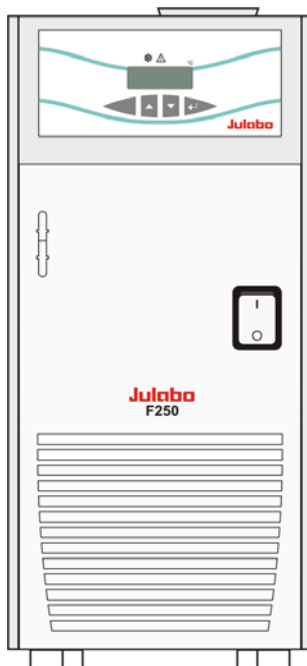


**English**

**OPERATING MANUAL**

Recirculating Cooler

F250



**Julabo**  
THE TEMPERATURE CONTROL COMPANY

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## Congratulations!

You have made an excellent choice.

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

This operating manual has been designed to help you gain an understanding of the operation and possible applications of our circulators. For optimal utilization of all functions, we recommend that you thoroughly study this manual prior to beginning operation.

## The JULABO Quality Management System



Temperature control devices for research and industry are developed, produced, and distributed according to the requirements of ISO 9001:2008. Certificate Registration No. 01 100044846



This product has been tested to the requirements of CAN/CSA-C22.2 No. 61010-1, second edition, including Amendment 1, or a later version of the same standard incorporating the same level of testing requirements.

## Unpacking and inspecting

Unpack the circulator and accessories and inspect them for possible transport damage. Damage should be reported to the responsible carrier, railway, or postal authority, and a damage report should be requested. These instructions must be followed fully for us to guarantee our full support of your claim for protecting against loss from concealed damage. The form required for filing such a claim will be provided by the carrier.

Printed in Germany

1 951.4803

Changes without prior notification reserved

01/11

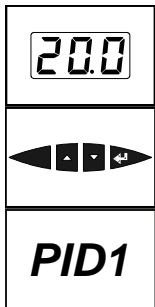
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## 1. Intended use

JULABO recirculating coolers have been designed for temperature application to specific fluids. The pump connections can be used for cooling applications in an external circuit at a constant temperature.



- ☑ The recirculating coolers are operated via the splash-proof keypad. The implemented microprocessor technology allows to set and to store the setpoint that can be indicated on the LED temperature display.
- ☑ The PID temperature regulation is used to withdraw heat from the bath fluid by means of the cooling machine and to automatically regulate the required need.



JULABO recirculating coolers are not conceived for direct temperature application to food and luxury articles or pharmaceutical and medico-technical products. Direct temperature application means: Unprotected contact of the object with the bath medium (bath fluid).

## 2. Operator responsibility – Safety recommendations

The products of JULABO ensure safe operation when installed, operated, and maintained according to common safety regulations. This section explains the potential dangers that may arise when operating the circulator and also specifies the most important safety precautions to preclude these dangers as far as possible.

- The operator is responsible for the qualification of the personnel operating the units.
- The personnel operating the units should be regularly instructed about the dangers involved with their job activities as well as measures to avert these dangers.
- Make sure all persons tasked with operating, installing, and maintaining the unit have read and understand the safety information and operating instructions.
- When using hazardous materials or materials that could become hazardous, the circulator may be operated only by persons who are absolutely familiar with these materials and the circulator. These persons must be fully aware of possible risks.

If you have any questions concerning the operation of your unit or the information in this manual, please contact us!

**Contact:** JULABO Labortechnik GmbH Tel. +49 (0) 7823 / 51-0 [info@julabo.de](mailto:info@julabo.de)  
Eisenbahnstraße 45 Fax +49 (0) 7823 / 24 91 [www.julabo.de](http://www.julabo.de)  
77960 Seelbach / Germany

### **Safety instructions for the operator:**

- You have received a product designed for industrial use. Nevertheless, avoid strikes to the housing, vibrations, damage to the operating-element panel (keypad, display), and contamination.
- Make sure the product is checked for proper condition regularly (depending on the conditions of use). Regularly check (at least every 2 years) the proper condition of the mandatory, warning, prohibition and safety labels.
- Make sure that the mains power supply has low impedance to avoid any negative effects on instruments being operated on the same mains.
- This unit is designed for operation in a controlled electromagnetic environment. This means that transmitting devices (e.g., cellular phones) should not be used in the immediate vicinity.  
Magnetic radiation may affect other devices with components sensitive to magnetic fields (e.g., monitors). We recommend maintaining a minimum distance of 1 m.
- Permissible ambient temperature: max. 40 °C, min. 5 °C.
- Permissible relative humidity: 50% (40 °C).
- Do not store the unit in an aggressive atmosphere.
- Protect the unit from contamination.
- Do not expose the unit to sunlight.

### **Appropriate operation**

Only qualified personnel is authorized to perform configuration, installation, maintenance and repairs of the circulator.

Routine operation can also be carried out by untrained personnel who should however be instructed by trained personnel.

### **Use:**

The bath can be filled with flammable materials. Fire hazard!




There might be chemical dangers depending on the bath medium used.

Observe all warnings for the used materials (bath fluids) and the respective instructions (safety data sheets).

Insufficient ventilation may result in the formation of explosive mixtures. Only use the unit in well ventilated areas. The unit is not for use in explosive atmosphere.

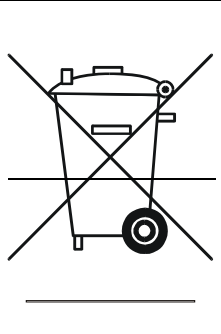
Only use recommended materials (bath fluids). Only use non-acid and non corroding materials.

When using hazardous materials or materials that could become hazardous, **the operator must** affix the enclosed safety labels (**1 + 2**) to the front of the unit so they are highly visible:

1		Warning label W00: Colors: yellow, black Danger area. Attention! Observe instructions. (operating manual, safety data sheet)
2		Mandatory label M018: Colors: blue, white Carefully read the user information prior to beginning operation. <b>Scope: EU</b>
or 2		Semi S1-0701 Table A1-2 #9 Carefully read the user information prior to beginning operation. <b>Scope: USA, NAFTA</b>

## 2.1. Disposal

This unit contains the refrigerants R134a – at this time considered not to have any negative effects on the ozone layer. However, during the long operating period of the unit, disposal prescriptions may change. So only qualified personnel should take care of disposal.

	<p><u>Valid in EU countries</u>                  Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (WEEE).                  This directive requires electrical and electronic equipment marked with a crossed-out trash can to be disposed of separately in an environmentally friendly manner.                  Contact an authorized waste management company in your country.                  Disposal with household waste (unsorted waste) or similar collections of municipal waste is not permitted!</p>
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## 2.2. EC Conformity



The products described in the operating instructions conform to the requirements of the following European guidelines:

Directive of the European Parliament and of the Council on the approximation of the laws of the Member States relating to machinery.

EMC guideline with respect to legal harmonization of the member countries concerning electromagnetic compatibility.

**Julabo**

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Eisenbahnstr. 45  
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### 3. Technical specifications

Recirculating Cooler			F250
Working temperature range		°C	+5 ... +40
Temperature stability		°C	±0.5
Temperature selection:			digital
via key pad			indication on LED-DISPLAY
Temperature indication:			LED-DISPLAY
Resolution		°C	0.1
Temperature control			PID 1
Temperature sensor			Pt 100
Excess temperature protection			85 °C - fixed value
Low liquid level protection			float switch
Circulating pump:			
discharge, max.at 0 bar		l/min	15
pressure, max. at 0 Liters		bar	0.35
Filling level indicator			sight glass
Filling volume	from ... to	Liters	1.7 ... 2.6
Dimensions (WxLxH)		cm	24x40x52
Weight		kg	27.0
Ambient temperature range		°C	5 ... 40
Return flow temperature	max.	°C	80
Cooling compressor			1- stage / air cooled
Refrigerant			R134a
Cooling capacity		°C	+20    +15    + 10    +5
	at 115 V / 60 Hz	W	250    240    220    210
	at 200 V / 60 Hz	W	250    240    220    210
	at 230 V / 60 Hz	W	250    240    220    210
	at 230 V / 50 Hz	W	250    240    220    210
	at 200 V / 50 Hz	W	220    210    195    185
Medium: Mixture water-glycol			
Mains power connection	230 V/50 Hz	V/ Hz	207-253 / 50
Current draw	(at 230 V)	A	3.0
Mains power connection	208 - 220 V/60 Hz	V/ Hz	207-253 / 60
Current draw	at 208V / 220 V	A	2.0
Mains power connection	200 V/50-60 Hz	V/ Hz	190-210 / 50-60
Current draw	(at 200 V)	A	2.0
Mains power connection	115 V/60 Hz	V/ Hz	103 -127 / 60
Current draw	(at 115 V)	A	4.0

All measurements have been carried out at: rated voltage and frequency  
 ambient temperature: 20 °C      Technical changes without prior notification reserved.

### 3.1. Warning functions and safety installations

Excess temperature protection	85 °C - fixed value
Low liquid level protection	float switch
Alarm message	optical + audible (permanent)
Overload protection	for compressor and pump motor
Classification according to DIN 12876-1	class I

#### Environmental conditions according to IEC 61 010-1:

Use only indoor.

Altitude up to 2000 m - normal zero.

Ambient temperature: +5 ... +40 °C

Air humidity:

Max. rel. humidity 80 % for temperatures up to +31 °C,

linear decrease down to 50 % relative humidity at a temperature of +40 °C

Max. mains fluctuations of  $\pm 10$  % are permissible.

The unit corresponds to Class I

Overvoltage category II

Pollution degree 2



#### **Caution:**

The unit is not for use in explosive environment

Standards for interference resistance according to EN 61326-1

This unit is an ISM device classified in Group 1 (using high frequency for internal purposes)

Class A (industrial and commercial range).

## 4. Safety notes for the user

### 4.1. Explanation of safety notes



In addition to the safety warnings listed, warnings are posted throughout the operating manual. These warnings are designated by an exclamation mark inside an equilateral triangle. “Warning of a dangerous situation (Attention! Please follow the documentation).”

The danger is classified using a signal word.

Read and follow these important instructions for averting dangers.



**Warning:**

Describes a **possibly** highly dangerous situation. If these instructions are not followed, serious injury and danger to life could result.



**Caution:**

Describes a **possibly** dangerous situation. If this is not avoided, slight or minor injuries could result. A warning of possible property damage may also be contained in the text.



**Notice:**

Describes a **possibly** harmful situation. If this is not avoided, the product or anything in its surroundings can be damaged.

### 4.2. Explanation of other notes



**Note!**

Draws attention to something special.



**Important!**

Indicates usage tips and other useful information.

### 4.3. Safety recommendations

Follow the safety recommendations to prevent damage to persons or property. Further, the valid safety instructions for working places must be followed.



- Only connect the unit to a power socket with an earthing contact (PE – protective earth)!
- The power supply plug serves as a safe disconnecting device from the line and must always be easily accessible.
- Place the unit on an even surface on a base made of nonflammable material.
- Make sure you read and understand all instructions and safety precautions listed in this manual before installing or operating your unit.

- Never operate the unit without bath fluid in the bath.
- Do not drain the bath fluid while it is hot!  
Check the temperature of the bath fluid prior to draining (e.g., by switching the unit on for a short moment).
- Use suitable connecting tubing.
- Make sure that the tubing is securely attached.
- Avoid sharp bends in the tubing, and maintain a sufficient distance from surrounding walls.
- Regularly check the tubing for material defects (e.g., for cracks).
- Never operate damaged or leaking units.
- Always turn off the unit and disconnect the mains cable from the power source before performing any service or maintenance procedures, or before moving the unit.
- Always turn off the unit and disconnect the mains cable from the power source before cleaning the unit.
- Always empty the bath before moving the unit.
- Transport the unit with care.
- Sudden jolts or drops may cause damage in the interior of the unit.
- Observe all warning labels.
- Never remove warning labels.
- Never operate units with damaged mains power cables.
- Repairs are to be carried out only by qualified service personnel.

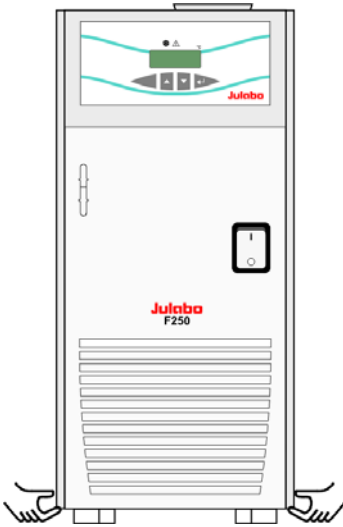
**Warning:****Danger of electric shock! Short Circuit with fire hazard!**

The overflow (8) at the rear of the unit is not to be sealed!

If the overflow is sealed, the unit may be damaged by due to overfilling as the liquid will run into the inside of the unit.

Fire hazard when using water/glycol mixture.

## 5. Installation

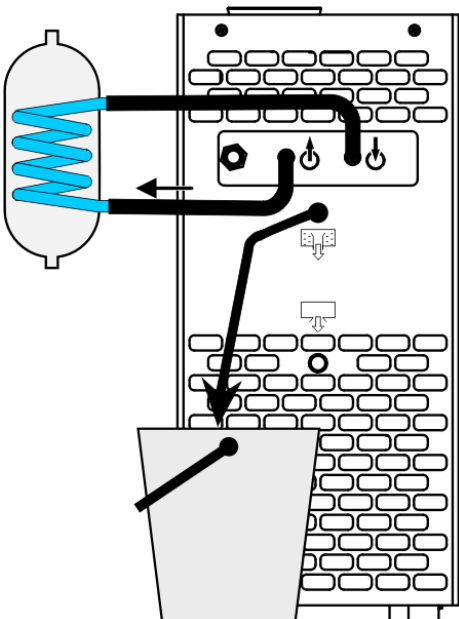


- Lifting and transport:  
Lift the unit with two persons taking hold of its bottom plate. For transport set the unit on a suitable trolley
- Place the unit on an even surface on a pad made of non-flammable material.
- Cooling machine, pump motor and electronics produce intrinsic heat that is dissipated via the venting openings.! Never cover these openings!
- Do not set up the unit in the immediate vicinity of heat sources and do not expose to sun light.
- Keep at least 20 cm of open space on the front and rear venting grids.
- The place of installation should be large enough and provide sufficient air ventilation to ensure the room does not warm up excessively because of the heat the instrument radiates to the environment. (Max. permissible ambient temperature: 40 °C). With regard to a disturbance in the cooling loop (leakage), the guideline EN 378 prescribes a certain room space to be available for each kg of refrigerant. The necessary amount of refrigerant is specified on the type plate.  
> For 0.25 kg of refrigerant R134a, a room space of 1 m<sup>3</sup> is required.

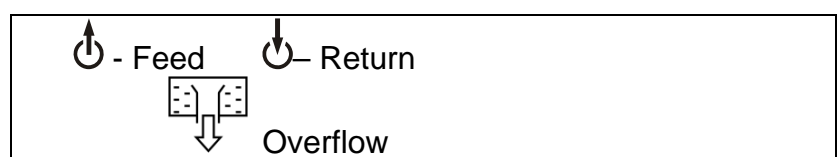


### Caution:

Securely attach all tubing to prevent slipping.  
Do not seal the overflow connector!



- Before operating the unit after transport, wait about one hour after setting it up. This will allow any oil that has accumulated laterally during transport to flow back down thus ensuring maximum cooling performance of the compressor.
- Unscrew the collar nuts from the pump connector (7a).
- Connect the tubings for cooling the external system to the pump connectors for feed and return on the rear of the recirculating cooler.



- Connect a piece of tubing to the overflow connector (8) and drain into a suitable vessel, which always has to be placed lower than the exit „Overflow“.  
Do not seal the overflow connector!



**Notice: Flood hazard!**

In case the system to be cooled is located at a higher level than the recirculating cooler, take note of bath liquid flowing back when the unit is switched off.

**Return flow safety device**

- Should the filling volume of the bath tank not be sufficient, prevent the liquid from flowing back by using shut-off valves..

Order No.	Description
8 970 456	Shut-off valve (suitable up to +90 °C) M16x1
8 970 444	Adapter M10x1 on M16x1

The following questions shall help to recognize possible dangers and to reduce the risks to a minimum.

- Are all tubes and electrical cables connected and installed?  
Note:  
sharp edges, hot surfaces in operation, moving machine parts, etc.
- What to do when a dangerous substance was spilled on or in the unit?  
Before starting to work, obtain information concerning the substance and determine the method of decontamination.





## 7. Operating procedures

### 7.1. Bath fluids



**Caution:**

No liability for use of other bath liquids!

**Do not use alcohols.**

**Water:**

- The quality of water depends on local conditions.
- Due to the high concentration of lime, hard water is not suitable for temperature control because it leads to calcification in the bath.
- Ferrous water can cause corrosion - even on stainless steel.
- Chloric water can cause pitting corrosion.
- Distilled and deionized water is unsuitable. Their special properties cause corrosion in the bath, even in stainless steel.
- Danger of freezing at working temperatures <5 °C.

**Mixture water -glycol:**

Strictly observe the safety data and handling instructions from the manufacturer. The proportion of water might evaporate by and by. Check the mixing ratio regularly and refill water if necessary.

**Recommended bath fluids:**

Bath fluids	Temperature range
JULABO Thermal G	-30 °C ... 80 °C
mixture water/glycol (50:50)	-30 °C ... 50 °C
water	+5 °C ... 80 °C

Order No.	Description	Quantity
8 940 124	JULABO Thermal G	10 liters
8 940 125	JULABO Thermal G	5 liters



See website for list of recommended bath fluids.

**Contact:** [www.julabo.de](http://www.julabo.de)



**Notice:**

Please contact JULABO before using other than recommended bath fluids. JULABO takes no responsibility for damages caused by the selection of an unsuitable bath fluid

## 7.2. Power connection

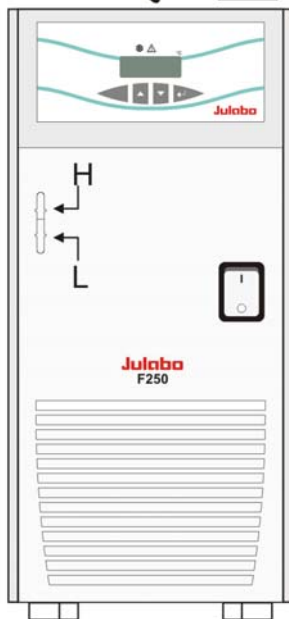
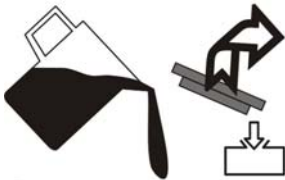


### Caution:

- Only connect the unit to a power socket with earthing contact (PE – protective earth)!
- The power supply plug serves as safe disconnecting device from the line and must be always easily accessible.
- Never operate equipment with damaged mains power cables.
- Regularly check the mains power cables for material defects (e.g. for cracks).
- We disclaim all liability for damage caused by incorrect line voltages!

Check to make sure that the line voltage matches the supply voltage specified on the identification plate.

## 7.3. Filling



Take care that no liquid enters the interior of the circulating cooler.

- ① Connect the tubing from the external system to the pump connectors and check for leaks
- ① Check to make sure that the drain tap (9) is closed.

- Remove the cap from the filling opening (5).
- Fill in tempering fluid up to marking „H“ of the filling level indicator.
- Turn the mains switch (1) on
- Switch on unit. To do so press button ← for approx. 4 seconds.
- Tempering fluid is pumped into the externally connected system.  
Refill fluid up to marking „H“.
- The recirculating cooler is ready for operation.

## 7.4. Switching on / Start - Stop

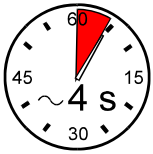




### Switching on:

- The recirculating cooler is turned on and off with the mains switch.

The unit performs a self-test. All segments of the 4-digit LED temperature DISPLAY and all indicator lights will illuminate. Then the software version and the type of unit is indicated. The display "OFF" indicates the unit is ready to operate (standby mode).










- Start:** Press enter  for about 4 seconds.  
The LED temperature DISPLAY indicates the actual bath temperature.
- Stop:** Press enter  for about 4 seconds.  
Turn the unit off with the mains power switch.

## 7.5. Setting the temperatures

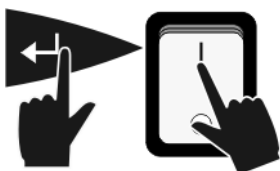
Factory setting: 25 °C ⓘ Setting can be carried out in the start/stop condition.


1. Press one of the keys   for a short moment.  
The setpoint value instead of the actual value is indicated on the display for about 8 seconds.  
The value can now be changed.
2. Change value:  
Press  to set a higher value.  
Press  to set a lower value.  
Keep the keys depressed for the value to change fast.
3. Press enter  to store the value.


## 7.6. AUTOSTART ON / OFF

The recirculating cooler has been configured and supplied by JULABO according to N.A.M.U.R. recommendations. This means for the start mode, that the unit must enter a safe operating state after a power failure (non-automatic start mode). This safe operating state is indicated by „OFF“ on the LED temperature display. A complete shutdown of the main functional elements such as compressor and circulating pump is effected simultaneously.

Should such a safety standard not be required, the AUTOSTART function (automatic start mode) may be activated, thus allowing the start of the circulator directly by pressing the mains power switch or using a timer.



Keep depressed enter  and turn on the unit with the mains power switch.  
For a short while the LED DISPLAY indicates the effective start mode:

 AUTOSTART on.  
AUTOSTART off.





### Warning:

For supervised or unsupervised operation with the AUTOSTART function, avoid any hazardous situation to persons or property.  
The circulator does no longer conform to N.A.M.U.R. recommendations.

## 8. Safety installations

### 8.1. Excess temperature protection



This safety installation is independent of the control circuit.

When the temperature of the bath fluid has reached the safety temperature (85 °C), a complete shutdown of the compressor and pump is effected.

The alarm is indicated by optical and audible signals (continuous tone) and on the LED-DISPLAY appears the error message "Error 14".

- ① Check dimensioning of application.  
Use a stronger recirculating cooler if necessary.

### 8.2. Low level protection



This safety installation is independent of the control circuit.

If the low liquid level protection device is triggered, a complete shutdown of the compressor and circulating pump is effected.

The alarm is indicated by optical and audible signals (continuous tone) and on the LED-DISPLAY appears the error message "Error 01".

- ① Turn off the unit with the mains switch, refill bath fluid and turn the unit on again!



#### Caution:

For refill always use the same bath fluid type that is already in the bath.



#### Notice:

Check the low liquid level protection device at least twice a year!

- To execute a functional test, drain the liquid until the alarm for low liquid level is triggered. Refill liquid afterwards.

## 9. Troubleshooting guide / Error messages



Whenever the microprocessor electronics registers a failure, a complete shutdown of the compressor and circulating pump is performed. The alarm light "⚠" illuminates and a continuous signal tone sounds. The LED temperature display indicates the cause for the alarm in form of a code.



Press enter  to quit the audible signal.



- The recirculating cooler is operated without bath fluid, or the liquid level is insufficient.  
Replenish the bath tank with the bath fluid.
- Tube breakage has occurred (insufficient filling level due to excessive bath fluid pumped out). Replace the tubing and replenish the bath tank with the bath fluid.



Cable of the working temperature sensor interrupted or short-circuited.

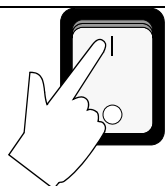


Error in A/D converter



The return temperature is above the switch-off value of the high temperature protection (85°C).

Check dimensioning of application.  
Use a stronger recirculating cooler if necessary.



After eliminating the malfunction, press the mains power switch off and on again to cancel the alarm state.

If the unit cannot be returned to operation, contact an authorized service station.

If the unit cannot be returned to operation, contact an authorized JULABO service station.

### **Disturbances that are not indicated.**

Overload protection:: a) for cooling machine  
b) for pump motor

After a short cooling interval, the unit will automatically start running.



### **Mains circuit breaker** (resettable)

The mains switch is also the circuit breaker of the unit.

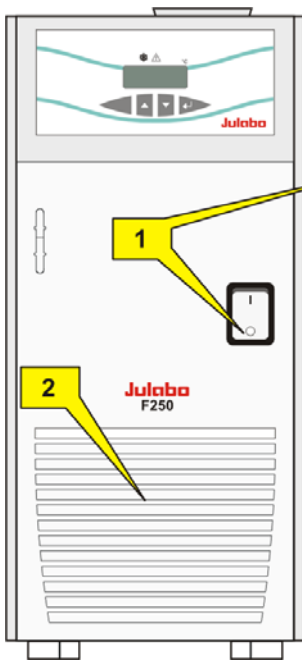
After a cooling interval the unit can be switched on again.

## 10. Cleaning / repairing the unit



### Caution:

- Always turn off the unit and disconnect the mains cable from the power source before cleaning the unit. Prevent humidity from entering into the unit.
- Electrical connections and any other work must be performed by qualified personnel only.



### Maintaining the cooling performance

To maintain the full cooling performance, clean the condenser from time to time.

1. Switch off the unit, disconnect mains power cable.
2. Clean the ribbed condenser behind the venting grid (front side) with a vacuum cleaner.

The unit is ready to operate. Switch on the unit.

### Cleaning:

Clean the unit using a wet cloth and low surface tension water. The recirculating cooler is designed for continuous operation under normal conditions. Periodic maintenance is not required. The tank should be filled only with a bath fluid recommended by JULABO. To avoid contamination, it is essential to change the bath fluid from time to time.

### Repairs:

Before asking for a service technician or returning a JULABO instrument for repair, please contact an authorized JULABO service station.

When returning the unit:

- Clean the unit in order to avoid any harm to the service personnel
- Attach a short fault description.
- When returning a unit, take care of careful and adequate packing.
- JULABO is not responsible for damages that might occur from insufficient packing.



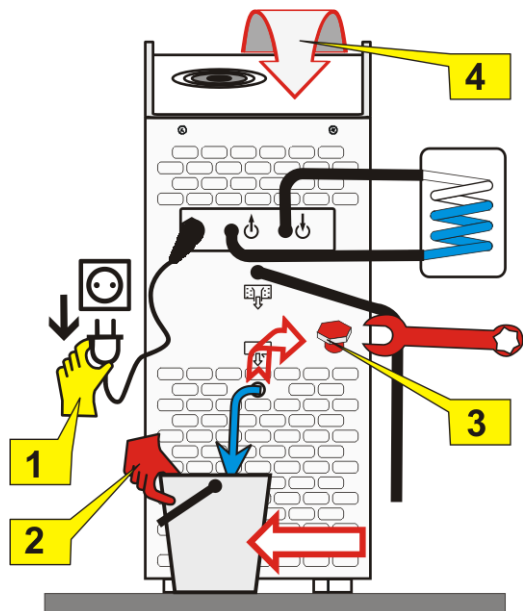
JULABO reserves the right to carry out technical modifications with repairs for providing improved performance of a unit.

## 10.1. Draining



### Notice:

Store and dispose the used bath fluid according to the laws for environmental protection.



1. Turn off the unit and disconnect the mains cable from the power source
2. Place a suitable vessel for accepting the used bath liquid underneath the drain.
3. Unscrew the drain plug on the rear and empty the unit completely.
4. Tilt the unit for a complete emptying somewhat.

**Tighten the drain plug** after draining the unit.

## 11. Warranty conditions

JULABO Labortechnik GmbH warrants its products against defects in material or in workmanship, when used under appropriate conditions and in accordance with appropriate operating instructions

**for a period of ONE YEAR.**

**Extension of the warranty period – free of charge**



With the '1PLUS warranty' the user receives a free of charge extension to the warranty of up to 24 months, limited to a maximum of 10 000 working hours.

To apply for this extended warranty the user must register the unit on the JULABO web site [www.julabo.de](http://www.julabo.de), indicating the serial no. The extended warranty will apply from the date of JULABO Labortechnik GmbH's original invoice.

JULABO Labortechnik GmbH reserves the right to decide the validity of any warranty claim. In case of faults arising either due to faulty materials or workmanship, parts will be repaired or replaced free of charge, or a new replacement unit will be supplied.

Any other compensation claims are excluded from this guarantee.