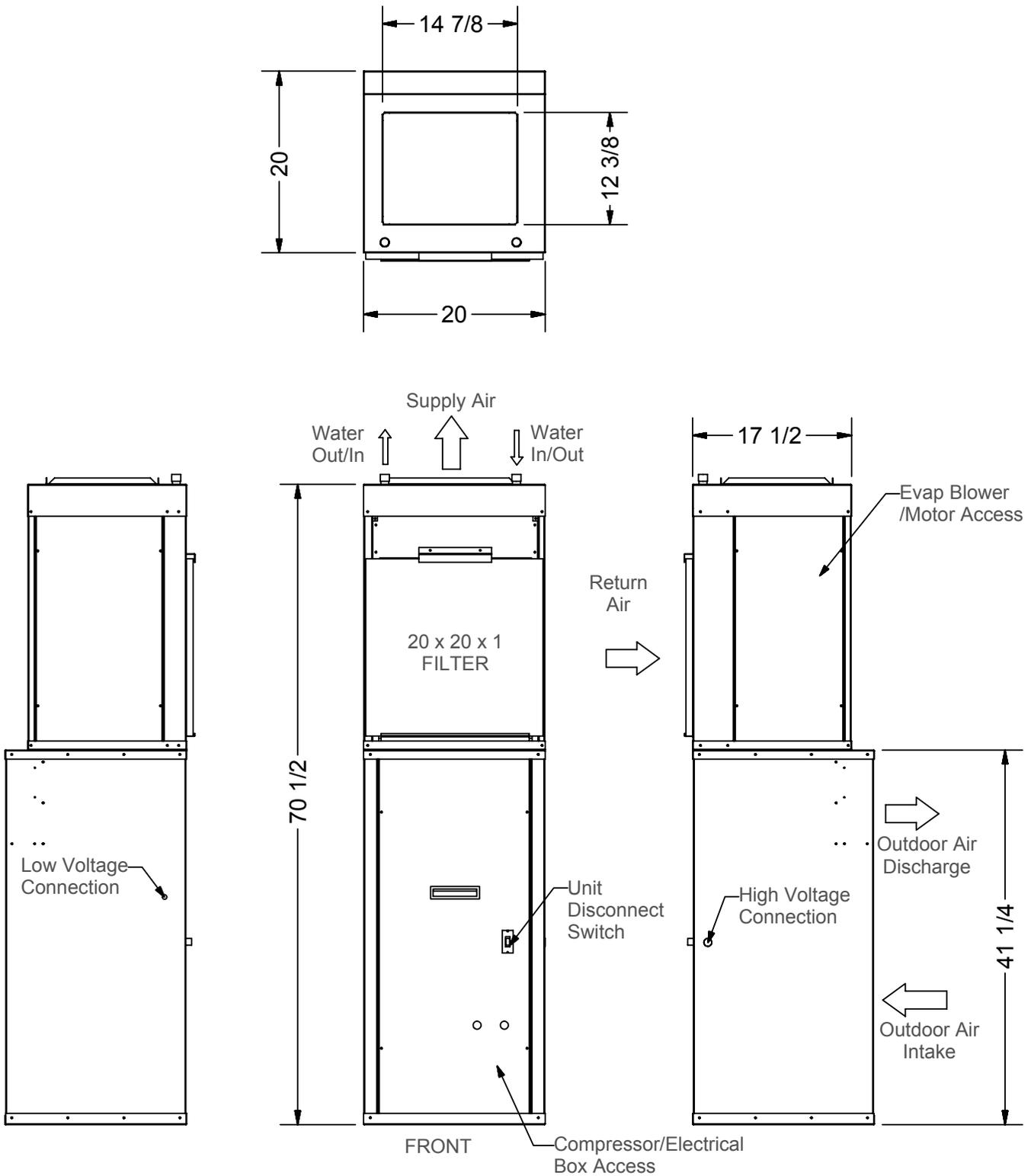
Before installing unit, make sure you know all applicable codes. National, state and local codes may take precedence over any instructions in this manual. Be sure to consult:

- Authorities having jurisdiction over units;
- Local code authorities for information on electrical wiring.



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FIG. 1 - VPC / VPP DIMENSIONS & CONNECTION LOCATIONS

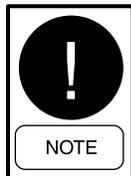


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FIG. 2 - VPH DIMENSIONS & CONNECTION LOCATIONS

4. UNPACKING

- a) Check the unit for indications of damage in shipment. Notify the Transportation company of any damage and note the damage on the shipping receipt.



Rough handling may dislocate internal components.

- b) Allow the shipping base to remain with the unit until it is ready to be set in its final location.
- c) Rotate blowers to assure free movement.
- d) The compressor is mounted on neoprene isolators with metal spacing sleeves inside and secured with nuts, which must be snug against the metal spacer sleeves.
- e) Check all refrigeration tubing to assure that it does not rub against any other parts.

5. NORMAL INSTALLATION

This unit is designed for indoor installation adjacent to an outside wall having an opening for outdoor air flow. The air flow products must:

- a) Discharge directly to the outside.
- b) Discharge away from any obstructions which could cause discharged air recirculation.

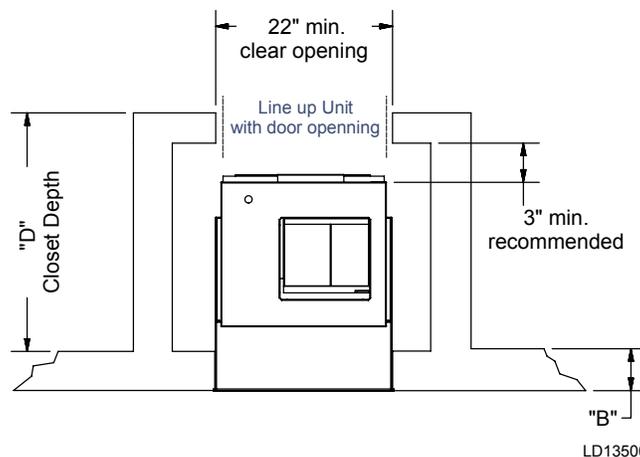
6. CLEARANCES

The unit is design certified for closet installation with the minimum clearances to combustible materials as stated on the data label. No clearance is required from the top, sides, or back of the unit. A minimum of 1 inch clearance is required from the front to any combustible materials. A combustible door may be placed 6 inches from the front of the unit. When the door is open there must be 30 inches clearance to any obstruction, to allow sufficient access for service and the replacement of parts.

Outside Wall Thickness 5"-8"
 $D = (29" - B)$

Outside Wall Thickness 8"-12"
 $D = (33" - B)$

Outside Wall Thickness 12"-15"
 $D = (36" - B)$



7. WALL OPENING

A finished opening in an outside wall is required for intake and exhaust of outdoor airflow. The wall opening required is 21-3/4" wide by 44" high. The bottom edge of wall opening must be located at least 6" higher from finished floor

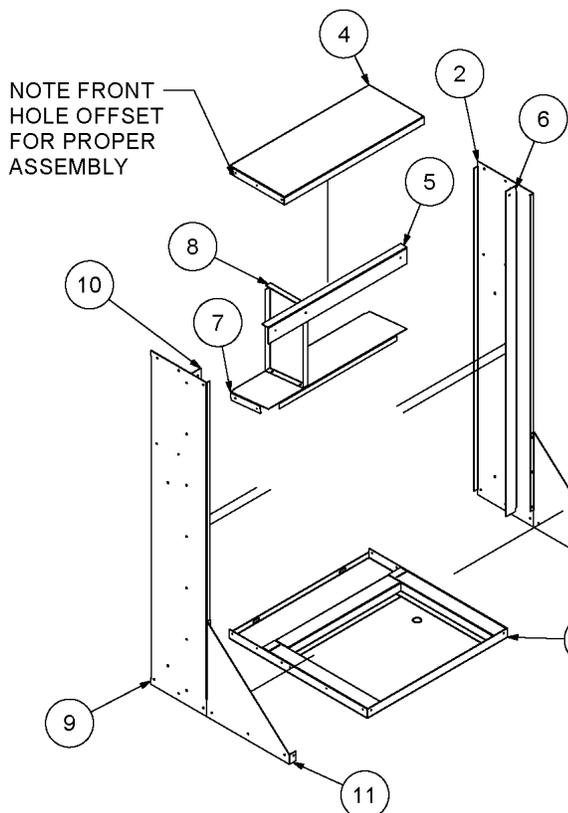
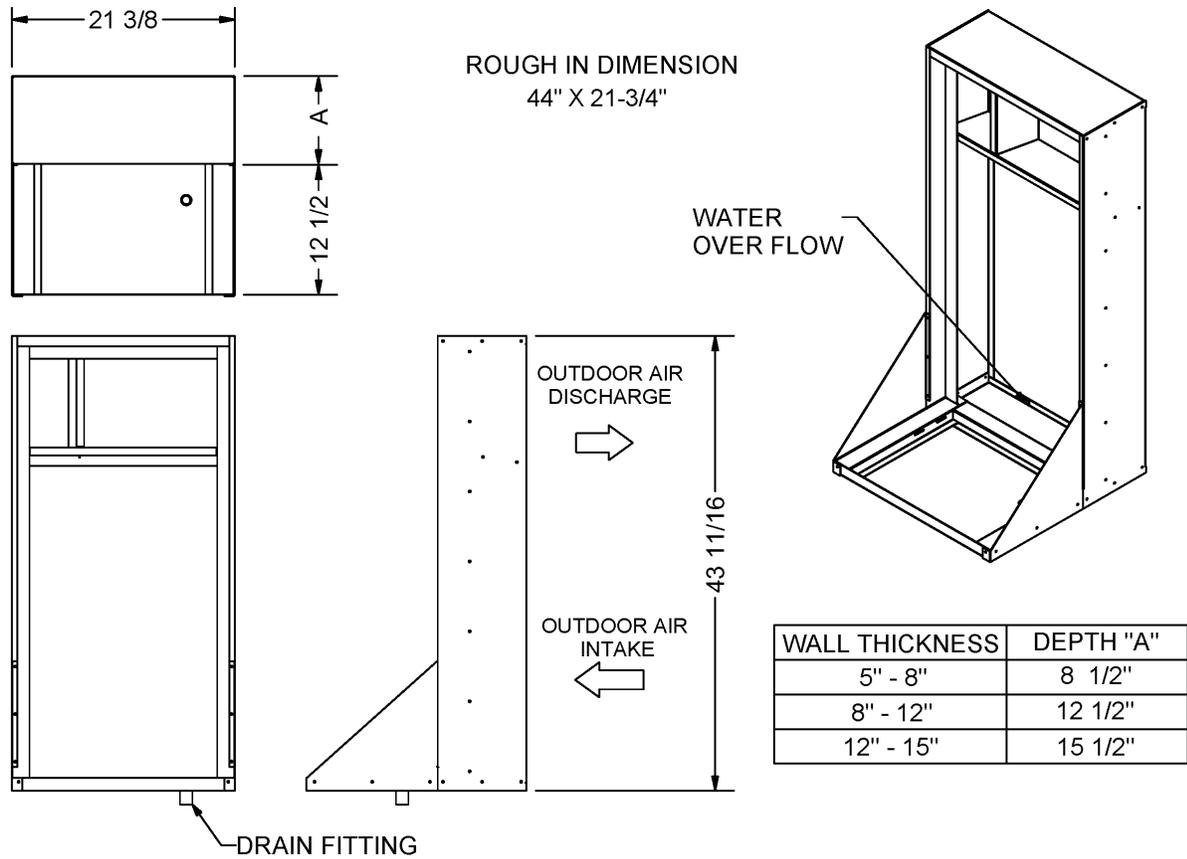
Consult local ordinances for building opening framing requirements.

8. WALL SLEEVE

A factory-made wall sleeve is required to finish the wall opening. The sleeve should be positioned with a minimum of 1/4" protruding from the finished outside wall face. This projection allows installation of the exterior grille without interference from the exterior finishing materials, and provides a right angle surface to apply a caulking bead around the wall penetration.

Use a spirit level or plumb line to make sure that the wall sleeve vertical flanges, which must mate with the back of the unit, are perfectly vertical. The sleeve must be secured to the building framing with suitable field-supplied fasteners (i.e. lag screws). (NOTE: Use shims as necessary, between the sleeve and the rough wall opening, to compensate for any irregularities at the sleeve fastening locations.) DO NOT allow the fasteners to distort the wall sleeve side panels.

A roll of 3/4" wide x 1/2" thick self adhesive foam gasket is packed in the blower compartment of the unit, to be used for sealing between the wall sleeve and the unit. Before moving the unit into final position, apply self-adhesive foam gasket to all the mating flanges on the wall sleeve, be sure to apply gasket material to the divider panel flange between the top and bottom sections of the wall sleeve. Also apply gasket material to the vertical flange of fresh air divider.



Parts List		
ITEM	QTY	PART NUMBER
1	1	WALL SLEEVE BOTTOM
2	1	RIGHT WALL SLEEVE SIDE
3	1	WALL SLEEVE TIE SIDE RIGHT
4	1	WALL SLEEVE TOP
5	1	WALL SLEEVE TOP FILLER
6	1	WALL SLEEVE SIDE SEAL FLANGE RIGHT
7	1	WALL SLEEVE CENTER DIVIDER
8	1	WALL SLEEVE FRESH AIR DIVIDER
9	1	LEFT WALL SLEEVE SIDE
10	1	WALL SLEEVE SIDE SEAL FLANGE LEFT
11	1	WALL SLEEVE TIE SIDE LEFT

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FIG. 3 - WALL SLEEVE ASSEMBLY

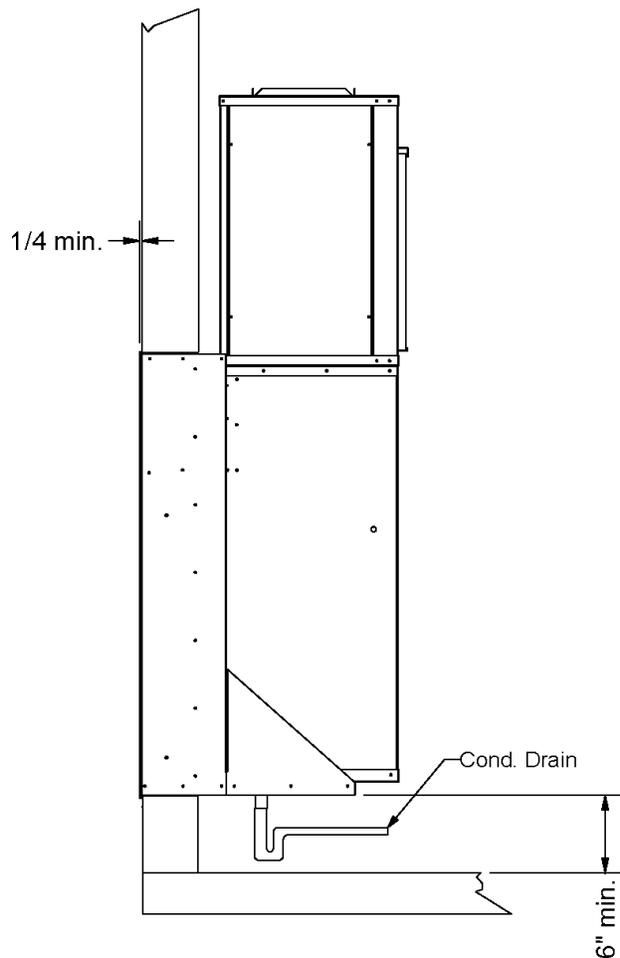
9. EXTERIOR GRILLE

Finish the sleeve exterior with a factory supplied intake and discharge grille.

10. UNIT TO SLEEVE ATTACHMENT

Lift the unit and place it inside of the wall sleeve. Then slide the unit forward until the unit contacts the wall sleeve and makes a seal with the gasket on the wall sleeve. Make sure unit is centered inside of the wall sleeve.

The unit is secured to the wall sleeve using two angles; use of the angles is optional and depends on field installation conditions. The angles should be placed on the both sides of the unit using pre-punched holes to position them. They must be installed before the unit is put into place.



After the unit is positioned screw the angles to the front flange of the wall sleeve sides using two #10 x 1/2 inch self-drilling sheet metal screws on each end. The required angles and screws are packed inside the blower compartment of the unit.

11. CONDENSATE DRAIN PIPING

The condensate drain pan is fitted with a 3/4" NPT female pipe fitting which protrudes through the unit wall sleeve bottom casing. The 3/4" drain piping should have drain trap installed to prevent conditioned air from being blown out of the drain line. The trap should be at least 2 inches deep with the outlet a minimum of 1-1/2 inch below the inlet.

The drain piping on the outlet side of the trap should be pitched 1/4 inch per foot down towards an open drain. Unions should be installed between the outlet side of the trap to allow for disconnecting the piping and the trap for cleaning out.

12. HOT WATER PIPING – VPH UNITS ONLY

The VPH models are supplied with a 2 or 3-row hot water heating coil. The water connections to the heating coil project through the top of the unit cabinet, adjacent to the supply air opening. The orientation of the water in / water out through the coil is interchangeable (either connection may be the water in, without affecting heating output).

The maximum design entering water temperature for these units is 200°F.

The sweat connection stubs are 7/8" ID copper. Unions should be installed on both the inlet and outlet piping (as close to the unit as possible), to allow for disconnecting and removal of the entire unit.

13. INSTALLING DUCT WORK

Install all duct work to meet current standards:

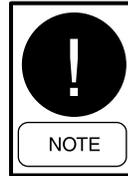
- ASHRAE/NFPA 90, Standard for Installation of Warm Air Heating and Air Systems.
- State, provincial, and local codes

Failure to follow these standards could reduce air flow or increase air leakage, resulting in reduced system performance or unit damage.

For all units, design duct systems within the maximum external static pressure limits indicated in Table 1.

SUPPLY AIR DUCT WORK

Duct attaching hardware must only be used on the supply air outlet flanges. Optional electrical heater is located under the top panel near these flanges. Do not drill or use screws in this area.



Supply air duct (plenum) connection must be at least the same size as the unit supply air opening. Seal supply air duct work to unit casing, walls, ceilings or floors.

TABLE 1 - CFM AND MOTOR SPEED SELECTION**INDOOR BLOWER CFM - VPC & VPP MODELS**

Model #	Motor Speed	EXTERNAL STATIC PRESSURE							
		0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40
VPC/VPP**09	HIGH	445	435	425	415	400	385	370	355
	MED	350	340	330	320	310	300	285	270
	LOW	280	275	270	265	255	245	235	220
VPC/VPP**12	HIGH	470	460	450	440	425	410	395	375
	MED	370	360	350	340	330	315	300	285
	LOW	295	290	285	280	270	260	245	230
VPC/VPP**18	HIGH	775	760	745	725	705	685	660	635
	MED	640	630	620	610	600	585	570	555
	LOW	450	445	440	435	430	420	405	390
VPC/VPP**24	HIGH	1070	1045	1020	995	970	945	915	885
	MED	930	920	910	900	890	875	860	840
	LOW	820	815	810	805	800	790	780	765

INDOOR BLOWER CFM - VPH MODELS

Model #	Motor Speed	EXTERNAL STATIC PRESSURE							
		0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40
VPH0209 2 ROW H/W COIL	HIGH	435	425	415	400	385	370	355	335
	MED	340	330	320	310	300	285	270	255
	LOW	275	270	265	255	245	235	220	205
VPH0212 2 ROW H/W COIL	HIGH	460	450	440	425	410	395	375	355
	MED	360	350	340	330	315	300	285	270
	LOW	290	285	280	270	260	245	230	215
VPH0218 2 ROW H/W COIL	HIGH	735	715	695	675	650	625	595	565
	MED	620	605	590	575	560	545	525	505
	LOW	445	440	435	430	425	415	410	395
VPH0318 3 ROW H/W COIL	HIGH	700	680	660	640	615	590	560	530
	MED	610	595	580	565	550	530	510	495
	LOW	440	435	430	420	410	400	390	380
VPH0224 2 ROW H/W COIL	HIGH	950	930	910	885	860	835	810	780
	MED	890	860	840	810	780	750	720	690
	LOW	805	800	790	775	760	740	715	685
VPH0324 3 ROW H/W COIL	HIGH	910	890	870	850	820	795	770	740
	MED	840	815	790	765	740	715	690	660
	LOW	790	775	760	740	720	690	660	630

NOTE: ALL UNITS SHIPPED FACTORY CONNECTED AT MEDIUM SPEED

14. AIR FILTERS

All return air entering the unit must be filtered. The return air is drawn from inside of the unit closet, which serves as a return air plenum. A return air opening on a closet must be furnished prior to the unit installation, either on the closet door or one of the side walls.

Fresh air for ventilation is drawn in through an adjustable intake damper, which is accessible through the compressor compartment access door. A washable polypropylene mesh filter is provided to prevent dust and insects from entering the indoor circulating air.

FILTER INSTALLATION



Air filters are required to keep the air conditioning coil, and blower motor clean. The return air filter can be removed from either side (closet space permitting), or from the front of the unit. Push the filter all way up into the top filter flange, slide it into the position and let it drop into the bottom flange.

RECOMMENDED FILTERS SIZE

<u>Unit Size</u>	<u>Filter Size</u>
3/4 Ton	20" x 20" x 1"
1 Ton	20" x 20" x 1"
1-1/2 Ton	20" x 20" x 1"
2 Ton	20" x 20" x 1"

The fresh air intake filter can be removed through the compressor access door. The filter pad is retained behind a small retaining bracket, which is secured to the intake damper assembly with a single screw. Remove the screw and bracket, and extract the filter for inspection and cleaning.

15. ELECTRICAL CONNECTIONS

Check the voltage and phase listed on the unit rating plate, before installation, to be sure the power supply is correct. If the compressor fails as the result of installation or improper voltage, the compressor is not replaceable under warranty and the manufacturer will not be responsible for the cost of replacement. The minimum and maximum operating voltages, and fuse sizes, are listed on the unit rating plate.

The power leads must be brought to the entry hole provided in the unit control box. Line voltage connection is made to a manufacturer supplied disconnect switch placed inside of the unit main electrical box. Main electrical supply entry hole is provided on the top of all VPC/VPP units.

16. INSTALLING ELECTRICAL WIRING



Provide unit with its own separate electrical circuit, means of circuit protection and electrical disconnect switch. Follow current National Electrical Code ANSI/NFPA 70, CSA C22.1 C.E.C. Part 1, and state and local codes. Failure to provide these shut-off means could cause electrical shock or fire, resulting in damage, injury or death.

Install proper electrical grounding source to green wire conductor in unit junction box. Follow current National Electrical Code ANSI/NFPA 70 and local codes, or CSA C22.1 Canadian Electrical Code Part 1.



Unit must have proper electrical ground. Failure to provide a proper electrical ground could cause electrical shock or fire, resulting in damage, injury or death.

Select a location for room thermostat that is away from supply air registers, on draft-free interior wall, and not near lights, television, direct sunlight, or other heat sources.

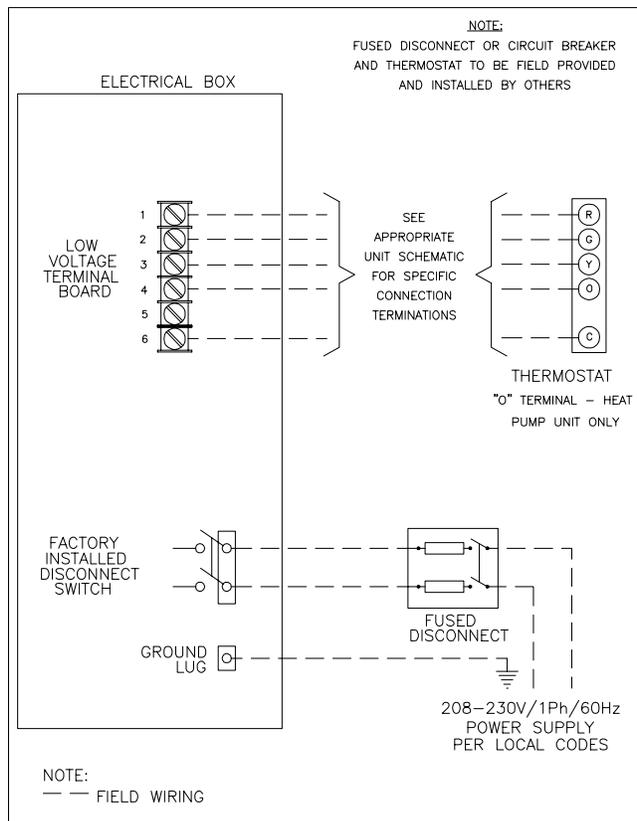
TABLE 2 - ELECTRICAL DATA**ELECTRICAL DATA - VERTICAL PTAC WITH ELECTRIC HEAT OPTION 208-230/1/60**

MODEL #	COMPRESSOR			INDOOR FAN		OUTDOOR FAN		HEATER KW			MCA			MAX FUSE / CCT. BKR. AMP		
	QTY	RLA	LRA	HP	FLA	HP	FLA	208V	230V	240V	208V	230V	240V	208V	230V	240V
VPC/VPP0209	1 @	3.5	22.2	0.10	0.80	0.10	0.60	1.50	1.84	2.00	10.03	10.98	11.42	15	15	15
VPC/VPP0309	1 @	3.5	22.2	0.10	0.80	0.10	0.60	2.25	2.76	3.00	14.54	15.97	16.63	15	20	20
VPC/VPP0409	1 @	3.5	22.2	0.10	0.80	0.10	0.60	3.00	3.67	4.00	19.06	20.97	21.83	20	25	25
VPC/VPP0212	1 @	4.3	27.0	0.10	0.80	0.13	0.80	1.50	1.84	2.00	10.03	10.98	11.42	15	15	15
VPC/VPP0312	1 @	4.3	27.0	0.10	0.80	0.13	0.80	2.25	2.76	3.00	14.54	15.97	16.63	15	20	20
VPC/VPP0412	1 @	4.3	27.0	0.10	0.80	0.13	0.80	3.00	3.67	4.00	19.06	20.97	21.83	20	25	25
VPC/VPP0512	1 @	4.3	27.0	0.10	0.80	0.13	0.80	3.76	4.59	5.00	23.57	25.96	27.04	25	30	30
VPC/VPP0218	1 @	10.0	41.0	0.13	0.75	0.17	1.10	1.50	1.84	2.00	14.35	14.35	14.35	20	20	20
VPC/VPP0318	1 @	10.0	41.0	0.13	0.75	0.17	1.10	2.25	2.76	3.00	14.48	15.91	16.56	20	20	20
VPC/VPP0418	1 @	10.0	41.0	0.13	0.75	0.17	1.10	3.00	3.67	4.00	18.99	20.90	21.77	20	25	25
VPC/VPP0518	1 @	10.0	41.0	0.13	0.75	0.17	1.10	3.76	4.59	5.00	23.51	25.89	26.98	25	30	30
VPC/VPP0618	1 @	10.0	41.0	0.13	0.75	0.17	1.10	4.51	5.51	6.00	28.02	30.89	32.19	30	35	35
VPC/VPP0818	1 @	10.0	41.0	0.13	0.75	0.17	1.10	6.01	7.35	8.00	37.05	40.87	42.60	40	45	45
VPC/VPP1018	1 @	10.0	41.0	0.13	0.75	0.17	1.10	7.51	9.18	10.00	46.08	50.85	53.02	50	60	60
VPC/VPP0324	1 @	12.1	54.0	0.25	1.50	0.25	1.50	2.25	2.76	3.00	18.13	18.13	18.13	30	30	30
VPC/VPP0424	1 @	12.1	54.0	0.25	1.50	0.25	1.50	3.00	3.67	4.00	19.93	21.84	22.71	30	30	30
VPC/VPP0524	1 @	12.1	54.0	0.25	1.50	0.25	1.50	3.76	4.59	5.00	24.44	26.83	27.92	30	30	30
VPC/VPP0624	1 @	12.1	54.0	0.25	1.50	0.25	1.50	4.51	5.51	6.00	28.96	31.82	33.13	30	35	35
VPC/VPP0824	1 @	12.1	54.0	0.25	1.50	0.25	1.50	6.01	7.35	8.00	37.99	41.81	43.54	40	45	45
VPC/VPP1024	1 @	12.1	54.0	0.25	1.50	0.25	1.50	7.51	9.18	10.00	47.01	51.79	53.96	50	60	60

ELECTRICAL DATA - VERTICAL PTAC WITH 'NO HEAT' OPTION / HYDRONIC HEAT OPTION (208-230/1/60)

MODEL #	COMPRESSOR			INDOOR FAN		OUTDOOR FAN		MCA	MAX FUSE / CCT. BKR. AMP
	QTY	RLA	LRA	HP	FLA	HP	FLA		
VPH0*09 / VPC0009	1 @	3.5	22.2	0.10	0.80	0.10	0.6	5.78	15
VPH0*12/ VPC0012	1 @	4.3	27.0	0.10	0.80	0.13	0.8	6.98	15
VPH0*18 / VPC0018	1 @	10.0	41.0	0.13	0.75	0.17	1.1	14.35	20
VPH0*18 / VPC0024	1 @	12.1	54.0	0.25	1.50	0.25	1.5	18.13	30

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FIG. 4 - FIELD WIRING DIAGRAM**17. SEQUENCE OF OPERATION ON COOLING CYCLE – VPC & VPH UNITS**

1. Room thermostat calls for cooling, connecting R to Y terminals.
2. The compressor and outdoor fan start immediately on a call for cooling. Air circulating fan also starts immediately with cooling operation.
3. When the room thermostat is satisfied, terminal Y on the thermostat is de-energized.
4. The compressor, outdoor fan and indoor fan stop immediately when the thermostat is satisfied.
5. A compressor restart delay timer is activated at the end of each cooling cycle. A minimum delay time of 3 minutes is required to ensure that system pressures have equalized before a compressor restart.

18. SEQUENCE OF OPERATION ON HEATING CYCLE – VPC UNITS ONLY

1. Room thermostat calls for heat, connecting R and W terminals.
2. Electric Heat sequencer relay (1S) is energized.
3. On 2kW through 5kW models the electrical heater is energized between 1-24 seconds after time delay is energized. Heating fan is energized simultaneously with heating element operation.
4. On a unit with two heating elements (6kW, 8kW, or 10 kW), the 2nd element will be energized by closure of the 2S sequencer contacts approximately 90 seconds after the first stage is energized.
5. When the room thermostat is satisfied, terminals R and W on the thermostat open, de-energizing the 1S/2S sequencer relays.
6. The bank of heating elements will be disconnected in descending order, the indoor fan will continue to run until the elements are de-energized.

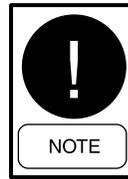
19. SEQUENCE OF OPERATION ON HEATING CYCLE – VPH UNITS ONLY

1. Room thermostat calls for heat, connecting R and W terminals.
2. Hydronic Heat Circulating Pump/valve relay is energized (field supplied). Heating fan is energized simultaneously with hot water flow interlock.

(Note: An electric/hot water heat thermostat, which energizes the indoor fan during the heating cycle, must be used.)
3. When the room thermostat is satisfied, terminals R and W on the thermostat open, de-energizing the hot water pump/valve interlock relay.

20. SEQUENCE OF OPERATION ON COOLING CYCLE – VPP UNITS ONLY

1. Room thermostat calls for cooling, connecting R to Y and O terminals (Reversing valve energized only in cooling).
2. The compressor and outdoor fan start immediately on a call for cooling. Air circulating fan also starts immediately with cooling operation.
3. When the room thermostat is satisfied, terminals Y and O on the thermostat are de-energized.
4. The compressor, outdoor fan and indoor fan stop immediately when the thermostat is satisfied. The reversing valve returns to the default position.
5. A compressor restart delay timer is activated at the end of each cooling cycle. A minimum delay time of 3 minutes is required to ensure that system pressures have equalized before a compressor restart.



The heat/cool interlock relay (R3) prevents the electric heat from being energized through terminal Y of a single-stage heat pump thermostat.

3. On 2kW through 5kW models the electrical heater is energized between 1-24 seconds after time delay is energized. Indoor fan is interlocked simultaneously with heating element operation.
4. On a unit with two heating elements (6kW, 8kW, or 10 kW), the 2nd element will be energized approximately 90 seconds after the first stage is energized.
5. When the room thermostat is satisfied, terminals R and Y on the thermostat open, de-energizing the 1S/2S sequencer relays.
6. The bank of heating elements will be disconnected in descending order, the indoor fan will continue to run until the elements are de-energized.

21. SEQUENCE OF OPERATION ON HEATING CYCLE – VPP UNITS ONLY

A. OUTDOOR AMBIENT ABOVE 40°F

1. Room thermostat calls for heat, connecting R and Y terminals (O terminal de-energized).
2. The compressor and outdoor fan start immediately on a call for heating. Air circulating fan also starts immediately with heating operation.
3. When the room thermostat is satisfied, terminal Y on the thermostat is de-energized.
4. The compressor, outdoor fan and indoor fan stop immediately when the thermostat is satisfied.
5. A compressor restart delay timer is activated at the end of each cooling cycle. A minimum delay time of 3 minutes is required to ensure that system pressures have equalized before a compressor restart.

B. OUTDOOR AMBIENT BELOW 40°F

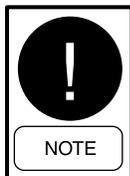
1. Room thermostat calls for heat, connecting R and Y terminals (O terminal de-energized).
2. The normally closed contacts of the Low Ambient relay (R2) route the thermostat signal through R3 to energize the electric element switching sequencers.

22. UNIT SECTION START-UP CHECKLIST

Before starting unit for the first time, be sure you can answer "Yes" to each of these questions:

1. Is the unit level?
2. Have you cleared away all loose construction and insulation materials?
3. Is unit installed within proper clearances to combustible materials?
4. Does electrical wiring follow current National Electrical Code ANSI 70 or CSA C22.1 as well as local codes?
5. Is unit electrically grounded?
6. Is room thermostat properly installed?
7. Is duct work system correctly sized and sealed?
8. Are air filters in place and correctly sized?

23. SYSTEM BALANCE



Electric heating elements require a minimum airflow to ensure proper heating output and maximum element operating life. Low airflow will also cause poor cooling performance.

Blower speed taps are factory set for optimum heating and cooling airflow ranges. Refer to Table 1 for factory blower speed settings, and minimum allowable heating airflow.



Operating unit below the minimum heating airflow may cause poor heating performance and decreased resistant heater life.

Installed system must be test run to ensure operation with sufficient heating and cooling airflow. Duct work static pressure should not exceed 0.3 inches W.C. in order to ensure proper volume of air flow.

24. MAINTAINING YOUR UNIT IN GOOD WORKING ORDER



Follow these procedures before inspecting unit.

- Turn room thermostat to the 'OFF' system setting.
- Wait at least five minutes for unit to cool if it was recently operating.
- Turn off unit electrical power; failure to do so could result in injury or death.



Use only recommended replacements parts. Failure to do so could cause improper unit operation, resulting in damage, injury or death.

Perform periodic preventive maintenance once before heating season begins and once before cooling season. Inspect, clean and repair as needed the following items:

- 1) All electrical wiring and connections, including electrical ground.
- 2) All supply air and return air ducts for obstructions, air leaks and loose insulation.
- 3) Blower housings, motors and wheels, and air filters. Blower motors do not require oiling.
- 4) Inspect indoor and outdoor coils for accumulations of dirt and debris, and clean as required. If the coils appear dirty, clean them using mild detergent or a commercial coil cleaning agent.

Dirty or clogged indoor coils cause low suction pressures and lost cooling capacity.

When operating in Cooling, with a clean outdoor coil, the air temperature leaving the outdoor fan discharge should be approximately 33°F above the outdoor air temperature. The saturated condensing temperature should be approximately 38°F above the outdoor air temperature.

<u>Outdoor Temp °F</u>	<u>Condensing Pressure (psig)</u>
70	200
75	215
80	230
85	245
90	260
95	280

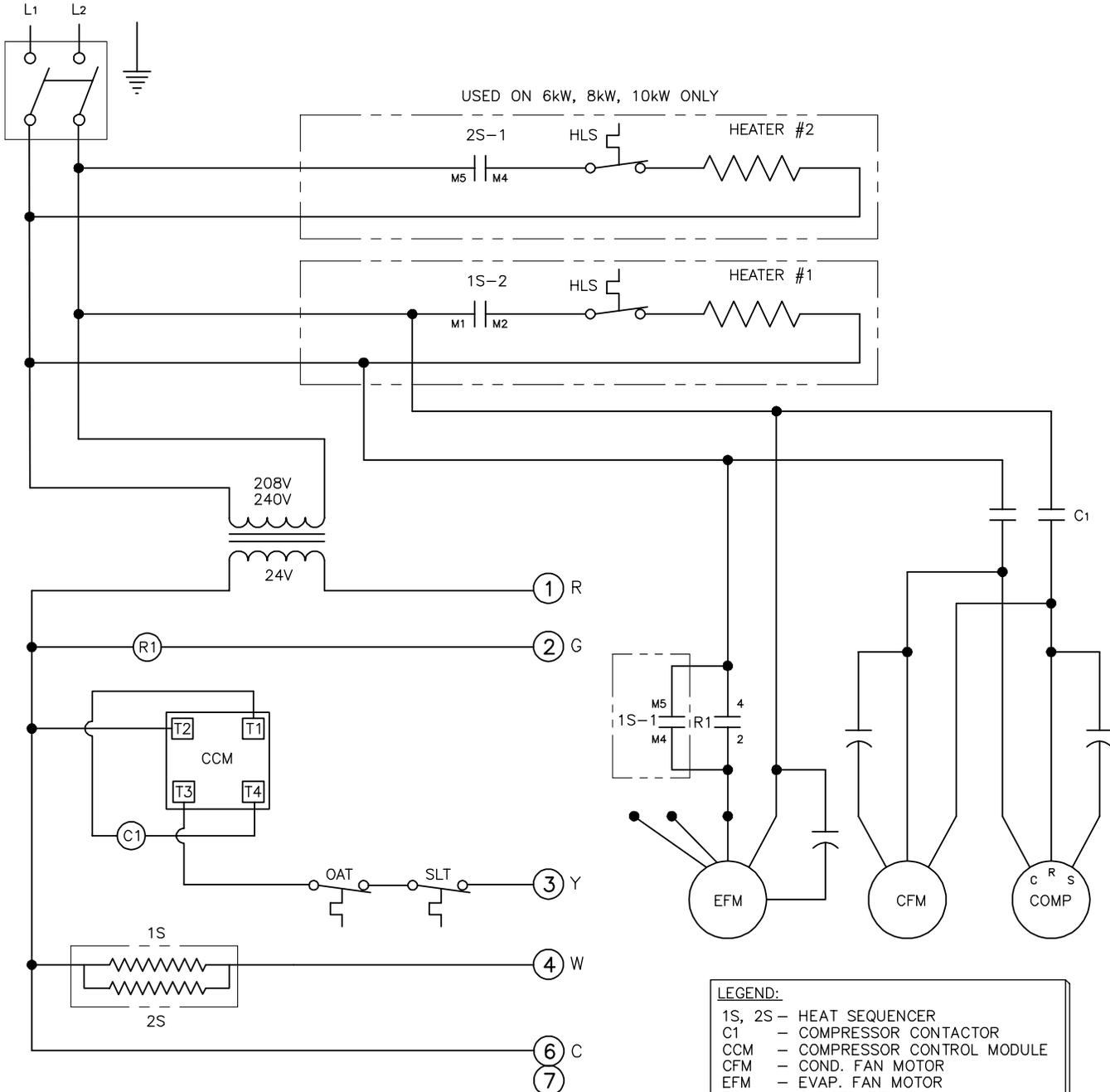
If the condensing pressure is higher than shown in the table above, dirt in the condenser must be suspected. To clean the condenser coil, remove the wall grille from the outside and remove the accumulated dirt from the air intake face of the coil using a brush and/or vacuum cleaner. Always remove all dislodged dirt from inside the wall sleeve so that it will not be sucked back into the condenser coil.

25. REFRIGERANT CHARGES

<u>UNIT MODEL#</u>	<u>R-22 CHARGE</u>
VP***0912	2 lb.- 6 oz.
VP***1212	2 lb.-10 oz.
VP***1812	3 lb.-11 oz.
VP***2412	4 lb.-10 oz.

208-230/1/60
POWER SUPPLY

VPC COOLING ONLY / COOLING WITH OPTIONAL ELECTRIC HEAT



USED ON 6kW, 8kW, 10kW ONLY

NOTE: COMPONENTS INDICATED WITH DASHED BORDER NOT USED ON COOLING ONLY UNITS

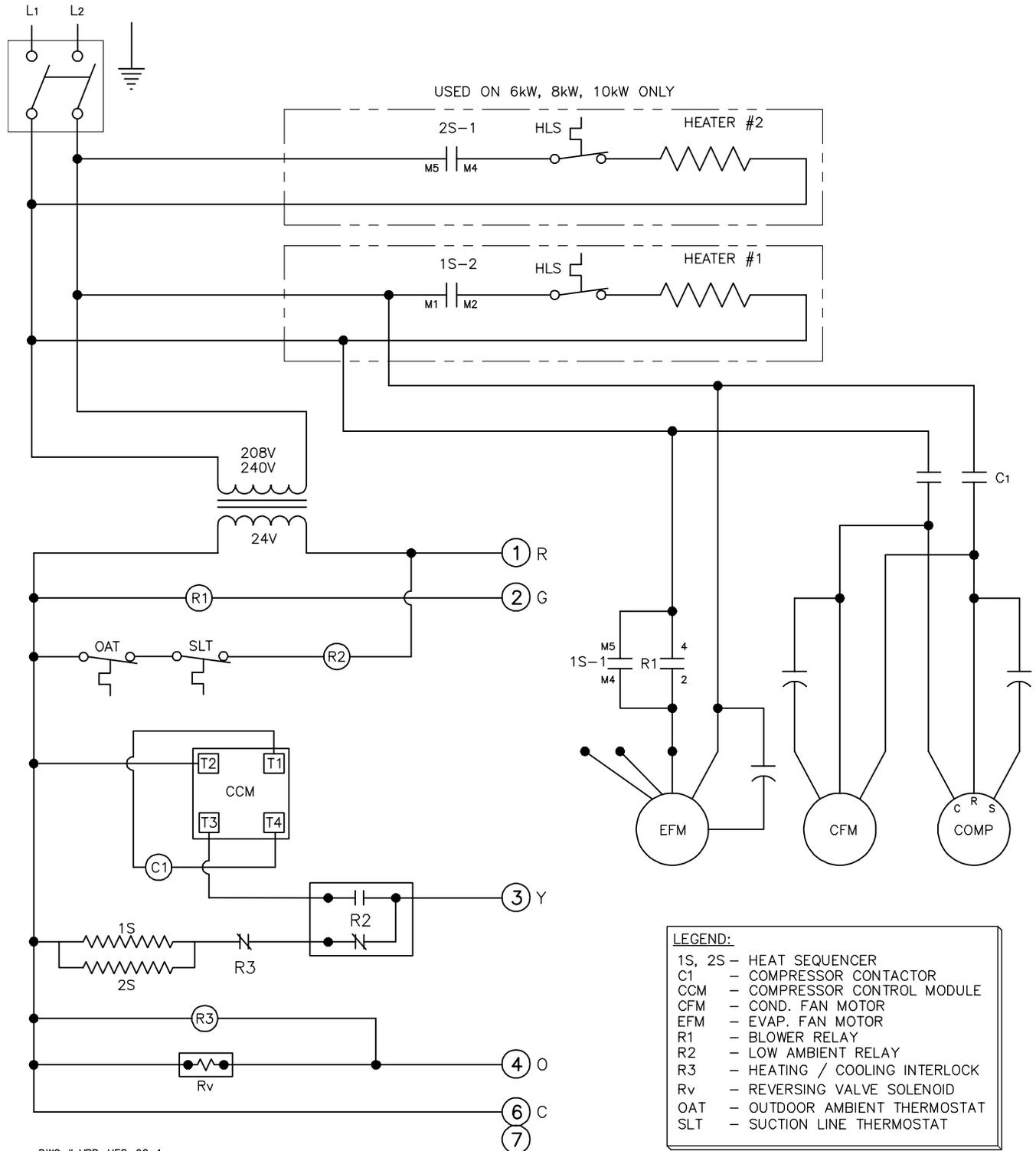
DWG # VPC-UES-02-1

- LEGEND:**
- 1S, 2S - HEAT SEQUENCER
 - C1 - COMPRESSOR CONTACTOR
 - CCM - COMPRESSOR CONTROL MODULE
 - CFM - COND. FAN MOTOR
 - EFM - EVAP. FAN MOTOR
 - R1 - BLOWER RELAY
 - OAT - OUTDOOR AMBIENT THERMOSTAT
 - SLT - SUCTION LINE THERMOSTAT

LD13504

VPP HEAT PUMP C/W ELECTRIC HEAT

208-230/1/60
POWER SUPPLY

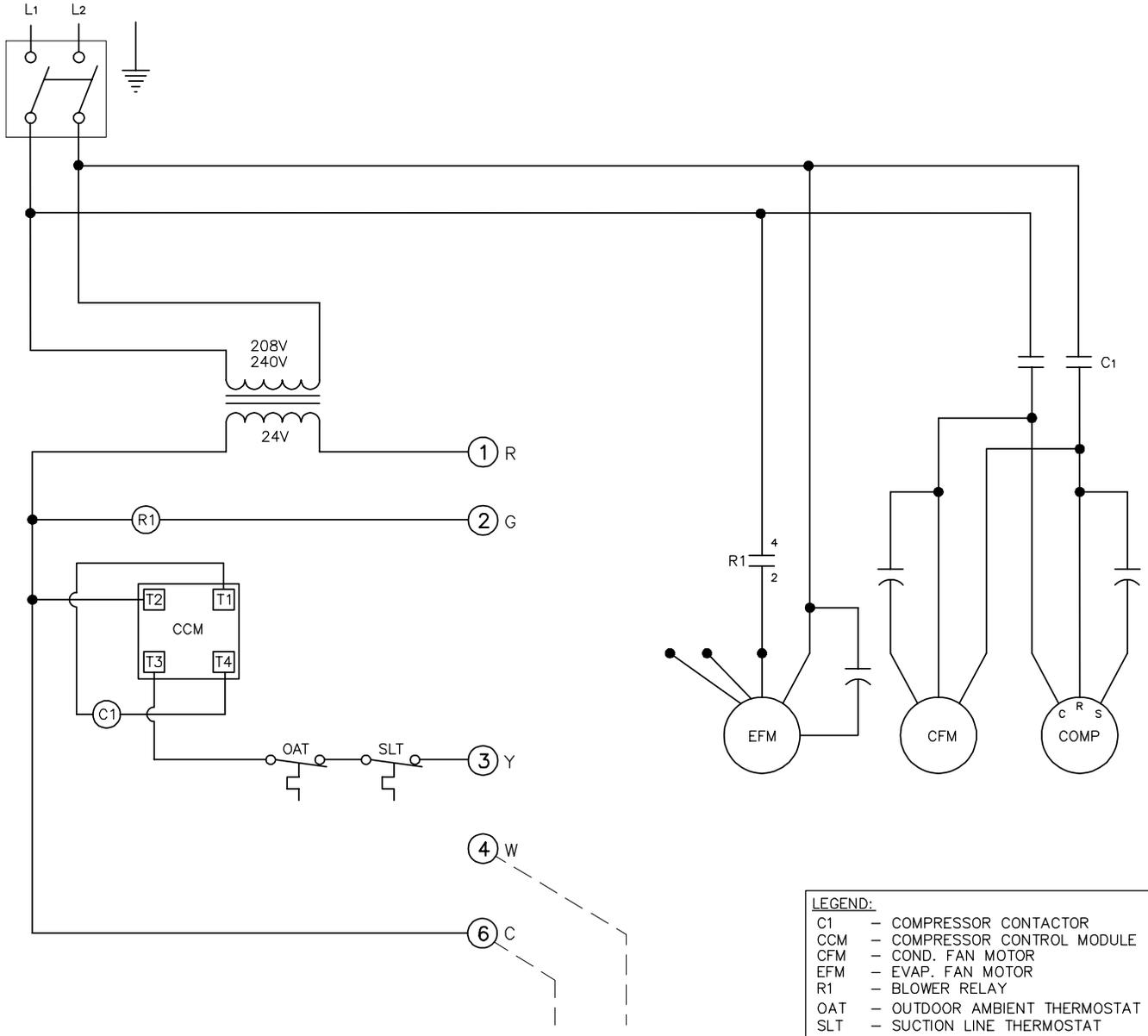


DWG # VPP-UES-02-1

LD13505

208-230/1/60
POWER SUPPLY

VPH - COOLING WITH HYDRONIC HEAT



LEGEND:	
C1	- COMPRESSOR CONTACTOR
CCM	- COMPRESSOR CONTROL MODULE
CFM	- COND. FAN MOTOR
EFM	- EVAP. FAN MOTOR
R1	- BLOWER RELAY
OAT	- OUTDOOR AMBIENT THERMOSTAT
SLT	- SUCTION LINE THERMOSTAT

DWG # VPH-UES-02-1

TO REMOTE CIRCULATING
PUMP INTERLOCK
(FIELD SUPPLIED - BY OTHERS)

LD13506

NOTES

NOTES

LIMITED WARRANTY

Johnson Controls warrants this product to be free from defects in workmanship or material for a period of one year from date of original installation or 18 months from date of shipment, whichever comes first.

Johnson Controls obligation under this Warranty is LIMITED to repairing or replacing at our sole option, at our factory, any part thereof which shall be returned to our factory, transportation charges prepaid and which on examination proves to have been thus defective under normal domestic use not exceeding the fuel rating. The defective part should be returned through a qualified servicing dealer. Upon warranty determination, the replacement part will be shipped freight collect and assumes the unexpired portion of this Limited Warranty.

When a defective part can be repaired or replaced, Johnson Controls shall not be obligated to repair the entire unit or any part thereof other than the defective part.

This warranty applies only to the original homeowner, and is subject to the terms and conditions hereof.

COMPRESSOR – FIVE YEAR LIMITED WARRANTY

In addition to the One Year Limited Warranty, Johnson Controls warrants the compressor to be free from defects in workmanship or material for a period of five (5) years from the date of original installation. If a compressor fails during this five year period, a new compressor will be supplied. The customer will be responsible for freight costs from our factory for delivery of the replacement compressor and also for the return of the defective compressor which may be required under the terms of the Warranty. Labor and any other expense involved in replacing the compressor is not covered by this Warranty.

LABOR AND COST NOT COVERED

This Warranty provides only replacement parts or credits, and does not provide for or cover any labor, shipping, handling or other costs for service travel, servicing, removing, or installing any parts.

EXCLUSIONS

This Warranty shall be void if:

1. The unit is not installed by a licensed or otherwise qualified or contractor and in compliance with the Installation Manual, applicable installation and good trade practices.
2. The defect or damage is caused by accident, abuse, negligence of any person or company, misuse, riot, flood, fire or Acts of God.
3. The unit is not operated and regularly serviced and maintained as called for in the Users' Manual.
4. Damages are caused by operating the unit in a commercial or corrosive atmosphere containing any damaging or dangerous chemicals.
5. The unit is modified or services in a manner not in accordance with the Installation Manual and Users' Manual.
6. Components, replacement parts, or other accessories not compatible with the unit or not approved by Johnson Controls have been used with or attached to the unit.
7. The defect or damage is not caused by Johnson Controls, or it arises from circumstances beyond the control of Johnson Controls.
8. The unit is installed outside the United States or Canada, or has been removed from the place where it was originally installed.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, OBLIGATIONS OR LIABILITIES, EXPRESSED OR IMPLIED BY EMPLOYEES OR REPRESENTATIVES OF JOHNSON CONTROLS. ALL STATUTORY, EXPRESSED OR IMPLIED WARRANTIES, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY NEGATED AND EXCLUDED. ANY CLAIMS FOR INCIDENTAL AND CONSEQUENTIAL DAMAGES, OR ANY OTHER DAMAGES OR EXPENSES BEYOND THE TERMS OF THIS LIMITED WARRANTY ARE HEREBY EXPRESSLY NEGATED AND EXCLUDED.

