Service/ Parts Manual

FRIEDRICH

VRP

Model	Revision	Voltage	BTU
VRP12K	A, B, C	230	12,000
VRP12R	A, B, C	265	12,000
VRP24K	A, B, C	230	24,000
VRP24R	A, B, C	265	24,000
VRP36K		230	36,000

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INTRODUCTION

The Friedrich VRP® is a variable capacity system that utilizes Precision Inverter® technology to provide optimal space conditions.

While each VRP unit has a nominal capacity of 12,000, 24,000, OR 36,000 Btus, every unit has the ability to adjust Btu output based on the actual room load. This equates to:

- Greater in-room dehumidification from longer compressor run time.
- Lower energy costs by consuming less power.
- Greater occupant comfort due to smaller swings in room temperature and humidity.

The VRP accomplishes this by constantly monitoring various system and environmental inputs to vary the output of the unit.

The ability to vary compressor and blower speeds and the use of reheat coil enables the VRP to provide optimal comfort. With up to 20.0 SEER and 10.0 HSPF, the VRP provides a highly efficient solution. Further, the Precision Inverter technology allows the heat pump to operate at ambient conditions as low as 0˚F reducing the use of strip heat. This results in significant savings in operational costs.

An optional integrated FreshAireTM system delivers up to 70 CFM of conditioned fresh air into the space. The fresh air is filtered through a MERV 8 filter per ASHRAE 62.1-2013, and is then conditioned through the unit's primary DX coils backed by a reheat coil that augments the unit's dehumidification capability. This integrated fresh air solution provides the ability to potentially downsize or eliminate additional make up air and humidity control equipment.

Friedrich's wall controller is the main interface between conditioned space and the unit. The controller has seven back-lit segment displays that indicate the system mode (cool, heat, fan only), fan speed (low, high or auto), setpoint (°F or °C) or alternatively room temperature (°F or °C).

The controller has an integrated temperature and humidity sensor that sends room status to the main control unit (MCU) to determine operating modes and speeds of various components.

The wall controller also contains a motion sensor that wakes the wall controller from a sleep mode when not in use. This energy saving feature eliminates annoying glow from the controller and the need to turn on lights at night to operate it.

The unitary packaged design means easier installation or replacement. Because the VRP is a packaged unit, it is installed as a completely assembled refrigeration system. Unlike VRF or chilled water systems that require on-site wiring, piping and sealing of individual components, VRP units are assembled, charged and run tested under strict quality control guidelines in Friedrich's North American factory. Additionally, there is no need to locate the cooling tower or condensing units on the ground or rooftops where green spaces can exist instead.

In sum, The Friedrich VRP offers a significant value to all parties involved in the design and construction of a new building.

Because of the simpler and more straightforward nature of the packaged design, and the ability to potentially downsize or eliminate additional make up air and humidity control equipment, the VRP reduces much of the headache and complexity facing the design engineer. Because the VRP is easy to install, with no complicated floor-to-floor piping and wiring involved, the contractor can be confident of a high-quality installation and get on and off the job more quickly. And finally, the owner gets the efficiency and performance of larger, more complex and costly equipment, with a lower overall installed cost; and he/she virtually eliminates the potential safety and service issues associated with systems that rely on thousands of feet of refrigerant or water piping running throughout the building, including occupied spaces.

INTRODUCTION

VRP® Variable Speed System vs. Fixed-speed System

Low Ambient Heat Pump Performance: Variable speed technology enables VRP units to supply continuous hot air in heat pump mode even at low outdoor ambient temperatures. This reduces strip heat usage resulting in exceptional savings with VRP units when compared with traditional fixed-speed units which need to switch to strip heat at much higher ambient temperatures.

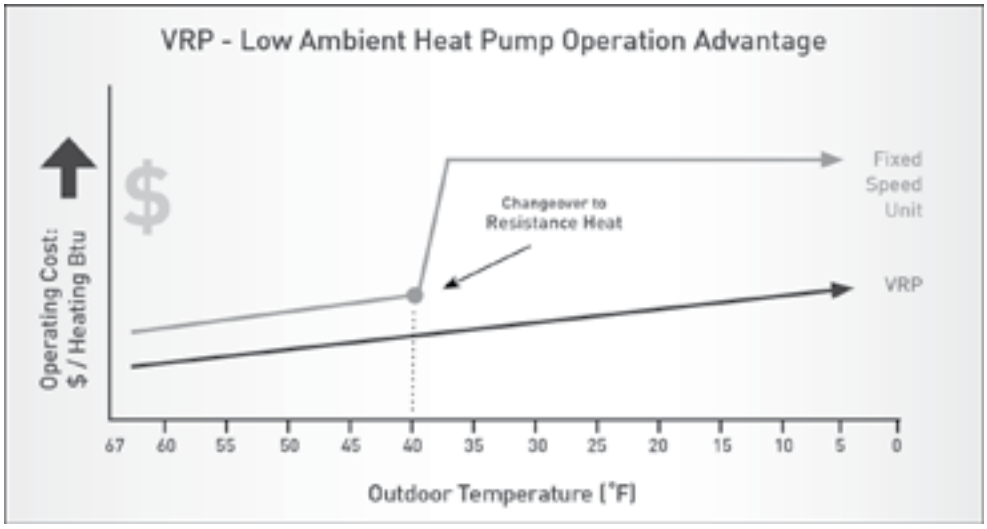


Figure 101(Cost Savings)

Precise Temperature & Humidity Control: VRP units not only help keep the air at the preferred temperature, but can more effectively remove moisture from the air. VRP units run longer cycles at lower pressures, helping to cool the air more evenly. The combination of variable speed compressor & blower motor and reheat coil in VRP units provide optimal comfort to the occupants. On the other hand, traditional fixed-speed systems tend to cool the air too fast without proper moisture removal increasing the risk of mold and other airborne problems.

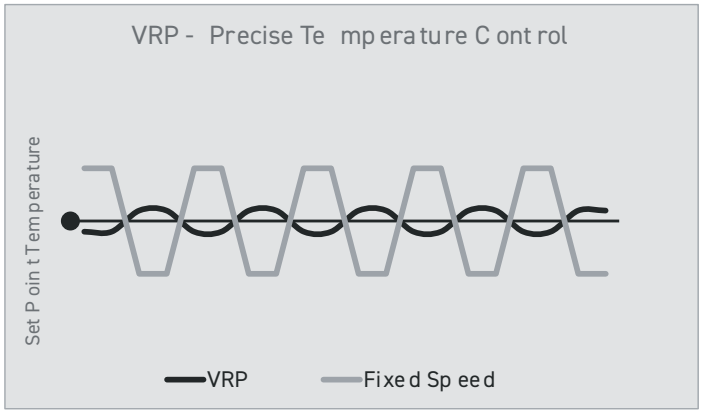


Figure 102 (Precision Temp Control)

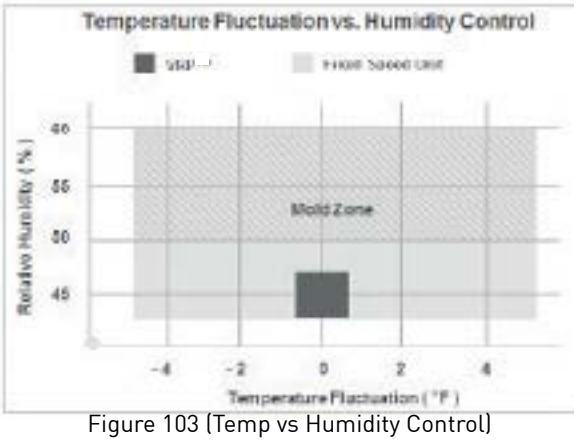


Figure 103 (Temp vs Humidity Control)

INTRODUCTION

FreshAire™ Conditioned Fresh Air

FreshAire is a dedicated fresh air system that brings in up to 70 CFM of outdoor air into the VRP® unit. The FreshAire system uses one fan (up to 35 CFM) or two fans (up to 70 CFM) (depending on outdoor air CFM volume requirements) to bring in fresh outside air into the the unit. The outdoor air passes through dedicated 6"x 6"x 1" MERV 8 filters that are easily replaceable from the front of the unit.

This outdoor air is mixed with the return air inside the unit prior to the main evaporator coils, reheat coil and heater. Because of the variable speed of both the compressor and evaporator fan, the VRP can increase or decrease the unit's capacity to cool, heat or dehumidify the total supply air. The system uses a proprietary algorithm to measure the dew point of the leaving air. As the system nears the room setpoint, the system will throttle back both the compressor and the supply air volume in order to maximize the dwell time on the indoor coil to maximize dehumidification.

(Single speed systems cycle on and off, providing less dehumidification capacity and run time as well as encounter condensate re-evaporation when cycled off.)

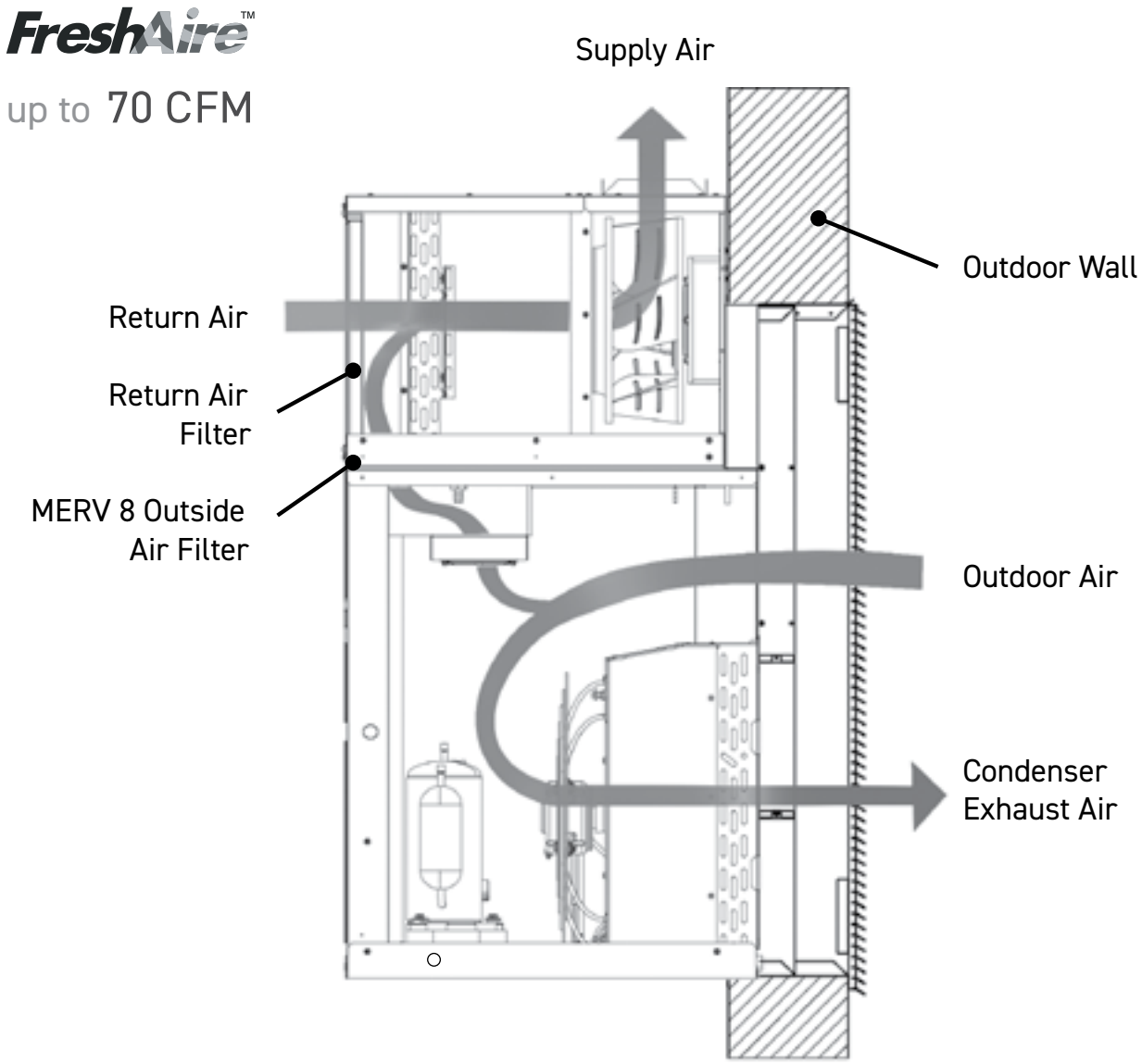


Figure 104 (FreshAire)

INTRODUCTION

Reheat Coil - Augments VRP's Dehumidification Capability

Temperature differences are not the only source of discomfort in a living space. Humidity also plays a big role — especially in climates that tend to be both hot and humid. The air conditioning industry's focus on humidity issues has elevated the importance of dehumidification. Air conditioning units operate in environments with varying indoor humidity levels. Therefore, the system should be able to adequately respond to the humidity changes by removing sufficient amounts of moisture in order to keep the conditioned space within the comfort zone.

Anytime the compressor is running in air conditioning mode, it will also be pulling humidity out of the space. Fixed-speed systems shut off after the desired set temperature is reached (i.e. when the sensible load is met). VRP® units run much longer at lower capacity and energy consumption than traditional systems. Humidity levels are reduced to more comfortable levels. The dehumidification capability of VRP units is enhanced through the use of a reheat coil that provides superior flexibility in satisfying a wide range of latent and sensible capacity demands. The reheat coil is placed behind the evaporator coil.

At relatively high ambient temperatures, both sensible and latent components of the system capacity are required to satisfy increased cooling and dehumidification demands. The VRP wall controller and other sensors in the unit combine to continuously monitor the space RH levels and when there is demand for extra dehumidification, the refrigerant exiting the condenser is rerouted to the reheat coil located behind the evaporator on the way to the indoor air stream supplied to the conditioned space.

Thus, cooled and dehumidified air exiting the evaporator coil is reheated to desirable comfort levels for the space.

INTRODUCTION

Important Safety Information

The information in this manual is intended for use by a qualified technician who is familiar with the safety procedures required for installation and repair, and who is equipped with the proper tools and test instruments required to service this product.

Installation or repairs made by unqualified persons can result in subjecting the unqualified person making such repairs as well as the persons being served by the equipment to hazards resulting in injury or electrical shock which can be serious or even fatal.

Safety warnings have been placed throughout this manual to alert you to potential hazards that may be encountered. If you install or perform service on equipment, it is your responsibility to read and obey these warnings to guard against any bodily injury or property damage which may result to you or others.

Your safety and the safety of others is 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 a safety Alert symbol.

This symbol alerts you to potential hazards that can kill or hurt you and others.

⚠WARNING All safety messages will follow the safety alert symbol with the word "WARNING"

or "CAUTION". These words mean:

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

NOTICE 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 what the potential hazard is, tell you how to reduce the chance

⚠ 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 standard R22 gauge sets.

INTRODUCTION

Important Safety Information

CAUTION

DO NOT OPERATE EQUIPMENT DURING ACTIVE STAGES OF CONSTRUCTION

To ensure proper operation, Friedrich requires that all equipment is not operated during active construction phases. This includes active stages of completing framing, drywalling, spackling, sanding, painting, flooring, and moulding in the equipment's designated conditioning space. The use of this equipment during construction could result in premature failure of the components and/or system and is in violation of our standard warranty guidelines. The operation of newly installed equipment during construction will accelerate the commencement and/or termination of the warranty period.

⚠ 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

⚠ 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

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

ndicates 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.

INTRODUCTION

Personal Injury Or Death Hazards

	⚠ WARNING	⚠ AVERTISSEMENT	⚠ ADVERTENCIA
SAFETY FIRST	Do not remove, disable or bypass this unit's safety devices. Doing so may cause fire, Doing so may cause fire, injuries, or death.	Ne pas supprime, désactiver ou contourner cette l´unité des dispositifs de sécurité, faire vous risqueriez de provoquer le feu, les blessures ou la mort.	No eliminar, desactivar o pasar por alto los dispositivos de seguridad de la unidad. Si lo hace podría producirse fuego, lesiones o muerte.

ELECTRICAL HAZARDS:

- Shutdown and/or disconnect all electrical power to the unit before performing inspections, maintenance, or service.
- Make sure to follow proper lockout/tag out procedures.
- Always work in the company of a qualified assistant if possible.
- Capacitors, even when disconnected from the electrical power source, retain an electrical charge potential capable of causing electric shock or electrocution. Wait a few minutes after shutdown to allow the capacitors to discharge the stored energy.
- Handle, discharge, and test capacitors according to safe, established, standards, and approved procedures.
- Extreme care, proper judgment, and safety procedures must be exercised if it becomes necessary to test or troubleshoot equipment with the power turned on to the unit.
- Do not spray water on the air conditioning unit while the power is on.
- Electrical component malfunction caused by water could result in electric shock or other electrically unsafe conditions when the power is restored and the unit is turned on, even after the exterior is dry.
- Use air conditioner on a single dedicated circuit within the specified amperage rating.
- Ensure the unit that the unit is properly grounded.
- Do not cut or modify the power supply cord or remove the ground prong of the plug.
- Never operate the unit on an extension cord.
- Follow all safety precautions and use approved protective safety equipment such as: gloves, goggles, and clothing. Ensure that properly insulated tools, and testing equipment are are used as well to protect against equipment damage and reduce the risk of injury.
- Failure to follow proper safety procedures and these warnings can result in serious injury or possibly death.

INTRODUCTION

Model and Serial Number Identification Guides

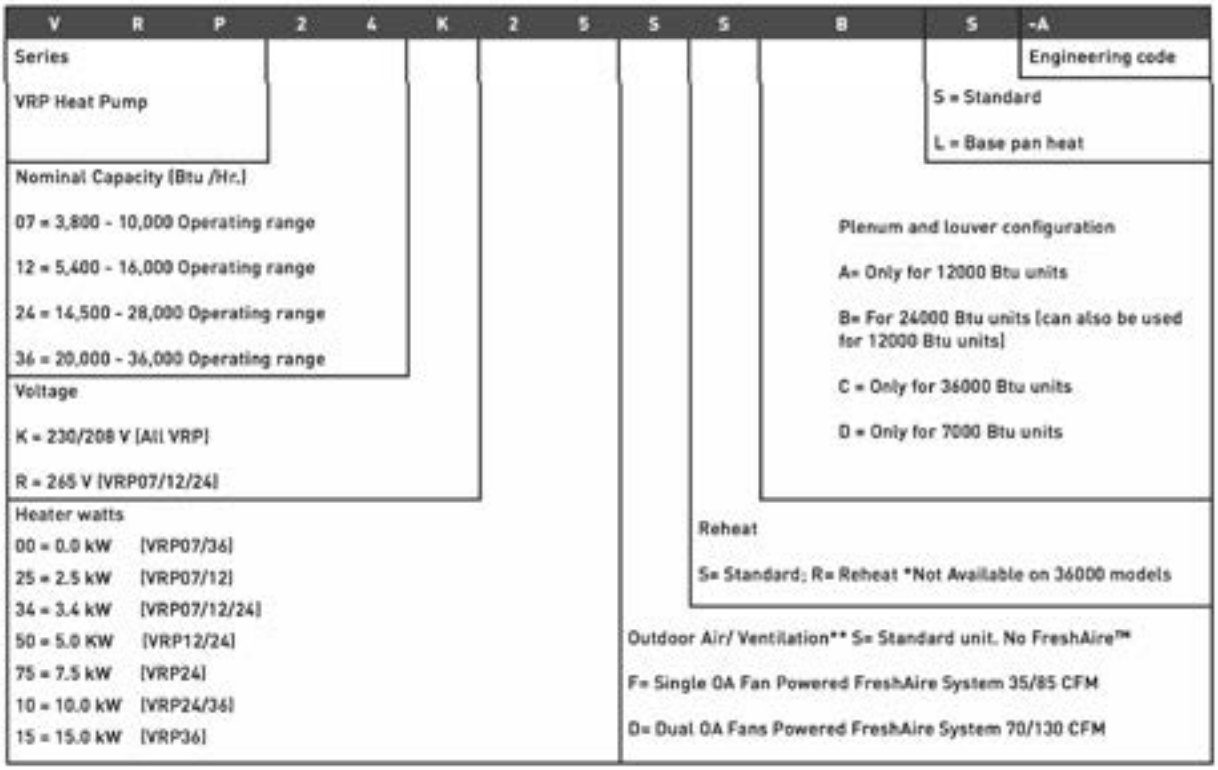


Figure 105 (Model Identification Guide)

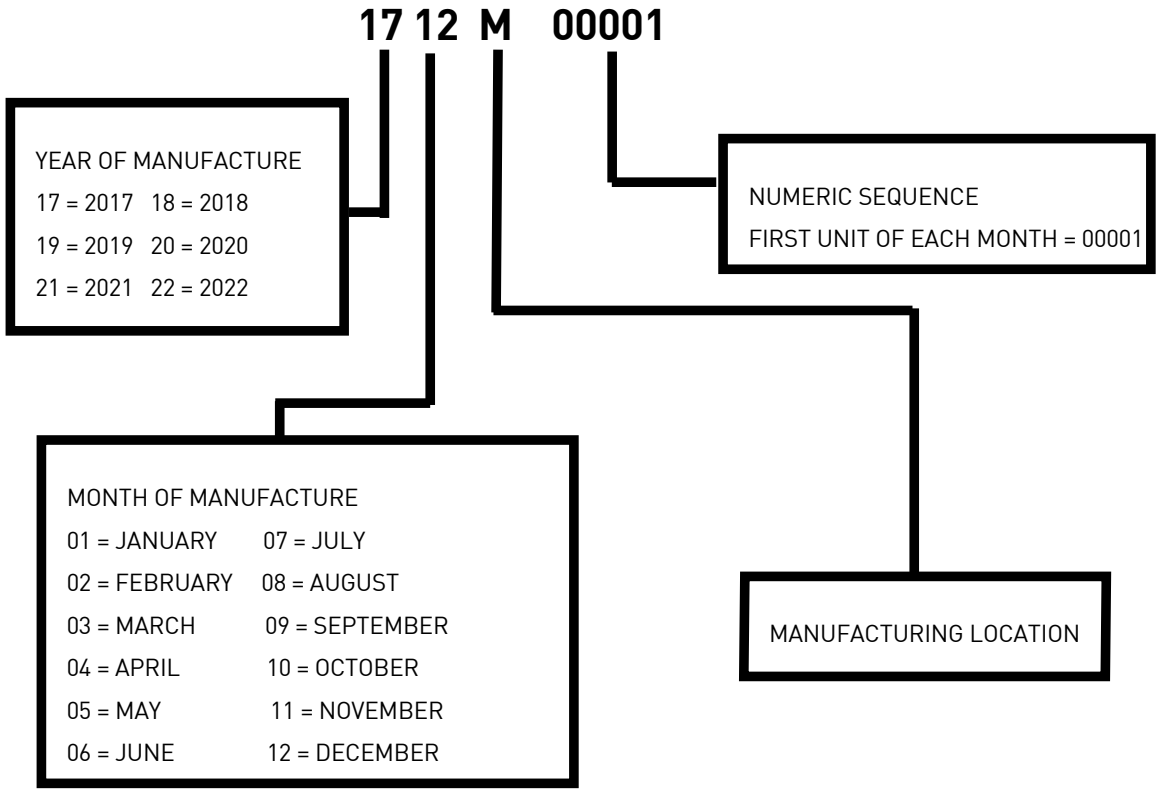


Figure 106 (Serial Number Identification)

SPECIFICATIONS

Cooling Performance

Model	**VRP12K / VRP12R**		**VRP24K / VRP12R**		**VRP36K**
Cooling Performance Data (Cooling Standards: 95°F DB/75°F WB outdoor, 80°F DB/67°F WB indoor)					
Voltage	230/208	265	230/208	265	230/208
Cooling Btu (Rated)	12,000		23,400		33,400
Cooling Btu (Min. – Max)	4,000 – 16,000		12,000 – 28,000		20,000 - 36,000
Outdoor Operating Range (°F)	55 – 115		55 – 115		55 - 115
Power (W)	923		2138		2990
SEER	20.0		17.5		15.5
EER	13.0		11.0		11.0
Sensible Heat Ratio	0.71		0.7		0.76
Cooling Amps	4.3		10.0		14.2
Heat Pump Performance Data					
Heating Btu (Rated @ 47° F)	11,500		21,000		28,500
Heating Btu (@ 17° F)	7,100		13,000		18,300
Heating Btu (Min. – Max.)	4,000 – 14,000		12,000 – 26,000		16,000 - 30,000
Heat Pump Outdoor Operating Range (°F)*	0 – 70		0 – 70		0 - 70
COP (Rated @ 47° F)	3.4		3.1		3.25
COP (@ 17° F)	2.2		2.4		2.29
HSPF	10.0		10.0		8.6
Heating Power (W)	991		1954		2570
Heating Amps	4.8	4.1	9.1	7.8	12.26

Figure 201 (Cooling Performance)

SPECIFICATIONS

12k Extended Cooling Performance Data

Model: VRP12K		Indoor Temperature														
		70˚ FDB			75˚ FDB			**80˚ FDB**			85˚ FDB			90˚ FDB		
		60˚ F WB			63˚ F WB			**67˚ F WB**			71˚ F WB			73˚ F WB		
Outdoor Temperature Dry (°F)	(˚F) DB	Capacity (Btu/h)	Input (W)	Amps (A)	Capacity (Btu/h)	Input (W)	Amps (A)	Capacity (Btu/h)	Input (W)	Amps (A)	Capacity (Btu/h)	Input (W)	Amps (A)	Capacity (Btu/h)	Input (W)	Amps (A)
	65˚	11680	615	2.8	12755	615	2.8	13825	615	2.8	14900	615	2.8	15975	620	2.8
	70˚	11460	665	3.0	12510	665	3.0	13555	675	3.0	14600	675	3.0	15650	675	3.0
	75˚	11240	720	3.2	12260	720	3.2	13280	725	3.2	14300	725	3.2	15320	725	3.2
	80˚	10990	765	3.4	11980	775	3.5	12970	775	3.5	13965	775	3.5	14955	780	3.5
	85˚	10735	815	3.6	11700	820	3.7	12660	825	3.7	13625	825	3.7	14585	830	3.7
	90˚	10460	860	3.9	11400	870	3.9	12330	875	3.9	13270	880	3.9	14200	880	3.9
	95˚	10185	910	4.1	11090	920	4.1	12000	925	4.1	12910	930	4.2	13815	935	4.2
	100˚	9875	960	4.3	10760	970	4.3	11645	975	4.4	12530	985	4.4	13415	990	4.4
	105˚	9565	1010	4.5	10425	1020	4.6	11285	1030	4.6	12145	1040	4.7	13005	1045	4.7
	110˚	9265	1060	4.7	10100	1075	4.8	10940	1085	4.9	11775	1100	4.9	12610	1110	5.0
	115˚	8965	1120	5.0	9775	1130	5.1	10590	1145	5.1	11400	1155	5.2	12215	1170	5.2

Model: VRP12R		Indoor Temperature														
		70˚ FDB			75˚ FDB			**80˚ FDB**			85˚ FDB			90˚ FDB		
		60˚ F WB			63˚ F WB			**67˚ F WB**			71˚ F WB			73˚ F WB		
Outdoor Temperature Dry (°F)	(˚F) DB	Capacity (Btu/h)	Input (W)	Amps (A)	Capacity (Btu/h)	Input (W)	Amps (A)	Capacity (Btu/h)	Input (W)	Amps (A)	Capacity (Btu/h)	Input (W)	Amps (A)	Capacity (Btu/h)	Input (W)	Amps (A)
	65˚	11680	615	2.4	12755	615	2.4	13825	615	2.4	14900	615	2.4	15975	620	2.4
	70˚	11460	665	2.6	12510	665	2.6	13555	675	2.6	14600	675	2.6	15650	675	2.6
	75˚	11240	720	2.8	12260	720	2.8	13280	725	2.8	14300	725	2.8	15320	725	2.8
	80˚	10990	765	3.0	11980	775	3.0	12970	775	3.0	13965	775	3.0	14955	780	3.0
	85˚	10735	815	3.2	11700	820	3.2	12660	825	3.2	13625	825	3.2	14585	830	3.2
	90˚	10460	860	3.3	11400	870	3.4	12330	875	3.4	13270	880	3.4	14200	880	3.4
	95˚	10185	910	3.5	11090	920	3.6	12000	925	3.6	12910	930	3.6	13815	935	3.6
	100˚	9875	960	3.7	10760	970	3.8	11645	975	3.8	12530	985	3.8	13415	990	3.8
	105˚	9565	1010	3.9	10425	1020	4.0	11285	1030	4.0	12145	1040	4.0	13005	1045	4.1
	110˚	9265	1060	4.1	10100	1075	4.2	10940	1085	4.2	11775	1100	4.3	12610	1110	4.3
	115˚	8965	1120	4.4	9775	1130	4.4	10590	1145	4.5	11400	1155	4.5	12215	1170	4.5

Cooling Standards: 95°F DB/75°F WB outdoor, 80°F DB/67°F WB indoor

Figure 202 (12k Extended Cooling Performance Data)

SPECIFICATIONS

24k Extended Cooling Performance Data

Model: VRP24K		Indoor Temperature														
		70˚ FDB			75˚ FDB			**80˚ FDB**			85˚ FDB			90˚ FDB		
		60˚ F WB			63˚ F WB			**67˚ F WB**			71˚ F WB			73˚ F WB		
Outdoor Temperature Dry (°F)	**(˚F) DB**	Capacity (Btu/h)	Input (W)	Amps (A)	Capacity (Btu/h)	Input (W)	Amps (A)	Capacity (Btu/h)	Input (W)	Amps (A)	Capacity (Btu/h)	Input (W)	Amps (A)	Capacity (Btu/h)	Input (W)	Amps (A)
	65˚	22875	1420	6.4	24980	1420	6.4	27075	1420	6.4	29180	1420	6.4	31285	1430	6.4
	70˚	22440	1535	6.8	24500	1535	6.8	26545	1560	6.8	28590	1560	6.8	30650	1560	6.8
	75˚	22010	1665	7.3	24010	1665	7.3	26005	1675	7.3	28005	1675	7.3	30000	1675	7.3
	80˚	21520	1765	7.7	23460	1790	7.9	25400	1790	7.9	27350	1790	7.9	29285	1800	7.9
	85˚	21025	1880	8.2	22910	1895	8.4	24795	1905	8.4	26680	1905	8.4	28560	1915	8.4
	90˚	20485	1985	8.8	22325	2010	8.8	24145	2020	8.8	25985	2030	8.8	27810	2030	8.8
	95˚	19945	2100	9.3	21720	2125	9.3	23500	2135	9.3	25280	2150	9.5	27055	2160	9.5
	100˚	19340	2215	9.8	21070	2240	9.8	22805	2250	10	24540	2275	10	26270	2285	10
	105˚	18730	2330	10.2	20415	2355	10.4	22100	2380	10.4	23785	2400	10.7	25470	2415	10.7
	110˚	18145	2450	10.7	19780	2480	10.9	21425	2505	11.1	23060	2540	11.1	24695	2565	11.3
	115˚	17555	2585	11.3	19145	2610	11.6	20740	2645	11.6	22325	2665	11.8	23920	2700	11.8

Model: VRP24R		Indoor Temperature														
		70˚ FDB			75˚ FDB			**80˚ FDB**			85˚ FDB			90˚ FDB		
		60˚ F WB			63˚ F WB			**67˚ F WB**			71˚ F WB			73˚ F WB		
Outdoor Temperature Dry (°F)	**(˚F) DB**	Capacity (Btu/h)	Input (W)	Amps (A)	Capacity (Btu/h)	Input (W)	Amps (A)	Capacity (Btu/h)	Input (W)	Amps (A)	Capacity (Btu/h)	Input (W)	Amps (A)	Capacity (Btu/h)	Input (W)	Amps (A)
	65˚	22875	1420	5.5	24980	1420	5.5	27075	1420	5.5	29180	1420	5.5	31285	1430	5.5
	70˚	22440	1535	5.9	24500	1535	5.9	26545	1560	5.9	28590	1560	5.9	30650	1560	5.9
	75˚	22010	1665	6.3	24010	1665	6.3	26005	1675	6.3	28005	1675	6.3	30000	1675	6.3
	80˚	21520	1765	6.7	23460	1790	6.9	25400	1790	6.9	27350	1790	6.9	29285	1800	6.9
	85˚	21025	1880	7.1	22910	1895	7.3	24795	1905	7.3	26680	1905	7.3	28560	1915	7.3
	90˚	20485	1985	7.7	22325	2010	7.7	24145	2020	7.7	25985	2030	7.7	27810	2030	7.7
	95˚	19945	2100	8.1	21720	2125	8.1	23500	2135	8.1	25280	2150	8.3	27055	2160	8.3
	100˚	19340	2215	8.5	21070	2240	8.5	22805	2250	8.7	24540	2275	8.7	26270	2285	8.7
	105˚	18730	2330	8.9	20415	2355	9.1	22100	2380	9.1	23785	2400	9.3	25470	2415	9.3
	110˚	18145	2450	9.3	19780	2480	9.5	21425	2505	9.7	23060	2540	9.7	24695	2565	9.9
	115˚	17555	2585	9.9	19145	2610	10.1	20740	2645	10.1	22325	2665	10.3	23920	2700	10.3

Cooling Standards: 95°F DB/75°F WB outdoor, 80°F DB/67°F WB indoor

Figure 203 (24k Extended Cooling Performance Data)

SPECIFICATIONS

12 and 24k Extended Heating Performance Data

Model: VRP12K		Indoor Temperature Dry Bulb (F)								
		60˚			**70˚**			80˚		
Outdoor Temperature Dry Bulb (F)	**(˚F) DB**	Capacity (Btu/h)	Input (W)	Amps (A)	Capacity (Btu/h)	Input (W)	Amps (A)	Capacity (Btu/h)	Input (W)	Amps (A)
	17˚	7551	866	3.5	7100	946	3.8	6609	1014	4.1
	25˚	8810	877	3.6	8273	958	4	7688	1031	4.3
	35˚	10384	890	3.8	9740	974	4.2	9036	1051	4.5
	47˚	12272	906	4	11500	992	4.4	10654	1077	4.8
	55˚	13531	916	4.2	12673	1004	4.6	11733	1093	5
	62˚	14633	925	4.3	13700	1015	4.7	12677	1108	5.1
Model: VRP12R		Capacity (Btu/h)	Input (W)	Amps (A)	Capacity (Btu/h)	Input (W)	Amps (A)	Capacity (Btu/h)	Input (W)	Amps (A)
Outdoor Temperature Dry Bulb (F)	**(˚F) DB**									
	17˚	7551	866	3.0	7100	946	3.3	6609	1014	3.5
	25˚	8810	877	3.1	8273	958	3.4	7688	1031	3.7
	35˚	10384	890	3.3	9740	974	3.6	9036	1051	3.9
	47˚	12272	906	3.4	11500	992	3.8	10654	1077	4.1
	55˚	13531	916	3.6	12673	1004	4.0	11733	1093	4.3
	62˚	14633	925	3.7	13700	1015	4.1	12677	1108	4.4
Model: VRP24K		Capacity (Btu/h)	Input (W)	Amps (A)	Capacity (Btu/h)	Input (W)	Amps (A)	Capacity (Btu/h)	Input (W)	Amps (A)
Outdoor Temperature Dry Bulb (F)	**(˚F) DB**									
	17˚	15208	1399	6.4	14299	1528	7	13310	1638	7.5
	25˚	17407	1473	6.7	16347	1610	7.4	15190	1732	7.9
	35˚	20156	1565	7.2	18907	1712	7.8	17541	1850	8.5
	47˚	23455	1675	7.7	21979	1835	8.4	20362	1991	9.1
	55˚	25654	1749	8	24027	1917	8.8	22243	2086	9.5
	62˚	27579	1813	8.3	25819	1989	9.1	23888	2168	9.9
Model: VRP24R		Capacity (Btu/h)	Input (W)	Amps (A)	Capacity (Btu/h)	Input (W)	Amps (A)	Capacity (Btu/h)	Input (W)	Amps (A)
Outdoor Temperature Dry Bulb (F)	**(˚F) DB**									
	17˚	15208	1399	5.5	14299	1528	6.0	13310	1638	6.5
	25˚	17407	1473	5.8	16347	1610	6.4	15190	1732	6.8
	35˚	20156	1565	6.2	18907	1712	6.7	17541	1850	7.3
	47˚	23455	1675	6.6	21979	1835	7.2	20362	1991	7.8
	55˚	25654	1749	6.9	24027	1917	7.6	22243	2086	8.2
	62˚	27579	1813	7.2	25819	1989	7.8	23888	2168	8.5

Heating Standards: 47°F DB/43°F WB outdoor, 70°F DB/60°F WB indoor

Figure 204 (12 and 24k Extended Heating Performance Data)

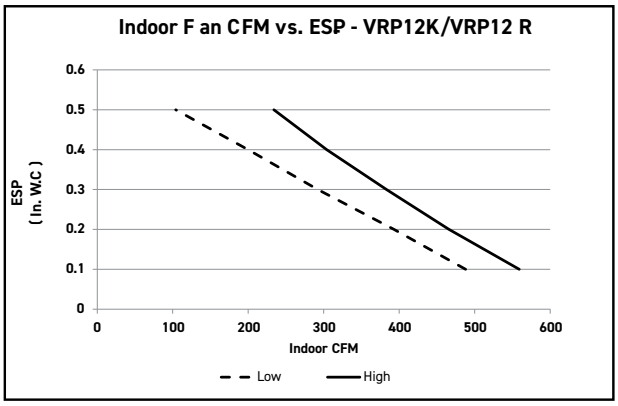
SPECIFICATIONS

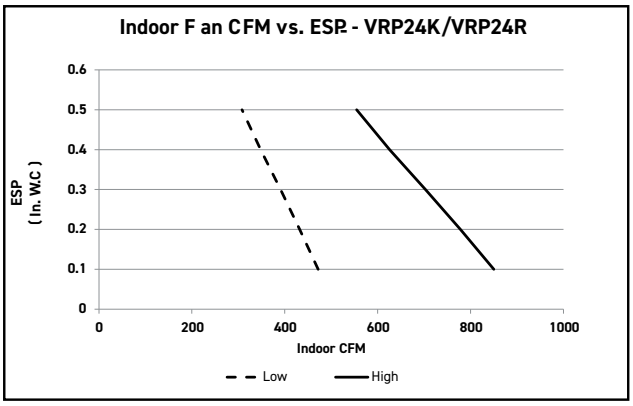
Air Flow Data -12k and 24k

Indoor CFM & External Static Pressure

Model	VRP12K / VRP12R		VRP24K / VRP24R	
Air Flow Data				
Indoor CFM	Low	**High**	Low	**High**
.10" ESP*	488	559	472	850
.20" ESP	393	466	432	778
.30" ESP	292	383	391	703
.40" ESP	200	304	348	626
.50" ESP	104	234	308	555

* Rated at 0.10 " ESP, High and includes 0.08 " ESP for factory installed 1 " filter





Condenser CFM & External Static Pressure

VRP® is designed to mount through an exterior wall through a plenum (VRPXWP****) with an external louver (VRPXAL*).

Building design and applications may require different configurations of this external connection for aesthetic/architectural reasons. These different configurations may include custom louvers, plenums or special ducted returns.

The following are guidelines for the design of these custom external configurations.

Condenser External Static Pressure			
VRP Model	Design		Maximum
	CFM	ESP ("WC)	ESP ("WC)
VRP 12000 Btu	700	0.03	0.1
VRP 24000 Btu	1150	0.017	0.11

CAUTION: If the Friedrich designed plenum and louver combinations are not used, the louver/duct design must be evaluated to insure the total pressure drop does not exceed the maximum allowable limits.

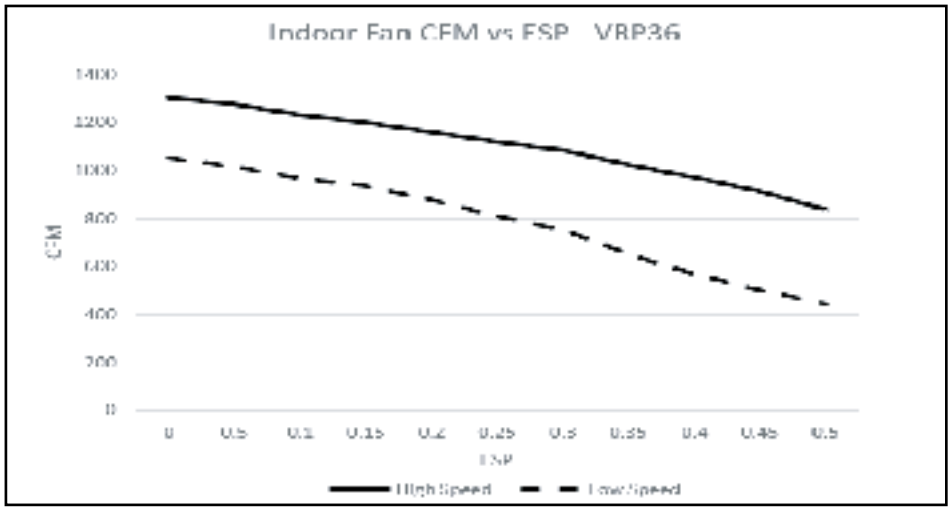
Figure 205 (12K and 24K Air Flow Data)

SPECIFICATIONS

Air Flow Data -36k

Indoor CFM & External Static Pressure

Model	VRP36K	
Air Flow Data		
Indoor CFM	Low	**High**
.15" ESP *	1015	1200
.20" ESP	875	1160
.30" ESP - Max @ Low Speed	750	1080
.40" ESP	565	970
.50" ESP - Max @ High Speed	440	835
* Rated at 0.15 " ESP, High and includes 0.08 " ESP for factory installed 1 " filter		



Condenser CFM & External Static Pressure

VRP® is designed to mount through an exterior wall through a plenum (VRPXWP****) with an external louver (VRPXAL*).

Building design and applications may require different configurations of this external connection for aesthetic/architectural reasons. These different configurations may include custom louvers, plenums or special ducted returns.

The following are guidelines for the design of these custom external configurations.

Condenser External Static Pressure			
VRP Model	Design		Maximum
	CFM	ESP ("WC)	ESP ("WC)
VRP 36000 Btu	2030	0.03	0.20

CAUTION: If the Friedrich designed plenum and louver combinations are not used, the louver/duct design must be evaluated to insure the total pressure drop does not exceed the maximum allowable limits.

Figure 206 (36K Air Flow Data)

SPECIFICATIONS

Electrical Data

VRP Model	Voltage	Heater Watts	Heating Btu	Heater Amps	ID Blower Amps	OD Blower Amps	Heating Amps	MCA	MOP / MOCP
VRP12K	230	2500	8530	10.9	0.34	0.57	11.2	14.0	15
	208	2030	6980	9.8	0.38	0.63	10.2		
	230	3400	11601	14.8	0.34	0.57	15.1	18.9	20
	208	2780	9480	13.4	0.38	0.63	13.8		
	230	5000	17060	21.7	0.34	0.57	22	27.5	30
	208	4100	13980	19.7	0.38	0.63	20.1		
VRP12R	265	2500	8530	9.4	0.2	0.5	9.8	12.3	15
		3400	11601	12.8	0.2	0.5	13.2	16.5	20
		5000	17060	18.9	0.2	0.5	19.3	24.1	25
VRP24K	230	2500	8530	10.8	0.77	1.06	11.6	14.5	15
	208	2030	6980	9.8	0.85	1.17	10.7		
	230	3400	11600	14.8	0.77	1.06	15.6	19.5	20
	208	2780	9480	13.4	0.85	1.17	14.3		
	230	5000	17050	21.8	0.77	1.06	22.6	28.3	30
	208	4100	13980	19.7	0.85	1.17	20.6		
	230	7500	25590	32.6	0.77	1.06	33.4	41.8	45
	208	6130	20900	29.5	0.85	1.17	30.4		
	230	10000	34120	43.5	0.77	1.06	44.3	55.4	60
	208	8180	27890	39.3	0.85	1.17	40.2		
VRP24R	265	2500	8530	9.4	0.7	1.0	10.8	13.5	15
		3400	11601	12.8	0.7	1.0	14.2	17.8	20
		5000	17060	18.9	0.7	1.0	20.3	25.4	25
		7500	25590	28.3	0.7	1.0	29.7	37.1	40
		10000	34120	37.7	0.7	1.0	39.1	48.9	60
VRP36K	230	0	0	0	/	/	/	18.2	30
	208	0	0	0	/	/	/		
	230	10000	34120	43.5	/	/	/	55.8	60
	208	8180	27890	39.3	/	/	/		
	230	15000	51150	65.3	/	/	/	83.0	90 (60 + 30)
	208	12280	41870	59.0	/	/	/		

MCA = Minimum Circuit Ampacity

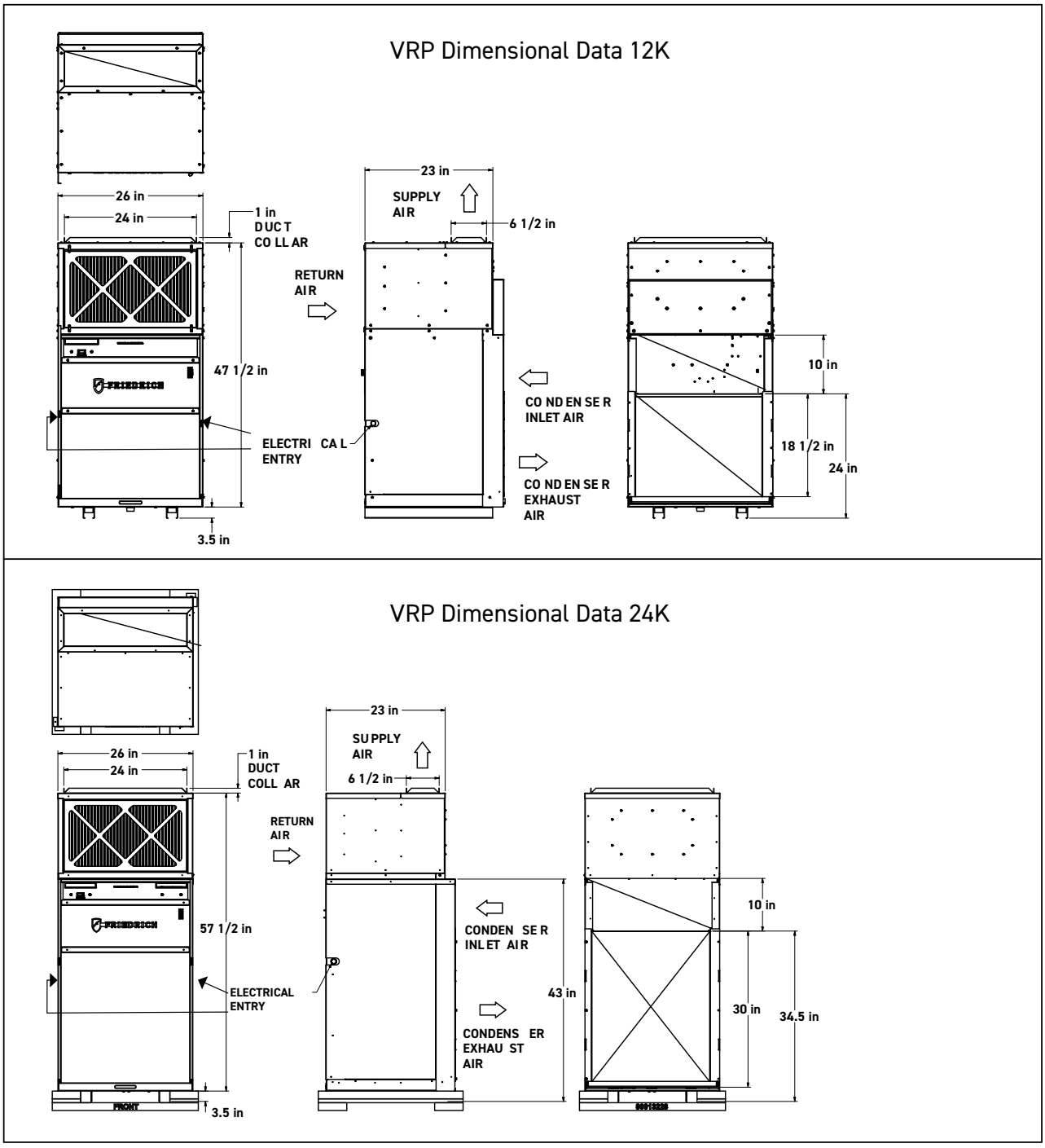
MOP / MOCP = Maximum Overcurrent Protection / Breaker Size

Minimum Circuit Amps (MCA) and MOCP values in the above table are calculated in accordance with The NEC. Article 440

Figure 207 (Electrical Data)

SPECIFICATIONS

12k and 24k Unit Dimensional Data

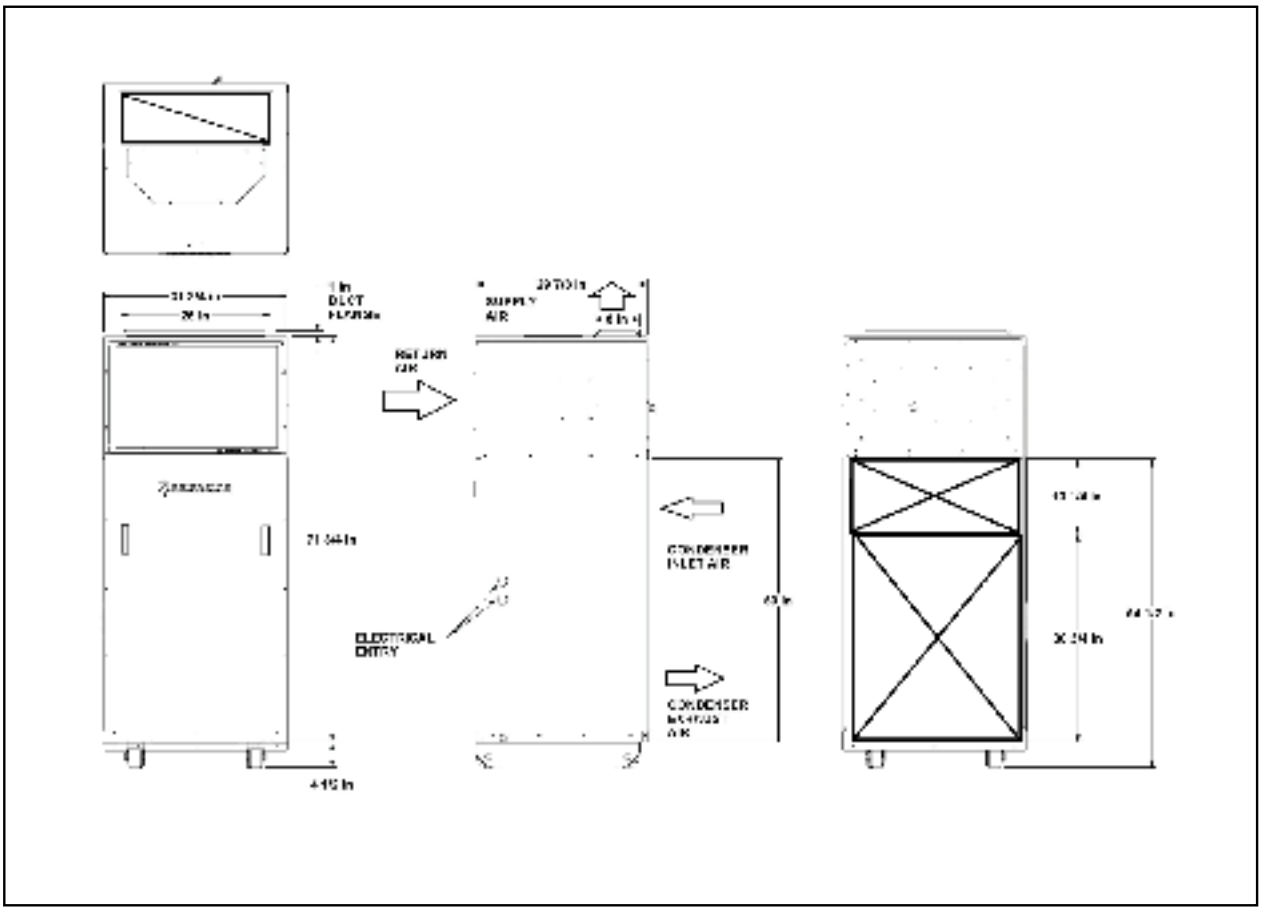


Model	VRP12K	VRP12R	VRP24K	VRP24R
Dimensions (W x D x H)	26 1/8" x 25 1/8" x 52"		26 1/8" x 25 1/8" x 62"	
Shipping Dimensions (W x D x H)	28 1/8" x 27 3/8" x 54.5"		28 1/8" x 27 3/8" x 64.5"	
Net Weight (lbs.)	215	215	255	255
Shipping Weight (lbs.)	276	276	316	316
R410A Charge (oz.)	49.8	49.8	68.3	68.3

Figure 208 (12k and 24k Unit Dimensional Data)

SPECIFICATIONS

36k Unit Dimensional Data

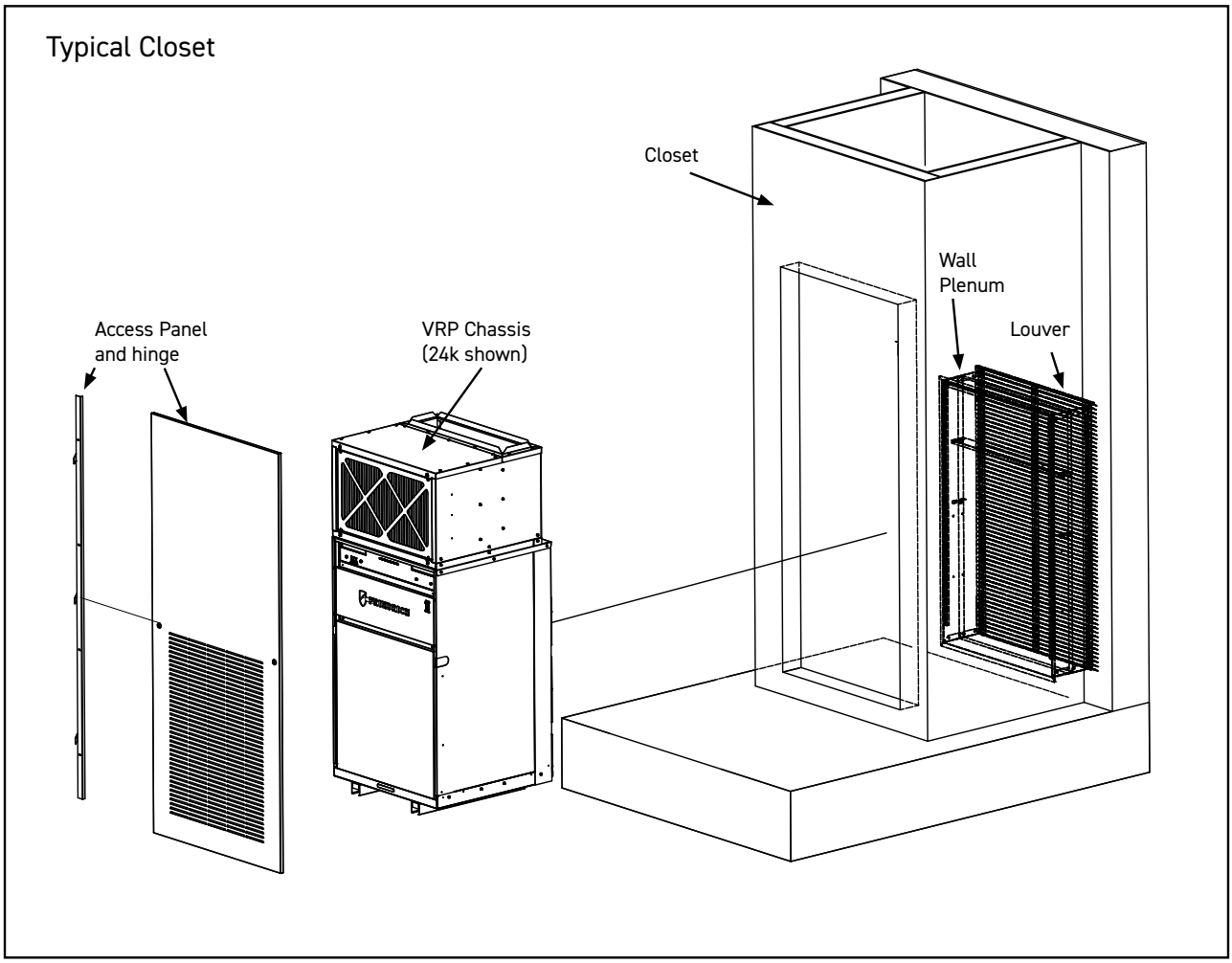


Model	VRP36K
Dimensions (W x D x H)	31 3/4" x 29 7/8" x 77 1/4"
Shipping Dimensions (W x D x H)	34" x 35" x 81"
Net Weight (lbs.)	330
Shipping Weight (lbs.)	357
R410A Charge (oz.)	125

Figure 209 (36K Unit Dimensional Data)

SPECIFICATIONS

12k and 24k Unit Installation Dimensional Data



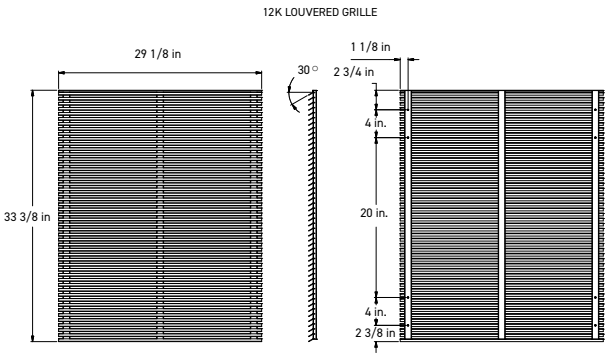
Model	VRP12K	VRP12R	VRP24K	VRP24R
Outside Wall- Cut Out Dimensions				
Dimensions (W x H) For VRPXWPA-8 or VRPXWPA-14 Plenum	28 1/8" x 32 1/4"		NA	
Dimensions (W x H) For VRPXWPB-8 or VRPXWPB-14 Plenum	28 1/8" x 42 1/4"		28 1/8" x 42 1/4"	
Access Door- Cut Out Dimensions (W x H)	30" x 70"			
Minimum Closet Dimensions (W x D)	See Installation Types			

Figure 210 (12k and 24k Unit Dimensional Data)

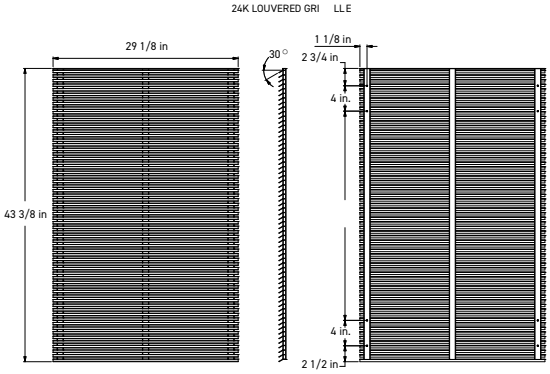
SPECIFICATIONS

12k and 24k Accessories Dimensional Data-Louvers & Return Access Door

12K Louvered Grille



24K Louvered Grille



Accessory	Description	Outer Dimensions
VRPXALA	Architectural louver (VRP12 only) (30 ° Blade angle)	29 1/8" W x 33 3/8" H
VRPXALB	Architectural louver (VRP24) (30 ° Blade angle) (Can also be used for VRP12)	29 1/8" W x 43 3/8" H
VRPXSCA	Architectural louver (VRP12 only) Custom Color - Special Order (30 ° Blade angle)	29 1/8" W x 33 3/8" H
VRPXSCB	Architectural louver (VRP24) Custom Color - Special Order (30 ° Blade angle) (Can also be used for VRP12)	29 1/8" W x 43 3/8" H

42° blade angle louvers available by special order.

Return Air Access Panel

Return Air Access Panel	VRPXAP1	32" x 72"

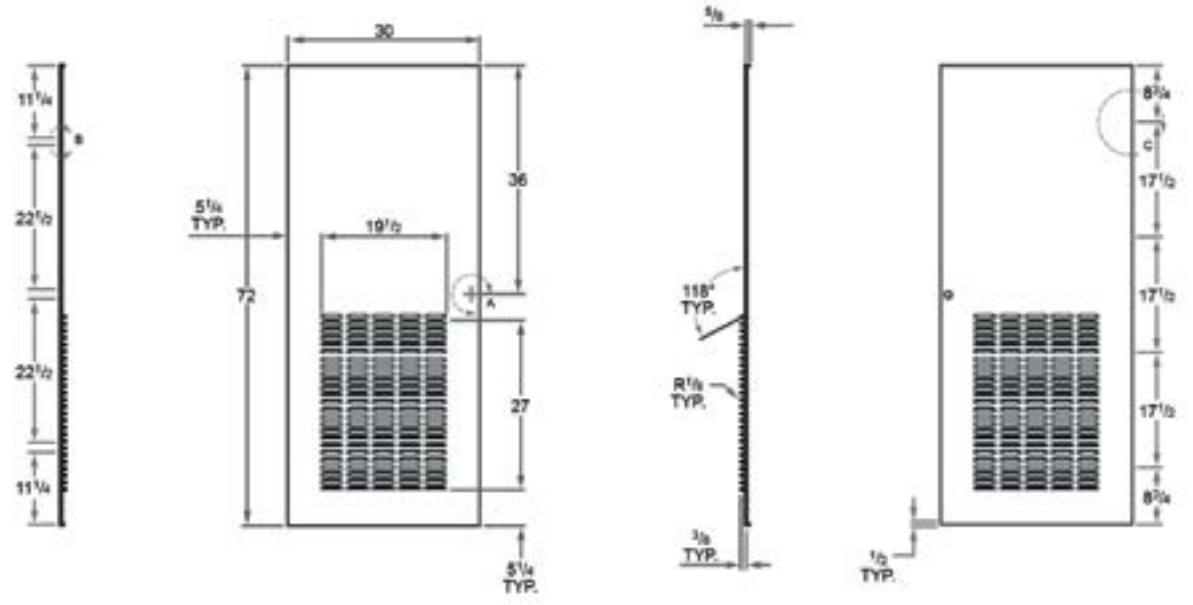


Figure 211 (12k and 24k Accessories Dimensional Data-Louvers & Return Access Door)

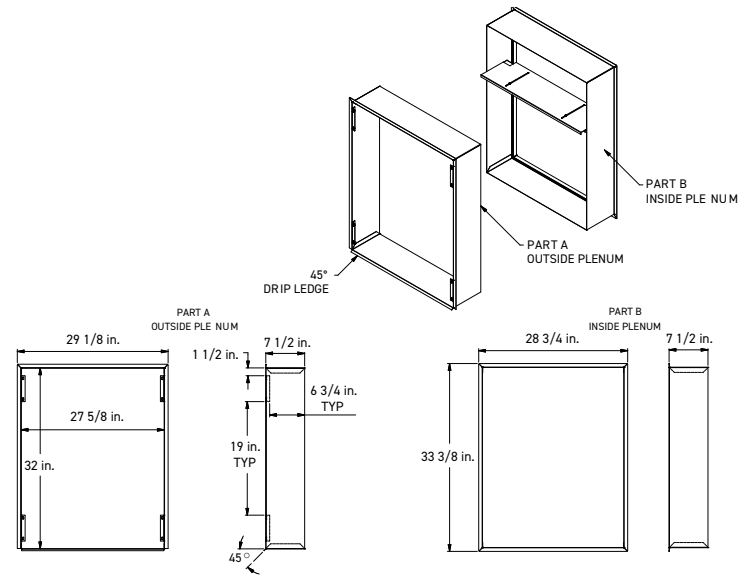
SPECIFICATIONS

12k and 24k Accessories Dimensional Data - Wall Plenums

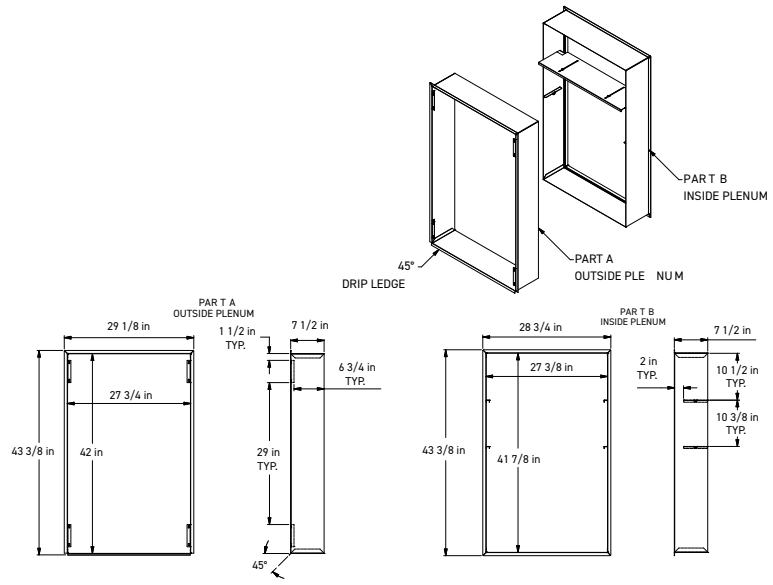
Installation Guidelines

- Chassis is to be installed against an exterior wall. Refer to page 11 for wall cut out dimensions
- 32" x 32" recommended minimum closet dimensions for return air, drain connections and change outs
- Minimum recommended access door rough-in measurements: 30" wide by 69 3/4" high
- The use of a Friedrich wall plenum is required for installation. Refer to this page for different sizes and selection guide
- Plenum opening minimum distance from floor to lower edge of outside wall cut out should be 3"
- Wall plenum allows chassis to be inserted 2 3/8" into plenum
- Return air is accommodated with a return air filter attached to the unit or through the use of a return air filter grille. (VRPXAP1).
- Exterior louvers are available in anodized aluminum or in custom painted colors and two different sizes: One for only 12K Btu units and the other that can be used with either 12K or 24K units. Refer to page 12 for details
- Unit is controlled by a remote wall-mounted 'Controller'

Wall Plenum for VRP12 with VRPXWPA-8/14 "



Wall Plenum for VRP24 with VRPXWPB-8/14 "



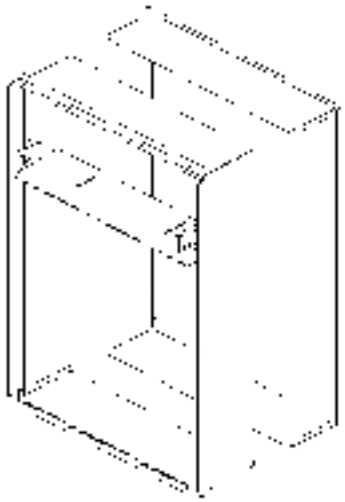
Accessory	Description	Outer Dimensions
VRPXWPA-8	Compact Wall Plenum for 4" to 8" thick wall	28 7/8" (W) x 33 3/8" (H)
VRPXWPB-8	Standard Wall Plenum for 4" to 8" thick wall	28 7/8" (W) x 43 3/8" (H)
VRPXWPA-14	Compact Wall Plenum for 8" to 14" thick wall	28 7/8" (W) x 33 3/8" (H)
VRPXWPB-14	Standard Wall Plenum for 8" to 14" thick wall	28 7/8" (W) x 43 3/8" (H)

Figure 212 (12k and 24k Accessories Dimensional Data - Wall Plenums)

SPECIFICATIONS

36k Accessories Dimensional Data-Louvers

VRPXWPC-8/14



VRPXALC/VRPXSCC

Accessory	Description	Outer Dimensions
VRPXWPC-8	VRP36 Wall Plenum for 4" to 8" thick wall	33" W x 52" H
VRPXWPC-14	VRP36 Wall Plenum for 8" to 14" thick wall	33" W x 52" H
VRPXALC	VRP36 Architectural Louver	33" W x 52 1/2" H
VRPXSCC	VRP36 Architectural Louver Special Color	33" W x 52 1/2" H

Figure 213 (36K Accessories Dimensional Data-Louvers)

OPERATION

Sequence Of Operations

Cooling Sequence:

The wall thermostat provides the temperature set point as well as the current dry bulb temperature and relative humidity. Upon a call for cooling, the compressor modulates based on the difference between room temperature and set point. As cooling demand decreases the compressor will modulate to a minimum speed. If the room temperature drops 2 °F below set point the compressor will cycle off.

Heating Sequence:

The wall thermostat provides the temperature set point as well as the current dry bulb temperature and relative humidity. Upon a call for heating, the compressor modulates based on the difference between room temperature and set point. As Heating demand decreases the compressor will modulate to a minimum speed. If the room temperature raises 2 °F above set point the compressor will cycle off.

Main Supply Fan Sequence:

Option 1: (ON/Continuous) The Supply fan runs continuously

Option 2: (Auto) The Supply fan cycles with the compressor.

Option 3: (Smart Fan) The Supply fan cycles with the compressor. The fan will modulate based on the difference between the space temperature and space set point.

IAQ Ventilation Fan Sequence:

Option 1: (ON) The fan(s) runs at all times.

Option 2: (OFF) The OSA fan(s) do not run.

Hot Gas Reheat Coil Sequence:

Once the sensible load of the space is satisfied, and if the relative humidity of the space is above 55%, the hot gas reheat coil will be activated. The hot gas reheat coil will remain activated until the relative humidity drops below 50% or if the room temperature creeps too far away from set point.

Auxiliary Electric Heat Sequence:

Auxiliary Heat is activated on a sliding scale based on outdoor ambient temperature and the difference between set point and room temperature. During mild ambient conditions, the large difference between set point and actual room temperature is permitted. In extreme low temperatures a smaller difference between the two are permitted energizing the auxiliary heat sooner.

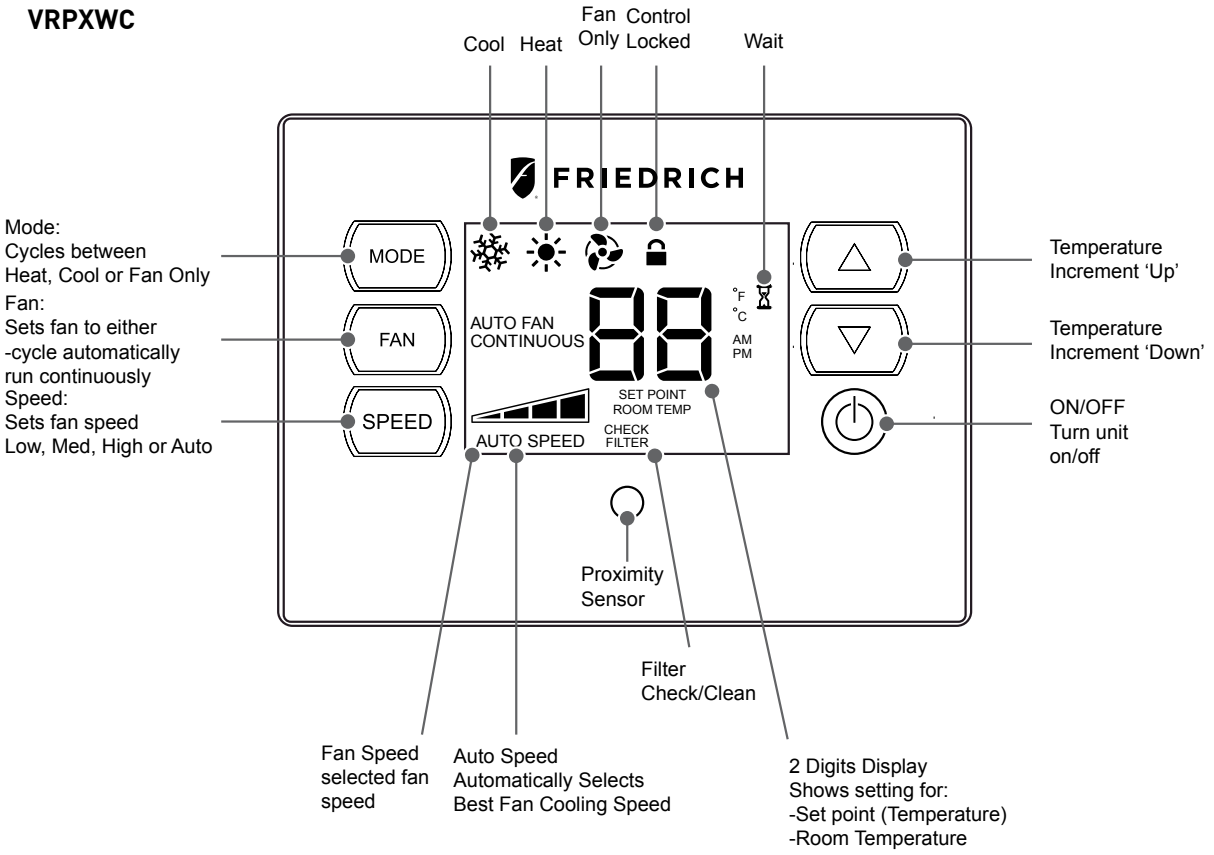
Defrost:

The electric heat for the VRP is to be considered “backup” and not “supplemental”. At no point in time will the pump and electric heat operate simultaneous. Normally, and in a vast majority of heating conditions, the heat pump will be the primary source of heat (down to 0°F). Eventually, the outdoor coil may accumulate frost and the unit will require a defrost cycle. If the space is still 1 °F or more below set point, the VRP will stop heat pump operation and satisfy the space with electric heat. Once the room is satisfied the VRP will operate the blower and condenser fans at their lowest speeds and run the compressor in the cooling cycle to defrost the outdoor coil. The blower fan operates to help prevent the indoor coil from freezing during this process. Once the outdoor coil rises above 46 degrees Farenheit, the defrost cycle will end and the unit will continue with normal operation based on the space conditions and settings.

OPERATION

Wall Controller Operation

VRPXWC



Push Buttons
There are three control push buttons on each side of the display. Each Push Button illuminates to indicate that the power is on. The backlight on the Push Buttons will automatically dim to 20% intensity after 15 seconds of inactivity.

Display
The display is a high efficiency LCD with a built-in white backlight. The backlight has an automatic two (2) step dim function. After 15 seconds of inactivity, the display dims to 20% intensity. After an additional 120 seconds, the display switches off. Touching any button automatically changes the display to full brightness. [Unless the Motion Sensor is activated.]

VRPXEM(W)RT1/2

Energy management wall controller with an occupancy sensor

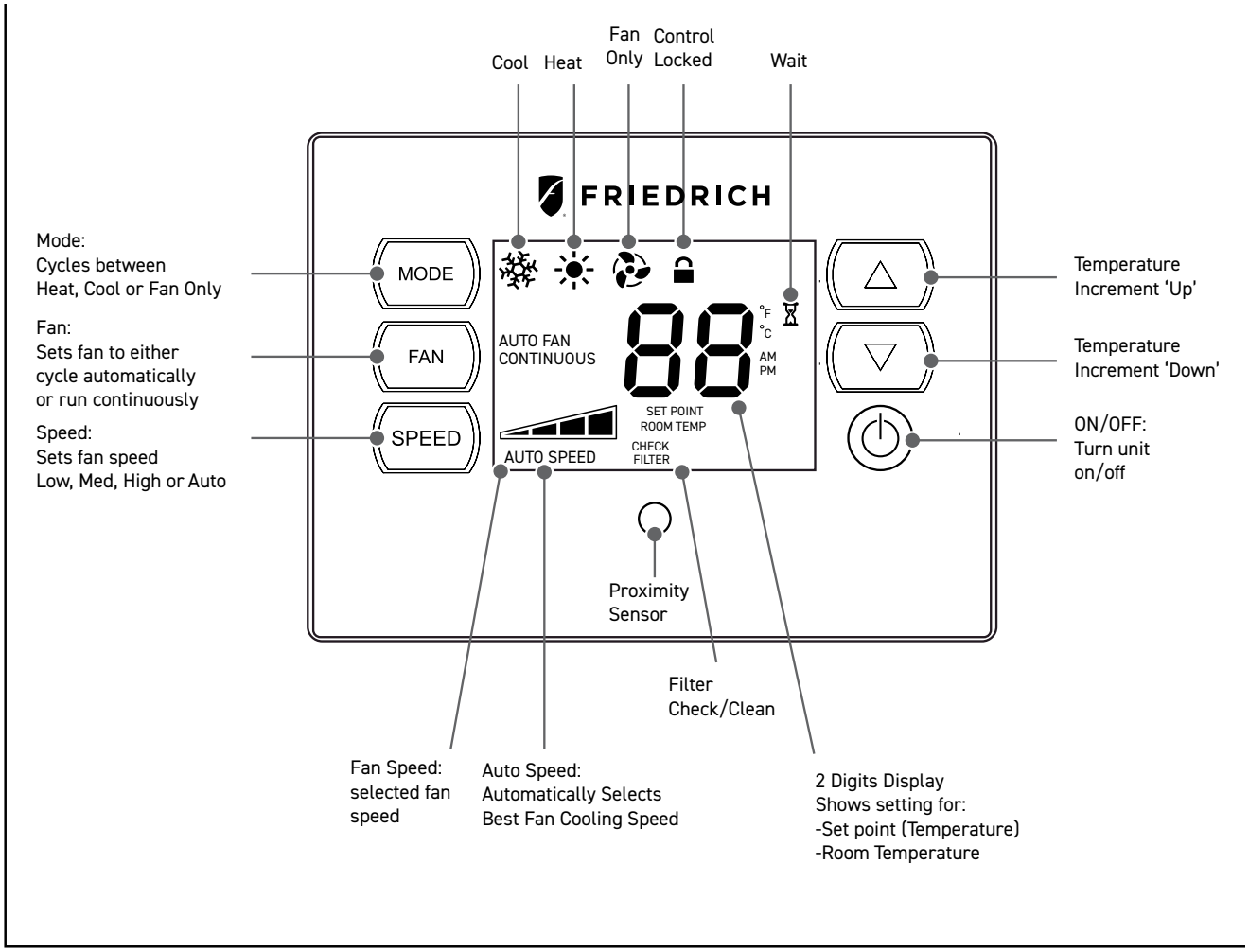
WIRED	VRPXEMRT2
WIRELESS	VRPXEMWRT2

Note: For VRPXEMRT2 and VRPXEMWRT2 please refer to respective Installation and Operations Manuals

VRPXEM(W)RT2

OPERATION

Wall Controller



Push Buttons

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Display

The display is a high efficiency LCD with a built-in white backlight. The backlight has an automatic two (2) step dim function. After 15 seconds of inactivity, the display dims to 20% intensity. After an additional 120 seconds, the display switches off. Touching any button automatically changes the display to full brightness. [Unless the Motion Sensor is activated.]

Wiring

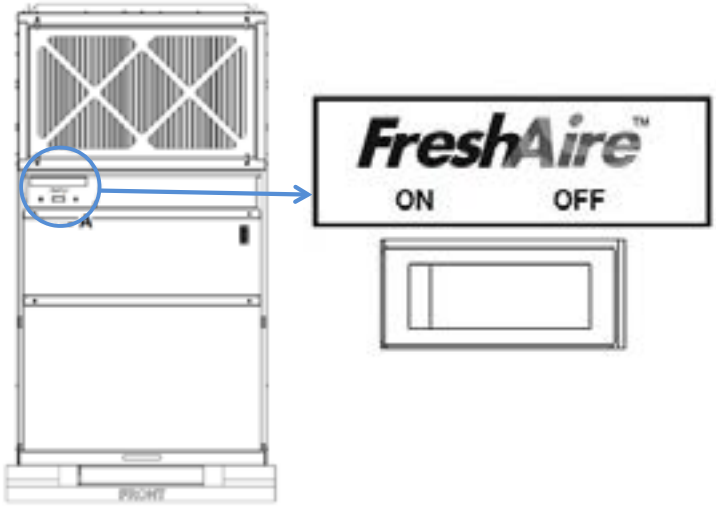
Use Cat 6 cable in twisted pair strands.

For VRPXEMRT1 & VRPXEMWRT1, refer to respective Installation & Operation Manuals

OPERATION

FreshAire Control

- To engage the FreshAire system, flip the switch into the ‘ON’ position.



OPERATION

Startup-Process
Firmware Overview

- The VRP, like smartphones and computers, uses special coding to control unit operation called Firmware.
- Firmware contains the software needed by components to function and is stored to onboard SD cards.
- There are three components which require firmware to operate:

VRPXWC Wall Controller

Motor Control System (MCS)

Friedrich Main Controller (FMC)

OPERATION

Startup-Process
Firmware Overview

MCS SD cards have a ***yellow*** dot.

FMC SD cards have a ***green*** dot.

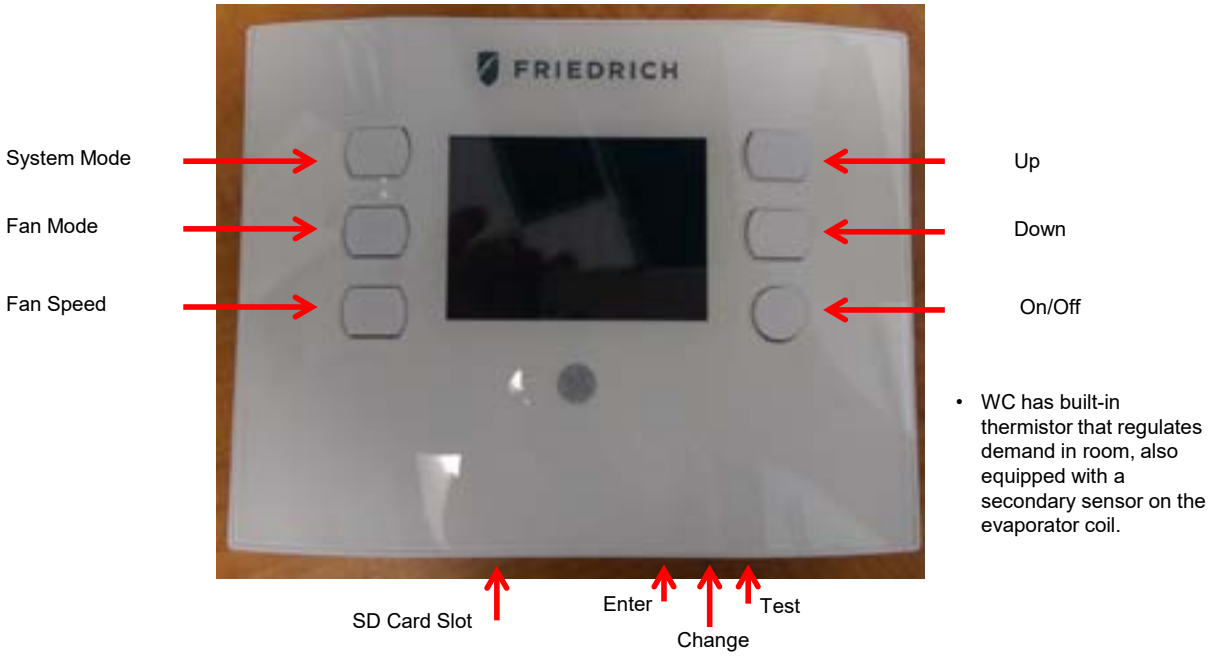
- All firmware has a "version" to denote the equipment's operating guidelines.

- All firmware versions can be checked/confirmed from the VRPXWC only. It is recommended that the VPXWC is used for startup and troubleshooting purposes.

OPERATION

Startup-Process

VPXWC Overview

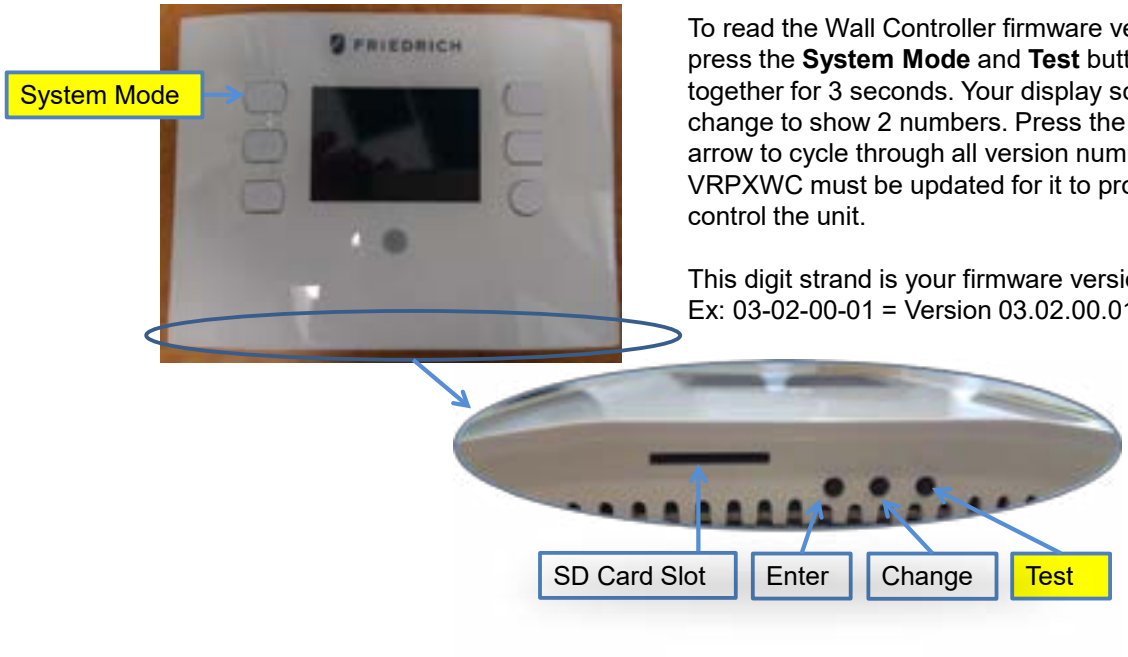


- WC has built-in thermistor that regulates demand in room, also equipped with a secondary sensor on the evaporator coil.

OPERATION

Startup-Process

Wall Controller Firmware



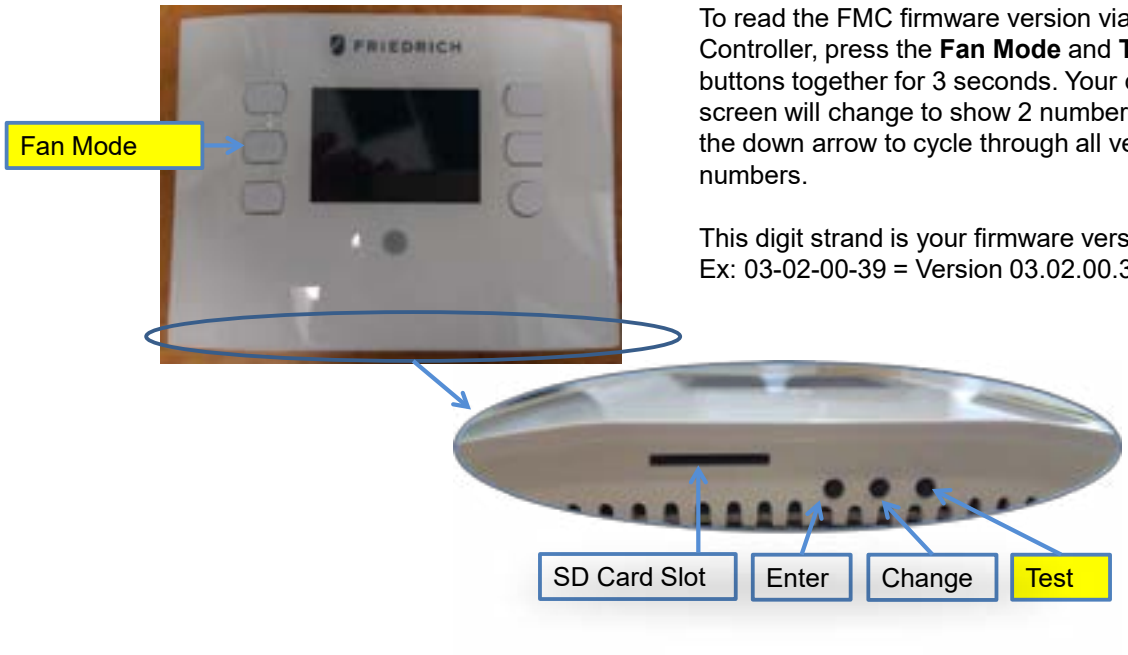
To read the Wall Controller firmware version, press the **System Mode** and **Test** buttons together for 3 seconds. Your display screen will change to show 2 numbers. Press the down arrow to cycle through all version numbers. The VRPXWC must be updated for it to properly control the unit.

This digit strand is your firmware version.
Ex: 03-02-00-01 = Version 03.02.00.01.

OPERATION

Startup-Process

FMC Firmware via Wall Controller (WC)



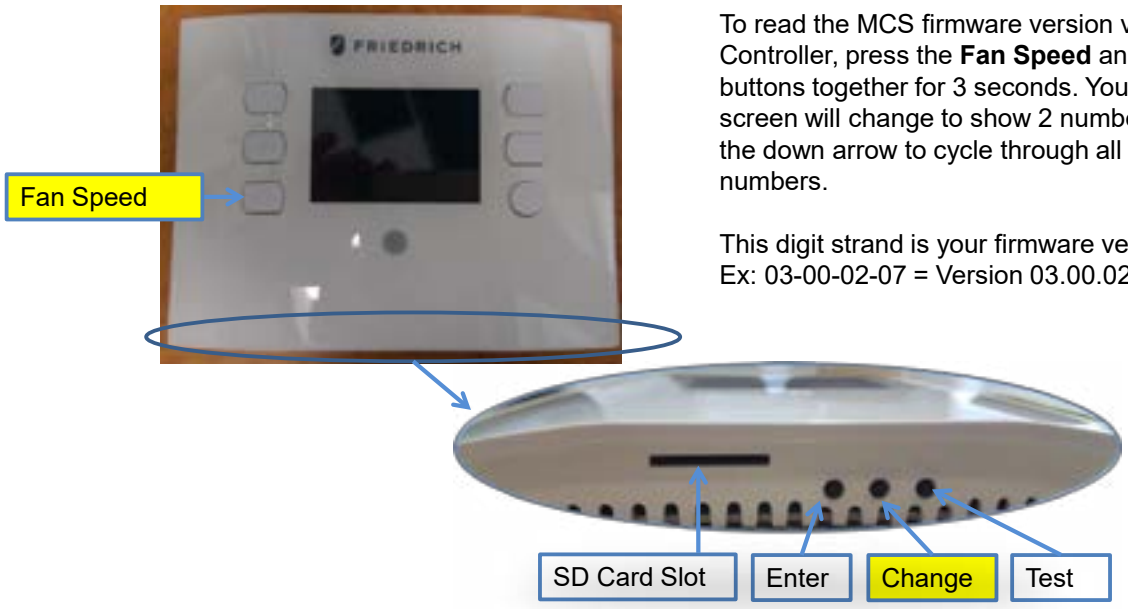
To read the FMC firmware version via the Wall Controller, press the **Fan Mode** and **Test** buttons together for 3 seconds. Your display screen will change to show 2 numbers. Press the down arrow to cycle through all version numbers.

This digit strand is your firmware version.
Ex: 03-02-00-39 = Version 03.02.00.39.

OPERATION

Startup-Process

MCS Firmware via Wall Controller (WC)



To read the MCS firmware version via the Wall Controller, press the **Fan Speed** and **Change** buttons together for 3 seconds. Your display screen will change to show 2 numbers. Press the down arrow to cycle through all version numbers.

This digit strand is your firmware version.
Ex: 03-00-02-07 = Version 03.00.02.07.

OPERATION

Startup-Process

VRPXWC Operating Modes

- The VRP currently supports two main operating modes:
  - Cooling
  - Heating

OPERATION

Startup-Process

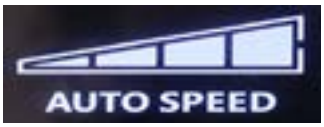
Fan Operating Modes

- The VRP currently supports two fan operating settings by pressing the **FAN** button.
  - **Auto Fan**
    - Fan only operates when there is a temperature demand and will assume a standby mode when temperature demand is lost.
  - **Continuous**
    - Fan will continue to operate in designated speed regardless of demand (unless “Off”).

OPERATION

Startup-Process

Fan Operating Modes



- The VRP currently supports three fan operating speed settings by pressing the **SPEED** button.
  - **Low**
    - Fan operated at minimum CFM
  - **High**
    - Fan operated at maximum CFM
  - **Auto Speed (Smart Fan)**
    - The indoor blower optimizes CFM based on proximity to set point.
- Verify fan operation in High and Low speed, then set to “Auto Speed” in either cooling or heating mode.

OPERATION

Startup-Process

Cooling Operating Mode

Cooling Operation Mode

- Press the “Mode” button to display your cooling icon.
- Use the up and down arrows to ensure that the set point is lower than the room temperature.
- Verify with a temperature measuring instrument (Dry Bulb or IR Thermometer) the decrease in temperature at the register or diffuser. The temperature will vary.
- Example: Air discharge temperature starts at 76F, and is 56F after 3 minutes of cooling.

OPERATION

Startup-Process

Heating Operating Mode

- Press the “Mode” button until the heat icon is displayed.
- Use the up and down arrows to ensure that the set point is higher than the room temperature.
- Verify with a temperature measuring instrument (Dry Bulb or IR Thermometer) for an increase in temperature at the register or diffuser. The temperature will vary.
- The set point can be raised to the maximum (85F) to force Electric Heat mode depending on the current room conditions.
- Example: Air discharge temperature starts at 76F, and is 91F after 3 minutes of heating.

OPERATION

Startup-Process

Button Light Functions

- To change back light dim setting on the buttons:
  - Press & hold the “Power” button for 3 seconds.
    - There are 3 different settings:
      - **Option 1** (Factory setting) is Auto Dim. The wall controller’s light will start at 100%, then dim to 20% after 45 seconds of inactivity, finally turning off after another 2 minutes.
      - **Option 2** will dim the backlight to continuous 20% level.
      - **Option 3** will maintain backlight at 100%.
  - Once you select your desired setting, press the enter button on the bottom of the WC to lock in your setting.

OPERATION

Startup-Process

VRPXWC Button Sequences

Action/Menu	Button(s) Press ***hold for 3 seconds***
Filter Reset	System Mode + Fan Mode
Lock/Unlock Keys	Change + Test
F/C Toggle	Up + Down
VRPXWC Firmware Version	System Mode + Test
FMC Firmware Version	Fan Mode + Test
MCS Firmware Version	Fan Speed + Test
Dimness Level	Power
Active Errors	Fan Mode + Fan Speed

OPERATION

Component Identification

- Indoor Coil
- Indoor Blower
- Outdoor Coil
- Outdoor Fan
- Compressor
- Electric Heater
- Electronic Expansion Valve (EEV)
- 4-Way Reversing Valve
- Reheat Solenoids
- FreshAire Fan
- Pressure Switches
- Condensate Base Pan Heaters (optional)
- Sump Pan (36k models only)

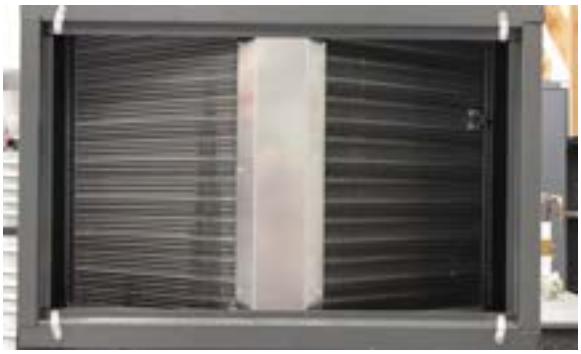
OPERATION

Component Identification

Indoor Coil 12 & 24k

12k (1 ton)
Slab coil

24k (2 ton)
“A” frame coil



Monitored by 2 thermistors

OPERATION

Component Identification

Indoor Coil 36k

OPERATION

Component Identification

Indoor Blower

- BLDC
- Counter Clockwise Impeller
- 600-1300 RPM

OPERATION

Component Identification

Outdoor Coil

- Monitored by 1 thermistor

OPERATION

Component Identification

Outdoor Fan

- BLDC
- Variable Speed= 600-1000 RPM

OPERATION

Component Identification

Compressor

- 12k (1 Ton)
  - Inverter Rotary
  - Single Rotor

- 24k (2 Ton)
  - Inverter Rotary
  - Dual Rotor

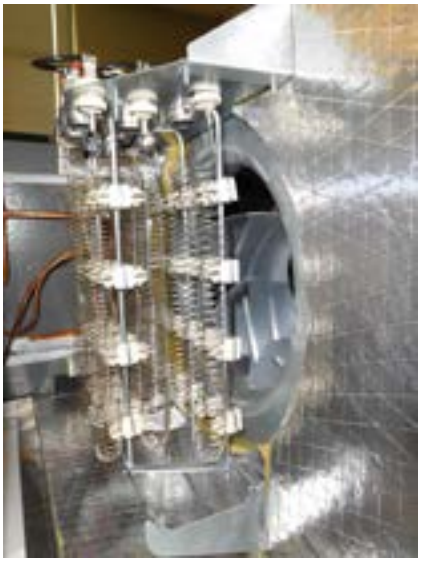
  - 36k (3 ton)
  - Copeland Scroll

OPERATION

Component Identification

Electric Heater

- 2.5 / 3.4 / 5.0 / 7.5 / 10.0 Kilowatt variations
- Located directly behind the indoor coil and in front of the indoor blower



OPERATION

Component Identification

Electronic Expansion Valve

- Three sizes
  - 12k
  - 24k
  - 36k
- Used to control superheat
- Controlled by magnetic pulse

OPERATION

Component Identification

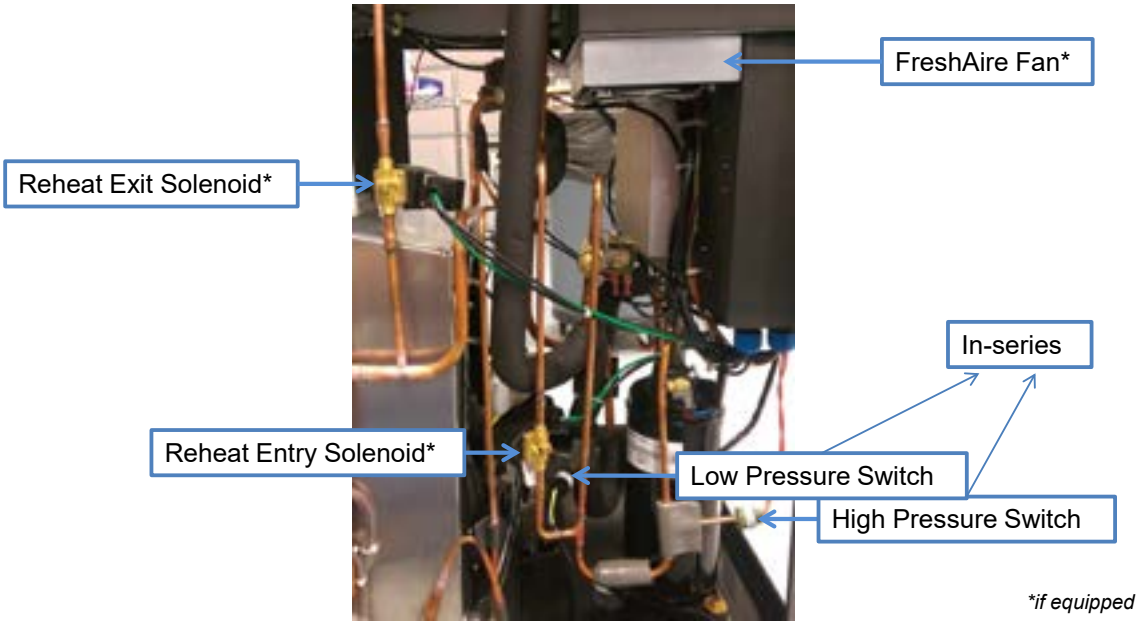
4-Way Reversing Valve

- 208/230v
- Reversing valve assembly

OPERATION

Component Identification

Remaining Components (Side View)

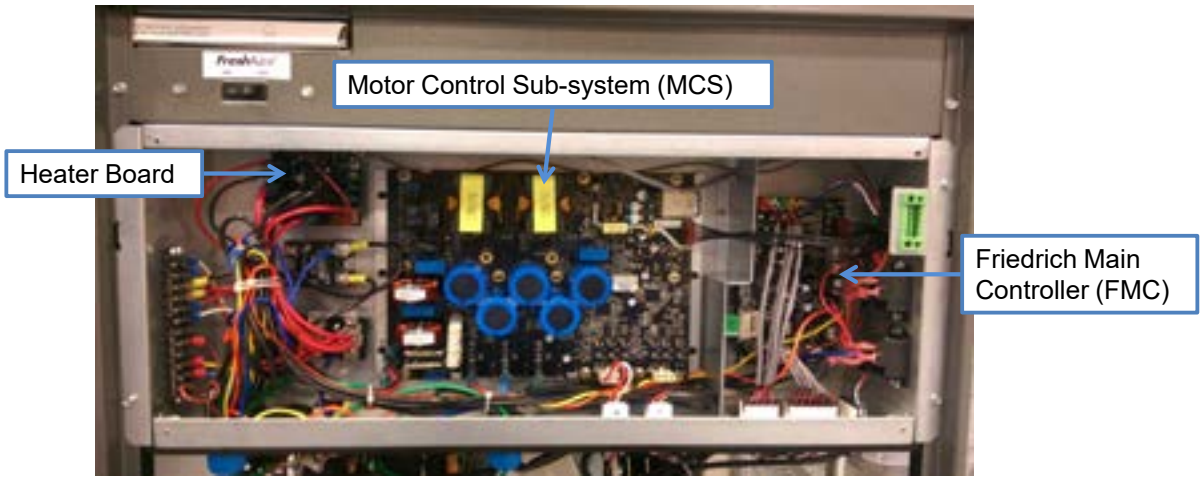


**if equipped*

OPERATION

Component Identification

VRP Control Boards



OPERATION

Component Identification

Main Controller

- **Relay and Control Logic (VRP Brain)**
  - Diagnostic Logic
- **Communicates with:**
  - Wall Controller (WC)
  - Heater Board
  - Motor Control Sub-system (MCS)
- **Handles/Controls:**
  - Electronic Expansion Valve (EEV)
  - Pressure Switches
  - Indoor Blower
  - Reheat and FreshAire Relays
- **Upgradeable**
  - Wall Controller via SD card
  - Manual via SD card

OPERATION

Component Identification
Main Controller(FMC)

- **Thermistors**
  - IDC Cool Inlet (T1)
  - Liquid Heat (T2)
  - Comp. Suction (T3)
  - Comp. Discharge (T4)
  - IDC Heat Cond (T5)
  - Liquid Cool (T6)
  - ODC Heat Inlet (T7)
  - Return Air (T8)
  - Discharge Air (T9)
  - Outdoor Air (T10)

OPERATION

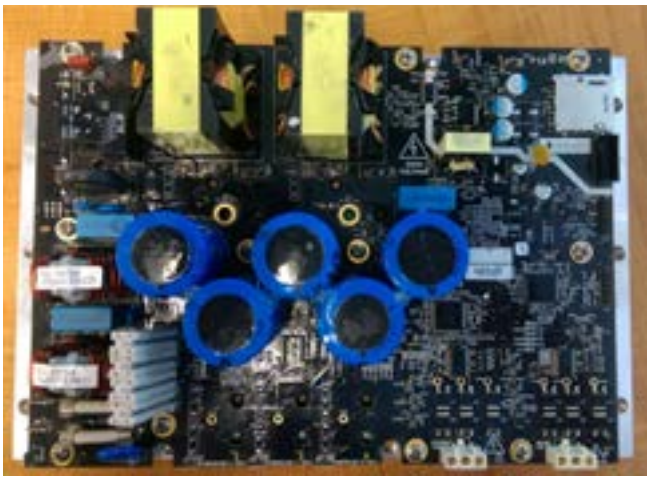
Component Identification

Motor Control Sub-System (MCS)

- High Voltage
- Controls:
  - Compressor
  - OD Fan
- Communicates directly with FMC
- Upgradeable
  - Wall controller via SD card
  - Manual via SD card

OPERATION

Component Identification
Motor Control Sub-System (MCS)



- Active Power Factor Corrector (PFC)
  - Handles robust AC voltage range
    - 187-293 Vac
  - Maintains healthy DC bus voltage
    - 430 Vdc
- Provides precise motor control
- Internal hardware and software protection

OPERATION

Component Identification

Heater Board

- High Voltage
- Controls:
  - Electric Heater
  - 4-Way (Reversing) Valve
- Communicates directly with the FMC

OPERATION

Component Identification

Compressor Control

- The rate of change of the space conditions is assessed periodically and the compressor frequency is changed accordingly.
- Unless diagnostically conflicted, the compressor will operate in some capacity any time there is a cooling or heat pump demand.

OPERATION

Component Identification

EEV Control

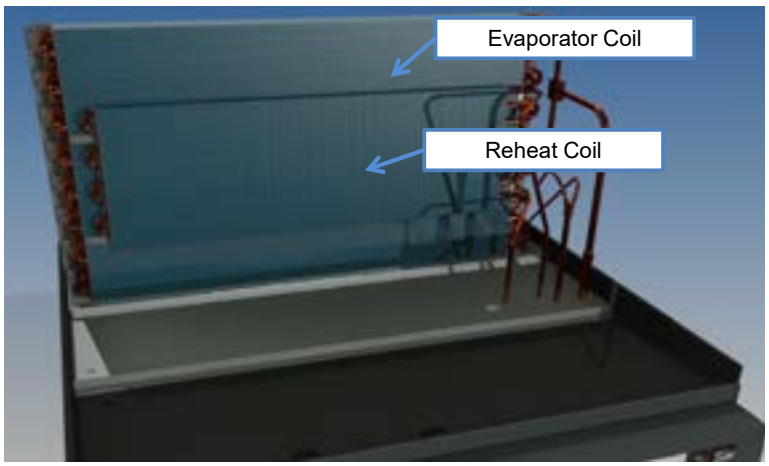
- The Electronic Expansion Valve is used to maintain superheat during both cooling and heat pump operation.
- Superheat (cooling) = Compressor Suction (T3) – IDC Cool Inlet (T1)
- Superheat (heat pump) = Compressor Suction (T3) – ODC Heat Inlet (T7)
- The EEV will open if the super heat is too high and will meter if the super heat is too low.

OPERATION

Component Identification

Reheat Control

- The VRP models, when equipped with the reheat option, increase room dehumidification capability.
- The reheat option has a coil installed downstream of the main indoor evaporator coil.
- When activated, a portion of the compressor discharge gas is routed through the reheat coil.
- This coil “reheats” the air leaving the evaporator and allows longer run times for additional dehumidification without over-cooling the room.



OPERATION

Component Identification

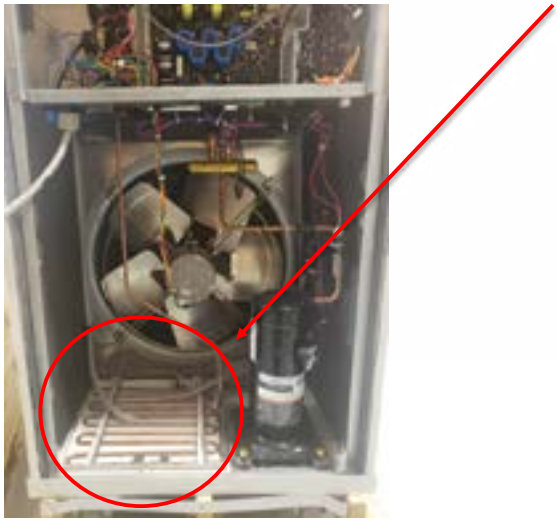
Condensate Base Pan Heater

- Friedrich offers optional condensate base pan heaters.
- These heaters may be required in certain applications.
- Base pan heaters work in conjunction with an adjustable thermostatic sensing bulb and will turn on when outdoors temperatures are low enough to cause freezing of condensate in the drain pan.

OPERATION

Component Identification

Condensate Sump Pan - 36k Models



- Only 36k models utilize a condensate sump pan
- During cooling operation condensate from the indoor coil drains into this pan
- The condensate in the pan helps pre-cool the hot liquid refrigerant and increases overall efficiency of the system.
- If the outside air gets near freezing the bellows valve in the pan opens and condensate drains out to prevent the pan from freezing.
- This pan should be cleaned during regular system maintenance.

INSTALLATION

The Friedrich VRP 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 insrtructions and safety warnings detailed in this manual. All applicable national and local mechanical and electrical codes should be followed and take precedence over any Friedrich requirements or reccomenedations regarding installation applications 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

Indications property damage can occur if instructions are not followed.

INSTALLATION

VRP Required Minimum Clearances

Building Exterior Unit Opening Requirements

VRP 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.

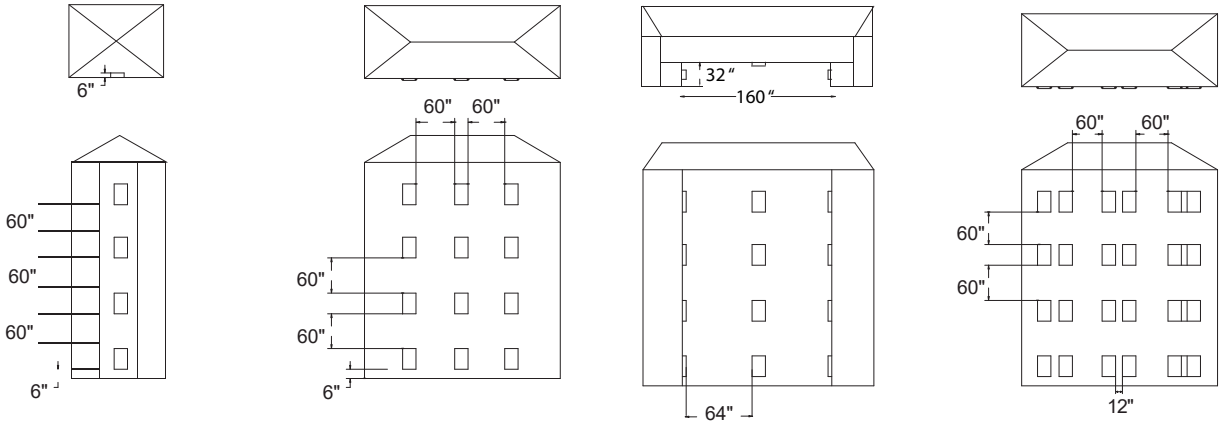


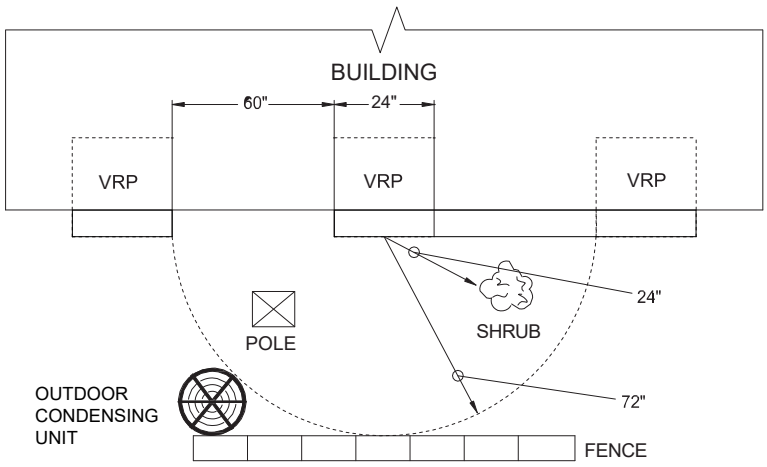
Figure A Figure B Figure C Figure D

Grill Clearance Requirements

Where obstructions are present use the following guidelines for proper spacing from the VRP exterior louvered grill. Friedrich reccomends 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.

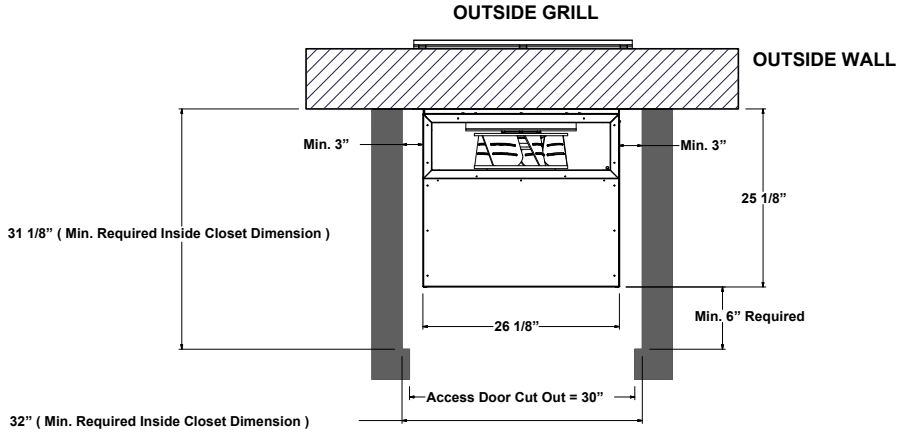
For major obstructions such as a solid fence, wall, or other heat rejecting devices like a condensing unit, a minimum distance of 72" must be kept.



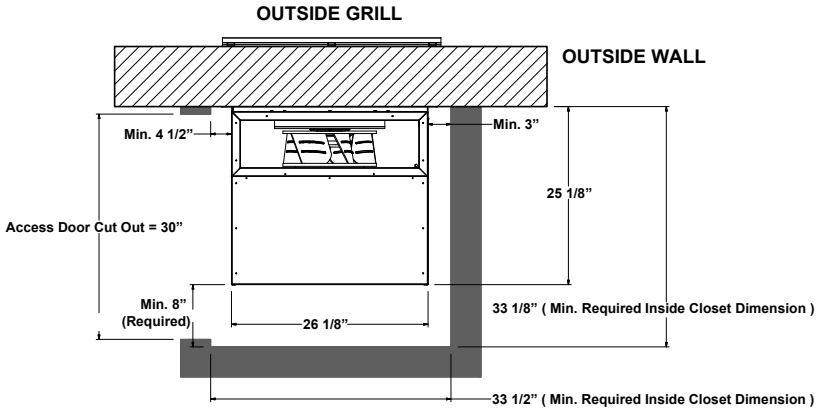
The the example pictured above is for reference only and does not represent all possible installations. Please contact Friedrich Air Conditioning for information regarding effects of other installation arrangements.

INSTALLATION

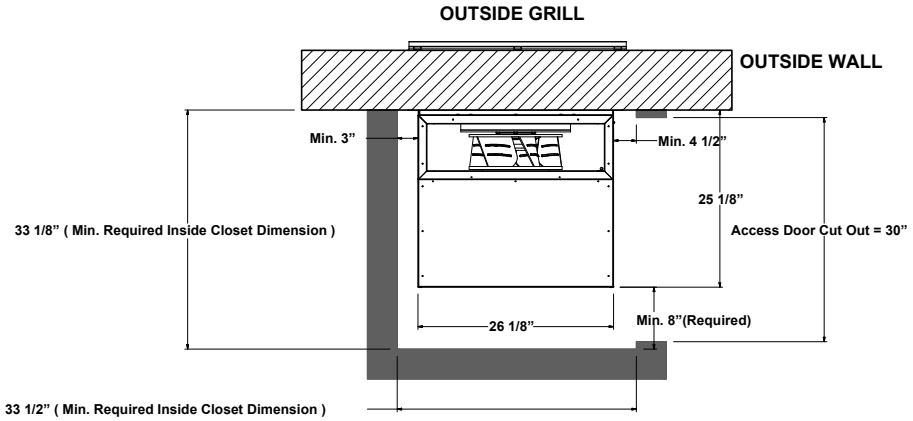
Installation Orientations 12&24k



Front Installation-Top View



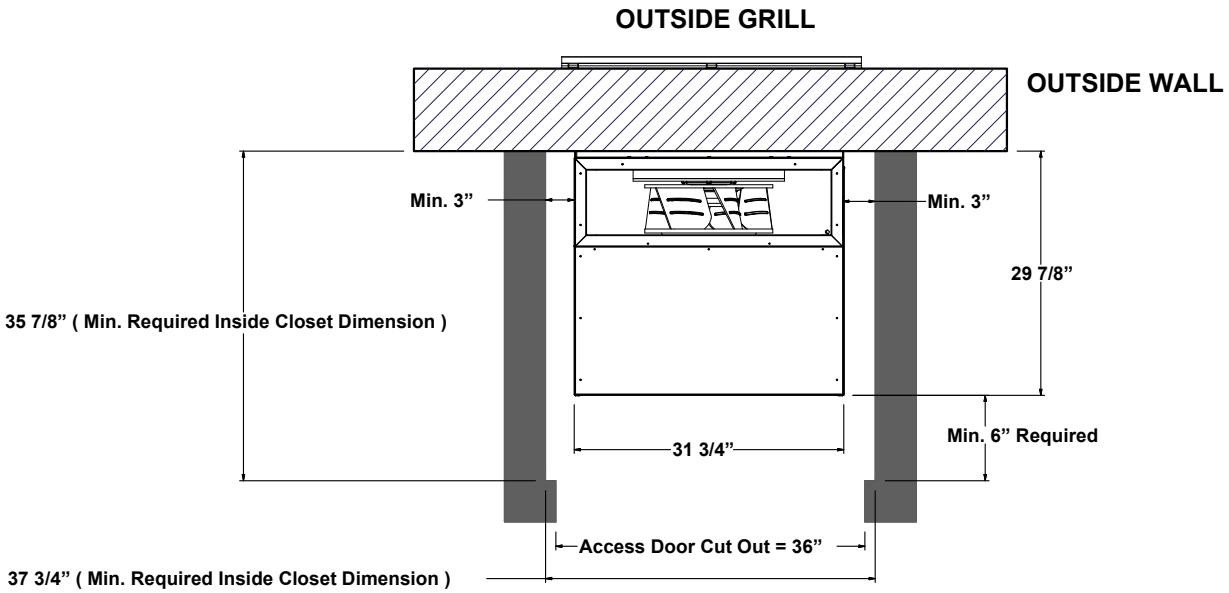
Left Installation-Top View



Right Installation-Top View

INSTALLATION

Installation Orientations 36k



NOTE: The VRP 3-ton unit comes equipped with bi-directional casters for ease of movement. The casters only allow for movement forward and backward. The VRP 3-ton should be installed with the access door positioned in front of the unit.

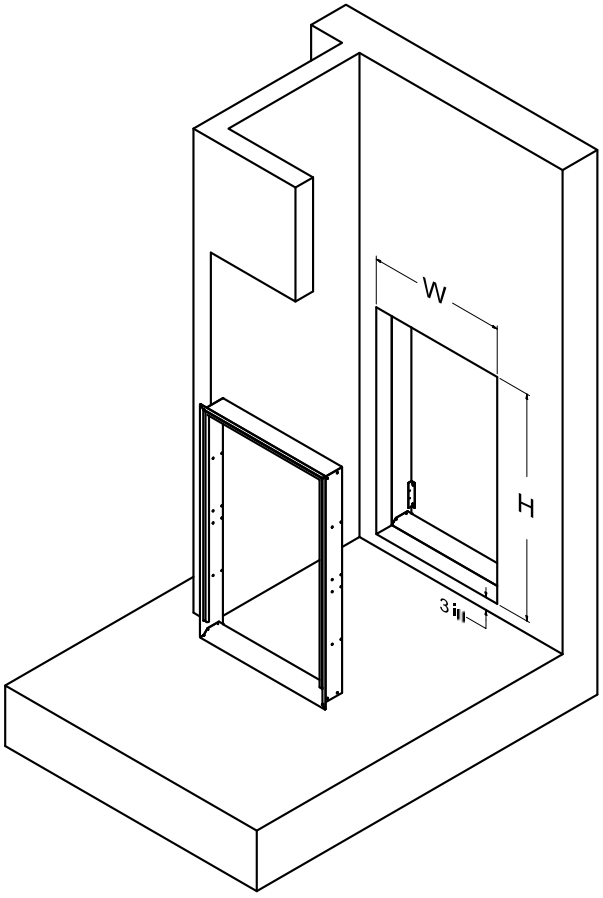
INSTALLATION

Exterior Wall Opening Dimensios 12 &24k

Exterior Wall Rough Opening Dimensions		
Unit	Width	Heigth
Compact (VRPXWPA-*)	28 1/8"	32 1/4"
Standard (VRPXWPB-*)	28 1/8"	42 1/4"

Compact (A) configuration is for 12000 BTU units only. Standard (B) configuration is for 24000 BTU and 12000 BTU units. A compact 12000 BTU unit can be converted to standard dimensions with a factory provided adapter. Ensure that the correct wall plenum is selected based on unit configuration.

NOTE: The distance between the rough opening and the finished floor/platform must be 3".



INSTALLATION

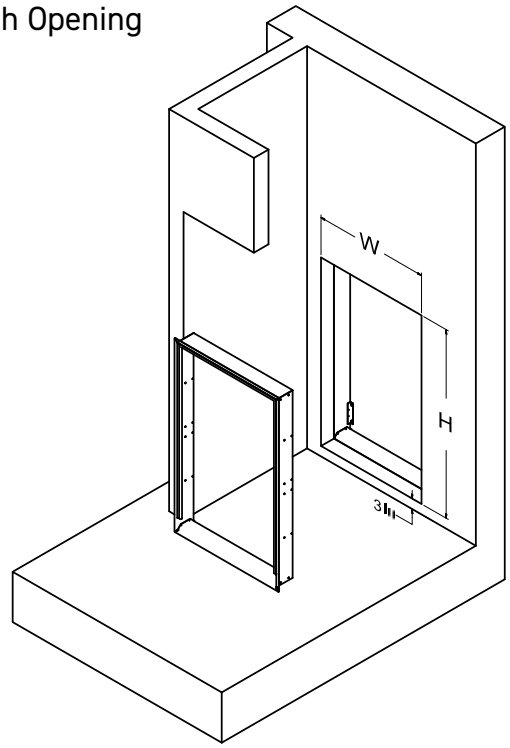
Exterior Wall Opening Dimensios 12 &24k

WALL OPENING DIMENSIONS		
Unit	W	H
12K	28 1/8"	32 1/4"
24K*	28 1/8"	42 1/4"

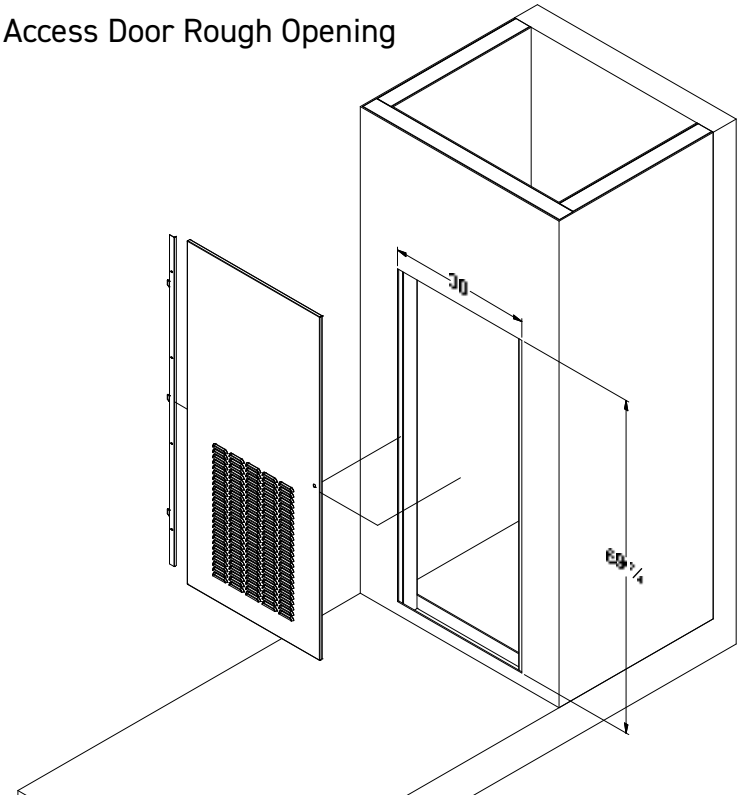
*Also applicable for 12K unit if VRPXALB/VRPXSCB Louver and VRPXWPB-8/VRPXWPB-14 plenum are selected to be used with 12K unit. (Hint: Your unit model name should have letter '**B**' as the 11th digit. Example: VRP12K34SS **B**S)

NOTE: The distance between the rough opening and the finished floor/platform should be 3"

Exterior Rough Opening



Access Door Rough Opening

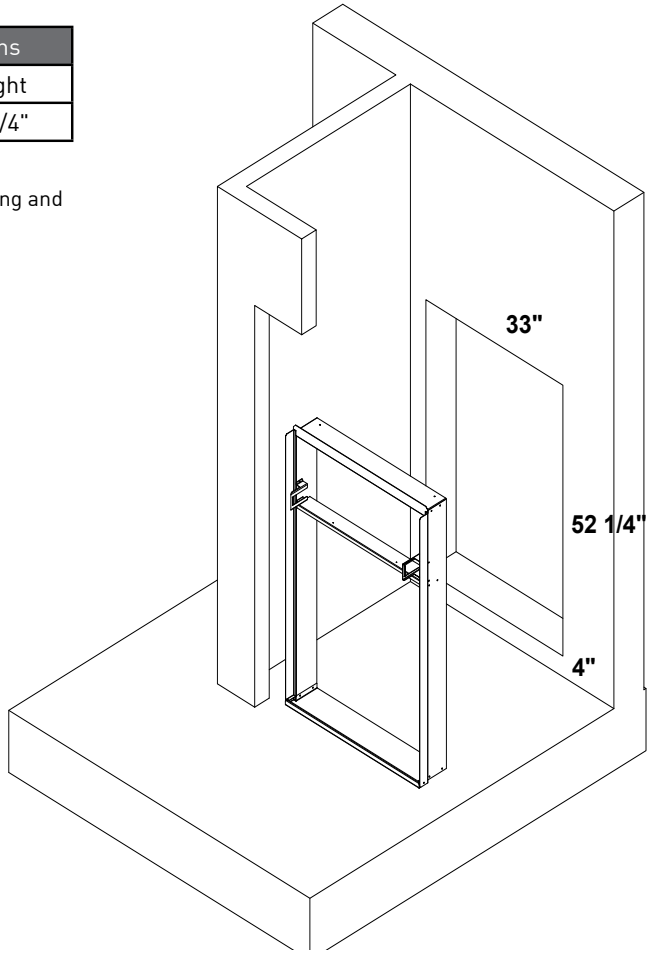


INSTALLATION

Exterior Wall Opening Dimensios 36k

Exterior Wall Rough Opening Dimensions		
Unit	Width	Height
VRPXWPC-*	33"	52 1/4"

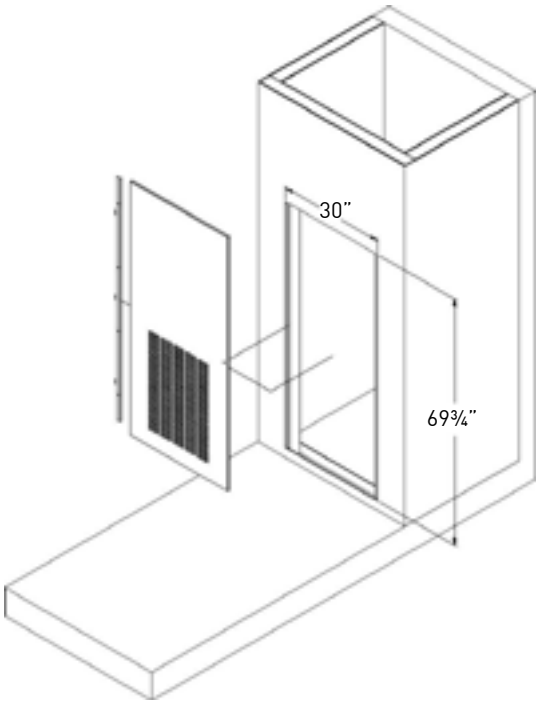
NOTE: The distance between the rough opening and the finished floor/platform must be 4".



INSTALLATION

Interior(Closet) Wall Opening Dimensions 12 & 24k

Return Air Access Door Wall Cut-Out



NOTE: To maintain ease of removal and serviceability, if the unit is installed on a platform ensure that the total height of the unit from the floor does not exceed the height of the interior rough opening.

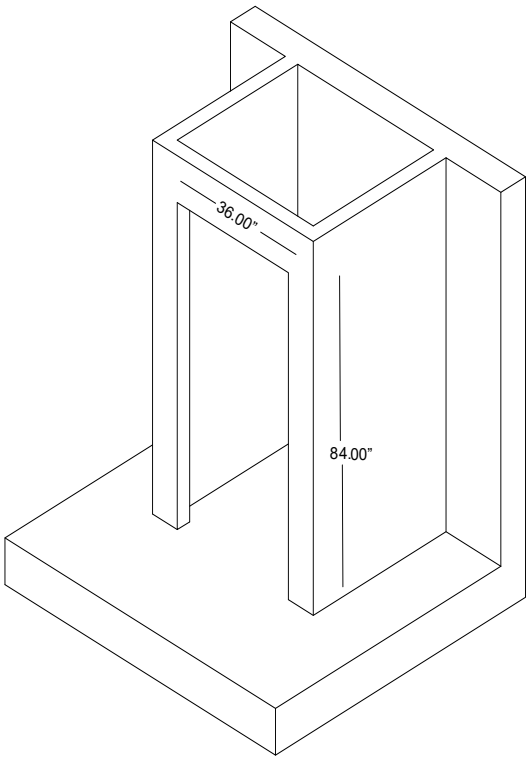
INSTALLATION

Interior(Closet) Wall Opening Dimensions 36k

Return Air Access Door Wall Cut-Out

Interior Wall Rough Opening Dimensions		
Unit	Width	Height
VRP36	36"	84"

NOTE: Dimensions based on standard 36" door frame.



INSTALLATION

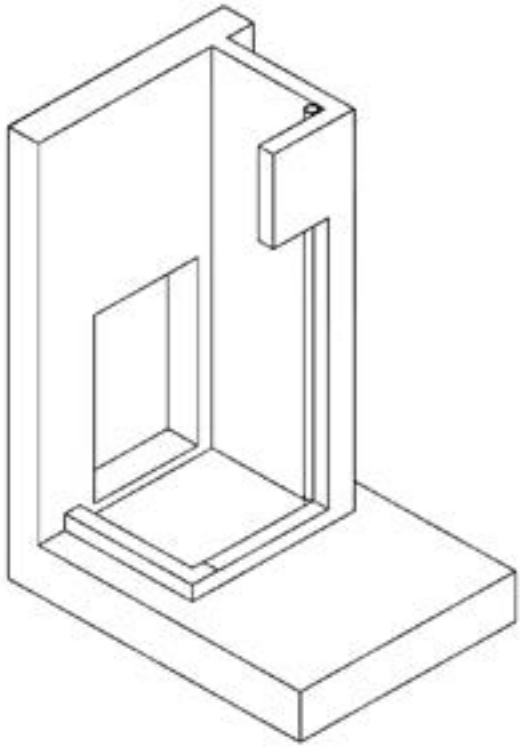
Preliminary Plumbing

Standard (Front Install)

The image to the right shows the installation closet for the standard (Front Install) configuration (where the wall plenum is opposite the service access door).

A drainage system is required, and should provide a "P-trap" to prevent undesirable waste gas from entering into the residential area. This is represented by a vertical standpipe in the image shown, but other solutions are possible and are at the discretion of the building designer and contractor.

The near wall has been trimmed away at the door centerline to permit full view of the installation.

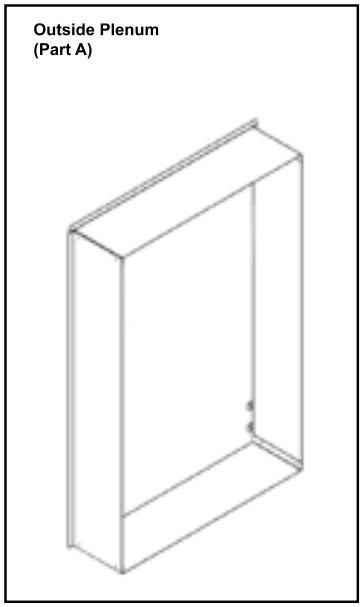


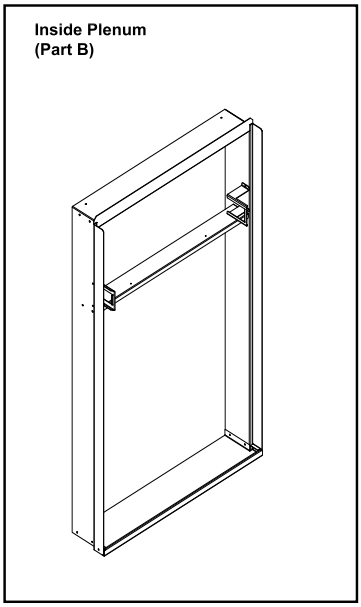
INSTALLATION

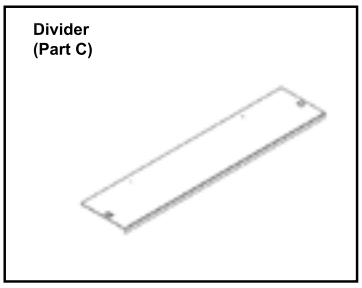
Wall Plenum Installation 12 & 24k

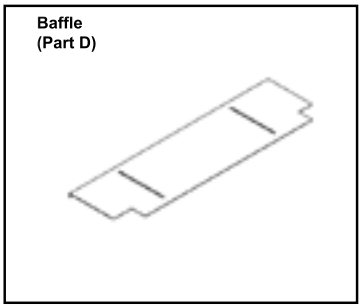
Parts included in Plenum kit:

Outside Plenum (Part A)
Inside Plenum (Part B)
Divider (Part C)
Baffle (Part D)



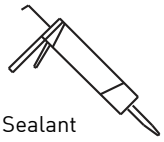


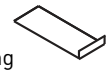




Field Supplied Parts:

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

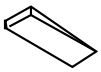

Sealant


Flashing

VRPXWPA-8, VRPXWPB-8 adjust for walls up to 4"- 8" thick.

VRPXWPA-14, VRPXWPB-14 adjust for walls up to 8" - 14" thick

All installations are similar.

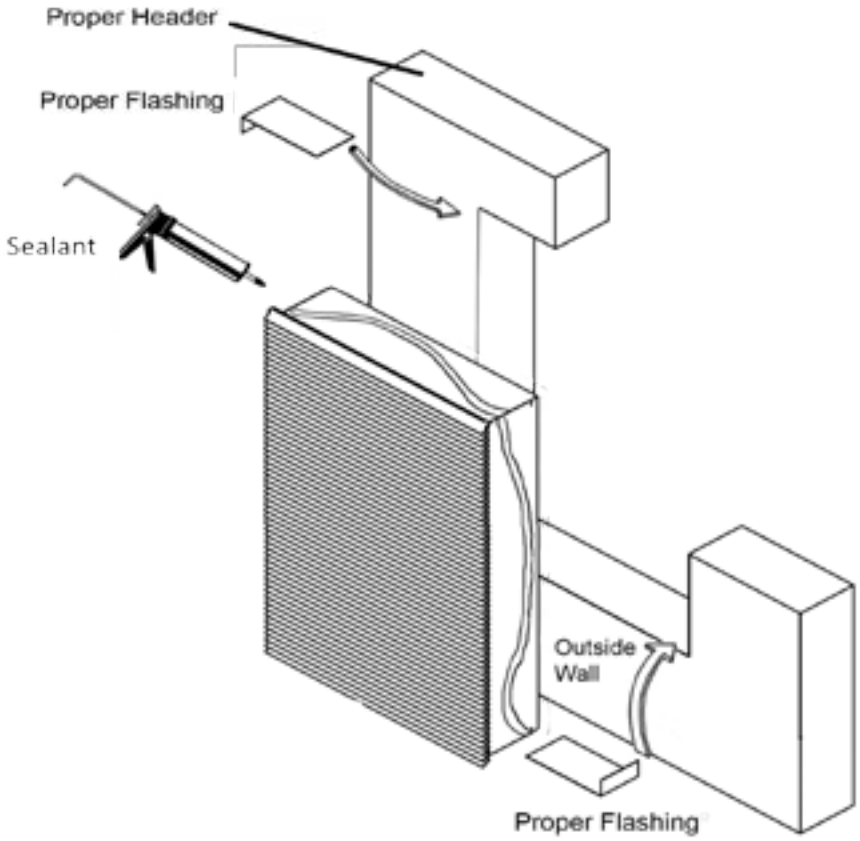

Shim


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

INSTALLATION

Wall Plenum Installation 12 & 24k

ep 1 - Outside Wall Plenum Half



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

Prepare the rough opening. The rough opening should be lined with metal or wood. The plenum will warp if sealed against concrete or brick.

Dry fit the outside plenum half into the rough opening and check the fit and level.

Remove the outside plenum half, flash the rough opening to ensure proper fit and level.

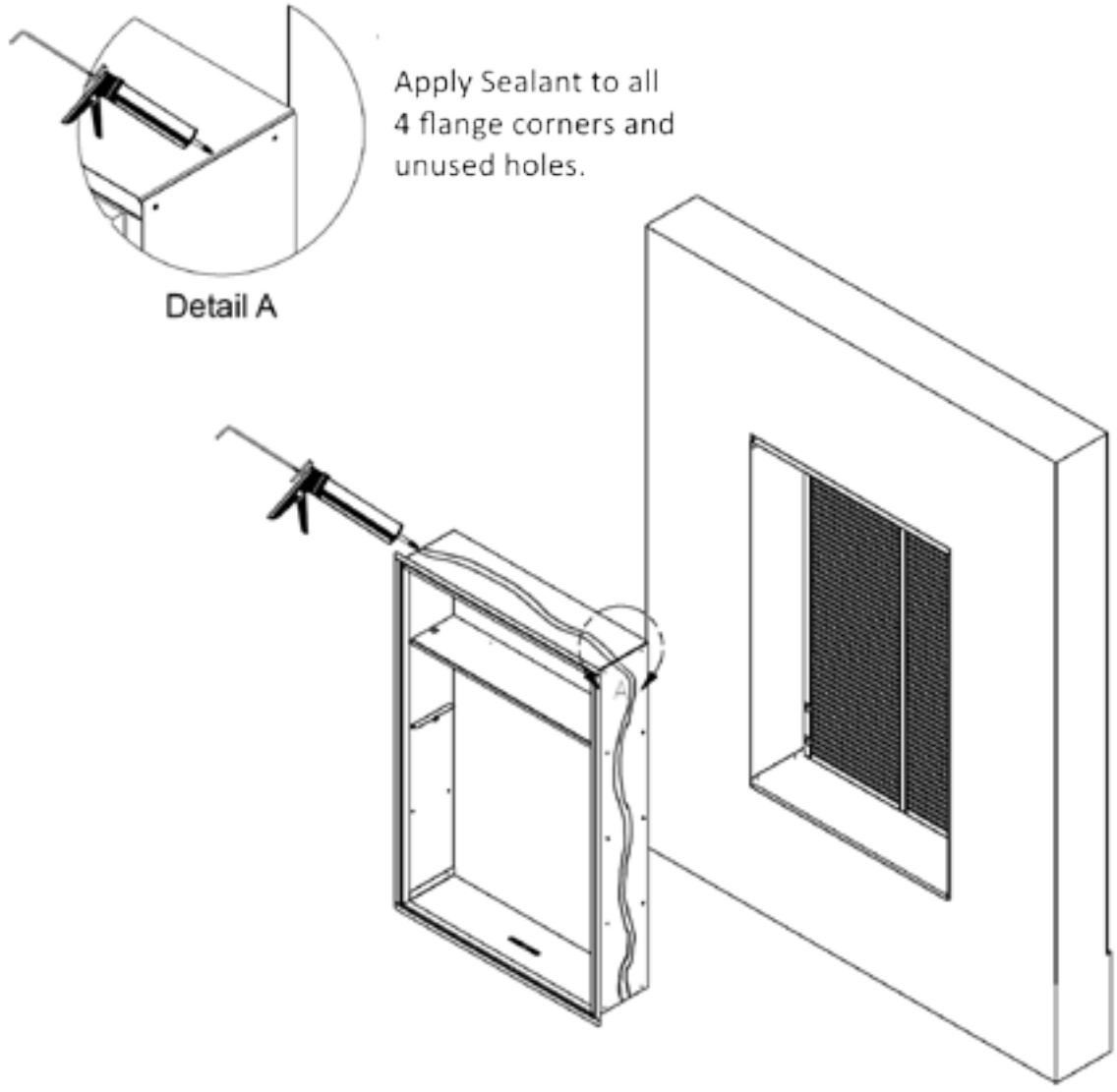
Pre-installing the exterior louver (VRPXALA/B) as shown above is optional.

Apply sealant to the outside plenuem half and insert into the rough opening to ensure a water-tight seal. Ensure that the oustide plenum half is securely attached to the framed opening.

INSTALLATION

Wall Plenum Installation 12 & 24k

Step 2 - Inside Wall Plenum Half

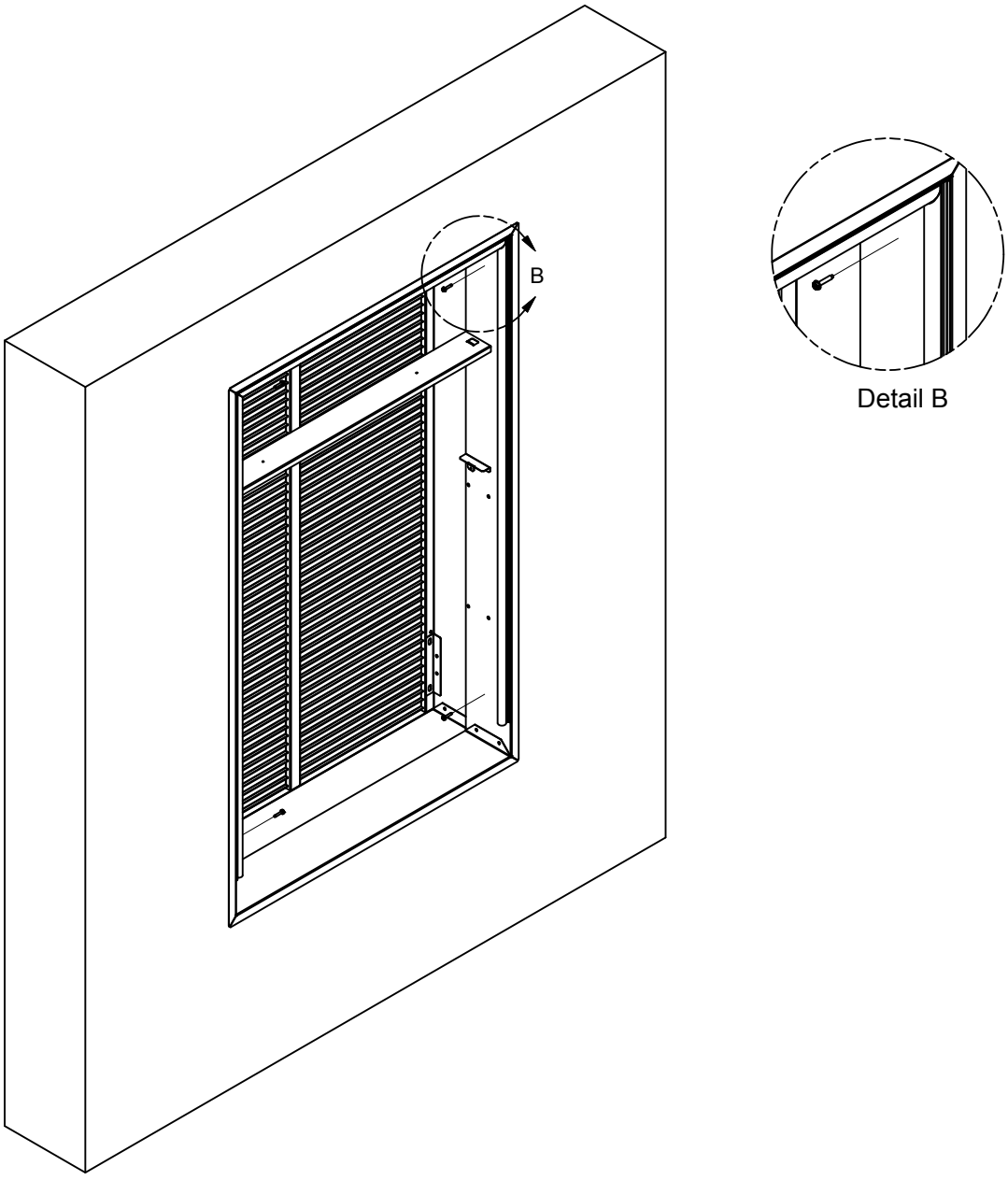


1) Apply sealant to all 4 flange corners and unused holes. See Detail A.
2) Place the baffle (Part D) on the approprate baffle mounting tabs located on the inner perimeter of the inside plenum half based on unit size (Compact/Standard).
3) Flash the inside of the rough opening to ensure the proper fit and level.
4) Insert inside plenum half (Part B) into Outside Plenum Half (Part A). Ensure that Part A does not back out of the rough opening.
5) Remove the inside plenum half.
6) Apply sealant to the outside plenuem half and insert into the rough opening to ensure a water-tight seal.

INSTALLATION

Wall Plenum Installation 12 & 24k

ep 3 - Inside Wall Plenum (cont.)



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

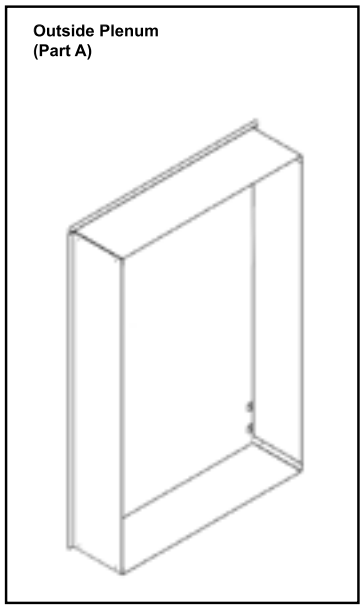
Drill pilot holes on the interior of the inside plenum half (Part B) as show in Detail B. Pilot holes should be located approxiamtely 4" from the top and bottom of the inside plenum half, on both the left and right sides.

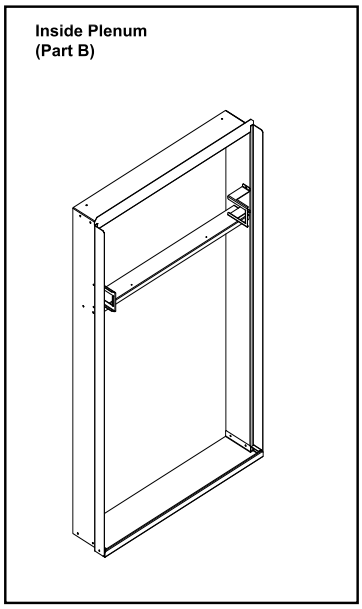
INSTALLATION

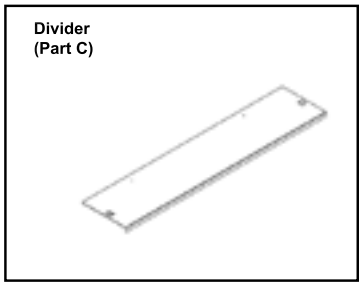
Wall Plenum Installation 36k

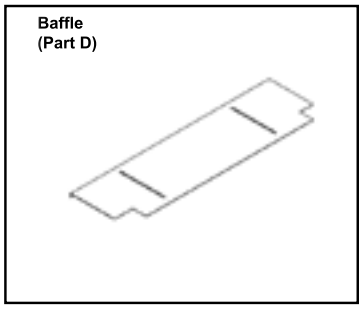
Parts included in Plenum kit:

Outside Plenum (Part A)
Inside Plenum (Part B)
Divider (Part C)
Baffle (Part D)









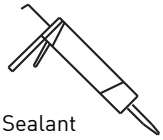
Field Supplied Parts:

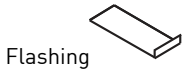
Sealant, attachment screws, and flashing
are field supplied. Silicone sealant is recommended.

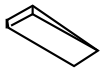
VRPXWPC-8 adjusts for walls 4”- 8” thick.

VRPXWPC-14 adjusts for walls 8” - 14” thick

All installations are similar.


Sealant


Flashing

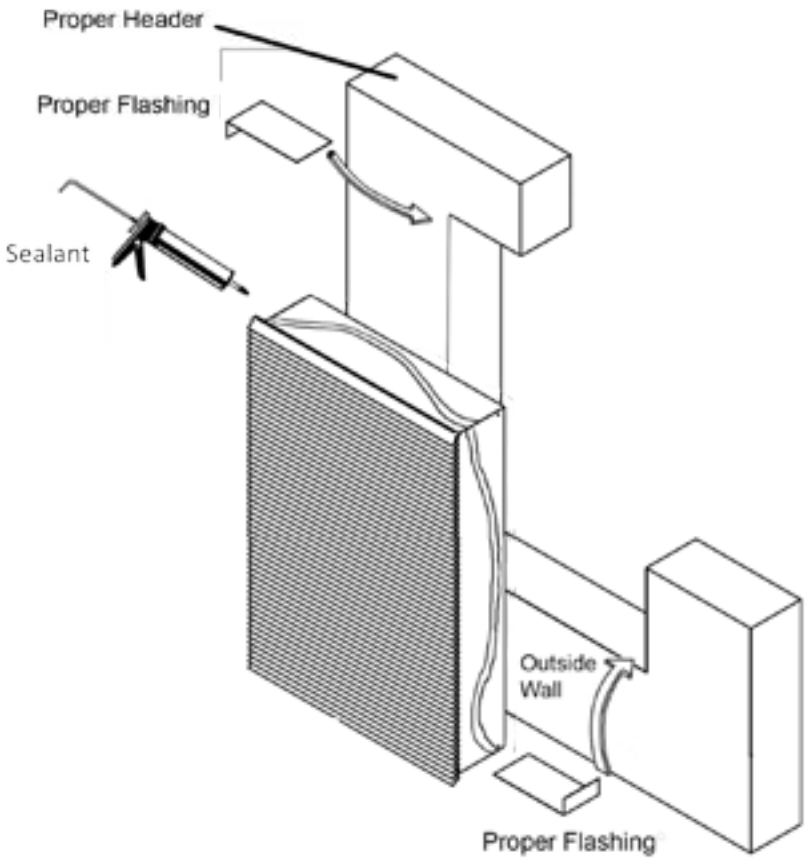

Shim

1”-3” Screws to attach the plenum assembly to the wall studs

INSTALLATION

Wall Plenum Installation 36k

Step 1 - Outside Wall Plenum Half

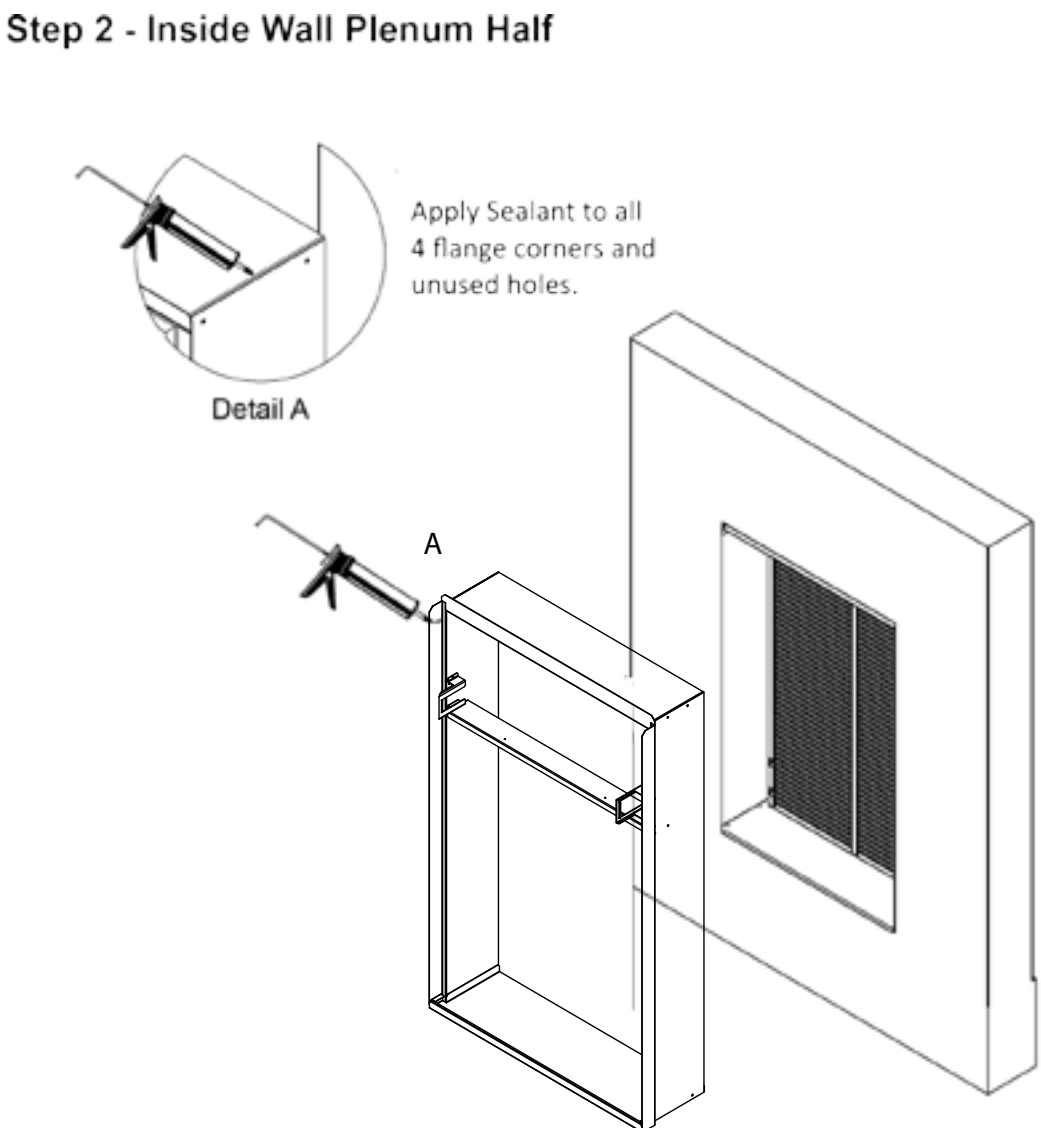


Note: The wall plenum is not designed to carry any structural load. A load bearing header must be built above the rough opening.

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 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.

INSTALLATION

Wall Plenum Installation 36k

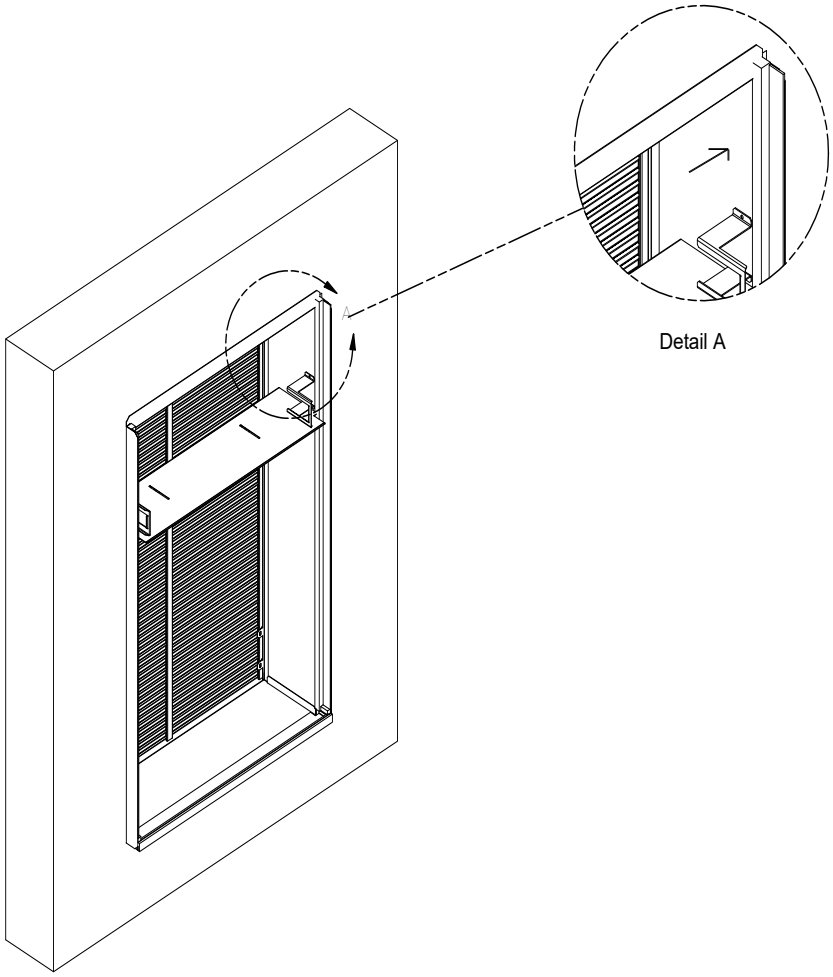


1) Apply sealant to all 4 flange corners and unused holes. See Detail A.
2) Flash the inside of the rough opening to ensure the proper fit and level.
3) Insert inside plenum half (Part B) into Outside Plenum Half (Part A). Ensure that Part A does not back out of the rough opening.
4) Remove the inside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

INSTALLATION

Wall Plenum Installation 36k

Step 3 - Inside Wall Plenum (cont.)



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

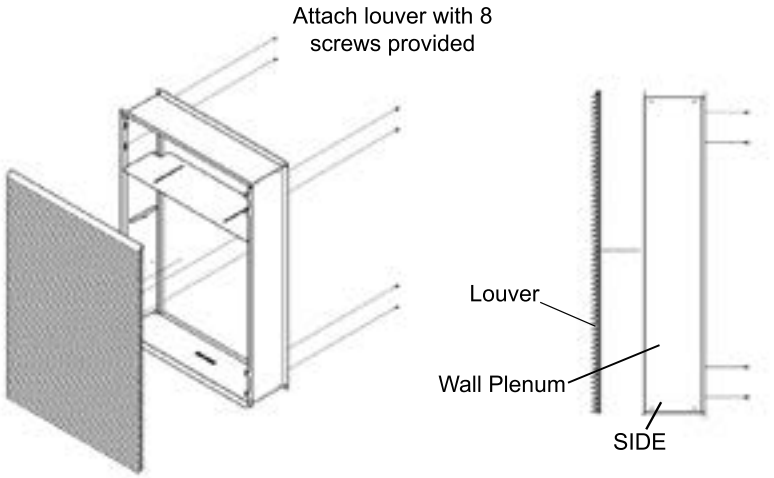
1) Drill pilot holes on the interior of the inside plenum half (Part B) as show in Detail A. Pilot holes should be located approximately 4" from the top and bottom of the inside plenum half, on both the left and right sides.

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.

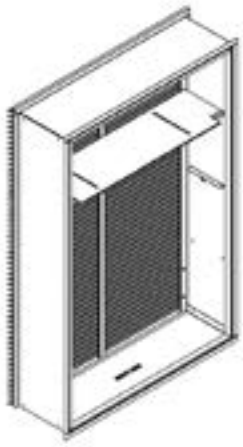
INSTALLATION

Louver Installation

Installation of the louver PRIOR to Wall Plenum Installation



NOTE: Louvers & Drip Ledge orientation is down

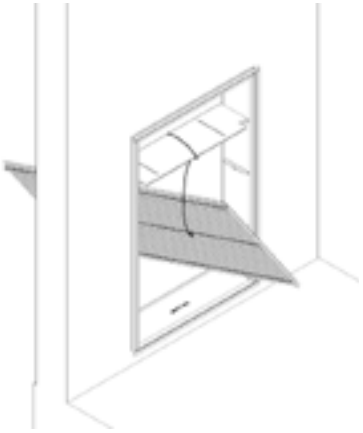


Optional Pre-assembled Outside Element (Grill and Plenum)

Hold the louver up to the outside plenum half (Part A) and line up the louver top with the very top edge of the ¾" flange.

Line up the wall plenum holes with the threaded holes in the louver and securely tighten fasteners.

nstallation of the louver AFTER the installation of wall plenum on levated floors



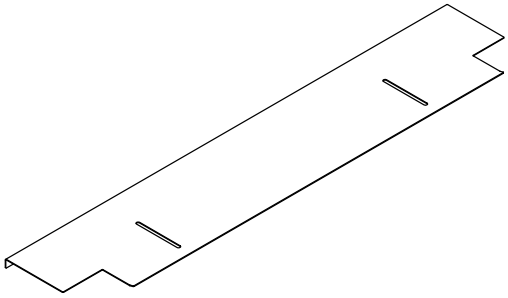
rom the interior of the utility closet:

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

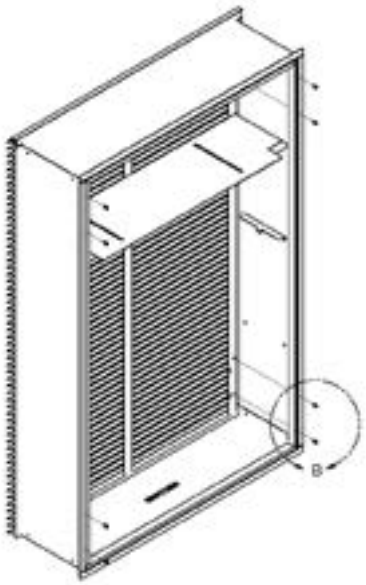
INSTALLATION

Final Wall Plenum And Architectual Louver Installation

Plenum Divider Extension Plate (Baffle)



Plenum Divider Extension Plate Installed into Full Plenum Assembly



ıre that the weather strip is undamaged and provides a continuous
around the inner perimeter of the plenum.

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

Install the plenum adjuster plate. Ensure the exterior edge is seated against the inside of the archetiectural louver.

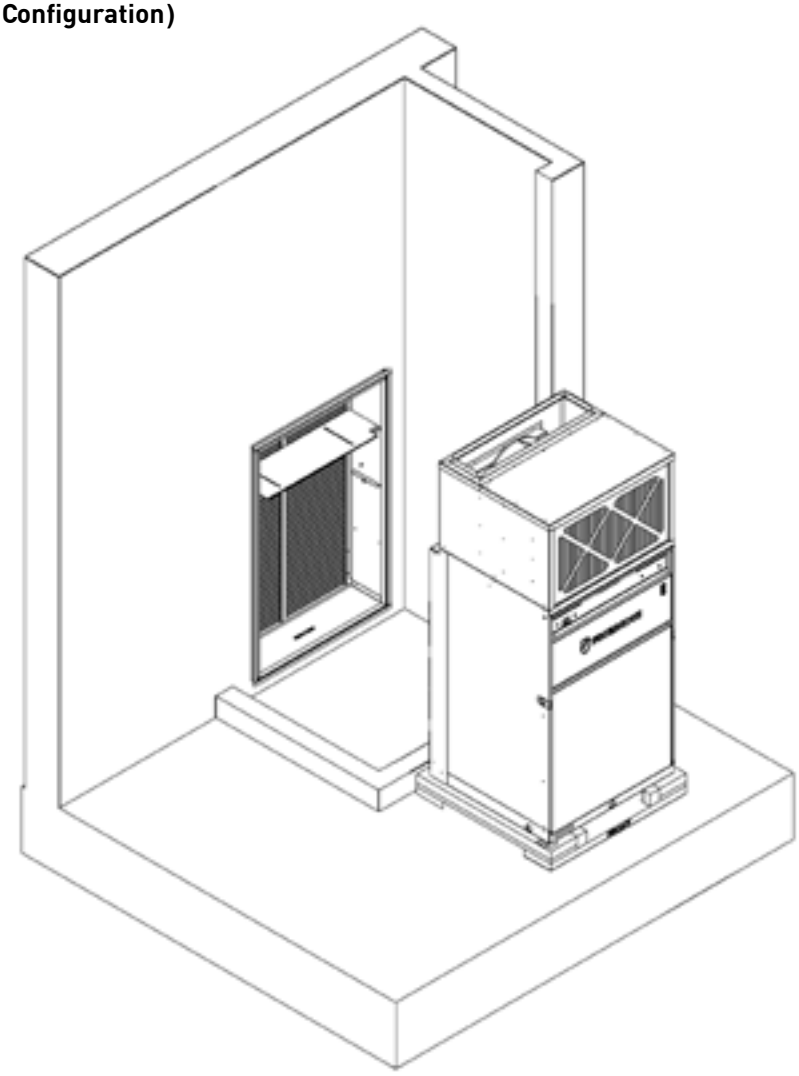
Secure the plenum divider extension plate to the archetiectural louver using the two provided screws.

Use tape and sealant to seal any gaps.

INSTALLATION

Unit Installation

Unit Placement Prior to Installation (Front-Install Configuration)

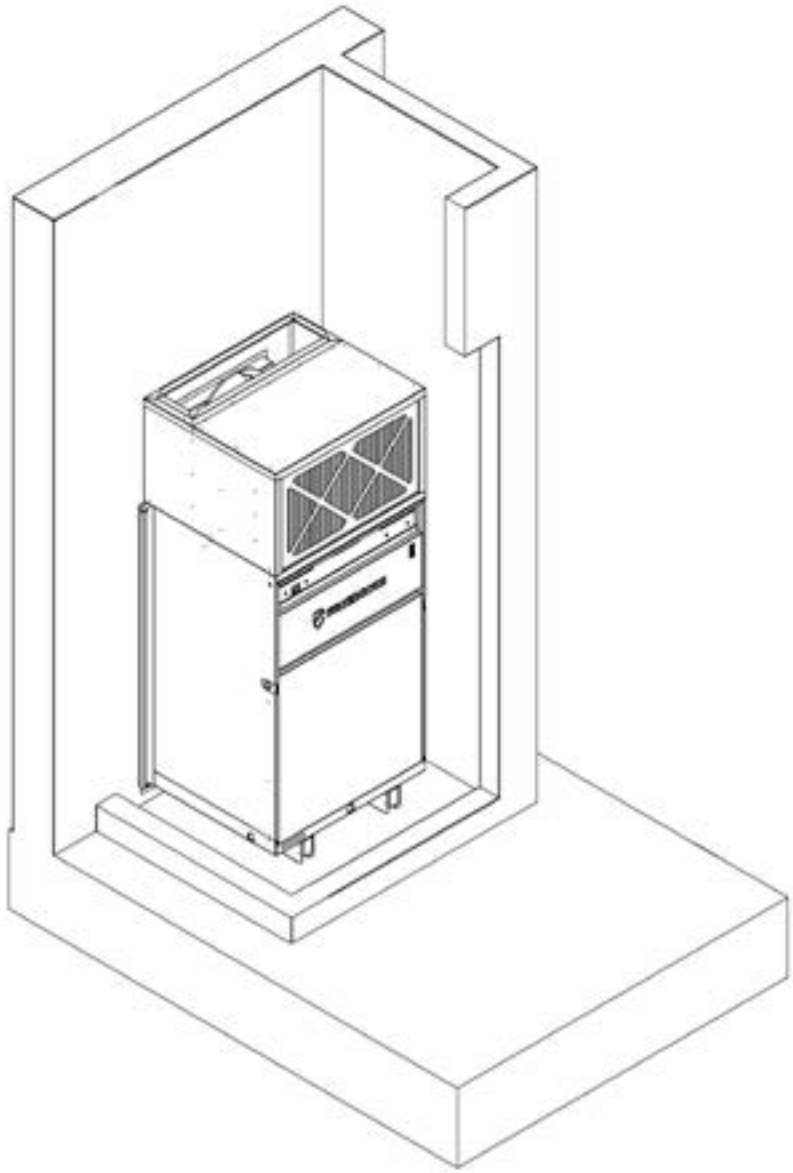


All louver, plenum, rough plumbing, and rough wiring steps must be complete prior to final installation of the air conditioning chassis.

INSTALLATION

Final Unit Installation Overview

Unit Final Placement - Front Install



Ensure that power if off at the junction box feeding power to the air conditioner until all process steps are completed.

Move the unit from the shipping base and onto the installation site.

Insert the unit's rear extension into the wall plenum. There should be approximately 2" of penetration of the unit into the wall plenum, resulting in a complete seal all around.

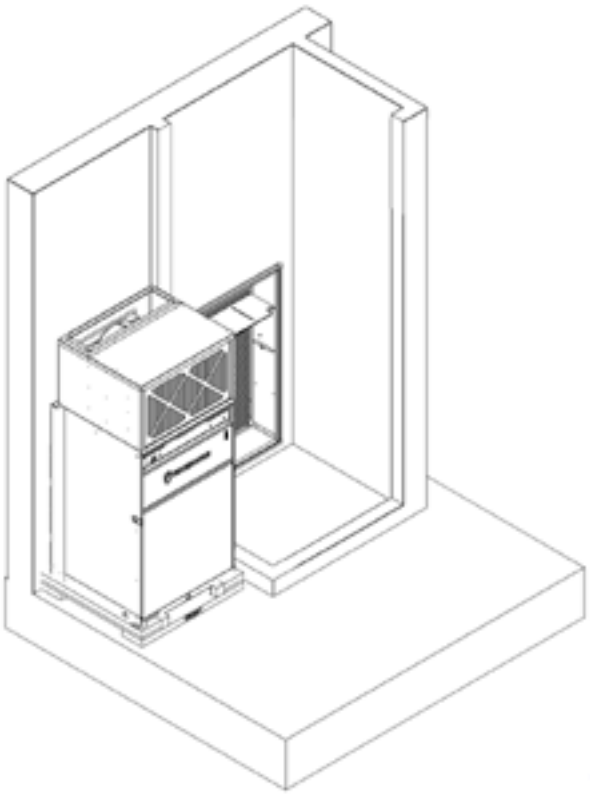
Identify the appropriate drain port to use and complete plumbing.

Attach the ductwork to the unit at the supply-air outlet and ensure the seal is air tight.

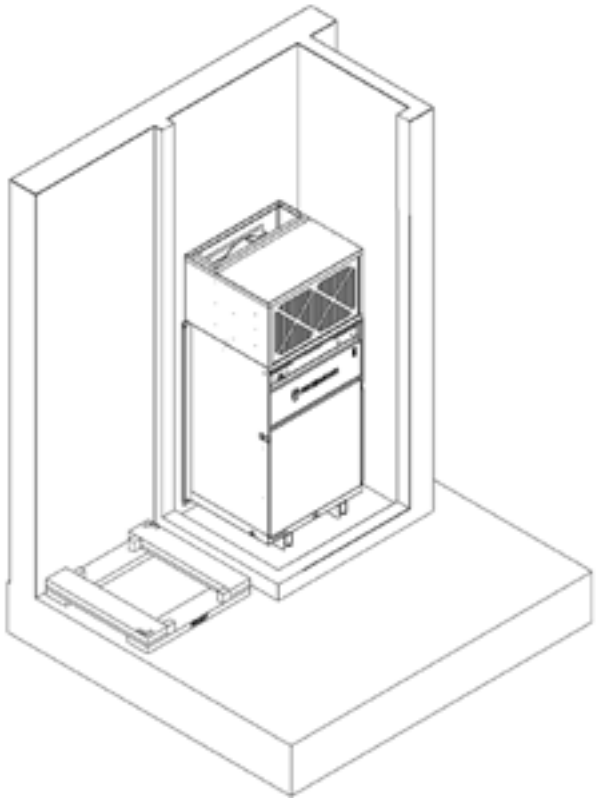
INSTALLATION

Side Configuration Installation

Left Install VRP Unit
Prepared for Installation



Left Install VRP Unit
in Closet (Fully Installed)

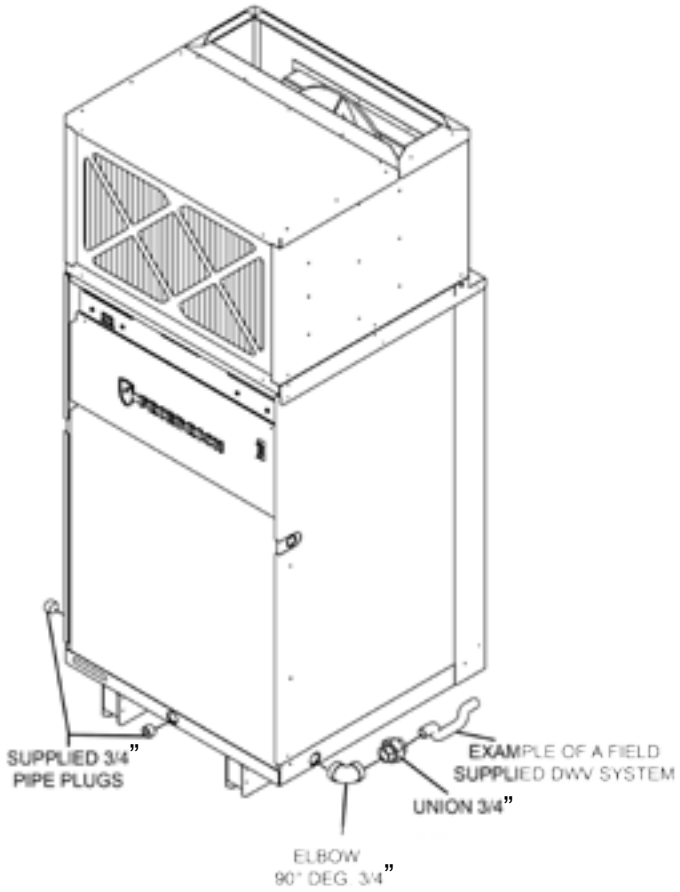


For side-install applications, place the unit adjacent to the closet and slide it in. Then, slide the unit backwardward into the plenum.

INSTALLATION

Unit Drain Installation

Unit Drain Installation

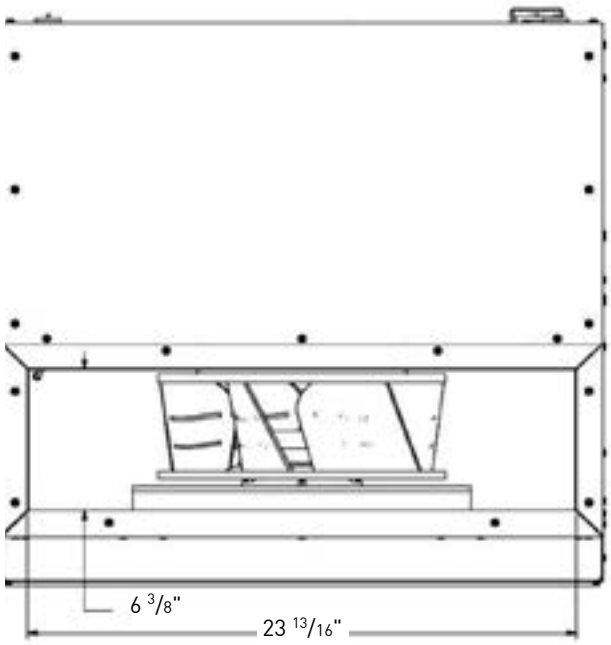


NOTE: Failure to follow the following procedures may result in serious property damage. A field supplied secondary condensate pan may be required. Check with local codes. In case of drainage system blockage, the unit base will allow excess water to flow out of the unit through the plenum and the architectural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

1) Connect the supplied drain kit must be connected to one of the three (left, right or rear) 3/4" FPT connections on the unit basepan. 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 provide 3/4" pipe plugs and field-supplied Teflon tape or pipe joint compound. High 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.

INSTALLATION

Ductwork Installation



Supply air duct connection is the responsibility of the installer and should be installed per industry best practices.

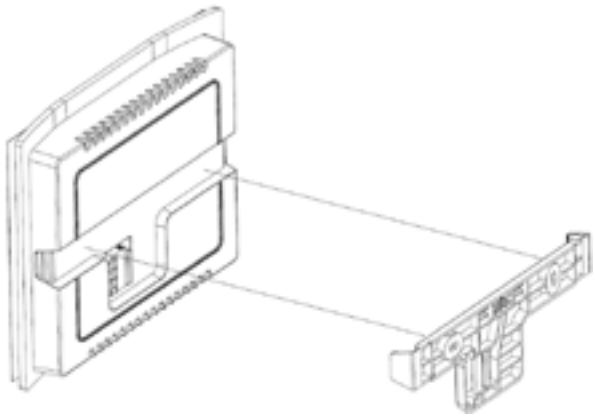
Sheet metal or duct board may be used for the transition from the discharge to 10" or larger diameter flexible ducting.

Avoid sharp transitions in the ductwork to ensure optimal indoor blower performance.

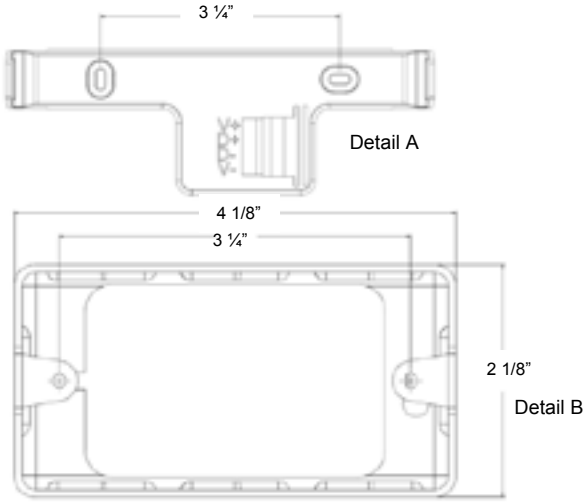
Allow at least 12" (18" preferred) from the discharge of the unit to the final reduced-size transition to support optimal efficiency of the blower system.

INSTALLATION

Wall Controller Installation 12 & 24k

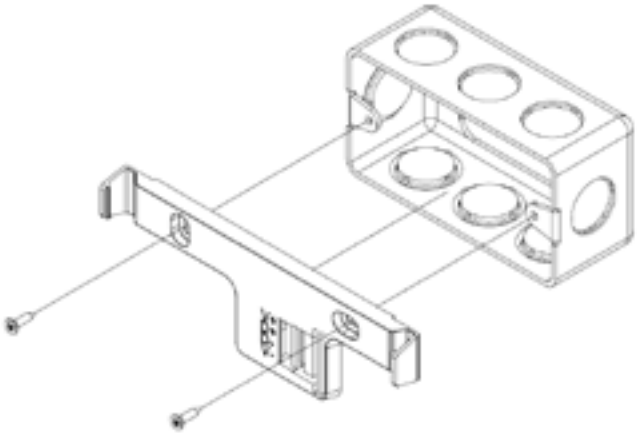


Remove the wall controller bracket from the back of the wall controller.



The wall bracket screw locations only allow the bracket (Detail A) to be mounted to a horizontally oriented electrical junction box (Detail B).

Install the wall controller bracket using two (2) 6/32” x 1” screws (field provided). Ensure that the bracket sits flush against the electrical junction box.



INSTALLATION

Wall Controller Installation 12 & 24k

Proper Wiring of VRP unit to VRPXWC Wall Control

Use shielded and stranded CAT 6 cable with twisted pairs to wire the wall controller. Use the wire colors with the corresponding terminals on the wall controller to the VRP unit as shown in the table below.

Wire Color		Label
Orange / Green / White		V +
Brown / Blue / White		D +
Blue / Brown / White		D -
Green / Orange / White		V -
Ground Shield Wire		GND

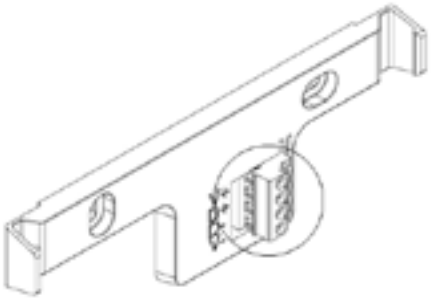
Table shows which wire pairs go with which screw terminal.

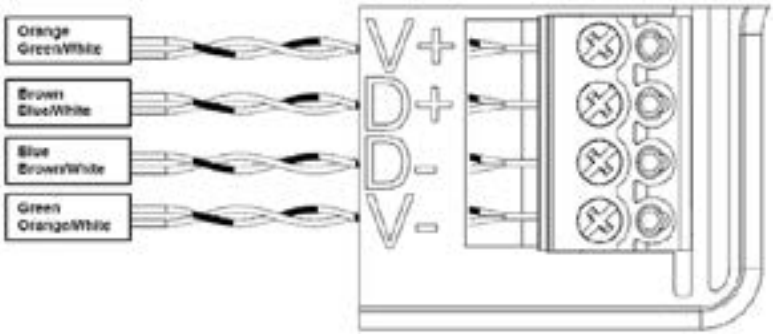
INSTALLATION

Wall Controller Installation 12 & 24k

Step 1: Wiring the VRPXWC Wall Controller

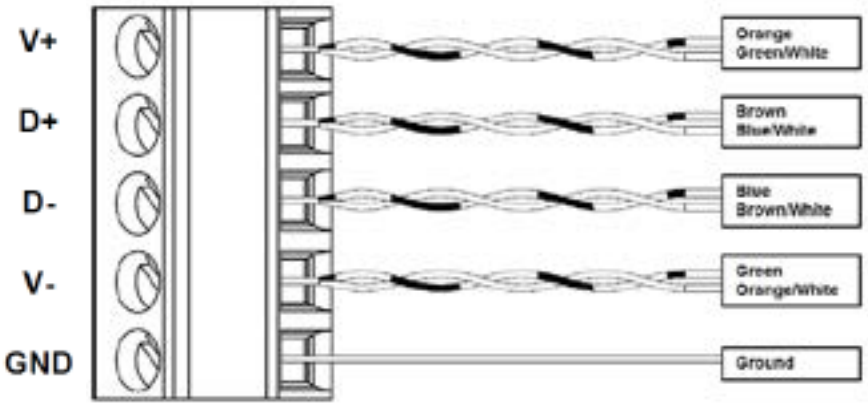
A. Remove the wall mount bracket from the wall controller.
B. Insert the wires from back of wall mount bracket.
C. Strip the wire ends 9/16" (15 mm).
D. Insert the wire pairs into the terminals as shown below.
E. Tighten the screws to secure the wires to the corresponding terminals.
F. Pull the wires to check that they are securely affixed to the terminal block.
G. Position the wires so that the wall controller bracket fits securely on the wall.

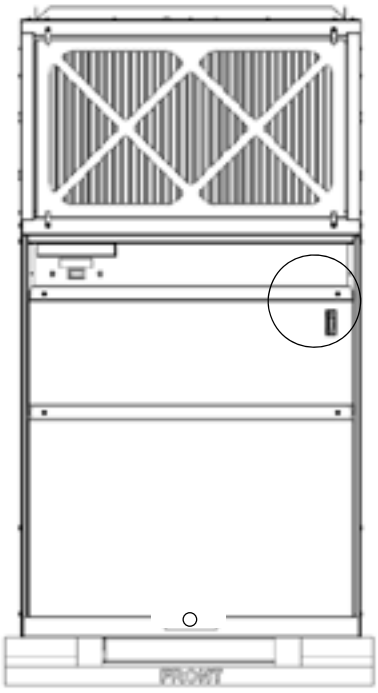




Step 2: Wiring the VRP Unit

A. Strip the wire ends to 9/16" (15 mm).
B. Insert the wire pairs into terminals as shown below.
C. Insert ground shield wire into ground terminal (marked with a ground symbol).
D. Tighten the screws to secure the wires to the corresponding terminals.
E. Pull the wires to check that they are securely affixed to the terminal block.

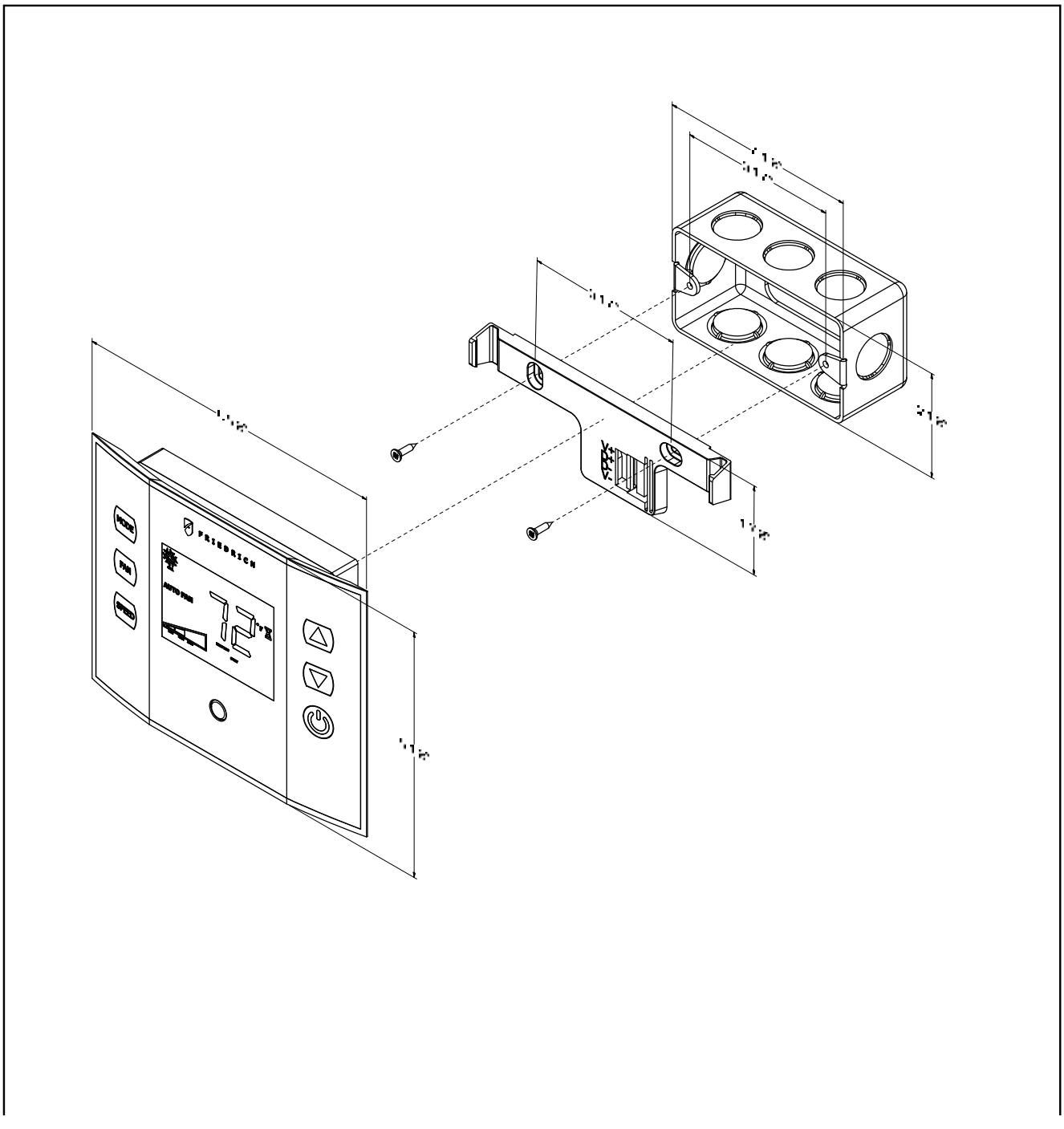




INSTALLATION

Wall Controller Installation 12 & 24k

Install the wall controller into place on the previously installed wall controller bracket.



INSTALLATION

Wall Controller Installation 36k

Proper Wiring of VRP unit to Wall Controller

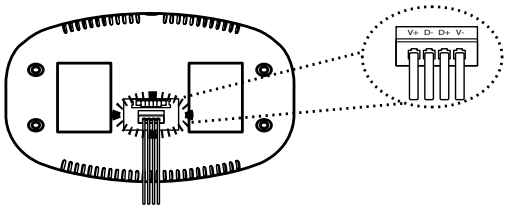
Use shielded and stranded CAT 6 cable with twisted pairs to wire the wall controller. Use the wire colors with the corresponding terminals on the wall controller to the VRP unit as shown in the table below.

Wire Color	Label
Orange / Green / White	V +
Brown / Blue / White	D +
Blue / Brown / White	D -
Green / Orange / White	V -
Ground Shield Wire	GND

Table shows which wire pairs go with which screw terminal.

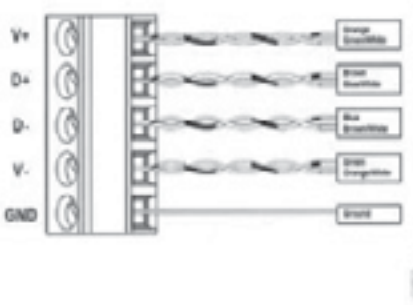
INSTALLATION

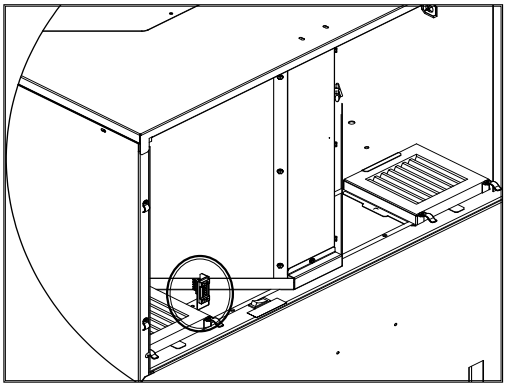
Wall Controller Installation 36k



WIRE COLOR	LABEL
Orange	Connection 1
Green/White	V+ Orange
Brown	Connection 2
Blue/White	D+ Brown
Blue	Connection 3
Brown/White	D- Blue
Green	Connection 4
Orange/White	V- Green
Ground Shield Wire	GND

1. Strip and untwist the individual CAT 6 wires.
2. Pair the wires on both ends based on the combinations detailed in the table above.
3. Pair one end of the twisted pairs with the corresponding single wire on the controller using the pro vided pairing clamps.



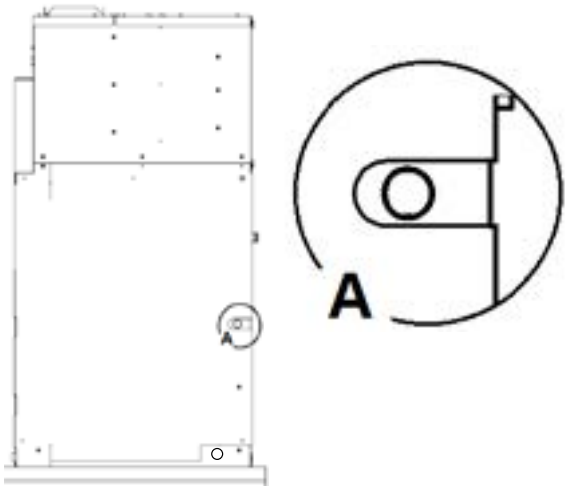


4. Remove the filter from the unit and unplug the green molex controller plug.
5. Insert the corresponding color pair into the appropriate screw terminal and tighten.
6. Insert the sheath into the “GND” screw terminal and tighten.
7. Plug in the green molex plug into the green receptacle and re-install the return air filter.

NOTE: These steps are to be followed for use with the VRPXEMRT2, VRPXEMWRT2, and VRPXWCT.

INSTALLATION

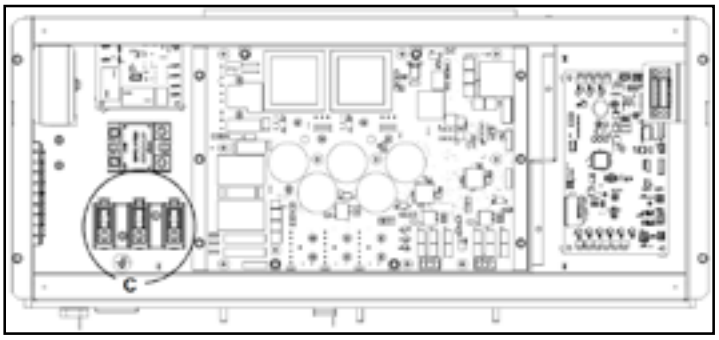
Electrical Installation 12 & 24k



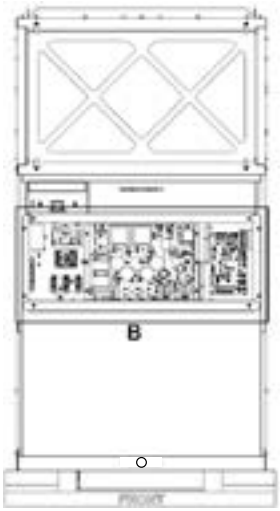
Remove and discard hole knock-out from the side of the unit (Detail A)

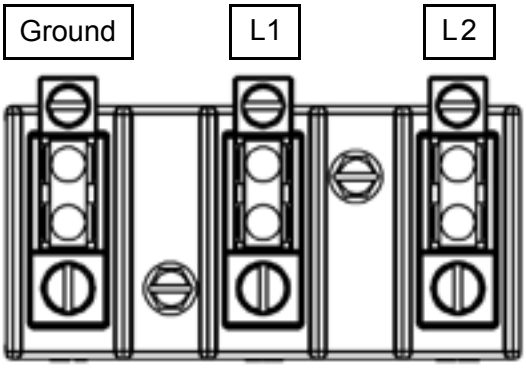
Remove the electrical access panel (Detail B) to expose the incoming Ppwer terminal block (Detail C, see below)

(Detail C, see below)



B

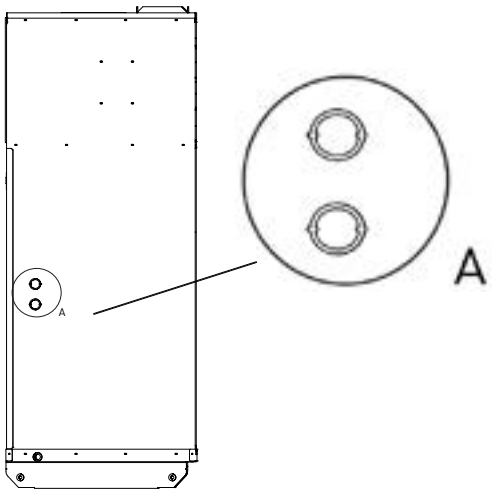




Insert all wires through the punched out hole and fasten wires as follows:

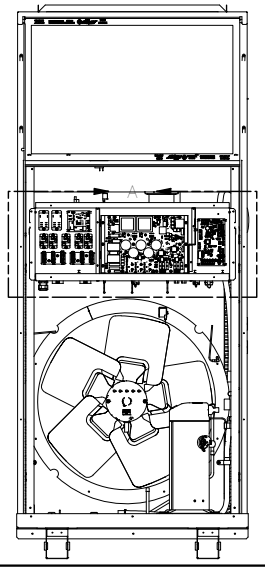
INSTALLATION

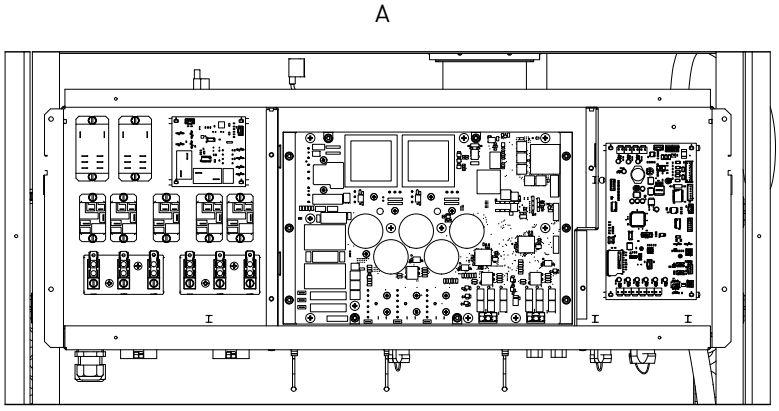
Electrical Installation 36k



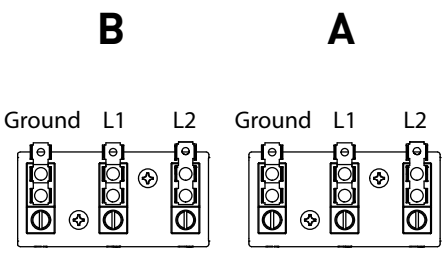
Remove and discard hole knock-out from the side of the unit (Detail A)

NOTE: Only one punch-out needs to be removed for 0.0 kW and 10.0 kW models.. Both punch-outs must be removed on the 15.0 kW models for dual service.





Remove the front access panel (Detail A) to expose the electrical box and incoming Power terminal block (see below)



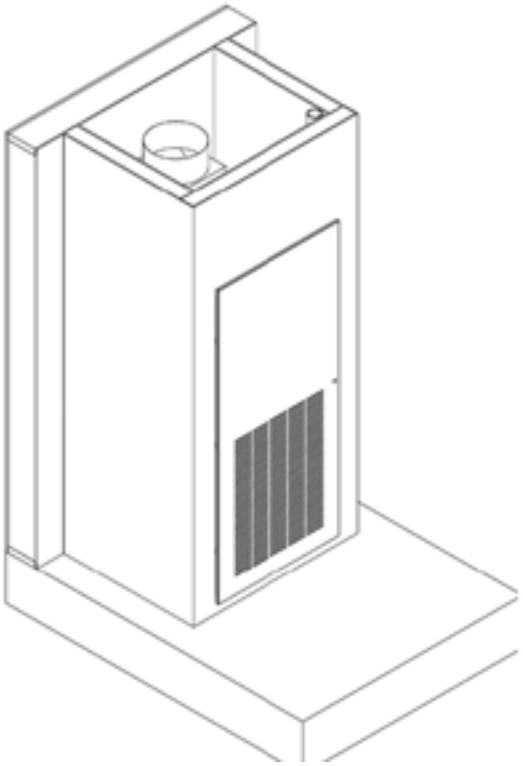
Insert all wires through the punched out hole(s) and fasten wires as shown.

The 0kW and 10kW models will require the use of only one of the terminal blocks (Block 'A'). The 15kW models will connect the extra 5kW electric heat to the remaining terminal block (Block 'B') and separate 30A service.

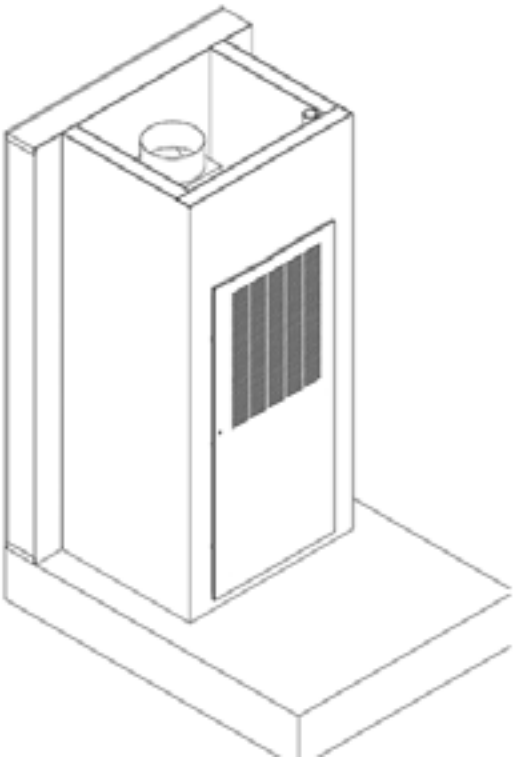
INSTALLATION

Return Air Door Installation12 & 24k

Option 1



Option 2



The door panel is supported along one edge by the provided hinge. The opposite edge has a latch which secures the panel to the adjacent framed structure.

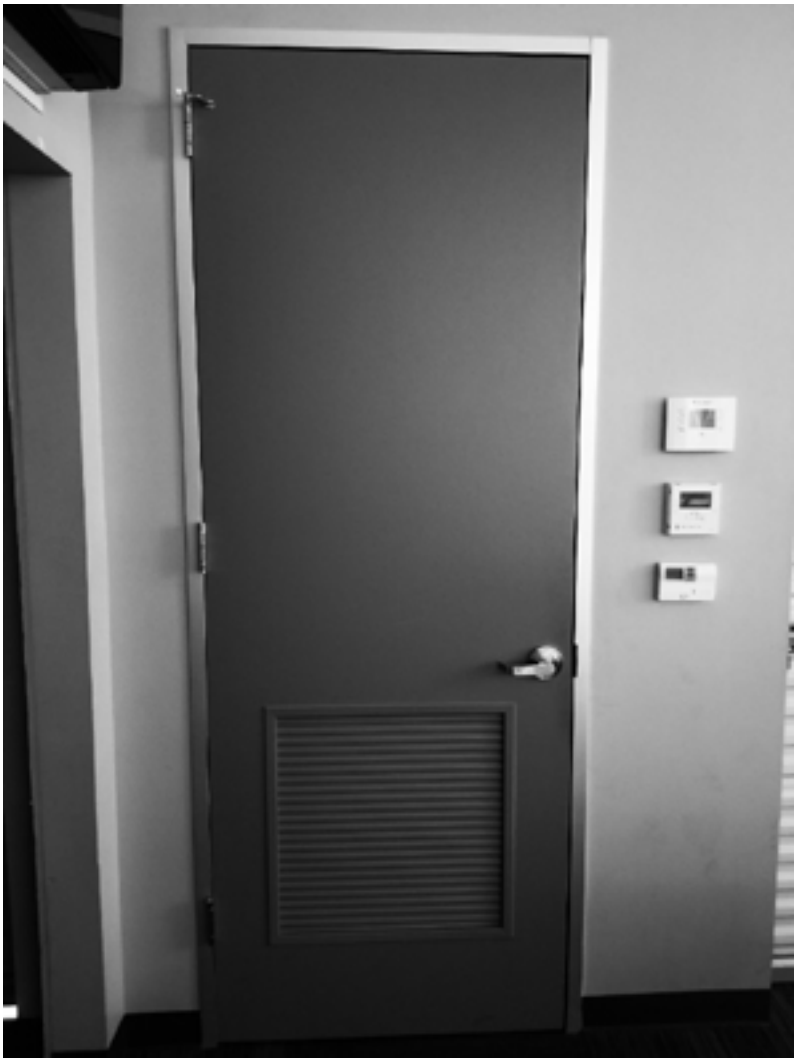
The kit contains hinge bracket for mounting the door with the return air openings low (shown in option 1) or high (shown in Option 2) on the door. For increased sound reduction, it is recommended to install the door with the return air opening in the high position.

The door panel has a provision for filter installation on the door. This feature is only usable when the door is installed in the lower orientation (Option 1) and the unit filter has been removed.

The unit should not be operated with both the unit filter and the door filter installed.

INSTALLATION

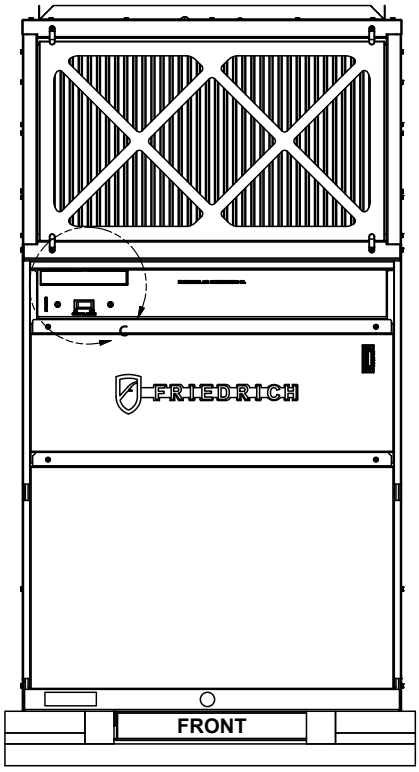
Return Air And Door Installation 36k

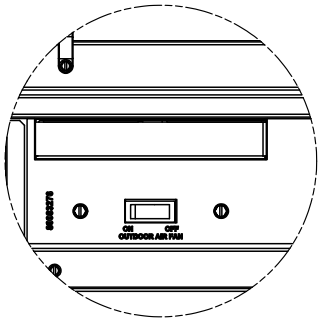


1. A 36” door louvered door is recommended for all VRP36 installations.
2. The louvered portion of the door should have a minimum of 325 sq. in. of free area.
3. Alternatively, a solid door may be used in tandem with a transfer register on an adjacent wall to the closet. The transfer register should have a minimum free area of 325 sq. in.

INSTALLATION

FreshAire System Set-up and Operation





DETAIL C

If equipped with the FreshAire™ System, the unit will come with a FreshAire filter and blank-off plate.

Remove the blank-off plate prior to turning the unit on.

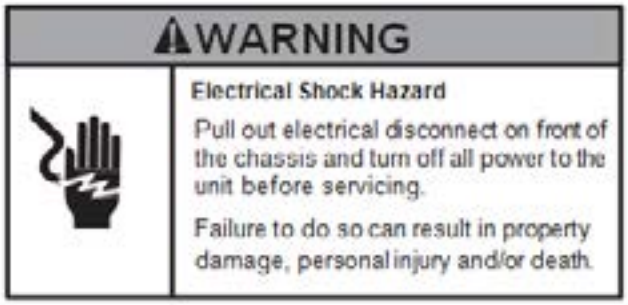
To remove the blank off plate, pull the attached tab shown in Detail A. The blank-off plate can be discarded or retained for future use.

To engage the FreshAire™ System, flip the switch into the On Position.

ON OFF
OUTDOOR AIR FAN

INSTALLATION

Final Installation Checklist



- 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.

Chassis Operation

Cooling Operation

The set point must be at least 3°F below room temperature to ensure compressor operation.
In the cooling mode, when demand is present, the indoor blower and outdoor fan will operate. The compressor will vary operating speed to maintain desired set point.

Heat Pump Operation

The set point must be greater than 3°F but not greater than 6°F above room temperature to ensure compressor operation.
In the heating mode, when demand is present, the indoor blower and outdoor fan will operate. The compressor will vary operating speed to maintain desired set point.

Electric Heat Operation

If the set-point is greater than 5°F - 15°F (depending on outdoor conditions) above room temperature, the heat pump operation will be terminated and the electric heater will be energized to satisfy the heating demand.
If heat pump operation is not available due to defrost or error, the electric heater will be used to satisfy heating demand.

FreshAire™

The FreshAire™ System (optional) delivers outside air to the indoor space. The system has a fan that draws outdoor air into the system. The outdoor air leaves the system through a filter and enters the indoor space in front of the indoor conditioning coil. The outdoor air mixes with the return air and is drawn through the indoor conditioning coil. The optional system can be configured to have either a single (F option) outdoor air fan and filter, or dual (D option) outdoor air fans and filters.

The FreshAire™ System uses a 6 x 6 x 1 filter (quantity of 1 for option F and 2 for option D). The filters are accessed through the front of the unit just below the main unit filter. Slide the filter straight out to remove and straight in to replace.

INSTALLATION

Return Air Grille/ Access Panel VRPXAP1

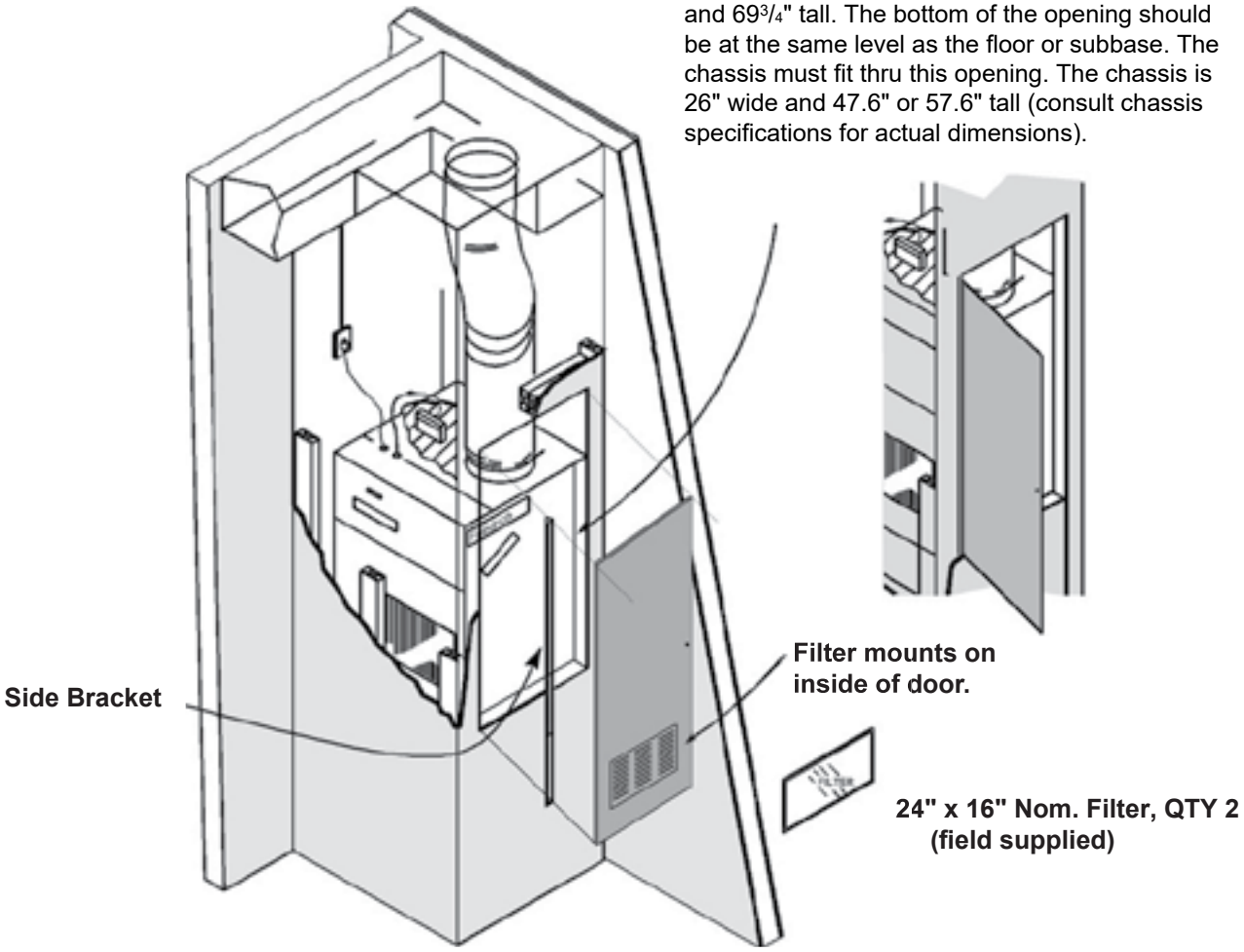
Parts Included in this Kit

- VRPXAP1 Return Air Grille / Access Panel (72" Tall x 32" Wide)
- Mounting Bracket
- Mounting Screws

Parts not Included in this Kit

- 24" x 16" Filter, QTY 2
- 5/32" Allen wrench for latch mechanism operation

Frame and sheetrock the access hole to 30" wide and 69 3/4" tall. The bottom of the opening should be at the same level as the floor or subbase. The chassis must fit thru this opening. The chassis is 26" wide and 47.6" or 57.6" tall (consult chassis specifications for actual dimensions).



R-410A SEALED SYSTEM REPAIR

The following is a list of important considerations when working with R-410A equipment

⚠ 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 practicces must be used.

Only use gauge sets designed for use with R410A. Do not use standard R22 gauge sets.

1. R-410A pressure is approximately 60% higher than R-22 pressure.

2. R-410A cylinders must not be allowed to exceed 125 F, they may leak or rupture.

3. R-410A must never be pressurized with a mixture of air, it may become flammable.

4. Servicing equipment and components must be specifically designed for use with R-410A and dedicated to prevent contamination.

⚠ WARNING

EPA 608 Warning:
It is a violation of the environmental Protection Agency, Claus608A, to service refrigeration systems without proper certification

5. Manifold sets must be equipped with gauges capable of reading 750 psig (high side) and 200 psig (low side), with a 500-psig low-side retard.

6. Gauge hoses must have a minimum 750-psig service pressure rating

7. Recovery cylinders must have a minimum service pressure rating of 400 psig, (DOT 4BA400 and DOT BW400 approved cylinders).

8. POE (Polyol-Ester) lubricants must be used with R-410A equipment.

9. To prevent moisture absorption and lubricant contamination, do not leave the refrigeration system open to the atmosphere longer than 1 hour.

10. Weigh-in the refrigerant charge into the high side of the system.

11. Introduce liquid refrigerant charge into the high side of the system.

12. For low side pressure charging of R-410A, use a charging adaptor.

EQUIPMENT REQUIRED:

1. Eletrical Multimeter
2. E.P.A. Approved Refrigerant Recovery System
3. Vacuum Pump (capable of 200 microns or less vacuum.)
4. Acetylene Welder
5. Electronic Halogen Leak Detector capable of detecting HFC (Hydrofluorocarbon) refrigerants.
6. R410A Refrigerant Manifold
7. 1/4" Braze-type Access Ports
8. Pinch Tool
9. Refrigerant Scale
10. Vacuum Gauge - (0 - 1000 microns)
11. Facilities for flowing nitrogen through refrigeration tubing during all brazing processes.

EQUIPMENT MUST BE CAPABLE OF:

1. Recovering refrigerant to EPA required levels.
2. Evacuation from both the high side and low side of the system simultaneously.
3. Introducing refrigerant charge into high side of the system.
4. Accurately weighing the refrigerant charge introduced into the system.

R-410A SEALED SYSTEM REPAIR

Refrigerant Charging

⚠ WARNING

RISK OF ELECTRIC SHOCK

Unplug and/or disconnect all electrical power to the unit before performing inspections, maintenances or service.

Failure to do so could result in electric shock, serious injury or death.

⚠ WARNING

RISK OF ELECTRIC SHOCK

Unplug and/or disconnect all electrical power to the unit before performing inspections, maintenances or service.

Failure to do so could result in electric shock, serious injury or death.

Proper refrigerant charge is essential to unit operation. Operating a unit with an improper refrigerant charge will result in reduced performance (capacity) and/or efficiency. Accordingly, the use of proper charging methods during servicing will insure that the unit is functioning as designed and that its compressor will not be damaged.

Too much refrigerant (overcharge) in the system is just as bad (if not worse) than not enough refrigerant (undercharge). They both can be the source of certain compressor failures if they remain uncorrected for any period of time. Quite often, other problems (such as low air flow across evaporator, etc.) are misdiagnosed as refrigerant charge problems. The refrigerant circuit diagnosis chart will assist you in properly diagnosing these systems.

An overcharged unit will at times return liquid refrigerant (slugging) back to the suction side of the compressor eventually causing a mechanical failure within the compressor. This mechanical failure can manifest itself as valve failure, bearing failure, and/or other mechanical failure. The specific type of failure will be influenced by the amount of liquid being returned, and the length of time the slugging continues.

Not enough refrigerant (undercharge) on the other hand, will cause the temperature of the suction gas to increase to the point where it does not provide sufficient cooling for the compressor motor. When this occurs, the motor winding temperature will increase causing the motor to overheat and possibly cycle open the compressor overload protector. Continued overheating of the motor windings and/or cycling of the overload will eventually lead to compressor motor or overload failure.

R-410A SEALED SYSTEM REPAIR

Undercharged Refrigerant Systems

An undercharged system will result in poor performance (low pressures, etc.) in both the heating and cooling cycle.

Whenever you service a unit with an undercharge of refrigerant, always suspect a leak. The leak must be repaired before charging the unit.

To check for an undercharged system, turn the unit on, allow the compressor to run long enough to establish working pressures in the system (15 to 20 minutes).

During the cooling cycle you can listen carefully at the exit of the metering device into the evaporator; an intermittent hissing and gurgling sound indicates a low refrigerant charge. Intermittent frosting and thawing of the evaporator is another indication of a low charge, however, frosting and thawing can also be caused by insufficient air over the evaporator.

Checks for an undercharged system can be made at the compressor. If the compressor seems quieter than normal, it is an indication of a low refrigerant charge.

A check of the amperage drawn by the compressor motor should show a lower reading. (Check the Unit Specification.) After the unit has run 10 to 15 minutes, check the gauge pressures. Gauges connected to system with an undercharge will have low head pressures and substantially low suction pressures.

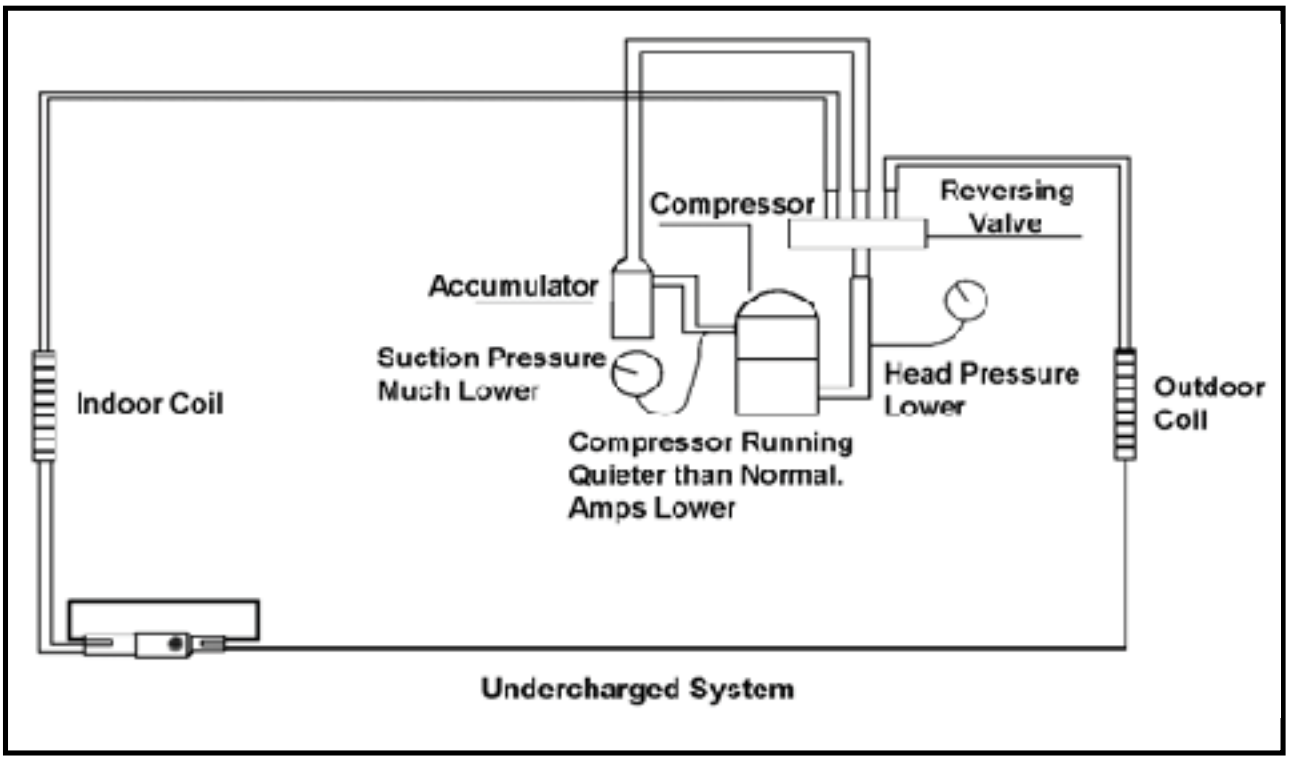


Figure 501(Undercharged System)

R-410A SEALED SYSTEM REPAIR

Overcharged Refrigerant Systems

Compressor amps will be near normal or higher. Noncondensables can also cause these symptoms. To confirm, remove some of the charge, if conditions improve, system may be overcharged. If conditions don't improve, Noncondensables are indicated.

Whenever an overcharged system is indicated, always make sure that the problem is not caused by air flow problems. Improper air flow over the evaporator coil may indicate some of the same symptoms as an over charged system.

An overcharge can cause the compressor to fail, since it would be "slugged" with liquid refrigerant.

The charge for any system is critical. When the compressor is noisy, suspect an overcharge, when you are sure that the air quantity over the evaporator coil is correct. Icing of the evaporator will not be encountered because the refrigerant will boil later if at all. Gauges connected to system will usually have higher head pressure (depending upon amount of over charge). Suction pressure should be slightly higher.

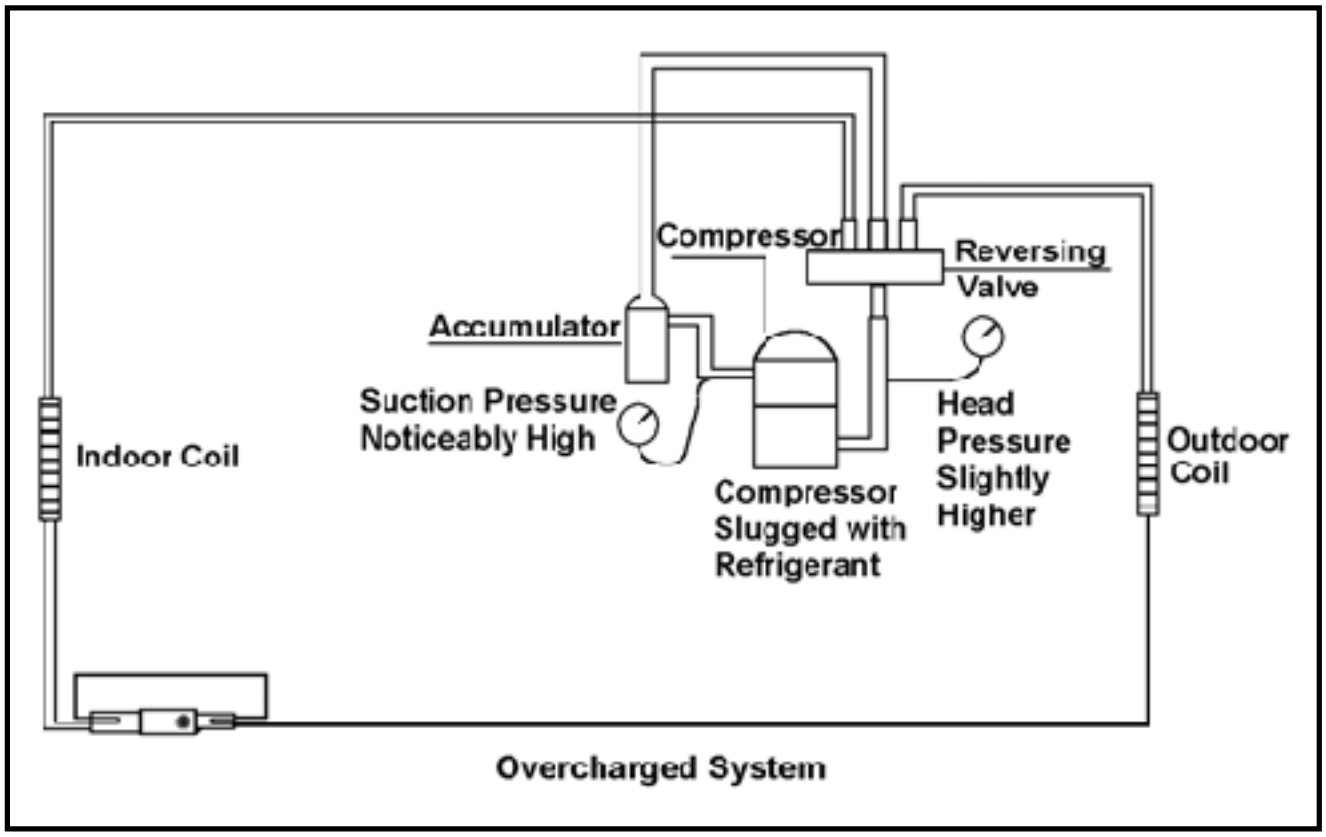


Figure 502(Overcharged System)

R-410A SEALED SYSTEM REPAIR

Restricted Refrigerant System

Troubleshooting a restricted refrigerant system can be difficult. The following procedures are the more common problems and solutions to these problems. There are two types of refrigerant restrictions: Partial restrictions and complete restrictions.

A partial restriction allows some of the refrigerant to circulate through the system.

With a complete restriction there is no circulation of refrigerant in the system.

Restricted refrigerant systems display the same symptoms as a “low-charge condition.”

When the unit is shut off, the gauges may equalize very slowly.

A quick check for either condition begins at the evaporator. With a partial restriction, there may be gurgling sounds at the metering device entrance to the evaporator. The evaporator in a partial restriction could be partially frosted or have an ice ball close to the entrance of the metering device. Frost may continue on the suction line back to the compressor.

Often a partial restriction of any type can be found by feel, as there is a temperature difference from one side of the restriction to the other.

With a complete restriction, there will be no sound at the metering device entrance. An amperage check of the compressor with a partial restriction may show normal current when compared to the unit specifi cation. With a complete restriction the current drawn may be considerably less than normal, as the compressor is running in a deep vacuum (no load.) Much of the area of the condenser will be relatively cool since most or all of the liquid refrigerant will be stored there.

The following conditions are based primarily on a system in the cooling mode.

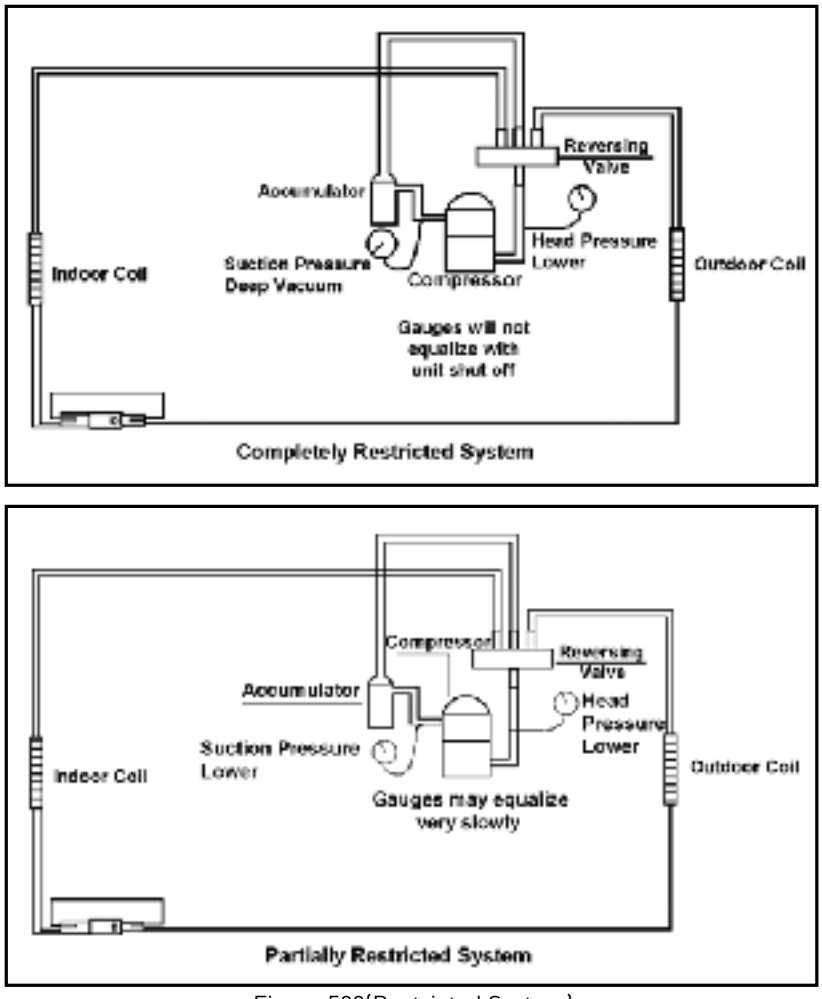


Figure 503(Restricted System)

R-410A SEALED SYSTEM REPAIR

Sealed System Method of Charging/ Repairs

⚠ WARNING

BURN HAZARD

Proper safety procedures must be followed, and proper protective clothing must be worn when working with a torch.

Failure to follow these procedures could result in moderate or serious injury.

⚠ CAUTION

FREEZE HAZARD

Proper safety procedures must be followed, and proper protective clothing must be worn when working with liquid refrigerant.

Failure to follow these procedures could result in minor to moderate injury.

The only acceptable method for charging the sealed system is the Weighed in Charge Method. The weighed in charge method is applicable to all units. It is the preferred method to use, as it is the most accurate.

The weighed in method should always be used whenever a charge is removed from a unit such as for a leak repair, compressor replacement, or when there is no refrigerant charge left in the unit. To charge by this method, requires the following steps:

1. Connect your EPA approved gauges to the proper valves with 750 psig rated pressure hoses.
2. Recover Refrigerant in accordance with EPA regulations.
4. Make necessary repairs to system.

NOTE: When brazing, ensure to flow nitrogen to reduce contamination of capillaries and valves.

5. Evacuate system and hold at or below 500 microns.
6. Weigh in refrigerant with the property quantity of R-410A refrigerant.
7. Start unit, and verify performance.
8. Remove hoses and ensure valves are tight and sealed to the O-ring in the valve cap.

R-410A SEALED SYSTEM REPAIR

Compressor replacement

⚠ WARNING

ELECTRIC SHOCK HAZARD

Disconnect power to the unit before servicing. Failure to follow this warning could result in serious injury or death.

⚠ CAUTION

FREEZE HAZARD

Proper safety procedures must be followed, and proper protective clothing must be worn when working with liquid refrigerant.

Failure to follow these procedures could result in minor to moderate injury.

⚠ WARNING

BURN HAZARD

Proper safety procedures must be followed, and proper protective clothing must be worn when working with a torch.

Failure to follow these procedures could result in moderate or serious injury.

⚠ WARNING

EXPLOSION HAZARD

The use of nitrogen requires a pressure regulator. Follow all safety procedures and wear protective safety clothing etc.

Failure to follow proper safety procedures could result in serious injury or death.

1. Be certain to perform all necessary electrical and refrigeration tests to be sure the compressor is actually defective before replacing.

2. Recover all refrigerant from the system though the process tubes. PROPER HANDLING OF RECOVERED REFRIGERANT ACCORDING TO EPA REGULATIONS IS REQUIRED. Do not use gauge manifold for this purpose if there has been a burnout. You will contaminate your manifold and hoses. Use a Schrader valve adapter and copper tubing for burnout failures.

3.After all refrigerant has been recovered, disconnect suction and discharge lines from the compressor and remove compressor. Be certain to have both suction and discharge process tubes open to atmosphere.

4.Carefully pour a small amount of oil from the suction stub of the defective compressor into a clean container.

5.Using an acid test kit (one shot or conventional kit), test the oil for acid content according to the instructions with the kit.

6.If any evidence of a burnout is found, no matter how slight, the system will need to be cleaned up following proper procedures.

7.Install the replacement compressor.

8. Pressurize with a combination of R-410A and nitrogen and leak test all connections. If a leak cannot be found, pressurize with a combination of Nitrogen and a trace charge of R-410A and sweep with with an electronic or Halide leak detector. Recover refrigerant and repair any leaks found.

8a. If leak detector is unavailable remove all refrigerant from system and pressurize with nitrogen to 550 psi. Check that system holds pressure.

Repeat Step 8 to insure no more leaks are present

9. Evacuate the system with a good vacuum pump capable of a final vacuum of 200 microns or less. The system should be evacuated through both liquid line and suction line gauge ports. While the unit is being evacuated, seal all openings on the defective compressor. Compressor manufacturers will void warranties on units received not properly sealed. Do not distort the manufacturers tube connections.

10. Recharge the system with the correct amount of refrigerant. The proper refrigerant charge will be found on the unit rating

R-410A SEALED SYSTEM REPAIR

Compressor Replacement -Special Procedure in Case of Compressor Burnout

⚠ WARNING

HIGH PRESSURE HAZARD

Sealed Refrigeration System contains refrigerant and oil under high pressure.

Proper safety procedures must be followed, and proper protective clothing must be worn when working with refrigerants.

Failure to follow these procedures could result in serious injury or death.

⚠ WARNING

ELECTRIC SHOCK HAZARD

Turn off electric power before service or installation. Extreme care must be used, if it becomes necessary to work on equipment with power applied.

Failure to do so could result in serious injury or death.

⚠ WARNING

EXPLOSION HAZARD

The use of nitrogen requires a pressure regulator. Follow all safety procedures and wear protective safety clothing etc.

Failure to follow proper safety procedures could result in serious injury or death.

⚠ WARNING

NEVER, under any circumstances, liquid charge a rotary-compressor through the LOW side. Doing so would cause permanent damage to the new compressor. Use a charging adapter.

1. Recover all refrigerant and oil from the system.

2. Remove compressor,and EEV.

3. Flush evaporator, condenser and all connecting tubing with dry nitrogen or equivalent. Use standard flushing agent to remove all contamination from system. Inspect suction and discharge line for carbon deposits. Remove and clean if necessary. Ensure all acid is neutralized.

4. Reassemble the system.

5. Pressurize with a combination of R-410A and nitrogen and leak test all connections. If a leak cannot be found, pressurize with a combination of Nitrogen and a trace charge of R-410A and sweep with with an electronic or Halide leak detector. Recover refrigerant and repair any leaks found.

5a. If leak detector is unavailable remove all refrigerant from system and pressurize with nitrogen to 550 psi. Check that system holds pressure.

Repeat Step 5 to insure no more leaks are present

6. Evacuate the system with a good vacuum pump capable of a final vacuum of 200 microns or less. The system should be evacuated through both liquid line and suction line gauge ports. While the unit is being evacuated, seal all openings on the defective compressor. Compressor manufacturers will void warranties on units received not properly sealed. Do not distort the manufacturers tube connections.

7. Recharge the system with the correct amount of refrigerant. The proper refrigerant charge will be found on the unit rating plate. The use of an accurate measuring device, such as a charging cylinder, electronic scales or similar device is necessary.

R-410A SEALED SYSTEM REPAIR

Replace The Reversing Valve

⚠ WARNING

HIGH PRESSURE HAZARD

Sealed Refrigeration System contains refrigerant and oil under high pressure.

Proper safety procedures must be followed, and proper protective clothing must be worn when working with refrigerants.

Failure to follow these procedures could result in serious injury or death.

NOTICE

FIRE HAZARD

Not following the above WARNING could result in fire or electically unsafe conditions which could cause moderate or serious property damage.
Read, understand and follow the above warning.

1. Recover refrigerant from sealed system. PROPER HANDLING OF RECOVERED REFRIGERANT ACCORDING TO EPA REGULATIONS IS REQUIRED.
2. Remove solenoid coil from reversing valve. If coil is to be reused, protect from heat while changing valve.
3. Unbraze all lines from reversing valve.
4. Clean all excess braze from all tubing so that they will slip into fittings on new valve.
5. Remove solenoid coil from new valve.
6. Protect new valve body from heat while brazing with plastic heat sink (Thermo Trap) or wrap valve body with wet rag.
7. Fit all lines into new valve and braze lines into new valve.

⚠ WARNING

EXPLOSION HAZARD

The use of nitrogen requires a pressure regulator. Follow all safety procedures and wear protective safety clothing etc.

Failure to follow proper safety procedures could result in serious injury or death.

8. Pressurize sealed system with a combination of R-410A and nitrogen and check for leaks, using a suitable leak detector. Recover refrigerant per EPA guidelines.
9. Once the sealed system is leak free, install solenoid coil on new valve and charge the sealed system by weighing in the proper amount and type of refrigerant as shown on rating plate. Crimp the process tubes and solder the ends shut. Do not leave Schrader or piercing valves in the sealed system.

NOTE: When brazing a reversing valve into the system, it is of extreme importance that the temperature of the valve does not exceed 250°F at any time.

Wrap the reversing valve with a large rag saturated with water. “Re-wet” the rag and thoroughly cool the valve after each brazing operation of the four joints involved.

The wet rag around the reversing valve will eliminate conduction of heat to the valve body when brazing the line connection.

R-410A SEALED SYSTEM REPAIR

Replace The Condensor Coil 12k/24k

1. Remove unit from the closet.
2. Ensure no charge is left in the system, evacuating according to EPA standards.
3. Remove the lower left panel.
4. Remove six mount screws on rear of condenser coil.
5. Detach one thermistor from coil.
6. Sweat out tubing connections to condenser coil as required
7. Slide coil and shroud assembly out of the rear of the unit to access the 6 screws attaching the shroud to the outdoor coil.
8. Remove coil from shroud and reinstall evaporator coil in reverse sequence.
9. Pressurize with a combination of R-410A and nitrogen. Leak test all connections. If a leak cannot be found, pressurize with a combination of Nitrogen and a trace charge of R-410A and sweep with with an electronic or Halide leak detector. Recover refrigerant and repair any leaks found.
10. If leak detector is unavailable, remove all refrigerant from system and pressurize with nitrogen to 550 psi. Check that system holds pressure.

Repeat Step 9 to insure no more leaks are present.

10. Evacuate the system with a good vacuum pump capable of a final vacuum of 200 microns or less. The system should be evacuated through both liquid line and suction line gauge ports. While the unit is being evacuated, seal all openings on the defective compressor. Compressor manufacturers will void warranties on units received not properly sealed. Do not distort the manufacturers tube connections.

11. Recharge the system with the correct amount of refrigerant. The proper refrigerant charge will be found on the unit rating plate. The use of an accurate measuring device, such as a charging cylinder, electronic scales or similar device is necessary.

R-410A SEALED SYSTEM REPAIR

Replace The Condensor Coil 36k

1. Remove unit from the closet.

2. Ensure no charge is left in the system, evacuating according to EPA standards.

3. Remove the front and side panels.

4. Sweat out tubing connections to condenser coil as required

5. Remove mount screws attaching condenser coil to shroud on the left and right side of the coil.

6. Detach thermistor from coil.

7. Slide coil out of the rear of the unit.

8. Instal new coil in reverse sequence.

9. Pressurize with a combination of R-410A and nitrogen. Leak test all connections. If a leak cannot be found, pressurize with a combination of Nitrogen and a trace charge of R-410A and sweep with with an electronic or Halide leak detector. Recover refrigerant and repair any leaks found.

10. If leak detector is unavailable, remove all refrigerant from system and pressurize with nitrogen to 550 psi. Check that system holds pressure.

Repeat Step 9 to insure no more leaks are present.

11. Evacuate the system with a good vacuum pump capable of a final vacuum of 200 microns or less. The system should be evacuated through both liquid line and suction line gauge ports. While the unit is being evacuated, seal all openings on the defective compressor. Compressor manufacturers will void warranties on units received not properly sealed. Do not distort the manufacturers tube connections.

12. Recharge the system with the correct amount of refrigerant. The proper refrigerant charge will be found on the unit rating plate. The use of an accurate measuring device, such as a charging cylinder, electronic scales or similar device is necessary.

Figure 505 (36k Condensor replacement)

R-410A SEALED SYSTEM REPAIR

Replace The Evaporator Coil 12k/24k

1. Remove unit from closet.

2. Ensure no charge in the system, evacuating according to EPA standards.

3. Remove top panel.

4. Remove duct collar.

5. Remove left side upper panel.

NOTE: The 24k units utilize 2 evaporator coils and 2 reheat coils if applicable. The replacement varies from 12k unit. Additional panels may need to be removed depending on which coil or coils are being replaced.

6. Detach 2 thermistors from coil.

7. If Unit has a reheat coil;

   Reheat coil can be removed from evaporator coil by removing 4 screws.

   Caution: (reheat coil will need to be supported to prevent damage to tubing.

   Alternatively, the tube to reheat coil can either be sweateded off and rebrazed or cut and swedged.

8. Sweat out evaporator coil tubing connections.

9. Remove 3 screws on right hand side end plate.

10. Lift coil up and out and replace evaporator coil in reverse sequence. Reinstall reheat coil if applicable.

11. Pressurize with a combination of R-410A and nitrogen and leak test all connections . If a leak cannot be found, pressurize with a combination of Nitrogen and a trace charge of R-410A and sweep with with an electronic or Halide leak detector. Recover refrigerant and repair any leaks found.

12. If leak detector is unavailable remove all refrigerant from system and pressurize with nitrogen to 550 psi. Check that system holds pressure.

Repeat Step 11 to insure no more leaks are present

13. Evacuate the system with a good vacuum pump capable of a final vacuum of 200 microns or less. The system should be evacuated through both liquid line and suction line gauge ports. While the unit is being evacuated, seal all openings on the defective compressor. Compressor manufacturers will void warranties on units received not properly sealed. Do not distort the manufacturers tube connections.

14. Recharge the system with the correct amount of refrigerant. The proper refrigerant charge will be found on the unit rating plate. The use of an accurate measuring device, such as a charging cylinder, electronic scales or similar device is necessary.

Figure 504 (12k Evaporator coil)

Figure 505 (24k Evaporator coil)

R-410A SEALED SYSTEM REPAIR

Replace The Evaporator Coil 36k

1. Remove unit from closet.

2. Ensure no charge in the system, evacuating according to EPA standards.

3. Remove front, side, and top panels

Caution: Rear blower panel will need to be supported or removed if top panel is removed. Damage to equipment could otherwise occur.

Figure 506 (Support blower panel)

NOTE: The 36k units utilize 2 evaporator coils and 2 reheat coils if applicable. Either or both coils may be replaced as required.

6. Detach 2 thermistors from coil.

7. If Unit has a reheat coil;

Reheat coil can be removed from evaporator coil by removing 4 screws.

Caution: (reheat coil will need to be supported to prevent damage to tubing.

Alternatively, the tube to reheat coil can either be sweateded off and rebrazed or cut and swedged.

8. Remove screws on front header plate.

9. Sweat out evaporator coil tubing connections.

10. remove remaining screw attaching coil to the drain pan.

11. Lift coil up and out and replace evaporator coil in reverse sequence. Reinstall reheat coil if applicable.

Figure 507 (Remove Header Panel)

12. Pressurize with a combination of R-410A and nitrogen and leak test all connections . If a leak cannot be found, pressurize with a combination of Nitrogen and a trace charge of R-410A and sweep with with an electronic or Halide leak detector. Recover refrigerant and repair any leaks found.

13. If leak detector is unavailable remove all refrigerant from system and pressurize with nitrogen to 550 psi. Check that system holds pressure.

Repeat Step 11 to insure no more leaks are present

14. Evacuate the system with a good vacuum pump capable of a final vacuum of 200 microns or less. The system should be evacuated through both liquid line and suction line gauge ports. While the unit is being evacuated, seal all openings on the defective compressor. Compressor manufacturers will void warranties on units received not properly sealed. Do not distort the manufacturers tube connections.

15. Recharge the system with the correct amount of refrigerant. The proper refrigerant charge will be found on the unit rating plate. The use of an accurate measuring device, such as a charging cylinder, electronic scales or similar device is necessary.

R-410A SEALED SYSTEM REPAIR

Replace The Evaporator Coil Drain Pan

1. Remove unit from the closet.
2. Remove top panel.
3. Remove filter.
4. Remove left and right upper side panels
5. Carefully lift coil up a few inches and support to avoid damage to tubing.
6. Pry up plastic drain pan using putty knife or other suitable tool.
7. Scape off anyt glue or sealant remaining on the unit using putty knife or other suitable tool.
8. Install new pan, evaporator coil, and panels.

NOTE: 36k Unit Evaporator drain pan does not normally need to be replaced. If replacement were required, removal of evaporator coils may be neccessary to facilitate replacement.

EXTERNAL STATIC PRESSURE

External Static Pressure can best be defined as the pressure difference (drop) between the Positive Pressure (discharge) and the Negative Pressure (intake) sides of the blower. External Static Pressure is developed by the blower as a result of resistance to airfl ow (Friction) in the air distribution system EXTERNAL to the VRP cabinet.

Resistance applied externally to the VRP (i.e. duct work, fi lters, etc.) on either the supply or return side of the system causes an INCREASE in External Static Pres-sure accompanied by a REDUCTION in airfl ow.

External Static Pressure is affected by two (2) factors;

1. Resistance to Airflow as already explained.

2. Blower Speed. Changing to a higher or lower blower speed will raise or lower the External Static Pressure accordingly.

These affects must be understood and taken into consideration when checking External Static Pressure/Airfl ow to insure that the system is operating within design conditions.

Operating a system with insufficient or excessive airflow can cause a variety of different operating problems. Among these are reduced capacity, freezing evaporator coils, premature compressor and/or heating component failures. etc.

System airflow should always be verified upon completion of a new installation, or before a change-out, compressor replacement, or in the case of heat strip failure to insure that the failure was not caused by improper airflow.

Checking External Static Pressure

The airflow through the unit can be determined by measuring the external static pressure of the system, and consulting the blower performance data for the specific VRP.

1. Set up to measure external static pressure at the supply and return air.

2. Ensure the coil and filter are clean, and that all the registers are open.

3. Determine the external static pressure with the blower operating.

4. Refer to the Air Flow Data for your VRP system to find the actual airflow for factory-selected fan speeds.

5. If the actual airfl ow is either too high or too low, the blower speed will need to be changed to appropriate setting or the ductwork will need to be reassessed and corrections made as required.

6. Select a speed, which most closely provides the required airflow for the system.

7. Recheck the external static pressure with the new speed. External static pressure (and actual airflow) will have changed to a higher or lower value depending upon speed selected. Recheck the actual airflow (at this "new" static pressure) to confirm speed selection.

8. Repeat steps 8 and 9 (if necessary) until proper airfl ow has been obtained.

EXAMPLE: Airflow requirements are calculated as follows: (Having a wet coil creates additional resistance to airflow. This

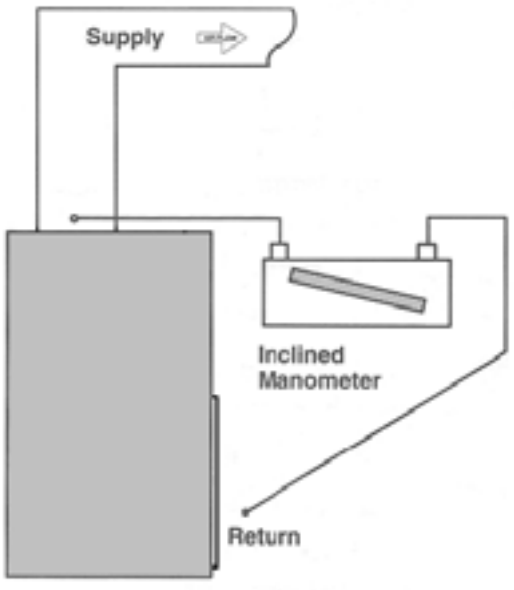


Figure 506 (Checking External Static Pressure)

EXTERNAL STATIC PRESSURE

Determining the Indoor CFM						
Model	VRP12K/VRP12R		VRP24K/VRP24R		VRP36K	
Air Flow Data						
Indoor CFM	Low	High	Low	High	Low	High
.10" ESP*	488	559	472	850	-	-
.15 ESP*	-	-	-	-	1015	1200
.20" ESP	393	466	432	778	875	1160
.30" ESP	292	383	391	703	750	1080
.40" ESP	200	304	348	626	565	970
.50" ESP	104	234	308	555	440	835

*** Rated at 0.10" ESP, High and includes 0.08" ESP for factory installed 1" filter**

Correct CFM (if needed): Correction Multipliers	
230V	1.00
208V	0.97
265V	
Heating	1.00
Cooling	0.95

Explanation of charts

Chart A is the nominal dry coil VRP CFMs. Chart B is the correction factors beyond nominal conditions.

1 ½ TON SYSTEM (18,000 Btu)

Operating on high speed @ 230 volts with dry coil

measured external static pressure .10

Air Flow = 450 CFM

In the same SYSTEM used in the previous example but having a WET coil you must use a correction factor of .95 (i.e. 450 x .95=428 CFM) to allow for the resistance (internal) of the condensate on the coil.

It is important to use the proper procedure to check external Static Pressure and determine actual airfl ow. Since in the case of the VRP, the condensate will cause a reduction in measured External Static Pressure for the given airfl ow.

It is also important to remember that when dealing with VRP units that the measured External Static Pressure increases as the resistance is added externally to the cabinet. Example: duct work, filters, grilles.

Indoor Airflow Data

The VRP A series units must be installed with a free return air configuration. The table below lists the indoor airflow at corresponding static pressures. All units are rated at low speed.

The VRP units are designed for either single speed or two fan speed operation. For single speed operation refer to the airflow table below and select the most appropriate CFM based on the ESP level. Connect the fan output from the thermostat to the unit on either the GL terminal for low speed or to the GH terminal for high speed operation.

For thermostats with two-speed fan outputs connect the low speed output to the unit GL terminal and the high speed output to the GH terminal.

EXTERNAL STATIC PRESSURE

Ductwork Preparation

If flex duct is used, be sure all the slack is pulled out of the flex duct. Flex duct ESP can increase considerably when not fully extended. DO NOT EXCEED a total of .30 ESP, as this is the MAXIMUM design limit for the VERT-I-PAK A-Series unit.

IMPORTANT: FLEX DUCT CAN COLLAPSE AND CAUSE AIRFLOW RESTRICTIONS. DO NOT USE FLEX DUCT FOR: 90 DEGREE BENDS, OR UNSUPPORTED RUNS OF 5 FT. OR MORE.

Fresh Air Door

The Fresh Air Door is an "intake" system. The fresh air door opened via a slide on the front of the chassis located just above the indoor coil. Move the slide left to open and right to close the fresh air door. The system is capable of up to 60 CFM of fresh air @ ~.3" H20 internal static pressure.

Checking Approximate Airflow

If an inclined manometer or Magnehelic gauge is not available to check the External Static Pressure, or the blower performance data is unavailable for your unit, approximate air fl ow call be calculated by measuring the temperature rise, then using tile following criteria.

$$\text{CFM} = \frac{\text{Kilowatts} \times 3413}{\text{Temp Rise } \times 1.08}$$

Electric Heat Strips

The approximate CFM actually being delivered can be calculated by using the following formula:

DO NOT simply use the Kilowatt Rating of the heater (i.e. 2.5, 3.4, 5.0) as this will result in a less-than-correct airfl ow calculation. Kilowatts may be calculated by multiplying the measured voltage to the unit (heater) times the measured current draw of all heaters (ONLY) in operation to obtain watts. Kilowatts are than obtained by dividing by 1000.

EXAMPLE: Measured voltage to unit (heaters) is 230 volts. Measured Current Draw of strip heaters is 11.0 amps.

230 x 11.0 = 2530
2530/1000 = 2.53 Kilowatts
2.53 x 3413 = 8635

Supply Air = 95°F

Return Air = - 75°F

Temperature Rise = 20°F

20 x 1.08 = 21.6

$$\frac{8635}{21.6} = 400\ CFM$$

COMPONENT TESTING

Electronic Expansion Valve (EEV)

⚠ WARNING

BURN HAZARD

Proper safety procedures must be followed, and proper protective clothing must be worn when working with a torch.

Failure to follow these procedures could result in moderate or serious injury.

⚠ WARNING

CUT/SEVER HAZARD

Be careful with the sharp edges and corners. Wear protective clothing and gloves, etc.

Failure to do so could result in serious injury.

All units are equipped with Electronic Expansion Valve (EEV) metering devices.

The electronic expansion valve (EEV) operates with a much more sophisticated design than Capillary tube metering devices. EEVs control the flow of refrigerant entering a direct expansion evaporator. They do this in response to signals sent to them by an electronic controller. A small motor is used to open and close the valve port.

Check Stepper Motor

1. To remove the stepper motor from the valve body, rotate the stepper motor approximatately 30 degrees to unlock the locking tabs, and then lift straight up.

2. Check that the stepper motor is plugged into the FMC (EEV, P13).

3. Verify wires are connected and intact on stepper motor.

4. Check the resistance of the stepper motor by ohming out all of the wires to each other.

5. The resistance of the blue wire to the either the yellow, orange, black, or red wire should be 46 ohms.

6. The resistance of the yellow, orange, black, or red wires to each other should be 93 ohms.

Checking for restrictions

1. Connect pressure gauges to unit.

2. Start the unit in the cooling mode. If after a few minutes of operation the pressures are normal, the EEV is not restricted.

3. Switch the unit to the heating mode and observe the gauge readings after a few minutes running time. If the system pressure is normal, the EEV is not restricted.

4. If the operating pressures are lower than normal in both the heating and cooling mode, or the system pressure is very high (over 575psi) on the liquid side and very low (or vacuum) on the low side, the EEV may be restricted.

5. Inspect and examine the EEV stepper motor first! Then Verify the unit has proper refrigerant charge and no leaks prior to continuing diagnosis of bad Valve body.

Possible causes for expansion valve failures:

1. Initial installation of equipment or a valve replacement. When installing the air handler, evaporator coil case, or an expansion valve, always protect the sensor (EEV) from the heat of the pipe as you solder in the suction line. Do this by either wrapping the sensor in cold water or simply remove the sensor from the line before you solder (this is the best way to insure no damage to the sensor). Many sensors have been damaged on install by not removing them (they are hiding behind the equipment panel within inches from the suction line stub out). The EEV sensor will usually not fail completely but will be out of calibration and produce an incorrect temperature reading which results in an incorrect super heat control. The repair on a brand new unit or replacement valve will cost the hvac company time, money and not to mention major frustration to the technician and customer. PLUS the customer's confidence in the technician and the equipment fails too, and that is more devastating to the company than anything else!

2. Low air flow or turbulent air flow (i.e. short plenum distribution boxes or bull head T fittings. These conditions can cause the EEV valve to shut down due to a very cold coil and the valve is incorrectly replaced as failed shut.

COMPONENT TESTING

Reversing Valve Description And Operation

The Reversing Valve controls the direction of refrigerant flow to the indoor and outdoor coils. It consists of a pressure-operated, main valve and a pilot valve actuated by a solenoid plunger. The solenoid is energized during the heating cycle only. The reversing valves used in the RAC system is a 2-position, 4-way valve.

The single tube on one side of the main valve body is the high-pressure inlet to the valve from the compressor. The center tube on the opposite side is connected to the low pressure (suction) side of the system. The other two are connected to the indoor and outdoor coils. Small capillary tubes connect each end of the main valve cylinder to the "A" and "B" ports of the pilot valve. A third capillary is a common return line from these ports to the suction tube on the main valve body. Four-way reversing valves also have a capillary tube from the compressor discharge tube to the pilot valve.

The piston assembly in the main valve can only be shifted by the pressure differential between the high and low sides of the system. The pilot section of the valve opens and closes ports for the small capillary tubes to the main valve to cause it to shift.

NOTE: System operating pressures must be near normal before valve can shift.

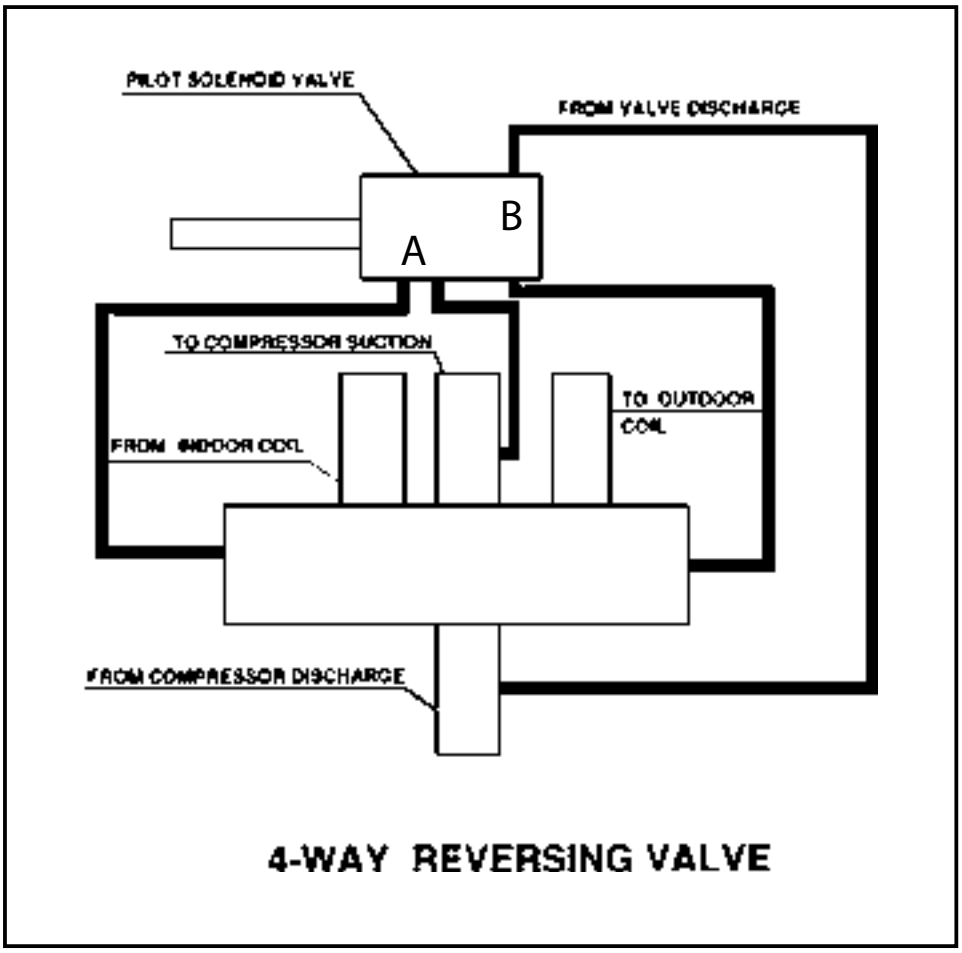


Figure 601 (Reserving Valve)

COMPONENT TESTING

Testing The Reversing Valve Solenoid Coil

⚠ WARNING

ELECTRIC SHOCK HAZARD

Disconnect power to the unit before servicing. Failure to follow this warning could result in serious injury or death.

The solenoid coil is an electromagnetic type coil mounted on the reversing valve and is energized during the operation of the compressor in the heating cycle.

1. Turn off high voltage electrical power to unit.
2. Unplug line voltage lead from reversing valve coil.
3. Check for electrical continuity through the coil. If you do not have continuity replace the coil.
4. Check from each lead of coil to the copper liquid line as it leaves the unit or the ground lug. There should be no continuity between either of the coil leads and ground; if there is, coil is grounded and must be replaced.
5. If coil tests okay, reconnect the electrical leads.
6. Make sure coil has been assembled correctly.

NOTE: Do not start unit with solenoid coil removed from valve, or do not remove coil after unit is in operation. This will cause the coil to burn out.

Touch Test in Heating/Cooling Cycle

⚠ WARNING

BURN HAZARD

Proper safety procedures must be followed, and proper protective clothing must be worn when working with a torch.

Failure to follow these procedures could result in moderate or serious injury.

The only definite indications that the slide is in the mid-position is if all three tubes on the suction side of the valve are hot after a few minutes of running time.

NOTE: If both tubes shown as hot or cool are not the same corresponding temperature, refer to figure 703, then the reversing valve is not shifting properly.

COMPONENT TESTING

Checking The Reversing Valve

⚠ WARNING

HIGH PRESSURE HAZARD

Sealed Refrigeration System contains refrigerant and oil under high pressure.

Proper safety procedures must be followed, and proper protective clothing must be worn when working with refrigerants.

Failure to follow these procedures could result in serious injury or death.

NOTE: You must have normal operating pressures before the reversing valve can shift.

Check the operation of the valve by starting the system and switching the operation from "Cooling" to "Heating" and then back to "Cooling". Do not hammer on valve.

Occasionally, the reversing valve may stick in the heating or cooling position or in the mid-position.

When sluggish or stuck in the mid-position, part of the discharge gas from the compressor is directed back to the suction side, resulting in excessively high suction pressure.

Should the valve fail to shift from coooling to heating, block the air flow through the outdoor coil and allow the discharge pressure to build in the system. Then switch the system from heating to cooling.

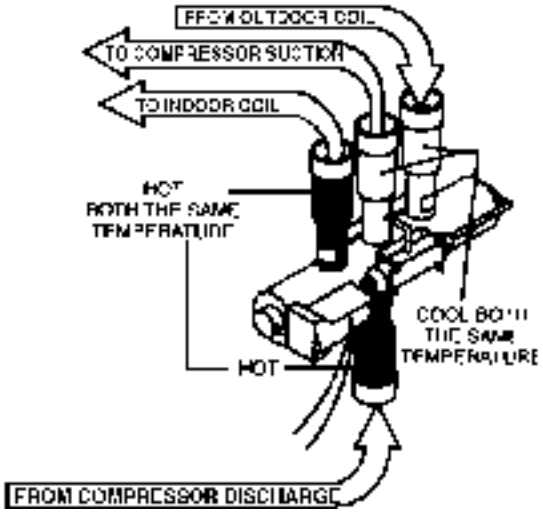
If the valve is stuck in the heating position, block the air flow through the indoor coil and allow discharge pressure to build in the system. Then switch the system from heating to cooling.

Should the valve fail to shift in either position after increasing the discharge pressure, replace the valve.

Dented or damaged valve body or capillary tubes can prevent the main slide in the valve body from shifting.

If you determing this is the problem, replace the reversing valve.

After all of the previous inspections and checks have been made and determined correct, then perform the "Touch Test" on the reversing valve.



Reversing Valve in Heating Mode

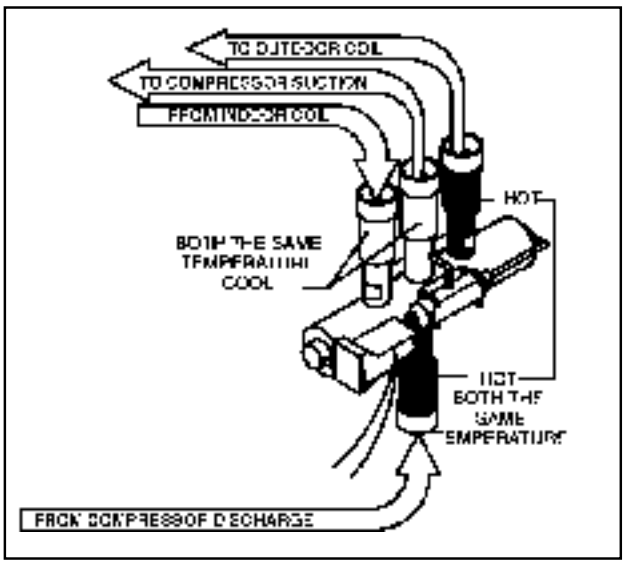


Figure 602 (Reserving Valve)

COMPONENT TESTING

Touch Test Chart : To Service Reversing Valves

NORMAL FUNCTION OF VALVE								
VALVE OPERATING CONDITION	DISCHARGE TUBE from Compressor	SUCTION TUBE	COIL	Tube to OUTSIDE COIL	LEFT Pilot	RIGHT Pilot	NOTES: * TEMPERATURE OF VALVE BODY ** WARMER THAN VALVE BODY	
	1	2	3	4	5	6	POSSIBLE CAUSES	CORRECTIONS
Normal Cooling	Hot	Cool	Cool as (2)	Hot as (1)	*TVB	TVB		
Normal Heating	Hot	Cool	Hot as (1)	Cool as (2)	*TVB	TVB		
MALFUNCTION OF VALVE								
Valve will not shift from cool to heat.	Check Electrical circuit and coil						No voltage to coil.	Repair electrical circuit.
							Defective coil.	Replace coil.
	Check refrigeration charge						Low charge.	Repair leak, recharge system.
							Pressure differential too high.	Recheck system.
	Hot	Cool	Cool, as (2)	Hot, as (1)	*TVB	Hot	Pilot valve okay. Dirt in one bleeder hole.	Deenergize solenoid, raise head pressure, reenergize solenoid to break dirt loose. If unsuccessful, remove valve, wash out. Check on air before installing. If no movement, replace valve, add strainer to discharge tube, mount valve horizontally.
							Piston cup leak	Stop unit. After pressures equalize, restart with solenoid energized. If valve shifts, reattempt with compressor running. If still no shift, replace valve.
Valve will not shift from cool to heat.	Hot	Cool	Cool, as (2)	Hot, as (1)	*TVB	*TVB	Clogged pilot tubes.	Raise head pressure, operate solenoid to free. If still no shift, replace valve.
	Hot	Cool	Cool, as (2)	Hot, as (1)	Hot	Hot	Both ports of pilot open. (Back seat port did not close).	Raise head pressure, operate solenoid to free partially clogged port. If still no shift, replace valve.
	Warm	Cool	Cool, as (2)	Hot, as (1)	*TVB	Warm	Defective Compressor.	Replace compressor
Starts to shift but does not complete reversal.	Hot	Warm	Warm	Hot	*TVB	Hot	Not enough pressure differential at start of stroke or not enough fl ow to maintain pressure differential.	Check unit for correct operating pressures and charge. Raise head pressure. If no shift, use valve with smaller port.
							Body dama ge.	Replace valve
	Hot	Warm	Warm	Hot	Hot	Hot	Both ports of pilot open.	Raise head pressure, operate solenoid. If no shift, use valve with smaller ports.
	Hot	Hot	Hot	Hot	*TVB	Hot	Body damage.	Replace valve
							Valve hung up at mid-stroke. Pumping volume of compressor not suf fi cient to maintain reversal.	Raise head pressure, operate solenoid. If no shift, use valve with smaller ports.
	Hot	Hot	Hot	Hot	Hot	Hot	Both ports of pilot open.	Raise head pressure, operate solenoid. If no shift, replace valve.
Apparent leap in heating.	Hot	Cool	Hot, as (1)	Cool, as (2)	*TVB	*TVB	Piston needle on end of slide leaking.	Operate valve several times, then recheck. If excessive leak, replace valve.
	Hot	Cool	Hot, as (1)	Cool, as (2)	**WVB	**WVB	Pilot needle and piston needle leaking.	Operate valve several times, then recheck. If excessive leak, replace valve.
Will not shift from heat to cool.	Hot	Cool	Hot, as (1)	Cool, as (2)	*TVB	*TVB	Pressure differential too high.	Stop unit. Will reverse during equalization period. Recheck system
							Clogged pilot tube.	Raise head pressure, operate solenoid to free dirt. If still no shift, replace valve.
	Hot	Cool	Hot, as (1)	Cool, as (2)	Hot	*TVB	Dirt in bleeder hole.	Raise head pressure, operate solenoid. Remove valve and wash out. Check on air before reinstalling, if no movement, replace valve. Add strainer to discharge tube. Mount valve horizontally.
	Hot	Cool	Hot, as (1)	Cool, as (2)	Hot	*TVB	Piston cup leak.	Stop unit. After pressures equalize, restart with solenoid deenergized. If valve shifts, reattempt with compressor running. If it still will not reverse while running, replace the valve.
	Hot	Cool	Hot, as (1)	Cool, as (2)	Hot	Hot	Defective pilot.	Replace valve.
	Warm	Cool	Warm, as (1)	Cool, as (2)	Warm	*TVB	Defective compressor.	Replace compressor

Figure 603 (Reserving Valve)

COMPONENT TESTING

Compressor checks

⚠ WARNING

ELECTRIC SHOCK HAZARD

Disconnect power to the unit before servicing. Failure to follow this warning could result in serious injury or death.

⚠ WARNING

BURN HAZARD

Proper safety procedures must be followed, and proper protective clothing must be worn when working with a torch.

Failure to follow these procedures could result in moderate or serious injury.

Caution: After disconnecting power from unit, allow 2 minutes for capacitors to discharge before handling MCS board, disconnecting leads, or taking readings with a meter.

1. Remove front panel from unit and gain access to the MCS board.
2. Locate and disconnect the motor winding leads shown in the figure below.

   U= Red V= Blue W= Black
3. Using an OHM Meter, check resistance from U to V, U to W, and V to to W.

   All of the readings should be within 0.1 ohms of each other.

   A difference of more than 01. ohms indicates that windings may be damaged and the compressor should be replaced.

NOTE: Actual OHM values may vary due to temperature of the compressor.

4. Using a MegOhm Meter, check the motor windings for a short to ground.

   Measure the resistance of each winding to ground.

   A reading of less than 10 Megohms indicates that the motor windings may be damaged and the compressor should be replaced.

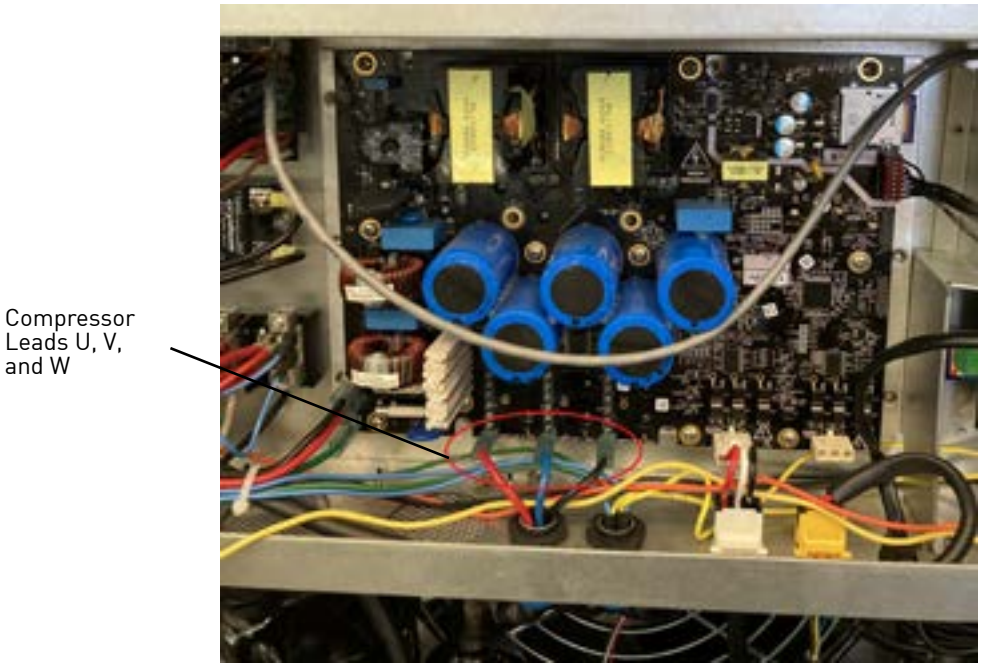


Figure 604 (Compressor Checks)

COMPONENT TESTING

Check the Outdoor Fan 12k/24k

Caution: Wait for 2 minutes after removing power from the unit to allow capacitors to discharge before handling the MCS board, disconnecting leads or connectors, or taking ohm readings.

1. Remove outdoor fan connector from MCS board at J8 as shown in figure below.
2. Ohm out all three wires to each other.
3. 15 ohms is a normal reading.
4. If the resistance is not within 0.1 ohms, replace motor or repair associated wiring.

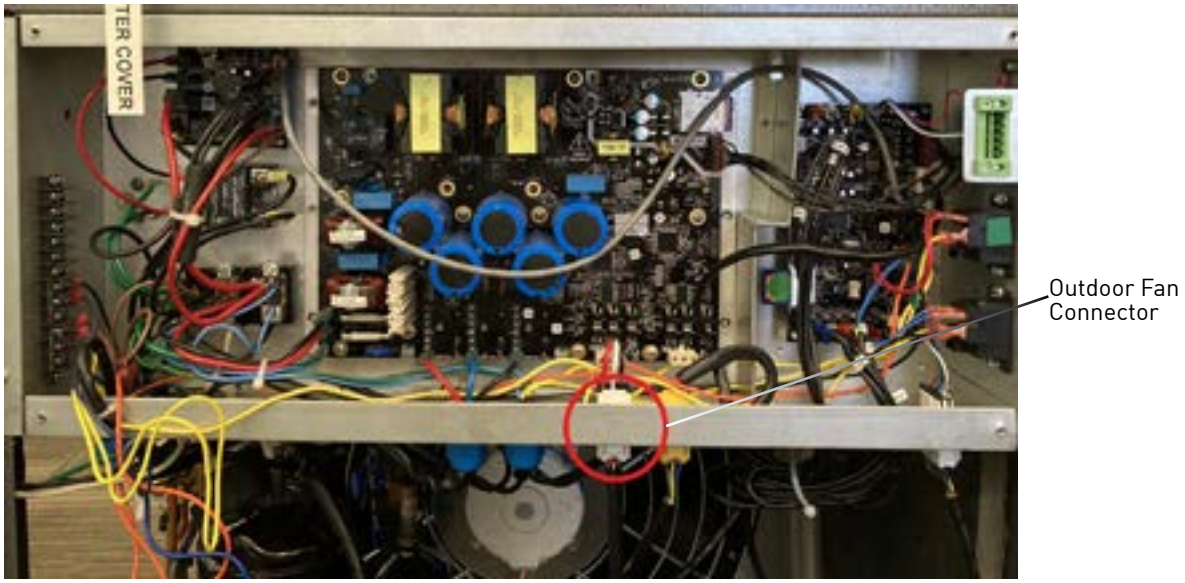


Figure 605 (Outdoor Fan)

COMPONENT TESTING

Check the Outdoor Fan 36k

Caution: Wait for 2 minutes after removing power from the unit to allow capacitors to discharge before handling the MCS board, disconnecting leads or connectors, or taking ohm readings.

1. Check that red and black wires have line voltage at terminal block.

2. Jumper yellow wire to L1 and check that motor runs

3. Jumper orange wire to L1 and check that motor runs.

4. Jumper orange wire and yellow wire to L!1 and check that motor runs.

5. If fan does not run in all three condtions, fan motor should be replaced.

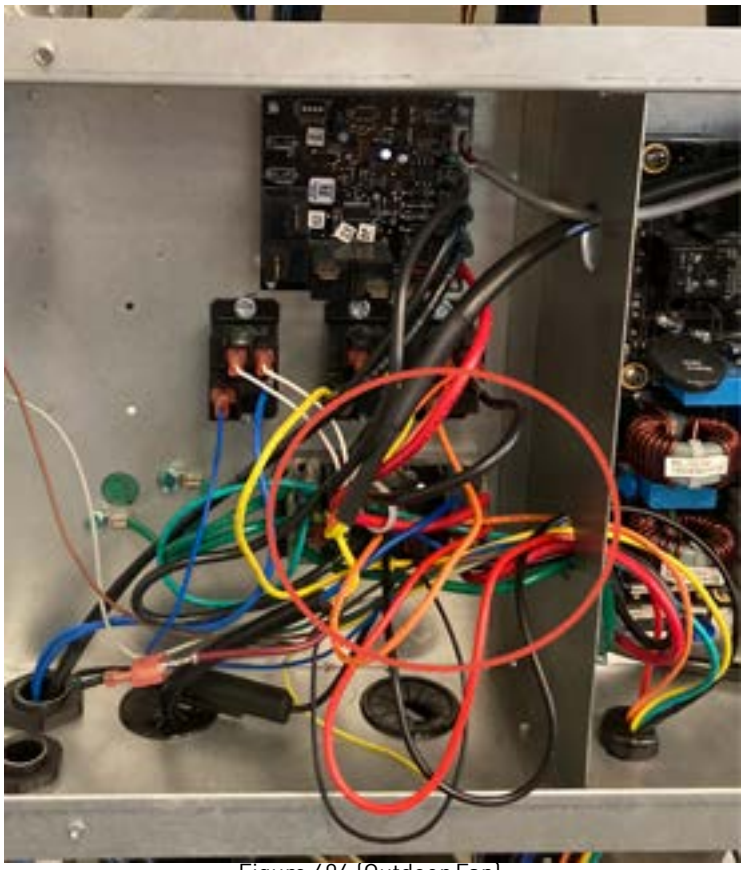


Figure 606 (Outdoor Fan)

COMPONENT TESTING

Replace the Outdoor Fan 12k/24k

Caution: Wait for 2 minutes after removing power from the unit to allow capacitors to discharge before handling the MCS board, disconnecting leads or connectors, or taking ohm readings.

1. Remove unit from closet.
2. Remove front, left and and right side access panels.
3. Unplug molex harness from cabinet junction (white 3 pin plug)
4. Remove nuts from fan motor mount at 4 places.

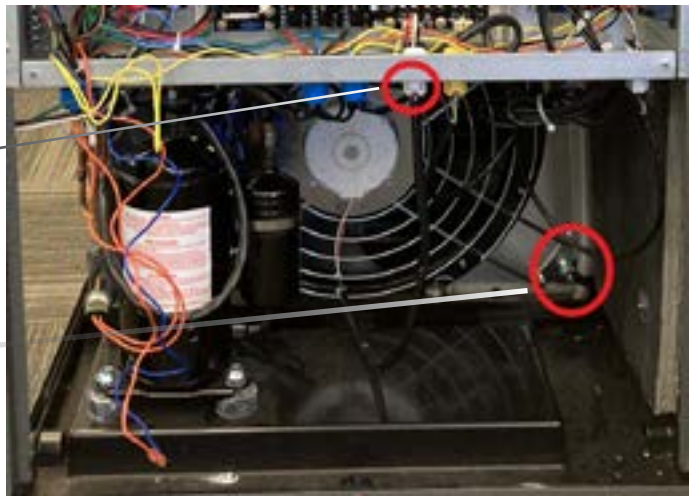


Figure 607 (Outdoor Fan)

5. Remove 8 screws from fan inlet ring.
6. Fan assembly can be removed through the right side of the unit.
7. Remove fan blade from motor shaft.
8. Remove motor from mount.
9. Install new fan motor in reverse sequence.

COMPONENT TESTING

Replace the Outdoor Fan Motor36k

1. Remove front panel.
2. Disconnect and tag fan motor electrical connections.
3. Loosen set screw attaching fan blade to fan motor shaft.
4. Loosen belly band clamp bolt.
5. Remove Motor.
6. Install new motor in reverse sequence.

Figure 608 (Outdoor Fan)

COMPONENT TESTING

Check the Indoor Fan 12k/24k

1. Check for line voltage at yellow molex connector.

NOTE:To unplug connector, pull down on the red locking tab and squeeze the connector while pulling down.

2. If no line voltage trace back to terminal block

3. Check for 10 vdc at green and brown wire at white molex connector for indoor fan motor next fmc board.
4. If line voltage is present at yellow connector, but 10vdc is not present at white connecor, indoor fan motor is bad.
5. If10vdc is present at white molex connector, jump from brown wire to yellow wire.

If fan does not run at full speed, fan is bad.

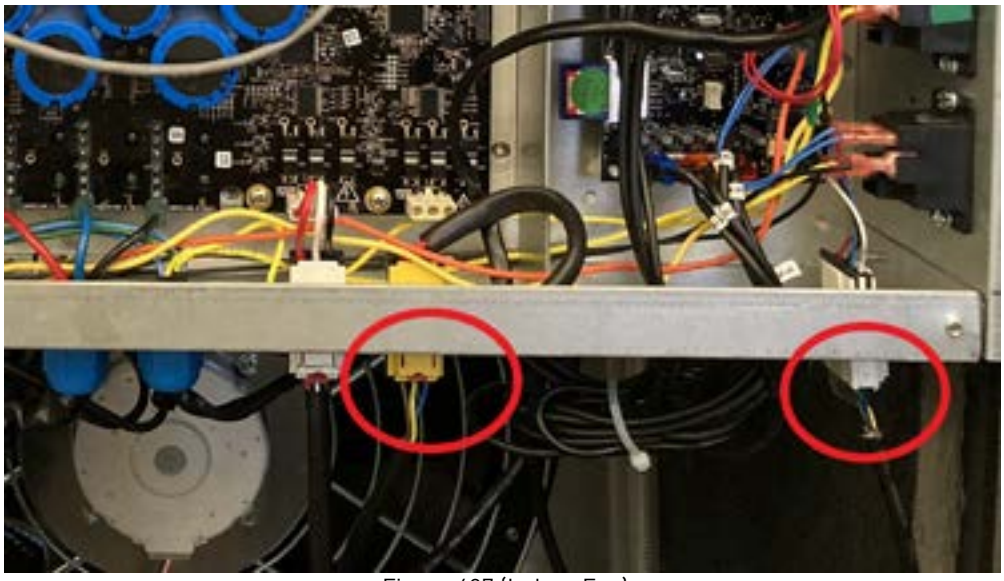


Figure 607 (Indoor Fan)

COMPONENT TESTING

Check the Indoor Fan 36k

1. Check for line voltage at terminal block.(blue and red wires)

Note: There is an inline fuse installed on red wire (check for continuity if line voltage is not present.) always ensure power is removed from unit when checking continuity)

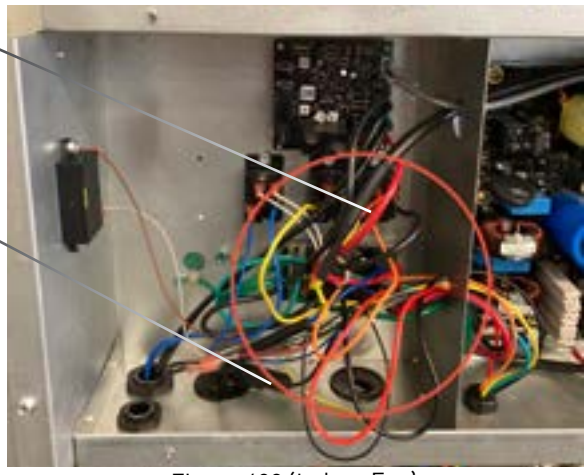


Figure 608 (Indoor Fan)

2. Check for 10 vdc at red and black wire at white molex connector for indoor fan motor next to fmc board.

3. If line voltage is present at terminal block, but 10vdc is not present at white connecor, indoor fan motor is bad.

4. If10vdc is present at white molex connector, jump from red wire to yellow wire.

If fan does not run at full speed, fan is bad.

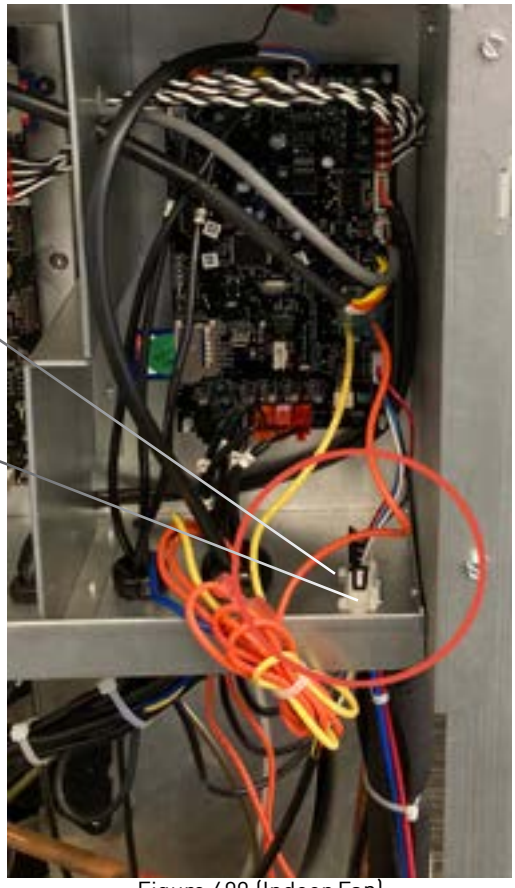


Figure 609 (Indoor Fan)

COMPONENT TESTING

Replace the Indoor Fan 12k/24k

1. Remove unit from closet.
2. Unplug yellow and white molex connectors. Unlock connector by pulling down on red tab and squeezing connector.
3. Remove wires from clips back to fan
4. Remove duct collar by removing screws

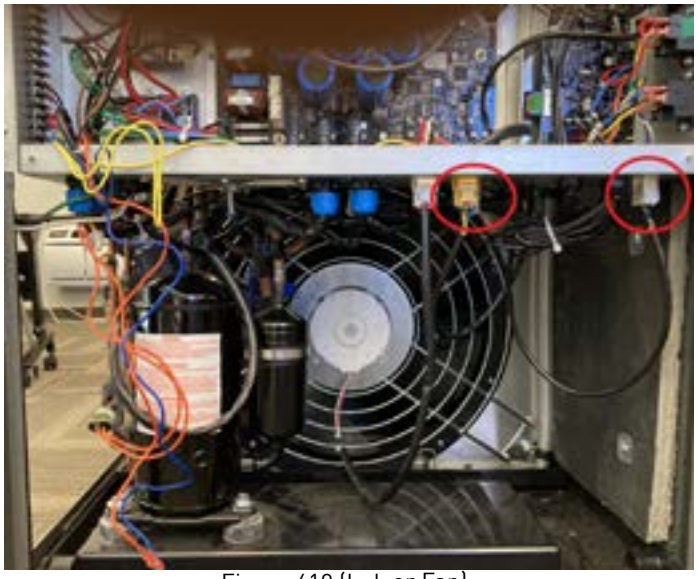


Figure 610 (Indoor Fan)

5. Remove rear panel by removing perimeter screws.
6. Remove rear panel from fan by removing 10 screws.

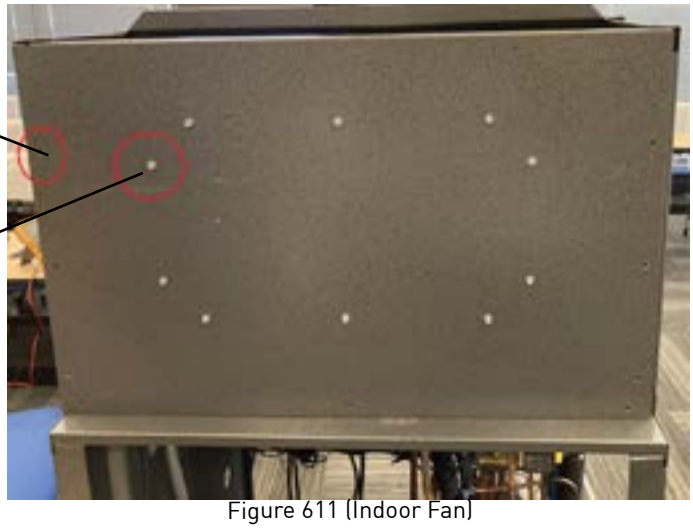


Figure 611 (Indoor Fan)

7. Remove fan mount bolts (Allen Head bolts (4 places).)
8. Install new fan motor in reverse sequence.

Figure 612 (Indoor Fan)

COMPONENT TESTING

Replace the Indoor Fan 36k

1. Remove unit from closet.

2. Disconnect Indoor fan electrical connections. Tag and identify.

3. Remove wires from clips back to fan.

4. Remove rear panel by removing perimeter screws.

6. Remove rear panel from fan by removing 10 screws.

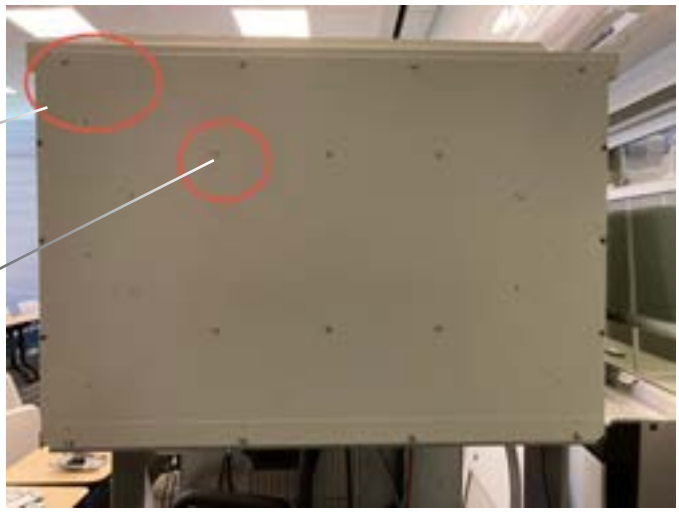


Figure 613 (Indoor Fan)

7. Remove fan mount bolts (Allen Head bolts (4 places).

8. Install new fan motor in reverse sequence.

Figure 614 (Indoor Fan)

COMPONENT TESTING

Check the Heating Elements

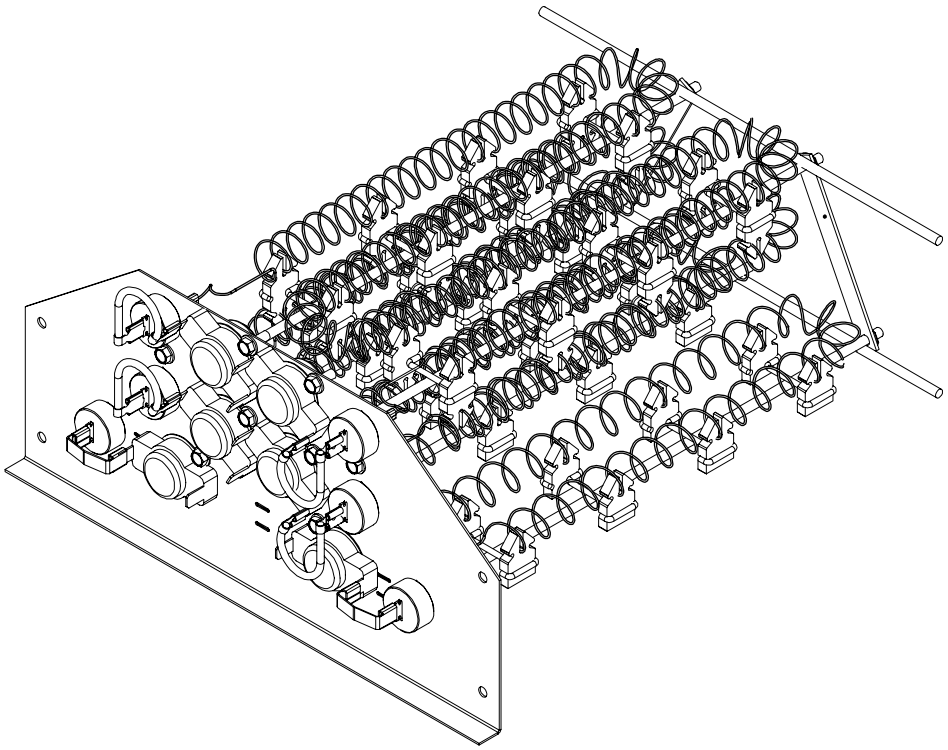


Figure 609 (Heating Elements)

COIL 1	COIL 2	COIL 3	THERMAL DISC LIMITER	THERMAL DISC FUSE
265V 10 KW MULTI				
5000KW 12.35 OHMS +-5%	2500 KW 24.71 OHMS +- 5%	2500 KW 24.71 OHMS +- 5%	OPEN 165°F CLOSE 135°F	OPEN 240°F
265V 5 KW MULTI				
2450KW 27.54 OHMS +-5%	800 KW 84.35 OHMS +- 5%	1500 KW 44.99 OHMS +- 5%	OPEN 165°F CLOSE 135°F	OPEN 240°F
230V 10 KW MULTI				
5000KW 10.13 OHMS +-5%	2500 KW 20.26 OHMS +- 5%	2500 KW 20.26 OHMS +- 5%	OPEN 165°F CLOSE 135°F	OPEN 240°F
230V 5 KW MULTI				
2450KW 20.68 OHMS +-5%	800 KW 63.32 OHMS +- 5%	1500 KW 33.77 OHMS +- 5%	OPEN 165°F CLOSE 135°F	OPEN 240°F

COMPONENT TESTING

Replace the Heating Elements

1. Remove duct work as neccesary to gain access to top panel.

2. Remove top panel.

Note: on 36k units remove access panel on top of unit.

3. Disconnect input wires (2 places)

4. Remove Mounting screws (4 places).

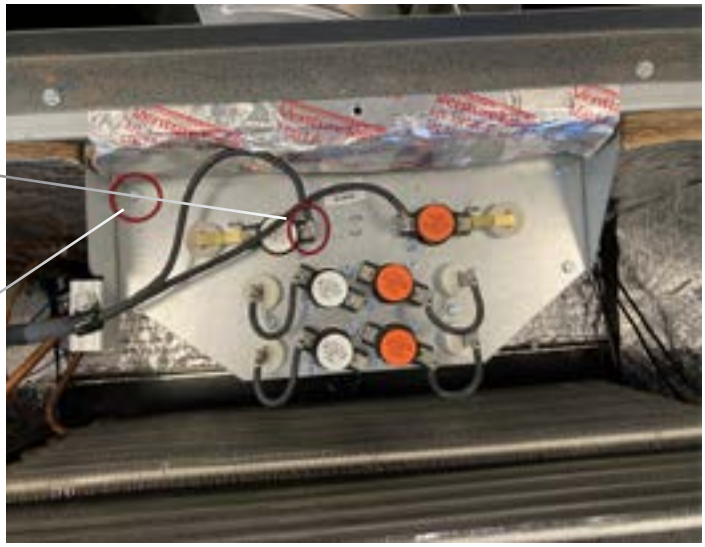


Figure 615 (Heating Elements)

5. Lift heater element assembly straight up and out of unit.

COMPONENTS TESTING

MCS Motor Control System Board Pin out

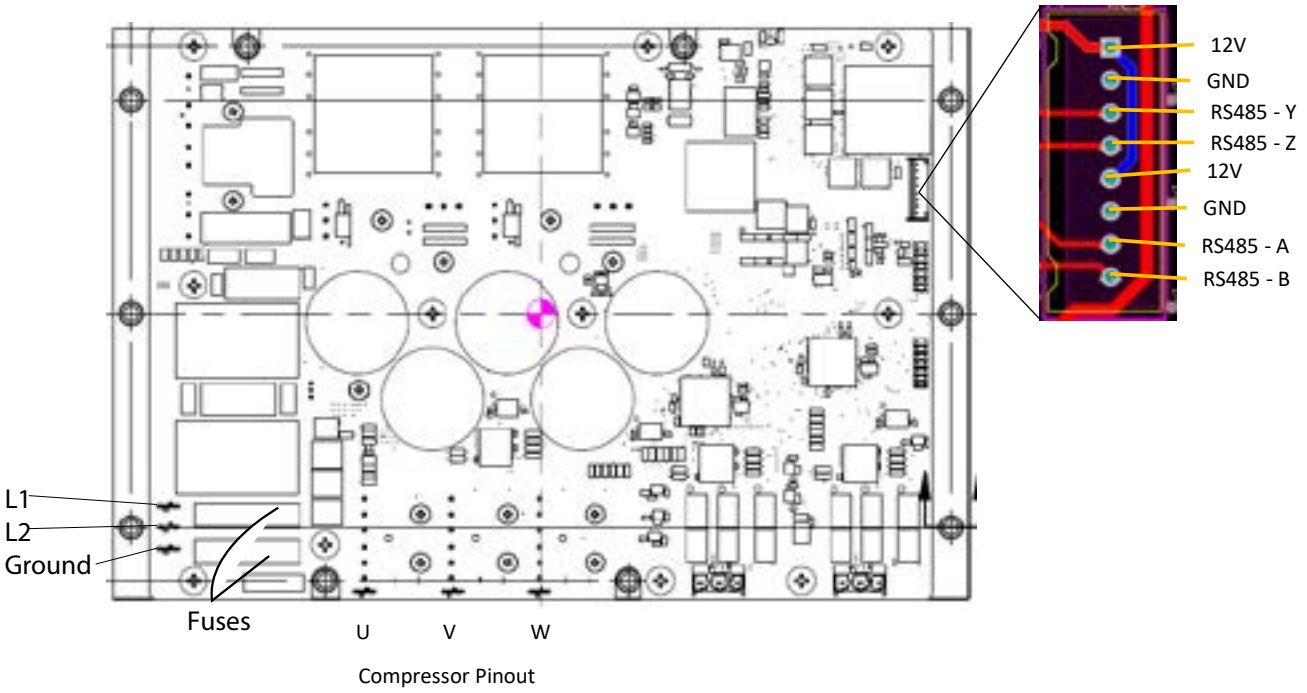


Figure 616 (MCS Board)

1. Check power from pins 1 to 2 for 12 volts.
2. Check power from pins 5 to 6 for 12 volts.
3. Check power from Line 1 to ground for appopriate voltage.
4. Check power from Line 2 to ground for appropriate voltage.
5. Remove power from the unit and allow two minutes for capacitors to discharge before attempting to take continuity readings.
6. Check for continuity on the fuses. If fuses are blown, replace MCS board.

COMPONENTS TESTING

Mcs Motor Control System Board Replacement

1. Remove power from the unit and wait 2 minutes for capacitor bleed off before removing leadsd or handling the MCS board.
2. Disconnect electrical connections and tag wires.
3. Unhook heater board communication cable to avoid damage.
3. Remove 10 9/64 allen head bolts.
4. Tap from the back to dislodge the board.

Caution: when reinstalling bolts use hand tools and hand tighten. Cross threading the bolts may cause the need for high level repairs.

5. Remove SD card from old board and place into new board.
6. Install new board into unit.

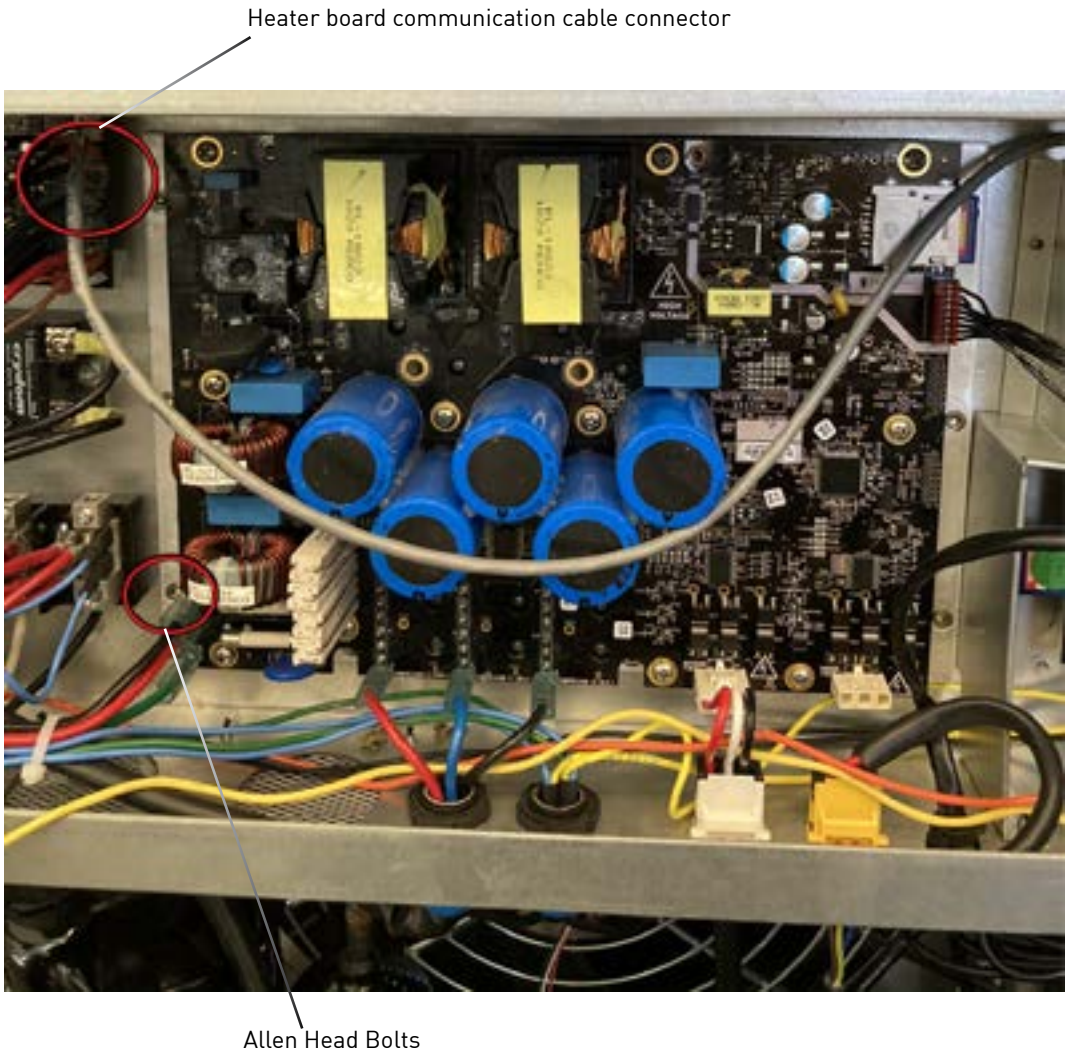


Figure 617 (MCS Board)

COMPONENTS TESTING

Fmc Board Pin Out

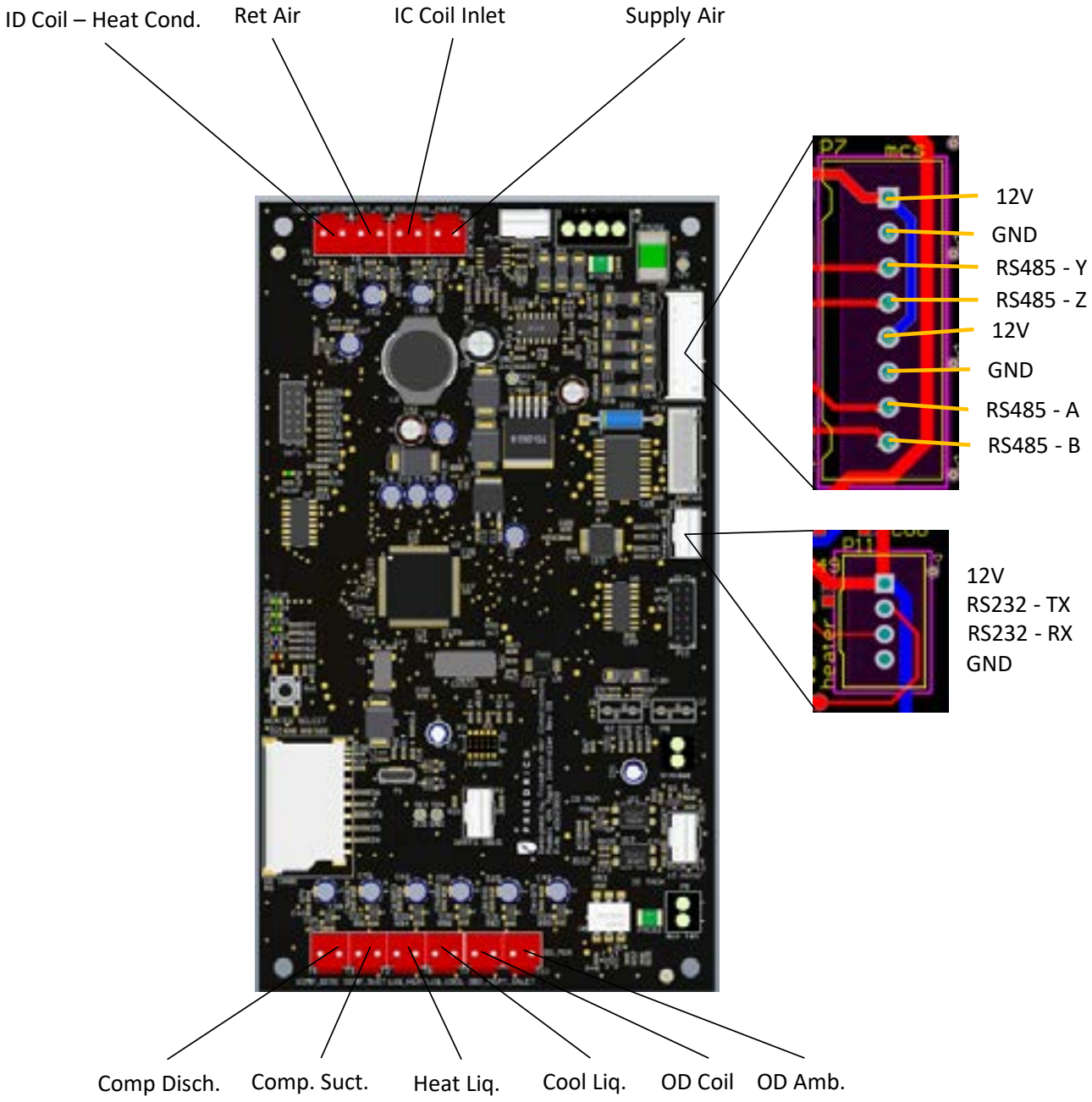


Figure 618 (FMC Board)

1. Check for 12 v to ground 3 places.
2. Check for 3.3 volts across thermistor pins.
3. Check resistance of thermistors (10 places). Refer to thermistor values (Figure 630).

COMPONENTS TESTING

FMC Board Replacement

Note: When ordering the part, the model and serial number must be supplied for flashing of board.

1. Disconnect all electrical connections, tag and identify wires.
2. Carefully compress pcb standoffs and remove board.
3. Install new board.

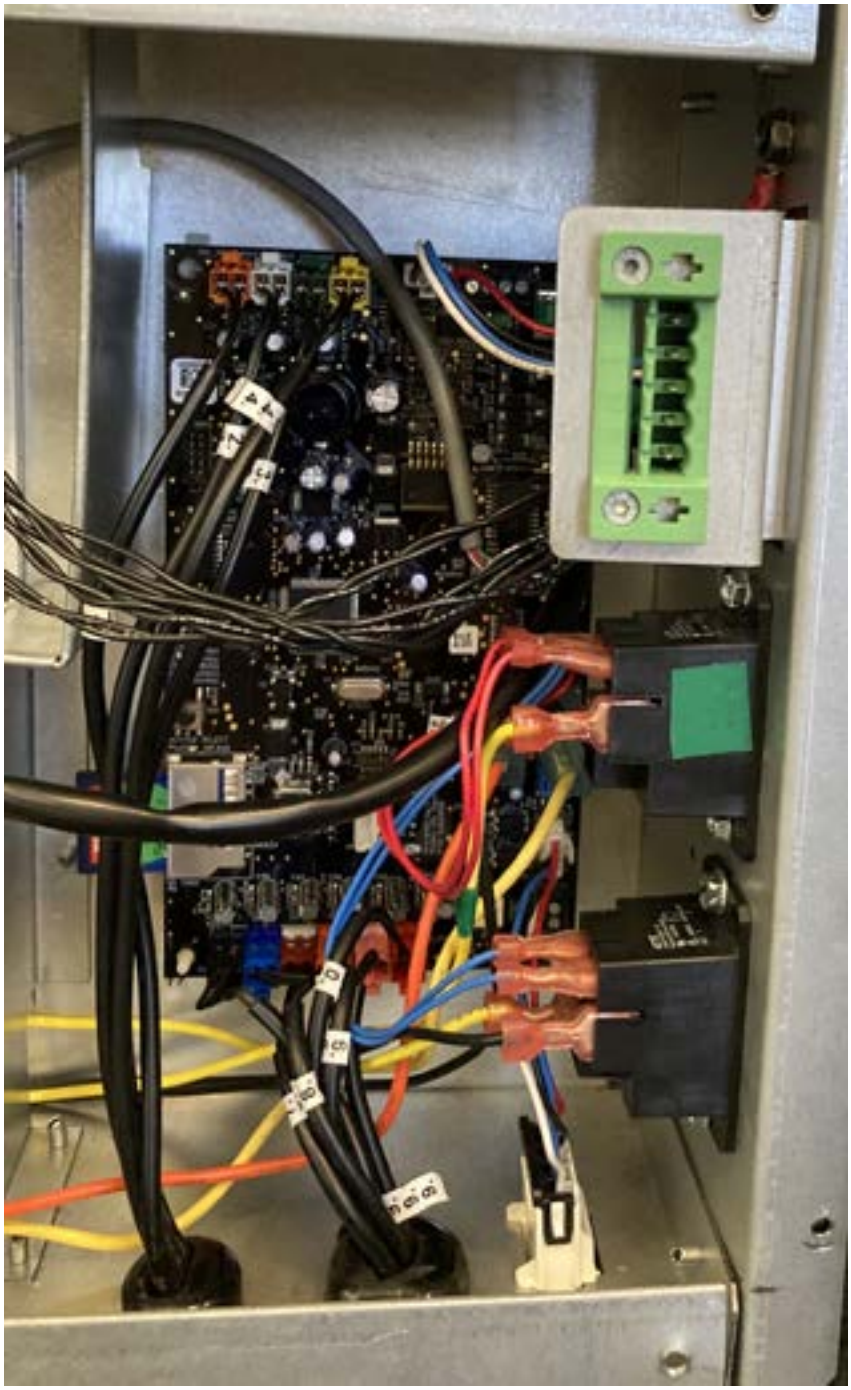


Figure 619 (FMC Board)

COMPONENTS TESTING

Heater Board Pin Out

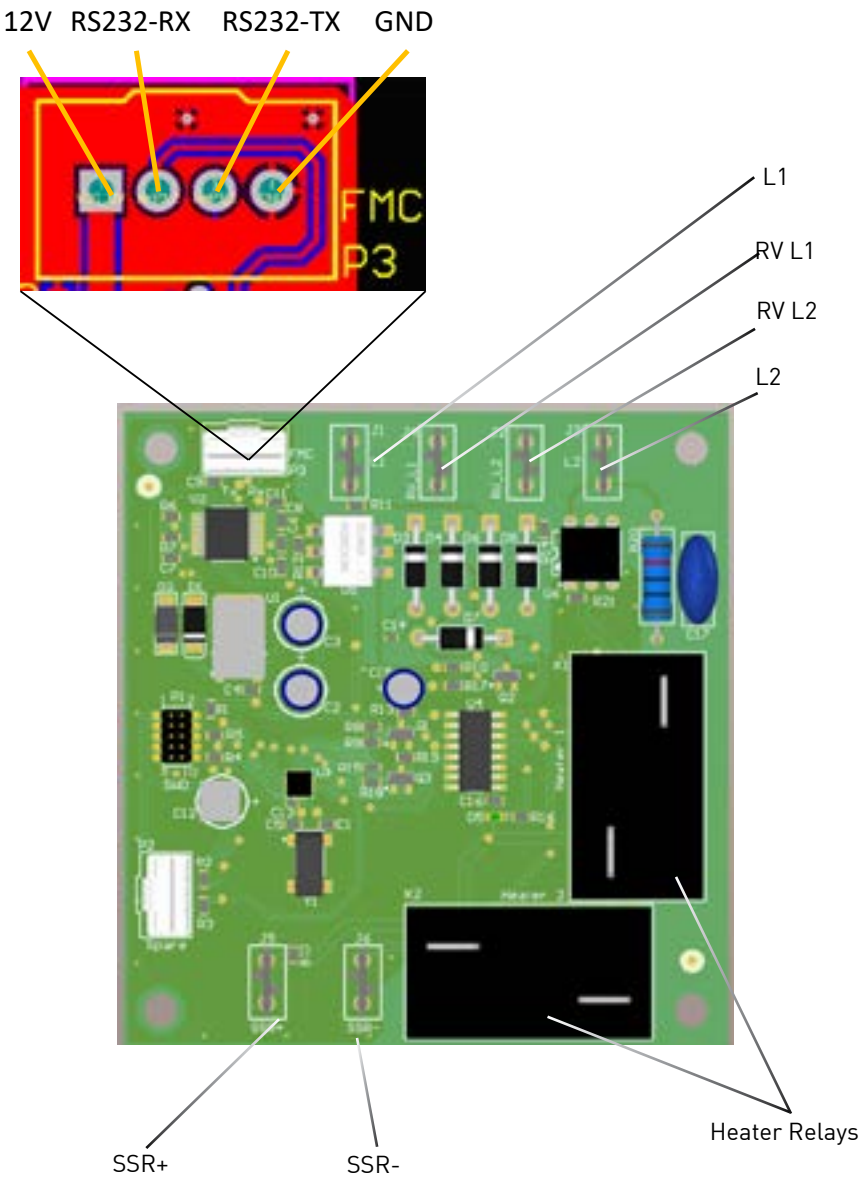


Figure 620 (Heater Board)

1. Check for 12 volts between VCC 1 and ground.
2.Check for line voltage at L1 and L2, reversing valve L1 and L2,
3.Check voltage at SSR + an - for 12 vdc.

COMPONENTS TESTING

Heater Board Replacement

1. Ensure power is removed from the unit.
2. Disconnect all wires and identify.
3.Remove board by carefully compressing standoffs.
4. Install new board.

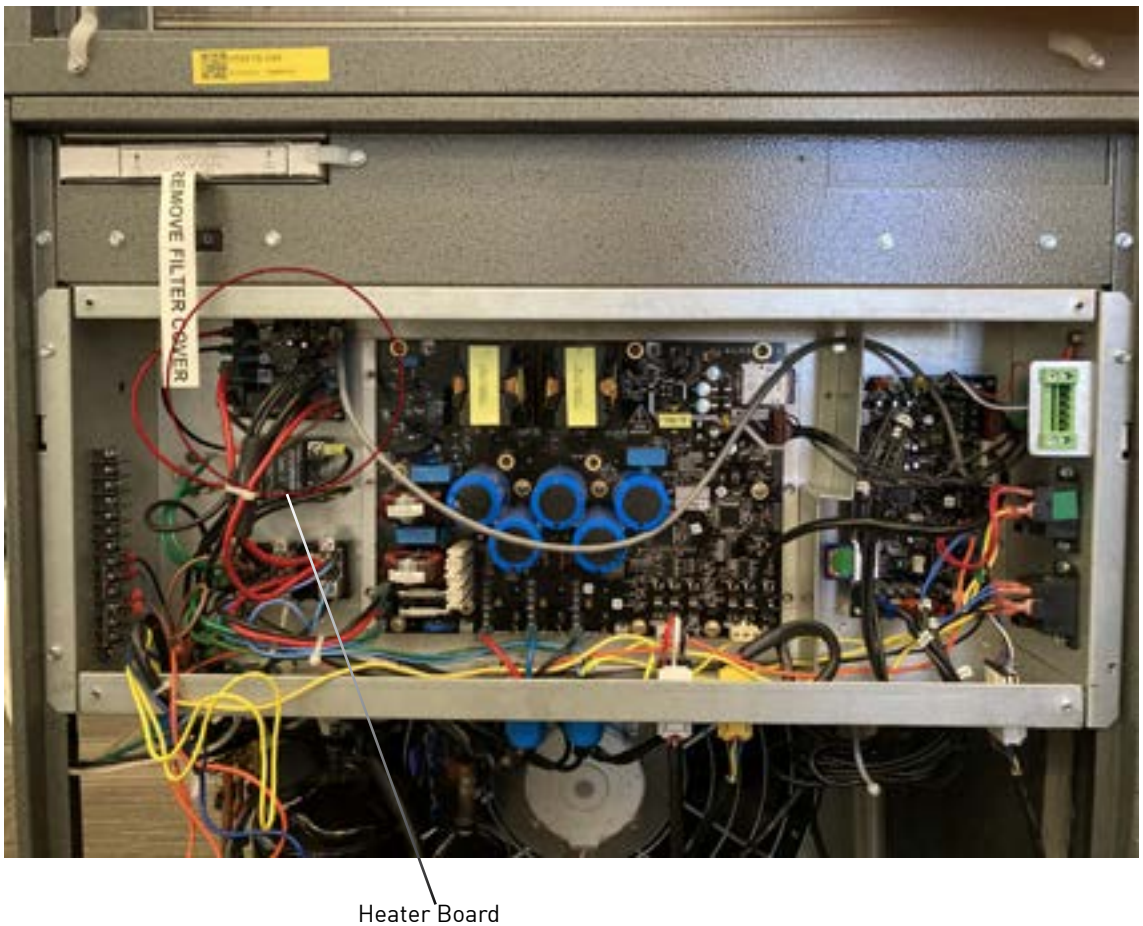


Figure 621 (Heater Board)

COMPONENTS TESTING

Thermistor Locations
T8 (Return Air Sensor)

The T8 (Return Air Sensor) is located behind the Air Filter.

Figure 622 (Thermistor Locations)

COMPONENTS TESTING

Thermistor Locations

T1 (Evaporator Coil In Sensor)
T5 (Evaporator Coil Out Sensor)

To access the evaporator coil sensors remove the top panel and right side upper panel.
The top sensor is T5 (Evap. Coil Out)
The lower sensor is T1 (Evap. Coil In.)

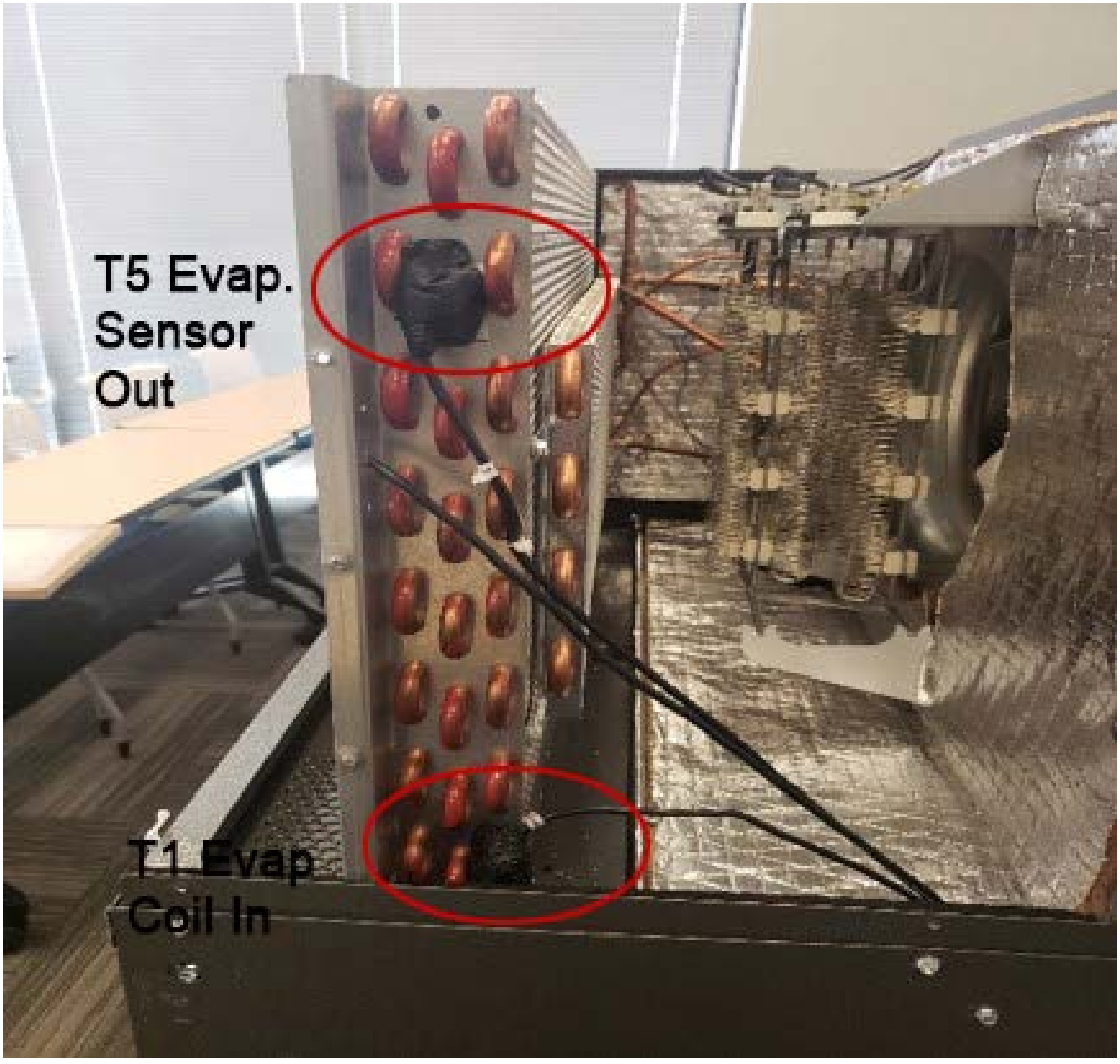


Figure 623 (Thermistor Locations)

COMPONENTS TESTING

Thermistor Locations

T9 (Discharge Air Sensor)

The T9 discharge air sensor is located inside the blower housing.

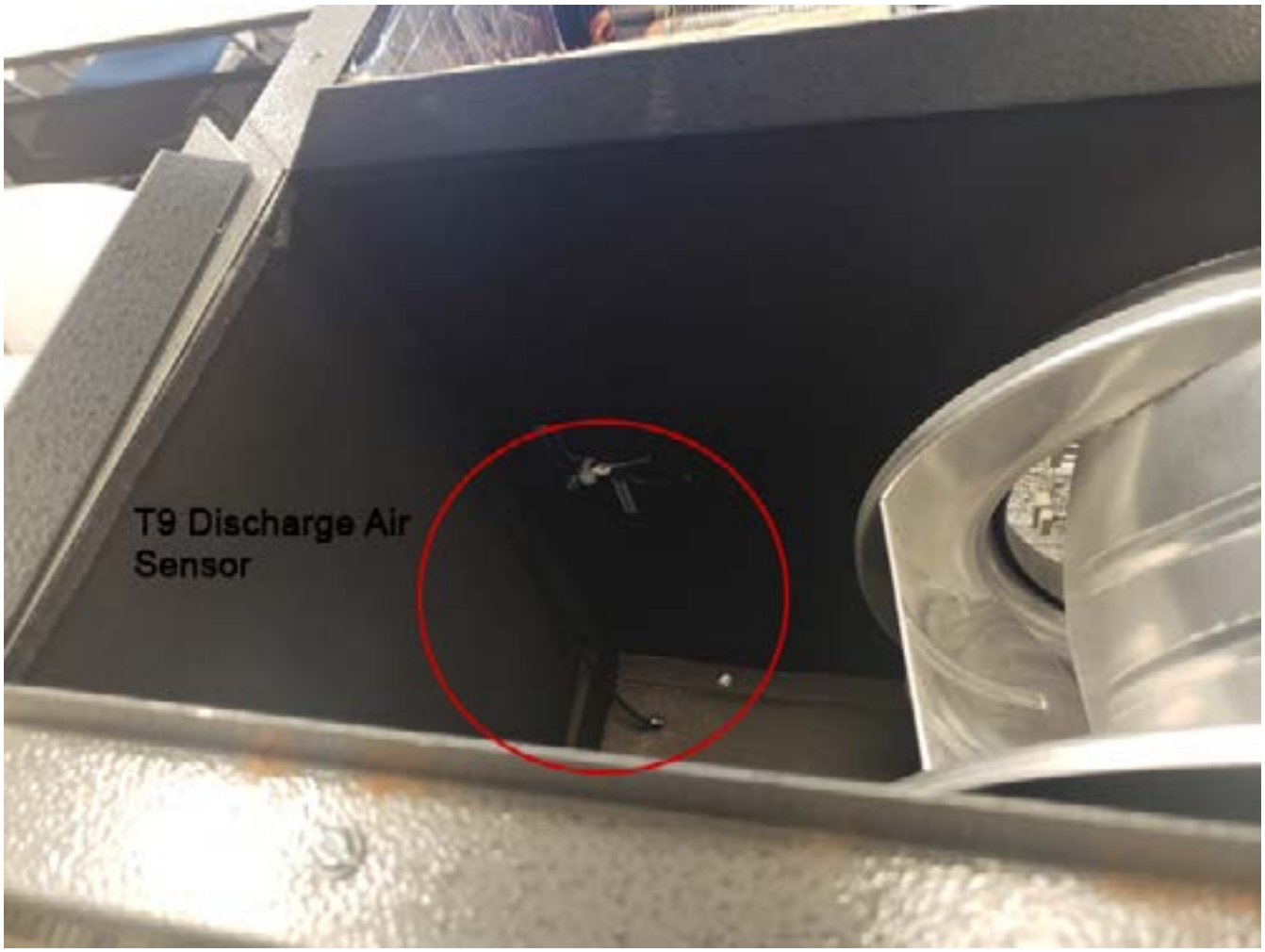


Figure 624 (Thermistor Locations)

COMPONENTS TESTING

Thermistor Locations

T2 (Liquid Heat)
T6 (Liquid Cool)

The T2 and T6 Sensors are located in the outdoor section attached to the EEV (Electronic Expansion Valve).

The pipe going into the bottom of the EEV is T2 (Liquid Heat).

The one on the pipe leaving the side of the EEV is T6 (Liquid Cool).

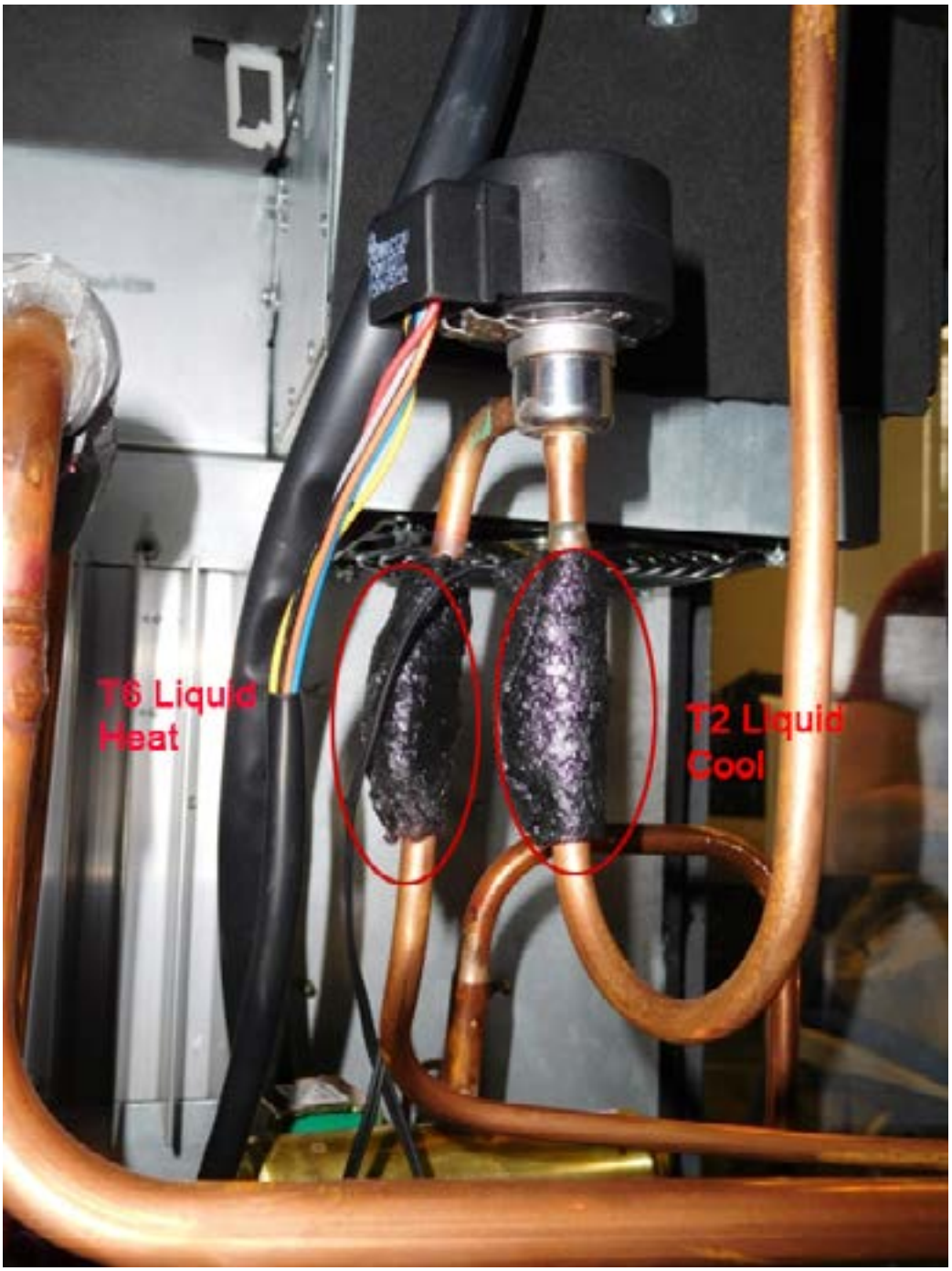


Figure 625 (Thermistor Locations)

COMPONENTS TESTING

Thermistor Locations

T10 (Outdoor Ambient Air Sensor)

The T10 (Outdoor Ambient Air Sensor) is located in the outdoor section, mounted on the bottom of the indoor blower housing.

Figure 626 (Thermistor Locations)

COMPONENTS TESTING

Thermistor Locations

T7 (Cond. Coil Sensor)

T7 (Cond. Coil Sensor is attached to the outdoor coil on the right hand side.
This sensor is attached to the coil roughly halfway down on one of the return bends.

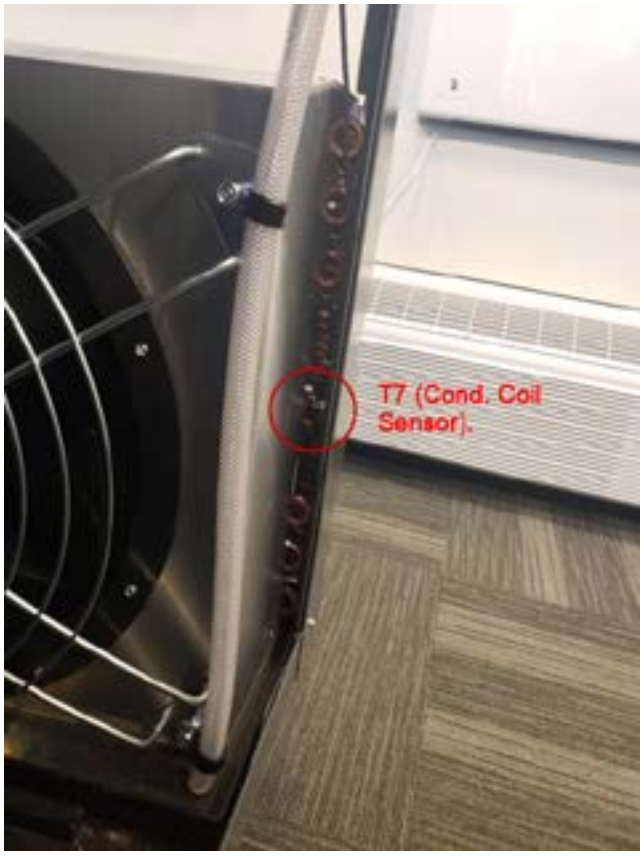


Figure 627 (Thermistor Locations)

COMPONENTS TESTING

Thermistor Locations

T4 (Comp. Discharge).

The T4 (Comp. Discharge) is attached to the compressor discharge line.

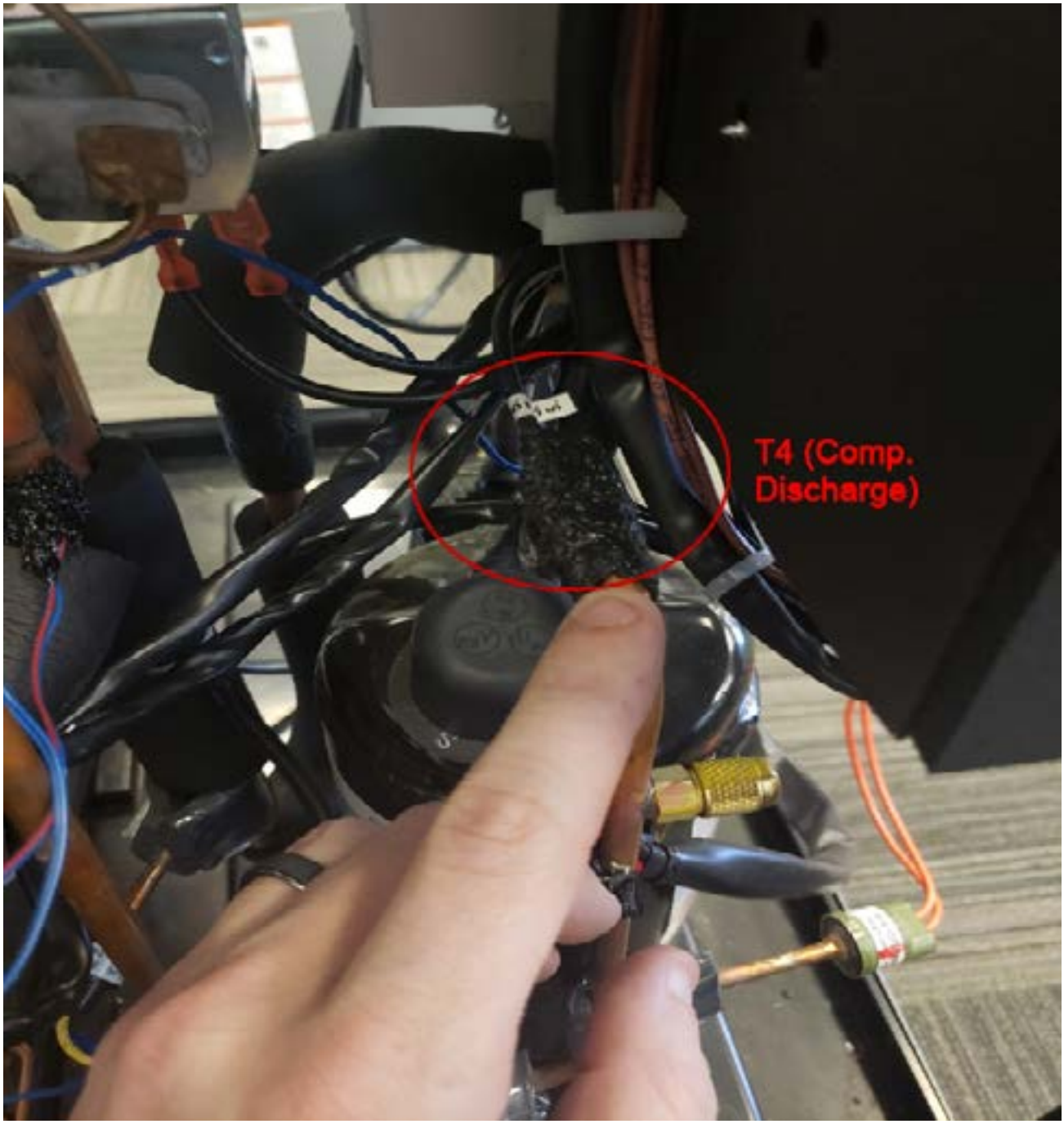


Figure 628 (Thermistor Locations)

COMPONENTS TESTING

Thermistor Locations

T3 (Comp. Suction).
The T3 (Comp. Suction) is attached to the compressor suction line.

Figure 629 (Thermistor Locations)

COMPONENTS TESTING

Thermistor Values

All thermistors in the VRP units have a 10k ohm Resistence at 77° F.

The chart below shows the value vs. temperature

If the sensor reads O/L (open) or 0 OHM (short) it is a bad sensor and should be replaced.

If the sensors OHM value equates to a temperature that is incorrect, i.e. room temperature is 65 ° but the sensor reads 6 OHM (97°), then the sensor is out of calibration and needs to be replaced.

TEMP	RESISTENCE (K Ohms)			RESISTANCE TOLERANCE %	
F	MIN	CENTR	MAX	MIN	MAX
-25	210.889	225.548	240.224	6.50	6.51
-20	178.952	190.889	202.825	6.25	6.25
-15	151.591	161.325	171.059	6.03	6.03
-10	128.434	136.363	144.292	5.81	5.81
-5	108.886	115.340	121.794	5.60	5.60
0	92.411	97.662	102.912	5.38	5.38
5	78.541	82.812	87.083	5.16	5.16
10	66.866	70.339	73.812	4.94	4.94
15	57.039	59.864	62.688	4.72	4.72
20	48.763	51.060	53.357	4.50	4.50
25	41.786	43.654	45.523	4.28	4.28
30	35.896	37.415	38.934	4.06	4.06
31	34.832	36.290	37.747	4.02	4.02
32	33.803	35.202	36.601	3.97	3.97
33	32.808	34.150	35.492	3.93	3.93
34	31.846	33.133	34.421	3.89	3.89
35	30.916	32.151	33.386	3.84	3.84
36	30.016	31.200	32.385	3.80	3.80
37	29.144	30.281	31.418	3.75	3.75
38	28.319	29.425	30.534	3.76	3.77
39	27.486	28.532	29.579	3.67	3.67
40	26.697	27.701	28.704	3.62	3.62
45	23.116	23.931	24.745	3.40	3.40
50	20.071	20.731	21.391	3.18	3.18
55	17.474	18.008	18.542	2.96	2.96
60	15.253	15.684	16.115	2.75	2.75
65	13.351	13.697	14.043	2.53	2.53
66	13.004	13.335	13.666	2.48	2.48
67	12.668	12.984	13.301	2.44	2.44
68	12.341	12.644	12.947	2.39	2.39
69	12.024	12.313	12.603	2.35	2.35
70	11.716	11.993	12.269	2.31	2.31
71	11.418	11.682	11.946	2.26	2.26
72	11.128	11.380	11.633	2.22	2.22
73	10.846	11.088	11.329	2.18	2.18
74	10.574	10.804	11.034	2.13	2.13
75	10.308	10.528	10.748	2.09	2.09
76	10.051	10.260	10.469	2.04	2.04
77	9.800	10.000	10.200	2.00	2.00
78	9.550	9.748	9.945	2.03	2.03
79	9.306	9.503	9.699	2.07	2.07
80	9.070	9.265	9.459	2.10	2.10
81	8.841	9.033	9.226	2.13	2.13
82	8.618	8.809	9.000	2.17	2.17
83	8.402	8.591	8.780	2.20	2.20
84	8.192	8.379	8.566	2.23	2.23
85	7.987	8.172	8.358	2.27	2.27
86	7.789	7.972	8.155	2.30	2.30
87	7.596	7.778	7.959	2.33	2.33
88	7.409	7.589	7.768	2.37	2.37
89	7.227	7.405	7.583	2.40	2.40
90	7.050	7.226	7.402	2.43	2.43
91	6.878	7.052	7.226	2.47	2.47
92	6.711	6.883	7.055	2.50	2.50
93	6.548	6.718	6.889	2.53	2.53
94	6.390	6.558	6.727	2.57	2.57
95	6.237	6.403	6.569	2.60	2.60
96	6.087	6.252	6.417	2.63	2.63
97	5.942	6.105	6.268	2.67	2.67
98	5.800	5.961	6.122	2.70	2.70
99	5.663	5.822	5.981	2.73	2.73
100	5.529	5.686	5.844	2.77	2.77
105	4.912	5.060	5.208	2.93	2.93
110	4.371	4.511	4.651	3.10	3.10
115	3.898	4.030	4.161	3.27	3.27
120	3.482	3.606	3.730	3.43	3.43

Figure 630 (Thermistor Values)

COMPONENTS TESTING

Thermistor Part numbers

VPH and VRP revision –A/B models used a sensor pack for the indoor and outdoor sensors.

VRP revision –C and newer all use single sensors.

THe Single sensors are compatible with the sensor pack.

The sensor packs are no longer available and all VRP/VPH models will use the single sensors going forward.

The part numbers for the individual sensors are listed here.

Part Number	Sensor
80083701	SENSOR EVAP COIL OUT ORG (T5)
80083702	SENSOR RETURN AIR TEMP WHT (T8)
80083703	SENSOR EVAP COIL IN GRN (T1)
80083704	SENSOR DISCHARGE AIR YEL (T9)
80083705	SENSOR COMPRESSOR DISCHARGE BLK (T4)
80083706	SENSOR COMPRESSOR SUCTION BLU (T3)
80083707	SENSOR HEATING LIQUID BRW (T2)
80083708	SENSOR COOLING LIQUID ORG (T6)
80083709	SENSOR CONDENSER OUT PNK (T7)
80083710	SENSOR AMBIENT RED (T10)

COMPONENTS TESTING

Check High and Low Pressure Limit Switches

1. Ensure power is removed from the unit.
2. At fmc board disconnect the orange (J8) and yellow (J7) wires.
3. The switches are wired together in series and if either switch is faulty you will get an error code 14.
4. Trace high pressure switch wires through grommet into upper cabinet and locate disconnect point.
5. Disconnect orange and blue wire.
6. Check orange to orange to check high pressure switch.
7. Check yellow to blue for low pressure switch.
8. An ohms reading of open indicates a faulty switch or refrigerant pressur

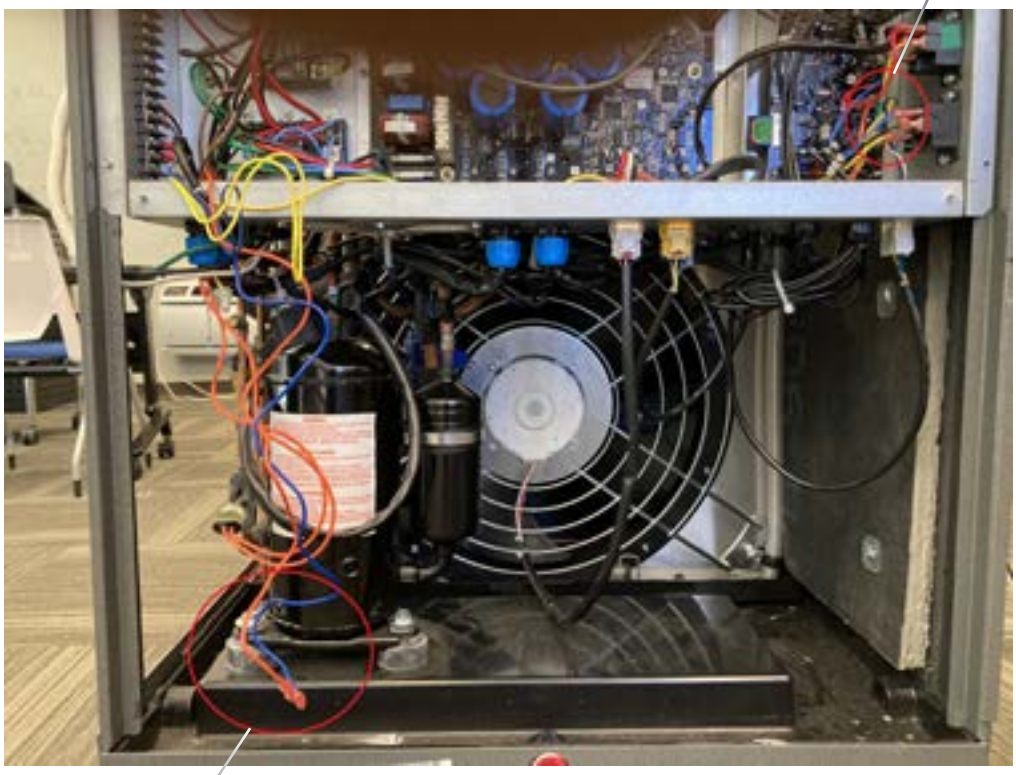


Figure 631 (Pressure Limit Switches)

COMPONENTS TESTING

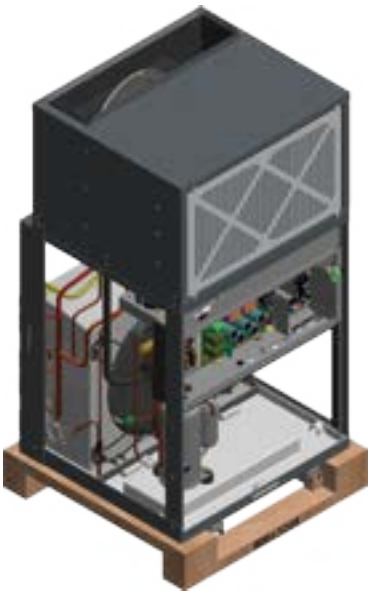
Replace High Pressure Limit Switch

DISCONNECT POWER AND FOLLOW ALL LABELED WARNINGS.

NOTE The pressure switch can either be replaced by brazing in a new part of ordering a "bolt-on" kit that attached to the service port. The method below describes the use of the bolt-on kit.

Step 1. Attention! Please read these instructions before attempting installation. Always turn off all the power to the unit.

Step 2. Remove front and side panels for a better access.



COMPONENTS TESTING

Replace High Pressure Limit Switch

Step 3. Install pressure switch to discharge tube service port. To minimize refrigerant loss, install assembly quickly.



Step 4. Cut the wires off old pressure switch and strip them. Attach to existing wire to new pressure switch wires with the two wire nuts supplied in kit. You can't miss wire it.


Step 5. Collect all loose wiring and zip tie together, remove any reaming wire from old pressure switch.


Step 6. New switch is complete. Reinstall all panels and power up unit to make sure all repairs were completed.

TROUBLESHOOTING

VRP Troubleshooting Map

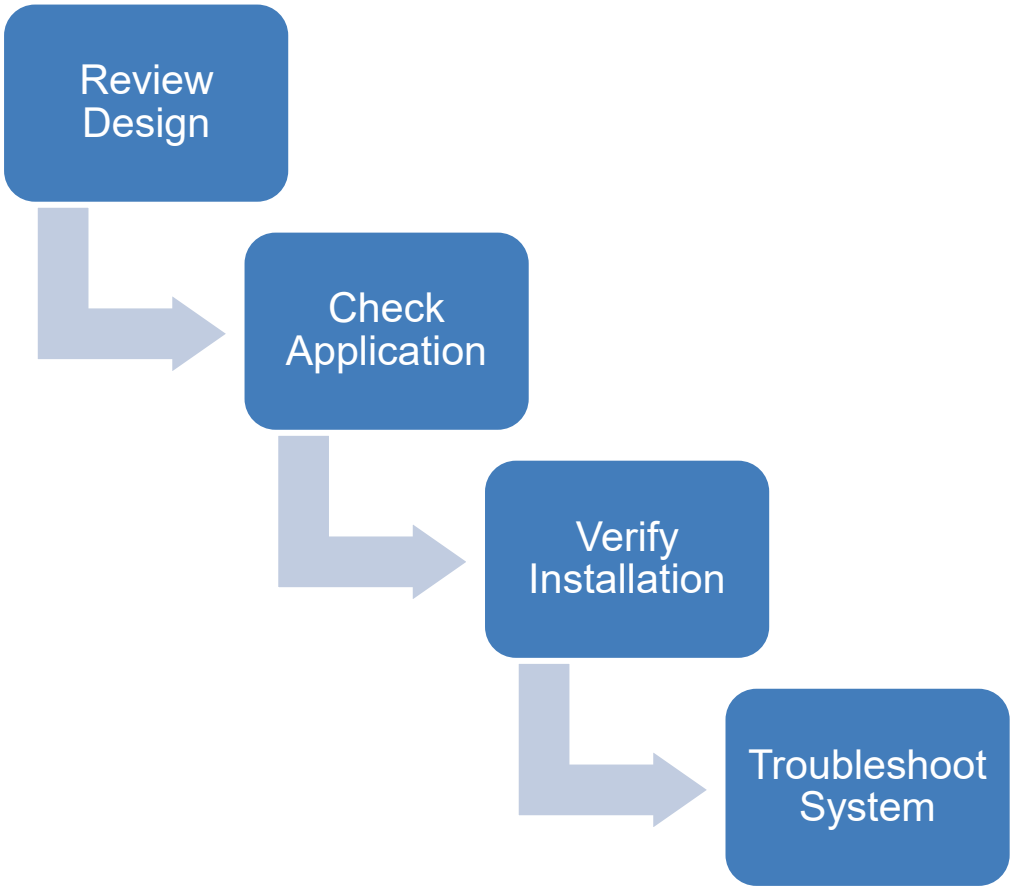


Figure 701 (Troubleshooting Map)

TROUBLESHOOTING

Required Tools

Meters = Need to Read

- Volts A/C – 500
- Volts D/C – 600
- Ohms – 10k Megaohms.

Test Leads:

- Needle Point
- 1000V/20A Rated

410a Gauge Manifold

VPXWC with a 3’ Molex Whip

Figure 702 (Troubleshooting Tools)

TROUBLESHOOTING

Required Skills

1. Patience – Revolutionary digital communicating technology has replaced older analog components.

2. Patience – Needle point leads will save you time when backprobing molex connectors.

3. Patience – Know who to call when you need help.

4. Observation – There are many LED indicators on the MCS and FMC which all correspond to unit operation.

5. Electrical tracing – 24V AC systems have replaced low (5-10V) DC voltage.

6. DC Communication – The interpretation of values and commands transmitted by VDC.

Troubleshooting by Rule Out Methodology

Probability Diagnosis:

- The act of ruling out and understanding certain components operation *based on experience* and simply watching and observing the system operate.

Rule Out:

- The act of understanding how components operate to *maintain their logical sequence of operation* where failure to produce expected results occurs.

True Certainty Diagnosis:

- The act of proving a condition exists, or existed, by testing and acquiring physical and empirical evidence which caused, or is the result, of that condition.

TROUBLESHOOTING

Troubleshooting Flowchart

Verify smart at wall controller

Confirm firmware

> 

Check for diagnostic codes

Active error code

Refer to Diagnostic Codes Chart and Troubleshoot accordingly

No error code

Abnormal board lights?
Voltage correct?
Connectors plugged in and secure?
Does a system reset resolve the issue?

> Rule out components

Figure 702 (Troubleshooting Flowchart)

TROUBLESHOOTING

Wall Controller Not "Smart"

- "Smart" on the wall controller indicates proper communication with the VRP.
- If this symbol is not lit, check the wiring for correct twisted pairs or broken wires.

Wall Controller Installation

Proper Wiring of VRP™ unit to VPXWC Wall Control

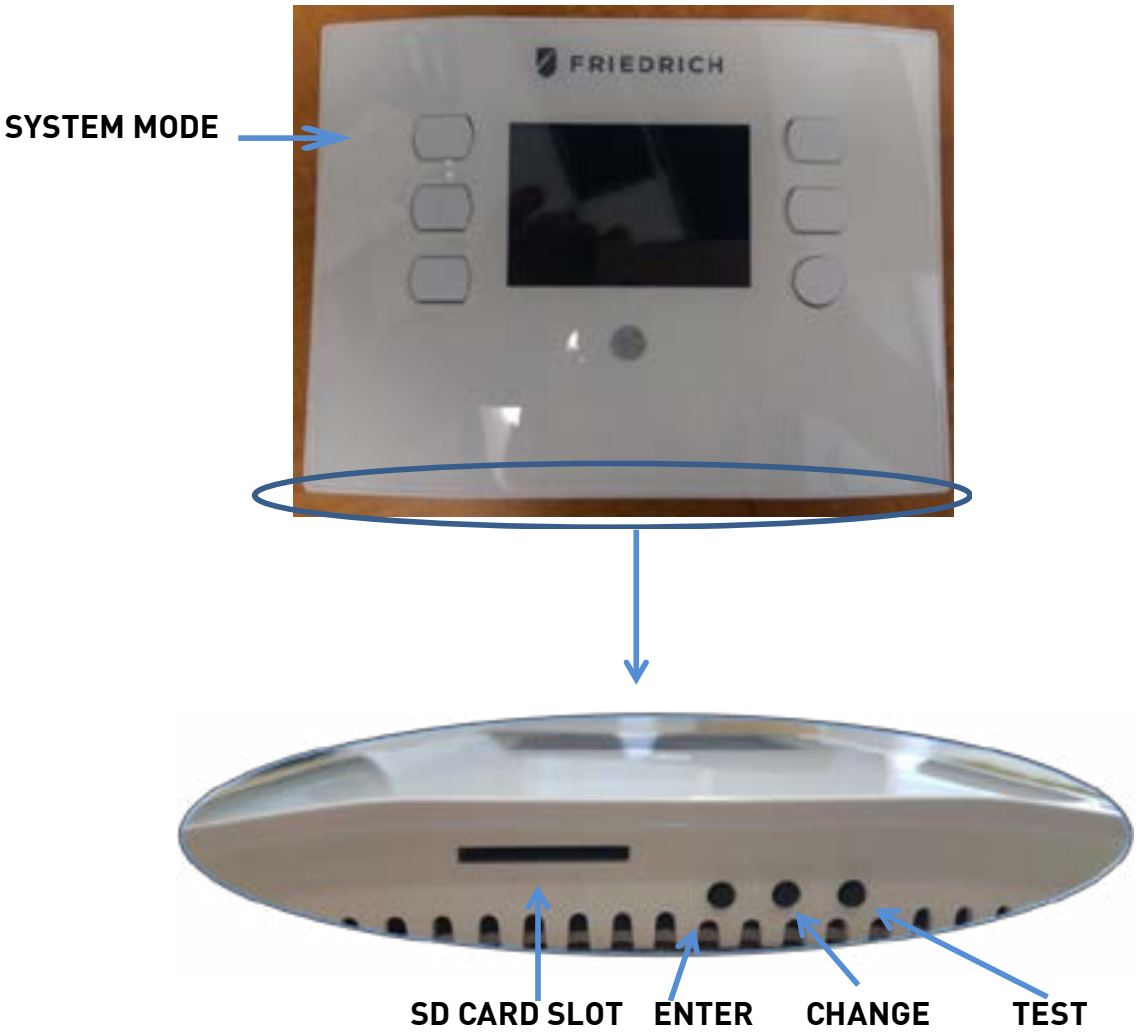
To provide the best possible performance of your VRP™ unit, and to ensure the highest level of EMF shielding it is required that Stranded CAT 6 Cable be used with Twisted Pairs.

Wire Color	Label
Orange / Green / White	V +
Brown / Blue / White	D +
Blue / Brown / White	D -
Green / Orange / White	V -
Ground Shield Wire	GND

Table above shows which wire pairs go with which screw terminal. Match wire colors with corresponding terminals on the Wall Controller to the VRP Unit as shown in the following steps.

TROUBLESHOOTING

Verify Wall Controller Firmware



To read the Wall Controller firmware version, press the System Mode and Test buttons together for 3 seconds. Your display screen will change to show 2 numbers. Press the down arrow to cycle through all version numbers.

This digit strand is your firmware version. I.E. 03-02-00-01 = Version 03.02.00.01.

Current Wall Controller Version = 03.02.00.01.

TROUBLESHOOTING

Verify FMC Firmware

To read the FMC firmware version via the Wall Controller, press the Fan Mode and Test buttons together for 3 seconds. Your display screen will change to show 2 numbers. Press the down arrow to cycle through all version numbers.

This digit strand is your firmware version.
I.E. 03-02-00-54 = Version 03.0_.0_.54.

Current FMC Version = 03.02.00.54.

TROUBLESHOOTING

Verify MCS Firmware

To read the MCS firmware version via the Wall Controller, press the Fan Speed and Change buttons together for 3 seconds. Your display screen will change to show 2 numbers. Press the down arrow to cycle through all version numbers.

This digit strand is your firmware version.
I.E. 03-0_-0_-07 = Version 03.0_.0_.07.

Current MCS Version = 03.02.00.07.

TROUBLESHOOTING

Check For Power

If the wall controller does not light up, ensure the unit has power.

Check the electrical circuit breaker.

Check the units disconnect.

If in doubt, uncover the electrical panel from the unit and check that the processors on the motor control board are flashing green, not red.

TROUBLESHOOTING

Diagnostic Code Check

Is your WC blank?

Ensure that the WC is wired properly and connected on the unit and the back of the WC.

You cannot check error codes on a bad WC, but you can utilize the FMC's diagnostic lights as a secondary.

You can also connect a known good Wall Controller with a whip directly to the unit to rule out a possible wire break or bad controller.

Press and hold the Fan Mode and Fan Speed buttons together for 3 seconds.

You will see an E appear, and can scroll through any active error codes by pressing the up arrow.

The error code mode will time out if no buttons are made for 15 seconds.

ACTIVE ERROR CODE

TROUBLESHOOTING

Diagnostic Code Check

The FMC will have green lights, but if an error code occurs, a blue and/or red light will flash.

The blue LED is the 10 digit and the red LED is the singles digit.

For example, 4 blue flashes and 3 red flash would be a code 43.

If more than one code is active, the FMC will cycle through the codes in active numeric order, one at a time, then return to the first code.

TROUBLESHOOTING

Diagnostic Code (Temperature Based)

Temperature Based:

Thermistors (sensors) modify VDC and is interpreted through the FMC.
Errors indicate a possible issue with the sensor, FMC, or the sensor has detected an abnormal condition (or an out of parameter value).
Solution: Sensor error, FMC error, or abnormal condition.

VRP Sensor Bank contains 10 sensors for air and coil temperature. Each is 10k Ohm and must be unplugged from the FMC to test against a resistance chart. The sensors have a two-port molex connected to the FMC. They all share a common power supply which can be checked against the other connectors for continuity and rule out the FMC.

Rule Out Thermistors:

A thermistor will only give an error code if the thermistor is shorted, 0 ohms, or opened, O/L. If the thermistor is out of range, it may not give an error code and the system may not operate correctly.

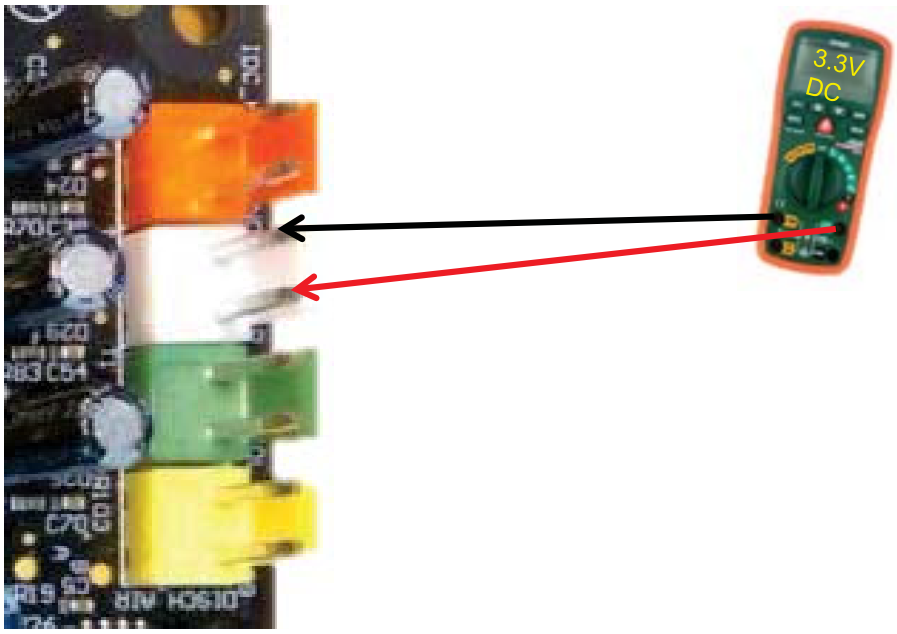
Rule out FMC - Continuity Check

The first pin in each set can be checked against the others to make sure voltage has the ability to flow through that thermistor port.

Rule out FMC - Voltage Check

The Thermistor port can be checked without the sensor attached to verify proper voltage is being passed through the molex.

Voltage should be ~3.3VDC



TROUBLESHOOTING

Diagnostic Codes (Voltage/ Amperage)

Amperage (or Current) Diagnostic Codes

The current sensing portion of the MCS had detected that the motor is pulling more than designed amperage.

Grounded Motor

Faulty/"Demagged" Motor

Damaged MCS Board

I2T (IPM Amperage) Faults

The current sensing portion of the MCS had detected that the motor is pulling the maximum allowable amperage for an extended period of time.

Dirty or restricted coils

Blocked or restricted Motor

Abnormally high outdoor temperature

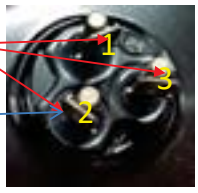
Compressor is attached to the MCS with flag terminals for easy access. If you do not get the same resistance through each phase (+/- 0.1), then test the terminals directly.

Check the each terminal to the compressor to ground.

Disconnect wires from compressor before checking. The compressor should ohm out with the same resistance between the terminals

5M+ Ohms

1.5 to 3.5 Ohms on any two phases



1-2
1-3
2-3

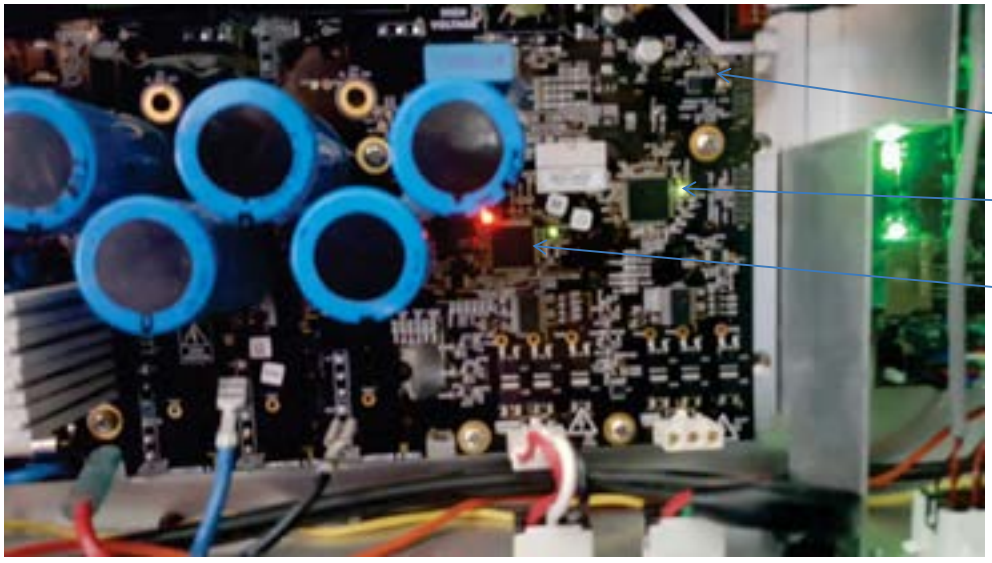
TROUBLESHOOTING

Voltage/Amperage Related Diagnostics –ODF Rule Out

The Outdoor Fan Motor (ODF), like the Compressor, is a BLDC Motor. Troubleshooting this component is the same as the compressor.

Ohm at the connector at the MCS first for the same resistance (+/-0.1) across any two phases, then check each phase to ground.

Voltage/Amperage Related Diagnostics - MCS Operational Lights

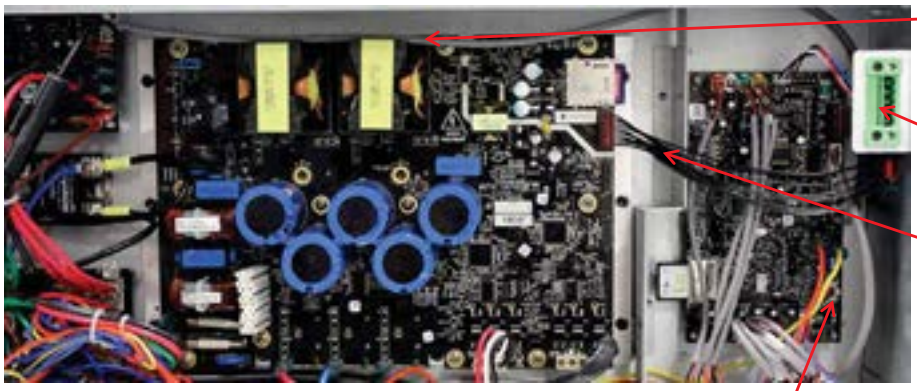


If a fault LED is produced on motor engagement, rule out firmware, then motor. Lastly, change the MCS board.

TROUBLESHOOTING

Configuration/Communication Diagnostic Codes

The FMC, MCS, Heater Board (HB), Wall Controller and Indoor Fan all communicate via ribbon cables. If communication is lost or dropped, the VRP will not operate. These codes will also populate when there is a software, firmware, or logic failure.



Configuration/Communication Diagnostic Codes 27 & 43

Check HB and MCS ribbon cable connection to FMC. Is the HB light on?

If HB light is on, the cable is more than likely working correctly. If the light is not on, it could be a malfunctioned HB or cable.

Verify the ribbon cable is fully inserted in the FMC and MCS. If all checks pass, there may be an issue with software. Replace MCS and FMC SD card.

TROUBLESHOOTING

Configuration/Communication Diagnostic Codes – 39 (IDF Comm Error)

IDF Layout:

When checking communication, use the ground (blk) to reference all other pins in VDC:

3-pin block – Power

Red – L1

Grn – Ground

Blue – L2

4-Pin block – Communication

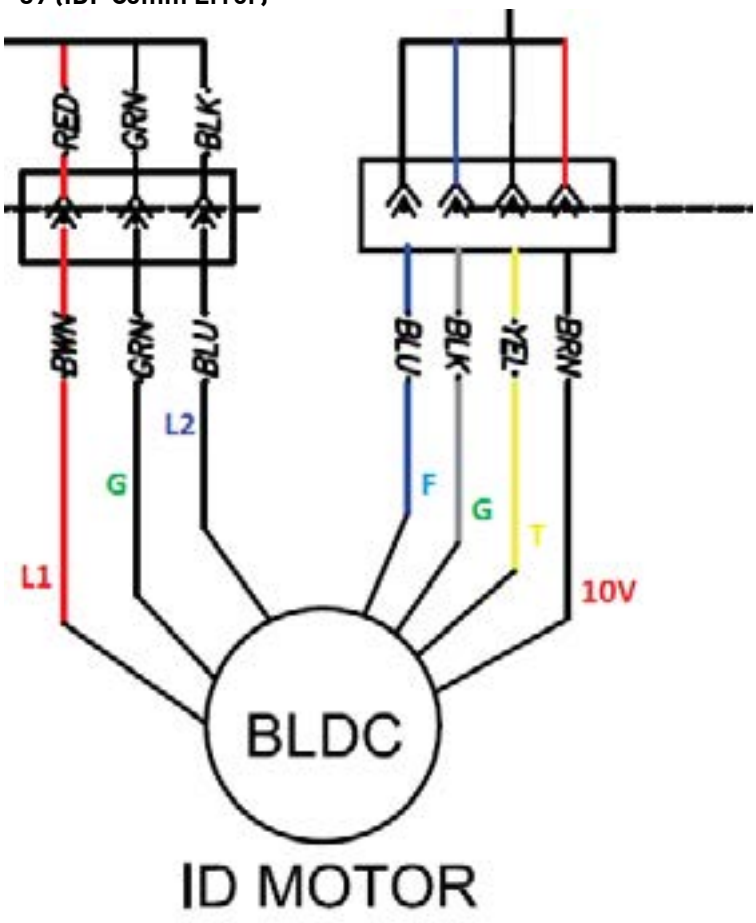
Brn – 10V

Yel – Signal to Fan (T) ~1-5VDC

Blk – Ground

Blu–Tacfrom Fan (F) ~1-5VDC

Verify proper voltage to fan on power block, then make sure 10v is present on comm. block. Start a call for fan and measure signal to fan. If voltage is present, FMC is good. Check fan for blockage or possible demag.



TROUBLESHOOTING

Diagnostic Codes

Diag	Description	Diagnostic Check point	Solution
3	Return Air sensor (T8) is open or shorted	1. An open or shorted sensor is detected by the A/D conversion value residing at the upper or lower end of the conversion range. 2. The Ambient Indoor Temperature Sensor(T8) is open or shorted 3. Defective contact between male and female electrical molex connectors. 4. The sensor is not properly connected to the FMC.	1. Disconnect the sensor at the FMC then reconnect. 2. Ohm out the sensor to determine the failure point and correct as needed. Refer to Component Testing (Thermistor Values) 3. Replace the FMC board.
4	Indoor Coil Cool Inlet sensor (T1) is open or shorted		
5	Outdoor Coil Heat Inlet sensor (T7) is open or shorted		
6	Discharge Air sensor (T9) is open or shorted		
7	Outdoor Ambient Air sensor (T10) is open or shorted.		
8	Indoor Coil Heat Cond. sensor (T5) is open or shorted.		
9	Compressor Discharge sensor (T4) is open or shorted.		
10	Compressor Suction sensor (T3) is open or shorted.		
11	Liquid Cool sensor (T6) is open or shorted		
12	Liquid Heat sensor (T2) is open or shorted		
13	Humidity sensor is open or shorted.	1. The wall controller is not properly connected to the FMC. 2. There is an issue with the sensor itself.	1. Verify that the wall controller is correctly connected to the unit, if it is and the problem persists, replace the wall controller.
14	Pressure Limit Switch Open	1. Pressure of suction line is too low. 2. Pressure of discharge line is too high. 3. Quick connects on FMC board are loose or damaged. 4. Faulty high or low pressure switch.	1. Check high and low pressure switches per procedure located in the component testing section of this manual. 2. Check EEV per procedure located in the component testing section of this manual. 3. Determine cause of leak or restriction in sealed system and repair.
19	Outdoor Coil > 175°F	1. The Outdoor Coil reaches a temperature greater than 175°F 2. Outdoor fan is not running when the compressor is on in cool. 3. EEV malfunction 4. Seal system restriction. 5. Imporoper installation causing outdoor air recirculation.	1. Ensure that the outdoor fan is properly connected and operational 2. Check EEV per procedure located in the component testing section of this manual. 3. Repair sealed system restriction problem. 4. Outdoor fan replacement. 5. Ensure proper installation of unit and baffle per Installation section of this manual.
20	The Indoor Coil at sensor T1's location reaches a temperature < 30°F and remains there for 5 consecutive minutes	1. Lower than usual IDB speeds. 2. Low refrigerant charge. 3. Low Ambient.	1. Ensure that the IDB is connected properly and is operational. 2. Check that there is no blockage in the duct work. 3. Check the filter. 4. Check for refrigerant leaks and reprocess.
21	Unit cycles (heat or cool demand) > 9 times per hour	1. Unit is oversized for the space 2. Wall controller is placed in a position where the temperature is grossly off of the actual room condition.	1. Ensure that the wall controller's placement is "correct" based on room air flow

TROUBLESHOOTING

Diagnostic Codes

Diag	Description	Diagnostic Check point	Solution
22	Unit cycles (heat or cool demand) < 3 times per hour.	This diagnostic test is used for testing and non-critical analysis only	
		The unit cycles heating or cooling demand less than 3 times within an hour	
23	Room Freeze Protection	1. The Indoor Ambient temperature is below 40°F 2. Inadequate insulation in room or closet. 3. Wall Controller sensor is bad 4. T8 Sensor is bad	1. Make sure the room is properly insulated. 2. Ohm out T8 sensor and replace if necessary. Refer to thermistor values chart 3. Replace Wall Controller
24	The Discharge Air sensor is reading above 185°F	1. IDB is not operating when electric heat is on. 2. Electric heat limit switches are failing.	1. Replace Electric Heat Element. 2. Verify operation of IDB, replace if necessary
25	Indoor Coil Restriction	If one thermistored coil is frozen while another thermistored coil is not.	
26	Temperature is Beyond Operating Limits	The T8 (Indoor Ambient) sensor reads less than 0°F or greater than 130°F	1. Make sure diagnostic 23 is activated and perform solutions. 2. Make sure the room is properly insulated.
27	Minimum Configuration not Met	One of the following conditions must be TRUE in order for this test to register an error 1. The Heater Board is NOT Connected 2. The MCS board is NOT initialized 3. The unit is NOT Provisioned 4. Communication with the MCS has failed MCS communication failure is determined by comparing the PFC current value that is retrieved every 12 seconds. If the value remains the same for 5 minutes, the assumption is made that all communication with MCS is blocked	1. Ensure that the heater board is connected properly to the FMC. Replace the board/or communication cable as necessary. 2. Ensure that the MCS board is powered up. 3. Replace the MCS-FMC communication cable as necessary. 4. Replace with a known provisioned FMC.
28	Outdoor Coil < 30°F (Defrost)	The Heat Pump has accumulated 60 minutes of runtime while the Outdoor Coil sensor read below 30°F	
30	MCS Indoor Fan Over Current The MCS board has flagged a current fault on the Indoor Fan axis and notified the FMC.	1. Short on the MCS board 2. Improperly wired indoor blower. 3. Grounded/Demagged indoor blower	Power cycle the unit and see if the problem persists, if so: 1.Ensure that the orientation of the wiring for the indoor fan is correct. 2. Replace the MCS board. 3. Replace the indoor blower
31	MCS Outdoor Fan Current Fault. The MCS board has flagged a current fault on the Outdoor Fan axis and notified the FMC	1. Short on the MCS board 2. Improperly wired outdoor fan. 3. Grounded/Demagged outdoor fan.	Power cycle the unit and see if the problem persists, if so: 1.Ensure that the orientation of the wiring for the outdoor fan is correct. 2. Replace the MCS board. 3. Replace the outdoor blower

TROUBLESHOOTING

Diag	Description	Diagnostic Check point	Solution
32	MCS Compressor Current Fault. The MCS board has flagged a current fault on the Compressor axis and notified the FMC	1.Short on the MCS board 2. Improperly wired compressor 3. Grounded/Demagged compressor	1.Short on the MCS board 2. Improperly wired compressor 3. Grounded/Demagged compressor
33	Compressor Lubrication	1. The Compressor has run at low frequency (less than 35 Hz) for 200 consecutive minutes and requires lubrication 2. Monitors if the FMC has not provisioned	
34	Unit Not Provisioned	Provisioned is defined as both switch and "provision" data has been set	Replace with provisioned the FMC
35	MCS DC Bus Over Voltage The MCS board has flagged an Over Voltage fault on the MCS DC Bus and notified the FMC	The MCS bus voltage rose above ~465 VDC when one of the motor axis was enabled.	Power cycle the unit and see if the problem persists, if so: 1. Replace the MCS board
36	MCS DC Bus Under Voltage The MCS board has flagged an Under Voltage fault on the MCS DC Bus and notified the FMC	The MCS board has flagged an Under Voltage fault on the MCS DC Bus and notified the FMC	Power cycle the unit and see if the problem persists, if so: 1. Check line voltage 2. Replace the MCS board.
37	MCS Board Over Temperature	1. The MCS board is reporting a board temperature of greater than 60°C 2. The MCS board components are not being properly cooled while running under heavy load. (greater than 70°C/160°F)	1. Verify proper installation 2. Replace MCS board
38	MCS Heatsink Over Temperature	1. The MCS board is reporting a heat sink temperature of greater than 60°C 2. The MCS heat sink components are not being properly cooled while running under heavy load. (greater than 70°C/160°F)	1. Verify proper installation 2. Replace MCS board
39	PSC Fan Low RPM	The Indoor Fan's RPM is less than 60% of its commanded RPM for 5 minutes	
40	Wall Controller not Connected	The FMC determines the Wall Controller is not connected	Check all wiring between the FMC and Wall Controller
41	EEV Fault	The EEV returns a fault status in the FMC	
43	MCS Communication Failure	If no "good" message between the FMC and MCS has occurred in 15 min- utes the error is reported.	Replace the communication wire between the MCS and FMC.
44	Reversing Valve out of Position (Stuck)	The RV is in the incorrect position (On/Off) for the mode that the system is in	
		The Discharge Air temperature is not indicative of active cooling or heating for 5 minutes	
46	Indoor Coil > 175°F for 5 consecutive minutes	The T5 sensor reads a temperature greater than 175°F for 5 consecutive minutes	

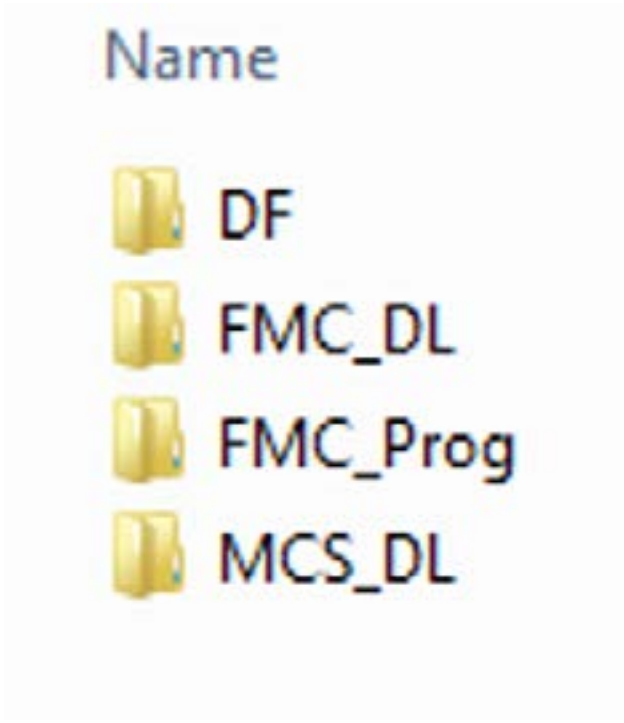
TROUBLESHOOTING

Diagnostic Codes

Diag	Description	Diagnostic Check point	Solution
47	MCS Compressor I2T Fault "The MCS board has flagged an Compressor I2T fault and has notified the FMC." The Compressor is operating at max allowable amperage for an extended period)	The problem occurred more than 5 times within an hour 1. Dangerously low charge. 2. Abnormally high outdoor temperatures 3. Restriction in the sealed system. 4. A damaged compressor.	Power cycle the unit and see if the problem persists, if so: 1. Ensure the EEV is operational. 2. Infer the presence of a sealed system obstruction and reprocess/repair if necessary. 3. Replace the compressor. 4. Replace MCS
48	MCS Indoor Fan I2T Fault The MCS board has flagged an IDF I2T fault and has notified the FMC. (The indoor fan is operating at max allowable amperage for an extended period of time)	The problem occurred more than 5 times within an hour 1. Restricted Airflow 2. Abnormally high outdoor temperatures 3. Damaged Indoor Fan	Power cycle the unit and see if the problem persists, if so: 1. Check that the indoor fan blade is moving (i.e. locked rotor). 2. Check that the indoor air supply is not impeded 3. Replace the indoor fan.
49	MCS Outdoor Fan I2T Fault. The MCS board has flagged an ODF I2T fault and has notified the FMC. (The outdoor fan is operating at max allowable amperage for an extended period of time)	The problem occurred 5 or more times within an hour 1. Restricted Airflow 2. Abnormally high outdoor temperatures 3. Damaged Outdoor Fan	This condition requires a system reset. 1. Check that the outdoor fan blade is moving (i.e. locked rotor/frozen drain pan). 2. Check that the outdoor air supply is not impeded 3. If the problem continues, replace the outdoor fan.
50	MCS 15V Rail Fault. The MCS board has flagged a 15V rail fault and has notified the FMC.	There is an issue with the 15 V rail on the MCS	This condition requires a system reset. 1. Restart the system with the FMC disconnected from the MCS. A. If the processor has a red light when rebooted, replace the MCS.
52	MCS PFC Over Voltage The MCS board has flagged a PFC over voltage and has notified the FMC.	The MCS board has flagged a PFC over voltage and has notified the FMC.	The MCS board has flagged a PFC over voltage and has notified the FMC.
53	MCS AC Line Under Voltage. The MCS board has flagged an AC line under voltage and has notified the FMC."	The input AC line voltage is less than 187V rms	The system will require a reset. 1. If the system does not power up, replace the MCS board. 2. Ensure that there were no brownouts in the area recently. 3. Ensure that the input voltage is greater than 187V. If it is less than 187V this error may occur often due to voltage sag.
54	MCS AC Line Over Voltage. "The MCS board has flagged an AC line over voltage and has notified the FMC."	The input AC line voltage exceeds 293V rms.	The system will require a reset. 1. If the system does not power up, replace the MCS board. 2. Ensure that the input voltage is less than 293V. If it is greater than 293V this error may occur often due to voltage spikes.

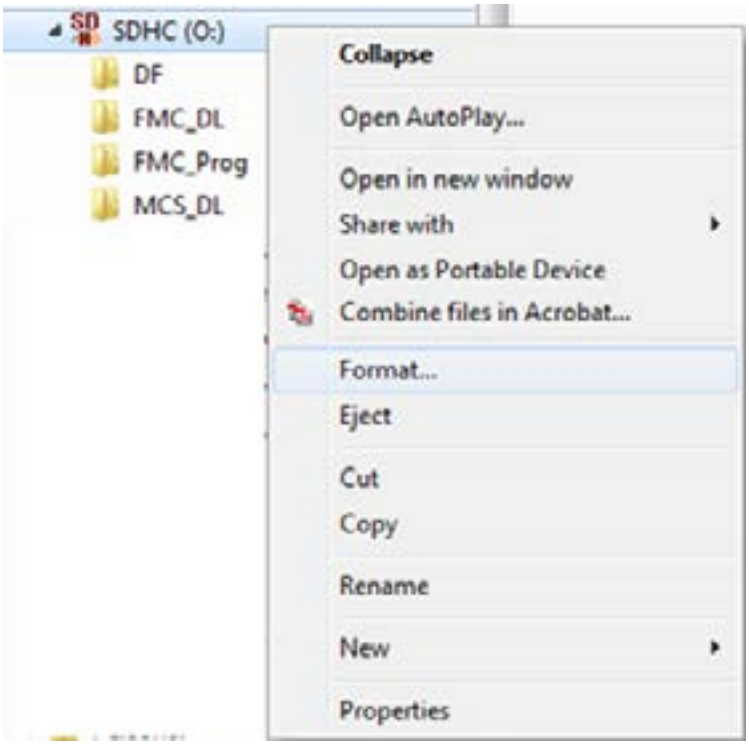
UPDATING VRP FIRMWARE

FMC Manual Update Process - Remove SD Card from FMC load on a PC or Laptop

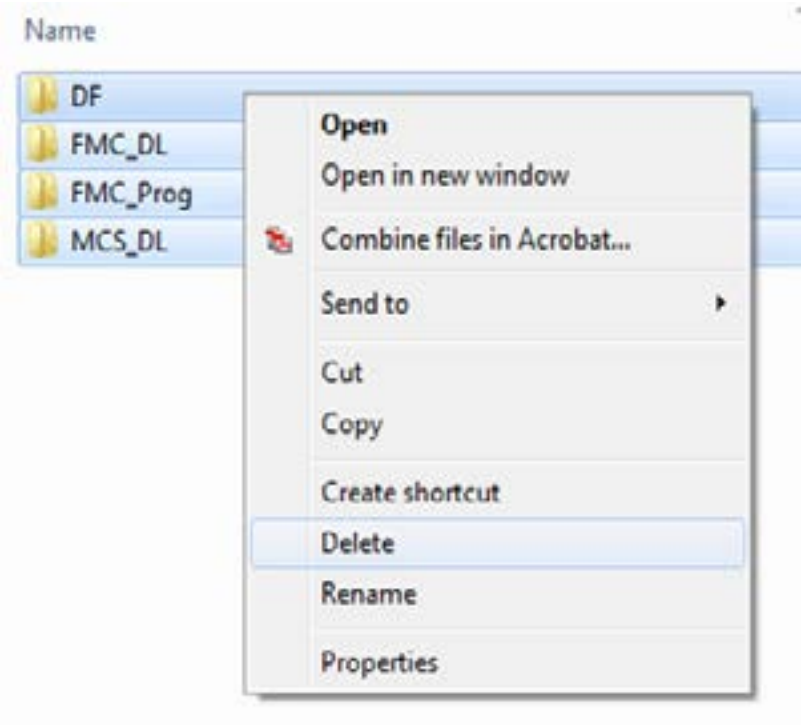


NOTE: Ensure Power is OFF! You will need an SD Card Reader to complete this step

UPDATING VRP FIRMWARE

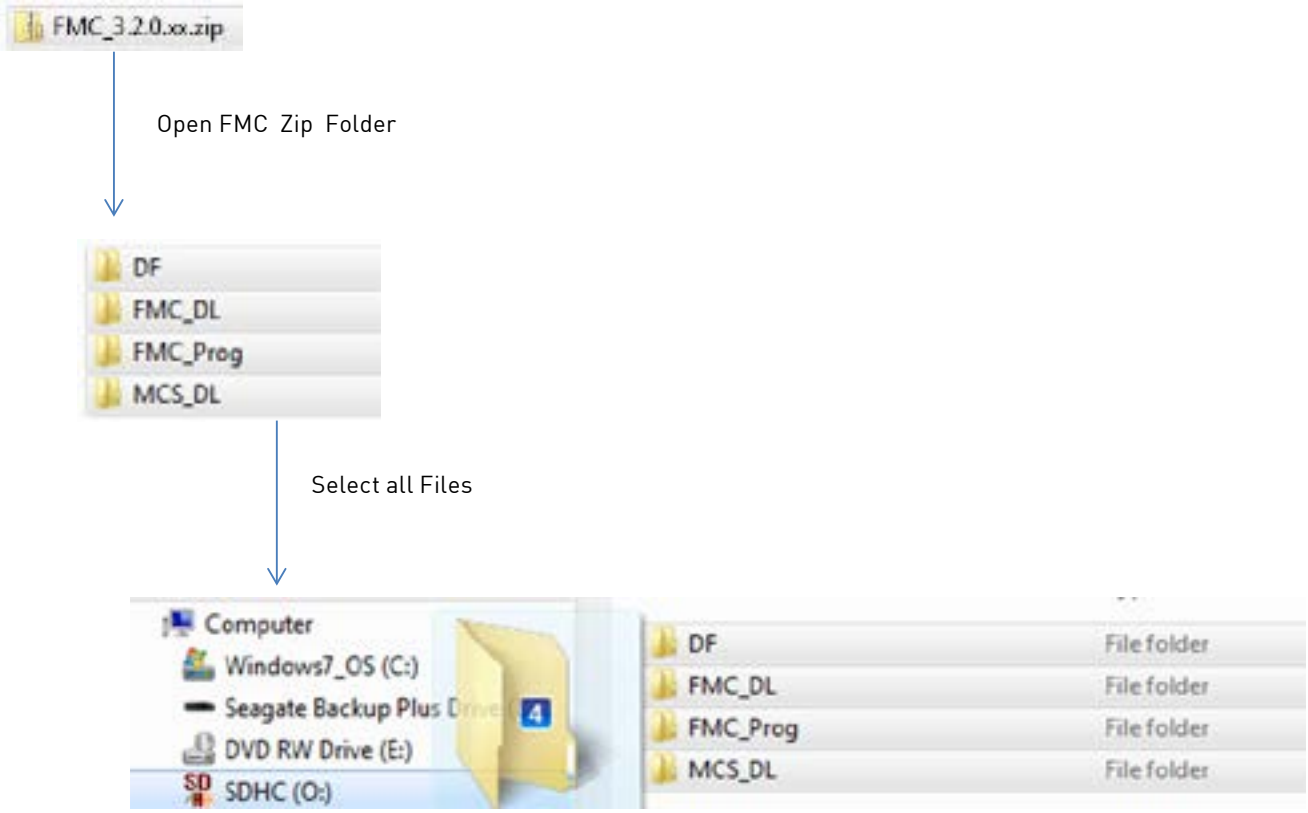


Or



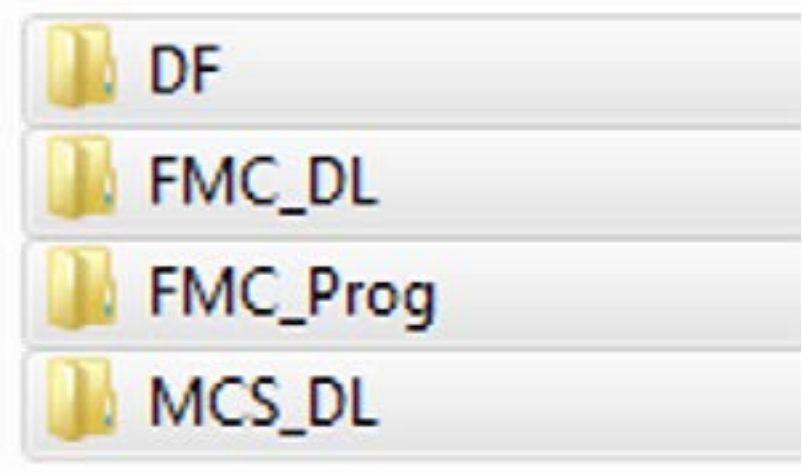
UPDATING VRP FIRMWARE

"xx" will be replaced by two numbers, indicating the software version. Example: 3.2.0.55 – Version 55



Copy to your SD Card Drive

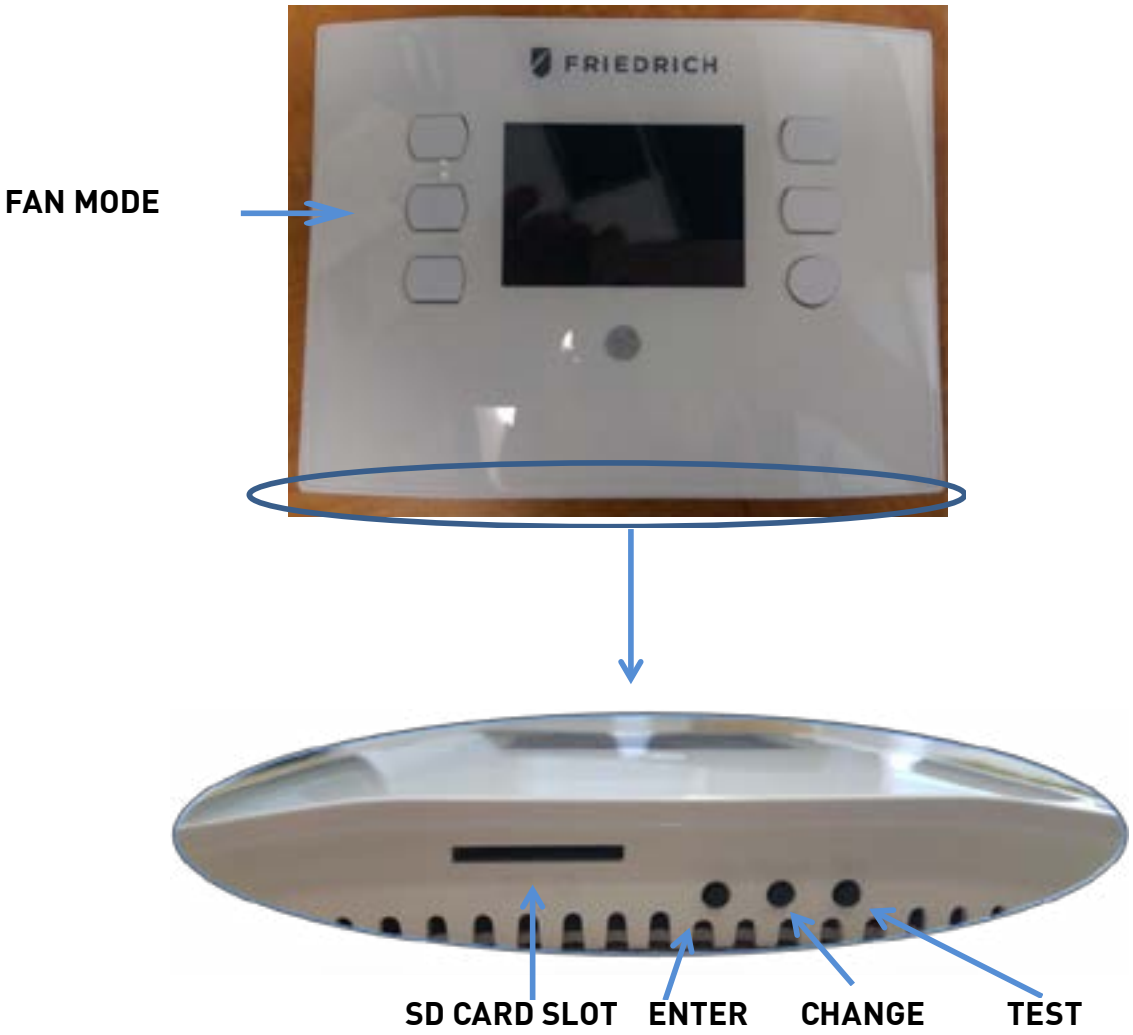
UPDATING VRP FIRMWARE



FMC Update Process – Loading new Firmware

Insert SD Card into FMC and apply power. The FMC Firmware load will confirm by showing three green downward cascading LEDs:

UPDATING VRP FIRMWARE



To read the FMC firmware version via the Wall Controller, press the Fan Mode and Test buttons together for 3 seconds. Your display screen will change to show 2 numbers. Press the down arrow to cycle through all version numbers.

This digit strand is your firmware version. I.E. 03-02-00-54 = Version 03.00.02.55.

Current FMC Version = 03.02.00.55.

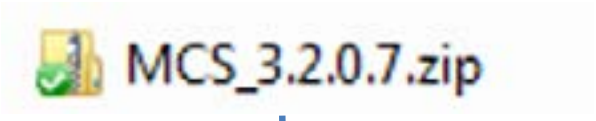
UPDATING VRP FIRMWARE

Delete this file so that the SD card is empty. You can also “Format” the SD card.

Ensure Power is OFF! You will need an SD Card Reader to complete this step

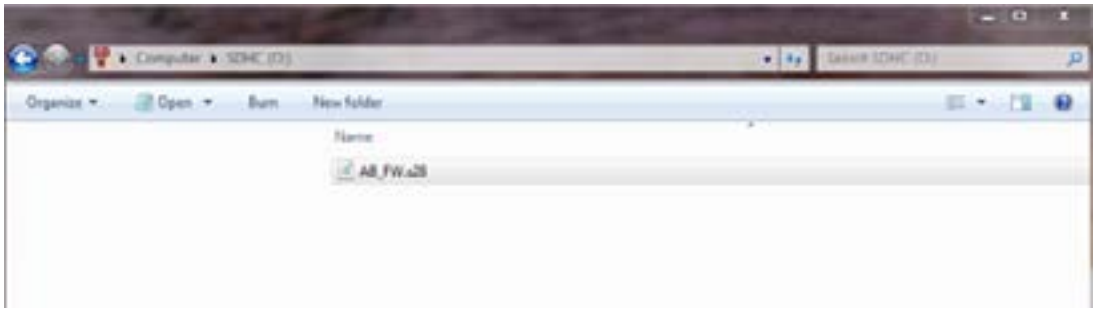
UPDATING VRP FIRMWARE

MCS Update Process – Unzip Files to Blank or Formatted SD Card



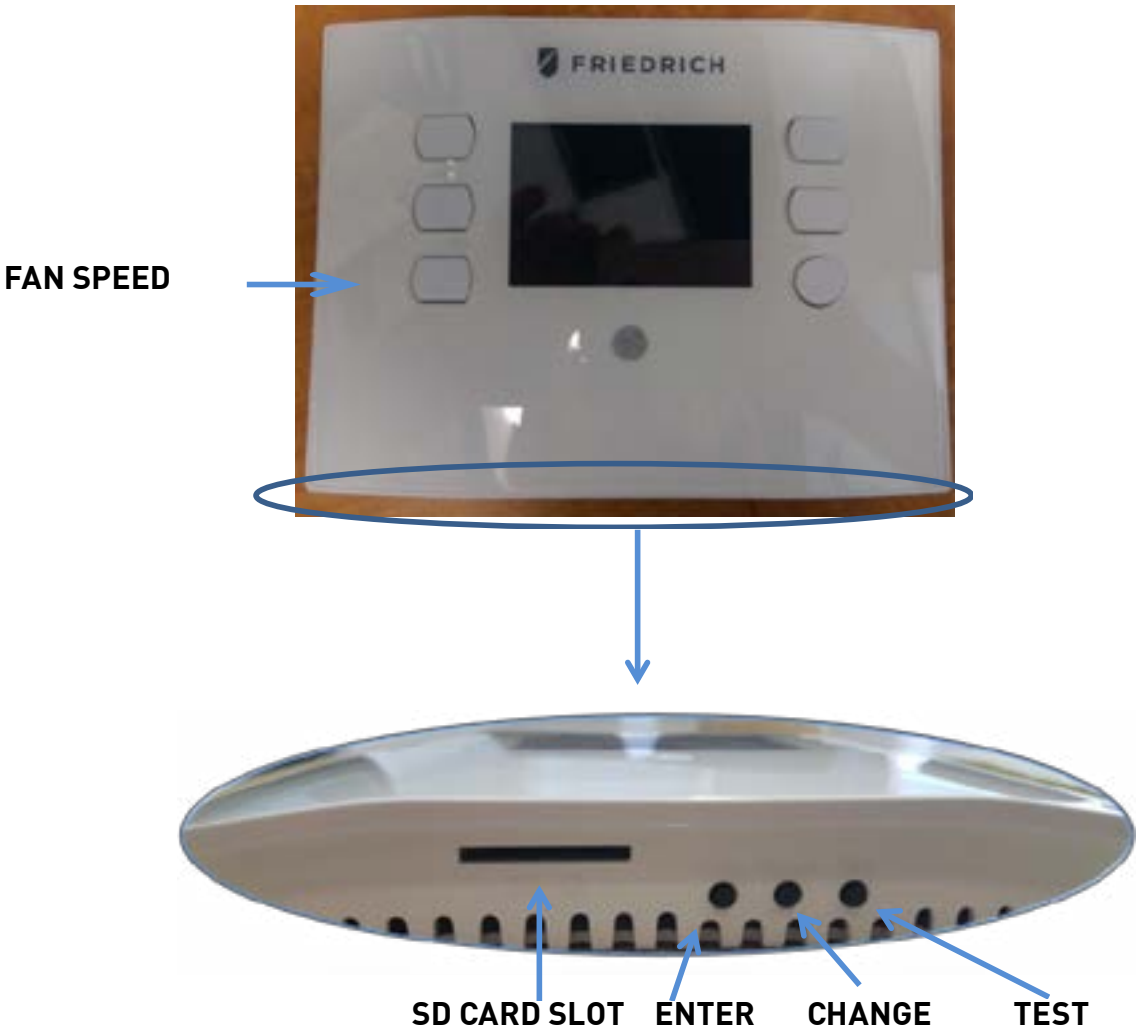
Open zip file

Copy to SD Card



Verify the new AB_FW.s28 is the only file on the SD card and insert back into MCS

UPDATING VRP FIRMWARE

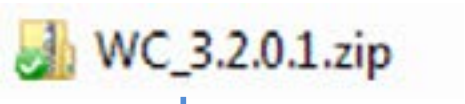


To read the MCS firmware version via the Wall Controller, press the Fan Speed and Change buttons together for 3 seconds. Your display screen will change to show 2 numbers. Press the down arrow to cycle through all version numbers.

This digit strand is your firmware version. I.E. 03-00-02-07 = Version 03.00.02.07.

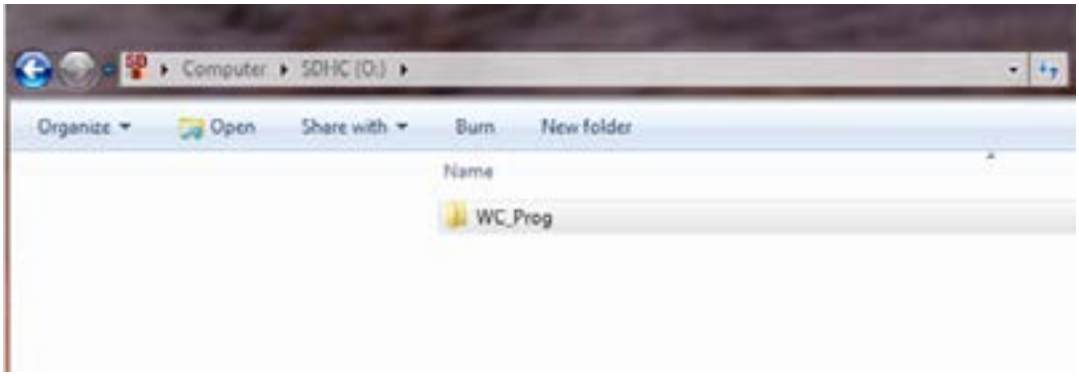
Current MCS Version = 03.02.00.07.

UPDATING VRP FIRMWARE



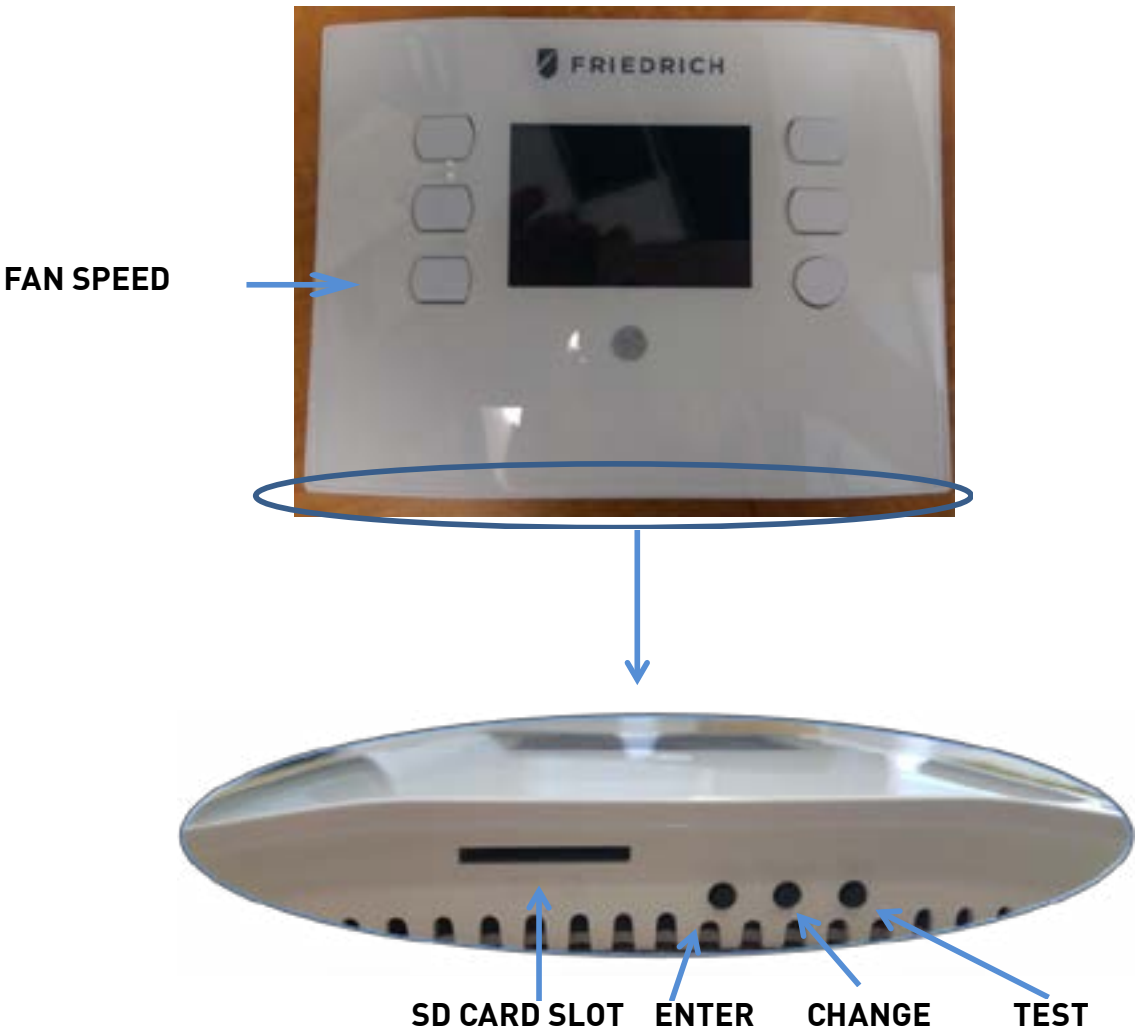
Open zip file

Copy to SD Card



Insert into SD Card Slot

UPDATING VRP FIRMWARE



To read the Wall Controller firmware version, press the System Mode and Test buttons together for 3 seconds. Your display screen will change to show 2 numbers. Press the down arrow to cycle through all version numbers.

This digit strand is your firmware version. I.E. 03-02-00-01 = Version 03.02.00.01.

Current Wall Controller Version = 03.02.00.01.

UPDATING VRP FIRMWARE

Introduction

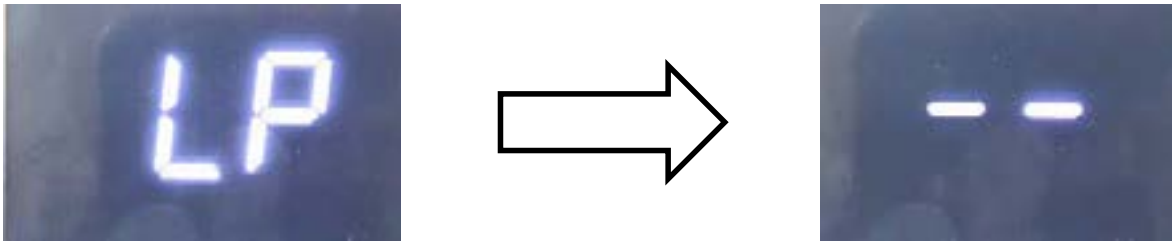
The Wall Controller (WC) can be updated via an SD card inserted into the card reader slot on versions 03.01.00.02 or higher. After inserting the associated SD Card, the WC update will initialize. The command takes 20-30 seconds to upload to the WC.

Preparation

After verifying the WC is version 03.01.00.02 or higher, make sure the machine is in standby mode with “Smart” illuminated:

WC Update

Insert the SD card into the slot on the WC. The WC will flash “LP”, followed by alternating hash marks “--“:



After approximately 20 seconds, “PL” should flash and the WC should restart. This indicates that the process has been completed and the sensor has been disabled. If the WC does not restart, remove the SD card to force restart.

Error Handling

The only errors which can be activated are “U1 or U2”  . These errors indicate that the WC was not “Smart” upon starting the upload process, or “Smart” was lost during upload. Reset power and reattempt to upload.

UPDATING VRP FIRMWARE

VRP Remote Upgrade Procedure

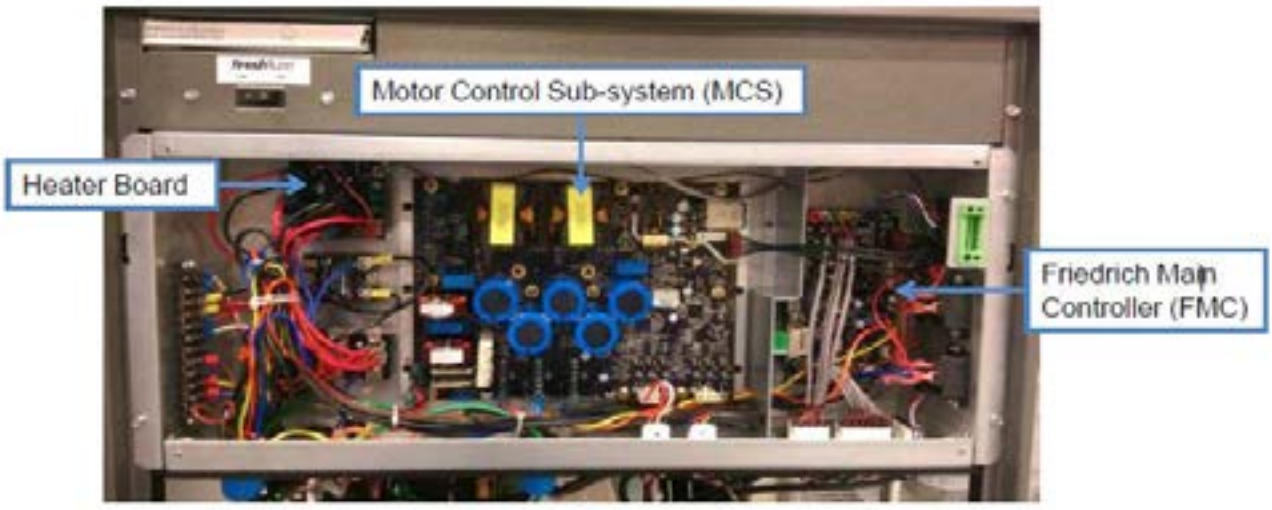
Introduction

The Remote Upgrade procedure on the Friedrich VRP system is designed to greatly reduce the amount of effort required in upgrading the system firmware. The procedure can upgrade the Friedrich Main Controller (FMC), Wall Controller (WC), and Motor Control System (MCS) boards. It is capable of upgrading just one board, all the boards at once, or any combination of any two boards. All that is required from the user is having a correctly formatted SD Card that is inserted into the Wall Controller. After insertion into the SD Card slot of the Wall Controller, the process is autonomous and regular operation resumes after a successful update.

Setup

In-Board SD Cards

The first step in making sure the unit is properly configured for Remote Upgrade is ensuring that there are SD Cards in both the FMC and MCS boards. If the procedure is started without these cards present the WC will display an error and the procedure will terminate [See Errors].



Procedure

To Remote Upgrade, the Wall Controller (WC) must be Version 03.02.00.00 or higher, Friedrich Main Controller (FMC) Version 03.02.00.07 only, and Motor Control System (MCS) Version 03.02.00.04 only. The Wall Controller can be upgraded from any version to 03.02.00.01 by inserting the “WC 3.2.0.1” SD Card. If the FMC or MCS version do not match the above, a direct upgrade must be done.

UPDATING VRP FIRMWARE

VRP Remote Upgrade Procedure

Starting Remote Upgrade

To begin the procedure, ensure that the machine is on and in standby mode with “Smart” illuminated

All that is required to start the Remote Upgrade procedure is to insert the “Remote Update” SD Card into the SD Card slot of the Wall Controller. If the system detects that there is no need to upgrade (all the Software Revisions already match), the Wall Controller will momentarily drop connection to the FMC (the “Smart” Icon will turn off). After a moment it will recover connection and continue regular operation.

Tracking Progress

While there is no percentage completion display, there are multiple visual cues to track the progress of the Remote Upgrade process. The two-digit portion of the screen will show combinations of numbers and letters to display which stage of the process the system is in, to display success or failure, or to display an error if one is detected. The update process will take approximately 20 minutes.

Stage Display

After the card is inserted the WC screen will display a series of letters and numbers. The first to be displayed is “UP” and the Hourglass Icon. After the system determines that the FMC is OK to continue the procedure, a “02” will be displayed while the FMC verifies the MCS’s status:

As the procedure progresses, these numbers will change to display each stage of the process. The highest stage that might be seen is stage 9.

UPDATING VRP FIRMWARE

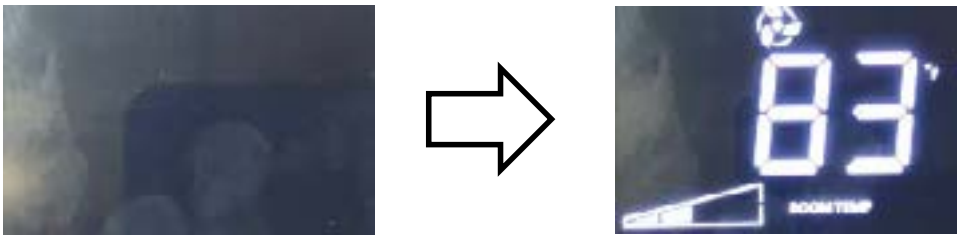
VRP Remote Upgrade Procedure

There are two stages that will be displayed for the majority of the time. The first is while the WC is transferring files to the FMC, it will display a “6” and the Communication Icon will blink. This stage will last approximately 7-8 minutes.

When the FMC is sending a file to the MCS, the digits “5L” will be displayed. This stage will last approximately 11-12 minutes:

This will persist until near the end of the Remote Upgrade process as the WC is waiting to hear if the MCS and/or FMC upgrade process was successful. After this stage a “9” will be displayed for approximately 1-2 minutes:

After the remote upgrade has been completed, the WC screen may restart or go blank. Remove the SD Card to restart the WC:



UPDATING VRP FIRMWARE

VRP Remote Upgrade Procedure

Error Handling

In the event something goes wrong, the system will display an error code on the WC display. The Wrench Icon will be illuminated to distinguish error display from stage display. Due to the number and nature of errors, the error codes are displayed using both the two-digit display and the Fan Speed indicator. Each permutation of illuminated bars in the Fan Speed Triangle denotes a different bank of errors. It is possible to have the same two digit error number in different error banks. Equivalent digits may or may not denote the same type of error with a different point of origin.

General Errors

The general error handler is used to display generalized errors not specific or identifiable to any one board.

Displayed Error Number	Description	Corrective Action
07	WallController Timeout – The WallController has not heard from the FMC in the expected time.	This is a generalized error with multiple possible origins. Address any previous errors first. Cycle system power and retry procedure.

WC Errors

Displayed Error Number	Description	Corrective Action
00	WC has failed to initialize Remote Upgrade.	Verify Key Card is correctly formatted. Verify Key File Software Revisions are correct. Retry Remote Upgrade.
01	WallController SD Card was removed. (FR_DISK_ERR)	Cycle system power and retry upgrade with a different Key Card. If error persists, contact Friedrich.
02	SD Card access failure thrown when failing to read/write expected amount of data. (FR_INT_ERR)	Reset system and restart process with a different Key Card. If error persists, contact Friedrich.
03	The SD Card is present but not accessible. (FR_NOT_READY)	Verify Write-Only lock is not on. Verify SD Card contacts are in good shape. Restart system and retry process. If unsuccessful, try new Key Card. Contact Friedrich if problem persists. †
04	An expected file is unable to be located.	Try different Key Card. If problem persists, contact

VRP Remote Upgrade Procedure

	(FR_NO_FILE)	Friedrich.
10	Undefined Parameter. System failed in unexpected way that shouldn't happen.	Cycle power to the unit and try again.

FMC Errors

Displayed Error Number	Description	Corrective Action
01	FMC SD Card was removed. (FR_DISK_ERR)	Ensure the FMC SD Card is in place. Cycle system power and retry upgrade.
02	SD Card access failure thrown when failing to read/write expected amount of data. (FR_INT_ERR)	Verify presence of SD card. Reset system and restart process.
03	The SD Card is present but not accessible. (FR_NOT_READY)	Verify Write-Only lock is not on. Verify SD Card contacts are in good shape. Reset system and retry process. If problem persists, contact Friedrich.
20	Bad FMC Software Revision. The software revision after update does not match with what is in the Key File.	The FMC Program File may be incorrect or corrupted, or the reboot process is failing. Reset system and try process with different Key Card.

MCS Errors

Displayed Error Number	Description	Corrective Action
01	Disk Error – SD Card is not detected	Verify presence of SD Card in MCS. Reset system and retry process.
02	Wrong Message. MCS received unexpected message in RU process.	Verify good contact between FMC and MCS. Loose wiring could cause intermittent connection and desynchronize data transmission. [Diagnostic # for MCS Comm error]
03	Bad Checksum. The file on the MCS SD card does not match the one on WC SD Card. Likely due to transmission or write error.	Reset system and retry process. If problem persists, contact Friedrich.

VRP Remote Upgrade Procedure

04	Missing File or Bad Path. An expected file or folder is missing on the MCS.	TBD
05	No Revert File.	TBD
08	Bad Software Revision. The software revision after update does not match with what is in the Key File.	Contact Friedrich
09	Bad revert. The attempt to revert the MCS has failed.	TBD
26	Too many retries. The FMC has sent to many retried messages to the MCS in the RU process.	This error implies a connectivity problem between the FMC and MCS. Check that the physical connection is intact. [Diagnostic # for MCS Comm error]

MCS Poll Errors

MCS Poll errors happen either during initial setup or before transferring a file to the MCS.

Displayed Error Number	Description	Corrective Action
00	Wrong Bootloader. The MCS has detected it has an incorrect bootloader for RU.	Contact Friedrich
01	Bad Processor A. Processor A is not in an appropriate state for Remote Upgrade.	Reset system and retry. Otherwise, contact Friedrich
02	Bad Processor B. Processor B is not in an appropriate state for Remote Upgrade.	Reset system and retry. Otherwise, contact Friedrich

Recovery

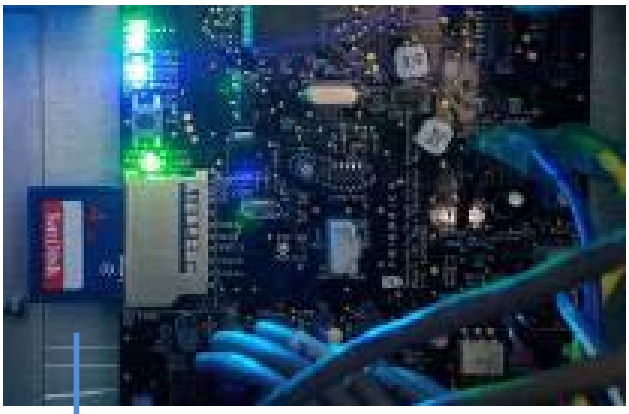
In all cases where an error is detected, the Remote Upgrade process is terminated and must be restarted for it to continue. To facilitate this, the system is automatically reset when the Key Card is removed from the WC. Before doing this be sure to have noted the error displayed on the screen. After removing the Key Card, wait a few seconds until the WC restarts and the screen goes momentarily blank. Once the Smart Icon is displayed again, the system is ready for another Remote Upgrade attempt.

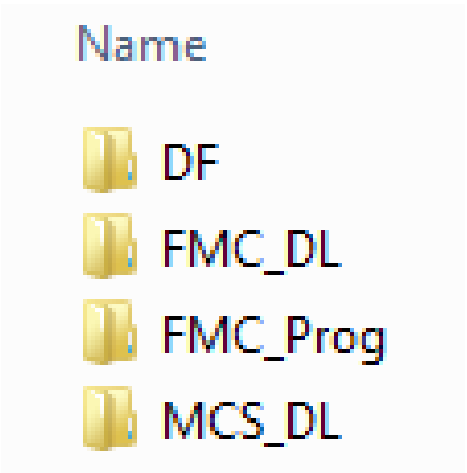
If the screen never seems to reset, there may have been an issue relaying the reset command. In

UPDATING VRP FIRMWARE

Retrieving VRP Data

Remove SD Card from FMC and Locate “DF”

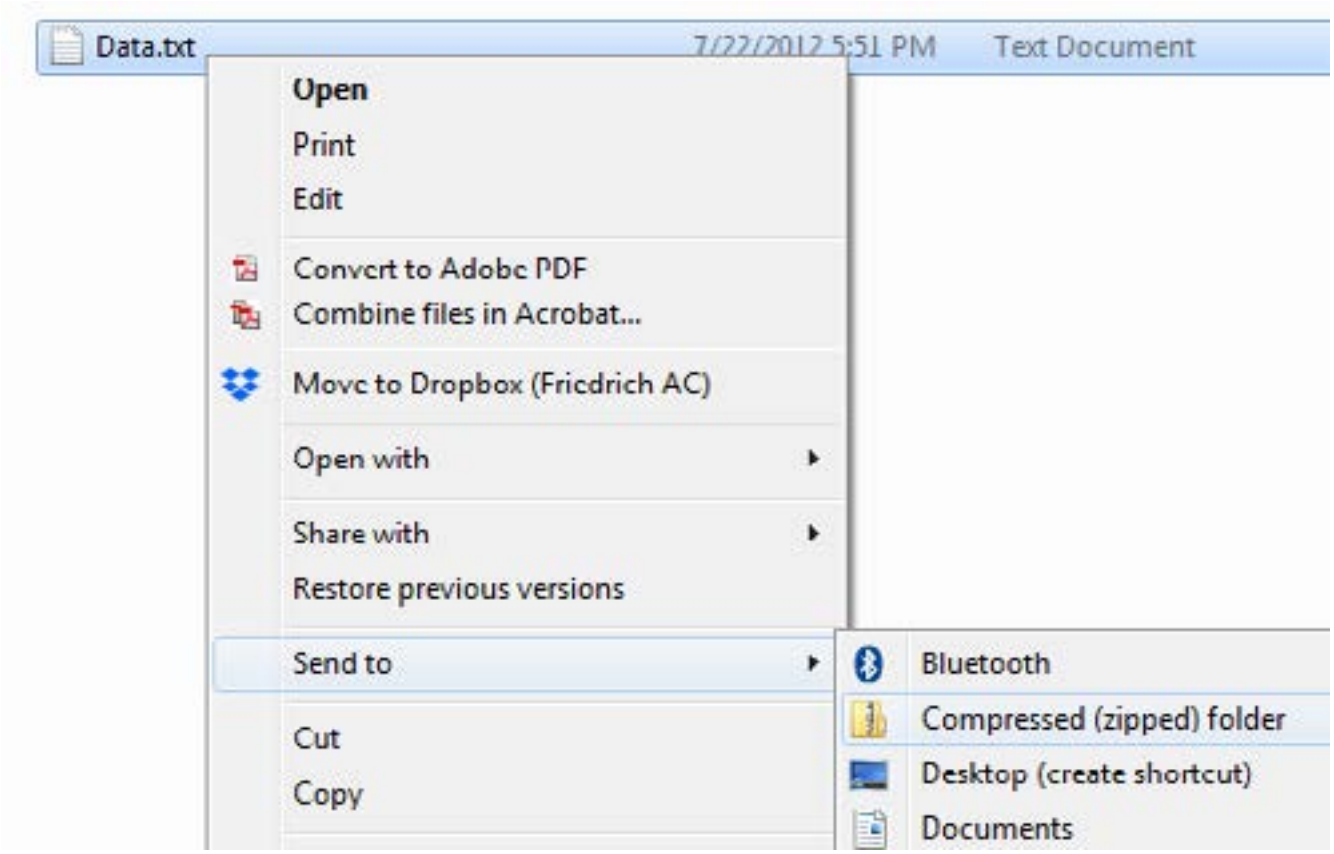




UPDATING VRP FIRMWARE

Retrieving VRP Data

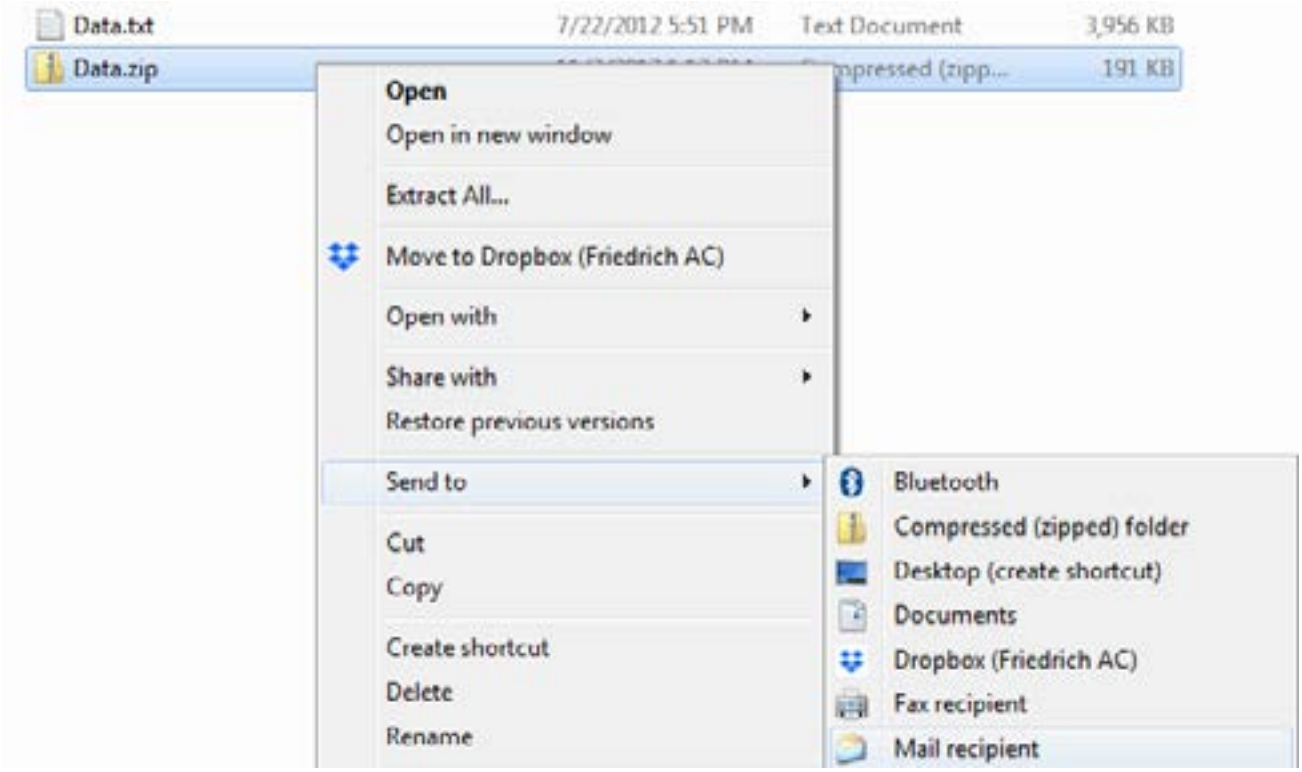
Right Click "Data.txt." Send to: Compressed (zipped) folder



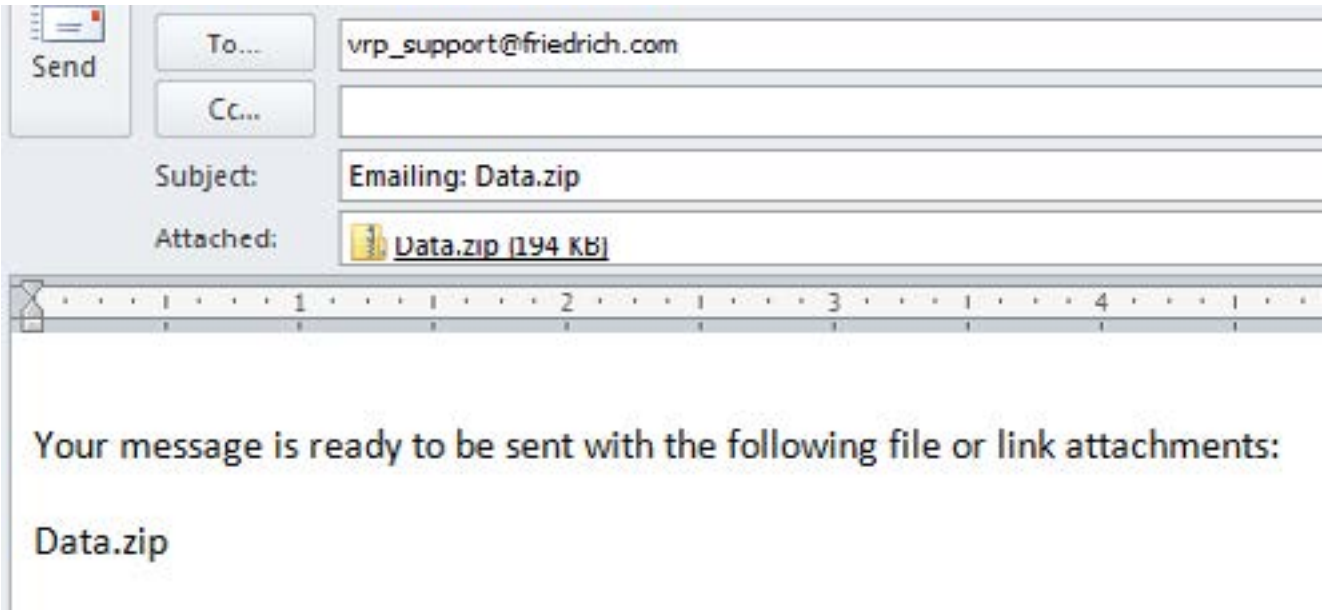
UPDATING VRP FIRMWARE

Retrieving VRP Data

Right Click “Data.ZIP.” Send to: Mail Recipient



Email Data.ZIP to VRP_Support@Friedrich.com !! FILE SIZE WILL VARY !!



WIRING DIAGRAMS

12-24 BTU (A, B,C MODELS) (208/230V 2.5, 3.4, & 5.0 KW)

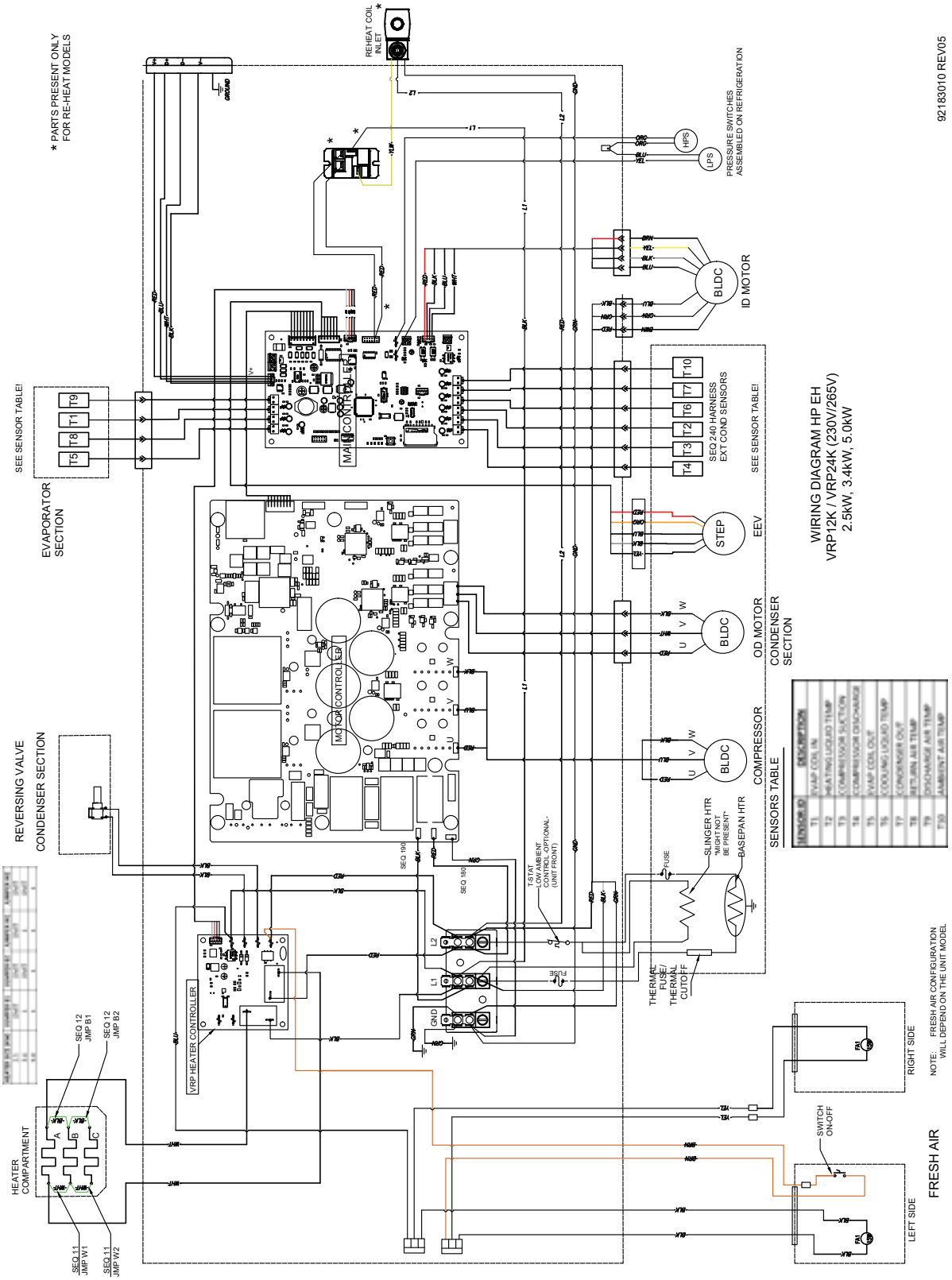


Figure 801 (Wiring Diagram)

WIRING DIAGRAMS

12-24 BTU (A, B, C MODELS) (208/230V 7.5&10.0 KW)

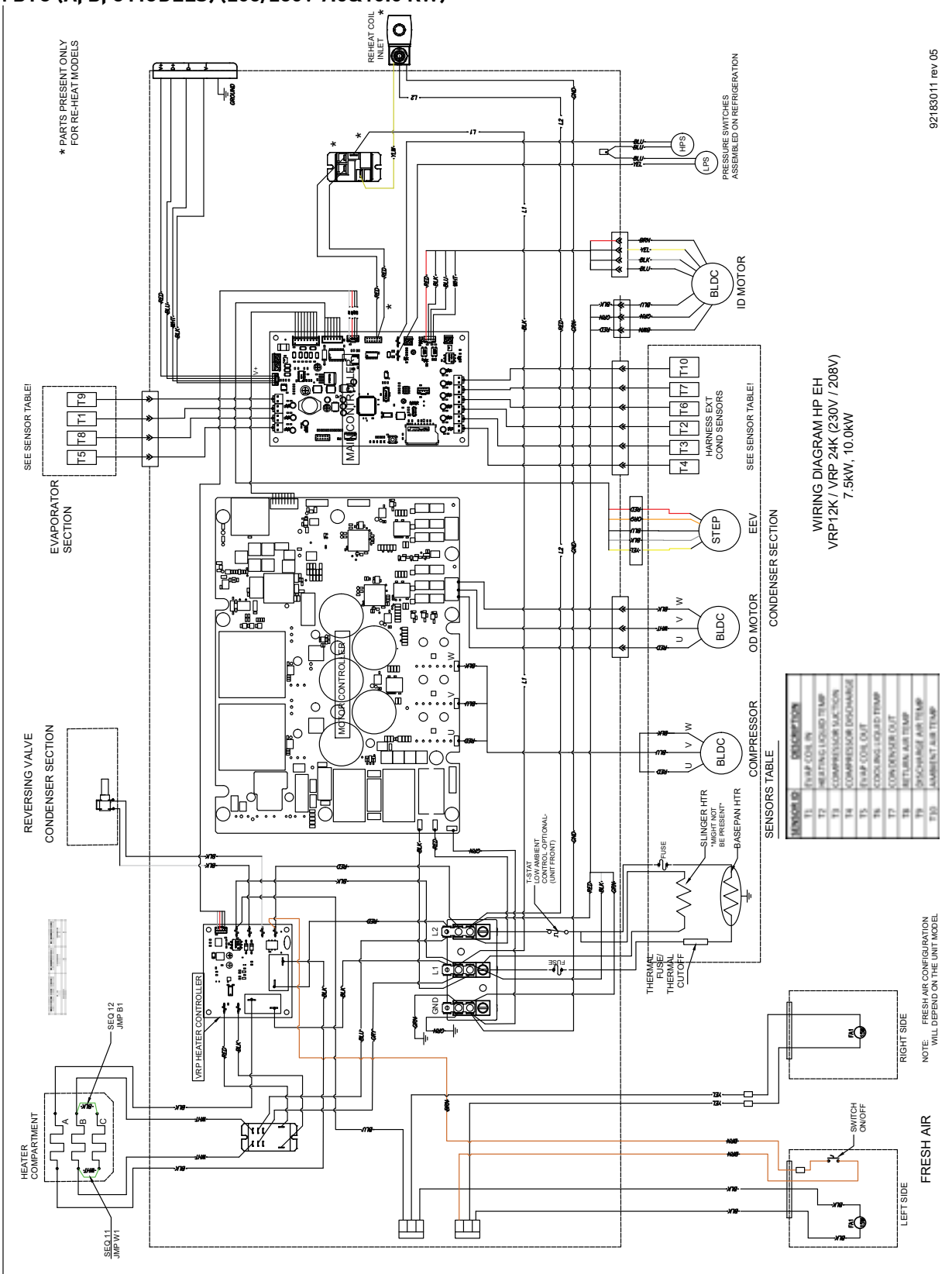


Figure 803 (Wiring Diagram)

WIRING DIAGRAMS

12-24 BTU (A, B, C MODELS) (265V 2.5, 3.4, & 5.0 kW)

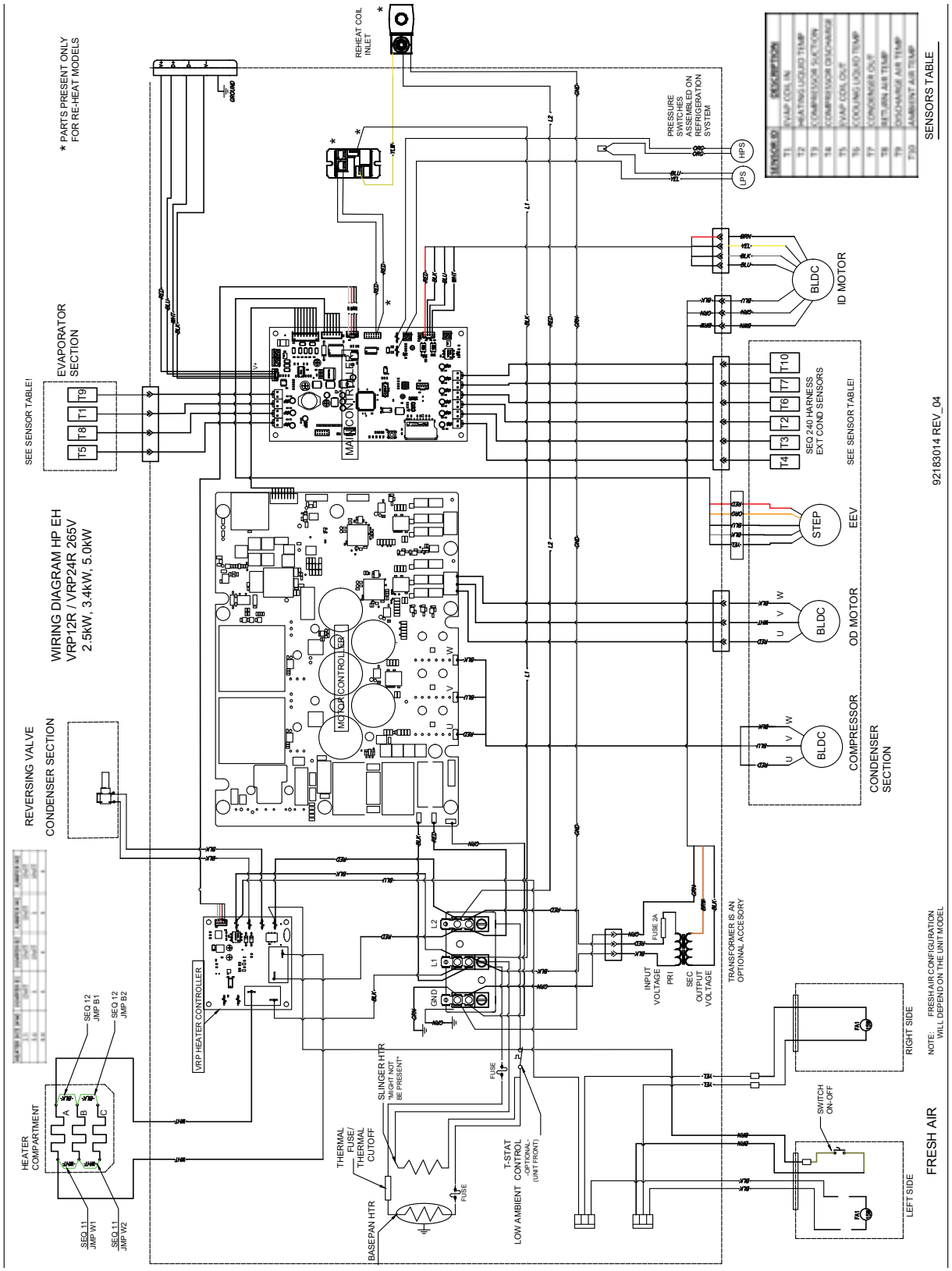


Figure 805 (Wiring Diagram)

WIRING DIAGRAMS

12-24 BTU (A, B, C MODELS) (265V 7.5 & 10 kW)

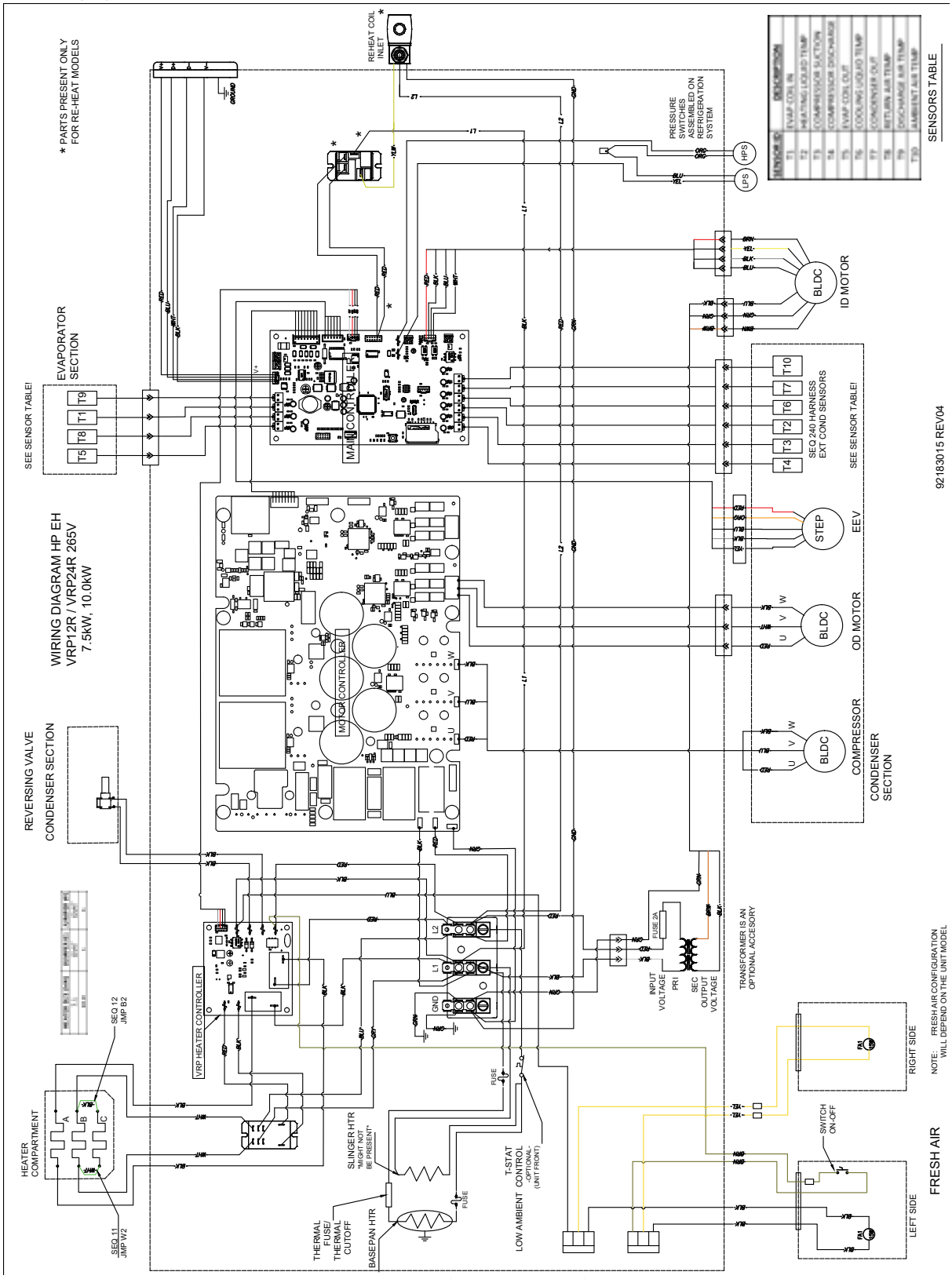


Figure 807 (Wiring Diagram)

WIRING DIAGRAMS

36 BTU - 208/230V

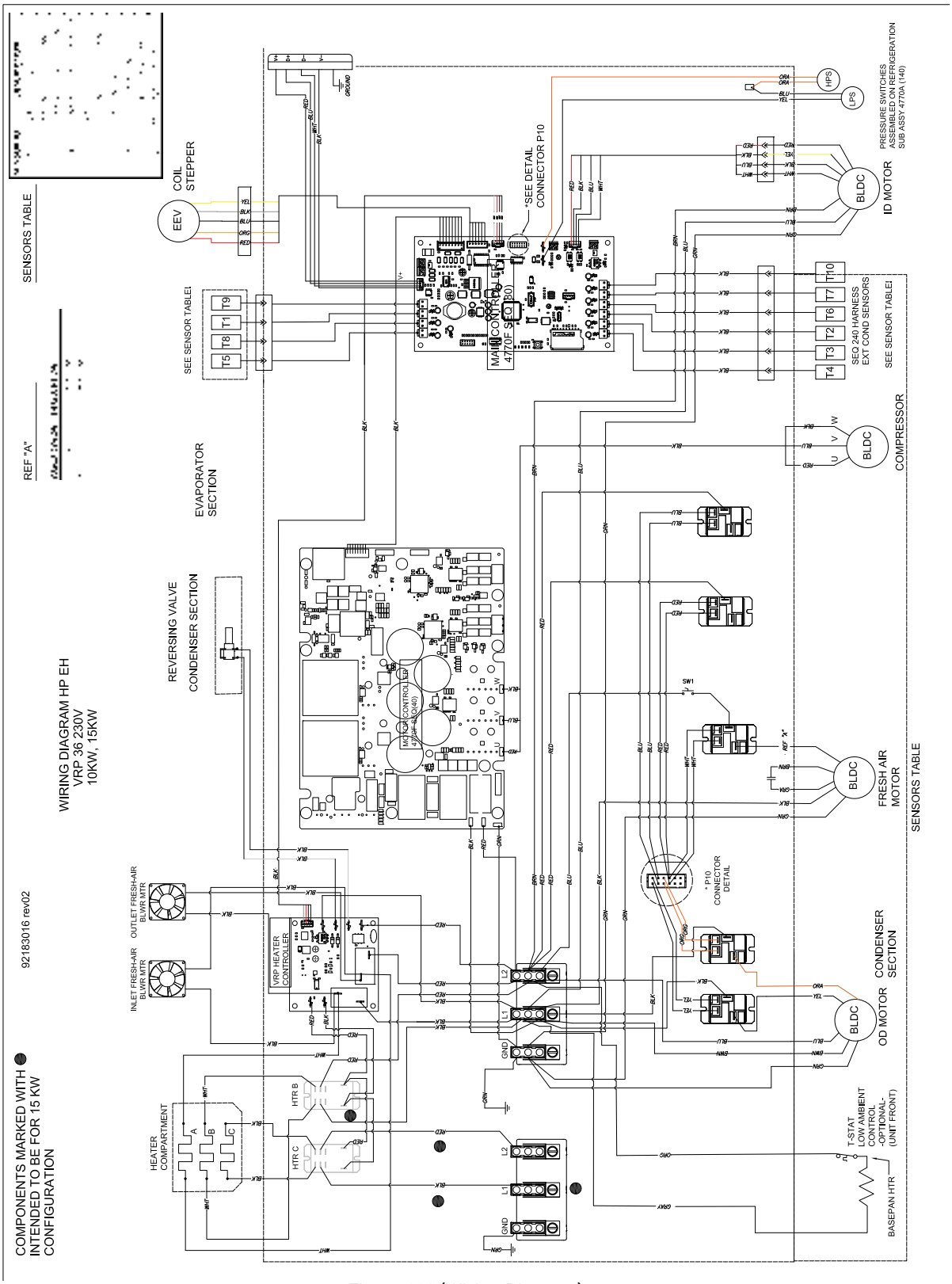
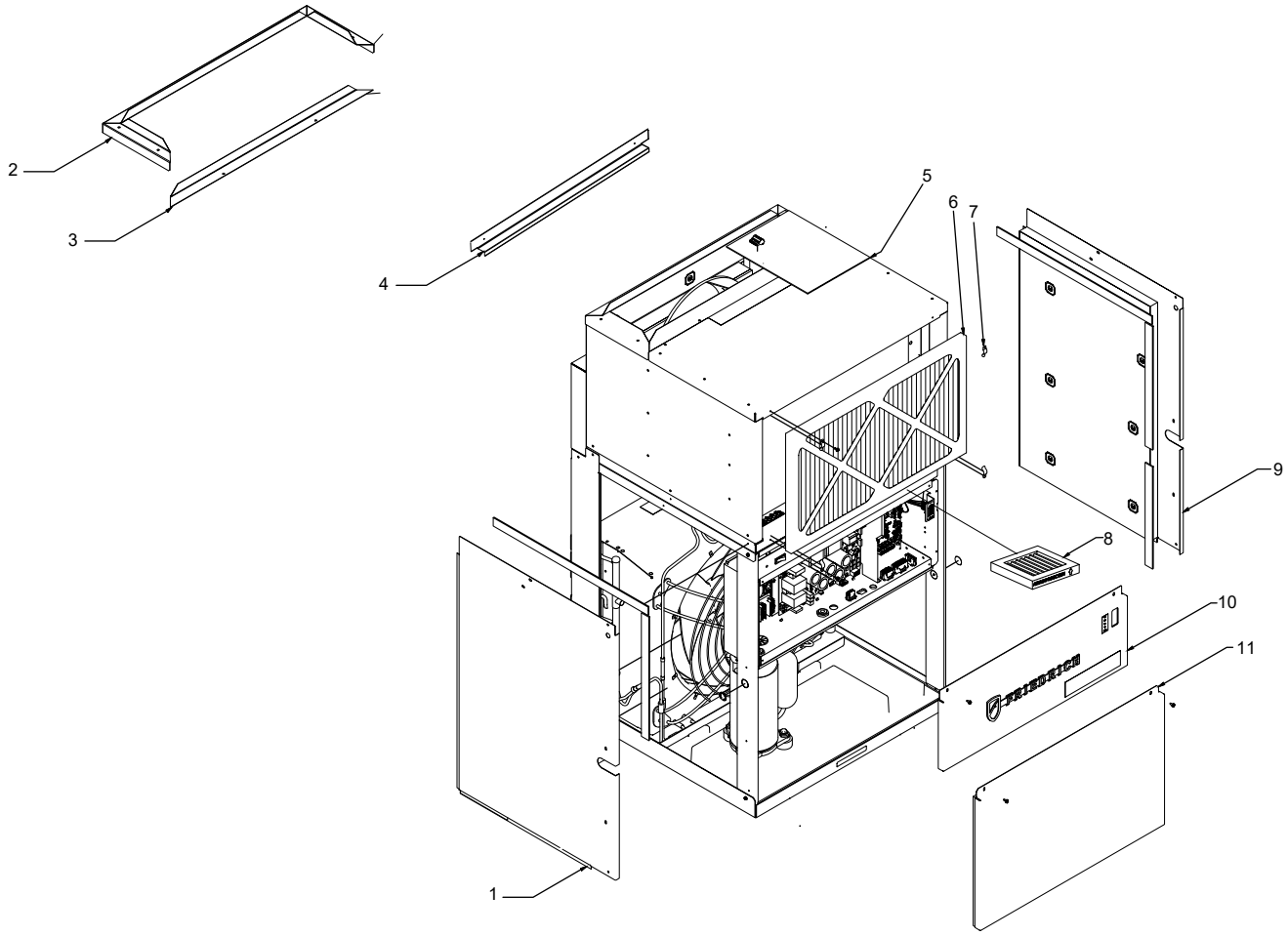


Figure 809 (Wiring Diagram)

PARTS CATALOG

Figure 901 (Unit Assembly)

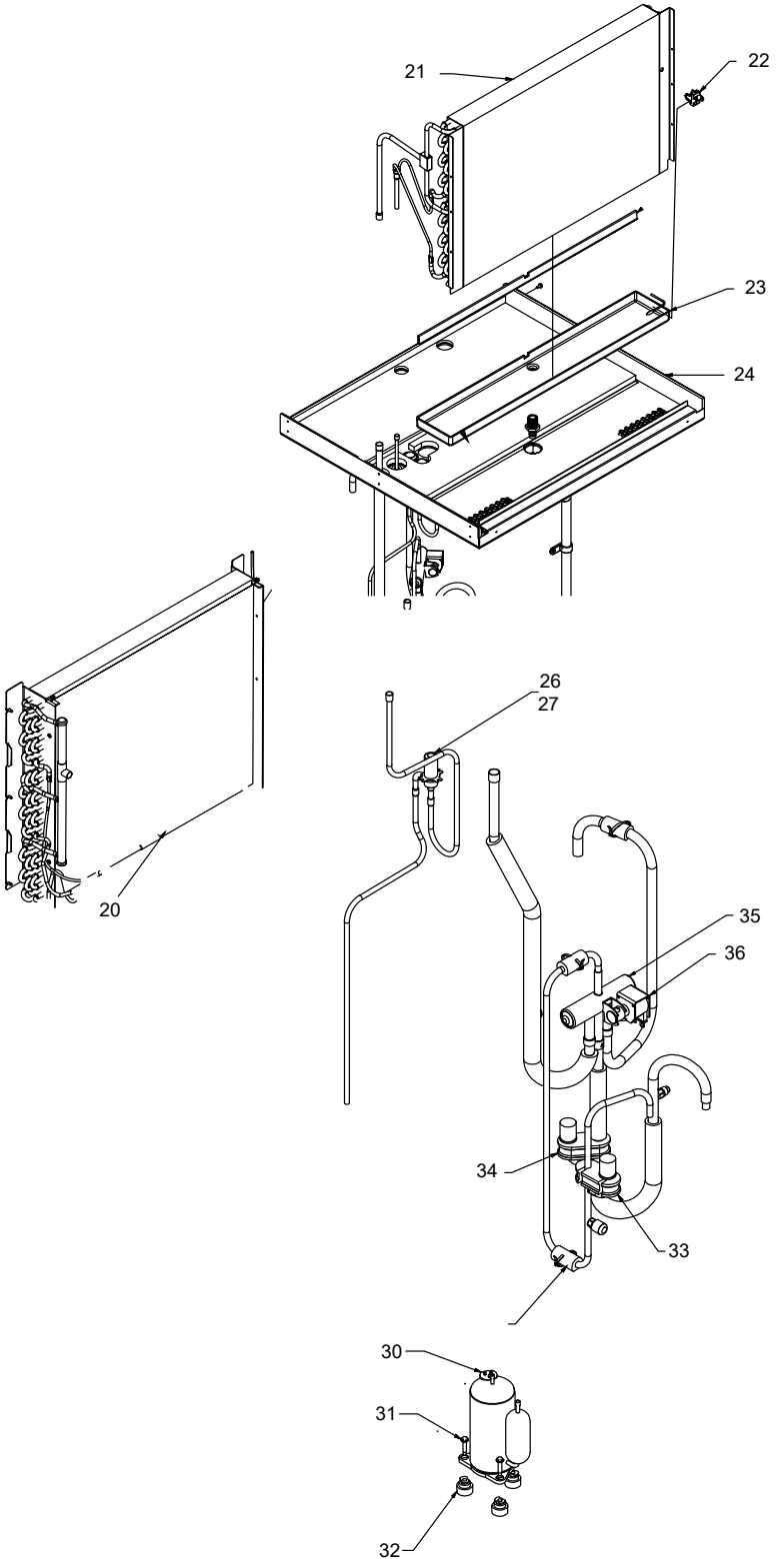
12k BTU A-C Models



PARTS CATALOG

Figure 902 (Refigeration Without Reheat)

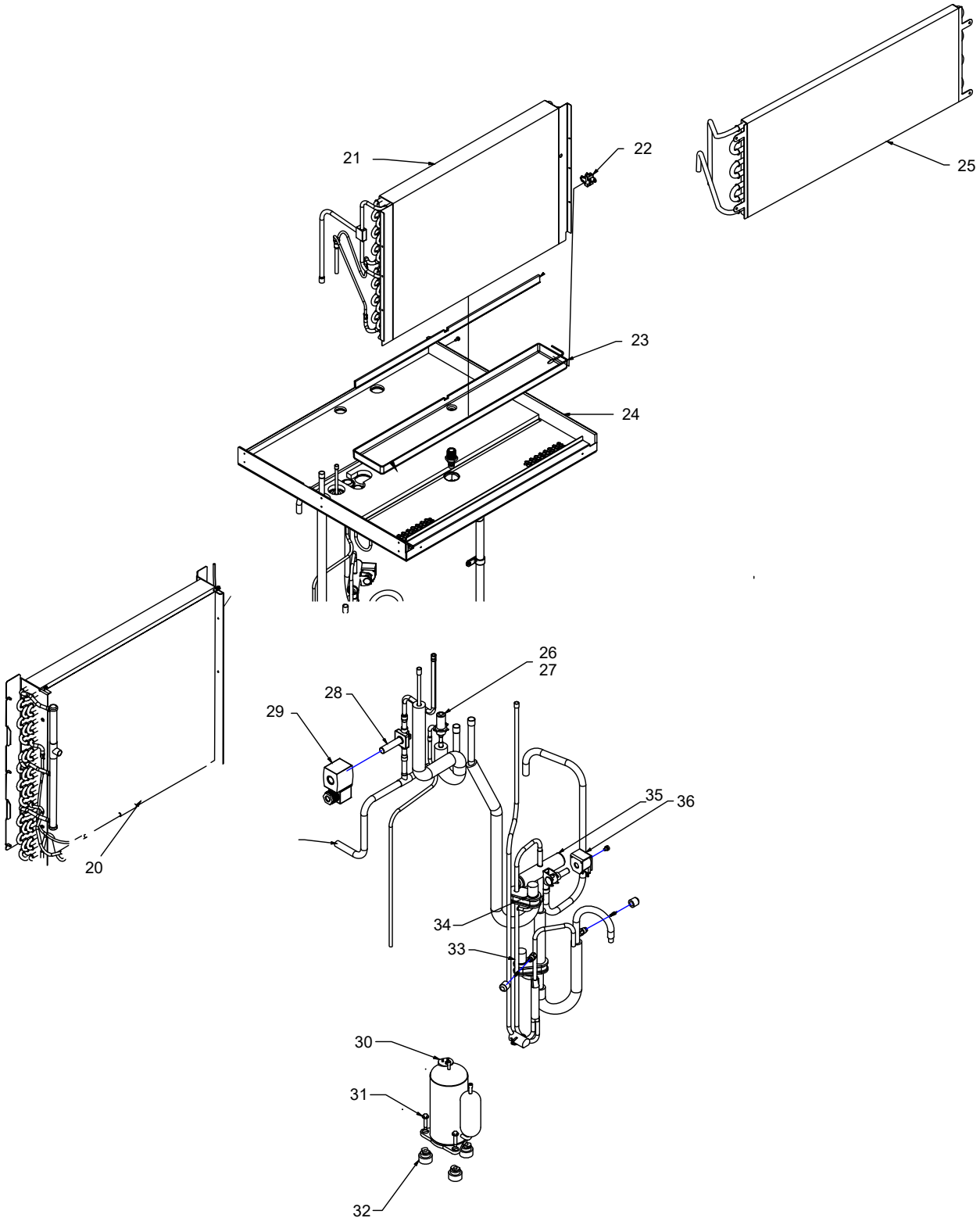
12k BTU A-C Models



PARTS CATALOG

Figure 903 (Refrigeration with Reheat)

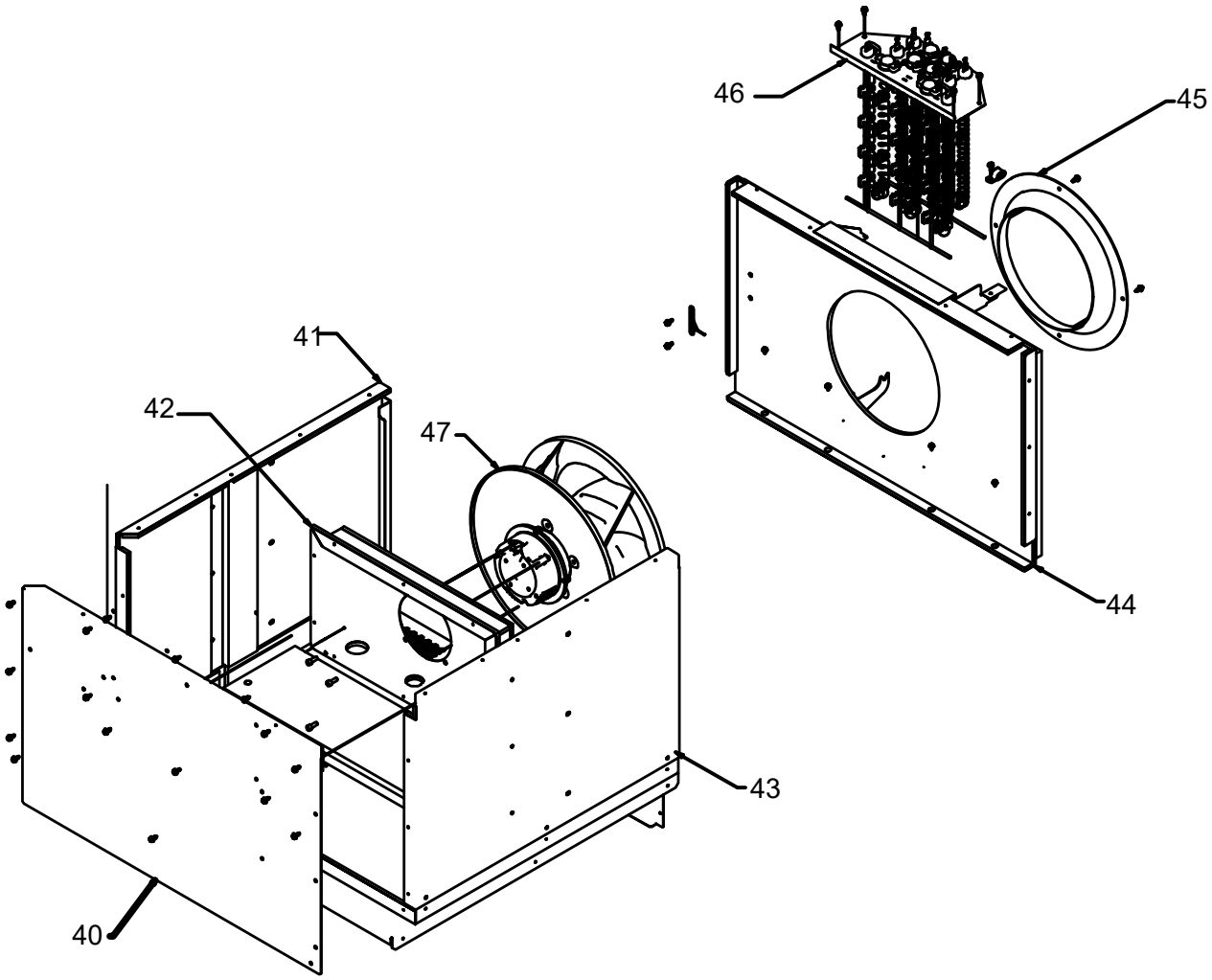
12K BTU A-C Models



PARTS CATALOG

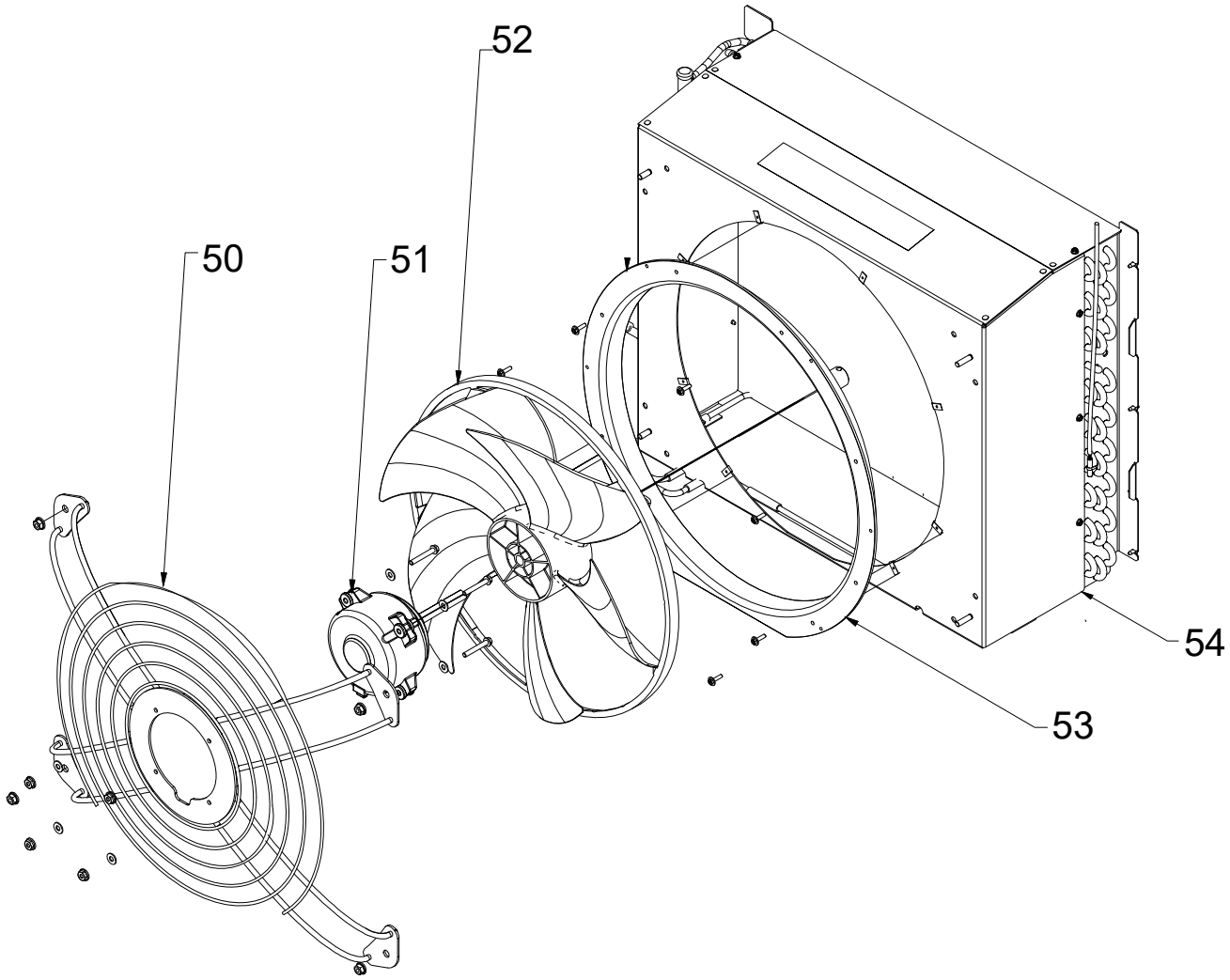
Figure 904 (Blower Module)

12K BTU A-C Models



PARTS CATALOG

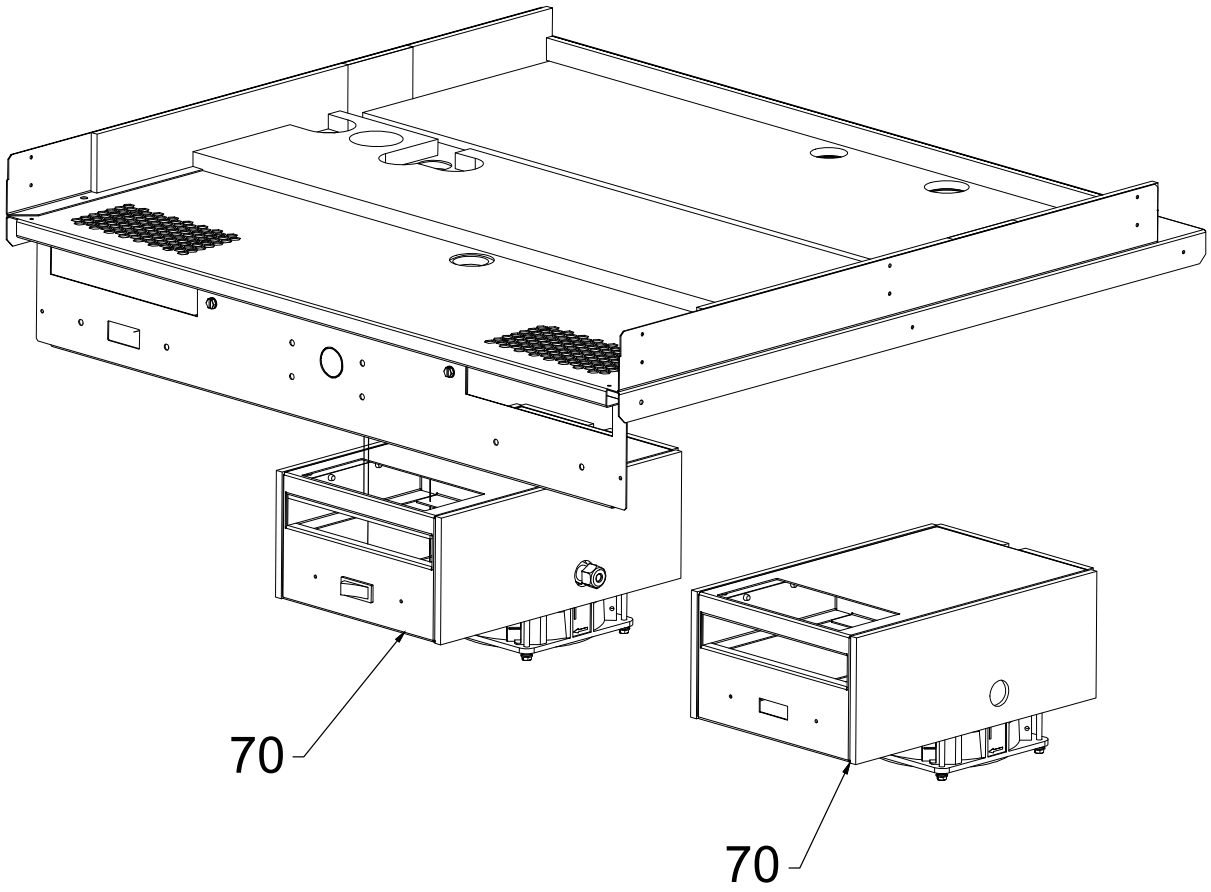
12K BTU A-C Models



PARTS CATALOG

Figure 906 (Fresh Air Service Kit)

12K BTU A-C Models



PARTS CATALOG

12K BTU A-C MODELS Main Diagram

ITEM	Manuf. ID	PART NUMBER	PART DESCRIPTION	USED ON MODEL	QTY
1	100020	80083598	ASSY SOUND INSUL LEFT COND 12K REPLACED BY P/N 80083565	ALL	1
2	080150	80080177	FLANGE DISCHARGE VRP REPLACED BY P/N 80080198	ALL	1
3	080160	80080181	FLANGE DISCHARGE VRP REPLACED BY P/N 80080197	ALL	1
4	010224	80083660	BRACKET FILTER HOLDER REPLACED BY P/N 80083669	ALL	1
5	080130	80081002	ASSY INSUL TOP REPLACED BY P/N 80081018	ALL	1
6	100040	80080500	EVAP. FILTER 14X24	ALL	1
7	100030	80080226	FILTER RETAINER	ALL	1
8	100041	80083140	FRESH AIR FILTER MERV 8 6X6X1	FRESH AIR	2
9	100010	80083597	ASSY SOUND INSUL RIGHT COND 12K REPLACED BY 80083563	ALL	1
10	100110	80083183	ASSY INSUL ELECTRICAL ACCESS PANEL	A-B MODEL	1
10	100110	80083119	ASSY INSUL ELECTRICAL ACCESS PANEL	C MODEL	1
11	100070	80083654	ASSY INSUL ACCESS PANEL 12 REPLACED BY P/N 80083673	ALL	1
20	020030	80080135	CONDENSOR. COIL	ALL	1
21	030060	80080193	EVAP. COIL	ALL	1
22	040031	61699902	CLIP THERMOSTAT .312 ID	ALL	1
23	030030	80083761	DRAIN PAN EVAP 12K VRP SERVICE KIT INCLUDES DRAIN PAN 80083756 AND PIPE FITTING 80083334	ALL	1
24	010220	80083681	ASSY INSUL PANEL INNER VRP REPLACED BY P/N 80083785	ALL	
25	030061	80083444	REHEAT COIL	REHEAT	1
26	030140-01	80080210	VALVE EXP EEV 12K, DPF(T01)1.3C-07	ALL	1
27	070230	80083485	ELECTRONIC STEPPER MOTOR COIL	ALL	1
28	030141-05	80083472	VALVE SOLENOID 3/8 ODF DIRECT ACTING	REHEAT	2
29	030240	80083473	REHEAT SOLENOID COIL 230V	REHEAT 230V	2
29	030240	80083474	REHEAT SOLENOID COIL 265V	REHEAT 265V	2
30	010120	80080133	COMPRESSOR	ALL	1
31	010122	80083148	COMPRESSOR MOUNTING BOLT	ALL	1
32	010121	61028904	COMPRESSOR GROMMET	ALL	1

PARTS CATALOG

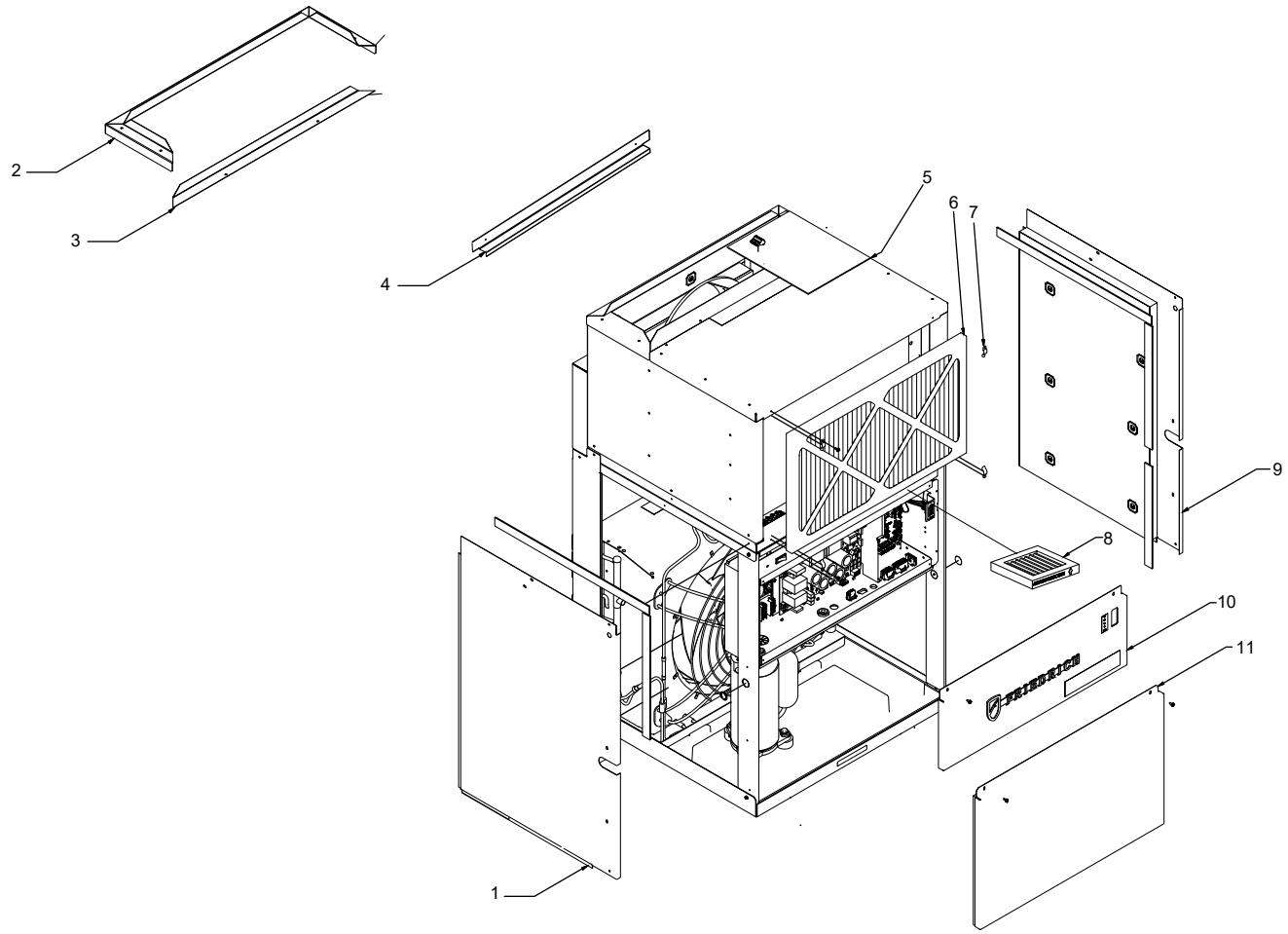
12K BTU A-C MODELS

ITEM	Manuf. ID	PART NUMBER	PART DESCRIPTION	USED ON MODEL	QTY
33	030120-10 030120-09	80112504	HIGH PRESSURE SWITCH	ALL	1
34	030120-09 030120-08	80083340	LOW PRESSURE SWITCH	ALL	1
35	030120-02	25018305	REVERSING VALVE BODY	ALL	1
36	030230	25063605	REVERSING VALVE SOLENOID COIL	230V	1
36	030230	25063705	REVERSING VALVE SOLENOID COIL	265V	1
40	080030	80081500	ASSY INSUL REAR EVAP VRP REPLACED BY P/N 80081308	ALL	1
41	080110	80081502	ASSY INSUL LEFT EVAPR 12K REPLACED BY P/N 80081521	ALL	1
42	080020	80081005	ASSY INSUL BLOWER MOUNT	ALL	1
43	080120	80081504	ASSY INSUL RIGHT EVAPR 12K REPLACED BY P/N 80081523	ALL	1
44	080040	80081505	ASSY INSUL BLOWER FRONT	ALL	1
45	080050	80080171	IR-310 INLET RING EVAP BLOWER PSC DIA 12"	ALL	1
46	080060	80080152	HEATER 10KW 230V MULTI	230V	1
46	080060	80080153	HEATER 10KW 265V MULTI	265V	1
47	080010	80083150	BLOWER MOTOR 310X140 PI2E310140MB2M	ALL	1
50	020050	80080217	MOUNT WIRE FAN MOTOR	ALL	1
51	020080	80080023	MOTOR 70W 2 8P CW/CCW 1 ECM	ALL	1
52	020100	60542007	FAN PLASTIC 16" LRG; VPAK	ALL	1
53	020090	80083486	SHROUD INLET RING VRP12K & 07K	ALL	1
54	020020	80080216	SHROUD CONDENSER FAN	ALL	1
70	050000	80084610	FRESH AIR KIT SINGLE 230V C MODEL	230V FRESHAIR SINGLE FAN	1
70	050000	80084600	FRESH AIR KIT DUAL 230V C MODEL	230V FRESHAIR DUAL FAN	1
70	050000	80084620	FRESH AIR KIT SINGLE 265V C MODEL	265V FRESHAIR SINGLE FAN	1
70	050000	80084630	FRESH AIR KIT DUAL 265V C MODEL	265V FRESHAIR DUAL FAN	1
-71*	N/A	01100001	TOUCH UP PAINT (CORPATE GRAY)	ALL	RF
-ITEMS ARE NON- ILLUSTRATED *ITEMS ARE NON-STOCKED, WILL NORMALLY REQUIRE EXTENDED DAYS LEAD TIME					

PARTS CATALOG

Figure 907 (Unit Assembly)

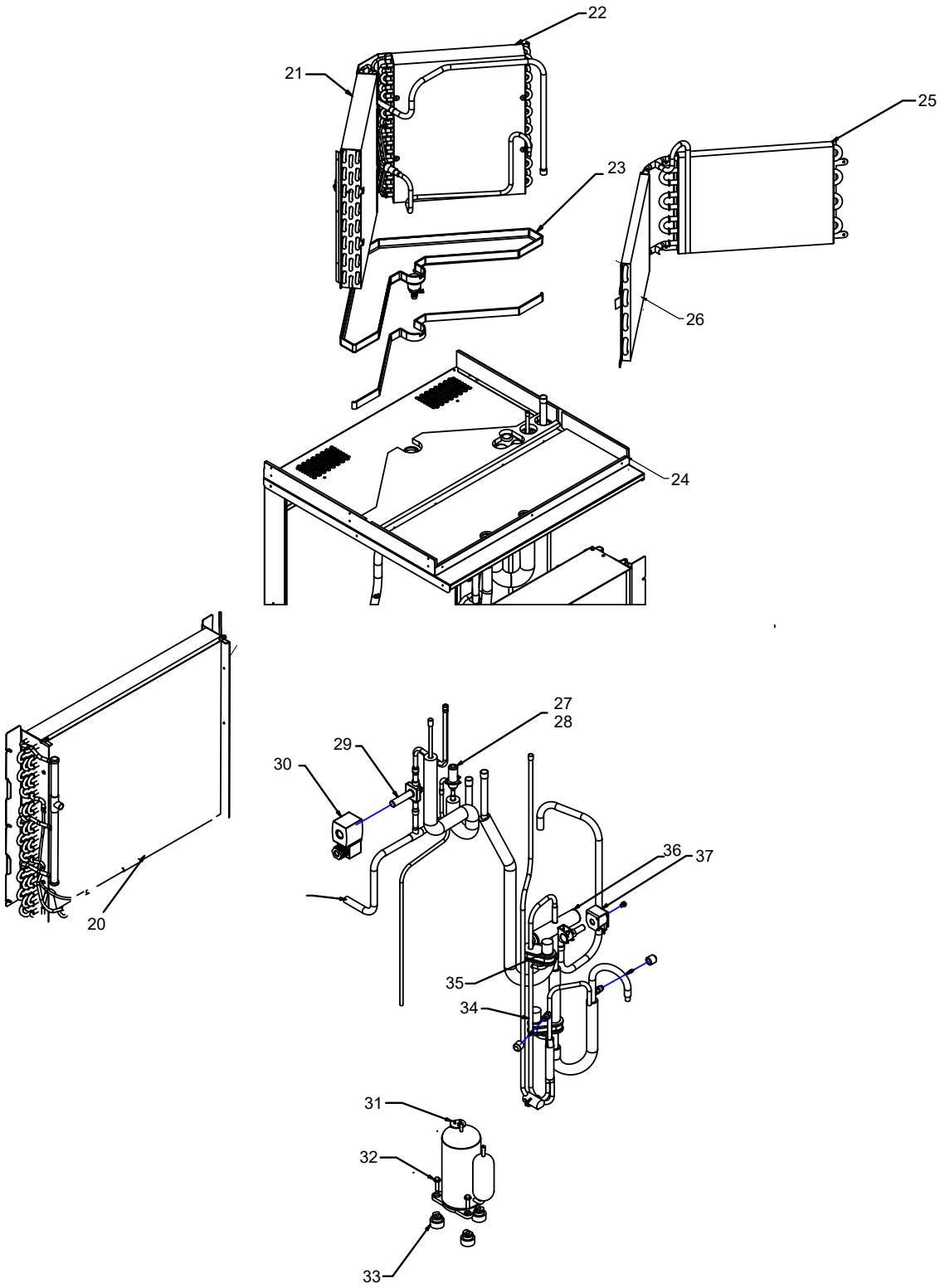
24K BTU A-C Models



PARTS CATALOG

Figure 908 (Refrigeration with Reheat)

24K BTU A-C Models



PARTS CATALOG

Figure 909 (Refrigeration without Reheat)

24K BTU A-C Models

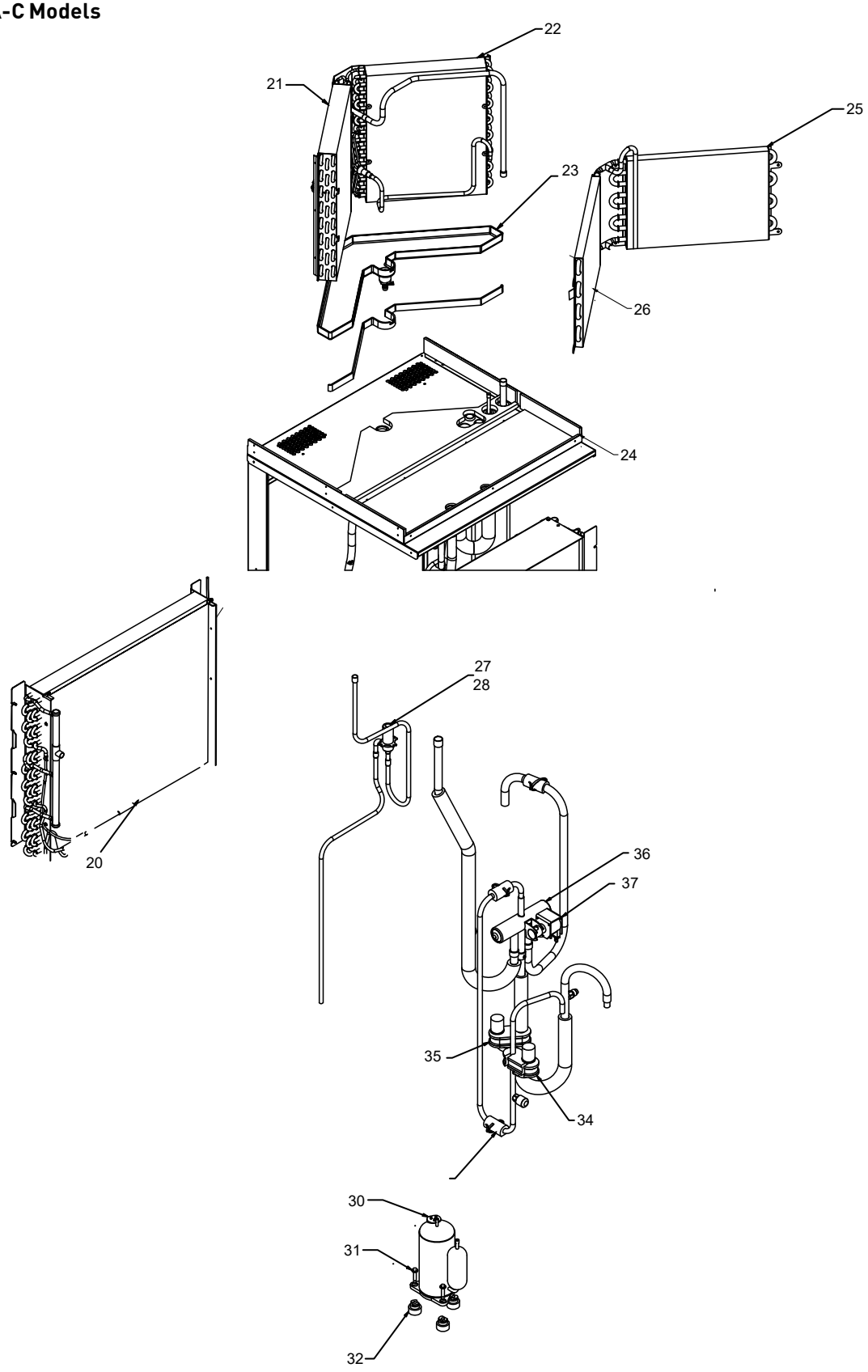
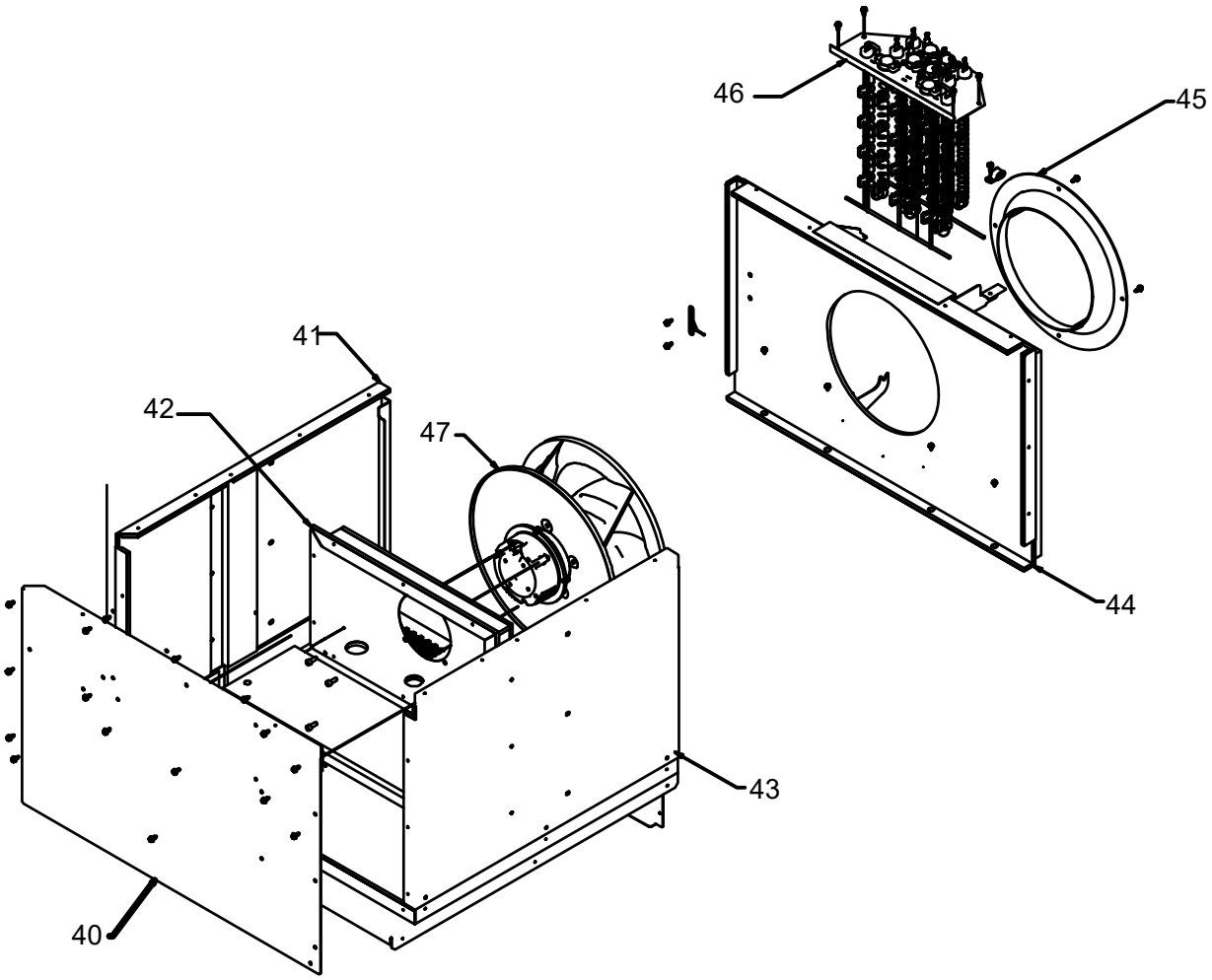


Figure 910 (Blower Module)

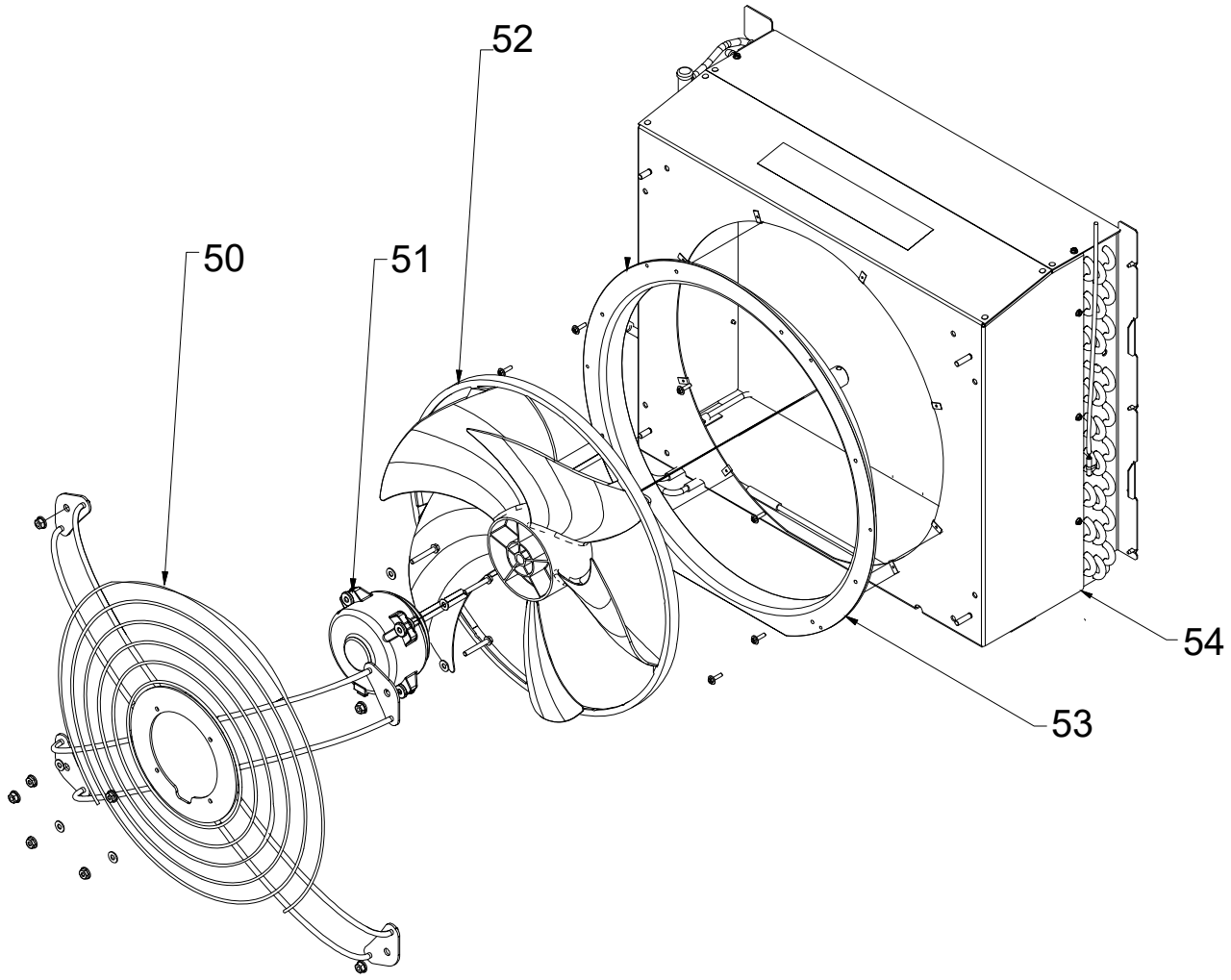
24K BTU A-C Models



PARTS CATALOG

Figure 911 (Outdoor Fan)

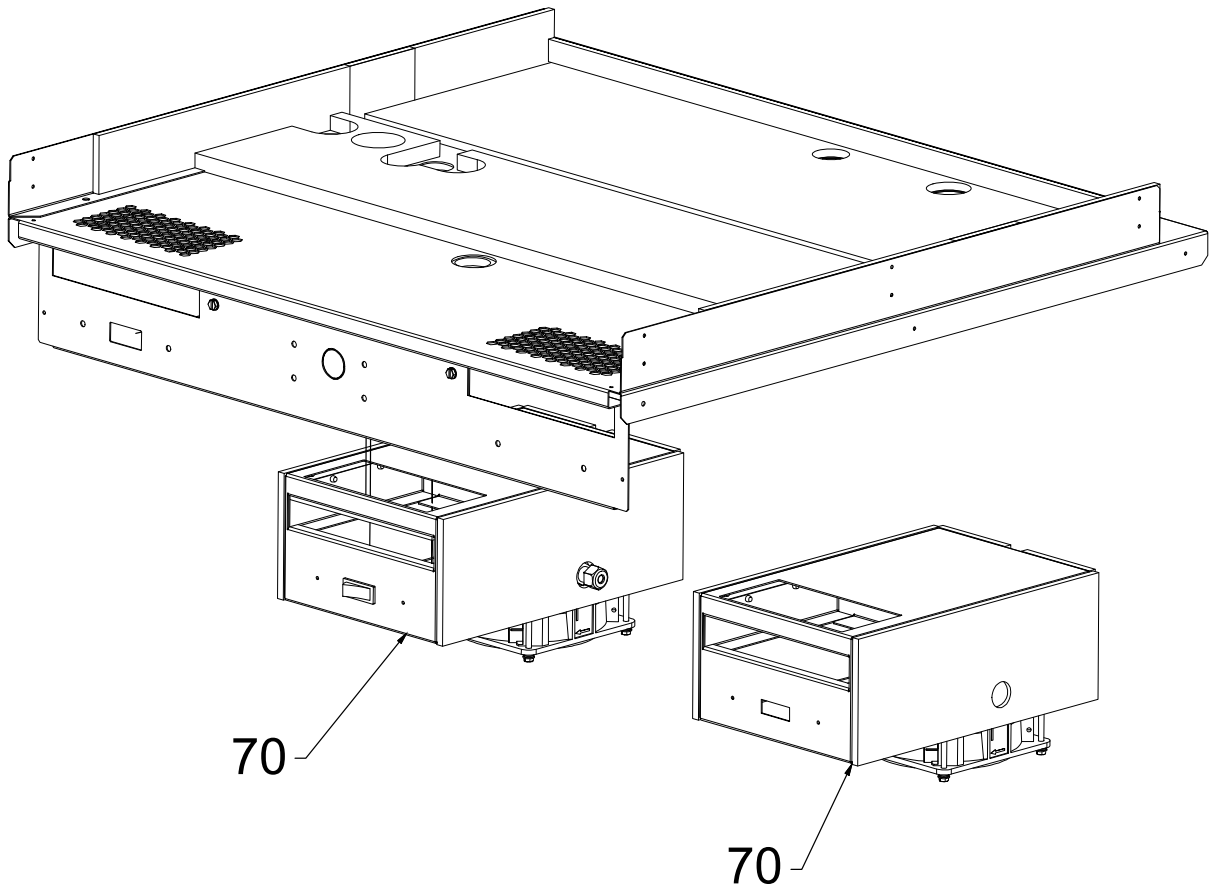
24K BTU A-C Models



PARTS CATALOG

Figure 912 (Fresh Air Service Kit)

24K BTU A-C MODELS



PARTS CATALOG

24K BTU A-C Models

ITEM	op-find	PART NUMBER	PART DESCRIPTION	USED ON MODEL	QTY
1	100020	80083601	ASSY SOUND INSUL LEFT COND 24K REPLACED BY P/N 80083697	ALL	1
2	080150	80080177	FLANGE DISCHARGE 3 SIDED REPLACED BY P/N 80080198	ALL	1
3	080160	80080181	FLANGE DISCHARGE VRP 1 SIDE REPLACED BY 80080197	ALL	1
4	010224	80083660	BRACKET FILTER HOLDER REPLACED BY P/N 80083669	FRESHAIR	1
5	080130	80081002	ASSY INSUL TOP EVAP REPLACED BY P/N 80081018	ALL	1
6	100040	80080500	EVAP. FILTER 14X24	ALL	1
7	100030	80080226	FILTER RETAINER	FRESHAIR	1
9	100010	80083600	ASSY SOUND INSUL RIGHT COND 24K REPLACED BY P/N 80083695	ALL	1
10	100110	80083183	ASSY INUSL ELECTRICAL ACCESS PANEL	REV A , REV B	1
10	100110	80083119	ASSY INUSL ELECTRICAL ACCESS PANEL	REV C	1
11	100070	80083655	ASSY SOUND ACCESS PANEL 24K REPLACED BY 80083676	ALL	1
20	020030	80080030	COIL VCS.312X3X16XC9E45B23X30H6	ALL	1
21	030060	80080187	COIL VCE.312X3X16XC9E45A13X16H6	ALL	1
22	030070	80080186	COIL VCE.312X3X16XC9E45A13X16H6	ALL	1
23	030030	80083762	DRAIN PAN EVAP 24K VRP SERVICE KIT INCLUDES DRAIN PAN 80083758 AND PIPE FITTING 80083334	ALL	1
24	010220	80083791	ASSY INSUL PANEL INNER VRP 24	ALL	1
25	030061	80083445	COIL VCS.312X1X10RC2N45A11X8N0(RH)	REHEAT	1
26	030071	80083446	COIL VCS.312X1X10RC2N45A11X8N0(LH)	REHEAT	1
27	030140	80083398	ASSY EXPANSION VALVE (REHEAT)	ALL	1
28	070230	80083485	ELECTRONIC STEPPER MOTOR COIL	ALL	1
29	030141-01	80083472	VALVE SOLENOID 3/8 ODF DIRECT ACTING	REHEAT	2
30	030240	80083473	REHEAT SOLENOID COIL 230V	REHEAT 230V	2
30	030240	80083474	REHEAT SOLENOID COIL 265V	REHEAT 265V	2
31	010120	80080139	COMPRESSOR DA230S2C-31MT INVERTER 23CC	ALL	1
32	010122	80083148	COMPRESSOR MOUNTING BOLT	ALL	1
33	010121	61028904	COMPRESSOR GROMMET	ALL	1
34	030120-11 030120-08	80112504	HIGH PRESSURE SWITCH	ALL	1

PARTS CATALOG

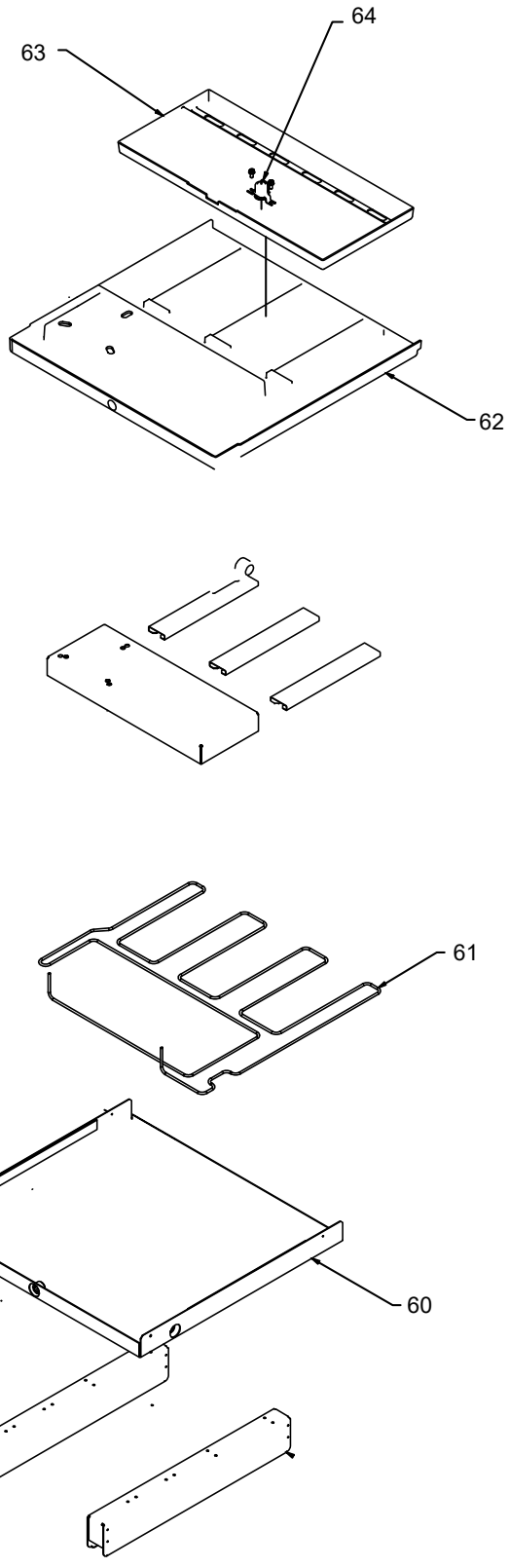
24K BTU A-C Models

ITEM	op-find	PART NUMBER	PART DESCRIPTION	USED ON MODEL	QTY
35	030120-12 030120-09	80083340	LOW PRESSURE SWITCH	REHEAT	1
36	030120-04	25018305	REVERSING VALVE BODY	ALL	1
37	030230	25063605	REVERSING VALVE SOLENOID COIL	230V	1
37	030230	25063705	REVERSING VALVE SOLENOID COIL	265V	1
40	080030	80081500	ASSY INSUL REAR EVAP VRP REPLACED BY P/N 80081308	ALL	1
41	080110	80081015	ASSY INSUL LEFT EVAPR 24K REPLACED BY 80081525	ALL	1
42	080020	80081005	ASSY INSUL BLOWER MOUNT	ALL	1
43	080120	80081016	ASSY INSUL RIGHT EVAPR 24K REPLACED BY 80081527	ALL	1
44	080040	80081505	ASSY INSUL BLOWER FRONT	ALL	1
45	080050	80080171	IR-310 INLET RING EVAP BLOWER PSC DIA 12"	ALL	1
46	080060	80080152	HEATER 10KW 230V MULTI	230V	1
46	080060	80080153	HEATER 10KW 265V MULTI	265V	1
47	080010	80083150	BLOWER MOTOR 310X140 PI2E310140MB2M	ALL	1
50	020050	80080217	MOUNT WIRE FAN MOTOR	ALL	1
51	020080	80080023	MOTOR 70W 2 8P CW/CCW 1 ECM	ALL	1
52	020100	80080120	FAN 20" CCW 4 W/SLINGER	ALL	1
53	020090	80083488	SHROUD INLET RING VRP 24K INJ	ALL	1
54	020020	80118320	SHROUD CONDENSER FAN 24K	ALL	1
70	050000	80084610	FRESH AIR KIT SINGLE 230V C MODEL	230V FRESHAIR SINGLE FAN	1
70	050000	80084600	FRESH AIR KIT DUAL 230V C MODEL	230V FRESHAIR DUAL FAN	1
70	050000	80084620	FRESH AIR KIT SINGLE 265V C MODEL	265V FRESHAIR SINGLE FAN	1
70	050000	80084630	FRESH AIR KIT DUAL 265V C MODEL	265V FRESHAIR DUAL FAN	1
-71*	N/A	01100001	TOUCH UP PAINT (CORPATE GRAY)	ALL	RF
-ITEMS ARE NON- ILLUSTRATED *ITEMS ARE NON-STOCKED, WILL NORMALLY REQUIRE EXTENDED DAYS LEAD TIME					

PARTS CATALOG

Figure 913 (Basepan Heat)

12-24K A-C Models Basepan Heat



PARTS CATALOG

12-24K A-C Models Basepan

ITEM	op-find	PART NUMBER	PART DESCRIPTION	USED ON MODEL	QTY
60	010030	80083672	BASEPAN VRP PREPAINTED	ALL	1
61	010273	tbd	HEATER TUBE SERVICE KIT	VR-BH-K, VR-BH-R	1
62	010100	80080235	BASEPAN LINER	VR-BH-K, VR-BH-R	3
62	010100	80080233	BASEPAN LINER	VR BH-S	1
63	010240	80080104	COND./SLINGER DRAIN PAN	VR BH-S	1
63	010272	80080260	DRAIN PAN SUMP LOOP SLOTTED VRP12/24	VR-BH-K, VR-BH-R	1
64	010260	60179904	CONDENSATE DRAIN VALVE	VR BH-S	1
-ITEMS ARE NON- ILLUSTRATED *ITEMS ARE NON-STOCKED, WILL NORMALLY REQUIRE EXTENDED DAYS LEAD TIME					

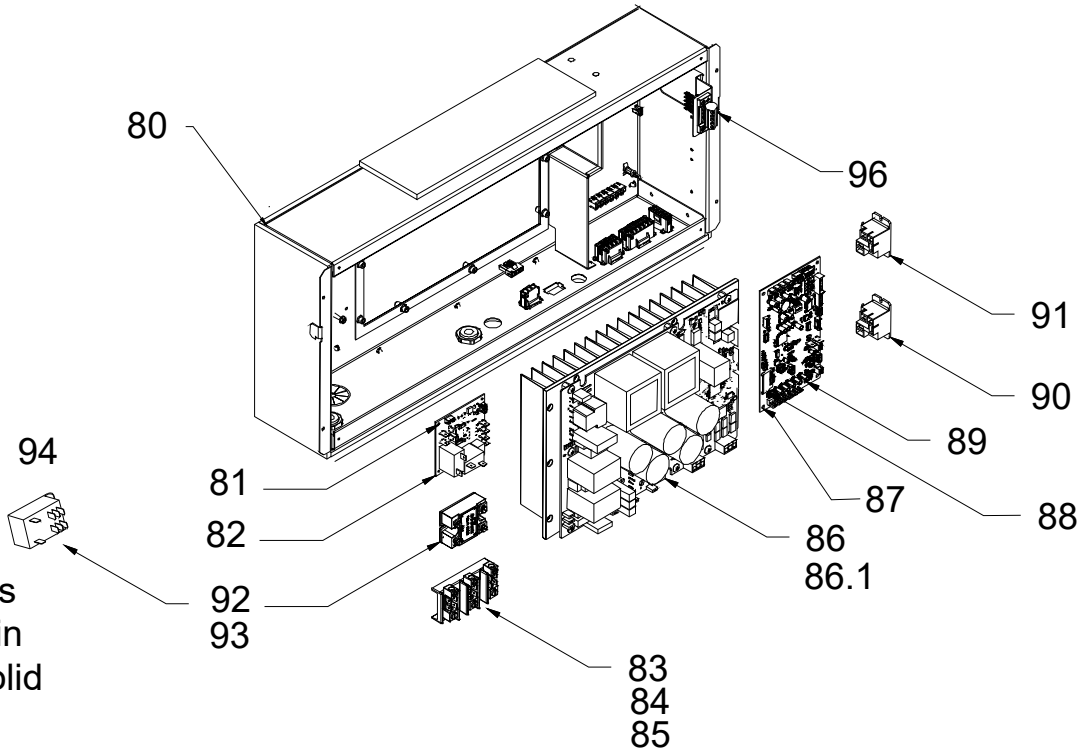
PARTS CATALOG

Figure 914 (230V Electrical Controls)

12-24K BTU A-C Models 230v Electrical Controls

Non-Illustrated Parts

100	SENSOR EVAP COIL OUT ORG
101	SENSOR RETURN AIR TEMP WHT
102	SENSOR EVAP COIL IN GRN
103	SENSOR DISCHARGE AIR YEL
104	SENSOR COMPRESSOR DISCHARGE BLK
105	SENSOR COMPRESSOR SUCTION BLU
106	SENSOR HEATING LIQUID BRW
107	SENSOR COOLING LIQUID ORG
108	SENSOR CONDENSER OUT PNK
109	SENSOR AMBIENT RED



PARTS CATALOG

12-24K BTU A-C Models 230v Electrical Controls

ITEM	op-find	PART NUMBER	PART DESCRIPTION	USED ON MODEL	QTY
80	060010	80083592	CONTROL BOX	12K-A, 24K-A	1
80	060010	80081305	CONTROL BOX	12K-B, 24K-B	1
80	060010	80083220	CONTROL BOX	12K-C, 24K-C	1
81	060171	80080227	HEATER BOARD STAND OFF	ALL	4
82	060070	62623500	VRP FRIEDRICH HEATER BOARD (REPLACED BY 63900141)	ALL	1
83	060120	80083723	BLOCK TERM 3 POLES X 6QC TAB#2-14	ALL	1
84	010279	80083438	FUSE HOLDER	BASEPAN HEAT	3
85	010281	80060030	FUSE 3AB 1.0A, 400VDC, TIME DELAY	BASEPAN HEAT	3
86	060040	62623301	MCS BOARD	ALL	1
86.1	060050	80083425	SD CARD ASSEMBLY FOR THE MOTOR CONTROLLER (MCS)	ALL	1
87	060081	80080227	FMC BOARD STAND OFF	ALL	4
88	060090	80083425	SD CARD ASSEMBLY FOR THE MAIN BOARD (FMC)	ALL	1
89	060080	62622001	FMC BOARD	ALL	1
90	060170	80083432	RELAY, 12VDC COIL X 30A	REHEAT	1
91	050232	80083432	RELAY, 12VDC COIL X 30A	REHEAT	1
92	060100	80083303	SOLID STATE RELAY (HEATER)	2.5, 3.4, 5KW UNITS	1
93	060100	80060301	SERVICE KIT, RELAY	7.5,10KW UNITS	1
94	070340	80060160	RELAY, 12VDC COIL 2NO X 30A (USED ON LATER C MODELS IN PLACE OF SOLID STATE RELAY)	LATER C MODELS	1
96	100131	80083202	5 PIN WALL CONTROLLER PLUG	ALL	1
100	040013	80083701	SENSOR EVAP COIL OUT ORG	ALL	1
101	040014	80083702	SENSOR RETURN AIR TEMP WHT	ALL	1
102	040015	80083703	SENSOR EVAP COIL IN GRN	ALL	1
103	040016	80083704	SENSOR DISCHARGE AIR YEL	ALL	1
104	040017	80083705	SENSOR COMPRESSOR DISCHARGE BLK	ALL	1
105	040018	80083706	SENSOR COMPRESSOR SUCTION BLU	ALL	1
106	040019	80083707	SENSOR HEATING LIQUID BRW	ALL	1
107	040020	80083708	SENSOR COOLING LIQUID ORG	ALL	1
108	040021	80083709	SENSOR CONDENSER OUT PNK	ALL	1
109	040022	80083710	SENSOR AMBIENT RED	ALL	1

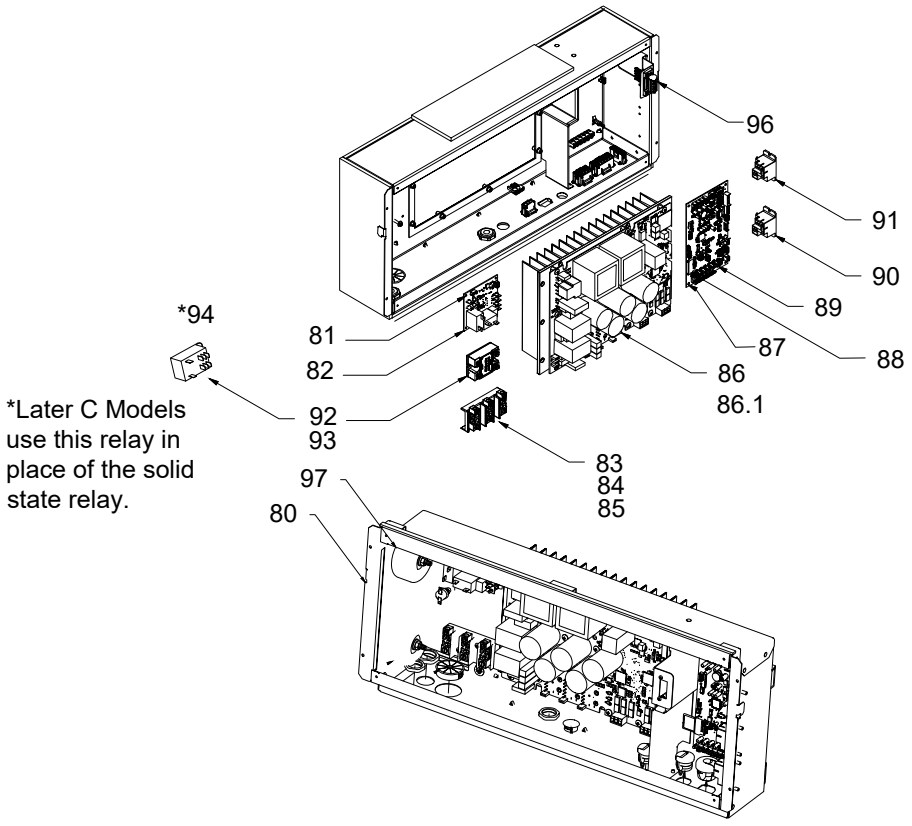
PARTS CATALOG

Figure 915 (265V Electrical Controls)

12-24K BTU A-B Models 265v Electrical Controls

Non-Illustrated Parts

100	SENSOR EVAP COIL OUT ORG
101	SENSOR RETURN AIR TEMP WHT
102	SENSOR EVAP COIL IN GRN
103	SENSOR DISCHARGE AIR YEL
104	SENSOR COMPRESSOR DISCHARGE BLK
105	SENSOR COMPRESSOR SUCTION BLU
106	SENSOR HEATING LIQUID BRW
107	SENSOR COOLING LIQUID ORG
108	SENSOR CONDENSER OUT PNK
109	SENSOR AMBIENT RED



PARTS CATALOG

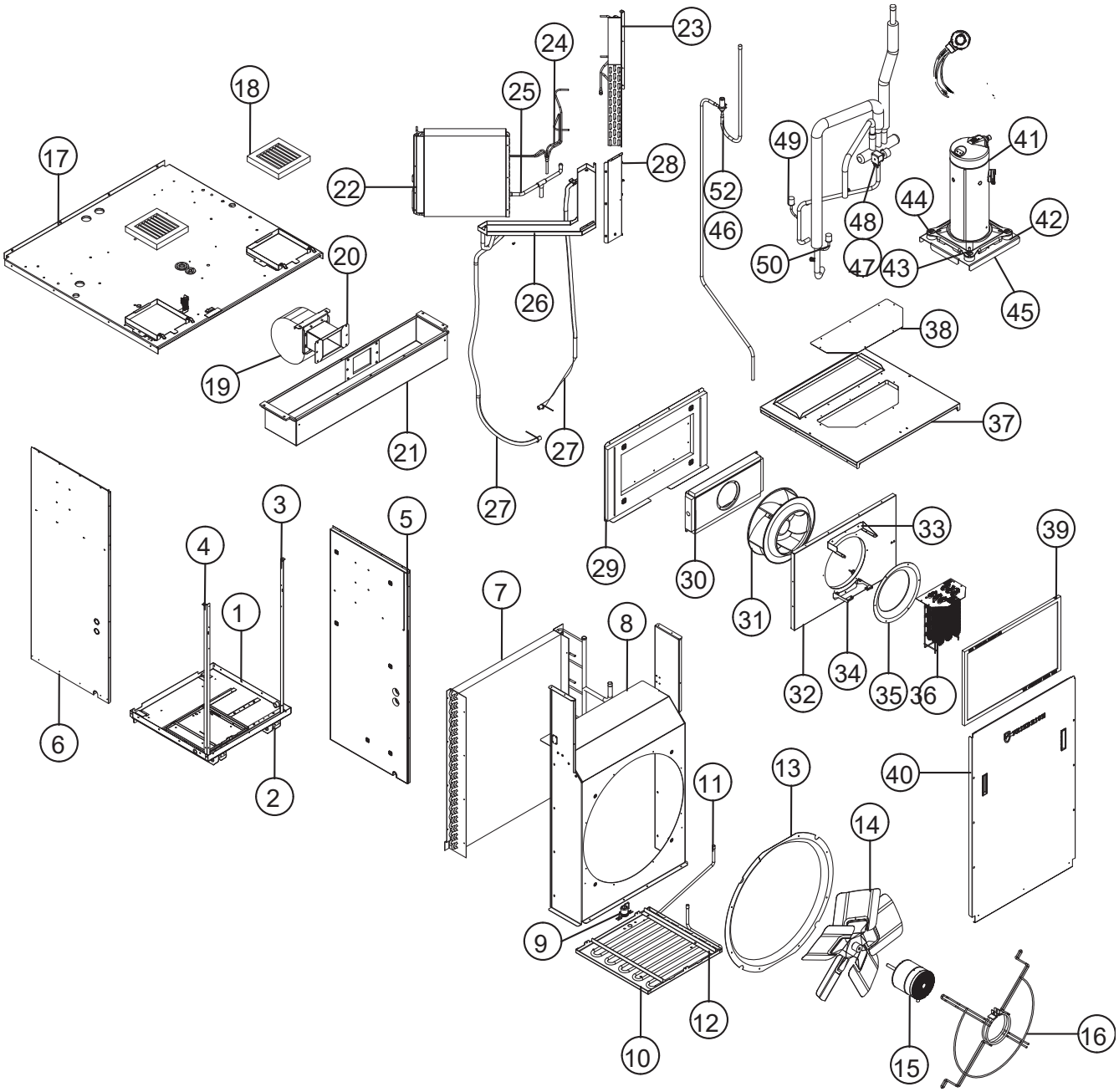
12-24k A-C Models 265v Electrical Controls

ITEM	op-find	PART NUMBER	PART DESCRIPTION	USED ON MODEL	QTY
80	060010	80083592	CONTROL BOX	12K-A, 24K-A	1
80	060010	80081305	CONTROL BOX	12K-B, 24K-B	1
80	060010	80083220	CONTROL BOX	12K-C, 24K-C	1
81	060171	80080227	HEATER BOARD STAND OFF	ALL	4
82	060070	62623500	VRP FRIEDRICH HEATER BOARD (REPLACED BY 63900141)	ALL	1
83	060120	80083723	BLOCK TERM 3 POLES X 6QC TAB#2-14	ALL	1
84	010279	80083438	FUSE HOLDER	BASEPAN HEAT	3
85	010281	80060030	FUSE 3AB 1.0A, 400VDC, TIME DELAY	BASEPAN HEAT	3
86	060040	62623301	MCS BOARD	ALL	1
86.1	060050	80083425	SD CARD ASSEMBLY FOR THE MOTOR CONTROLLER (MCS)	ALL	1
87	060081	80080227	FMC BOARD STAND OFF	ALL	4
88	060090	80083425	SD CARD ASSEMBLY FOR THE MAIN BOARD (FMC)	ALL	1
89	060080	62622001	FMC BOARD	ALL	1
90	060170	80083432	RELAY, 12VDC COIL X 30A	REHEAT	1
91	050232	80083432	RELAY, 12VDC COIL X 30A	REHEAT	1
92	060100	80083303	SOLID STATE RELAY	2.5, 3.4, 5KW UNITS	1
93	060100	80060301	SERVICE KIT, RELAY,	7.5,10KW UNITS	1
94	070340	80060160	RELAY, 12VDC COIL 2NO X 30A (USED ON LATER C MODELS IN PLACE OF SOLID STATE RELAY)	LATER C MODELS	1
96	100131	80083202	5 PIN WALL CONTROLLER PLUG	ALL	1
97	010274	80081206	TRANSF PRI 265V X SEC 230V 300VA W/F	ALL	1
100	040013	80083701	SENSOR EVAP COIL OUT ORG	ALL	1
101	040014	80083702	SENSOR RETURN AIR TEMP WHT	ALL	1
102	040015	80083703	SENSOR EVAP COIL IN GRN	ALL	1
103	040016	80083704	SENSOR DISCHARGE AIR YEL	ALL	1
104	040017	80083705	SENSOR COMPRESSOR DISCHARGE BLK	ALL	1
105	040018	80083706	SENSOR COMPRESSOR SUCTION BLU	ALL	1
106	040019	80083707	SENSOR HEATING LIQUID BRW	ALL	1
107	040020	80083708	SENSOR COOLING LIQUID ORG	ALL	1
108	040021	80083709	SENSOR CONDENSER OUT PNK	ALL	1
109	040022	80083710	SENSOR AMBIENT RED	ALL	1

PARTS CATALOG

Figure 916

36k Main Diagram



PARTS CATALOG

36k Main Diagram

ITEM	OP-FIND	PART NUMBER	PART DESCRIPTION	USED ON MODEL	QTY
1	010020	80060003	ASSY INSUL WELDMENT BASEPAN	ALL	1
2	010040	80060129	WHEEL 4IN OD	ALL	1
3	010050	80060016	CORNERPOST RIGHT	ALL	1
4	010070	80060017	CORNERPOST LEFT	ALL	1
5	100010	80060044	ASSY INSUL PANEL SIDE RIGHT	ALL	1
6	100020	80060047	ASSY INSUL PANEL SIDE LEFT	ALL	1
7	020030	80083481	COIL VCS.312X3X16RCE45B027X036	ALL	1
8	020020	80060152	ASSY SHROUD OD COIL	ALL	1
9	010260	60179904	CONDENSATE DRAIN VALVE	ALL	1
10	010240	80060101	ASSY SUMP PAN	ALL	1
11	020010	80060066	TUBE SUMP LOOP	ALL	1
12		80060099	BRACKET SUMP LOOP	VRP 36K-R	1
13	020090	80060023	SHROUD INLET RING	ALL	1
14	020100	80060024	FAN METAL	ALL	1
15	020080	80060025	OD FAN MOTOR	ALL	1
16	020050	80060026	MOUNT WIRE FAN MOTOR	ALL	1
17	010200	80060079	ASSY DIVIDER FRESH AIR	VR3 FA-S-K	1
17	010200	80060031	Weldment Panel System Divider	VR3 FA-STD	1
18	100041	80083140	FILTER 6 X 6 X 1, PLEATED, MERV 8	VR3 FA-S-K	1
19	010310	80060123	BLOWER FRESH AIR	VR3 FA-S-K	1
20	010300	80060175	ASSY INSUL FRESH AIR DUCT MINOR	VR3 FA-S-K	1
21	010290	80060174	ASSY INSUL FRESH AIR DUCT MAJOR	VR3 FA-S-K	1
22	030060	80083482	COIL VES.375X3X16RCN45A017X020	ALL	1
23	030070	80083483	COIL VES.375X3X16RCN45A017X020	ALL	1
24	030110	80060107	ASSY TUBE EVAP FEEDERS	ALL	1
25	030040	80060104	ASSY TUBE DISCH EVAP	ALL	1
26	030030	80060057	DRAINPAN EVAP	ALL	1
27	030050	80060172	HOSE DRAIN 1/2 ID X 80	ALL	1
28	030100	80060093	BLOCKOFF PLATE EVAP COILS	ALL	1
29	070040	80060039	ASSY INSUL PANEL REAR	VR3 EH-0-K	1
30	070050	80060118	ASSY INSUL MOUNT BLOWER	VR3 EH-0-K	1
31	080010	80060094	BLOWER WHEEL MTR	ALL	1

PARTS CATALOG

36k Main Diagram

ITEM	OP-FIND	PART NUMBER	PART DESCRIPTION	USED ON MODEL	QTY
32	080040	80060050	ASSY INSUL PANEL BLOWER FRONT	ALL	1
33	080090	80060251	MOUNT ELECTRICAL HEATER TOP VRP36K 15KW	VRP 36K-R	1
34	080100	80060252	MOUNT ELECTRICAL HEATER BOTTOM VRP36K 15KW	VRP 36K-R	1
35	020090	80060023	Shroud Inlet Ring	VRP 36K-R	1
36	080035	80083810	HEATER 10kW 208/230V VRP36	VRP 36K-R	1
36	080035	80083811	HEATER 15kW 208/230V VRP36	VRP 36K-R	1
37	080130	80060036	ASSY INSUL PANEL TOP	ALL	1
38	080135	80060086	ASSY INSULATED TOP ACCESS PANEL	ALL	1
39	100050	80060164	FILTER 20 X 30 X .75 FIBER GLASS	ALL	1
40	100070	80060059	ASSY INSUL PANEL FRONT ACCESS	ALL	1
41	010120	80060180	COMP ZPV0212E-2X9-130	ALL	1
42	010121	1150941	GROMMET COMP HI DENSITY	ALL	1
43	010122	91400402	STUD COMP MTG	ALL	1
44	020052	61625121	BRKT COMP MNTG MODIFIED	ALL	1
45	010010	80060018	BRACKET COMP ISLAND	ALL	1
46	070230	80083485	COIL STPR EEV	ALL	1
47	030230	25063605	COIL SOLENOID 208/230VAC DUNAN	ALL	1
48	030120-07	80060092	REVERSING VALVE	VRP 36K-R	1
49	030120-09	80112500	HIGH PRESSURE SWITCH	VRP 36K-R	1
50	030120-04	80083340	SWITCH LOW PRESSURE	VRP 36K-R	1
52	030140-02	80083305	VALVE REV 24K, EEV	ALL	1
-ITEMS ARE NON- ILLUSTRATED *ITEMS ARE NON-STOCKED, WILL NORMALLY REQUIRE EXTENDED DAYS LEAD TIME					

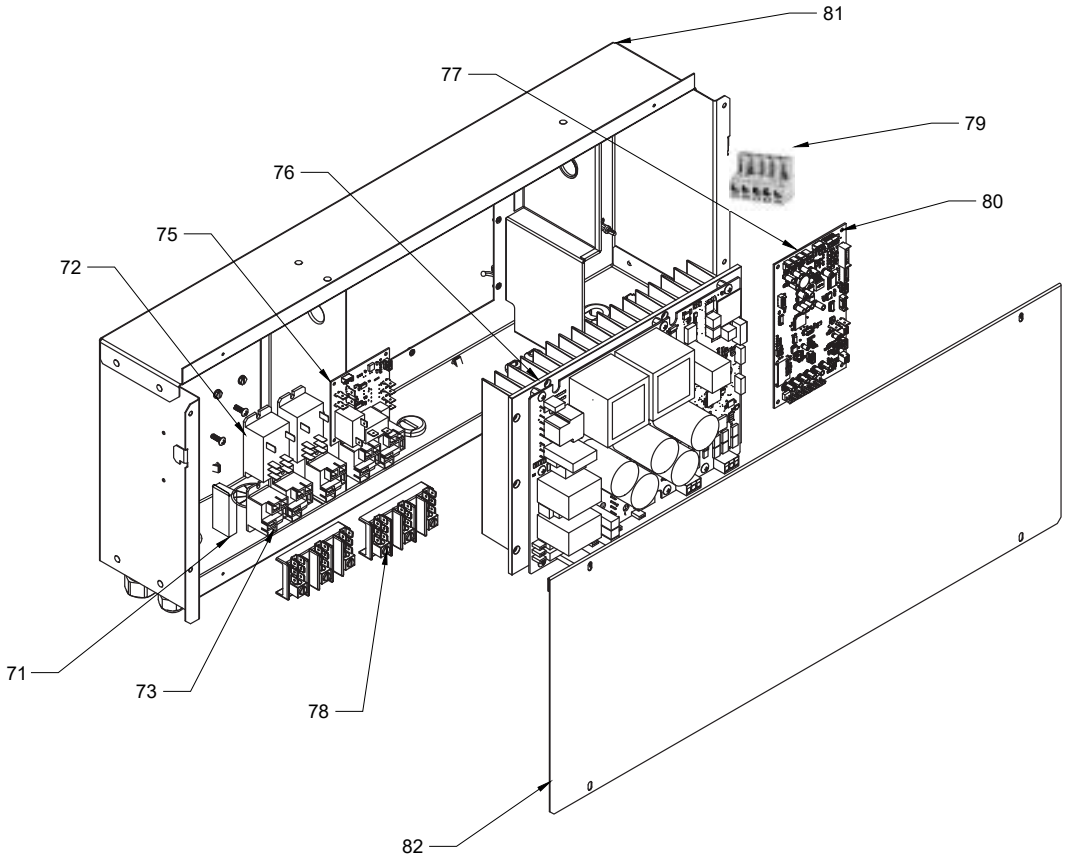
PARTS CATALOG

Figure 917

36k Electrical Controls

Non-Illustrated Parts

100	SENSOR EVAP COIL OUT ORG VRP3
101	SENSOR COMPRESSOR DISCHARGE BLK VRP3
102	SENSOR COOLING LIQUID ORG VRP3
103	SENSOR CONDENSER OUT PNK VRP3
104	SENSOR COMPRESSOR DISCHARGE BLK
105	SENSOR COMPRESSOR SUCTION BLU
106	SENSOR HEATING LIQUID BRW
107	SENSOR COOLING LIQUID ORG
108	SENSOR CONDENSER OUT PNK
109	SENSOR AMBIENT RED



PARTS CATALOG

Figure 906

36k Electrical Controls

ITEM	OP-FIND	PART NUMBER	PART DESCRIPTION	USED ON MODEL	QTY
71	060170	80060184	CAPACITOR, FRESH AIR	ALL	1
72	060100	80060160	RELAY, 12VDC COIL 2NO X 30A	ALL	1
73	060112	80083432	RELAY, 12VDC COIL X 30A	ALL	1
74	070060	80083723	BLOCK TERM 3 POLES X 6QC TAB#2-14	ALL	1
75	060070	63900141	PCBA, FRIEDRICH HEATER CONTROLLER (FHC)	ALL	1
76	060040	62623301	VRP MSC BOARD	ALL	1
77	060080	62622000	VRP FRIEDRICH MAIN CNTRLLER - DO NOT SELL - USE 62622001 TO SELL	ALL	1
78	070070	80083438	ASSY FUSE HOLDER VRP	ALL	1
79	100131	80083202	WALL CTRL CONNECTOR WIRE 5 POS	ALL	1
80	060071	80080227	STAND OFF - PCB DIA.156 X .5 H	ALL	1
81	060010	80060063	ASSY CONTROL BOX VRP36	ALL	1
82	100060	80060022	CONTROL BOX LID	ALL	1
83	040013	80083901	SENSOR EVAP COIL OUT ORG VRP3	ALL	1
84	040014	80083902	SENSOR COMPRESSOR DISCHARGE BLK VRP3	ALL	1
85	040015	80083903	SENSOR COOLING LIQUID ORG VRP3	ALL	1
86	040016	80083904	SENSOR CONDENSER OUT PNK VRP3	ALL	1
87	040017	80083705	SENSOR COMPRESSOR DISCHARGE BLK	ALL	1
88	040018	80083706	SENSOR COMPRESSOR SUCTION BLU	ALL	1
89	040019	80083707	SENSOR HEATING LIQUID BRW	ALL	1
90	040020	80083708	SENSOR COOLING LIQUID ORG	ALL	1
91	040021	80083909	SENSOR CONDENSER OUT PNK	ALL	1
92	040022	80083710	SENSOR AMBIENT RED	ALL	1

-ITEMS ARE NON- ILLUSTRATED

*ITEMS ARE NON-STOCKED, WILL NORMALLY REQUIRE EXTENDED DAYS LEAD TIME

PARTS CATALOG

Figure 907

Accessories

ITEM	PART NUMBER	PART DESCRIPTION	USED ON MODEL	QTY
1	VRPXWPA-8	Wall Plenum with VRPXALA for 4" to 8" thick wall	VRP12	1
2	VRPXWPB-8	Wall Plenum with VRPXALB for 4" to 8" thick wall	VRP12, VRP24	1
3	VRPXWPA-14	Wall Plenum for with VRPXALA for 8" to 14" thick wall	VRP12	1
4	VRPXWPB-14	Wall Plenum with VPXALB for 8" to 14" thick wall	VRP12, VRP24	1
5	VRPXALA	Architectural louver	VRP12	1
6	VRPXALB	Architectural louver	VRP12, VRP24	1
7	VRPXSCA	Architectural louver – Custom Color - Special Order	VRP12	1
-7a	VRPXSCB	Architectural louver – Custom Color - Special Order	VRP12, VRP24	1
11	VRPXAP1	Return Air Access Panel	VRP12, VRP24	1
13	VRPXWC1	Wall Controller	VRP12, VRP24, , VRP36	1
14	VRPXEMRT1	VRP Energy Management Wired Wall Controller with Occupancy Sensor	VRP12, VRP24, , VRP36	1
16	VRPXEMWRT1	VRP Energy Management Wireless Wall Controller with Occupancy Sensor	VRP12, VRP24, , VRP36	1
18	VRPXEMRT2	VRP Energy Management Wired Wall Controller with Occupancy Sensor	VRP12, VRP24, VRP 36	1
19	VRPXEMWRT2	VRP Energy Management Wireless Wall Controller with Occupancy Sensor	VRP12, VRP24, VRP 36	1
20	EMOCT	Online Connection Kit – Optional with VRPXEMRT1/ VRPXEMWRT1	VRP12, VRP24, VRP36	1
21	EMRAF	Remote Access Fee – Optional with VRPXEMRT1/ VRPXEMWRT1	VRP12, VRP24, VRP36	1

ACCESSORIES

Friedrich offers two types of control options for VRP units:

- Standard Wall Controller (Wired), VRPXWC
- Energy Management Wall Controller with an Occupancy Sensor
  - Wired, VRPXEMRT1(12k and 24k only), VRPXEMRT2
  - Wireless, VRPXEMWRT1(12k and 24k only), VRPXEMWRT2

VRPXWC

VRPXEMRT1 / VRPXEMWRT1

Wall controller has push buttons that illuminate to indicate the power is on. Backlight on push buttons will dim to 20% of intensity after 15 seconds of inactivity.

The high efficiency LCD display has a built-in backlight. Display dims to 20% after 15 seconds of inactivity, and after and additional 120 seconds, will turn off. Touching any button will change the display to full brightness. (Unless the Motion Sensor is activated.)

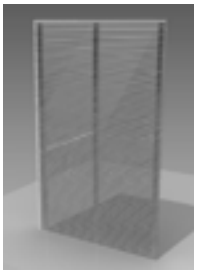
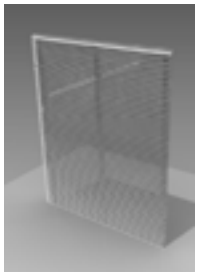
VRPXEMRT2 / VRPXEMWRT2

- Real time motion and thermal occupancy sensor
- Wired or wireless installation
- 5 energy savings presets
- Remote monitoring

ACCESSORIES

TYPE	ITEM	DESCRIPTION	CHECK LIST
WALL CONTROLLER	VRPXWCT	Wall Controller 	Required one per unit
	VRPXEMRT2	VRP Energy Management Wired Wall Controller with Occupancy Sensor	Require One of the Controllers per unit
	VRPXEMWRT2	VRP Energy Management Wireless Wall Controller with Occupancy Sensor	
	EMOCT	Online Connection Kit – Optional with VRPXEMRT1/VRPXEMWRT1	Optional
	EMRAF	Remote Access Fee – Optional with VRPXEMRT1/VRPXEMWRT1	Optional
		 VRPXEM(W)RT2	

ACCESSORIES

ITEM	DESCRIPTION	QTY.	CHECK LIST
VRPXWPA-8	Wall Plenum for VRP12 with VRPXALA for 4" to 8" thick wall		Require One of these Wall Plenums per unit
VRPXWPB-8	Wall Plenum for VRP24 with VRPXALB up for 4" to 8" thick wall (Can also be used with VRP 12)		
VRPXWPA-14	Wall Plenum for VRP12 with VRPXALA for 8" to 14" thick wall		
VRPXWPB-14	Wall Plenum for VRP24 with VRPXALB up for 8" to 14" thick wall (Can also be used with VRP 12)		
	 		
VRPXALA	Architectural louver (VRP12 only) (30˚ Blade angle)		Require One of these Louvers per unit
VRPXALB	Architectural louver (VRP24) (30˚ Blade angle) (Can also be used for VRP12)		
VRPXSCA	Architectural louver (VRP12 only) Custom Color - Special Order (30˚ Blade angle)		
VRPXSCB	Architectural louver (VRP24) Custom Color - Special Order (30˚ Blade angle) (Can also be used for VRP12)		
	 		
VRPXAP1	Return Air Access Panel		Require One per unit
			

Friedrich Air Conditioning Co.
10001 Reunion Place, Suite 500
San Antonio, TX 78216
800. 541. 6645
www.friedrich.com

VRP® Variable Refrigerant Packaged Heat Pump

LIMITED WARRANTY

1. A) ONE YEAR PARTS WARRANTY - FRIEDRICH AIR CONDITIONING CO. (FRIEDRICH) warrants to the original end-user of this product that should it prove defective due to improper workmanship and/or material under normal use for a period of one years from the date of installation, FRIEDRICH will repair or replace, at its option, any defective part without charge for the part. Replacement parts are warranted for the remainder of the original warranty period.

B) THIS WARRANTY DOES NOT INCLUDE LABOR or other cost incurred for servicing, repairing, removing, installing, shipping, or handling of either defective or replacement parts, or complete unit. Such cost may be covered by a separate warranty provided by the installing contractor.

C) 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. LABOR IS NOT INCLUDED FOR INSTALLING REPLACEMENT PARTS.

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, 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.

D) NOTICE : To obtain service and/or warranty parts replacement, you must notify an authorized FRIEDRICH Air Conditioning Co. distributor, dealer, or contractor of any defect within the applicable warranty period.

2. Any defective part to be replaced must be made available to FRIEDRICH in exchange for the replacement part. You must present proof of the original date of installation of the product in order to establish the effective date of the warranty. Otherwise, the effective date will be deemed to be the date of purchase plus thirty days. The return of the owner registration card is not a condition of warranty coverage. However, please detach and return it so that we can contact you should a question of safety arise which could affect you.

3. TO OBTAIN WARRANTY SERVICE, please contact your authorized FRIEDRICH distributor, dealer, or the contractor who installed the equipment. If your dealer or contractor needs assistance, the authorized FRIEDRICH distributor is available for consultation, and FRIEDRICH supports the efforts of the distributor.

4. This limited warranty applies only to units remaining at the site of the original installation (except for mobile home installations) and only to units installed within the continental United States, Alaska, Hawaii, and Canada. This limited warranty applies only if the unit is installed and operated in accordance with FRIEDRICH instructions and in compliance with applicable local installation and building codes and good trade practices.

5. THIS WARRANTY DOES NOT COVER damages caused by: (a) accident, abuse, negligence, or misuse; (b) operating the product in a corrosive atmosphere containing chlorine, fluorine or any other damaging chemicals; (c) modification, alteration, poor service practices; (d) improper matching or application of the product or components; (e) failure to provide proper maintenance and service to the product according to manufacturer's instructions; (f) installation or operating of the product in a manner contrary to the instructions of the manufacturer; (g) lightning, fluctuations in electrical power or other Acts of God. This LIMITED WARRANTY also excludes all cost of installation, disconnection or dismantling the product, parts used in connection with normal maintenance such as air filters or belts and owner-required maintenance. Consult the instructions enclosed with the product for information regarding recommended maintenance.

6. No one is authorized to change this LIMITED WARRANTY in any respect, or to create any other obligation or liability in connection with this product.

7. YOUR ONLY REMEDIES ARE PROVIDED IN THIS LIMITED WARRANTY. ANY EXPRESS WARRANTY NOT PROVIDED HEREIN, AND ANY REMEDY WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION OR OPERATION OF LAW, IS HEREBY EXCLUDED AND DISCLAIMED. THE IMPLIED WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR ANY PARTICULAR PURPOSE ARE EXPRESSLY LIMITED TO A TERM OF ONE YEAR FROM THE DATE OF ORIGINAL INSTALLATION. UNDER NO CIRCUMSTANCES SHALL FRIEDRICH BE LIABLE TO THE OWNER OR ANY OTHER PERSON FOR ANY INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH THIS PRODUCT, WHETHER ARISING OUT OF BREACH OF WARRANTY, BREACH OF CONTRACT OR OTHERWISE.

8. Some states do not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental, special or consequential damages, so the above limitations or exclusions may not apply to you.

9. This warranty gives you specific legal rights, and you may have other rights which vary from state to state and province to province.

10. This warranty is valid in the U.S.A. and Canada and is not transferable.

CUSTOMER SATISFACTION and QUALITY ASSURANCE

Friedrich is a conscientious manufacturer, concerned about customer satisfaction, product quality, and controlling warranty costs. As an Authorized Service Provider you play a vital role in these areas. By adhering to the policies and procedures you provide us with vital information on each warranty repair you complete. This information is used to identify product failure trends, initiate corrective action, and improve product quality, thereby further

FRIEDRICH AUTHORIZED PARTS DEPOTS

AAA Refrigeration Service

1322 24th Street, Suite B Kenner, Louisiana 70062

504-464-7444
877-813-7444

Alamo Service Company

1450 North Flores Street San Antonio, Texas 78281

210-227-2450
315-328-2450

The Gabbert Company
6868 Ardmore
Houston, Texas 77054

713-747-4110
315-458-4110

Johnstone Supply of Woodside

27-01 Brooklyn Queens Expway
Woodside, New York 11377

718-545-5464
315-431-1143

Reeve Air Conditioning, Inc.

2501 South Park Road

Hallandale, Florida 33009

954-962-0252
315-962-1333

FRIEDRICH

TECHNICAL SUPPORT CONTACT INFORMATION

Friedrich Air Conditioning Co.

10001 Reunion Place, Suite 500 • San Antonio, Texas 788.5

1-31.5-541-6645

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