Operating Manual

Recirculating Cooler

F250

F500

F1000

Julabo
THE TEMPERATURE CONTROL COMPANY

1.951.4806-V3 08/16

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 and ISO 14001.Certificate Registration No. 01 100044846

For F250 device

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

Important: keep original operating manual for future use

CONTENT

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.

PID1

☑ 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.

⚠WARNING
Health hazards caused by the bath fluid.
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.
- Make sure that the persons who operate the chillers, are trained in this work.
- 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.

3. Handling

- 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.

3.1. 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.

3.2. Use

⚠WARNING
Fire hazard!
The unit is not for use in explosive atmosphere.

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		Danger area. Attention! Observe instructions. (operating manual, safety data sheet)
2a or		Carefully read the user information prior to beginning operation. Scope: EU
2b		Carefully read the user information prior to beginning operation. Scope: USA, NAFTA

3.3. 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.

Valid in EU countries
See the current official journal of the European Union – WEEE directive.
Directive of the European Parliament and of the Council 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!

4. Technical specifications

4.1. F250

Recirculating Cooler			F250
Working temperature range		°C	-10 ... +40
Temperature stability		°C	±0.5
Temperature selection:			digital
via key pad			indication on LED-DISPLAY
Temperature indication:			LED-DISPLAY
Adjustment and 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

at 100 V / 60 Hz at 200 V / 60 Hz	at 115 V / 60 Hz at 230 V / 60 Hz at 230 V / 50 Hz	°C	+20	+15	+10	+5	0	-5	-10
		W	250	240	220	210	180	90	60
at 100 V / 50 Hz	at 200 V / 50 Hz	°C	+20	+15	+10	+5	0	-5	-10
		W	220	210	195	185	170	80	40

Medium: Mixture water-glycol

Mains power connection		V/ Hz	230 ±10 % / 50
Current draw	(at 230 V)	A	3.0
Mains power connection		V/ Hz	230 ±10 % / 60
Current draw	(at 230 V)	A	2.0
Mains power connection		V/ Hz	200 -5 %; +21 % / 50-60
Current draw	(at 200 V / 50 Hz)	A	2.0
	(at 200 V / 60 Hz)	A	2.0
Mains power connection		V/ Hz	115 ±10 % / 60
Current draw	(at 115 V)	A	4.0
Mains power connection		V/ Hz	100 ±10 % / 50-60
Current draw	(at 100 V / 50 Hz)	A	5.0
	(at 100 V / 60 Hz)	A	5.0

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

4.2. F500

Recirculating Cooler			F500
Working temperature range		°C	0 ... +40
Temperature stability		°C	±0.5
Temperature selection:			digital
via key pad			indication on LED-DISPLAY
Temperature indication:			LED-DISPLAY
Adjustment and 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	24
pressure, max. at 0 Liters		bar	0.5
Filling level indicator			sight glass
Filling volume	from ... to	Liters	5,0 ... 7,5
Dimensions (WxLxH)		cm	37,5x44x59
Weight		kg	34.0
Ambient temperature range		°C	5 ... 40
Return flow temperature	max.	°C	80
Cooling compressor			1- stage / air cooled
Refrigerant			R134a
Cooling capacity			
at 230 V / 50 Hz		°C	+20 +10 +5 0
Medium: Mixture water-glycol		W	500 400 300 250
Mains power connection		V/ Hz	230 -10 %; +7 % / 50
Current draw	(at 230 V)	A	3.0
Mains power connection		V/ Hz	230 ±10 % / 60
Current draw	(at 230 V)	A	3.0
Mains power connection		V/ Hz	115±10 % / 60
Current draw	(at 115 V)	A	6.0
Mains power connection		V/ Hz	100 -5 %; +10 % / 50-60
Current draw	(at 100 V / 50 Hz)	A	6.0
	(at 100 V / 60 Hz)	A	6.0

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

4.3. F1000

Recirculating Cooler			F1000
Working temperature range		°C	0 ... +40
Temperature stability		°C	±0.5
Temperature selection:			digital
via key pad			indication on LED-DISPLAY
Temperature indication:			LED-DISPLAY
Adjustment and 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	23
pressure, max. at 0 Liters		bar	1.0
Filling level indicator			sight glass
Filling volume	from ... to	Liter	7.0 ... 9.5
Dimensions (WxLxH)		cm	37.5x49x64
Weight		kg	46
Ambient temperature range		°C	5 ... 40
Return flow temperature	max.	°C	80
Cooling compressor			1- stage / air cooled
Refrigerant			R134a
Cooling capacity			
at 230 V / 50 Hz		°C	+20 +10 +5 0
Medium: Water-glycol		W	1000 700 550 350
Mains power connection		V/ Hz	230 ±10 % / 50
Current draw	(at 230 V / 50 Hz)	A	5.0
Mains power connection		V/ Hz	230 ±10 % / 60
Current draw	(at 230 V / 60 Hz)	A	4.0
Mains power connection		V/ Hz	200 ±10 % / 50-60
Current draw	(at 200 V / 50 Hz)	A	-
Current draw	(at 200 V / 60 Hz)	A	-
Mains power connection		V/ Hz	115 ±10 % / 60
Current draw	(at 115 V / 60 Hz)	A	9.0

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

4.4. Warning functions and safety installations

Excess temperature protection	85 °C - fixed value
Low liquid level protection	float switch
Alarm messages	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. permissible mains fluctuations, see Technical specifications.

The unit corresponds to Class	I
Overvoltage category	II
Pollution degree	2

⚠WARNING
Fire hazard!
The unit is not for use in explosive atmosphere.

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).

Information about the used refrigerants
The **Regulation (EU) No. 517/2014 on fluorinated greenhouse gases** applies to all systems which contain fluorinated refrigerants and replaces (EC) 842/2006.
The aim of the Regulation is to protect the environment by reducing emissions of fluorinated greenhouse gases.
Among other things it regulates the emission limits, use and recovery of these substances. It also contains requirements for operators of systems which require / contain these substances to function.

Under Regulation 517/2014, the operator of a system of this nature has the following duties:

- The operator must ensure that the equipment is checked at regular intervals for leaks.
- These intervals depend on the CO_2 equivalent of the system. This is calculated from the refrigerant fill volume and type of refrigerant. The CO_2 equivalent of your system is shown on the model plate.
- The operator undertakes to have maintenance, repair, service, recovery and recycling work carried out by certified personnel who have been authorized by JULABO.
- All such work must be documented. The operator must keep records and archive them for at least five years. The records must be submitted to the relevant authority on request.

Refer to the text of the Regulation for further information.

4.5. Materials of Construction of the wetted Parts

F250	
Designation	**Material**
Tube, inner diameter 8.0 x 2.0 mm	PVC
Sealings processed	PA
Bath, complete	1.4404, 1.4301, 1.4435
Sealing screw a.f. 13.0 x 11.0	1.4571
Profile sealing	Silicone, white
Filling pipe, above	PVC
Stopper	POM
O-ring	CR11-70 (Chloroprene rubber)
Motor mounting sheet	
Motor plate	1.4301
Pump	1.4301, 1.4401, PPS (Rytone)
Sensors 2xPt 100	1.4571
Float switch	1.4301, PP
Barbed fittings	CuZn39Pb3 (nickel plated)

F500	
Designation	**Material**
Tube	PVC
Sealings processed	PA
Bath, complete	1.4301, 1.4404
Sealing screw a.f. 13.0 x 11.0	1.4571
Profile sealing	Silicone, white
Filling pipe, above	PVC,grey
Stopper	POM
O-ring	CR11-70 (Chloroprene rubber)
Motor mounting sheet	
Motor plate	1.4301/304H,1.4305/303
Pump	1.4301/304H, EPDM
Sensors 2xPt 100	1.4571
Float switch	1.4301/304, PP
Barbed fittings	1.4305/303

F1000	
Designation	**Material**
Tube (level indicator)	PVC
Sealings processed	PA
Bath, complete	1.4301, 1.4404
Sealing screw a.f. 13.0 x 11.0	1.4571
Profile sealing	Cellular rubber,neoprene 4.314.9910
Filling pipe, above	PVC, gray
Stopper	POM
O-ring	CR11-70 (Chloroprene rubber)
Motor mounting sheet	
Motor plate	1.4301/304H,1.4305/303
Pump	1.4301/304H, EPDM, 1.4401, PTFE, FKM
Sensors 2xPt 100	1.4571
Float switch	1.4301, PP
Barbed fittings	1.4305/303

5. Safety Notes

5.1. Description of the safety notes

	In addition to the safety warnings listed, warnings are posted throughout the 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.
	**⚠DANGER** indicates a hazardous situation which, if not avoided, will result in death or serious injury.
	**⚠WARNING** indicates a hazardous situation which, if not avoided, could result in death or serious injury.
	**⚠CAUTION** indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.
	NOTICE indicates a property damage message.

5.2. Explanation of other notes

	**Note!** Draws attention to something special.
	**Important!** Indicates usage tips and other useful information.

5.3. Safety instructions

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 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 instrument on an even surface on a pad made of non-inflammable material.
- Do not stay in the area below the unit.
- 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 or cold!
  Check the temperature of the bath fluid prior to draining (by switching the unit on for a short moment for example).
- 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 equipment.
- 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 drops may cause damage in the interior of the unit.
- Observe all warning labels.
- Never remove warning labels.
- Never operate equipment 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 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

6. Moving up and connect

⚠CAUTION

Risk of injury for hands. Close cover carefully.
Carry the unit with 2 persons.
Wear safety shoes.

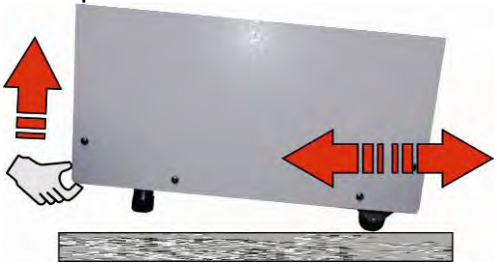
6.1. Transportation and site conditions

F250

Caster platform
(Order No.: 8910045

F500, F1000

Transport



- **Lifting and Transport:**

At F250: Lift the unit with two persons taking hold of its bottom plate. For transport set the unit on a suitable caster platform (Order No.: 8910045).

At F500, F1000: The unit is lifted by two people by the hand grips (front and back). For transport by **one** person, the device can be lifted and moved forward on the rear casters.

- Place the unit on an even surface on a base made of nonflammable material.
- Cooling machine, pump motor and electronics produce intrinsic heat that is dissipated via the venting openings! Never cover these openings!
- The air vents of the unit must not be covered.
- Keep at least 20 cm of open space at the front and rear venting grid.
- Do not install the unit in the immediate vicinity of heat sources and do not expose it to sunlight.
- Ensure good ventilation of the site.
- 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 rejects to the environment. (Max. permissible ambient temperature: 40 °C).
  For a fault (leakage) in the refrigeration system, the standard EN 378 prescribes a certain room space to be available for each kg of refrigerant.
  The refrigerant quantity is specified on the type plate.
- For 0.25 kg of refrigerant R134a, 1 m^3 of space is required.

6.2. Tubing

⚠CAUTION

Damage caused by leaking bath fluid!

- Employ 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).
- Preventive maintenance: Replace the tubing from time to time.
- Do not seal the overflow  !
- 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.

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

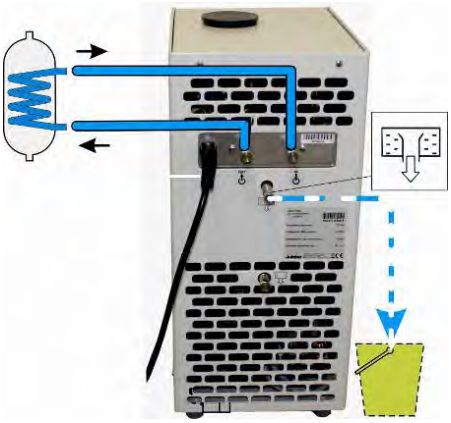
- Are all tubes and electrical cables connected and installed?
  Note:
  sharp edges, hot surfaces in operation, moving machine parts, etc.
- What to do when a dangerous substance was spilled on or in the unit?
  Before starting to work, obtain information concerning the substance and determine the method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

The units have the following dimensions to connect the tubing:

	F250	**F500**	**F1000**
Feed (⏻)	M10x1 male or barbed fittings ∅ 8/10 mm inner diameter.	M16x1 male or barbed fittings ∅ 8/12 mm inner diameter.	M16x1 male or barbed fittings ∅ 8/12 mm inner diameter.
Return (⏻)	M10x1 male or barbed fittings ∅ 8/10 mm inner diameter.	M16x1 male or barbed fittings ∅ 8/12 mm inner diameter.	M16x1 male or barbed fittings ∅ 8/12 mm inner diameter.

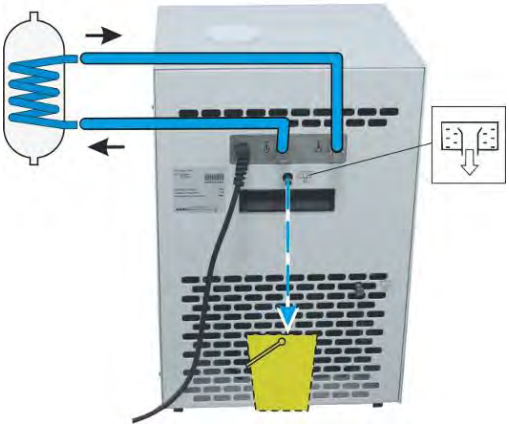
Further accessories can be found at JULABO-Homepage www.julabo.com.

F250



- Before operating the unit after transport, wait about one hour after installation.
  This will allow any oil that has accumulated laterally during transport to flow back down, thus ensuring that the compressor can develop its maximum capacity.
- Remove cap screws from the connections.
- Connect the tubing from the external system to the pump connectors and check for leaks.

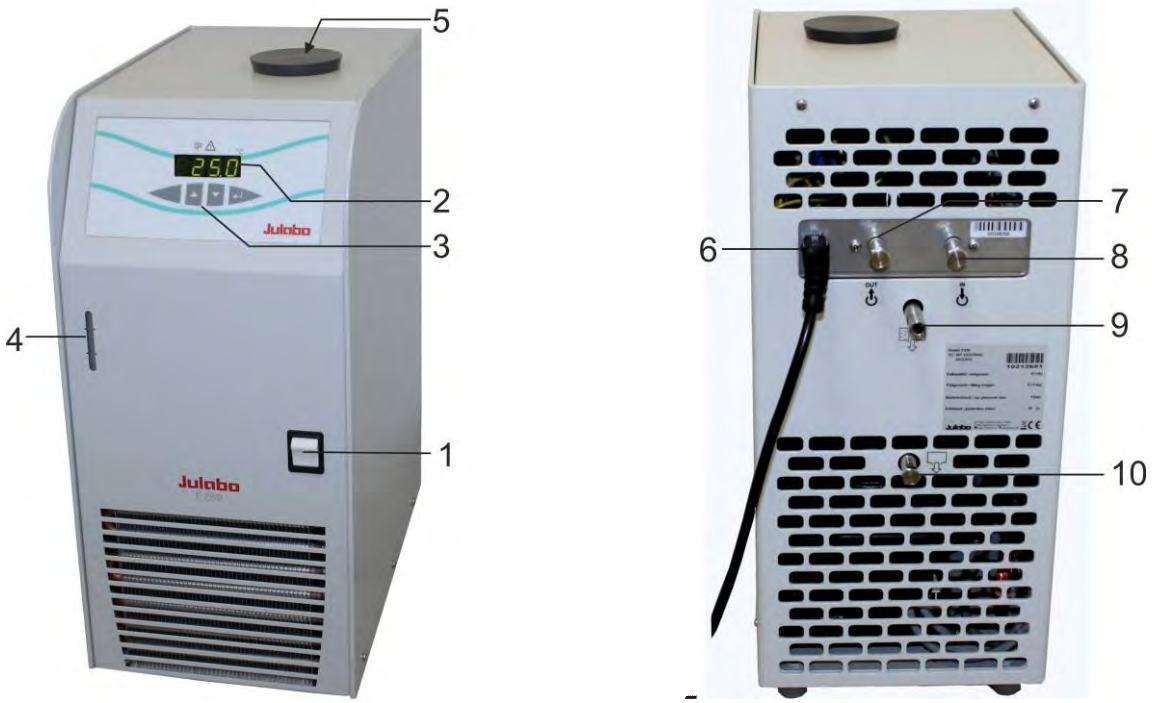
F500, F1000



- If required, connect a hose to the overflow  and drain into a suitable container, which must be positioned deeper than the initial "overflow".
- Do not seal the overflow!

7. Operating controls and functional elements

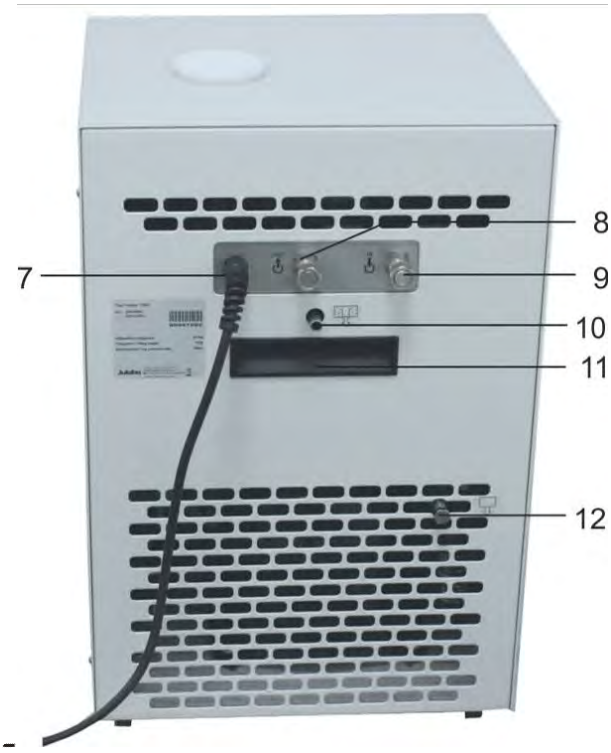
7.1. F250



1		**Main switch**, splash water proofed with integral MCB. **I** = On **O** = Off
2		**Indication elements**
2(1)		- LED Temperature display
2(2)		- Control display “Cooling”
2(3)		- Control display „Alarm“
3		**Foil key pad**, splash water proofed
3.1		- Modify keys for Setpoint – higher / lower
3.2		- Enter key for storage of Setpoint / Parameter
4		**Level indication**
5		**Filling hole**

6		**Power cable** with plug
7		**Pump connection - outlet**, M10x1 male or barbed fitting ∅ 8/10 mm inner diameter
8		**Pump connection - return**, M10x1 male or barbed fitting ∅ 8/10 mm inner diameter
9		**Overflow for Bath**, D_{out} 10 mm, d_{inner} 8 mm
10		**Drain screw**, M10x1 male

7.2. F500, F1000



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2(1)		- LED Temperature display
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2(3)		- Control display „Alarm“
3		**Foil key pad**, splash water proofed
3(1)		- Modify keys for Setpoint – higher / lower
3(2)		- Enter key for storage of Setpoint / Parameter
4		**Level indication**
5		**Filling hole**
6		**Hand grip**

7		**Power cable** with plug
8		**Pump connection - outlet**, M16x1 male or barbed fitting ∅ 8/12 mm inner diameter.
9		**Pump connection - return**, M16x1 male or barbed fitting ∅ 8/12 mm inner diameter.
10		**Overflow for Bath**, D_{out} 10 mm, d_{inner} 8 mm
11		**Hand grip**
12		**Drain screw**, M10x1 male

8. Operating procedures

8.1. Bath fluids

⚠CAUTION

No liability for use of other bath liquids!
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
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.
- No liablity for use with water. 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 fluid	Temperature range
JULABO Thermal G	-30 °C ... 80 °C
Water/Glycole (50:50)	-30 °C ... 50 °C
soft/decalcified water	+5 °C ... 80 °C

Order No.	Ordering text	Volume
8 940 124	JULABO Thermal G	10 Liter
8 940 125	JULABO Thermal G	5 Liter

See website for list of recommended bath fluids.
Contact: www.julabo.com

NOTICE

Use of non-recommended bath fluids may result in a fire hazard or other hazard:
JULABO will **assume** no liability for damages resulting from use of an unsuitable bath liquid.

8.2. Power connection

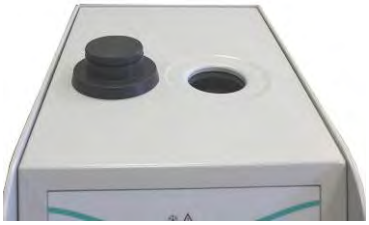
⚠CAUTION

Danger of electric shock!

- Only connect the unit to a power socket with earthing contact (PE – protective earth)! We disclaim all liability for damage caused by incorrect line voltages!
- 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).
- No liability for incorrect line voltages!

Make sure that the line voltage and frequency match the supply voltage specified on the type plate.
Max. permissible mains fluctuations, see Technical specifications.

8.3. Filling



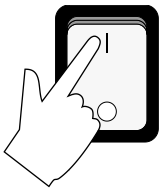
Take care that no liquid enters the interior of the circulating cooler. Positions as shown in chapter 7.Operating controls and functional elements, page 18.

ⓘ Connect the tubing from the external system to the pump connectors and check for leaks

ⓘ Check to make sure that the drain screw (Pos. 10 at F250, or Pos. 12 at F500, F1000) is closed.

- Remove the cover of filling (Pos. 5).
- Fill bath fluid to the upper level of the fill level indicator (Pos. 4).
- Switch on the unit with the main switch (Pos. 1)
- Start the unit. Therefore press the key  for about 4 seconds.
- The bath fluid will be pumped into the externally connected system. Refill the bath fluid to the upper marking of the level indicator.
- The chiller is ready for operation.

8.4. Switching on / Start - Stop

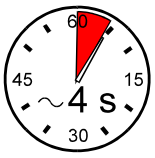


Switching on:

- The recirculating cooler is turned on and off with the mains switch (1).

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.

8.5. 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:

 to set a higher value.

 to set a lower value.

Keep the keys depressed for the value to change fast.

3.  to store the value.

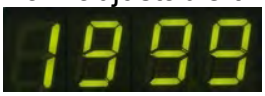
8.6. Timer function

With the timer function the operating time can be limited to an allowed time.

8.6.1. Setting the time

ⓘ The setting can only be made in the Stop status.

Factory setting is the max. adjustable time:



33 h 19 min.

1. Calling the timer function:

   Hold the  key pressed and activate the edit key  shortly. The time which was set last, is shown.

2. Setting the time:

   Activate key  to set a higher value.

   Activate key  to set a lower value.
   Activate the key shortly for single step, hold the key pressed for quick enumeration.

3. Store the set value with the  key.
   Example: 120 minutes

ⓘ This time remains stored until something is changed.

8.6.2. Timer operation

Timer operation

- **Starting the timer**:

  Hold the  key pressed and activate the edit key  shortly.

ⓘ The bath temperature is shown. In case of timer operation the comma in the display is blinking. The set time is counted up to zero. When the time has elapsed, the circulator stops.

- **Interrupting the timer** / Failure of power supply voltage:
  If there is a power failure, or if the unit is switched off at the mains switch, the circulator memorizes the position of the timer. When the power supply is switched on again, the circulator only works off the remaining time.
- **Canceling the timer operation**:

  Press the  key for approx. **4 seconds.**
  The timer can be restarted.

8.7. 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.

The set values are stored in the memory, and by pressing the main switch in manual mode, the device is restored to operation.

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

Danger from unattended device start.

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.

9. Safety installations

9.1. 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 "**E**rror **14**".

ⓘ Check the sizing of the application.
You may have to use a more powerful chiller.

9.2. 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 "**E**rror **01**".

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

⚠WARNING

Do not mix the bath fluids.

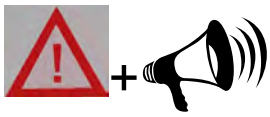
For refill always use the same bath fluid type that is already in the bath.

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.

10. 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 occured (insufficient filling level due to excessive bath fluid pumped out). Replace the tubing and replenish the bath tank with the bath fluid.

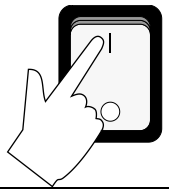
Cable of the working temperature sensor interrupted or short-circuited.

Sensor difference alarm.
Working temperature and safety sensors report a temperature difference of more than 25 K.

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.

The leads to the high temperature protection are broken.



- Switch off the unit
- Wait for approx.2 seconds
- Switch on the unit

If the error occurs again, a remote diagnosis must be made.

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.

(1) 

Main fuse:
The main switch (1) of the device is also a circuit breaker.
After a cooling period, the unit can be switched on again.

11. Cleaning / repairing the unit

⚠WARNING

Danger of electric shock!

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

Venting grid (front)

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

F250

1. Switch off the unit
2. disconnect mains power cable.
3. Clean the ribbed condenser with a vacuum cleaner.

F500, F1000

Cleaning:

Clean the outside of 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.

During the repair process, JULABO will perform any upgrades or technical changes that are necessary to ensure the reliable operation of the device.

11.1. Draining

⚠CAUTION

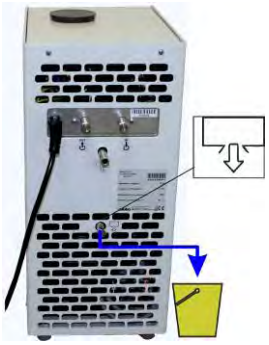
Danger of electric shock!

- Turn off the unit and disconnect the mains cable from the power source.

NOTICE

Environmental damage caused by improper storage and disposal of the bath fluid.

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



F250

F500, F1000

1. Turn off the unit and disconnect the mains cable from the power source.
2. Prepare a suitable vessel for receiving the used bath fluid.
3. Turn out the drain screw on the rear of the unit to drain the bath fluid.
4. Tilt the unit slightly back to drain it completely.

Close the drain screw after the complete emptying of the unit.

12. Warranty conditions

JULABO 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.