



"Instructions for the Universal High-Speed Centrifuge Device"

Model: UNIVERSAL 320



Abbildung 1/1



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Bone & Joint Research Lab



Technical Specifications

Device name	High speed universal centrifuge
Model	UNIVERSAL 320
Type of action	Classic and refrigerated
Manufacturing Country	Germany
Manufacturer company	HETTICH
Voltage	210-230 V
Frequency	50 Hz
Maximum capacity	4 × 100ml
Temperature	-5 +40°C
Maximum power consumption	1000-1100 w
Maximum kinetic energy	8,600 Nm

Universal High-Speed Centrifuge Device

Centrifuge is a laboratory instrument used to separate materials or compounds from a substance, which may also contain human-derived materials or compounds.



Steps to works

- Connect the plug of the device to the standard outlet
- The device is turned on by putting the key in position 1
- The device door is opened when the device is on and the rotor is completely still.
- When the device door is opened by pressing the **stop/open** key, the light on the left side of the key also turns off. **(Figure. 1)**

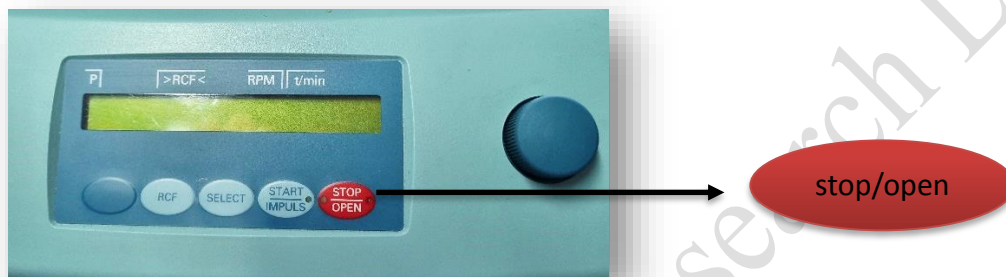


Figure 1. Schematic image of the centrifuge screen

- ⚠ When closing the door, it is necessary to pay attention to the safety of the fingers that do not get stuck between the door and the body. The door should not be closed in such a way as to hit the device.

Entering the parameters

- By pressing the **RCF** key, the RCF or rpm mode is selected **(Figure.2)**
- The desired parameters are selected using the **Select** key, and adjustments are made using the volume settings

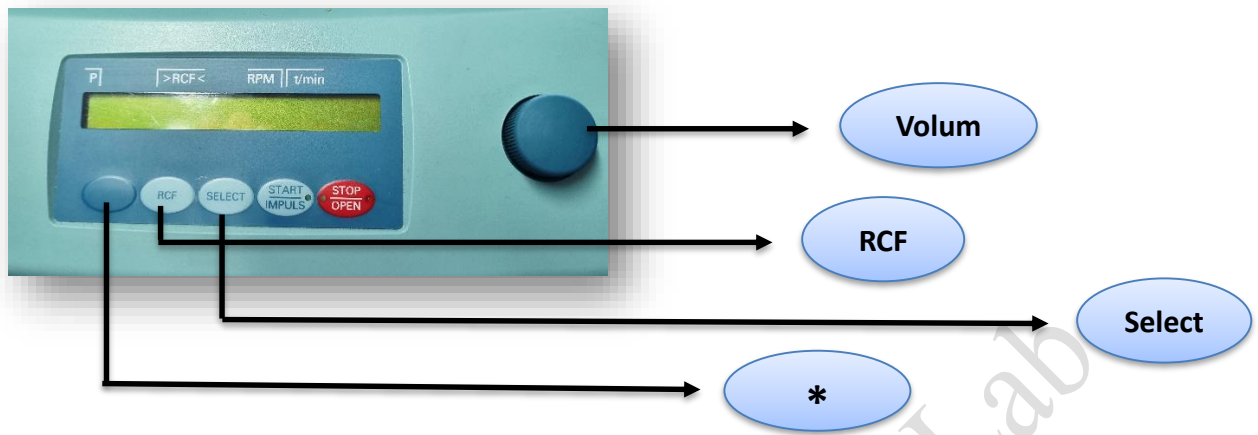


Figure 2. Schematic image of centrifuge keys

- To achieve uninterrupted and time-unlimited rotation, the min/t and sec/t parameter volume keys should be set to zero. The display will show the symbol " ∞ " to indicate continuous rotation without interruption.
- After entering all parameters, press the **Start/Implus** key to save the settings on program # or any other program. To confirm and save the settings, the message "*** ok ***" will briefly appear on the display.

Entering or Changing Program

There are two ways to enter a new program:

A. Entering a new program:

- Press the **Select** key to display the centrifuge parameters.
- Use the **volume** key to increase or decrease the parameter values.
- Press **Select** again to confirm the specified parameters, which can be adjusted using the volume control.
- Finally, when the parameter **STO PROG** is displayed, a number from 1 to 9 is selected by rotating the volume control, and then the **Start/Implus** key is pressed.
- If the message "*** ok ***" is displayed, the operation has been successfully completed.



- The set parameters for the specified program number are stored in the device's memory.

B. Using the programs stored in memory:

- Press the **Select** key to display **RCL PROG**.
- Use the volume control to select the desired program number.
- Then press the **Start/Implus** key to use the selected program.
- If the **Start/Implus** key is pressed without activating the **STO PROG** parameter, the settings will be saved on program #.
- If saved, the new information will replace the previous data.

Using the Programs

- Press the **Select** key to select the **RCL PROG** parameter, and use the volume control to select the desired program.
- Press the **Start/Implus** key to display the selected program data.
- The parameters can be reviewed by pressing the **Select** key.
- To exit this mode, press the **stop/open** key or do not press any key for 8 seconds.

Running the Centrifuge

- By placing the **on/off** switch in position 1, the device turns on.
- After loading the rotor, close the centrifuge lid.
- To centrifuge with the set time, select the programmed time or a pre-set program with a time setting.
- Press the **Start/ Implus** key. The light on the key remains on until the rotor stops spinning.
- After the rotation time is complete, by pressing the **stop/open** key, the device stops according to the pre-programmed slope and is displayed on the screen.



- During centrifugation, the program number, rotor speed or resulting RCF value, temperature, and remaining time are visible on the display.

Cooling

- The temperature can be set from -5°C to $+40^{\circ}\text{C}$. The lowest achievable temperature depends on the type of rotor used. When the rotor is stationary and the device lid is closed, the centrifuge chamber is cooled according to the pre-set temperature. The set temperature is displayed on the screen.

To prepare the centrifuge for operation at the required temperature, follow these steps:

- With the device lid closed, press the * key to bring the centrifuge chamber to the set temperature and let it run for at least 5 minutes. As long as the rotor is spinning, the light on the **Start/Implus** key remains on.
- To end the cooling process, press the stop/open key. The device stops according to the selected slope. After that, the device is ready for loading and operation at the required temperature.

Emergency Stop

- Press the **stop/open** key twice.
- In case of emergency stop, the device stops in the shortest possible time.

Safety and Important Notes

- If the rotor loading is not balanced within an acceptable range, the message "**IMBALANCE**" appears on the display when the centrifuge starts.
- At any time, the rotor motion can be stopped by pressing the **stop/open** key.



- The RCF and rpm values can be changed on the display by using the RCF key. If the RCF mode is used, entering the centrifugal radius is essential.
- If the "OPEN" sign appears on the display, simply opening and closing the lid once will allow the device to continue operating.
- During operation, no material, object, or person should be within the safety perimeter of the device, which is less than 300 millimeters.
- Due to the high speed of the device, it is recommended to use standard test tubes with a recommended speed rating.
- The centrifuge should not be used with flammable or explosive materials, materials that produce high energy reactions, or corrosive substances that affect the mechanical strength of the rotors and buckets.
- It is essential to load the rotors uniformly. Regarding centrifuge tubes, the specified volume should be considered to maintain the weight difference to a minimum.
- The centrifuge device is one of the most advanced laboratory equipment that if used according to the operating principles, is completely safe. However, if used improperly or beyond its intended purpose by untrained users, it can be hazardous for the user and others.
- The centrifuge should be placed on a sturdy and stable workbench. Before use, make sure the rotor is securely and properly closed in place. According to 020-2-IEC 61010, no person, materials, or objects should be within 300 millimeters of the device during operation.
- Do not move or hit the device while it is in operation. If the device's lid is accidentally or urgently opened, never touch it before the rotor is completely stopped.
- To prevent the device from being damaged due to condensation, when moving the centrifuge from a cold room to a warm room, wait for three hours before connecting it to the electricity or run the device for 30 minutes in a cold room before moving it.



- Only use rotors and accessories approved by the manufacturer. Due to the high speed of the device, use standard and appropriate test tubes for the consumable rotation.
- Load the rotors according to the "Rotor Loading" section. The density of the used materials or compounds should not exceed 1.2 kg/dm³.
- The centrifuge should be operated within an acceptable balance range. Do not use the centrifuge in places exposed to explosion hazards.
- Do not use the centrifuge with flammable or explosive materials or substances that produce a lot of energy in their reactions.
- Do not use the centrifuge with materials that can affect the mechanical strength of the rotors and bags.
- Do not use rotors, bags, and accessories with visible signs of corrosion, mechanical damage, or past expiration dates.
- Only approved manufacturer personnel are authorized to perform repairs.