

Use and maintenance

U L T R A F R E E Z E R



fiocchetti
THE COLD MANUFACTURER

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1. GENERAL

The ULTRAFREEZER series Ultra Low Temperature freezers have a storage freezing system with a temperature range from -50°C up to -86 °C.

Cooling is realized by means of a cascade system, where in the highest stage (first) R507 is used as refrigerant and in the lowest stage (second) a mix of R508b and R170. Both the high as the low stage are fitted with a capillary injection.

The cooling system is protected by a pressostat, a thermostat, a time delay for the second stage and a clixon thermal protection.

The ULTRAFREEZER is controlled by a microprocessor controller. When cooling is necessary, the cooling-relays and fan are activated. After a cooling action, the fan still runs by means of a time-delay. Temperature measurement will be done by a 2 wire PT1000 sensor.

The controller has a connection for an external backup battery. The battery will be loaded continuously by the controller, so it will always be stand-by. During power-failure of the main voltage, the controller still remains in function. With the standard battery the controller will still function for a few hours. The current-loader of the controller can also be used for loading a battery of the optional CO₂ backup cooling-system.

The controller has an alarm-system, which will be activated when the set minimum or maximum alarm temperature will be exceeded or when a sensor is defective.

Through the built-in buzzer, the alarm leds and errors on the front and the potential free alarm contact will activate. In case of exceeding the maximum CO₂-alarm temperature, the CO₂ backup cooling will switch on. This is a pulsating contact. The contact remains active until the set temperature has been achieved. When the temperature has been restored, the relevant error remains in the display, to remember the error. In case a power failure occurs and any emergency power is present, the CO₂-relay keeps on switching continuously.

An acoustic and visual alarm will be activated if the door is open more than 30 seconds (the door delay is adjustable): code alarm E6.

The controller has an internal memory of 512 MB to store the measured temperatures, set setpoints etc. The sample frequency is done every 5 minutes and the memory is stored for up to 6 months. Also during power failure (thanks to an external back-up battery), the values will still be stored. Ultrafreezer has both an Ethernet and USB connection.

To prevent impermissible use, such as ON/OFF switching or changing parameters/ setpoints, the controller can be protected by using a password which has been entered through the **Code** button.

The control settings of the panel can be adjusted via the internal parameters.

In case of power failure (no AC available) the controller switches to the back-up battery power. During this mode, all relays will be off except for the CO₂ relay, which will be activated when the temperature will be higher than the set temperature.

During battery backup mode, the 2 decimal points of the displays will flicker one time in four seconds (because of power saving). The buzzer will sound one short time per minute. If a button is pressed, the controller can be used normally. After approx. 30 seconds, the decimal points in the displays will start flickering again.

2. TRANSPORT

The Fiocchetti ULTRAFREEZERS must be transported vertically (especially for the compressors which need to be upright under all circumstances!).

This prevents that oil comes out of the carter (from the compressors and the oil separator), which would affect the cooling system seriously. The compressors could be damaged too.

The wheels must be free from the ground (for example freezer mounted on a pallet), so that the wheels do not break off during transport.

After transport, wait a while! The freezer may be switched on after 8 hours.

3. SPECIFICATIONS

3.1 Freezer

Material internal	Stainless Steel
Material external	Coated steel
Isolation	Polyurethane
Cooling	2 cascade connected compressors
Protection compressors	Thermal
Protection cooling system first stage	Pressostat (350 psi / diff 100 psi)
Protection cooling system second stage	Thermostat
Refrigerant first stage	R507
Refrigerant second stage	Mix of R508b and R170
Heating door	Door warmth cooling system
Controller	SL9002
Temperature sensor	PT1000
Temperature adjustments	-50°C till -86°C
Minimum temperature	-86°C
Time delay second stage	180 seconds
Locker	All models by using a key
Transit/vacuum release	Ø 26 mm / vacuum release situated in transit (optional)
Requirements	220/240 VAC, 50 Hz, fuse 16 Amp. slow
Condenser	Air-cooled Water-cooled (optional), see chapter 4

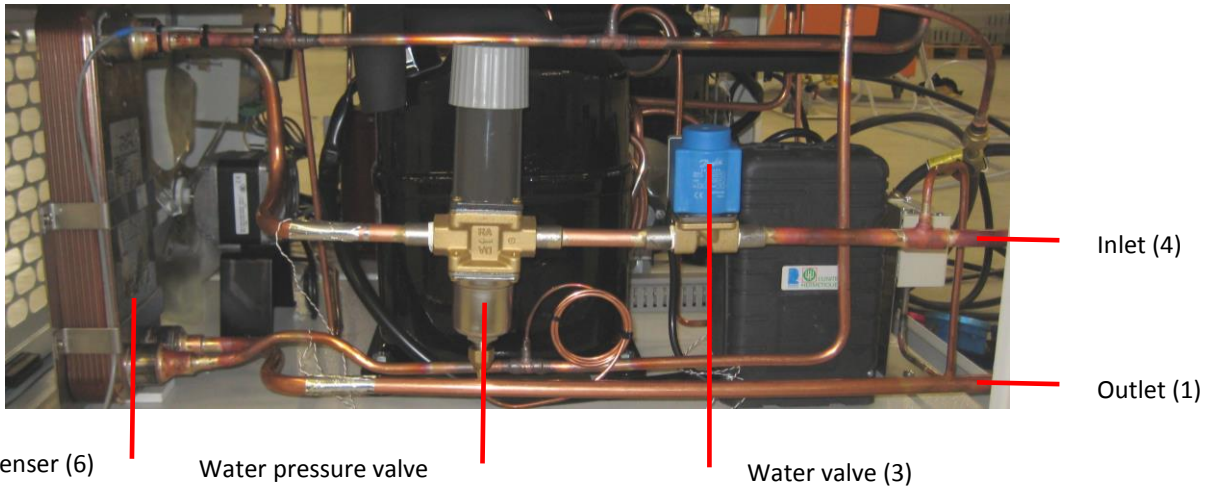
3.1 Controller

Type	SL9002 – Slimline, version 1.04
Case	Aluminium built-in profile
Dimensions	200 * 72 * 30 mm (lxhxd)
Hole in the panel	min. 173 * 66 mm (bxh)
Front	Polycarbonate (IP-44)
Display	4-digit digital display
Connections	RS485 powered by 2x twisted-pair secured min. 0,5 mm ²
Operating temperature	-20°C/ +50°C
Storage temperature	-20°C/ +60°C
Operating humidity	10% / +90 % RH not condensing
Accuracy	± 0,5 % of the range
Status leds	COOL = relay cooling on BACKUP = CO ₂ backup cooling on PRG. = PRG active CODE = CODE active
Alarm leds	LOW BATT = battery empty TEMP HIGH = warm temperature alarm TEMP LOW = cold temperature alarm
Buttons	POWER ON/OFF = on/off button ▲ = value increasing button ▼ = value decreasing button PRG = program button with led CODE = access code button with led SETP. = set point button BATT. = battery state button
Buzzer	Built-in buzzer for alarm

3.2 Basic print

Voltage	100-240 Vac; 50/60 Hz.
Power	10 VA
External emergency power	24 Vdc, 5 VA
External battery	12 Vdc, max. 15 Ah
Print size	280 * 140 mm
Range	100/+25°C
Sensors	TEMP-1 = Control sensor, PT1000-2 sensor, DIN/IEC751 TEMP-2 = condenser sensor, PT1000-2 sensor, DIN/IEC751
Digital inputs	DOOR = door contact entry, potential free entry contact
Communication	USB connection Ethernet RJ connection
Relays	RY1 = Alarm, potential free contact RY2 = Backup cooling, CO ₂ RY3 = Cooling RY4 = Fan RY5 = Battery monitoring RY6 = Temperature alarm relay, telephone

4. WATER COOLED CONDENSER (optional)



Water-cooled condenser system



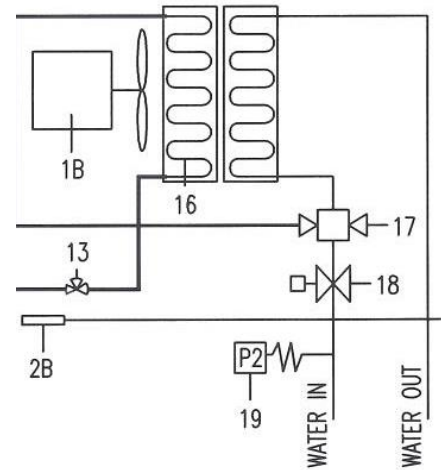
Pressure pressostat (2)



Water in- & outlet (1)

Inlet (4)

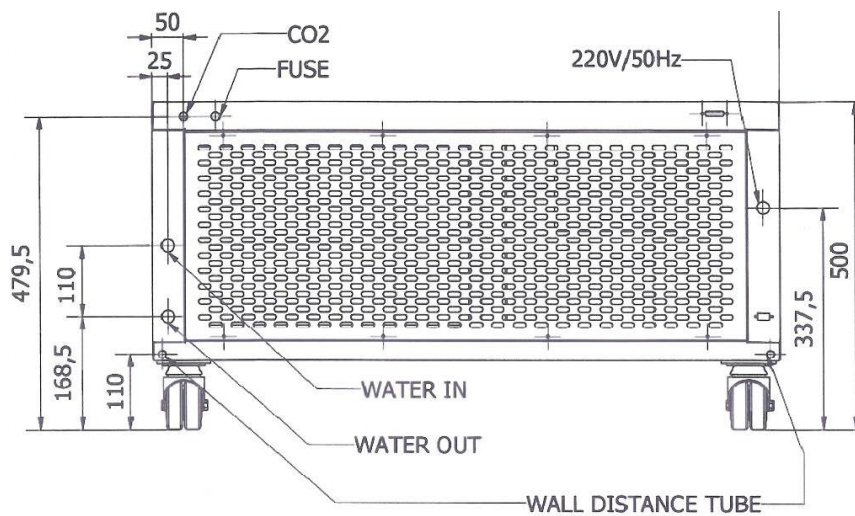
Outlet (1)



Cool technical diagram
freezer with water-cooled
condenser

← Example back of upright
freezer, water-cooled
condenser, CO₂ emergency
cooling system (optional)

← Fixation points
spacers



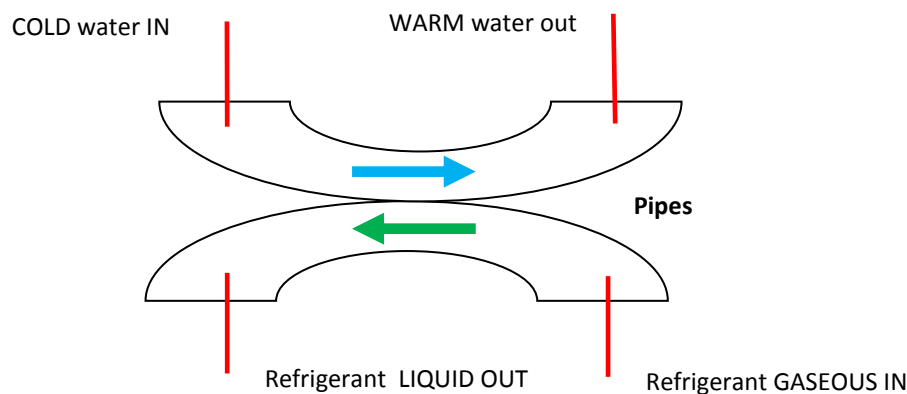
Explanation

At the back of the freezer you'll find the connections for the water inlet (4) and the water outlet (1). PT1000 sensor (temperature value sensor shown in the display) activate the cooling only when necessary. This system also directly switches on a water valve (3), which is connected to the water inlet.

Water, when at temp. +15°C, flows through the water pressure valve (5) to the water cooled condenser (6). Water flows opposite to the refrigerant gas in the condenser (see the below drawing) and then goes out of it. Outlet water temperature is warmer than the inlet water temperature. Water is heated by the refrigerant which flows into the condenser in a gaseous state and changes from the gaseous state into the liquid state.

The water condenser system is protected by means of a pressure pressostat (2). So, when water does not have enough pressure, the cooling won't be activated and the temperature inside of the freezer will increase.

Schematic drawing



5. INSTALLATION INSTRUCTIONS

Check that the equipment has been transported in an upright position and has not any physical damage. Make sure that the main voltage is as specified in the documentation or as mentioned into the identification label of the equipment. Check if the necessary voltage and power is available: 220V-240 VAC/ 50Hz. Fuse 16 Amp. slow, wire 2,5 mm² diameter.

Install the equipment in a room with sufficient ventilation for sufficient heat-emission and locate the freezer at least 15 cm from the walls.

The relative humidity must be lower than 65%.

Make sure that the freezer is far from heat sources.



IMPORTANT

When valuable products are going to be stored into the freezer, we advise a test-run of 10 days (for detecting possible cracking), before storing the products.

6. INSTALLATION

General items of attention:

- The optimal ambient temperature shall be within +20°C and +25°C (maximum tolerable +35°C)
- With every freezer a pair of spacers is delivered, which can be mounted at the backside of the freezer.
- During the cooling, the high temperature (1^e) stage compressor will operate at first, as well as the ventilator which cools the condenser. After ± 6 minutes the low temperature (2^e) stage will switch on.
- It's possible that the low temperature stage switches on/off several times before the final temperature has been reached. After some time (depending on the capacity of the freezer and on the ambient temperature) the set temperature will be reached.
- The potential free contact, which is situated at the back of the freezer, can be used to signal an eventual alarm at distance (for example to the technical service).
- We advise to keep the door open as short as possible to avoid freezing and temperature leaps.
- If the ultrafreezer is kept on stock for a long while, the battery may be out of power. So, loading the battery can take some time.
- The RJ connection, at the back of the freezer, can be used to connect the freezer to a local network (Ethernet).

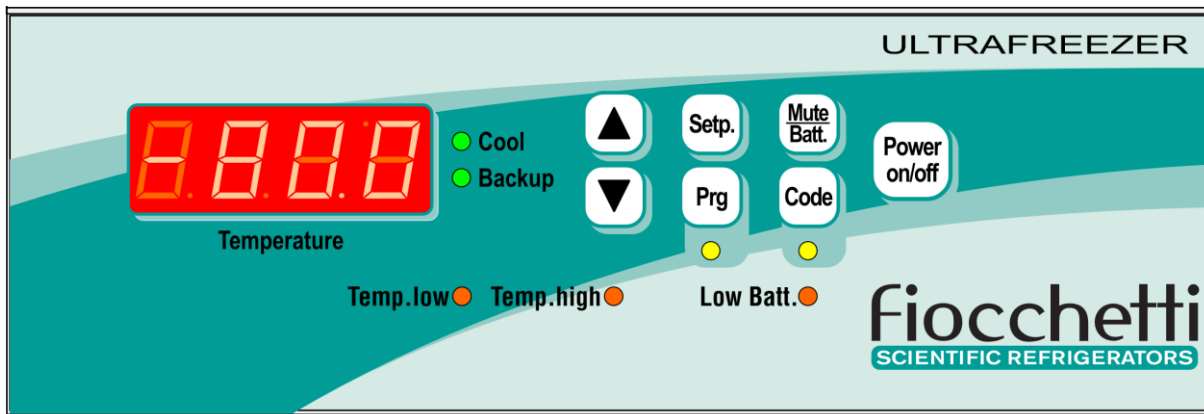
Water-cooled condenser, see chapter 4:

- Connect the water supply tube to the water connection (4).
- Take care that there is sufficient water pressure available (+/- 4 bar) and that the quality of water is as clean as possible (it should not be extremely chalky).
- For safety reasons you can choose to arrange a water lock in the water inlet (for example: in case there will be more than 5 liters flowing through, it will switch off the water supply automatically, think for example about a laundry machine connection).
- The advisable water temperature is +15°C.
- Connect the water drainage to the return water system(1).
- Open the water drainage and check it for leakages. Remember to check the drainage also when the freezer is functioning.
- Take care that there are no nodes in the water tubes and check that they are mounted properly.

Water- and air-cooled condenser:

- Connect the power cable to a 220V outlet, fitted with a 16A slow fuse.
- Install the enclosed spacers to the back of the engine room, see page 7.
- LOAD will appear in the display.
- When LOAD is off, switch on the freezer as mentioned in paragraph 7.

7. ULTRAFREEZER FUNCTIONING



7.1. Entry of the Access code

Insert a special 4-digit password to avoid undesirable alterations of the settings by non-authorized users or to switch the controller on or off.

Press the **Code** button. After that, it's possible to enter an access code with a combination of the following 6 buttons:

▲ = 1; **Setp.** = 2; **Batt.** = 3, ▼ = 4; **Prg** = 5 and **Code** = 6 .

The standard factory password is '1 2 3 4'. During the input of the password, the led above the '**CODE**' button flickers. When the code is correct, the led above the '**CODE**' button will burn continuously.

By pressing again on the **Code** button, the led above the '**Code**' button will switch off and it is not possible anymore to modify it again. If during 30 seconds no button is pressed, automatically the adjust mode will be de-activated. In order to enter again in the Control Panel, digit the password (as described here above).

Before doing any of the below operations, make sure to have entered the password.

7.2. Switching ON/OFF

Plug in the ultrafreezer.

The ULTRAFREEZER is switched on by pressing the '**POWER ON/OFF**' button, if the access code is correct (led above code button is switched on). Once switched on the freezer the controller will display the temperature detected by the temperature sensor and the temperature alarm relay will be activated. When the controller is off you have to enter the correct code first by pressing the '**CODE**' button. Then the '**POWER ON/OFF**' button can be used again. If the ULTRAFREEZER is not switched off following the described procedure, the display will continue to visualize the chamber temperature and to signal alarm till the battery won't be completely discharged.

7.3. Reading the setpoint

By pressing the '**SETP.**' button, the value of the setpoint will appear on the display. After releasing the '**SETP.**' button, the actual temperature will appear in the display.

7.4. Reading the battery capacity

When the '**BATT.**' button is pressed, the display will show the current capacity of the battery.

After releasing the 'BATT.' button, the actual temperature will appear again in the display. **Settings can be changed as mentioned in the paragraphs 7.5, 7.6 and 7.7 (the controller is set on the factory settings).**

7.5. Changing the setpoint

After having entered the correct access code, the setpoint can be changed in the display by pressing 'SETP.' button. Press **Setp.** button and at the same time press ▲ or ▼ to modify the setpoint.

7.6. Changing the alarm

By pressing the 'PRG' button, alarm limits, the alarm temperature signalled by relay, the switch-on temperature of the CO₂ cooling and can be modified.

After pressing the 'PRG' button, the display will show **P30** (LED under 'PRG' button will light on). By pressing 'SETP.' the set value of the **minimum alarm temperature** appears. This can be changed by pressing the 'SETP.' and ▲ or ▼ buttons at the same time. Release the buttons when the correct value is reached. The display will return to its normal status when the 'PRG' button is pressed or when during 30 seconds no button is used.

When the ▲ button is pressed, the display will show **P31**. When the 'SETP.' is pressed, the display will show the adjusted value of the **maximum alarm temperature**. This can be changed by pressing the 'SETP.' and ▲ or ▼ button at the same time. Release the buttons when the correct value is reached. The display will go back to its normal status when the 'PRG' button is pressed or when during 30 seconds no button is used.

When again the ▲ button is pressed, the display will show **P37**. When the 'SETP.' is pressed, the display will show the adjusted value of the **alarm temperature relay (or telephone selector)**. This can be changed by pressing the 'SETP.' and ▲ or ▼ at the same time. Release the buttons when the correct value is reached. The display returns to its normal status when the 'PRG' button is pressed or when during 30 seconds no button is used.

When again the ▲ button is pressed, the display will show **P50**. By pressing 'SETP.' the display will show the set value of the **'switch on' temperature of the CO₂ backup system**. This can be changed by pressing the 'SETP.' and ▲ or ▼ at the same time. Release the buttons when the correct value is reached. The display returns to its normal status when the 'PRG' button is pressed or when during 30 seconds no button is used.

When again the ▲ button is pressed, the display will show **P70**. By pressing 'SETP.' the display will show the set value of the **'alarm relay'**. This can be changed by pressing the 'SETP.' and ▲ or ▼ at the same time. Release the buttons when the correct value is reached. The display returns to its normal status when the 'PRG' button is pressed or when during 30 seconds no button is used.

When again the ▲ button is pressed, the display will show **P80**. By pressing 'SETP.' the display will show the set value of the **'actual year'**. This can be changed by pressing the 'SETP.' and ▲ or ▼ at the same time. Release the buttons when the correct value is reached. The display returns to its normal status when the 'PRG' button is pressed or when during 30 seconds no button is used.

When again the ▲ button is pressed, the display will show **P81**. By pressing 'SETP.' the display will show the set value of the **'actual month'**. This can be changed by pressing the

SETP.' and ▲ or ▼ at the same time. Release the buttons when the correct value is reached. The display returns to its normal status when the **'PRG'** button is pressed or when during 30 seconds no button is used.

When again the ▲ button is pressed, the display will show **P82**. By pressing **'SETP.'** the display will show the set value of the **'actual day'**. This can be changed by pressing the **SETP.'** and ▲ or ▼ at the same time. Release the buttons when the correct value is reached. The display returns to its normal status when the **'PRG'** button is pressed or when during 30 seconds no button is used.

When again the ▲ button is pressed, the display will show **P83**. By pressing **'SETP.'** the display will show the set value of the **'actual hour'**. This can be changed by pressing the **SETP.'** and ▲ or ▼ at the same time. Release the buttons when the correct value is reached. The display returns to its normal status when the **'PRG'** button is pressed or when during 30 seconds no button is used.

When again the ▲ button is pressed, the display will show **P84**. By pressing **'SETP.'** the display will show the set value of the **'actual minute'**. This can be changed by pressing the **SETP.'** and ▲ or ▼ at the same time. Release the buttons when the correct value is reached. The display returns to its normal status when the **'PRG'** button is pressed or when during 30 seconds no button is used.

7.7. Alarm test function

- Enter the password, standard factory setting 1234.
- After activation, press simultaneously **'BATT.-MUTE'** and ▲. All leds, buzzer and potential free contact will be activated.
- The display returns to its normal status when the buttons are released and when during 30 seconds no button is used.

7.8. Changing password

The customer can change the password by pressing first the **'PRG'** button (LED under **Prg** button light on) and second 4 times the ▲ button. The display will show **P90**. A new password can be entered by using the following buttons: ▲ = 1; **Setp.** = 2; **Batt.** = 3, ▼ = 4; **Prg** = 5 and **Code** = 6. The password can be modified pressing simultaneously **'SETP.'** button and the new password. The display returns to its normal status when the **'PRG'** button is pressed or when during 30 seconds no button is used.



Important

Remember to take note of the password! The freezer cannot be switched off or the parameters can not be changed or visualized on the display without it. When you forgot the code, Fiocchetti can supply you a master code. With this master code, all parameters including the access code can be adjusted.

7.9. Door contact

This is only valid for the upright models. When the door is opened, an alarm delay-time will start. When this alarm time-delay has passed, an alarm will be activated (E6). The alarm time-delay is set to 30 seconds.

7.10. Resetting alarm/buzzer

If there is an alarm, a message appears on the display and a LED light on (with the exception of the alarm temperature relay). At the same time, the potential free contact and the buzzer is activated. The buzzer can be reset by pressing the '**MUTE**' button. When the alarm situation is solved by the equipment, the buzzer, the relay and the display will be reset automatically. Despite this the original alarm remains in the display, to show that there has been an alarm.

Reset alarm

- Press **Code**.
- Press **▲** = 1; **Setp.** = 2; **Batt.** = 3, **▼** = 4, the password.
- Press **Setp.** to reset alarm.

If a temperature sensor is defective during installation, the controller does not work properly and the sensor needs to be replaced. If the sensor is defective after some time of operation, the controller shall switch the cooling on and off, depending on the previous ON/OFF switching times of the cooling cycles. In this way, the temperature in the freezer remains. Of course this situation needs to be repaired as soon as possible.

7.11. Storage of the log on a USB stick

To download the log files on the USB pen, put the USB pen (with sufficient free space) into the USB connection at the front of the freezer (behind the condenser plate, which can be removed very easily).

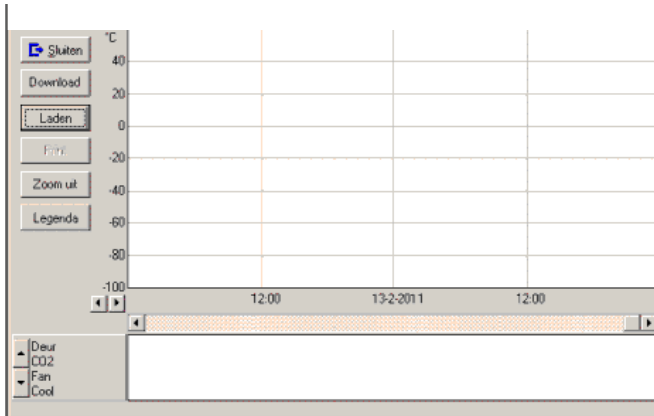
Enter the password and press on the **▲** button after having entered the password. When the text **L.USB** appears on the screen, the '**Setp.**' button needs to be pressed to start up the storing. The percentage of loading is shown in the screen. After the transfer of all the log files, the text "**donE**" will appear on the display. There are two error codes possible: **E.US1**, no USB stick has been inserted. **E.US2**, there is not enough free space on the stick.

To check the name of the file (MAC-address), please do the following:

- If the correct password is used, press the '**PRG**' button.
- Press **▲** button, the display will show **P91**.
- By pressing '**SETP.**' the display will show a '**MAC address**'.
- Write this number down.
- The display returns to its normal status when the '**PRG**' button is pressed or when during 30 seconds no button is used.

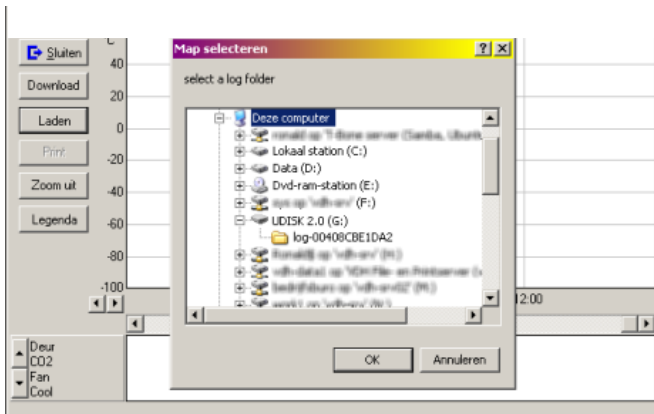
7.12. Open log

The log (with the correct MAC-address) on the USB stick can be opened by using the pc program `sl_log.exe` (which can be downloaded). After opening the program, the following screen appears.

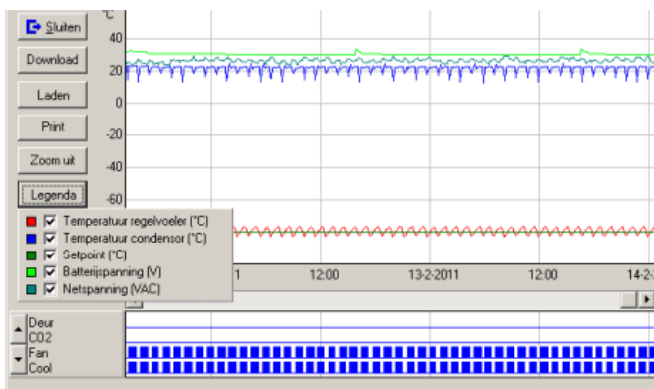


Click on the Focchetti logo, left above and CHOOSE LANGUAGE. Select the language you wish.

Press button load and below dialog screen appears to select the map with the log data.



Press **OK** and the data will be read in and appears in the program.



8. ALARMS

The alarm relays are activated in normal position and will be de-activated during alarm. So, an alarm will be generated during total power failure. An alarm can be generated when:

- one of the temperature sensors is defective;
- the lead battery is empty/ voltage is too low/ battery is not connected;
- there is power failure;
- temperature is out of cold- or warm range;
- maximum time door-open;
- maximum temperature of the condenser sensor is exceeded.

By pressing '**Setp.**' button the buzzer will be reset. The alarm codes will be staying on the display. The alarm leds will keep on flickering. When the failure hasn't been restored, the buzzer will be activated again after one minute.

In the next table the alarm codes are listed:

CODE	DESCRIPTION	CHECK
E1	Temperature sensor cabinet defective.	Connections
E2	Condenser sensor defective.	Connections
E3	Battery not connected.	Connections, fuses, battery
E4	Main voltage absent.	Absence voltage, fuse internal
E5	Battery voltage too low.	Battery
E6	Door alarm.	Closure of the door
E10	Main voltage deviates too much.	Parameter P72/P73
Lo1	Temperature line sensor inside too low.	See chapter 10
Hi1	Temperature line sensor inside too high.	See chapter 10
Hi2	Temperature condenser sensor too high.	See chapter 10

9. MAINTENANCE

- In spite of the anti condense heating in the edges of the freezer, freezing can occur. To guarantee a proper functioning of the lockable rubbers, this freezing needs to be removed.
- Keep the freezer dry at the outside when there is some drip water.
- Check frequently the vacuum release (left side upright freezers), if it's ice-free. The vacuum release can easily be removed.

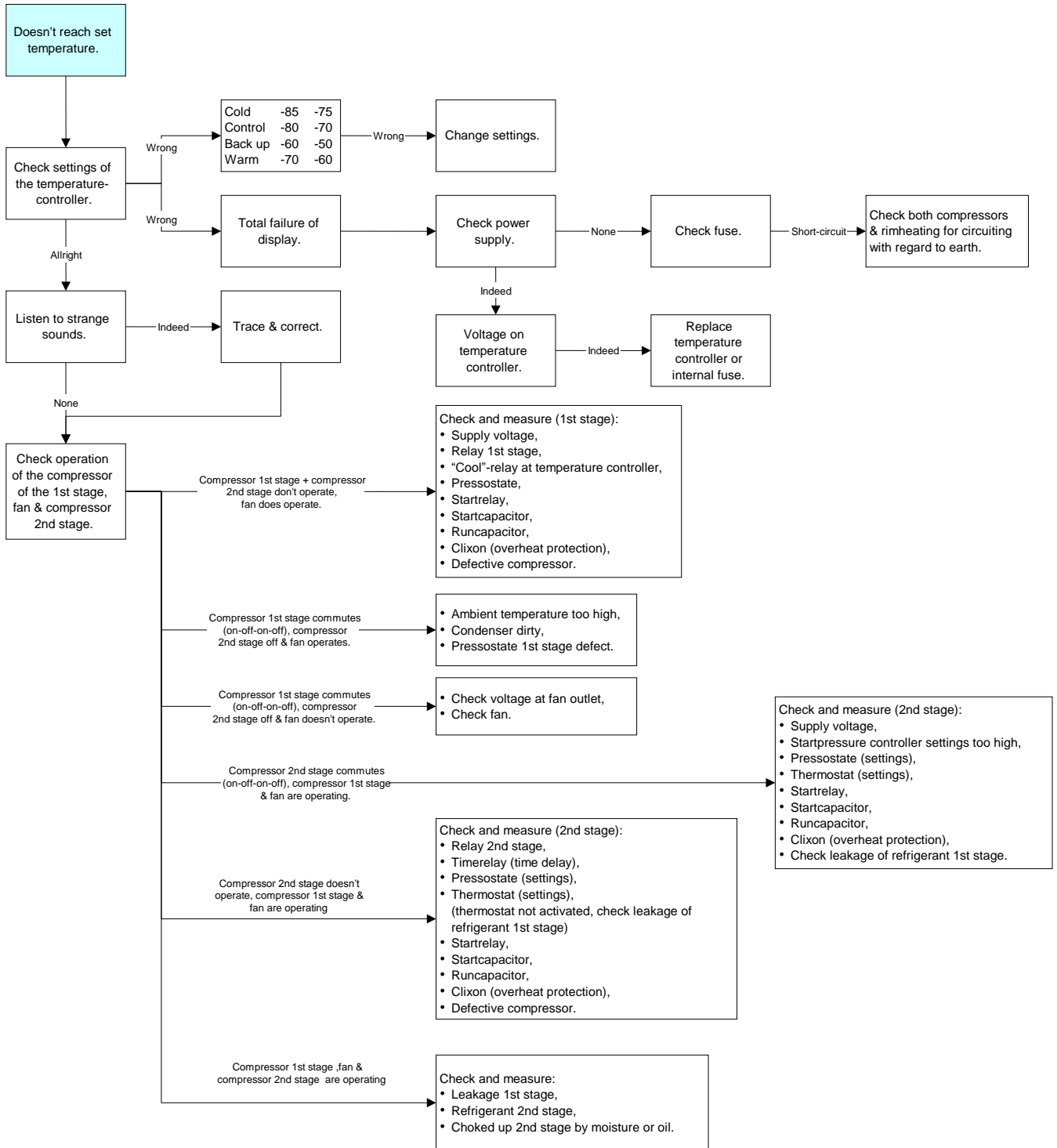


Important

When unexpected problems occur during working with the ULTRAFREEZER, which can be dangerous for yourself and/or your surrounding, remove the plug immediately from the outlet.

10. TROUBLE SHOOTING

10.1 TROUBLE SHOOTING AIRCOOLED CONDENSER



10.2 EXTRA, TROUBLE SHOOTING WATERCOOLED CONDENSER

Compressor 1ste stage commutes (on-off-on-off), compressor 2^e stage off & ventilator functions:

- Magnet switch for water is defect;
- Constipation warmth exchanger;
- Water temperature too high;
- Water pressure too low;
- Absence of water circulation.

Space reserved for the data sheet with the characteristics of the appliance



Space reserved for the stamp of the distributor



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THE COLD MANUFACTURER

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