Julabo
THE TEMPERATURE CONTROL COMPANY

Heating immersion circulators, heating circulators with open bath, refrigerated circulators

Translation of the original operating manual

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EN

Foreword

Congratulations

You have made a good choice.

JULABO thanks you for the trust you have placed in us.

These operating instructions are intended to familiarize you with the operation and possible applications of our appliances. Please read the operating instructions carefully. Keep the operating instructions to hand at all times.

Copyright

The illustrations in this operating manual are for illustrative purposes only and are not necessarily shown to scale.

Imprint

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1 General information

1.1 About This Operator's Manual

This operating manual contains important notices regarding the safe installation, operation, and maintenance of the devices listed on the cover page.

It is intended for anyone who installs, operates, or maintains these devices.

NOTE

Observe the safety instructions!
Before putting the device into service, read the operating instructions in their entirety and keep them for future reference.

1.2 Notes on CE marking

The conformity of this product with the relevant EU directives is confirmed by the EU Declaration of Conformity contained in the appendix to these instructions.

The conformity of this product with the relevant regulations of the United Kingdom is demonstrated by the UKCA Declaration of Conformity included in the appendix to this manual.

1.3 Accessories

JULABO offers a wide range of accessories for these devices. These accessories are not described in this operating manual.

You can find the complete range of accessories for the devices described in this operating manual on our website at www.julabo.com. Please use the search function on the website.

NOTE

Use only genuine JULABO accessories!
Using unsuitable accessories will void the JULABO warranty.

1.4 Symbols used

This user manual uses various symbols to make it easier to understand. The list below describes the symbols used.

► Prerequisite for the following procedure
1. Numbered action steps
⇨ Interim results for individual steps
✓ Final result of a procedure
< > Terms in angle brackets indicate operating menus
[ ] Terms in square brackets refer to keys, softkeys and buttons

1.5 Operator obligations

The operator must comply with the following obligations in order to ensure safe operation:

- The operator is responsible for the qualification of the operating personnel.
- The operator is responsible for training the operating personnel in the use of the equipment.
- Train operating personnel at regular intervals on the hazards associated with their work and on the measures to prevent them.
- The operator must ensure that the persons entrusted with operation, installation and maintenance have read and understood the operating instructions.
- The device may only be configured, installed, maintained and repaired by appropriately qualified personnel.
- If hazardous substances or substances that could become hazardous are used, the device may only be operated by persons who are qualified to handle these substances and the device.
- The operator must ensure that the appliance is checked for safe and proper condition at regular intervals depending on its use.
- The operator must ensure that the mains supply has a low impedance in order to avoid interference with devices that are operated on the same mains supply.
- The appliance is not suitable for children or persons with mental or severe physical disabilities.

1.6 Qualification of the operating personnel

Technical personnel are defined as persons who have successfully completed vocational training. They must be able to assess the work assigned to them and independently recognize and avoid potential hazards based on their technical training and professional experience.

2 Safety instructions

2.1 Meaning of the warnings

The operating instructions contain warnings intended to ensure safety when using the device. Always follow the warnings.

A warning sign in signal color precedes the signal word. The colored signal word classifies the severity of the danger.

DANGER

The signal word indicates a hazard with a high degree of risk which, if not avoided, will result in death or serious injury.

WARNING

The signal word indicates a hazard with a medium degree of risk which, if not avoided, could result in death or serious injury.

CAUTION

The signal word indicates a hazard with a low level of risk which, if not avoided, may result in minor or moderate injury.

NOTE

The signal word indicates a potentially harmful situation. If it is not avoided, the system or objects in its vicinity may be damaged.

2.2 General Safety Instructions

The device is manufactured in accordance with the state of the art and recognized safety standards. Nevertheless, its use may pose a risk to the life and limb of the user or third parties.

Read and follow the safety instructions below before use.

DANGER

Electric shock from the electrical system!

Touching damaged live parts can result in severe electric shock and may injure or kill people.

- Have damaged insulation and components of the electrical system repaired immediately by a JULABO service technician or a qualified service center.
- Replace damaged power cords immediately.
- Do not operate the unit if the power cord is damaged.
- When making a connection using the power plug, ensure that the plug is always easily accessible.

DANGER

Danger to life due to electric shock!

An electric shock can result in serious injury or death.

- Operate the device only on a power outlet protected by a residual current circuit breaker (Type B, $I_{\Delta n}$ = 30 mA).
- Operate the device only at outlets with a protective ground (PE).

DANGER

Danger to life due to electric shock!

An electric shock can result in serious injury or death.

- Live parts are enclosed within the device housing. If the device housing is damaged, live parts may be exposed.
- Do not connect the device to the power supply if the housing is damaged!

DANGER

Danger of death from electric shock!

An electric shock can result in serious injury or death.

- The device may only be opened by a qualified electrician.
- Work on the electrical system must be performed exclusively by qualified electricians.

WARNING

Hot surfaces!
The following parts and components may become hot during operation or remain hot for some time after operation:
– heat transfer fluid
– Heating element
– Bath lid
– Bath surface

Contact may result in severe burns or scalds to the hands, arms, face, and limbs.
- Keep a safe distance from hot surfaces and liquids.
- Wear appropriate protective gloves.

WARNING

Suspended loads!
Falling loads can cause serious injury and damage the equipment.
- Do not stand under a suspended load.
- Transport the unit using suitable and safe lifting equipment.
- Wear personal protective clothing.

WARNING

Maintenance and Repair Work!
Improper maintenance and repair work jeopardizes operational safety. This can result in serious injury or death.
- Perform only the work described in this operating manual.
- Before starting work, turn off the unit and unplug it from the power source.
- Have repair work performed only by JULABO service technicians or an authorized service center.

CAUTION

Improper Use!
If the device is used in a manner not intended by the manufacturer, the protection provided by the device may be compromised.

CAUTION

Immediately take the unit out of service and disconnect it from the power supply in the event of:

- medium leakage,
- Unusual noises, odors, or vibrations,
- Smoke, sparks, or flames inside or on the device.

Do not continue to operate the device. It may only be put back into service after a professional inspection and repair by qualified personnel.

NOTE

No liability is assumed for the use of unsuitable heat transfer fluids!
Unsuitable heat transfer fluids that have not been approved by JULABO may damage the device.

- Use heat transfer fluids recommended by JULABO.
- Check parts in contact with the heat transfer fluid for compatibility with the heat transfer fluid before filling.
- Do not exceed the maximum permissible viscosity during operation.
- Consult JULABO before using any heat transfer fluid other than the recommended one.

NOTE

Use only genuine JULABO replacement parts!
Using non-original replacement parts voids the JULABO warranty.

NOTE

Use only genuine JULABO accessories!
Using unsuitable accessories will void the JULABO warranty.

NOTE

Wear personal protective equipment!
Failure to use or the use of unsuitable personal protective equipment increases the risk of health hazards and personal injury.
Examples of personal protective equipment include:

- Work gloves
- Safety shoes
- Protective clothing
- Respiratory protection
- Hearing protection
- Face and Eye Protection
- Determine and provide personal protective equipment appropriate for the specific application.
- Use only personal protective equipment that is in good condition and provides effective protection.
- Adjust personal protective equipment to fit the wearer, e.g., size.

NOTE

Keep safety labels legible!
Safety labels on the equipment warn of hazards at danger zones and are an important part of the equipment's safety features. Missing safety labels increase the risk of injury to people.

- Clean any soiled safety labels.
- Replace damaged or illegible safety labels immediately.

2.3 Intended Use

JULABO immersion and bath thermostats are designed for temperature control application of water. Samples can be temperature-controlled in suitable vessels.

2.4 Anticipated Misuse

The device is not suitable for the direct temperature control application for food and beverages, as well as pharmaceutical and medical devices.

The device is not suitable for use in a potentially explosive atmosphere.

The device is not suitable for use in a corrosive or aggressive environment.

The device is not intended for use in residential areas. It may interfere with radio reception.

2.5 Safety Labels

The following safety labels are affixed to the device.

Symbol	Description	Location
	Warning of a hazardous area. Follow the operating instructions.	Back of the device
	Read the operating instructions before turning on the device.	Back of the device

2.6 Protective devices

Technical safety devices ensure safe operation. If a safety device is triggered, the operator is warned by a message on the display and an acoustic signal.

Overheating protection

The overheating protection prevents the heater from overheating.

The protective mechanism triggers if the appliance detects a temperature difference of more than 20 K between the working temperature sensor and the safety temperature sensor. An error message appears on the display. A restart is required.

Low level protection

A level switch detects if the level of the temperature control liquid in the bath tank is too low. The appliance issues a warning to prevent the heater from overheating and the pump from running dry.

The low level alarm is triggered when the float reaches its lower limit stop. The device switches off the pump and heater. A continuous signal tone sounds. An error message appears on the display. A restart is required.

3 Technical data

Performance specifications measured in accordance with DIN 12876.
Performance specifications apply at an ambient temperature of 20 °C.

Classification of the device according to CISPR 11:
- The device is an ISM device of Group 1, Class A, which uses radio frequency for internal purposes
- Class A: Use in an industrial electromagnetic environment

The device is designed in accordance with IEC 61010-1 for safe operation under the following environmental conditions:
- Indoor use
- Altitude up to 2000 m above sea level
- Ambient temperature +5 … +40 °C (unless otherwise specified in the technical data)
- Maximum relative humidity of 80% at air temperatures up to 31 °C, decreasing linearly to 50% relative humidity at 40 °C
- Pollution degree 2

NOTE

The maximum transport temperature is +70 °C.

General Information		
Display		LED segment display
Protection class according to IEC 60529		IP21

Temperature Data		
Operating temperature range	°C	+20 ... +100
temperature stability	K	±0.03
Temperature resolution	K	0.01
Temperature control		PID1
Temperature setting		digital
ATC sensor calibration		1-point calibration

Dimensions and Weight		
Overall Dimensions (W x D x H)	cm	13.2 x 16.0 x 36.2
Weight	kg	1.9
Immersion depth	cm	16.6

Pump		
Flow rate	l/min	6
Delivery pressure	bar	0.1
Max. viscosity	cSt	1

Electrical Connection Specifications					
Mains connection	V Hz	100–115 50/60		200–230 50/60	
	V Hz	100 50/60	115 /60	200 50/60	
Current consumption	A	8	10	9	
Heating capacity	kW	0.8	1.0	2.0	
Mains fuse, resettable	A	15			

3.1 Materials and Media Compatibility

3.1.1 Materials of Parts in Contact with the Medium

The following table lists the materials that may come into contact with the heat transfer fluid.

This information can be used to verify compatibility with the heat transfer fluid being used.

- 1.4301 / 304 / S30400
- 1.4401 / 316 / S31600
- 1.4404 / 316L / S31603
- 1.4571 / 316Ti / S31635
- FPM / FKM 75
- PPS

3.1.2 heat transfer fluids

The most important criterion when selecting the heat transfer fluid is the operating temperature range in which the application is used.

- Select the heat transfer fluid so that its flash point is never exceeded when it comes into contact with the ambient air.
- Recommended heat transfer fluids and further information are available on the JULABO website.

NOTE

No liability is assumed for the use of unsuitable heat transfer fluids!
Unsuitable heat transfer fluids that have not been approved by JULABO may damage the device.

- Use heat transfer fluids recommended by JULABO.
- Check parts in contact with the heat transfer fluid for compatibility with the heat transfer fluid before filling.
- Do not exceed the maximum permissible viscosity during operation.
- Consult JULABO before using any heat transfer fluid other than the recommended one.

NOTE

Adding ammonia to the heat transfer fluid is not permitted!

Water Quality Requirements

When using water as the heat transfer fluid, the following water quality requirements apply:

- Calcium carbonate concentration: 0.7–1.4 $^{mmol}/_{l}$
- pH value: 6–8.5
- Ultrapure water / distilled water is suitable as a heat transfer fluid after adding 0.15 g of $NaHCO_3$ per liter of water.

NOTE

The following types of water are unsuitable as a heat transfer fluid:

- distilled, deionized, and fully desalinated water
- seawater
- water containing halogens or halides (e.g., chlorinated water or fluorinated water)
- contaminated water
- water containing iron
- River water

3.2 heat transfer hoses

Heat transfer hoses for the connection to an external system must be designed for the operating temperature range and the specific temperature control application.

You can find heat transfer hoses for every application on our website.

Heat transfer hoses must meet the following requirements:

- Temperature resistance
- Pressure resistance
- Material properties suitable for the heat transfer fluid used

NOTE

Damage to heat transfer hoses due to kinking!

Heat transfer hoses are damaged by kinks and may develop leaks.

- Lay the heat transfer hoses in wide bends.
- Avoid kinking the heat transfer hoses.

4 Structure and function

4.1 Product Overview

The circulators can be combined with various baths with volumes of up to 30 l.

Hang-on Thermostat

CORIO C circulator for bath vessels up to 30 L.

Bath Thermostat

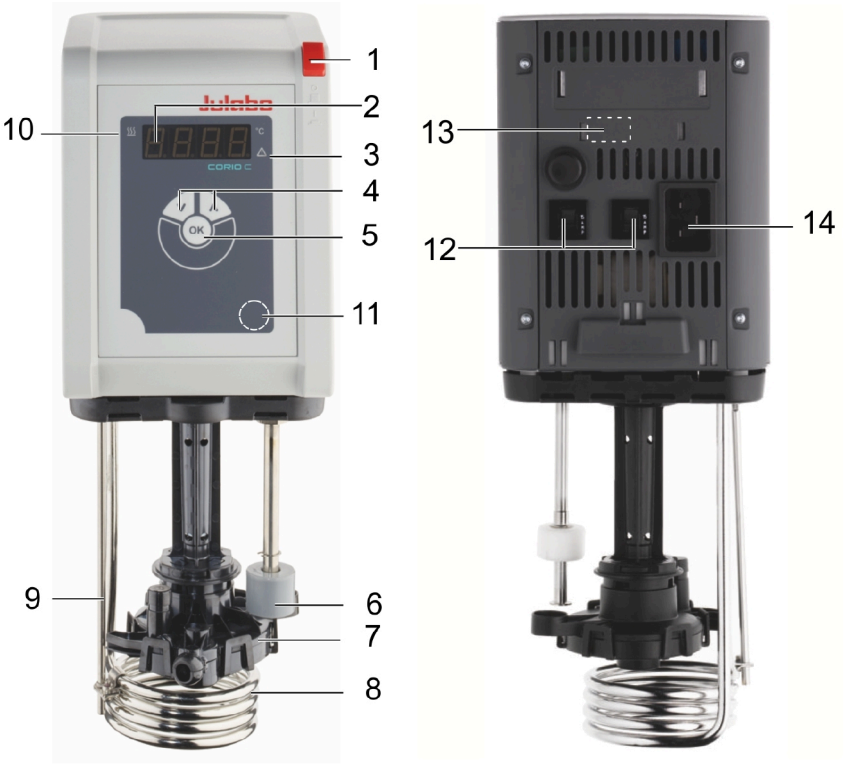
Circulator with a transparent bath vessel. Example: CORIO C-BT9.

4.2 Function Description

The circulator can be mounted on any bath vessel with a volume of up to 30 liters.

4.3 Controls and Functional Elements

This chapter describes the controls and functional elements and shows their locations on the device.



Control and Operating Elements CORIO C

1. Power switch
2. LED temperature display, menu display
3. Status indicator – Alarm
4. Edit buttons:
   Set temperature setpoint higher/lower; press button briefly for single steps, hold button down for rapid counting
5. OK button: 1. Turn the device on/off; 2. Save value/parameter
6. Float
7. Pump
8. Pipe heater
9. Temperature sensor
10. Control indicator – Heating
11. Service button (hidden)
12. Mains fuse: 15 A circuit breakers
13. USB interface (covered by a sticker)
14. Power connection: Built-in appliance plug

The device is operated via the keypad. All menu functions and inputs are controlled here.

Button	Function
	The **[OK]** key starts a temperature control application or stops a running one. The **[OK]** key activates a selected function or confirms a set value.
	Use the arrow keys to select a function or set a value. Press briefly for single steps; hold down for rapid cycling.

5 Transportation

CAUTION

Hot/cold surface!
The heating element may still be hot even after the device has been turned off and can cause burns if touched.
- Wear heat-resistant protective gloves.
- Allow the unit to cool to room temperature after turning it off.

CAUTION

Risk of crushing from falling equipment!
An unsecured unit can fall during improper transport and cause crush injuries.
- Secure the unit against tipping and falling during transport.
- Secure loose parts to prevent them from falling during transport.
- Transport the equipment in an upright position using a suitable means of transport.
- Wear safety shoes.

Prerequisites

▶ The unit is turned off and disconnected from the power supply.

▶ The heat transfer fluid has been drained.

▶ All external connections have been removed.

Procedure

1. Disconnect the circulator from the bath.

   NOTE See the technical specifications for weight information.

✓ The unit can be safely transported to its installation location.

6 Set up

6.1 Set up the device at the place of operation

Prerequisites

- ▶ The device has been transported to the place of operation.
- ▶ The size and infrastructure of the place of operation are suitable for operating the device.

NOTE Recommended minimum distance of 1 m from adjacent devices to avoid electromagnetic interference.

Procedure

1. Place the device on a level, smooth, non-flammable surface.

NOTE
- Ensure the device is stable.
- Maintain a clearance of at least 20 cm in front of and behind the device.
- Do not cover any ventilation openings in the housing.
- The refrigerant cycle must not be damaged.

✓ The unit is installed at the place of operation.

7 Commissioning

7.1 Installing a Heated Circulator or Refrigerated Circulator

In the case of a heated circulator or a refrigerated circulator, the circulator is mounted on the closed bath or on the cooling machine.

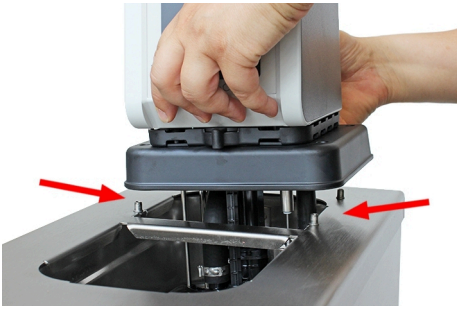
If the circulator is removed—for example, due to a unit replacement or for service purposes—it can then be easily reinstalled using the junction box.

Prerequisites

- ▶ The circulator is ready for installation on a closed bath or a cooling machine.
- ▶ The bath is empty.

Procedure

1. Carefully insert the circulator into the bath. Align the four holes in the junction box with the four threaded sleeves on the bath.



2. Position the mounting screws into the holes in the junction box.
3. Tighten the mounting screws.

4. Check for proper fit and sealing.
✓ The circulation thermostat or refrigeration circulation thermostat is now installed.

7.2 Connect the device to the power supply

7.2.1 Connecting a Bridge Thermostat or Heated Circulator

This section describes the electrical connection of the device with a power plug.

DANGER

Electric shock from the electrical system!
Touching damaged live parts can result in severe electric shock and may injure or kill people.
- Have damaged insulation and components of the electrical system repaired immediately by a JULABO service technician or a qualified service center.
- Replace damaged power cords immediately.
- Do not operate the unit if the power cord is damaged.
- When making a connection using the power plug, ensure that the plug is always easily accessible.

DANGER

Danger to life due to electric shock!
An electric shock can result in serious injury or death.
- Operate the device only on a power outlet protected by a residual current circuit breaker (Type B, $I_{\Delta n}$ = 30 mA).
- Operate the device only at outlets with a protective ground (PE).

DANGER

Danger to life due to electric shock!
An electric shock can result in serious injury or even death.
- Live parts are enclosed within the unit's housing. If the unit's housing is damaged, live parts may be exposed.
- If the appliance housing is damaged, do not connect the appliance to the power supply!

NOTE

Damage to the power cord due to excessive heat!
The power cord must not come into contact with any parts that become hot during operation.
- Keep the power cord away from surfaces that may become hot.

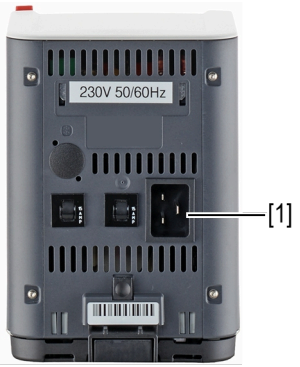
Prerequisites

- ▶ The circulator is installed as a bridge or heated circulator.
- ▶ The power cord is ready for use.

NOTE If the 200–230 V, 50/60 Hz version is used in the United States or Canada, the JULABO USA 3x12AWG power cord (order number 7.901.2694) must be used. This power cord is not included in the scope of delivery.

Procedure

1. Plug the device connector of the included power cord into the power connection socket on the back of the unit [1].



2. Plug the power cord into an outlet.

✓ The device is now connected to the power supply.

7.3 Filling the device

This section describes how to fill the appliance with temperature control medium during commissioning.

The filling quantity can be found in the technical data.

NOTE

Property damage due to overflow of the heat transfer fluid!
Expansion of the heat transfer fluid during operation can cause the system's maximum fill volume to be exceeded. Uncontrolled leakage of the heat transfer fluid can cause damage to the unit.

- Do not fill the unit unattended.
- Connect the hose to the overflow and route it into a suitable collection vessel.
- Never block the overflow at the back of the unit!

Prerequisite

▶ The unit is mounted on a bath and turned off.

Procedure

1. Fill the bath with water.

   NOTE Maximum fill level: 30 mm below the top edge of the bath.

   NOTE As the temperature rises, the heat transfer fluid expands and may overflow.

   NOTE As the temperature drops, the low-level protection may activate and interrupt the temperature control process.

2. Place the item to be temperature-controlled into the bath.
3. Adjust the liquid level as needed by adding more fluid or draining some out.

   NOTE At operating temperature and with the material to be temperature-controlled in place, the level of the heat transfer fluid in the bath vessel should be above the circulator's heating coil.

✓ The unit is filled with heat transfer fluid.

7.4 Adjusting the Flow of the Heat Transfer Fluid

Use the lever on the front panel to set the flow direction of the heat transfer fluid:

- Lever position to the left (external): The heat transfer fluid is primarily directed to the external application.
- Lever in the right position (internal): The heat transfer fluid is primarily circulated within the internal bath.

NOTE

Spilling heat transfer fluid

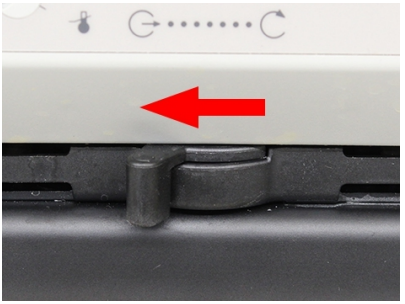
If the pump connections are not sealed, heat transfer fluid may spray out even when the flow direction is set internally.

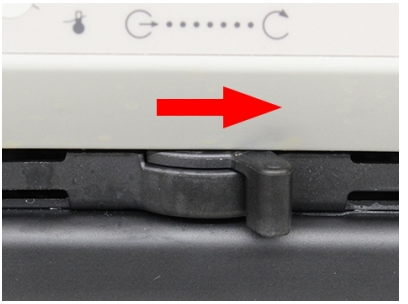
- For a temperature control application, seal the external pump connections.

Prerequisites

▶ The unit is turned off.

▶ The unit is filled with heat transfer fluid.





Procedure

1. Set the lever to a low setting for internal circulation (e.g., position 2 from the right stop).
2. Turn on the unit and check whether the flow of the heat transfer fluid is suitable for the application.
3. Adjust the flow rate so that it is suitable for the application.

✓ The heat transfer fluid flow is now set.

8 Operation

8.1 User Interface

This section describes the controls and functional elements and shows their location on the device.

8.2 Alarms and Warnings

Alarms and warnings are indicated by error codes on the display.
Important error codes are described in the chapter **“Malfunctions and Troubleshooting**.”

If an error cannot be resolved by the operator, contact Technical Support.

Warning:

A warning does not interrupt the temperature control application. An intermittent beep sounds. The display alternately shows the current temperature and the error code. The beep can be turned off by pressing the **[OK]** button. Once the cause of the warning has been resolved, the warning will clear. Depending on the cause, warnings may clear on their own after a certain amount of time, e.g., as the unit cools down.

Alarm:

When an alarm occurs, the indicator LED lights up. The temperature control application is stopped. At the same time, a continuous beep sounds and an error code appears on the display. The beep can be silenced by pressing the **[OK]** button. The cause of the alarm must be resolved. A restart is required.

NOTE

The list of alarm and warning messages can be found in **Chapter 10, “Malfunctions and Troubleshooting.”**

8.3 Operator Messages

Operator messages are informal messages that inform the operator of status changes in the device.

Operator messages display the operating status of individual units in the status bar of the home screen. Status messages from a connected cooling machine are also displayed as operator messages.

8.4 Turning on the Device

This section describes how to turn on the device.

Prerequisites

▶ The device is connected and ready for use.

Procedure

1. Turn on the device using the power switch.
   ⇨ All display elements light up briefly; the software boots and starts the device.

✓ The device is turned on and ready for operation. The display shows “OFF.” If the autostart function is enabled, the device starts up directly with the last setting.

8.5 Turning Off the Device

This section describes how to turn off the device.

Prerequisites

▶ The device is turned on.

Procedure

1. Stop the current temperature control application.

   NOTE Do not turn off the unit until it is in standby mode.

2. Turn off the unit at the power switch.

✓ The unit is now turned off.

8.6 Start temperature control application

A temperature control application can be started directly on the unit. Another option is to control the temperature control application using the timer.

Prerequisites

- ▶ The unit is turned on.
- ▶ The setpoint temperature has been set.

Procedure

1. Hold down the **[OK]** button until the temperature control application starts.

✓ The setpoint temperature is saved. The display flashes briefly. The device begins temperature control application immediately. Press the **[OK]** button to pause the temperature control application.

NOTE

Note for heating thermostats:
For temperature control tasks near or below ambient temperature: Use a cooling coil or a JULABO immersion chiller.

8.7 Set the Setpoint Temperature

The device maintains the temperature at the setpoint. The setpoint can be changed during the temperature control application. The set value is saved.

Prerequisites

▶ The device is turned on.

Procedure

1. Briefly press one of the arrow keys.
   ⇨ The display switches from the actual value display to the setpoint display and shows the last saved setpoint temperature. The digit before the decimal point flashes.
2. Adjust the value before the decimal point using the arrow keys and confirm with **[OK]**.
   ⇨ The set value is applied. The decimal place flashes.
3. Use the arrow keys to set the decimal place value and confirm twice with **[OK]**.
   ⇨ The set value is applied. The new setpoint temperature flashes briefly.

✓ The setpoint temperature is now set and active.

8.8 Enable the Autostart Function

The autostart function allows you to start a temperature control application directly using the power switch or via an intermediate timer.

The unit is factory-configured to switch to a safe operating state in the event of a power failure. The autostart function is disabled. “OFF” appears on the display. The chiller, heater, and pump motor are disconnected from the mains power supply.

WARNING

Unsupervised automatic startup of the unit!
When commissioning the unit, ensure that an unattended automatic startup—e.g., following a power outage—cannot pose a hazard to people or equipment.

- Ensure that the unit’s safety and warning devices are functioning properly.

Prerequisites

▶ The unit is turned off

▶ The autostart function is disabled.

Procedure

1. Press and hold the **[OK]** button and the power switch simultaneously until the device turns on.
   ⇨ The display shows **<AOn>**.

✓ The autostart function is enabled. The temperature control application starts automatically with the preset values and continues each time the device is turned on, as long as the autostart function remains active. To disable it, turn off the device and repeat the procedure. **<AOFF>** will then appear on the display.

A timer can be connected and programmed. In this case, the unit’s power switch must remain on at all times.

8.9 Set the Timer

The timer allows you to program the duration of a temperature control application from 0 to 999 minutes. The setpoint temperature is maintained for the programmed duration. Once the set duration has elapsed, the device switches to standby mode.

Prerequisites

⇨ The device is turned on.

Procedure

1. Press the **[Down Arrow]** button and the **[OK]** button at the same time.
   ⇨ The display shows **<t O>**.
2. Use the arrow keys to set the minutes and press **[OK]** to confirm.
   ⇨ The display flashes briefly.

✓ The timer is set and active.

The decimal point flashes on the display until the timer starts. The timer starts when the setpoint temperature is reached and maintained for at least 30 seconds with an accuracy of ±0.1 °K. If the remaining time is less than 1 minute, it is displayed in seconds. Once the set time has elapsed, a beep sounds twice and the device switches to standby mode. The setpoint temperature can still be changed until it is reached. The timer remains active and starts when the new setpoint temperature is reached. If the setpoint temperature is changed while the timer is running, the timer is deactivated. Press the **[OK]** button to stop the running timer

8.10 Adjusting the Temperature Sensor (ATC)

Due to physical conditions, a temperature difference may develop in the bath vessel between the temperature sensor and a defined, more distant point within the temperature control medium volume. As a result, the measured temperature deviates slightly from the actual temperature in the bath. Calibrating the temperature sensor can improve the accuracy of the temperature control application.

Prerequisites

- ▶ The bath vessel is filled.
- ▶ The device is turned on.

Procedure

1. Hang the thermometer in the bath vessel and place the bath lid on top.
2. Set the desired target temperature and start the temperature control application.
   - ⇨ Once the setpoint is reached, allow the temperature to stabilize for a few minutes.

   NOTE The more stable the temperature in the bath vessel, the more accurate the calibration result.
3. Press the Service button and the **[Down Arrow]** button simultaneously until the decimal point flashes briefly.
4. Use the arrow keys to enter the measured reference temperature, then confirm with **[OK]**.

   NOTE The calibration value is applied immediately. The display shows **<CAL>** to confirm.

   - ⇨ The entered reference temperature must be within ±5 °C of the setpoint temperature; otherwise, an error message will appear and the entry will be ignored.

- ✓ The temperature sensor is calibrated.

9 Cleaning and maintenance

9.1 Taking the Device Out of Service and Storing It

If a device is not going to be used for an extended period of time or, for example, needs to be sent to Technical Service for repair, it should be taken out of service. To ensure that it continues to function reliably even after prolonged storage, follow the procedure described below.

Prerequisites

▶ The device is turned off and disconnected from the power supply.

Procedure

1. Completely drain the device (see **“Draining the Device”).**
2. Completely drain the heat transfer fluid.
3. Clean the unit inside and out.
4. Remove all residues of the cleaning fluid from the piping system (e.g., with compressed air).
5. Close all connections and drain valves.
6. Store the unit in a well-ventilated, dust-free, dry, and frost-free location. Avoid corrosive and aggressive environments.

✓ The unit is stored safely and securely. It can be put back into service as needed.

9.2 Maintenance Intervals

The table lists the regular maintenance tasks according to their maintenance intervals. The maintenance intervals listed apply to single-shift operation. The time specifications are approximate.

Interval	Task	Qualification	Duration [min]
Every 6 months	Check the function of the low-level protection	Operator	15
Every 2 years	Check safety markings	Operator	1

NOTE

For information on JULABO’s maintenance and service offerings, contact JULABO Sales or Service.

9.3 Genuine JULABO Replacement Parts

Reliable continuous operation and safety also depend on the quality of the replacement parts used.

Only genuine JULABO replacement parts guarantee the highest quality and safety. You can obtain genuine JULABO replacement parts directly from JULABO or through authorized JULABO dealers.

NOTE

Use only genuine JULABO replacement parts
Using non-genuine replacement parts voids the JULABO warranty.

9.4 Emptying the Device

If the device is to be sent to Technical Service or disposed of properly, it must be completely emptied.

As a general rule, the device should be completely drained before any extended period of non-use and whenever the external application is changed.

CAUTION

Risk of scalding from hot heat transfer fluid!
The heat transfer fluid can become very hot during the temperature control process. Contact with hot heat transfer fluid can cause scalding.

- Allow the unit to cool to room temperature before draining it.
- Avoid direct contact with hot heat transfer fluid
- Wear protective gloves.

Prerequisites

- ▶ The unit is turned off.
- ▶ The device has reached room temperature.
- ▶ A sufficiently large collection container is placed beneath the unit's drain.

Procedure

1. Remove the material being temperature-controlled from the bath.
2. Remove the circulator from the bath.
3. Empty the bath over a sink.

✓ The unit is now empty.

9.5 Cleaning the Unit

The exterior of the unit should be cleaned at regular intervals. Before using any cleaning or decontamination method other than those recommended by JULABO, consult with JULABO to ensure that the intended method will not damage the unit.

NOTE

Damage to the electronics caused by water ingress!
Water ingress can damage the device's electronics and cause the device to fail.

- Clean the exterior of the unit only with a damp cloth.
- Prevent water from entering the unit.

Requirements

- ▶ Lint-free cloth
- ▶ Mild detergent
- ▶ The unit is turned off.
- ▶ The device is disconnected from the power supply.

Procedure

1. Allow the device to cool to room temperature.
2. Clean the surface of the device with a damp cloth.

   NOTE You can use a small amount of dish soap for cleaning. If in doubt, ask Technical Support about alternative cleaning agents.

✓ The device is clean.

9.6 Replacing the Detachable Power Cord

The device is equipped with a detachable power cord.

NOTE

The device must only be operated with the power cord provided. If the power cord needs to be replaced due to a defect, it can be reordered.

Order number	Description
7.901.2655	EU power cord, 200–230 V

9.7 Check Low-Level Protection for Proper Operation

This section describes how to check the function of the low-level protection.

CAUTION

Risk of scalding from hot heat transfer fluid!
The heat transfer fluid can become very hot during the temperature control process. Contact with hot heat transfer fluid can cause scalding.
- Allow the unit to cool to room temperature before draining it.
- Avoid direct contact with hot heat transfer fluid
- Wear protective gloves.

Prerequisites

▶ The device is turned on.
▶ The device must be in standby mode (OFF state).
▶ The medium is at room temperature.

1. Remove the bath cover.
2. Using a long object, carefully push the circulator's float down until it reaches the mechanical stop.
   ⇨ An audible signal will sound and the error code **<E 01>** will be displayed. The low-level protection device is functioning properly.
3. Turn off the unit, wait a short while, then turn it back on.
   ⇨ The alarm message is deactivated.
4. Close the bath opening.

✓ The low-level protection device has been tested.

9.8 Send in the unit

If the device malfunctions and the operator cannot resolve the issue on their own, contact Technical Service.

NOTE

Before shipping, note the following:

- Completely drain the unit
  - heat transfer fluid
- Clean and decontaminate the unit properly to prevent any risk to service personnel.
- Securely close all connections with nuts and caps.
- Pack the unit carefully to protect it from damage.
- Mark the packaging to ensure the unit is transported in an upright position.
- Fill out the online return form at **https://www.julabo.com/de/service/after-sales-service/reparatur-service/ruecksendeformular** completely.

NOTE

For safe return shipping to JULABO, use the original packaging whenever possible.

Shipping Address

JULABO GmbH
Gerhard-Juchheim-Strasse 1
77960 Seelbach
Germany
Phone: +49 7823 51-66
service.de@JULABO.com

9.9 Warranty

JULABO guarantees the proper functioning of the device, provided that it is used and operated in accordance with the operating instructions.

The warranty period is one year from the date of invoice.

With the 1PLUS warranty, the warranty can be extended to two years free of charge.

With the 1PLUS warranty, the user receives a free extension of the warranty to 24 months, limited to a maximum of 10,000 operating hours. The prerequisite is that the user registers the device at www.julabo.com within four weeks of commissioning, stating the serial number.

The date of invoice from JULABO GmbH is decisive for the warranty.

10 Faults and troubleshooting

10.1 Alarm and warning messages

Alarm and warning messages are described in the table.
If a displayed error code is not listed in the table, or if the error persists after turning the device off and back on, contact Technical Support and provide them with the error code.

Code	Cause	Action
E01	The level has fallen below the minimum.	Top up the temperature control medium. Check temperature control hoses for damage and replace if necessary.
E05	Open circuit or short circuit in the operating temperature sensor of the over-temperature protection device.	Contact JULABO Service.
E06	There is too great a temperature difference between the working temperature sensor and the safety temperature sensor.	Increase the circulation. Check the viscosity of the temperature control medium. If the fault is not rectified, contact Technical Service.
E14	The set protection temperature has been exceeded.	Check the operating temperature range of the application. Increase the protection temperature value or decrease the setpoint temperature until it is lower than the set protection temperature ⚠ **WARNING** Set the high temperature cut-off to at least 25 K below the flash point of the heat transfer fluid being used.
E33	The safety temperature sensor wire is shorted or broken.	Contact JULABO Service.
E60	Internal read/write error.	Switch off the device at the power switch, wait 4 seconds and then switch the device back on.

E61	Connection error between the circulator and the cooling machine	Check the connection cable for damage and replace it if necessary. Switch the device back on. If the error has not been rectified, contact Technical Service. Alternatively: Deactivate the cooling unit. The thermostat is working as a heating thermostat.
E63	The watchdog function has been triggered.	Switch off the device at the mains switch, wait 4 seconds and then switch the device back on.
E83	Excessive power consumption via the USB Interface.	Check the connected external storage device for errors and replace it if necessary. The USB interface is not suitable for devices with a power consumption higher than the maximum allowed.
E108	The protective device's self-holding function is still active.	Switch off the appliance at the mains switch, wait 4 seconds and then switch the appliance back on.
E116	The protective device's self-locking mechanism is still active.	Switch off the appliance at the mains switch, wait 4 seconds and then switch the appliance back on.
E118	Error in internal temperature sensing.	Contact JULABO Service.
E999	Internal error.	If this occurs repeatedly, contact JULABO Service.

10.2 Error Messages During the Configuration Process

If errors occur during a configuration process or during a firmware update, they are displayed on the screen as an error code in a scrolling message.

Error code	Description	Solution
CFG Error	Error during configuration.	• Repeat the process. • If the error occurs again, replace the USB flash drive. • If the error persists, contact Technical Support.
ProG Error	Firmware update error.	• Repeat the procedure. • If the error occurs again, replace the USB flash drive. • If the error persists, contact Technical Support.

11 Disposal

When disposing of the device, follow the applicable state-specific guidelines.

This symbol on the product or its packaging indicates that it must not be disposed of with household waste.
Proper disposal avoids negative effects on people and the environment and allows valuable raw materials to be reused.
Information on collection points for old appliances can be obtained from the city or municipality or an authorized disposal company.

12 Appendix

12.1 EC Conformity

EG-Konformitätserklärung nach EG Maschinenrichtlinie 2006/42/EG, Anhang II A
EC-Declaration of Conformity to EC Machinery Directive 2006/42/EC, Annex II A

Hersteller / *Manufacturer*:

JULABO GmbH
Eisenbahnstr. 45
77960 Seelbach / Germany
Tel: +49(0)7823 / 51 - 0

CE

Hiermit erklären wir, dass das nachfolgend bezeichnete Produkt
We hereby declare, that the following product

Produkt / *Product*: Thermostat / *Circulator*

Typ / *Type*: CORIO C **Serien-Nr. / *Serial-No.*:** siehe Typenschild / *see type label*

aufgrund seiner Konzipierung und Bauart in der von uns in Verkehr gebrachten Ausführung den grundlegenden Sicherheits- und Gesundheitsanforderungen den nachfolgend aufgeführten EG-Richtlinien entspricht.
due to the design and construction, as assembled and marketed by our Company – complies with fundamental safety and health requirements according to the following EC-Directives.

Maschinenrichtlinie 2006/42/EG; Machinery Directive 2006/42/EC
EMV-Richtlinie 2004/108/EG; EMC-Directive 2004/108/EC
RoHS-Richtlinie 2011/65/EU; RoHS-Directive 2011/65/EU

Angewandte harmonisierte Normen und techn. Spezifikationen:
The above-named product is in compliance with the following harmonized standards and technical specifications:

EN 50581 : 2012
Technische Dokumentation zur Beurteilung von Elektro- und Elektronikgeräten hinsichtlich der Beschränkung gefährlicher Stoffe
Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

EN ISO 12100 : 2010
Sicherheit von Maschinen - Allgemeine Gestaltungsleitsätze - Risikobeurteilung und Risikominderung (ISO 12100:2010)
Safety of machinery - General principles for design - Risk assessment and risk reduction (ISO 12100:2010)

EN 61010-1 : 2010
Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgeräte, Teil 1: Allgemeine Anforderungen
Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1: General requirements

EN 61010-2-010 : 2003
Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgeräte, Teil 2-010: Besondere Anforderungen an Laborgeräte für das Erhitzen von Stoffen
Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 2-010: Particular requirements for laboratory equipment for the heating of materials

EN 61326-1 : 2013
Elektrische Mess-, Steuer-, Regel- und Laborgeräte- EMV-Anforderungen- Teil 1: Allgemeine Anforderungen
Electrical equipment for measurement, control, and laboratory use - EMC requirements - Part 1: General requirements

Bevollmächtigter für die Zusammenstellung der techn. Unterlagen:
Authorized representative in charge of administering technical documentation:
Hr. Torsten Kauschke, im Hause / *on the manufacturer's premises as defined above*

Die Konformitätserklärung wurde ausgestellt
The declaration of conformity was issued and valid of

Seelbach, 19.02.2015

M. Juchheim, Geschäftsführer / *Managing Director*

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12.2 UKCA Compliance

UK Office: JULABO UK Ltd., Unit 7, Casterton Road Business Park, Old Great North Road, Little Casterton, Stamford, PE9 4EJ, United Kingdom, Tel.: +44 1733 265892

UKCA-Declaration of Conformity

Manufacturer:

JULABO GmbH
Gerhard-Juchheim-Strasse 1
77960 Seelbach / Germany
Tel: +49 7823 51-0

This declaration is issued under the sole responsibility of the product manufacturer

Product: Circulator

Type: CORIO C **Serial-No.:** see type label

The object of the declaration described above is in conformity with the relevant UK Statutory Instruments and their amendments:

Supply of Machinery (Safety) Regulations 2008
Electromagnetic Compatibility Regulations 2016
The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

Applied following harmonized standards and technical specifications:

EN IEC 63000:2018
Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

EN ISO 12100 : 2010
Safety of machinery - General principles for design - Risk assessment and risk reduction (ISO 12100:2010)

EN 61010-1 : 2010 / A1 : 2019 / AC : 2019-04, EN 61010-1 : 2010 / A1:2019
Safety requirements for electrical equiment for measurement, control, and laboratory use, Part 1: General requirements

EN IEC 61010-2-010:2020
Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 2-010: Particular requirements for laboratory equipment for the heating of materials

EN 61326-1 : 2013
Electrical equipment for measurement, control, and laboratory use - EMC requirements - Part 1: General requirements

Authorized representative in charge of administering technical documentation:

JULABO UK Ltd., Mr. Gary Etherington, Unit 7, Casterton Road Business Park, Little Casterton, Stamford PE9 4EJ United Kingdom, Telephone: +44 1733 265892

The declaration of conformity was issued and valid of

Seelbach, 16.05.2023

i.V. Bernd Rother, Senior Expert Products & Innovation

12.3 Interface Commands

The device can be controlled remotely using Interface commands. Parameters can be retrieved and the current status can be queried. To do this, the device must be connected to the host computer via a digital Interface.

Interface commands are entered using a terminal program.

Interface commands are divided into IN commands and OUT commands.

String Element	Symbol	Hex
Space	␣	20
Carriage return	←	0D
Line feed	LF	0A

- IN commands: Retrieve parameters
  Command structure: Command + ←

  Example: Querying the setpoint temperature:
  IN_SP_00←

  Example: Device response:
  55.5 ← LF
  (

- OUT Commands: Set Parameters (Remote control mode only)
  Command structure: Command + ␣ + Parameter + ←

  Example: Setting the setpoint temperature to 55.5 °C:
  OUT_SP_00␣55.5←

12.4 OUT Commands

OUT commands are used to set parameters on the device. Remote control mode must be active for this.

Setpoints and Warning Limits	Comment

Device Modes	Comment
out_mode_05	Start/stop command for the device in remote control mode: 0 = Stop temperature control application 1 = Start temperature control application

Auxiliary parameters	Comment
out_hil_00	Setting for the cooling capacity control variable limit (0–100%)
out_hil_01	Setting for the control variable limit of the heating capacity (0–100%)

12.5 IN Commands

IN commands are used to retrieve parameters from the device.

Process Values	Comment
version	Version
status	Status
in_pv_00	Temperature Value
in_pv_01	Current control variable [%]
in_pv_03	Current temperature of the safety temperature sensor
in_pv_04	Current setpoint of the over-temperature protection device

Setpoints and warning limits	Comment
in_sp_00	Set temperature setpoint

Device Modes	Comment
in_mode_05	Set operating mode of the temperature control system: 0 = Stop 1 = Start

Auxiliary parameters	Comment
in_hil_00	Set control variable limit for cooling capacity (%)
in_hil_01	Set control variable limit for heating capacity (%)