

OPERATION MANUAL

LAUDA
ultracool



DMI-0133
rev.16
10.07.2014

Ultracool UC-0060/0240 2008 50/60Hz

Warnings

This Operation Manual is to be followed by all persons working with the unit. It is imperative that this Manual is made freely available at all times to service personnel and is kept at the point where the unit is installed.

The basic maintenance should be carried out by properly trained personnel and, if necessary, under the supervision of a person qualified for this job.

LAUDA Ultracool S.L. personnel, or personnel authorized by LAUDA Ultracool S.L., should carry out any work in the refrigerating or electric circuit during the warranty period. After the warranty period, the work must be carried out by qualified personnel.

Disposal of Waste Equipment by Users in Private Household in the European Union.



This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

Table of Contents

<hr/>			
1	Introduction		
	1.1	General notes	3
	1.2	Safety regulations	3
<hr/>			
2	Possible Installations		
	2.1	Superplus version	4
	2.2	Standard version	4
<hr/>			
3	Installation		
	3.1	Reception and inspection	5
	3.2	Transportation	5
	3.3	Site	5
	3.4	Identification labels on the Ultracool unit	6
	3.5	Water connection	7
	3.6	Electrical connection	8
<hr/>			
4	Start-up		
	4.1	Operating conditions	10
	4.2	Chiller start-up	12
<hr/>			
5	Control Panel		
	5.1	Components of the control panel	14
	5.2	Control thermostat	15
	5.2.1	Operation	15
<hr/>			
6	Maintenance		
	6.1	Basic maintenance	18
<hr/>			
7	Troubleshooting		
	7.1	Possible causes of defaults	19
<hr/>			
8	Technical Features		
	8.1	Technical Features 50Hz	23
	8.2	Technical Features 60 Hz	24
<hr/>			
9	Log Book		
	9.1	Log Book	25
<hr/>			
10	Annexes		
	10.1	Water quality	26
	10.2	MSDS Refrfluid B	27
<hr/>			
11	Technical Diagrams		
	12.1	Dimensional sheet	
	12.2	Flow sheet	
	12.3	Wiring sheet	



Attention. Points of special interest to keep in mind.

1 Introduction

1.1 General notes

- This water chiller complies fully with CE.
- The Company does not accept responsibility if safety regulations are not met during handling, operation, maintenance and repair, even though these may not be strictly stated in this operation manual.
- We recommend the translation of this operation manual into the native language of foreign workers.
- The usability and life cycle of the water chiller as well as avoiding premature repairs depends on proper operation, maintenance, care and competent repair under consideration of this operation manual.
- We are constantly updating our products and are confident that they respond to the latest scientific and technological demands. However, as manufacturers, we do not always know the end use or the total range of our products' applications. Therefore we cannot accept liability for our products in applications where additional safety measures may be necessary. We highly recommend that users inform us of the intended application in order to undertake additional safety measures, if necessary.

1.2 Safety regulations



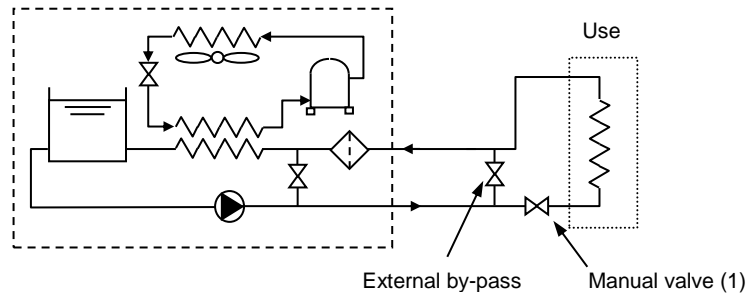
The operator has to observe the national working, operating and safety regulations. Also, existing internal factory regulations must be met. Maintenance and repair work must only be carried out by specially trained personnel and, if necessary, under supervision of a person qualified for this work.

- Protective or safety devices must not be removed, modified or readjusted.
- During operation of the water chiller none of the protective or safety devices must be removed, modified or readjusted, temporarily or permanently.
- Only use correct tools for maintenance and repair work.
- Use original spare parts only.
- All maintenance and repair work must only be carried out to the machine once it has been stopped and disconnected from the power supply. Ensure that the water chiller cannot be switched on by mistake by unplugging it.
- Do not use flammable solvents for cleaning.
- Keep the surrounding area absolutely clean during maintenance and repair work. Keep free of dirt by covering the parts and free openings with clean cloth, paper or adhesive tape.
- Ensure that no tools, loose parts or similar are left inside the system.

2 Possible Installations

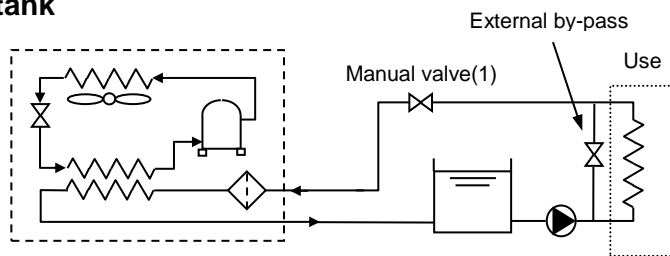
2.1 Superplus Version

Without heat exchanger



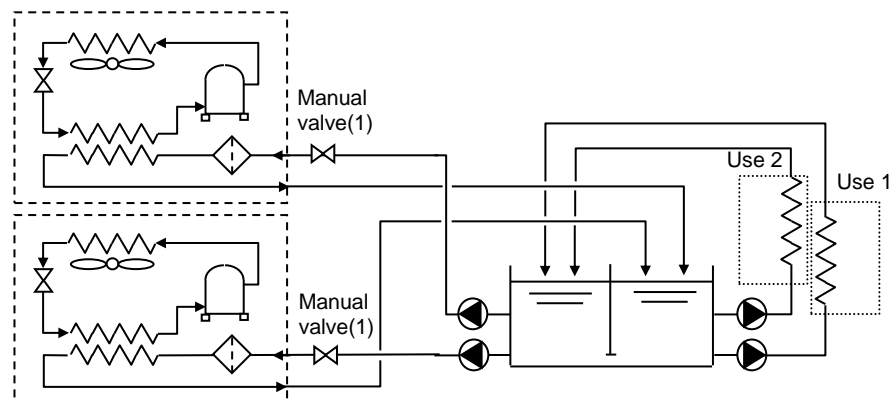
2.2 Standard Version

With an external water tank



Several Ultracool units with external tank

When there are extensions foreseen



(1) Permits to adjust the pressure drop of the user application according to the nominal pump pressure.

3 Installation

3.1 Reception and Inspection



On receipt of the Ultracool unit, it must be inspected for damage during transport. In the case of any damage, external or internal, this cannot be referred to the manufacturer because all units are checked before dispatch. **If any damage is observed, this should be documented and reported to the forwarding company. The LAUDA Ultracool S.L. warranty does not include any damages incurred during transportation.**

The refrigerant circuit controls are set before shipment of the unit. They should not be re-adjusted under any circumstances (except by an authorized service agent). This would void the warranty of the unit.

3.2 Transportation



Keep the unit upright at all times. Do not tilt when shipping or moving. **The tilting of the Ultracool unit may affect the internal suspension of the refrigerant compressor.**

The Ultracool unit must be transported by pallet jack or forklift truck.

3.3 Site

The Ultracool unit must be installed in an atmosphere where the range of temperatures is within the indicated margins mentioned in point 4.1. It is necessary to add ethylene glycol to the water of the circuit, as indicated in point 4.1.

The chiller must be installed on a solid level surface that is capable of supporting a minimum of 400kg (880 lb). The floor must not have any slope.

We recommend the installation of the Ultracool unit in a well-ventilated site and in a corrosive-free, dust-free atmosphere.

In the case of out-door installation, it is recommended to protect the Ultracool unit from rain with a roof and it should be installed in such way that the control panel receives as few direct sunlight as possible.

Leave a space of 1m (40") in the front, right and left panels of the UC unit (see **figure 1**). In UC-0180/0240 it is necessary to leave 1m (40") on the back panel too. This space is important to facilitate maintenance work and cleaning, especially in front of the condenser(s) grid.

If necessary the unit can be installed without any free space on the left and right panels. In this case foresee that the unit can be moved forwards to free the lateral panels when there are maintenance works to be carried out.

3

Installation

The inlet of fresh air onto the condenser should be in the most direct way possible, avoiding any chance of air recycling (the ceiling above should not be at less than 1 m (40")).

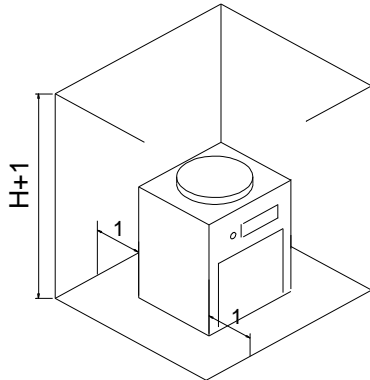


Fig.1

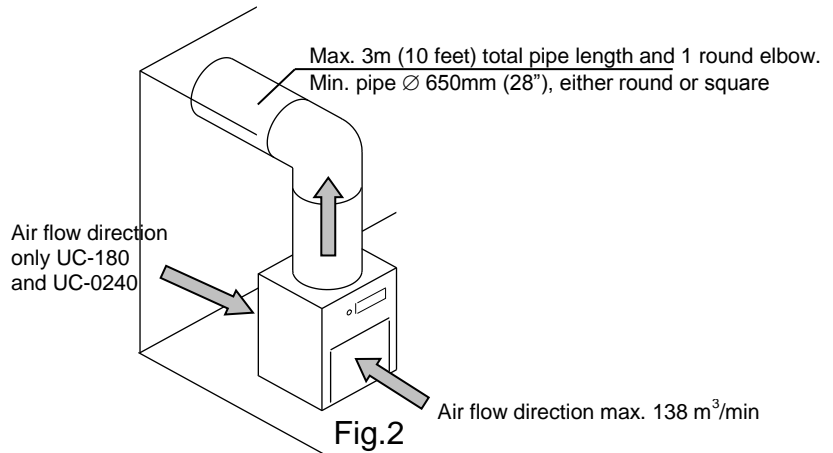


Fig.2

Figure 1: In case of installation in a small room it is imperative that the room has an appropriate ventilation system to evacuate all the heat generated by the chiller as explained before on this same point. If the heat is not removed the temperature in the room will quickly increase beyond the operating limits of the unit and it will stop by high pressure alarm (see point 4.1).

Figure 2 shows the maximum length that the air from the chiller can be conducted if the room has not an appropriate ventilation system. In this case it is still necessary to install a ventilation grid facing the condenser/s with a minimum surface of 0.75 m² (8 square feet).

Make sure that if the chiller is vented to the outside there is a way (a louver door or shutoff door on out side wall) to keep the cold outside air from entering the chiller when it is not operating. Take into account the pressure drop created by these elements when sizing the air duct.

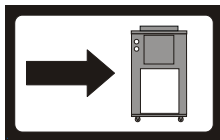
In this type of installation consider that the chiller will be drawing into the room the same amount of air that it is exhausting to the outside.



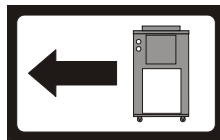
The Ultracool units must always operate with the panels closed to enable the inlet of fresh air only through the condenser.

3.4 Identification labels on the Ultracool unit

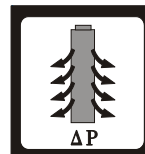
You can find the following labels stuck on the Ultracool unit.



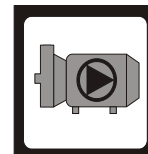
Water inlet from the installation to the Ultracool unit (**inside the housing**).



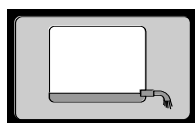
Water outlet from the Ultracool unit to the installation (**inside the housing**).



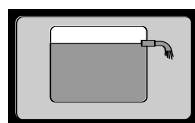
Water filter pressure drop.



Water pump pressure.



Drain (**inside the housing**).



Connection for the tank overflow (**inside the housing**).



Power supply depending on version.



Danger, hot surface.



WARNING
TURN OFF & LOCK OUT POWER BEFORE SERVICING. DO NOT REMOVE PANEL UNTIL FAN HAS STOPPED ROTATING.
Danger of cuts!
Completely disconnect the chiller power supply before opening this cover.

3.5 Water Connection

Leave at least **1.5 meters (5 feet) of flexible pipe** right after the chiller's inlet and outlet connection. It will allow moving the chiller for a better maintenance access without dismantling the water pipes.

The chiller should be located as close as possible to the application. Pressure drop in the pipe should not exceed 0.7 bar. The water lines must be in pipes of at least 1".

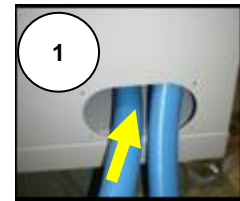
Minimize the number of bends in the water lines. The length of hose, number of fittings, valves, etc. will also cause an increase of the pressure drop.



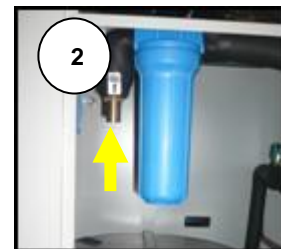
To perform the water connections **make sure the chiller is turned Off and disconnected from any power supply** and open the left panel of the chiller.

Superplus models:

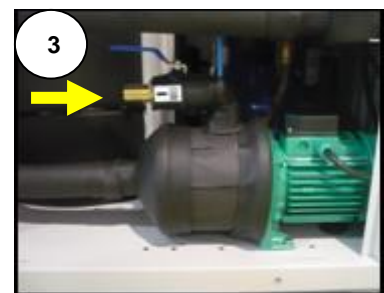
1.- Introduce the inlet and outlet water pipes inside the chiller housing through the connections port. There are two connections ports available; one at the back panel and the other at the left panel. You can use the most suitable for you and close the other with the cover supplied.



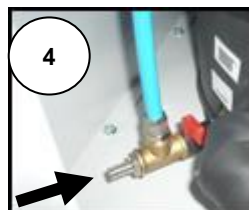
2.- Connect the inlet water pipe to the hose carrier located at the inlet of the water filter



3.- Connect the outlet water pipe to the hose carrier located at the pump outlet. See the identification labels.



4.- Connect a pipe at the drain and overflow connection located at the bottom of the water tank. Use a flexible pipe with 10mm internal diameter.



Always install thermal insulation for all pipes or, at least, make sure that the pipes are opaque to the light.

Standard models: The user pump must provide the chiller with the flow indicated in the Ultracool characteristics plate (See point 8). Take into account that the maximum pressure at the chiller's inlet cannot exceed 6 bar.

Standard with pump models: If the pump is to draw liquid from a level lower than the pump suction port, a foot/non-return valve must be fitted to the water inlet from the installation to the Ultracool unit.



When possible install the water lines at the same level as the chiller until reaching the application. The height difference between the chiller and the application should never exceed 10m (33 feet). **In the installations in which the water level of the circuit exceeds the maximum level of the tank inside the Ultracool unit, it will be necessary to install a check valve in the water outlet of the Ultracool unit and a solenoid valve in the water inlet.** The power supply of this solenoid valve will be carried out by terminals designed for that purpose (see electrical diagrams).

To prevent rusting of the water pipes, we recommend plastic pipes and fittings.

Where flexible tubing is used, it should be of reinforced construction and rating for a minimum working pressure of 6 bar g (90 psig) within -15°C and 30°C (5°F and 86°F).

3.6 Electrical Connection

Operating voltage 400VAC +/-10%, 50Hz, 3 Ph or 460VAC +/-10%, 60Hz, 3 Ph depending on the version.

It must be checked that the supply voltage does not exceed a maximum variation of 10% referring to nominal.

Introduce the main power supply cable through the cable gland located at the bottom of the right panel (see fig.7). Avoid as much as possible that the cable gets in contact with the air/refrigerant heat exchanger (which looks like a radiator) as its surface gets hot during operation (see fig.8). Connect the cable with the incoming power terminal block which is located on the left side of the X1 terminal block inside the electrical box of the chiller (see fig.9).



Fig.7



Fig.8



Fig.9

For the electrical supply of the Ultracool unit, use an appropriate electrical line according to the data in the characteristics plate.

The chiller has some special terminals prepared for the following functions:

- **Terminals 23 and 24, remote On/Off operation:** This chiller can be turned On and Off automatically by an external signal. This remote On/Off signal is transmitted to these terminals by a dry contact in the application (open contact = chiller Off, closed contact= chiller On).

Note: During the initial commissioning, the chiller must stay turned Off but connected to the power supply (Main power switch On) for at least 6 hours (see point 4.2). During this time the chiller must not receive any On signal; do not connect the wire bridge supplied between terminals 23 and 24 yet.

- **Terminals 25 and 26, external solenoid valve connection:** They can be used to supply a solenoid valve with 24VAC. If the pipes of the application are installed above the level of the chiller's outlet this valve prevents backflow when the chiller is stopped (see point 3.5). These terminals are only at 24V when the water pump is working.
- **Terminals 27 and 28, external alarm report signal:** These terminals provide a dry contact for a general alarm of the chiller. This contact can be adjusted in order to open or close when there is an alarm (see section 5.2.1).



A system of fuses or circuit breakers must be installed before the power inlet connection to the Ultracool unit. The maximum size of these protections is defined in the Ultracool characteristics plate.

4 Start-up

4.1 Operating Conditions

The control thermostat in the chiller will control it in order to maintain the preset cold water temperature.

Water temperature at the inlet:

Nominal:	15°C (59°F)
Maximum:	30°C (86°F)

Cold water temperature at the outlet:

Nominal:	10°C (50°F)
Minimum:	7°C (45°F) (1)
Maximum:	25°C (77°F)

Temperature of the ambient air:

Nominal:	25°C (77°F)
Minimum:	-15°C (5°F) (2)
Maximum:	50°C (122°F)

(1) The Ultracool units can work with cold water temperatures lower than 7°C (45°F). To do so, add ethylene glycol to the water and contact an authorized technical service to adjust the chiller.

(2) In order to work at temperatures lower than 0°C (32°F), add ethylene glycol to the water and contact an authorized technical service to adjust the chiller.



Only an authorized technical service can adjust the antifreeze set point.
The following table shows the ethylene glycol concentration and the antifreeze adjustment required:

Glycol concentration (3) and antifreeze adjustment		Min Ambient Temperature		
		0°C or more	Less than 0°C until -5°C	Less than -5°C until -15°C
Cold Water Set Point	7°C or more	0% 0°C	15% -5°C	30% -15°C
	Less than 7°C until 5°C	15% -5°C	15% -5°C	30% -15°C
	Less than 5°C until 0°C	30% -15°C	30% -15°C	30% -15°C
	Less than 0°C until -5°C	30% -15°C	30% -15°C	30% -15°C

Glycol concentration (3) and antifreeze adjustment		Min Ambient Temperature		
		32°F or more	Less than 32°F until 23°F	Less than 23°F until 5°F
Cold Water Set Point	45°F or more	0% 32°F	15% 23°F	30% 5°F
	Less than 45°F until 41°F	15% 23°F	15% 23°F	30% 5°F
	Less than 41°F until 32°F	30% 5°F	30% 5°F	30% 5°F
	Less than 32°F until 23°F	30% 5°F	30% 5°F	30% 5°F

(3) The ethylene glycol percentage is given as % measured as weight of the total mixture. In case of any modification in the quantity of water in the installation, the concentration of ethylene glycol should be checked.

If more volume is required it is necessary to keep the ethylene glycol concentration



Do not use automotive antifreeze. Use lab grade ethylene glycol only! Do not use an ethylene glycol concentration above 30%; this would damage the water pump.

4.2 Chiller start-up



Clean the application water circuit with tap water in order to be sure that there are no free particles. Otherwise the filter element can block up during the start up process.

Turn Off the Main power switch (to avoid any possibility of unexpected start up of the equipment during this operation). Open a lateral panel, open the tank cover and fill the tank **with water of the required quality (see annex 10), the suitable glycol concentration and the Refrfluid B additive** according to **point 4.1** of this manual. Fill it directly to the tank until the maximum level of the tank is reached. Lift the level switch manually to make sure it resets itself: when it resets you will hear its contact “click”.

Prime the pump in order to release any air inside, **in superplus models:**

1. Remove the priming plug (P, see diagram below).
2. Keep the priming plug open until only liquid runs out the priming plug.
3. Replace the priming pump and tighten securely.

Standard with pump models:

1. Close the external manual valve at the Ultracool outlet.
2. Remove the priming plug (P, see diagram below).
3. Pump priming:
 - a. **If the liquid level in the tank is below the pump inlet:** Pour water through the priming port. Make sure that the suction pipe and pump are completely filled and vented.
 - b. **If the liquid level in the tank is above the pump inlet:** Keep the priming plug open until only liquid runs out the priming plug.
4. Replace the priming plug and tighten securely.
5. Open the external manual valve at the Ultracool outlet.

Do not start the Ultracool unit until the pump has been properly vented.



Open the water inlet valve completely and close the outlet water valve completely as shown on the following pictures:



Make sure that the external fuses are installed. See electrical diagram.

Make sure that the Remote On/Off control is not connected between terminals 23 and 24 and a wire-bridge is not installed between them either.



When the Ultracool unit is started for the first time, it is necessary to turn On the Main power switch (element 1 in the control panel, see point 5) and wait six hours before continuing with the start-up sequence. This time is necessary for the crankcase of the compressor to heat up. **The compressor can be damaged if this procedure is not followed.**

Close both lateral panels and **switch OFF the main power switch during any electrical intervention.**

Connect the Remote ON/OFF control in terminals 23 and 24. If you do not use a remote control, connect the wire-bridge supplied inside the electrical box to link terminals 23 and 24.

Switch ON the general switch and, if necessary, give an ON signal through the remote ON/OFF, then **the unit will start up.**

Check that the working pressure of the pump is higher than nominal pressure indicated at the characteristics plate. If it is below this value the pump is turning in the wrong direction. If this happens **switch OFF the main power switch, disconnect the chiller from the power supply** and exchange two phases in the main power supply. In units from UC-180 to UC-0240 with scroll compressors the compressor of the chiller is connected in phase with the water pump: Once the pump is turning in the right direction the compressor will turn correctly too. **If the compressor runs in the wrong direction it will make a loud noise while operating and the chiller will not cool down the water. Do not let the compressor run like this for long or it could get damaged.**

Increase the cold water setpoint up to the maximum allowed value (see point 5.2) to prevent the compressor from starting. Switch the main power switch OFF and then back ON. Open the left panel and adjust the water outlet valve so the pump works at the nominal pressure indicated in the chiller's data plate.

If the water tank temperature is above the programmed setpoint, the compressor will start 2 minutes after switching the main power switch ON. If this happens switch the main power switch OFF and perform the operation again within 2 minutes. If the compressor works with the lateral panel open the chiller will trip by high pressure alarm, see point 7.



After 5 minutes stop the unit open the left panel and check the level in the tank. If the level is below the maximum then refill the water tank again.

Repeat this operation until water level in the tank remains constant.

When refilling the tank respect the ethylene glycol concentration as per point 4.1.



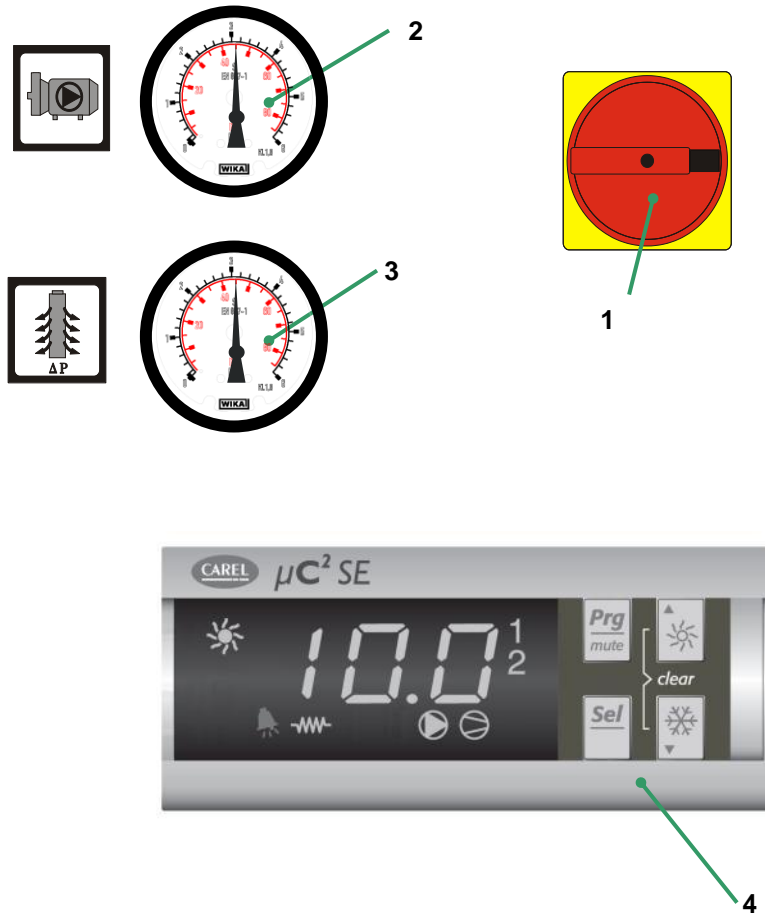
In the standard models UC-180 and UC-240, **it will be necessary to check the direction of rotation of the compressor.** To do so, wait until the compressor starts up. If the direction of rotation is wrong then the compressor produces a loud and disgusting noise. In this case exchange two phases in the main power supply.

On the control thermostat select the desired temperature of the cold water outlet (see point 5.2.1). The Ultracool units are delivered with a pre-set temperature of 10°C (50°F).



Check the working pressure of the water pump, if it is higher than the value indicated in the characteristics plate and all manual valves in the circuit are fully open, then check that the water pipes meet the requirements on point 3.5.

5 Control Panel

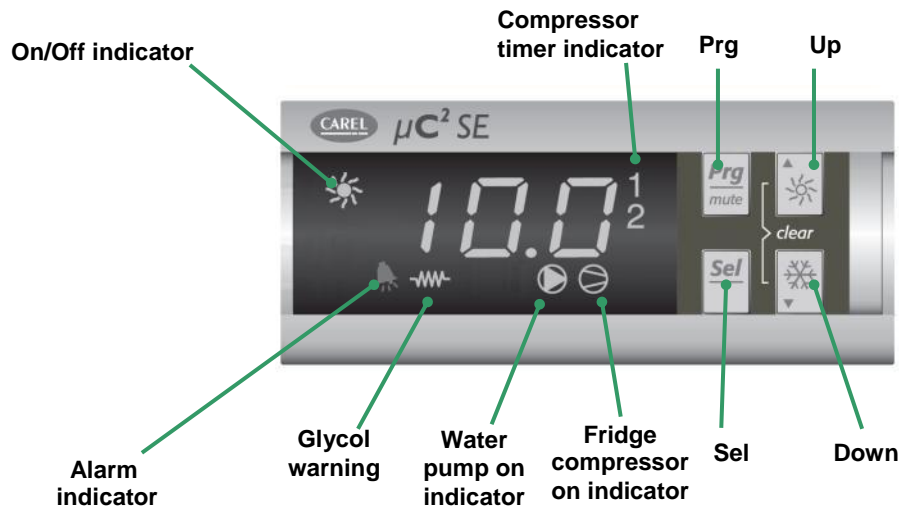


5.1 Components of the Control Panel

The control panel consists of the following elements:

- 1. Main power switch:** connects and disconnects the Ultracool unit from the power supply.
- 2. Water pressure gauge:** indicates the pressure supplied by the pump (superplus and standard with pump models) or the pressure at the inlet (standard models).
- 3. Water filter pressure gauge:** indicates the pressure drop of the water filter and the evaporators (superplus units), or the water outlet pressure (standard units).
- 4. Control thermostat:** indicates the cold water temperature at the outlet of the Ultracool unit and enables it to be regulated.

5.2 Control Thermostat



5.2.1 Operation

As long as the main power switch is on, the display of the control thermostat shows the water temperature measured in the water tank. In the 50Hz version the display shows the temperature in °C and in the 60Hz version it shows it in °F.

Remote On/Off: The chiller cannot be started without an On signal through Remote On/Off control from the application (circuit closed between terminals 23 and 24). See point 3.6.

On/Off memory: The control thermostat comes back to the last mode/status (“On” or “Stand by”) at which the control thermostat it was powered off the last time. This means that, if the chiller was initially in Standby mode, if you turn Off and On the Main Power Switch, the chiller will still continue in Standby instead of turning On automatically.

To start the chiller again you should give an On signal locally through the thermostat keypad, with the UP key as indicated above or remotely through remote On/Off terminals 23 and 24.

Local On/Off: As long as the remote On/Off is connected, the chiller can be also turned On and Off locally through the control thermostat keypad. In order to start/stop the chiller press the UP button during a few seconds. When the chiller turns On the On/Off indicator signal is lit in the thermostat display as depicted above.

Temperature probe reading: During normal thermostat operation, pressing Up for less than 5 seconds allows displaying the current values of the different probes of the chiller. In this mode, pressing UP and DOWN selects the probe and pressing SEL displays the value of the selected probe.

To exit this mode, press PRG button or do not press any button for at least 60 seconds.

Setting the temperature: to introduce the required working temperature (between -5°C (23°F) and 25°C (77°F) use the following procedure:

- Press **Sel** button for about 5 seconds, the display will show "- / -".
- Press **Down** button several times until the display shows "- r -".
- Press **Sel** button and the display will show "r01". This parameter is the setpoint.
- Press **Sel** button to display the current setpoint value.
- To increase or to decrease the value of the setpoint, use the **Up** and **Down** buttons.
- Press **Sel** button to confirm the new value. The display will show "r01".
- Press **Prg** button three times to exit the setpoint modification procedure. The display will show again the water tank temperature.

1. **On/Off indicator:** it indicates when the chiller is turned On.
2. **Alarm indicator:** this is lit when there is an alarm. Depending on the alarm it can cause fridge circuit or all the Ultracool unit to stop. The display will show the alarm code:
 - Alarm code FL: Low water level alarm or pump overload.
 - Alarm code A1: Antifreeze alarm.
 - Alarm code tC1: compressor overload alarm (only in UC-0180 and UC-0240)
 - Alarm code LP1: Low refrigerant pressure.
 - Alarm code HP1: High refrigerant pressure.
 - Alarm code Ht: High water temperature.
 - Alarm code E1, E2: Temperature sensor disconnected, short-circuited or faulty.
 - Alarm code EPr : EEPROM error during operation.
 - Alarm code EPb: EEPROM error at start-up.
 - Alarm code ELS: Low supply voltage.
 - Alarm code EHS: High supply voltage.
 - Alarm code EL1: Electromagnetic noise detected in the power supply.
 - Alarm code Hc1, Hc2, Hc3, Hc4: Maintenance warning.

3. **External alarm contact adjustment (see electrical diagram):**

The UC unit has two terminals that provide a dry contact for a general alarm of the chiller. In order to modify the behaviour of this contact it is necessary to modify the value of the following control thermostat parameter:

If P21=0 (default value): The contact closes when there is an active alarm

If P21=1: The contact opens when there is an active alarm.

The procedure to modify the P21 parameter is the following:

- Press for about 5 seconds the button **Sel** and the display will show "- / -".
- Press **DOWN** button until the display shows "- P -".
- Press **Sel** button and the display will show "P21".
- Press **Sel** button.
- To adjust the P21 value to 0 or 1, use the **UP** and **DOWN** buttons.
- Press **Sel** button to confirm the new value. The display will show "P21".
- Press **Prg** button three times to exit the modification procedure.

4. **Glycol warning:** this indicator is lit when the working conditions of the chiller require ethylene glycol as antifreeze agent in the water circuit to avoid freezing. Be sure that the water mixture has the suitable ethylene glycol concentration when this lit is on. Please check **point 4.1** from this manual to adjust the ethylene glycol concentration of the water mixture according to the ambient temperature and antifreeze set point.
5. **Pump On indicator:** this remains lit when the pump is working.
6. **Compressor On indicator:** this remains lit when the compressor is working.
7. **Compressor timer indicator:** when “1” blinks it means that the thermostat is delaying the compressor’s start. Once the compressor starts “1” is fixed.

6 Maintenance

6.1 Basic Maintenance

Weekly:

Verify that the water temperature indicated on the control thermostat is approximately at the set point.

Verify the water level in the tank.

Verify the state of the water filter, if the pressure drop exceeds 1 bar (10 psi) change the filter element.

Monthly:

With the Unit disconnected (Main power switch Off), clean the condenser removing dust/dirt with a soft brush and/or vacuum clean the surface from the outside.



Do not use any detergents.

Clean the housing, internally and externally, eliminating the dust present especially on the water pump rack.

Yearly:

Change the filter element and refill the circuit with water of the required quality (see annex 10), the suitable glycol concentration according to point 3.1 of this manual and all the Refrfluid B additive supplied with the chiller (2 liters per each 100 liters of water tank volume).

Preventive maintenance warning (Hc1, Hc2, Hc3 or Hc4)

The control thermostat has a preventive maintenance warning based on the working hours. When this warning appears, contact an authorised technical service to perform the preventive maintenance.

7 Troubleshooting

In the following chart the possible causes for an alarm are given together with their solution:

DEFAULT	CAUSE	SOLUTION	RESTART PROCEDURE
<p>HP1</p> <p>Alarm due to high pressure of the refrigerant: The pressure of the fridge circuit is higher than the maximum allowed (20 bar). It stops the compressor</p>	<p>Lateral panels of the housing open</p> <p>Low airflow into the condenser</p> <p>The ambient temperature is too high</p> <p>Water temperature too high</p> <p>Motor fan not working</p> <p>High pressure switch failure</p>	<p>Close the panels</p> <p>Check that there is enough free space in front of the condenser and clean the condenser if necessary</p> <p>Wait until the ambient temperature is lower</p> <p>Try to cool down the water in the circuit running the chiller with the application stopped. If the unit still stops, try doing this with the outlet valve completely closed (see point 4.2)</p> <p>The motor fan is not working if it is not turning when the chiller is running and tripping by HP1, then contact authorized technical service</p> <p>Contact authorized technical service</p>	<p>Disconnect the chiller and connect it again by turning Off/On the main power switch (element 1 on point 5.1)</p>
<p>LP1</p> <p>Alarm due to low pressure of the refrigerant: The pressure of the fridge circuit is below the minimum allowed (0.5 bar)</p>	<p>Ambient temperature too low</p> <p>Water freezing</p> <p>Gas leakage</p> <p>Low pressure switch failure</p>	<p>The minimum ambient temperature is -15°C</p> <p>Verify the ethylene glycol content. See point 4.1. If the problem persists contact an authorized technical service.</p> <p>Contact authorized technical service</p> <p>Contact an authorized technical service to replace it</p>	<p>The Low-pressure safety switch (SLP) automatically resets itself when the pressure is back to normal</p>

DEFAULT	CAUSE	SOLUTION	RESTART PROCEDURE
tC1 Compressor overload alarm	<p>Excess current</p> <p>Compressor running in the wrong direction</p>	<p>Check if the electrical connections are correct. Check supply voltage and power surges</p> <p>All the motors in the chiller are delivered turning in the same direction. Verify that the pump is turning in the right direction. See point 4.2</p>	<p>Disconnect the chiller (turn Off the main power switch, see element 1 on point 5). Open the electrical box and reset the circuit breaker . Turn the Main power switch On and start the unit through the remote On/Off control</p>
FL Water level alarm (Only SP units)	<p>Level switch did not switch to the "full" position</p> <p>Water leak in the internal circuit of the UC</p> <p>Water leak in the external water circuit</p> <p>Water leak in the water pump</p>	<p>Check that the level switch works properly and that the tank is full enough. After disconnecting the Main Power switch open the back panel, open the water tank, lift the level switch manually. If it works correctly you should hear its contact "click". Close the tank and the panel and try to start the unit again</p> <p>Contact authorized technical service</p> <p>Find the leak and get it repaired</p> <p>If there is a leak in the water pump seal contact authorized technical service to replace the whole water pump. Check that the water quality is inside the limits (see point 10)</p>	<p>The level switch automatically resets itself when there is enough water in the tank</p>
or Water pump overload (Only SP units)	<p>Circuit breaker Q2 is Off</p>	<p>Check if the electrical connections are correct. Check voltages, intensities and variations. Check water pressure. Check water quality. Check if the pump is blocked</p>	<p>Disconnect the chiller (turn off the main power switch, see element 1 on point 5). Open the electrical box of the chiller and reset the circuit breaker Turn the Main power switch On and start the unit through the remote On/Off control</p>

DEFAULT	CAUSE	SOLUTION	RESTART PROCEDURE
or Differential pressure switch trip / flow switch trip (Only ST units and units with Flow Switch option)	Water filter blocked Water circuit blocked Possible freezing	Replace the water filter element and check the water quality Clean the water circuit Check the proportion of ethylene glycol	Switch the chiller Off and back On to reset the alarm
A1 Antifreeze control operates continuously (see point 5)	Water circuit blocked Possible freezing due to low ambient temperature Water tank temperature sensor fault	Clean the water circuits, if necessary replace the water filter element. Check for closed valves in the circuit The ethylene glycol concentration must be according to point 4.1 and the antifreeze setpoint also has to be adjusted according to it. Contact authorized technical service Measure the water temperature inside the tank and check that it is approximately the same as shown on the control thermostat's display. If it isn't contact authorized technical service	The control will go back to normal operation when the problem is solved
Ht High water temperature	The water tank temperature is above 35°C for some minutes	Check the cold water set point is within the limits indicated on point 4.1. Disconnect the application from the chiller for a while and run the chiller without load. If the problem persists contact authorized technical service	The chiller is still working normally

DEFAULT	CAUSE	SOLUTION	RESTART PROCEDURE
<p>The control thermostat displays the following codes:</p> <p>E1, E2</p> <p>EPr, EPb</p> <p>ELS, EHS</p> <p>EL1</p>	<p>A temperature sensor (NTC sensor) is faulty, disconnected or short-circuited</p> <p>There is an internal memory error</p> <p>The power supply voltage is out of limits</p> <p>There are electromagnetic disturbances in the power supply</p>	<p>Contact authorized technical service</p> <p>Contact authorized technical service</p> <p>Check that the power supply is within the specifications on point 3.6</p> <p>Check the quality of the power being supplied to the chiller. Eliminate the source of the disturbances or connect the chiller to a different power supply</p>	<p>The chiller can be restarted when the faulty part is replaced</p> <p>The chiller will go back to normal operation when the problem is solved</p> <p>The chiller is still working normally. The message disappears when the disturbances stop</p>
<p>Hc1, Hc2, Hc3, Hc4</p> <p>Maintenance warning</p>	<p>The chiller has exceeded the working hours defined between preventive maintenances.</p>	<p>Contact authorised technical service for a preventive maintenance of the unit.</p>	<p>The chiller is still working normally. The authorised technical service will reset the warning during the preventive maintenance.</p>

8 Technical Features

8.1 Technical Features 50Hz

UC CE			60	80	100	140	180	240	
Cooling capacity	kcal/h		6117	8086	9795	12061	18920	22655	
	kW		7,11	9,40	11,39	14,02	22,00	26,34	
Water flow	l/h		1204	1598	2016	2628	3753	5043	
Water pressure	3 bar		4,0	4,0	3,9	3,7	3,2	2,7	
	5 bar		5,3	5,3	5,1	4,8	5,2	4,9	
Refrigerant circuits	Nº		1	1	1	1	1	1	
Compressor	kW		2,02	2,26	2,81	3,78	4,78	6,25	
	Nº		1	1	1	1	1	1	
Condenser	kW		9,13	11,66	14,20	17,80	26,78	32,59	
	Nº		1	1	1	1	2	2	
Evaporator	kW		7,11	9,40	11,39	14,02	22,00	26,34	
	Nº		1	1	1	1	1	1	
Motor fan	Nº		1	1	1	1	1	1	
	kW		1,04	1,04	1,04	1,04	1,04	1,04	
	m3/h		7000	7000	7000	7000	9000	9000	
3 bar pump		kW	0,75	0,75	0,75	0,75	0,75	0,75	
	max	l/h	8000	8000	8000	8000	8000	8000	
	min		800	800	800	800	800	800	
	max	bar	4,2	4,2	4,2	4,2	4,2	4,2	
	min		1	1	1	1	1	1	
5 bar pump		kW	1,10	1,10	1,10	1,10	2,20	2,20	
	max	l/h	8000	8000	8000	8000	12000	12000	
	min		800	800	800	800	1200	1200	
	max	bar	5,6	5,6	5,6	5,6	5,8	5,8	
	min		1,8	1,8	1,8	1,8	3	3	
Volume water tank	l		100	100	100	100	100	100	
Sound Pressure Level (1)	dB(A)		56,3	60,1	58,5	58,1	56,0	57,5	
Power	ST	kW	3,06	3,30	3,85	4,82	5,82	7,29	
	SP 3bar	kW	3,81	4,05	4,60	5,57	6,57	8,04	
	SP 5bar	kW	4,16	4,40	4,95	5,92	8,02	9,49	
Max. Fuse	A		20	25	25	25	32	32	
Voltage	V/Ph/Hz		400V/3Ph/50Hz						
Nominal COP			2,32	2,85	2,96	2,91	3,78	3,61	

(1) Sound Pressure Level at 5 meters from the chiller in free-field conditions

All data related to nominal conditions: Water outlet temperature 10°C and ambient temperature 25°C.

8.2 Technical Features 60Hz

UC USA		60	80	100	140	180	240	
Cooling capacity	ton	2,64	3,14	3,96	4,74	7,35	8,63	
	kW	9,28	11,04	13,94	16,68	25,87	30,38	
Water flow	US gal/min	5,30	7,04	8,88	11,57	16,52	22,20	
Water pressure	40 psi	57	55	55	54	51	45	
	70 psi	78	78	77	75	73	67	
Refrigerant circuits	Nº	1	1	1	1	1	1	
Compressor	kW	2,87	2,86	3,67	4,91	6,19	8,46	
	Nº	1	1	1	1	1	1	
Condenser	ton	3,45	3,95	5,00	6,13	9,11	11,03	
	Nº	1	1	1	1	2	2	
Evaporator	ton	2,64	3,14	3,96	4,74	7,35	8,63	
	Nº	1	1	1	1	1	1	
Motor fan	Nº	1	1	1	1	1	1	
	kW	1,04	1,04	1,04	1,04	1,04	1,04	
	scfm	4120	4120	4120	4120	5297	5297	
40 psi pump	kW	1,04	1,04	1,04	1,04	1,04	1,04	
	max	US gal/min	33,0	33,0	33,0	33,0	33,0	33,0
			min	3,3	3,3	3,3	3,3	3,3
	max	psi	59	59	59	59	59	59
			min	30	30	30	30	30
70 psi pump	kW	1,70	1,70	1,70	1,70	1,70	1,70	
	max	US gal/min	33,0	33,0	33,0	33,0	33,0	33,0
			min	3,3	3,3	3,3	3,3	3,3
	max	psi	81	81	81	81	81	81
			min	49	49	49	49	49
Volume water tank	US gal	26,4	26,4	26,4	26,4	26,4	26,4	
Sound Pressure Level (1)	dB(A)	56,5	60,8	60,8	60,8	58,0	59,1	
Power	ST	kW	3,91	3,90	4,71	5,95	7,23	9,50
	SP 40psi	kW	4,95	4,94	5,75	6,99	8,27	10,54
	SP 70psi	kW	5,61	5,60	6,41	7,65	8,93	11,20
Max. Fuse	A	20	25	25	25	32	32	
Voltage	V/Ph/Hz	460V/3Ph/60Hz						
Nominal COP		2,37	2,83	2,96	2,80	3,58	3,20	

(1) Sound Pressure Level at 5 meters from the chiller in free-field conditions

All data related to the following conditions: Water outlet temperature 10°C (50°F) and ambient temperature 25°C (77°F).

10 Annexes

10.1 Water quality

In order to protect the water circuit of the Ultracool units, the water to be cooled must have specific physical/chemical properties so that it is not aggressive. If this water is outside any of the limits listed in the table below, it can seriously damage some of the materials of the Ultracool unit.

Parameter	Limit values
pH	7 – 8
Total Hardness (TH)	< 150 ppm
Conductivity	50 – 500 μ S/cm
NH ₃	< 2 ppm
Total iron ions (Fe ²⁺ and Fe ³⁺)	< 0.2 ppm
Chloride (Cl ⁻)	< 300 ppm
H ₂ S	< 0.05 ppm
Solid particles	< 150 μ m
Ethylene glycol	Min 15% - Max 30%

The Total Hardness is specified in ppm (mg/L) of Ca₂CO₃.

Please note that ultra pure waters like deionised water can also be harmful for some of the materials of the Ultracool units as they have a conductivity below 50 μ S/cm.



A concentration of ethylene glycol higher than the 30% can seriously damage the pump of the Ultracool units.



LAUDA Ultracool S.L. will not accept any warranty for any damage caused by water that is out of one or more of the above limits.



Do not use automotive antifreeze. Use lab grade ethylene glycol only! Do not use an ethylene glycol concentration above 30%; this would damage the water pump.

10.2 MSDS Refrfluid B**TECHNICAL SHEET**

CHARACTERISTICS

Concentrated fluid specially designed for the treatment and conservation of the inside of tanks and piping in cooling equipment or water recirculating chillers (closed circuit). Its composition has been designed to accomplish two different objectives using a single fluid, resistant to temperature changes:

- It contains an anticorrosive, that protects against all types of corrosion to the metal components of the system, such as iron, aluminum, copper and welds of different alloys.
- It includes protectors for refrigeration systems and industrial processes.

INSTRUCTIONS FOR USE

REFRI-FLUID-B has to be used diluted into a proportion of 2 litres of REFRI-FLUID-B in 100 litres of demineralised water.

If the machine has to work at temperatures below 0 °C it is necessary to use ethylene glycol as antifreeze agent.

With a 20% of ethylene glycol it has a large antifreeze capacity, preventing freezing at temperatures as low as -7°C. To achieve this, dilute 2 litres of REFRI-FLUID-B into a proportion of 80 litres of demineralised water and 20 litres of ethylene glycol.

It is recommended to change the cooling water at least once per year.
For other temperatures or more information see the Operation Manual.

SAFETY DATA SHEET

In accordance with Regulation (EC) No. 1907/2006 (REACH)

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY /UNDERTAKING

Product identifier: REFRI-FLUID B

Relevant identified uses: Concentrated protector and anticorrosive for closed circuits.

Details of the supplier of the safety data sheet: SENIGRUP, S.L.

C-55 Km.25 Polígono Industrial Raval dels Torrents Nave-A

08297 Castellgalí (Barcelona).

Tel. +34 93 833 28 88 – Fax.+34 93 833 28 89

Emergency telephone number: +34 93 833 28 88

e-mail: senigrup@senigrup.com

2. HAZARDS IDENTIFICATION

Classification: The product has been classified and labeled according to current EC Regulations for classification of dangerous substances and preparations.

- Labelling according to Directives 67/548/EEC and 1999/45/EC



Harmful (Xn)

Risk Phrases:

R63 Possible risk of harm to the unborn child.

Safety phrases:

S2 Keep out of the reach of children.

S36/37 Wear suitable protective clothing and gloves.

S46 If swallowed, seek medical advice immediately and show this container or label.

Other hazards / phrases:

Do not swallow.

Contains: sodium 2-ethylhexanoate

- Labelling according Regulation (EC) No 1272/2008 [CLP]

Pictogram



Signal Word: **Warning**

Hazard Statements

H361d - Suspected of damaging the unborn child

Precautionary Statements

P102 Keep out of the reach of children.

P281 - Use personal protective equipment as required

Contains: sodium 2-ethylhexanoate

3. COMPOSITION / INFORMATION ON INGREDIENTS

Substance or mixture: Mixture

Chemical name	CAS number	EC number	REACH number	%	Classification	Regulation (EC) No 1272/2008
sodium 2-ethylhexanoate	19766-89-3	243-283-8	**	5-15	Xn/Repro. Cat. 3; R63	Repr. 2; H361d

** Not available or substance currently exempt from REACH registration.

For full text of R phrases, H and EUH mentioned in this Section, see Section 16. Occupational exposure limits, if available, are listed in section 8.

4. FIRST AID MEASURES

In case of accident phone to the Spanish Toxicological Information Service. Tf.+34 915620420

In case of eye contact: Rinse with plenty of water during 15 minutes keeping the eyes open and consult a doctor.

In case of skin contact: Wash off immediately with plenty of water and soap.

If swallowed: Rinse mouth, drink water, does not provoke the throwing out. Call a physician immediately.

If inhaled: Remove to fresh air. Give oxygen. Consult a physician. Move the person to fresh air and keep at rest in a comfortable position for breathing. If symptoms persist, seek medical advice and show the label or the container.

5. FIREFIGHTING MEASURES

Suitable extinguishing media: Pulverized water, alcohol-resistant foam, dry chemical or carbon dioxide.

Unsuitable extinguishing media: High volume water jet.

Special protection equipments: In case of fire, wear appropriate protective equipment and self contained breathing apparatus with a full face protection operating in positive pressure mode.

6. ACCIDENTAL RELEASE MEASURES

Human beings protection: Restrict the area. In case of contact with the product take out the contaminated clothes and clean with plenty of water the area.

Environment protection: Do not canalize the product to public water conductions.

Clearing and collection: Collect the product with absorbent material. Clean the remaining with plenty of water.

7. HANDLING AND STORAGE

Handling: Handle in accordance with good industrial hygiene precautions and observe safety practices. Do not eat, drink or smoke in areas where this material is handled or stored.

Storage: Store according to local legislation. Store the containers in a dry, well-ventilated area away from heat and direct sunlight. Keep container tightly closed and sealed until ready for use. Store in original container. Do not store in unlabeled containers. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Do not store this material near food or drinking water.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limits:

Chemical name	Exposure limit values	
	VLA-ED (daily exposure)	VLA-EC (short-term exposure)
sodium 2-ethylhexanoate	Not established	Not established

Special person's protection equipment: Proper clothes for chemical products handling.

Breathing protection: not required.

Hands protection: rubber gloves.

Eyes protection: safety glasses.

Skin protection: body and shoes protectors.

General protection measures: Do not eat, drink nor smoke during the use of this product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: liquid.

Color: red-pink

Smell: sweet.

Fusion point: Under 0°C.

Boiling point: Over 100°C.

Ignition temperature: -

Density (at 20°C): 1.01-1.02 g/cm³.

Solubility in water: may be mixed with water at all proportions.

Solubility in water (20 ° C): miscible in water.

Solubility in other solvents: alcohols and organic solvents.

PH value at 20 ° C: 9.5-10.0

Viscosity: 5-20 centipoise in Brookfield

10. STABILITY AND REACTIVITY

Conditions to avoid: Avoid the contact with rusted products.

Dangerous reactions: any special

Materials to avoid: oxidizing agents

Products of dangerous decomposition: It does not decomposed.

11. TOXICOLOGICAL INFORMATION

Information on toxicological effects: There are no experimental data available

Inhalation: No known significant effects or critical risks.

Contact with skin: In cases of severe exposure, may produce irritation.

Toxicity for reproduction: Possible risk of harm to the unborn child. Pregnant women should not be exposed to this product.

12. ECOLOGICAL INFORMATION

Behavior in the environment: Biodegradable product.

Toxic effects: Slightly hazardous.

13. DISPOSAL CONSIDERATIONS

Product: The product has to be eliminated considering European standards, national, regional and local. In waste management companies authorized.

Containers / packaging: Eliminate as the product.

The user must take into account the existence of possible regulations European, national, regional and local respect.

14. TRANSPORT INFORMATION

This product is not classified for transport

15. REGULATORY INFORMATION

15.1 Regulatory and safety, health and environment legislation for the substance or mixture.

No data available.

15.2 Chemical safety assessment

Not done a chemical safety assessment for the mixture

16. OTHER INFORMATION

Text of R phrases mentioned in Section 3:

R63 Possible risk of harm to the unborn child.

Text of H and EUH phrases mentioned in Section 3:

H361d - Suspected of damaging the unborn child

The information contained in this safety data sheet is until this date, considered true and correct. However, the data supplied and the recommendations do not imply a warranty. Because the conditions of use are beyond the control of our company, it is responsibility of the user to ensure the correct the conditions for a safe use of the product. The information contained in this safety data sheet does not represent the technical specifications. For these owes please read our data sheet technical.



EC Declaration of conformity

GB

97/23/EC (Defined by pressure equipment directive)

2006/42/EC (Known as the 'Machinery Directive')

LAUDA Ultracool S.L.

Based in Terrassa-Barcelona-Spain, Colom II Street, nº 606, Postal Code 08228

Declares that under our sole responsibility for supply/manufacture of the product:

Model

UC-0060/0080/0100/0140/0180/0240

To which this declaration relates, is in conformity with the Directive 97/23/EC issued by the EUROPEAN COMMUNITY



EC Konformitäts Erklärung

D

97/23/EC (Defeniert in der Druckgeräteverordnung)

2006/42/EC (Bekannt als 'Maschinen Weisung')

LAUDA Ultracool S.L.

Mit Sitz in Terrassa-Barcelona-Spain, Colom II Strasse, nr. 606, Postfach 08228

Erklärt, daß unserer alleinigen Verantwortung unterliegt, das Lieferung/Herstellung des Produktes:

Modell

UC-0060/0080/0100/0140/0180/0240

Auf welches diese Erklärung Bezug nimmt, den erlassenen Weisungen 97/23/EC der EUROPÄISCHEN GEMEINSCHAFT



Declaration de conformité CE

F

97/23/EC (Défini par la directive des équipements sous pression)

2006/42/EC (connue comme 'Directive Machine')

LAUDA Ultracool S.L.

Domicilié à Terrassa-Barcelona-Espagne, rue Colom II, no. 606

Déclare sous sa seule responsabilité de fournisseur/fabriqueur du produit:

Modél

UC-0060/0080/0100/0140/0180/0240

Objet de cette déclaration, est en conformité avec la Directive 97/23/EC issue de la COMMUNAUTE EUROPEENNE



Declaración de conformidad CE

E

97/23/EC (Definida por la directiva de equipos a presión)

2006/42/EC (Conocida como 'Directiva de maquinaria')

LAUDA Ultracool S.L.

Con sede en Terrassa-Barcelona-España, calle Colom II nº 606, C.P. 08228

Declara que, bajo nuestra responsabilidad como proveedores/fabricantes, el producto:

Model

UC-0060/0080/0100/0140/0180/0240

Es conforme a la Directiva 97/23/EC establecida por la COMUNIDAD EUROPEA.



EC Konformitäts Erklärung

NL

97/23/EC (Ontworpen volgens de Pressure Equipment Directive - richtlijnen)

2006/42/EC (Bekend als 'machine richtlijn')

LAUDA Ultracool S.L.

Gezeteld in Terrassa-Barcelona-Spanje, Colom II Straat, nr. 606, Postcode 08228

Verklaart dat onder volledig eigen verantwoordelijkheid voor de levering/fabricage van onderstaand product

Modell

UC-0060/0080/0100/0140/0180/0240

Waartoe deze verklaring behoort, conform is aan de richtlijn 97/23/EC, uitgegeven door de EUROPESE GEMEENSCHAP



Declaration de conformité CE

I

97/23/EC (Definita dalla direttiva dei recipienti a pressione)

2006/42/EC (conforme alla 'Direttiva Macchine')

LAUDA Ultracool S.L.

Colom II Street, nº 606, Terrassa-Barcelona Codice Postale 08228

Dichiara la responsabilità per la produzione prodotto:

Modell

UC-0060/0080/0100/0140/0180/0240

Il contenuto della presente relazione è in conformità con la Direttiva 97/23/EC della COMUNITÀ EUROPEA



Declaración de conformidad CE

CZ

97/23/EC (Definováná směrnicí pro tlaková zařízení)

2006/42/EC (Machinery Directives)

LAUDA Ultracool S.L.

Se sídlem Terrassa-Barcelona-Spain, Colom II Street, nº 606, Postal Code 08228

Z titulu své odpovědnosti výrobce a dodavatele prohlašuje ze toto prohlášení o shode se vztahuje k zařízení:

Model

UC-0060/0080/0100/0140/0180/0240

A je plně v souladu se směrnicí Evropského společenství č. 97/23/EC



EC Konformitäts Erklärung

DK

97/23/EC (Defineret af direktivet for trykluftudstyr)

2006/42/EC (Kendt som 'Maskindirektivet')

LAUDA Ultracool S.L.

Bosiddende i Terrassa-Barcelona-Spain, Colom II Street, nº 606, Postal code 08228

Erklærer under eneansvar for levering/fremstilling af produktet:

Modell

UC-0060/0080/0100/0140/0180/0240

Hvortil denne erklæring relaterer, at produktet er i overensstemmelse med Direktivet 97/23/EC udstedt af det EUROPÆISKE FÆLLESSKAB



Declaration de conformité CE

RO

97/23/EC (Conform reglementarilor de utilizare a echipamentelor sub presiune)

2006/42/EC (Cunoscuta ca 'Directiva Constructiilor de Masini')

LAUDA Ultracool S.L.

Domicilié à Terrassa-Barcelona-Espagne, rue Colom II, no. 606

Declara pe proprie raspundere ca furnizarea/ fabricarea produsului:

Modell

UC-0060/0080/0100/0140/0180/0240

La care se refera aceasta declaratie este in conformitate cu Directiva 97/23/EC emisa de COMUNITATEA EUROPEANA

LAUDA
ultracoolXavi Prats
Technical Director