



## Introduction

Horizontal separation offers many advantages over traditional fixed-angle separations, including tighter straight-line gel separations to reduce re-spins and re-mixes. The ComboXL centrifuge spins test tubes from 3ml to 15ml, and even 50ml, at speeds up to 4,000 rpm, with microprocessor speed control. Simply program the digital time and speed and the ComboXL centrifuge will lock the lid and spin the load. G-forces up to 2,683g's will produce serum in minutes, or reduce the speed for urine sediment and other separations. The zero-rpm interlocking metal lid will stay locked until the rotor has come to a stop, to ensure safety. The all-metal rotor buckets are built for strength and durability, and the wide-mouth metal bowl allows for easy cleanup. The whisper-quiet heavy-duty brushless DC motor can handle high volume use and high-speed full loads for years to come.

MKT-7.5.3.-L-215 | Rev 0

# Unpacking & Set Up

## What's included in standard Swing-out model:

- ComboXL Centrifuge
- 3-prong AC Power Cord (attached)
- Emergency Manual Lid Release Tool
- Rotor Hex Wrench
- One 6.3amp 250v Fuse (pre-installed)
- 12-pack of 10mm rubber tube cushions

## Packed Inside the Rotor Chamber (must be removed before operating)

- 4-place Metal Swing-out Bucket Rotor
- 4 3ml-6ml Rotor Inserts (Maximum tube size: 13.5mm x 90mm)
- 4 7ml-15ml Rotor Inserts (Maximum tube size: 18mm x 125mm)
- 4 50ml Rotor Inserts (Maximum tube size: 30mm x 125mm)

**\*\*Some customers may order the model with IRAP rotor only\*\***

# Before Operating

LW Scientific packs each ComboXL 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 packaging 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.

- 1 Remove the centrifuge from the box and inspect for possible shipping damage. **DO NOT OPERATE THE CENTRIFUGE AT THIS POINT.**
- 2 Please read and complete the warranty form online at [LWScientific.com/warranty\\_form](http://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.
- 3 Place the centrifuge on a sturdy, level surface. Plug the power cord into the appropriate grounded power outlet. Turn the power on with the **On/Off** switch on the right side of the unit. The cooling fan will come on.
- 4 Press the **POWER** button on the front label. The digital display will light up. **DO NOT OPERATE THE CENTRIFUGE AT THIS POINT.**
- 5 To open the lid press the **OPEN** button. If power fails, the lid can be manually opened by inserting the Manual Lid Release Tool (or a small screwdriver) into the release hole on the right front side of the unit. On the digital display, the **LID OPEN** icon will illuminate.
- 6 Remove all rotor inserts and packing material from the rotor chamber.
- 7 Install one set of 4 rotor inserts into the 4 metal buckets. Make sure that no rotor inserts or other materials remain loose in the bowl.
- 8 Make sure that the center rotor screw is tight using the included Rotor Hex Wrench.

# Operation

- 1 For an initial test run, do not insert test tubes. Close the lid, and press down firmly until you hear the lid lock click. On the digital display, the **LID OPEN** icon will disappear when the lid is closed and locked. **SPEED** and **TIME** can only be adjusted when the lid is closed and locked.
- 2 To set the speed, press the **SPEED** button once, then use the **UP/DOWN** arrows to select 1,000 rpm. Press the **SPEED** button again to lock the speed.
- 3 To set the time, press the **TIME** button once to flash seconds, or twice to flash minutes. Use the **UP/DOWN** arrows to choose 1:00 minute. Press the **TIME** button again to lock the time.
- 4 Start the unit by pressing the **START/STOP** 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.

- 5 Repeat the process above to set the speed to the highest setting of 4000 rpm, and check for smooth sound and little vibration. If there is excessive vibration or noise, shut off the unit immediately and contact LW Scientific.
- 6 The unit is now ready to be loaded.
- 7 **ALWAYS BALANCE THE LOAD.** Be certain to balance tubes of equal weight across from each other on the rotor. If you need to spin only one tube, you must use another tube filled with an equal amount of a similar 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 or may cause the unit to shut down due to imbalance detection.

**NOTE:** When loading test tube into the inserts, position the tubes in a “centered” position as in the examples below. Properly balanced means a line can be drawn from one tube to the other which will pass directly over the center rotor screw.



- 8 Depending on the size and length of test tubes, rubber cushions may be necessary in the 7ml-15ml inserts. Proper positioning of the test tubes is important, first to ensure the tubes are easy to remove from the insert after spinning, but also to ensure the tubes don't hit the rotor when spinning. Test fit the tubes by inserting into the centrifuge and then rotating the buckets to a horizontal position – make sure the tubes do not contact the inner portion of the rotor.
- 9 **ALWAYS MAKE SURE TUBES ARE SUPPORTED FROM THE BOTTOM,** using the proper rotor inserts. Never allow a tube to hang by its cap on the rim of the insert, which can cause the stopper 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.
- 10 **KNOW THE G-FORCE LIMITS OF YOUR TUBES.** The ComboXL 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.
- 11 **NEVER FORCE A TUBE INTO THE ROTOR INSERTS.** Tubes should fit easily into and out of the inserts. Make sure the tubes do not exceed the length limits listed in “Unpacking & Setup” or the tubes may hit the rotor and/or lid and break upon start-up.
- 12 Once loaded, select the desired speed and time and start the centrifuge. The ComboXL cannot be opened while the rotor is turning.
- 13 Once the unit has completed the cycle and come to a complete stop, an audible BEEP will sound. The lid will unlock automatically.

**WARNING:** Always ensure rotor is secure before each use.

## RPM/RCF Feature & Rotor Selection

The ComboXL can show either RPM or RCF (g-force) on the digital display. **Most customers will simply leave the centrifuge on RPM display, so the following rotor selection instructions will be irrelevant and can be ignored.**

RCF is calculated based on speed and radius. The ComboXL has many rotor and insert choices, each with a different radius. To ensure the RCF display is accurate, the correct rotor and inserts must be selected first.

Press the **ROTOR** button once to choose the appropriate rotor (as listed below) using the **UP/DOWN** arrows. Press the **ROTOR** button again to choose the tube insert radius. Press the **ROTOR** button a final time to lock in the rotor choice. This will ensure that the RCF (g-force) will be accurate for the rotor installed.

| Rotor                     | Inserts            | Rotor Display | Insert Radius Display |
|---------------------------|--------------------|---------------|-----------------------|
| 4-place Swing-out Buckets | 4-hole 7ml         | -56-          | 7ml / 110mm           |
| 4-place Swing-out Buckets | 3-hole 15ml        | -56-          | 15ml / 150mm          |
| 4-place Swing-out Buckets | 1-hole 50ml        | -56-          | 50ml / 145mm          |
| IRAP rotor                | Metal Sleeves 60ml | Ar06          | 50ml / 129mm          |

## Memory Function

There are 9 memory presets available for each rotor selected above. Press **MEMO**. button once and the memory icon will flash. Use the **UP** arrows to select which memory preset number (1-9). While flashing, you can set the appropriate speed and time. Press **MEMO**. again to save the settings. **Note:** The memory presets are tied to the rotor selection, and will change as you change rotors.

## Recommended Fluid Speeds & Times

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.

|               |                     |           |
|---------------|---------------------|-----------|
| <b>Blood</b>  | 4,000 rpm (2,682 g) | 8-10 min. |
| <b>Fecals</b> | 1,300 rpm (280 g)   | 6 min.    |
| <b>Urine</b>  | 1,600 rpm (400 g)   | 5 min.    |
| <b>Semen</b>  | 1,600 rpm (400 g)   | 10 min.   |

## Troubleshooting

### No Power:

- Ensure power switch on right side is on.
- Ensure outlet has power or move to another outlet on a different circuit.
- Disconnect power cord from outlet and check fuse located on rear of unit. Visually inspect fuse filament, if broken or glass is discolored, replace fuse.

### Wobbles or shakes:

- Ensure unit is properly balanced.
- To test unit is balance, ensure rotor, tube shields and inserts are clean, and run unit without samples.
- If unit is still imbalanced, remove components (e.g., inserts, then tube shields) and run to determine where the imbalance is occurring.
- If you still experience imbalance, contact LW Scientific.

### Makes excessive noise:

- Ensure rotor and rotor retention screw is secure.

### Breaking tubes:

- Ensure your tubes are adequate for the speed/G-force selected.
- Discard tubes and try new ones.

### Lid won't open:

- Ensure unit is powered on.
- If unit does not have power, use included release tool or small screwdriver. The unit has a manual release port on the right side. Gently push the release tool into the port while applying light pressure down on the lid to release.

## Care & Maintenance

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 to know the maximum force allowed for the tubes.

Never force a tube into the tube shield. The tube shields and cushions were designed to accommodate most common sizes of tubes.

Keep the rotor inserts clean. If a tube breaks inside an insert, clean all the debris from the insert, bucket, and bowl and disinfect.

Motor and electrical maintenance: The ComboXL 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.

Because of the safety issues with high g-forces in a centrifuge, it is recommended that rotors, buckets, and inserts be inspected every 6 months for corrosion and fatigue. If there is any indication of wear, the rotor, buckets, and inserts 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.