



# HOSHIZAKI

## Service Manual

HX Series  
Refrigerated Medical Equipment

Models  
Upright A



[hoshizakiamerica.com](http://hoshizakiamerica.com)

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**⚠ WARNING**

Only qualified service technicians should install and service the appliance. To obtain the name and phone number of your local Hoshizaki Certified Service Representative, visit [www.hoshizakiamerica.com](http://www.hoshizakiamerica.com). No service should be undertaken until the technician has thoroughly read this Service Manual. Failure to service and maintain the appliance in accordance with this manual will adversely affect safety, performance, component life, and warranty coverage. Proper installation is the responsibility of the installer. Product failure or property damage due to improper installation is not covered under warranty.

Hoshizaki provides this manual primarily to assist qualified service technicians in the service and maintenance of the appliance.

Should the reader have any questions or concerns which have not been satisfactorily addressed, please call, send an e-mail message, or write to the Hoshizaki Technical Support Department for assistance.

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Peachtree City, GA 30269

Attn: Hoshizaki Technical Support Department

**NOTE:** To expedite assistance, all correspondence/communication **MUST** include the following information:

- Model Number \_\_\_\_\_
- Serial Number \_\_\_\_\_
- Complete and detailed explanation of the problem.

## **IMPORTANT**

This manual should be read carefully before the appliance is serviced. Read the warnings and guidelines contained in this manual carefully as they provide essential information for the continued safe use, service, and maintenance of the appliance. Retain this manual for any further reference that may be necessary.

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## Important Safety Information

Throughout this manual, notices appear to bring your attention to situations which could result in death, serious injury, damage to the appliance, or damage to property.

	<b>R-290 Class A3 Flammable Refrigerant Used</b>	
<b>⚠ DANGER</b>	<b>Indicates a hazardous situation that, if not avoided, will result in death or serious injury.</b>	
<b>⚠ WARNING</b>	<b>Indicates a hazardous situation that, if not avoided, could result in death or serious injury.</b>	
<b>NOTICE</b>	<b>Indicates a situation that, if not avoided, could result in damage to the appliance or property.</b>	
<b>IMPORTANT</b>	<b>Indicates important information about the use and care of the appliance.</b>	
<b>⚠ DANGER</b>		
<p><b><u>Risk of Fire or Explosion</u></b>  <b><u>Flammable Refrigerant Used</u></b></p> <ul style="list-style-type: none"> <li>• Only qualified service technicians should install and service the appliance. Qualified service technicians are those having the appropriate technical training and experience necessary to be aware of hazards to which they are exposed in performing a task and of measures necessary to minimize the danger to themselves or other persons.</li> <li>• No service should be undertaken until the technician has thoroughly read this Service Manual. All safety precautions must be followed.</li> <li>• This appliance to be installed in accordance with the Safety Standard for Refrigeration Systems ANSI/ASHRAE 15.</li> <li>• Follow handling instructions carefully in compliance with national regulations.</li> <li>• Do not use mechanical devices or other means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.</li> <li>• Do not puncture refrigerant tubing. Risk of fire or explosion due to puncture of refrigerant tubing; follow handling instructions carefully.</li> </ul>	<ul style="list-style-type: none"> <li>• Servicing shall be done by trained service personnel with certified competence in handling flammable refrigerants to minimize the risk of possible ignition due to incorrect parts or improper service.</li> <li>• Component parts shall be replaced with like components. So as to minimize the risk of possible ignition due to incorrect parts.</li> <li>• Dispose of properly in accordance with federal or local regulations.</li> <li>• Do not pierce or burn.</li> <li>• Be aware that refrigerants may not contain an odor.</li> <li>• Do not damage the refrigeration circuit.</li> <li>• See nameplate for R-290 refrigerant charge:             <ul style="list-style-type: none"> <li>• If greater than 114 g (4 oz.), do not install in public corridor or lobby.</li> <li>• If greater than 152 g (5.3 oz.), do not install within 6 m (20 ft) of open flame.</li> </ul> </li> <li>• 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).</li> </ul>	

**⚠ DANGER continued**

- Do not place any potential ignition sources in or near the appliance.
- Keep clear of obstruction all ventilation openings in the appliance enclosure or in the structure for building-in.
- No potential sources of ignition are to be used in the searching for or detection of refrigerant leaks.
- Do not use electrical appliances inside the appliance unless they are of the type recommended by the manufacturer.
- Do not store explosive substances such as aerosol cans with a flammable propellant in this appliance.
- 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.
- 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.

**Risque D'Incendie ou D'Explosion**  
**Fluide Frigorigène Inflammable Utilisé**

- Seuls des techniciens de service qualifiés doivent installer et entretenir l'appareil. Les techniciens de service qualifiés sont ceux qui possèdent la formation technique et l'expérience nécessaires pour être conscients des dangers auxquels ils sont exposés dans l'accomplissement d'une tâche et des mesures nécessaires pour réduire au minimum le danger pour eux-mêmes ou pour d'autres personnes.
- Aucune opération d'entretien ne doit être entreprise avant que le technicien n'ait lu attentivement ce manuel. Toutes les précautions de sécurité doivent être suivies.
- Cet appareil doit être installé conformément à la norme de sécurité pour les systèmes de réfrigération ANSI/ASHRAE 15.
- Suivez attentivement les instructions de manutention conformément aux règlements nationaux.
- Ne pas utiliser de dispositifs mécaniques ou d'autres moyens pour accélérer le processus de dégivrage ou pour nettoyer, autres que ceux recommandés par le fabricant.
- Ne pas perforer la conduite de fluide frigorigène. Risque d'incendie ou d'explosion en cas de perforation d'une canalisation de fluide frigorigène; suivez attentivement les instructions de manutention.
- L'entretien doit être effectué par du personnel formé et certifié pour la manipulation de réfrigérants inflammables afin de réduire au minimum le risque d'inflammation dû à des pièces incorrectes ou à un entretien inadéquat.
- Les pièces doivent être remplacées par des pièces similaires, de manière à réduire au minimum le risque d'inflammation dû à des pièces incorrectes.

## **⚠ DANGER Continué**

- Mettre au rebut conformément aux règlements fédéraux ou locaux.
  - Ne pas percer ou brûler.
  - Attention, les fluides frigorigènes peuvent ne pas dégager d'odeur.
  - Ne pas endommager les composants du circuit de réfrigération.
  - Voir plaque signalétique pour la charge de réfrigérant R-290:
    - Si elle est supérieure à 114 g (4 oz.), ne pas l'installer dans un couloir public ou un hall d'entrée.
    - Si elle est supérieure à 152 g (5.3 oz.), ne pas l'installer à moins de 6 m (20 pi) d'une flamme nue.
  - 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 placer aucune source d'inflammation potentielle à l'intérieur ou à proximité de l'appareil.
  - Ne pas obstruer les ouvertures de ventilation dans l'enceinte de l'appareil ou dans la structure d'encastrement.
  - Aucune source potentielle d'inflammation ne doit être utilisée pour rechercher ou détecter des fuites de réfrigérant.
  - Ne pas utiliser d'appareils électriques à l'intérieur de l'appareil, sauf s'ils sont du type recommandé par le fabricant.
  - Ne pas entreposer dans cet appareil des substances explosives telles que des bombes aérosols contenant un gaz propulseur inflammable.
- Vérifier que le câblage ne sera pas soumis à l'usure, à la corrosion, à une pression excessive, à des vibrations, à des arêtes vives ou à tout autre effet environnemental négatif. Le contrôle doit également prendre en compte les effets du vieillissement ou des vibrations continues provenant de sources telles que les compresseurs ou les ventilateurs.
  - S'assurer que la zone est à l'air libre ou qu'elle est correctement ventilée avant de pénétrer dans le système ou d'effectuer un travail à chaud. Une certaine ventilation doit être maintenue pendant la durée des travaux. La ventilation doit permettre de disperser en toute sécurité tout réfrigérant libéré et, de préférence, de l'expulser dans l'atmosphère.

## WARNING

The appliance should be destined only to the use for which it has been expressly conceived. Any other use should be considered improper and therefore dangerous. The manufacturer cannot be held responsible for injury or damage resulting from improper, incorrect, and unreasonable use. Failure to service and maintain the appliance in accordance with this manual will adversely affect safety, performance, component life, and warranty coverage and may result in costly water damage.

**To reduce the risk of death, electric shock, serious injury, or fire, follow basic precautions including the following:**

- This appliance is not intended for use above 2,000 m (6,561 ft). Installation above 2,000 m (6,561 ft) may adversely affect safety, performance, and component life.
- Wear appropriate personal protective equipment (PPE) when servicing the appliance.
- The appliance must be installed in accordance with applicable national, state, and local codes and regulations. Failure to meet these code requirements could result in death, electric shock, serious injury, fire, or damage.
- The appliance requires an independent power supply of proper capacity. See the nameplate for electrical specifications. Failure to use an independent power supply of proper capacity can result in a tripped breaker, blown fuse, damage to existing wiring, or component failure. This could lead to heat generation or fire.
- Do not make any alterations to the appliance. Alterations could result in electric shock, injury, fire, or damage to the appliance.

### • **THE APPLIANCE MUST BE**

**GROUNDING.** The appliance is equipped with a hospital-grade NEMA 5-15 three-prong grounding plug  to reduce the risk of potential shock hazards. It must be plugged into a properly grounded, independent 3-prong wall outlet. If the outlet is a 2-prong outlet, it is your personal responsibility to have a qualified electrician replace it with a properly grounded, independent 3-prong wall outlet. Do not remove the ground prong from the power cord and do not use an adapter plug. Failure to follow these instructions may result in death, electric shock, or fire.

- To reduce the risk of electric shock, do not touch the control module with damp hands.
- To reduce the risk of electric shock, make sure the control module is in the "OFF" position before plugging in or unplugging the appliance.
- Unplug the appliance before servicing.
- Do not use an appliance with a damaged power cord. The power cord should not be altered, jerked, bundled, weighed down, pinched, or tangled. Such actions could result in electric shock or fire. To unplug the appliance, be sure to pull the plug, not the cord, and do not jerk the cord.
- Do not use an extension cord.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent, or similarly qualified persons in order to avoid a hazard. Upon replacement, the GREEN ground wire in the power cord must be connected to the designated grounding screw.
- Appliance is heavy. Use care when lifting or positioning. Work in pairs when needed to prevent injury or damage.

**⚠ WARNING continued**

- The appliance is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- Do not splash, pour, or spray water directly onto or into the appliance. This might cause short circuit, electric shock, corrosion, or failure.
- Children should be supervised to ensure that they do not play with the appliance.
- Do not climb, stand, or hang on the appliance or drawers or allow children or animals to do so. Do not climb into the appliance or allow children or animals to do so. Death or serious injury could occur or the appliance could be damaged.
- Open and close the door with care. Door opened too quickly or forcefully may cause injury or damage to the appliance or surrounding equipment.
- Be careful not to pinch fingers when opening and closing the door. Be careful when opening and closing the door when children are in the area.
- Do not use combustible spray or place volatile or flammable substances in or near the appliance. They might catch fire.
- Keep the area around the appliance clean. Dirt, dust, or insects in the appliance could cause harm to individuals or damage to the appliance.

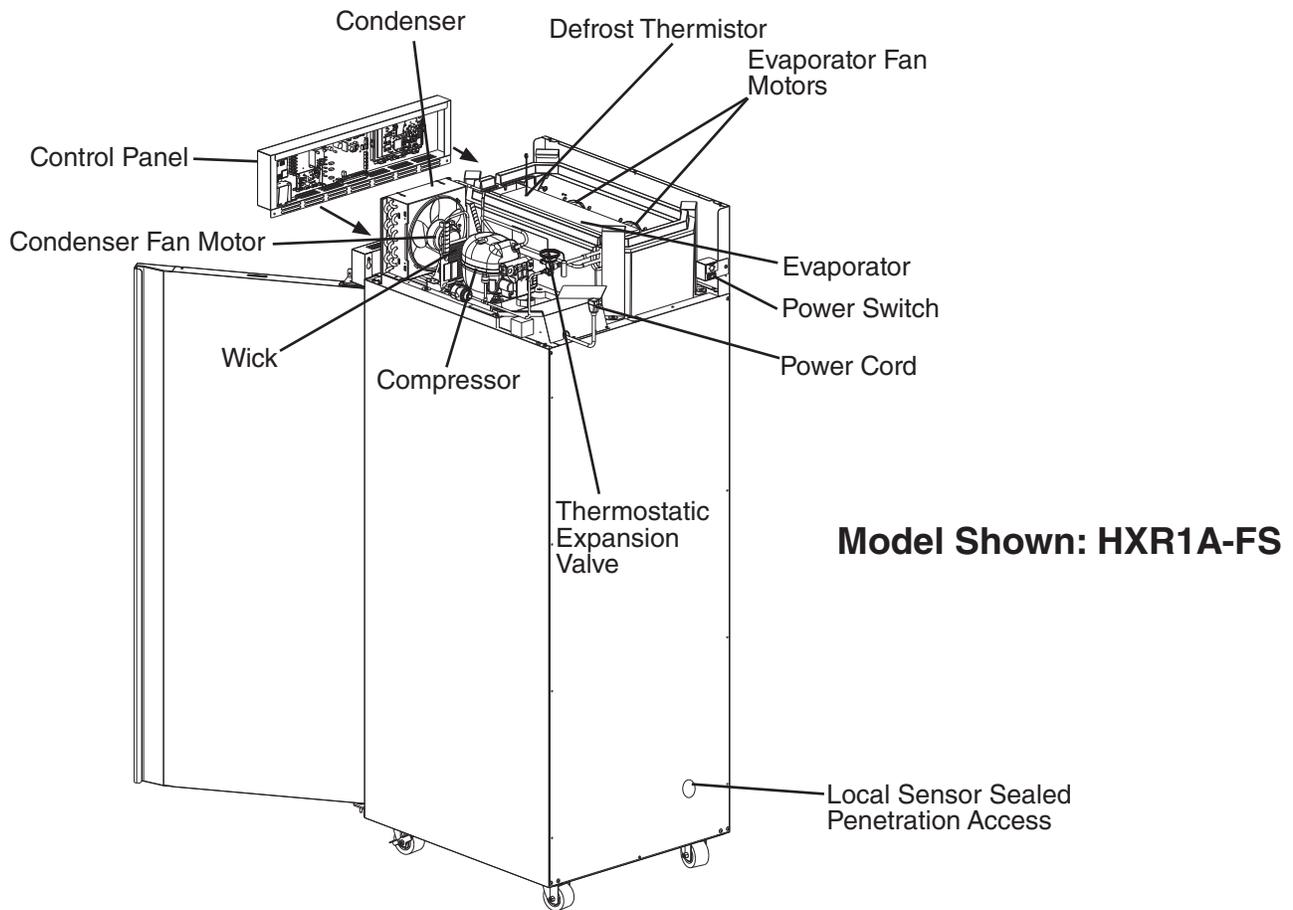
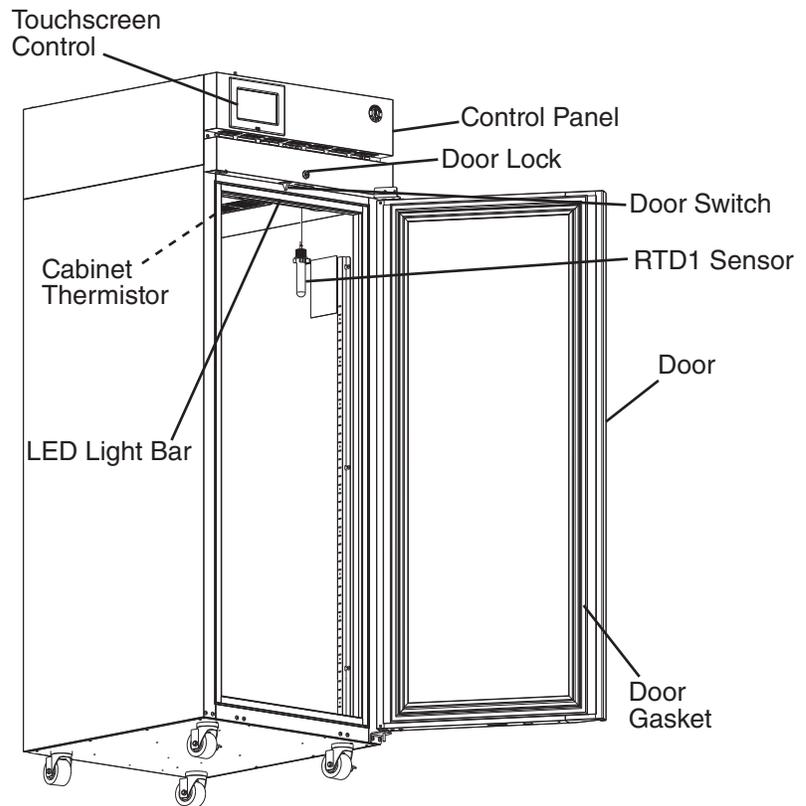
**NOTICE**

- Install the appliance in a location that stays above freezing. Normal operating ambient temperature must be within 45°F to 80°F (7°C to 27°C).
- Do not leave the appliance on during extended periods of non-use, extended absences, or in sub-freezing temperatures. To properly prepare the appliance for these occasions, follow the instructions in "VI. Preparing the Appliance for Periods of Non-Use."
- Do not place objects on top of the appliance.
- Protect the floor when moving the appliance to prevent damage to the floor.
- Do not allow the appliance to bear any outside weight.

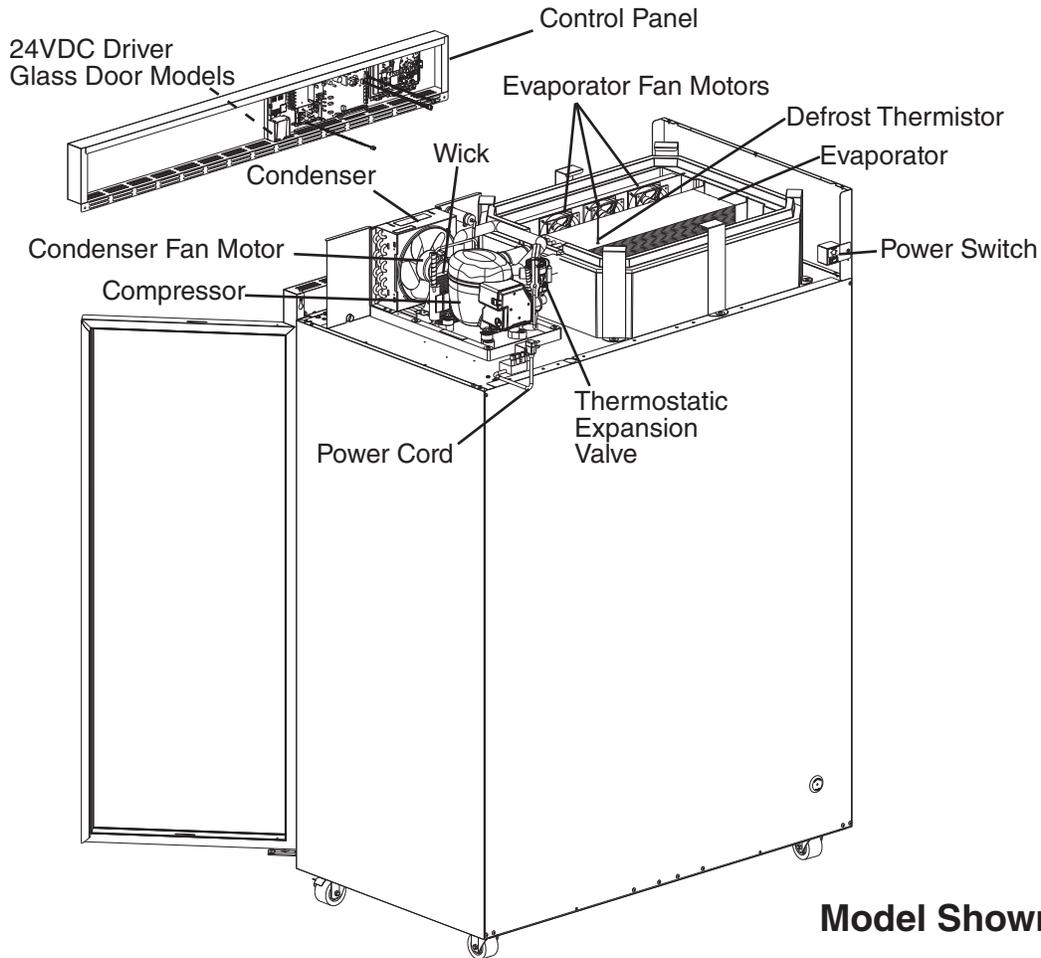
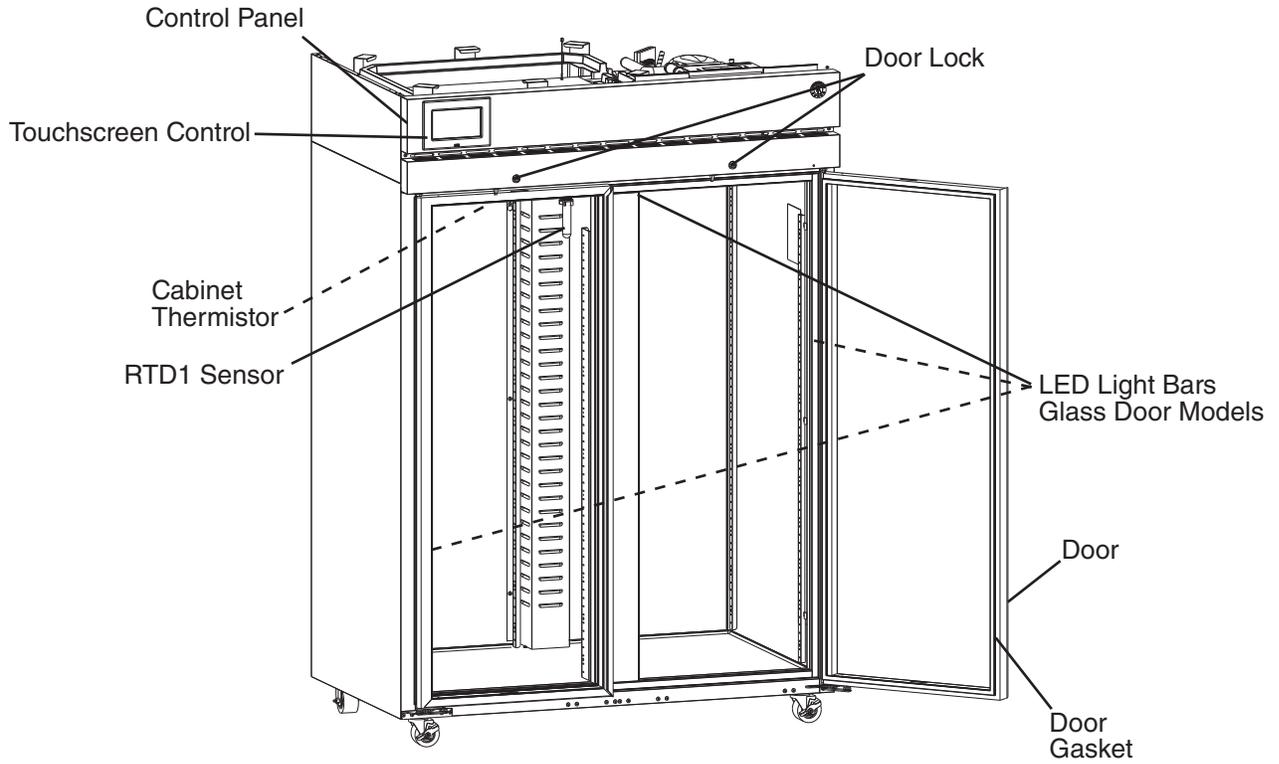
# I. General Information

## A. Construction

### 1. Solid Door Models

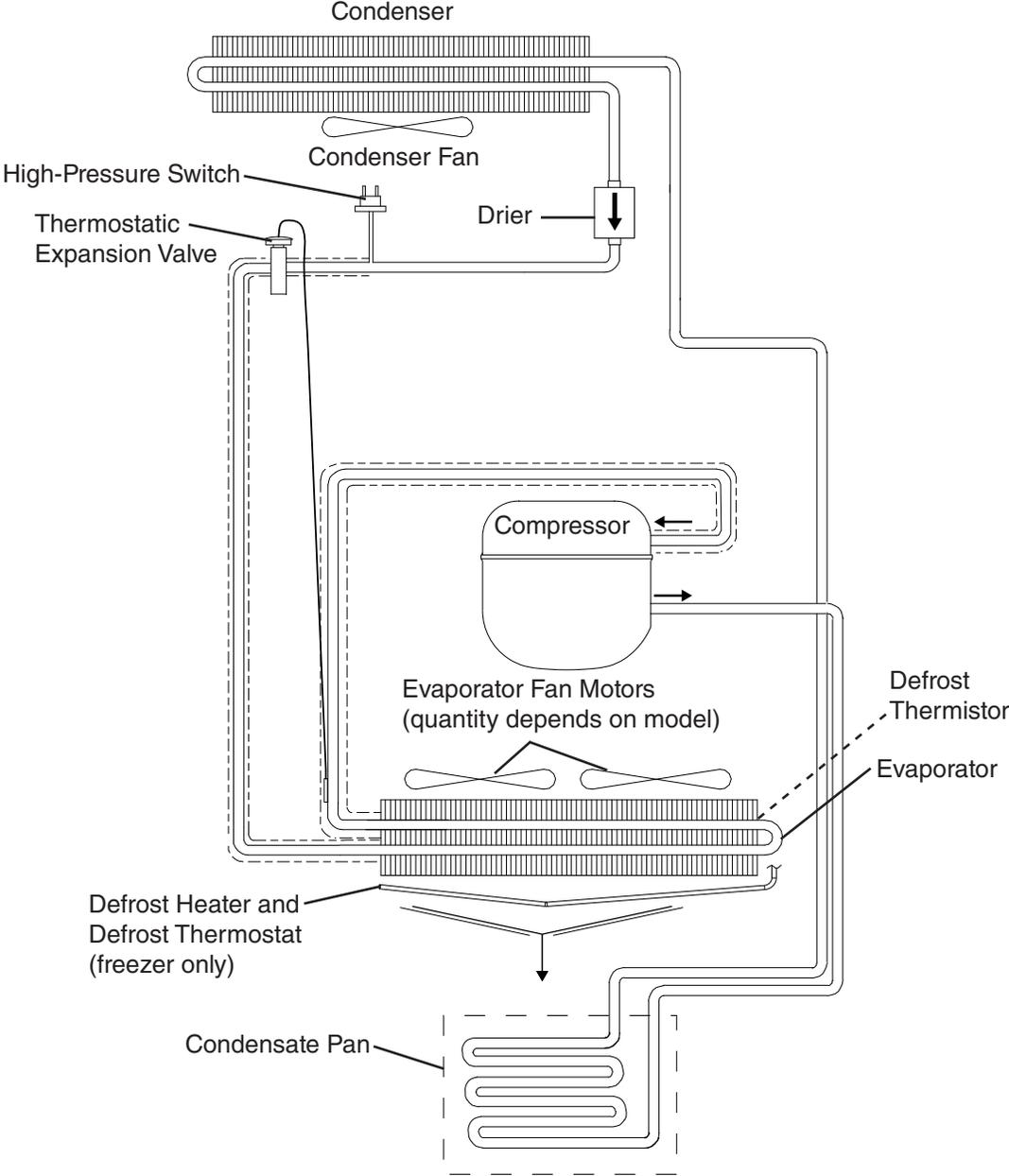


## 2. Glass Door Models



**Model Shown: HXR2A-FG**

# B. Refrigeration Flow Chart

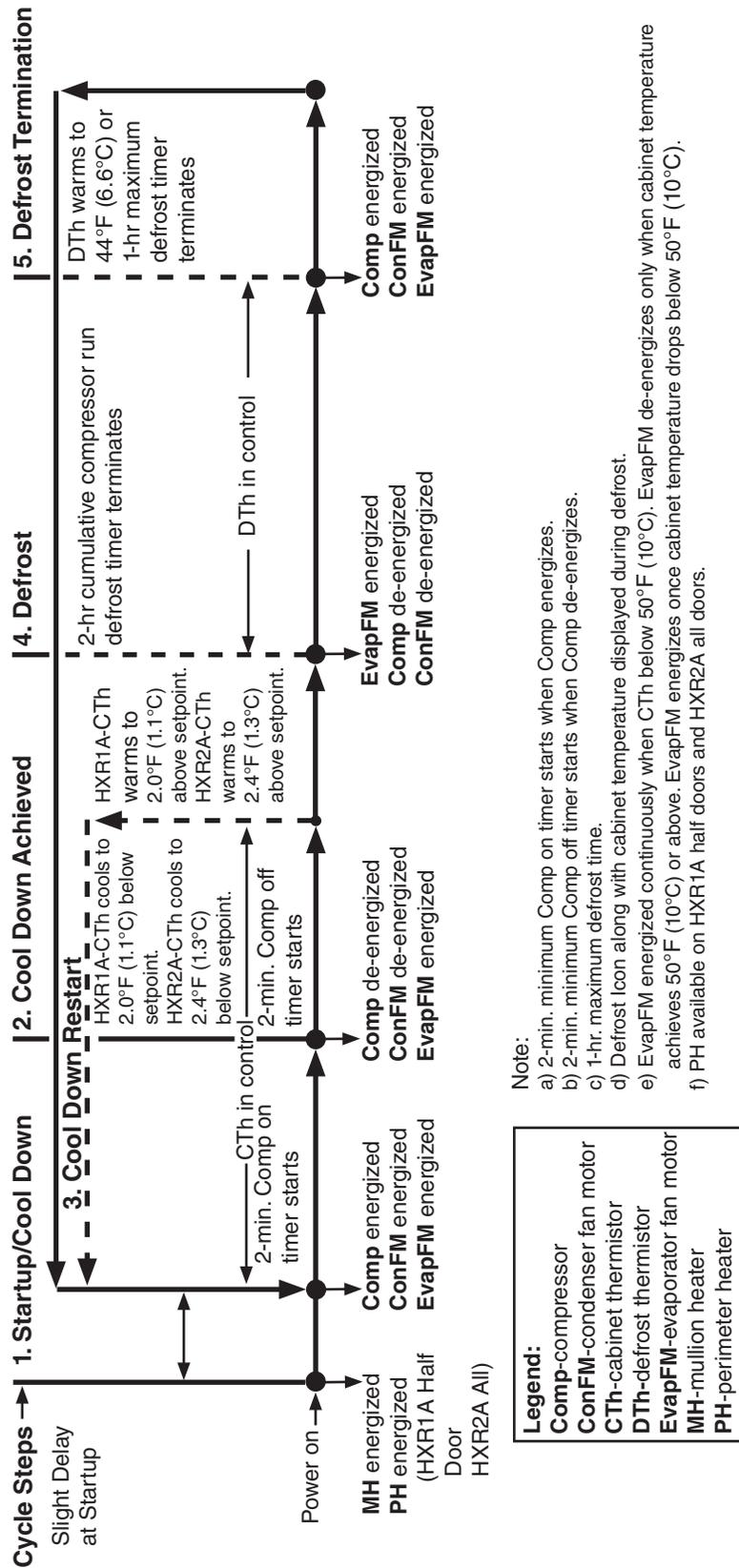


## II. Sequence of Operation

### A. Sequence of Operation Flow Charts

#### 1. Refrigerator

Refrigerator Sequence Flow Chart



## 2. Freezer

**DATA PENDING**

### III. Service Diagnosis, Refrigeration Circuit Service, and Component Service

#### A. Safety Precautions When Servicing | Précautions à prendre lors de l'entretien

##### 1. English



#### R-290 Class A3 Flammable Refrigerant Used

#### **⚠ DANGER**

##### **Risk of Fire or Explosion. Flammable Refrigerant Used.**

- Be sure to follow all Important Safety Information located at the beginning of this manual and in this section.
- The appliance should be diagnosed and repaired only by qualified service personnel to reduce the risk of death, electric shock, serious injury, or fire.
- Servicing shall be done by trained service personnel with certified competence in handling flammable refrigerants to minimize the risk of possible ignition due to incorrect parts or improper service.
- Follow handling instructions carefully in compliance with national regulations.
- Do not use mechanical devices or other means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
- Be aware that refrigerants may not contain an odor.
- Do not puncture refrigerant tubing. Risk of fire or explosion due to puncture of refrigerant tubing; follow handling instructions carefully.
- Component parts shall be replaced with like components. So as to minimize the risk of possible ignition due to incorrect parts.
- Do not place any potential ignition sources in or near the appliance.
- Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimized.
- 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.
- Work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapor being present while the work is being performed.
- The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres.
- Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e., nonsparking, adequately sealed, or intrinsically safe.  
NOTE: The use of silicone sealant can inhibit the effectiveness of some types of leak detection equipment.

## **⚠ DANGER continued**

- 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 recalibration. (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.  
Note: Examples of leak detection fluids are:
    - bubble method
    - fluorescent method agents
- 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 CO<sub>2</sub> fire extinguisher should be adjacent to the charging area. You must have a Class B chemical fire extinguisher available at all times.
- 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.
- 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.

## **⚠ DANGER continued**

- 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:
  - safely remove refrigerant following local and national regulations
  - purge the circuit with inert gas
  - evacuate (optional for A2L)
  - purge with inert gas (optional for A2L)
  - open the circuit by cutting or brazing
- 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.
- 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 labeled 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 manufacturer 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.
- 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.

## **⚠ DANGER continued**

- In addition to conventional charging procedures, the following requirements shall be followed:
  - Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
  - Cylinders shall be kept in an appropriate position according to the instructions.
  - Ensure that the refrigerating system is earthed (grounded) prior to charging the system with refrigerant.
  - Label the system when charging is complete (if not already).
  - 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.
- 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.
- Confirm that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking.
- Confirm that no live electrical components and wiring are exposed while charging, recovering, or purging the system.
- Confirm that there is continuity of earth bonding (grounding).
- 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.
- Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times, Hoshizaki America's maintenance and service guidelines shall be followed. If in doubt, consult Hoshizaki America's Technical Support department for assistance.
- Confirm the actual refrigerant charge is in accordance with the room size within which the refrigerant containing parts are installed.
- Confirm the ventilation machinery and outlets are operating adequately and are not obstructed.
- Confirm marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected.

## **⚠ DANGER continued**

- Confirm refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.
- 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 (control box/component) 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 Hoshizaki America's specifications.
- 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 Hoshizaki America. Other parts can result in the ignition of refrigerant in the atmosphere from a leak.
- 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.

## 2. Français



### R-290 Classe A3 Réfrigérant Inflammable Utilisé

#### **⚠ DANGER**

##### **Risque De Feu Ou D'Explosion. Fluide Frigorigène Inflammable Utilisé.**

- Assurez-vous de suivre toutes les informations importantes de sécurité situées au début de ce manuel et dans cette section.
- L'appareil ne doit être diagnostiqué et réparé que par un personnel qualifié afin de prévenir les risques de mort, d'électrocution, de blessures graves ou d'incendie.
- L'entretien doit être effectué par du personnel formé et certifié pour la manipulation de réfrigérants inflammables afin de réduire au minimum le risque d'inflammation dû à des pièces incorrectes ou à un entretien inadéquat.
- Suivez attentivement les instructions de manutention conformément aux règlements nationaux.
- Ne pas utiliser de dispositifs mécaniques ou d'autres moyens pour accélérer le processus de dégivrage ou pour nettoyer, autres que ceux recommandés par le fabricant.
- Attention, les fluides frigorigènes peuvent ne pas dégager d'odeur.
- Ne pas perforer la tubulure contenant le frigorigène. Risque de feu ou d'explosion si la tubulure contenant le frigorigène est perforée; suivre les instructions de manutention avec soin.
- Les pièces doivent être remplacées par des pièces similaires, de manière à réduire au minimum le risque d'inflammation dû à des pièces incorrectes.
- Ne placez aucune source d'inflammation potentielle dans ou près de l'appareil.
- Avant de commencer à travailler sur des systèmes contenant des réfrigérants inflammables, des contrôles de sécurité sont nécessaires pour s'assurer que le risque d'inflammation est minimisé.
- Tout le personnel d'entretien et les autres personnes travaillant dans la zone locale doivent être informés de la nature des travaux effectués. Les travaux dans des espaces confinés doivent être évités.
- Les travaux doivent être entrepris selon une procédure contrôlée afin de minimiser le risque de présence de gaz ou de vapeur inflammable pendant l'exécution des travaux.
- La zone doit être contrôlée à l'aide d'un détecteur de réfrigérant approprié avant et pendant les travaux, afin de s'assurer que le technicien est conscient de l'existence d'atmosphères potentiellement toxiques ou inflammables.
- Assurez-vous que l'équipement de détection des fuites utilisé est adapté à l'utilisation de tous les réfrigérants applicables, c'est-à-dire qu'il ne produit pas d'étincelles, qu'il est correctement scellé ou qu'il est intrinsèquement sûr. REMARQUE: L'utilisation de mastic silicone peut réduire l'efficacité de certains types d'équipements de détection des fuites.

## **⚠ DANGER Continué**

- En aucun cas, des sources potentielles d'inflammation ne doivent être utilisées pour rechercher ou détecter des fuites de réfrigérant. Une lampe haloïde (ou tout autre détecteur utilisant une flamme nue) ne doit pas être utilisée.
- Les méthodes de détection de fuite suivantes sont considérées comme acceptables pour tous les systèmes de réfrigération:
  - Des détecteurs de fuites électroniques peuvent être utilisés pour détecter les fuites de réfrigérants, mais, dans le cas de réfrigérants inflammables, la sensibilité pourrait ne pas être adéquate ou nécessiter un réétalonnage. (L'équipement de détection doit être étalonné dans une zone sans réfrigérant.) Assurez-vous que le détecteur n'est pas une source potentielle d'inflammation et qu'il est adapté au réfrigérant utilisé. L'équipement de détection des fuites doit être réglé sur un pourcentage de la LII du réfrigérant et doit être étalonné en fonction du réfrigérant utilisé, et le pourcentage approprié de gaz (25% au maximum) est confirmé.
  - Les liquides de détection des fuites conviennent également à la plupart des réfrigérants, mais l'utilisation de détergents contenant du chlore doit être évitée, car le chlore peut réagir avec le réfrigérant et corroder la tuyauterie en cuivre.  
Remarque : Voici quelques exemples de liquides de détection de fuites :
    - méthode des bulles
    - agents de méthode fluorescents
- Si un travail à chaud doit être effectué sur l'équipement réfrigérant ou toute partie associée, un équipement d'extinction d'incendie approprié doit être disponible. Un extincteur à poudre chimique ou à CO<sub>2</sub> devrait être installé à proximité de la zone de chargement. Un extincteur chimique de classe B doit être disponible à tout moment.
- Il est interdit à toute personne effectuant des travaux en rapport avec un système réfrigérant qui impliquent la mise à nu d'une tuyauterie d'utiliser des sources d'inflammation de manière à entraîner un risque d'incendie ou d'explosion. Toutes les sources d'inflammation possibles, y compris la cigarette, doivent être suffisamment éloignées du site d'installation, de réparation, d'enlèvement et d'élimination, au cours desquels du réfrigérant peut éventuellement être libéré dans l'espace environnant. Avant d'entamer les travaux, la zone autour de l'équipement doit être étudiée pour s'assurer qu'il n'y a aucun risque d'inflammabilité ou d'inflammation. Des panneaux «Interdiction de fumer» doivent être affichés.
- Assurez-vous que la zone est à l'air libre ou qu'elle est correctement ventilée avant de pénétrer dans le système ou d'effectuer un travail à chaud. Un certain degré de ventilation doit être maintenu pendant la période où les travaux sont effectués. La ventilation doit permettre de disperser en toute sécurité tout réfrigérant libéré et, de préférence, de l'expulser dans l'atmosphère.

## **⚠ DANGER Continué**

- Pour pénétrer dans le circuit du réfrigérant afin d'effectuer des réparations ou pour toute autre raison, des procédures conventionnelles doivent être utilisées. Toutefois, pour les réfrigérants inflammables, il est important de suivre les meilleures pratiques, car l'inflammabilité est un facteur à prendre en considération. La procédure suivante doit être respectée:
  - éliminer le réfrigérant en toute sécurité conformément aux réglementations locales et nationales
  - purger le circuit avec du gaz inerte
  - évacuer (en option pour A2L)
  - purger avec du gaz inerte (en option pour A2L)
  - ouvrir le circuit par coupure ou brasage
- Si une fuite est suspectée, toutes les flammes nues doivent être enlevées/éteintes.
- Si une fuite de réfrigérant nécessitant un brasage est constatée, tout le réfrigérant doit être récupéré dans le système ou isolé (au moyen de vannes d'arrêt) dans une partie du système éloignée de la fuite.
- Lors de l'élimination du réfrigérant d'un système, que ce soit pour l'entretien ou la mise hors service, il est recommandé de veiller à ce que tous les réfrigérants soient éliminés en toute sécurité.
- Lors du transfert de réfrigérant dans des bouteilles, veillez à ce que seules des bouteilles de récupération de réfrigérant appropriées soient utilisées. Assurez-vous que le nombre de bouteilles nécessaires pour contenir la charge totale du système est disponible. Toutes les bouteilles à utiliser sont désignées pour le réfrigérant récupéré et étiquetées pour ce réfrigérant (c'est-à-dire des bouteilles spéciales pour la récupération du réfrigérant). Les bouteilles doivent être équipées d'une soupape de surpression et de soupapes d'arrêt associées qui sont en bon état de fonctionnement. Les bouteilles de récupération vides sont évacuées et, si possible, refroidies avant la récupération.
- L'équipement de récupération doit être en bon état de fonctionnement, accompagné d'un ensemble d'instructions concernant l'équipement disponible et doit être adapté à la récupération de tous les réfrigérants appropriés, y compris, le cas échéant, les réfrigérants inflammables. En outre, un ensemble de balances étalonnées doit être disponible et en bon état de fonctionnement. Les tuyaux doivent être complets, équipés de raccords de déconnexion sans fuite et en bon état. Avant d'utiliser la machine de récupération, vérifiez qu'elle est en bon état de fonctionnement, qu'elle a été correctement entretenue et que tous les composants électriques associés sont scellés pour éviter toute inflammation en cas de fuite de réfrigérant. Consulter le fabricant en cas de doute.
- Le réfrigérant récupéré doit être renvoyé au fournisseur de réfrigérant dans la bouteille de récupération appropriée et le bon de transfert de déchets correspondant doit être établi. Ne mélangez pas les réfrigérants dans les unités de récupération et surtout pas dans les bouteilles.

## **⚠ DANGER Continué**

- Si les compresseurs ou les huiles de compresseur doivent être retirés, assurez-vous qu'ils ont été évacués à un niveau acceptable afin de s'assurer qu'il ne reste pas de réfrigérant inflammable dans le lubrifiant. Le processus d'évacuation doit être effectué avant que le compresseur ne soit renvoyé aux fournisseurs. Seul le chauffage électrique du boîtier du compresseur doit être utilisé pour accélérer ce processus. Lorsque l'huile est vidangée d'un système, cette opération doit être effectuée en toute sécurité.
- En plus des procédures de charge conventionnelles, les exigences suivantes doivent être respectées:
  - S'assurer qu'aucune contamination de différents réfrigérants ne se produit lors de l'utilisation de l'équipement de charge. Les tuyaux ou conduites doivent être aussi courts que possible afin de minimiser la quantité de réfrigérant qu'ils contiennent.
  - Les bouteilles doivent être maintenues dans une position appropriée conformément aux instructions.
  - S'assurer que le système de réfrigération soit mis à la terre avant de charger le système avec du réfrigérant.
  - Étiqueter le système lorsque la charge est terminée (si cela n'a pas déjà été fait).
  - Il faut veiller à ne pas trop remplir le système de réfrigération.
- Avant de recharger le système, celui-ci doit être testé sous pression avec le gaz de purge approprié. Le système doit être soumis à un essai de fuite à la fin de la charge, mais avant la mise en service. Un test de contrôle de fuite doit être effectué avant de quitter le site.
- La réparation et l'entretien des composants électriques incluent les contrôles de sécurité initiaux et les procédures d'inspection des composants. En cas de défaut susceptible de compromettre la sécurité, aucune alimentation électrique ne doit être connectée au circuit tant que le problème n'a pas été résolu de manière satisfaisante. Si le défaut ne peut être corrigé immédiatement mais qu'il est nécessaire de poursuivre l'exploitation, une solution temporaire adéquate doit être utilisée. Cela doit être signalé au propriétaire de l'équipement, afin que toutes les parties soient informées.
- S'assurer que les condensateurs sont déchargés : cette opération doit être effectuée en toute sécurité afin d'éviter tout risque d'étincelle.
- S'assurer qu'aucun composant ou câblage électrique sous tension n'est exposé lors de la charge, de la récupération ou de la purge du système.
- S'assurer de la continuité de la mise à la terre.
- Lors des réparations de composants scellés, toutes les alimentations électriques doivent être déconnectées de l'équipement sur lequel on travaille avant tout retrait des couvercles scellés, etc. Si l'alimentation électrique de l'équipement est absolument nécessaire pendant l'entretien, un dispositif de détection des fuites fonctionnant en permanence doit être placé au point le plus critique afin de signaler en cas de situation potentiellement dangereuse.

## **⚠ DANGER Continué**

- Lorsque des composants électriques sont remplacés, ils doivent être adaptés à l'usage prévu et répondre aux spécifications correctes. Les directives de maintenance et d'entretien de Hoshizaki America doivent être respectées à tout moment. En cas de doute, consulter le service d'assistance technique de Hoshizaki America pour obtenir de l'aide.
- S'assurer que la charge réelle de réfrigérant est conforme à la taille de la pièce dans laquelle les pièces contenant du réfrigérant sont installées.
- S'assurer que les dispositifs et les sorties de ventilation fonctionnent correctement et ne sont pas obstrués.
- S'assurer que le marquage de l'équipement est toujours visible et lisible. Les indications et les panneaux illisibles doivent être corrigés.
- S'assurer que les tuyaux ou les composants de réfrigération sont installés dans un endroit où ils ne risquent pas d'être exposés à une substance susceptible de corroder les composants contenant du réfrigérant, à moins que les composants ne soient construits avec des matériaux intrinsèquement résistants à la corrosion ou qu'ils ne soient protégés de manière appropriée contre la corrosion.
- Une attention particulière doit être accordée aux points suivants afin de s'assurer qu'en travaillant sur les composants électriques, le boîtier n'est pas altéré de manière à ce que le niveau de protection soit affecté. Il s'agit notamment des dommages causés aux câbles, du nombre excessif de connexions, des terminaux non conformes aux spécifications d'origine, des dommages causés aux joints et du montage incorrect des presse-étoupes, etc.
- S'assurer que l'appareil (boîtier de commande/composant) est solidement fixé.
- S'assurer que les joints ou les matériaux d'étanchéité ne sont pas dégradés au point de ne plus pouvoir empêcher la pénétration d'atmosphères inflammables. Les pièces de rechange doivent être conformes aux spécifications de Hoshizaki America.
- N'appliquez aucune charge inductive ou capacitive permanente au circuit sans vous assurer que celle-ci ne dépassera pas la tension et le courant autorisés pour l'équipement utilisé.
- Les composants à sécurité intrinsèque sont les seuls types de composants sur lesquels il est possible de travailler sous tension en présence d'une atmosphère inflammable. L'appareil d'essai doit être adapté à la puissance requise.
- Ne remplacer les composants que par des pièces spécifiées par Hoshizaki America. D'autres pièces peuvent entraîner l'inflammation du réfrigérant dans l'atmosphère à la suite d'une fuite.
- Vérifier que le câblage ne sera pas soumis à l'usure, à la corrosion, à une pression excessive, à des vibrations, à des arêtes vives ou à tout autre effet environnemental négatif. Le contrôle doit également prendre en compte les effets du vieillissement ou des vibrations continues provenant de sources telles que les compresseurs ou les ventilateurs.

## B. Service Diagnosis



### R-290 Class A3 Flammable Refrigerant Used

#### **⚠ DANGER**

##### **Risk of Fire or Explosion. Flammable Refrigerant Used.**

- Be sure to follow all Important Safety Information located at the beginning of this manual and in section "III.A. Safety Precautions When Servicing."
- Servicing shall be done by trained service personnel with certified competence in handling flammable refrigerants to minimize the risk of possible ignition due to incorrect parts or improper service.

##### **Risque De Feu Ou D'Explosion. Fluide Frigorigène Inflammable Utilisé.**

- Assurez-vous de suivre toutes les informations importantes de sécurité qui se trouvent au début du présent manuel et en section «III.A. Précautions de sécurité lors de l'entretien.»
- L'entretien doit être effectué par du personnel formé et certifié pour la manipulation de réfrigérants inflammables afin de réduire au minimum le risque d'inflammation dû à des pièces incorrectes ou à un entretien inadéquat.

#### **⚠ WARNING**

- Risk of electric shock. Use extreme caution and exercise safe electrical practices.
- Turn the power switch off to turn the appliance off, then unplug the appliance from the electrical outlet before servicing.
- Risk of electric shock. Power switch in "OFF" position does not de-energize 115VAC circuit.
- Moving parts (e.g., fan blade) can crush and cut. Keep hands clear.
- Make sure all food zones in the appliance are clean after service.

The diagnostic procedure is a sequence check that allows you to diagnose the electrical system and components. Before proceeding, check for correct installation and proper voltage per nameplate. Always choose a neutral (W) to establish a good neutral connection when checking high voltages. If the display is in alarm, see "III.H. Alarm Safeties."

Note: There is a minimum 2-min. Comp on time and 2-min. Comp off time.

## **IMPORTANT**

The maximum allowable voltage variation is  $\pm 6$  percent of the nameplate rating. 115VAC is used as a reference voltage when checking voltage to components. Voltage may vary depending on power supply.

### **Factory Default Settings:**

- a) Cabinet Temperature Setpoint: The cabinet temperature setpoint is the value for the average cabinet temperature as monitored by the cabinet sensor. See the table below for factory default settings.

<b>Model</b>	<b>Default Temperature Setting</b>
HXR1A-FS(-FG)	41.0°F (5.0°C)
HXR2A-FS(-FG)	41.0°F (5.0°C)
HXF1A-FS(-FG)	-6.0°F (-21.1°C)
HXF2A-FS	-6.0°F (-21.1°C)

- b) Temperature Display Scale: °F.

For further details, see "III.F. Controls and Adjustments."

- 1) Turn off the on/off switch, then unplug the appliance from the electrical outlet.
- 2) Remove the control panel.
- 3) Plug the appliance back into the electrical outlet, then move the on/off switch to the "ON" position. **WARNING! Risk of electric shock. Use extreme caution and exercise safe electrical practices. On/Off switch in the "OFF" position does not de-energize all loads (mullion heater, perimeter heater, plug harness, and control board). The on/off switch is a control board 5VDC circuit.**

### **1a. Refrigerator Diagnostic Procedure:**

- 4) **Startup – LED 1 is blinking.** MH (HXR2A) energizes. TS begins initializing. There is a slight delay as the TS control initializes. MCB LED 1 (115VAC power supply) starts blinking.
  - a) **Mullion Heater Diagnosis (HXR2A):** MH and PH (if applicable) energize at startup. To confirm, check the amp draw on the black-smooth (BK-SM) wire of the heater. If no amp draw is present, check for 115VAC at the heater wiring black-smooth (BK-SM) to the heater black-ribbed (BK-RB) neutral. If 115VAC is not present, check the power supply and the power supply connections. If 115VAC is present, check the continuity of the heater(s). Replace as needed.

b) **Main Control Broad and Touch Screen Diagnostics:**

**MCB:** At startup MCB LED 1 starts blinking. If not, confirm the on/off switch is in the "ON" position. If in the "ON" position and LED 1 does not start blinking, check for 115VAC at CB P4 power (BK) to P2 neutral (W). If 115VAC is not present, check the power supply, power cord, and wiring connections. If 115VAC is present, and LED 1 remains off, remove the CB P36 AUX IN connector (on/off switch) and check for 5VDC from the CB AUX IN (on/off switch) red (R) wire pin to the CB P34 (negative DC ground terminal). If 3.3VDC is not present, replace MCB. If 3.3VDC is present, check the continuity of the on/off switch. Replace as needed.

**TS Diagnostics:** If LED 1 is blinking, TS display initiates. Date, time, RTD1 probe temperature, and cabinet thermistor temperature are displayed on the TS and the 2-hr. defrost timer starts. If TS display does not initiate (power up), remove the TS connector from CB P33 and check for 12VDC from the top pin (red (R) wire) to CB P34 negative (ground). If 12VDC is not present, replace CB. If 12VDC is present and TS doesn't initiate, replace TS. If TS initiates and three dashes are shown (- - -) instead of RTD1 probe temperature or cabinet thermistor temperature, check the RTD1 and cabinet thermistor connections. Next, check the RTD1 probe thermistor and cabinet thermistor. See "III.D.a) RTD1 Thermistor" and "III.D.b) Cabinet and Defrost Thermistors."

5) **Cooldown – MCB LEDs 1, 4, 5, and 9 turn on and TS Comp and EvapFM icons**

**turn.** With MCB LED 1 blinking and the cabinet thermistor temperature above the setpoint setting, LEDs 4, 5, and 9 turn on and the Comp, ConFM, and EvapFM energize. Cooldown begins. Note, in warm installation area's, if the DTh is above 50°F (10°C) EvapFM is de-energized and LED 4 is off until DTh is below 50°F (10°C).

a) **Comp Diagnosis:** MCB LEDs 5 and 9 are on along with the TS Comp icon. Comp and ConFM energize. If not, confirm setpoint is below cabinet temperature. Next, check the cabinet thermistor for proper kΩ value. See "II.D.b) Cabinet and Defrost Thermistors." If the CabTH is good, and LED 9 and 5 are on but the Comp and ConFM are not energized, check for 12VDC at the MBC P14 COMP violet (V) to P15 COMP violet (V). If 12VDC is not present, replace MCB. If 12VDC is present, check for 12VDC at CR terminals 0 and 1. If 12VDC is not present, check wiring from MCB to CR. If 12VDC is present, check CR coil continuity. Replace as needed. If CR coil is good, check for 115VAC at CR terminal no. 4 black (BK) to neutral (W). If 115VAC is not present, check main power supply wiring. If 115VAC is present, check for 115VAC at CR no. 2 violet (V) to neutral (W). If 115VAC is not present, replace CR. If 115VAC is present, check condensing unit receptacle and plug for proper connections and proper 115VAC power supply. If 115VAC is present at the receptacle and the plug is properly connected to the receptacle and the ConFM is energized but the Comp is not, check for 115VAC at the external protector black-smooth (BK-SM) to neutral (W). If 115VAC is present, check the Comp terminal side of the external protector. If 115VAC is not present, let the external protector cool and reset. If the external protector does not reset, replace the external protector. If 115VAC is present, check Comp start components and motor windings. Replace as needed.

**ConFM:** If ConFM is not energized, check ConFM fan blades for binding and motor winding continuity. If Comp and ConFM are energized and the cabinet does not cool down, check for a restriction in the refrigeration circuit, correct TXV operation, and correct refrigerant charge. See nameplate for correct charge amount.

- b) **EvapFM Diagnosis:** MCB LED 4 and TS EvapFM icon turn on. EvapFM energizes. If not, confirm DTh is at 50°F (10°C) or lower. If DTh is above 50°F (10°C), wait for evaporator to cool down. If EvapFM does not energize, remove the DS connector from MCB P37 (door switch) and check for 5VDC from the CB P37 (door switch) red (R) wire connector to the CB P34 (negative dC ground terminal). If 5VDC is not present, replace MCB. If 5VDC is present, confirm the doors are closed and DS engaged, check DS continuity. If DS is engaged and contacts are open, replace DS. If contacts are closed, replace the door switch connector to CB P37. Next, check for 115VAC at CB P5 dark blue (DBU) wire to neutral white (W) wire. If 115VAC is not present, replace CB. If 115VAC is present, check EvapFM blades for binding and EvapFM continuity.
- c) **HPS Activation:** If Comp, ConFM, and EvapFM are de-energized due to an open HPS, confirm ConFM fan blade turns freely, condenser coil is not clogged or restricted. Let refrigeration circuit pressures equalize. Confirm there are no restrictions in the refrigeration circuit (TXV and drier). If HPS does not reset and pressures are equalized, replace HPS. If pressures are not equalized, reclaim refrigerant and diagnose refrigeration circuit restriction.
- d) **Cabinet Light(s) Diagnosis (FS, FG, FGE):** MCB LED 6 turns on when a door opens or the TS light icon is activated (pressed). When a door opens, the TS door icon is activated (highlighted) and the TS light icon activates. Open a door, confirm the light(s) turn on. If not, remove the MCB door switch connector from CB P37. Check for 3.3VDC from MCB P37 red (R) wire pin to CB P34 DC negative pin (negative DC ground terminal). If 3.3VDC is not present, replace MCB. If 3.3VDC is present, check DS continuity. Replace as needed. If DS is activated (open), check for 115VAC from MCB P7 yellow (Y) to a neutral (W). If 115VAC is not present, replace MCB. If 115VAC is present at MCB P7 yellow (Y) to a neutral (W) and light(s) are not on, check for 24VDC at DCD black (BK) wire to DCD white (W) wire. If 24VDC is not present, check continuity of DCD driver. If open, replace DCD driver. If 24VDC is present and light(s) are not on, check wiring harness and wiring connections from DCD to light(s). If connections are good and light(s) are not on, replace light(s).
- 6) **Cool Down Achieved** – MH and PH (if applicable) continue.
- Comp and ConFM:** MCB LEDs 5 and 9 turn off and the TS Comp icon turns off. Comp and ConFM de-energize. LED 4 and EvapFM continue. If Comp and ConFM does not de-energize, confirm setpoint is above cabinet temperature. Next, check the cabinet thermistor for proper kΩ value. See "III.D.b) Cabinet and Defrost Thermistor." If the cabinet thermistor is good, and LED 9 and 5 are off but Comp and ConFM are energized, check for 12VDC at MCB P14 COMP violet (V) to P15 COMP violet (V). If 12VDC is present, replace MCB. If 12VDC is not present, check for 115VAC at CR terminal no. 2 violet (V) to neutral (W). If 115VAC is present, replace CR.
- EvapFM:** MCB LED 4, TS EvapFM icon, and EvapFM continue. If EvapFM de-energizes, check for 115VAC at CB P5 dark blue (DBU) wire to neutral white (W) wire. If 115VAC is not present and LED 4 is on, replace MCB.

- 7) **Defrost– LED 4, and Defrost Icon are on.** There is a 1-hr. maximum defrost time, and a 2-hr. defrost interval. If DTh above 50°F (10°C) at time of defrost, 2-hr. cumulative Comp run defrost timer resets and defrost is skipped.
- a) **Time-Initiated:** 2-hr cumulative Comp run defrost timer terminates (Comp energized more than 2 hrs.). Defrost icon turns on. Comp icon and LEDs 5 and 9 turn off. Comp and ConFM de-energize. EvapFM icon stays on and EvapFM continues.
  - b) **Manually-Initiated:** To initiate a manual defrost, press the gear icon on the TS, then the defrost icon on the user settings menu. The defrost icon turns on. If on, the Comp icon turns off. Comp and ConFM de-energize. EvapFM icon stays on and EvapFM continues.
  - c) **Defrost Termination:**
    - (1) DTh warms to 44°F (6.6°C). If not, confirm DTh status. See "III.D.c) Cabinet and Defrost Thermistor." If DTh is in proper range. 3 min. Comp delay timer starts. Defrost and EvapFM icons continue. EvapFM remains energized.
    - (2) 3 min. Comp delay timer terminates. Comp icon turns on and TS defrost icon turns off. Comp and ConFM energize.

#### 1b. Defrost Diagnosis:

##### a) Time-Initiation or Manual Initiation:

**Time-Initiation;** 2-hr cumulative compressor run defrost timer terminates.

Note: EvapFM remains energized during defrost. EvapFM de-energizes if DTh reaches 50°F (10°C).

**Manual Initiation;** TS defrost button pressed.

Note: There is a 1-hr. maximum defrost time.

- (1) **MCB, Comp, and CondFM Diagnosis:** Confirm defrost icon turns on, and Comp icon turns off. If not, replace MCB. Next, check that MCB P14 (V) and P15 (V) does not have 115VAC to neutral (W). If 115VAC is present, replace MCB.
- (2) **EvapFM Diagnosis:** Confirm EvapFM icon is on. If not, confirm DTh is below 50°F (10°C). Next, check for 115VAC at MCB P5 (DBU) to neutral (W). If 115VAC is not present, replace MCB.

### 1c. Defrost Termination:

DTh warms to 44°F (6.6°C). If not, confirm DTh status. See "III.D. Thermistor Check."  
If DTh is in proper range, Comp icon turns on and Comp and ConFM energize.  
Cool-down starts. EvapFM continues unless DTh is above 50°F (10°C).

Legend: **CL**—cabinet light; **Comp**—compressor; **ConFM**—condenser fan motor; **CTh**—cabinet thermistor; **DCD**—direct current driver; **DS**—door switch; **DTh**—defrost thermistor; **EvapFM**—evaporator fan motors; **HPS**—high-pressure switch; **MCB**—main control board; **TS**—touch screen; **TXV**—thermostatic expansion valve; **CUR**—condensing unit receptacle

**2a. Freezer Diagnostic Procedure:**

**DATA PENDING**

5) Cooldown – MCB LEDs 1, 4, 5, and 9 turn on and TS Comp and EvapFM icons

**DATA PENDING**

**DATA PENDING**

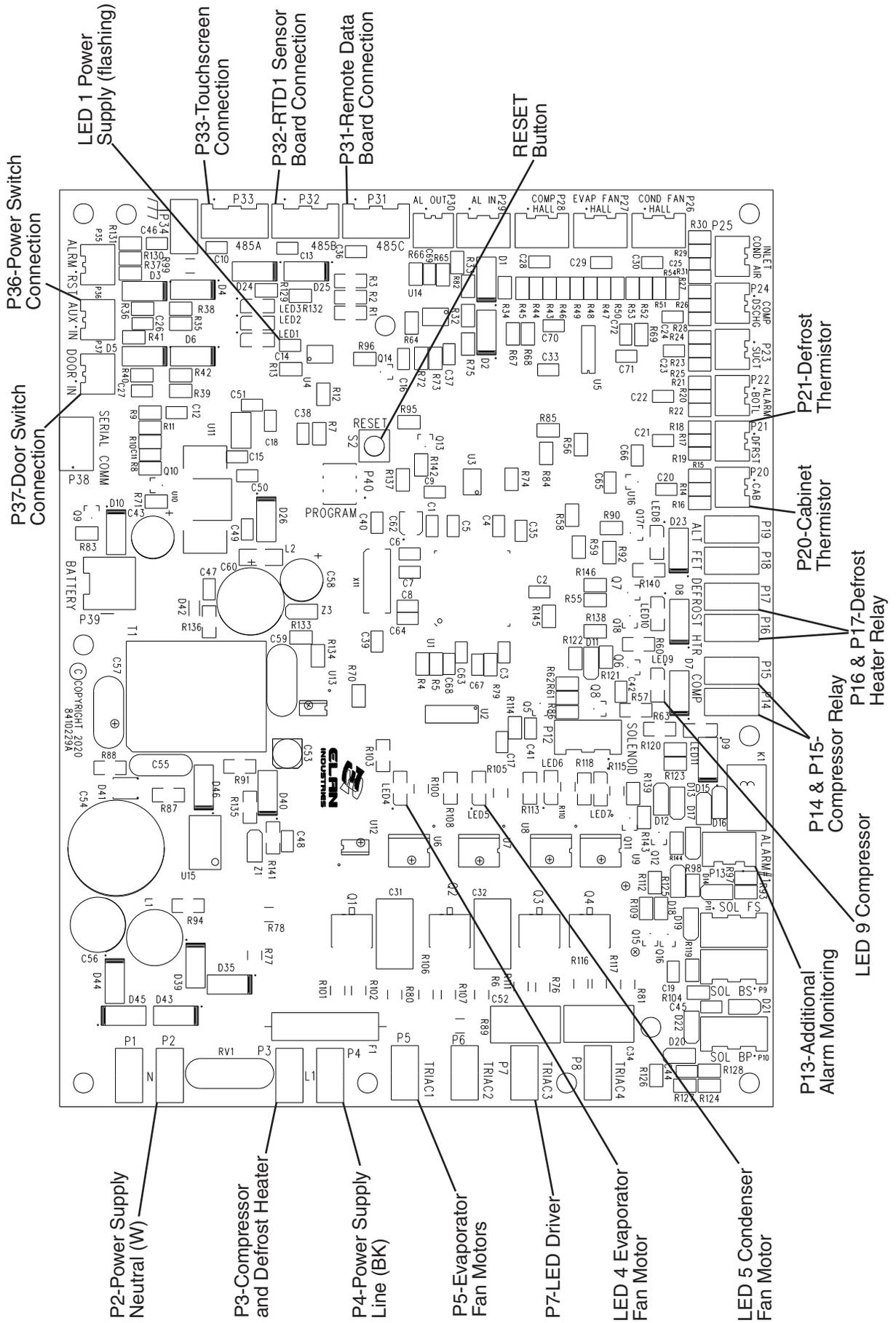
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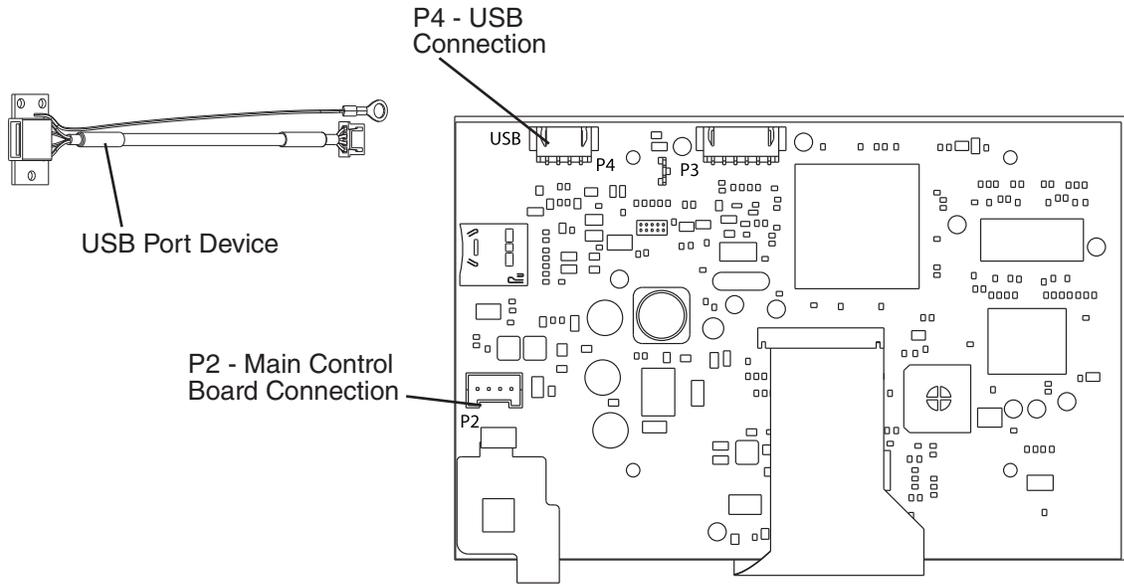
### **C. Control Board Check**

Before replacing control board that does not show a visible defect and that you suspect is bad, confirm you have proper voltage to the control board. Always choose a ground (- negative) terminal to establish a good ground connection when checking DC voltages. Confirm there is a good AC power supply at the main control board power supply connections; P4 - black (BK) power terminal and P2 - white (W) neutral terminal. Next, confirm proper DC volts to the components or control board. See "VIII.B. Wiring Diagrams."

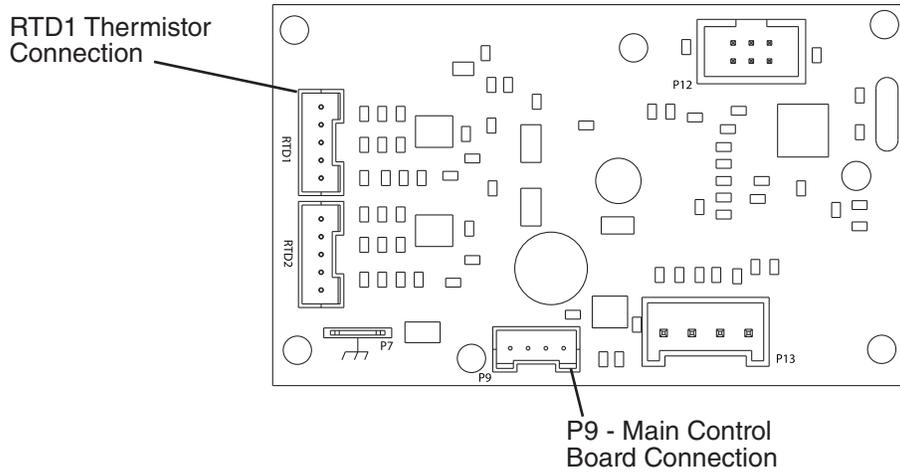
# 1. Main Control Board Layout



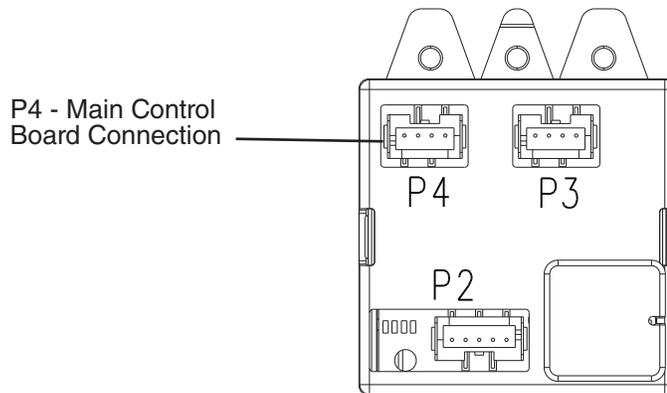
## 2. Touchscreen Layout



## 3. RTD1 Control Board



## 4. Remote Data Control Board



## D. Thermistor Check

This appliance utilizes 3 thermistors for cabinet temperature control, defrost initiation, defrost termination, and high and low temperature safety alarms.

### a) RTD1 Thermistor:

The RTD1 thermistor is placed in a sealed container located in the cabinet area. The container is filled to a 90% capacity with blue propylene glycol solution and with a nylon centering washer installed on the inside. The RTD1 thermistor and glycol solution are used to show the temperature of liquid products inside the cabinet. See the table below for the RTD1 thermistor Ohm scale.

OUTPUTTABLE ( 1000 OHM, .00385ALPHA )					
°C	OHMS	°C	OHMS	°C	OHMS
0	1000.0	36	1139.9	72	1278.4
1	1003.9	37	1143.8	73	1282.2
2	1007.8	38	1147.7	74	1286.0
3	1011.7	39	1151.5	75	1289.8
4	1015.6	40	1155.4	76	1293.7
5	1019.5	41	1159.3	77	1297.5
6	1023.4	42	1163.1	78	1301.3
7	1027.3	43	1167.0	79	1305.1
8	1031.2	44	1170.8	80	1308.9
9	1035.1	45	1174.7	81	1312.7
10	1039.0	46	1178.5	82	1316.6
11	1042.9	47	1182.4	83	1320.4
12	1046.8	48	1186.2	84	1324.2
13	1050.7	49	1190.1	85	1328.0
14	1054.6	50	1194.0	86	1331.8
15	1058.5	51	1197.8	87	1335.6
16	1062.4	52	1201.6	88	1339.4
17	1066.3	53	1205.5	89	1343.2
18	1070.2	54	1209.3	90	1347.0
19	1074.0	55	1213.2	91	1350.8
20	1077.9	56	1217.0	92	1354.6
21	1081.8	57	1220.9	93	1358.4
22	1085.7	58	1224.7	94	1362.2
23	1089.6	59	1228.6	95	1366.0
24	1093.5	60	1232.4	96	1369.8
25	1097.3	61	1236.2	97	1373.6
26	1101.2	62	1240.1	98	1377.4
27	1105.1	63	1243.9	99	1381.2
28	1109.0	64	1247.7	100	1385.0
29	1112.8	65	1251.6	101	1388.8
30	1116.7	66	1255.4	102	1392.6
31	1120.6	67	1259.2	103	1396.4
32	1124.5	68	1263.1	104	1400.2
33	1128.3	69	1266.9	105	1403.9
34	1132.2	70	1270.7	106	1407.7
35	1136.1	71	1274.5	107	1411.5

**b) Cabinet and Defrost Thermistors:**

The cabinet thermistor is located at the top of the cabinet area inside the return air louver area. The cabinet thermistor is used to control the refrigeration circuit and is monitored for high and low temperature safety alarms. See the table below for the cabinet thermistor Ohm scale:

**c) Defrost Thermistor:**

The defrost thermistor is located in the evaporator. The defrost thermistor is used to control the refrigeration defrost cycles. See the table below for the defrost thermistor Ohm scale:

10K NTC THERMISTOR OUTPUT					
°C	OHMS x 1000	°C	OHMS x 1000	°C	OHMS x 1000
-50	329.5	5	22.05	60	3.02
-45	247.7	10	17.96	65	2.58
-40	188.5	15	14.69	70	2.22
-35	144.1	20	12.09	75	1.92
-30	111.3	25	10.00	80	1.66
-25	86.43	30	8.31	85	1.45
-20	67.77	35	6.94	90	1.26
-15	53.41	40	5.82	95	1.10
-10	42.47	45	4.91	100	.973
-5	33.90	50	4.16	105	.857
0	27.28	55	3.53	110	.757

## E. Diagnostic Tables

Check for correct appliance installation per the instruction manual and proper voltage per appliance nameplate.

### 1. Not Cooling

Not Cooling - Possible Cause	
1. Power Supply	a) Unplugged, off, blown fuse, tripped or defective circuit breaker.
	b) Loose connection.
	c) Not within specifications.
2. Cord and Plug	a) Loose connection.
	b) Defective.
3. Wiring	a) Loose connection.
	b) Faulty.
4. Control Module See "III.H. Alarm Safeties" and "III.C. Control Board Check."	a) In alarm.
	b) Defective.
5. Door Switch	a) Not engaged.
	b) Defective.
6. Evaporator Fan Motor	a) Defective.
7. High-Pressure Switch	a) Dirty condenser.
	b) Ambient temperature too warm.
	c) Condenser fan motor not operating.
	d) Refrigerant overcharge.
	e) Refrigerant lines or components restricted.
	f) Defective.
8. Compressor External Protector	a) Dirty condenser.
	b) Condenser fan motor not operating.
	c) Compressor capacitor or start relay defective.
	d) Defective.
9. Compressor	a) Defective.
10. Condenser	a) Dirty.
11. Evaporator See "III.E.2. Evaporator Frozen Up."	a) Clogged or frozen.
12. Refrigerant/Refrigerant Lines	a) Refrigerant leak.
	b) Refrigerant lines restricted.

### 2. Evaporator Frozen Up

Evaporator Frozen Up - Possible Cause	
1. Evaporator	a) Dirty.
2. Evaporator Fan Motor	a) Fan blades binding.
	b) Defective.
3. Defrost Thermistor	a) Out of position or defective.
4. Main Control Board	a) Defective.
5. Refrigerant Charge/Refrigerant Lines	a) Low.
	b) Component restriction (TXV, cap tube, drier).
6. Defrost Heater (freezer)	a) Defective.

### 3. Defrost

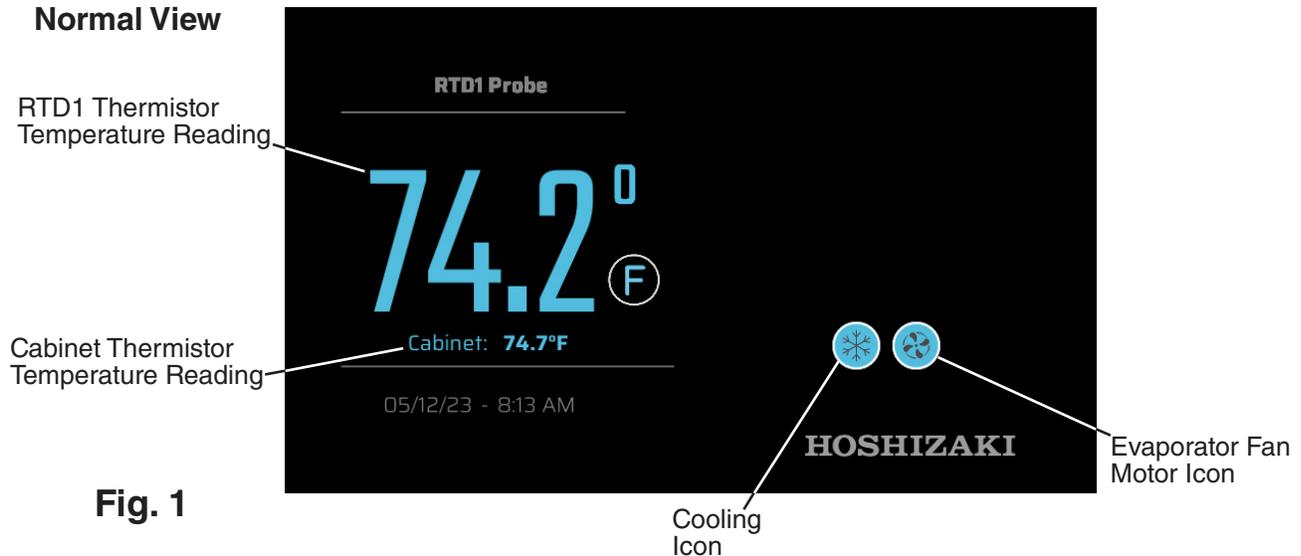
<b>Refrigerator Defrost Fails to Initiate - Possible Cause</b>	
1. Main Control Board (2-hr. cumulative compressor run time defrost timer)	a) Defective.
<b>Refrigerator Defrost Fails to Terminate - Possible Cause</b>	
1. Defrost Thermistor (Confirm DTh status. See "III.D. Thermistor Check.")	a) Defrost termination temperature 44°F (6.6°C) not achieved.
	b) Defective.
2. Main Control Board	a) Defrost thermistor connection loose.
	b) Defective.
<b>Freezer Defrost Fails to Initiate - Possible Cause</b>	
1. 5-hr. compressor cumulative run time defrost timer terminated.	a) Check compressor operation. See "1. Not Cooling."
2. Main Control Board	a) Defective.
3. Defrost Thermostat	a) Open. Cut-out: 120°F±5°F (49°C±3°C), Cut-in: 70°F±5°F (21°C±3°C)
<b>Freezer Defrost Fails to Terminate - Possible Cause</b>	
1. Defrost Heater	a) Defrost thermostat open.
	b) Defective.
2. Defrost Thermistor (Confirm DTh status. See "III.D. Thermistor Check.")	a) Defrost termination temperature 77°F (25°C) not achieved.
	b) Defrost thermistor connection loose.
3. Main Control Board	a) Defective.

## F. Controls and Adjustments

### 1. Touchscreen Normal View

On the touchscreen display normal view, the RTD1 thermistor temperature reading, cabinet thermistor temperature reading, date/time, and operational icons are shown. See Fig. 1.

#### Normal View

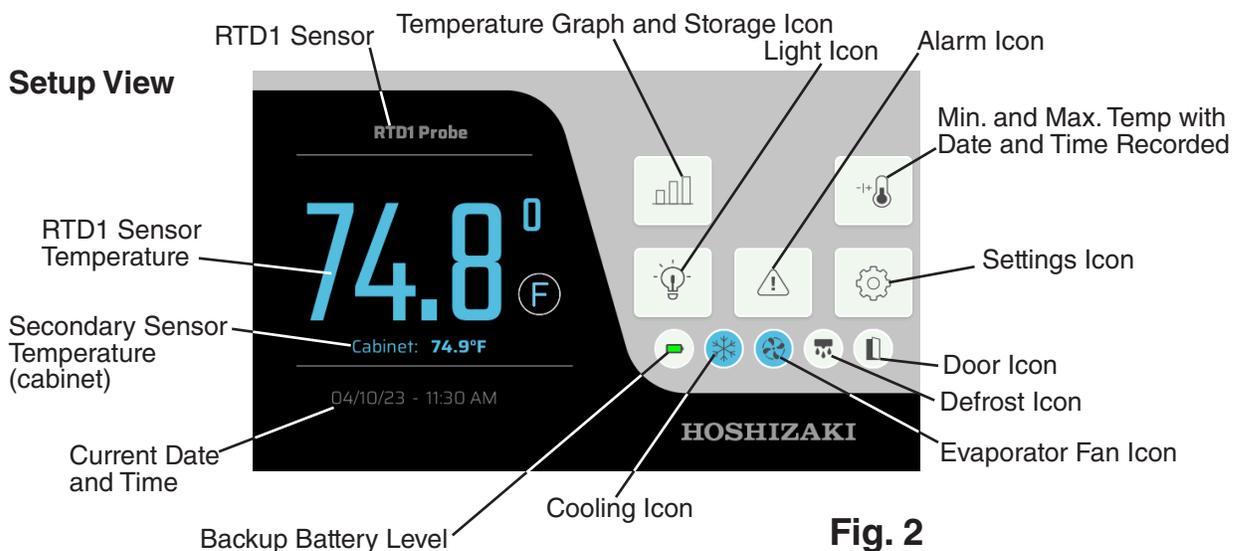


**Fig. 1**

### 2. Touchscreen Setup View

Touch anywhere on the display to get to the touchscreen setup view. Operational icons and settings icons are shown below. Collecting data or making changes may be made by selecting the appropriate icon from the touchscreen setup view. See Fig. 2. The cabinet temperature setpoint is the value for the average cabinet temperature as monitored by the cabinet sensor. See the table below for default settings.

Model	Default Temperature Setting
HXR1A HXR2A	41.0°F (5.0°C)
HXF1A HXF2A	-6.0°F (-21.1°C)



**Fig. 2**

### 3. Adjusting Temperature Setpoint

The cabinet temperature differential for the compressor to turn on and off is:

HXR1A-XX  $\pm 2.0^{\circ}\text{F}$  ( $\pm 1.1^{\circ}\text{C}$ ) of the cabinet temperature setpoint.

HXR2A-XX  $\pm 2.4^{\circ}\text{F}$  ( $\pm 1.3^{\circ}\text{C}$ ) of the cabinet temperature setpoint.

For example, for a 1-section refrigerator temperature setpoint of  $41.0^{\circ}\text{F}$  ( $5.0^{\circ}\text{C}$ ), the compressor comes on at  $43^{\circ}\text{F}$  ( $6.1^{\circ}\text{C}$ ), and the compressor goes off at  $39^{\circ}\text{F}$  ( $3.9^{\circ}\text{C}$ ).

- For refrigerators, the temperature setpoint is adjustable between  $30.0^{\circ}\text{F}$  and  $50.0^{\circ}\text{F}$  ( $-1.1^{\circ}\text{C}$  and  $10^{\circ}\text{C}$ ).

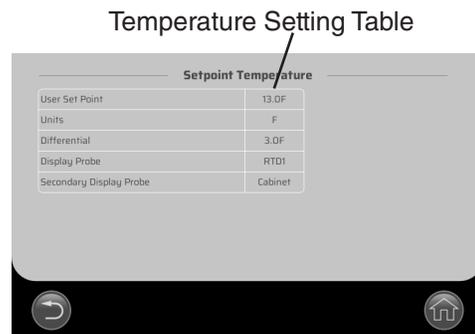
- | DATA PENDING For FREEZER

If necessary, adjust the cabinet temperature setpoint as follows:

- Press and release anywhere on the screen. The touchscreen setup view is shown. See Fig. 3.
- Press and release the center of the RTD1 probe temperature display. The temperature setting table is shown. See Fig. 4.

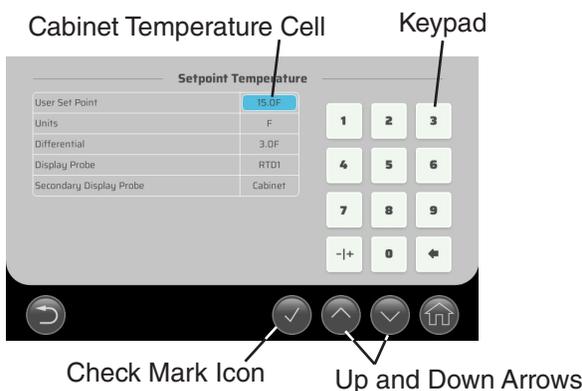


**Fig. 3**

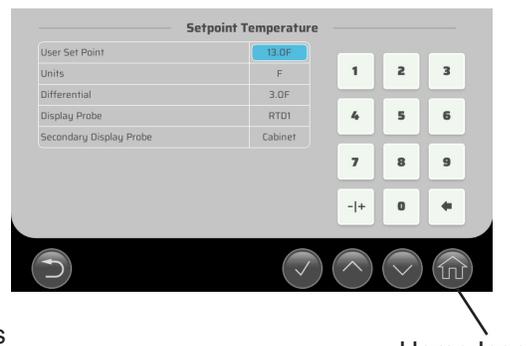


**Fig. 4**

- Press the User Set Point temperature cell. See Fig. 5.
- Type with the keypad or scroll using the up or down arrow, to the desired cabinet temperature.
- Press the check mark icon to save the new cabinet temperature setpoint.
- Press the home icon to return to the touchscreen setup view. See Fig. 6.



**Fig. 5**



**Fig. 6**

Home Icon

The touchscreen setup view returns to touchscreen normal view after 1 min. See Fig. 7.

**NOTICE! Do not adjust the temperature setpoint more than 2°F (1°C) at a time. Allow the temperature to stabilize for a minimum of 8 hours before making further temperature setpoint adjustments.**

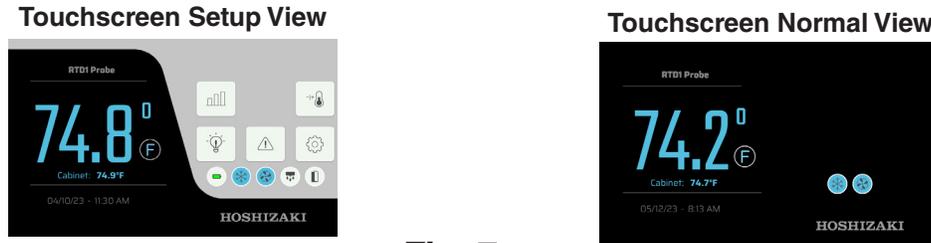


Fig. 7

#### 4. Cabinet Temperature Display Scale

The default cabinet temperature display scale is Fahrenheit °F, but can be changed to Celsius °C. Note: This must be in °C for RTD1 calibration.

To change the cabinet RTD1 sensor temperature display scale:

- a) Press and release the center of the RTD1 probe temperature display. The touchscreen setup view is shown. See Fig. 8.
- b) Press and release the center of the RTD1 probe temperature display again. The temperature setting table is shown. See Fig. 9.

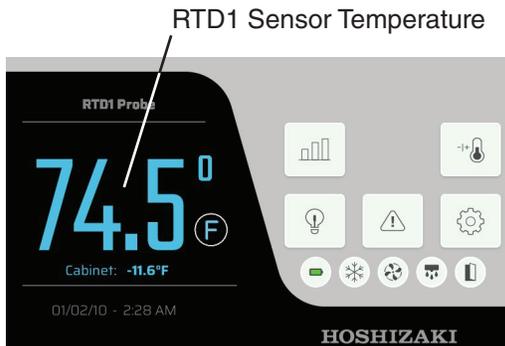


Fig. 8

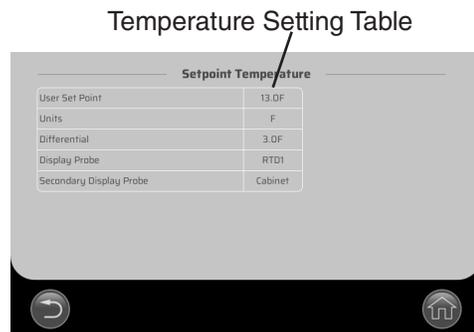
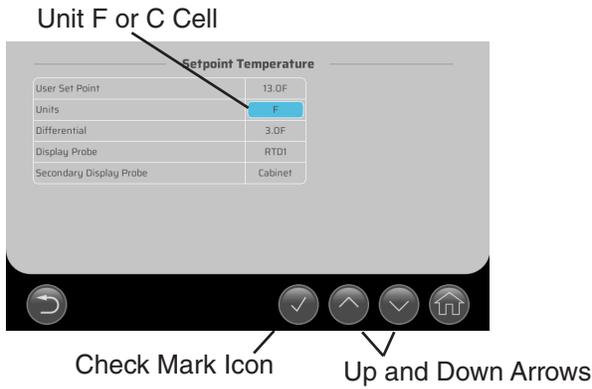
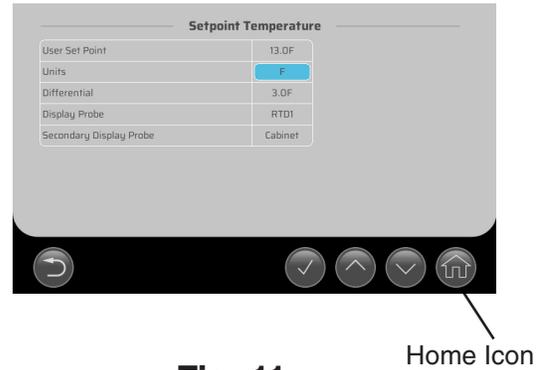


Fig. 9

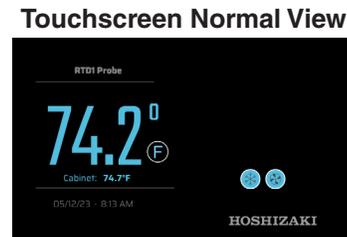
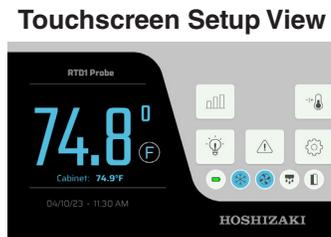
- c) Press the Units F or C cell in the Units row. See Fig. 10.
- d) Press the up arrow icon for Celsius C or Fahrenheit F.
- e) Press the check mark icon to save the new cabinet temperature setpoint.
- f) Press the home icon to return to the touchscreen setup view. See Fig. 11.  
The touchscreen setup view returns to touchscreen normal view after 1 min.  
See Fig. 12.



**Fig. 10**



**Fig. 11**

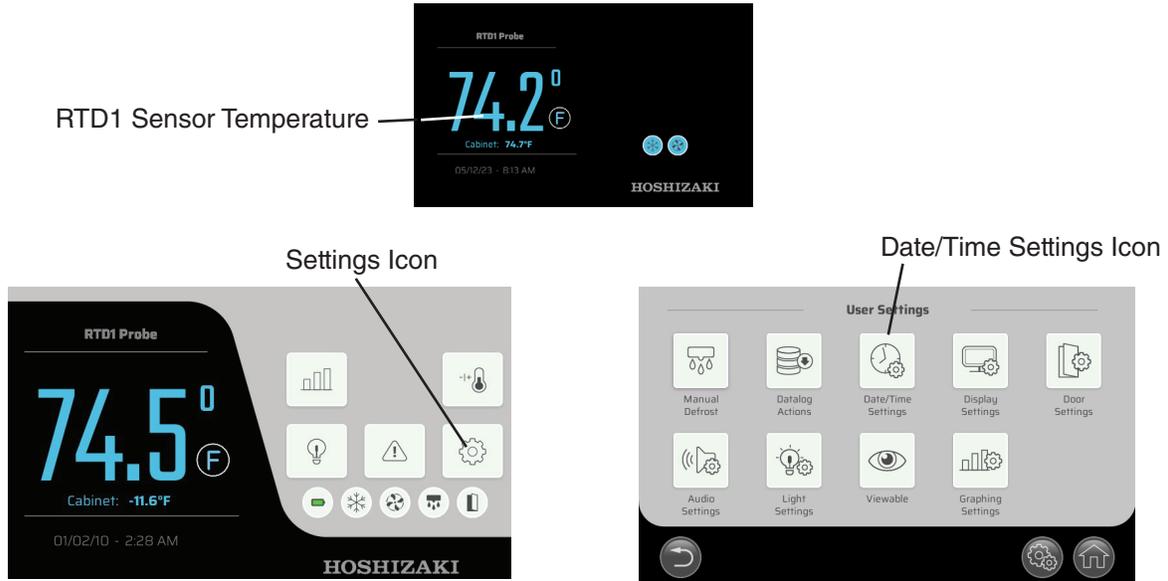


**Fig. 12**

## 5. Date and Time Setting

If necessary, adjust the date or time as follows:

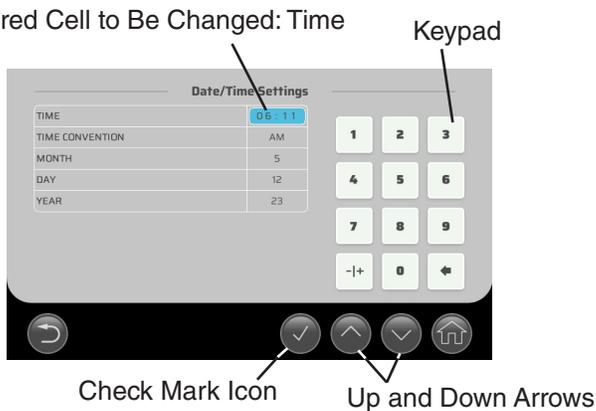
- Press and release the center of the RTD1 probe temperature display. See Fig. 13.
- Press the settings icon, then press the "Date/Time Settings" icon.



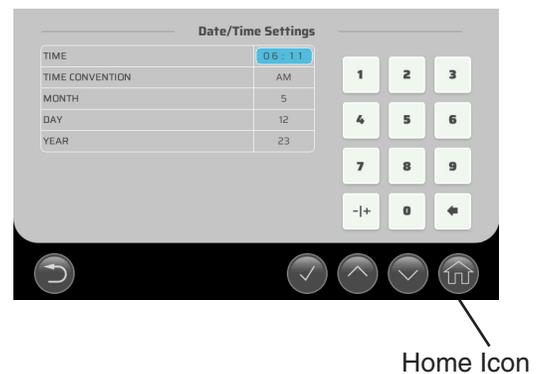
**Fig. 13**

- Press the desired cell to be changed. See Fig. 14.
- Type with the keypad or scroll using the up or down arrow, to the desired setting.
- Press the check mark icon to save the new setting.
- Press the home icon to return to the touchscreen setup view. See Fig. 15.  
The touchscreen setup view returns to touchscreen normal view after 1 min.  
See Fig. 16.

Desired Cell to Be Changed: Time



**Fig. 14**



**Fig. 15**

Touchscreen Setup View



Touchscreen Normal View



**Fig. 16**

## 6. Display Icons

Touchscreen display icons inform you of energized components and if the appliance is in alarm.

Control Module Icons	
Icon	Meaning
	Door Door open when lit.
	Cooling Mode: Compressor and Condenser Fan Motor Compressor and Condenser Fan Motor Energized.
	Evaporator Fan Motor Evaporator fan motor energized. Evaporator fan motor de-energizes when door is open.
	Defrost Appliance is in defrost cycle. See "III.B. Service Diagnosis" for details.
	Alarm Exclamation Mark Appliance is in alarm. See "III.H. Alarm Safeties" for details.
	Backup Battery Backup batteries condition.
	Light Light on or off.
	Product Graph Icon System operation graph.
	Settings Icon User setting access.
	Probe values and temperature alarm limits

## G. Defrost

### **⚠ DANGER**

#### **Risk of Fire or Explosion. Flammable Refrigerant Used.**

- Do not use mechanical devices to defrost.
- Do not puncture refrigerant tubing. Risk of fire or explosion due to puncture of refrigerant tubing; follow handling instructions carefully.

#### **Risque De Feu Ou D'Explosion. Le Frigorigène Est Inflammable.**

- Ne pas utiliser d'appareils mécaniques pour dégivrer le réfrigérateur.
- Ne pas perforer la tubulure contenant le frigorigène. Risque de feu ou d'explosion si la tubulure contenant le frigorigène est perforée; suivre les instructions de manutention avec soin.

### 1. Refrigerators

Refrigerators use a time-initiated, off-cycle defrost. Defrost occurs when either the 2-hr. cumulative compressor run timer terminates. When the 2-hr. cumulative compressor run timer terminates, defrost begins. The 5-min. minimum defrost timer and the 1-hr. maximum defrost timer starts. If energized, the compressor de-energizes and the evaporator fan motor continues. The defrost icon is displayed during defrost. After the 5-min. minimum defrost timer terminates and the defrost thermistor warms to 44°F (6.6°C), defrost terminates. The defrost icon turns off and the compressor energizes. Note: If the defrost thermistor is above 50°F (10°C) the evaporator fan motor de-energizes until the defrost thermistor drops to 49°F (9°C).

### 2. Freezers

# DATA PENDING

### 3. Manual Defrost Initiation

1) Press the display module settings icon. See Fig. 17. User Settings display appears.

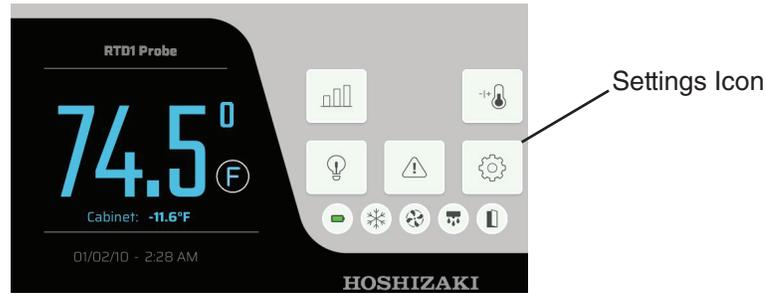


Fig. 17

2) Press the Manual Defrost icon. See Fig. 18. Defrost icon turns red and defrost initiates.

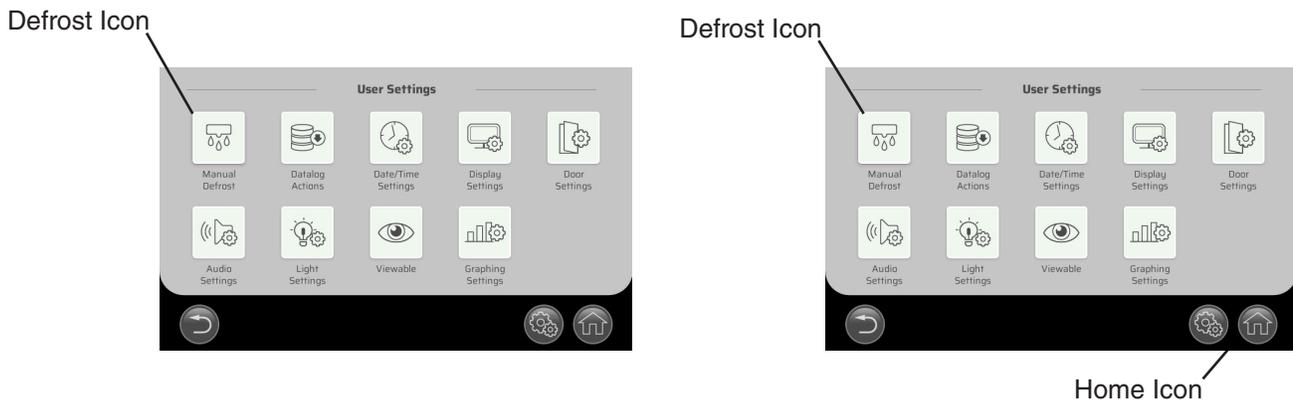


Fig. 18

3) Press the Home icon in the lower right hand corner of the display module.

4) Defrost engaged and defrost icon turns on. See Fig. 19.



Fig. 19

### 4. Manual Defrost Termination

1) Repeat steps 1-4 in "3. Manual Defrost Initiation" above.

## H. Alarm Safeties

Alarm signals are designed to protect the appliance and product. These alarms give information or warnings in the event the appliance is operating out of acceptable parameters. Alarm status can be viewed by pressing the alarm icon. See Fig. 20. Normal operation is shown with a "Checkmark" inside the alarm icon. See Fig. 21. A fault issue is shown with an "Exclamation Mark" inside the alarm icon.

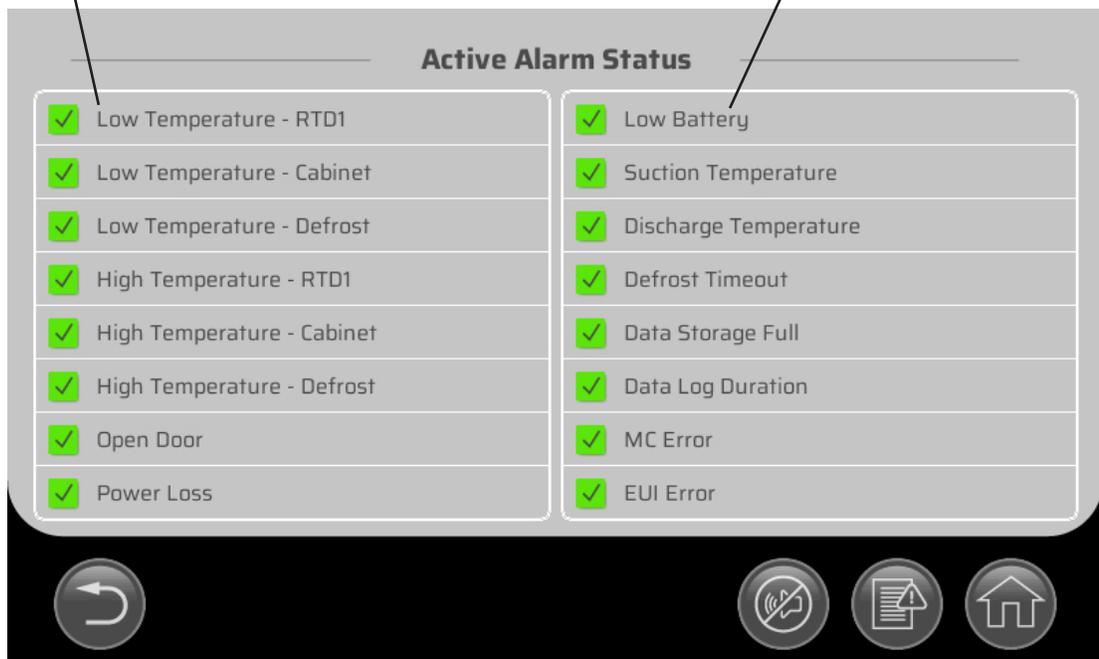


Fig. 20

Alarm Icon

Non-Alarm Condition

Low Battery Alarm Engaged



Probe Sensor	Temperature Sensor
Probe 1	RTD1 Sensor
Probe 2	Cabinet Thermistor
Probe 3	Defrost Thermistor

Fig. 21

## **I. Safety Devices**

### **1. Compressor External or Internal Overload**

If combined temperature/amperage value is above the limit specified by the compressor manufacturer, the compressor overload operates independently to turn off the compressor. The compressor overload de-energizes the compressor until the temperature/amperage value returns to an acceptable level.

### **2. Short-Cycle Protection**

There is a 2-minute minimum off-time and 2-minute minimum on-time for the compressor.

Note: Time may vary with compressor overload or high-pressure switch activation.

### **3. High-Pressure Switch**

If pressure on the high-side of the appliance exceeds Hoshizaki specifications, the high-pressure switch activates and interrupts the compressor circuit, de-energizing the compressor until the pressure returns to an acceptable level.

## **J. Cooling Performance**

Be sure the appliance is properly installed and located for optimum cooling performance. If cooling performance is not at its optimum level, check the following items:

- Door(s) opened too often.
- Door(s) left open. Close.
- Dirty air filter and/or condenser. Clean.
- Cabinet too tightly packed or cabinet air inlet/outlet blocked. Allow some space between items to ensure good air flow.
- Warm or hot items inside. Take them out until they cool down more.
- Ambient temperature too high. Avoid installation near high heat producing equipment or exposure to direct sunlight.
- Temperature setpoint too high. Readjust it to a lower temperature.
- Appliance in defrost cycle. The cabinet temperature may rise temporarily during the defrost cycle, but this will not affect the product inside.

## **K. Cabinet Condensation**

In the event condensation develops on the cabinet exterior, check the following items:

- Door(s) left open. Close.
- Ambient humidity too high. In high humidity areas it may be necessary to wipe off the cabinet frame occasionally.

## **L. Mullion/Perimeter Heater**

Refrigerators are equipped with mullion heaters and the freezers are equipped with mullion and perimeter heaters. The heaters are energized when the appliance is plugged into the electrical outlet.

## IV. Refrigeration Circuit and Component Service Information

### DANGER

#### **Risk of Fire or Explosion. Flammable Refrigerant Used.**

- Follow handling instructions carefully in compliance with U.S. government regulations.
- Do not use mechanical devices to defrost.
- Do not puncture refrigerant tubing. Risk of fire or explosion due to puncture of refrigerant tubing; follow handling instructions carefully.
- Component parts shall be replaced with like components.
- Servicing shall be done by factory authorized service personnel to minimize the risk of possible ignition due to incorrect parts or improper service.
- Consult instruction manual/service manual before attempting to install or service this product.
- Dispose of properly in accordance with federal or local regulations.
- Do not place any potential ignition sources in or near the appliance.

#### **Risque De Feu Ou D'Explosion. Fluide Frigorigène Inflammable Utilisé.**

- Suivre attentivement les instructions de manipulation conformément à la réglementation gouvernementale.
- Ne pas utiliser d'appareils mécaniques pour dégivrer le réfrigérateur.
- Ne pas perforer la tubulure contenant le frigorigène. Risque de feu ou d'explosion si la tubulure contenant le frigorigène est perforée; suivre les instructions de manutention avec soin.
- Les pièces des composants doivent être remplacées par des pièces et accessoires équivalents.
- L'entretien doit être effectué par le personnel de service autorisé par le fabricant afin de minimiser les risques d'inflammation attribuables à l'installation d'une pièce inadéquate ou à la mauvaise exécution du service.
- Consulter le manuel du propriétaire/guide de réparation avant de tenter une réparation. Toutes les mesures de sécurité doivent être respectées.
- Éliminer conformément aux règlements fédéraux ou locaux.
- Ne placez aucune source d'inflammation potentielle dans ou près de l'appareil.

## **⚠ WARNING**

- Wear appropriate personal protective equipment (PPE) when servicing the appliance.
- Technician must utilize a combustible gas leak detector at all times.
- Notify everyone in the immediate area that you are working with flammable refrigerant.
- Do not work on appliance in a confined space. Confirm area is well ventilated.
- Identify and eliminate all possible ignition points in a 10 ft. (3 m) area around service area.
- Do not use mechanical devices to defrost.
- Use non-sparking tools.
- Class B dry chemical fire extinguisher or equivalent must be available.
- Do not pressurize system above 200 PSIG during leak check procedure or prior to evacuating refrigeration system.
- This appliance should be diagnosed and repaired only by qualified service personnel to reduce the risk of death, electric shock, serious injury, or fire.
- To reduce the risk of electric shock, do not touch the plug with damp hands.
- Unplug the appliance from the electrical outlet before servicing.
- Make sure all food zones in the appliance are clean after the appliance is serviced.

## A. Refrigeration Circuit



### R-290 Class A3 Flammable Refrigerant Used

#### **⚠ DANGER**

##### **Risk of Fire or Explosion. Flammable Refrigerant Used.**

- Be sure to follow all Important Safety Information located at the beginning of this manual and in section "III.A. Safety Precautions When Servicing."
- Servicing shall be done by trained service personnel with certified competence in handling flammable refrigerants to minimize the risk of possible ignition due to incorrect parts or improper service.
- Confirm that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking.
- A dry chemical or CO<sub>2</sub> fire extinguisher should be adjacent to the charging area. You must have a Class B chemical fire extinguisher available at all times.
- 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:
  - safely remove refrigerant following local and national regulations
  - purge the circuit with inert gas
  - evacuate (optional for A2L)
  - purge with inert gas (optional for A2L)
  - open the circuit by cutting
- Confirm that no live electrical components and wiring are exposed while charging, recovering, or purging the system.
- You must have a combustible gas leak detector in the immediate work area at all times.
- Be sure the area is clear of refrigerant vapor before brazing.
- 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 dry 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.

## **DANGER Continué**

### **Risque De Feu Ou D'Explosion. Fluide Frigorigène Inflammable Utilisé.**

- Assurez-vous de suivre toutes les informations importantes de sécurité qui se trouvent au début du présent manuel et en section «III.A. Précautions de sécurité lors de l'entretien.»
- L'entretien doit être effectué par du personnel formé et certifié pour la manipulation de réfrigérants inflammables afin de réduire au minimum le risque d'inflammation dû à des pièces incorrectes ou à un entretien inadéquat.
- S'assurer que les condensateurs sont déchargés : cette opération doit être effectuée en toute sécurité afin d'éviter tout risque d'étincelle.
- Un extincteur à poudre chimique ou à CO<sub>2</sub> devrait être installé à proximité de la zone de chargement. Un extincteur chimique de classe B doit être disponible à tout moment.
- Pour pénétrer dans le circuit du réfrigérant afin d'effectuer des réparations ou pour toute autre raison, des procédures conventionnelles doivent être utilisées. Toutefois, pour les réfrigérants inflammables, il est important de suivre les meilleures pratiques, car l'inflammabilité est un facteur à prendre en considération. La procédure suivante doit être respectée:
  - éliminer le réfrigérant en toute sécurité conformément aux réglementations locales et nationales
  - purger le circuit avec du gaz inerte
  - évacuer (en option pour A2L)
  - purger avec du gaz inerte (en option pour A2L)
  - ouvrir le circuit par coupure
- S'assurer qu'aucun composant ou câblage électrique sous tension n'est exposé lors de la charge, de la récupération ou de la purge du système.
- Un détecteur de fuites de gaz combustible doit se trouver à tout moment dans la zone de travail immédiate.
- Assurez-vous que la zone est exempte de vapeur de réfrigérant avant de procéder au brasage.
- La charge de réfrigérant doit être récupérée dans les bouteilles de récupération appropriées si la ventilation n'est pas autorisée par les normes locales et nationales. Pour les appareils contenant des réfrigérants inflammables, le système doit être purgé avec de l'azote sec sans oxygène afin de rendre l'appareil inoffensif pour les réfrigérants inflammables. Cette procédure peut être répétée plusieurs fois. L'air comprimé ou l'oxygène ne doivent pas être utilisés pour la purge des systèmes de réfrigération.

## **WARNING**

- Wear appropriate personal protective equipment (PPE) when servicing the appliance.
- Notify all persons in the immediate area that you are working with a flammable refrigerant.
- Do not use silver alloy or copper alloy containing arsenic.

### a) Refrigerant Recovery

- 1) Move the power switch to the "OFF" position, then unplug the appliance from the electrical outlet. Maintain good ventilation in the area at all times and eliminate all ignition sources in the area. A combustible gas leak detector and fire extinguisher must be present in the working area at all times.
- 2) Using proper refrigerant practices, place clamp-type piercing access valves toward the ends (crimped area) of the high and low-side process tubes, then recover the refrigerant into an approved container or device.

### b) Refrigerant Component Disassembly from Refrigeration Circuit

- 3) After proper refrigeration recovery procedures, purge the refrigeration circuit with oxygen-free dry nitrogen gas flowing at a pressure of 3 to 5 PSIG (21 to 34 kPaG) for 2 min. **⚠ DANGER! For appliances containing flammable refrigerants, the system shall be purged with oxygen-free dry 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.**
- 4) After purging the refrigeration circuit with oxygen-free dry nitrogen gas, turn the nitrogen gas off and disconnect the refrigerant hoses from the clamp-type piercing access valves to open the refrigeration circuit to the atmosphere.
- 5) Remove the component or pipe from the refrigeration circuit.

### c) Refrigerant Component Assembly to Refrigeration Circuit Brazing

- 6) Using proper refrigeration practices, place the component in its correct position in the refrigeration circuit.
- 7) After component placement and prior to brazing, purge the refrigeration circuit with oxygen-free dry nitrogen gas flowing at a pressure of 3 to 5 PSIG (21 to 34 kPaG) for 2 min. **⚠ DANGER! For appliances containing flammable refrigerants, the system shall be purged with oxygen-free dry 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.**

- 8) Braze/repair/replace damaged component or fittings while purging the refrigeration circuit with oxygen-free dry nitrogen flowing at a pressure of 3 to 5 PSIG (21 to 34 kPaG).

**NOTICE**

- Do not leave the system open for longer than 15 min. when replacing or servicing parts. The Polyol Ester (POE) oils used in R-290 applications can absorb moisture quickly. Therefore it is important to prevent moisture from entering the system when replacing or servicing parts.
- Always install a new drier every time the sealed refrigeration system is opened. Do not replace the drier until after all other repair or replacement has been made. Install the new drier with the arrow on the drier in the direction of the refrigerant flow.
- When brazing, protect the drier by using a wet cloth to prevent the drier from overheating. Do not allow the drier to exceed 250°F (121°C).

- 9) Use a combustible gas leak detector or soap bubbles to check for leaks. Raise the pressure using oxygen-free dry nitrogen gas (190 PSIG (1310 kPaG)). Do not use any refrigerant as a mixture with pressurized air for leak testing.
- 10) Once leak checking is complete, release the nitrogen gas from the system.

**d) Evacuation**

- 11) Attach a vacuum pump to the system. Be sure the high-side charging hose is connected to the field-installed high-side clamp-type piercing access valve.

**IMPORTANT**

The vacuum level and vacuum pump may be the same as those for current refrigerants. However, the rubber hose and gauge manifold to be used for evacuation and refrigerant charge should be exclusively for POE oils.

- 12) Turn on the vacuum pump, then open the high-side valve on the gauge manifold. Never allow the oil in the vacuum pump to flow backwards.
- 13) Allow the vacuum pump to pull down to a 29.9" Hg (500 micron) vacuum. Evacuating period depends on pump capacity.
- 14) Close the high-side valve on the gauge manifold.
- 15) Disconnect the gauge manifold hose from the vacuum pump and attach it to a refrigerant service cylinder. Remember to loosen the connection and purge the air from the hose. See the nameplate for the required refrigerant charge. Hoshizaki recommends only virgin refrigerant or reclaimed refrigerant which meets the requirements of AHRI Standard 700 (latest edition) be used.

## e) Recharge

### DANGER

- In addition to conventional charging procedures, the following requirements shall be followed:
  - Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
  - Cylinders shall be kept in an appropriate position according to the instructions.
  - Ensure that the refrigerating system is earthed (grounded) prior to charging the system with refrigerant.
  - Label the system when charging is complete (if not already).
  - Extreme care shall be taken not to overfill the refrigerating system.
- 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.

- En plus des procédures de charge conventionnelles, les exigences suivantes doivent être respectées :
  - S'assurer qu'aucune contamination de différents réfrigérants ne se produit lors de l'utilisation de l'équipement de charge. Les tuyaux ou conduites doivent être aussi courts que possible afin de minimiser la quantité de réfrigérant qu'ils contiennent.
  - Les bouteilles doivent être maintenues dans une position appropriée conformément aux instructions.
  - S'assurer que le système de réfrigération soit mis à la terre avant de charger le système avec du réfrigérant.
  - Étiqueter le système lorsque la charge est terminée (si cela n'a pas déjà été fait).
  - Il faut veiller à ne pas trop remplir le système de réfrigération.
- Avant de recharger le système, celui-ci doit être testé sous pression avec le gaz de purge approprié. Le système doit être soumis à un essai de fuite à la fin de la charge, mais avant la mise en service. Un test de contrôle de fuite doit être effectué avant de quitter le site.

- 16) R-290 can be charged in either the liquid or vapor state. Liquid charge is preferred. If refrigerant charging is done in the liquid state, place the service cylinder on the scales; **if the service cylinder is not equipped with a dip tube, invert the service cylinder, then place it on the scales.** Open the high-side valve on the gauge manifold.
- 17) Allow the system to charge with liquid until the proper charge weight is met.
- 18) Close the high-side valve on the gauge manifold. If charging is complete, skip to step 20.

- 19) If necessary, add any remaining charge to the system through the low-side.  
**NOTICE! To prevent compressor damage, use a throttling valve or liquid dispensing device to add the remaining liquid charge through the low-side refrigerant clamp-type piercing access valve with the compressor running.**  
Close the refrigerant cylinder valve and let the low-side refrigerant equalize to the system, then close the low-side manifold gauge.
- 20) Pinch off (crimp down) the process tubes just below the clamp-type piercing access valves.
- 21) Remove the clamp-type piercing access valves. Cut the process tubes to remove the clamp-type piercing access valve holes.
- 22) Use a combustible gas leak detector or soap bubbles to confirm there are no leaks from the pinched off process tubes, then braze the process tubes closed.  
**⚠ DANGER! Be sure there is no refrigerant leak before brazing.**
- 23) Use a combustible gas leak detector or soap bubbles to check for leaks again.
- 24) Place red sleeves over the process tubes.
- 25) Plug the appliance back into the electrical outlet.

## B. Component Service Information



### R-290 Class A3 Flammable Refrigerant Used

#### **⚠ DANGER**

##### **Risk of Fire or Explosion. Flammable Refrigerant Used.**

- Be sure to follow all Important Safety Information located at the beginning of this manual and in section "III.A. Safety Precautions When Servicing."
- Component parts shall be replaced with like components. So as to minimize the risk of possible ignition due to incorrect parts.
- This appliance should be diagnosed and repaired only by qualified service personnel to reduce the risk of death, electric shock, serious injury, or fire.
- 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.
- Confirm that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking.
- Confirm that no live electrical components and wiring are exposed while charging, recovering, or purging the system.
- Confirm that there is continuity of earth bonding (grounding).

## **⚠ DANGER Continué**

### **Risque D'Incendie ou D'Explosion. Fluide Frigorigène Inflammable Utilisé.**

- Assurez-vous de suivre toutes les informations importantes de sécurité qui se trouvent au début du présent manuel et en section «III.A. Précautions de sécurité lors de l'entretien.»
- Les pièces doivent être remplacées par des pièces similaires, de manière à réduire au minimum le risque d'inflammation dû à des pièces incorrectes.
- Cet appareil ne doit être diagnostiqué et réparé que par un personnel qualifié afin de réduire les risques de mort, d'électrocution, de blessures graves ou d'incendie.
- La réparation et l'entretien des composants électriques incluent les contrôles de sécurité initiaux et les procédures d'inspection des composants. En cas de défaut susceptible de compromettre la sécurité, aucune alimentation électrique ne doit être connectée au circuit tant que le problème n'a pas été résolu de manière satisfaisante. Si le défaut ne peut être corrigé immédiatement mais qu'il est nécessaire de poursuivre l'exploitation, une solution temporaire adéquate doit être utilisée. Cela doit être signalé au propriétaire de l'équipement, afin que toutes les parties soient informées.
- S'assurer que les condensateurs sont déchargés : cette opération doit être effectuée en toute sécurité afin d'éviter tout risque d'étincelle.
- S'assurer qu'aucun composant ou câblage électrique sous tension n'est exposé lors de la charge, de la récupération ou de la purge du système.
- S'assurer de la continuité de la mise à la terre.

### ***NOTICE***

When replacing a component listed below, see the notes to help ensure proper operation.

<b>Component</b>	<b>Notes</b>
Compressor	Install a new start relay and compressor external protector. <b>WARNING! To reduce the risk of electric shock, be sure to reconnect the compressor's ground wire.</b>

## V. Maintenance

This appliance must be maintained in accordance with the instruction manual and labels provided with the appliance. Consult with your local Hoshizaki Certified Service Representative about maintenance service.

### WARNING

- Only qualified service technicians should service this appliance.
- Failure to install, operate, and maintain the appliance in accordance with this manual will adversely affect safety, performance, component life, and warranty coverage.
- Turn the power switch off to turn the appliance off, then unplug the appliance from the electrical outlet before servicing.
- Risk of electric shock. Power switch in "OFF" position does not de-energize 115VAC circuit.
- After service, make sure that there are no wires pinched between the panels and appliance. Make sure you do not damage the power cord

## A. Maintenance Schedule

The maintenance schedule below is a guideline. More frequent maintenance may be required depending on water quality, the appliance's environment, and local sanitation regulations.

Maintenance Schedule		
Frequency	Area	Task
Bi-Weekly	Air Filters	Inspect. Wash with warm water and neutral cleaner if dirty.
Bi-Yearly	Condenser	Inspect. Clean if necessary by using a brush or vacuum cleaner. More frequent cleaning may be required depending on location.

## VI. Preparing the Appliance for Periods of Non-Use

### **DANGER**

#### **Risk of Fire or Explosion. Flammable Refrigerant Used.**

- Be sure to follow all Important Safety Information located at the beginning of this manual and in section "III.A. Safety Precautions When Servicing."
- Only qualified service technicians should service this appliance.
- The appliance shall be stored in an area where the room size corresponds to the room area as specified for operation. See the nameplate or instruction manual for Minimum Room Floor Area.
- The appliance shall be stored in a room without continuously operating open flames (for example an operating gas appliance) or other potential ignition sources (for example an operating electric heater, hot surfaces).

#### **Risque D'Incendie ou D'Explosion. Fluide Frigorigène Inflammable Utilisé.**

- Assurez-vous de suivre toutes les informations importantes de sécurité qui se trouvent au début du présent manuel et en section «III.A. Précautions de sécurité lors de l'entretien.»
- Seuls des techniciens de service qualifiés doivent installer et entretenir l'appareil.
- L'appareil doit être conservé dans une zone où la taille de la pièce correspond à la surface de la pièce spécifiée pour le fonctionnement.
- 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).

### **WARNING**

When preparing the appliance for long storage, prevent the drawers from closing to reduce the risk of children getting trapped.

### **NOTICE**

When preparing the appliance for long storage, clean the appliance. See the instruction manual for cleaning details.

- 1) Before shutting down the appliance, move all foods into another clean refrigerator or freezer.
- 2) Unplug the appliance. **WARNING! To reduce the risk of electric shock, do not touch the plug with damp hands.**

## VII. Disposal and Decommissioning



### R-290 Class A3 Flammable Refrigerant Used

#### **⚠ DANGER**

##### **Risk of Fire or Explosion. Flammable Refrigerant Used.**

- Be sure to follow all Important Safety Information located at the beginning of this manual and in section "III.A. Safety Precautions When Servicing."
- Servicing shall be done by trained service personnel with certified competence in handling flammable refrigerants to minimize the risk of possible ignition due to improper service.
- Follow handling instructions carefully in compliance with national regulations.
- Dispose of properly in accordance with federal or local regulations.
- Do not puncture refrigerant tubing. Risk of fire or explosion due to puncture of refrigerant tubing; follow handling instructions carefully.
- 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 labeled 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 manufacturer 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.
- 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.

## **⚠ DANGER Continué**

### **Risque D'Incendie ou D'Explosion. Fluide Frigorigène Inflammable Utilisé.**

- Assurez-vous de suivre toutes les informations importantes de sécurité qui se trouvent au début du présent manuel et en section «III.A. Précautions de sécurité lors de l'entretien.»
- L'entretien doit être effectué par du personnel formé et certifié pour la manipulation de réfrigérants inflammables afin de réduire au minimum le risque d'inflammation dû à un entretien inadéquat.
- Suivre attentivement les instructions de manutention conformément aux règlements nationaux.
- Mettre au rebut conformément aux conformément aux règlements fédéraux ou locaux.
- Ne pas perforer la conduite de fluide frigorigène. Risque d'incendie ou d'explosion en cas de perforation d'une canalisation de fluide frigorigène; suivez attentivement les instructions de manutention.
- Lors de l'élimination du réfrigérant d'un système, que ce soit pour l'entretien ou la mise hors service, il est recommandé de veiller à ce que tous les réfrigérants soient éliminés en toute sécurité.
- Lors du transfert de réfrigérant dans des bouteilles, veillez à ce que seules des bouteilles de récupération de réfrigérant appropriées soient utilisées. Assurez-vous que le nombre de bouteilles nécessaires pour contenir la charge totale du système est disponible. Toutes les bouteilles à utiliser sont désignées pour le réfrigérant récupéré et étiquetées pour ce réfrigérant (c'est-à-dire des bouteilles spéciales pour la récupération du réfrigérant). Les bouteilles doivent être équipées d'une soupape de surpression et de soupapes d'arrêt associées en bon état de fonctionnement. Les bouteilles de récupération vides sont évacuées et, si possible, refroidies avant la récupération.
- L'équipement de récupération doit être en bon état de fonctionnement, accompagné d'un ensemble d'instructions concernant l'équipement disponible et doit être adapté à la récupération de tous les réfrigérants appropriés, y compris, le cas échéant, les réfrigérants inflammables. En outre, un ensemble de balances étalonnées doit être disponible et en bon état de fonctionnement. Les tuyaux doivent être complets, équipés de raccords de déconnexion sans fuite et en bon état. Avant d'utiliser la machine de récupération, vérifiez qu'elle est en bon état de fonctionnement, qu'elle a été correctement entretenue et que tous les composants électriques associés sont scellés pour éviter toute inflammation en cas de fuite de réfrigérant. Consulter le fabricant en cas de doute.
- Le réfrigérant récupéré doit être renvoyé au fournisseur de réfrigérant dans la bouteille de récupération appropriée et le bon de transfert de déchets correspondant doit être établi. Ne mélangez pas les réfrigérants dans les unités de récupération et surtout pas dans les bouteilles.
- Si les compresseurs ou les huiles de compresseur doivent être retirés, assurez-vous qu'ils ont été évacués à un niveau acceptable afin de s'assurer qu'il ne reste pas de réfrigérant inflammable dans le lubrifiant. Le processus d'évacuation doit être effectué avant que le compresseur ne soit renvoyé aux fournisseurs. Seul le chauffage électrique du boîtier du compresseur doit être utilisé pour accélérer ce processus. Lorsque l'huile est vidangée d'un système, cette opération doit être effectuée en toute sécurité.

The appliance contains refrigerant and must be disposed of in accordance with applicable national, state, and local codes and regulations. Refrigerant must be recovered and safely disposed of by properly trained service personnel.

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.

- Become familiar with the equipment and its operation.
- Isolate the system electrically.
- **Before attempting the procedure, ensure that:**
  - mechanical handling equipment is available, if required, for handling refrigerant cylinders.
  - all personal protective equipment is available and being used correctly.
  - the recovery process is supervised at all times by a competent person.
  - recovery equipment and cylinders conform to the appropriate standards.
- Pump down refrigerant system, if possible.
- If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
- Make sure that cylinder is situated on the scales before recovery takes place.
- Start the recovery machine and operate in accordance with instructions.
- Do not overfill cylinders (no more than 80% volume liquid charge).
- Do not exceed the maximum working pressure of the cylinder, even temporarily.
- 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.
- Recovered refrigerant shall not be charged into another refrigerating system unless it has been cleaned and checked.

**Follow the steps below for decommissioning and disposal:**

**1. Recovery**

- 1) Recover the refrigerant, and safely dispose of the refrigerant.
- 2) Evacuate the appliance.
- 3) Purge the refrigeration system with oxygen-free dry nitrogen gas.
- 4) Cut out the compressor and drain and dispose of the compressor oil. 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. Dispose of compressor and compressor oil in compliance with national, state, and local codes and regulations.
- 5) Purge the refrigeration system with oxygen-free dry nitrogen gas.

**2. Labeling**

Equipment shall be labeled stating that it has been decommissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing flammable refrigerant, ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

## VIII. Technical Information

### A. Electrical and Refrigerant Data

See the nameplate for electrical and refrigerant data. The nameplate is located inside the cabinet.

We reserve the right to make changes in specifications and design without prior notice.

Model Number	HXR1A-FS/FG/FGE	HXR2A-FS/FG/FGE
AC SUPPLY VOLTAGE	~115/60/1	~115/60/1
AMPERES	5	8
DESIGN PRESSURE kPa (PSI)	HI-2482 (360) LO-1310 (190)	HI-2482 (360) LO-1310 (190)
REFRIGERANT g (oz.)	R-290 130 (4.6)	R-290 140 (4.9)
INSULATION BLOWING GAS	HFO 1233zd(E)	HFO 1233zd(E)
MINIMUM ROOM FLOOR AREA m <sup>2</sup> (ft <sup>2</sup> )	6.2 (67)	6.7 (72.1)
VOLUME (AHAM) m <sup>3</sup> (ft <sup>3</sup> )	0.65 (23.1)	1.43 (50.4)
USABLE VOLUME (AHAM) m <sup>3</sup> (ft <sup>3</sup> )	0.36 (12.7)	0.72 (25.4)

Model Number	HXF1A-FS/FG/FGE	HXF2A-FS/FG/FGE
AC SUPPLY VOLTAGE	~115/60/1	~115/60/1
AMPERES	9	9.5
DESIGN PRESSURE kPa (PSI)	HI-2482 (360) LO-1310 (190)	HI-2482 (360) LO-1310 (190)
REFRIGERANT g (oz.)	R-290 115 (4.1)	R-290 120 (4.2)
INSULATION BLOWING GAS	HFO 1233zd(E)	HFO 1233zd(E)
MINIMUM ROOM FLOOR AREA m <sup>2</sup> (ft <sup>2</sup> )	5.5 (59.2)	5.7 (61.8)
VOLUME (AHAM) m <sup>3</sup> (ft <sup>3</sup> )	0.65 (23.1)	1.43 (50.4)
USABLE VOLUME (AHAM) m <sup>3</sup> (ft <sup>3</sup> )	0.36 (12.7)	0.72 (25.4)

Note: Normal operating ambient temperature for refrigerated medical equipment refrigerators and freezers must be within 45°F to 80°F (7°C to 27°C).

Operation of the appliance, for extended periods, outside of these normal temperature ranges may affect appliance performance.

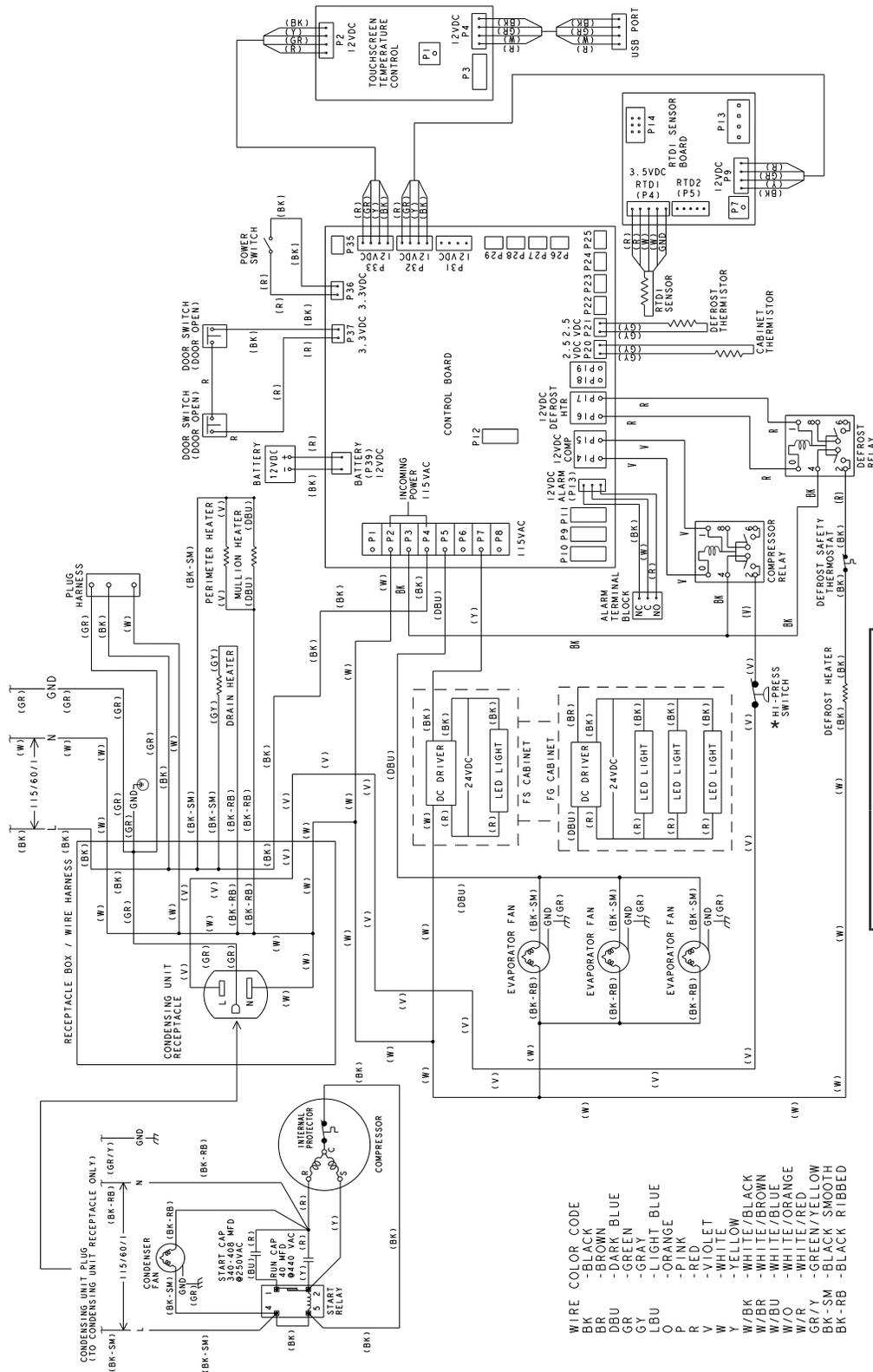
Additional Data Items:

Overvoltage Category	Category II
Pollution Degree	2
RF Emissions	Group 1 - Class A
EMC Environment	Basic



## 2. HXF2A-FS(-FG)

# HXF2A-FS(-FG)(-FGE)



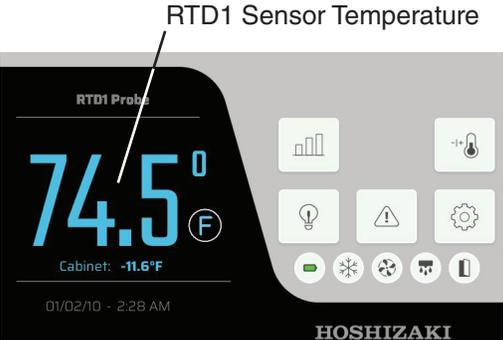
### **C. RTD1 Sensor Temperature Calibration and Certification Sheet**

For this appliance to conform with the NSF-456 vaccine storage standard, the RTD1 sensor must be calibrated from the factory at time of construction and re-calibrated based on the re-calibration due date. Hoshizaki America has calibrated and recorded the calibration data during manufacturing and the calibration certification is available in the accessory bag of this appliance. The factory calibration date is effective for 2 years from time of manufacturing date. Re-calibration is required at the end of the 2 years from the manufacturing date, then every year thereafter to conform with the NSF-456 certification. The end user is responsible for all re-calibration updates. Upon the required calibration due date, follow the calibration instructions below. After re-calibrating, update and record the data on the RTD1 sensor certification sheet provided in this manual. Make copies of the certification sheet for future re-calibration updates. If assistance is needed during re-calibration, contact Hoshizaki America Technical Support.

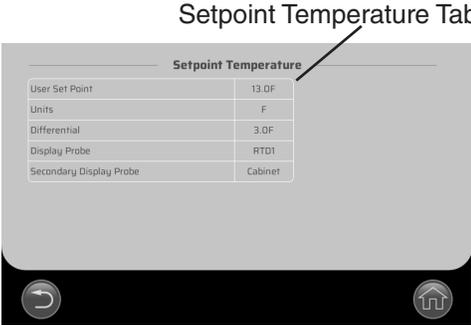
**1. Cabinet Temperature Display Scale**

The default cabinet temperature display scale is Fahrenheit °F, but must be changed to Celsius °C for RTD1 sensor calibration. Follow the steps below to change from Fahrenheit °F to Celsius °C.

- a) Press and release the center of the RTD1 probe temperature display. The touchscreen setup view is shown. See Fig. 22.
- b) Press and release the center of the RTD1 probe temperature display again. The Setpoint Temperature table is shown. See Fig. 23.

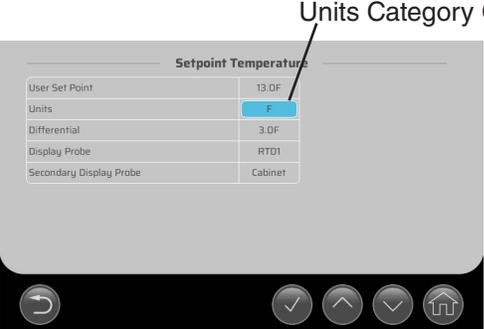


**Fig. 22**



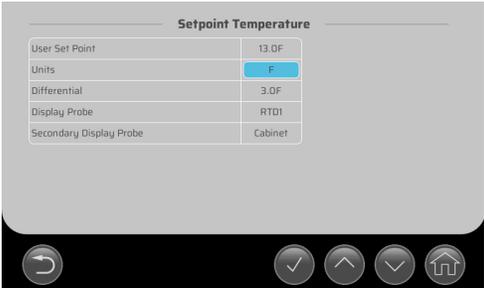
**Fig. 23**

- c) Press the Units category cell for F or C. See Fig. 24.
- d) Press the up arrow icon for Celsius C or Fahrenheit F.
- e) Press the check mark icon to save the new temperature unit.
- f) Press the home icon to return to the touchscreen setup view. See Fig. 25.



Check Mark Icon      Up and Down Arrows

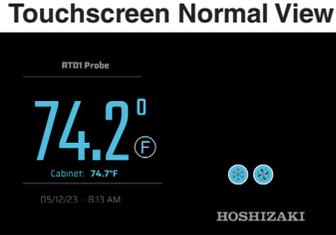
**Fig. 24**



Home Icon

**Fig. 25**

- g) The touchscreen setup view returns to touchscreen normal view after 1 min. See Fig. 26.



**Fig. 26**

- h) Continue to "2. RTD1 Sensor Calibration."

## 2. RTD1 Sensor Calibration

Certify the RTD1 Sensor for NIST.

The touchscreen display must be showing the cabinet temperature in the Celsius °C temperature scale during re-calibration procedures. See "VIII.C.1. Cabinet Temperature Display Scale" to adjust from the Fahrenheit scale °F to the Celsius °C scale. Once in the Celsius °C scale, follow the steps below.

- 1) Remove the RTD1 sensor tube.
- 2) If not already plugged into the electrical outlet, plug the appliance into the electrical outlet.
- 3) Move the power switch to the "ON" position.
- 4) Prepare an ice bath (ice melting point test). Select a container large enough to hold the RTD1 sensor tube, ice, and water. Fill the container with ice. Next, fill the container to an 80% level with distilled or deionized water.
- 5) Place and secure the RTD1 sensor tube into the center of the container. Be sure the RTD1 sensor tube cannot touch the sides.
- 6) Place a small final layer of ice over the RTD1 sensor tube and container of ice to create a thermal barrier.
- 7) Allow the display to come to equilibrium with a realization temperature of the ice melting point (0.0°C). If the display shows 0.0°C or a value within the  $\pm 0.5^\circ\text{C}$  tolerance level, proceed to step 8. Otherwise, follow the procedure below to calibrate the RTD1 sensor.
  - a) Press the touchscreen to view the setup menu.
  - b) Press the gear motor icon on the right side of the display.
  - c) Press the double gear icon in the lower right corner.
  - d) Enter the pass code 9999 then press the check mark icon.
  - e) Press the "Probe Calibration" icon.
  - f) Press the P4-RTD #1 "OFF SET" temperature cell (number).  
Number highlights in blue.
  - g) Press the up or down arrow to adjust to the correct offset needed to achieve 0.00°C
  - h) Press the check mark on the bottom row.
  - i) Press the Home icon in the lower right hand corner. Calibration is complete.
  - j) Continue to step 8.
- 8) Move the power switch to the "OFF" position.
- 9) Remove the RTD1 sensor from the ice bath. Wipe the RTD1 sensor off with a dry towel. Replace and secure the RTD1 sensor in its correct position.
- 10) Record the service company, date, time, and recorded value during calibration on the certification sheet provided with this appliance.
- 11) Move the power switch to the "ON" position.
- 12) See "VIII.C.1. Cabinet Temperature Display Scale" to adjust from the Celsius °C scale back to the Fahrenheit °F scale.

## 2. RTD1 Sensor Certification Sheet

### HOSHIZAKI AMERICA

#### NSF-456 Temperature Calibration Certification

Model Number: \_\_\_\_\_

Serial Number: \_\_\_\_\_

Factory Calibration Date: \_\_\_\_\_

Re-Calibration Due Date: \_\_\_\_\_

Please note that after the factory calibration is complete, the RTD1 sensor must be re-calibrated every year thereafter.  
 0°C reading required for re-calibration annual certification

			Calibration Reading (Touchscreen Display Reading)			Tolerance (±0.5°C)
Sensor	Cal .Date	Next Cal.	Actual (°C)	Offset (°C)	Adjusted (°C)	Adjusted Value °C In Tolerance (Y/N)
RTD1 Sensor						

Calibrated by: \_\_\_\_\_

Method: Ice Bath - See Instruction Manual for Details

Calibration of the RTD1 sensor is traceable to NIST (National Institute of Standards and Technology).