



Immersion / Open Bath Circulators

Operating Instructions

Important: keep original operating manual for future use.

1.953.0400-V0

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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 is designed to familiarize you with the operation of our units and their possible applications. Please read the operating manual carefully.

Please call us if you have any questions about the operation of the unit or about the operating manual.



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The JULABO quality management system



The standards for the development, production and distribution of temperature control devices for laboratory and industry use satisfy the requirements of ISO 9001 and ISO 14001.
Registration certificate No. 01 100044846.

Unpacking and inspection

If the packaging is damaged or if you discover any concealed transport damage when you have unpacked the devices and the accessories, please notify the supplier in the form of a statement of damage.



NOTICE

The operating manual

- should be kept for future use.
- must be available to operating personnel at all times.

1 Intended use

JULABO circulators are designed for controlling the temperature of water in a bath tank.

JULABO circulators are not designed for the direct temperature control of foods, semi-luxury foods and tobacco, or pharmaceutical and medical products.

- Direct temperature control means unprotected contact between the object and the tempering medium (bath fluid).
- The device is not suitable for use in potentially explosive environments.

2 CORIO® C product overview

 A vertical immersion circulator with a grey control panel on top and a stainless steel heating element at the bottom. The digital display shows 37.0.	 An open bath circulator consisting of a white plastic bath tank with a stainless steel heating element and a grey control panel on top. The digital display shows 25.2.
<p>Immersion circulator for bath tanks up to 30 l.</p>	<p>Open bath circulator with high quality bath tanks made of transparent plastic or stainless steel.</p>

3 Description

- These circulators are operated via the splash-proof keypad. The microprocessor technology allows the setpoint to be set, displayed and saved using the LED temperature display.
- The PID temperature control automatically adjusts the heat supply to the requirements in the bath.
- ATC - Absolute Temperature Calibration (1-point calibration)
- Low level protection using a float switch.
- If the low level protection device is triggered, the heater and circulating pump are completely shut down.



NOTICE

It is important to follow these safety instructions to prevent personal injury and property damage. These instructions apply in addition to the safety instructions at your workstation.

It is essential that you read the user information before starting the device.



4 Explanation of safety information



The operating manual contains warnings to increase safety when using the unit. The general warning sign, consisting of an equilateral triangle surrounding an exclamation sign and reproduced in various signal colors, is preceded by the signal words.

"Warning of a dangerous situation".

The significance of the danger is classified with a signal word. Read the instructions carefully and follow them.



⚠ DANGER

This signal word designates a danger with a high level of risk which, if it not prevented, will result in death or serious injury.



⚠ WARNING

This signal word designates a danger with a medium level of risk which, if it not prevented, may result in death or serious injury.



⚠ CAUTION

This signal word designates a danger with a low level of risk which, if it not prevented, may result in minor or moderate injury.

NOTICE

Designates a possibly harmful situation. If it is not prevented, the system or something near it may be damaged.

4.1 Explanation of other information



TIP

Your attention is drawn to something special by this.

Designates user tips and other useful information.



Dangers at second glance

Designates states which only occur after the start of an action and could have been prevented if the warning had been heeded.



Informative note

Provides additional information.

5 Safety instructions

It is important to follow these safety instructions to prevent personal injury and property damage. These instructions apply in addition to standard safety practices for working places.

- It is essential that you read the user information before starting the unit.
- Place the unit on a flat surface and a mat made of non-flammable material.
- Do not start the unit if it is damaged or leaking.
- Only connect the unit to a power socket with ground contact (PE – protective earth)!
- The power supply plug serves as safe disconnecting device from the power supply network and must be freely accessible at all times.
- Do not start the unit if it has a damaged mains power cable.
- Never use the unit without bath fluid.
- Check the filling level of the bath fluid at regular intervals. The pump and heater must always be completely covered with bath fluid.
- Do not drain the bath fluid when it is hot.
- Check the temperature of the bath fluid prior to draining, for example by switching on the unit briefly.
- Switch off the unit and pull the plug before moving the unit or carrying out service or repair work.
- Have all service and repair work carried out by authorized specialists only.
- Switch off the unit and disconnect it from the power supply before cleaning it.
- Empty the unit completely before transporting it.
- Transport the unit carefully. The interior of the unit can also be damaged by impacts or if it is dropped.
- Refer to the safety sticker.
- Do not remove the safety sticker.

6 Operator's responsibility - safety instructions

Products manufactured by JULABO GmbH ensure safe operation when installed, operated and according to common safety regulations. This section explains the potential dangers which may occur when operating the unit and specifies the most important safety measures to prevent these dangers as far as possible.

6.1 Requirements for the operating personnel

The operator is responsible for the qualifications of the personnel operating the unit. Ensure that the personnel who operate the unit are trained in the relevant work application by a trained person.

The operator must receive regular training about the dangers involved with their work as well as preventive action.

Ensure that everybody involved with the operation, maintenance and installation have read and understood the safety information and the operating manual. The unit may only be configured, installed, maintained and repaired by trained personnel.

If hazardous substances or substances which may become hazardous are used, the unit may only be used by a person who is completely familiar with these substances and the unit. This person must be able to assess the possible dangers in full.

6.2 Operating and ambient conditions for using the unit

- Avoid impacts on the housing, vibrations, damage to the touch-sensitive foil (keys and display) and heavy soiling.
- Ensure that the product is checked at regular intervals suitable for its frequency of use to ensure that it is in perfect condition.
- Check the proper condition of the mandatory warning, prohibition, and safety labels at regular intervals, but at least every 2 years.
- Ensure that the mains supply has a low impedance to prevent influencing of other units powered in the same mains.
- The unit is designed for operation in a controlled electromagnetic environment. This means that in an environment of this nature, transmission equipment such as mobile phones should not be used in the immediate vicinity.
- Other units with components which are susceptible to magnetic fields may be influenced by magnetic radiation. We recommend to maintain a minimum distance of 1 m.
- Permissible ambient temperature max. 40 °C, min. 5 °C.
- The relative humidity should not exceed 50 % (40 °C).
- Do not store in an aggressive atmosphere. Protect from dirt.
- Protect from direct sunlight.

6.3 Operating the unit

The bath may not be filled with flammable materials. **Fire hazard!**

Special substance specifications (bath fluids) must be observed for correct operation. Caustic or corrosive bath fluids must not be used.

The formation of explosive mixtures is possible if the ventilation is inadequate.

Only use the units in well ventilated areas. The unit is not suitable for use in potentially explosive environments.

When using hazardous substances or substances which may be hazardous, the operator must apply the enclosed safety symbols (1; 2; 3) on the control side panel where they are clearly visible:



Warning of a danger zone. Attention!
Observe documentation (Operating manual, safety data sheet).



It is essential that you read the user information prior to beginning operation.

Area of validity: EU



It is essential that you read the user information prior to operation.

Area of validity: USA, NAFTA

3

Warning label Proposition 65

WARNING: This product contains chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

As a result of the wide range of operating temperatures, special care and caution is essential.

There are thermal dangers: Burns, scalds, hot steam, hot parts and surfaces which may be touched.



Warning about hot surfaces.

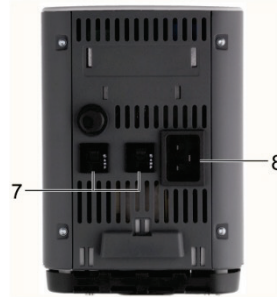
(The label is applied by JULABO)

7 Control and function elements

Front



Rear



Position	Designation
1	Mains switch
2	Four-figure temperature display LED, menu display
3	Control indicator - alarm
4	Edit keys Temperature setpoint increase or decrease Press the key briefly for step-by-step changes. Press and hold the key for fast change of setpoint.
5	OK key 1. Switch the device on/off. 2. Store value / parameter.
6	Control indicator - heating
7	Fuses: Miniature circuit-breaker
8	Electrical connection: Integrated connector plug

Accessories, included in the scope of supply



- Power supply cable

For further country-specific power supply cables,
see www.julabo.com

8 Preparations for operating the device

8.1 Installation



⚠ WARNING

Danger of electric shock.

Carefully secure the immersion circulator on the bath tank. Poorly installed circulators can fall into the bath tank.

Have the unit checked by a service technician prior to re-use.

The heater must not be in contact with the wall or the bottom of the bath tank. Minimum distance 15 mm.

Pull the plug to disconnect the unit from the power supply. Only then take the immersion circulator out of the bath tank.



Bath attachment clamp, order No. 9970420

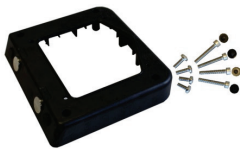
- Pay special attention to the circulator's immersion depth (see Technical data) when selecting the bath.
- Place the bath on a flat surface on a pad made of non-flammable material.
- Secure the bath attachment clamp to the bath tank. The wall thickness may be up to 30 mm.
- Attach the circulator with a "clac" to the bath attachment clamp.
- For use with glass tanks a stand attachment with rod is available as an optional accessory. (Order No. 9970022)



Stand attachment, order No. 9970022

For use with glass tanks a stand attachment with rod is available as an optional accessory.

The circulator must be mounted vertically and secured against rotation. If necessary, secure the nuts of the rod also.



Bracket, order No. 9970178

Installation on the circulator

- Slide the bracket over the heater on to the circulator.
- Secure the bracket housing to the base of the circulator using the four screws.

8.2 Installation of the circulator



CAUTION

Danger of scalding due to leaks from the baths

The JULABO plastic baths are not solvent-resistant. JULABO plastic bath tanks are for water at a working temperature range from +20°C to +100°C.

Do not contaminate the bath fluid with solvents.

Things to keep in mind during the installation process:

This work may only be carried out by trained personnel.

- The installation site should be a sufficiently large room to ensure that it does not become too hot due to the waste heat.
- The surface for the device should be flat and made of non-flammable material.
- A specific room size is prescribed for refrigerated circulators.
- Observe the safety sticker - do not remove!

8.3 Open bath tanks



Open JULABO baths can be combined with JULABO circulators from the CORIO product series. When combined with these circulators they are designed for controlling the temperature of liquid media recommended by JULABO.

The circulators are mounted on the baths using bath attachment clamps, for example.



Technical details for transparent bath tanks

Type		BT5	BT9	BT19	BT27
Order numbers		9901305	9901309	9901319	9901327
Temperature range	°C	+20 ... +100			
Approx. weight	kg	1.2	1.5	2.3	2.7
Dimensions (WxDxH*)	cm	23 x 38 x 38	32 x 38 x 38	38 x 58 x 38	38 x 58 x 43
Useful bath opening (WxLxD)	cm	15 x 15 x 15	23 x 15 x 15	30 x 35 x 15	30 x 35 x 20
Filling volume, Min...Max	l	3.5 ... 5.0	6.0 ... 9.0	14.0 ... 19.0	20.0 ... 27.0
Material		Parts in contact with the bath fluid: Polycarbonate			
* With CORIO circulators					



Technical details for stainless steel bath tanks

Type		B5	B13	B17	B19
Order numbers		9903405	9903413	9903417	9903419
Temperature range	°C	+20 ... +150			
Approx. weight	kg	2.6	5.2	6.1	6.9
Dimensions (WxDxH*)	cm	23x38x41	38x40x42	38x40x47	38x58x42
Useful bath opening (WxLxD)	cm	15x15x15	30x18x15	30x18x20	30x35x15
Filling volume, Min...Max	l	3.5 ... 5.0	9.0 ... 13.0	13.0 ... 17.0	14.0 ... 19.0
Material		Parts in contact with the bath fluid: Stainless steel			

Type		B27	B33	B39
Order numbers		9903427	9903433	9903439
Temperature range	°C	+20 ... +150		
Approx. weight	kg	8.0	17.6	14.6
Dimensions (WxDxH*)	cm	38x58x47	91x36x43	54x34x57
Useful bath opening (WxLxD)	cm	30x35x20	66x32x15	33x30x30
Filling volume, Min...Max	l	19.5 ... 22.0	26.0 ... 30.0	35.0 ... 41.0
Material		Parts in contact with the bath fluid: Stainless steel		

* With CORIO circulators

Bath covers

Order No.	Designation	For Baths
9970296	Flat stainless steel bath cover	B5
9970290	Flat stainless steel bath cover	B13, B17
9970291	Flat stainless steel bath cover	B19, B27
9970292	Flat stainless steel bath cover	B33
9970293	Flat stainless steel bath cover	B39
9970254	Lift-up stainless steel gable cover	B19, B27, BT19, BT27
9970257	Lift-up stainless steel gable cover	B33



Cooling coil, order No. 9970101

A cooling coil is required for working at ambient temperature (20 °C) A cooling water flow rate of 45 ml/min is generally sufficient to compensate for the intrinsic temperature.

The cooling water temperature should be at least 5 °C lower than the working temperature.

8.4 Bath fluid

NOTICE

This circulator is only approved for use with water as the bath fluid.

Recommended water mixture.

70 % soft/decalcified water and 30% tap water.

The parts of the bath which come into contact with the bath fluid may be damaged and cause the failure of the device.

The water quality depends on the local conditions.

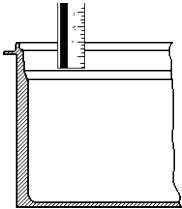
- Hard water is not suitable for temperature control tasks due to its high lime content and will produce lime deposits in the bath.
- Ferrous water can cause corrosion, even on stainless steel.
- Chloric water can cause pitting corrosion.
- Distilled and deionized water is not suitable. Their specific properties cause corrosion in the bath, even on stainless steel.
- ① Check the quality of the water you use at regular intervals.
- ① Evaporation and constant refilling may produce a concentration of harmful substances in the bath.
You should therefore check the quality of the water in the bath at regular intervals.
- ① Replace the water in the bath in full at regular intervals.

9 Filling

NOTICE

Check the level of the bath fluid at regular intervals. The pump and heater must always be completely covered with bath fluid.

The device is **not** suitable for unsupervised continuous operation.



- Ensure that no bath fluid gets into interior of the circulator.
- The recommended maximum fill level for water is 30 mm below the bath edge.
- After filling, insert the material or place the lid on the bath if the bath opening is not required.

**⚠ CAUTION****Properties of indirectly temperature-controlled fluids and substances**

The intended use of the units includes the indirectly temperature control of fluids.

We do not know which substances these are.

Many substances are:

- inflammable, flammable or explosive
- harmful
- polluting

In other words: dangerous

The user bears sole responsibility for handling these substances.

Use personal protective equipment.



The following questions should help to identify possible dangers and minimize risk.

- Are hazardous vapors or gases produced when heated?
Does operation of the bath has to be conducted in a fume hood?
- What should you do if a dangerous substance has been spilled on or in the device?
Obtain information on the substance before starting work and define a decontamination method.
- Are all hoses and electrical cables securely connected and routed?
Keywords: Sharp edges, hot surfaces during operation, moving machine parts, etc.

10 Initial Operation



⚠ WARNING

Danger from mains voltage.

Risk of injury from electric power.

- Compare the mains voltage and frequency with the details on the model plate.
- The unit may only be connected to power outlets with a ground contact (PE – protective earth).
- The mains plug serves as a safe disconnecting device from the power supply network and must be freely accessible at all times.
- Do not start the unit if it has a damaged mains cable.
- Check the mains cable regularly for signs of damage.
- We disclaim all liability for damage caused by incorrect line voltages!



⚠ CAUTION

What should be observed when operating the JULABO temperature control unit?

- Unit parts may develop high surface temperatures. A hot surface means it has a temperature of 140°F / 60°C or more.
- Let the device cool down to an uncritical safe temperature.
- Use safety gloves

10.1 Switching on / Start - Stop



When pressing the keys, it is advisable to hold the circulator head with one hand.

Switching on

- The device is switched on by pressing the power switch (1).
- ① The unit performs a self-test. All the segments of the four digit LED temperature display will illuminate.



OFF

The "OFF" signal then indicates that the unit is ready to operate.

28.3

**Start**

- Press **OK** for approx. 4 seconds.
The current bath temperature will be shown on LED temperature display.

Stop

- Press **OK** for approx. 4 seconds.
- Switch off the unit with the circulator's mains power switch.

10.2 Automatic / Manual start mode

The AUTOSTART function allows the device to be started as soon as the mains power switch is pressed, which in turn allows you to use a timer.



WARNING

Autostart

If circulators are started using "AUTOSTART", ensure that even if it is started accidentally, for example after a power outage, it does not pose a danger to personnel or equipment.

- Ensure that the circulator's safety equipment is set correctly.

OK + 

1. Press and hold **OK** and
2. Switch on the circulator using the mains power switch.

The switchover process is shown briefly on the LED temperature display.

AOn

Autostart on

AOff

Autostart off

10.3 Adjusting of temperature setpoint

Factory setting: 10°C

The temperature can be set in the start/stop condition.

- ① The set value is saved so that it will be retained even after a power outage.
 1. Press the edit key **▼** or **▲** briefly to switch from displaying the actual value to the desired value. The decimal point will flash.
 2. Change the value:
Press the **▲** key to set a higher value.
Press the **▼** key to set a lower value.
 3. Press the key briefly for single steps, press and hold the key to adjust the values quickly.
 4. Save the set value as the desired value by pressing the **OK** key.
 5. The new desired value will flash three times.

Example:

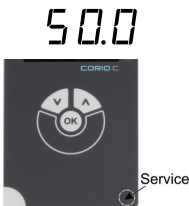


10.4 ATC - Absolute Temperature Calibration (1-point calibration)

1-point calibration:

The temperature sensor can be calibrated at any value in the working temperature range.

Place a calibrated thermometer (resolution: 0.01 °C) in the center of the bath to measure the actual bath temperature.



50.0

- 1st Switch on the circulator at its mains switch
- 2nd Set the required calibration value as described in "Adjusting temperature setpoint" (example: 50.0 °C).
- 3rd Start the unit:
Press the **OK** key.
- 4th The bath will be heated to 50.0°C.
When the setpoint is reached, allow the bath temperature to settle for approx. 3 minutes.
5. Start the calibration:
Press the "Service" and the **▼** key together until the comma in the display starts to flash.

48.9

6. Read the bath temperature value on the calibrated thermometer and round it up or down and set it.
(Example: 48.87°C to 48.9°C)

CAL

7. Press the **OK** key to confirm.
8. The circulator will confirm the process by displaying "CAL".






- Err

NOTICE

If the value is outside a window of ± 5 °C, its entry will be ignored!
Error message: **Err** = Error

11 Error messages / Possible causes of faults

	<p>The following faults which trigger alarms result in the unit's heater and circulating pump being shut down permanently.</p> <p>The alarm indicator  lights up and a continuous signal tone will sound. The reason for the alarm will be shown on the LED temperature display in coded form.</p>
	<p>The signal tone can be muted by pressing the OK key.</p>
<p>E 01</p>	<p>The device is being operated with no or too little bath fluid or the level is below the minimum level. Top up the bath fluid.</p> <p>A hose has burst (bath fluid level too low because it has been pumped out). Replace the hose and top up the bath fluid.</p>
<p>E 05</p>	<p>The cable for the working temperature sensor has been interrupted or short-circuited.</p>
<p>E 06</p>	<p>Defect of the working or excess temperature sensor.</p> <p>The working and excess temperature sensors report a temperature difference of more than 20 K.</p>
<p>E 14</p>	<p>The cut-out value of the excessive temperature protector is below the defined working temperature.</p>
<p>E 33</p>	<p>The cable for the overtemperature safety sensor has been broken or short-circuited.</p>
<p>E 108</p> <p>E 116</p>	<p>The self-locking alarm is still active. Switch off the device at the main switch. Wait for approx. 4 seconds and then switch it on again.</p>
<p>E 118</p>	<p>The internal AD converter is defective.</p>

To cancel the alarm state



1. Switch off the device at the main switch.
2. Rectify the cause of the alarm.
3. Rectify the cause of the alarm or wait for approx. 4 seconds, depending on error type.
4. Switch on the device again at the main switch.
5. If the error occurs again, a remote diagnostic must be prepared.

Faults which are not displayed:

Circulating pump motor overload trip

The circulating pump motor has a trip to protect it from overloads. After a cooling phase the motor will restart automatically.

If necessary the unit should be inspected by a JULABO service technician.

JULABO Technical Service

Phone: (610) 231-0250 option 3

Fax: (610) 231-2060

Email: service.us@julabo.com

12 Draining the bath tank



WARNING

Risk of burns

What is to be observed when draining the bath fluid.

- Hot bath fluid:
Do not drain the bath fluid when it is hot.
- Environmental hazard :
Refer to all regulations for disposing of bath fluids.

Emptying

- Switch off the device and pull the plug or disconnect the connection to the power supply on all poles.
For baths without a drain tap, remove the circulator from the bath tank.
- Small bath tanks do not have a drain tap and can be carried with two hands for draining. The temperature of the bath fluid should not exceed 50 °C.



- ① To reduce the weight, the bath can be partly emptied using a hose pump (transfer pump).

13 Technical data

13.1 Circulator

Circulator		CORIO™ C
Working temperature range	°C	20 ... 100.
Temperature stability	°C	±0.03
Temperature setting		Digital
Temperature display		LED
Resolution	°C	0.1
ATC - Absolute Temperature Calibration		1-point
Temperature control		PID1
Heating capacity (at 230 V)	kW	2.0
Heating capacity (at 115 V)	kW	1.0
Heating capacity (at 100 V)	kW	0.8
Circulating pump		
Circulating capacity	l/min	6.0
Pressure at 0 litre	bar	0.1
Overall dimensions (WxDxH)	cm	13.2x16.0x18.4
Useful immersion depth	cm	16.6
Weight	kg	1.9
Ambient temperature range	°C	5 ... 40
Operating temperature range	°C	5 ... 100
Main power connection 230 V 50/60 Hz	V / Hz	230 ±10 % / 50/60
Power consumption (at 230 V)	A	9
For CH and GB model (at 230 V)	A	9
Mains power conn. 100 V – 115 V 50/60 Hz	V / Hz	100 ±10 % / 50 / 60
Power consumption (at 100 V)	A	8
Power consumption (at 115 V)	A	10
Classification to DIN 12876-1		I (NFL)

All data refer to Rated voltage and rated frequency Ambient temperature 20°C

Safety precautions to IEC 61010-2-010:

Excess temperature protection, fixed value	103.5 ±2 °C
Classification to DIN 12876-1	Class I
Alarm	Optical and audible (permanent)

Ambient conditions to IEC 61010-1:

For indoor use only.
 Altitude up to 200 m - normal zero.
 Ambient temperature: +5 ... +40 °C

Humidity

Maximum relative humidity 80 %, for temperatures up to 31 °C,
 linear decrease to 50 % relative humidity at a temperature of 40 °C
 Max. voltage fluctuation of ± 10 % are permissible

Protection class to EN 60529:	IP 21
Overvoltage category	II
Pollution degree	2

14 Materials of parts in contact with the bath fluid

14.1 Circulator

Description	Material
Motor	1.4301
Pump	PPS
Heater	1.4404 / 316L
Sensor 2xPt 100 metal, fitted	1.4571
Sensor connection	1.4301
Float	1.4401
Float pipe	1.4571
Barbed fitting	1.4301
Tubing	FPM / FKM

15 Accessories

A wide selection of accessories is available for the following products at www.julabo.com for optimum adaption to your temperature control task.

15.1 For external connection

- Bath fluids
- Tubing
- Shut-off valve
- Barbed fittings
- Adapters

15.2 For open baths

Temperature applications for samples, preparation of samples for serology and clinical chemistry, analysis, etc.

- Test tube racks
- Immersion-height adjustable platforms

16 Maintenance, repair and transport



⚠ CAUTION

Danger of injury during maintenance, repair and transport
Danger from mains voltage.

- Have all service and repair work carried out by authorized specialists only.
- Switch off the unit and pull the plug,
 - before starting any cleaning work,
 - before carrying out any service or repair work or
 - before moving the unit.
- Empty the unit completely before moving it.
- Transport the unit carefully.

16.1 Cleaning

Clean the unit with a cloth and low surface tension water.

The unit is designed for continuous operation under normal conditions. Regular maintenance is not required.

The bath tank should only be filled with suitable bath fluid. In case of contamination the bath tank must be cleaned and the bath fluid replaced from time to time.

16.2 Repair service

Before asking for a service technician or returning a JULABO unit for repair, please contact our Technical Service Department.

JULABO Technical Service

Phone: (610) 231-0250 option 3

Fax: (610) 231-2060

Email: service.us@julabo.com

If you return a unit to JULABO:

- Clean the unit to avoid any harm to the service personnel.
- Ensure careful and adequate packing.
- It is essential that you enclose a short fault description.
- If you return your JULABO unit to us, please complete an online return form on our website at www.julabo.com.
- JULABO cannot accept any liability for damage caused by incorrect packaging.
- In the interest of product improvement, JULABO reserves the right to make any necessary modifications during the repair to ensure the proper functioning of the unit.

17 Warranty

The following Warranty Provisions shall apply to products sold in North America by Julabo (“**Seller**”) to the entity shown as buyer (“**Buyer**”) on Seller’s invoice.

1. **Initial Warranty.**

Upon Seller’s receipt of payment in full for the products and subject to Buyer’s compliance with the terms of sale and any other agreement with Seller relating to the products, Seller warrants to the Buyer that the products manufactured by the Seller are free from defects in material and workmanship for a period not to exceed two (2) years or ten thousand (10,000) hours of operation, whichever comes first, from the date the product is shipped by Seller to Buyer (the “**Initial Warranty**”).

2. **EXCLUSION OF ALL OTHER EXPRESS WARRANTIES; EXCLUSION OF ALL IMPLIED WARRANTIES. OTHER THAN THE INITIAL WARRANTY, NO OTHER EXPRESS WARRANTIES ARE MADE. ALL IMPLIED WARRANTIES OF EVERY TYPE AND KIND, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE, ARE EXCLUDED IN ALL RESPECTS AND FOR ALL PURPOSES. SELLER DISCLAIMS AND MAKES NO IMPLIED WARRANTIES WHATSOEVER.**

3. **Exclusions.**

The Initial Warranty does not include damage to the product resulting from accident, misuse, improper installation or operation, unauthorized or improper repair, replacement or alteration (including but not limited to repairs, replacements, or alterations made or performed by persons other than Seller’s employees or authorized representatives), failure to provide or use of improper maintenance, unreasonable use or abuse of the product, or failure to follow written installation or operating instructions. Buyer must return the product’s record of purchase to the Seller or one of Seller’s authorized representatives within thirty (30) days of the date the product is shipped by Seller to Buyer in order to make a claim under the Initial Warranty. Notwithstanding anything contained herein to the contrary, all glassware, including but not limited to reference thermometers, are expressly excluded from the Initial Warranty.

4. **Buyer’s sole remedies; Limitations on Seller’s Liability.**

Buyer’s sole and exclusive remedy under the Initial Warranty is strictly limited, in Seller’s sole discretion, to either: (i) repairing defective parts;

or (ii) replacing defective parts. In either case, the warranty period for the product receiving a repaired or replaced part pursuant to the terms of the Initial Warranty shall not be extended. All repairs or replacements performed by Seller pursuant to these Warranty Provisions shall be performed at Seller's facility in Allentown, Pennsylvania, U.S.A. or at the facility of an authorized representative of Seller, which location shall be determined by Seller in its sole discretion; provided, however, that Seller may, in its sole discretion perform such repairs or replacements at Buyer's facility in which case Buyer shall pay Seller's travel, living and related expenses incurred by Seller in performing the repairs or replacements at Buyer's facility. As a condition precedent to Seller's obligation to repair or replace a product part under the Initial Warranty, Buyer shall (i) promptly notify Seller in writing of any such defect; (ii) shall have returned the product's record of purchase to Seller or to one of Seller's authorized representatives within thirty (30) days of the date the product is delivered to Buyer; and (iii) assist Seller in all respects in its attempts to determine the legitimacy and basis of any claims made by or on behalf of Buyer including but not limited to providing Seller with access to the product to check operating conditions. If Buyer does not provide such written notice to Seller within the Initial Warranty period or fails to return the product's record of purchase as set forth above, Seller shall have no further liability or obligation to Buyer therefore. In no event shall Seller's liability under the Initial Warranty exceed the original purchase price of the product which is the subject of the alleged defect.

5. THE REMEDIES PROVIDED IN THE INITIAL WARRANTY ARE THE SOLE AND EXCLUSIVE REMEDIES AVAILABLE TO THE BUYER. NOTWITHSTANDING ANYTHING TO THE CONTRARY CONTAINED HEREIN, AND EVEN IF THE SOLE AND EXCLUSIVE REMEDIES FAIL OF THEIR ESSENTIAL PURPOSE FOR ANY REASON WHATSOEVER, IN NO EVENT SHALL SELLER BE LIABLE FOR BUYER'S MANUFACTURING COSTS, LOST PROFITS, GOODWILL, OR ANY OTHER SPECIAL, INDIRECT, PUNITIVE, INCIDENTAL OR CONSEQUENTIAL DAMAGES TO BUYER OR ANY THIRD PARTY AND ALL SUCH DAMAGES ARE HEREBY DISCLAIMED.

6. Assignment.

Buyer shall not assign any of its rights or obligations hereunder without the prior written approval of Seller; provided, however, that if Buyer is a distributor of Seller, the rights and obligations of Buyer under these Warranty Provisions shall inure to the benefit of and be binding upon Buyer's customers who provide the product's proof of purchase to Seller pursuant to the terms set forth herein. Seller may assign any or all of its rights or obligations hereunder without Buyer's prior consent.

7. **Governing Law.**

The Warranty Provisions and all questions relating to their validity, interpretation, performance, and enforcement shall be construed in accordance with, and shall be governed by, the substantive laws of the Commonwealth of Pennsylvania without regard to its principles of conflicts of law.

8. **Waiver.**

Any failure of the part of Seller to insist on strict compliance with the Warranty Provisions shall no way constitute a waiver of such right. No claim or rights arising out of a breach of the Warranty Provisions by Buyer may be discharged in whole or in part by a waiver of the claim or right, unless the waiver is in writing signed by an authorized representative of Seller. Seller's waiver or acceptance of any breach by Buyer of any provisions of the Warranty Provisions shall not constitute a waiver of or an excuse for nonperformance as to any other provision of the Warranty Provisions nor as to any prior or subsequent breach of the same provision.

9. **Freight.**

Buyer will arrange and pay for shipping and handling charges for the unit to be returned to the Seller. Seller will arrange and pay for shipping and handling for the return of the unit to the Buyer.

18 Waste disposal

18.1 Packaging

Packaging materials must be disposed of as prescribed by the current local regulations.

18.2 Unit



In the European Economic Area (EEA) the disposal of waste equipment is regulated in the "**Directive of the European Parliament and of the Council on Waste Electrical and Electronic Equipment (WEEE)**". The current official journal on this matter is available on the European Parliament's homepage.

The symbol for the separate collection of electrical and electronic equipment is a crossed-out trash can.

Disposal with household waste (unsorted waste) or similar collections of municipal waste is not permitted!

Contact an authorized waste disposal contractor in your country.

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