Instruction Manual

Denville 260D
Brushless Microcentrifuge

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DENVILLE
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1. General Information

This manual provides important safety information for the Denville 260D laboratory microcentrifuge. It should be kept near the centrifuge for quick and easy reference.

1.1 Description

The 260D is a small benchtop centrifuge designed for separation of various research samples. The motor is brushless and requires no routine maintenance. The 260D is supplied with a 1.5ml rotor for micro samples. Adapters are available for tubes smaller than 1.5ml. The 260D reaches speeds of up to 14,000rpm/ 16,000 x g.

1.2 Safety precautions

Note: All users of the centrifuge must read the Safety Precautions 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 available 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

1.3 Technical data

Manufacturer	Denville Scientific PO box 4588 Metuchen, NJ 08840-4588 Phone: 908 757-7577 Fax 908 757-7551
Type	260D
Dimension	
Width	9 inches
Depth	11 inches
Height	7.5 inches
Maximum speed	14,000rpm
Maximum RCF	16,000 x g
Maximum volume	24 x 1.5/2.0ml
Admiss. density	1.2kg/dm^3
Electrical/fuse rating	120V~, 50-60Hz, 1.0A/2.5AT 230V~, 50-60Hz, 0.6A/1.25AT

1.4 Accessories supplied with centrifuge

Each unit is supplied with 1 instruction manual, 1 warranty card and 1 power cord. Some models are supplied with a rotor screw wrench.

1.5 Warranty

This centrifuge has been subject to thorough testing and quality control. In the unlikely event of a manufacturing fault, our two 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.

Denville reserves the right to make technical modifications. Statements contained herein are not to be considered binding.

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 cushions. Remove the centrifuge from the carton. Retain the carton and cushions until it has been established that the centrifuge is working properly.

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.

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, cabinet, 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 supply corresponds to that on the manufacturer's rating label, then connect the power cord to the centrifuge and the power supply.

3. Installing the rotors

3.1 Rotors and accessories

The following accessories are available for the 260D:

Angle rotor for 18 or 24 x 1.5ml tubes (included with unit)

Tube measurement	1.5ml (10 x 40mm)
Max. speed	14,000rpm
Centrifuging radius	7.3cm
RCF (g-value)	16,000 x g

Adapter for 0.5ml tubes

Order no.	C-1205
Tube measurement	8 x 30mm
Max. speed	14,000rpm
Centrifuging radius	6.6cm
RCF (g-value)	14,462 x g

Adapter for 0.4ml tubes

Order no.	C-1206
Tube measurement	6 x 47mm
Max. speed	14,000rpm
Centrifuging radius	7.3cm
RCF (g-value)	16,000 x g

Adapter for 0.2ml tubes

Order no.	C-1222
Tube measurement	6 x 21mm
Max. speed	14,000rpm
Centrifuging radius	6.1cm
RCF (g-value)	13,366 x g

3.2 Mounting and securing the angle rotor

Remove the rotor screw from the motor shaft by turning the screw counterclockwise. Clean the motor shaft and the rotor mounting hole (see figure 1). Place the rotor on the motor shaft ensuring that the cross-pin (figure 2) aligns correctly with the rotor slot (see figure 1). Note: Figures 1 and 2 are located on the following page.

Reinstall the rotor screw on the motor shaft by turning it clockwise. Hold the rotor with one hand and hand-tighten the rotor screw. Use an adjustable or 1/4 inch wrench (some units are supplied with a wrench) to tighten the screw an additional quarter turn.

When loading the rotor, refer to figure 3 (located on the following page). Loading in the pattern indicated will ensure a balanced load. Tubes to be loaded should be filled equally by eye. The difference in the weight between the tubes should not exceed 0.1 gram. A partially loaded rotor may be centrifuged if the loading scheme for balancing a rotor given in figure 3 is followed.

3.3 Removing the rotor

Using an adjustable or 1/4 inch wrench (some units are supplied with a wrench) loosen the screw and remove the rotor retaining screw/washer assembly by turning it counterclockwise. Lift the rotor directly upward in a straight vertical motion.

Caution: Be sure to secure the rotor screw and tighten with a wrench before further operation.

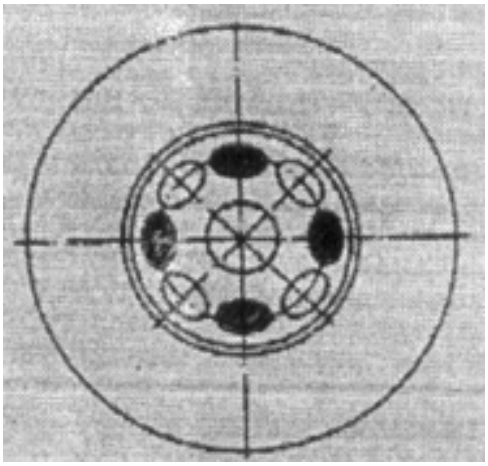


Figure 3. Loading the rotor

3.4 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 measured 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:

Reduced speed (n_{red}) = x max speed (n_{max})

Example:

Where the density of the liquid is 1.7, the new maximum speed would be calculated as follows:

n_{red} = x 14,000 = 9,882 rpm

If in doubt concerning maximum speeds, please contact the manufacturer for assistance.

4. Operation

ATTENTION: 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 or accessories.

Figure 4. Control panel layout

4.1 Closing the lid

After the rotor has been properly secured and loaded, close the centrifuge lid, making sure that the interlock has been engaged.

4.2 Lid release

The lid of the centrifuge automatically opens at the end of a run, The lid button used to open the lid in between runs, ie when loading the rotor. The lid button is inactive while the rotor is in motion.

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, below the quick button.
3. Pull the cord (attached to the plug) to open the lid lock manually.

4.3 Lid lock

The centrifuge can be started only with the lid securely closed. When the rotor begins to accelerate, the lid button becomes inoperable. Do not attempt to open the lid while the rotor is in motion.

4.4 Speed selection

Speed (rpm) can be selected digitally from 1000 to 14,000 in 100rpm increments. It may also be selected in RCF (g-force) mode. The increments in the rcf mode correspond to the 100rpm speed increments. Press the rpm/rcf button at any time to switch between rpm and rcf.

4.5 Selection of operating time and momentary operation

Operation of the centrifuge, in any mode, begins when the start button is pressed. Use the up/down arrows to select the time up to 99 minutes in one minute increments (0.5 increments for times between 0 and 10 minutes). The continuous run position is above 99 indicated by "--".

Momentary (non-timed) operation is achieved by pressing the

start button to start operation and releasing to end the run.

When the preselected time expires or the stop button is pressed, the centrifuge will come to a stop and the lid will automatically open. At this point the rotor is no longer in motion and samples can be removed.

4.6 Activate / Disable Beep

Press the "rpm/rcf" button during power up for approximately three seconds and release to toggle beep on/off.

5. Service and Maintenance

5.1 Centrifuge service

The brushless motor in the 260D 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 50ºC)

5.3 Disinfection

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

5.4 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 prying 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.)

6. Troubleshooting Guide

Please refer to this guide before calling for service.

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 the power cord in intact and 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

7. Where to call

Should you have any questions about the 260D or its accessories,

please call Denville's Customer Service Department at 908 757-7577. Customer Service is staffed from 8:30am to 5:00pm, EST, Monday through Friday. Our 24 hour fax number is 908 757-7551. Inquiries may also be sent via our electronic mailbox at info@denvillescientific.com.

Should your 260D require service, please call Denville's Technical Services Department at 908 757-7577. Our Service Department is staffed from 8:30am to 5:00pm, EST, Monday through Friday. Our 24 hour fax number is 908 757-7551. Electronic mail may be sent to info@denvillescientific.com

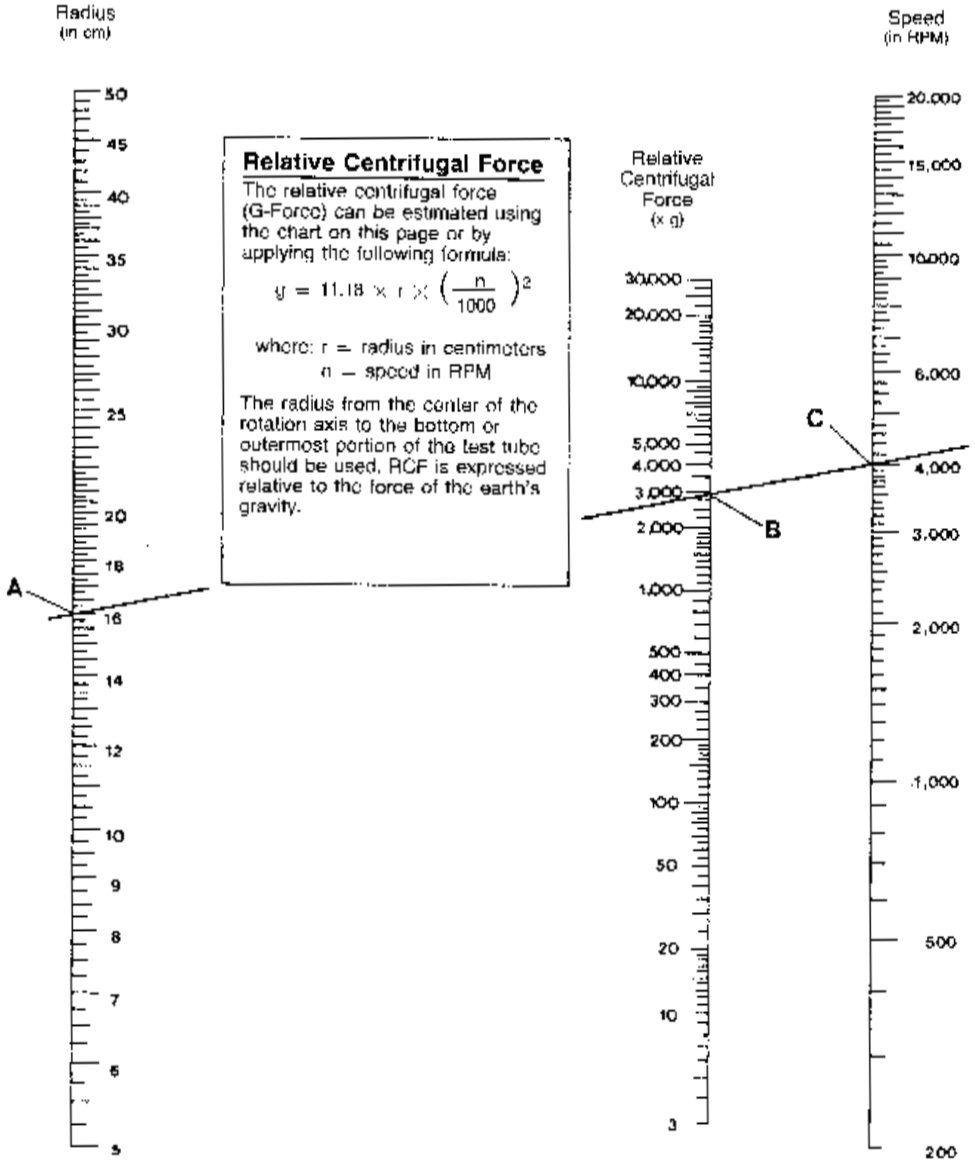
Please be sure to have the unit's serial number (located on the back panel of the instrument) available when calling. Should an item require return to Denville for service, a return authorization (RA) number must first be received from Denville. Items sent without an RA number will not be accepted.

8. Determination of g-values

When using the 18 x 1.5ml rotor, the centrifuging radius is 7.3cm. See Section 3.1 for the correct radius when using adapters and smaller tubes. When using the 24 x 1.5ml rotor, the radius of the outer row of tubes is 7.3cm. The radius for the inner row is 6.4cm.

See the following page for the formula for determining g-values and a quick reference chart.

RELATIVE CENTRIFUGAL FORCE



To use this chart, find the radius value on the radius scale. Place the edge of a ruler on the value. Place the right side edge of the ruler on the speed scale at the desired speed. The estimated RCF can then be read from the RCF scale where the ruler edge passes through it. This chart can also be used to determine the proper speed for the desired RCF value.

Notes