



HERMLE Labortechnik GmbH  
Gosheimer Straße 56  
78564 Wehingen  
Phone +49 (0) 74 26 - 96 22-50  
Fax +49 (0) 74 26 - 96 22-49  
Email: [hermle@hermle.biz](mailto:hermle@hermle.biz)  
Internet: <http://www.hermle.biz>

Technical modification rights reserved.  
© HERMLE Labortechnik GmbH

**Instruction Manual  
for  
Microlitre Centrifuge  
Z 160 M  
Brushless Motor**



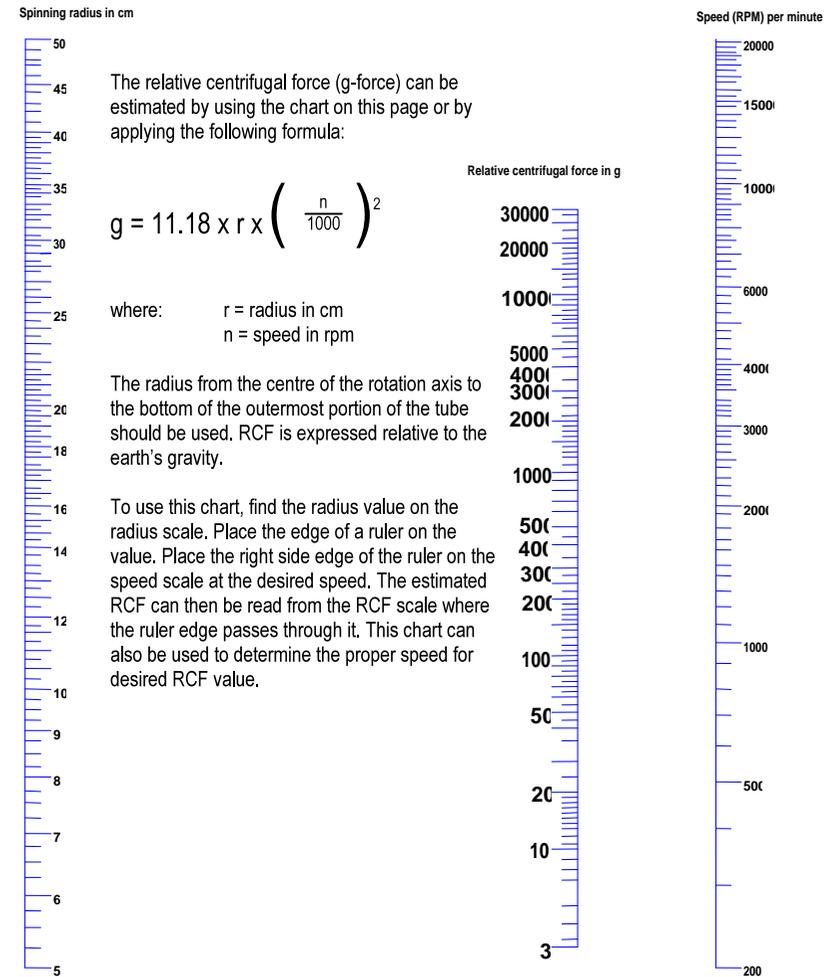
Notes:

## Table of Contents

- 1. General Information**
  - Description
  - Safety Precautions
  - Technical Data
  - Accessories Supplied with Unit
  - Warranty
- 2. Installation**
  - Unpacking the Centrifuge
  - Required Space
  - Installing the Centrifuge
- 3. Installing the Rotor**
  - Rotors and Accessories
  - Mounting and Securing the Angle Rotors
  - Removing the Rotor
  - Overloading the Rotor
- 4. Operation**
  - Closing the Lid
  - Lid Release
  - Lid Lock
  - Speed Selection
  - Selection of Operating Time and Momentary Operation
- 5. Service and Maintenance**
  - Service
  - Cleaning
  - Disinfection
  - Replacing Fuses
- 6. Troubleshooting**
- 7. Where to call**
- 8. Determination of g-Values**

## 8. Determination of g-values

When using the 1.5 ml rotor the radius is 7.3 cm. See section 3.1 for the correct radius when using adapters and smaller tubes.



## 7. Where to call

Should you have any questions about the HERMLE Z 160 M or its accessories, please call Hermle Labortechnik's Customer Service Department at +49-7426-96 22 55. Customer Service is staffed from 8:00 am to 12:00 am and from 1:00 pm to 4:00 pm, Monday through Friday. Our 24 hour fax number is +49-7426-96 22 49.

Should your HERMLE Z 160 M require service, please call our above Customer Service Department.

Please be sure to have your serial number (located on the back panel of the instrument) available when calling.

## 1. General Information

This manual provides important operating and safety information for the HERMLE Z 160 M Microcentrifuge. It should be kept near the centrifuge for quick and easy reference.

### 1.1 Description

The HERMLE Z 160 M is a small benchtop centrifuge that is designed for separation of various research samples. The motor is brushless and requires no routine maintenance. The HERMLE Z 160 M is supplied with an 18 x 1.5 ml rotor for microsamples. Adapters are available for tubes smaller than 1.5 ml. The HERMLE Z 160 M reaches speeds of up to 14,000 rpm/16,000 x g.

### 1.2 Safety precautions

**Note: All users of the centrifuge must read the Safety Precautions section 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 HERMLE Z 160 M 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 do not belong to the standard range of accessories and/or permission to use such rotors/accessories has not been obtained from the manufacturer.  
*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

Type	HERMLE Z 160 M
Dimensions:	
Width	209 mm
Depth	226 mm
Height	178 mm
Maximum speed	14,000 rpm
Maximum volume	18 x 1.5/2.0 ml
Maximum RCF	16,000 x g
Admiss. density	1.2 kg/dm <sup>3</sup>
Electrical rating	230 V, 50/60 Hz, 0.6 A
Fuse	1.6 AT

### 1.4 Accessories supplied with each centrifuge unit

Each unit is supplied with

- 1 instruction manual,
- 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 one year warranty (from the date of delivery) covers the centrifuge and the rotor. This warranty becomes invalid in case of incorrect operation, use of nonstandard spare parts or accessories and unauthorized modification of the rotor or the centrifuge.

## 6. Troubleshooting guide

Please refer to this guide before calling for service.

### Centrifuge will not start

<i>Possible reason:</i>	<i>No power supply</i>
<i>Solution:</i>	Check that power is being supplied to the outlet. Check that the power cord is correctly plugged into the wall outlet and the back of the centrifuge. Check that the power cord is intact not damaged.
<i>Possible reason:</i>	<i>Blown fuse</i>
<i>Solution:</i>	Check fuse and replace if necessary.

### Lid lock will not release

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

### Centrifuge cannot be started, although power is on

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

## 5. Service and Maintenance

### 5.1 Centrifuge service

The brushless motor in the HERMLE Z 160 M requires no routine maintenance. Any required service should be performed only by authorized, qualified personnel. Repairs performed by unauthorized personnel may void the warranty.

### 5.2 Cleaning the centrifuge

Always keep the centrifuge housing, rotor chamber, rotors 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 to 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 (max. temp. 50°C).

### 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 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.)

HERMLE Labortechnik 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 an carton with protective cushions. Remove the centrifuge from the carton. Please retain the carton and the cushions until it has been established that your unit 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. The HERMLE Z 160 M should be operated on a stable laboratory table, cabinet, etc. To guarantee sufficient ventilation, ensure that the centrifuge has at least 15 cm of free space on all sides, including the rear.

It is recommended that the centrifuge is not located in a position subject to excessive heat such as strong sunlight, radiators or near the exhaust of a compressor, as heat buildup can occur within the rotor chamber.

## 2.3 Installation

Make certain the timer is set to the **off** position. 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.

**ATTENTION: The timer must be in the OFF position before connecting the power cord. Failing to place the timer in the off position may result in damage to the centrifuge and injury to personnel.**

## 3. Installing the rotors

### 3.1 Rotors and accessories

The following accessories are available for the HERMLE Z 160 M:

#### Angle rotor for 18 x 1.5 ml

Order no.	Included with unit
Tube measurement:	1.5 ml (10 x 40 mm)
Maximum speed:	14,000 rpm
Centrifuging radius:	7.3 cm
RCF (g-value):	16,000 x g

#### Adapter for 0.5 ml

Order no.	704.007
Tube measurements:	8 x 30 mm
Maximum speed:	14,000 rpm
Centrifuging radius:	6.6 cm
RCF (g-value):	14,462 x g

#### Adapter for 0.4 ml

Order no.	704.006
Tube measurements:	6 x 47 mm
Maximum speed:	14,000 rpm
Centrifuging radius:	7.3 cm
RCF (g-value):	16,000 x g

When the rotor begins to accelerate, the lid lock indicator light turns on and the lid button becomes inoperable. Do not attempt to open the lid until the lid lock indicator turns off.

### 4.4 Speed selection

The speed (rpm) can be selected to 14,000 rpm with the knob labelled "speed". The scale is directly proportional to the speed – a setting of 9 corresponds to 9,000 rpm, a setting of 13 corresponds to 13,000 rpm, etc.

### 4.5 Selection of operating time and momentary operation

Operation of the centrifuge begins when the timer knob is turned clockwise to set a run time. For run times less than 5 minutes, turn the knob clockwise past the halfway point and then counter-clockwise to the desired time. For run times longer than 5 minutes, turn the knob clockwise to the desired time.

When the selected time expires, the centrifuge will stop automatically. To stop the centrifuge prior to the expiration of set time, turn the timer knob to the zero position.

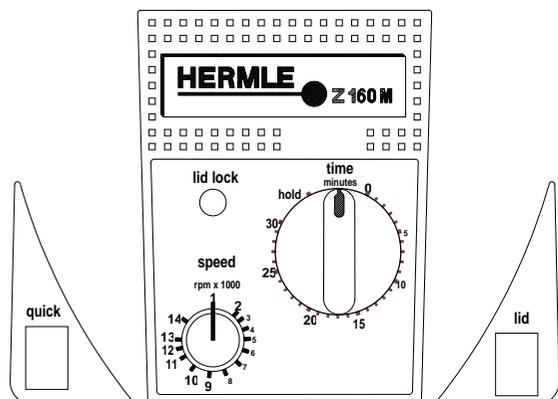
The centrifuge may be operated manually by pressing and holding the quick button. The centrifuge will continue to run as long as the button is depressed.

Some models have a timer with a hold position. For continuous operation, turn the timer knob firmly to the left. The centrifuge will continue to run until the knob is turned back to the zero position.

#### Note:

The timer knob may be turned in either direction during operation of the centrifuge without damage to the timer mechanism.

Figure 4:  
HERMLE  
Z 160 M  
control panel  
layout



#### 4.1 Closing the lid

After the rotor has been properly secured and loaded, close the centrifuge lid by holding it down for two seconds in order to engage the lid latch.

#### 4.2 Lid release

At the end of a run, the centrifuge lid will automatically pop open.

**WARNING: Do not attempt to open the lid of any centrifuge until the unit 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 power supply.
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.

### 3.2 Mounting and securing the angle rotor

Remove the rotor screw from the motor shaft by turning it counter clockwise. Clean the motor shaft and the rotor mounting hole (see figure 1). Place the rotor on the motor shaft ensuring that the crosspin (figure 2) aligns correctly with the rotor slot (see figure 1).

*Note: Figures 1 and 2 can be found on the following pages.*

Install 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  $\frac{1}{4}$  in. wrench (some units are supplied with a wrench) to tighten the screw one 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 weight between the tubes should not exceed 0.1 gram.

A partially loaded rotor may be centrifuged. For example, you may want to operate the 18-place rotor with only 2 or 4 tubes loaded. In this case, it is important that the occupied holes are opposite each other (refer to figure 3).

### 3.3 Removing the rotor

Using an adjustable or  $\frac{1}{4}$  in. wrench (some units are supplied with a wrench) loosen the screw and remove the rotor retaining screw/washer assembly by turning it counter clockwise. 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.**

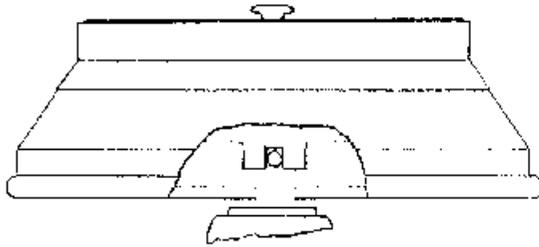


Figure 1: Motor shaft and rotor mounting hole – **right!**

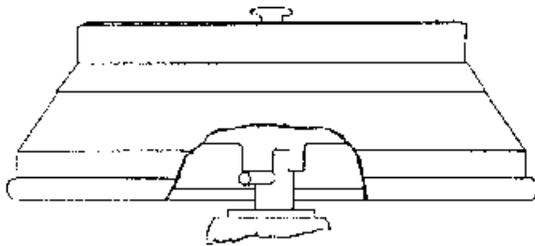


Figure 2: Motor shaft and rotor mounting hole – **wrong!**

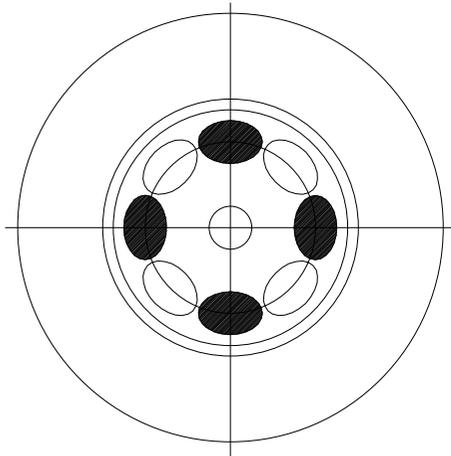


Figure 3: Loading the rotor

### 3.4 Overloading rotors

The maximum load of the rotor and 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 1.2 g/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:

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

Example:

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

$$(n_{\text{red}}) = \sqrt{\frac{1.2}{1.7}} \times 14,000 = 11,762 \text{ rpm}$$

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.**