Benchmark Scientific

Operations Manual

Item: C2417 (-E)

MC-24™ Touch

High Speed Microcentrifuge

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7. Where to call

Should you have any questions about the MC-24 Touch™ or its accessories, please call Benchmark's Customer Service Department at 908-769-5555. Customer Service is staffed from 8:30am to 5:30pm, EST, Monday through Friday. Our 24 hour fax number is 732 313-7007. Inquiries may also be sent via our electronic mailbox at info@benchmarkscientific.com

Should your MC-24 Touch™ require service, please call Benchmark's Technical Services Department at 908 769-5555. Our Service Department is staffed from 8:30am to 5:30pm, EST, Monday through Friday. Our 24 hour fax number is 732 313-7007. Electronic mail may be sent to info@Benchmarkscientific.com.

Please have the unit's serial number (located on the back panel of the instrument) available when calling. Should an item require return to Benchmark for service, a repair authorization (RA) number must first be received from Benchmark and a decontamination form completed by the user. Items sent without an RA number or decontamination form will not be accepted.

Table of Contents

1. General Information

This manual provides important safety information for the MC-24 ™ Touch laboratory microcentrifuge. It should be kept near the centrifuge for quick and easy reference.

1.1 Description

The MC-24 Touch is a compact touchscreen benchtop centrifuge designed for separation of various research samples. The motor is brushless and requires no routine maintenance. The MC-24 ™ Touch is supplied with a COMBI-Rotor ™ 24 x 1.5/2.0ml and 2 x PCR-Strip rotor for micro samples. Adapters are available for tubes smaller than 1.5ml. The MC-24 ™ Touch reaches speeds of up to 13,500rpm/16,800 x g.

1.2 Safety precautions

Note: All users of the centrifuge must read the Safety Pre- cautions section of this manual before attempting to operate the unit!

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not operate the centrifuge if any of the following conditions exist:

-The centrifuge has not been installed properly
-The centrifuge is partially dismantled
-Service has been attempted by unauthorized or unqualified personnel
-The rotor has not been installed securely on the motor shaft
-Rotors and accessories not belonging to the standard range are being used without permission being obtained from the manufacturer to use such rotors and/or accessories in the centrifuge Exception: Microcentrifuge tubes made of plastic, normally avail- able in the laboratory.
-The centrifuge is located in an explosive atmosphere
-Materials to be centrifuged are combustible and/or explosive
-Materials to be centrifuged are chemically reactive
-The rotor load is not properly balanced

6. Troubleshooting Guide

Centrifuge will not start

Possible reason: - No power supply
Solution: - Check that power is being supplied to the outlet
- Check that the power cord is plugged into both the wall outlet and the back of the centrifuge
- Check that power cord is not damaged
Possible reason: - Blown fuse
Solution: - Check fuse and replace if necessary

Lid lock will not release

Possible reason: - Defective lid lock
Solution: - Open manually and have unit serviced
Possible reason: - No power from PC board
Solution: - Call for service
Possible reason: - Lid lock is jammed
Solution: - Call for service
Possible reason: - Centrifuge is not receiving power
Solution: - See "Centrifuge will not start"

Centrifuge cannot be started, although power is on

Possible reason: - Lid not closed correctly
Solution - Close lid correctly
Possible reason: - No speed or time has been selected
Solution: - Set speed and/or time

Error#	Label	
1	Lid Open	Trying to Start when LID is open
2	Lid Unlock	Trying Start when LID lock not able to lock
3	Lid Stuck	At stop LID will not open and is " stuck"
4	Motor Stall	Motor is not spinning
5	OV/UV/OC	Over voltage, under voltage or over current
6	Motor Imbalance	Motor spinning imbalance
7	COMM. Error	Display could not communicate with power board, cable is bad or not connected or noise issue
8	Over Temp.	Output stage temperature is too high

5. Service and Maintenance

5.1 Centrifuge service

The brushless motor in the MC-24 Touch™ requires no routine maintenance. Any required service should be performed by authorized, qualified personnel only. Repairs performed by unauthorized personnel may void the warranty.

5.2 Cleaning the centrifuge

Always keep the centrifuge housing, rotor chamber, rotor and rotor accessories clean. All parts should be wiped down periodically with a soft cloth. For more thorough cleaning, use a neutral cleaning agent (pH between 6 and 8) applied with a soft cloth.
Excessive amounts of liquid should be avoided. Liquid should not come into contact with the motor. After cleaning, ensure that all parts are dried thoroughly by hand or in a warm air cabinet (maximum temperature 50°C)

5.3 Cleaning the rotor

The rotor should be cleaned regularly. When spinning samples containing phenol or phenol chloroform, the rotor should be cleaned immediately after use.

5.4 Disinfection

Should a spill of infectious materials occur within the rotor or chamber, the unit should be disinfected. This should be performed by qualified personnel with proper protective equipment.

5.5 Replacing fuses

Check the fuse when it is recommended in the Troubleshooting Guide located in this manual. The fuse holder is located in the power inlet on the rear of the unit. Disconnect the power cord from the power inlet. Open the fuse holder drawer by inserting a small screwdriver under the tab and trying it open. Remove the innermost (operative) fuse from its retaining tabs and replace the fuse if necessary. A spare fuse is located in the outermost chamber of the fuse drawer. Replace only with a fuse of exactly the same value as the original. (Fuse type may be found in the Technical data section of this manual.)

1.3 Technical data

Dimensions	
Width	9 inches
Depth	12 inches
Height	7.75 inches
Maximum speed	13,500 rpm
Maximum RCF	16,800 x g
Maximum volume	24 x 1.5/2.0ml
Admissible sample density	1.2 kg/dm3
Electrical/fuse rating	120V, 50-60Hz, 1.3A, 2.5 AT
	230V, 50-60Hz, 0.7A, 1.25 AT
Operating temp./humidity	+4°C to 35°C - 80%RH

1.4 Packing List

Each unit is supplied with an instruction manual, a power cord, a combination rotor and a rotor removal wrench.

1.5 Warranty

This centrifuge has been subjected to thorough testing and quality control. In the unlikely event of a manufacturing fault, our 2 year warranty (from the date of delivery) covers the centrifuge and the rotor. This warranty becomes invalid in the case of incorrect operation, use of nonstandard spare parts or accessories and unauthorized modification of the rotor or centrifuge.

Benchmark reserves the right to make technical modifications.

2. Installation

2.1 Unpacking the centrifuge

Before unpacking the centrifuge, inspect the outside of the carton for any shipping damage. The centrifuge is delivered in a carton with protective foam cushioning. Remove the centrifuge from the carton. Retain the carton and cushioning until it has been established that the centrifuge is working.

Inspect the centrifuge for any visible signs of shipping damage. Shipping damage is the responsibility of the transportation carrier. Any claims for damage must be filed within 48 hours with the carrier that delivered the centrifuge.

The accessories supplied with the centrifuge should be kept with the instruction manual near the centrifuge's place of installation.

2.2 Required space

The centrifuge should be installed on a rigid, even surface such as a stable laboratory bench, countertop, etc. To guarantee sufficient ventilation, ensure that the centrifuge has at least 15cm (6 inches) of free space on all sides, including the rear.

The centrifuge should not be located in areas subject to excessive heat such as in direct sunlight or near radiators or the exhaust of a compressor, as a buildup of heat may occur within the chamber.

2.3 Installation

Before operating the centrifuge, check that the power source (electrical outlet on the wall) corresponds to that on the manufacturer's rating label, then connect the power cord to the centrifuge and the power source.

3. Installation of rotors and rotor maintenance

3.1 Rotors and accessories

Included:

Angle Combi-rotor™ for 24 x 1.5ml tubes

Tube measurement	1.5ml I 2.0ml (10 x 40mm)
Max. speed	13,500rpm
Centrifuging radius	8.23cm
Max. RCF (g-value)	16,800 x g

Rotor Wrench

Order no.	SP-C2417-WR

Rotor Lid

Order no.	SP-C2417-LID

Optional:

Adapter for 0.5ml tubes (pk./6)

Order no.	C1008-A5-6

4.5 Speed selection (see Figure 2.)

The speed (rpm or g-force) can be selected from 1,000 to 13,500 rpm or from 100 to 16,800 x g by touching the speed display and adjusting with the up and down arrow buttons. Display of rpm/rcf can be toggled with the rcf/rpm button on the display.

4.6 Selection of operating time, momentary operation, Start/Stop

Operating time can be selected from 0 min to 99 min by pressing the “set time” button and adjusting with the up and down arrow buttons. Setting the time at 0 will put the MyTouch™ in continuous run. In this mode, the centrifuge will run until manually stopped. To start a run, press the timer knob.

When the preselected time expires, the centrifuge will stop automatically. To stop the centrifuge prior to the expiration of set time, press the “start/stop” button.

The centrifuge may be operated for a short run by pressing and holding the “start/stop” button. The centrifuge will continue to run as long as the button is held down.

Figure 2. MC-24 Touch™ control panel layout

4. Operation

CAUTION: Never attempt to operate the centrifuge with rotors or adapters that show signs of corrosion or mechanical damage. Never centrifuge strongly corrosive materials that may damage the rotors, accessories, or bowl of the unit.

4.1 Attaching rotor lid

After the rotor has been properly secured and loaded, attach the rotor lid to the rotor. Always use the rotor lid for safety and to allow the rotor to reach proper speed. Make sure that the rotor lid snaps securely into place.

4.2 Closing the lid

Close the centrifuge lid. (The MC-24 Touch™ has a lid lock that activates when closed and the start button is pressed.)

4.3 Lid release

The lid will remain locked during a centrifuge run. Once the run has been completed and the rotor has come to a stop, a beep will indicate the end of a run, and the lid will unlock automatically.

WARNING: Do not attempt to open the lid of any centrifuge until the rotor has come to a complete stop.

In the event of a power failure or malfunction, it may be necessary to open the lid manually.

1. Disconnect the power cord from the wall socket.
2. Remove the plastic plug, located on the left side of the unit.
3. Pull the wire (attached to the plug) to open the lid lock manually.

4.4 Lid lock

The centrifuge can be started only with the lid securely closed. When a run is started, the lid lock automatically activates. Do not attempt to open the lid during a centrifuge run. At the end of the run, the lid will automatically unlock.

Never attempt to override the lid lock mechanism. Doing so is dangerous and could damage the centrifuge.

3.2 Rotor maintenance

The rotor should be cleaned regularly. Thorough cleaning must be performed when spinning samples containing phenol or phenol chloroform. Periodically inspect the rotor for dents, dings, scratches, discoloration and cracks. If any damage to the rotor is found, discontinue use of the rotor immediately and replace.

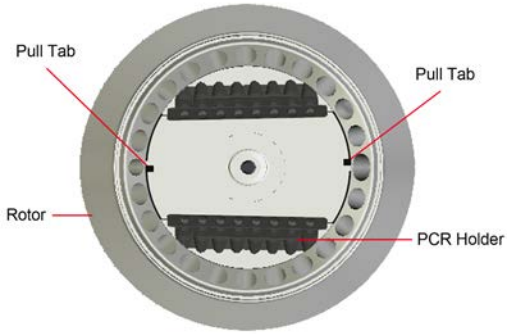
3.3 Removing and installing the angle rotor

The MC-24 Touch™ comes complete with a COMBI-Rotor™, 24 place 1.5/2.0ml rotor combination rotor with 2-place PCR-strip installed. To remove the rotor for cleaning, remove the rotor securing screw from the motor shaft by turning the screw counterclockwise, using the rotor wrench. Lift the rotor directly upward in a straight vertical motion.

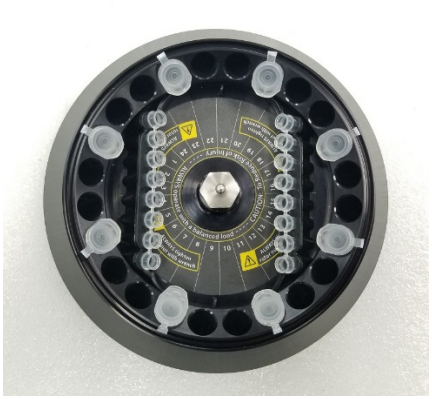
To replace rotor, first make sure the motor shaft and rotor mounting hole are clean. Place the rotor on the motor shaft. Reinstall the rotor securing screw on the motor shaft by turning it clockwise. Hold the rotor with 1 hand and tighten the rotor securing screw, using the rotor wrench.

3.4

To remove the PCR holders, locate the tabs on each of the two holders and pull them inward towards the center of the rotor using a pair of plyers. If reinstalling the PCR holders, always ensure that both holders are installed and that the arms of each holder rest firmly against the body of the rotor (not overlapping the arm of the opposite PCR holder.)



Balanced rotor load



Incorrect rotor load

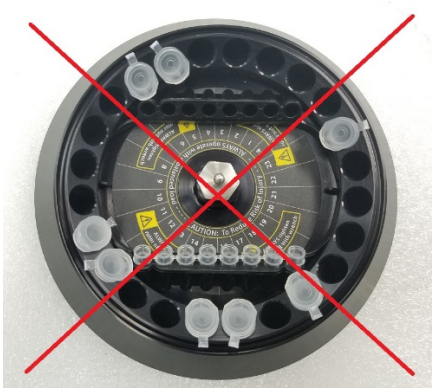


Figure 1. Loading the rotor to achieve balance

3.5 Loading the rotor

Tubes to be loaded should be filled equally by eye. The difference in the weight between the tubes should not exceed 0.1 gram. Tubes should always be loaded so that there is equal spacing between all tubes. One or two additional loaded tubes may need to be added to achieve this. Refer to Figure 1. to see one typical balancing scheme.

3.6 Overloading rotors

The maximum load of the rotor and the maximum speed have been established by the manufacturer. Do not attempt to exceed these values. The maximum speed of the rotor has been established for liquids having a homogeneous density of 1.2g/ml or less. In order to centrifuge liquids with a higher density it is necessary to reduce the speed. Failure to reduce the speed may result in damage to the rotor and centrifuge. The revised maximum speed can be calculated with the following formula:

$$\text{Reduced speed } (n_{red}) = \sqrt{\frac{1.2}{\text{Higher density value}}} \times \text{max speed } (n_{max})$$