Service Manual

FRIEDRICH

RoomAir Conditioners

Chill Premiere Series Models (R-410A Refrigerant)

Fixed chassis, cool only
CCF05A10A, CCF06A10A, CCF08A10A, CCF10A10A
CCF12A10A
Slide out chassis, cool only
CCW06B10A, CCW08B10A, CCW10B10A, CCW12B10A
CCW15B10A, CCW18B30A, CCW24B30A
Slide out chassis, heat & cool
CEW08B11A, CEW12B33A, CEW18B33A, CEW24B33A

Unifit Series Models (R-410A Refrigerant)

Cool Only
UCT08A10A, UCT10A10A, UCT10A30A,
UCT10A30B,UCT12A10A, UCT12A30A, UCT14A30A,
UCT14A30B
Cool with Electric Heat
UET08A11A, UET10A33A, UET12A33A, UET14A33A

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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.

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/Operation manual which can be aquired on the Friedrich website.

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.

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.

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.

NOTICE — Indicates property damage can occur if 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

SAFETY FIRST	⚠ WARNING	⚠ AVERTISSEMENT	⚠ ADVERTENCIA
	Do not remove, disable or bypass this unit's safety devices. 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.

⚠ WARNING

ALWAYS USE INDUSTRY STANDARD PERSONAL PROTECTIVE EQUIPMENT (PPE)

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. Reference EPA regulations (40 CFR Part 82, Subpart F) Section 608.
- 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.

SPECIFICATIONS

Model	Cooling Btu	Heating Btu	Volts Rated	Cooling Amps	Cooling Watts	Heating Amps	Heating Watts	EER	CEER	Moisture Removal-Pints/HR	Refrigerant	Refrigerant Charge	CFM	Sleeve	Weight Net./ Ship lbs.
FIXED CHASSIS, COOL ONLY (WINDOW INSTALLATION ONLY)															
CCF05A10A	5200	—	115	4.3	459	—	—	12.1	12.1	1.0	R410A	12.35	141		44/51
CCF06A10A	6000	—	115	4.3	492	—	—	12.1	12.1	0.9	R410A	13.76	141		44/51
CCF08A10A	8000	—	115	5.8	661	—	—	12.1	12.0	1.0	R410A	14.46	206		51/57
CCF10A10A	10000	—	115	7.3	826	—	—	12.1	12.0	1.2	R410A	19.4	282		64/73
CCF12A10A	12000	—	115	8.6	992	—	—	12.1	12.0	1.5	R410A	22.93	270		73/82
CHILL PREMIER SLIDE OUT CHASSIS, COOL ONLY															
CCW06B10A	6000	—	115	4.3	492	—	—	12.2	12.1	0.9	R410A	13.76	200		44/51
CCW08B10A	8000	—	115	5.8	661	—	—	12.1	12.0	1.0	R410A	14.46	250		44/61
CCW10B10A	10000	—	115	7.3	826	—	—	12.1	12.0	1.2	R410A	19.76	300		51/68
CCW12B10A	12000	—	115	8.6	992	—	—	12.1	12.0	1.5	R410A	22..22	330		64/86
CCW15B10A	15000	—	115	11.0	1270	—	—	11.9	11.8	2.0	R410A	28.22	400		73/93
CCW18B30A	18000	—	230	7.1	1525	—	—	11.9	11.8	2.7	R410A	29.98	520		106/136
CCW24B30A	24000	—	230	10.2	2308	—	—	10.4	10.3	2.7	R410A	37.03	590		117/144
CHILL PREMIER SLIDE OUT CHASSIS, HEAT & COOL															
CEW08B11A	7800	4200	115	6.3	670	12	1450	11.0	10.9	2.1	R410A	15.17	250		44/61
CEW12B33A	12000	10600	230	4.8	1060	16	3450	11.0	10.9	3.3	R410A	20.81	265		64/86
CEW18B33A	18000	10600	230	7.2	1600	16	3450	10.8	10.7	5.5	R410A	29.98	430		106/136
CEW24B33A	23,200	10600	230	10.6	2340	16	3450	9.5	9.4	6.5	R410A	37.03	560		117/144
UNI-FIT® Cool Only															
UCT08A10A	8000	—	115	6.9	755	—	—	10.7	10.6	0.8	R410A	14.46	265	64	64/78
UCT10A10A	10000	—	115	8.3	940	—	—	10.7	10.6	1.25	R410A	19.05	247	74	74/86
UCT10A30A	10000	—	230	4.5	940	—	—	10.7	10.6	1.25	R410A	19.75	265	74	74/86
UCT10A30B	10000	—	230	4.2	900	—	—	10.7	10.6	1.25	R410A	19.75	265	74	74/86
UCT12A10A	12000	—	115	10.1	1130	—	—	10.6	10.5	1.7	R410A	22.22	276	75	75/88
UCT12A30A	12000	—	230	5.4	1130	—	—	10.6	10.5	1.7	R410A	22.22	265	75	75/88
UCT14A30A	14000	—	230	7.2	1490	—	—	9.4	9.3	2.15	R410A	22.22	265	76	76/89
UCT14A30B	14000	—	230	7.2	1450	—	—	9.4	9.3	2.15	R410A	22.22	265	76	76/89
UNI-FIT® Cool with Electric Heat															
UET08A11A	8000	4200	115	7.2	810	12.5	1320	9.7	9.6	0.75	R410A	13.76	265	66	66/79
UET10A33A	10000	10600	230	4.9	1030	15	3500	9.7	9.6	1.2	R410A	17.99	276	75	75/87
UET12A33A	12000	10600	230	5.9	1230	15	3500	9.7	9.6	1.65	R410A	20.1	276	76	76/89
UET14A33A	14000	10600	230	7.2	1490	15	3500	9.4	9.3	2.15	R410A	22.22	265	77	77/90

Figure 201 (Refrigeration Systems Performance Data)

SPECIFICATIONS

Model	Height Inches	Width Inches	Depth Inches	Window Width Inches	
				Minimum*	Maximum
CCF05A10A, CCF06A10A, CCF08A10A	13 3/8	18 5/8	15 5/8	23	36
CCF10A10A, CCF12A10A	15 1/8	19 7/8	21 1/2	26	36
CCW06B10A, CCW08B10A,	14 5/8	19 3/4	21 1/2	23	36
CEW08B11A, CCW10B10A, CCW12B10A, CEW12B33A,	15 1/8	19 3/4	24	26	36
CCW15B10A, CCW18B30A, CEW18B33A	17 7/8	23 5/8	25 3/8	28	41
CCW24B30A, CEW24B33A	18 3/4	26 3/8	26 7/8	30	41

Figure 202 (Chill Premier Installation)

Sleeve Dimen-sions	Friedrich USC Sleeve	Amana	Carrier (51S Series)	Fedders/ Emerson/ Friedrich WSE	Emer-son/ Fedders	GE/ Hotpoint	Whirl-pool	White-Westing-house/ Frigidaire/ Carrier (52F Series)
Height	15 1/2"	15 5/8"	16 7/8"	16 3/4"	15 3/4"	15 5/8"	16 1/2"	15 1/4"
Width	25 7/8"	26"	25 3/4"	27"	26 3/4"	26"	25 7/8"	25 1/2"
Depth	16 3/4"	16 7/8"	18 5/8"	16 3/4" or 19 3/4"	15"	16 7/8"	17 1/8" or 23"	16", 17 1/2" or 22"

Figure 203 Unifit (Sleeve Dimensions)

Installation Clearances

Improper installation of the Air Condtioner can cause poor performance and premature wear of the unit.
Ensure that the unit is installed with proper clearances as described below.
Ensure no obstructions. or enclosures are within clearances limits to allow for proper airflow.

Clearances
Top and Bottom of Unit - One (1) foot
Sides of Unit - One (1) foot
Front of Unit - Three (3) feet
Rear of Unit - Three (3) feet

SPECIFICATIONS

Electrical Data

⚠ 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.

NOTICE

FIRE HAZARD

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

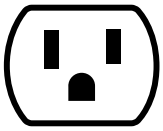
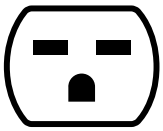
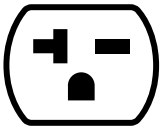
Model	Circuit Rating Breaker or T-D Fuse	Plug Face (NEMA#)	Power Cord Length (ft.)	Wall Outlet Appearance
ALL CCF MODELS. CCW06B10A, CCW08B10A, CCW10B10A, CCW12B10A, CEW08B11A	125V-15A	5-15P	6	
Chill® Premier CCW15B10A			5.5	
UNI-FIT® UCT08A10A, UCT10A10A, UCT12A10A			6	
Chill® Premier CCW18B30A, CCW24B30A,	250V - 15A	6 - 15P	4.5	
UNI-FIT® UCT10A30A, UCT10A30B, UCT12A30A,UCT14A30A, UCT14A30B		6-15P	6	
Chill® Premier CCW18B30A, CCW24B30A	250V-20A	6-20P	4	
Chill® Premier CEW12B33A, CEW18B33A, CEW24B33A			6	
UNI-FIT® UET10A33A, UET12A33A, UET14A33A			4.75	

Figure 204 (Circuit Breaker / Plug / Receptacle / Cord Rating)

SPECIFICATIONS

Electrical Data

⚠ WARNING

Electrical Shock Hazard

Make sure your electrical receptacle has the same configuration as your air conditioner's plug. If different, consult a Licensed Electrician.
Do not use plug adapters.
Do not use an extension cord.
Do not remove ground prong.Always plug into a grounded 3 prong outlet.
Failure to follow these instructions can result in death, fire, or electrical shock.

Wire Size - Use ONLY wiring size recommended for single outlet branch circuit.

Fuse/ Circuit Breaker - Use ONLY the correct HVAC/R type and size fuse/circuit breaker. Read electrical ratings on unit's rating plate. Proper circuit protection is the responsibiity of the homeowner.

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.

Receptacle - The field supplied outlet must match plug on service cord and be within reach of service cord. Do NOT alter the service cord or plug. Do NOT use an extension cord. Refer to the table above for proper receptacle and fuse type.

Make sure the wiring is adequate for your unit.

If you have fuses, they should be of the time delay type. Before you install or relocate this unit, be sure that the amperage rating of the circuit breaker or time delay fuse does not exceed the amp rating listed in Table 206.

DO NOT use an extension cord.

The cord provided will carry the proper amount of electrical power to the unit; an extension cord may not.

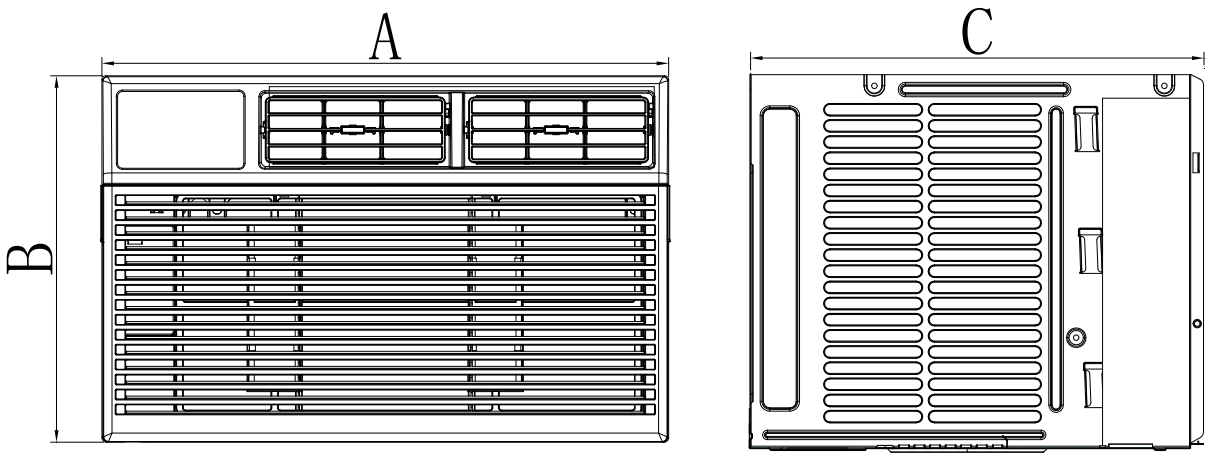
Make sure that the receptacle is compatible with the air conditioner cord plug provided.

Proper grounding must be maintained at all times. Two prong receptacles must be replaced with a grounded receptacle by a certified electrician.

The grounded receptacle should meet all national and local codes and ordinances. You must use the three prong plug furnished with the air conditioner. Under no circumstances should you remove the ground prong from the plug.

SPECIFICATIONS

Product Dimensions

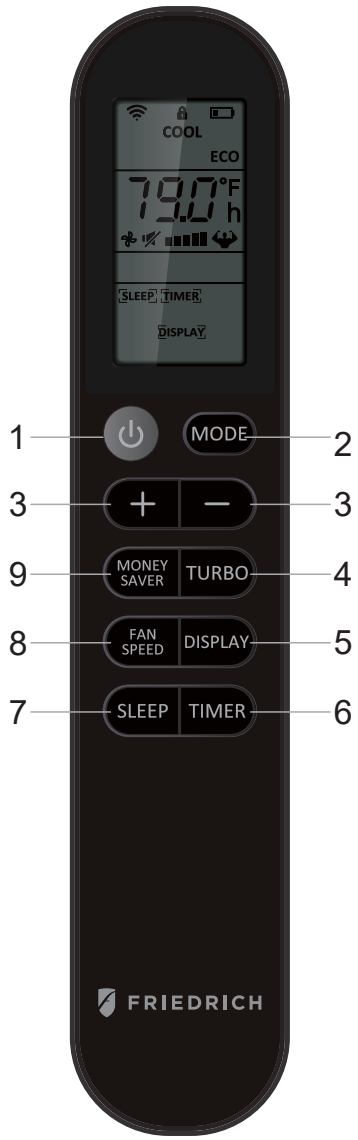


Model	A “(inches)	B “(inches)	C “(inches)
Chill® Premier			
CCF05A10A, CCF06A10A, CCF08A10A	$18^{5/8}$	$13^{3/8}$	$15^{5/8}$
CCF10A10A, CCF12A10A	$19^{3/4}$	$15^{1/8}$	$21^{1/2}$
CCW06B10A, CCW08B10A	$19^{3/4}$	$14^{5/8}$	$21^{1/2}$
CEW08B11A, CCW10B10A, CCW12B10A, CEW12B33A,	$19^{3/4}$	$15^{1/8}$	24
CCW15B10A, CCW18B30A, CEW18B33A	$23^{1/2}$	$17^{7/8}$	$25^{3/8}$
CCW24B30A, CEW24B33A	$26^{1/2}$	$18^{1/2}$	$26^{1/2}$
UNI-FIT®			
All Models	24 7/32	14 17/32	20 9/32

Figure 205

OPERATION

Remote Control



1. Power: Turn the air conditioner on and off. This button will clear the TIMER setting.

2. MODE: Press the button to select the mode of operation, AUTO, COOL, DRY, FAN ONLY, HEAT.

Note: The HEAT mode is only for some heating models. If you do not need it, press the MODE button for more than 5 seconds to delete the HEAT function, and the COOL mode will be selected automatically. Press the MODE again for more than 5 seconds to add the HEAT function, and the HEAT mode will be selected automatically.

3. + And - : Use these buttons to increase or decrease the set temp from 61 ~88°F. Also used to set Timer.

Note: After setting temperature with remote using the + and - buttons, both the remote display and the unit display will automatically turn off after a short time. This does not affect the unit operation.

4. TURBO: When the remote is ON, press the button to activate the TURBO function, under AUTO/COOL/FAN ONLY mode. Press again to cancel the TURBO function, and the fan speed will change to pre-setting before.
Note: °F and °C change: After inserting the batteries, in the off state within 3 minutes, press the TURBO button for more than 5 seconds to switch the Fahrenheit (°F) or Celsius (°C) degree display.

5. DISPLAY: When the unit is ON, press the button, to switch off/on all lights or LED display. And this function will be canceled when changing mode.

6. TIMER: Use the button to set the TIMER, or cancel the TIMER.

TIMER OFF: When the unit is ON, the timed OFF is programmed by pressing TIMER button, the remote will display 6 hours pre-setting at first.
Set the rest time by pressing the button or until the needed rest time display, then press TIMER button again to confirm.

TIMER ON: When the unit is OFF, the timed ON is programmed by pressing TIMER button, the remote will display 6 hours pre-setting at first. Set the rest time by pressing the button or until the needed rest time display, then press TIMER button again to confirm. Later, the remote screen will keep display [TIMER] icon.
Note: When TIMER ON, it cannot select Sleep mode, but can pre-set Mode, temperature, fan speed, ECO.

7. SLEEP: Press the SLEEP button, all of the display lights will turn off after a while, but the Sleep light is always on. In SLEEP mode, the air conditioner will automatically adjust the temperature and fan speed to make the room more comfortable during the night. The set temperature will automatically raise every 30-60 minutes and at most change six times until the set temperature is 81 or 82°F. This function can be selected when COOL or HEAT mode.

8. FAN SPEED: Press the FAN SPEED button to choose the fan speed options. You can choose Hi, Med, Low or Auto speed in COOL or HEAT mode and choose Hi, Med, Low in FAN mode. When DRY mode, it is only Low fan speed.

9. MONEY SAVER: When the unit is in COOL mode, press the button to MONEY SAVER function. In MONEY SAVER mode, the unit will turn off once the room is cooled to the user set temperature. The unit will turn back on when the room temperature rises above the user set temperature. Before the compressor starts, the fan motor will run for 20 sec., then it will stop for 10 min., and will repeat to provide a much more comfortable feeling and save energy.

Battery size: AAA
Note: Do not mix old and new batteries or different types of AAA batteries.

Figure 301 (Remote Control Operation)

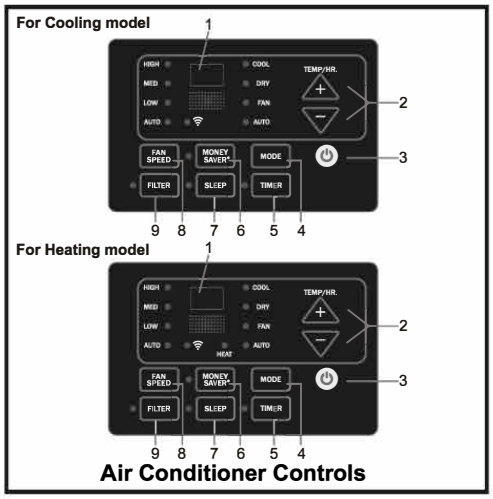
OPERATION

Control Panel

USING YOUR AIR CONDITIONER

Electronic Control Panel & Remote Control

NOTE: This display always shows the room temperature in Fan Mode except when setting the Timer.



Air Conditioner Controls

Normal Operating Sounds

- You may hear a pinging noise caused by water hitting the condenser on rainy days, or when the humidity is high. This design feature helps remove moisture and improve efficiency.
- You may hear the thermostat click when the compressor cycles on and off.
- Water will collect in the base pan during rain or days of high humidity. The water may overflow and drip from the outside part of the unit.
- The fan may run even when the compressor is not on.

1. **Digital Display:** Without timer setting, the set temperature will be displayed.
   Time will be displayed under the timer setting.
2. **+ and - Button:** Use these buttons on the control panel and remote to increase or decrease the Set Temperature or Timer.
   Temperature range: 61℉~88℉ or 16℃~31℃.
3. **Button:** Turn the air conditioner on and off.
4. **Mode Button:** Press the mode button to cycle through the various modes: Cool, Dry, Fan and Auto, or Heat.

Cool Mode: The cooling function allows the air conditioner to cool the room and at the same time reduces air humidity. Press the MODE button to activate the cooling function. To optimize the function of the air conditioner, adjust the temperature and the speed by pressing the button indicated.
Dry Mode: This function reduces the humidity of the air to make the room more comfortable. Press MODE button to set the DRY mode. An automatic function of alternating cooling cycles and air fan is activated.
Fan Mode: The conditioner works in only ventilation. Press MODE button to set the FAN mode. With pressing the FAN SPEED button the speed changes in the following sequence: Hi, Med and Low in FAN mode.
Auto Mode: In AUTO mode the unit automatically chooses the fan speed and the mode of operation (COOL,HEAT,DRY or FAN). In this mode the temperature is set automatically according to the room temperature (tested by the temperature sensor which is incorporated in the indoor unit.).
Heat Mode: The heating function allows the air conditioner to heat the room. Press the MODE button to activate the heating function. To optimize the function of the air conditioner, adjust the temperature and the speed by pressing the button indicated.

5. **Timer Button:** Use these buttons on the control panel and remote to set the Timer.
   Timer Off: The timed stop is programmed by pressing TIMER button. Set the rest time by pressing the button "+" or "-" until the rest time displayed is to your liking then press the TIMER button again.
   Timer On: When the unit is off, press TIMER button at the first time, set the temperature with pressing the button "+" or "-". Press TIMER button at the second time, set the rest time with pressing the button "+" or "-". Press TIMER button at the third time, confirm the setting, then the rest time to next automatic switching-on could be read on the display of the machine. **Note:** It can be set to automatically turn off or on in 0.5-24 hours. Each press of the "+" "-" buttons will increase or decrease the timer. The Timer can be set in 0.5 hours increment below 10 hours and 1 hour increment for 10 hours or above. The SET light will turn on while setting.
   To cancel the set function, press the TIMER button again.

OPERATION

Control Panel

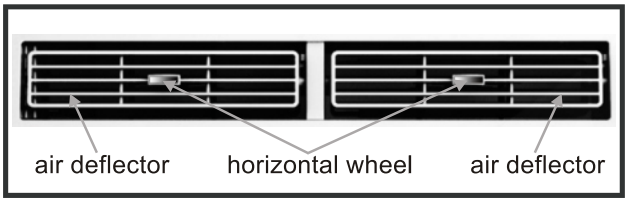
6. **Money Saver Button:** When the unit is in Money Saver mode, the light will turn on. In Money Saver mode, the unit will turn off once the room is cooled to the user-set temperature.
   The unit will turn back on when the room temperature rises above the user-set temperature. Before the compressor starts,the fan motor will run for a while, then it will stop for a while, and will repeat to provide a much more comfortable feeling and save energy.

7. **Sleep Button:** Press the SLEEP button, all of the display lights will turn off after a while, but the Sleep light is always on. In SLEEP mode, the air conditioner will automatically adjust the temperature and fan speed to make the room more comfortable during the night. The set temperature will automatically raise every 30-60 minutes, and at most change six times until the set temperature is 81 or 82℉ for cooling and 75 or 76℉ for heating.

8. **Fan Speed Button:** Press the FAN SPEED button to choose the fan speed options. You can choose Hi, Med, Lo or auto speed in COOL mode or HEAT mode and choose Hi, Med, Lo in FAN mode.

9. **Filter Button:**
   When the Filter Check light is on, you can turn off the light by pressing the Filter Check button. After the fan motor works for 500 total hours, the Filter Check light will turn on to remind the user to clean the filter.
   When the Filter Check light is off, it is not necessary to press the Filter Check button.

10. **Directional Louvers:** To direct the airflow, use the horizontal wheel to control the horizontal direction, and use the air deflectors to control the vertical direction.



OPERATION

Sequence of Operation

Main function
NOTES:

RT------Room Temperature.

IC------Indoor CoilTemperature.

ST------indoor Set Temperature.

OC---Outdoor Coil Temperature.

CRT---Compensated Room Temperature

1. Cooling mode

In the cooling mode, COOL indicator is ON, the set temperature and fan speed could be changed or adjusted.

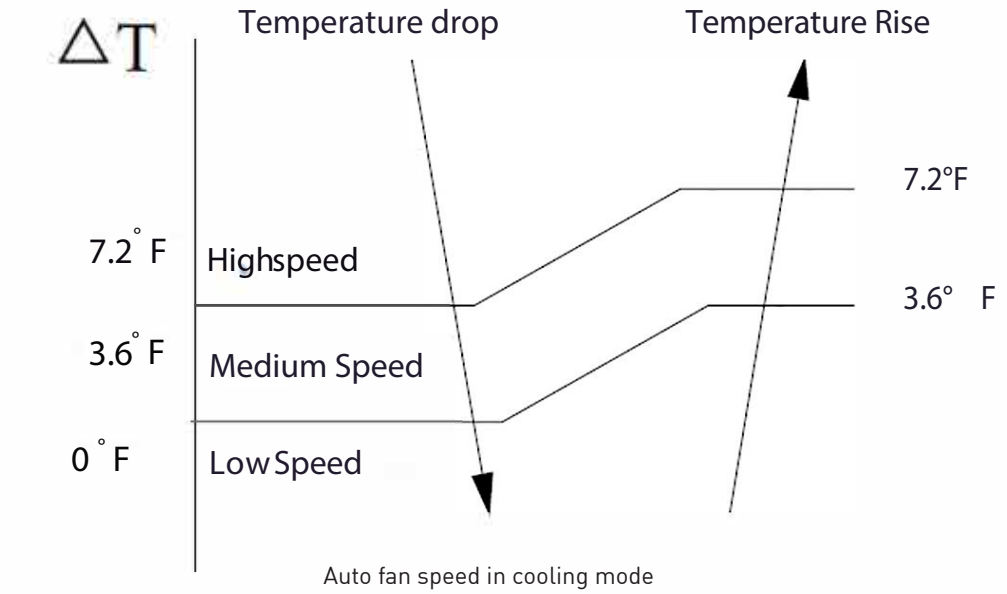
a. When RT-ST≥ 1.8°F the compressor operates if there is not any protection or failure happened.
b. When RT-ST< 1.8°F the compressor stops, and fan motor keeps operation continuous.
c. When 1.8°F ≤RT-ST<1.8°F the compressor keeps former status.

1.1 Indoor fan motor control

1.1.1 Indoor fan motor can be controlled by Auto, Low, Med and High speed.

1.1.2 Indoor fan motor Auto control as below:

a) In cooling mode Δ T=RT-ST
b) While Δ T<0°F, operates in low speed;
c) If ΔT= 3.6°F, in medium speed
d)If Δ T≥7.2°F , in high speed
e) If 3.6°F < Δ T < 7.2°F , The fan motor runs at original speed while it was set in High or Med mode. If original at Low speed, it will change to Med speed automatically.
f) If 0°F ≤ ΔT < 3.6°F, , The fan motor operates at original speed while it was set in Low or Med mode. If original at High speed, it will change to Med automatically.
g) When fan speed changes due to the temperature variation, it could be changed only by sequence as High, Med to Low speed or Low, Med to High speed, and each status will keep at least 2 minutes.



Auto fan speed in cooling mode

2. Dry mode

While selected to Dry mode, AC works at set temperature to 44.6°F for 3 minutes. After that the set temperature change to be RT 3.6°F, the compressor works as cooling mode, and indoor fan motor operates at low speed.
The fan speed can not be changed while in dry mode, but the air direction can be adjusted.

OPERATION

Sequence of Operation

3. Heating mode

When in heating operation mode, the set temperature, fan speed and air direction can be adjusted, compressor does not operate, but electrical heater works, and indoor fan motor starts up 10s later.

a ST-RT≥ 1.8°F electrical heater operates

b ST-RT < 1.8°F electrical heater stops.

c 1.8°F ≤ST-RT < 1.8° electrical heater keeps the original works status .

Indoor fan motor control

4.1 Indoor fan motor can be controlled by Auto, Low, Med or High speed.

4.2 Indoor fan motor Auto works as follow:

a) In heating mode: ΔT=ST-CRT

b) ΔT 0°F, running in low speed

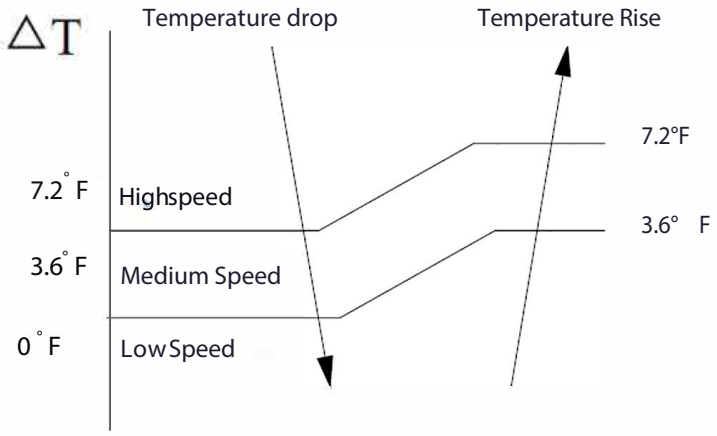
c) ΔT=3.6°F, in medium speed

d) Δ ≥ 7.2°F,in high speed .

e) 3.6°F < ΔT < 7.2°F , the fan speed keeps in medium or high speed as it's originally preset, but if the fan was originally in low speed, it will change to medium.

f) 0°F ≤ ΔT < 3.6°F , the fan speed keeps in low or medium speed as it's originally preset, if fan in high speed, it will change to medium speed.

g) When fan speed changes due to the temperature variation , it could be changed only by sequence as High, Med to Low speed or Low, Med to High speed , and each status keeps at least 2 minutes.



4. Fan mode

In FAN mode, the corresponding indicator is ON, fan motor runs according to the set speed (default High speed for the first time), compressor doesn't work, Buzzer and PCB do not respond while pressing the UP/DOWN button on remote controller, the fan motor is adjustable in high, medium or low speed, but not auto , 88 digital display shows environment temperature.

5. Sleep mode

6.1 In SLEEP mode, the indoor fan motor runs at low speed, except that the power source and sleep LED is ON, the running LED and others light are OFF, the condition of timer LED is according to the preset, and all the LEDs will be OFF after 30 seconds.

6.2 Temperature control

Processing SLEEP while in Cooling or Heating mode, unit runs according to the sleeping operation.

Item	initial set temp. (F)	The 1st change		The 2nd change		The 3rd change		The 4th change		The 5th change		The 6th change	
		runing time	ST(F)	runing time	ST(F)	runing time	ST(F)	runing time	ST(F)	runing time	ST(F)	runing time	ST(F)
The controlled set temperature. Note:unit--- Time: minute	≥82	60	no change	60	no change	60	no change	60	no change	60	no change	60	no change
	80	60	82	60	no change	60	no change	60	no change	60	no change	60	no change
	78	50	80	60	82	60	no change	60	no change	60	no change	60	no change
	77	40	78	50	80	60	no change	60	no change	60	no change	60	no change
	75	30	77	40	78	50	80	60	no change	60	no change	60	no change
	73	30	75	30	77	40	78	50	80	60	no change	60	no change
	71	30	73	30	75	30	77	40	78	50	80	60	no change
	≤70	30	74	30	58	50	75	50	91	40	109	50	80
Fan speed	set speed	set speed		low speed		low-low speed							
UP/DOWN swing	ON/OFF	keep original		keep angle for cold air prevention									

OPERATION

Sequence of Operation

a) The indoor fan runs at the set speed when processing sleep mode, after the 1st change, unit runs at low speed, and after the 2nd change, unit runs at low-low speed (if AC without low-low speed, it runs at low speed instead). 10 hours later AC quits from sleep mode and runs at former set fan speed .
b) In SLEEP mode, the vane works according to the preset, after the first change, vane blade works at cold air prevention angle. 10 hours later AC quits from sleep and works as the former preset.
c) The set fan speed refers to the preset value before processing SLEEP mode. If the unit just on stand by before sleep operation, the set value to be according to low speed . If AC preset in super speed, the set value will change to high speed, while in Auto wind, it will change to low speed.

B. Sleep mode on Heating operation:

table 2

Item	initial set temp. (℃)	The 1st change		The 2nd change		The 3rd change		The 4th change		The 5th change		The 6th change	
		runing time	ST(℃)	runing time	ST(℃)	runing time	ST(℃)	runing time	ST(℃)	runing time	ST(℃)	runing time	ST(℃)
The controlled set temperature. Note:unit—— Time: minute	⩾28	60	27	60	26	60	25	60	no change	60	no change	60	no change
	27	60	26	60	25	60	24	60	no change	60	no change	60	no change
	26	60	25	60	24	60	no change	60	no change	60	no change	60	no change
	25	60	24	60	no change	60	no change	60	no change	60	no change	60	no change
	⩽24	60	no change	60	no change	60	no change	60	no change	60	no change	60	no change
Fan speed	set speed	set speed		only High speed change to Med speed, otherwise keep the set fan speed									
UP/DOWN swing	ON/OFF	keep original											

1) The indoor fan runs at the set speed when processing in sleep mode, after the first change, unit changes to medium speed if the preset is in high operation, and the medium and low speed preset will keep the original even after the first change. 10 hours later AC quits from sleep mode and runs at former set fan speed
2) Processing SLEEP mode, the vane works according to the preset, 10 hours later AC quits from sleep and works as the former preset.
3) The set fan speed refers to the preset value before processing SLEEP mode. If the unit just on stand by before sleep operation, the set value to be according to low speed. if AC preset in super speed, the set value will change to high speed, while in Auto wind, it change to low speed.

Sleep process control

1) If the set temperature is changed during the period of sleep mode, it is also executed as the initial sleep set, and the change time is reset to 0, the temperature change will be restarted, but the 10 hours running time will not be reset as 0, it will accumulate continuously.
2) The fan speed can not be changed during sleep mode.
3) During the sleep period in cooling mode, the new set will be executed if the vane work status is changed, the anti-cold angle will not be executed.
4) During the sleep period in heating mode, the wind speed and vane swinging for cold air prevention function is selected first.

The sleep instruction in Cooling or Heating of I FEEL mode

1) The current set temperature is set as initial value if sleep mode has not been set before processing sleep mode.
2) If the set temperature is changed, the change times is reset to 0, the new set temperature will be executed, 10 hours timing will be continued.
3) There is other operation during sleep mode, e.g. vane operation, AC keeps operation continuously with the initial value no exchanged.
4) The sleep mode category is changed during sleep operation, the initial set temperature in cooling or heating of I FEEL mode will be set as initial running value if no temperature adjustment; or the temperature after increased or decreased will be set as initial running value after temperature adjustment; and the change times is reset to 0, 10 hours timing accumulation will be restarted.
5) The unit works according to the new set temperature when operating remote controller or other controller to quit sleep mode.

7. Auto Restart Function (Optional) .

7.1 PCB with auto restart function will keep the operation parameters in EEPROM even with power off. And the unit can restore operation as the former status automatically while power is on.
7.2 The status parameters include the set mode, fan speed, set temperature and the vane blade position when unit is off (the swinging status will be remembered when the vane was set as swinging)
7.3 Pressing sleep button 10 times within 8 seconds during running status, the Auto Restart Function could be activated or turned off; The buzzer sounds 3 times BIBI when activated and 4 times BIBI when function is turned off (operate with remote controller).

8. ECO function

8.1 The adjustable temperature: 61°F-88°F.
8.2 The action temperature and running of compressor is the same as cooling mode.
8.3 The fan speed setting and other assistant function same as cooling mode.
8.4 The indoor fan motor works as below while RT meets the set temperature to stop compressor:

OPERATION

Sequence of Operation

a) The indoor fan motor runs for 1 min according to the set speed continuously, and then stops.
b) The indoor fan keeps the stopping status in the following 10 min if RT meets the requirement of compressor stopping work.
c) After 10 min, the indoor fan motor runs for 20 seconds and lets the indoor air flow through the evaporator.
d) The indoor fan works as step b) and c) circularly.
e) During above process, if RT increase or ST decrease, also RT meet the requirement of compressor need to work, the unit exits above b), c) & d) circulation----indoor fan motor operation immediately at set speed, and compressor also starts up while three-min protection is met.
f) If the compressor working condition is not met after switching on the unit, the indoor fan runs at set speed for 1 min, then runs as step b) and c) circularly; If the compressor working condition is met after switching on the unit, the indoor fan runs at set speed
g) In above circulation, the 3-min protection for compressor always function.

9. Filter cleaning function

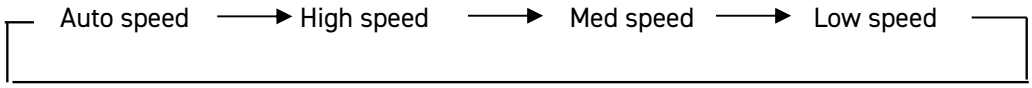
1. The LED for air FILTER will light (ON) when the indoor fan motor work has accumulated 500 hours.
2. Pressing the FILTER button means cleaning is finished, the accumulation hours are reset to 0 and start timing again, the FILTER indicator OFF at. 500 accumulation hours could be reset to 0 by pressing the filter button only.
4. There is no effect on the AC operation even when the filter indicator is ON.

Assistance function

1. Display and Key button
Display: default indicates set temperature (ST).
The key buttons include POWER (ON/OFF), FAN, MODE, UP, DOWN, TIMER, SLEEP, ECO, FILTER, the buzzer BIBI response for each valid button pressing.
The detailed instructions are below:

POWER ON/OFF button
When switched on, the indicator displays current set value and the running status can be adjusted by pressing buttons; there is no display when turned off, press FAN, UP, DOWN and MODE button is invalid; In timer mode, the timer indicator ON and digital LED displays the remained time, no other indicator, FAN and MODE button invalid. Pressing ON/OFF button may cancel the timer function. (Note: The Auto Restart Function default activated after production in the factory.)

FAN speed button
Pressing the FAN speed button causes switchover as:



MODE button
Cooling Only: Cooling -Dry - Fan - Auto.
Cooling & Heating pump : Cooling - Dry - Fan - Heat - Auto.

UP / DOWN button
It is used for temperature preset and timer adjustment.
When pressing the UP or DOWN button, buzzer response, and the digital display the set temperature or the set time.
In the running status, pressing SLEEP button 6 times within 8 seconds will turn the room temperature display ON or OFF, the buzzer shortly beeps twice. (by remote controller)
TIMER button

When unit is working (without time set), press TIMER button to set the AC time to shut down, the timer indicator ON.
When unit is OFF, press TIMER button to set the time of AC power on, the timer indicator ON
The timer can be set from 0.5, 1.0, 1.5, 2.0, ...10, 11, 12..... to 24 hours, it could circulate by dual direction: when showing 0.5, pressing DOWN button, the time changes to 24, vice versa, when showing 24, pressing UP button, the time changes to 0.5.
When 88 digital display timer, press UP/DOWN to adjust the timing time, the number flashes and 10s later, the digital recovery to display the set temperature. In order to regulate timer quickly in timing mode, pressing the UP/DOWN button for 2 seconds to trigger continuous adjustment with the frequency 5Hz.

FILTER button
When filter light is ON, pressing this button, the light will be OFF. It will be meaningless to press this button while the light is OFF.

2 BUZZER function
Power on controller: Buzzer buzzing once for 0.3s.
Power off unit: Buzzer beeps once.
Pressing button and\or receiving signal: Buzzer beeps shortly once.
Malfunction: buzzer beeps shortly 3 times

OPERATION

Sequence of Operation

Protection / Failure code
1 Anti-frozen protection for indoor evaporator:

If IPT≤32°F for continuous 3min, compressor shut off, fan motor keeps former operation; 3min later, if IPT≥50°F, compressor start up operation and fan motor keeps the former running status.

2 SENSOR error protection
When sensor short circuit or broken, Room Temperature failure shows E1, and Coil Temperature failure shows E2. When E1 or E2 happened, compressor stops and indoor fan motor operates at the set speed.
When AC on STANDBY, there is no malfunction inspection.

The NTC sensor resistance: 5kΩ/ 77°F
3 Compressor protection
If unit is on STANDBY before power off, there is no 3-min protection while switch on, otherwise the unit always has 3-min protection.

4 SELF-DIAGNOSIS function
Press the ON/OFF button first, and then switching on unit. AC works and checks as below accordingly:
Buzzer beeps 2 times, 88 Digital fully lights, Electric heating (for cooling & heating) , Compressor , High fan speed ,Medium speed ,Low speed , Health , WIFI LED, indicator of Heat/Cool /High speed/Dry / Medium speed / Low speed/Auto fan/ Timing / Sleep/ Filter cleaning/ ECO/Health, Room temperature , Indoor coil Temperature , EEPROM calibration etc.
After self-diagnosis, unit to STANDBY (Note: unit with auto restart function will operate according to it's former status)

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 (laws) in its operation they 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. 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.

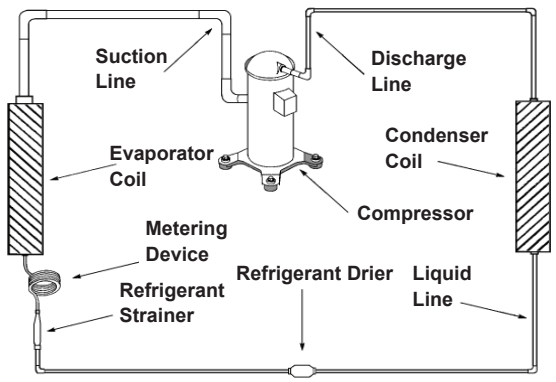
The design determines at exactly what point (in the condenser) the change of state (i.e. gas to a liquid) takes place. In all cases, however, the refrigerant must be totally condensed (changed) to a Liquid before leaving the condenser coil.

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 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.



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.

Figure 302 (Refrigeration Sequence Of Operation)

TROUBLESHOOTING

Check Thermistors

1. Gain Acces to Main PCB (logic) board

2. Using a multi meter ohm across applicaple pins for the sensor you are checking.

3. All Sensors are 5k. Refer to thermistor chart on following for resistance and temperature deviation.

4. Replace sensor if open or if resistance values deviate by more than 10% of the listed values.

MODEL	RT SENSOR	IPT SENSOR (INDOOR COIL)	IET SENSOR
CCF05A10A	5kΩ	/	/
CCF06A10A	5kΩ	/	/
CCF08A10A	5kΩ	/	/
CCF10A10A	5kΩ	5kΩ	/
CCF12A10A	5kΩ	5kΩ	/
UCT08A10A	5kΩ	5kΩ	/
UCT10A10A	5kΩ	5kΩ	/
UCT10A30B	5kΩ	5kΩ	/
UCT12A10A	5kΩ	5kΩ	/
UCT12A30A	5kΩ	5kΩ	/
UCT14A30B	5kΩ	5kΩ	/
UET08A11A	5kΩ	5kΩ	5kΩ
UET10A33A	5kΩ	5kΩ	5kΩ
UET12A33A	5kΩ	5kΩ	5kΩ
UET14A33A	5kΩ	5kΩ	5kΩ
CCW06B10A	5kΩ	/	/
CCW08B10A	5kΩ	/	/
CCW10B10A	5kΩ	5kΩ	/
CCW12B10A	5kΩ	5kΩ	/
CCW15B10A	5kΩ	5kΩ	/
CCW18B30A	5kΩ	5kΩ	/
CCW24B30A	5kΩ	5kΩ	/
CEW08B11A	5kΩ	5kΩ	5kΩ
CEW12B33A	5kΩ	5kΩ	5kΩ
CEW18B33A	5kΩ	5kΩ	5kΩ
CEW24B33A	5kΩ	5kΩ	5kΩ

TROUBLESHOOTING

Check Thermistors -Resistance Table of Thermistors (5K)

Temp	Resis	Temp	Resis	Temp	Resis	Temp	Resis	Temp	Resis
-33	130100	7	34252	47	10785	57	8275	97	3119
-32	125518	8	33209	48	10499	58	8063	98	3048
-31	121114	9	32202	49	10221	59	7857	99	2980
-30	116881	10	31228	50	9952	60	7657	100	2913
-29	112811	11	30288	51	9690	61	7462	101	2848
-28	108898	12	29378	52	9437	62	7273	102	2785
-27	105131	13	28499	53	9190	63	7090	103	2723
-26	101511	14	27650	54	8952	64	6911	104	2662
-25	98029	15	26828	55	8720	65	6738	105	2604
-24	94676	16	26034	56	8494	66	6569	106	2546
-23	91453	17	25266	57	8275	67	6406	107	2491
-22	88349	18	24523	58	8063	68	6247	108	2436
-21	85362	19	23805	59	7857	69	6092	109	2383
-20	82486	20	23110	60	7657	70	5942	110	2331
-19	79719	21	22437	61	7462	71	5796	111	2281
-18	77052	22	21787	62	7273	72	5654	112	2231
-17	74486	23	21158	63	7090	73	5515	113	2183
-16	72014	24	20548	64	6911	74	5381	114	2137
-15	69633	25	19959	65	6738	75	5251	115	2091
-14	67338	26	19388	66	6569	76	5124	116	2046
-13	65127	27	18836	67	6406	77	5000	117	2003
-12	62996	28	18301	68	6247	78	4880	118	1960
-11	60943	29	17783	69	6092	79	4763	119	1919
-10	58965	30	17282	70	5942	80	4649	120	1878
-9	57055	31	16796	71	5796	81	4538	121	1839
-8	55216	32	16325	72	5654	82	4431	122	1800
-7	53442	33	15870	73	5515	83	4326	123	1763
-6	51732	34	15428	74	5381	84	4224	124	1726
-5	50082	35	15001	75	5251	85	4125	125	1690
-4	48490	36	14586	76	5124	86	4028	126	1655
-3	46955	37	14184	77	5000	87	3934	127	1621
-2	45473	38	13795	48	10499	88	3842	128	1588
-1	44044	39	13418	49	10221	89	3753	129	1555
0	42664	40	13052	50	9952	90	3666	130	1524
1	41332	41	12698	51	9690	91	3582	131	1493
2	40047	42	12354	52	9437	92	3499	132	1462
3	38805	43	12021	53	9190	93	3419	133	1433
4	37607	44	11698	54	8952	94	3341	134	1404
5	36450	45	11384	55	8720	95	3265	135	1375
6	35332	46	11080	56	8494	96	3191	136	1348

TROUBLESHOOTING

ROOM AIR CONDITIONER UNIT PERFORMANCE TEST DATA SHEET

JOB NAME_____ TECH'S NAME_____

DATE_____ MODEL#_____ SERIAL #_____

CHECK THE INSTALLATION	ACCEPTABLE YES	NOT ACCEPTABLE NO
IS A CHASIS GASKET INSTALLED?	_____	_____
IS THE FRESH / EXHAUST AIR VENT OPEN?	_____	_____
IS A FRIEDRICH SLEEVE INSTALLED?	_____	_____
IS A FRIEDRICH OUTDOOR GRILLE INSTALLED?	_____	_____
IS MAINTENANCE BEING PERFORMED?	_____	_____

ELECTRICAL	
LINE VOLTAGE (STATIC)	_____ VOLTS
START UP VOLTAGE	_____ VOLTS
AMPERAGE DRAW (COOL)	_____ AMPS
AMPERAGE DRAW (HEAT)	_____ AMPS
COMPRESSOR	
LOCKED ROTOR AMPS	_____ AMPS
RUNNING AMPERAGE DRAW	_____ AMPS
INDOOR CONDITIONS	
INDOOR AMBIENT TEMPERATURE	_____ F
RELATIVE HUMIDITY (RH) INDOOR	_____%
DISCHARGE AIR TEMPERATURE (INDOOR)(COOL)	_____F
DISCHARGE AIR TEMPERATURE (INDOOR)(HEAT)	_____F
RETURN AIR TEMPERATURE (INDOOR)(COOL)	_____F
RETURN AIR TEMPERATURE (INDOOR) (HEAT)	_____F
OUTDOOR TEMPERATURE	
OUTDOOR AMBIENT TEMPERATURE	_____F
RH OUTDOOR RELATIVE HUMIDITY	_____%
DISCHARGE AIR TEMPERATURE (OUTDOOR)(COOL)	_____F
DISCHARGE AIR TEMPERATURE (OUTDOOR)(HEAT)	_____F
INTAKE AIR TEMPERATURE (OUTDOOR)(COOL)	_____F
INTAKE AIR TEMPERATURE (OUTDOOR)(HEAT)	_____F

COOLING OR HEATING AREA

AREA W_____ * L_____ = FEET SQUARED

FOR A GENERAL GUIDE REFER TO SIZING GUIDE TO THE RIGHT

FOR EXACT LOAD CALCULATIONS CONSULT MANUAL J OR M.

Figure 713 (Test Data Sheet)

COOLING SIZING GUIDE

AREA TO BE CONDITIONED IN SQ. FT.	APPROXIMATE COOLING BTU REQUIRED
100 - 150	5000
150 - 250	6000
250 - 300	7000
300 - 350	8000
350 - 400	9000
400 - 450	10000
450 - 550	12000
550 - 700	14000
700 - 1000	18000
1000 - 1200	21000
1200 - 1400	23000
1400 - 1500	24000
1500 - 2000	30000
2000 - 2500	34000

Guide based on normal room insulation, average number of sun exposed windows and two person occupancy.

1. If heavily shaded, reduce cooling Btus required by 10%
2. If very sunny, increase cooling Btus required by 10%
3. Add 500 Btus per person over 2 people
4. Add 4,000 Btus if the area is a kitchen

Figure 714 (Cooling Sizing Guide)

TROUBLESHOOTING

Product Does Not Operate At All

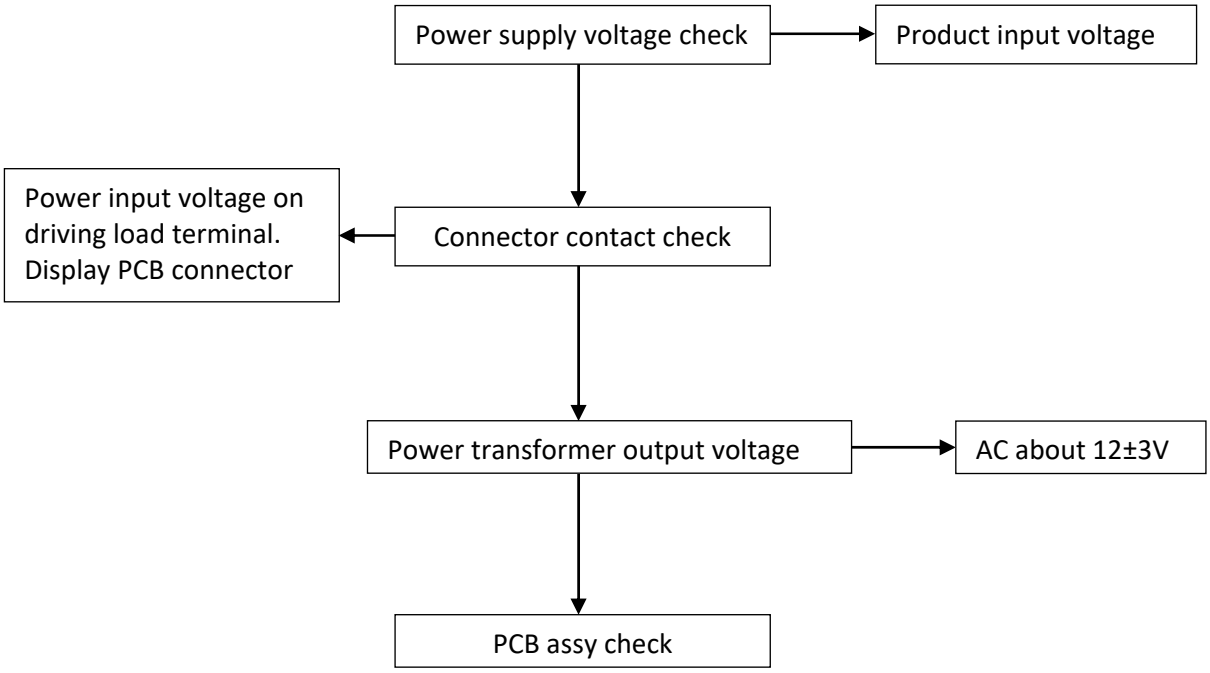


Figure 401

TROUBLESHOOTING

Indoor Fan Does Not Operate At All

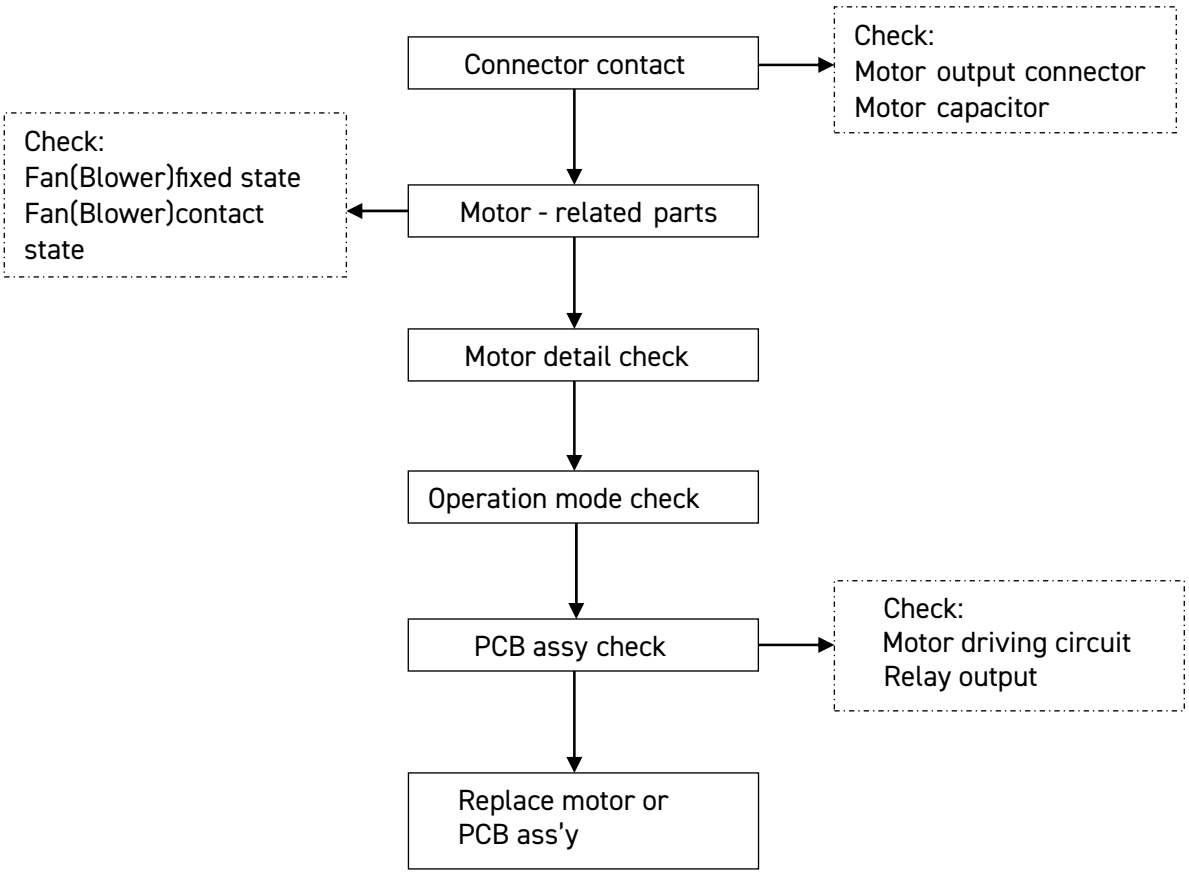


Figure 402

TROUBLESHOOTING

Compressor Or Outdoor Fan Does Not Operate At All

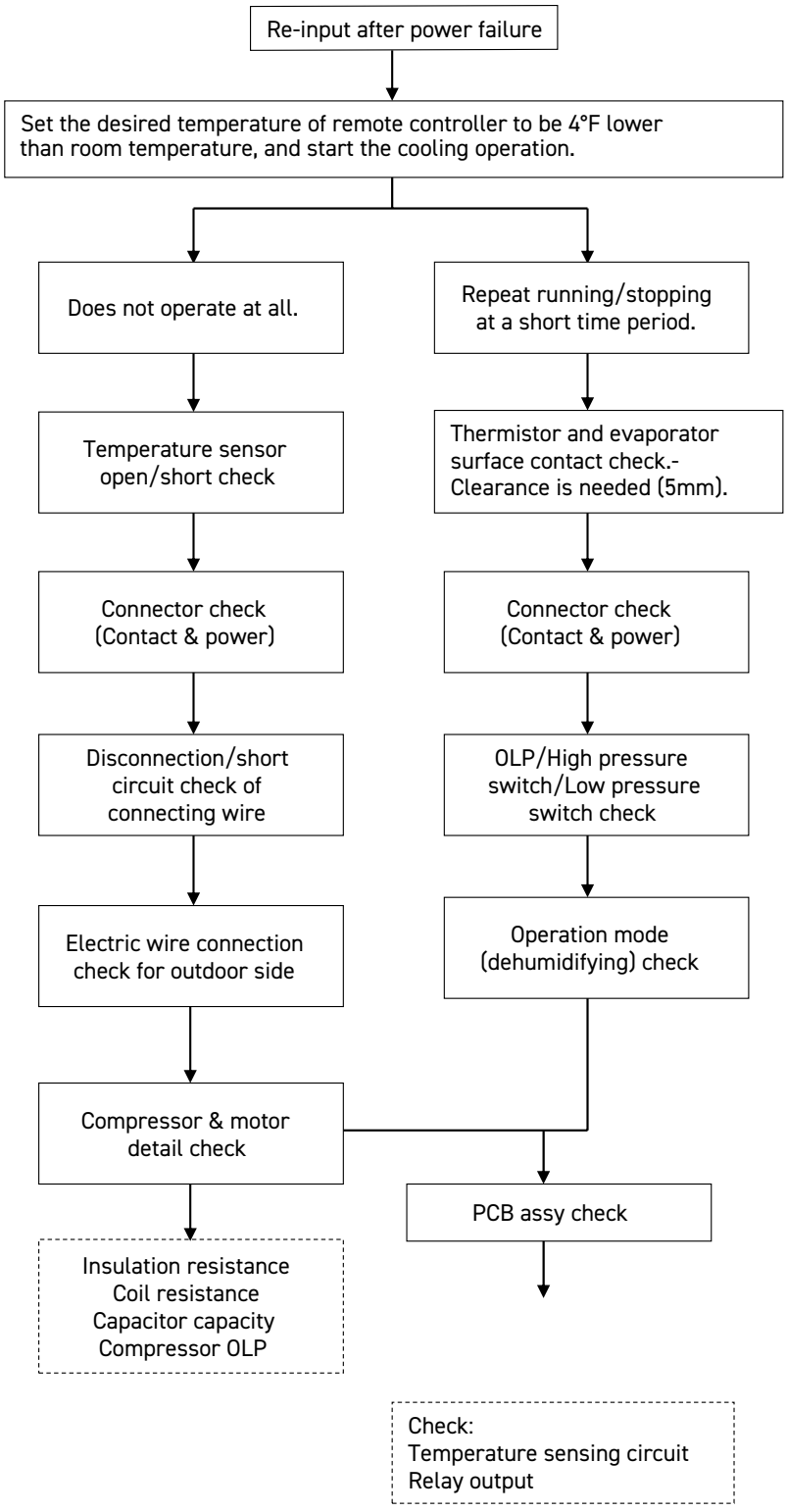


Figure 403

TROUBLESHOOTING

Display E1 or E2

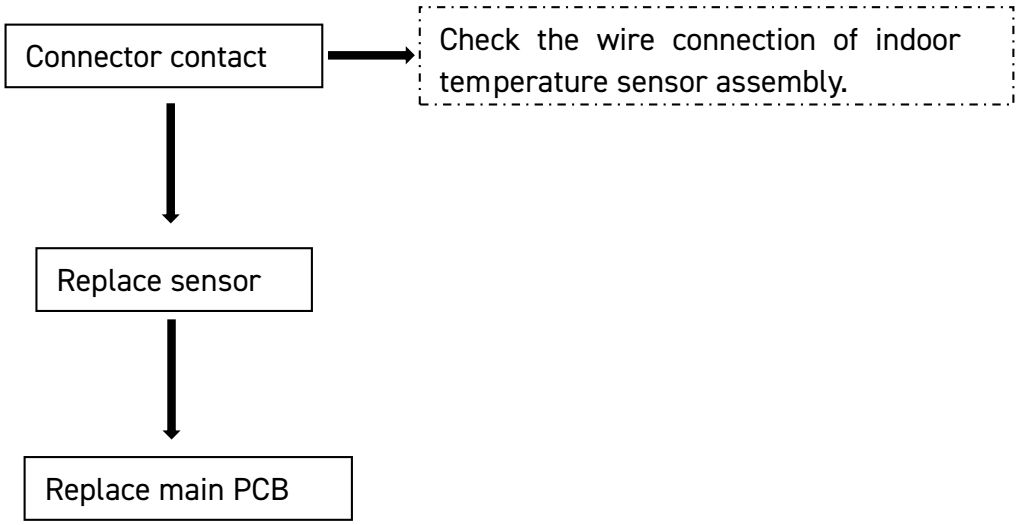


Figure 404

COMPONENT TESTING

Capillary Tube Assy (Cool Only Units)

Test the Capillary Tube and Check Valve Assy

1. Check the capillary tube temperature by hand where the refrigerant enters the capillary tube. A partial restriction of the capillary tube will be indicated by frost or freezing in that area.
2. If the capillary tube is fully restricted, then pressure will increase and pressure switch will open if installed. If no pressure switch is installed, the unit will shut down due to the compressor overload opening. High discharge temperature will be present at the compressor.

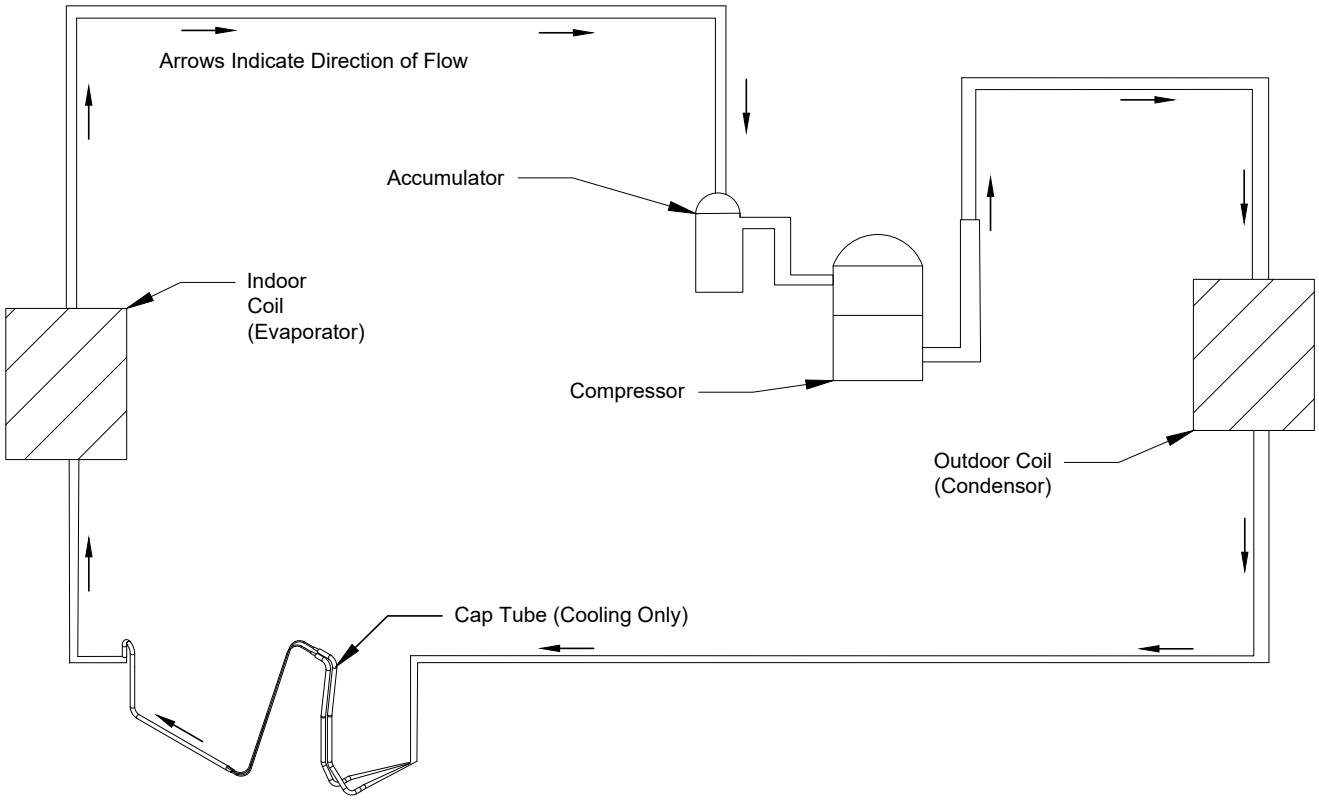


Figure 501 (Cooling Only Refigerant Flow)

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
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.

Interrnal Overloads
Some model compressors are equipped with an internal overload. 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.

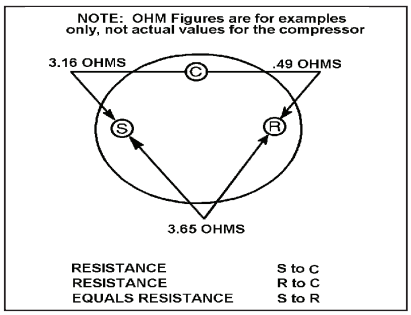


Figure 502 (Resistance Chart)

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.

NOTE: Before installing valves and gauges, check the compressor discharge temperature and compressor current, Low compressor amperage combined with low discharge temperature is an indication that the compressor might be faulty,

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 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.

COMPONENTS TESTING

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
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.

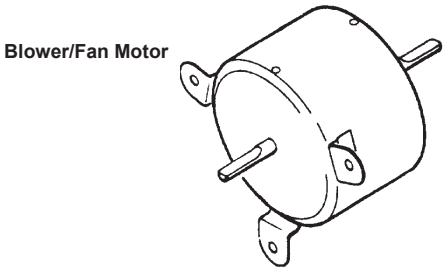


Figure 503 (Blower)

Blower / Fan Motor Test

1. Check Capacitor as shown below.
2. Place the unit into fan only mode, and verify proper voltage at motor leads.
3. If proper voltage exists, check the resistance of the windings, replace fan motor.

Capacitors

⚠ 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.

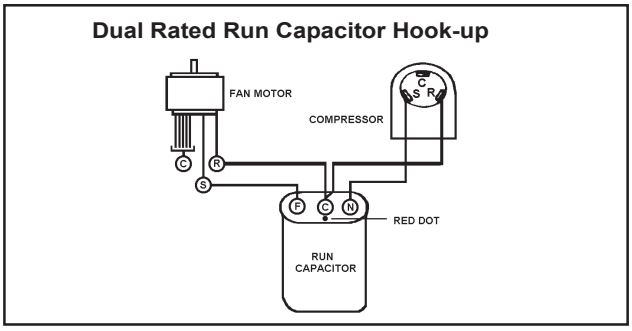


Figure 504 Dual Rated Capacitor Hook-Up

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

The meter 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 common terminal is connected to the "S" or start terminal. The common 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.

COMPONENTS TESTING

Heating Element

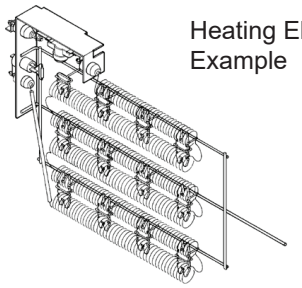
⚠ WARNING

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.



Heating Element Example

All electric heat models are equipped with a heating element . The models are equipped with either a 1.32 Kw or a 3.5 Kw element.
The heating element contains a fuse link. The fuse link is in series with the power supply and will open and interrupt the power when the temperature reaches 185°F or a short circuit occurs in the heating element. Once the fuse link separates, a new heater element must be installed.

NOTE: Always replace the heating element with the exact replacement.

TESTING THE HEATING ELEMENT
Testing of the elements can be made with an ohmmeter across the terminals after the connecting wires have been removed.
A cold resistance reading of approximately 11.5 +-10% ohms for the 1.32 KW heater should be registered.
A cold resistance reading of approximately 30.4 +-10% ohms for the 3.5 KW heater should be registered.

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.
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.
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 Friedrich approved R-410A filter dryers only.

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

EQUIPMENT REQUIRED:

1. Voltmeter
2. Ammeter
3. Ohmmeter
4. E.P.A. Approved Refrigerant Recovery System
5. Vacuum Pump (capable of 200 microns or less vacuum.)
6. Acetylene torch.
7. Electronic Halogen Leak Detector capable of detecting HFC (Hydrofluorocarbon) refrigerants.
8. Digital refrigerant scale
9. High Pressure Gauge - (0 to 750 lbs.)
10. Low Pressure Gauge - (-30 to 200 lbs.)
11. Vacuum Gauge capable of 300 microns
12. 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

Refrigerant Charging

⚠ WARNING

RISK OF ELECTRIC SHOCK

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

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

⚠ WARNING

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: Always weigh in refrigerant based on the model nameplate.

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.

NOTE:Factory sealed units will not be overcharged

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

Undercharged Refrigerant Systems

⚠ 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.

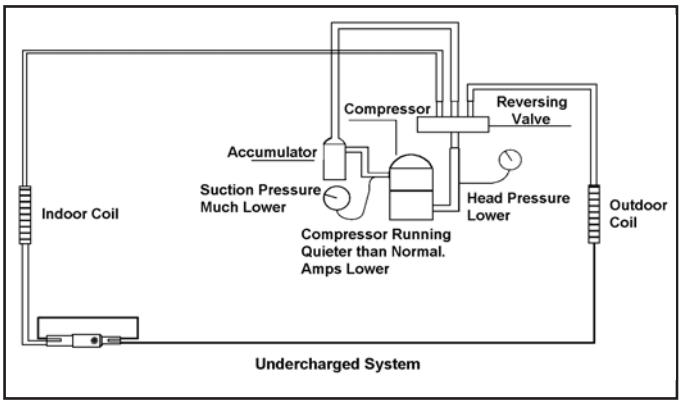
⚠ WARNING

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.



NOTE: Ensure fan is on high speed during testing.
An undercharged system will result in poor performance (low pressures, etc.) in both the heating and cooling cycle.

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

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

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

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

If the compressor reads low amperage and has a high discharge line temperature at the compressor, it is an indication of low system refrigerant.

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

Figure 601 (Undercharged System)

R-410A SEALED SYSTEM REPAIRS

Overcharged Refrigerant Systems

⚠ 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.

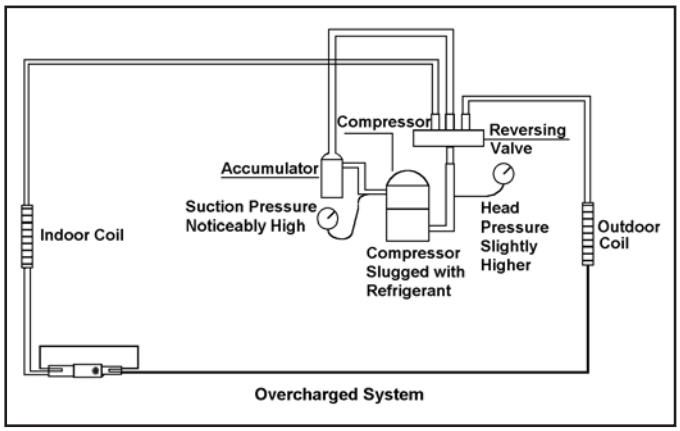


Figure 602 (Overcharged System)

NOTE: Ensure fan is on high speed during testing.
Compressor amps will be near normal or higher. Noncondensables can also cause these symptoms. To confirm, remove some of the charge, if conditions improve, system may be overcharged. If conditions don't improve, Noncondensables are indicated.

NOTE:Factory sealed units will not be overcharged

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.

R-410A SEALED SYSTEM REPAIRS

Restricted Refrigerant System

NOTE: Ensure fan is on high speed during testing.
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."

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.

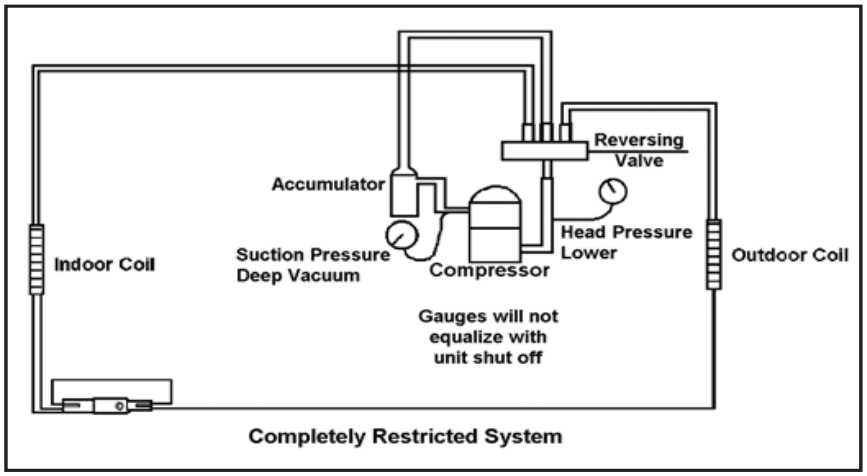
Often a partial restriction of any type can be found by feel, as there is a temperature difference from one side of the restriction to the other. There will ususally be a diiference felt at the capillary tube. This does not indicate a restricted condition.

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 specification. 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.

Make all checks posible before tapping into the system and installing gauges.

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

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



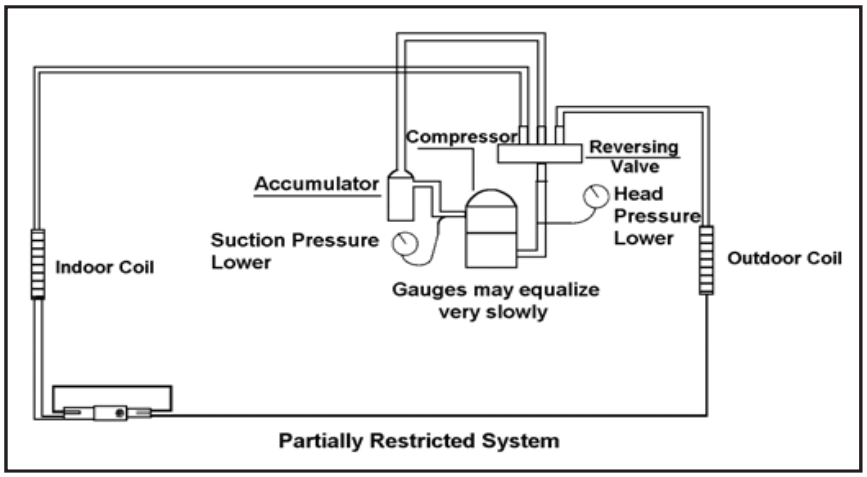


Figure 603 (Restricted System)

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

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

1. 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 the system to 1500 microns
6. Repressurize to 50 PSI with nitrogen
7. Evacuate the system to 1000 microns
8. Repressurize to 50 PSI with nitrogen
9. Evacuate the system to below 500 microns
10. Weigh in the refrigerant charge with the property quantity of R-410A refrigerant per model nameplate.
11. Start unit, and verify performance.
12. Crimp the process tube and solder the end shut.

R-410A SEALED SYSTEM REPAIRS

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.

⚠ WARNING

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

1. 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.

CAUTION: 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.

8. Pressurize with trace amounts of R-410A and nitrogen to 550 psi and leak test all connections with a leak detector.Repair any leaks found.
8a. If leak detector is unavailable remove all refrigerant from system and pressurize with nitrogen to 550 psi. Check that system holds pressure.
Repeat Step 8 to ensure no more leaks are present
9. Evacuate the system with a good vacuum pump capable of a final vacuum of 300 microns or less. The system should be evacuated through both liquid line and suction line gauge ports.

- 9a.Evacuate the system to 1500 microns.
- 9b. Repressurize to 50 PSI with nitrogen.
- 9c. Evacuate the system to 1000 microns.
- 9d. Repressurize to 50 PSI with nitrogen.
- 9e. Evacuate the system to below 500 microns.

10. Weigh in the refrigerant charge with the property quantity of R-410A refrigerant per model nameplate.
11.Start unit, and verify performance.
12. Crimp the process tube and solder the end shut.

R-410A SEALED SYSTEM REPAIRS

Compressor Replacement -Special Procedure in Case of Compressor Burnout

⚠ WARNING

HIGH PRESSURE HAZARD

Sealed Refrigeration System contains refrigerant and oil under high pressure.

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

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

⚠ WARNING

ELECTRIC SHOCK HAZARD

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

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

⚠ WARNING

EXPLOSION HAZARD

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

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

⚠ WARNING

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

1. Recover all refrigerant and oil from the system.
2. Remove compressor, 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.

5. Pressurize with trace amounts of R-410A and nitrogen to 550 psi and leak test all connections with a leak detector. Repair any leaks found.
5a. If leak detector is unavailable remove all refrigerant from system and pressurize with nitrogen to 550 psi. Check that system holds pressure.

Repeat Step 5 to insure no more leaks are present.

NOTE: 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.

9. Evacuate the system with a good vacuum pump capable of a final vacuum of 300 microns or less. The system should be evacuated through both liquid line and suction line gauge ports.

- 9a.Evacuate the system to 1500 microns.
- 9b. Repressurize to 50 PSI with nitrogen.
- 9c. Evacuate the system to 1000 microns.
- 9d. Repressurize to 50 PSI with nitrogen.
- 9e. Evacuate the system to below 500 microns.

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.

WIRING DIAGRAMS

Chill Premier CCF

Models: CCF05A10A CCF06A10A CCF08A10A

CCF10A10A CCF12A10A

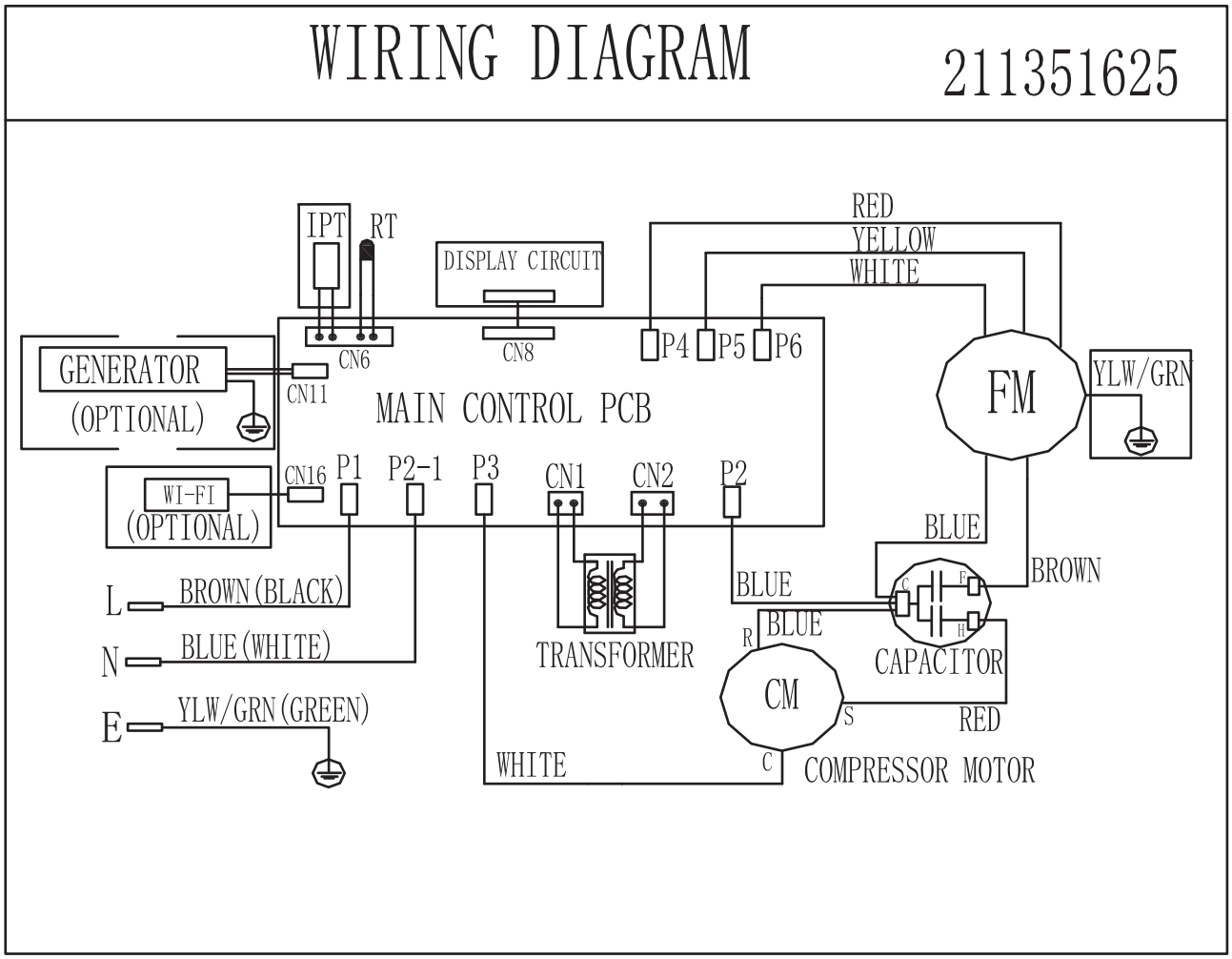


Figure 801

WIRING DIAGRAMS

Chill Premier CCW

Models: CCW06B10A . CCW24B30A

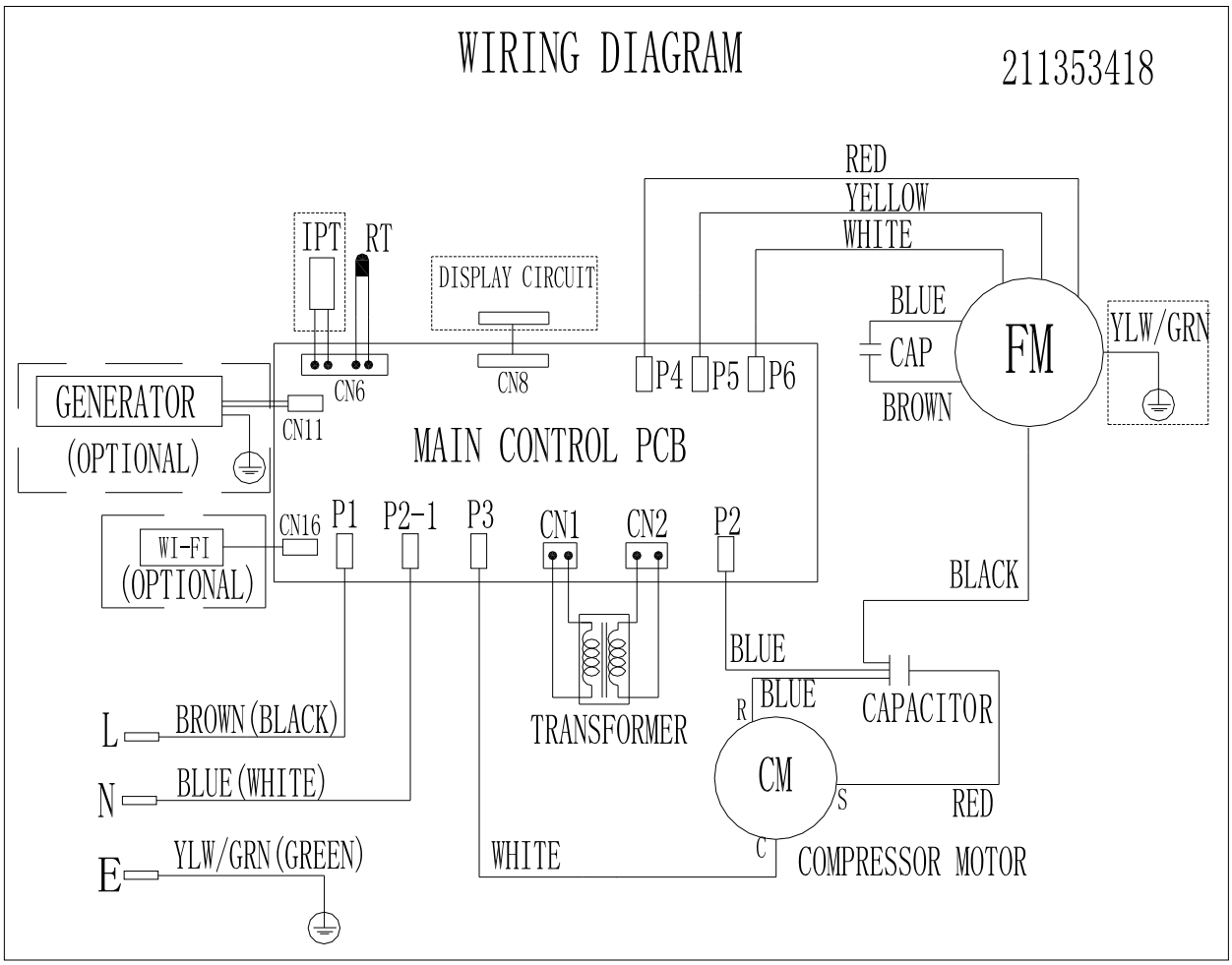


Figure 802

WIRING DIAGRAMS

Chill Premier CCW

CCW08B10A

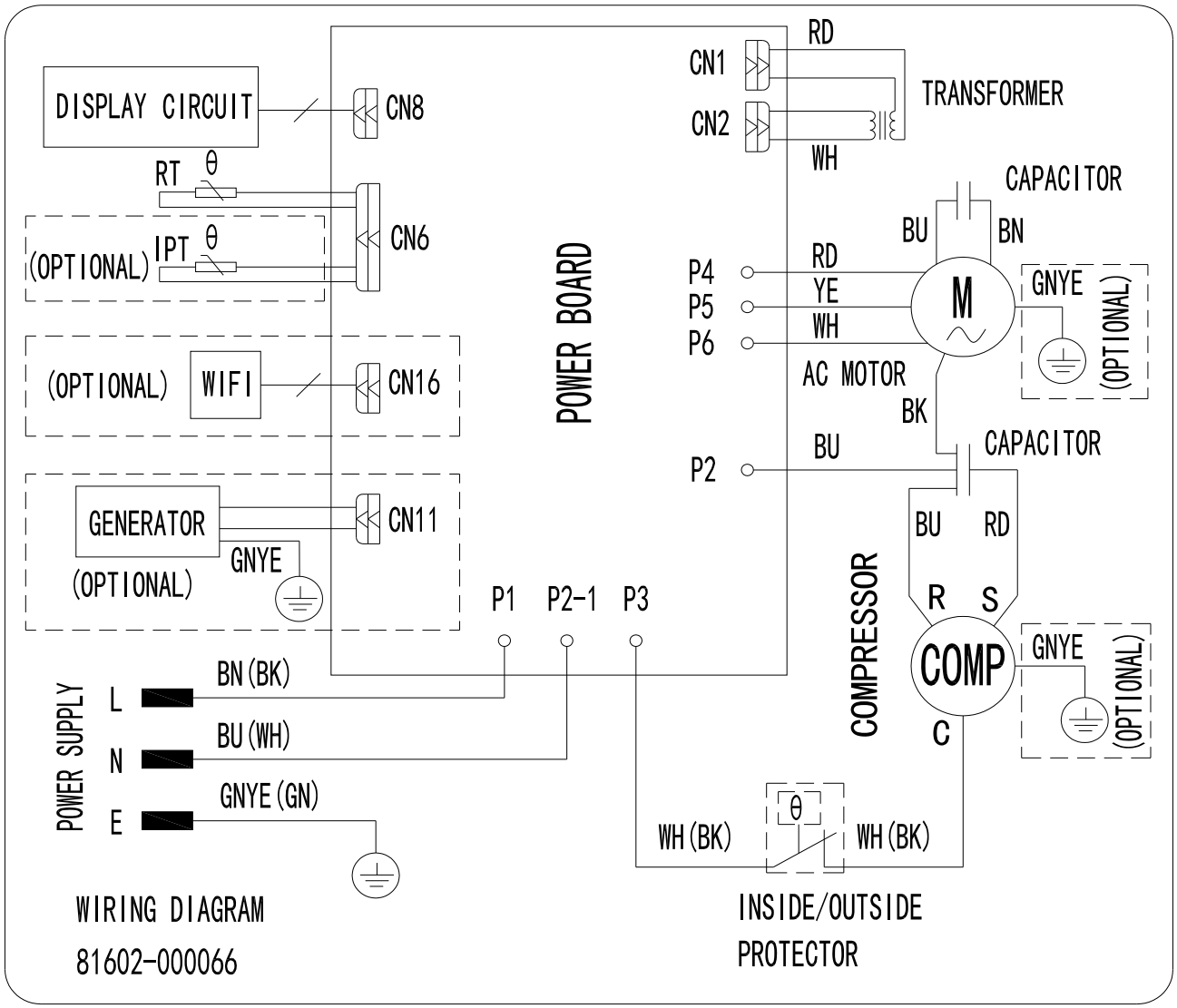


Figure 803

WIRING DIAGRAMS

Chill Premier

CCW10B10A, CCW12B10A, CCW15B10A, CCW18B30A

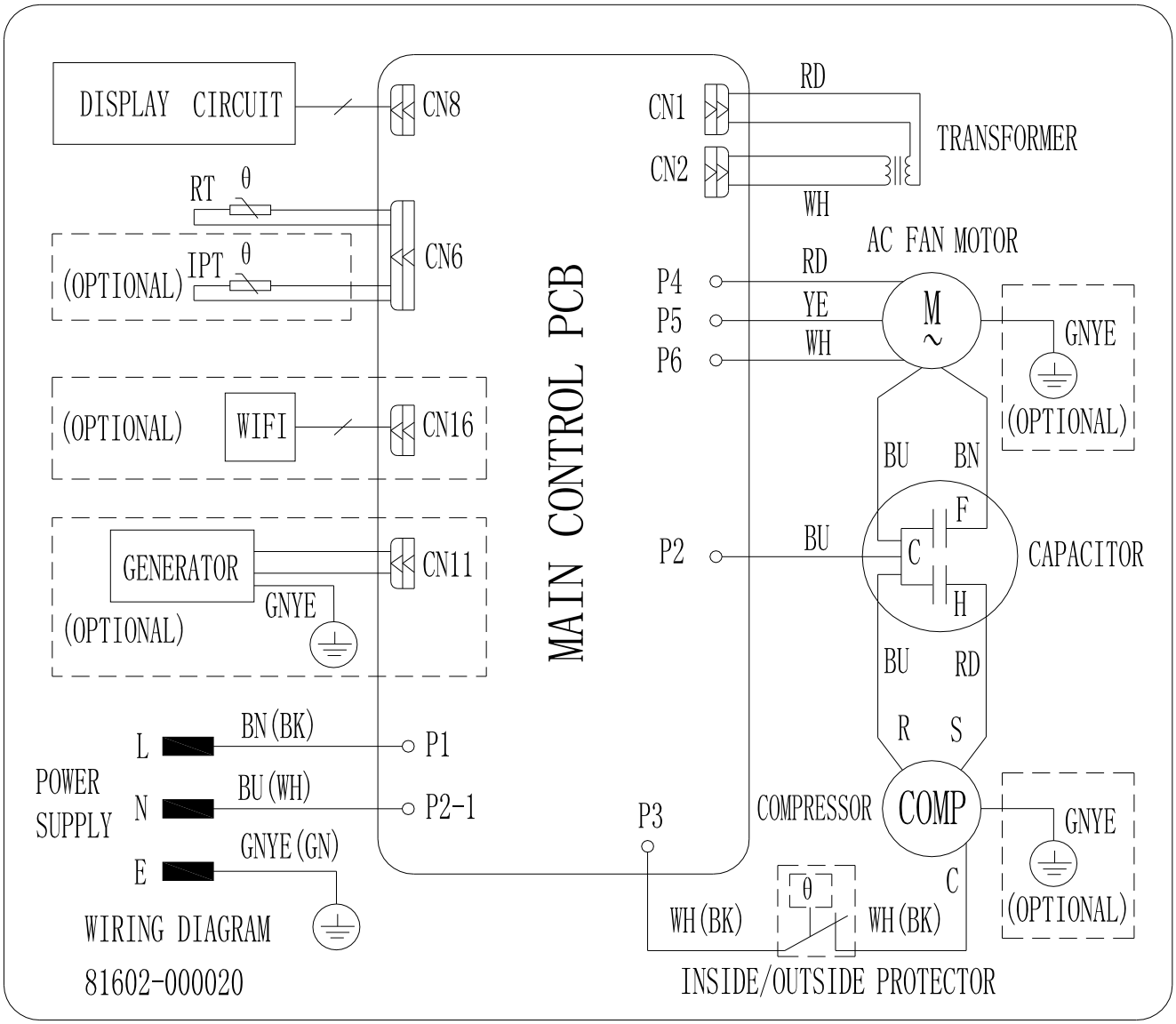


Figure 804

WIRING DIAGRAMS

Chill Premier CEW

CEW08B11A

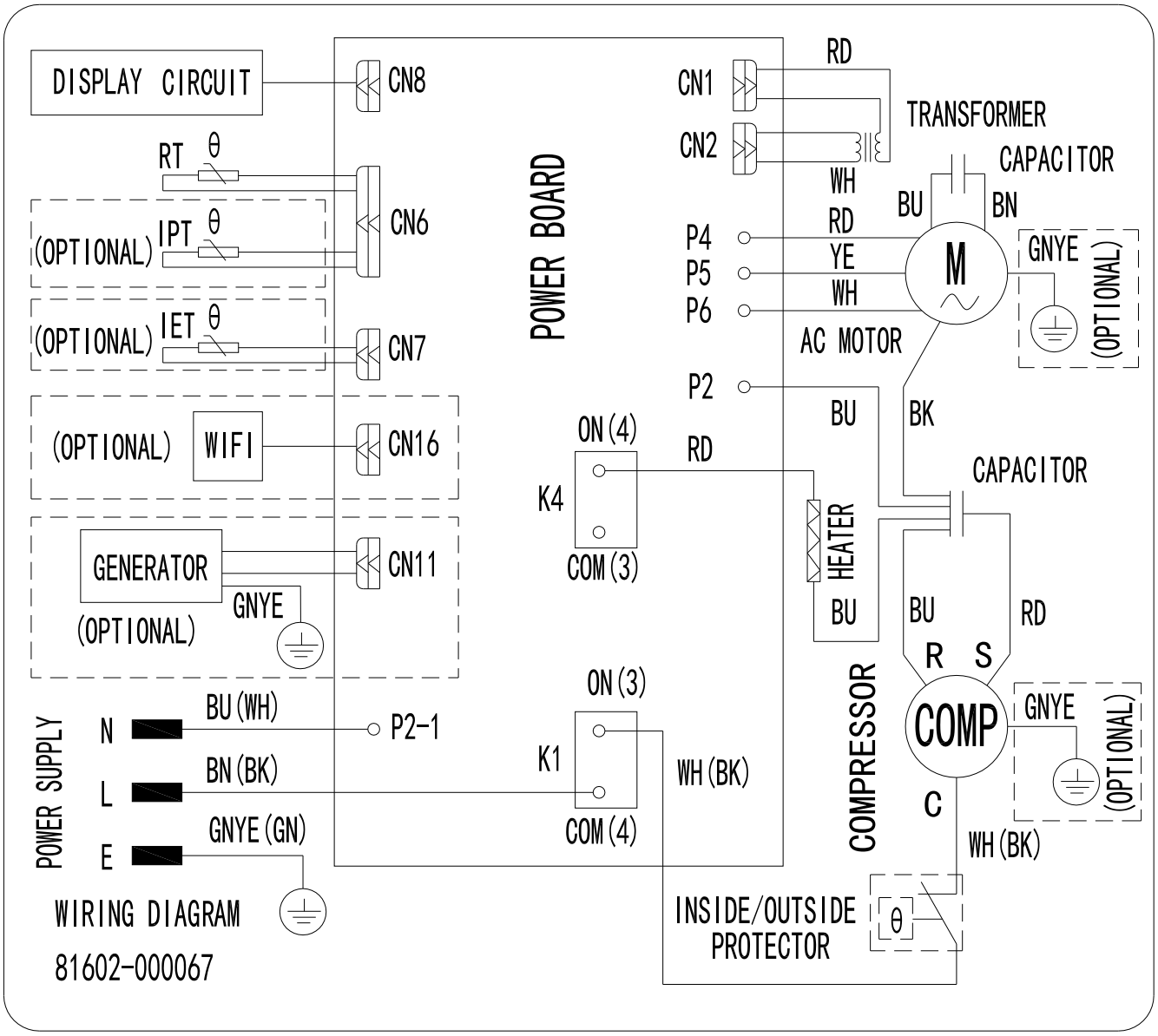


Figure 805

WIRING DIAGRAMS

Chill Premier CEW

CEW12B33A, CEW18B33A

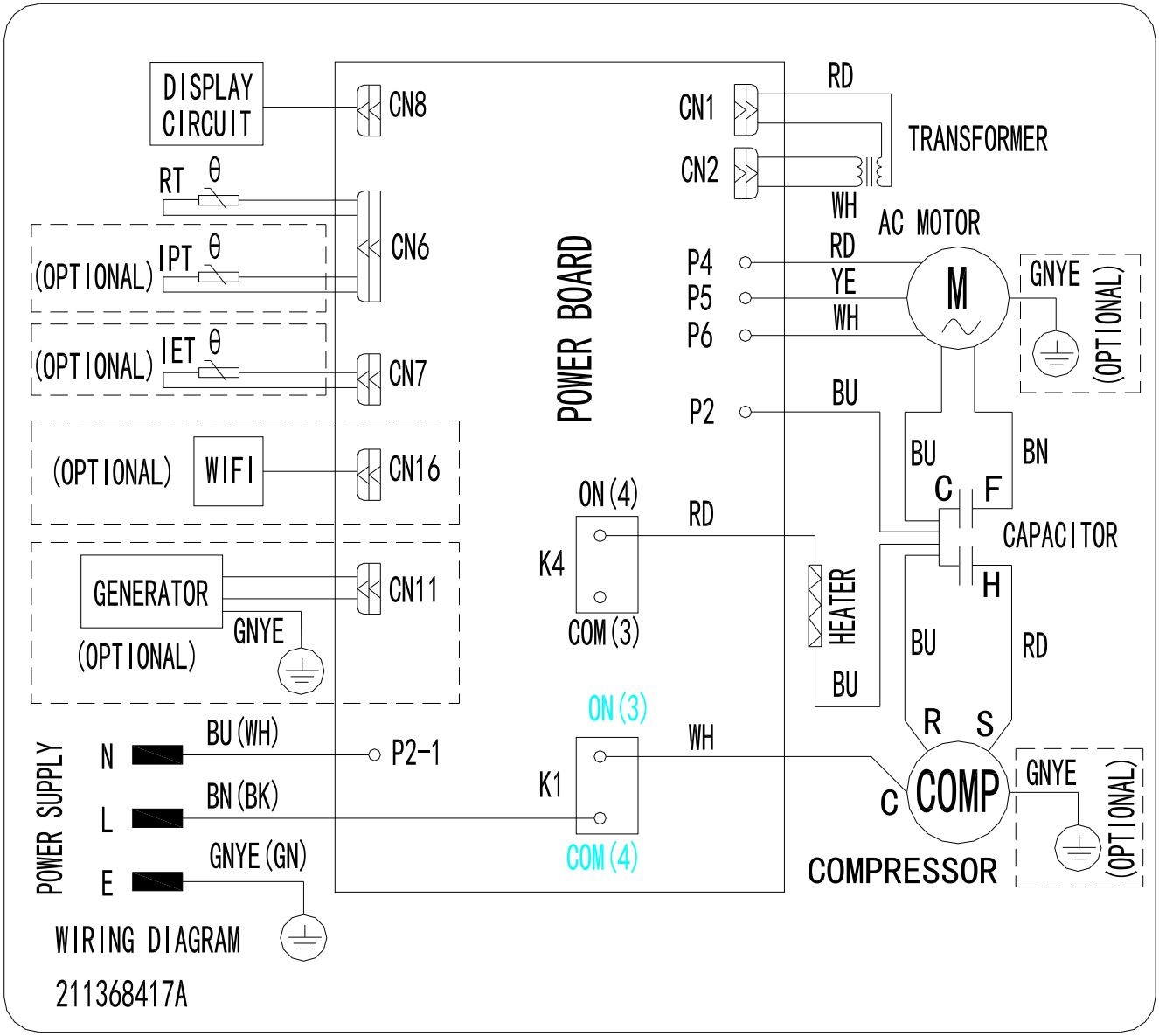


Figure 806

WIRING DIAGRAMS

Chill Premier CEW

CEW24B33A

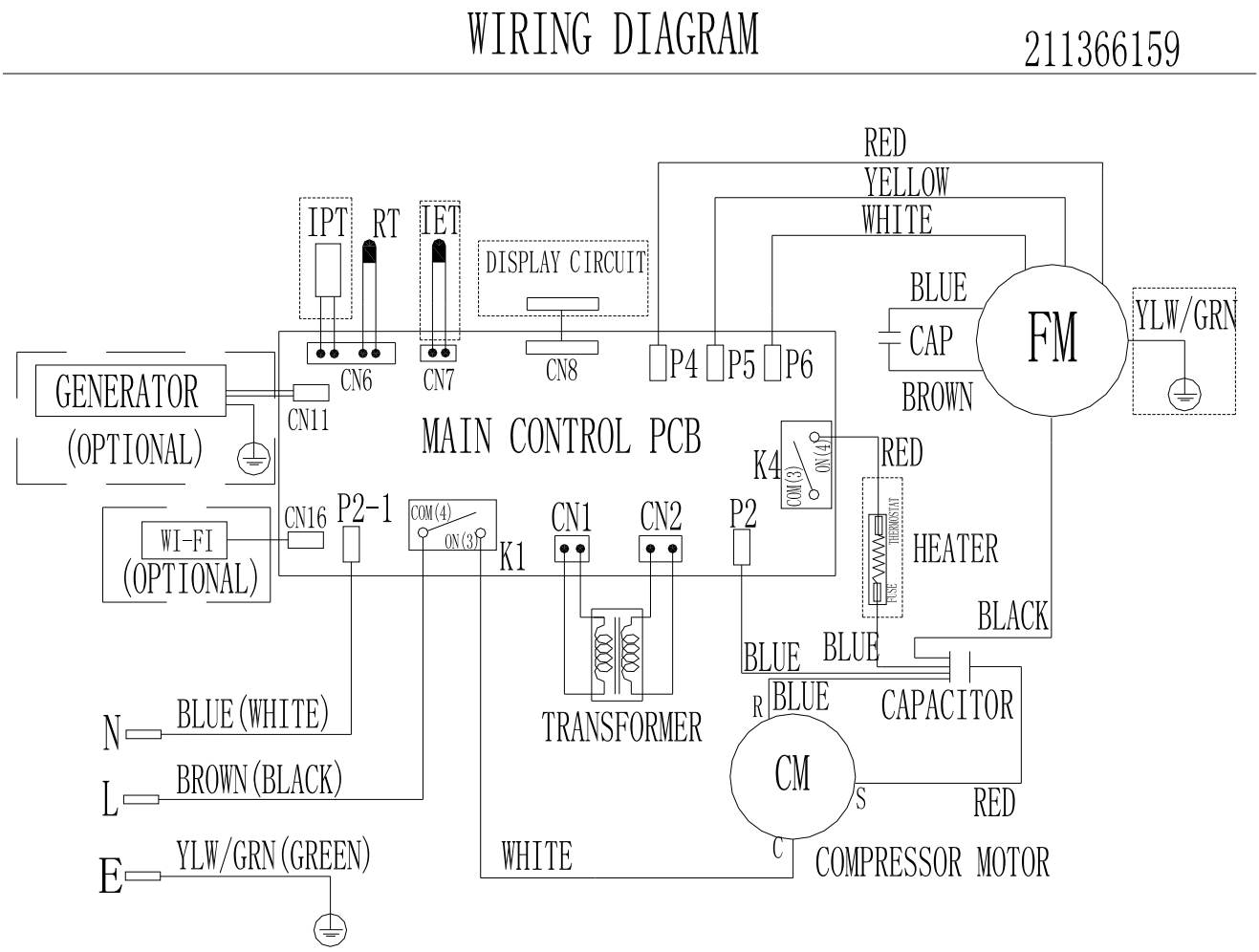


Figure 807

WIRING DIAGRAMS

Unifit

UCT08A10A, UCT10A10A, UCT12A10A, UCT10A30A, UCT12A30A, UCT14A30A

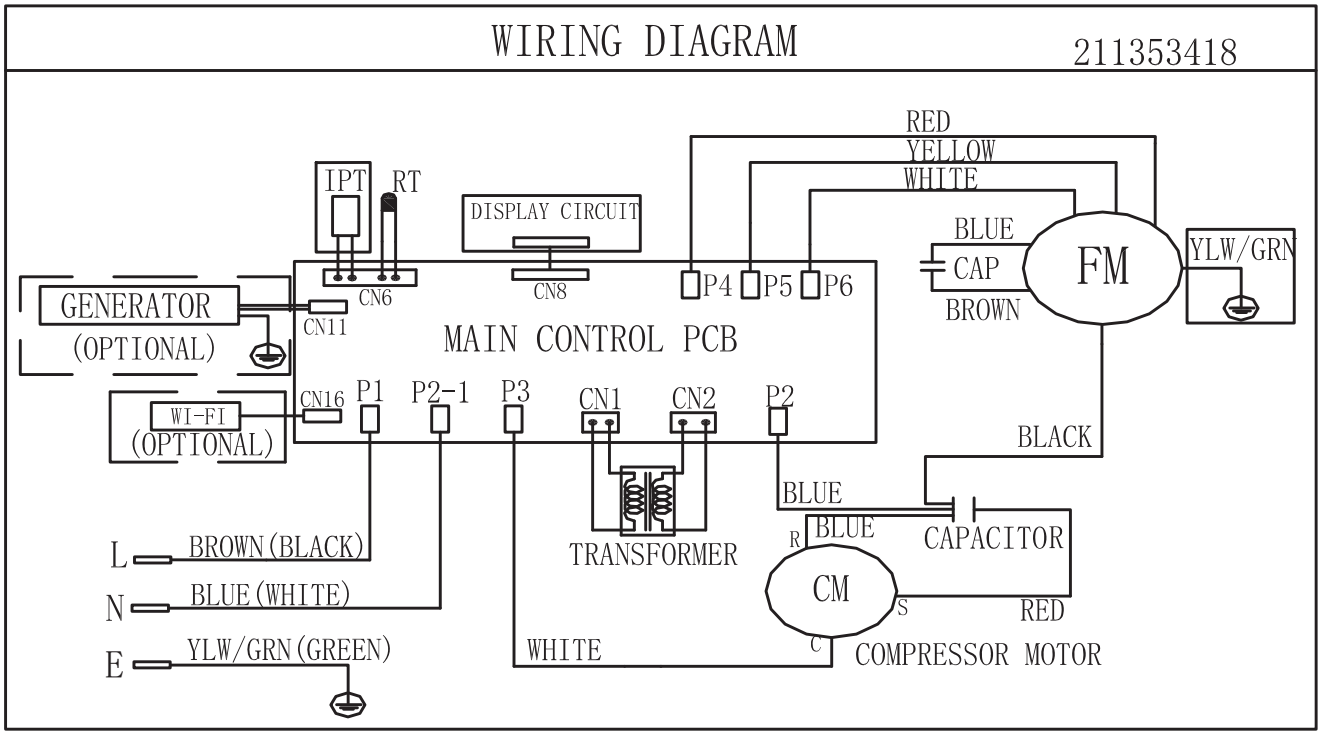


Figure 808

WIRING DIAGRAMS

Unifit

UET10A33A, UET12A33A, UET14A33A, UET08A11A

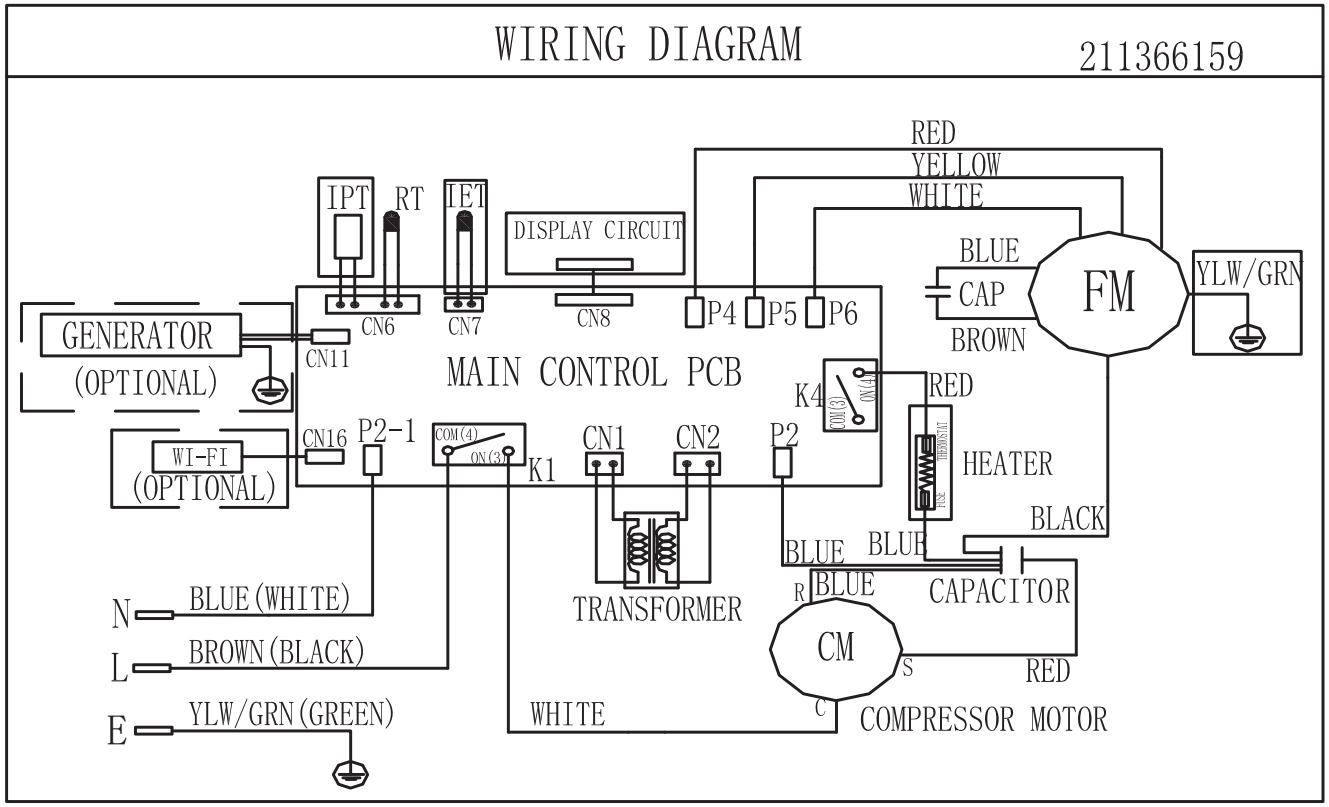


Figure 809

INTERACTIVE PARTS VIEWER

All Friedrich Service Parts can be found on our online interactive parts viewer.

Please click on the link below:

Interactive Parts Viewer

For Further Assistence contact Friedrich customer service at **(1-800-541-6645)**.

AVAILABLE ACCESSORIES

Unifit

USC SLEEVE

An existing or new sleeve is required for installation. The Friedrich USC sleeve ships with the accessories needed for installation in new construction, or installation into an existing sleeve.

INCLUDED WITH USC SLEEVE

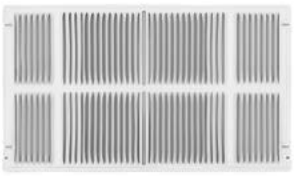
USC wall sleeve ships with weather panels (2) and grille. Sleeve is shown at right with:

1. Painted steel inner panel
2. Painted steel outer panel
3. Painted steel standard grille

USC sleeve

Inner weather panel

Outer weather panel



Standard grille

OPTIONAL GRILLE

ARCHITECTURAL GRILLE-UXAA

Optional extruded brushed aluminum grille.

UXAA, optional architectural grille

IMPORTANT:

When installing into an existing sleeve, consult Installation Section of your Installation/Operation Manual to determine whether or not the grille needs to be replaced and/or a baffle adapter (included with chassis) should be used.

SLEEVE/ CHASSIS DIMENSIONS

Model	Height	Width	Depth	Depth with Front	Minimum Extension Into Room	Minimum Extension Outside	Thru-the-wall Finished Hole Height	Thru-the-wall Finished Hole Width	Thru-the-wall Finished Hole Max. Depth
Uni-Fit ®									
USC Sleeve	15 1/2"	25 7/8"	16 3/4"	20 1/2"	–	1/2"	15 3/4"	26 1/8"	16 1/4"
UCT, UET Chassis	14 1/2"	24 1/4"	-	20 5/16"	3 3/4"	–	–	–	–

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

ROOM AIR CONDITIONERS LIMITED WARRANTY

FIRST YEAR

ANY PART: If any part supplied by FRIEDRICH fails because of a defect in workmanship or material within twelve months from date of original purchase, FRIEDRICH will repair the product at no charge, provided room air conditioner is reasonably accessible for service. Any additional labor cost for removing inaccessible units and/or charges for mileage related to travel by a Service Agency that exceeds 25 miles one way will be the responsibility of the owner. This remedy is expressly agreed to be the exclusive remedy within twelve months from the date of the original purchase.

SECOND THROUGH FIFTH YEAR

SEALED REFRIGERANT SYSTEM: If the Sealed Refrigeration System (defined for this purpose as the compressor, condenser coil, evaporator coil, reversing valve, check valve, capillary, filter drier, and all interconnecting tubing) supplied by FRIEDRICH in your Room Air Conditioner fails because of a defect in workmanship or material within sixty months from date of purchase, FRIEDRICH will pay a labor allowance of $100 and parts necessary to repair the Sealed Refrigeration System; PROVIDED FRIEDRICH will not pay any additional labor charges over the prescribed labor allowance including the cost of diagnosis of the problem, removal, freight charges, and transportation of the air conditioner to and from the Service Agency, and the reinstallation charges associated with repair of the Sealed Refrigeration System. All such cost will be the sole responsibility of the owner. This remedy is expressly agreed to be the exclusive remedy within sixty months from the date of the original purchase.

APPLICABILITY AND LIMITATIONS: This warranty is applicable only to units retained within the Fifty States of the U.S.A., District of Columbia, and Canada. This warranty is not applicable to:

1. Air filters, fuses, batteries and the front grille removal tool.
2. Products on which the model and serial numbers have been removed.
3. Products which have defects or damage which results from improper installation, wiring, electrical current characteristics, or maintenance; or caused by accident, misuse or abuse, fire, flood, alterations and/or misapplication of the product and/or units installed in a corrosive atmosphere, default or delay in performance caused by war, government restrictions or restraints, strikes, material shortages beyond the control of FRIEDRICH, or acts of God.

OBTAINING WARRANTY PERFORMANCE: Service will be provided by the FRIEDRICH Authorized Dealer or Service Organization in your area. They are listed in the Yellow Pages. If assistance is required in obtaining warranty performance, write to: Room Air Conditioner Service Manager (the Friedrich address is at the top of this w arranty) or email tac@friedrich.com.

LIMITATIONS: THIS WARRANTY IS GIVEN IN LIEU OF ALL OTHER WARRANTIES. Anything in the warranty notwithstanding, ANY IMPLIED WARRANTIES OF FITNESS FOR PARTICULAR PURPOSE AND/OR MERCHANTABILITY SHALL BE LIMITED TO THE DURATION OF THIS EXPRESS WARRANTY. MANUFACTURER EXPRESSLY DISCLAIMS AND EXCLUDES ANY LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGE FOR BREACH OF ANY EXPRESSED OR IMPLIED WARRANTY.
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 w arranty period of the unit.
3. Providing a replacement unit of equal value

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

NOTE: Some states do not allow limitations on how long an implied w arranty lasts, or do not allow the limitation or exclusion of consequential or incidental damages, so the foregoing exclusions and limitations may not apply to you.

OTHER: This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

PROOF OF PURCHASE: Owner must provide proof of purchase in order to receive any w arranty related services.

All service calls for explaining the operation of this product w ill be the sole responsibility of the consumer.

All warranty service must be provided by an **Authorized FRIEDRICH Service Agency,** unless authorized by FRIEDRICH prior to repairs being made.

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

United Products Distributors Inc.
4030A Benson Ave
Halethorpe, MD 21227
888-907-9675
c.businsky@updinc.com

Shivani Refigeration & Air Conditioning Inc.
2259 Westchester Ave.
Bronx, NY 10462
sales@shivanionline.com

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

Total Home Supply
26 Chapin Rd Ste 1109
Pine Brook, NJ 07058
877-847-0050
support@totalhomesupply.com
https://www.totalhomesupply.com/brands/Friedrich.html

FRIEDRICH

TECHNICAL SUPPORT CONTACT INFORMATION

Friedrich Air Conditioning Co.
10001 Reunion Place, Suite 500 • San Antonio, Texas 78216
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www.friedrich.com