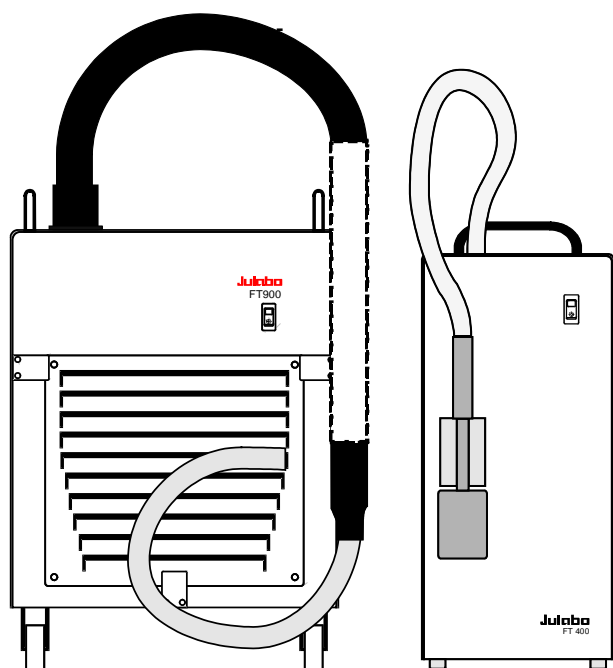


English

OPERATING MANUAL

Immersion Coolers
FT200 FT400 FT900

Flow-Through Cooler
FD200



Julabo
THE TEMPERATURE CONTROL COMPANY

1.951.4616-V4

05/16

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2.4. Technical specifications

| | | FT200 | FD200 |
|--------------------------------------|--------------------------------------|------------------------------------------------------------|-----------------------------------------|
| Temperature range | °C | -20 ... +30 | 10 ... +30 |
| Cooling capacity (medium ethanol) | $\frac{^{\circ}\text{C}}{\text{kW}}$ | $\frac{+20 \quad 0 \quad -30}{0.25 \quad 0.15 \quad 0.04}$ | $\frac{+20 \quad +10}{0.22 \quad 0.18}$ |
| Refrigerant | | R134a | R134a |
| Recommended flow rate | l/min | ----- | 2 - 3 |
| Freezing protection | °C | ----- | 10 |
| Immersion probe (Lxdia.) | cm | 9x4 | ----- |
| Connection tubing (L) | cm | 120 | ----- |
| Dimensions (WxLxH) | cm | 18x27x39 | 18x27x39 |
| Weight | kg | 18 | 16 |
| Ambient temperature | °C | 5 ... 35 | 5 ... 35 |
| | | | |
| Mains power connection | V/Hz | 190-253 /50 | 230/50 |
| Current draw (at 230 V) | A | 2,0 | 2,0 |
| Mains power connection | V/Hz | 103-127 / 60 | 115 / 60 |
| Current draw (at 115 V) | A | 3,0 | 3,0 |

| | | FT400 | FT900 |
|--------------------------------------|--------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| Temperature range | °C | -40 ... +30 | -90 ... +30 |
| Cooling capacity (medium ethanol) | $\frac{^{\circ}\text{C}}{\text{kW}}$ | $\frac{+20 \quad +10 \quad -20 \quad -40}{0.45 \quad 0.36 \quad 0.14 \quad 0.03}$ | $\frac{+20 \quad +10 \quad -40 \quad -80}{0.3 \quad 0.27 \quad 0.2 \quad 0.07}$ |
| Cooling compressor | | 1-stage | 2- stage |
| Refrigerant | | R404A | R404A/R23 |
| Immersion probe (Lxdia.) | cm | 12x5 | 65x1.5 (flexible) |
| Connection tubing (L) | cm | 120 | 160 |
| Dimensions (WxLxH) | cm | 20x30x43 | 38x55x60 |
| Weight | kg | 24 | 50 |
| Ambient temperature | °C | 5 ... 35 | 5 ... 35 |
| | | | |
| Mains power connection | V/Hz | 230 / 50 | 230 / 50/60 |
| Current draw (at 230 V) | A | 3,0 | 6,0 |
| Mains power connection | V/Hz | 115 / 60 | 115 / 60 |
| Current draw (at 115 V) | A | 4,0 | 7,0 |

Note:

All measurements have been carried out at:
rated voltage and frequency; ambient temperature 20 °C;

Environmental conditions according to IEC 61 010-1:

Use indoors only.

Altitude up to 2000 m - normal zero.

Ambient temperature: see Technical specifications

Humidity:

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

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

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

Protection class according to IEC 60 529 IP21

The unit corresponds to Class I

| | |
|----------------------|----|
| Overvoltage category | II |
|----------------------|----|

Pollution degree 2



Caution:

The unit is not for use in explosive environment.

EMC requirements according to EN 61326-1

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:

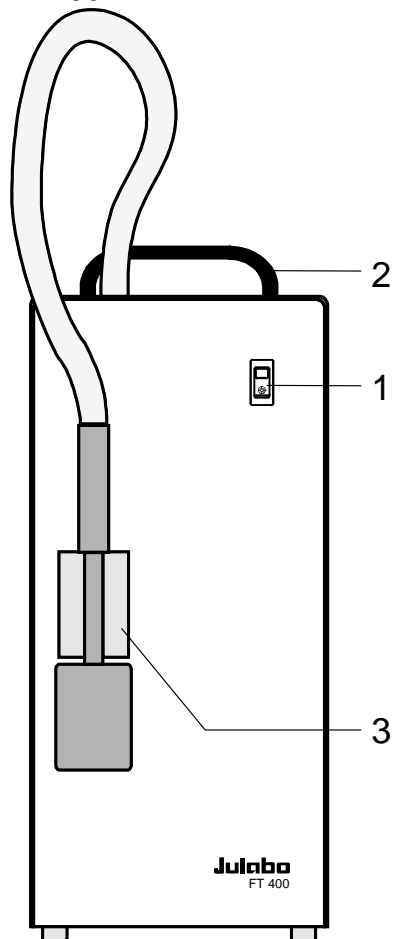
- The operator must ensure that the equipment is checked at regular intervals for leaks.
- These intervals depend on the CO₂ equivalent of the system. This is calculated from the refrigerant fill volume and type of refrigerant. The CO₂ equivalent of your system is shown on the model plate.
- The operator 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.

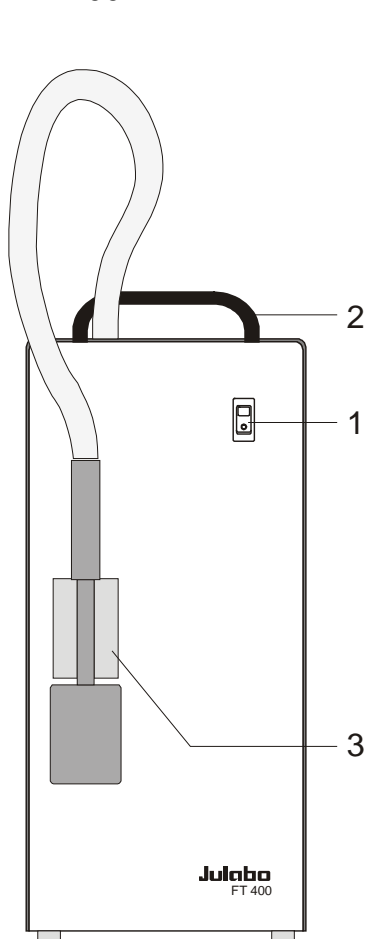
Operating instructions

3. OPERATING CONTROLS AND FUNCTIONAL ELEMENTS

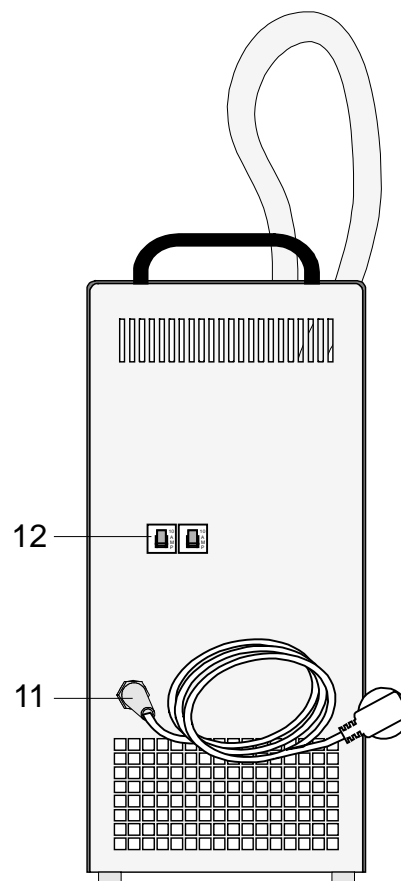
FT400



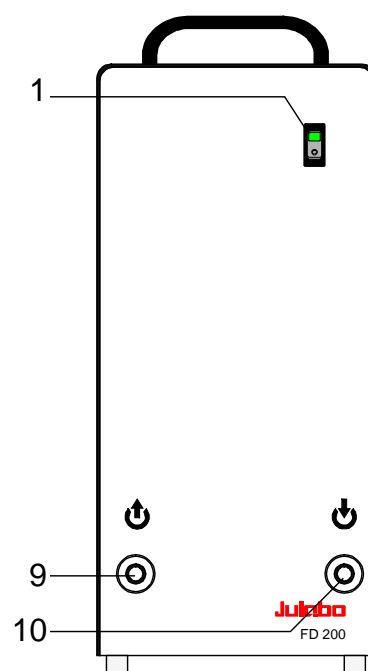
FT200



Rear view



FD200



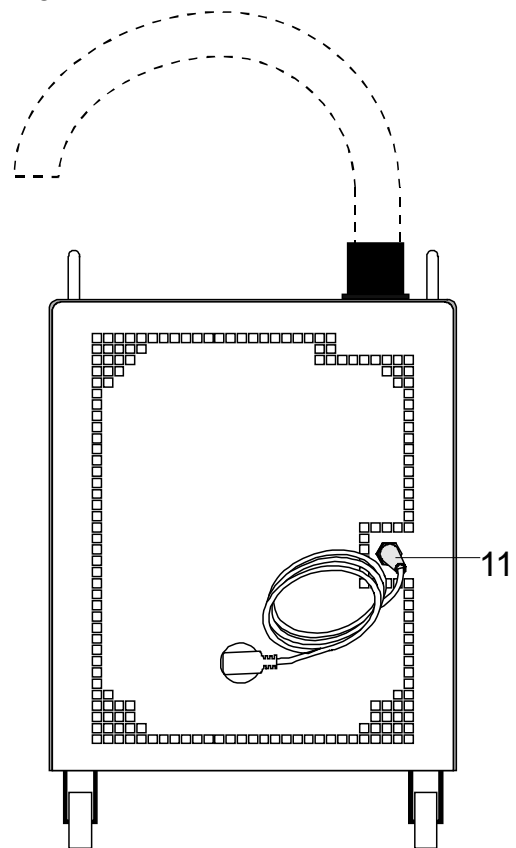
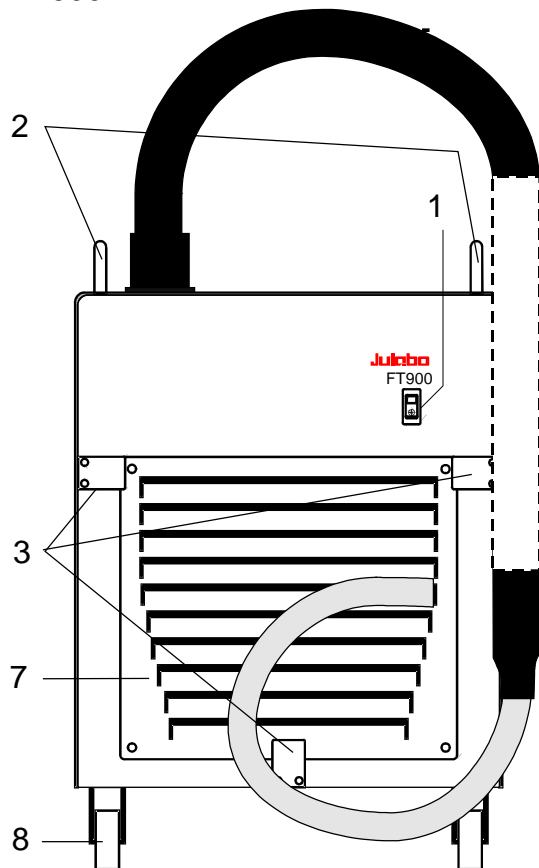
- 1 Mains switch, illuminated
- 2 Cooling control light
- 3 Clamp for immersion probe
- 7 Removable ventilation grid
- 8 Castor with locking lever
- 9 Tube connection - discharge
- 10 Tube connection - intake
- 11 Mains power cable with plug
- 12 Safety cutouts: Mains fuses 10 A



OPERATING CONTROLS AND FUNCTIONAL ELEMENTS

FT900

Rear view



4. Safety notes for the user

4.1. Explanation of safety notes



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 classified using a signal word.
Read and follow these important instructions.

**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 instructions

Follow the safety instructions to avoid personal injury and property damage. Also, the valid safety instructions for workplaces must be followed.



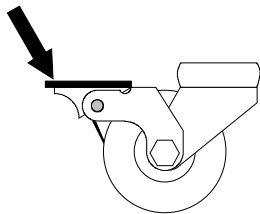
- Only connect the unit to a power socket with an earthing contact (PE – protective earth)!
- The power supply plug serves as a safe disconnecting device from the line and must always be easily accessible.
- Place the unit on an even surface on a base made of nonflammable material.
- Do not stay in the 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.
- 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.
- 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.
- 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.



- There are thermal dangers: Touchable parts of the probe can be very cold. Therefore, exercise particular caution when touching these parts. Use gloves.

5. Preparations

5.1. Installation



- Place the unit on an even surface on a pad made of non-flammable material.
- Press down the castor levers on model FT900.
- The instrument should be set up at a frost-proof and dry location.
- 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: 35 °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.
 - > For 0.25 kg of refrigerant R134a, 1 m³ of space is required.
 - > For 0.52 kg of refrigerant R404A, 1 m³ of space is required.
 - > For 0.68 kg of refrigerant R23, 1 m³ of space is required.
- The ambient temperature must not exceed 35 °C.
- 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.

5.2. Immersion Probe

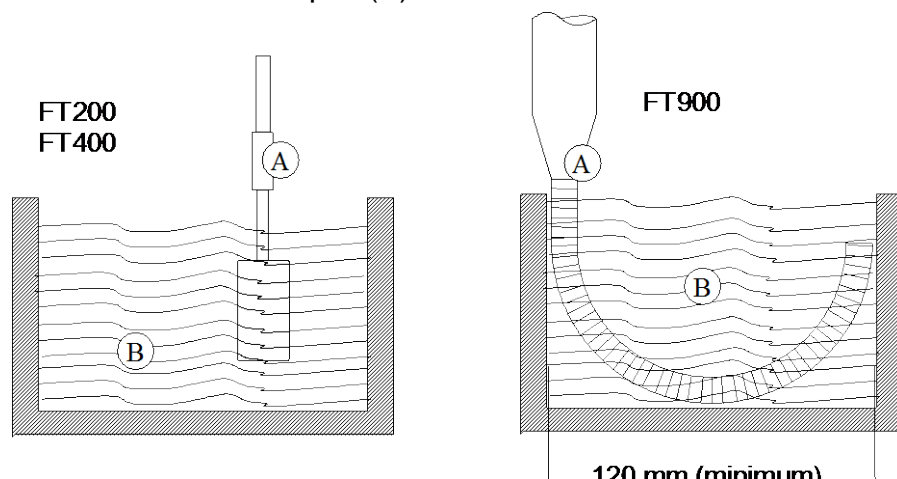


Avoid touching the immersion probe if it is frosted.

DANGER OF INJURY. Use gloves.

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

To prevent the immersion probe (A) from icing, it should be completely immersed into the bath liquid (B).



Accessory: Clamp for cooler probe FT200/400 - order no. 8 970 400

5.3. Tube connection FD200



- Connect the tubes and secure with tube clamps.
discharge (9)
intake (10)

Recommended flow rate: 2 to 3 l/min

6. OPERATING PROCEDURES

6.1. 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!

Make sure that the line voltage and frequency match the supply voltage specified on the type plate.
Deviations of $\pm 10\%$ are permissible.

6.2. Switching On



- The immersion cooler is turned on and off with the mains switch. (1).
The control light in the switch will illuminate.



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!

7. TROUBLESHOOTING

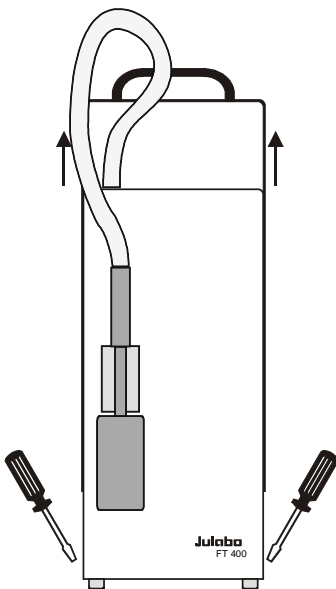
- Malfunction of compressor:
The cooling compressor is equipped with an overload protection device that will be triggered by overheating or excessive current consumption. Possible causes include insufficient ventilation or contamination of the condenser. After a cool-down phase, the motor is automatically switched on again.
- Interruption of the cooling loop (FD200) by a bended tube.

8. Cleaning / repairing 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. Service and repair work may be performed only by authorized electricians. Prevent humidity from entering into the immersion cooler.



JULABO coolers are designed for continuous operation under normal conditions.

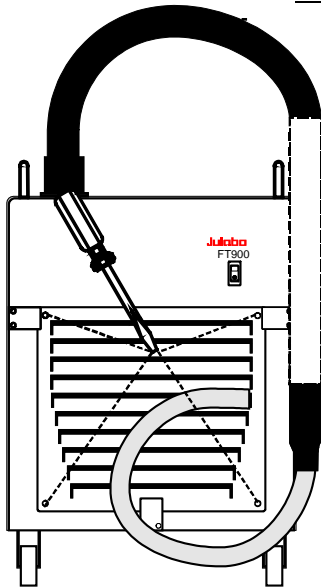
Periodic maintenance is not required.

Regularly check the condensor for dirt contamination. Clean the ribbed condensor, because dust and dirt will reduce cooling performance of the unit.

Cleaning the Cooling Compressor:

- Switch off the unit, disconnect mains power cable.

Remove the hood (FD200, FT200, FT400).

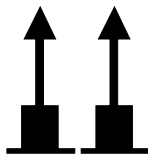


- The ventilation grid (7) is detached by unscrewing the four mounting screws (FT900).
- Clean the ribbed condensor with a vacuum cleaner.
- Replace the hood or the ventilation grid.
- Switch on the unit.

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

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.
- 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.