



## Mini-Motion Base Service & Repair Manual

040-0226-01 Rev. A

- Read this manual before use.
- Keep this manual with the machine at all times.



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## Warnings



To avoid electrical shock, unplug the BOTH cabinet AC Power Cords before performing installation or service procedures.

If a power cord is damaged, it must be replaced by the equivalent power cord available from GLOBAL VR or your distributor.



GLOBAL VR® assumes no liability for any damages or injuries incurred while setting up or servicing the cabinet. Only qualified service personnel should perform installation or service procedures!

## Chapter 1 — Introduction

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This document contains Maintenance, Service, and Repair information for the Twisted Mini-Motion Seat Base only. For all other service information refer to the *Twisted — Nitro Stunt Racing Operation & Service Manual*, Part Number 040-0224-01.

The Display Cabinet used with the Mini-Motion Base is the same as the 42" Deluxe (non-motion) configuration except for the additional AC connection and On/Off breaker on the AC Power Plate.

### General Precautions

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**GLOBAL VR assumes no liability for any damage or injuries incurred while servicing the cabinet. Only qualified service personnel should perform service and installation of cabinet hardware.**

**Do not connect or disconnect any cables or connectors with the power on. Doing so could potentially damage the game.**

**To prevent electrostatic discharge (ESD) damage, handle PCBs by the edges only and use a grounding wrist strap or similar precaution.**

**Please read the service instructions before working on the cabinet.**

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**The Display Cabinet and Mini-Motion Base have components that produce HIGH VOLTAGE. Repairs must be performed by authorized personnel only.**

**Always turn the cabinet OFF and disconnect both AC power cords before performing any repair work. Wait 5 minutes before replacing any electrical part or parts on the Motion Base to avoid the risk of shock.**

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- Do not tamper with the original wiring configuration, or the positioning of ferrite shields and clamps. Alteration of game wiring may result in faulty operation.
- Always return all leg levelers to the extreme up position before moving the game.
- Always separate the Display Cabinet from the Mini-Motion Base before moving the game.

### Weight Limit

The maximum player weight for the Mini-Motion Seat is 350 lbs. The seat has a fail-safe system to protect the motor. When the system detects too much current is being drawn by the motor, indicating a weight overload, the PCB will shut down the motion system. Once this happens, you can reset the PCB by either pushing in and pulling out the Motion-STOP button, or by power cycling the Mini-Motion Base with the switch on the back of the display cabinet. A message will appear onscreen to tell players to push in the Motion STOP Button to restart motion. This will be followed by the standard Pull Out for Motion message.

## Chapter 2 — Routine Maintenance

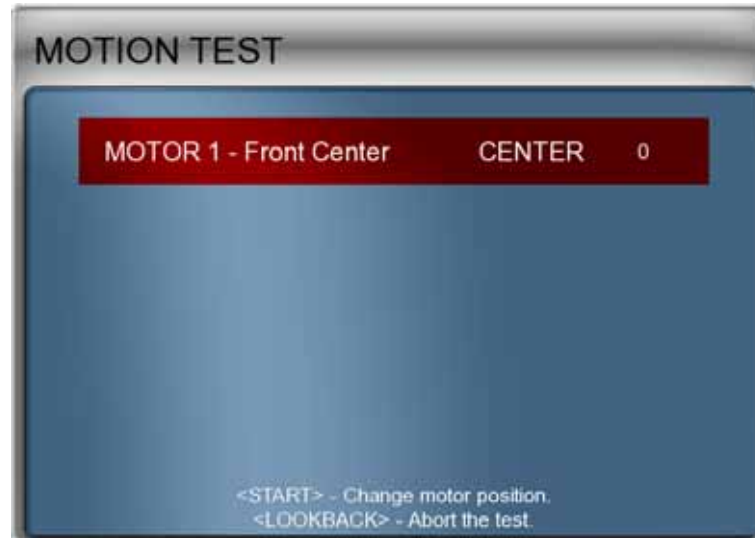
### Routine Inspection Schedule for Mini-Motion Base

Regular maintenance will prolong the operational life of your game and enhance gameplay.

Item	Task	When	Comments
Bellows around Mini-Motion Base	Visually inspect for tears, rips, and loose or missing retaining screws. Replace if damaged.	Daily	The bellows is important for player safety and prevents debris from getting inside the motion system mechanisms.
Bellows Retaining Screws	Visually inspect for loose or missing retaining screws and replace or tighten.	Weekly	Missing screws encourage vandalism. All screws must be in place to ensure player safety.
Resting motion inspection	With the Motion STOP Button up, visually inspect the game to make sure it is not moving in Attract Mode.	Daily	The Mini-Motion Base should <b>not</b> move during Attract Mode. If it does, this can severely decrease the life expectancy of the motor. This condition is usually caused by a bad pot. Contact Technical Support immediately for a replacement.
Motion function check	Make sure the game is level during Attract Mode and motion appears normal.	Weekly	If the platform is not level during Attract Mode, the pot is probably out of calibration. Refer to <i>Motor and Potentiometer Calibration</i> on page 6.
Lifter Assembly check (bellows open)	<ol style="list-style-type: none"> <li>1. Check the entire Lifter Assembly for loose hardware.</li> <li>2. Check Rod End connections for signs of wear.</li> <li>3. If any of these items are worn excessively, stop using the game immediately and contact Technical Support.</li> </ol>	Monthly	Continuing to run the game with damaged or worn components may cause severe damage to the Mini-Motion Base, and may void the warranty. See Figure 4 on page 15 for lifter and motor assembly components.
Connecting Brackets	Make sure all bolts are tight on the Connecting Brackets between the display cabinet and Mini-Motion Base.	Weekly	The powerful jolts may cause the unit to “travel” after extensive use. Make sure it stays in its location.
Cooling Fans	Verify that the cooling fans are working. Clean all air vents. If a fan stops working, check the power connection. Replace a non-working fan immediately.	Monthly	<b>Important:</b> The fan in the open area under the seat platform runs on +12 VDC. The 230 VAC fan inside the Electronics Box must be serviced only by a GLOBAL VR technician. Failure to maintain proper ventilation may decrease the performance and/or lifespan of your game.
Leg Levelers	Make sure the game is sitting flat on all of the leg levelers, and all of the casters are locked in the full up position.	Monthly	

## Using the Motion Test Menu

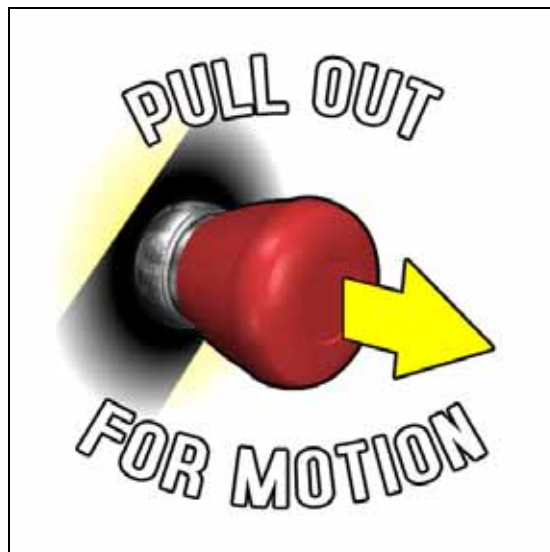
1. Open the Operator Menu and use the **VIEW** and **♪** buttons on the control panel to select **Diagnostics: Motion Test**.
2. Press the **START** button to open the Motion Test menu. This menu lets you cycle the motor through Up, Down, and Center positions. Center is the neutral position; the platform should be level in this position.



*Figure 1. Motion Test Menu*

**Note:** If the motion STOP button is down you will be prompted to pull it up to activate motion.

3. Press the **LOOK BACK** button to exit from the Motion Test menu.



## Chapter 3 — Service and Repair Procedures

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### Opening the Bellows and Cover Plates

Depending on the procedure you wish to perform, you may simply need to open one cover plate. To access the Electronics Box or the Pot, open the cover plate on the left side. To access the Transformer, open the cover plate on the right side.

Do the following to open a cover plate:

1. Remove the screws. The left and right cover plate each have three (3) screws on the side and four (4) screws on the top. The front cover plate has four (4) screws on the top.
2. For most procedures you should be able to carefully lift the cover plate up against the bellows without removing the bellows retaining screws or bracket.

For full access to motion drive components you must open the bellows. The bellows is held in place with a front and rear retaining bracket, secured with screws and washers, and two additional machine screws and washers on each side.

Do the following to open the bellows:

1. Remove the 14 retaining screws and washers and the front and rear retaining brackets that secure the bottom of the bellows.
2. Lift the Bellows to gain access to the parts inside the Mini-Motion Base.

Do the following to close the bellows:

1. Lower the Bellows into place.
2. Line up the holes in the bellows and secure with the retaining screws, washers and brackets removed previously.

### Replacing the Bellows (Skirt)

Do the following if you need to replace the bellows assembly:

1. Turn off both cabinet power switches and disconnect both AC power cords.
2. Remove the retaining screws, washers, and brackets at the top and bottom of the bellows.
3. Remove the bellows by lifting it over the Mini-Motion Seat.
4. Reverse these steps to install the new bellows.

### Motor and Potentiometer Calibration



**Secure all loose clothing, jewelry, and hair before working around the motor. Lose items could get caught in the moving parts of the motor.**

Perform the following steps **only** if the motion platform is not level during Attract Mode, or after replacing the motor or pot. Refer to Figure 4 on page 15 to identify components.

1. Turn the cabinet OFF and remove the left cover plate as described on page 6.
2. Power ON the cabinet.
3. Open the Operator Menu and select **Diagnostics: Motion Test** (see page 4).

4. Press the **START** button to move the motor to the **DOWN** position.
5. Look at the motor and verify that the Lifter mechanism is at the lowest point in its vertical travel.
6. Press the **START** button to move the motor to the **UP** position. Look at the motor and verify that the Lifter mechanism is at the highest point in its vertical travel.
7. If the motor is not stopping at the full up and full down positions, refer to Figure 4 on page 15 and perform the following steps to calibrate the motor potentiometer:
  - a. Press the **START** button to move the platform to the **CENTER** position.
  - b. Loosen (do not remove) the Pot Alignment Set Screw that attaches the Pot Support Bracket to the Pot Adjustment Plate.
  - c. Rotate the Pot Adjustment Plate slightly clockwise or counter-clockwise to adjust the angle of the lifter bearing. The lifter arm should be vertical, and the clamps should be perpendicular to the lifter arm.
  - d. Re-tighten the Pot Alignment Set Screw.
8. Test the calibration by cycling the motor through the UP, CENTER, and DOWN positions.
9. Exit from the Operator Menu and verify that the motion platform is level when the game is running in Attract Mode.
10. Lift the bellows into place, line up the holes and secure them with the retaining screws, washers and brackets removed previously.

## Potentiometer (Pot) Assembly Replacement

Refer to Figure 4 on page 15 to identify motor components, and perform the following steps:

1. Turn off both cabinet power switches and disconnect both AC power cords.
2. Remove the left cover plate as described on page 6.
3. Disconnect the connector on the pot harness.
4. Remove the bolt that secures the Pot Support Bracket to the Steel Spacer.
5. The Elastic Coupler that attaches to the Pot shaft has four set screws. Loosen the two set screws that are closest to the pot.
6. Reverse these steps to install the new Pot Assembly. Make sure there is some play in the Pot Support Bracket. Do not over tighten.
7. Calibrate Motor and Potentiometer Assembly as described in the previous section.

## Lifter Assembly Replacement

Refer to Figure 4 on page 15 to identify motor components, and perform the following steps:

1. Turn off both cabinet power switches and disconnect both AC power cords.
2. Move the seat to the fully forward position.
3. Open the bellows as described on page 6.
4. Remove the nut and washer that secures the rod end under the seat platform and rotate the lifter arm down.

5. Loosen the three nuts and bolts that secure the lifter to the blue bearing housings and remove the lifter.
6. Reverse the removal steps to install the new lifter.
7. Calibrate the Motor and Potentiometer Assembly as described on page 6.

## **Rod End Replacement**

1. Turn off both cabinet power switches and disconnect both AC power cords.
2. Move the seat to the fully forward position
3. Open the bellows as described on page 6.
4. Remove the nut and washer that secures the rod end under the seat platform and rotate the lifter down.
5. Unscrew the rod end from the lifter arm by using a wrench at the bottom of the rod end assembly.
6. Screw the new rod end firmly onto the lifter arm.
7. Reassemble the components in the reverse order of disassembly.

## **Motor Replacement**

Refer to Figure 4 on page 15 to identify components, and perform the following steps:

1. Turn off both cabinet power switches and disconnect both AC power cords.
2. Open the bellows as described on page 6.
3. Disconnect the Motor Power Cable from the Electronics Box and snip the cable ties that secure it to the base.
4. Remove the nut and washer that secures the rod end under the seat platform.
5. Lift the seat and platform forward.
6. Loosen the nut on the clamp to loosen the clamp.
7. Remove the four mounting bolts from the pillow bearings and slide the bearing and lifter assembly away from the motor.
8. Remove the motor mounting bolts and lift the motor out of the cabinet.
9. Reverse these steps to install the new motor
10. Calibrate the Motor and Potentiometer as described on page 6.



## Electronics Box Replacement



**PREVENT INJURY OR DEATH: Never open the Electronics Box. The Electronics Box must be serviced by a GLOBAL VR technician. Components in the Electronics Box are powered by ~230 VAC. Attempts to improperly service may cause SERIOUS INJURY OR DEATH.**

1. Turn off both cabinet power switches and disconnect both AC power cords.
2. Remove the left cover plate as described on page 6.
3. Disconnect the six cables from the Electronics Box:
  - Main power cable from transformer
  - Motor power cable
  - Motion STOP Button cable
  - Data cable from pot
  - USB cable from System Computer
  - DC power harness
4. Remove the four mounting screws that secure the Electronics Box in place and lift the box out.
5. Reverse these steps to install the new Electronics Box.

**Important:** Do not pull on the cables to disconnect them; grip and pull the connectors only.

**Important:** Make sure all cables are firmly and properly connected.

## Seat Bearing Replacement

Do the following to replace the bearings at the front of the seat platform:

1. Turn off both cabinet power switches and disconnect both AC power cords.
2. Open the bellows as described on page 6.
3. Loosen the set screw that secures the bearing to the pivot stud.
4. Remove the two bolts with washers that secure the bearing in place and slide the bearing off the pivot stud.
5. Reverse these steps to install the new seat bearing.

## Motion STOP Button Service

The Motion STOP Button is mounted to the Display Cabinet. It contains two switches. One switch is connected to the GVRI/O Mini PCB in the Display Cabinet, which puts a message onscreen when the button is down. The other switch is connected to the Electronics Box in the Mini-Motion Base.

## Seat Slide Assembly Replacement

Please refer to the *Twisted Operation and Service Manual* for this procedure.

## Rear (Seat) Speaker or Subwoofer Replacement

Please refer to the *Twisted Operation and Service Manual* for this procedure.

## Mini-Motion Base Power Distribution Service

The Mini Motion Base gets its power through the AC Power Plate on the back of the Display Cabinet. The 115 VAC power is connected to a Power Transformer in the Mini-Motion base that outputs 230 VAC. The 230 VAC power is connected to the Electronics Box that contains the components that drive the motor.

Primary power distribution components consist of the AC Power Plate on the back of the Display Cabinet, AC Power cord between the Power Plate and Mini-Motion Base, the Power Transformer that outputs 230 VAC for the Mini-Motion Base components. +12 VDC for the CCFL lights and fan are provided by the DC Power Supply in the Display Cabinet.

Refer to the *Twisted — Nitro Stunt Racing Operation & Service Manual* for a detailed description of the AC Power Plate.

### Power Transformer Service



**DANGER HIGH VOLTAGE!**

**Disconnect power before servicing the transformer.**

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The power transformer in the motion base transforms 115 VAC input voltage to 230 VAC to power the Servo Driver in the Electronics Box, which drives the motor. Do the following to replace the transformer:

1. Turn off both cabinet power switches and disconnect both AC power cords.
2. Remove the right cover plate as described on page 6.
3. Disconnect the wires from the transformer and connect them to the same terminals on the replacement transformer.
4. Remove the four mounting bolts that secure the transformer in place and use them to secure the new transformer.
5. Be sure to re-connect the green ground wire on the output harness to one of the mounting bolts.

### Fan Service

The Mini-Motion Base has a +12 VDC fan in the open area under the seat platform, and a 220 VAC fan inside the Electronics Box.



**The 220 VAC fan in the Electronics Box should be serviced ONLY by a GLOBAL VR technician.**

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It is important for the fans to be working properly to prevent overheating the components in the Mini-Motion base. Keep the fans and all ventilation holes clear of dust and debris so air can flow freely. If either fan stops working it should be replaced immediately.

Do the following to replace the 12 VDC fan:

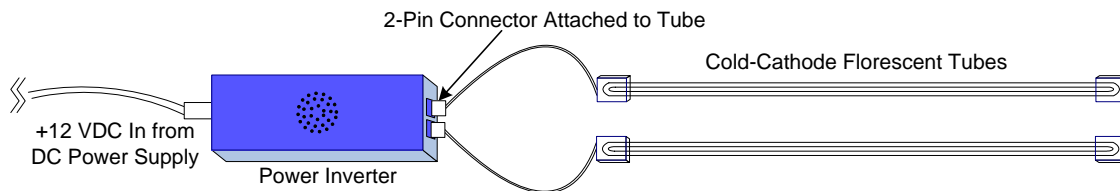
1. Turn off both cabinet power switches and disconnect both AC power cords.
2. Remove the left cover plate as described on page 6.
3. Disconnect the fan power connector and snip any cable ties securing the wires in place.

4. Remove the two bolts from the mounting bracket below the fan and remove the fan with the bracket.
5. Remove the mounting bracket and install it on the new fan.
6. Reverse the removal steps to install the new 12 VDC fan in the motion base.

## Cold-Cathode Florescent Light Service

Dual Cold-Cathode Florescent Lights (CCFLs) provide the red lighting on the back of the Mini-Motion Base. CCFLs are powered by +12 VDC from the DC Power Supply. If both lights fail, check the power connection to the inverter, and test the inverter by connecting a known good inverter. Perform the following steps to replace a CCFL or inverter:

1. Turn off both cabinet power switches and disconnect both AC power cords.
2. Open the bellows as described on page 6.
3. To replace a cold-cathode light tube, disconnect the tube from the power inverter and then snip the cable ties that secure the tube to the cabinet.
4. To replace an inverter, disconnect the power connector and light tubes and remove the inverter from the cabinet. It is held in place with Velcro™.
5. Reverse these steps to install the new tube or inverter.



*Figure 2. Cold-Cathode Florescent Lights (CCFL)*

## Chapter 4 — Mini-Motion Base Troubleshooting

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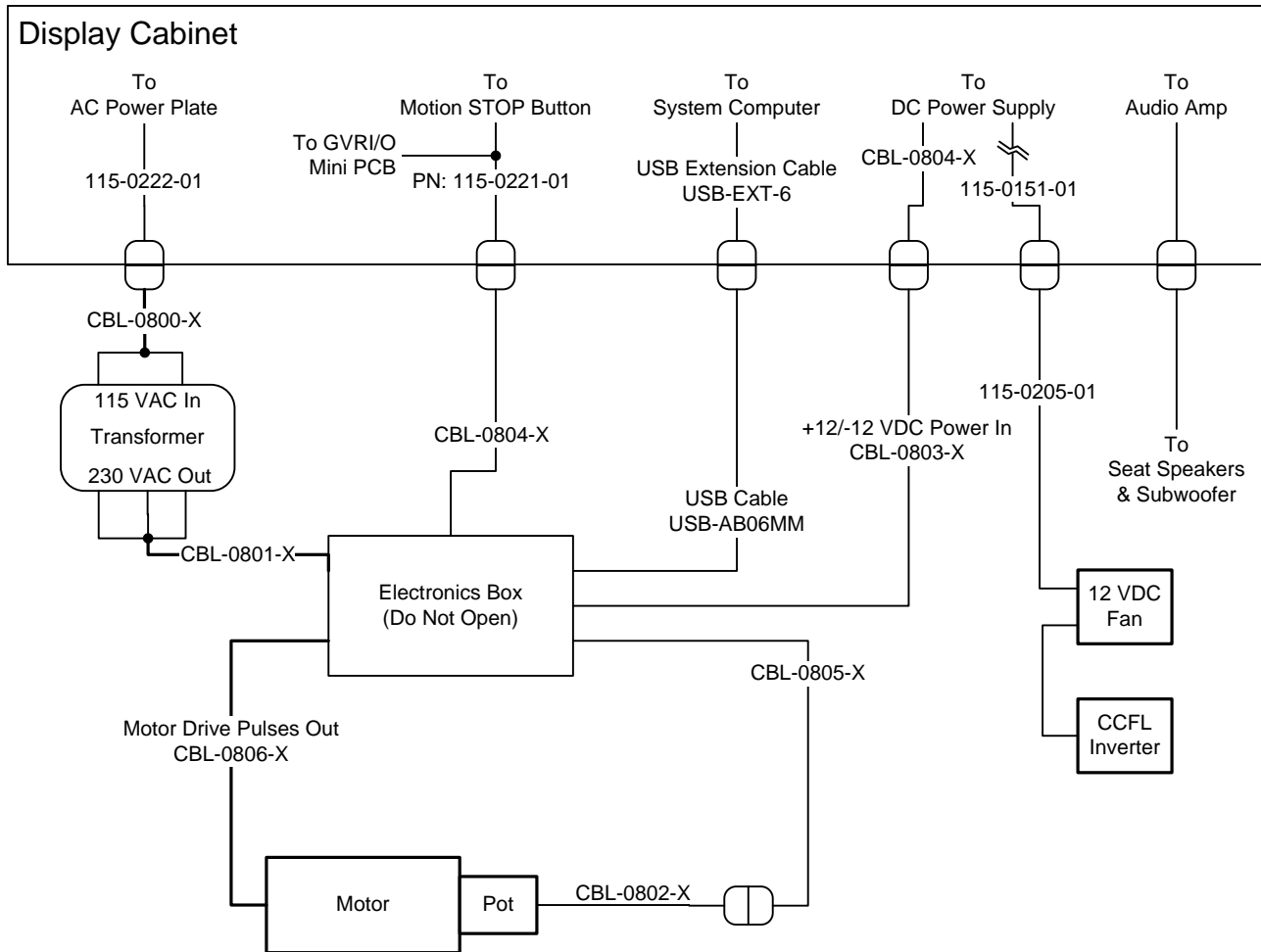
**Note:** If the Mini-Motion Base is powered OFF, but the Display Cabinet is powered ON, the CCFL lighting and ventilation fan in the Mini-Motion Base will work, as they are powered by the DC Power Supply in the Display Cabinet.

If the Mini-Motion Base is powered ON, but the Display Cabinet is powered OFF, the base will move uncontrollably as the PCB waits for a signal from the System Computer. The 12 VDC ventilation fan and CCFL lighting in the motion base will be off.

<b>Problem</b>	<b>Cause</b>	<b>Possible Solution</b>
Motion Platform is not level during Attract Mode	Motor and Pot are not calibrated	Test the motor as described on page 4; if needed, calibrate as described on page 6.
There is no 230 VAC power to the Mini-Motion Base	Base is not plugged in	Check the AC power cords from the wall outlets to the Display Cabinet, and the Display Cabinet to the Mini-Motion Base.
	Tripped Breaker on AC Power Plate	Check the Breaker on the power plate at the rear of the Display Cabinet.
	Blown Fuse on Electronics Box	Check the fuse on the Electronics Box. Replace with 7 Amp fuse if blown.
	Tripped Breaker for AC Wall Outlet	Check the Breaker Switch for the AC Wall Outlet.
	No voltage output from the Transformer	Check the Transformer input and output voltage. Input voltage should be ~115 VAC. Output voltage should be ~230 VAC.
Motor is not responding There IS 230 VAC power to the Electronics Box	Motion STOP Button is down	Pull up the Motion STOP Button.
	Motion STOP Button cable faulty or not connected properly	Check the cable connections to the Motion STOP Button and Electronics Box.
	Motion STOP Button is faulty	Check continuity across the Motion STOP Button.
	Loose or faulty USB cable	Check the USB cable between the computer and Electronics Box
	Loose or faulty motor cable	Check cable from Electronics Box to Motor.
	Faulty component in Electronics Box	Contact Technical Support for assistance.
	Faulty Motor	Check to see if the Motor Shaft will rotate by hand (with no power to the Motor). If it will not, your Motor is faulty. If it will rotate, check the Motor Cable.
Mini-Motion Base moves during Attract Mode	Faulty Pot	Disconnect the Mini-Motion Base AC Power Cord Immediately. (You can continue to use the game without motion, if desired.) Replace the pot as described on page 7.

Problem	Cause	Possible Solution
Motor cannot find home position or Motor appears to move out of control	Faulty Pot Loose Pot	Disconnect the Mini-Motion Base AC Power Cord Immediately. (You can continue to use the game without motion, if desired.) Check the pot and replace if faulty (see page 7).
	Disconnected or faulty USB Cable	The motor will keep moving if it does not receive a signal from the System Computer.
Game is turned off but Mini-Motion Base keeps moving	Mini-Motion Base is not powered off	Turn off BOTH power switches on the back of the display cabinet. If you turn off the display cabinet power but leave the motion base power switch on, the game will continue to move while the PCB waits for a signal from the System Computer.
12 VDC Ventilation Fan is NOT working	Loose or faulty wiring	Make sure the Fan Power Harness is securely connected.
	Faulty Fan	Replace a faulty fan immediately.
Fan in Electronics Box is NOT working Motor is functional	Problem is inside Electronics Box	Contact Technical Support. <b>Do not open</b> the Electronics Box. Disconnect the Mini-Motion Base AC Power Cord Immediately to prevent damage to components in the Electronics Box. (You can continue to use the game without motion, if desired.)

## Chapter 5 — Diagrams and Schematics



*Figure 3. Mini Motion Base Simplified Wiring Diagram*

**Note:** In countries with 220-230 VAC line voltage, the Electronics Box will be powered directly without requiring the power transformer.

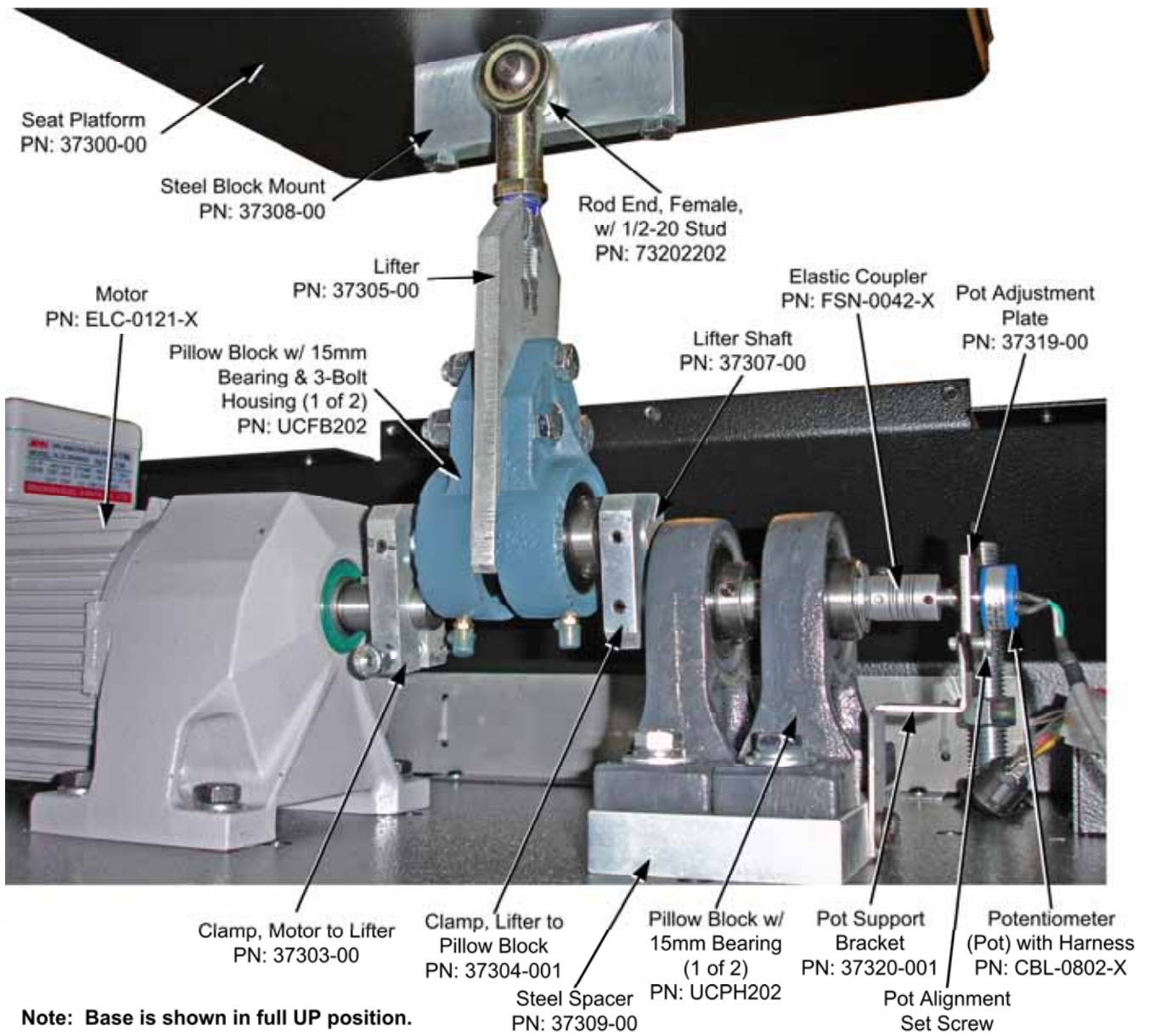


Figure 4. Motor & Lifter Assembly

# Technical Support

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## Service & Parts

**Hours:** 7:00AM–5:00PM Pacific Time, Monday–Friday

**Phone:** 408.597.3435

**Fax:** 408.597.3437

**E-mail:** [techsupport@globalvr.com](mailto:techsupport@globalvr.com)

**Website:** <http://service.globalvr.com>

**Extended Service Hours:** Monday–Friday 5pm—Midnight  
Saturday & Sunday 7:00am—Midnight Pacific Time

Free telephone, e-mail, and online support are provided for systems during the warranty period. GLOBAL VR<sup>®</sup> Technical Support can help you troubleshoot problems and diagnose defective parts. We can also answer questions about the operation of your game.

When you contact Technical Support, please provide the information listed below to assist the Technical Support representative in solving your problem quickly. For your convenience, space is provided to write important numbers.

- Cabinet Serial Number: \_\_\_\_\_
- Game Version (from Operator Menu): \_\_\_\_\_
- OS Version (from Operator Menu): \_\_\_\_\_
- Dongle Version (from Operator Menu): \_\_\_\_\_
- IO Board Version (From Operator Menu): \_\_\_\_\_
- Your mailing address and telephone number.
- A summary of the question or a detailed description of the problem with your cabinet.

The additional information listed below, as applicable, may assist Technical Support in solving your problem quickly.

- Specific error message
- Any changes made to the system
- Date of latest install or upgrade
- For game-play issues, the game mode and number of players

To comment on this manual, please e-mail: [techpubs@globalvr.com](mailto:techpubs@globalvr.com)