

English

Operating manual

Immersion Coolers

FT402

FT902

Distributed by:



Carl Stuart Limited

ADVANCED APPLIED TECHNOLOGIES

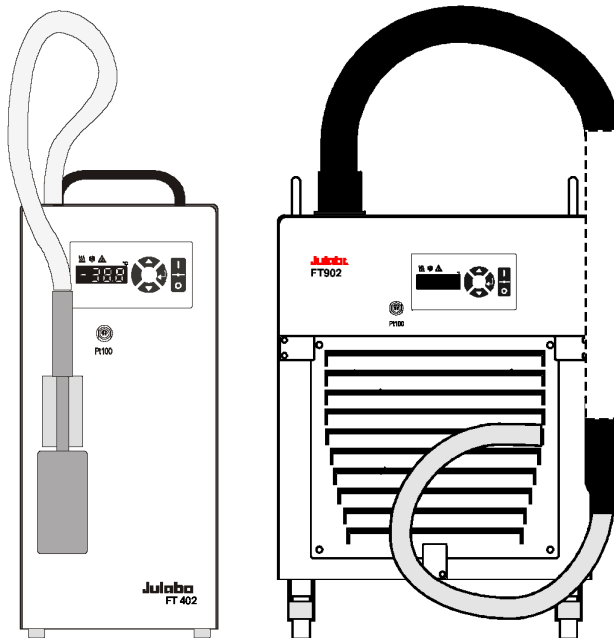
Contact Us:

Irl Ph: 01 4523432

UK Ph: 08452 30 40 30

Web: www.carlstuart.com

Email: info@carlstuart.com



1.951.4620BE2 07/06

Julabo
Innovative Temperature Technology

JULABO Labortechnik GmbH
77960 Seelbach / Germany

☎ +49 (0) 7823 / 51-0

📄 +49 (0) 7823 / 24 91

✉ info@julabo.de

🌐 www.julabo.de

Contents	
Operating manual	Pages 2 to 9
Operating instructions	Pages 10 to 21

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 principles of operating and possibilities of our circulators. For optimum utilization of all functions, we recommend that you thoroughly study this manual prior to beginning operation.

Quality Management System



The JULABO Quality Management System:

Development, production and distribution of temperature application instruments for research and industries conform to the requirements according to DIN EN ISO 9001:2000. Certificate Registration No. QA 051004008.

Unpacking and checking

Unpack the circulator and accessories and check for damages incurred during transit. These should be reported to the responsible carrier, railway, or postal authority, and a request for a damage report should be made. 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

Changes without prior notification reserved

TABLE OF CONTENTS

Operating manual	4
Description	4
Operator responsibility – Safety recommendations	5
EC Conformity	7
Warranty conditions	8
Technical specifications	9
Operating instructions	12
1. Operating controls and functional elements	12
2. Safety notes for the user	14
3. Preparations	14
3.1. Installation	14
3.2. Immersion probe / Sensor connection - Pt100	15
4. Operating procedures	17
4.1. Power connection	17
4.2. Switching on / Start - Stop	17
4.3. Automatic / non-automatic start mode	18
4.4. Setting the temperatures	19
4.5. Temperature control	19
5. Troubleshooting guide / Error messages	20
6. Safety recommendations	21
7. Electrical connection	21
8. Maintenance, Cleaning the unit	22

Operating manual

Description

JULABO immersion coolers have been designed for temperature application to specific fluids in a bath tank.

For example: Dewar vessels, beakers, or other containers in conjunction with heating circulators for continuous countercooling or for dry-ice substitution.



- ☑ The immersion coolers are operated via the 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 control adapts the cooling supply to the thermal requirements of the bath.



- ☑ Electrical connection:
Connection for Pt100 external sensor for temperature measurement and control.



- ☑ Model FT402 is provided with a handle for portable use. Model FT902 is equipped with four castors. Two of the castors include locking levers that should be pressed down after setting up the unit to prevent it from moving.



- ☑ The immersion probe is connected to the instrument with a flexible, specially insulated tube. On model FT902 the immersion probe is also flexible and may be adjusted precisely to different positions within the vessel.
- ☑ The immersion cooler conforms to the relevant requirements specified by European guidelines.



JULABO immersion 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).

Operator responsibility – Safety recommendations

The products of JULABO Labortechnik GmbH warrant a safe operation if installation, operation and maintenance is carried out according to common safety regulations. This section informs you about potential dangers that may arise from operating the immersion cooler and also mentions the most important safety precautions

Persons:

The operator is responsible for the qualification of the personnel operating the units. The operator should be constantly informed about the dangers involved with their job activities as well as preventive actions.


Make sure all persons expected to carry out operation, installation and maintenance of the unit read and understand the safety information and operating instructions.

When using hazardous materials, the immersion cooler may only be operated by persons that are absolutely familiar with these materials and the immersion cooler.

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
Eisenbahnstrasse 45
77960 Seelbach / Germany
 +49 7823 51-0
 +49 7823 2491
 info@julabo.de
 www.julabo.de

Handling:

You received a product conceived for industrial use. Nevertheless, avoid strikes to the housing, vibrations, damages to the keypad foil (keys, display) or contamination.

Make sure the product is regularly checked for proper condition. Regularly check (at least every 2 years) the proper condition of the mandatory, warning, prohibition and safety labels.

Take care that the mains supply features a low impedance to avoid any negative affects on the instrument being operated in 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 influence other units with components susceptible to magnetic fields

(e.g. a monitor). We recommend to keep a minimum distance of 1 m.

Permissible ambient temperature: max. 35 °C, min. 5 °C.

Permissible relative air humidity: 50 % (40 °C).

Do not store in an aggressive atmosphere. Protect from contaminations. Do not expose to sunlight.

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. The summarized user guidance (short manual) and the specification table with information on individual parameters are sufficient for this.

Use:

The bath tank 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.

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

Particular care and attention is necessary because of the wide operating range.

There are thermal dangers: Touchable parts of the probe can be very cold.

The user must attach the enclosed safety labels to the unit so they are well visible.

Safety label including warning label W017:

Colours: yellow, black

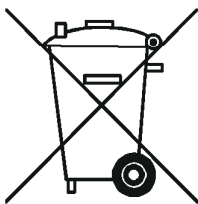
Attention: Do not touch cold probe.



Disposal:

The product may be used with oil as bath fluid. The oil fully or partially consists of mineral oil or synthetic oil. For disposal, observe the instructions in the safety data sheets.

This unit contains the refrigerants R134a, R404A and R23– 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

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!

EC Conformity



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

Low voltage regulations with respect to legal harmonization of the member countries concerning electric devices for use within certain voltage limits.

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

Julabo

JULABO Labortechnik GmbH
Eisenbahnstr. 45
77960 Seelbach / Germany

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, 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.

Technical specifications

Immersion cooler		FT402	FT902
Working temperature range	°C	-40 ... 30	-90 ... 30
Temperature stability	°C	±0.5	±1
Temperature selection		digital	digital
Temperature indication		LED	LED
Resolution	°C	0.1	0.1
Temperature control		PID1	PID1
Cooling capacity	°C	<u>+20 10 -20 -40</u>	<u>+20 10 -20 -40 -80</u>
Medium ethanol	W	450 360 140 30	270 270 240 200 70
Cooling compressor		1-stage	2-stage
Refrigerant	230 V / 50 Hz 115 V / 60 Hz	R404A R134a	R404A/R23 R404A/R23
Electrical connections:			
Pt100 external sensor		Pt100	Pt100
Overall dimensions (WxDxH)	cm	20x30x43	38x55x60
Immersion probe (Lxdia.)	cm	12x5	-----
Immersion probe, flexible (Lxdia.)	cm	-----	65x1.5
Connection tubing (L)	cm	120	160
Noise level, distance 1 m	dBA	61	60
Weight	kg	24	50
Ambient temperature	°C	5 ... 35	5 ... 35
Mains power connection 230 V/50 Hz	V/ Hz	207-253 / 50	207-253 / 50
Current input (at 230 V)	A	1.8	3.5
Mains power connection 115 V/60 Hz	V/ Hz	103-127 / 60	103-127 / 60
Current input (at 115 V)	A	3.5	7

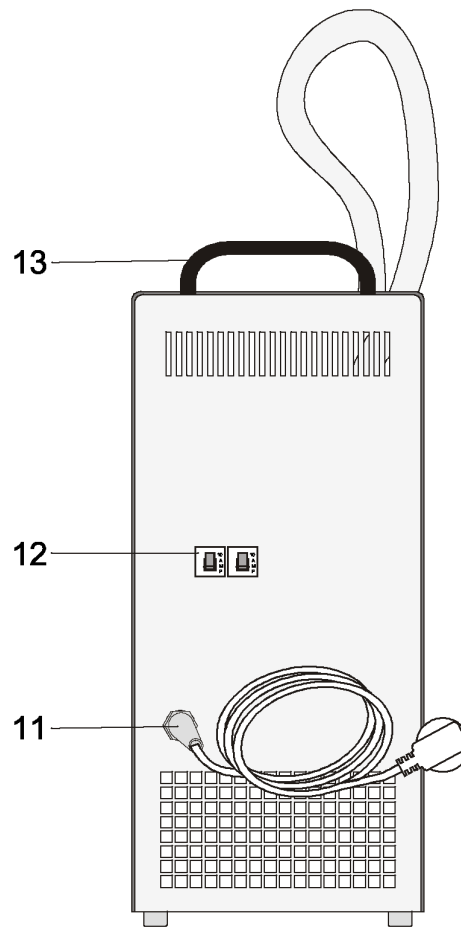
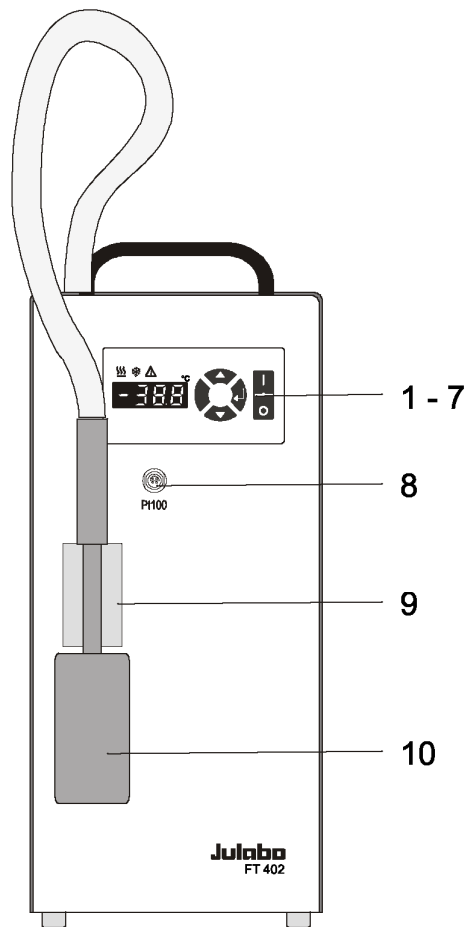
All measurements have been carried out at: rated voltage and frequency
ambient temperature: 20 °C Technical changes without prior notification reserved.








Operating instructions

1. Operating controls and functional elements

FT402 Front view

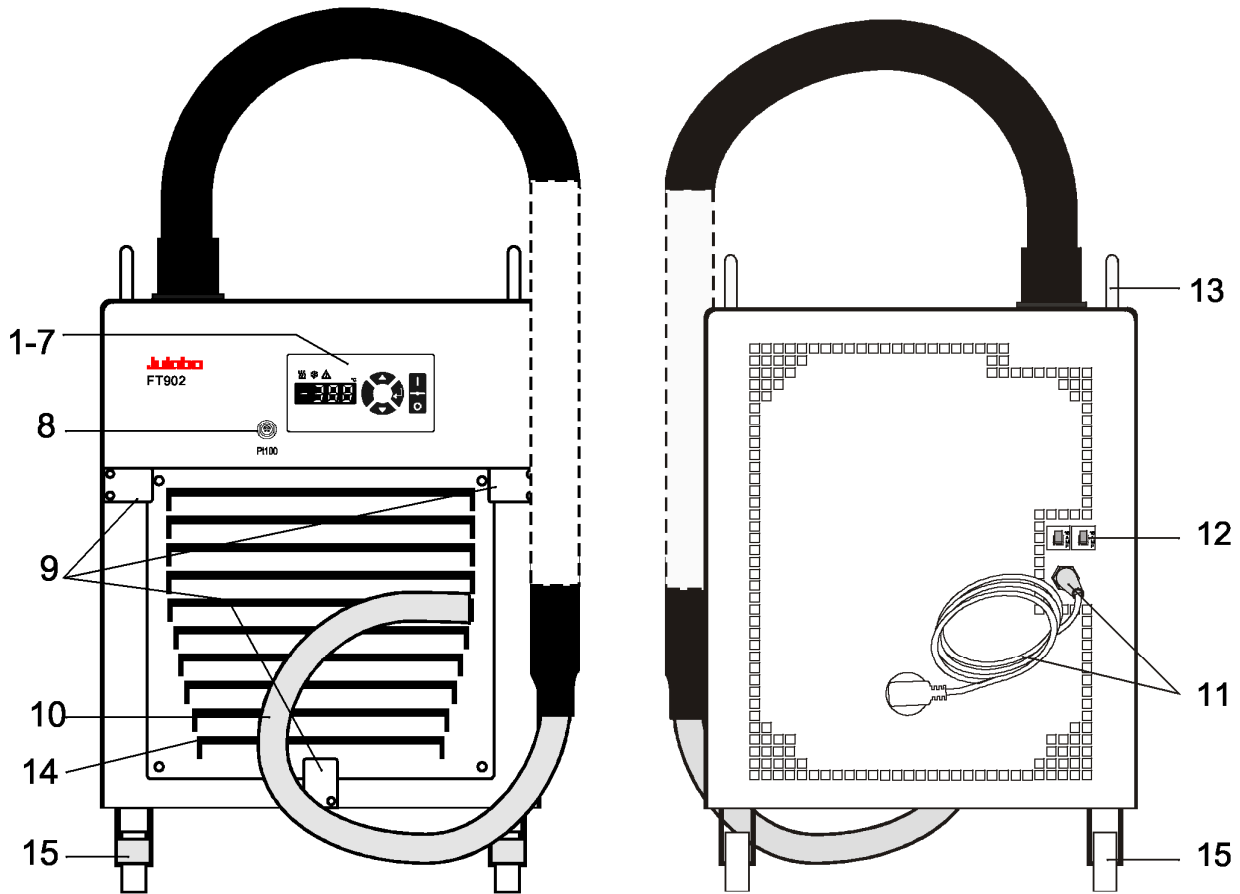
Rear view


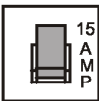


- 1  Mains power switch, illuminated
! on
○ off
- 2  Edit keys (increase/decrease setting)
- 3  Enter key (store)
- 4  LED temperature display
- 5  Control indicator – Heating (without function)
- 6  Control indicator – Cooling
- 7  Control indicator – Alarm





FT902 Front view

Rear view



- 8  External Pt100 sensor connector
Included with each unit:
Order No. 8 981 003 Pt100 sensor, 200x6 mm dia., stainless steel
- 9 Clamp for immersion probe
- 10 Immersion probe
- 11 Mains power cable with plug
- 12  Mains circuit breakers (resettable)
FT402 10 A FT902 15 A
- 13 Carrying handle
- 14 Venting grid, removable (only FT902)
- 15 Castor with brake (at the front)
Castor without brake (at the back)

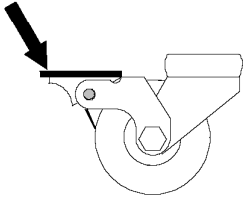
2. Safety notes for the user

	<p>In addition to the safety warnings listed above, 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 described according to an alarm keyword. Read and follow these important instructions.</p>
	<p>Warning: Describes a possibly highly dangerous situation. If this is not avoided, serious injury and danger to life could result.</p>
	<p>Caution: Describes a possibly dangerous situation. If this is not avoided, slight or minor injuries could result. A warning of possible damage can also be contained in the text.</p>
	<p>Notice: Describes a possibly harmful situation. If this is not avoided, the product or anything in its surroundings can be damaged.</p>

3. Preparations

3.1. Installation

- Place the unit on an even surface on a pad made of non-flammable material.
- 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 m³ is required.
 - > For 0.48 kg of refrigerant R404A, a room space of 1 m³ is required.
 - > For 0.68 kg of refrigerant R23, a room space of 1 m³ is required.



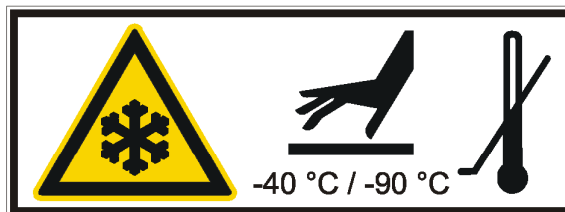
- The instrument should be set up at a frost-proof and dry location.
- The ambient temperature must not exceed 35 °C.
- Press down the castor levers on model FT902.
- Keep at least 20 cm of open space on the front and rear venting grids.
- Do not set up the unit in the immediate vicinity of heat sources and do not expose to sun light.
- 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.

3.2. Immersion probe / Sensor connection - Pt100



Caution:

Avoid touching the immersion probe if it is frosted.
DANGER OF INJURY.
Use gloves.



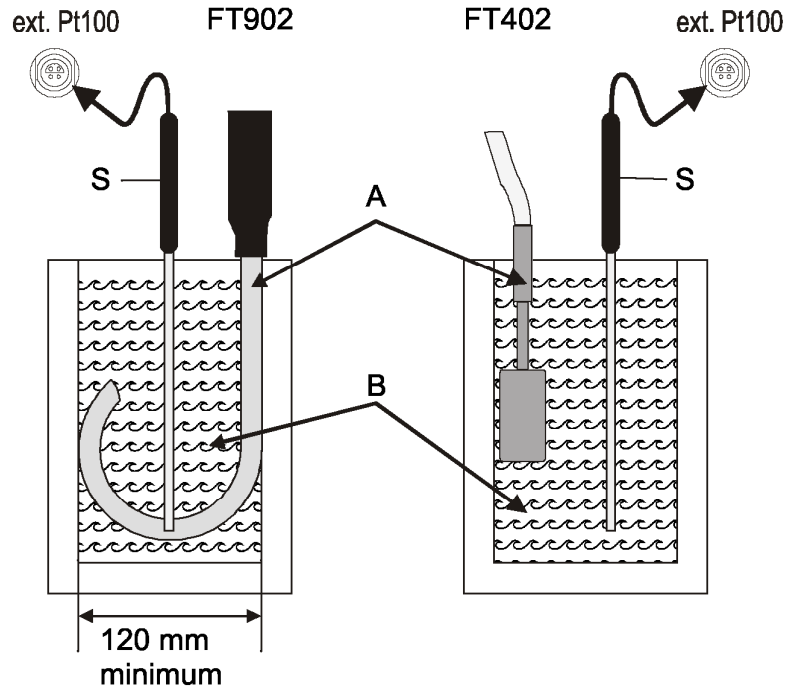
Switch the unit on only if the probe is immersed into the bath fluid.

Preparations



The immersion coolers are provided with a Pt100 sensor 200x6 mm dia., stainless steel - Order No. 8 981 003

- Connect the Pt100 sensor to the connector (Pt100) .
- To prevent the immersion probe (A) from icing, it should be completely immersed into the bath liquid (B).



Important:


- ① Place the external sensor (S) into the bath medium and securely fix the sensor.
- ① FT902: The diameter of the bent probe should not be less than 120 mm.

Accessories:

Order No.	Description
8 981 005	Pt100 sensor 200x6 mm dia., glass, 1.5 m cable
8 981 010	Pt100 Fühler 300x6 mm dia., stainless steel, 1.5 m cable
8 970 400	Clamp for cooler probe FT402

4. Operating procedures

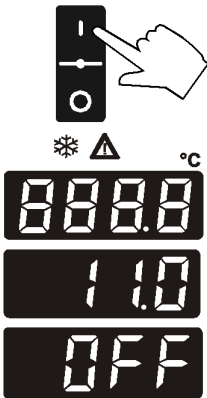
4.1. Power connection



Caution:
 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!

Check to make sure that the line voltage matches the supply voltage specified on the identification plate.
 Deviations of $\pm 10\%$ are permissible.



4.2. Switching on / Start - Stop



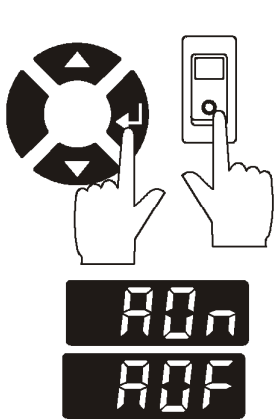
- **Switching on:**
 Turn on the mains power switch (1).
- ① The unit performs a self-test. All segments of the 4-digit LED temperature DISPLAY and all indicator lights will illuminate (as illustrated on the left).
 Then the software version (example: 11.0) appears.
 The display "OFF" indicates the unit is ready to operate (standby mode).




Start / Stop:

- Press enter  for about 4 seconds.
- ① **Start:** The LED temperature DISPLAY indicates the actual bath temperature.
 The cooling control indicator  signals the cooling condition – on/off.
- ① **Stop:** The LED temperature DISPLAY indicates "OFF".
- **Switching off:**
 Turn the unit off with the mains power switch.

4.3. Automatic / non-automatic start mode



- ① Keep depressed enter  and
- ② turn on the immersion cooler with the mains power switch.

For a short while the LED temperature DISPLAY indicates the effective start mode:

⇒ AUTOSTART on.

⇒ AUTOSTART off.

NOTE:

The immersion 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 is effected simultaneously.

The values set on the immersion cooler remain stored, and the unit is returned to operation by pressing the start/stop key. 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.



Warning:

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

4.4. Setting the temperatures

This function is used to set the lowest desired temperature value.

① 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.

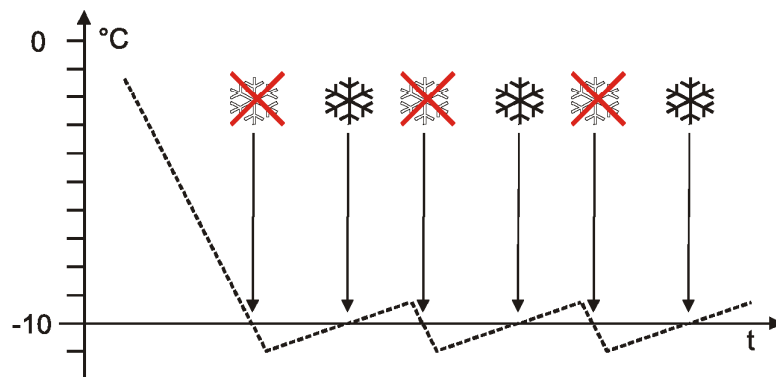
4.5. Temperature control

The immersion cooler can only control the temperature if both - the Pt100 sensor and immersion probe - are immersed into the same bath fluid.

Application: Cooling a fluid in a vessel

If the actual temperature falls below the setpoint temperature, the compressor is switched off (on FT902: only one of the two compressors).

The cooling control indicator ❄️ goes out. If cooling is required again, the compressor switches on automatically.



Example: Setpoint temperature $-10\text{ }^{\circ}\text{C}$

Troubleshooting guide / Error messages

The temperature curve resembles a two-point control (on-off). Response time and amplitude of the temperature curve are depending on the volume of the bath fluid (amongst others).

- ① According to manufacturer's instructions, there is an off-period of minimum 4 minutes to protect the compressor.



Caution:

The immersion probe – as part of the cooling circuit – should not be exposed to bath temperatures above the working temperature of the immersion cooler.

This would cause damage to the compressor.

Do not immerse a frosted immersion probe into hot bath oil.

DANGER OF INJURY!

5. Troubleshooting guide / Error messages



Whenever the microprocessor electronics registers a failure, a complete shutdown of the compressor is performed.

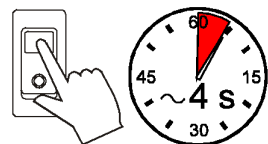
The alarm light "△" illuminates and a continuous signal tone sounds. The LED temperature display indicates the cause for the alarm in form of a code.



Press enter  to quit the audible signal.

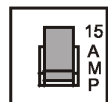


- Cable of the working temperature sensor interrupted or short-circuited.
- The temperature inside the bath is outside the working temperature range.



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 JULABO service station.




Mains circuit breakers (resettable)

FT402 10 A

FT902 15 A


6. Safety recommendations

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

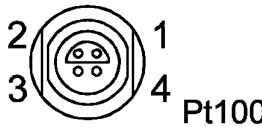


- Only connect the unit to a power socket with earthing contact (PE – protective earth)!
- Place the instrument on an even surface on a pad made of non-inflammable material.
- Do not touch the immersion probe if it is frosted.
- Do not bend the tube connection of the immersion probe
- Keep the air intake and exhaust grids free of obstructions. (Maintain a sufficient distance from all surrounding surfaces!)
- Do not move the unit from the position where it was set up during operation.
- 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.
- Never operate equipment with damaged mains power cables.
- Electrical connections and any other work on the cooling system must be performed by qualified personnel only.

7. Electrical connection



Notice:
Use shielded cables only.
The shield of the connecting cable is electrically connected to the plug housing.

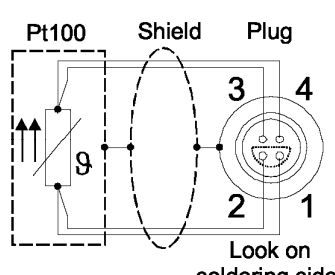


Pt100

Connector for external Pt100 sensor

Pin assignment:

Pin	Signal
1	I+
2	U+
3	U-
4	I-



Pt100 Shield Plug

Look on soldering side.

The shield of the connecting cable is electrically connected to the plug housing and the sensor tube.

8. Maintenance, Cleaning the unit



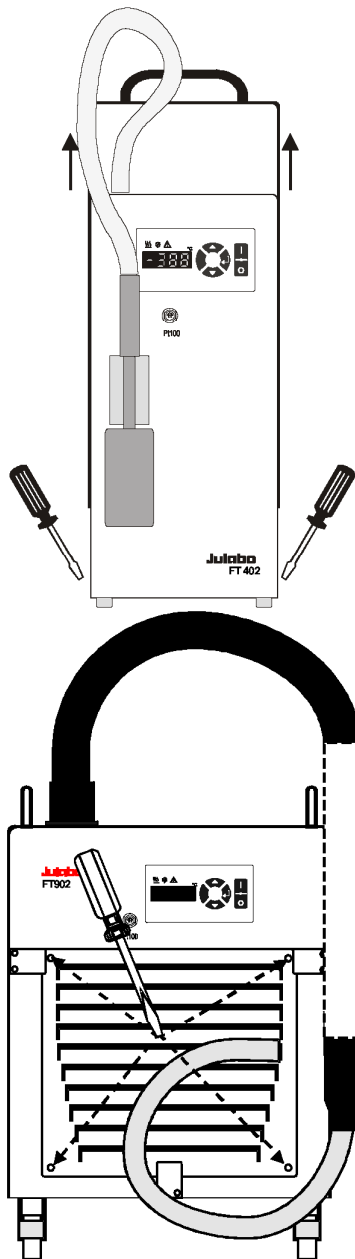
Caution:

Before cleaning the unit, disconnect the power plug from the mains socket!

Always turn off the unit and disconnect the mains cable from the power source before performing any service or maintenance procedures.

Electrical connections and any other work on the cooling system must be performed by qualified personnel only.

Prevent humidity from entering into the immersion cooler.



The immersion cooler is designed for continuous operation under normal conditions.

Periodic maintenance is not required.

- Clean the outside of the unit using a wet cloth and low surface tension water.

Regularly check the condenser for dirt contamination.

Clean the ribbed condenser, because dust and dirt will reduce cooling performance of the unit.

Cleaning the Cooling Compressor:

- Switch off the unit, disconnect mains power cable.
- Model FT402: Remove the hood.
- Model FT902: The ventilation grid is detached by unscrewing the four mounting screws
- Clean the ribbed condenser with a vacuum cleaner.
- Replace the hood or the ventilation grid.
- Switch on the unit.

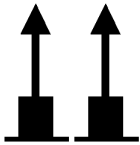
Repairs

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.

If you intend to return your JULABO unit to us, you will find a Service Return Form on our website www.julabo.de (Sales & Service/Technical Support/Service Forms). Please use this as a delivery note and include it to the unit or send it in advance either by Fax or E-Mail.



- During transport the unit has to stand upright. Mark the packing correspondingly.
- 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.