ECU Installation & Operation Manual
Vertical Air Conditioners

Models SlimPac ECUA12-18

ECUA12

ECUA18

Intertek

Manufactured By:

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

ICE SlimPac ECUA12-18 I&O Manual 03/2019 Rev.2
Part Number 01706

How To Use This Manual

This manual is intended to be a guide to Industrial Climate Engineering's 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 air conditioner 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 air conditioner works (Chapters 1 & 3).
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 1-229-273-9558 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.

⚠ 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.

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Chapter 1 Description & Specifications

1.1 General Description

The SlimPac™ line of environmental control units (ECUA) is designed for the telecommunication cabinet and shelter. Below are some of the features of the unit.

- The SlimPac™ ECUA is available in cooling capacities of 12,000 BTUH (ECUA12) and 18,000 BTUH (ECUA18).
- Cabinet has powder coated finish for long term durability.
- ECUA protection provided by low refrigerant pressure switch (ECUA18 only), freeze stat and high pressure switch.
- Dry contacts are available for remote monitoring of lockout due to a high or lower pressure.
- Low ambient operation provided by condenser fan cycle control (ECUA12) or modulating head pressure control (ECUA18).
- 3.6 kW electric strip heat is optional.
- The ECUA12 and ECUA18 SlimPac are safety listed by ETL. Both units are manufactured and tested to UL 1995 current edition and CAN/CSA-C22.2 No. 236 2nd Ed.

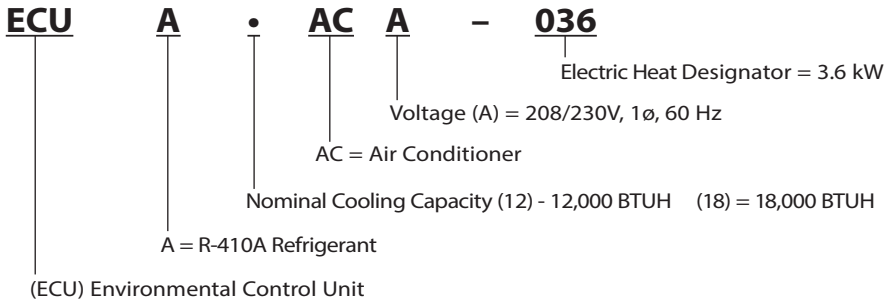
The operating functions of the SlimPac™ ECUA line are described below.

Cooling - Mechanical cooling is provided.

Heating - A 3.6 kW electric resistant heater (standard) operates to provide heating as required.

1.2 Model Identification

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



Example:
ECUA18ACA-036 = Counterflow Vertical Package ECU Nominal 1.5 tons; 208/230V, 1ø, 60 Hz; 3.6 kW Electric Heat

1.3 Serial Number Date Code

A = January	E = May	J = September	D = 2014
B = February	F = June	K = October	E = 2015
C = March	G = July	L = November	F = 2016
D = April	H = August	M = December	

1.4 Electrical Ratings and Performance Data

ELECTRIC HEAT		000 = None		036 = 3.6 kW	
BASIC MODEL	VOLTAGE / PHASE / HZ	CKT #1		CKT #1	
		MCA	MFS	MCA	MFS
ECUA12ACA (N)	208-230/1/60	9.3	15	19.7	20
ECUA18ACA (N)	208-230/1/60	14.9	20	20.4	25
MCA =Minimum Circuit Ampacity (Wire Sizing Amps) MFS = Max. Fuse Size or HACR circuit breaker					

Table 1. Summary Ratings

BASIC MODEL	COMPRESSOR					OUTDOOR MOTOR				INDOOR MOTOR			
	TYPE	VOLTS-HZ-PH	RLA	LRA	MCC	VOLTS-HZ-PH	RPM	FLA	HP	VOLTS-HZ-PH	RPM	FLA	HP
ECUA12ACA (N)	Rotary	208/230-60-1	6.3	29.0	9.8	208/230-60-1	1050	0.50	1/15	208/230-60-1	1600	0.95	1/8
ECUA18ACA (N)	Scroll	208/230-60-1	9.0	48.0	14.0	208/230-60-1	825	2.00	1/3	208/230-60-1	1075	1.60	1/4
RLA = Rated Load Amps LRA = Locked Rotor Amps MCC = Maximum Continuous Current RPM = Revolutions per Minute FLA = Full Load Amps HP = Horsepower													

Table 2. Electrical Characteristics

BASIC MODEL NUMBER	VOLTAGE HERTZ PHASE	CURRENT AMPS		LOAD OF RESISTIVE HEATING ELEMENTS ONLY (AMPS)	TOTAL MAXIMUM HEATING AMPS (STANDARD UNIT)
		AC UNIT	IBM	3.6 kW	3.6 kW
ECUA12ACA (N)	208/230-60-1	7.75	0.95	15.00	15.95
ECUA18ACA (N)	208/230-60-1	12.60	1.60	15.00	16.60
IBM = Indoor Blower Motor					

Table 3. Unit Load Amps

CFM @ ESP (Dry Coil)						
Model	.00	.05	.10	.15	.20	.25
ECUA12	510	470	450	420	390	360
ECUA18	750	710	680	650	625	600
CFM = Cubic Feet/Minute Indoor Air Flow ESP = External Static Pressure in Inches WG **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.						

Table 4. Air Flow

Data based upon 80°F Dry Bulb/ 67°F wet bulb return air temperature at Various Outdoor Temperatures. Airflow at 450 CFM											
Outdoor temperature	70°F	75°F	80°F	85°F	90°F	95°F	100°F	105°F	110°F	115°	120°F
Total cooling (BTUH)	10,570	10,370	10,170	9,975	9,788	9,600	9,165	8,730	8,105	7,480	6,860
Sensible Cooling (BTUH)	6,930	6,860	6,790	6,720	6,655	6,590	6,435	6,280	6,065	5,850	5,640
Data based upon 26.5°C Dry Bulb/ 19.5°C wet bulb return air temperature at Various Outdoor Temperatures. Airflow at 760 m3/hr.											
Outdoor temperature	21°C	24°C	26.5°C	29°C	32°C	35°C	38°C	40.5°C	43.3°C	46°	48.4°C
Total cooling (kW)	3.10	3.04	2.98	2.92	2.87	2.81	2.69	2.56	2.37	2.19	2.01
Sensible Cooling (kW)	2.03	2.01	1.99	1.97	1.95	1.93	1.89	1.84	1.78	1.71	1.65

Table 5. ECUA12 Total & Sensible Cooling Capacity

Data based upon 80°F Dry Bulb/ 67°F wet bulb return air temperature at Various Outdoor Temperatures. Airflow at 500 CFM											
Outdoor temperature	70°F	75°F	80°F	85°F	90°F	95°F	100°F	105°F	110°F	115°	120°F
Total cooling (BTUH)	16,075	15,770	15,470	15,170	14,885	14,600	13,938	13,275	12,325	11,375	10,430
Sensible Cooling (BTUH)	9,835	9,725	9,610	9,500	9,395	9,290	9,050	8,810	8,470	8,130	7,800
Data based upon 26.5°C Dry Bulb/ 19.5°C wet bulb return air temperature at Various Outdoor Temperatures. Airflow at 850 m3/hr.											
Outdoor temperature	21°C	24°C	26.5°C	29°C	32°C	35°C	38°C	40.5°C	43.3°C	46°	48.4°C
Total cooling (kW)	4.71	4.62	4.53	4.44	4.36	4.28	4.08	3.89	3.61	3.33	3.06
Sensible Cooling (kW)	2.88	2.85	2.82	2.78	2.75	2.72	2.65	2.58	2.48	2.38	2.29

Table 6. ECUA18 Total & Sensible Cooling Capacity

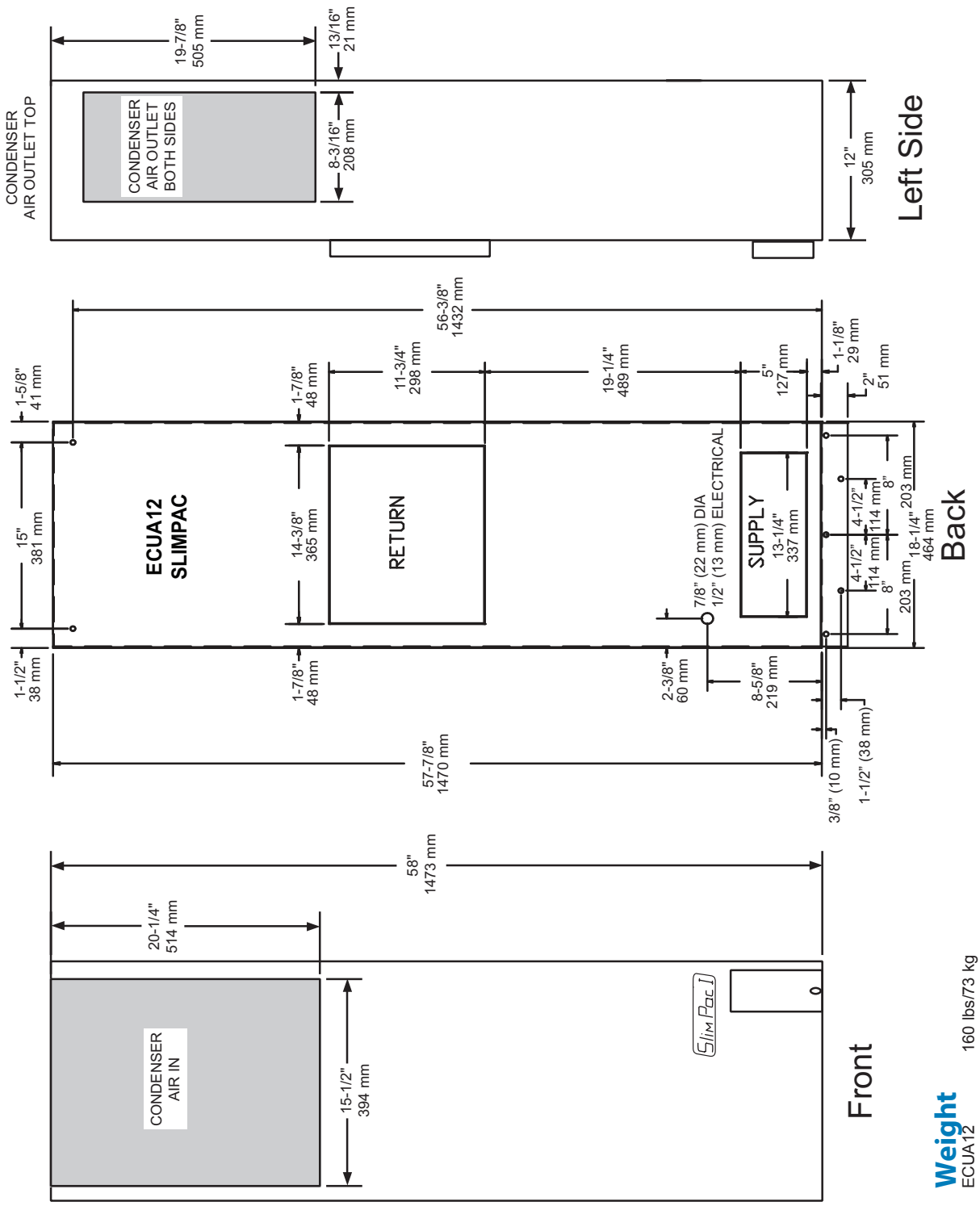


Figure 1a. Dimensional Data - ECUA12

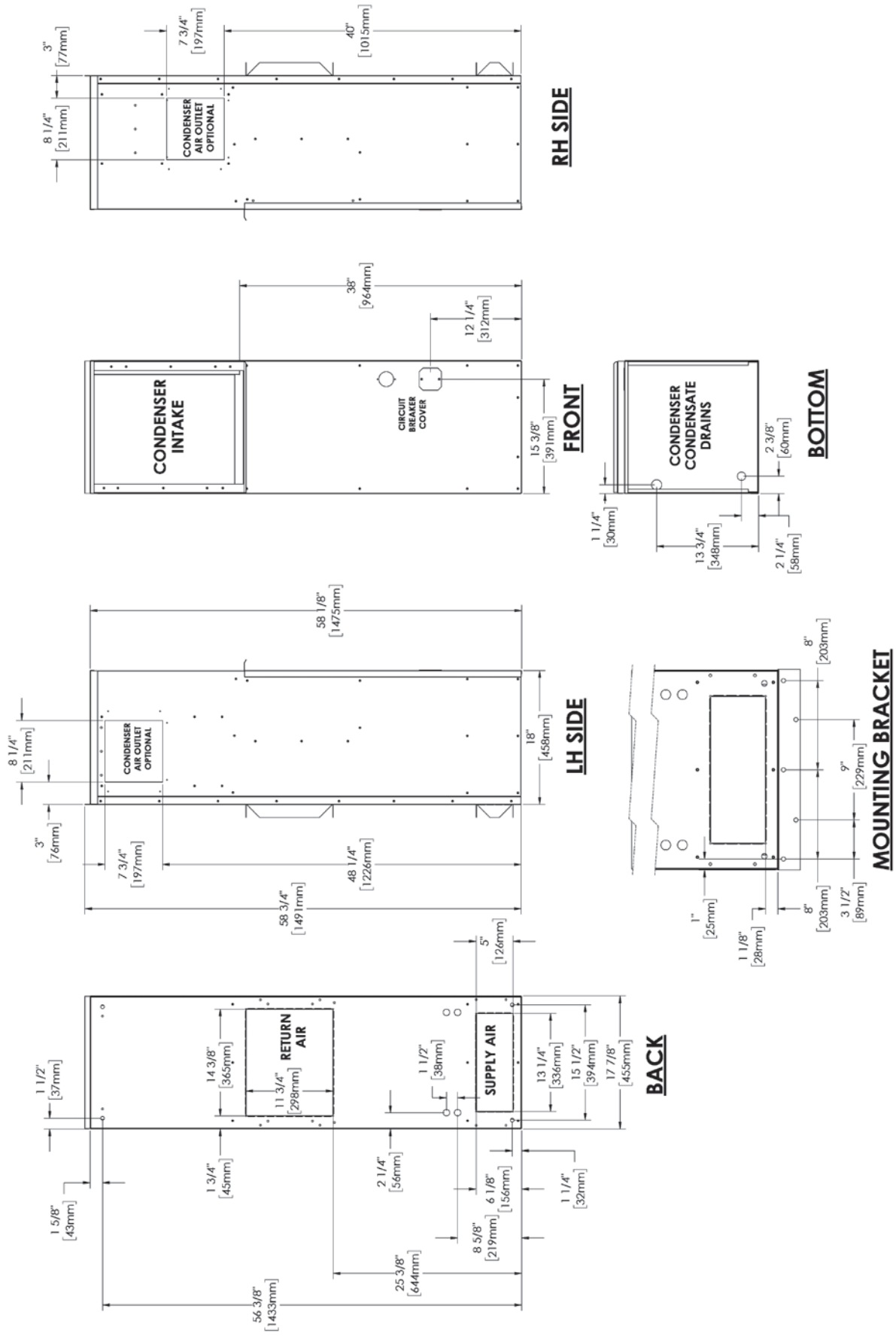


Figure 1b. Dimensional Data - ECUA18

1.5 General Operation

Refrigerant Cycle (Cooling Mode)

The SlimPac™ uses R-410A refrigerant in a conventional vapor-compression refrigeration cycle to transfer heat from air in an enclosed space to the outside. A supply blower assembly pulls indoor air across the evaporator. 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 expanded into the evaporator through the metering device to repeat the cycle.

Cooling Mode: The compressor and condenser fan are energized with a contactor controlled by a 24 VAC pilot signal (see Figures 2a and 2b). The outside fan or blower motor is controlled by the head pressure control (see head pressure control, section 1.7). The supply air blowers are energized by the blower relay.

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 blower and the resistance elements.

1.6 Electrical Diagrams

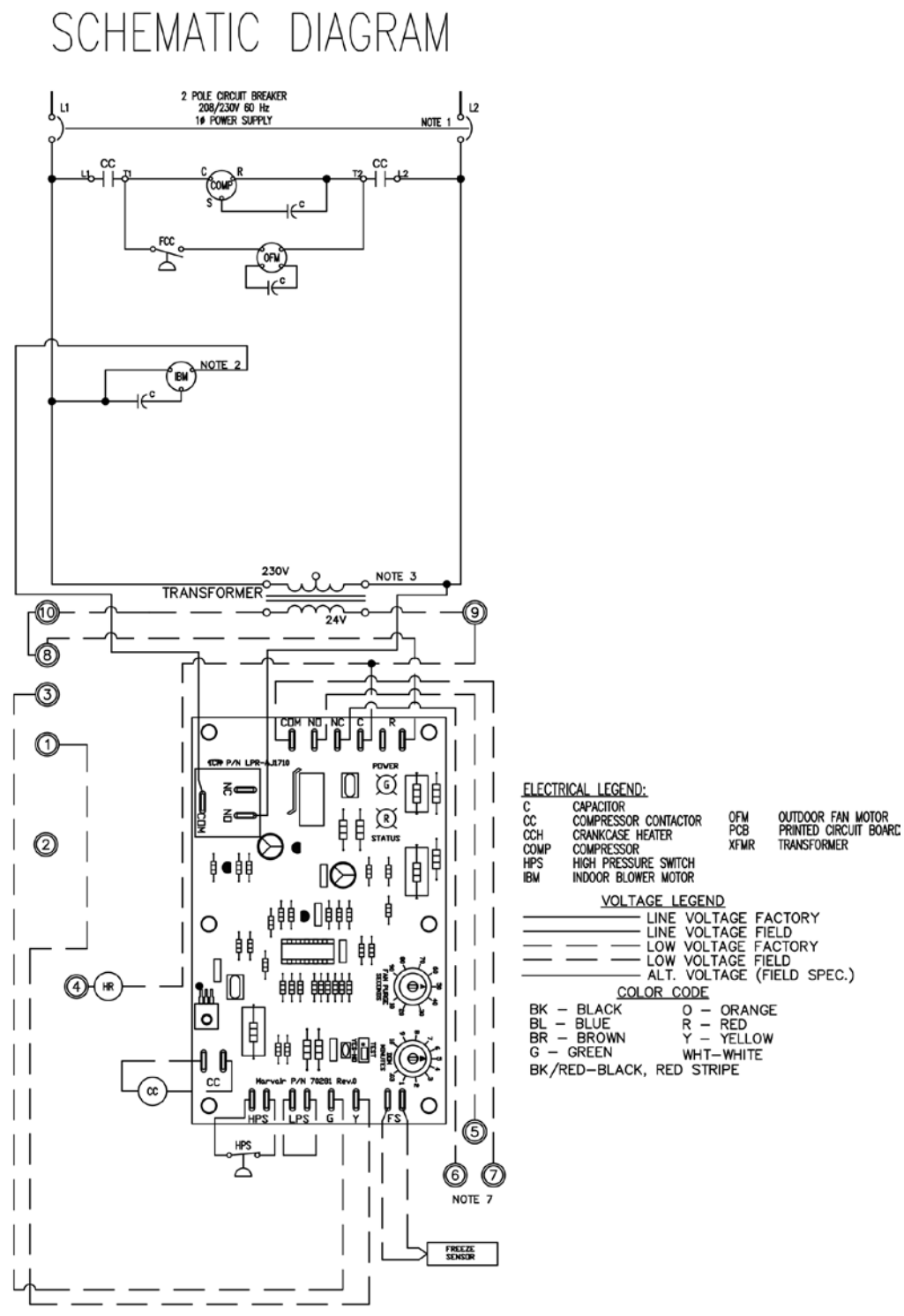
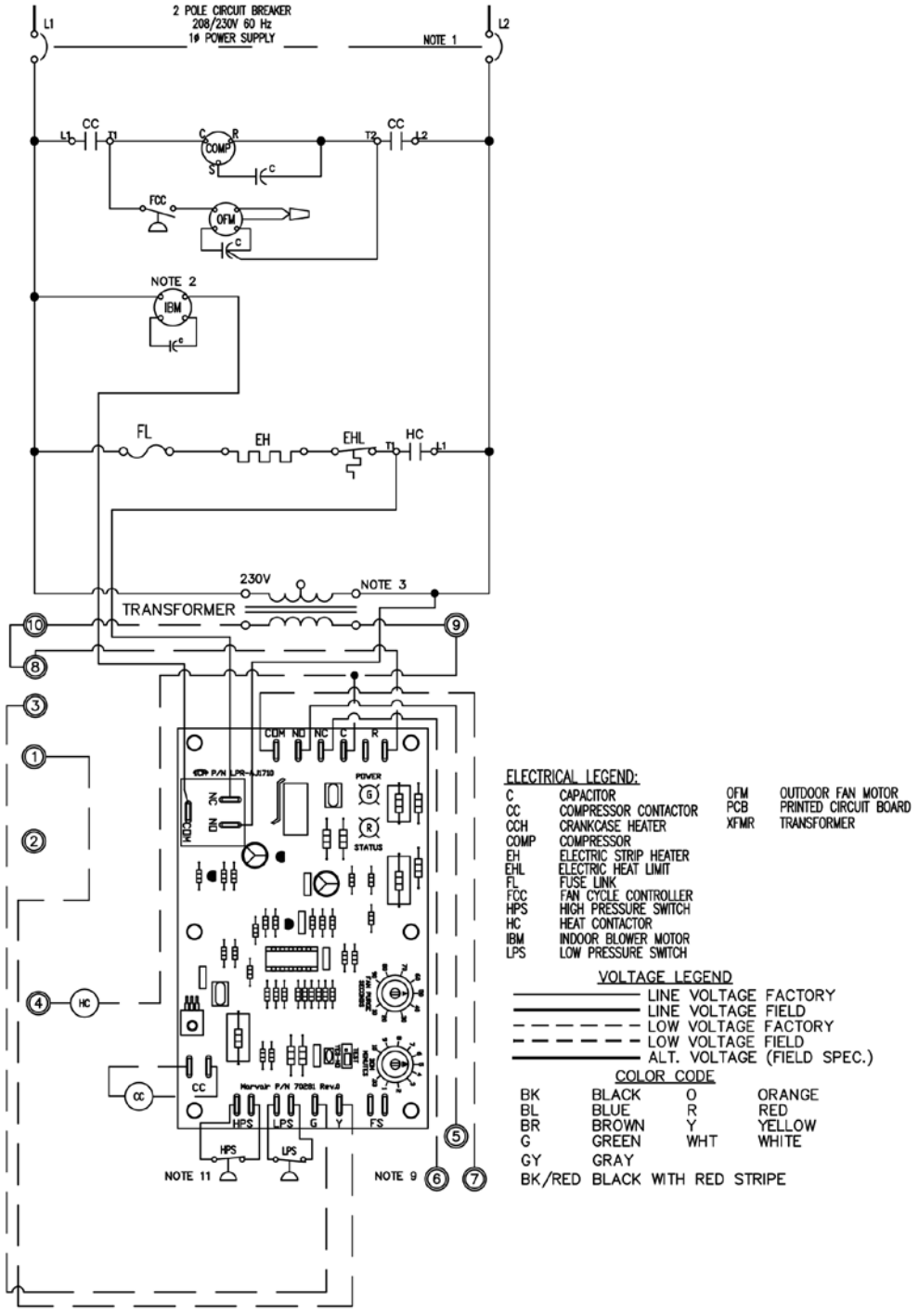


Figure 2a. Typical Electrical Schematic - ECUA12

SCHEMATIC DIAGRAM



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. PTCR IS NOT REQUIRED ON ALL COMPRESSORS.
7. COMPRESSOR TIME DELAY AND FAN PURGE DELAY ARE LOCATED ON THE PCB (PRINTED CIRCUIT BOARD) AND ARE ADJUSTABLE.
8. 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.
9. 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 2b. Typical Electrical Schematic - ECUA18

1.7 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 245 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 liquid line. It is electrically connected to a lockout circuit on the board which shuts down the system if the refrigerant pressure rises to 625 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.

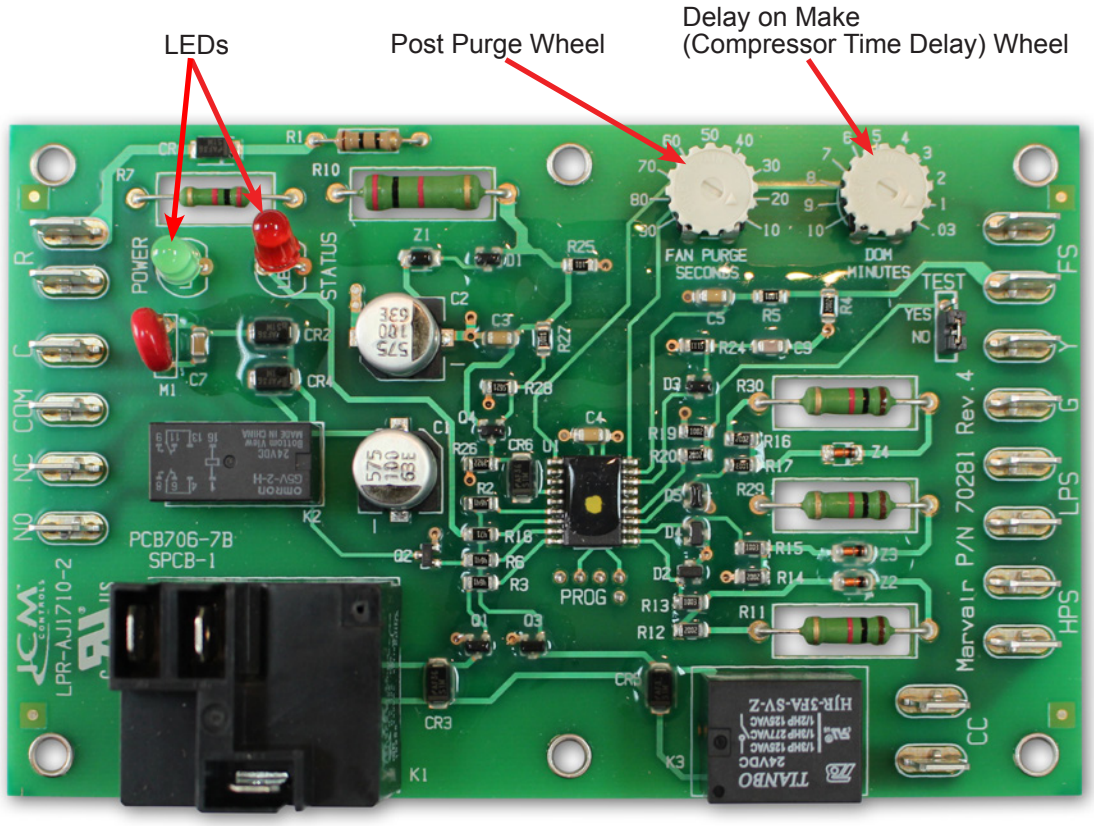


Figure 3. Control Board Detail

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. 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. **Evaporator Condensate Drainage**. Condensate produced during operation must be discharged from the evaporator pan through the primary and/or secondary drain hoses. Make sure the condensate lines are free of any restrictions.

   Condenser Pan Drainage. Water from rain will accumulate in the condenser drain pan and should discharge from the condenser pan through the drain line. Make sure the drain hole and line are not restricted due to trash or crimping.

2. **Placement.**

   A. Place the unit in a shaded area, if possible.
   B. Install it above ground for protection against flooding.
   C. Make sure the airflow from the condenser section and vent hood are not impeded by shrubbery or other obstructions.
   D. Make sure the unit is installed level.

3. **Clearances:**
   The units are designed to operate when either the left or right side (not both) on the condenser section are blocked. The open side and the top should have a minimum clearance of 24". The rear of the unit should be 60" from any obstruction to air flow.

4. **Codes:**
   Make sure your installation conforms to all applicable electrical, plumbing, building, and municipal codes.

5. **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 Electrical Ratings (section 1.4) for ampacity requirements.

Electrical Rating Designations*	AC
Nominal Voltage	208/230
Phase	1
Minimum Voltage	197
Maximum Voltage	253

Table 7. Voltage Limitations

2.3 Installation Materials

Installation Kits

The SlimPac™ ECUA is shipped with a **bottom mounting bracket kit.** If you have not yet unpacked the unit, follow the instructions in section 2.1.

Bottom Mounting is One 0.080 Aluminum L-Shaped Bracket:

One 0.080 Aluminum Bottom Bracket (ships mounted on unit)

Other Optional Equipment:

The package may include other factory-supplied items (optional) as follows:

PART #	DESCRIPTION
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.
50218	Digital, non-programmable thermostat. 1 stage cool and 1 stage heat. Auto-changeover.
50252	Non-programmable digital thermostat with backlit display. 2 stage heat and 2 stage cool. Auto changeover.
50107	Digital thermostat. 2 stage heat, 2 stage cool. 7 day programmable. Fan switch: Auto & On. Auto-change over. Status LED's. Backlit display. Programmable fan. Non-volatile program memory.
50092	Thermostat guard for use with the 50123 and 50107 thermostats.
50186	One stage cool, one stage heat. Auto-changeover.
S/04581	CommStat 3™ Lead/Lag Controller.
70705	CommStat 6 2/4™ HVAC Controller
S/12087-04	CommStat 6 4/8™ HVAC Controller
S/12087-06	CommStat 6 6/12™ HVAC Controller
50131	Internal Thermostat w/ Temperature Range of 60°F to 140°F, Differential of 5°F.
80685	Adjustable Aluminum Supply Grille, 5" x 13-1/4"
80680	Aluminum Return Filter Grille, 12" x 14"
40388	ECUA18 Condenser Discharge
40389	ECUA18 Conden Intake Grille

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 concrete, fiberglass or steel frame structure. Concrete and fiberglass structures have different requirements.

- **Silicone Sealer** to seal around cracks and openings. Seal all top mounting holes not used and provide a seal at the top of the unit where it meets the building to eliminate water intrusion. Provide a complete perimeter seal between the unit and cabinet. The insulation that is factory installed around the supply and return air openings is an air seal only. It is not a water or weather seal.
- **Use 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 and in the *Electrical Ratings* table in section 1.4.
- **Over-Current Protection Device** sized in accordance with the MFS (maximum fuse size) listed on the unit data plate and in the *Electrical Ratings* table in section 1.4.

⚠ 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.

Minimum Airflow Requirements

The duct system must be engineered to assure sufficient air flow through the SlimPac™ ECUA, even under adverse conditions such as dirty filters, etc. See table below and Table 4, CFM at External Static Pressure (Wet Coil) in section 1.4.

Model	Maximum Total Static	Minimum Filter Area
ECUA12	0.25	2.58 Sq. Ft
ECUA18	0.25	2.58 Sq. Ft

Table 8. Maximum Static Pressure

2.5 Air Flow Requirements and Ducting

Ducting

Extension length 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 editions of the National Fire

Protection Association Standards 90A and 90B before designing and installing duct work. The duct system must be engineered to ensure 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. 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 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 (UL-181) to a minimum of 197°F.

2.6 Bottom Bracket Installation

Wall Openings

Measure the dimensions of the supply and return ports on the SlimPac™ ECUA.

Cut openings in the enclosure wall for the supply and return ducts. Make the supply openings one inch larger than the duct flanges on the unit. The one inch clearance must be maintained on all sides of the supply duct to combustible material for the first three feet of the duct.

1. Remove and discard the shipping crate attached to the unit.
2. The SlimPac™ ECUA is shipped with the bottom brackets easily removed.
3. Refer to Figure 3. Attach the bottom support bracket to the wall using appropriate hardware.

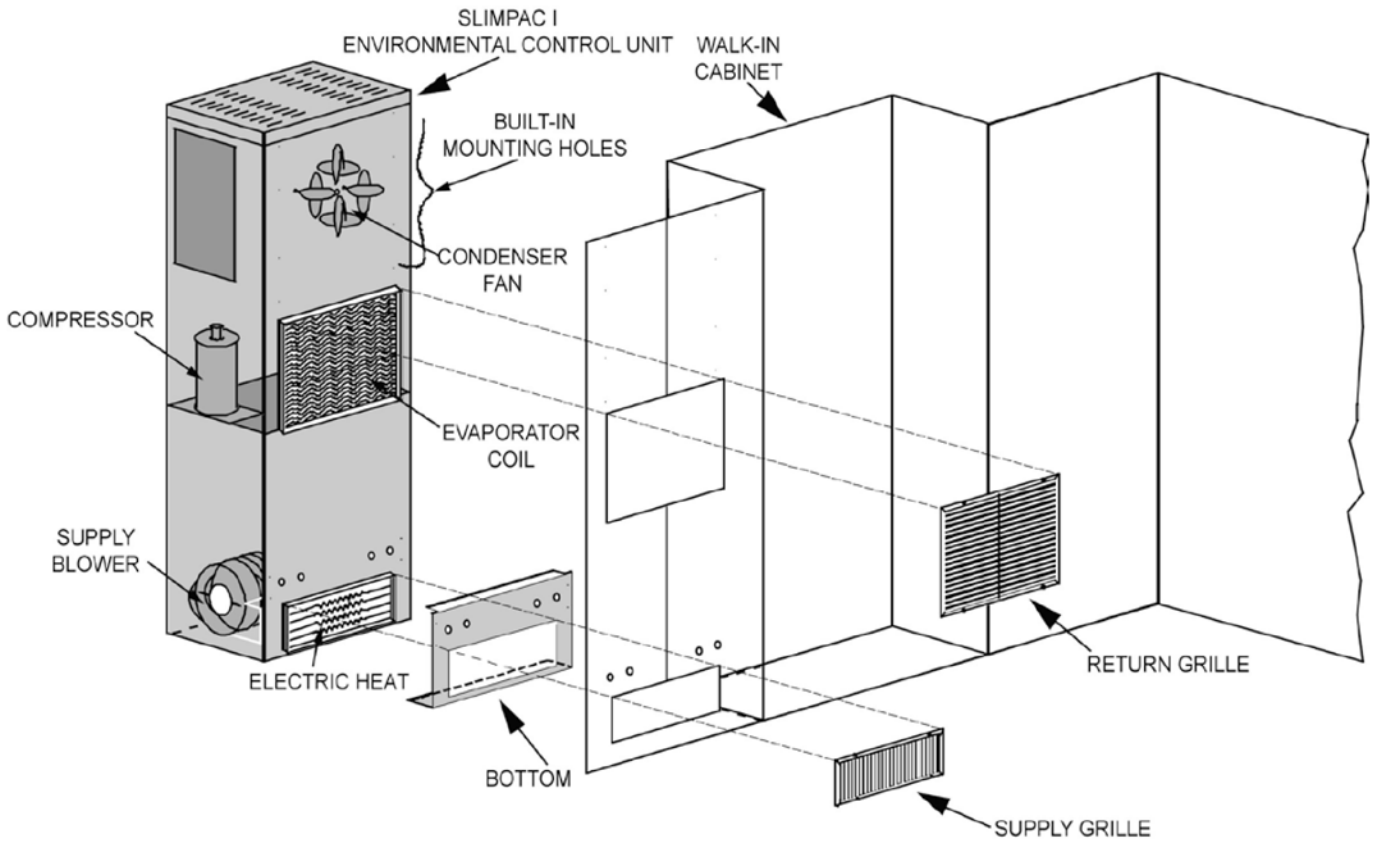


Figure 4. Wall Mounting Detail

2.7 Condenser Blower Orientation (SlimPac™ 18 Only)

The condenser blower in the SlimPac™ 18 can be rotated 180° to allow one side of the unit to be flush against a splice chamber or similar structure. The blower must be rotated **PRIOR** to mounting the unit on the building.

To rotate the blower:

- Remove the six screws that hold the top panel in place and remove the top panel.
- Remove the square blank off plate opposite the blower discharge.
- Remove the three screws that hold the blower in place.
- Facing the supply and return openings, rotate the blower counterclockwise and secure in place with the three screws.
- Install square blank off plate opposite the blower discharge.

2.8 Mounting the Unit

1. Using an appropriate and safe lifting device, set the SlimPac™ ECUA 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.
2. Make sure that the duct flanges are properly aligned with the wall opening. Adjust as necessary.
3. Apply silicone sealer to the perimeter of the unit, around the supply and return flanges, and over the unused mounting holes.
4. Bolt the top and bottom of the unit to the shelter wall.
5. Apply a silicone bead to the top and perimeter where the unit meets the cabinet.
6. Pull the power and control wires through the conduit into the cabinet.

2.9 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 SlimPac units are provided with labeled power leads and an eight-conductor thermostat cable.

High Voltage Wiring

The high voltage wire provided with the SlimPac™ ECUA can be replaced to eliminate wire nut connections. L1, L2 and ground wires can be replaced at the circuit breaker.

The power supply(s) should have the proper voltage, phase, and ampacity for the selected models.

Low Voltage (Control) Wiring

1. Mount the sub-base on a level plane. Use a line and surface level. Connect the thermostat wire as shown in Figure 4.

2. Attach the thermostat assembly to the sub-base. Check stage one anticipator settings - should read .40.

   Note: Black and blue wires on the ECUA12 and black, blue and orange wires on the ECUA18 terminal block are dry contacts which can be used for remote signaling in the event of equipment shut-off on low or high pressure limits.

3. Unit shut down is available from a field provided alarm device; i.e., smoke alarm, fire stat. Install a normally closed device between red wire and the "R" terminal on the thermostat. This will disable the 24V control voltage. See Figure 4.

NOTE: THE INTERNAL TRANSFORMER IS NOT DESIGNED TO POWER OTHER EXTERNAL DEVICES.

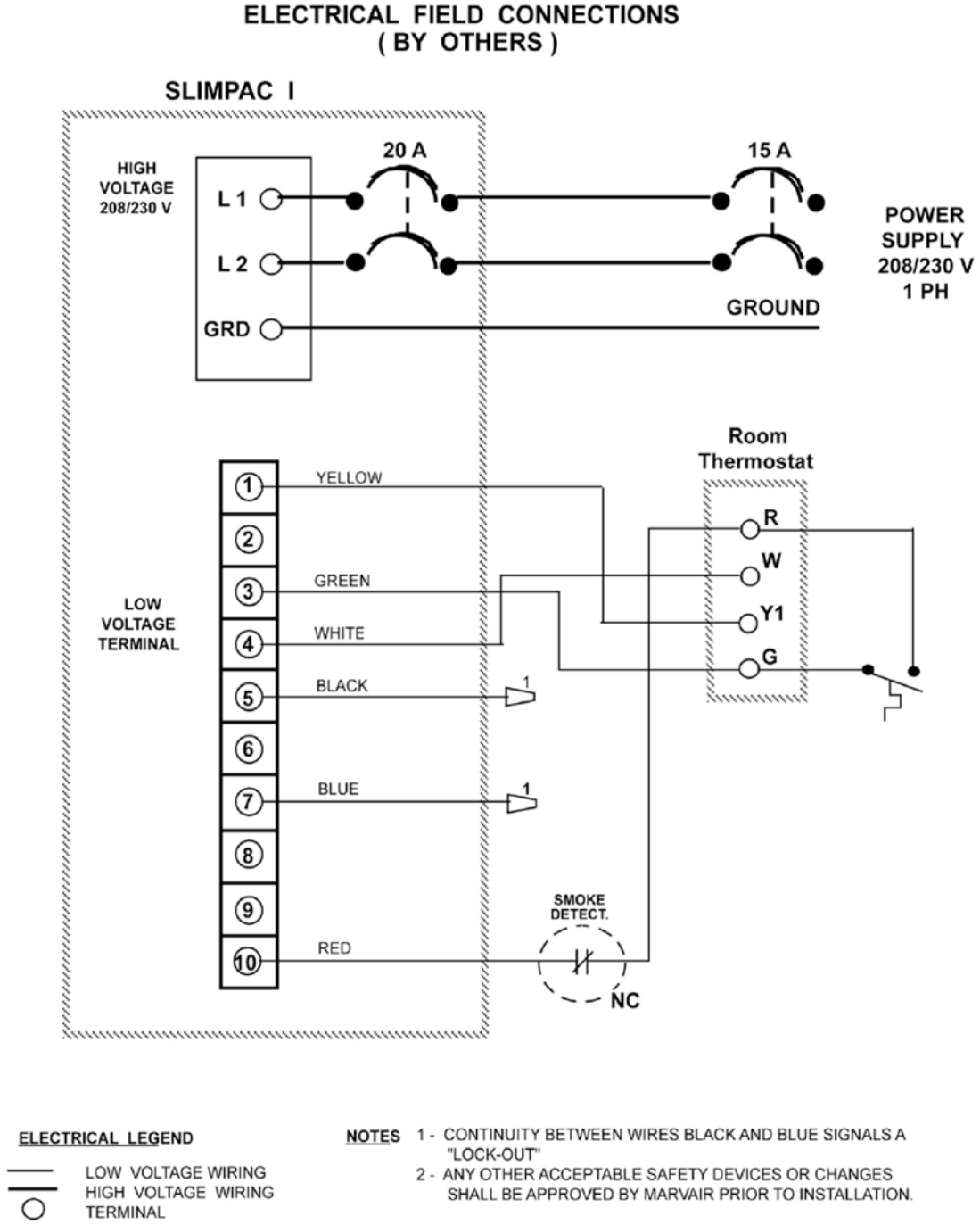


Figure 5. Thermostat Wiring Diagram

Chapter 3 Start-Up

3.1 Check-Out of Cooling Cycle

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 control box to three minutes.
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.

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

Follow the same procedure for additional units.

3.2 Check-Out of Heating Cycle

Procedure: (Applies only to units with resistance elements)

1. To stop the cooling, slowly raise the cooling temperature set point to a temperature *higher* than the ambient.
2. Raise the heating temperature set point to a setting which is higher than the ambient temperature. The blower and electric heat should immediately cycle on.
3. Move the system switch to the "OFF" position. All functions should stop.

3.3 Check-Out of High Temp. Alarm and/or Gas Detection Device

Procedure:

1. Set the system to operate in the cooling mode as described in section 3.1 above. Trigger the normally closed external device (high temperature alarm or gas detection device) to open and the ECUA should shut off.
2. Set the system to operate in the heating mode as described in section 3.2 above. Trigger the normally closed external device to open and the ECUA should shut off.

Chapter 4 Troubleshooting

4.1 Overview

⚠ WARNING

Failure to follow these instructions could result in death, severe personnel injury and/or property damage.

A comprehensive understanding of the operation of the SlimPac™ ECUA is a prerequisite to trouble-shooting. Please read the Chapter 1 for basic information about the unit.

ICE SlimPac ECUs are thoroughly tested before they are shipped from the factory. Or 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 SlimPac ECUA, please review the installation steps in Chapter 2. It may be helpful to get another person to review and check them with you.

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 SlimPac™ ECUA. Use only safe and proven service techniques. Use refrigeration goggles when servicing the refrigeration circuit.

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.	1. Check power supply for adequate phase and voltage. Check wiring to unit and external breakers or fuses.
	2. Tripped internal disconnect.	2. Check internal circuit protection devices for continuity.
	3. Shut off by external thermostat or thermostat is defective.	3. Check operation of wall-mounted thermostat.
	4. Unit off on high or low pressure limit.	4. Reset pressure switch.
	5. Internal component or connection failure.	5. Check for loose wiring. Check components for failure.

PROBLEM/SYMPTOM	LIKELY CAUSE(S)	CORRECTION
B. Unit runs for long periods or continuously; cooling is insufficient.	1. Dirty filter or reduced airflow	1. Check air filter(s). Check blower operation. Remove airflow restriction.
	2. Low refrigerant.	2. Check for proper charge and possible refrigerant leak.
	3. Component failure.	3. Check internal components, especially compressor for proper operation.
	4. Unit undersized for job.	4. Add additional units for greater capacity.
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 60 PSIG (low pressure) and 650 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.

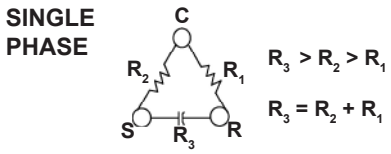
The following electrical tests will aid diagnosis:

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.

Chapter 5 Maintenance

5.1 Scheduled Maintenance

Industrial Climate Engineering 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. Never operate the unit without the filter in place.

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. Use a fin comb of the correct spacing to straighten mashed or bent fins.

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 SlimPac™ 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 Airxcel Commercial/Industrial Group Limited Product Warranty

Airxcel Commercial/Industrial Group (ACIG) warrants its products to be free from defects in materials and workmanship under normal use to the original purchaser when installed within the contiguous United States, the District of Columbia, and Canada for the period of time in the table below. For units installed in Alaska and Hawaii, flat rate labor applies. If any part of your ACIG product fails within 15 months from the date of the original shipment from ACIG, or within twelve months from the date of original start-up but not to exceed 18 months from date of original shipment, whichever comes first, ACIG 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	**Suburban Applied Products**
90 Days* w/Flat Rate Labor *(See Marvair, ICE, Eubank Flat Rate Labor Guidelines)*	1 Year Parts/Labor – w/Flat Rate Labor *(See Suburban AP Flat Rate Labor Guidelines)*
1 Year Parts	5 Years Heat Exchanger
5 Years Compressor	5 Years Compressor

*If any part of your ACIG unit fails within 90 days of the commencement of the warranty, ACIG 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 ACIG Flat Rate Labor Guidelines.

The following optional warranties are available from Airxcel Commercial/Industrial Group:

Bronze	**Silver**	**Gold**	**Diamond**
Any Special Warranty Written for a Job	1 Year Parts/Labor	2 Years Parts/Labor	5 Years Parts/Labor

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 ACIG unit or controller.

ACIG will not be responsible for labor, transportation costs, delays or failures to complete repairs caused by events beyond our control.

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 the any part of the sealed systems unless authorized in advance in writing by ACIG.

When service is required, it must be performed during normal working hours (8:00 AM - 5:00 PM) Monday - Friday and must be performed by ACIG personnel or a designated Service Representative. ACIG will pay for non-priority shipping costs of the compressor during the first twelve months of the warranty period. After the first twelve months of the warranty period, all costs of shipment and risk of loss during the shipment of the compressor shall be the responsibility of the owner.

The owner of the product may ship the allegedly defective or malfunctioning product or part to ACIG, at such owner's expense, and ACIG will diagnose the defect and, if the defect is covered under this warranty, ACIG will honor its warranty and furnish the required replacement part. All costs for shipment and risk of loss during shipment of the product to ACIG and back to the owner shall be the responsibility and liability of the owner. Upon written request by an owner, ACIG 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 ACIG and its authorized agents and employees.

THIS WARRANTY CONSTITUTES THE EXCLUSIVE REMEDY OF ANY PURCHASER OF AN AIRXCEL COMMERCIAL/INDUSTRIAL GROUP 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 AIRXCEL COMMERCIAL/INDUSTRIAL GROUP 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.

06/2018 Rev.7

Chapter 7 Exploded View Parts List

EXPLODED VIEWS AND PARTS LISTS

Current parts lists and exploded views of the unit can be found on our web site at www.acice.com. Click on the Service and Parts in the menu on the left hand side of the Home page. From the drop down menu, select Exploded Views. Once here, you can select your air conditioner or heat pump. The units are grouped by model and by the refrigerant – R-22 or R-410A.

NOTES