



Buttons

- SET:** Change parameters
ENTER: Enter parameter changes
▲: Up
▼: Down
RCF / RPM: Toggle display of Relative Centrifugal Force (g) / Speed (rpm)
START: Start a cycle
SHORT SPIN: Instantaneous centrifugation. With the lid closed, press the Short Spin button. The machine will begin a short cycle. The short cycle ends with the release of Short Spin button.
STOP / OPEN: Stop a cycle / Open lid

Display

- SPEED:** Displayed in rpm
TIME: Time in MIN:SEC
ROTOR: ID number of rotor: Calculates RCF. Reference table on last page.
PROG: Allows recall of 1-9 programs with specific cycle parameters to include rotor ID
ACC: Acceleration Rate 1-9, 1 is slowest, 9 is quickest
DEC: Deceleration Rate 1-9, 1 is slowest, 9 is quickest

Unpacking and Set up



This symbol refers to hazards that may be encountered when using this product.

CAUTION means that damage to product or environment could occur.

What's included:

- MX5 Centrifuge
- Rotor Wrench
- 8-place Rotor*
- 3-prong AC Power Cord
- Two 5-amp 250v Spare Fuses
- 8 Tube shields*
- Manual Lid Release Tool
- Motor Shaft Nut (holds rotor in place)
- 8 Tube Sleeve Inserts (for small tubes)*

*Some customers may order a bucket rotor or specialty rotor, and will not receive the 8-place rotor. Bucket rotors include 4-place rotor, 4-metal buckets, and 4 inserts to hold tubes.

- 1 LW Scientific packs each MX5 centrifuge with utmost care. All units undergo a QC check prior to shipping from LW Scientific headquarters in Lawrenceville, GA to ensure proper operation. Examine the outer and inner containers for any visible damage, and retain the packing material. If there is visible damage, please contact the shipper or your distributor, as our warranty does not cover shipping damage.
- 2 Remove the centrifuge from the shipping container and inspect for possible shipping damage. **DO NOT OPERATE THE CENTRIFUGE AT THIS POINT.**
- 3 Please read and complete the warranty form online at LWScientific.com/warranty form. The warranty form documents your purchase. Failure to fill out the warranty form may void any warranty claims on the unit.
- 4 Place the centrifuge on a sturdy, level surface. Plug the power cord into the appropriate power outlet.
- 5 Turn the power on with the ON/OFF switch on the back of the unit. The LCD display will illuminate. You will hear the internal fan operating. **DO NOT OPERATE THE CENTRIFUGE AT THIS POINT.**
- 6 The lid on the MX5 centrifuge remains locked while at rest and while spinning. To open the lid while at rest, push the STOP/OPEN button, then press on the lid within 3 seconds to release the lid lock. After 3 seconds, the lid will relock. If power fails, the lid can be manually opened by inserting the Manual Lid Release Tool into the release hole on the front right side and left side of the unit.
- 7 Inspect the chamber. Remove all packing material from the chamber, install the rotor, and ensure that all the tube shields are in place. Make sure that no tube shields or tube cushions or other pieces have fallen loose into the bowl. Make sure that the rotor nut is tight using the included Rotor Wrench. **DO NOT OPERATE THE CENTRIFUGE AT THIS POINT.**
- 8 If you purchased the 8-place rotor, eight smaller tube sleeve inserts are included to accommodate smaller tubes. Make sure that all shields and cushions are balanced on the rotor at all times. Proceed to "Operation".



WARNING: Ensure the rotor is securely fixed to the rotor shaft. Failure to properly secure rotor could lead to personal injury or damage to the centrifuge.

Troubleshooting

Imbalance:

- (1) Ensure the weight of each sample is equal or within 1.5g of opposing sample.
- (2) Ensure the rotor is properly seated and secure.
- (3) Ensure the rotor, tube shields / buckets and components are clean and free of any debris.
- (4) If tube cushions are used, ensure they are properly spaced and balanced.

Lid Latch Issue:

- (1) Ensure the lid is completely closed and latched. The lid display icon will show open or closed.
- (2) If the lid display icon does not change states, there may be an issue with the lid safety switch. Parts and service are available from LW Scientific.

Electronic failure:

- (1) Ensure voltage is present at outlet.
- (2) Ensure the power switch is turned on.
- (3) Ensure the fuses are good. Replace if necessary.
- (4) No display. User interface board (UIB) may have failed. Parts and service are available from LW Scientific.
- (5) If display illuminates, but there is a no spin condition, there may be an issue with the motor control board (MCB). Parts and service are available from LW Scientific.

Motor failure:

- (1) The connecting wires from the MCB to the motor may be off.
- (2) The motor has failed. Parts and service are available from LW Scientific.
- (3) The MCB has failed. Parts and service are available from LW Scientific.

Operation

- 1 Do not insert test tubes at this time. Close the lid, and press down until you hear the lid lock click. Set the speed to "1,000" rpm and the time to "5:00" minutes.
- 2 Start the unit by pressing the START button. The unit should come up to speed with a smooth sound and little or no vibration. If there is excessive vibration or noise, shut off the unit immediately, check the troubleshooting tips, and contact LW Scientific if not resolved.
- 3 Now turn the speed up to the highest setting of "5000" rpm for the swing-out rotor or for the bucket rotor, and check for smooth sound and little vibration. The unit is now ready to be loaded. **NOTE:** If there is excessive vibration or noise, shut off the unit immediately and contact LW Scientific.
- 4 **ALWAYS BALANCE THE LOAD.** Be certain to balance tubes of equal weight across from each other on the rotor. You can only balance 2, 4, 6, or 8 tubes at a time on an 8-place rotor and similarly even increments in a 24-place bucket rotor. If you need to spin only one tube, you must use another tube filled with similarly equal fluid (or water) to balance the rotor. If spinning fecals, use the same fecal solution in the balance tube, because water is much lighter than the dense fecal solutions (for Fecal Hints, please contact LW Scientific). Proper balancing will improve sample separation and will extend the life of the centrifuge. Spinning out-of-balance loads may break tubes, and can cause damage to the unit which will not be covered under warranty.
- 5 **ALWAYS MAKE SURE TUBES ARE SUPPORTED FROM THE BOTTOM,** using proper tube shields and/or rubber tube cushions. Never allow a tube to hang by its cap on the rim of the tube shield, which can cause the stopper top to pop off and the tube to break as it hits the bottom of the shield. The cap may also cause damage inside the bowl. Damage due to improper loading will not be covered under warranty.
- 6 **KNOW THE G-FORCE LIMITS OF YOUR TUBES.** The MX5 at full speed will produce enough g-force to break some low-cost types of tubes. Be certain that you are not exceeding the recommended g-forces for the brand of tubes that you are using.
- 7 **NEVER FORCE A TUBE INTO THE SHIELDS.** Tubes should fit easily into and out of the tube shield.

*Please see Figure 1 for tube requirements of the 24-place bucket rotor.

- 8 Once loaded, select the desired speed and time and start the centrifuge. The MX5 cannot be opened while the rotor is turning. Once the unit has completed the cycle and come to a complete stop, an audible BEEP will sound. To open the lid while at rest, push the STOP/OPEN button, then press on the lid within 3 seconds to release the lid lock. The lid will relock after 3 seconds for safety. To unlock later, simply push the STOP/OPEN button and press the lid again.

IMPORTANT: Time and speed values can be saved into memory. To recall previous values, press the SET button repeatedly until you reach the PROG selection. Then using the arrows select PROG 1-9 and press enter. If the parameters in that PROG are incorrect, simply cycle to the parameter and adjust, then ENTER again. The new parameter will be saved in that PROG. This convenient feature will save time when switching between processes.



WARNING: Failure to secure rotor could lead to personal injury or damage to the centrifuge.

CAUTION: Spinning unbalanced loads could damage unit and destroy samples.

Figure 1



Care and Maintenance

With proper care and maintenance, your MX5 centrifuge will provide years of laboratory service. Please follow these guidelines:

- 1 Use only high quality test tubes. Lower quality or inexpensive glass or plastic tubes may fracture and release their contents into the tube chamber. Make sure you know the maximum force allowed for the tubes you are spinning.
- 2 Never force a tube into the tube shield. The tube shields and cushions were designed to accommodate most common sizes of tubes.
- 3 Keep the tube shields clean. If a tube breaks inside a shield, clean all the debris from the shield and bowl and disinfect.
- 4 Motor and electrical maintenance: The MX5 uses a maintenance-free brushless motor and its bearings are permanently lubricated. It should not need servicing for the life of the unit. Likewise, the electrical components were designed for high reliability and should not need regular service. However, if repairs are needed, please contact LW Scientific.

The unit is equipped with an emergency release. In the event that there is a power loss or the electronic latch isn't working properly, you can access the chamber manually. To access the chamber, utilize the included hex key. This fits the access port on the right and left side of the unit. Carefully insert the hex key through the access port, and slide in until you feel it mate with the latch mechanism. Carefully press and release on the right side and then left side until the lid opens. This may require gently pushing and lifting on the lid as the release key is inserted. If you have questions, contact LW Scientific service.



Because of the safety issues with high g-forces in a centrifuge, it is recommended that rotors, buckets, and tube shields be inspected every 6 months for corrosion and fatigue. If there is any indication of wear, the rotor, buckets, and tube shields should be removed from service. Contact LW Scientific for return instructions, so the rotor can be evaluated by an LW Scientific technician for repair or replacement. It is also recommended that after 2 years of service rotors, buckets, and tube shields be returned to LW Scientific for inspection. Following these procedures will ensure safety of lab personnel as well as extend the life of the centrifuge.

Tips for Success

G-Force and Spin Time are the most important considerations for proper fluid separations. G-force is a function of radius and speed, and varies with different centrifuges and rotor configurations. The following are commonly recommended separation settings. Please refer to your tube manufacturer and/or medical procedures manuals for the correct G-force and spin times for each fluid, tube type, and procedure.

Blood can be separated at G-forces between 1,000g and 4,220g, and at spin times between 2 minutes and 15 minutes depending upon tube type and procedure. Common routine blood separations are performed at 1,500g - 2,000g (3,000-4,000 rpm) for 8-10 minutes, and platelet-poor-plasma separations are done at 4,200g (5,000 rpm) in 6-8 minutes.

Blood	3,000+ rpm	(1,500+ g)	10 min.
Fecals	1,300 rpm	(280 g)	6 min.
Semen	1,600 rpm	(400 g)	10 min.
Urine	1,600 rpm	(400 g)	5 to 10 min.

Use the following formula to compute your own G-force.

$$\mathbf{G\text{-}Force = 1.118 (R) (N/1,000)^2}$$

R: radius in millimeters N: rpm's

Warning: Some types of tubes cannot withstand the high G-forces produced at full speed in the MX5, and tube breakage may result from improper speed settings.

G-Forces:	Large Tube Sleeve (151mm radius)		Small Tube Sleeve Insert (117mm radius)		Specifications	
	RPM's	G-Force	G-Force			
	1,000	168	131		Speed Range:	100-5,000 rpm
	1,300	Fecals 285	221		Max Force:	4,220 G-force
	1,600	Urine / Semen 432	335		Max Volume:	240 ml (24-place) 120 ml (8-place)
	1,800	546	424		Fuse:	5 amp / 250 v
	2,000	675	523		Motor:	Brushless DC
	2,500	1,055	818		Unit (No rotor)	
	3,000	1,519	1,177		Height:	11.5" (292 mm)
	3,500	2,068	1,602		Length:	16.5" (419 mm)
	4,000	Blood 2,701	2,093		Width:	16" (419 mm)
	4,500	3,418	2,649		Weight:	38.25 lb (17.34 kg)
	5,000	4,220	3,270			

Rotor Selection for Accurate G-Force Calculation	ID #
Swing-out rotors (151mm radius) - Default setting	1*
Swing-out rotors with small tube sleeve insert (117mm radius)	2
Unused	3
Unused	4
Unused	5