



Model KAC4P3777R

AIR CONDITIONER OPERATOR'S MANUAL



CAUTION

**BEFORE INSTALLING AND USING
THIS AIR CONDITIONER, IT IS
IMPORTANT THAT INSTALLATION
INSTRUCTIONS (DOCUMENT
NUMBER 900-090-00) SHIPPED
WITH THE UNIT BE READ AND
UNDERSTOOD THOROUGHLY**

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I. Introduction

Kooltronic Air Conditioners are designed to provide a cool, dehumidified environment for your electronic components. There are models to fit virtually all sizes and shapes of electronics enclosures, in capacities ranging from 1,000 to 30,000 BTU/H. Our "closed-loop" design also ensures that your components will not be exposed to hot, dirty operating conditions.

This Manual provides you with the necessary general information for properly installing and operating standard Kooltronic Air Conditioners. Technical data and mounting instructions are presented on pages 6 through 11.

II. Incoming Inspection

Kooltronic Air Conditioners are designed, built and packaged to withstand the shock and vibration normally associated with shipment by common carriers. Occasionally improper handling during shipping causes damage. Such handling could include unbanding of palletized shipments, failing to respect "**This Side Up**" arrows, rough handling, falling off conveyors, excessive vibration, crushing, etc. Therefore, a thorough inspection should be done upon receipt of all shipments. Any packaging tears, dents, scratches, loose articles or evidence of oil are signs of damage and should be noted on the Freight Bill. Shipments should be opened immediately and the units inspected for CONCEALED DAMAGE. Kooltronic Air Conditioners must be delivered in the proper mounting position to assure that damage to the compressor has not occurred during shipping. Any Kooltronic Air Conditioner that is delivered lying down or removed from the shrink wrapped or banded pallet should be refused.

An immediate claim **MUST** be filed with the freight carrier and an inspection requested. Retain all packing materials. Kooltronic cannot assume responsibility for Consignee's failure to file a timely freight claim.

III. Product Handling:

- 1) Do not attempt to operate your Kooltronic Air Conditioner until you read and thoroughly understand this Manual. See section **VI PRE-INSTALLATION TESTING**.
- 2) Before operating the Kooltronic Air Conditioner be certain that it is placed in its correct mounting position. **All Air Conditioners containing an M, P, or V as part of the model number are designed to operate in a vertical position only. All Air Conditioners containing an H, RT or RM in the model number are designed to operate in a horizontal position only.** This placement must be done a minimum of 5 minutes prior to operating in order to allow the compressor oil to drain to the compressor sump area.

CAUTION

Kooltronic Air Conditioners must be operated in their proper mounting position. If attempts are made to operate a unit that is not in its designed mounting position, permanent compressor damage will occur. This action will void the warranty. To avoid compressor damage do not tip the unit more than 45° from its proper mounting position.



- 3) Before operating this unit, all electrical wiring must be checked to assure the proper connection to the correct power source. Minimum circuit ampacity should be at least 125% of the amperage found on the air conditioner label for the corresponding voltage. Do not exceed the maximum fuse size found on the label.
- 4) We do not recommend that Air Conditioners be shipped to their final destination attached to an enclosure. In the event that the Air Conditioner needs to be shipped attached to an enclosure it is strongly recommended that proper support be provided for the Air Conditioner. Excessive vibration can occur if Air Conditioners are not properly supported when shipped on enclosures, increasing the potential for internal damage and voiding the warranty.
- 5) **PROCEDURE FOR PROPER PACKING AND SHIPMENT OF KOOLTRONIC AIR CONDITIONERS:**
 - Keep Air Conditioner in proper upright position indicated by arrow markers.
 - Pack Air Conditioner in a suitable container (preferably original packaging if possible), with adequate internal protective packaging, making sure shipment is marked and is kept in correct upright position.
 - For local, controlled transportation, strap packaging to a secure part of truck to prevent falling or sliding, minimize vibration, etc.
 - For common carrier shipment, band unit(s) securely to a pallet. Unpalletted shipment risks severe damage which voids the warranty.

IV. Product Identification and Labels

Each Kooltronic Air Conditioner includes an identification label. This label provides:

- ① Model Number
- ② Serial Number
- ③ Electrical power characteristics
- ④ Maximum and minimum ambient operating temperatures
- ⑤ Cooling capacity
- ⑥ Heating capacity
- ⑦ Type and amount of refrigerant required for recharging
- ⑧ Design Pressure
- ⑨ Filter Part Number
- ⑩ Customer Part Number
- ⑪ Final Assembly Number
- ⑫ Manufacturing Order Number

We recommend you copy this information from your unit.

				Air Conditioner		
MODEL NO. ①				SERIAL NO. ②		
VOLTS. ③	FREQ. ③	PH. ③	COOLING F.L.A. ③	AMBIENT TEMP MIN. °F ④ MAX °F ④		HEATING F.L.A. ③
COOLING BTU ⑤		HEATING BTU ⑥		REFRIGERANT ⑦		Oz. ⑦
DESIGN PRESSURE P.S.I.G. LOW ⑧ HIGH ⑧		MAX. FUSE SIZE ③		FILTER P/N ⑨		
CUSTOMER PART NO. ⑩						
FINAL ASSEMBLY NO. ⑪		MFG. ORDER NO. ⑫				
<p>SPECIAL PURPOSE AIR CONDITIONER NEMA/EEMAC/UL50 BY UNDERWRITERS LABORATORIES, INC. TYPES 3R & 12 INTERFACE TO THE ELECTRICAL ENCLOSURE ONLY</p> <p>NEMA/EEMAC/UL50 BY UNDERWRITERS LABORATORIES, INC. TYPE 1 SPECIAL PURPOSE AIR CONDITIONER EQUIPMENT COMPARTMENT ONLY</p> <p>SERVICE AIR FILTERS REGULARLY ALLOW 5 MIN. BEFORE RESTARTING AFTER SHUTDOWN UNAUTHORIZED SERVICE OR MODIFICATION VIOLATES WARRANTY ALL MOTORS ARE THERMALLY PROTECTED</p> <p>THIS PRODUCT IS PROTECTED BY ONE OR MORE OF THE FOLLOWING PATENTS: 3,019,965 3,120,166 3,211,360 3,559,728 3,807,493 AND OTHER PATENTS PENDING</p>						
<p>MANUFACTURED BY: KOOLTRONIC, INC. PENNINGTON, NJ VENTURA, CA</p>						

- ①② When ordering parts, specify the Model Number and Serial Number.
- ③ Before operating, be sure that the power source matches these requirements.
- ④ Make sure that these parameters are met. Failure to do so may result in permanent damage to the unit.
- ⑥ Use of incorrect type or amount of refrigerant will adversely affect performance and may damage the unit.

V. Principles of Operation

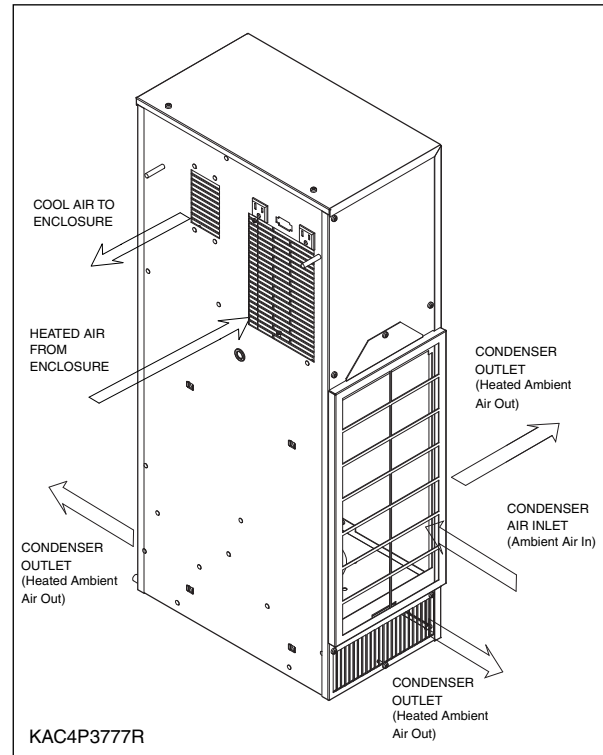
Kooltronic Air Conditioners are required when the equipment operating temperature must be kept near or lower than the ambient room temperature, and/or the cabinet must be sealed from dust, fumes, oil, corrosives and other contaminants. These Air Conditioners utilize a "Closed-Loop Cooling System" to ensure optimum performance of the installed components.

Closed-Loop cooling seals the electronic enclosure from hostile elements in the environment. Two separate circulation systems are employed. The internal system cools and dehumidifies the air inside the cabinet, totally isolating the sensitive electronics and other components from the environment. The external system uses circulating ambient air or water to discharge the heat removed from the electronics. The heat is dissipated from the enclosure by means of the vapor compression refrigeration cycle. This takes place in a hermetically-sealed refrigeration system, utilizing either an air-cooled or water-cooled condenser heat exchanger. The warm air inside the enclosure is drawn through the evaporator coil where it is cooled, dehumidified and returned.

Any enclosure moisture accumulated on the evaporator coil is collected in the condensate tray and removed through the drain tube to the condensate evaporator. Condensate evaporates in the condensate evaporator and is released to the ambient air by the condenser impeller.

The heat removed through the evaporator coil is transferred by the compressed refrigerant to the condenser coil. Ambient air is then passed through the condenser coil, where it absorbs the heat and is then discharged to the environment.

This unit is equipped with Cooling (Low Temperature) and Heating thermostats. The factory Cooling thermostat setting is 92°F with a differential of 7°F. When the temperature inside of the enclosure rises above 99°F the air conditioner will run in Cooling Mode. When the temperature inside of the enclosure drops below 92°F the air conditioner will shut off. The factory Heater thermostat setting is 45°F with a differential of 5°F. When the temperature inside of the enclosure drops below 40°F the air conditioner will run in Heating Mode. When the temperature inside of the enclosure exceeds 45°F the air conditioner will shut off. The Cooling and Heating thermostats are interlocked, so that the air conditioner cannot run in Cooling and Heating Mode simultaneously. The Condenser Impeller is controlled by a pressure switch. At medium ambient temperature below 75°F the Condenser Impeller will cycle. When the air conditioner starts in Cooling Mode the Condenser Impeller will remain off for about four (4) to seven (7) minutes, until the discharge refrigerant pressure builds up. The Cooling thermostat is equipped with a three (3) minute time delay on start-up to prevent compressor short cycling.



VI. Pre-Installation Testing

Before mounting the air conditioner to the enclosure, test for proper operation. This will verify the shipping integrity of the system. Please follow the steps below prior to installation.

CAUTION

The air conditioner must be standing in its proper mounting position for a minimum of five (5) minutes prior to testing. Failure to follow this procedure will cause permanent damage to the compressor. To avoid compressor damage do not tip the unit more than 45° from its proper mounting position.

1. The unit must sit in an upright position at a minimum room temperature of 65°F to allow the system to warm up.
2. Note that the factory Low Temperature Thermostat (compressor) setting is 92°F with a differential of 7°F (Cooling Mode, Cut out at set point), and that the Heater Thermostat setting is 45°F with a differential of 5°F (Heating Mode, Cut out at set point).
3. Refer to the identification label for proper electrical voltage and current requirements. Connect the power cord from the rear of the unit to a properly grounded and fused electrical supply, leaving electrical power to the unit turned off.
4. Plug the remote control 3 position connector into the unit receptacle labeled "Control." Plug the remote control power cord into the unit receptacle labeled "Thermostat Power."
5. Turn the electrical power on.
6. Verify that the evaporator blower is running. (The remote control includes a compressor time delay. After operating three (3) minutes the unit will run in cooling mode.)
7. Heat up the cooling thermostat sensor with a heat gun. When the cooling thermostat display temperature reaches 100°F the air conditioner should start. Keep the cooling thermostat temperature above 93°F.
8. After four (4) to seven (7) minutes the condenser impeller should start.
9. Operate the air conditioner for ten (10) minutes. During this period no unusual noise or vibration should be evident. The condenser impeller could cycle during this period of time. The cool air discharge should be at least 15°F lower than the ambient temperature.

NOTE: Before shipment all Kooltronic Air Conditioners are subjected to a performance test.

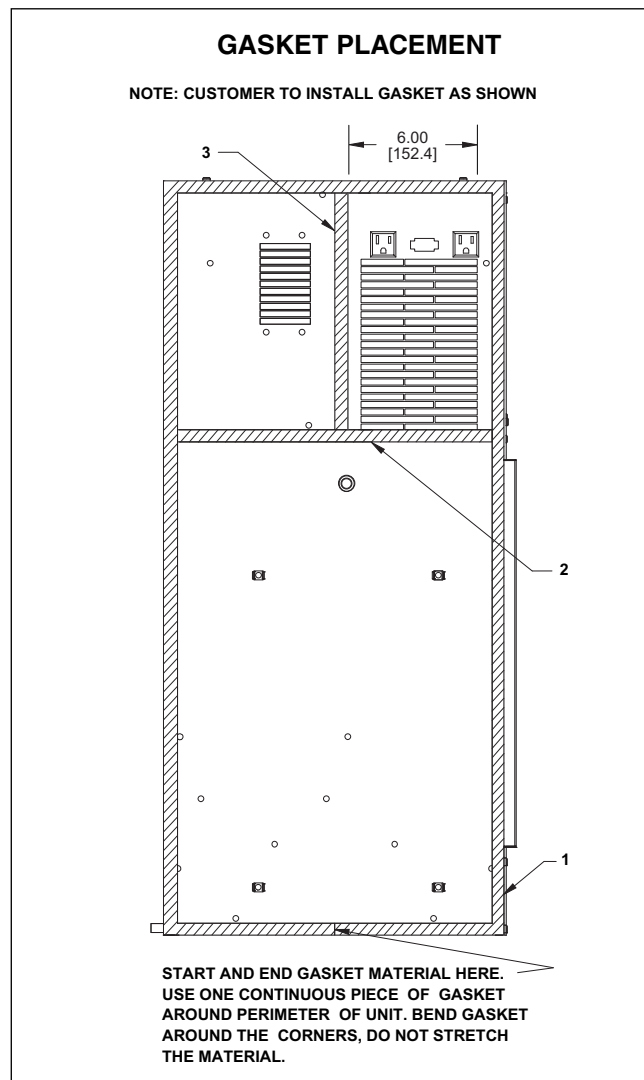
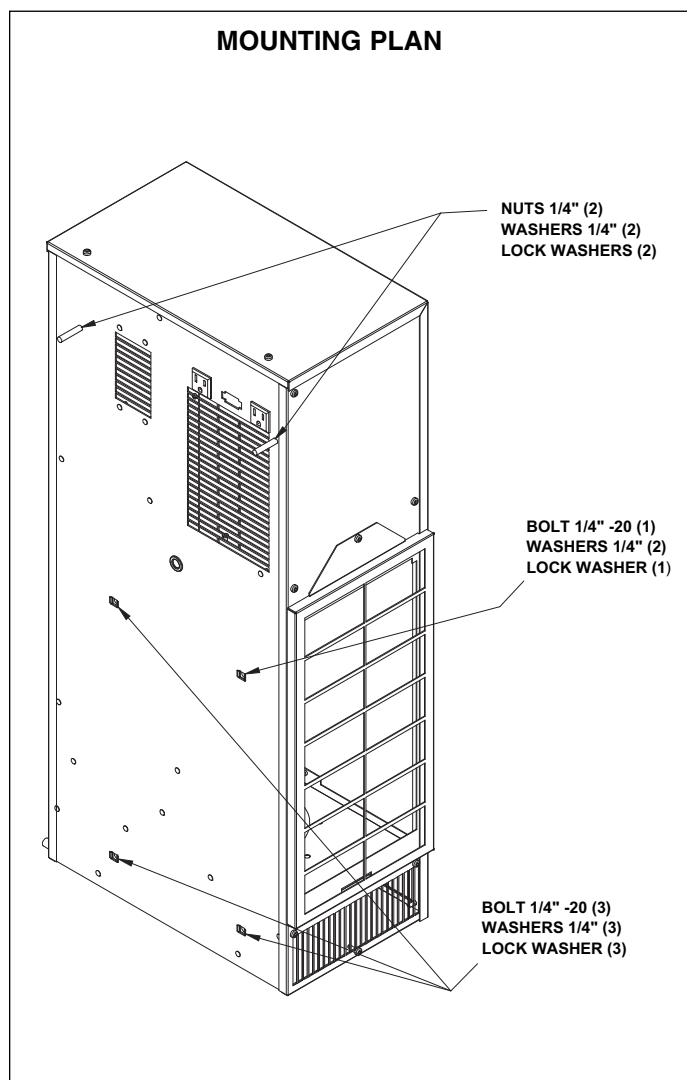
VII. Specific Model Data

Mounting

The Kooltronic Special Purpose Air Conditioners KAC4P3777R have been engineered to be installed easily. To avoid damaging your air conditioner, please read the following information before installation:

1. After pre-installation testing disconnect both the power cord and the remote control.
2. Apply supplied gaskets to the unit front panel. (See Gasket Installation)
3. Remove two 1/4" nuts from the upper studs and save them.
4. Hang the unit on the enclosure on the two upper studs. Run the unit power cord through the enclosure cutout.
5. Secure the unit to the enclosure using the remaining (4) supplied 1/4" bolts and nuts, the two saved 1/4" nuts, and the supplied (7) washers (two washers must be used on upper left mounting hole - See Mounting Plan) and (6) lock washers.
6. Attach the plastic drain hose to the drain tubing on the bottom of the air conditioner using the supplied clamp.
7. Install the remote control inside of the enclosure.
8. Plug the remote control 3 position connector into the unit receptacle labeled "Control." Plug the remote control power cord into the unit receptacle labeled "Thermostat Power."
9. Plug the unit power cord into the enclosure outlet.

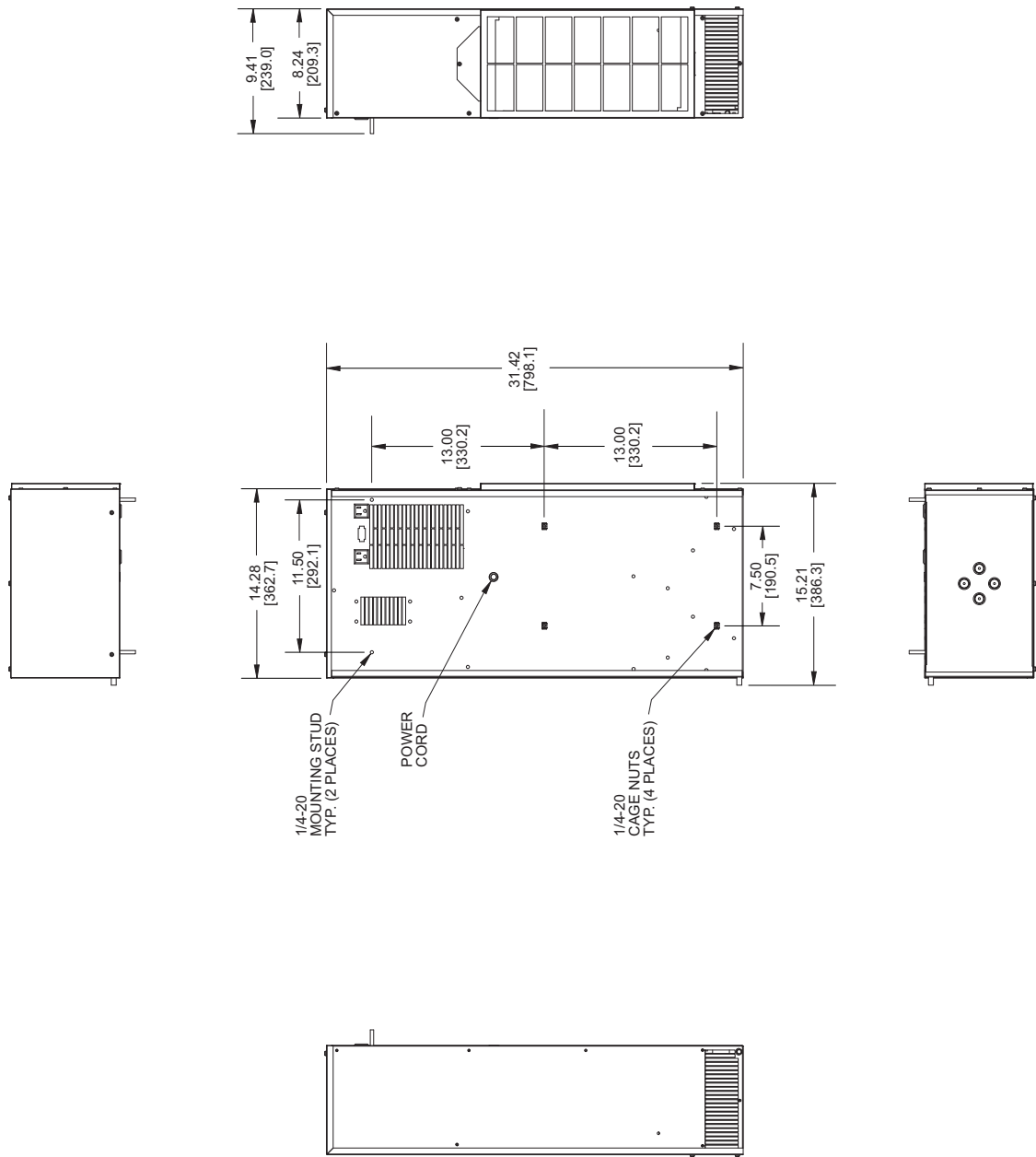
Drawings and Dimensions



Dimensions, inches [mm], are for reference only and are subject to change.

Drawings and Dimensions

KAC4P3777R



Dimensions, inches [mm], are for reference only and are subject to change.

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Technical Data

Model	BTU/H 95°F/95°F	Ambient Temp. °F Max./Min.	Volts	Hz	Running Amps 131°F	Approximate Weight (lbs.)
KAC4P3777R	3800	131/0	115	60	8.5	69

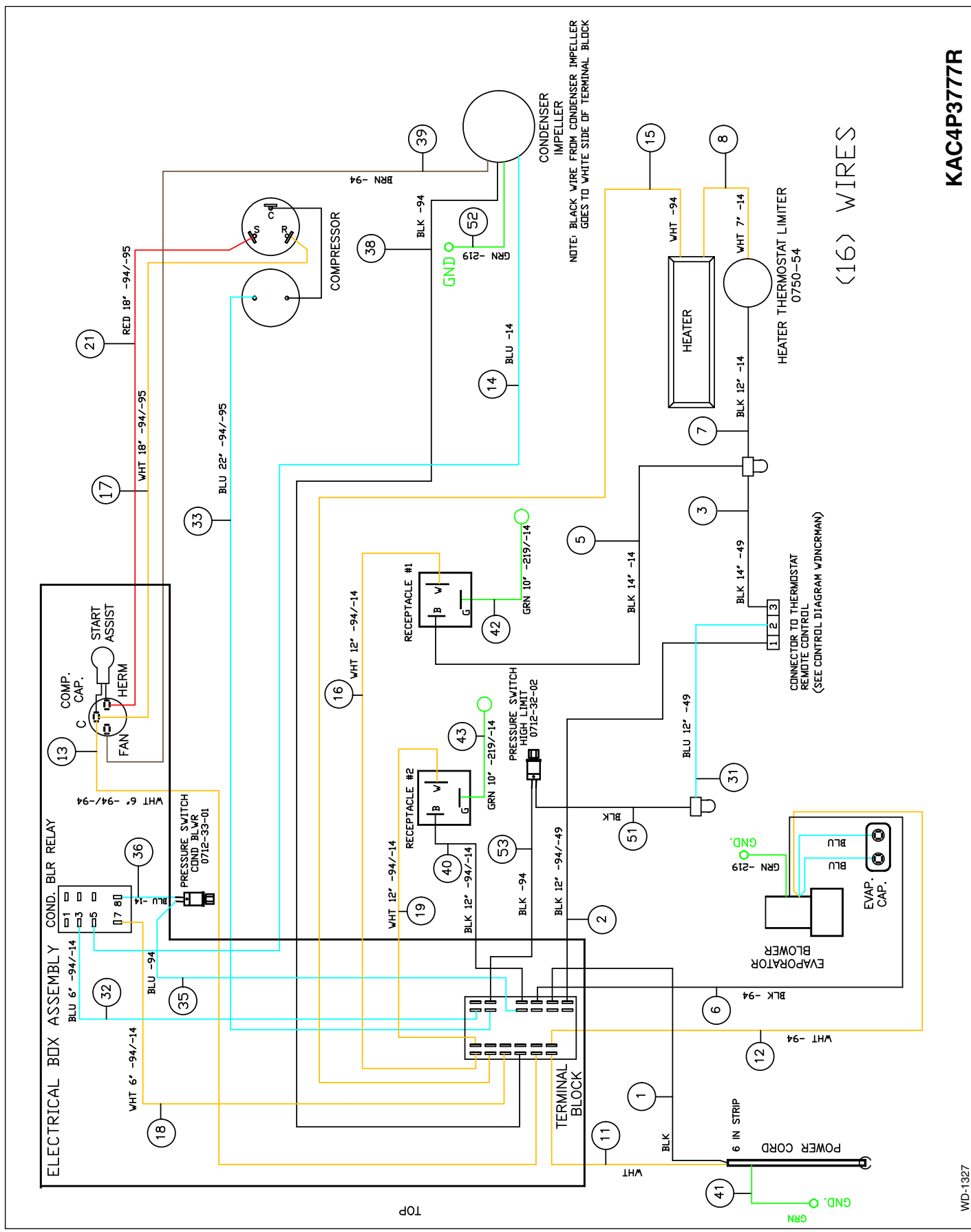
Major Component Replacements

KAC4P3777R

Part	Part Number
Compressor	0665-411
Compressor Run Capacitor	0452-93
Condenser Impeller	0194-76
Condenser Impeller Capacitor	0452-93
Evaporator Blower	201032-00-28
Evaporator Impeller Capacitor	0452-06
Condenser Coil	0666-66
Evaporator Coil	0667-64
Heater	0718-22
Filter	8001F
Heating Thermostat	0750-132
Cooling Thermostat	0750-131

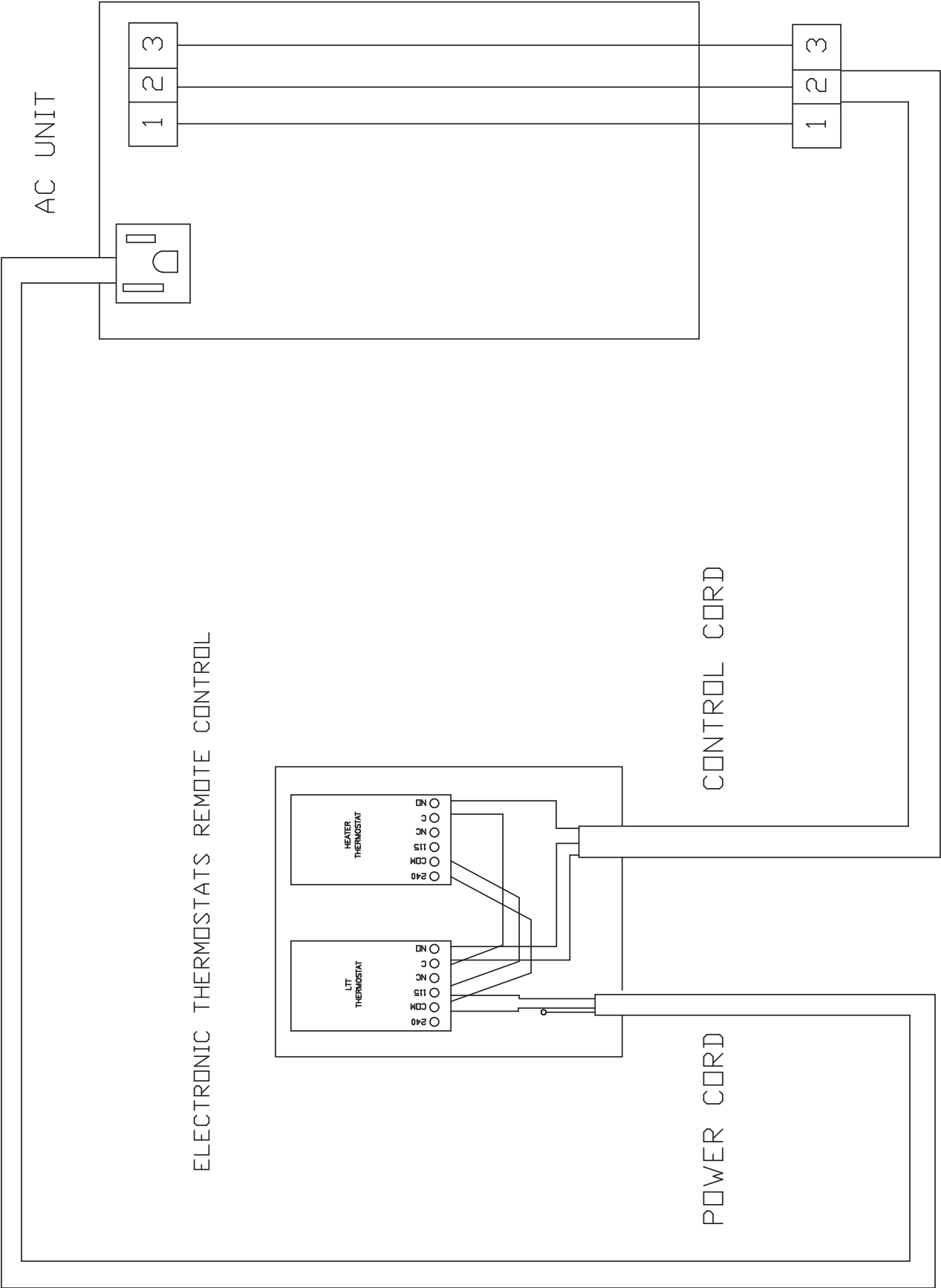
Standard Features

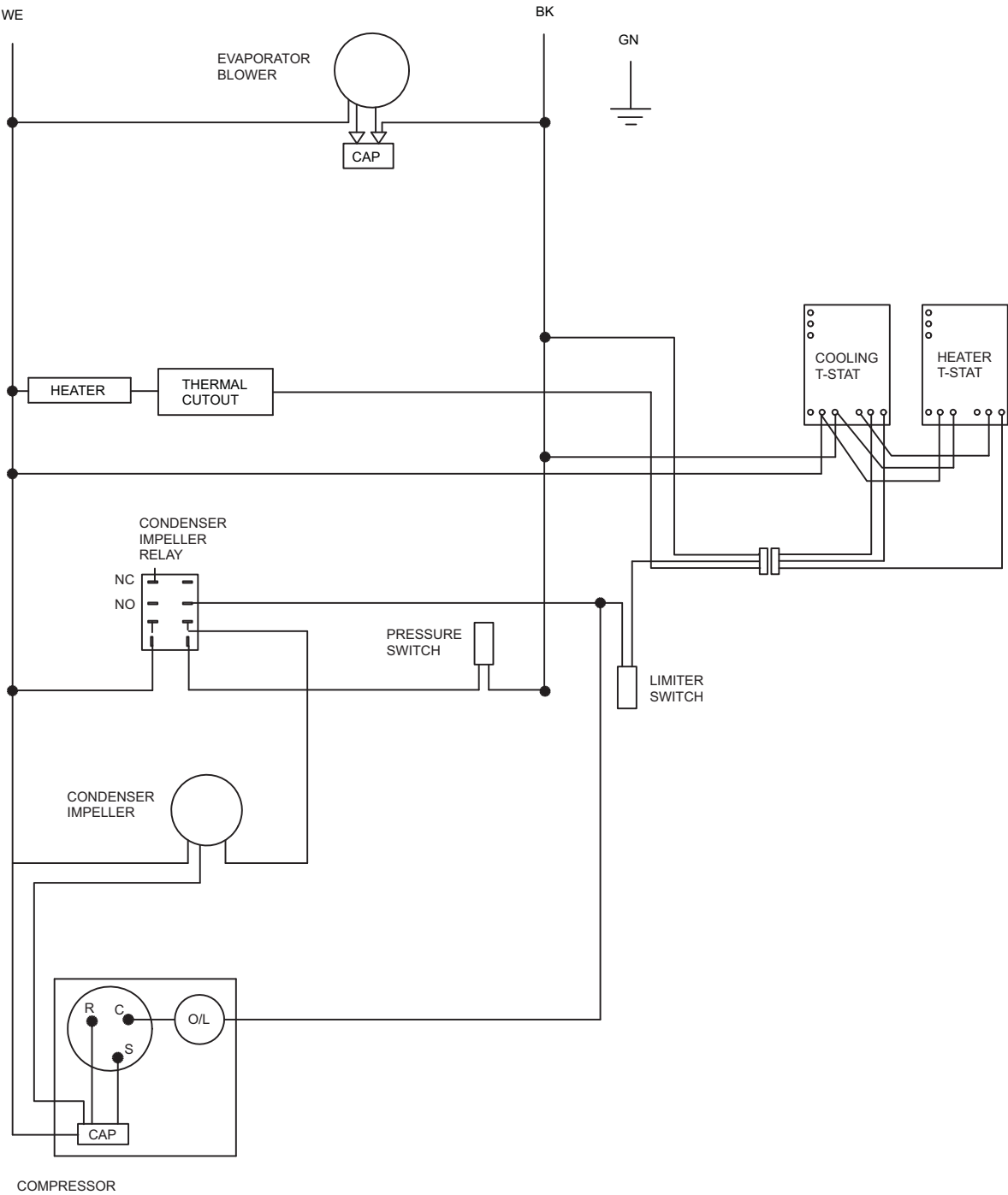
Low Temperature Thermostat
Heater Thermostat
Condenser Impeller Controller
Maintains NEMA 12/3R Rating (UL50)



KAC4P3777R

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VIII. Maintenance

Kooltronic Air-Cooled Air Conditioners require routine cleaning of the condenser coil (if necessary) and the air filters (if they are supplied) to assure unimpeded airflow through the condenser heat exchanger. It is not possible to recommend specific condenser coil or filter cleaning intervals, since the level and the nature of airborne particulate matter differs widely with each installation. It is generally sufficient to clean the condenser coil and/or the aluminum mesh filter when the outer surfaces appear covered with a thin layer of dust, lint or other foreign matter. The condenser coil can be washed or blown out with air, depending on the foreign matter involved (see below - **Filter and condenser coil service**). The aluminum mesh filter can be washed with warm water. Appropriate disposable replacement filters are available from Kooltronic.

If routine condenser coil or filter service is neglected or delayed, the air conditioner will not perform at its design capacity. The first indication of an excessively clogged condenser coil or air filter is usually a gradual increase of temperature within the equipment cabinet. If operation is continued under these conditions, the compressor will be shut off by the thermal overload device. The compressor will restart when its external temperature drops below the protector threshold setting and the compressor will continue to cycle on and off. Continued operation under these conditions will cause damage, shorten compressor life and void the warranty.

A. Filter and condenser coil service

If an optional filter is installed on externally mounted air conditioners (filter should not be used for internal mounted air conditioner), the rear panel must be removed in order to clean the filters. After removal, the filters should be flushed under warm running water with clean side up. If the accumulated dirt is oily, washing in a detergent bath is recommended, followed by a warm water wash as above.

If an optional filter is not used for an externally and/or internally mounted air conditioner, the exposed condenser coil must be cleaned by pressurized air or pressurized cleaning solution. Dirty liquid will be removed through the condenser coil drain pan.

B. Blowers

The design life of the blowers used in all Kooltronic Air Conditioners is substantially in excess of 20,000 hours. All Kooltronic condenser and evaporator blowers are equipped with automatic-reset thermal overload protectors.

CAUTION

Before opening the air conditioner, disconnect all power.
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If field replacement of a blower motor is necessary, most blower assemblies, including the mounting plate, are readily removable. Each of the blower mounting plates is held to the air conditioner cabinet structure by screws and nuts. For installation of the replacement blower, electrical connections may be broken at the terminal block, or power leads may be cut and appropriately spliced together.

C. Compressor

All Kooltronic compressors are approved by UL and CSA, and require no maintenance. They are hermetically sealed and charged at the factory, and equipped with automatic-reset thermal overload protectors.

If the compressor fails, it is strongly recommended that the air conditioner be returned to Kooltronic for service.

D. Refrigerant Loss

Kooltronic Air Conditioners are subjected to a series of tests to detect refrigerant leaks, during and after manufacture. It is possible that shipping or other damage, or microscopic leaks over a long period, may result in the need for replenishment of refrigerant charge. **When it has been verified by a Certified EPA Technician that a refrigerant shortage does exist, the leak must be repaired. Then the unit may be evacuated and recharged in the field by a Certified EPA Technician only.**

CAUTION

Refer to the data on the unit name plate which specifies the type of refrigerant and the amount of charge in ounces.

E. Relocation

If your Kooltronic Air Conditioner has to be moved to another location by truck, the following precautions should be taken:

- De-mount the air conditioner from the equipment, controller or enclosure.
- Conform to the applicable provisions of PROCEDURE FOR PROPER PACKING AND SHIPMENT OF KOOLTRONIC AIR CONDITIONERS in this manual under *Section III. "PRODUCT HANDLING"*.

IX. Trouble-Shooting

Each Kooltronic Air Conditioner is engineered for performance and built for reliability. They are designed to require only routine maintenance. If your air conditioner should require warranty service, please contact Kooltronic. If you require service out of warranty, we have compiled a trouble-shooting chart to assist your service personnel. If additional assistance is required contact Kooltronic at (609) 466-3400.

Problem	Cause	Solution
Unit does not run.	No Power.	Check Power Source and electrical connection. Check unit ON-OFF switch (UL Listed units only). Check unit power cord connection to terminal block.
After initial 15 minute energization of air conditioner, compressor and condenser fan do not run.	Return temperature is between Thermostat set point and differential (92°F to 99°F).	Normal Operation. Check return air temperature. Check sensor connection on Thermostat.
Unit not cooling. (Temperature difference between return and supply air is less than 10°F). Evaporator Blower is running. Compressor and Condenser Blower do not run. Return temperature is above set point plus differential (90°F).	Failed Thermostat or Relay. Low Line Voltage. Failed Compressor.	Check Thermostat and Relay wire connections. Replace Thermostat or Relay. Check Nameplate Voltage against supply Voltage. Check Compressor wire connections. Check Compressor overload. Check Compressor Capacitor. Replace Compressor.

Problem	Cause	Solution
Unit not cooling. (Temperature difference between return and supply air is less than 10°F). Compressor and Condenser Blower are running. Evaporator Blower does not run.	Failed Evaporator Blower.	Check Blower wire connections. Check blower capacitor. Replace Evaporator Blower.
Unit not cooling. (Temperature difference between return and supply air is less than 10°F). Compressor and Evaporator Blower are running. Condenser Blower does not run.	Low Refrigerant charge. Failed Condenser Blower. Failed Speed Controller.	Check discharge and suction pressure for Refrigerant leak. Check Blower wire connections. Check Blower Capacitor. Replace Condenser Blower. Replace Pressure Switch or Relay.
Unit not cooling. (Temperature difference between return and supply air is less than 10°F). Evaporator Blower, Condenser Blower and Compressor are running.	Condenser or Evaporator Coil clogged. Loss of Refrigerant. Ice on Evaporator Coil. Excessive condensate draining and loss of A/C sensible cooling performance.	Clean Coil. Locate and repair leak. Clean Evaporator Coil. Check discharge and suction pressure for Refrigerant leak. Check for any obstruction of Evaporator airflow. Check and seal all openings. Eliminate the frequency of door openings.
Unit overcooling. Evaporator Blower, Condenser Blower and Compressor are running.	Failed Thermostat. Failed Relay.	Check Thermostat wire connections. Replace Thermostat. Replace Relay.
Compressor cycling more than 10 cycles per hour.	Short circuiting of air between A/C discharge and inlet openings.	Provide baffle in the enclosure separating A/C Outlet and inlet.
Excess vibration.	Defective motor in Blower. Defective wheel in Blower. Bad Compressor.	Replace motor. Replace wheel. Replace Compressor.

X. Standard Warranty

KOOLTRONIC products are warranted to be free of defects in workmanship, materials and components. The following warranty periods apply from date of shipment:

- Air moving devices/components and hermetic system components: One year
- Non-operating parts, except filters: 5 years

The above warranty applies when the equipment is operated under the following conditions:

- Ambient temperature not in excess of 125°F (52°C) in normal atmosphere or as stated on product nameplate
- Voltage variation no greater than $\pm 10\%$ from nameplate rating
- Frequency variation no greater than $\pm 3\text{Hz}$ from nameplate rating
- Maximum cooling load no higher than air conditioner nameplate rating
- Waiting five minutes before restarting air conditioner after intentional or accidental shutoff
- Compliance to all other installation, maintenance and operating instructions, as supplied
- The purchaser assumes the responsibility of grounding the unit and installing it in accordance with local electrical and safety codes, as well as the National Electric Code (NEC) and OSHA

KOOLTRONIC cannot assume responsibility for mis-application of its products or the erroneous selection of an inappropriate product by a non-authorized KOOLTRONIC representative. Our applications engineers will gladly assist in the selection of the proper product, provided all required details of the application are furnished.

THIS WARRANTY CONSTITUTES THE ENTIRE WARRANTY WITH RESPECT TO THE PRODUCT AND IS IN LIEU OF ALL OTHERS, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY AND WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE AND IN NO EVENT IS KOOLTRONIC RESPONSIBLE FOR ANY CONSEQUENTIAL DAMAGES OF ANY NATURE WHATSOEVER.

RETURN AUTHORIZATION (RA) PROCEDURE

- All returns require a Return Authorization number whether the return is for warranty or non-warranty repair, rotation of stock, damage or any other reason. Returns without an RA number will be refused.
- Customer must call KOOLTRONIC After Sale Kare (ASK), Pennington, New Jersey (609 • 466 • 3400) to obtain an RA number, or email ask@kooltronic.com.
- The following information is required when an RA is requested:
 - Original customer Purchase Order number and date
 - Date product was received by customer
 - Number of parts to be returned
 - Product description, model and serial number
 - Reason for return
 - Action requested
 - Contact name, telephone, FAX numbers and e-mail address
- Pack unit in a suitable container for shipment, preferably the

KOOLTRONIC assumes no liability beyond the repair or replacement of its own product. This Warranty does not cover:

- Labor or reimbursement of labor for evaluation, removal, installation, repair, or cost of any warranted part, unless authorized in writing by KOOLTRONIC
- Use of equipment for other than its designed purpose or operating conditions
- Operation in harsh, oily, corrosive or other abnormal environmental conditions, without the proper filtration, sealing, protective coatings and/or weather protection
- Damage to hermetic system resulting from continuous operation with dirty or clogged air filters or improper or negligent maintenance
- Use of refrigerant other than designated
- Customer modification or abuse
- Shipping damage or other accident (Claims for shipping damage are the responsibility of the customer. Timely claims must be filed by the customer with the freight carrier)
- Cracked or broken hermetic tubing, brazed joints or other internal damage caused by shipping or mishandling
- Damage caused by shipping units attached to an enclosure
- Any and all conditions resulting from noncompliance with the preceding operating conditions
- Returned freight must be paid by customer
- **This standard warranty does not apply to custom products. Consult your KOOLTRONIC representative for limitations**

original packaging if available. All Air Conditioners must be returned in an upright position properly secured to a pallet. **Improper packaging may void warranty claim.** If an Air Conditioner is received laying down or shipped via UPS or similar small parcel service the warranty will be void.

- Mark carton prominently with KOOLTRONIC's Return Authorization Number.
- Enclose all pertinent documents.
- Freight charges on all products returned to KOOLTRONIC shall be paid by the customer. Unauthorized collect shipments will be refused.
- If a unit is repaired under Warranty, KOOLTRONIC will pay the freight charges both ways within the Continental USA at KOOLTRONIC's negotiated rates. Warranty repaired units will be returned to customer at KOOLTRONIC expense only within the Continental USA.
- All authorized returns are subject to a restocking fee.