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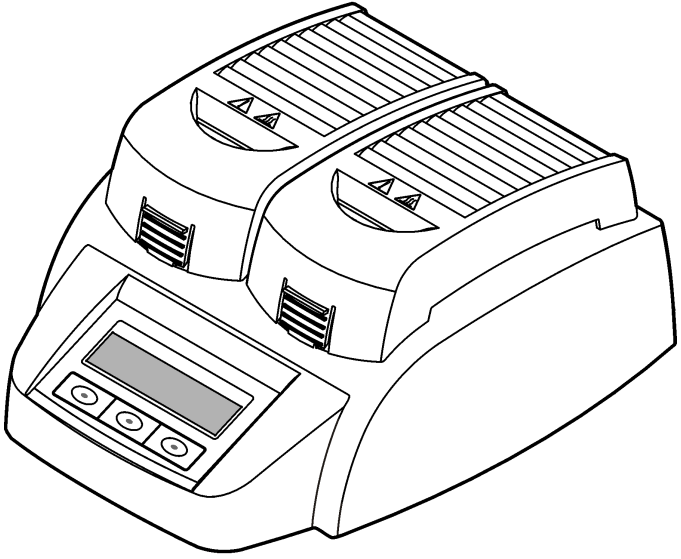
LT 200 / DRB 200

05/2018, Edition 3



User Manual
Benutzerhandbuch
Manuale utente
Manuel de l'utilisateur
Manual del usuario
Manual do utilizador
Návod k použití
Brugervejledning
Gebruikershandleiding
Instrukcja obsługi
Bruksanvisning
Käyttöopas
Ръководство за потребителя
Felhasználói kézikönyv
Manual de utilizare
Naudotojo vadovas
Руководство пользователя
Kullanıcı Kılavuzu
Návod na použitie
Navodila za uporabo
Korisnički priručnik
Εγχειρίδιο χρήστη
Kasutusjuhend
Priručnik za korisnika

Table of contents

Specifications

Specifications are subject to change without notice.

Specification	Details
Dimensions	25 x 14.5 x 31 cm (9.8 x 5.7 x 12.2 in.)
Weight	Single heating block: 2 kg (4.4 lb) Dual heating block: 2.8 kg (6.17 lb)
Power requirements	100–240 V, +5%/–15%, 50/60 Hz, Protection Class I
Power input	Single heating block: 115 V: 300 VA; 230 V: 450 VA Dual heating block: 115 V: 600 VA; 230 V: 900 VA
Storage temperature	–40 to +60 °C (–40 to +140 °F)
Operating temperature	10 to 45 °C (50 to 113 °F)
Operating humidity	90% (non-condensing)
Temperature range	LT 200: 37 to 150 °C (98.6 to 302 °F) DRB 200: 37 to 165 °C (98.6 to 329 °F)
	Timer: 0 to 480 minutes
Temperature stability	LT 200: ± 1 °C (± 2 °F) DRB 200: ± 2 °C (± 3.5 °F)
Heating rate	LT 200: From 20 to 148 °C (68 to 298 °F) in 10 min (to DIN 38409-44) DRB 200: From 20 to 150 °C (68 to 302 °F) in 10 minutes
Certification	CE and cTUVus

General information

In no event will the manufacturer be liable for direct, indirect, special, incidental or consequential damages resulting from any defect or omission in this manual. The manufacturer reserves the right to make changes in this manual and the products it describes at any time, without notice or obligation. Revised editions are found on the manufacturer's website.

Safety information

NOTICE

The manufacturer is not responsible for any damages due to misapplication or misuse of this product including, without limitation, direct, incidental and consequential damages, and disclaims such damages to the full extent permitted under applicable law. The user is solely responsible to identify critical application risks and install appropriate mechanisms to protect processes during a possible equipment malfunction.

Please read this entire manual before unpacking, setting up or operating this equipment. Pay attention to all danger and caution statements. Failure to do so could result in serious injury to the operator or damage to the equipment.

Make sure that the protection provided by this equipment is not impaired. Do not use or install this equipment in any manner other than that specified in this manual.

Use of hazard information

⚠ DANGER

Indicates a potentially or imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

Indicates a potentially or imminently hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Indicates a potentially hazardous situation that may result in minor or moderate injury.

NOTICE

Indicates a situation which, if not avoided, may cause damage to the instrument. Information that requires special emphasis.

Precautionary labels

Read all labels and tags attached to the instrument. Personal injury or damage to the instrument could occur if not observed. A symbol, if noted on the instrument, will be included with a danger or caution statement in the manual.

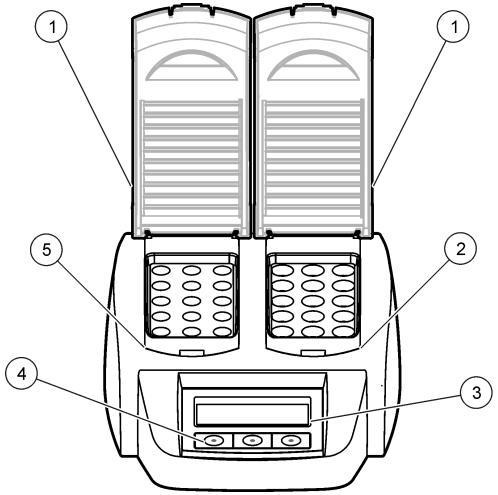
	This symbol, if noted on the instrument, references the instruction manual for operation and/or safety information.
	Electrical equipment marked with this symbol may not be disposed of in European domestic or public disposal systems. Return old or end-of-life equipment to the manufacturer for disposal at no charge to the user.
	This symbol indicates that the marked item can be hot and should not be touched without care.
	This symbol indicates that the marked item requires a protective earth connection. If the instrument is not supplied with a ground plug on a cord, make the protective earth connection to the protective conductor terminal.

Product overview

This instrument has one or two heating blocks that increase the temperature of solutions in round sample cells to a specified temperature for a specified time period (Figure 1).

The LT 200 has three stored temperature programs and six temperature programs that are configured by the user and saved. The DRB 200 has six stored temperature programs and three temperature programs that are configured by the user and saved.

Figure 1 Front view



1 Protective cover	**3** Display	**5** Left heating block
2 Right heating block	**4** Keys	

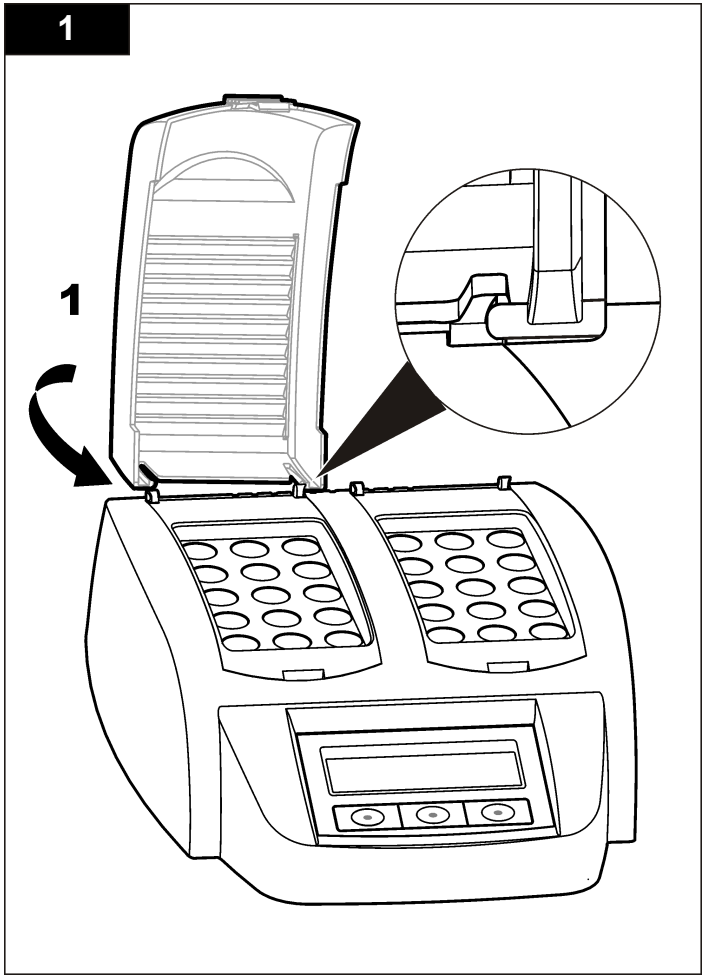
Installation

Install the protective covers

⚠WARNING

Shock and Burn Hazard. The protective cover must be installed to prevent personal injury. The protective cover prevents burns and power cord contact with the heating block.

Refer to the illustrated steps that follow.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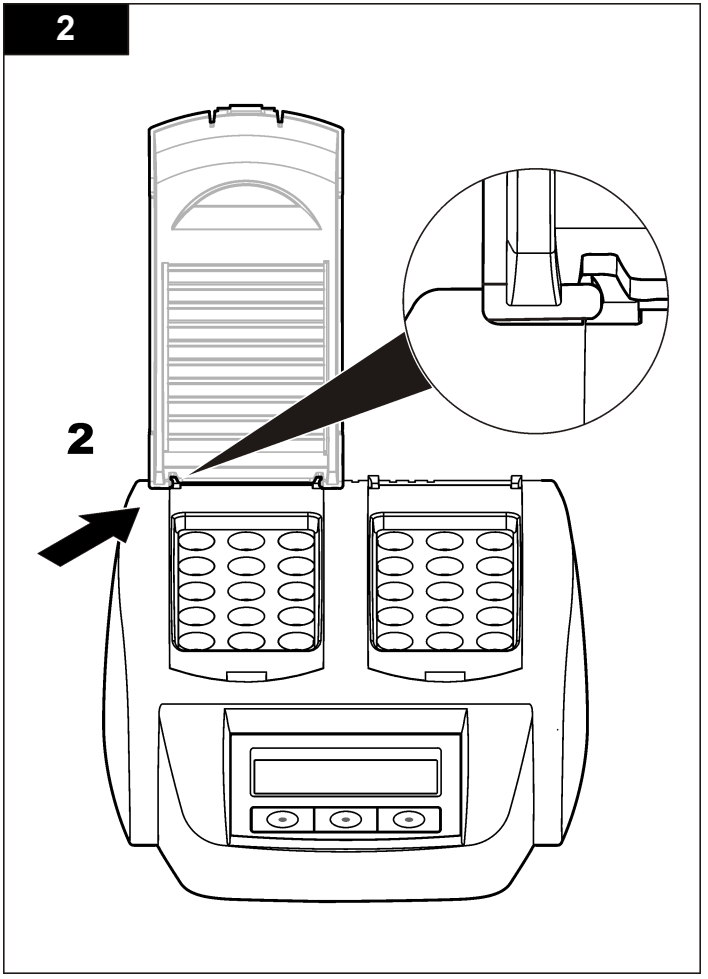
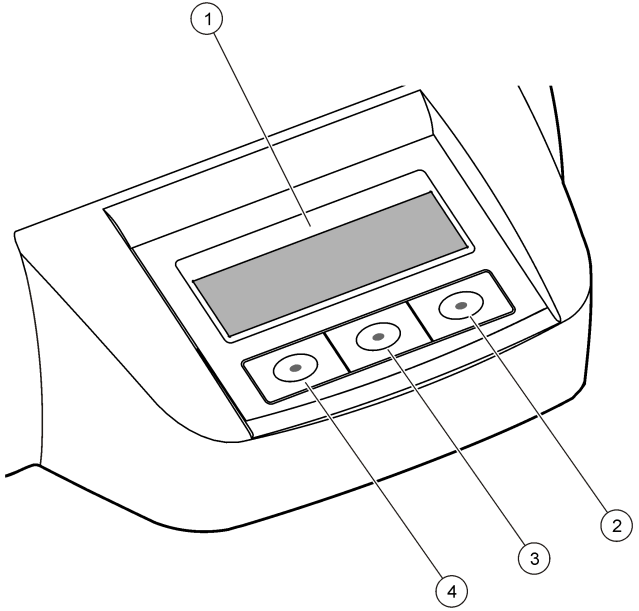

2
2

User interface and navigation

User interface

The instrument is operated using three keys that are located below the display (Figure 2). The function of each key is shown on the display. If no function is shown for a key, that key is not currently active.

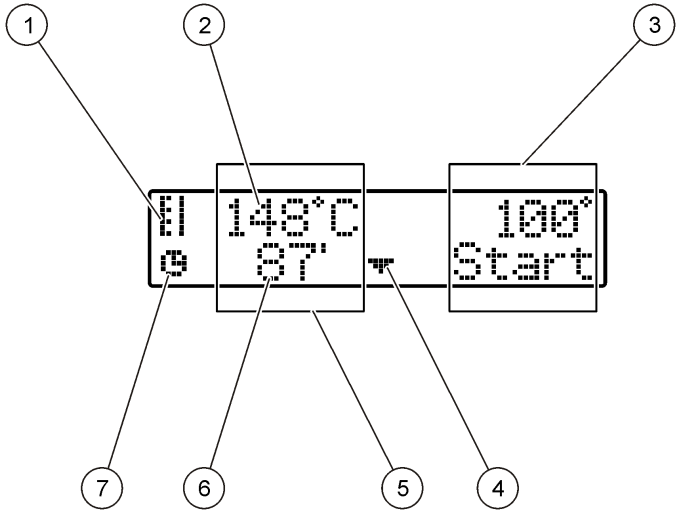
Figure 2 Keypad description



1 Display	**3** Middle key
2 Right key	**4** Left key

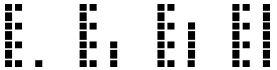
Display description

Figure 3 Screen display when a program is active on the left heating block only



1 Thermometer symbol	**5** Left heating block
2 Temperature of heating block	**6** Remaining time
3 Right heating block	**7** Timer symbol
4 Down arrow key (use to select program)	

Table 1 Thermometer symbols

Symbol	Description
	The heating block is increasing in temperature.
	The heating block is at the selected temperature.
	The heating block is decreasing in temperature.

Startup

Turn the instrument on

NOTICE

Do not turn the instrument off and on quickly as this can damage the instrument. Always wait about 20 seconds before turning the instrument on again.

1. Put the instrument on a stable, level, heat-resistant surface.
2. Connect the power cord to the power plug on the back of the instrument.
3. Connect the power cord to a power socket with earthing contact.
4. Push the power switch on the back of the instrument to turn the instrument on.

   The first time the instrument is turned on, the language selection screen is shown. Refer to Select the language on page 8.

Select the language

1. Hold down the left key and turn the instrument on.
2. Push the right arrow key to scroll through the menu. The display goes back to the start of the menu at the end of the menu.
3. When the correct language is shown, push the key for the language. Refer to Table 2.

Table 2 Language settings

Setting	Language	Setting	Language
GB	English	E	Spanish
D	German	NL	Dutch
F	French	S	Swedish
I	Italian	PL	Polish

Set the display contrast

1. Hold down the middle key and turn the instrument on.
2. Push or hold down the up and down arrow keys to change the contrast value.
3. Push **OK** to save the change.

Operation

⚠ DANGER

Chemical exposure hazard. Obey laboratory safety procedures and wear all of the personal protective equipment appropriate to the chemicals that are handled. Refer to the current safety data sheets (MSDS/SDS) for safety protocols.

Routine operation

⚠ CAUTION

Burn Hazard. Do not put a finger in an opening in the heating block. Close the protective cover before increasing the temperature of the heating block, and always keep the protective cover closed during operation.

⚠ CAUTION

Burn Hazard. Sample cells are hot. Wear thermal insulating material (e.g., gloves or finger cots). Do not remove a sample cell that is greater than 80 °C. Do not put a sample cell that is greater than 80 °C in a colorimeter.

⚠ CAUTION

Chemical Hazard. If a sample cell breaks, do not let the liquid touch skin. Use a fume hood as necessary to remove chemical fumes.

⚠ CAUTION

Chemical exposure hazard. Dispose of chemicals and wastes in accordance with local, regional and national regulations.

NOTICE

To prevent sample cell and instrument damage, keep the openings in the heating block dry. Dry the outside of sample cells fully.

NOTICE

To prevent instrument damage, immediately disconnect power if an accidental spill occurs or a sample cell breaks, then clean the instrument. Refer to Clean the instrument on page 11.

NOTICE

Do not cover the ventilation slits in the protective cover. The instrument and sample cells may become too hot and decrease the accuracy of measurement.

1. Prepare the test sample cells as specified in the analysis procedure.
2. Close the sample cells with the cap.
3. Dry the outside of the sample cells fully.
4. Turn the instrument on and open the protective cover. The last temperature program(s) selected is shown on the display.
5. If using 16 mm tubes with a heating block with 20 mm openings, put reducing adapters in the openings.
6. LT 200: Put the test sample cells in the correct heating block and close the protective cover.
7. Select the correct temperature program (and digestion period if applicable) using the keys, then push **Start**. Refer to Stored programs on page 9. The temperature program is selected independently for each heating block when there are two heating blocks.

   Note: *To stop a program, push the key below the program two times.*

   LT 200: The digestion program starts. The temperature of the heating block increases to the selected temperature, then the time automatically counts down to zero (0). When the digestion program is completed, three beeps are heard and the heater turns off.

   DRB 200: The temperature of the heating block increases to the selected temperature.
8. DRB 200: When the heating block is at the selected temperature (two beeps are heard), put the test sample cells in the correct heating block and close the protective cover. Push **Start** to start the digestion program.

   When the digestion program is completed, three beeps are heard and the heater turns off.

Stored programs

Table 3 provides descriptions of the stored temperature programs for the LT 200. Table 4 provides descriptions of the stored temperature programs for the DRB 200.

Table 3 Stored programs—LT 200

Program	Description
COD	Increases the temperature of the sample cells to 148 °C for 120 minutes. In the cooling phase, four beeps are heard when the sample cells are at 80 °C. Remove and carefully invert the sample cells several times, before letting them decrease in temperature in a rack. The COD temperature program can be used for all COD sample cell tests.
100 °C	Increases the temperature of the sample cells to 100 °C for 10, 60 or 120 minutes. For example, the “100 °C, 60 minutes” temperature program is used to: • Identify phosphate and chromium • Digest heavy metals • Digest samples using the LCW 902 Crack Set
40 °C	Increases the temperature of the sample cells to 40 °C for 10 minutes. For example, the “40 °C, 10 minutes” temperature program is used for formaldehyde test or enzymatic food tests.

Table 4 Stored programs—DRB 200

Program	Description
COD	Increases the temperature of the sample cells to 150 °C for 120 minutes. In the cooling phase, four beeps are heard when the sample cells are at 120 °C. Remove and carefully invert the sample cells several times, before letting them decrease in temperature in a rack.
TOC	Increases the temperature of the sample cells to 105 °C for 120 minutes. The TOC temperature program can be used for all Hach TOC sample cell tests.

Table 4 Stored programs—DRB 200 (continued)

Program	Description
100 °C	Increases the temperature of the sample cells to 100 °C for 30, 60 or 120 minutes. For example, the “100 °C, 60 minutes” temperature program is used to: • Digest samples using the Metals Prep Set • Identify phosphate and chromium • Digest heavy metals
105 °C	Increases the temperature of the sample cells to 105 °C for 30, 60 or 120 minutes.
150 °C	Increases the temperature of the sample cells to 150 °C for 30, 60 or 120 minutes.
165 °C	Increases the temperature of the sample cells to 165 °C for 30, 60 or 120 minutes.

User programs

The LT 200 has six temperature programs that are configured by the user (PRG1–PRG6). The DRB 200 has three temperature programs that are configured by the user (PRG1–PRG3).

To configure a user temperature program:

1. Select a user temperature program using the keys.
2. Push **Prog** to enter programming mode.
3. Select a 4-character name for the program. Push the left key to change the character. Push the right arrow key to move the cursor to the next position. Push **OK** to save the change.
4. Push or hold down the up and down arrow keys to set the temperature (37 to 150 °C). Push **OK** to save the change.
5. Push or hold down the up and down arrow keys to set the time (0 to 480 minutes). Push **OK** to save the change.
6. Push **OK** to save the program.

Maintenance

⚠ CAUTION

Multiple hazards. Only qualified personnel must conduct the tasks described in this section of the document.

NOTICE

Do not disassemble the instrument for maintenance. If the internal components must be cleaned or repaired, contact the manufacturer.

Clean the instrument

Keep the instrument clean to get continuous and accurate operation.

⚠ CAUTION

Fire hazard. Do not use flammable agents to clean the instrument.

⚠ CAUTION

Burn hazard. Do not clean the instrument when it is hot.

NOTICE

To prevent instrument damage, do not use cleaning agents such as turpentine, acetone or similar products to clean the instrument including the display.

1. Turn the instrument off and disconnect the power cord.
2. When the instrument is cool, clean the surface of the instrument with a soft, moist cloth and a weak soap solution. Make sure that no water gets into the instrument.

If the liquid in a sample cell spills or a sample cell breaks:

1. Turn the instrument off and disconnect the power cord.
2. Let the temperature of the heating block(s) and sample cells decrease until cool.
3. Remove the liquid with a pipette. Do not let the liquid touch skin.
4. Move the liquid to the correct disposal.
5. Remove broken glass using tweezers. Remove any remaining liquid on the instrument. Do not let the liquid touch skin.

Measure the temperature of the heating block

Measure the temperature of the heating block to make sure that the temperature shown on the display is correct.

The temperature shown on the display is the temperature in a closed sample cell that is filled with a liquid. While the temperature of the heating block is increasing, the temperature of the heating block, near the heater, may be greater than the temperature shown on the display.

Tools needed:

- Sample cell (LT 200: LCW906, DRB 200: 2275800)
- Glycerol (anhydrous), 5 mL
- Thermometer, stem-type, calibrated for 95 to 155 °C (203 to 311 °F), type 67C to ASTM

To measure the temperature of the heating block:

1. Fill a clean, empty sample cell with glycerol that is at room temperature.
2. Put the thermometer in the sample cell until the thermometer touches the bottom of the sample cell.
3. LT 200: Make sure that the level of the glycerol is 62 mm ± 0.5 mm (2.44 in. ± 0.02 in.) from the bottom of the sample cell when the thermometer is in the sample cell.
4. DRB 200: Make sure that the level of the glycerol is 56 mm ± 0.5 mm (2.20 in. ± 0.02 in.) from the bottom of the sample cell when the thermometer is in the sample cell.
5. Put the sample cell in the center opening of the second row of the heating block.

6. Start a temperature program of 100 °C for 60 minutes using the keys, then push **OK**.
7. When the heating block is at the selected temperature (two beeps are heard), the thermometer temperature should be the same as the temperature shown on the display.

Troubleshooting

Refer to Table 5 for error messages, possible causes and corrective actions.

Table 5 Error messages

Error	Solution
BLOCK IS TOO HOT! PLEASE WAIT	The temperature of the heating block is greater than the selected temperature. Wait until the temperature of the heating block decreases.
INIT ERROR	The instrument is defective. Contact Customer Service.

Replacement parts and accessories

⚠ WARNING

Personal injury hazard. Use of non-approved parts may cause personal injury, damage to the instrument or equipment malfunction. The replacement parts in this section are approved by the manufacturer.

Note: *Product and Article numbers may vary for some selling regions. Contact the appropriate distributor or refer to the company website for contact information.*

Replacement parts

Description	Quantity	Item no.
Protective cover	1	LZT048

Accessories—DRB 200

Description	Quantity	Item no.
Reducing adapter, 20 > 16 mm	1	HHA155
Reducing adapter, 16 > 13 mm	1	2895805
Tube, 16 x 100 mm	1	2275800
Tube, 16 x 100 mm	6	2275806
Thermometer, 0 to 200 °C	1	4565500

HACH COMPANY World Headquarters
P.O. Box 389, Loveland, CO 80539-0389 U.S.A.
Tel. (970) 669-3050
(800) 227-4224 (U.S.A. only)
Fax (970) 669-2932
orders@hach.com
www.hach.com

HACH LANGE GMBH
Willstätterstraße 11
D-40549 Düsseldorf, Germany
Tel. +49 (0) 2 11 52 88-320
Fax +49 (0) 2 11 52 88-210
info-de@hach.com
www.de.hach.com

HACH LANGE Sàrl
6, route de Compois
1222 Vésenaz
SWITZERLAND
Tel. +41 22 594 6400
Fax +41 22 594 6499