



PRO³ TOP MOUNT PACKAGED REFRIGERATION SYSTEM

Installation and Operations Manual
For Indoor Applications

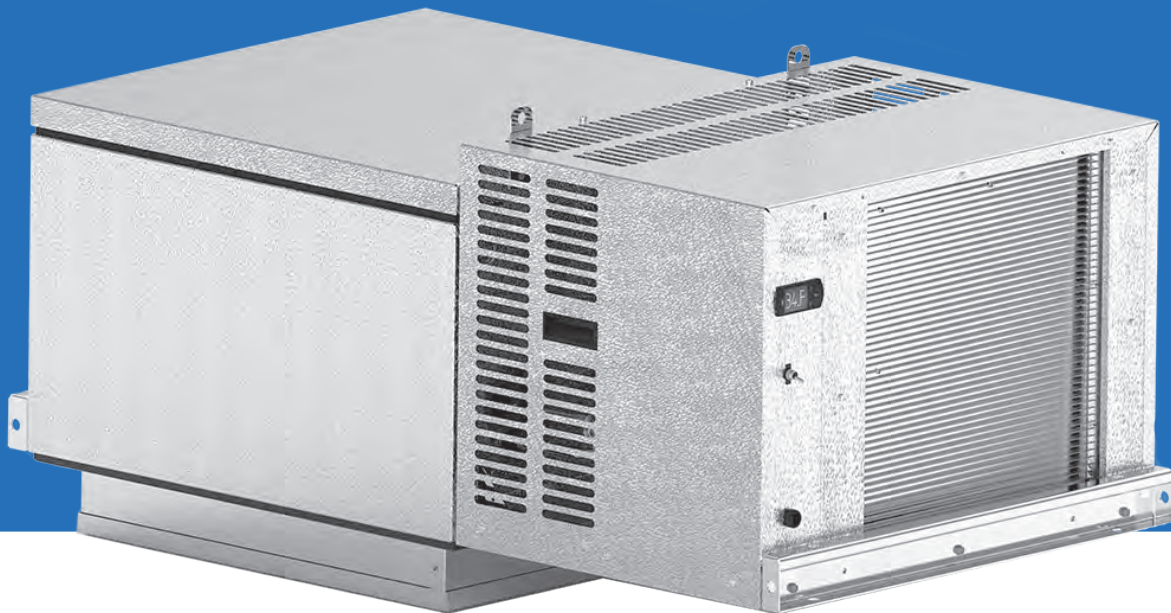


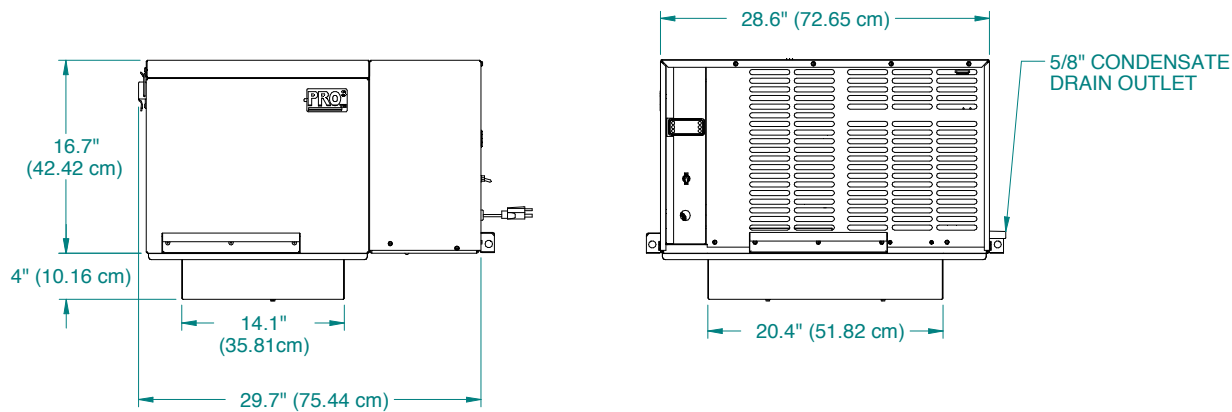
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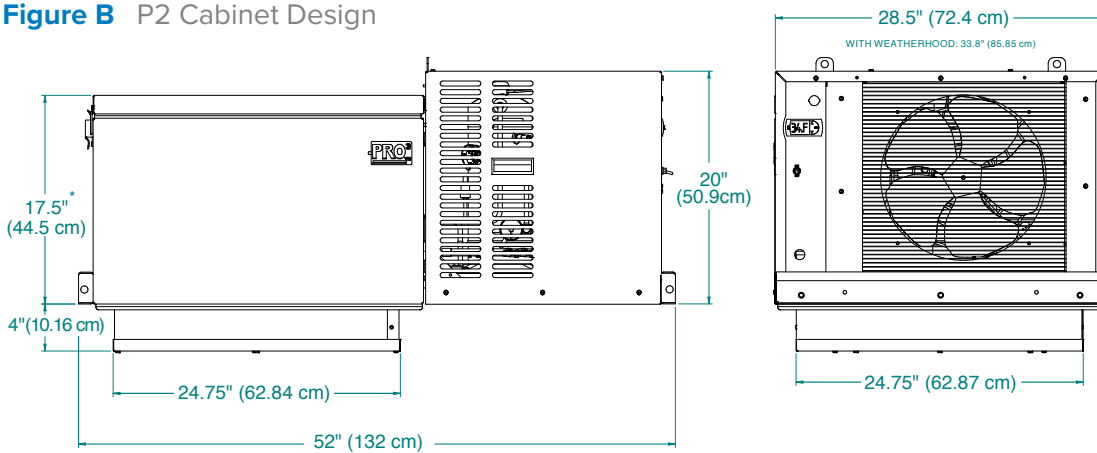
DIMENSIONAL DRAWINGS

Figure A P1 Cabinet Design (indoor only)



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

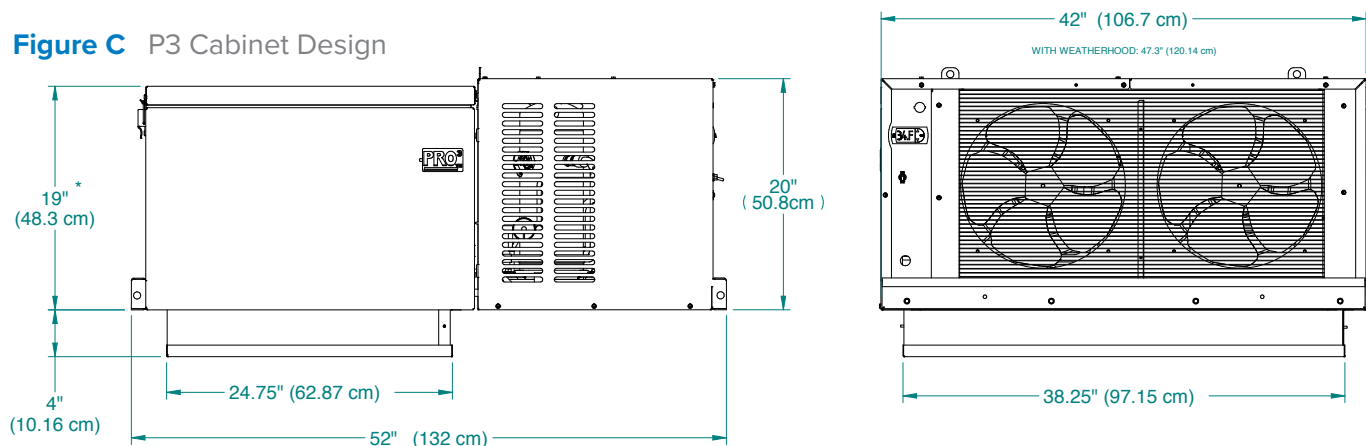
Figure B P2 Cabinet Design



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

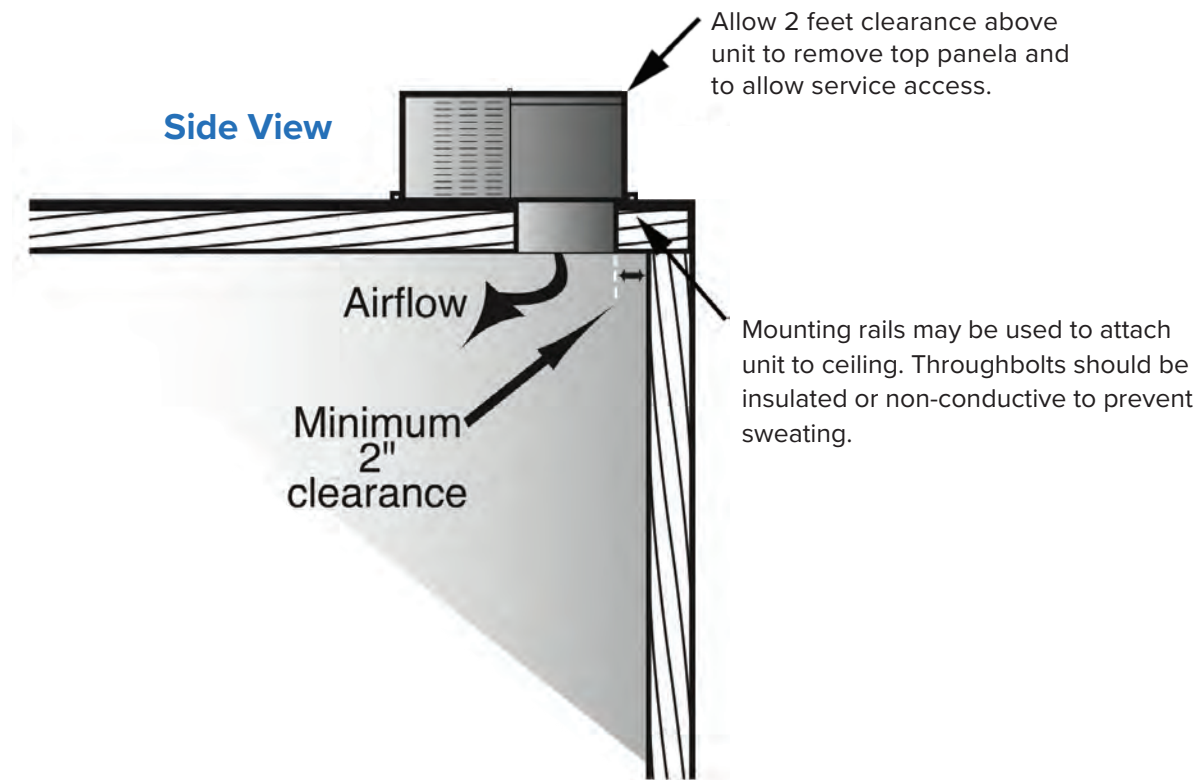
SPACE AND LOCATION REQUIREMENTS FOR INDOOR MODELS

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

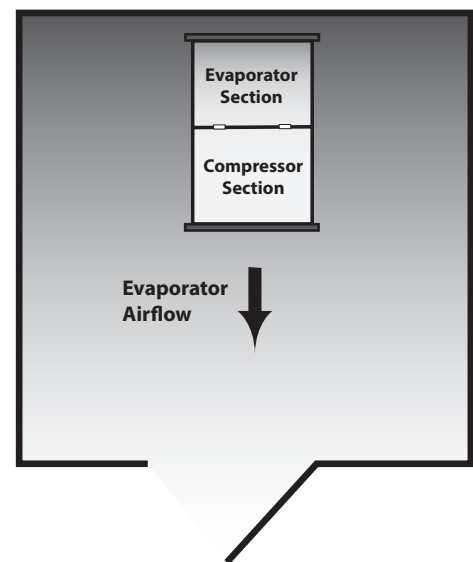
Some general rules for the evaporator section placement which must be followed are:

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.

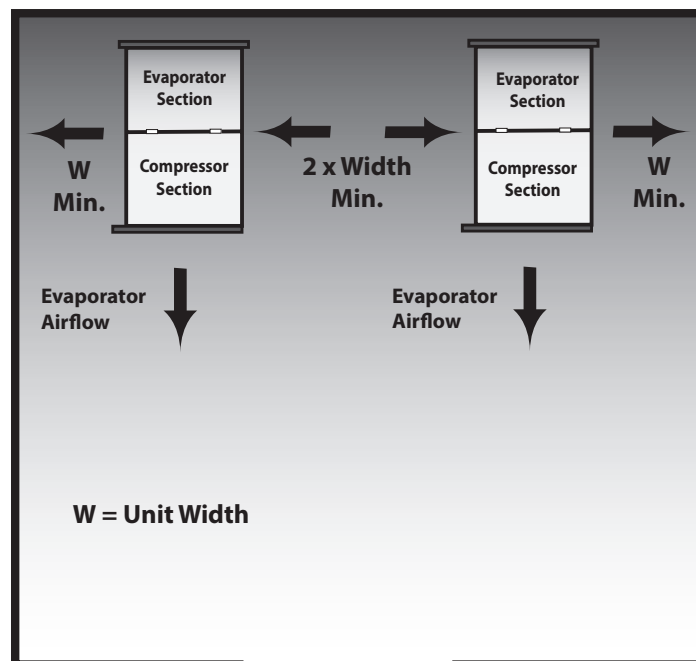
The size and shape of the storage will generally determine the type and number of units to be used and their location.

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

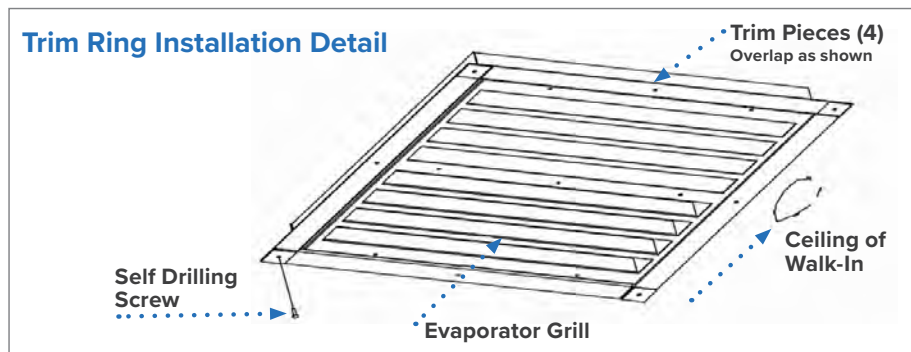
Rigging holes are provided on all models. Caution should be exercised when moving these units. To prevent damage to the unit housing during rigging, cables or chains used must be held apart by spacer bars. The mounting platform or base should be level and located so as to permit free access of supply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

SYMBOLS

Listed below are the warning symbols and their meanings.



A2L or A3

Warning; Risk of fire / flammable materials



Warning; Hazard
Category 1 Flammable
Gases

WARNING

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).

Do not pierce or burn.

Be aware that refrigerants may not contain an odor.

In Canada, the French translation is

MISE EN GARDE

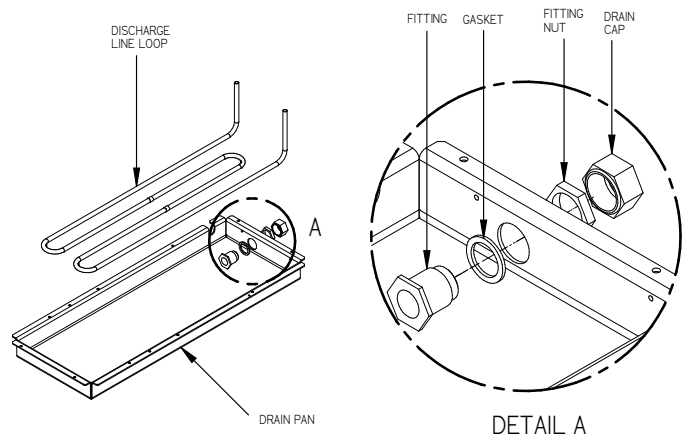
Ne pas utiliser de moyens autres que ceux recommandés par le fabricant pour accélérer le processus de dégivrage ou pour nettoyer l'appareil.

L'appareil doit être entreposé dans un local ne contenant pas de sources d'inflammation permanentes (flammes nues, appareil à gaz ou dispositif de chauffage électrique en fonctionnement, par exemple).

Ne pas percer ou brûler.

Attention, les fluides frigorigènes peuvent ne pas dégager d'odeur.

14. Check unit for proper operation.
15. To change defaults as a group follow steps mentioned in the next section:
16. Indoor P1 Cabinet models are equipped with 5/8" external drain line. There is no condensate evaporation within the unit.
17. Indoor P2 and P3 Cabinet models are equipped with an internal re-evaporation pan, located beneath the compressor. During operation, hot refrigerant gas passes through this pan and evaporates condensate water from the evaporator coil. In most cold storage applications, the re-evaporation pan is sufficient to handle all evaporator condensate water, eliminating the need for an external drain line.
18. For applications with high indoor humidity and/or extended run times; there is a risk of condensate water overflow of the re-evaporation pan. For those applications, the indoor PRO3 includes a 3/4" NPT external drain connection which may be connected to a remote drain via a field-supplied condensate pump or external drain line.



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.

REFRIGERANT DETECTION SYSTEMS, IF EQUIPPED

- a) The REFRIGERANT DETECTION SYSTEM is a sensing system which responds to a pre-set concentration of refrigerant in the environment. When a refrigerant leak is detected by the refrigerant leak sensors mounted on the Evaporator, the mitigation actions are taken.
- b) Listed below are the operation and required servicing measures for the refrigerant detection system. When a refrigerant leak is detected by the refrigerant leak sensors mounted on the unit cooler the mitigation actions are taken
 - i. Compressor is turned “OFF”.
 - ii. Evaporator fan is turned to “Low Speed” to provide air circulation.
 - iii. If the unit is in defrost mode, the defrost heaters are turned “OFF”.

A service technician is required to manually reset the refrigerant detection controller.

- c) Use of refrigerant leak detection sensor is optional; UL does not require the addition of a sensor.
- d) Field installation of refrigerant leak detection sensor is not allowed. Check Heatcraft product offering for models with factory assembled refrigerant leak detection system.

QUALIFICATION OF WORKERS

Working personnel for maintenance, service, and repair operations should be trained and qualified to work on A2L refrigeration systems. Personnel should have the appropriate technical training and experience necessary to be aware of hazards to which he or she is exposed in performing a task and of measures necessary to minimize the danger to themselves or other persons.

Every working procedure that affects safety means shall only be carried out by competent persons according to Annex 101.DVT in UL 60335-2-89

Examples for such working procedures are:

- a) breaking into the refrigerating circuit;
- b) opening of sealed components;
- c) opening of isolated enclosures.

MRLDS-450 GAS DETECTOR (LEAK SENSOR) - OVERVIEW OF NORMAL OPERATIONS

Applying Power and the Start-up Sequence

After applying power, the instrument will go through a start-up sequence (initialization, audible/visual test and self-test sequence). After the start-up sequence completes, the instrument will enter a warmup period to allow the sensor element to stabilize before reporting a valid output.

Step	Description
1	Switch power on.
2	Observe start-up sequence and warm-up phase: - Green LED will blink at 0.5 Hz for about five (5) minutes - Modbus flag for warm-up is set - Buzzer is off - Relay state is “no alarm” - Gas reading invalid
3	Observe normal operation: - Green LED is steady on - Modbus flag for warm-up is cleared - Buzzer is off - Relay state is “no alarm” - Gas reading valid

MRLDS-450 GAS DETECTOR (LEAK SENSOR) - STATUS INDICATION:

The MRLDS-450 gas detections provide external indication of its current operational state via audible and visual feedback. Visual indication of the instrument status is provided by a single tri-color LED (Green/Red/Orange). MRLDS-450 gas detection instruments also provide relays outputs. Instrument states and corresponding outputs are shown in Table below

State	LED	Buzzer	Relay 1 (LOW)	Relay 2 (HIGH)	Relay 3 (FAULT)
Warm-up			OFF	OFF	OFF
Normal			OFF	OFF	OFF
Low Alarm			ON	OFF	OFF
High Alarm			ON	ON	OFF
Offline			OFF	OFF	OFF
Fault			OFF	OFF	ON
Negative Gas Fault			OFF	OFF	ON
Zero Cal. Fault			OFF	OFF	OFF
Span Cal. Fault			OFF	OFF	OFF

ALARM RESET INSTRUCTIONS:

CAUTION Before resetting the alarm, please verify and ensure the leak is fixed.

User interaction with the MRLDS-450 gas detector is accomplished through the use of two magnetic switches located on the bottom of each unit. To actuate a magnetic switch, apply the supplied magnetic wand to the relevant switch location as shown in Figure below



Switch locations above are referred to in this document as MAG#1 and MAG#2. Depending on the duration the switch is held, a short “tap” or long “hold” will be detected.

- To carry out a tap function, tap the relevant switch location for one (1) second, until a single “chirp” is heard and remove the wand to confirm a “tap”. This will only mute the buzzer/alarm. Recommended to turn off the unit and fix the leak first before next step.
- To carry out a hold function, do not remove the magnetic wand after the first “chirp” but continue to hold for more than five (5) seconds, until a double “chirp” is heard, and remove wand to confirm a “hold”. This step will acknowledge the alarm and reset the leak sensor. If the leak is still not fixed, the sensor will go into alarm mode again.
- If either switch is held for more than 30 seconds, a stuck switch fault will be indicated.
- To interact with the instrument without use of the magnetic wand, two internal push button tactile switches may be used. Remove the lid without removing the ribbon cable to access. Internal switches **TACT#1** and **TACT#2** (items 7 and 9 in below picture) mirror the functions of **MAG#1** and **MAG#2**.



Tactile Switches location (Items 7 and 9)

The function of each switch depends on the current state of the instrument. Refer to below Table for switch functions in each instrument state.

State	Switch 1 Tap	Switch 1 Hold	Switch 2 Tap	Switch 2 Hold
Warm-up	Enable Bluetooth® Connectivity	Start Zero Calibration	Disable Bluetooth® Connectivity	Start Span Calibration
Normal				Ack. Latched Alarm
Low Alarm				Ack. Latched Alarm
High Alarm				Ack. Latched Fault
Offline				Start Zero Calibration
Fault				Ack. Latched Fault
Negative Gas Fault				Acknowledge Fault
Zero Cal. Fault				Acknowledge Fault
Span Cal. Fault				Acknowledge Fault

Switch Functions

GENERAL INFORMATION FOR SERVICE PERSONNEL

The below sections contain specific information for service personnel

CHECKS TO THE AREA

Prior to beginning work on systems containing FLAMMABLE REFRIGERANTS, safety checks are necessary to ensure that the risk of ignition is minimized. For repair to the REFRIGERATING SYSTEM, Sections listed below for service personnel shall be completed prior to conducting work on the system.

WORK PROCEDURE

Work shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapour being present while the work is being performed.

GENERAL WORK AREA

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.

PRESENCE OF FIRE EXTINGUISHER

If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available on hand. A dry chemical or CO₂ fire extinguisher should be adjacent to the charging area.

NO IGNITION SOURCES

No person carrying out work in relation to a REFRIGERATING SYSTEM which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment shall be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

VENTILATED AREA

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

CHECKS TO THE REFRIGERATING EQUIPMENT

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times, the maintenance and service guidelines shall be followed. If in doubt, consult Heatcraft's technical department for assistance.

CHECKS TO ELECTRICAL DEVICES

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment, so all parties are advised.

Initial safety checks shall include:

- a) that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
- b) that no live electrical components and wiring are exposed while charging, recovering or purging the system;
- c) that there is continuity of earth bonding.

REPAIRS TO SEALED COMPONENTS

During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.

Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.

ENSURE THAT THE APPARATUS IS MOUNTED SECURELY.

Ensure that seals or sealing materials have not degraded to the point that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with Heatcraft's specifications.

REPAIR TO INTRINSICALLY SAFE COMPONENTS

Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use.

Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating.

Replace components only with parts specified by Heatcraft. Other parts can result in the ignition of refrigerant in the atmosphere from a leak.

NOTE: The use of silicon sealant can inhibit the effectiveness of some types of leak detection equipment. Intrinsically safe components do not have to be isolated prior to working on them.

CABLING

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges, or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

DETECTION OF FLAMMABLE REFRIGERANTS

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

The following leak detection methods are deemed acceptable for all refrigerant systems.

Electronic leak detectors may be used to detect refrigerant leaks but, in the case of FLAMMABLE REFRIGERANTS, the sensitivity might not be adequate, or might need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed.

Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine can react with the refrigerant and corrode the copper pipe-work.

Examples of leak detection fluids are

- fluorescent method agents
- bubble method

If a leak is suspected, all naked flames shall be removed/ extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Removal of refrigerant shall be according to instructions under Removal and Evacuation.

REMOVAL AND EVACUATION

When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to:

- a) safely remove refrigerant following local and national regulations;
- b) purge the circuit with inert gas;
- c) evacuate; (optional for A2L);
- d) purge with inert gas; (optional for A2L);
- e) open the circuit by cutting.

While performing service or repair that requires accessing the sealed system, it is critical to ensure that all refrigerant has been removed. Under certain conditions, it is possible for refrigerant to become trapped between components. In either a sealed system or one with only a low side service valve, use of a piercing type of valve is required on liquid line or any section of piping where refrigerant could be isolated. Verify complete refrigerant removal from system. Remove service cores from valves and purge with nitrogen while brazing. Never use a torch to remove a component or braze without verifying complete refrigerant removal.

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum(optional for A2L). This process shall be repeated until no refrigerant is within the system(optional for A2L). When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.

Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.

CHARGING PROCEDURES

In addition to conventional charging procedures, the following requirements shall be followed.

- a) Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them.
- b) Cylinders shall be kept in an appropriate position according to the instructions.
- c) Ensure that the REFRIGERATING SYSTEM is earthed prior to charging the system with refrigerant.
- d) Label the system when charging is complete (if not already).
- e) Extreme care shall be taken not to overfill the REFRIGERATING SYSTEM.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

DECOMMISSIONING

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task is commenced.

- a) Become familiar with the equipment and its operation.
- b) Isolate the system electrically.
- c) Before attempting the procedure, ensure that:
 - i. Compressor is turned “OFF”.
 - ii. Evaporator fan is turned to “Low Speed” to provide air circulation.
 - iii. If the unit is in defrost mode, the defrost heaters are turned “OFF”.
- d) Pump down refrigerant system, if possible.
- e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
- f) Make sure that cylinder is situated on the scales before recovery takes place.
- g) Start the recovery machine and operate in accordance with instructions.

- h) Do not overfill cylinders (no more than 80 % volume liquid charge).
- i) Do not exceed the maximum working pressure of the cylinder, even temporarily.
- j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
- k) Recovered refrigerant shall not be charged into another REFRIGERATING SYSTEM unless it has been cleaned and checked.

LABELING

Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing FLAMMABLE REFRIGERANTS, ensure that there are labels on the equipment stating the equipment contains FLAMMABLE REFRIGERANT.

RECOVERY

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e., special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, FLAMMABLE REFRIGERANTS. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult Heatcraft if in doubt.

The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

RECOVERY (cont.)

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that FLAMMABLE REFRIGERANT does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

CORRECT WORKING PROCEDURES:

a) Commissioning

Check safety equipment before putting into service.

b) Maintenance

- i) Portable equipment is to be repaired outside or in a workshop specially equipped for servicing units with FLAMMABLE REFRIGERANTS.
- ii) Ensure sufficient ventilation at the repair place.
- iii) Be aware that malfunction of the equipment can be caused by refrigerant loss and a refrigerant leak is possible.
- iv) Discharge capacitors in a way that won't cause any spark. The standard procedure to short circuit the capacitor terminals usually create sparks.
- v) Reassemble sealed enclosures accurately. If seals are worn, replace them.
- vi) Check safety equipment before putting into service.

c) Repair

- i) Portable equipment is to be repaired outside or in a workshop specially equipped for servicing units with FLAMMABLE REFRIGERANTS.
- ii) Ensure sufficient ventilation at the repair place.
- iii) Be aware that malfunction of the equipment can be caused by refrigerant loss and a refrigerant leak is possible.
- iv) Discharge capacitors in a way that won't cause any spark.
- v) When brazing is required, the following procedures shall be carried out in the following order:
 - 1) Safely remove the refrigerant following local and national regulations. If the recovery is not required by national regulations, drain the refrigerant to the outside. Take care that the drained refrigerant will not cause any danger. In

doubt, one person should guard the outlet. Take special care that drained refrigerant will not float back into the building.

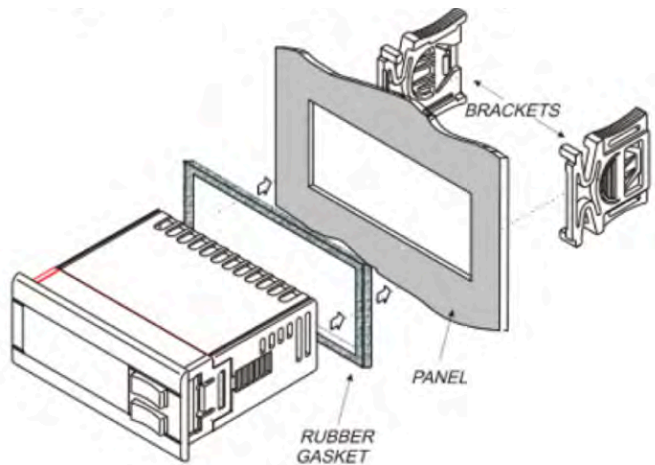
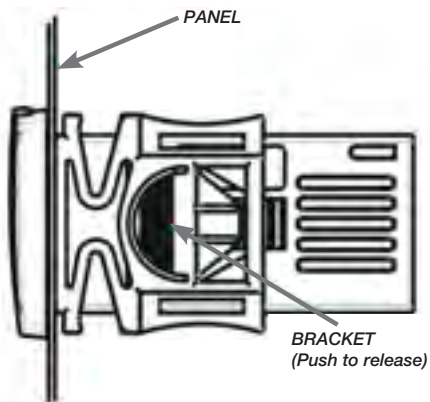
- 2) Purge the refrigerant circuit with oxygen free nitrogen.
 - 3) Evacuate the refrigerant circuit.
 - 4) Purge the refrigerant circuit with nitrogen for 5 min (not required for A2L refrigerants).
 - 5) Evacuate again. (not required for A2L refrigerants).
 - 6) Remove parts to be replaced by cutting.
 - 7) Purge the braze point with nitrogen during the brazing procedure required for repair.
 - 8) Carry out a leak test before charging with refrigerant.
- vi) Reassemble sealed enclosures accurately. If seals are worn, replace them.
- vii) Check safety equipment before putting into service.
- ### d) Decommissioning
- i) If the safety is affected when the equipment is put out of service, the REFRIGERANT CHARGE is to be removed before decommissioning.
 - ii) Ensure sufficient ventilation at the equipment location.
 - iii) Be aware that malfunction of the equipment can be caused by refrigerant loss and a refrigerant leak is possible.
 - iv) Discharge capacitors in a way that will not cause any spark.
 - v) Remove the refrigerant. If the recovery is not required by national regulations, drain the refrigerant to the outside. Take care that the drained refrigerant will not cause any danger. In doubt, one person should guard the outlet. Take special care that drained refrigerant will not float back into the building.
 - vi) When FLAMMABLE REFRIGERANTS except A2L REFRIGERANTS are used,
 - 1) Evacuate the refrigerant circuit.
 - 2) Purge the refrigerant circuit with nitrogen for 5 min.
 - 3) Evacuate again.
 - 4) Fill with nitrogen up to atmospheric pressure.
 - 5) Put a label on the equipment that the refrigerant is removed.

e) Disposal

- i) Ensure sufficient ventilation at the working place.
- ii) Remove the refrigerant. If the recovery is not required by national regulations, drain the refrigerant to the outside. Take care that the drained refrigerant will not cause any danger. In doubt, one person should guard the outlet. Take special care that drained refrigerant will not float back into the building.
- iii) When FLAMMABLE REFRIGERANTS are used,
 - 1) Evacuate the refrigerant circuit.
 - 2) Purge the refrigerant circuit with oxygen free nitrogen.
 - 3) Evacuate again (not required for A2L refrigerants).
- iv) Cut out the compressor and drain the oil.

CONTROLLER INSTALLATION AND REMOVAL

Instrument XR40CH shall be mounted on vertical panel, in a 29x71 mm hole, and fixed using the special bracket supplied.



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).

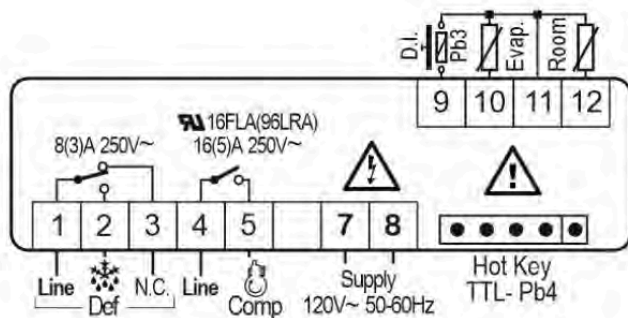
Reduce the path of the probe and sensor cables as much as possible, and avoid spiral paths that enclose power devices. The probes must be connected using shielded cables (minimum cross-section of each wire: 0.5 mm²).

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



DISPLAY

FRONT PANEL COMMANDS



SET	To display target set point. In programming mode it selects a parameter or confirms an operation.
	(DEF) To start a manual defrost.
	(UP) To see the map in use: Lt → °F; nt → °C. In programming mode it browses the parameter codes or increases the displayed value.
	(DOWN) To see the map in use: Lt → °F; nt → °C. In programming mode it browses the parameter codes or decreases the displayed value.
	On/Off button (De-activated)
	Not enabled.

KEY COMBINATIONS:

+	To lock & unlock the keyboard.
SET +	To enter in programming mode.
SET +	To return to the room temperature display.

USE OF LEDS

Each LED function is described in the following table.

LED	MODE	FUNCTION
	ON	Compressor enabled
	Flashing	Anti-short cycle delay enabled
	ON	Defrost enabled
	Flashing	Drip time in progress
	ON	Fans enabled
	Flashing	Fans delay after defrost in progress.
	ON	An alarm is occurring
	ON	Continuous cycle is running
°C/°F	ON	Measurement unit
°C/°F	Flashing	Programming phase

MAIN FUNCTIONS

HOW TO: SEE THE SET-POINT



1. Push and immediately release the SET key: the display will show the Set-Point value;
2. Push and immediately release the SET key or wait for 5 sec to display the probe value again.

HOW TO: CHANGE THE SET-POINT

1. Push the SET key more than 2 sec to change the Set-Point value.
2. The value of the actual Set-Point will be displayed and the “°C” or “°F” LED will start blinking.
3. To change the SET value, push the UP or DOWN keys within 10 sec.
4. To memorise the new Set-Point value push the SET key again or wait for 10 sec.

HOW TO: START A MANUAL DEFROST



Push the DEF key more than 2 sec, then a manual defrost will start.

HOW TO: CHANGE A PARAMETER VALUE IN MAIN (“PR1”) MENU

ENTERING THE MAIN MENU To change a parameter value, operate as follows:

1. Enter the Programming mode by pressing the SET+DOWN keys for 3 sec (the “°C” or “°F” LED will start blinking).

NOW THE MENU IS DISPLAYED

1. Select the required parameter.
2. Press the SET key to display its actual value.
3. Use UP or DOWN keys to change its value.
4. Press SET to store the new value and to move to the following parameter.

To exit: Press SET+UP or wait for 15 sec without pressing any key.

NOTE: The new set value will be stored even if the procedure is exited by waiting for the time-out to expire.

HOW TO: CHANGE PARAMETER VALUE IN HIDDEN MENU (“PR2”) MENU

In the hidden menu there are a few parameters of the instrument. ENTERING THE HIDDEN MENU to change a parameter value, operate as follows:

1. Enter the Programming mode by pressing the SET+DOWN keys for 3 sec (the “°C” or “°F” LED will start blinking).

2. Release the keys and then push again the SET+DOWN keys more than 7 sec. The “Pr2” label will be displayed immediately, followed from the HY parameter.

NOW THE HIDDEN MENU IS DISPLAYED

1. Select the required parameter.
2. Press SET key to display its actual value
3. Use UP or DOWN keys to change its value.
4. Press SET to store the new value and move to the following parameter.

To exit: Press SET+UP or wait for 15 sec without pressing any key.

NOTE: The new set value will be stored even if the procedure is exited by waiting for the time-out to expire.

HOW TO: MOVE A PARAMETER FROM THE HIDDEN MENU TO THE FIRST LEVEL AND VICEVERSA.

Each parameter present in the HIDDEN MENU can be moved or put into “THE FIRST LEVEL” (user level) by pressing SET+DOWN keys. In HIDDEN MENU, if a parameter is present also in the First Level (Pr1), the decimal point will be lit.

HOW TO: LOCK THE KEYBOARD

1. Keep pressed more than 3 sec the UP+DOWN keys.
2. The “PoF” message will be displayed and the keyboard will be locked. At this point it will be possible only to see the Set-Point or the MAX or Min stored temperature.
3. After pressing any key more than 3 sec, the “PoF” message will be displayed.

HOW TO: UNLOCK THE KEYBOARD

Keep pressed both UP+DOWN keys pressed more than 3 sec till the “Pon” message will be displayed.

HOW TO: THE CONTINUOUS CYCLE ACTIVATION

When defrost is not in progress, it can be activated by keeping the UP key pressed for about 3 sec. The compressor will work to maintain the CCS Set-Point for the time set through the CCt parameter. The cycle can be terminated before the end of the CCt time by using the same activation key (UP) for 3 sec.

HOW TO: THE ON/OFF FUNCTION



If onF=off, pushing the ON/OFF key the instrument will be switched off. The “off” message will be displayed and, in this configuration, the regulation disabled.

To switch the instrument on, push again the ON/OFF key.

WARNING: Loads connected to the normally closed contacts of the relays are always supplied and under voltage, even if the instrument is in stand-by (OFF) mode.

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.

Message	Cause	Outputs
"P1"	Room probe failure	Compressor output acc. to par. Con and CoF .
"P2"	Evaporator probe failure	Defrost end is timed.
"P3"	Third probe failure	Outputs unchanged.
"P4"	Fourth probe failure	Outputs unchanged.
"HA"	Maximum temperature alarm	Outputs unchanged.
"LA"	Minimum temperature alarm	Outputs unchanged.
"HA2"	Condenser high temperature	It depends on the AC2 parameter.
"LA2"	Condenser low temperature	It depends on the bLL parameter.
"dA"	Door open	Compressor and fans restarts.
"EA"	External alarm	Output unchanged.
"CA"	Serious external alarm (i1F=bAL)	All outputs OFF.
"CA"	Pressure switch alarm (i1F=PAL)	All outputs OFF.

ALARM RECOVERY

Probe alarms "**P1**", "**P2**", "**P3**" and "**P4**" start some seconds after the fault in the related probe; they automatically stop some seconds after the probe restarts normal operation. Check connections before replacing the probe.

Temperature alarms "**HA**", "**LA**" "**HA2**" and "**LA2**" automatically stop as soon as the temperature returns to normal values.

Alarms "**EA**" and "**CA**" (with i1F=bAL) recover as soon as the digital input is disabled.

Alarm "**CA**" (with i1F=PAL) recovers only by switching off and on the instrument

DEVICE SETUP

Parameter	Description	Vis. Level	XR40CH Settings	XR40CH Settings	XR40CH Settings
			MT Air Defrost	MT Electric Defrost	LT Electric Defrost
SEt	Set point		38	34	-10
Hy	Differential	Pr1	2	2	2
LS	Minimum set point	Pr2	0	0	-15
US	Maximum set point	Pr2	50	50	30
ot	Thermostat probe calibration	Pr1	0	0	0
P2P	Evaporator probe presence	Pr1	y	y	y
oE	Evaporator probe calibration	Pr2	0	0	0
P3P	Third probe presence	Pr2	n	n	n
o3	Third probe calibration	Pr2	0	0	0
P4P	Fourth probe presence	Pr2	n	n	n
o4	Fourth probe calibration	Pr2	0	0	0
AC	Anti-short cycle delay	Pr1	4	4	4
CF	Temperature measurement unit	Pr2	F	F	F
Lod	Probe displayed	Pr2	P1	P1	P1
dLy	Display temperature delay	Pr2	0	0	0
tdF	Defrost type	Pr1	EL	EL	EL
dFP	Probe selection for first defrost	Pr2	P2	P2	P2
dtE	Defrost termination temperature first defrost	Pr1	40	65	65
idF	Interval between defrost cycles	Pr1	6	6	6
MdF	(Maximum) length for first defrost	Pr1	40	40	60
dSd	Start defrost delay	Pr2	0	0	0
dFd	Displaying during defrost	Pr2	deF	deF	deF
dAd	Max display delay after defrost	Pr2	5	5	5
Fdt	Draining time	Pr2	0	0	2
dPo	First defrost after start-up	Pr2	n	n	n
dAF	Defrost delay after fast freezing	Pr2			
ALC	Temperature alarms configuration	Pr2	Ab	Ab	Ab
ALU	Maximum temperature alarm	Pr1	75	75	50
ALL	Minimum temperature alarm	Pr1	0	0	-30
ALd	Temperature alarm delay	Pr2	15	15	15
dAo	Delay of temperature alarm at start up	Pr2	01:00	01:00	01:00
AP2	Probe selection for condenser temperature alarms	Pr2	nP	nP	nP
OnF	On/off key configuration	Pr2	nu	nu	nu

To determine if the parameter is in Main menu ("Pr1") or Hidden Menu ("Pr2"), refer to Column "Vis. Level" in above table.

Parameters not shown here will be default values.

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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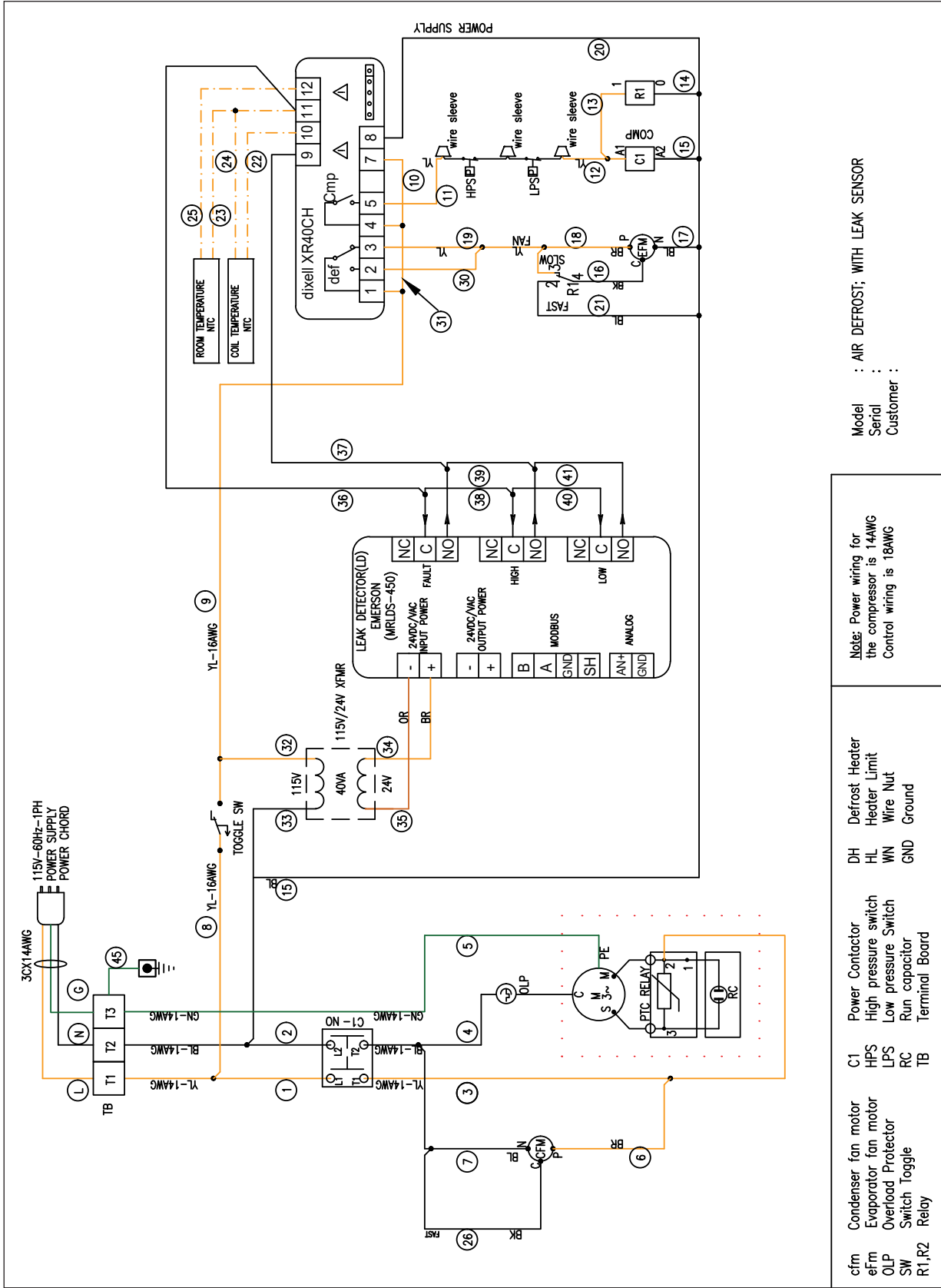
Finally, one simple source for all your replacement needs from a name you can trust.

REPLACEMENT PARTS

Model	Cabinet, Voltage/Phase					
	P1, 115/1		P2, 115/1	P2, 230/1	P3, 230/1	P3, 230/3
	PT0024	PT0028, PT0032				
Motor - Condenser	25312001	25302101	25308501	25322404	25322404	25322404
Motor - Evaporator	25302101		25329002	25329101	25329101	25329101
Fan blade - Condenser	N/A		5110E	22901601	22901601	22901601
Fan blade - Evaporator	N/A		22901901	22901901	22901901	22901901
Motor Mount - Condenser	N/A		23103301	23106101	23106101	23106101
Motor Mount - Evaporator	N/A		23103301	23103301	23103301	23103301
Contactor	2254303		2254303	R034915200	R034915200	2259996
Temperature Controller	21300001		21300001	21302401	21302401	21302401
Room Temp Sensor	28913702		28913703	28913703	28913703	28913703
Defrost Temp Sensor	28913701		28913701	28913701	28913701	28913701
Defrost Limit Switch	5708L		5708L	5708L	5708L	5708L
Defrost Heaters	24712101		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
Grille			24112501		24112601	
Mitigation Sensor	28992601			28992701		

WIRING DIAGRAMS

AIR DEFROST SYSTEMS /With Leak Sensor- P1 Cabinet



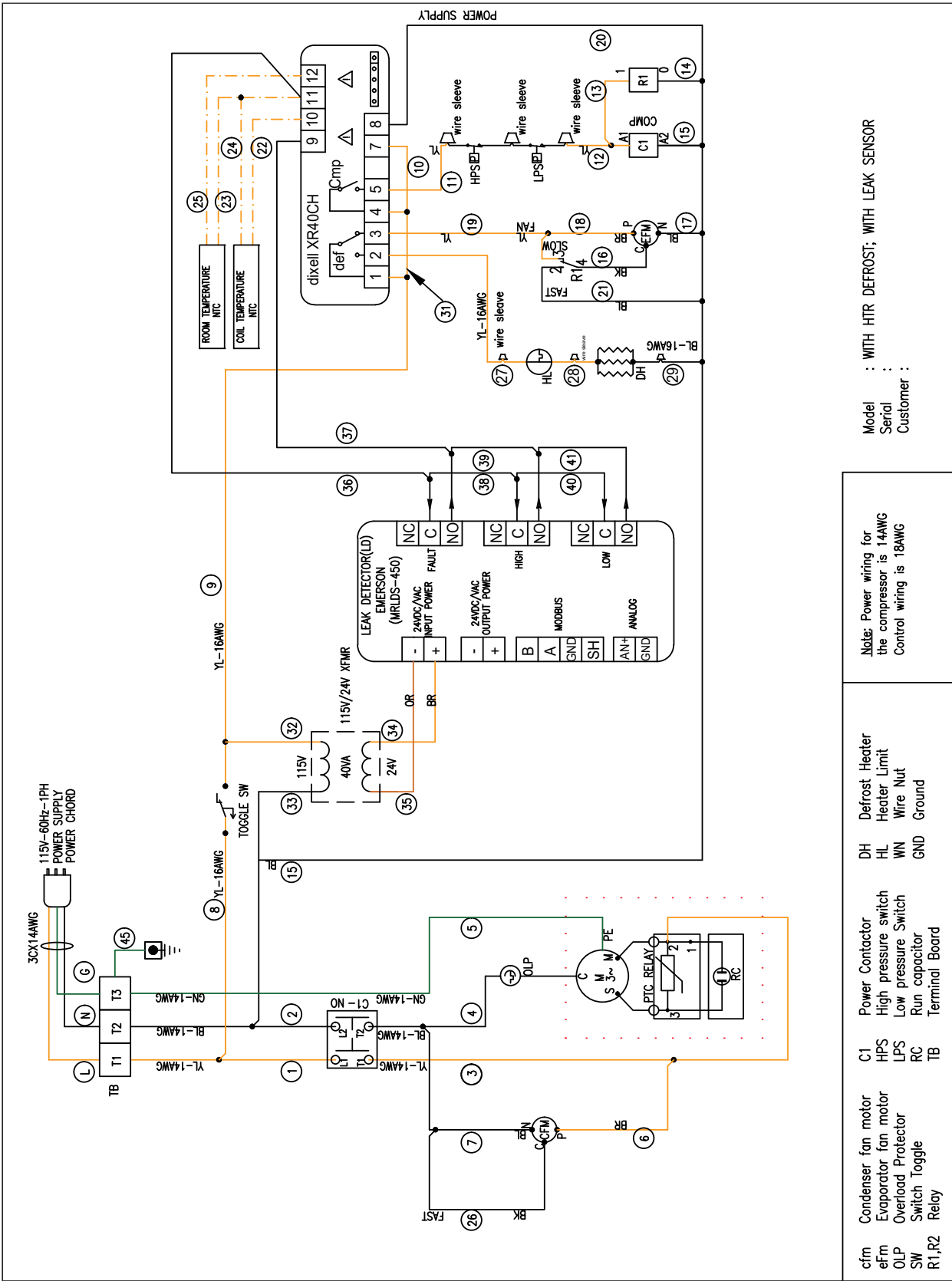
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Note: Power wiring for the compressor is 14AWG
Control wiring is 18AWG

cfm	Condenser fan motor	C1	Power Contactor	DH	Defrost Heater
efm	Evaporator fan motor	HPS	High pressure switch	HL	Heater Limit
OLP	Overload Protector	LPS	Low pressure Switch	WN	Wire Nut
R1,R2	Switch Toggle	RC	Run capacitor	GND	Ground
	SW	TB	Terminal Board		

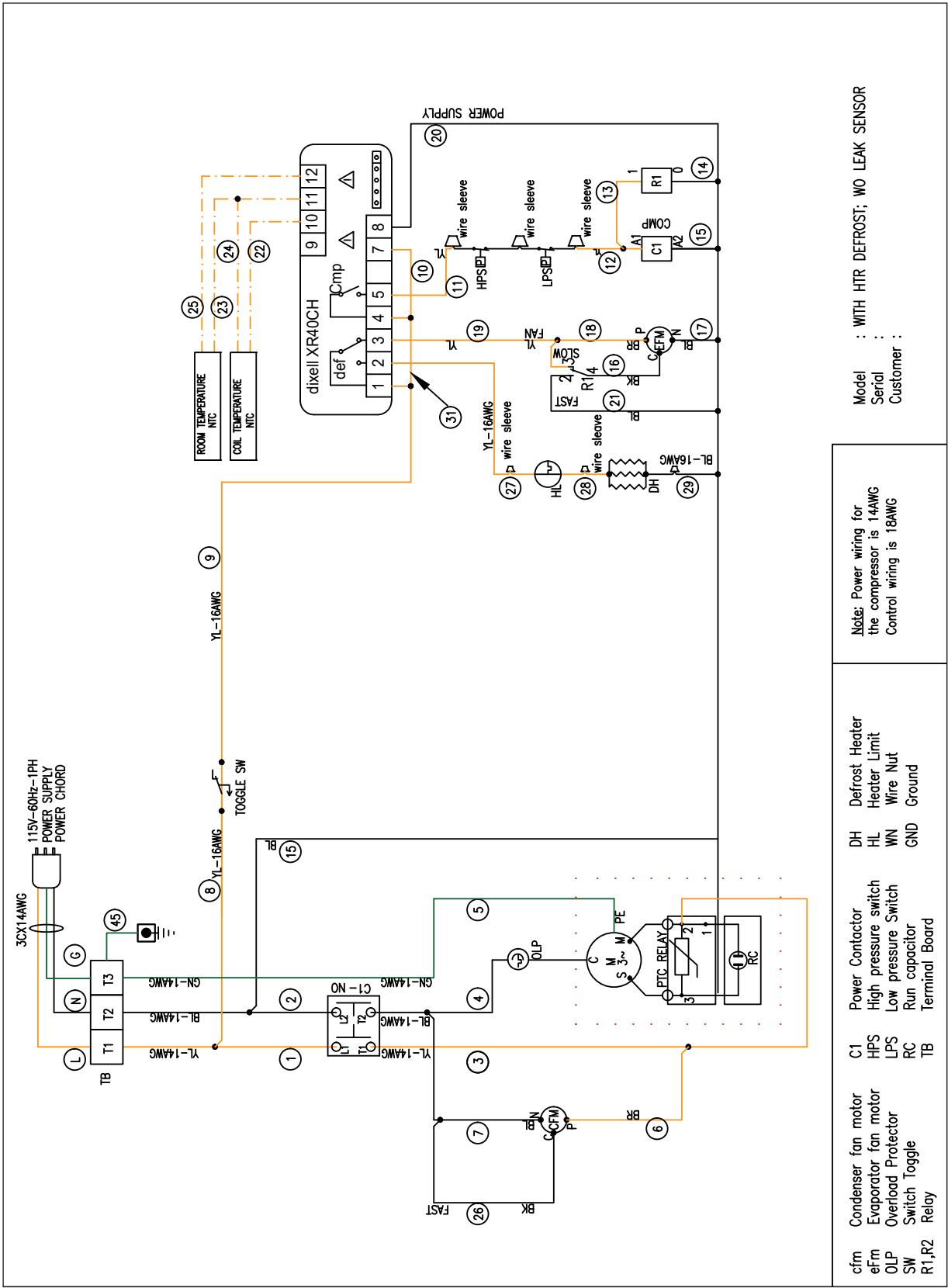
WIRING DIAGRAMS

HEATER DEFROST SYSTEMS /With Leak Sensor- P1 Cabinet

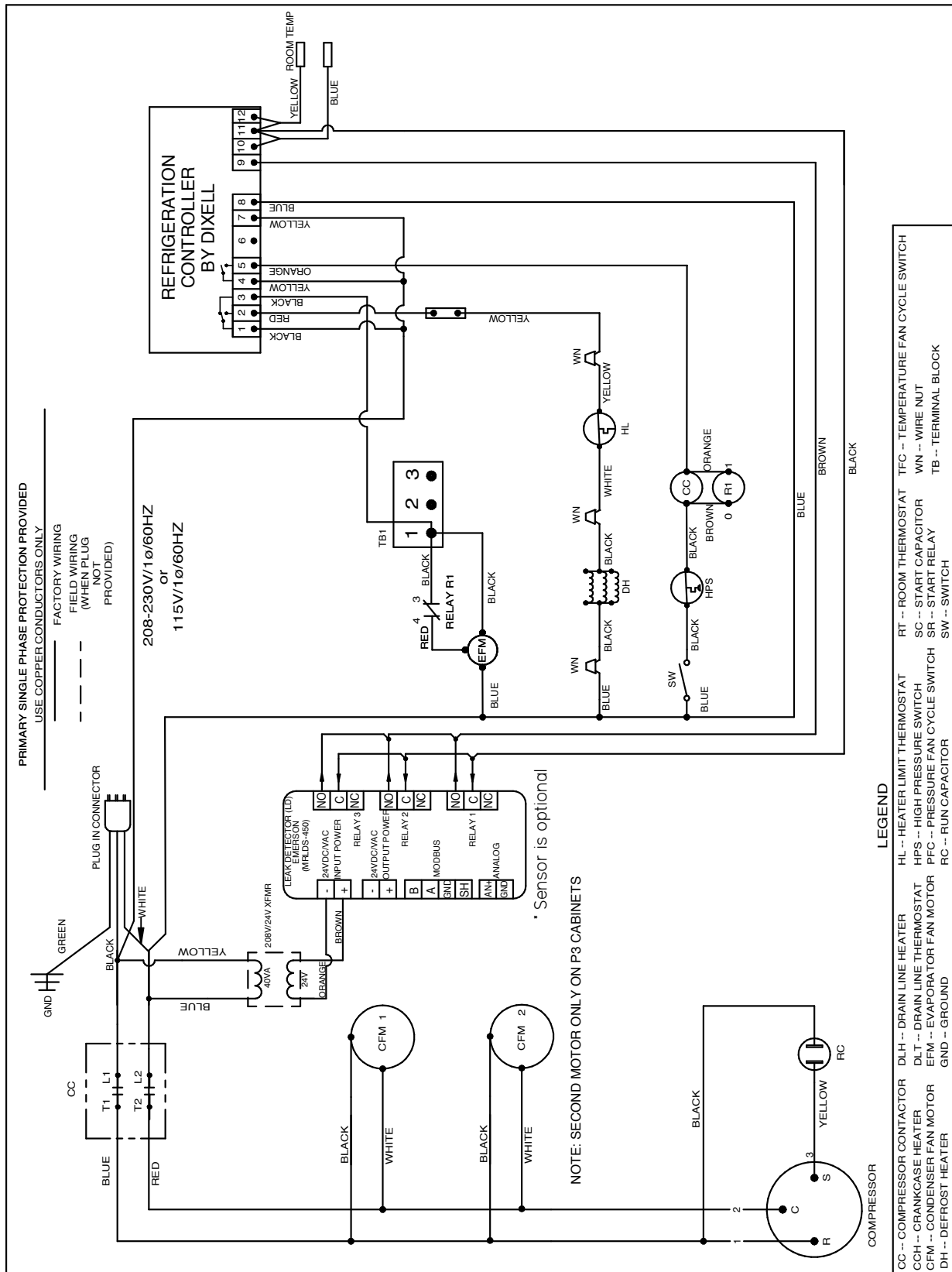


WIRING DIAGRAMS

HEATER DEFROST SYSTEMS /Without Leak Sensor- P1 Cabinet



ELECTRIC DEFROST SYSTEMS /Single Phase- Indoor with sensor P2 and P3 cabinet



PRIMARY SINGLE PHASE PROTECTION PROVIDED
USE COPPER CONDUCTORS ONLY

--- FACTORY WIRING
--- FIELD WIRING (WHEN PLUG NOT PROVIDED)

REFRIGERATION CONTROLLER BY DIXELL

208-230V/3ø/60HZ

LEGEND

CC -- COMPRESSOR CONTACTOR
DLH -- DRAIN LINE HEATER
DLT -- DRAIN LINE THERMOSTAT
CFM -- CONDENSER FAN MOTOR
GND -- GROUND

HL -- HEATER LIMIT THERMOSTAT
HPS -- HIGH PRESSURE SWITCH
PFC -- PRESSURE FAN CYCLE SWITCH
RC -- RUN CAPACITOR

RT -- ROOM THERMOSTAT
SC -- START CAPACITOR
SR -- START RELAY
SW -- SWITCH

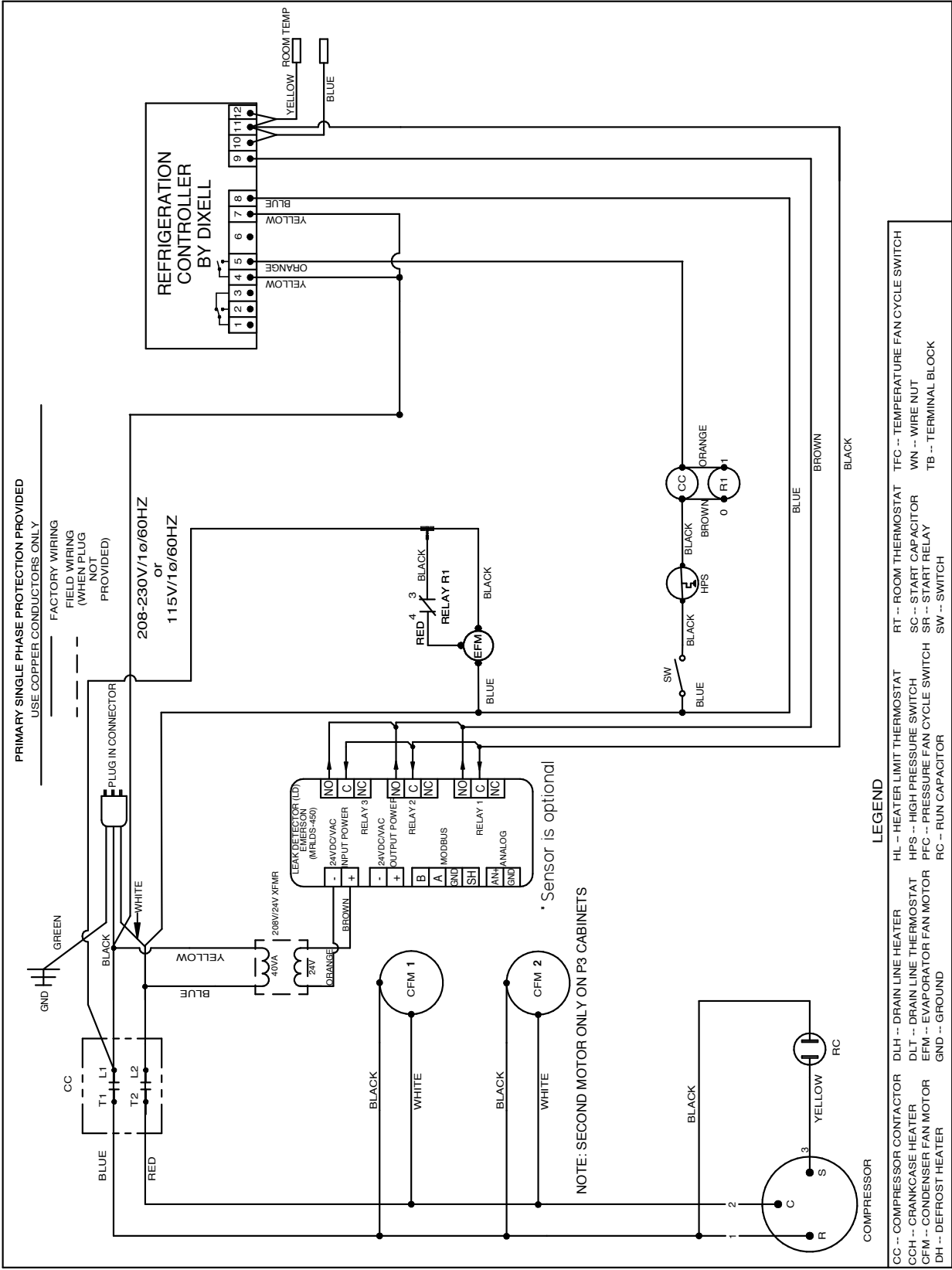
TFC -- TEMPERATURE FAN CYCLE SWITCH
WN -- WIRE NUT
TB -- TERMINAL BLOCK

WIRING DIAGRAM

The diagram shows the electrical connections for a refrigeration system. It includes a 208-230V/3ø/60HZ power supply, a refrigeration controller by Dixell, a relay assembly (RELAY R1), a fan motor (CFM 1), a compressor contactor (CC), and various sensors and switches. The wiring is color-coded and labeled with terminal numbers and component names. A note indicates that a sensor is optional.

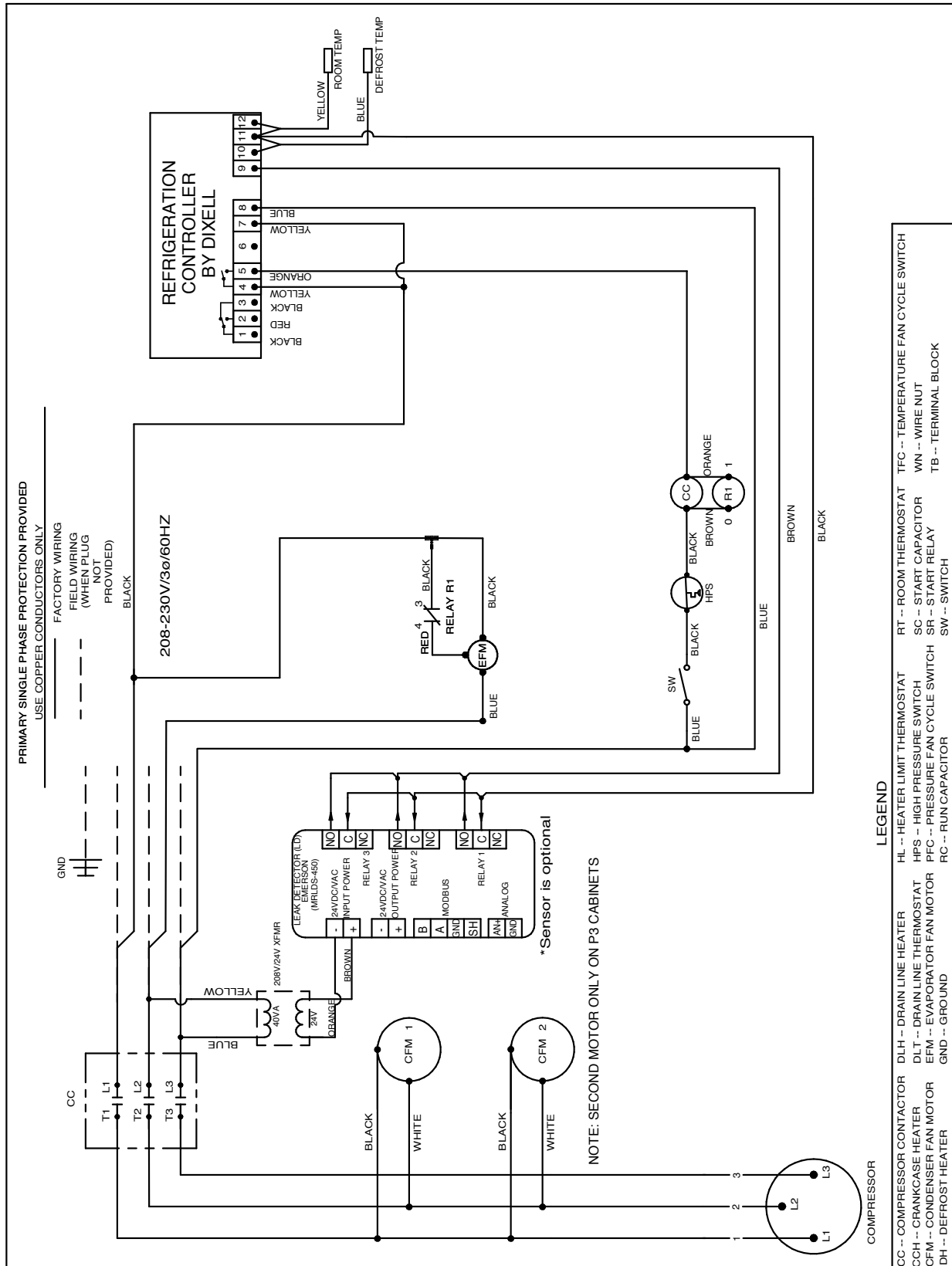
WIRING DIAGRAMS

AIR DEFROST SYSTEMS /Single Phase- Indoor with sensor P2 and P3 cabinet



WIRING DIAGRAMS

AIR DEFROST SYSTEMS /Three Phase- Indoor with sensor P2 and 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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This image shows a full page of blank, lined paper. It features approximately 20 evenly spaced horizontal grey lines across its entire width, providing a guide for handwriting or typing. The background is a clean, solid white color.



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

H-IM-81E-0925 | Version 004

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