BBR, 36" PROPANE REFRIGERATOR

(H&K P/N 87077.01P)

Equipment Manual

Place this equipment chapter in the Drive-Thru section of the Equipment manual.

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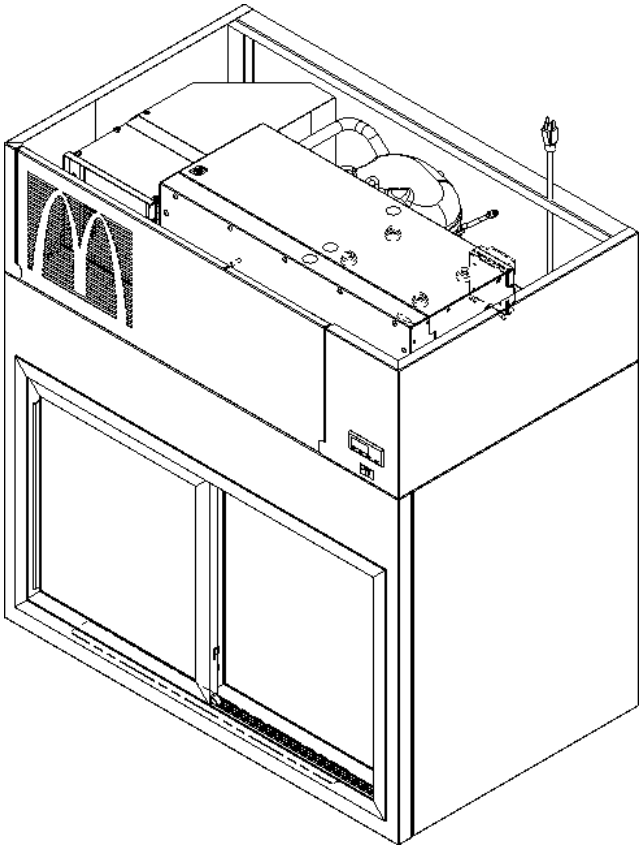

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Refrigeration Warnings

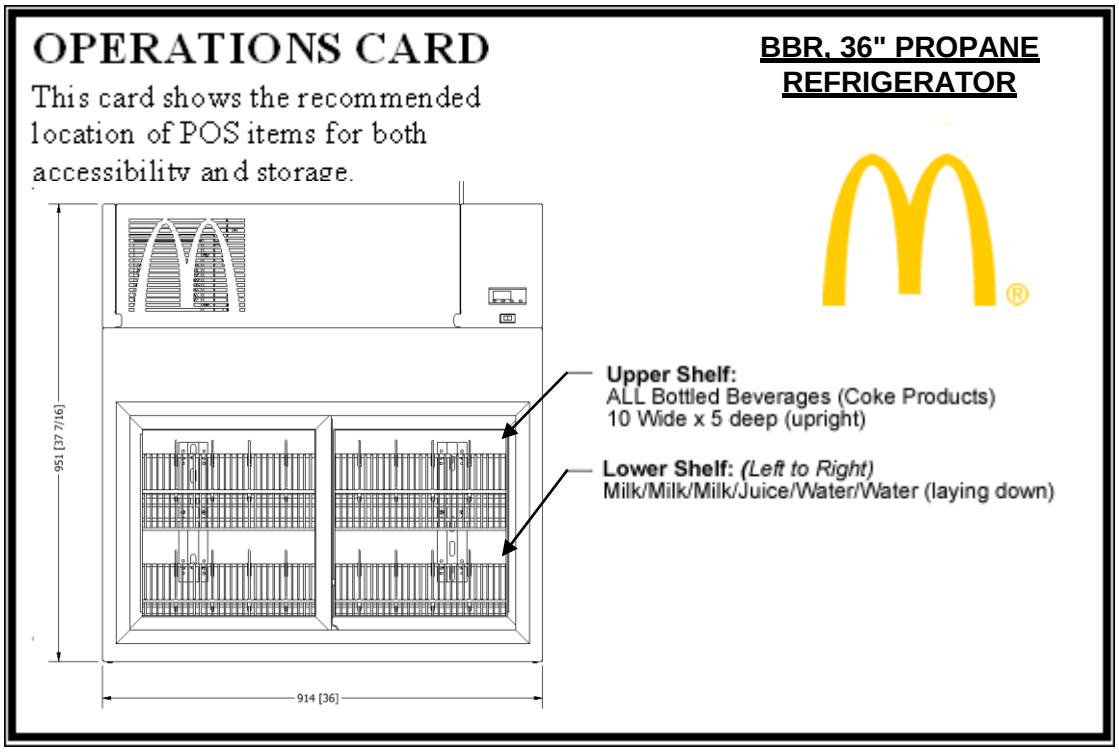
CAUTION: This unit contains a flammable refrigerant

- Under no circumstances can a mechanical device be used to defrost evaporator.
- Do not puncture refrigeration tubing.
- The unit is to be repaired by only a trained technician with experience with flammable refrigerants.
- Consult this manual before attempting to install or service a product with a flammable refrigerant.
- Unit must be disposed of in accordance with Federal or local regulations.

Introduction

> **Note:** This Installation & Operating Manual contains important instructions and safety information on the Drive Thru Refrigerator (DTR). Read and understand the contents of this manual **before** attempting to install, operate, or service the unit.

The DTR is a compact, wall-mounted refrigerator designed for short term point of use storage of various items. The DTR is designed for use in the Drive Thru area and can be wall mounted above work tables and other equipment, or can be free standing when coupled with its optional stand (H&K P/N 77454). The DTR includes two sliding double pane glass doors with automatic rollback closure, flexible shelf/display system providing setup versatility, product visibility, roll-forward racking, and easy access for product stocking and serving.



Installation Instructions

Installation of this equipment must be completed by qualified personnel in compliance with all manufacturer's instructions and local building, food safety and electric codes.

Inspection

Upon receipt, examine the equipment carefully for any damage. If damage has occurred, notify the freight carrier and H&K immediately.

Uncrate the Unit

This unit will arrive crated in a skid-mounted carton.

Caution! The shipping container may have staples, nails, banding under tension and possible wood splinters, which can cause injuries. Wear gloves and eye protection to reduce the risk of injury when uncrating.

- Cut the banding holding the cardboard carton to the shipping pallet, using heavy scissors or tin snips. Use caution to avoid contact with cut banding.
- Lift the cardboard carton straight up and off the unit.
- Cut the banding that holds the refrigerator to the shipping pallet or skid. Use caution to avoid contact with the cut banding.

Note: Leave unit on skid until ready to wall-mount

- Peel the protective adhesive film from all exposed areas (front, sides, and interior).

Caution! The DTR weighs approximately 180 lbs (82 kg). Do not attempt to remove this unit from its packaging without assistance.

Remove Packing & Loose Components

The glass rollback doors and loose components have been secured to prevent damage during shipping. Remove any tape and blocking. Remove any foam blocking and tape used to secure the inside stainless steel wire product shelves and racks. Remove the carton containing product shelf display components.

Wash and Sanitize Unit Interior & Shelving Components

Note! Use only McDonald's approved cleaning and sanitizing agents according to instructions.

- ☐ Wipe down, sanitize and dry the refrigerator interior.
- ☐ Wipe down, sanitize and dry individual shelf components if pre-installed.

Pre-Installation Checklist

☑	Ensure wall is reinforced appropriately using a minimum of ¾" (19mm) plywood wall support
☑	Power receptacle within 72" (1828 mm) to plug in unit

Determine Refrigerator Wall Mounting Location

WARNING! Qualified carpenters and/or equipment installers capable of evaluating wall construction and securely wall mounting heavy refrigerated case must perform wall preparation.

Identify a wall mounting location within the drive-through area. The DTR is typically mounted immediately right or left of the pass-through window, on the adjacent wall, and above the beverage/POS counter, within easy reach of the drive-through crewmember. (Figure 1).

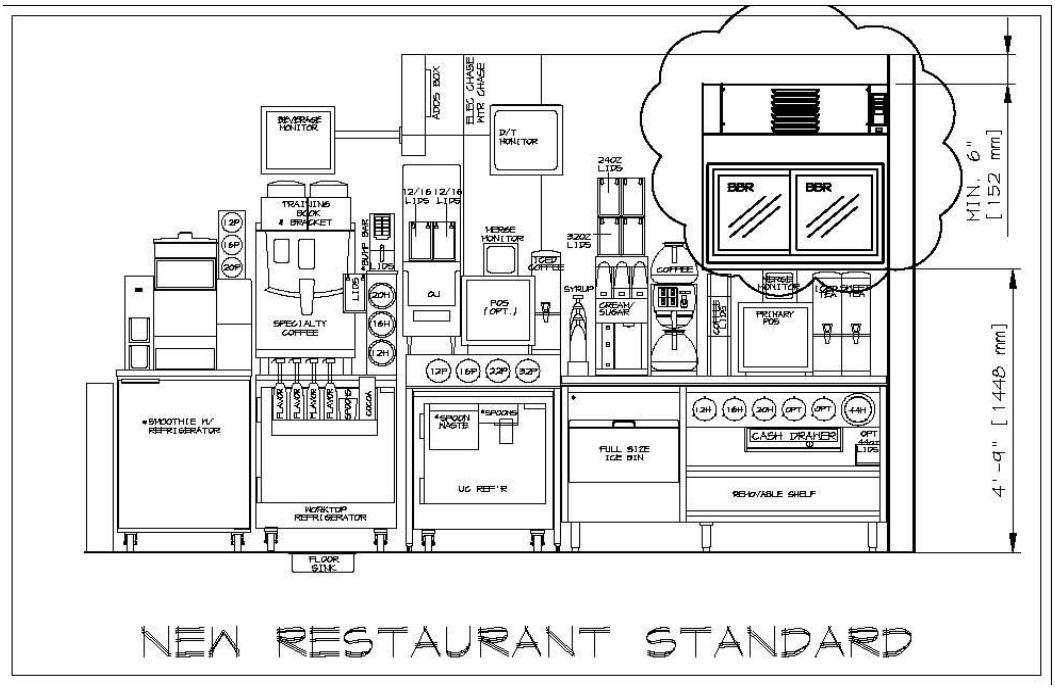


Figure 1. Typical Drive-Through Mounting Location.

Caution! The DTR is designed for operation at a maximum ambient temperature of 100ºF (38ºC) and 50% relative humidity. The DTR is designed for use indoors in the drive-through or restaurant kitchen area protected from weather, excessive heat, direct sunlight, excessive humidity and corrosive salt air.

Mounting Preparation

- **Standard Mounting**

  The mounting wall must be prepared using minimum 3/4” (19 mm) thick plywood securely anchored to the wall structure, from 60” (152 cm) to 96” (244 cm) above the finished floor completely covering the width of the refrigerator. (Figure 2.)

- **Over-Window Mounting**

  If there is a small side window on the wall where the DTR is to be mounted, the wall surface must be furred out with minimum 3/4” (19 mm) plywood over the window frame to ensure a solid and perpendicular installation. In addition, the window should be blacked out or closed off to provide a finished look when viewed from the building exterior. (Figure 3).

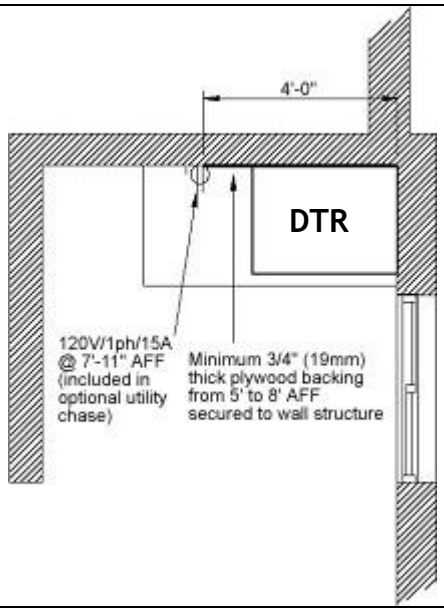


Figure 2. Standard Mounting.

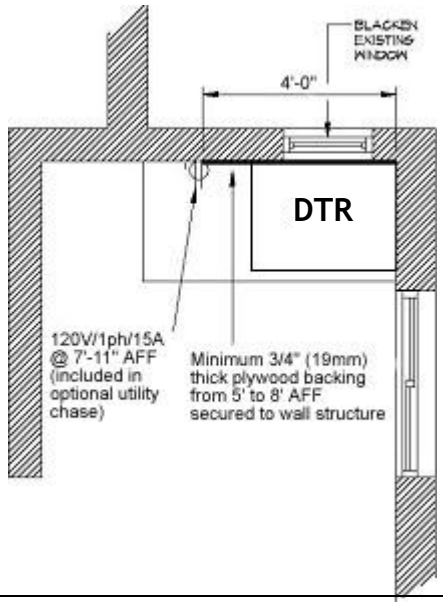


Figure 3. Over Window Mounting.

Wall Mounting the DTR Refrigerator

A steel offset mounting strip has been provided for the wall mounting of this unit. This mounting strip will engage the full width of the refrigerator case upper rear frame/flange. (Figure 4.)

Warning! The steel offset mounting strip must engage the back flange at the bottom of the upper compressor compartment shown. The channel at the top of the compressor compartment is ***NOT*** designed to support the DTR weight.

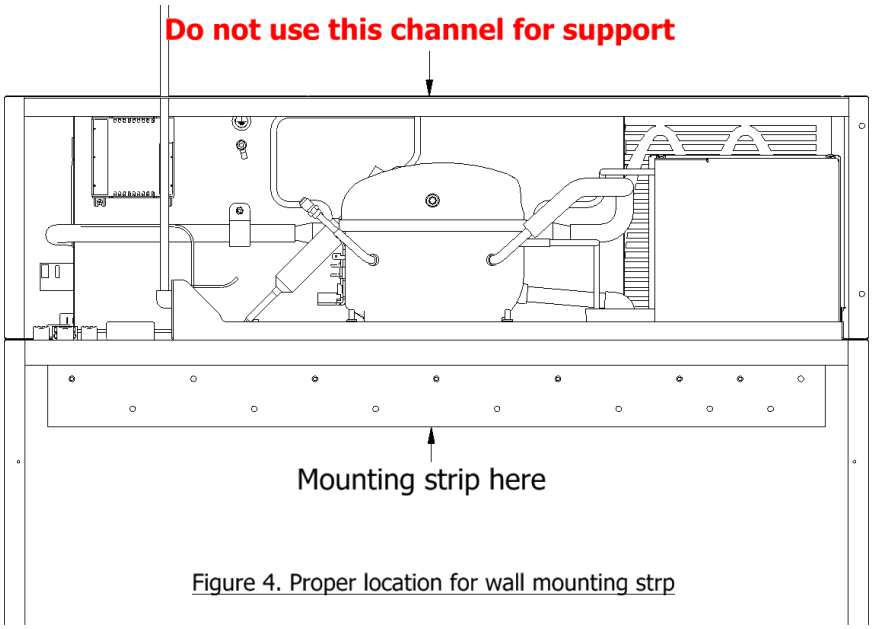


Figure 4. Proper location for wall mounting strp

Locate center point of desired case-mounting position on wall surface. Measure up 80-9/16" (204.7 cm) from floor, (Figure 5) to provide a DTR unit bottom height or clearance of 57" (145 cm) above the finished floor (A.F.F.). (**NOTE**: Mounting height may vary to meet site requirements.)

Place the bottom of mounting strip at this (80-9/16") height against wall, on center with your mark. Level the mounting strip with a small spirit or laser level. Mark location of the six (minimum) screw holes in the mounting strip. Verify that a minimum of 19-5/8" (50 cm) exists from the bottom of the mounting strip to the ceiling (Figure 6) to allow proper ventilation for the DTR compressor (6" minimum from top of DTR to ceiling).

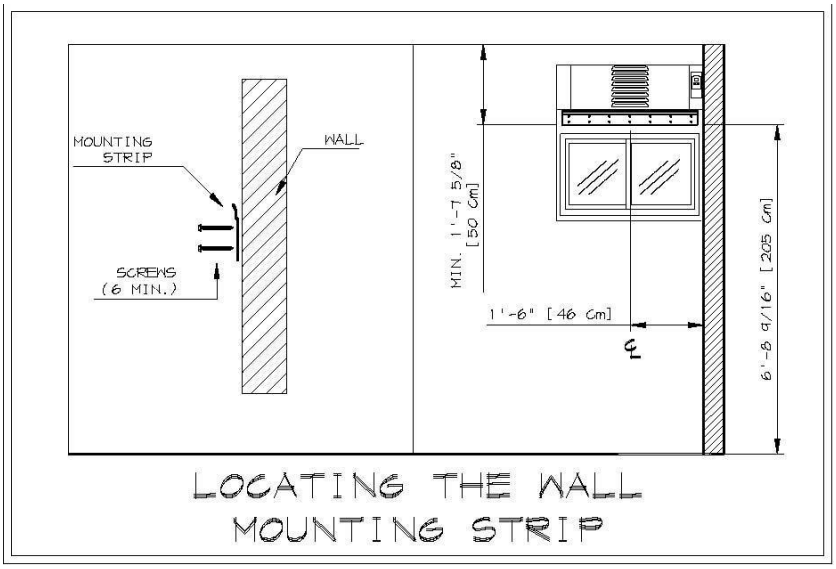


Figure 4. Installing the Wall Mounting Strip.

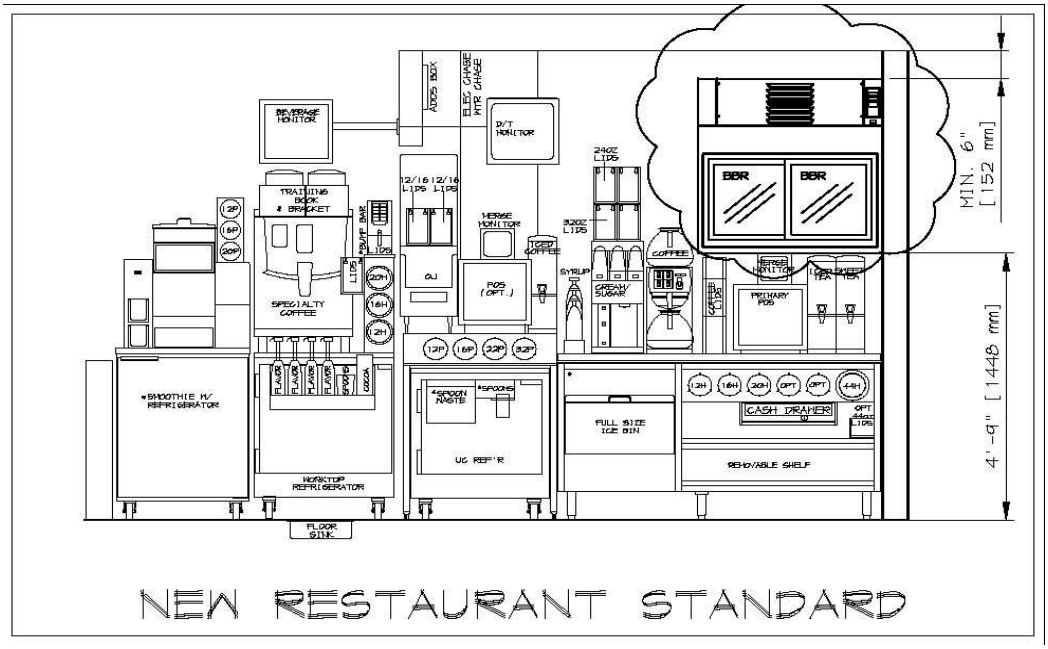


Figure 5. Proper Mounting Height and Clearance for DTR.

Important! Failure to provide sufficient top (minimum 6” to ceiling) clearance may shorten the DTR life, increase compressor run time and energy usage, and void the unit’s warranty coverage.

Drill a minimum of six pilot holes in the anchor wall, per screw or anchor system instructions.

Secure the mounting strip to wall using #12 x 2” screws in the CBB hardware kit (minimum length) or anchor system. Make sure top edge of strip protrudes from wall as shown in Figure 5. Recheck level of mounting strip.

With assistance, lift the cabinet by the sides to a height that will clear the mounting strip with rear frame flange on cabinet then slowly lower the case flush with wall, to engage mounting strip along full length. Ensure refrigerator frame flange slips behind the mounting strip while you continue to support weight of cabinet.

> ***Note**: Ensure that the power cord is not pinched and is free from sharp bends or kinks.

Place spirit or laser level on top of unit and verify it is level left-to-right and front-to-back. (**NOTE**: Case can be pitched slightly to the rear but not pitched forward.)

Note! The DTR is shipped with an overflow hose installed. Overflow conditions can be caused by extreme conditions such as high humidity, improper product maintenance (faulty door springs), or improper operation by store personnel such as keeping the door open for extended periods of time, in which case the overflow hose can be run to a floor drain or other approved location.

Plug in power cord at 120-volt/60-Hz outlet identified earlier. Any excess power cord can be coiled and stored in the upper compressor compartment.

To Stand Mount the DTR Refrigerator

Please refer to the installation instructions for the DTR stand (*H&K P/N 77454*) for specific installation instructions.

Operating Instructions

Connect to Power Source

Insert the plug of the DTR into a standard 120V AC 60 Hz. 15A outlet. The DTR contains a compressor and should not be used on the same circuit with other motors or heavy demand appliances.

Start-up

The DTR power switch is located on the front top panel of the unit (Figure 7). This switch will illuminate red when activated indicating that the refrigeration and the interior lighting are operating. ***Allow the DTR to run for one hour prior to loading with product to come up to operating temperature***

Figure 12

Temperature Setting

The DTR has been tested and preset at the factory to maintain a temperature between 34ºF (1°C) and 40ºF (4.4°C). The temperature controller located on the front top panel displays the internal temperature of the refrigerator. (Figure 12.)

Thermostat Adjustment

If the temperature is not reading within the range specified above, the thermostat can be adjusted by use of the <**i**> and <▲> or <▼> keys in the following sequence.

Pressing and holding <**i**> button displays the setpoint. Use the <▲> or <▼> while holding <**i**> key to select desired setpoint. Complete by releasing <**i**> key.

Caution! Do not adjust the set point below 34ºF or 1ºC. Doing so may result in excessive ice buildup on the cooling coils, the unit not holding a safe temperature, and potential damage to the compressor.

Caution! Excessive tampering with the temperature controller may lead to operating difficulties and compromise food safety.

Door Removal/Installation

Remove the sliding glass doors by firmly grasping the outer (right side) door and lifting it straight up in its track. When the bottom edge of the door is free from the lower track, rotate the door out from the bottom. (Figure 8) Repeat the process with the inner (left side) door. Use care to avoid damaging the track spring tabs at the center of the opening (Figure 9). Install doors by reversing the process, taking care to ensure the spring tabs engage the doors.

Figure 6. Removing Sliding Doors.

Figure 7. Door Track Spring Tab.

Door Locking Feature

The sliding doors can be locked in the open position for ease of loading/unloading. The inner (left side) door has a hook that can be raised to engage a tab on the back of the outer (right side) door (Figure 10). To unlock the doors, slide both doors towards the center until the hook disengages.

Figure 8. Sliding Door Lock.

Caution! Do not leave the self-closing doors in the locked position for an extended period of time.

Shelf Installation

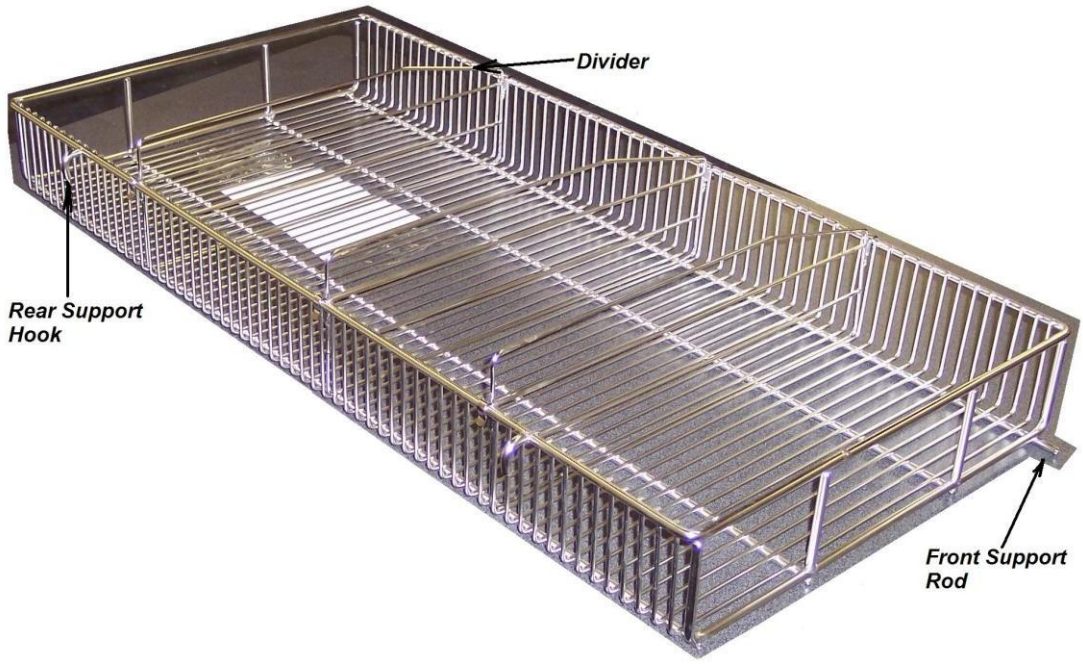


Figure 9. Removable Shelf with Adjustable Dividers.

- Remove the doors to install the shelves.
- Insert the lower shelf into the DTR and lay it flat on the bottom of the refrigerator.
- Insert the upper shelf into the DTR using the center slot on the rear support channels.

- Hold the upper shelf with the front edge about one inch lower than the back edge and insert the rear support hooks into the rear support channels. At the same time, slide the front support rods into the front support channels. Push the shelf back and down to lock it into the channels.

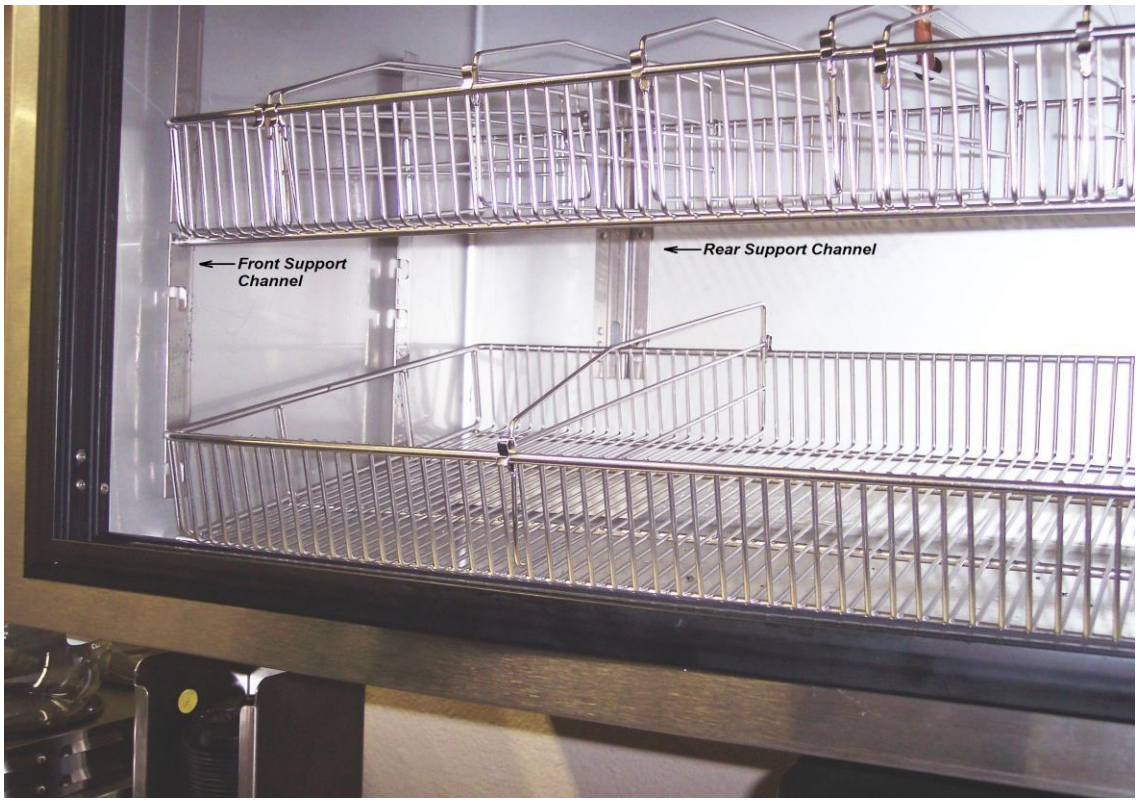


Figure 10 Installing Removable Shelves.

- Raise the back of the lower shelf and secure the rear support hooks into the rear support channel. The front of the lower shelf will rest on the floor of the DTR liner.

- Insert the dividers starting at the left side using individual products as spacers (Figure 13) according to the product alignment (Figure 14).

- Shelf height is adjustable by raising or lowering the front and

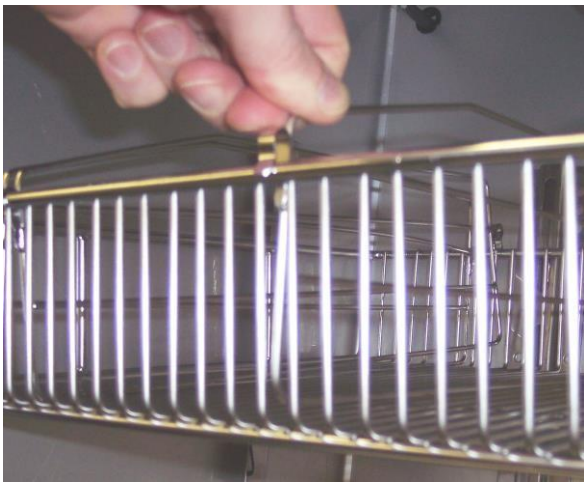


Figure 11. Installing the Shelf Dividers.

rear support channel screws. Front and rear support channels must be adjusted together or the shelves may not properly support their load and be secured in the cabinet. Do not over-tighten the screws.

Figure 12 Product Alignment

Loading and Restocking

Shelf Stocking

All shelving compartments are inclined so that containers will roll or slide forward to the front of the shelf for quick and easy access to the item requested. When restocking product, always fill from the back of a row.

General Product Loading Tips

- **DO NOT** over-load the DTR Case. All refrigeration requires good air circulation to maintain uniform temperatures.
- **DO NOT** let plastic bags, packaging or containers block or obstruct the Evaporator air intake openings at the top of the case.
- **DO NOT** leave the door open, except to remove product or to restock.

Store Closing Procedure

The DTR is designed for continuous operation. Unsold product may remain in the DTR overnight as long as the unit remains turned on and the doors remain closed. Store operations will determine whether to leave product in the DTR overnight. *Consult your store manager or operations director for guidance.*

Cleaning

Caution! Do not use a pressurized spray to clean the DTR.

Caution! Do not use abrasives or strong chemicals to clean any surfaces of the DTR.

Warning! Do not spray liquids directly onto the power switch, into the compressor compartment at the top of the cabinet, on the internal lights, or into the evaporator. Doing so will void the warranty and risk serious personal injury.

Exterior Cleaning

The exterior of the unit should be cleaned with a mild soap and water solution and a sanitizer. Do not use abrasive cleaners to clean the exterior of the cabinet as this might damage the stainless steel finish. Do not use steel wool or any strong chemicals.

Interior Cleaning

The anodized aluminum interior of the refrigerator can be cleaned using a soft sponge and a mild soap and water solution. Do not allow liquid to puddle in the unit. Wipe the liner dry after cleaning.

Wipe any debris from the sliding door track.

The wire shelves and dividers may be removed from the DTR for cleaning.

> ***Caution! Leaking products may damage the interior liner.*** If a product leak is discovered, immediately remove and discard the defective product. Promptly clean any remaining soiled product containers and the DTR interior according to the instructions above.

Glass Door Cleaning

Glass doors may be cleaned using a McDonald's approved glass cleaner. Use care to prevent the glass cleaner from contacting the metal or plastic surfaces and immediately wash off any excess.

Preventative Maintenance

Warning! Failure to properly perform scheduled preventative maintenance may void manufacturer's warranty.

WARNING! Verify refrigerator is disconnected from the power source before attempting any preventative maintenance. Failure to disconnect the electric power could result in electric shock, burns, injuries or death.

CAUTION! The fins on a condenser coil are very sharp, and some refrigeration components can be very hot, resulting in possible cuts and/or burns. Avoid physical contact with the fins on the condenser coil or any related refrigeration lines. Gloves are recommended when accessing the internal components of any refrigerated equipment.

CAUTION! The condenser coil is located above the display compartment, which is mounted 7 feet (214 cm) above floor level. Any individual performing maintenance should use a ladder or safe, stable work platform to access and clean service compartment. Use caution to avoid falls and potential injuries.

Empty and Clean the DTR Display (Weekly)

Once a week the display case should be shut down, emptied and given a thorough cleaning, as follows:

- Turn OFF power at switch.
- Unplug unit from 120-volt power outlet.
- Open doors, lock in OPEN position and remove all product from shelves. Any perishable product (milk) should be put into refrigerated storage elsewhere.
- Remove upper and lower shelf sections. *See instructions in the "Operating Instructions – Shelf Installation" section of this manual*.

Note! Use only McDonald's approved cleaning and sanitizing agents, according to instructions.

- Place all shelf components in the sink, then wash, sanitize and wipe dry or allow to air dry.
- Remove both glass doors and clean the glass on both sides.
- Wipe down doorframes and tracks. Inspect tracks for any broken glass or debris. Brush or vacuum out any debris found.
- Clean, sanitize and dry the display compartment, to include: back, sides, top, and floor.

- Return all display rack components to their original mounting position. Install sliding glass doors.
- Plug in cord at 120-volt outlet.
- Turn ON power switch.

Allow case to run for at least one hour to return to target operating temperature of 34° - 40° F before reloading or stocking product.

Clean the Condenser Coils (Monthly)

First turn the DTR off and unplug from the outlet. Grab the top of the panel as shown and lift straight up until the bottom of the panel just clears the lower retaining tabs as shown in Figure 16.

Figure 16

Rotate the top towards you and pull to remove as shown in Figure 17.

Figure 17

Use a soft-bristled cleaning brush or vacuum cleaner to gently remove dust and debris in and around the coil face. Make sure to brush only in the direction of the coil fins as shown in Figure 18.

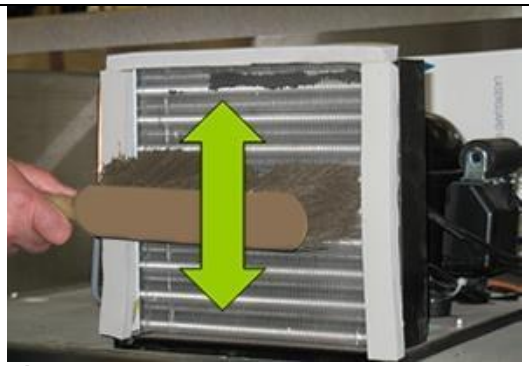


Figure 18

Replace access panel in reverse order of removal making sure the top flange of the panel catches. Plug the DTR back in and turn on the power switch.

Product Warranty

H&K Dallas, Inc. makes the following limited warranties to the original purchaser only for this equipment and replacement parts:

H&K warrants all components to be free of defects in material and workmanship, if properly installed, operated and maintained, for a period of (2) years from the date of the delivery.

The company's obligation under this warranty is limited to repairing or replacing any part or parts of the refrigerator determined to be defective by an authorized representative of H&K.

The company reserves the privilege of determining if such repairs are to be made in the field or at the H&K factory.

The company assumes no liability for expenses or repairs made by other parties except by written consent.

Corrections of such defects by repair or replacement shall constitute fulfillment of all company obligations to the purchaser.

H&K shall not be liable for loss, damages or expenses arising from misuse, abuse, alteration, accident or improper installation of the freezer such as:

Improper or unauthorized repair;
Failure to follow proper installation instruction;
Improper maintenance;
Damage in shipment;
Abnormal use;
Improper power supply;
Natural disaster;

Special Conditions

This warranty also does not cover:

Overtime or holiday charges;
Consequential damages (the cost of repairing or replacing other property which is damaged), loss of time, profits, use of any other incidental damages of any kind.

Troubleshooting

PROBLEM	*POSSIBLE CAUSE*	*WHAT TO DO*
Unit won't run when unit is plugged into a grounded (120-volt) electric power outlet.	Unit is not "fully" plugged in.	Verify unit is plugged into outlet.
	Wall outlet isn't working.	Plug DTR into another nearby outlet. If individual outlet is not working, use alternate and contact licensed electrician to repair or replace outlet.
	Circuit breaker has been tripped.	Check circuit breaker to see if it has tripped. Reset if necessary. If these steps do not fix problem, **call H&K at 800-788-2445.**
Refrigerator is running but it won't reach target operating temperature of 34°-40° F.	Door is left opened for extended periods.	Review product loading and general use instructions with crew to ensure door is open for restocking and order filling only.
	Refrigerator is in direct sun through drive-through window.	Contact 3M® Corporation or their representative for information on tinted window film and its installation.
	Room temperature and/or humidity exceed recommended maximums.	Adjust store or drive-thru zone air conditioning. If these steps do not fix problem, **Call H&K at 800-788-2445.**
	Condenser Coil is dirty or clogged with debris.	Use a vacuum cleaner or soft brush to clean coils, per Preventative Maintenance instructions in Section 7. If these steps do not fix problem, **Call H&K at 800-788-2445.**
Door won't close automatically when released.	Obstruction in door track.	Check bottom door track for broken glass or other debris that may interfere with door.
	Door not installed properly.	Lift up and remove door. Catch spring return tab with top/leading edge of doorframe. Push toward center of case and insert door. See page 14 for photos and full instruction.
	Door auto-close spring broken.	**Call H&K at 800-788-2445.**

Parts List

Item	Description	H&K Part Number
1	Sliding Door and Frame	H-12-14-22
2	Wire Shelf	H-18-249
3	Shelf Divider	H-18-250
4	Condensing Unit	E-6-11-21
5	Filter/Dryer	P-1-12-25
6	Cord with Plug	E-10-12-8
7	Electronic Temperature Control	G-R02043
8	Evaporator	E-6-11-20
9	Evaporator Fan	E-6-022
10	Lumimax LED, 13-3/4” Cool White Hera	E-13-19-14
11	Power Switch	E-1-19-1
12	Temperature Probes	E-4-3-157
13	Drain Pan	H-11-72
14	Compressor	P-1-353
15	Condenser Fan	E-6-023
16	Heater exchanger	P-1-29-1

Parts Ordering and Service

Returns

Contact: H&K International, Inc.
2200 Skyline Drive
Mesquite, TX 75149
(214) 818-3500

Damages and Shortages

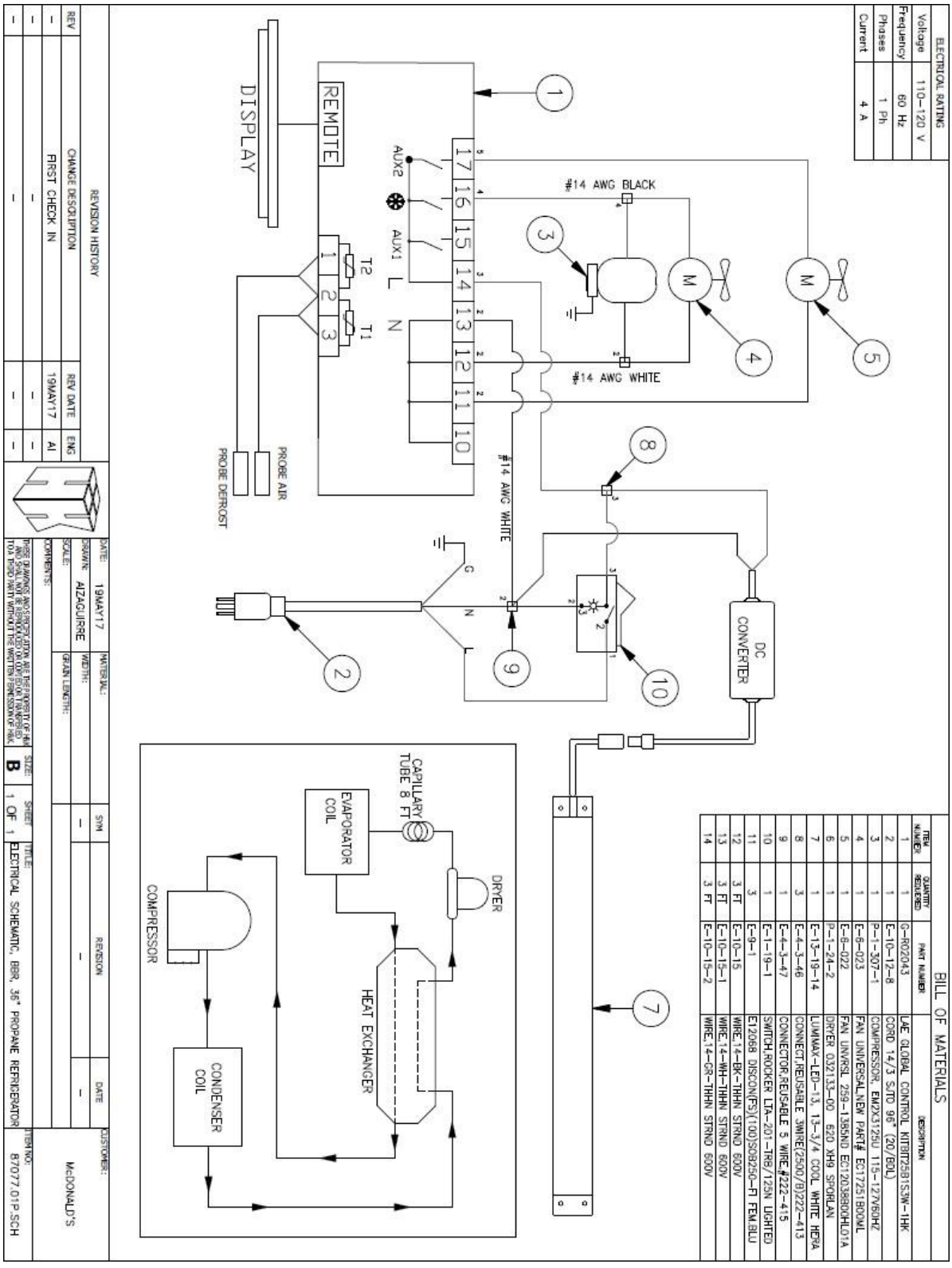
Upon receipt, examine the equipment carefully for any damage. If damage has occurred, notify the carrier and H&K Dallas, Inc. immediately.

Service and Parts

Contact: H&K International, Inc.
2200 Skyline Drive
Mesquite, TX 75149
(214) 818-3500

HAZARD Disconnect all power sources before attempting any service or repair work.
Caution! A qualified licensed technician should perform all service and repair.

Wiring Diagram



Parameters

Parameter	Setting Value	Parameter	Setting Value
SPL	≥33	FDH	01
SPH	40	FT1	00
SP	33	FT2	06
C-H	REF	FT3	20
HYS	07	ATM	NON
CRT	01	ADO	00
CT1	05	AHM	NON
CT2	07	ACC	00
CSD	00	IISM	NON
DFM	TIME	SB	YES
DFT	12	DI1	NON
DFB	NO	DI2	NON
DLI	44	LSM	NON
DTO	50	OA1	NON
DTY	OFF	OA2	FAN
DPD	00	OS1	03
DRN	00	T2	YES
DDM	DEF	OS2	00
DDY	10	TLD	30
FID	YES	SCL	F
FDD	45	SIM	00
FTO	00	ADR	1
FCM	NON	RES	NO
FDT	00		

Appendix: Controller Manual

BIT25 INSTRUCTIONS FOR USE

Thank you for having chosen an LAE electronic product. Before installing the instrument, please read this instruction booklet carefully in order to ensure safe installation and optimum performance.

DESCRIPTION

Fig.1 - Front panel

i Info / Setpoint button.

Manual defrost / Decrease button.

INDICATIONS

Thermostat output

Fan output

Defrost output

II° Activation of 2nd parameter set

Alarm

M Increase button / Manual activation.

Exit / Stand-by button.

INSTALLATION

- The BIT-25 controller has a size 86x82x44 mm (WxHxD).
- Make sure that electrical connections comply with the paragraph "wiring diagrams". To reduce the effects of electromagnetic disturbance, keep the sensor and signal cables well separate from the power wires.
- Place the probe T1 inside the room in a point that truly represents the temperature of the stored product.
- If present, place the probe T2 on the evaporator where there is the maximum formation of frost.
- If probe T3 is connected to DI2, its function is determined by the parameter **T3M**. With **T3M**=DSP the probe measures the temperature to be displayed. With **T3M**=CND the probe measures the condenser temperature, it must therefore be placed between the fins of the condensing unit.

OPERATION

DISPLAY

During normal operation, the display shows either the temperature measured or one of the following indications:

dEF	Defrost in progress	hi	Room high temperature alarm
oFF	Controller in stand-by	Lo	Room low temperature alarm
cL	Condenser clean warning	E1	Probe T1 failure
do	Door open alarm	E2	Probe T2 failure
hc	Condenser high temperature alarm	E3	Probe T3 failure
ALr	Generic Alarm		

INFO MENU

The information available in this menu is:

t1	Instant probe 1 temperature	tLo	Minimum probe 1 temperature recorded
t2 *	Instant probe 2 temperature	cnd **	Compressor working weeks
t3 *	Instant probe 3 temperature	Loc	Keypad state lock
th1	Maximum probe 1 temperature recorded		

: displayed only if enabled (see §Configuration Parameters)* * : displayed only if **ACC** > 0*

Access to menu and information displayed.

- Press and immediately release button i .
- With button ▼ or ▲ select the data to be displayed.
- Press button i to display value.
- To exit from the menu, press button ✖ or wait for 10 seconds.

Reset of THI, TLO, CND recordings

- With button ▼ or ▲ select the data to be reset.
- Display the value with button i.
- While keeping button i pressed, use button ✖.

SETPOINT : display and modification

- Press button i for at least half second, to display the setpoint value.
- By keeping button i pressed, use button ▼ or ▲ to set the desired value (adjustment is within the minimum **SPL** and the maximum **SPH** limit).
- When button i is released, the new value is stored.

STAND-BY
Button ⏻, when pressed for 3 seconds, allows the controller to be put on a standby or output control to be resumed (with **SB**=YES only).

KEYPAD LOCK
The keypad lock avoids undesired, potentially dangerous operations, which might be attempted when the controller is operating in a public place. In the INFO menu, set parameter **LOC**=YES to inhibit all functions of the buttons. To resume normal operation of keypad, adjust setting so that **LOC**=NO.

SELECTION OF SECOND PARAMETER GROUP
It's possible to select control parameters between two different pre-programmed groups, in order for the fundamental control parameters to be adapted quickly to changing needs. Changeover from Group **I** to Group **II** (and vice versa) may take place MANUALLY by pressing button M for 2 seconds (with **IISM**=MAN), or AUTOMATICALLY when **IISM**=DI2 and the AUXILIARY INPUT DI2 is activated (the activation of DI2 selects Group **II**). If **IISM**=NON, switchover to Group **II** is inhibited. The activation of Group **II** is signalled by the lighting up of the relevant LED on the controller display.

SETPOINT ADJUSTMENT VIA POTENTIOMETER
With **DI2**=PSP the setpoint is set via a 10KΩ linear potentiometer connected to DI2. The setpoint changes between **PSL** (10KΩ) and **PSL+PSR** (0Ω) proportionally. With **POF**=YES, if the potentiometer is turned to the minimum (0Ω), the controller will be put on standby. If the second parameter group is active, the setpoint used will be **IISP**.

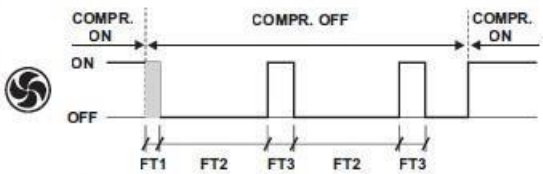
DEFROST
Automatic defrost. Defrost starts automatically when the defrost timer matches the time value set with **DFT**.
- Timed defrost. With **DFM**=TIM defrosts take place at regular intervals of **DFT** hours. For example, with **DFM**=TIM and **DFT**=06, a defrost will take place every 6 hours.
- Optimized defrost. With **DFM**=FRO the timer is increased only when the condition for frost to form in the evaporator occurs. Once the **DFT** value is reached, defrost takes place. If the evaporator works at 0°C, defrost frequency depends on the thermal load and climatic conditions. With setpoints much lower than 0°C, defrost frequency mainly depends on the refrigerator operating time.
- Defrost time count backup. At the power-up, if **DFB**=YES, the defrost timer resumes the time count from where it was left off before the power interruption. Vice versa, with **DFB**=NO, the time count re-starts from 0. In stand-by, the accumulated time count is frozen.

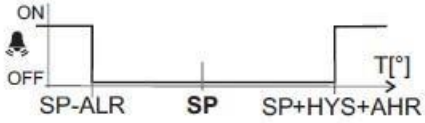
Manual or remote defrost start. It's possible to manually start a defrost, by pressing button ❄ for 2 seconds, or defrost may be started remotely, if **DI1**=RDS (**DI2**=RDS), through the making of the auxiliary contact DI1 (DI2).
Defrost type. Once defrost has started, Compressor and Defrost outputs are controlled according to parameter **DTY**. If **FID**=YES, the evaporator fans are active during defrost.
Defrost termination. The actual defrost duration is influenced by a series of parameters.
- Time termination: **T2**=NO. the evaporator temperature is not monitored and defrost will last as long as time **DTO**.
- Temperature termination: **T2**=YES. In this case, if the sensor T2 measures the temperature **DLI** before the time **DTO** elapses, defrost will be terminated in advance.

Resuming thermostatic cycle. When defrost is over, if **DRN** is greater than 0, all outputs will remain off for **DRN** minutes, in order for the ice to melt completely and the resulting water to drain. Moreover, the fans will re-start only when the evaporator temperature is lower than **FDD** (if **T2**=YES), or after **FTO** minutes have elapsed.
*Caution: if **DFM**=NON all defrost functions are inhibited; if **DFT**=0, automatic defrost functions are excluded; during a high pressure alarm or a DI1 (DI2) generic alarm, defrost is suspended; during defrost, high temperature alarm is bypassed.*

CONFIGURATION PARAMETERS
- To get access to the parameter configuration menu, press button ⏻ + i for 5 seconds.
- With button ▼ or ▲ select the parameter to be modified.
- Press button i to display the value.
- By keeping button i pressed, use button ▼ or ▲ to set the desired value.
- When button i is released, the newly programmed value is stored and the following parameter is displayed.
- To exit from the setup, press button ✖ or wait for 30 seconds.

PAR	RANGE	DESCRIPTION
SPL	-50..SPH	Minimum limit for SP setting.
SPH	SPL...110°C	Maximum limit for SP setting.
SP	SPL... SPH	Setpoint (value to be maintained in the room).
HYS	1.0...10.0°C	OFF/ON thermostat differential.

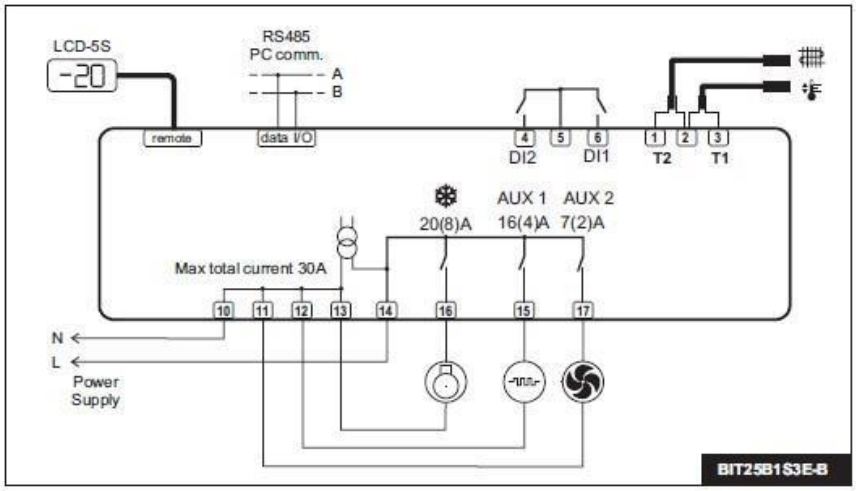
CRT		0...30min	Compressor rest time. The output is switched on again after CRT minutes have elapsed since the previous switchover. We recommend to set CRT=03 with HYS<2.0°.
CT1		0...30min	Thermostat output run when probe T1 is faulty. With CT1=0 the output will always remain OFF.
CT2		0...30min	Thermostat output stop when probe T1 is faulty. With CT2=0 and CT1>0 the output will always be ON. *Example:* CT1=4, CT2= 6: In case of probe T1 failure, the compressor will cycle 4 minutes ON and 6 minutes OFF.
CSD		0..30min	Compressor stop delay after the door has been opened (active only if D1=DOR or DI2=DOR).
DFM		NON; TIM; FRO	Defrost start mode **NON** : defrost function is disabled *(the following parameter will be* FCM*).* **TIM** : regular time defrost. **FRO** : the defrost time count is only increased when the conditions occur for frost to form on the evaporator (optimised time increase).
DFM = TIM or FRO	**DFT**	0...99 hours	Built-in timer value for an automatic defrost to take place.
	DFB	NO/YES	Defrost timer backup. With DFB=YES, after a power interruption, the timer resumes the count from where it was left off with ±30 min. approximation. With DFB=NO, after a power interruption, the defrost timer will re-start to count from zero.
	DLI	-50...110°C	Defrost end temperature.
	DTO	1...120min	Maximum defrost duration.
	DTY	OFF; ELE; GAS	Defrost type **OFF**: off cycle defrost (Compressor and Heater OFF). **ELE**: electric defrost (Compressor OFF and Heater ON). **GAS**: hot gas defrost (Compressor and Heater ON).
	DPD	0...240sec	Evaporator pump down. At the beginning of defrost, defrost outputs (determined by DTY) are OFF for DPD seconds.
	DRN	0...30min	Pause after defrost (evaporator drain down time).
	DDM	RT; LT; SP; DEF	Defrost display mode. During defrost the display will show: **RT**: the real temperature; **LT** : the last temperature before defrost; **SP** : the current setpoint value; **DEF** : "dEF".
	DDY	0...60min	Display delay. The display shows the information selected with parameter DDM during defrost and for DDY minutes after defrost termination.
	FID	NO/YES	Fans active during defrost.
	FDD	-50...110°C	Evaporator fan re-start temperature after defrost (referred to T2 probe).
	FTO	0...120min	Maximum evaporator fan stop after defrost.
FCM		NON; TMP; TIM	Fan mode during thermostatic control. **NON** : The fans remain ON all the time; **TMP** : Temperature-based control. The fans are ON when the compressor is ON. When the compressor is turned OFF, the fans remain ON as long as the temperature difference T2-T1 is greater than FDT. The fans are turned ON again with FDH differential. (T1 = Air temperature, T2 = Evaporator temperature); **TIM** : Timed-based control. The fans are ON when the compressor is ON. When the compressor is OFF, the fans switch ON and OFF according to parameteres FT1, FT2, FT3. 
FDT		-12.0...0.0°C	Evaporator-Air temperature difference for the fans to turn OFF after the compressor has stopped.

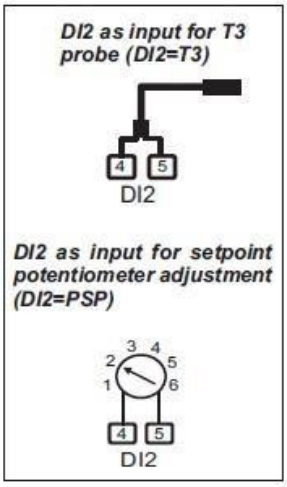
	FDH	1.0 ...12.0°C	Temperature differential for fan re-start. *Example*: FDT = -1.0, FDH=3.0. In this case, after the compressor has stopped, the fans are OFF when T2 > T1 - 1.0 (FDT), whereas the fans are ON when T2 < T1 - 4.0 (FDT-FDH).
	FT1	0...180sec	Fan stop delay after compressor stop.
	FT2	0 ... 30min	Timed fan stop. With FT2=0 the fans remain on all the time.
	FT3	0 ... 30min	Timed fan run. With FT3=0, and FT2 > 0, the fans remain off all the time.
	ATM	NON; ABS; REL	Alarm threshold management. **NON** : all temperature alarms are inhibited (*the following parameter will be* ADO). **ABS** : the values programmed in ALA and AHA represent the real alarm thresholds. **REL** : the values programmed in ALR and AHR are alarm differentials referred to SP and SP+HYS.  Temperature alarm with relative thresholds (ATM=REL).
ATM = ABS	**ALA**	-50 ... 110°C	Low temperature alarm threshold.
ATM = ABS	**AHA**	-50 ... 110°C	High temperature alarm threshold.
ATM = REL	**ALR**	-12.0...0.0°C	Low temperature alarm differential. With ALR=0 the low temperature alarm is excluded.
ATM = REL	**AHR**	0.0 ...12.0°C	High temperature alarm differential. With AHR=0 the high temperature alarm is excluded.
ATM = ABS or REL	**ATI**	T1; T2; T3	Probe used for temperature alarm detection.
ATM = ABS or REL	**ATD**	0 ... 120min	Delay before alarm temperature warning.
	ADO	0 ... 30min	Delay before door open alarm warning.
	AHM	NON; ALR; STP;	Operation in case of high condenser alarm **NON** : high condenser alarm inhibited *(the following parameter will be* ACC*)*. **ALR** : in case of alarm, "HC" flashes in the display and the buzzer is switched on. **STP** : in addition to the alarm symbols displayed, the compressor is stopped and defrosts are suspended.
	AHT	-50...110°C	Condensation temperature alarm (referred to T3 probe). [only if AHM=ALR or AHM=STP]
	ACC	0 ... 52 weeks	Condenser periodic cleaning. When the compressor operation time, expressed in weeks, matches the ACC value programmed, "CL" flashes in the display. With ACC=0 the condenser cleaning warning is disabled and CND disappears from Info Menu.
	IISM	NON; MAN; DI2	Switchover mode to second parameter set **NON** : inhibition to use the second parameter group (*the following parameter will be* SB). **MAN** : button M switches the two parameter groups over. **DI2** : switchover to the second parameter group when the auxiliary DI2 input makes.

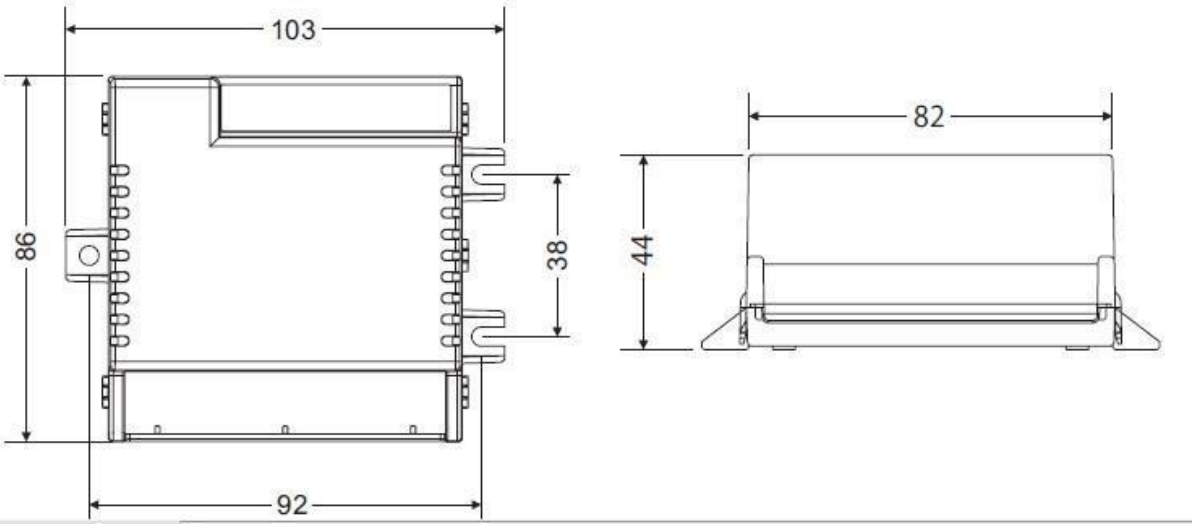
IISM = MAN or DI2	**IISL**	-50... IISH	Minimum limit for IISP setting.
	IISH	IISL... 110°C	Maximum limit for IISP setting.
	IISP	IISL... IISH	Setpoint in mode 2.
	IIHY	1.0... 10.0°C	OFF/ON differential in mode 2.
	IIFC	NON; TMP; TIM	Fan control in mode 2. See FCM.
	IIDF	0...99 hours	Built-in timer value for an automatic defrost to take place, in mode 2.
	SB	NO/YES	Stand-by button ⏻ enabling.
	DI1	NON; DOR; ALR; RDS.	DI1 digital input operation **NON** : digital input 1 not active. **DOR** : door input. **ALR** : when contact opens an alarm is generated (if AHM=STP, the compressor is stopped and defrosts are suspended). **RDS** : when contact makes a defrost is started (remote control).
	DI2	NON; DOR; ALR; RDS; IISM; T3; PSP	DI2 digital input operation **NON** : digital input 2 not active. **DOR** : door input. **ALR** : when contact opens an alarm is generated (if AHM=STP, the compressor is stopped and defrosts are suspended). **RDS** : when contact makes a defrost is started (remote control). **IISM** : when contact makes the second parameter group is active. **T3** : probe T3 input. **PSP** : potentiometer setpoint input.
DI2 = T3	**T3M**	DSP; CND.	Auxiliary probe T3 operation **DSP** : temperature T3 to be displayed. **CND** : condenser temperature measurement.
	OS3	-12.5..12.5°C	Probe 3 offset.
DI2 = PSP	**PSL**	-50...70°C	Minimum setpoint adjusted via potentiometer.
	PSR	0.0...15.0 °C	Range of setpoint adusted via potentiometer Example: with PSL=2.0 and PSR=8.0, the setpoint changes between 2.0°C and 10.0°C (PSL+PSR).
	POF	NO/YES	Potentiometer standby enabling. With POF=YES, when the potentiometer is turned to the minimum, the controller will be put on standby.
	LSM	NON; MAN; D1O; D2O; D2C.	Light control mode **NON** : light output not controlled. **MAN** : light ouput controlled through button M **D1O** : when DI1 is open, light output is on. **D2O** : when DI2 is open, light output is on. **D2C** : when DI2 is closed, light output is on.
	OA1	NON; FAN; DEF; LGT; 0-1; ALO; ALC	AUX 1 output operation **NON** : output disabled (always off). **FAN** : output enabled for fan control. **DEF** : output enabled for defrost control. **LGT** : output enabled for light control. **0-1** : the relay contacts follow the on/standby state of controller. **ALO** : contacts open when an alarm condition occurs. **ALC** : contacts make when an alarm condition occurs.

OA2	See **OA1**	AUX2 output operation. See OA1.
OS1	-12.5..12.5°C	Probe T1 offset.
T2	NO/YES	Probe T2 enabling (evaporator).
OS2	-12.5..12.5°C	Probe T2 offset.
TLD	1...30 min	Delay for minimum temperature (TLO) and maximum temperature (THI) logging.
SCL	1°C; 2°C; °F	Readout scale. **1°C** : measuring range -50…110°C (0.1°C resolution within -9.9 ÷ 19.9°C interval, 1°C outside) **2°C** : measuring range -50…110°C **°F** : measuring range -58…180°F
SIM	0...100	Display slowdown.
ADR	1...255	BIT25 address for PC communication.

WIRING DIAGRAMS







Notes