

FROST-TECH MANUAL

GUIDE FOR INSTALLATION AND USE

PROPER USE

The refrigerated cabinets as described in this operating manual are mainly intended for storing prepacked cooked meats, delicatessen snacks (baguettes, sandwiches etc) beverages, prepacked salads, dairy products, fruit and vegetables.

The siting of Frost-tech cabinets must be carried out by qualified technical personnel.

Do not load the cabinet with non-refrigerated products or use it to cool products.

The products should be loaded in such a way that the correct rotation of the product is ensured.

Variation in the configuration of the equipment and/or the use of elements added without the authorisation of Frost-Tech Limited, may cause incorrect operation.

In the afore-mentioned product groups, only prepacked products with the following temperatures may be stored:

- salad, fruit and vegetables	+5°C TO +10°C
- dairy products	0°C TO +7°C
- delicatessen	0°C TO +7°C
- snacks (e.g.sandwiches)	0°C TO +7°C
- cooked meat	0°C TO +7°C
- cooked poultry	0°C TO +7°C

Proper use only means the use as described above, adhering to the specifications on installation, operation and service. Any other use is regarded as being contrary to specifications and is prohibited

The Buyer responsibility to insure that the equipment will be fit for the purpose for which the Buyer intend to use the equipment.

Do not operate in a room ambient temperature over 25 °C and 60% relative humidity. If the cabinet is to be operational in a room ambient over 25 °C, air conditioning and an extract system should be installed

Keeping Food at Safe Temperatures

<u>Stage of Food Handling</u>	<u>When to Check</u>	<u>Recommended Safe Temps</u>
Delivery	Every time perishable food is delivered	0° to 7°C is ideal for refrigerated food. -22° C to - 18° C is ideal for frozen food
Storage in refrigerator or cold store	Daily, at least	0° to 7° C
Storage in refrigerated counter or display	Daily, at least	0° to 7° C
Deep Freezer	Daily, at least	- 18°C or below
Defrosting frozen meat or poultry	Whenever food is thawed	0° to 7°C
Cooking	Whenever food is cooked	Minimum core temp.of 70° C for 2 mins
Cooling	Whenever food is cooled	7° C or cooler, ideally within 90 minutes
Re-heating	Whenever food is re-heated	Minimum core temp.of 70° C for 2 mins
Hot food on display	Frequently while on display	Minimum core temp of 63° C
Cold food on display	Frequently while on display	0° to 7°C is recommended

The chart above gives the temperatures that are generally accepted as good practice together with the recommended period of time involved where appropriate. Keeping food at these temperatures plays a major part in ensuring that food is safe to eat. Do not leave food standing in a room, or in sunlight (for instance in a shop window)

Cooking at 70° or hotter for sufficient time kills most pathogenic bacteria, although some bacterial spores can survive high temperatures. Food must always be cooked thoroughly, right through to the centre of the thickest part

**Remember: Keep cold foods really cold
Keep hot foods really hot.**

SAFETY REGULATIONS

The plug-in refrigerated cabinet described in this operating manual is designed and manufactured in compliance with the international safety regulations. Like any electrical appliance, it must be handled with all due care, particularly with consideration to ensuring electrical safety.

To ensure safe operation in all service conditions, the following safety precautions must be observed:

- The power plug must be connected in regulation matter and as instructed in this manual
- Contact your service organisation if you are in any doubt about electrical connection, working or safety of your plug-in refrigerated cabinet.
- When disconnecting the power plug, always pull on the plug itself and never the cable.
- Never detach any cover except where specifically instructed in this manual. Doing so might expose live electrical parts
- If any damage occurs to the power cable, pull the plug to disconnect the cabinet
- Never use a water-hose or high-pressure jet to clean the cabinet.
- All work on electrical equipment must be left to a qualified electrician. Safety First!
- Never connect the cabinet to the power supply if it is damaged (in transit or otherwise) When in doubt contact your service organisation or dealer

INSTALLATION

Selecting the Place of Installation

In selecting the place of installation, ensure that the following instructions are observed, this being vital for proper and troublefree working of the cabinet.

- do not install the cabinet outdoors
- do not install the cabinet in the vicinity of heating radiators or other heat sources
- do not install the cabinet where it is exposed to direct sunlight (e.g. through windows)
- avoid the installation of incandescent illumination. Fluorescent lighting is recommended
- do not install the cabinet where it is exposed to drafts from air conditioners, ventilators or open doors
- do not install the cabinet in a shop or room where the ambient temperature is above 25°
- do not stack items on top of the unit
- keep the air intake and outlet area around the front grill area of the cabinet clear of cartons and other obstacles
- when installing a cabinet against a wall, make sure that the refrigeration unit fan is free to take in ambient air from the room via the front grill area and blow it off at the back.

Adhere to the specific minimum distance of 80mm!

- When the cabinet is installed as a stand-alone unit against a wall, a minimum distance of 80mm must be maintained between cabinet back and room wall to ensure free air exit on the cabinet back
- When installing several cabinets alongside or behind one another, be sure to observe the specific installation plan

In all installation options, the air exit must be unhindered at the back of the refrigerated cabinet to exclude the accumulation of heat. Only then is trouble free operation guaranteed

Requirements for Electrical Connection

All refrigerated cabinets must be PAT tested (Portable Appliance Test) to the legal requirement. This is to ensure that all electrical connections and components have not been damaged in transit

The cabinet is connected by inserting the power plug into a socket. The plug is fitted with a 13-amp fuse. The cabinet has an ON/OFF switch but we recommend the provision of a remote switch. Ask your electrician

The socket employed must be properly earthed, firmly installed and protected by a 32-amp circuit breaker, type C

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Supply voltage and frequency must be in accordance with the data shown on the cabinet type plate. The local utility company's regulations on earth-fault protection must be observed. If in doubt, consult a qualified electrician.

The cabinet must not be plugged into a multiple outlet power strip

Run the power cables so that they are protected from risk of damage and there is no risk of tripping

STARTING and COMMISSIONING

If the cabinet has been sharply tilted while being sited or for counting of accessories, it must be left to stand for at least three hours before being started to allow the lubricating oil to settle in the compressor. Failure to do so can cause total destruction of the refrigeration system

Ensure the means of transporting/positioning used does not damage elements which exist in the lower part of the equipment.

Start the cabinet only if it has been installed as described and where the room temperature is not over 25 ° C

- plug power plug into socket
- switch on

Starting is signalled by the running noise of fans and refrigeration system

SETTING THE STORAGE TEMPERATURE

The temperature regulation parameters as well as recommended defrost times for each cabinet are based on Frost-Tech experience and on the results obtained in laboratory tests.

Regulation which is different from those recommended may be necessary for reasons of non-standard ambient and/or operating conditions

The units are delivered with the regulation already factory-set. All temperature and defrost regulations must be set by a qualified refrigeration engineer.

The buyer responsibility to ensure that the equipment will be fit for the purpose for which the Buyer intend to use the equipment.

ADJUSTING THE CONTROLLER

Please refer to the specific controller instructions included

AUTOMATIC EVAPORATOR DEFROSTING

Defrosting of the evaporator fins and evaporation of the drip water formed during the defrosting is performed automatically.

During automatic defrosting, the temperature in the display compartment may rise slightly

Defrost frequency as well as duration and time are factory-set. Defrosting is automatic four times a day

All cabinets have a stainless steel drip tray with an electrical heating element operated by a float switch, and a hot gas pipe running under the tray to evaporate the condensate water

CLEANING

A general shut down of the units must be carried out every 30 days in order to carry out a general cleaning and allow the elimination of any ice build-up which might exist. For purposes of hygiene, more frequent cleaning may be necessary.

Make sure that the drain overflows are not obstructed to avoid significant damage being caused.

Turn off power supply to the cabinet by disconnecting the power plug before cleaning.

Do not use any aggressive or abrasive cleaning agents. Never use a water hose or a high-pressure jet to clean the cabinet.

Cleaning the Outer-casing

Wipe the outer casing with a cotton cloth moistened with luke-warm water. The glazed parts of the end walls can be cleaned with a commercial-brand alcohol based glass cleaner

Cleaning the internal surfaces

Remove the merchandise from the display compartment and transfer it to another storage place

Do not start cleaning before the internal surfaces have risen to near room temperature:

- take accessories out of display compartment
- unscrew 2 recessed-head screws at the return air grill with a screwdriver
- pull out return air grill backward of the fixing device

No cleaning water must be allowed to flow into the defrost water drain

- moisten cotton cloth with luke-warm water and a little detergent
- wipe fan wall below the return air grill
- wipe display compartment and display shelves
- carefully dry all wiped surfaces with a dry cotton cloth

After cleaning, no humidity should remain in the display compartment

The defrost water gutter should be cleaned 2-3 times per year

Replace return air grill in reverse order and then screw on again.

Restart cabinet

The cabinet can be reloaded with refrigerated merchandise approximately 40 minutes after putting into operation

MAINTENANCE

Maintenance must be carried out by a qualified refrigeration engineer every three months.

The positioning and type of defective elements to be repaired or replaced can be seen in the spare parts drawings

In order to prevent accidents: WHERE THE MANIPULATION AND/OR REPLACEMENT OF ELECTRICAL COMPONENTS IS TO BE CARRIED OUT, ALWAYS DISCONNECT THE UNITS FROM THE ELECTRIC MAINS BEFOREHAND

Turn off power supply to the cabinet by disconnecting the power plug before starting any maintenance on the cabinet

In the case of breakdown in the functioning of the unit, the user must carry out the necessary steps to prevent the deterioration of the product. i.e. destocking and removal of the product to an operational storage facility.

Where operational faults are detected, check the electrical protection and switches to make sure they are in perfect condition. If the fault persists, advise the maintenance contractor.

Cleaning the condenser fins

The refrigerated cabinet must be maintained by a qualified refrigeration engineer every three months: and in addition, the condenser fins need cleaning by a qualified refrigeration engineer *whenever a layer of dust or fluff begins to build up between the fins*

- disconnect the power plug
- unscrew 4 recessed head screws with a screw-driver
- remove front grill
- check whether the condenser fins need cleaning
- clean fins with vacuum cleaner and brush attachment
- replace front grill after cleaning
- put cabinet in operation

Regular cleaning of the condensers is important to save power and to avoid unnecessary breakdown

USERS' RESPONSIBILITY

Card situated near the unit indicating a) name & address of the installer or person responsible for service of the system

- b) nature of refrigerant, chemical formula & designation number
- c) instructions for shutting down the system in case of emergency
- d) maximum allowable pressures
- Log Book recording: a) all details of maintenance and repair work
- b) the quantities and kind of refrigerant (new, reused or recycled) refrigerant which have been charged on each occasion, the quantity transferred from the system on each occasion and the source of the reused refrigerant
- c) changes and replacements of components to the system
- d) results of all periodic routine tests
- e) significant periods of non-use
- inspection: a) should be carried out after repair or significant alterations
- b) should be carried out after reinstalling on another site
- c) refrigerated equipment should be P.A.T tested (Portable Appliance Test) to the legal requirements
- maintenance & repair : each refrigeration system must be subjected to preventative maintenance every three months
- a) ***the parties concerned for the refrigerating system must ensure that the system is inspected, regularly supervised and maintained in a satisfactory manner***
- b) the parties concerned shall also be responsible when the system is used by another person unless a division of responsibility has been agreed upon
- c) regular maintenance or adjustment of the refrigerating system can only be carried out by a qualified refrigeration engineer
- maintenance shall be carried out every three months by a qualified refrigeration engineer and will include the following procedures:
 - a) clean condensers
 - b) clean drains
 - c) clean evaporators
 - d) clean all fan blades
 - e) test condenser & evaporator fan motors
 - f) clean & check condensate trays
 - g) check condensate heater
 - h) check all controls & panel
 - i) check defrost system
 - j) test defrost time clock
 - k) check all pipework
 - l) check gas pressure on compressors
 - m) test Klixon overload
 - n) test capacitors
 - o) test contactors
 - p) test transformer
 - q) check all electrical connections & wiring condition
 - r) check fuses & electrical sockets
 - s) check customer's power supply
 - t) check condition of electrical control panel including signs of overheating of all electrical components and wiring loom. Repair or replace as necessary
 - u) check tightness of all terminals
 - v) check integrity of seals on components

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- w) check copper tubing
 - x) check internal lights
 - y) check shelves & supports
 - z) check door gaskets, handles & hinges of storage equipment
- RUN & TEST THAT ALL PARTS ARE WORKING SATISFACTORILY**

- maintenance shall be carried out in such a way that:
 - a) accidents to personnel are minimised
 - b) damage to goods is prevented
 - c) the components of the system remain in good working order
 - d) the purpose and availability of the system are maintained
 - e) leakage of refrigerant or oil identified and remedied
 - f) waste of energy is minimized
- Repairs on refrigerant containing components shall be carried out in the following order:
 - a) instructing of the maintenance staff
 - b) disconnecting & safeguarding of the components to be repaired
 - c) emptying & evacuating
 - d) cleaning & purging respectively (e.g. with nitrogen)
 - e) releasing for repair. NOTE: welding or arc/flame-producing apparatus may require a special work permit
 - f) carrying out the repair
 - g) testing & checking of the repaired component
 - h) replacing, evacuating and recharging with refrigerant
- refrigerant leaks shall be identified and repaired as soon as practicable by a qualified refrigeration engineer and the system shall only be put into service again when all the leaks have been repaired
- During each periodic maintenance and following each repair, the following tasks shall be performed
 - a) ***all safety, control and measurement devices as well as alarm systems shall be checked to verify their correct operation and perfect working order.***
 - b) leakage tests shall be carried out at the relevant part of the refrigerating system
 - c) evacuating
 - d) adjustment of refrigerant charge
 - e) functional test of safety devices
- Maintenance and repair requiring the assistance of other skilled personnel (such as welders, electricians and other specialist staff) shall be carried out under the supervision of a qualified refrigeration engineer
- Brazing and welding shall only be carried out by a qualified refrigeration engineer
- Replacement of components or changes to the system shall be ordered and carried out by a qualified refrigeration engineer
- Recovery, reuse, recycle, reclaim & disposal shall only be carried out by a qualified refrigeration engineer

Adhering to these maintenance procedures will ensure the cabinets work to their optimum efficiency, and will detect any faulty parts before any major breakdown occurs. *Failure to keep to this maintenance schedule will invalidate the manufacturer's warranty and no claim will be accepted*

It is a legal requirement for the user of refrigerated equipment to ensure that all refrigerated cabinets are inspected and regularly serviced in accordance with BS-EN378

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COMPRESSOR/CONDENSING UNITS INSTALLATION INSTRUCTIONS ACCORDING TO MACHINE DIRECTIVE 2006/42/EC annex VI.

Intended use: Hermetic compressors and condensing units to be installed in refrigerating machines.

WARNING

- Before incorporating the compressor/condensing units inside the application read carefully all of the following instructions. Failure to follow these safety warnings could result in serious injury or death.

WARNING

- During application design and compressor/condensing unit integration, the original equipment or manufacturer must follow all valid and applicable regulations in terms of electrical, pressure and flammability safety.

WARNING

- The equipment's electrical connections and wiring must be designed taking into consideration electrical characteristics of the compressor/condensing unit and its electrical components.

WARNING

- For applications designed to be used with flammable refrigerants it is necessary to perform an evaluation of the risk involved with the usage of this refrigerant. The equipment manufacturer should perform a risk assessment and ensure proper knowledge about the handling and use of any flammable refrigerant prior to applying the compressor/condensing unit.

WARNING

- Compressor/condensing unit incorporation into the final equipment or any service performed must be done by trained personnel only.

WARNING

- Compressor/condensing unit handling must be performed with care keeping in mind the weight to avoid injury. Protective means (safety glasses, gloves and protective shoes) must be worn during compressor handling at the time of original integration and during servicing.

CAUTION

- Compressor/condensing units in this application must be used within a working range specified by the manufacturer.

CAUTION

- Install the compressor/condensing units with an appliance base plate using specified bolts, grommets and connect compressor/condensing unit tubes (as specified by manufacturer) to the corresponding line tubes of the application.

WARNING

- Do not energize the compressor before connecting to the application.

CAUTION

- Give special attention to the correct welding or other forms of connecting joints in the system to avoid the possibility of leaks.

CAUTION

- Use a leak detector suitable for the respective refrigerant to guarantee the maximum efficiency in controlling leaks.

CAUTION

- Avoid damaging the compressor/condensint unit label during the assembly process.

CAUTION

- Good refrigeration practice suggests system evacuation from both the low and high side, achieving a minimum level of 0.14 mbar (100 µHg), with a non-condensable value of less than 0.3%.

WARNING

- Avoid the compressor/condensing unit starting under vaccum or without refrigerant charge.

WARNING

- Use the compressor/condensing unit only with the refrigerant indicated on compressor/condensing unit label.

WARNING

- System refrigerant charge when using HC refrigerants (R 600 a, R 290) must be limited to 150 g max.

WARNING

- Use the compressor/condensing unit only with the power supply indicated on the compressor/condensing unti label.

WARNING

- Use the compressor/condensing unit only with the electrical components specified by the manufacturer. The electrical box of the compressor should be located in a position where a safe distance from any plastic, foam, wire or any ither flammable material is ensured. The electrical box should not be placed close to any water tray, close to insulation of suction tubes or close to electrical connections or application wiring.

WARNING

- For electrical connection, refer to applicable compressor/ condensing unit wiring diagram.

WARNING

- Use compressor/condensing unit in a grounded system only.
- Proper compressor/condensing unit cooling according to specification must be assured.

ADDITIONAL INSTRUCTIONS FOR SERVICE INTERVENTION ON THE COMPRESSOR/CONDENSING UNIT.**WARNING**

- For service intervention, follow the instructions of application manufacturer.

WARNING

- Turn off power supply before servicing the compressor/condensing unit.

WARNING

- Discharge all capacitors before servicing the compressor/condensing unit.

WARNING

- Remove pressure from both high and low pressure side before removing the compressor/condensing unit.

WARNING

- Use tubing cutter to open the refrigerant circuit. Do not use a torch.

WARNING

- For compressor/condensing unit replacement, follow the instructions of the original equipment manufacturer. Use only with electrical components specified by the manufacturer.

WARNING

- On applications where flammable refrigerant is used, do not weld the tubes by torch, but connect the compressor/condensing unit tubes by other means such as lock ring.

WARNING

- Before energizing the system, check the compressor/condensing unit grounding and make sure electrical components and covering are fixed properly.

WARNING

- Connect the equipment only to a power supply with a proper ground connection, over current protection and electrical safety devices.

WARNING

- Do not use disassembled compressor again.

WARNING

- Disassembled compressor used with flammable refrigerant may contain certain amount of refrigerant in the oil. Do not mix this oil with other oils and treat it properly, due to its flammability risk.

WARNING

- Before energizing the condensing units, ensure that the finger guard of the fan motor is properly installed.

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SHUT DOWN

Remove the merchandise from the display compartment and transfer to another storing place

Unplug power plug or switch off control switch

If the cabinet is to be shut down for any length of time, clean cabinet

When stored in a storage room, cover with a cotton sheet.

Do not use plastic tarpaulins as these may encourage formation of moisture and odours inside the cabine

TROUBLESHOOTING

Any trouble occurring might be due to a minor problem that you can correct yourself following the instructions below. Do not try any further action if the pointers given cannot solve the problem!

Repairs on the cabinet must be made only by a qualified refrigeration engineer. Incompetent repair work can cause serious personal danger: contact your service organisation for any repairs needed.

Cabinet does not work (no audible running noise or only fan noise audible)

Possible Cause:

- a) automatic evaporator defrosting active or thermostat switched off
- b) power plug not connected
- c) fuse blown, power plug or socket defective
- d) condenser fins dirty

Corrective Measure:

None: cooling will automatically switch on again
Insert plug properly. Switch ON
Contact your electrician or service organisation
Contact service organisation for maintenance

Storage Temperature too high

- a) automatic defrosting active
- b) ambient temperature too high or
- c) distance to wall not adhered
- c) lack of air intake due to obstruction of grill
- d) condenser fins dirty

None: Temporary minor temperature rise during defrosting is normal
Avoid extreme operating environment i.e temperature over 25 °
Adjust storage temperature-controller
Maintain prescribed minimum distance
Remove any obstacles in air intake area
Contact engineer to perform maintenance

Storage Temperature too low

- a) misadjustment

Adjust storage temperature in small increments

Cabinet lighting failed

- a) lighting not switched on
- b) the starter or light fitting is defective

Switch lighting on
Replace starter or complete fitting

Heavy Condensation in Display Area

Extreme ambient temperature – relative humidity is more than 60% or very high summer temps

Improve operating environment.
install air conditioning to reduce room temperature to below 25 ° C

Water under or in front of cabinet

- a) automatic defrosting defective
- b) extreme operating environment. Relative humidity over 60% or high summer temperatures causes overflow of drip tray

Wipe water off. If new water forms within the next 48 hours contact your service organisation

Formation of Odour in Cabinet

- a) Spaces under return air grill dirty
- b) Drain pipe blocked
- c) Spillage

Clean
Remove blockage
Clean