

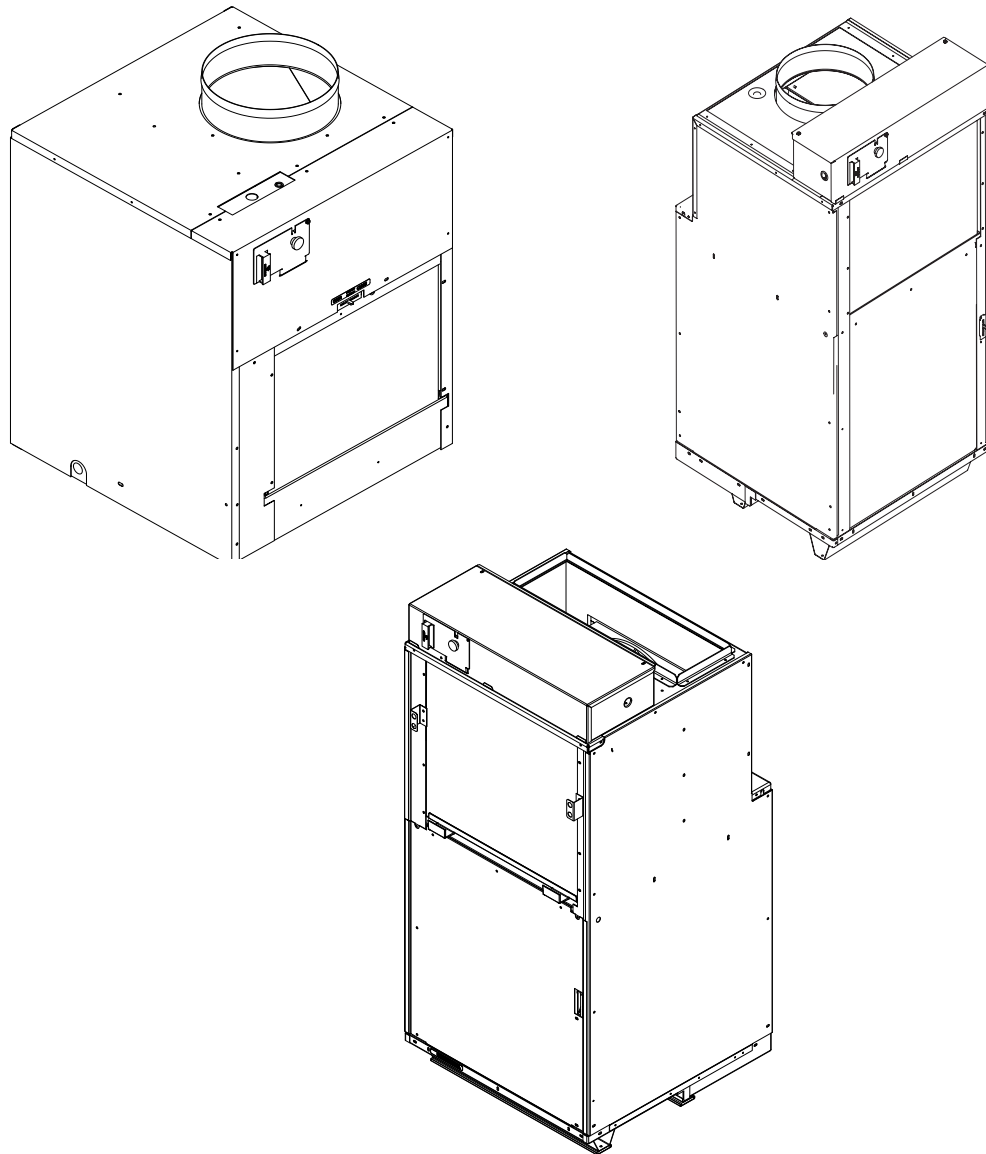


# FRIEDRICH

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## VERT-I-PAK® A-Series

### Single Package Vertical Heat Pump System



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# Congratulations!

The Friedrich VPAK has been carefully engineered and manufactured to provide many years of dependable, efficient operation while maintaining a comfortable temperature and humidity level. Many extra features have been built into the unit to ensure quiet operation, optimal circulation of cool, dry air, and the most economic operation.

Please carefully read and follow the installation instructions and safety warnings detailed in this manual.

## WARNING

Please read this manual thoroughly prior to equipment installation or operation. It is the installer's responsibility to properly apply and install the equipment. Installation must be in conformance with the NFPA 70-2008 National Electric Code or current edition, International Mechanic code 2009 or current edition and any other applicable local or national codes.

## WARNING

Refrigeration system under high pressure. Do not puncture, heat, expose to flame or incinerate. Only certified refrigeration technicians should service this equipment. R410A systems operate at higher pressures than R22 equipment. Appropriate safe service and handling practices must be used. Only use gauge sets designed for use with R410A. Do not use R22 gauge sets. Failure to do so can result in property damage, personal injury, or death.

## WARNING



### Electrical shock hazard.

Turn OFF electric power before service or installation.

Unit must be properly grounded.

Unit must have correct fuse or circuit breaker protection. Unit's supply circuit must have the correct wire conductor size. All electrical connections and wiring must be installed by a qualified electrician and conform to the National Electrical Code and all local codes which have jurisdiction. Failure to do so can result in property damage, personal injury and/or death.

## Your safety and the safety of others are very important.

We have provided many important safety messages in this manual and on your appliance. Always read and obey all safety messages.



This is the safety alert symbol. This symbol alerts you to potential hazards that can kill or hurt you and others.

All safety messages will follow the safety alert symbol with the word "WARNING" or "CAUTION".

These words mean:

## WARNING

Indicates a hazard which, if not avoided, can result in severe personal injury or death and damage to product or other property.

## CAUTION

Indicates a hazard which, if not avoided, can result in personal injury and damage to product or other property. All safety messages will tell you how to reduce the chance of injury, and tell you what will happen if the instructions are not followed.

## NOTICE

Indicates property damage can occur if instructions are not followed.

## THINK SAFETY FIRST

### WARNING

Do not remove, disable or bypass this unit's safety devices. Doing so may cause, fire, injuries or death.

### AVERTISSEMENT

Ne pas supprimer, désactiver ou contourner cette l'unité des dispositifs de sécurité. faire vous risqueriez de provoquer, le feu, les blessures ou la mort.

### ADVERTENCIA

No eliminar, desactivar o pasar por alto los dispositivos de seguridad de la unidad. Si lo hace podría producirse fuego, lesiones o muerte.

# General Specifications

MODEL	VHA09K		VHA09R		VHA12K		VHA12R		VHA18K		VHA18R		VHA24K		VHA24R	
COOLING DATA																
TOTAL COOLING CAP.	9300		9300		11500		11500		18400		18400		22500		22500	
SENSIBLE COOL CAP.	7440		7440		9085		9085		13430		13430		15750		15750	
POWER (W)	845		845		1045		1045		1670		1670		2045		2045	
EER	11.0		11.0		11.0		11.0		11.0		11.0		11.0		11.0	
HEATER SIZE (kW)	2.5/3.4/5.0		2.5/3.4/5.0		2.5/3.4/5.0		2.5/3.4/5.0		2.5/3.4/5.0		2.5/3.4/5.0		2.5/3.4/5.0/7.5/10.0		2.5/3.4/5.0/7.5/10.0	
HEAT PUMP DATA																
REVERSE HEATING BTU	8300		8300		10600		10600		16700		16700		19500		19500	
COP @ 47F	3.3		3.3		3.3		3.3		3.3		3.3		3.3		3.3	
HEATING POWER (W)	730		730		940		940		1480		1480		1732		1732	
HEATING CURRENT (A)	3.6		3.1		4.5		3.7		7.0		6.1		9.2		9.2	
ELECTRICAL DATA																
VOLTAGE (1 PHASE, 60 HZ)	208-230		265		208-230		265		208-230		265		208-230		265	
VOLT RANGE	197-253		239-292		197-253		239-292		197-253		239-292		197-253		239-292	
COOLING CURRENT (A)	4.1		3.5		4.9		4.0		7.9		7.0		10.5		10.5	
AMPS L.R	21.0		21.0		23.0		23.0		37.0		37.0		44.0		44.0	
INDOOR MOTOR (HP)	1/4		1/4		1/4		1/4		1/4		1/4		1/5		1/5	
INDOOR MOTOR (A)	1.2		1.2		1.2		1.2		0.42		0.42		1.4		1.4	
OUTDOOR MOTOR (HP)	—		—		—		—		1/4		1/4		1/4		1/4	
OUTDOOR MOTOR (A)	—		—		—		—		1.6		1.6		1.7		1.7	
PHYSICAL																
DIMENSIONS (W X D X H)	23"x23"x32"		23"x23"x32"		23"x23"x32"		23"x23"x32"		23"x23"x47"		23"x23"x47"		23"x23"x52"		23"x23"x52"	
NET WEIGHT (LBS)	142		144		147		149		190		192		225		227	
SHIPPING WEIGHT (LBS)	164		166		169		171		216		218		251		253	
TEST SETTING	LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	
R410A CHARGE (OZ)	38.0		38.0		42.1		42.1		57		57		62		62	
AIRFLOW DATA																
INDOOR CFM	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
.10" ESP	430	490	430	490	430	490	430	490	630	675	630	675	660	700	660	700
.15" ESP	410	470	410	470	410	470	410	470	595	640	595	640	615	665	615	665
.20" ESP	360	440	360	440	360	440	360	440	550	600	550	600	575	625	575	625
.25" ESP	310	400	310	400	310	400	310	400	505	550	505	550	525	580	525	580
.30" ESP	260	350	260	350	260	350	260	350	455	500	455	500	485	540	485	540
.35" ESP	-	-	-	-	-	-	-	-	400	445	400	445	450	500	450	500
.40" ESP	-	-	-	-	-	-	-	-	345	400	345	400	415	465	415	465
VENT CFM																
UP TO " " CFM	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60

## NOTES:

Cooling Standards: 95°F DB/75°F WB OUTDOOR, 80°F DB/67°F WB INDOOR

Heating Standards: 47°F DB/43°F WB OUTDOOR, 70°F DB/60°F WB INDOOR

Normal Value Wet Coil @ .1" ESP.

Rated CFM at Low Speed: VHA09....430 VHA12....430

VHA18....630 VHA24....655

Due to continuing research in new energy-saving technology, specifications are subject to change without notice.

# Electrical Data- VHA09 & 12

ELECTRICAL DATA						
	VHA09K			VHA12K		
HEATER WATTS	2050-2500	2780-3400	4090-5000	2050-2500	2780-3400	4090-5000
VOLTAGE	208-230					
ELECTRIC HEATING BTU	7000-8500	9500-11600	13900-17000	7000-8500	9500-11600	13900-17000
ELEC. HEATING CURRENT (AMPS)	11.1-12.0	14.6-16.0	20.9-22.9	11.1-12.0	14.6-16.0	20.9-22.9
MINIMUM CIRCUIT AMPACITY	15.0	20.0	29.2	15.0	20.0	29.2
BRANCH CIRCUIT FUSE (AMPS)	15	20	30	15	20	30
LRA-COMPRESSOR (AMPS)	21.0	21.0	21.0	23.0	23.0	23.0
BASIC HEATER SIZE	2.5KW	3.4KW	5.0KW	2.5KW	3.4KW	5.0KW
POWER CONNECTION HARD WIRED	HARD WIRED					
RECOMMENDED BRANCH CIRCUIT WIRE SIZES *AWG- AMERICAN WIRE GAUGE	14	12	10	12	12	10

ELECTRICAL DATA						
	VHA09R			VHA12R		
HEATER WATTS	2500	3400	5000	2500	3400	5000
VOLTAGE	265					
ELECTRIC HEATING BTU	8500	11600	17000	8500	11600	17000
ELEC. HEATING CURRENT (AMPS)	10.5	13.9	19.9	10.5	13.9	19.9
MINIMUM CIRCUIT AMPACITY	13.8	18.0	25.7	13.8	18.0	25.7
BRANCH CIRCUIT FUSE (AMPS)	15	20	30	15	20	30
LRA-COMPRESSOR (AMPS)	21.0	21.0	21.0	23.0	23.0	23.0
BASIC HEATER SIZE	2.5KW	3.4KW	5.0KW	2.5KW	3.4KW	5.0KW
POWER CONNECTION HARD WIRED	HARD WIRED					
RECOMMENDED BRANCH CIRCUIT WIRE SIZES *AWG- AMERICAN WIRE GAUGE	14	12	10	12	12	10

# Electrical Data- VHA18 & 24

ELECTRICAL DATA								
	VHA18K			VHA24K				
HEATER WATTS	2050-2500	2780-3400	4090-5000	2050-2500	2780-3400	4090-5000	6135-7500	8180-10000
VOLTAGE	208-230							
ELECTRIC HEATING BTU	7000-8500	9500-11600	13900-17000	7000-8500	9500-11600	13900-17000	20900-25600	27900-34100
ELEC. HEATING CURRENT (AMPS)	11.1-12.0	14.6-16.0	20.9-22.9	11.3-12.3	14.8-16.2	21.1-23.1	30.9-34.0	40.7-44.9
MINIMUM CIRCUIT AMPACITY	15.0	20.0	29.2	15.4	20.3	29.0	42.6	56.1
BRANCH CIRCUIT FUSE (AMPS)	15	20	30	20	25	30	45	60
LRA-COMPRESSOR (AMPS)	37.0	37.0	37.0	44.0	44.0	44.0	44.0	44.0
BASIC HEATER SIZE	2.5KW	3.4KW	5.0KW	2.5KW	3.4KW	5.0KW	7.5KW	10.0KW
POWER CONNECTION HARD WIRED	HARD WIRED							
RECOMMENDED BRANCH CIRCUIT WIRE SIZES *AWG- AMERICAN WIRE GAUGE	14	12	10	12	10	10	6	4

ELECTRICAL DATA								
	VHA18R			VHA24R				
HEATER WATTS	2500	3400	5000	2500	3400	5000	7500	10000
VOLTAGE	265							
ELECTRIC HEATING BTU	8500	11600	17000	8500	11600	17000	25600	34100
ELEC. HEATING CURRENT (AMPS)	10.5	13.9	19.9	10.8	14.2	20.3	29.7	39.1
MINIMUM CIRCUIT AMPACITY	13.8	18.0	25.7	13.6	17.8	25.4	37.2	49.0
BRANCH CIRCUIT FUSE (AMPS)	15	20	30	20	20	30	40	50
LRA-COMPRESSOR (AMPS)	37.0	37.0	37.0	44.0	44.0	44.0	44.0	44.0
BASIC HEATER SIZE	2.5KW	3.4KW	5.0KW	2.5KW	3.4KW	5.0KW	7.5KW	10.0KW
POWER CONNECTION HARD WIRED	HARD WIRED							
RECOMMENDED BRANCH CIRCUIT WIRE SIZES *AWG- AMERICAN WIRE GAUGE	14	12	10	12	12	10	6	4

# Electrical Specifications & Sound

Electrical Requirements	
Wire Size	Use <b>ONLY</b> wire size recommended for single outlet branch circuit.
Fuse/Circuit Breaker	Use <b>ONLY</b> type and size fuse or HACR circuit breaker indicated on unit's rating guide. Proper over current protection to the units is the responsibility of the owner.
Grounding	Unit <b>MUST</b> be grounded from branch circuit to unit, or through separate ground wire provided on permanently connected units. Ensure that branch circuit or general purpose outlet is grounded.
Wire Sizing	Use recommended wire size given in tables and install a single branch circuit. All wiring must comply with local and national codes. NOTE: Use copper conductors only.

## Electrical Rating Table


NOTE: Use copper conductors **ONLY**. Wire sizes are per NEC.

Recommended Branch Circuit Sizes*	
Nameplate Maximum Circuit Breaker Size	AWG Wiring Size**
15A	14
20A	12
25A & 30A	10
40A & 45A	6
50A & 60A	4


AWG - American Wire Gauge

\* Single circuit from main box.

\*\* Based on 100' or less of copper, single insulated conductor at 60° C



## WARNING



**Electrical Shock Hazard.**

Turn OFF electric power before service or installation.

Unit must be properly grounded.

Unit must have correct fuse or circuit breaker protection. Unit's supply circuit must have the correct wire conductor size. All electrical connections and wiring must be installed by a qualified electrician and conform to the National Electrical Code and all local codes which have jurisdiction. Failure to do so can result in property damage, personal injury and/or death.

**NOTE:** All 230/208 chassis must be hard wired with a properly sized breaker. See unit nameplate for specific electrical requirements. Use HACR type breakers to avoid nuisance trips. All field wiring must be done in accordance with NEC and local codes. It is the installer's responsibility to ensure that the electrical codes are met.

## Sound Data

Indoor (free Inlet/casing raditated) tested per AHRI 260 standards.

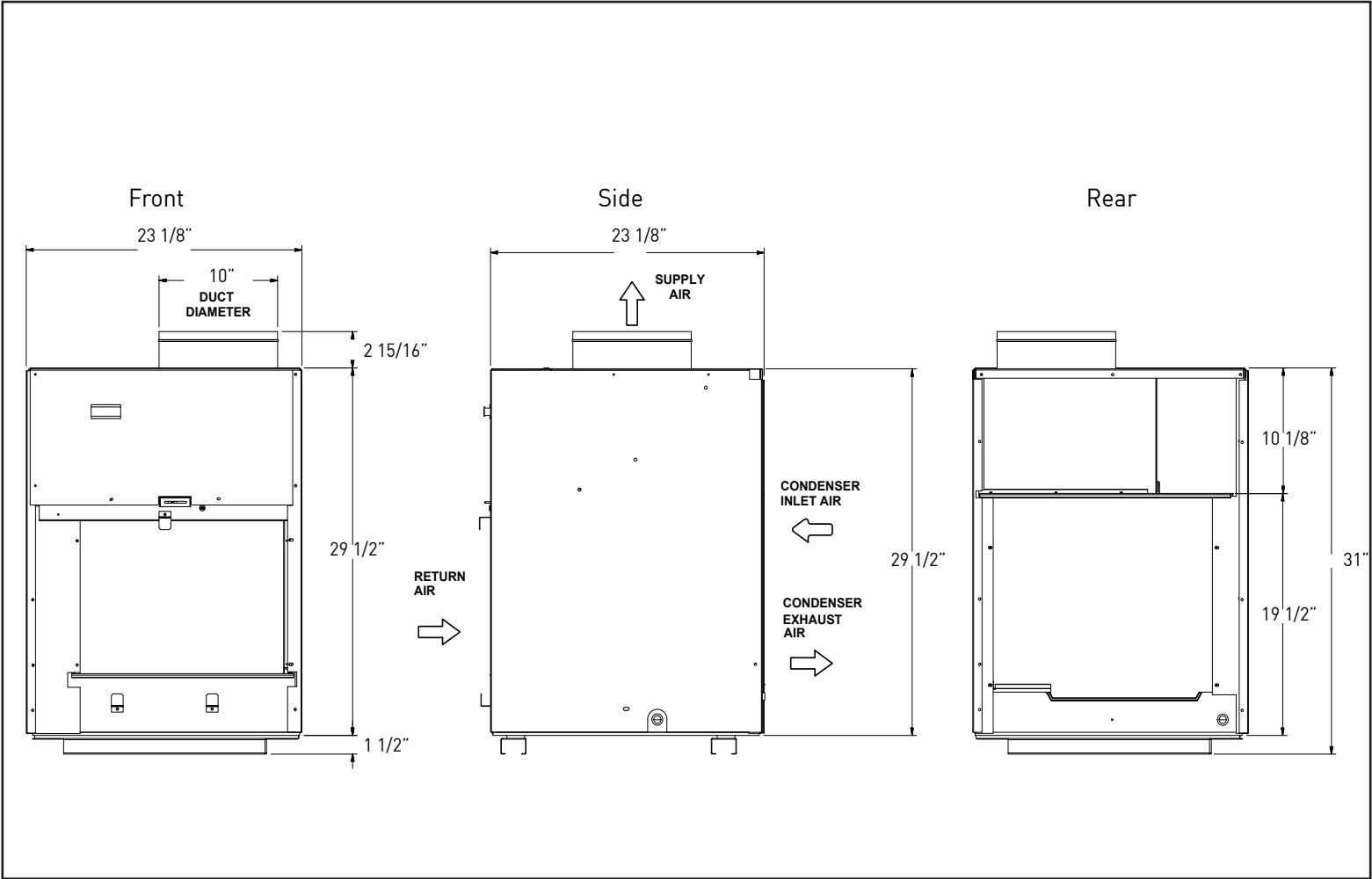
Outdoor sound power tested per AHRI 270 standards.

Sound transmission class (STC) tested per ASTM E90 standards.

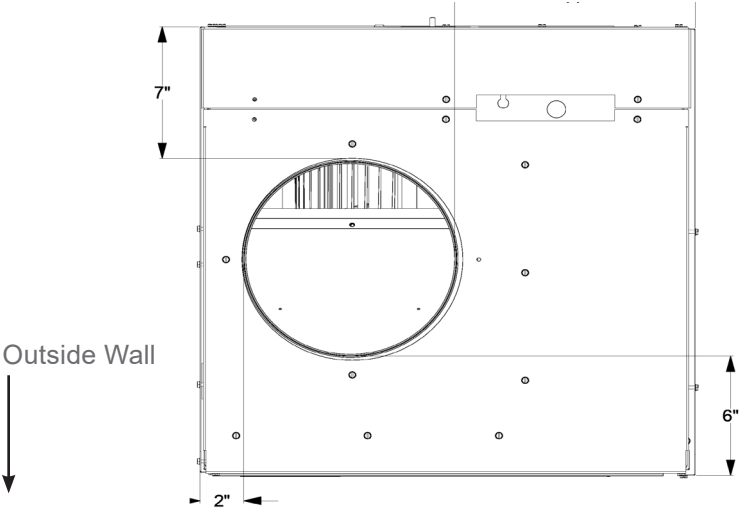
Sound Power and STC					
Model	STC	Indoor (dBA)		Outdoor (dBA)	
		High Cool	Low Cool	High Cool	Low Cool
VHA09	23	63.6	61.4	75.4	72.9
VHA12	23	63.0	60.8	75.3	72.7
VHA18	24	67.2	65.7	74.9	74.8
VHA24	25	67.8	66.4	78.5	72.7

**NOTE:** Testing performed by 3rd party lab. The above values representative of an installation of the unit into an exterior wall through a VPAWP-\* wall-sleeve without a finished closet. Vert-I-Pak is typically installed in a finished closet. Friedrich recommends that closet wall construction include finished walls on both the interior and exterior sides for optimal sound attenuation.

# Chassis Dimensions - VHA09 & VHA12

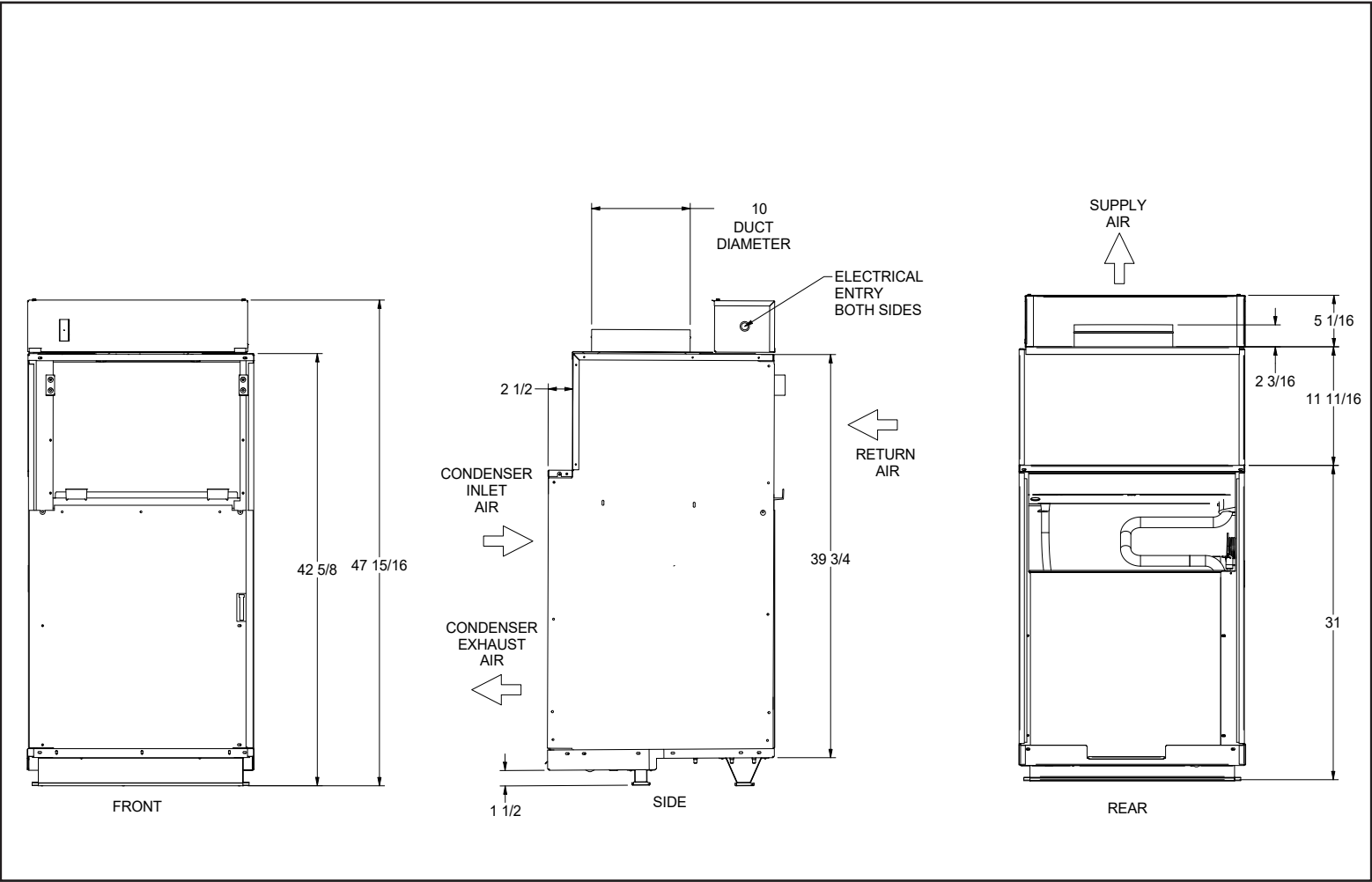


## UNIT TOP VIEW DIMENSIONS

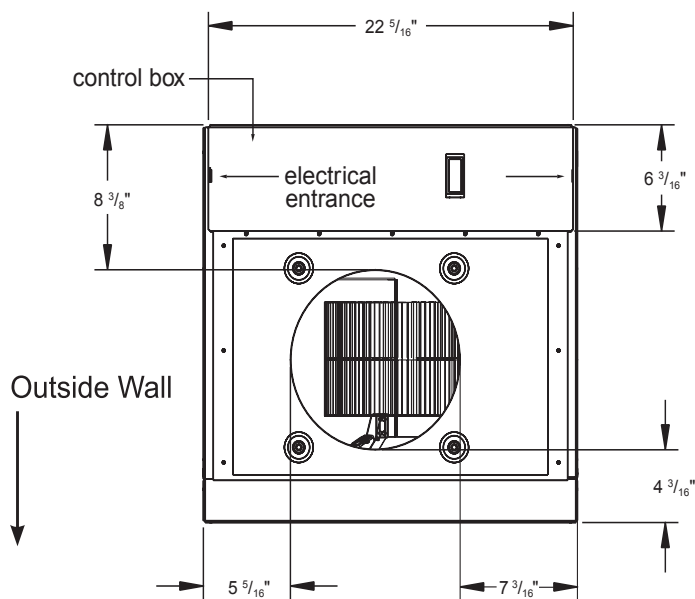




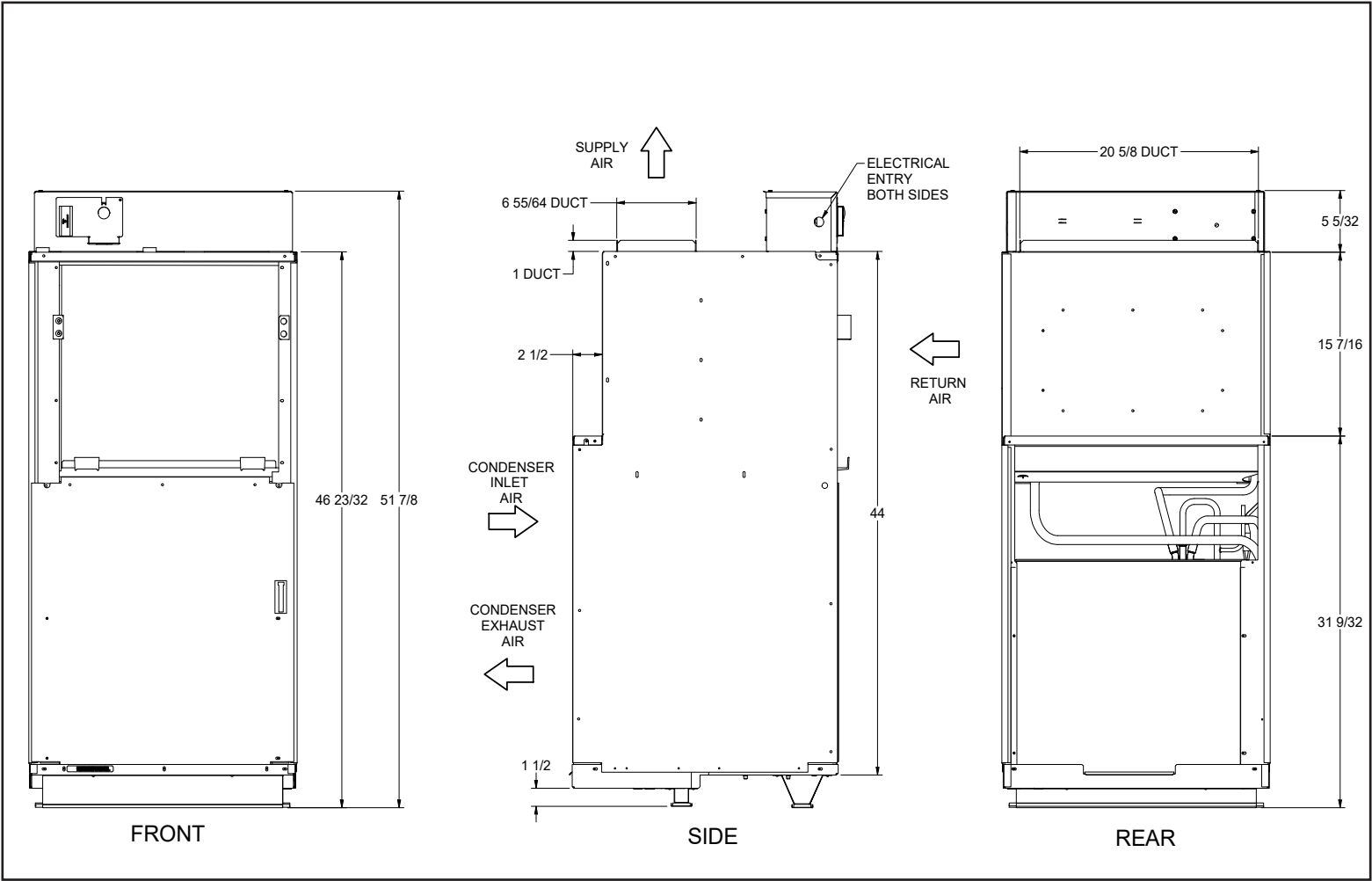
# Chassis Dimensions - VHA18



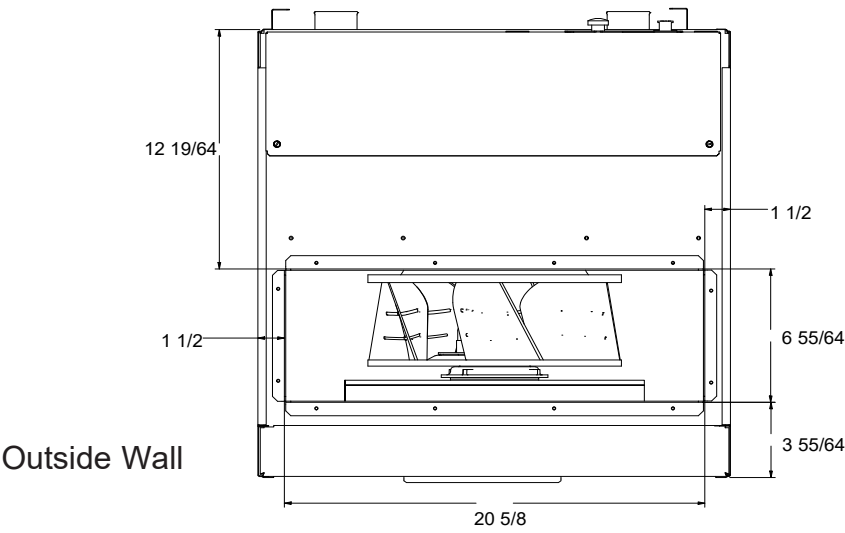
## UNIT TOP VIEW DIMENSIONS



# Chassis Dimensions - VHA24



## UNIT TOP VIEW DIMENSIONS



# Supply Air Flow Data

## Indoor CFM & External Static Pressure

	Model					
	VHA09/VHA12		VHA18		VHA24	
Fan Speed	Low	High	Low	High	Low	High
ESP (")	SCFM					
0.0"	470	520	730	800	755	805
0.05"	460	510	670	735	700	750
0.10"	430	490	630	675	660	700
0.15"	410	470	595	640	615	665
0.20"	360	440	550	600	575	625
0.25"	310	400	505	550	525	580
0.30"	260	350	455	500	485	540
0.35"	--	--	400	445	450	500
0.40"	--	--	345	400	415	465

Indoor air flow may be determined by measuring the external static pressure (ESP) of the duct system using an inclined manometer or magnahelic gauge and consulting the above chart to derive actual air flow. Under no circumstances should the small chassis Vert-I-Pak equipment be operated at an external static pressure in excess of 0.3" W.C. on the VHA09 & VHA12 and 0.4" W.C. on the VHA18 & VHA24. Operation of the Vert-I-Pak under these conditions will result in inadequate air flow, leading to poor performance and/or premature component failure.

## Control

For LOW speed only operation, connect the fan output terminal from the thermostat to the GL terminal of the electronic control.

For HIGH speed only operation, connect the fan output terminal from the thermostat to the GH terminal of the electronic control.

For thermostats with two-speed capability, connect the LOW speed output to the GL terminal and the HIGH speed output to the GH terminal.

## Condenser CFM & External Static Pressure

VPAK is designed to install through an exterior wall with a plenum (VPAWP-8, VPAWP-14) and a Friedrich external louver .

Condenser External Static Pressure			
Model	Design		Maximum
	CFM	ESP (WC)	ESP (WC)
VHA09	650	0.03	0.12
VHA12	650	0.03	0.12
VHA18	950	0.03	0.12
VHA24	980	0.03	0.12

If the Friedrich designed plenum and louver combinations are not used, the selections and design must be evaluated by Friedrich to ensure the total pressure drop does not exceed the maximum allowable limits.

# Vert-I-Pak Required Minimum Clearances

## Building Exterior Unit Opening Requirements

VPAK units must be installed on an outside wall. Confined spaces and/or covered areas should be avoided. Units must be installed no closer than 12" apart when two units are side by side. If three or more units are to operate next to one another, maintain a minimum of 60" between units or pairs of units (Figure B). If more than two units are sharing a floor with adjacent, outset units, a minimum distance of 64" must be kept between units (Figure C). Also, a vertical clearance of 60" must be maintained (Figure A) between units. Units installed on the bottom floor must be mounted at least 6" off of the ground.

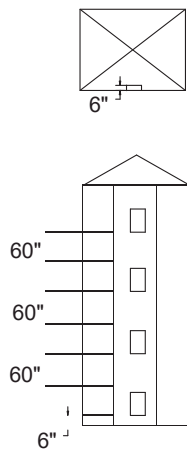


Figure A

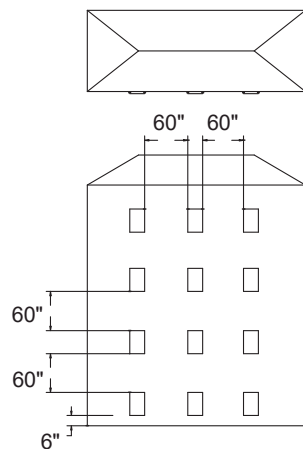


Figure B

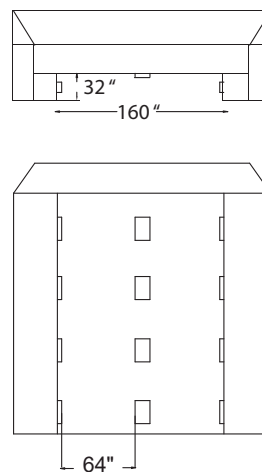


Figure C

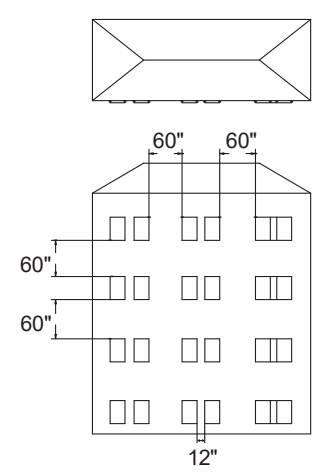


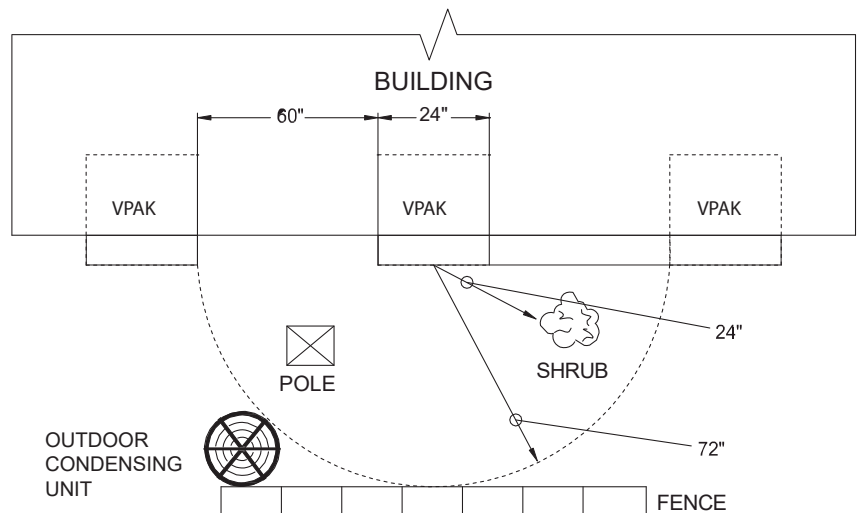
Figure D

## Grill Clearance Requirements

Where obstructions are present use the following guidelines for proper spacing from the VPAK exterior louvered grill. Friedrich recommends that ALL obstructions are a minimum of 72" from the exhaust.

For minor obstruction(s) such as lamp poles or small shrubbery, a clearance of 24" from the outdoor louver must be maintained.

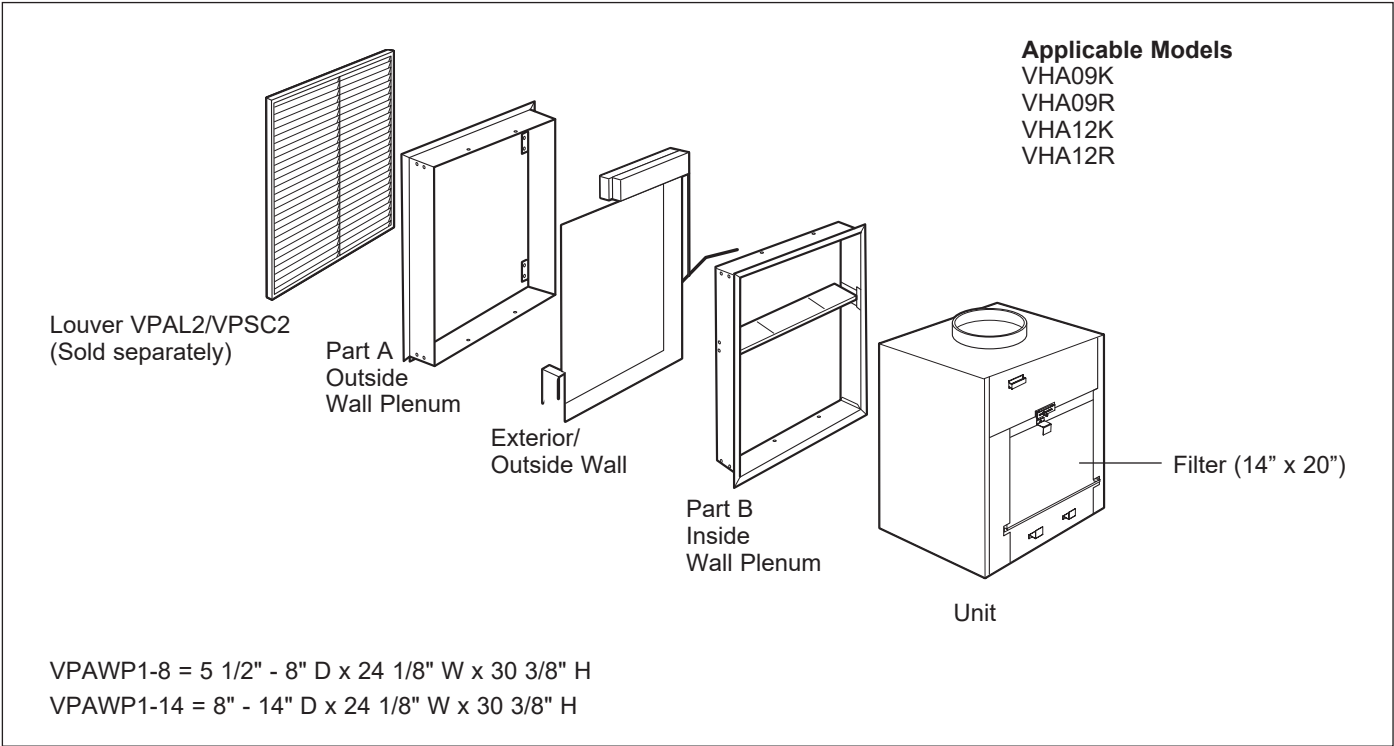
For major obstructions such as a solid fence, wall, or other heat rejecting devices like a condensing unit, a minimum distance of 72" must be kept.



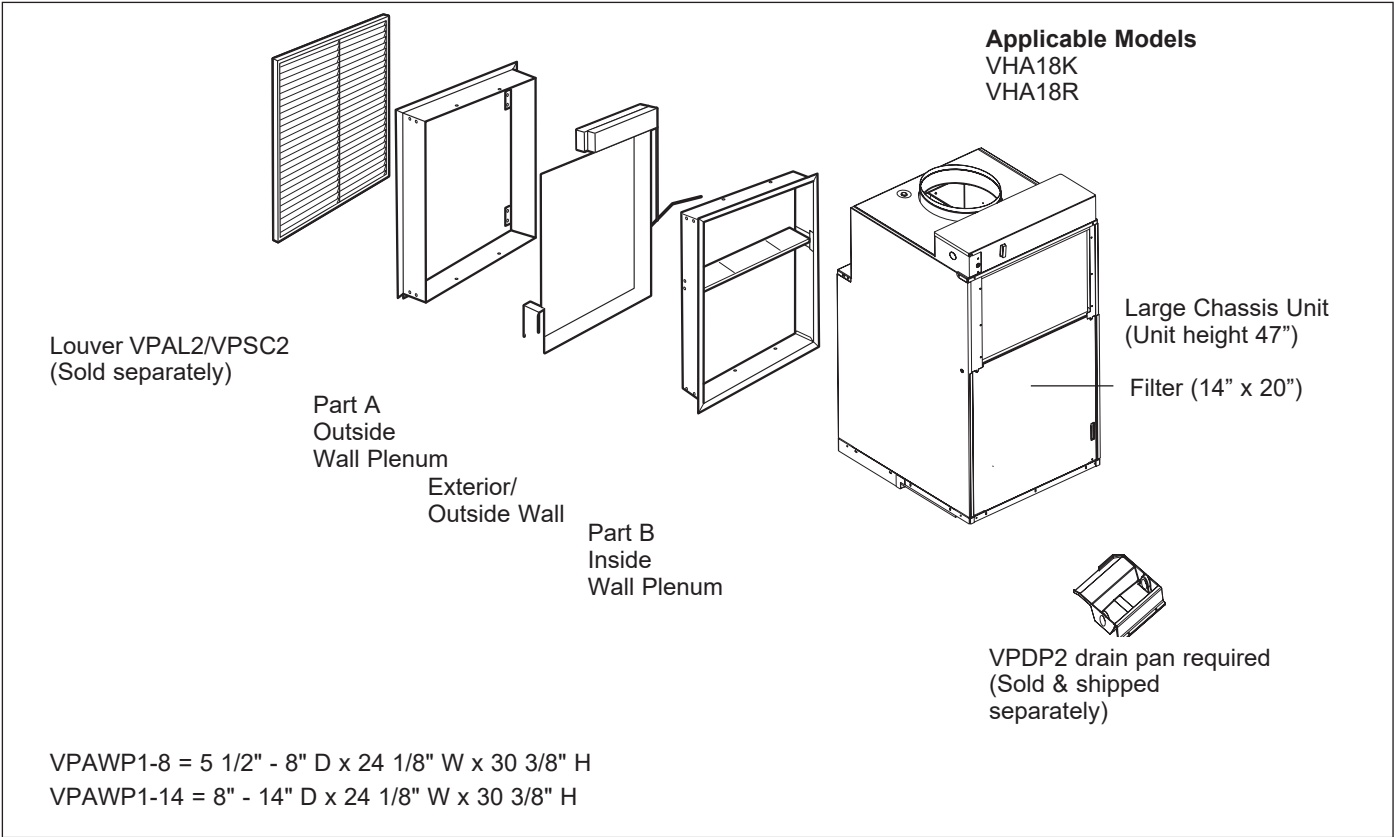
The example pictured above is for reference only and does not represent all possible installations. Please contact Friedrich Air Conditioning for information regarding effects of other installation arrangements.

# Installation Overview

## VHA09 & VHA12

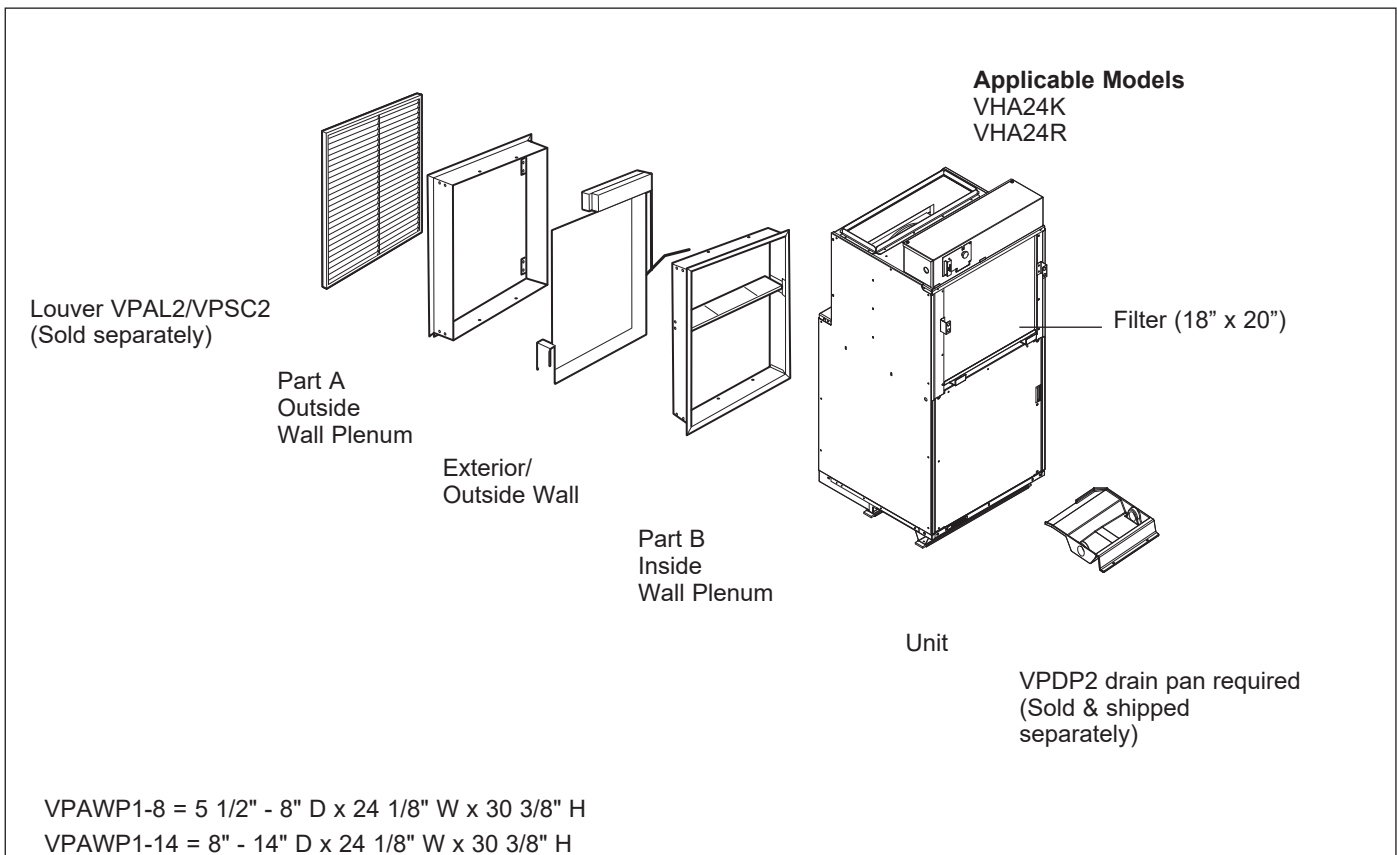


## VHA18

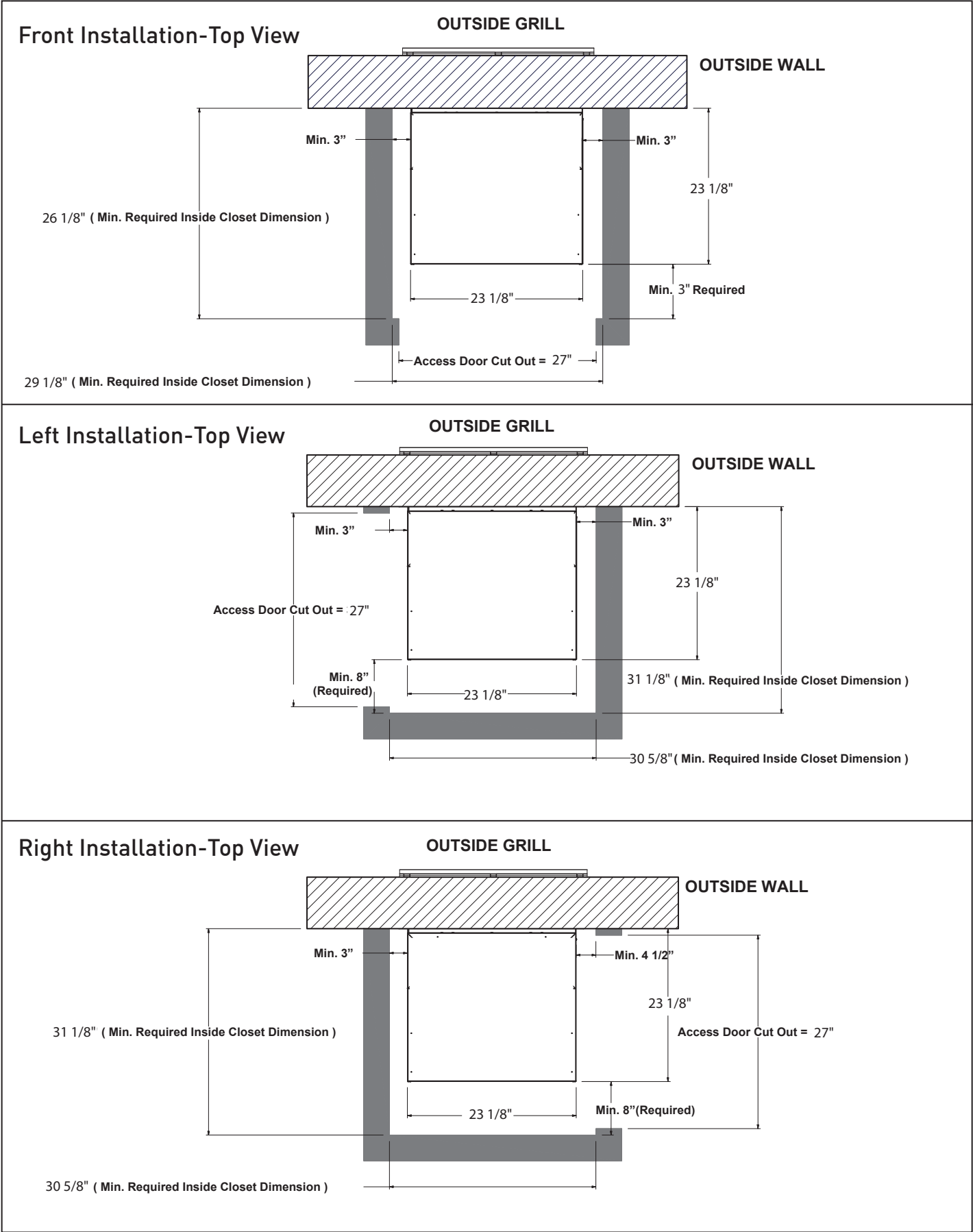


# Installation Overview

## VHA24

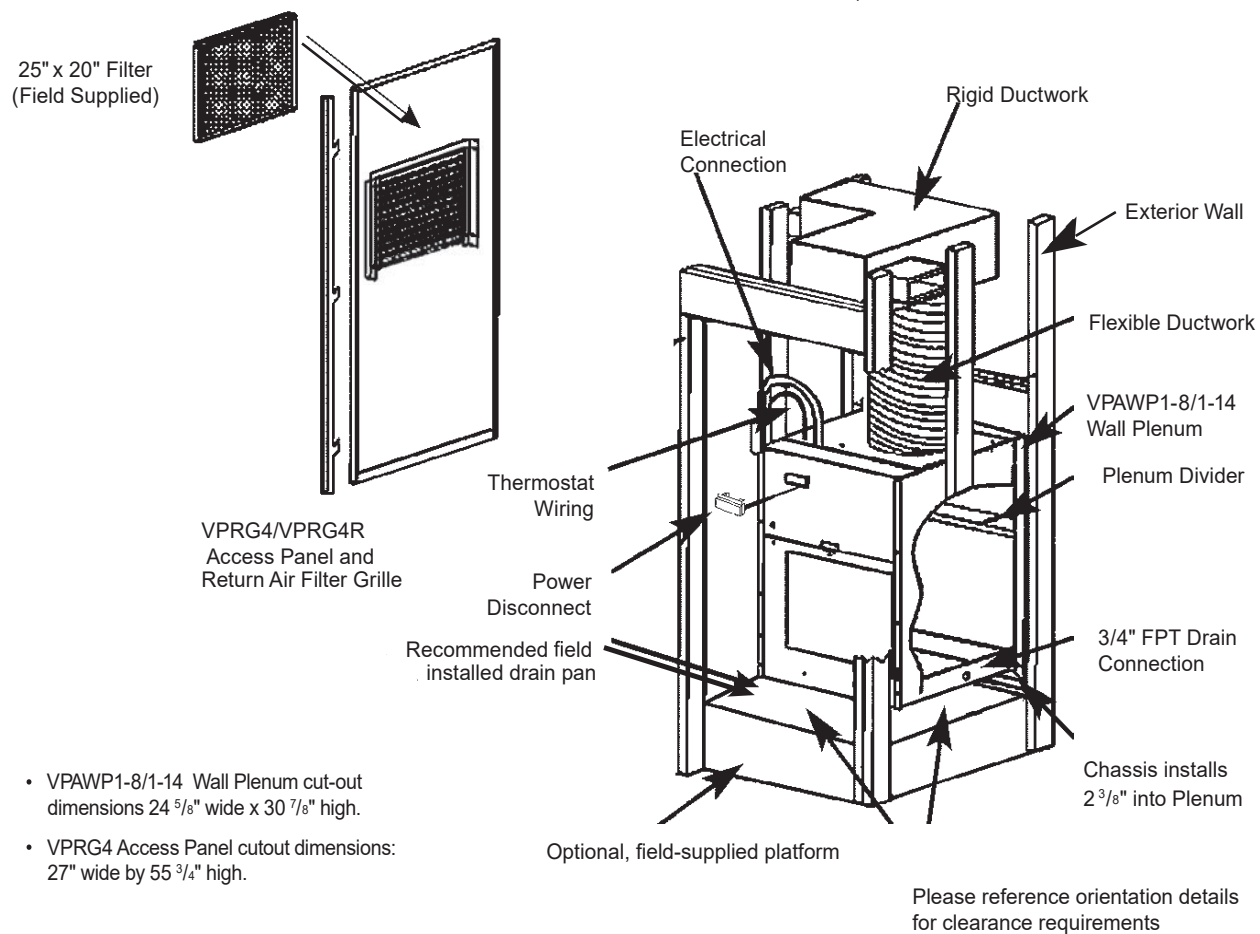


# Closet Orientations & Dimensions



# Closet View

## Example Closet



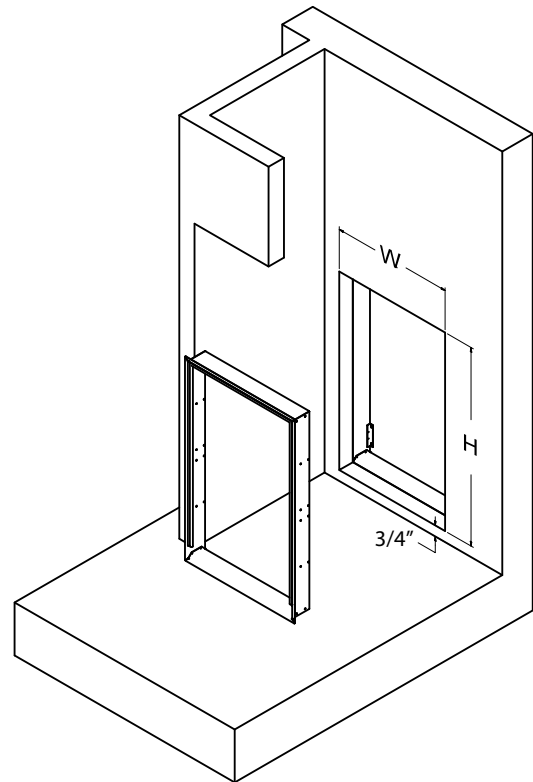
**NOTE:** It is recommended that 6" of clearance is provided on the side where the primary condensate is plumbed.



# Wall Opening Dimensions

## Exterior Wall Plenum Cut-Out

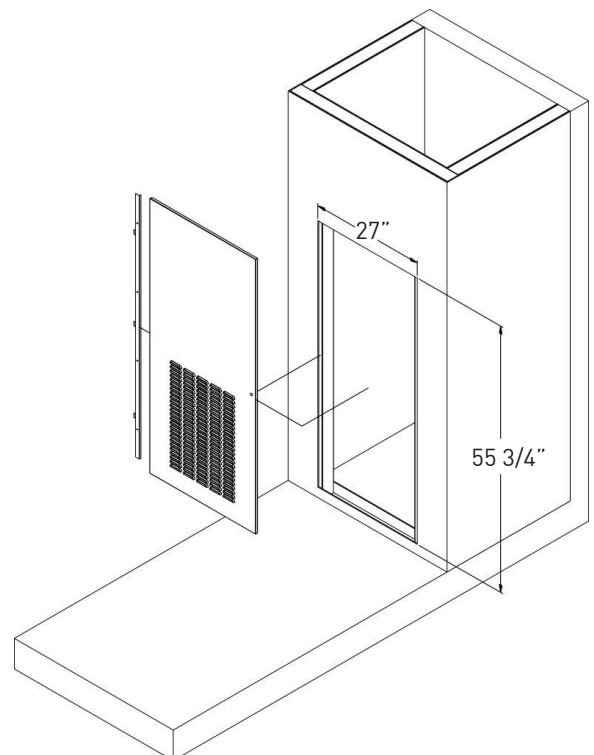
**Dimensions (W x H):**  
**24 5/8" x 30 7/8"**



**NOTE:** The distance between the rough opening and the finished floor/platform must be 3/4". If the installation will utilize an auxiliary drain pan it may not exceed 3/4" in height.

## Return Air Access Door Wall Cut-Out

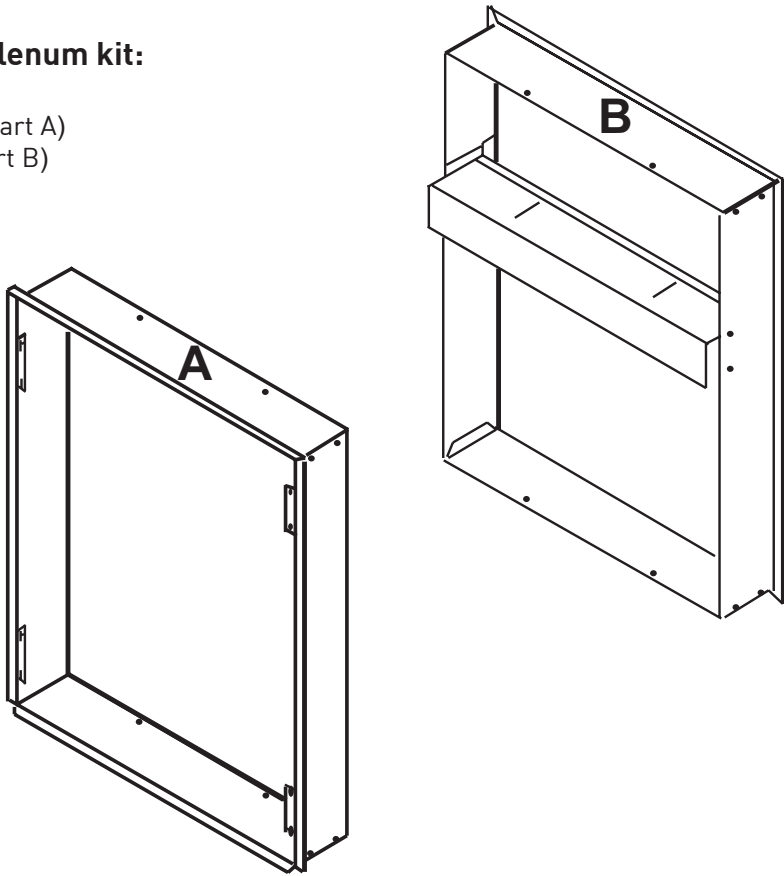
**Dimensions (W x H):**  
**27" x 55 3/4"**



# Wall Plenum Installation

**Parts included in Plenum kit:**

- Outside Plenum Half (Part A)
- Inside Plenum Half (Part B)



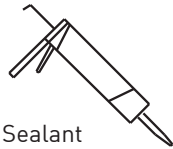
**Field Supplied Parts:**

Sealant, attachment screws, and flashing are field supplied. Silicone sealant is recommended.

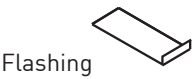
VPAWP-8 adjust for walls up to 4" - 8" thick.

VPAWP-14 adjust for walls up to 8" - 14" thick

All installations are similar.



Sealant



Flashing



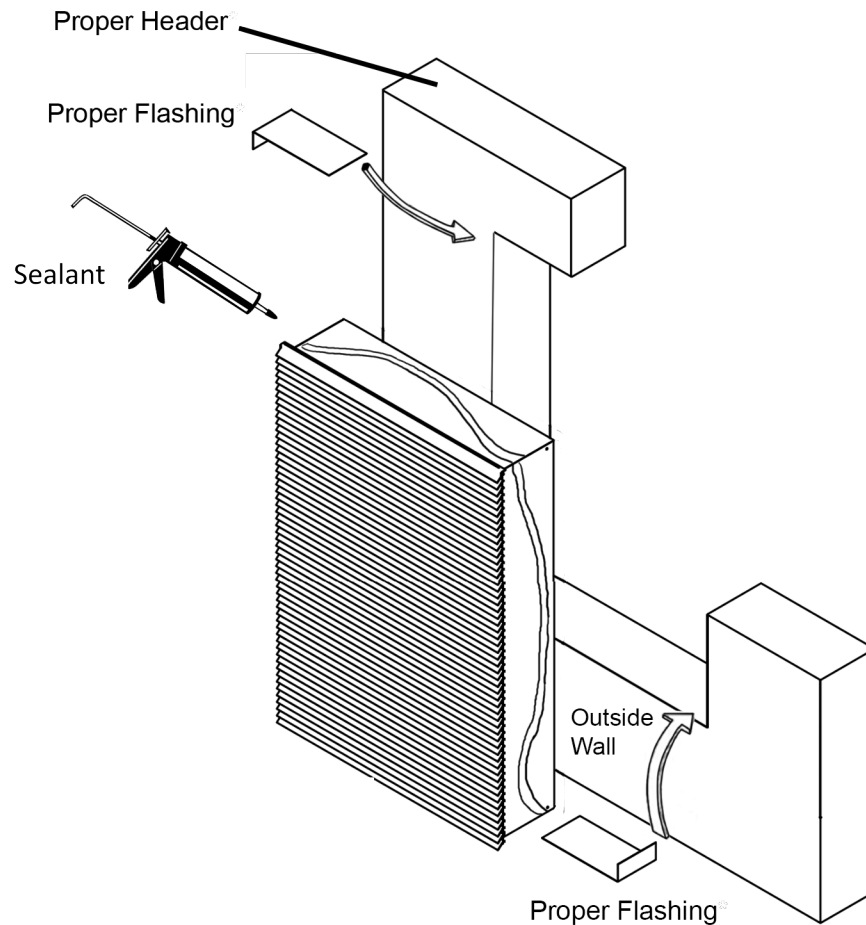
Shim



1"-3" screws to attach the plenum assembly to the wall studs

# Wall Plenum Installation

## Step 1 - Outside Wall Plenum Half

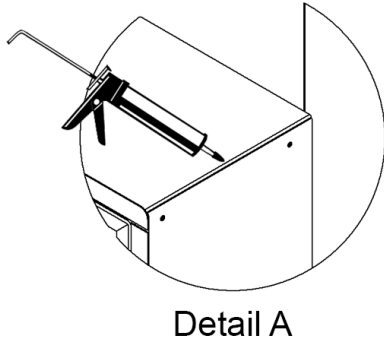


**Note: The wall plenum is not designed to carry any structural load. A load bearing header must be built above the rough opening.**

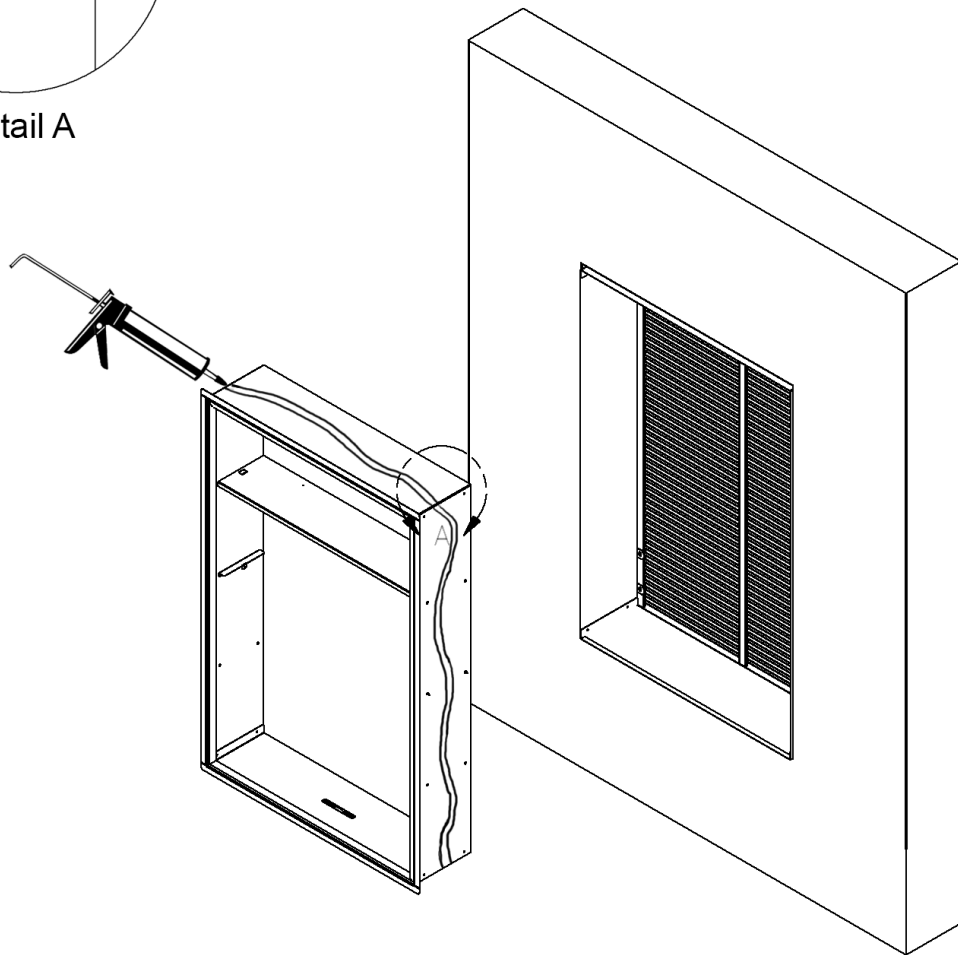
1. Prepare the rough opening. The rough opening should be lined with metal or wood. The plenum will warp if sealed against concrete or brick.
2. Dry fit the outside plenum half into the rough opening and check the fit and level.
3. Remove the outside plenum half, flash the rough opening to ensure proper fit and level.
4. Pre-installing the exterior louver (VPAL2) as shown above is optional (See Page 17).
5. Apply sealant to the outside plenum half and insert into the rough opening to ensure a water-tight seal. Ensure that the outside plenum half is securely attached to the framed opening.

# Wall Plenum Installation

## Step 2 - Inside Wall Plenum Half



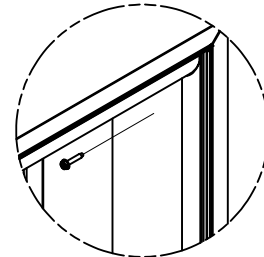
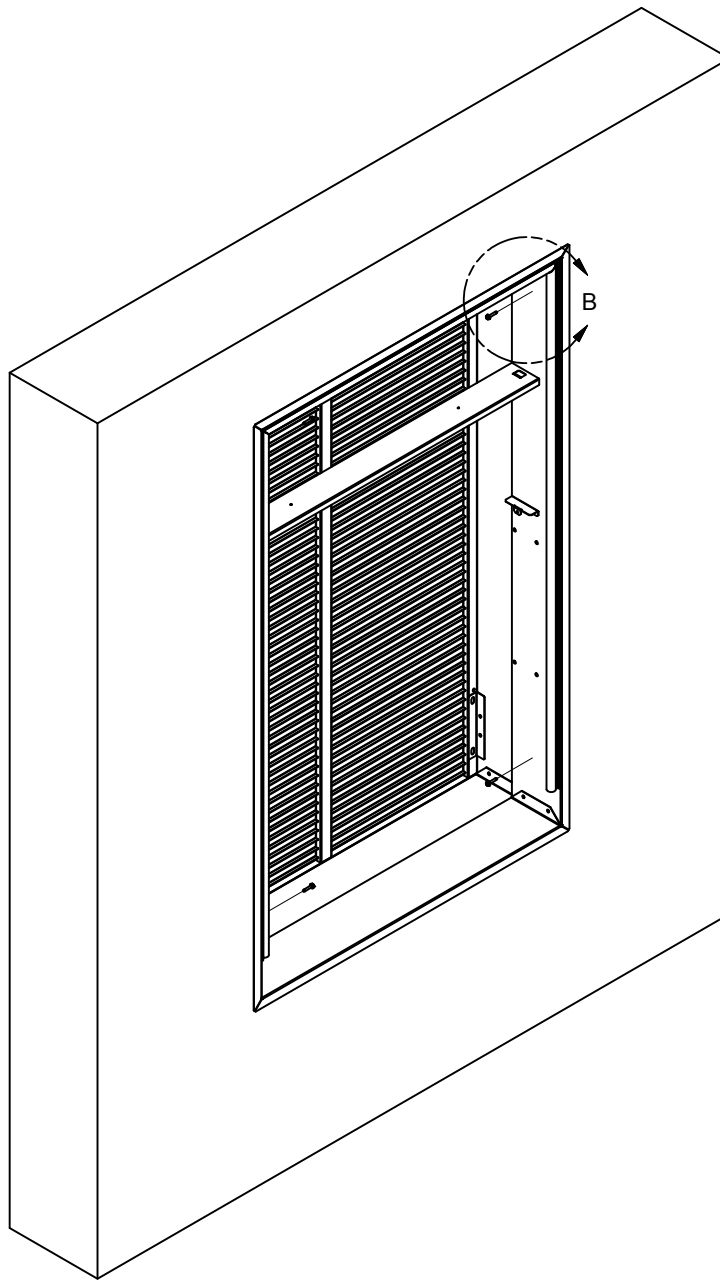
Apply Sealant to all 4 flange corners and unused holes.



1. Apply sealant to all 4 flange corners and unused holes. See Detail A.
2. Flash the inside of the rough opening to ensure the proper fit and level.
3. Insert inside plenum half (Part B) into outside plenum half (Part A). Ensure that Part A does not back out of the rough opening.
4. Remove the inside plenum half.
5. Apply sealant to the outside plenum half and insert into the rough opening to ensure a water-tight seal.

# Wall Plenum Installation

## Step 3 - Inside Wall Plenum (cont.)



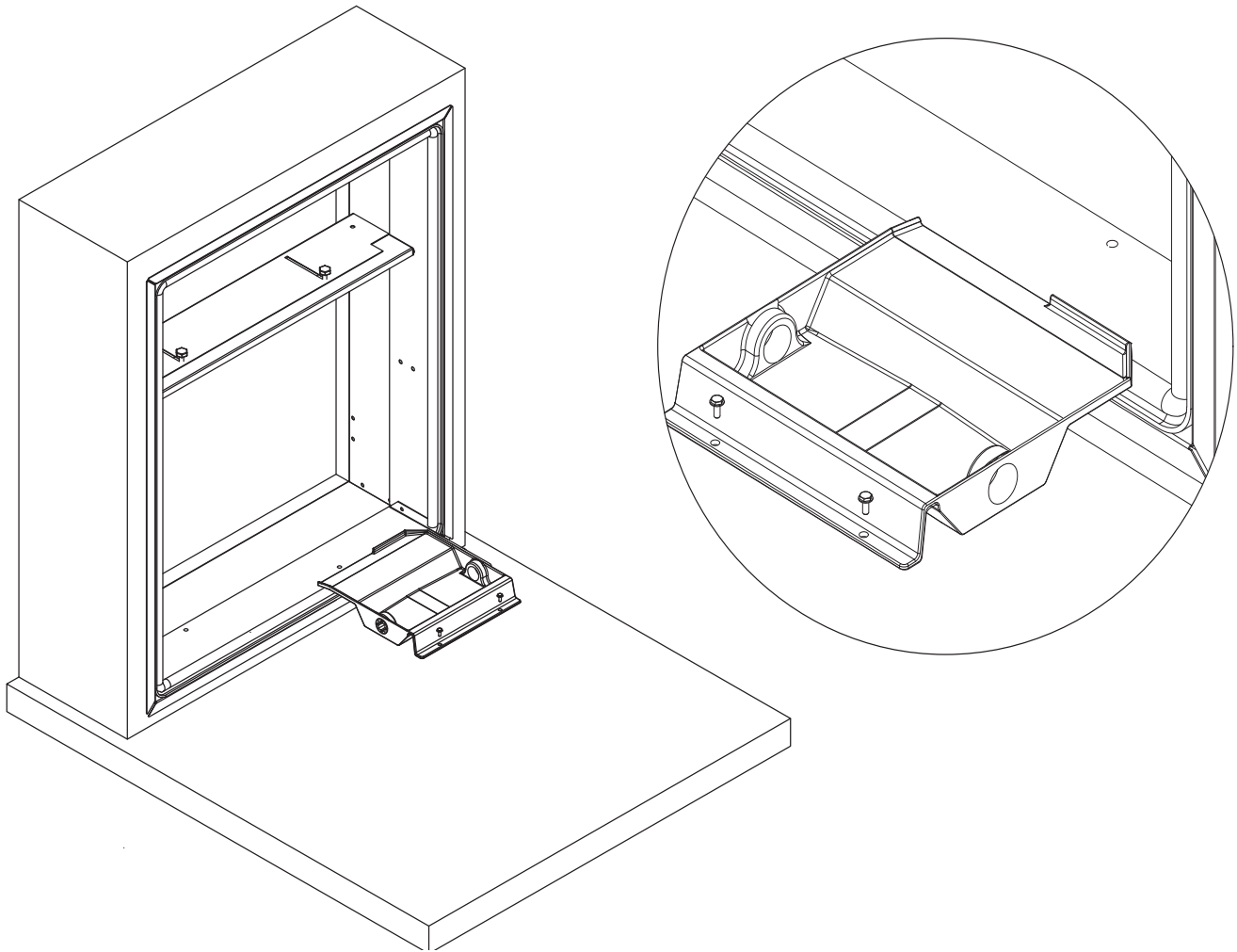
Detail B

**NOTE:** Do not place any screws, fasteners, or penetrating holes through the top or bottom of the plenum assembly.

1. Drill pilot holes on the interior of the inside plenum half (Part B) as show in Detail B. Pilot holes should be located approximately 4" from the top and bottom of the inside plenum half, on both the left and right sides.
2. Install fasteners through each pilot hole. Fastener must pass through both Part A and Part B. If the inside and outside plenum halves do not overlap at fastening point, be certain to drill extra holes where needed to secure both Part A and Part B to the rough opening.

# Wall Plenum Installation

## Step 3a - Inside Wall Plenum Half VHA18 & VHA24 Drain Kit Installation

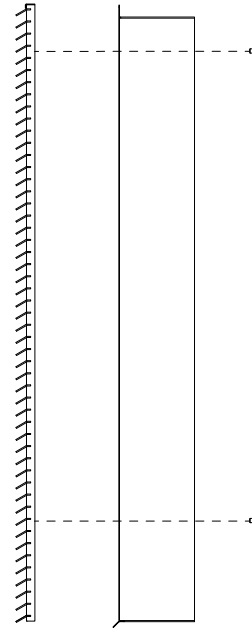
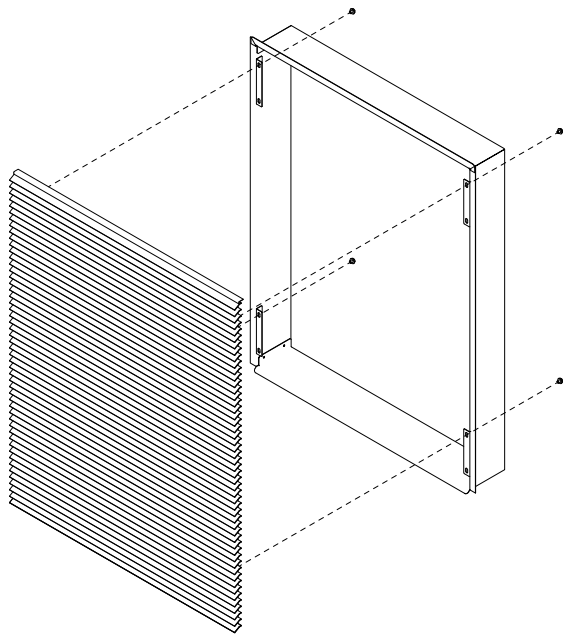


**Note: The VHA18 and VHA24 models require installation of the large chassis drain kit (VPDP2). Please reference the VPDP2 installation manual for more detailed instructions.**

1. Cut away gasket from the of the base of the inside wall plenum half the length of the drain kit beginning from the bottom right corner.
2. Place the VPDP2 where the gasket has been removed as shown above.
3. Ensure that the back lip of the VPDP2 is inserted no deeper than 1.5" into the exterior opening.
4. Secure the VPDP2 to the finished floor or platform.

# Louver Installation

## Installation of the louver PRIOR to wall plenum installation

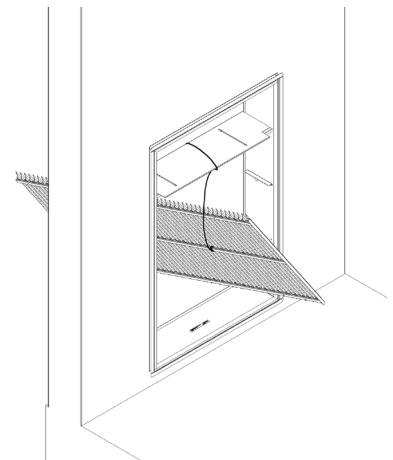


1. Hold the louver up to the outside plenum half (Part A) and line up the louver top with the very top edge of the  $\frac{3}{4}$ " flange.
2. Line up the wall plenum holes with the threaded holes in the louver and securely tighten fasteners.

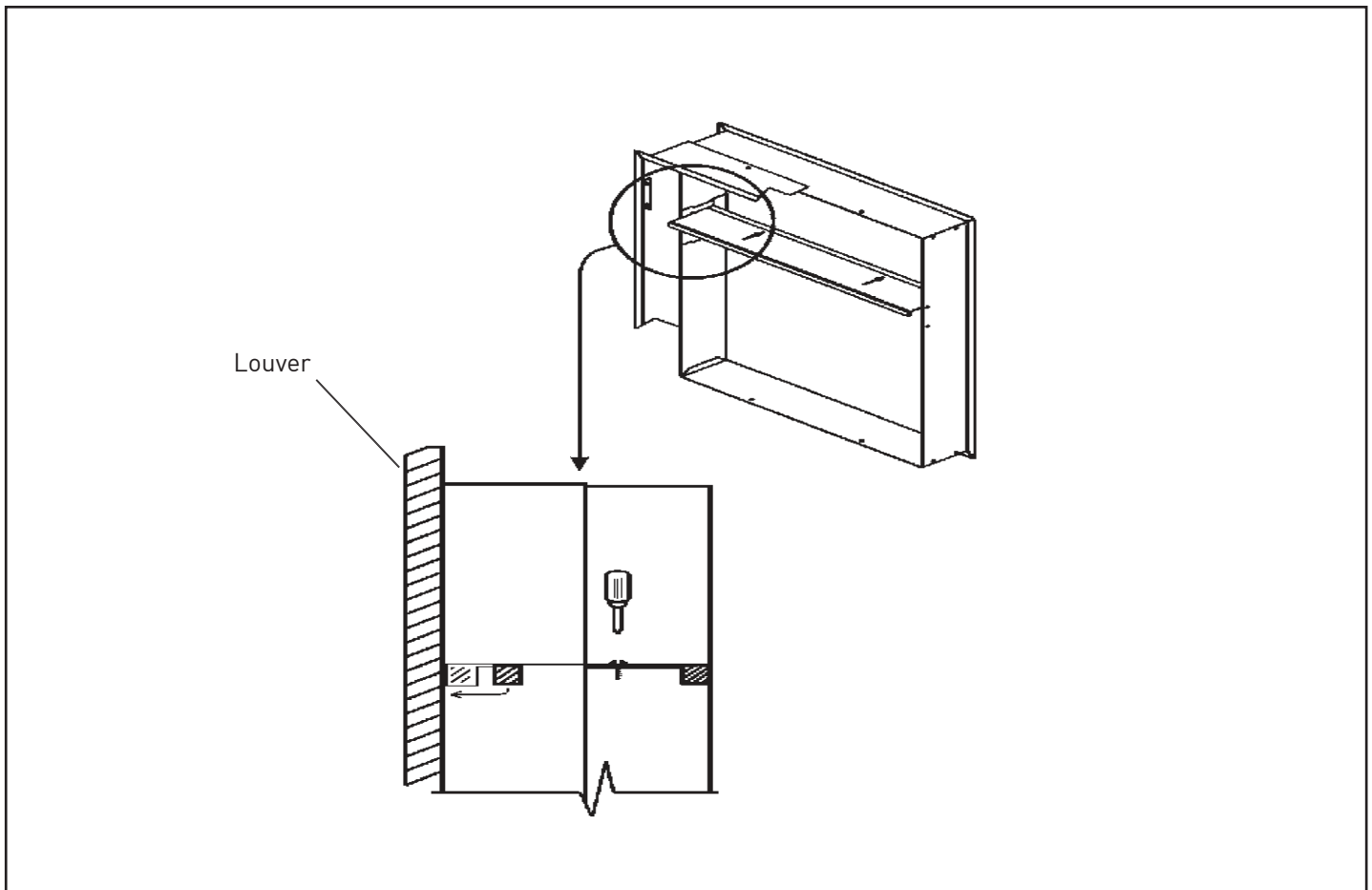
## Installation of the louver AFTER the installation of wall plenum on elevated floors

### From the interior of the utility closet:

1. Tie a rope or tether to the architectural louver and the divider in the wall plenum to prevent it from falling if dropped.
2. Turn the louver sideways and push the louver out below the divider in the wall plenum.
3. Pull the louver back against the wall plenum and align the holes.
4. Insert and tighten all eight provided fasteners. When the louver is secured, remove the safety tether.



## Final Wall Plenum and Architectural Louver Installation



**NOTE:** Ensure that the weather strip is undamaged and provides a continuous seal around the inner perimeter of the plenum.

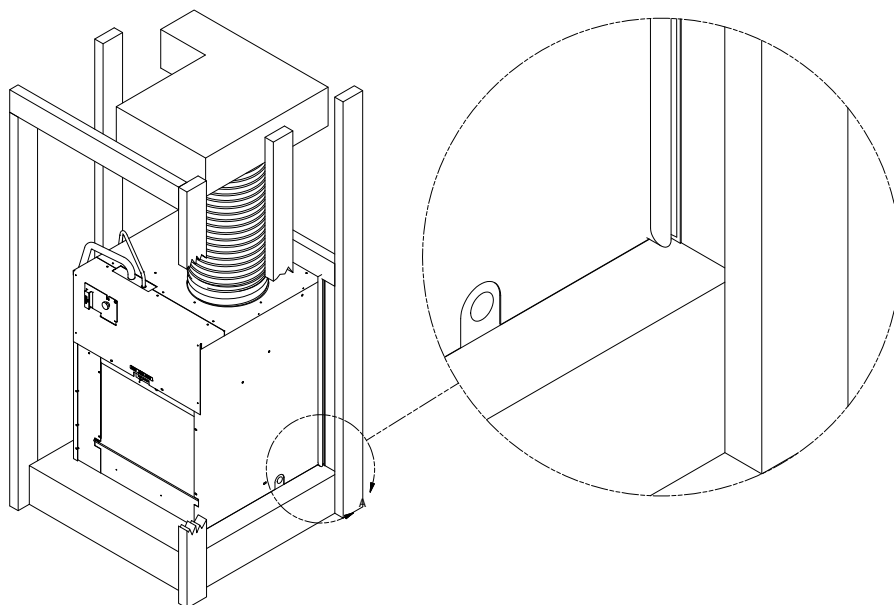
Apply silicone grease or other non-petroleum-based lubricants to the weather strip to enhance the sealing capability of the weather strip and ease installation of the air conditioner chassis.

1. Loosen the two set screws located on the top side of the divider.
2. Slide the top part of the divider toward the outside until the sealing strip makes contact with the exterior louver.
3. Tighten the set screws to complete the adjustment.

**NOTE:** Let all flashing cure completely before installing the chassis.







## Chassis Installation



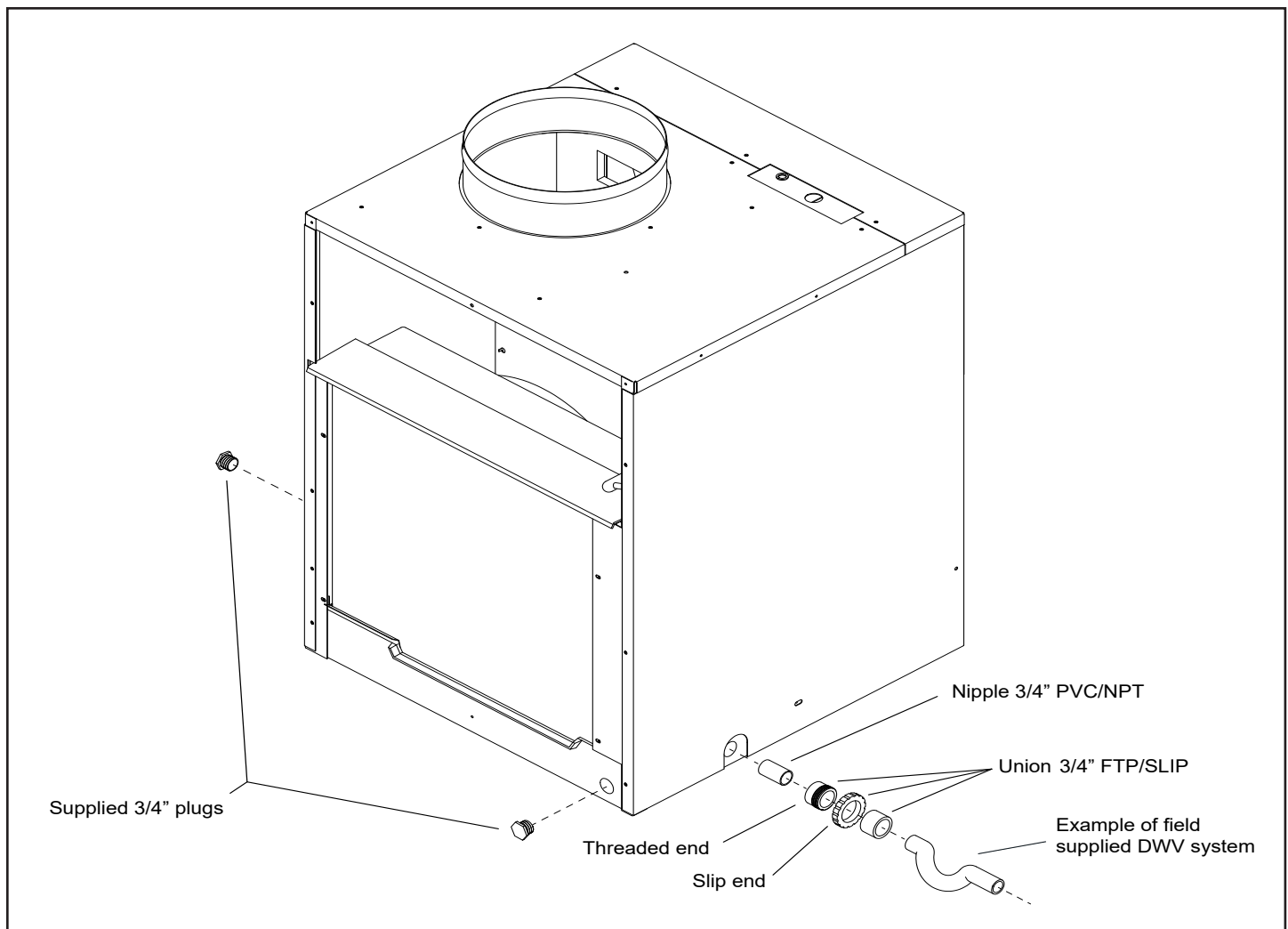
1. Ensure that the wall plenum and louver are installed in accordance with the instructions listed on pages 13-18.
2. Place the chassis into the closet with the outdoor side facing the wall plenum opening.
3. Slide the chassis into the wall plenum until the plenum divider seal is established.

**NOTE:** The Vert-I-Pak chassis must be inserted into the wall plenum so that the plenum divider gasket makes contact with the plastic condenser baffle on the unit. The chassis will fit approximately 2 3/8" into the wall plenum.

 <b>CAUTION</b>	
	<p><b>Cut/Sever Hazard</b></p> <p>Some edges may be sharp.</p> <p>Use gloves or other hand protection when handling the unit.</p> <p>Failure to do so can result in minor to moderate personal injury</p>

 <b>CAUTION</b>	
	<p><b>Excessive Weight Hazard</b></p> <p>Use two or more people when installing your air conditioner.</p> <p>Failure to do so can result in back or other injury.</p>

# Primary Drain Installation



**NOTE:** Failure to follow the following procedures may result in serious property damage. A field supplied secondary condensate pan or P-trap may be required. Check with local codes. In case of drainage system blockage, the unit base will allow excess water to flow out of the unit through the plenum and the architectural louver. It is critical to ensure that the drainage path is not blocked or obstructed in any way during installation.

1. The supplied drain kit must be connected to one of the three (left, right or rear) 3/4" FPT connections on the unit base pan. Use of rear fitting without connection to DWV system (drain, waste, vent) may result in staining of the outside wall.
2. Insert the provided 3/4" nipple into the determined connection using field-supplied Teflon tape or pipe joint compound.
3. With the slip end of a 3/4" union, connect to the nipple with Teflon tape or pipe joint compound.
4. Hand-tighten all fittings to prevent damage to unit or fittings.
5. Install a field-supplied drain system to the slip end of the union. A trap is recommended and drain connections should be connected to building DWV system. Pitch the drain line of a 1/4" downward slope for every foot (1') of lateral horizontal run to the DWV.
6. Plug the two unused connection ports with the two provided 3/4" pipe plugs with field-supplied Teflon tape or pipe joint compound. Hand tighten to prevent damage to the unit or fittings. Do not thread metal or copper pipe fittings directly into unit.
7. Check the system for leaks.

# Indoor Return Air Grille and Ductwork Installation



**Option 1**

**VPRG4/R Return Air Grille with Access Panel**

A field-supplied (25" x 20") can be mounted inside the hinged access door. The door can be installed with the grille oriented at the top of the panel for improved sound attenuation.



**Option 2**

**Field Supplied Return Air Grille**

A field supplied return air grille divorced from the access panel must have a minimum 250 square inches of free area.

**NOTE:** All Vert-I-Pak chassis are shipped with a 20" x 14" filter installed. If a different filter holder or location is to be used, the filter on the chassis **MUST** be removed.

## Ductwork

The supply duct system should be designed using a recognized method such as the equal fraction or velocity reduction method, using the appropriate duct calculator(s) for the type(s) of duct being used in the system. The duct system should be designed for a maximum friction rate of 0.3" with the VHA09 & VHA12, and 0.4" with the VHA18 & VHA24. water column taking into consideration all fittings, registers and/or diffusers.

**NOTE;** Do not operate the unit without a supply duct attached. The return air to the Vert-I-Pak unit **MUST NOT** be ducted and all units must have a free return air configuration to perform properly.

# Remote Thermostat and Low Voltage Control Connection

## Remote Thermostat

All Friedrich Vert-I-Pak units are factory configured to be controlled by using a single stage heat/cool remote wall mounted thermostat. The thermostat may be auto or manual changeover as long as the control configuration matches that of the Vert-I-Pak unit.

### To connect the wall mounted thermostat:

1. Pull the disconnect switch.
2. Unscrew and remove the control box panel.
3. Select which side to run your thermostat wire.
4. Run the wires through the side hole in the box to reach the connection terminal wiring.
5. Make the connections, appropriately matching the wires as shown in the wiring diagram.
6. Reattach the control box cover.

## Front Desk Control Terminals

The Friedrich Vert-I-Pak has built-in provisions for connection to an external switch to control power to the unit. The switch can be a central desk control system door switch.

For desk control operation, connect on side of the switch to the D1 terminal and the other to the D2 terminal. When the circuit is closed, unit operation will stop.

**NOTE:** The desk control system and switches must be field supplied.

## Maximum Wire Length for Desk Control Switch

AWG Wire Size	Maximum Length (ft.)
24	400
22	600
20	900
18	1500
16	2000

## Auxiliary Fan Control

The Friedrich Vert-I-Pak also has the ability to control a 24VAC relay to activate an auxiliary or transfer fan. The outputs are F1 and F2 on the control board.

To connect the relay, simply wire one side of the relay to F1 and the other side to F2.

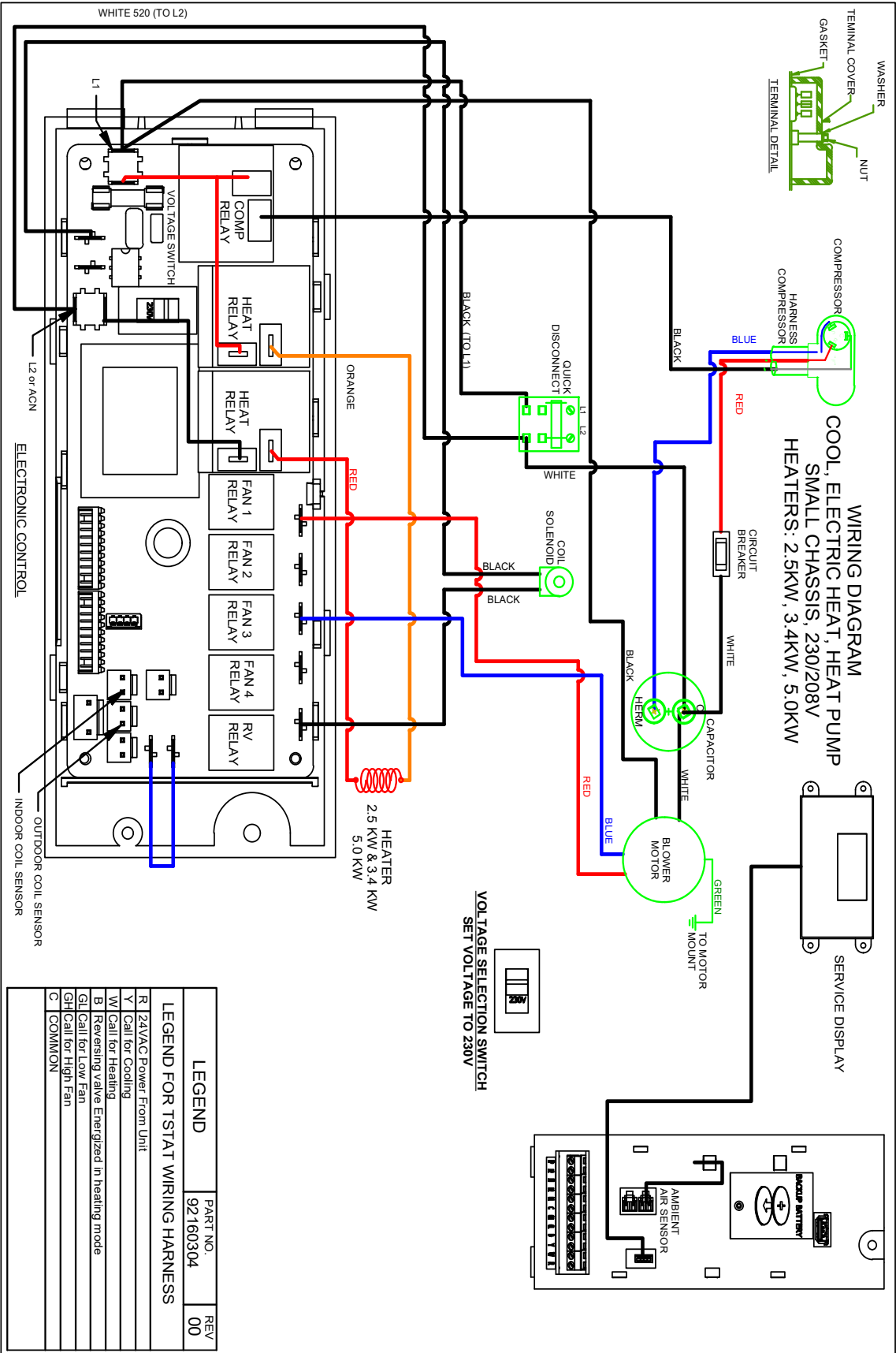
**NOTE:** The relay and auxiliary fans must be field supplied. The relay must be 24VAC @ 100mA or less.

## Interface Definition

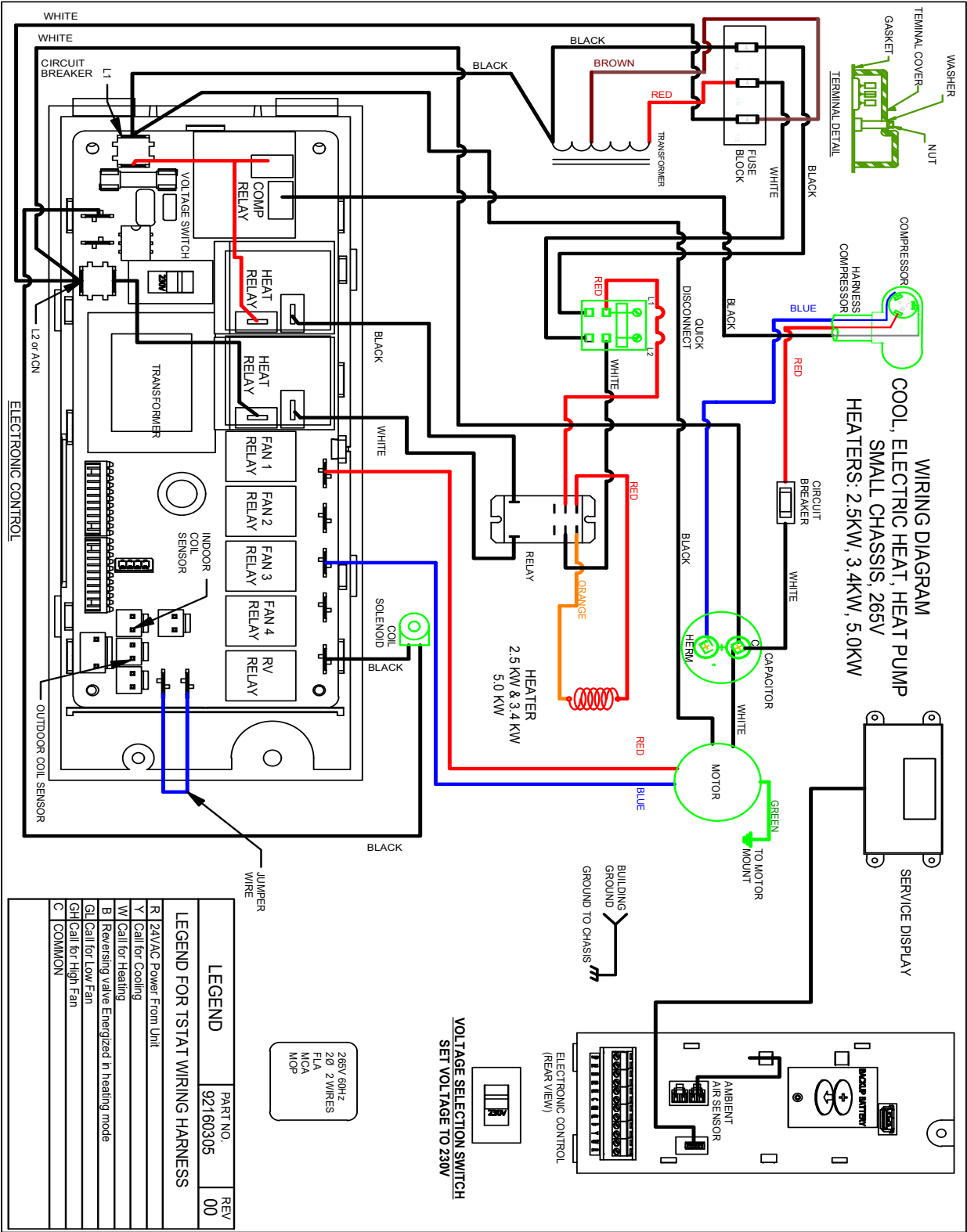
Terminal Code	Wire Connection Function
C	Common Ground Terminal
GH	Call for High Fan
GL	Call for Low Fan
B	Call for Heat Pump (Reversing Valve)
Y	Call for Compressor
W	Call for Heating (Electric)
R	24VAC to Wall Thermostat

**NOTE:** It is the installer's responsibility to ensure that all control wiring connections are made in accordance with the installation instructions. Improper connection of the thermostat control wiring and/or tampering with the unit's internal wiring can void the equipment warranty and may result in property damage, personal injury, or death. Questions concerning proper connections to the unit should be directed to the factory.

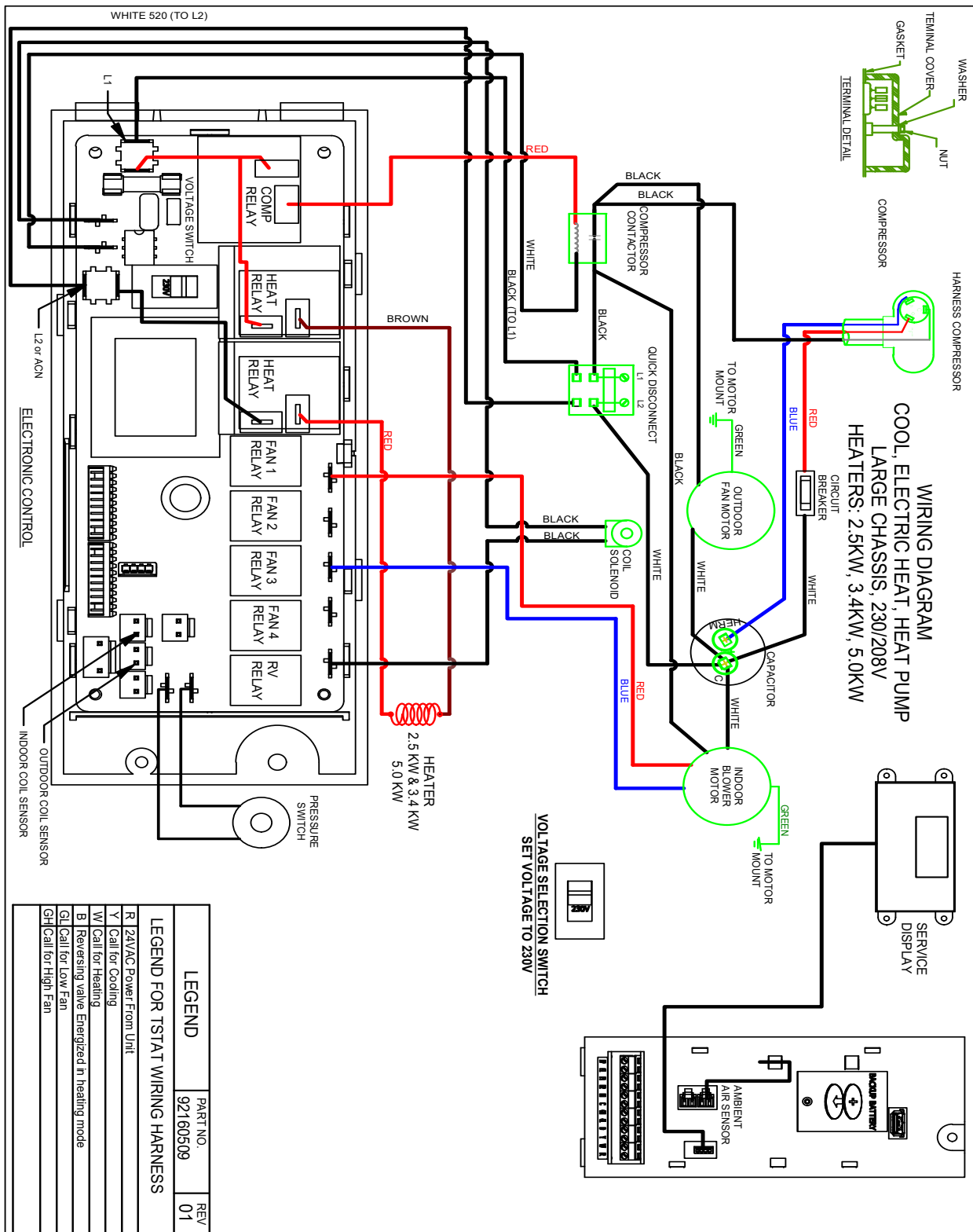
# VHA09 & VHA12 208-230 Electrical Wiring Diagram



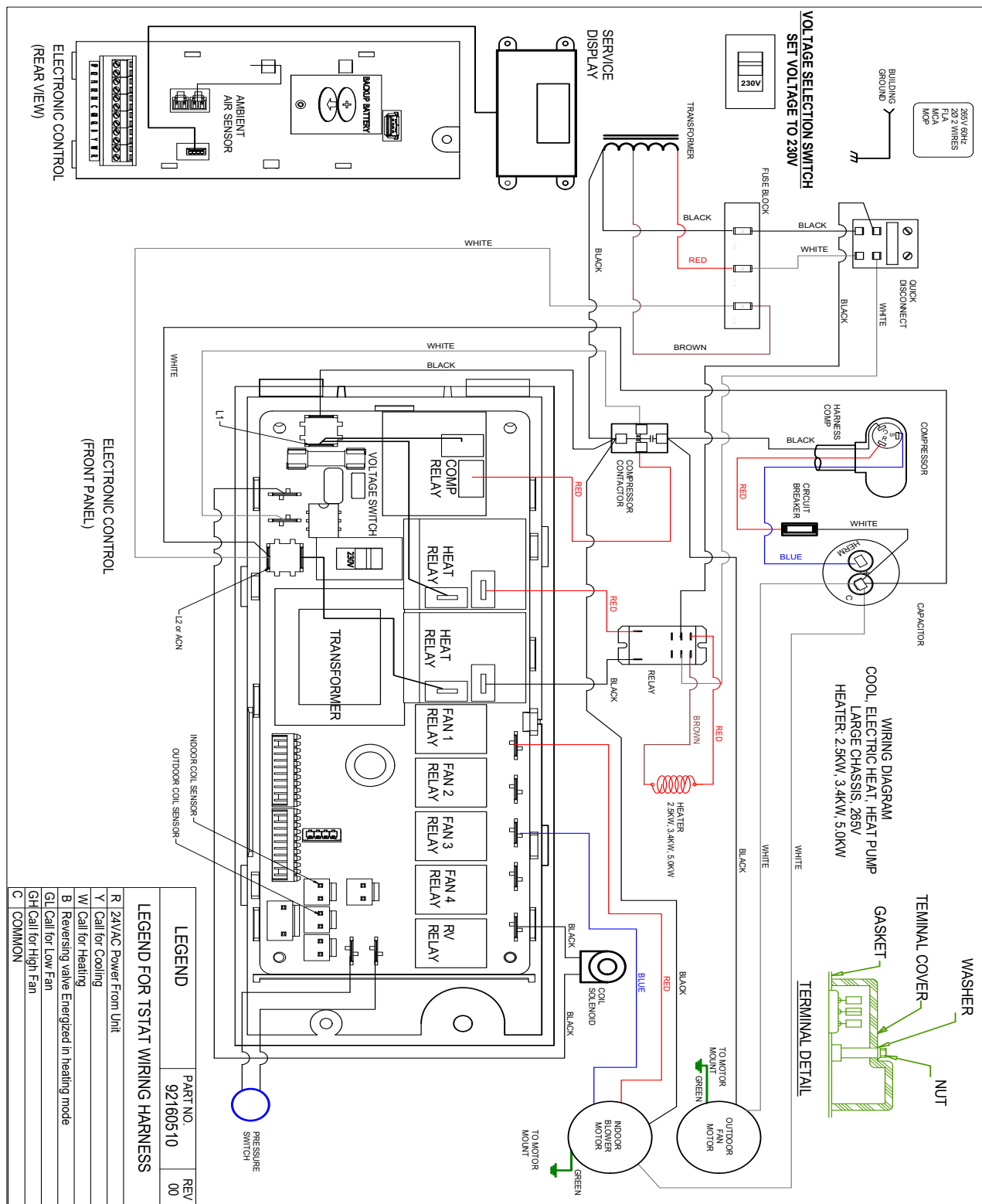
# VHA09 & VHA12 265 Electrical Wiring Diagram



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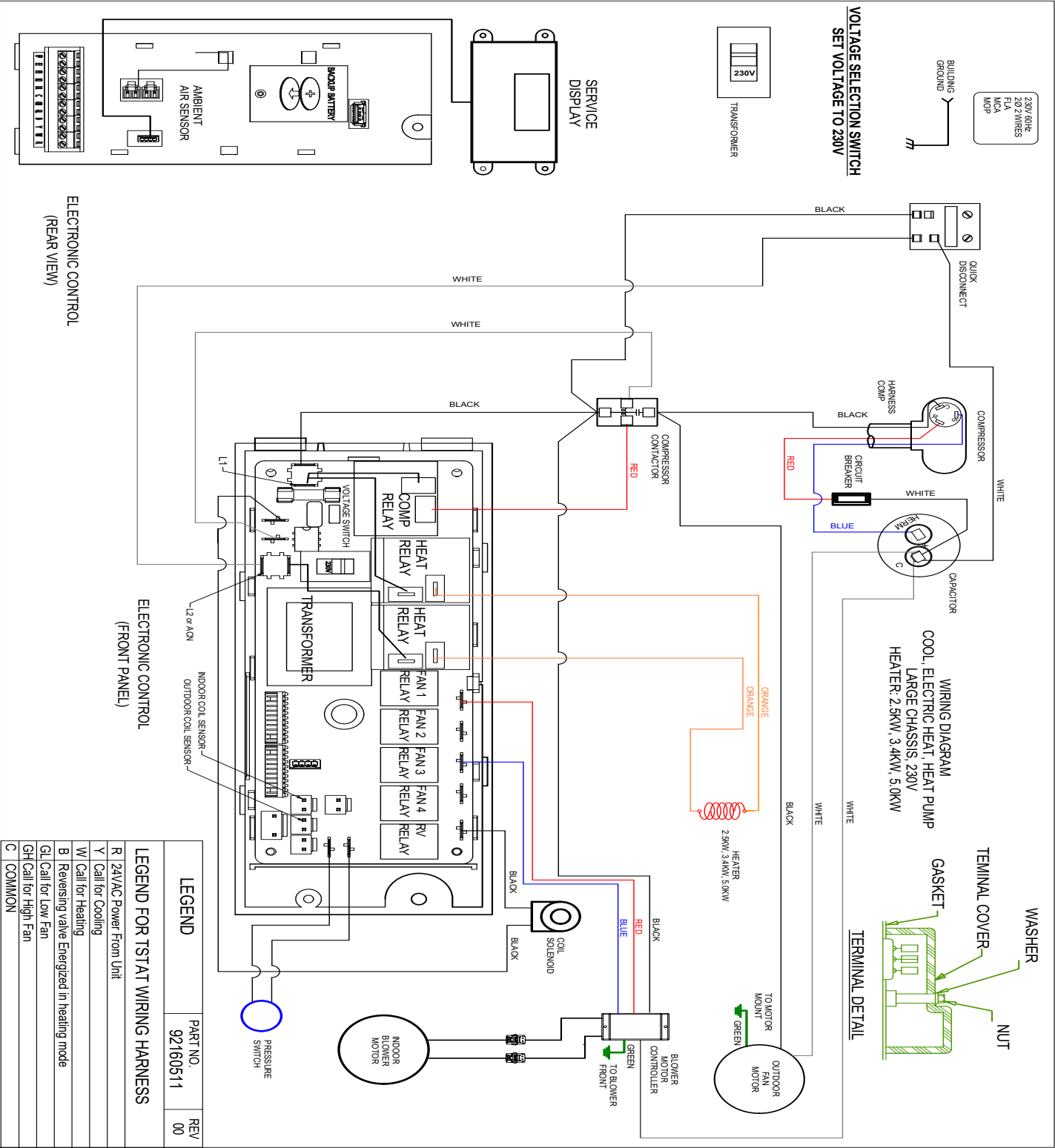


# VHA18 265 Electrical Wiring Diagram

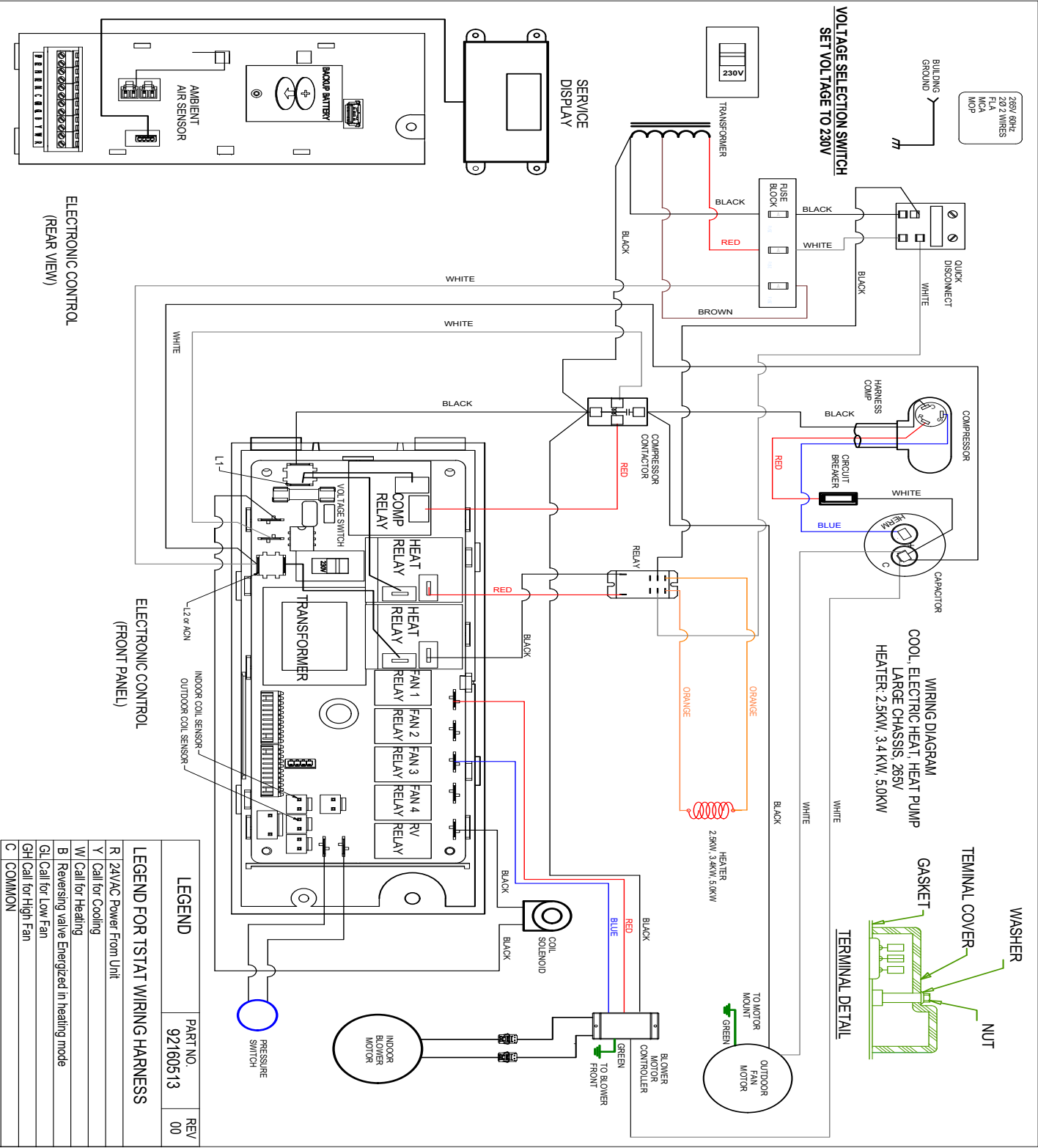




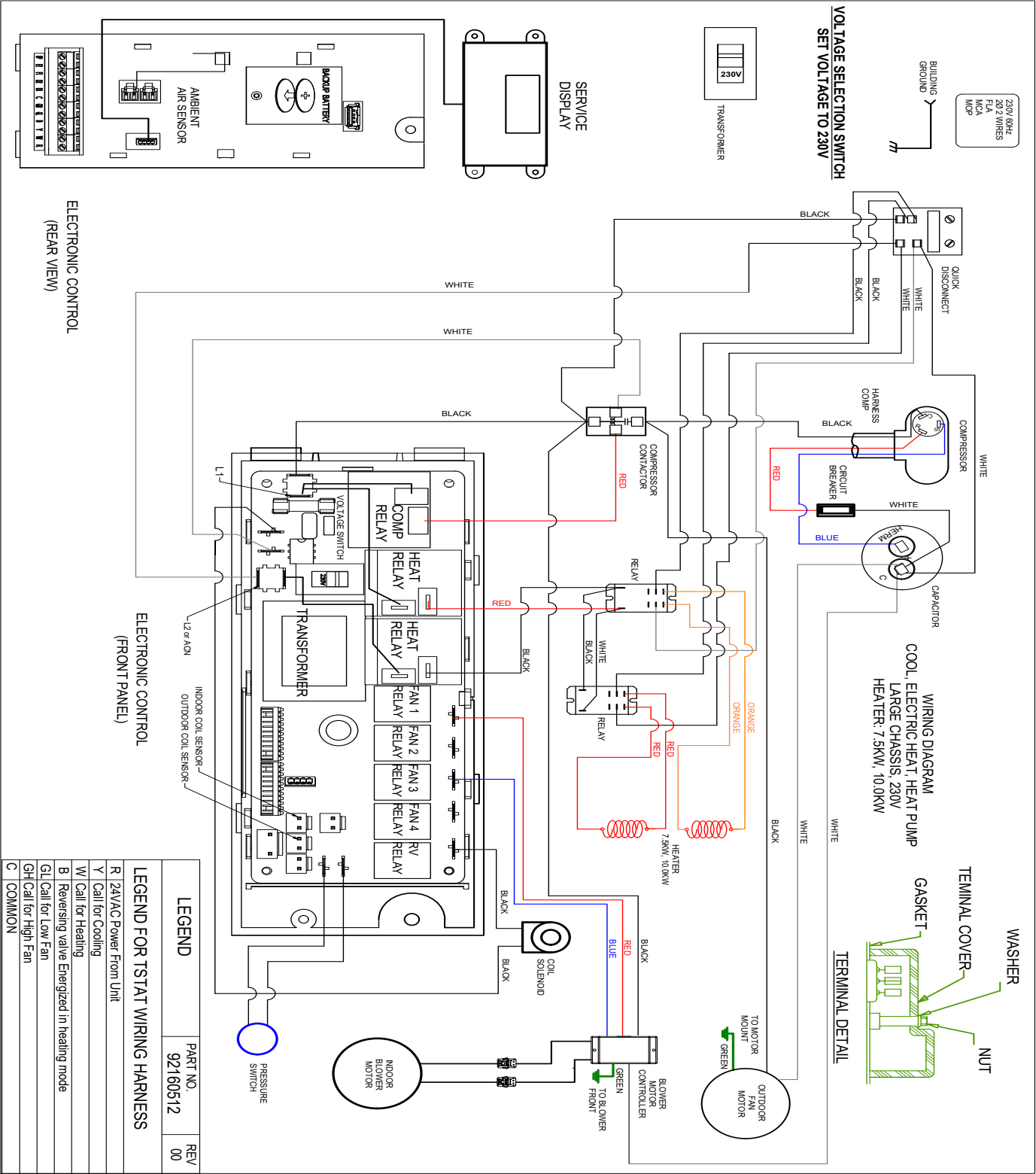
# VHA24 208-230 Electrical Wiring Diagram (2.5kW/3.4kW/5.0kW)



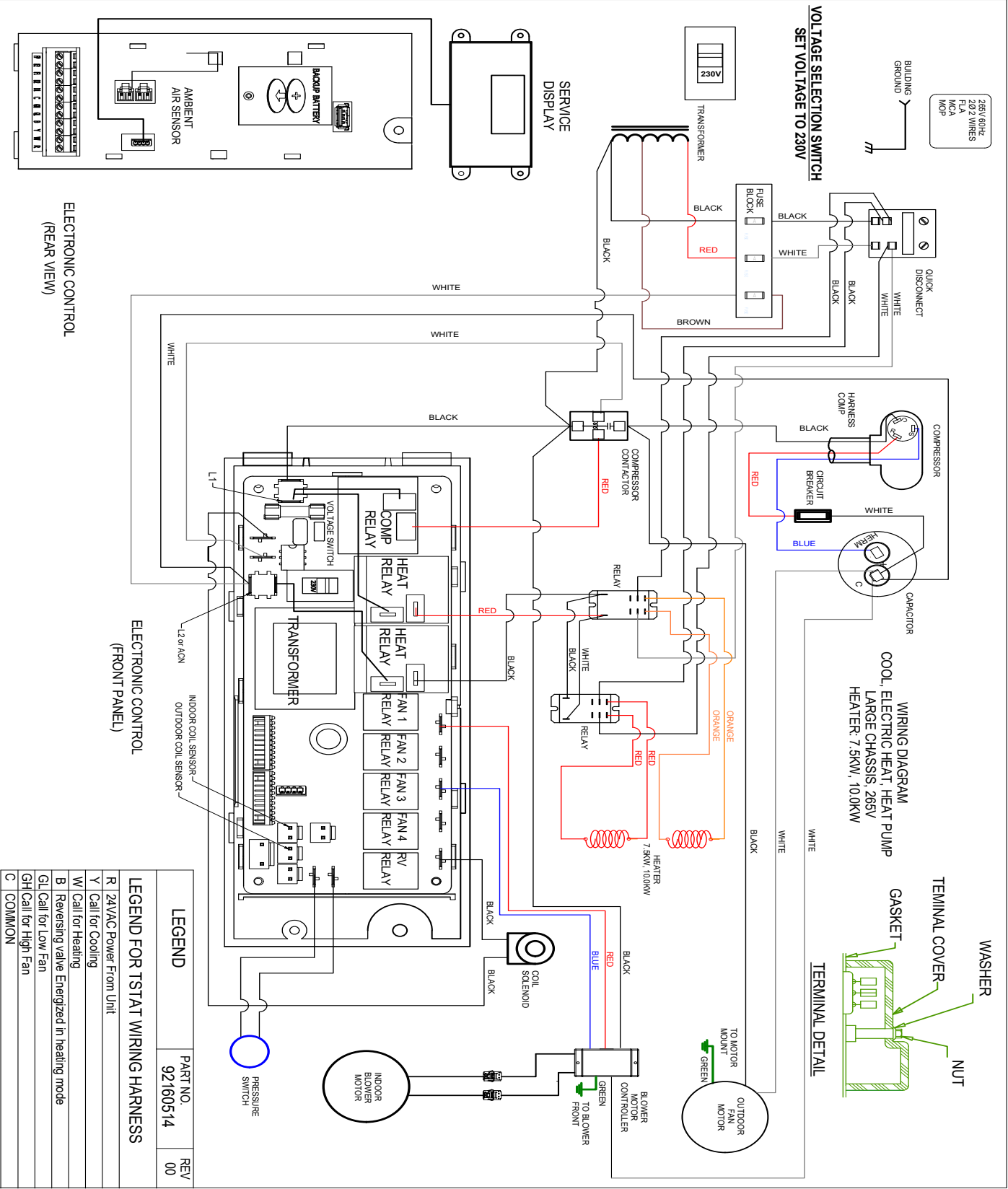
# VHA24 265 Electrical Wiring Diagram (2.5kW/3.4kW/5.0kW)




# VHA24 208-230 Electrical Wiring Diagram (7.5/10.0kW)



# VHA24 265 Electrical Wiring Diagram (7.5/10.0kW)



# Final Installation Checklist

⚠ WARNING	
	<p><b>Electrical Shock Hazard</b></p> <p>Pull out electrical disconnect on front of the chassis and turn off all power to the unit before servicing.</p> <p>Failure to do so can result in property damage, personal injury and/or death.</p>

- Inspect and ensure that all components and accessories have been installed properly and that they have not been damaged during the installation process.
- Ensure that all installation instructions concerning clearances around the unit have been adhered to.
- Check to ensure that the unit air filter, indoor coil, and outdoor coil are free from any obstructions.
- Ensure that the circuit breaker(s) or fuse(s) and supply circuit wire size have been sized correctly.
- Check the condensate water drain(s) to ensure that they are adequate for the removal of condensate water and that they meet approval of the end user.
- Ensure that the entire installation is in compliance with all applicable national and local codes and ordinances having jurisdiction.
- **ENSURE THAT THE SUPPLY VOLTAGE TO THE UNIT IS WITHIN THE OPERATING RANGE**
- Secure all access panels (i.e. front cover and/or control box), apply power to the unit. The unit commissioning should be done at this time to ensure unit function.

**NOTE: Maintaining a log for recording the dates of maintenance and/or service is recommended, and should be suggested to the owner or operator of the equipment.**

- Present the owner or operator of the equipment with the Installation & Operation Manual, all accessory installation instructions, and the name, address and telephone number of the Authorized Friedrich Warranty Service Company in the area for future reference if necessary.

**NOTE:** The unit is not designed to guarantee continuous operation with outdoor ambient conditions greater than 115F.

## Chassis Operation

### Fresh Air Door

The fresh air door is an “intake” system. It is opened via a slide mechanism on the front of the chassis located just above the indoor coil. Move the slide left to open and right to close the door. The system is capable of delivering up to 60 CFM of outdoor air.

### Low Ambient Compressor Cut Out

Each chassis is equipped with low ambient protection that is determined by thermistor feedback. The feedback will prevent the compressor from operating at low suction temperatures.

### Room Freeze Protection


This feature will monitor the indoor room conditions and in the event that the room falls below 40F, the unit will cycle on high fan with the electric heater. This occurs regardless of mode.

⚠ WARNING
<p>This equipment is not intended for use during construction. The use of equipment during construction could result in premature failure of the components and/or system and is in violation of our standard warranty guidelines and may result in the suspension or termination of the warranty.</p>

# Service & Warranty


## Servicing / Chassis Quick Change Outs

The chassis is designed for quick disconnect and change out. For minor electrical service, the control box cover lifts straight up after the screws and disconnect pull-out are removed. For major electrical, refrigeration, and fan service the chassis should be removed from the utility closet.

<b>⚠ WARNING</b>	
	<p><b>Electrical Shock Hazard</b> Pull out electrical disconnect on front of the chassis and turn off all power to unit before servicing. Failure to do so can result in property damage, personal injury and/or death.</p>

## Routine Maintenance Performing Routine Maintenance

With proper maintenance and care, your system will operate economically and dependably. Maintenance can be accomplished easily by referring to the following directions. However, before performing any maintenance, see above stated WARNING.

<b>⚠ CAUTION</b>	
	<p><b>Cut/Sever Hazard</b> Some edges may be sharp, use gloves or other hand protection when handling unit. Failure to do so can result in minor to moderate personal injury.</p>

## Replace Air Filter

A dirty air filter reduces the efficiency of your Vert-I-Pak unit and allows lint and dirt to accumulate on the indoor coil. Lint and dirt on the indoor coil can damage your unit. The air filter should be replaced as it becomes dirty. To replace the chassis mounted return air filter:

1. Slide the holders away from the filter.
2. Remove the filter.
3. Install a new disposable filter.
4. The unit filter size is 20" x 14" x 1"

**NOTE: DO NOT OPERATE YOUR SYSTEM WITHOUT A FILTER IN PLACE OR BLOCK THE FRONT OF THE UNIT RETURN AIR OPENING.**

## To Remove the Chassis from the Closet:

1. Switch the unit off at the thermostat.
2. Disconnect the power coming into the unit from the main breaker panel or the closet mounted disconnect.
3. Disconnect the electrical connection.
4. Disconnect the duct work.
5. Slide the chassis out of the wall plenum.
6. Slide and slightly lift the chassis out of the utility closet.

## Inspect and Clean Indoor Air Coil

Eventually, minor amounts of lint and dirt may pass through the filter and collect on the indoor-air coil. These minor accumulations can be carefully vacuumed away with a brush attachment on a vacuum cleaner. Care must be taken to avoid bending the aluminum fins on the coil. Bent fins should be straightened using a special fin tool available from most HVAC supply depots.

## Inspect Outdoor Air (OA) Intake and Exhaust

The unit's outdoor-air intake and outdoor-air exhaust paths must remain clear. Keep it free of all debris, snow, or ice. The OA intake should also be kept free of obstructions. Blocking the OA exhaust or OA intake opening will reduce the efficiency of your unit and could damage it.

## Inspect and Clean Condensate Drain

The condensate drain must be routed to a suitable drainage area. Check the unit condensate drain periodically. Keep it free of anything that may block or impede the flow of condensate water. If there is any accumulation of foreign matter in the drain pipe, it should be removed and cleaned. The entire drain line must be protected from freezing.

## Warranty

All warranty service work must be done by an authorized servicer. See Product Warranty, and consult your dealer or contractor for details.

## Electronic Control Error Code Diagnostics and Test Mode

### Error Code Diagnostics

The electronic control continuously monitors the Vert-I-Pak unit operation and will store error codes if certain conditions are observed. In some cases the unit may take action and shut the unit off until conditions are corrected.

To access the error code menu press the 'ENTER' button. If error codes are present they will be displayed. If multiple codes exist you can toggle between error codes using the 'SCROLL' button.

# Diagnostic Error Codes

## Unit Control Panel

The display has four (4) digits. The left two digits indicate the error code (1-24) and the "On/Off" icons above these digits indicate the current state of the error code. The right two digits show the history count (up to 99) of the associated error. The display contains a maintenance icon (wrench) that will illuminate when the unit requires maintenance.

Code	Description	Action
1	Front panel button stuck for more than 20 seconds	Continue to monitor for "open" switch.
2	Input voltage out of specification	Unit stops and opens all relays until voltage is back within specification.
3	Indoor temperature sensor open or shorted	The unit defaults the sensor to 75F in COOLING and 68F in HEATING and continues operation.
4	Indoor coil temperature sensor is open or shorted	The unit defaults the sensor to 40F and continues operation.
5	Outdoor coil temperature sensor is open or shorted	The unit defaults the sensor to 20F and continues operation. The unit will default to electric heat in HEATING if available.
6	Outdoor coil > (greater than) 175F	The unit will shut down for 5 minutes then resume operation. If the failure occurs three times the severity is increased and unit operation is locked out.
7	Indoor coil < (less than) 30F for 2 consecutive minutes	The compressor will turn off and the high fan speed will run. When the coil temperature rises above 45F the unit will resume normal operation.
8	Unit cycles > (greater than) 9 times per hour	The unit will continue to operate and be monitored.
9	Unit cycles < (less than) 3 times per hour	The unit will continue to operate and be monitored.
10	Room freeze protection	Only applicable when electric heat is available. Will run high speed fan and electric heat until the room temperature reaches 46F. The unit will display "FRZ" during operation. Logged only.
11	Thermostat or connection issue	The unit will not operate
12	Not Applicable	Not Applicable
13	High pressure limit switch is open ***Applies to 24000 BTU/hr units only	Compressor is turned off and high speed fan is run until the switch closes. 3 occurrences within an hour will lock out unit operation.
14	Not Applicable	Not Applicable
15	Heat pump error	If the indoor coil temperature is less than the ambient temperature for 3 minutes the unit will use electric heat to satisfy heating demand.
16	Temperature beyond operating limits	Occurs if the ambient temperature falls below 0F or above 130F. The unit is turned off until the temperature returns within operating range then continues normal operation.
17	Minimum configuration not met	The compressor must be enabled and have at least 2 fan speeds
18	Not Applicable	Not Applicable
19	Not Applicable	Not Applicable
20	Not Applicable	Not Applicable
21	Not Applicable	Not Applicable
22	Outdoor coil temperature < 30F for 2 consecutive minutes	Unit will use electric heat to satisfy heating demands until the coil temperature rises above 45F. Applicable for heat pump models only.
23	Frost protection	Unit will run active defrost for a minimum of 6 minutes when the heat pump run-time is greater than 60 minutes and the outdoor coil temperature is 26F or less.
24	Not Applicable	Not Applicable



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## VERT-I-PAK® A SERIES SINGLE PACKAGE VERTICAL AIR CONDITIONERS LIMITED WARRANTY

**SAVE THIS CERTIFICATE.** It gives you specific rights. You may also have other rights which may vary from state to state and province to province.

In the event that your unit needs servicing, contact your nearest authorized service center. If you do not know the nearest service center, ask the company that installed your unit or contact use - see address and telephone number above. To obtain service and/or warranty parts replacement, you must notify an authorized FRIEDRICH Air Conditioning Co. service center, distributor, dealer, or contractor of any defect within the applicable warranty period.

**When requesting service:** please have the **model** and **serial number** from your unit readily available.

**Unless specified otherwise herein, the following applies:**  
**FRIEDRICH VERT-I-PAK A SERIES HEAT PUMPS & AIR CONDITIONERS**

**LIMITED WARRANTY - FIRST YEAR (Twelve (12) months from the date of installation).** Any part found to be defective in the material or workmanship will be repaired or replaced free of charge by our authorized service center during the normal working hours; and

**LIMITED WARRANTY - SECOND THROUGH FIFTH YEAR (Sixty (60) months from the date of installation). ON THE SEALED REFRIGERATION SYSTEM.** Any part of the sealed refrigeration system that is defective in material or workmanship will be repaired or replaced free of charge (excluding freight charges) by our authorized service center during normal working hours. The sealed refrigeration system consists of the compressor, metering device, evaporator, condenser, reversing valve, check valve, and the interconnecting tubing.

**These warranties apply only while the unit remains at the original site and only to units installed inside the continental United States, Alaska, Hawaii, Puerto Rico, Mexico and Canada. The warranty applies only if the unit is installed and operated in accordance with the printed instructions and in compliance with applicable local installation and building codes and good trade practices. For international warranty information, contact the Friedrich Air Conditioning Company - International Division.**

Any defective part to be replaced must be made available to **FRIEDRICH** in exchange for the replacement part. Reasonable proof must be presented to establish the date of install, otherwise the beginning date of this certificate will be considered to be our shipment date plus sixty days. Replacement parts can be new or re-manufactured. Replacement parts and labor are only warranted for any unused portion of the unit's warranty.

We will not be responsible for and the user will pay for:

1. Service calls to:  
A) Instruct on unit operation. B) Replace house fuses or correct house wiring. C) Clean or replace air filters. D) Remove the unit from its installed location when not accessible for service required. E) Correct improper installations.
2. Parts or labor provided by anyone other than an authorized service center.
3. Damage caused by:  
A) Accident, abuse, negligence, misuse, riot, fire flood or acts of God. B) Operating the unit where there is a corrosive atmosphere containing chlorine, fluorine, or any damaging chemicals (other than in a normal residential environment). C) Unauthorized alteration or repair of the unit, which in turn affects its stability or performance. D) Failing to provide proper maintenance and service. E) Using and incorrect power source. F) Faulty installation or application of the unit. G) Operation of the unit during construction.

**We shall not be liable for any incidental, consequential, or special damages or expenses in connection with any use or failure of this unit. We have not made and do not make any representation or warranty of fitness for a particular use or purpose and there is no implied condition of fitness for a particular use or purpose. We make no expressed warranties except as stated in this certification No one is authorized to change this certificate or to create for us any other obligation or liability in connection with this unit. Any implied warranties shall last for one year after the original purchase date.** Some states and provinces do not allow limitations on how long an implied warranty or condition lasts, so the above limitation or exclusions may not apply to you. The provisions of this warranty are in addition to and not a modification of or subtraction from the statutory warranties and other rights and remedies provided by law.

**Performance of Friedrich's Warranty obligation is limited to one of the following methods:**

1. Repair of the unit
2. A refund to the customer for the prorated value of the unit based upon the remaining warranty period of the unit.
3. Providing a replacement unit of equal value

**The method of fulfillment of the warranty obligation is at the sole discretion of Friedrich Air Conditioning.**

**In case of any questions regarding the provisions of this warranty, the English version will govern.**



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