eppendorf

New Brunswick™ Excella® E 25/25R Shaker

Operating manual

M1353-0050-F/022016

Table of contents

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.

1.2 Danger symbols and danger levels

1.2.1 Hazard icons

	**Electric shock**		**Crushing**
	**Material damage**		**Hazard point**
	**Heavy loads**		**Explosion**
	**Biohazard**		

1.2.2 Degrees of danger

The following danger levels are used in safety messages throughout this manual.

DANGER	*Will* lead to severe injuries or death.
WARNING	*May* lead to severe injuries or death.
CAUTION	May lead to light to moderate injuries.
NOTICE	May lead to material damage.

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.

2 Safety

2.1 User profile

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

2.2 Safety precautions

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.

CAUTION! Lack of safety due to incorrect use of materials

- Do not use this device to process any flammable materials, or use materials where the transfer of mechanical energy to glass apparatus could lead to breakage.

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 regarding the risks associated with using these types of substances is the user's responsibility.

Before operating the shaker, verify that anyone involved with its operation has been instructed in both general safety practices for laboratories and specific safety practices for this apparatus.

- The user is also responsible for following local guidelines for handling hazardous waste and biohazardous materials that may be generated from the use of this equipment.

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 check with Eppendorf that that proposed method woud not damage the equipment.

This equipment is not *explosion-proof*, and should never be used with flammable substances or used to grow organisms that produce flammable by-products.

WARNING! Risk of explosion and injury or death!

- Do not use equipment with flammable substances or organisms with flammable by-products.

NOTICE! Damage to device!

- Never run shaker without a platform.

2.3 Warnings for intended use

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.

CAUTION! Lack of safety due to incorrect use of materials

- Do not use this device to process any flammable materials, or use materials where the transfer of mechanical energy to glass apparatus could lead to breakage.

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.

WARNING! Heavy!

- Do not attempt to lift the Excella E25/25R shaker by yourself.
- Ask for assistance or use suitable equipment when raising or handling the device.

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.
- Remove caution label from back of unit.
- Set the circuit breaker on the right side of the unit to the OFF position.

WARNING! Risk of electric shock and/or damage to device!

- Use a grounded power supply.

WARNING! Risk of electric shock and/or damage to the device!

- Before cleaning device, turn off and unplug from mains/power supply.

WARNING! Risk of electric shock when replacing fuses!

- Turn off shaker and disconnect from mains/power supply.

WARNING! Injury from hazardous biological material!

- Use respiratory protection when cleaning spills where aerosolization is suspected.
- Wear gloves, safety glasses, and laboratory coat when cleaning.

NOTICE! Damage to device!

- Never run shaker without a platform.

3 Product description

3.1 Product overview

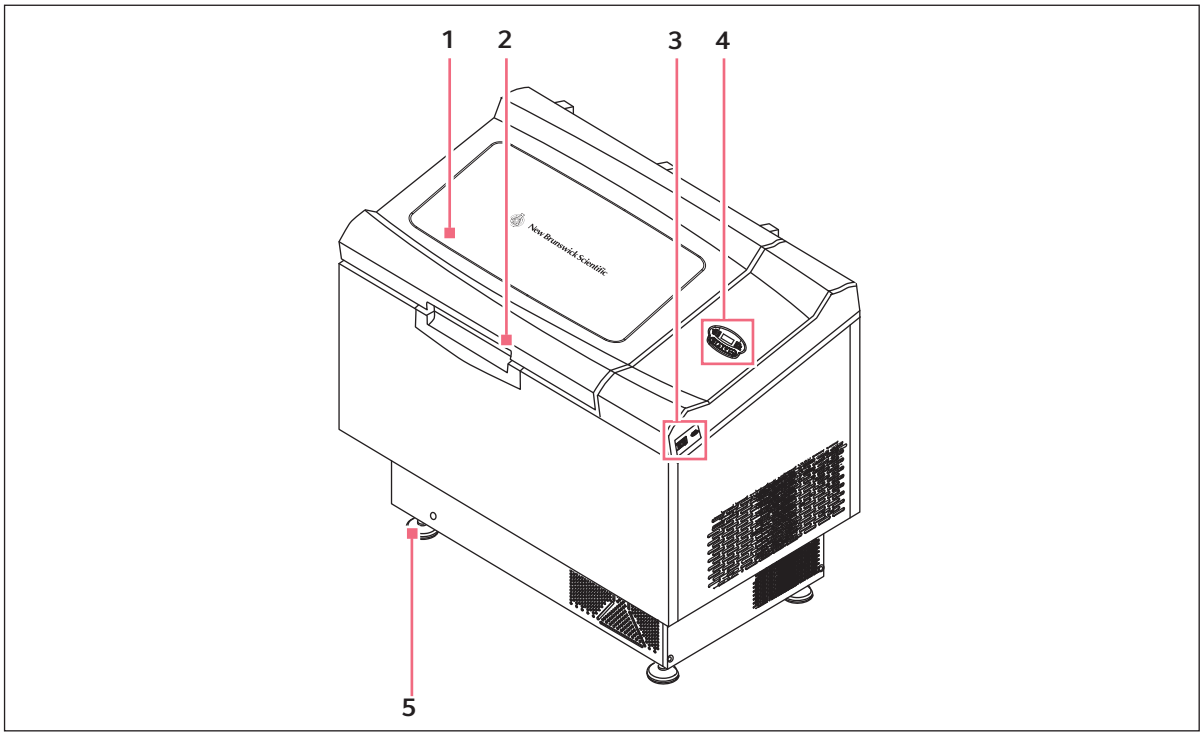

Fig. 3-1: Excella E25/25R shaker

1 Lid

2 Lid handle

3 On/off switch

4 Control panel
(see *Control panel on p. 10)*

5 Foot

3.2 Control panel

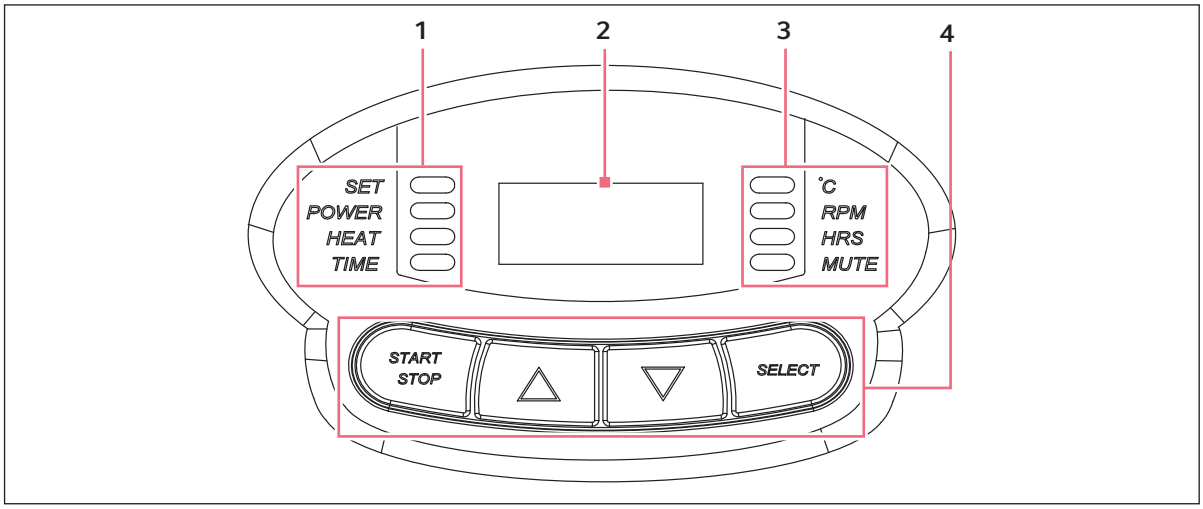

Fig. 3-2: Control panel

1 Status indicators
(see p. 11)

2 LED display
3 digit (see p. 11)

3 Function indicators
(see p. 12)

4 User interface keys
(see p. 11)

The control panel consists of 4 status indicators, an LED display, 4 function indicators, and the 4 user interface keys.

3.2.1 User interface keys

Key	Description
START/STOP	• Starts and stops the shaker • Starts and stops 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 SET mode for setpoint changes

3.2.2 Status indicators

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

Indicator	Meaning	Description
SET	Shaker is in SET mode	• Setpoints are displayed and can be altered • Activated by pressing the SELECT key or the ▲ (up) or ▼ (down) keys
POWER	Power failure	• Illuminates and blinks during power up or if power is interrupted during a run • Press the SELECT key and change to another function to turn off this indicator
HEAT	Heater is on	• Illuminate to indicate that the heater is on
TIME	Timer is in operation	• Shaker can be programmed to run for a preset time from 0.1 to 99.9 hours • Can be disengaged without stopping an ongoing run

3.2.3 LED display

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

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

3.2.4 Function indicators

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

Indicator	Meaning	Description
°C	Interior chamber temperature	• When in SET mode, can be set between 4 °C and 60 °C using the ▲ or ▼ keys • Indexes at 0.1 °C increments unless the ▲ or ▼ key is pressed for 4 seconds, after which it indexes more rapidly
RPM	Revolutions per minute	• When in SET mode, use the ▲ or ▼ key to change the speed • Indexes at 1 RPM increments unless the ▲ or ▼ key is pressed for 4 seconds, after which it indexes more rapidly
HRS	Time remaining in a timed run	• Can be set from 0.1 to 99.9 hours using the ▲ or ▼ keys • Indexes at 0.1 hour increments unless the ▲ or ▼ key is pressed for 4 seconds, after which it indexes more rapidly
MUTE	Audible alarm mute	• Controlled by the SELECT key • When activated, the audible alarm is muted, and remains so until is is reactivated • If MUTE is ctivated when the shaker is turned off, it will remain active when the unit is powered on • Press the SELECT key until the MUTE indicator illuminates; press the ▲ or ▼ key to display ON or OFF as desired, then press SELECT.

3.3 Features

A Proportional/Integral (PI) microprocessor controller with instantaneous digital feedback controls the speed of the Excella® 25/25R shaker over the entire range.

3.3.1 Operation

The device may be operated in the following ways.

Continuously	• At a set speed and temperature, until user stops device
Timed mode	• At a set speed, time and temperature for a period of up to 99.9 hrs, after which the device automatically shuts off

Please see the Operation section of this manual for more information on the various modes of operation.

3.3.2 Orbit

- Single eccentric counterbalanced drive mechanism
- Horizontal plane rotary motion
- Available in 2.5 cm (1 in) diameter circular orbit

3.3.3 Temperature control

Ambient temperature is measured at 1 m from the exterior of the unit.

- The E25R provides temperature control from 7 °C above ambient to 60 °C
- The E25 provides temperature control from 15 °C below ambient (as low as 4 °C) to 60 °C

Both ranges depend upon relative humidity and other ambient factors.

3.3.4 Safety

For safe operation, device is designed with a safety switch that automatically stops the drive when the lid is opened.

3.3.5 Alarms

The device is equipped with visual and/or audible alarms that alert the user to the following conditions:

- The end of a timed run
- Deviations from speed setpoint
- Deviations from temperature setpoint
- Power failure
- Lid open

3.3.6 Platforms and accessories

To accommodate customer needs, a wide variety of platforms and accessories can be used with the device.

Universal platforms	• The most flexible • Provides hole patterns for flask clamps, test tube racks and other accessories
Dedicated platforms	• Supplied with 1 size of flask clamps attached • Designed solely and expressly for this purpose

The following accessories are also available. For more information about these accessories, (see *Accessories on p. 36)*.

- Test tube racks
- Microplate holders
- Erlenmeyer flask clamps (up to 6 L)

WARNING!

▸ Do not use this equipment with accessories not provided or recommended by Eppendorf, or used in a manner not specified by Eppendorf and this manual. Protection provided by the equipment may be impaired, and serious injury or death can occur.

3.3.7 Lid

The chamber of the device is accessed through the top-opening hinged lid. To open the lid lift up on the front handle. The lid stays on its hinges until you choose to close it.

When the lid is open:

- The heater turns off
- The shaker stops

4 Installation

4.1 Inspection of boxes

After you receive your order from Eppendorf, inspect the boxes carefully for any damage that may have occurred during shipping. Report any damage immediately to the carrier and your local Eppendorf customer service department.

4.2 Packing list verification

Verify against your Eppendorf packing list that you have received all of the correct materials.

4.3 Unpacking equipment

WARNING! Heavy!

- Do not attempt to lift the Excella E25/25R shaker by yourself.
- Ask for assistance or use suitable equipment when raising or handling the device.

To unpack your device, you will need the following:

- Claw hammer
- Scissors (to cut nylon strapping)
- Tool to remove 7.6 cm (3 in) metal staples

4.4 Environment

The shaker is designed to operate optimally in the following ambient conditions:

- 10 °C – 35 °C
- Up to 2000 m altitude limit
- 20 % – 80 % relative humidity

4.4.1 Physical location

It is essential that the instrument be situated in an area where there is sufficient space for the shaker to clear walls and potential obstructions during operation. The surface on which the unit is placed must be smooth, level, and able to support the shaker under full load operating conditions.

WARNING! Heavy!

- Do not attempt to lift the Excella E25/25R shaker by yourself.
- Ask for assistance or use suitable equipment when raising or handling the device.

The device has casters and leveling feet. When you need to move the unit across the floor, make sure the feet are raised enough so that the casters can move freely without scraping the floor with the feet.
At all other times, ensure that the feet are down to avoid any unintended rolling.

4.4.2 Electrical requirements

Power supply	100 V ±10 %, 50 – 60 Hz 120 V ±10 %, 60 Hz 230 V ±10 %, 50 Hz	800 VA 1500 VA

Check your shaker's electrical specification plate (located on the back of the unit) to be sure the electrical requirements of your unit match the output of your electric supply. If they do not match, contact your Eppendorf customer service representative.

4.5 Space requirements

Allow at least 10 cm (4 in) around the shaker for proper ventilation, access to the power switch and access to the RS-232 port.

Also allow enough room above the shaker for the lid to be fully open.

Be sure to keep the power plug and power outlet easily accessible to facilitate unplugging the unit as needed.

Dimensions:

Depth	77 cm (30.3 in)
Width	127 cm (50 in)
Height	105.9 cm (41.9 in)
Height (with lid open)	186.6 cm (73.5 in)

4.6 Leveling the shaker

WARNING! Heavy!

- Do not attempt to lift the Excella E25/25R shaker by yourself.
- Ask for assistance or use suitable equipment when raising or handling the device.

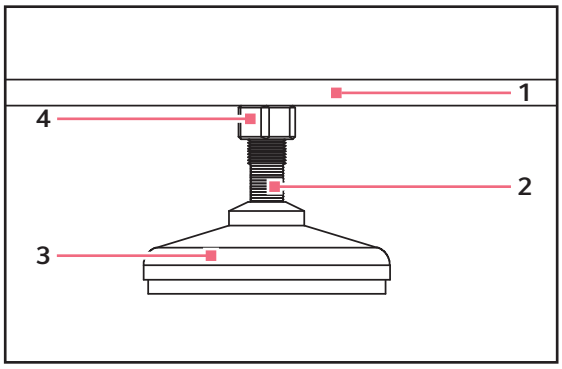

Fig. 4-1: Shaker foot

1 Bottom of unit
2 Flats for wrench
3 Foot
4 Lock nut

The device has casters and leveling feet. When you need to move the unit across the floor, make sure the feet are raised enough so that the casters can roll freely without scraping the floor with the feet.

- Make sure that the shaker is placed on a level surface, in its intended location.
- Lower all 4 adjustable feet until they are solidly on the surface.

If the shaker is not level, adjust the feet as needed to achieve leveling:

1. Immobilize the top lock nut against the unit with 1 wrench (**whenever you adjust the foot**) to keep the threaded stud from falling out.
2. Using a second wrench placed against the flats of the threaded nut (just above the foot), rotate counterclockwise to lower the foot.
3. Rotate counter-clockwise to raise the foot.
4. Place a level at the top of the unit.
5. If necessary, make further adjustments by repeating all steps until the unit is level.
6. After installing the platform (see *Installing the platform on p. 19)*, fully load the shaker and do a test run at normal speed.
7. Make additional leveling adjustments if necessary.

4.7 Installing the platform

NOTICE! Damage to device!

- Never run shaker without a platform.

The device can be used with a variety of Eppendorf platforms that will accept a wide range of clamps for flasks, test tubes, etc. (see *Platforms on p. 36)*. A platform, **which is required for operation**, is a separate item, not included with the shaker assembly. The shaker is shipped with 4 Allen head platform screws installed in the bearing housing.

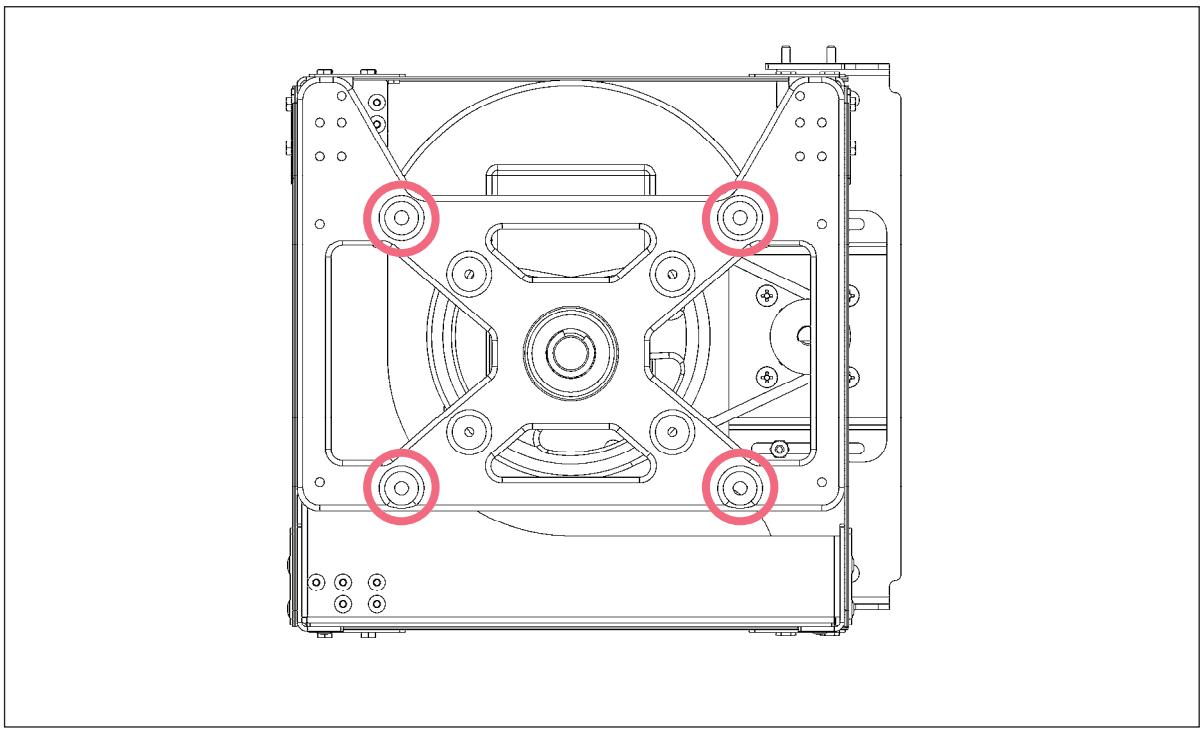

Fig. 4-2: Platform screw locations

To install the platform in your device:

1. Make sure the unit is unplugged and the power switch is in the Off position.
2. Open the cover.
3. Remove the 4 Allen head platform screws installed in the bearing housing (circled in red).
4. Place the platform on the top plate of the bearing housing.
5. Reinstall the 4 Allen head platform screws to secure the platform.

4.8 Install flask clamp

Eppendorf flask clamps are used on a variety of shaker platforms. Flat head screws of different lengths and thread pitch are used to secure the clamp.

To install flask clamps, you will need:

- Phillips® screwdriver
- 10 – 24 × 5/16 in (7.9 mm) flat Phillips screws

Flask clamps purchased for use with universal platforms require installation (see Fig. 4-3 on p. 20). Clamps are installed by securing the base of the clamp to the platform with the correct type and number of screws. All clamps are shipped complete with hardware.

Clamps for 2 L, 2.8 L, 4 L and 6 L flasks are shipped with an additional girdle to keep the flasks in place.

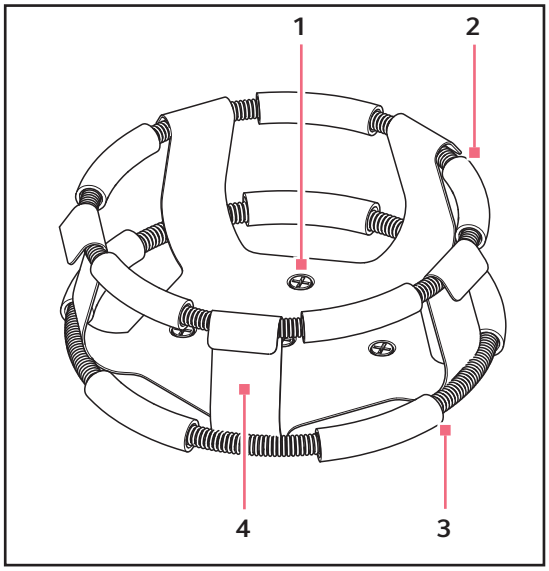

Fig. 4-3: Double girdle clamp

1 Clamp mounting holes (with screws)

2 Upper girdle with girdle tubes
Secures the flask within the clamp

3 Lower girdle with girdle tubes
Prevents the flask from spinning

4 Clamp body (legs and base)

To install these double girdle clamps:

1. Place the clamp on the platform, aligning it with the mounting holes with the holes on the platform.
2. Secure the clamp in place using the provided screws (#S2116-3051, 10-24 × 5/16 in Phillips head).

   Do not overtighten the screws.
3. Place the loose girdle around the upper portion of clamp body so that it is held in place by the legs of the clamp.
4. Insert the flask into the clamp.
5. Push the girdle down so the rubber tubes are in contact with the platform and the flask.

Description	Part No.	Quantity	Application
10 – 24 × 5/16 in (7.9 mm) 	S2116-3051	1	5/16 in (7.9 mm) thick aluminum, phenolic and stainless steel platforms

4.9 Electrical connections

Before making electrical connections, verify that:

- The power source voltage matches the voltage on the elctrical specification plate.
- The on/off switch is in the off position.

The electrical specification plate is located on the rear panel of the unit near the power connector.

To set up an electrical connection to your device:

1. Connect the power cord to the power connector.
2. Connect the other end of the power cord to a suitable, grounded receptacle.

Make sure there is enough clearance to disconnect the plug whenever necessary.

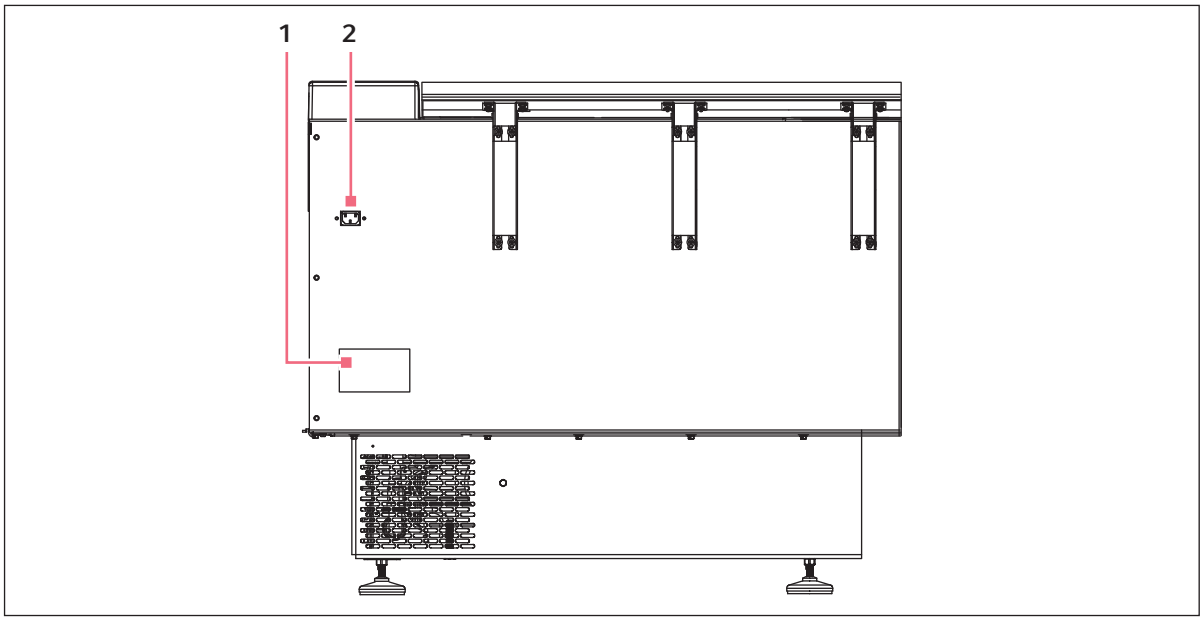

Fig. 4-4: Rear panel

1 Electrical specification plate

2 Power connector

5 Operation

5.1 Powering on

1. Close the lid.
2. Turn the power switch to the on position.

When the shaker begins to operate, the display will track the speed as it accelerates to the last entered setpoint. The shaking action may be started or stopped by pressing the START/STOP switch on the front panel.

The shaker will not operate if the lid is open. This is indicated by the word LID appearing on the display (see Fig. 3-2 on p. 10).

5.2 Continuous (untimed) run

1. Press SELECT until the RPM indicator is illuminated.
2. If the display indicates that the shaker is OFF, press the START/STOP key.
3. Press either the ▲ or ▼ key to enter SET mode.
   The SET indicator will illuminate.
4. Set the speed by using the ▲ or ▼ key until the desired setpoint is displayed.

Holding the ▲ or ▼ key for more than 0.5 seconds causes the speed setpoint to change. Should this occur, resetting will be necessary.

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

5.3 Check setpoint

1. Press SELECT until the desired indicator is illuminated.
2. Briefly press either the ▲ or ▼ key to enter the SET mode and display the current setpoint.

Holding the ▲ or ▼ key for more than 0.5 seconds causes the speed setpoint to change. Should this occur, resetting will be necessary.

5.4 Timed functions

The shaker may be programmed to automatically stop after a preset time period of 0.1 to 99.9 hours. 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.

5.4.1 Setting the timer

To set the timer:

1. Press the SELECT key until the HRS indicator is illuminated.
2. Press either the ▲ or ▼ key to enter the SET mode and set the desired run time, between 0.1 and 99.9 hours.

   If the shaker is stopped, (see *If the shaker is stopped: on p. 24)*. If the shaker is already running continue to Step 3.
3. Press the START/STOP key.

   The shaker will stop and the display will read OFF.
4. Press the START/STOP key again.

   The TIME indicator will light and the shaker will start the timed run.

To cancel the timer without stopping the shaker:

- Repeat steps 1 and 2.
- Immediately press the START/STOP key.

The TIME indicator will stop flashing and the display will read OFF.

5.4.2 If the shaker is stopped:

1. Follow steps 1 and 2, (see *Setting the timer on p. 24)*
2. Press the START/STOP key. The shaker will start in untimed mode.
3. Press the START/STOP key again. The shaker will stop and the display will read OFF.
4. Press the START/STOP key a third time; the TIME indicator will light and the shaker will start the timed run.

To disable the visual alarm (flashing TIME indicator):

- Press the SELECT key and change to any other function

5.5 Alarm functions

In addition to visual alarm, the Excella E25/25R shaker has an audible alarm that is activated at predetermined times. It can be deactivated by using the **MUTE** function (see *Deactivating on p. 25)*.

5.5.1 Deactivating

1. Press the SELECT key until the MUTE indicator illuminates.
2. Press the ▲ or ▼ key to display ON, 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. Press the ▲ or ▼ key to display OFF, 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 to 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 will automatically deactivate as the incubator 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 (flask placement and size, heat produced by growing organisms, heat losses due to liquid evaporation from flasks.), the display temperature may differ from temperatures within the flasks themselves.

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 function °C indicator illuminates.
5. Simultaneously press the ▲ or ▼ keys. The display will indicate CAL.
6. Using the ▲ and ▼ keys, enter the Temperature Correction Value calculated in Step 3.
7. Simultaneously press the ▲ and ▼ to save the Temperature Correction Value to memory.

The °C light will pulse 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 function °C indicator illuminates.
2. Simultaneously press the ▲ and ▼ keys. The display will indicate 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 will stop.

5.9 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, minimum speed should be 250 rpm.
2. Compare the reading on the display to the measured reading.

5.9.1 Calibration adjustments

If an adjustment is needed:

1. Press the SELECT key until the RPM indicator light illuminates.
2. Press the ▲ and ▼ keys simultaneously. The display will indicate CAL.
3. Press either the ▲ or ▼ keys to change the displayed value to match the measured speed.
4. Press the ▲ and ▼ keys simultaneously to save the adjustment.
5. Turn the shaker off using the on/off switch, then turn it back on.

5.10 Power interruption

In the event of a power failure, the Excella E25/25R shaker is equipped with an automatic restart function. The shaker's non-volatile memory retains all stored information.

If the shaker was in operation prior to the power interruption, the shaker will begin to operate at its last entered setpoints. The LED display will flash and the audible alarm will sound, indicating that a power failure has occurred. Press any key to cease the flashing in the display and the audible alarm.

6 Troubleshooting

6.1 Troubleshooting

If any problems occur with your shaker, do not attempt to perform any service on the unit other than specified in this manual. Please contact your local Eppendorf customer service department for assistance.

In any correspondence with Eppendorf, please refer to the model number and serial number of your unit. This information is on the electrical specification plate, located on the rear panel of the unit, below the power connector (see Fig. 4-4 on p. 22).

There are some problems, however, that you can investigate and correct yourself. Please refer to the following troubleshooting guide:

Symptom	Cause	Solution
Shaker does not run	• Power cord is not plugged in	▸ Plug in power cord to working mains/power outlet
	• Lid is ajar	▸ Ensure lid is closed firmly
	• Defective main board • On/off switch is broken • Lid switch is broken • Defective display board • Jammed shaking mechanism • Defective motor • Drive belt out of alignment or worn	▸ Call for service
	• Shaking speed has been set to 0 by program running or by computer interface	▸ Reset shaking speed (see *Continuous (untimed) run on p. 23)*
	• Improperly installed fuse	▸ Remove and reinstall fuse
Shaker runs slowly and/or there is no speed indication	• Improperly installed fuse • Fuse is burned out	▸ Remove and reinstall fuse
	• Incorrect speed calibration	▸ Recalibrate shaking speed (see *Speed calibration on p. 26)*
	• Defective main board • Defective motor • Drive belt out of alignment or worn	▸ Call for service
Shaker does not run at set speed	• Shaker is overloaded and/or you are using baffled flasks	▸ Remove some contents and balance load
	• Defective motor • Drive belt out of alignment or worn	▸ Call for service
	• Speed not calibrated correctly	▸ Check speed calibration (see *Speed calibration on p. 26)*

Symptom	Cause	Solution
Excessive operating noise	• Load out of balance	▸ Unload all contents and reload
	• Loose components in platform, subplatform, and/or drive assembly	▸ Call for service
Shaker does not reach set temperature	• Heater fuse blown • Compressor fuse blown	▸ Replace fuse (see *Fuse replacement on p. 29)*
	• Compressor over-pressure switch activated • Defective heater • Defective refrigeration system • Defective heater	▸ Call for service
	• Ambient temperature too high or too low	▸ Adjust the room temperature
	• Lid is not completely closed (even though LID may not appear on display)	▸ Open and reclose it firmly
	• Incorrect temperature indication	▸ (see Tab. on p. 28)

Incorrect temperature indication	• Temperature Offset has been programmed	▸ Reprogram Temperature offset
	• Defective RTD assembly • Defective main board • Defective humidity sensor or broken contact	▸ Call for service (see *Temperature offset calibration on p. 25)*

7 Maintenance

7.1 Cleaning external and internal surfaces

WARNING! Personnel injury and equipment damage!

- When cleaning the unit, always turn off the shaker and disconnect the power cord from the power supply.

The unit may be cleaned using a damp cloth or any standard household or laboratory cleaner to wipe down its outer surfaces. Do not use abrasive or corrosive compounds to clean this instrument, as they may damage the unit.

7.2 Fuse replacement

E25 models require (1) 8 A electrical fuse, which is housed in the fuse holder located on the M1324-7004 PCB (see Fig. 7-2 on p. 30).

E25R models have (2) 8 A electrical fuses, housed in the 2 fuse holders located on the M1324-7003 PCB (see Fig. 7-3 on p. 30).

To check or replace a fuse:

1. Set the On/Off switch to Off and disconnect the power cord from the power source.
2. To remove the front right bezel from the shaker, grasp with top edge with one hand. Using the cut-out provided on the bottom, grasp the bottom edge with the other hand.
3. Pull the bezel up from the bottom, then out and away.

   Set aside.
4. Remove the 2 screws that fasten the electrical panel in place.

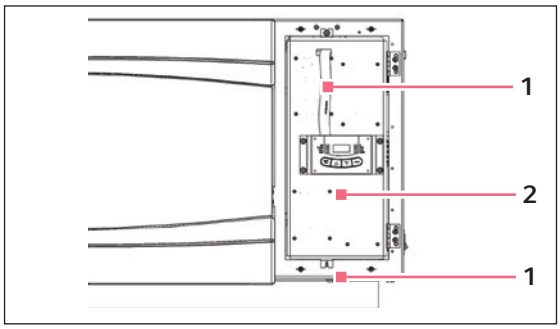

Fig. 7-1: Front bezel removed

1 Remove screws

Set the screws aside for reuse.

2 Electrical panel

5. Swing the electrical panel to the right to access the PCB board that houses the fuse(s).
6. Remove the fuse and check it. Replace if it has failed.
7. Swing the electrical panel to the left, flush against the unit.
8. Using the screws set aside in step 4, fasten the electrical panel in place.
9. With 2 hands, reinstall the front bezel, snapping the top in place first, then the bottom.
10. Verify that it fits snugly and securely.

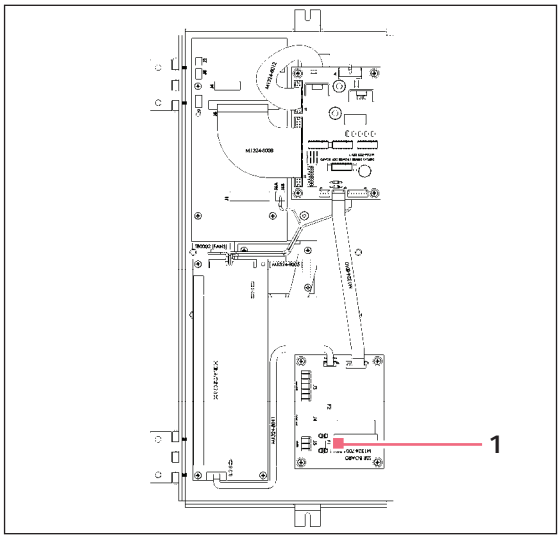

Fig. 7-2: Rear of electrical panel (E25)

1 Fuse holder

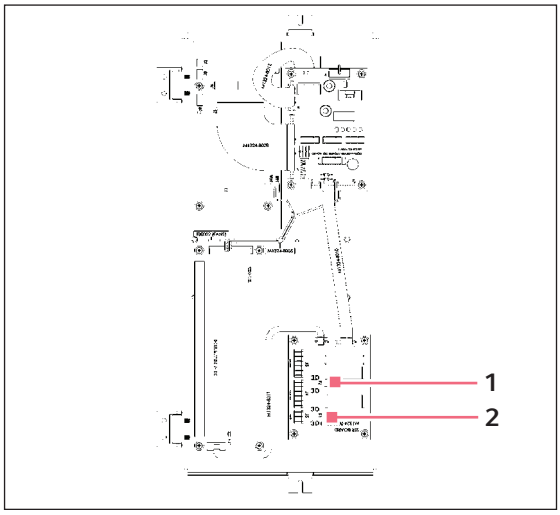

Fig. 7-3: Rear of electrical panel (E25R)

1 Fuse holder

2 Fuse holder

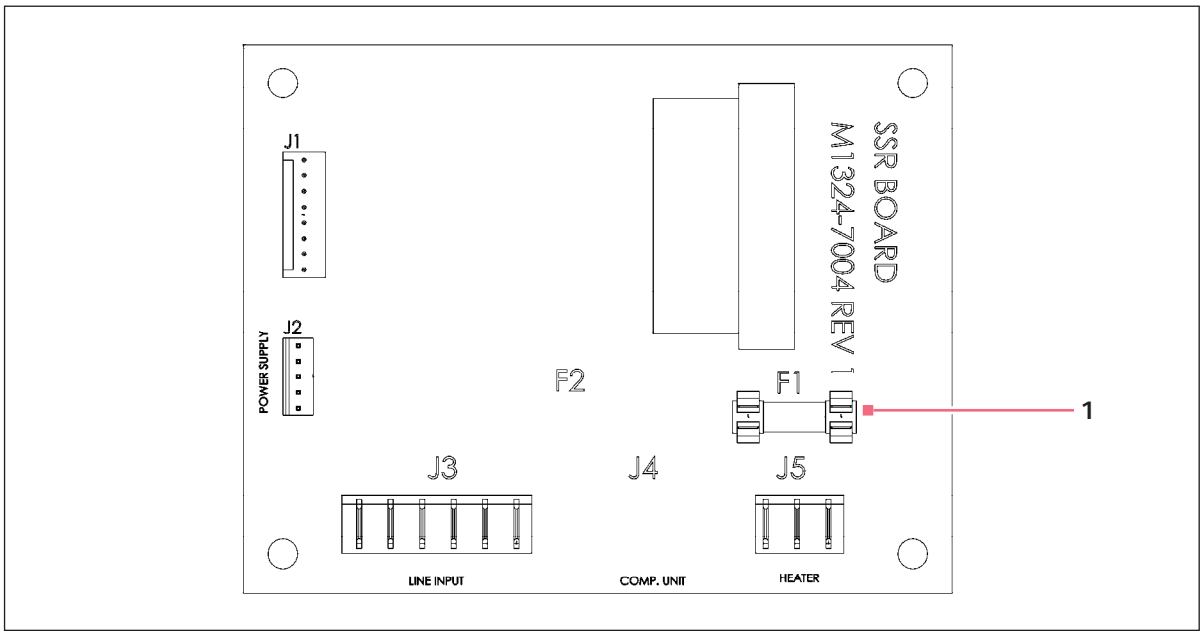

Fig. 7-4: Fuse holder detail (E25)

1 Fuse holder

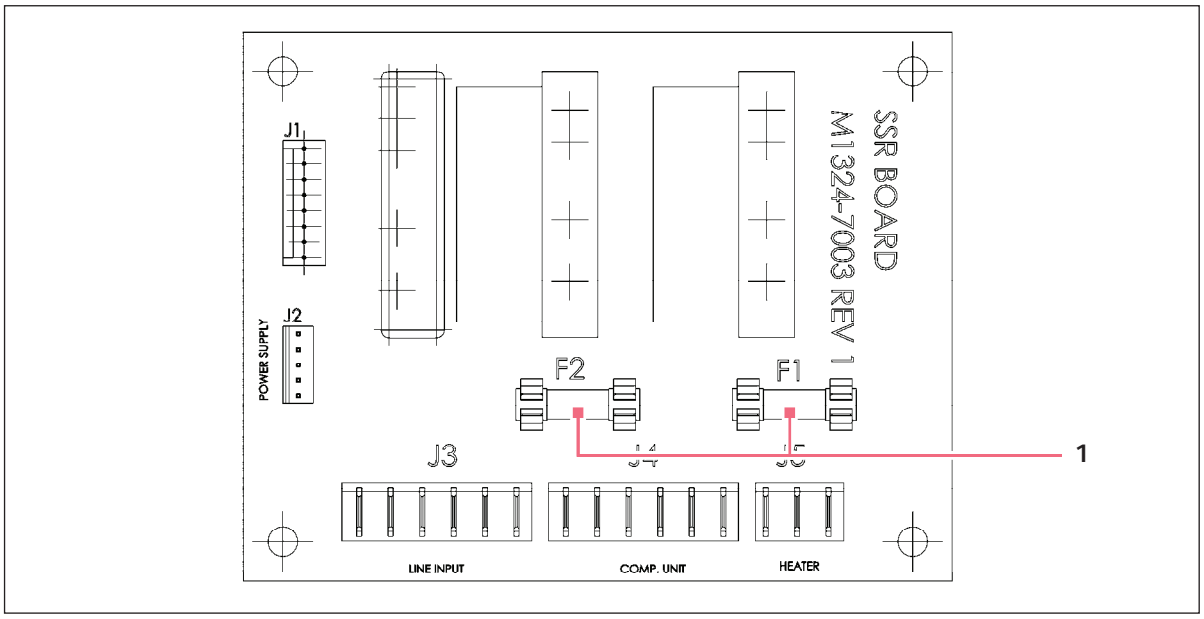

Fig. 7-5: Fuse holder detail (E25R)

1 Fuse holder

8 Technical data

8.1 Specifications

The use of baffled flasks will significantly reduce maximum speed for any shaker.

8.1.1 Shaking

Speed	• 50 rpm – 400 rpm
Control accuracy	• ±1 rpm
Stroke	• 2.5 cm (1 in)
Indication	• Displayed in 1 rpm increments
Alarm signal	• ±5 rpm
Safety	• Drive interrupt stops agitation when lid is opened • Acceleration/deceleration circuit prevents sudden starts and stops, minimizing both splashing and mechanical damage.

8.1.2 Temperature control

Control accuracy	• ±0.1 °C from 37 °C
Alarm signal	• ±1 °C
Temperature range (E-25)	• 7 °C above ambient temperature to 60 °C
Temperature range (E-25R)	• 15 °C below ambient to 60 °C (minimum 4 °C)

8.1.3 Power supply

Power supply	100 V ±10 %, 50 – 60 Hz 120 V ±10 %, 60 Hz 230 V ±10 %, 50 Hz	E25R: 1500 VA E25: 800 VA

8.1.4 Ambient conditions

Ambience	Only for use indoors
Ambient temperature	10 °C – 35 °C
Relative humidity	20 % – 80 %, non-condensing
Altitude	Up to 2000 m

8.1.5 Dimensions and weight

Space requirements	Width: 198 cm (77.9 in) Depth: 87 cm (34.3 in) Height: 165.7 cm (65.25 in)
Dimensions	Width: 127 cm (50 in) Depth: 77 cm (30.3 in) Height: 105.9 cm (41.9 in) Lid open height: 165.7 cm (65.25 in)
Chamber dimensions	Width: 85 cm (33.5 in) Depth: 58.4 cm (23 in) Height: 48 cm (19 in)
Weight	E25R weight: 281 kg (480 lb) E25 weight: 204.5 kg (450 lb)

8.1.6 Automatic restart

- After power is restored
- Indicated by flashing display

8.2 Maximum recommended speed

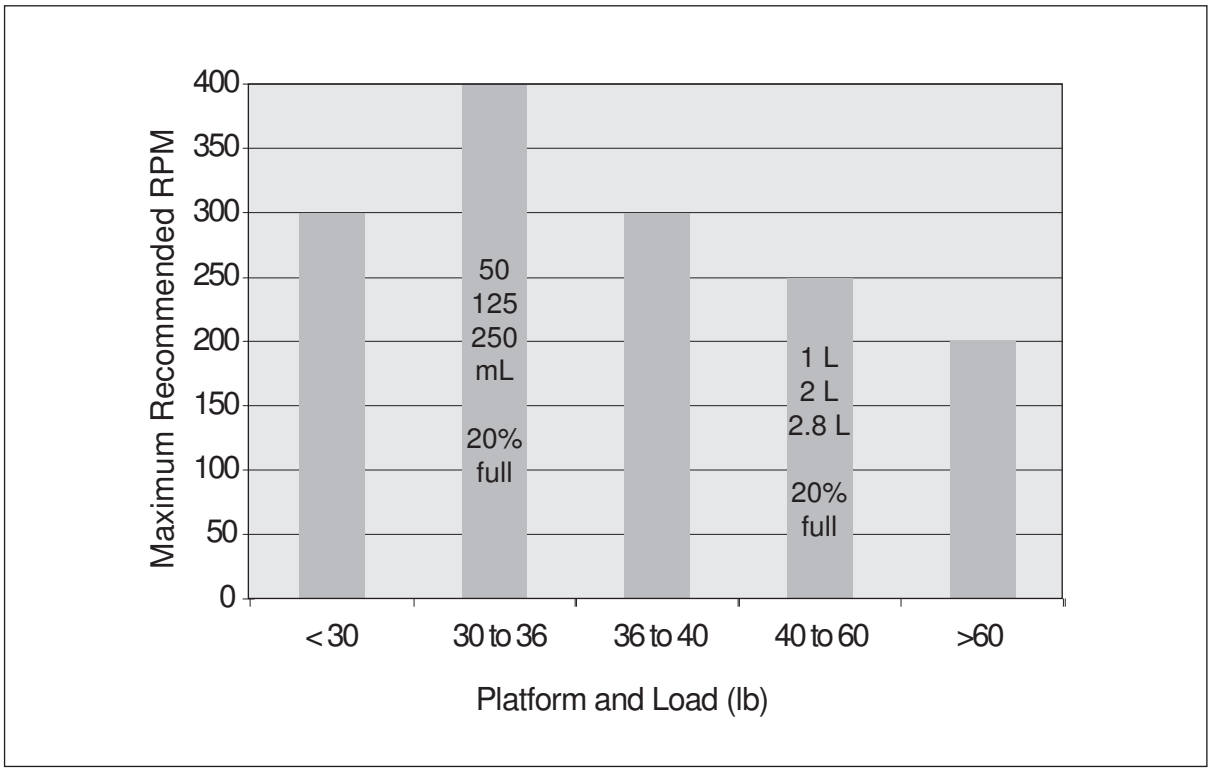

Fig. 8-1: Maximum speed recommended (by load)

20 % full refers to the amount of liquid in the flasks.

9 Ordering information

9.1 Replacement parts

For a list of replacement parts you may need for your Excella E25/25R shaker, (see Tab. on p. 35).

Tab. 9-1: Spare parts kit (M1352-6000)

Description	Quantity	Part number
8.0 A fuse (motor)	1 (E25) 2 (E25R)	P0380-3790
15 A circuit breaker	1	P0400-4305
120 V 15 A power cord	1	P0720-2024
220 V power cord	1	P0720-2021
V belt	1	R-324
Gasket (door)	1	M1353-9900
AC connector, power entry	1	P0460-2205
Drive assembly	1	M1353-1003

9.2 Accessories

When ordering accessories, you may be asked to provide the model number and serial number of your shaker. This information is on the electrical specification plate, located on the rear panel of the unit.

The serial number is also labled in the lower right corner of the front panel, below the chamber lid seal.

WARNING!

- Do not use this equipment with accessories not provided or recommended by Eppendorf, or used in a manner not specified by Eppendorf and this manual. Protection provided by the equipment may be impaired, and serious injury or death can occur.

9.2.1 Platforms

For a list of the the various solid 45.7 cm × 76 cm (18 in × 30 in) platforms available for your device, (see Tab. on p. 36).

Tab. 9-2: Platforms

Description	Part number
Universal platform	M1250-9920
50 mL Erlenmeyer flask dedicated platform	M1191-9908
125 mL Erlenmeyer flask dedicated platform	M1191-9909
250 mL Erlenmeyer flask dedicated platform	M1191-9910
500 mL Erlenmeyer flask dedicated platform	M1191-9911
1 L Erlenmeyer flask dedicated platform	AG-1
2 L Erlenmeyer flask dedicated platform	AG-2
2.8 L Erlenmeyer flask dedicated platform	AG-28
4 L Erlenmeyer flask dedicated platform	AG-4
6 L Erlenmeyer flask dedicated platform	AG-6

Universal platforms have multiple holes enabling you to mount an assortment of flask clamps or other accessories on a single platform. The capacities shown below represent the maximum number of flasks in a given size that will fit on the platform in a balanced pattern. Universal plaforms, clamps and accessories are sold sepparately.

Dedicated platforms will come with flask clamps already mounted. Dedicated platforms generally will hold a greater number of flasks than the universal platform, but do not offer the versatility.

For a list of flask capacities for universal and dedicated platforms designated solely for 1 flask size, (see Tab. on p. 37).

Tab. 9-3: Flask capacities

Flask type	Dedicated platform capacity	Universal platform capacity
10 mL	--	109
25 mL	--	64
50 mL	64	45
125 mL	34	21
250 mL	25	18
500 mL	16	14
1 L	9	8
2 L	5	5
2.8 L	4	4
4 L	4	4
5 L	4	4
6 L	--	2
Large test tube rack	--	4
Medium test tube rack	--	5
Small test tube rack	--	5
Microplate rack (stack)	--	8
Microplate rack (1 layer)	--	2

9.2.2 Flask clamps for platforms

For a list of clamps that are available for the matching dedicated platform, (see Tab. on p. 37).

All may be used on the universal platform.

Tab. 9-4: Flask clamps

Clamp size	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-20002
2.8 L Fernbach flask	ACFE-2800S
4 L Erlenmeyer flask	ACE-4000S
5 L Erlenmeyer flask	ACE-5000S
6 L Erlenmeyer flask	ACE-6000S

Eppendorf flask clamps come complete with mounting screws. Additional screws are available separately in packs of 25.

9.2.3 Test tube racks

For a list of available accessories, accessory capacity and corresponding part numbers, (see Tab. on p. 38).

Tab. 9-5: Accessories

Accessory description		Part number	Platform capacity
Adjustable angle test tube rack for tubes 8 – 11 mm diameter	80 tube capacity	M1289-0100	7
	60 tube capacity	M1289-0010	9
	48 tube capacity	M1289-0001	9
Adjustable angle test tube rack for tubes 12 – 15 mm diameter	60 tube capacity	M1289-0200	7
	44 tube capacity	M1289-0020	9
	34 tube capacity	M1289-0002	9
Adjustable angle test tube rack for tubes 15 – 18 mm diameter	42 tube capacity	M1289-0300	7
	31 tube capacity	M1289-0030	9
	24 tube capacity	M1289-0003	9
Adjustable angle test tube rack for tubes 18 – 21 mm diameter	30 tube capacity	M1289-0400	7
	23 tube capacity	M1289-0040	9
	18 tube capacity	M1289-0004	9
Adjustable angle test tube rack for tubes 22 – 26 mm diameter	22 tube capacity	M1289-0500	7
	16 tube capacity	M1289-0050	9
	13 tube capacity	M1289-0005	9
Adjustable angle test tube rack for tubes 26 – 30 mm diameter	20 tube capacity	M1289-0600	7
	16 tube capacity	M1289-0060	9
	12 tube capacity	M1289-0006	9
Microplate holder rack (stacked)	3 deep well or 9 standard	M1289-0700	16

Universal platform is required for angled test tube rack holder and angled test tube rack spacer bar.

10 Transport, storage and disposal

10.1 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.

Index

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:

Excella® E25 & Excella® E25R

including accessories

Product type:

Incubator shaker with optional refrigeration

Relevant directives / standards:

2014/35/EU:	EN 61010-1, EN-61010-2-010, EN 61010-2-051, UL 61010-1, CSA C22.2 No.: 61010-1, UL 61010A-2-010, CSA C22.2 No. 1010.2.010
2014/30/EU:	EN 55011, EN 61326-1, CISPR 11 Group 1, Class B
2011/65/EU:	EN 50581

Date: January 06, 2016

Management Board

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