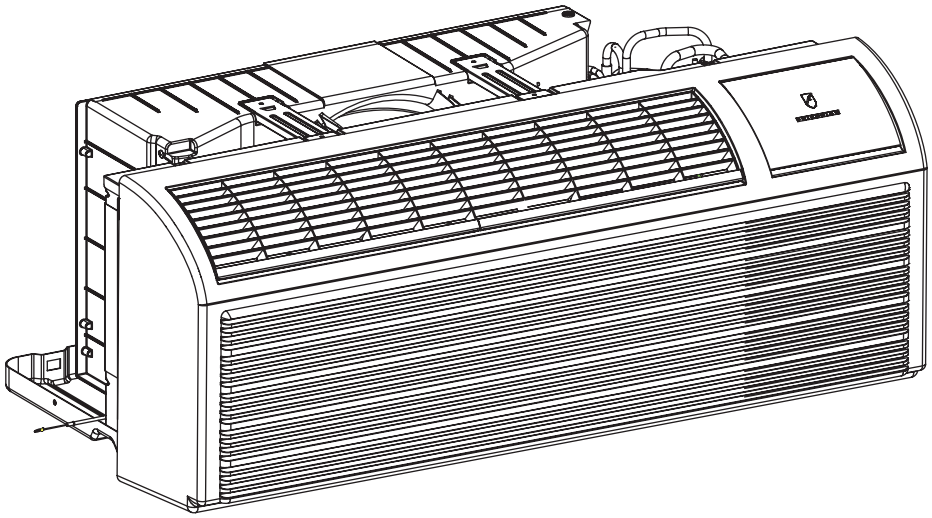
Service/ Parts Manual

FRIEDRICH

PTAC
ZONEAIRE® SELECT



Standard Chassis Models

7K	**PZE07K3SA** **PZH07K3SA**
9K	**PZE09K3SA, PZE09R3SA** **PZH09K3SA, PZH09R3SA**
12K	**PZE12K3SA, PZE12R3SA** **PZH12K3SA, PZH12R3SA**
15K	**PZE15K5SA** **PZH15K5SA**

94161400_00 Rev. 2/22/23

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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.

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.

NOTICE

All safety messages will tell you what the potential hazard is, tell you how to reduce the chance of injury, and tell you what will happen if the instructions are not followed.

⚠ 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

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:

- Unplug 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.
- 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 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.
- Use on a properly grounded outlet only.
- 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 proper and adequate protective safety aids such as: gloves, goggles, clothing, properly insulated tools, and testing equipment etc.
- Failure to follow proper safety procedures and/or these warnings can result in serious injury or death.

INTRODUCTION

Personal Injury Or Death Hazards

- **REFRIGERATION SYSTEM REPAIR HAZARDS:**
- Use approved standard refrigerant recovering procedures and equipment to relieve high pressure before opening system for repair.
- Do not allow liquid refrigerant to contact skin. Direct contact with liquid refrigerant can result in minor to moderate injury.
- Be extremely careful when using an oxy-acetylene torch. Direct contact with the torch's flame or hot surfaces can cause serious burns.
- Make certain to protect personal and surrounding property with fire proof materials and have a fire extinguisher at hand while using a torch.
- Provide adequate ventilation to vent off toxic fumes, and work with a qualified assistant whenever possible.
- Always use a pressure regulator when using dry nitrogen to test the sealed refrigeration system for leaks, flushing etc.
- **MECHANICAL HAZARDS:**
- Extreme care, proper judgment and all safety procedures must be followed when testing, troubleshooting, handling, or working around unit with moving and/or rotating parts.
- Be careful when, handling and working around exposed edges and corners of the sleeve, chassis, and other unit components especially the sharp fins of the indoor and outdoor coils.
- Use proper and adequate protective aids such as: gloves, clothing, safety glasses etc.
- Failure to follow proper safety procedures and/or these warnings can result in serious injury or death.

• PROPERTY DAMAGE HAZARDS

- **FIRE DAMAGE HAZARDS:**
- Read the Installation/Operation Manual for the air conditioning unit prior to operating.
- Use air conditioner on a single dedicated circuit within the specified amperage rating.
- Connect to a properly grounded outlet only.
- Do not remove ground prong of plug.
- Do not cut or modify the power supply cord.
- Do not use extension cords with the unit.
- Be extremely careful when using acetylene torch and protect surrounding property.
- Failure to follow these instructions can result in fire and minor to serious property damage.
- **WATER DAMAGE HAZARDS:**
- Improper installation, maintenance or servicing of the air conditioner unit can result in water damage to personal items or property.
- Insure that the unit has a sufficient pitch to the outside to allow water to drain from the unit.
- Do not drill holes in the bottom of the drain pan or the underside of the unit.
- Failure to follow these instructions can result in damage to the unit and/or minor to serious property damage.

INTRODUCTION

Operation of Equipment in During Construction

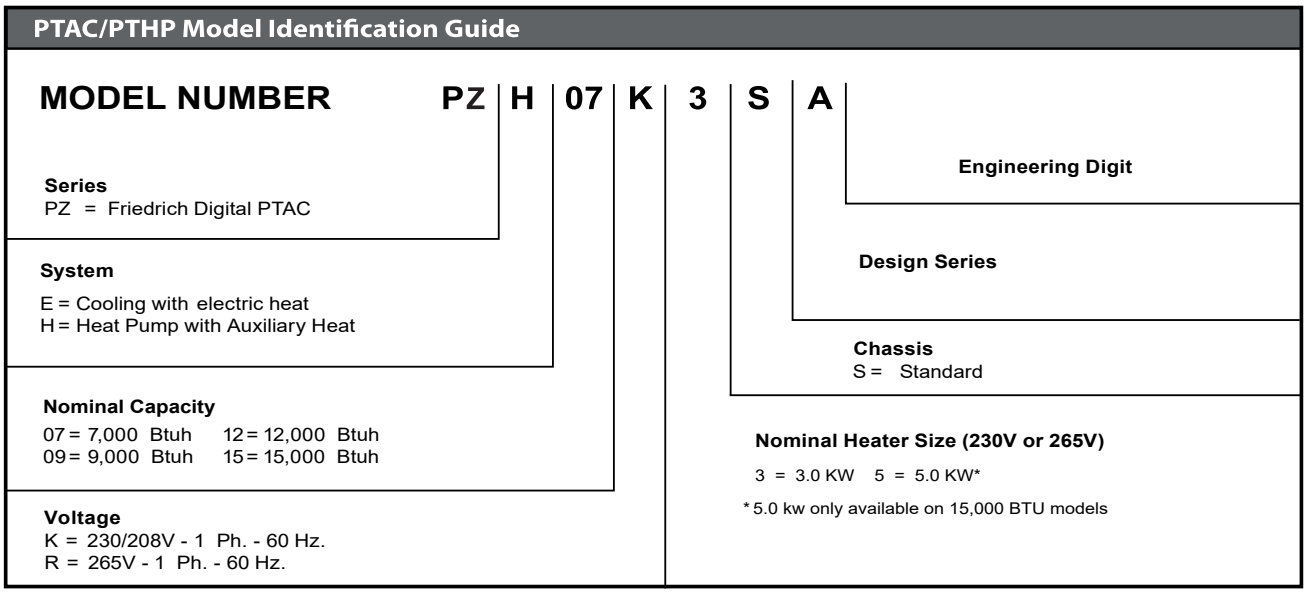
- **OPERATION OF EQUIPMENT MUST BE AVOIDED DURING CONSTRUCTION PHASES WHICH WILL PRODUCE AIRBORNE DUST OR CONTAMINTES NEAR OR AROUND AIR INTAKE OPENINGS:**
- Wood or metal framing;
- Drywalling or sheathing,
- Spackling or applying joint compound.
- Sanding or grinding.
- Moulding or trimwork.

NOTICE
Operating the equipment during any phase of active construction noted above can void the equipment's warranty, also leading to poor performance and premature failure

INTRODUCTION

This service manual is designed to be used in conjunction with the installation and operation manuals provided with each air conditioning system.
This service manual was written to assist the professional service technician to quickly and accurately diagnose and repair malfunctions.
Installation procedures are not given in this manual. They are given in the Installation and Operation Manual which can be aquired on the Friedrich website (www.friedrich.com).

Model Number Reference Guide

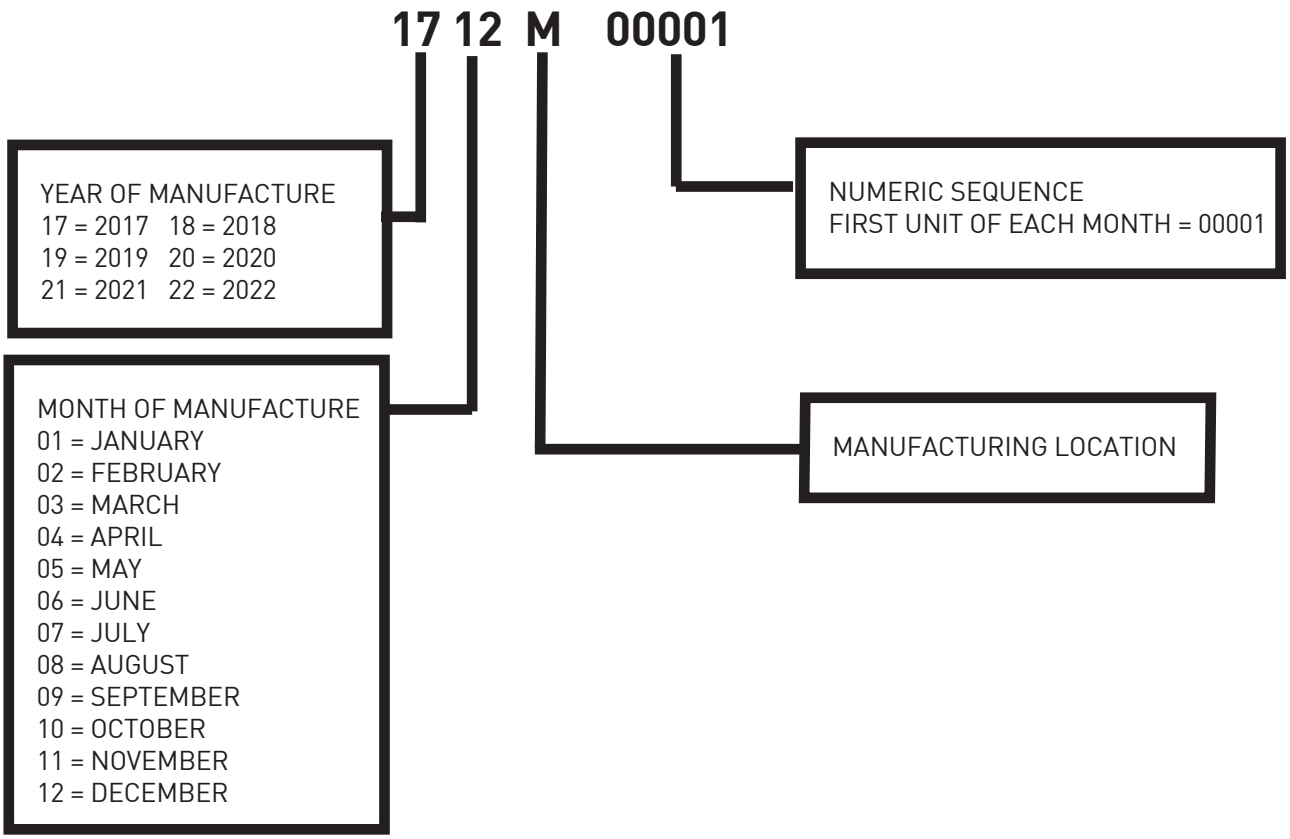


IMPORTANT: It will be necessary for you to accurately identify the unit you are servicing, so you can be certain of a proper diagnosis and repair.

Figure 103

INTRODUCTION

Serial Number Reference Guide



Refer to the Chart below for Serial Numbers beginning with an Alpha Sequence

PTAC Serial Number Identification Guide

SERIAL NUMBER	A	K	A	M	00001

YEAR MANUFACTURED

LJ = 2009 AE = 2015
AK = 2010 AF = 2016
AA = 2011 AG = 2017
AB = 2012
AC = 2013
AD = 2014

PRODUCTION RUN NUMBER

PRODUCT LINE
M = PRODUCT CODE

MONTH MANUFACTURED

A = Jan	D = Apr	G = Jul	K = Oct
B = Feb	E = May	H = Aug	L = Nov
C = Mar	F = Jun	J = Sep	M = Dec

Figure 104

INTRODUCTION

Product Features

PRODUCT FEATURES

DIGITAL TEMPERATURE READOUT	By digitally monitoring the desired room temperature, the room is controlled more precisely than conventional systems. The large, easy-to-read LED display can show either the set point or actual room temperature as selected by owner.
ONE-TOUCH OPERATION	When the unit is powered off, the unit can be returned directly to heating or cooling mode by pressing the 'Heat' or 'Cool' buttons without the confusing power up sequence of some controls. One-touch control takes the guesswork out of unit control, delivering a more enjoyable experience and eliminating front-desk calls.
INDIVIDUAL MODE & FAN CONTROL BUTTONS	By having separate control buttons and indicators for both fan and mode settings, the Friedrich digital control eliminates the confusion of previous digital PTACs. The accurate temperature setting provides greater guest comfort than other systems.
QUIET START/STOP FAN DELAY	The fan start and stop delays prevent abrupt changes in room acoustics due to the compressor energizing or stopping immediately. Upon call for cooling or heating, the unit fan will run for five seconds prior to energizing the compressor. Also, the fan-off delay allows for "free cooling" by utilizing the already cool indoor coil to its maximum capacity by running for 30 seconds after the compressor.
REMOTE THERMOSTAT OPERATION	Some applications require the use of a wall-mounted thermostat. All new Friedrich PTACs may be switched from unit control to remote thermostat control easily without the need to order a special model or accessory kit.
INTERNAL DIAGNOSTIC PROGRAM	The Friedrich digital PTAC features a self-diagnostic program that can alert maintenance to component failures or operating problems. The internal diagnostic program saves properties valuable time when diagnosing running problems.
SERVICE ERROR CODE STORAGE	All Friedrich PTAC units have self-diagnostic features that will store trouble codes in the case of an event. Storing the codes allows the property to see the trouble codes at a future time after the condition may have corrected.
ELECTRONIC TEMPERATURE LIMITING	By limiting the operating range, the property can save energy by eliminating "max cool" or "max heat" situations common with older uncontrolled systems. The new electronic control allows owners to set operating ranges for both heating and cooling independently of one another.
ROOM FREEZE PROTECTION	When the PTAC senses that the indoor room temperature has fallen to 40˚F, the unit will cycle on the fan (high) and the electric strip heat to raise the room temperature to 46˚F, and then cycle off again. This feature works regardless of the mode selected and can be turned off. The control will also store the Room Freeze cycle in the service code memory for retrieval at a later date. This feature ensures that unoccupied rooms do not reach freezing levels where damage can occur to plumbing and fixtures.
RANDOM COMPRESSOR RESTART	Multiple compressors starting at once can often cause electrical overloads and premature unit failure. The random restart delay eliminates multiple units from starting at once following a power outage or initial power up. The compressor delay will range from 180 to 240 seconds.
CONDENSATE REMOVAL SYSTEM	Condenser fan utililzes slinger ring technology to pick up condensate from the base pan and disperse it on to the condenser coil where it evaporates. This helps to cool the coil and increase the energy efficiency of the unit.

INTRODUCTION

Product Features

PRODUCT FEATURES

DIGITAL DEFROST THERMOSTAT	The PZ Series uses a digital thermostat to accurately monitor the outdoor coil conditions to allow the heat pump to run whenever conditions are correct. Running the PTAC in heat pump mode saves energy and reduces operating costs. The digital thermostat allows maximization of heat pump run time.
INSTANT HEAT HEAT PUMP MODE	Heat pump models will automatically run the electric heater to quickly bring the room up to temperature when initially energized, then return to heat pump mode. This ensures that the room is brought up to temperature quickly without the usual delay associated with heat pump units.
EVEN HEAT MONITORING	The digital control monitors indoor conditions, ensuring room temperature is within 5° F of the setpoint. If needed, the unit will briefly cycle the electric heater to maintain temperature. This feature preserves the efficiency benefits of a heat pump while ensuring guest comfort.
SEPARATE HEAT/COOL FAN CYCLE CONTROL	The owner may choose between fan cycling or fan continuous mode based on property preference. (Note: Even heat monitoring and quiet start/stop fan delay only operate in fan cycle mode) Fan continuous mode is used to keep constant airflow circulation in the room during all times the unit is 'ON'. Fan cycle will conserve energy by only operating the fan while the compressor or electric heater is operating. The ability to set the fan cycling condition independently between heating and cooling mode will increase user comfort by allowing the choice of only constantly circulating air in the summer or winter time (unlike other PTAC brands that only allow one selection).
EMERGENCY HEAT OVERRIDE	In the event of a compressor failure in heat pump mode, the compressor may be locked out to provide heat through the resistance heater. This feature ensures that even in the unlikely event of a compressor failure, the room temperature can be maintained until the compressor can be serviced.
DESK CONTROL READY	All Friedrich digital PTACs have low voltage terminals ready to connect a desk control energy management system. Controlling the unit from a remote location like the front desk can reduce energy usage and requires no additional accessories on the PTAC unit.
INDOOR COIL FROST SENSOR	The frost sensor protects the compressor from damage in the event that airflow is reduced or low outdoor temperatures cause the indoor coil to freeze. When the indoor coil reaches 30°F, the compressor is disabled and the fan continues to operate based on demand. Once the coil temperature returns to 45°F, the compressor returns to operation.
ULTRAQUIET AIR SYSTEM	The PZ- series units feature an indoor fan system design that reduces sound levels without lowering airflow or preventing proper air circulation.
HIGH EFFICIENCY	The Friedrich PTAC has been engineered so that all functional systems are optimized so that they work together to deliver the highest possible performance.
DUAL MOTOR	The dual-motor design means that the indoor motor can run at slower speeds which reduces sound levels indoors.
ROTARY COMPRESSOR	High efficiency rotary compressors are used on all Friedrich PTACs to maximize durability and efficiency.
STAINLESS STEEL ENDPLATES	Outdoor coil endplates made from stainless steel reduce corrosion on the outdoor coil common with other coil designs.
TOP-MOUNTED AIR FILTERS	All filters are washable, reusable and easily accessed from the top of the unit without the removal of the front cover.
FILTERED FRESH AIR INTAKE	Friedrich PTAC units are capable of introducing up to 75 CFM of outside air into the conditioned space. The outdoor air passes through a washable mesh screen to prevent debris from entering the airstream.
R-410A REFRIGERANT	Friedrich PTAC units use environmentally-friendly refrigerant.

SPECIFICATIONS

General Specifications

PZE Series

	PZE07K	PZE09K	PZE09R	PZE12K	PZE12R	PZE15K
PERFORMANCE DATA:						
COOLING Btu	7700/7600	9000/8800	9000	12000/11800	12000	15000/14600
POWER (WATTS)	640/620	800/770	800	1120/1120	1120	1530/1510
EER	12.0/12.2	11.3/11.4	11.3	10.7/10.5	10.7	9.8/9.7
DEHUMIDIFICATION (pints/hr)	1.7	2.2	2.2	2.7	2.7	3.2
SENSIBLE HEAT RATIO	0.84	0.81	0.81	0.67	0.67	0.65
ELECTRICAL DATA:						
VOLTAGE (1 PHASE, 60 Hz)	230/208	230/208	265	230/208	265	230/208
VOLT RANGE	253-187	253-187	292-239	253-187	292-239	253-187
CURRENT (AMPS)	2.8/3.0	3.7/3.9	3.7	5.1/5.3	4.8	6.7/7.5
POWER FACTOR	0.97	0.99	0.99	0.99	0.99	0.99
Compressor LRA	19.0	17.0	18.0	27.0	23.0	32.6
Compressor RLA	2.8	3.7	2.9	5.0	4.3	6.6
Fan motor horsepower	0.024	0.029	0.029	0.031	0.031	0.031
AIRFLOW DATA:						
INDOOR CFM, HIGH	345/315	360/345	360	360/350	360	385/375
INDOOR CFM, MED	320/290	330/305	330	330/310	330	360/330
INDOOR CFM, LOW	295/265	300/270	300	310/280	310	320/290
VENT CFM	75	75	75	75	75	75
PHYSICAL DATA:						
DIMENSIONS (H x W x D)	16 x 42 x 13 3/4 (all models)					
NET WEIGHT (lbs.)	106	111	111	116	116	119
SHIPPING WEIGHT (lbs.)	126	131	131	136	136	139
R-410A CHARGE (oz)	23.63	33.51	33.51	35.27	35.98	38.10
Dim.s w/ Pkg. (inches)	*19 3/4 x 23 x 43 1/2 (all models)*					

PZH Series

	PZH07K	PZH09K	PZH09R	PZH12K	PZH12R	PZH15K
PERFORMANCE DATA:						
COOLING Btu	7700/7600	9000/8800	9000	12000/11800	12000	14500/14200
POWER (WATTS) cool	640/620	800/770	800	1120/1120	1120	1480/1460
EER	12.0/12.2	11.3/11.4	11.3	10.7/10.5	10.7	9.8/9.7
REVERSE HEATING Btu	6300/6100	8100/7900	8100	10700/10500	10700	13300/13000
POWER (WATTS) HEAT	540/530	720/770	720	1010/990	1010	1300/1270
COP	3.4/3.4	3.3/3.3	3.3	3.1/3.1	3.1	3.0/3.0
DEHUMIDIFICATION (pints/hr)	1.7	2.2	2.2	2.7	2.7	3.2
SENSIBLE HEAT RATIO	0.84	0.81	0.81	0.67	0.67	0.65
ELECTRICAL DATA:						
VOLTAGE (1 PHASE, 60 Hz)	230/208	230/208	265	230/208	265	230/208
VOLT RANGE	253-187	253-187	292-239	253-187	292-239	253-187
CURRENT (AMPS)	2.8/3.0	3.7/3.9	3.7	5.1/5.3	4.8	6.7/7.5
REVERSE HEAT. Amps	2.4/2.5	3.4/3.8	3.4	4.5/4.7	4.5	5.8/6.2
POWER FACTOR	0.97	0.99	0.99	0.99	0.99	0.98
Compressor LRA	19.0	18.5	19.0	27.0	23.0	36.0
Compressor RLA	2.8	3.6	3.2	5.0	4.3	6.6
Fan motor horsepower	0.024	0.029	0.029	0.031	0.031	0.031
AIRFLOW DATA:						
INDOOR CFM, HIGH	345/315	360/345	360	360/350	360	420/390
INDOOR CFM, MED	320/290	330/305	330	330/310	330	410/380
INDOOR CFM, LOW	295/265	300/270	300	310/280	310	380/350
VENT CFM	75	75	75	75	75	75
PHYSICAL DATA:						
DIMENSIONS (H x W x D)	16 x 42 x 13 3/4 (all models)					
NET WEIGHT (lbs.)	108	113	113	118	118	121
SHIPPING WEIGHT (lbs.)	128	133	133	138	138	141
R-410A CHARGE (oz)	23.63	33.51	35.27	35.27	35.98	39.86

Figure 201 (General Specs)

SPECIFICATIONS

230V COOLING AND HEATING PERFORMANCE

PZE 230V - Extended Cooling Performance

		OUTDOOR DRY BULB TEMP. (DEGREES F AT 40% R.H.)														
		75			85			95			105			110		
		INDOOR WET BULB TEMP. (DEGREES F AT 80 F D.B.)														
		72	67	62	72	67	62	72	67	62	72	67	62	72	67	62
PZE07	Btu	9055	8709	8062	8624	8131	7500	8285	7700	6815	7762	6892	6075	6907	5944	5251
	WATTS	522	531	536	569	575	582	640	640	640	692	691	693	755	755	758
	AMPS	2.3	2.3	2.4	2.5	2.5	2.5	2.8	2.86	2.8	3.0	3.0	3.0	3.3	3.3	3.3
	SHR	0.53	0.72	0.96	0.54	0.74	0.98	0.54	0.77	0.99	0.55	0.81	0.99	0.58	0.87	0.99
PZE09	Btu	10584	10179	9423	10080	9504	8766	9684	9000	7965	9072	8055	7101	8073	6948	6138
	WATTS	653	663	670	711	718	727	800	800	800	865	864	866	943	943	947
	AMPS	3.1	3.1	3.1	3.3	3.3	3.3	3.7	3.7	3.7	4.0	4.0	4.0	4.3	4.3	4.4
	SHR	0.49	0.66	0.89	0.50	0.69	0.91	0.50	0.71	0.91	0.51	0.75	0.92	0.54	0.80	0.91
PZE12	Btu	14112	13572	12564	13440	12672	11688	12912	12000	10620	12096	10740	9468	10764	9264	8184
	WATTS	914	928	939	996	1006	1018	1120	1120	1120	1211	1210	1213	1320	1320	1326
	AMPS	4.2	4.2	4.3	4.5	4.6	4.6	5.1	5.1	5.1	5.5	5.5	5.5	6.0	6.0	6.0
	SHR	0.49	0.66	0.89	0.50	0.69	0.91	0.50	0.71	0.91	0.51	0.75	0.92	0.54	0.80	0.91
PZE15	Btu	17640	16965	15705	16800	15840	14610	16140	15000	13275	15120	13425	11835	13455	11580	10230
	WATTS	1248	1268	1282	1360	1374	1391	1530	1530	1530	1654	1652	1657	1804	1804	1812
	AMPS	5.5	5.6	5.6	6.0	6.0	6.0	6.7	6.7	6.7	7.2	7.2	7.2	7.9	7.9	7.9
	SHR	0.47	0.63	0.85	0.48	0.66	0.87	0.48	0.68	0.87	0.49	0.72	0.88	0.51	0.77	0.87
								RATING POINT ARI 310/380								

PZH 230V - Extended Cooling Performance

		OUTDOOR DRY BULB TEMP. (DEGREES F AT 40% R.H.)														
		75			85			95			105			110		
		INDOOR WET BULB TEMP. (DEGREES F AT 80 F D.B.)														
		72	67	62	72	67	62	72	67	62	72	67	62	72	67	62
PZH07	Btu	9055	8709	8062	8624	8131	7500	8285	7700	6815	7762	6892	6075	6907	5944	5251
	WATTS	522	531	536	569	575	582	640	640	640	692	691	693	755	755	758
	AMPS	2.3	2.3	2.4	2.5	2.5	2.5	2.8	2.8	2.8	.03	3.0	3.0	3.3	3.3	3.3
	SHR	0.53	0.72	0.96	0.54	0.74	0.98	0.54	0.77	0.99	0.55	0.81	0.99	0.58	0.87	0.99
PZH09	Btu	10584	10179	9423	10080	9504	8766	9684	9000	7965	9072	8055	7101	8073	6948	6138
	WATTS	653	663	670	711	718	727	800	800	800	865	864	866	943	943	947
	AMPS	3.1	3.1	3.1	3.3	3.3	3.3	3.7	3.7	3.7	4.0	4.0	4.0	4.3	4.3	4.4
	SHR	0.49	0.66	0.89	0.50	0.69	0.91	0.50	0.71	0.91	0.51	0.75	0.92	0.54	0.8	0.91
PZH12	Btu	14112	13572	12564	13440	12672	11688	12912	12000	10620	12096	10740	9468	10764	9264	8184
	WATTS	914	928	939	996	1006	1018	1120	1120	1120	1211	1210	1213	1320	1320	1326
	AMPS	4.2	4.2	4.3	4.5	4.6	4.6	5.1	5.1	5.1	5.5	5.5	5.5	6.0	6.0	6.0
	SHR	0.49	0.66	0.89	0.50	0.69	0.91	0.50	0.71	0.91	0.51	0.75	0.92	0.54	0.80	0.91
PZH15	Btu	17052	16400	15182	16240	15312	14123	15602	14500	12833	14616	12978	11441	13007	11194	9889
	WATTS	1208	1227	1240	1316	1329	1345	1480	1480	1480	1600	1598	1603	1745	1745	1752
	AMPS	5.4	5.5	5.5	5.9	5.9	5.9	6.5	6.6	6.6	7.1	7.1	7.1	7.7	7.7	7.7
	SHR	0.48	0.65	0.88	0.49	0.68	0.89	0.49	0.70	0.90	0.50	0.74	0.90	0.53	0.79	0.90
								RATING POINT ARI 310/380								

Extended Heating Performance

		OUTDOOR DRY BULB TEMP. (DEGREES F)				
		37	42	47	52	57
PZH07	Btu	5250	5540	6300	6900	7620
	WATTS	509	518	540	549	580
	AMPS	2.3	2.4	2.4	2.5	2.6
PZH09	Btu	6005	6399	8100	8647	9245
	WATTS	647	656	720	725	735
	AMPS	3.3	3.3	3.4	3.4	3.5
PZH12	Btu	7726	8531	10700	11278	12234
	WATTS	883	917	1010	1039	1073
	AMPS	4	4.1	4.5	4.7	4.9
PZH15	Btu	10530	10850	13300	14550	15940
	WATTS	1197	1212	1300	1377	1439
	AMPS	5.3	5.4	5.8	6.1	6.3
				RATING POINT ARI 310/380		

Figure 202 (230V Cooling and Heating Performance)

SPECIFICATIONS

265V COOLING AND HEATING PERFORMANCE

PZE 265V - Extended Cooling Performance

		OUTDOOR DRY BULB TEMP. (DEGREES F AT 40% R.H.)														
		75			85			95			105			110		
		INDOOR WET BULB TEMP. (DEGREES F AT 80 F D.B.)														
		72	67	62	72	67	62	72	67	62	72	67	62	72	67	62
PZE09	Btu	10584	10179	9423	10080	9504	8766	9684	9000	7965	9072	8055	7101	8073	6948	6138
	WATTS	653	663	670	711	718	727	800	800	800	865	864	866	943	943	947
	AMPS	3.1	3.1	3.1	3.3	3.3	3.3	3.7	3.7	3.7	4.0	4.0	4.0	4.3	4.3	4.4
	SHR	0.49	0.66	0.89	0.50	0.69	0.91	0.50	0.71	0.91	0.51	0.75	0.92	0.54	0.80	0.91
PZE12	Btu	14112	13572	12564	13440	12672	11688	12912	12000	10620	12096	10740	9468	10764	9264	8184
	WATTS	914	928	939	996	1006	1018	1120	1120	1120	1211	1210	1213	1320	1320	1326
	AMPS	4.0	4.0	4.0	4.3	4.3	4.3	4.8	4.8	4.8	5.2	5.2	5.2	5.6	5.6	5.7
	SHR	0.49	0.66	0.89	0.50	0.69	0.91	0.50	0.71	0.91	0.51	0.75	0.92	0.54	0.80	0.91
								RATING POINT ARI 310/380								

PZH 265V - Extended Cooling Performance

		OUTDOOR DRY BULB TEMP. (DEGREES F AT 40% R.H.)														
		75			85			95			105			110		
		INDOOR WET BULB TEMP. (DEGREES F AT 80 F D.B.)														
		72	67	62	72	67	62	72	67	62	72	67	62	72	67	62
PZH09	Btu	10584	10179	9423	10080	9504	8766	9684	9000	7965	9072	8055	7101	8073	6948	6138
	WATTS	653	663	670	711	718	727	800	800	800	865	864	866	943	943	947
	AMPS	3.1	3.1	3.1	3.3	3.3	3.3	3.7	3.7	3.7	4.0	4.0	4.0	4.3	4.3	4.4
	SHR	0.49	0.66	0.89	0.50	0.69	0.91	0.50	0.71	0.91	0.51	0.75	0.92	0.54	0.80	0.91
PZH12	Btu	14112	13572	12564	13440	12672	11688	12912	12000	10620	12096	10740	9468	10764	9264	8184
	WATTS	914	928	939	996	1006	1018	1120	1120	1120	1211	1210	1213	1320	1320	1326
	AMPS	4.0	4.0	4.0	4.3	4.3	4.3	4.8	4.8	4.8	5.2	5.2	5.2	5.6	5.6	5.7
	SHR	0.49	0.66	0.89	0.50	0.69	0.91	0.50	0.71	0.91	0.51	0.75	0.92	0.54	0.80	0.91
								RATING POINT ARI 310/380								

Extended Heating Performance

		OUTDOOR DRY BULB TEMP. (DEGREES F)				
		37	42	47	52	57
PZH09	Btu	6005	6399	8100	8647	9245
	WATTS	647	656	720	725	735
	AMPS	3.3	3.3	3.4	3.4	3.5
PZH12	Btu	7726	8531	10700	11278	12234
	WATTS	883	917	1010	1039	1073
	AMPS	4.0	4.1	4.5	4.7	4.9
				RATING POINT ARI 310/380		

Figure 203 (265v Cooling and Heating Performance)

SPECIFICATIONS

Electric Heat Data

Electric Heat Data

	PZE/ PZH07K	
HEATER WATTS	3000	2450
VOLTAGE	230	208
HEATING Btu	10236	8360
HEATING CURRENT (AMPS)	13.2	12.2
MINIMUM CIRCUIT AMPACITY	16.8	15.6
BRANCH CIRCUIT FUSE (AMPS)	20	20

Electric Heat Data

	PZE/ PZH09K		PZE/PZH09R
HEATER WATTS	3000	2450	3000
VOLTAGE	230	208	265
HEATING Btu	10236	8360	10236
HEATING CURRENT (AMPS)	13.2	12.2	11.4
MINIMUM CIRCUIT AMPACITY	16.8	15.6	14.6
BRANCH CIRCUIT FUSE (AMPS)	20	20	20

Electric Heat Data

	PZE/ PZH12K		PZE/PZH12R
HEATER WATTS	3000	2450	3000
VOLTAGE	230	208	265
HEATING Btu	10236	8360	10236
HEATING CURRENT (AMPS)	13.2	12.2	11.4
MINIMUM CIRCUIT AMPACITY	16.8	15.6	14.6
BRANCH CIRCUIT FUSE (AMPS)	20	20	20

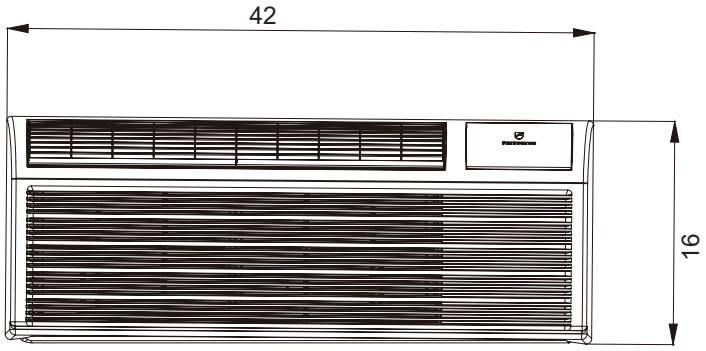
Electric Heat Data

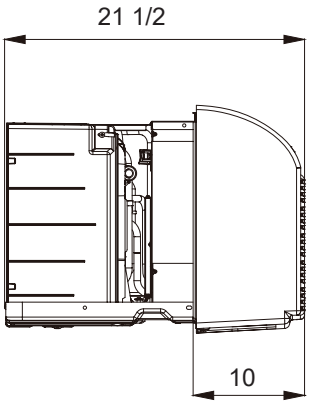
	PZE/ PZH15K	
HEATER WATTS	5000	4090
VOLTAGE	230	208
HEATING Btu	17060	13960
HEATING CURRENT (AMPS)	21.5	20.5
MINIMUM CIRCUIT AMPACITY	27.2	26.0
BRANCH CIRCUIT FUSE (AMPS)	30	30

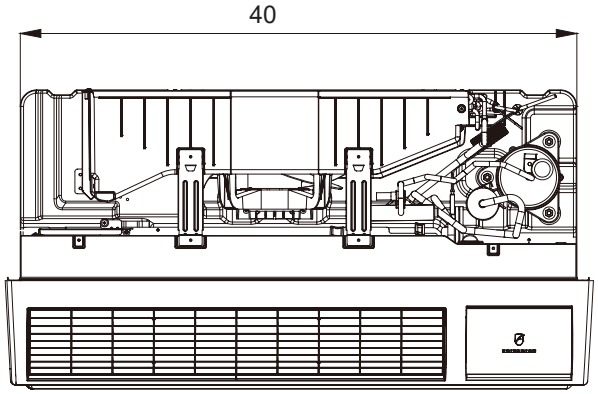
Figure 204 (Electric Heat Data)

SPECIFICATIONS

Dimensions

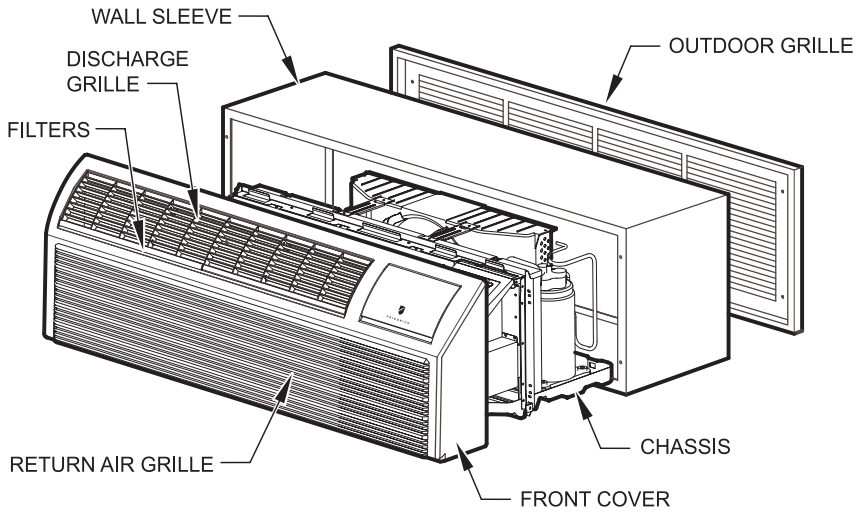






Unit:inch

Figure 205 (Chassis Specs)



PDXWS Wall Sleeve Dimensions:
16" H x 42" W x 13-¾" D

Front Cover Dimensions:
16" H x 42" W x 7-¾" D

Cut-Out Dimensions:
16-¼" x 42-¼"

Figure 206 (Typical Unit Components and Dimensions)

SPECIFICATIONS

Electrical Data

A. Electrical Rating Tables

All units are equipped with standard power cords.

NOTE:. Use.Copper.Conductors.ONLY...Wire.sizes.are.per.NEC,.check.local.codes.for.overseas.applications.

Table 1	Receptacles and Fuse Types		
Voltage	230V		265V
Amps	**20**	**30**	**30**
Heater Size	3.0 kw	5.0 kw	3.5 kw
Receptacles			
NEMA# Receptacle	6-20 R	6-30 R	7-20 R
NEMA# Plug	6-20 P	6-30 P	7-20 P

⚠ WARNING

Electrical Shock Hazard

Turn off electrical power before service or installation.
ALL electrical connections and wiring **MUST** be installed by a qualified electrician and conform to the National Code and all local codes which have jurisdiction.
Failure to do so can result in property damage, personal injury and/or death.

FUSE/CIRCUIT BREAKER	Use ONLY type and size fuse or HACR circuit breaker indicated on unit's rating plate. Proper current protection to the unit is the responsibility of the owner. NOTE: A time delay fuse is provided with 265V units.
GROUNDING	Unit MUST be grounded from branch circuit through service cord to unit, or through separate ground wire provided on permanently connected units. Be sure that branch circuit or general purpose outlet is grounded. The field supplied outlet must match plug on service cord and be within reach of service cord. Refer to Table 1 for proper receptacle and fuse type. Do NOT alter the service cord or plug. Do NOT use an extension cord.
RECEPTACLE	The field supplied outlet must match plug on service cord and be within reach of service cord. Refer to Table 1 for proper receptacle and fuse type. Do NOT alter the service cord or plug. Do NOT use an extension cord.

B. Power Cord Information (230/208V models only)

All.Friedrich.230/208V.PTAC.units.are.shipped.from.the.factory.with.a.Leakage.Current.Detection.Interrupter.(LCDI).equipped.power.cord...The.LCDI.device.meets.the.UL.and.NEC.requirements.for.cord.connected.air.conditioners.effective.August.2004.

To.test.your.power.supply.cord:

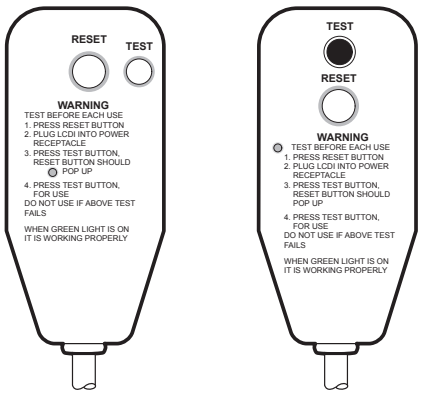
1. Plug.power.supply.cord.into.a.grounded.3.prong.outlet.
2. Press.RESET.
3. Press.TEST.(.listen.for.click;.Reset.button.trips.and.pops.out).
4. Press.and.release.RESET.(listen.for.click;.Reset.button.latches.and.remains.in)...The.power.supply.cord.is.ready.for.operation.

NOTE:. The.LCDI.device.is.not.intended.to.be.used.as.a.switch.

Once.plugged.in.the.unit.will.operate.normally.without.the.need.to.reset.the.LCDI.device.

If.the.LCDI.device.fails.to.trip.when.tested.or.if.the.power.supply.cord.is.damaged.it.must.be.replaced.with.a.new.supply.cord.obtained.from.the.product.manufacturer,.and.must.not.be.repaired.

Figure 14
Typical LCDI Devices



15/20A LCDI Device **30A LCDI Device**

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SPECIFICATIONS

Electrical Data

TABLE 2					
MODEL	HEATER kW	Power Cord Kit	Voltage	Amperage	Receptacle
PZE / PZH07K	3.0	STD	230/208	15	NEMA 6-20r
PZE / PZH09K	3.0	STD	230/208	20	NEMA 6-20r
PZE / PZH12K	3.0	STD	230/208	20	NEMA 6-20r
PZE / PZH15K	5.0	STD	230/208	30	NEMA 6-30r
PZE / PZH09R	3.0	STD	265	20	NEMA 7-20r
PZE / PZH12R	3.0	STD	265	20	NEMA 7-20r

Electrical Wiring for 265 Volt Models

Power Cord Installation

All 265V PTAC/PTHP units come with a factory installed non-LCDI power cord for use in a subbase. If the unit is to be hard-wired refer to the instructions below.

NOTE: It is recommended that the PXSB subbase assembly, the PXCJA conduit kit (or equivalent) be installed on all hardwire units... If installing a flush-floor mounted unit, make sure the chassis can be removed from the sleeve for service and maintenance.

⚠WARNING

Electrical Shock Hazard

Turn off electrical power before service or installation.
ALL electrical connections and wiring **MUST** be installed by a qualified electrician and conform to the National Code and all local codes which have jurisdiction.
Failure to do so can result in property damage, personal injury and/or death.

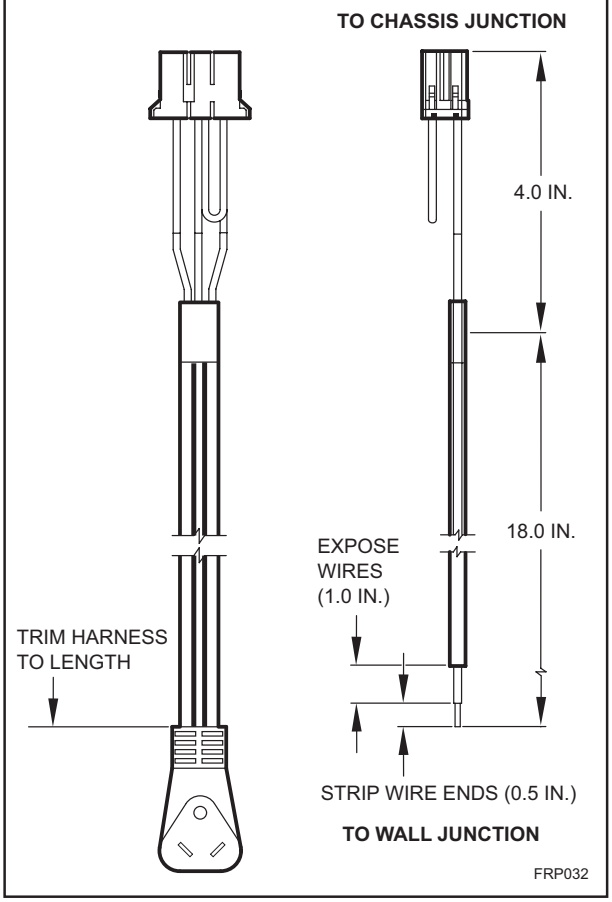
To install the line voltage power leads and conduit to chassis, follow the instructions below and refer to Figures 25-27 on page 19. PXCJA Conduit Kit is required with this setup.

1. Follow the removal process of the chassis's junction box (Figure 25, step 2, page 19).
2. Prepare the 265V (or 230V) power cord for connection to the chassis' power cord connector by cutting the cord to the appropriate length (refer to Figure 26 and follow Figure 15)...Power cord harness selection shown on Table 2 on page 14.

SPECIFICATIONS

Electrical Data

Figure 15



3. Route the cut ends of harness through the conduit connector assembly and flex conduit sleeve. Be sure to use the supplied conduit bushing to prevent damage to the cord by the conduit.

The cord should pass through the Locknut, Spacer, Chassis Junction Box, Conduit Connector, Bushing, then the Conduit Sleeve. See Figure 17.

4. Route the cut ends of the power cord through the elbow connector at the other end of the conduit. Tighten screws on elbow connector to secure conduit sleeve.

5. Fasten and secure the elbow connector to the wall junction box cover with locknut. Place and mount the wall junction box with the four wall mounting screws making sure to pass the wall lines through the junction box. Connect and join all wall lines with the stripped ends using wire nuts. Tighten both screws of the wall junction box cover to junction box.

6. Follow steps 4-6 on page 19 and refer to Figure 27.

Figure 16

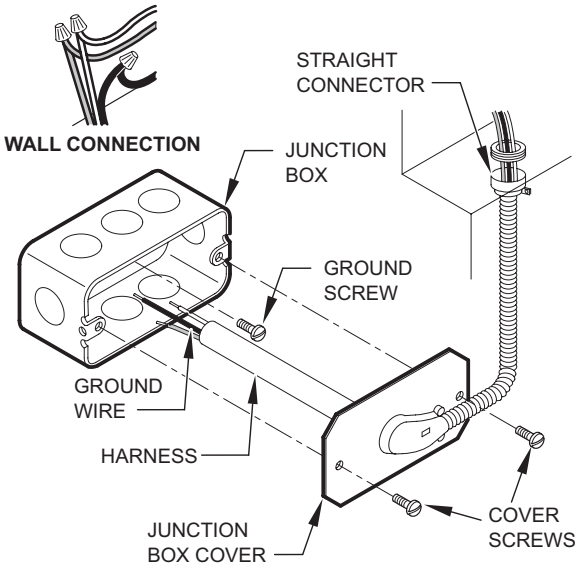
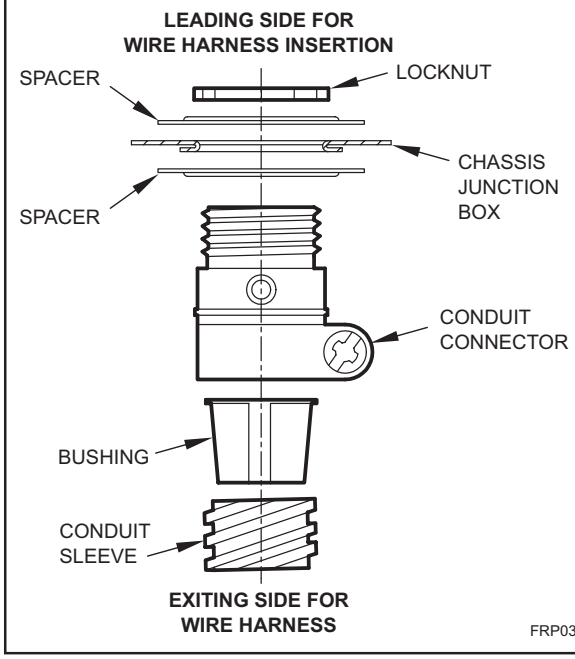


Figure 17



OPERATION

Function and Control

Friedrich PTAC Digital Control and Unit Features

The new Friedrich digital PTAC has state of the art features to improve guest comfort, indoor air quality and conserve energy. Through the use of designed control software for the PTAC industry Friedrich has accomplished what other Manufacturer's have only attempted – a quiet, dependable, affordable and easy to use PTAC.
Below is a list of standard features on every Friedrich PTAC and their to the owner.

Digital Temperature Readout	By digitally monitoring desired room temperature the room is controlled more precisely than conventional systems. The large, easy to read LED display can show either set-point or actual room temperature as selected by owner.
One-Touch Operation	When the unit is powered off the unit can be returned directly to heating or cooling mode by pressing the 'Heat' or 'Cool' buttons without the confusing power up sequence of some controls. One-touch control takes guesswork out of unit control delivering a more enjoyable experience and eliminating front-desk calls.
Three Fan Speeds	The Friedrich PTAC/PTHP units feature three fan speeds for the user to select from. This allows the user to properly match the amount of cooling/ heating for their comfort level and also deliver's quiet performance.
Individual Mode and Fan Control Buttons	By having separate control buttons and indicators for both fan and mode settings the Friedrich digital control eliminates the confusion of previous digital PTACs The accurate temperature setting provides greater guest comfort than other systems.
Quiet Start/Stop Fan Delay	The fan start and stop delays prevent abrupt changes in room acoustics due to the compressor energizing or stopping immediately. Upon call for cooling or heating the unit fan will run for five seconds prior to energizing the compressor Also, the fan off delay allows for "free cooling" by utilizing the already cool indoor coil to its maximum capacity by running for 30 seconds after the compressor.
Two-Speed Wall Thermostat Mode	When connected to a wall thermostat the user can select from high or low fan speed at the thermostat, unlike competitive models that have only one speed selection This allows for more comfortable and quieter operation Requires the use of Friedrich remote thermostat RT6 or equivalent thermostat with two speed fan output.
Remote Thermostat Operation	Some applications require the use of a wall mounted thermostat. All new Friedrich PTACs may be switched from unit control to remote thermostat control easily without the need to order a special model or accessory kit
Internal Diagnostic Program	The Friedrich digital PTAC features a self diagnostic program that can alert maintenance to component failures or operating problems The internal diagnostic program saves properties valuable time when diagnosing running problems.
Service Error Code Storage	The self diagnosis program will also store error codes in memory if certain conditions occur and correct themselves such as extreme high or low operating conditions or activation of the room freeze protection feature. Storing error codes can help properties determine if the unit faced obscure conditions or if an error occurred and corrected itself.
Electronic Temperature Limiting	By limiting the operating range the property can save energy by eliminating "max cool" or "max heat" situations common with older uncontrolled systems. The new electronic control allows owners to set operating ranges for both heating and cooling independently of one another.
Room Freeze Protection	When the PTAC senses that the indoor room temperature has fallen to 40° F the unit will cycle on high fan and the electric strip heat to raise the room temperature to 46° F then cycle off again This feature works regardless of the mode selected and can be turned off. The control will also store the Room Freeze cycle in the service code memory for retrieval at a later date. This feature ensures that unoccupied rooms do not reach freezing levels where damage can occur to plumbing and fixtures.
Random Compressor Restart	Multiple compressors starting at once can often cause electrical overloads and premature unit failure. The random restart delay eliminates multiple units from starting at once following a power outage or initial power up. The compressor delay will range from 180 to 240 seconds.

OPERATION

Function and Control

Digital Defrost Thermostat	The Friedrich PTAC uses a digital thermostat to accurately monitor the outdoor coil conditions to allow the heat pump to run whenever conditions are correct. Running the PTAC in heat pump mode saves energy and reduces operating costs. The digital thermostat allows maximization of heat pump run time.
Instant Heat In Pump Mode	Heat pump models will automatically run the electric heater to quickly bring the room up to temperature when initially energized, then return to heat pump mode. This ensures that the room is brought up to temperature quickly without the usual delay associated with heat pump units.
Even Heat Monitoring	The digital control monitors indoor conditions to ensure that the room temperature is within 5 degrees of the setpoint. If necessary the unit will cycle the electric heat to maintain the temperature. This feature ensures guest comfort by delivering the heating of an electric heater while maintaining the efficiency of a heat pump.
Separate Heat/Cool Fan Cycle Control	"The owner may choose between fan cycling or fan continuous mode based on property preference. (Note: Even heat monitoring and quiet start/stop fan delay only operate in fan cycle mode) Fan continuous mode is used to keep constant circulation in the room during all times the unit is 'ON'. Fan cycle will conserve energy by only operating the fan while the compressor or electric heater is operating. The ability to set the fan cycling condition independently between heating and cooling mode will increase user comfort by allowing the choice of only constantly circulating air in the summer or winter time. Unlike other PTAC brands that only allow one selection."
Emergency Heat Override	In the event of a compressor failure in heat pump mode the compressor may be locked out to provide heat through the resistance heater. This feature ensures that even in the unlikely event of a compressor failure the room temperature can be maintained until the compressor can be serviced.
Desk Control Ready	All Friedrich digital PTACs have low voltage terminals ready to connect a desk control energy management system. Controlling the unit from a remote location like the front desk can reduce energy usage and requires no additional accessories on the PTAC unit.
Indoor Coil Frost Sensor	The frost sensor protects the compressor from damage in the event that airflow is reduced or low outdoor temperatures cause the indoor coil to freeze When the indoor coil reaches 30° F the compressor is disabled and the fan continues to operate based on demand. Once the coil temperature returns to 45° F the compressor returns to operation.
Ultra-Quiet Air System	The new Friedrich PZ series units feature an indoor fan system design that reduces sound levels without lowering airflow and preventing proper air circulation.
High Efficiency	The Friedrich PTAC benefits from quality components and extensive development to ensure a quiet, efficient, and dependable unit.
Dual Motor	Friedrich's new dual motor design allows for the quietest and most efficient units yet.
Rotary Compressor	High efficiency rotary compressors are used on all Friedrich PTACs to maximize durability and efficiency.
Stainless Steel Endplates	Outdoor coil endplates made from stainless steel reduce corrosion on the outdoor coil common with other coil designs.
Top Mounted Air Filters	All filters are washable and reusable and are easily accessed from the top of the unit without the removal of the front cover.
Filtered Fresh Air Intake	Friedrich PTAC units are capable of introducing up to 75 CFM of outside air into the conditioned space. The outdoor air passes through a mesh screen to prevent debris from entering the air stream.

OPERATION

Function and Control

System Configuration

Fresh Air Vent Control

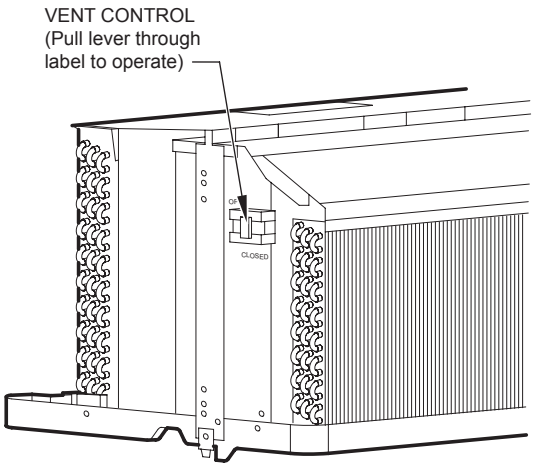
The vent control lever is located on the left side of the unit, behind the front panel.

NOTE:. The vent door shipping hardware must be removed before using the vent control lever...See page 17, Figure 21, (Remove Shipping Screw from Vent Door if present).

When vent door is set to **CLOSE**, only the air inside the room is circulated and filtered, See Figure 28.

When vent door is set to **OPEN**, some outdoor air will be drawn into room. This may reduce heating or cooling efficiency.

Figure 28
Air Vent Control Location



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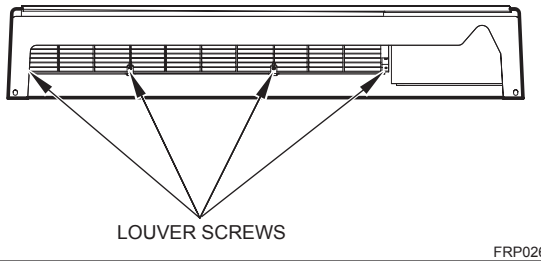
Adjusting Air

To adjust air direction:

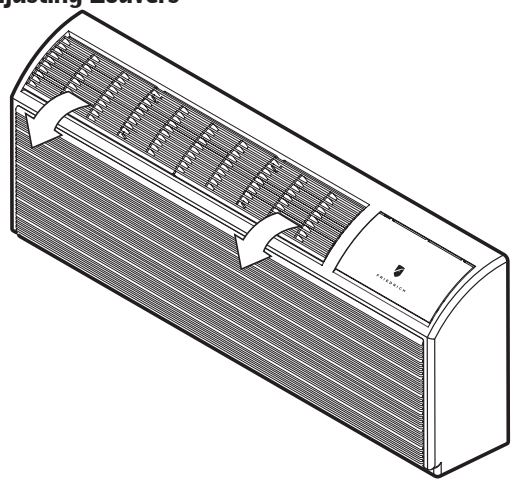
1. Remove front panel. See Figure 22.
2. Remove louver screws that hold louver insert in place (from back side of front panel). See Figure 29.
3. Turn louver insert and rotate 180°. See Figure 30.
4. Replace louver insert.
5. Replace screws and front panel.

Figure 29
Backside of Front Panel

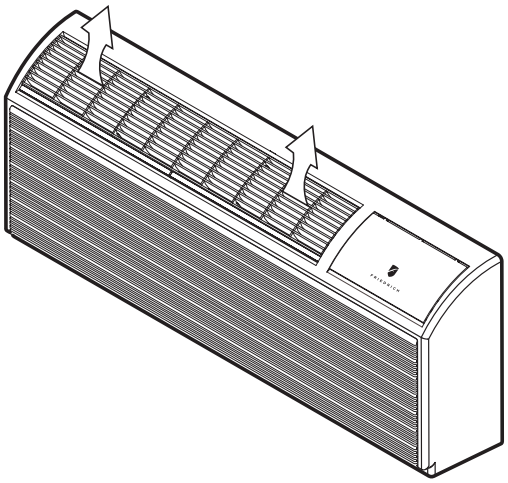


FRP026

Figure 30
Adjusting Louvers



AIR DISCHARGE OUTWARD (Default)



AIR DISCHARGE UPWARD

FRP027

OPERATION

Digital Control User Input Configuration

The adjustable control dip switches are located at the lower left hand portion of the digital Smart Center, The inputs are only visible and accessible with the front cover removed from the PTAC,
Dip Switch Setting

1. Emergency Heat Override – Switch 1 In the unlikely event of a compressor failure a heat pump unit may be switched to operate in only the electric heat mode until repairs can be made. Moving Dip Switch 1 to 'ON'

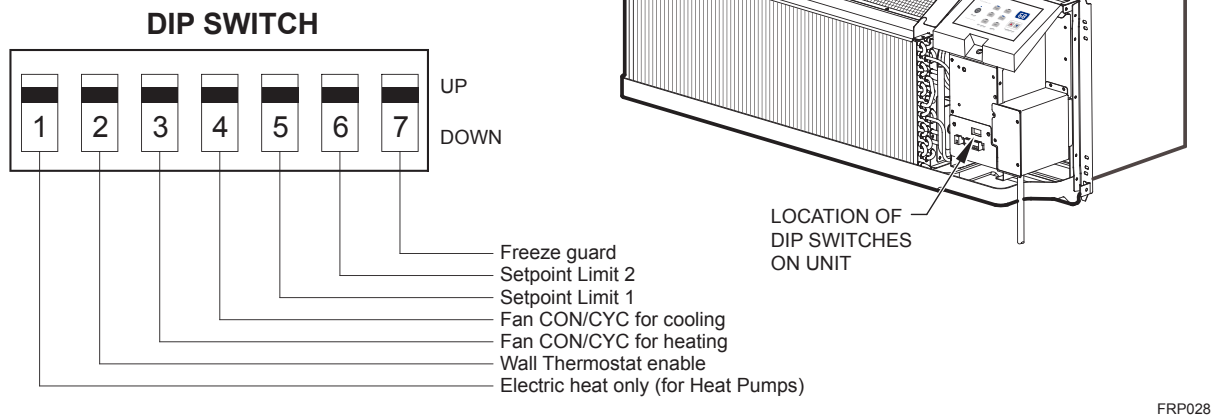
2. Wall Thermostat Switch 2
In order to enable the wall thermostat move Dip Switch to 'ON'

3. Fan Cycle Control – Switch 3-4 All PTACs are shipped from the factory with Dip Switch 3-4 in the 'OFF' position In this position the cooling fan cycle will run continuously providing air circulation during the warm months. The heating fan cycle is set to 'cycle' on and off The fan may be set to 'continuous' mode by switching Dip Switch 3 to 'ON' position.

4. Electronic Temperature Limiting – Switches 5-6 The digital control is set from the factory to allow a temperature range between 61° F and 86° F in both heating and cooling mode Dip Switches 5-6 can be used to set high and low limits for either heating both, cooling both or both.
From the factory switches are in the down 'OFF' position The chart below shows the available electronic limiting ranges.

5. Room Freeze Protection – Switch 7 Units are shipped from the factory with the room freeze protection enabled Room Freeze Protection can be switched off at the owner's preference by moving Dip Switch 7 to 'OFF' This feature will monitor the indoor room conditions and in the event that the room falls below 40°F the unit will cycle on high fan with the electric heater This occurs regardless of mode.

Figure 31
Dip Switches



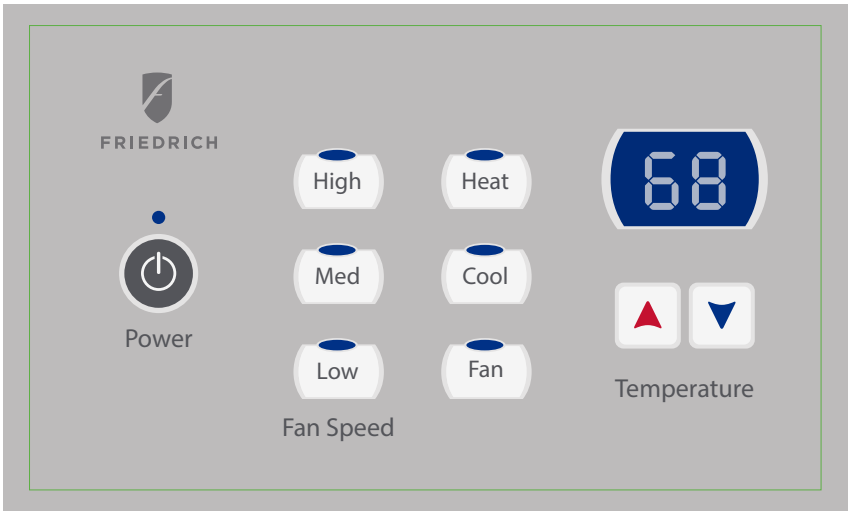
Switch	Description	Function	Factory Setting				Option			
1	Emergency.Heat.Override. for.PZH.Heat.Pump. Models	Enables.electric.heat.only.operation.in.the.event.of.a.com-pressor.failure.on.HP.models.	Down.-.Normal.Operation				Up.-.Overrides.compressor.operation.. (PDH.models.only)			
2	Wall.Thermostat.Switch	Enables.the.use.of.a.wall.thermostat.or.unit.controls	Down.-.Unit.Controls				Up.-.Enables.Wall.Thermostat.Usage			
3	Fan.Cycle.for.Heating	Allows.selection.of.continuous.fan.or.cycling.in.heating.mode.	Not. Applicable				Not. Applicable			
4	Fan.Cycle.for.Cooling	Allows.selection.of.continuous.fan.or.cycling.in.cooling.mode.	Not. Applicable				Not. Applicable			
5	Setpoint.Switch.1	Allows.the.temperature.setpoint.range.to.be.adjusted.	Down	61°F-86°F	Up	63°F-80°F	Down	65°F-78°F	Up	68°F-75°F
6	Setpoint.Switch.2		Down	(16°C-30°C)	Down	(18°C-28°C)	Up	(19°C-26°C)	Up	(20°C-24°C)
7	Room.Freeze.Protection	Allows.the.unit.to.ensure.the.indoor.room.temperature.does. not.fall.below.40°F.even.when.turned.off.	Down.-.Freeze.Protection.Enabled				Up.-.Freeze.Protection.Disabled			

OPERATION

Digital Control

Digital Control Operation

Figure 32
Digital Control Panel



°F vs °C Display
The unit is factory configured to display all temperatures in degrees Fahrenheit (° F). To switch to degrees Celsius press the 'Fan Only' and 'Low Fan' buttons simultaneously for three seconds. The display will show a 'C' as acknowledgement of the change . To revert back to ° F press the 'Fan Only' and 'Low Fan' buttons simultaneously for three seconds. The display will show an 'F' as acknowledgement of the change.

Cooling Mode
Pressing the 'Cool' button while the unit is in any mode, including off, will put the unit into cooling mode. Adjust the temperature readout to the desired room temperature and the unit will cycle the compressor on and off to maintain a comfortable room. The compressor will cycle on anytime that the room temperature is 18° F above the desired temperature The fan operation is dependent on the fan mode selected, either continuous or cycling. See Fan Mode for fan cycle control.

Heating Mode
Pressing the 'Heat' button while the unit is in any mode, including off, will put the unit into heating mode.

Heat Pump Models (PZH)
When the 'Heat' button is pressed initially the unit will energize the electric resistance heat to quickly bring the room to the set temperature. When the desired room temperature falls 18° F below the desired set temperature the unit will cycle the compressor on and operate as a heat pump to maintain the room temperature while running more efficiently than resistance heat only models If the room temperature should fall more than 5° F from the set temperature the unit will run the resistance heater The fan operation is dependent on the fan mode selected, either continuous or cycling Dip switch 3 controls the fan mode. When the outdoor coil temperature falls below 30° F for more than 2 min- utes the unit will operate the resistance heaters and not the compressor When the outdoor coil temperature reaches 45° F the compressor will be allowed to operate again.

Heat/Cool Models (PZE)
After pressing the 'Heat' button, adjust the temperature readout to the desired room temperature and the unit will cycle the resistance heat on and off to maintain a comfortable room. The heater will come on anytime that the room temperature is 18° F below the desired temperature The fan operation is dependent on the fan mode selected, either continuous or cycling Dip switch 3 controls the fan mode, see page 23 for setting.

Emergency Heat Operation
In the event of a compressor failure in heat pump mode the compressor may be locked out to provide heat through the resistance heater. This feature ensures that even in the unlikely event of a compressor failure the room temperature can be maintained until the compressor can be serviced Dip switch 1 controls the emergency heat setting.

Fan Mode
Pressing the fan mode button will provide constant or cycle fan operation in cooling or heating modes The fan speed selection is made by pressing either High or Low fan speed button.

Cycle/Continuous
The owner may choose between fan cycling or fan continuous mode based on property preference (Note: Even heat monitoring and quiet start/stop fan delay only operate in fan cycle mode). Fan continuous mode is used to keep constant airflow circulation in the room during all times the unit is 'ON' Fan cycle will conserve energy by only operating the fan while the compressor or electric heater is operating. Dip switch 3-4 controls the fan mode.

OPERATION

Refrigeration Sequence Of Operation

A good understanding of the basic operation of the refrigeration system is essential for the service technician. Without this understanding, accurate troubleshooting of refrigeration system problems will be more difficult and time consuming, if not (in some cases) entirely impossible. The refrigeration system uses four basic principles in its operation which are as follows:

1. "Heat always flows from a warmer body to a cooler body."

2. "Heat must be added to or removed from a substance before a change in state can occur"

3. "Flow is always from a higher pressure area to a lower pressure area."

4. "The temperature at which a liquid or gas changes state is dependent upon the pressure."

The refrigeration cycle begins at the compressor when a demand is received from the thermostat. Starting the compressor creates a low pressure in the suction line which draws refrigerant gas (vapor) into the compressor. The compressor then "compresses" this refrigerant vapor, raising its pressure and its (heat intensity) temperature.

The refrigerant leaves the compressor through the discharge line as a hot high pressure gas (vapor). The refrigerant enters the condenser coil where it gives up some of its heat. The condenser fan moving air across the coil's finned surface facilitates the transfer of heat from the refrigerant to the relatively cooler outdoor air.

When a sufficient quantity of heat has been removed from the refrigerant gas (vapor), the refrigerant will "condense" (i.e. change to a liquid). Once the refrigerant has been condensed (changed) to a liquid it is cooled even further by the air that continues to flow across the condenser coil.

The design determines at exactly what point (in the condenser) the change of state (i.e. gas to a liquid) takes place. In all cases, however, the refrigerant must be totally condensed (changed) to a liquid before leaving the condenser coil.

The refrigerant leaves the condenser coil through the liquid line as a warm high pressure liquid. It next will pass through the refrigerant drier (if equipped). It is the function of the drier to trap any moisture present in the system, contaminants, and large particulate matter.

The liquid refrigerant next enters the metering device. The metering device is called a capillary tube. The purpose of the metering device is to "meter" (i.e. control or measure) the quantity of refrigerant entering the evaporator coil.
In the case of the capillary tube this is accomplished (by design) through size (and length) of device, and the pressure difference present across the device. Since the evaporator coil is under a lower pressure (due to the suction created by the compressor) than the liquid line, the liquid refrigerant leaves the metering device entering the evaporator coil. As it enters the evaporator coil, the larger area and lower pressure allows the refrigerant to expand and lower its temperature (heat intensity). This expansion is often referred to as "boiling" or atomizing. Since the unit's blower is moving indoor air across the finned surface of the evaporator coil, the expanding refrigerant absorbs some of that heat. This results in a lowering of the indoor air temperature, or cooling.

The expansion and absorbing of heat cause the liquid refrigerant to evaporate (i.e. change to a gas). Once the refrigerant has been evaporated (changed to a gas), it is heated even further by the air that continues to flow across the evaporator coil.

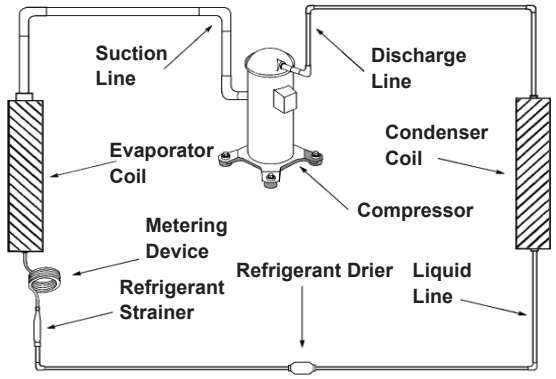


Figure 301 (Sequence of Operation)

The particular system design determines at exactly what point (in the evaporator) the change of state (i.e. liquid to a gas) takes place. In all cases, however, the refrigerant must be totally evaporated (changed) to a gas before leaving the evaporator coil.

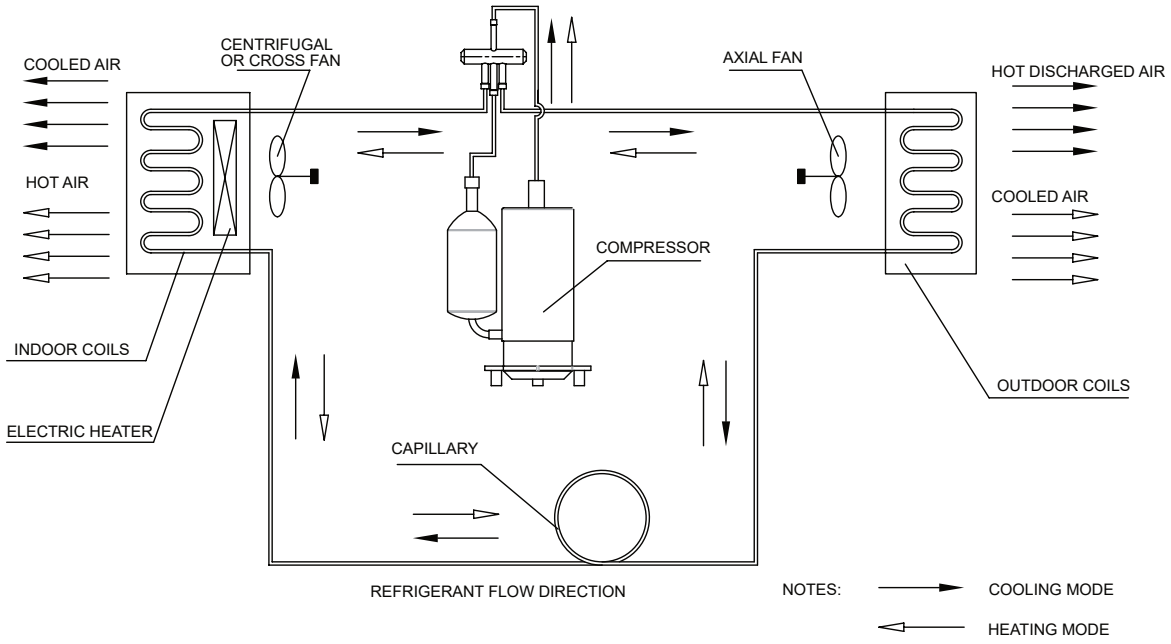
The low pressure (suction) created by the compressor causes the refrigerant to leave the evaporator through the suction line as a cool low pressure vapor. The refrigerant then returns to the compressor, where the cycle is repeated.

OPERATION

Refrigerant System Diagram

(1)Cooling + Heat Pump + Auxiliary Electric Heater

PZH07K3SG PZH09K3SG PZH09R3SG PZH12K3SG PZH12R3SG PZH15K5SG



(2) Cooling + Electric Heater

PZE07K3SG PZE09K3SG PZE09R3SG PZE12K3SG PZE12R3SG PZE15K5SG

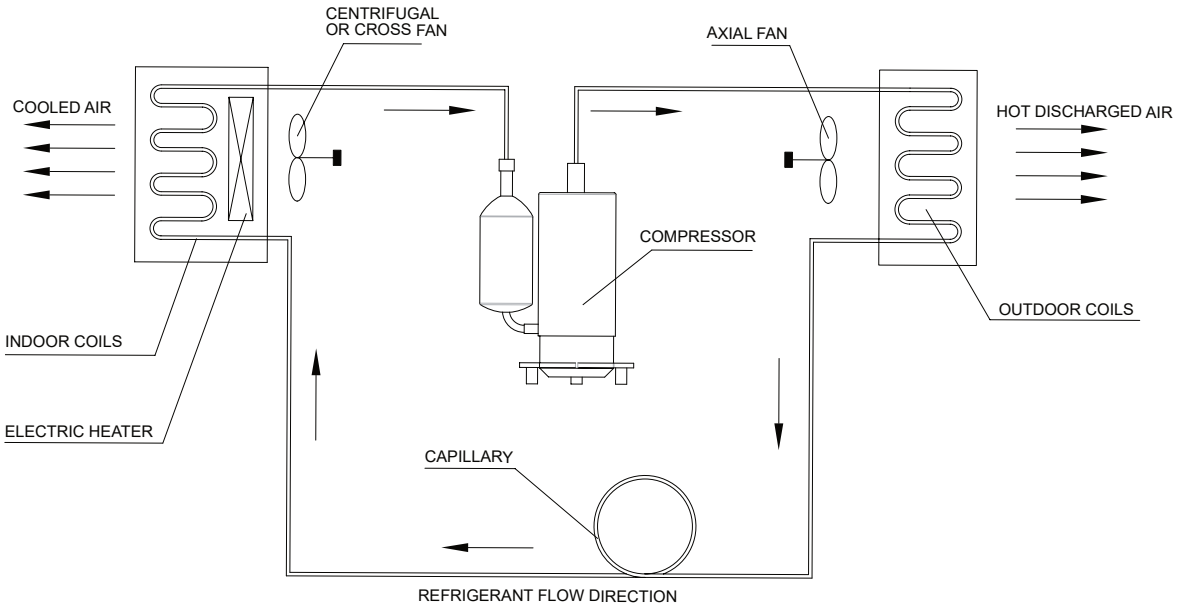


Figure 302 (Sequence of Operation)

Routine Maintenance

Coils & Chassis

NOTE: Do not use a caustic cleaning agent on coils or base pan. Use a biodegradable cleaning agent and degreaser. The use of harsh cleaning materials may lead to deterioration of the aluminum fins or the coil end plates.

The indoor coil and outdoor coils and base pan should be inspected periodically (annually or semi-annually) and cleaned of all debris (lint, dirt, leaves, paper, etc.) as necessary. Under extreme conditions, more frequent cleaning may be required. Clean the coils with and base pan with a coil comb or soft brush and compressed air or vacuum. A low pressure washer device may also be used; however, you must be careful not to bend the aluminum fin pack. Use a sweeping up and down motion in the direction of the vertical aluminum fin pack when pressure cleaning coils.

NOTE: It is extremely important to insure that none of the electrical and/or electronic parts of the unit get wet when cleaning. Be sure to cover all electrical components to protect them from water or spray.

NOTE: When installed on or near sea coast environments, it recommended that all coils be cleaned at minimum biannually.

Decorative Front

Use a damp (not wet) cloth when cleaning the control area to prevent water from entering the unit, and possibly damaging the electronic control.

The decorative front and the cabinet can be cleaned with warm water and a mild liquid detergent. Do NOT use solvents or hydrocarbon based cleaners such as acetone, naphtha, gasoline, benzene, etc.

The indoor coil can be vacuumed with a dusting attachment if it appears to be dirty. DO NOT BEND FINS. The outdoor coil can be gently sprayed with a garden hose.

The air filter should be inspected weekly and cleaned if needed by vacuuming with a dust attachment or by cleaning in the sink using warm water and a mild dishwashing detergent. Dry the filter thoroughly before reinstalling. Use caution, the coil surface can be sharp.

Fan Motor & Compressor

The fan motor & compressor are permanently lubricated and require no additional lubrication.

Wall Sleeve

Inspect the inside of the wall sleeve and drain system periodically (annually or semi-annually) and clean as required. Under extreme conditions, more frequent cleaning may be necessary. Clean both of these areas with an antibacterial and antifungal cleaner. Rinse both items thoroughly with water and ensure that the drain outlets are operating correctly. Check the sealant around the sleeve and reseal areas as needed.

Inspect for mold or mildew periodically. If present, ensure the sealing gasket around the unit is in good condition and not allowing outside air (or light) through the gasket.

Blower Wheel / Housing / Condensor Fan / Shroud

Inspect the indoor blower and its housing, evaporator blade, condenser fan blade and condenser shroud periodically (yearly or bi-yearly) and clean of all debris (lint, dirt, mold, fungus, etc.). Clean the blower housing area and blower wheel with an antibacterial / antifungal cleaner. Use a biodegradable cleaning agent and degreaser on condenser fan and condenser shroud. Use warm or cold water when rinsing these items. Allow all items to dry thoroughly before reinstalling them.

Electrical / Electronic

Periodically (at least yearly or bi-yearly) inspect all control components: electronic, electrical and mechanical, as well as the power supply. Use proper testing instruments (voltmeter, ohmmeter, ammeter, wattmeter, etc.) to perform electrical tests. Use an air conditioning or refrigeration thermometer to check room, outdoor and coil operating temperatures.

Air Filter

To ensure proper unit operation, the air filter should be cleaned at least monthly, and more frequently if conditions warrant. The unit must be turned off before the filter is cleaned.

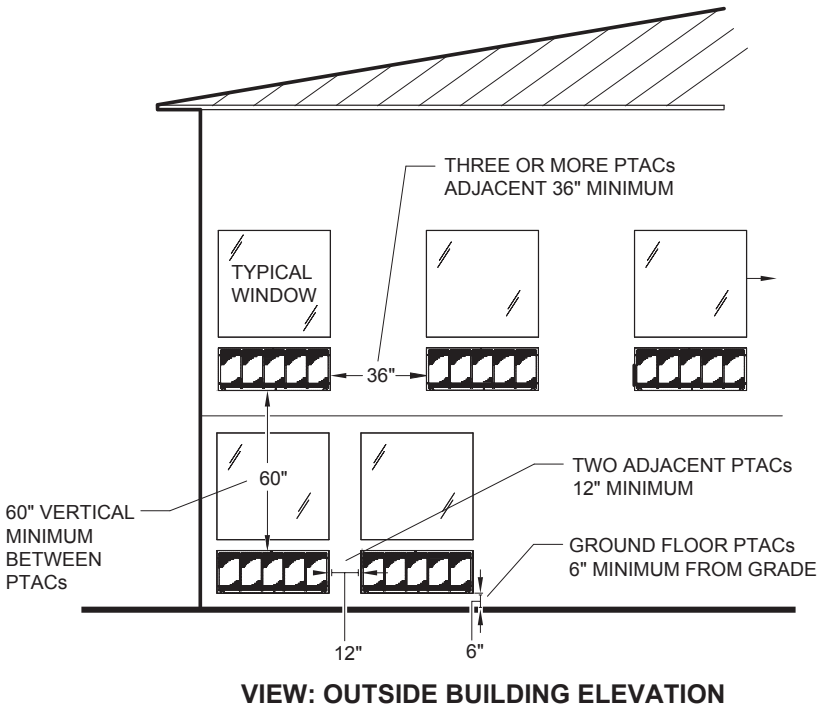
INSTALLATION

PTAC Installation Recommendations

For proper PTAC unit performance and maximum operating life refer to the minimum installation clearances below:

Figure 1

PTAC. units. should. be. installed. no. closer. than. 12". apart. when. two. units. are. side. by. side... If. three. or. more. PTAC. units. are. to. operate. next. to. one. another. allow. a. minimum. of. 36". between. units... Also,. a. vertical. clearance. of. 60". should. be. maintained. between. units. installed... In. the. interior. of. the. room. the. unit. should. be. located. a. minimum. of. 1/4". from. the. floor. and. a. minimum. of. 36". from. the. ceiling.



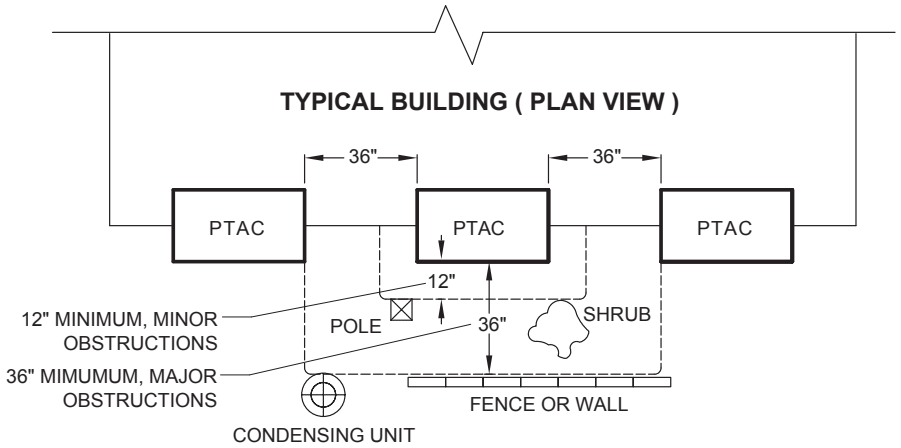
VIEW: OUTSIDE BUILDING ELEVATION

FRP001

For PTACs on the ground floor or anytime obstructions are present, use the following guidelines:

Figure 2

- For. minor. obstructions. such. as. lamp. poles. or. small. shrubbery. a. clearance. of. 12". from. the. outdoor. louver. should. be. maintained.
- For. major. obstructions. such. as. a. solid. fence,. wall. or. other. heat. rejecting. device. like. a. condensing. unit,. a. minimum. distance. of. 36". should. be. kept.



FRP002

The. above. suggestions. are. for. reference. only. and. do. not. represent. all. possible. installations... Please. contact. Friedrich. for. information. regarding. affects. of. other. installation. arrangements... By. following. these. simple. recommendations. you. can. be. confident. that. your. Friedrich. PTAC. will. provide. years. of. worry. free. operation.

INSTALLATION

Wall Sleeve Installation Instructions (PDXWS)

Wall Sleeve Installation Instructions (PDXWSA)

NOTE:. Insure.that.the.unit.is.only.installed.in.a.wall.structurally.adequate.to.support.the.unit.including.the.sleeve,.chassis.and.accessories...If.the.sleeve.projects.more.than.8".into.the.room,.a.subbase.or.other.means.of.support.MUST.be.used…Please.read.these.instructions.completely.before.attempting.installation.

⚠WARNING

Falling Object Hazard

Not following Installation Instructions for mounting your air conditioner can result in property damage, injury, or death.

NOTICE

DO NOT allow any pitch toward the inside.

Flashing on all 4 sides of the opening is recommended.

Potential property damage can occur if instructions are not followed.

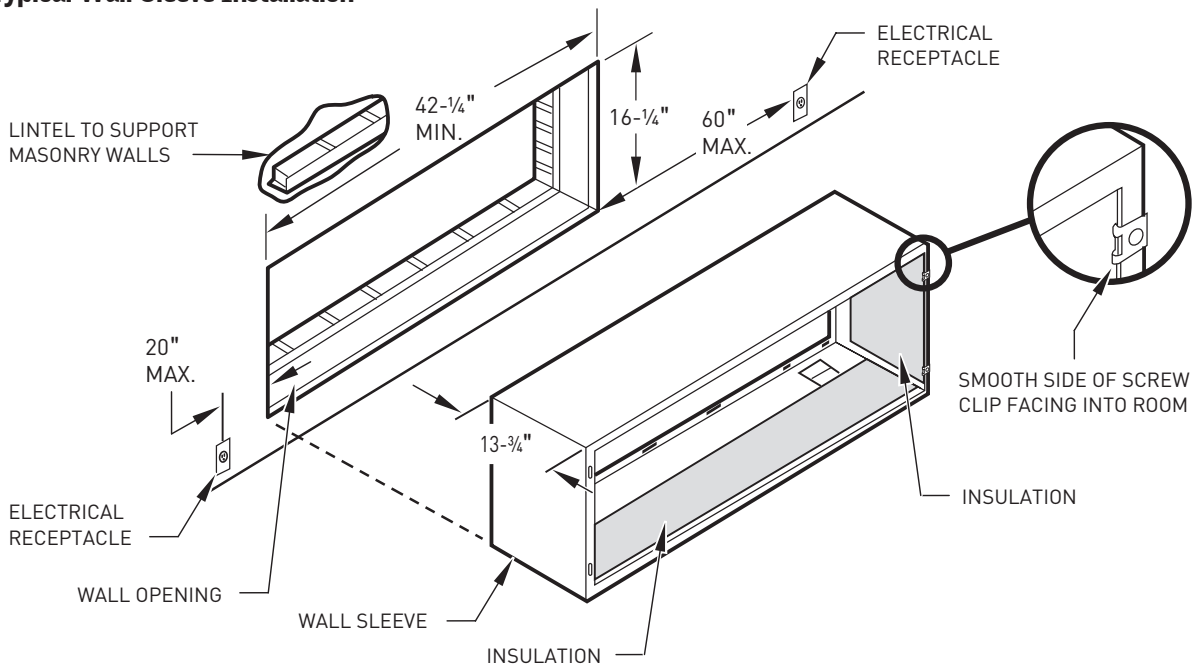
For Deep Wall Installation (Greater than 13 1/4") See Page 9

The.following.instructions.apply.ONLY.to.walls.less.than.13.¼".in.depth..

1. The.PXDR10.Drain.Kit,(optional.for.new.construction).see.page.10. if.applicable,.must.be.installed.before.the.wall.sleeve.is.installed. into.the.wall.
2. The.External.Drain.(for.new.construction.or.unit.replacement).see. page. 11 if .applicable,.must.be.installed.before.the.wall.sleeve.is. installed.into.the.wall.
3. From.inside.the.building,.position.the.wall.sleeve.in.the.opening.and. push.it.into.the.wall.until..it.protrudes.at.least.¼".on.the.outside... (See.Figure. 9, .Page.8).
4. Position. the. wall. sleeve. with. a. slight. tilt. towards. the. outside. to. facilitate.condensate.drainage...It.should.be.level.side-to-side.and. the.front.should.be.¼.bubble.higher.than.the.back.

Figure 3

Typical Wall Sleeve Installation



NOTE: All 230/208V units are manufactured with a 60” power cord and all 265V units with a 18” power cord.

FRP008

INSTALLATION

Alternate Wall Installations

Figure 4
Panel Wall

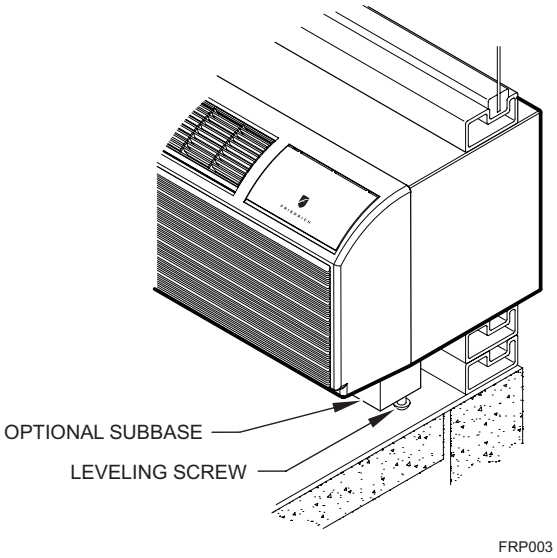


Figure 5
Frame and Brick Veneer

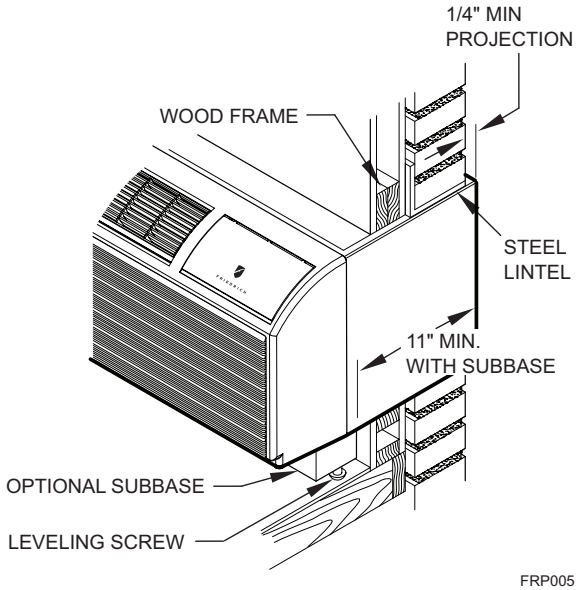


Figure 6
Curtain Wall

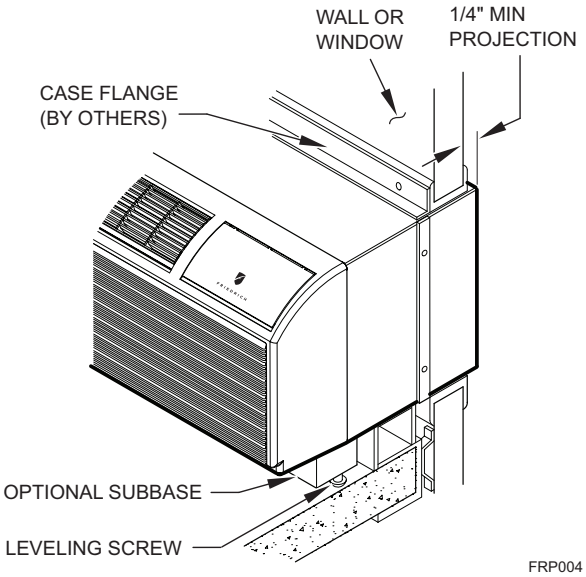
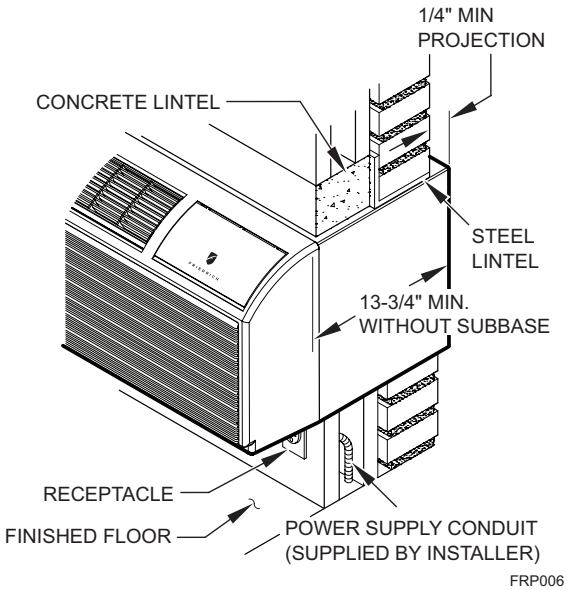


Figure 7
Block and Brick Veneer



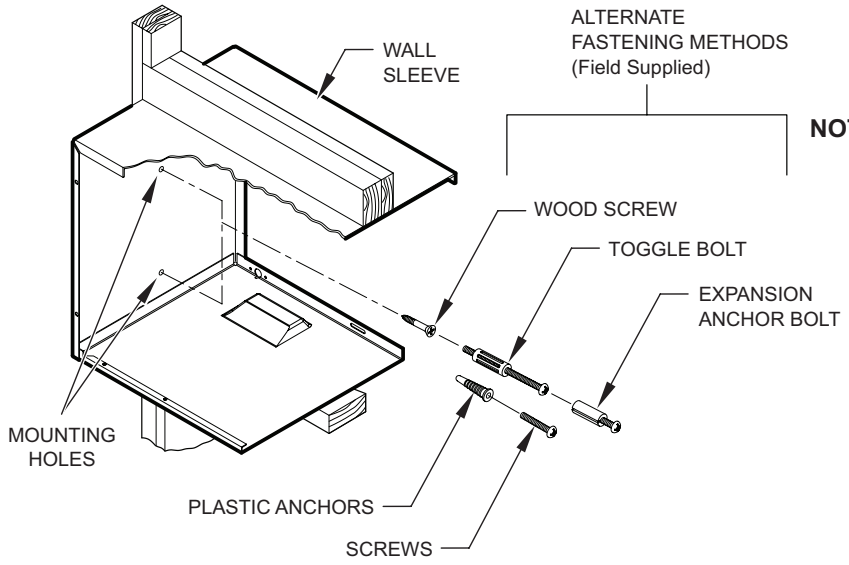
NOTE: Follow all wall system manufacturer installation instructions. For sunrooms and modular buildings, adhere to their installation instructions for supporting and sealing sleeve to their frames. All wall and window/wall installations must provide for proper drainage. In applications where the drain holes on the PTAC wall sleeve are not exposed beyond the wall an internal drain system is recommended. It is the installer's responsibility to ensure there is adequate drainage for the PTAC unit.

INSTALLATION

Alternate Wall Installations

Figure 8

Wall Sleeve Attachment

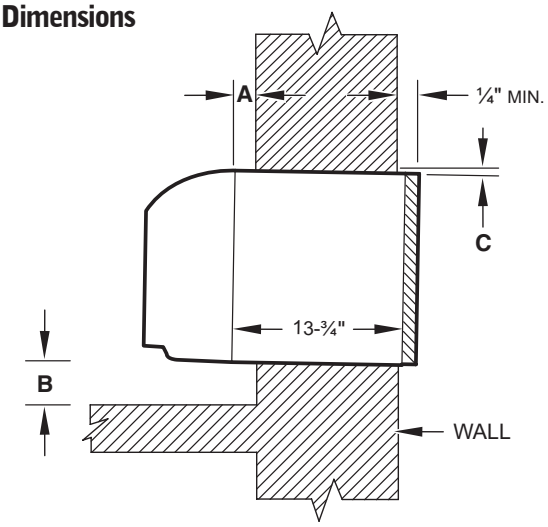


NOTE: The Wall Sleeve must be horizontally level (side-to-side) and pitched 1/4 bubble to the outside when installed in an opening.
The mounting hole location should be approximately 2-4" from the top and bottom of the sleeve.

FRP007

Figure 9

Dimensions



Dimension*	A Allow for wall finishing	B Allow for floor finishing		C Allow for proper drainage
	(Minimum)	Min.	Max.	(Front-to-Back)
No Accessories	¼"	¼"	---	---
With Subbase	1-¾"	3-½"	5"	---
With Lateral Duct	¾"	¼"	---	---
Wall Sleeve Tilt	---	---	---	¼"

* If more than one accessory is to be used, use the maximum dimension. If the wall thickness is more than 13-¾" - (A+ ¼"), a sleeve extension must be used.

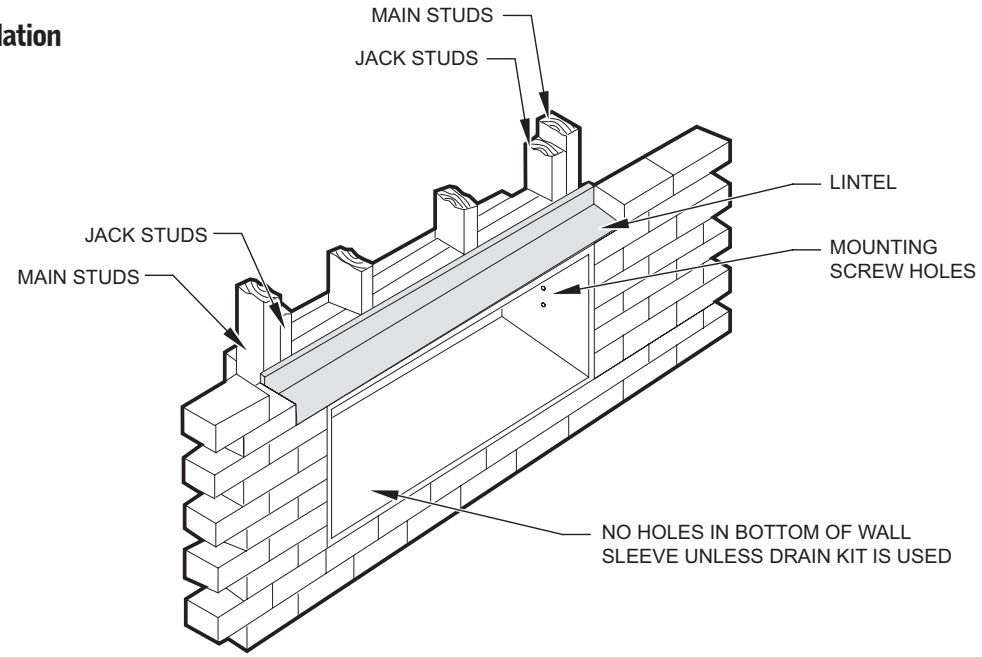
FRP009

INSTALLATION

Alternate Wall Installations

5. Drill two 3/16" holes through each side of the sleeve approximately 4" from top and 4" from bottom of sleeve. Screw four #10 x 1" screws (included) or appropriate fasteners for your installation, through the holes in the sides of the wall sleeve.
6. Apply sealant around the wall sleeve where it projects through the inside and outside wall surfaces. Apply the sealant to the screw heads or the tops of the fasteners used in Step #5.
7. If the chassis and exterior grille are to be installed later, leave the weatherboard and center support in place, otherwise remove and dispose of them. (See Figure 13, Page 12).
8. Provide a support lintel if the wall sleeve is installed in a concrete or masonry wall (See Figure 10, Page 9).

Figure 10
Lintel Installation



NOTE: Construct wall opening to comply with all applicable building codes.

FRP010

One-Piece Deep Wall Sleeve Installation (PDXWSEXT)

If the wall is thicker than 13 1/4" a deep wall sleeve or wall sleeve extension MUST be used. The deep wall sleeve may be special ordered through your Sales Representative.

INSTALLATION

PXDR10 Drain Kit Installation

PXDR10 Drain Kit Installation Instructions (optional for new construction)

NOTE:. Determine.whether.drain.will.be.located.within.the.wall,.on.the. indoor.side,.or.will.drain.to.the.exterior.of.the.building...Follow. appropriate.instructions.below.depending.on.your.particular. type.of.installation.

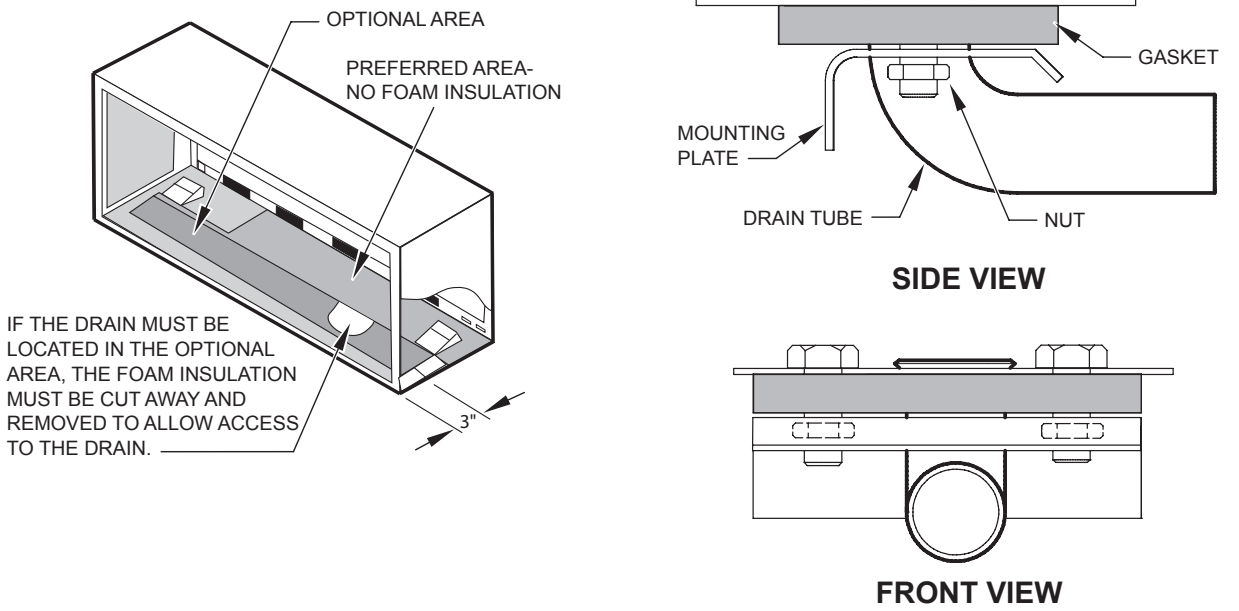
Internal Drain

NOTE:. If.installing.an.internal.drain,.you.MUST.install.a.drain.kit.on. the.wall.sleeve.before.the.wall.sleeve.is.installed.

1. Refer. to. Figure. 11. and. locate. the. drain. within. the. "Preferred". area.of.best.drainage...Maintain.at.least.a.½".clearance.from.the. embossed.area.
2. Using. the. mounting. plate. with. the. ½". hole. as. a. template,. mark. and. drill. two,. 3/16". mounting. holes. and. a. ½". drain. hole. in. the. sleeve.bottom.
3. Remove.the.backing.from.the.gasket.and.mount.it.on.the.flat.side. of.the.mounting.plate...(See.Figure.12,.Page.11)...Insert.the.drain. tube.through.the.hole.in.the.gasket.and.mounting.plate.so.the.tube. flange.will.be.against.the.wall.sleeve.
4. Position.the.assembly.beneath.the.drilled.holes.and.secure.it.with. #10-24.x.½".machine.screws.and.lock.nuts.provided...Seal.the.tops. of.the.screws.with.silicone.caulking..
5. Use.½".I.D..copper.tube,.PVC.pipe,.or.vinyl.hose.(obtained.locally). to.connect.the.internal.drain.tube.to.the.drain.system.in.the.building.
6. Referring.to.Figure.12,.Detail.A,.Page.11,.locate.and.assemble.the. two.cover.plates.and.gaskets.over.the.drain.holes.at.the.rear. of.the.wall.sleeve...Attach.them.with.the.#10.sheet.metal.screws. provided...Make.certain.that.the.four.overflow.slots.at.the.rear.of. the.wall.sleeve.are.not.blocked.(See.drawing.of.the.back.of.the. sleeve.Figure.12,.Page.11).
7. If.a.deep.wall.extension.(PDXWSEXT).is.used,.after.installing.the. field.supplied.flashing,.caulk.as.required...Be.sure.to.caulk.around. the.flashing.and.the.wall.sleeve.where.the.hole.was.drilled.for.the. drain.tube..

Figure 11

Drain Kit Location and Installation



PXDR10	
QUANTITY	**DESCRIPTION**
2	COVER PLATES
1	MOUNTING PLATE
1	DRAIN TUBE
3	MOUNTING PLATE GASKET
4	#10 X ½" SHEET METAL SCREWS
2	#10-24 X ½ " MACH. SCREWS
2	#10-24 X ½" LOCKNUTS

INSTALLATION

External Drain

External Drain (for new construction or unit replacement)

When using an external drain system, the condensate is removed through either of two drain holes on the back of the wall sleeve. Select the drain hole which best meets your drainage situation and install the drain kit. Seal off the other with a cover plate.

Drain Tube Installation (See Figure 12)

1. Peel the backing tape off the gaskets and apply the sticky side to one cover plate and one mounting plate as shown in Details A and B.
2. Place the drain tube through the gasket and the mounting plate with the flange toward the wall sleeve.
3. Attach the drain tube assembly to one of the two drain holes at the rear of the wall sleeve. The large flange on the mounting plate is positioned at the bottom of the sleeve facing toward the sleeve, Detail B. When the drain tube is positioned at the desired angle, tighten the screws.

Cover Plate Installation

4. Mount the foam gasket to the cover plate. Using two #10 x ½" sheet metal screws (provided), attach the cover plate to the remaining drain hole. Make certain the large flange on the plate is positioned at the bottom of the sleeve.
5. Discard the additional cover plate, gasket, machine screws, and locknuts.

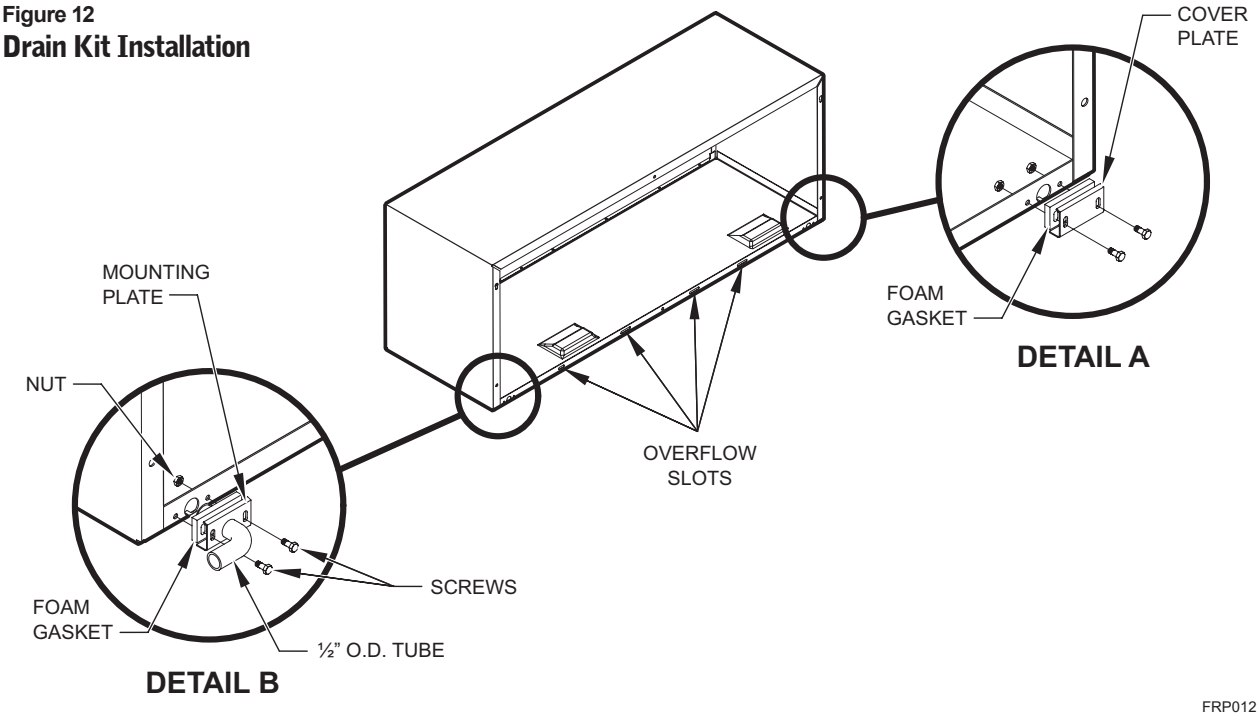
NOTICE

If the wall sleeve has not been installed, the drain tube must be rotated to a horizontal position until after the sleeve is installed. Tighten the mounting plate screws when the tube is in the proper position. Make certain that the four overflow slots at the rear of the wall sleeve are not blocked (See Figure 12).

When sealing the sleeve on the outside of the building, be careful NOT to let the sealant block the two condensate drain holes or the four overflow slots at the bottom flange of the sleeve.

Potential property damage can occur if instructions are not followed.

Figure 12
Drain Kit Installation



NOTE: The large flange on the mounting plate is positioned at the bottom of the sleeve facing toward the sleeve. The drain tube must be rotated to a horizontal position to allow for the wall sleeve to be installed into the wall. Once the wall sleeve is installed, return the drain tube to a downward angle.

INSTALLATION

PXGA Standard Grille

PXGA Standard Grille Installation Instructions

1. Remove the center support and weatherboard if still installed in the sleeve.
2. Insert six plastic grommets into the grille openings from the outside of the grille as shown in Figure 13.
3. Insert two #8 x ⅜" sheet metal screws (provided) in the top two outside edge plastic grommets, and tighten them half way into the grommets.
4. Grasp the grille by the attached plastic handles. Position it with the condensate drain knockouts facing down.

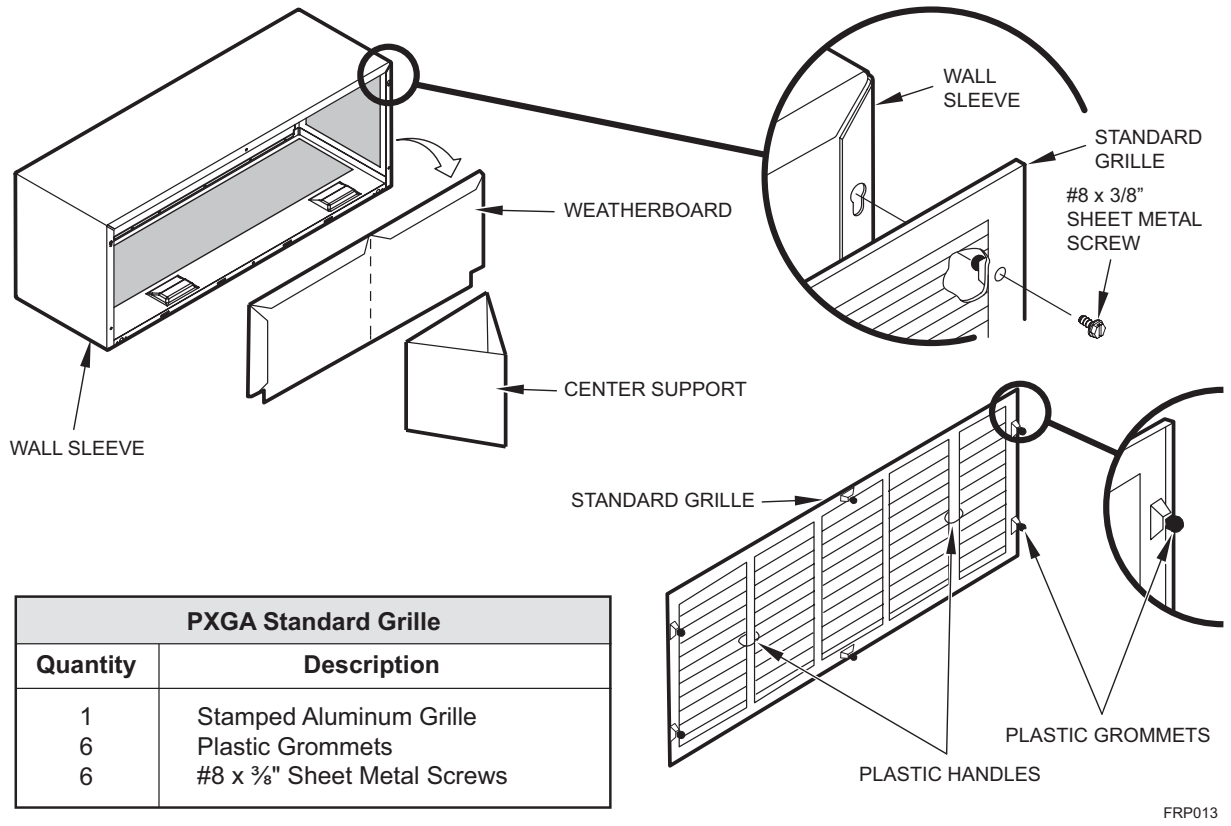
   From inside the building, maneuver the grille through the wall sleeve and pull toward you until the screw heads are inserted into the keyhole slots at the top of the wall sleeve. Tighten the two screws completely.
5. Insert the remaining screws into the remaining holes and tighten securely.

⚠WARNING

Falling Object Hazard

Not following Installation Instructions for mounting your air conditioner can result in property damage, injury, or death.

Figure 13
Standard Grille



PXGA Standard Grille	
Quantity	**Description**
1	Stamped Aluminum Grille
6	Plastic Grommets
6	#8 x ⅜" Sheet Metal Screws

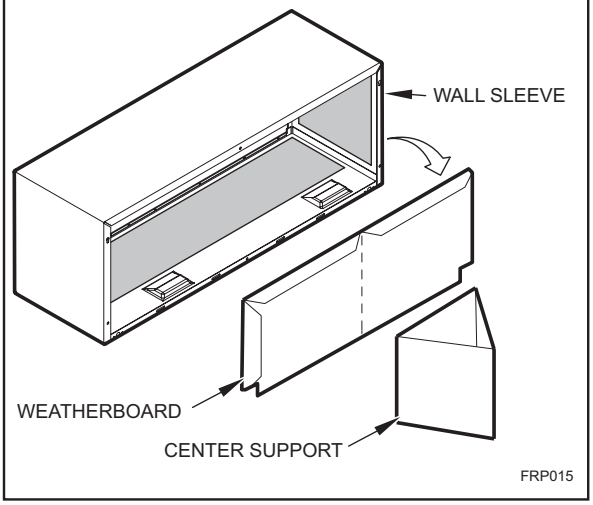
INSTALLATION

Chassis Install Preparation

Check to be sure the wall sleeve, extension (if used), grille, and drain kit are installed properly before chassis installation.

1. Remove the weatherboard and center support from the sleeve (if still in place). Be sure an outdoor grille is attached.

Figure 18



NOTE: Use a wall sleeve adapter kit (PXSE) if installing a P-Series chassis in a T-Series sleeve.

⚠WARNING

Suffocation Hazards

Keep bag away from babies and children.

Do NOT use in cribs, beds or playpens. Destroy immediately after opening. This bag is NOT a toy.

Failure to do so can result in personal injury and/or death.

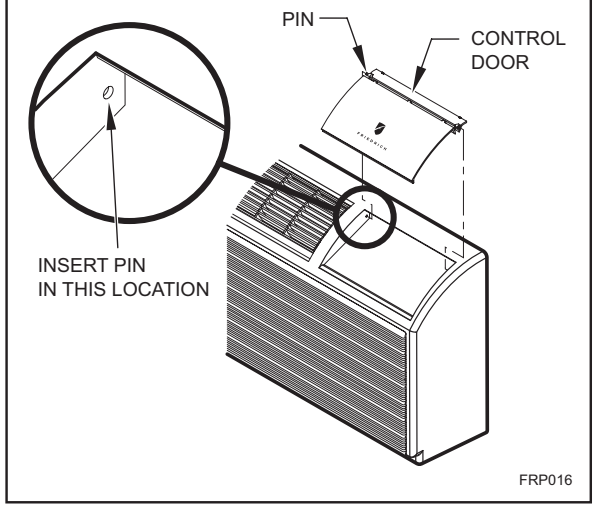
2. Remove the front cover contained in a protective plastic bag from chassis. Remove the bag and dispose of it properly.

If the control door is not installed, follow these steps:

a. From the front cover, slide the right control door pin into the hole on the right side of the front cover.
b. Slide the left door pin into the hole on the left side of the front cover opening.
c. Snap cover into place.

NOTE: To avoid breaking the door or hinge pins, do not apply excessive force when installing.

Figure 19



IMPORTANT: When installing a Friedrich PTAC into an existing sleeve, it is important to ensure that the unit is installed completely. Inspection of the air seal between the condenser air baffles and around the indoor mounting flange is recommended.

In some cases additional gaskets or baffling may be required.

INSTALLATION

Chassis Install Preparation

CAUTION

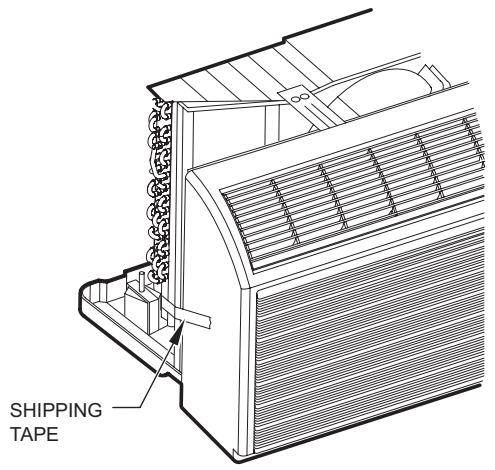
Unit Damage Hazard

Failure to follow this caution may result in equipment damage or improper operation.

Failure to remove shipping tape and screw will prevent fresh air vent door from opening and may result in damage to vent door cable.

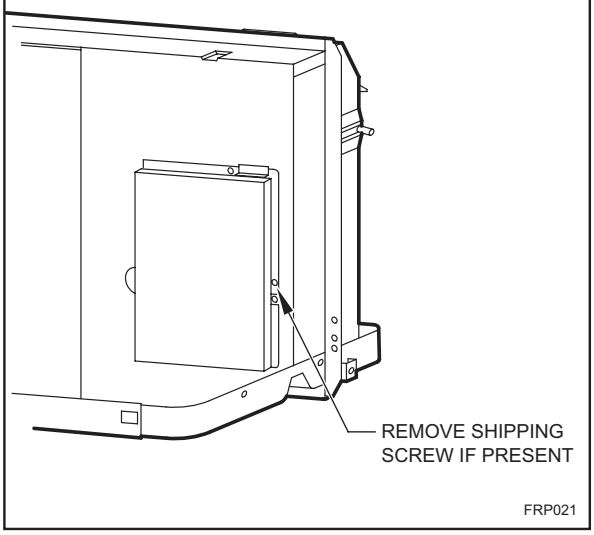
3. Carefully remove shipping tape from the front panel and vent door. See Figure 20

Figure 20
Shipping Tape Location



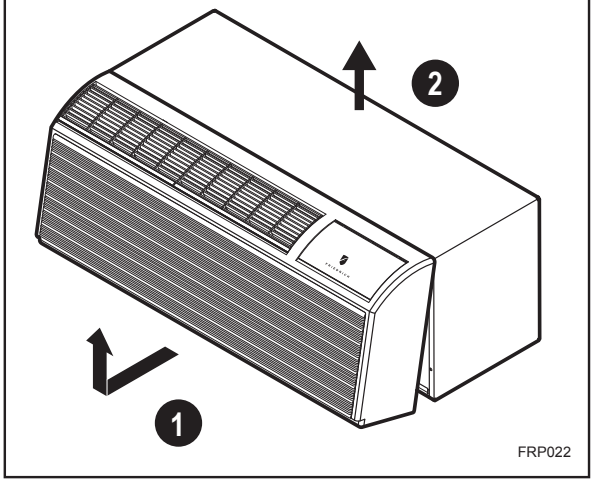
4. Remove shipping screw from the vent door, if present. See Fig 21.

Figure 21
Shipping Screw Location



5. Remove front panel. See Figure 22.

Figure 22
Removing Front Panel



Pull out at the bottom to release it from the tabs (1). Then lift up (2).

NOTE: If the unit is mounted flush to the floor, the service cord MUST be rerouted at the bottom of the front cover on the side closest to the receptacle. A notch MUST be made in the front cover side where the cord exits the unit. It is the responsibility of the installer to create an exit notch.

INSTALLATION

Thermostat

Remote Control Thermostat Installation

Install Thermostat

1. Approximately 5 ft. from the floor.
2. Close to or in a frequently used room, preferably on an inside wall.
3. On a section of wall without pipes or ductwork.

The Thermostat should NOT be mounted:

1. Close to a window, on an outside wall, or next to a door leading outside.
2. Where it can be exposed to direct sunlight or heat, such as the sun, a lamp, fireplace, or any ther temperatureradiating object which may cause a false reading.
3. Close to or in the direct airflow of supply registers and/or return air grilles.
4. Any areas with poor air circulation, such as a corner, behind a door, or an alcove.

Remote Thermostat and Low Voltage Control Connections

Remote Thermostat

All Friedrich PZ model PTAC units are factory configured to be controlled by either the chassis mounted Smart Center or a 24V remote wall mounted thermostat. The thermostat may be auto or manual changeover as long as the control configuration matches that of the PTAC unit.

NOTE: All PDE models require a single stage cool, single stage heat thermostat. All PDH models require a single stage cool, dual stage heat thermostat with an O reversing valve control. The Friedrich RT6 thermostat can be configured for either model.

To control the unit with a wall mounted thermostat follow the steps below:

1. Unplug the unit before doing any work.
2. With the front cover removed locate the dip switches located below the Smart Center control panel. See page 23. Switch Dip switch 2 to the up on 'ON' position.
3. Remove the low voltage terminal block from the unit.
4. Connect the corresponding terminals from the wall thermostat to the terminal block.
5. Replace the terminal block on the unit.
6. Restore power to the unit.
7. The unit is now controlled by the wall thermostat only.
8. If the accessory escutcheon kit (PDXRTA) is to be used, install it over the existing control panel.

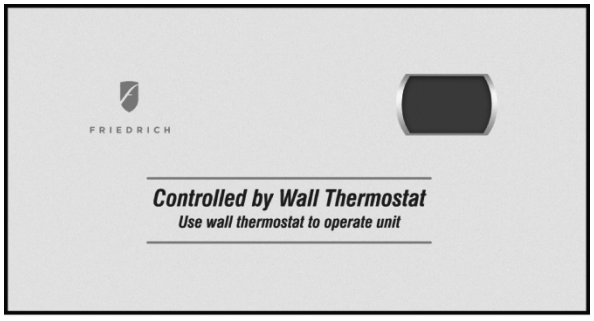
NOTE: The unit mounted controls no longer control the unit. To restore the unit mounted controls move dip switch 2 to the down or 'OFF' position.

Thermostat Connections

R = 24V Power from Unit
Y = Call for Cooling
W = Call for Heating
O = Reversing Valve Energized in cooling mode (PDH Models Only)
GL = Call for Low Fan
GH = Call for High Fan
C = Common Ground

*If only one G terminal is present on thermostat connect to GL for low speed fan or to GH for high speed fan operation.

Figure 33
Control board with optional PDXRT escutcheon kit installed



FRP029

INSTALLATION

Thermostat

Desk Control Terminals

The Friedrich PD model PTAC has built-in provisions for connection to an external switch to control power to the unit. The switch can be a central desk control system or even a normally open door switch.

For desk control operation connect one side of the switch to the D1 terminal and the other to the D2 terminal (See Figure 31, Page 23). Whenever the switch closes the unit operation will stop.

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

Energy Management

Sometimes known as Front Desk Control, an input is provided so that the unit can be manually disabled from a remote location. If the unit detects 24Vac on this input, it will automatically turn itself off. If no voltage is detected on the input , the unit will run normally.

NOTE: It is the installer's responsibility to ensure that all control wiring connections are made in accordance with the installation instructions. Improper connection of the thermostat control wiring and/or tampering with the unit's internal wiring can void the equipment warranty. Other manufacturer's PTACs and even older Friedrich models may have different control wire connections. Questions concerning proper connections to the unit should be directed to Friedrich.

⚠WARNING

Electrical Shock Hazard

Turn off electrical power before service or installation.
ALL electrical connections and wiring **MUST** be installed by a qualified electrician and conform to the National Code and all local codes which have jurisdiction.
Improper connection of the thermostat control wiring and/or tampering with the units internal wiring may result in property damage, personal injury or death.

Final Inspection & Start-up Checklist

- ❑ Inspect and ensure that all components and accessories have been installed properly and that they have not been damaged during the installation process.
- ❑ Check the condensate water drain(s) to ensure they are adequate for the removal of condensate water, and that they meet the approval of the end user.
- ❑ Ensure that all installations 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 entire installation is in compliance with all applicable national and local codes and ordinances that have jurisdiction.
- ❑ Secure components and accessories, such as the chassis, decorative front cover and control door.
- ❑ Start the unit and check for proper operation of all components in each mode of operation. Instruct the owner or operator of this units operation, and the manufacturer's recommended routine maintenance schedule.

NOTE: A log for recording the dates of maintenance and/or service is recommended.

- ❑ 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.

Routine Maintenance

To ensure proper unit operation and life expectancy the following maintenance procedures should be performed on a regular basis.

⚠WARNING

Electrical Shock Hazard

Unplug Unit or turn off electrical power to unit prior to performing maintenance procedures.

Failure to do so can result in electrical shock or death.

Air Filter

To ensure proper unit operation, the air filters should be cleaned at least monthly, and more frequently if conditions warrant. The unit must be turned off before the filters are cleaned.

To remove the air filters, grasp the top of the filter and lift out of the front cabinet. Reverse the procedure to reinstall the filters.

Clean the filters with a mild detergent in warm water, and allow them to dry thoroughly before reinstalling.

Coils & Chassis

NOTE: Do not use a caustic coil cleaning agent on coils or base pan. Use a biodegradable cleaning agent and degreaser. The use of harsh cleaning materials may lead to deterioration of the aluminum fins or the coil end plates.

The indoor coil and outdoor coils and base pan should be inspected periodically (annually or semi-annually) and cleaned of all debris (lint, dirt. leaves, paper, etc.) as necessary. Under extreme conditions, more frequent cleaning may by required. Clean the coils and base pan with a soft brush and compressed air or vacuum. A pressure washer may also be used, however, you must be careful not to bend the aluminium fin pack. Use a sweeping up and down motion in the direction of the vertical aluminium fin pack when pressure cleaning coils.

NOTE: It is extremely important to insure that none of the electrical and/or electronic parts of the unit get wet. Be sure to cover all electrical components to protect them from water or spray.

Decorative Front

The decorative front and discharge air grille may be cleaned with a mild soap or detergent. Do NOT use solvents or hydrocarbon based cleaners such as acetone, naphtha, gasoline, benzene, etc., to clean the decorative front or air discharge grilles.

Use a damp (not wet) cloth when cleaning the control area to prevent water from entering the unit, and possibly damaging the electronic control.

Fan Motor & Compressor

The fan motor & compressor and are permanently lubricated, and require no additional lubrication.

Wall Sleeve

Inspect the inside of the wall sleeve and drain system periodically (annually or semi-annually) and clean as required.

Under extreme conditions, more frequent cleaning may be necessary. Clean both of these areas with an antibacterial and antifungal cleaner. Rinse both items thoroughly with water and ensure that the drain outlets are operating correctly. Check the sealant around the sleeve and reseal areas as needed.

R-410A SEALED SYSTEM REPAIR

⚠ 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.

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

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.
13. Use industry standard R-410A filter dryers.

IMPORTANT

SEALED SYSTEM REPAIRS TO COOL-ONLY MODELS REQUIRE THE INSTALLATION OF A LIQUID LINE DRIER.

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 REPAIRS

⚠ 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

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.

Refrigerant Charging

NOTE: Because the refrigerant system is a sealed system, service process tubes will have to be installed. First install a line tap and remove refrigerant from system. Make necessary sealed system repairs and vacuum system. Crimp process tube line and solder end shut. Do not leave a service valve in the sealed system.

Proper refrigerant charge is essential to proper 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 the systems.

An overcharged unit will 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 REPAIRS

⚠ WARNING

RISK OF ELECTRIC SHOCK

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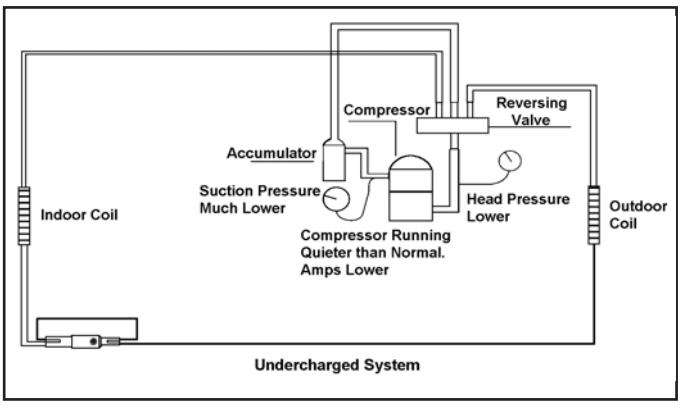

Figure 601 (Undercharged System)

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 or partial restriction in the refrigeration system besides the metering device..

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.

R-410A SEALED SYSTEM REPAIRS

⚠ 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

HIGH PRESSURE HAZARD

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

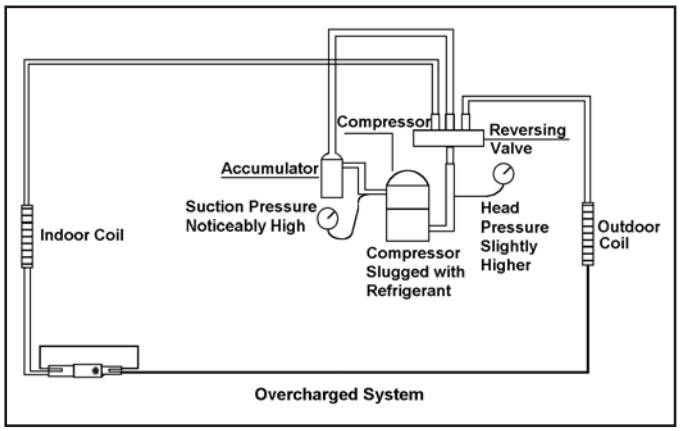


Figure 602 (Overcharged System)

Overcharged Refrigerant Systems

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.

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

R-410A SEALED SYSTEM REPAIRS

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, or the compressor disengages, 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.

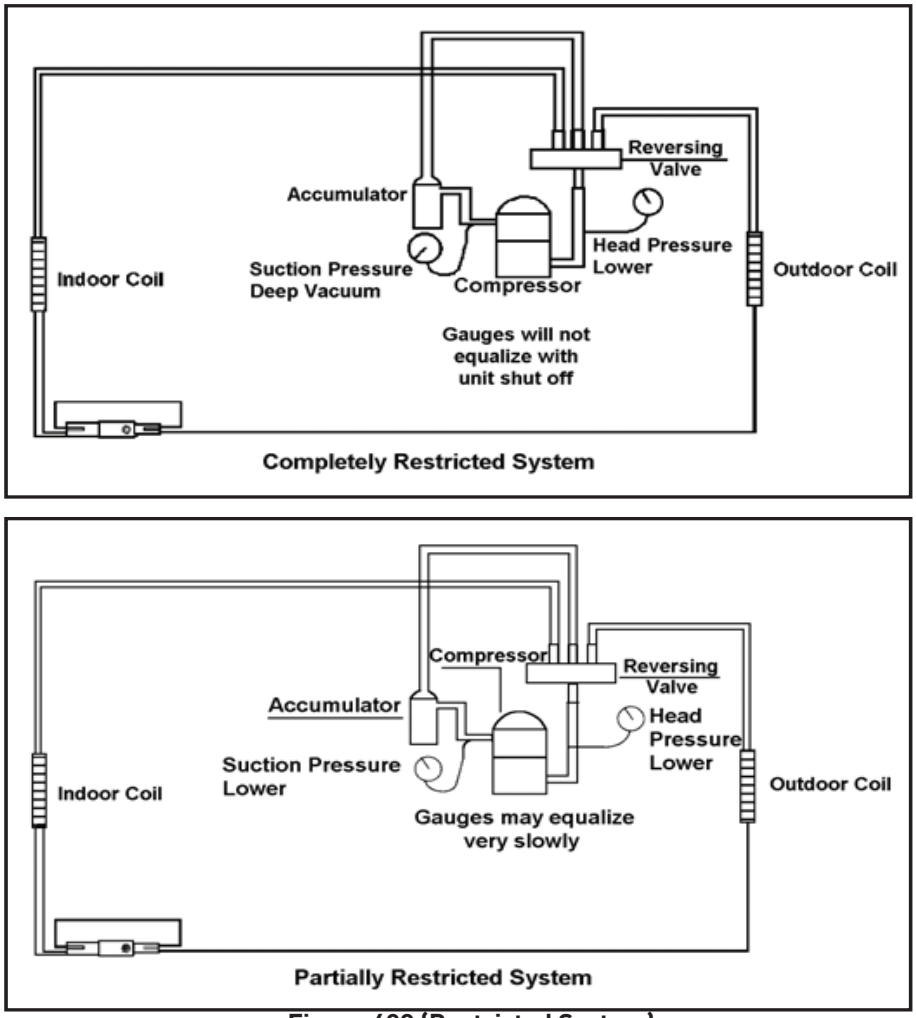


Figure 603 (Restricted System)

R-410A SEALED SYSTEM REPAIRS

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 refrigerant cycle is critically charged. The only acceptable method for charging the sealed system is the Weighed in Charge Method.

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. Install a piercing valve to remove refrigerant from the sealed system. (Piercing valve must be removed from the system before recharging.)
2. Recover Refrigerant in accordance with EPA regulations.
3. Install a process tube to sealed system.
4. Make necessary repairs to system.
5. Evacuate system to 200 microns or less.
6. Weigh in refrigerant with the property quantity of R-410A refrigerant.
7. Start unit, and verify performance.
8. Crimp the process tube and solder the end shut.

COMPONENT TESTING

Electrical

BLOWER / FAN MOTOR

A single phase permanent split capacitor motor is used to drive the evaporator blower and condenser fan. A self-resetting overload is located inside the motor to protect against high temperature and high amperage conditions.

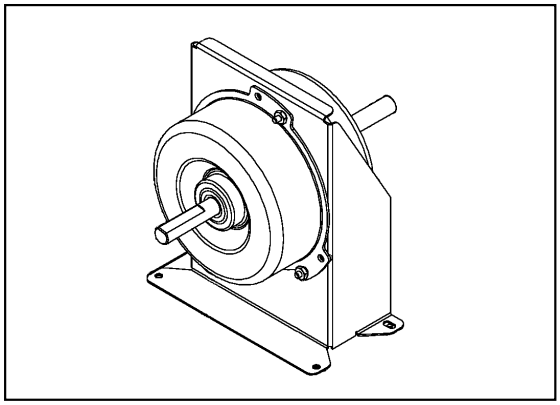
⚠ WARNING

ELECTRIC SHOCK HAZARD

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

BLOWER / FAN MOTOR TEST

1. Make sure the motor has cooled down.
2. Disconnect the fan motor wires from the control board.
3. Test for continuity between the windings also, test to ground.
4. If any winding is open or grounded replace the motor.



CAPACITORS

⚠ WARNING

ELECTRIC SHOCK HAZARD

Turn off electric power before servicing. Discharge capacitor with a 20,000 Ohm 2 Watt resistor before handling.

Failure to do so may result in personal injury, or death.

Many motor capacitors are internally fused. Shorting the terminals will blow the fuse, ruining the capacitor. A 20,000 ohm 2 watt resistor can be used to discharge capacitors safely. Remove wires from capacitor and place resistor across terminals. When checking a dual capacitor with a capacitor analyzer or ohmmeter, both sides must be tested.

Capacitor Check with Capacitor Analyzer

The capacitor analyzer will show whether the capacitor is "open" or "shorted." It will tell whether the capacitor is within its micro farads rating and it will show whether the capacitor is operating at the proper power-factor percentage. The instrument will automatically discharge the capacitor when the test switch is released.

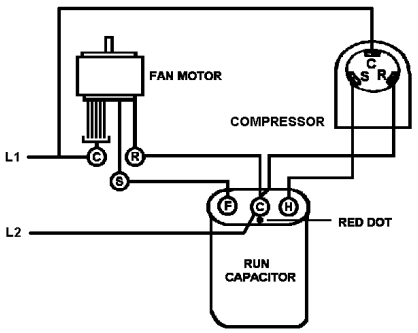
Capacitor Connections

The starting winding of a motor can be damaged by a shorted and grounded running capacitor. This damage usually can be avoided by proper connection of the running capacitor terminals.

From the supply line on a typical 230 volt circuit, a 115 volt potential exists from the "R" terminal to ground through a possible short in the capacitor. However, from the "S" or start terminal, a much higher potential, possibly as high as 400 volts, exists because of the counter EMF generated in the start winding. Therefore, the possibility of capacitor failure is much greater when the identified terminal is connected to the "S" or start terminal. The identified terminal should always be connected to the supply line, or "R" terminal, never to the "S" terminal.

When connected properly, a shorted or grounded running capacitor will result in a direct short to ground from the "R" terminal and will blow the line fuse. The motor protector will protect the main winding from excessive temperature.

Dual Rated Run Capacitor Hook-up



COMPONENT TESTING

Electrical

HEATER ELEMENTS AND LIMIT SWITCHES' SPECIFICATIONS

All heat pumps and electric heat models are equipped with a heating element and a limit switch (bimetal thermostat). The limit is in series with the element and will interrupt the power at a designed temperature.

Should the blower motor fail, filter become clogged or airflow be restricted etc., the high limit switch will open and interrupt the power to the heater before reaching an unsafe temperature condition.

TESTING THE HEATING ELEMENTS AND LIMIT SWITCHES

⚠ WARNING

ELECTRIC SHOCK HAZARD

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

Testing of the heating elements can be made with an ohmmeter or continuity tester across the terminals after the power wires have been removed. Test the limit switch for continuity across its input and output terminals.Test below the limit switch's reset temperature.

DRAIN PAN VALVE

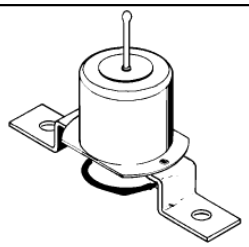
During the cooling mode of operation, condensate which collects in the drain pan is picked up by the condenser fan blade and sprayed onto the condenser coil. This assists in cooling the refrigerant plus evaporating the water.

During the heating mode of operation, it is necessary that water be removed to prevent it from freezing during cold outside temperatures. This could cause the condenser fan blade to freeze in the accumulated water and prevent it from turning.

To provide a means of draining this water, a bellows type drain valve is installed over a drain opening in the base pan.

This valve is temperature sensitive and will open when the outside temperature reaches 40°F. The valve will close gradually as the temperature rises above 40°F to fully close at 60°F.

Bellows Assembly
Drain Pan Valve



COMPONENT TESTING

Hermetic Components Check

⚠ 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.

Metering Device - Capillary Tube Systems

All units are equipped with capillary tube metering devices. Checking for restricted capillary tubes.

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 check valve and the cooling capillary are 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 lower than normal, the heating capillary is restricted.
4. If the operating pressures are lower than normal in both the heating and cooling mode, the cooling capillary is restricted.

Check Valve

A unique two-way check valve is used on the reverse cycle heat pumps. It is pressure operated and used to direct the flow of refrigerant through a single filter drier and to the proper capillary tube during either the heating or cooling cycle.

NOTE: The slide (check) inside the valve is made of teflon. Should it become necessary to replace the check valve, place a wet cloth around the valve to prevent overheating during the brazing operation.

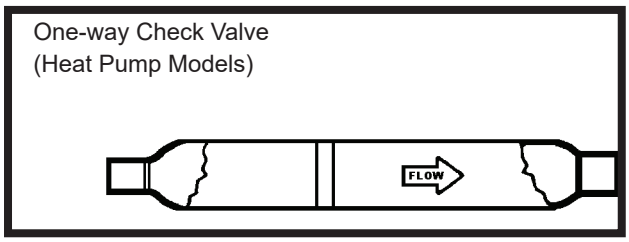


Figure 701 (Check Valve)

CHECK VALVE OPERATION

In the cooling mode of operation, high pressure liquid enters the check valve forcing the slide to close the opposite port (liquid line) to the indoor coil. Refer to refrigerant flow chart. This directs the refrigerant through the filter drier and cooling capillary tube to the indoor coil.

In the heating mode of operation, high pressure refrigerant enters the check valve from the opposite direction, closing the port (liquid line) to the outdoor coil. The flow path of the refrigerant is then through the filter drier and heating capillary to the outdoor coil.

Failure of the slide in the check valve to seat properly in either mode of operation will cause flooding of the cooling coil. This is due to the refrigerant bypassing the heating or cooling capillary tube and entering the liquid line.

COOLING MODE

In the cooling mode of operation, liquid refrigerant from condenser (liquid line) enters the cooling check valve forcing the heating check valve shut. The liquid refrigerant is directed into the liquid dryer after which the refrigerant is metered through cooling capillary tubes to evaporator. (Note: liquid refrigerant will also be directed through the heating capillary tubes in a continuous loop during the cooling mode).

HEATING MODE

In the heating mode of operation, liquid refrigerant from the indoor coil enters the heating check valve forcing the cooling check valve shut. The liquid refrigerant is directed into the liquid dryer after which the refrigerant is metered through the heating capillary tubes to outdoor coils. (Note: liquid refrigerant will also be directed through the cooling capillary tubes in a continuous loop during the heating mode).

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.

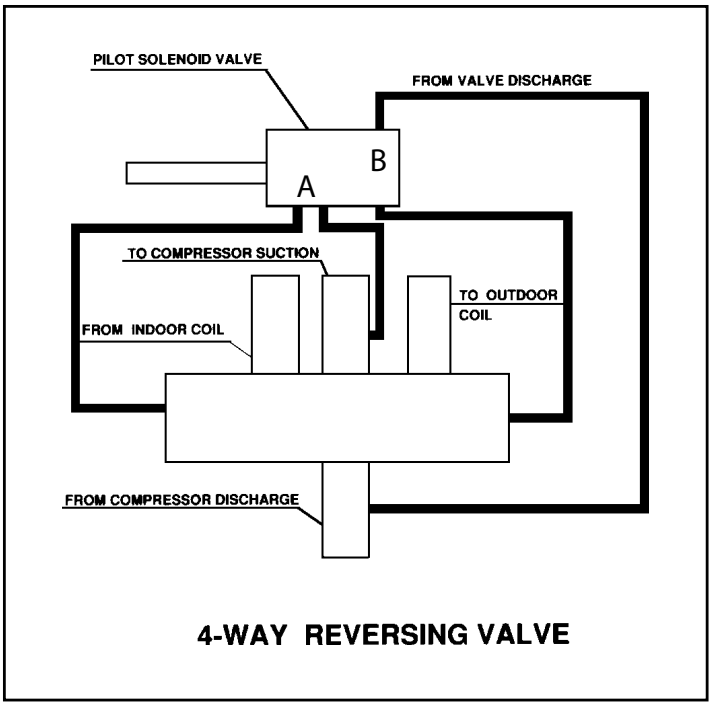


Figure 702 (Reversing Valve)

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

Certain unit components operate at temperatures hot enough to cause burns.

Proper safety procedures must be followed, and proper protective clothing must be worn.

Failure to follow these procedures could result in minor to moderate 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". Rapidly cycle. 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.

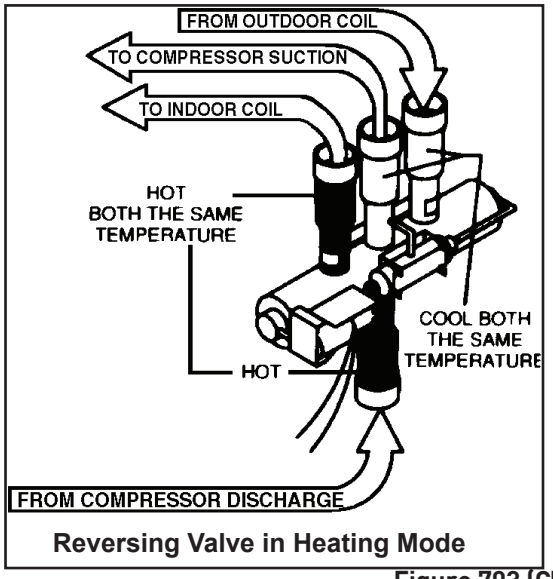
Should the valve fail to shift from cooling to heating, block the air flow through the outdoor coil and allow the discharge pressure to build in the system. Then switch the system from heating to cooling.

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.



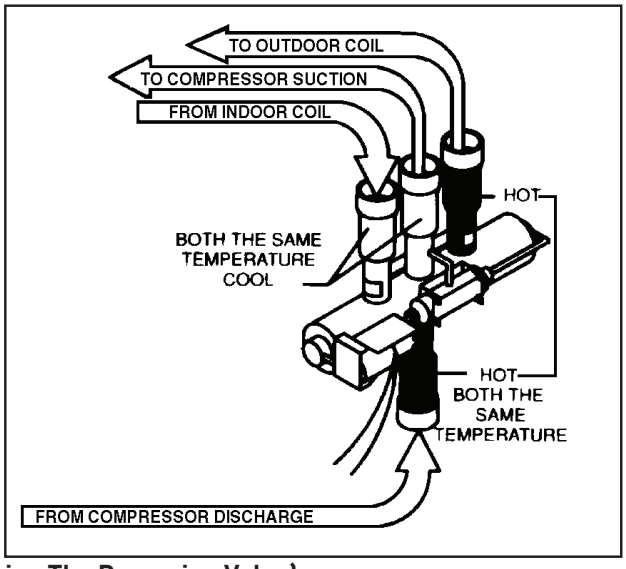


Figure 703 (Checking The Reversing Valve)

COMPONENT TESTING

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

The use of a torch requires extreme care and proper judgment. Follow all safety recommended precautions and protect surrounding areas with fire proof materials. Have a fire extinguisher readily available. Failure to follow this notice could result in moderate to serious property damage.

1. Install Process Tubes. 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, remove solenoid and 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. Pressurize system to 550 psi and triple evacuate. 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.

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 damage.	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 suffi 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 704 (Touch Test Chart)

COMPONENT TESTING

Compressor Checks

⚠ WARNING

ELECTRIC SHOCK HAZARD

Turn off electric power before service or installation.

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 personal 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.

Locked Rotor Voltage (L.R.V.) Test
Locked rotor voltage (L.R.V.) is the actual voltage available at the compressor under a stalled condition.

Single Phase Connections
Disconnect power from unit. Using a voltmeter, attach one lead of the meter to the run "R" terminal on the compressor and the other lead to the common "C" terminal of the com-pressor. Restore power to unit.

Determine L.R.V.
Start the compressor with the volt meter attached; then stop the unit. Attempt to restart the compressor within a couple of seconds and immediately read the voltage on the meter. The compressor under these conditions will not start and will usually kick out on overload within a few seconds since the pressures in the system will not have had time to equalize. Voltage should be at or above minimum voltage of 197 VAC, as specified on the rating plate. If less than minimum, check for cause of inadequate power supply; i.e., incorrect wire size, loose electrical connections, etc.

Amperage (R.L.A) Test
The running amperage of the compressor is the most important of these readings. A running amperage higher than that indicated in the performance data indicates that a problem exists mechanically or electrically.

Single Phase Running and L.R.A. Test
NOTE: Consult the specification and performance section for running amperage. The L.R.A. can also be found on the rating plate.
Select the proper amperage scale and clamp the meter probe around the wire to the "C" terminal of the compressor.
Turn on the unit and read the running amperage on the meter. If the compressor does not start, the reading will indicate the locked rotor amperage (L.R.A.).

Overloads
The compressor is equipped with either an external or internal overload which senses both motor amperage and winding temperature. High motor temperature or amperage heats the overload causing it to open, breaking the common circuit within the compressor. Heat generated within the compressor shell, usually due to recycling of the motor, is slow to dissipate. It may take anywhere from a few minutes to several hours for the overload to reset.

Checking the Overloads

External Overloads VPAK 9, 12, and 18K Btus
With power off, remove the leads from compressor terminals. If the compressor is hot, allow the overload to cool before starting check. Using an ohmmeter, test continuity across the terminals of the external overload. If you do not have continuity; this indicates that the overload is open and must be replaced.

Internal Overloads VPAK 24k Btus
The overload is embedded in the motor windings to sense the winding temperature and/or current draw. The overload is connected in series with the common motor terminal.
Should the internal temperature and/or current draw become excessive, the contacts in the overload will open, turning off the compressor. The overload will automatically reset, but may require several hours before the heat is dissipated.

Checking the Internal Overload
1. With no power to unit, remove the leads from the compressor terminals.
2. Using an ohmmeter, test continuity between terminals

C-S and C-R. If no continuity, the compressor overload is open and the compressor must be replaced.

COMPONENT TESTING

Compressor Checks

⚠ 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

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.

Single Phase Resistance Test

Remove the leads from the compressor terminals and set the ohmmeter on the lowest scale (R x 1).
Touch the leads of the ohmmeter from terminals common to start ("C" to "S"). Next, touch the leads of the ohmmeter from terminals common to run ("C" to "R").
Add values "C" to "S" and "C" to "R" together and check resistance from start to run terminals ("S" to "R"). Resistance "S" to "R" should equal the total of "C" to "S" and "C" to "R."
In a single phase PSC compressor motor, the highest value will be from the start to the run connections ("S" to "R"). The next highest resistance is from the start to the common connections ("S" to "C"). The lowest resistance is from the run to common. ("C" to "R") Before replacing a compressor, check to be sure it is defective.

GROUND TEST

Use an ohmmeter set on its highest scale. Touch one lead to the compressor body (clean point of contact as a good connection is a must) and the other probe in turn to each compressor terminal. If a reading is obtained the compressor is grounded and must be replaced.
Check the complete electrical system to the compressor and compressor internal electrical system, check to be certain that compressor is not out on internal overload.

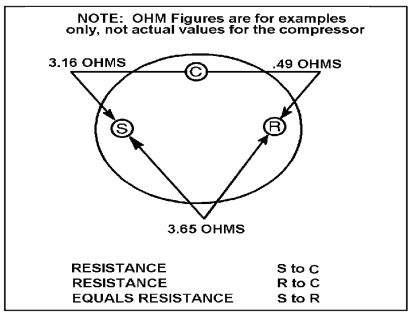


Figure 705 (Resistance Chart)

Complete evaluation of the system must be made whenever you suspect the compressor is defective. If the compressor has been operating for sometime, a careful examination must be made to determine why the compressor failed.
Many compressor failures are caused by the following conditions:
1.Improper air flow over the evaporator.
2.Overcharged refrigerant system causing liquid to be returned to the compressor.
3.Restricted refrigerant system.
4.Lack of lubrication.
5.Liquid refrigerant returning to compressor causing oil to be washed out of bearings.
6.Noncondensables such as air and moisture in the system. Moisture is extremely destructive to a refrigerant system.
7.Capacitor.

CHECKING COMPRESSOR EFFICIENCY

The reason for compressor inefficiency is normally due to broken or damaged suction and/or discharge valves, reducing the ability of the compressor to pump refrigerant gas.
This condition can be checked as follows:

1. Install a piercing valve on the suction and discharge or liquid process tube.
2. Attach gauges to the high and low sides of the system.-
3. Start the system to operate the compressor and run a "cooling or heating perfor mance test." If test shows:
   - A. Below normal high side pressure
   - B. Above normal low side pressure
   - C. Low temperature difference across coil

The compressor valves are faulty - replace the compressor.

COMPONENT TESTING

Compressor Replacement

⚠ 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

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

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.

⚠ 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.

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 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 350 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 plate. The use of an accurate measuring device, such as a charging cylinder, electronic scales or similar device is necessary.

COMPONENT TESTING

Compressor Replacement -Special Procedure in Case of Compressor Burnout

1. Recover all refrigerant and oil from the system.
2. Remove compressor, capillary tube and filter drier from the system.
3. Flush evaporator condenser and all connecting tubing with dry nitrogen or equivalent. Use approved 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, including new drier strainer and capillary tube.

⚠ 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.

5. Pressurize with a combination of R-410A and nitrogen and leak test all connections 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 350 psi. Check that system holds pressure.

⚠ 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.

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.

⚠ 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.

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.

ROTARY AND SCROLL COMPRESSOR SPECIAL TROUBLESHOOTING AND SERVICE

Troubleshooting and servicing rotary compressors is basically the same as on the reciprocating compressor with only one main exception:

⚠ 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.

TROUBLESHOOTING

Basic Troubleshooting

COMPLAINT	CAUSE	SOLUTION
Unit does not operate.	• Unit turned off.	• Turn unit on
	• Thermostat is satisfied.	• Raise/Lower temperature setting.
	• LCDI power cord is unplugged.	• Plug into a properly grounded 3 prong receptacle. See "Electrical Rating Tables" on page 13 for the proper receptacle type for your unit.
	• LCDI power cord has tripped.	• Press and release RESET (listen for click; Reset button latches and remains in) to resume operation.
	• Circuit breaker has tripped.	• Reset the circuit breaker.
	• Supply circuit fuse has blown.	• Replace the fuse.
	• Local power failure.	• Unit will resume normal operation once power has been restored.
Unit trips circuit breaker or blows fuses.	• Other appliances being used on same circuit.	• The unit requires a single outlet circuit, not shared with other appliances.
	• An extension cord is being used.	• Do NOT use an extension cord with this or any other air conditioner.
	• Circuit breaker or time-delay fuse isn't of the proper rating.	• Replace circuit breaker or time-delay fuse for the proper rating. See "Electrical Rating Tables" on page 13. If problem continues contact a licensed electrician.
LCDI Power Cord Trips (Reset Button Pops Out) NOTE: A damaged power supply cord must be replaced with a new power supply cord obtained from the product manufacturer and must not be repaired.	• The LCDI Power cord can trip (Reset button POPS out) due to disturbances on your power supply line.	• Press and release RESET (listen for click; Reset button latches and remains in) to resume normal operation.
	• Electrical overload, overheating or cord pinching can trip (Reset button POPS out) the LCDI power cord.	• Once the problem has been determined and corrected, press and release RESET (listen for click; Reset button latches and remains in) to resume normal operation.
Unit does not cool/heat room sufficiently, or cycles on and off too frequently	• The return/discharge air grille is blocked.	• Ensure that the return and/or discharge air paths are not blocked by curtains, blinds, furniture, etc
	• Windows or doors to the outside are open.	• Ensure that all windows and doors are closed.
	• The temperature is not set at a cool enough/warm enough setting.	• Adjust the temperature control to a cooler or warmer setting as necessary.
	• The filter is dirty or obstructed.	• Clean the filter, (See Recommended Maintenance) or remove obstruction.
	• The indoor coil or outdoor coil is dirty or obstructed.	• Clean the coils, (See Recommended Maintenance) or remove obstruction.
	• The temperature of the room you are trying to cool is extremely hot.	• Allow additional time too cool a very hot room
	• The outside temperature is below 60º F.	• Do not try to operate your air conditioner in the cooling in the cooling mode when the outside temperature is below 60º F. The unit will not cool properly, and the unit may be damaged.
	• The digital control is set to fan cycling mode.	• Since the fan does not circulate the room air continuously at this setting, the room air does not mix as well and hot (or cold) spots may result. Using the continuous fan setting is recommended to obtain optimum comfort levels.
	• The air conditioner has insufficient cooling capacity to match the heat gain of the room.	• Check the cooling capacity of your unit to ensure it is properly sized for the room in which it is installed. Room air conditioners are not designed to cool multiple rooms.

TROUBLESHOOTING

Basic Troubleshooting

COMPLAINT	CAUSE	SOLUTION
Unit does not cool/heat room sufficiently, or cycles on and off too frequently	• The air conditioner has insufficient heating capacity to match the heat loss of the room.	• Check the heating capacity of your unit. Air conditioners are sized to meet the cooling load and heater size is then selected to meet the heating load. In extreme, northern climates, room air conditioners may not be able to be used as a primary source of heat.
Unit runs too much	• This may be due to an excessive heat load in the room. • This may be normal for higher efficiency (EER) air conditioners.	• If there are heat product appliances in use in the room, or if the room is heavily occupied, the unit will need to run loner to remove the additional heat. • Be sure to use exhaust vent fans while cooking or bathing and, if possible, try not to use heat producing appliances during the hottest part of the day. It may also be due to an improperly sized unit. • Depending upon the size of the room being cooled, a higher capacity air conditioner may be necessary • The use of higher efficiency components in your new air conditioner may result in the unit running longer than you feel it should . This may be more apparent, if it replaced an older, less efficient, model. The actual energy usage, however, will be significantly less when compared to older models. • Likewise, you may notice that the discharge air temperature of your new air conditioner may not seem as cold as you may be accustomed to from older units. This does not, however, indicate a reduction in the cooling capacity of the unit • The energy efficiency ratio (EER) and cooling rating (Btu/h) listed on the unit's rating plate are both agency certified.

Service & Assistance

Before calling for service, please check the "Basic Troubleshooting" section above. This may help you to find the answer to your problem, avoid unnecessary service calls, and save you the cost of a service call if the problem is not due to the product itself. If you have checked the "Basic Troubleshooting" section and still need help, here is a list of available services:

You can find the name of you local Authorized Service Provider by visiting our web site at www.friedrich.com.

If you require further assistance you can call the Customer Support Call Center at 1-800-541-6645.

Before calling, please make sure that you have the complete model and serial number, and date of purchase of your equipment available. By providing us with this information we will be better able to assist you.

Our specialists are able to assist you with:

* Inspect and ensure that all components and accessories have been installed properly and that they have not been damaged during the installation.
* Specifications and Features of our equipment
* Referrals to dealers, and distributors.
* Use and Care information
* Recommended maintenance procedures
* Installation information
* Referrals to Authorized Service Providers and Parts depots.

TROUBLESHOOTING

Malfunction Analysis

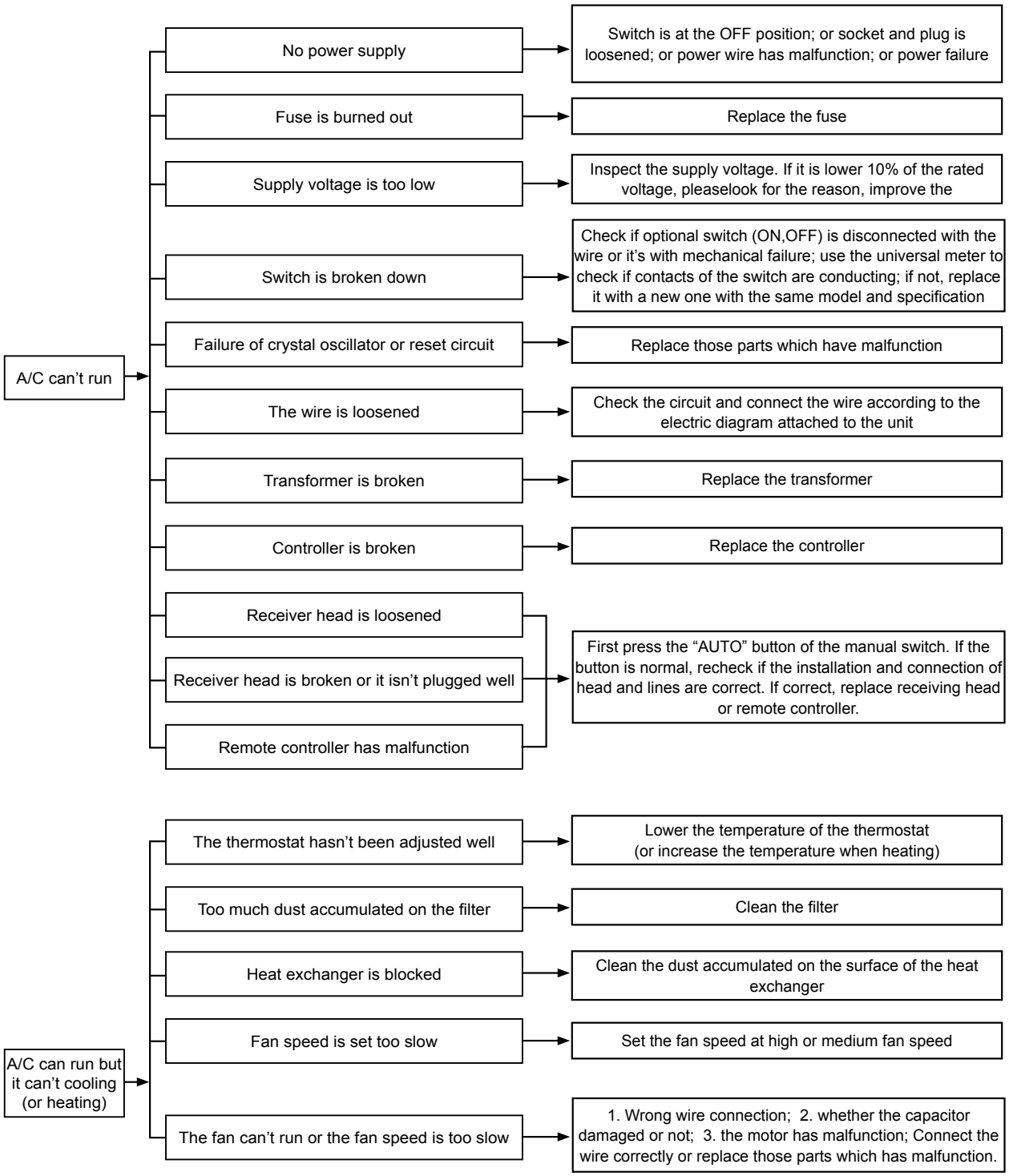
DIGITAL CONTROL DIAGNOSTICS

The chart below lists malfunctions and their description.

1	Indoor air temp sensor open/short	Display ‘F1’, with STATUS light flash
2	Indoor coil sensor open or short	Display ‘F2’, with STATUS light flash
3	Outdoor coil sensor open/short	Display ‘F4’, with STATUS light flash
4	Freeze Guard protection	Display ‘FP’, with STATUS light flash
5	Indoor coil high temp protection	STATUS light flash 8 times and off 3 sec, repeat
6	Outdoor coil high temp protection	STATUS light flash 6 times and off 3 sec, repeat
7	Indoor coil freeze protection	STATUS light flash 5 times and off 3 sec, repeat
8	Defrost (heat pump type)	STATUS light flash 7 times and off 3 sec, repeat
9	Thermostat wiring error	STATUS light flash 9 times and off 3 sec, repeat

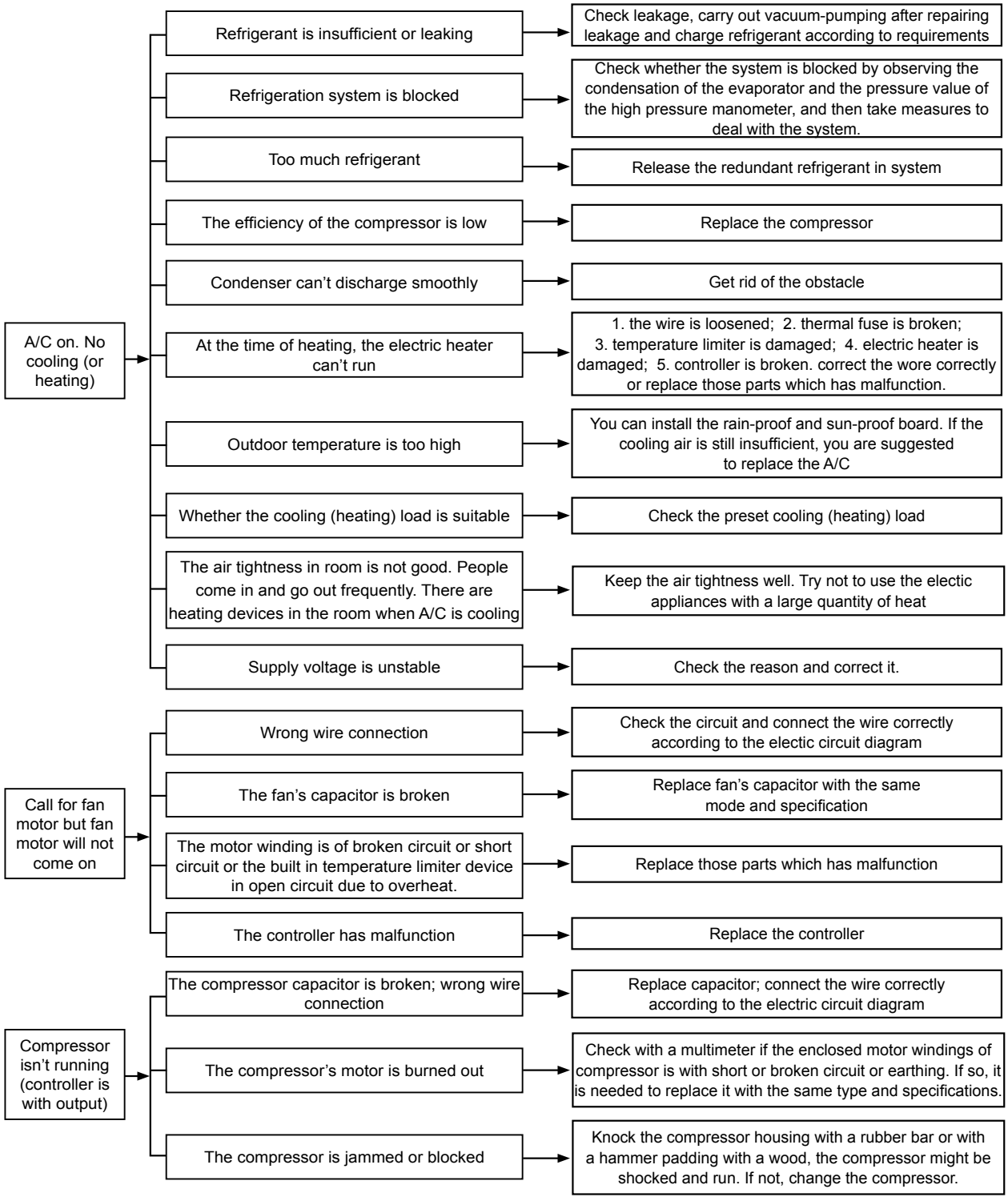
TROUBLESHOOTING

Malfunction Analysis



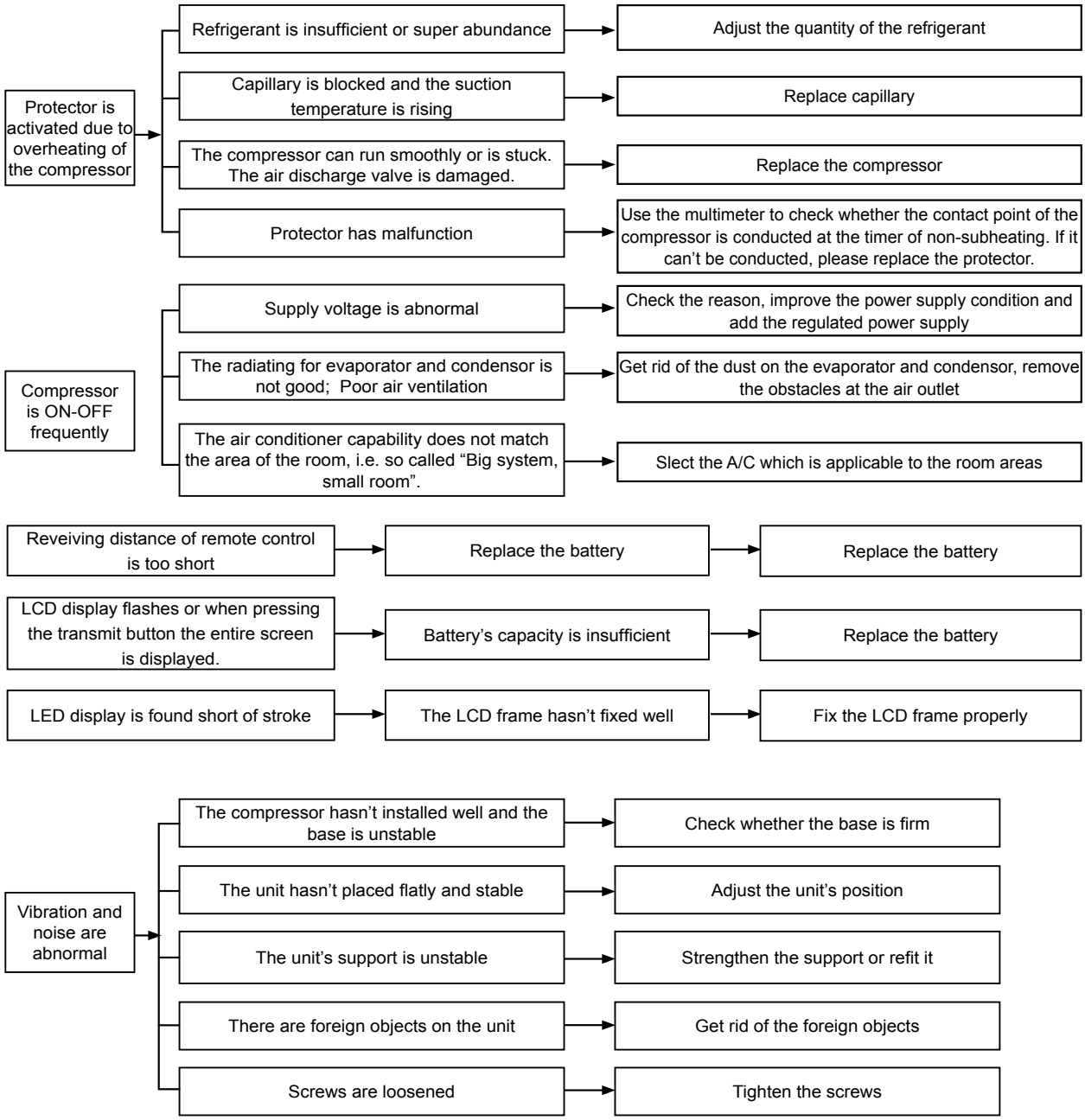
TROUBLESHOOTING

Malfunction Analysis



TROUBLESHOOTING

Malfunction Analysis

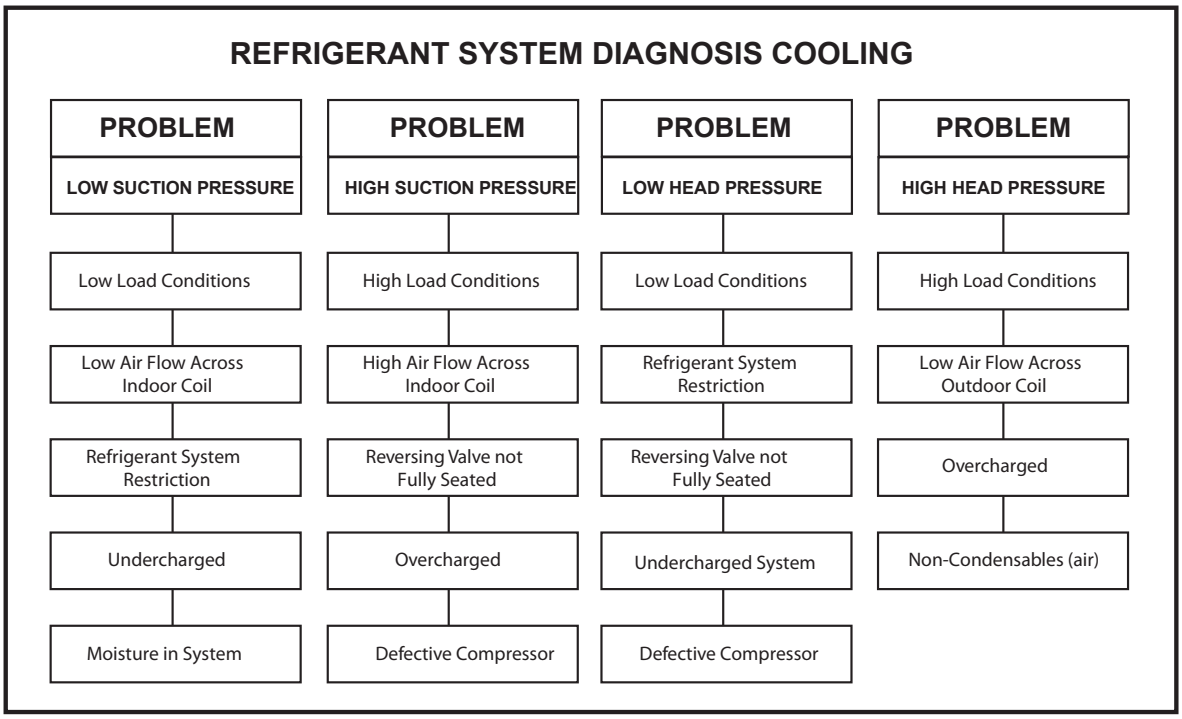


As for the above malfunction analysis, there aren't malfunction related to heating for the cooling only unit.

TROUBLESHOOTING

Troubleshootin Chart

TROUBLESHOOTING CHART - COOLING



TROUBLESHOOTING CHART - HEATING

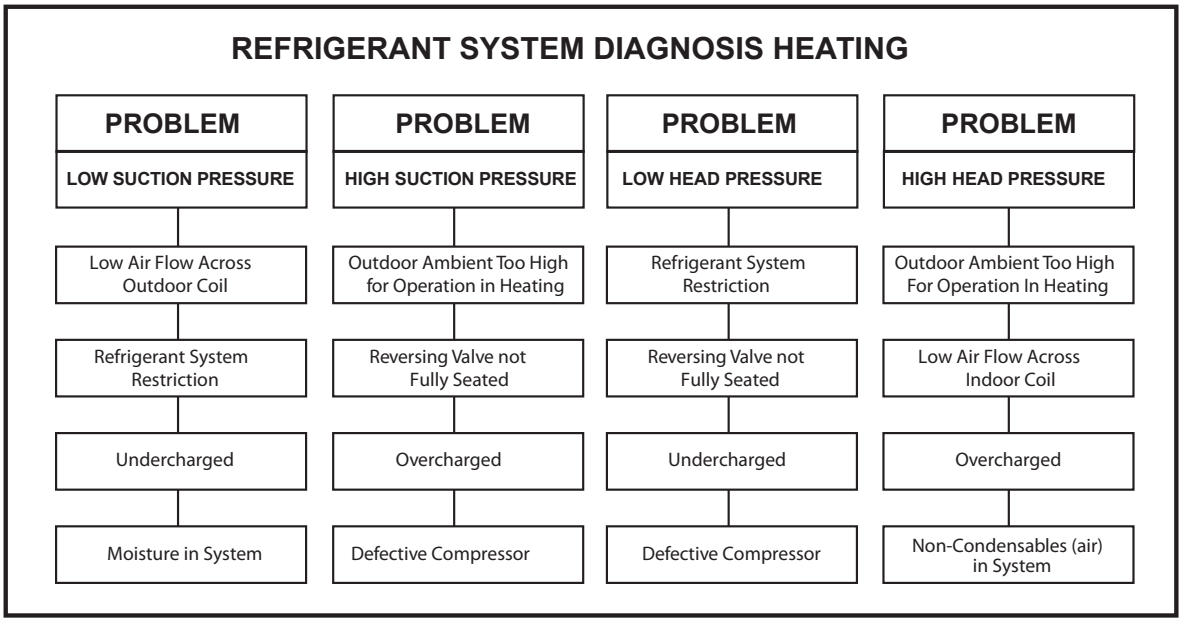


Figure 701

TROUBLESHOOTING

Heat Pump

⚠ 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.

⚠ CAUTION

BURN HAZARD
Certain unit components operate at temperatures hot enough to cause burns.

Proper safety procedures must be followed, and proper protective clothing must be worn.

Failure to do so could result in minor to moderate injury.

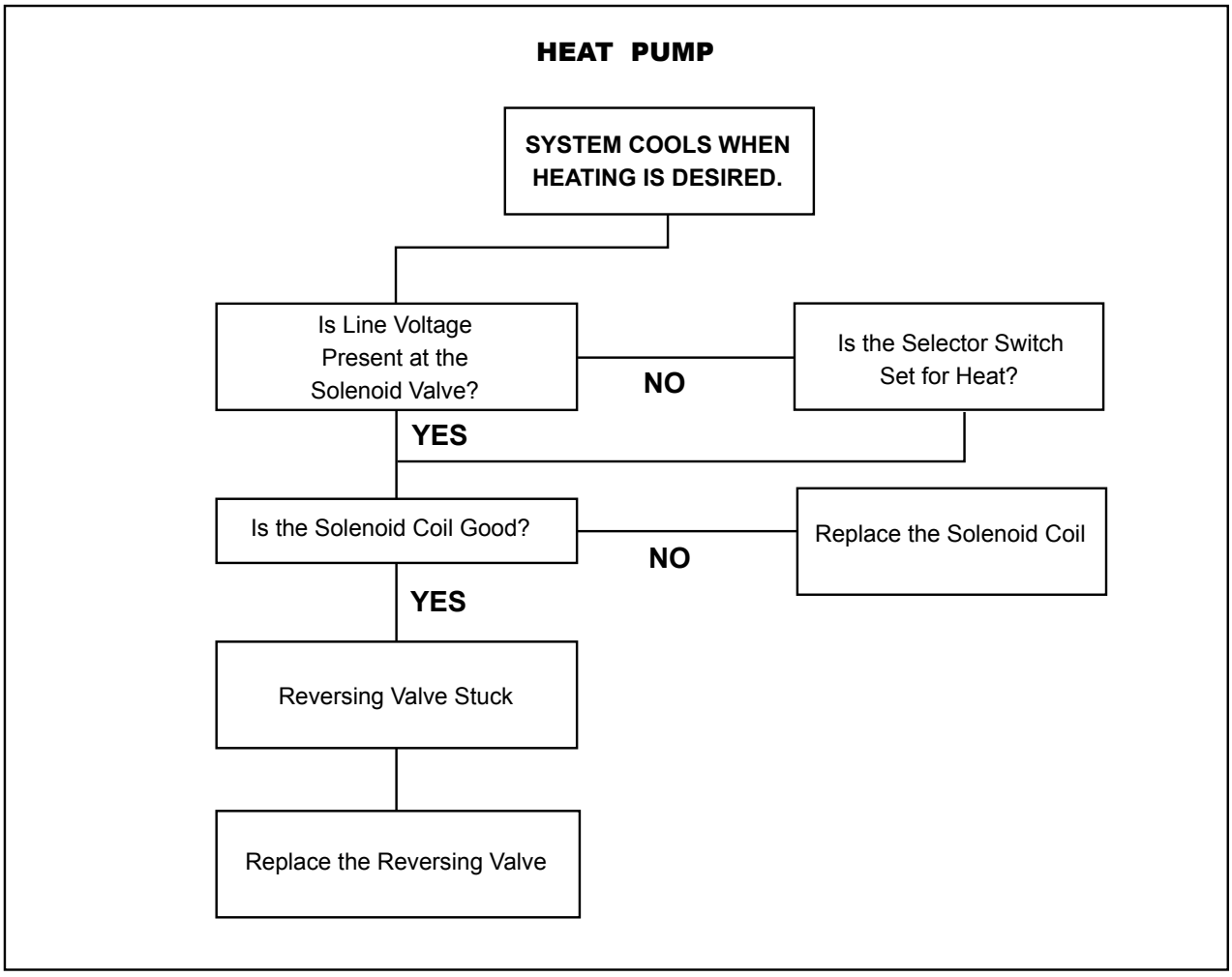


Figure 702

WIRING DIAGRAMS

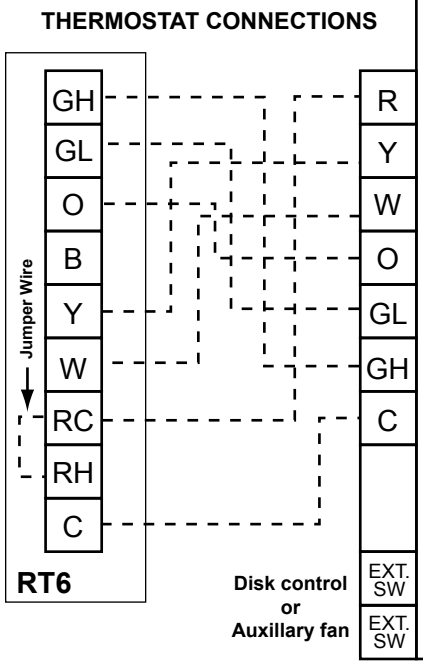
Remote Wall Thermostat Wiring Diagram

Cool With Electric Heat

LEGEND FOR T-STAT WIRING HARNESS

R	24 VAC Power From Unit
Y	Call for Cooling
W	Call for Heat
O	Reversing Valve Energized in cooling mode
GL	Call for Low Fan
GH	Call for High Fan

RT6 - Two Speeds Fan T-Stat - Field Provided
-- -- -- Field Wiring



Electronic Control Board

Figure 801

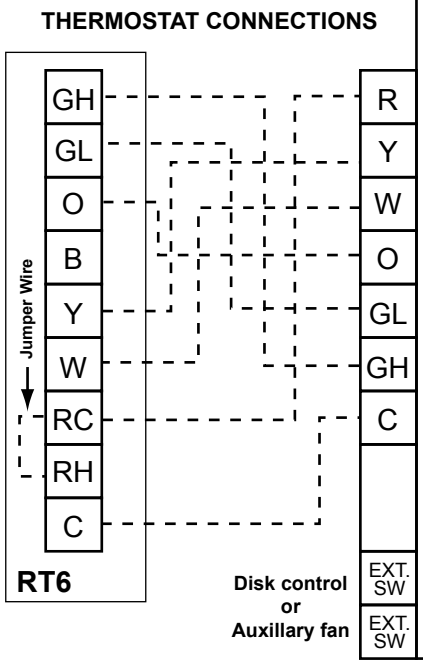
WIRING DIAGRAMS

Remote Wall Thermostat Wiring Diagram

Heat Pump With Electric Heat

LEGEND FOR T-STAT WIRING HARNESS

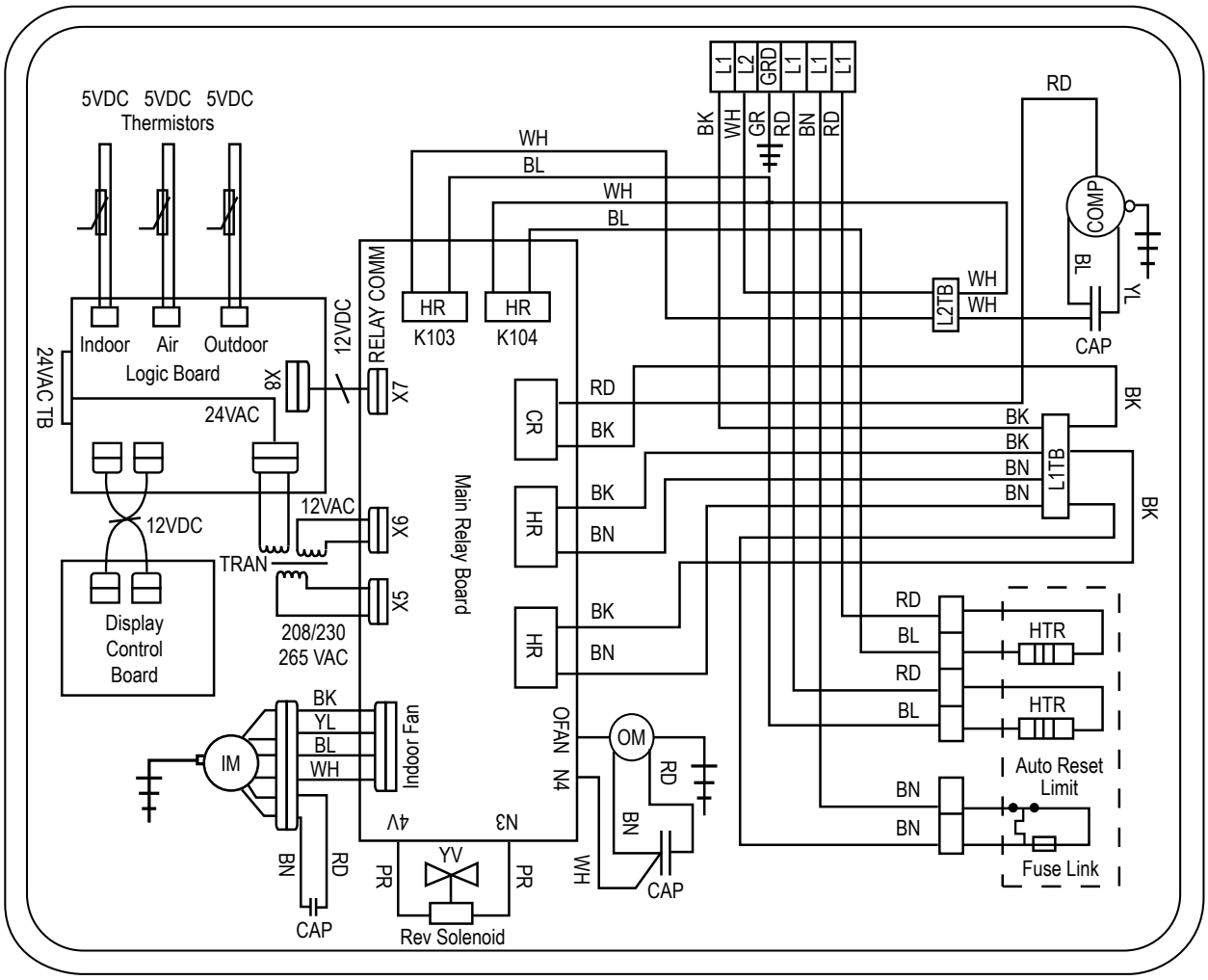
R	24 VAC Power From Unit
Y	Call for Cooling
W	Call for Heat
O	Reversing Valve Energized in cooling mode
GL	Call for Low Fan
GH	Call for High Fan
RT6 - Two Speeds Fan -- -- -- Field Wiring	T-Stat - Field Provided



Electronic Control Board

Figure 802

WIRING DIAGRAMS



COMPONENT ID
COMP = Compressor
CAP = Capacitor
HTR = Heater
TB = Terminal Block
OM = Outdoor Fan Motor
IM = Indoor Fan Motor
TRAN = Transformer
RELAY COMM = L.V. Relay Cable
CR = Compressor Relay
HR = Heater Relay
YV = Reversing Valve Solenoid

WIRE COLOR ID
BL = Blue
BN = Brown
BK = Black
RD = Red
WH = White
PR = Purple
YL = Yellow
GR = Green

Figure 803

PARTS CATALOG

Introduction

This illustrated part catalog has been written to help assist the technician to quickly locate the parts that he or she needs to make a repair.

The catalog is broken down into different figures which represent different modules of the air conditioning unit. For example; the chassis, refrigeration system, blower system, or electrical controls. Each figure contains an illustration(s) containing item numbers and a corresponding item list.

The item list contains the item number, part number, part description, the model it is used on, and the quantity used per figure. The models will end with a letter indicating the major revision of the model. for example; WCT12A30A. Choose the part that corresponds with the USED ON MODEL annotation that corresponds to your nameplate.

In some cases there will be an additional "-" letter indicating there has been a minor revision to that model which may have caused a part number change. For example; WCT12A30A-B. If there are minor revisions listed for a part, and the minor revision that is listed on your equipment's nameplate is not listed in the manual please check our online parts viewer for the latest update. If you still require asistance, call Friedrich customer service(1-800-541-6645) for an explanation.

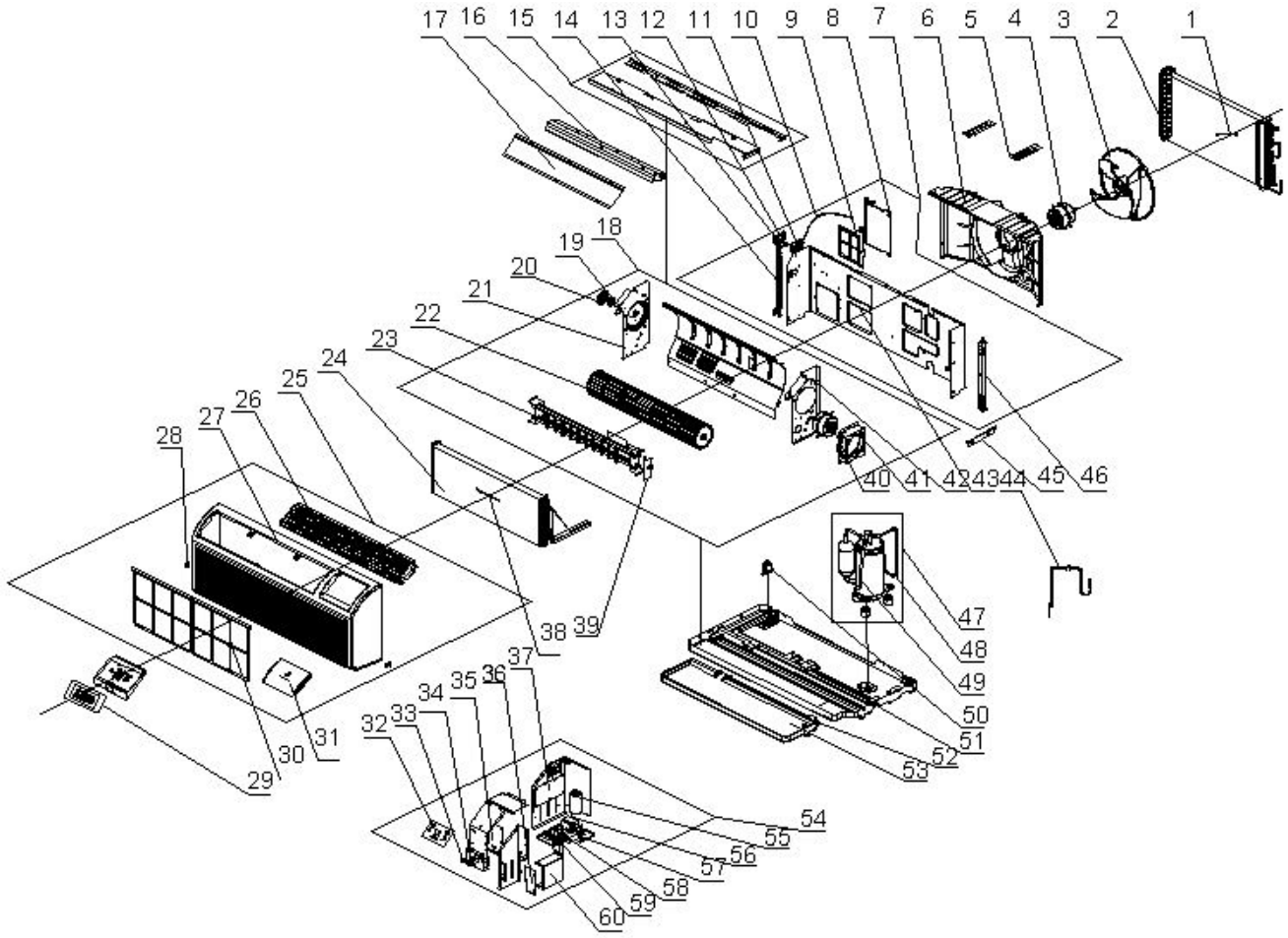
Items with a - in front of the item number (for example -10), are non illustrated items.

Items with an * in front of the number (for example *10) are non-stocked items. If you require these items contact Friedrich customer service at (1-800-541-6645) to check for availability and lead time.

PARTS CATALOG

Figure 901

PZE



PARTS CATALOG

PZE

Figure 901

ITEM	PART NUMBER	PART DESCRIPTION	USED ON MODEL	QTY
1	68700152	Ambient Temperature Sensor	ALL	1
2	68700246	0110127201 CONDENSER ASSY	PZE07K3SA	1
2	68700231	0110180903 CONDENSER ASSY	PZE09K3SA, PZE09R3SA, PZE12R3SA	1
2	68700235	01101363 CONDENSER ASSY	PZE12K3SA	1
2	68700245	0110119102 CONDENSER ASSY	PZE15K5SA	1
3	68700135	Condenser Fan Blade	ALL	1
4	68700087	Fan Motor, Condenser	PZE07K3SA, PZE09K3SA	1
4	68700223	1501180305 FAN MOTOR	PZE09R3SA	1
4	68700078	Fan Motor, Condenser	PZE12K3SA	1
4	68700243	1501180302 FAN MOTOR	PZE12R3SA	1
4	68700078	Fan Motor, Condenser	PZE15K5SA	1
5	68700119	Shroud Brace	ALL	2
6	68700137	Fan Shroud + Motor Mount	ALL	1
7	68700226	1231112 MID CLAPBOARD ASSY	ALL	1
8	68700121	Fresh Air Door	ALL	1
9	68700139	Fresh Air Door Filter	ALL	1
10	68700133	Fresh Air Door Cable	ALL	1
11	68700150	Lower cover of Fresh Air Door Lever	ALL	1
12	68700148	Fresh Air Door Lever	ALL	1
13	68700149	Upper cover of Fresh Air Door Lever	ALL	1
14	68700188	Outer Support Sub-assy(Left)	ALL	1
15	68700116	Top Cover Plate Sub-Assy	ALL	1
16	68700131	Deck	ALL	1
17	68700122	Discharge Screen	ALL	1
18	68700227	01221020 AIR DUCT SUB-ASSY	PZE07K3SA	1
18	68700232	0122102002 AIR DUCT SUB-ASSY	PZE09K3SA	1
18	68700234	0122102003 AIR DUCT SUB-ASSY	PZE09R3SA	1
18	68700244	0122102005 AIR DUCT SUB-ASSY	PZE12R3SA	1
18	68700236	0122102004 AIR DUCT SUB-ASSY	PZE12K3SA, PZE15K5SA	1
19	68700147	Bearing Support, Rubber sub-assy	ALL	1
20	68700127	Bearing Cap	ALL	1
21	68700129	Cross flow fan support, left	ALL	1
22	68700136	Cross Flow Fan, Evaporator	ALL	1
23	68700165	3200103502 ELECTRIC HEATER TUBE	ALL	1
24	68700079	Evaporator Coil	PZE07K3SA	1
24	68700014	Evaporator Coil	PZE09K3SA	1
24	68700013	01001043 ASSY EVAP	PZE09R3SA	1

PARTS CATALOG

PZE

Figure 901

ITEM	PART NUMBER	PART DESCRIPTION	USED ON MODEL	QTY
24	68700101	Evaporator Coil	PZE12K3SA, PZE12R3SA	1
24	68700101	Evaporator Coil	PZE15K5SA	1
25	68700144	Front Panel Assy (Complete)	ALL	1
26	68700143	Discharge Grille	ALL	1
27	68700142	Front Panel	ALL	1
28	68700128	Front Panel clip	ALL	2
29	68700228	63029901311 MEMBRANE	ALL	1
30	68700138	Air Filter (Pair)	ALL	2
31	68700145	Control Door	ALL	1
32	68700151	Display Board	ALL	1
33	68700154	Wiring Terminal, 2 position 24VAC	ALL	1
34	68700155	Wiring Terminal, 7 position 24VAC	ALL	1
35	68700169	MAIN BOARD 2 (POWER BOARD)	PZE07K3SA, PZE09K3SA, PZE12K3SA, PZE15K5SA	1
35	68700172	MAIN BOARD 2 (POWER BOARD)	PZE09R3SA, PZE12R3SA	1
36	68700117	Junction lid	ALL	1
37	68700170	MAIN BOARD 1 (LOGIC BOARD)	ALL	1
38	68700229	390002073 TUBE SENSOR	ALL	1
39	68700126	Heater Wiring Block Board	ALL	1
40	68700072	Fan Motor, Evaporator	PZE07K3SA	1
40	68700070	Fan Motor, Evaporator	PZE09K3SA	1
40	68700071	Fan Motor, Evaporator	PZE09R3SA	1
40	68700090	Fan Motor, Evaporator	PZE12R3SA	1
40	68700089	Fan Motor, Evaporator	PZE12K3SA, PZE15K5SA	1
41	68700123	Motor Bracket, Indoor	ALL	1
42	68700130	Cross flow fan support, right	ALL	1
43	68700230	01231083P MID CLAPBOARD	ALL	1
44	68700085	Capillary Tube Assy	PZE07K3SA	1
44	68700233	03001918 CAPILLARY SUB-ASSY	PZE09K3SA	1
44	68700016	03001079 CAPILLARY SUB-ASSY	PZE09R3SA	1
44	68700237	030015CAPILLARY SUB-ASSY/ NLA WHEN DEPLETED	PZE12K3SA	1
44	68700084	Capillary Tube Assy	PZE12R3SA	1
44	68700059	030013CAPILLARY SUB-ASSY	PZE15K5SA	1
45	68700118	Bottom Inner Wall Brace	ALL	1
46	69700400	Outer Support Sub-assy(Right)	ALL	1
47	68700050	Compressor Assy	PZE07K3SA	1
47	68700001	Compressor Assy	PZE09K3SA	1
47	68700004	00101055 COMPRESSOR AND FITTINGS	PZE09R3SA	1

PARTS CATALOG

PZE

Figure 901

ITEM	PART NUMBER	PART DESCRIPTION	USED ON MODEL	QTY
47	68700238	00101087 COMPRESSOR AND FITTINGS	PZE12K3SA	1
47	68700048	Compressor Assy	PZE12R3SA	1
47	68700005	00101085 COMPRESSOR AND FITTINGS	PZE15K5SA	1
48	68700065	03611745 DISCHARGE TUBE 1	PZE07K3SA	1
48	68700022	03611824 DISCHARGE TUBE	PZE09K3SA	1
48	68700023	03611825 DISCHARGE TUBE	PZE09R3SA	1
48	68700239	03611887 DISCHARGE TUBE	PZE12K3SA	0
48	68700066	03611826 DISCHARGE TUBE	PZE12R3SA	1
48	68700064	03611432 DISCHARGE TUBE	PZE15K5SA	0
49	68700069	Inhalation Tube 1	PZE07K3SA	1
49	68700024	03621829 INHALATION TUBE	PZE09K3SA	1
49	68700025	03621830 INHALATION TUBE	PZE09R3SA	1
49	68700240	03621634 INHALATION TUBE	PZE12K3SA	1
49	68700068	03621831 INHALATION TUBE	PZE12R3SA	1
49	68700067	03621354 INHALATION TUBE	PZE15K5SA	1
50	69700427	Drainage Valve	ALL	1
51	68700096	Basepan	PZE07K3SA, PZE09R3SA	1
51	68700015	Basepan	PZE09K3SA	1
51	68700241	0120102607P CHASSIS SUB-ASSY	PZE12K3SA	1
51	68700097	Basepan	PZE12R3SA	1
51	68700077	Basepan	PZE15K5SA	1
52	68700141	Evaporator Foam Drain Tray	ALL	1
53	68700132	Thermal baffle	ALL	1
54	68700028	Electric Box Assy	PZE07K3SA	1
54	68700032	Electric Box Assy	PZE09K3SA	1
54	68700034	2010129907 ASSY ELECTRIC BOX	PZE09R3SA	1
54	68700242	2010129916 ELECTRIC BOX ASSY	PZE12K3SA	1
54	68700038	Electric Box Assy	PZE12R3SA	1
54	68700040	2010129913 ASSY ELECTRIC BOX	PZE15K5SA	1
55	68700100	Capacitor	PZE07K3SA, PZE09R3SA	1
55	68700107	Capacitor	PZE09K3SA	1
55	69700445	Capacitor CBB65	PZE12K3SA	1
55	68700107	Capacitor	PZE12R3SA	1
55	68700044	33000045 CAPACITOR CBB65	PZE15K5SA	1
56	68700112	Transformer	ALL	1
57	68700091	Capacitor, Fan	PZE07K3SA, PZE09K3SA	1
57	68700108	Capacitor, Fan	PZE09K3SA, PZE09R3SA, PZE09R3SA	1
57	68700109	Capacitor, Fan	PZE12K3SA, PZE12R3SA, PZE15K5SA	1

PARTS CATALOG

PZE

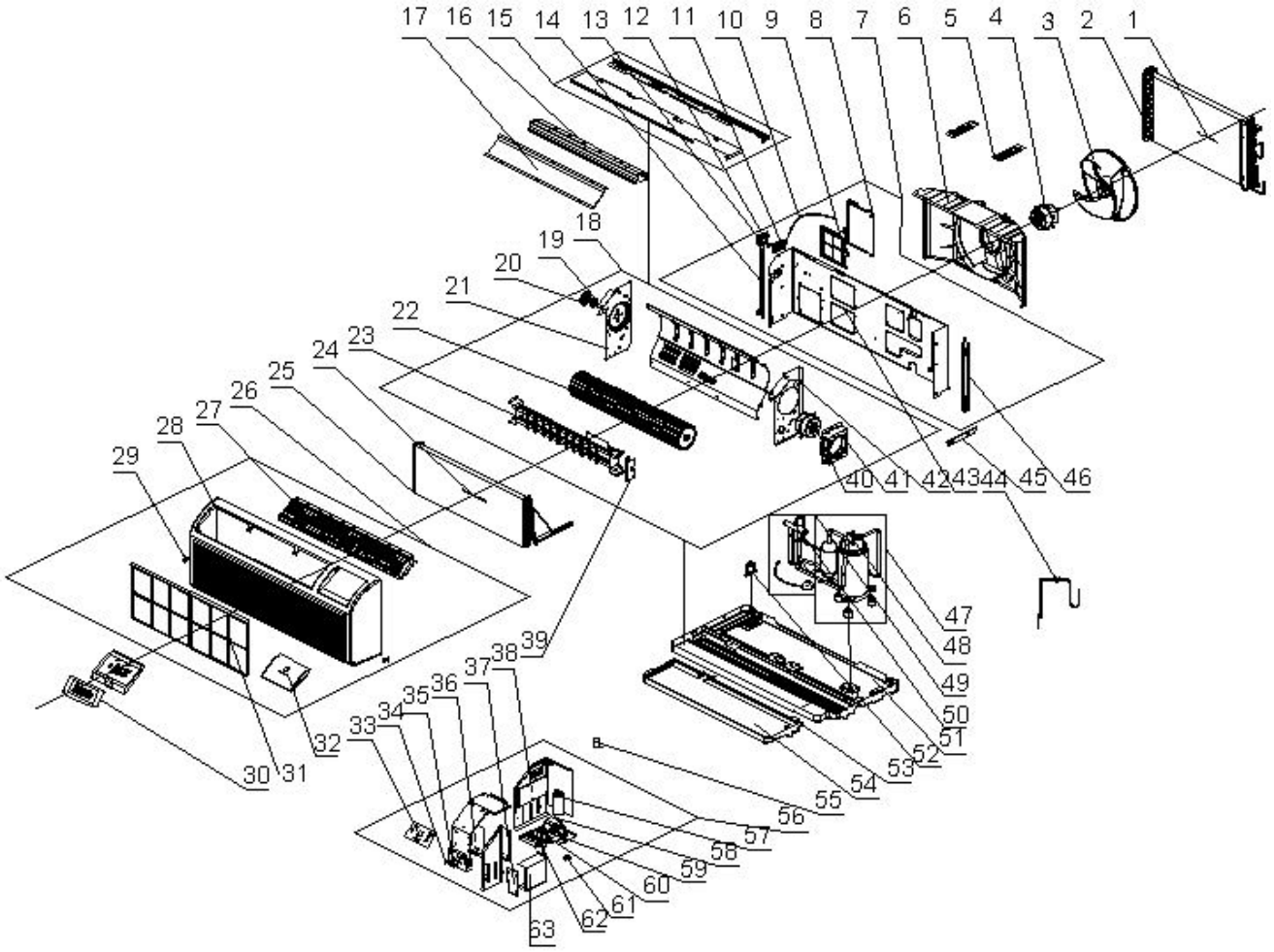
Figure 901

ITEM	PART NUMBER	PART DESCRIPTION	USED ON MODEL	QTY
58	68700113	Capacitor, Fan	PZE07K3SA, PZE12K3SA, PZE15K5SA	1
58	68700108	Capacitor, Fan	PZE12R3SA	1
59	68700156	Terminal Board - 24vac	ALL	2
60	68700120	Junction box	ALL	1
-ITEMS ARE NON- ILLUSTRATED *ITEMS ARE NON-STOCKED, WILL NORMALLY REQUIRE EXTENDED LEAD TIME				

PARTS CATALOG

Figure 902

PZH



PARTS CATALOG

Figure 902

PZH

ITEM	PART NUMBER	PART DESCRIPTION	USED ON MODEL	QTY
1	68700152	Ambient Temperature Sensor	ALL	1
2	68700246	0110127201 CONDENSER ASSY	PZH07K3SA	1
2	68700235	01101363 CONDENSER ASSY	PZH09K3SA, PZH12K3SA	1
2	68700231	0110180903 CONDENSER ASSY	PZH09R3SA, PZH12R3SA	1
2	68700245	0110119102 CONDENSER ASSY	PZH15K5SA	1
3	68700135	Condenser Fan Blade	ALL	1
4	68700087	Fan Motor, Condenser	PZH07K3SA	1
4	68700248	1501180303 FAN MOTOR	PZH09K3SA	1
4	68700223	1501180305 FAN MOTOR	PZH09R3SA	1
4	68700078	Fan Motor, Condenser	PZH12K3SA	1
4	68700243	1501180302 FAN MOTOR	PZH12R3SA	1
4	68700026	Fan Motor, Condenser	PZH15K5SA	1
5	68700119	Shroud Brace	ALL	2
6	68700137	Fan Shroud + Motor Mount	ALL	1
7	68700226	1231112 MID CLAPBOARD ASSY	ALL	1
8	68700121	Fresh Air Door	ALL	1
9	68700139	Fresh Air Door Filter	ALL	1
10	68700133	Fresh Air Door Cable	ALL	1
11	68700150	Lower cover of Fresh Air Door Lever	ALL	1
12	68700148	Fresh Air Door Lever	ALL	1
13	68700149	Upper cover of Fresh Air Door Lever	ALL	1
14	68700188	Outer Support Sub-assy(Left)	ALL	1
15	68700116	Top Cover Plate Sub-Assy	ALL	1
16	68700131	Deck	ALL	1
17	68700122	Discharge Screen	ALL	1
18	68700227	01221020 AIR DUCT SUB-ASSY	PZH07K3SA	1
18	68700249	0122102404 AIR FLUE ASSY	PZH09K3SA	1
18	68700234	0122102003 AIR DUCT SUB-ASSY	PZH09R3SA	1
18	68700236	0122102004 AIR DUCT SUB-ASSY	PZH12K3SA	1
18	68700244	0122102005 AIR DUCT SUB-ASSY	PZH12R3SA	1
18	68700236	0122102004 AIR DUCT SUB-ASSY	PZH15K5SA	1
19	68700147	Bearing Support, Rubber sub-assy	ALL	1
20	68700127	Bearing Cap	ALL	1
21	68700129	Cross flow fan support, left	ALL	1
22	68700136	Cross Flow Fan, Evaporator	ALL	1
23	68700165	3200103502 ELECTRIC HEATER TUBE	ALL	1
24	68700229	390002073 TUBE SENSOR	ALL	1

PARTS CATALOG

Figure 902

PZH

ITEM	PART NUMBER	PART DESCRIPTION	USED ON MODEL	QTY
25	68700079	Evaporator Coil	PZH07K3SA	1
25	68700054	Evaporator Coil	PZH09K3SA, PZH09R3SA	1
25	68700101	Evaporator Coil	PZH12K3SA, PZH12R3SA	1
25	68700101	Evaporator Coil	PZH15K5SA	1
26	68700144	Front Panel Assy (Complete)	PZH07K3SA, PZH09R3SA, PZH12K3SA, PZH12R3SA, PZH15K5SA	1
26	68700202	Front Panel Assy	PZH09K3SA	1
27	68700143	Discharge Grille	ALL	1
28	68700142	Front Panel	ALL	1
29	68700128	Front Panel clip	ALL	2
30	68700228	63029901311 MEMBRANE	ALL	1
31	68700138	Air Filter (Pair)	ALL	2
32	68700145	Control Door	ALL	1
33	68700151	Display Board	ALL	1
34	68700155	Wiring Terminal, 7 position 24VAC	ALL	1
35	68700154	Wiring Terminal, 2 position 24VAC	ALL	1
36	68700169	MAIN BOARD 2 (Power Board)	PZH07K3SA, PZH09K3SA, PZH12K3SA, PZH15K5SA	1
36	68700172	MAIN BOARD 2 (Power Board)	PZH09R3SA, PZH12R3SA	1
37	68700117	Junction lid	ALL	1
38	68700171	30132064 Logic Board	ALL	1
39	68700126	Heater Wiring Block Board	ALL	1
40	68700072	Fan Motor, Evaporator	PZH07K3SA	1
40	68700070	Fan Motor, Evaporator	PZH09K3SA	1
40	68700071	Fan Motor, Evaporator	PZH09R3SA	1
40	68700089	Fan Motor, Evaporator	PZH12K3SA	1
40	68700090	Fan Motor, Evaporator	PZH12R3SA	1
40	68700089	Fan Motor, Evaporator	PZH15K5SA	1
41	68700123	Motor Bracket, Indoor	ALL	1
42	68700130	Cross flow fan support, right	ALL	1
43	68700230	01231083P MID CLAPBOARD	ALL	1
44	68700085	Capillary Tube Assy	PZH07K3SA	1
44	68700250	03001543 CAPILLARY SUB-ASSY	PZH09K3SA	1
44	68700060	Capillary Tube Assy	PZH09R3SA	1
44	68700237	030015CAPILLARY SUB-ASSY/ NLA WHEN DEPLETED	PZH12K3SA	1
44	68700084	Capillary Tube Assy	PZH12R3SA	1
44	68700018	Capillary Tube Assy	PZH15K5SA	1
45	68700118	Bottom Inner Wall Brace	ALL	1
46	69700400	Outer Support Sub-assy(Right)	ALL	1
47	68700050	Compressor Assy	PZH07K3SA	1

PARTS CATALOG

Figure 902

PZH

ITEM	PART NUMBER	PART DESCRIPTION	USED ON MODEL	QTY
47	68700251	00101323 COMPRESSOR AND FITTINGS	PZH09K3SA	1
47	68700003	Compressor Assy	PZH09R3SA	1
47	68700238	00101087 COMPRESSOR AND FITTINGS	PZH12K3SA	1
47	68700048	Compressor Assy	PZH12R3SA	1
47	68700007	Compressor Assy	PZH15K5SA	1
48	68700052	Overload Protector	PZH07K3SA	1
48	68700252	00181077 COMPRESSOR OVERLOAD PROTEC	PZH09K3SA	1
48	68700162	Overload Protector	PZH09R3SA	1
48	68700255	00181071 COMPRESSOR OVERLOAD PROTEC	PZH12K3SA	0
48	68700161	Overload Protector	PZH12R3SA	1
48	68700258	NLA COMPRESSOR OVERLOAD PROTECTOR(EXTER	PZH15K5SA	0
49	68700247	03015200076 4-WAY VALVE ASSY	PZH07K3SA	1
49	68700253	03021027 4-WAY VALVE ASSY	PZH09K3SA	1
49	68700063	4-way Reversing Valve Assy	PZH09R3SA	1
49	68700256	03021236 4-WAY VALVE ASSY	PZH12K3SA	1
49	68700061	4-way Reversing Valve Assy	PZH12R3SA	1
49	68700020	4-way Reversing Valve Assy	PZH15K5SA	1
50	68700094	4-way Reversing Valve Assy	PZH07K3SA, PZH09K3SA, PZH09R3SA	1
50	68700095	4-way Reversing Valve Assy	PZH12K3SA, PZH12R3SA, PZH15K5SA	1
51	68700096	Basepan	PZH07K3SA	1
51	68700241	0120102607P CHASSIS SUB-ASSY	PZH09K3SA	1
51	68700097	Basepan	PZH09R3SA	1
51	68700241	0120102607P CHASSIS SUB-ASSY	PZH12K3SA	1
51	68700097	Basepan	PZH12R3SA	1
51	68700160	Basepan	PZH15K5SA	1
52	69700427	Drainage Valve	PZH07K3SA	1
52	69700427	Drainage Valve	PZH09K3SA	1
52	69700427	Drainage Valve	PZH09R3SA	1
52	69700427	Drainage Valve	PZH12K3SA	1
52	69700427	Drainage Valve	PZH12R3SA	1
52	69700427	Drainage Valve	PZH15K5SA	1
53	68700141	Evaporator Foam Drain Tray	PZH07K3SA	1
53	68700141	Evaporator Foam Drain Tray	PZH09K3SA	1
53	68700141	Evaporator Foam Drain Tray	PZH09R3SA	1
53	68700141	Evaporator Foam Drain Tray	PZH12K3SA	1
53	68700141	Evaporator Foam Drain Tray	PZH12R3SA	1

PARTS CATALOG

Figure 902

PZH

ITEM	PART NUMBER	PART DESCRIPTION	USED ON MODEL	QTY
53	68700141	Evaporator Foam Drain Tray	PZH15K5SA	1
54	68700132	Thermal baffle	PZH07K3SA	1
54	68700132	Thermal baffle	PZH09K3SA	1
54	68700132	Thermal baffle	PZH09R3SA	1
54	68700132	Thermal baffle	PZH12K3SA	1
54	68700132	Thermal baffle	PZH12R3SA	1
54	68700132	Thermal baffle	PZH15K5SA	1
55	69700456	Magnet Coil	PZH07K3SA	1
55	69700456	Magnet Coil	PZH09K3SA	1
55	68700092	Solenoid Coil	PZH09R3SA	1
55	69700456	Magnet Coil	PZH12K3SA	1
55	68700092	Solenoid Coil	PZH12R3SA	1
55	69700456	Magnet Coil	PZH15K5SA	1
56	68700029	Electric Box Assy	PZH07K3SA	1
56	68700254	0260103621 ELECTRIC BOX ASSY	PZH09K3SA	1
56	68700035	Electric Box Assy	PZH09R3SA	1
56	68700257	2010129917 ELECTRIC BOX ASSY	PZH12K3SA	1
56	68700039	Electric Box Assy	PZH12R3SA	1
56	68700041	Electric Box Assy	PZH15K5SA	1
57	68700100	Capacitor	PZH07K3SA, PZH09R3SA	1
57	69700445	Capacitor CBB65	PZH09K3SA	1
57	69700446	Capacitor CBB65	PZH12K3SA	1
57	68700107	Capacitor	PZH12R3SA	1
57	68700043	Capacitor	PZH15K5SA	1
58	68700112	Transformer	PZH09K3SA, PZH12K3SA, PZH15K5SA	1
58	68700111	Transformer	PZH09R3SA, PZH12R3SA	1
59	68700091	Capacitor, Fan	PZH07K3SA	1
59	69700442	Capacitor CBB61S	PZH09K3SA	1
59	68700108	Capacitor, Fan	PZH09R3SA	1
59	68700109	Capacitor, Fan	PZH12K3SA, PZH12R3SA, PZH15K5SA	1
60	68700113	Capacitor, Fan	PZH07K3SA, PZH12K3SA, PZH15K5SA	1
60	69700444	Capacitor CBB61S	PZH09K3SA	1
60	68700108	Capacitor, Fan	PZH09R3SA, PZH12R3SA	1
61	68700157	Radiator	ALL	1
62	68700156	Terminal Board - 24vac	ALL	2
63	68700120	Junction box	ALL	1

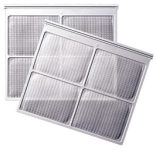
-ITEMS ARE NON- ILLUSTRATED
*ITEMS ARE NON-STOCKED, WILL NORMALLY REQUIRE EXTENDED LEAD TIME

ACCESSORIES

Accessories

New Construction Accessories		
PDXWSA PDXWSEXT	**WALL SLEEVE** Galvanized zinc coated steel is prepared in an 11-step process, then powder coated with a polyester finish and cured in an oven for exceptional durability. The wall sleeve is insulated for sound absorption and thermal efficiency, 16" High x 42" Wide x 13 3/4" Deep. **DEEP WALL SLEEVE EXTENSION** For use when the wall is thicker than 13 1/4"deep. The wall sleeve may be special ordered through your Sales Representative and will be cut to your specific depth requirements..	
PXGA	**GRILLE** Standard, stamped aluminium, anodized to resist chalking and oxidation.	
PXAA PXBG PXSC	**ARCHITECTURAL GRILLES** Consist of heavy-gauge 6063-T5 aluminum alloy: PXAA – Clear, extruded aluminum PXBG – Beige acrylic enamel PXSC – Also available in custom colors.	
PXDR10	**CONDENSATE DRAIN KIT** Attaches to the bottom of the wall sleeve for internal draining of condensate or to the rear wall sleeve flange for external draining. Recommended on all units to remove excess condensate. Packaged in quantities of ten.	
PXSBA	**DECORATIVE SUBBASE** Provides unit support for walls less than six inches thick. Includes leveling legs, side filler panels and mounting brackets for electrical accessories. Accepts circuit breaker, power disconnect switch, or conduit kit.	
	ELECTRICAL SUBBASE Provides unit support for walls less than six inches thick. Includes leveling legs, side filler panels, mounting brackets, a plug-in receptacle and field-wiring access. The subbase also includes electrical knockouts for a power disconnect switch or circiut breaker. PXSB23020 - Electrical Subbase - 230V 15 & 20A PXSB23030 - Electrical Subbase - 230V 30A PXSB26515 - Electrical Subbase - 265V 15A PXSB26520 - Electrical Subbase - 265V 20A PXSB26530 - Electrical Subbase - 265V 30A	
PDXRTA	**REMOTE THERMOSTAT ESCUTCHEON KIT** This kit contains ten escutcheons that can be placed over the factory control buttons when a remote wall mounted thermostat is used. The escutcheon directs the guest to the wall thermostat for operation and retains the LED window to display error codes and diagnostic information.	
PXSE	**SLEEVE EXTENSION RETROFIT KIT** Galvanized zinc coated steel, 2.4" sleeve extension attached to the room side of the sleeve to allow for the installation of a PD-Series Friedrich PTAC in a T-Series sleeve.	
PXCJA	**CONDUIT KIT WITH JUNCTION BOX** Hard wire conduit kit with junction box for 208/230V and 265V units (subbase not required). Kit includes a means of quick disconnect for easy removal of the chassis. *Required for 265V installations.	

ACCESSORIES

New Construction Accessories		
PDXDAA	**LATERAL DUCT ADAPTER** Attaches to the Friedrich PTAC/PTHP unit to direct up to 35% of the total airflow to a second room. The unit mounted duct plenum features a front mounted aluminum grille that has two positions to provide the most optimal air direction. The air may be directed to either the left or the right of the unit through the supplied 3.5 H" x 7 W" x 47" L plenum. Plenum may be cut to length by the installer. Kit includes duct plenum, front grille, 47" duct extension, duct discharge grille, duct end cap and all necessary mounting hardware.	
PDXDEA	**LATERAL DUCT EXTENSION** Additional 3.5 H" x 7" W x 47" L plenum for use with the LATERAL DUCT ADAPTER. A maximum of 3 duct extensions total may be used. Note: Ducted airflow is reduced as duct length is increased.	
PXFTA	**REPLACEMENT FILTER PACK** These are original equipment return air filters. They are reusable and can be cleaned by vacuuming, washing, or blowing out, and are sold in convenient ten-packs. (Two filters per chassis).	
RT6	**DIGITAL REMOTE WALL THERMOSTAT** Single stage cool, single stage heat for PDE models or single stage cool, dual stage heat for PDH model thermostat features high/low fan speed switch. Thermostat is hard wired and can be battery powered or unit powered. Features backlit display and multiple configuration modes. For use on PD-series Friedrich PTACs and Vert-I-Paks.	
WRT1	**DIGITAL THERMOSTAT** Wireless, single stage, wall-mounted digital thermostat with two fan speeds. Features backlit display and multiple configuration modes.	
	FRIEDRICHLINK® ENERGY MANAGEMENT THERMOSTAT Integrated occupancy sensor uses a combination of motion and thermal sensing technologies for accurate occupancy detection. Reliable occupancy detection allows saving energy when rooms are unoccupied. Energy saving presets eliminate the guesswork and make it easy to adjust the energy saving settings.	
EMWRT1	Wireless thermostat with occupancy sensor.	
EMRT1	Wired thermostat with occupancy sensor.	

APPENDIX

Reference Sheet of Celsius and Fahrenheit

Conversion formula for Fahrenheit degree and Celsius degree: Tf=Tcx1.8+32

Set temperature

Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius(°C)		Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius (°C)		Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius (°C)
61	60.8	16		69/70	69.8	21		78/79	78.8	26
62/63	62.6	17		71/72	71.6	22		80/81	80.6	27
64/65	64.4	18		73/74	73.4	23		82/83	82.4	28
66/67	66.2	19		75/76	75.2	24		84/85	84.2	29
68	68	20		77	77	25		86	86	30

Ambient temperature

Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius(°C)		Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius(°C)		Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius(°C)
32/33	32	0		55/56	55.4	13		79/80	78.8	26
34/35	33.8	1		57/58	57.2	14		81	80.6	27
36	35.6	2		59/60	59	15		82/83	82.4	28
37/38	37.4	3		61/62	60.8	16		84/85	84.2	29
39/40	39.2	4		63	62.6	17		86/87	86	30
41/42	41	5		64/65	64.4	18		88/89	87.8	31
43/44	42.8	6		66/67	66.2	19		90	89.6	32
45	44.6	7		68/69	68	20		91/92	91.4	33
46/47	46.4	8		70/71	69.8	21		93/94	93.2	34
48/49	48.2	9		72	71.6	22		95/96	95	35
50/51	50	10		73/74	73.4	23		97/98	96.8	36
52/53	51.8	11		75/76	75.2	24		99	98.6	37
54	53.6	12		77/78	77	25				

APPENDIX

Resistance Table for Air Indoor Temperature Sensor

Temp. (F)	Resistance (kΩ)		Temp. (F)	Resistance (kΩ)		Temp. (F)	Resistance (kΩ)		Temp. (F)	Resistance (kΩ)
-19	138.100		20	18.750		59	3.848		98	1.071
-18	128.600		21	17.930		60	3.711		99	1.039
-17	121.600		22	17.140		61	3.579		100	1.009
-16	115.000		23	16.390		62	3.454		101	0.980
-15	108.700		24	15.680		63	3.333		102	0.952
-14	102.900		25	15.000		64	3.217		103	0.925
-13	97.400		26	14.360		65	3.105		104	0.898
-12	92.220		27	13.740		66	2.998		105	0.873
-11	87.350		28	13.160		67	2.896		106	0.848
-10	82.750		29	12.600		68	2.797		107	0.825
-9	78.430		30	12.070		69	2.702		108	0.802
-8	74.350		31	11.570		70	2.611		109	0.779
-7	70.500		32	11.090		71	2.523		110	0.758
-6	66.880		33	10.630		72	2.439		111	0.737
-5	63.460		34	10.200		73	2.358		112	0.717
-4	60.230		35	9.779		74	2.280		113	0.697
-3	57.180		36	9.382		75	2.206		114	0.678
-2	54.310		37	9.003		76	2.133		115	0.660
-1	51.590		38	8.642		77	2.064		116	0.642
0	49.020		39	8.297		78	1.997		117	0.625
1	46.600		40	7.967		79	1.933		118	0.608
2	44.310		41	7.653		80	1.871		119	0.592
3	42.140		42	7.352		81	1.811		120	0.577
4	40.090		43	7.065		82	1.754		121	0.561
5	38.150		44	6.791		83	1.699		122	0.547
6	36.320		45	6.529		84	1.645		123	0.532
7	34.580		46	6.278		85	1.594		124	0.519
8	32.940		47	6.038		86	1.544		125	0.505
9	31.380		48	5.809		87	1.497		126	0.492
10	29.900		49	5.589		88	1.451		127	0.480
11	28.510		50	5.379		89	1.408		128	0.467
12	27.180		51	5.197		90	1.363		129	0.456
13	25.920		52	4.986		91	1.322		130	0.444
14	24.730		53	4.802		92	1.282		131	0.433
15	23.600		54	4.625		93	1.244		132	0.422
16	22.530		55	4.456		94	1.207		133	0.412
17	21.510		56	4.294		95	1.171		134	0.401
18	20.540		57	4.139		96	1.136		135	0.391
19	19.630		58	3.990		97	1.103		136	0.382

APPENDIX

Resistance Table for Frost Protection Indoor and Outdoor Temperature Sensors

Temp. (F)	Resistance (kΩ)		Temp. (F)	Resistance (kΩ)		Temp. (F)	Resistance (kΩ)		Temp. (F)	Resistance (kΩ)
-19	181.400		20	25.010		59	5.130		98	1.427
-18	171.400		21	23.900		60	4.948		99	1.386
-17	162.100		22	22.850		61	4.773		100	1.346
-16	153.300		23	21.850		62	4.605		101	1.307
-15	145.000		24	20.900		63	4.443		102	1.269
-14	137.200		25	20.000		64	4.289		103	1.233
-13	129.900		26	19.140		65	4.140		104	1.198
-12	123.000		27	18.130		66	3.998		105	1.164
-11	116.500		28	17.550		67	3.861		106	1.131
-10	110.300		29	16.800		68	3.729		107	1.099
-9	104.600		30	16.100		69	3.603		108	1.069
-8	99.130		31	15.430		70	3.481		109	1.039
-7	94.000		32	14.790		71	3.364		110	1.010
-6	89.170		33	14.180		72	3.252		111	0.983
-5	84.610		34	13.590		73	3.144		112	0.956
-4	80.310		35	13.040		74	3.040		113	0.930
-3	76.240		36	12.510		75	2.940		114	0.904
-2	72.410		37	12.000		76	2.844		115	0.880
-1	68.790		38	11.520		77	2.752		116	0.856
0	65.370		39	11.060		78	2.663		117	0.833
1	62.130		40	10.620		79	2.577		118	0.811
2	59.080		41	10.200		80	2.495		119	0.770
3	56.190		42	9.803		81	2.415		120	0.769
4	53.460		43	9.420		82	2.339		121	0.746
5	50.870		44	9.054		83	2.265		122	0.729
6	48.420		45	8.705		84	2.194		123	0.710
7	46.110		46	8.370		85	2.125		124	0.692
8	43.920		47	8.051		86	2.059		125	0.674
9	41.840		48	7.745		87	1.996		126	0.658
10	39.870		49	7.453		88	1.934		127	0.640
11	38.010		50	7.173		89	1.875		128	0.623
12	36.240		51	6.905		90	1.818		129	0.607
13	34.570		52	6.648		91	1.736		130	0.592
14	32.980		53	6.403		92	1.710		131	0.577
15	31.470		54	6.167		93	1.658		132	0.563
16	30.040		55	5.942		94	1.609		133	0.549
17	28.680		56	5.726		95	1.561		134	0.535
18	27.390		57	5.519		96	1.515		135	0.521
19	26.170		58	5.320		97	1.470		136	0.509

WARRANTY

FRIEDRICH

Friedrich Air Conditioning Co.
10001 Reunion Place, San Antonio, TX 78216
800.541.6645

www.friedrich.com

PZ-SERIES
PACKAGED TERMINAL AIR CONDITIONERS
LIMITED WARRANTY

SAVE THIS CERTIFICATE. It gives you specific rights.You may also have other rights which may vary from state to state and province to province.
In the event that your unit needs servicing, contact your nearest authorized service center. If you do not know the nearest service center, ask the company that installed your unit or contact us - see address and telephone number above. To obtain service and/or warranty parts replacement, you must notify an authorized FRIEDRICH Air Conditioning Co. service center, distributor, dealer, or contractor of any defect within the applicable warranty period.

When requesting service: please have the model and serialnumber from your unit readily available.

Unlesss pecified otherwise herein, the following applies:
FRIEDRICH PACKAGED TERMINAL AIR CONDITIONERS AND HEAT PUMPS

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

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

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

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

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

1. Service calls to:
   A)Instruct on unit operation. B)Replace house fuses or correct house wiring. C)Clean or replace air filters. D)Remove the unit from its installed location when not accessible for service required. E) Correct improper installations.

2. Parts or labor provided by anyone other than an authorized service center.

3. Damage caused by:
   A)Accident,abuse,negligence,misuse,riot,fire,flood,or acts of God. B)operating the unit where is a corrosive atmosphere containing chlorine,fluorine,or any damaging chemicals(other than in a normal residential environment). C)Unauthorized alteration or repair of the unit,which in turn affects its stability or performance. D) Failing to provide proper maintenance and service. E) Using an incorrect power source. F) Faulty installation or application of the unit. **G) Operation of the unit during Construction**

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

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

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

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

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

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 reducing warranty expenses while increasing customer satisfaction levels.

FRIEDRICH AUTHORIZED PARTS DEPOTS

AAA Refrigeration Service
1322 24th Street, Suite B Kenner,
Louisiana 70062
504-464-7444
877-813-7444

The Gabbert Company
6868 Ardmore
Houston, Texas 77054

713-747-4110
800-458-4110

Johnstone Supply of Woodside
27-01 Brooklyn Queens Expway
Woodside, New York 11377
718-545-5464
800-431-1143

Reeve Air Conditioning, Inc.
2501 South Park Road Hallandale, Florida
33009
954-962-0252
800-962-3383

FRIEDRICH

TECHNICAL SUPPORT CONTACT INFORMATION

Friedrich Air Conditioning Co.
10001 Reunion Place, Suite 500 • San Antonio, Texas 78216
1-800-541-6645
www.friedrich.com