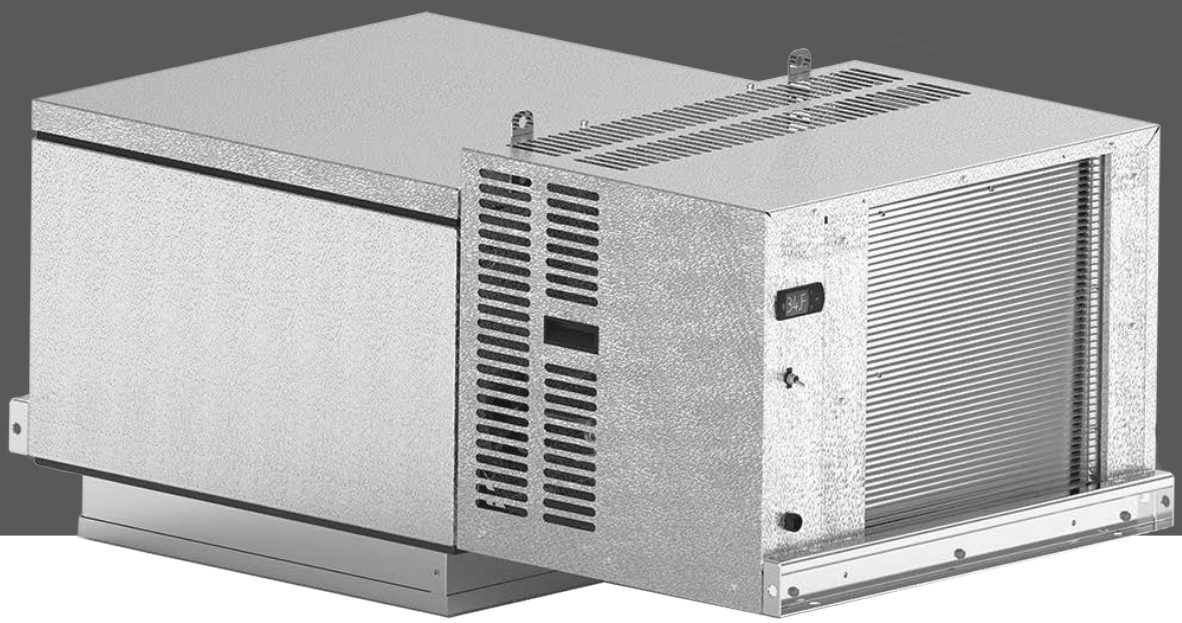
H-IM-81E | **MARCH 2020**
Part# 25002301

PRO^3 TOP MOUNT PACKAGED REFRIGERATION SYSTEM

Installation and Operations Manual

For Indoor Applications



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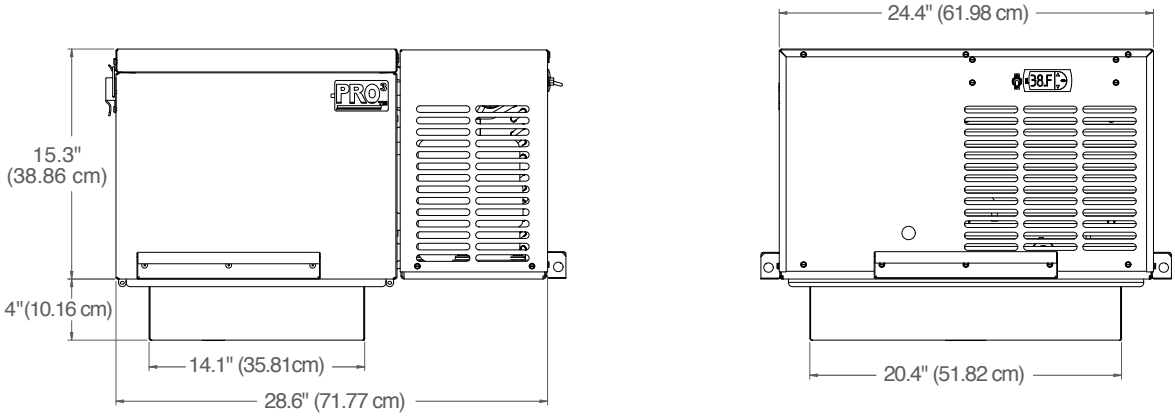
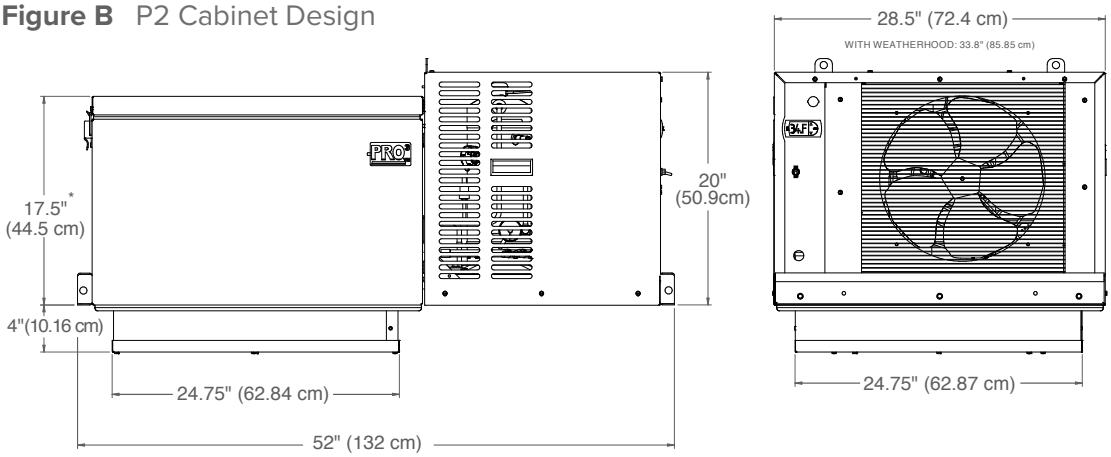
DIMENSIONAL DRAWINGS

Figure A P1 Cabinet Design (indoor only)



14.25"x 20.75" panel opening required for evaporator section of “P” cabinet sizes.

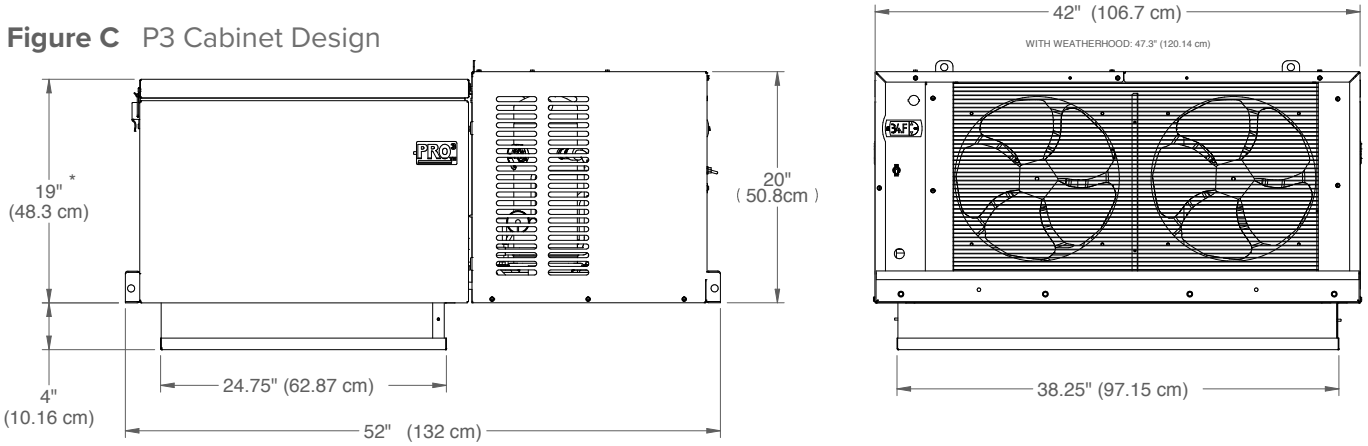
Figure B P2 Cabinet Design



25"x 25" panel opening required for evaporator section of “P2” cabinet sizes.

**- 21.5" (54.61 cm) on outdoor models with weatherhood*

Figure C P3 Cabinet Design



25"x 38.5" panel opening required for evaporator section of “P3” cabinet sizes.

**- 23.5" (59.69 cm) on outdoor models with weatherhood*

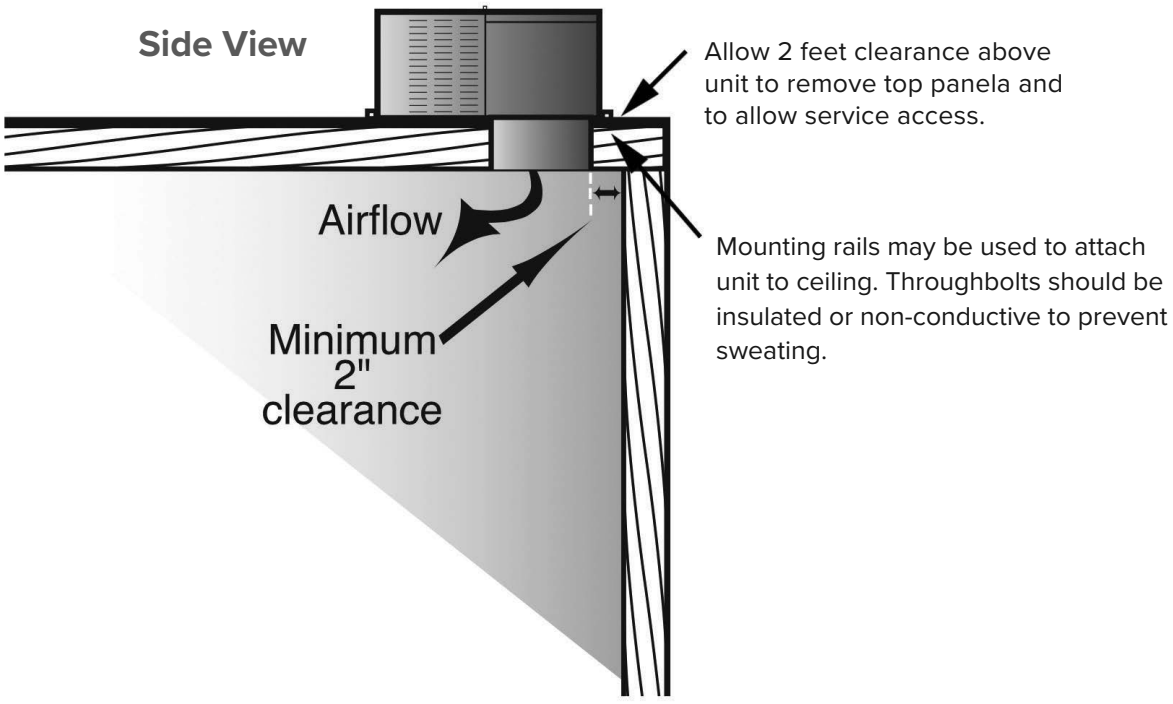
SPACE AND LOCATION REQUIREMENTS FOR INDOOR MODELS

The most important consideration which must be taken into account when deciding upon the location of air-cooled equipment is the provision for a supply of ambient air to the condensing unit. Ignoring this essential requirement will result in higher condensing pressure and contribute to poor operation or potential equipment failure. Units must not be located in the vicinity of steam, hot air or fume exhausts. Adequate air circulation through the condensing unit is critical to ensure proper equipment operation. Improper installation can damage the unit and will void the warranty. PRO³ penthouse-style packaged units are designed for **indoor use only** in ambient temperatures of 50°F to 100°F. The unit cabinet is not approved for weather tight applications.

Another important consideration is that the unit should be mounted away from noise sensitive spaces and must have adequate support to avoid vibration and noise transmission into the building. Storage should not be allowed on top of walk-in structure. Unit must not be enclosed in an unventilated space.

FIGURE 1

System Space and Location Requirements for INDOOR models



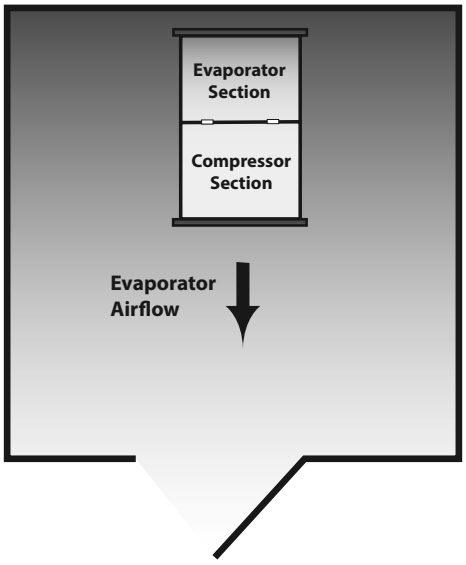
RECOMMENDED UNIT PLACEMENT FOR INDOOR MODELS

Some general rules for the evaporator section placement which must be followed are:

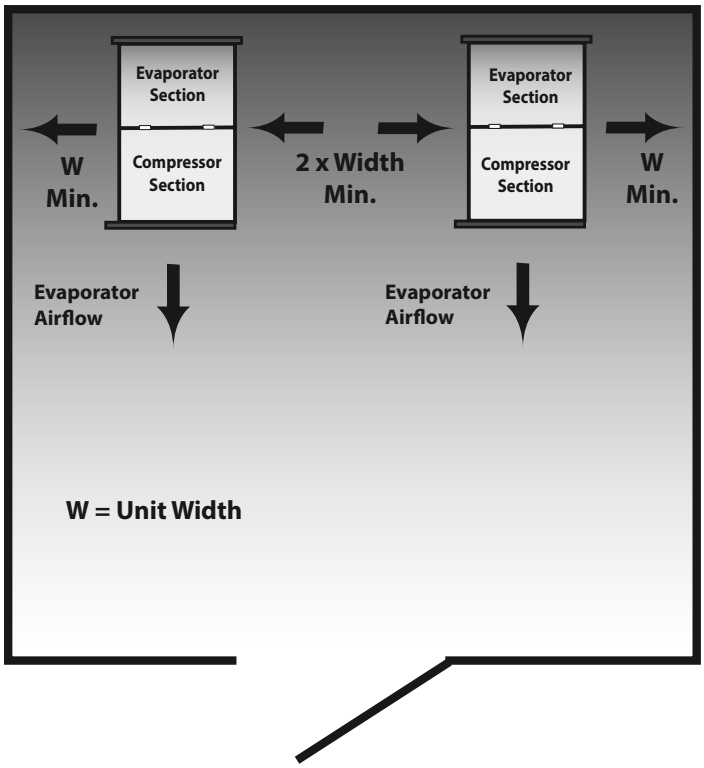
1. Ensure that the structural integrity of the box can withstand the weight of the top mounted equipment.
2. The air pattern must cover the entire room.
3. **NEVER** locate the evaporator section over doors.
4. Location of aisles, racks, etc. must be known.
5. Never remove or unlock any panel cam-locks to install top mounted equipment.

The size and shape of the storage will generally determine the type and number of units to be used and their location.

NOTE: Always avoid placement of units directly above doors and door openings.



Top View
One PRO³ System



Top View
Two PRO³ Systems

Indoor Models

RIGGING

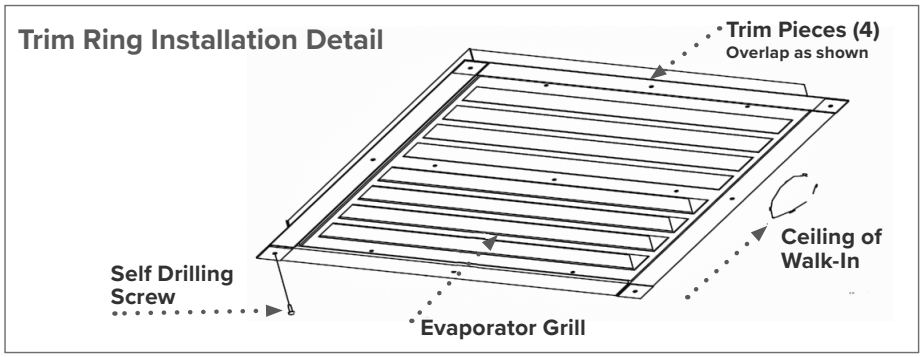
Rigging holes are provided on all models. Caution should be exercised when moving these units. To prevent damage to the unit housing during rigging, cables or chains used must be held apart by spacer bars. The mounting platform or base should be level and located so as to permit free access of supply air.

ACCESS REQUIREMENTS

Provide adequate space at the compressor end of the unit for servicing. Provide two (2) feet of space above unit for service.

MOUNTING

The system requires an opening in the ceiling to the dimensions stated on page 3. Mounting rails are located at both ends of the chassis. Mounting rails may be used to attach unit to ceiling. Through-bolts should be insulated or non-conductive to prevent sweating. The chassis is weather stripped around the air grille and will seal to the box roof. The trim ring (shipped loose), when provided, should be installed around the air diffuser when secured with the hardware provided. Be sure to adhere to your local standard construction codes.



INSPECTION

1. Each shipment should be carefully checked against the bill of lading.
2. The shipping receipt should not be signed until all items listed on the bill of lading have been accounted for.
3. Check packaging for signs of damage.
4. Any shortage or damages should be immediately reported to the delivering carrier.
5. Damaged material becomes the delivering carrier's responsibility, and should not be returned to the manufacturer unless prior approval is given to do so.
6. When unpacking the system, care should be taken to prevent damage.
7. Avoid removing the shipping base until the unit has been moved to the final destination.
8. Complete warranty return card for each unit and mail to Heatcraft Refrigeration Products.

GENERAL SAFETY INFORMATION

1. Installation and maintenance to be performed only by a licensed contractor.
2. Ensure that the structural integrity of the box can withstand the weight of the PRO³. See Tech Bulletin for unit weights
3. Avoid contact with sharp edges and coil surfaces. They are a potential injury hazard. Wear gloves during moving and rigging.
4. Make sure all power sources are disconnected before any service work is done on units.

STANDARD INSTALLATION PROCEDURE (FOR INDOOR USE)

1. Inspect packaging for shipping damage. Open package and inspect unit for concealed damage.
2. Review the space and location requirements on page 4.
3. Provide a finished opening in the box ceiling, to the appropriate dimensions and structural strength.
4. DO NOT remove or disengage any box cam-locks in order to install the PRO³ unit.
5. Clean the roof of the box to provide a good sealing surface for the unit weatherstrip. Refer to box manufacturer's instructions for any procedures or processes necessary to ensure the integrity of the exposed foam in the panels is not compromised.
6. Check the mounting surface with a level. PRO³ units require a surface that is within 1° of level or better and no more than a 5/8" drop per 3 feet (17 mm drop per meter).
7. For walk-in boxes with aluminum top panels, it is recommended that a thermal break be placed on the roof adjacent to the opening to prevent the possibility of sweating.
8. Place the unit gently into the provided opening with the evaporator air flow directed toward the door (See page 4). Be careful not to damage the grill during installation.
9. Ensure that the condenser air flow is not obstructed.

10. Install the trim around the inside opening with the hardware provided.

11. Add water to the condensate drain line to maintain liquid seal in the P-Trap

12. Connect unit to power supply using the cord with plug, if provided, or hard wire. Adhere to local electrical/ wiring codes.

13. Apply power to unit. All controls are preset to factory default settings (See Table 1).

14. Check unit for proper operation.

15. To change defaults as a group follow steps mentioned in the next section:

IMPORTANT:

- **Do not use extension cords to connect unit to power.**
- **Plug-in to grounded three prong outlet.**
- **Do not remove grounding prong.**
- **Do not use a power adapter.**

CHANGING THE EZY

To change defaults as a group, follow these steps:

1. Press Set button and hold in until the display flashes “PS”.
2. Press the Set Button and the display will change to “0” and will begin to flash.
3. Press the up button until “22” is displayed.
4. Press the Set button.
5. Press the down button 2 times. “EZY” will be displayed.
6. Press the Set button.
7. Select the proper number for the model needed by
   - 1 - L Low temperature model
   - 2 - M Med temperature model - Electric Defrost
   - 3 - M Med temperature model - Air Defrost
8. Press Set and wait for unit to return out of programming mode.
9. Disconnect power
10. Press the Set Button while turning unit On
11. “CE” should display to verify programming display.

Table 1: Control Factory Default Settings

Indoor Models	Temperature Set Points	Defrost Start Times	Defrost Duration (Maximum)	Drip Time	Fan Delay	Defrost Termination Set Point	EZY Default
M - Cooler Models Air Defrost	38˚F	4 / day	60 min.	–	–	38˚F	3
M - Cooler Models Electric Defrost	34˚F	4 / day	40 min.	2 min.	1 min.	65˚F	2
L - Freezer Models Electric Defrost	-10˚F	4 / day	40 min.	2 min.	1 min.	65˚F	1

REFRIGERATION/DEFROST SEQUENCE OF OPERATION

The sequence of operation varies depending on the model that has been installed. The three basic models are Low Temperature, Medium Temperature Electric Defrost, and Medium Temperature Air Defrost models.

Control of the refrigeration and defrost system is provided by the Carel controller along with a space (box) temperature sensor and a coil (defrost) temperature sensor. The controller will control on and off switching for the compressor, condenser fan motor(s) (cycles with the compressor), evaporator fan motor(s) and electric defrost heaters for electric defrost.

The Carel controller is pre-programmed for all three applications. This is done with the use of the parameter list. The parameter list can be changed by entering the Carel Controller and changing the "EZY" setting. See page 14.

TABLE 2: INDOOR MODELS | LOW TEMPERATURE MODELS | EZY SETTING=1

SET POINT IS -10° F

These models are intended for freezer applications and require electric defrost.

Status		Compressor	Condenser Fans	Evaporator Fans	Defrost Heaters	Notes
Off	Display alternates "OFF" and Room Temperature	Off	Off	Off	Off	If unit shows "OFF", depress the "^" button and hold for three seconds.
On	Automatic Defrost on start up	Off	Off	Off	On	If coil temperature is below 65° F. If it is above, defrost is not initiated. Drip Time and Freeze Time are ignored.
On	Defrost Sensor reaches 65° F and defrost is terminated	Off	Off	Off	Off	
On	Cooling cycle initiated - Drip Time	Off	Off	Off	Off	System Timer Begins/ 2 min drip time
On	Drip Time of 2 minutes ends - coil freeze begins	On	On	Off	Off	Compressor starts and evaporator fans delay for 2 minutes to freeze the coil.
On	Evaporator fans start after 2 min delay	On	On	On	Off	
On	Box Temperature (-10.1° F) is satisfied	Off	Off	On	Off	
On	Box Temperature rises to -8.0° F	On	On	On	Off	2° F Differential, Minimum Compressor Off time is 4 minutes
On	Defrost Initiated (Manually or 6 hour counter)	Off	Off	Off	On	Electric Defrost
On	Cooling cycle initiated - Drip Time	Off	Off	Off	Off	System Timer Begins/ 2 min drip time
On	Drip Time of 2 minutes ends - coil freeze begins	On	On	Off	Off	Compressor starts and evaporator fans delay for 1 minute to freeze the coil.
On	Evaporator fans start after 1 min delay	On	On	On	Off	

TABLE 3: INDOOR MEDIUM TEMPERATURE MODELS-ELECTRIC DEFROST | EZY SETTING=2

SET POINT IS 34° F

These models are intended for cooler applications and have electric defrost. These models are intended for coolers that may be operated at a lower saturated suction temperature and require electric defrost to clear the coil.

Status		Compressor	Condenser Fans	Evaporator Fans	Defrost Heaters	Notes
Off	Display alternates “OFF” and Room Temperature	Off	Off	Off	Off	If unit shows “OFF”, depress the “^” button and hold for three seconds.
On	Automatic Defrost on start up	Off	Off	Off	On	If coil temperature is below 65° F. If it is above, defrost is not initiated. Drip Time and Freeze Time are ignored.
On	Defrost Sensor reaches 65° F and defrost is terminated	Off	Off	Off	Off	
On	Cooling Cycle initiated - Drip Time	Off	Off	Off	Off	System Timer Begins/2 min drip time
On	Drip Time of 2 minutes ends	On	On	On	Off	Compressor and evaporator fans start
On	Box Temperature (33.9° F) is satisfied	Off	Off	On	Off	
On	Box temperature rises to 36° F	On	On	On	Off	2° F Differential, Minimum Compressor Off Time is 4 minutes
On	Defrost Initiated (manually or 6 hour counter)	Off	Off	Off	On	Electric Defrost
On	Defrost terminated by temperature 65° F	On	On	On	Off	
On	Drip Time of 2 minutes ends	On	On	On	Off	Compressor starts and evaporator fans delay for 1 minute to freeze coil

TABLE 4: INDOOR MEDIUM TEMPERATURE MODELS-AIR DEFROST | EZY SETTING=3

SET POINT IS 38° F

These models are intended for cooler applications and have air (Off-cycle) defrost. The controller is pre-programmed for 4 defrost per day. These periods are reprogrammable.

Status		Compressor	Condenser Fans	Evaporator Fans	Defrost Cycle	Notes
Off	Display alternates “OFF” and Room Temperature	Off	Off	Off	Off	If unit shows “OFF”, depress the “^” button and hold for three seconds.
On	Cooling Cycle initiated	On	On	On	Off	System Timer Begins
On	Box Temperature (37.9° F) is satisfied	Off	Off	On	Off	
On	Box temperature rises to 40.0° F	On	On	On	Off	2° F Differential, Minimum Compressor Off Time is 4 minutes
On	Defrost Initiated (Manually or 6 hour counter)	Off	Off	On	On	Air Defrost
On	Defrost Terminated by time of 40 minutes	On	On	On	Off	

PROGRAMMING THE PJEZC CAREL ELECTRONIC CONTROLLER

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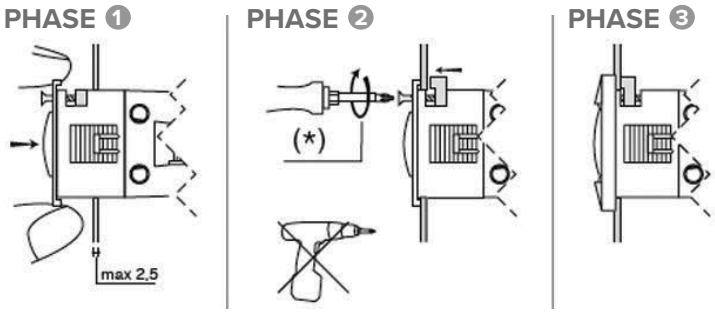
The Carel PJEZC control is a fully configurable electronic refrigeration controller. The Top Mount packaged refrigeration system uses the Carel controller on all three temperature designated models. The models differ by a pre-programmed parameter list that is specific for each application.

There are two levels of programming with the C controller. The first level can be accessed through the keypad. Set Point (st), Interval between defrost (do), Maximum Defrost Duration (dP), and Dripping Time (dd) are examples of first level parameters. Second level parameters can be accessed by entering a password. See “Modifying Parameters” (page 17).

INSTALLATION AND REMOVAL

PANEL INSTALLATION FROM THE FRONT USING SCREWS

- The thickness of the fastening panel must not exceed 3 mm.
- Remove the front frame and make sure that the two catches are in place (these must not protrude from the outline of the drilling template). If necessary, unscrew the two screws. Do not unscrew excessively, the screws must not be detached from the front panel (phase 1).
- Insert the instrument in the opening in the panel and hold it in position by the centre of the front panel (phase 1).
- Using the screwdriver, tighten the bottom screw 90°, the catch must come out of its slot and click onto the panel, then tighten until the front panel is secure. Do not over-tighten, when the front panel is secured blocks simply make another ½ turn to compress the gasket; If the catch does not click onto the panel, unscrew the screw, applying pressure at the same time with the screwdriver so that the catch moves back. Do not unscrew too much, the head of the screw must not be raised from the surface of the front panel (phase 2).
- Repeat the same operation for the top screw (phase 2).
- Apply the front frame (phase 3).



*** Do not over-tighten the screws.**

DISMANTLING USING THE SCREWS FROM THE FRONT

- Unclip the front frame.
- Unscrew the bottom screw, at the moment the front panel detaches from the panel keep pressure on the screw and unscrew a further 90° to make the catch go back into its slot.
- Repeat for the top screw.
- Remove the instrument from panel, keeping it horizontal.

ELECTRICAL CONNECTIONS

WARNINGS:

The electrical connections must only be completed by a qualified electrician.

A power supply other than the type specified may seriously damage the system.

Separate as much as possible the probes and digital input signal cables from the cables carrying inductive loads and power cables to avoid possible electromagnetic disturbance. Never lay power cables (including the electrical cables) and probe signal cables in the same conduits. Do not install the probe cables in the immediate vicinity of power devices (contactors, circuit breakers or similar).

Reduce the path of the probe and sensor cables as much as possible, and avoid spiral paths that enclose power devices. The probes must be connected using shielded cables (minimum cross-section of each wire: 0.5 mm²).

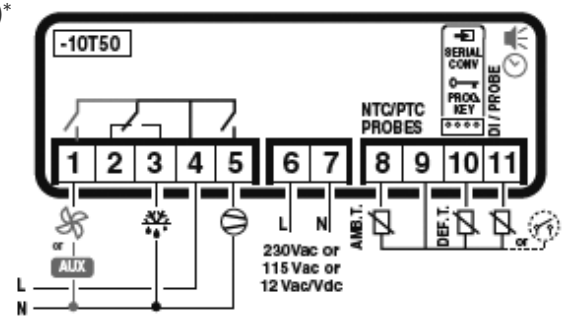
Avoid direct contact with internal electronic components.

Connection errors (and connections other than those indicated in this manual) may involve danger to the safety of the users and cause faults on the instruments and the components connected.

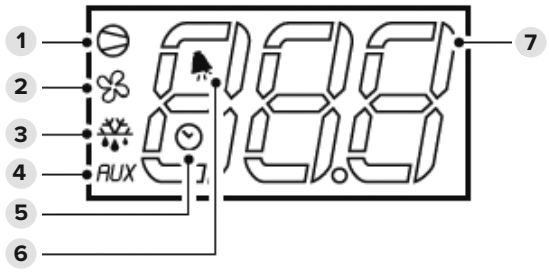
Fit the unit with all the electromechanical safety devices required to guarantee correct operation and the complete safety of the user.

CONTROLLER WIRING

PJEZ(C,Y)*

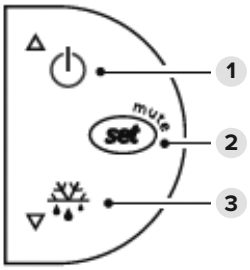


DISPLAY



But. No.	Function	Normal Operation			Start up
		On	Off	Flash	
1	compressor	on	off	call	on
2	fan	on	off	call	on
3	defrost	on	off	call	on
4	auxiliary output (AUX)	output active	output not active	–	on
5	clock (RTC)	RTC available, enabled (tEN=1) and at least one time band has been set)	RTC not available or not enabled (tEN=0) or no time band set		on (if the clock is fitted)
6	alarm	alarm in progress	no alarm in progress	–	on
7	digits	three digits with decimal point and range -199 to 999. See parameters /4, /5, /6 for the type of probe displayed, values in °C/°F and decimal point			

KEYPADS



But. No.	Normal Operation		Start up	
	Pressing the button alone	Pressing with other buttons		
1	more than 3 s: switch ON/ OFF	pressed together with 3 activates/ deactivates the continuous cycle	–	
2	- 1 s: displays/ sets the set point - more than 3 s: accesses the parameter setting menu (enter password 22) - mutes the audible alarm (buzzer)	–	for 1 s RESET current EZY set	pressed together (2 and 3) activate parameter reset procedure
3	more than 3 s: activates/ deactivates the defrost	pressed together with 1 activates/ deactivates the continuous cycle	for 1 s displays firmware version	

PRELIMINARY CONFIGURATIONS

Once the electrical connections have been completed, simply power-up the controller to make it operative.

Heatcraft recommends that you check the parameters listed.

Control Parameters	
st	set point
rd	set point differential
Defrost Parameters	
d0	type of defrost
dI	interval between two defrosts
dt	end defrost temperature
dP	maximum defrost duration
Alarm Parameters	
Ad	temperature alarm delay
AL	low temperature alarm threshold/deviation
AH	high temperature alarm threshold/deviation

FUNCTIONS AVAILABLE FROM KEYPAD

ON AND OFF

Switching the instrument ON: press UP for more than 3 s (when pressing the button, the display shows ON).

Switching the instrument OFF: press UP for more than 3 s. The display shows the message “OFF”, alternating with the temperature measured by the set probe.

In off status, the following functions are disabled (if featured by the model):

- compressor control / duty setting / continuous cycle;
- defrost;
- fan control;
- alarms : ‘LO’, ‘HI’, ‘IA’, ‘cht’, ‘CHT’;
- door switch (A4= 7/8);
- buzzer (when available)

While the following are enabled:

- temperature display, alternating with the message “OFF”;
- parameter display and setting;
- alarms: “E0”, “E1”, “E2”;
- the internal timer relating to parameter ‘dI’ is updated. If ‘dI’ expires in OFF status, a defrost is performed when restarting;
- auxiliary relay management, only in the following configurations:
  - H1= = 1/2 (“E0” alarm only)
  - H1= 3, A4= 6;

WARNING:

When first connected, easy is already on and ready to be used. The instrument can be switched on from a supervisor PC and via an external contact (setting A4= 5). The latter has priority over the other modes.

SET POINT SETTING (DESIRED TEMPERATURE VALUE)

The easy and easy compact devices control the desired temperature (set point) inside the cabinet or cold room directly and dynamically.

To view and modify the set point:

- press SET for 1 s, the set value will start flashing.
- increase or decrease the value using UP or DOWN.
- press SET to confirm the new value.

MANUAL DEFROST

Press DOWN for more than 3 s (activated only if the temperature conditions are right).

CONTINUOUS CYCLE

Press UP+DOWN for more than 3 s (activated only if the temperature conditions are right).

The continuous cycle is used to maintain refrigeration active in the cabinet or cold room, regardless of the temperature inside the unit. This may be useful for rapidly bringing the temperature below the set point value.

RAPID DISPLAY OF THE TEMPERATURE READ BY THE OTHER PROBES

Press the DOWN button to scroll the temperatures read by the probes. Each time the DOWN button is pressed, the display will show the name of the probe Pr1, Pr2 or Pr3 (only on the models with 3 inputs and with multifunction input configured as a probe) and after 1 s the temperature measured by the selected probe will be displayed.

To display the other probes, press DOWN again.

To return to the normal display, wait 3 s without pressing any buttons (exit by timeout).

TEMPERATURE DISPLAY

The temperature displayed, the unit of measure and the decimal resolution can be set according to the following parameters: /4, /5 and /6.

/4 : SELECT PROBE DISPLAYED

Used to choose whether to display the temperature read by the control probe (Probe 1), Probe 2 or the status of the multifunction input (analogue or digital).

Parameter /4 selects the probe shown on the display, all the other display and control modes remain unchanged.

IMPORTANT: the easy compact models can display up to 2 probes.

/5: SELECT °C/°F

Defines the unit of measure used for temperature control.

/5=0 to work in °C

/5=1 to work in °F.

WARNING:

When changing from one unit of measure to the other, all the values of the temperature parameters are modified to the new unit of measure.

The max and min limits of the absolute temperature parameters are the same for both °C that °F. The range of temperatures allowed is therefore different between °C and °F:

/6: DISABLE DECIMAL POINT

Used to enable or disable the temperature display with the resolution to the tenths of a degree between -20 and + 20 (easy) or -10 and +10 (easy compact).

/6= 0 temperature displayed to the tenth of a degree;

/6=1 temperature displayed without the tenths of a degree.

NOTE: the decimal point is only disabled in relation to the reading shown on the display (the calculations performed by the controller remain unchanged).

TEMPERATURE CONTROL

The following parameters are used to control the temperature: St, r1, r2, r3, r4 and rd.

ST: SET POINT, R1 MINIMUM VALUE AND R2 MAXIMUM VALUE OF THE SET POINT

Parameter St determines the desired temperature to be maintained inside the cabinet or cold room (set point). Parameters r1 (minimum value) and r2 (maximum) set the range of temperatures for setting the set point.

NOTE: the set point can be set by pressing the SET button (see par. “Setting the set point (desired temperature value)” page 11).

R3: SELECT DIRECT/REVERSE OPERATION

Defines the operating mode of the device:

- r3=0: direct with defrost. Used to request the activation of the compressor when the temperature measured by probe 1 rises above the set point. This mode also includes defrost.
- r3=1: direct without defrost.
- r3=2: reverse without defrost. Used to request the activation of the compressor when the temperature measured by probe 1 falls below the set point. This mode does NOT include defrost.

RAPID PARAMETER SET SELECTION (EZY)

The easy controller features the EZY parameter which is used to quickly choose a list of parameters, with corresponding values, for the control of the refrigeration system.

TABLE OF ALARMS AND SIGNALS

When an alarm is activated, the display shows the corresponding message that flashes alternating with the temperature; if fitter and enabled, the buzzer and the alarm relay are also activated.

All the alarms have automatic reset (that is, they stop when the causes are no longer present), except for alarm 'CHt' which has manual reset (instrument on/off using the UP button or by disconnecting the power supply).

NOTE:

- To restore the selected rapid parameter set at any time, turn the controller off and on again, while holding SET. The display shows "CE" to indicate that the selected rapid set (EZY= 1, 2, 3) has again over written the operating parameters, thus restoring the original set of parameters.
- To restore all the parameters and return to the original default values (factory settings), turn the controller off and on again while holding DOWN and SET, until the display shows "CF". Use this procedure with extreme car, as it may compromise the fundamental control settings.
- EZY= 0 brings no change

Pressing the SET button mutes the buzzer, while the code displayed and the alarm relay only go off when the causes of the alarm have been resolved. The alarm codes are shown in the able below:

Alarm Code	Buzzer and Alarm Relay	LED	Alarm Description	Reset	Enable Alarm parameters involved
E0	active	ON	probe 1 error= control	automatic	–
E1	not active	ON	probe 2 error= defrost	automatic	d0= 0 / 1 / 4, F0= 1
E2	not active	ON	probe 3 error= condenser/ product	automatic	[A4=10]
IA	active	ON	external alarm	automatic	[A4 = 1] [+A7]
dOr	active	ON	open door alarm	automatic	[A4 = 7/8][+A7]
LO	active	ON	low temperature alarm	automatic	[AL] [Ad]
HI	active	ON	high temperature alarm	automatic	[AH] [Ad]
EE	not active	ON	unit parameter error	not possible	–
EF	not active	ON	operating parameter error	manual	–
Ed	not active	ON	defrost ended by timeout	on first defrost ended correctly	[dP] [dt] [d4] [A8]
dF	not active	OFF	defrost running	automatic	[d6=0]
cht	not active	ON	dirty condenser pre-alarm	automatic	[A4=10]
CHt	active	ON	dirty condenser alarm	manual	[A4=10]
EtC	not active	ON	clock alarm	by setting the time	if bands active

DESCRIPTION OF THE MAIN SIGNALS AND ALARMS

LED FLASHING

The activation of the corresponding function is delayed by a timer, awaiting an external signal or disabled by another procedure that is already in progress. e.g. if is a continuous cycle in progress and a defrost is called, the latter will remain pending until the end of the continuous cycle, and the corresponding LED (defrost) will flash.

E0 STEADY OR FLASHING

Control probe error:

- Probe not working: the probe signal is interrupted or short-circuited;
- Probe not compatible with the instrument;

The alarm signal E0 is steady if it is the only active alarm (the temperature value is not displayed), while it fl ashes if other alarms are active or the second probe is displayed.

E1 FLASHING

Evaporator probe or food conservation probe error:

- Probe not working, the probe signal is interrupted or short-circuited;
- Probe not compatible with the instrument;

E2 FLASHING

Condenser probe or food conservation probe error:

- Probe not working, the probe signal is interrupted or short-circuited;
- Probe not compatible with the instrument;

IA FLASHING

Immediate or delayed alarm from multifunction digital input:

- Check the multifunction input and parameters A4 and A7.

LO FLASHING

Low temperature alarm. The probe has measured a temperature lower than the set point by a value that exceeds parameter AL:

- Check parameters AL, Ad and A0.

The alarm is automatically reset when the temperature returns within the set limits (see parameter AL).

HI FLASHING

High temperature alarm. The probe has measured a temperature higher than the set point by a value that exceeds parameter AH.

- Check parameters AH, Ad and A0.

The alarm is automatically reset when the temperature returns within the set limits (see parameter AH).

EE DISPLAYED DURING OPERATION OR ON POWER-UP

Unit parameter reading error. See Data errors.

EF DISPLAYED DURING OPERATION OR ON POWER-UP

Operating parameter reading error. See Data errors.

ED FLASHING

The last defrost ended after exceeding the maximum duration rather than when reaching the end defrost set point.

- Check parameters dt, dP and d4;
- Check the efficiency of the defrost.

The message disappears when the next defrost ends correctly.

DF FLASHING

Defrost running:

- This is not an alarm signal, but rather a message that the instrument is running a defrost. Only shown if d6= 0.

CHT FLASHING

Dirty condenser alarm:

- Check parameters A4, Ac, AE and Acd.

ETC FLASHING

Internal clock error.

DATA ERROR

In certain operating conditions, the instrument may detect errors in the data saved. These errors may compromise the correct operation of the instrument. If the microprocessor detects a data saving error, the display shows the message “EE”.

If the fault persists, the controller needs to be replaced. If, on the other hand, the message disappears, it can continue to be used. When “EE” error occurs frequently and/or remains for some time, the controller should be checked, as the original precision may not be guaranteed.

MODIFYING THE PARAMETERS

PARAMETER NAVIGATION

The operating parameters, modifiable using the keypad, are divided into two types: frequent (type F) and configuration (type C). Access to the latter is protected by password (default= 22) to prevent accidental or unauthorized modifications.

ACCESSING THE TYPE F PARAMETERS:

- Press the SET button for more than 3 s (if there are active alarms, mute the buzzer), the display shows the parameter code 'PS' (password).
- Use the UP and DOWN buttons to scroll the parameters. The LED corresponding to the category of parameters will be on.
- Press SET to display the value associated with the parameter increase or decrease the value using the UP or DOWN button respectively.
- Press SET to temporarily save the new value and display the parameter again.
- Repeat the procedure for any other parameters that need to be modified.
- Press the SET button for more than 3 s to permanently save the parameters and exit the parameter setting procedure.

ACCESSING THE TYPE C PARAMETERS:

- Press the SET button for more than 3 s (if there are active alarms, mute the buzzer), the display shows the parameter code "PS" (password).
- Press the SET button to access the password setting.
- Use the UP and DOWN buttons to scroll the numbers until displaying "22" (password to access the parameters).
- Press the SET button to confirm the password.
- Use the UP and DOWN buttons to scroll the parameters. The LED corresponding to the category of parameters will be on (see Table below).
- Press SET to display the value associated with the parameter increase or decrease the value using the UP or DOWN button respectively.
- Press SET to temporarily save the new value and display the parameter again.
- Repeat the procedure for any other parameters that need to be modified.
- Press the SET button for more than 3 s to permanently save the parameters and exit the parameter setting procedure.

WARNINGS:

If no button is pressed for 60 s, all the changes made to the parameters, temporarily saved in the RAM, will be canceled and the previous settings restored.

The Day, Hr, Min parameters are not restored, as these are saved instantly when entered.

If power is disconnected from the instrument before saving the settings (pressing the SET button for 3 s), all the changes made to the parameters and temporarily saved will be lost.

Category	Initial	Icon
Probe parameters	/	-
Control parameters	r	-
Compressor parameters	c	
Defrost parameters	d	
Alarm parameters	A	
Fan parameters	F	
AUX output configuration parameters	H1	AUX
RTC parameters	-	

SETTING THE DEFAULT PARAMETERS

WARNINGS:

Running this procedure overwrites any custom parameter settings.

To reset the default parameters:

- Disconnect power from the instrument.
- Reconnect power while holding the SET and DOWN buttons.
- The display will show the message "CF".
- After a few seconds the instrument starts operating with the default configuration. Any different parameter settings will need to be updated.

TROUBLESHOOTING

The following table shows a number of situations that may occur on the various models.

The most frequent causes and corresponding checks are described:

Problem	Cause	Checks
the compressor does not start (signaled by the compressor LED flashing)	• compressor delay set defrost post • dripping in progress	parameters c0, c1 and c2 and dd
the temperature is over the set limits but there is no alarm message and the buzzer, if fitted, does not sound	alarm delay set	parameters Ad, c6, d8
alarm IA is signaled (multifunction input) without actually being active	the multifunction input generates an alarm when the contact opens	connection of the input and whether this is closed in normal operation
the alarm connected to the multifunction input is not detected	alarm delay set or parameter programming error	1. if A4=1 2. the status of digital input A7
the defrost is not activated	defrost duration too short (dP) interval between defrosts dI=0: in this case the defrost is not activated	parameters dP and dI
	the end defrost temperature is too low or the evaporator temperature is too high	parameters dt and d/ (defrost probe)
the manual defrost is not activated and the defrost LED flashes	compressor protection times set	parameter d9 (select d9=1)
the high temperature alarm is shown after a defrost	the alarm delay after defrost is too short or the alarm threshold is too low	parameters d8 and AH
the display remains frozen even after the defrost	the ambient temperature has not yet reached the set point or alternatively the time d8 has not elapsed	wait or reduce d8
after modifying a parameter the controller continues working with the old values	the instrument has not updated the old value or alternatively the parameter setting procedure has not been ended correctly by pressing the SET button for 3 s	turn the instrument off and on again or alternatively reprogram the parameters correctly
the evaporator fan does not start 1	1. a compressor and fan start delay has been set 2. if F0=1 (fan managed by fan controller) • the evaporator is “hot”: the evaporator temperature can be read by selecting parameter /d • dripping in progress • F1 (evaporator fan control set point) too low • post-dripping delay set 3. if F0=0 • F2=1 and the compressor is off • dripping in progress • post-dripping in progress	1. parameter c0 2. parameters F0, F1, Fd, dd and d/ 3. parameters F0, F2, dd and Fd

DEVICE SETUP

Set 1 - Low Temperature Models - Electric Defrost w/ -10° F Set Point

Set 0 | Set 1 | Set 2 | Set 3 | Set 4

Parameter	Description	Min	Max	Default
St	Set point	-30	30	-10
r1	Minimum set point value	-50	303	-30
r2	Maximum set point value	-30	150	30
c2	Minimum compressor off time	0	100	4
do	Type of Defrost	0	4	0
dI	Interval between defrost	0	199	6
dt	End defrost temperature set point	-50	127	65
dP	Maximum defrost duration ALARM_ED	1	199	60
d4	Defrost on power-up	0	1	1
dd	Dripping time	0	15	2
F0	Enable evaporator fan control	0	1	0
F2	Stop evaporator fan if compressor off	0	1	0
F3	Evaporator fan status during defrost	0	1	1
Fd	Post-dripping time	0	15	2

Set 2 - Medium Temperature Models - Electric Defrost w/ 34° F Set Point

Set 0 | Set 1 | Set 2 | Set 3 | Set 4

Parameter	Description	Min	Max	Default
St	Set point	0	50	34
r1	Minimum set point value	-50	50	0
r2	Maximum set point value	0	150	50
c2	Minimum compressor off time	0	100	4
do	Type of Defrost	0	4	0
dI	Interval between defrost	0	199	6
dt	End defrost temperature set point	-50	127	65
dP	Maximum defrost duration ALARM_ED	1	199	60
d4	Defrost on power-up	0	1	1
dd	Dripping time	0	15	2
F0	Enable evaporator fan control	0	1	0
F2	Stop evaporator fan if compressor off	0	1	0
F3	Evaporator fan status during defrost	0	1	1
Fd	Post-dripping time	0	15	0

Set 3 - Medium Temperature Models - Air Defrost w/ 38° F Set Point

Set 0 | Set 1 | Set 2 | Set 3 | Set 4

St	Set point	0	50	38
r1	Minimum set point value	-50	50	0
r2	Maximum set point value	0	150	50
c2	Minimum compressor off time	0	100	4
do	Type of Defrost	0	4	2
dI	Interval between defrost	0	199	6
dt	End defrost temperature set point	-50	127	40
dP	Maximum defrost duration ALARM_ED	1	199	40
d4	Defrost on power-up	0	1	0
dd	Dripping time	0	15	0
F0	Enable evaporator fan control	0	1	0
F2	Stop evaporator fan if compressor off	0	1	0
F3	Evaporator fan status during defrost	0	1	0
Fd	Post-dripping time	0	15	0

Table 5: PRO³ System Troubleshooting Chart		
PROBLEM	**POSSIBLE CAUSES**	**POSSIBLE CORRECTIVE STEPS**
Compressor will not run	1. Main switch open.	1. Close switch.
	2. Fuse blown.	2 Check electrical circuits and motor winding for shorts or grounds. Investigate for possible overloading. Replace fuse after fault is corrected.
	3. Thermal overloads tripped.	3. Overloads are automatically reset. Check unit closely when unit comes back on line.
	4. Defective contactor or coil.	4. Repair or replace.
	5. System shut down by safety devices.	5. Determine type and cause of shutdown and correct it before resetting safety switch.
	6. No cooling required.	6. None. Wait until calls for cooling.
	7. Motor electrical trouble.	7. Check motor for open windings, short circuit or burn out.
	8. Loose wiring.	8. Check all wire junctions. Tighten all terminal screws.
Compressor noisy or vibrating	1. Flooding of refrigerant into crankcase.	1. Check setting of expansion valves.
	2. Worn compressor.	2. Replace.
High discharge pressure	1. Non-condensables in system.	1. Remove the non-condensables.
	2. Fan not running.	2. Check electrical circuit. Replace if motor fails.
	3. Dirty condenser coil.	3. Clean.
	4. System overcharged with refrigerant.	4. Reclaim refrigerant and recharge proper amount.
Low discharge pressure	1. Insufficient refrigerant in system.	1. Check for leaks. Repair and add charge.
	2. Low suction pressure.	2. See corrective steps for low suction pressure.
High suction pressure	1. Excessive load.	1. Reduce load or add additional equipment.
	2. Expansion valve overfeeding.	2. Check remote bulb. Regulate superheat.
Low suction pressure	1. Lack of refrigerant.	1. Check for leaks. Repair and add charge
	2. Evaporator dirty or iced.	2. Clean.
	3. Expansion valve malfunctioning.	3. Check and reset for proper superheat.
	4. Condensing temperature too low.	4. Check ambient temperature 50°F to 100°F.
Compressor thermal protector switch open	1. Operating beyond design conditions.	1. Add equipment so that conditions are within allowable limits.
	2. Dirty condenser coil.	2. Clean coil.
	3. Overcharged system.	3. Reduce charge
Fan(s) will not operate	1. Main switch open.	1. Close switch.
	2. Blown fuses.	2. Replace fuses. Check for short circuits or overload conditions.
	3. Defective motor.	3. Replace motor.
	4. Defective defrost control.	4. Replace defective component.
	5. Unit in defrost cycle.	5. Wait for completion of cycle.
	6. Coil does not get cold enough to reset thermostat.	6. Adjust fan delay setting of control.
Room temperature too high	1. Control cut out set too high.	1. Adjust control.
	2. Superheat too high.	2. Adjust thermal expansion valve.
	3. System low on refrigerant.	3. Add refrigerant.
	4. Coil iced-up.	4. Manually defrost coil. Check defrost controls for malfunction.
Ice accumulating on ceiling around evaporator and/or on fan guards' venturi or blades	1. Defrost duration is too long.	1. Adjust defrost termination temperature on control.
	2. Fan delay not delaying fans after defrost period.	2. Adjust fan delay setting or replace bad sensor.
	3. Defective defrost control or sensor.	3. Replace defective control or sensor.
	4. Too many defrosts.	4. Adjust number of defrosts.
Coil not clearing of frost during defrost cycle.	1. Coil temperature not getting above freezing point during defrost.	1. Check heater operation.
	2. Not enough defrost cycles per day.	2. Adjust control for more defrost cycles.
	3. Defrost cycle too short.	3. Adjust defrost control, defrost duration setting.
	4. Defective defrost control or sensor.	4. Replace defective component.
Ice accumulating in drain pan	1. Defective heater.	1. Replace heater.
	2. Unit not installed properly (out of level).	2. Check and adjust if necessary.
	3. Drain line plugged.	3. Clean drain line.
	4. Defective control.	4. Replace defective component.

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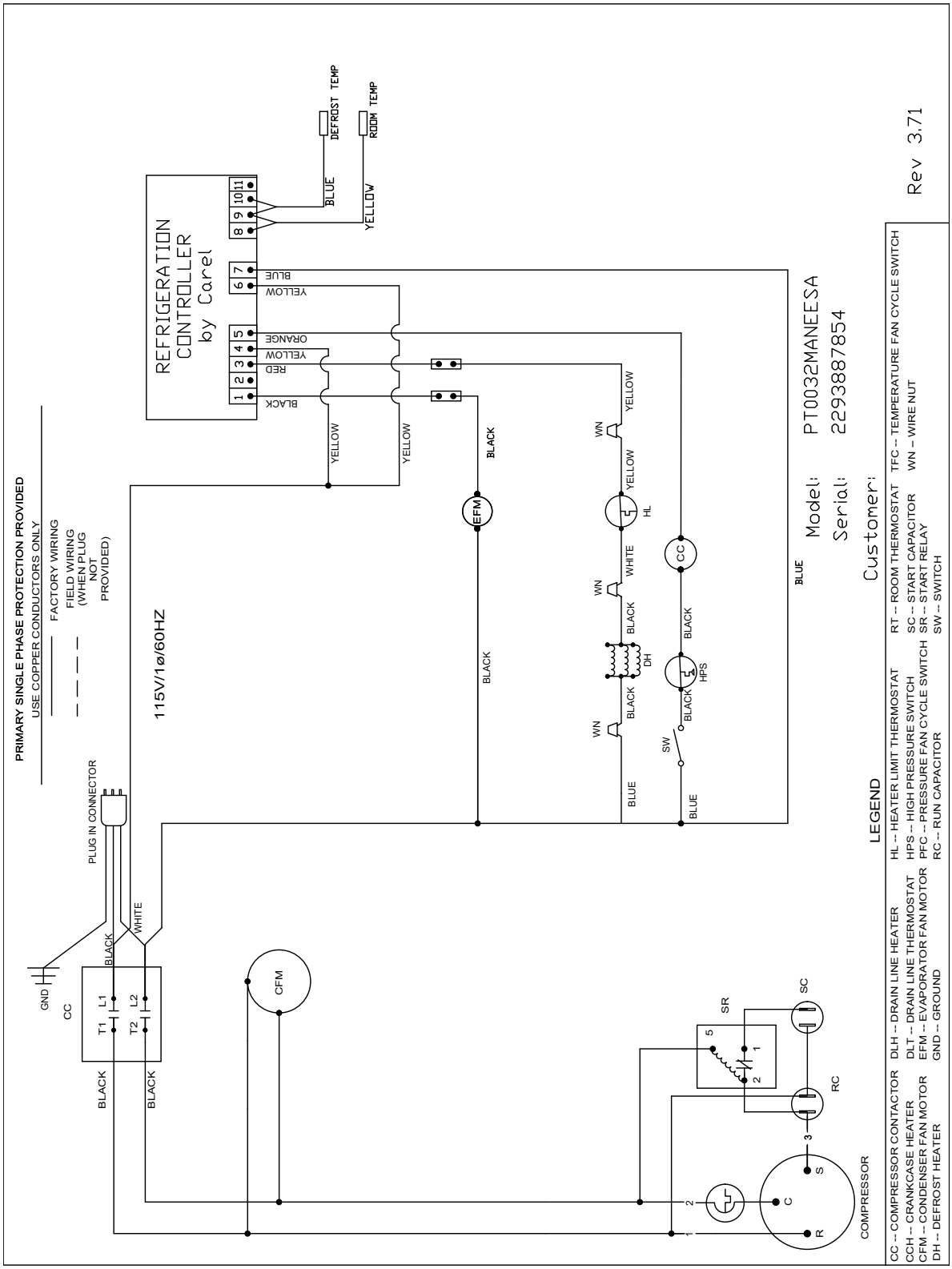
REPLACEMENT PARTS

Model	Cabinet, Voltage/Phase				
	P1, 115/1	P2, 115/1	P2, 230/1	P3, 230/1	P3, 230/3
Motor - Condenser	25308501	25308501	25322404	25322404	25322404
Motor - Evaporator	25319301	25329001	25329101	25329101	25329101
Fan blade - Condenser	22900601	5110E	22901601	22901601	22901601
Fan blade - Evaporator	23100501	22901901	22901901	22901901	22901901
Motor Mount - Condenser	23101101	23103301	23106101	23106101	23106101
Motor Mount - Evaporator	23101401	23103301	23103301	23103301	23103301
Contactor	2252303	2252303	R034915200	R034915200	2259996
Temperature Controller	21301101	21301101	21301001	21301001	21301001
Room Temp Sensor	28913702	28913702	28913702	28913702	28913702
Defrost Temp Sensor	28913701	28913701	28913701	28913701	28913701
Heater Limit Thermostat	5708L	5708L	5708L	5708L	5708L
Defrost Heaters	24751901	24712101	4312F	4313F	4313F
Fan Pressure Control	N/A	N/A	28917302	28917302	28917302
Fan Temp Control	N/A	N/A	N/A	5521R	5521R
Drain Line Heater	N/A	N/A	24753401	24753401	24753401
Drain Line Heater T'stat	N/A	N/A	28917401	28917401	28917401
Weatherhood	N/A	N/A	59332801	50087601	50087601

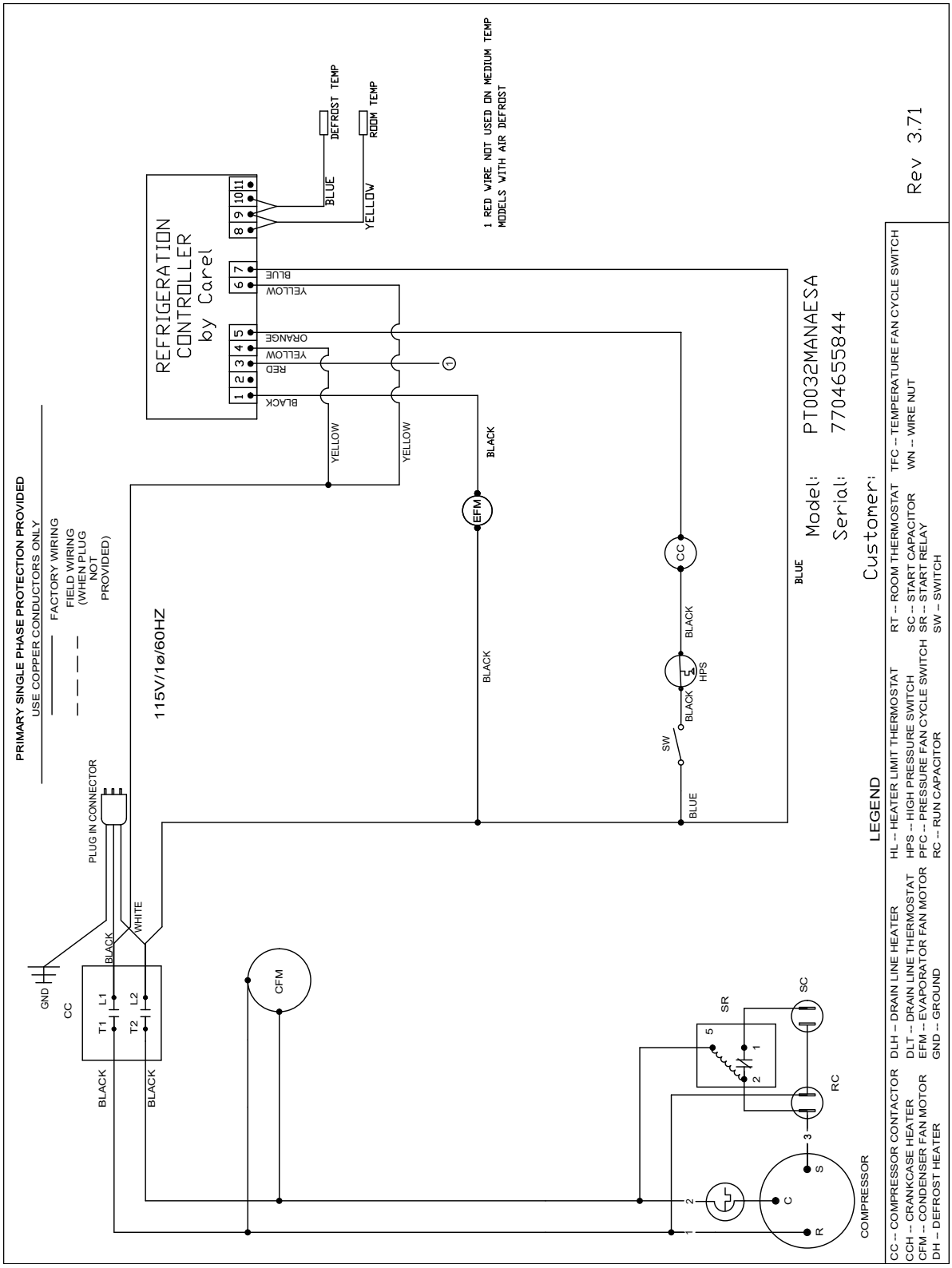
ELECTRICAL WIRING DIAGRAMS

ELECTRIC DEFROST SYSTEMS /Single Phase-P1 Cabinet



ELECTRICAL WIRING DIAGRAMS

AIR DEFROST SYSTEMS /Single Phase-P1 Cabinet



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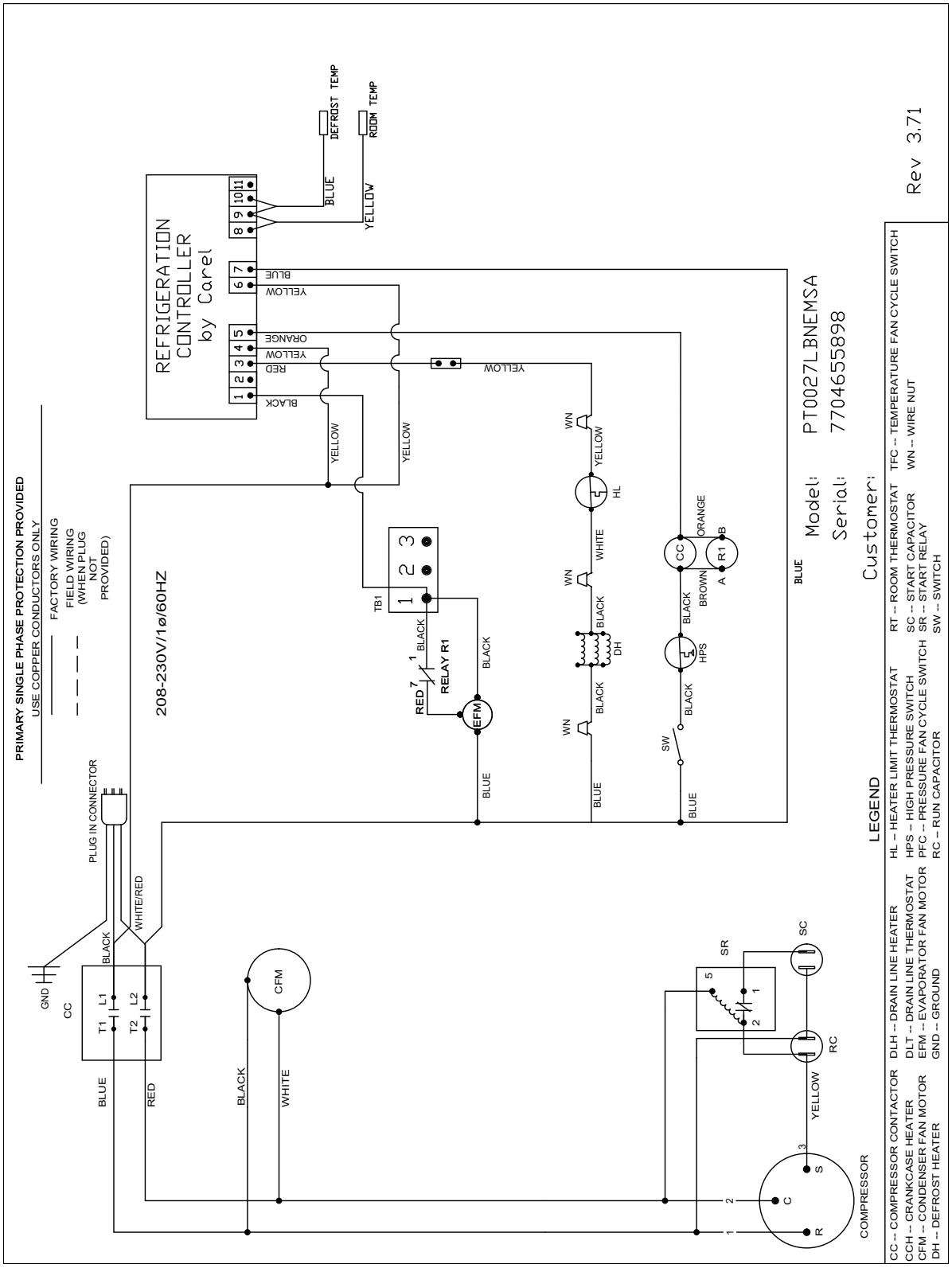

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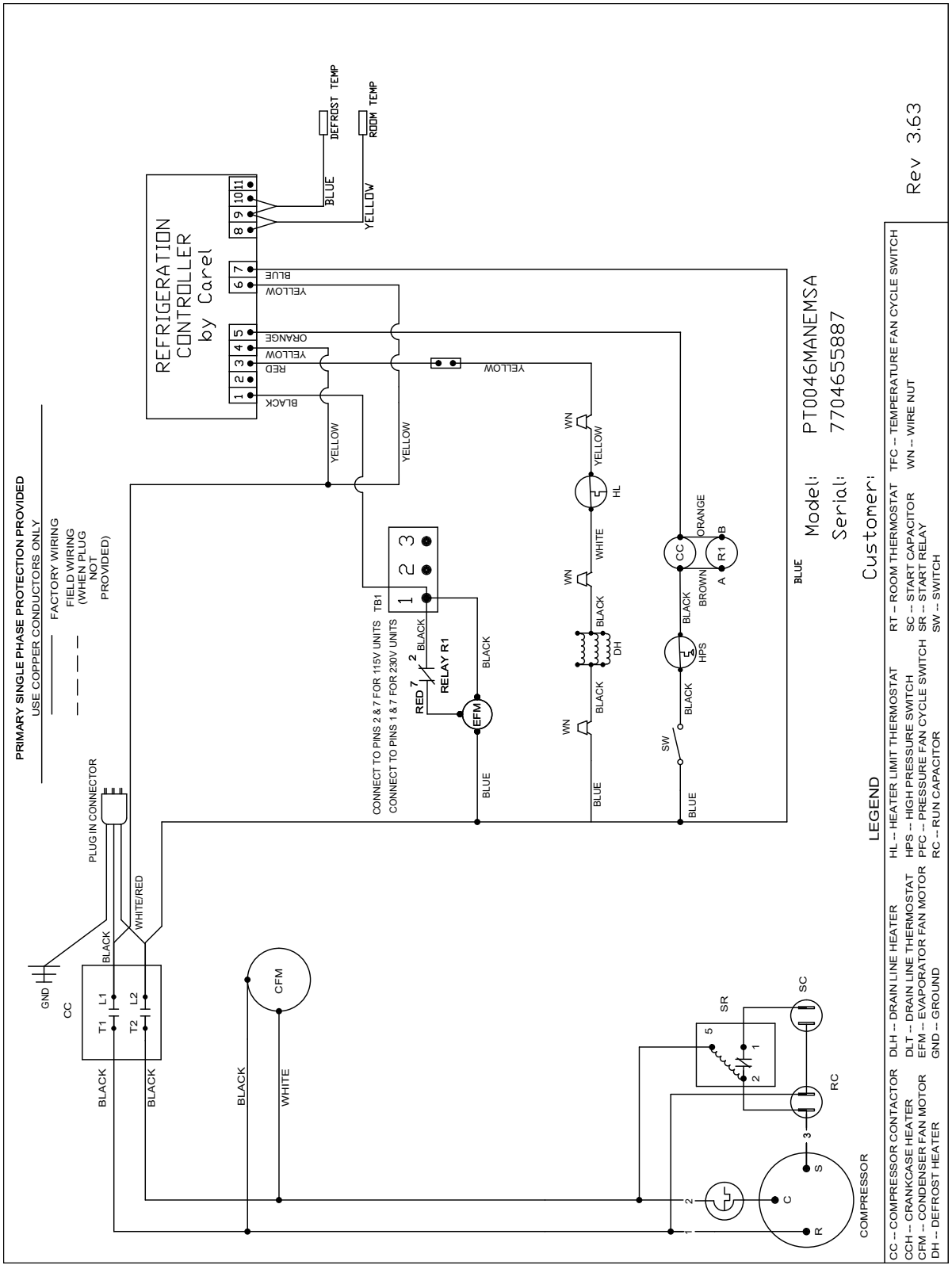

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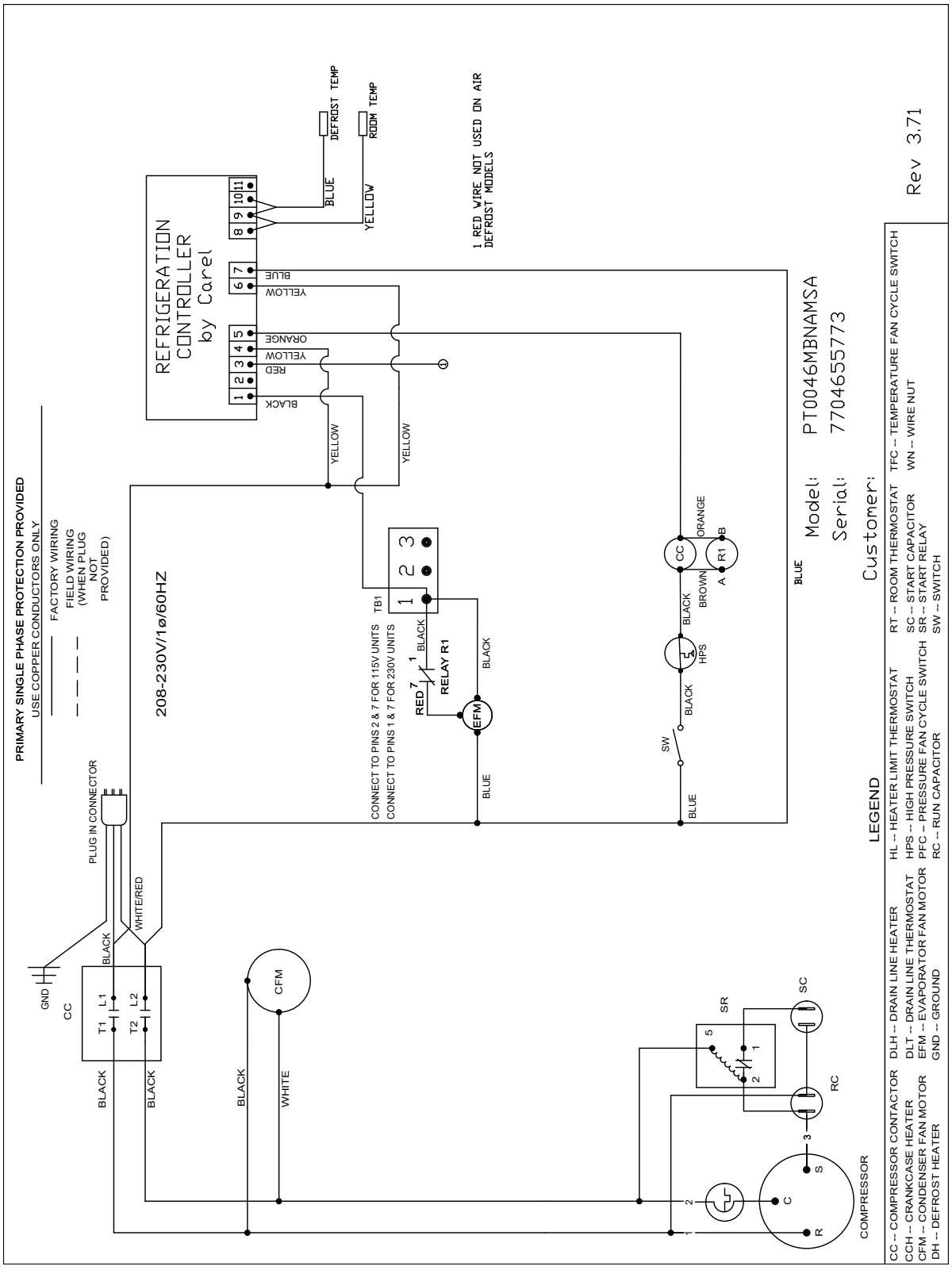

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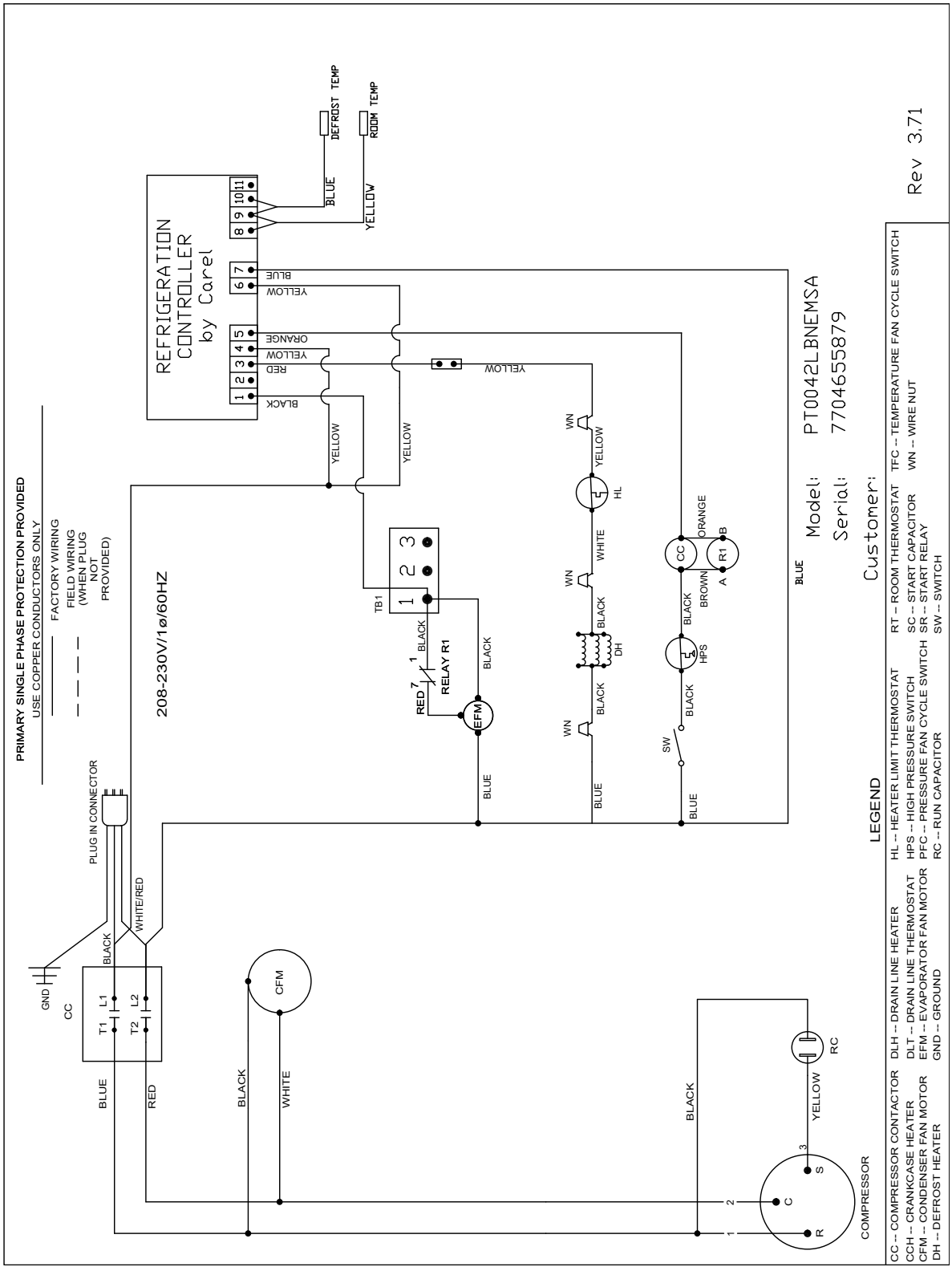

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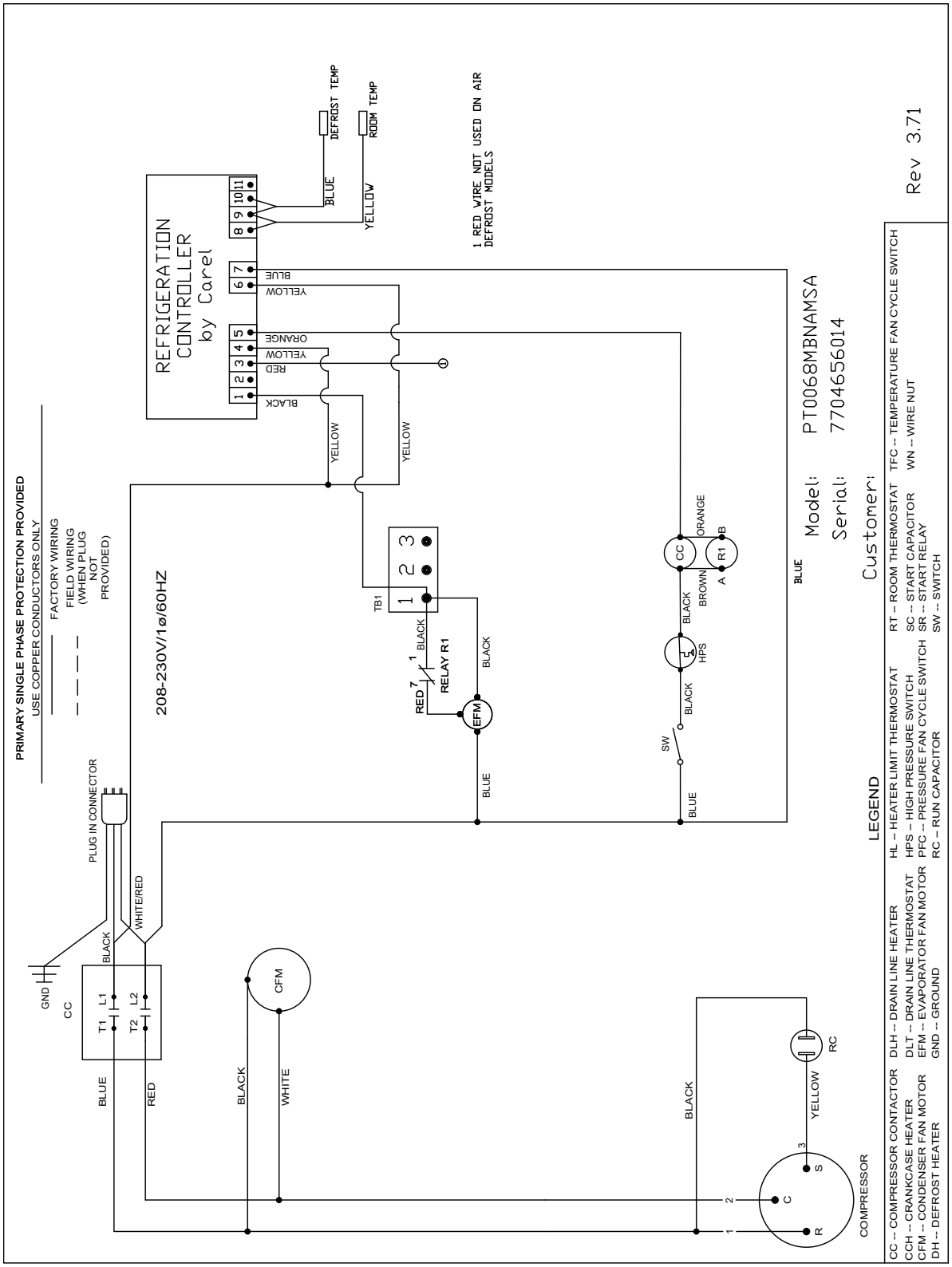
AIR DEFROST SYSTEMS /Single Phase-P2 Cabinet



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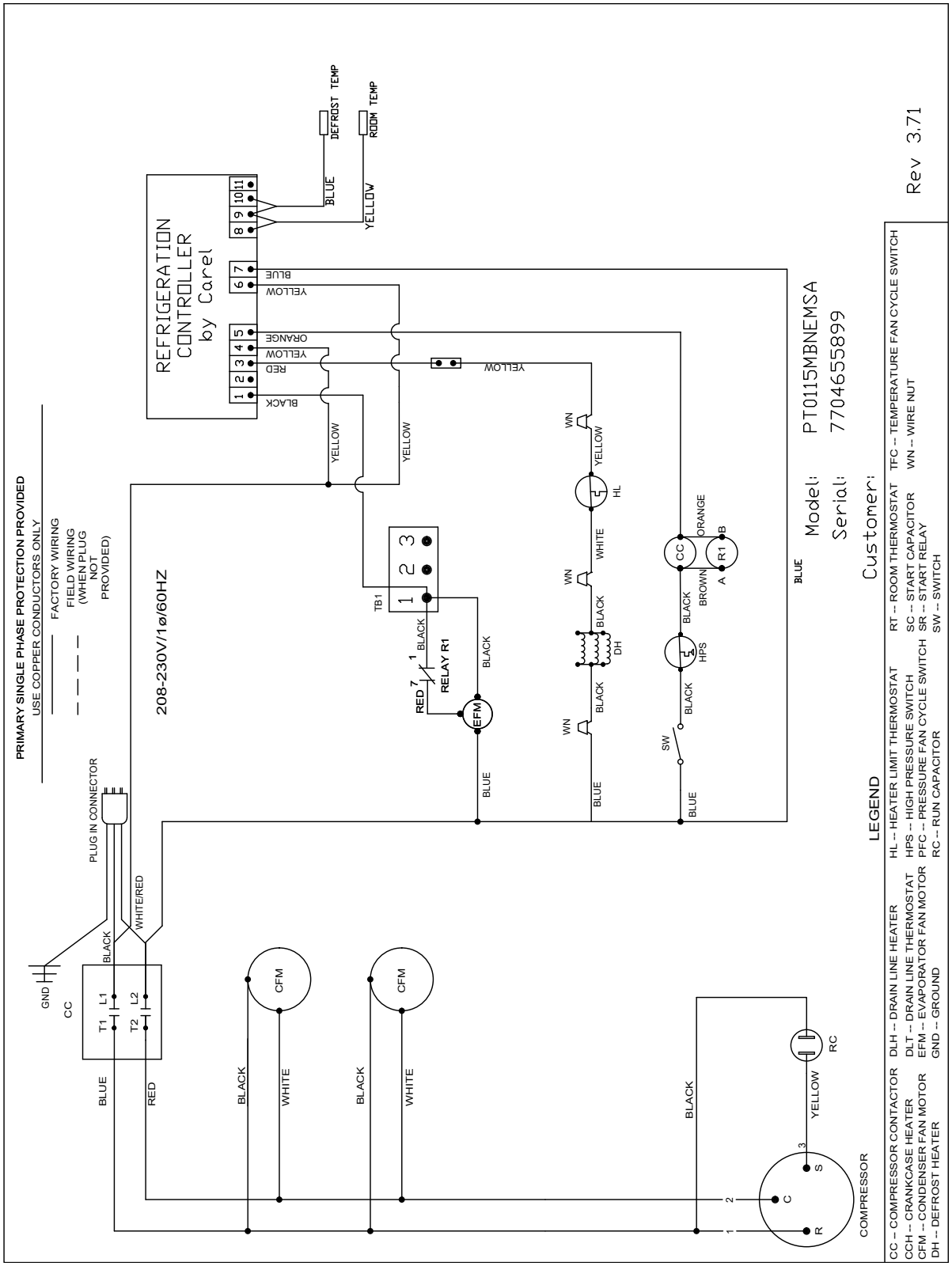

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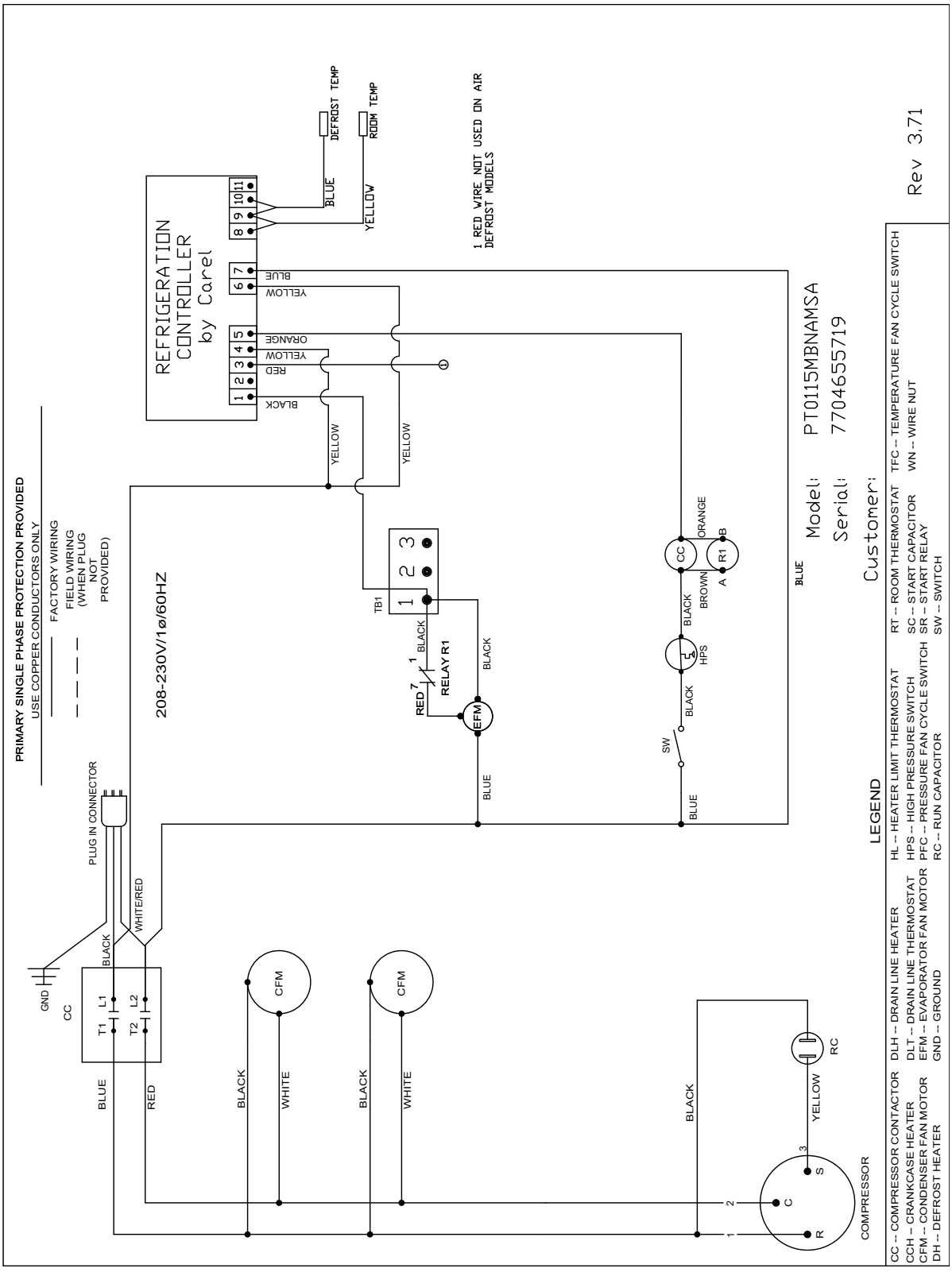
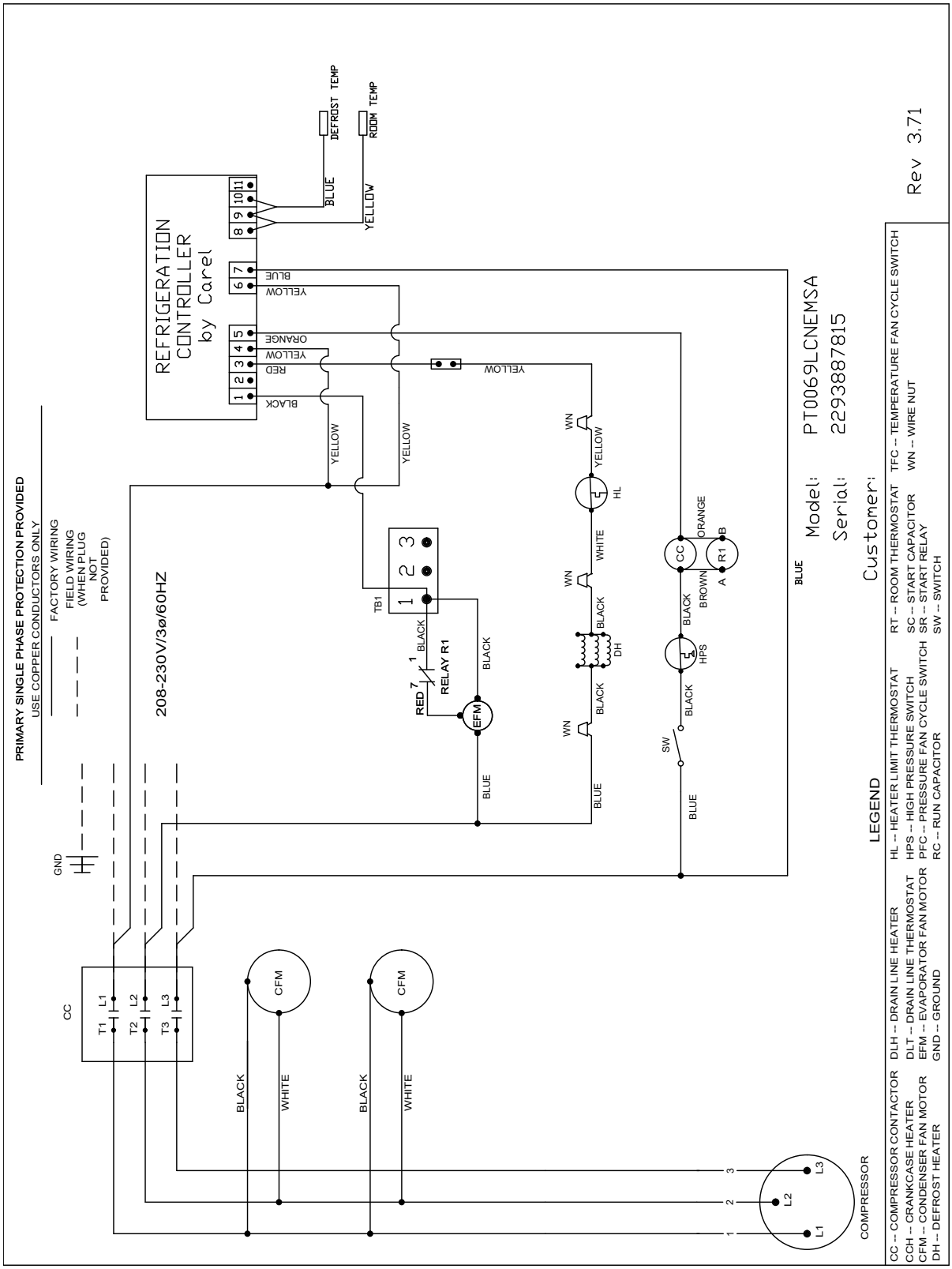
AIR DEFROST SYSTEMS /Single Phase-P3 Cabinet



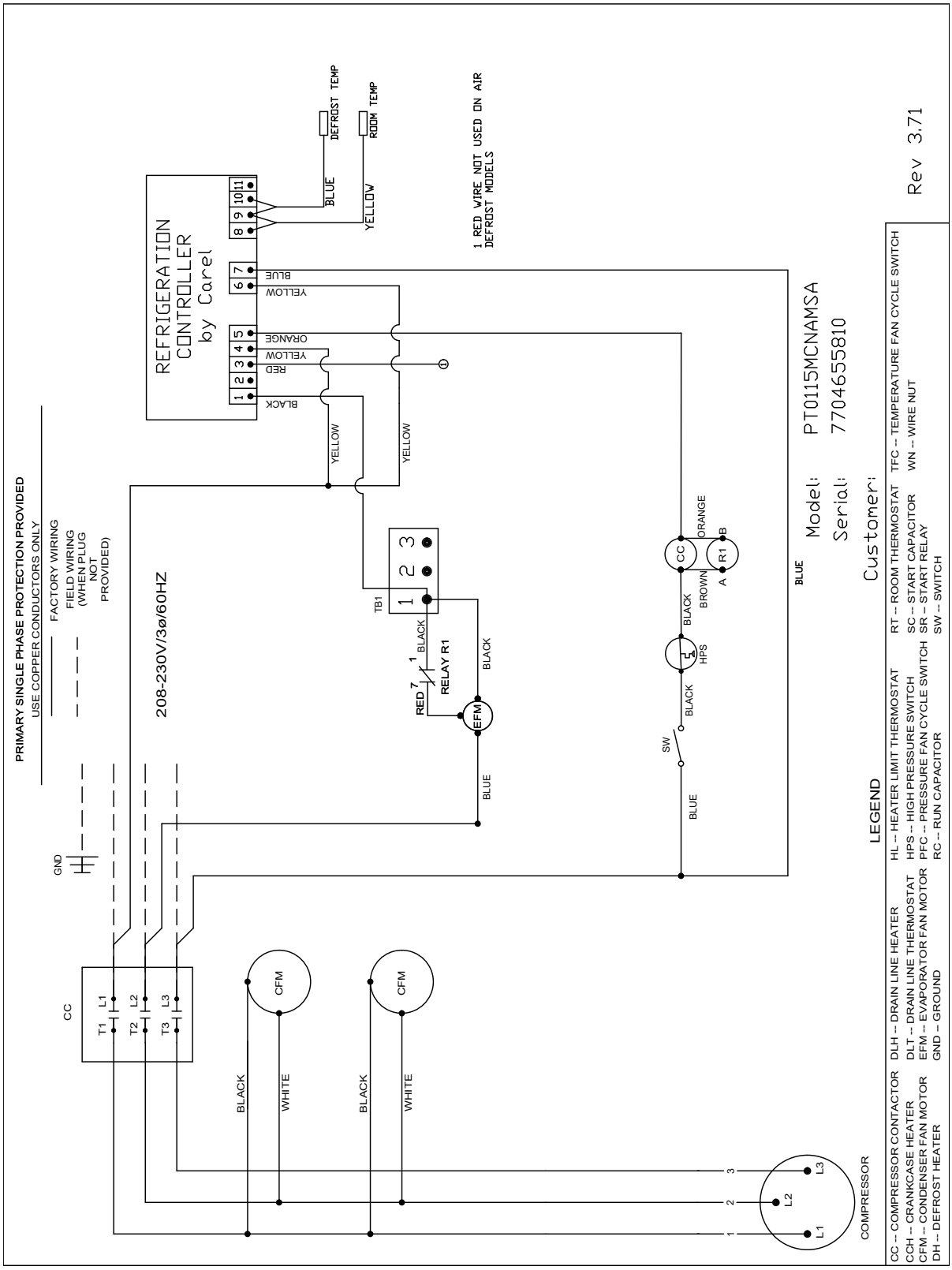
ELECTRICAL WIRING DIAGRAMS

ELECTRIC DEFROST SYSTEMS /Three Phase-P3 Cabinet



ELECTRICAL WIRING DIAGRAMS

AIR DEFROST SYSTEMS /Three Phase-P3 Cabinet



WARRANTY STATEMENT

Heatcraft Refrigeration Products LLC warrants to its direct purchasers that the PRO³ product, except Service Parts, manufactured by Heatcraft Refrigeration Products LLC shall be of a merchantable quality, free of defects in material or workmanship, under normal use and service for a period of two (2) years from date of original installation, or thirty (30) months from date of shipment by Heatcraft Refrigeration Products LLC, whichever first occurs. Service Parts, for product out of original warranty, should be so warranted for a period of twelve (12) months from date of shipment. Any product covered by this order found to Heatcraft Refrigeration Products LLC's satisfaction to be defective upon examination at Heatcraft Refrigeration Products LLC's factory will, at Heatcraft Refrigeration Products LLC's option, be repaired or replaced and returned to Buyer via lowest common carrier, or Heatcraft Refrigeration Products LLC may at its option grant Buyer a credit for the purchase price of the defective article. Upon return of a defective product to Heatcraft Refrigeration Products LLC's plant, freight prepaid, by Buyer, correction of such defect by repair or replacement, and return freight via lowest common carrier, shall constitute full performance by Heatcraft Refrigeration Products LLC of its obligations hereunder.

Hermetic compressors furnished by Heatcraft Refrigeration Products LLC are subject to the standard warranty terms set forth above, except that motor compressor replacements or exchanges shall be made through the nearest authorized wholesaler of the motor compressor manufacturer (not at Heatcraft Refrigeration Products LLC's factory) and no freight shall be allowed for transportation of the motor compressor to and from the wholesaler. The replacement motor compressor shall be identical to the model of the motor compressor being replaced. Additional charges which may be incurred throughout the substitution of other than identical replacements are not covered by this warranty.

The foregoing is in lieu of all other warranties, express or implied, notwithstanding the provisions of the uniform commercial code, the Magnuson-Moss Warranty-Federal Trade Commission Improvement Act, or any other statutory or common law, federal or state.

Heatcraft Refrigeration Products LLC makes no warranty expressed or implied, of fitness for any particular purpose, or of any other nature whatsoever, with respect to products manufactured or sold by Heatcraft Refrigeration Products LLC hereunder, except as specifically set forth above and on the face hereof. It is expressly understood and agreed that Heatcraft Refrigeration Products LLC shall not be liable to buyer, or any customer of Buyer, for direct or indirect, special, incidental, consequential or penal damages, or for any expenses incurred by reason of the use or misuse by Buyer or third parties of said products. To the extent said products may be considered "Consumer Products,' as defined in Section 101 of the Magnuson-Moss warranty-Federal Trade Commission Improvement Act, Heatcraft Refrigeration Products LLC makes no warranty of any kind, express or implied, to "Consumers," except as specifically set forth above and on the face hereof.

This equipment is designed to operate properly and produce the rated capacity when installed in accordance with good refrigeration industry practices.

The following conditions should be adhered to when installing this unit to maintain the manufacturers warranty:

(a) The power supply to the unit must meet the following conditions:

   A. Three phase voltages must be +/- 10% of nameplate ratings. Single phase must be within +10% or -5% of nameplate ratings.

   B. Phase imbalance cannot exceed 2%.

(b) All control and safety switch circuits must be properly connected according to the wiring diagram.

(c) The factory installed wiring must not be changed without written factory approval.

OPTIONAL THREE-YEAR EXTENDED COMPRESSOR WARRANTY

The Equipment Dealer may purchase for the Owner at the time of the original invoice of the equipment a Three-Year Limited Replacement Compressor Warranty. This entitles the owner to be reimbursed for the cost of a replacement compressor, during the third through fifth year of the life of the compressor.

The warranty program functions similarly to the standard warranty offered. When a compressor failure occurs and the unit is exchanged "over the counter" at the authorized wholesaler outlet a salvage credit is issued along with the invoice for the new compressor. Return copies of both the credit and invoice to the Equipment Dealer along with the model and serial number of the condensing unit. The Equipment Dealer will process this claim with the Manufacturer and subsequently reimburse the Owner for the cost of the new compressor.

This warranty covers the actual compressor only and does not extend to any labor, trip charges, crane rental, taxes or additional parts, refrigerant or processing/handling charges required to make the unit operational.

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HEATCRAFT™
Worldwide Refrigeration

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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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