HEATCRAFT™ Refrigeration Products

intelliGen Refrigeration Controller

H-IM-iRC | **September 2026** | **Part No. 25009901**

Installation and Operation Manual



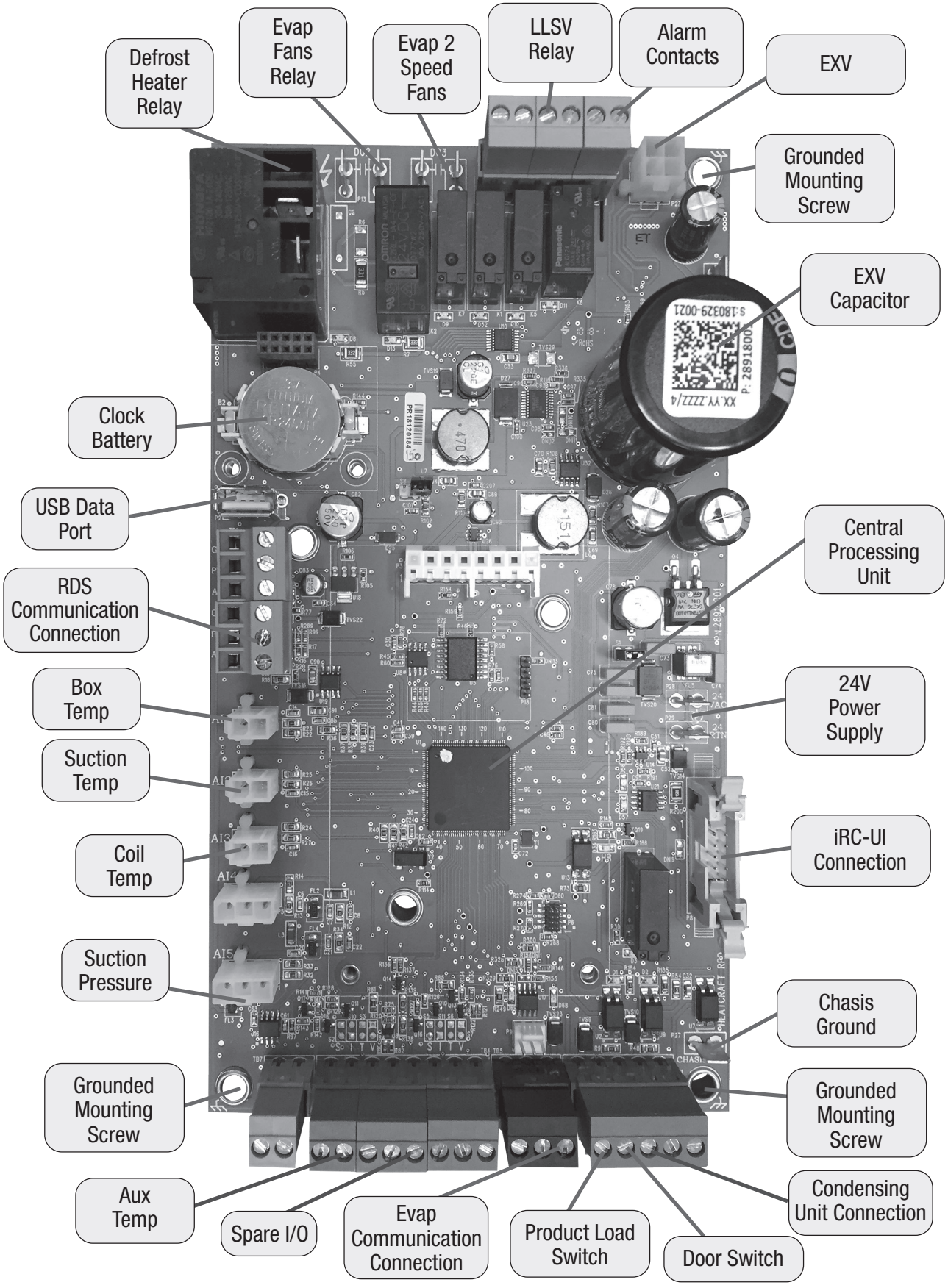
intelliGen
BY HEATCRAFT REFRIGERATION PRODUCTS

Scan QR code to view the manual online

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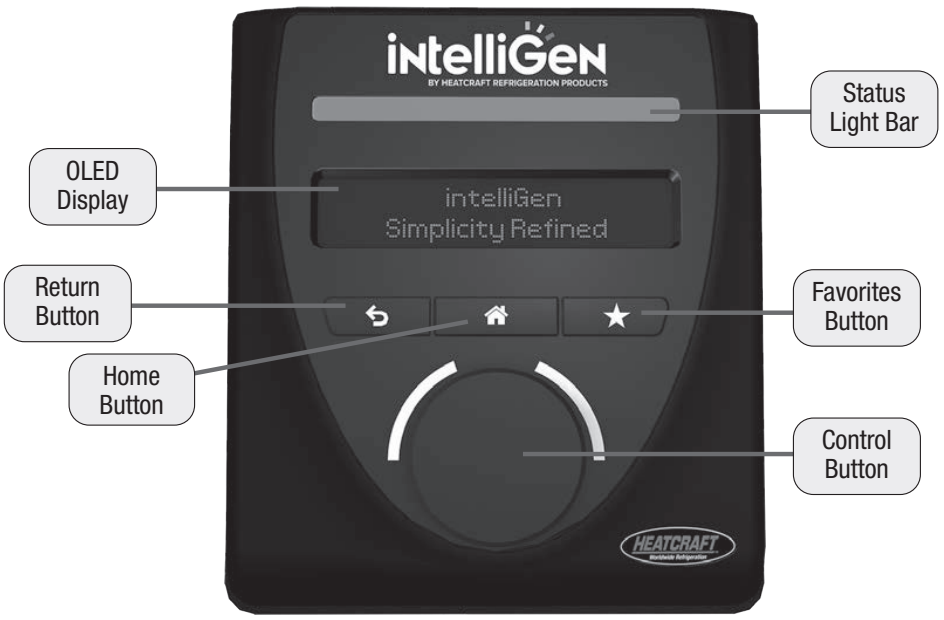
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intelliGen Board (iRC) Layout



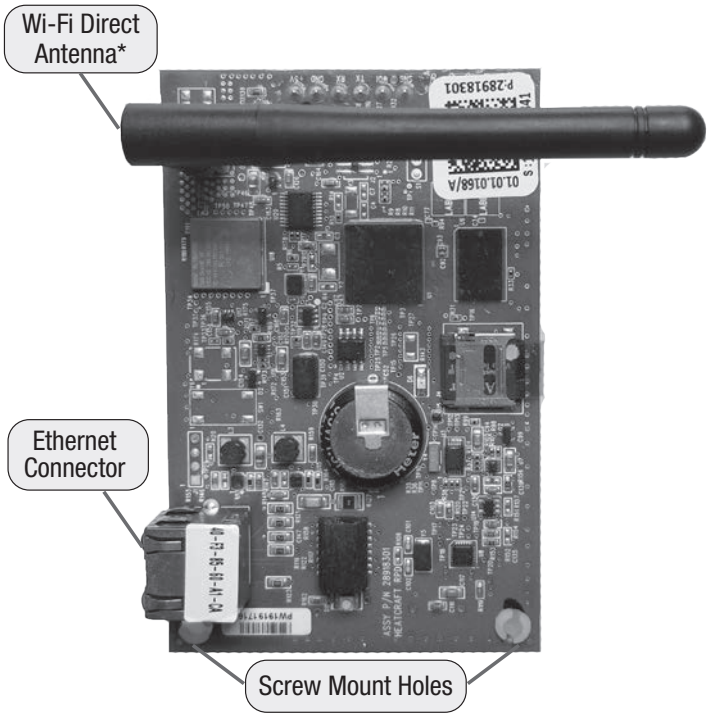
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intelliGen User Interface (iRCUI) Layout



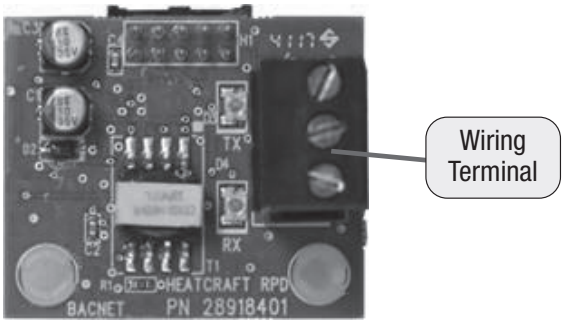
intelliGen Remote Access Cards

MULTI-SYSTEM CONTROL CARD - MSC
WEBSERVER CARD - iWC



NOTE: Refer to iWC & MSC Installation & Operation Manual (H-IM-iWC/MSC for installation and maintenance instructions.
** MSC card comes with Wi-Fi Direct antenna and the iWC webserver card does not come with Wi-Fi Direct antenna.*

INTEGRATION CARD - iIC



Scan the QR code or visit www.intelliGencontrols.com/resources to view the manual.

LEGEND

Abbrev. Name	Long Name
EV	Evap/Evaporator
SP	Set-Point
AUX	Auxiliary
TEMP	Temperature/Temp
CALIB	Calibration
EXV	Electronic Expansion Valve
CU	Condensing Unit
COMP	Compressor
CXN	Connection
LL	Lead-Lag
RDS	Refrigerant Detection System

Installation Tips

• Best practice procedures used for all commercial refrigeration equipment must be followed for the placement of the units, sizing of refrigerant lines, proper line installation, brazing, leak testing, evacuation and refrigerant charging.

• Each Heatcraft intelliGen Refrigeration Controller (iRC) board gets its own 24 VAC power supply from a dedicated transformer mounted in the electrical end of each evaporator. On 208-240 volt systems, the multi-tap transformer is shipped from our factory wired for 240 volts. **If your supply voltage is 208 volts, you must change to the 208 volt tap on the transformer.**

• Each control board gets a dedicated 24V transformer for units with more than one board.

NOTE: *On multiple evaporator systems, since a transformer is in each evaporator, the voltage tap must be set properly on each evaporator.*

• Refer to wiring schematic shipped on units for unit wiring. Schematics in this Installation & Operation Manual are typical wiring schematics only.

• The suction line temperature sensor MUST be removed from the suction line before brazing to the suction tubing. The sensor MUST then be reinstalled into the sleeve on the suction line after brazing is completed and the tubing has cooled. Cork-tape is to be used to insulate when finished.

• The electric expansion valves must be protected from high temperatures while brazing to the liquid line. Wrapping them with wet cloth will normally suffice during this procedure.

• A suction pressure transducer is installed on the evaporator. Do not leak test system above 285 psig while it is connected or damage to transducer could occur. If leak testing must be greater than 300 psig, disconnect the transducer from the suction header and reconnect after testing is complete.

• There are built-in ground connections on the Heatcraft intelliGen Refrigeration Controller (iRC) board's four corner brass spacers. Use of four sheet-metal screws to mount the board on the evaporator is needed for common-mode noise filtering. Make sure that the evaporator ground terminal is earth grounded.

Evaporator Unit

The evaporator contains the iRC board, iRC UI, electric expansion valve, suction pressure transducer, distributor, orifice/nozzle, transformer and three temperature sensors. These components are all factory mounted and wired. The three temperature sensors provide input to the controller for the following: defrost/coil temperature, suction temperature, room temperature. An extra sensor is provided in case one is damaged during installation.

• Room temperature sensors may be left connected on ALL evaporators.

NOTE: *Please use caution during removal of the evaporator from its shipping packaging. Take special care to protect the plastic iRC UI from damage as it protrudes from evaporator cabinet. The round, plastic control knob on the front of the iRC UI should be checked to assure it is in place.*

Each evaporator unit must be installed using proper refrigeration practices and codes. Make sure the piping is correctly sized (see H-IM-CU) and properly routed. It is highly recommended that the liquid and suction lines be insulated. There must also be good clearance around unit. See H-IM-UC Installation and Operation manual for more details (www.heatcraftrpd.com/PDF/I&O/H-IM-UC.pdf).

The intelliGen Refrigeration Controller can be used as a stand-alone evap controller or be wired to a condensing unit and used as a system controller.

Anti-Short Cycle Time Delay Relay at Condensing Unit

Some condensing units may have an Anti-Short Cycle Time Delay Relay (ASCT) installed for compressor short cycle protection. These time delay relays should be removed when connecting the condensing unit to unit coolers with intelliGen installed. The intelliGen control has compressor short cycle protection functionality built-in, and failure to remove the electro-mechanical ASCT relay can result in system run-time conflicts and negative impacts to system performance.

Condensing Unit by Others

Condensing units do not require a Defrost Timer or any evaporator controls. These components should be disconnected if installed. A head pressure control is recommended to be installed in condensing unit.

Condensing units must be installed using proper refrigeration practices and codes. Make sure there is sufficient clearances around unit for adequate air flow and access.

Wiring of intelliGen Refrigeration Controller is ONLY allowed with specifically designed Heatcraft condensing units. Connecting to condensing units by other manufacturers is strictly prohibited.

Special Condensing Unit By Heatcraft

The special Heatcraft condensing unit control panel contains the relays, compressor contactor, time delay and a terminal block, which is appropriately marked to match the low voltage wiring connections. The low pressure switch must be set per instructions. The low pressure switch bypass time delay relay, located in the condensing unit, must be set to a minimum of 1 minute.

Condensing unit must be installed using proper refrigeration practices and codes. Make sure there is sufficient clearances around unit for adequate air flow and access. Refer to H-IM-CU manual.

Refrigerant Line Brazing (Caution)

The electric expansion valve on the liquid line and the suction temperature sensor on the suction line are factory installed. Care must be taken to protect them when brazing these lines at the evaporator.

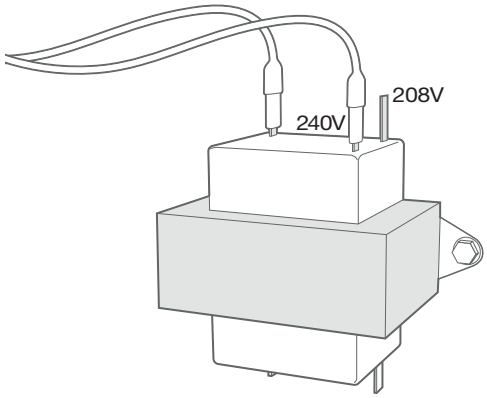
Too high a temperature may destroy these components. Heat absorbing compounds or "wet rags must be used to protect the electric expansion valve when brazing the refrigerant line connections.

THE SUCTION LINE SENSOR MUST BE REMOVED BEFORE BRAZING.



Power Supply

The iRC board gets its 24 VAC power supply from a transformer mounted in the electrical end of each evaporator. On 208-240 volt systems, a multi-tap transformer is supplied, factory wired for 240 volts.



VERY IMPORTANT:

If the supply voltage to the evaporator is 208 volts, the primary tap of the transformer must be moved to the 208 volt tap.

This must be done for all the evaporators on that system.

If the 24 VAC power supply falls below 18 VAC, the system may power down and shut off. When the power supply is corrected to 24 VAC, the system will restart after the hold-off period and resume normal operation.

The main power for the evaporator may be supplied separately from the power supply of the condensing unit. All wiring, must comply with all applicable local and national codes, standards and ordinances.

Leak Testing

After all lines are connected, the entire system must be leak tested. The complete system should be pressurized to minimum of 150 psig and not more than 300 psig with refrigerant and dry nitrogen. The use of an electronic type leak detector is highly recommended because of its greater sensitivity to small leaks. As a further check, it is recommended that this pressure be held for a minimum of 12 hours and then rechecked. For a satisfactory installation, the system must be leak tight.

Refrigerant Charging

The special HRP condensing units are shipped standard with a head pressure control valve. The maximum system refrigerant capacity is the receiver capacity as listed in the sales literature plus the liquid line capacity. Do not add more refrigerant to the system than 90% of the receiver capacity unless the line run exceeds 25 feet.

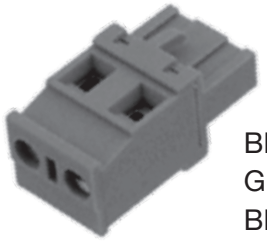
• It is recommended that the crankcase heater be energized 24 hours prior to system start-up. The initial setup of the iRC board should be delayed until after this period is complete.

Wiring

Wiring at the evaporator(s) will be as follows (see wiring diagrams):

• High voltage - There may be high voltage on the defrost heater relay and the fan relay. All of this wiring is done at the factory. Field power supply should include a grounding conductor. The evaporator should be connected to a separate power supply from the condensing unit. See unit cooler spec. plate for ampacity.

• Low voltage – Field wiring to the iRC board will employ molded, pluggable terminal blocks. These will be color coded to indicate input, output or communication wiring.

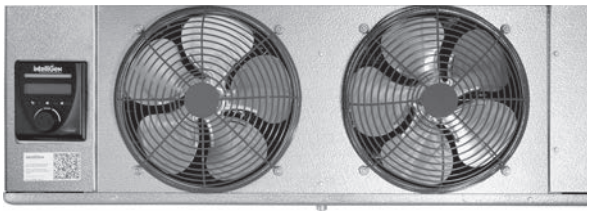


BLUE- Input
GREEN- Output
BLACK- Communication

Wiring (cont.)

Access to iRC board for wiring varies by evaporator style. Below are the examples of how to access. All iRC boards are mounted on the piping or header end of the evaporators.

Low Profile Evaporators

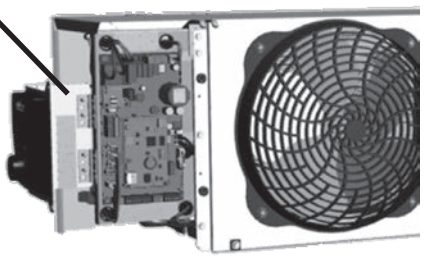


To access to iRC board:

1.) Remove side panel (take care to not damage iRC UI which is in a panel cut-out)

2.) Swing iRC UI to left

3.) iRC board is exposed



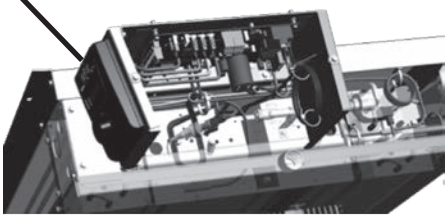
Center Mount Evaporators



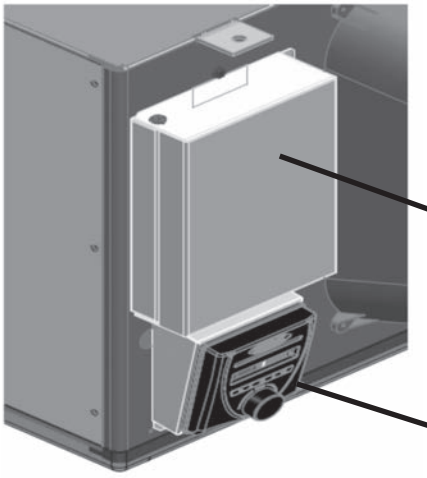
To access to iRC board:

1.) Remove side panel from exterior ebox

2.) iRC board is exposed



Medium Profile Evaporators



To access to iRC board:

1.) Swing open door of exterior ebox

2.) iRC board is exposed

Large Unit Cooler Evaporators



To access to iRC board:

1.) Remove side panel

2.) iRC board is exposed

Wiring (cont.)

• Low voltage - 24V Class II control circuit. A total of two low voltage leads are required to connect a special HRP condensing unit to an iRC evaporator. (See wiring diagrams.) The field wiring to the condensing unit may be connected from any iRC board on the system.

All 24 volt wiring must be run separate from the line voltage wiring.

• Low voltage wiring to the condensing unit must be 18 gauge minimum.

For low voltage wiring, maximum distances are:

Condensing unit to iRC board	**500 ft.**
Between evaporator iRC boards	**325 ft.**

• Each iRC board's power is supplied by its own control circuit transformer located in the evaporator's electrical section. Do not run any 24 VAC wires between the boards on the evaporators.

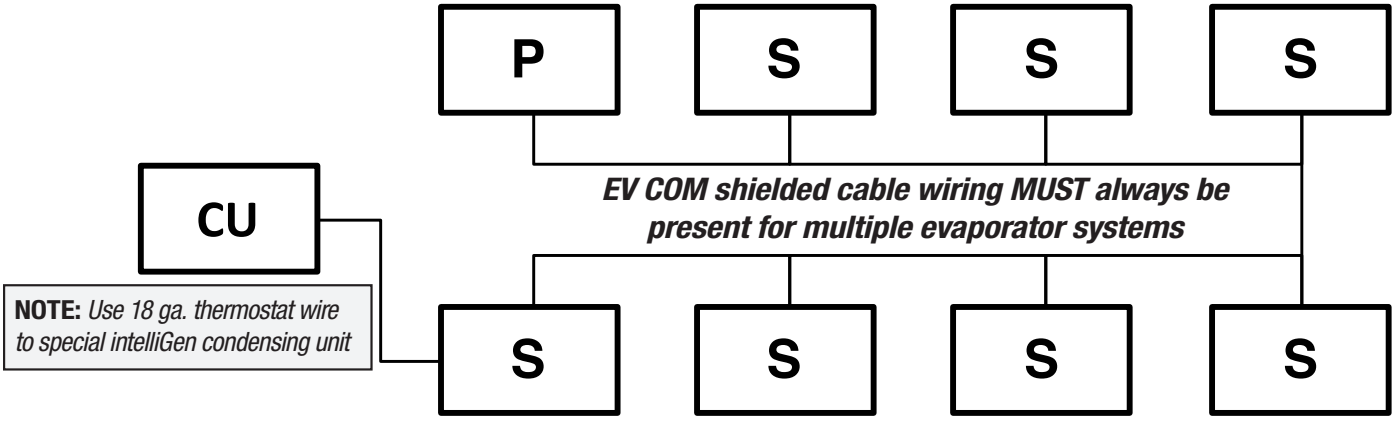
• All wiring must comply with all applicable local and national codes, standards and ordinances.

• Multiple units – The EV COM terminals on the iRC board are for field wired communication connections. Connection sequence must follow proper wiring protocols using 24 AWG twisted-pair, RS-485 shielded cable . See below.

• Alarm circuit - The onboard alarm is a dry set of NC contacts (DO6) which open on power up and closes to indicate an alarm or loss of power. The type and wiring for the alarm is customer specified. Note that the alarm circuit does not distinguish or indicate what has caused the alarm. These contacts can handle up to a 230VAC & 5 Amp load. Alarm device by others.

CAUTION: All 24V wiring must be run separate from the line voltage wiring. Wires/Leads must not touch other component connection points or power wires to avoid damage to the board or its components.

FIG.1. Maximum Multiple Evaporator Configuration



CU = Special intelliGen Condensing Unit **P** = Primary Evaporator* **S** = Secondary Evaporator

*Primary Evaporator: The evaporator unit that is selected to act as the box thermostat. This unit will trigger refrigeration as necessary.

Wiring Terminals

• Bottom iRC board terminals to the right are those which will be wired in the field. Not all of them are available at this time, and not all of them will be selected for use on the job.

• The following optional inputs may be wired using normal 18 AWG thermostat wire:

Auxiliary Temperature Sensor

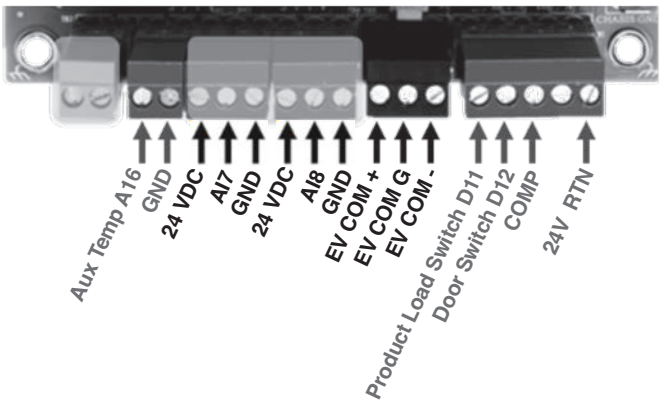
Product Load Switch

Door Switch

Compressor Safety Circuit

Relative Humidity Sensor

Service Mode Switch



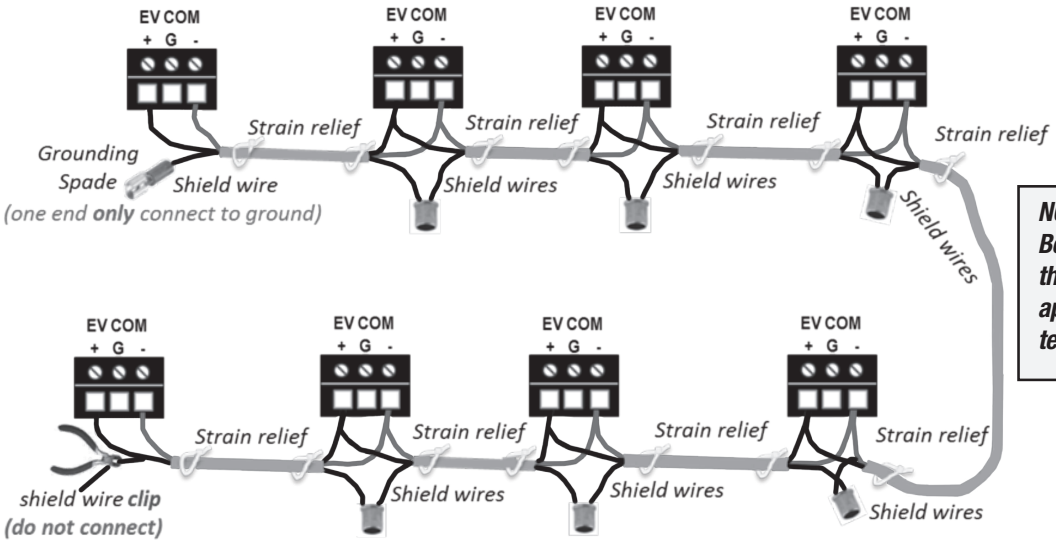
Wiring Terminals

For multiple intelliGen evaporators on a system, wiring between the evaporators is required to meet RS-485 protocols. This wiring is polarized which requires connections to "like" terminals on each iRC board using 24 AWG twisted-pair, shielded RS-485 cable. A chassis ground spade connection is available for the shield-drain grounding connection.

Below is an example of the wiring connections for the maximum of 8 iRC boards on a single system.

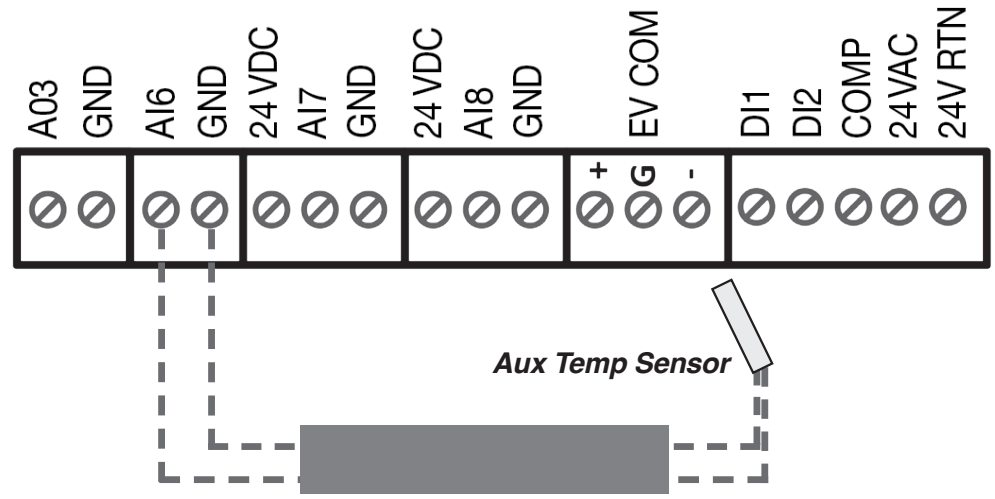
NOTE: *The shielded cable must be grounded at one end ONLY. Removal of the last shield wire is recommended to avoid miswiring by others.*

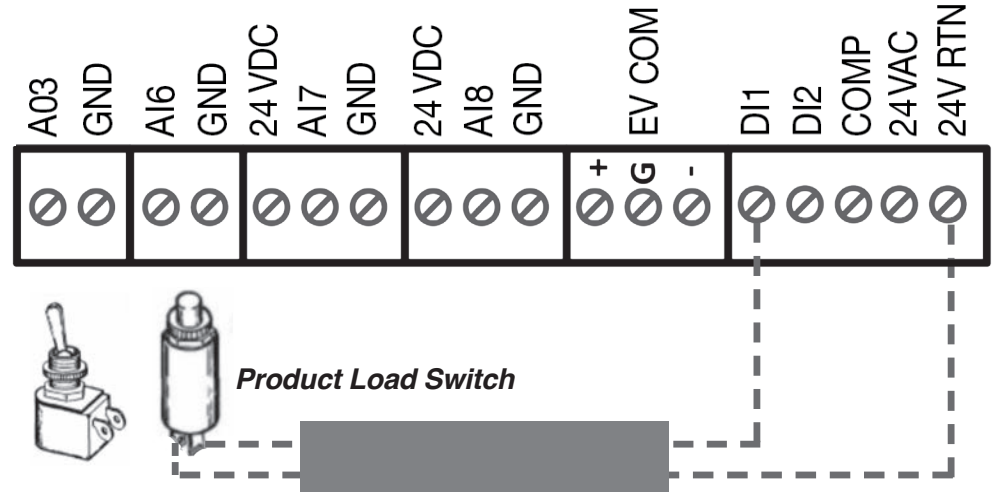
FIGURE 2. Maximum Boards Communication Wiring

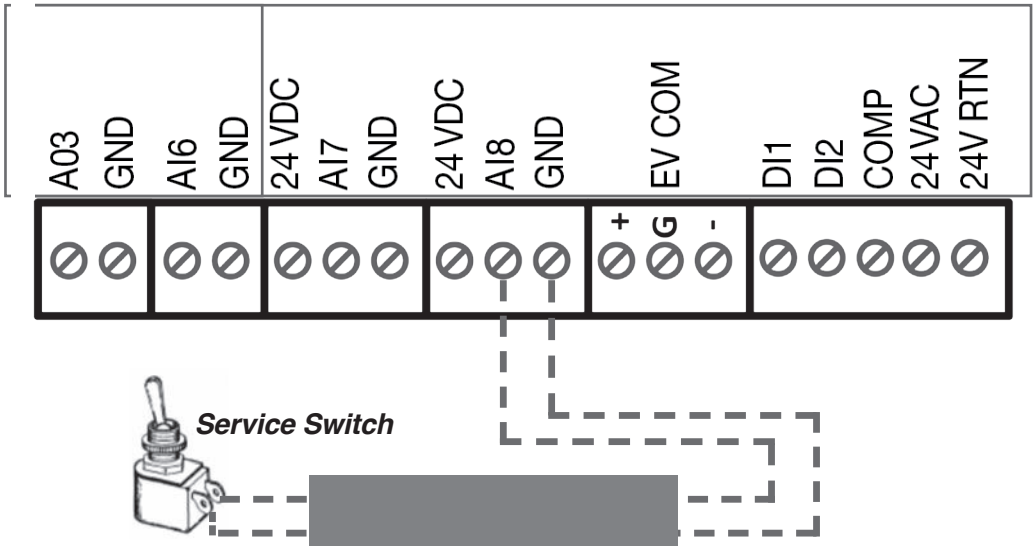


NOTE: We recommend using Belden 89841 or equivalent as the communication cable for applications where the operating temperatures are below -22 °F.

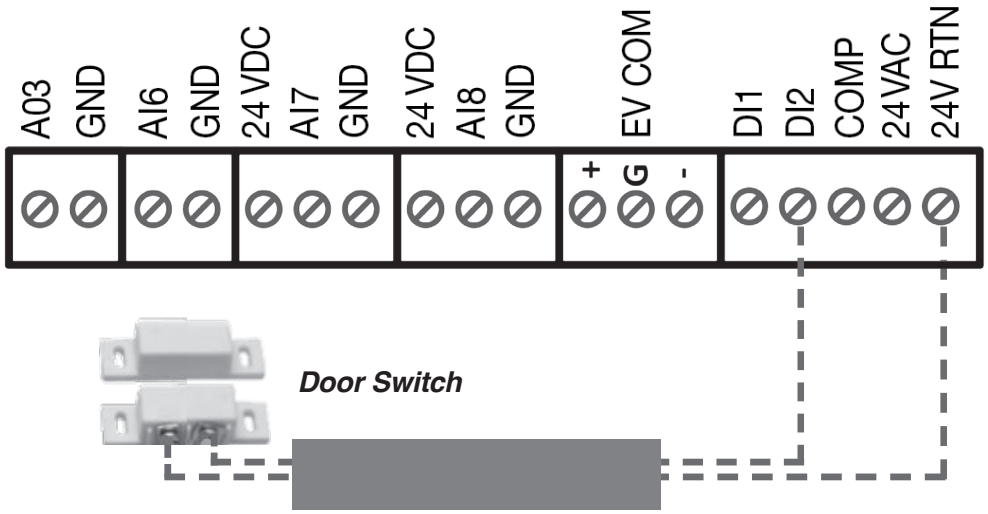
Field Wiring Options





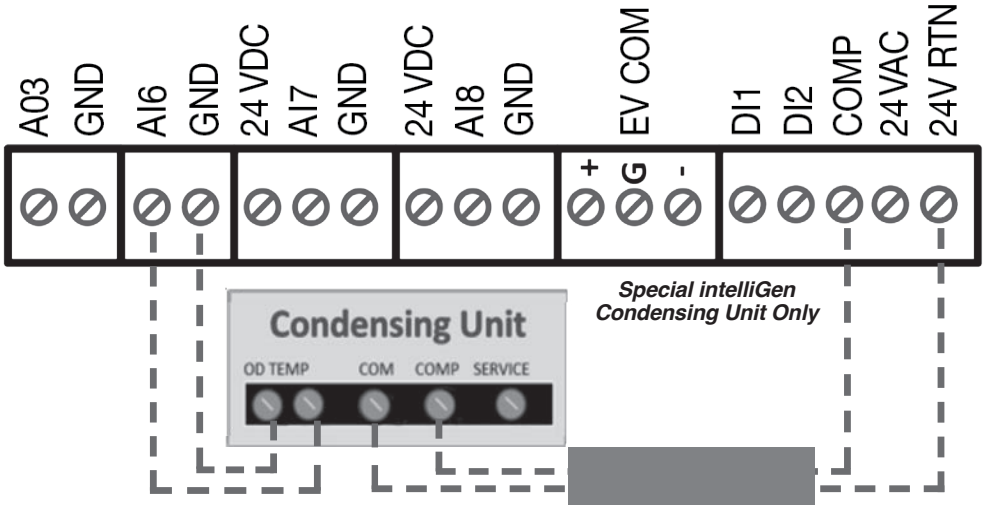


Field Wiring Options



NOTE: *Door Switch can be configured for Normally Open or Normally Closed.*

Special HRP Condensing Unit

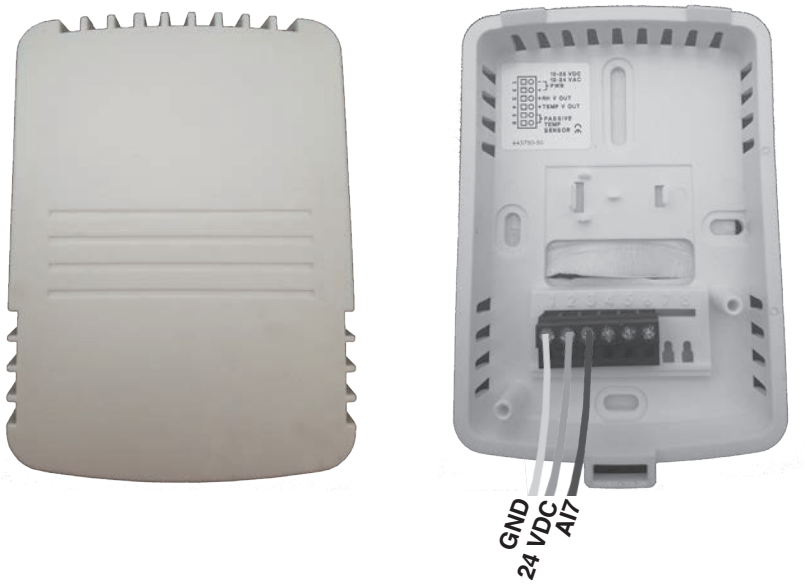


NOTE: *To use the Outdoor sensor as an aux temp sensor, wire OD TEMP to AI6 terminals of iRC*

Humidity Sensor

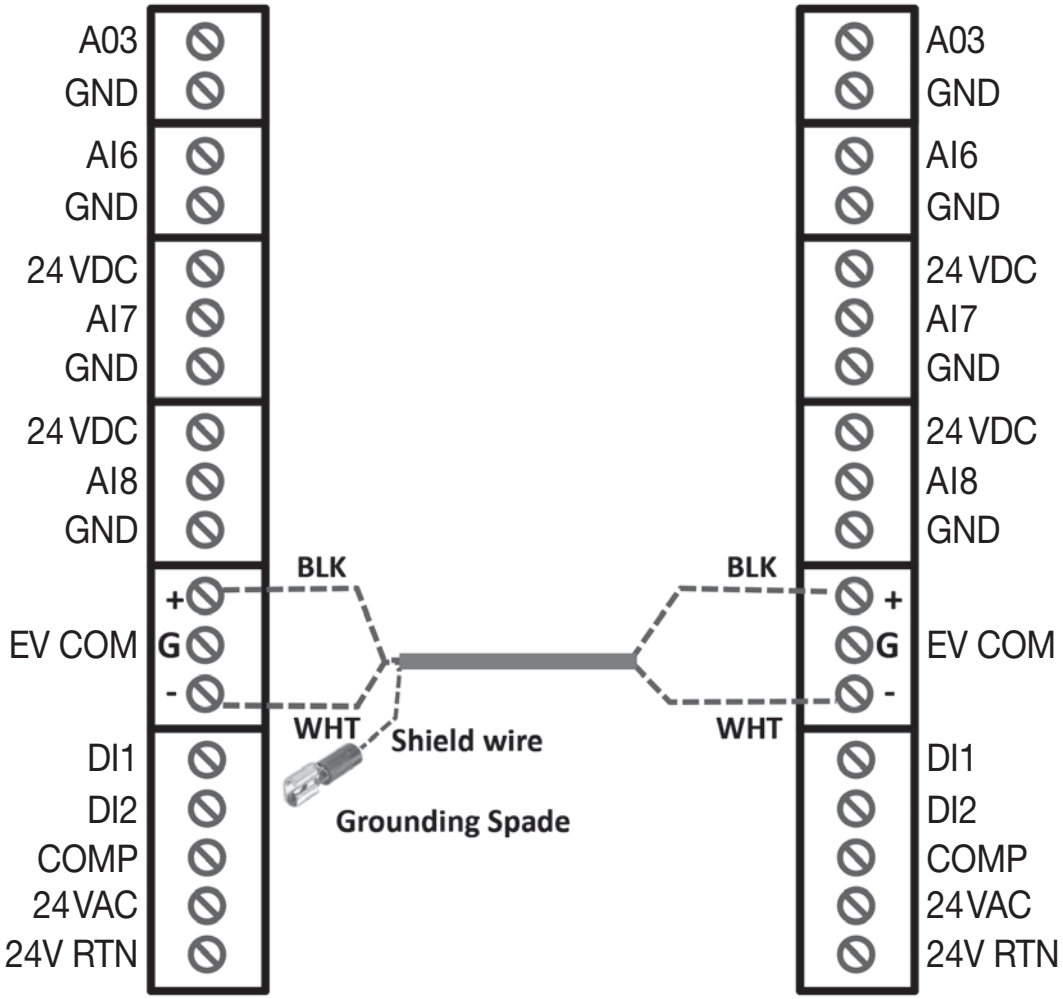
Heatcraft Supplied Humidity Sensor
Relative Humidity Range: 0-100%
Output: 0-10VDC
Power: 24VDC
Operational Temperature Limits: -40F to 140F
Heatcraft Part Number: 22597901
Accuracy: +/-3% 20-80% RH @ 25C
Drift: <1% RH/year
Hysteresis: +/- 1%
Repeatability: +/- 0.1% Typical
Weight: 0.3 lbs

intelliGen Webserver Card (iWC) or Multi-System Control Card (MSC) is required to configure the humidity sensor.



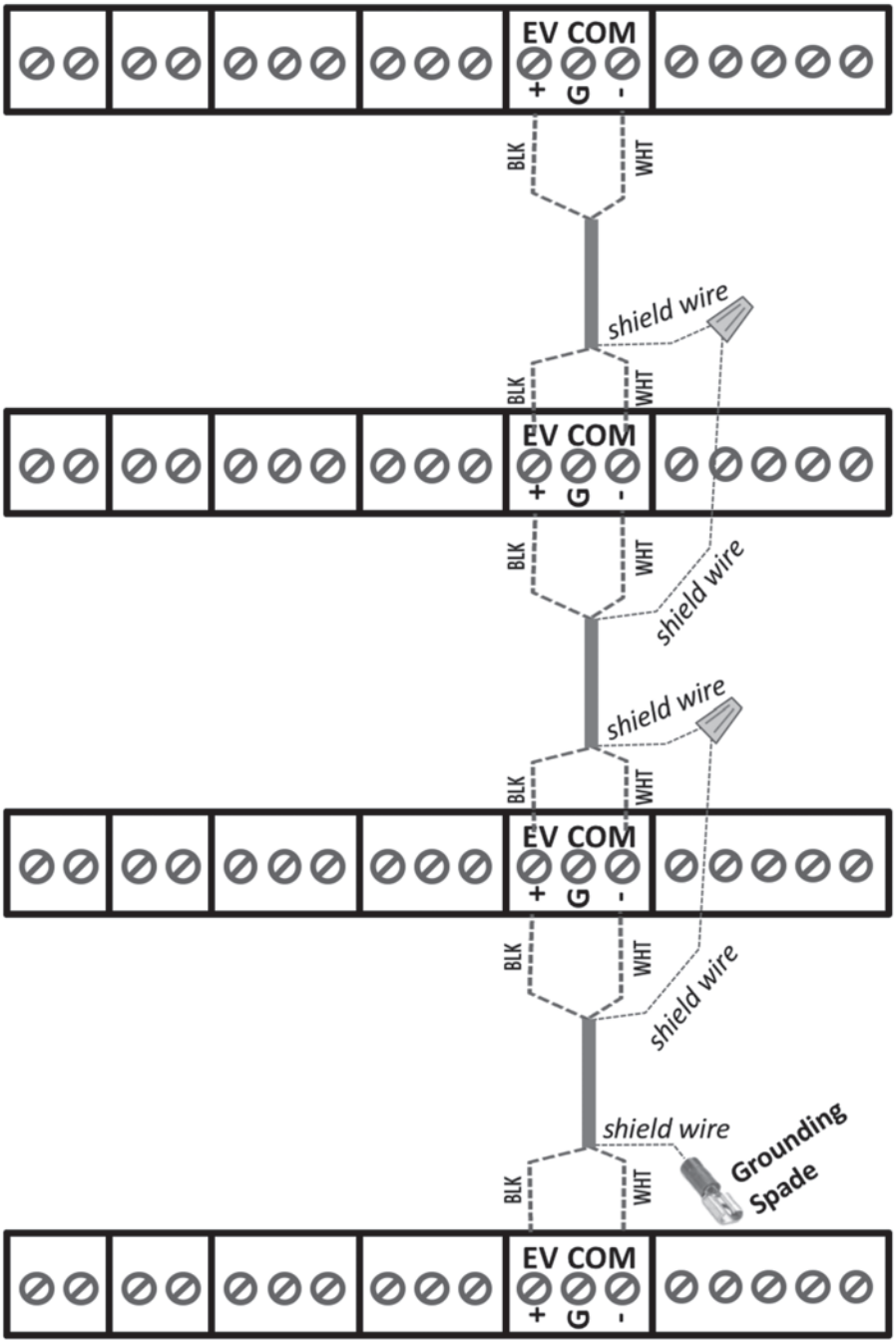
EV COM WIRING CONNECTIONS:

HEATCRAFT intelliGen | Refrigeration Controller
Two evaporators on a single system
(24 AWG 1-twisted-pair RS-485 shielded cable)



EV COM WIRING CONNECTIONS:

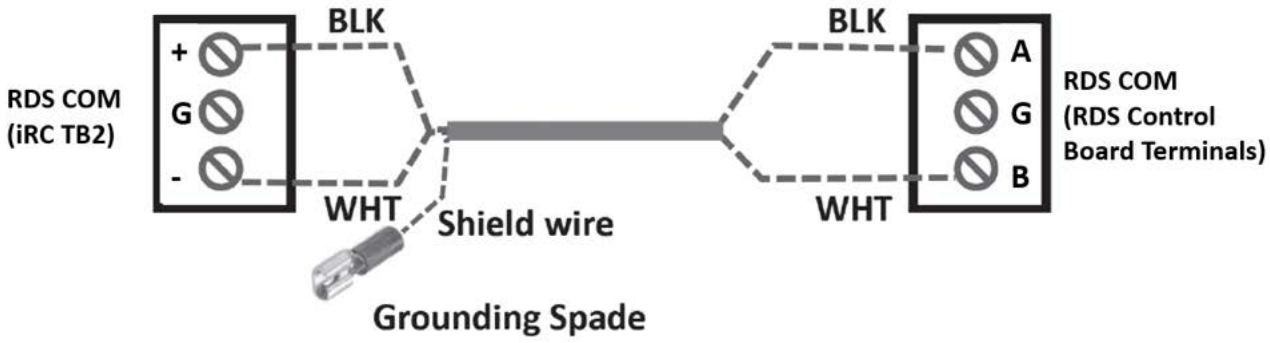
HEATCRAFT intelliGen | Refrigeration Controller
Four evaporators on a single system
(24 AWG 1-twisted-pair RS-485 shielded cable)



NOTE: *For applications with more than one dual-board Large Unit Cooler (LUC), disconnect factory installed COM wire and reference Page 8 for proper wiring procedures.*

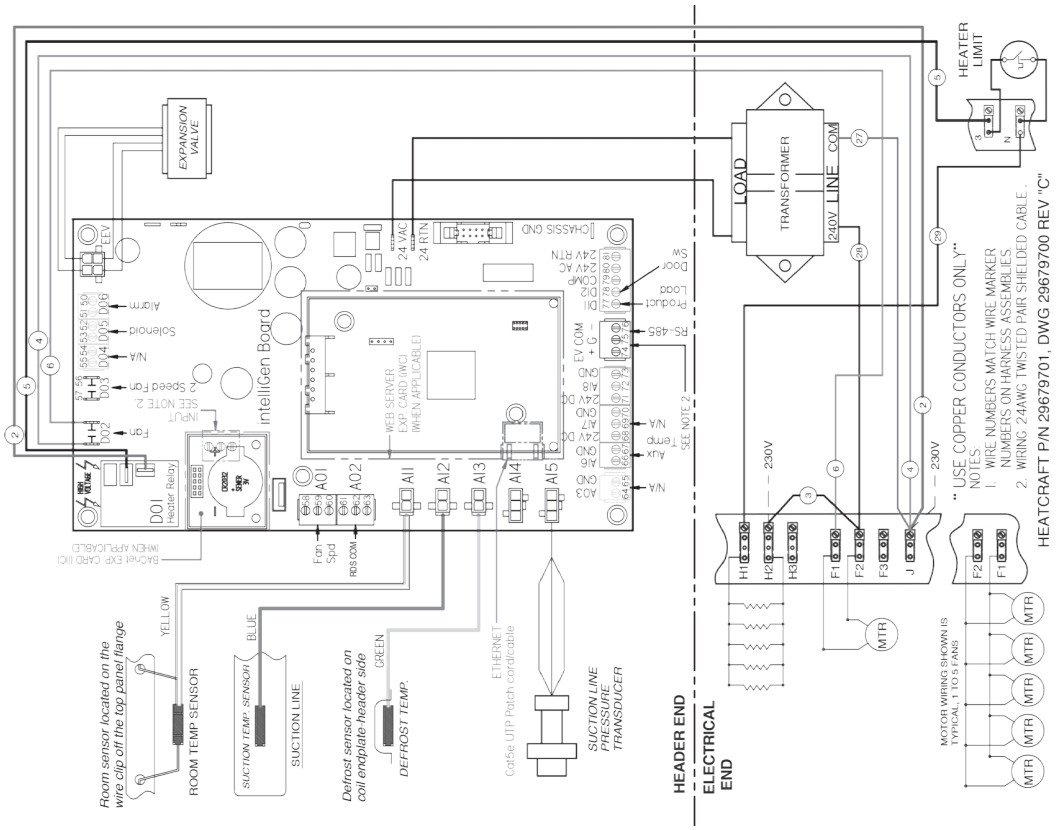
REFRIGERANT DETECTION SYSTEM (RDS) COMMUNICATION WIRING CONNECTIONS:

For A2L Refrigerant Unit Coolers with intelliGen
(24 AWG 1-twisted-pair RS-485 shielded cable)

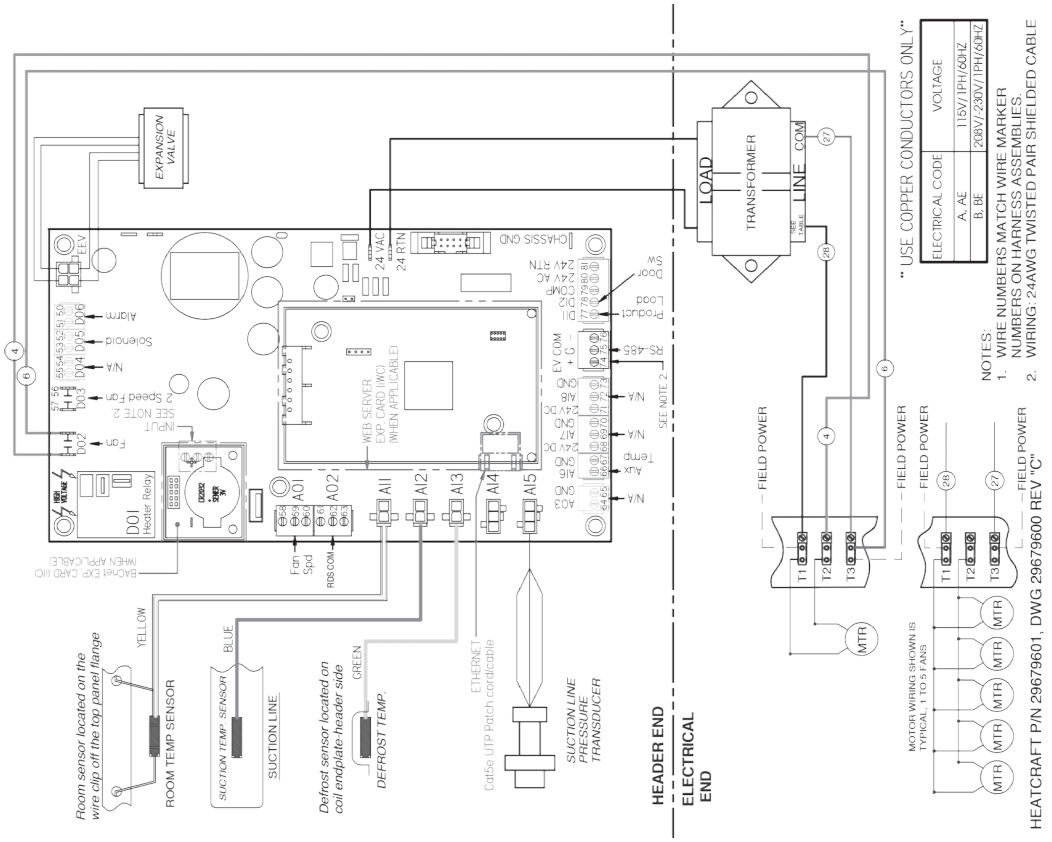


TYPICAL EVAPORATOR INTERNAL WIRING DIAGRAM

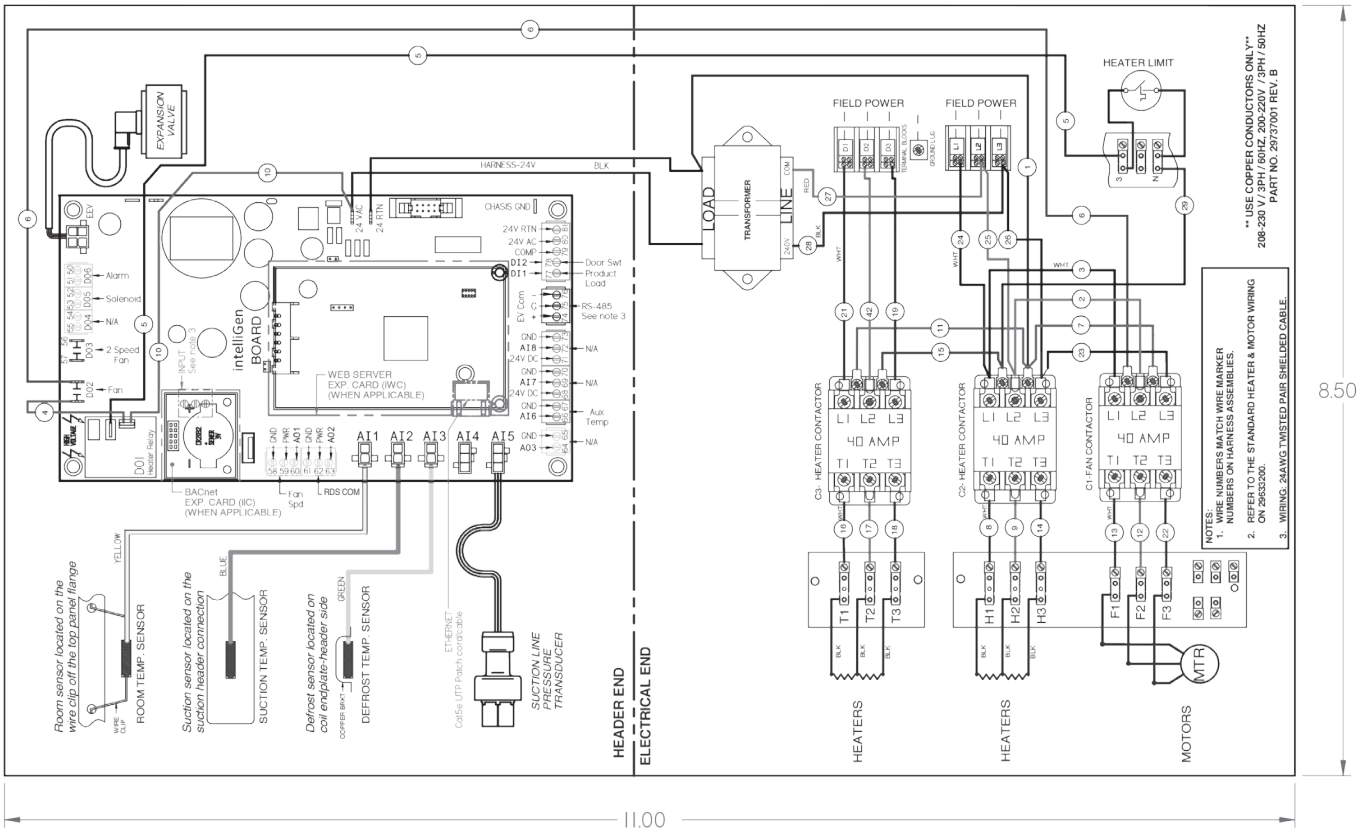
ELECTRIC DEFROST



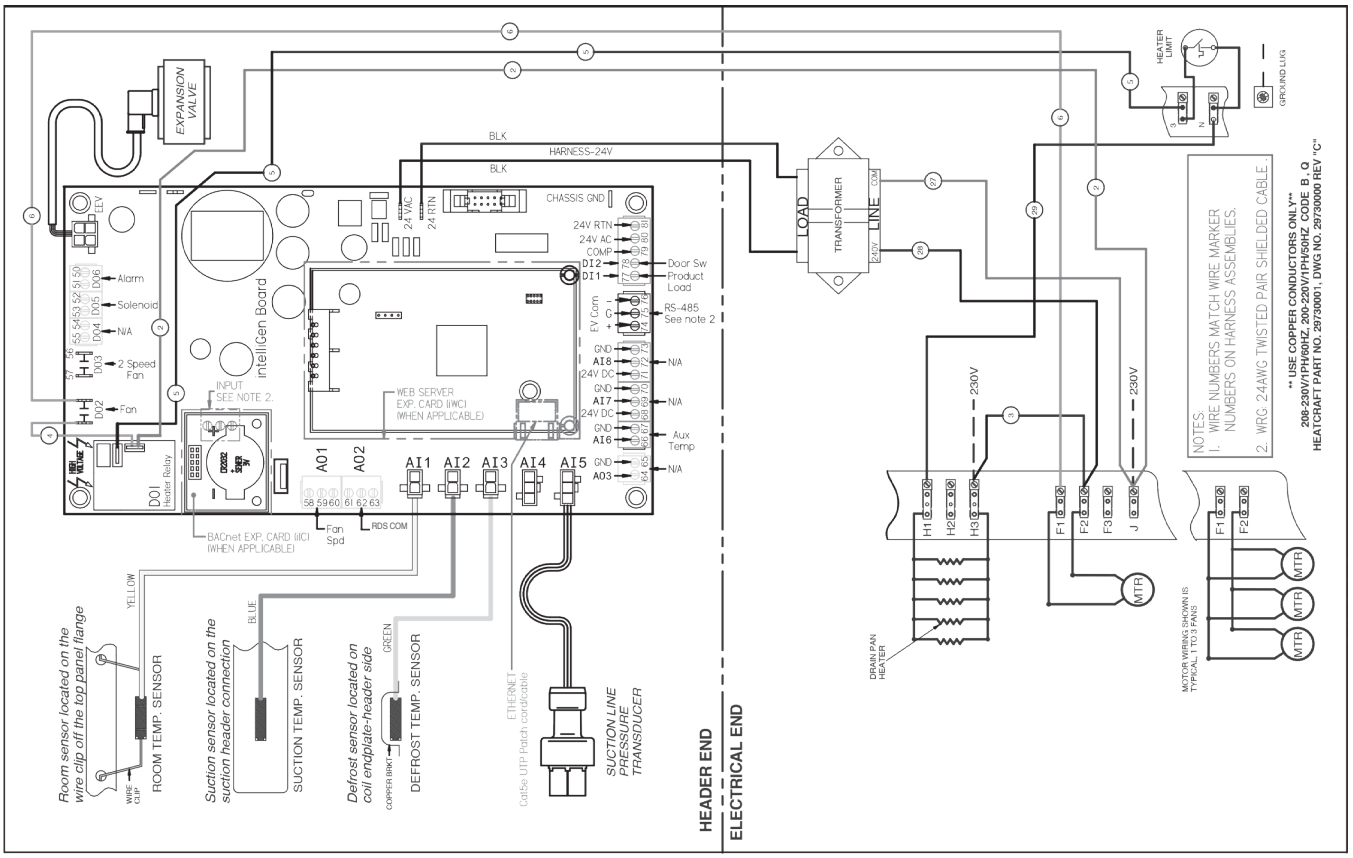
AIR DEFROST



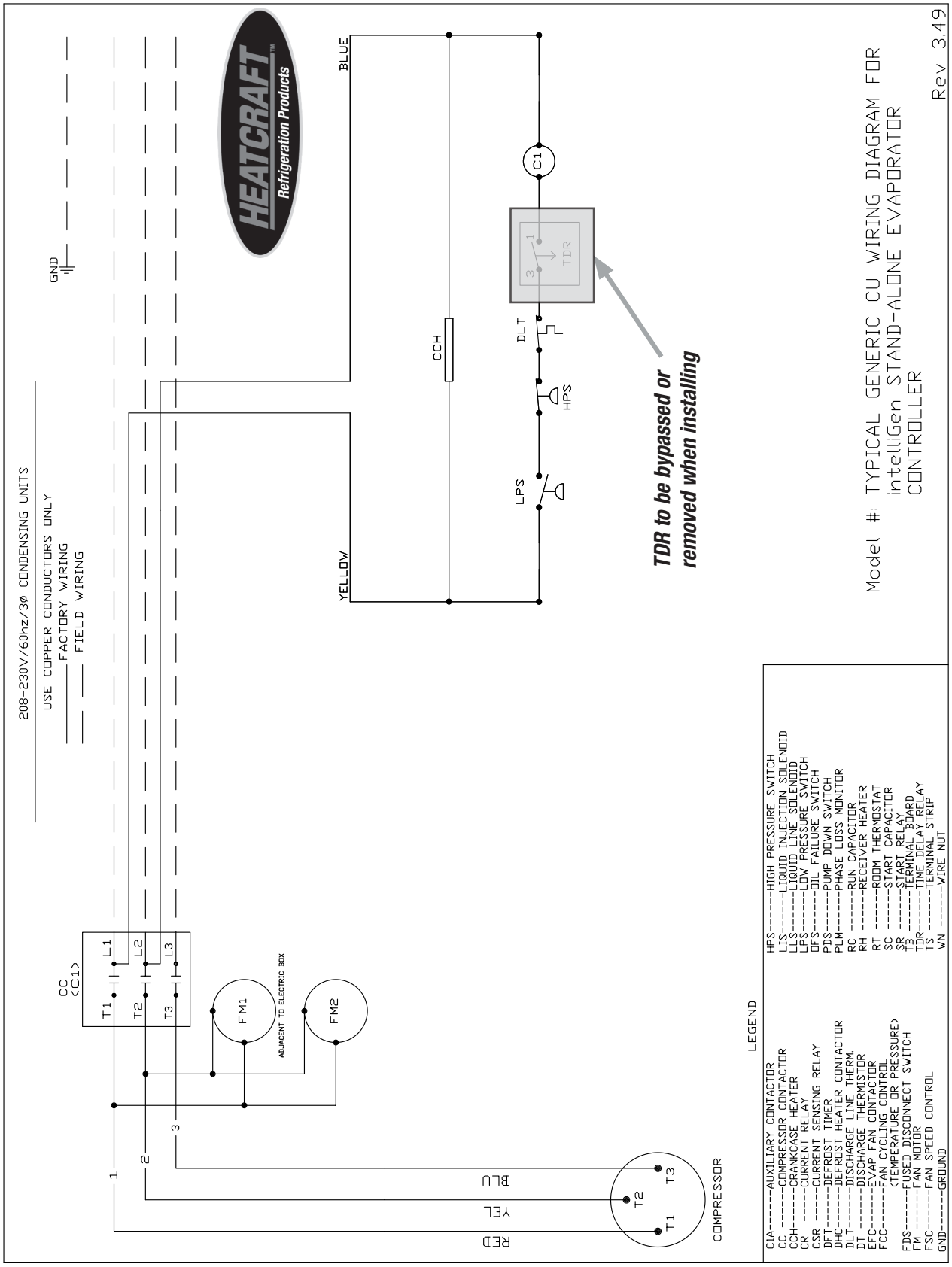
LARGE UNIT COOLER EVAPORATOR



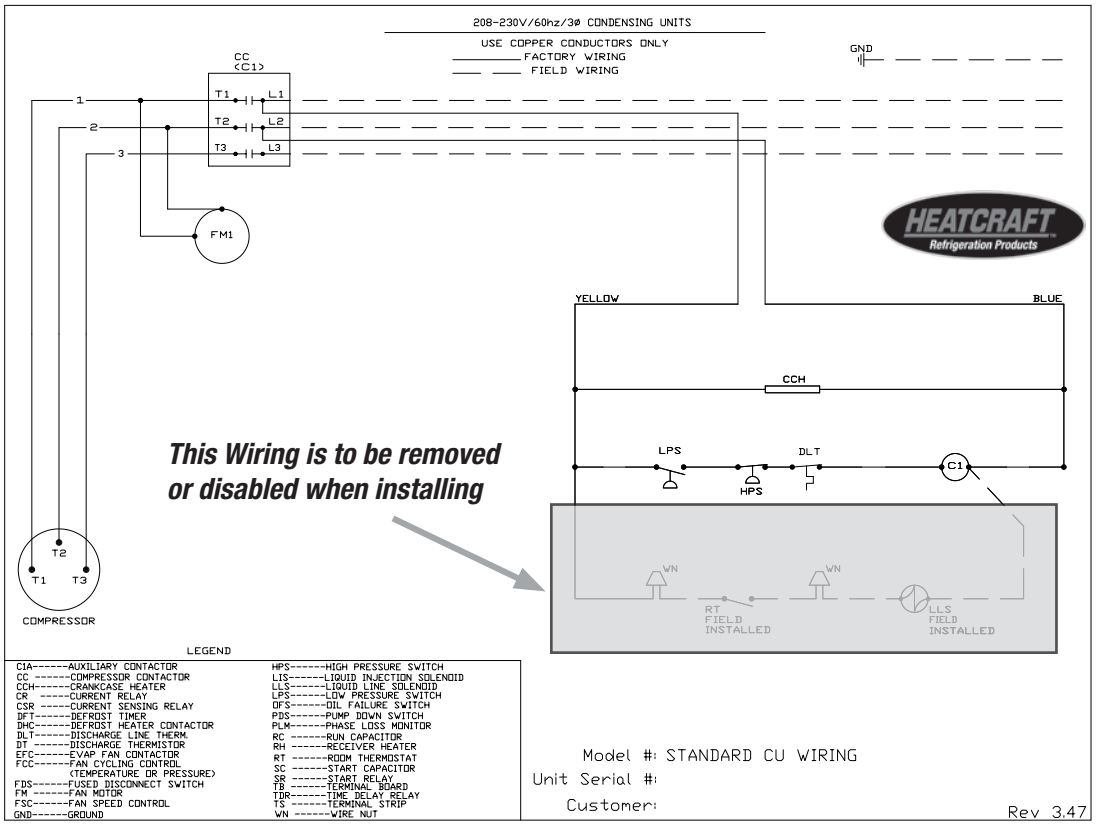
MEDIUM PROFILE EVAPORATOR

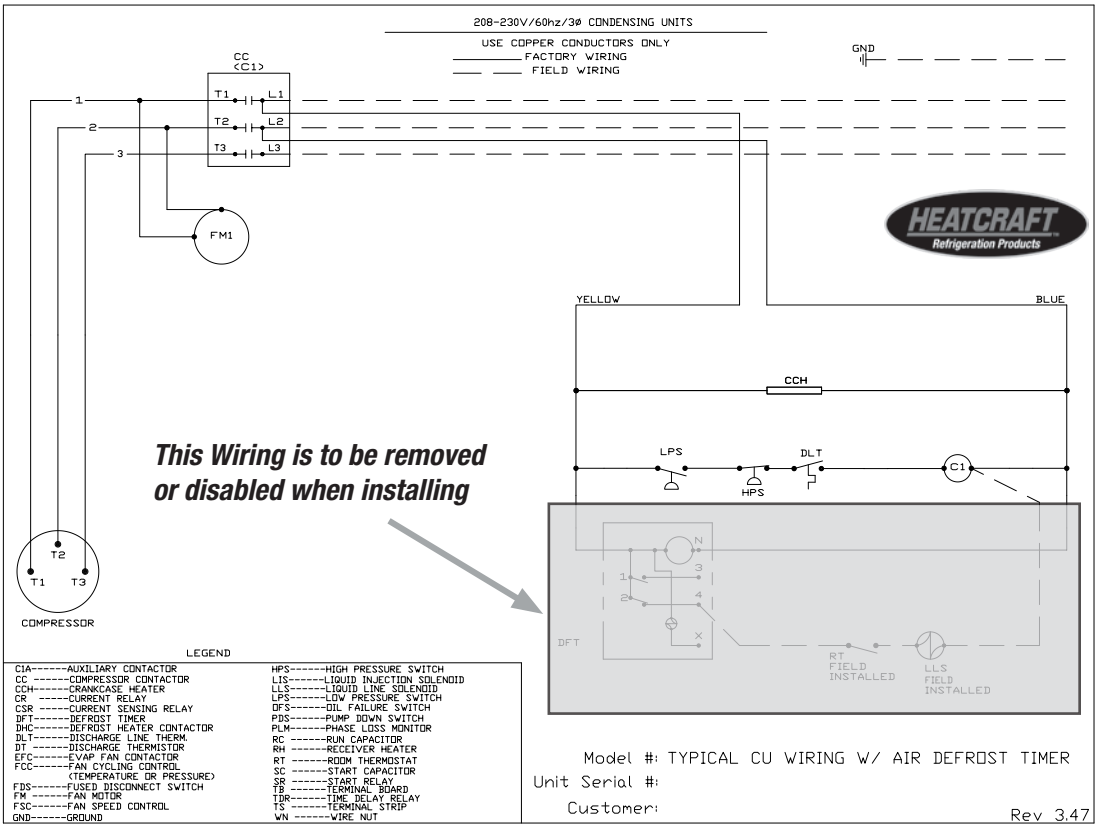


TYPICAL GENERIC CONDENSING UNIT WIRING DIAGRAM FOR intelliGen STAND-ALONE EVAPORATOR CONTROLLER

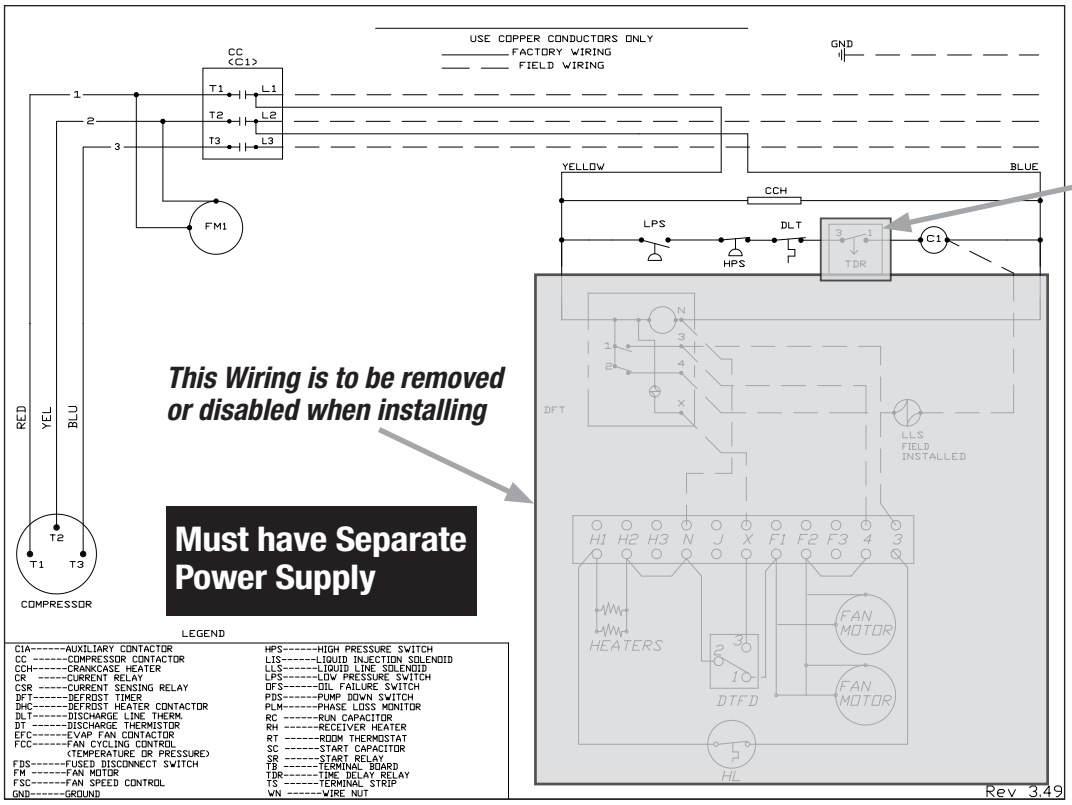


CONVENTIONAL CONDENSING UNIT WIRING CONVERSION FOR INTELLIGEN STAND-ALONE EVAPORATOR CONTROLLER

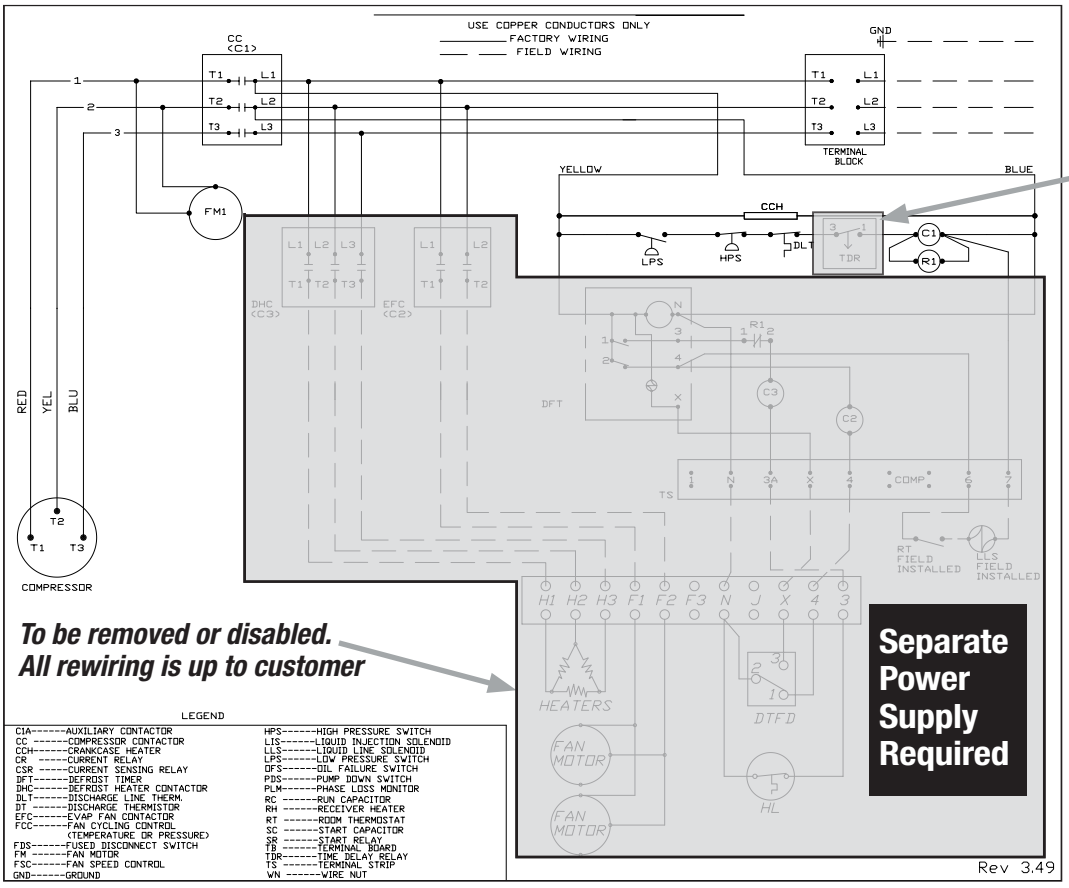




CONVENTIONAL CONDENSING UNIT WIRING CONVERSION FOR INTELLIGEN STAND-ALONE EVAPORATOR CONTROLLER



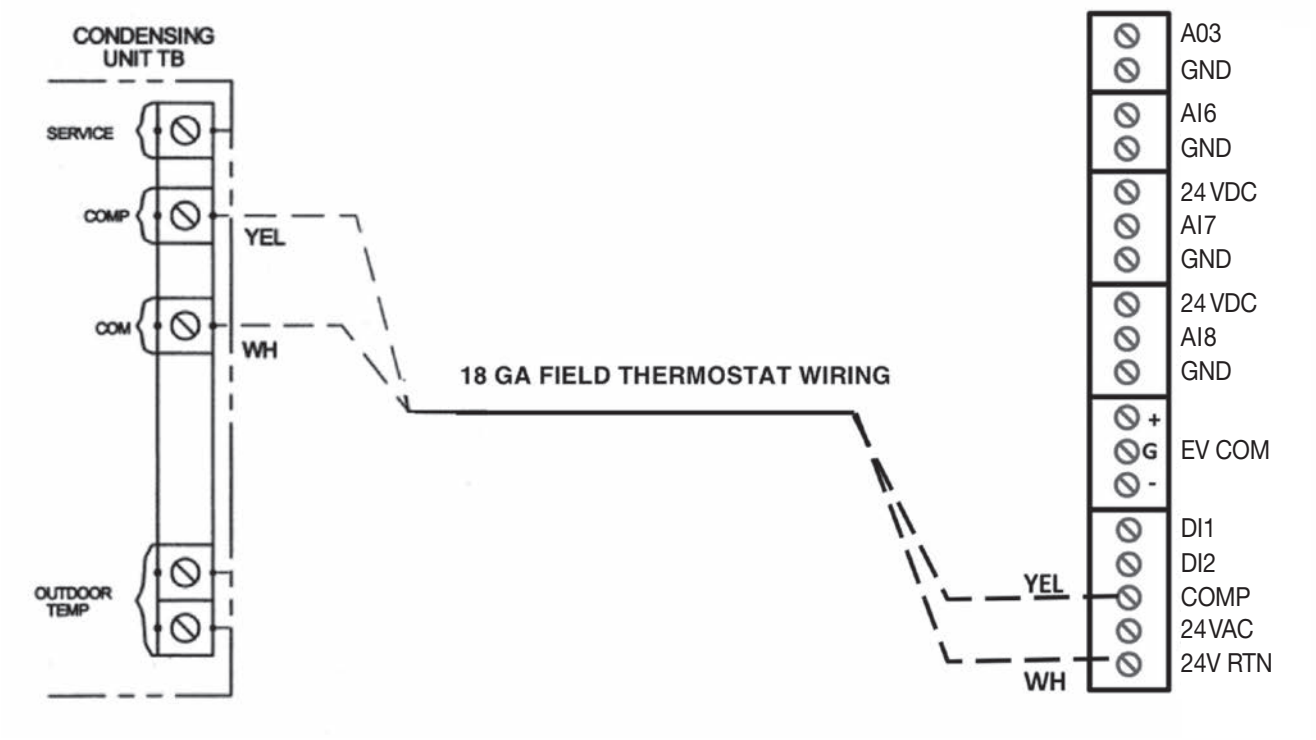
TDR to be bypassed or removed when installing



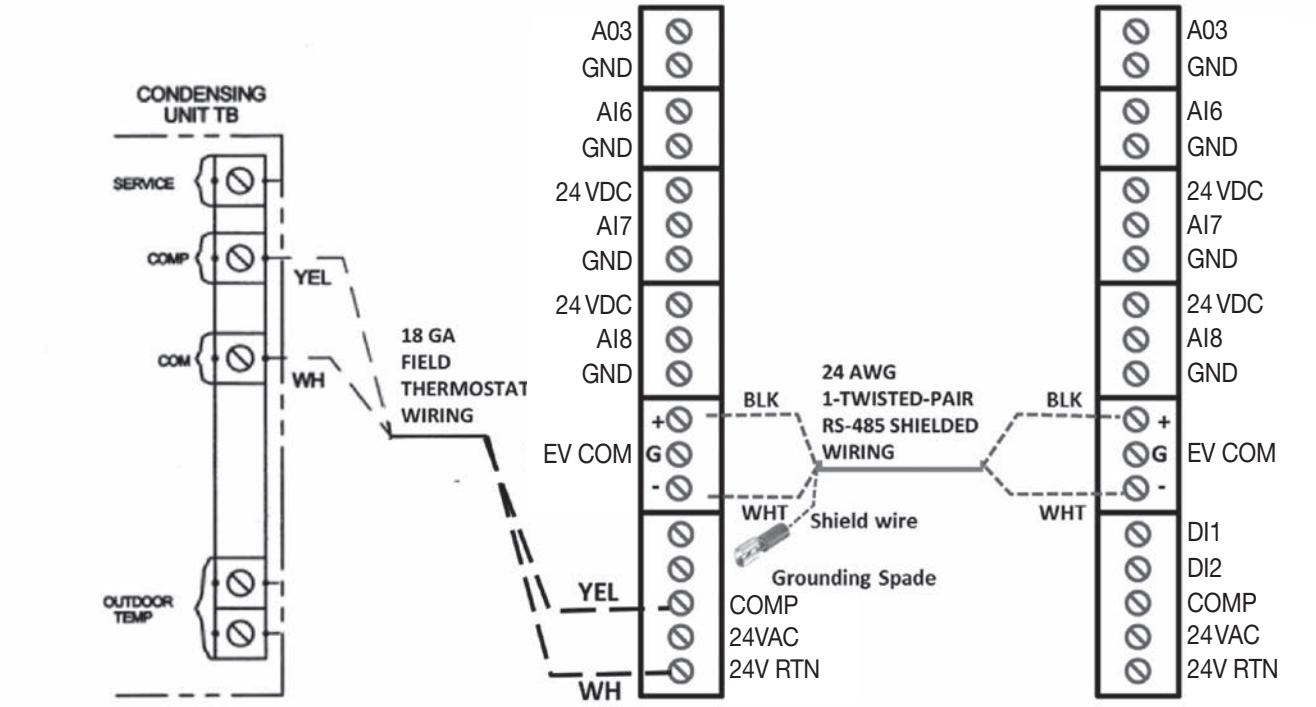
TDR to be bypassed or removed when installing

24 VOLT CONNECTION WIRING - HEATCRAFT CONDENSING UNIT

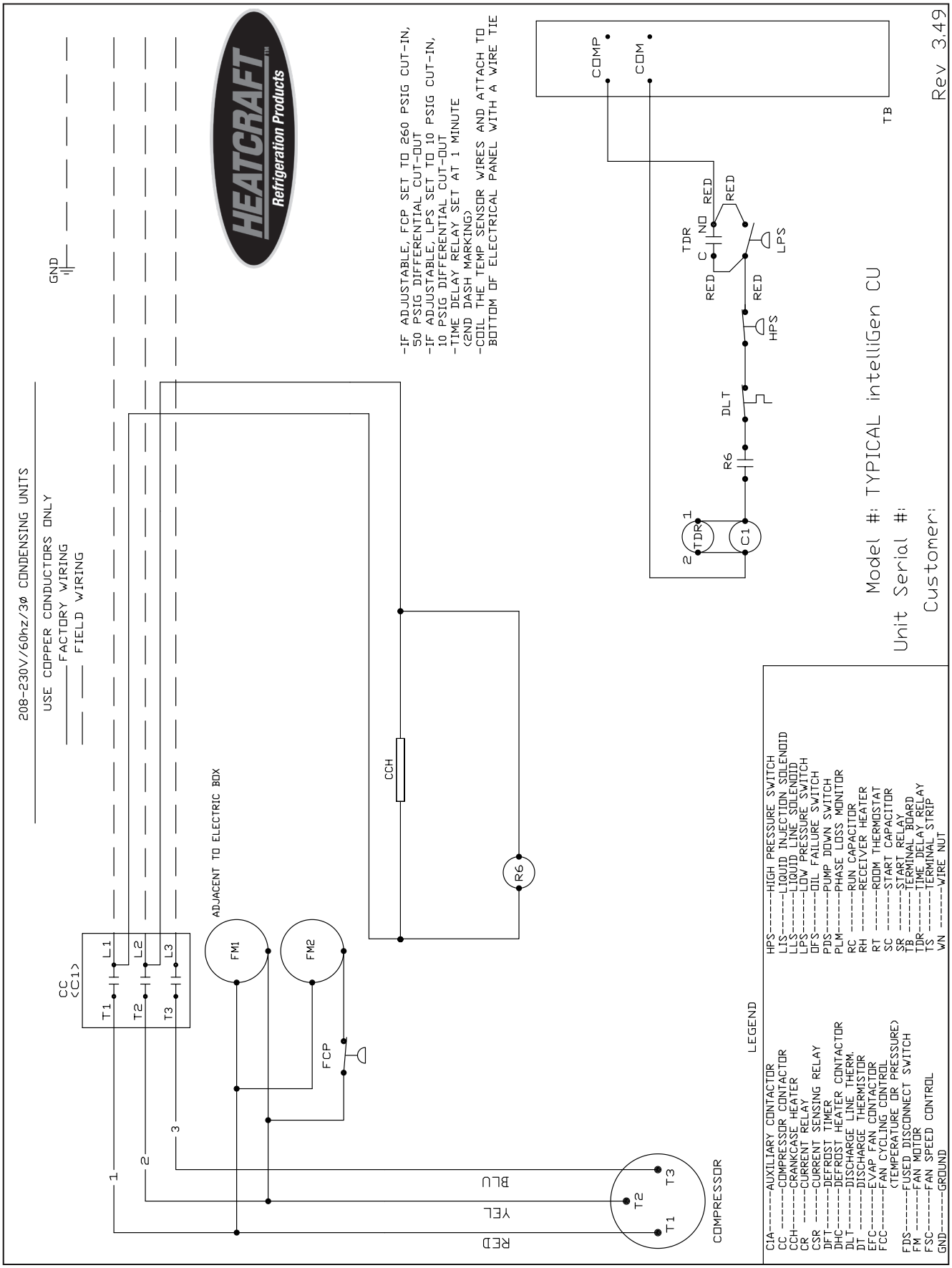
CONDENSING UNIT WITH ONE EVAPORATOR



CONDENSING UNIT WITH TWO EVAPORATORS



TYPICAL intelliGen CONDENSING UNIT WIRING



Installation Check List

Date of Start-up_____

Location Address_____

ELECTRICAL

- Check Primary Supply voltage at Evaporator If 208 V, change transformer wiring in the Cooler and Freezer to the 208 V tap

  YES NO
- Check Compressor Amps for COOLER and FREEZER compressors. Should match nameplate.

  YES NO

PIPING

- Is suction line trapped at the Cooler?

  YES NO
- Is suction line trapped at the Freezer?

  YES NO

DRAIN LINES

- Are drain lines sloped properly?

  YES NO
- Is drain line trapped outside the Cooler?

  YES NO
- Is drain line trapped outside the Freezer?

  YES NO
- Is heat tape wrapped along entire length of the drain line in the Freezer?

  YES NO
- Is heat tape plugged in and heating the drain line?

  YES NO

INSULATION

- Are Liquid lines fully insulated?

  YES NO
- Are Suction lines fully insulated?

  YES NO

SETTINGS

- Check Heatcraft intelliGen Refrigeration Board settings for the following:

FREEZER

Refrigerant Type _____
EXV Type _____
Box Setpoint Temp _____
Superheat _____
No. of Defrost / Day _____
Defrost End Temp. _____

COOLER

Refrigerant Type _____
EXV Type _____
Box Setpoint Temp. _____
Superheat _____
No. of Defrost/Day _____
Defrost End Temp. _____

CONDENSING UNIT

MODEL #_____
SERIAL #_____

COOLER UNIT

MODEL #_____
SERIAL #_____

FREEZER UNIT

MODEL #_____
SERIAL #_____

SYSTEM CHECKS

- Check Compressor Superheat for the COOLER (Should be between 20°F. & 30°F.)

  YES NO
- Check Compressor Superheat for the FREEZER (Should be between 20°F. & 30°F.)

  YES NO
- Force unit into a Defrost. Check heater amps. Should match nameplate amps.

  YES NO
- Check Low Pressure Switch on FREEZER. Should be set at 0 psig Cut-out/10 psig Cut-in. For CO2 90Bar application ONLY:
  Low Temp Application - 130 psig Cut-out / 190 psig Cut-in
  Medium Temp Application - 260 psig Cut-out / 320 psig Cut-in

  YES NO
- Did FREEZER and COOLER cycle off on LPS at Setpoint Temperature?

  YES NO
- Is the sight glass free of bubbles?

  YES NO
- Are the COOLER and FREEZER fans at proper speeds?

  YES NO
- Check system for refrigerant leaks. Are there any leaks on the COOLER, FREEZER, CONDENSING UNIT or INTERCONNECTING PIPING?

  YES NO
- Check system piping for unusual vibration or noise. Is there any unusual vibration or noise on the COOLER, FREEZER, CONDENSING UNIT or INTERCONNECTING PIPING?

  YES NO
- Start the FREEZER only. Does the compressor start and evaporator fans run for this FREEZER?

  YES NO
- For A2L refrigerant systems, is Refrigerant Detection System (RDS) installed and communicates with intelliGen?

  YES NO

Check-Out Installation

After the installation has been completed, the following points should be covered before the system is placed in operation:

(**a**) Check all electrical and refrigerant connections. Be sure they are all correct and tight.

(**b**) Check voltage taps on transformer at the evaporators. The transformer is shipped wired to 240 voltage tap/ connection. If your supply voltage is 208 volt systems, change to 208 voltage tap.

(**c**) Check high and low pressure controls, pressure regulating valves, oil pressure safety controls, and all other safety controls and adjust them, if necessary.

(**d**) Check and confirm the EXV type and pressure transducer type are selected correctly for the unit.

(**e**) On freezers only, check the low pressure switch setting. It must be set to 0 PSIG cut out, 10 PSIG cut in, to allow start and operation, especially in cold ambients. Applies to special intelliGen condensing units only.

(**f**) Suction and liquid lines should always be insulated.

(**g**) Wiring diagrams, instruction bulletins, etc. attached to the condensing units should be read and filed for future reference.

(**h**) All fan motors on air cooled condensers, evaporators, etc. should be checked for proper rotation. Fan motor mounts should be carefully checked for tightness and proper alignment.

(**i**) Observe system pressures during charging and initial operation. Do not add oil while the system is short of refrigerant unless oil level is dangerously low.

(**j**) Continue charging until system has sufficient refrigerant for proper operation. Do not overcharge. Remember that bubbles in a sight glass may be caused by a restriction as well as a shortage of refrigerant.

CAUTION: *Extreme care must be taken in starting compressors for the first time after system charging. At this time, all of the oil and most of the refrigerant might be in the compressor creating a condition which could cause compressor damage due to slugging. Activating the crankcase heater for 24 hours prior to start-up is recommended. If no crankcase heater is present, then directing a 500 watt heat lamp or other safe heat source on the lower shell of the compressor for approximately thirty minutes will be beneficial in eliminating this condition which might never reoccur.*

Initial Power On

When power supply is connected to the iRC for the first time, a series of inputs is required to identify specific system parameters. Since there are no factory set-point defaults pre-setup, the Quick Set-up procedure is triggered to capture essential information about the system when the system is first energized. This also occurs when a new iRC board is installed on a single evaporator system.

Inputs for the Quick Set-up are made using the iRC user interface (UI) control. The Control Knob on the iRC UI is used to navigate through the required steps and to identify selections. Turning the knob will navigate through possible selections for that particular parameter. Pressing the Control Knob makes selections (similar to an Enter key on a PC).



Scan the QR code to view the Quick Start Configuration Video

System Start-up

When the system is initiated for the first time, the compressor and the electric defrost evaporator fans will be in a hold-off cycle and will not start unless the hold-off cycle is complete. The electric expansion valve (EXV) then opens to 50% and will begin its superheat control sequence. The compressor starts and will be in a "hold-on" cycle. (This is to minimize short-cycling of the system).

At initial start-up, the system may cycle off after a few minutes and display a low superheat error, then restart itself. This cycle may be repeated a few times. Do not shut the system off. Let the system run, as it may take a few cycles for the electric expansion valve to attain the correct setting for the set superheat.

Do not leave the unit unattended until the system has reached normal operating conditions with the box pulled down to design conditions and the oil charge has been properly adjusted to maintain the oil level at the center of the sight glass.

When the room thermostat setting is satisfied (which may take a considerable amount of time on “hot-box” pulldown), and if the compressor has run for a minimum time for the “hold-on” cycle, the EXV will close (shutting off the refrigerant flow to the evaporator), and the system will pumpdown and shut off. The evaporator fans will continue to run.

Call for Cooling Start-up Operation

When the box temperature sensor detects a rise of approximately half the box temperature differential, and the system has been off a minimum of the hold-off cycle time, the EXV will open to its last position, and the compressor will start. The EXV is then adjusted as necessary to obtain and maintain the superheat setting. During this time, the compressor will run for a minimum of the “hold-on” cycle time.

User Interface Navigation

Home Menus

The QUICK SETUP inputs only appear when the system is first initialized and will NOT appear on iRC UI for any other system starts. Home menu display appears on system starts and when HOME is pressed.

If there is no UI activity for 5 minutes, the screen saver mode is activated. The UI display will cycle through **Box Temp / Box Temp SP, System**, and **Operating Mode** for 5 seconds each continuously.

Below are examples of operating modes:

OFF	Product Load
Cooling	Pumpdown
Defrost	Test
Drain	Service
Refreeze	Manual

Press the HOME button to access the HOME menus, **as shown below**.

MONITOR
ALARMS
BOX SETTINGS
SUPERHEAT CONTROL
DEFROST SETTINGS
EV FAN
EXV
RDS (For A2L Refrigerants Only)
CONNECTIVITY
GENERAL SETTINGS
MANUAL
CALIBRATION
USB OPERATION
SECURITY

The first HOME menu is the Monitor menu, which is read-only, and the values cannot be changed. This menu will be covered in the Diagnostics section of this manual.

PIN

There are two Personal Identification Numbers (PIN) set within iRC: Basic and Expert.

Factory defaults: **Basic = 888888**
Expert = 999999

Navigation

To navigate to other menus, turn the Control Knob on the iRC UI until the menu desired is displayed. Then press the Control Knob to select that menu.

The first item in the menu will now be displayed. To see a selection of set-point values, turn the Control Knob until you see the selection desired. Press the Control Knob to make the selection. Then the next set-point item will be displayed. Or you may press the return icon to return to the menu item prompt.

At any time, you may press the Return button to return to the beginning of the current menu. Or press the Home button to return to the main menu.



Return- Beginning of current menu



Home- Back to main menu

System vs Local Parameters

Some of the set-point menu items are for “system” parameters and others are for “local” parameters. System parameters are global settings which affect all of the iRCs on the system, while local parameters are for settings which affect a specific evaporator’s iRC.

The system parameters may be set or changed from any evaporator on the systems through its iRC UI. However, the local parameters can only be set using the iRC UI on the specific evaporator.

In the pages that follow for each menu, the properties of the related set-point items will be shown in table fields to indicate:

- Default Value for AIR, MED or LOW ELECTRIC defrost – Based on Quick Set-Up inputs
- Range of Input values available
- Type of parameter (system or local)
- Change Mode required (running or service)

Monitor Menu

In this menu, you can review the current status of most critical system parameters.

Parameter/Measurement	Range
BOX TEMP	-40°F to 125°F
BOX TEMP SP	-30°F to 60°F
SYSTEM NAME	20 characters of text
EV UNIT NAME	20 characters of text
BOX RH	0% to 100% RH
OPERATING MODE	(See page 24)
DATE & TIME	Current Date/Time
EV PRIMARY TEMP	-40°F to 125°F
EV AUX PROBE TEMP	-40°F to 125°F
SUPERHEAT TEMP	Calculated
COIL TEMP	-40°F to 125°F
EV SUCTION TEMP	-40°F to 125°F
EV SUCTION PRESSURE	### psig (Transducer Type Dependent**)
EXV STEP POSITION	### steps (EXV Type Dependent**)
SST	Calculated
DEFROSTS SINCE 12AM	Calculated
LAST DEFROST LENGTH	Calculated
USB LOG DUMP STATUS	Text varies based on USB log download status
BOARD VOLTAGE	18 to 30 VAC
ZONE NAME*	User Defined
ZONE TYPE*	Stand Alone / Lead-Lag Control
IRC SW VERSION	XX.YY.ZZZZ
IRC-UI SW VERSION	XX.YY.ZZZZ
IWC SW VERSION	XX.YY.ZZZZ

* Lead-lag zone are only applicable for intelliGen systems with Multi-System Control Card added. See installation and operation manual for Multi-System Control Card for details.

** Suction pressure and EXV step positions vary based on the type of refrigerant, EXV and pressure transducer selected for the unit.

Alarm Menu

Upon entering the Alarm menu, a list of all **active alarms** is displayed. Pressing and turning the control knob will allow you to scroll through the list. Next is the **alarm history** which lists all of the alarms since the last "clearing' of the alarms. The final menu item is **alarm configuration**.

Alarm Configuration Parameter/Set-Points	Parameter/Set-Point Defaults are Dependent on Defrost Type			Range	Type	Change Mode
	Air	Medium Electric	Low Electric			
ALARM HIGH BOX TEMPERATURE	50°F	40°F	5°F	-40°F to +90°F	System	Running
ALARM LOW BOX TEMPERATURE	30°F	20°F	-15°F	-40°F to +90°F	System	Running
ALARM DELAY TIME	60 min	60 min	60 min	2 to 120 min	System	Running
ALARM DOOR OPEN TIME	60 min	60 min	60 min	5 to 240 min	System	Running

BOX Settings Menu

The first item in this menu will allow you to enter or exit the **SERVICE** mode. Then the following parameters items are displayed for your settings. There are also entries to **Flash Evaporator ID** and **EV Wired to Condensing Unit**.

Parameter/Set-Point	Parameter/Set-Point Defaults are Dependent on Defrost Type			Range	Type	Change Mode
	Air	Medium Electric	Low Electric			
ENTER/EXIT SERVICE MODE	Execute			N/A	System	Running
BOX TEMP	Read-Only			-40°F to 125°F	System	N/A
BOX TEMP SP	35°F	25°F	-10°F	-30°F to 75°F		Running
BOX SP DIFFERENTIAL	2°F	2°F	2°F	1 to 10°F		Running
PROD LOAD TIME DELAY	0 min	0 min	0 min	0 to 60 min		Running
PROD LOAD MODE TIMER	20 min	20 min	20 min	5 mins to 24 hours		Running
DOOR SWITCH TYPE	Normally Open	Normally Open	Normally Open	Normally Open, Normally Closed	Local	Running
SERVICE SWITCH INPUT**	None	None	None	None, AI7, AI8	System	Service
MINIMUM RUN TIME	2 min	2 min	2 min	1 to 4 min		Service
MINIMUM OFF TIME	4 min	4 min	4 min	2 to 10 min		Service
SYS LOW SUPERHEAT SP	0°F	0°F	0°F	0-3°F	System	Service
REFRIGERANT	R404A	R404A	R404A	R404A, R507, R407A, R407C, R407F, R22, R448A, R449A, R455A, R454A, R454C, R744		Service
FLASH TO IDENTIFY EV	N/A			N/A	Local	Running
SELECT PRIMARY EV	N/A			User Defined	System	Service
TRANSDUCER TYPE*	28911201 (139.7PSIA) or 28911202 (300PSIA)			139.7 or 300 PSIA	Local	Service
CU WIRED?	N/A			User Defined	System	Service
SYSTEM NAME	N/A			User Defined	System	Running

* Pressure transducer setting 28911201 (139.7 PSIA) is intended for retrofitting Heatcraft legacy Beacon II and QRC systems with intelliGen controls. Factory-installed intelliGen systems typically use transducer 28911202 (300 PSIA). These transducers are applicable to A1 and A2L refrigerant systems only. CO2 systems require higher-pressure transducers.

** The SERVICE SWITCH INPUT selection menu is not showing on local user interface when a Webserver Card or Multi-system Control Card is installed. The selection menu is available on the webserver page.

Superheat Control Menu

In this menu, you will be able to set your design, desired operating superheat (at the evaporator) and also set the minimum superheat value which will trigger an error if any iRC operates for **2 minutes** below this value.

Parameter/Set-Point	Parameter/Set-Point Defaults are Dependent on Defrost Type			Range	Type	Change Mode
	Air	Medium Electric	Low Electric			
SUPERHEAT TEMP	Read-Only			N/A	Local	Running
SUPERHEAT SP	8°F	8°F	8°F	4°F to 20°F	Local	Running
SYS LOW SUPERHEAT SP	0°F	0°F	0°F	0°F to 3°F	System	Running
DIGITAL SCROLL COMP*	No			Yes / No	System	Service
DSC SUPHT AVG PERIOD*	20 Sec			1 to 60 Sec	System	Service

Note: * DIGITAL SCROLL COMP and DSC SUPHT AVG PERIOD parameters are designed for condensing units have digital scroll compressors. The superheat average period is a rolling average adjustment to help synchronize the EXV operation at the unit cooler with the digital scroll compressor operation at the condensing unit.

Defrost Settings Menu

From this menu, you are able to **force a defrost** from the first menu item. Next, you will be able to set the following set-points.

Parameter/Set-Point	Parameter/Set-Point Defaults are Dependent on Defrost Type			Range	Type	Change Mode
	Air	Medium Electric	Low Electric			
FORCE DEFROST	Execute			N/A	Local	Service
DEFROST TYPE	Air	Medium Temp Electric	Low Temp Electric	Air, Medium and Low Temp Electric	Local	Service
DEFROST STYLE	Timed	User Defined	User Defined	Timed, Smart, Demand	System	Service
NUMBER OF DEFROSTS	2	Defrost Style*	Defrost Style*		System	Service
DEFROST 1 SCHEDULE	12:00am	Defrost Style*	Defrost Style*	00:00 to 23:59	System	Service
DEFROST 2 SCHEDULE	12:00pm	Defrost Style*	Defrost Style*	00:00 to 23:59	System	Service
DEFROST 3 SCHEDULE	N/A	Defrost Style*	Defrost Style*	00:00 to 23:59	System	Service
DEFROST 4 SCHEDULE	N/A	Defrost Style*	Defrost Style*	00:00 to 23:59	System	Service
DEFROST 5-12 SCHEDULE	N/A	Defrost Style*	Defrost Style*	00:00 to 23:59	System	Service
DEFROSTS SINCE 12 AM	Read-Only			N/A	System	Service
DEFROST FAIL SAFE	40 min	30 min	30 min	10 to 200 min	Local	Service
DEFROST END TEMP SP	45°F	60°F	60°F	40°F to 100°F	System	Service
DRAIN DOWN PERIOD	1 min	2 min	2 min	1 to 10 min	System	Service
DUAL COIL TEMP?	No	No	No	Yes, No	System	Service
REFREEZE TIME SAFETY	N/A	3 min	3 min	1 to 10 min	System	Service
REFREEZE SUCTION SP	N/A	34°F	28°F	20°F to 35°F	System	Service

* Dependent on Defrost Style Selection

EV Fan Menu

In this menu, you will be able to set your fan control parameters.

Parameter/Set-Point	Defaults	Range	Type	Change Mode
EVAP FAN CONTROL STYLE	Standard	Standard, Two Speed, Variable	Local	Service
EVAP FAN STIR ENABLE	Off	On, Off	Local	Service
EVAP FAN STIR CYCLE FREQUENCY	12 min	12 to 30 min	Local	Service
EVAP FAN STIR DUTY CYCLE	60%	60%, 70%, 80%	Local	Service
EVAP FAN SPEED (OFF CYCLE)	50%	30% to 100% (2% increments)	Local	Service
EVAP FAN OFF*	No	No, Yes	Local	Service

Note: * When EVAP FAN OFF mode is activated with "Yes" selection, the evaporator fan will be on when the unit is in cooling. The evaporator fan will be off when the unit is not in cooling.

EXV Menu

In this menu, you can select Valve Type and reset EXV controls.

Parameter/Set-Point	Defaults	Range	Type	Change Mode
EXV TYPE	EXV-Carel	Varies by Refrigerant Selection	Local	Service
EXV STEP POSITION	Read-Only	Calculated	N/A	N/A
EXV ALGO RESET	Execute	Default Position (50% open)	System	Service
DSC EXV UPDATE RATE*	20 Sec	5 to 60 Sec	System	Service
ENTER MAN EXV MODE	0	Varies by EXV Selection	Local	Manual EXV

EXV Type	Step Range	Refrigerant Supported
EXV-Carel	255	A2L, A1
EXV-Sporlan	2500	A2L, A1, CO2
TXV	N/A	A2L, A1
EXV-CCMT 3L, 5L, 8L	210	CO2
EXV-Emerson CV4-7	750	CO2
EXV-CCMT 2, 4, 8	1100	CO2
EXV-CCMT 16	800	CO2
EXV-CCMT 24	1400	CO2

Note: * DSC EXV UPDATE RATE parameter is designed for adjustment to help synchronize the EXV operation at the unit cooler with the digital scroll compressor operation at the condensing unit.

RDS Menu

This RDS menu is available when A2L refrigerant is selected for the system. In this menu, you can turn RDS communication to intelliGen on and off, and change early warning leak detection setting.

Parameter/Set-Point	Defaults	Range	Type	Change Mode
RDS INSTALLED	Yes	Yes, No	Local	Service
RDS STATE	Read-Only	Initializing, Monitoring, Mitigating, Fault Handling, Servicing, User Test, No Good Value	Local	Running
EARLY WARN THRESH	6% LFL	5% to 12%, 0.5% increment	System	Running
SENSOR COUNT	Read-Only	1, 2, 3	Local	Running
VIEW SENSORS	Enter	1, 2, 3	Local	Running
RDS MODEL NO	Read-Only	1	Local	Running

RDS - View Sensors Menu

Parameter/Set-Point	Defaults	Range	Type	Change Mode
SENSOR X STATUS	Read-Only	Normal, Mitigation, Fault, Service	Local	Running
SENSOR X % LFL	Read-Only	X.X to XX.X %	Local	Running
SENSOR X TEMP	Read-Only	XX.X to XXX.X F	Local	Running
SENSOR X HUMIDITY	Read-Only	X.X to XX.X %	Local	Running

Connectivity Menu

In this menu, you can view and set connectivity parameters for both web based connections and building management system connections.

Parameter/Set-Point	Defaults	Range	Type	Change Mode
EXTERNAL MODBUS ADDR	0	0-246	System	Running
EXTERNAL BACNET ADDR	0	0-127	System	Running
BACNET/ExMODBUS BAUD	38400 bps	9600, 19200, 38400 bps	System	Running
ExMODBUS PARITY	EVEN	EVEN, NONE	System	Running
IP ADDRESS & SUBMASK	N/A			
WI-FI DIRECT	N/A			
REMOTE ACCESS	N/A			

Connectivity- IP Address & Submask

In this sub-menu, you can view and set IP parameters for web based connections.

Parameter/Set-Point	Defaults	Range	Type	Change Mode
ETHERNET MAC ADDR	Read-Only	12 digit hexadecimal	System	N/A
CONFIGURE IPv4	DHCP	DHCP, Static	System	Running
IPv4 ADDRESS	User Defined (Set Automatically if DHCP is selected)	0.0.0.0 - 255.255.255.255	System	Running
SUBNET MASK	User Defined (Set Automatically if DHCP is selected)	0.0.0.0 - 255.255.255.255	System	Running
DEFAULT GATEWAY	User Defined (Set Automatically if DHCP is selected)	0.0.0.0 - 255.255.255.255	System	Running
DNS SERVER ADDR	User Defined (Set Automatically if DHCP is selected)	0.0.0.0 - 255.255.255.255	System	Running

Connectivity- Wi-Fi Direct

In this sub-menu, you can view and set WIFI DIRECT parameters for connecting directly to the intelliGen Webserver Card (iWC) via a Wi-Fi enabled device. WI-FI Direct is a point-to-point wireless connection does not require setup a network with router.

Parameter/Set-Point	Defaults	Range	Type	Change Mode
WIFI DIRECT CONN	On	On, Off	System	Running
WIFI DIRECT SSID	Read-Only	Randomly generated Wi-Fi signal name (DT-intelliGen-xxxx)	System	N/A
WIFI DIRECT MAC	12 digit hexadecimal	N/A	System	N/A
WIFI NO OF CONNECTED DEVS	Read-Only	0-5	System	N/A
WIFI DEVICE 1 MAC	Read-Only	12 digit hexadecimal	System	N/A
WIFI DEVICE 2 MAC	Read-Only	12 digit hexadecimal	System	N/A
WIFI DEVICE 3 MAC	Read-Only	12 digit hexadecimal	System	N/A
WIFI DEVICE 4 MAC	Read-Only	12 digit hexadecimal	System	N/A
WIFI DEVICE 5 MAC	Read-Only	12 digit hexadecimal	System	N/A

Connectivity- Remote Access

In this sub-menu, you can view remote web connection status and debug information .

Parameter/Set-Point	Defaults	Range	Type	Change Mode
REMOTE WEB SETUP	Execute	Execute, System ID of registered system	System	N/A
REMOTE IP	Read-Only	Remote web-server web connection IP	System	N/A
REMOTE CONNECTION	Read-Only	Status of remote connection	System	N/A

General Settings Menu

In this menu, you will be able to set your general system parameters.

Parameter/Set-Point	Defaults	Range	Type	Change Mode
TIME FORMAT	12 Hour Format	12 Hr, 24 Hr	System	Service
COUNTRY	User Defined	US, Canada	System	Service
TIME ZONE	User Defined	Various	System	Service
UTC OFFSET	User Defined	For 'Non-standard" time zone only	System	Service
DAYLIGHT SAVINGS?	User Defined	Yes, No	System	Service
DATE & TIME	User Defined	Year	System	Service
DATE & TIME	User Defined	Month	System	Service
DATE & TIME	User Defined	Day	System	Service
DATE & TIME	User Defined	Hour	System	Service
DATE & TIME	User Defined	Minute	System	Service
DATE & TIME	User Defined	AM/PM	System	Service
TEMPERATURE UNITS	°F	°F, °C	System	Service
PRESSURE UNITS	PSIG	PSIG, kPa, Bar	System	Service
LANGUAGE	English	English, Spanish, French	System	Running
LIGHT BAR ENABLE	Yes	Yes, No	System	Service
EV UNIT NAME	User Defined	N/A	System	Running
EV UNIT ADDRESS	1	N/A	System	Running
FACTORY RESET	Execute	N/A	System	Service

Manual Menu

In this menu, you will be able to set manual control parameters.

Parameter/Set-Point	Defaults	Range	Type	Change Mode
RESET ACTIVE TIMER	Execute	N/A	System	Running
MANUAL RELAY MODE	Off	Off, EV Spare Relay, EV Fan Relay, EV Solenoid Relay, EV Alarm Relay, EV 2 Speed Fan Relay, Heater/Defrost Relay	Local	Service
TEST MODE	Off	On, Off	System	Service

Note: After enter test mode, it automatically cycles through all of the relays outputs on the iRC main control board for 10 seconds on and 10 seconds off for each relay. This sequence repeats three times then returns to the Service mode.

Calibration Menu

In this menu, you will be able to configure off-set calibration parameters.

Parameter/Set-Point	Defaults	Range	Type	Change Mode
BOX TEMPERATURE SENSOR	0	-10 to +10°F	Local	Service
EVAP SUCTION TEMPERATURE SENSOR	0	-10 to +10°F	Local	Service
EVAP SUCTION PRESSURE SENSOR	0	-10 to +10 psig	Local	Service
EVAP AUX TEMPERATURE SENSOR	0	-10 to +10°F	Local	Service
EVAP COIL TEMPERATURE SENSOR	0	-10 to +10°F	Local	Service

USB Operation

In this menu, you wlll be able to select and execute USB functions.

Parameter/Set-Point	Defaults	Range	Type	Change Mode
FIRMWARE UPDATE	N/A	Execute	Local	Service
LOGS COPY	N/A	Select Log Type (Operational Logs, Transactional Logs, Alarm Logs, All Logs)	Local	Running

Security

In this menu, you will be able to configure security pins.

Parameter/Set-Point	Defaults	Range	Type	Change Mode
BLOCK LOCAL ACCESS	No	Yes / No	Local	Running
BLOCK REMOTE ACCESS	No	Yes / No	Local	Running
BASIC PIN	N/A	Change	System	Service
EXPERT PIN	N/A	Change	System	Service
RESET SECURITY PINS	N/A	Execute	System	Service

Anti-Short Cycling Provision

To minimize the problems associated with rapid, short cycling of the compressor, the intelliGen™ Refrigeration Controller has anti-short cycling included. Therefore, the refrigeration system will NOT be energized until the **Minimum Off Time** has been reached ... regardless of a call for cooling. And it will not end the cooling cycle until the **Minimum Run Time** has elapsed.

NOTE: *For condensing units have an Anti-Short Cycle Time Delay Relay (ASCT) installed for compressor short cycle protection. These time delay relays should be removed when connecting the condensing unit to unit coolers with intelliGen installed.*

Call for Cooling (Evap Controller Only)

When there is a call for cooling, the current box temperature measurement is greater than the **Box Temperature Set Point** plus half the **Box Differential Set Point** value and the **Minimum Off Time** is satisfied, the control program will evaluate the conditions and begin opening the expansion valve (EXV) to its last position prior to the last pumpdown and begin its superheat control sequence. The compressor will start when the suction pressure reaches the cut-in setting of the low pressure control.

Once started, the system will run until the **Minimum Run Time** has elapsed before shutting off even if the box temperature is satisfied, unless forced off by any safety or system protection in the control circuit.

Pumpdown (Evap Controller Only)

When the box temperature measurement is less than box temperature set point minus half the differential set point the system records and closes the EXV step position into memory, and the system goes into pumpdown mode and goes into an off cycle with the compressor turning off when the suction pressure falls below the low pressure switch cut-out setting.

The evaporator fan motor(s) will remain on and be controlled by the “Stir” cycling settings during the off cycle.

Call for Cooling (System Controller)

When there is a call for cooling, the current box temperature measurement is greater than the **Box Temperature Set Point** plus half the **Box Differential Set Point** value and the **Minimum Off Time** is satisfied, the control program will evaluate the suction pressure and determine an optimized start-up sequence to ensure proper compressor start-up.

Once started, the system will run until the **Minimum Run Time** has elapsed before shutting off even if the box temperature is satisfied, unless forced off by any safety or system protection in the control circuit.

NOTE: *For system controllers, during the OFF mode the controller will monitor system suction pressure. If it rises to 10 psig or more, a short pump-down cycle of 15 seconds will be initiated as long as the **Minimum Off Time** is satisfied.*

Pumpdown (System Controller)

When the box temperature measurement is less than box temperature set point minus half the differential set point the system closes the EXV and records the EXV step position into memory, and the system goes into pumpdown mode. It goes into an off cycle with the compressor turning off when the suction pressure falls below the low pressure switch cut-out setting, or the primary unit’s suction pressure falls below 5 psig, or 2 minutes have elapsed in the pumpdown mode.

The evaporator fan motor(s) will remain on and be controlled by “Stir” cycling settings during the off cycle.

Cooling Sequence of Operation

Defrost Initiation

When a defrost is initiated based on time of day, frost load magnitude or 'forced', the controller must first check that the compressor has been on for the **Minimum Run Time**, then the EXV closes, its position is saved in memory, the compressor is allowed to pump-down and shut off.

If the iRC is connected to a condensing unit, the compressor safety circuit will be locked out for the duration of the defrost cycle.

Air Defrost Mode

The evaporator fans stay on during the entire defrost cycle. The air defrost cycle is performed for the specific time period set by the **Defrost Fail Safe Time**. Once the air defrost cycle has been terminated the system goes back into normal cooling mode without the need for a Refreeze cycle.

Electric Defrost Mode

The evaporator fans are cycled off and the defrost heaters are energized. On multiple evaporator systems, all controllers must terminate their defrost, either on temperature or fail-safe time, before the iRC will end the defrost cycle.

Timed Interval Defrost:

Timed defrost is simply the selection of a number of defrost that are desired per day. The system will then evenly distribute that number of defrost among a 24 hour time period. If Timed Defrost is selected, but no defrost times are specified, the controller will initiate one defrost each day at midnight. When this value is changed, all Defrost 1-12 values will be reset to default values based on selected value. The initial default Defrost 1 value will be 00:00 (midnight) and each successive Defrost value will be spaced evenly from the first 00:00 value. After the default values have been set, the user can manually adjust each defrost time.

Smart Defrost:

Smart Defrost is the means of evaluating the magnitude of the frost load on the evaporator coil and initiating a defrost cycle at one of multiple set defrost opportunity times if the system determines the frost load will exceed the minimum acceptable level. Defrost can only occur at one of these time intervals to allow some means of scheduling when a defrost may occur. If Smart Defrost is selected, the controller will initiate at least one defrost every 24 hours of COOLING mode run time. If a system has multiple evaporator units, each iRC will have to run the appropriate algorithm statistics. When the system checks for a defrost, all units in the system must permit a skipped defrost. Even if only one unit needs to defrost, all units will enter the defrost mode.

Demand Defrost:

Demand Defrost is the means of evaluating the magnitude of the frost load on the evaporator coil and initiating a defrost cycle when the frost load has exceeded the minimum acceptable level. If a system has multiple evaporators, each iRC will have to run the appropriate algorithm statistics. As soon as one iRC decides a Defrost is necessary, all units on that system will enter defrost mode.

Drain Down Period

This period allows any remaining droplets to drain from the coil and drain pan. The evaporator will sit idle waiting for the remaining evaporators to terminate their defrost. If the **Defrost Fail Safe Time** Set Point has elapsed prior to all of the evaporators terminating their defrost, the primary controller will force all of the coils to terminate and perform the drain down period.

Refreeze Cycle

If there is a call for cooling immediately following the drain down period, the EXV opens to its last position and the compressor is energized. The evaporator fans remain off during this period until all the evaporator Suction Temperatures go below the **Refreeze Suction Temp** or the **Refreeze Time** has been exceeded. Then the evaporator fans are turned on and the system returns to normal Cooling operation.

Updating Firmware Using USB

Firmware updates to the intelliGen Refrigeration Controller board may be accomplished using a USB flash drive by following the steps below:

1. The firmware file to be uploaded to the intelliGen Refrigeration Controller should be saved on a USB flash drive within a folder named 'firmware'. The firmware folder should reside in the root directory of the flash drive. Example D:\firmware
2. With the firmware file properly saved to the flash drive, insert the drive into the USB socket on the iRC board. The socket is located directly below the battery.
3. On the iRC User Interface, press the Home Button twice (2) and then use the turn knob to navigate to and select the "USB OPERATION" menu.
4. Use the knob to scroll to the "Firmware Update" option and press the knob to 'Execute'.
5. Enter the Expert PIN (default is 999999) and press the knob to submit. (If not in 'Service' mode, the iRC will automatically enter service; this process can take up to 2 minutes and the iRCUI will display "Entering Service Mode... please wait")
6. Press the knob again to start the update process.
7. The iRCUI will display "Checking FW File" as it searches the flash-drive for an appropriate firmware file.
8. The iRCUI will display: "FIRMWARE UPDATE Install vXX. XX.XXXX?"
9. If the displayed firmware version is the correct, desired update, press the Knob to initiate install.
10. The iRCUI will display "UPDATING FIRMWARE" followed by a status message indicating update progress.
11. Once update is complete, iRCUI will go blank and automatically restart. Once the iRCUI goes blank, it may take several minutes for the board to restart. This process can be expedited by power cycling the 24V power on the iRC.
12. Update should now be complete, to confirm current firmware version, Press the Home button twice (2) and go to "iRC SW VERSION" under the "MONITOR" menu.
13. Exit Service Mode to put the system back to normal operation. Go to "BOX SETTINGS" menu, select "Exit" in the "IN SERVICE MODE" sub-menu.

USB Drive Support

The following brands of USB drives were tested compatible.

- SanDisk
- Kingston
- Transcend
- PNY
- Samsung
- Microcenter

Results may vary if other generic brands of USB drive is used. The older intelliGen iRC board part numbers 28918001 and 28918002 support USB drive with storage capacity up to 32GB and file format FAT32.

Product Load Mode – Optional Input

Product Load mode is defined as the period after an external switch has been toggled or momentarily closed for 2 seconds that pumps the system down and turns off all of components such as EXV, fans, heaters, alarm, etc. This mode has a user set **Prod Load Mode Timer** to force the system back into operation regardless of the Product Load switch state.

If the System is in Defrost Mode when the Product Load Mode is enabled, the system will complete the defrost cycle, then enter the Product Load Mode.

During this Product Load Mode high box temperature alarms shall be ignored for the duration plus **Prod Load Time Delay** parameter setting after Cooling mode has been restarted.

Superheat Control Sequence

The EXV is adjusted to maintain the ‘target’ superheat every 20 seconds on a stand-alone board and every 45 seconds with a condensing unit wired. It is more aggressive in closing the EXV than opening the EXV.

Door Open – Optional Input

This is wired to a door sensor to monitor when a door is open and the duration of each event (if greater than 2 seconds). If the door open time exceeds the time in parameter **Door Open Alarm Time**, an alarm is triggered.

If the High Box Temp alarm has been exceeded and the door has been open a minimum of 10 minutes during 30 minutes, and the door is now closed, the High Box Temp alarm will be delayed by 30 minutes and then reevaluated.

Door switch input can be set to 'Normally Open' or 'Normally Closed' via the Box Settings menu to accommodate various door switch configurations.

Evap Auxiliary Temp – Optional Input

This sensor may be used to measure an additional sensor such as a **product simulator**. The purpose of monitoring and logging product temperatures may be for personal use or regulator requirements.

It can be used as a Dual Coil **Termination defrost control** for evaporators with two different coils. For this use, the standard coil temperature sensor will be used for one coil while the auxiliary sensor is used for the second coil. Both sensors must reach the specified set-point value for the defrost cycle to terminate.

If it is used as the **main controlling temperature** for the refrigerated space and an alarm or error is triggered for it, the system will fall back to the Box Temp sensor (if available) or the Coil Temp sensor until the Auxiliary Temp sensor is replaced. Similar fall back is used for Box Temp sensor as primary box sensor. Auxiliary temp used first then Coil temp next.

NOTE: *The Auxiliary Temp Sensor may be designated as ONLY ONE of the three uses shown above.*

Service Mode

This mode is enable through execution from the Box Sys Settings menu. It is similar to the Product Load mode, except it does not have a maximum time delay override feature. It will stay in the Service Mode until the mode is **exited** from the Box Sys Settings menu.

Digital Scroll Compressor Support

For condensing units with digital scroll compressor, it may require the EXV refresh timing to be in sync with the digital scroll compressor update timing for the refrigeration system to work properly. intelliGen's EXV update rate and superheat average period can be adjusted in the EXV Menu and the Superheat Control Menu to be compatible with the digital scroll compressor operation at the condensing unit.

Spare I/O Configurations

Analog inputs AI7 and AI8 are configurable spare inputs. A Webserver card (iWC) or Multi-System Control Card (MSC) is required to configure the spare inputs. AI8 comes with factory default set as remote service switch input. These are the configurable input options.

* Service Mode Switch
* Humidity Sensor

Dual Defrost Sensors Termination

In certain high humidity applications, if the default defrost cycle was not able to completely defrost the coil. Adjust the defrost settings (Defrost End Temperature Setpoint and Defrost Fail Safe Timer) to better align with the application's operating conditions would address the issue. If the problem still persist after the settings adjustment, use the Dual Coil Temperature Termination feature to improve the defrost performance.

1. Run the unit cooler through a defrost cycle. Monitor both sides of the coil during the defrost cycle and identify the coldest part of the unit for the location to mount an Auxiliary Temperature Sensor as the second coil temperature sensor. Typically, the location where the frost last to disappear is the coldest location to mount the temperature sensor.
2. Mount an Auxiliary Temperature Sensor to the coldest location of the unit.
3. Install the input end of the auxiliary temperature sensor to the AI6 input terminals (labeled Aux Temp) on the iRC control board. The AI6 input terminals are located at the lower left corner of the iRC control board.
4. From the intelliGen local user interface, navigate to the DEFROST SETTINGS/DUAL COIL TEMP? menu. Press the knob to enter to change the setting.
5. Enter the expert pin (factory default pin 999999) when prompted and the unit would automatically enters Service Mode to allow change.
6. After the unit entered Service Mode, select "Yes" to activate the Dual Coil Temperature Termination. After activation, both the primary coil temperature sensor and the auxiliary temperature sensor must reach the specified defrost termination temperature setpoint to end the defrost cycle.
7. Press the "HOME" button to get back to the MONITOR menu.
8. Rotate the knob and navigate to the BOX SETTINGS menu.
9. Press the knob to get to the SERVICE MODE menu. Press the knob again to select "Exit" to put the unit back to normal operation mode.

A2L Alarm and Alerts

For A2L refrigerant unit coolers, a Refrigerant Detection System (RDS) is required in the unit cooler to detect refrigerant leaks and perform mitigation actions to meet regulatory requirement. intelliGen has the capability to communicate with the RDS control board via RS-485 communication connection and provide A2L related alarm alerts and status reporting.

The intelliGen user interface will display the below error codes and the yellow lightbar as alerts when the RDS detects the error condition.

ER32: A2L Early Warning-X**
ER33: A2L Sensor Fault
ER34: A2L Service-X**
ER35: A2L Mitigation-X**
ER36: A2L Refrigerant Mismatch
ER37: A2L Mitigation Controller Communication Loss

> **NOTE:** ** X indicates the A2L refrigerant leak detection sensor number.

When the RDS detects refrigerant leak and the refrigerant concentration level reaches the defined mitigation level, it enters mitigation mode, closes safety shut-off valve, turns on the circulation fan, and the ventilation fan if required. The intelliGen user interface will display the below alarm code and the red lightbar.

AL12: A2L Override

Service Record

Outdoor Temperature _____°F DATE: _____

Condensing Unit Supply Voltage _____Volts _____PH _____Hz

Cooler Temperature _____°F

Cooler Compressor Amps _____L1 _____L2 _____L3

Cooler Discharge Pressure _____PSIG

Cooler Suction Pressure @ Compr_____PSIG @ Evap_____PSIG

Cooler Suction Temperature @ Compr_____PSIG @ Evap_____PSIG

Cooler Refrigerant Charge _____lbs. of R-_____

Cooler Discharge Temperature _____°F/°C

Freezer Temperature _____°F/°C

Freezer Compressor Amps _____L1 _____L2 _____L3

Freezer Discharge Pressure _____PSIG

Freezer Suction Pressure @ Compr_____PSIG @ Evap_____PSIG

Freezer Suction Temperature @ Compr_____PSIG @ Evap_____PSIG

Freezer Refrigerant Charge _____lbs. of R-_____

Freezer Discharge Temperature _____°F/°C

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Evaporators

All evaporator units should be checked once a month or more often for proper defrosting because the amount and pattern of frosting can vary greatly. It is dependent on the coil temperature, the temperature of the room, the type of product being stored, how often new product is brought into the room and the percentage of time the door to the room is open. It may be necessary to periodically change the number of defrost cycles or adjust the duration of defrost.

Condensing Units / Evaporators

Under normal usage conditions, maintenance should cover the following items at least once every 6 months:

1. Check and tighten ALL electrical connections
2. Check all wiring and insulators
3. Check contactors for proper operation and for worn contact points
4. Check all fan motors. Tighten motor mount bolts and nuts and tighten fan set screws
5. Clean the condenser coil surface
6. Check the refrigerant and oil level in the system
7. Check the operation of the control system. Make certain all safety controls are operating properly
8. Check that all defrost controls are functioning properly
9. Clean the evaporator coil surface
10. Clean the drain pan and check the drain pan and drain line for proper drainage
11. Check the drain line heater for proper operation, cuts and abrasions
12. Check and tighten all flare connections
13. Verify settings on adjustable Low Pressure Switches and Time Delay Relays are correct

Check-Out & Start-Up

After the installation has been completed, the following points should be covered before the system is placed in operation:

(a) Check all electrical and refrigerant connections. Be sure they are all correct and tight.

(b) Check voltage taps on transformer at the evaporators. The transformer is shipped wired to 240 voltage tap/ connection. If your supply voltage is 208 volt systems, change to 208 voltage tap.

(c) Check high and low pressure controls, pressure regulating valves, oil pressure safety controls, and all other safety controls and adjust them, if necessary.

(d) On freezers only, check the low pressure switch setting. For A2L and A1 refrigerant systems, it must be set to 0 PSIG cut out, 10 PSIG cut in, to allow start and operation, especially in cold ambients. For CO2 90Bar systems, set to 130 PSIG cut out and 190 PSIG cut in.

(e) Suction and liquid lines should always be insulated.

(f) Wiring diagrams, instruction bulletins, etc. attached to the condensing units should be read and filed for future reference.

(g) All fan motors on air cooled condensers, evaporators, etc. should be checked for proper rotation. Fan motor mounts should be carefully checked for tightness and proper alignment.

(h) Observe system pressures during charging and initial operation. Do not add oil while the system is short of refrigerant unless oil level is dangerously low.

(i) Continue charging until system has sufficient refrigerant for proper operation. Do not overcharge. Remember that bubbles in a sight glass may be caused by a restriction as well as a shortage of refrigerant.

(j) Do not leave unit unattended until the system has reached normal operating conditions and the oil charge has been properly adjusted to maintain the oil level at the center of the sight glass.

(k) At initial start-up, the system may cycle off at 2 minutes and display a low superheat error, then restart itself. This cycle may be repeated a few times. Do not shut the system off. Let the system run, as it may take a few cycles for the electric expansion valve to attain the correct setting for the desired superheat.

CAUTION: *Extreme care must be taken in starting compressors for the first time after system charging. At this time, all of the oil and most of the refrigerant might be in the compressor creating a condition which could cause compressor damage due to slugging. Activating the crankcase heater for 24 hours prior to start-up is recommended. If no crankcase heater is present, then directing a 500 watt heat lamp or other safe heat source on the lower shell of the compressor for approximately thirty minutes will be beneficial in eliminating this condition which might never reoccur.*

Mounting the Webserver Card (iWC) and Multi-System Control Card (MSC)

To enable local and remote access to the intelliGen system, a Webserver Card or Multi-System Control Card may be mounted to the iRC. There is a row of pins protruding from the back and top of the card which must plug into sockets on the board located near the center of the board above the CPU (central processing unit) chip.

TURN OFF POWER TO THE iRC BOARD. Take care when plugging the card into the board to not bend any of these pins. After the pins on the card are settled into the board, #6-32x1 stainless steel machine screws are required to secure the card to the board. Do not over tighten.

Local Access

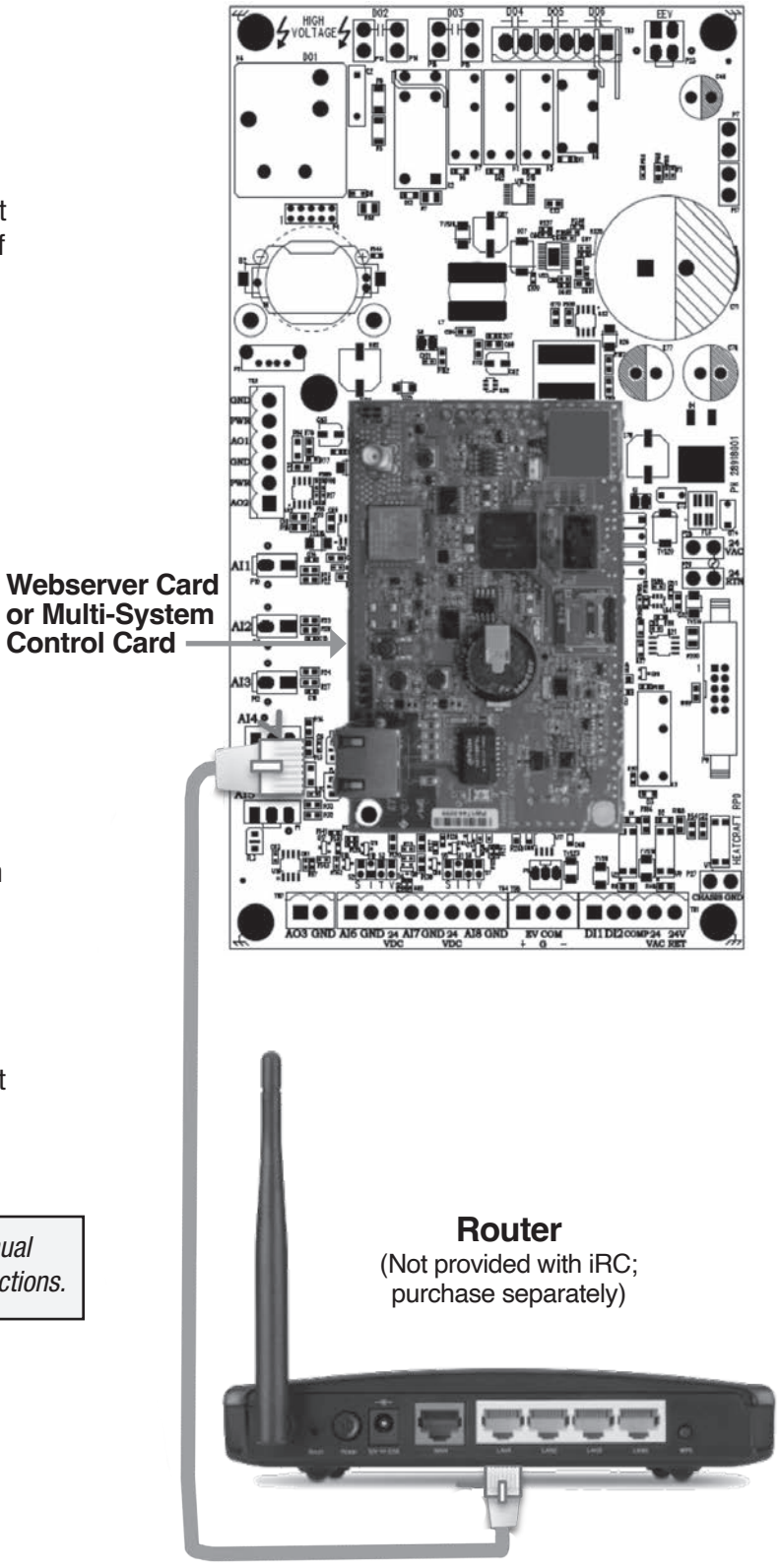
For local access to the intelliGen system using a smart device, you will need to connect the card to a wireless. Connect a CAT5e cable to the connector at the bottom, left side of the Webserver Card or Multi-System Control Card. Then connect it to a "LAN" connection on the router. Once the router is powered up, you can connect a smart device to communicate with the system through the router by selecting the router's SSID.

Remote Access

To connect to the intelliGen system from any internet device for remote access, the router needs to be internet enabled and connected. New the SSID will be available for internet connection.

NOTE: *Refer to iWC & MSC Installation & Operation Manual (H-IM-iWC/MSC) for installation and maintenance instructions.*

Scan the QR code or visit www.intelliGencontrols.com/ resources to view the manual.

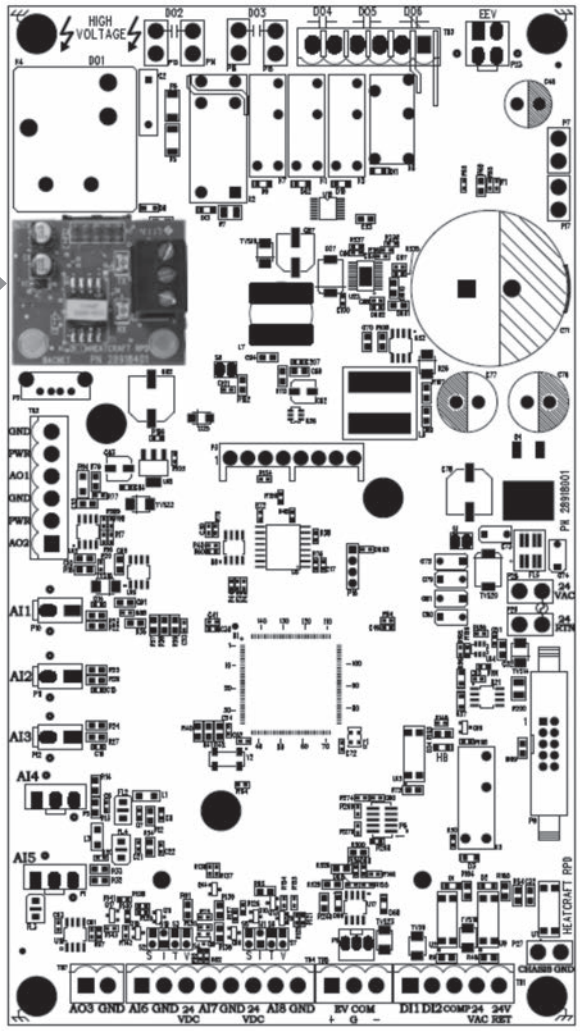


Mounting the Integration Card (iIC)

To enable access to the intelliGen system through a Building Automation System, an Integration Card may be mounted to the iRC. There two rows of pins protruding from the back and top of the card which must plug into sockets on the board located above the clock battery.

TURN OFF POWER TO THE iRC BOARD. Take care when plugging the card into the board to not bend any of these pins. After the pins on the card are settled into the board, mounting screws are required to secure the card to the board. Do not over tighten. For proper mounting, #6-32x1 inch stainless steel machine screws should be used.

iIC



BAS Access

To connect to the intelliGen system to a Building Automation System requires wiring to the 3-pin black communication pluggable terminal block and plugging it into the connector on the right side of the card. Wiring to the pluggable terminal block must be in accordance to the wiring prescribed by your BAS connection protocol.

NOTE: *Refer to iIC Installation & Operation Manual (H-IM-iIC) for installation and maintenance instructions.*

Scan the QR code or visit www.intelliGencontrols.com/resources to view the manual.

Light Bar on iRC UI

There are several different features available on the intelliGen Refrigeration Controller to inform users of current system or local unit status or condition. The most predominant feature is the light bar on the iRC UI which provides immediate and very noticeable visual indication of the status of the system.

It will display a green light bar if the system is running normally with no errors or alarms. If there is an error on any of the evaporators on the system, all light bars will display yellow, and the unit with the error will have a flashing yellow light bar.

Likewise, if there is an alarm on any of the units on the system, all light bars on all of the system evaporators will turn red with the unit causing the alarm flashing red. This allows for a quick notice of a situation which needs to be addressed and the location of the problem.

OLED Display

When an error or alarm conditions occurs, it's code is shown on the OLED display (see codes on the right). There are also INFORMATION codes which may appear to notify of unwanted conditions for possible remedial actions (see codes to the right).

Errors

ER01: Box Temp
ER02: Coil Temp
ER03: EV Suc Temp
ER04: EV Suc Press
⚠ **ER11: Control Circuit (only if CU wired)**
ER13: Spare I/O
ER14: Power Supply Low
ER15: Power Supply High
ER16: Low Superheat

Errors (cont.)

ER18: Aux Probe Temp
ER19: Replace Battery / Set Time
ER20: Log Disrupted
ER22: UI Failure
ER23: Board Comm
ER24: Aux Temp Override
ER25: System Cxn Lost
ER26: EV Cxn Lost
ER27: High Humidity
ER28: Low Humidity
ER29: Humidity Sensor
ER31: LL Conn Lost - xxx*
ER32: A2L Early Warning-X**
ER33: A2L Sensor Fault
ER34: A2L Service-X**
ER35: A2L Mitigation-X**
ER36: A2L Refrigerant Mismatch
ER37: A2L Mitigation Controller Communication Loss

NOTE: *Last 3 digits of the IP address assigned to the disconnected system
** X indicates the A2L leak detection sensor number.

Alarms

AL01: High Box Temp
AL02: Low Box Temp
⚠ **AL03: System Startup (only if CU wired)**
AL04: Input Fault (ER01/ER03/ER04)
AL06: Door Open
AL10: LL High Box Temp
AL11: LL Low Box Temp
AL12: A2L Override

Information

IN01: Too Many Defrosts (<5 min 8 consecutive)
IN05: Too Few Defrosts (time-term 8 consecutive)

Monitor Menu

Pressing the HOME key will show the HOME menus on the OLED display. The first menu displayed is the Monitor menu. These items are the actual operating conditions of the system or unit. The first three of these items are also displayed for the Screen Saver mode.

If there is no UI activity for 5 minutes, the Screen Saver mode is activated. The UI display will cycle through the items listed below for 5 seconds each continuously.

- **Box Temp**
- **System Name**
- **Operating Mode**
- **Box Temp SP**
- **Evap Name**
- **Date & Time**

Test Mode

This mode may be useful for troubleshooting and must be initiated from the Service mode. It automatically cycles through all of the relays outputs on the iRC board energizing each one separately for 10 seconds with a 10 second pause between each. This sequence repeats three times … then returns to the Service mode.

- **Comp**
- **Defrost Heater**
- **Evap. Fan**
- **Alarm**
- **Exv**
- **Solenoid**

Power Failures

In the event of a power failure, intelliGen will automatically close the expansion valve to prevent refrigerant from migrating throughout the system. After power returns, with 24 VAC at the board, the system will restart in the cooling mode after the desired, programmed hold off period.

Checking Sensors

REMOVAL OF SENSORS FROM EVAPORATORS FOR CHECKING IS NOT REQUIRED.

Use the Monitor menu to display the value for the suspect sensor. There are menu items for suction temperature sensor, coil temperature sensor, aux temperature sensor and room temperature sensor. Compare their values to the measured value with a thermometer at each of these points. If they do not match, change the sensor.

or

The sensors can be checked for their proper operation by placing them in a cup of ice water. Stir the ice water and measure the resistance of the sensor. At 32°F the resistance should be 32,650 ohms. If it is higher or lower by **1,000 ohms**, the sensor should be replaced.

Aux Temp Sensor Terminals

IntelliGen provides a set of input terminals for customers who may want to monitor an additional temperature or items such as Product Temperature. These input terminals are on the bottom of the iRC board designated as AI6 and requires a signal from a thermistor which meets the temperature/resistance values in Table 1 below.

If a product temperature simulator is used, it must meet the resistance/temperature specification listed in Table 1. The temperature range for this input is –30°F to 140°F. Sensors on the iRC, as supplied, will not simulate product temperature.

This input can be monitored on the OLED display from the "**MONITOR**" menu for the **Evap Auxiliary Temp** item. The value displayed will be the temperature of the auxiliary sensor.

Table 1. Resistance/Temperature Specification

Temperature °F	Ohms	Temperature °F	Ohms
104	5,320	32	32,650
86	8,060	23	42,330
77	10,000	14	55,330
68	12,490	5	72,950
59	15,710	-4	97,070
50	19.900	-13	130,410
41	25,400	-22	176,960

Checking Operation of Expansion Valve

Checking Operation Of Expansion Valve (EXV)

To check if the expansion valve is closing properly:

Install a pressure gauge-set to suction line at the condensing unit. With the system running, close the valve on the liquid line, at the condensing unit. The system should pumpdown and shut off on the low pressure switch (LPS). If the system does not pumpdown and trip on the LPS, then the compressor valves are weak and needs to be changed.

After the system pumps-down and trip on the LPS, put the system in the service mode. This will cause the expansion valve to close. Open the valve on the liquid line, at the condensing unit. The suction pressure reading on the gauge set should not increase. If the suction pressure increases then the expansion valve is leaking and should be changed.

The expansion valve position can be monitored from the OLED in the "**MONITOR**" menu by scrolling to the "EXV STEP POSITION". This will indicate the number of steps the expansion valve is open.

Another check is to see how the EXV reacts to operational modes: Go to the "**MONITOR**" menu and scroll to the "EV SUCTION PRES"which indicates the evaporator suction pressure. Record the pressure displayed. Start the system and observe the pressures displayed. If the pressure does not increase, the EXV, its wiring harness, or its board action relay could be defective.

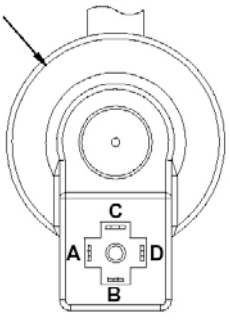
If the system is running, go to the "**MONITOR**" menu and scroll to the "EV SUCTION PRES" which indicates the evaporator suction pressure. Record the pressure displayed. Put the system into service mode and observe the pressures displayed while the system is pumping down. If the pressure does not decrease, the EXV, its wiring harness, or its board action relay could be defective.

Expansion Valve Motor Winding Resistance

If the expansion valve is suspected of not functioning properly, the motor windings resistance should be measured. This is a bipolar motor with two windings. Measure the resistance at the pins, on top of the valve, between locations A and B or C and D.

(Note that the pins are not labeled A, B, C, D. This labeling is just for reference).

VALVE P/N	VENDOR	RESISTANCE A to B, C to D
29326101	CAREL	150 Ω
29326201	CAREL	150 Ω
29326401	CAREL	150 Ω
29326501	CAREL	150 Ω
29326601	CAREL	150 Ω



CAREL VALVE

Resistance reading at 150 Ω at 75° F

"C" is largest spade

Measuring resistance between locations A and C or B and D will always show "Open" because these locations are between the motor windings.

When the valve is opening or closing, the voltage measured between A and B or C and D should be between 17-30 VAC.

NOTE: *To check if the EXV should be open or closed, go to the "**MONITOR**" menu and scroll to the "EXV STEP POSITION". This will indicate the number of steps the expansion valve is open. If the value is less then "5", the valve should be closed. 255 steps indicates the valve is wide open.*

The EXV may also be manually manipulated by turning the motor stator on the top of the valve clockwise to open the valve or counter-clockwise to close the valve. See the arrows on the figure above and to the left. Each full revolution is about 60 steps.

Table 2. Evaporator Temperatures

	R-22 Evaporator Temperature (°F) 100 psi Pressure Drop				R-404A/R-507 Evaporator Temperature (°F) 100 psi Pressure Drop			
	+20		-20		+20		-20	
PART NUMBER	TONS	BTUH	TONS	BTUH	TONS	BTUH	TONS	BTUH
29326101	0.44	5220	0.41	4920	0.73	8706	0.64	7692
29326201	4.25	51000	3.99	47900	3.11	37309	2.75	32966
29326401	7.52	90260	7.54	90480	4.66	55964	4.12	49449
29326501	15.14	181680	14.25	171000	10.89	130692	9.62	115480
29326601	22.18	266160	20.87	250440	16.08	192985	14.21	170521

	R-407A Evaporator Temperature (°F) 100 psi Pressure Drop				R-407C Evaporator Temperature (°F) 100 psi Pressure Drop			
	+20		-20		+20		-20	
PART NUMBER	TONS	BTUH	TONS	BTUH	TONS	BTUH	TONS	BTUH
29326101	0.99	11831	0.90	10808	1.07	12898	0.99	11863
29326201	4.23	50704	3.86	46320	4.61	55279	4.24	50839
29326401	6.34	76056	5.79	69481	6.91	82919	6.35	76258
29326501	14.80	177616	13.52	162259	16.14	193641	14.84	178088
29326601	21.86	262273	19.97	239598	23.83	285938	21.91	262970

	R-407F Evaporator Temperature (°F) 100 psi Pressure Drop				R-448A Evaporator Temperature (°F) 100 psi Pressure Drop			
	+20		-20		+20		-20	
PART NUMBER	TONS	BTUH	TONS	BTUH	TONS	BTUH	TONS	BTUH
29326101	1.09	13067	1.01	12094	1.01	12128	0.92	11098
29326201	4.67	56001	4.32	51831	4.33	51977	3.96	47561
29326401	7.00	84001	6.48	77746	6.50	77966	5.95	71341
29326501	16.35	196168	15.13	181562	15.17	182075	13.88	166604
29326601	24.14	289669	22.34	268100	22.40	268859	20.50	246014

	R-449A Evaporator Temperature (°F) 100 psi Pressure Drop			
	+20		-20	
PART NUMBER	TONS	BTUH	TONS	BTUH
29326101	1.01	12125	0.92	11083
29326201	4.33	51965	3.96	47499
29326401	6.50	77947	5.94	71249
29326501	15.17	182030	13.87	166389
29326601	22.40	268793	20.47	245696

Table 2. Evaporator Temperatures (cont.)

	R-454A Evaporator Temperature (°F) 100 psi Pressure Drop				R-454C Evaporator Temperature (°F) 100 psi Pressure Drop			
	+20		-20		+20		-20	
PART NUMBER	TONS	BTUH	TONS	BTUH	TONS	BTUH	TONS	BTUH
29326101	1.33	15,994	1.22	14,627	1.20	14,369	1.07	12,865
29326201	4.57	54,788	4.18	50,104	4.10	49,223	3.67	44,071
29326401	6.95	83,372	6.35	76,245	6.24	74,904	5.59	67,064
29326501	18.74	224,935	17.14	205,706	16.84	202,088	15.08	180,936
29326601	26.37	316,475	24.12	289,420	23.69	284,330	21.21	254,570

	R-455A Evaporator Temperature (°F) 100 psi Pressure Drop			
	+20		-20	
PART NUMBER	TONS	BTUH	TONS	BTUH
29326101	1.22	14,594	1.09	13,108
29326201	4.17	49,992	3.74	44,900
29326401	6.34	76,074	5.69	68,327
29326501	17.10	205,246	15.36	184,342
29326601	24.06	288,773	21.61	259,362

	R-744 (CO2) Evaporator Temperature (°F) 200 psi Pressure Drop			
	+20		-20	
PART NUMBER	TONS	BTUH	TONS	BTUH
29377901	1.10	13,168	1.24	14,880
29377902	2.05	24,637	2.69	32,280
29377903	4.60	55,221	5.20	62,400
29377904	12.4	148,673	14.0	168,000
29329701	8	96,000	9.5	114,000
29377204	21	252,000	25	300,000
29377292	37	444,000	46	552,000
29392201	74	888,000	92	1,104,000
29392301	112	1,344,000	138	1,656,000

Replacement Parts by InterLINK

InterLink is your link to a complete line of dependable and certified commercial refrigeration parts, accessories and innovative electronic controls for all Heatcraft Refrigeration Products (HRP) brands - including Bohn, Larkin, Climate Control and Chandler. At InterLink, we provide our wholesalers with a comprehensive selection of product solutions and innovative technologies for the installed customer base. Every product is built to ensure the same high performance standards with which all HRP brands are built — backed by a dedicated team to serve every customer need, delivering at the best lead times in the industry.

Visit www.interlinkparts.com or call (800) 686-7278 for more information.

Table 3. intelliGen Field Mount (iFM) Kit and Accessories

Description	Part Number
intelliGen Field Mount (iFM) Kit with 25ft sensor lead wires	59755002
15ft harness for power, fan, defrost heater	22699903
25ft harness for power, fan, defrost heater	22699902
40ft harness for power, fan, defrost heater	22699901
15ft sensor kit	59755302
40ft sensor kit	59755301
10ft cable for Carel EXV	22592201
25ft cable for Carel EXV	22592103
40ft cable for Carel EXV	22592102
15ft wire harness for pressure transducer	22515107
40ft wire harness for pressure transducer	22515105

Table 4. intelliGen Retrofit Kits for Legacy Beacon II and QRC Controls

Model Family	Defrost Type	Voltage/ Phase	Model Size	Color Finish	Description	Retrofit Kit Part #
Low Profile LOP	Air & Electric	115/1 208-230/1	All	Stucco	INTELLIGEN RETROFIT, LOP, STUCCO	89730101
				White	INTELLIGEN RETROFIT, LOP, WHITE	89730102
Center Mount (CM) Low Velocity Center Mount (LVCM)	Air & Electric	115/1 208-230/1	CM: ALL[1] LVCM: 050/075[2]	Stucco	INTELLIGEN RETROFIT, CM/LVCM, SMALL, STUCCO	89730201
				White	INTELLIGEN RETROFIT, CM/LVCM, SMALL, WHITE	89730202
			LVCM: 100[2]	Stucco	INTELLIGEN RETROFIT, CM/LVCM, MEDIUM, STUCCO	89730205
				White	INTELLIGEN RETROFIT, CM/LVCM, MEDIUM, WHITE	89730206
			LVCM: 130 TO 340[2]	Stucco	INTELLIGEN RETROFIT, CM/LVCM, LARGE, STUCCO	89730209
				White	INTELLIGEN RETROFIT, CM/LVCM, LARGE, WHITE	89730210
Medium Profile (MP)	Air	115-230/1	All	Stucco	INTELLIGEN RETROFIT, MP, AD, 115/230V, STUCCO	89730301
				White	INTELLIGEN RETROFIT, MP, AD, 115/230V, WHITE	89730302
		460/1		Stucco	INTELLIGEN RETROFIT, MP, AD, 460V, STUCCO	89730303
				White	INTELLIGEN RETROFIT, MP, AD, 460V, WHITE	89730304
	Electric	208-230/3	All	Stucco	INTELLIGEN RETROFIT, MP, ED, 208/230V, STUCCO	89730305
				White	INTELLIGEN RETROFIT, MP, ED, 208/230V, WHITE	89730306
		208-230/3 WITH >30A HEATER[3]		Stucco	INTELLIGEN RETROFIT, MP, ED, 208/230V, CONTACTOR, STUCCO	89730307
				White	INTELLIGEN RETROFIT, MP, ED, 208/230V, CONTACTOR, WHITE	89730308
		460/3		Stucco	INTELLIGEN RETROFIT, MP, ED, 460V, STUCCO	89730309
				White	INTELLIGEN RETROFIT, MP, ED, 460V, WHITE	89730310

Table 4. intelliGen Retrofit Kits for Legacy Beacon II and QRC Controls (cont.)

Model Family	Defrost Type	Voltage/ Phase	Model Size	Color Finish	Description	Retrofit Kit Part #
Large Unit Cooler (LUC)	Air	230-460/1	24" Fan	Plain Aluminum	INTELLIGEN RETROFIT, LUC, AD, 230/460V, 1PH, SMALL	89730401
			30" Fan		INTELLIGEN RETROFIT, LUC, AD, 230/460V, 1PH, LARGE	89730402
		230-575/3	24" Fan		INTELLIGEN RETROFIT, LUC, AD, 230/460/575, 3PH, SMALL	89730403
			30" Fan		INTELLIGEN RETROFIT, LUC, AD, 230/460/575, 3PH, LARGE	89730404
			30" Fan		INTELLIGEN RETROFIT, LUC, AD, DUAL CIRCUITS, MULTI VOL	89730405
	Electric	230-460/1	24" Fan		INTELLIGEN RETROFIT, LUC, ED, 230/460V, 1PH, SMALL	89730406
			30" Fan		INTELLIGEN RETROFIT, LUC, ED, 230/460V, 1PH, LARGE	89730407
		208-230/3	24" Fan		INTELLIGEN RETROFIT, LUC, ED, 208-230V, 3PH, SMALL	89730408
			30" Fan		INTELLIGEN RETROFIT, LUC, ED, 208-230V, 3PH, LARGE	89730409
		460/3	24" Fan		INTELLIGEN RETROFIT, LUC, ED, 460V, 3PH, SMALL	89730410
			30" Fan		INTELLIGEN RETROFIT, LUC, ED, 460V, 3PH, LARGE	89730411
		575/3	24" Fan		INTELLIGEN RETROFIT, LUC, ED, 575V, 3PH, SMALL	89730412
			30" Fan		INTELLIGEN RETROFIT, LUC, ED, 575V, 3PH, LARGE	89730413
			30" Fan		INTELLIGEN RETROFIT, LUC, ED, DUAL CIRCUITS, MULTI VOL	89730414

1. Center Mount unit cooler models use 89730201 or 89730202 kit part numbers only.
2. Low Velocity Center Mount unit cooler models are based on the capacity digits in the model number for the kit size and part number.
3. Medium Profile unit coolers have greater than 30 Amp draw with large defrost heaters use kit part number 89730307 and 89730308.
4. intelliGen is not available for Low Profile models with 208-230/3/60 and 460/1/60.
5. intelliGen is not available for Low Velocity Center Mount models with 460/1/60.

Table 5. intelliGen Ship Loose Service Parts

Service Part Description	Part Number
Control Boards	
iRC Main Control Board Replacement Kit	28918003S
iRCUI User Interface Replacement Kit	28918201S
iWC Webserver Card	28918301S
MSC Multi-system Control with Lead-Lag Card	28918302S
iIC Integration Card	28918401S
Electronic Expansion Valve (EXV) & Cables for A2L & A1 Refrigerant Systems	
Carel EXV E2V11FWAE0 - 3/8" x 3/8" Connections	29326101
Carel EXV E2V24FWAE0 - 3/8" x 3/8" Connections	29326201
Carel EXV E2V24FSME0 – 5/8" X 5/8" Connections	29326401
Carel EXV E3V45ASTE0 – 7/8" X 1 3/8" Connections	29326501
Carel EXV E3V55ASTE0 – 7/8" X 1 3/8" Connections	29326601
Cable with Molex connector for Carel EXV, 39in	22592101
Sporlan SER-AA 3x4 ODF	29390201
Sporlan SER-A 3x4 ODF	29390101
Sporlan SER-B 3x4 ODF	29389401
Sporlan SER-C 3x4 ODF	28389501
Sporlan SER-C 4x5 ODF	28389601
Sporlan SER-D 4x5 ODF	29389701
Sporlan SER-D 4x7 ODF	29389801
Cable with Molex connector for Sporlan SER EXV, 40in	29360101
Electronic Expansion Valve (EXV) & Cables for CO2 Refrigerant Systems	
Sporlan SER AA-HP	29377901
Sporlan SER A-HP	29377902
Sporlan SER B-HP	29377903
Sporlan SER C-HP	29377904
Danfoss CCMT 2	29329701
Danfoss CCMT 4	29377204
Danfoss CCMT 8	29377292
Danfoss CCMT 16	29392201
Danfoss CCMT 24	29392301
Cable with Molex connector for Danfoss CCMT EXV, 48in	22632601
Temperature Sensors	
Temperature Sensor Kit* - White Leads, 3ft	89904903
Pressure Transducer & Harnesses	
Pressure Transducer 0 - 300 PSIA	28911202
Transformers	
Transformer 120/24 volt - 40 VA	22529601
Transformer 240/24 volt - 40 VA	22529602
Transformer 460/24 - 40 VA	22529603
Transformer 575/24 - 40 VA	22529701
UI to iRC Ribbon Cables	
For Center Mount/Low Velocity Center Mount Unit Cooler, 8" Replacement Kit	22602101
For Low Profile Unit Cooler, 14" Replacement Kit	22602102
For Medium Profile and Large Unit Cooler, 24" Replacement Kit	22602104
For Large Unit Cooler 35" Replacement Kit	22602103
EV-COM Cable	
EV-COM Cable 28"" for Large Unit Cooler DUAL iRC Board Replacement Kit	22596801
Door Switch	
Door Switch Kit (includes door switch and 2 ft cable)	22543102

Replacing EXV's

Preparation – POWER OFF

To make the EXV is ready for removal, you will need to disconnect the wiring harness from the top of the valve. Loosen the mounting screw holding the harness to the top of the valve and pull the plug straight up from the EXV to remove.

Next, remove the thumb nut holding the motor stator to the valve. Then pull the motor off the top of the valve.

Remove EXV from Piping

Use a brazing torch to heat the braze joints on each end of the valve to soften the brazing material. Use appropriate personal protective equipment to protect you from burns, etc. Pull the EXV off the distributor connection and remove the liquid line from the valve. Then clean the liquid line stub and the distributor connector of excess brazing material in preparation for mounting the replacement EXV.

Mount a new EXV to the unit

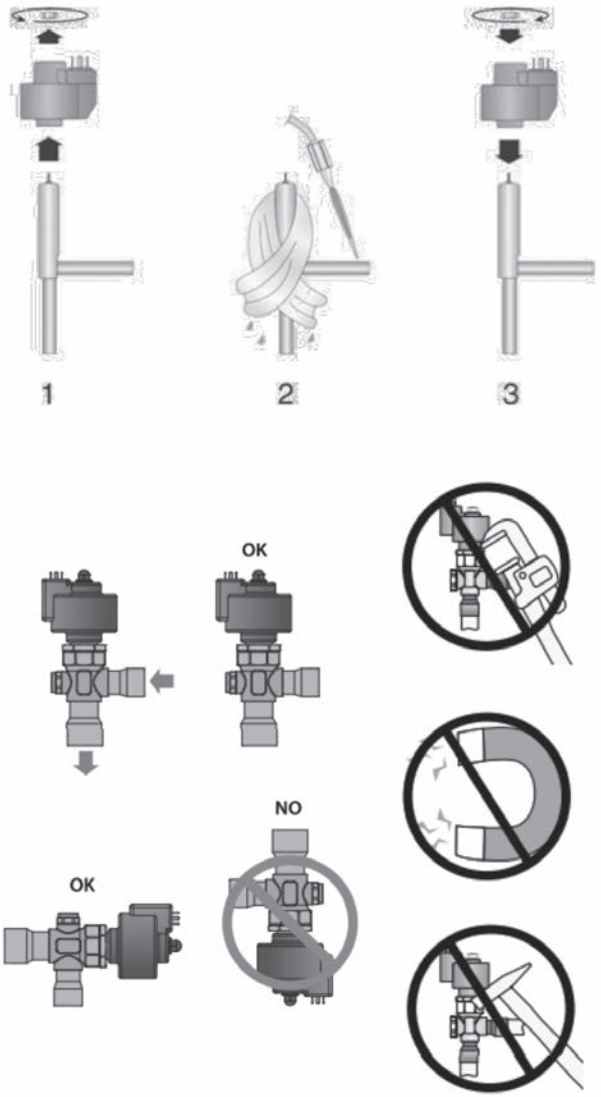
Remove the EXV body from its packaging. Braze the EXV in place to the distributor connection and the liquid line stub to the EXV using proper brazing techniques. Make sure the motor/head of the EXV is NOT pointing down. It should be pointed upward or horizontal. (see diagram to right)

Connect the wiring harness and motor

Push the external motor stator assembly onto the top of the valve . Then, tighten the mounting thumb nut to hold the motor in place on the top of the valve.

Smear a small amount of dielectric grease between the pins on the top of the motor. If dielectric grease is not available, automotive ignition grease can be used. (Do NOT use silicone). This is to eliminate moisture presence between the pins and the control harness. Connect the wiring harness to the top of the motor/head assembly. The proper orientation of the harness plug is for the cable to run to the right as you are facing the Carel brand name on the motor/head. The plug has one wide slot that is to align with a wide spade connector on the motor/head.

Now the valve has been successfully replaced and is Ready for normal operation.



Do not exert torque or deforming stress on the valve or the connection pipes.

Do not hit the valve with hammers or other objects.

Do not use pliers or other tools that may deform the external structure or damage the internal parts.

Never aim the flame at the valve.

Never place the valve near magnetic fields.

Never install or use the valve in the event of:

- **deformation or damage to the external structure;**
- **heavy impact, due for example to dropping;**
- **damage to the electrical parts (stator, contact carrier, connector,...)**

Replacing iRC Board

Preparation – POWER OFF

The iRC board has several different types of wiring connections and uses color coded terminals to better identify which terminals are inputs and which ones are output. There are also terminal identification labels stuck around the board to assist in reconnecting back to the correct locations.

The first step is to unplug wiring connections from the existing board. This includes input and output terminals, sensor Molex connectors, ¼" spade connectors, and special iRC UI harness. It might be useful to use a permanent marker and tape to tag the pluggable terminal blocks or other wiring connectors.

Unmount the iRC board from the unit

Next, remove the four (4) grounding, mounting screws holding the board to the mounting plate. Now the old iRC board should be easily extracted and placed aside.

Mount a new iRC board to the unit

Use the same four (4) grounding, mounting screws to attach the new board to the mounting plate. Do not over tighten.

Reconnect all wiring connections

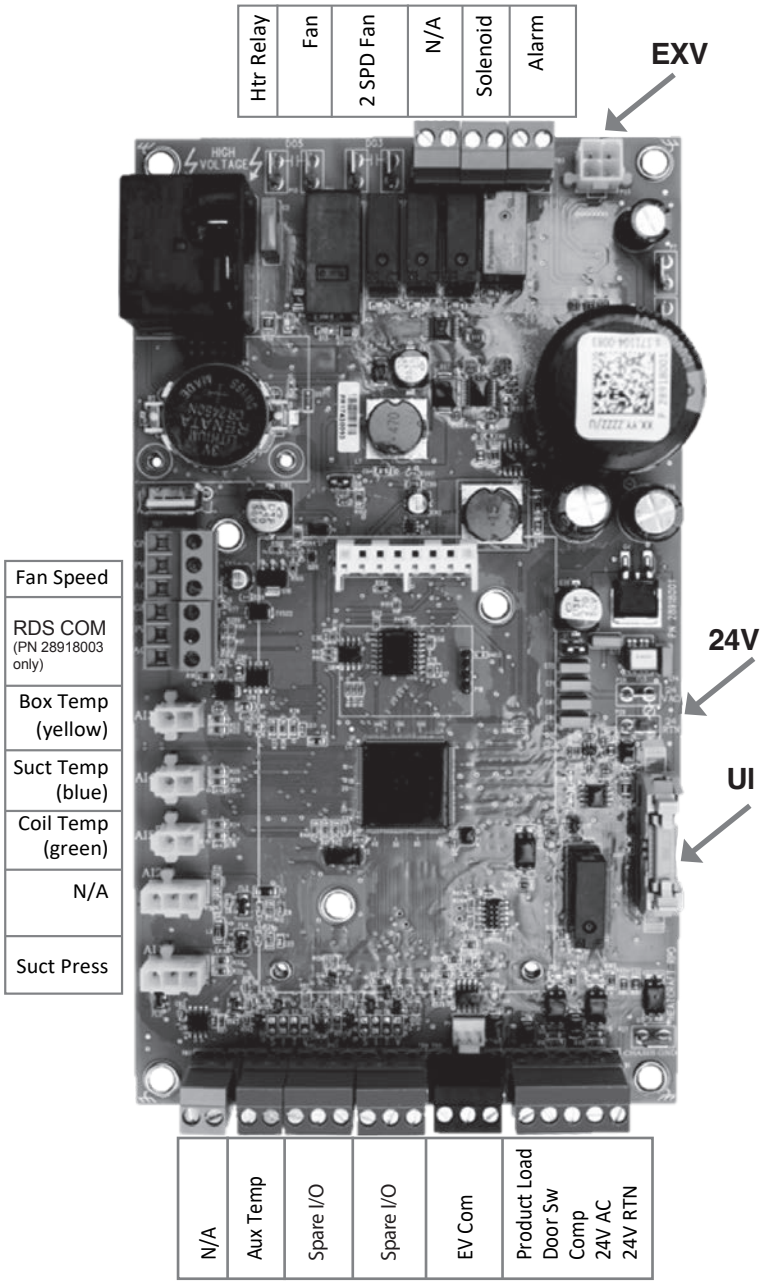
Using the identification labels and any tagging markings you used, plug all wiring connections back onto the iRC board in their proper locations. Be sure to check for good, tight connections. Note the color coded terminals and sensor wires. Don't forget the power supply connections and the iRC UI harness connections on the right side of the iRC board.

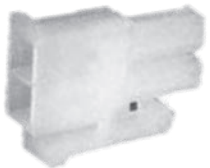
Power up the new iRC

Now you are ready to setup the new IRC.

Factory reset and configuration

For a multi-unit system, if a board is added, replaced or removed. Trigger factory reset from each of the units individually and then reconfigure the system through quick configuration. See GENERAL SETTINGS menu for Factory Reset command.

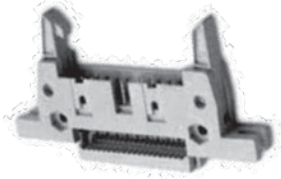




Molex Connector



Pluggable Terminal Block



Locking Ribbon Connector



Spade Connector

Replacing iRC User Interface

Preparation – POWER OFF

To make the iRC UI ready for removal, you will need to disconnect the ribbon harness which also attaches to the iRC board. This special, locking ribbon connector is part of the iRC UI and is accessible from the back of the UI. It protrudes through the back of the mounting plate for the iRC UI. On some units the iRC UI mounting bracket must be removed from the cabinet to access the back of the mounting plate.

To disconnect the ribbon harness, push both of the 'ears' of the connector outward. The ribbon will be lifted out of the connector making it easy to remove.

Remove the iRC UI from the unit

From the back of the mounting plate you will need to remove (4) mounting screws … one in each corner. Then the iRC UI may be lifted off the mounting plate.

Mount a new iRC UI to the unit

Position the new iRC UI and its gasket onto the front of the mounting plate. Take care to properly align the gasket to fit properly to the back of the iRC UI and aligns with the mounting holes.

Using the original (4) mounting screws, attach the new UI to the mounting plate. Do not over tighten.

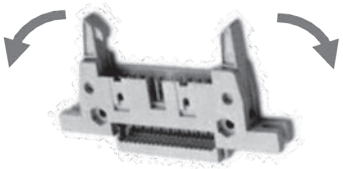
Reconnect the ribbon harness

From the back side of the mounting plate, insert the ribbon harness into the locking ribbon connector. Press the 'ears of the connector inward to properly mount the ribbon harness into the connector. It should be completely seated when the 'ears' are straight up. Take care not the break the plastic 'ears' of the connector. If also replacing the ribbon harness, there is a similar locking ribbon connector on the back of the iRC.

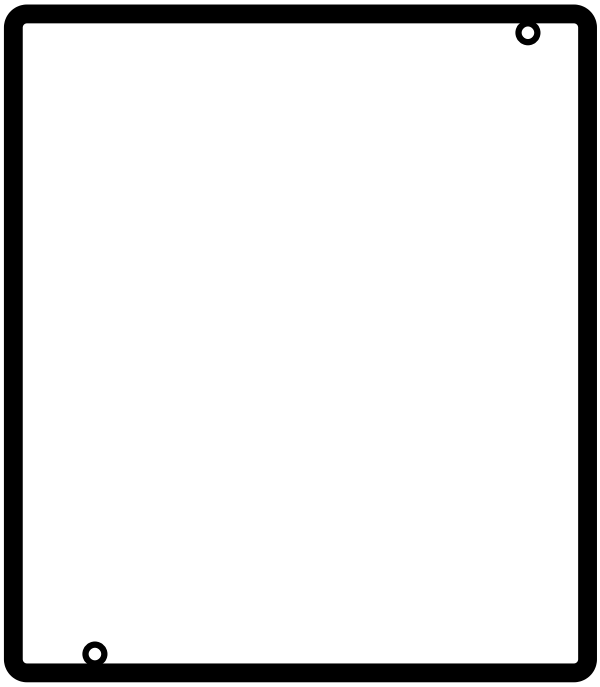
Power up the new iRC UI

When the power is switched back on for the iRC board, the iRC UI should power up with a display. If no display is shown, double check the locking ribbon connector to assure the ribbon harness is completely seated and tight.





Locking Ribbon Connector



iRC UI gasket

intelliGen Refrigeration Controller Troubleshooting Guide

PROBLEM	STEP	ACTION ITEM	IF NOT OK
Display is not lit.	1. 2. 3. 4. 5. 6.	Check primary power supply Check voltage to transformer Check transformer secondary voltage Check voltage to iRC board Check harness to iRC UI Replace iRC board	1. Check fuses and circuit breakers 2. Check field wiring for breaks 3. Replace transformer as needed 4. Check factory wiring & connections 5. Replace harness as needed 6. Replace iRC UI
iRC shows cooling, but compressor does not run	1. 2. 3.	Check compressor internal overload Check compressor contactor voltage Check compressor contactor is “pulled in”	1. Wait for thermal overload to reset 2. Check internal condensing unit wiring 3. Replace contactor as needed 4. If ASCT or TDR is installed in condensing unit, remove it
ERROR CODES: **ER01: Box Temp** **ER02: Coil Temp** **ER03: Evap Suc Temp** **ER04: Evap Suc Press**		Check Sensor & Connections	Replace as needed

intelliGen Refrigeration Controller Troubleshooting Guide (continued)

PROBLEM	STEP	ACTION ITEM	IF NOT OK
ER11: Control Circuit	1.	Check wiring connection to the board	Check field wiring connection to the board
	2.	Low Pressure Safety (LPS) Tripped: • Check for correct refrigerant type • Check refrigerant charge • Check LPS setting • Check LPS wiring • Check EEV operation (stuck?) • Check coil for icing • Check for correct superheat reading • Check for correct nozzle selection • Check for clogged EEV inlet screen • Check line sizing • Check LPS time delay relay setting • Check operation of LPS	• Change setpoint to match refrigerant • Add more refrigerant to proper charge • Correct LPS setting • Correct LSP wiring • Clean or replace EEV • Defrost coil • Check/replace sensor or transducer • Replace distributor nozzle • Replace EEV • Correct line sizing • Reset to 1 minute • Replace Low Pressure Safety Switch
	3.	High Pressure Safety (HPS) Tripped: • Check for system overcharge • Check for non-condensables • Check condenser fan motor and blade • Check for dirty condenser coil • Check head pressure controls • Check fan cycling controls • Check liquid line sizing • Check for liquid line restrictions • Check operation of HPS	• Reclaim/recover excess charge • Remove all non-condensables • Repair or replace motor and/or blade • Clean condenser coil • Adjust or replace faulty controls • Adjust or replace faulty controls • Correct line sizing • Repair line or remove restrictions • Replace HPS if necessary
	4.	Oil Pressure Safety (OPS) Tripped: • Check oil level in compressor • Check oil sump screen pickup • Check oil pump pressure • Check for proper piping practices • Check for low superheat • Check operation of auxiliary relay • Check OPS sensor • Check operation of OPS	• Add oil to crankcase to minimum level • Clean or replace pickup screen • Replace compressor oil pump • Correct piping to minimize oil logging • Correct per steps in E6 • Replace auxiliary relay • Replace faulty OPS sensor • Replace faulty OPS
	5.	Compressor Module Tripped (when supplied): • Check module • Check superheat at compressor inlet • Check compressor for overheating • Check suction pressure (too low?)	• Replace faulty module • Reduce superheat • Correct overheating problem • Consider crankcase pressure regulator or other measures
	6.	Phase Loss Monitor (PLM) Tripped: • Check presence of all phase legs • Check power supply • Check operation of PLM	• Correct power phase problem • Correct power supply problems • Replace faulty PLM
	7.	Demand Cooling (when supplied): • Check auxiliary relay • Check demand cooling device	• Replace auxiliary relay • Replace faulty demand cooling device
	8.	Check compressor relay on board	Replace board if relay is faulty

intelliGen Refrigeration Controller Troubleshooting Guide (continued)

PROBLEM	STEP	ACTION ITEM	IF NOT OK
ER14: Power Supply Low **ER15: Power Supply High**	1. 2.	Check 24 Volt Terminals for minimum 22 Volt and maximum of 30 Volt Check Transformer Tap	1. Check Primary Power Supply 2. Replace transformer as needed
ER16: Low Superheat	1. 2. 3. 4. 5. 6. 7. 8.	Check Refrigerant Type Check Coil for Ice Check EEV step position Check EEV closure Compressor not operating Check suction temp sensor Check suction pressure transducer Check box settings in primary evap for incorrect settings	1. Compare for accuracy 2. Defrost coil and check defrost settings, sensor, and heater amps 3. Replace board if step count is not **2** 4. Pumpdown system check for LPS closes or times out – EEV is bad or LPS is set wrong 5. Check overloads & contactor 6. Compare reading w/ actual suction line temp 7. Compare reading against gauges
ER18: Aux Temp	1.	Check Sensor & Connections	1. Replace as needed.
ER19: Replace Battery	1.	Check battery is present and securely connected	1. Replace the clock coin cell battery on the board.
ER20: Log Disrupted	1.	Pull data log to confirm missing data	1. Power Cycle
ER22: iRCUI Failure	1.	Check ribbon cable connection between iRC and iRCUI	1. Replace cable
ER23: Board Comm	1.	Check ribbon cable connection between iRC and iRCUI	1. Power Cycle
ER24: Aux Temp Override	1.	No action required. Error notifies that the aux temp sensor was assigned to two different functions	

intelliGen Refrigeration Controller Troubleshooting Guide (continued)

PROBLEM	STEP	ACTION ITEM	IF NOT OK
ER25: System Cxn Lost	1.	Check for proper polarity at terminals for + and -	1. Check wires for damage
	2.	Check all shield drain pigtails	
	3.	Check for shield drain to ground screw connection (ONLY ONE)	3. Remove excess ground connections
ER26: EV Connection Lost	1.	Check for proper polarity at terminals for + and -	1. Check wires for damage
	2.	Check all shield drain pigtails	
	3.	Check for shield drain to ground screw connection (ONLY ONE)	3. Remove excess ground connections
ER27: High Humidity	1.	Triggered because input humidity reading is greater than the 'Maximum Humidity' set-point.	1. Ensure humidity sensor is not shorted, consider raising 'Maximum Humidity' set-point, review box for humidity intrusion.
ER29: Humidity Sensor	1.	Indicates Humidity sensor is open or not installed.	1. Review sensor wiring
ER31: LL Conn Lost - xxx	1.	Check Ethernet cable connections between MSC card and the network router	1. Check IP address type setting if it is Static or Dynamic
	2.	Power cycle the intelliGen control and the network router	2. Static IP address is required for continuous connection. Change IP address type if needed.
ER32: A2L Early Warning-X**	1.	Check all piping in unit cooler for refrigerant leaks.	1. Fix refrigerant leaks
	2.	Check the piping in the adjacent unit coolers for potential cross over leak detection.	2. Fix refrigerant leaks
	3.	Reset A2L Controller for the RDS.	
ER33: A2L Sensor Fault	1.	Check refrigerant sensors wire connections.	
	2.	Check refrigerant sensors for damages.	2. Replace sensors as needed.
	3.	Reset A2L Controller for the RDS.	
ER34: A2L Service-X**	1.	Check refrigerant sensors wire connections.	
	2.	Check refrigerant sensors for damages.	2. Replace sensors as needed.
	3.	Reset A2L Controller for the RDS.	
ER35: A2L Mitigation-X**	1.	Check all piping in unit cooler for refrigerant leaks.	1. Fix refrigerant leaks
	2.	Check the piping in the adjacent unit coolers for potential cross over leak detection.	2. Fix refrigerant leaks
	3.	Reset A2L Controller for the RDS.	
ER36: A2L Refrigerant Mismatch	1.	Check refrigerant selection in intelliGen controller.	1. Factory reset intelliGen controller and selection correct refrigerant.
ER37: A2L Mitigation Controller Communication Loss	1.	Check communication wiring connections	
	2.	Check RS-485 connection polarities	2. Rewire connections to match polarities.
	3.	Check if communication LEDs are blinking on RDS controller and the intelliGen controller	3. Replace control board as needed.

Note: ** X indicates the A2L refrigerant leak detection sensor number.

intelliGen Refrigeration Controller Troubleshooting Guide (continued)

PROBLEM	Step	ACTION ITEM	IF OK	IF NOT OK
Cannot get to box temperature	1.	Check system operation: Is it running?		1. Check power to condensing unit Check position of Service Mode switches Check compressor overloads and contactor
	2.	Check system charge		2. Add or remove refrigerant to proper charge
	3.	Check for proper operating superheat		3. Check EEV operation Check control board EEV signal Check suction sensor and transducer
	4.	Check for high superheat and EEV wide open		4. Check EEV inlet screen and restrictions Check liquid line sizing Check head pressure controls
	5.	Check Low Pressure Safety Switch		5. Check everything for E7 LPS above
	6.	Compare equipment capacity with requirements	Go to	6. Add or replace with more/larger equipment
	7.	Check box temperature setpoint	next step	7. Correct setpoint to proper value
	8.	Check compressor performance		8. Check compressor application limitations Check integrity of compressor operation (impaired, worn or damaged components)
	9.	Check condenser coil for dirt/debris		9. Clean condenser coil
	10.	Check condenser for non-condensables		10. Remove all non-condensables
	11.	Check condenser fan operation		11. Replace/repair fan blade, motor, cycling switch or make corrective adjustments.
	12.	Check for correct refrigerant type		12. Compare board setpoint and refrigerant
	13.	Check for iced evaporator coil		13. Defrost coil and check defrost cycle (see E2) settings/setpoints and defrost sensor
	14.	Check defrost parameters		14. Correct defrost setpoints in program (frequency and termination of defrosts)
	15.	Check superheat setpoint (too high?)		15. Correct setpoint for more cooling surface
	16.	Check display values (°F or °C)		16. Correct setpoint for proper display values

Special Tips

Putting the System into Service Mode

To put the system into the SERVICE mode, you must open the **BOX SYS SETTINGS** menu. It is the first item to appear. Enable by **Executing** the "ENTER SERVICE MODE" prompt. This mode is similar to the Product Load mode, except it does not have a maximum time delay override feature. It will stay in the Service Mode unit the mode is **exited** from the Box Sys Settings menu. (Or see favorites menu below.)

If you wish to put the system in the **Product Load Mode** with a timed override feature, you will need to toggle or momentarily closed a switch wired to the DI1 terminals on the bottom of the iRC, for 2 seconds. *(Refer to page 32 for more information on these modes.)*

Forcing a Defrost Cycle

To force the system into an unscheduled defrost cycle, you must open the **DEFROST SYS SETTINGS** menu. It is the first item to appear. Enable by **Executing** the "FORCE DEFROST" prompt.
(Or see favorites menu below.)

Favorites Menu

The Favorites menu contains some favorites and often used items copied from other system menus. Below are the items included in Favorites menu which makes it faster, simpler and easier to access and select these:

- **Active Alarms**
- **Box Temp and Set Point**
- **Service Mode (Enter and Exit)**
- **Force Defrost**
- **Identify Evap Unit**
- **Reset Active Timer**

Turning the System On

If the system has power and there is a call for cooling, the system should be on.

There are a few exceptions to this:

First Power Initiation – user must complete the Quick Set-up and press control know when prompted to Start the System.

Minimum Off Time – the system has not been off the minimum off time. To force a start, you must execute Reset Time in the MANUAL menu.

Error / Alarm – If there is an error or alarm which has the systems off, you must remedy the situation to fix the error or alarm before the system will start up.

Compressor Overloads – If the compressor is off on over-loads, compressor module, safety circuit, etc., this situation must be resolved or time-out before the system will start.

Service or Product Load Mode – if either of these modes are energized, you must terminate to start the system. For service mode, see instructions in first column on exiting … for Product Load Mode, terminate by flipping the Product Load Switch.

Defrost Mode – the defrost mode may be terminated on time, temperature or RESET TIME. It is not recommended to terminate a defrost cycle before the coil is clear of frost, but you can by executing RESET TIME in the MANUAL menu.

Data Log

Local **Operational** board data of monitored items will be logged every minute for 60 days for each board. **Box Temp, Operating Mode, Coil Temp, Evap Suction Press & Temp, Superheat, Aux Temp, EXV Steps, Unit Name, Door Switch, Last Defrost Time, Volts, Defrost Cycles, System Name**

Transaction data on parameter changes will be logged as they occur. Maximum of 500 entries allowed.

Error and Alarm data will be logged as errors/alarms start and end. Maximum of 500 entries allowed

Retrieval of logged data is done via USB flash drive on each board. When the USB drive is mounted, navigate to 'USB OPERATION' menu and select 'LOGS COPY' followed by the desired Logs (transactional, operational, alarms or all) and the desired date range. Files will be downloaded in CSV format.

The recommended USB drive maximum storage capacity is 32GB .

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Since product improvement is a continuing effort, we reserve the right to make changes in specifications without notice.

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