Please read this owner's manual thoroughly before operating your new EXL-M40.

The OSADA EXL-M40 Brushless Micromotor System for laboratory applications is designed as a complete unit consisting of the EXL-M40 Power Console, MVFP Variable Speed Foot Pedal with magnetic sensor and LHP12/L12M-MC12 Brushless Micromotor handpiece assembly with motorcord.

The Brushless Micromotor System is completely different from conventional micromotors with carbon brushes. The L12M brushless micromotor is completely sealed and is virtually maintenance-free because there are no carbon brushes that will wear.

The EXL-M40 (1,000-40,000 min⁻¹) Brushless Micromotor System is extremely quiet and smooth, unlike any other. The microprocessor controlled feedback circuitry provides deceivingly powerful performance. A maximum of 25,000 min⁻¹ (rpm) is sufficient to accomplish most laboratory tasks. The easy-to-see Blue Beam on the speed dial shows the maximum speed selected for the foot pedal and also warns the user of abnormal conditions and reverse rotation.

Please use as directed. Any alteration or substitution of any part of the unit may cause serious damage and will void the warranty.

TIPS FOR ELECTRIC HANDPIECE USERS

- KEEP THE AIR AROUND YOU CLEAN
  - Use a good vacuum system while working.
  - Keep away loose material (including your hair).
  - Maintain a clean work area.
- WORK IN A COMFORTABLE POSITION
  - Set up the power console, foot pedal and handpiece assembly so that you can work comfortably.
  - Wear safety equipment as needed.
- LEARN A SAFE RANGE OF SPEED FOR EACH TASK. AVOID HIGH SPEED. Please remember, the larger the bur head, the slower the rotational speed.
  - Use new burs with sharp blades and straight shanks.
  - Use the lowest speed range recommended for each bur.
  - Use light pressure against the object you are cutting to let the bur do the cutting.
- KEEP THE HANDPIECE ASSEMBLY (ESPECIALLY THE CHUCK AREA) FREE OF DEBRIS BY DUSTING OFTEN WITH A TOOTHBRUSH.
**SPECIFICATIONS**

*Model OSADA EXL-M40*

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Voltage</td>
<td>120 Volts AC (or 220-240 Volts)*</td>
</tr>
<tr>
<td>Primary Frequency</td>
<td>50/60 Hz 40 VA</td>
</tr>
<tr>
<td>Wattage or Voltage/Amp</td>
<td>12 Watts or 12 VA</td>
</tr>
<tr>
<td>Current</td>
<td>3 Amp</td>
</tr>
</tbody>
</table>

**Model L12M BRUSHLESS MICROMOTOR**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>AC 30 Volts</td>
</tr>
<tr>
<td>Variable Speed</td>
<td>1,000 min(^{-1}) through 40,000 min(^{-1})</td>
</tr>
<tr>
<td>Torque</td>
<td>4.8 Ncm</td>
</tr>
<tr>
<td>Maximum Torque</td>
<td>8 Ncm at 30,000 min(^{-1})</td>
</tr>
<tr>
<td>Wattage</td>
<td>90 Watts</td>
</tr>
</tbody>
</table>

RPM is now indicated as min\(^{-1}\) (international standard)

*Optional 220-240 Volt units are available.

**MAJOR COMPONENTS**

- **A:** EXL-M40 Power Console
- **B:** MVFP Foot Pedal with Magnetic Sensor
- **C:** LHP12 Handpiece Assembly
  LHP12/L12M-MC12
## SETTING UP

**Model OSADA EXL-M40**

<table>
<thead>
<tr>
<th>PARTS</th>
<th>DO</th>
<th>DO NOT/Avoid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Console (Compact but heavy: handle with care)</td>
<td>Place it on a safe flat surface.</td>
<td>Avoid high temperature, high moisture, dust, or loose material.</td>
</tr>
<tr>
<td>Power Cord with 3-prong plug</td>
<td>Plug into the nearest 120V outlet.</td>
<td>Do not overextend cord to reach outlet.</td>
</tr>
<tr>
<td>Foot Pedal and cord with plug (Hold the plug with the RED mark up.)</td>
<td>Place foot pedal on the floor and connect cord to receptacle on the back of the power console.</td>
<td>Avoid dirty/dusty floor. Do not overextend cord to reach power console. Do not pull the cord to disconnect.</td>
</tr>
<tr>
<td>Handpiece Assembly including cord: (LHP12/L12M-MC12) Place it on the handpiece holder or on a safe, level surface.</td>
<td>Hold the plug with the RED mark up. Connect the plug to the receptacle on the back of the power console.</td>
<td>Avoid rough handling. Do not pull the motorcord to disconnect. Avoid uneven surfaces or letting the handpiece fall or drop. Avoid loose materials that may become entangled with the bur.</td>
</tr>
</tbody>
</table>

**Connect the 3-prong power cord plug of the Power Console into the nearest 120V wall socket.**

**Hold the Foot Pedal cord plug with the RED mark up. Push it into the receptacle on the back of the Power Console.**

**Hold the Handpiece motorcord plug with the RED mark up. Push it into the receptacle on the front of the Power Console.**
## OSADA EXL-M40 Components

<table>
<thead>
<tr>
<th>#</th>
<th>COMPONENTS</th>
<th>MODEL</th>
<th>Dimensions mm</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Power Console</td>
<td>EXL-M40</td>
<td>100 x 185 x 105 mm</td>
<td>2.9 Kg</td>
</tr>
<tr>
<td>B</td>
<td>Variable Speed Foot Pedal</td>
<td>MVFP</td>
<td>100 x 170 x 77 mm</td>
<td>530 g</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cord Length: 1800 mm</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Handpiece &amp; Micromotor</td>
<td>LHP12 &amp; L12M</td>
<td>Φ26.5 mm x 137 mm long</td>
<td>175 g</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Φ1.1&quot; x 5.1/2&quot; long</td>
<td></td>
</tr>
<tr>
<td>C1</td>
<td>Motorcord</td>
<td>MC12</td>
<td>180 cm (6 ft)</td>
<td>125 g</td>
</tr>
<tr>
<td>D1</td>
<td>Rubber Handpiece Holder</td>
<td>RHH</td>
<td>145 x 70 x 30 mm</td>
<td>270 g</td>
</tr>
<tr>
<td>D2</td>
<td>Fuse (2 per Unit)</td>
<td>3A</td>
<td>2 installed &amp; 2 spare</td>
<td></td>
</tr>
<tr>
<td>D3</td>
<td>Cord Holder Clamp</td>
<td>Clamp</td>
<td>30 x 30 x 30 mm</td>
<td></td>
</tr>
<tr>
<td>D4</td>
<td>Chuck Remover</td>
<td>Chuck Wrench</td>
<td>40 mm-50 mm long (with</td>
<td></td>
</tr>
<tr>
<td></td>
<td>See Page 11</td>
<td></td>
<td>guide bur), Φ12 mm</td>
<td></td>
</tr>
<tr>
<td>D5</td>
<td>Spindle Holder to hold spindle</td>
<td>Spindle Holder</td>
<td>20 x 16 x 13 mm</td>
<td></td>
</tr>
<tr>
<td>D6</td>
<td>Cleaning Brush</td>
<td>Brush</td>
<td>70 mm</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>Removable Chuck</td>
<td></td>
<td>3 shank sizes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>installed &amp; optional</td>
<td></td>
<td>Standard Φ2.35 mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Optional: Φ1.6 &amp; Φ3.0</td>
<td></td>
</tr>
</tbody>
</table>

- **D1** Rubber Handpiece Holder
- **D2** Fuse (3A) installed (2) and spare (2)
- **D3** Cord Holder Clamp
- **D4** Chuck Wrench
- **D5** Spindle Holder
- **D6** Cleaning Brush
- **X** Standard Chuck (installed in the handpiece)
User safety is always Osada's first priority in the design of its handpiece units.

**EXL-M40 Safety Devices**

**BLUE BEAM WARNING SIGNALS**

- **PULSATING BLUE BEAM** indicates bur rotation is in reverse direction, whereas a steady beam indicates forward direction. Normally blades are made to cut in forward rotation.

- **RAPIDLY PULSATING BLUE BEAM** indicates that an irregularity has occurred and ceased the operation.

- **1) Irregular procedure**: If you turn the main switch on while the activation (Manual/Foot mode) switch is in the Manual mode, no activation occurs to prevent unintended activation. Turn to Foot mode and try again. Similarly, in the Foot mode, if you turn the main switch on while depressing the foot pedal, activation will not occur.

- **2) Irregular rotation or no rotation due to abnormal stress or high temperature**: If the handpiece has tangled material, clogged bearings, or irregular assembly, the micromotor will stop rotation. Remedy any obvious causes. If high temperature seems to be the only cause, turn the Mode switch to Foot for off position, wait for a while, and restart the operation. Wait a few seconds between restarting the unit.

- **BUILT-IN CIRCUIT BREAKER** will cease the rotation if it senses irregularity.

- **AUTOMATIC SHUT-OFF** will stop the bur rotation when the handpiece is left unattended or remains in the same mode for 60 minutes (very effective when auto-cruising is used).
# EXPLANATION OF SWITCHES AND CONTROLS

<table>
<thead>
<tr>
<th>#</th>
<th>SWITCHES &amp; CONTROLS</th>
<th>OUT Normal Position (not depressed)</th>
<th>IN (When Depressed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1b</td>
<td>FORWARD/REVERSE ROTATION SWITCH</td>
<td>Forward rotation (shown with steady Blue Beam on the Speed Dial)</td>
<td>DEPRESSED: Reverse rotation (with pulsating Blue Beam)</td>
</tr>
<tr>
<td>1c</td>
<td>ACTIVATION SWITCH (MANUAL / FOOT MODE SWITCH)</td>
<td>Foot Pedal activates and turns off the rotation with Instant Stop.</td>
<td>DEPRESSED: to activate the micromotor rotation manually at the speed set on the dial. Always return to Foot mode for safety.</td>
</tr>
<tr>
<td>1d</td>
<td>ROTATIONAL SPEED DIAL with BLUE BEAM sets the maximum speed</td>
<td>Rotates the Speed Dial clockwise to increase the speed, and rotates counterclockwise to decrease speed, with the BLUE BEAM pointing to the speed.</td>
<td>Sets the maximum rotational speed for Foot Pedal, varying from 1,000 min⁻¹ through the selected maximum.</td>
</tr>
<tr>
<td>1e</td>
<td>CONSTANT / VARIABLE SWITCH on the rear panel</td>
<td>Normally DOWN for variable speed: MVFP Foot Pedal linearly varies the rotational speed from 1,000 through the user selected maximum speed on the dial.</td>
<td>UP for constant speed: Tap on the Foot Pedal to turn on Auto Cruise (at the selected speed on the Dial). Tap on the Foot Pedal again to stop Auto Cruise.</td>
</tr>
</tbody>
</table>
(1d) SPEED DIAL sets the maximum speed.

(1a) MAIN POWER SWITCH

BLUE BEAM points to the selected maximum speed on the dial.

MOTOR CORD PLUG (shown connected to the receptacle))

(1b) FORWARD/REVERSE SWITCH (depress to reverse)

LHP12 HANDPIECE

L12M BRUSHLESS MICROMOTOR

RHH RUBBER HANDPIECE HOLDER

REAR PANEL OF THE POWER CONSOLE

FOOT PEDAL RECEPTACLE

POWER CORD

(1c) ACTIVATION SWITCH

MANUAL/FOOT MODE SWITCH

MVFP VARIABLE SPEED FOOT PEDAL

FUSE HOLDER (2) with 3A FUSE installed

(1e) CONSTANT (for auto-cruising) / VARIABLE SWITCH
PERFORM A TEST RUN OF
YOUR NEW HANDPIECE SYSTEM

1) Hold the handpiece assembly (with a test bur chucked in) in your hand or place it on the handpiece holder.

2) Make sure that the Manual Foot Switch is in "FOOT" mode (normal OUT position). Turn the Main Switch on. You will see the BLUE BEAM light up on the Speed Dial.

3) Rotate the Speed Dial counterclockwise all the way to the lowest speed and then clockwise to set the position of the BLUE BEAM at a safe speed for testing - around 10,000 min⁻¹ (rpm).

4) Depress the MVFP Foot Pedal to activate the micromotor. Depress further to see how the speed increases. The speed will start from 1,000 min⁻¹ (rpm) and linearly increase up to the speed pointed by the BLUE BEAM. The speed will never exceed the point that you set on the Speed Dial. The capacity speed is 40,000 min⁻¹.

5) Turn off the rotation with Instant Stop by simply releasing pressure from the Foot Pedal. If you have been operating without a foot pedal, turn the Manual / Foot Switch to normal Foot mode (OUT) to stop.

6) Depress the Rotational Switch to Reverse: You will see the BLUE BEAM pulsate. Tap the switch button back to Forward: The rotational direction changes to Forward very smoothly.

7) At the end of the day, make sure you turn off the power by turning the Main Switch to OFF.

WARNING:

Do not attempt to open the power console or foot pedal, as there are no user-serviceable parts inside. Do not attempt to separate the cord from the micromotor. If you notice any irregularity, please contact OSADA, INC. for assistance in trouble shooting before sending the components for service.
CORD HOLDER CLAMP (included in the accessory kit):
Since the MC12 Motorcord is straight, a cord holder clamp comes in handy to hold the unused length of the cord out of the way. Carefully bundle the excess length of the motorcord and place it in the clamp. The cord should be long enough for you to work comfortably without restricting your movements. Do not bend or strain the motorcord. (Try out the cord length before actually attaching the clamp with adhesive.) Peel off the backing of the adhesive tape of the clamp and attach the clamp onto the side of the console or wherever convenient.
**LHP12 / L12M-MC12**
**BRUSHLESS MICROMOTOR HANDPIECE ASSEMBLY**

The LHP12 Handpiece Assembly is very ergonomic:
small (6 in long), slender (Ø18 - 26.5 mm), lightweight (6 oz) and perfectly balanced even when held with a pencil grip.
With removable interchangeable chucks in 3 different shank sizes, different tasks can be performed effectively and comfortably.

**SO QUIET AND SMOOTH: YOU MUST LITERALLY SEE IT TO BELIEVE IT!**
- **Excellent concentricity** provides vibration-free, accurate rotation.
- **Almost silent rotational sound** provides a more comfortable work environment. You should keep an eye on the BLUE BEAM on the speed dial because the rotational sound is deceivingly quiet and smooth.
- **Dust-shedding nose tip structure** scatters shaven debris to minimize dust entering inside.
- **Easy-to-open lever chucking system** provides quick bur changes.
- **Removable chucks** provide easy cleaning and replacement of weak or vibrating chucks. Removable chucks are available in three different shank sizes: standard dental bur shank (Ø2.35 mm), friction grip turbine bur shank (Ø1.6 mm), and industrial bur shank (Ø3.0 mm). (See next page for details.)
- **The L12M Brushless Micromotor is completely sealed and virtually maintenance-free** to provide long-lasting excellent performance (no carbon brushes to wear out).
- **Change in rotational direction is smooth and immediate,** and the pulsating BLUE BEAM reminds the user it is in Reverse Rotation.
- **With sealed bearings, no lubrication is required**: dusting is all that is needed.
- **Compliance with EMC (European Standard)** curbs the generation of electromagnetic waves that may cause malfunction of other electric and electronic equipment.
HANDPIECE LHP12 AND LEVER CHUCKING SYSTEM

To open the chuck, turn the lever counterclockwise to the right until it is at a right angle to the handpiece. Pull out the bur. Place a bur into the open chuck and release the lever to secure the bur.

REMOVABLE CHUCKS IN 3 DIFFERENT (INTERCHANGEABLE) SHANK SIZES

- Standard Chuck: Shank ø2.35 mm
- Short Friction Grip Turbine Chuck: Shank ø1.6 mm
- Industrial Chuck: Shank ø3.0 mm

Insert the chuck wrench into the open chuck, matching the triangular shapes to engage. Push and twist the wrench counterclockwise to loosen the chuck. Unscrew and remove the chuck by rotating the chuck wrench. Clean the chuck with a brush.

To install a new or cleaned chuck, turn the handpiece lever to open position; insert the chuck held with the wrench; screw in securely while the lever is kept in the open position.

Use the spindle holder if the spindle cannot be held with the lever in the open position. Insert the spindle holder tip end into the slots of the cone section, guiding the spindle (with the chuck closed) to click into the holder. Turn the lever to open the chuck, insert the chuck wrench, and proceed with the above instructions.
TROUBLE SHOOTING

SHOULD YOU FIND THE UNIT WORKING ABNORMALLY,
PLEASE CALL OSADA, INC., LOS ANGELES
TOLL FREE TELEPHONE NO. 1-800-426-7232.

IF ABNORMAL BUR ROTATION OCCURS, THE BLUE BEAM
WILL PULSATE RAPIDLY AND THE CIRCUIT BREAKER
MAY STOP THE ROTATION. CHECK THE UNIT AND
REMEDY OBVIOUS PROBLEMS. OTHERWISE CALL
OSADA, INC.

IF ABNORMAL PERFORMANCE OCCURS WITH THE FOOT
PEDAL, IT MAY NEED SENSOR ADJUSTMENTS.