Industrial Climate Engineering™
An ACS Brand

ICExp Installation & Operation Manual

Vertical Air Conditioners

Increased Safety for Hazardous Locations

Models EXNA12-72

ICExp
Increased Safety for Hazardous Locations™

EXNA60

Designed, Engineered & Assembled In the USA

All EXNA models are ETL listed.
EONA models are pending.

Manufactured By:

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How To Use This Manual

This manual is intended to be a guide to Industrial Climate Engineering's line of increased safety vertical air conditioners for use in hazardous locations. 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 is used to point out helpful suggestions that will result in improved installation, reliability or operation.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.
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⚠ 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

Industrial Climate Engineering's (ICE) ICExp units are a series of vertical wall-mounted air conditioning systems for hazardous locations that provide heating, cooling, and ventilation for electronic equipment shelters, process control centers, E-Houses, and other applications in hazardous locations. The series includes multiple sizes and nominal cooling capacities from 12,000 to 240,000 BTUH.

Industrial Climate Engineering ICExp units feature a Siemens S7-1200 PLC for overall control of the system and all non-arcing components in the electrical control system.

Other standard components include:

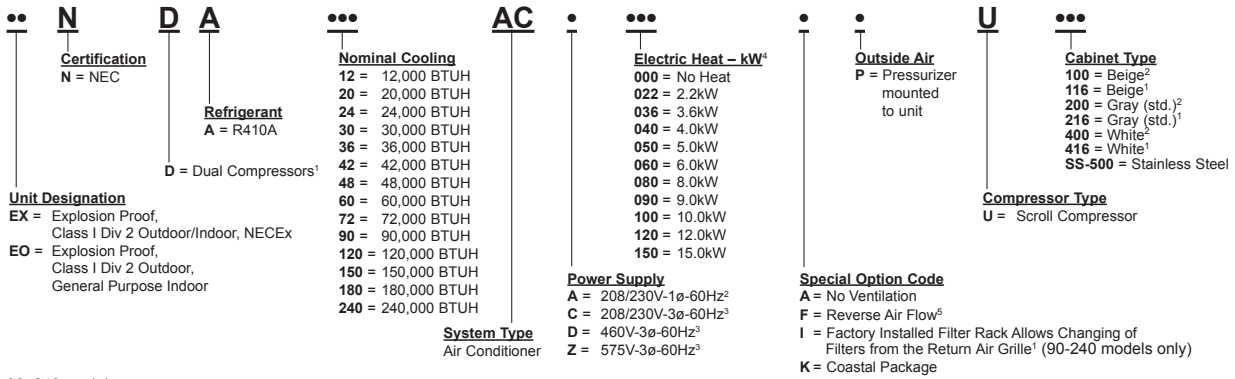
- Hot gas by-pass valve provides for precise temperature control in the cooling mode and protects against coil freeze-up during low load conditions
- Thermal Expansion valve to improve both efficiency and capacity over a wide range of ambient temperatures
- Solid state motor controllers that eliminate contact arcing and provide much improved component life spans
- 24VDC power supply for all low voltage controls

The ICExp air conditioners are designed for easy installation and service. Major components are accessible for service beneath external panels.

All units have fusing and internal disconnects. Depending upon state and local code requirements, this feature may eliminate the need for an external breaker or disconnect.

1.2 Model Identification

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



[1]Applies to 90–240 models

[2]Applies to 12-72 models only

[3]Three wire

[4]Electric heat only available for EONA General Purpose/Ordinary location Indoor Environment. Not all heat options are available for all models. See Electrical Data tables.

[5]The standard configuration is with the supply (conditioned) air at the top of the unit and the return air below it. In the reverse air flow configuration, the return is at the top and the supply air below it. Available only on 90–240 models.

1.3 Serial Number Date Code

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

1.4 Weights and Filter Sizes

Complete electrical and performance specifications and dimensional drawings are in the Product Data Sheet.

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 Number	Cooling BTUH[1]	Rated Air Flow (CFM)[2]	ESP[3] @ Rated Conditions
EXNA/EONA12	10,800	400	0.10
EXNA/EONA20	19,600	755	0.10
EXNA/EONA24	24,000	840	0.10
EXNA/EONA30	29,000	1,000	0.10
EXNA/EONA36	35,000	1,100	0.15
EXNA/EONA42	42,000	1,575	0.15
EXNA/EONA48	46,000	1,725	0.20
EXNA/EONA60	54,500	1,850	0.20
EXNA/EONA72	62,000	1,925	0.20
EXNA/EONA90	94,000	3,500	0.25
EXNA/EONA120	125,000	4,000	0.30
EXNA/EONA150	150,000	5,000	0.35
EXNA/EONA180	170,000	6,000	0.35
EXNA/EONA240	235,000	8,000	0.40

[1]Cooling rated at 95°F (35°C) outdoor and 80°F DB/67° WB (26.5°C DB/19.5°C WB) return air
[2]CFM=Cubic Feet per Minute
[3]ESP=External Static Pressure
Ratings are with no outside air. Performance will be affected by altitude.
Ratings are at 230 volts for 208/230 volt units ("A" & "C" models), 460 volts for "D" models.
Operation of units at a different voltage from that of the rating point will affect performance and air flow.

Table 1. Cooling Performance and Air Flow Ratings

MODEL	Description	INCHES	MILLIMETERS	PART NO.	FILTERS PER UNIT	MERV RATING
EXNA/EONA12	Interior Access Return Air Filter	20" x 10" x 2"	508 x 254 x 52	91974	1	8
EXNA/EONA20	Interior Access Return Air Filter	25" x 16" x 2"	635 x 406 x 51	80137	1	8
EXNA/EONA24	Interior Access Return Air Filter	25" x 16" x 2"	635 x 406 x 51	80137	1	8
EXNA/EONA30	Interior Access Return Air Filter	30" x 16" x 2"	762 x 406 x 52	80138	1	8
EXNA/EONA36	Interior Access Return Air Filter	30" x 16" x 2"	762 x 406 x 52	80138	1	8
EXNA/EONA42	Interior Access Return Air Filter	36½" x 22" x 2"	927 x 559 x 52	80162	1	8
EXNA/EONA48	Interior Access Return Air Filter	36½" x 22" x 2"	927 x 559 x 52	80162	1	8
EXNA/EONA60	Interior Access Return Air Filter	36½" x 22" x 2"	927 x 559 x 52	80162	1	8
EXNA/EONA72	Interior Access Return Air Filter	18" x 24" x 2"	457 x 610 x 52	81257	2	8
EXNA/EONA90/120/150	Interior Access Return Air Filter	15" x 20" x 2"	381 x 508 x 51	92365	3	8
EXNA/EONA90/120/150	Exterior Access Return Air Filter	25" x 16" x 2"	635 x 406 x 51	80137	3	8
EXNA/EONA180/240	Interior Access Return Air Filter	24" x 18" x 2"	610 x 457 x 51	81257	4	8
EXNA/EONA180/240	Exterior Access Return Air Filter	25" x 16" x 2"	635 x 406 x 51	80137	4	8

Table 2. Return Air Filter Sizes

MODEL	Unit Weight		Shipping Weight		Shipping Dimensions					
					Height		Width		Depth	
	LBS	KG	LBS	KG	Inches	MM	Inches	MM	Inches	MM
EXNA/EONA12	184	80	194	84	56	1,422	31	787	13	330
EXNA/EONA20	365	166	375	171	70	1,778	38	965	17	432
EXNA/EONA24	365	166	375	171	70	1,778	38	965	17	432
EXNA/EONA30	435	198	445	203	71	1,803	42	1,607	17	432
EXNA/EONA36	435	198	445	203	71	1,803	42	1,607	17	432
EXNA/EONA42	555	253	565	257	85	2,159	42	1,607	23	585
EXNA/EONA48	555	253	565	257	85	2,159	42	1,607	23	585
EXNA/EONA60	555	253	565	257	85	2,159	42	1,607	23	585
EXNA/EONA72	695	316	705	321	93	2,362	42	1,607	28	711
EXNA/EONA90	1,053	479	1,178	536	98	2,489	56	1,422	42	1,067
EXNA/EONA120	1,160	527	1,285	584	98	2,489	56	1,422	48	1,219
EXNA/EONA150	1,166	530	1,291	587	98	2,489	56	1,422	48	1,219
EXNA/EONA180	2,307	1,046	2,420	1,098	98	2,489	76	1,930	51	1,295
EXNA/EONA240	2,523	1,144	2,636	1,196	98	2,489	76	1,930	51	1,295

Table 3. Shipping Weights & Dimensions

1.5 Hazardous Area Classification and Operating Temperature Limits

All ICExp units are designed to operate in the following environment:

Area Class	Division	Groups	Temp. Code	Minimum Operating Temperature	Maximum Operating Temperatures	
					Indoor Section	Outdoor Section
1	2	A,B,C,D	T3	-4ºF (-20ºC)	+104ºF (+40ºC)	+130ºF (+55ºC)

Table 4. Operating Environment

1.6 General Operation

Refrigerant Cycle (Cooling Mode)

The 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. An indoor air mover 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 with a thermal expansion valve (TXV) into the evaporator to repeat the cycle.

Heating Mode

A wall-mounted thermostat controls the heating cycle of models which incorporate in-duct resistance heating elements. On a call for heat, the thermostat closes the heat relay to energize the indoor fan and the in-duct resistance elements.

1.7 Programmable Logic Controller (PLC)

The ICExp unit uses a factory installed PLC microprocessor to control the operation, the safety switches and any function options. LEDs show operational status and provide assistance with diagnosis if troubleshooting is ever required. Various control functions are field selectable and programmable. The PLC is also capable of communicating to other ICExp PLCs to allow run time leveling and except for a thermostat/controller, does not require additional equipment to be installed. The PLC microprocessor provides improved reliability because of the reduction of components, the components utilized are more

durable and the control box wiring has been simplified. Pertinent statistical data about the life of the refrigeration system can be accessed through the PLC.

The PLC is factory wired and tested and typically no adjustments or changes are required to the PLC when the air conditioner is installed.

Location

The PLC is located in the unit control panel. Remove the HVAC unit front access panel and open the panel door to the control cabinet.

Figure 1. Programmable Logic Controller

PLC Inputs & Outputs

The PLC has inputs located along the top right of the controller and outputs along the bottom right of the controller. An input is a signal to the PLC from either the thermostat, sensors in the air conditioner, or a customer supplied input, e.g., EMS (Energy Management System). An output is a signal from the PLC to the air conditioner, to the thermostat or to the customer.

PLC Inputs

The PLC inputs are powered by 24 VDC. The inputs are:

- **Y** – Compressor
- **Y2** – Dual Compressor
- **HUM** – Humidifier (uses optional electric heat)
- **HPS** – High Refrigerant Pressure Switch. The HPS is ON during normal operation. No light indicates an open switch. See lockout indicator "A" under Outputs. HPS B available for dual compressor systems.
- **LPS** – Low Refrigerant Pressure Switch. The LPS is ON during normal operation. No light indicates an open switch. See lockout indicator "A" under Outputs. LPS B available for dual compressor systems.
- **EMS** – Energy Management System. A shutdown input from an external source. When EMS input is de-energized, the unit compressor and fans will also de-energize.
- **PMF** - Phase monitor fault to monitor phase operation for 3 phase systems, light is on when 3 phase power is powered and connected correctly

PLC Outputs

The PLC outputs are connected to 24VDC and supply 24VDC loads within the control panel. These outputs are:

- **OFM** – Outdoor Fan Motor Starter
- **IBM** – Indoor Blower Motor Starter
- **CC** – Compressor Starter
- **CC2** – Compressor Starter B (Dual Systems)
- **LOI** – Lock Out Indicator. A blinking LED indicates that a pressure switch has opened or a motor fault has occured. Refer to section 1.8 for additional information concerning this indicator.
- **FR** – Fault Relay. An isolated form C relay contact is provided for the customer's use to monitor for fault conditions with the HPS or LPS switches.

On the left side of the PLC unit, there are three LED's that indicate the operational status of the PLC.

1. STOP/RUN

a. Solid yellow indicates STOP mode
b. Solid green indicates RUN mode
c. Flashing (alternating green and yellow) indicates that the CPU is in STARTUP mode

2. ERROR

a. Flashing red indicates an error, such as an internal error in the CPU, an error with the memory card, or a configuration error (mismatched modules)
b. Solid red indicates defective hardware
c. All LEDs flash if the defect is detected in the firmware

3. MAINT – (Maintenance) flashes whenever you insert a memory card. The CPU then changes to STOP mode. After the CPU has changed to STOP mode, perform one of the following functions to initiate the evaluation of the memory card:

a. Change the CPU to RUN mode
b. Perform a memory reset (MRES)
c. Power-cycle the CPU

The PLC has indicator LED's that show the status of all thermostat inputs and outputs. For example, if the "G" LED is on, this means that voltage is present from the "G" terminal on the thermostat.

1.8 Unit Operation

Normal

24 VDC power for an external thermostat can be obtained from "R" (24VDC+) and "C" (24VDC-) on the low voltage terminal strip. Upon a call for cooling "Y" and with the high pressure switch (HPS) closed, the compressor will be energized. 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 and the LOI output will energize.

Lock-out

If either of the fault conditions (LPS or HPS) occurs during the call for cooling, the PLC will enter into and indicate the lockout mode. In the lockout mode, the compressor is turned off. Upon lockout, the indoor blower motor will run for 30 seconds after the compressor is de-energized. When the lockout condition

is cleared, the unit will reset if the demand for the thermostat is removed or when the power is reset. Wired to the PLC is an external fault relay. This provides the user with either normally closed or normally open remote alarm dry contacts. The air conditioners are factory wired to supply either contact closure.

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 due to a low pressure fault.

Post Purge

When in the cooling mode, the blower will remain energized for 30 seconds after the compressor has been de-energized. When in heating mode, the blower will remain energized for 60 seconds after the heater is de-energized.

External LED Indicator Light

An external red LED indicator light is provided to assist in system operation. This LED indicator will blink when a fault has occurred. It will blink 1 or more times at 0.5 second intervals followed by a 3 second interval with no indicator operation. The sequence repeats after the 3 second time interval until the fault is corrected and the system is reset. If the unit is a dual compressor system, or has two compressor and fan cooling systems, the second system faults are depicted as System B. The blink counts are defined below.

Blink Count	Description
1	(HPS-A) High pressure switch has opened during call for cooling
2	(LPS-A) Low pressure switch has opened during call for cooling
3	(HPS-B) High pressure switch has opened during call for cooling (Dual Compressor)
4	(LPS-B) Low pressure switch has opened during call for cooling (Dual Compressor)
5	(PMF) Phase monitor fault has detected a phase fault (used only on 3 phase electrical systems)
6	(IBM-A) Indoor blower motor has faulted (only on EXNA/EONA90 – 240 units)
7	(OFM-A) Outdoor fan motor has faulted (only on EXNA/EONA90 – 240 units)
8	(IBM-B) Indoor blower motor has faulted (only on EXNA/EONA180 – 240 units)
9	(OFM-B) Outdoor fan motor has faulted (only on EXNA/EONA180 – 240 units)

Table 5. LED Indicator Light Functions

High Pressure Switch

The high pressure switch is mounted on the liquid line. It is electrically connected to an input on the PLC 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. To reset switch, turn primary power off, then back on or turn thermostat system switch off, then back on.

Phase Monitor Fault

The 3 phase electrical systems are monitored for proper phase rotation. If a fault occurs, the phase monitor will trip and shut the ac unit off. To reset fault, turn off system power, then back on. If fault persists, investigate phase rotation on unit for proper setup.

Indoor Blower Motor Fault

The indoor blower motor assembly at the top of the unit has faulted. See blower fan Operating Manual for additional information. To reset fault, turn primary power off, then back on or turn thermostat system switch off, then back on.

Outdoor Fan Motor Fault
The outdoor fan motor assembly at the bottom of the unit has faulted. See blower fan Operating Manual for additional information. To reset fault, turn primary power off, then back on or turn thermostat system switch off, then back on.

1.9 Optional Controls & Packages

Protective Coating Packages
Two corrosion protection packages are offered- one for the condenser section (the Coastal Environmental package) and the other for the entire unit (the Coat-All Package).

The condenser protection package includes:

- Corrosion resistant fasteners
- Anti-corrosive coating applied to all exposed internal copper and metal in the condenser section
- An anti-corrosive coating on the condenser coil

The Coat-all package includes all of the above but also includes an anti-corrosive coating on the evaporator coil and on all exterior and interior components and sheet metal.

(Note: the internal sheet metal which is insulated and the internal control box are not coated).

Protective Coil Coatings
Either the condenser or evaporator coil can be coated. For harsh conditions, e.g., power plants, paper mills or sites were the unit will be exposed to salt water, the condenser coil should be coated. Note: Cooling capacity may be reduced by up to 5% on units with coated coils.

Dirty Filter Indicator
A diaphragm type of indicator measures the air pressure on either side of the filter and when the pressure drops below the set point, a red LED is illuminated. The set point is adjustable.

Cabinet Color and Material
The air conditioners are available in two standard cabinet colors -the standard grey with beige as an option. Contact your ICE representative for color chips, custom colors and 316 stainless steel cabinets.

Filter Access From Return Air Grille
Factory or field installed filter bracket allows changing and access to the filters from the return air grille. See model ID, special option code “I”.

Reverse Air Flow Configuration ***(Only Available on the EXNA90-240)***
Location of Supply and Return Air Openings are reversed.

Room Pressurization
Provides the option to pressurize a room attached to the air conditioner using a variable speed/variable flow pressure blower and a digital pressure gauge to control the pressure.

1.10 Increased Safety Protection

The protection method used for hazardous area locations uses all non-arcing electrical components to minimize the chance of igniting any gas vapors if present.

All electrical components are either hermetically sealed or utilize solid state controls instead of magnetic relay type controls.

All electrical connections in the unit are installed in such a fashion as to eliminate loose connections due to unit vibration which could cause an electrical arc and subsequent ignition of gas vapors.

Wiring is routed and protected against moving parts and/or chafing.

Blower and fans are made of aluminum which prevents sparks if moving metal parts were to contact each other in the event of a failure.

1.11 Electrical Operation

The compressor and condenser fan are energized with a solid state contactor controlled by a 24 VDC signal from the PLC.

The condenser (outside fan) motor is energized by a solid state starter controlled by the PLC.

The indoor evaporator fan (indoor blower) motor is energized by a solid state starter controlled by the PLC.

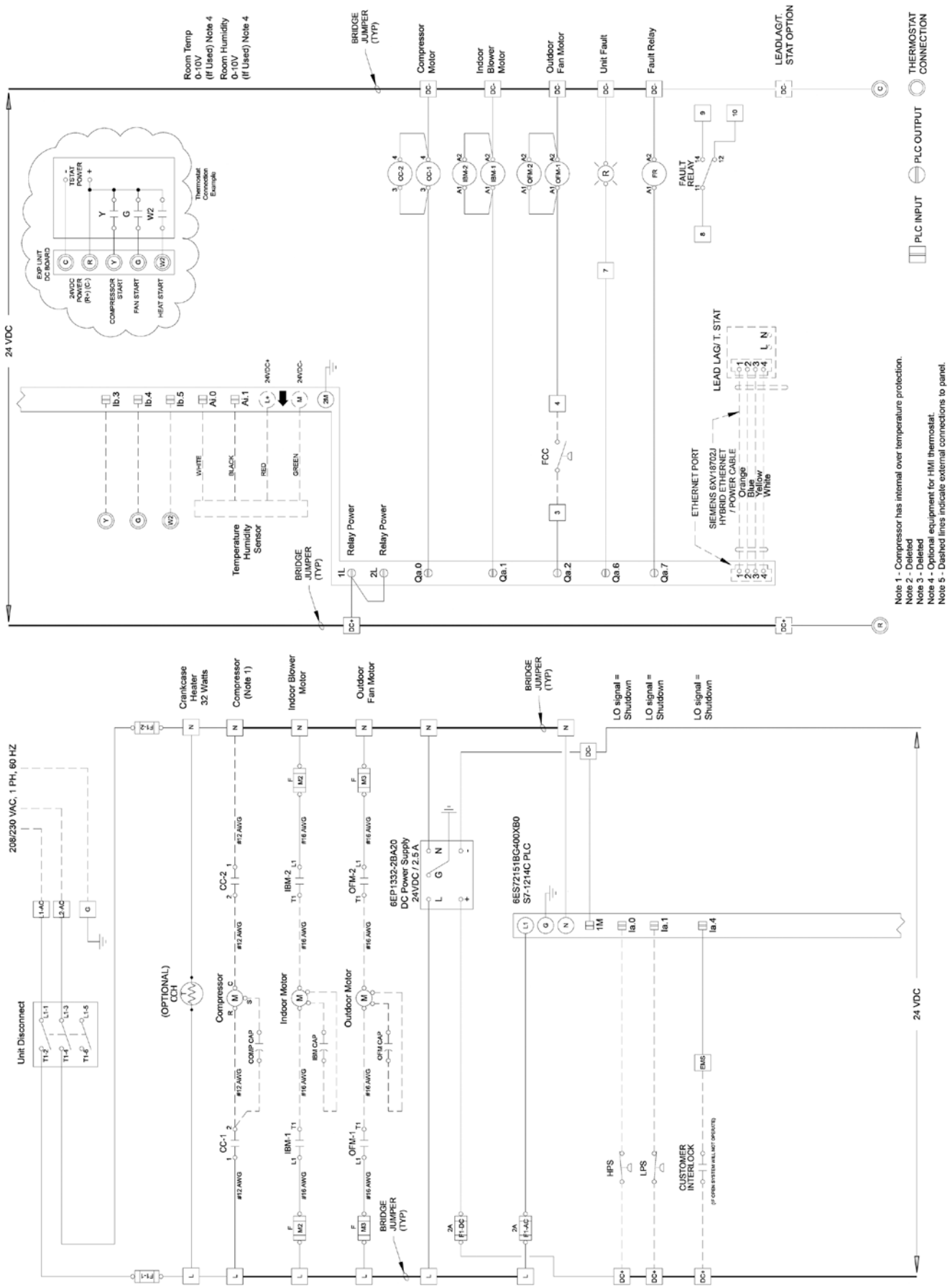


Figure 2a. Typical Electrical Schematic for EXNA/EONA12-72 Unit, 208-230v. 1ø, 60Hz Power Supply

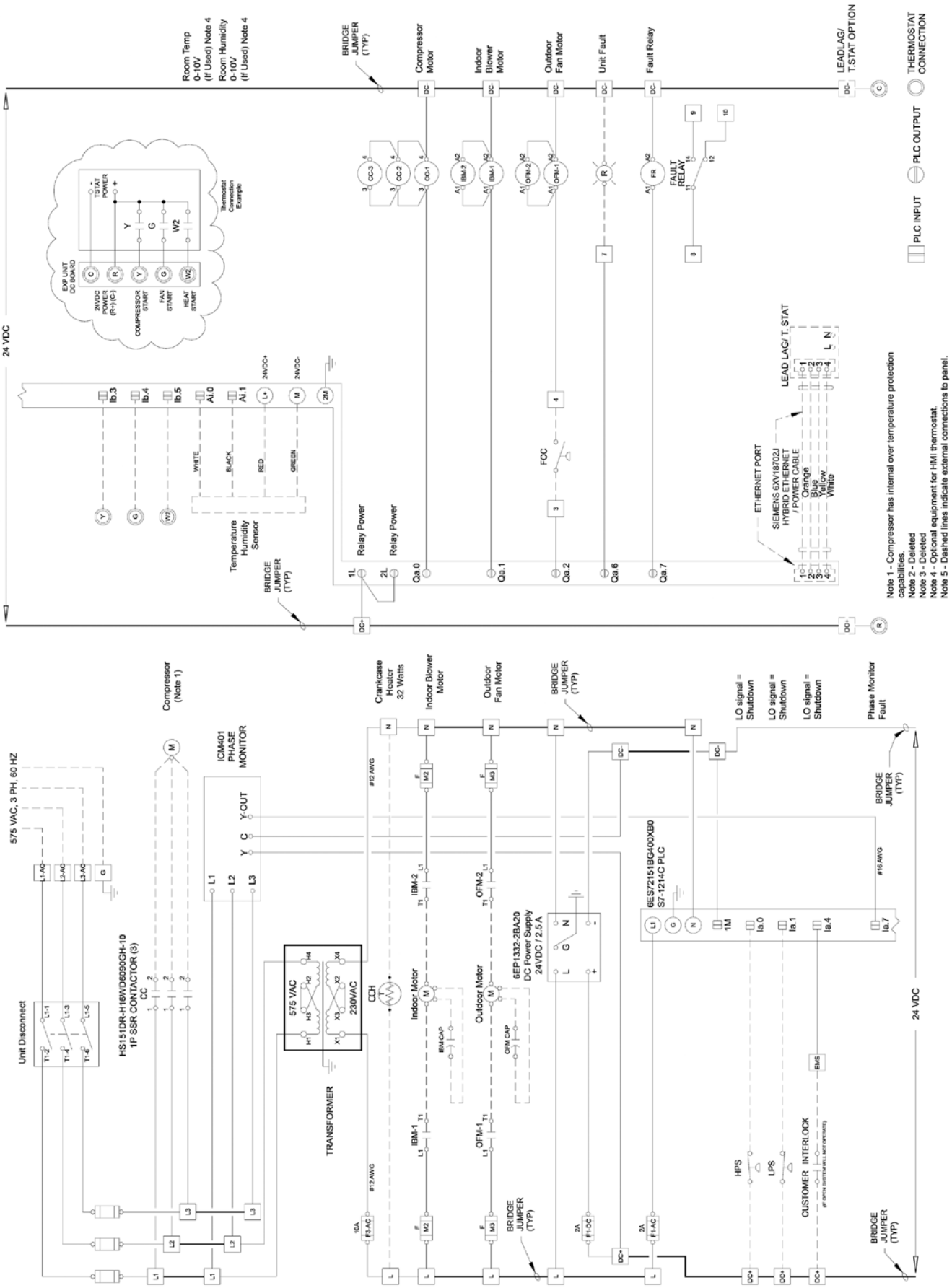


Figure 2b. Typical Electrical Schematic for EXNA/EONA12-72 Unit, 575v. 3ø, 60Hz Power Supply

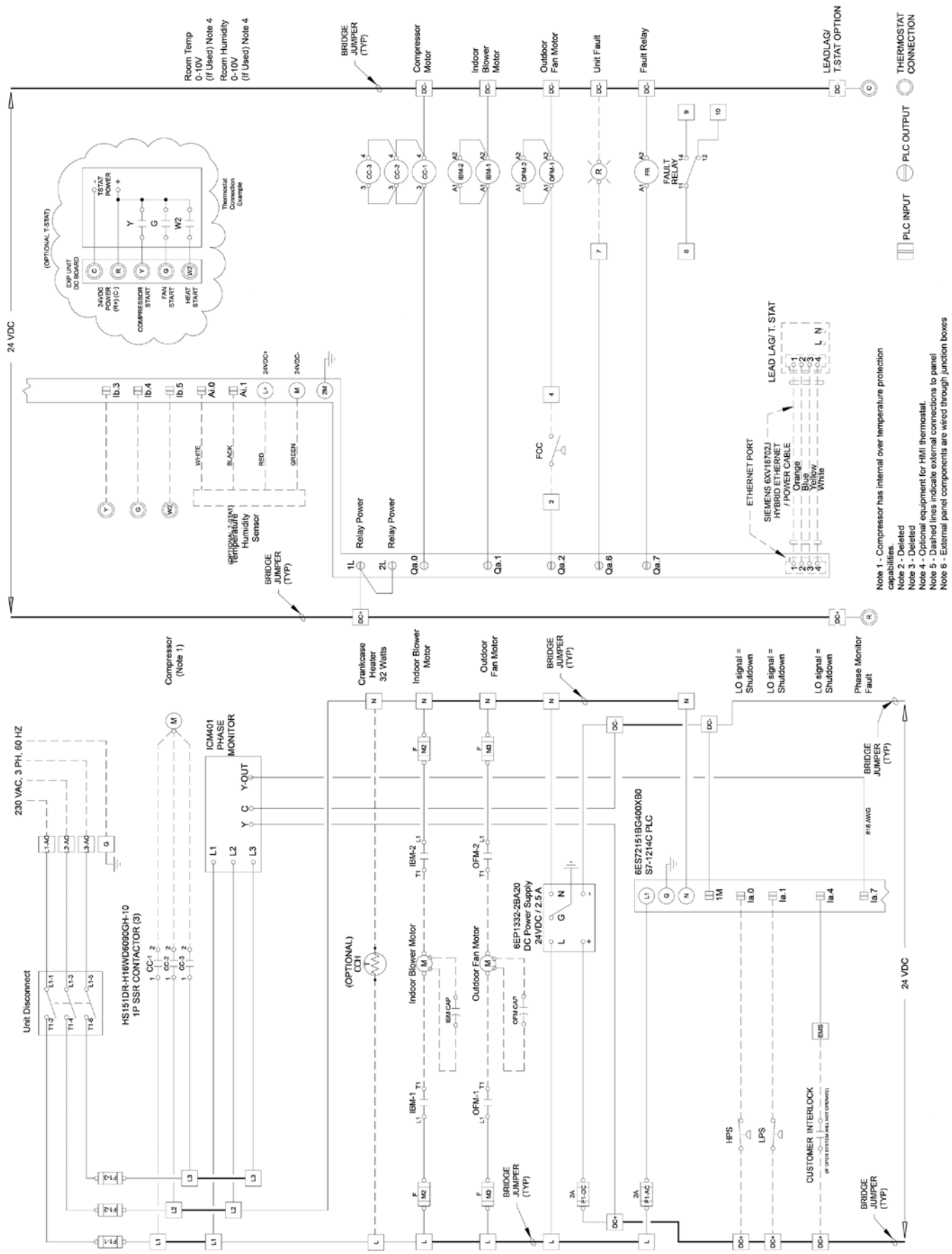


Figure 3a. Typical Electrical Schematic for EXNA/EONA24-72 Unit, 208-230v. 3ø, 60Hz Power Supply

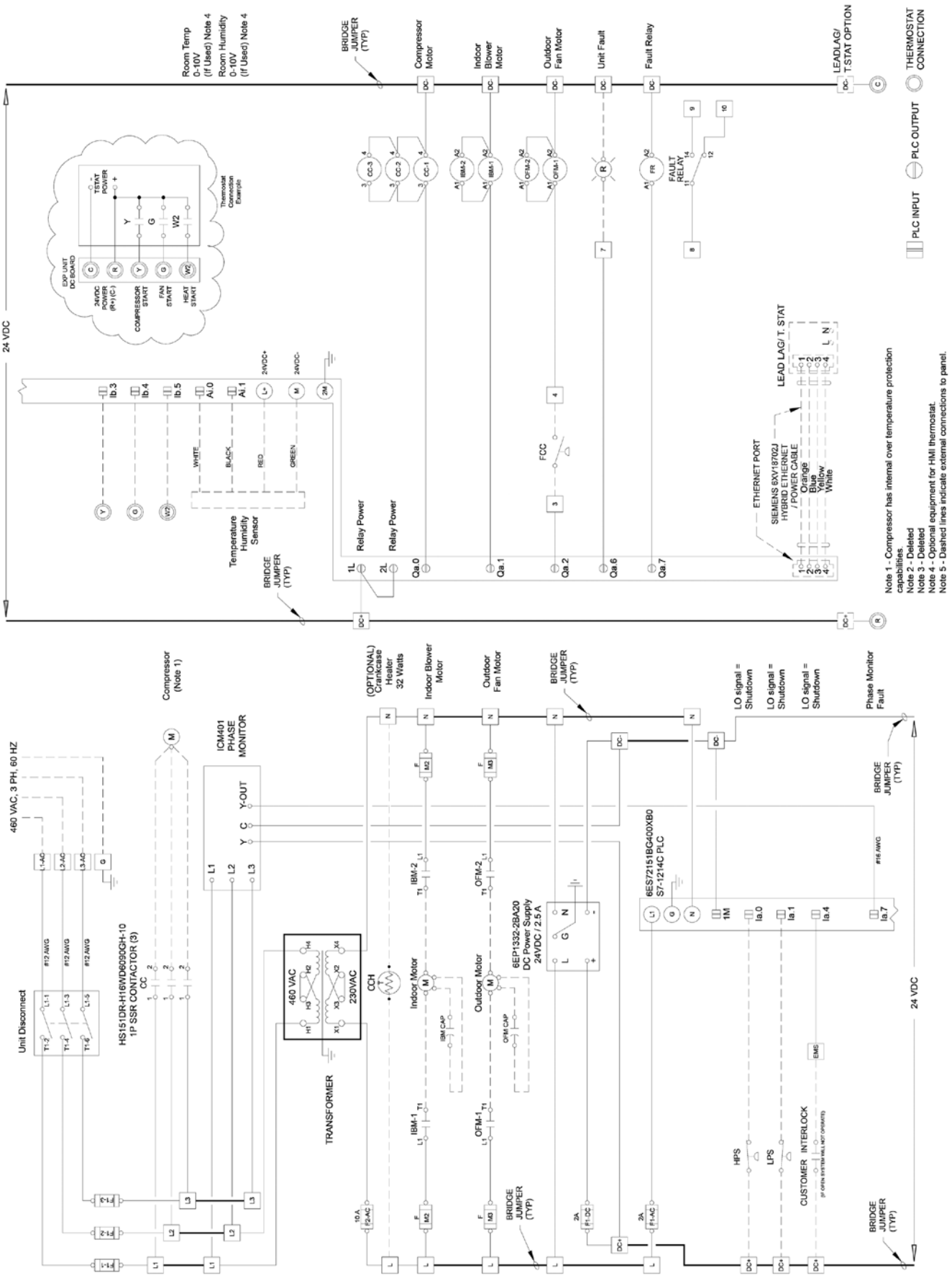


Figure 3b. Typical Electrical Schematic for EXNA/EONA24-72 Unit, 460v. 3ø, 60Hz Power Supply

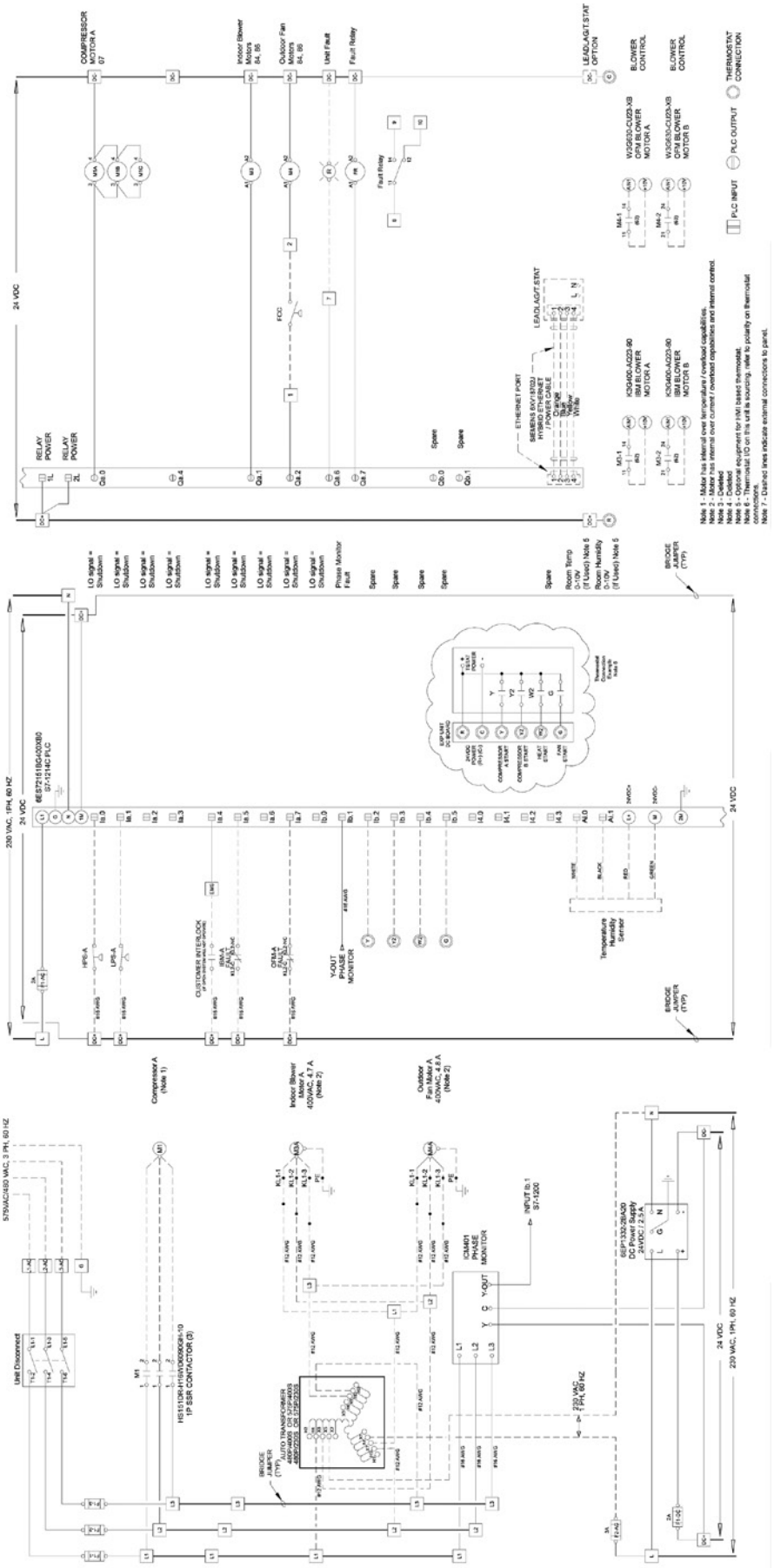


Figure 4. Typical Electrical Schematic for EXNA/EONA90-150 Unit, 460v. 3ø, 60Hz Power Supply

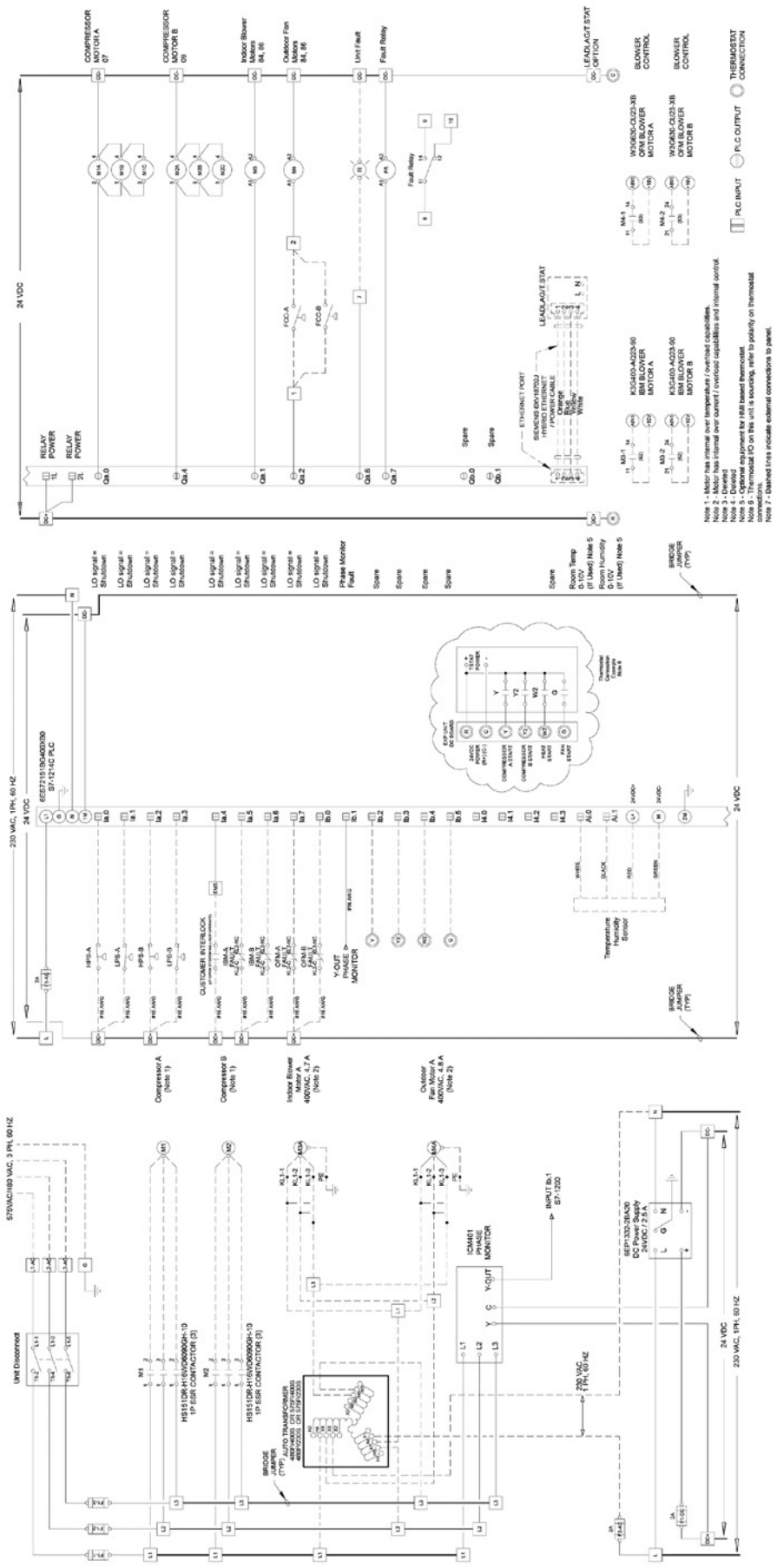


Figure 5. Typical Electrical Schematic for EXNDA/EONDA120-150 Unit, 460v. 3ø, 60Hz Power Supply

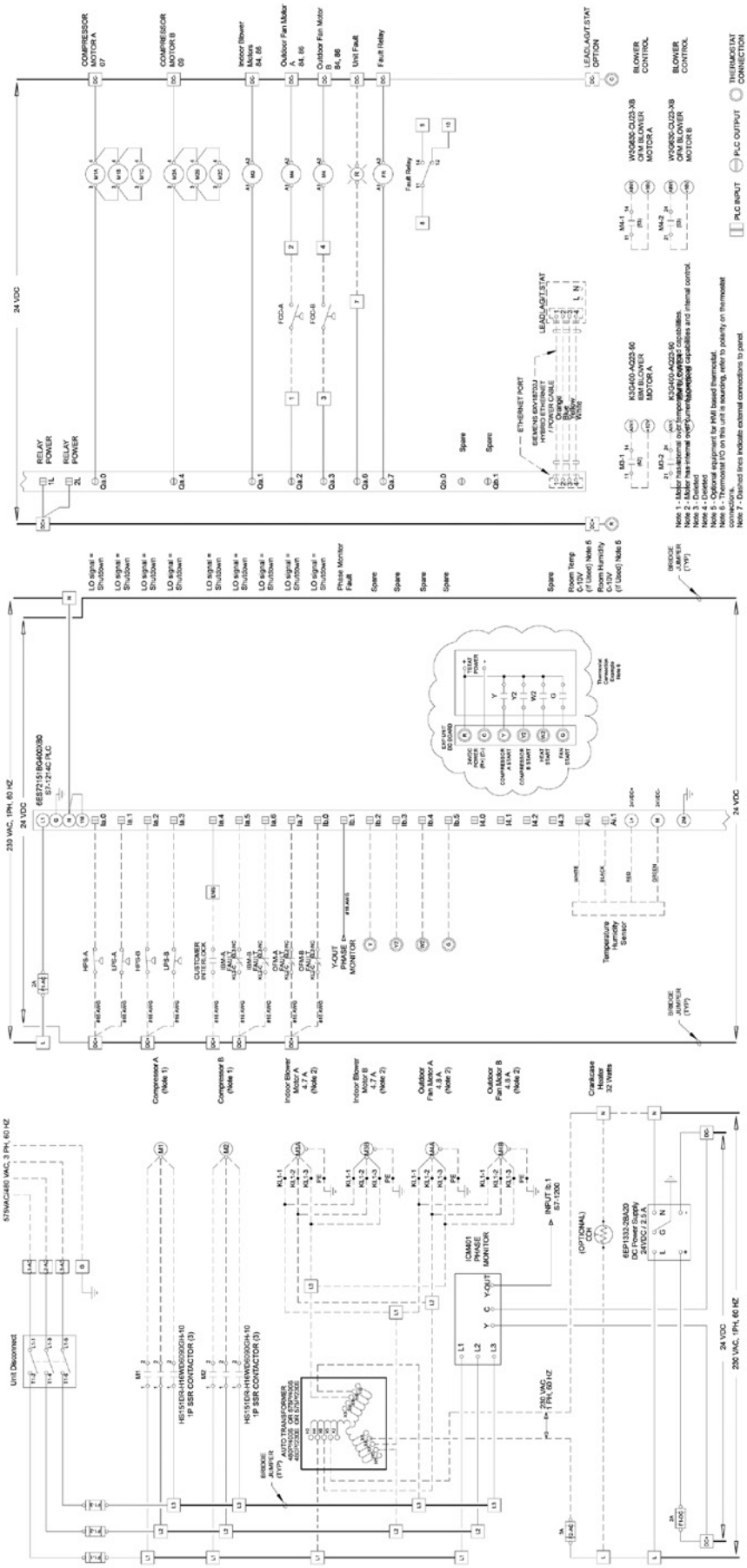


Figure 6. Typical Electrical Schematic for EXNDA/EONDA180-240 Unit, 460v. 3ø, 60Hz Power Supply

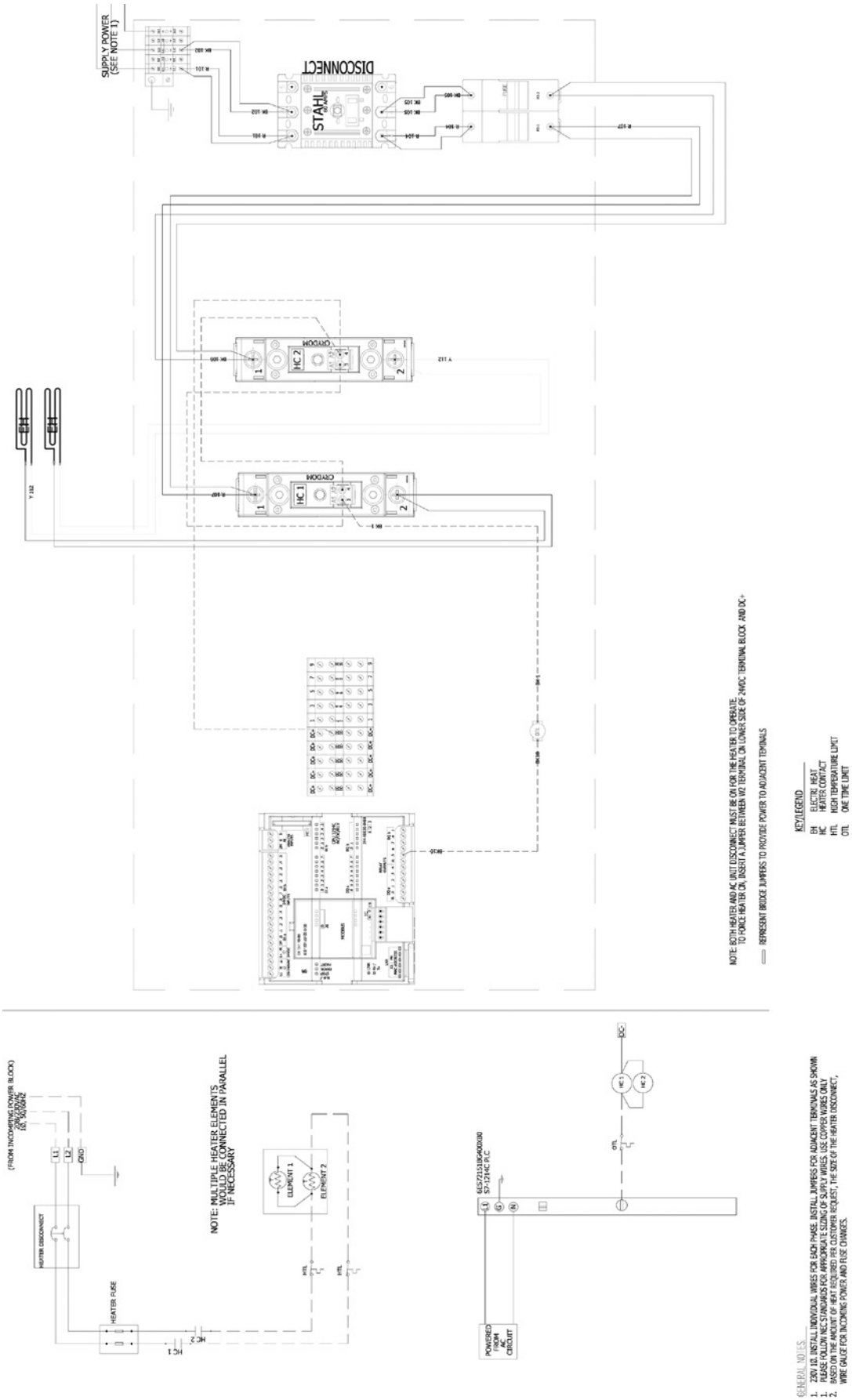


Figure 7a. Typical Electrical Schematic for Electric Heat (Single Phase Units)

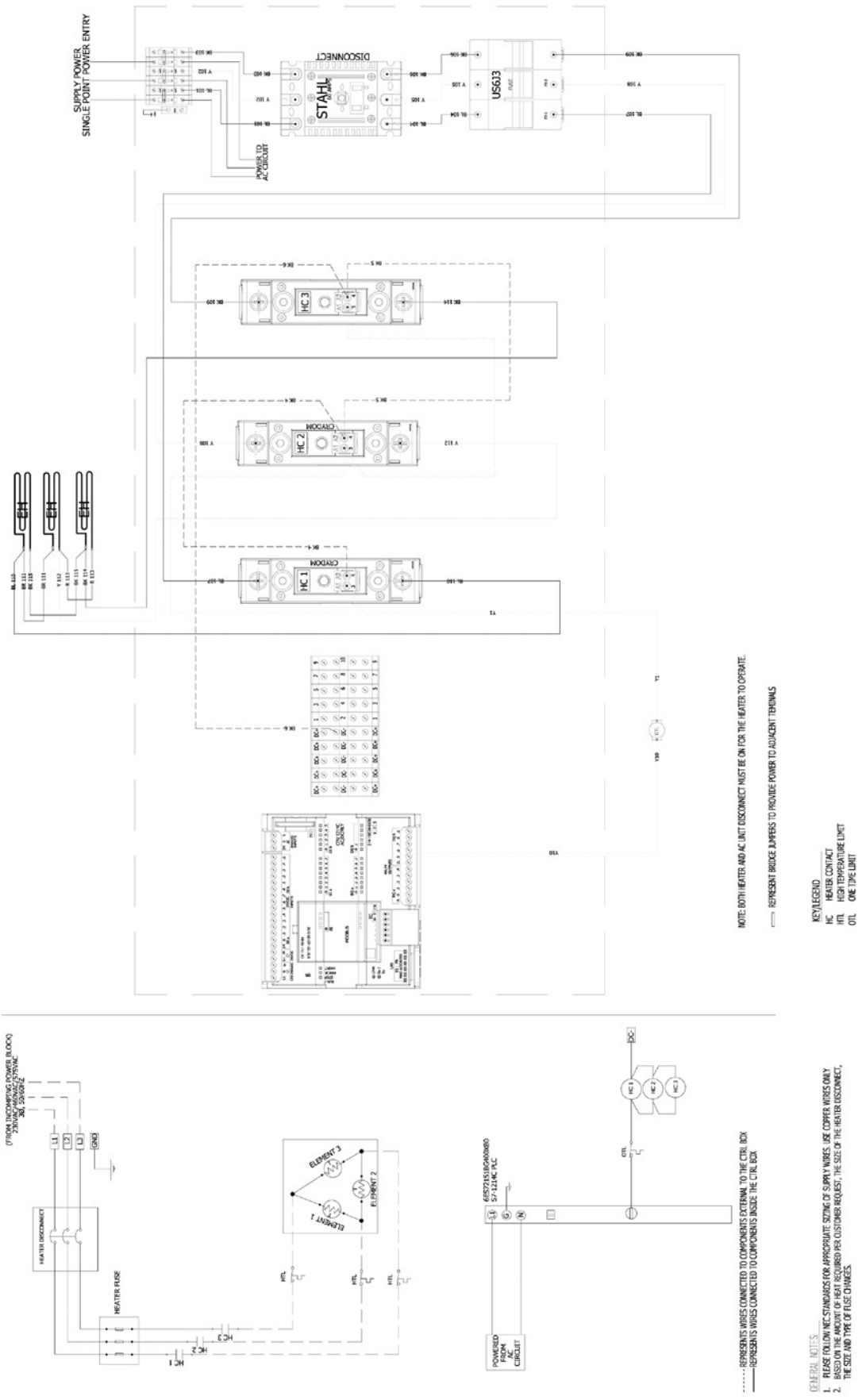


Figure 7b. Typical Electrical Schematic for Electric Heat (Three Phase Units)

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.

⚠ WARNING - EXPLOSION HAZARD

Do not remove or replace fuses when unit is energized. Do not connect or disconnect when unit is energized

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 off.
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 of Unit**
   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 6.

4. **Airflow Requirements:**

Model Number	IWG	Pa
EXNA/EONA12	0.25	62
EXNA/EONA20	0.25	62
EXNA/EONA24	0.25	62
EXNA/EONA30	0.25	62
EXNA/EONA36	0.40	100
EXNA/EONA42	0.40	100
EXNA/EONA48	0.40	125
EXNA/EONA60	0.50	125
EXNA/EONA72	0.50	125
EXNA/EONA90	1.2	300
EXNA/EONA120/150/180	1.8	450
EXNA/EONA240	2.1	525

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. Industrial Climate Engineering strongly recommends referring to the current edition of the National Fire Protection Association Standards 90A and 90B *before* designing and installing duct work. 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	MIN. CLEARANCE (FRONT)
EXNA/EONA12/20/24/30/36/42/48/60/72	24 inches (61 cm)	18 inches (46 cm)	24 inches (61 cm)	48 inches (121 cm)
EXNA/EONA90/120/150/180/240	24 inches (61 cm)	18 inches (46 cm)	24 inches (61 cm)	48 inches (121 cm)

Table 6. 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	Z
Nominal Voltage	208/230	208/230	460	575
Phase	1	3	3	3
Minimum Voltage	197	197	414	518
Maximum Voltage	253	253	506	600

* Letters refer to model number code designations. Refer to page 5.

Table 7. Voltage Limitations

2.3 Installation Materials

The EXNA/EONA90-240 models are shipped with a top bracket and lifting brackets. EXNA/EONA12-72 models do not require or include lifting brackets. The top bracket provides a method of sealing the top of the unit from water intrusion. The bracket is shipped attached to the top of the unit. Before installing the EXP, remove the bracket and reattach as described in Section 2.5

The Lifting brackets are shipped attached to the back panel of the unit. These brackets provide a method for lifting the unit. The installation of the brackets is described in Section 2.6.

Kit Components:

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

Description **P/N**

EXNA/EONA12

Aluminum Supply Grille for the EXNA/EONA12 80682
17" x 5" (432 mm x 127 mm)

Aluminum Return Air Grille for the EXNA/EONA12 92352
17" x 10" (432 mm x 25)

Aluminum Return Air Filter Grille for the EXNA/EONA12 80683
17" x 10" (432 mm x 25)

EXNA/EONA24

Aluminum Supply Grille for the EXNA/EONA24 80674
20" x 8" (508 mm x 203 mm)

Aluminum Return Air Grille for the EXNA/EONA24 80677
20" x 12" (508 mm x 305 mm)

EXNA/EONA36

Aluminum Supply Grille for the EXNA/EONA36 80675
28" x 8" (711 mm x 203 mm)

Aluminum Return Air Grille for the EXNA/EONA36 80678
28" x 14" (711 mm x 356 mm)

EXNA/EONA48/60/72

Aluminum Supply Grille for the EXNA/EONA48/60/72 80676
30" x 10" (762 mm x 254 mm)

Aluminum Return Air Grille for the EXNA/EONA48/60/72 80679
30" x 16" (762 mm x 406 mm)

EXNA/EONA90/120/150

Double Deflection Aluminum Supply Grille for the EXNA/EONA90/120/150 92508
42½ x 15½ (1,080 x 394)

Aluminum Return Air Grille for the EXNA/EONA90/120/150 92507
42½ x 21½ (1,080 x 546)

EXNA/EONA180/240

Double Deflection Aluminum Supply Grille for the EXNA/EONA180/240 92515
54½ x 15½ (1,384 x 394)

Aluminum Return Air Grille for the EXNA/EONA180/240 92525
54½ x 21½ (1,384 x 546)

Aluminum Return Air Grille for the EXNA/EONA240 92544
54½" x 37½" (1,384 x 953)

Additional Items Needed:
Additional hardware and miscellaneous supplies (not furnished by ICE®) are needed for installation.

The list below has the items typically needed for mounting a unit on a wood frame wall structure. Concrete or fiberglass structures have different requirements. ICE cannot recommend a specific method of attaching the air conditioner to the building due to the wide variety of building types, code requirements, wall construction and specific installation conditions. The installation of the air conditioner to the building must take in to account all of these factors and follow best industry practices to provide a safe and secure attachment to the building.

- (14) Mounting bolts for unit mounting flanges. The length needed is typically the wall thickness plus one inch (25 mm).
- (28) Washers
- (14) Hex nuts
- Silicone Sealer to seal around cracks and openings
- Minimum 5 conductor low voltage multicolored wire cable (i.e. thermostat wire), 600V insulation rated
- 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: ICExp™ units with electric heat require 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.

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.

2.5 Top Flange Installation *(EXNA/EONA90-240 only - See Figure 5)*

1. All models have built-in side mounting flanges.
2. Attach the top flange to the top of the air conditioner. The holes in the top of the air condtioner have been predrilled. Remove the 4 screws in these holes and use these screws to attach the top flange to the air conditioner.
3. 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.

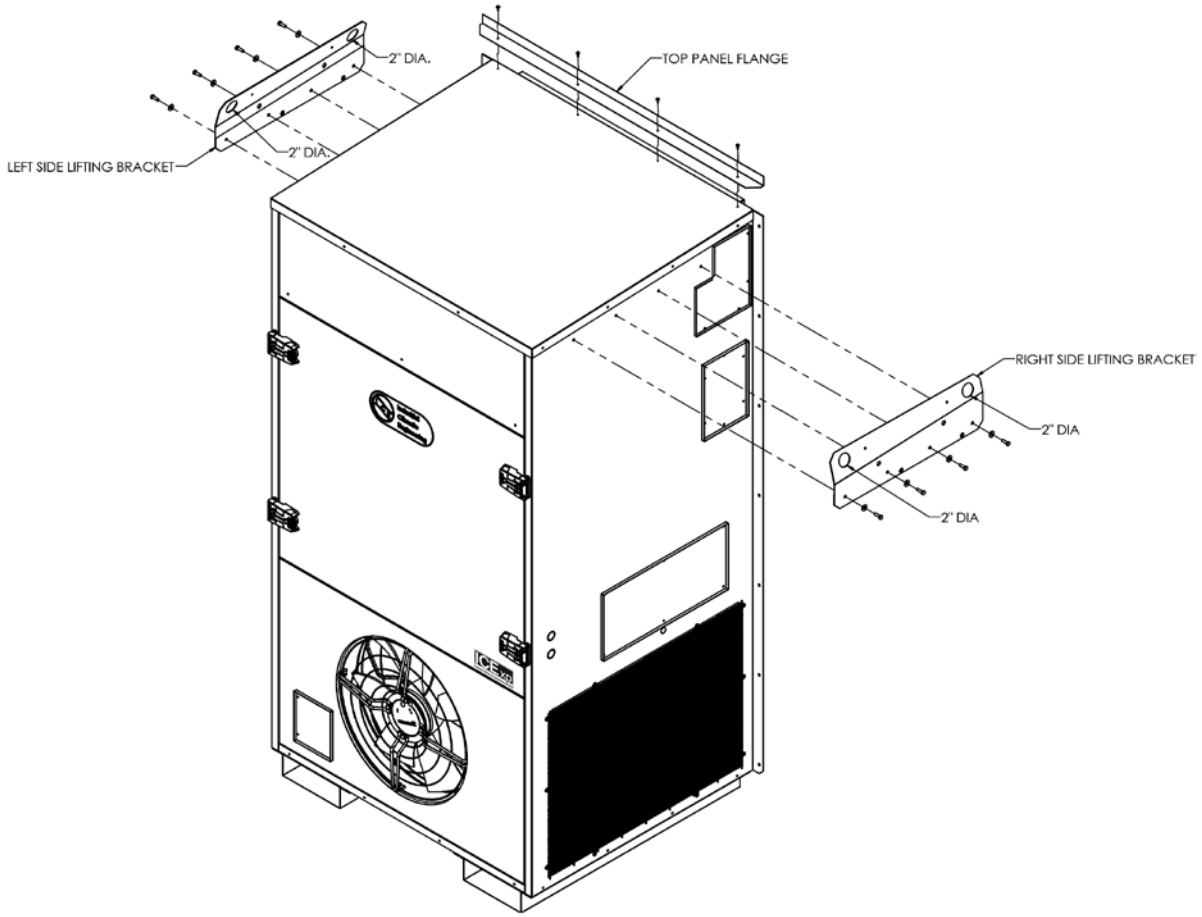


Figure 8. Top Flange and Lifting Bracket Installation (Typical)

2.6 Installing the Lifting Brackets

The EXNA/EONA90/120/150/180/240 units have lifting brackets that can be installed on the top of the side panels. These brackets allow the unit to be picked up thru lifting eyes in the brackets. The lifting brackets are shipped attached to the back panel of the unit. Attach the brackets to the left and right side panels as shown in Figure 5. The 4 screws for attaching the brackets are shipped in the holes at the top of the side panels. When attaching the brackets, make sure the top of the bracket is angled towards the center of the unit.

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. Lift the unit into position using an appropriate and safe lifting device.
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 drill bit. Insert the bolts through the flanges. Install nuts and washers on the inside of the shelter. Tighten the bolts to secure the unit.
5. All models require a bottom support bracket. Attach the bottom support bracket to the wall using appropriate hardware. See Figure 5.
6. Apply a bead of silicone where the side and top flanges contact the exterior wall.
7. 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.
8. 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.

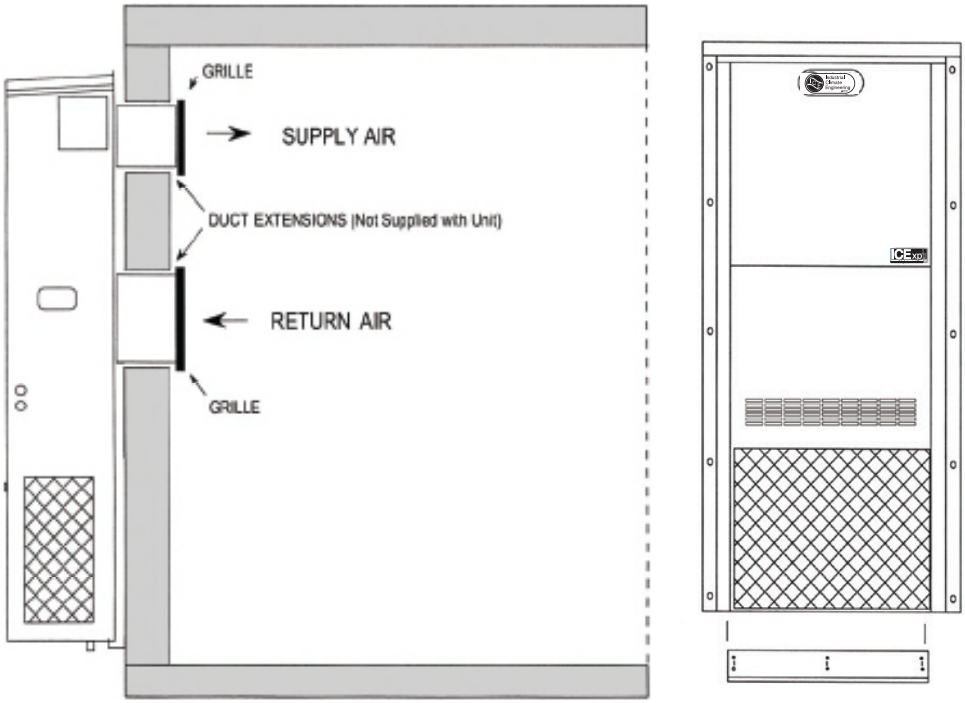


Figure 9. EXNA/EONA24/36/60/72 Air Conditioner Wall Mount Detail

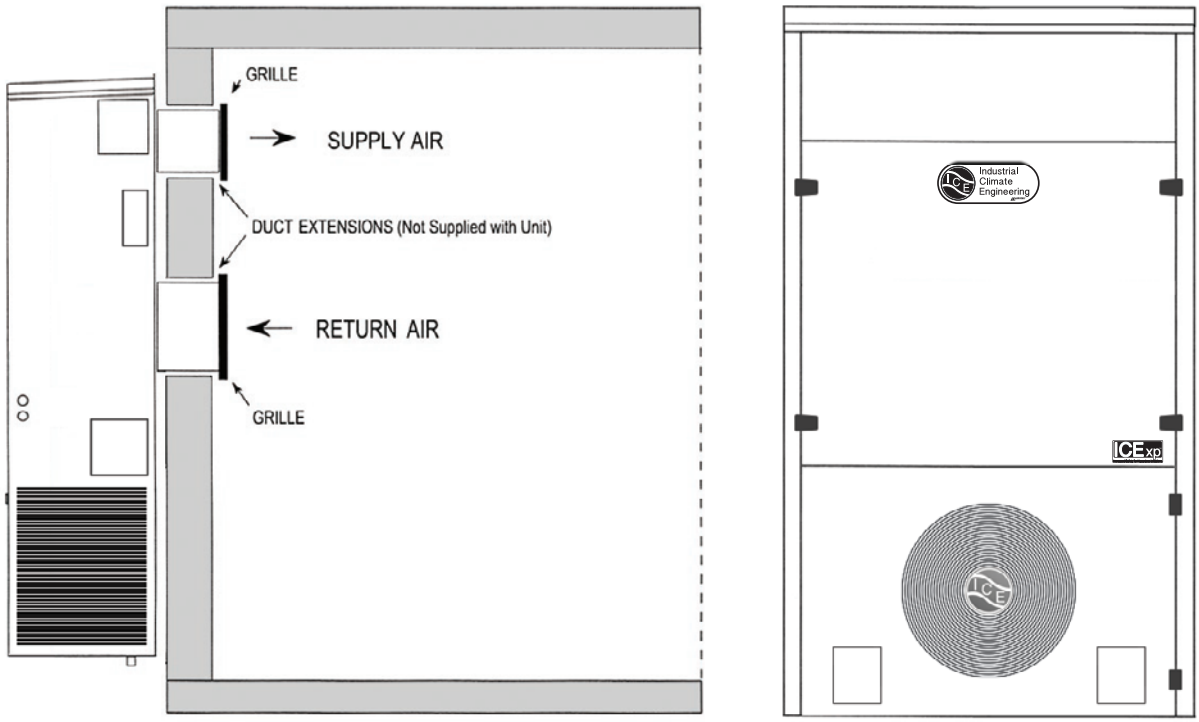


Figure 10. EXNA/EONA90/120/150 Air Conditioner Wall Mount Detail

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.

Scroll compressors, like several other types of compressors, will only compress in one rotational direction. The direction of rotation is not an issue with single-phase compressors since they will always start and run in the proper direction. However, three phase compressors will rotate in either direction depending upon phasing of power. Since there is a 50-50 chance of connecting power in such a way as to cause rotation in the reverse direction, it is imperative to confirm that the compressor is rotating in the proper direction at the initial field start-up of the system. Verification of proper rotation is made by observing that the suction pressure drops and the discharge pressure rises when the compressor is energized. An alternate method of verification for self contained system with small critical refrigerant charges, where the installation of gauges may be objectionable, can be made by monitoring the temperature of the refrigerant lines at the compressor. The temperature should rise on the discharge line while the suction line temperature decreases. Reverse rotation also results in a substantially reduced current draw when compared to tabulated values.

There is no negative impact on durability caused by operating three phase compressors in the reversed direction for a short duration of time, usually defined as less than one hour. However, after several minutes of operation the compressor's internal protector will trip. The compressor will then cycle on the protector

until the phasing is corrected. Reverse operation for longer than one hour may have a negative impact on the bearings.

To change the rotation, turn off power to the unit and reverse L1 & L2 at the disconnect in the air conditioner.

The middle front panel provides access to the electrical/control box and to the filters. This panel has hinges on the left and right hand side. This panel should ONLY be opened by using the two hinges on the left side **OR** the two hinges on the right side. **NEVER OPEN ALL FOUR HINGES SIMULTANEOUSLY**.

If all four hinges are opened simultaneously, the front panel will drop and may cause serious injury and damage the panel.

⚠ DANGER

EXNA/EONA90-240: NEVER open all four hinges simultaneously. The panel should ONLY be opened by using the two hinges on the left side OR the two hinges on the right side.

High Voltage Wiring

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

1. Refer to the electrical data on the data sticker on the unit for field wiring requirements of the unit. Size the incoming power supply lines and the fuse(s) or HACR breaker(s) according to requirements described in the National Electric Code. Run the power conductors through the knockouts on the side or back of the unit. Use appropriate conduit and strain reliefs.

⚠ CAUTION

Note: Power supply service must be within allowable range (+10% - 5%) of rated voltage stamped on the unit rating plate.

2. Connect the wires to the input side of the internal breaker or terminal block L1, L2, & L3 for three-phase models.
3. Install the ground wire on the ground lug.

⚠ CAUTION

The external breaker(s) that provide power to the air conditioner must be sized per the Maximum Fuse Size (MFS) shown on the Unit's data label.

Dual Unit Phasing

For applications where one controller operates two units:

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.

⚠ CAUTION

The ICExp units use a 24VDC power supply for all low voltage controls. The thermostat used must be capable of 24VAC/VDC power to properly interface with the ICExp unit. NOTE – Most residential type thermostats work only on 24VAC and will not work with this unit.

1. On single units, pull the low voltage wiring (e.g., 18 gauge 4 or 6-conductor Class 2 thermostat wire) from the air conditioners into the thermostat / subbase assembly. See Figure 6 for connections to various 24VDC 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 Figure 6.

Continuous fan operation: For continuous indoor fan operation, install a jumper between terminals R and G on the DC terminal board.

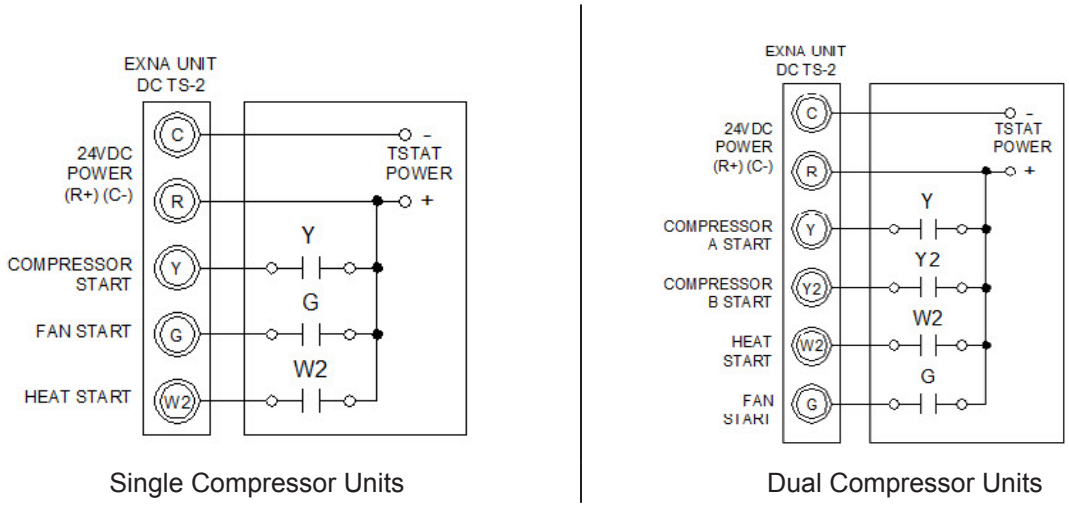


Figure 11. Typical Thermostat Connection Diagram

Remote Signalling: Terminals 8 & 9 (N.O.) and 8 & 10 (N.C.) on the air conditioners DC terminal board are dry contacts which can be used for remote signaling in the event of unit cutoff on low or high pressure limit. See Figure 7 below.

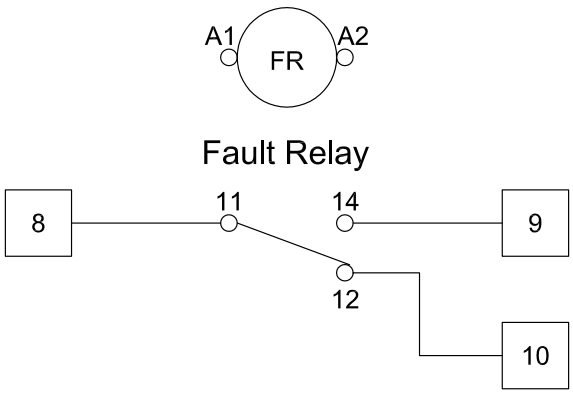


Figure 12. Fault Relay Diagram

Chapter 3 Start-Up

⚠ WARNING - EXPLOSION HAZARD

Do not remove or replace fuses when unit is energized.

3.1 Check-Out of Cooling Cycle

Double-check all electrical connections before applying power. All 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. 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.
4. 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 60 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 in-duct 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

The middle front panel provides access to the electrical/control box and to the filters. On Models EXNA/EONA90-240, this panel has hinges on the left and right hand side. This panel should ONLY be opened by using the two hinges on the left side **OR** the two hinges on the right side. **ON EXNA/EONA90-240 MODELS, NEVER OPEN ALL FOUR HINGES SIMULTANEOUSLY)**.

If all four hinges are opened simultaneously, the front panel will drop and may cause serious injury and damage the panel.

⚠ DANGER

On EXNA/EONA90-240 Models, NEVER open all four hinges simultaneously. The panel should ONLY be opened by using the two hinges on the left side OR the two hinges on the right side.

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.

Our 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 unit, 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 judgment 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.	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.
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.

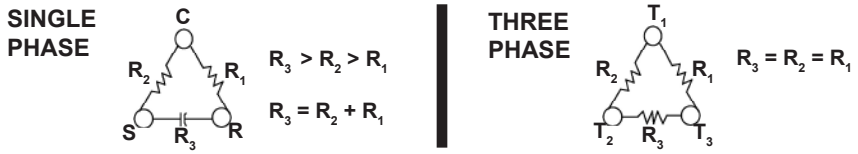
The following electrical tests will aid diagnosis:

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.

5. On single phase models, check the capacitor by substitution.

4.4 PLC Diagnosis

The programmable logic controller (PLC) powers an external red LED which indicates the lockout fault. (See section 1.6 for a complete description of the PLC.) The PLC will enter into and indicate lockout if either of the fault conditions (LPS or HPS) occur during a call for cooling.

The compressor starter must be energized before the fault condition for HPS or LPS can be recognized by the PLC. The compressor starter will energize after the unit is powered up and cooling is required. After the 3-minute time period, the fault condition will open the starter and shutdown the unit. The external "red" LED indicator will blink twice per second if the high pressure switch has opened and will blink once per second if the low pressure switch has opened. Please note the unit must be in the cooling mode (compressor starter energized) before a fault condition can occur.

Chapter 5 Maintenance

The middle front panel provides access to the electrical/control box and to the filters. This panel on Models EXNA/EONA90-240 has hinges on the left and right hand side. This panel should ONLY be opened by using the two hinges on the left side **OR** the two hinges on the right side. **ON EXNA/EONA90-240 MODELS, NEVER OPEN ALL FOUR HINGES SIMULTANEOUSLY)**. If all four hinges are opened simultaneously, the front panel will drop and may cause serious injury and damage the panel.

⚠ DANGER

On EXNA/EONA90-240 Models, NEVER open all four hinges simultaneously. The panel should ONLY be opened by using the two hinges on the left side OR the two hinges on the right side.

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:

5.2 Air Filter

Replace the air filter whenever it is visibly dirty. Never operate the unit without the filter in place. Depending upon the configuration of your unit, access to the filter can be either from the outside through the hinged door or from the return grille on the inside of the building.

5.3 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.

5.4 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.

5.5 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.

5.6 Drains

The condensate is drained from the condensate pan through two drains – one on the left side of the pan and the other on the right side. The condensate lines drain to the outside at the bottom of the unit through the base pan. Each of the drain lines is looped to form a trap.

Regularly check each drain line to make sure it is not obstructed. If a commercial drain solvent is used, flush out the drain pan and system with sufficient water to remove the solvent. Some solvents can cause the drain pan to corrode.

5.7 Lubrication

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

Chapter 6 Warranty

6.1 Limited Product Warranty

If any part of your Industrial Climate Engineering™ Increased Safety Control Unit (ICExp) fails because of a manufacturing defect within eighteen months from the date of original shipment by ICE or within twelve months from the date of original start-up, whichever is the earlier date, ICE will furnish without charge, EXW Cordele, Georgia, the required replacement part. Any transportation, related service labor, diagnosis calls, filter, driers and refrigerant are not included. The owner must provide proof of the date of the original start-up. The owner's registration card filed with ICE, the contractor's invoice, the certificate of occupancy or similar document are examples of proof of the date of the original start-up.

The responsibility of the Owner of the Equipment includes the following:

1. To operate the equipment according to the manufacturer's instructions.
2. To provide easy accessibility for service.
3. To check and reset any circuit breaker(s) and/or disconnect(s) before calling for service.
4. To keep the unit clean and free of dirt.
5. To replace any filters as required.
6. To keep the outdoor coil section clean and free of leaves, paper, etc.
7. To pay the charges incurred when any of the above have not been done.
8. To pay for repair or replacement of any material or part other than those within the ICE unit or thermostat itself.

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

This warranty only applies to products purchased and retained for use within the U.S.A, Canada and Mexico. This warranty does not cover damage caused by improper installation, misuse of equipment or negligent servicing.

THIS WARRANTY AND SERVICE POLICY CONSTITUTE THE EXCLUSIVE REMEDY OF ANY PURCHASER OF A ICE ECU 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 ICE SHALL HAVE NO OTHER OBLIGATION OR LIABILITY. IN NO EVENT SHALL ICE 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.

NEW

Chapter 7 Start-Up Check List

The middle front panel provides access to the electrical/control box and to the filters. This panel has hinges on the left and right hand side. This panel should ONLY be opened by using the two hinges on the left side **OR** the two hinges on the right side. **ON EXNA/EONA90-240 MODELS, NEVER OPEN ALL FOUR HINGES SIMULTANEOUSLY**.

If all four hinges are opened simultaneously, the front panel will drop and may cause serious injury and damage the panel.

⚠ DANGER

On EXNA/EONA90-240 Models, NEVER open all four hinges simultaneously. The panel should ONLY be opened by using the two hinges on the left side OR the two hinges on the right side.

7.1 Start-Up & Commissioning Form

Please complete the information on this form and return to Marvair by mail or fax. The mailing address and fax number can be found at the end of the form.

A. Equipment Information

Date: _____ Equipment Owner _____
Installing Company: _____ Installer: _____
Address: _____ State _____
City: _____

ICE Air conditioner: Model No. _____
Serial No. _____

Compressor: Model No. _____
Serial No. _____

Compressor: Model No. _____
Serial No. _____

B. Pre-Start Up

Is there any shipping damage? ❒Yes ❒No

If so, where? _____

Will this damage prevent starting the unit? ❒Yes ❒No

Check Power Supply, does it agree with data sticker on air conditioner? ❒Yes ❒No

Has the ground wire been connected? ❒Yes ❒No

Has the circuit protection been sized and installed properly? ❒Yes ❒No

Controls

Are the thermostat control wiring connections made and checked? ❒Yes ❒No

Are all wiring terminals (including main power supply) tight? ❒Yes ❒No

Condensate Section

Has water been placed in drain pan to confirm proper drainage? ❒Yes ❒No

Are correct filters in place? ❒Yes ❒No

Refrigerant Piping

If leaks are found, report any leaks to ICE Warranty Service Dept.

C. Check Rated Voltage at Terminal Block for Imbalance before starting of Unit.

❒208/230V 1 Phase ❒208/230V 3 Phase ❒460V 3 Phase ❒575 3 Phase 60 Hz.

Measured Line to Line Volts L1&L2_____V. L1&L3 _____V. L2&L3_____V.

(L1&L2 + L1&L3 + L2&L3)/3 = Avg. Voltage = _____

Max. Deviation from avg. voltage = _____volts

Voltage imbalance = (100 x Max. Deviation)/avg. Voltage = _____%

A voltage deviation greater than 2% with the unit running should be addressed and corrected. Excess voltage deviation can cause the compressor to overheat and to operate inefficiently.

Example: Maximum Deviation from Average Voltage X 100 (for Percent)
Average voltage

Measured Voltages:

L1 & L2 = 241 Volts
L1 & L3 = 243 Volts = 717 / 3 = 239 Average Voltage
L2 & L3 = 233 Volts

239 - 233 = 6
100 x 6/239 =2.5% Voltage Unbalance

Three phase units only check fan & compressor rotation.

D. Heating Mode Check & Record Readings

	Circuit 1	Circuit 2 *(if applicable)*
Room Temperature	_____	_____
Outside Temperature	_____	_____
Evap. Entering Air DB Temp	_____	_____
Evap. Entering Air WB Temp	_____	_____
Evap. Leaving Air DB Temp	_____	_____
Evap. Leaving Air WB Temp	_____	_____
Heater Contactor Amps (L1)	_____	_____
Heater Contactor Amps (L2)	_____	_____
Heater Contactor Amps (L3)	_____	_____

E. Cooling Mode Check & Record Refrigerant Pressures

Recheck voltage imbalance in cooling mode:

Measured Line to Line Volts L1&L2_____V. L1&L3 _____V. L2&L3_____V.

(L1&L2 + L1&L3 + L2&L3)/3 = Avg. Voltage = _____

Max. Deviation from avg. voltage = _____volts

Voltage imbalance = (100 x Max. Deviation)/avg. Voltage = _____%

After 10 minutes of compressor operation, record the following:

	Circuit 1	Circuit 2 *(if applicable)*
Room Temperature	_____	_____
Outside Temperature	_____	_____
Suction Pressure	_____	_____
Suction Line Temperature	_____	_____
Discharge Pressure	_____	_____
Discharge Line Temperature	_____	_____
Entering Condenser Air	_____	_____
Leaving Condenser Air	_____	_____
Evap. Entering Air DB Temp	_____	_____
Evap. Entering Air WB Temp	_____	_____
Evap. Leaving Air DB Temp	_____	_____
Evap. Leaving Air WB Temp	_____	_____
Compressor Amps (L1)	_____	_____
Compressor Amps (L2)	_____	_____
Compressor Amps (L3)	_____	_____