



# Operation manual

## Ultracool chillers

UC-0300, UC-0400, UC-0500, UC-0650, UC-0800, UC-1000, UC-1350, UC-1700, UC-2400

DMI-0165-00  
21/07/2021

Read this manual prior to performing any task!

## 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.

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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 the 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 INSTALLATION

### 2.1 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 our LAUDA Ultracool S.L. service department). This would void the warranty of the unit.

### 2.2 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.**

UC-0300/0800 – These units must be transported by pallet jack or fork-lift truck.

UC-1000/2400 – These units must be transported by crane.

### 2.3 SITE

The Ultracool unit must be installed in an atmosphere where the range of temperatures is within the indicated margins mentioned in point 3.1.

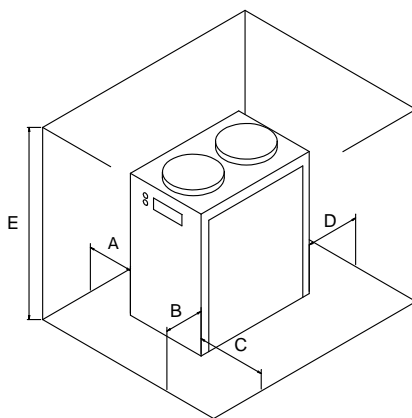
The chiller must be installed on a solid level surface that is capable of supporting a minimum of 1000 kg (2200 lb) for UC-0300 to UC-0650 units, a minimum of 1500 kg (3300 lb) for UC-0800 units and a minimum of 2500 kg (5500 lb) for UC-1000 to UC-2400 units.

We recommend the installation of the Ultracool unit in a well-ventilated site and in a non-corrosive, dust-free atmosphere. The air renewal of the room should be at least  $\frac{3}{4}$  of chiller's motor fan flow (see point 7).

The electrical protection degree of the Ultracool unit is IP54. In the case of outdoor 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 little direct sunlight as possible.

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 2 m (79") from the chiller's roof).

See in the picture the minimum distances that must be left around the Ultracool unit.



	A	B	C	D	E
Minimum distance in m (in)	2 (79")	2 (79")	2 (79")	2 (79")	4 (158")

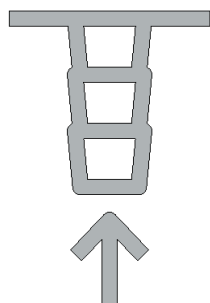
In case of installation in a small room, it is imperative that the room has an appropriate ventilation system to evacuate all the heat generated by the chiller as explained before on this same point. If the heat is not removed the temperature in the room will quickly increase beyond the operating limits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



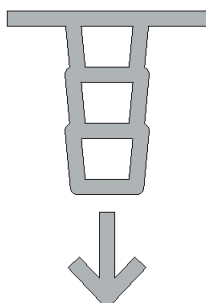
The Ultracool units must always operate with the panels closed to enable the inlet of fresh air only through the condenser.

## 2.4 IDENTIFICATION LABELS ON THE ULTRACOOOL UNIT

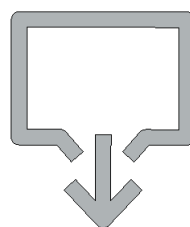
You can find the following labels on the Ultracool unit:



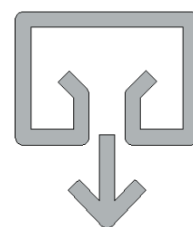
Water inlet from the installation to the Ultracool unit (UC-0300/0650 inside the housing)



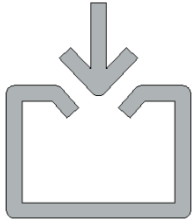
Water outlet from the Ultracool unit to the installation (UC-0300/0650 inside the housing)



Drain (UC-0300/0650 inside the housing)



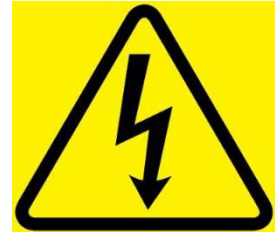
Connection for the tank overflow (UC-0300/0650 inside the housing)



Connection to fill the tank  
(only UC-0800/2400)



Danger of cuts! Completely disconnect the chiller power supply before opening this cover



Power supply depending on version

## 2.5 WATER CONNECTION

The water connection of the Ultracool unit must be carried out according to the indications of the labels (stickers) onto the unit.

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

The chiller should be located as close as possible to the application. Pressure drop in the pipe should not exceed 0.7 bar.



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



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



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 10 m (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 point 2.6).

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

Where flexible tubing is used, it should be of reinforced construction and rating for a minimum working pressure of 10 bar g (145 psig) within -5°C and 30°C (23°F and 86°F).

**Superplus models (only UC-0800/2400):** It is mandatory to install a manual valve at the chiller's water inlet and one at the chiller's water outlet.

**Standard models:** The user pump must provide the chiller with the flow indicated in point 7. Take into account that the maximum pressure at the chiller's inlet cannot exceed 10 bar (145 psi).

**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.

## 2.5.1 ULTRACOOL 0300/0650 WATER CONNECTION

The water lines must be pipes of at least 1 1/2".

1. Enclosed with the chiller are supplied the necessary fittings to make the inlet and outlet process water connections. For each connection there are:

- Gasket D.43/58 X 3
- 2"1/2" Quick threaded connection
- 1/2" F-F Fitting
- 1/2" x 40 Hose carrier



2. Assemble the fittings according to picture 2 and insert them into the inlet and outlet hoses for the process water.



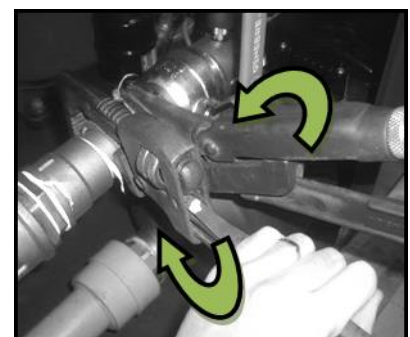
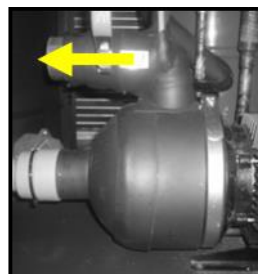
3. Introduce the inlet and outlet water hoses with the corresponding fittings already assembled inside the chiller housing through the connections ports at the back panel: Process water circuit and drain & overflow tap.



4. Connect the inlet water hose coming from the application to the 2" nipple located at the inlet of the water filter.



5. Connect the outlet water hose going to the application to the 2" nipple located at the pump outlet (superplus models) or evaporator outlet (standard models). See the identification labels.



Connect the fittings of the inlet/outlet using a wrench and counter wrench in order to avoid forcing the water components of the chiller.



6. Connect a hose to the drain and overflow connection located at the bottom of the water tank. Use a flexible hose with 10mm internal diameter.



## 2.5.2 ULTRACOOOL 0800/2400 WATER CONNECTION

The diameters of the inlet and outlet lines must be the same size or larger than those corresponding to the water inlet and outlet of the Ultracool unit.

## 2.6 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.

The electrical design of the Ultracool unit complies with EN-60204 norms.

For the electric supply to 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:** The Ultracool unit can be turned On and Off automatically by an external signal. This remote On/Off signal can be transmitted to these terminals by a dry contact in the application or by a remote switch (open contact = chiller Off, closed contact = chiller On).  
**Note:** During the initial commissioning, the Ultracool unit must stay turned Off but connected to the power supply (Main power switch On) for at least 6 hours (see point 3.2). During this time the Ultracool unit must not receive any On signal; do not connect the wire bridge supplied between terminals 23 and 24 yet. If the remote On/Off function is being used do not send any On signal to the chiller yet.
- **Terminals 25 and 26, external solenoid valve connection (only for superplus models):** 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 2.5). These terminals only receive power supply when the water pump is working.
- **Terminals 56 and 57, unit On/Off indicator:** These terminals provide a dry contact to indicate when the unit is turned on or turned off. This contact is open as long as the Ultracool unit is turned off.
- **Terminals 57 and 61, external alarm report signal:** These terminals provide a dry contact for a general alarm of the chiller. The factory setting of this contact is Normally Open (it closes when there is an active alarm). To change it to Normally Closed it is necessary to contact an authorized service engineer.



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.

### 3 START-UP

#### 3.1 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: 35°C (95°F)

Cold water temperature at the outlet:

Minimum: 13°C (55°F)  
Maximum: 25°C (77°F)

Temperature of the ambient air:

Nominal: 25°C (77°F)  
Minimum: 0°C (32°F) / -15°C (5°F) with speed regulator option (1)  
Maximum: 45°C (113°F)

(1) In order to work at temperatures lower than 0°C (32°F) it is necessary to add ethylene glycol to the water and contact an authorized technical service to adjust the chiller. The units can work below 0°C (32°F) by using the speed regulator option. The minimum ambient temperature with this option is -15°C (5°F).



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 (2) 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	13°C or more	0% 0°C	15% -5°C	30% -15°C

Glycol concentration (2) 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	55°F or more	0% 32°F	15% 23°F	30% 5°F

(2) 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.

## 3.2 CHILLER START-UP



Clean the application water circuit with tap water in order to be sure that there are no free particles inside. 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 the lateral and back panels, open the tank cover and fill the tank with water of the required quality (see annex 9), the suitable glycol concentration according to point 3.1 of this manual. Using the Refrfluid B consumable is strongly recommended to maintain the water quality. Fill the mixture directly to the tank or using the filling port (only UC-0800 to 2400) until the maximum level of the tank is reached.

In superplus models, check that the level switch has switched to the “full” position (you will feel it “click” if you lift by the hand).

Prime the pump in order to release any air inside,

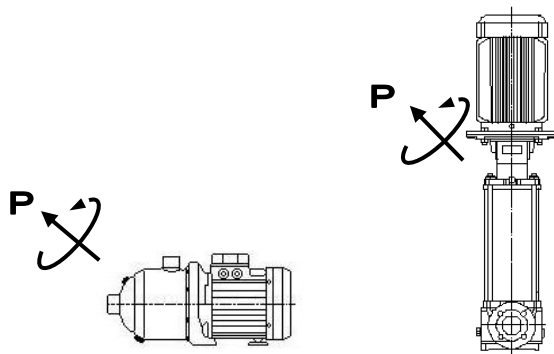
**in superplus models:**

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.

**in 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 unit 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 for UC-0300 to 0650. On UC-0800 to 2400 do the same with the water inlet and outlet valves installed.



Make sure that the external fuses are installed. See point 2.6.

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 4) 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 the lateral and back panels and **switch OFF the main power switch during any electrical intervention.**

Connect the Remote ON/OFF control in terminals 23 and 24 (see point 2.6). If you do not use a remote control, connect the wire-bridge supplied inside the electrical box to link terminals 23 and 24.

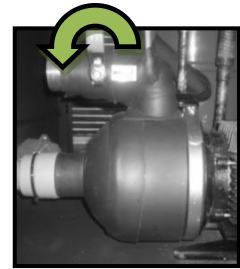
Switch ON the general switch and, if necessary, give an ON signal through the remote ON/OFF, then **the unit will start up.**

**In superplus models:** 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. It will not be necessary to check the turn direction of the fans, because they are delivered in phase with the pumps. Since it may be difficult to see the pump's rotation direction, verify that you did this operation correctly when the motor fans start working: The air should enter the condenser and go out through the top of the Ultracool unit. If the air is moving in the opposite direction then exchange two phases in the main power supply.

#### **Pump pressure adjustment UC-0300 to 0650:**

Increase the cold water set point up to the maximum allowed value (see point 4) to prevent the compressor from starting. Switch the main power switch OFF and then back ON. Open the lateral and back panel and adjust the water outlet valves 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 1 minute after switching the main power switch ON. If this happens switch the main power switch OFF and perform the operation again within 1 minute. If the compressor works with the lateral and/or back panel open the chiller will trip by high pressure alarm, see point 6.



#### **Pump pressure adjustment UC-0800 to 2400:**

Adjust the outlet valve so the pump works at the nominal pressure indicated in the chiller's data plate.

After 5 minutes stop the unit, open the left and back panels (only UC-0300/0650) 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 3.1.**

In the standard models, **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. Moreover, as the compressor is not compressing the refrigerant, the high pressure gauge (see element 5 point 4.1) will not increase its pressure and the low pressure gauge (see element 6 point 4.1) will not decrease its pressure. In this case exchange two phases in the main power supply.

Once the two phases are changed, check the turn direction of the fans, because they are delivered in phase with the compressor. Verify that you did this operation correctly when the motor fans start working: The air should enter the condenser and go out through the top of the Ultracool unit. If the air is moving in the opposite direction then exchange two phases in the main power supply.

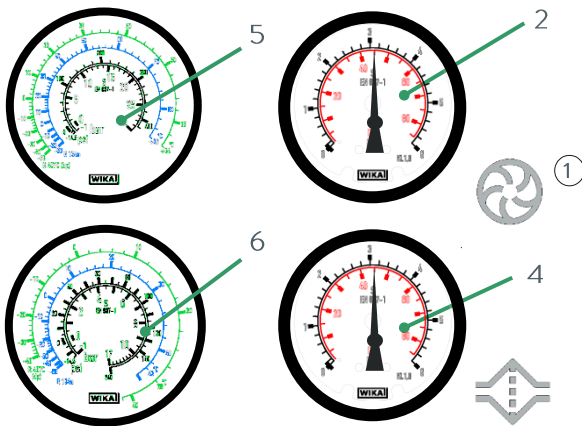
On the control thermostat select the desired temperature of the cold water outlet (see point 4.2.1). The Ultracool units are delivered with a pre-set temperature of 13°C (55°F).



If the pump pressure is higher than the Pnom. value indicated in the characteristics plate and the outlet manual valve is already fully open, check that all manual valves in the circuit are fully open. If the pressure is still above Pnom. then check that the water pipes meet the requirements on point 2.5.

## 4 CONTROL PANEL

### Pressure gauges



### Control Panel

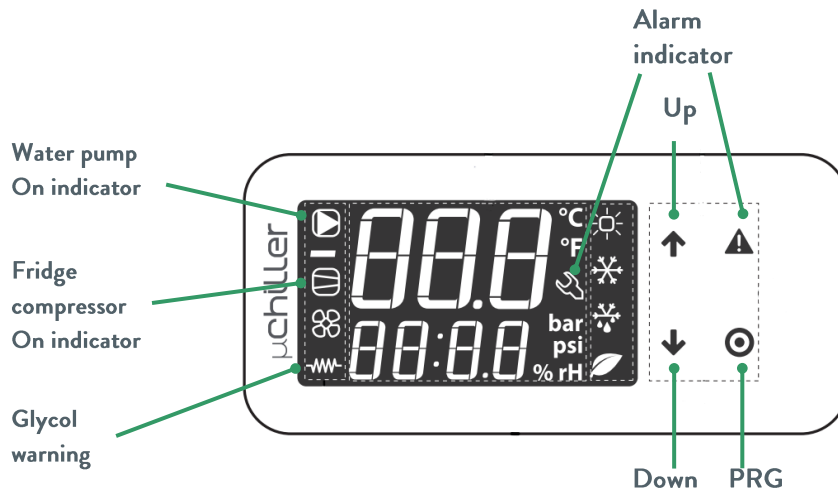


### 4.1 COMPONENTS OF THE CONTROL PANEL

The control panel includes 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).
4. **Water filter pressure gauge:** indicates the pressure drop of the water filter and the evaporator (superplus models), or the water outlet pressure (standard models).
5. **High pressure gauge:** indicates the pressure at the high-pressure side of the refrigerating circuit (after the compressor). Models from UC-0800 to UC-2400, that have two refrigerating circuits, have also two pressure gauges.
6. **Low pressure gauge:** indicates the pressure at the low-pressure side of the refrigerating circuit (before the compressor). Models from UC-0800 to UC-2400, that have two refrigerating circuits, have also two pressure gauges.
7. **Control thermostat:** indicates the cold water temperature at the outlet of the Ultracool unit and enables it to be regulated.

## 4.2 CONTROL THERMOSTAT



### 4.2.1 OPERATION

As long as the main power switch is on, the display of the control thermostat shows the outlet water temperature on the top row. The bottom row shows “- - -” when the unit is running and “OFF” when it is in Standby.



**Remote On/Off:** Please note that the chiller cannot be started without an On signal at terminals 23 and 24, either through a closed dry contact from the application or by a wire bridge connected between these two terminals. See point 2.6.

**On/Off memory:** When the main power switch is turned On, the control thermostat comes back to the last mode/status (“On” or “Standby”) at which it was when it was last powered off. For example, if there is a power loss while the chiller is running, once the power comes back the chiller will start running again automatically. If the unit was in Standby, it will still remain in Standby once the power comes back.

**Unit control and basic configuration:** From the standard display, pressing DOWN for 3 s gives access to the basic controls of the unit:

- Viewing and adjusting the Setpoint
- Turning the chiller On and Off
- Selecting the Unit of Measure



Please note that if the DOWN button is pressed during less than 3 s, the controller will show the **Unit information screens** (see below in this same point) instead of the basic configuration loop. If this happens, go UP until the ESC screen and press PRG to go back to the standard display to try again.



## Procedure

Press:

- DOWN for 3 s to access the basic control screens
- UP and DOWN to cycle through the screens and set the parameters
- PRG to change the parameter value and save the changes
- PRG (3 s) or PRG while on the “ESC” screen to return to the standard display



1. Go to the standard display



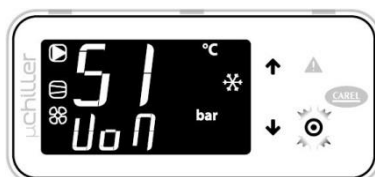
2. Press DOWN for 3 s: the current setpoint (SEtA) is shown (read only)



3. Press DOWN: the cooling setpoint (SEtC) is shown  
Press PRG: the value flashes; press UP/DOWN to change the value; PRG to confirm



4. Press DOWN: the unit On/Off screen (UnSt) is shown  
Press PRG: the value flashes; press UP/DOWN to change to ON or OFF; PRG to confirm



5. Press DOWN: the unit of measure screen (UoM) is shown  
Press PRG: the value flashes; press UP/DOWN to change to SI or IMP; PRG to confirm



6. Press DOWN: the ESC screen is shown  
Press PRG to exit to the standard display

**Unit information screens:** From the standard display, pressing DOWN briefly gives access to some basic information screens of the unit:

- If the unit is in Standby, the first information screen shows why the unit is turned OFF: “diSP” means it’s turned OFF from the display. “dl” means it’s turned OFF because the remote On/Off is open (see point 2.6). “AlrM” means it’s not running because of an alarm.
- The “CMP” screen shows which compressors are running (only relevant in units with more than one compressor). Each compressor has one symbol on the bottom row: “o” means that compressor is running and “\_” means that compressor is stopped.
- The “EuP1” screen shows the value read by the evaporation sensor.
- The “Hd00” to “Hd02” screens show other information not relevant to the chiller’s operation.
- The ESC screen allows going back to the standard display by pressing PRG.

#### Other information icons on the display:

1. **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 (see point 6). When an alarm is active, pressing the Alarm button shows the active alarm code. If more than one alarm is active, pressing UP or DOWN cycles through all active alarm codes:

- Alarm code A10: Low water level alarm or pump overload.
- Alarm code A30: Compressor overload alarm.
- Alarm code A28: Antifreeze alarm.
- Alarm code A29: Low refrigerant pressure.
- Alarm code A25: High refrigerant pressure.
- Warning code A15: High water temperature.
- Alarm code A06, A22: Temperature sensor disconnected, short-circuited or faulty.
- Warning code A32, A33, A65, A66: Maintenance warning.

2. **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 is lit.

3. **Pump On indicator:** this remains lit when the pump is working.

4. **Compressor On indicator:** this remains lit when the compressor is working.

## 5 MAINTENANCE

### 5.1 BASIC MAINTENANCE

#### Weekly:

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

Verify that the pressure of the pump is the same as the nominal pressure (P<sub>nom</sub>) indicated in the characteristics plate.

Verify the water level in the tank.

Verify the state of the water filter element, if the pressure drop exceeds 1,5 bar (22 psi) change the filter element (the filter is installed at the water inlet line inside the chiller).

#### Monthly:

With the unit disconnected (Main power switch Off), clean the condenser with a blast of compressed air, from the inside towards the outside.

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 9.1), the suitable glycol concentration according to point 3.1 of this manual and, if it's being used, the required volume of Refrfluid B additive (2 liters per each 100 liters of water tank volume).

#### Preventive maintenance warning (A32, A33, A65 and A66)

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

## 6 TROUBLESHOOTING

The following chart shows the possible causes for an alarm together with the solution:

FAULT	CAUSE	SOLUTION	RESTART PROCEDURE
<b>A25/A58</b> <b>Alarm due to high pressure of the refrigerant:</b> The pressure of the refrigerating circuit 1 (A25) or circuit 2 (A58) is higher than maximum allowed (28 bar (406 psi)). The alarm stops the compressors of the respective circuit. It will reset automatically up to three times within one hour. If more than three alarms occur the alarm will require restart procedure.	Lateral and back panels of the housing open	Close the panels.	Disconnect the chiller and connect it again by turning the Off/On power switch (element 1 on point 4.1).
	Low airflow into the condenser	Check that there is enough free space in front of the condenser and clean the condenser if necessary.	
	The ambient temperature is too high	Wait until the ambient temperature is lower (see point 3.1).	
	Water temperature too high	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.	
	High pressure switch failure	Check that the high pressure switch is tripping at the right pressure (28 bar (406 psi)). <b>Contact an authorized technical service</b> to replace it.	
Motor fan not working	Check the motor fan circuit breakers. If the problem persists <b>contact authorized technical service</b>		
<b>A29/A62</b> <b>Alarm due to low pressure of the refrigerant:</b> the pressure of the fridge circuit 1 (A29) or circuit 2 (A62) is below the minimum allowed (1,7 bar (25 psi)). The alarm stops the compressors of the respective circuit. It will reset automatically up to three times within one hour. If more than three alarms occur the alarm will require restart procedure.	Ambient temperature too low	The minimum ambient temperature is 0°C (32°F). With the speed regulator option it is -15°C (5°F).	Disconnect the chiller and connect it again by turning the Off/On power switch (element 1 on point 4.1).
	Low pressure switch failure	Check that low pressure switch is tripping at the right pressure (1,7 bar (25 psi)). <b>Contact an authorized technical service</b> to replace it.	
	Water freezing	Verify the ethylene glycol content. See point 3.1. If the problem persists <b>contact an authorized technical service</b> .	

FAULT	CAUSE	SOLUTION	RESTART PROCEDURE
	Gas leakage	Contact authorized technical service	
A30/A63 Circuit 1 (A30) compressors overload alarm Circuit 2 (A63) compressors overload alarm	Excess current	Check if the electrical connections are correct. Check supply voltage and power surges.	Disconnect the chiller (turn Off the main power switch, see element 1 on point 4.1). 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.
A10 Water level alarm (Only SP units)	Level switch did not switch to the "full" position	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 and 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.	Disconnect the chiller and connect it again by turning the Off/On power switch (element 1 on point 4.1)
	Water leak in the internal circuit of the UC	Contact authorized technical service	
	Water leak in the external water circuit	Find the leak and get it repaired	
	Water leak in the water pump	If there is a leak in the water pump seal <b>contact authorized technical service</b> to replace the whole water pump. Check that the water quality is inside the limits (see annex 9).	
or Water pump overload (only SP units)	Pump circuit breaker is Off	Check if the electrical connections are correct. Check voltages, intensities and variations. Check water pressure. Check water quality. Check if the pump is blocked.	Disconnect the chiller (turn off the main power switch, see element 1 on point 4.1). 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.

FAULT	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 filter 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.
A28/A61 Circuit 1 antifreeze control (A28) operates continuously Circuit 2 antifreeze control (A61) operates continuously	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 3.1 and the antifreeze setpoint also has to be adjusted according to it. <b>Contact authorized technical service.</b>  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 is not <b>contact authorized technical service.</b>	The control will go back to normal operation when the problem is solved
A15 High water temperature	The water tank temperature has been more than 10°C (18°F) above the setpoint for some minutes	Check the cold water setpoint is within the limits (see point 3.1). Disconnect the application from the chiller for a while and run the chiller without load. If the problem persists <b>contact authorized technical service.</b>	The chiller is still working normally. The warning will automatically reset when temperature is back to the setpoint
A32, A33, A65, A66 Maintenance warning	The chiller has exceeded the working hours defined between preventive maintenances	<b>Contact authorized technical service</b> for a preventive maintenance of the unit.	The chiller is still working normally. The authorized technical service will reset the warning during the preventive maintenance

## 7 TECHNICAL FEATURES

### 7.1 TECHNICAL FEATURES 50HZ

UC CE		300	400	500	650	800	1000	1350	1700	2400	
Cooling capacity	kcal/h	29335	37232	41897	55403	75577	91463	119674	151097	227934	
	kW	34,1	43,3	48,7	64,4	87,9	106,4	139,2	175,7	265,0	
Water flow	l/h	5882	7415	8982	11765	14830	17964	23530	29660	43963	
Water pressure	3 bar	3,9	3,6	3,3	3,7	3,4	3,3	4,3	3,4	3,6	
	5 bar	6,2	5,9	5,5	6,5	6,2	5,1	5,7	5,0	5,4	
Refrigerant circuits	N°	1	1	1	1	2	2	2	2	2	
Compressor	N°	1	1	1	1	2	4	4	4	4	
	kW (each)	6,7	8,7	10,9	13,8	11,5	6,7	8,7	11,5	14,1	
	kW (total)	6,7	8,7	10,9	13,8	22,9	27,0	34,7	45,8	56,4	
Condenser	N°	1	1	1	1	2	2	2	2	2	
	kW (each)	40,8	52,0	59,6	78,2	55,4	66,7	86,9	110,8	160,7	
	kW (total)	40,8	52,0	59,6	78,2	110,8	133,3	173,8	221,5	321,5	
Evaporator	N°	1	1	1	1	2	2	2	2	2	
	kW (each)	34,1	43,3	48,7	64,4	43,9	53,2	69,6	87,8	132,5	
	kW (total)	34,1	43,3	48,7	64,4	87,9	106,4	139,2	175,7	265,0	
Motor fan	N°	2	2	2	2	4	4	6	6	6	
	kW (each)	0,6	0,6	0,6	1,3	0,6	0,6	0,6	0,6	1,3	
	kW (total)	1,2	1,2	1,2	2,5	2,4	2,4	3,6	3,6	7,5	
	m3/h (total)	18000	18000	18000	23000	36000	40800	57000	55200	66000	
3 bar pump	kW	1,5	1,5	1,5	2,2	2,2	3,0	5,5	5,5	7,5	
	max min	l/h	14000	14000	14000	25000	25000	20000	45000	40000	58000
			1400	1400	1400	2500	2500	2000	4500	4000	5800
	max min	bar	4,6	4,6	4,6	4,7	4,6	4,8	5,2	5,2	5,3
1,5			1,5	1,5	1,5	1,5	3	1,8	2,5	2,8	
5 bar pump	kW	3,2	3,2	3,2	5,8	5,8	5,8	7,4	7,5	11,0	
	max min	l/h	15000	15000	15000	22000	25000	30000	30000	40000	58000
			1500	1500	1500	2200	2500	3000	3000	4000	5800
	max min	bar	6,5	6,5	6,5	6,9	6,2	5,5	7,2	7,1	8,1
3,4			3,4	3,4	4,5	7,2	3,8	3,5	3,5	4,2	
Water filter	N°	1	1	1	1	1	1	1	1	1	
Volume water tank	l	210	210	210	300	300	500	500	500	500	
Sound Pressure Level (1)	dB(A)	50,2	53,5	55,3	59,2	58,3	63,1	62,2	61,3	62,7	
Power	ST	kW	7,9	9,9	12,1	16,3	25,3	29,4	38,3	49,4	63,9
	SP 3bar	kW	9,4	11,4	13,6	18,5	27,5	32,4	43,8	54,9	71,4
	SP 5bar	kW	11,1	13,1	15,3	22,1	31,1	35,2	45,7	56,9	74,9
Max. Fuse	A	40	40	50	63	80	100	150	150	200	
Voltage	V/Ph/Hz	400V/3Ph/50Hz									
Nominal COP		4,30	4,39	4,03	3,95	3,47	3,62	3,64	3,55	4,15	

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

Data related to the following conditions: Water outlet temperature 10°C and ambient temperature 25°C.

## 7.2 TECHNICAL FEATURES 60HZ

UC USA		300	400	500	650	800	1000	1350	1700	2400	
Cooling capacity	ton	11,7	14,4	16,3	21,6	29,4	36,2	46,8	58,7	88,9	
	kW	41,3	50,8	57,5	76,1	103,4	127,3	164,6	206,7	313,0	
Water flow	US gal/min	25,9	32,6	39,5	51,8	65,3	79,1	103,6	130,6	193,6	
Water pressure	40 psi	68	65	62	55	44	65	71	51	42	
	70 psi	88	84	83	74	71	65	71	86	74	
Refrigerant circuits	N°	1	1	1	1	2	2	2	2	2	
Compressor	N°	1	1	1	1	2	4	4	4	4	
	kW (each)	8,4	10,9	14,1	17,4	14,8	8,7	11,1	14,8	17,8	
	kW (total)	8,4	10,9	14,1	17,4	29,6	34,9	44,5	59,3	71,2	
	N°	1	1	1	1	2	2	2	2	2	
Condenser	ton (each)	14,1	17,5	20,3	26,6	18,9	23,0	29,7	37,8	54,6	
	ton (total)	14,1	17,5	20,3	26,6	37,8	46,1	59,4	75,5	109,1	
	N°	1	1	1	1	2	2	2	2	2	
Evaporator	ton (each)	11,7	14,4	16,3	21,6	14,7	18,1	23,4	29,3	44,4	
	ton (total)	11,7	14,4	16,3	21,6	29,4	36,2	46,8	58,7	88,9	
	N°	1	1	1	1	2	2	2	2	2	
Motor fan	N°	2	2	2	2	4	4	6	6	6	
	kW (each)	0,81	0,81	0,81	2,91	0,81	0,81	0,81	0,81	2,91	
	kW (total)	1,6	1,6	1,6	5,8	3,2	3,2	4,9	4,9	17,5	
	scfm	11889	11889	11889	18482	23543	28252	38847	37081	54032	
40 psi pump	kW	2,5	2,5	2,5	2,5	2,5	4,0	6,0	5,5	7,5	
	max	US gal/min	79,3	79,3	79,3	79,3	79,3	114,5	158,5	211,3	308,2
			min	7,9	7,9	7,9	7,9	7,9	11,4	15,9	21,1
	max	psi	70	70	70	70	70	75	78	65	54
			min	36	36	36	36	36	49	55	22
70 psi pump	kW	3,4	3,4	3,4	4,0	4,0	4,0	6,0	11,0	11,0	
	max	US gal/min	70,4	70,4	70,4	114,5	114,5	114,5	158,5	206,9	308,2
			min	7,0	7,0	7,0	11,4	11,4	11,4	15,9	20,7
	max	psi	99	99	99	75	75	75	78	106	90
			min	42	42	42	49	49	49	55	55
Water filter	N°	1	1	1	1	1	1	1	1	1	
Volume water tank	US gal	55	55	55	79	79	132	132	132	132	
Sound Pressure Level (1)	dB(A)	55,6	57,4	58,3	64,8	61,3	65,2	64,3	64,3	68,5	
Power	ST	kW	10,0	12,5	15,8	23,2	32,9	38,1	49,3	64,2	88,6
	SP 40psi	kW	12,5	15,0	18,3	25,7	35,4	42,1	55,3	69,7	96,1
	SP 70psi	kW	13,4	15,9	19,2	27,2	36,9	42,1	55,3	75,2	99,6
Max. Fuse	A	40	40	50	63	80	100	150	150	250	
Voltage	V/Ph/Hz	460V/3Ph/60Hz									
Nominal COP		4,13	4,06	3,65	3,28	3,14	3,34	3,34	3,22	3,53	

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

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





## 9 ANNEXES

### 9.1 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 $\mu\text{S}/\text{cm}$
NH <sub>3</sub>	< 2 ppm
Total iron ions (Fe <sup>2+</sup> and Fe <sup>3+</sup> )	< 0.2 ppm
Chloride (Cl <sup>-</sup> )	< 300 ppm
H <sub>2</sub> S	< 0.05 ppm
Solid particles	< 300 $\mu\text{m}$
Ethylene glycol	30%

The Total Hardness is specified in ppm (mg/L) of Ca<sub>2</sub>CO<sub>3</sub>.

Please note that ultra-pure waters like deionized water can also be harmful for some of the materials of the Ultracool units as they have a conductivity below 50  $\mu\text{S}/\text{cm}$ .



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.