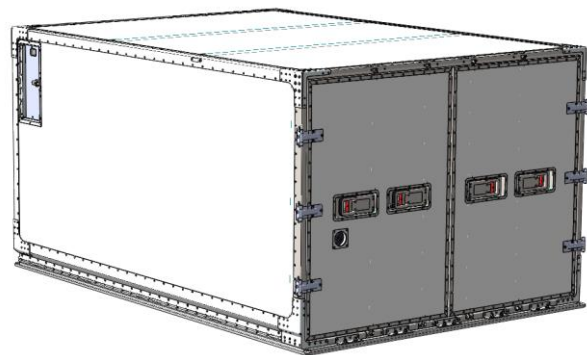
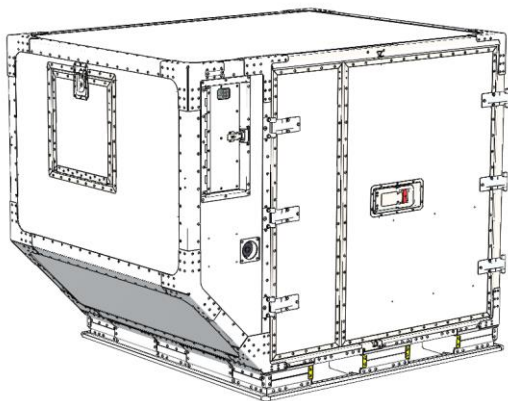




Operation Manual 25-56-12 / RRM 612-OM
COOL Container

Issue 4
08 February 2021



RECORD OF REVISION

Issue	Date of revision	Effect on pages	Reason Revision
1	23 January 2019	All pages	New issue
2	31 January 2020	All pages	New layout Rechargeable battery added
3	19 October 2020	201-235	Extra step rechargeable battery use
4	08 February 2021	204-205 and 216	Changed notes / QR code added

Responsible for	Signature	Date
Prepared P.M. van Tulden		08 February 2021
Checked M. van Berkel		08 February 2021
Approved P.M. van Tulden		08 February 2021

LIST OF EFFECTIVE PAGES

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Record of revision	001	4
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1. INTRODUCTION

1.1. GENERAL

This operation manual (OM), of which VRR is the owner and maintainer of the document, is created to inform users and handlers of the best practices when working with temperature controlled containers classified as class A-2. These containers are designed to be used to safely transport vaccines, drugs, blood plasma or food.

1.2. LAYOUT OF MANUAL

This manual contains a general operation description, a step-by-step guidance of different operation procedures and cleaning instruction for the temperature controlled containers classified as class A-2.

1.3. REVISION SERVICE

Revision of the product will result in an update of the manual.

1.4. SAFETY INSTRUCTIONS

The design minimizes hazards to personnel and equipment during use. No material used in the construction constitutes a risk to the health of the personnel involved. All structural and mechanical components are free of sharp edges. Every attempt has been made to anticipate potential dangers and build in protections to prevent injury to personnel.

1.5. SAFETY PRECAUTIONS

When handling the container, we strongly advice to use the following safety precautions:

- » It is strongly recommended to wear safety gloves while operating the cool container and dry ice
- » Always wear safety shoes while loading and unloading



1.6. CONTAINER DESCRIPTION

The RKN, MKN and RAP containers are temperature controlled containers which can be used for transport of temperature sensitive cargo. Every container is equipped with an integral temperature control system that utilizes stored energy (dry-ice) during ground and flight modes. The container is therefore classified as a temperature controlled container class A-2.

Design of the dry ice bunker and the TCU are similar for the RKN, MKN and the RAP. Therefore, this document is applicable for those cool containers. Where the containers differ, a correct method for the different containers are given.

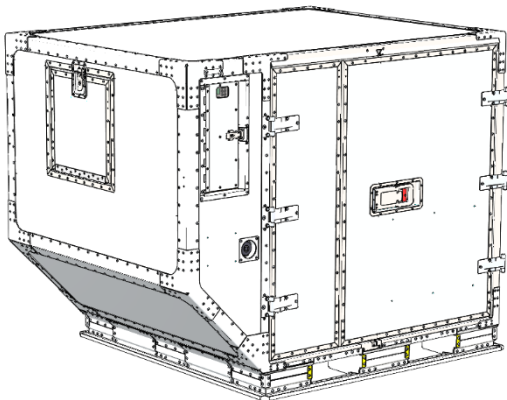


Figure 1: RKN / MKN container

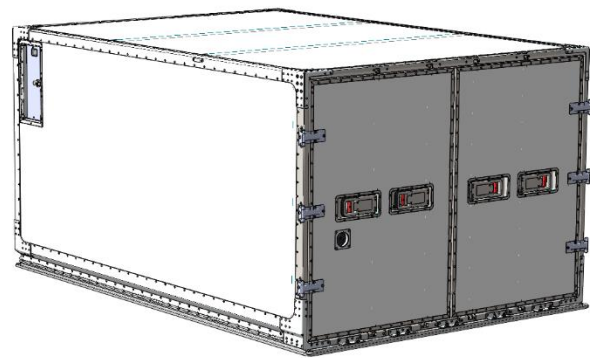


Figure 2: RAP container

Dry ice is contained in a separate dry ice bunker. This dry ice bunker is designed not to expose any CO₂ to the cargo space. This to prevent CO₂ from affecting the loaded cargo. The dry ice is considered a Class 9 dangerous cargo with the UN identification number 1845 and is described as "Carbon Dioxide, Solid". Always handle dry ice according to applicable regulations.

The temperature inside the container is controlled by a control unit and two fans. This control unit is powered by 8 or 16 D-cell batteries, or by a D-cell battery pack.

The temperature inside the container is measured by two sensors. One located at the top of the container. The other located below the dry ice bunker. When the sensors measure a temperature which is higher than the set temperature, the fans in the dry-ice bunker active.

The container can be set at different temperature setpoints.

The containers are designed to be fully air- and water tight. However, some container can be equipped with a Bergo floor to prevent condensed water will soak the packages located on the floor of the container.

2. OPERATION

2.1. GENERAL

The container shall be checked for damages prior to loading, as damaged containers may damage the aircraft loading and/or the restraint system invalidating the certified airworthiness. To ensure that a unit is in a serviceable condition, it must be inspected before each use.

Serviceability limits are indicated in the chapter "Check prior to use" of the CMM of the particular container.

Try to visualize the whole container load before commencing to pack, leave heavy and/or big items on the bottom. Spread load equally.

The local-base loading must not exceed 9.6 kN/m² (=980 kg/m² - 200 lb/sq.ft).

Cargo with density over 400 kg/m³ (25 lb/cu.ft) requires internal tie-down. This is not required in case of full load (min. 75%) with compressible material.

Internal tie-down fittings are integrated in the base, and each point is capable of absorbing 8.9 kN (= 908 kgf - 2000 lbf) omni-directionally.

Before transporting the container on dollies, transporters or other vehicles, ensure that restraint stops, locks or other securing devices have been applied correctly.

The container can be transported on roller beds and ball mats as well as by forklift truck (RKN/MKN), using the forklift pockets. The forklift pockets are designed to lift a fully loaded container.

CAUTION

- » The doors must be properly closed when the container is moved.
- » Container should always be stored and operated on flat ground
- » Stack only empty containers maximum 2 high; use wooden blocks on frame.

2.2. CARGO PRECONDITIONS

The cool containers are designed to maintain a lower temperature than ambient temperature. They do not have the capacity to cool down large quantity of cargo. It is therefore recommended that the cargo is properly pre-cooled before transport. The cargo must be pre-conditioned to the temperature that is to be maintained during transport.

The temperature displayed on the control unit is the temperature of the air in the container. Therefore, when records must be kept of cargo temperature, it is strongly recommended to place temperature recorders inside the cargo boxes. This ensures the correct temperature readings of the cargo temperature.

2.3. CONTAINER PRECONDITIONS

Before loading the cargo inside the container, it is recommended to pre-cool the container. There are three ways to pre-cool the container:

1. Pre cool the container in a temperature controlled room:
 - a) Place the container in a temperature controlled room
 - b) Set this room at the desired temperature
 - c) Open both doors of the container so that the cooled air can enter the cargo space
 - d) Pre-condition the container for at least one hour before loading the cargo inside
2. Pre-conditioning with dry ice (refrigerated products):
 - a) Use the dry ice system on the container to pre-condition the container.
 - b) Make sure the doors are properly closed
 - c) Fill the dry ice bunker with dry ice. The amount of dry ice can be calculated by using the information of chapter 2.5
 - d) Place batteries in the control unit (preferably new batteries)
 - e) Start the control unit and check the power level. In case of low level, place new batteries
 - f) Set the desired temperature
 - g) Pre-condition the container for at least one hour before loading the cargo inside
3. Pre-conditioning with dry ice (deep frozen products):
 - a) Use the dry ice to pre-condition the container
 - b) Fill the dry ice bunker with dry ice, 20 % of the amount that is calculated with the information in chapter 2.5
 - c) Place a large amount of dry ice (at least 40 kg) in the cargo space of the container
 - d) Close the doors of the container
 - e) Place batteries in the control unit (preferably new batteries)
 - f) Start the control unit and check the power level. In case of low level, place new batteries
 - g) Set the desired temperature
 - h) Pre-condition the container for at least one hour before loading the cargo inside

CAUTION

- » Do not expose dry ice to skin
- » Handle dry ice according to applicable dangerous goods regulations
- » Never use dry ice that has been exposed to ambient temperature more than 2 hours
- » Never re-use dry ice, that is used for preconditioning of the container, for a shipment

2.4. LOADING CARGO

It is recommended to perform loading of the container according to the guidelines described below:

1. Open the doors. Do this according to the sequence described below:
 - a) Twist the lock (red) in a vertical position, from underneath the lever;
 - b) Press the lever;
 - c) Pull the handle and open the door.

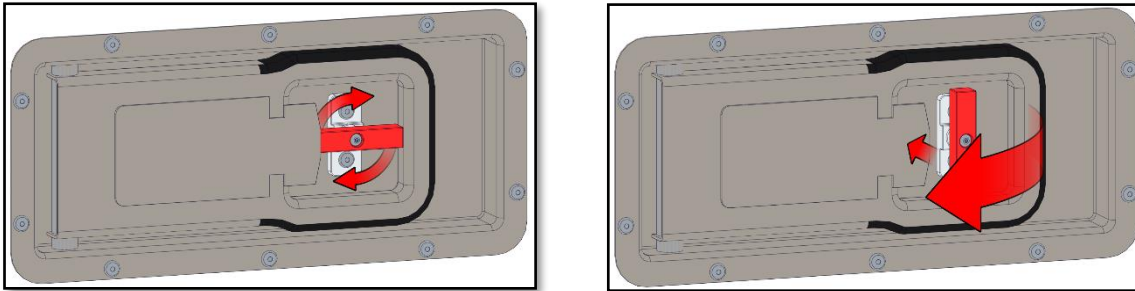


Figure 3: Twist lock

2. Use the door straps to hold the doors open during loading.



Figure 4: door straps

3. Load the cargo on a pallet or on spacers. Spacers need to be at least 2 cm high to allow a proper airflow.
4. Make sure no cargo is against the container wall and roof, leave at least 2 cm spacing to allow a proper airflow.
5. Make sure no cargo blocks one, or both, of the fans.
6. Ensure the weight is properly distributed in the container.
7. The load can be secured by using straps which can be attached to the seat track inside the container.

⚠ CAUTION

- » Doors must be properly closed before container is moved

To close the doors, perform the sequence above in reversed order.

2.5. DRY ICE

Dry ice when used in air transportation falls within the Dangerous Goods Regulations and must always be handled with care using protective gloves suitable for safe handling.

2.5.1. Dry ice amount

The amount of dry-ice needed for the duration of the transportation period depends on the temperature required to be maintained inside the container. Dry-ice quantities need to be calculated in relation to the effect imposed by the external range of ambient temperatures to which the container may be subject to.

Calculation of the amount of dry ice that is required can be done with a VRR tool or manually.

VRR tool:

[Dry Ice Calculator tool for RKN or RAP cool containers](#)  | VRR



Manually:

In calculating the quantity of dry-ice required for the **RKN/MKN** containers reference should be made to the following guidelines:

Average ambient temperature difference of:	5 °C	0.3 kg dry-ice / hour
Average ambient temperature difference of:	10 °C	0.5 kg dry-ice / hour
Average ambient temperature difference of:	15 °C	0.7 kg dry-ice / hour
Average ambient temperature difference of:	20 °C	0.9 kg dry-ice / hour
Average ambient temperature difference of:	25 °C	1.1 kg dry-ice / hour
Average ambient temperature difference of:	30 °C	1.3 kg dry-ice / hour
Average ambient temperature difference of:	35 °C	1.6 kg dry-ice / hour
Average ambient temperature difference of:	40 °C	1.8 kg dry-ice / hour

In calculating the quantity of dry-ice required for the **RAP** containers reference should be made to the following guidelines:

Average ambient temperature difference of:	5 °C	0.7 kg dry-ice / hour
Average ambient temperature difference of:	10 °C	1.3 kg dry-ice / hour
Average ambient temperature difference of:	15 °C	1.9 kg dry-ice / hour
Average ambient temperature difference of:	20 °C	2.5 kg dry-ice / hour
Average ambient temperature difference of:	25 °C	3.1 kg dry-ice / hour
Average ambient temperature difference of:	30 °C	3.8 kg dry-ice / hour
Average ambient temperature difference of:	35 °C	4.4 kg dry-ice / hour
Average ambient temperature difference of:	40 °C	5.0 kg dry-ice / hour

In addition to the total quantity calculated add an extra of 20 kg dry-ice to ensure sufficient capacity to counter wide fluctuations in ambient temperatures.

2.5.2. Dry ice calculation (example)

Below an example how to calculate the correct amount of dry ice:

A RAP door-to-door (including loading/unloading) transportation time of 20 hours with a required container internal temperature of 3 °C and an average ambient temperature of 18 °C.

Example calculation formula:

$$18 - 3 = 15 \rightarrow \text{this requires } 1.9 \text{ kg dry-ice / hour}$$
$$20 \times 1.9 = 38 \text{ kg} + 20 \text{ kg (reserve)} = \text{Total } 58 \text{ kg dry-ice}$$

2.5.3. Dry ice notes and cautions

NOTE 1: It remains the responsibility of the shipper to ensure that any final calculations they use are accurate and sufficient for the cargo under transportation.

NOTE 2: Since the container does not generate heat, exposure to outside temperatures near or below the required temperature may affect the cargo.

NOTE 3: Cooling range is -20 °C to +20 °C, providing that the ambient temperature is more than 5 °C higher than the temperature of the goods shipped.

NOTE 4: Use pre cooled cargo, the container is not design to cool down large quantity of cargo.

CAUTION

- » Handle dry ice according to applicable dangerous goods regulations
- » It is strongly recommended to wear safety gloves while operating the cool container and dry ice
- » Always wear safety shoes while loading and unloading



2.6. LOADING DRY ICE

Dry ice is available in different sizes. Most convenient to use is blocks of dry ice. These blocks can be stacked in the dry ice bunker. These blocks can be wrapped or unwrapped.

Below a description how to load the dry ice in the dry ice bunker:

Location of the Dry-ice door

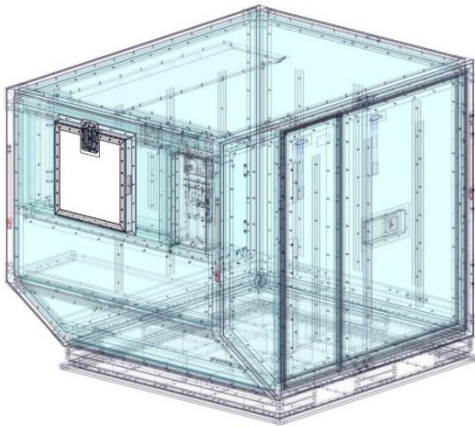


Figure 5: RKN / MKN container

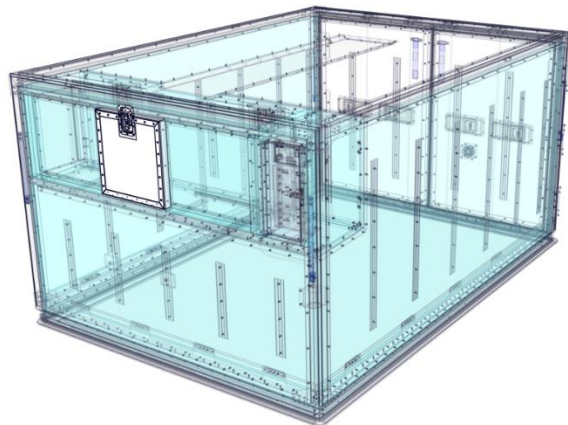


Figure 6: RAP container

1. Open the dry ice hatch according to the sequence as described below:
 - a) Pull the handle in the upward direction
 - b) Remove the clip from the catch
 - c) Open the dry ice hatch

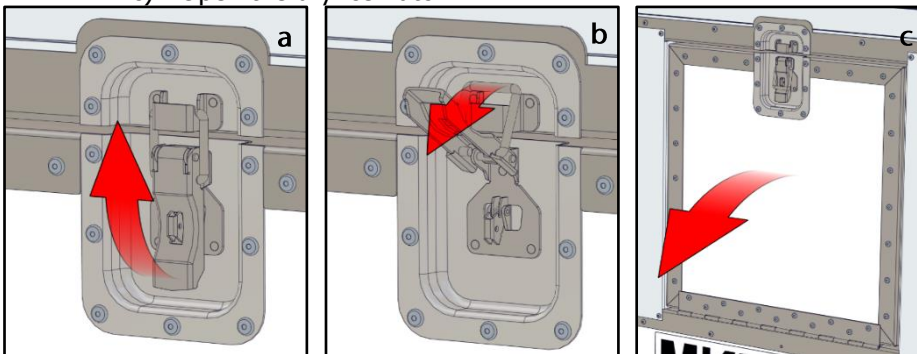


Figure 7: Dry ice latch

2. Load the dry ice in the dry ice bunker. Make sure the dry ice blocks are properly divided over the surface of the dry ice bunker
3. Close the dry ice hatch by performing the sequence above in reversed order
4. Additionally, a customs seal can be installed to prevent unauthorized access to the dry ice bunker during transport.

⚠ CAUTION

- » TCU door and dry ice hatch must be properly closed before container is moved
- » Never use dry ice that has been exposed to ambient temperature more than 2 hours

2.7. BATTERIES CONTROL UNIT

The RKN/MKN and the RAP uses a control unit to maintain the required temperature. This control unit is powered by 8 or 16 D-cell batteries. 16 Batteries are used when a longer endurance is required.

Since January 2020, cool containers can be powered by a VRR rechargeable battery pack. When equipped with this battery pack please skip to chapter 2.7.3.

2.7.1. Batteries

Batteries need to be taken out to prevent corrosion. It is recommended to install fresh/new batteries prior to a shipment.

The use of the following batteries is recommended:

Type	"D-Cell" Alkaline Batteries
Voltage	1.5V
IEC/JIS	LR20
ANSI/NEDA	13A

It is also allowed to use Manganese batteries. However, the performance of Manganese batteries is less than the performance of Alkaline batteries.

CAUTION

- » It is not allowed to use Lithium based batteries

2.7.2. Installation of batteries

Below a short description how the install the batteries:

1. Open the door of the control unit box
2. Place "D-Cell" batteries in the holder
3. Make sure the batteries are properly installed according to the figures below

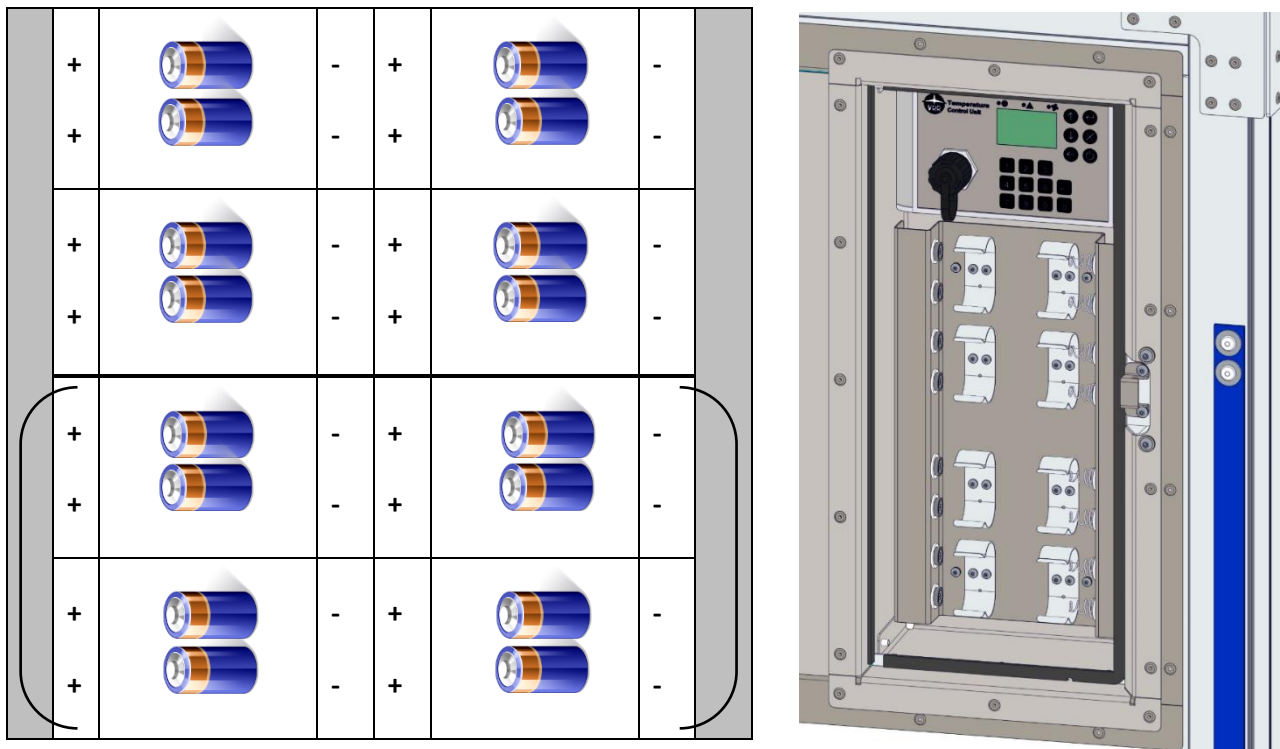


Figure 8: Battery holder

+ = Positive Terminal of the battery
- = Negative Terminal of the battery

When using 8 batteries, do not install batteries within brackets (figure above)

CAUTION

- » Make sure batteries make contact correctly
- » When necessary push the batteries to the + pole of the battery holder

2.7.3. Rechargeable battery

In order to reduce the amount of batteries used during cooled shipments, VRR has developed a rechargeable battery. The Rechargeable batteries are only compatible the required control unit housing and the correct TCU software version 0.72 or higher.



Figure 9: Battery

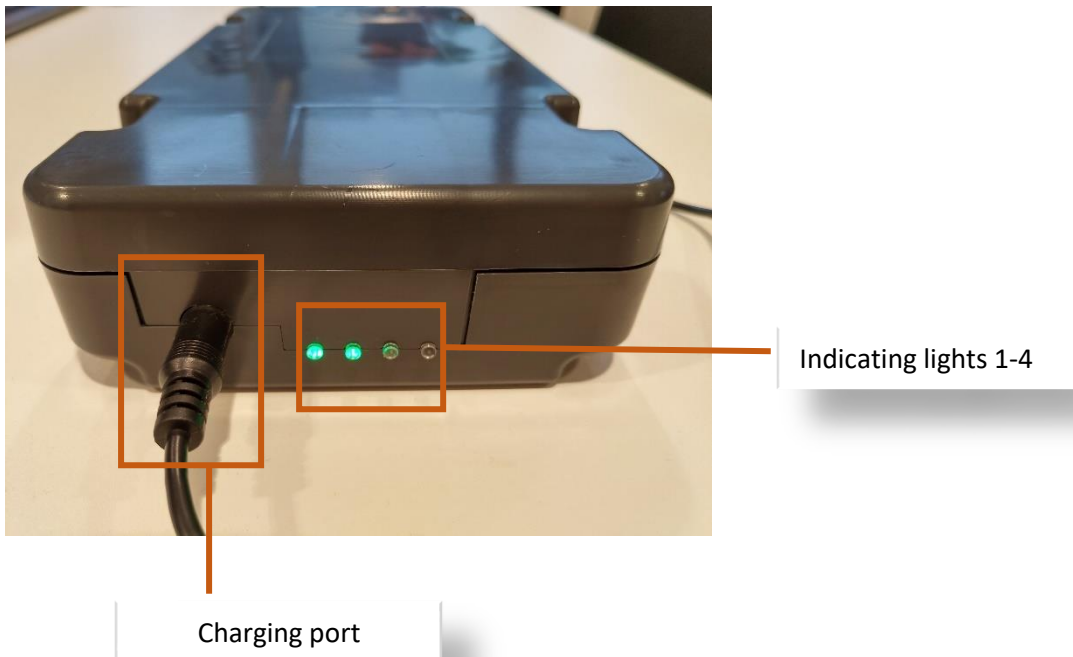


Figure 10: Battery

Specification of the rechargeable battery:

Part number	2000-05-3623_RALxxxx
Type	"D-Cell" NiMh Batteries
Number of cells	10
Capacity	1.2V per cell
Current	9Ah
IEC/JIS	LR20
ANSI/NEDA	13A
Weight	1.6kg

NOTE: The rechargeable battery should be taken out of the container when not in use.

⚠ CAUTION

- » No serviceable parts inside the battery pack
- » Do not throw into fire
- » Do not short circuit
- » Do not use battery packs in case of damage



2.7.4. Charging of Rechargeable battery

In case the rechargeable battery is almost completely discharged, the red and green LED will alternate until 2% charge is reached.

The rechargeable battery should only be charged with approved chargers.

In case the rechargeable battery is drained, the first led will start blinking RED/GREEN.

When charging, the LEDs will give information on the progress:

- Battery charge 10-25% of capacity → the first led will be blinking
- Battery charge 25-50% of capacity → the first led will be on and the second led will be blinking
- Battery charge 50-75% of capacity → led 1 and 2 are on and the third led will be blinking
- Battery charge 75-100% of capacity → led 1 to 3 are on and the fourth led will be blinking
- Battery fully charged → all 4 LEDs are on

Charging a completely drained battery will take around 8 hours.


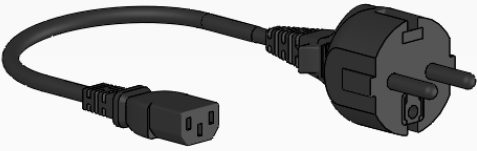
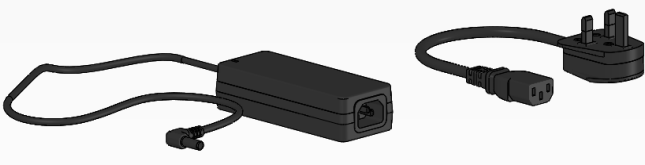
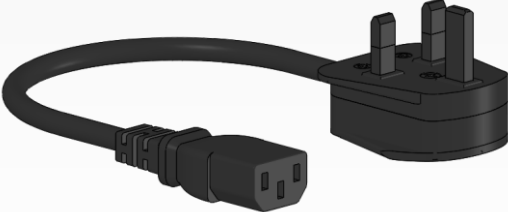
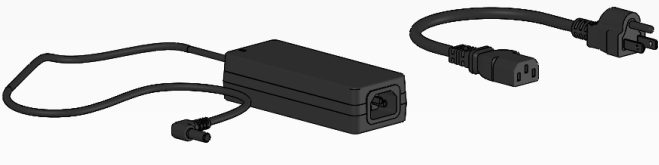

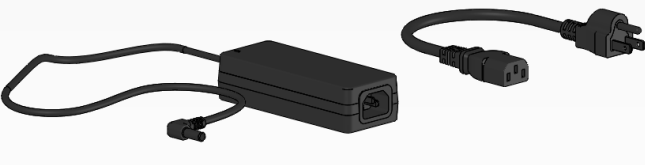


Make sure the battery pack is at room temperature before applying mains power: the battery pack will interpret a sudden increase in temperature as "battery full" and indicate 4 green lights, while the battery is actually still empty. To recover, either keep the battery pack in the charger for 5 days, or put it in an empty container and let the fans run until completely empty.

Due to the nature of NiMH, it is better to store the batteries fully charged but not connected to mains power.

Batteries will typically be partially charged on delivery: please charge fully before first use.

After 350 charge/discharge cycles, charging starts with all LEDs blinking for 30 seconds. This indicates that the battery may have reached the end of its usable life. After this blinking, normal charging will commence. It is recommended that batteries with 350 or more charge/discharge cycles are sent back to VRR for refurbishment.

Recommended chargers:

Charger Set EU - 2000-05-4506	Cable EU - 2000-05-4515
	
Charger Set UK - 2000-05-4507	Cable UK - 2000-05-4516
	
Charger Set USA - 2000-05-4508	Cable USA - 2000-05-4517
	
Charger Set Japan - 2000-05-4509	Cable Japan - 2000-05-4518
	
Power adapter 60W – 2000-05-4514	
	

2.7.5. Installation of rechargeable battery

Below a short description how the install the rechargeable battery:

1. Open the door of the control unit box
2. Place rechargeable battery according to below figures
3. If the ULD is equipped with a retainer, the retainer has to be closed.
» Retainer must be closed if a battery is installed.

Design of the rechargeable battery and battery holder prevents incorrect placement.



Figure 11: Battery



Figure 12: Battery holder

Place one side of the locking clips in the battery holder and press the battery pack in the compartment until all clips are locked in.



Figure 13: Battery placement

If the ULD is equipped with a retainer, this needs to be closed by turning the retainer counter clockwise.



Figure 14 Retainer in de open position, turn counter clockwise to close



Figure 15 Retainer closed, turn clockwise to open

2.8. TEMPERATURE CONTROL UNIT (TCU)

The control unit is used to control the temperature inside the container. Two sensors are connected to the control unit to measure the temperature inside the container. Once the temperature is above the set point of the TCU, the TCU will automatically turn the fans on so that cold air is distributed to the cargo space.

2.8.1. D-cell battery voltage and current consumption

The TCU will start only when the batteries are at least 8.5 V. At the nominal supply voltage, it uses approximately 0.5 mA when off, and approximately 16 mA when on.

As the batteries drain, the TCU will switch off the fans when the voltage drops below 7 V. With no fans running, most batteries will recover somewhat and increase their voltage. Only when the voltage exceeds 8V will the fans be enabled again. In practice, this will cause a period in which the fans will repeatedly switch on and off. This is normal behaviour. At low battery voltage, the TCU may also decide to use only fan-1, since the start-up current of the fan is rather high and will cause a sudden drop in voltage. Moreover, the TCU may insert a waiting time of 1 minute after switching off to reduce this on/off switching.

After the batteries have dropped below 7 V, the TCU will remain active until the voltage is below 5.5 V. This will typically keep the temperature recording going for several hours. Finally, below 5.5 V the TCU will switch off and drain the batteries empty so that the TCU will not switch on repeatedly when the batteries recover.

NOTE: the USB port draws a lot of current. Do not use it unless sufficient battery power is available.

2.8.2. Rechargeable battery voltage and current consumption

The TCU does not show the battery voltage, instead the display will indicate the remaining charge in %. The TCU will stop the fans when the charge level reaches 2% to continue logging the temperature for several more hours until the charge level is 0%. The TCU uses approximately 0.5 mA when off, and approximately 16 mA when on.

Note that the VRR rechargeable pack has 10 NiMH cells and a higher voltage than non-rechargeable batteries or 8 cell rechargeable packs. When the battery is almost empty, its voltage is still about 10V and the repeated on/off switching will not occur. This is normal behaviour. At low battery voltage, the TCU may also decide to use only fan-1, since the start-up current of the fan is rather high and will cause a sudden drop in voltage. Moreover, the TCU may insert a waiting time of 1 minute after switching off to reduce this on/off switching.

NOTE: the USB port draws a lot of current. Do not use it unless sufficient battery power is available.

2.8.3. Export data

The data that has been logged by the TCU can be downloaded on USB stick. Files are stored in the root directory of the memory stick in CSV format (comma separated values). The filename starts with a character A-Z, followed by the date as YYMMDD, e.g.:

A-151231.CSV

The first file will start with "A", and any subsequent logs on the same day will get the next character. So, on a single day, no more than 26 logs can be stored on the same memory stick. The filename is shown on the display, so please make a note of which file is stored for which container. If this information is lost, you may open the file and view the container number on the first line of the file.

Note that the embedded file system of the TCU has some limitations:

- The memory stick must be formatted in FAT32, with 512 bytes per sector (this is the most common format for all USB memory sticks, from 1 GB to at least 128 GB).
- Preferably use a memory stick that is not cluttered with thousands of files, since very long searches through the directory may trip the time-out and reset the TCU.
- Wait until the display says "Ready" before removing the disk.

If an error occurs during export, this will be shown with a number on the display:

1. USB device is not a compatible memory stick.
2. Format error, USB stick is probably not FAT32 formatted.
3. File error: could not write the log file to the memory stick.

If the batteries are nearly empty, the USB port may draw too much current and the writing to disk may fail. So, please ensure there is sufficient battery power when exporting data.

CAUTION

- » Only use a FAT32 formatted USB stick to download the data from the TCU

Exported data can be imported with:

- MS EXCEL
- VRR tool: [TCU Data log reader | VRR](#) (use only unmodified datafiles)
This tool will provide a data report (with graphs) of the transport.



2.9. TCU OPERATION

The TCU has a menu to set up the system. Below a description of the device with menu screens and their options.

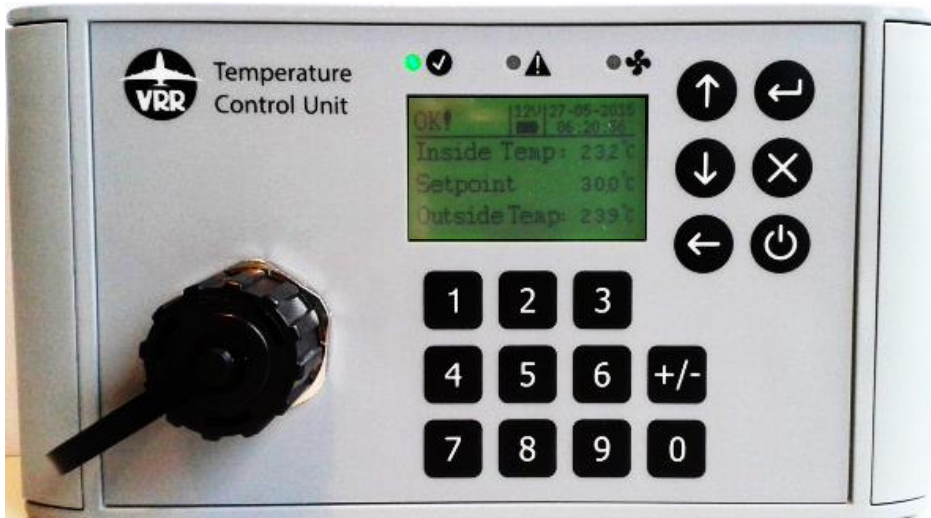


Figure 16: TCU

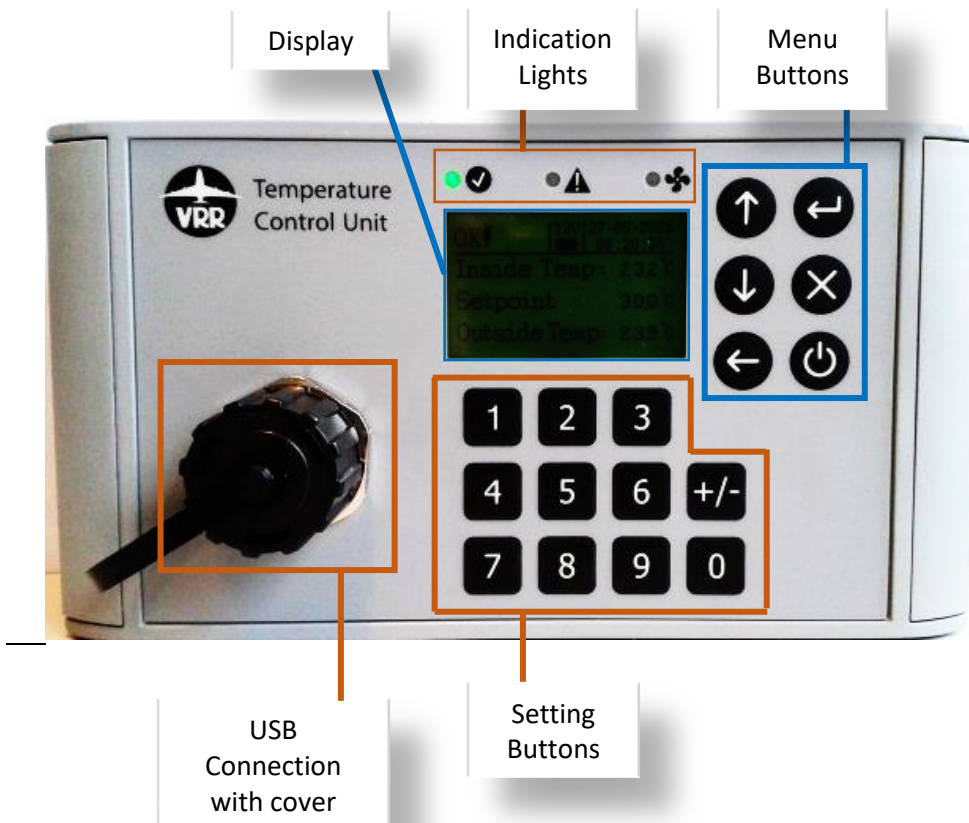


Figure 17: TCU functions

2.9.1. Display

On the display of the control unit is information displayed about the current and settings of the status of the system.

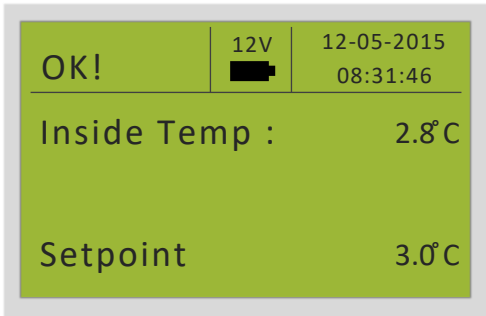


Figure 18: Display "start screen"

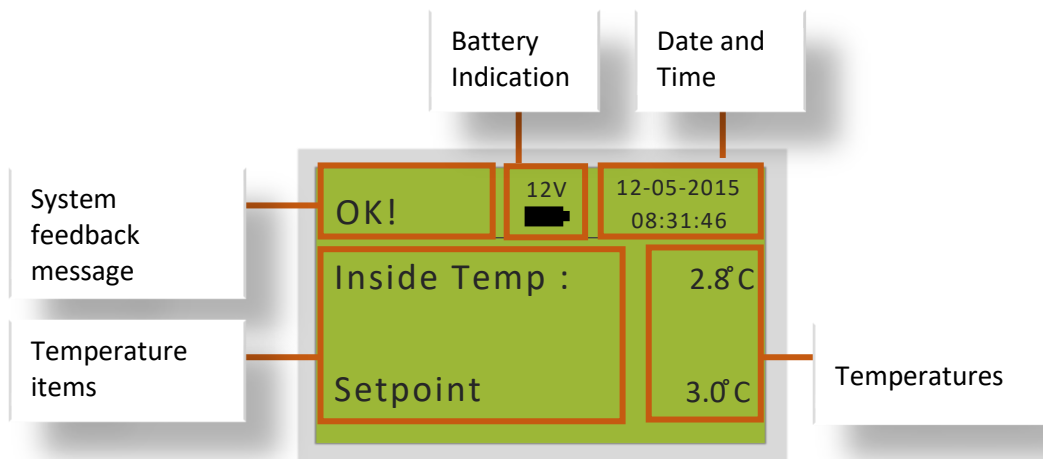


Figure 19: Display "start screen" functions

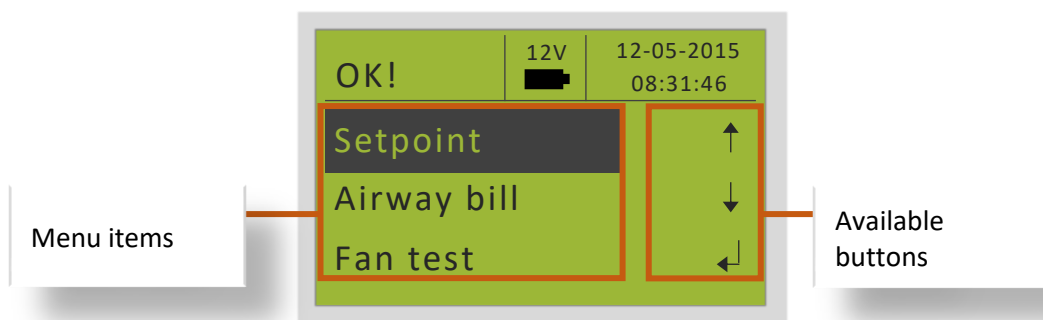


Figure 20: Display at "menu" – item "setpoint" selected

2.9.2. Indication lights

The device has three (3) indication lights. Multiple indicators can light up when the system is active. Below an description for each indication light and combination of indication lights:

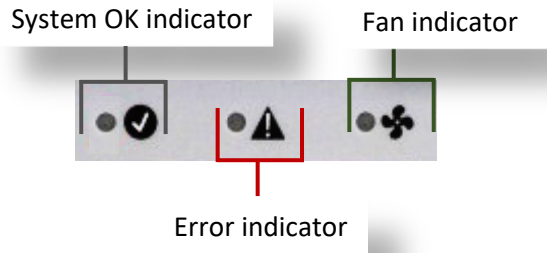


Figure 21: Indication lights

System OK

System is active and works fine.

When the green light is shown there will be a feedback message “OK!” in the upper left corner of the display.

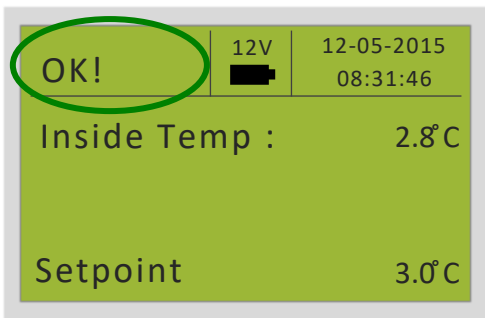


Figure 22: System OK

Fan

At least one of the fans is properly connected and active.



Figure 23: Battery holder

Error

Something is wrong with the TCU, the fans or the temperature sensors.

When the red light is shown there will be an error message in the upper left corner of the display. See below for an explanation of the possible errors.

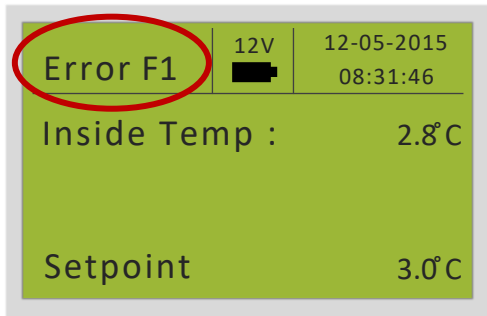


Figure 24: Battery holder

2.9.3. Error messages

The following error messages can appear at the upper left corner of the TCU screen:

Subject	Error message	Meaning	Solution
Batteries	Error B1	Battery low	1. Change batteries (see Battery paragraph)
Fans	Error F1	Fan 1 error	1. Check if the fan is blocked by anything remove blockage if that is the case; 2. Check if the FAN cable is correctly secured to the TCU (removal of the CONTROL UNIT assembly may be necessary); 3. In case above does not work, then the fan needs to be replaced.
	Error F2	Fan 2 error	See: Error F1 (Fan 1 error)
Sensor	Error T1	Sensor 1 error	1. Check if sensor cable is correctly secured to the TCU (removal of the CONTROL UNIT assembly may be necessary); 2. If correctly secured to TCU, then probably a failure inside the cable has occurred and sensor needs to be replaced.
	Error T2	Sensor 2 error	See: Error T1 (Sensor 1 error)
TCU	Error TCU	Memory error	1. Redo all settings; 2. In case above does not work, then the TCU needs to be replaced.

2.9.4. Menu buttons

The TCU can be set by using the numeric keypad.

Using this is a numeric touchpad to change settings like temperature setpoint and system date and time can be changed.

Use the +/- button to set the temperature setpoint value below or above zero (for instructions to change settings see below).

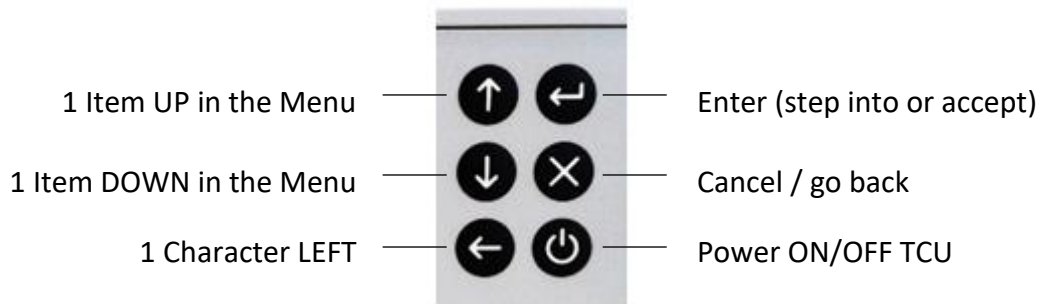


Figure 25: Menu buttons



Figure 26: Setting buttons

2.9.5. Menu items

The menu of the TCU is accessible by pushing one of the buttons on the TCU (except Cancel and Power button). The following items are accessible within the menu:

- » Temperature
- » Setpoint
- » Airway bill
- » Fan test
 - Fan 1 test
 - Fan 2 test
- » Data export
 - USB
- » System English
- » Set Language
- » Settings
 - Set °C or °F
 - Set Date/Time
 - Adv. Settings

Temperature

Return to the Start screen.

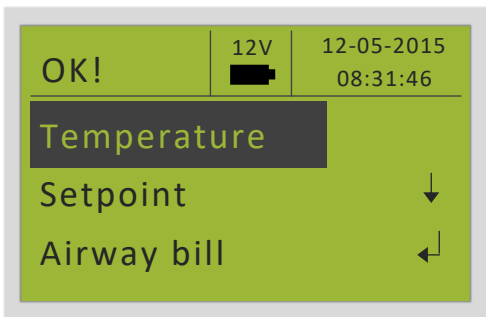


Figure 27: Temperature

Setpoint

The temperature setpoint can be changed by choosing the option Setpoint. In the next screen you can adjust the setpoint value. Use the setting buttons to change this value. Accept the value with the return button or cancel the action with the cancel button.

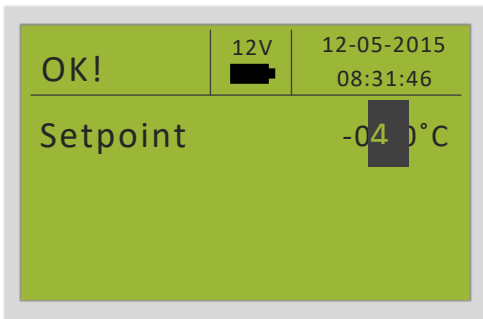
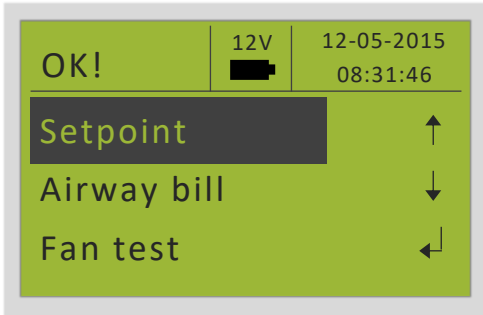


Figure 28: Setpoint

Airway bill

It is possible to set the Airway bill number. In the next screen you can set the number. Accept the value with the return button or cancel the action with the cancel button.

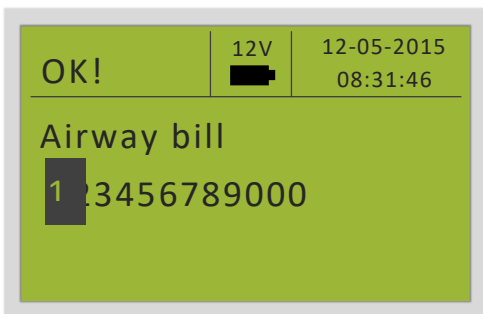


Figure 29: Airway bill

Fan test

With this option it is possible to check if the fans are working properly. They are tested separately by selecting the fan number in the next screen. The system checks whether the fan is receiving enough power, the display will show its corresponding current drawn.

Exit menu with "X".

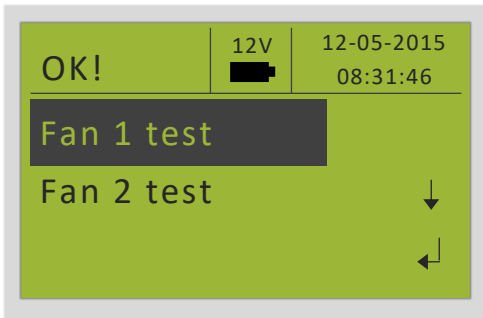
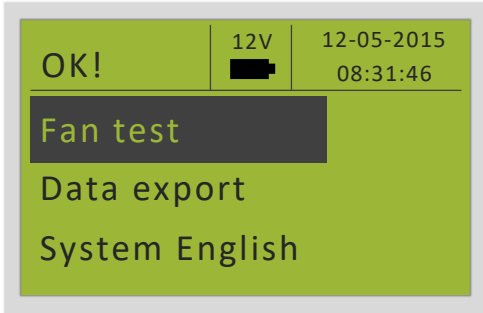


Figure 30: Fan test

Data export

To export the data from the TCU to an USB stick use this option.

First place the USB stick in the TCU. Choose USB from the next screen and set the required number of days.

The download will start after pushing the Enter button.

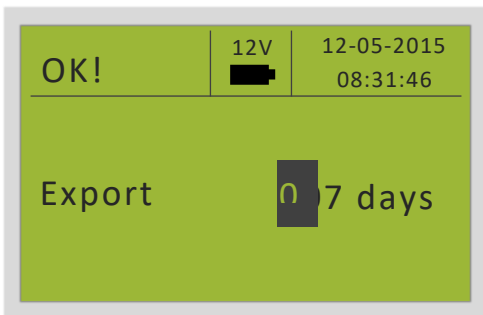
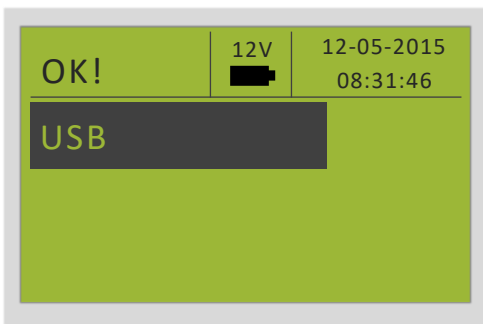
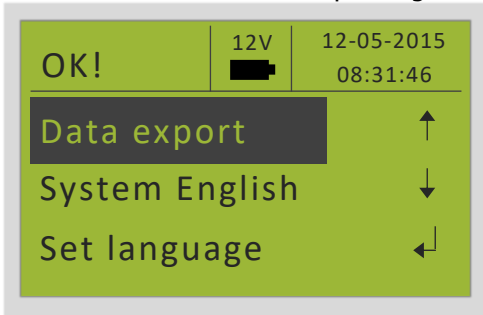


Figure 31: Data export

System English

Is only a confirmation of the set language

Instead of this function use *Set Language* to change the menu language.

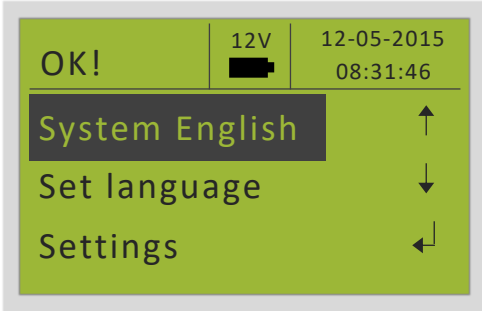


Figure 32: System English

Set language

The language on the TCU can be changed to English or Japanese. You can set the language by choosing this option in the menu.

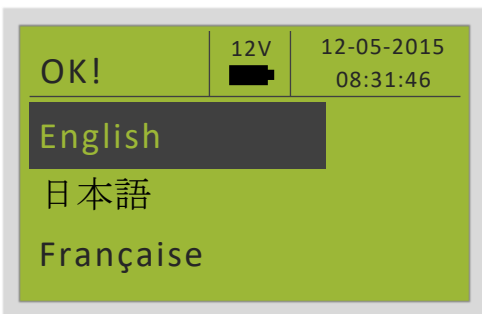
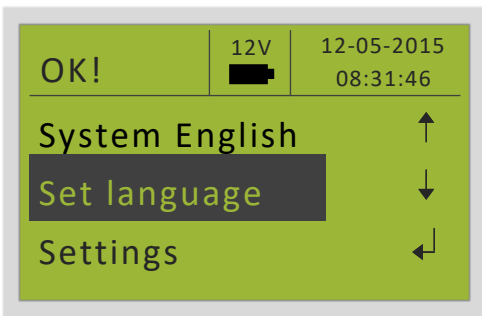
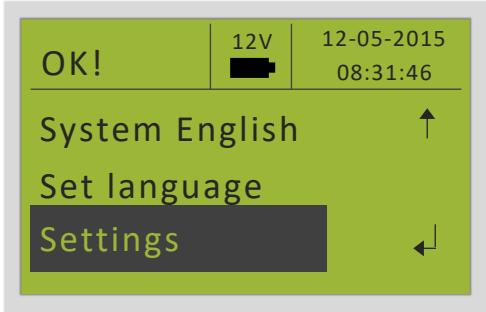


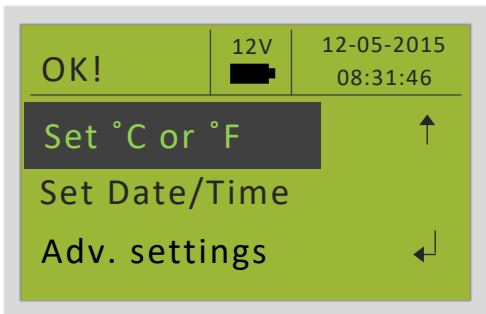
Figure 33: Set language

Settings

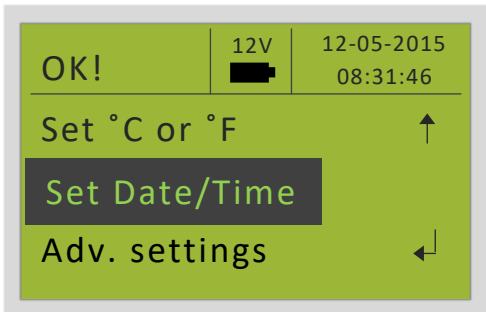
When entering the sub menu SETTINGS, it is possible to change the temperature unit and the date/time.



1.



2.



3.

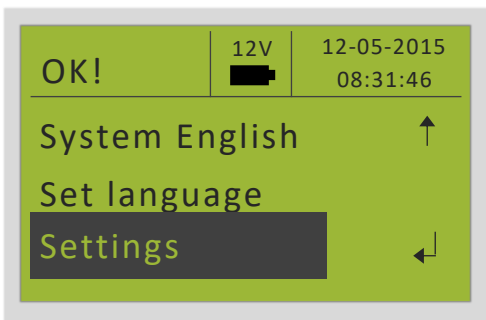
Figure 34: Settings

2.9.6. Update language pack

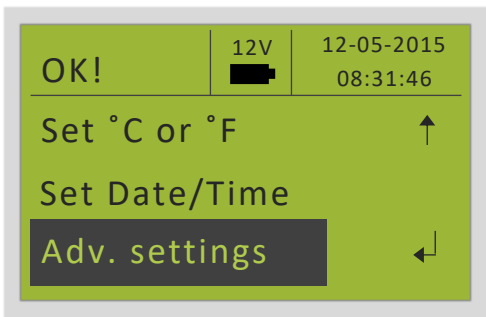
It could be that the language pack need to be updated due to a change this can be done by following the sequence below:

1. Go to settings
2. In the settings menu go to advanced settings
3. Fill in the pin code: 3079. Push the enter button
4. Go to firmware upgrade
5. Place the USB stick with the language pack on it
6. The language pack will be installed automatically

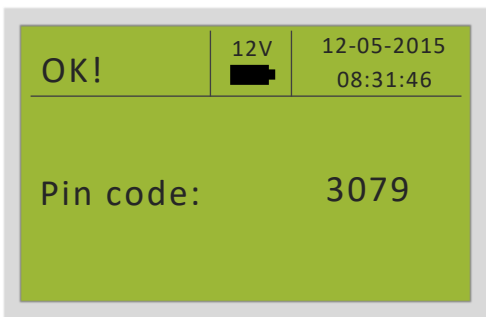
Important: Make sure that only the latest language pack is on the USB stick.



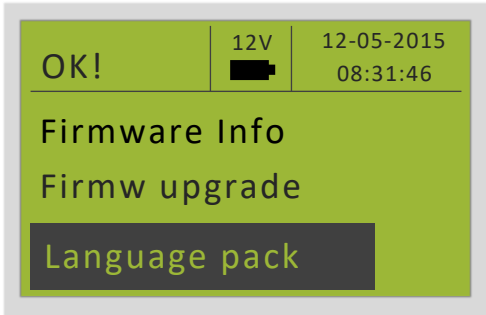
1.



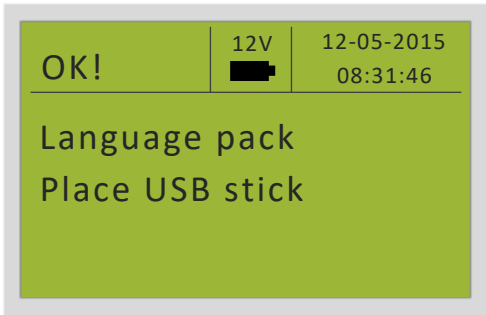
2.



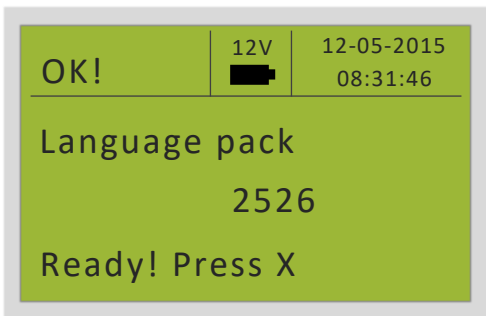
3.



4.



5.



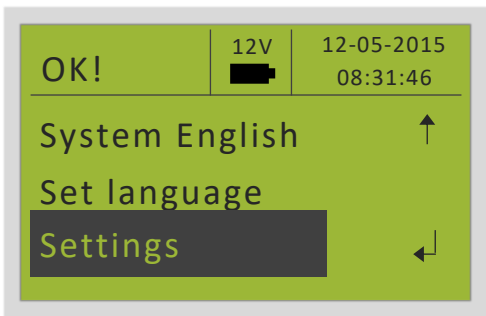
6.

Figure 35: Update language pack

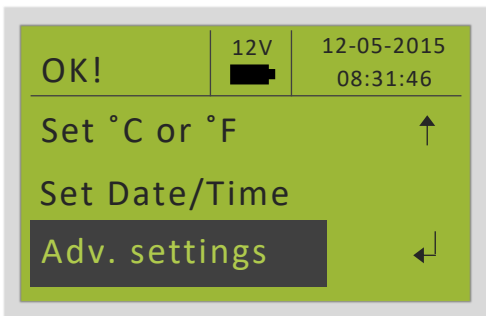
2.9.7. Check firmware version

To know if the latest firmware version is installed on the TCU the version can be checked. Below a description how to do this:

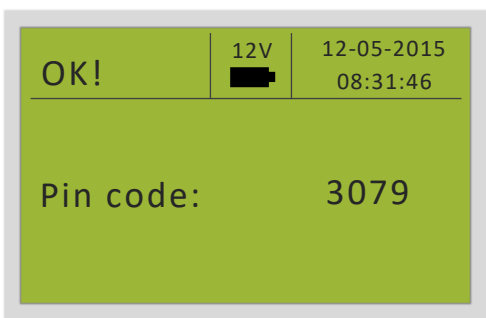
1. Go to settings
2. In the settings menu go to advanced settings
3. Fill in the pin code: 3079. Push the enter button
4. Go to firmware info
5. The firmware info will be shown on the screen



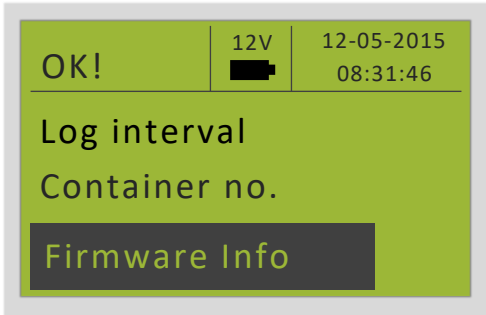
1.



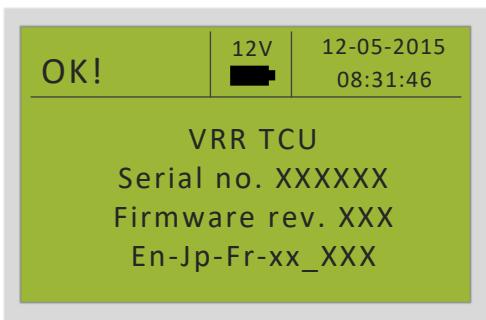
2.



3.



4.



5.

Figure 36: Check firmware

2.10. CALIBRATING SENSORS

The sensors used in the container have to be calibrated once in a while. To perform this calibration, you require a DTM3000-special thermometer and a bowl of water. Below the sequence that have to be followed for the calibration:

1. Prior to checking the temperature sensor, ensure that the DTM3000-special thermometer has been calibrated
2. Insert the temperature sensor of the DTM3000-special in the bowl with melting ice. Wait 5 minutes and check the temperature
3. The temperature displayed on the DTM3000-special should be in the range of $-/+ 1.0$ °C. if the temperature is out of range, wait 5 minutes and repeat the procedure.
4. Insert the temperature sensor(s) of the container in the bowl with melting ice, wait 5 minutes and check the temperature on the display of the control unit.
5. The temperature displayed on the control unit and on the DTM3000-special should be in the range of $-/+ 1.0$ °C.
6. If the temperature displayed on the control unit is out of the range then the control unit has to be returned to the manufacturer. In case of a significant difference in temperature (more than 5 °C) the test can be done again with a replacement temperature sensor to check the accuracy of the sensor.

2.11. PREPARING SHIPMENT – REFRIGERATED CARGO

Cargo which is refrigerated has a temperature between 0 °C and 5 °C. Refrigerated cargo is sensitive for CO₂, therefore the cargo may not come in contact with the exposed CO₂ of the dry ice.

Below is a step-by-step description of the steps needed to transport refrigerated cargo:

When the container is preconditioned with the use of a temperature-controlled room:

1. The container needs to be preconditioned according to the method described in *2.3 CONTAINER PRECONDITIONS*
2. The cargo needs to be preconditioned according to the method described in *2.2 CARGO PRECONDITIONS*.
3. Load the cargo in the container according to *2.4 LOADING CARGO*. Minimize the time the doors are open during loading.
4. Close the doors.
5. When required the container can now be moved from the temperature-controlled room.
6. Calculate the required amount of dry ice, do this according to *2.5 D*.
7. Load the dry ice in the bunker. Do this according to *2.6 LOADING DRY ICE*.
8. When the dry ice is loaded (re)install the batteries, according to *2.7 BATTERIES CONTROL UNIT*.
9. Set the temperature, according to *2.9 TCU OPERATION*. Recommended set temperature for refrigerated cargo is 2 °C, for a continuous cooling.
10. Place the shipping documents or check sheets in the document pouch.
11. The container is ready for transport

When the container is preconditioned with the use of dry ice:

1. The container needs to be preconditioned according to the method described in *2.3 CONTAINER PRECONDITIONS*.
2. The cargo needs to be preconditioned according to the method described in *2.2 CARGO PRECONDITIONS* Recommended set temperature for pre-cooling is 2 °C.
3. Remove the dry ice that is used to precondition the container
4. Load the cargo in the container according to *2.4 LOADING CARGO*. Minimize the time the doors are open during loading.
5. Close the doors.
6. Calculate the required amount of dry ice, do this according to *2.5 D*.
7. Load the dry ice in the bunker. Do this according to *2.6 LOADING DRY ICE*.
8. When the dry is loaded (re)install the batteries, according to *2.7 BATTERIES CONTROL UNIT*.
9. Set the temperature, according to *2.9 TCU OPERATION*. Recommended set temperature for refrigerated cargo is 2 °C, for a continuous cooling.
10. Place the shipping documents or check sheets in the document pouch.
11. The container is ready for transport

CAUTION

- » When using Dry ice make sure not to expose any skin or body parts to the dry ice. Because of the extreme low temperature, it could cause severe frostbite.
- » Handle dry ice according to applicable dangerous goods regulations
- » Never use dry ice that has been exposed to ambient temperature more than 2 hours
- » Never re-use dry ice, that is used for preconditioning of the container, for a shipment

2.12. PREPARING SHIPMENT – (DEEP) FROZEN

Cargo which is frozen has a temperature of -18 °C or lower. Frozen cargo is not sensitive for CO₂ from the dry ice, therefore the cargo may come in contact with the dry ice and the CO₂ that is exposed during transport.

Below is a step-by-step description of the steps needed to transport frozen cargo:

1. Precondition the container according to *2.3 CONTAINER PRECONDITIONS*.
2. Ensure that the cargo is completely frozen prior to loading.
3. Remove the dry ice, used for preconditioning the container.
4. Load the cargo in the container according to *2.4 LOADING CARGO*. Minimize the time the doors are open during loading.
5. Calculate the required amount of dry ice, do this according to *2.5 D*.
6. Load the dry ice in the bunker. Do this according to *2.6 LOADING DRY ICE*.
Part of the dry ice may be loaded on top of the cargo, but is not necessary.
Use one of the following methods:
 - » Put dry ice in boxes and secure on top of the cargo with plastic wrap or by similar means.
 - » Distribute dry ice on top of the cargo and secure with plastic wrap or by similar means.
7. Close the doors.
8. Set the temperature, according to *2.9 TCU OPERATION*. Recommended set temperature for frozen cargo is -22 °C, for a continuous cooling.
9. Place the shipping documents or check sheets in the document pouch.
10. The container is ready for transport.

CAUTION

- » When using Dry ice make sure not to expose any skin or body parts to the dry ice. Because of the extreme low temperature, it could cause severe frostbite.
- » Handle dry ice according to applicable dangerous goods regulations
- » Never use dry ice that has been exposed to ambient temperature more than 2 hours
- » Never re-use dry ice, that is used for preconditioning of the container, for a shipment

3. CLEANING

The interior and exterior faces of the container may be cleaned with any good grade industrial detergent, cleaner and/or water. The interior has to be wiped dry with a clean cloth.
There are no objections to blowing out the container with compressed air or using a vacuum cleaner.

In extremely contaminated condition, steam cleaning is permissible but only with a maximum temperature of 70 degrees Celsius.

If sealing is damaged or missing it shall be restored immediately.

It's permitted to clean the interior and exterior of the container with high pressure cleaner but with a maximum pressure of 2,5 bar.

CAUTION

- » Never use aggressive agents or chemicals;
- » The use of household like chemicals is preferred