Counterflow
Air Conditioner Product Manual
Vertical Wall-Mount Air Conditioners with Front Control Box Panel

Models CEA1036A-1048A-1060A

Intertek

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The most current version of this manual can be found at www.acice.com.

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Part Number 02094

How To Use This Manual

This manual is intended to be a guide to Industrial Climate Engineering™'s Counterflow line of vertical air conditioners. It contains installation, troubleshooting, maintenance, warranty, and application information. The information contained in this manual is to be used by the installer as a guide only. This manual does not supersede or circumvent any applicable national or local codes.

If you are installing the unit, first read Chapter 1 and scan the entire manual before beginning the installation as described in Chapter 2. Chapter 1 contains general, descriptive information and provides an overview which can speed up the installation process and simplify troubleshooting.

If a malfunction occurs, follow this troubleshooting sequence:

1. Make sure you understand how the Counterflow unit works (Chapter 1).
2. Identify and correct installation errors (Chapter 2).
3. Refer to the troubleshooting information in Chapter 4.

If you are still unable to correct the problem, contact the Factory at 1-800-841-7854 for additional assistance.

Please read the following "Important Safety Precautions" before beginning any work.

Important Safety Precautions

1. USE CARE when LIFTING or TRANSPORTING equipment.
2. TRANSPORT the UNIT UPRIGHT. Laying it down on its side may cause oil to leave the compressor and breakage or damage to other components.
3. TURN ELECTRICAL POWER OFF AT THE breaker or fuse box BEFORE installing or working on the equipment. LINE VOLTAGES ARE HAZARDOUS or LETHAL.
4. OBSERVE and COMPLY with ALL applicable PLUMBING, ELECTRICAL, and BUILDING CODES and ordinances.
5. SERVICE may be performed ONLY by QUALIFIED and EXPERIENCED PERSONS.
    - *** Wear safety goggles when servicing the refrigeration circuit**
    - *** Beware of hot surfaces on refrigerant circuit components**
    - *** Beware of sharp edges on sheet metal components**
    - *** Use care when recovering or adding refrigerant**
6. **Use COMMON SENSE - BE SAFETY-CONSCIOUS**

This is the safety alert symbol ⚠. When you see this symbol on the air conditioning unit and in the instruction manuals be alert to the potential for personal injury. Understand the signal word DANGER, WARNING and CAUTION. These words are used to identify levels of the seriousness of the hazard.

⚠ DANGER Failure to comply will result in death or severe personal injury and/or property damage.

⚠ WARNING Failure to comply could result in death or severe personal injury and/or property damage.

⚠ CAUTION Failure to comply could result in minor personal injury and/or property damage.

IMPORTANT Used to point out helpful info that will result in improved installation, reliability or operation.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

⚠ WARNING

- **If the information in these instructions are not followed exactly, a fire may result causing property damage, personal injury or loss of life.**
- **Read all instructions carefully prior to beginning the installation. Do not begin installation if you do not understand any of the instructions.**
- **Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life.**
- **Installation and service must be performed by a qualified installer or service agency in accordance with these instructions and in compliance with all codes and requirements of authorities having jurisdiction.**

INSTALLER: Affix the instructions on the inside of the building adjacent to the thermostat.

END USER: Retain these instructions for future reference.

Table of Contents

Table of Contents

Illustrations

Tables

Chapter 1 Description & Specifications

1.1 General Description

The ICE Counterflow air conditioners are designed to cool electronic and communication equipment shelters. ICE CEA models use R-410A refrigerant and a unique combination of controls and components to operate in extremely cold and high ambient conditions. The series includes multiple sizes with nominal cooling capacities of 36,000; 48,000; and 60,000 BTUH. Electric resistance heating are available in various wattages. In the counterflow configuration, the conditioned air is discharged at the bottom of the unit. This configuration is ideal where the conditioned air is required under floor or at floor level.

ICE CEA air conditioners are manufactured and tested to UL Standard 1995, 3rd Ed. and CAN/CSA C22.2 No. 236:2011, Ed. 4. The CEA models are commercial units and not intended for residential use.

1.2 Model Identification

The model identification number is found on the data sticker. Rating plate located on side panel.

Example	C	E	A	1	0	3	6	A	A	0	5	0	C	R	+	+	+	1	D	A	+	A	1	1	+	+	+	+	+	+
Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

1	Unit Designation/Family	**C** = Industrial Climate Engineering (ICE)
2	Energy Efficiency Ratio (EER)	**E** = Standard Efficiency
3	Refrigerant Type	**A** = R-410a
4	Compressor Type/Quantity	**1** = Single
5 **6** **7**	Unit Capacity/Nominal Cooling (BTUH)	**036** = 36,000 **048** = 48,000 **060** = 60,000
8	System Type	**A** = Air Conditioner
9	Power Supply (Volts-Hz-Phase)	**A** = 208/230-60-1 **C** = 208/230-60-3 **D** = 460-60-3
10 **11** **12**	Heat Designation @ Rated Voltage **KW** = Kilowatt	**000** = No Heat **090** = 9KW **040** = 4KW **100** = 10KW **050** = 5KW **120** = 12KW **060** = 6KW **150** = 15KW **080** = 8KW
13	Ventilation Configuration	**A** = Solid Front Door
14	Dehumidification	**R** = Electric Reheat **T** = Electric Reheat w/Humidity Control **+** = None
15	Controls	**A** = Power Fail Alarm w/Additional Lockouts **C** = 24V EMS Relay Kit **D** = 24V EMS Relay Kit w/Factory Installed T-Stat **E** = Factory Installed T-Stat **+** = None
16	Operating Condition	**A** = Evaporator Freeze Sensor (EFS) **C** = EFS w/Hot Gas Bypass **M** = Extreme Duty w/Hard Start & EFS **N** = Hard Start **P** = Hard Start w/Low Ambient & CCH **Q** = Hard Start w/Low Ambient & Fan Cycle Control (FCC) **R** = Crank Case Heater (CCH) **T** = Hard Start w/EFS **U** = Hard Start w/Hot Gas Bypass **V** = Hard Start w/Low Ambient & CCH & EFS **W** = Low Ambient w/CCH **X** = Hot Gas Bypass **Y** = Low Ambient w/CCH & FCC **Z** = Low Ambient w/CCH & EFS **1** = Low Ambient w/FCC **2** = Low Ambient w/FCC & EFS **3** = CCH w/Hot Gas Bypass **+** = None

17	Indoor Air Quality Features	**D** = Dry Bulb Sensor **E** = Dry Bulb Sensor w/Dirty Filter **G** = Dirty Filter Sensor **+** = None
18	Air Flow	**3** = Bottom Supply/Top Return (Counter)
19	Compressor Location	**D** = Left Hand
20	Filter Option	**A** = 2" Pleated (MERV 8, AC/HP-C) **C** = 2" Charcoal **D** = MERV 11 High Filtration Package **E** = MERV 13 High Filtration Package **F** = Filter Access Through Return Air Grille **W** = Aluminum Washable **+** = None
21	Corrosion Protection	**A** = Condenser Coil Only **C** = Evaporator Coil Only **D** = Both Coils Condenser & Evaporator **E** = All Coils Cond/Evap/Reheat **F** = Coat All **K** = Coastal Package **+** = None **$** = Special
22 **23**	Engineering Revision Level	A1
24	Cabinet Color	**1** = Beige **2** = Gray **3** = Carlsbad Canyon **4** = White **5** = Stainless Steel Exterior **6** = Dark Bronze **7** = .050 Aluminum Stucco **8** = Mesa Tan **9** = Pebble Gray **A** = Stainless Steel - Unit **$** = Custom Color (Powder Coat)
25	Sound Attenuation	**2** = Compressor Blanket **+** = None
26	Security Option	**A** = Lockable Access Plate/Tamper Proof **+** = None
27	Fastener/Drain Pan Option	**A** = Stainless Steel Fasteners **C** = Stainless Steel Drain Pan **D** = Stainless Steel Fasteners & Drain Pan **+** = None
28	Unused	**+** = None **$** = Special
29	Unused	**+** = None **$** = Special
30	Special Variation	**+** = None **$** = Special Configuration Not Covered by Model Nomenclature

Note: Not all options are available with all configurations. Contact your ICE sales representative for configuration details and feature compatibility.

1.3 Serial Number Date Code

A = January	E = May	J = September	D = 2014	H = 2018	M = 2022
B = February	F = June	K = October	E = 2015	J = 2019	N = 2023
C = March	G = July	L = November	F = 2016	K = 2020	P = 2024
D = April	H = August	M = December	G = 2017	L = 2021	R = 2025

1.4 Air Flow, Weights and Filter Sizes

Note: Follow local codes and standards when designing duct runs to deliver the required airflow. Minimize noise and excessive pressure drops caused by duct aspect ratio changes, bends, dampers and outlet grilles in duct runs.

MODEL	0.10	0.15	0.20	0.25	0.30	0.40	0.50
CEA1036A	1310	1265	1220	1185	1150	1060	N/A
CEA1048A/1060A	N/A	N/A	1900	1830	1760	1700	1620

Air flow ratings of 208-230 volt units are at 230v. Air flow ratings of 460 volt units are at 460 volts. Operation of units at a voltage different from the rating point will affect air flow.

Table 1. CFM @ External Static Pressure (Wet Coil) (IWG)

MODEL	CEA1036A	CEA1048A/1060A
POUNDS/KG	**LBS/KG**	**LBS/KG**
UNITS WITH A FRESH AIR DAMPER	540/245.5	545/248

Table 2. Weight

Filter	Inches	Millimeters	Part No.	Filters Per Unit	MERV Rating
Pleated, Disposable	16” x 20” x 2”	406 x 508 x 51	92374	2	7

Table 3. Filter Information

1.5 General Operation

Refrigerant Cycle (Cooling Mode)

The Counterflow air conditioners use R-410A refrigerant in a conventional vapor-compression refrigeration cycle to transfer heat from air in an enclosed space to the outside. A double blower assembly blows indoor air across the evaporator. Cold liquid refrigerant passing through the evaporator is boiled into gas by heat removed from the air. The warmed refrigerant gas enters the compressor where its temperature and pressure are increased. The hot refrigerant gas condenses to liquid as heat is transferred to outdoor air drawn across the condenser by the condenser fan. Liquid refrigerant is metered into the evaporator through capillary tubes to repeat the cycle.

Heating Mode

A wall-mounted thermostat controls the heating cycle of models which incorporate resistance heating elements. On a call for heat, the thermostat closes the heat relay to energize the indoor fan and the resistance elements. Except on units with the optional dehumidification kit, the compressor is locked out during the heating cycle.

1.6 Electronic Control Board Mode of Operation

Normal

24 VAC power must be continuously applied to “R” and “C”. Upon a call for cooling “Y” and with the high pressure switch (HPS) closed, the compressor will be energized. (Note: See the delay on make feature.) The compressor will remain energized during the 3 minute timed low pressure by-pass cycle. If the low pressure switch (LPS) is open after the 3 minute by-pass cycle, the compressor will de-energize.

Lock-out

If either of the fault conditions (LPS or HPS) occurs twice during the same call for cooling, the control board will enter into and indicate the lockout mode. In the lockout mode, the compressor is turned off. If there is a call for indoor air flow "G", the blower remains energized, the alarm output is energized and the status LED will blink to indicate which fault has occurred. When the lockout condition is cleared, the unit will reset if the demand for the thermostat is removed or when the power is reset. With the control board, the user can now have either normally closed or normally open remote alarm dry contacts. The air conditioners are factory wired to be normally open.

Delay on Break

If the compressor is de-energized due to a loss of a cooling "Y" call or the first fault, the unit re-start will be delayed 3 minutes from the time the contactor is de-energized. (Note: There is no delay on break if the lockout condition is reset.)

Delay on Make

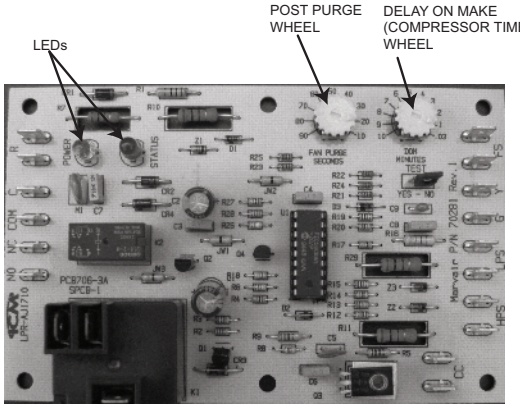
On initial power up only, the unit will wait 0.03 to 10 minutes from the cooling "Y" call before allowing the contactor to energize. The delay can be adjusted by the DOM wheel on the board. Factory recommended wait is 3 minutes.

Low Pressure By-Pass Time

When starting, the low pressure switch (LPS) fault condition will be by-passed for 3 minutes before the contactor is de-energized.

Post Purge

Upon a call for indoor airflow "G" the blower will energize immediately. When in the cooling mode, the blower will remain energized for 10 to 90 seconds (adjustable) after the compressor has been de-energized. The time period can be changed by fan purge wheel on the board. Factory setting is 90 seconds.



LED Indicator Lights

COLOR	TYPE	STATUS	DESCRIPTION
Green	Power	Contstant On	24 VAC power has been applied
Red	Status	Contstant On	Normal operation
Red	Status	1 Blink	High pressure switch has opened twice
Red	Status	2 Blinks	Low pressure switch has opened twice

Low Ambient Control

The low ambient control permits cooling when outdoor ambient temperatures are low. The control uses a reverse-acting high pressure switch to cycle the condenser fan motor according to liquid refrigerant pressure conditions. Switch closure and fan operation occurs when the pressure reaches 400 PSIG. The switch opens again when the refrigerant pressure falls to 290 PSIG. Therefore, the outdoor fan always starts after the compressor, and **it will cycle frequently during normal operation at low outdoor conditions.**

High Pressure Switch

The high pressure switch is mounted on the compressor liquid line. It is electrically connected to a lockout circuit which shuts down the system if the refrigerant pressure rises to 650 PSIG. This protects the unit if airflow through the condenser is blocked or if the outdoor fan motor fails.

Although the contacts of the high pressure switch close when the refrigerant pressure falls to approximately 450 PSIG, the system must be manually reset once the lockout circuit is activated. A manual reset is necessary to prevent harmful short-cycling. To reset switch, turn primary power off, then back on or turn thermostat system switch off, then back on.

Low Pressure Switch

The low pressure switch is mounted on the compressor suction line. It is designed to open if the refrigerant pressure drops to 40 PSIG; it resets when the pressure rises to 60 PSIG. The switch protects the unit if airflow through the indoor blower is impeded, if the blower motor fails, or if there is a loss of refrigerant.

1.7 Optional Controls & Packages

Hard Start Kit

Used on single phase equipment to give the compressor higher starting torque under low voltage conditions. Generally not recommended on units with scroll compressors.

Coastal Environmental

Recommended for units to be installed near an ocean or in a corrosive environment. Includes corrosion resistant fasteners, sealed or partially sealed condenser fan motor, protective coating applied to all exposed internal copper in the condenser section and a protective coating on the condenser coil.

Stainless Steel Cabinet

The units can be constructed with stainless steel exterior panels or with the exterior panels and interior panels (except for the condenser fan venturi panel) constructed of stainless steel.

Desert Duty Package

The Desert Duty package is designed for operation in hot climates including the Middle East and the American Southwest in ambient temperatures from 32°F to 130°F (0°C to 54°C). Standard features of the Desert Duty package include a thermal expansion valve and a sealed condenser fan motor.

Extreme Duty Package

Allows selected ICE air conditioners to operate in extremely cold and hot ambient conditions. The Extreme Duty Kit is always factory installed. Air conditioners will operate from 0°F to 130°F (-18° to 54°C). The Extreme Duty Package includes a suction line accumulator, thermal expansion valve (TXV), crankcase heater, hard start kit, an auto reset, high pressure switch and an outdoor thermostat and fan cycle switch. The fan cycle control is standard on all ICE air conditioners and operates based upon the liquid line pressure. The outside thermostat closes whenever the outside temperature is below 50°F (10°C) and opens when the outside temperature is 50° F (10°C) or higher. Whenever the temperature is below 50°F (10°C), the fan cycle switch is in the circuit; when temperatures are 50° F (10°C) or higher, the fan cycle switch is not in the circuit. The fan cycle control is used with a TXV to prevent excessive cycling or "hunting" of the TXV.

Electric Reheat Dehumidification

A humidity controller allows electric heat and cooling to operate simultaneously. ICE air conditioners equipped with the dehumidification option allow the indoor humidity of the controlled environment to be maintained at or below a certain humidity set point. These units do not have the ability to add humidity to the building.

IMPORTANT: The electrical wire and breaker or fuses must be sized for simultaneous operation of the electric heater and the air conditioner. Refer to the data sticker on the unit or the Counterflow models CEA Air Conditioner Product Data Sheet for the sizing information.

Dehumidification is achieved by operating mechanical cooling in conjunction with electric reheat. The strip heat is sized approximately to the sensible capacity of the total tonnage of the machine (i.e., on a 36,000 BTU unit the strip heat is sized at approximately 27,000 BTU). Because the strip heat is sized to the approximate sensible cooling capacity, only selected models are available.

Operation:

When the humidity rises above the set point on the humidity controller both mechanical cooling and electric reheat operate to temper the air and lower the humidity. If the temperature in the controlled environment rises above the set point of the thermostat and the unit is operating in the dehumidification mode, the call for cooling will override the call for dehumidification and the strip heat is disengaged until the thermostat is satisfied. This assures the environment temperature is maintained as first priority and humidity control is second.

In applications where a shelter has redundant air conditioning units and is controlled by a lead lag controller (ICE's LL357D4 or CommStat3 Controller), most times the dehumidification option is only necessary on one of the two units. It is possible for one unit to be operating in the cooling mode while the unit with dehumidification is operating at the same time. If the cooling unit does not maintain the shelter temperature set point, the unit with dehumidification will go into the cooling mode. It does not matter whether the unit with dehumidification is the lead or lag unit.

Protective Coil Coatings

Either the condenser or evaporator coil can be coated, however, coating of the evaporator coil is not common. For harsh conditions, e.g., power plants, paper mills or sites were the unit will be exposed to salt water, the coil should be coated with an impregnated polyurethane (trade name BlyGold®). The impregnated polyurethane coatings is sprayed on and passes 3,000 hours of B117 salt fog test. Note: Cooling capacity may be reduced by up to 5% on units with coated coils.

Factory Installed Disconnects on 380V Units

Factory installed disconnects are standard on all 208-230v. and 460 volt units. As an option, all 380V. units may be ordered with a disconnect.

Phase Monitor and High and Low Voltage Detector

Can be used on all 3Ø compressors. Detects if the unit is properly phased and if proper voltage is present. If it is not, it will not allow the compressor to operate. See Phase Monitor Technical Bulletin for complete details.

Washable Return Air Filters

Dirty Filter Indicator

A factory installed option that measures the difference in pressure across the internal filter and illuminates a LED when the pressure exceeds the desired difference.

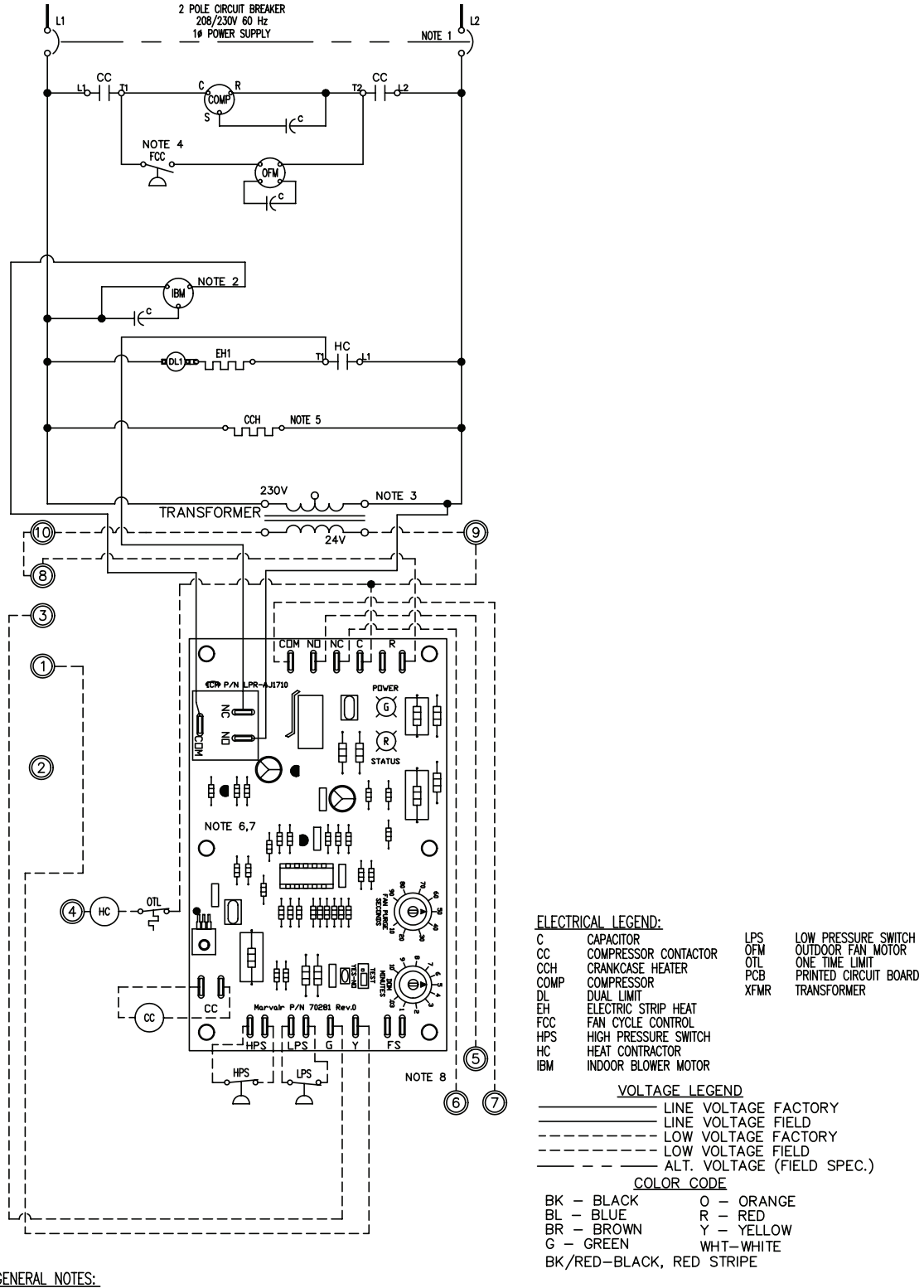
1.8 Electrical Operation

The compressor and condenser fan are energized with a contactor controlled by a 24 VAC pilot signal.

Some compressors incorporate an internal PTC crankcase heater that functions as long as primary power is available. The heater drives liquid refrigerant from the crankcase and prevents loss of lubrication caused by oil dilution. Power must be applied to the unit for 24 hours before starting the compressor.

The condenser (outside fan) motor is energized by the same contactor. However, the motor is cycled on and off by the low ambient control (see low ambient control 1.6).

The indoor evaporator fan motor is controlled by the fan purge on the electronic control board.



GENERAL NOTES:

1. 208/230 VOLT 60 Hz 1ø POWER SUPPLY. SEE DATA PLATE FOR AMPACITY & FUSE SIZE. OPTIONAL CKT BKR SHOWN.
2. SPEED TAP – SEE MOTOR NAMEPLATE FOR WIRE COLOR.
3. TRANSFORMER IS FACTORY WIRED FOR 230 VOLT OPERATION. FOR LOWER VOLTAGES, INTERCHANGE ORANGE AND RED LEADS. INSULATE UNUSED LEADS.
4. ALTERNATE DEVICE IS NOT ADJUSTABLE AND HAS ORANGE LEADS.
5. CRANKCASE HEATER MAY NOT BE REQUIRED ON ALL COMPRESSORS.
6. COMPRESSOR TIME DELAY AND FAN PURGE DELAY ARE LOCATED ON THE PCB (PRINTED CIRCUIT BOARD) AND ARE ADJUSTABLE.
7. THE (STATUS LED) WILL BLINK ONE TIME AFTER THE HPS (HIGH PRESSURE SWITCH) HAS OPENED TWICE AND THE UNIT WILL LOCKOUT. THE (STATUS LED) WILL BLINK TWICE AFTER THE LPS (LOW PRESSURE SWITCH) HAS OPENED TWICE AND THE UNIT WILL LOCKOUT.
8. THE LOCKOUT CIRCUIT CONTACTS ARE N.O. BETWEEN TERMINALS 5 AND 7 OF THE LOW VOLTAGE TERMINAL BOARD AND N.C. BETWEEN TERMINALS 7 AND 6 OF THE LOW VOLTAGE TERMINAL BOARD.

Figure 1. Typical Electrical Schematic

Chapter 2 Installation

⚠ WARNING

Failure to observe and follow Warnings and Cautions and these Instructions could result in death, bodily injury or property damage. Read this manual and follow its instructions and adhere to all Cautions and Warnings in the manual and on the ICE unit.

2.1 Equipment Inspection

Concealed Damage

Inspect all cartons and packages upon receipt for damage in transit. Remove cartons and check for concealed damage. **Important: keep the unit upright at all times.** Remove access panels and examine component parts. (Note: the "L"-shaped bottom bracket is stored in the condenser air compartment. Remove it before replacing the side screen). Inspect refrigerant circuit for fractures or breaks. The presence of refrigerant oil usually indicates a rupture. If damage is apparent, immediately file a claim with the freight carrier.

Units that have been turned on their sides or tops may have concealed damage to compressor motor mounts or to the oil system. If the unit is not upright, immediately file a claim for concealed damages and follow these steps:

1. Set unit upright and allow to stand for 24 hours with primary power turned on.
2. Attempt to start the compressor after 24 hours.
3. If the compressor will not start, makes excessive noise, or will not pump, return the unit to the freight carrier.

2.2 Installation Requirements

General

1. Inspect unit for completeness. Check for missing parts (e.g. hardware). Refer to the installation kit information in section 2.3.
2. Remove access panels and check for loose wires. Tighten screw connections.
3. Complete and mail the warranty registration card.

You must consider all of the following when choosing the installation site:

1. **Noise.** Install the unit so that the least amount of noise will be transmitted to inhabited spaces.
2. **Condensate Drainage**. Condensate produced during operation must be discharged to a suitable drain.
3. **Placement.**
   A) Place the unit in a shaded area, if possible.
   B) Install it above ground for protection against flooding.
   C) The unit exhausts air. Be sure that the airflow is not impeded by shrubbery or other obstructions.
   D) When installing multiple units, please note the recommended clearances noted in Table 4.
4. **Airflow Requirements:**
   Note the minimum CFM requirements (Table 6). Keep duct lengths as short as possible. Do not obstruct airflow through the unit.

   Duct work should be designed and installed in accordance with *all* applicable safety codes and

standards. ICE strongly recommends referring to the current edition of the National Fire Protection Association Standards 90A and 90B *before* designing and installing duct work. The duct system must be engineered to insure sufficient air flow through the unit to prevent over-heating of the heater element. This includes proper supply duct sizing, sufficient quantity of supply registers, and adequate return and filter areas. Duct work must be of correct material and must be properly insulated. Duct work must be constructed of galvanized steel with a minimum thickness of .019 inches. Duct work must be firmly attached, secured, and sealed to prevent air leakage. See section 2.4 for additional duct work requirements.

5. **Clearances:**
   Note the minimum clearances required for proper operation and service.

MODEL	MIN. CLEARANCE AROUND SIDES (SINGLE UNIT)	MIN. CLEARANCE BETWEEN UNITS (TWO UNITS)	MIN. SPACE ABOVE UNIT
1036A	30 inches (76 cm)	18 inches (46 cm)	6 inches (15 cm)
1048A & 1060A	30 inches (76 cm)	30 inches (76 cm)	6 inches (15 cm)

Table 4. Minimum Clearances

6. **Codes:**
   Make sure your installation conforms to all applicable electrical, plumbing, building, and municipal codes. Some codes may limit installation to single story structures.

7. **Electrical Supply:**
   The power supply must have the appropriate voltage, phase, and ampacity for the model selected. Voltage must be maintained above minimum specified values listed below. Refer to the data sticker on the unit for ampacity requirements.

Electrical Rating Designations*	A	C	D	E	W
Nominal Voltage	208/230	208/230	460	380	220-240
Phase	1	3	3	3	1
Minimum Voltage	197	197	414	342	198
Maximum Voltage	253	253	506	418	264

* Letters refer to model number code designations. Refer to page 6.

Table 5. Voltage Limitations

2.3 Installation Materials

Installation Kits

The air conditioners are shipped with one 12 Ga. "L" shaped bottom bracket. If you have not yet unpacked the unit, follow the instructions in section 2.1. All units have built-in full length mounting flanges. Therefore, use of mounting brackets is not required.

Kit Components:

1. One 12 Ga. "L"-shaped bottom bracket

Accessories:

The package may include other factory-supplied items (optional) as follows on the next page:

P/N	Description
S/04581	CommStat 3 Controller, Solid State Lead/Lag Controller
S/07846	CommStat 4 Controllers, Solid State Lead/Lag Controller
S/07529	LL357D4, Lead/Lag Controller with T'stat & Sub-Base; Controls 2 A/C Units
50123	Digital thermostat. 1 stage heat, 1 stage cool. 7 day programmable. Fan switch: Auto & On. Auto-change over. Keypad lockout. Non-volatile program memory.
50128	Digital thermostat. 1 stage heat, 1 stage cool. configurable. Fan switch: Auto & On. Auto-change over. Status LED's. Backlit display. Programmable fan. Non-volatile program memory.
80676	30 x 10" Adjustable, Aluminum, Double Deflection Supply Grill for CEA1036A/1048A/1060A
80679	30 x 16" Aluminum Return Grill for CEA1036A/1048A/1060A

Additional Items Needed:

Additional hardware and miscellaneous supplies (not furnished by ICE) are needed for installation. For example, the list below contains approximate quantities of items typically needed for mounting a unit on a wood frame wall structure. Concrete or fiberglass structures have different requirements.

Counterflow

(10) **3/8" carriage head mounting bolts** for unit mounting flanges. The length needed is typically the wall thickness plus one inch.

(20) **3/8" washers**

(10) **3/8" hex nuts**

(6) **3/8" x 2-1/2" lag screws** for bottom bracket

- **Silicone Sealer** to seal around cracks and openings
- **4-conductor low voltage multicolored wire cable** (i.e. thermostat wire)
- **Appropriate electrical supplies** such as **conduit, electrical boxes, fittings, wire connectors,** etc.
- **High voltage wire**, sized to handle the MCA (minimum circuit ampacity) listed on the data plate.
- **Over-Current Protection Device** sized in accordance with the MFS (maximum fuse size) listed on the unit data plate.

⚠ WARNING FIRE HAZARD

Improper adjustment, alteration, service, maintenance or installation could cause serious injury, death and/or property damage.

Installation or repairs made by unqualified persons could result in hazards to you and others. Installation MUST conform with local codes or, in the absence of local codes, with codes of all governmental authorities have jurisdiction.

The information contained in this manual is intended for use by a qualified service agency that is experienced in such work, is familiar with all precautions and safety procedures required in such work, and is equipped with the proper tools and test instruments.

2.4 Porting and Duct Work

General Information

Note: The following instructions are for general guidance only. Due to the wide variety of installation possibilities, specific instructions will not be given. When in doubt, follow standard and accepted installation practices, or contact ICE for additional assistance.

Wall Openings

Measure the dimensions of the supply and return ports on the unit.

Cut the openings in the exterior wall for the supply and return. **IMPORTANT: All units with electric heat must have 1" (25.4mm) clearance on all four sides of the supply outlet duct flange on the unit. The 1" (25.4mm) clearance must extend on all sides of the supply duct for the first 3 feet (1 meter) from the unit.**

IMPORTANT: ICE requires a minimum of 1" (25.4mm) from the surface of any supply ducts to combustible material for the first 3 feet (1 meter) of the duct.

Ducting

Extensions should be cut flush with the inside wall for applications without duct work.

Applications using duct work should be designed and installed in accordance with *all* applicable safety codes and standards. ICE strongly recommends referring to the current edition of the National Fire Protection Association Standards 90A and 90B *before* designing and installing duct work. The duct system must be engineered to insure sufficient air flow through the unit to prevent over-heating of the heater element. This includes proper supply duct sizing, sufficient quantity of supply registers, adequate return and filter area. Ductwork must be of correct material and must be properly insulated. Duct work must be constructed of galvanized steel with a minimum thickness of .019 inches for the first 3 feet (1 meter). Ductwork must be firmly attached, secured and sealed to prevent air leakage. Do not use duct liner on inside of supply duct within 4 feet (122cm) of the unit.

Galvanized metal duct extensions should be used to simplify connections to duct work and grilles. Use fabric boots to prevent the transmission of vibration through the duct system. The fabric must be U.L. rated to a minimum of 197°F (92°C).

Minimum Airflow Requirements

The duct system must be engineered to assure sufficient air flow through the unit even under adverse conditions such as dirty filters, etc. Use **Table 5** below and **Table 1**, **CFM at External Static Pressure (Wet Coil)** in section 1.4.

BASIC MODEL	MAXIMUM TOTAL STATIC	MINIMUM FILTER AREA
CEA1036A	.40	3.33
CEA1048A/1060A	.50	5.50

Table 6. Maximum Static Pressure

2.5 Fresh Air Hood

The hood, filter, filter bracket and a package of screws are shipped with the hood.

1. Remove the 9 screws from upper front door that hold the door onto the unit.
2. Remove the 2 lower screws from each side of the coil guard.
3. Lift up slightly on the upper front door to remove it from the unit.
4. Insert the upper flange of the fresh air hood inside the exhaust air opening on the front door. The two mating holes in the door and the top of the hood should be aligned. From the front side, hold the hood in place by installing 2 screws through the hood into the door.

5. Flip door over and install 10 screws (from the package of screws) from the back side of the door into the hood.
6. Slide filter into place from bottom side of the hood.
7. Attach the bottom filter bracket with 3 screws to the front door to hold filter in place.
8. Reattach upper front door with hood attached to the back on the unit by hooking top flange of the door over the condenser drain pan.
9. Install the screws that were removed in step 1 & 2 to attach the front door and the coil guard onto the unit.

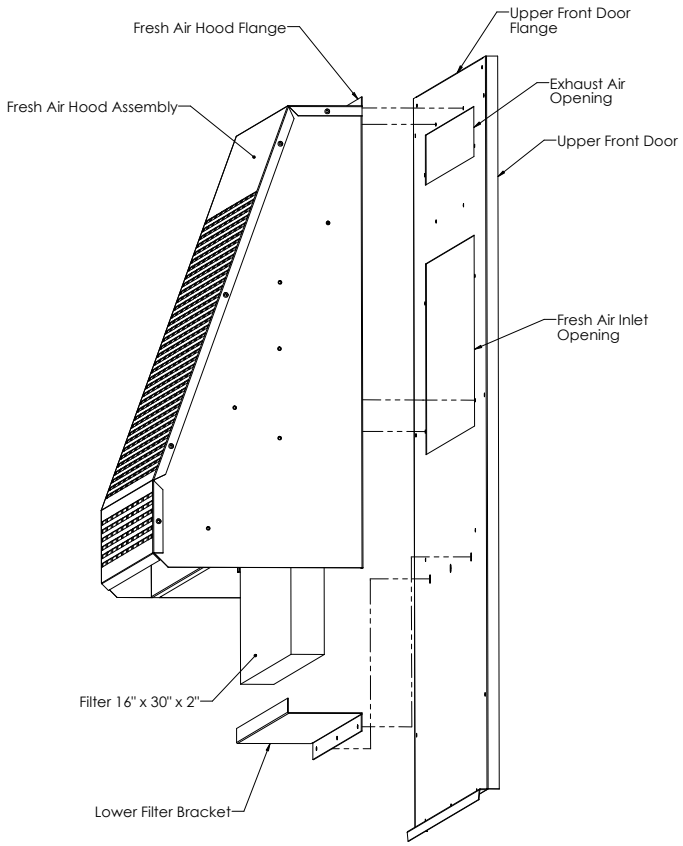


Figure 2. Fresh Air Hood Installation

2.6 Bracket Installation

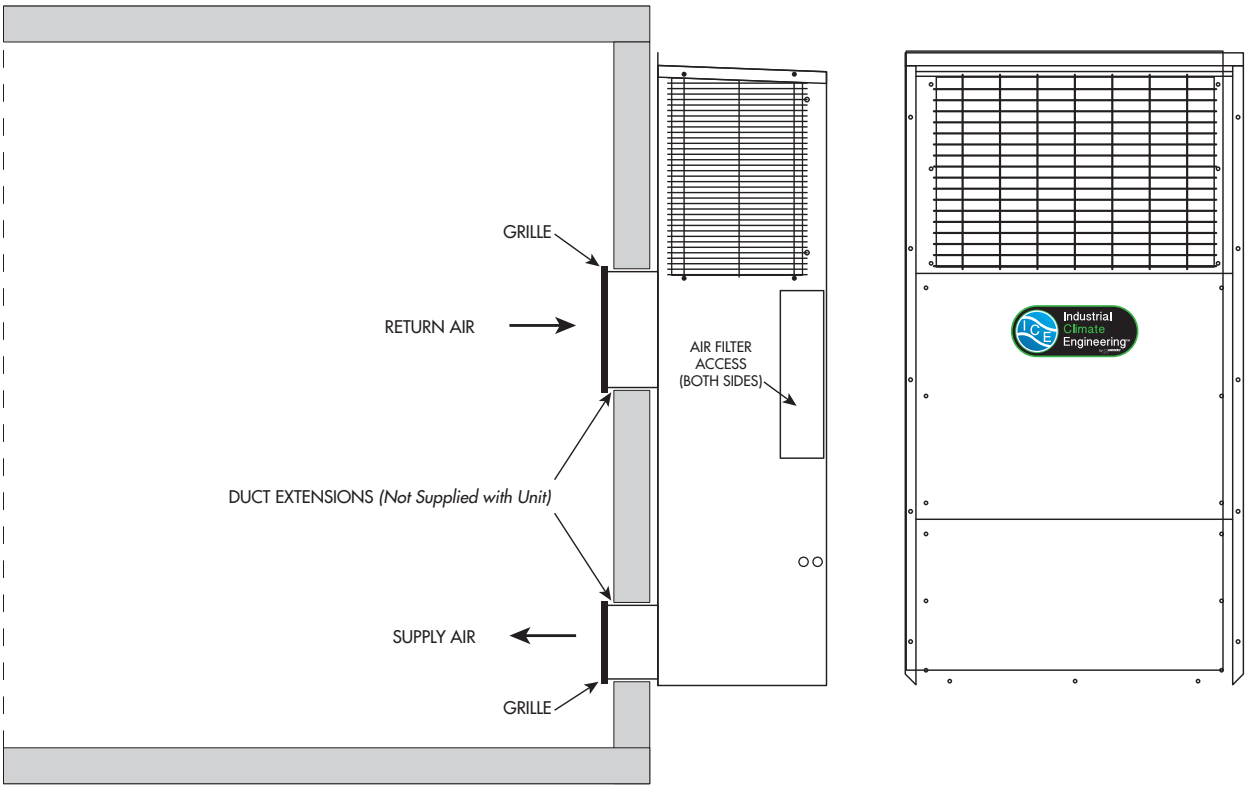
1. All models have built-in mounting flanges.
2. Apply a bead of silicone sealer on the wall side of the bottom support brackets on the unit. Circle the mounting holes with the silicone bead.
3. Refer to Figure 4. Attach the bottom support bracket to the wall using appropriate 3/8" diameter hardware.

For example, on wooden structures, use 3/8" x 2-1/2" all-thread lag screws. The screws must penetrate the center of the wall stud. Drill a pilot hole in the stud to prevent it from splitting.

2.7 Mounting The Unit

1. For wiring into the back of unit, locate the lower of the two knockouts on the wall side of the unit. Drill a one inch hole in the shelter wall to match this opening. Allow sufficient clearance to run 3/4" conduit through the hole and to the unit.

2. Using an appropriate and safe lifting device, set the unit on the bottom support bracket mounted on the wall. You must stabilize the unit on the bracket with the lifting device or by some other means - the bracket alone is not sufficient.
3. Make sure that the duct flanges are properly aligned with the wall opening. Adjust as necessary.
4. Note the holes in each side flange. Using the holes for guides, drill holes through the wall with a 3/8" drill bit. Insert the 3/8" x 5" bolts through the flanges. Install nuts and washers on the inside of the shelter. Tighten the bolts to secure the unit.
5. Apply a bead of silicone where the mounting flange contacts the unit and the shelter wall.
6. On the inside of the shelter, install the wall sleeves in the supply and return air openings. The sleeves may be trimmed to fit flush with the inside wall.
7. Check the fit of each sleeve to its mating flange for possible air leaks. Apply silicone sealer to close any gaps. Install the air return and supply grilles.



For units with electric heat, a one inch clearance is required around the duct extensions. The duct extensions must be constructed of galvanized steel with a minimum thickness of .019" as per the NFPA standards 90A & 90B.

Figure 3. A/C Wall Mount Detail

2.8 Electrical Connections

⚠ WARNING ELECTRICAL SHOCK HAZARD

Failure to follow safety warnings exactly could result in serious injury, death, and/or property damage.

Turn off electrical power at fuse box or service panel BEFORE making any electrical connections and ensure a proper ground connection is made before connecting line voltage.

Important

All electrical work must meet the requirements of local codes and ordinances. Work should be done **only** by qualified persons.

The air conditioners may incorporate an internal crankcase heater for compressor protection. **The crankcase heater must be energized for at least 24 hours prior to starting the compressor.**

High Voltage Wiring - (Single Units)

The power supply should have the proper voltage, phase, and ampacity for the selected model.

1. Size the incoming power supply lines according to Code requirements. Run the power conductors through the knockouts on the wall side of the unit, or to those adjacent to the electrical control box. Use appropriate conduit and strain reliefs.
2. Connect the wires to the input side of the internal breaker or terminal block (L1 & L2 for single-phase units; L1, L2, & L3 for three-phase models).
3. Install the ground wire on the ground lug.
4. For units designed for operation on 208/230V, 60Hz and 220-240V, 50Hz power supply, the transformer is factory wired for a 230V power supply. For a 208V power supply, remove the orange lead from the transformer and connect the red lead. Insulate the orange lead. For units operating on a 200-220v power supply, the red lead is factory wired to the transformer.
5. 460V units have a step down transformer for 230V motors.

Dual Unit Phasing

For applications where one controller operates two units, e.g., the CommStat 4 or LL357D.

The LL357D4 and the LL357D3 do not require unit phasing. However, if other devices are connected to the control system, phasing of the air conditioner is required. Earlier models; i.e., LL357, LL357A, LL357D2 require the unit to be properly phased.

1. Wire each unit as described in steps 1 through 4 above.
2. Test for proper phasing as follows:
   A. Power up the units.
   B. Using an AC volt meter set to the 300 volt scale, measure voltage between terminal L1 on the compressor contactor of unit #1 and terminal L1 on the compressor contactor of unit #2 If voltage is present, units are wired out of phase and must be rewired.
   C. If units are not in phase, turn off power and reverse the field power leads connected to the internal circuit breaker on one of the units only.
   D. Restore power and retest the phase (step B). When the voltage reads "0", the units are in phase.
   E. Turn off power and proceed.

Low Voltage Wiring

IMPORTANT. The following instructions are generic wiring instructions and may not be applicable for air conditioners with various options. Always refer to the wiring diagram in the air conditioner for the proper method to wire your unit.

1. On single units, pull the low voltage wiring (e.g., 18 gauge 4-conductor Class 2 thermostat wire) from the air conditioner into the thermostat / subbase assembly. See Figure 5b for connections to various thermostats.
2. Mount the thermostat on the wall of the shelter. The thermostat should be located so that the supply air from the unit does NOT blow directly on to the thermostat. Connect the thermostat to the terminal block in the air conditioner as shown in Figures 5a and 5b.

3. On dual units, refer to the *CommStat 3 Lead/Lag Controller Specification Sheet or CommStat 4 Controller Specification sheet.* Level and install the controller subbase. Wire the two air conditioners to the Lead/Lag Controller, according to the wiring diagram on the specification sheet and as shown in Figure 5c or 5d (note: the diagram also appears on the back cover of the controller).

Remote Signalling: Terminals 5 & 7(N.O.) and 6 & 7 (N.C.) on the air conditioner terminal board are dry contacts which can be used for remote signalling in the event of a/c cutoff on low or high pressure limit.

Continuous fan operation: For continuous indoor fan operation on single units, install a jumper between terminals 8 and 3. For continuous indoor fan operation on dual units using the LL357D4, install jumper between 8 and 3 and remove jumper between 1 and 3.

CommStat 3 Controller (See Figure 5d)

The CommStat 3 Controller by ICE is a solid state control package designed to operate a fully or partially redundant air conditioning system for a telecommunication cabinet or shelter. The CommStat 3 Controller is factory programmed with standard industry set points to facilitate installation. If desired, each of the set points can be quickly and easily changed in the field by the installer.

LL357D4 Lead/Lag Controller (See Figure 6c)

The ICE LL357D4 is a complete control package designed to operate a fully or partially redundant air conditioning system. It consists of a two-stage heat and two-stage cool electronic thermostat and a solid state timer. The LL357D4 provides environmental control and the security demanded by the communication shelter industry for a backup unit. The lead/lag controller insures equal wear on both air conditioners while allowing the lag unit to assist upon demand. The LL357D4 is factory wired, tested, and mounted in an enclosure for quick installation. Refer to the LL357D4 Product Data Sheet for complete installation instructions.

Operational Specifications

- Thermostat Range: 45ºF to 90ºF (7ºC to 32ºC)
- Accuracy: ±1ºF (± ½ºC)
- Changeover Temperature Differential (separation between the heat set point and the cool set point): 2ºF to 9ºF (1.0ºC to 4.5ºC)
- First Stage Temperature Differential (number of degrees between the set point temperature and the "turn on" temperature): 1ºF to 3ºF (.5ºC to 1.5ºC)
- Second Stage Temperature Differential (number of degrees between when stage 1 turns on and when stage 2 turns on): 1ºF to 6ºF (.5ºC to 3.0ºC).
- Minimum Cool Temperature Set Point: Adjustable from 45ºF to 75ºF (7ºC to 24.0ºC).
- Maximum Heat Temperature Set Point: Adjustable from 55ºF to 90ºF (13ºC to 32.0ºC)
- Staged OFF Outputs: Air conditioners will turn off independently.

Timing Device

- Solid state timer with both 3.5 and 7 day changeover capability.

  Note: Cut timer circuit wire to provide 3.5 day changeover. Timing accuracy ±5%.
- Momentary push button for accelerated manual timer advance. (9 seconds = 7 days)
- Light emitting diode indicates power on and identifies the lead unit.

Unit Shutdown/Fire Alarm Systems

Immediate shutdown of the air conditioning system can be accomplished by wiring the normally closed set of contacts in the fire extinguishing or alarm system across terminals 8 and 10 on the low voltage terminal board inside the air conditioner. Note: The factory jumper between these terminals must be removed.

This function cannot be accomplished at the wall thermostat because the fan purge on the electronic control board inside the unit allows the indoor blower to operate from 10 to 90 seconds following each cool "on" cycle.

Note: The fan purge on the electronic control board allows the indoor fan to run for approximately 10 to 90 seconds after the compressor is off. This operation provides a small improvement in system efficiency.

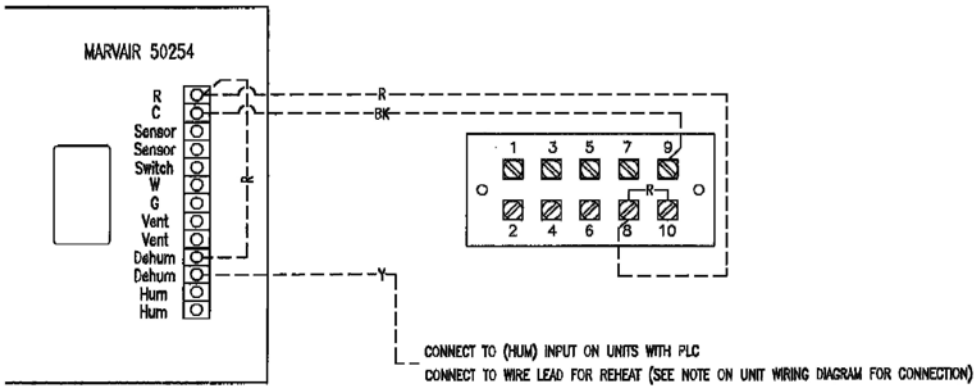
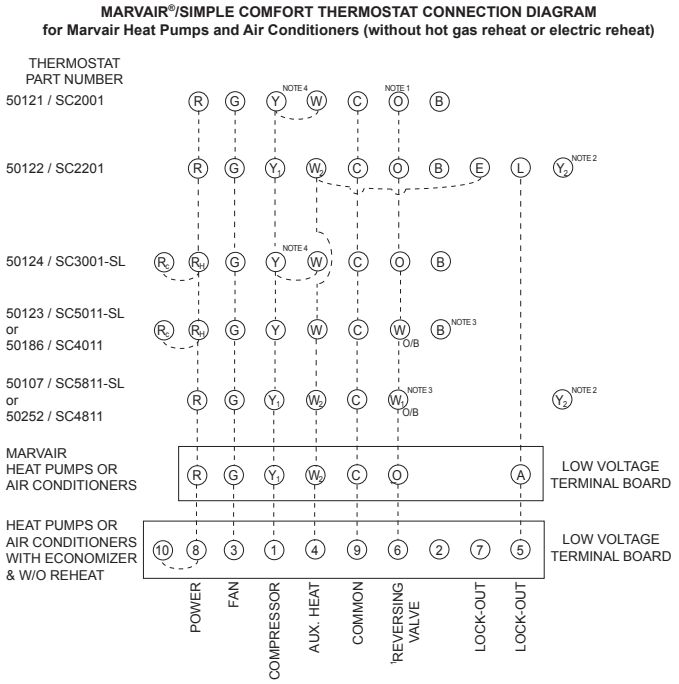


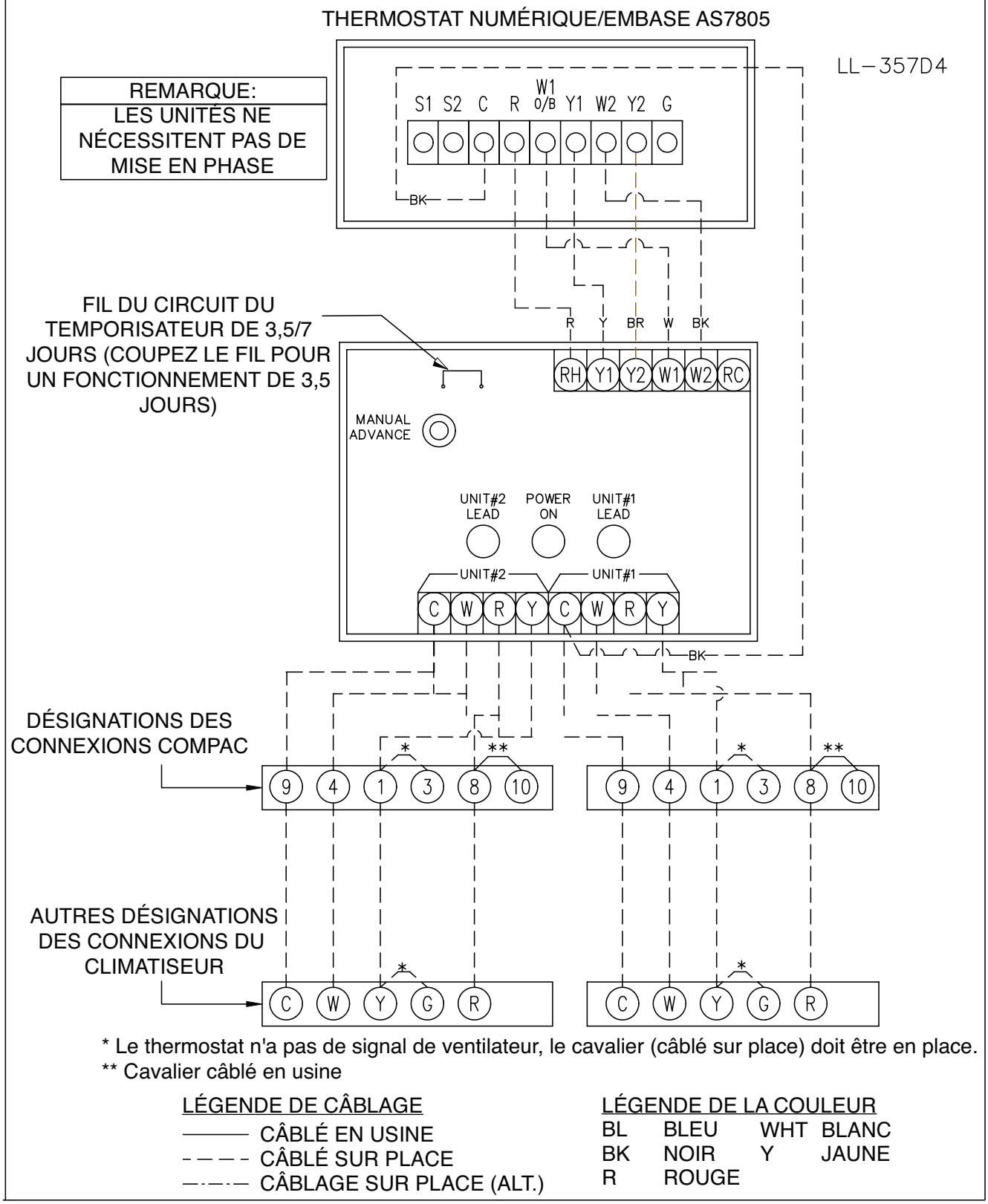
Figure 4a. Humidistat (P/N 50254) Wiring to an Air Conditioner with Reheat.



NOTES:
1. Reversing valve on heat pumps only.
2. For units with 2-stage compressors, connect lead from the compressor monitor and diagnostic module, e.g., Copeland's Comfort Alert, to Y_2
3. For air conditioners with strip heat, connect W/O/B to terminal W or 4.
4. Jumper for heat pump only, omit with air conditioners.

A. Terminals 5 & 7 are normally open dry contacts and close to indicate lockout.
B. Terminals 6 & 7 are normally closed dry contacts and open to indicate lockout.
C. If the thermostat has RC & RH terminals, install a jumper wire between RC & RH.
D. IMPORTANT. The instructions are generic wiring instructions and may not be applicable for air conditioners with various options. Always refer to the wiring diagram in the air conditioner for the proper method to wire your unit.

Figure 4b. Thermostat Connection Diagram



* Le thermostat n'a pas de signal de ventilateur, le cavalier (câblé sur place) doit être en place.
** Cavalier câblé en usine

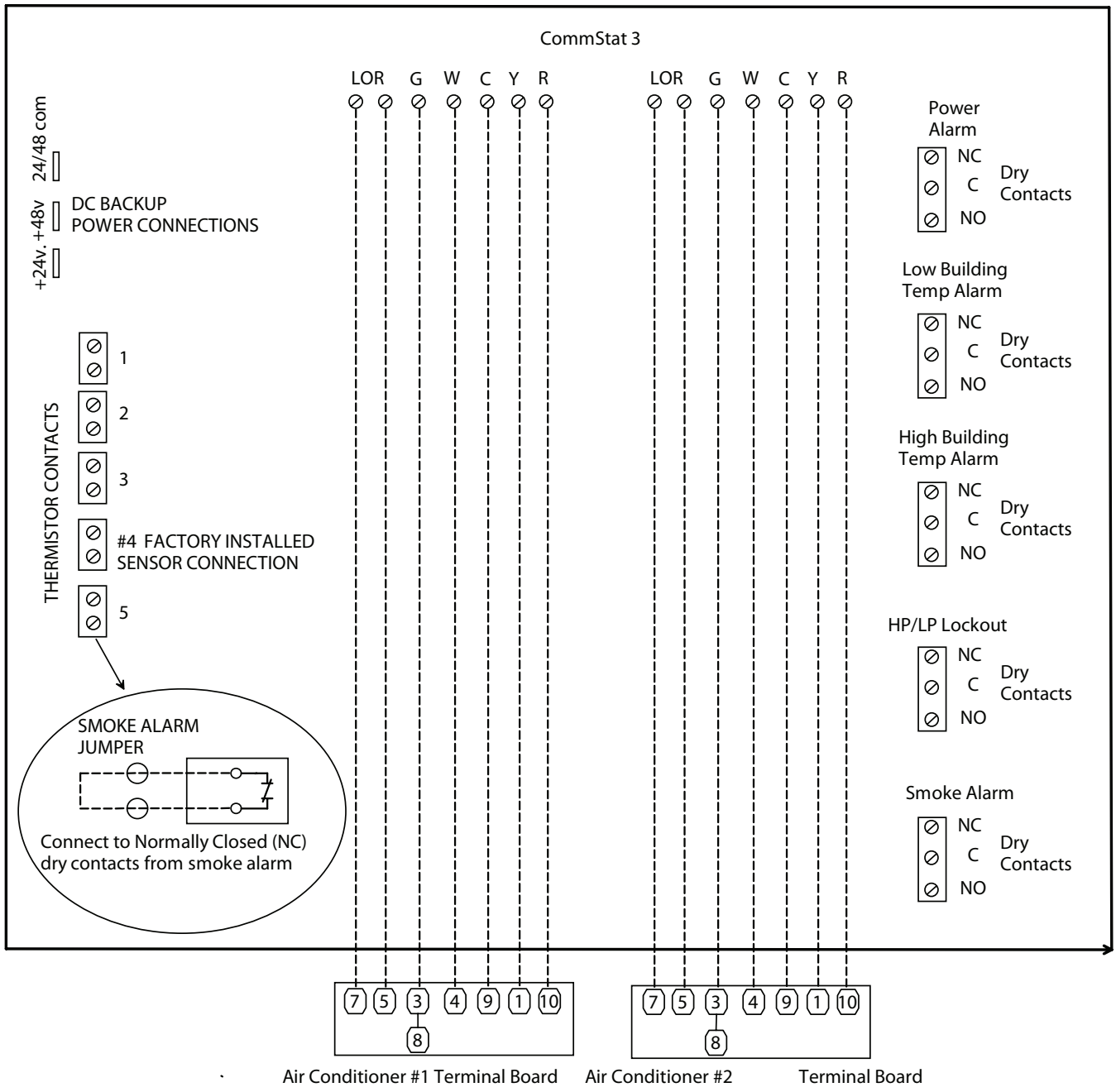
LÉGENDE DE CÂBLAGE

——— CÂBLÉ EN USINE
- - - - CÂBLÉ SUR PLACE
—·—·— CÂBLAGE SUR PLACE (ALT.)

LÉGENDE DE LA COULEUR

BL	BLEU	WHT	BLANC
BK	NOIR	Y	JAUNE
R	ROUGE		

Figure 4c. LL357D4 Wiring Diagram & Thermostat Keys



NOTE:

1. 24 VAC connections only.
2. For immediate shutdown of air conditioner upon a signal from the smoke alarm, the jumper between terminals 8 and 10 in the ComPac® I and ComPac® II units must be removed and a jumper placed from terminals 8 and 3.
3. When connecting a smoke alarm to the smoke alarm input terminals (normally closed), remove the factory installed jumper wire and install the smoke alarm leads.

IF LINE VOLTAGE IS BELOW 220 VAC, USE THE 208 TRANSFORMER TAP.

Figure 4d. CommStat 3 Wiring Diagram

Chapter 3 Start-Up

3.1 Check-Out of Cooling Cycle

Important: Be sure that the crankcase heater (if used) has been energized for at least 24 hours before starting the unit(s). Double-check all electrical connections before applying power. Air conditioners with scroll compressors running on 3Ø power must be checked for proper rotation during the initial start-up. Please refer to Section 2.8 for determining if the 3Ø compressors are rotating correctly. Incorrect rotation can damage the compressor and is not covered by the warranty

Procedure:

1. Set the cooling set point temperature on the wall thermostat to a point *higher* than the ambient temperature. Set the heating set point temperature to a temperature that is *lower* than the ambient.
2. Set the thermostat system switch in the AUTO position. Nothing should operate at this time.
3. Set the time delay in the air conditioner's control box to three minutes. Check the changeover setting of the enthalpy or dry bulb sensor and reset it if needed. See Section 1.6.
4. Slowly lower the thermostat's cooling set point temperature until the switch closes. The indoor fan should operate.

Once the indoor fan turns on, allow approximately three minutes for the compressor to start. Note that the outdoor fan may not come on immediately, because it is cycled by refrigerant pressures.

Alternately, when outdoor conditions are lower than the set point, a source of heat such as a hair dryer can be directed on the air temperature sensor to simulate warmer conditions, which will bring on mechanical cooling and start the compressor.

5. To stop cooling, slowly raise the thermostat cooling set point to a temperature higher than the ambient.

If the unit fails to operate, refer to the troubleshooting information in Chapter 4.

Follow the same procedure for additional units.

Note: The fan purge allows the indoor fan to run for approximately 90 seconds after the compressor is off. This operation provides a small improvement in system rated efficiency.

3.2 Check-Out of Heating Cycle

Procedure: (Applies only to units with resistance elements)

1. Raise the heating set point temperature to a setting which is higher than the ambient temperature. The fan and electric heat should immediately cycle on.
2. Move the system switch to the "OFF" position. All functions should stop.

Chapter 4 Troubleshooting

4.1 Overview

A comprehensive understanding of the operation of the air conditioner is a prerequisite to troubleshooting. Please read the Chapter 1 for basic information about the unit.

ICE's air conditioners are thoroughly tested before they are shipped from the factory. Of course, it is possible that a defect may escape undetected, or damage may have occurred during transportation. However, the great majority of problems result from installation errors.

If you experience difficulties with the air conditioners, please review the installation steps in Chapter 2.

Much time can be saved by taking a thoughtful and orderly approach to troubleshooting. Start with a visual check - are there loose wires, crimped tubing, missing parts, etc? Begin deeper analysis only after making this initial inspection.

The troubleshooting information in this manual is basic. The troubleshooting section contains problem/solution charts for general problems, followed by a compressor section.

Not every problem can be anticipated. If you discover a problem that is not covered in this manual, we would be very grateful if you would bring it to the attention of our service department for incorporation in future revisions.

As always, please exercise caution and good judgement when servicing the air conditioner. Use only safe and proven service techniques. Use refrigeration goggles when servicing the refrigeration circuit.

⚠ WARNING

The refrigerant circuit has hot surfaces, and the electrical voltages inside of the unit may be hazardous or lethal. SERVICE MAY BE PERFORMED ONLY BY QUALIFIED AND EXPERIENCED PERSONS.

4.2 Failure Symptoms Guide

PROBLEM/SYMPTOM	LIKELY CAUSE(S)	CORRECTION
A. Unit does not run. **NOTE**: An internal anti-short-cycle timer will prevent the unit from starting for .2 to 8 minutes following start-up.	1. Power supply problem. 2. Tripped internal disconnect. 3. Shut off by external thermostat or thermostat is defective. 4. Unit off on high or low pressure limit. 5. Internal component or connection failure.	1. Check power supply for adequate phase and voltage. Check wiring to unit and external breakers or fuses. 2. Check internal circuit protection devices for continuity. 3. Check operation of wall-mounted thermostat. 4. Reset pressure switch. 5. Check for loose wiring. Check components for failure.
B. Unit runs for long periods or continuously; cooling is insufficient.	1. Dirty filter or reduced airflow 2. Low refrigerant. 3. Component failure. 4. Unit undersized for job.	1. Check air filter(s). Check blower operation. Remove airflow restriction. 2. Check for proper charge and possible refrigerant leak. 3. Check internal components, especially compressor for proper operation. 4. Add additional units for greater capacity.

PROBLEM/SYMPTOM	LIKELY CAUSE(S)	CORRECTION
C. Unit cycles on high/low pressure limit.	1. Loss or restriction of airflow.	1. Check blower assembly for proper operation. Look for airflow restrictions, e.g.. the air filter. Check blower motor and condenser fan.
	2. Restriction in refrigerant circuit.	2. Check for blockage or restriction, especially filter drier and capillary tube assembly.
	3. Refrigerant overcharge (following field service)	3. Evacuate and recharge to factory specifications.
	4. Defective pressure control.	4. Check limit cutout pressures. Control is set to actuate at approximately 35 PSIG (low pressure) and 450 PSIG (high pressure).
D. Unit blows fuses or trips circuit breaker.	1. Inadequate circuit ampacity.	1. Note electrical requirements in Chapter 2 and correct as necessary.
	2. Short, loose, or improper connection in field wiring.	2. Check field wiring for errors.
	3. Internal short circuit. Loose or improper connection(s) in unit.	3. Check wiring in unit. See wiring and schematic diagrams. Test components (especially the compressor) for shorts.
	4. Excessively high or low supply voltage or phase loss (3ø only).	4. Note voltage range limitations specific to the compressor troubleshooting section.
E. Water on floor near unit.	1. Obstruction in condensate line.	1. Check for clog or restriction.
	2. Obstruction or leak in condensate pan.	2. Check pan for leak or blockage.
	3. Unit is not level.	3. Level unit.
F. No space heating or reduced heating (units equipped with resistance elements)	1. Defective heating element(s).	1. Check resistance element(s) for continuity.
	2. Thermal limit open.	2. Check continuity across thermal limit switch.
	3. Defective heater contactor.	3. Check relay for proper operation. Replace if defective.

4.3 Compressor Troubleshooting

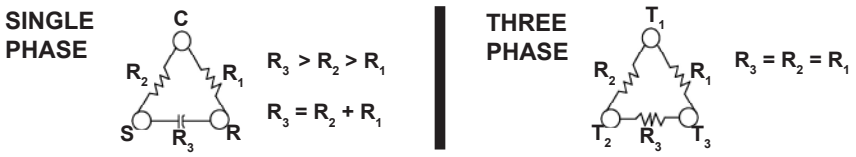
Note: It is important to rule out other component failures before condemning the compressor.

The following electrical tests will aid diagnosis:

1. **Start-Up Voltage**: Measure the voltage at the compressor contactor during start-up. The voltage must exceed the minimum shown in Table 5, section 2.2, or compressor failure is likely. A low voltage condition must be corrected.
2. **Running Amperage**: Connect a clip-on type ammeter to the (common) lead to the compressor. Turn on the supply voltage and energize the unit. The compressor will initially draw high amperage; it should soon drop to the RLA value or less. If the amperage stays high, check the motor winding resistances.

   Note: Feel the top of the compressor to see if it has overheated. If it is hot, the internal overload may be open. You may have to wait several hours for it to reset.

3. **Motor Winding Resistances:** Using a digital volt-ohm meter (VOM), measure the resistance across the compressor windings as shown below.



Resistance can be measured as shown above. Any deviation from above values could indicate a defective compressor.

4. **High Voltage/Insulation Test:** Test internal leakage with a megohmeter. Attach one lead to the compressor case on a bare metal tube and to each compressor terminal to test the motor windings. A short circuit at high voltages indicates a motor defect. Do not do this test under vacuum.
5. On single phase models, check the capacitor by substitution.

4.4 Control Board Diagnosis

The control board (see section 1.6a for a complete description of the control board) has a red diagnostic LED which indicates the lockout fault. The control board will enter into and indicate lockout if either of the fault conditions (LPS or HPS) occur twice.

The contactor must be closed before the first fault condition can be recognized by the control board. The contactor will be closed 3 minutes after the unit is energized and only if cooling is required. The first fault condition will open the contactor and shutdown the unit. The contactor on the unit that has the fault condition must be closed before the second fault condition can be recognized by the control board. The contactor on the unit with the fault condition will close after 3 minutes if the unit is still calling for cooling and if the fault condition no longer exists. If you get a second fault condition, the contactor will open and shutdown the unit. The “red” led will have one blink if the high pressure switch has opened twice and will have two blinks if the low pressure switch has opened twice. The unit must be in the cooling mode (compressor contactor Closed) before a fault condition can occur.

Chapter 5 Maintenance

5.1 Scheduled Maintenance

ICE strongly recommends that the air conditioner be serviced a minimum of twice a year – once prior to the heating season and once prior to the cooling season. At this time the filters, evaporator coil, condenser coil, the cabinet, and condensate drains should be serviced as described below. Also at this time, the air conditioner should be operated in the cooling and heating cycles as described in Chapter 3, Start-Up. In addition to this seasonal check-out, the air conditioner should be maintained as follows:

Air Filter
Replace the air filter whenever it is visibly dirty.

Evaporator
If the evaporator becomes clogged or dirty, it may be cleaned by careful vacuuming or with a commercial evaporator cleaning spray. DO NOT use a solvent containing bleach, acetone, or flammable substances. Turn off power before cleaning. Be careful not to wet any of the electrical components. Be sure the unit has dried before restarting.

Condenser
Periodically inspect the outdoor condenser coil and the cabinet air reliefs for dirt or obstructions. Remove foreign objects such as leaves, paper, etc.

If the condenser coil is dirty, it may be washed off with a commercial solvent intended for this purpose. TURN OFF POWER BEFORE CLEANING! Be sure that all electrical components are thoroughly dry before restoring power.

Cabinet
The cabinet may be cleaned with a sponge and warm, soapy water or a mild detergent. Do not use bleach, abrasive chemicals or harmful solvents.

Drains
Regularly check the primary and secondary condensate drains. The secondary drain has a stand pipe. An obstruction will force water to dump into the middle of the unit and drain out the sides of the unit, causing discoloration of the side panels. If discoloration is noted, service the drains.

If a commercial drain solvent is used, flush out the drain pan and system with plenty of fresh water to prevent corrosion.

Lubrication
Oiling of the condenser fan motor or the evaporator blower motor is not recommended.

Chapter 6 Warranty

6.1 Industrial Climate Engineering Limited Product Warranty

Marvair Inc., warrants its products to be free from defects in materials and workmanship under normal use to the original purchaser for the period of time in the table below. If any part of your product fails within 12 months from start-up, or 18 months from shipment from the factory, whichever comes first, Marvair, Inc. will furnish without charge, EXW Cordele, Georgia, the required replacement part. The owner must provide proof of the date of the original start-up. The contractor's invoice, the certificate of occupancy, or similar documents are examples of acceptable proof of the date of the original start-up.

Marvair, ICE, Eubank Products
90 Days[1] w/Flat Rate Labor[2] *(See Marvair, ICE, Eubank Flat Rate Labor Guidelines)*
1 Year Parts[2,3]
5 Years Compressor[2]

[1]If any part of your Marvair, Inc. unit fails within 90 days of the commencement of the warranty, Marvair, Inc. will furnish without charge, EX Works, Cordele, Georgia, the required replacement part and pay for the labor to replace the part in accordance with the Marvair, Inc. Flat Rate Labor Guidelines.

[2]All OTR (over the road) applications that are moved from one location to another: Factory Warranty applies only up to the point of initial start-up and test at all OEM manufacturing locations or subsequent facility. Once it goes into OTR service, the warranty expires immediately for compressor and sealed system components. This OTR exemption does not apply to relocatable classrooms, construction or office trailers.

[3]All warranty replacement parts shall be shipped Ground only. Expedited shipping is available upon request for additional cost.

The responsibility of the equipment owner includes:

1. To operate the equipment in accordance with the manufacturer's instructions.
2. To provide easy accessibility for servicing.
3. To check and reset any circuit breaker(s) and/or disconnect(s) prior to calling for service.
4. To keep the unit clean and free of dirt and containment and replace filters as required.
5. To keep the outdoor coil clean and free of leaves, paper, or other debris.
6. To pay the charges incurred when any of the above have not been done.
7. To pay for repair or replacement of any material or part other than those within the Marvair unit or controller.

Marvair, Inc., will not be responsible for labor after 90 days, transportation costs, delays or failures to complete repairs caused by events beyond our control (labor hours incurred due to required site-specific training, time waiting to gain access, or extended drive time for remote sites). This warranty does not cover:

1. Any transportation, related service labor, diagnosis calls, filter, driers, refrigerant, or any other material charges.
2. Damages caused by shipping, accident, abuse, negligence, misuse, fire, flood, or Acts of God.
3. Damages caused by operating or staging the unit in a corrosive environment.
4. Damages caused by improper application of the product.
5. Damages caused by failing to perform proper routine maintenance.
6. Expenses incurred for erecting, disconnecting or dismantling the product or installing the replacement part(s).
7. Products not installed or operated according to the included instructions, local codes, and good trade practices.
8. Products moved from the original installation site.
9. Products lost or stolen
10. Consequential damages or incidental expenses including losses to persons, property or business.
11. Modifications to original unit after it leaves the factory, such as breaking into any part of the sealed systems unless authorized in advance in writing by Marvair, Inc..
12. Damages as a result of operating as a construction site cooler / dehumidifier.

When labor (first 90 days only) is required, it must be performed during normal working hours (8:00 AM - 5:00 PM) Monday - Friday and must be performed by Marvair, Inc., personnel or a designated Service Representative.

The owner of the product may ship the allegedly defective or malfunctioning product or part to Marvair, Inc.,, at such owner's expense, and Marvair, Inc., will diagnose the defect and, if the defect is covered under this warranty, Marvair, Inc., will honor its warranty and furnish the required replacement part. All costs for shipment and risk of loss during shipment of the product to Marvair, Inc., and back to the owner shall be the responsibility and liability of the owner. Upon written request by an owner, Marvair, Inc., may arrange for remote diagnosis of the allegedly defective or malfunctioning product or part but all costs for transportation, lodging and related expenses with regard to such diagnostic services shall be the responsibility and liability of the owner.

An owner requesting performance under this Warranty shall provide reasonable access to the allegedly defective or malfunctioning product or part to Marvair, Inc., and its authorized agents and employees.

THIS WARRANTY CONSTITUTES THE EXCLUSIVE REMEDY OF ANY PURCHASER OF A MARVAIR HEAT PUMP OR AIR CONDITIONER AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR USE, TO THE FULLEST EXTENT PERMITTED BY LAW. IN NO EVENT SHALL ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR USE EXCEED THE TERMS OF THE APPLICABLE WARRANTY STATED ABOVE AND MARVAIR SHALL HAVE NO OTHER OBLIGATION OR LIABILITY. IN NO EVENT SHALL MARVAIR BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OR MONETARY DAMAGES.

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE-TO-STATE. Some states do not allow limitations or exclusions, so the above limitations and exclusions may not apply to you.