



# New Brunswick™ Excella® E24/E24R Shaker

Operating manual

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# 1 Operating instructions









## 1.1 Using this manual

- ▶ Read this operating manual completely before using the device for the first time. Also observe the instructions for use of the accessories.
- ▶ This operating manual is part of the product. Thus, it must always be easily accessible.
- ▶ Enclose this operating manual when transferring the device to third parties.
- ▶ You will find the current version of the operating manual for all available languages on our website [www.eppendorf.com](http://www.eppendorf.com).

## 1.2 Danger symbols and danger levels

The safety instructions of this operating manual indicate the following danger symbols and danger levels:

### 1.2.1 Danger symbols

	<b>Hazard point</b>		<b>Heavy loads</b>
	<b>Electric shock</b>		<b>Crushing</b>
	<b>Biohazard</b>		<b>Burns</b>
	<b>Explosion</b>		<b>Material damage</b>


### 1.2.2 Danger levels

<b>DANGER</b>	<i>Will</i> lead to severe injuries or death.
<b>WARNING</b>	<i>May</i> lead to severe injuries or death.
<b>CAUTION</b>	May lead to light to moderate injuries.
<b>NOTICE</b>	May lead to material damage.

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**1.3 Symbols used**

Example	Meaning
▶	You are requested to perform an action.
1. 2.	Perform these actions in the sequence described.
•	List.
	References useful information.

## 1.4 Abbreviations used

**°C**  
Degree Celsius

**cm**  
Centimeter

**h**  
Hour

**Hz**  
Hertz

**kg**  
Kilogram

**kWh**  
Kilowatt Hour

**L**  
Liter

**lb**  
Pound

**in**  
Inch

**m**  
Meter

**min**  
Minute

**mL**  
Milliliter

**mm**  
Millimeter

**PI**  
Proportional/Integral

**PPE**  
Personal Protective Equipment

**rpm**  
Revolutions per Minute

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**s**

Second

**V**

Volt

**VA**

Volt Ampere

**VAC**

Voltage in Alternating Current



## 2 Safety

### 2.1 Intended use

This device is exclusively intended for indoor use and for uniform movement and temperature control of biological solutions and cultures in reaction vessels.

### 2.2 User profile

The device may only be operated by trained lab personnel who have carefully read this operating manual and are familiar with the device functions.

### 2.3 Information on product liability

In the following cases, the designated protection of the device may be compromised.

The liability for the function of the device passes to the operator if:

- The device is not used in accordance with this operating manual.
- The device is used outside of the range of application described in the succeeding chapters.
- The device is used with accessories or consumables that were not approved by Eppendorf.
- Service or maintenance is completed on the device by people who are not authorized by Eppendorf.
- The owner has made unauthorized modifications to the device.

### 2.4 Application limits

---



#### **DANGER! Explosion hazard**

- ▶ Do not operate the device in areas where work is completed with explosive substances.
  - ▶ Do not use this device to process any explosive or highly reactive substances.
  - ▶ Do not use this device to process any substances which could create an explosive atmosphere.
- 

Due to its design and the ambient conditions in its interior, the device is not suitable for use in potentially explosive atmospheres.

The device may only be used in a safe environment, e.g., the open atmosphere of a ventilated lab. The use of substances which may contribute to a potentially explosive atmosphere is not permitted. The final decision on risks associated with the use of such substances lies with the user.

## 2.5 Warnings for intended use

---



### **WARNING! Health risk due to poisonous, radioactive or aggressive chemicals**

- ▶ Observe the national regulations for handling these substances as well as the material safety data sheets and manufacturer's application notes.
  - ▶ Wear personal protective equipment (PPE).
- 



### **CAUTION! Risk of injury and/or damage to unit**

- ▶ A minimum load is required to safely operate the Excella 24/24R Shaker.
  - ▶ Make sure the unit has a minimum load of 5.4 kg (12 lb) so that it can safely operate under the maximum speed (400 rpm). This includes the weight of the platform, flasks, and media.
- 



### **CAUTION! Lack of safety due to incorrect accessories or spare parts**

Accessories and spare parts that are not recommended by Eppendorf compromise the safety, function and precision of the device. Eppendorf cannot be held liable or accept any liability for damage resulting from the use of non-recommended accessories and spare parts.

- ▶ Only use accessories and original spare parts recommended by Eppendorf.
- 



### **WARNING! Burns due to hot metal on the device and hot pistons**

- ▶ Only touch the device and pistons when wearing protective gloves.
- 



### **WARNING! Risk of crushing fingers with lid**

- ▶ Do not reach between the lid and device, or into the lid locking mechanism, when opening and closing the device.
  - ▶ Always fully open the lid so it cannot fall and close.
- 



### **CAUTION! Risk to health due to lifting heavy loads**

- ▶ Only lift the device with another person or using a suitable aid.
  - ▶ Make sure to use a transport aid for transportation over long distances.
- 



### **NOTICE! Damage due to overheating**

- ▶ Do not place the device close to sources of heat (e.g., radiator, drying cabinet).
  - ▶ Do not expose the device to direct sunlight.
  - ▶ Ensure there is adequate distance to the wall and adjacent devices, on all sides of the device, in order to guarantee unobstructed air circulation.
-

### 3 Product description

#### 3.1 Product overview

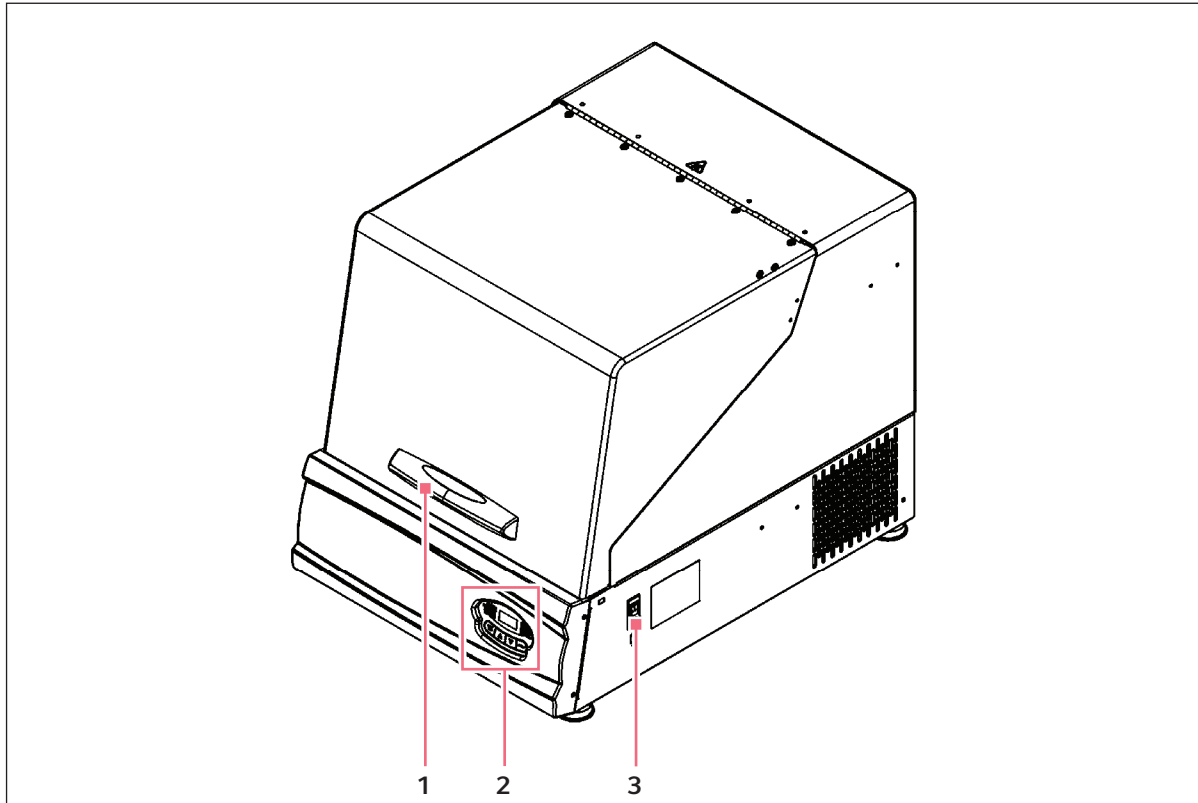


Fig. 3-1: Excella E24/24R shaker

1 Lid handle

2 User interface

3 ON/OFF mains/power switch

#### 3.2 Inspection of boxes

After you have received your order, inspect the boxes carefully for any damage that may have occurred during shipping. Report any damage to the carrier and to your local Eppendorf distributor immediately.

**Product description**

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### 3.3 Features

The New Brunswick E24/24R Shaker uses a UniCentric counter-balanced drive mechanism. It provide horizontal plane rotary motion in a 1.91 cm ( $\frac{3}{4}$  in) diameter circular orbit. A Proportional/Integral (PI) microprocessor controls the speed and temperature over the entire range.

The New Brunswick E24/24R Shaker operates from 7 °C above ambient to 60 °C. This range depends on relative humidity and other ambient factors. Ambient temperature is measured 1 m from the front of the unit.

Erlenmeyer flasks, 2.8 L Fernbach flasks, and a wide variety of tubes and plates can be accommodated using Eppendorf shaker accessories.

A wide variety of platforms can be used with the New Brunswick E24/24R Shaker:

- Universal platforms are the most flexible, providing hole patterns for flask clamps, test tube racks, and other accessories.
- Dedicated platforms are supplied with flask clamps attached; they are designed solely and expressly for this purpose.
- Test tube racks, microplate holders, and test tube rack holders are also available (a universal platform is needed for all test tube racks and holders).

For further information on these accessories (see *Accessories on p. 33*).

#### 3.3.1 Operating modes

The New Brunswick E24/24R Shaker can be operated in the following modes:

- **Continuously:** at a set speed and temperature, until user intervention.
- **In a timed mode:** run at a set speed, time and temperature for a period of up to 99.9 h, after which the shaker automatically shuts off, while the temperature is maintained at its setpoint.

#### 3.3.2 Visible/Audible user alarms

The New Brunswick E24/24R Shaker is equipped with visual and audible alarms for the following conditions:

- The end of a timed run
- Deviations from speed setpoint (5 min after lid is closed)
- Deviations from temperature setpoint (5 min after lid is closed)
- Mains/power failure
- Lid open

### **3.3.3 Data logging**

RS-232 connection provided for Data Logging.

### **3.3.4 Setpoint retention**

All setpoints and operating status are retained in non-volatile memory.

### **3.3.5 Automatic restart**

Automatic restart after power is restored, indicated by flashing display.

### **3.3.6 Drive interrupt**

Drive interrupt shuts off power to the shaker when the lid opens. Acceleration/deceleration circuit prevents sudden starts and stops, minimizing both splashing and mechanical damage.

**Product description**

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## 4 Installation

### 4.1 Selecting the location



#### NOTICE! Damage due to overheating

- ▶ Do not place the device close to sources of heat (e.g., radiator, drying cabinet).
- ▶ Do not expose the device to direct sunlight.
- ▶ Ensure there is adequate distance to the wall and adjacent devices, on all sides of the device, in order to guarantee unobstructed air circulation.

Select the location according to the following criteria:

- Suitable mains/power connection according to the name plate
- Stable, even, and resonance-free base
- Well-ventilated area and no direct sunlight to prevent additional temperature increases
- Ambient conditions of 10 °C – 35 °C, 20 %RH – 80 %RH non-condensing
- Able to accommodate 90.8 kg (200 lb)



Allow a minimum clearance of 7.6 cm (3 in) around the incubator shaker for ventilation, access to mains/power cord (rear panel), and access to mains/power switch and RS-232 port (right side).

### 4.2 Unpacking the device



Keep the packing material and transport securing device for later transport or storage.

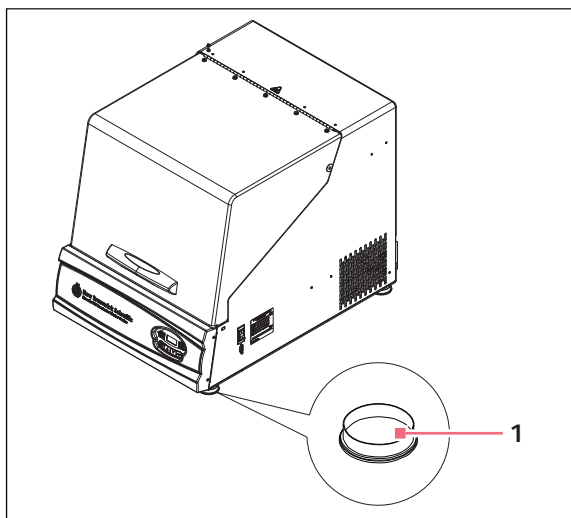
1. Remove the packing material.
2. Remove the transport securing device.
3. Use the details included in the scope of delivery to check that the delivery is complete.
4. Check all parts for damage in transit. Contact Eppendorf Customer Service if parts are missing or transport damage is present.



Before placing the shaker on the bench, remove the 4 red plastic feet protectors.

## Installation

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### 4.3 Utility requirements

The following utility requirements are needed for operation:

#### E24 mains/power supply

Utility	Requirement
Electricity	<ul style="list-style-type: none"> <li>• 100 V, 50 Hz, 800 VA maximum</li> <li>• 100 V, 60 Hz, 800 VA maximum</li> <li>• 120 V, 60 Hz, 800 VA maximum</li> <li>• 230 V, 50 Hz, 800 VA maximum</li> </ul>

#### E24R mains/power supply

Utility	Requirement
Electricity	<ul style="list-style-type: none"> <li>• 100 V, 50 Hz, 1500 VA maximum</li> <li>• 100 V, 60 Hz, 1500 VA maximum</li> <li>• 120 V, 60 Hz, 1500 VA maximum</li> <li>• 230 V, 50 Hz, 1500 VA maximum</li> </ul>

In all cases, voltage variations must not exceed  $\pm 10\%$ .



## 4.4 Installation of platform



A platform with typical anticipated clamps and load must be installed prior to use.

The New Brunswick E24/24R Shaker is shipped with 4 Allen® head platform screws installed in the 4 bearing housing uprights. Before installing the platform, remove the screws and retain them for use.

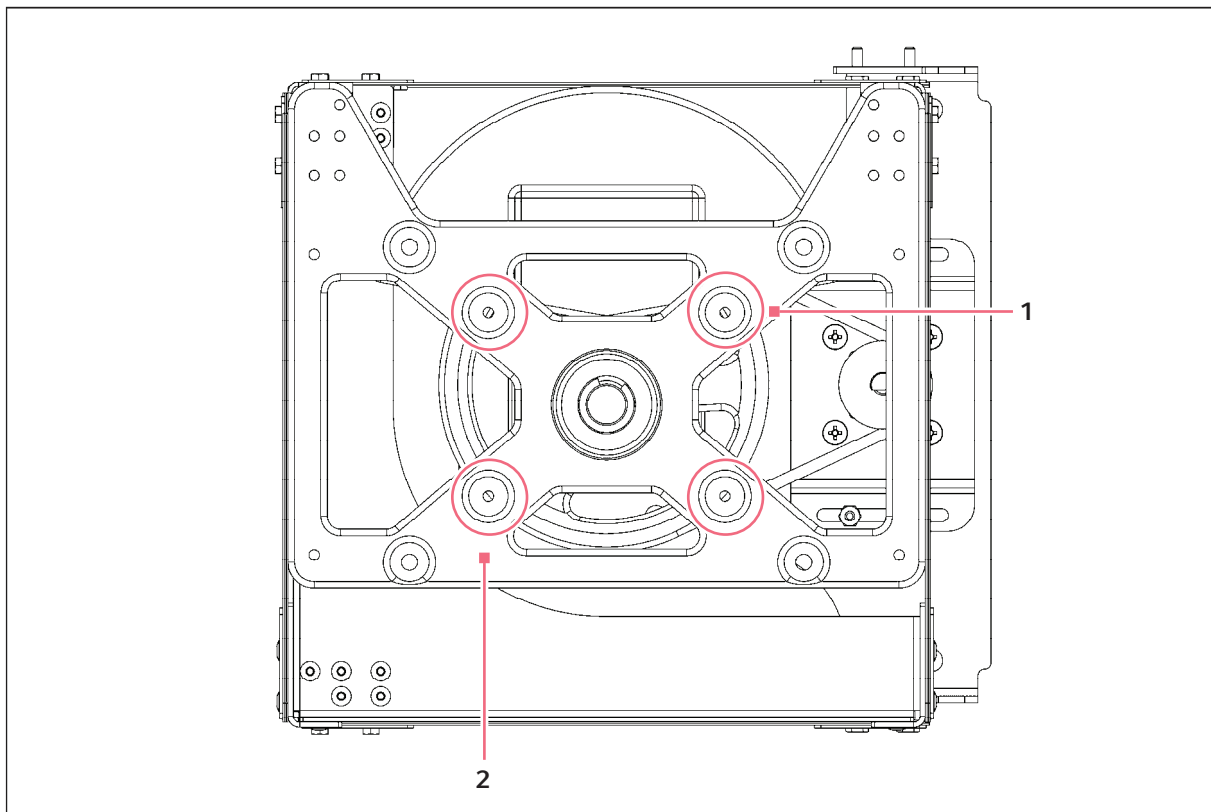


Fig. 4-1: Platform screw locations

### 1 Screws (4)

### 2 Sub-platform


1. Remove the 2 small plastic straps that secure the bearing housing in place for shipping.
2. Using the 7/32 in hex wrench provided, remove the 4 Allen head platform screws from the sub-platform. Save them for later use.
3. Place the selected platform on the sub-platform. Align the mounting holes of the platform with the platform screw locations in the sub-platform.
4. Insert the 4 Allen head platform screws previously removed. Tighten them with the 7/32 in hex wrench provided to secure the platform.

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## 4.5 Flask clamp installation


Flask clamps purchased for use with the platform require installation. Clamps are installed by securing the clamp base to the platform with the correct type and number of screws. All clamps are shipped complete with hardware.

-  The New Brunswick E24/24R Shaker platform requires 10-24 × 5/16 in Phillips® head screws (which are supplied) to fasten flask clamps.

Clamps for 2.8 L and 2 L flasks are shipped with an extra girdle to keep the flasks in place. The girdle is an assembly of springs and sections of girdle tube. One girdle is already in place on the clamp, the other is packed separately.

To install these double girdle clamps:

1. Place the clamp on the platform, aligning its mounting holes with holes on the platform. Secure the clamp in place using the flask clamp screws provided (#S2116-3051, 10-24 x 5/16 in).




-  3 different types of screws are shipped with the clamps, to identify the proper screws (see Fig. 4-2 on p. 18).


2. With the first girdle in place, as delivered, on the upper part of the clamp body, insert an empty flask into the clamp.
3. After making sure the sections of tubing are located between the clamp legs, roll the first girdle down the clamp legs as far as it can go. The tubing sections rest against the platform, and the springs are under the clamp base.
4. Place the second girdle around the upper portion of clamp body (just as the first girdle was initially). Make sure that its spring sections rest against the clamp legs, while its girdle tube sections sit against the flask, in between the clamp legs.



Fig. 4-2: Clamp fastener

Eppendorf flask clamps are used on various shaker platforms. Flat head screws of different lengths and thread pitch are used to secure the clamp. The following table identifies the proper screw for your shaker application by reference to the head style. Select the appropriate screws and set the others aside.

Description	Part number	Qty	Application
 Flask clamp screws, 10-24 x 5/16 in,	S2116-3051	25 pieces	5/16 in (7.9 mm) thick aluminum, phenolic and stainless steel platforms.  

 1 L and larger flask clamps are fastened with 5 screws.

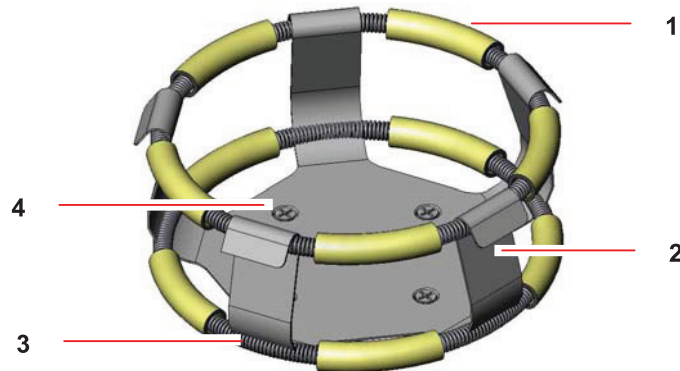



Fig. 4-3: Double girdle clamp installation

- 1 Upper girdle with girdle tubes
- 2 Clamp body (legs and base)
- 3 Lower girdle with girdle tubes
- 4 Clamp mounting holes (quantity: 5)

 The upper girdle secures the flask within the clamp, and the bottom girdle keeps the flask from spinning.

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## 4.6 Electrical connections

Please read the following warnings!

**WARNING! Risk of electric shock and/or damage to unit**

- ▶ Check that the voltage and frequency of your unit are compatible with mains/power supply.
- ▶ Set the mains/power switch to the OFF position.

**WARNING! Risk of electric shock and/or damage to unit**

- ▶ Use an earthed/grounded mains/power supply.


**CAUTION! Risk of injury and/or damage to unit**

- ▶ A minimum load is required to safely operate the Excella 24/24R Shaker.
- ▶ Make sure the unit has a minimum load of 5.4 kg (12 lb) so that it can safely operate under the maximum speed (400 rpm). This includes the weight of the platform, flasks, and media.

- 
- ▶ Only after taking the preceding precautions, plug the mains/power cord into the mains/power supply.

## 5 Operation

### 5.1 Start/Stop


 The New Brunswick E24/24R Shaker does not operate if the lid is open.

To initially start the shaker:

1. Close the lid.
2. Turn the **ON/OFF** switch to the **ON** position.  
During start-up, the LED display indicates the model of your shaker.
3. To start or stop operation of the platform, press the **START/STOP** key on the keypad.  
When the shaker begins to operate, the LED display tracks the speed as it accelerates to the last setpoint entered.


### 5.2 Continuous (untimed) run

1. Press the **SELECT** key until the **RPM** indicator illuminates.
2. If the display indicates that the shaker is **OFF**, press the **START/STOP** key.
3. To enter the **SET** mode, press either the **▲** or **▼** key.  
The **SET** indicator illuminates.
4. Set the speed by using the **▲** or **▼** key until the desired setpoint displays. Continued pressure the **▲** or **▼** key causes the setting to change more rapidly.

 The setpoint can be changed during a run without stopping the shaker by following Steps 2 – 4 above. During speed changes, a visual alarm (flashing **RPM** indicator) flashes and an audible alarm sounds until the speed returns to within 5 rpm of the setpoint.

### 5.3 Check setpoint

1. Press the **SELECT** key until the desired indicator illuminates.
2. To enter the **SET** mode and display the current setpoint, briefly press either the **▲** or **▼** key.

 Holding the **▲** or **▼** key for more than 0.5 s causes the speed setpoint to change. Should this occur, resetting is necessary.

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### 5.4 Timed functions

The shaker can be programmed to automatically stop after a preset time period of 0.1 h – 99.9 h. There must be power to the shaker in order to set the timer, although a timed run can be initiated while the shaker is either stopped or operating.

#### To set the timer:

1. Press the **SELECT** key until the **HRS** indicator illuminates.
2. To enter the **SET** mode and set the desired run time (between 0.1 h – 99.9 h, press either the ▲ or ▼ key.



If the shaker is stopped, skip to Step 5. If the shaker is already running, continue to Step 3.

3. Press the **START/STOP** key.  
The shaker stops and the display reads OFF.
4. Press the **START/STOP** key again.  
The **TIME** indicator illuminates and the shaker starts the timed run.

#### If the shaker is stopped:

5. Press the **START/STOP** key.  
The shaker starts the untimed mode.
6. Press the **START/STOP** key again.  
The shaker stops and the display reads OFF.
7. Press the **START/STOP** key a third time.  
The **TIME** indicator illuminates and the shaker starts the timed run.

To disable the visual alarm (flashing **TIME** indicator), press the **SELECT** key and change to any other function.

To cancel the timer without stopping the shaker, repeat Steps 1 and 2, and then immediately press the **START/STOP** key. The **TIME** indicator stops flashing and the display reads OFF.

### 5.5 Alarm functions

In addition to the visual alarm, the New Brunswick E24/24R Shaker has an audible alarm that is activated at predetermined times. It can be deactivated by using the **MUTE** function (see *Function indicators on p. 26*).

#### 5.5.1 Deactivating

1. Press the **SELECT** key until the **MUTE** indicator illuminates.
2. To display **ON**, press the ▲ or ▼ key. Then press the **SELECT** key.

#### 5.5.2 Reactivating

To reactivate the audible alarm:

1. Press the **SELECT** key until the **MUTE** indicator illuminates.
2. To display **OFF**, press the ▲ or ▼ key. Then press the **SELECT** key.

## 5.6 Temperature setpoint

Press the **SELECT** key until the function °C indicator illuminates. The temperature can be set from 5 °C above ambient temperature to 60 °C (non-refrigerated units) or from 4 °C – 60 °C (refrigerated units). Increasing or decreasing the setpoint is accomplished with the ▲ or ▼ key.

During operation, if the temperature of the chamber is more than 1.0 °C higher or lower than the temperature setpoint, an alarm is triggered. This alarm consists of a flashing °C indicator and audible beep. The alarm automatically deactivates as the New Brunswick E24/24R Shaker achieves the set temperature.

## 5.7 Temperature offset calibration

The temperature probe and the temperature controller are calibrated together at the factory. The temperature probe measures the temperature of the air at the probe's location, near the heat exchanger return vent. The controller uses the probe input to adjust air temperature, up or down, to match the temperature setpoint.

Depending on various conditions within the chamber (e.g., flask placement and size, the heat produced by growing organisms, heat losses due to liquid evaporation from flasks), the display temperature may differ from temperatures within the flasks.

If you wish to have the temperature display ("Indicated Temperature") match the temperature at a given point, or match the average of a series of points within the chamber ("Actual Temperature"), proceed as follows:

1. Let the unit equilibrate at or near the desired temperature. Record the Indicated Temperature.
2. Record the Actual Temperature.
3. Calculate the temperature correction value: Actual Temperature - Indicated Temperature = Temperature Correction Value.
4. Press the **SELECT** key until the °C indicator illuminates.
5. Press the ▲ and ▼ keys simultaneously.  
The display indicates **CAL**.
6. Using the ▲ or ▼ key, enter the Temperature Correction Value calculated in Step 3.
7. To save the Temperature Correction Value to memory, press the ▲ and ▼ keys simultaneously.



The °C indicator pulses rapidly to indicate it is not operating in the factory default mode.

## 5.8 Factory calibration

To return to the factory calibration:

1. Press the **SELECT** key until the °C indicator illuminates.
2. Simultaneously press the ▲ and ▼ keys. The display indicates **CAL**.
3. Using the ▲ or ▼ key, set the Temperature Correction Value to zero.
4. Simultaneously press the ▲ and ▼ keys. The rapid pulsing of the °C indicator stops.

## 5.9 Power failure

In the event of a mains/power failure, the New Brunswick E24/24R Shaker is equipped with an automatic restart function.

If the shaker was in operation prior to the power interruption, when power is restored the shaker begins to operate at its last entered setpoint. The LED display flashes and the audible alarm sounds, indicating that a mains/power failure has occurred. Press any key to stop the flashing in the display and the audible alarm.

## 5.10 Speed calibration

To calibrate the shaking speed:

1. Set the shaker to a speed that can easily be measured. If you are using a strobe, the minimum speed should be 250 rpm.
2. Compare the reading on the display to the measured reading.

If an adjustment is needed:

1. Press the **SELECT** key until the **RPM** indicator illuminates.
2. Press the ▲ and ▼ keys simultaneously. The display indicates **CAL**.
3. To change the displayed value to match the measured speed, press either the ▲ or ▼ key.
4. To save the adjustment, press the ▲ and ▼ keys simultaneously.
5. Using the mains/power switch, turn the shaker **OFF**, then turn it back **ON**.



## 6 Operating controls and function

### 6.1 Control panel

The control panel consists of the status indicators, LED display, function indicators, and the user interface keys.

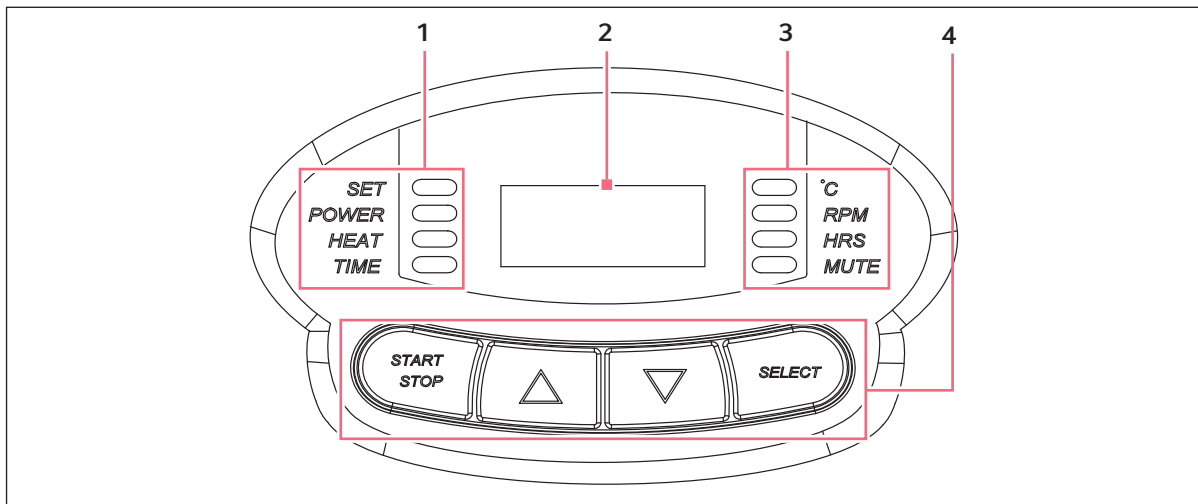


Fig. 6-1: Control panel

1 Status indicators

3 Function indicators

2 LED display

4 User interface keys

#### 6.1.1 Status indicators

4 status indicator lights are located to the left of the LED display. They are:

SET	Indicates that the shaker is in the <b>SET</b> mode, when setpoints are being displayed and can be altered. This is activated by pressing the <b>SELECT</b> key or by pressing the ▲ or ▼ key.
POWER	Illuminates and blinks during power up or if power is interrupted during a run. To turn off this indicator, press the <b>SELECT</b> key and change to another function.
HEAT*	Illuminates to indicate that the heater is on.
TIME	Indicates that the timer is in operation. The shaker can be programmed to run for a preset time from 0.1 h – 99.9 h. The timer can be disengaged without stopping an ongoing run.

\*Not applicable for the E-2, E-5, and E-10

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### 6.1.2 LED display

The digital display on the control panel is a three-digit LED display. During normal operation, the display indicates:

- Shaker status (On/Off)
- Shaking speed
- Chamber temperature\*
- Setpoints
- Hours remaining (in a timed run)
- Lid open (“LID”)\*

\*Not applicable for the E2, E5, and E10

### 6.1.3 Function indicators

4 function indicator lights are located to the right of the LED display. They indicate the current parameter(s) being displayed:

°C*	Interior chamber temperature. Can be set from 4 °C – 60 °C, when in <b>SET</b> mode, using the ▲ or ▼ key. It indexes at 0.1 °C increments unless the key is pressed for 4 s, after which it indexes more rapidly.
RPM	Revolutions per minute. When in <b>SET</b> mode, use the ▲ or ▼ key to change the speed. It indexes at 1 rpm increments unless the key is pressed for 4 s, after which it indexes more rapidly.
HRS	Time remaining in a timed run. Can be set from 0.1 h – 99.9 h, when in <b>SET</b> mode, using the ▲ or ▼ key. It indexes at 0.1 h increments unless the key is pressed for 4 s, after which it indexes more rapidly. The countdown begins when the <b>START/STOP</b> key is pressed. If the <b>START/STOP</b> key is pressed, the shaking stops (but temperature is maintained) and the timer pauses until the <b>START/STOP</b> key is pressed again. When a timed run ends, the <b>HRS</b> indicator blinks. To turn off this indicator, press the <b>SELECT</b> key and change to another function.
MUTE	This feature is controlled by the <b>SELECT</b> key. When activated, the audible alarm is muted, and remains so until is is reactivated. If <b>MUTE</b> is activated when the shaker is turned off using the <b>ON/OFF</b> switch, it remains engaged when the machine is powered up again. To activate (or deactivate) the <b>MUTE</b> function, press the <b>SELECT</b> key until the <b>MUTE</b> indicator illuminates. To turn the display <b>ON</b> or <b>OFF</b> , press the ▲ or ▼ key, and then press the <b>SELECT</b> key.

\*Not applicable for the E-2, E-5, and E-10

### 6.1.4 User interface keys

START/STOP	Start or stop the shaker. It will also activate or stop the timer when a timed run is desired.
SELECT	Used to change the displayed parameter.
▲ or ▼	Used to adjust the setpoint of a displayed parameter up or down. They also allow the user to enter the <b>SET</b> mode for setpoint changes.

**7 Troubleshooting**  
**7.1 General errors**

<b>Problem</b>	<b>Cause</b>	<b>Solution</b>
Device does not run.	• The power cable is loose.	▶ Check the cable connections on the power connection and plug.
	• The display is dark.	▶ Switch on the main power switch.
	• The lid is open.	▶ Close the lid.
	• The lid is closed. • The open lid symbol is shown.	▶ The safety switch is defective. Contact your local Eppendorf service partner.
	• The mains power switch is defective.	▶ Contact your local Eppendorf service partner.
Drive does not run at the set speed.	• The device is overloaded.	▶ Stop the drive. ▶ Reduce the sample weight.
	• The device is loaded unevenly.	▶ Stop the drive. ▶ Load the device uniformly.
Unusual operating noises	• The device is loaded unevenly.	▶ Stop the drive. ▶ Load the device uniformly.
	• Foreign bodies or loose parts in the drive.	▶ Stop the drive and switch off the device. ▶ Contact your local Eppendorf service partner.
	• Loose parts on the platform.	▶ Stop the drive. ▶ Bolt loose parts on the platform.

**Troubleshooting**

New Brunswick™ Excella® E24/E24R Shaker  
English (EN)

## 8 Maintenance

### 8.1 Routine maintenance

No routine maintenance schedule is required for the New Brunswick E24/24R Shaker.

Clean the shaker occasionally using a cloth with conventional household (non-abrasive) cleaner.

To ensure proper air flow in and around the shaker, vacuum or sweep the area around the shaker to remove dust and other debris.

### 8.2 Cleaning

---



**NOTICE! Risk of equipment damage**

Use of abrasive or corrosive compounds can damage the shaker and void the warranty.

- ▶ Do not use abrasive or corrosive compounds to clean the shaker.
- 

1. Routinely clean the exterior of the shaker by wiping it over with a soft cloth, moistened with soapy water.
2. Rinse the soap from the cloth in clean water, and wipe the exterior surfaces again.

If there is biohazard contamination, see below.

**Maintenance**

New Brunswick™ Excella® E24/E24R Shaker  
English (EN)

### 8.3 Disinfection/Decontamination

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**WARNING! Risk of potential harm to personnel**

- ▶ It is the responsibility of the user to carry out appropriate decontamination procedures if hazardous material is spilled on or inside the equipment. Before using any cleaning or decontamination method other than those suggested by the manufacturer, users should contact Eppendorf to ensure that the proposed method would not damage the equipment.

**CAUTION! Risk of potential harm to personnel**

- ▶ As a routine precaution, wear protective gloves.
  - ▶ Be sure to adequately ventilate the work area as you disinfect, to avoid the formation of potentially explosive alcohol vapors.
- 

Commercially available household bleach solutions, when diluted at a 1:10 ratio, are effective in routine decontamination of the shaker. The method for decontaminating a spill depends upon the nature of the spill.

1. Switch off the shaker. Unplug the shaker from the mains/power supply.
2. Spills involving fresh cultures or samples known to have low concentrations of biomass should be flooded with decontamination solution and soaked for 5 min before cleanup.
3. Spills involving samples with high concentrations of biomass, or involving organic matter, or occurring in areas warmer than room ambient temperature should be exposed to decontamination solution for at 1 h before cleanup.

**9 Technical data**  
**9.1 Weight/dimensions**  
**9.1.1 Device dimensions**

Width (external)	56 cm (22 in)
Height (external)	61 cm (24 in)
Height (with lid open)	101.9 cm (40 in)
Depth (external)	76 cm (30 in)
Weight (E24)	60 kg (133 lb)
Weight (E24R)	79 kg (175 lb)

**9.1.2 Platform dimensions**

Width	46 cm (18 in)
Depth	46 cm (18 in)
Weight	2.5 kg (5.5 lb)

**9.1.3 Chamber dimensions**

Width	51.7 cm (20 3/8 in)
Height	34.4 cm (13 9/16 in)
Depth	53.3 cm (21 in)

**9.1.4 Required space/footprint**

Width	68.6 cm (27 in)
Height	106.7 cm (42 in)
Depth	83.8 cm (33 in)

**Technical data**

New Brunswick™ Excella® E24/E24R Shaker  
English (EN)

**9.2 Application parameters****9.2.1 Speed**

Speed (with 1.91 cm (¾ in) orbit)	50 rpm – 400 rpm
Control accuracy	±1 rpm



Use of baffled flasks significantly reduces maximum speed for any shaker. We may be able to improve this maximum speed by using an alternative motor pulley. Contact Eppendorf Customer Service for more information.

**9.2.2 Capacity**

Maximum load	15.42 kg (34.00 lb)
Heater	Long-life, low-watt density resistance-type heater with high temperature thermostat

**9.2.3 Temperature**

Range (E24)	7 °C above ambient temperature to 60 °C
Range (E24R)	15 °C below ambient temperature (minimum 4 °C) to 60 °C
Accuracy	±0.1 °C at 37 °C
Ambient operating environment	10 to 35 °C, 20 to 80 % relative humidity, non-condensing
Altitude limit	2000 m

**9.3 Power supply****E24 mains/power supply**

100 V, 50 Hz	800 VA
100 V, 60 Hz	800 VA
120 V, 60 Hz	800 VA
230 V, 50 Hz	800 VA

**E24R mains/power supply**

100 V, 50 Hz	1500 VA
100 V, 60 Hz	1500 VA
120 V, 60 Hz	1500 VA
230 V, 50 Hz	1500 VA



**10 Ordering information**  
**10.1 Accessories**

Platforms	Part number
Universal platform	M1250-9902
125 mL Erlenmeyer flask dedicated platform*	M1194-9904
250 mL Erlenmeyer flask dedicated platform*	M1194-9905
500 mL Erlenmeyer flask dedicated platform*	M1194-9906
1 L Erlenmeyer flask dedicated platform*	M1194-9907
2 L Erlenmeyer flask dedicated platform*	M1194-9908
2.8 L Fernbach flask dedicated platform*	M1194-9932
Utility carrier with cushioned crossbars	M1194-9909
Utility tray with non-skid rubber surface	M1194-9910
Sticky Pad® platform	M1250-9903

\*dedicated platforms include flask clamps

Flask clamps	Part number
10 mL Erlenmeyer flask	ACE-10S
25 mL Erlenmeyer flask	M1190-9004
50 mL Erlenmeyer flask	M1190-9000
125 mL Erlenmeyer flask	M1190-9001
250 mL Erlenmeyer flask	M1190-9002
500 mL Erlenmeyer flask	M1190-9003
1 L Erlenmeyer flask	ACE-1000S
2 L Erlenmeyer flask	ACE-2000S
2.8 L Fernbach flask	ACSB-2800S

**Ordering information**

New Brunswick™ Excella® E24/E24R Shaker  
English (EN)

<b>Racks and trays</b>		<b>Part number</b>	<b>Platform capacity</b>
Adjustable angle test tube rack for tubes 8 mm – 11 mm diameter	80 tube capacity	M1289-0110	4
	60 tube capacity	M1289-0010	5
	48 tube capacity	M1289-0001	5
Adjustable angle test tube rack for tubes 12 mm – 15 mm diameter	60 tube capacity	M1289-0200	4
	44 tube capacity	M1289-0020	5
	34 tube capacity	M1289-0002	5
Adjustable angle test tube rack for tubes 15 mm – 18 mm diameter	42 tube capacity	M1289-0300	4
	31 tube capacity	M1289-0030	5
	24 tube capacity	M1289-0003	5
Adjustable angle test tube rack for tubes 18 mm – 21 mm diameter	30 tube capacity	M1289-0400	4
	23 tube capacity	M1289-0040	5
	18 tube capacity	M1289-0004	5
Adjustable angle test tube rack for tubes 22 mm – 26 mm diameter	22 tube capacity	M1289-0500	4
	16 tube capacity	M1289-0050	5
	13 tube capacity	M1289-0005	5
Adjustable angle test tube rack for tubes 26 mm – 30 mm diameter	20 tube capacity	M1289-0600	4
	16 tube capacity	M1289-0060	5
	12 tube capacity	M1289-0006	5
Microplate holder rack (stacked)	3 deep well or 9 standard	M1289-0700	8
Microplate holder rack (single layer)	5 deep well or standard	TTR-221	2
Angled test tube rack holder* for user-supplied test tube racks that are 10 mm – 13 mm (4 in – 5 in) wide and up to 38 mm (1.5 in) long.	NA	TTR-210	2
Angled test tube rack spacer bar* for use with TTR-210 to accommodate test tubes racks that are less than 13 mm (0.5 in) wide.	NA	TTR-215	NA

\*Universal platform required

## 11 Transport, storage and disposal

### 11.1 Disposal

In case the product is to be disposed of, the relevant legal regulations are to be observed.

#### Information on the disposal of electrical and electronic devices in the European Community:

Within the European Community, the disposal of electrical devices is regulated by national regulations based on EU Directive 2012/19/EU pertaining to waste electrical and electronic equipment (WEEE).

According to these regulations, any devices supplied after August 13, 2005, in the business-to-business sphere, to which this product is assigned, may no longer be disposed of in municipal or domestic waste. To document this, they have been marked with the following identification:



Because disposal regulations may differ from one country to another within the EU, please contact your supplier if necessary.

In Germany, this is mandatory from March 23, 2006. From this date, the manufacturer has to offer a suitable method of return for all devices supplied after August 13, 2005. For all devices supplied before August 13, 2005, the last user is responsible for the correct disposal.

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New Brunswick™ Excella® E24/E24R Shaker  
English (EN)

**Index****A**

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# Declaration of Conformity

The product named below fulfills the requirements of directives and standards listed. In the case of unauthorized modifications to the product or an unintended use this declaration becomes invalid.

**Product name:**

New Brunswick™ Excella® E24/E24R

including accessories

**Product type:**

Benchtop incubator shaker with optional refrigeration

**Relevant directives / standards:**

2014/35/EU: EN 61010-1, EN 61010-2-010, EN 61051-2-051

UL 61010-1, UL 61010A-2-10,

CAN/CSA C22.2 No. 61010-1, CAN/CSA C22.2 No. 1010.2.10

2014/30/EU: EN 61326-1, EN 55011

CISPR 11

EN 50419

Date: July 22, 2015



Management Board



Portfolio Management

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