



# Operation manual

## Ultratemp process thermostats

UT 2505 W, UT 3505 W, UT 5005 W

DMI-0228-00  
21/02/2024

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 unit 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 unit 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 must 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 unit 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 unit 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.
- 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.

## 2 Unpacking

### 2.1 Reception and Inspection

Unpack the Ultratemp unit. Keep the original packaging of your unit for subsequent transportation.

Check the Ultratemp unit for any transport damage immediately after delivery. 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. Never operate a device that has sustained transport damage.**



### 2.2 Transportation



Keep the unit upright at all times. Do not tilt when shipping or moving.

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

Models with wheels can be moved on the wheels **only on completely flat surfaces and by at least two people. NEVER move the unit on their wheels on slopes or titled surfaces: There would be a high risk of property damage or personal injury or death.**



### 2.3 Site

The Ultratemp 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 unit must be installed on a solid level surface that is capable of supporting a minimum of 800 kg (1750 lb). The floor must not have any slope.



**If the unit has wheels, make sure to activate their brakes once the unit is in place to prevent it from moving. Do not place heavy objects on top of the unit.**

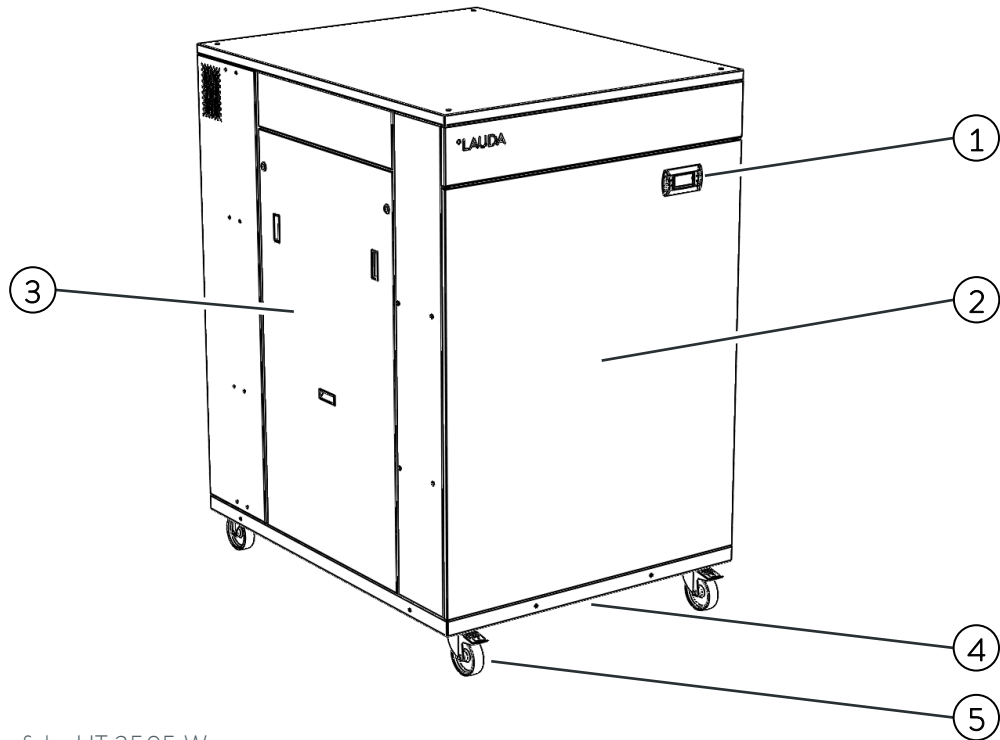
We recommend the installation of the Ultratemp unit in a well-ventilated site and in a corrosive-free, dust-free atmosphere.

In the case of outdoor installation, it is recommended to protect the Ultratemp unit from rain with a roof.

Leave a space of 1m (40") around the unit. This space is important to facilitate maintenance work and cleaning.

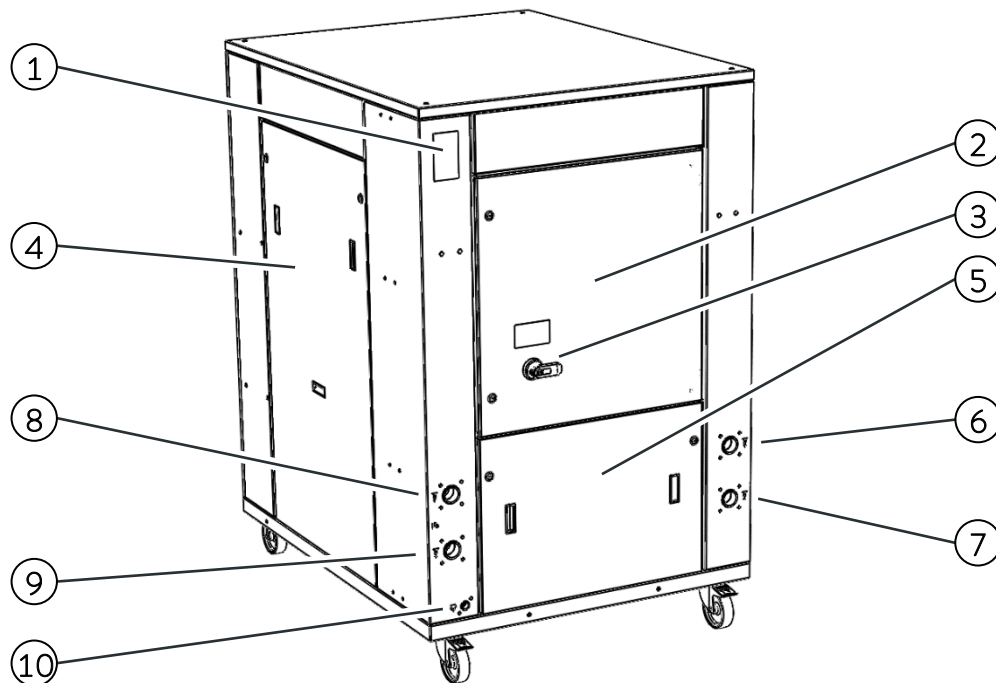
## 3 Ultratemp unit description

### 3.1 Setup of the Ultratemp unit (UT 2505W to UT 5005 W)



Front of the UT 3505 W

1. Controller display
2. Front service panel
3. Left service panel
4. Power and communications cables inlet (below the unit)
5. Four wheels with locking brake (feet on UT 5005 W)



Back of the UT 3505 W

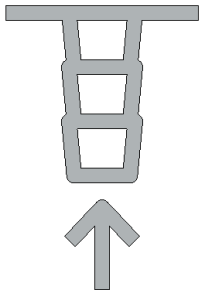
1. Characteristics plate
2. Electrical box door
3. Main power switch
4. Right service panel
5. Back service panel
6. Process water inlet connection
7. Process water outlet connection
8. Cooling water inlet connection
9. Cooling water outlet connection
10. Drain connection



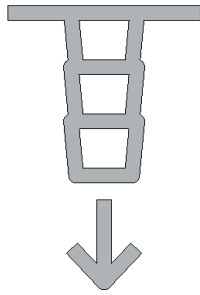
### 3.2 Identification labels on the Ultratemp unit

You can find the following labels on the Ultratemp unit:

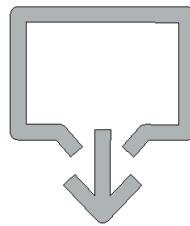
Process circuit:



Water inlet from the installation to the UT unit



Water outlet from the installation to the UT unit



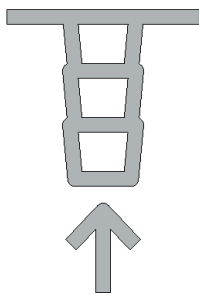
Drain

Electrical danger:



Danger, risk of electric shock

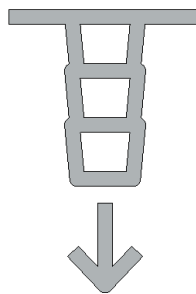
Cooling water circuit:



Water inlet from the cooling water loop to the UT unit



Label identifying the cooling water connections



Water outlet from the UT unit to the cooling water loop

### 3.3 Water Connection

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

The unit should be located as close as possible to the application. The external pipes and related fittings should be sized so that their total pressure drop does not exceed 0.7 bar (14 psi) with the flow rate required by the application. The water lines must be in pipes of at least 1 1/2".

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.



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 unit until reaching the application. The height difference between the unit 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 Ultratemp unit, it may be necessary to install a check valve in the water outlet of the Ultratemp unit and a solenoid valve in the water inlet (an accessory is available including these elements).

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

Where flexible tubing is used, it should be of reinforced construction and rated for a minimum working pressure of 6 bar g (90 psig) within -15°C and 80°C (5°F and 176°F).



For pressure-sensitive applications with a maximum permissible working pressure below the maximum pressure of the pump (see characteristics plate of the unit), a safety valve must be installed before the application's water inlet to protect against operating errors.

In these cases it's also strongly recommended to install a pressure reducing valve before the application's water inlet (available as an accessory).

### 3.4 Electrical Connection



Any electrical works/connections must be carried out by qualified personnel.

Operating voltage, please check the power supply on the characteristics plate of the unit. Depending on the model, the required power supply is 400VAC +/- 10%, 50Hz, 3 Ph or 460VAC +/- 10%, 60Hz, 3 Ph.

Make sure 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 on the base of the unit and connect it to the incoming power terminals which are located on the bottom-left side of the electrical box of the unit.

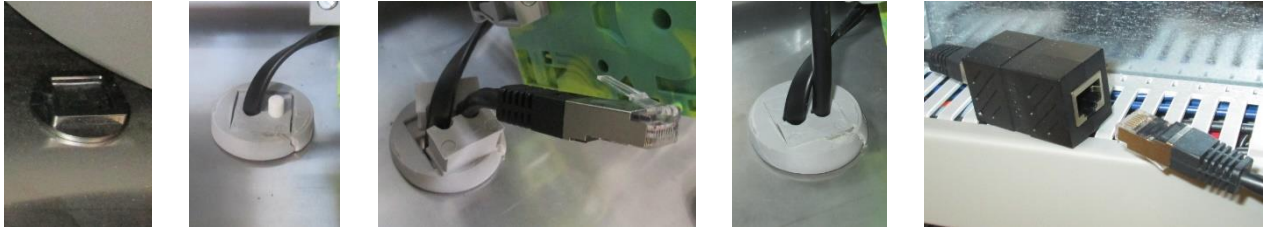


For the electrical supply of the Ultratemp unit, use an appropriate electrical line according to the data in the characteristics plate.



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

**Ethernet cable connection, if the unit is connected to a local network via Ethernet or to a Cloud gateway:**  
Introduce the Ethernet cable through the brush cable gland on the base of the unit and into the electrical box through the rubber cable holder. Then connect it to the Ethernet connector.



### 3.5 Additional electrical connections

The unit also has some special terminals prepared for the following functions (introduce the required cables also through the brush cable gland on the base of the unit):

**Terminals 23 and 24, remote On/Off operation:** This unit 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 = unit Off, closed contact= unit On).



**Note:** The unit will not turn On unless these terminals are bridged. Once the commissioning operation is complete, if the remote On/Off function described above is not used, connect the supplied wire bridge between terminals 23 and 24 to be able to turn the unit On from the display.

**Terminals 27 and 28, external alarm report signal:** These terminals provide a dry contact to report a general alarm of the unit. By default, this contact closes when there is an active alarm and it remains open when the unit is working normally without any alarm. The behaviour of this contact can be inverted in the settings menu of the controller, see point 5.3.

**Terminals 29 and 30, low level warning signal:** These terminals provide a dry contact to report low level warning at the tank of the unit. While the warning is active, the unit still works normally but if the level in the tank drops further, the unit will stop by low level alarm. This contact opens when the level in the tank is getting too low and it remains closed when the water level is high enough.

**Terminals 56 and 57, unit On/Off indicator:** These terminals provide a dry contact to indicate when the unit is turned On or Off. This contact is open while the Ultratemp unit is turned off and it's closed while it's On.

**Terminals 71 and 72, external solenoid valve connection:** They can be used to supply a solenoid valve with 24VDC. If the pipes of the application are installed above the level of the unit's tank, this valve prevents backflow when the unit is stopped. These terminals are only at 24VDC when the water pump is working.

**Terminals 90 and 91, outlet temperature reported by 4-20 mA signal:** The unit communicates its outlet water temperature through a 4-20 mA signal available at these terminals. **Make sure to respect the polarity + and -:**

- Terminal 90: Positive +
- Terminal 91: Negative -

**Terminals 94, 95 and 102, external application temperature reported by a PT100 probe:** The external application's temperature can also be read directly by the unit with a PT100 sensor installed at the application and connected to these terminals:

- Terminal 94: PT100 Red wire
- Terminal 95: PT100 Red wire
- Terminal 102: PT100 White wire

**Terminals 96 and 102, external application temperature sent to the unit by 4-20 mA signal:** These terminals can be used to communicate the external application's temperature to the unit with a 4-20 mA signal. **Make sure to respect the polarity + and -:**

- Terminal 96: Positive +
- Terminal 102: Negative -

**Terminals 100 and 102, Setpoint controlled by 4-20 mA signal:** These terminals allow adjusting the operation Setpoint remotely with a 4-20 mA signal. **Make sure to respect the polarity + and -:**

- Terminal 100: Positive +
- Terminal 102: Negative -

### 3.6 EMC Requirements

Table 1: Classification in accordance with EMC requirements.

Device	Interference immunity	Emissions class	Customer power supply
UT 2505 W UT 3505 W UT 5005 W	Type 2 (Industrial) in accordance with DIN EN 61326-1	Emissions Class B in accordance with CISPR 11	No limitation

Instructions for Class A digital device, USA:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC (Federal Communication Commission) Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

## 4 Startup

### 4.1 Operating Conditions

Water Outlet temperature from the UT unit:

Minimum: -5°C (23°F) (1)

Maximum: 60°C (140°F)

Cooling water temperature requirements:

Minimum inlet temperature: 0°C (32°F)

Maximum inlet temperature: 45°C (113°F)

Cooling water flow and pressure requirements:

	Minimum available cooling water flow l/min (gpm)	Minimum differential pressure available between inlet and outlet connections bar (psi)	Maximum cooling water inlet pressure bar(g) (psig)
UT 2505 W	60,6 (16)	2,0 (30)	6,0 (90)
UT 3505 W	82,9 (22)	2,0 (30)	6,0 (90)
UT 5005 W	109,3 (29)	2,0 (30)	6,0 (90)

Temperature limits of the ambient air:

Minimum: -15°C (5°F) (2)

Maximum: 50°C (122°F)



Observe the permissible storage and operating temperatures. See point 8.1 for storage temperature limits.

(1) To work with outlet temperatures below 15°C (59°F) it's necessary to add ethylene glycol to the water and contact an authorized technical service to adjust the unit's antifreeze protection accordingly.

(2) In order to work at ambient temperatures lower than 0°C (32°F), it's necessary to add ethylene glycol to the water and contact an authorized technical service to adjust the unit's antifreeze protection accordingly.



In such conditions, cooling water must also contain enough ethylene glycol to prevent it from freezing while the unit is not working. Failing to do so may lead to the water freezing inside the condenser and causing irreparable damage to the unit.

The unit's warranty does not cover any damages caused by freezing.



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

Glycol concentration (1) and antifreeze adjustment		Min Ambient Temperature		
		0°C or more	Less than 0°C until -5°C	Less than -5°C until -15°C
Lowest required Outlet from the UT unit	15°C or more	0% 0°C	15% -5°C	30% -15°C
	Less than 15°C until 10°C	15% -5°C	15% -5°C	30% -15°C
	Less than 10°C until 0°C	30% -15°C	30% -15°C	30% -15°C
	Less than 0°C until -5°C	40% -20°C	40% -20°C	40% -20°C

Glycol concentration (1) and antifreeze adjustment		Min Ambient Temperature		
		32°F or more	Less than 32°F until 23°F	Less than 23°F until 5°F
Lowest required Outlet from the UT unit	59°F or more	0% 32°F	15% 23°F	30% 5°F
	Less than 59°F until 50°F	15% 23°F	15% 23°F	30% 5°F
	Less than 50°F until 32°F	30% 5°F	30% 5°F	30% 5°F
	Less than 32°F until 23°F	40% -4°F	40% -4°F	40% -4°F

(1) The ethylene or propylene 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 or propylene glycol concentration.



Do not use automotive antifreeze. Use lab grade ethylene or propylene glycol only! Do not use a glycol concentration above 40%; this would damage the water pump.

## 4.2 Unit start-up



Clean the application water circuit with tap water 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 the lateral panel, open the tank cover and fill the tank **with water of the required quality (see annex 10.1) and the suitable glycol concentration** according to **point 4.1** of this manual. Using the Refrifluid B consumable is strongly recommended to maintain the water quality. Fill the tank until the maximum level of the tank is reached.



Be careful not to spray the heat transfer fluid. A funnel or a hose placed directly inside the tank is recommended for filling. If a hose is used, make sure it is secured in place and it cannot escape during the filling process.

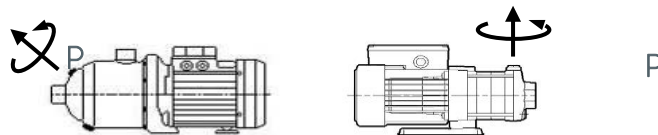
Before starting the unit, make sure the electrical box is closed and, once it starts, watch for any possible leaks/fluid sprays from the water connections due to improperly tightened/sealed fittings or hoses.

Prime both pumps to release any air inside:

Remove the priming plug (P, see diagram below).

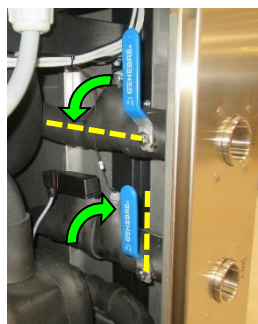
Keep the priming plug open until only liquid runs out the priming plug.

Replace the priming plug and tighten securely.



Do not start the Ultratemp unit until the pumps have been properly vented.

Open the water inlet valve completely and close the outlet water valve completely. These valves are inside the unit on the right side looking from the back of the unit, under the electrical box:



Make sure that the external fuses are installed, see point 3.4.

Switch OFF the main power switch during any electrical intervention.

Connect the Remote On/Off control from the application to terminals 23 and 24 of the unit (**only valid if the Remote On/Off control is a dry contact**). If a remote control is not used, connect the wire-bridge supplied inside the electrical box to link terminals 23 and 24.

Switch ON the general switch and **change the Setpoint to the minimum allowed value depending on the glycol concentration (see points 4.1 and 5.2)**. This will force the 3-way valve inside the unit into full cooling mode and will prevent air in the external circuit from entering the main circuit pump.



If this is not done, air could enter the main pump while the external circuit is not yet full of water. If this happens, the pump could get de-primed, causing its working pressure to drop to very low values and the unit could stop by low flow alarm. If this happens, prime the main pump again to remove any air inside.

Make sure the cooling water circuit is correctly connected to the unit (see point 3.3) and that cooling water is available for the unit before starting it up.



**Never operate the unit without cooling water.**

If the remote On/Off is used, send a remote On signal.

Finally, switch the unit On from the controller display (see point 5.2) and **the unit will start up**.



**Phase Sequence Verification:** Check that the working pressure of the main circuit pump (M2) is higher than the nominal pressure indicated on the characteristics plate. The pump pressure can be checked on the "Info – Press sensors" screen from the Information screens loop on the controller display (see point 5.3).

If the pressure is below this nominal value, the pump is turning in the wrong direction. If this happens **switch Off the main power switch, disconnect the unit from the power supply and exchange two phases in the main power supply**.

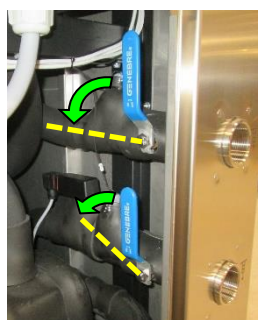


The unit will automatically switch Off the pumps after a few seconds when it detects that there is no water flow circulation through the external circuit. If this happens before the working pressure can be checked, repeat the procedure by resetting the alarm: Press the Alarm button once, press Down to reach the alarms reset screen and keep the Alarm button pressed for a few seconds until the pump restarts:



The compressor of the unit 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 unit will not cool down the water. Do not let the compressor run like this for long or it could get damaged.

Adjust the water outlet valve so that the main circuit pump (M2) works at the nominal pressure indicated in the unit's data plate:





After 5 minutes, or when the unit stops by low water level alarm, turn the main power switch Off, open the lateral panel and check the level in the tank. If the level is below the maximum refill the water tank until the maximum level.

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

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

Select the desired control method and Setpoint temperature (see point 5.3).



Check the working pressure of the main pump (M2), if it is higher than the nominal value indicated in the characteristics plate and all manual valves in the main circuit are fully open, check that the water pipes meet the requirements on point 3.3.



Please note that, under normal operation, the refrigerant compressor and some copper pipes can reach temperatures above 100°C (212°F).



Be careful not to touch these elements shortly after turning Off the unit; allow enough time for the components inside to cool down before opening the access panels.



Please note that, in the event of a fault while on heating mode, the fluid in the process circuit may reach temperatures of up to 80°C.

## 5 Unit Controls

### 5.1 Control and monitoring elements

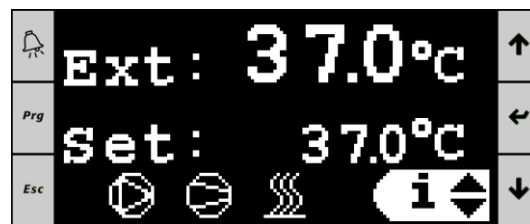
Main Power Switch



Controller display



Webserver controller display








The following elements allow controlling the unit and monitoring its status:

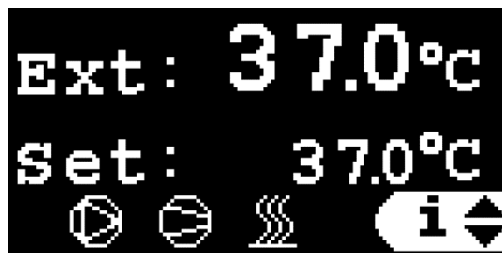
1. **Main power switch:** Located on the back side of the UT. It connects and disconnects the Ultratemp unit from the power supply.
2. **Controller display:** It shows all information on the operation of the unit and allows controlling it. It can be accessed either from the display on the front of the unit or from any computer connected to the same Ethernet network as the unit by accessing its webserver from a web browser.  
To access the webserver, the unit must be connected to the network with an Ethernet cable, see point 3.4, and its IP address must be configured as indicated on point 5.6.

## 5.2 Ultratemp Controller

Controller buttons:

	<b>Alarm button:</b> Displays the list of active alarms. It's also used to manually reset alarms
	<b>Prg button:</b> Used to access the configuration menu (for authorized service only)
	<b>Esc button:</b> Return to the main screen
	<b>Up – Down buttons:</b> Navigate between the display screens or increase/decrease the value of a selected parameter
	<b>Enter button:</b> Used to enter a subscreen/menu from the main screen or to switch between screen navigation and the different parameters that can be modified on a specific screen

Main screen:



The main screen shows the current temperature at the External application (Ext) or the Outlet water temperature (Out) depending on the control type, the current setpoint and it shows which elements in the unit are currently active.

The symbols are, from left to right, the water pump, the refrigerant compressor and the heater.

If an element is running, its symbol is lit and if it is stopped, its symbol is not shown. A blinking symbol means that an Off signal has been received, but the element is still running and it will turn Off shortly, it is being delayed by an internal minimum running time timer in the unit's software.

### External application temperature control:

The required Outlet water temperature from the UT unit is automatically calculated by the controller to achieve the desired Setpoint temperature at the external application.

### Outlet water temperature control:

The Setpoint directly controls the outlet water temperature from the unit.

From the main screen it's also possible to access the On/Off screen, the Settings screens loop and the Information screens loop. Use the **Up/Down** buttons to select the desired subscreen/menu and press **Enter** to access it:



Pressing **Esc** from any screen goes back to this main screen

## 5.3 Operation

### 5.3.1 Remote On/Off and On/Off from the display

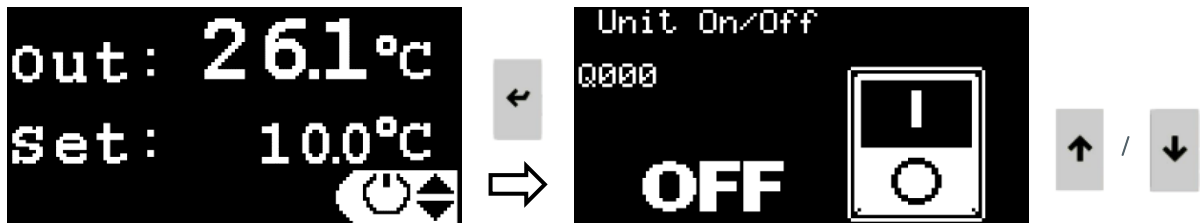


The unit will only turn On when it receives **both** an On signal from its remote On/Off contacts (circuit closed between terminals 23 and 24, see point 3.4) and it **also** receives an On command from the display. In the same way, the unit will turn Off either when the circuit between terminals 23 and 24 is open or when an Off command is issued from the display.

### 5.3.2 On/Off from the display

As long as the remote On/Off is connected, the unit can be turned On and Off from the display (either the local display on the unit or the webserver on a connected computer).

In order to start/stop the unit from the display, go to the On/Off screen (see point 5.2), and use the Up/Down buttons to toggle between On and Off.



### 5.3.3 Unit Autostart function

When the Main Power Switch is turned On or when the power is restored after a power loss, the unit will either return to its previous On or Off state or it will remain in an Off state until it is manually switched back On. This behaviour can be selected with the Autostart function:

- Autostart On: The unit will return to the previous On or Off state after a power loss
- Autostart Off: The unit will remain Off after a power loss

To enable/disable the Autostart function, go to the Settings screens loop (see point 5.2), press Down until the "Autostart" screen, press Enter to highlight the current set value, use the Up/Down buttons to change the value and press Enter again to confirm the new value.

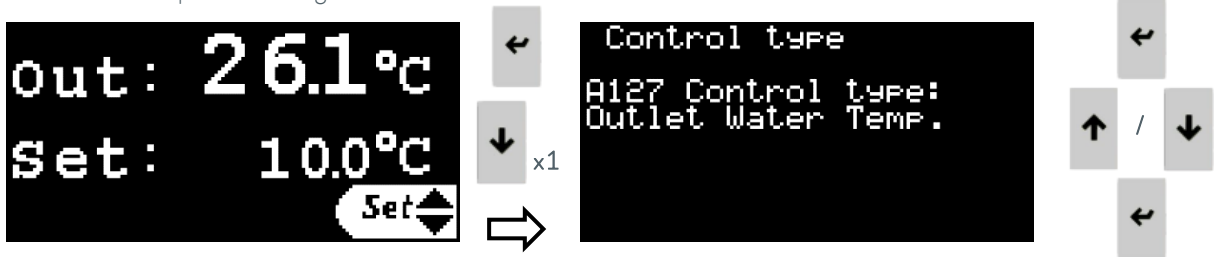


### 5.3.4 Setting the control type

The second screen in the **Settings screens loop** allows selecting the control type as External application temperature control or Outlet water temperature control.

Please note that for the External application temperature control to work, the unit needs to receive the external application temperature either by connecting it to a PT100 sensor installed at the application or by sending a 4-20 mA signal to it (see point 3.4). See further down this point how to select the source of the external temperature and how to configure the 4-20 mA signal.

In order to set the control type, go to the **Settings screens loop** (see point 5.2), press **Down** once to access the “Control type” screen, press **Enter** to highlight the current set value, use the **Up/Down** buttons to change the value and press **Enter** again to confirm the new value.



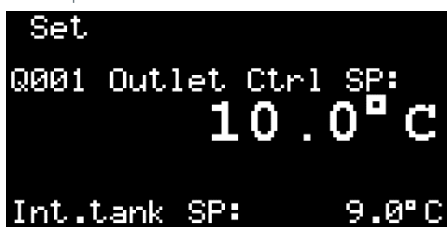
### 5.3.5 Setting the temperature

The required External application temperature or Outlet water temperature, depending on the control type selected, can be set between the limits indicated on point 4.1.

To set the temperature, go to the **Settings screens loop** (see point 5.2), press **Enter** to highlight the current set value, use the **Up/Down** buttons to change the value and press **Enter** again to confirm the new value.



Setpoint screen:



→ User Setpoint: Desired External application temperature or Outlet water temperature depending on the control type.

→ Setpoint of the internal water tank. It is calculated by the software and cannot be modified manually.

### 5.3.6 Setting the language

To change the language of the display, go to the **Settings screens loop** (see point 5.2), press **Down** until the “press ENTER to change language” screen and press **Enter** to access the language configuration screen. From the new screen, press **Enter** to change the language and press **Esc** or let the timer run out to confirm the new language.



### 5.3.7 Setting the Units of Measure (UoM)

To change the Units of Measure used by the controller, go to the **Settings screens loop** (see point 5.2), press **Down** until the “press ENTER to change Units of Measure” screen and press **Enter** to access the Units of Measure configuration screen.

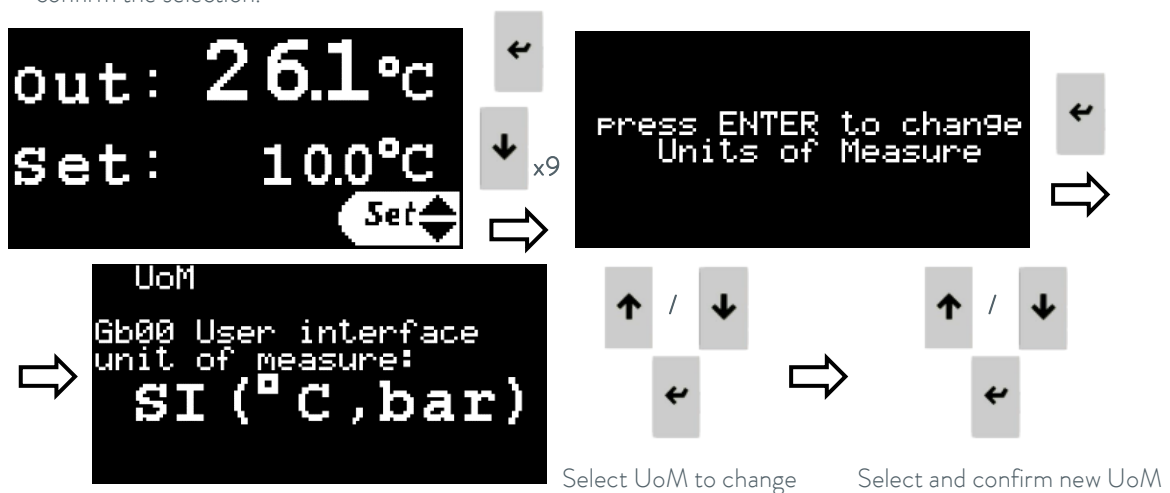
From the new screen, press **Up** or **Down** to select the Units of Measure to be changed:

- User interface: Changes the units of measure used by the display of the unit, both the External controller display and also the Webserver controller display.
- Modbus TCP/IP: Changes the units of measure used to transmit data through the Modbus TCP/IP communications.
- Web pages: Changes the units of measure of the information shown on the Webserver.



Please note and bear in mind that a different set of Units of Measure can be selected for each of these three options.

Press **Enter** to highlight the current Units of Measure, press **Up** or **Down** to change them and **Enter** again to confirm the selection.



Select UoM to change

Select and confirm new UoM

### 5.3.8 Setting the Date and Time

To change the Date and Time used by the controller, go to the **Settings screens loop** (see point 5.2), press **Down** until the “press ENTER to change Date/Time” screen and press **Enter** to access the Date and Time configuration screen.

Press **Enter** to highlight each field, **Up/Down** to change the value and **Enter** to confirm the new value and to move to the next field.



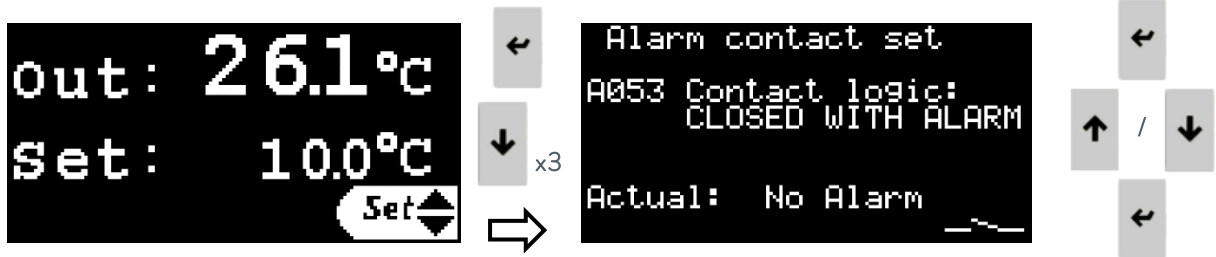
### 5.3.9 Setting the external alarm signal logic

The unit has a dry contact available to report a general alarm of the unit (see point 3.5).

To change the logic of this contact (closed when an alarm is active or open when an alarm is active), go to the **Settings screens loop** (see point 5.2), press **Down** until the “Alarm contact set” screen.

Press **Enter** to highlight the current contact logic, use the **Up/Down** buttons to change it and press **Enter** again to confirm the new logic.

The screen also shows the current Alarm/No Alarm status of the unit and of the alarm contact.

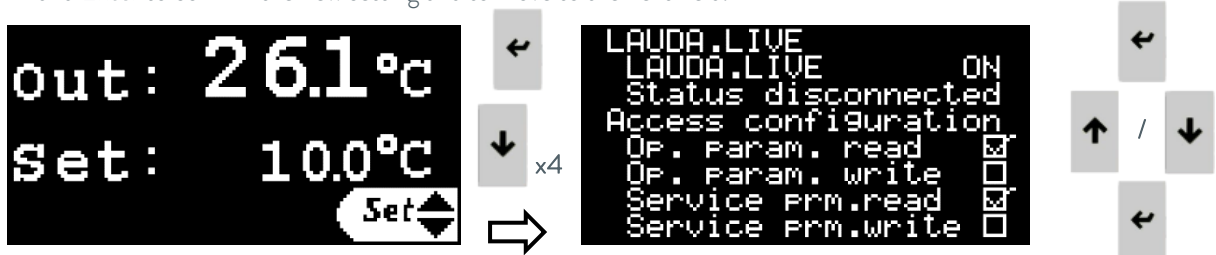


### 5.3.10 Setting LAUDA.LIVE permissions

The Settings screen loop also contains a screen to enable or disable the communications with the LAUDA.LIVE service and to set its access permissions.

This function only works if the service has been requested and activated for this particular unit and if the unit itself is connected to a Cloud gateway through an Ethernet connection. **The unit does not have internet connectivity on its own.**

To enable/disable the LAUDA.LIVE service and set its permissions, go to the Settings screens loop (see point 5.2), press **Down** until the “LAUDA.LIVE” screen. Press **Enter** to highlight each field, **Up/Down** to change it and **Enter** to confirm the new setting and to move to the next field.



### 5.3.11 Setting Dynamic Setpoint parameters

This screens loop contains the set of parameters used by the unit to control the external application temperature.

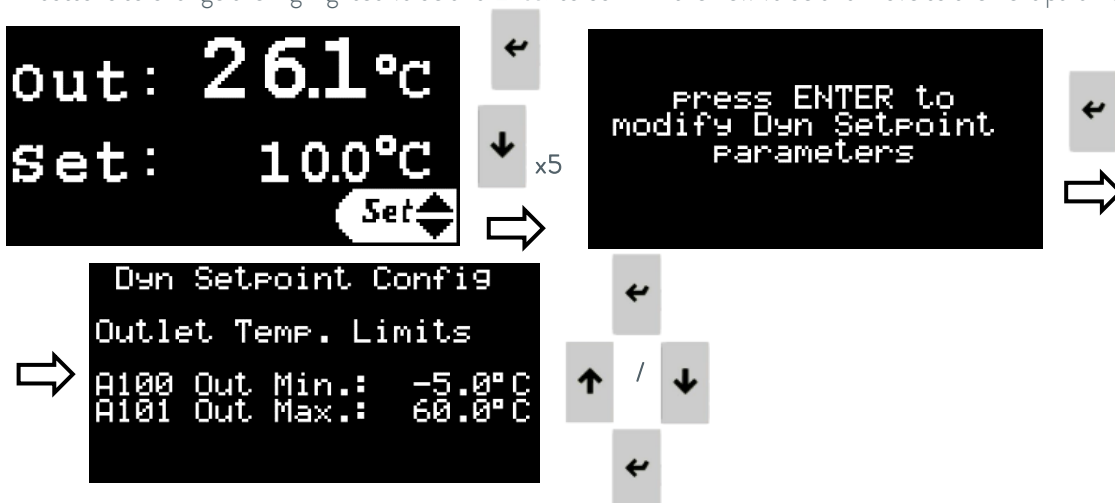
If the control type is set to Outlet water temperature, only the Outlet temperature limits parameters will have an effect; the rest of parameters in this loop will not be active.

See point 5.4 for a detailed explanation on the External application temperature control configuration and the function of each parameter in this loop.

To set these parameters, go to the Settings screens loop (see point 5.2), press **Down** several times until the “press ENTER to modify Dyn Setpoint parameters” screen and press **Enter** to access this screen loop.

From within the Dyn Setpoint Config screens loop, press **Up/Down** while the cursor is on the top left corner to cycle through the different screens.

While on any of the screens, press **Enter** to cycle through the different parameters in it, use the **Up/Down** buttons to change the highlighted value and **Enter** to confirm the new value and move to the next parameter.



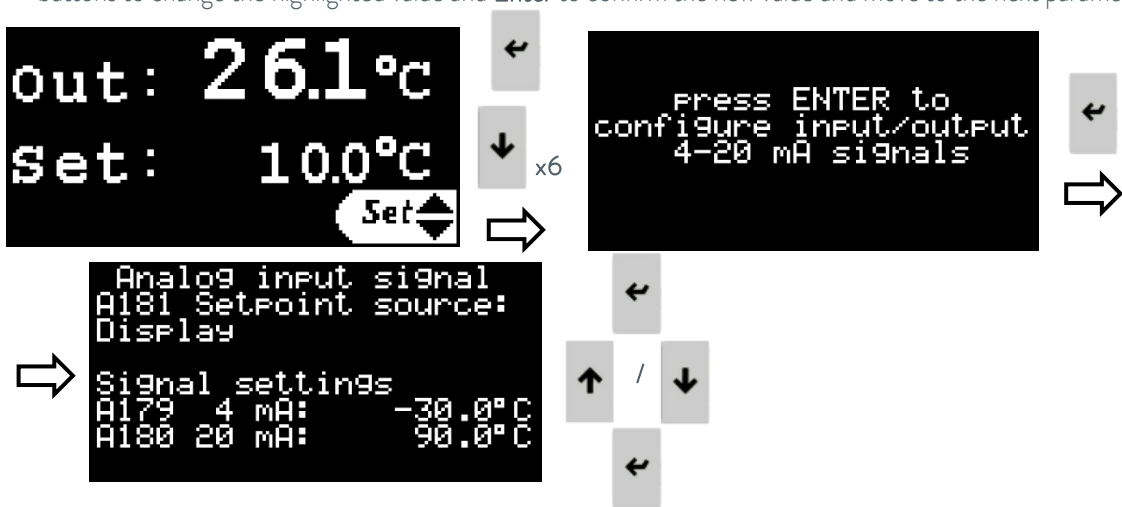


## 5.3.12 Setting the 4-20 mA signals parameters

This screens loop contains the set of parameters that allow enabling/disabling and configuring the 4-20 mA signals. See point 3.5 for information on what terminals are used to connect each signal.

To set these parameters, go to the **Settings screens loop** (see point 5.2), press **Down** several times until the “press ENTER to configure input/output 4-20 mA signals” screen and press **Enter** to access this screen loop. From within the Analog signals screens loop, press **Up/Down** while the cursor is on the top left corner to cycle through the different screens.

While on any of the screens, press **Enter** to cycle through the different parameters in it, use the **Up/Down** buttons to change the highlighted value and **Enter** to confirm the new value and move to the next parameter.



The following parameters can be accessed and modified on these screens:

### A181 Setpoint source:

This parameter is used to select the source of the user Setpoint: The Setpoint can either be set directly through the controller’s display or by a 4-20 mA input signal.

A179 Temperature corresponding to 4 mA on the Setpoint input signal.

A180 Temperature corresponding to 20 mA on the Setpoint input signal.

### A134 External temperature source:

This parameter is used to select the source of the external temperature: Either a PT100 sensor installed in the application and connected to the Ultratemp unit or a 4-20 mA input signal.

A131 Temperature corresponding to 4 mA on the external temperature input signal.

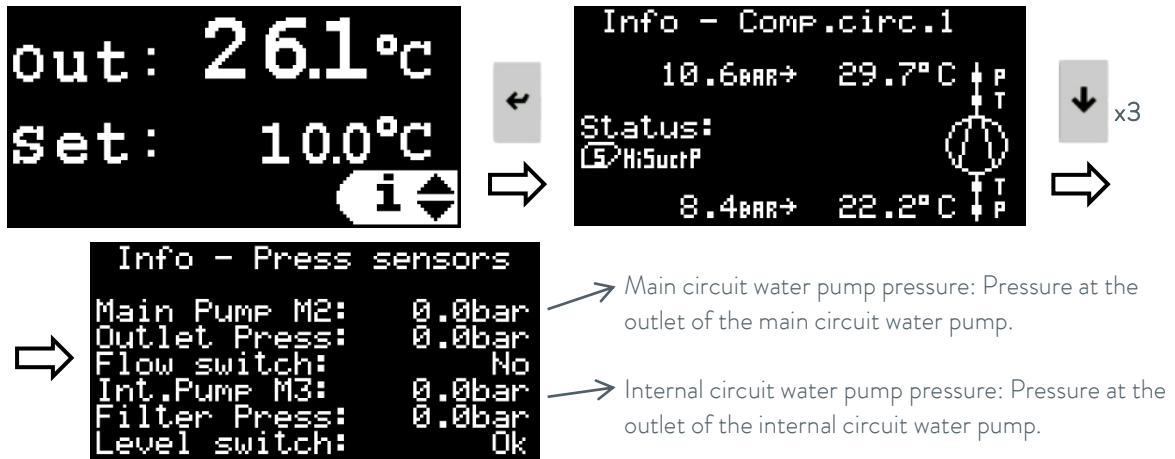
A132 Temperature corresponding to 20 mA on the external temperature input signal.

A090 Temperature corresponding to 4 mA on the outlet temperature output signal.

A091 Temperature corresponding to 20 mA on the outlet temperature output signal.

### 5.3.13 Information screens loop

This is a series of information screens that can be accessed from the controller display (see point 5.2). They contain information on the operation of the unit, readings of physical sensors, software version and its serial number. Use the Up/Down buttons to navigate the different screens. Information on the pumps pressures can be found within this loop, on the "Info - Press sensors" screen.



Main circuit water pump pressure: Pressure at the outlet of the main circuit water pump.

Internal circuit water pump pressure: Pressure at the outlet of the internal circuit water pump.

### 5.4 External temperature control configuration

#### External application temperature control basics

In external application temperature control mode, the unit automatically adjusts its outlet temperature to reach and maintain the desired temperature at the external application.

- When the external application temperature is too low, the unit will be in full heating mode to increase it. In this mode, the unit activates its heater at 100% power as long as the outlet temperature is below the maximum outlet temperature defined. Once the outlet temperature reaches the maximum defined, the unit automatically adjusts the power of the heater to maintain the outlet temperature at that value.
- When the external application temperature is too high, the unit will be in full cooling mode to decrease it. In this mode, the unit activates its cooling circuit at 100% power as long as the outlet temperature is above the minimum outlet temperature defined. Once the outlet temperature reaches the minimum defined, the unit automatically adjusts the power of the cooling circuit to maintain the outlet temperature at that value.
- When the external application temperature is close to the programmed setpoint, the unit is in fine temperature tuning mode. In this mode, the unit monitors the external application temperature and gradually corrects the outlet temperature it delivers so that the external application reaches and stays at the setpoint temperature.

## Control parameters

The thermal inertia and the thermal connection of the application to the unit may make it necessary to adjust the control parameters.

Only modify the control parameters if you possess adequate knowledge of control system engineering.

### Control parameters definition.

See point 5.3.11 on details on how to access and change these parameters.

See point 5.5 for recommendations on how to set these parameters.

### A100 Outlet temperature minimum limit:

This defines the minimum temperature that can be selected as a Setpoint in outlet temperature control mode and also the minimum temperature with which the unit can work in external application temperature control mode.

### A101 Outlet temperature maximum limit:

This defines the maximum temperature that can be selected as a Setpoint in outlet temperature control mode and also the maximum temperature with which the unit can work in external application temperature control mode.

### A069 Dead zone:

This is a temperature offset above and below the setpoint. When the external application temperature enters this zone, the unit will switch from full heating or full cooling modes to fine temperature tuning mode.

### A142 Quick tuning differential:

This is also a temperature offset above and below the setpoint and it must always be smaller than the dead zone. This parameter is used during the fine temperature tuning mode: While the temperature is within this zone, the control only makes very slow changes to the outlet temperature to maintain the external application temperature at the setpoint. If the external application temperature gets outside this zone, the unit will try to implement faster changes to its outlet temperature to maintain the external application temperature within the fine tuning zone and avoid switching the control to full heating or full cooling.

### Dynamic Offset:

This is an internal control parameter that the unit uses to calculate what outlet temperature does it need to supply for the external application temperature to stay at the desired setpoint. This offset is relative to the programmed setpoint.

This can be a positive offset when the outlet temperature needs to stay above the external temperature setpoint (the unit is providing some heating) or a negative offset when the outlet temperature needs to stay below the external temperature setpoint (the unit is providing some cooling).

In the fine temperature tuning stage, the unit dynamically changes this offset to adapt its outlet temperature as the needs of the external application change. For example, the application may need some heating in the initial stages and some cooling later on. The unit dynamically adapts by changing this parameter.

This can be checked in the screen “Dyn Setpoint Status” within the Dynamic Setpoint settings loop; see point 5.3.11 on details on how to access it.

Many applications require working with at least 2 setpoint values. For example, it may be necessary to reach and maintain a high temperature setpoint to start and maintain a reaction and later on switch to a low temperature setpoint to stop the reaction and maintain the external application at a low temperature. These two scenarios typically require a different initial offset between the desired setpoint at the external application and the outlet temperature of the unit. The unit can adapt and automatically change its Dynamic Offset as needed, but it will reach the desired temperature significantly faster if the optimum values are known and they are introduced in the corresponding parameters in advance:

#### **A130 Initial Dynamic Offset High:**

This is the optimum initial value for the Dynamic Offset when the application needs to work with its highest setpoint. When the setpoint temperature is changed to a high value, once the unit reaches the dead zone, it will start the fine temperature tuning with this offset value.

#### **A140 Initial Dynamic Offset Low:**

This is the optimum initial value for the Dynamic Offset when the application needs to work with its lowest setpoint. When the setpoint temperature is changed to a low value, once the unit reaches the dead zone, it will start the fine temperature tuning with this offset value.

#### **A170 High/Low Setpoint threshold:**

This is a threshold temperature to tell the unit when to switch to the High or the Low initial Dynamic Offset values:

When the Setpoint is adjusted to a value above this threshold, the unit will use the Initial Dynamic Offset High.

When the Setpoint is adjusted to a value below this threshold, the unit will use the Initial Dynamic Offset Low.

## **5.5 Recommended steps to adjust the external control parameters**

Make sure that the unit and the external application are completely full of fluid. Adjust the unit so that the application receives as much flow as possible. Make sure that the temperature sensor or 4-20 mA signal used to monitor the external application temperature is correctly installed and it provides a **very stable** measurement value. **Please note that unstable external application temperature or setpoint temperature signals will affect very negatively the temperature stability that the unit is able to achieve.**

See point 5.3.11 on details on how to access and change the Dynamic Setpoint Offset parameters that control the unit's operation in external application temperature control mode.

Adjust the **A100** and **A101** parameters according to your application limits. Set parameter **A100** at the minimum value allowed for the unit's outlet temperature compatible with both the freezing point of the external application and also the unit's internal fluid (see Glycol concentration and antifreeze adjustment on point 4.1).

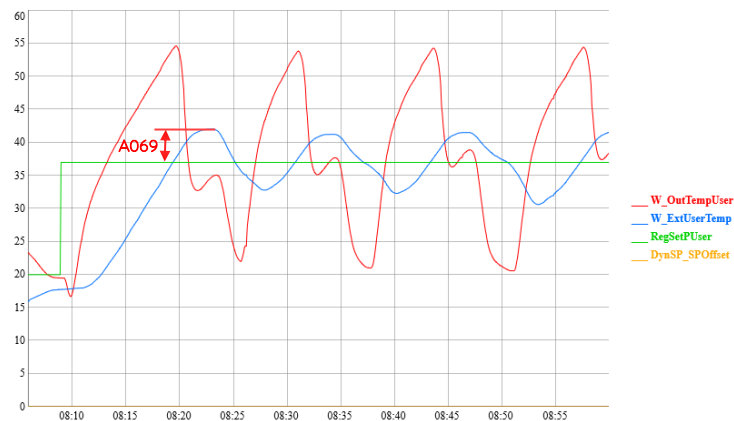
1. Make sure the unit's control type is set as External application temperature control (see point 5.3.4).

- Set parameter **A069** Dead zone at 0°C, **A142** Quick tuning differential at 0°C and **A130** Initial Dynamic Offset High at 0°C.

```
Dyn Setpoint Config
A069 Dead zone: 0.0°C
A142 QckDff: 0.0°C
A130 Initial Offst Hi:
      0.00°C
```

- Set parameter **A170** High/Low Setpoint threshold half-way between the desired highest and lowest temperature values for the application.
- Change the Setpoint to a value below parameter **A170**, confirm the new value and then change again the Setpoint and set it to the desired highest temperature value for the external application. This will force the unit to reset any previously stored Dynamic Offset value back to 0°C as per parameter **A130**.
- Turn the unit On and let it run until the external application temperature reaches the setpoint and starts to fluctuate. Measure the maximum overshoot of the external application temperature in the first fluctuation.

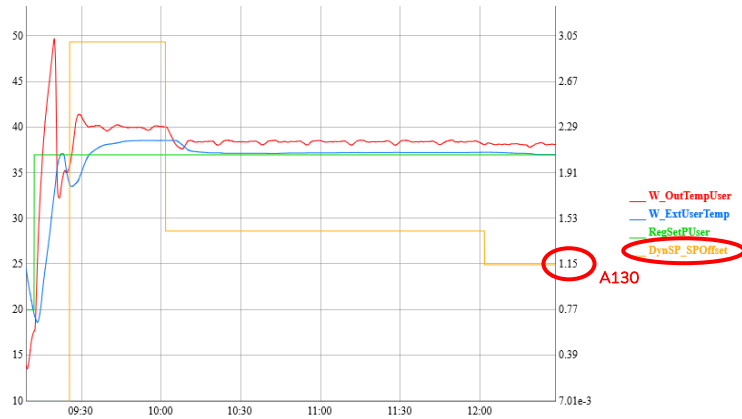
The evolution of the temperatures can be checked at the “Dyn Setpoint Status” screen within the Dynamic Setpoint settings loop (see point 5.3.11), but it is strongly advised to connect the unit to a PC via Ethernet and download or view all the temperature data from the integrated webservice like in the example below (see points 5.6 and 5.7):



- Stop the unit and set **A069** Dead zone at the same value as the overshoot measured in the previous point. Set the **A142** Quick tuning differential at 60% of the value of **A069**. In the above example the parameters would look like this:

```
Dyn Setpoint Config
A069 Dead zone: 5.0°C
A142 QckDff: 3.0°C
A130 Initial Offst Hi:
      0.00°C
```

- Turn the unit back On and let it work until the external application temperature is stable at the setpoint. Depending on the thermal inertia of the external application this can take some time. Set the current value of the Dynamic Offset (DynSP\_SPOffset variable in the graph) as **A130** Initial Dynamic Offset High.

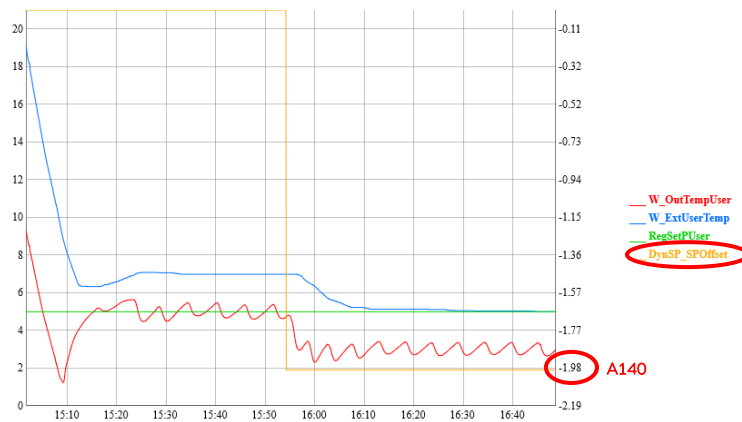


- Set **A140** Initial Dynamic Offset Low at 0°C and adjust the Setpoint at the desired lowest temperature value for the external application.

```

Dyn Setpoint Config
A140 Initial Offst Lo:
    0.00°C
A170 Hi/Lo threshold:
    21.0°C
    
```

- Turn the unit back On and let it work until the external application temperature is stable at the setpoint. Depending on the thermal inertia of the external application this can take some time. Set the current value of the Dynamic Offset (DynSP\_SPOffset variable in the graph) as **A140** Initial Dynamic Offset Low.



The configuration is now complete and the unit will automatically set the value of parameters **A130** or **A140** as the initial Dynamic Offset whenever the Setpoint is changed to a value above or below **A170** respectively.

## 5.6 Ethernet Configuration

The unit can be remotely monitored and operated through any PC connected to the same network where the unit is connected via Ethernet.

To be able to access the unit remotely it is first necessary to configure its IP address. Follow these steps on the external controller display to do so:

1. Press the **Alarm** and the **Enter** buttons for a few seconds, until the display changes to the following screen:

```
> INFORMATION
  SETTINGS
  APPLICATION
  UPGRADE
  LOGGER
  DIAGNOSTICS
```

2. Use the **Down** button to select "SETTINGS" and press **Enter** to access the Settings menu:

```
> PASSWORD
  USB SETTINGS
  PLAN SETTINGS
  CLOCK SETTINGS
  APP SETTINGS
  NET SETTINGS
  TCP/IPV4 SETTINGS
```

3. Use the **Down** button to select "TCP/IPv4 SETTINGS" and press **Enter** to access the IP Configuration screen:

```
Enable: Static
IP:      0.  0.  0.  0
Mask:    0.  0.  0.  0
GW:      0.  0.  0.  0
DNS:     0.  0.  0.  0

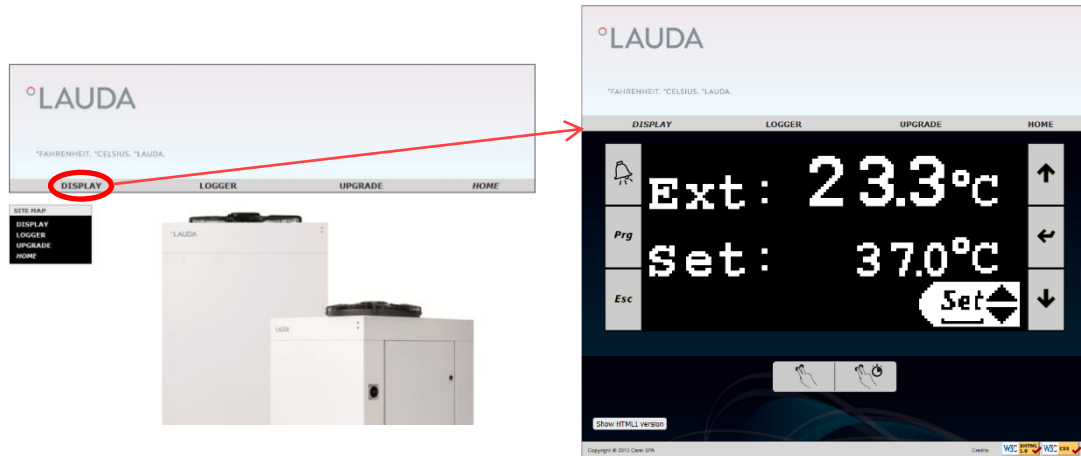
Update config? No
```

4. In this screen, use the **Enter** button to move to the next field and **Up** and **Down** to change the values. Check with your IT team which values are correct for your local network. Once done, select the "Update config?" field, change it to Yes with the **Up** button and confirm with **Enter**. This will save all the new values.

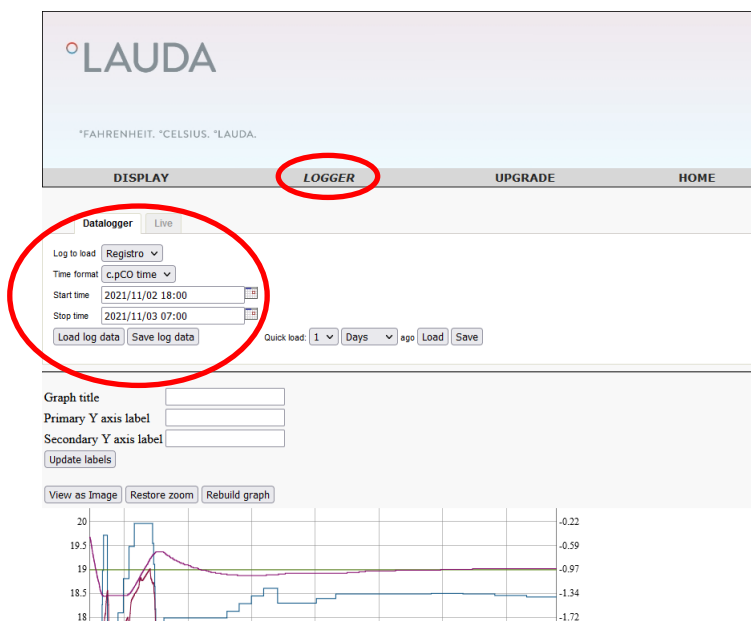
**Note:** If no button is pressed for 30 seconds, the controller discards any changes that have not been saved and goes back to the Main screen.

## 5.7 Embedded Webserver

Once the IP address is configured, it will be possible to access the webserver of the unit from a web browser on any PC connected to the same network as the unit. To do so, just introduce the IP number of the unit on the navigation bar of the web browser and select the DISPLAY option from the home page.



The LOGGER tab gives access to the unit's data logger. It allows viewing its stored data in a graph format and also downloading it in a CSV file format:



To view the log data in graph format: Select a **Start time** and a **Stop time** then press **Load log data**.  
 To save the log data in a CSV file: Select a **Start time** and a **Stop time** then press **Save log data**. If no Start and no Stop times are introduced, pressing **Save log data** downloads all stored data.  
 The unit continually records and stores data from the last 48 hours of operation (older data is automatically overwritten).



## 6 Maintenance

### 6.1 Basic Maintenance

General safety instructions:



The unit must be disconnected from the main power supply before any kind of maintenance is performed.  
Unit's maintenance is to be done only by skilled personnel.  
Bring device parts, accessories and heat transfer liquid to room temperature before touching them.

**Weekly:**

Verify that the water temperature indicated on the controller display is approximately at the setpoint.

Verify the water level in the tank.

Check water filter pressure drop while the unit is running: It's the difference between the Internal Pump M3 pressure and the Filter pressure on the "Info – Press sensors" screen of the Information screens loop, see point 5.3.

If the pressure drop exceeds 1 bar (15 psi) change the filter element.

**Monthly:**

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 10.1), the suitable ethylene glycol concentration according to point 4.1 and, if it's being used, the required volume of Refrfluid B additive (2 litres per each 100 litres of water tank volume).

## 7 Troubleshooting

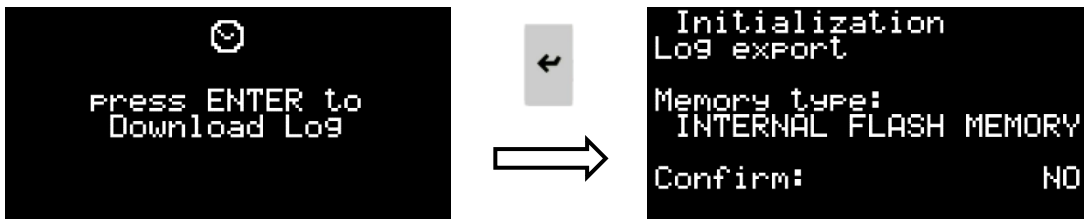
### 7.1 Saving a log file in case of alarm

The unit has a built-in log function that continually records data from the last 48 hours of operation (older data is automatically overwritten).

If an alarm triggers and it's not possible to restore the unit by following the indications on this chapter, then follow these steps to save a copy of the stored logs shortly after the alarm has triggered. If the unit is connected to a PC through its Ethernet connection, it's also possible to download its log data directly from its Webserver, see point 5.7, and the steps below can be skipped.

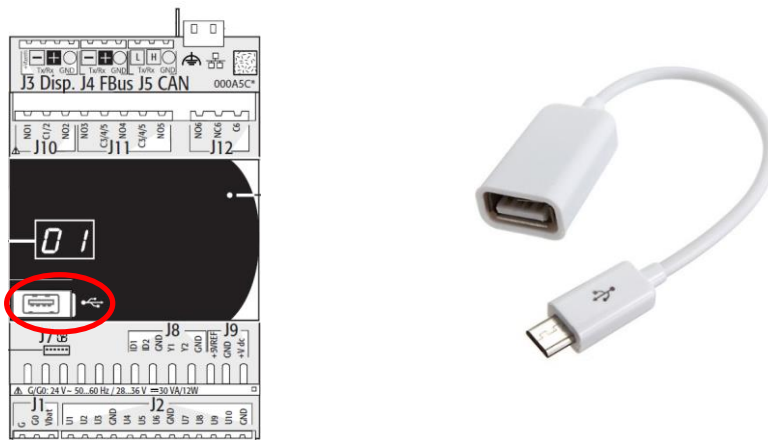
The information contained in the log file with the operation data of the hours preceding the alarm can greatly help the service engineers to diagnose the problem and solve it faster.

1. Go to the Information screens loop (see point 5.2), press **Up** once and then **Enter** to access the Log export screen:



2. Press **Enter** and then the **Up** or **Down** buttons to select where to save the log file. The file can be stored in the unit's controller Internal Flash Memory or it can be saved to a connected USB drive.

If using a USB drive, turn the unit Off with the Main Power Switch, open the electrical box and connect it to the microUSB port available on the front of the unit's controller. Use a microUSB to USB adapter if necessary. Once the USB drive is connected, close the electrical box and turn the Main Power Switch back On:



After selecting the save location, press **Enter**, select YES on the "Confirm:" field with the **Up** or **Down** buttons and press **Enter** again to begin the Log export.

If the log file is saved to the Internal Flash Memory, when the service engineer is on site with the unit, they will be able to retrieve the saved log file for analysis. **Please note that if this process is repeated at a later time, the saved log file will be overwritten, which could cause the relevant data to diagnose the alarm to be lost.**

If the log file is saved to a USB drive or is downloaded through the unit's Webserver, it can then be sent in advance to our service team for analysis. This can greatly help in identifying the problem in advance.

## 7.2 Alarms and Warnings list

See the following table for the main possible causes for an alarm or warning and their solution:

Fault	Cause	Solution	Restart procedure
<b>AL173</b> <b>HP alarm by pressure switch</b> <b>Alarm due to high pressure of the refrigerant:</b> The pressure of the refrigerant circuit is higher than the maximum allowed. It stops the compressor	Low water flow into the condenser	Clean the condenser Y strainer. Check that the cooling water supply is within the requirements indicated on section 4.1 of this manual	Disconnect the unit by turning Off the main power switch (see point 5.1). Turn it back On after at least 10 seconds have passed
	The cooling water temperature is too high	Try to reduce the temperature of the cooling water	
	High pressure switch failure	<b>Contact authorized technical service</b>	
	Internal pressostatic valve failure	<b>Contact authorized technical service</b>	
<b>AL174</b> <b>LP alarm by pressure switch</b> <b>Alarm due to low pressure of the refrigerant:</b> The pressure of the refrigerant circuit is below the minimum allowed	Ambient temperature too low	The minimum ambient temperature is -15°C	Disconnect the unit by turning Off the main power switch (see point 5.1). Turn it back On after at least 10 seconds have passed
	Water freezing	Verify the glycol concentration (see point 4.1). If the problem persists, <b>contact an authorized technical service</b>	
	Gas leakage	<b>Contact authorized technical service</b>	
	Low pressure transducer failure	<b>Contact an authorized technical service to replace it</b>	

Fault	Cause	Solution	Restart procedure
<b>AL165</b> <b>Alarm freeze evaporating temp.</b> <b>Alarm due to low evaporating temperature:</b> The evaporation temperature is too low and there is risk of freezing. It stops the compressor if it happens 3 times in a short period	Internal water circuit blocked  Possible freezing due to low ambient temperature  Water tank temperature sensor fault	Clean the water circuit. 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 accordingly. <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 controller's display (Info screens loop, "Info – Temp sensors" screen, see point 5.3.13). If it isn't <b>contact authorized technical service</b>	Disconnect the unit by turning Off the main power switch (see point 5.1). Turn it back On after at least 10 seconds have passed
<b>AL175</b> <b>Compressor 1 overload alarm</b> It stops the compressor	Q1 circuit breaker tripped  Compressor running in the wrong direction	Check if the electrical connections are correct. Check supply voltage and power surges  All the motors in the unit are delivered turning in the same direction. Verify that the pump is turning in the right direction. See point 4.2	Disconnect the unit by turning Off the main power switch (see point 5.1). Open the electrical box and reset the Q1 circuit breaker. Turn the Main power switch back On
<b>Tank level warning (Dry contact)</b>	Level warning switch did not switch to the "full" position  Water leak inside the UT unit  Water leak in the external water circuit  Water leak in the water pump	Check that the level switch works properly and that the tank is full enough. After disconnecting the Main Power switch open the right panel, open the water tank to check the water level  <b>Contact authorized technical service</b>  Find the leak and get it repaired  <b>Contact authorized technical service</b> to replace the water pump. Check that the water quality is inside the limits (see point 10.1)	It is only a warning; the unit is still working normally. To remove the warning, fill the tank until the maximum level of the tank is reached.

Fault	Cause	Solution	Restart procedure
<b>AL012</b> <b>Tank level alarm</b> It stops the whole unit	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 right panel, open the water tank to check the water level	Disconnect the unit by turning Off the main power switch (see point 5.1). Turn it back On after at least 10 seconds have passed
	Water leak inside the UT unit	<b>Contact authorized technical service</b>	
or <b>Pump overload</b> It stops the whole unit	Water leak in the external water circuit	Find the leak and get it repaired	Disconnect the unit by turning Off the main power switch (see point 5.1). Open the electrical box and reset the Q2 or Q3 circuit breakers. Turn the Main power switch back On
	Water leak in the water pump	<b>Contact authorized technical service</b> to replace the water pump. Check that the water quality is inside the limits (see point 10.1)	
<b>AL474</b> <b>Internal Tank High Temperature</b> It stops the whole unit	Circuit breaker Q2 or Q3 has tripped	Check if the electrical connections are correct. Check voltages, intensities and variations. Check water pressure. Check water quality. Check if the pump is blocked	The unit restarts automatically once the temperature has dropped enough
	3-way proportional valve stuck in a fixed position	Check that the 3-way proportional valve is working correctly. Wait until the temperature decreases. If the problem persists, <b>contact authorized technical service</b>	
	The temperature has increased too much after a different alarm has stopped the compressor	Reset the alarm that has stopped the compressor and wait until the temperature decreases	

Fault	Cause	Solution	Restart procedure
<b>AL467</b> <b>Main circuit low flow</b> There is no water flow in the main circuit or it is too low. It stops the whole unit	External or internal valve closed          Water circuit blocked	Check that there are no valves closed in the external water circuit. Check that the inlet valve inside the unit is fully open. Check that the outlet valve is properly adjusted to keep the main pump working at its nominal pressure (see point 4.2)  Clean the water circuit	Press the <b>Alarm</b> button once, press <b>Down</b> to reach the alarms reset screen and keep the <b>Alarm</b> button pressed for a few seconds until the pump restarts
<b>AL469</b> <b>Heater outlet high temperature</b> It stops the whole unit	The water temperature measured at the heater's outlet has exceeded the maximum values	<b>Contact authorized technical service</b>	Disconnect the unit by turning Off the main power switch (see point 5.1). Turn it back On after at least 10 seconds have passed
<b>AL470</b> <b>DN33 communication error</b> It stops the whole unit	The communication between the main controller and the temperature limit safety controller inside the unit is lost	It could be a momentary error due to external interferences. Check that all cables between the two controllers are tight. If the problem persists, <b>contact authorized technical service</b>	Disconnect the unit by turning Off the main power switch (see point 5.1). Turn it back On after at least 10 seconds have passed
<b>AL460</b> <b>cpCOe offline</b> It stops the whole unit	The communication between the main controller and its expansion module is lost	Check that all cables between the two modules are tight. If the problem persists, <b>contact authorized technical service</b>	Disconnect the unit by turning Off the main power switch (see point 5.1). Turn it back On after at least 10 seconds have passed
<b>AL100 and AL101</b> <b>Discharge pressure probe error AND Suction pressure probe error</b> It stops the compressor	Major refrigerant leak, the unit has lost all of its refrigerant gas  Faulty pressure probes	<b>Contact authorized technical service</b>  <b>Contact authorized technical service</b>	The unit can be restarted after it is repaired
<b>Various temperature / pressure probe errors</b> Depending on the probe, the unit may keep running or it may stop working	A probe is damaged or not reading correctly	Check that the electrical connections are tight. If the problem persists, <b>contact authorized technical service</b>	The unit can be restarted when the faulty probe is replaced

Fault	Cause	Solution	Restart procedure
<p>AL465, AL471 or AL475 PT100 sensor error or 4-20 mA input signals error They stop the whole unit</p>	<p>Damaged PT100 sensor, damaged cable, loose connection or 4-20 mA signal interrupted</p>	<p>Check that all cables are tight, that the sensor or cables are not damaged and that the signals are being sent correctly. If the problem persists, <b>contact authorized technical service</b></p> <p>In the meantime, the unit can keep on running if the control mode is switched to Outlet temperature control and/or the 4-20 mA signals are disabled and the local controls are used instead (see point 5.3.12)</p>	<p>The unit can be restarted when the problem is solved or</p>
<p>The controller's display shows the message "NO LINK" or "I/O board 01 fault" or it doesn't lit up at all The unit keeps running and still responds to commands received through its digital inputs and to remote control through Ethernet</p>	<p>Controller's display cable damaged or loose connections  Controller's display damaged</p>	<p>Check that the cable connections are tight at both ends and examine the total length of the cable for any damages. If the cable is damaged <b>contact authorized technical service</b> to replace it</p> <p><b>Contact authorized technical service</b></p>	<p>The unit is still running normally and it accepts On/Off commands through the 23/24 digital input. Other settings and information functions are still available through the Ethernet connection</p>
<p>Maintenance request</p>	<p>The unit has exceeded the working hours defined between preventive maintenances</p>	<p><b>Contact authorized technical service</b> for a preventive maintenance of the unit</p>	<p>It's a warning only; the unit is still working normally. The authorized technical service will reset the warning during the preventive maintenance</p>

## 8 Technical Features

### 8.1 Technical Features with 50 Hz operation

UT		UT 2505 W E2	UT 3505 W E2	UT 5005 W E2	UT 2505 W E7	UT 3505 W E7	UT 5005 W E7	
Cooling capacity	kcal/h	22188	30358	40162	22188	30358	40162	
	kW	25,8	35,3	46,7	25,8	35,3	46,7	
Heating capacity	kW	35,0	35,0	50,0	26,5	26,5	37,8	
Water flow	l/min	90,0	90,0	180,0	90,0	90,0	180,0	
Water pressure	bar	3,0	3,0	3,5	3,0	3,0	3,5	
Refrigerant circuits	N°	1	1	1	1	1	1	
Compressor	N°	1	1	1	1	1	1	
	kW (each)	3,8	5,2	6,7	3,8	5,2	6,7	
	kW (total)	3,8	5,2	6,7	3,8	5,2	6,7	
Condenser	N°	1	1	1	1	1	1	
	kW (each)	29,6	40,5	53,4	29,6	40,5	53,4	
	kW (total)	29,6	40,5	53,4	29,6	40,5	53,4	
Evaporator	N°	1	1	1	1	1	1	
	kW (each)	25,8	35,3	46,7	25,8	35,3	46,7	
	kW (total)	25,8	35,3	46,7	25,8	35,3	46,7	
Process pump	kW	1,27	1,27	2,36	1,27	1,27	2,36	
	max	l/min	250	250	250	250	250	250
			min	25	25	25	25	25
	max	bar	3,2	3,2	4,8	3,2	3,2	4,8
min			1,5	1,5	2,5	1,5	1,5	2,5
Internal pump	kW	0,74	0,74	0,74	0,74	0,74	0,74	
	max	l/min	250	250	250	250	250	250
			min	25	25	25	25	25
	max	bar	1,6	1,6	1,6	1,6	1,6	1,6
			min	1	1	1	1	1
Volume water tank	l	100	100	100	100	100	100	
Cooling water flow	l/min	60,6	82,9	109,3	60,6	82,9	109,3	
Differential pressure cooling	bar	2	2	2	2	2	2	
Maximum pressure cooling	bar	6	6	6	6	6	6	
Sound Pressure Level (1)	dB(A)	47,0	49,0	50,0	47,0	49,0	50,0	
Power	kW	40,8	42,2	59,8	32,3	33,7	47,6	
Max. Fuse	A	80	80	125	80	80	125	
Voltage	V/Ph/Hz	400V/3Ph/50Hz			400V/3Ph/50Hz or 460V/3Ph/60Hz			
Storage Temp. Limits	°C (°F)	-25°C to 60°C (-13°F to 140°F)						

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

All data related to the following working conditions: Water outlet temperature at 20°C and cooling water temperature at 20°C.



## 8.2 Technical Features with 60 Hz operation

UT		UT 2505 W E7	UT 3505 W E7	UT 5005 W E7	
Cooling capacity	kcal/h	26058	35346	47816	
	kW	30,3	41,1	55,6	
Heating capacity	kW	35,0	35,0	50,0	
Water flow	l/min	90,0	90	180	
Water pressure	bar	4,4	4,4	5,7	
Refrigerant circuits	N°	1	1	1	
Compressor	N°	1	1	1	
	kW (each)	4,6	6,3	8,4	
	kW (total)	4,6	6,3	8,4	
Condenser	N°	1	1	1	
	kW (each)	34,9	47,4	64,0	
	kW (total)	34,9	47,4	64,0	
Evaporator	N°	1	1	1	
	kW (each)	30,3	41,1	55,6	
	kW (total)	30,3	41,1	55,6	
Process pump		kW	2,20	2,20	4,00
	max	l/min	300	300	300
	min		30	30	30
	max	bar	4,6	4,6	7
	min		2,3	2,3	3,6
Internal pump		kW	1,28	1,28	1,28
	max	l/min	300	300	300
	min		30	30	30
	max	bar	2,3	2,3	2,3
	min		0,9	0,9	0,9
Volume water tank	l	100	100	100	
Cooling water flow	l/min	60,6	82,9	109,3	
Differential pressure cooling	bar	2	2	2	
Maximum pressure cooling	bar	6	6	6	
Sound Pressure Level (1)	dB(A)	50,0	55,0	55,0	
Power	kW	43,0	44,8	63,6	
Max. Fuse	A	80	80	125	
Voltage	V/Ph/Hz	400V/3Ph/50Hz or 460V/3Ph/60Hz			
Storage Temp. Limits	°C (°F)	-25°C to 60°C (-13°F to 140°F)			

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

All data related to the following working conditions: Water outlet temperature at 20°C and cooling water temperature at 20°C.



## 10 Annexes

### 10.1 Water quality

In order to protect the water circuits of the Ultratemp units, the water to be cooled and also the cooling water must have specific physical/chemical properties so that they are not aggressive. If the water is outside any of the limits listed in the table below, it can seriously damage some of the materials of the Ultratemp 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	< 150 $\mu\text{m}$
Glycol	Max 40%

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 Ultratemp units as they have a conductivity below 50  $\mu\text{S}/\text{cm}$ .



Do not use automotive antifreeze. Use lab grade glycol only! Do not use a glycol concentration above 40%; this would damage the water pumps.



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.

## 11 EC DECLARATION OF CONFORMITY UT 2505 W

**Manufacturer:** LAUDA Ultracool S.L.  
Carretera de Rubí 316, 08228 Terrassa, Spain

Declares that under our sole responsibility the machines described below

**Product Line:** Ultratemp **Serial number:** from 79094

**Types:** UT 2505 W

comply with all relevant provisions of the EC Directives and Regulations listed below due to their design and type of construction in the version brought on the market by us:

Machinery Directive	2006/42/EC
Pressure Equipment Directive	2014/68/EU
EMC Directive	2014/30/EU
RoHS Directive	2011/65/EU in connection with (EU) 2015/863
F-GAS regulation	(EU) 517/2014

The evaluation process was carried out on its main high-pressure components (compressor, evaporator, liquid vessel and safety devices), the cooling circuit is in accordance with Module A category I of Directive 2014/68/EU.

The safety objectives of the Machinery Directive regarding electrical safety are complied in accordance with Annex I Paragraph 1.5.1 by its conformity with the Low Voltage Directive 2014/35/EU.

Applied standards:

- EN 378-2:2016

Authorized representative for the composition of the technical documentation:

Xavi Prats, Technical Director

Terrassa, 15<sup>th</sup> February 2024



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Carlos Díez, Quality Engineer

## 12 EC DECLARATION OF CONFORMITY UT 3505 W, UT 5005 W

**Manufacturer:** LAUDA Ultracool S.L.  
Carretera de Rubí 316, 08228 Terrassa, Spain

Declares that under our sole responsibility the machines described below

**Product Line:** Ultratemp **Serial number:** from 79094

**Types:** UT 3505 W, UT 5005 W

comply with all relevant provisions of the EC Directives and Regulations listed below due to their design and type of construction in the version brought on the market by us:

Machinery Directive	2006/42/EC
Pressure Equipment Directive	2014/68/EU
EMC Directive	2014/30/EU
RoHS Directive	2011/65/EU in connection with (EU) 2015/863
F-GAS regulation	(EU) 517/2014

The evaluation process was carried out on its main high-pressure components (compressor, evaporator, liquid vessel and safety devices), the cooling circuit is in accordance with Module A2 category II of Directive 2014/68/EU

**Notified body:** BUREAU VERITAS INSPECCIÓN Y TESTING, S.L.  
Camí Can Ametller, 34 EDIFICI 3  
08195 Sant Cugat del Vallès (Barcelona),  
Spain

**Code number of notified body:** 0056

**EC certificate of conformity applied:** CE-0056-PED-A2-LUD 001-24-ESP

The safety objectives of the Machinery Directive regarding electrical safety are complied in accordance with Annex I Paragraph 1.5.1 by its conformity with the Low Voltage Directive 2014/35/EU.

**Applied standards:**

- EN 378-2:2016

**Authorized representative for the composition of the technical documentation:**

Xavi Prats, Technical Director

Terrassa, 15<sup>th</sup> February 2024



Carlos Díez, Quality Engineer