# 30 Cu Ft HAZARDOUS LOCATION REFRIGERATOR


# OWNERS' MANUAL

## Disclaimer

This manual is intended as a resource to provide the operator with instructions on the proper use and maintenance of particular Horizon Scientific, Inc. products.

Failure to adhere to the instructions as herein could result in improper product operation, injury, and potentially void product warranties Horizon Scientific, Inc. accepts no liability or responsibility for results stemming from improper use or maintenance of its products.

The content within this guide is provided for illustrative purposes only and may vary from the actual hardware or software photos, screen shots or illustrations.

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# 1. GENERAL

## 1.1 INTENDED AUDIENCE

This manual is intended for authorized service technicians and end users. The information herein pertains only to the specifically indicated products.

## 1.2 APPLICATION

This manual applies to 30 Cu Ft Hazardous Location refrigerators

This manual does NOT apply to the following:

- Flammable Storage refrigerators
- Laboratory refrigerators
- Any dual temperature (refrigerator and freezer) models

## 1.3 SAFETY AND NOTICES

### Symbols found in this manual

 This is a general warning, caution, hazard, or important consideration symbol.

 This is an electrical hazard caution / warning symbol.

 This is a hot surface hazard caution / warning symbol.

 This is a flammable hazard caution / warning symbol.

 This is a pinch or potential injury hazard caution / warning symbol.

## Warnings, cautions, and important considerations

 **WARNING:** This product can expose you to chemicals including chromium which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov

 **WARNING:** Electric Shock Hazard. Do Not Remove top electrical cover. Contact a qualified service representative.

 **WARNING:** Do not remove electrical system components access unless instructed to do so.

 **WARNING:** Do not modify the refrigeration circuit, electrical wiring or components, unless work is performed by a certified technician.

 **WARNING:** Do not damage the refrigeration circuit. Flammable refrigerants used in this equipment may not contain an odor. Do not pierce or burn.

 **WARNING:** Supply circuit must comply with National Electric Code (NEC) and any state and local codes applicable to commercial and industrial equipment in hazardous locations

 **WARNING:** The controller automatically switches power to components. Always disconnect power supply before making repairs.

 **WARNING:** Do not use electrical appliances inside the storage compartments of this appliance, unless they are of the type recommended by the manufacturer.

 **WARNING:** Do not overload shelves with heavy products or concentrated loads, this increases the likelihood of items falling and causing injury.

 **WARNING:** Do not store any unsealed chemical material in this cabinet. Corrosive fumes from chemical material can linger inside of the chamber and cause serious damage to the refrigeration coils. Storing unsealed chemical material in this equipment will void the factory product warranty.

 **WARNING:** Do not store explosive substances such as aerosol cans with flammable propellant in this cabinet. Do not store flammable substances such as gasoline in this cabinet. This equipment is not rated for flammable material storage.

 **WARNING:** Do not operate this equipment in the presence of explosive fumes. This equipment is not

rated as a hazardous locations storage cabinet.

 **WARNING:** Keep ventilation openings clear of obstruction. This includes ventilation inside the appliance enclosure or in the built-in structure.

 **CAUTION:** Exterior walls of the equipment may be hot. Provide adequate clearance for heat dissipation.

 **CAUTION:** Do not use mechanical devices or other means to accelerate the defrosting process, other than those recommended by the manufacturer.

 **CAUTION:** Avoid any sharp edges or points when working on or in the unit.

 **CAUTION:** Keep fingers out of pinch point areas; clearances between the doors and between the doors and cabinet are necessarily small; be careful closing doors.

 **IMPORTANT:** Only use manufacturer supplied or approved components and authorized personnel, when servicing the unit.

 **IMPORTANT:** This unit must be properly installed and located in accordance with the Safety Standard for Refrigeration Systems, ANSI/ASHRAE 15, and with these installation instructions before use.

 **IMPORTANT:** This unit must be decontaminated prior to sending for repair or service. Contact Horizon Scientific or your distributor for decontamination instructions.

## Specific to hydrocarbon refrigerants:

Refrigerant class per ANSI/ASHRAE 34

- **DANGER:** Risk of fire or explosion, flammable refrigerant used. Do not use mechanical devices to defrost the unit. Do not puncture refrigerant tubing.
- **DANGER**: Risk of fire or explosion, flammable refrigerant used. To be repaired only by trained service personnel. Do not puncture refrigerant tubing.
- **CAUTION:** Risk of fire or explosion, flammable refrigerant used. Consult instruction manual/ repair manual/ owner's guide before attempting to service this product. All safety precautions must be followed.
- **CAUTION:** Risk of fire or explosion, flammable refrigerant used. Dispose of properly in accordance with federal or local regulations.
- **CAUTION:** Risk of fire or explosion, flammable refrigerant used. Do not puncture refrigerant tubing; follow handling instructions carefully.

## 1.4 RECEIVING AND SHIPPING DAMAGE HANDLING

Each unit is carefully inspected to meet our high quality standards before it ships to you. Unfortunately, shipping damage can happen during transportation to you. There are two general types of shipping damage. The first is visible damage. This type of damage includes visible loss, damage, shortage or any external evidence of loss or damage that is visible at the time of delivery. This type of damage must be noted in detail on your delivery receipt. Make sure the driver signs and dates the delivery receipt, acknowledging the damages. We also recommend taking many pictures to demonstrate and document the damaged area(s). This must happen at the time of delivery. Keep a copy for your records and send another to the carrier's damage claims department along with a formal request for an inspection report. Follow up with a phone call. Their contact information can be found on the carrier's web site.

The second type of shipping damage is concealed damage. This type of damage will probably not be apparent at time of delivery and may not be discovered until unpacking and inspecting the unit. Remember, time is of the essence. You should unpack and inspect the unit as soon as possible. Each day that passes reduces the likelihood that the carrier will pay the claim. As soon as the concealed damage is discovered, stop unpacking and retain all packing materials. Take many pictures to demonstrate and document the concealed damage area(s). Contact the carrier by phone to report the claim. Note the date and time and person you spoke with. Get a claim number. Follow up with a written letter referencing the claim number and including a formal request for an inspection. Again, consult the carrier's website for specific claim instructions and follow them precisely.

 **AS STATED ABOVE, THE CARRIER IS YOUR SOLE SOURCE FOR SATISFACTION OF A DAMAGE CLAIM. UNDER NO CIRCUMSTANCES SHOULD THE MERCHANDISE BE RETURNED TO THE MANUFACTURER. NO RETURNS WILL BE ACCEPTED WITHOUT PRIOR AUTHORIZATION.**

# 2. INSTALLATION

## 2.1 UNPACKING

- Remove outer stretch wrap and cardboard packaging for unobstructed access under the unit.
- Unbolt the cabinet from the pallet using a 14mm (9/16”) wrench or socket to remove the 4 bolts in opposite corners of the unit.
- A fork truck or pallet jack is *recommended* to remove the unit from the pallet.
    - When using a fork truck, place forks under the unit from the front or rear of the unit. Forks should be set as wide as possible for stability. DO NOT place forks in the center of the unit to avoid tip over.
    - When using a pallet jack, center the forks directly in front or back of the unit. Lift forks to the same height as the top runners supporting the unit.
    - Slide unit straight forward or backward until it is completely supported by the pallet jack.
    - Install the leveling feet
    - With the unit supported by a fork truck or pallet jack, lift unit slightly to provide easy access to the 4 mounting locations on the bottom of the unit near the outside corners.
    - For leveling feet, locate the (4) ½” threaded inserts and thread each foot completely into place until it stops.
- Alternately, if fork truck or pallet jack is unavailable, carefully rotate the unit so it is 45° to the pallet, with a corner of the pallet centered at the front of the unit. Pull the unit forward to expose the front leveling leg or caster mounting locations. Install the front legs or casters, then pull unit forward keeping the rear of the unit supported by the pallet, until the rear legs. Then carefully remove the unit from the pallet.
- Remove foam/cardboard shipping supports from the inside of the chamber prior to powering on unit. Make sure to do this after the unit is set in place to prevent damage.

## 2.2 GENERAL RECOMMENDATIONS

- After unpackaging, allow the unit to come to room temperature before starting.
- On startup, the high temperature alarm may sound until the unit is able to cool the interior to operating range.
- Allow for the set point to be reached and for the unit to stabilize before storing products.
- Do not overload the unit.
- Only store items on the shelves. Products on the floor, against walls, or against the door(s) may obstruct air flow and impair the performance of the unit.

## 2.3 LOCATION AND FUNCTIONAL INSPECTION

Ambient conditions:
The refrigerator is meant to be installed indoors, and operates best in climate-controlled, +18°C to +26°C (+65°F to +78°F), <70% RH, to ensure efficiency and strong thermal performance. Some ambient state excursions are acceptable, but performance may be impacted if used in other environmental conditions. Please refer to the Product Specifications section of this manual for guidance.

While the refrigerator will operate in a wide range of conditions, the following considerations may help to reduce the chance of an undesirable condition. Units placed near room doors, HVAC registers, or widows will be subject to more ambient temperature variation. Direct sunlight or other powered equipment in the room will raise localized temperatures differently than what is registered by an HVAC thermostat. Air currents in a room from building ventilation, windows, or doorways will impact the quality and amount of air exchange between the refrigerated chamber and the ambient during door openings.

Clearance Space:
This model requires a minimum of four (4) inches of clearance space above, behind, and on both sides of the unit. This will allow good airflow and access to the unit for periodic maintenance, or service. Ensure that there is enough clearance to allow the door to open more than 90 degrees without obstruction.

The cabinet must be located within reach of an outlet that has an appropriate power supply as listed above with a protective earth ground. The outlet should be easily accessible when installation is complete as this is the only method for powering off the equipment.

## 2.4 LEVELING

### Leveling

Ensure that the placement chosen for installation has a level floor. The unit must be level side to side and front to back. If the unit is not level, leveling legs can be adjusted by spinning each leg to extend or retract to the correct length.

 **IMPORTANT:** If the unit is not level, door closure may be negatively impacted.

## 2.5 DOOR ALIGNMENT

Verify that the door is level and opens and closes easily. Verify that the door gasket seals along all surfaces of the cabinet. Improper sealing will affect the ability to maintain temperature over time and may lead to excessive condensation in refrigerator units. If adjustment is needed, contact technical service.

## 2.6 SHELVES

The refrigerator chamber comes equipped with adjustable wire shelves. Pilasters are factory installed and allow user to select spacing between each shelf. Shelf loading should not exceed 50 lbs per shelf evenly distributed.

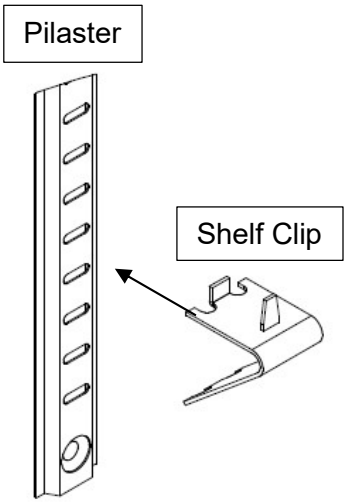
**IMPORTANT:** For shelves to remain level and strong; it is critical that the shelf clips are properly installed and locked securely into position.

**CAUTION:** The shelf clip(s) present pinch points when assembling and disassembling.

**WARNING:** Do not use pliers or any crimping tools when installing shelf clips. Altering shelf clips in any way can lead to shelving instability.

Shelf Installation and Repositioning

1. Locate shelf clips delivered in a plastic bag with the unit.
2. Start at the bottom in terms of shelf installation and work your way up.
3. Properly insert the shelf clips in the desired height (Remember all shelf clips will need to be installed at the same height to keep the shelf level.)
4. Always lay the back of each shelf down on the rear clips before the front.
5. The Bottom tab of the shelf clip will fit tightly. You may need to squeeze or twist the bottom of the shelf clip to install.
6. After installation, the shelf clip will fit snug into the shelf standard. The shelf clip should not be loose or able to wiggle out of the shelf standard.
7. When placing the shelves on the shelf clips ensure the shelf is pushed back as far as it can go to ensure proper temperatures across the entire shelf.



## 2.7 ELECTRICAL COMPONENTS

**Remote Alarms Contact Terminal Block**

A remote alarm contact terminal block is provided to allow for connection to a building monitoring system. The terminal block is located at the back of the cabinet near the bottom of the unit.

For units with a temperature controller only (no optional display), there will be 3 wires: Normally Open (NO), Common (C), and Normally Closed (NC). Connecting to NC and C will provide a signal to the monitor during normal operation, then interrupt when an alarm condition exists (including when power is lost). Connecting to NO and C will have no signal to the monitor during normal operation, then provide signal when an alarm exists.

## 2.8 ELECTRICAL INSTALLATION

Check the proposed external power outlet/supply to be used to ensure that the voltage, phase, and current carrying capacity of the circuit from the electrical panel correspond to the requirements of the cabinet.

 The supply circuit to this cabinet must conform to NEC (National Electrical Code). Consult the cabinet Serial-Data plate for voltage, cycle, phase, and amperage requirements before making connection.

 Supply voltage should not vary more than 10% from the serial plate ratings.

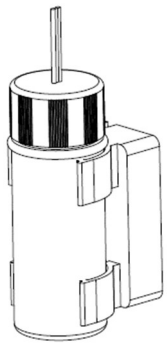
 DO NOT “hard-wire” into a Ground Fault Circuit Interrupter (GFCI) device..

 Per UL, NFPA, and OSHA guidelines, this refrigerator or freezer can only be powered by “hard-wire” only. There is an included harness to connect to your power source. Consult with your electrician before installation.

## 2.9 TEMPERATURE PROBES

A primary temperature monitoring probe is imbedded in a bottle containing a glass bead thermal media. The thermal media is designed to simulate the temperature of stored product during normal operation. The bottle ships clipped to the side wall of the equipment. It is recommended to place this bottle in the center of the center shelf to more accurately represent temperatures where product is stored.

Verify that the metal temperature probe is fully inserted into the bottle and that the cap is completely closed to avoid spilling any thermal media. Failure to maintain a full probe bottle may cause the display to report temperatures that do not represent the stored product temperature accurately.



**Bottle Probe**

## 2.10 EXTERNAL PROBE ACCESS PORT

This unit is equipped with a ¾" (19 mm) port that can be used for external monitoring devices. This port is located on the back of the unit. Remove the external and internal plugs in the port for routing. Seal the probe port hole around wiring with duct seal or moldable putty to prevent air from getting into the chamber. Do not route wires through the door gasket, which compromises the integrity of the door seal.

## 2.11 EMERGENCY BACKUP PLAN

Before using this refrigerator, establish an emergency backup plan in case of power outage or other possible unseen issue:

- How will equipment be monitored?
    a. Onboard audible and visual alarms notify personnel in the vicinity. Alarm setpoints should be verified prior to storing products in the refrigerator.
    b. Alarm conditions may be monitored remotely by connecting the remote alarm contacts to a building monitor or remote dialer. Test at startup and at regular intervals to verify operation.
    c. Remote temperature monitoring is recommended. Touchscreen displays include a 4-20mA output that can be used for remote temperature monitoring. Otherwise, 3rd party temperature monitoring probes should be installed via the probe access port.
- What is the contingency to keep product cold?
    a. External power backups or power generators must be sized appropriately for refrigerator equipment. Compressor motors draw maximum power momentarily when the cooling cycle starts.
    b. Extra cold storage equipment or temporary storage method (i.e. coolers and ice packs) if the

refrigerator has unexpected issues.

IF YOU PLAN TO STORE IRREPLACEABLE AND/OR HIGH VALUE PRODUCTS IN THIS UNIT TAKE THE PROPER PRECAUTIONS NOW.

The manufacturer's sole obligation under this warranty is limited to either repair or replacement of parts, subject to the additional limitations below. This warranty neither assumes, nor authorizes any person to assume obligations other than those expressly covered by this warranty.

NO CONSEQUENTIAL DAMAGES. The manufacturer is not responsible for economic loss, profit loss, or special indirect or consequential damages, including without limitation, losses, or damages arising from contents spoilage claims whether or not on account of refrigeration or mechanical failure.

## 2.12 INITIAL POWER UP AND OPERATION

Once all elements of the installation and any on-site IQ (Installation Qualification) have been completed, your unit is ready for startup. Simply plug in the unit into a grounded outlet that meets the electrical requirements, and the unit will automatically start the cooling operation. The main controller, which is located below the door on the front of the unit, is factory set.

The controller may display a high temperature alarm while the equipment is cooling to the operational temperature range. Alarms will automatically clear once operating temperature is reached.

# 3. CONTROLLER / DISPLAY

## 3.1 OVERVIEW

This equipment comes equipped with a digital microprocessor temperature controller for managing the cooling functions. During normal operation, the compressor will turn on and off to maintain the cold temperature in the storage chamber. The temperature controller utilizes a dedicated NTC temperature probe that reacts quickly to changes in chamber temperature to manage cooling.

The system utilizes a bottle probe, described in section 2 of this manual, to simulate the actual temperature experienced by product. If an optional display is not installed, the LCD of the temperature controller reflects the temperature of this bottle probe. If an optional display is installed, the optional display will indicate the bottle probe temperature and the temperature controller will be hidden.

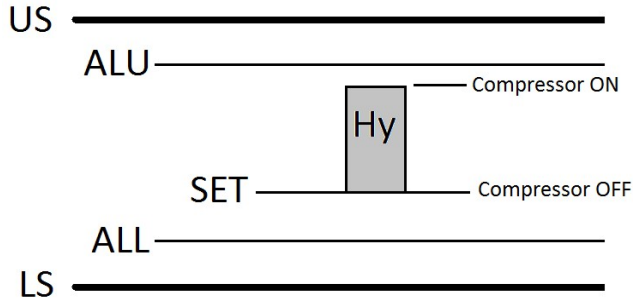
## 3.2 OPERATING THE CONTROLLER


**Please Note: The digital temperature controller has been factory set and tested to allow your unit to operate at its desired temperature cycle.**

**Adjusting the settings on the controller will alter factory settings. WE STRONGLY RECOMMEND YOU CONTACT THE MANUFACTURER'S TECHNICAL SUPPORT DEPARTMENT BEFORE MAKING ANY ADJUSTMENTS TO THIS CONTROLLER. TECH SUPPORT PHONE NUMBER IS (800) 648 4041, SELECT OPTION 5 FOR TECHNICAL SEVICE.**

For the temperature controller, the point where the compressor turns off is called "SET POINT". The point where the compressor turns on is calculated by adding the value of "SET POINT" and "Hy" (temp differential).

For example, if you wish to maintain the operation temperature between 4°C and 6°C, "SET" = 4°C, and "Hy" = 2°C.




**View the set point**
Press and release [SET] button. The display will show the current set point value.

**Change the set point** (compressor turn-off point)
Press and hold [SET] until °C or °F icon blinking. Press [UP] or [DOWN] to change the setting value. Then, press [SET] once to confirm the new setting.

**Other parameters available**

| CODE | DESCRIPTION | Application |
|---|---|---|
| **HY** | Temp differential between compressor start and off point | **All models** |
| **OT** | Air (control) probe calibration | **All models** |
| **ALU** | High temp alarm point | **No optional display installed** |
| **ALL** | Low temp alarm point | **No optional display installed** |
| **O3** | Bottle (display) probe calibration | **No optional display installed** |

**View or Change the other parameters**

Press and hold both [SET] and [DOWN] at the same time until "Hy" appears on the display.

Press [UP] or [DOWN] to scroll through parameters. Press [SET] to enter the current setting. Press [UP] or [DOWN] to change value. Press [SET] once to confirm the new setting. The display will show the next setting.

At any setting, press and hold both [SET] and [UP] to exit out the setting mode, or simply leave the display alone for 10 seconds.

**ALARMS**

For models without an optional display installed, the following alarms will be indicated by the controller during abnormal conditions. When an optional display is installed, that display will indicate alarms.

| CODE | MEANING | DESCRIPTION |
|---|---|---|
| **HA** | High Temperature alarm | Bottle probe temperature is above the ALU setting for alarm delay duration (default 0 minutes) |
| **LA** | Low Temperature alarm | Bottle probe temperature is below the ALL setting for alarm delay duration (default 0 minutes) |
| **P1 (P#)** | Probe Failure alarm | Probe is faulty or disconnected. Number corresponds to the affected probe. |
| **DA*** | Door Ajar alarm *(if equipped) | Door is open for the door alarm delay duration (default 60 seconds) |
| **CA*** | Power Loss alarm *(if equipped) | Loss of main power to the unit – cooling is disabled |

# 3.3 CALIBRATION, VERIFICATION, AND VALIDATION

The display temperatures should be verified on start-up and periodically thereafter to assure that the unit is performing to the requirements. Comparative measurements can be accomplished by utilizing a calibrated Temperature Monitoring Device.

Next place the calibrated Temperature Monitoring Device in a medium that simulates the product being stored (per site verification / validation standards) at the appropriate process temperatures. Allow the medium and thermometer temperature to equalize before comparing the displayed product temperatures and thermometer reading. The displayed Product Temperature should read within ±1°C of the calibrated device. If the displayed Product Temperature is out of range enter an offset in the Product Temperature Calibration screen.

## 3.4 ALARM FUNCTIONALITY

During normal operation, if an alarm occurs, a visual indicator on the display will show. Additionally, the remote alarm contact will change state.

For alarms that activate on the temperature controller, the visual indicator and remote alarm contact will remain active until the alarm condition is resolved.

# 4. PRODUCT SPECIFICATIONS

## 4.1 OPERATING STANDARDS

**These models are designed to operate under the following conditions:**

- Indoor use only
- Maximum altitude: 6562 ft. (2000 m)
- Optimal ambient conditions: 18°C to +26°C (+65°F to +78°F), <70% RH
- Short duration ambient conditions: 15°C to 32°C (59°F to 90°), <80% RH
- Safety tested to 43°C ambient, classified Climatic class 5 (40°C / 40% R.H.) or 7 (35°C / 75% R.H.)

### Electrical Specifications:

| Model | Input Voltage & Frequency | Voltage Tolerance | Rated Amperage | Power Source | Remote Alarm Maximum Capacity |
|---|---|---|---|---|---|
| Refrigerator | 115V 60 Hz | ± 10% | 3.1 | Hardwired, meeting national electric code (NEC) in the U.S. and all local electrical requirements | 230VAC @ 10A, 115VAC @ 10A and 30VDC @ 10A |

# 5. MAINTENANCE

**Observe all Warning Labels. Disconnect power to eliminate injury from electrical shock when servicing equipment or cleaning.**

Important: It is critical that cleaning recommendations are followed to ensure optimal performance and longevity of the unit.

## 5.1 INSPECTION AND SERVICING

**Periodic inspections** (Every 6 months or as required):

- Check the door gasket for proper seal
- Check that ventilation openings inside and outside are not blocked
- Check that proper ventilation is still maintained around the unit

**Cleaning**

- Never use abrasive cleaners or instruments (steel pads, wire brushes, etc.) on the equipment.
- Warm soapy water is best for cleaning
- If cleaning solution is required, rinse all surfaces the cleaning solution touches with clean water and dry thoroughly.
- Gaskets should be cleaned only with warm soapy water. Cleaning products could damage gaskets or cause them to embrittle over time. Never use tools which could cut or tear the gasket.
- All moving parts have been permanently lubricated and will generally require no maintenance.

**Work on systems containing FLAMMABLE REFRIGERANTS**

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

**Work procedure**

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.

**General work area**

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

**Checking for presence of refrigerant**

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., non-sparking, adequately sealed, or intrinsically safe.

**Presence of fire extinguisher**

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

**No ignition sources**

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

**Ventilated area**

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

**Checks to the refrigerating equipment**

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

The following checks shall be applied to installations using FLAMMABLE REFRIGERANTS:

a. the actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant containing parts are installed;
b. the ventilation machinery and outlets are operating adequately and are not obstructed;
c. if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;
d. marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
e. 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.

**Checks to electrical devices**

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

Initial safety checks shall include:

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

**Repairs to sealed components**

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

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

Ensure that the apparatus is mounted securely.

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

**Cabling**

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

from sources such as compressors or fans.

**Detection of flammable refrigerants**

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

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

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

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

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

**Decommissioning**

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

a. Become familiar with the equipment and its operation.
b. Isolate the system electrically.
c. Before attempting the procedure, ensure that:
    i. mechanical handling equipment is available, if required, for handling refrigerant cylinders;
    ii. all personal protective equipment is available and being used correctly;
    iii. the recovery process is supervised at all times by a competent person;
    iv. recovery equipment and cylinders conform to the appropriate standards.
d. Pump down refrigerant system, if possible.
e. If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
f. Make sure that cylinder is situated on the scales before recovery takes place.
g. Start the recovery machine and operate in accordance with instructions.
h. Do not overfill cylinders (no more than 80 % volume liquid charge).
i. Do not exceed the maximum working pressure of the cylinder, even temporarily.
j. When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
k. Recovered refrigerant shall not be charged into another REFRIGERATING SYSTEM unless it has been cleaned and checked.

**Labelling**

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

# 5.2 SERVICE AND ANALYSIS GUIDE

| MALFUNCTION | | POSSIBLE CAUSE | | SOLUTION |
|---|---|---|---|---|
| Compressor will not start | 1. | Overload tripped | 1. | Determine reasons and correct |
| | 2. | Control stuck open | 2. | Repair or replace |
| | 3. | Wiring incorrect | 3. | Check wiring against the diagram |
| Compressor trips on overload protection | 1. | Improperly wired | 1. | Check wiring against the diagram |
| | 2. | Low voltage to unit | 2. | Determine reason and correct |
| | 3. | Inverter malfunction | 3. | Determine reason and replace |
| | 4. | Relay failing to close | 4. | Determine reason, correct, or replace |
| Compressor starts and runs, but short cycles on overload protector | 1. | Low voltage to unit | 1. | Determine reason and correct |
| | 2. | Overload defective | 2. | Check current, replace overload protector |
| | 3. | Excessive head pressure | 3. | Check ventilation or restriction in refrigeration system |
| Inverter malfunction | 1. | No Power | 1. | Check power / ground wiring |
| | 2. | control input error | 2. | Check control wiring |
| | 3. | Improper compressor wiring | 3. | Check compressor cable connections |
| Refrigerated space too warm | 1. | Control setting too high | 1. | Lower the set point |
| | 2. | Refrigerant overcharge | 2. | Reclaim and recharge |
| | 3. | Dirty condenser | 3. | Clean condenser |
| | 4. | Evaporator coil iced | 4. | Determine reason and defrost |
| | 5. | Not operating | 5. | Determine reason, replace if necessary |
| | 6. | Air flow to condenser or evaporator blocked Control | 6. | Remove obstruction for free air flow.<br>the control |
| Frozen product | 1. | Set point is too low | 1. | Raise the set point |
| | 2. | Control points stuck | 2. | Replace the controller |
| Objectionable noise | 1. | Fan blade hitting fan shroud | 1. | Align fan and shroud or replace components |
| | 2. | Tubing rattle | 2. | Locate and reform |
| | 3. | Vibrating fan blade | 3. | Replace fan blade |
| | 4. | Condenser fan | 4. | Check motor bracket mounting, tighten. If necessary, replace components. |
| | 5. | Worn fan motor bearings | 5. | Replace fan motor |
| Moisture collects inside | 1. | Door gasket is not sealing properly | 1. | Check for debris, cracks, and items passing through door at the gasket. |
| | 2. | The refrigerator or freezer is facing a doorway or is underneath of air conditioning vent. | 2. | Relocate the unit or redirect air vent.<br>Too many door openings. Minimize time door is open. |
| | 3. | Hot, humid weather increases condensation | 3. | Make sure there is a water trap (U-shaped loop) in the drain tube near the compressor. This will “trap” a small amount of water in the loop and prevent air from entering the chamber through the tube. |
| Moisture collects on outside surface | | Hot, humid weather increases condensation | | As humidity decreases, moisture will disappear. |
| Odor inside the unit | | Interior needs to be cleaned. See section on maintenance and cleaning in this manual. | | Make sure product containers are tightly sealed to prevent leakage |
| Door will not close | | The unit is not level. Refer to the Leveling section at the beginning of this manual | | Check for dirt and debris or items passing through the door seal. |

# 6. WARRANTY

Horizon Scientific, Inc. warrants to the original purchaser every new Horizon Scientific, Inc. refrigerated unit, the cabinet, and all parts thereof, to be free from defects in material or workmanship, when such unit is installed, used, and maintained in accordance with provided instructions. The warranty period starts two weeks from the date of shipment from Horizon Scientific, Inc. This two-week period allows ample shipping time so that the warranty will go into effect at approximately the same time your equipment is delivered. Unless subject to prior written agreement with Horizon Scientific, Inc., this warranty does not allow for any warranty start deferment greater than two weeks from date of shipment due to a delayed installation and/or start-up. By purchasing any product from Horizon Scientific, Inc., you, and any entity for which you are purchasing acknowledge and agree to every provision contained herein, and all other Notices and Terms provided to Purchaser by Horizon Scientific, Inc., which are hereby incorporated.

## 6.1 FACTORY WARRANTY

Under this warranty, Horizon Scientific, Inc., through its authorized service organizations, will repair, or at its option, replace any part found to contain a manufacturing defect in material or workmanship without charge to the owner for parts and service labor. Replacement or repaired parts will be warranted for only the unexpired portion of the original warranty. Horizon Scientific, Inc. will not assume any shipping or cartage costs for parts under warranty. These costs shall be paid by the customer.

## 6.2 COMPRESSOR WARRANTY

In addition to the standard warranty, Horizon Scientific, Inc. warrants its hermetically and semi-hermetically sealed compressors to be free from defects in both material and workmanship under normal use and service in addition to the standard warranty period. Compressors determined by Horizon Scientific, Inc. to have been defective within this extended time period will, at Horizon Scientific, Inc.'s option, be either repaired or replaced with a compressor or compressor parts of similar design and capacity.

The compressor warranty applies only to hermetically and semi-hermetically sealed parts of the compressor and does not apply to any other parts or components, including, but not limited to, cabinet, paint finish, temperature control, refrigerant, metering device, driers, motor starting equipment, fan assembly or any other electrical components.

Horizon Scientific, Inc.'s sole obligation under this warranty is limited to either repair or replacement of parts, subject to the additional limitations below.

This warranty neither assumes nor authorizes any person to assume obligations other than expressly covered by this warranty.

## 6.3 ADDITIONAL WARRANTY INFORMATION

**NO CONSEQUENTIAL DAMAGES.** Horizon Scientific, Inc. is not responsible for economic loss; profit loss; or special, indirect, or consequential damages, including without limitation, losses or damages arising from contents spoilage claims whether because of refrigeration failure, electrical failure, power failure, or compressor failure.

HORIZON SCIENTIFIC, INC.'S MAXIMUM CUMULATIVE LIABILITY RELATIVE TO ALL CLAIMS AND LIABILITIES, INCLUDING OBLIGATIONS UNDER ANY INDEMNITY, WHETHER OR NOT INSURED, SHALL NOT EXCEED THE COST OF THE PRODUCT(S) GIVING RISE TO THE CLAIM OR LIABILITY.

**WARRANTY IS NOT TRANSFERABLE.** This warranty is not assignable and applies only in favor of the original purchaser/user to whom delivered. Any such assignment or transfer shall void the warranties herein made and shall void all warranties, express or implied, including any warranty of merchantability of fitness for a purpose.

**NO IMPLIED WARRANTY OF MERCHANTABILITY OF FITNESS FOR A PARTICULAR PURPOSE.** There are no other warranties, express, implied, or statutory, except the standard warranty and the additional compressor warranty as described above. These warranties are exclusive and in lieu of all other warranties, including implied warranty and merchantability of fitness for a purpose. There are no warranties which extend beyond the description on the face hereof, whether based on contract, warranty, tort (including negligence), strict liability, indemnity, or any other legal theory, and whether arising out of warranties, representations, instructions, installations, or non-conformities from any cause. Purchaser further acknowledges that the purchase price of the Product reflects these warranty terms and remedies.

**ALTERATION, NEGLECT, ABUSE, MISUSE, ACCIDENT, DAMAGE DURING TRANSIT OR INSTALLATION, FIRE, FLOOD OR OTHER EXTERNAL CAUSES.**
Horizon Scientific, Inc. is not responsible for the repair or replacement of any parts that Horizon Scientific, Inc. determines have been subjected after the date of manufacture to alteration, neglect, abuse, misuse, accident, damage during transit or installation, fire, flood, or other external causes. It does not apply to defects resulting from failure to properly install, operate or maintain the product in accordance with the printed instructions provided, or damage caused by the storage of any corrosive material that comes in contact with the interior or exterior portions of the cabinet, or the use of spark producing equipment or containers (such as galvanized or carbonized steel containers) that come in contact with any interior portion of the cabinet.

**OUTSIDE U.S./CANADA.** This warranty does not apply to, and Horizon Scientific, Inc. is not responsible for, any warranty claims made on products sold or used outside the United States and Canada.

**CHOICE OF LAW/VENUE.** The laws of the State of South Carolina shall govern the validity, interpretation, and enforcement of this warranty, regardless of conflicts of law principles. Purchaser agrees that proper venue for any action to enforce the terms of this warranty shall be the Dorchester County District Courts, South Carolina. Purchaser submits the jurisdiction of such courts over the Purchaser and the subject matter of any such action. Any action for breach of these warranty provisions must be commenced within one (1) year after that cause of action has accrued.

## 6.4 WARRANTY CLAIMS

To obtain prompt warranty service, simply contact the manufacturer at 800-648-4041. Horizon Scientific, Inc.'s shipping records showing date of shipment shall be conclusive in establishing the warranty period. All claims should include model number of the unit, the serial number of the cabinet, proof of purchase, date of installation, and all pertinent information supporting the existence of the alleged defect. Any repairs must be authorized by Horizon for the warranty to be honored.

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# COMPLIANCE

## 7.1 SAFETY

**Safety testing:** This unit is safety certified by UL (certified to UL60335-2-89 standard and rated for Class 1 Division 2 group C & D Hazardous environments).

## 7.2 ENVIRONMENTAL

**EPA:** The refrigerant and foaming agents used in this product EPA SNAP compliant hydrocarbon.

# CONTACT US

Technical Support: 1-800-648-4041 x5
Customer Support: 1-800-648-4041 x3
technicalservice@horizonscientific.com