

# **User Manual**

## **for**

# **Portable refrigerator**

## **Models: C29, C41, C65**

**Version 1.5**  
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## **Important**

This manual is subject to periodic review, update, and revision. Customers are cautioned to verify that the manual's information applies to the software and hardware present in the equipment.

This product performs as described in this manual, and in accompanying labels and/or inserts, when assembled, operated, maintained, and repaired in accordance with the instructions provided.

This product must be cleaned and checked periodically. Do not use a defective product. Parts that are broken, missing, plainly worn, distorted or contaminated should be replaced immediately. Do not repair this product or any of its parts other than in accordance with written instructions provided by Lmb Technologie GmbH. The user of this product shall have the sole responsibility for any malfunction that results from improper use, faulty maintenance, improper repair, unauthorized service, damage, or alteration by anyone other than Lmb Technologie GmbH.

The safety, reliability, and performance of this device can only be assured under the following conditions:

- If the device has been used according to the accompanying operating instructions.
- If fittings, extensions, readjustments, changes, or repairs have been carried out by Lmb Technologie authorized representatives.
- If it is used in buildings having ground equalization wiring that complies with relevant local standards and regulations.

## **Disclaimer**

Information provided by Lmb Technologie GmbH is believed to be accurate and reliable. However, Lmb Technologie GmbH assumes no responsibility for the use of such information nor for any infringement of patents or other rights of third parties, that may result from its use.

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# 1 Introduction

This user manual gives basic information about normal operation and behavior of device. It contains the full technical specification of the device and all the necessary information and support for the operator. In order to achieve the optimal result, we recommend that the user reads this document carefully before any operation with the product.

The information in this document is subject to change without prior notice in order to improve reliability, design and function.

## 1.1 Intended use

Developed for the transport of medicine, vaccines and temperature-controlled products, our Portable Refrigerators adequately answer the most various requirements, taking advantage of continuous power supply (for installation on ambulances and on cars) or of alternate power current. Compact design and good insulation guarantee the top quality of the product and good performances.

## 1.2 Product features

- Polyurethane foam insulation
- Digital thermostat
- Electronic Display
- Retractable PVC handles
- Compressor operated
- Acoustic and Visual Alarm
- Internal lighting
- Key lock
- Hinged door
- Optional 230-12V Automatic feeder
- Temperature chart recorder

## 1.3 Product standard and options

- 230V - 12V Automatic feeder
- Temperature chart recorder



## 2 Safety

### 2.1 Types of Warnings, Cautions and Notes



**Warning:** A warning indicates precautions to avoid the possibility of personal injury or death.



**Caution:** A caution indicates a condition that may lead to damage to equipment, or a lower quality of treatment.



**Note:** A note provides other important information.

### 2.2 General Safety Instructions



#### Warnings

#### • DO NOT USE BEFORE READING AND UNDERSTANDING THIS MANUAL.

- Changes or modifications not expressly approved by Lmb Technologie could affect the safety and effectiveness of the system and will void the system's warranty.
- Do not misuse of device in potentially explosive atmospheres.
- The more refrigerant in the unit, the larger the room in which the unit is located must be. In rooms that are too small, a leak can result in a flammable mixture of gas and air. The installation space must be at least 1 m<sup>3</sup> for every 8.9 g of refrigerant. Information on the refrigerant contained is on the type of plate inside the device.
- Do not block ventilation openings in the device housing or in the installation housing.
- Do not damage the refrigerant circuit system.
- Do not operate electrical equipment inside the refrigerator compartment that is not of the type recommended by the manufacturer.
- The power cord must not be damaged when setting up the device.
- Multiple sockets/distribution strips and other electronic devices (e.g. halogen transformers) must not be placed and operated on the rear of devices.
- Do not set up the device around direct sunlight, next to heating and the like.
- The system contains no user-serviceable components.
- Failure of operation - If unit fails during current leakage tests, remove it from operation until qualified service personnel have corrected the situation.
- Electrical shock and flammability hazard - Before cleaning or servicing the device, always turn it OFF and disconnect the power cord from the AC power supply.

- Operator may only perform maintenance procedures specifically described in this User Guide. Refer servicing to qualified service personnel trained in the repair of this equipment.
- This equipment must be properly grounded.
- Do not under any circumstances remove the grounding conductor from the power plug.
- Do not use extension cords or adapters of any type. The power cord and plug must be intact and undamaged.
- If there is any doubt about the integrity of the protective earth conductor arrangement, do not operate the device until the AC power supply protective conductor is fully operational. Damaged Equipment – Any product that has been dropped or damaged should be checked by a qualified service technician to insure proper operation before use.
- The product is to be used only by, or on, the order of ~~medically~~ trained personnel.



### Cautions

- Disposal of this device should be performed in accordance with local regulations.
- Keep out of the reach of children.
- Do not disassemble any part of the device. This system is not user-serviceable.
- If the electrical cable becomes unplugged during operation, reinsert the cable and restart the device.



### Notes

- These instructions do not purport to cover all possible contingencies that may arise during operation or maintenance. If you require further information regarding this instrument, please contact Lmb Technologie GmbH.
- This instrument should only be opened by a duly authorized representative. The unit should only be opened in an anti-static environment. Failure to do so may damage the device.

## 3 Packaging

### 3.1 Unpacking the product before use

Remove the device from the shipping carton and inspect for possible damaged parts. Report any damage immediately to Lmb Technologie GmbH service center. The original packing case should be used for storage and for transporting the system to a new location. Do not discard any shipping materials.








**When unpacking, make sure that all components are present, and check for any damaged parts.**

## 3.2 Packing the product after use

If the device has to be shipped to the producer for service and repair the original packing container has to be used. If this container is not available any more, please use similar or ask Lmb Technologie for recommendations.

## 4 Explanation of symbols

The following symbols may appear on the product itself, label or shipping materials.

	<p>The WEEE symbol, indicating separate collection for WEEE- Waste of electrical and electronic equipment</p>
	<p>Attention! You must take precautions when using the device. Refer to the documents that accompany the device before use</p>
	<p>Warning of flammable refrigerant</p>
	<p>RoHS compliant</p>
	<p>The system has CE mark.</p>



## 5 Technical Datasheet

General technical data			
Model	C29	C41	C65
Capacity	29L	41L	65L
Temperature Range	-10°C / +10°C		-20°C / +10°C
Ambient Temperature	SN		
External Dimensions (WxDxH) [mm]	530x350x390	600x370x400	700x440x470
Internal Basket (WxDxH) [mm]	280x250x250		460x360x320
Weight [kg]	16	17	24
Insulation Thickness [mm]	40		
Refrigerant	R600a		
Refrigerant weight [Kg]	0,016	0,016	0,018
Noise level	< 70dB		
Power Supply			
Voltage [V]	12V-24V 110V-240V/1~/50-60Hz		
Nominal consumption 12Vcc [A]	2.8	2.8	3.6
Nominal power consumption [W]	48	48	67
Environmental			
Temperature (Working conditions)	+10°C / +32°C		
Humidity (Storage, Transport and Working conditions)	20% / 90% non-condensed		
Temperature (Storage & Transport conditions)	-20°C / +65°C		
Compliance data			
Classification	Laboratory device		
Directive and Standards applied	2014/30/EU, 2014/35/EU, 2011/65/EU EN 378-1, EN 60335-2-89, EN 60335-2-24 EN 61326		
Classification (Protection against electric shock)	Class II		

## 6 User instructions

### 6.1 Installation

Place the refrigerator on a horizontal surface making sure it is not going to move around while the vehicle is travelling. Ensure adequate air flow for unit making sure that the side air grills are not blocked (suggested = 100 mm).

1. To work with 12V/24V DC, it's suggested to create a dedicated line from the battery of the vehicle.
2. Suggested dimensions of the cables:

Cable section in mm <sup>2</sup>	Maximum cable length in meters	
	<i>12V models</i>	<i>24V models</i>
<b>2.5</b>	2.5	5
<b>4</b>	4	8
<b>6</b>	6	12
<b>10</b>	10	20

3. Cigarette lighter connection (male plug on the refrigerator, female socket on the vehicle) can be used for power supply of the unit.
4. If AC (110V/240V) and DC (12V/24V) are both connected, the preferential source will be the AC.

### 6.2 Electronic control board

The function of this electronic unit is to pilot the compressor motor and monitor all the controls and electrical cut-out devices in the system.  
The main characteristics are:

- a) Protection against reversed polarity.
- b) Battery cut-out device with automatic compressor shut down if the power supply voltage drops below the minimum threshold.  
The compressor will restart automatically once the voltage return to its normal value.
- c) Ammeter safety device if the compressor fails to start up. This normally happens when the internal pressures have not enough time to stabilize: in this situation, the compressor will try to restart automatically after 2 minutes.
- d) The compressor will shut down if voltage exceeds the limits of 17 volts for 12-volt models and 31.5 volts for 24-volt models.  
Also, in this case the compressor will restart automatically once the voltage returns to its normal value.

### 6.2.1 Electrical connections

The compressor's electrical connections must be made by observing the following instructions:

- 1) Feed the assembly with a DC power supply taken from a battery (12V or 24 V). Avoid using appliances which do not guarantee direct current such as transformers or alike.
- 2) Ensure that a suitable sized cable is used for the power supply line (see table above); if possible, with no junctions on the wire which might otherwise cause voltage drops.



**The use of wires with inadequate dimensions may interfere with the compressor even if the battery is charged.**

- 3) Any circuit breakers must have a breaking load of not less than **20A (10A for the 24-Volt models)**.
- 4) Ensure the polarity is correct.
- 5) Protect the power supply line with a 20A fuse (10A fuse on the *24V model*).
- 6) Connect the wires to the socket supplied checking that polarity connections are correct.

These devices could be powered with 12-24V DC and from 110-240V AC 50-60Hz. In case of DC power supply 12V the maximum apparent power is 17VA DC, or 31.5VA DC in case of power supply 24V DC.

In case of power supply AC, the maximum apparent power is 260VA AC and the minimum is 100VA AC.

## 6.3 Turning ON/OFF

### Turning on:



Press the button for 5 seconds, the display will show the internal temperature.

### Turning off:



Press the button for 5 seconds, the display will show the word OFF.

### Internal temperature adjustment:





Choose a temperature between +10°C and -20°C for the model C65 and between +10°C and -10°C for other models. Set the temperature on the electronic thermostat following the specific instructions below in *section 6.4*.

During its function, the display will constantly show the temperature inside the cell.

## 6.4 Temperature settings

The refrigerator is fitted up with an ELECTRONIC and DIGITAL THERMOSTAT with HIGH/LOW TEMPERATURE ALARMS

As soon as the refrigerator is connected to the power source and the turning on procedure is completed, the temperature of the sensor will appear on the display. Below we list the functions of the keys that may be used by the user in order to view and/or to adjust the portable refrigerator temperature.

	<p><b>SET:</b> press SET for 1 s, the set value will start flashing after a few moments; Increase or decrease the value using UP or DOWN; Press SET to confirm the new value. After 30 sec display will visualize the internal temperature</p>		
	<p><b>UP:</b> used to increase the set point value, as well as the parameter when in programming.</p>		
<p>When held down for a few seconds, the charge rate accelerates.</p>			
	<p><b>DOWN:</b> same functions except to decrease a value.</p>		
<p style="text-align: center;"><b>Alarms</b></p>			
<b>Code</b>	<b>Buzzer and Alarm relay</b>	<b>LED</b>	<b>Description</b>
E0	Active	ON	Probe 1 Error = Control
E1	Inactive	ON	Probe 2 Error = Defrost
E2	Inactive	ON	Probe 3 Error = Condenser
LO	Active	ON	Low Temperature Alarm
HI	Active	ON	High Temperature Alarm

## 6.5 Temperature chart recorder (optional)

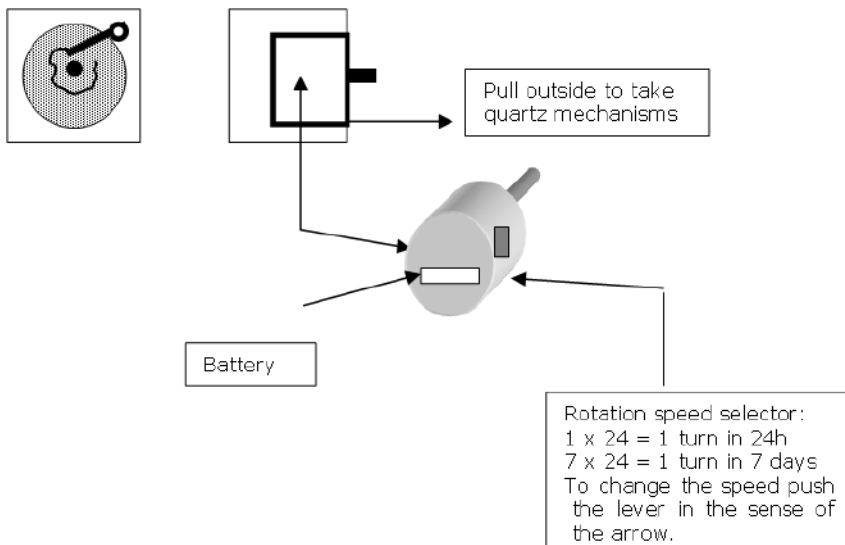
### Installing the diagram for battery operated mechanism

- Release the pointer from the diagram
- Unscrew the knurled nut
- Place the diagram on the drive's axis
- Insert the diagram under the tabs foreseen to hold it
- Tighten the nut, the knurled part toward the outside, up to the stop
- Gently bring the pointer on the diagram.

### Installing the battery (for quartz mechanisms)

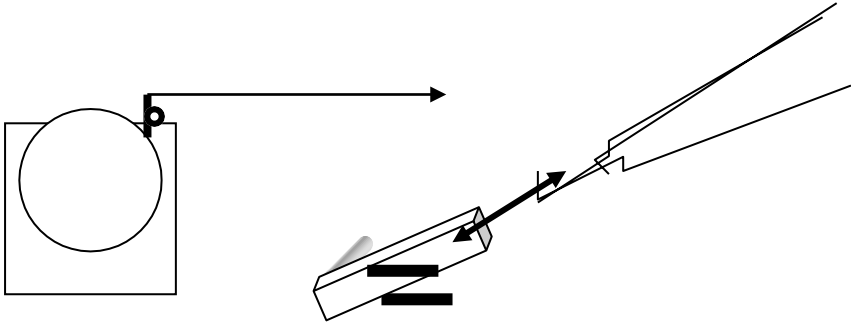
- Open the recorder door
  - Lift the pointer to release the diagram
  - Unscrew the knurled nut and remove the diagram
  - Firmly hold the case in one hand and, with the other, pull the mechanism axis toward the outside by alternatively swinging up and down to release it from its base
  - Change the battery located behind the mechanism, replace the mechanism in its case up to the stop
- For two-speed versions, the mechanism thus taken out allows access to the speed-changing lever
- Tighten the nut, the knurled part toward the outside, up to the stop.

The standard LR6 leak proof alkaline battery should be replaced every year.



### Putting the fiber point pen in place

- Lift the plate's pointer
- Insert the end of the pointer into the fiber point pen's slide rail up to the stop
- Remove the cap by pulling and turning it at the same time
- Do not place the point of the fiber point pen in contact with the fingers
- Gently place the pointer on the diagram again.



## 6.6 Defrosting

Defrosting is necessary when the frost layer is over 4mm. Disconnect the portable refrigerator from the mains for a manual defrosting.

Do not use sharp metal objects to remove frost or ice.

Await the complete defrosting, drain/wipe the equipment and then restart.

## 7 Troubleshooting

The following table shows possible errors and symptoms and possible correction measures (troubleshooting).

### Explanation:

The table contains correction measures of two different classes. **Class A**- measures can be executed by the operator of the device, **class B**-measures shall be executed by trained service technician.

Errors/Symptoms	Class	Troubleshooting / Possible corrective actions
Unit does not work or the temperature is unsatisfactory	<b>A/B</b>	Clogged ventilator grills – clean and test again.
	<b>A/B</b>	Check fuse.
	<b>A</b>	Ambient temperature outside range -2°C to +35°C. Move the device to room within the temperature range and test again.
	<b>B</b>	Check electrical connection.

## 8 Cleaning and Maintenance

### 8.1 General cleaning instructions

Device should be cleaned as defined in maintenance checklist.  
Please observe the following table of warnings and cautions:



Caution: Ensure that the device is completely dry before use.



Caution: Don't allow water or any other liquid to spill onto the device interior. Unplug the line power supply from the device before cleaning or disinfecting.



Caution: Should the system become wet, wipe off all moisture and allow sufficient time for drying before operating.



Caution: Do not soak or immerse device in any liquid.



Caution: Use cleaning solution sparingly. Excessive solution can enter the unit and cause damage to internal components.



Caution: Do not use petroleum-based or acetone solutions, or other harsh solvents, to clean the unit. These substances attack the device's materials and damage the device.




Caution: Contact with solvents can cause severe deterioration of plastic parts and malfunctioning of the instrument and accessories.

Standard cleaning procedure:

- Remove loose dust on the outside of the device with a lint-free cloth. Be careful to avoid scratching of the surface.
- Use a soft cloth dampened with aqueous solution of 75% isopropyl alcohol for efficient cleaning.
- Before operating device make sure that is dried properly after cleaning.
- The device is designed exclusively for indoor use only. Additional measures have to be taken if it is to be used outdoors.
- It is not necessary to maintain the device once a year. To ensure good results, a regular cleaning should be done. On customer request, an annual service can be offered.

## 8.2 Maintenance schedule

Components	Recommended action	Cleaning: dates			
		weekly	monthly	yearly	Remarks
<b>Device cleaning:</b> Due to frequent use, ventilator grills can get clogged with dirt.	Clean the finned condenser with air jet or dry brush. Do not use any metal brush and take care not to damage fins of the condenser.			✓	
<b>Interior cleaning:</b> Due to frequent use internal compartment can get dirty.	Periodically clean the interior of the fridge with warm water and a neutral detergent (or sodium bicarbonate light solution). After the cleaning, rinse with clean water and carefully dry.	✓	✓		Monthly or more often depending on level of contamination

## 9 Service

Equipment should be maintained in good working order. Routine maintenance may be performed by clinic staff unless otherwise specified. Any maintenance procedure not mentioned in this guide must be performed only by Lmb Technologie GmbH authorized technical personnel.



**Warning:** Do not remove the cover of the device. Only perform maintenance procedures specifically described in this User Manual.



**Caution:** Improper use or adjustment of this system may invalidate the service warranty agreement.



## 9.1 Service questions

Repairs of device under warranty must be made by authorized repair centers. If the device needs repair, contact Lmb Technologie GmbH service department or your local distributor.



### **Lmb Technologie GmbH**

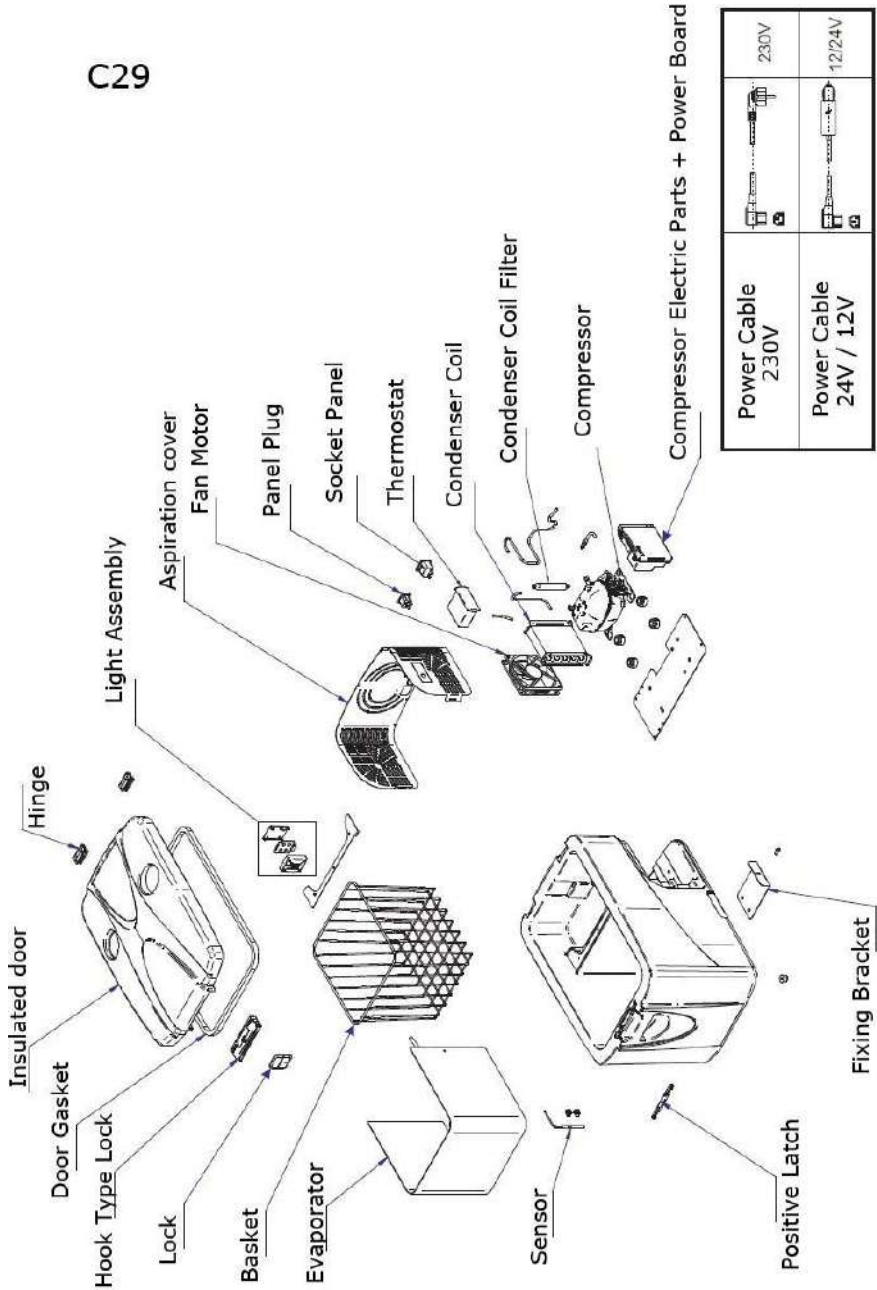
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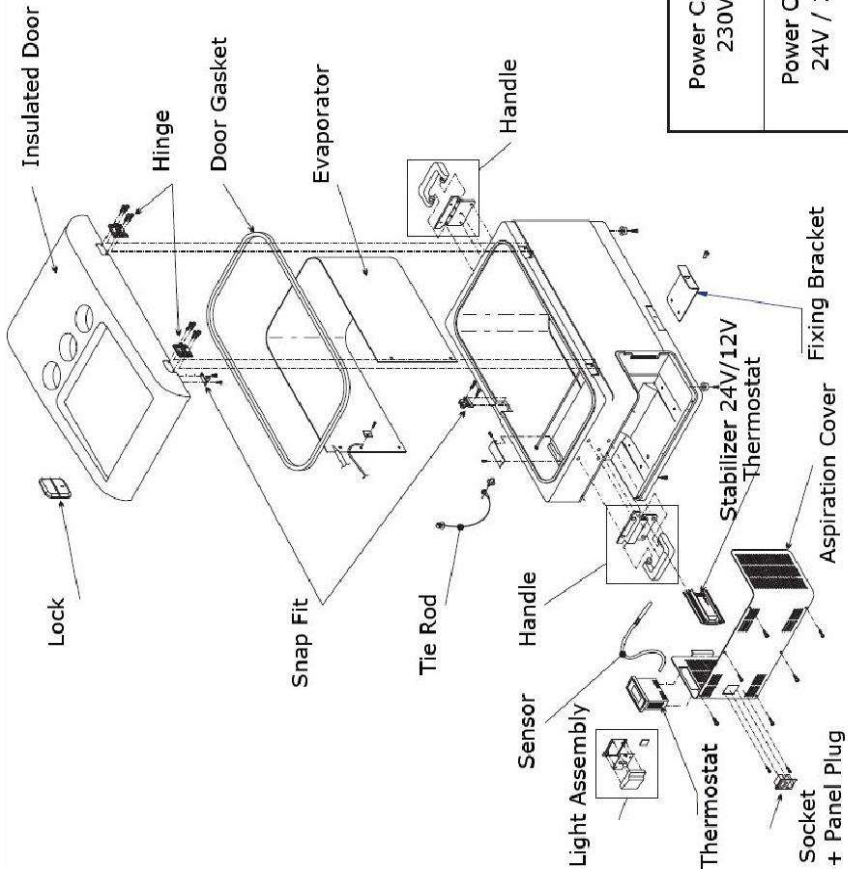
## 10 Spare parts



	Name	C29	C41	C65
1	Lock	KÜ-10275		
2	Handle	KÜ-10276		
3	Socket panel	KÜ-10382	KÜ-10277	
4	Stabilizer 24V/12V thermostat	KÜ-10278		
5	Thermostat	KÜ-10383		
6	Sensor	KÜ-10224		
7	Power cable 24V/12V	KÜ-10280		
8	Power cable 230V	KÜ-10281		
9	Compressor electric parts + Power board	KÜ-10381	KÜ-10226	
10	Compressor	KÜ-10379	KÜ-10282	
11	Condenser coil	KÜ-10283		
12	Fan motor	KÜ-10284		
13	Compressor filter	KÜ-10380	KÜ-10285	

## C29

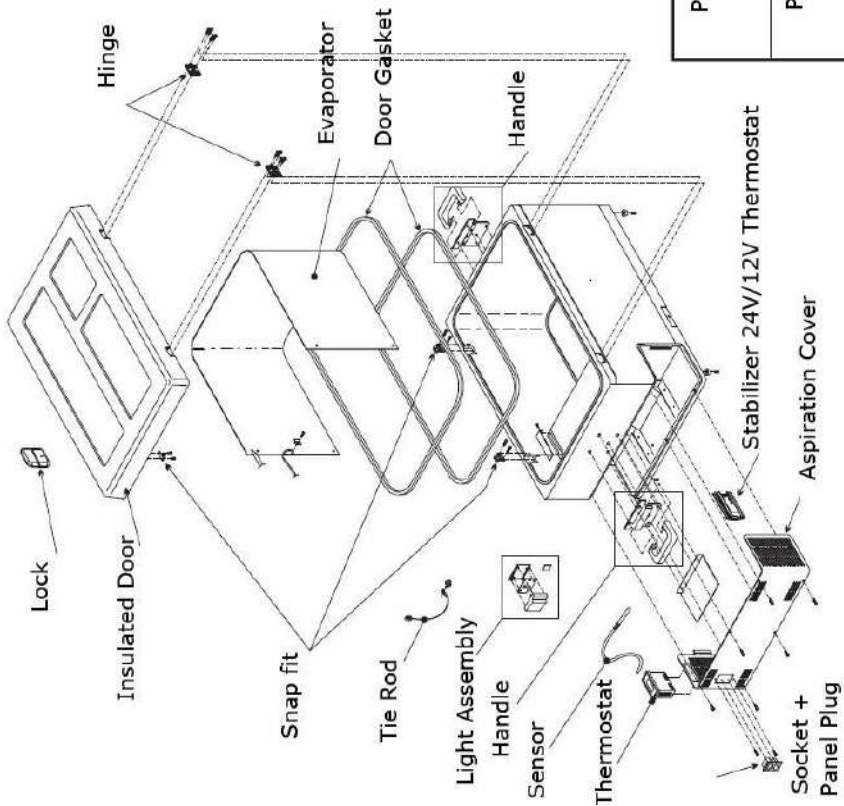




# C41



Power Cable 230V		230V
Power Cable 24V / 12V		12/24V

## C65



Power Cable 230V		230V
Power Cable 24V / 12V		12/24V

