

**English**

**OPERATING MANUAL**

**Refrigerators for chemicals**

**KRC 50**

**KRC 180**



**Julabo**  
THE TEMPERATURE CONTROL COMPANY

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## **Congratulations!**

You have made an excellent choice.

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

This operating manual has been designed to help you gain an understanding of the operation and possible applications of our immersion coolers. 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

### **Unpacking and inspecting**

Unpack the immersion cooler 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 Changes without prior notification reserved

Important: keep operating manual for future use

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## 1. Intended use

JULABO refrigerators for chemicals are especially designed for cooling and storing hazardous substances at a working temperature range of -2 °C to +12 °C.



JULABO refrigerators for chemicals are not suitable for direct temperature control of foods and semi-luxury foods.

### 1.1. DESCRIPTION

Chemicals should not be stored in commercially available refrigerators, which are neither equipped with suitable, self-protecting control circuits nor guarded against overheating of the cooling compressor.

JULABO refrigerators for chemicals are especially designed for cooling and storing hazardous substances.

They are available in two sizes and provide the following advantages:

Interior free of ignition source

LED display of actual/selected temperature value

Removable control unit

Self-protecting control circuits

Separate control and safety circuit

Bipolar shutoff in the event of a functional disturbance

Alarm output (with floating DPDT contact)

The KRC 50 and KRC 180 refrigerators for chemicals have been developed in research laboratories for enhanced safety.

They are comprised of:

#### 1. Electronics Module

Power supply with control and alarm circuits, permanently mounted on the rear of the refrigerator.

#### 2. Control Unit

Operating controls and display, with connecting cable to the electronics module; with magnetic foil on rear; for mounting to refrigerator door or in special holder provided.

#### Functional Description

Temperature control is performed with a two-point control circuit. A PTC sensor in the refrigerator interior is employed for temperature control and measurement.

The sensor and the selected temperature value are monitored by the control circuit with a differential measurement technique.

An additional PTC sensor is employed for safety temperature measurement, monitoring the capsule temperature of the compressor.

## 2. Operator responsibility – Safety instructions

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 refrigerators for chemicals and also specifies the most important safety precautions to preclude these dangers as far as possible.

The operator is responsible for the qualification of the personnel operating the units.

The personnel operating the units should be regularly instructed about the dangers involved with their job activities as well as measures to avert these dangers.

Make sure all persons tasked with operating, installing, and maintaining the unit have read and understand the safety information and operating instructions.

When using hazardous materials or materials that could become hazardous, the refrigerators for chemicals may be operated only by persons who are absolutely familiar with these materials and the circulator. These persons must be fully aware of possible risks.

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

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

Avoid strikes to the housing, vibrations, damage to the operating-element panel (buttons, 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 the instruments being operated on the same mains.

Permissible ambient temperature: max. 35 °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.

## 2.1. Disposal

In the second stage this unit contains the flammable refrigerant R600a. Therefore only qualified personnel from Julabo are authorized to dispose of the waste.



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!

### 3. Safety notes for the user

#### 3.1. 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.

#### 3.2. Explanation of other notes



#### **Note!**

Draws attention to something special.



#### **Important!**

Indicates usage tips and other useful information.

#### 3.3. 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. The standard EN 378 prescribes a certain room space to be available for each kg of refrigerant.

Make sure you read and understand all instructions and safety precautions listed in this manual before installing or operating your unit.

Keep the air intake and exhaust grids free of obstructions. (Maintain a sufficient distance from all surrounding surfaces!)

## Safety notes for the user

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.

Never operate units with damaged mains power cables.

Repairs are to be carried out only by qualified service personnel.

In case of suspected leaks in the refrigerant cycle defective units may not be transported by air.

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

**Nur für Chemikalien**  
**For chemicals only - no food**



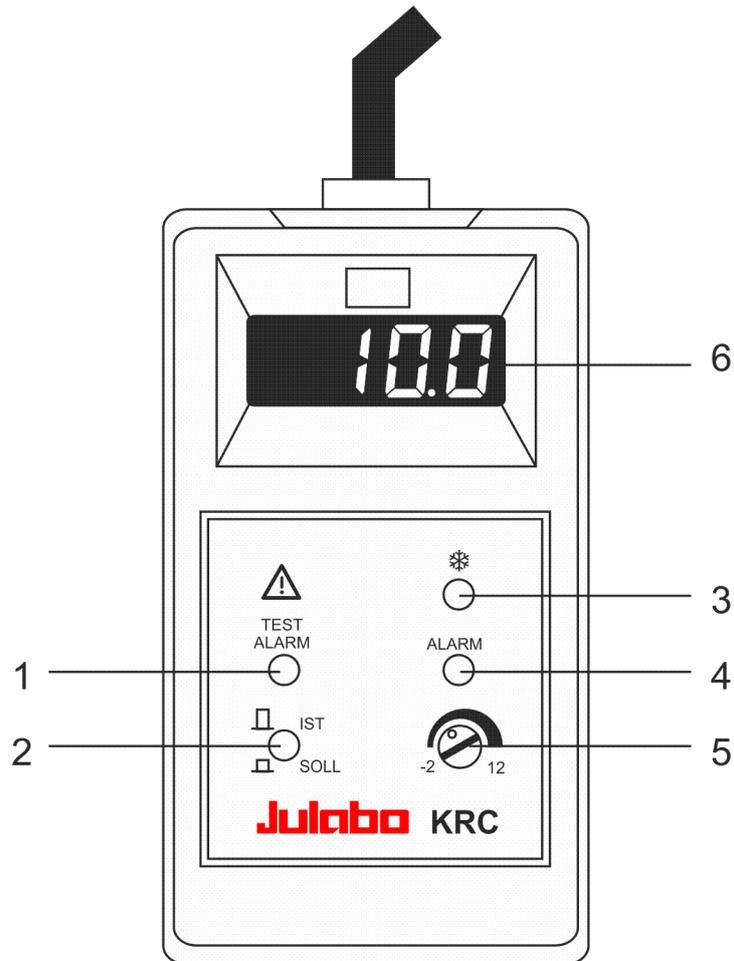
**Nur Innenraum frei von Zündquellen**  
**Only interior free of ignition source**

Observe all warning labels.  
Never remove warning labels.

The KRC 50 and KRC 180 refrigerators for chemicals are suitable for unsupervised operation.

Sources of ignition (for example: electrical devices) may not be operated in the interior.  
Explosion hazard!

## 4. OPERATING CONTROLS AND FUNCTIONAL ELEMENTS



- 1 Test button for excess temperature protection of the compressor  
Note:  
Resetting is performed by pulling out and reconnecting the mains power plug
- 2 Selector button for actual/selected temperature value display
- 3 LED, green: indication of compressor ON
- 4 LED, red: indication of "ALARM"
- 5 Selected temperature adjustment screw
- 6 Display

## 5. OPERATION

### 5.1. Installation

The refrigerator should not be installed in the vicinity of radiators or other sources of heat. Optimum cooling performance is generally obtained at ambient temperatures of +16 °C to +32 °C (+60 °F to 90 °F).

Fixed bolts on the rear of the unit insure that sufficient distance will be maintained to adjacent walls for proper air circulation.

Make sure that no objects obstruct circulation behind the refrigerator.

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.

Stable mounting is attained by turning one or more of the height-adjusting feet underneath the appliance.

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.

The standard EN 378 prescribes a certain room space to be available for each kg of refrigerant.

Please see type label for amount of refrigerant.

> For 0.0011 kg of refrigerant R600a, 1 m<sup>3</sup> of space is required.

The door handle and the locking mechanism with key are enclosed with the **KRC 180** unit. Change the door opening side (part 6.) if the right side is not convenient, and mount the door handle.

### 5.2. Power connection / Switching On



#### 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!

Compare the intended mains voltage with the voltage specification on the identification plate. Deviations of +10 % / -10 % are permissible.

Switching on: connect the unit to a power socket

Indication of the interior refrigerator temperature:

Temperature on Display (6)

Actual temperature value : selector button (2) released

Selected temperature value : selector button (2) pressed

Interior Refrigerator Temperature: (Temperature range: -2 ... +12°C)

Selected Temperature Adjustment

Press the selector button (2), and set the adjustment screw (5) to achieve the desired selected temperature value on the display (6).

## 6. CHANGING THE DOOR OPENING SIDE

### KRC50



#### Notice

Installation, maintenance and repairs on the refrigerator may only be carried out by qualified personnel.

Before carrying out the procedures mentioned below, disconnect the refrigerator from the mains socket!



#### Notice

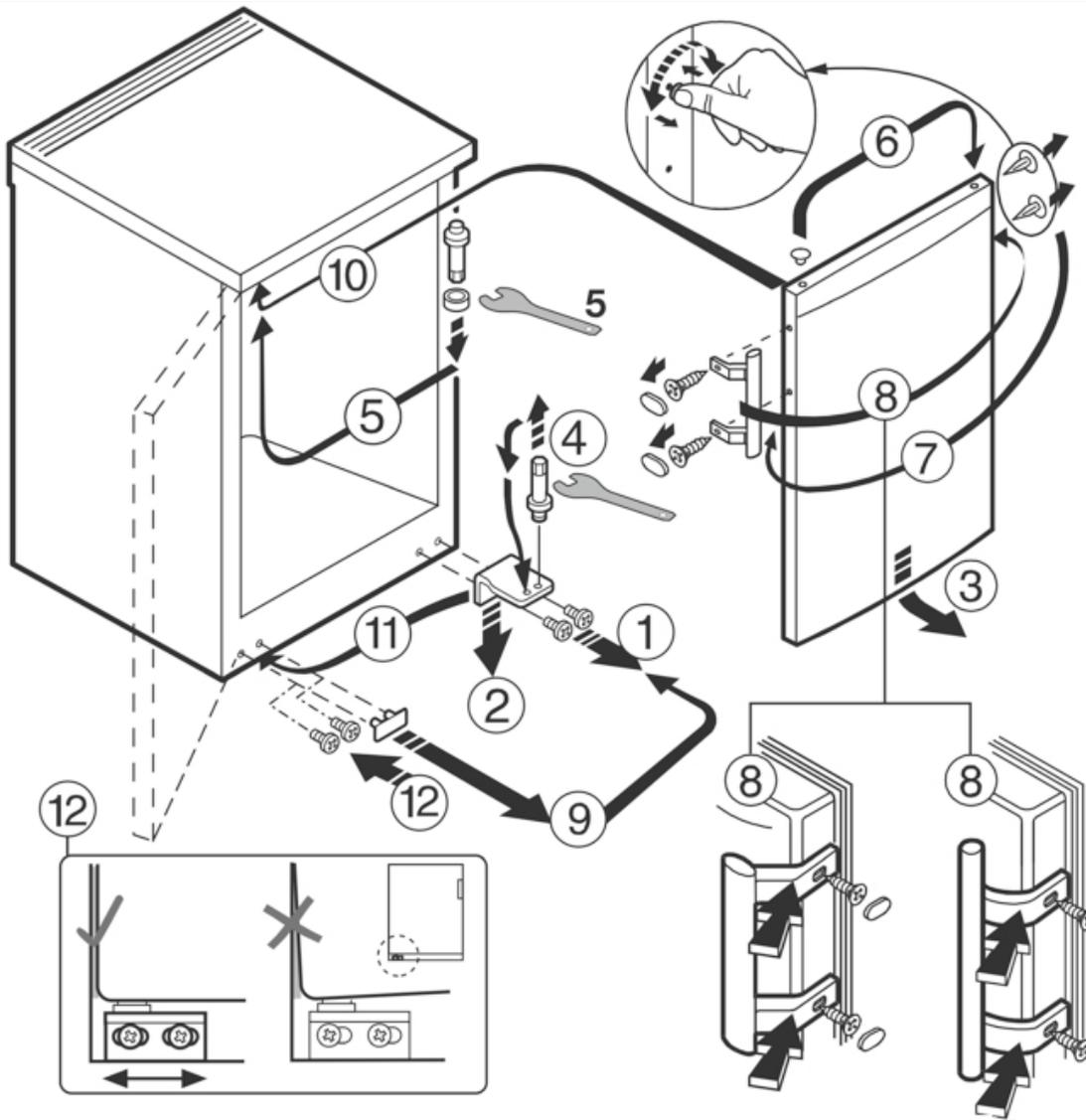
Installation, maintenance and repairs on the refrigerator may only be carried out by qualified personnel.

Before carrying out the procedures mentioned below, disconnect the refrigerator from the mains socket!

The refrigerators are delivered from the factory with the door hinges on the right.

- 1) Remove hinge bracket with the door closed.
- 2) Unscrew hinge pin.
- 3) Remove the door downwards.
- 4) Unscrew hinge pin from bracket and screw it into the adjacent mounting hole.
- 5) Screw it into the opposite side of the overhang.
- 6) Pry out cover piece from the lower left side, and insert to cover the exposed mounting holes at the right side.
- 7) Pry out cover piece from the door handle on the right side of the door.
- 8) Remove the door handle, and install on the opposite side of the door in the mounting holes provided.
- 9) Pull out plugs from the right side of the door, and insert into the exposed mounting holes at the left side.
- 10) Hang the door into hinge pin, and close the door.
- 11) Screw hinge bracket to the left side of the unit, not forgetting the washers.
- 12) If the door is not in line with the unit housing, readjust its position in the slots of hinge bracket, and tighten all screws firmly.

# CHANGING THE DOOR OPENING SIDE



## 7. SAFETY INSTALLATIONS

The red "alarm" LED (4) will illuminate and the refrigerator be switched off if:

- the compressor overheats (the alarm threshold is set at the factory to approx. +105°C, as measured by the safety sensor on the compressor capsule);
- the safety sensor circuit is open or shorted;
- the control sensor circuit is open or shorted;
- a difference threshold is exceeded between the selected and actual temperature values in the control circuit (difference 45 K);
- power voltage failure.

the test button (1) is pressed



Resetting is performed by pulling out and reconnecting the mains power plug.

### Mains fuses

The mains fuses are in the electronics module on the rear of the refrigerator.

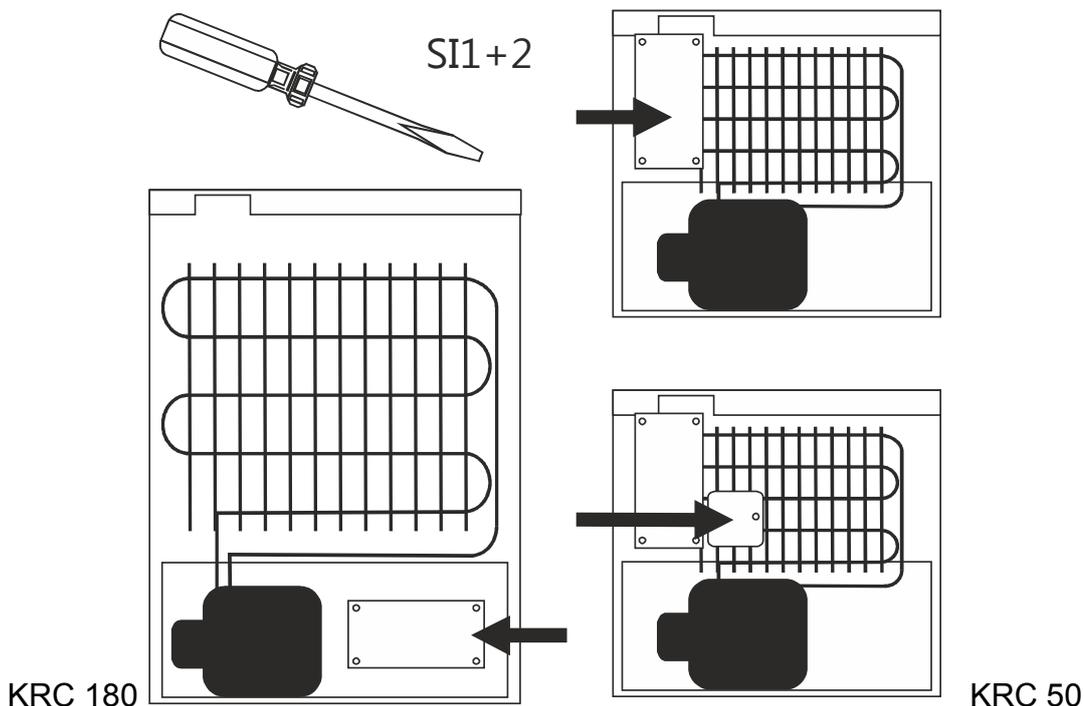
Fine fuse MT 6.3 A, D 5x20 mm



#### Caution

Before exchanging the fuses, turn off the mains power switch and disconnect the power plug from the mains socket!

Only use fine fuses with a nominal value as specified.



## 8. Cleaning / repairing the unit



### Caution

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

Cleaning of the opened unit may only be done by authorised and qualified personnel.

Prevent humidity from entering into the electronic module and the control unit.

In case of suspected leaks in the refrigerant cycle defect units may not be transported by air.

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

The circulator is designed for continuous operation under normal conditions. Periodic maintenance is not required.

### 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.

When returning a unit, take care of careful and adequate packing.

Attach a short fault description.

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

In case of suspected leaks in the refrigerant cycle defect units may not be transported by air.

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.

## 9. ALARM RELAY



### Caution

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

The electronics module (on the rear of the refrigerator) contains a relay with floating contact:

### Normal operation and Power OFF:

pins 2 + 3 of connector SK3 bridged

### Alarm:

pins 1 + 3 of connector SK3 bridged

Contact loading:

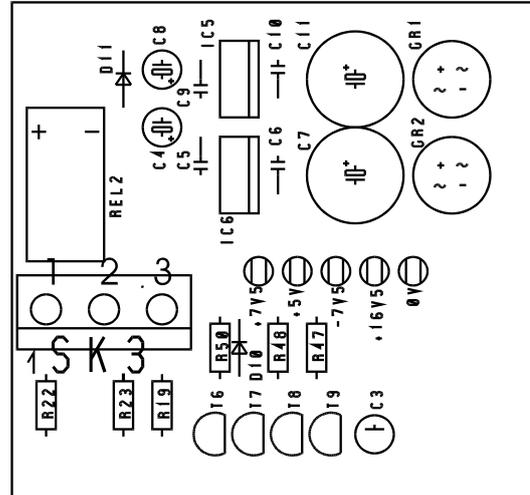
Switching voltage, max.: 220 V - / 250 V

Switching current, max.: 2 A

Switching power, max.: 60 W / 125 VA

(non-inductive load)

Contact material: Ag Pd 60/40



## 10. ACCESSORIES

Mount for control unit for KRC 50/180

Plastic pan (for dripping water) for KRC 180

## 11. TECHNICAL DATA

Description	KRC50	KRC180
Working temperature range	-2 ... 12 °C	
Temperature adjustment	analog	
Temperature indication	digital, 7-Segment, green	
Resolution	0,1	
Temperature control accuracy	±1 K	
Temperature control	two-point	
Working sensor	PTC	
Safety sensor	PTC	

### Safety installations:

Overheating protection for compressor	105 °C
Working sensor monitoring	disconnection
Working temperature adjustment	short-circuit
Safety sensor monitoring	short-circuit
Monitoring of power voltages	DC
Alarm signal	optical

### Alarm-Relay

Switching voltage, max.	220 V/DC; 250 V/AC
Switching current, max.	2 A
Switching power, max. (non-inductive load)	60 W / 125 VA
Contact material	Ag Pd 60/40

Volumetric capacity	68 l	180 l
Interior dimensions (WxDxH)	42 x 29 (43) x 44 cm	52 x 40 x 70 cm
Exterior dimensions (WxDxH)	55 x 64 x 63 cm	60 x 64 x 86 cm
Weight	32 kg	36 kg

Mains power connection	207...253 V / 50 Hz	
Current draw (at 230 V)	0.9 A	0.5 A
Permissible ambient temperature	0 ... 35 °C	

## 12. EC Declaration of Conformity

### EU-Konformitätserklärung EU-Declaration of Conformity

Hersteller / Manufacturer:

JULABO GmbH  
Gerhard-Juchheim-Strasse 1  
77960 Seelbach / Germany  
Tel: +49(0)7823 / 51 - 0



Hiermit erklären wir, dass das nachfolgend bezeichnete Produkt  
*We hereby declare, that the following product*

**Produkt / Product:** Chemikalien-Kühlschrank / *Refrigerator for chemicals*  
**Typ / Type:** KRC 50

aufgrund seiner Konzipierung und Bauart in der von uns in Verkehr gebrachten Ausführung den grundlegenden Sicherheits- und Gesundheitsanforderungen den nachfolgend aufgeführten EG-Richtlinien entspricht.  
*due to the design and construction, as assembled and marketed by our Company – complies with fundamental safety and health requirements according to the following EC-Directives.*

**Niederspannungsrichtlinie 2014/35/EU; Low-Voltage Directive 2014/35/EU**  
**EMV-Richtlinie 2014/30/EU; EMC-Directive 2014/30/EU**  
**RoHS-Richtlinie 2011/65/EU; RoHS-Directive 2011/65/EU**

**Angewandte harmonisierte Normen und techn. Spezifikationen:**  
*The above-named product is in compliance with the following harmonized standards and technical specifications:*

EN 50581 : 2012  
*Technische Dokumentation zur Beurteilung von Elektro- und Elektronikgeräten hinsichtlich der Beschränkung gefährlicher Stoffe*  
*Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances*

EN 61010-1 : 2010  
*Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgeräte, Teil 1: Allgemeine Anforderungen*  
*Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1: General requirements*

EN 61326-1 : 2013  
*Elektrische Mess-, Steuer-, Regel- und Laborgeräte- EMV-Anforderungen- Teil 1: Allgemeine Anforderungen*  
*Electrical equipment for measurement, control, and laboratory use - EMC requirements - Part 1: General requirements*

EN 378-2 : 2016  
*Kälteanlagen und Wärmepumpen – Sicherheitstechnische und umweltrelevante Anforderungen – Teil 2: Konstruktion, Herstellung, Prüfung, Kennzeichnung und Dokumentation*  
*Refrigerating systems and heat pumps - Safety and environmental requirements - Part 2: Design, construction, testing, marking and documentation*

**Das CE-Zeichen wurde angebracht**  
*The CE marking was affixed*

Seelbach, 20.10.2017

  
M. Juchheim, Geschäftsführer / *Managing Director*

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**EU-Konformitätserklärung**  
**EU-Declaration of Conformity**

**Hersteller / Manufacturer:**

JULABO GmbH  
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77960 Seelbach / Germany  
Tel: +49(0)7823 / 51 - 0



Hiermit erklären wir, dass das nachfolgend bezeichnete Produkt  
*We hereby declare, that the following product*

**Produkt / Product:** Chemikalien-Kühlschrank / *Refrigerator for chemicals*

**Typ / Type:** KRC 180

aufgrund seiner Konzipierung und Bauart in der von uns in Verkehr gebrachten Ausführung den grundlegenden Sicherheits- und Gesundheitsanforderungen den nachfolgend aufgeführten EG-Richtlinien entspricht.  
*due to the design and construction, as assembled and marketed by our Company – complies with fundamental safety and health requirements according to the following EC-Directives.*

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Seelbach, 20.10.2017

M. Juchheim, Geschäftsführer / *Managing Director*

### 13. 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.

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

JULABO 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.