



medical
systems

MRB 3000 SDD

SOLAR DIRECT DRIVE
ICE-LINED BLOOD STORAGE REFRIGERATOR



USER MANUAL



This equipment is certified according to the safety standard IEC 60335-1.

Ice-lined blood storage refrigerators in 220-240V 50/60Hz are Class IIa medical devices according to the European Medical Device Regulation (EU) 2017/745 and bear a CE0123 marking.



This equipment is designed to be safe at least under the following conditions (based on the IEC 60335-1):

- Indoor use;
- Altitude up to 2000 m;
- Temperatures 10°C to 43°C;
- Maximum relative humidity 95%.
- Mains supply voltage fluctuations up to $\pm 6\%$ of the nominal voltage;
- Transient overvoltages up to the levels of overvoltage category II;
- Pollution degree 2.

TABLE OF CONTENTS

	page
1 Model Overview _____	5
2 Important Information _____	6
2.1 Warnings and Cautions _____	6
2.1.1 Warnings _____	7
2.1.2 Cautions _____	8
2.2 Labels and Symbols on the Packaging _____	9
2.3 Unpacking and Inspection _____	9
2.4 Intended Use _____	10
2.4.1. Intended purpose _____	10
2.4.2. Intended target users _____	10
2.4.3. Intended use environment _____	10
2.4.4. Indications _____	10
2.4.5. Contraindications _____	11
3 Installation Procedure _____	12
3.1 Location _____	12
3.2 Final position _____	13
3.3 Initial cleaning and disinfection _____	13
3.4 Electrical Connection _____	14
3.4.1 Connecting to the "B Medical Systems" Solar Generator _____	14
4 Use and Operation _____	15
4.1 Switching on _____	15
4.2 Opening and closing _____	15
4.3 Important Advice for Storage _____	16
4.4 Operating controls _____	17
4.4.1 Main switch _____	17
4.4.2 Control panel _____	17
4.4.3 Display _____	17
4.4.4 Temperature setpoint and alarm values _____	17
5 Alarms _____	18
5.1 Messages overview _____	18
5.2 Alarm messages _____	19
5.3 Warning messages _____	19
6 Additional equipment _____	21
6.1 Rechargeable battery _____	21
7 Maintenance and repair _____	22
7.1 Cleaning _____	22
7.2 Condensation water _____	22
7.3 Ventilation _____	23
7.4 Periodic Maintenance _____	23
7.4.1 Daily _____	23
7.4.2 Weekly _____	23
7.4.3 Monthly _____	23
8 Disposal _____	23
9 Troubleshooting _____	24
10 Technical data _____	25
11 Track changes _____	26

1 Model Overview

Group

Model name

Ice-lined Blood Storage Refrigerators

MRB3000SDD

2 Important Information

- Before using the MRB3000SDD, read these operating instructions carefully, including all the information on operating safety, use and maintenance.
- B Medical Systems does not guarantee the safety of the stored products, if the appliance is used for any purposes other than its intended use or if any procedures other than those mentioned in this operating manual are used.
- Keep these operating instructions ready at hand and leave them with the unit, so that all users have access to information on the functions and safety regulations.
- Contact our sales representative or agent for any problems related to these operating instructions.
- Any serious incident that has occurred in relation to the device should be reported to the manufacturer and the competent authority of the Member State in which the user is established.
- These operating instructions may not be reproduced in any form without the written permission of our company.
- Our company guarantees the product under certain warranty conditions. We shall in no way be responsible for any loss or damage of content.
- The sound intensity level produced by the appliance is lower than 70 dBA (measured at a distance of 1 meter).
- The MRB3000SDD is an ice-lined blood storage refrigerator for Solar Direct Drive without battery storage. It has a bank of icelining elements installed inside the cabinet. During operation these elements freeze and act as cold storage for protecting the stored blood bags during periods without energy supply (night time).

2.1 Warnings and Cautions

- It is of utmost importance that any user complies with these operating instructions as they contain important safety advice.
- Items and procedures are described so that this unit can be used correctly and safely. Following the advised precautions will prevent possible injury to the user and third parties.
- Precautions are illustrated in the following way:



WARNING

A **WARNING** is a statement that alerts to the possibility of injury, death or other serious adverse reactions associated with the use or misuse of the device.



CAUTION

A **CAUTION** is a statement that alerts to the possibility of a problem with the device associated with its use or misuse. Such problems include device malfunction, device failure, damage to the device or damage to other property.



This mark is placed where electrical components are enclosed to prevent electric shock. The cover should only be removed by a qualified engineer or a service personnel only.



This mark is placed where flammable components (refrigerants) are enclosed. Special care has to be taken when working on these components.



This mark warns about low temperatures and freezing conditions inside the appliance.

2.1.1 Warnings



- Do not use the device outdoors. Current leakage or electric shock may result if the unit is exposed to rain water.
- Before cleaning or carrying out maintenance work, always switch the device off and disconnect the mains plug. Working on the connected appliance may cause electric shock or fire.
- During defrosting, water will leak from the unit. Collect this water so that it does not lead to a risk of slipping for passing persons.
- Make sure that no water penetrates the ventilation slots of the unit.
- Before cleaning or carrying out maintenance work, the contents preserved in it will have to be removed and temporarily stored in another working refrigerator.
- Make sure the condensation water is removed on a weekly basis. Increased condensation water inside the device may lead to malfunctioning of the device.
- Inspect the unit on a regular basis for damaged parts. Only genuine spare parts may be used. Use of any other parts may affect the performance or cause physical injury or damage to the equipment.
- The wall socket must be easily accessible.
- When disconnecting, always pull the plug and never the cable. Pulling the cord may result in electric shock or fire by short circuit.
- These devices must only be used by adults. Do not allow children to play with the device or touch the controls.
- Ensure that the unit is steady and perfectly straight and does not knock against anything next to it. If the floor is not strong enough or the installation site is not adequate, this may result in injury from the unit falling or tipping over.
- When transporting or moving the device, be aware of its weight. Do not try to move a fully loaded device.
- Ensure that the connecting cable is not squeezed or bent when the unit is being installed or moved. Deterioration of the insulation may cause current leakage or electric shock.
- Never install the device where acid or corrosive gases are present as current leakage or electric shock may result due to corrosion.
- Before connecting, check whether the details on the nameplate correspond to local values. Use of a voltage or frequency other than that on the nameplate may cause fire or electric shock.
- Do not store flammable or explosive substances inside these appliances (e.g. aerosols with flammable propellant). These may cause explosion or fire.
- Make sure that no sharp or pointed objects come into contact with the cooling system. The cooling system contains flammable refrigerant. Both the appliance and the products stored inside can be severely damaged if this system starts to leak.
- Do not insert metal objects such as a pin or a wire into any vent, gap or any outlet. This may cause electric shock or injury by accidental contact with moving parts.
- Disconnect the power supply prior to any repair or maintenance in order to prevent electric shock or injury.
- Do not touch any electrical parts (such as power supply plug) or operate switches with a wet hand. This may cause electric shock.
- All installation work and adjustments to the refrigerator must be carried out by qualified personnel. Work performed by persons with insufficient technical knowledge may adversely affect the performance or cause physical injury or damage to the equipment.
- When the unit is in its final position it is important to immobilise the unit using the feet.
- It is of utmost importance that the icelining elements are in place. Make sure that all these elements are in place before starting the unit. Never remove the icelining elements from the unit.
- Make sure that the lid is securely closed by closing the latches.
- Note that the unit may be locked using a key. Always ensure that the key is available to the user.
- Before scrapping an old unit, remove the door so that children cannot lock themselves inside while playing.
- Before scrapping the unit, remove the lead accumulator and dispose of it separately.
- When disposing of the unit, make sure that it does not get too hot, as combustible gas would cause the insulating foam to froth up.
- The appliances contain environmentally friendly refrigerant. Before disposing of the appliance, the refrigeration circuit should be opened outside so that the refrigerant can escape.
Attention: The refrigerant is flammable!
- Make your contribution to saving the environment. Bear in mind that orderly and proper disposal is required. Packaging materials and devices are always recyclable and should be taken for recycling.



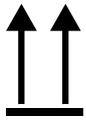
2.1.2 Cautions



- Ensure that there is sufficient room around the unit for air circulation. A good air circulation especially around the compressor is essential for trouble-free operation. Keep the ventilation openings of the compressor cover always free from any obstruction. Make sure that a minimum distance is provided between the unit and any wall or other device located next to it.
- Do not locate the unit below a ceiling fan or right next to air-conditioning equipment.
- The sound intensity level produced by the appliance is lower than 70 dBA (measured at a distance of 1 meter).
- Check whether the appliance has been delivered undamaged. If you find that damage has occurred in transit, immediately contact the delivery service or relevant sales outlet, submitting the delivery note or proof of purchase.
- Do not operate a unit that has been damaged in transit! If you are unsure, contact your sales outlet and ask them.
- The device must be transported in an upright position only (maximum inclination 45°).
- All connected devices/signalling equipment must provide reinforced or double insulation for protection against electric shock.
- Upon the occurrence of an alarm situation, attempts must be made to discover the reason for the alarm and resolve it as quickly as possible. If that is not successful the necessary measures must immediately be taken so that the stored goods are not damaged.
- Optimal function of the appliance is given at an ambient temperature indicated in the technical data (see chapter 10) with a maximum relative humidity of 95%.
- The device must be set up in a dry well-ventilated place. Avoid direct sunlight or locating it close to a heat source. The location must be protected against rain and dust.
- This device cannot be used/is not for use in facilities at altitudes of 2000m or higher.
- The use of hydrogen peroxide H₂O₂ (VHP) for the disinfection (sterilization) of the appliances is not suitable. This procedure may be applied exclusively with dedicated appliances.
- Other than the cleaning procedure described in this manual, follow the internal policy and procedures.
- Before using the refrigerator it should be cleaned inside and outside.
- For cleaning, use only gentle cleaning agents. Never use aggressive or caustic cleaning agents, scouring powder, steel wool, abrasive sponges or chemical solvents. When cleaning, make sure that no fluids of any kind run into the ventilation housing.
- For disinfecting, we recommend all the surface disinfecting agents commonly used by the customer, provided they are recommended by the national organizations. For disinfecting small areas, we recommend using a concentrated alcoholic agent.
- Before being loaded, the unit must have reached the set point temperature.
- The load should only be stored in the provided baskets and should not exceed the storage areas. The total amount of stored blood bags should be evenly distributed on the 5 baskets (max. 18 blood bags per basket) (image 6). Do not overload the device.
- Different blood or plasma types should be sorted and stored in a manner for the User to identify these with easy.
- The loading must never obstruct the air-inlet-openings.
- Do not store warm items in the devices. They are not designed for fast cooling of warm items.
- Avoid long and / or frequent lid openings to prevent that the inner temperature rises to high.
- Make sure that the lid is correctly closed by using the supplied latches and that the lid gasket seals correctly against the cabinet.
- Do not bring more than 18 new blood bags per day into the MRB3000SDD.

2.2 Labels and Symbols on the Packaging

- Follow the instructions for transport and storage of the product marked on the packaging:



This side up



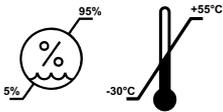
Stacking limitation



Handle with care



Store in a dry place

REF <h1>991.2341.30</h1> 		UDI  <p>(01)05450104447129 (11)220101 (21)000000 (240)991.2341.30 (22)MRB3000SDD (10)ORDERNR-LINE</p>	
SN 0000000 	Order Nr.  ORDERNR LINE	 Date of manufacture : YYYY-MM-DD	Qty <h1>1</h1>
Product type / Model Ice-lined Blood Storage Refrigerator <h2>MRB3000SDD</h2> <p>BLUE 25V DC</p>		 CE 0123	
		manufactured by : B medical systems B Medical Systems S.à.r.l. Op der Hei, 17 L - 9809 Hosingen country of origin : <h2>LUXEMBOURG</h2>	

2.3 Unpacking and Inspection



CAUTION

- Check whether the unit has been delivered undamaged. If you find that damage has occurred in transit, immediately contact the delivery service or relevant sales outlet, submitting the delivery note or proof of purchase.
- Do not operate a unit that has been damaged in transit! If you are unsure, contact your sales outlet and ask them.
- The unit must be transported in an upright position only (maximum allowable inclination 45°).

- Make your contribution to saving the environment. Bear in mind that orderly and proper disposal of packing materials is required. Packaging materials and devices are always recyclable and should be taken for recycling.

2.4 Intended Use

2.4.1. Intended purpose

Ice-lined blood storage refrigerators are devices intended to be used in the blood transfusion medicine for the support on the diagnosis, prevention and treatment of diseases or injuries by keeping whole blood or blood components at a protective and stable temperature between 2°C to 6°C until they are ready for use. The devices comprise an icelined compression cooling system and an integrated alarm system that warns against unexpected temperature excursions and power failures.

2.4.2. Intended target users

Pharmacists, doctors, laboratory staff or other staff that are trained and/or experienced in dealing with whole blood and blood components.

The Ice-lined blood storage refrigerators must be operated by individuals in organizations that have the knowledge of the relevant FDA, AABB, EU or any other applicable regulations on storage and distribution of blood and blood components. The organization must implement and validate procedures for the storage and distribution of blood and blood components according to these regulations, including the necessary storage temperature and the suitable storage period.

Service technicians with a recognized license or certificate as required by local authorities for installation, servicing and repair of refrigeration systems and equipment, and properly trained on the ice-lined blood storage refrigerators.

Patients do not come into direct contact with the refrigerators.

2.4.3. Intended use environment

The Ice-lined blood storage refrigerators are stationary type devices and are intended to operate indoors in hospitals, blood donation services, blood transfusion centers and clinical laboratories.

The devices are designed for an ambient temperature range from +10°C to +43°C under operation, and from -30°C to +55°C during transport and storage. The ambient humidity range during transport, storage and operation lies between 5% and 95%.

The devices must not be used outdoors.

2.4.4. Indications

The Ice-lined blood storage refrigerators are intended for the safe storage of whole blood and blood components used in the clinical medicine for diagnosis, prevention and treatment of diseases or injuries.

Whole blood, red cells, and other blood components intended to be used for transfusion, like leucocyte-depleted whole blood and red cells, must be kept at a controlled temperature between 2°C and 6°C during storage and can be stored for a period of time of up to 35 days, depending on the anticoagulant/preservative solution used.

Long storage of whole blood and blood components above 6°C increases the risk of bacterial contamination (septicemia), which may progress to septic shock. Septic shock has a death rate as high as 50%, depending on the type of organism involved, and therefore requires urgent medical intervention.

The storage of blood and blood components below 2°C increases the risk of rupture of the red cells (haemolysis).

During a maximum transit time of 24 hours, the temperature of whole blood or other blood components must at no time exceed +10°C. Temperature excursions above +10°C increases the risk of sepsis due to bacterial contamination.

Blood components intended for intrauterine and exchanged transfusion (e.g. IUT, ET, PR/ET) must be stored between 2°C and 6°C for no longer than five days prior to use. After concentration and irradiation, the storage time must be no longer than 24 hours.

2.4.5. Contraindications

The devices are not intended to be used for quick cooling of blood or blood components.

The devices are not intended to be used for the cooling of foodstuffs or any other products not covered in the intended purpose.

The devices are not intended to be operated outside the environmental and installation conditions documented in the operating instructions.

3 Installation Procedure



WARNING

- All installation work and adjustments to the refrigerator must be carried out by qualified personnel. Work performed by persons with insufficient technical knowledge may adversely affect the performance or cause physical injury or damage to the equipment.
- Ensure that the connecting cable is not squeezed or bent when the unit is being installed or moved. Deterioration of the insulation may cause current leakage or electric shock.
- When transporting or moving the device, be aware of its weight. Do not try to move a fully loaded device.

3.1 Location

- The following section provides information on how to install and place the device in your location. Please note that all indicated distances are minimum distances.



WARNING

- Do not use the device outdoors. Current leakage or electric shock may result if the unit is exposed to rain water.
- Ensure that the unit is steady and perfectly straight and does not knock against anything next to it. If the floor is not strong enough or the installation site is not adequate, this may result in injury from the unit falling or tipping over.
- Never install the unit where acid or corrosive gases are present as current leakage or electric shock may result due to corrosion.
- The wall socket must be easily accessible.
- When the unit is in its final position it is important to immobilise the unit using the feet.



CAUTION

- Optimal function of the appliance is given at an ambient temperature indicated in the technical data (see chapter 10) with a maximum relative humidity of 95%.
- Ensure that there is sufficient room around the unit for air circulation. Refer to images 1 and 2 for minimum distances to a wall or adjacent units. A good air circulation especially around the compressor is essential for trouble-free operation. Keep the ventilation openings of the compressor cover always free from any obstructions. Make sure that a minimum distance is provided between the unit and any wall or other device located next to it.
- The device must be set up in a dry well-ventilated place. Avoid direct sunlight or locating it close to a heat source. The area must be protected against rain and dust.
- Do not locate the unit below a ceiling fan or right next to air-conditioning equipment.
- This device cannot be used/is not for use in facilities at altitudes of 2000m or higher.

- Two spacers are included with the MRB3000SDD. These must be attached to the rear of the unit as shown in the figure, before positioning the unit against the wall.

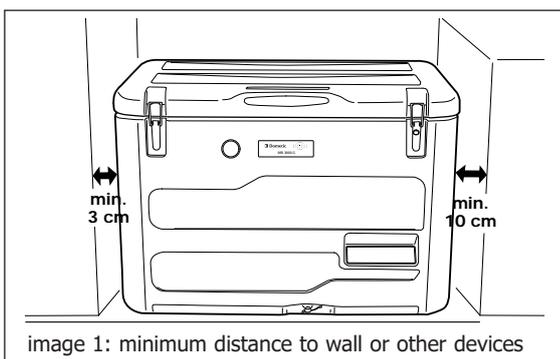


image 1: minimum distance to wall or other devices

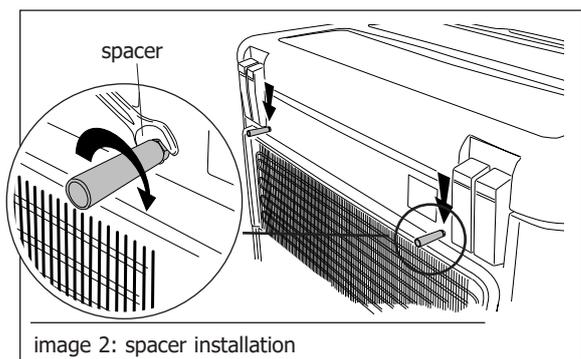
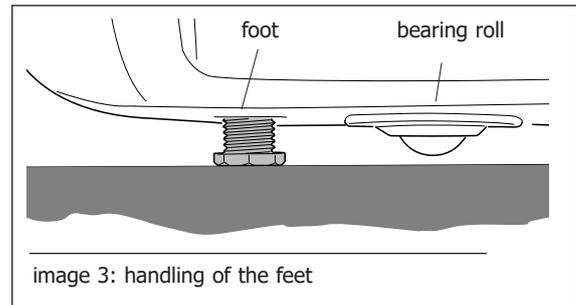


image 2: spacer installation

3.2 Final position

- The MRB3000SDD is equipped with bearing rolls. Once it is in its final position, the feet must be screwed up to immobilise it and stop it rolling away. Screw the feet with the provided key until the rolls do not touch the floor anymore (image 3).



3.3 Initial cleaning and disinfection



CAUTION

- The use of hydrogen peroxide H₂O₂ (VHP) for the disinfection (sterilization) of the appliances is not suitable. This procedure may be applied exclusively with dedicated appliances.
 - Other than the cleaning procedure described in this manual, follow the internal policy and procedures.
 - Before using the refrigerator it should be cleaned inside and outside.
 - For cleaning, use only gentle cleaning agents. Never use aggressive or caustic cleaning agents, scouring powder, steel wool, abrasive sponges or chemical solvents. When cleaning, make sure that no fluids of any kind run into the ventilation housing.
 - For disinfecting, we recommend all the surface disinfecting agents commonly used by the customer, provided they are recommended by the national organizations. For disinfecting small areas, we recommend using a concentrated alcoholic agent.
- Refer to section 7 for more information on cleaning.

3.4 Electrical Connection

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WARNING

- Before connecting, check whether the details on the nameplate in the interior correspond to local values. Use of any other voltage or frequency other than that on the nameplate may cause fire or electric shock.
- Disconnect the unit from power supply prior to any repair or maintenance in order to prevent electric shock or injury.
- Do not touch any electrical parts (such as power supply plug) or operate switches with a wet hand. This may cause electric shock.
- When disconnecting, always pull the plug and never the cable. Pulling the cord may result in electric shock or fire by short circuit.



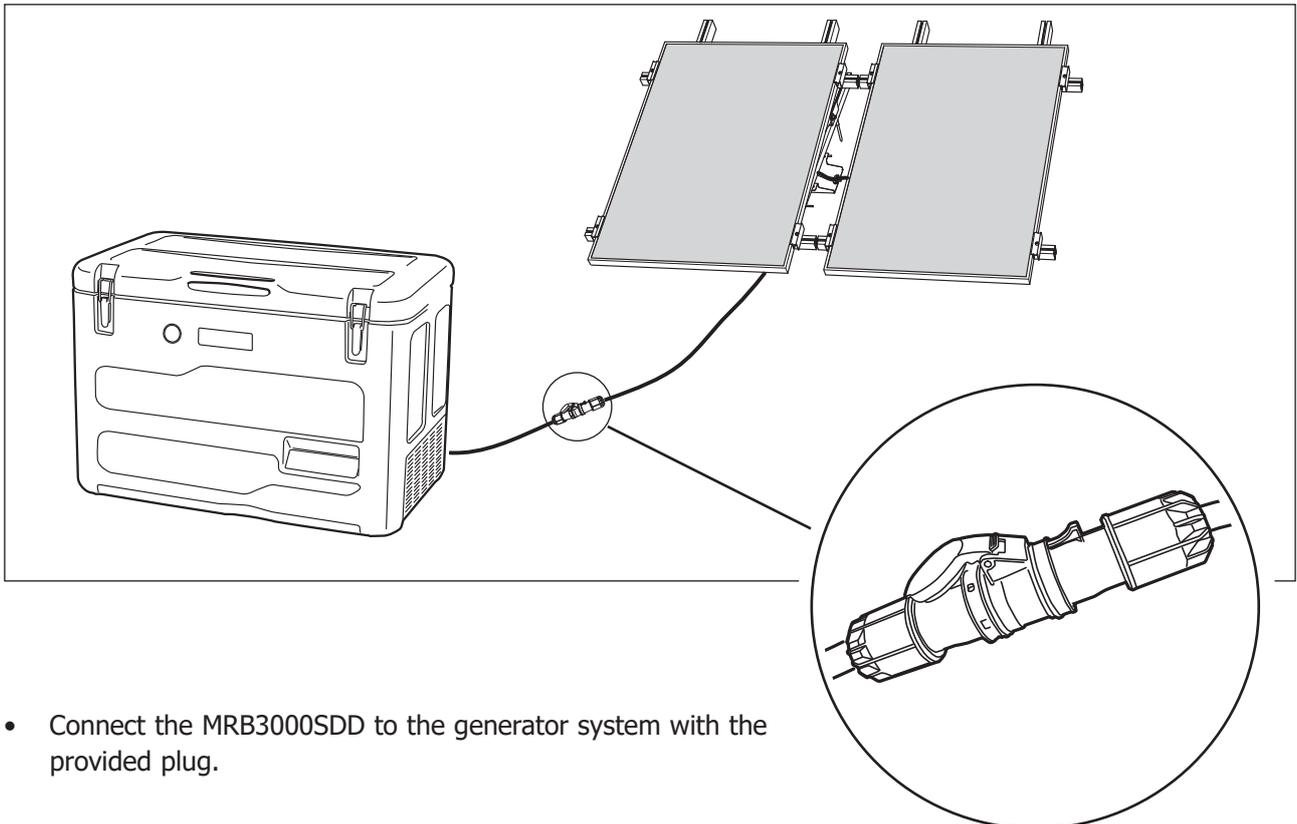
CAUTION

- Before connecting and switching the unit on for the first time, allow it to stand for 30 minutes.
- To prevent problems with other electrical equipment causing malfunction, the unit should be connected to a separate circuit. Never connect it to a single socket with other electrical equipment by means of a multi-socket.
- Make sure that the plug is easily accessible so that if needed it can be easily be disconnected without having to move other equipment or furniture.
- All connected devices/signaling equipment must provide reinforced or double insulation for protection against electric shock.

- The MRB3000SDD is intended to be connected to a "B Medical Systems" solar generator.
- It is designed to work with a minimum solar radiation reference period of 3.5 kWh/m²/day.
- The generator must provide a voltage of 25V DC with a minimum power of 400W at STC.

3.4.1 Connecting to the "B Medical Systems" Solar Generator

- For installation of the solar power generator refer to the Installation instructions.



- Connect the MRB3000SDD to the generator system with the provided plug.

4 Use and Operation



WARNING

- The devices must only be used by adults. Do not allow children to play with it or touch the controls.
- Do not store flammable or explosive substances inside these appliances (e.g. aerosols with flammable propellant). These may cause explosion or fire.
- Make sure that no sharp or pointed objects come into contact with the cooling system. The cooling system contains flammable refrigerant. Both the appliance and the products stored inside can be severely damaged if the system starts to leak.
- Do not insert metal objects such as a pin or a wire into any vent, gap or any outlet. This may cause electric shock or injury by accidental contact with moving parts.
- It is of utmost importance that the icelining elements are in place. Make sure that all these elements are in place before starting the unit. Never remove the icelining elements from the unit.
- Make sure that the lid is securely closed by closing the latches (refer to 4.2).
- Note that the unit may be locked using a key. Always ensure that the key is available to the user.



CAUTION

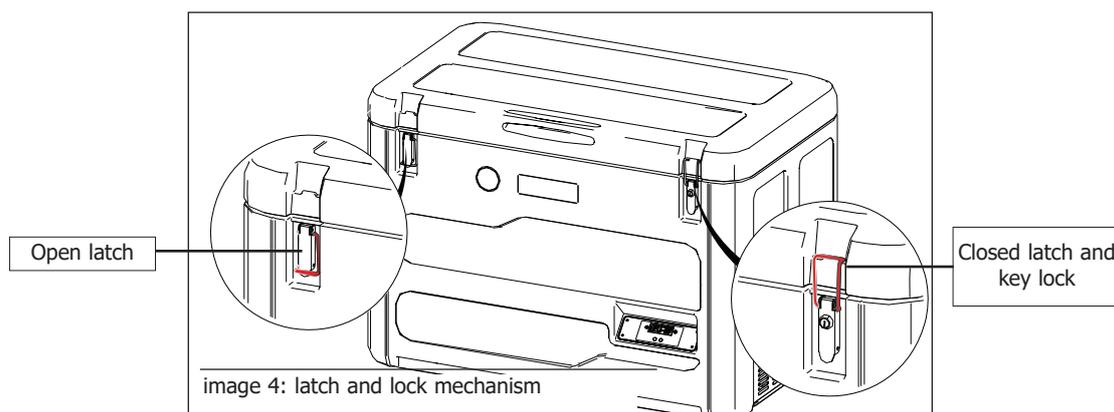
- The sound intensity level of the unit is lower than 70dBA (measured at a distance of 1 meter)

4.1 Switching on

- Install the MRB3000SDD as detailed under "Installation procedure".
- Shift the ON/OFF-switch to position "I" (see 4.3.2). The temperature display turns on. In case it does not, the battery is discharged. Wait for solar power to be present in order to turn the display on. The green LED lights up when there is a minimum of solar energy available.
- Supposed that there is enough solar energy available after switching on, the device starts working after a delay of 5 minutes. This also applies, if the equipment is switched off and on again.
- Close the lid and allow the unit to run. The temperature inside the cabinet is indicated on the main area of the display. Observe the temperature from time to time.
- Initially the temperature inside will be observed to be similar to or slightly below the ambient temperature. It will decrease slowly and remain steady after several days.
- The warning message „E0.3“ will be displayed in the max area of the display until the temperature has once reached the preset range of +2°C to +6°C. During this startup phase the temperature alarm system is deactivated. The alarm system will be activated as soon as the message „E0.3“ disappears or latest 72 hours after switching on.
- During the start phase, until the activation of the temperature alarm system, the temperatures displayed in the different areas of the display are identical.
- In order to assure a complete freezing of the icelining, it is advisable to run the MRB3000SDD for at least 7 days before loading.

4.2 Opening and closing

- The unit comes with two latches, one of which contains a key lock system.
- To open the unit, pull the clip up and remove the latch from the groove in the lid.
- To close the unit, pull the clip up, hook the latch in the groove of the lid and pull the clip down.
- Once the unit has been securely closed, the user may lock the unit using a common key lock system.



4.3 Important Advice for Storage



CAUTION

- Before being loaded, the unit must have reached the set point temperature.
- The load should only be stored in the provided baskets and should not exceed the storage areas. The total amount of stored blood bags should be evenly distributed on the 5 baskets (max. 18 blood bags per basket) (image 6). Do not overload the unit.
- Different blood or plasma types should be sorted and stored in a manner for the user to identify these with ease.
- The loading must never obstruct the air-inlet-openings.
- Do not store warm items in the devices. They are not designed for fast cooling of warm items.
- Avoid long and / or frequent lid openings to prevent that the inner temperature rises to high.
- Make sure that the lid is correctly closed by using the supplied latches and that the lid gasket seals correctly against the cabinet.
- Do not bring more than 18 new blood bags per day into the MRB3000SDD.

- The MRB3000SDD is designed as storage unit for blood bags. It is not designed for cool down. The bags should therefore be precooled at less than +6°C before storing them in the MRB3000SDD.
- The maximum storage capacity of the MRB3000SDD is 40.5 L of blood (90 blood bags of 500ml filled with 450ml each).
- Store the blood bags in upright position (image 5).
- The optimum storage place for newly inserted blood bags is in the upper right basket.
- To benefit from the maximum daily runtime of the compressor, new blood bags should be brought into the MRB3000SDD in the early morning at sun rise.



image 5: upright position of blood bags

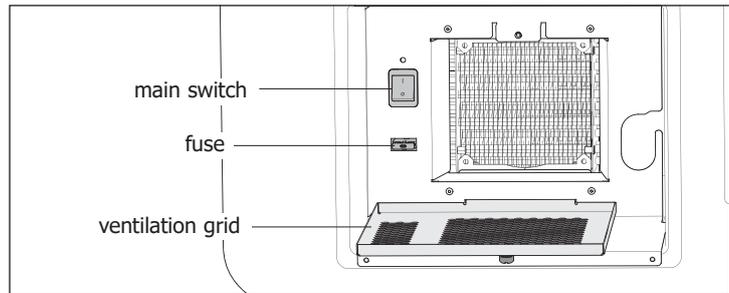


image 6: max. storage capacity

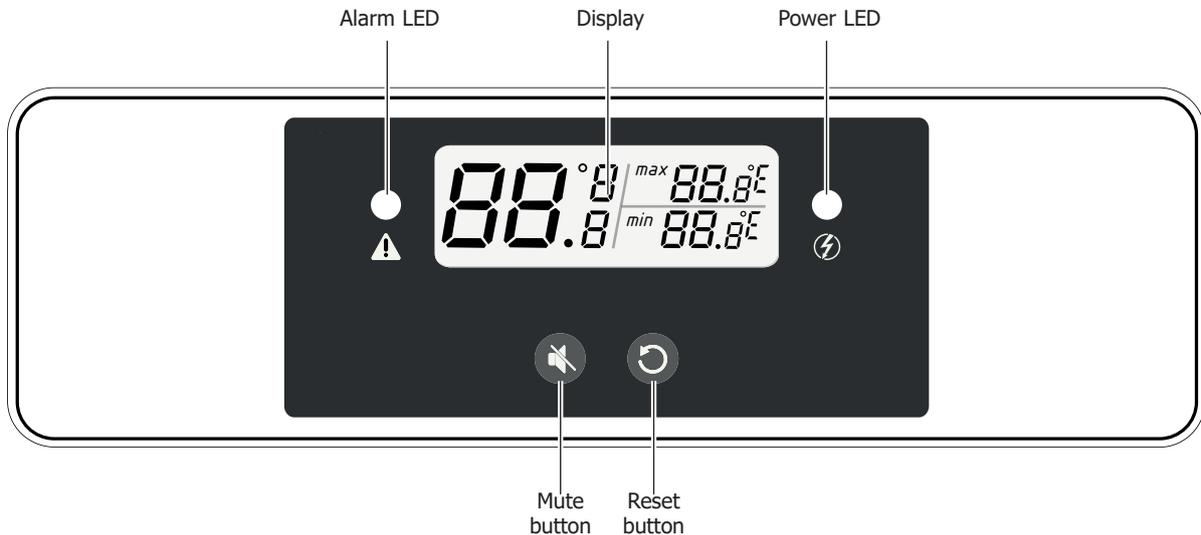
4.4 Operating controls

4.4.1 Main switch

- The main switch of the MRB3000SDD is located behind the ventilation grid on the back side of the unit.



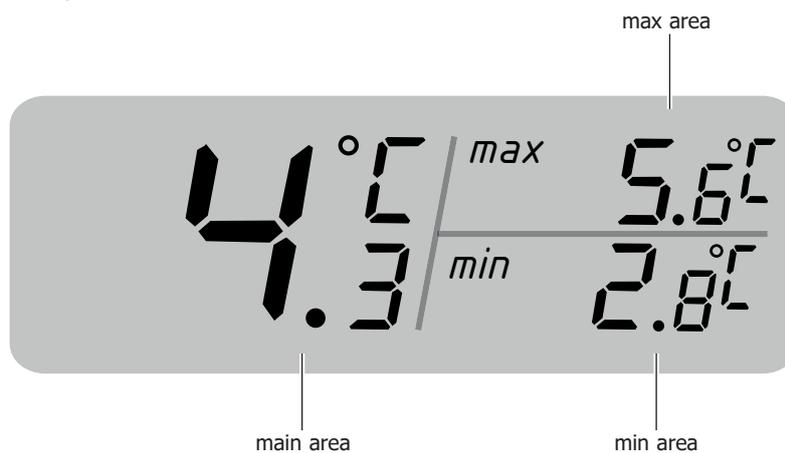
4.4.2 Control panel



- The red Alarm LED lights up if an alarm situation occurs.
- The green power LED indicates that the cooling system is active.
- The Mute button is used to switch off the audible alarm for a predefined time of 30 minutes.
- Press the Reset button for 5 seconds to synchronize the actual inside temperature and the displayed max and min values.

4.4.3 Display

- In normal use, the inside temperature of the appliance is displayed in the main area of the display (°C with one decimal).



- The max and min areas are showing the highest respectively lowest temperature since the last Reset.
- If an alarm situation occurs, the corresponding alarm message is displayed in the main area.
- Warning messages are shown in the max area of the display.

4.4.4 Temperature setpoint and alarm values

- The temperature setpoint as well as the alarm values are preset at the factory and cannot be changed. The alarm values defined by the blood directives are +2°C (low alarm) and +6°C (high alarm)

5 Alarms



CAUTION

- Upon the occurrence of an alarm situation, attempts must be made to discover the reason for the alarm and resolve it as quickly as possible. If that is not successful the necessary measures must immediately be taken so that the stored goods are not damaged.
- An error of the system or a component can lead to a system failure. Depending of the failure type the error can generate an alarm or a warning

5.1 Messages overview

Code	Type	Description
E0.1	Alarm	Low temperature alarm
E0.2	Alarm	High temperature alarm
E0.3	Warning	Temperature alarm disabled
E1.1	Alarm	Display sensor not connected
E1.2	Alarm	Display sensor short circuit
E1.3	Alarm	Display sensor reading error
E1.4	Warning	Display sensor below reading range
E1.5	Warning	Display sensor above reading range
E2.1	Alarm	Heating sensor not connected
E2.2	Alarm	Heating sensor short circuit
E2.3	Alarm	Heating sensor reading error
E2.4	Warning	Heating sensor below reading range
E2.5	Warning	Heating sensor above reading range
E3.1	Alarm	Cooling sensor not connected
E3.2	Alarm	Cooling sensor short circuit
E3.3	Alarm	Cooling sensor reading error
E3.4	Warning	Cooling sensor below reading range
E3.5	Warning	Cooling sensor above reading range
E4.1	Alarm	Battery not connected
E4.2	Alarm	Battery failure
E5.3	Warning	Compressor error: motor start error
E5.4	Warning	Compressor error: minimum motor speed error
E5.5	Warning	Compressor error: thermal cut-off
E9.0	Alarm	Communication error
E9.1	Alarm	Parameter inconsistency
E9.2	Alarm	Flash memory inconsistency
E9.3	Warning	System hardware error

5.2 Alarm messages

- In case of an alarm, all display areas start flashing and the related alarm code is shown in the display. Furthermore the red Alarm LED on the display blinks and the buzzer sounds. The buzzer sound can be muted by pressing the Mute button on the display. When the muting time is elapsed or a new alarm situation comes up, the buzzer starts again.



- Temperature alarm - E0.1 / E0.2
If the internal temperature rises above the upper alarm limit or falls below the low alarm limit a temperature alarm „E0.1“ or „E0.2“ is created. The temperature alarm persists even if the temperature is in range again. It needs to be acknowledged by pressing and holding the reset button for 3 seconds. The alarm situation is also cleared when switching the unit off and on again.
- Temperature reading error - E1.1 / E1.2 / E1.3 / E2.1 / E2.2 / E2.3 / E3.1 / E3.2 / E3.3
When one of the temperature values for proper temperature regulation or temperature display is not available because of a reading error, the appropriate temperature sensor reading alarm is generated. The fault can be a short circuit, an open circuit or an invalid resistor value on the reading input. The alarm message E2 and E3 for heating and cooling sensor errors will disappear as soon as the alarm situation is cleared. In case of a reading error on the sensor for the display temperature (E1), the alarm situation can only be cleared by holding the reset button for 3 seconds.
- Battery failure / not connected - E4.1 / E4.2
As the battery is necessary for the correct daily use of the SDD unit, its presence is mandatory. When it is not connected an alarm is created. When it is damaged (detected by a low voltage on the poles) another alarm is created.
- Communication error - E9.0
When the communication between mainboard and display board is interrupted or the exchanged data is inconsistent, the display board emits an alarm. The alarm disappears as soon as the communication is re-established.
- Parameter inconsistency - E9.1 / Flash memory inconsistency - E9.2
A check of parameters and memory is done every time the unit is switched on. If anything goes wrong during this check, an alarm is created.

5.3 Warning messages

- In case of a warning the related message is shown on max area of the display. The LED is not turned on. Warnings are not displayed in case an alarm is active.



- Temperature alarm disabled - E0.3
The warning message „E0.3“ will be displayed in the max area of the display until the temperature has once reached the preset range of +2°C to +6°C. During this startup phase the temperature alarm system is deactivated.
- Temperature reading limit - E1.4 / E1.5 / E2.4 / E2.5 / E3.4 / E3.5
When the temperature value read on one sensor is outside the temperature reading range of -30.0 °C to +50.0 °C, a warning is displayed. The message disappears as soon as the read value is in range again.
- Compressor start error - E5.3
The compressor cannot start. Keep the unit switched on. This problem might occur if the solar generator doesn't deliver enough power (cloudy day, shadow on solar panels, bad positioning of solar panels etc.). Check the actual situation of the panels, and if the problem persists after corrective actions, notify Refrigerator Technician.

- Minimum compressor speed error - E5.4
Keep the unit switched on. This problem might occur if the solar generator doesn't deliver enough power (cloudy day, shadow on solar panels, bad positioning of solar panels etc.). Check the actual situation of the panels, and if the problem persists after corrective actions, notify Refrigerator Technician.
- Thermal cut-out of electronic unit - E5.5
The ambient temperature is too high, the electronic unit will run too hot. Switch the unit off. Switch it on again after 1 hour. If the problem still persists, notify Refrigerator Technician.

6 Additional equipment

6.1 Rechargeable battery

- The monitoring of the temperature alarm system and the temperature display during phases without power supply are maintained by an integrated rechargeable battery.
- The battery is charged during phases with solar power.
- If the capacity of the battery is no longer sufficient to take over the control function, the alarm message "E4.2" appears on the display.
- If no battery is connected, the system will generate an „E4.1“ alarm message.
- The battery should be pre-emptively replaced every 5 years or when alarm E4.2 appears. This replacement must only be carried out by a recognised service technician.
- The battery is a lead-acid storage battery that must be disposed of separately in the case of a fault.

7 Maintenance and repair



WARNING

- Before cleaning or carrying out maintenance work, always switch the machine off and disconnect the mains plug. Working on the connected appliance may cause electric shock or fire.
- When disconnecting, always pull the plug and never the cable. Pulling the cord may result in electric shock or fire due to a short circuit.
- During defrosting, water will leak from the unit. Collect this water so that it does not lead to a risk of slipping for passing persons.
- Watch out that no water can penetrate the ventilation slots of the unit.
- Before cleaning or carrying out maintenance work, the contents preserved in it will have to be removed and stored temporarily in another working refrigerator.
- Make sure the condensation water is removed on a weekly basis. Increased condensation water inside the device may lead to malfunctioning of the device.
- Inspect the unit on a regular basis for damaged parts. Only genuine spare parts may be used. Use of any other parts may affect the performance or cause physical injury or damage to the equipment.



CAUTION

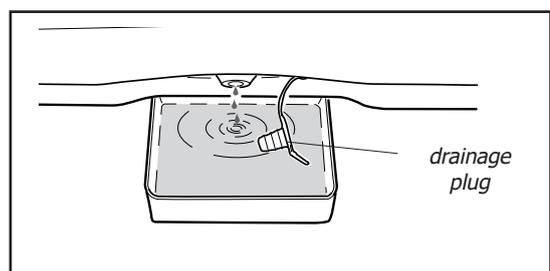
- The use of hydrogen peroxide H₂O₂ (VHP) for the disinfection (sterilization) of the appliances is not suitable. This procedure may be applied exclusively with dedicated appliances.
- Other than the cleaning procedure described in this manual, follow the internal policy and procedures.
- Before using the refrigerator it should be cleaned inside and outside.
- For cleaning, use only gentle cleaning agents. Never use aggressive or caustic cleaning agents, scouring powder, steel wool, abrasive sponges or chemical solvents. When cleaning, make sure that no fluids of any kind run into the ventilation housing.
- For disinfecting, we recommend all the surface disinfecting agents commonly used by the customer, provided they are recommended by the national organizations. For disinfecting small areas, we recommend using a concentrated alcoholic agent.

7.1 Cleaning

- Switch off the MRB3000SDD and disconnect it from power supply.
- Prepare the temporary storage and transfer the stored goods and preserve them properly with care.
- Clean all parts inside and outside the cabinet, the lid and the lid gaskets with warm water and mild detergent. Allow the cleaned parts to dry completely.
- Close the lid. Connect the power supply and switch on the MRB3000SDD.
- Allow it to run and observe the cabinet temperature on the display.
- Put back the blood bags into the MRB3000SDD from the temporary storage, only when it has attained safe recommended temperature range for storage.

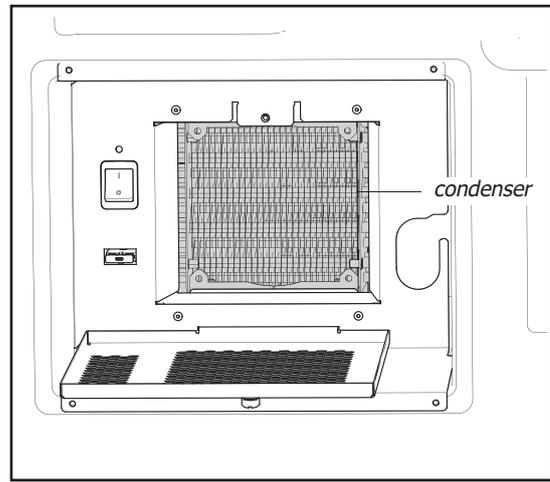
7.2 Condensation water

- The moisture in the air, which enters the cabinet due to lid opening is attracted by the cold surfaces inside. The moisture will condensate on these cold surfaces. The condensation water is collected at the bottom of the inner cabinet and must be evacuated on a regular basis (at least once a week) using the drainage plug on the front side of the cabinet.
- Open the drainage plug at the bottom front side the cabinet. Keep a suitable container under the drain hose to collect the water.
- Close the drainage plug after all water is evacuated.



7.3 Ventilation

- The airflow to the internal fan must never be obstructed. The ventilation openings of the MRB3000SDD must therefore never be blocked or covered.
- The ventilation openings as well as the condenser behind the front ventilation grid must be cleaned regularly using the supplied brush. To access the condenser, remove the front ventilation grid by unscrewing the fixation screw.



7.4 Periodic Maintenance

7.4.1 Daily

- Take temperature readings and note down the temperature and the time of reading. Keep the temperature records systematically. It is suggested that minimum 2 readings should be taken (in the morning and afternoon) preferably at the same hours of each day.

7.4.2 Weekly

- Evacuate the condensation water as described before.
- If it is observed that quantity of condensation water is increased :
 - Examine the gaskets on the lid, if they sit properly. Any gap between the cabinet and gaskets will allow outside air to go in and form condensation. In such cases the hinges should be adjusted or the gaskets should be changed.
 - Restrict and reduce frequency of opening the MRB3000SDD. Open only when absolutely necessary.

7.4.3 Monthly

- Clean the unit from any dust :
 - Switch off the MRB3000SDD and disconnect it from power supply.
 - Clean the condenser.
- Clean the lid seal.

8 Disposal



WARNING

- Before scrapping an old unit, remove the door so that children cannot lock themselves inside while playing.
- Before scrapping the unit, remove the lead accumulator and dispose of it separately.
- When disposing of the unit, make sure that it does not get too hot, as combustible gas would cause the insulating foam to froth up.
- The appliances contain environmentally friendly refrigerant. Before disposing of the appliance, the refrigeration circuit should be opened outside so that the refrigerant can escape.
Attention: The refrigerant is flammable!
- Make your contribution to saving the environment. Bear in mind that orderly and proper disposal is required. Packaging materials and devices are always recyclable and should be taken for recycling.

9 Troubleshooting

- If the unit does not appear to be working correctly, you may be able to attend to the fault yourself. Before calling a serviceman, carefully read and follow the information and advice below.

Problem: Interior temperature too hot

- Please check if large quantities of warm goods have been placed inside the unit, causing a surge of the interior temperature.
- Keep door openings to a minimum. The interior temperature may be hot due to a recent door opening. Wait and determine if the interior temperature decreases to normal values.
- Check if the ambient temperature is too high, outside of the operating range of the device, which can cause the interior temperature to rise.
- Check if there is enough air circulation around the unit, a lack of air circulation can cause a surge in interior temperature.

Problem: Interior temperature too cold

- Please check if large quantities of cold goods have been placed inside the unit, causing a surge of the interior temperature.

Problem: The unit does not work at all

- Before calling a serviceman, check if:
 - the main switch of the device is switched on.
 - the fuses are intact and the power socket is supplying enough power.
 - the power supply cord is properly connected.
 - the unit has not been switched off due to the battery protection.

10 Technical data

Model	MRB3000SDD
Gross volume [L]	141
Blood storage capacity [L]	40.5
External dimensions (HxWxD) [mm]	910x1270x780
Supply voltage [V]	25V DC
Energy Source(s)	Solar / DC
Power [W]	80
Climate Class	SN/T
Set point [°C]	+4
Preset cold alarm [°C]	2°C
Preset warm alarm [°C]	6°C
Ambient operating temperature range [°C]	+10 to + 43
Storage and transport temperature (not operational) [°C]	-30°C to +55°C
Max Humidity range [%]	5 to 95
Altitude	2000
Refrigerant Type	R600a
Refrigerant quantity [g]	75
Hold over time at 32°C	>72h
Hold over time at 43°C	39.9h
Cool down	144h
Energy consumption stable running	0.5kWh/24h at 32°C (Empty)
Energy consumption cool down	0.8kWh/24h at 32°C (Empty)
Energy consumption stable running, no IP freezing, full load (intermittent energy)	0.7kWh/24h at 32°C

11 Track changes

ed102023 Updates:

- Page 9: Update packaging label.
- Page 10: Subtitle changed to Intended target users.



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