



Operator's Manual

ColdCube™ Connect

Operator's and Diagnostic Procedures

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Introduction

There is nothing complicated about operating and maintaining your Thermo King unit, but a few minutes studying this manual will be time well spent. Performing pre-trip checks and enroute inspections on a regular basis will minimize on-the-road operating problems. A regular maintenance program will also help to keep your unit in top operating condition. If factory recommended procedures are followed, you will find that you have purchased the most efficient and dependable temperature control system available. (see “Cleaning and Maintenance” on page 38).

All service requirements, major and minor, should be handled by a Thermo King Dealer for these very important reasons:

- They have factory trained and certified technicians
- They have genuine Thermo King replacement parts
- They are equipped with the factory recommended tools to perform all service functions
- The warranty on your new unit is valid only when the repair and replacement of component parts is performed by an authorized Thermo King Dealer.

Important: *This manual is published for informational purposes only and the information furnished herein should not be considered as all-inclusive or meant to cover all contingencies. If more information is required, consult your Thermo King Service Directory for the location and telephone number of the local dealer.*

Customer Satisfaction Survey

Let your voice be heard!

Your feedback will help improve our manuals. The survey is accessible through any internet-connected device with a web browser.

Scan the Quick Response (QR) code or click or type the web address to complete the survey:

http://irco.az1.qualtrics.com/SE/?SID=SV_2octfSHoUJxsk6x



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Emergency Assistance

Thermo Assistance is a multi-lingual communication tool designed to put you in direct contact with an authorized Thermo King dealer.

Thermo Assistance should only be contacted for breakdown and repair assistance.

To use this system, you need the following information before you call:
(phone charges will apply)

- Contact Phone Number
- Type of TK Unit
- Thermostat Setting
- Present Load Temperature
- Probable Cause of Fault
- Warranty Details of the Unit
- Payment Details for the Repair

Leave your name and contact number and a Thermo Assistance Operator will call you back. At this point you can give details of the service required and the repair will be organized.

Please note that Thermo Assistance cannot guarantee payments and the service is designed for the exclusive use of refrigerated transporters with products manufactured by Thermo King Corporation.



Belgium	+32 270 01 735
Denmark	+45 38 48 76 94
France	+33 171 23 05 03
Germany	+49 695 00 70 740
Italy	+39 02 69 63 32 13
Spain	+34 914 53 34 65
The Netherlands	+31 202 01 51 09
United Kingdom	+44 845 85 01 101
Kazakhstan	+7 7273458096
Russia	+7 4992718539
Others	+32 270 01 735

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General Inquires and Unit Maintenance

For general inquiries please contact your local Thermo King dealer. Go to www.europe.thermoking.com and select dealer locator for your local Thermo King dealer. Or refer to the Thermo King Service Directory for contact information.

Warranty

The ColdCube™ Connect Unit Warranty is two years for parts and labour. A full description of the warranty is available upon request.

Accessing Operator Manual Translations

This manual is available in the following languages: English, French, Italian, German, Spanish and Turkish. Your unit comes with English version only printed as standard. However, you can access the translated versions at the following location:
www.emea-user-manuals.thermoking.com



You can also order a printed version of your particular manual from your Thermo King Dealer Representative.

Section 1 - Safety Information

Danger, Warning, Caution, and Notice

Thermo King® recommends that all service be performed by a Thermo King dealer and to be aware of several general safety practices.

Safety advisories appear throughout this manual as required. Your personal safety and the proper operation of this unit depend upon the strict observance of these precautions. The four types of advisories are defined as follows:

⚠ DANGER

Hazard!

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

Hazard!

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Hazard!

Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury and unsafe practices.

NOTICE

Hazard!

Indicates a situation that could result in equipment or property-damage only accidents.

Section 1 - Safety Information

General Practices

Thermo King recommends that all services be performed by a Thermo King dealer. However, there are several general safety practices which you should be aware of:

Important: *Thermo King will not be held liable for claims for damage resulting from the following:*

- *Misuse, improper installation, abnormal service, storage of hazardous chemicals, use of corrosive substances, transit damage, recharging of cooling system, accident, fire, improper repair, tampering or abuse.*
- *Incorrect voltages or faults with regard to power supply which falls outside of the ColdCube™ Connect operating parameters.*

⚠ DANGER

Risk of Injury!

Improper servicing can lead to fire, electrocution, or explosion. Never service, repair, or troubleshoot a system unless you are a professional service person.

⚠ WARNING

Personal Protective Equipment (PPE) Required!

Always wear goggles or safety glasses and proper PPE when working on a unit. Refrigerant liquid, oil, and battery acid can permanently damage your eyes. When working with or around hazardous chemicals, ALWAYS refer to appropriate Material Data Safety Sheets (MSDS) and OSHA/GHS (Global Harmonized System of Classification and Labelling of Chemicals) guidelines for information on allowable personal exposure levels, proper respiratory protection, and handling instructions.

⚠ CAUTION

Risk of Injury!

Thermo King Multi-Temperature SPECTRUM truck condensing units and SPECTRUM remote evaporators are shipped with a 35–69 kPa (5–10 psi) holding charge of nitrogen. This holding charge may be safely vented into the atmosphere by carefully removing the ORS caps from the condensing unit and unsoldering the caps from the evaporators. Always wear goggles or safety glasses when removing the refrigeration tubing caps.

Section 1 - Safety Information**NOTICE****Children!**

Do not let children to tamper with the unit. The unit is not intended for use by young children unless they have been adequately supervised by a responsible person to ensure they can use it safely.

NOTICE**Equipment Damage!**

Do not operate the unit if it is visibly damaged.

NOTICE**Equipment Damage!**

The ColdCube™ Connect is not suitable for transporting caustic materials or materials containing solvents. Food may transported in its original packaging or in suitable containers.

NOTICE**Equipment Damage!**

Do not place any electrical devices inside the cooling container.

NOTICE**Equipment Damage!**

Set up the ColdCube™ Connect in a dry location where it is protected against splashing water. Protect the ColdCube™ Connect and the cable against rain and moisture.

NOTICE**Equipment Damage!**

Risk of overheating! Do not place ColdCube™ Connect near open flames or other heat sources (heaters, direct sunlight, gas ovens etc.). Always make sure there is sufficient ventilation so that heat generated during normal operation can dissipate. Make sure the ventilation slots are not covered. Leave at least 2 inches (50 mm) from top and around the ColdCube™ Connect to ensure adequate ventilation. Never immerse the ColdCube™ Connect in water. Do not fill the inner container with ice or fluid.

Electrical Hazards

⚠ DANGER

Hazardous Voltage!

Risk of fatal injury from electric shocks! Do not touch exposed cables with your bare hands. This especially applies when operating the ColdCube™ Connect from an AC power supply.

⚠ DANGER

Hazardous Voltage!

Risk of fatal injury from electric shocks! When using the ColdCube™ Connect on boats, if the ColdCube™ Connect is powered by 110-240 VAC, verify the power supply has a residual current circuit breaker. Check if the voltage specification on the type plate is the same as that of the power supply.

Only connect the ColdCube™ Connect as follows:

- with the 12/24 V connection cable included with the ColdCube™ Connect to a 12/24 V battery.
- or, with the 110-240 V connection cable included with the ColdCube™ Connect to the 110-240 VAC supply.

If the cable is damaged, it must be replaced to prevent possible electrical hazards.

Disconnect the connection cable before cleaning and maintenance, after use and before changing a fuse.

⚠ WARNING

Hazardous Voltage!

Treat all wires and connections as if they were high voltage until a meter and wiring diagram indicate otherwise. Only use tools with insulated handles. Never hold uninsulated metal tools near exposed, energized conductors. If there is a risk of energized electrical contact, arc, or flash, technicians **MUST** put on all PPE in accordance with OSHA, NFPA 70E, or other local, state, or country-specific requirements for arc flash protection **PRIOR** to servicing the unit. **NEVER PERFORM ANY SWITCHING, DISCONNECTING, OR VOLTAGE TESTING WITHOUT PROPER ELECTRICAL PPE AND ARC FLASHING CLOTHING. ELECTRICAL METERS AND EQUIPMENT MUST BE PROPERLY RATED FOR INTENDED VOLTAGE.**

Section 1 - Safety Information**⚠ WARNING****Live Electrical Components!**

Control circuits used in your equipment are low voltage (12 or 24 VDC). The voltage is not dangerous but the large amount of electric current (amperage) from alternator and battery can cause severe burns if accidentally shorted to ground with metal objects, such as tools. Do not wear jewelry, watches, or rings because they increase the risk of shorting out electrical circuits and damaging the equipment or causing severe burns.

⚠ WARNING**Risk of Injury!**

The unit power plug must be clean and dry before connecting it to a power source.

⚠ WARNING**Hazardous Voltage!**

Never work alone on high voltage circuits in the refrigeration unit. Another person should be nearby to shut off the unit and provide aid in the event of an accident. If there is a risk of energized electrical contact, arc, or flash, technicians **MUST** put on all PPE in accordance with OSHA, NFPA 70E, or other local, state, or country-specific requirements for arc flash protection **PRIOR** to servicing the unit. **NEVER PERFORM ANY SWITCHING, DISCONNECTING, OR VOLTAGE TESTING WITHOUT PROPER ELECTRICAL PPE AND ARC FLASHING CLOTHING. ELECTRICAL METERS AND EQUIPMENT MUST BE PROPERLY RATED FOR INTENDED VOLTAGE.**

⚠ WARNING**Hazardous Voltage!**

Danger of electrocution! Disconnect the connection cable before you replace the ColdCube™ Connect fuse.

⚠ WARNING**Personal Protective Equipment (PPE) Required!**

In the event of an electrical accident, all required PPE should be near the work area in accordance with OSHA, NFPE 70E, or other local, state, or country-specific requirements for a Category 2 risk.

Section 1 - Safety Information**⚠ WARNING****Risk of Injury!**

Do not make rapid moves when working on high voltage circuits in refrigeration units. Do not grab for falling tools because you might accidentally touch a high voltage source.

NOTICE**Equipment Damage!**

Disconnect your equipment and all other electric devices from the battery before you connect the battery to a quick charging device. Over-voltage can damage the electronics of your equipment.

First Aid

REFRIGERANT

- **Eyes:** For contact with liquid, immediately flush eyes with large amounts of water and get prompt medical attention.
- **Skin:** Flush area with large amounts of warm water. Do not apply heat. Remove contaminated clothing and shoes. Wrap burns with dry, sterile, bulky dressing to protect from infection. Get prompt medical attention. Wash contaminated clothing before reuse.
- **Inhalation:** Move victim to fresh air and use Cardio Pulmonary Resuscitation (CPR) or mouth-to-mouth resuscitation to restore breathing, if necessary. Stay with victim until emergency personnel arrive.
- **Frost Bite:** In the event of frost bite , the objectives of First Aid are to protect the frozen area from further injury, warm the affected area rapidly, and to maintain respiration.

REFRIGERANT OIL

- **Eyes:** Immediately flush with large amounts of water for at least 15 minutes. Get prompt medical attention.
- **Skin:** Remove contaminated clothing. Wash thoroughly with soap and water. Get medical attention if irritation persists.
- **Inhalation:** Move victim to fresh air and use Cardio Pulmonary Resuscitation (CPR) or mouth-to-mouth resuscitation to restore breathing, if necessary. Stay with victim until emergency personnel arrive.
- **Ingestion:** Do not induce vomiting. Immediately contact local poison control center or physician.

ENGINE COOLANT

- **Eyes:** Immediately flush with large amounts of water for at least 15 minutes. Get prompt medical attention.
- **Skin:** Remove contaminated clothing. Wash thoroughly with soap and water. Get medical attention if irritation persists.
- **Ingestion:** Do not induce vomiting. Immediately contact local poison control center or physician.

BATTERY ACID

Under normal usage, the Ni-MH batteries are hermetically sealed. In case of accident, perform the following instructions:

Section 1 - Safety Information

- **Eyes:** Immediately flush with large amounts of water for at least 15 minutes. Get prompt medical attention. Wash skin with soap and water.
- **INHALATION:** Provide fresh air. Rinse mouth and nose with water. Seek immediate medical assistance.
- **SKIN CONTACT:** Immediately remove contaminated clothing. Wash skin with large volumes of water, for at least 15 minutes. Wash skin with soap and water. Do not apply fatty compounds. Seek immediate medical assistance.
- **INGESTION:** If the injured person is fully conscious: make the person drink extensive amounts of milk. Do not induce vomiting. Take the injured person immediately to a hospital.

ELECTRICAL SHOCK

Take IMMEDIATE action after a person has received an electrical shock. Get quick medical assistance, if possible.

The source of the shock must be quickly stopped, by either shutting off the power or removing the victim. If the power cannot be shut off, the wire should be cut with a non-conductive tool, such as a wood-handle axe or thickly insulated cable cutters. Rescuers should wear insulated gloves and safety glasses, and avoid looking at wires being cut. The ensuing flash can cause burns and blindness.

If the victim must be removed from a live circuit, pull the victim away with a non-conductive material. Use wood, rope, a belt or coat to pull or push the victim away from the current. **DO NOT TOUCH** the victim. You will receive a shock from current flowing through the victim's body. After separating the victim from power source, immediately check for signs of a pulse and respiration. If no pulse is present, start Cardio Pulmonary Resuscitation (CPR). If a pulse is present, respiration might be restored by using mouth-to-mouth resuscitation. Call for emergency medical assistance.

ASPHYXIATION

Move victim to fresh air and use Cardio Pulmonary Resuscitation (CPR) or mouth-to-mouth resuscitation to restore breathing, if necessary. Stay with victim until emergency personnel arrive.

Section 2 - Unit Description

Thermo King ColdCube™ Connect cooling containers are the flexible and convenient solution for transportation of perishable goods in cars, trucks or vans. The heavy duty ColdCube™ Connect is made of rotationally moulded polyethylene and can be cleaned easily according to 93/43/EEC (HACCP).

- Operating voltage is 12/24 V DC and 110-140 V AC, 50-60 Hz for the optional AC connection.
- The refrigerant gas is CFC free R134a R404a.
- The digital temperature controller allows easy setting of the internal temperature.

Figure 1. ColdCube™ Connect



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There are sixteen ColdCube™ Connect models available:

- 32 Litre in freezing
- 32 Litre in freezing and heating (Pharma)
- 82 Litre in freezing
- 82 Litre in freezing and heating (Pharma)

Section 2 - Unit Description

- 140 Litre in cooling
- 140 Litre in cooling and heating
- 140 Litre in freezing
- 140 Litre in freezing and heating (Pharma)
- 330 Litre in cooling
- 330 Litre in cooling and heating
- 330 Litre in freezing
- 330 Litre in freezing and heating (Pharma)
- 720 Litre in cooling
- 720 Litre in cooling and heating
- 720 Litre in freezing
- 720 Litre in freezing and heating (Pharma)

Section 3 - Specifications

ColdCube™ Connect Style

ColdCube™ Connect Style	Gross Capacity (Litres)	Minimum Temp (a)	Max Amps @ 12 VDC (b)	External Dimensions L x W x H (mm)	Internal Dimensions L x W x H (mm)	Weight (kg)
Freezing	32	- 24°C	9 A	670 x 390 x 480	327 x 223 x 344	22,5
Freezing & Heating (Pharma)	32	- 24°C	9 A	670 x 390 x 480	327 x 223 x 344	22,5
Freezing	82	- 24°C	9 A	940 x 560 x 551	523 x 358 x 366	35
Freezing & Heating (Pharma)	82	- 24°C	9 A	940 x 560 x 551	523 x 358 x 366	35
Cooling	140	- 10°C	10 A	1000 x 620 x 710	620 x 369 x 510	52
Cooling & Heating	140	- 10°C	10 A	1000 x 620 x 710	540 x 369x 510	54
Freezing	140	- 21°C	18 A	1000 x 620 x 710	590 x 369 510	55
Freezing & Heating (Pharma)	140	- 21°C	18 A	1000 x 620 x 710	520 x 369 x 510	57
Cooling	330	0°C	10 A	1020 x 1000 x 1000	810 x 550 x 660	80
Cooling & Heating	330	0°C	10 A	1020 x 1000 x 1000	730 x 550 x 660	83
Freezing	330	- 21°C	18 A	1020 x 1000 x 1000	780 x 550 x 660	83
Freezing & Heating (Pharma)	330	-21°C	18 A	1020 x 1000 x 1000	710 x 550 x 660	86
Cooling	720	0°C	20 A	1400 x 1100 x 1100	1020 x 850 x 780	144
Cooling & Heating	720	0°C	20 A	1400 x 1100 x 1100	940 x 850 x 780	147
Freezing	720	- 24°C	32 A	1400 x 1100 x 1100	980 x 850 x 780	150
Freezing & Heating (Pharma)	720	-24°C	32 A	1400 x 1100 x 1100	910 x 850 x 780	153

Section 3 - Specifications

(a) At ambient temperature of 30°C

(b) Divide by 2 to get 24 VDC Amps; divide by 10 to get 120 VAC Amps

Fuse Sizes

- 32 Litre in freezing: 16 A
- 32 Litre in freezing and heating (Pharma): 16 A
- 82 Litre in freezing: 25 A
- 82 Litre in freezing and heating (Pharma): 25 A
- 140 Litre in cooling: 30 A
- 140 Litre in cooling and heating: 30 A
- 140 Litre in freezing: 50 A
- 140 Litre in freezing and heating (Pharma): 50 A
- 330 Litre in cooling: 30 A
- 330 Litre in cooling and heating: 30 A
- 330 Litre in freezing: 30 A
- 330 Litre in freezing and heating (Pharma): 30 A
- 720 Litre in cooling: 50 A
- 720 Litre in cooling and heating: 50 A
- 720 Litre in freezing: 50 A
- 720 Litre in freezing and heating (Pharma): 50 A

Section 4 - ColdCube™ Connect Installation

Note: Refer to ColdCube™ Connect specifications page in the rear of this manual for unit max and average current requirements. Please ensure this has been taken into account for alternator and battery sizing.

⚠ CAUTION

Hazard!
Anchor the ColdCube™ Connect to prevent it from shifting and causing harm to people or cargo.

⚠ CAUTION

Hazard!
The ColdCube™ Connect unit and electrical connections are not water resistant or water proof. The ColdCube™ Connect may not be used outside without proper protection from the weather.

Choose a well-ventilated installation location that is protected from direct sunlight.

Electrical Connections

Figure 2. AC/DC Cover (150W Example)



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1	AC Power Cable
2	DC Power Cable

Connecting to a DC Battery

Note: If the vehicle is equipped with a battery disconnect switch, always wire the ColdCube™ Connect after the switch. This allows power to the ColdCube™ Connect to be turned off by the battery disconnect switch.

⚠ CAUTION

Hazard!

Danger of damaging the ColdCube™ Connect! Over-voltages can damage device electronics. Disconnect the cooling container and other consumers from the battery before charging the battery with a quick charging device.

For safety reasons, the cooling container is equipped with an electronic system to protect it against reversed polarity when connecting to a battery.

⚠ CAUTION

Hazard!

Danger of damaging the ColdCube™ Connect! To prevent voltage and power losses, the cable should be as short as possible and not be interrupted. For this reason avoid additional switches, plugs or socket strips.

The ColdCube™ Connect is supplied with a standard length DC battery cable with a fuse on the positive side. If this cable cannot be used, the fuse must be transferred to the cable installed.

Determine the required cross section of the cable in relation to the cable length according to the following table:

140, 330 and 720 Litre Cooling			
Cross section		Max Length 12V	Max Length 24V
(mm ²)	(AWG)	(m)	(m)
2.5	13	2.5	5
4	11	4	8
8	6	6	12
10	7	10	20

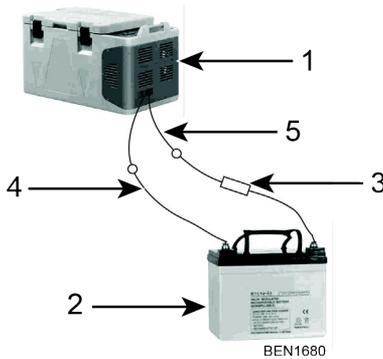
Section 4 - ColdCube™ Connect Installation

32, 82, 140, 330 and 720 Litre Freezing			
Cross section		Max Length 12V	Max Length 24V
(mm ²)	(AWG)	(m)	(m)
5	10	2.5	5
8	8	4	8
12	6	6	12
20	4	10	20

⚠ CAUTION

Hazard!
 Danger of damaging the ColdCube™ Connect! Make sure that the polarity is correct.

Figure 3. Battery Connections



1	ColdCube™ Connect	4	Negative
2	Battery	5	Positive
3	Fuse		

Before starting up the ColdCube™ Connect for the first time, check whether the operating voltage and the battery voltage match (see type plate).

Note: Make sure that the cable at the positive battery terminal is protected with a fuse. See Figure 3.

Low Voltage DC Protection

The ColdCube™ Connect is equipped with a battery monitor that protects the compressor from low voltage when connected to DC power. Thermo King has set the compressor low voltage disconnect higher than required to provide partial battery protection. If the ColdCube™ Connect is operated when the vehicle ignition is switched off, the compressor switches off automatically as soon as the supply voltage falls below a set level. The compressor will switch back on once the battery has been recharged to the restart voltage level (normally 1.3 V higher than the cut-out value).

Note: *The battery monitor only switches the compressor off and not the fans or controller, therefore a residual draw of 1 to 1.5 amps on the battery will remain unless the ColdCube™ Connect power switch is turned off. We highly recommend installing an ignition switch relay to turn off the ColdCube™ Connect when the vehicle is not running.*

Connecting to a 110-240 VAC Power Source

⚠ CAUTION

Hazard!

Danger of electrocution! Never handle plugs and switches with wet hands or if you are standing on a wet surface.

The ColdCube™ Connect can be purchased with the option of a built-in multi-voltage electrical connection adapter with a priority circuit for connecting to a 110-240 VAC supply.

The priority circuit automatically switches to VAC operation if the ColdCube™ Connect is connected to a 110-240 VAC supply, even if the 12/24 V cable is still connected.

If both power sources are connected, AC power is selected. If the AC power supply is disconnected or drops below 85 VAC there will be a one minute time delay before the compressor switches to operate on DC power. If AC power is established at any time, there will be no delay to compressor operation.

- Plug the AC connection cable into the AC voltage.

Section 5 - HACCP / Bluetooth Module - Optional

EVconnect is an easy solution that helps to easily get HACCP temperature and to manage the basic temperature, open door and blackout alarms.

EVconnect is made of three basic elements:

- **Thermoregulators:** The newest Evco controllers EV3290 series or EVJ series. Some controllers can have the EVLINK on board.
- **EVFI25TBX:** A memory also called EVLINK and transmission module (provided with 16 Mb memory, real time clock and Bluetooth 4.0 transmission module)
- **EVconnect:** Application for Android 4.4 devices which supports BLE 4.0.

EVLINK is available as an accessory and the application is freely downloadable on Google Play (an Apple version is under development).

This solution is capable of storing at least one year of recordings, that the user can download via Bluetooth into a smartphone or tablet without losing data. Temperature graph is immediately available as far as the possibility of send via e-mail the information as image or “.csv” file for Excel.

Wiring

The EVLINK module should be connected to the EVCO thermostat using the TTL port on the side of the same. Do not try to extend the wirings. For full installation and use instructions see the notes provided with the EVLINK. It is the EVlink module that features a real time clock, data storage and Bluetooth transmission. You have to wire connect the module to the controller (by removing the front panel) and then you can pair the module to your Android phone by the EVconnect application.

Regulator Display

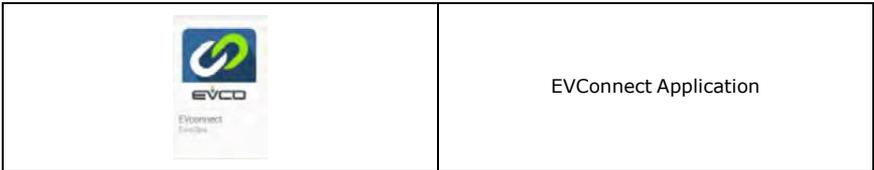
The very first time a regulator is connected to the EVlink, the RTC alarm can appears. The user can decide to set the real time clock via keyboard (1) or via APP (2).

1. Unlock the device keyboard if necessary, push Down key for 2", “rtc” appears. Push repetitively SET key to select the rtc_items year, month... (Y- n- d-) and change value with UP/DOWN.
2. By connecting EVconnect you will be asked to synchronize with the local time of your device.

How to Start Using EVConnect Application

Download EVConnect Application to your device from Google Play store.

Note: The application is compatible with the android 4.4 version and above and Bluetooth BLE 4.0 Low Energy and above.



Compatible with

- Android 4.4
- BLE 4.0 Low Energy

The application enables the language of your device if available.

Start the Application

1. Activate the Bluetooth.

Change the program of the EVCO Controller

Note: When you connect the Bluetooth device to a new unit, you will be required to change the program of the EVCO Controller.
(It only happens when you connect the Bluetooth device later than you buy it, otherwise it will be done in the factory).

- a. Switch ON the EVCO unit.
- b. Press and hold SET.
- c. Once PA appears on the screen , press SET and enter the password (-19) to enter in the programming mode.

Note: Do not change the parameters other than: rE1, BLE.

- d. Select rE1 using DOWN icon and press SET to check the value is 1. If not then use UP icon until 1 is display on the screen then press SET.
- e. Select BLE using DOWN icon and press SET to check the value is 1. If not then use UP icon until 1 is display on the screen then press SET.
- f. Press and hold SET to exit the programming mode and restart the unit.

Section 5 - HACCP / Bluetooth Module - Optional

2. BLE SCANNING When starting EVconnect checks the BLE compatible devices that are listed below.
3. Under the SETUP icon it is possible to select the language if necessary.

	Setup Icon
---	------------

4. Select EVLINK #1 and wait some seconds. Be aware of not selecting other items of the list.
5. Real time clock synchro: if necessary you will be required to synchronize the clock.
6. PASSWORD
The default passwords are the following:
 - Limited access (end user): 426
 - Full access (service): 826

Be aware that the unit may have different settings.

Home Page

The Home Page allows you to easily operate with 4 main selections: HACCP, REAL TIME, ALARMS, and SERVICE while with the following setup icons you can:

	Power Icon
	Setting Icon
	Back Arrow Icon

1. Push power icon to go back to scan list of the compatible BLE 4.0 devices.
2. Push setting icon to enter the basic settings:

CONNECTION NAME: give a connection name between the smart device and the EVLINK unit. All the saved settings are automatically repeated with the next connection.

Section 5 - HACCP / Bluetooth Module - Optional

DEVICE NAME: it allows to set a name to the physical device. The new device name will be in substitution of the EVLINK#1. Be aware when using small display smart phones, a device name too long implies a shorter reading data space area.

HACCP: to manage the recordings:

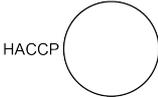
- **START/STOP REG:** stop recordings
- **INSTANT READING:** to log instantaneously, eg: without waiting the log interval time.
- **RESET:** to reset the whole memory. Be aware that logs are no more reloaded.

PASSWORD: To modify the password level (user or service) by entering the corresponding password.

FIRMWARE VERSION AND PROTOCOL: system identification data. Push back arrow to go back to HOME.

HACCP Reading

1. After having enough recordings into the memory, push HACCP to access the logs. Remember that the recording interval time is a parameter of the main controller.

	HACCP Icon
--	------------

2. The daily recordings (today) are downloaded after a while. These icons can follow the data:

	Bad Alarm Occurred.
	Event or Alarm Occurred

Push below icon to download the available intervals of data..

	Download
---	----------

Section 5 - HACCP / Bluetooth Module - Optional

To help the user a popup menu allows to download some defined interval of times such as: Today, Last Week, from to etc.

Push back arrow to go back to HOME.

Showing the Data

	Select the variables to show
	Show as graph format
	Back to table format (top left)
	Send the data (e-mail, etc.)

Data can be sent as graph image of the main variables or “.csv” file containing the day by day data (a complete file).

Information / Details

	<p style="text-align: center;">Information / Details</p> <p>20/05/16 50.7  12:09</p>
---	--

Push on the information key allows you to check additional events that are combined with that temperature recording such as probe error readings, main regulation status and alarms. CLOSE to go back.

Real Time Data

	Select this icon to access the real time data readings.
---	---

A list of functioning status are displayed such as: regulation temperatures, status of the relays (compressor, defrost, fans), and functions: energy saving, defrost etc. Manual Commands are available depending on the model of the controllers.

Real Time Alarms

	Select this icon to show actual alarms with its description.
---	--

Service

	Service
---	---------

Note: *Expert only with service password.*

Push service icon to access the 4 items menu:

Real for real time data with limited variables.

Service for all the variables of the unit.

ALAR for all the possible alarms of the unit.

PAR for local parameter manager.

Parameters for Expert Only

This selection allows to check or modify a run time parameter value, wait to download the full list before operating (some seconds depending on the controller model).

AVAILABLE OPERATION

1. PAR menu: load instantaneously the parameter map, wait some seconds before the data are completely downloaded.
2. Scroll the list and /select the parameter.
3. Change and save the new parameter value. Be aware that the operation is completed just after pushing CONFIRM button.
4. Export a map.
5. Import a map.

Section 6 - Operation

NOTICE

Equipment Damage!

Risk of overheating! Do not place ColdCube™ Connect near open flames or other heat sources (heaters, direct sunlight, gas ovens etc.). Always make sure there is sufficient ventilation so that heat generated during normal operation can dissipate. Make sure the ventilation slots are not covered. Leave at least 2 inches (50 mm) from top and around the ColdCube™ Connect to ensure adequate ventilation. Never immerse the ColdCube™ Connect in water. Do not fill the inner container with ice or fluid.

Control Panel



1.	The main switch
2.	The electronic thermostat (touchscreen type)
3.	The red led light of self-diagnostic or the jack for the connection to SECOP communication gateway and Tool4Cool diagnostic software (only units with BD220CL compressor).

Electronic Thermostat (EVCO)

The EVCO electronic thermostat has a digital touchscreen display and an alarm buzzer.

Figure 4. Thermostat Display



Touchscreen icons used for operating the thermostat:

Table 1. Thermostat Display Keys

Key	Description
 SET	SET keypad lock
	OFF ^(a)
FNC 	DOWN
	UP

^(a) Quick exit from programming procedure, with last set values saved in memory.

Following icons are active on the display:

Table 2. Thermostat Display Icons

Icon	ON	OFF	Flashing
	Compressor on	Compressor off	Setpoint setting active
HACCP	Saved HACCP alarm in Evlink		

Table 2. Thermostat Display Icons (continued)

Icon	ON	OFF	Flashing
			Setting active Operation with EVconnect App active
°C °F	View temperature (°C or °F)		
AUX	Heating on (if applicable)	Heating off (if applicable)	

The display can show following alarm labels:

Table 3. Alarm Labels

Label	Description
"Pr1"	Cabinet probe alarm
"AL"	Low temperature alarm
"AH"	High temperature alarm

Switch ON the Unit

Note: Before starting your ColdCube™ Connect for the first time, you should clean it inside and outside with a damp cloth.

Switch on the unit by turning the main switch to position "1".

The digital thermostat will run a self-test. Following the initialization, the present temperature inside the unit appears. The factory preset temperature for all models is +4°C.

Switch OFF the Unit

Switch off the unit always by pressing the main switch to position "0". The unit will take the last set temperature in memory. If you do not want to use the cooler for a longer period of time, leave the cover slightly open. This prevents odor build-up.

Lock / Unlock the Keypad

If 30 seconds have elapsed without the keys being pressed, the display will show the “**Loc**” label and the keypad will lock automatically.

To unlock the keypad, press a key for 1 second: the display will show the label “**UnL**”.

Modify the Setpoint

Check that the keypad is not locked.

1. Press the SET key.
2. Press the UP or DOWN key within 15 seconds to set the new value.
3. Press the SET key (or do not operate for 15 seconds).

Setting Configuration Parameters

1. Press the SET key for 4 seconds; the display will show the label “**PA**”.
2. Press the SET key, the display will show the value “**0**”.
3. Press the UP or DOWN key within 15 seconds to set “**-19**”.
4. Press the SET key (or do not operate for 15 seconds), the display will show the label “**SP**”.
5. Press the UP or DOWN key to select a parameter to modify.
6. Press the SET key, the display will show the actual value.
7. Press the UP or DOWN key within 15 seconds to set the value.
8. Press the SET key (or do not operate for 15 seconds).
9. Press the SET key for 4 seconds (or do not operate for 60 seconds, or press the OFF key) to exit the procedure.

Note: Please see the Appendix section, chapter “Configuration Parameters For Different Models” for parameters for different models.

Enable Temperature Decimal Point

Note: Not available with °F.

1. Follow the parameter setting procedure.
2. Reach parameter “**P1**”.
0 = no 1 = yes (default: 1)
3. Exit the procedure.

Change Temperature Unit of Measure (°C or °F)

1. Follow the parameters setting procedure.
2. Reach parameter "P2".
0 = °C 1 = °F (default: 0)
3. Exit the procedure.

Set a Cabinet Probe Offset

1. Follow the parameters setting procedure.
2. Reach parameter "CA1".
Min ... Max values are -25 ... +25 °C/°F
3. Exit the procedure.

Set High / Low Temperature Alarm

The EVCO electronic thermostat is equipped with an internal buzzer and high / low temperature alarms can be set. As there is not real time clock, back up battery and memory, alarms are active only with power connected and are not recorded.

1. Follow the parameters setting procedure.
2. Reach parameter "A2" (low temperature alarm type), press UP or DOWN to select a value and press SET key to set it.
0 = disabled, 1 = relative to set point, 2 = absolute (default is 0)
3. Reach parameter "A1" (threshold for low temperature alarm), press UP or DOWN to select a value and press SET key to set it.
Min ... Max values are -99 ... +99 °C/°F
4. Reach parameter "A5" (high temperature alarm type), press UP or DOWN to select a value and press SET key to set it.
0 = disabled, 1 = relative to set point, 2 = absolute (default is 0)
5. Reach parameter "A4" (threshold for high temperature alarm), press UP or DOWN to select a value and press SET key to set it.
Min ... Max values are -99 ... +99 °C/°F
6. Reach parameter "A6" (high temperature alarm delay after power on), press UP or DOWN to select a value and press SET key to set it.
Min ... Max values are 0 ... 99 minutes (default is 0)

Section 6 - Operation

7. Reach parameter "A7" (high/low temperature alarms delay), press UP or DOWN to select a value and press SET key to set it.

Min ... Max values are 0 ... 240 minutes (default is 0)

8. Reach parameter "A11" (high/low temperature alarms reset differential), press UP or DOWN to select a value and press SET key to set it.

Min ... Max values are 1 ... 15 °C/°F (default is 2.0)

9. Press the SET key for 4 seconds (or press the Off key) to exit the procedure.

In case of High / Low temperature alarm the display will show "AL" or "AH" and the buzzer sound.

The temperature alarms have automatic reset. To silence the buzzer press a key.

Energy Saving Tips

- Allow hot perishable items to cool down first before you place it into the ColdCube™ Connect.
- Do not open the cooling container more often than necessary.
- Defrost the cooling container once a layer of ice forms.
- Avoid unnecessarily low temperature settings.

Replacement of the ColdCube™ Connect Fuse

WARNING

Hazardous Voltage!

Danger of electrocution! Disconnect the connection cable before you replace the ColdCube™ Connect fuse.

1. Switch off the ColdCube™ Connect.
2. Pull the connection cable off.
3. Pry out the fuse with a screwdriver.
4. Replace the defective fuse with a new fuse that has the same rating — see "Fuse Sizes," p. 20.
5. Press the fuse back into the housing.

Pre-Cooling Load

Pre-cool or freeze goods before putting them in the ColdCube™ Connect. The ColdCube™ Connect is designed to maintain product temperature, not to pull down product temperature.

Pre-Cooling ColdCube™ Connect

The ColdCube™ Connect is a highly insulated unit designed to maintain product temperature with minimal electrical consumption. The ColdCube™ Connect is not designed for fast temperature pull down. You may need to pre-cool or pre-freeze an empty ColdCube™ Connect for several hours to reach the setpoint temperature before loading product.

Defrost

The ColdCube™ Connect is not designed for automatic defrosting. If excess frost builds up, clean out the frost.

Section 7 - Troubleshooting

⚠ CAUTION

Hazard!

Before performing any service, disconnect the battery cables at the battery and also disconnect the AC supply.

The ColdCube™ Connect has a built-in self diagnostic program. On all models with BD50 and BD80 compressors there are a red led light nearby the electronic thermostat. In case the PCB of the compressor records an operational error, the diode will flash a number of times. The number of flashes depends on what kind of operational error was recorded. Each flash will last 1/4 second. After the actual number of flashes there will be a delay with no flashes, so that the sequence for each error recording is repeated every 4 seconds. In the case of units with the BD220 compressor (now the F0720/FDN and F0720/FDH) you do not have led lights but a jack to connect a specific Secop interface (the “One Wire Gateway”) to a computer with the Secop “Tool4Cool” software installed. The T4C software can be freely downloaded from Secop website. You can set and monitor all working parameters of the BD220 compressor, including working time, failures, etc. directly from the T4C software.

1 Flash	Battery protection cut/out	The battery voltage has fallen below the cut/out setting. Check the source battery for proper operation and sufficient voltage output. If power source is adequate then check wire sizes and conditions of the connectors to avoid voltage drops. Charge source battery.
2 Flash-es	Fan over-current cut/out	The fan loads the electronic unit with more than 0,5 A (avg) or 1,0 A (peak). Fan may be blocked, fan wires may be loose or damaged or the fan motor has failed and is drawing over/current to protect itself. Visually inspect fan for blockage, check wires for chafes or loose connections and repair. Or if fan has failed then replace it.
3 Flash-es	Motor start error	The rotor is blocked or the differential pressure in the refrigeration system is too high (> 5 bar). Compressor may not start because of high refrigerant pressure due to a high heat situation. High ambient temperatures may cause excessive heat, if so then the area around the ColdCube™ Connect must be cooled down before trying to restart compressor. Or, if compressor just cycled off, wait a few minutes for pressure to come down and try again.
4 Flash-es	Minimum motor speed error	If the refrigerant system is too heavily loaded, the compressor motor cannot maintain minimum speed 1,850 rpm. As above this may happen when system and/or ambient area is very hot which increases refrigerant pressure. Solution is as above, let area cool dawn and wait awhile before starting ColdCube™ Connect.

Section 7 - Troubleshooting

5 Flash- es	Thermal cut/out of electronic unit	If the refrigeration system has been too heavily loaded, and if the ambient temperature is high, the electronic unit will run too hot. As with all electronics, the compressor module is sensitive to heat. The module has a temperature sensor on the heat sink and if it gets too hot, due to high amp draw or high ambient temperatures, the ColdCube™ Connect will shut down.
6 Flash- es	Thermostat failure	If the NTC thermistor is short-circuit or has no connection.

If the test light shows 3, 4 or 5 flashes then verify that there is adequate ventilation around the refrigerator/freezer. Check that vents are not blocked or dirty. Ensure that the ColdCube™ Connect is not installed near a heat source.

In case ColdCube™ Connect does not function, with display off, check the fuse and/or the proper connection to battery / AC connection.

In the case of units with the BD220 compressor (now the 720 Litre in freezing and 720 Litre in freezing & heating) you do not have led lights but a jack to connect a specific Secop interface (the "One Wire Gateway") to a computer with the Secop "Tool4Cool" software installed. The T4C software can be freely downloaded from Secop website. You can set and monitor all working parameters of the BD220 compressor, including working time, failures, etc. directly from the T4C software.

Section 7 - Troubleshooting

Apart from possible problems identified by the red LED light of the self diagnosis system, other possible problems are:

Problem	Possible Reason	Action
The ColdCube™ Connect works connected to the AC but not connected to 12/24 VDC (everything off)	DC fuse burn out	Replace fuse
	DC cord defective or not properly connected on socket	Check and, in case, replace DC cord
	Main switch defective	Replace main switch
	Electronic unit defective	Replace electronic
The ColdCube™ Connect works connected to 12/24 VDC but not connected to the AC (everything off)	Main switch defective	Replace main switch
	Electronic unit defective	Replace electronic
The ColdCube™ Connect switch on (controller glows) but compressor and fan don't run	Error in controller programming	Re-set on the right programming parameters
	Controller defective (in case compressor and fan icon on are lighted)	Replace controller
	Defective wire connection	Check or replace wires
The ColdCube™ Connect is working but fan is stopped (see also self diagnosis)	Defective wire connection	Check
	Fan defective	Replace fan
	Electronic unit defective	Replace electronic
The ColdCube™ Connect is working but not cooling down	Lack of refrigerant gas	Check for refrigerant gas leakage and vacuum / recharge the unit gas quantity on the serial number label.
	Oil in the circuit (probably the ColdCube™ Connect has operated for some time with a high angle)	Repeat short operation cycles (few minutes on and then 5 minutes off) to let the oil turn back to compressor. If not solved then vacuum and recharge.
	Compressor defective	Replace compressor

Section 8 - ColdCube™ Connect FLEX

Important

These are additional instructions for the ColdCube™ Connect FLEX models related to operation on own battery and to the recharge of the same from AC mains.

Before using a ColdCube™ Connect FLEX unit, read the User Manual and these additional instructions carefully, including all information on operating safety, use and maintenance.

Keep the User Manual and these additional instructions ready at hand and leave them with the unit, so that all users can find out about the functions and safety regulations. Every user must be well acquainted with the operation of the appliance and with the instructions concerning safety. Failure to observe these instructions can impair the performance of the appliance and cause damage.

ColdCube™ Connect FLEX Models Power Source

The ColdCube™ Connect FLEX models are delivered with a single internal 12Vdc VRLA deep cycle battery and are intended to operate fully autonomously for at least one daily working shift (8+ hours) powered only by their internal power source (the 12V battery) without any external power connection.

No connection to an external 12Vdc power source is available (unlike the standard models there is only one DC inlet, to connect the AC/DC battery charger included in the scope of delivery). The internal battery protection will monitor the voltage of the battery and eventually switch off the compressor.

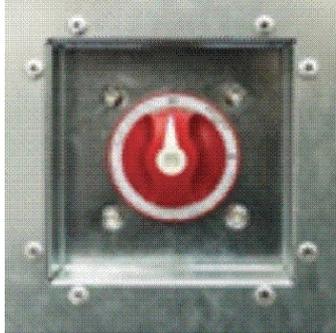
Included Battery

The batteries used to power the FLEX models are VRLA type (lead acid, valve regulated) gel deep cycle type, sealed and with no maintenance, with nominal voltage 12Vdc. Are classified as UN2800, cleared as safe for all type of use / transport.

Please check specific ColdCube™ Connect FLEX model data sheet for nominal Ah battery capacity info. The average life of the batteries included in the ColdCube™ Connect FLEX models is more than 500 cycles if always recharged correctly.

Battery Safety Switch

A main battery safety switch that disconnect the battery from the electrical circuit is standard on the ColdCube™ Connect FLEX. The units leave the factory with the safety switch on “OFF”.



BEN1306

The safety switch shall be always left on “OFF” position in case of no use of the unit for prolonged time.

AC/DC Battery Charger

The FLEX type models scope of delivery includes an external battery charger, to recharge the internal battery from the AC mains.

The included battery chargers have a 24A output capacity with a nominal output voltage of 14,4Vdc and an universal input voltage range of 100-240Vac (by switch selection) 50-60 Hz and are EC, UL and CSA approved. The battery chargers have built-in short-circuit, reverse polarity and over temperature protection.

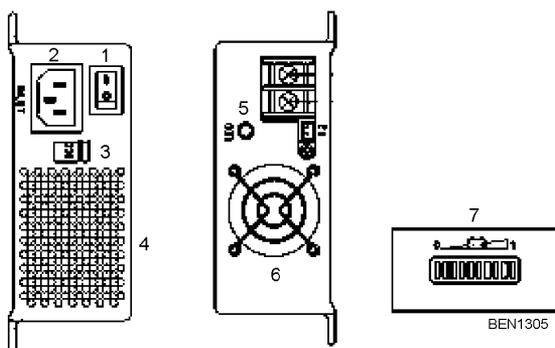
The battery chargers have a 3 stages charging curve, with last stage as “float voltage” so that the battery can maintain full charge even with battery charger left connected to the AC mains for long time.

Battery Charger Operation

▲ CAUTION

Hazard!

The battery chargers included in the unit package have a manual voltage input selection switch (3). The voltage switch is positioned nearby the on/off switch (1). Please select the correct input voltage for the battery charger of the unit, positions are "115" or "230". Risk of damage to the charger in case of incorrect input voltage selection.



To charge the battery of the ColdCube™ Connect FLEX models:

- Turn the safety switch to "ON"
- Check the proper input voltage (115 or 230) with the red switch (3)
- Connect the battery charger to the AC mains
- Turn the battery charger switch (1) to "On"
- At the beginning stage of operation, the charger provides the largest current with 14.4Vdc of output voltage to charge battery. The LED indicator (5) will lighten in red and the built-in fan (6) will spin to dissipate the heat. After a period of time (probably a couple of hours, based on the capacity of batteries), the charging current will decrease gradually.
- After reaching 10% of its maximum value, the charger will go into "floating-charge" stage. The fan will stop spinning, charging voltage will decrease to 13.6Vdc, and the LED indicator (5) will turn to green.

The battery chargers provided with the ColdCube™ Connect FLEX units are externally fixed with 4 screws to the metal cover of the unit and with the

Section 8 - ColdCube™ Connect FLEX

12Vdc line AP connector already inserted in the unit DC inlet. Just remove the screws and disconnect the 12Vdc AP connector to remove the battery charger from the unit.

Note: *The LED bar indicator (7) shows the voltage level of the battery, not the charging percentage.*

User Tips

1. The ColdCube™ Connect FLEX units are delivered with the internal battery already charged. Nevertheless before first use it is recommended to full charge the battery.
2. With the battery charger connected to the AC mains and all switches on “On” it is possible at the same time to operate the unit and to recharge the internal battery (with longer battery charging time).
3. It is recommended, if possible, to pre-cool at the desired internal temperature the ColdCube™ Connect FLEX model before use with the battery charger connected to the AC mains and “On”; this will increase the autonomous operating time of the unit powered by its own internal battery.

For more info about features and use read the specific User Manual of the battery charger.

Section 9 - Cleaning and Maintenance

⚠ CAUTION

Hazard!

Danger of electrocution! Always disconnect any electrical connection before you clean and service the units.

⚠ CAUTION

Hazard!

Danger of damaging the ColdCube™ Connect! Do not wet the electronic components. They are not water proof!

⚠ CAUTION

Hazard!

Danger of damaging the ColdCube™ Connect! Do not use abrasive cleaning agents or hard objects during cleaning as these can damage the ColdCube™ Connect. Never use brushes, scouring pads or hard or pointed tools to remove ice or to loosen objects which have frozen in place.

Clean the unit before first time use and at regular intervals thereafter.

Important: *Do not wet the electronic components, are not water proof!*

Use only neutral (food safe) cleaning agents. Never use aggressive or caustic cleaning agents, scouring powder, steel wool, abrasive sponges or chemical solvents. Never use brushes, scouring pads or hard or pointed tools to remove ice or to loosen objects which have frozen in place.

The use of a high pressure cleaner and/or steam jet is strictly forbidden.

Clean the unit (inside and outside) with a neutral detergent, rinse with lukewarm water and dry it before any long term storage unplugged.

Humidity can form frost in the interior of the cooling device. This reduces the cooling capacity. Defrost the device in good time to avoid this. Wipe off the melted water with a damp cloth.

The hermetic cooling circuit of the units are maintenance free. No periodical maintenance is requested.

Section 10 - Recover Refrigerant

At Thermo King, we recognize the need to preserve the environment and limit the potential harm to the ozone layer that can result from allowing refrigerant to escape into the atmosphere.

We strictly adhere to a policy that promotes the recovery and limits the loss of refrigerant into the atmosphere.

In addition, service personnel must be aware of Federal regulations concerning the use of refrigerants and the certification of technicians. For additional information on regulations and technician certification programs, contact your local THERMO KING dealer.

Section 11 - Diagnostics

The ColdCube™ Connect professional mobile refrigerators have 2 diagnostic systems: the first is included in the EVCO EV3294 digital controller; the second is integrated in the Secop/Nidec compressors' electronics.

EVCO EV3294 Controller

Important: the operating voltage of the EVCO EV3294 controller is 12-24 Vdc +10% -15%. So, if in a 12 Vdc nominal system the voltage goes <10,2 Vdc, the display will turn off.

There are several possible alarm codes in the EVCO EV3294 but only few can be shown, as the majority is linked to functions not active in the ColdCube™ Connect.

Figure 5. Thermostat Display



First possible alarm code is "Pr1" that is the cabinet temperature probe alarm. The possible remedies are:

- check the "P0" parameter (follow the procedure to set configuration parameters described in the User Manual) ; value shall be "1" for NTC probe, if not modify and store the proper value
- check the electrical connections of the NTC probe
- check the physical integrity of the NTC probe

The reset of the alarm is automatic.

A second possible alarm code is “rtC” that is the “real time clock” alarm:



The real time clock is a function not included in the EV3294 installed in the ColdCube™ Connect, it is included in the EVlink Bluetooth module 510012/00.

If the user tries to set up time and date on the EV3294 the alarm is triggered.

The possible remedies are:

- check the “Hr0” parameter (enable clock), the value shall be “0” (no), if not modify and store the proper value
- connect the EVlink Bluetooth module 510012/00 and set the time via keyboard or via the EVconnect App

The alarms “AL” and “AH” are the low and high internal alarm temperature (also a buzzer will sound) linked to the eventual set up of specific alarm temperature values (parameter “A2”: low temperature alarm; parameter “A5”: high temperature alarm).”

The temperature alarms have automatic reset. To silence the buzzer press a key.

To disable temperature alarms set parameters “A2” and “A5” values to “0”.

Secop/Nidec BD Compressors’ Electronics

The Secop/Nidec compressors’ electronics used in the ColdCube™ Connect units have a built-in self-diagnostic program.

BD50F and BD80F: On models with BD50F and BD80F compressors, if there is a detectable error, the red LED light positioned nearby the EV3294 controller will flash 1 to 6 times and repeat the pattern, showing the possible reason of the stop of the operation.

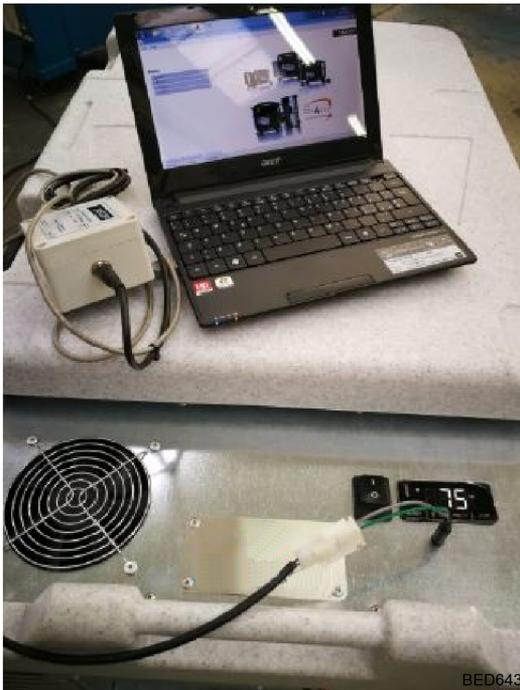


Each flash will last 1/4 second. After the actual number of flashes there will be a delay with no flashes, so that the sequence for each error recording is repeated every 4 seconds.

LED flashes	Error type
6×	Thermostat failure If the NTC thermistor is short-circuited or has no connection.
5×	Thermal cut-out of electronic unit If the refrigeration system has been too heavily loaded, or if the ambient temperature is high, the electronic unit will run too hot. Surface temperature must be below 90° C. Start delay of 66 s.
4×	Minimum motor speed error If the refrigeration system is too heavily loaded, the motor cannot maintain minimum speed at approximately 1,850 rpm. Restart made after 66 s.
3×	Motor start error The rotor is blocked or the differential pressure in the refrigeration system is too high (>5 bar). Restart made after 66 s.
2×	Too many start attempts or fan over current Too many compressor or fan starts in short time or fan current higher than 0.5A avg. The unit will prevent further starts for 66 s.
1×	Battery protection cut-out The voltage at electronic terminals is too low, outside the cut-out setting. Battery must be charged. Hereafter start delay of 66 s.

BD220CL: on models with BD220CL compressors, nearby the controller there is no LED light but a female jack, to connect the electronic unit of the compressor to a notebook, through the *Secop/Nidec One Wire/LIN Gateway* (available on request, Secop #105N9501, EE #850036/00)

The software TOOL4COOL® (T4C), freely downloadable from www.secop.com allows to set all working parameters of the BD220CL compressor and also to access the self-diagnostic info, including the Error and Event logs, recorded by the electronic unit of the compressor.



The error log records the following data for each error arising:

- Time of occurrence related to compressor power up, with 1 sec as sample time
- The sequence of occurrence
- Number of occurrence (when no value is related to the parameter)
- Error name

- The value of the parameter which caused the failure (if connected to a parameter)
- Event list reference (changes which caused the failure if a parameter change caused the failure)

The error log can be cleared using the clear function.

The event log records the following parameter and event data to assist in service situations:

- Parameter changes (Parameters defined in the parameter)
- Power up
- Start/Stop signal from application module

The following information is recorded for each event:

- Time of occurrence related to compressor power up, with 1 sec as sample time
- The sequence of occurrence (Event list reference)
- Parameter/Event description
- The value of the parameter
- Number of occurrence (when no value is related to the parameter)

For more information about the T4C software, please refer to specific Secop/Nidec Manual.

Important: *on ColdCube™ Connect units with BD50F and BD80F compressors the motor speed and the battery protection settings are set up by resistors. But it would be possible the same to access to the Error and Event logs stores in the electronic by connecting a notebook with the T4C software through the Secop/Nidec Gateway directly to the D/I and C terminals of the electronic.*

ColdCube™ Connect troubleshooting guide – for service partner

Situation	Claim	Possible cause	Check	Eventual actions
Unit with ac/dc power supply	Unit works properly when connected to the 12 V battery but not when connected to the AC mains, display on	Low voltage from the power supply (higher than 10.2 Vdc but less than cut-in value)	Voltage at the yellow AP connector on the fridge	Replace ac/dc power supply
	Unit works properly when connected to the 12 V battery but not when connected to the AC mains, display off	Internal relay does not switch from the red to the yellow power line	Internal relay	Replace relay
			3 A fuse	Replace 3 A fuse
	Unit works properly when connected to the AC mains but not when connected to the battery, display on	Low voltage from battery, lower than cut-in value, not proper electrical connections, voltage drops	Voltage at compressor terminals, cables and connections	Replace cord to battery with one with a more suitable cross section, avoid voltage drops; charge or replace battery, select battery of proper capacity
	Unit works properly when connected to the AC mains but not when connected to the battery, display off	Very low voltage, less than 10.2 Vdc	Voltage level of battery	Charge or replace battery, select battery of proper capacity

Section 11 - Diagnostics

Situation	Claim	Possible cause	Check	Eventual actions
All cases	Unit does not turn on	Very low voltage, less than 10.2 Vdc	Voltage level of battery	Charge or replace battery, eventually with a larger capacity one
		On/Off main switch	If circuit is closed in On position	Replace main switch
		Main fuse blown	The main fuse	Replace the main fuse
	The display is on but the compressor does not run	Low voltage from battery, lower than cut-in value, not proper electrical connections, voltage drops	Voltage at compressor terminals, cables and connections	Replace line to battery with one with a more suitable cross section, avoid voltage drops; charge or replace battery, eventually with a larger capacity one
		High differential pressure in the refrigerant circuit,	To not have switched on/off the unit with minimum interval	Stop time long enough for pressure equalization
		Thermal cut-out of electronic unit	Ambient temperature > +55° C	Ensure proper ventilation
			Condenser fan not running	Replace condenser fan
		Defective electronic thermostat	Check thermostat connections	Replace thermostat
		Defective electronic unit	Check electronic units connections	Replace electronic unit
		Defective compressor	Check electronic units first, if ok then check resistance between pins M and S of the compressor terminals	If no connection between pins, replace compressor

Section 11 - Diagnostics

Situation	Claim	Possible cause	Check	Eventual actions
All cases	Compressor runs but reduced cooling	Low refrigerant charge	Recharge and search for leaks (brazing points, damages in the evaporator)	Ensure leak-free system and proper charge, replace drier
		Too high ambient temperature	Ambient temperature $\geq +55^{\circ}\text{C}$	Ensure proper ventilation
		To high condensing temperature	Condenser and compressor ventilation	Ensure proper ventilation and distance from wall, replace condenser fan
		Capillary partly blocked	If compressor was running with an angle $>30^{\circ}$ or unit was transported / stocked upside down	Try series of 5 min. runs and 15 minutes stops for an hour, if not successful: replace the dryer, evacuate the system for at least one hour and recharge the system
	Compressor runs but no cooling	No refrigerant in the circuit	Recharge and search for leaks (brazing points, damages in the evaporator)	Ensure leak-free system and proper charge, replace drier
		Capillary blocked	If compressor was running with an angle $>30^{\circ}$ or unit was transported / stocked upside down	Try series of 5 min. runs and 15 minutes stops for an hour, if not successful: replace the dryer, and the evaporator with capillary, Ensure leak-free system and proper charge

Section 11 - Diagnostics

Situation	Claim	Possible cause	Check	Eventual actions	
All cases	Compressor runs on/off	Defective electronic thermostat	Check thermostat connections	Replace thermostat	
		Ice block built up on evaporator	Check for ice on evaporator	Check gasket, defrost properly	
		Wrong refrigerant charge		Ensure leak-free system and proper charge, replace drier	
	Noise, banging at start or stop of compressor	Compressor block hitting housing internally	Compressor overload by pressure		Clean condenser if dusty, ensure proper ventilation
			Refrigerant charge too high		Evacuate and recharge the system
			Pressure equalization before start and number on on/off cycles		Assure a stop time of at least 5 minutes between stop and start
	Blown fuses	Short circuit , defective cabling	All connecting cables and power supply cord for loose connections, short circuits		Fix connections properly
		Short circuit, defective thermostat	Thermostat connections		Fix connections properly
		Short circuit in compressor motor	Resistance values between pins M and S of the compressor terminals		Replace compressor if short-circuited

Section 12 - Diagram Index

The following table lists the diagrams that are relevant to this unit.

The diagrams are available on EMEA Info Central.

Drawing No.	Drawing Title
3E52384G01	Wiring Diagram Coldcube Connect™ 32L Freezing
3E52384G02	Wiring Diagram Coldcube Connect™ 32L Freezing and Heating
3E52384G03	Wiring Diagram Coldcube Connect™ 82L Freezing
3E52384G04	Wiring Diagram Coldcube Connect™ 82L Freezing and Heating
3E52384G05	Wiring Diagram Coldcube Connect™ 140L Cooling

Section 13 - Appendix

Models / vans match - Product range

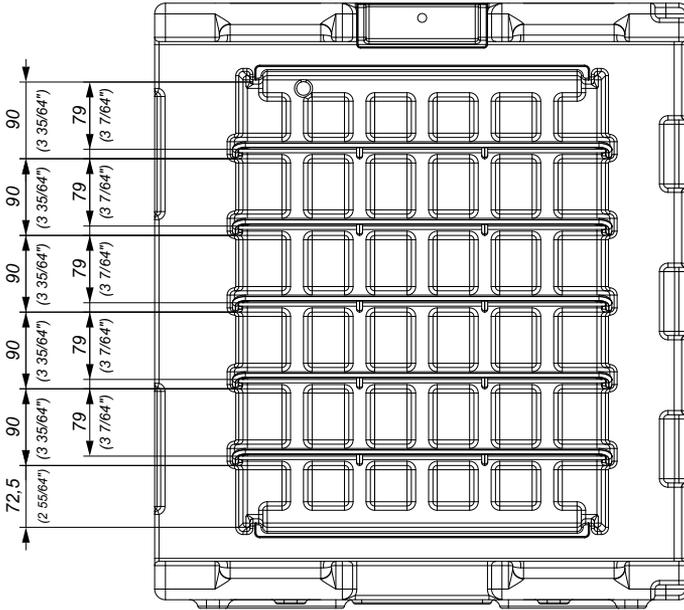
	F0330	F0720		F0915	
		w/o pallet	w/ pallet	w/o pallet	w/ pallet
Citroen Nemo	✓	✗	✗	✗	✗
Citroen Berlingo L1	✓	✓	✓*	✗	✗
Citroen Berlingo L2	✓	✓	✓*	✗	✗
Citroen Jumpy	✓	✓	✓	✓	✓
Dacia Dokker	✓	✓	✗	✗	✗
Fiat Fiorino	✓	✗	✗	✗	✗
Fiatold Doblò	✓	✓	✓	✗	✗
Fiat new Doblò	✓	✓	✓	✓	✓
Fiat Scudo	✓	✓	✓	✓	✓
Ford old Transit Connect SWB	✓	✓	✓	✗	✗
Ford old Transit Connect LWB	✓	✓	✓	✓	✗
Ford new Transit Connect SWB	✓	✓	✓	✗	✗
Ford new Transit Connect LWB	✓	✓	✓	✗	✗
Mercedes Citan Compact	✓	✗	✗	✗	✗
Mercedes Citan Long	✓	✓	✗	✗	✗
Mercedes Citan Extra long	✓	✓	✗	✗	✗
Mercedes Benz Vito	✓	✓	✓	✓	✓
Nissan NV200	✓	✓	✓	✗	✗
Opel / Vauxhall old Combo	✓	✗	✗	✗	✗
Opel / Vauxhall 2012 Combo	✓	✓	✓	✓	✓
Opel Vivaro	✓	✓	✓	✓	✓
Peugeot Bipper	✓	✗	✗	✗	✗

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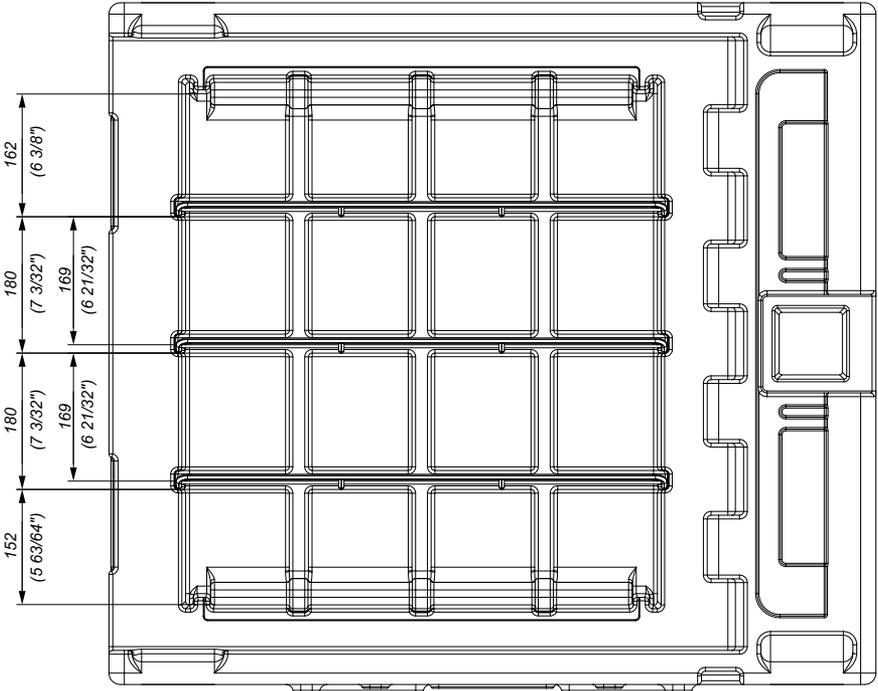
	F0330	F0720		F0915	
		w/o pallet	w/ pallet	w/o pallet	w/ pallet
Peugeot Partner L1	✓	✓	✓*	✗	✗
Peugeot Partner L2	✓	✓	✓*	✗	✗
Peugeot Expert	✓	✓	✓	✓	✓
Renault Kangoo Compact	✓	✗	✗	✗	✗
Renault Kangoo Express	✓	✓	✗	✗	✗
Renault Kangoo Maxi	✓	✓	✗	✗	✗
Toyota HiAce	✓	✓	✓	✓	✓
Volkswagen Caddy	✓	✓	✗	✗	✗
w/o pallet: means that the pallet base shall be removed ✓ : yes ✓* : yes, but with special 30 mm pallet base ✗ : no					

Shelves Positions

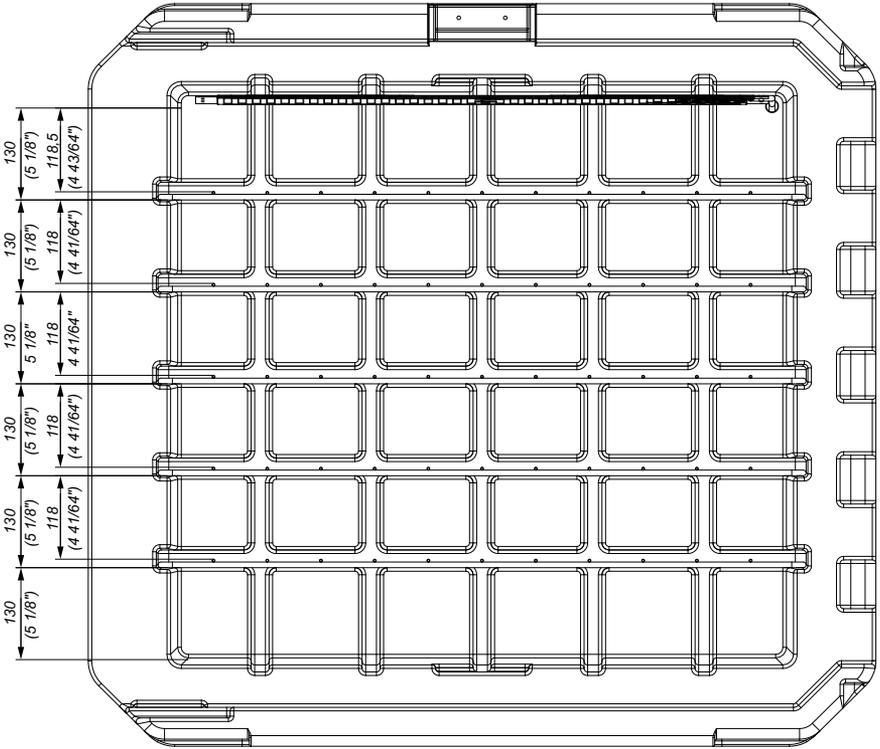
140 litres



330 litres



720 litres



Configuration Parameters For Different Models

	T0032 FDN	T0032 FDH	T0082 FDN	T0082 FDH	F0140 NDN	F0140 NDH	F0140 FDN	F0140 FDH	F0330 NDN	F0330 NDH	F0330 FDN	F0330 FDH	F0720 NDN	F0720 NDH	F0720 FDN	F0720 FDH	F0915 NDN	F0915 FDN	F0915 FDH
PASSWORD																			
PA-S	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19
PAR. SETPOINT																			
SP	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
PAR. ANALOGUE INPUTS																			
C-A1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C-A2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C-A3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
P1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
P2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0
P5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P7	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0	5	5	5
P8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
PAR. REGULATION																			
r0	0.5	0.7	0.5	0.7	0.5	0.7	0.5	0.7	0.5	0.7	0.5	0.7	0.5	0.7	0.5	0.7	0.5	0.5	0.7
r1	-24	-24	-24	-24	-10	-10	-21	-21	0.0	0.0	-21	-21	0.0	0.0	-24	-24	0.0	-21	-21
r2	25	40	25	40	25	30	25	30	25	30	25	30	25	30	25	30	25	25	30
r4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
r5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
r6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
r7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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	610235	610236	610237	610238	610239	610240	610241	610242	610243	610244	610245	610246	610247	610248	610249	610250	610251	610252	610253
	T0032 FDN	T0032 FDH	T0082 FDN	T0082 FDH	F0140 NDN	F0140 NDH	F0140 FDN	F0140 FDH	F0330 NDN	F0330 NDH	F0330 FDN	F0330 FDH	F0720 NDN	F0720 NDH	F0720 FDN	F0720 FDH	F0915 NDN	F0915 FDN	F0915 FDH
r8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
r12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PAR. COMPRESSOR																			
C0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C6	70	70	70	70	70	70	70	70	70	70	70	70	70	70	80	80	70	80	80
C7	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90
C8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
C-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PAR. DEFROST																			
d0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
d1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
d2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
d3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
d4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
d5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
d6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
d7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
d8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
d9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
d1-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
d1-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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	610235	610236	610237	610238	610239	610240	610241	610242	610243	610244	610245	610246	610247	610248	610249	610250	610251	610252	610253
	T0032 FDN	T0032 FDH	T0082 FDN	T0082 FDH	F0140 NDN	F0140 NDH	F0140 FDN	F0140 FDH	F0330 NDN	F0330 NDH	F0330 FDN	F0330 FDH	F0720 NDN	F0720 NDH	F0720 FDN	F0720 FDH	F0915 NDN	F0915 FDN	F0915 FDH
d1-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
d1-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
d1-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
d2-0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
d2-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
d2-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PAR. ALARMS																			
AA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A-11	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
PAR. FANS																			
F0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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	610235	610236	610237	610238	610239	610240	610241	610242	610243	610244	610245	610246	610247	610248	610249	610250	610251	610252	610253
	T0032 FDN	T0032 FDH	T0082 FDN	T0082 FDH	F0140 NDN	F0140 NDH	F0140 FDN	F0140 FDH	F0330 NDN	F0330 NDH	F0330 FDN	F0330 FDH	F0720 NDN	F0720 NDH	F0720 FDN	F0720 FDH	F0915 NDN	F0915 FDN	F0915 FDH
F5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F1-1	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
F1-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F1-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F1-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PAR. DIGITAL INPUTS																			
I0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
I1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
I2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
I3	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
I5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
I6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
I7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
I10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
I13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
I14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PAR. DIGITAL OUTPUTS																			
u1	5	5	5	5	5	5	5	5	5	5	5	5	5	5	7	5	5	5	7
u2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
u-c2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
u4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
u5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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	610235	610236	610237	610238	610239	610240	610241	610242	610243	610244	610245	610246	610247	610248	610249	610250	610251	610252	610253
	T0032 FDN	T0032 FDH	T0082 FDN	T0082 FDH	F0140 NDN	F0140 NDH	F0140 FDN	F0140 FDH	F0330 NDN	F0330 NDH	F0330 FDN	F0330 FDH	F0720 NDN	F0720 NDH	F0720 FDN	F0720 FDH	F0915 NDN	F0915 FDN	F0915 FDH
u6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
u7	-4-.0	-0-.7	-4-.0	-0-.7	-4-.0	-0-.7	-4-.0	-0-.7	-4-.0	-0-.7	-4-.0	-0-.7	-4-.0	-0-.7	0	-0-.7	-4-.0	0	-0-.7
PAR. ENERGY SAVING																			
H-E2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PAR. REAL TIME ENERGY SAVING																			
H-01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H-02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H-03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H-04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H-05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H-06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H-07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H-08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H-09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H-11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H-13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H-14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PAR. REAL TIME DEFROST																			
H-d1	h-																		
H-d2	h-																		

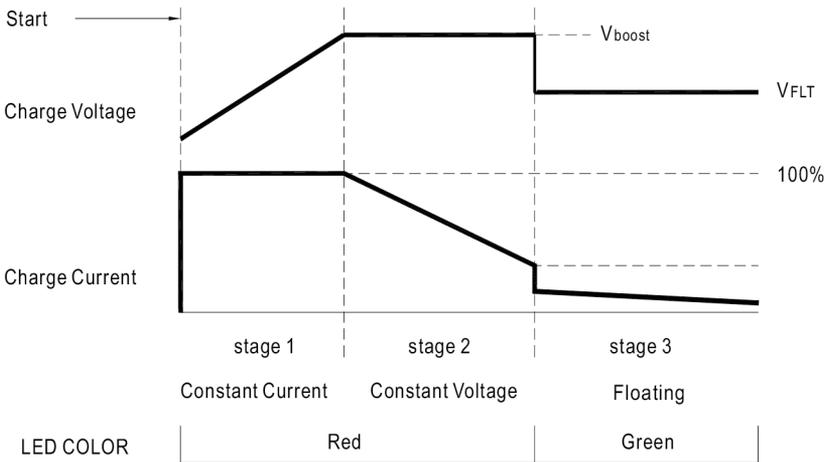
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	T0032 FDN	T0032 FDH	T0082 FDN	T0082 FDH	F0140 NDN	F0140 NDH	F0140 FDN	F0140 FDH	F0330 NDN	F0330 NDH	F0330 FDN	F0330 FDH	F0720 NDN	F0720 NDH	F0720 FDN	F0720 FDH	F0915 NDN	F0915 FDN	F0915 FDH
H-d3	h-																		
H-d4	h-																		
H-d5	h-																		
H-d6	h-																		
PAR. SAFETIES																			
P-OF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PA-S	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19
PA1	42-6	42-6	42-6	42-6	42-6	42-6	42-6	42-6	42-6	42-6	42-6	42-6	42-6	42-6	42-6	42-6	42-6	42-6	42-6
PA2	82-4	82-4	82-4	82-4	82-4	82-4	82-4	82-4	82-4	82-4	82-4	82-4	82-4	82-4	82-4	82-4	82-4	82-4	82-4
PAR. REAL TIME CLOCK																			
H-r0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PAR. DATA LOGGING EVLINK																			
bL-E	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rE0	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
rE1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
PAR. MODBUS																			
LA	24-7	24-7	24-7	24-7	24-7	24-7	24-7	24-7	24-7	24-7	24-7	24-7	24-7	24-7	24-7	24-7	24-7	24-7	24-7
Lb	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	2	2	2

Technical Specification of Charger for ColdCube™ Connect FLEX Unit

Status Under General Operation:

At the beginning stage of operation, the charger provides the largest current with 14.4VDC of output voltage (for 12V batteries) to charge batteries. The LED indicator will lighten in red and the built-in fan will spin to dissipate the heat (360W only). After a period of time (probably a couple of hours, based on the capacity of batteries), the charging current will decrease gradually. After reaching 10% of its maximum value, the charger will go into "floating-charge" stage. The fan will stop spinning, charging voltage will decrease to 13.6VDC, and the LED indicator will turn to green. The relationship between charging current and charging voltage for each operation stage are shown in the curves below:



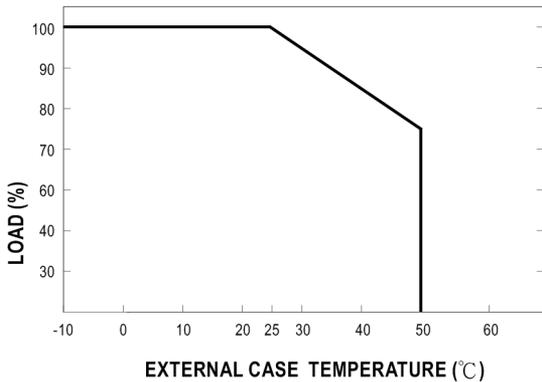
State	PB-300/360-12	PB-300/360-24	PB-300/360-48
V_{boost}	14.4V	28.8V	57.6V
V_{FLT}	13.6V	27.2V	54.4V

BEN1701

Note: Output voltage of the charger (V) can be adjusted through SVR1 without connecting the batteries and this adjustment will change the value of V at the same time. For example, if originally V is 13.6V and V is 14.4V, after adjusting V to 13.2V under no-load condition, V will also reduce to 14V. So, please consult the manufacturer of batteries about the suitable charging voltage before make any adjustment.

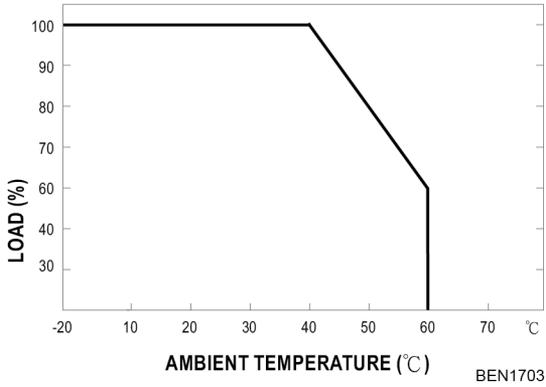
Charging Current And Ambient Temperature

1. The charging current of PB-300 will reduce when the ambient temperature goes up. Please refer to the derating curve shown as below:



BEN1702

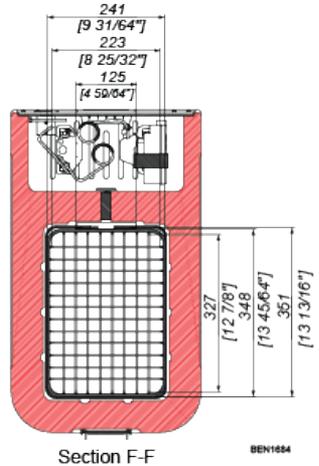
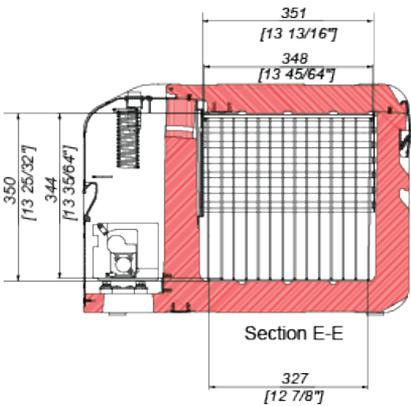
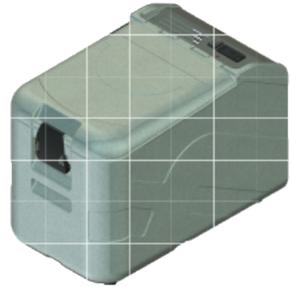
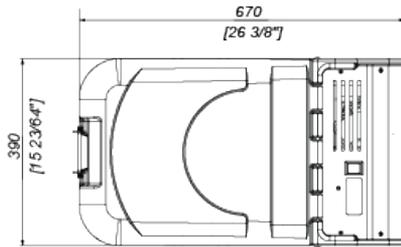
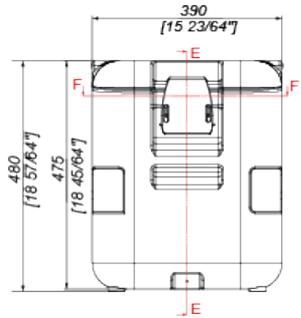
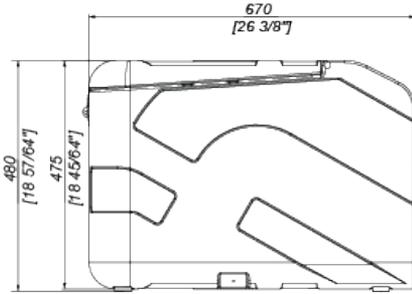
2. Below the ambient temperature of 40 , PB-360 can provide the maximum charging current to the batteries. If the ambient temperature is higher than 40 , the output current of PB-360 will decrease automatically. Please refer to the derating curve shown as below:



Dimensions of the ColdCube™

32 Litre in freezing

32 Litre in freezing and heating (Pharma)

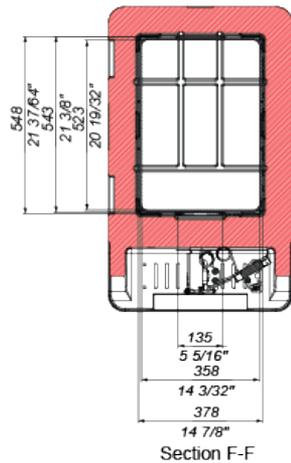
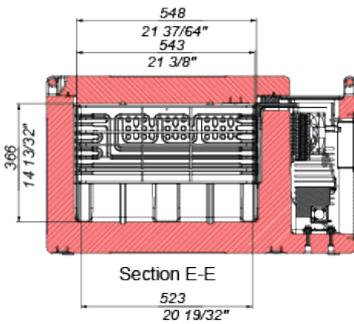
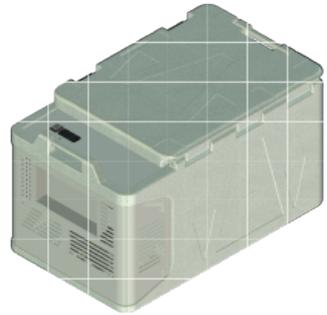
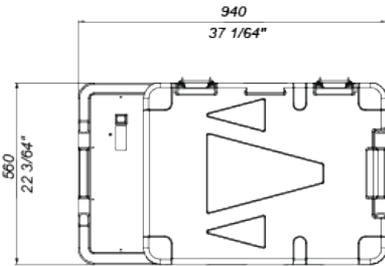
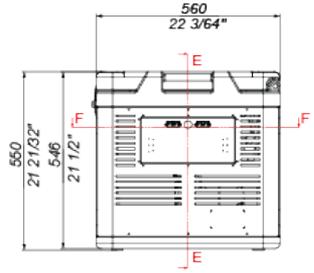
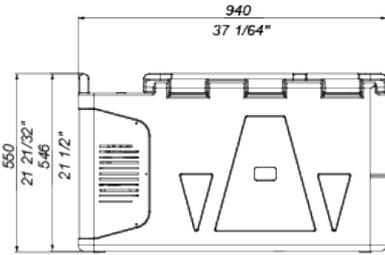


BEN1654

Section 13 - Appendix

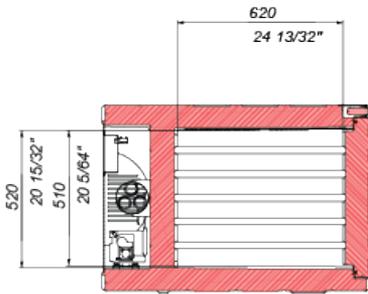
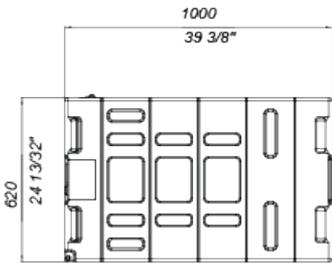
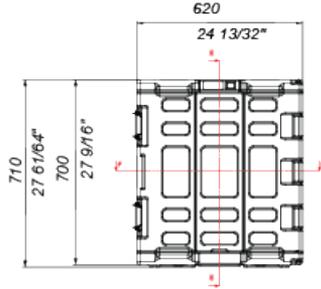
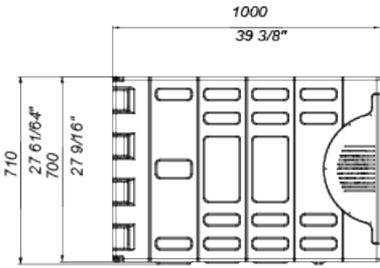
82 Litre in freezing

82 Litre in freezing and heating (Pharma)

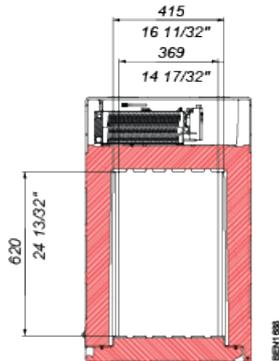


82EN1 006

140 Litre in cooling



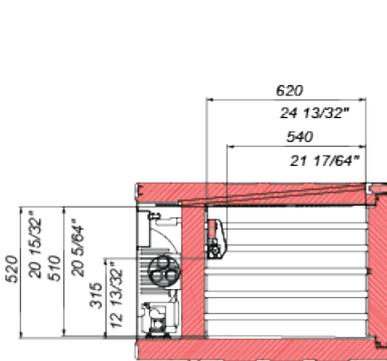
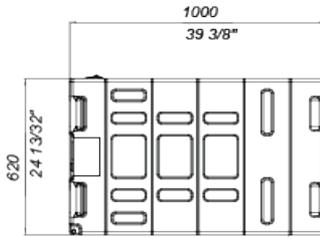
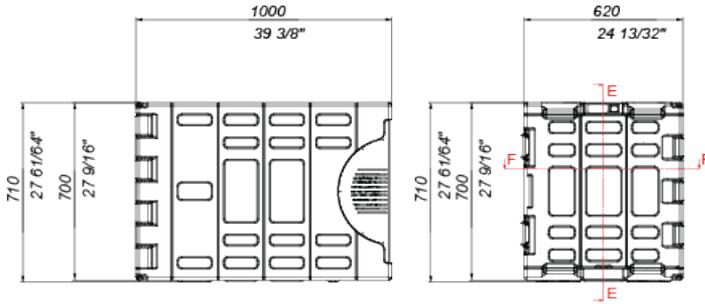
Section E-E



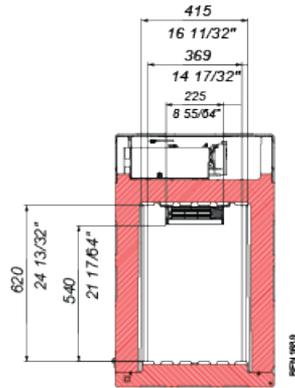
Section F-F

82011938

140 Litre in cooling and heating

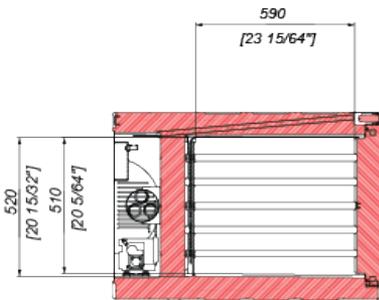
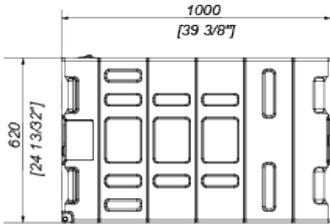
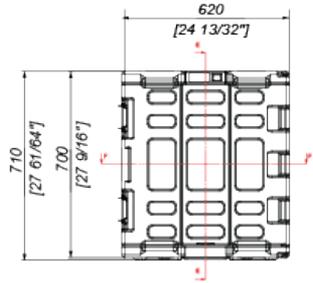
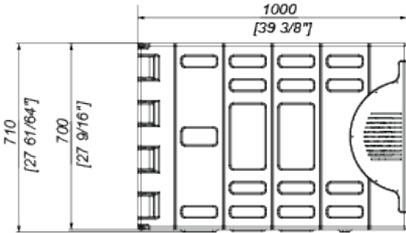


Section E-E

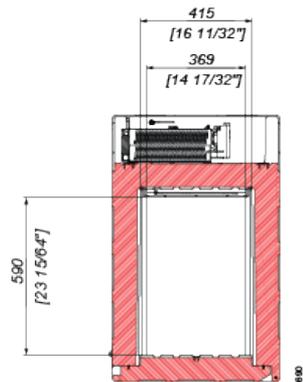


Section F-F

140 Litre in freezing



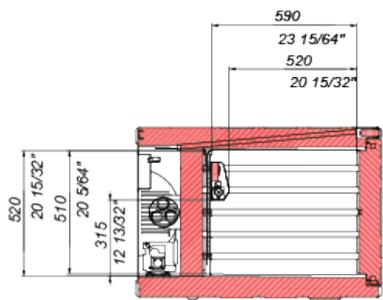
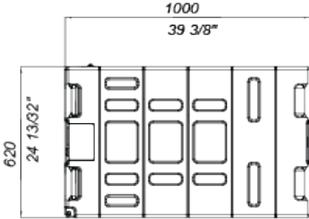
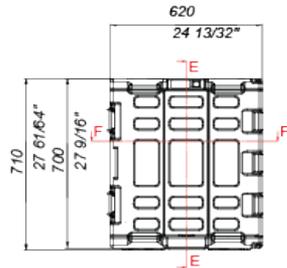
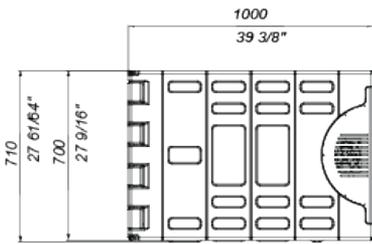
Section E-E



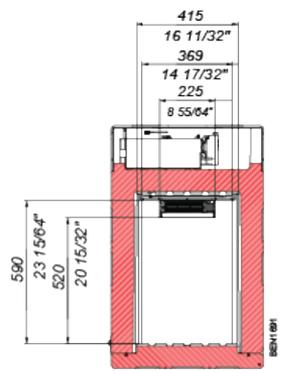
Section F-F

BSI 19/00

140 Litre in freezing and heating (Pharma)

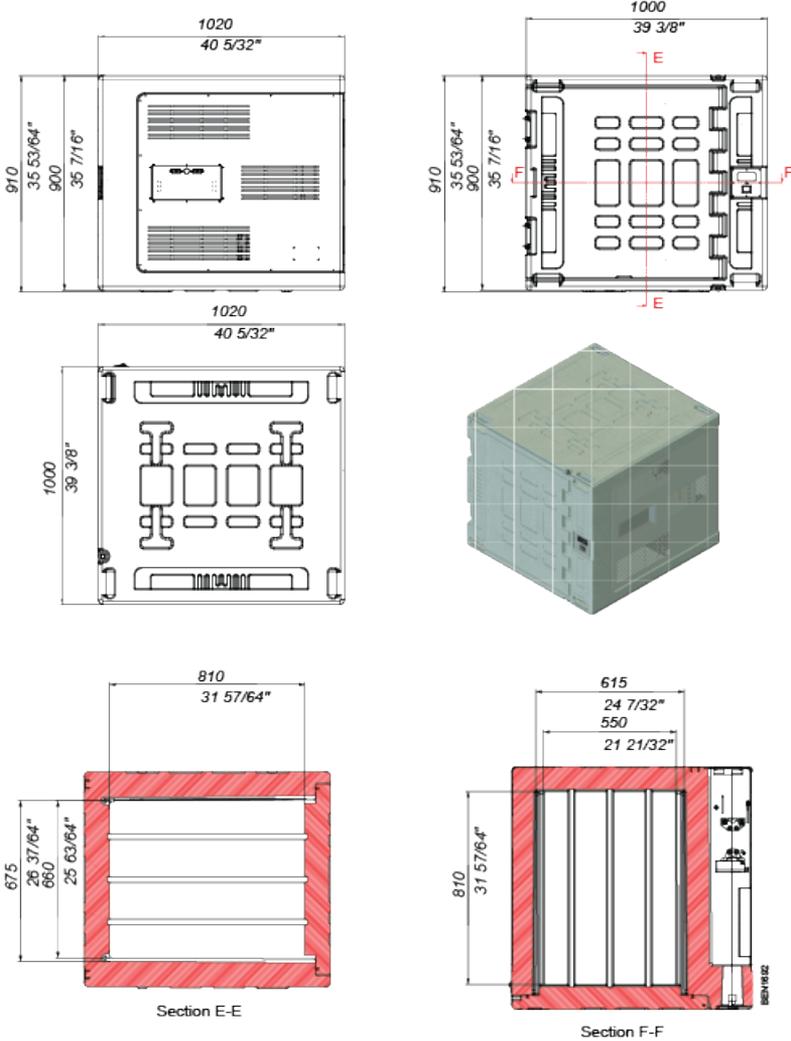


Section E-E

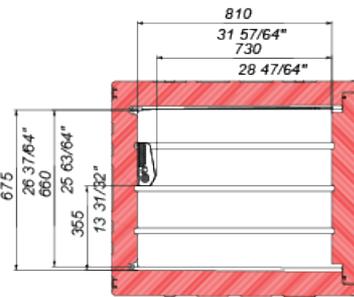
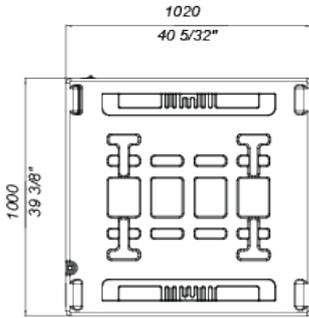
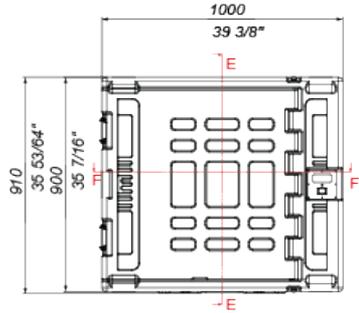
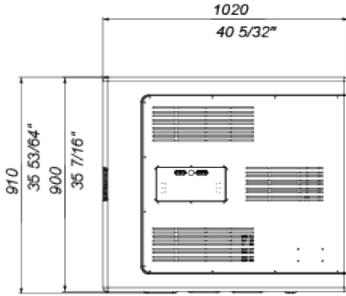


Section F-F

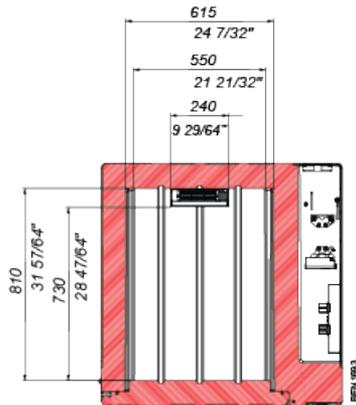
330 Litre in cooling



330 Litre in cooling and heating

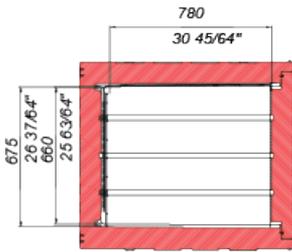
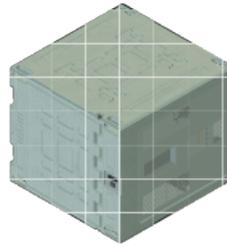
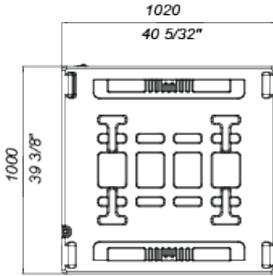
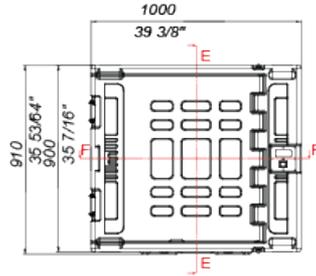


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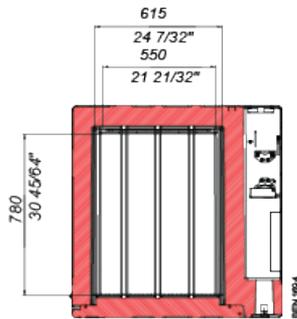


Section F-F

330 Litre in freezing

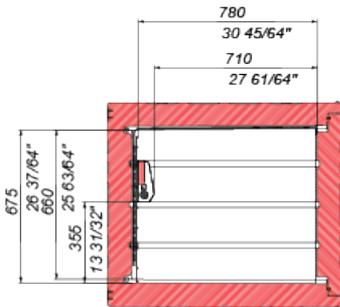
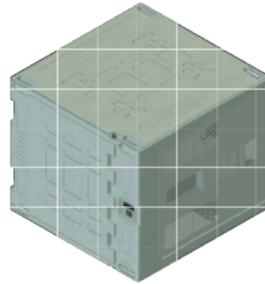
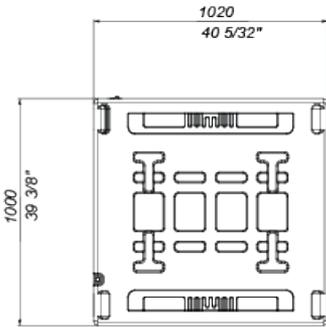
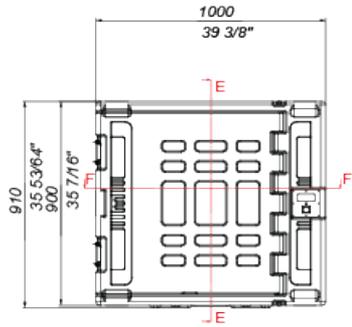
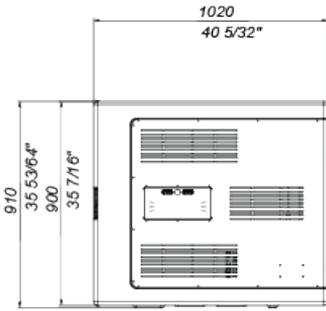


Section E-E

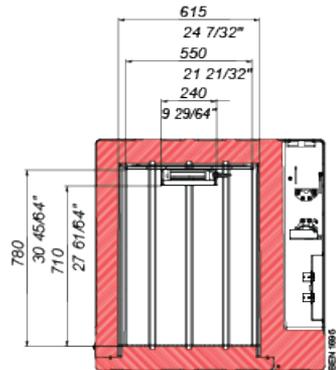


Section F-F

330 Litre in freezing and heating (Pharma)

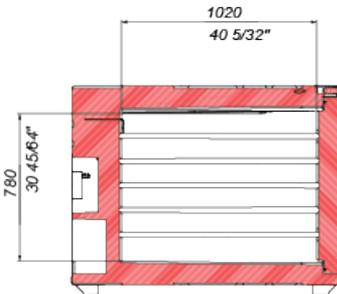
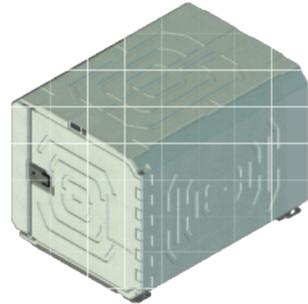
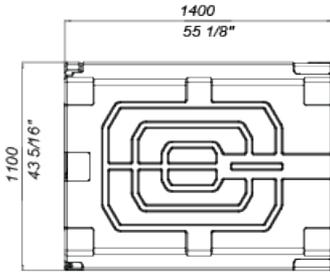
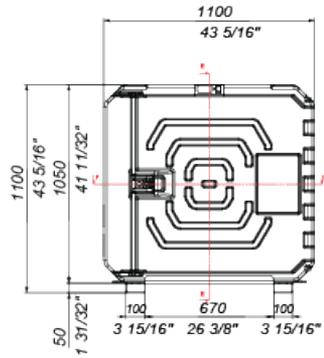
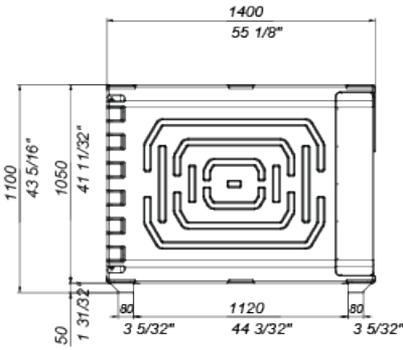


Section E-E

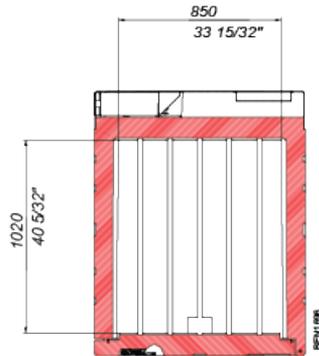


Section F-F

720 Litre in cooling

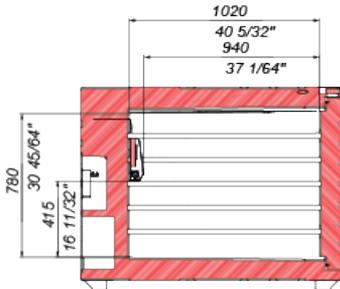
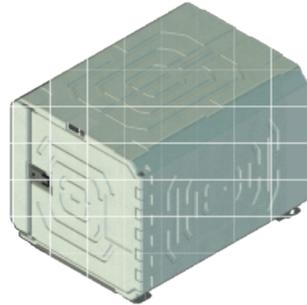
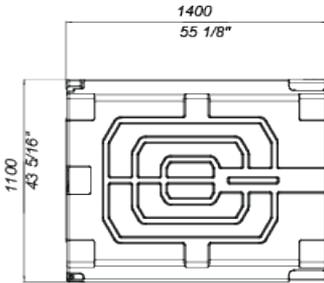
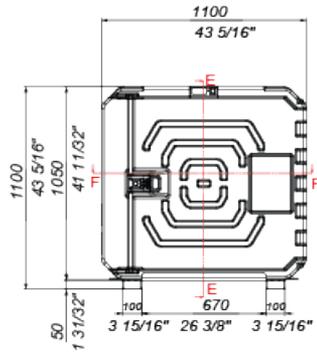
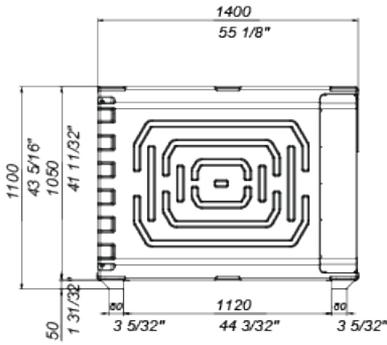


Section E-E

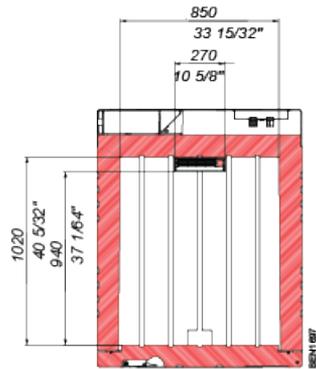


Section F-F

720 Litre in cooling and heating

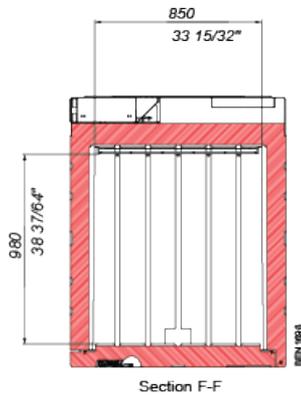
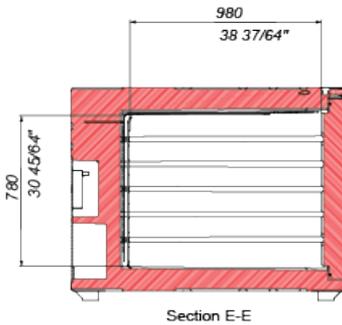
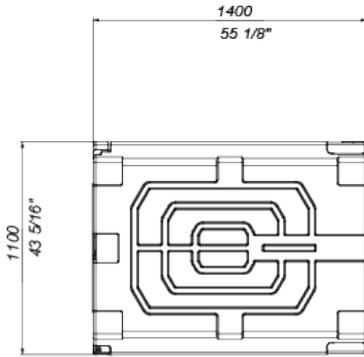
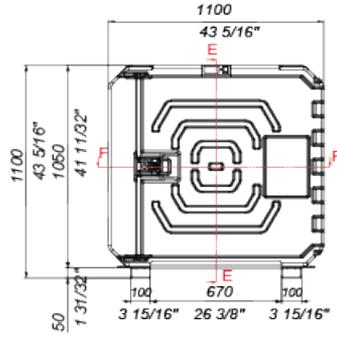
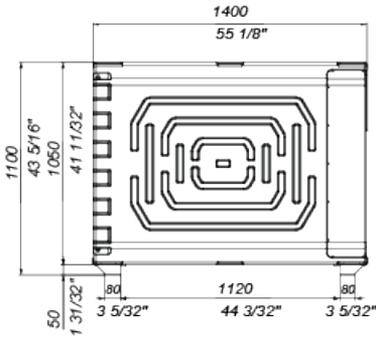


Section E-E

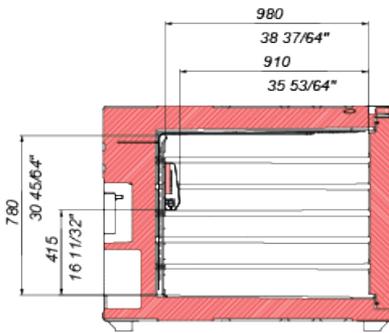
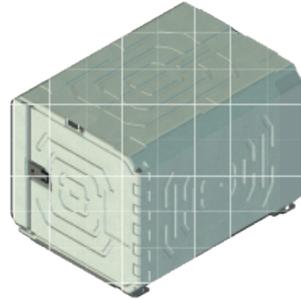
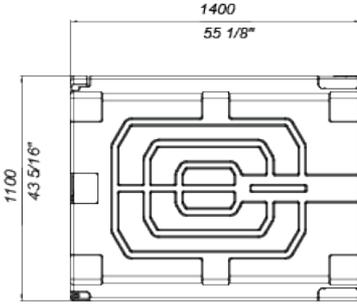
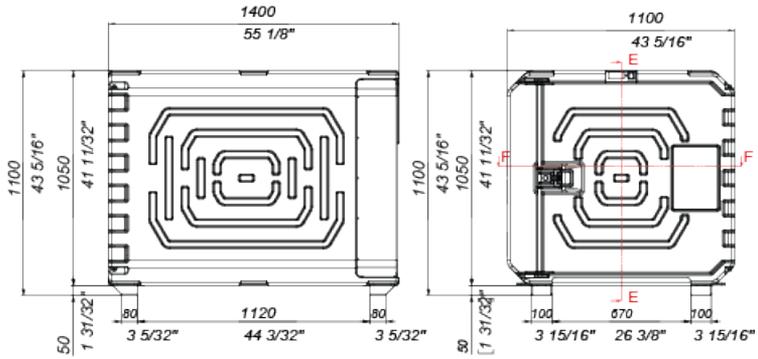


Section F-F

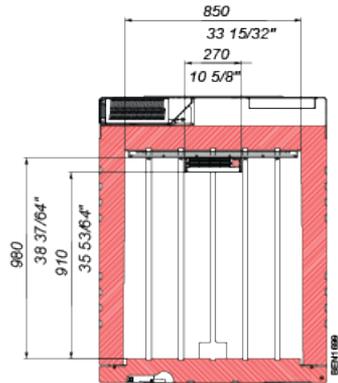
720 Litre in freezing



720 Litre in freezing and heating (Pharma)

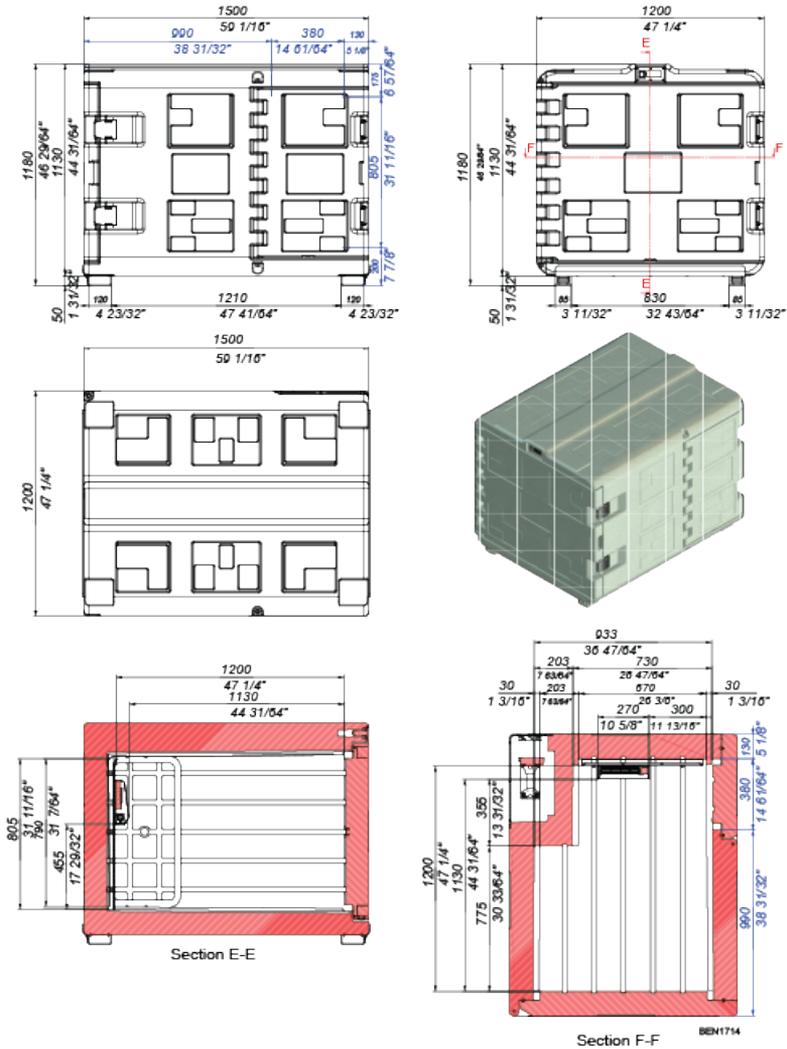


Section E-E



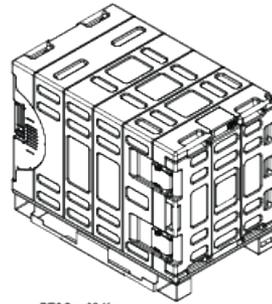
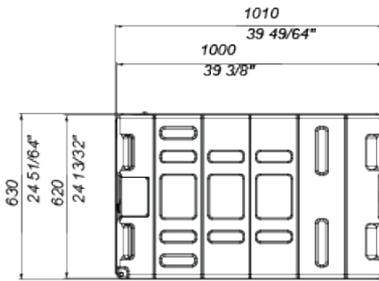
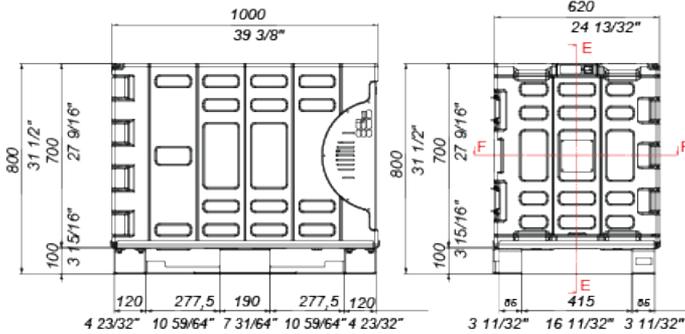
Section F-F

915 Litre in freezing and heating (Pharma)

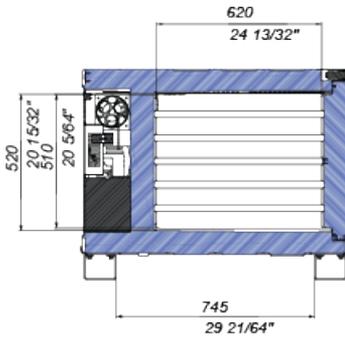


Dimensions of the ColdCube™ Connect FLEX

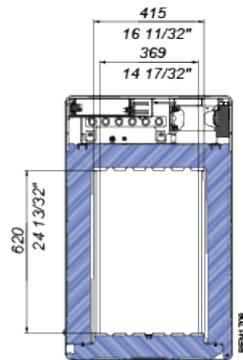
140 Litre in cooling



PESO= 93 Kg

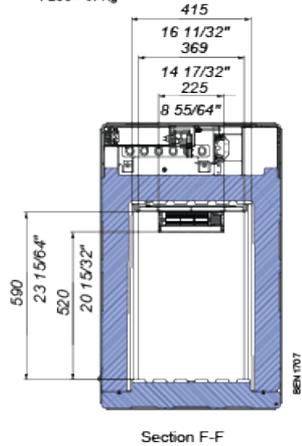
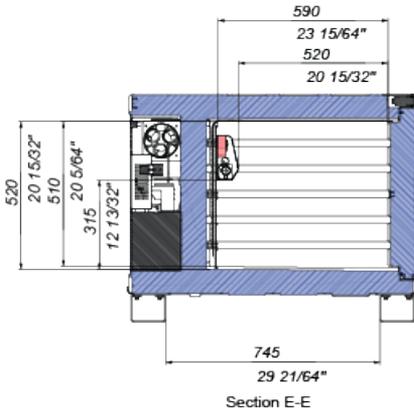
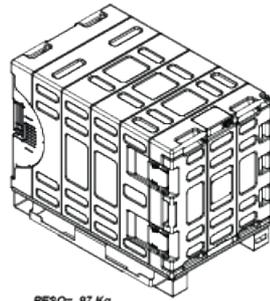
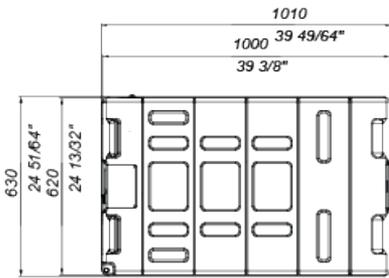
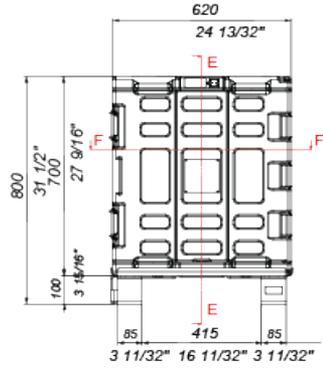
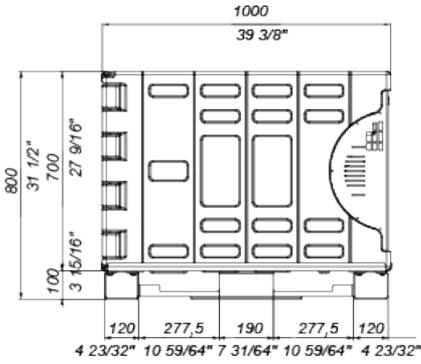


Section E-E

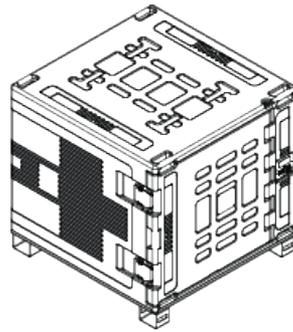
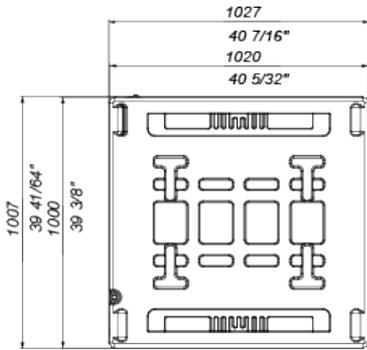
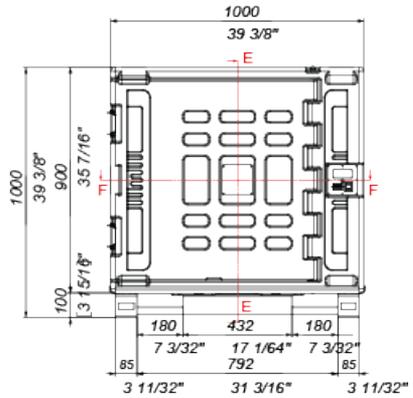
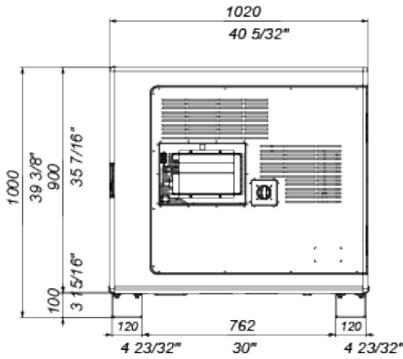


Section F-F

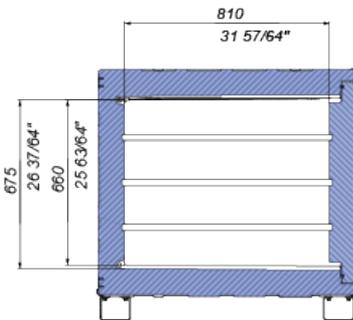
140 Litre in freezing and heating (Pharma)



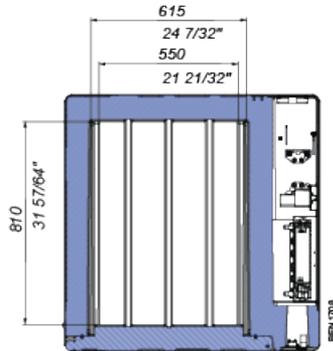
330 Litre in cooling



PESO= 128 Kg

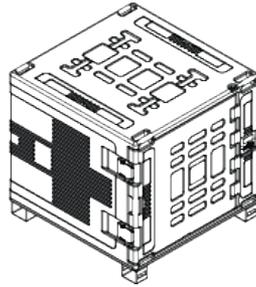
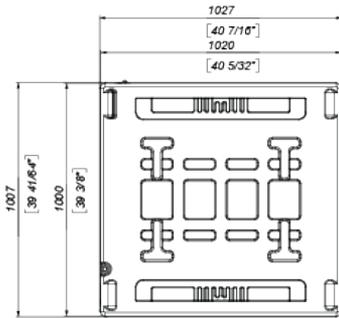
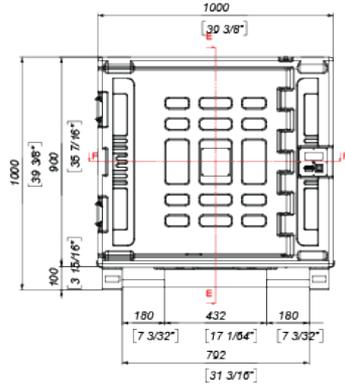
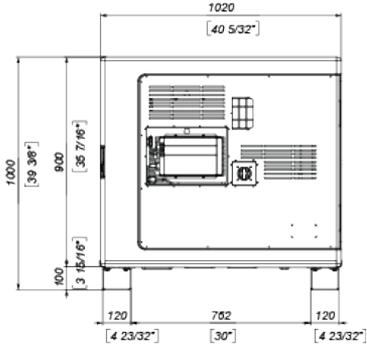


Section E-E

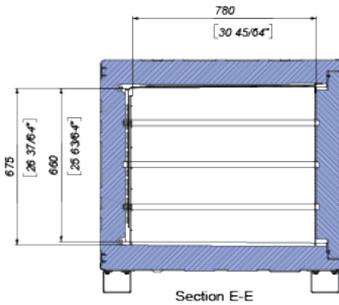


Section F-F

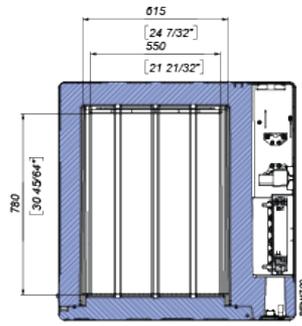
330 Litre in freezing



PESO= 129 Kg

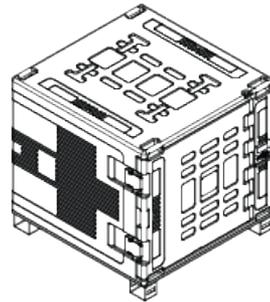
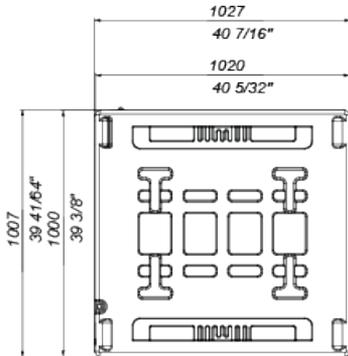
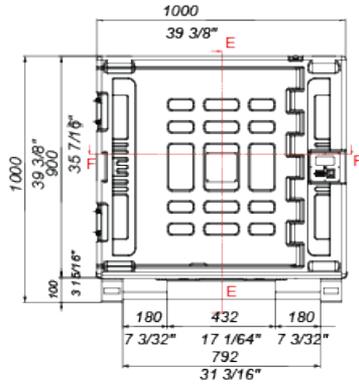
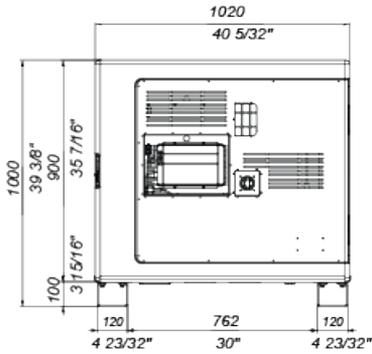


Section E-E

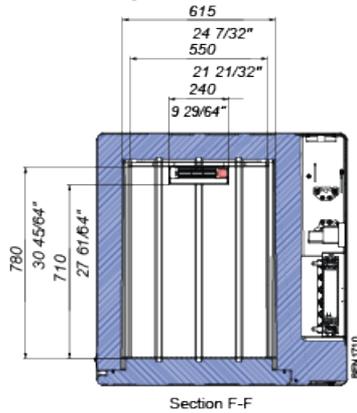
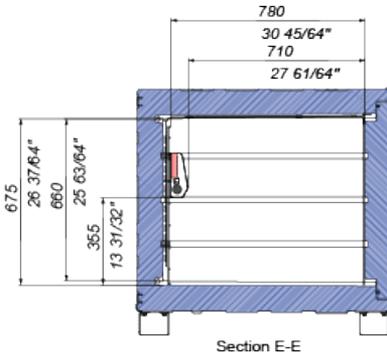


Section F-F

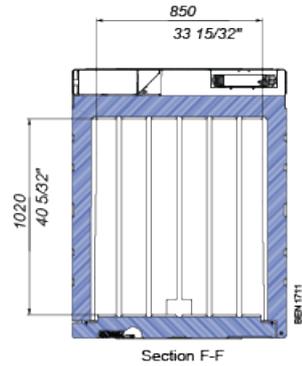
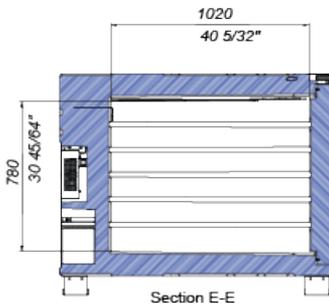
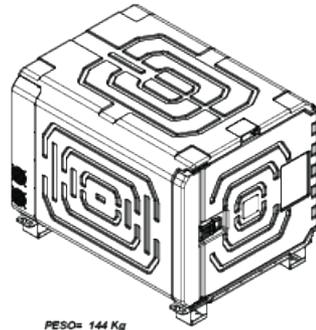
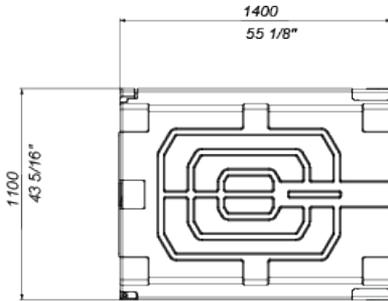
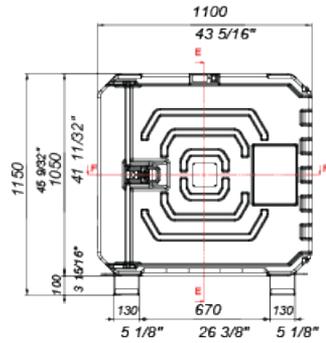
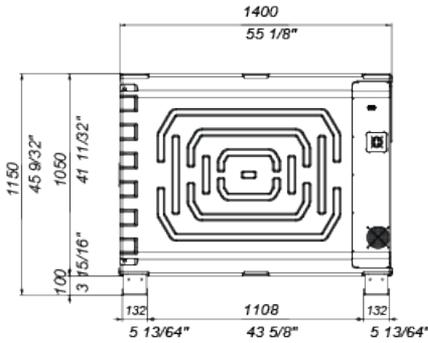
330 Litre in freezing and heating (Pharma)



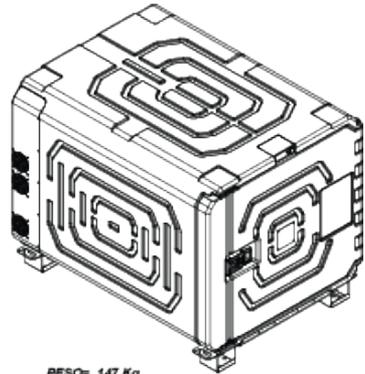
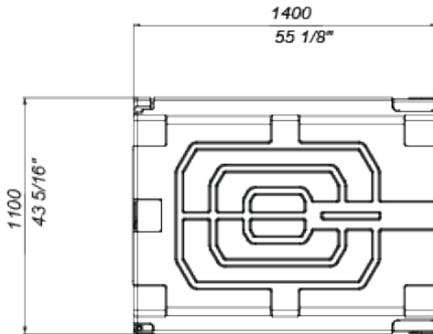
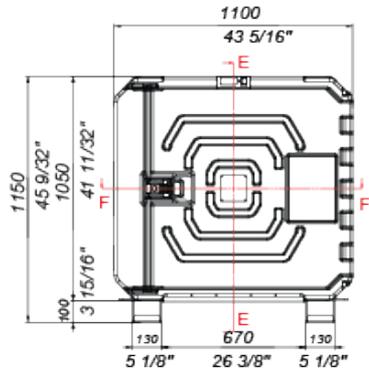
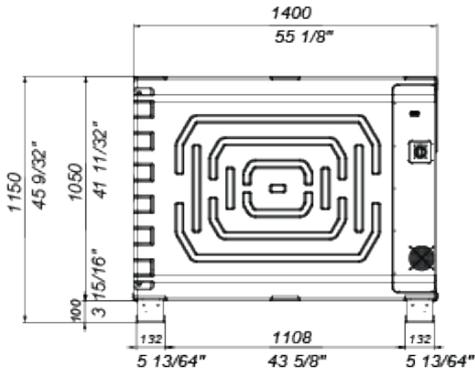
PESO= 131 Kg



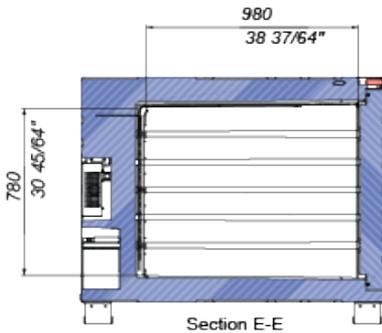
720 Litre in cooling



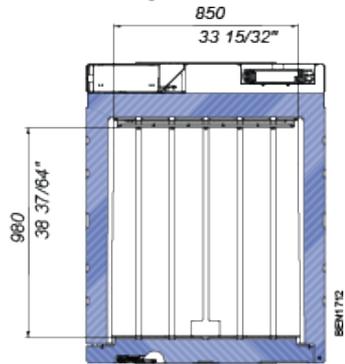
720 Litre in freezing



PESO= 147 Kg

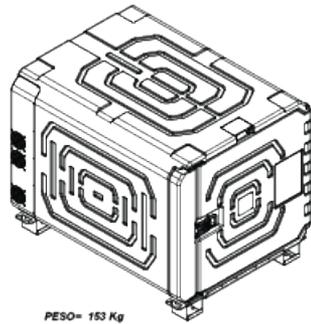
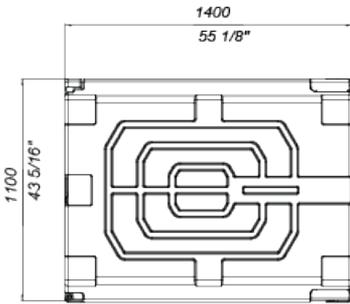
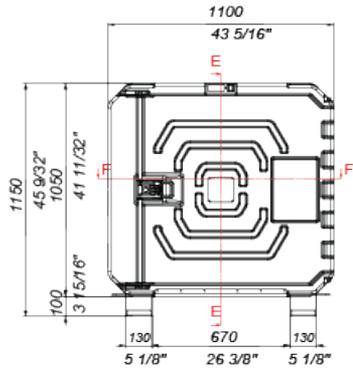
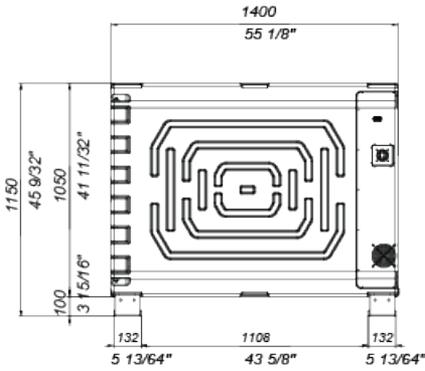


Section E-E

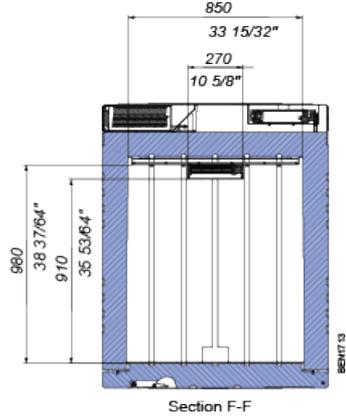
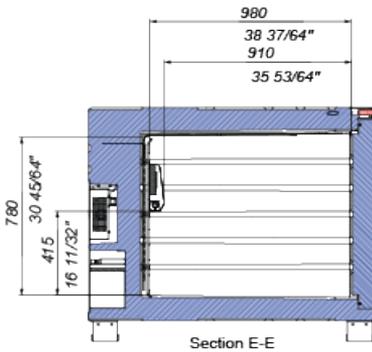


Section F-F

720 Litre in freezing and heating (Pharma)



PESO= 153 Kg



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