

# Power Procedures Table

*Model Numbers:*

**641** -002 thru -005



## Service and Parts Manual



FOR USE BY MIDMARK TRAINED TECHNICIANS ONLY

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## Symbols



### **DANGER**

*Indicates an imminently hazardous situation which **will** result in serious or fatal injury if not avoided. This symbol is used only in the most extreme conditions.*



### **WARNING**

*Indicates a potentially hazardous situation which **could** result in serious injury if not avoided.*



### **CAUTION**

*Indicates a potentially hazardous situation which **may** result in minor or moderate injury if not avoided. It may also be used to alert against unsafe practices.*



### **Equipment Alert**

*Indicates a potentially hazardous situation which could result in equipment damage if not avoided.*



*In Section A, test the components in the order indicated. (ex. 1st ✓ then, 2nd ✓)*

*Refer to Section B for component testing procedures.*

The symbols below may be used in this manual to represent the operational status of table functions and components.



*Indicates the function / component is working properly. No action required.*



*Indicates the function / component is working, but a problem exists.*



*Indicates the function / component is not working at all.*

## Ordering Parts

The following information is required when ordering parts:

- Serial number & model number
- Part number for desired part.

*[Refer to Exploded Views / Parts Lists section]*

**Non-warranty parts orders may be faxed to Midmark using the Fax Order Form in the back of this manual.**

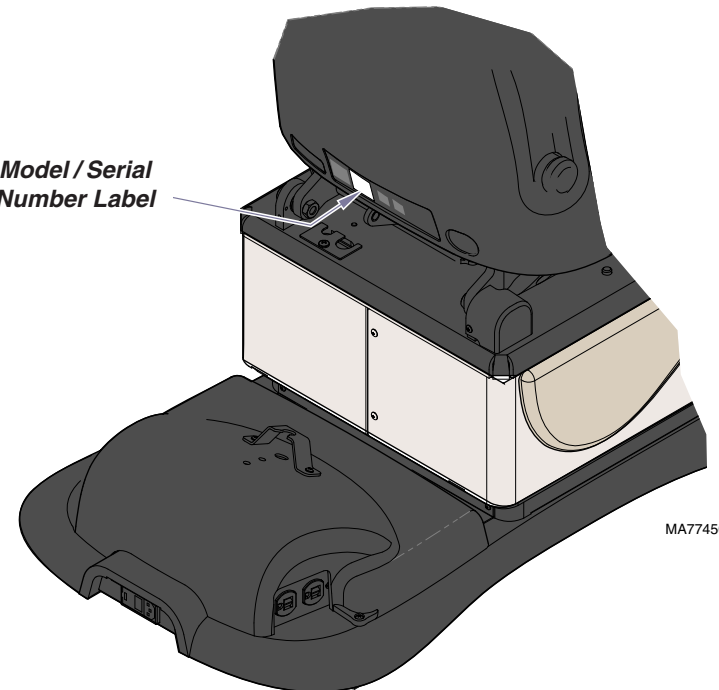
**For warranty parts orders, call Midmark's Technical Service Department with the required information.**

Hours: 8:00 am until 5:00 pm EST [Monday - Friday]

Phone: 1-(800)-Midmark

## Model / Serial Number Location

Model / Serial Number Label

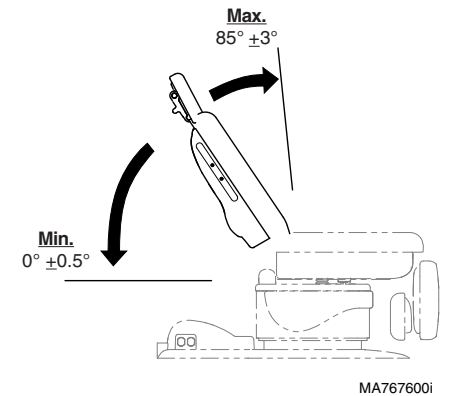
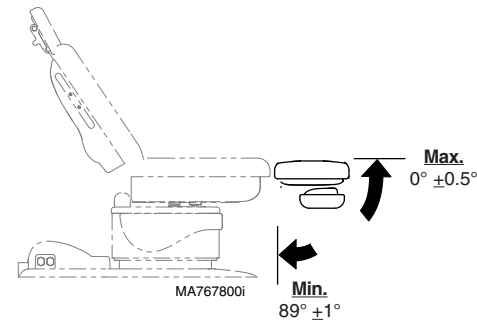
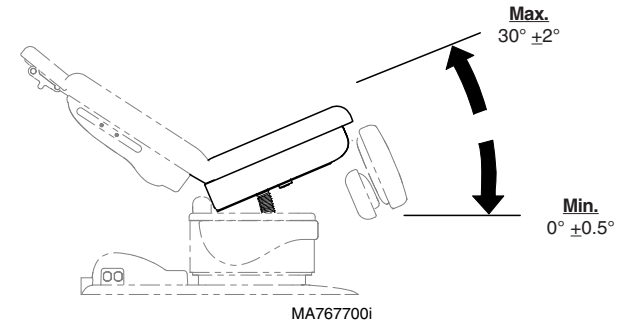
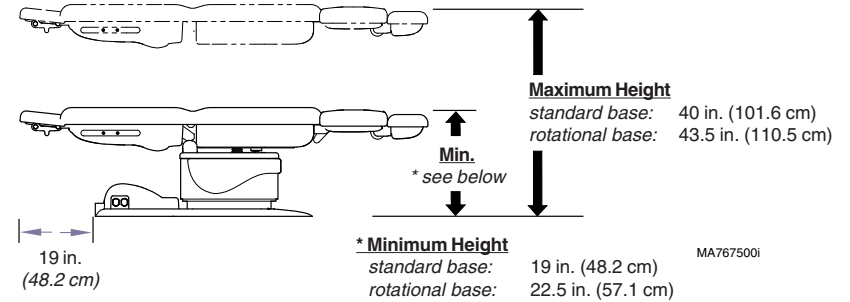


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# General Information

## Specifications

<b>Patient Weight (maximum)</b> .....	<b>450 lbs (204 kgs)</b>
<b>Range of Motion</b> .....	<b>See illustration on this page</b>
<b>Dimensions</b> .....	<b>See illustration on next page</b>
<b>Weight of Table:</b>	
w/ Standard Base .....	<b>440 lbs (200 kg)</b>
w/ Rotational Base .....	<b>525 lbs (238 kg)</b>
<i>(Note: For packaged weight, contact Midmark Customer Service)</i>	
<b>Power Cord:</b> .....	<b>8 ft. (243.8 cm) long</b>
<b>Electrical Requirements:</b> .....	<b>See Compliance Charts</b>
<b>Foot / Hand Control Voltage:</b> .....	<b>10 VAC, SELV (Safety Extra Low Voltage)</b>
<b>Duplex Receptacle (optional)</b>	
<b>maximum load:</b> .....	<b>115 VAC, 5A, 50/60 Hz</b>
<b>Fuses:</b>	
<i>Main Power (located at power cord inlet):</i>	
F1 & F2 .....	<b>6.3A, 250V, Type-T, 5 x 20 mm High-Breaking Current</b>
<b>Duty Cycle:</b>	
<i>Actuator motor run time:</i> .....	<b>Intermittent Operation (30 seconds ON / 5 minutes off)</b>
<b>Classifications:</b> .....	<b>Class 1, Type B Applied Part,</b>
<b>Protection against ingress of fluids:</b> .....	<b>Ordinary Equipment</b>
<i>Foot Control only:</i> .....	<b>IPX1</b>
<b>Regulatory Compliance:</b> .....	<b>See Compliance Charts</b>
<b>Table Speeds (by function):</b>	
<i>Back / Tilt:</i>	
w/Patient Load <200lbs (<90 kg) .....	<b>less than 16 seconds</b>
w/Patient Load >200lbs (>90 kg) .....	<b>less than 20 seconds</b>
<i>Base</i> .....	<b>less than 20 seconds</b>
<i>Foot</i> .....	<b>less than 14 seconds</b>



# General Information

## Model Identification / Compliance Chart

Model	Description	Complies To:				Electrical Ratings:		
		UL 60601-1	CAN/CSA 22.2, #601.1-M90	EN 60601-1	EN 60601-1-2 (EMC)	VAC +/-10%	Amps	Cycles (Hz)
641-002	Power Procedures Chair <i>(Non-Programmable)</i>	•	•	•	•	<i>Configurable</i>		50 / 60
						115 230	8.5 4.5	
641-003	Power Procedures Table <i>(Programmable) w/ Receptacles</i>	•	•	•	•	115	11.5	50 / 60
641-004	Power Procedures Chair <i>(Non-Programmable) w/Rotational Base</i>	•	•	•	•	<i>Configurable</i>		50 / 60
						115 230	8.5 4.5	
641-005	Power Procedures Table <i>(Programmable) w/ Rotational Base</i>	•	•	•	•	<i>Configurable</i>		50 / 60
						115 230	8.5 4.5	

**Fire Code Ratings:**

All upholstery complies with California Bureau of Home Furnishing Technical Bulletin 117.

Optional upholstery is available that complies with California Bureau of Home Furnishing Technical Bulletin 133.

# General Information

Scheduled Maintenance 641 Power Procedures Chair			
Interval	Inspection or Service	Service, Adjust, Repair, and / or Replace as Required (Refer to appropriate S&P or Quick Reference Guide)	641
Weekly	Cleaning	Clean upholstery with appropriate diluted bleach solution 10:1 (water:bleach)	X
		Wipe painted metal & plastic surfaces with a clean soft cloth and mild cleaner. <i>(NOTE: Periodic application of common furniture wax will ease cleaning, and maintain the luster of the surfaces).</i>	X
	Obvious Damage	Visually inspect components for damage that could cause problems during operation or unsafe operation.	X
Semi-Annually	Mechanical Operation	Check all mechanical functions using the foot control. Repeat using the hand control when present.	X
		Table shrouds should move smoothly & quietly when base is raised & lowered. <i>(NOTE: There are plastic glides on the shroud tabs. Missing glides may result in noisy operation)</i>	X
	Labels / Decals	Replace any missing or illegible labels.	X
	Hardware	All fasteners must be present and fastened securely.	X
	Electrical System	Inspect power cord and all wiring for damage.	X
		Be sure all electrical connections are tight.	X
<b>Date of Service:</b> ____ / ____ / ____ <b>Location:</b> <b>Service Technician:</b>			<b>Model:</b>  <b>Serial Number:</b>

## **Warranty Information**

### **SCOPE OF WARRANTY**

Midmark Corporation (“Midmark”) warrants to the original purchaser its new Alternate Care products and components (except for components not warranted under “Exclusions”) manufactured by Midmark to be free from defects in material and workmanship under normal use and service. Midmark’s obligation under this warranty is limited to the repair or replacement, at Midmark’s option, of the parts or the products the defects of which are reported to Midmark within the applicable warranty period and which, upon examination by Midmark, prove to be defective.

### **APPLICABLE WARRANTY PERIOD**

The applicable warranty period, measured from the date of delivery to the original user, shall be one (1) year for all warranted products and components.

### **EXCLUSIONS**

This warranty does not cover and Midmark shall not be liable for the following: (1) repairs and replacements because of misuse, abuse, negligence, alteration, accident, freight damage, or tampering; (2) products which are not installed, used, and properly cleaned as required in the Midmark “Installation” and or “Installation / Operation Manual for this applicable product. (3) products considered to be of a consumable nature; (4) accessories or parts not manufactured by Midmark; (5) charges by anyone for adjustments, repairs, replacement parts, installation, or other work performed upon or in connection with such products which is not expressly authorized in writing in advance by Midmark.

### **EXCLUSIVE REMEDY**

Midmark’s only obligation under this warranty is the repair or replacement of defective parts. Midmark shall not be liable for any direct, special, indirect, incidental, exemplary, or consequential damages or delay, including, but not limited to, damages for loss of profits or loss of use.

### **NO AUTHORIZATION**

No person or firm is authorized to create for Midmark any other obligation or liability in connection with the products.

**THIS WARRANTY IS MIDMARK’S ONLY WARRANTY AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. MIDMARK MAKES NO IMPLIED WARRANTIES OF ANY KIND INCLUDING ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. THIS WARRANTY IS LIMITED TO THE REPAIR OR REPLACEMENT OF DEFECTIVE PARTS.**

### **Additional Information**

Failure to follow the guidelines listed below will void the warranty and/or render the table unsafe for use.

- If a malfunction is detected, do not use the table until necessary repairs are made.
- Do not attempt to disassemble table, replace components, or perform adjustments unless you are a Midmark authorized service technician.
- Do not use another manufacturer's parts to replace malfunctioning components. Use only Midmark replacement parts

# General Information



# Section A

## Operation & Troubleshooting



<u>Function / System</u>	<u>Page</u>
Power To The Table:	
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<i>models w/Rotational Base</i> .....	A-4
Base Up / Down .....	A-8
Back Up / Down .....	A-18
Tilt Up/Down .....	A-23
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Table Receptacles .....	A-54
Rotational Base Brake System .....	A-56

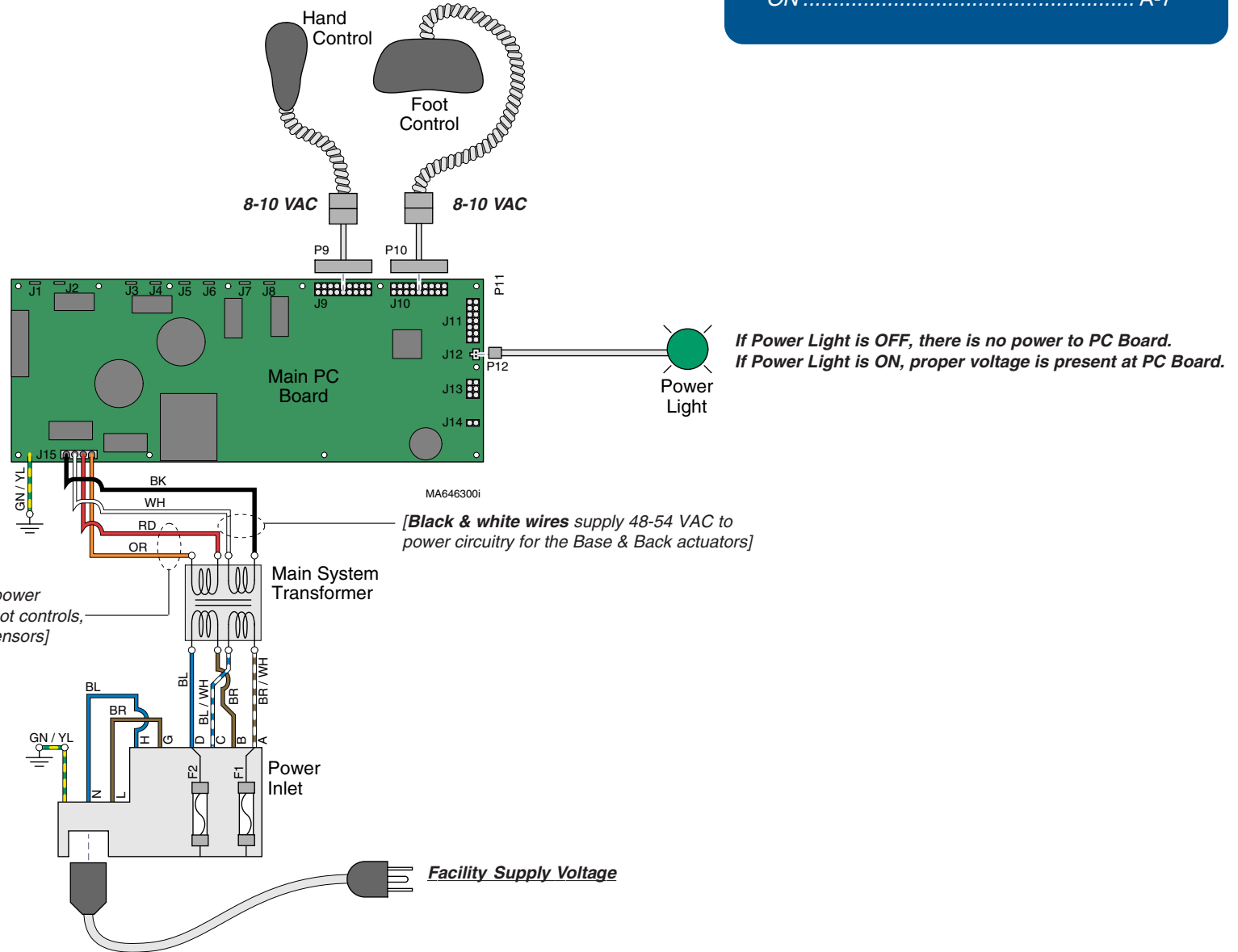
# Operation & Troubleshooting

## Power To The Table (models w/ Standard Base)

This illustration shows only the components that affect ALL TABLE FUNCTIONS.  
Refer to the following page for a detailed description of the power supply to the table.

**Troubleshooting**  
[No Power / No Functions Will Operate]

Power Light is:	Page
OFF .....	A-6
ON .....	A-7



[Red & orange wires supply 34-37 VAC to power circuitry for the Tilt & Foot actuators, hand/foot controls, power light, all limit switches, and position sensors]

[Black & white wires supply 48-54 VAC to power circuitry for the Base & Back actuators]

# Operation & Troubleshooting

## Power To The Table (models w/ Standard Base)

### Facility Supply Voltage

With the table's power cord properly connected, facility supply voltage (115 or 230 VAC) is supplied thru the cord to the power inlet.

### Power Inlet



#### EQUIPMENT ALERT

The voltage setting displayed in the power inlet window must match facility supply voltage (115 or 230 VAC).

[Remove fuse holder and rotate 180° to change voltage setting].

Current flows thru two fuses in the power inlet, to the main system transformer.

### Main System Transformer

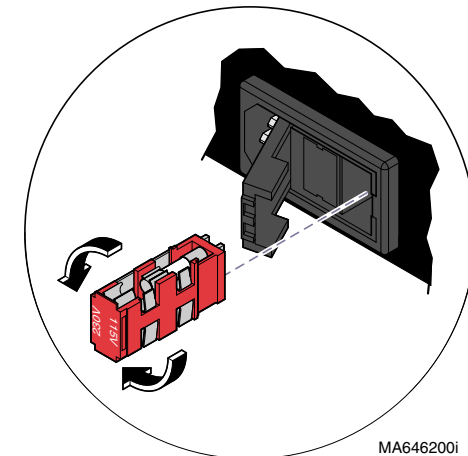
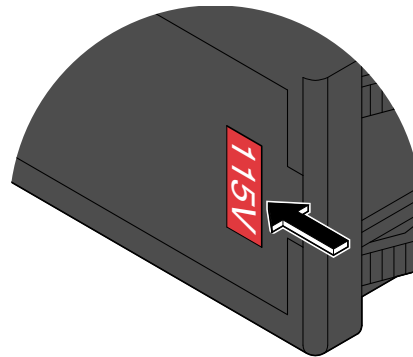
#### NOTE

This transformer is protected from overload by a thermal cutout feature. This will automatically reset when the transformer cools.

Line voltage (115 or 230 VAC) is supplied to the main system transformer. The transformer reduces the voltage and current flows to the main PC board thru two separate windings (four wires).

[The black & white wires supply 48-54 VAC to power circuitry for the Base & Back actuators only].

[The red & orange wires supply 34-37 VAC to power circuitry for the Tilt & Foot actuators, hand/foot controls, power light, all limit switches, and position sensors (on Midmark models only)].



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### Power Indicator Light

When voltage is applied to the PC board, the power light is illuminated.

### Main PC Board

Circuitry on the PC board provides the required voltage to power all of the table's components: hand/foot controls, actuators, limit switches, and position sensors.

### Hand / Foot Controls

Circuitry on the main PC board supplies 8-10 VAC to the hand / foot control connection ports.

Models: 641 (-002 & -003)  
Serial Numbers: all

Power To The Table  
(Standard Base)

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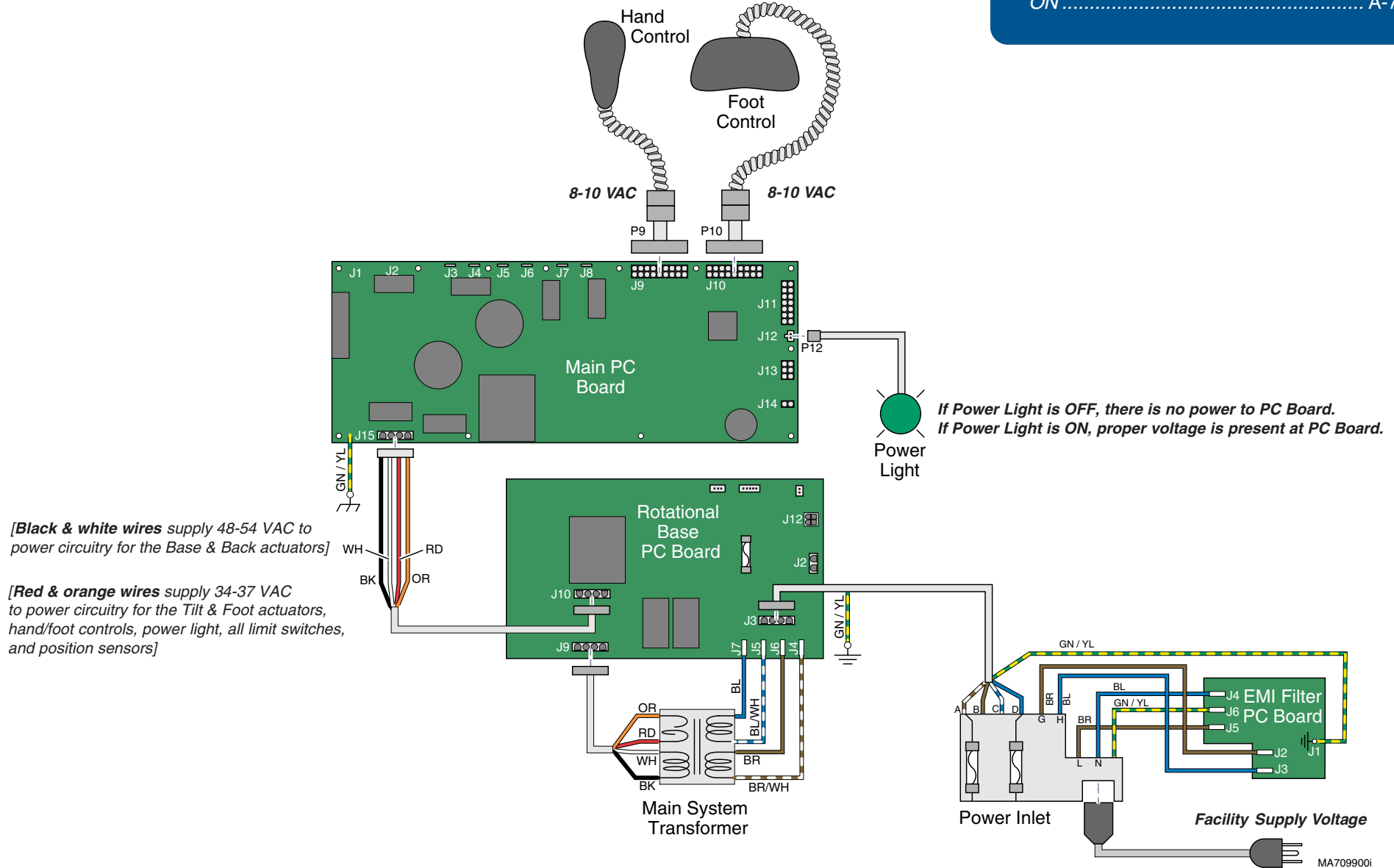
# Operation & Troubleshooting

## Power To The Table (models w/ Rotational Base)

This illustration shows only the components that affect ALL TABLE FUNCTIONS.  
Refer to the following page for a detailed description of the power supply to the table.

**Troubleshooting**  
[No Power / No Functions Will Operate]

<b>Power Light is:</b>	<b>Page</b>
OFF .....	A-6
ON .....	A-7



# Operation & Troubleshooting

## Power To The Table (models w/ Rotational Base)

### Facility Supply Voltage

With the table's power cord properly connected, facility supply voltage (115 or 230 VAC) is supplied thru the cord to the power inlet.

### Power Inlet / EMI Filter Board

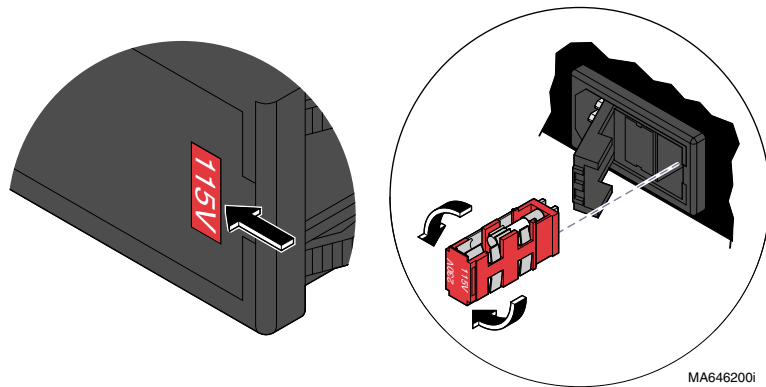


#### EQUIPMENT ALERT

The voltage setting displayed in the power inlet window must match facility supply voltage (115 or 230 VAC).

[Remove fuse holder and rotate 180° to change voltage setting].

Current flows from the power inlet thru the EMI filter board, then back thru the power inlet fuses to the rotational base PC board.



### Rotational Base PC Board

Current flows thru the rotational base PC board to the main system transformer. The transformer reduces the voltage and current flows back to the rotational base PC board.

Circuitry on the rotational base PC board provides the required voltage to power the rotational base brake system.

The reduced voltage is supplied to the main PC board thru the rotational base PC board.

### Main System Transformer

#### NOTE

This transformer is protected from overload by a thermal cutout feature. This will automatically reset when the transformer cools.

Line voltage (115 or 230 VAC) is supplied to the main system transformer thru the rotational base PC board. The transformer reduces the voltage and current flows back to the rotational base PC board, then to the main PC board thru two separate windings (four wires).

[The black & white wires supply 48-54 VAC to power circuitry for the Base & Back actuators only].

[The red & orange wires supply 34-37 VAC to power circuitry for the Tilt & Foot actuators, hand/foot controls, power light, all limit switches, and position sensors (on Midmark models only)].

### Power Indicator Light

When voltage is applied to the PC board, the power light is illuminated.

### Main PC Board

Circuitry on the PC board provides the required voltage to power all of the table's components: hand/foot controls, actuators, limit switches, and position sensors.

### Hand / Foot Controls

Circuitry on the main PC board supplies 8-10 VAC to the hand / foot control connection ports.

Models: 641 (-004 & -005)  
Serial Numbers: all

Power To The Table  
(Rotational Base)

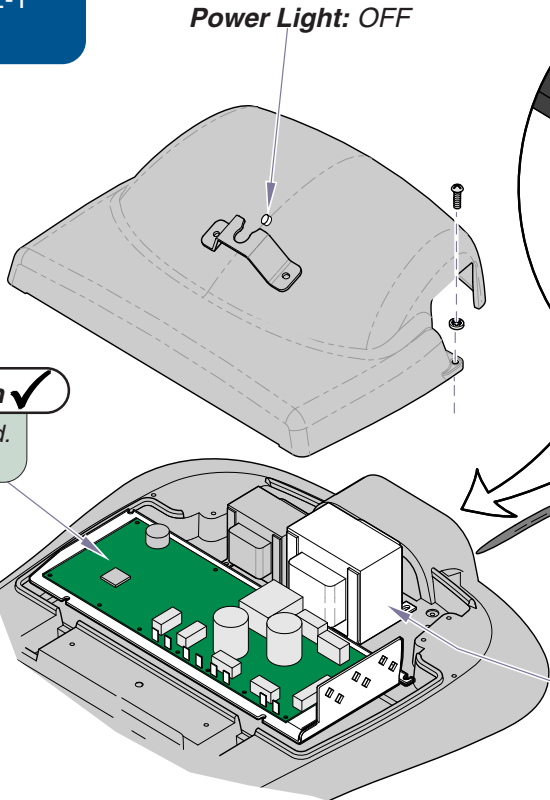
# Operation & Troubleshooting

Refer To:	Page
Primary Fuses .....	B-2
Main System Transformer .....	B-29
Main PC Board .....	B-37
Wiring Diagrams .....	D-1
Exploded Views / Part Numbers .....	E-1

**Power to the Table - continued**

**Problem:** No functions will operate - and Power light is **OFF**.

**Main PC Board** 5th ✓  
 If the transformer is OK, replace main PC board.  
 Refer to: Section B - Main PC Board



Power Light: OFF

**Voltage setting** 2nd ✓  
 Must match facility supply voltage (115 / 230 V).

**Primary Fuses** 3rd ✓  
 Refer to: Section B - Primary Fuses

**Facility Supply Voltage** 1st ✓  
 Check power cord connections.  
 Check facility circuit breaker.

**Main System Transformer** 4th ✓  
 Check all wire connections between power inlet & main PC board. If connections are OK, test transformer.  
 Refer to: Section B - Main System Transformer

Models w/Rotational Base only:  
 If there is no power to the main system transformer...

**Rotational Base PC Board / EMI Filter Board**  
 Check all wire connections between rotational base PC board & the transformer. If connections are OK, perform EMI Filter Board Test.  
 Refer to: Section B - Rotational Base Brake System

(Standard Base shown)

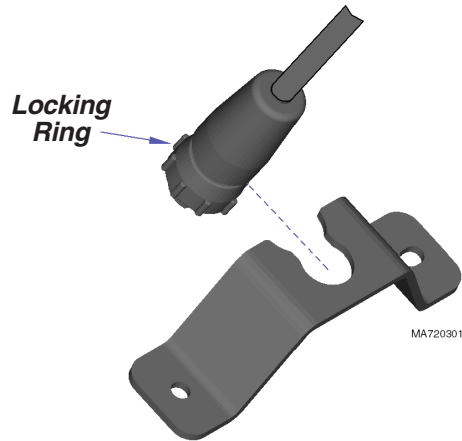
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# Operation & Troubleshooting

## Power to the Table - continued

**Problem:** No functions will operate - and Power light is **ON**.

**Note:** The cord connector is "keyed" and must be oriented properly to connect. Tighten locking ring to secure connector.



### Hand / Foot Controls

Check cords for damage / proper connection.  
Check both connection ports on table.

Refer to: Section B - Hand & Foot Controls

1st ✓

### Loose / Damaged Wire Connections

(between connection ports & PC board)

3rd ✓

### Check for error code(s)

Refer to: Section B - Main PC Board

4th ✓



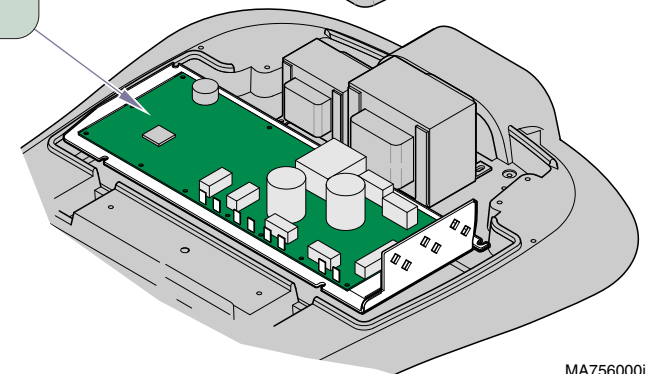
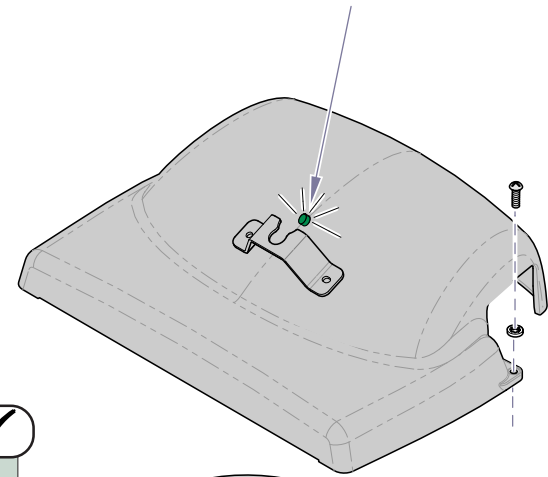
Position "4" Button

**Programmable Models only:**  
**Press "4" button on hand control for five seconds, then try functions again...**  
If table functions operate, go to Section B, Main PC Board (Hand/Foot Control Lockout Feature)  
If table functions still will not move, go to next check.

2nd ✓

Refer To:	Page
Hand & Foot Controls .....	B-3
Main PC Board .....	B-37
Wiring Diagrams .....	D-1
Exploded Views / Part Numbers .....	E-1

Power Light: ON



(Standard Base shown)

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Models:  
Serial Numbers:

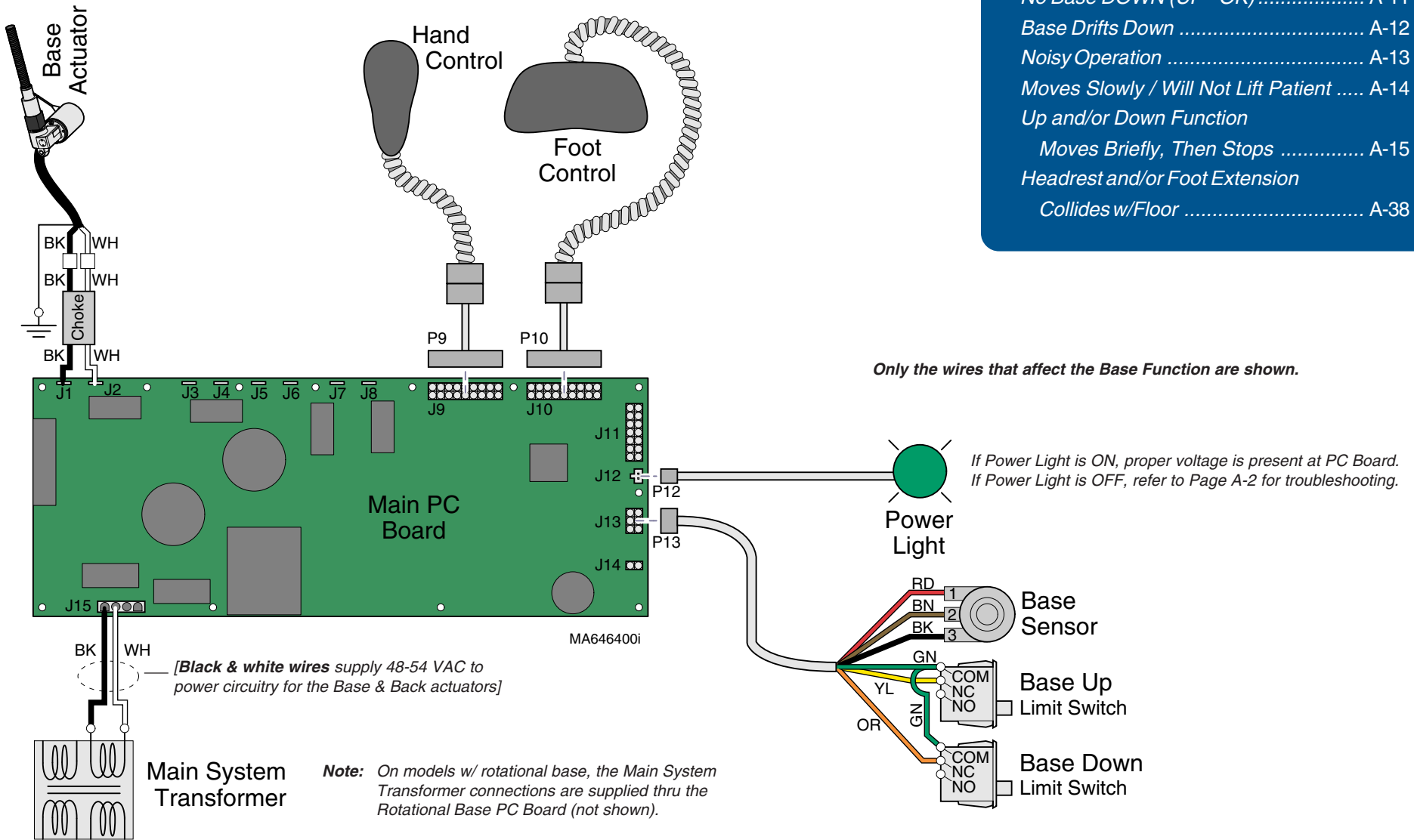
ALL

Power To The Table

# Operation & Troubleshooting

## Base UP / DOWN Function

This illustration shows only the components that affect the Base UP / DOWN function. Refer to the following page for a detailed description of Base UP / DOWN operation.



## Troubleshooting

[Base Up / Down Function]

Problem	Page
No Base UP or DOWN .....	A-10
No Base UP (DOWN - OK) .....	A-11
No Base DOWN (UP - OK) .....	A-11
Base Drifts Down .....	A-12
Noisy Operation .....	A-13
Moves Slowly / Will Not Lift Patient .....	A-14
Up and/or Down Function Moves Briefly, Then Stops .....	A-15
Headrest and/or Foot Extension Collides w/Floor .....	A-38



## Base UP / DOWN Function

### Is There Power To The Table?

When voltage is present at the PC board, the power light is illuminated.

*[Refer to 'Power To The Table' (page A-2), for description of current flow to the PC board].*

### Power To Foot / Hand Controls

Circuitry on the PC board supplies 8-10 VAC to the hand / foot control connection ports.

## Base Up Operation

When the Base Up function is activated, current flows thru the hand / foot control, back to the PC board. Circuitry on the PC Board supplies approximately 48 VDC to the base actuator motor.

The actuator motor runs and raises the table.

### **NOTE**

The PC board continuously monitors the Base Up limit switch and the Base position sensor.

*If the Base Up limit switch is tripped (open), the Base Up function will not operate.*

*If the Base position sensor detects that the table has reached its upper limit, the Base Up function will not operate.*

### **Actuator Motor runs until:**

1. Hand / foot control button is released.
2. Base Up limit switch is tripped.
3. Emergency Stop button is pressed.
4. Position Sensor detects upper limit.
5. Overcurrent protection tripped.
6. Software time-out limit is reached (approx. 25 seconds).

## Base Down Operation

When the Base Down function is activated, current flows thru the hand / foot control, back to the PC board. Circuitry on the PC Board supplies approximately 40 VDC to the base actuator motor.

The actuator motor runs and lowers the table.

### **NOTE**

The PC board continuously monitors the Base Down limit switch and the Base position sensor.

*If the Base Down limit switch is tripped (open), the Base Down function will not operate.*

*If the Base position sensor detects that the table is in a potential "crash position", or that the base has reached its lower limit, the Base Down function will not operate\*.*

### **Actuator Motor runs until:**

1. Hand / foot control button is released.
2. Base Down limit switch is tripped.
3. Emergency Stop button is pressed.
4. Crash Avoidance System activated\*.
5. Position Sensor detects lower limit.
6. Overcurrent protection tripped.
7. Software time-out limit is reached (approx. 25 seconds).

**\*Note:** Refer to *Section A: Crash Avoidance System* for a detailed description of "crash position", and the table functions that are disabled.

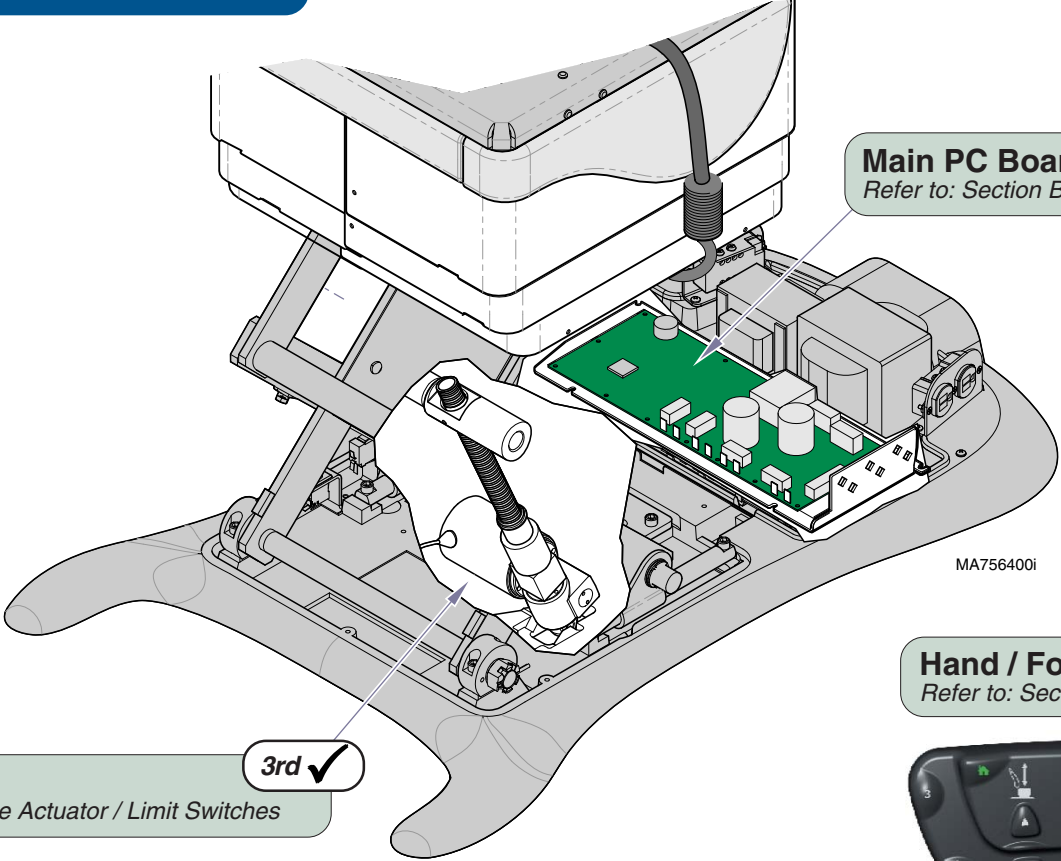
# Operation & Troubleshooting

**Base Up / Down Function - continued**

**Problem:** No Base Up or Base Down

Refer To:	Page
Hand & Foot Controls .....	B-3
Base Actuator / Limit Switches .....	B-6
Main PC Board .....	B-37
Wiring Diagrams .....	D-1
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**Loose / Damaged Wire Connections** 1st ✓  
*(Base Actuator, Base Up/Down Limit Switches, hand/foot control ports, black & white wires between main system transformer & PC board)*



**Main PC Board** 4th ✓  
*Refer to: Section B - Main PC Board*

**Base Actuator** 3rd ✓  
*Refer to: Section B - Base Actuator / Limit Switches*

**Hand / Foot Control** 2nd ✓  
*Refer to: Section B - Hand & Foot Controls*



## Base Up / Down Function - continued

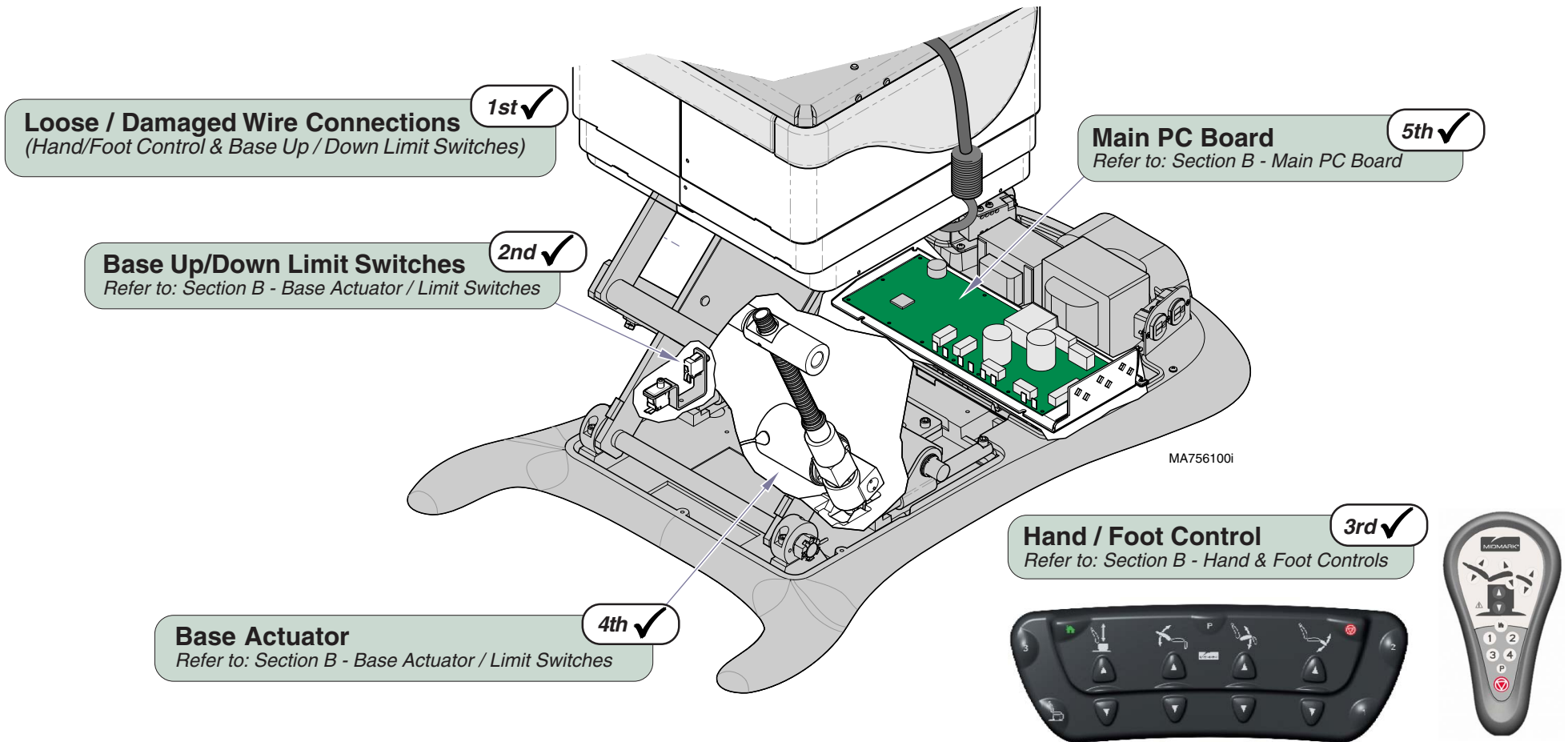
**Problem:** No Base Up. [Base Down - OK]  
**-or-**  
 No Base Down. [Base Up - OK]

**Attention:** If Base Down is inoperable, move the other chair functions to the positions listed below:

**Back / Foot:** full UP  
**Tilt:** full DOWN

If Base Down function becomes operable, refer to: Section A - Crash Avoidance System

Refer To:	Page
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Base Actuator / Limit Switches .....	B-6
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Exploded Views / Part Numbers .....	E-1



**Models:** ALL  
**Serial Numbers:**

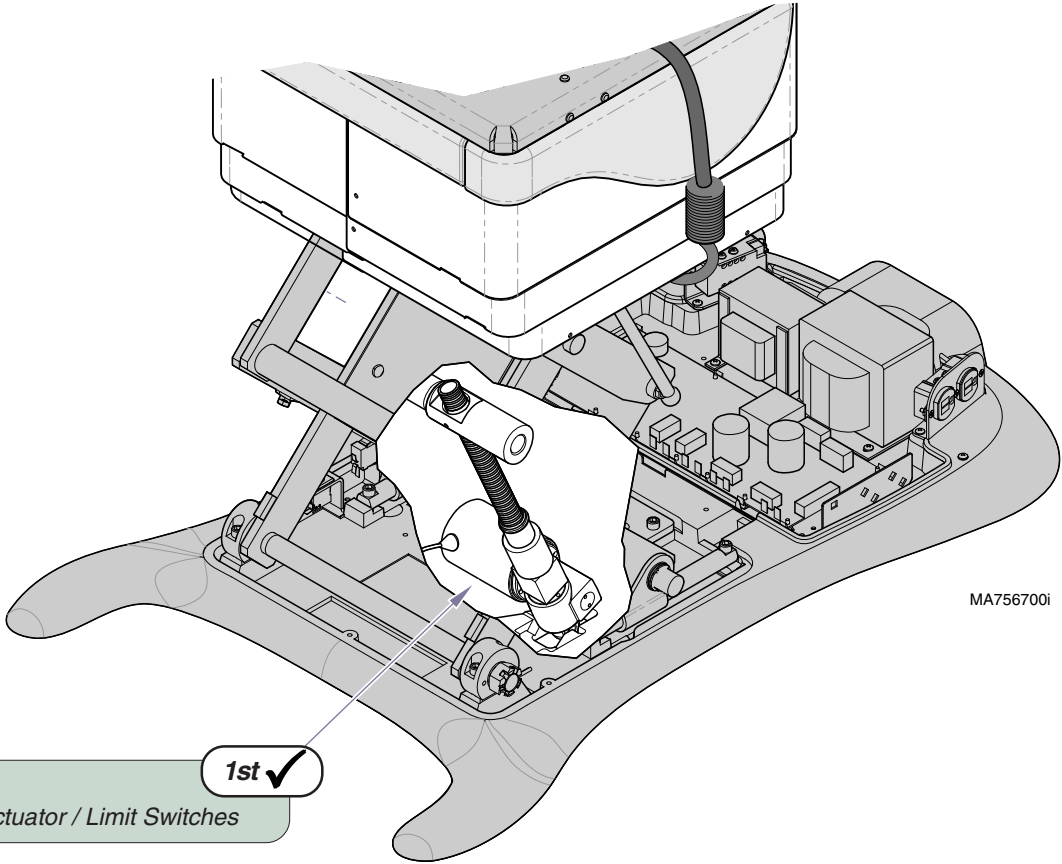
**Base Up / Down**

# Operation & Troubleshooting

## Base Up / Down Function - continued

**Problem:** Base drifts down.

Refer To:	Page
Base Actuator / Limit Switches .....	B-6
Wiring Diagrams .....	D-1
Exploded Views / Part Numbers .....	E-1



**Base Actuator**  
Refer to: Section B - Base Actuator / Limit Switches

## Base Up / Down Function - continued

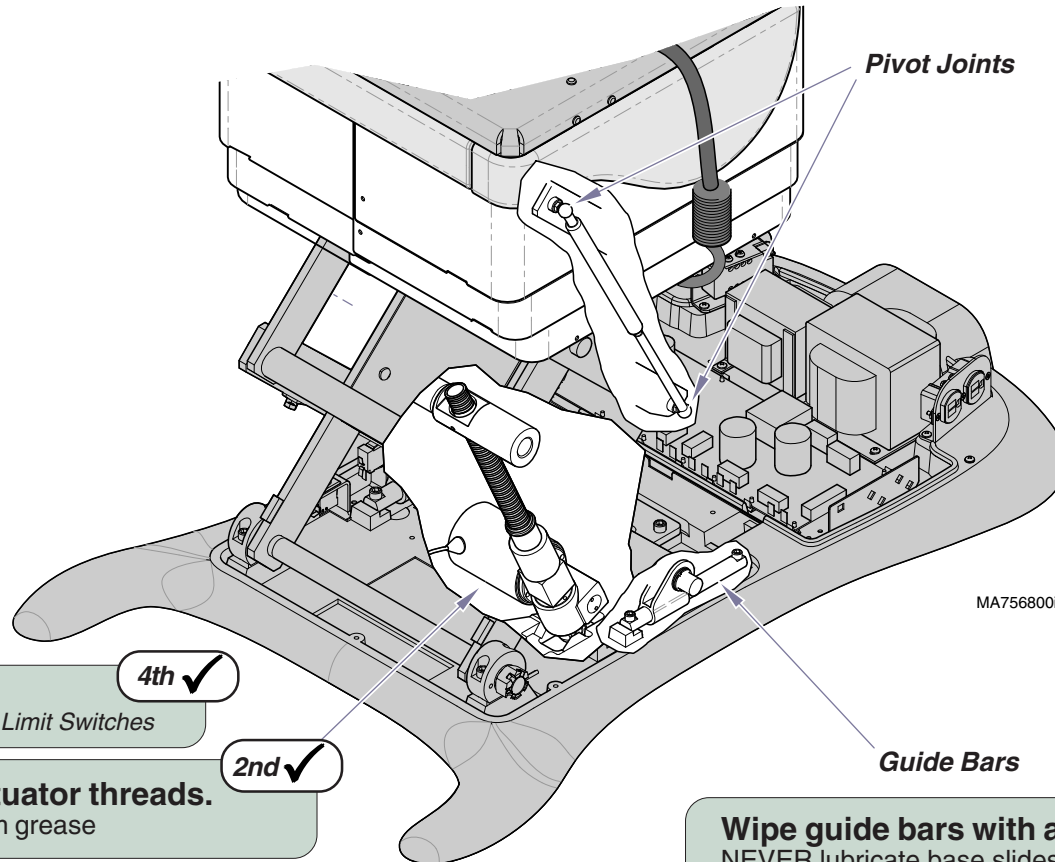
**Problem:** Noisy operation. (Grinding, squeaking, etc)

Refer To:	Page
Base Actuator / Limit Switches .....	B-6
Gas Springs .....	B-27
Wiring Diagrams .....	D-1
Exploded Views / Part Numbers .....	E-1

### Clean / lubricate gas spring pivot joints 1st ✓

Recommended lubricant: Lithium grease

Refer to: Section B - Gas Springs



### Base Actuator 4th ✓

Refer to: Section B - Base Actuator / Limit Switches

### Clean / lubricate base actuator threads. 2nd ✓

Recommended lubricant: Lithium grease

**Wipe guide bars with a clean, dry cloth. 3rd ✓**  
NEVER lubricate base slides / scissor mechanism.

Models:  
Serial Numbers:

ALL

Base Up / Down

# Operation & Troubleshooting

Refer To:	Page
General Information (Specifications) .....	ii
Base Actuator .....	B-6
Gas Springs .....	B-27
Wiring Diagrams .....	D-1
Exploded Views / Part Numbers .....	E-1

**Base Up / Down Function - continued**

**Problem:** Moves slowly - and/or  
Will not lift patient.

**1st ✓**

**Did patient exceed 450 lb. weight limit?**  
Inform staff that max. patient weight is 450 lbs.

Refer to: General Information section

**3rd ✓**

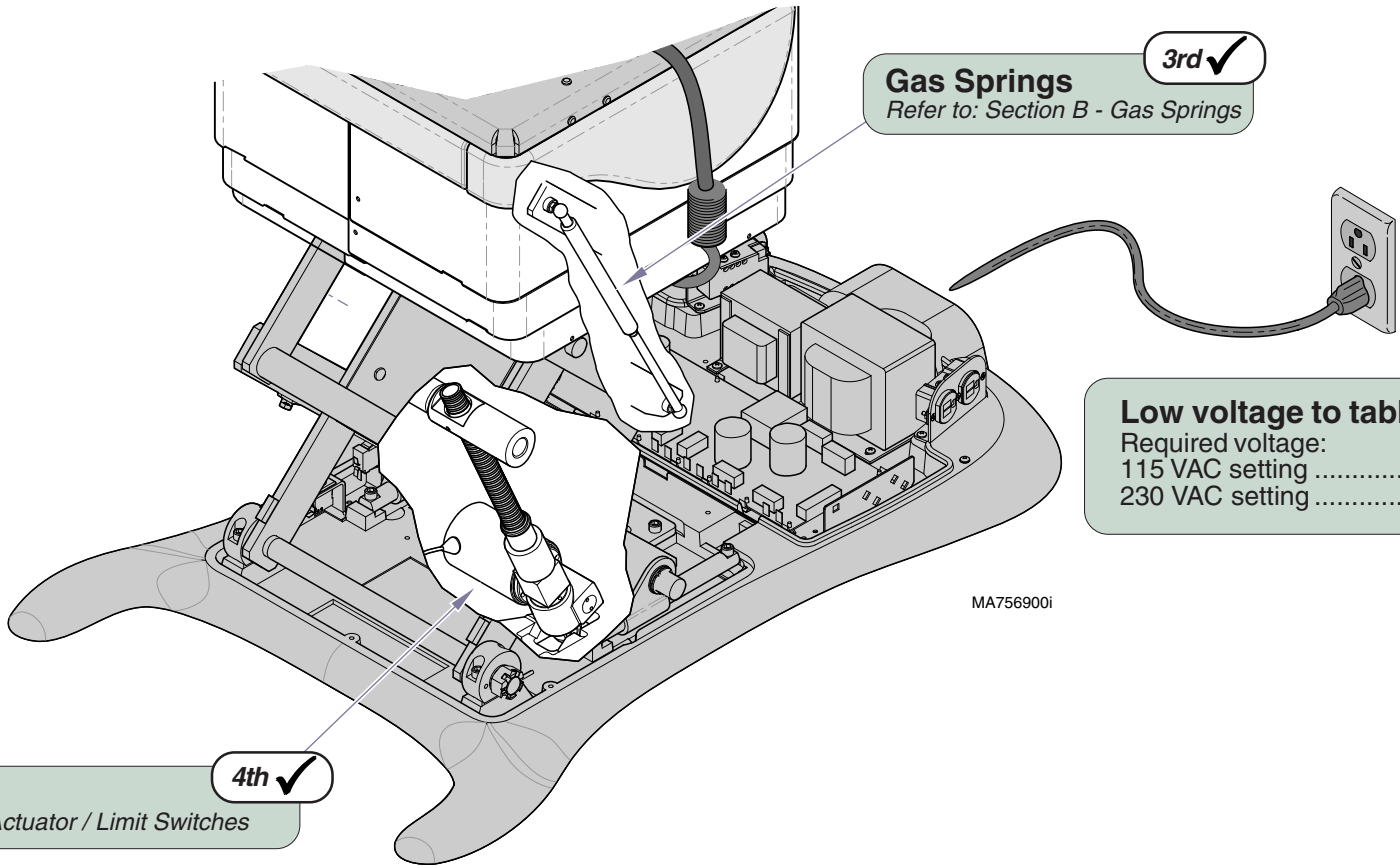
**Gas Springs**  
Refer to: Section B - Gas Springs

**2nd ✓**

**Low voltage to table**  
Required voltage:  
115 VAC setting ..... 115 ±10% VAC  
230 VAC setting ..... 230 ±10% VAC

**4th ✓**

**Base Actuator**  
Refer to: Section B - Base Actuator / Limit Switches



## Base Up / Down Function - continued

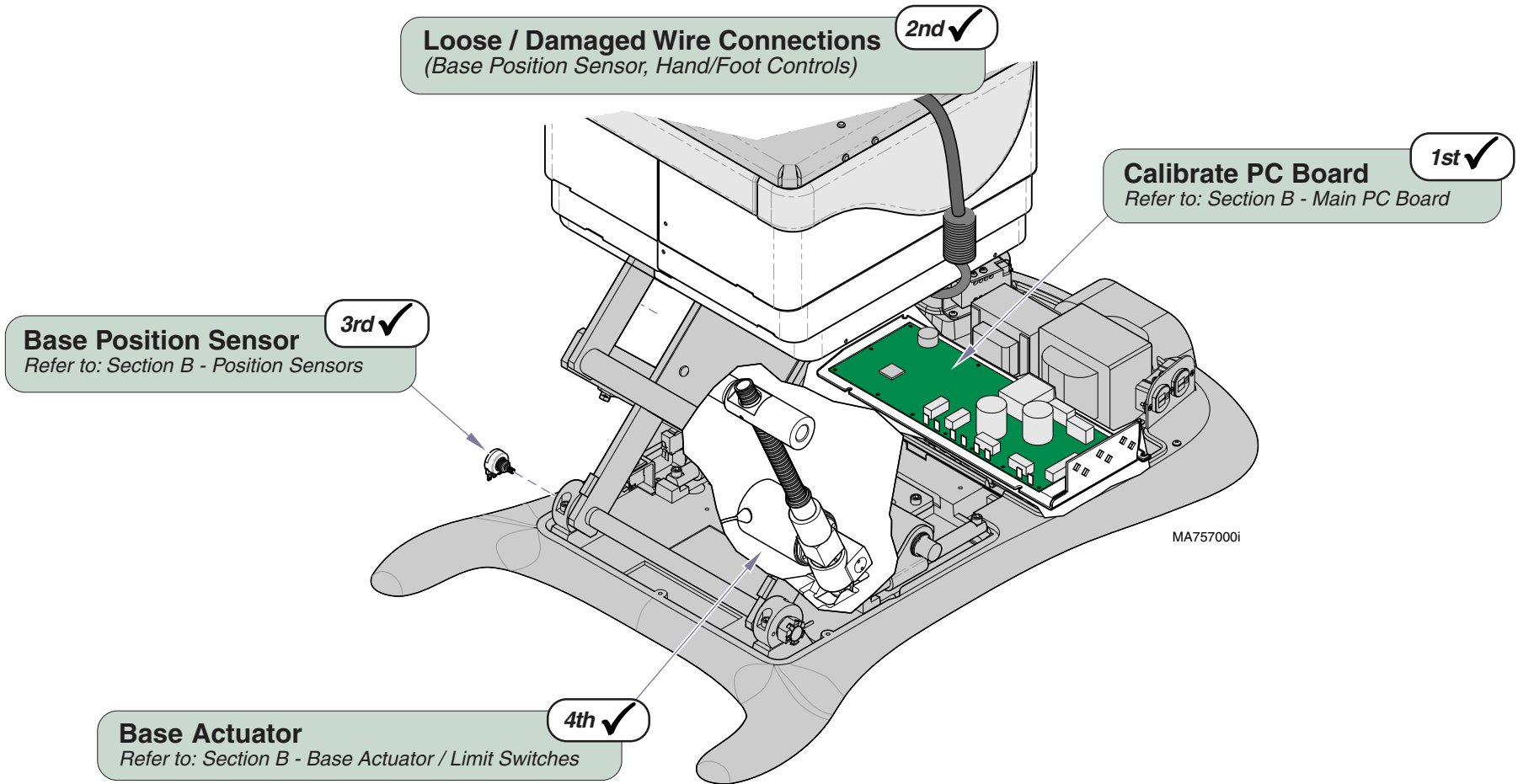
**Problem:** Base Up and/or Base Down moves briefly, then stops ("beeps").

**Attention:** Before performing any of the checks on this page, move the chair functions to the positions listed below:

**Back / Foot:** full UP  
**Tilt:** full DOWN

If Base function becomes operable, refer to: Section A - Crash Avoidance System

Refer To:	Page
Crash Avoidance System .....	A-38
Base Actuator / Limit Switches .....	B-6
Position Sensors .....	B-31
Main PC Board .....	B-37
Wiring Diagrams .....	D-1
Exploded Views / Part Numbers .....	E-1



**Models:**  
**Serial Numbers:**

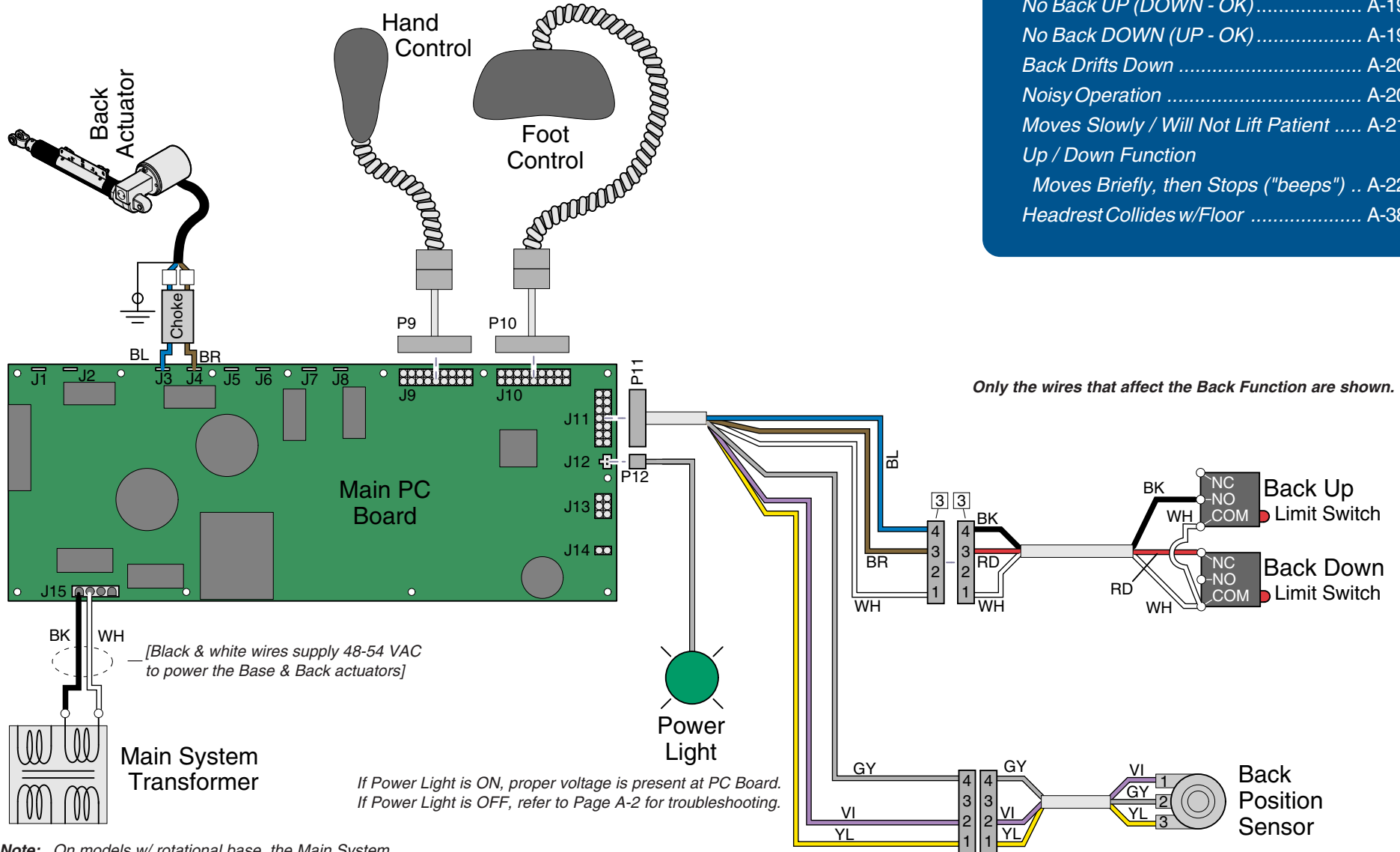
**ALL**

**Base Up / Down**

# Operation & Troubleshooting

## Back UP / DOWN Function

This illustration shows only the components that affect the Back UP / DOWN function. Refer to the following page for a detailed description of Back UP / DOWN operation.



## Troubleshooting [Back Up / Down Function]

Problem	Page
No Back UP or DOWN .....	A-18
No Back UP (DOWN - OK) .....	A-19
No Back DOWN (UP - OK) .....	A-19
Back Drifts Down .....	A-20
Noisy Operation .....	A-20
Moves Slowly / Will Not Lift Patient .....	A-21
Up / Down Function	
Moves Briefly, then Stops ("beeps") ..	A-22
Headrest Collides w/Floor .....	A-38

Only the wires that affect the Back Function are shown.

**Note:** On models w/ rotational base, the Main System Transformer connections are supplied thru the Rotational Base PC Board (not shown).

MA758500i



## Back UP / DOWN Function

### Is There Power To The Table?

When voltage is present at the PC board, the power light is illuminated.

*[Refer to 'Power To The Table' (page A-2), for description of current flow to the PC board].*

### Power To Foot / Hand Controls

Circuitry on the PC board supplies 8-10 VAC to the hand / foot control connection ports.

## Back Up Operation

When the Back Up function is activated, current flows thru the hand / foot control, back to the PC board. Circuitry on the PC Board supplies approximately 48 VDC to the back actuator motor.

The actuator motor runs and raises the back section.

### **NOTE**

The PC board continuously monitors the Back Up limit switch and the Back position sensor.

*If the Back Up limit switch is tripped (closed), the Back Up function will not operate.*

*If the Back position sensor detects that the back section has reached its upper limit, the Back Up function will not operate.*

### **Actuator Motor runs until:**

1. Hand / foot control button is released.
2. Back Up limit switch is tripped.
3. Emergency Stop button is pressed.
4. Position Sensor detects upper limit.
5. Overcurrent protection tripped.
6. Software time-out limit is reached (approx. 30 seconds).

## Back Down Operation

When the Back Down function is activated, current flows thru the hand / foot control, back to the PC board. Circuitry on the PC Board supplies approximately 44 VDC to the back actuator motor.

The actuator motor runs and lowers the back section.

### **NOTE**

The PC board continuously monitors the Back Down limit switch and the Back position sensor.

*If the Back Down limit switch is tripped (open), the Back Down function will not operate.*

*If the Back position sensor detects that the table is in a potential "crash position", or that the back section has reached its lower limit, the Back Down function will not operate\*.*

### **Actuator Motor runs until:**

1. Hand / foot control button is released.
2. Back Down limit switch is tripped.
3. Emergency Stop button is pressed.
4. Crash Avoidance System activated\*.
5. Position Sensor detects lower limit.
6. Overcurrent protection tripped.
7. Software time-out limit is reached (approx. 30 seconds).

**\*Note:** Refer to *Section A: Crash Avoidance System* for a detailed description of "crash position", and the table functions that are disabled.

# Operation & Troubleshooting

**Back Up / Down Function - continued**

**Problem:** No Back Up or Back Down.

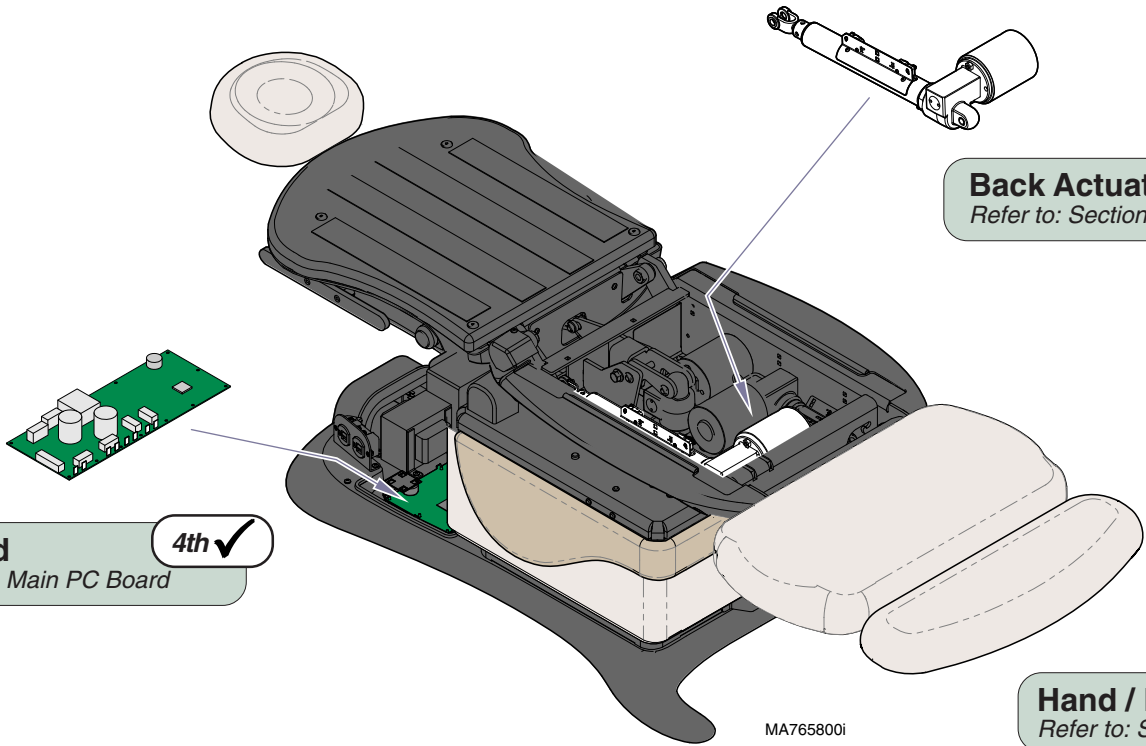
Refer To:	Page
Hand & Foot Controls .....	B-3
Back Actuator / Limit Switches .....	B-10
Main PC Board .....	B-37
Wiring Diagrams .....	D-1
Exploded Views / Part Numbers .....	E-1

**Loose / Damaged Wire Connections** 1st ✓  
*(Back Actuator, Back Up/Down Limit Switches, hand/foot control ports, black & white wires between main system transformer & PC board)*

**Back Actuator / Limit Switches** 3rd ✓  
*Refer to: Section B - Back Actuator / Limit Switches*

**Main PC Board** 4th ✓  
*Refer to: Section B - Main PC Board*

**Hand / Foot Control** 2nd ✓  
*Refer to: Section B - Hand & Foot Controls*



## Back Up / Down Function - continued

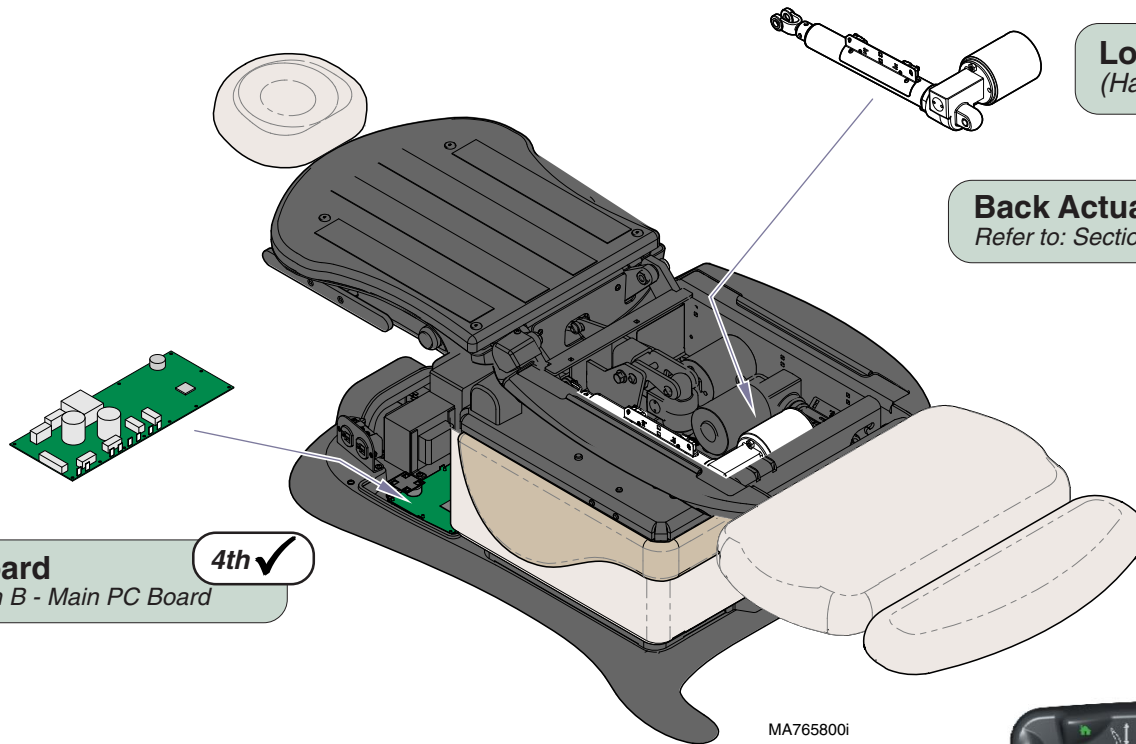
**Problem:** No Back Up. [Back Down - OK]  
 -or  
 No Back Down. [Back Up - OK]

**Attention:** If Back Down is inoperable, move the other chair functions to the positions listed below:

**Base / Foot:** full UP  
**Tilt:** full DOWN

If Back Down function becomes operable,  
 refer to: Section A - Crash Avoidance System

Refer To:	Page
Crash Avoidance System .....	A-38
Hand & Foot Controls .....	B-3
Back Actuator / Limit Switches .....	B-10
Main PC Board .....	B-37
Wiring Diagrams .....	D-1
Exploded Views / Part Numbers .....	E-1



**Loose / Damaged Wire Connections** 1st ✓  
 (Hand/Foot Control & Back Up / Down Limit Switches)

**Back Actuator / Limit Switches** 3rd ✓  
 Refer to: Section B - Back Actuator / Limit Switches

**Main PC Board** 4th ✓  
 Refer to: Section B - Main PC Board

**Hand / Foot Control** 2nd ✓  
 Refer to: Section B - Hand & Foot Controls



**Models:** ALL  
**Serial Numbers:**

**Back Up / Down**

# Operation & Troubleshooting

Refer To:	Page
Back Actuator / Limit Switches .....	B-10
Wiring Diagrams .....	D-1
Exploded Views / Part Numbers .....	E-1

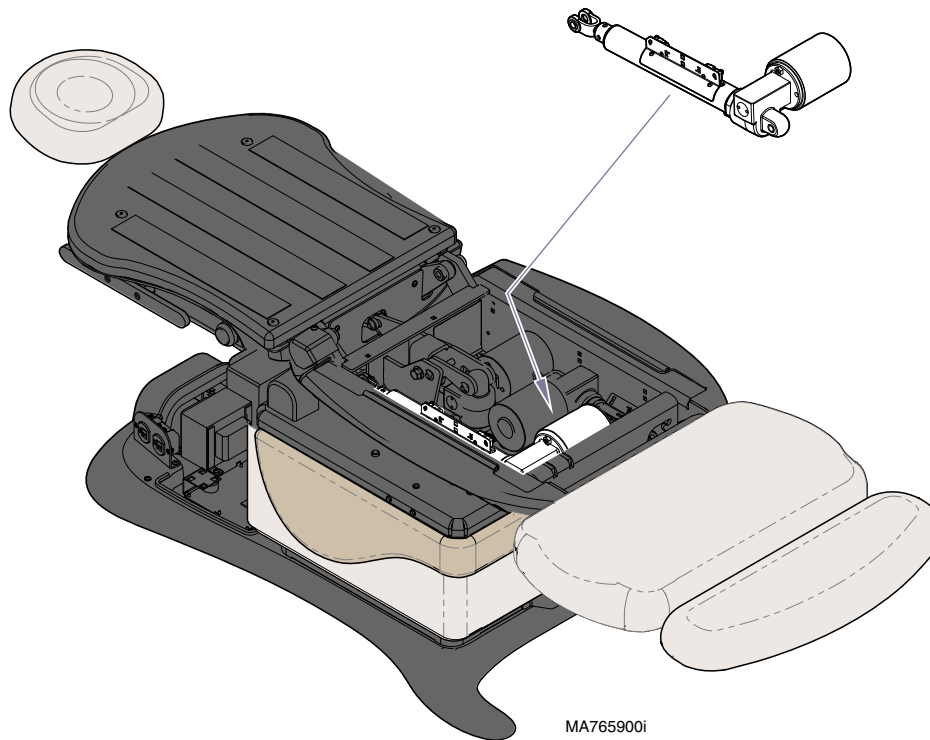
## Back Up / Down Function - continued

**Problem:** Back drifts down.- and/or  
Noisy operation. (Grinding / squeaking)

### Back Actuator

Refer to: Section B - Back Actuator / Limit Switches

1st ✓



MA765900i

## Back Up / Down Function - continued

**Problem:** Moves slowly - and/or  
Will not lift patient.

Refer To:	Page
General Information (Specifications) .....	ii
Back Actuator / Limit Switches .....	B-10
Wiring Diagrams .....	D-1
Exploded Views / Part Numbers .....	E-1

### 1st ✓ Did patient exceed 450 lb. weight limit?

Inform staff that max. patient weight is 450 lbs.

Refer to: General Information Section

### 3rd ✓ Back Actuator

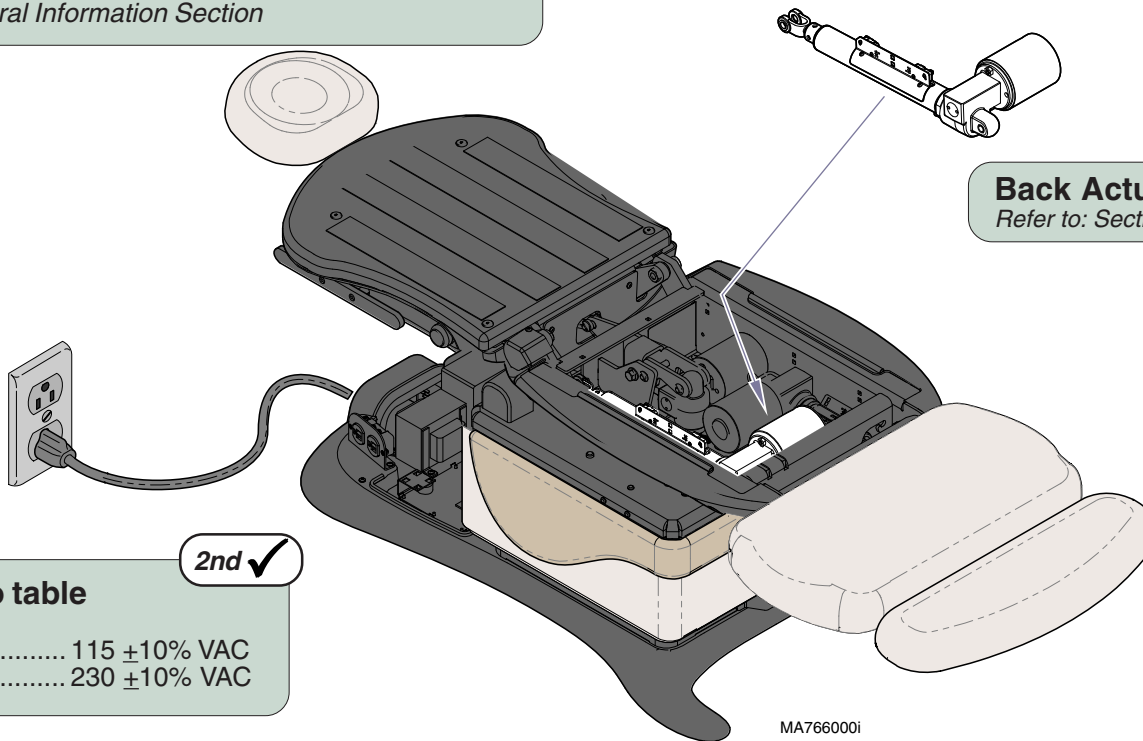
Refer to: Section B - Back Actuator / Limit Switches

### 2nd ✓ Low voltage to table

Required voltage:

115 VAC setting ..... 115 ±10% VAC

230 VAC setting ..... 230 ±10% VAC



MA766000i

Models:  
Serial Numbers:

ALL

Back Up / Down

# Operation & Troubleshooting

**Back Up / Down Function - continued**

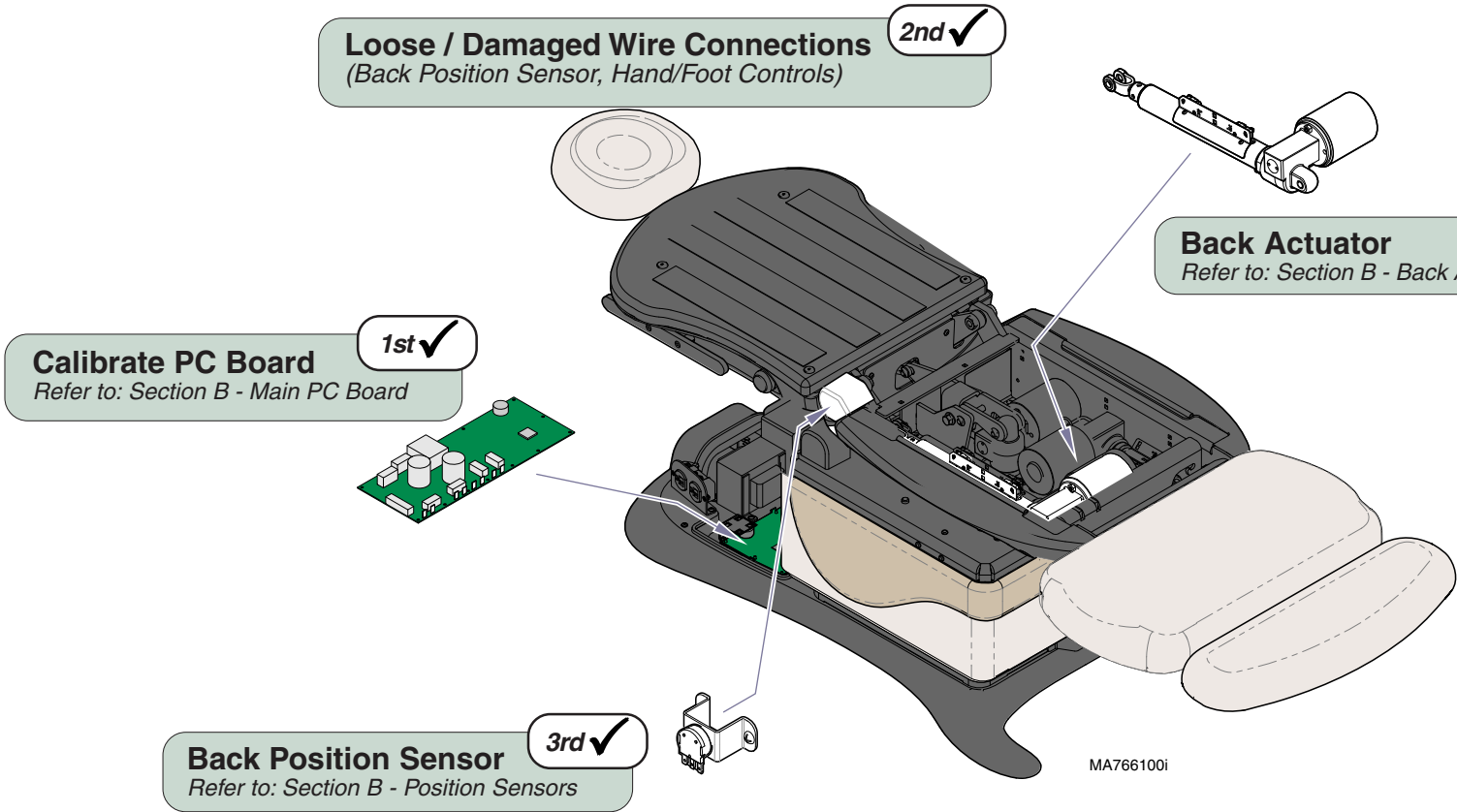
**Problem:** Back Up and/or Back Down moves briefly, then stops ("beeps").

Refer To:	Page
Crash Avoidance System .....	A-38
Back Actuator / Limit Switches .....	B-10
Position Sensors .....	B-31
Main PC Board .....	B-37
Wiring Diagrams .....	D-1
Exploded Views / Part Numbers .....	E-1

**Attention:** Before performing any of the checks on this page, move the chair functions to the positions listed below:

**Base / Foot:** full UP  
**Tilt:** full DOWN

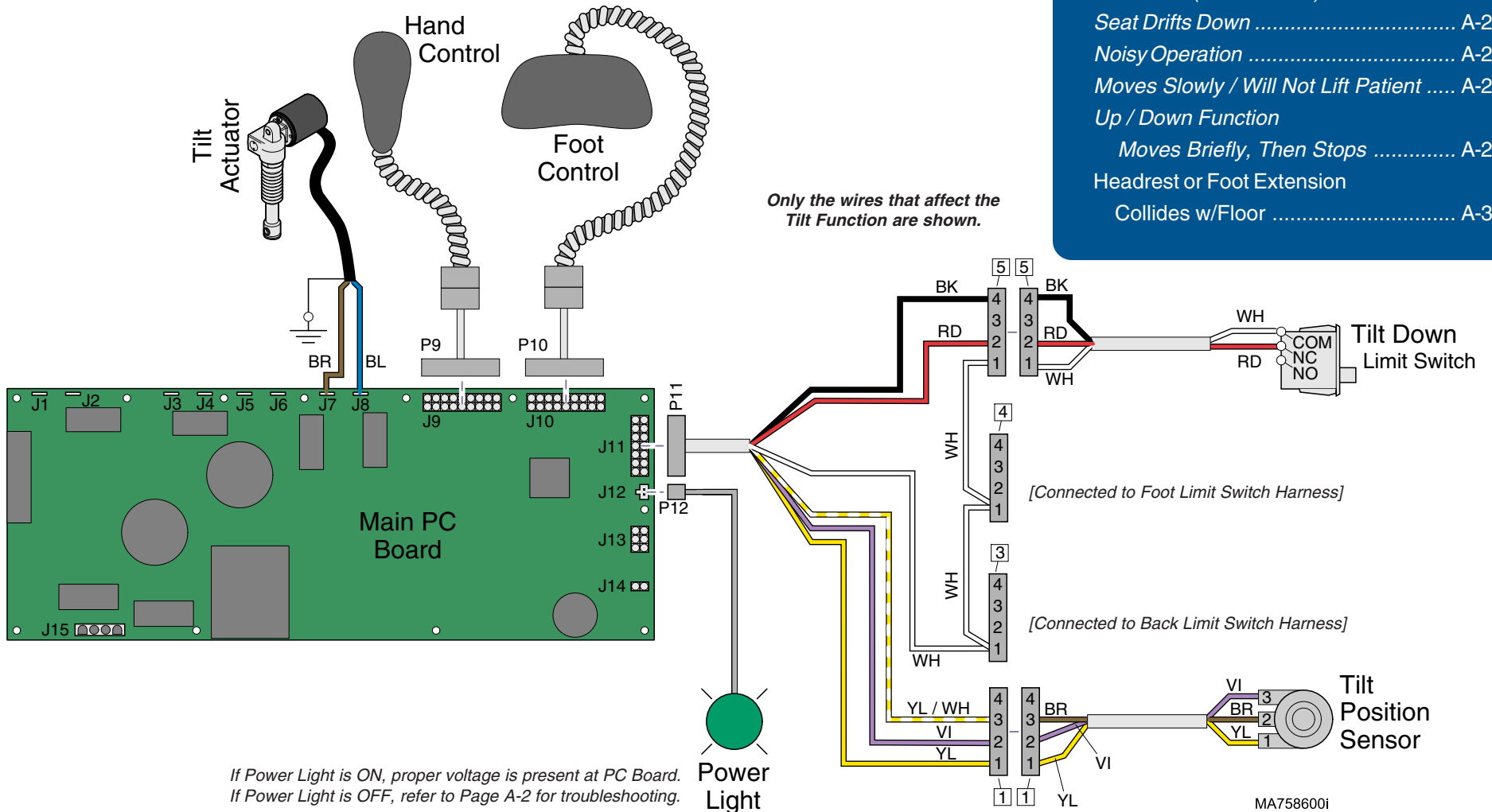
If Tilt function becomes operable, refer to: Section A - Crash Avoidance System



# Operation & Troubleshooting

## Tilt UP / DOWN Function

This illustration shows only the components that affect the Tilt UP / DOWN function. Refer to the following page for a detailed description of Tilt UP / DOWN operation.



## Troubleshooting [Tilt Up / Down Function]

Problem	Page
No Tilt UP or DOWN .....	A-25
No Tilt DOWN (UP - OK) .....	A-26
No Tilt UP (DOWN - OK) .....	A-26
Seat Drifts Down .....	A-27
Noisy Operation .....	A-27
Moves Slowly / Will Not Lift Patient .....	A-28
Up / Down Function	
Moves Briefly, Then Stops .....	A-29
Headrest or Foot Extension	
Collides w/Floor .....	A-38

Models:  
Serial Numbers:

ALL

Tilt Up / Down

A-23

# Operation & Troubleshooting

## ***Tilt UP / DOWN Function***

### **Is There Power To The Table?**

When voltage is present at the PC board, the power light is illuminated.

*[Refer to 'Power To The Table' (page A-2), for description of current flow to the PC board].*

### **Power To Foot / Hand Controls**

Circuitry on the PC board supplies 8-10 VAC to the hand / foot control connection ports.

## **Tilt Up Operation**

When the Tilt Up function is activated, current flows thru the hand / foot control, back to the PC board. Circuitry on the PC Board supplies approximately 48 VDC to the tilt actuator motor.

The actuator motor runs and reclines the seat section.

### **NOTE**

The PC board continuously monitors the Tilt position sensor.

*When the Tilt position sensor detects that the seat section has reached its upper limit, or that the table is in a potential "crash position", the Tilt Up function will not operate\*.*

### ***Actuator Motor runs until:***

1. Hand / foot control button is released.
2. Emergency Stop button is pressed.
3. Crash Avoidance System activated\*.
4. Position Sensor malfunction.
5. Overcurrent protection tripped.
6. Software time-out limit is reached.  
*(approx. 30 seconds).*

## **Tilt Down Operation**

When the Tilt Down function is activated, current flows thru the hand / foot control, back to the PC board. Circuitry on the PC Board supplies approximately 48 VDC to the tilt actuator motor.

The actuator motor runs and brings the seat section back to a flat position.

### **NOTE**

The PC board continuously monitors the Tilt Down limit switch and the Tilt position sensor.

*If the Tilt Down limit switch is tripped (open), the Tilt Down function will not operate.*

*If the Tilt position sensor detects that the table is in a potential "crash position", or that the seat section has reached its lower limit, the Tilt Down function will not operate\*.*

### ***Actuator Motor runs until:***

1. Hand / foot control button is released.
2. Tilt Down limit switch is tripped.
3. Emergency Stop button is pressed.
4. Crash Avoidance System activated\*.
5. Position Sensor malfunction.
6. Overcurrent protection tripped.
7. Software time-out limit is reached.  
*(approx. 30 seconds).*

**\*Note:** Refer to *Section A: Crash Avoidance System* for a detailed description of "crash position", and the table functions that are disabled.



# Operation & Troubleshooting

## Tilt Up / Down Function - continued

**Problem:** No Tilt Up or Tilt Down.

Refer To:	Page
Hand & Foot Controls .....	B-3
Tilt Actuator / Limit Switch .....	B-14
Main PC Board .....	B-37
Wiring Diagrams .....	D-1
Exploded Views / Part Numbers .....	E-1

**Loose / Damaged Wire Connections**  
(Tilt Actuator, hand/foot control ports)

1st ✓

**Tilt Actuator**

Refer to: Section B - Tilt Actuator / Limit Switch

3rd ✓

**Main PC Board**

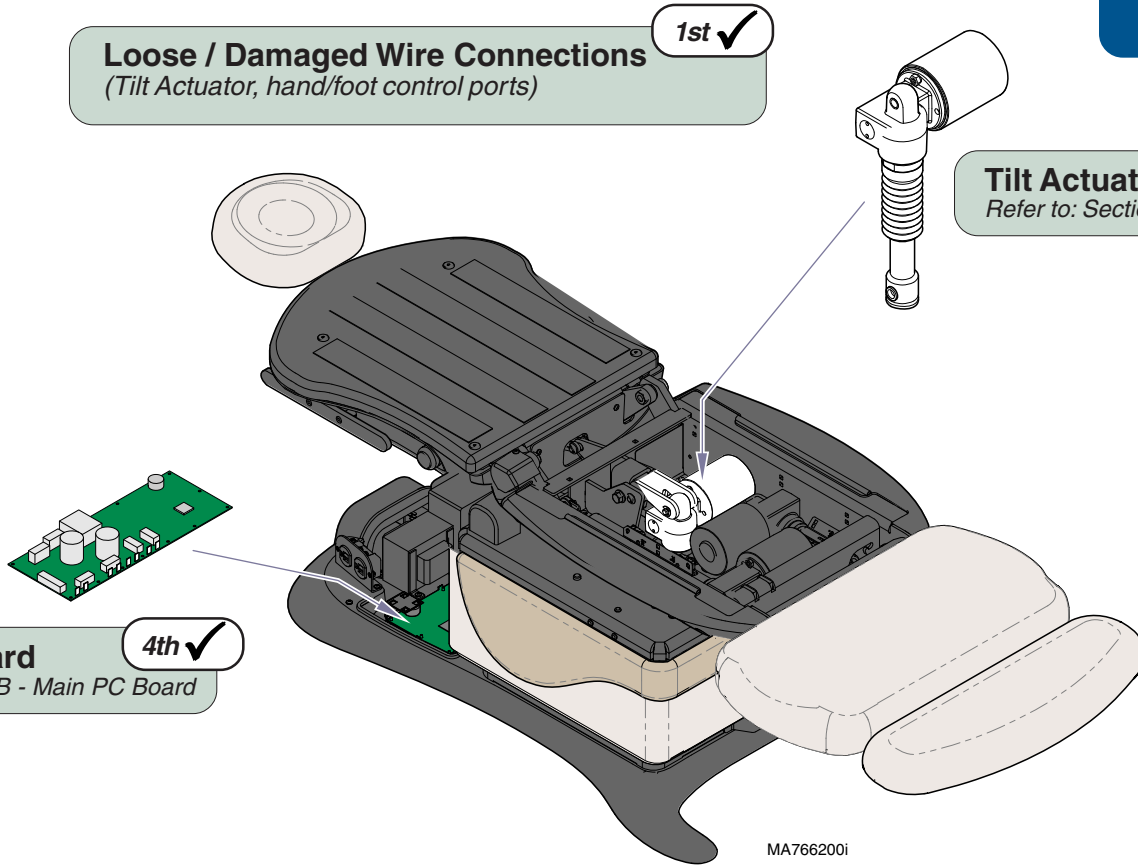
Refer to: Section B - Main PC Board

4th ✓

**Hand / Foot Control**

Refer to: Section B - Hand & Foot Controls

2nd ✓



MA766200i



**Models:**  
**Serial Numbers:**

**ALL**

**Tilt Up / Down**

**A-25**

# Operation & Troubleshooting

Refer To:	Page
Crash Avoidance System .....	A-38
Hand & Foot Controls .....	B-3
Tilt Actuator / Limit Switch .....	B-14
Main PC Board .....	B-37
Wiring Diagrams .....	D-1
Exploded Views / Part Numbers .....	E-1

## Tilt Up / Down Function - continued

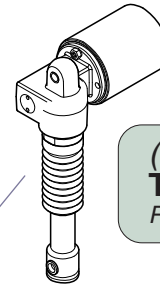
**Problem:** No Tilt Up. [Tilt Down - OK]  
**-or-**  
 No Tilt Down. [Tilt Up - OK]

**Attention:** Before performing any of the checks on this page, move the chair functions to the positions listed below:

**Base / Back / Foot:** full UP

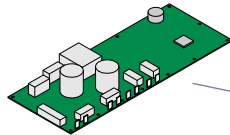
If Tilt function becomes operable, refer to: Section A - Crash Avoidance System

**Loose / Damaged Wire Connections** 1st ✓  
 (Tilt Down Limit Switch, & hand/foot control ports)



**(No Tilt Down)** 3rd ✓  
**Tilt Down Limit Switch**  
 Refer to: Section B - Tilt Actuator / Limit Switch

**Main PC Board** 4th ✓  
 Refer to: Section B - Main PC Board

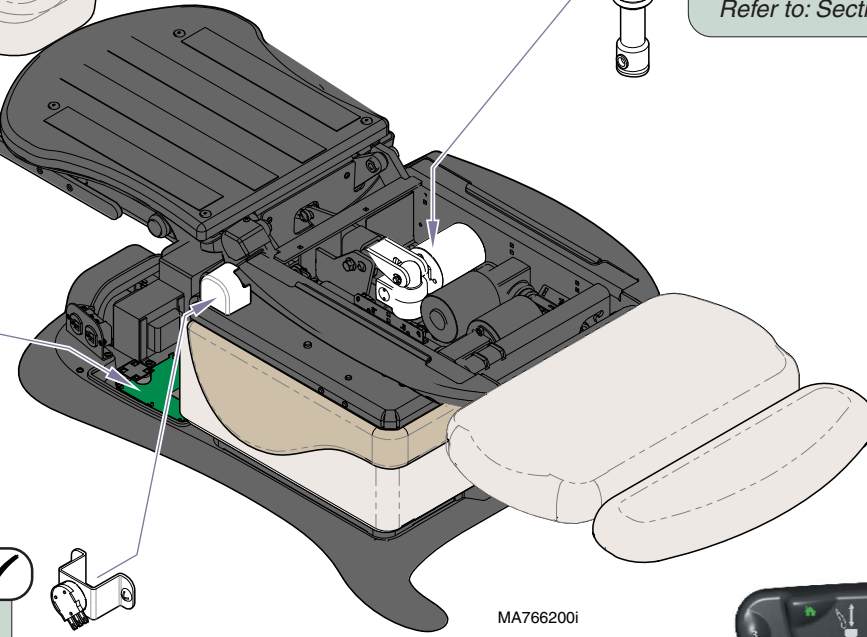


**Hand / Foot Control** 2nd ✓  
 Refer to: Section B - Hand & Foot Controls

**(No Tilt Up)** 3rd ✓  
**Tilt Position Sensor**  
 Refer to: Section B - Position Sensors



3rd ✓



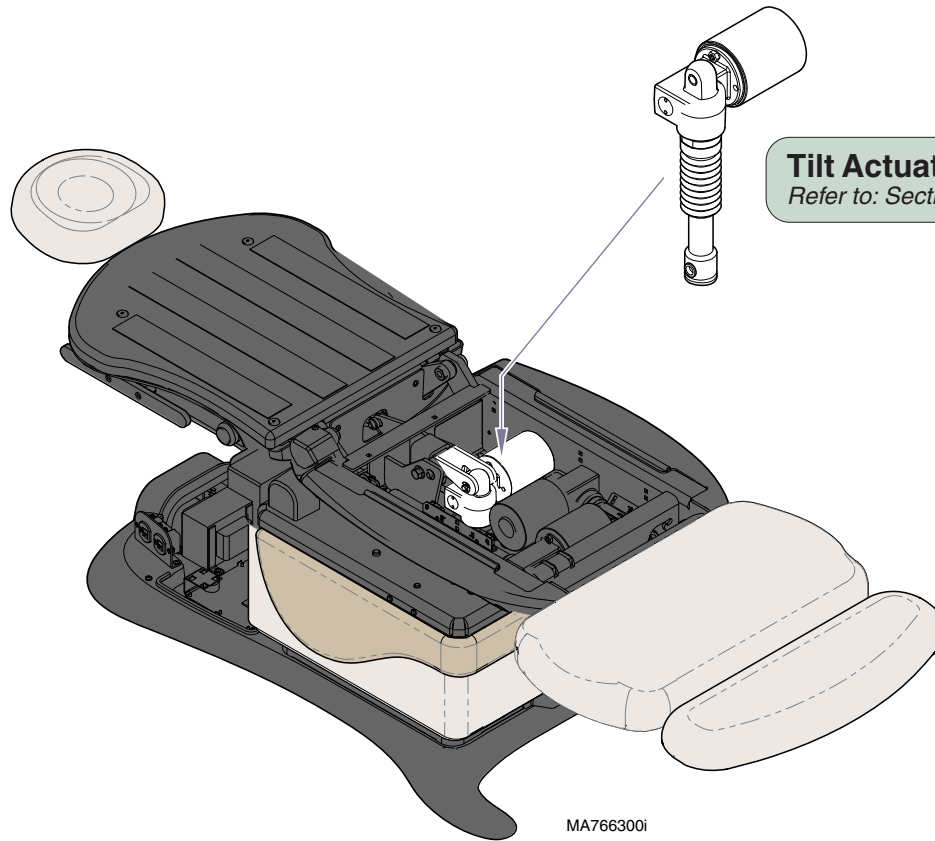
MA766200i



## Tilt Up / Down Function - continued

**Problem:** Seat drifts down.  
-or  
Noisy operation. (Grinding / squeaking)

Refer To:	Page
Tilt Actuator / Limit Switch .....	B-14
Wiring Diagrams .....	D-1
Exploded Views / Part Numbers .....	E-1



### Tilt Actuator

Refer to: Section B - Tilt Actuator / Limit Switch

1st ✓

MA766300i

**Models:**  
**Serial Numbers:**

**ALL**

**Tilt Up / Down**

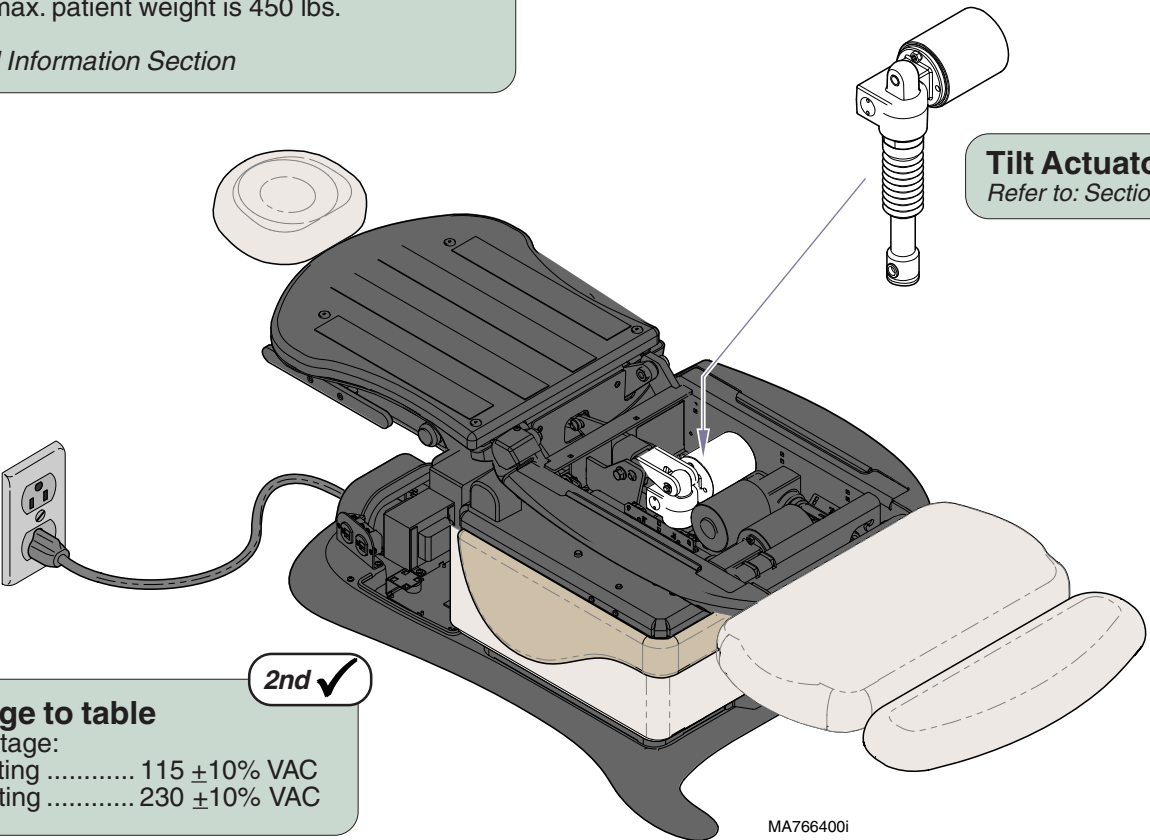
**A-27**

# Operation & Troubleshooting

**Refer To:** **Page**  
General Information (Specifications) ..... ii  
Tilt Actuator / Limit Switch ..... B-14  
Wiring Diagrams ..... D-1  
Exploded Views / Part Numbers ..... E-1

**Tilt Up / Down Function - continued**  
**Problem:** Moves slowly - and/or  
Will not lift patient.

**1st ✓**  
**Did patient exceed 450 lb. weight limit?**  
Inform staff that max. patient weight is 450 lbs.  
*Refer to: General Information Section*



**3rd ✓**  
**Tilt Actuator**  
*Refer to: Section B - Tilt Actuator / Limit Switch*

**2nd ✓**  
**Low voltage to table**  
Required voltage:  
115 VAC setting ..... 115 ±10% VAC  
230 VAC setting ..... 230 ±10% VAC

## Tilt Up / Down Function - continued

**Problem:** Tilt Up and/or Tilt Down moves briefly, then stops ("beeps").

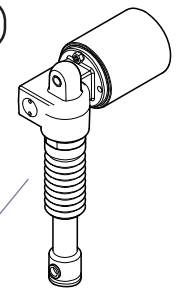
**Attention:** Before performing any of the checks on this page, move the chair functions to the positions listed below:

**Base / Back / Foot:** all the way up

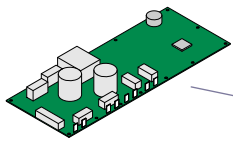
If Tilt function becomes operable, refer to: Section A - Crash Avoidance System

Refer To:	Page
Crash Avoidance System .....	A-38
Tilt Actuator / Limit Switch .....	B-14
Position Sensors .....	B-31
Main PC Board .....	B-37
Wiring Diagrams .....	D-1
Exploded Views / Part Numbers .....	E-1

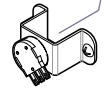
**Tilt Actuator** 4th ✓  
Refer to: Section B - Tilt Actuator / Limit Switch



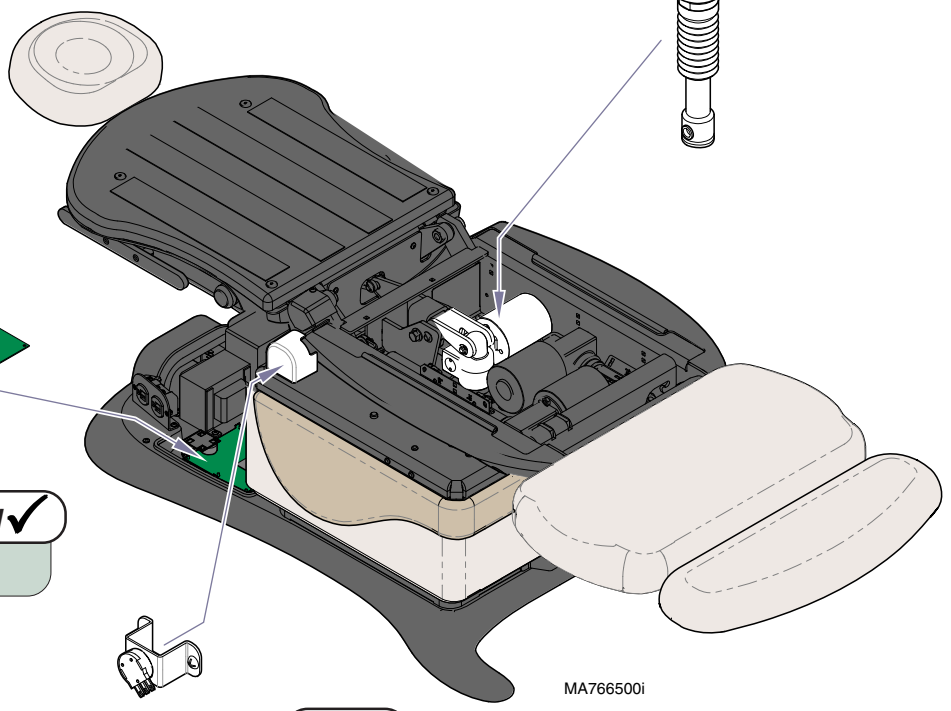
**Calibrate PC Board** 1st ✓  
Refer to: Section B - Main PC Board



**Loose / Damaged Wire Connections** 2nd ✓  
(Tilt Position Sensor, Hand/Foot Controls)



**Tilt Position Sensor** 3rd ✓  
Refer to: Section B - Position Sensors



MA766500i

**Models:** ALL  
**Serial Numbers:**

**Tilt Up / Down**

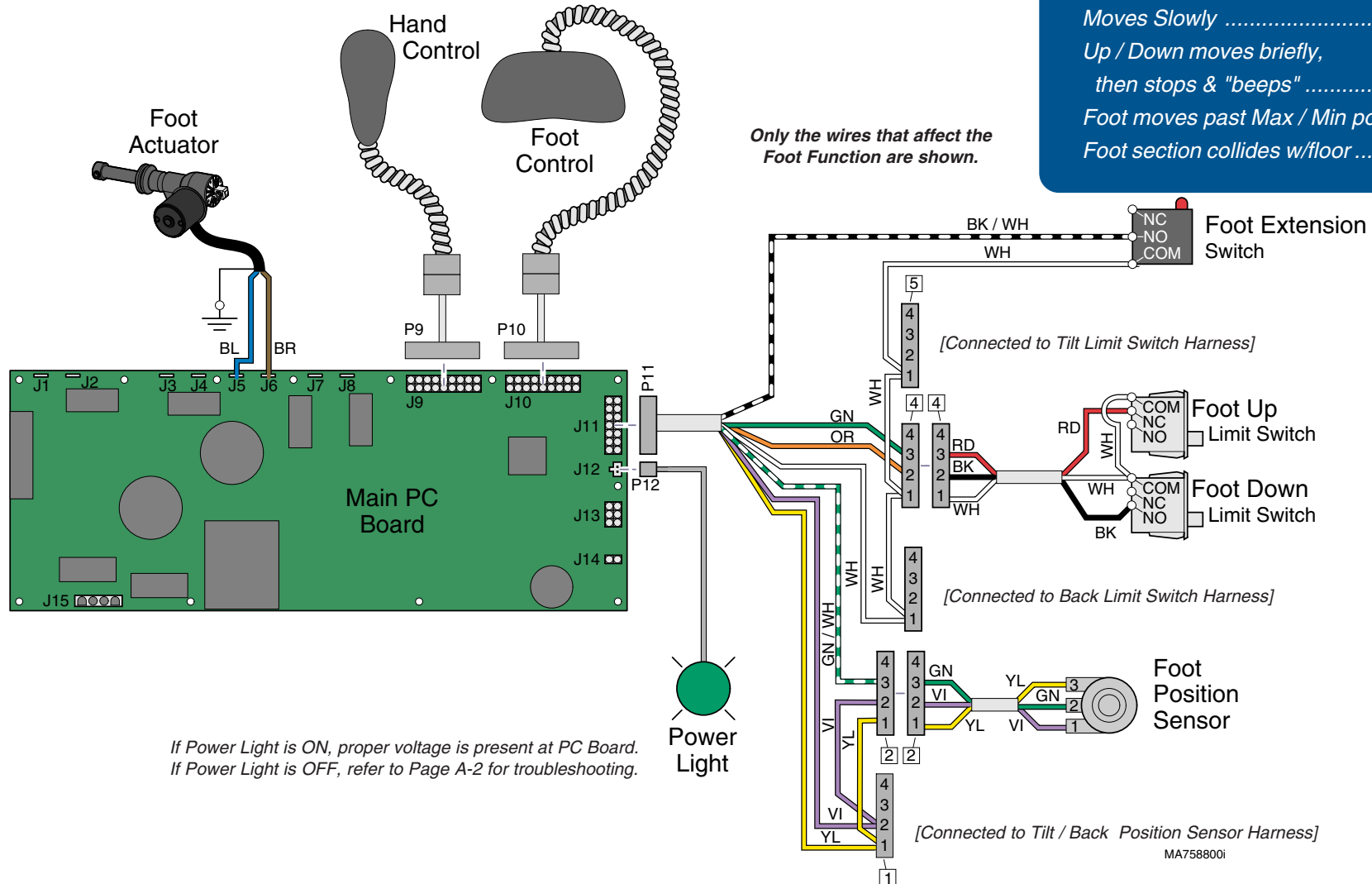
# Operation & Troubleshooting

## Foot UP / DOWN Function

This illustration shows only the components that affect the Foot UP / DOWN function. Refer to the following page for a detailed description of Foot UP / DOWN operation.

### Troubleshooting [Foot Up / Down Function]

Problem	Page
No Foot UP or DOWN .....	A-32
No Foot UP (DOWN - OK) .....	A-33
No Foot DOWN (UP - OK) "beeps" .....	A-33
Foot Drifts Down .....	A-34
Noisy Operation .....	A-34
Moves Slowly .....	A-35
Up / Down moves briefly, then stops & "beeps" .....	A-36
Foot moves past Max / Min position ....	A-37
Foot section collides w/floor .....	A-38



## Foot UP / DOWN Function

### Is There Power To The Table?

When voltage is present at the PC board, the power light is illuminated.

*[Refer to 'Power To The Table' (page A-2), for description of current flow to the PC board].*

### Power To Foot / Hand Controls

Circuitry on the PC board supplies 8-10 VAC to the hand / foot control connection ports.

## Foot Up Operation

When the Foot Up function is activated, current flows thru the hand / foot control, back to the PC board. Circuitry on the PC Board supplies approximately 48 VDC to the foot actuator motor.

The actuator motor runs and raises the foot section.

### **NOTE**

The PC board continuously monitors the Foot Up Limit Switch and the Foot position sensor.

*If the Foot Up Limit Switch is tripped (open), the Foot Up function will not operate.*

*If the Foot position sensor detects that the foot section has reached its upper limit, the Foot Up function will not operate.*

### **Actuator Motor runs until:**

1. Hand / foot control button is released.
2. Foot Up limit switch is tripped.
3. Emergency Stop button is pressed.
4. Position Sensor malfunction.
5. Overcurrent protection tripped.
6. Software time-out limit is reached.  
(*approx. 20 seconds*).

## Foot Down Operation

When the Foot Down function is activated, current flows thru the hand / foot control, back to the PC board. Circuitry on the PC Board supplies approximately 48 VDC to the foot actuator motor.

The actuator motor runs and lowers the foot section.

### **NOTE**

The PC board continuously monitors the Foot Down limit switch, the Foot position sensor, and the Foot Extension switch.

*If the Foot Down limit switch is tripped (closed), the Foot Down function will not operate.*

*If the Foot position sensor detects that the foot section has reached its lower limit, the Foot Down function will not operate.*

*If the Foot Extension switch is not tripped, and the Foot position sensor detects that the table is in a potential "crash position", the Foot Down function will not operate\*.*

### **Actuator Motor runs until:**

1. Hand / foot control button is released.
2. Foot Down limit switch is tripped.
3. Emergency Stop button is pressed.
4. Crash Avoidance System activated\*.
5. Position Sensor malfunction.
6. Overcurrent protection tripped.
7. Software time-out limit is reached  
(*approx. 20 seconds*).

**\*Note:** Refer to *Section A: Crash Avoidance System* for a detailed description of "crash position", and the table functions that are disabled.

# Operation & Troubleshooting

**Foot Up / Down Function - continued**

**Problem:** No Foot Up or Foot Down.

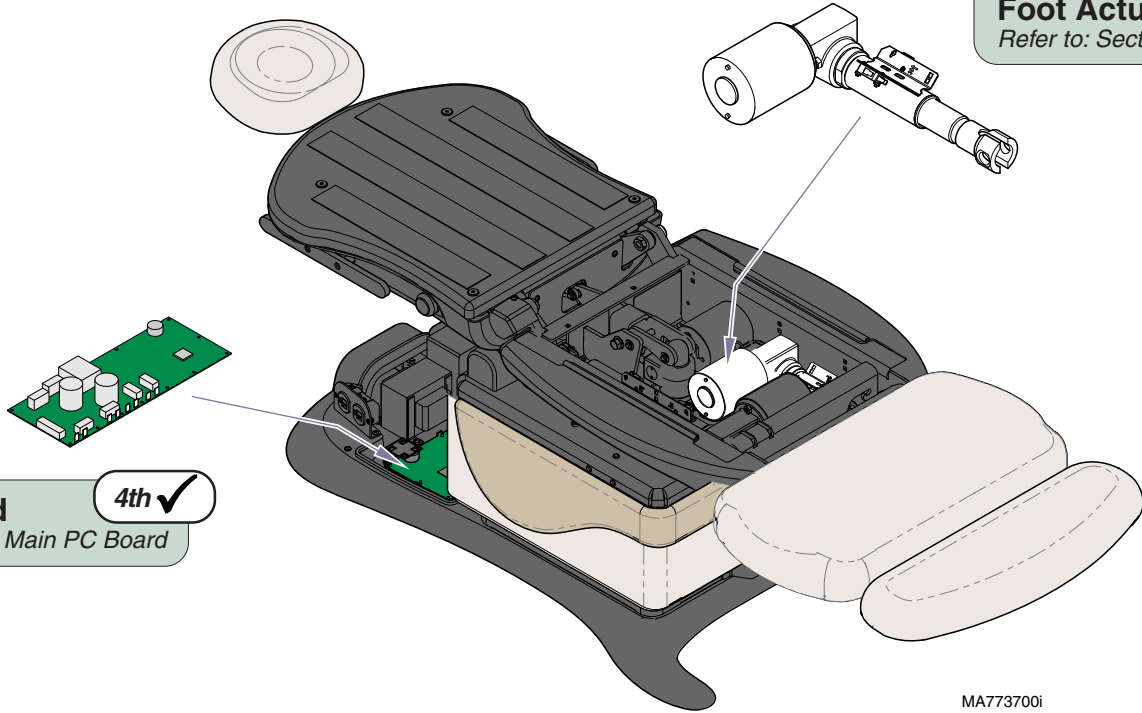
Refer To:	Page
Hand & Foot Controls .....	B-3
Foot Actuator / Limit Switches .....	B-19
Main PC Board .....	B-37
Wiring Diagrams .....	D-1
Exploded Views / Part Numbers .....	E-1

**Loose / Damaged Wire Connections** 1st ✓  
*(Hand/Foot Control, Foot Actuator, & Foot Up/Down Limit Switches)*

**Foot Actuator** 3rd ✓  
*Refer to: Section B - Foot Actuator*

**Main PC Board** 4th ✓  
*Refer to: Section B - Main PC Board*

**Hand / Foot Control** 2nd ✓  
*Refer to: Section B - Hand & Foot Controls*



MA773700i





## Foot Up / Down Function - continued

**Problem:** No Foot Up. [Foot Down - OK]  
**-or-**  
 No Foot Down. [Foot Up - OK] "beeps"

**Attention:** If Foot Down is inoperable, move the foot extension to its stowed position, and move the other chair functions to the positions listed below:

**Base / Back:** full UP  
**Tilt:** full DOWN

If Foot Down function becomes operable, refer to: Section A - Crash Avoidance System

Refer To:	Page
Crash Avoidance System .....	A-38
Foot Actuator / Limit Switches .....	B-19
Hand & Foot Controls .....	B-3
Main PC Board .....	B-37
Foot Extension / Limit Switch .....	B-24
Wiring Diagrams .....	D-1
Exploded Views / Part Numbers .....	E-1

### Loose / Damaged Wire Connections 1st ✓

Hand/Foot Control, Foot Up/Down Limit Switches, Foot Extension Limit Switch

### Foot Actuator / Limit Switches 5th ✓

Refer to: Section B - Foot Actuator / Limit Switches

### Switch affects DOWN function only 2nd ✓ Foot Extension Limit Switch

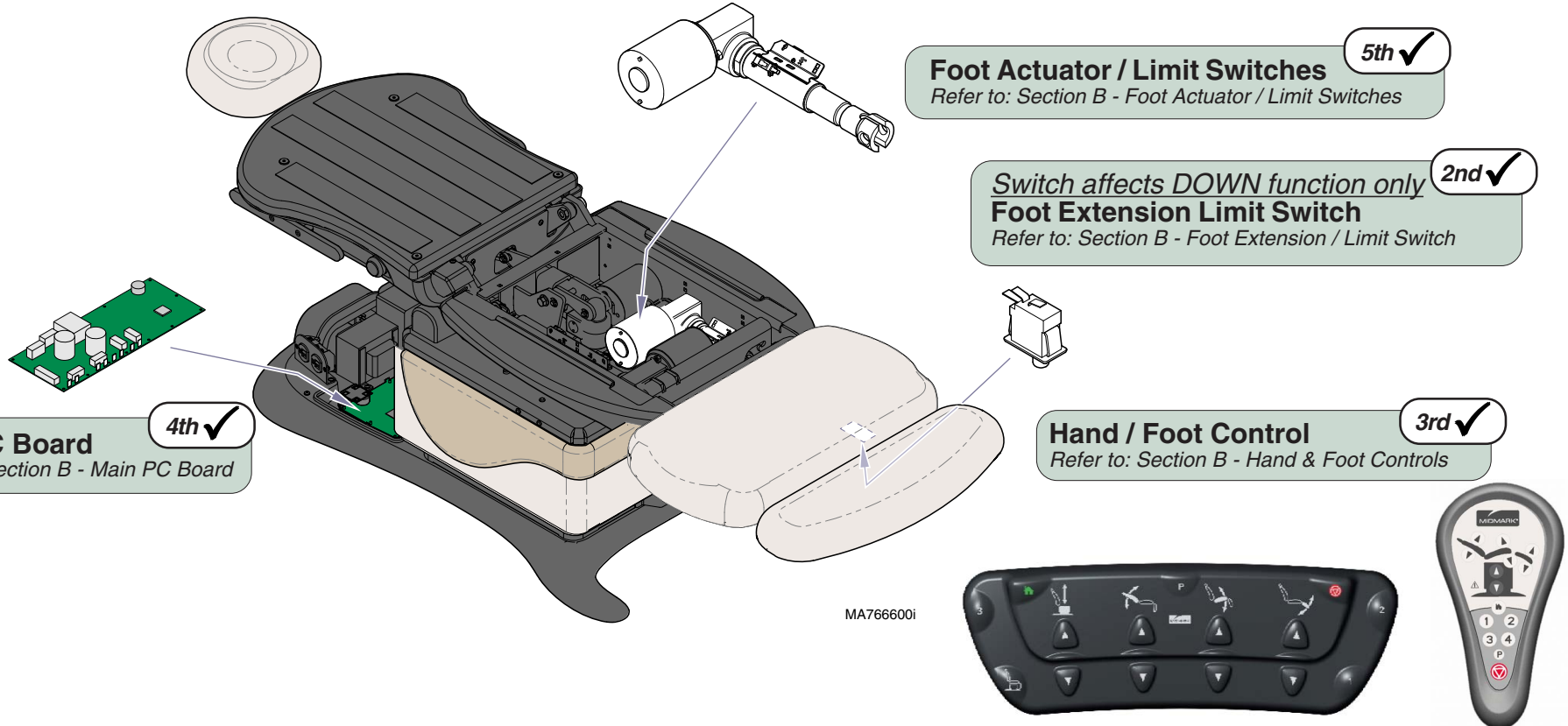
Refer to: Section B - Foot Extension / Limit Switch

### Hand / Foot Control 3rd ✓

Refer to: Section B - Hand & Foot Controls

### Main PC Board 4th ✓

Refer to: Section B - Main PC Board



**Models:** ALL  
**Serial Numbers:**

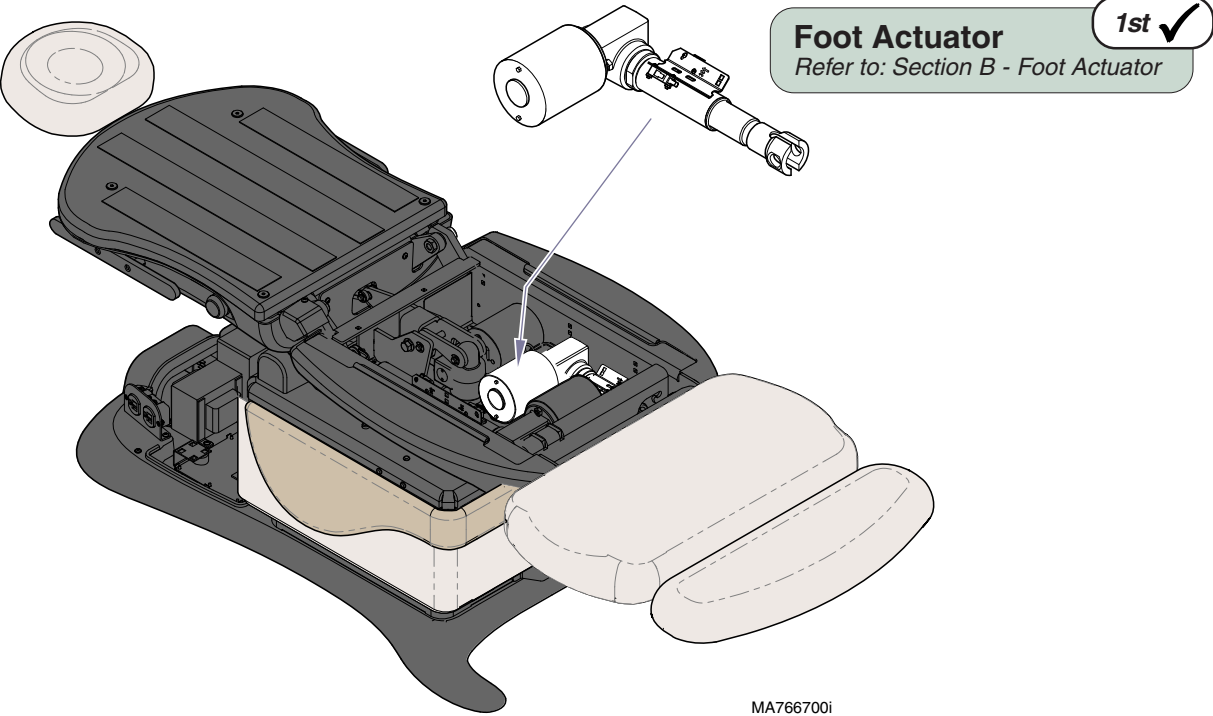
**Foot Up / Down**

# Operation & Troubleshooting

Refer To:	Page
Foot Actuator / Limit Switches .....	B-19
Wiring Diagrams .....	D-1
Exploded Views / Part Numbers .....	E-1

**Foot Up / Down Function - continued**

**Problem:** Foot drifts down.  
-or  
Noisy operation. (Grinding, / squeaking)



## Foot Up / Down Function - continued

**Problem:** Moves slowly - and/or  
Will not lift patient.

Refer To:	Page
General Information ( <i>Specifications</i> ) .....	ii
Foot Actuator / Limit Switches .....	B-19
Wiring Diagrams .....	D-1
Exploded Views / Part Numbers .....	E-1

**Did patient exceed 450 lb. weight limit?**  
Inform staff that max. patient weight is 450 lbs.

1st ✓

Refer to: *General Information Section*

**Foot Actuator**

Refer to: *Section B - Foot Actuator*

3rd ✓

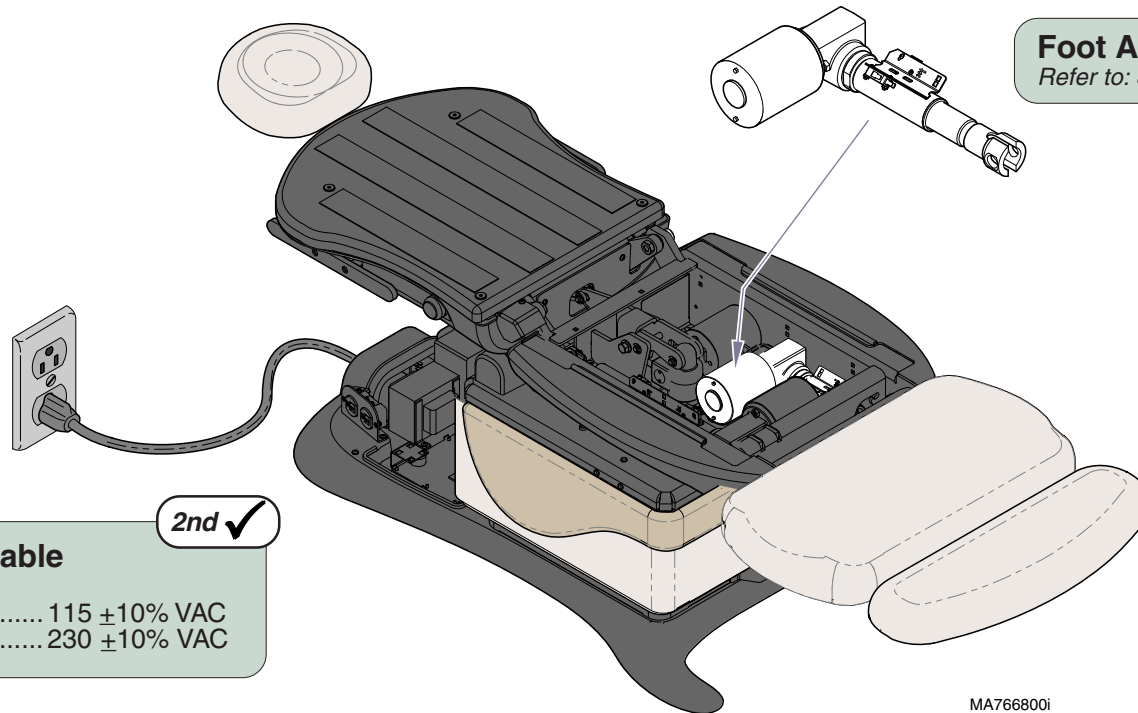
**Low voltage to table**

Required voltage:

115 VAC setting ..... 115 ±10% VAC

230 VAC setting ..... 230 ±10% VAC

2nd ✓



**Models:**  
**Serial Numbers:**

ALL

Foot Up / Down

# Operation & Troubleshooting

Refer To:	Page
Foot Actuator / Limit Switches .....	B-19
Position Sensors .....	B-31
Main PC Board .....	B-37
Wiring Diagrams .....	D-1
Exploded Views / Part Numbers .....	E-1

**Foot Up / Down Function - continued**

**Problem:** Foot Up *and/or* Foot Down moves briefly, then stops ("beeps").

**Attention:** If *only* the Foot Down function is inoperable, move the chair functions to the positions listed below:

**Base / Back:** all the way up  
**Tilt:** all the way down

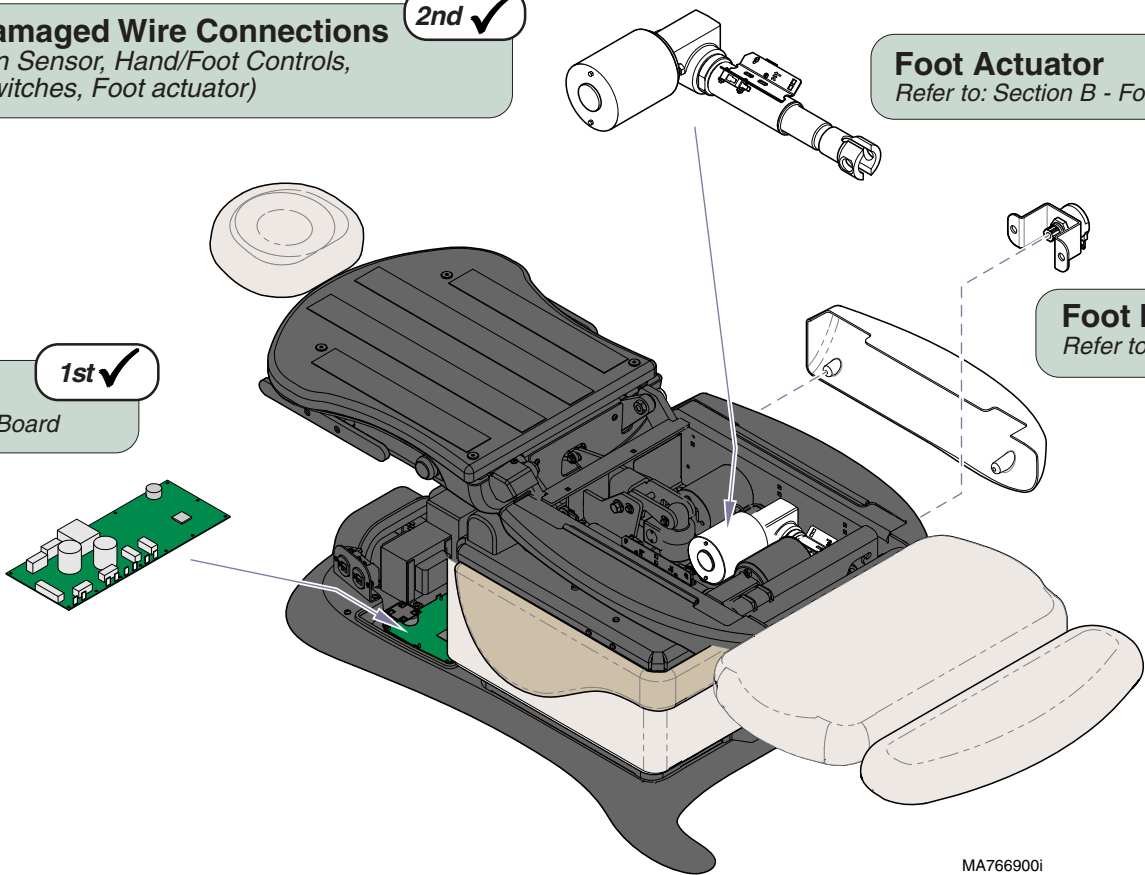
If Foot Down function becomes operable, refer to: Section A - Crash Avoidance System

**Loose / Damaged Wire Connections** 2nd ✓  
 (Foot Position Sensor, Hand/Foot Controls, Foot limit switches, Foot actuator)

**Calibrate PC Board** 1st ✓  
 Refer to: Section B - Main PC Board

**Foot Actuator** 4th ✓  
 Refer to: Section B - Foot Actuator

**Foot Position Sensor** 3rd ✓  
 Refer to: Section B - Position Sensors



## Foot Up / Down Function - continued

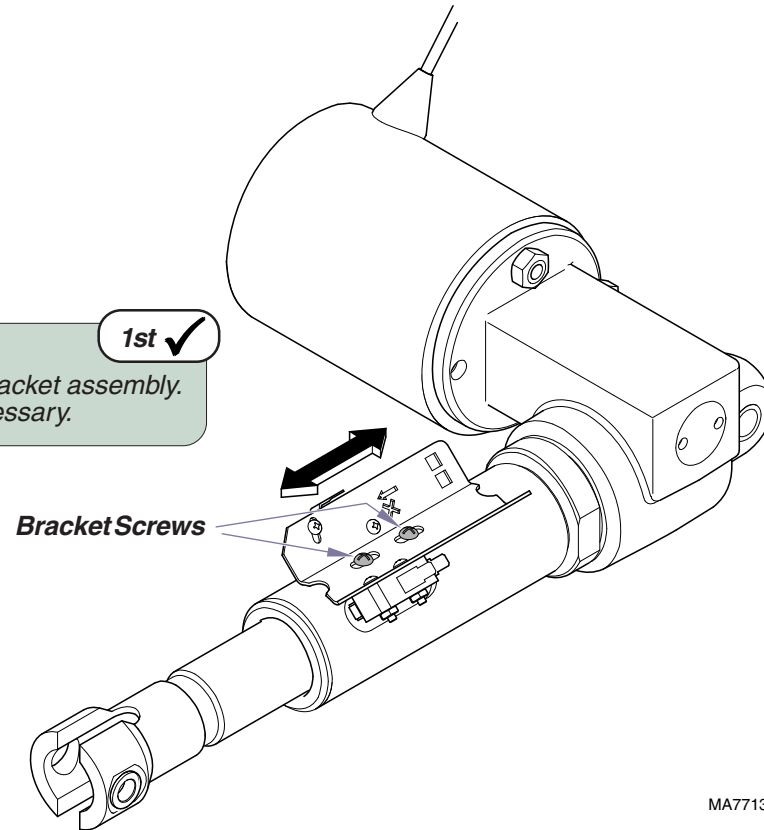
**Problem:** Foot moves past Max. / Min. position.

Refer To:	Page
Foot Actuator / Limit Switches .....	B-19
Exploded Views / Part Numbers .....	E-1

### Adjust Foot Limit Switch Bracket

Loosen two bracket screws & reposition bracket assembly.  
Check for proper operation. Repeat as necessary.

1st ✓



MA771300i

Models:  
Serial Numbers:

Foot Up / Down

# Operation & Troubleshooting

## Crash Avoidance System

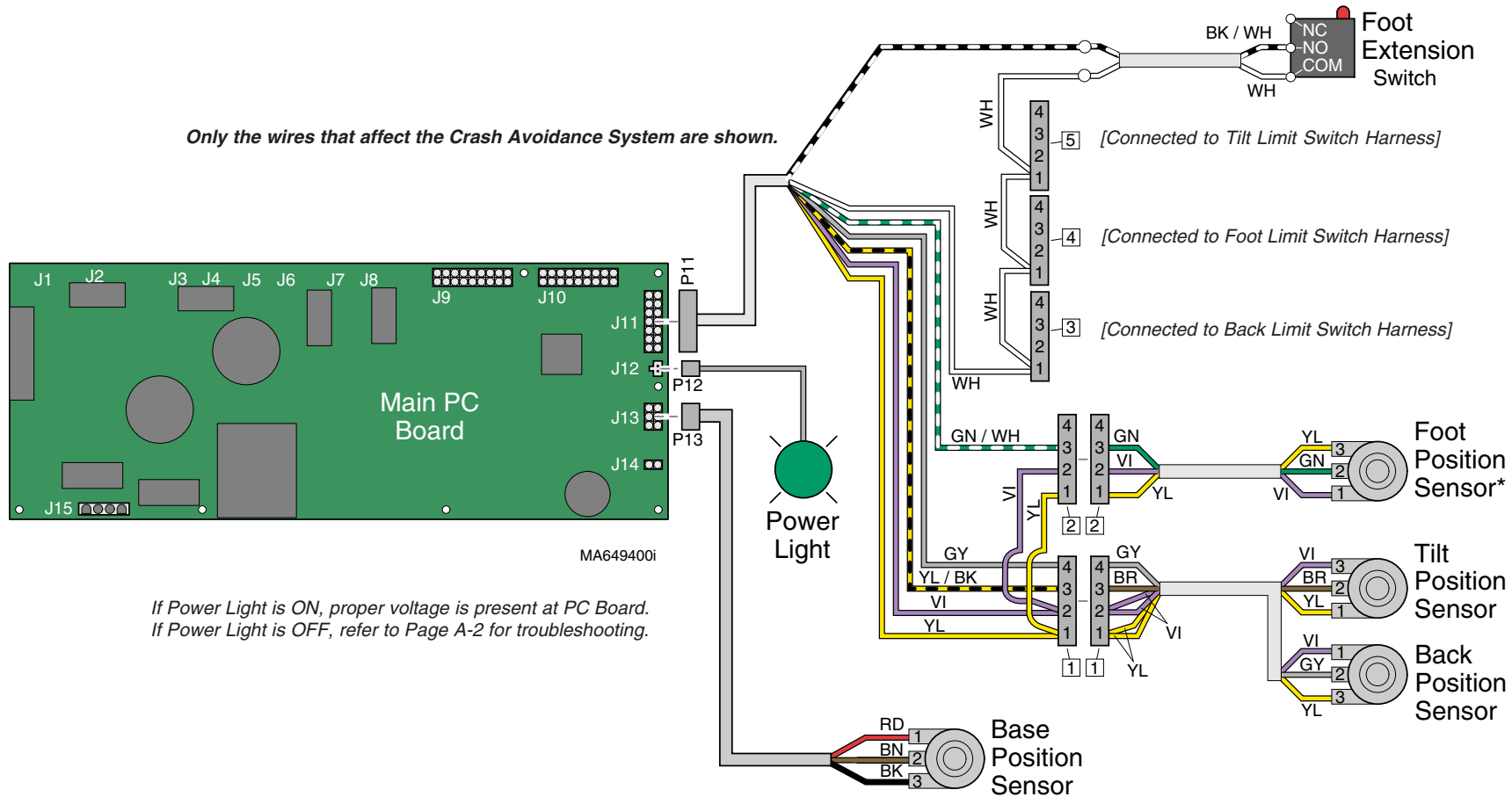
The Crash Avoidance System prevents damage to the chair by disabling certain functions if a potential crash position is detected.

This illustration shows only the components that are monitored by the Crash Avoidance System. Refer to the following page for a detailed description of "crash" position and how the system functions.

### Troubleshooting [Crash Avoidance System]

**Problem** **Page**  
*One or more functions not working properly  
 (Chair not in Crash Position):*

*Base Down, Back Down,  
 Tilt Up/Down, Foot Down ..... A-40*



## Crash Avoidance System

### When Are Functions Disabled?

The main PC board continuously monitors the all four position sensors, as well as the foot extension switch.

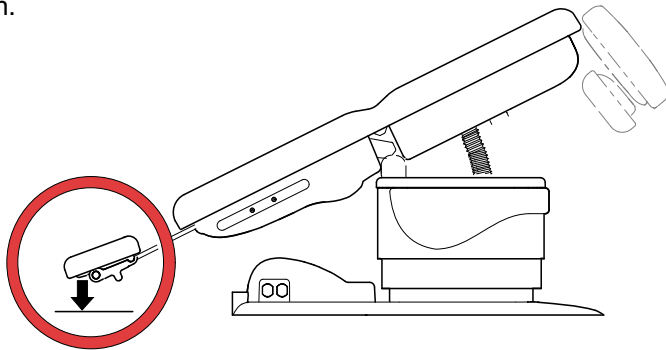
Based on the position sensor readings, and the status of the foot extension switch, circuitry on the PC Board estimates the position of the headrest and the foot extension.

If the estimated position of the headrest indicates a potential collision with the floor, the Base Down, Tilt Up, and/or Back Down function(s) are disabled.

If the estimated position of the foot extension indicates a potential collision with the floor or the chair shrouds, the Base Down, Tilt Down, and/or Foot Down function(s) are disabled.

### When Are Functions Restored?

Functionality is restored when one or more of the axis are moved out of the potential crash position.



**Crash Position A:** Potential Headrest Collision

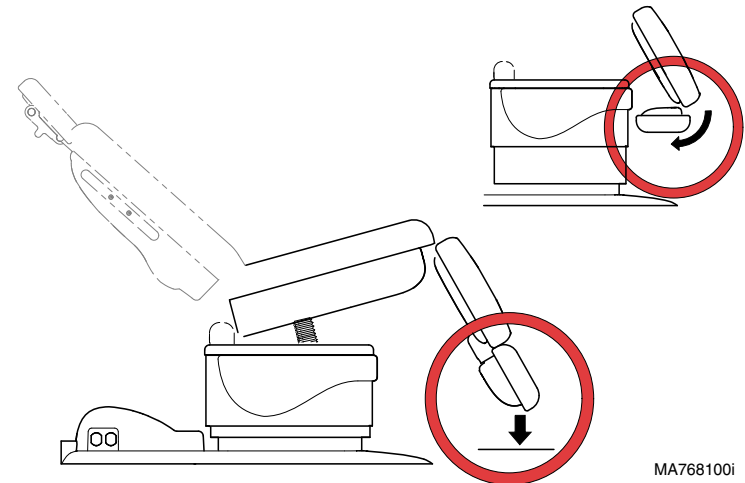
*One or more of the following functions may be disabled:  
Base Down / Tilt Up / Back Down*

### What Is Crash Position?

The chair is considered to be in a potential crash position when:

- A. The Base, Back, and Tilt position sensors indicate that the headrest mechanism is approximately 2 in. (5 cm) from the floor\*.
- B. The Foot Extension switch is not tripped (*indicating the foot extension is not in the stowed position*), **and** the Base, Tilt, and Foot position sensors indicate that the foot extension cannot be moved to the stowed position without contacting the floor or chair shrouds.

\* This measurement is an estimate based on "normal" headrest position (shown). The distance from the floor will vary with the headrest position.



**Crash Position B:** Potential Foot Extension Collision

*One or more of the following functions may be disabled:  
Base Down / Tilt Down / Foot Down*

**Models:**  
**Serial Numbers:**

**ALL**

**Crash Avoidance  
System**

# Operation & Troubleshooting

<b>Refer To:</b>	<b>Page</b>
Position Sensors .....	B-31
Main PC Board .....	B-37
Wiring Diagrams .....	D-1
Exploded Views / Part Numbers .....	E-1

**Crash Avoidance System - continued**

**Problem:** One or more of the following functions not working properly.

- **Base Down**
- **Back Down**
- **Tilt Up/Down**
- **Foot Down**

(Chair is not in "Crash Position")

**Attention:** Before performing any of the checks on this page, move the foot extension to its stowed position.

**Position Sensors [Base / Back / Tilt / Foot]** 3rd ✓

Refer to: Section B - Position Sensors

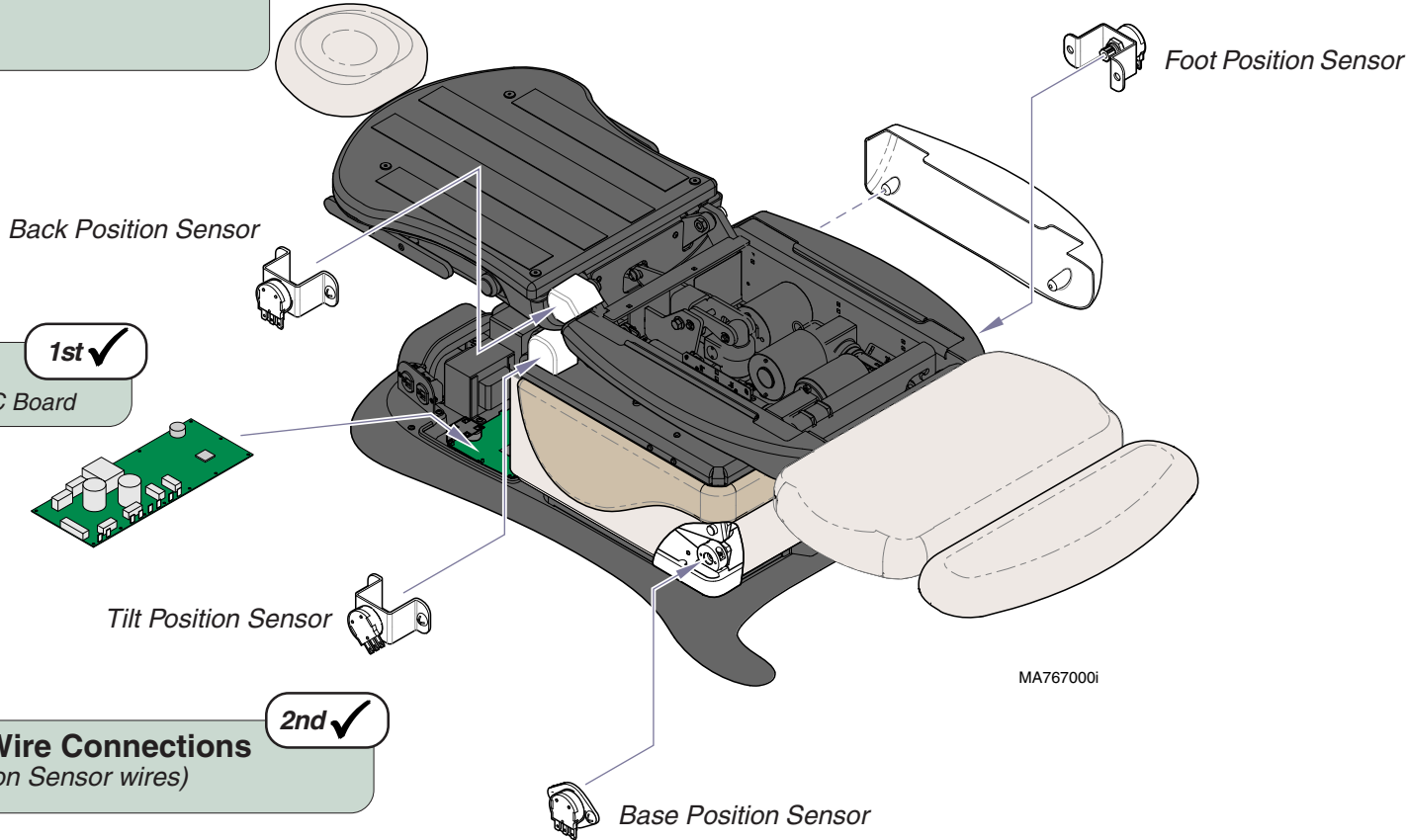
**Note:** One (or more) malfunctioning sensor may cause this problem to occur.

**Calibrate PC Board** 1st ✓

Refer to: Section B - Main PC Board

**Loose / Damaged Wire Connections** 2nd ✓

(Base / Tilt / Back Position Sensor wires)





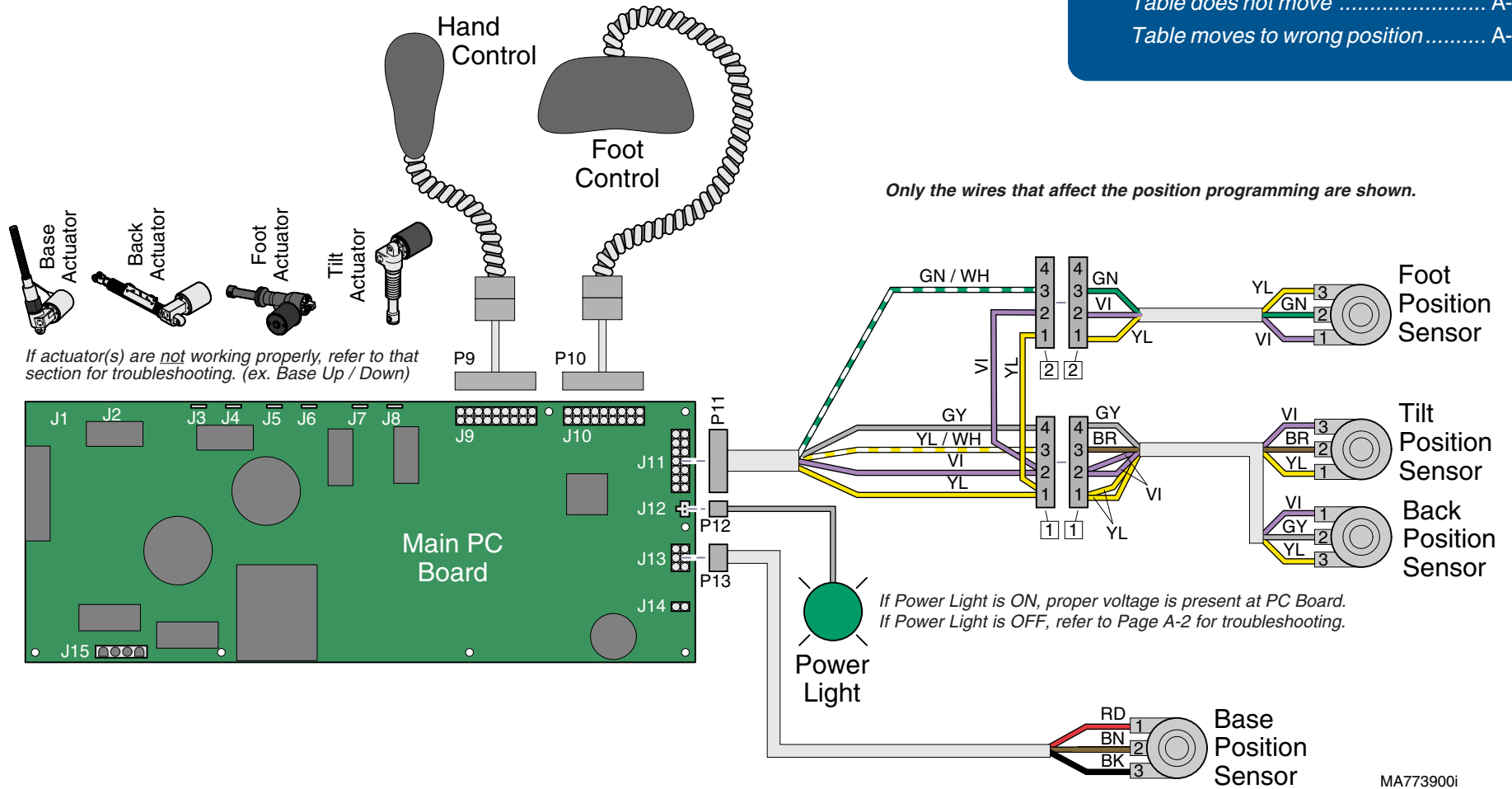
## Position Programming

The programming feature allows the user to store up to four frequently used table positions.

This illustration shows only the components that affect the position programming. Refer to the following page for a detailed description of this feature.

### Troubleshooting [Position Programming]

Problem	Page
Positions cannot be programmed .....	A-43
When Position Button (1,2,3,4) is pressed: Table does not move .....	A-43
Table moves to wrong position .....	A-43



**Models:** 641 (-003 & -005)  
**Serial Numbers:** all

Position Programming

# Operation & Troubleshooting

## Position Programming

### Programming a Table Position

The four position sensors continuously monitor the position of each axis (*Base, Back, Tilt, Foot*). This information is transmitted to the PC Board.

When a table position is properly programmed into the PC board's memory, the position of each axis is recorded based on the readings from the four sensors.

### Recalling a Programmed Position

When a programmed position is recalled, the PC board activates the required functions (*all at the same time*) until the readings from the four position sensors match those of the recorded position.

#### To program a table position....

- Move the table to desired position.
- Press the Program button. (you will hear a single "beep")
- Press the desired Position button (1, 2, 3, or 4). (three "beeps")

**Tip:** You must press the Position button within 5 seconds of pressing the Program button.



#### To recall a programmed position....

Press and hold the desired Position button (1, 2, 3, or 4).

## Position Programming - continued

**Problem:** Positions cannot be programmed. - or  
When position button is pressed, table does not move,  
or moves to wrong position.

[All manual functions - OK]

**Note:** If manual function(s) are not working properly, refer to that section for troubleshooting. (ex. Base Up / Down)

Refer To:	Page
Hand & Foot Controls .....	B-3
Main PC Board .....	B-37
Wiring Diagrams .....	D-1
Exploded Views / Part Numbers .....	E-1

1st ✓

**Reprogram the desired position.** (see previous page)

Did you hear all of the "beeps" indicated in the programming procedure?

If NO, go to 2nd ✓

If YES, go to 3rd ✓

2nd ✓

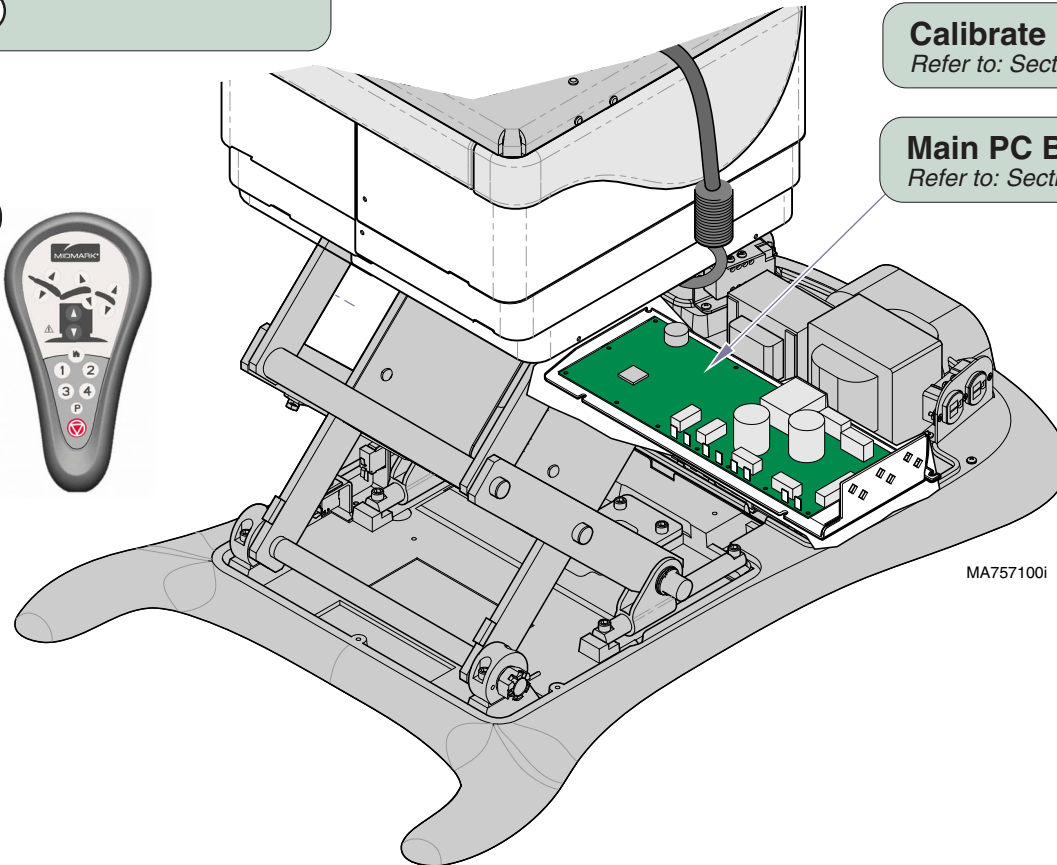
**Hand / Foot Controls**

Refer to: Section B - Hand & Foot Controls.



3rd ✓  
**Calibrate PC Board**  
Refer to: Section B - Main PC Board

4th ✓  
**Main PC Board**  
Refer to: Section B - Main PC Board



MA757100i

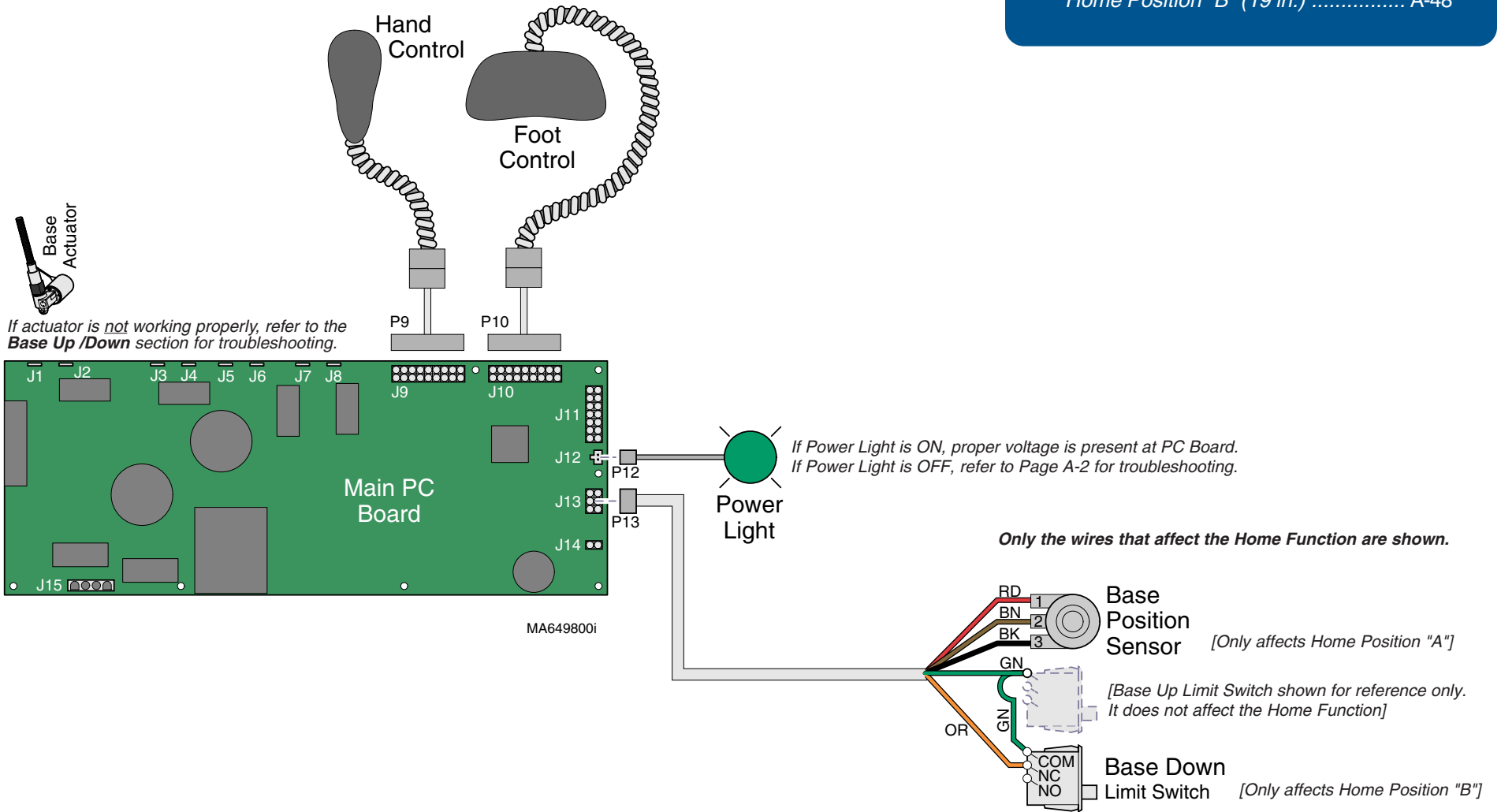
**Models:** 641 (-003 & -005)  
**Serial Numbers:** all

# Operation & Troubleshooting

## "Home" Function

The Home function automatically lowers the table base to **Home Position "A"** [23 in. (58.4 cm)] or **Home Position "B"** [19 in. (48.2 cm)].

This illustration shows only the components that affect the Home Function. Refer to the following page for a detailed description of this feature.



## Troubleshooting ["Home" Function]

Problem	Page
When Home button is pressed, nothing happens .....	A-46
Table does not stop at correct height:	
Home Position "A" (23 in.) .....	A-47
Home Position "B" (19 in.) .....	A-48

## "Home" Function

### **Home Position "A" [23 in. (58.4 cm)]**

When the Home button is pressed then immediately released, the Base Down function is activated.

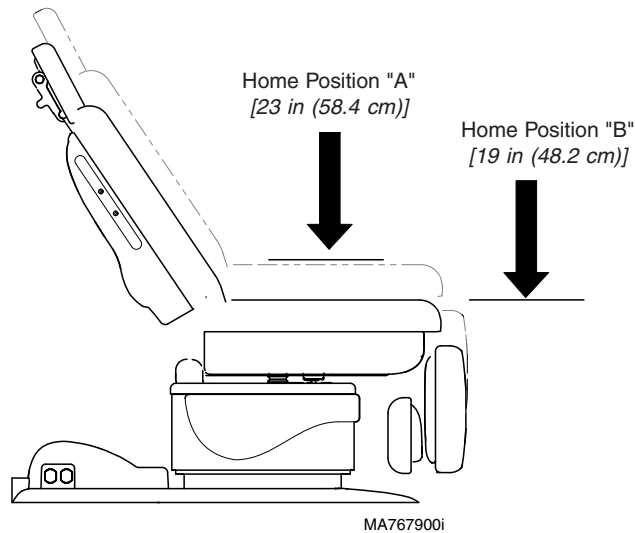
When the Base Position Sensor indicates that table has reached 23 in., the PC Board stops the table.

### **Home Position "B" [19 in. (48.2 cm)]**

When the Home button is pressed and held for approximately 2 seconds a short "beep" is emitted, and the Base Down function is activated.

The table stops when the Base Down Limit Switch is tripped at approx. 19 in.

*To go to Home Position "A" [23 in. (58.4 cm)]....  
Press, then immediately release the Home button.*



*To go to Home Position "B" [19 in. (48.2 cm)]...  
Press and hold the Home button until you hear a single "beep"  
(approx. 2 seconds).*

# Operation & Troubleshooting

Refer To:	Page
Hand & Foot Controls .....	B-3
Main PC Board .....	B-37
Wiring Diagrams .....	D-1
Exploded Views / Part Numbers .....	E-1

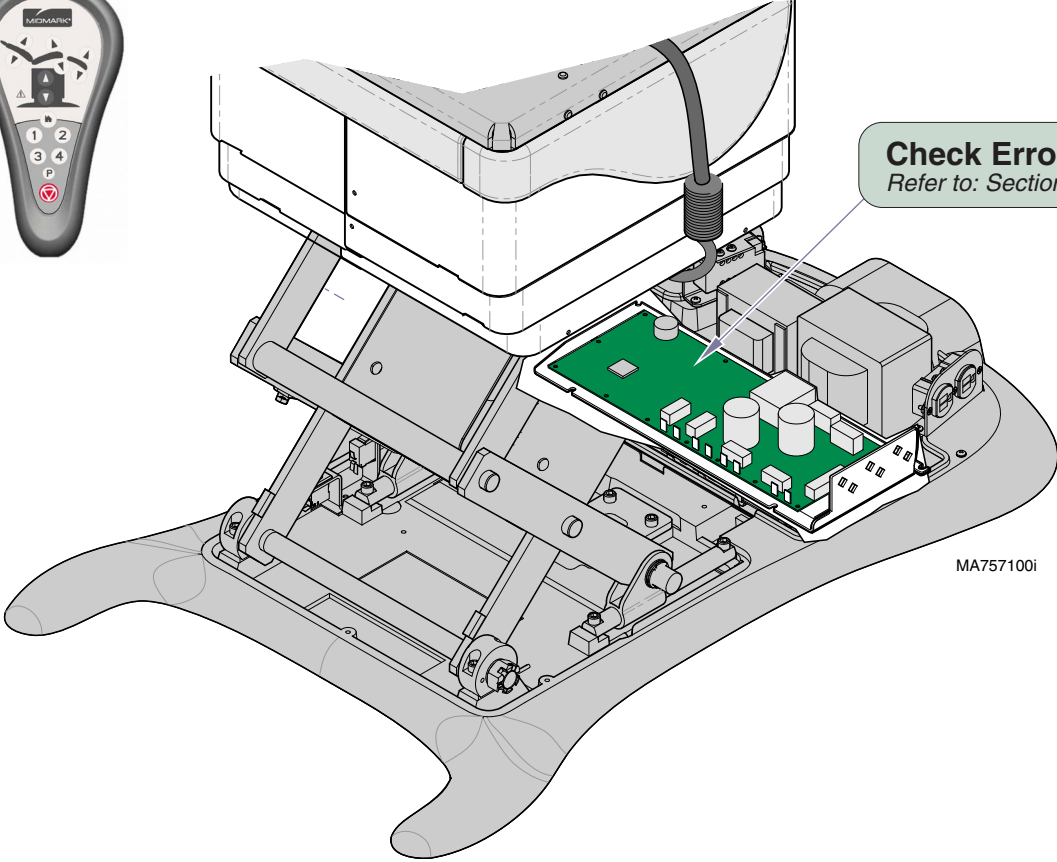
**"Home" Function - continued**

**Problem:** When Home button is pressed, nothing happens.

**[All manual functions - OK]**

**Note:** If manual function(s) are not working properly, refer to that section for troubleshooting. (ex. Base Up / Down)

**Hand / Foot Controls** 1st ✓  
Refer to: Section B - Hand & Foot Controls.



**Check Error Code(s)** 2nd ✓  
Refer to: Section B - Main PC Board

MA757100i

## "Home" Function - continued

**Problem:** Home position "A" does not stop at 23 in. (58 cm).  
Home position "B" - OK.

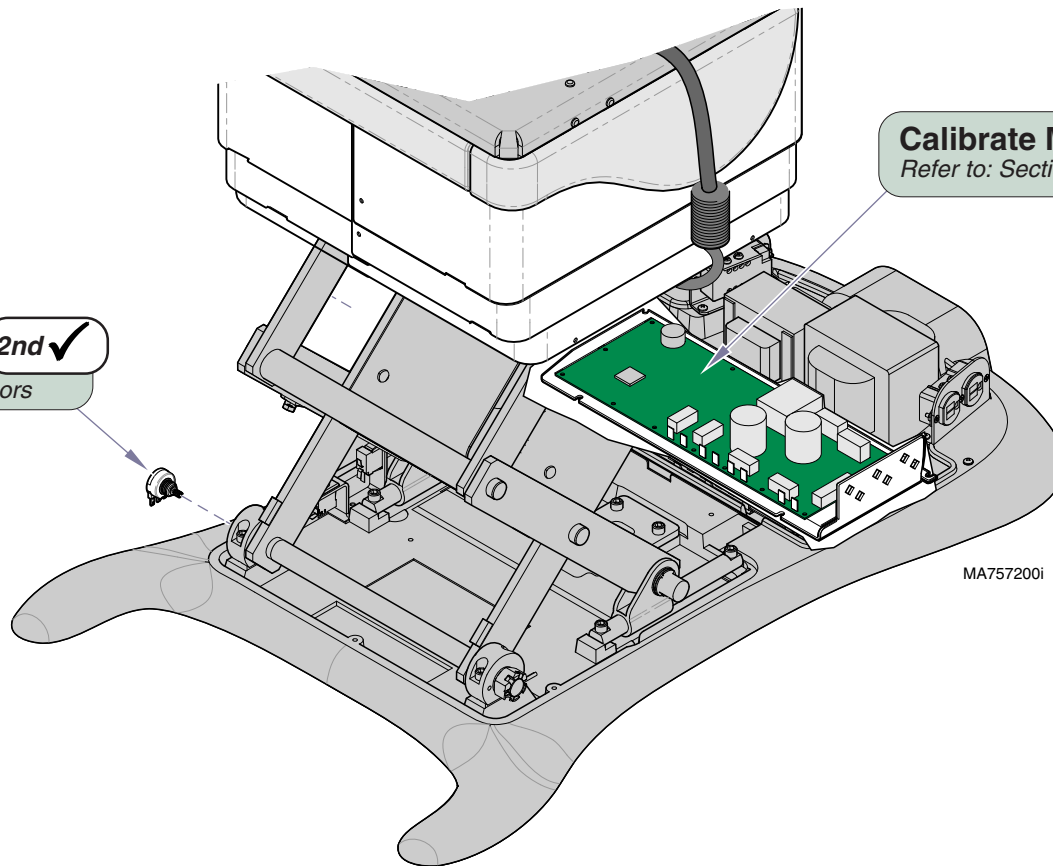
**[All manual functions - OK]**

**Note:** If manual function(s) are not working properly,  
refer to that section for troubleshooting.  
(ex. Base Up / Down)

Refer To:	Page
Position Sensors .....	B-31
Main PC Board .....	B-37
Wiring Diagrams .....	D-1
Exploded Views / Part Numbers .....	E-1

**Calibrate Main PC Board** 1st ✓  
Refer to: Section B - Main PC Board

**Base Position Sensor** 2nd ✓  
Refer to: Section B - Position Sensors



Models:  
Serial Numbers:

ALL

"Home" Function

# Operation & Troubleshooting

<b>Refer To:</b>	<b>Page</b>
Base Actuator / Limit Switches .....	B-6
Wiring Diagrams .....	D-1
Exploded Views / Part Numbers .....	E-1

## "Home" Function - continued

**Problem:** Home position "B" does not stop at 19 in. (48 cm).  
Home position "A" - OK.

**[All manual functions - OK]**

**Note:** If manual function(s) are not working properly,  
refer to that section for troubleshooting.  
(ex. Base Up / Down)

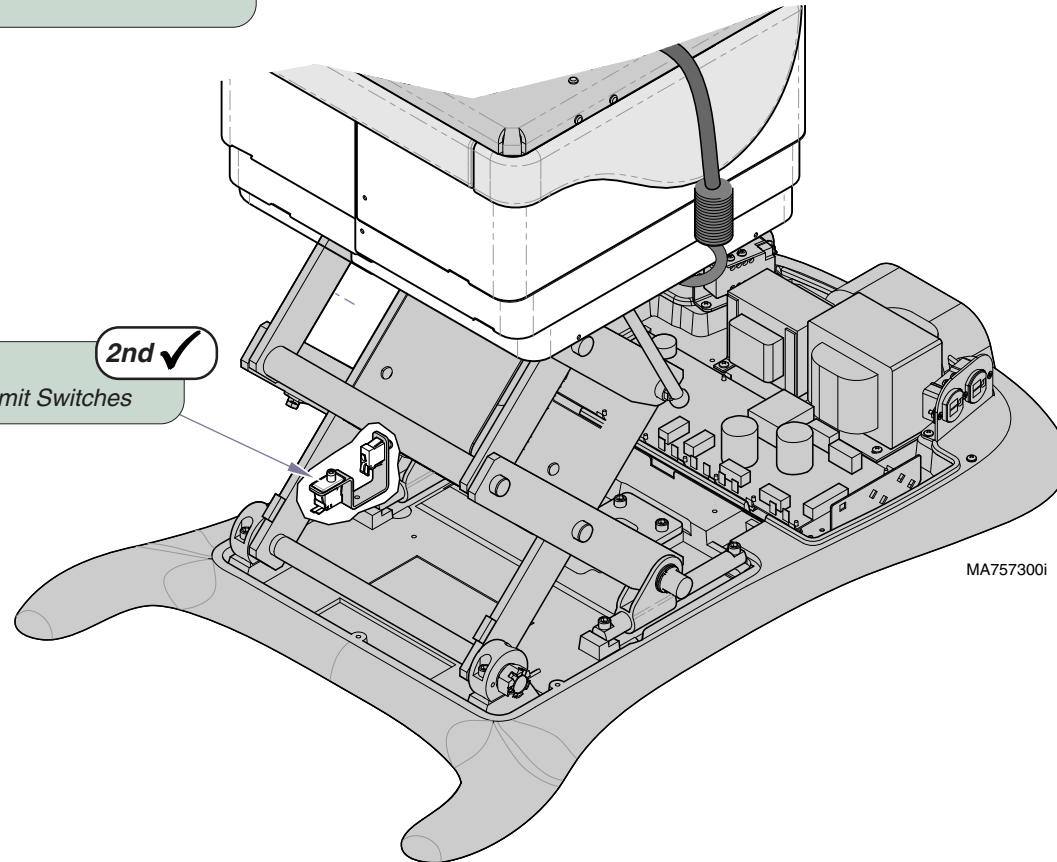
**Loose / Damaged Wire Connections**  
(Base Down Limit Switch)

1st ✓

**Base Down Limit Switch**

Refer to: Section B - Base Actuator / Limit Switches

2nd ✓



MA757300i



## QuickChair™ Function (w/ Foot Control Only)

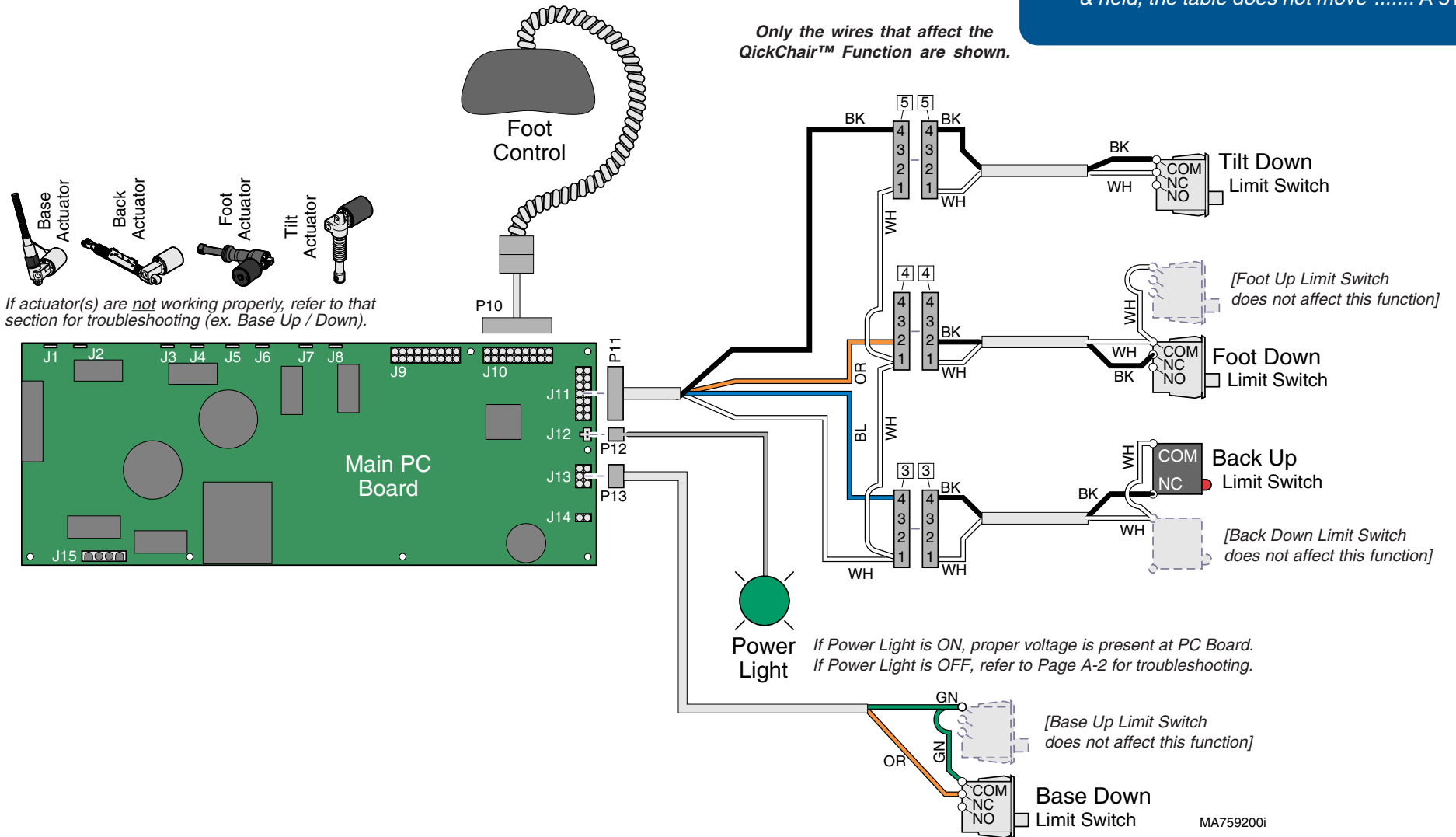
This function activates the *Base Down*, *Tilt Down*, *Foot Down*, and *Back Up* functions at the same time to move the table into "chair position".

This illustration shows only the components that affect the QuickChair™ Function. Refer to the following page for a detailed description of this feature.

### Troubleshooting [QuickChair™ Function]

Problem	Page
When QuickChair button is pressed & held, the table does not move .....	A-51

Only the wires that affect the QuickChair™ Function are shown.



Models: ALL  
Serial Numbers:

QuickChair™  
Function

# Operation & Troubleshooting

## QuickChair™ Function

### What is "Chair Position"?

Base: *all the way down*  
Back: *all the way up*  
Tilt: *all the way down*  
Foot: *all the way down*

### How it works...

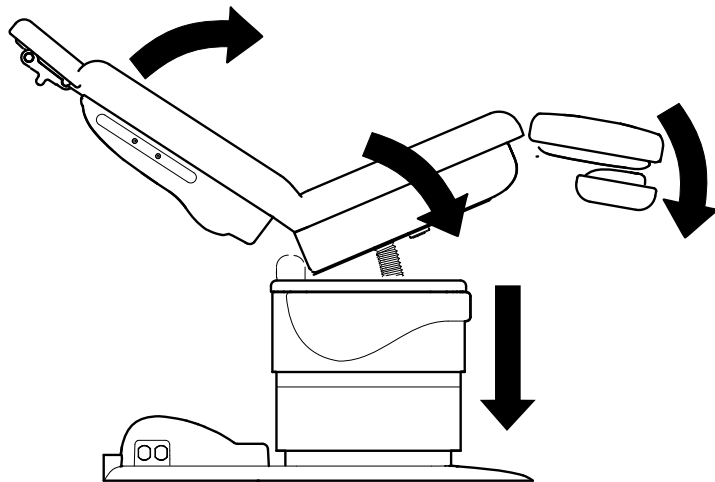
When the QuickChair™ button is pressed and held, the PC Board activates all of the following functions:

#### Function

Base Down  
Back Up  
Tilt Down  
Foot Down

#### Runs until...

Base Down limit switch is tripped  
Back Up limit switch is tripped  
Tilt Down limit switch is tripped  
Foot Down limit switch is tripped



MA768000i

**To activate the QuickChair™ function....**  
Press and hold the Chair Position button.



QuickChair™  
Button

## QuickChair™ Function - continued

**Problem:** When QuickChair™ button is pressed & held, the table does not move.

**[All manual functions - OK]**

**Note:** If manual function(s) are not working properly, refer to that section for troubleshooting. (ex. Base Up / Down)

Refer To:	Page
Hand Foot Controls .....	B-3
Main PC Board .....	B-37
Wiring Diagrams .....	D-1
Exploded Views / Part Numbers .....	E-1

Is table already in Chair Position?

1st ✓

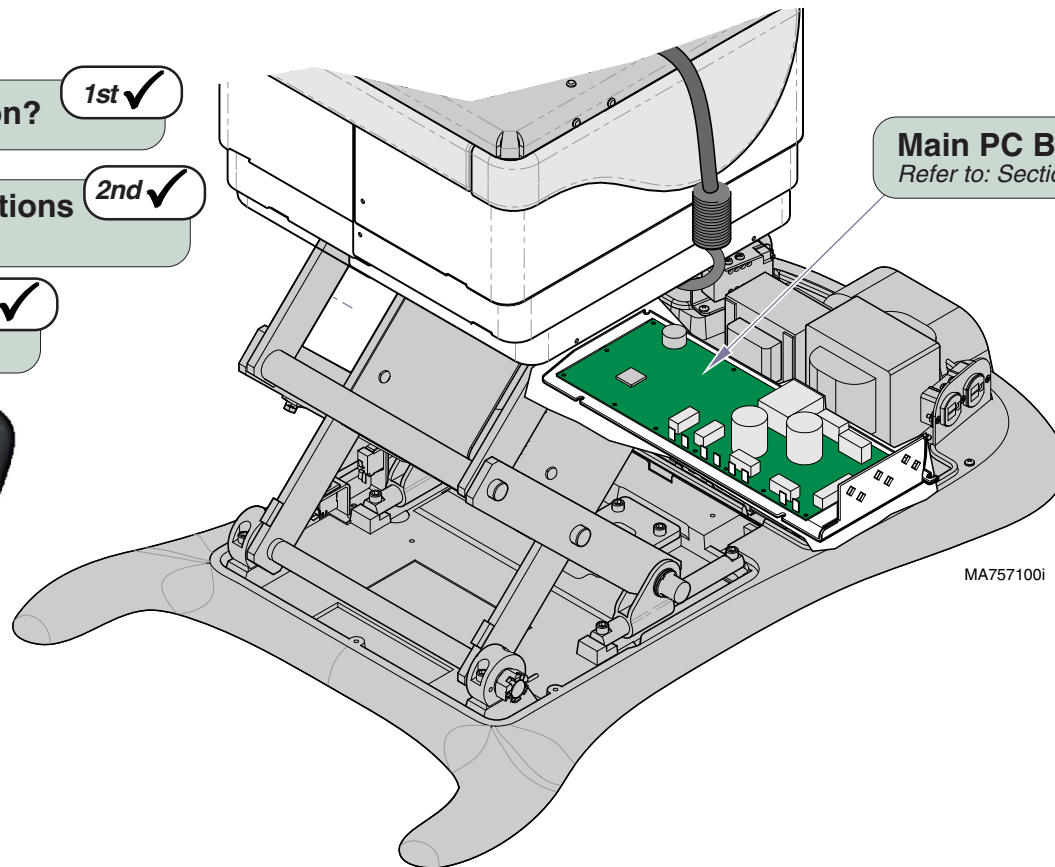
Loose / Damaged Wire Connections  
(Foot control to PC Board)

2nd ✓

Foot Control

Refer to: Section B - Hand & Foot Controls

3rd ✓



MA757100i

Models:  
Serial Numbers:

ALL

Quick-Chair™  
Function

# Operation & Troubleshooting

## Foot Extension

This illustration highlights the mechanical components of the foot extension latch mechanism.

### Troubleshooting

[Foot Extension]

#### Problem

#### Page

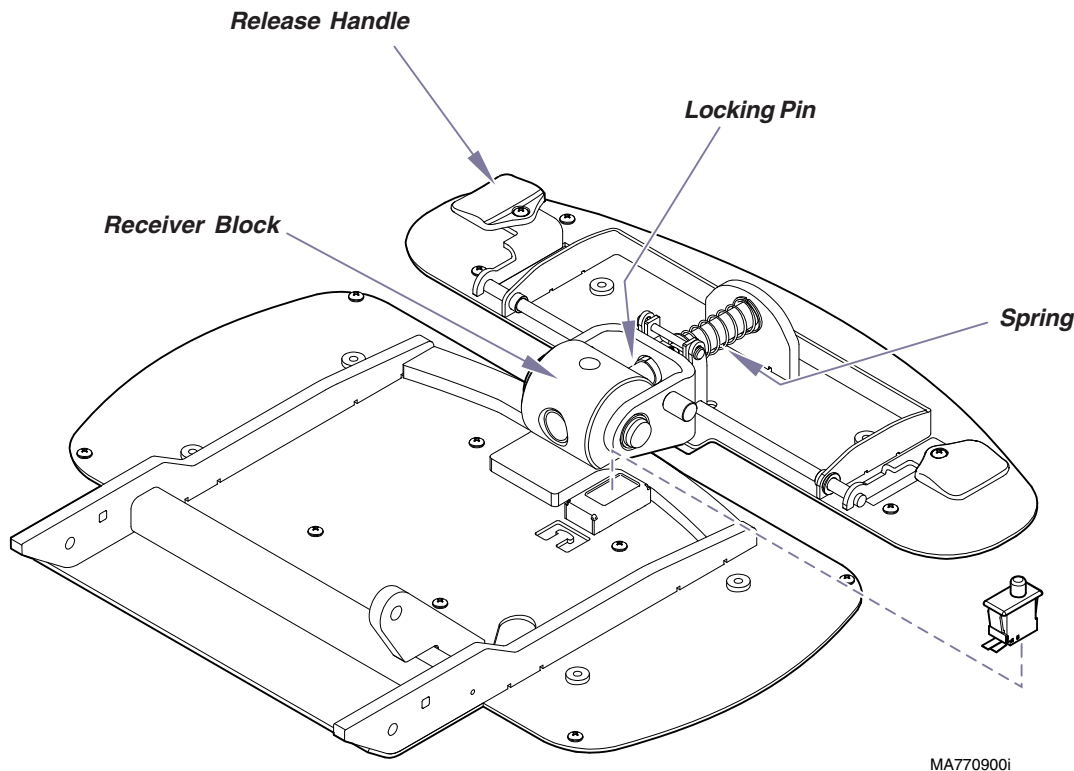
Foot extension will not lock in place ..... A-53

Foot extension will not release ..... A-53



### Equipment Alert

The weight capacity of the foot extension is 120 lbs (54.4kg). Exceeding this limit may result in equipment damage.



### Latch Mechanism

When either foot extension **release handle** is pressed, the associated linkage retracts the **locking pin**. When the locking pin disengages the **receiver block**, the foot extension will move freely.

When the foot extension is moved to either of the two locking positions (*extended / stowed*), **spring** pressure engages the locking pin into the receiver block.

### Foot Extension Limit Switch

The foot extension limit switch does not affect the mechanical function of the foot extension.

A faulty switch may affect any / all of the following chair functions:  
*Base Down, Tilt Down, Foot Down*

## Foot Extension - continued

**Problem:** Foot extension will not lock in place. - or  
Foot extension will not release.

**Refer To:** **Page**  
Foot Extension & Limit Switch ..... B-24  
Exploded Views / Part Numbers ..... E-7

### Inspect Latch Mechanism

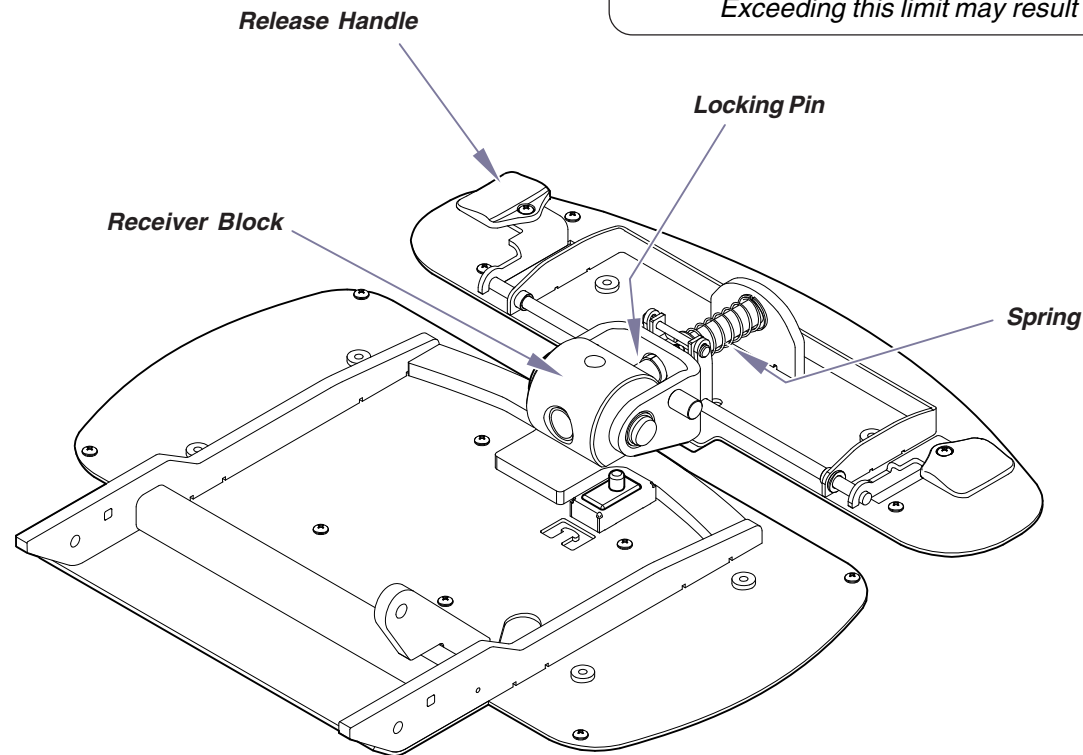
Remove any debris, replace damaged / faulty components  
Refer to: Section B - Foot Extension & Limit Switch

1st ✓



### Equipment Alert

The weight capacity of the foot extension is 120 lbs (54 kg).  
Exceeding this limit may result in equipment damage.



MA771200i

**Models:**  
**Serial Numbers:**

**ALL**

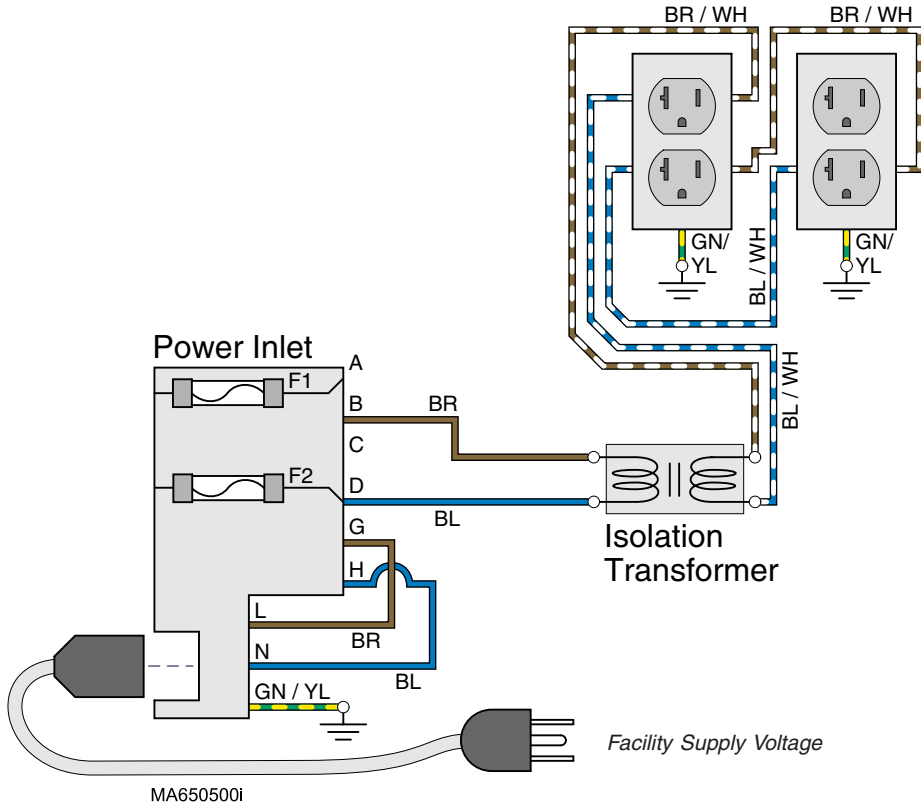
**Foot Extension**

# Operation & Troubleshooting

## Chair Receptacles (optional - 115 VAC models only)

This illustration shows only the components that affect the chair receptacle.

Only the wires that affect the chair receptacles are shown.



## Troubleshooting [Chair Receptacles]

Problem	Page
No power at receptacles .....	A-55

### Facility Supply Voltage

With the chair power cord properly connected, facility supply voltage (115 VAC) is supplied thru the cord to the power inlet.

### Power Inlet



### Equipment Alert

The voltage setting displayed in the power inlet window must match facility supply voltage (115 VAC).  
[Remove fuse holder and rotate 180° to change voltage setting].

Current flows thru two fuses in the power inlet, to the isolation transformer.

### Isolation Transformer

### Note

The isolation transformer separates the receptacles from the rest of the chair's electrical system. This transformer is protected from overload by a thermal cutout feature. It will automatically reset when the transformer cools.

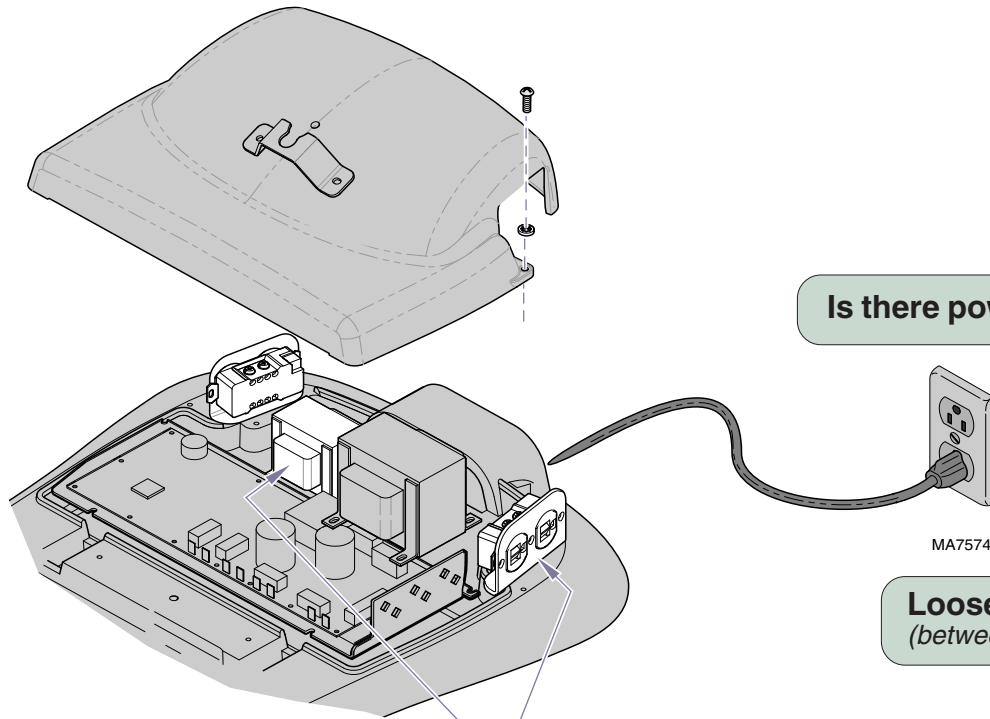
The isolation transformer provides 115 VAC to each of the chair receptacles.

# Operation & Troubleshooting

## Chair Receptacles - continued

**Problem:** No power at receptacle(s).

Refer To:	Page
Isolation Transformer / Chair Receptacle .....	B-28
Wiring Diagrams .....	D-1
Exploded Views / Part Numbers .....	E-1



Is there power to the chair? **1st ✓**

**Loose / Damaged Wire Connections** **2nd ✓**  
*(between power inlet & receptacles)*

**Isolation Transformer / Receptacle** **3rd ✓**  
*Refer to: Section B - Isolation Transformer / Chair Receptacle*

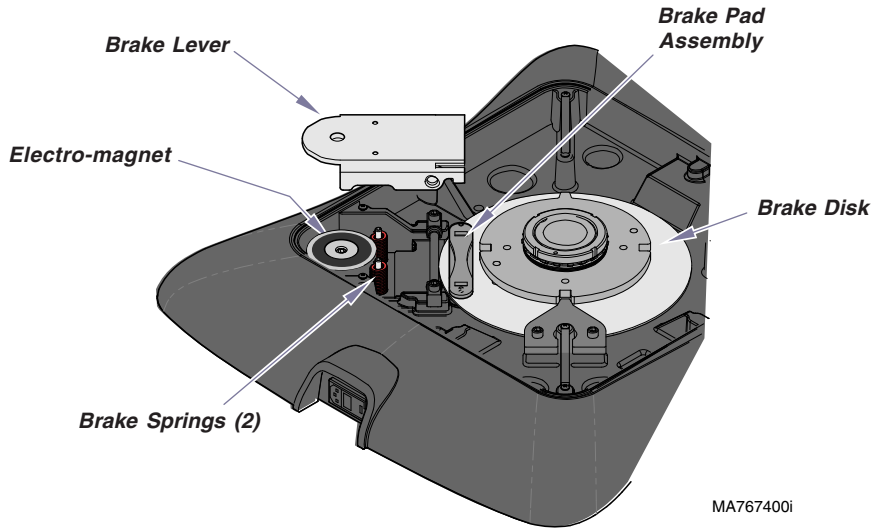
**Models:** 641 (-003)  
**Serial Numbers:** all

**Chair Receptacles**

# Operation & Troubleshooting

## Rotational Base Brake System (optional)

This illustration shows only the components that affect the Rotational Base Brake System. A detailed description of current flow during this function also appears below.



MA767400i

### Base Rotation LOCKED:

The two brake springs press upward on the brake lever. This pivots the brake lever so that pressure is applied to the brake pad assembly. This prevents the brake disk from rotating.

### To unlock base rotation:

Press & release either brake pedal.

### Base Rotation UNLOCKED:

The rotational base PC board supplies 31 - 36 VAC to the two normally closed brake switches. When either brake pedal is pressed & released, the corresponding brake switch opens. When the open switch is detected, the PC board supplies approximately 15 - 20 VAC to the electro-magnet thru the F1 fuse.

When voltage is applied to the electro-magnet, the magnet's pull overpowers the brake springs. This removes pressure from the brake pad assembly allowing the brake disk to rotate.

### To lock base rotation:

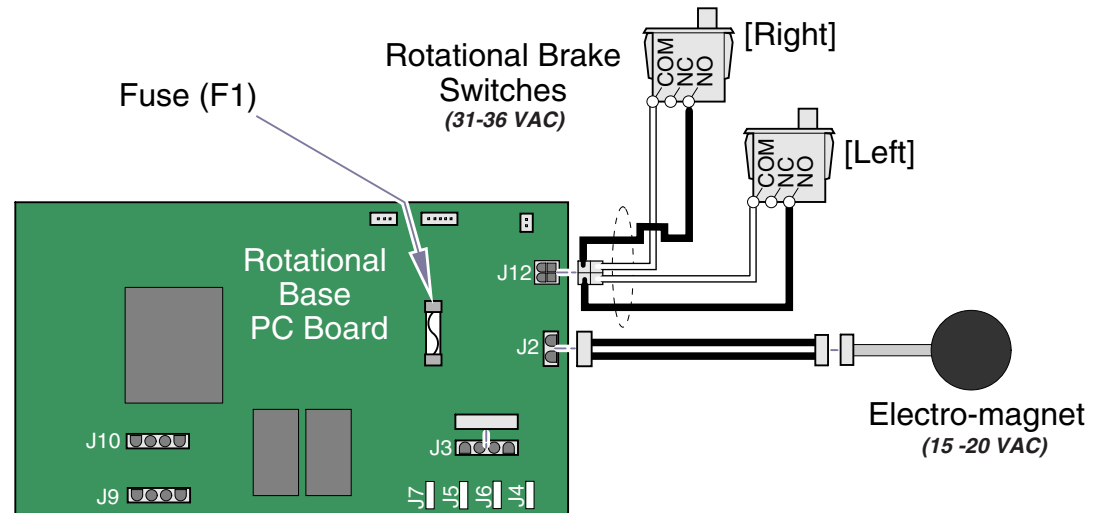
Press & release either brake pedal.

*Note: Base automatically locks in place after 2 minutes.*

## Troubleshooting

### [Rotational Base Brake System]

Problem	Page
Base rotation will not unlock .....	A-57
Base rotation will not lock .....	A-58
Base "wobbles" when locked .....	A-59
Base grinds when rotating .....	A-59



MA708900i



## Rotational Base Brake System - continued

**Problem:** Base rotation will not unlock.

Refer To:	Page
Rotational Base Brake System .....	B-41
Wiring Diagrams .....	D-1

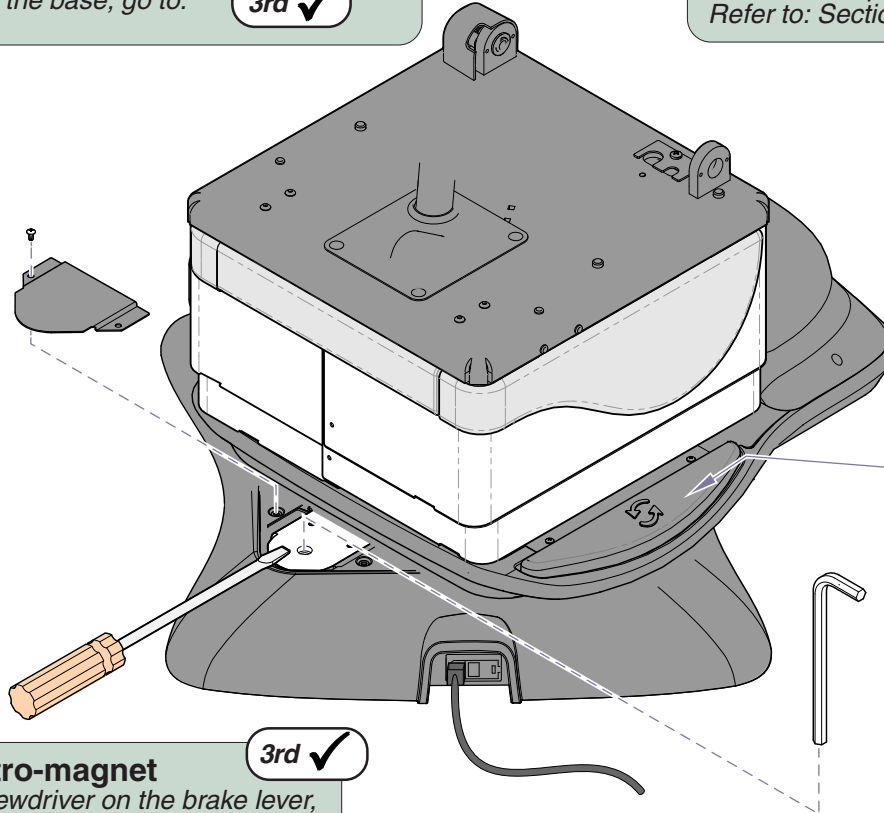
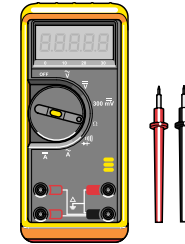
### Check both brake pedals 1st ✓

If one brake pedal unlocks the base, go to: 2nd ✓

If neither pedal unlocks the base, go to: 3rd ✓

### Check Rotational Base PC Board Fuse 5th ✓

If fuse is OK, perform *Rotational Brake Electrical Test*  
Refer to: Section B - Rotational Base Brake System



### Faulty brake pedal switch 2nd ✓

Check connections / replace switch if necessary.  
Refer to: Section B - Rotational Base Brake System

### Perform Magnet Position Adjustment 4th ✓

Refer to: Section B - Rotational Base Brake System

MA767200i

### Check the electro-magnet 3rd ✓

While holding a screwdriver on the brake lever, press & release the brake pedal.

Can you feel the electro-magnet energize?

If YES, go to: 4th ✓

If NO, go to: 5th ✓

**Models:** 641 (-004 & -005)  
**Serial Numbers:** all

**Rotational Base  
Brake System**

# Operation & Troubleshooting

## Rotational Base Brake System - continued

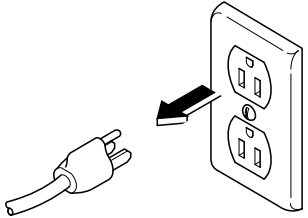
**Problem:** Base rotation will not lock.

<b>Refer To:</b>	<b>Page</b>
Rotational Base Brake System .....	B-41
Wiring Diagrams .....	D-1

**Unplug table power cord** 1st ✓

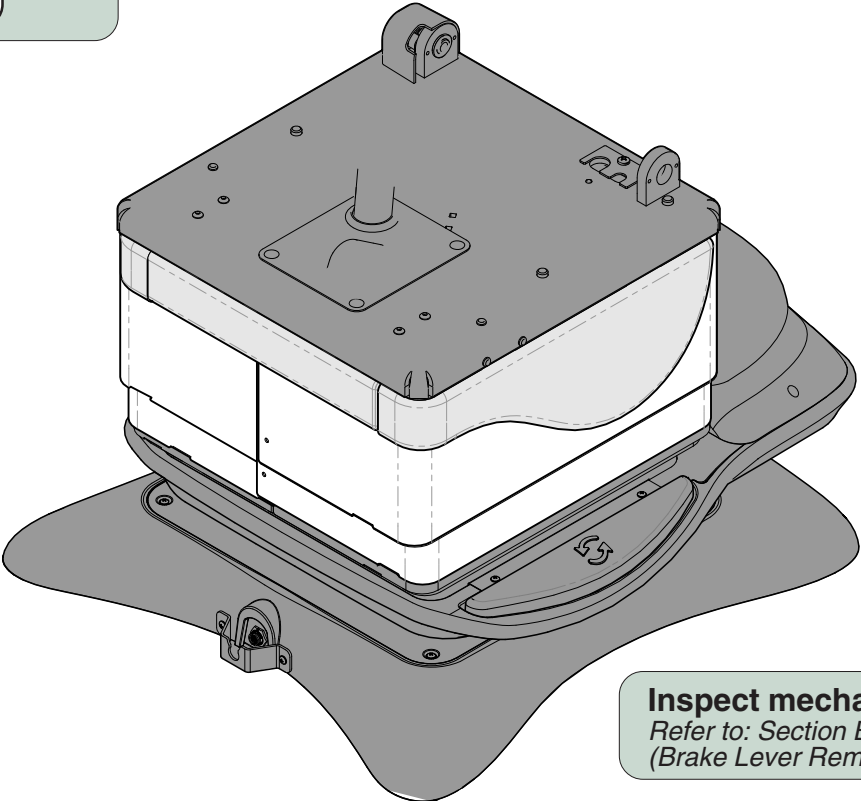
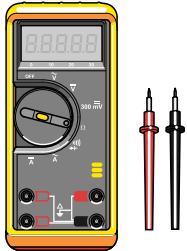
If base rotation locks, go to: 2nd ✓

If base does not lock, go to: 3rd ✓



**Perform Rotational Brake Electrical Test** 2nd ✓

Refer to: Section B - Rotational Base Brake System



**Inspect mechanical brake components.** 3rd ✓

Refer to: Section B - Rotational Base Brake System (Brake Lever Removal)

## Rotational Base Brake System - continued

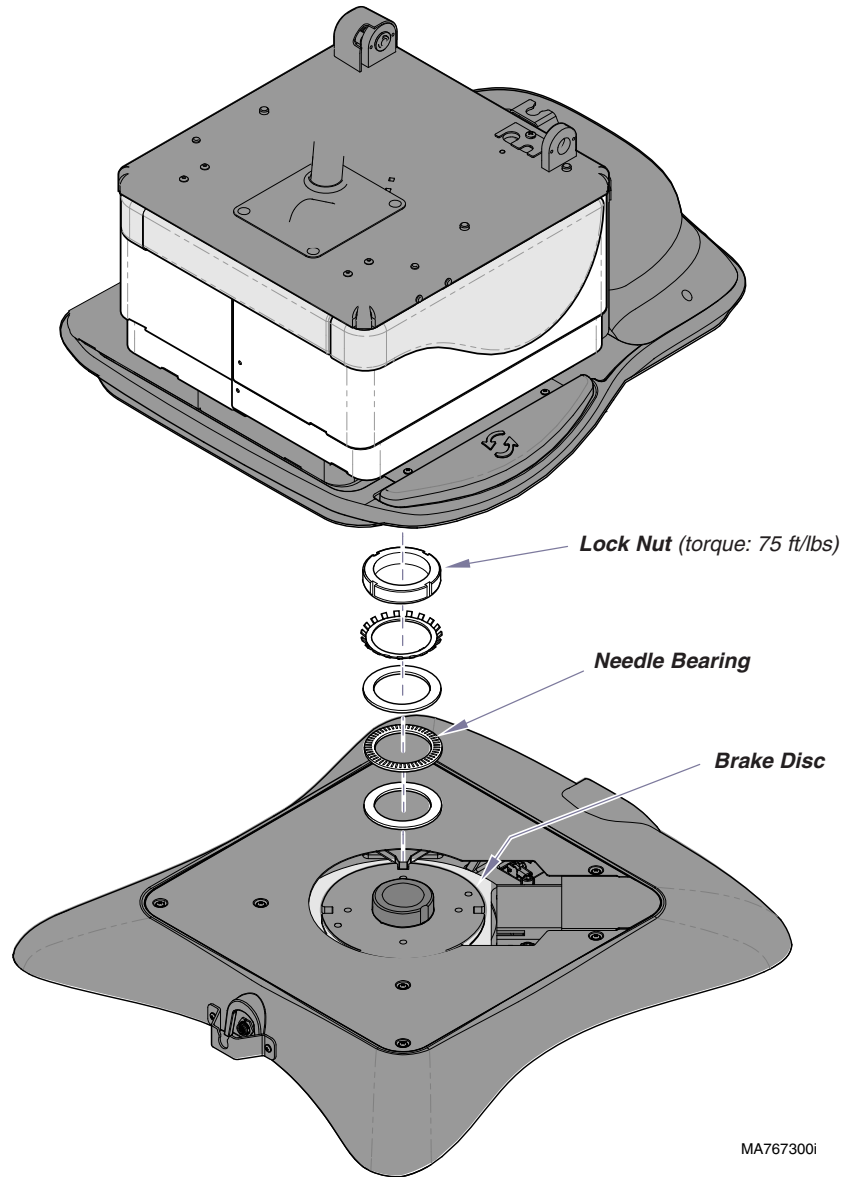
**Problem:** Base "wobbles" when locked. - and / or  
Base makes grinding noise when rotating

### Refer To:

### Page

Rotational Base Brake System ..... B-41

Wiring Diagrams ..... D-1



MA767300i

### 1st ✓ Debris between upper & lower castings

Without separating the base castings, remove any debris.

### 2nd ✓ Loose hub screws

Tighten four screws securing the upper & lower castings.

For access instructions refer to:  
Section B - Rotational Base Brake System  
(Separating Upper & Lower Base Castings)

### 3rd ✓ Inspect rotation bearings / brake disc

Inspect needle bearing & brake disc for damage, debris, etc.  
Lock nut must be tightened to 75 ft/lbs.

For access instructions refer to:  
Section B - Rotational Base Brake System  
(Separating Upper & Lower Base Castings)

**Models:**  
**Serial Numbers:**

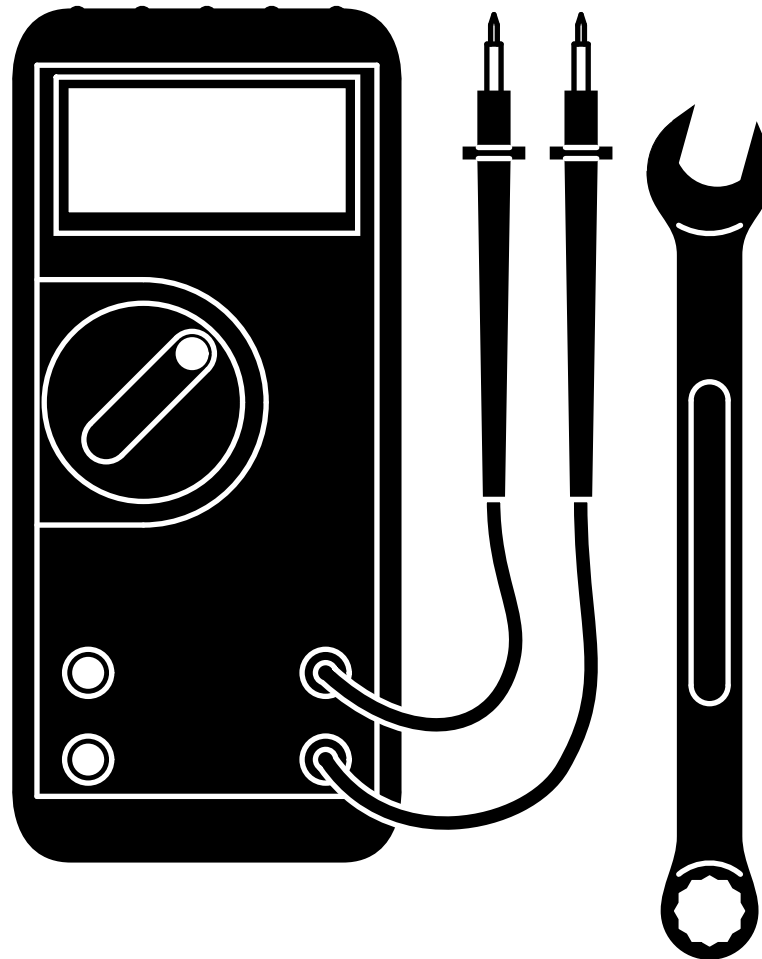
**641** (-004 & -005)  
all

**Rotational Base  
Brake System**



# Section B

## Component Testing & Repair

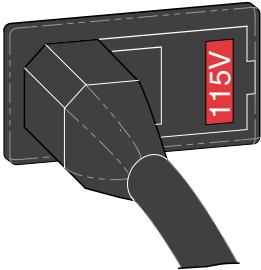


<u>Components</u>	<u>Page</u>
Primary Fuses .....	B-2
Hand / Foot Control .....	B-3
Base Actuator / Limit Switches .....	B-6
Back Actuator / Limit Switches .....	B-10
Tilt Actuator / Limit Switch .....	B-14
Foot Actuator / Limit Switches .....	B-19
Foot Extension / Limit Switch .....	B-24
Gas Springs .....	B-27
Isolation Transformer / Table Receptacles .....	B-28
Main System Transformer .....	B-29
Position Sensors .....	B-31
Main PC Board .....	B-37
Rotational Base Brake System .....	B-41

# Component Testing & Repair

## Primary Fuses

Location / Voltage Setting



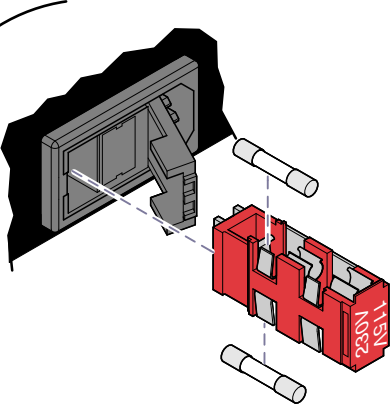
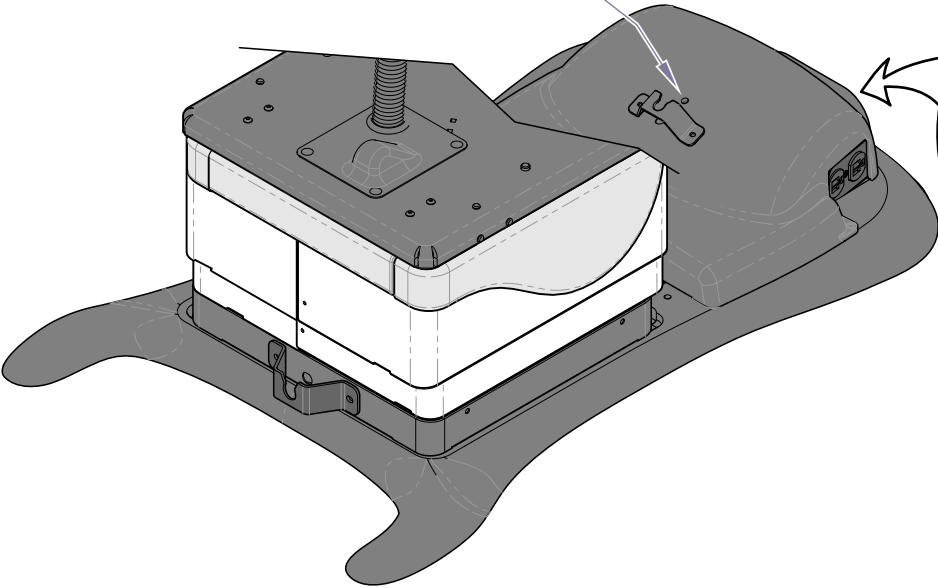
### Equipment Alert

When replacing fuses, rotate fuse holder so that the correct voltage setting appears in window.  
**Voltage setting must match facility supply voltage.**

Incorrect setting will result in damage to the table.

Primary Fuses	Page
Location / Voltage Setting .....	B-2
Wiring Diagrams .....	D-1
Fuse Rating .....	6.3A, 250V
	Type T, 5 x 20mm
Part Number .....	015-0346-40

**If Power Indicator Light is...**  
**OFF:** No power to table (check the fuses)  
**ON:** Table has power (fuses - OK)



MA768300i

# Component Testing & Repair

## Hand & Foot Controls

### Isolating a Malfunction

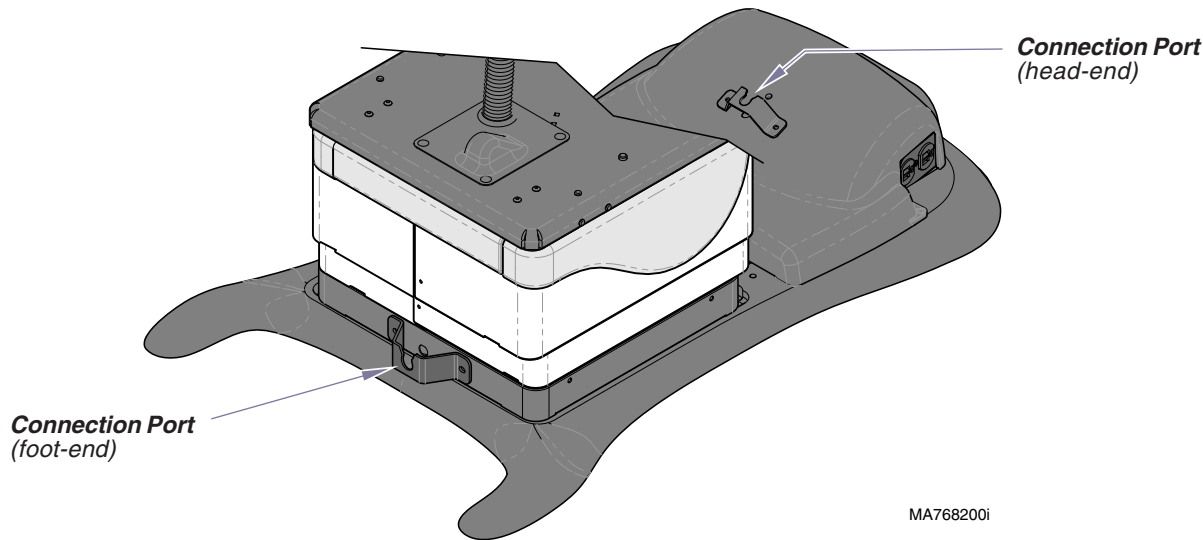


**To isolate a malfunction...**  
Plug the hand / foot control into the other connection port.

*Does the hand / foot control work properly?*

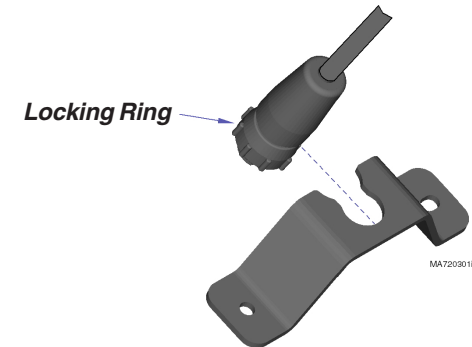
If **YES**, replace the wire harness at the malfunctioning connection port. (Refer to *Wiring Diagrams* for part number).

If **NO**, perform the *Hand / Foot Control Test*.



<u>Hand &amp; Foot Controls</u>	<u>Page</u>
Isolating a Malfunction .....	B-3
Hand / Foot Control Test .....	B-4
Control Cord Continuity Test .....	B-5
Wiring Diagrams .....	D-1
Exploded View / Part Numbers:	
Foot Control (Linear-style) .....	E-23
Foot Control (Disc-style) .....	E-24
Hand Control .....	E-25

**Note:** The cord connector is “keyed” and must be oriented properly to connect. Tighten locking ring to secure connection.



Models:  
Serial Numbers:

ALL

Hand & Foot Controls

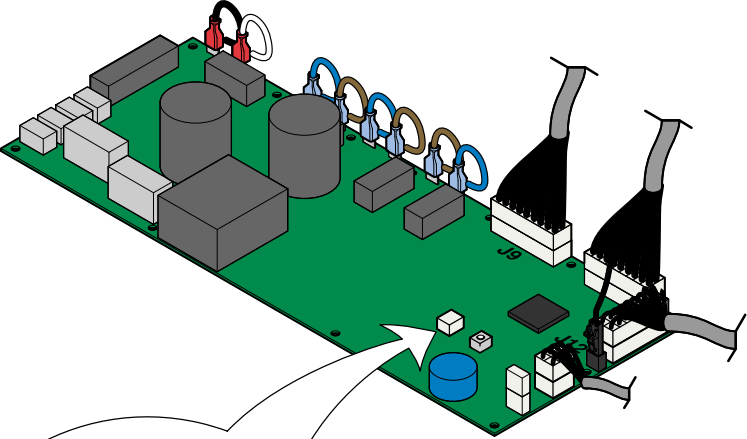
© Midmark Corporation 2007 SF-1891

# Component Testing & Repair

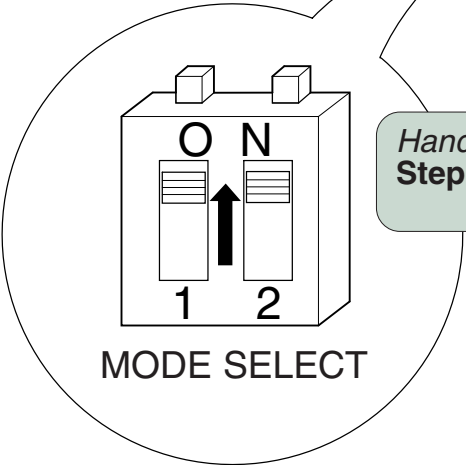
## Hand & Foot Controls - continued

### Hand / Foot Control Test

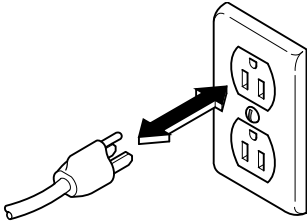
Refer To:	Page
Control Cord Test .....	B-5
Access Procedures (Cover Removal) ....	C-1



MA653000i



**Hand/Foot Control Test**  
**Step 1:** Move both switches on MODE SELECT block to ON.



**Hand/Foot Control Test**  
**Step 2:** Unplug table (to reset PC Board). Plug table back in.

**Hand/Foot Control Test**  
**Step 3:** One at a time, press & hold each button on the hand / foot control.  
 Do you hear "beeps" each time a button is pressed?  
 If **YES**, that button is functioning properly.  
 If **NO**, perform the *Control Cord Test*.



**ATTENTION!**  
**To return to normal operation...**  
 A. Move MODE SELECT block switches back to original position.  
 B. Unplug table (to reset board).  
 C. Plug table back in.



# Component Testing & Repair

## Hand & Foot Controls - continued

### Control Cord Test

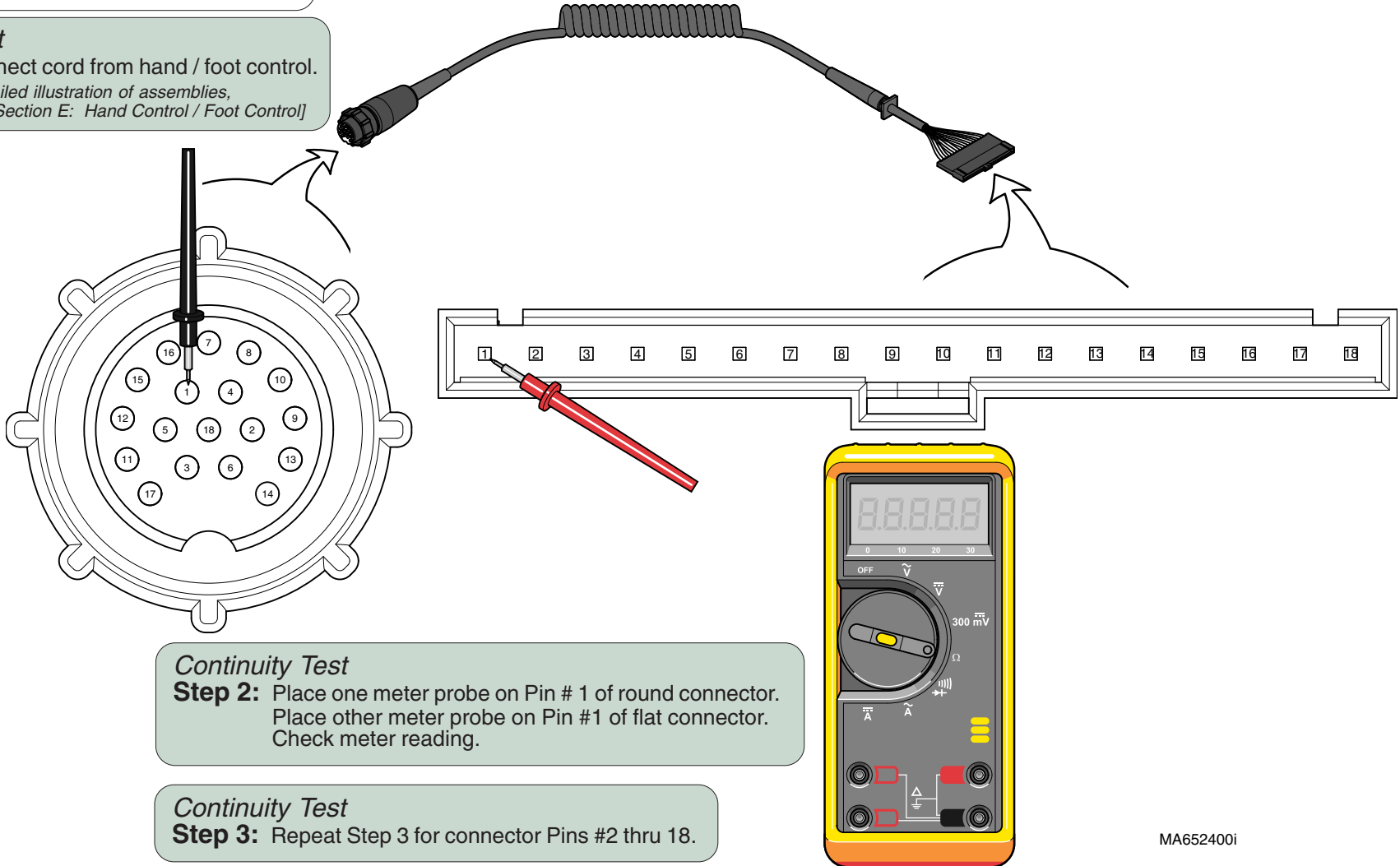
#### Attention

The hand & foot control cords are interchangeable. If a working cord is available, switch the cords to test. If one is not available, perform the Continuity Test.

#### Continuity Test

**Step 1:** Disconnect cord from hand / foot control.

[For detailed illustration of assemblies, refer to Section E: Hand Control / Foot Control]



#### Continuity Test

**Step 2:** Place one meter probe on Pin # 1 of round connector. Place other meter probe on Pin #1 of flat connector. Check meter reading.

#### Continuity Test

**Step 3:** Repeat Step 3 for connector Pins #2 thru 18.

Meter Reading	Status	Required Action
ALL pins less than 100 Ω		Cord - OK [Replace touch pad]
ANY pin(s) OL		Replace control cord.

Models:  
Serial Numbers:

ALL

Hand & Foot Controls

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B-5

# Component Testing & Repair

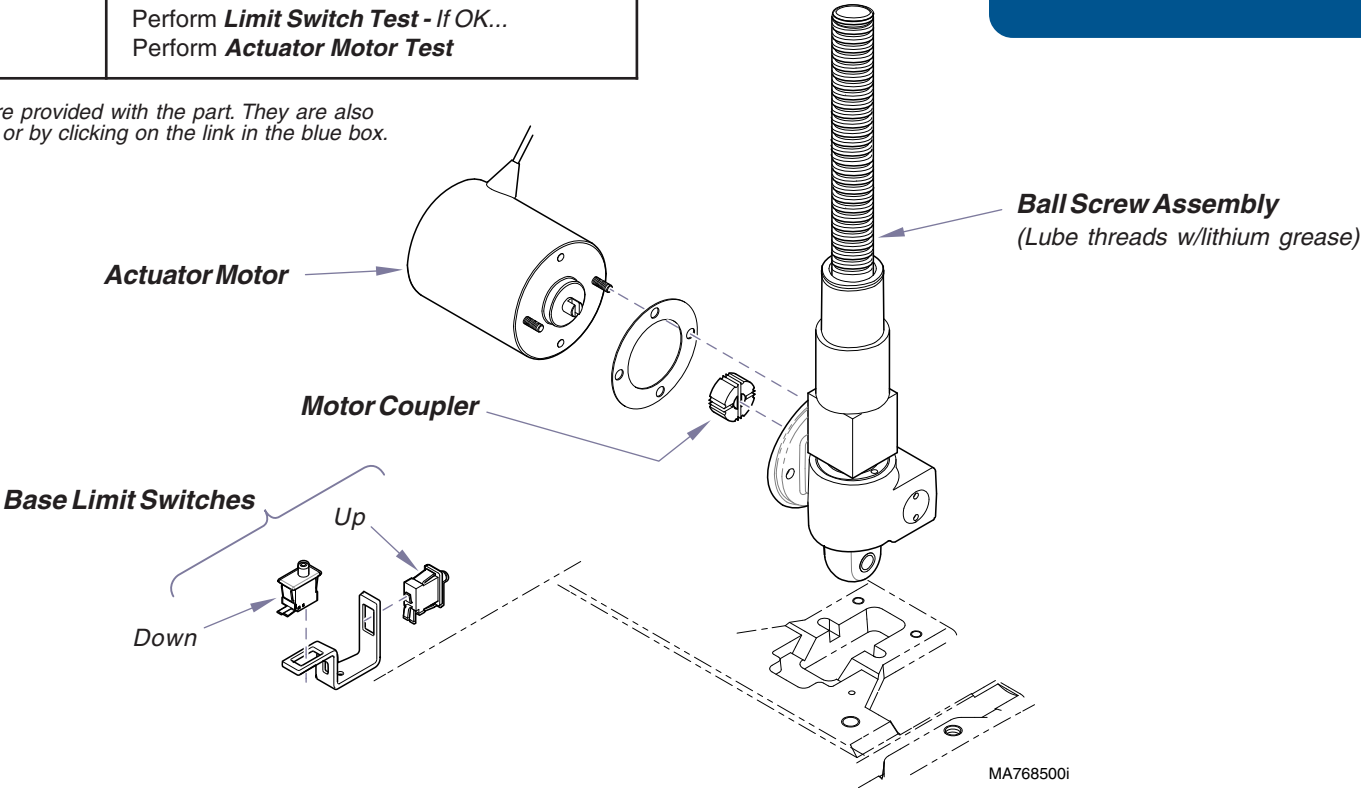
## Base Actuator / Limit Switches

### Isolating a Malfunction

This illustration shows the base limit switches and the three serviceable components of the base actuator. Use the table below to isolate the malfunction.

<b>Problem</b>	<b>Required Action</b>
Motor runs, but makes grinding noise.	Clean / lube actuator threads. Replace actuator if necessary*.
Motor runs, but table does not move.	Inspect / replace motor coupler*.
Motor does not run.	Perform <b>Limit Switch Test</b> - If OK... Perform <b>Actuator Motor Test</b>

\*Replacement instructions are provided with the part. They are also available on [Documark.com](http://Documark.com), or by clicking on the link in the blue box.



<b>Base Actuator</b>	<b>Page</b>
Isolating a Malfunction .....	B-6
Limit Switch Test .....	B-7
Actuator Motor Test .....	B-8
PC Board Test .....	B-9
Access Procedures ( <i>Cover Removal</i> ) ...	C-1
Wiring Diagrams .....	D-1
Exploded View / Part Numbers .....	E-19

<b>www.Documark.com:</b>	<b>File Name</b>
Base Actuator / Motor Replacement .....	003-1739-00

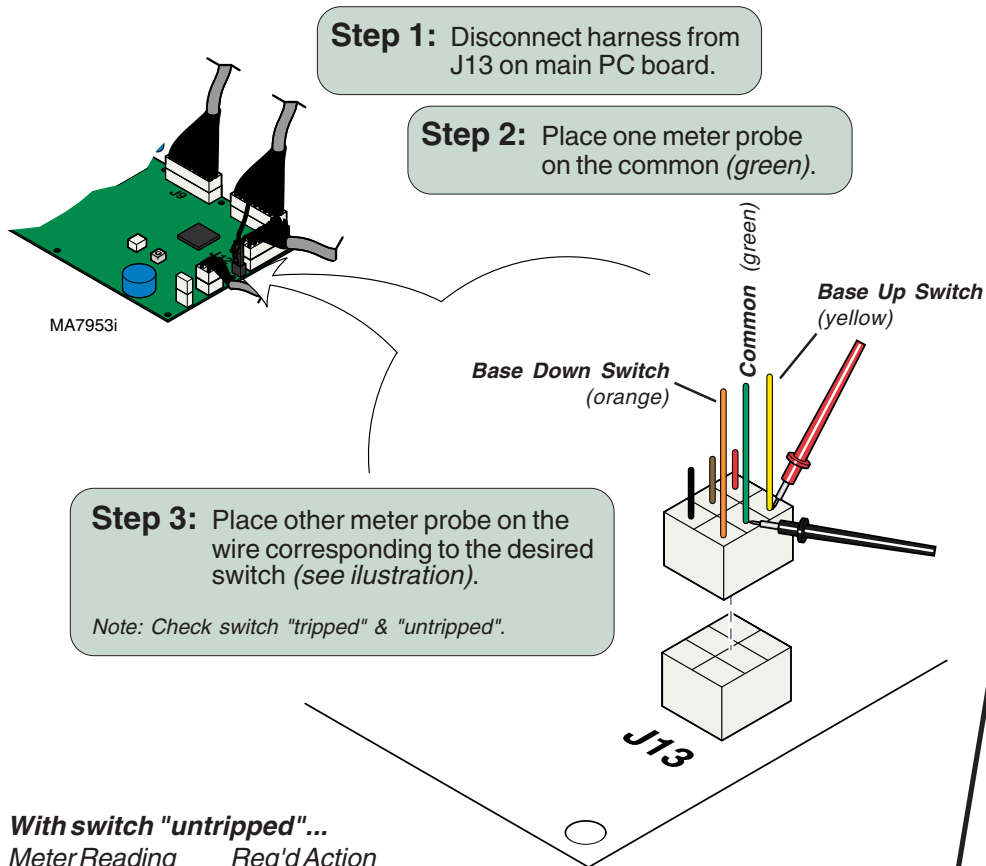
Refer To:

Page

Actuator Motor Test ..... B-8

## Base Actuator / Limit Switches - continued

### Limit Switch / Harness Test



#### With switch "untripped"...

Meter Reading Req'd Action

<b>OL</b>	Perform <b>Limit Switch Continuity Test</b>
<b>less than 10 Ω</b>	Limit switch / harness - OK Perform <b>Actuator Motor Test</b>

#### With switch "tripped"...

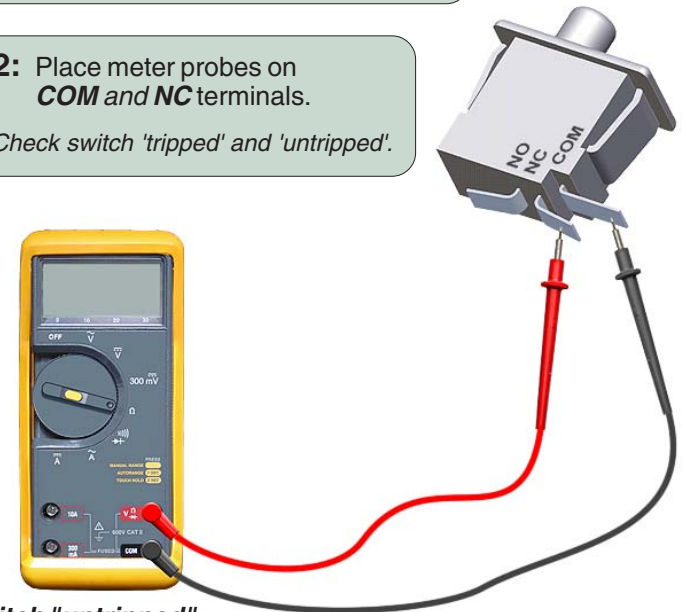
<b>less than 10 Ω</b>	Perform <b>Limit Switch Continuity Test</b>
<b>OL</b>	Limit switch / harness - OK Perform <b>Actuator Motor Test</b>

### Limit Switch Continuity Test

**Step 1:** Tag / disconnect wires from switch.

**Step 2:** Place meter probes on **COM** and **NC** terminals.

Note: Check switch 'tripped' and 'untripped'.



#### With switch "untripped"...

Meter Reading Req'd Action

<b>OL</b>	Replace limit switch.
<b>less than 5 Ω</b>	Limit switch - OK Replace limit switch harness.

#### With switch "tripped"...

<b>less than 5 Ω</b>	Replace limit switch.
<b>OL</b>	Limit switch - OK Replace limit switch harness.

Models:  
Serial Numbers:

**ALL**

**Base Actuator /  
Limit Switches**

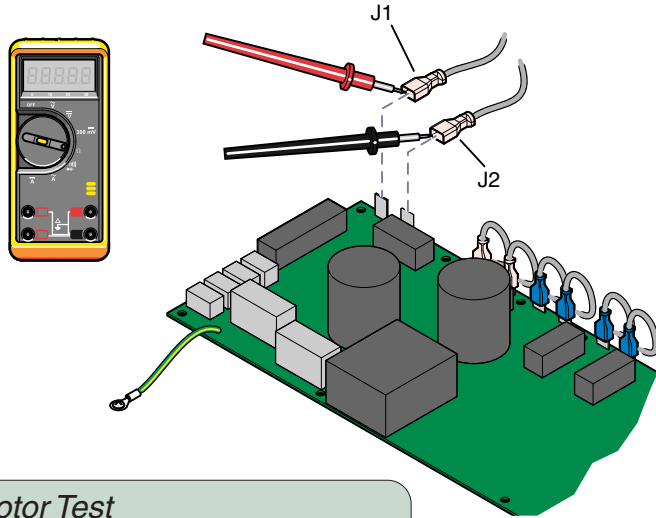
# Component Testing & Repair

## Base Actuator / Limit Switches - continued

### Actuator Motor Test

#### Actuator Motor Test

**Step 1:** Tag, then disconnect base actuator wires (J1 & J2).



#### Actuator Motor Test

**Step 2:** Place meter probes on actuator wires. Check meter reading.

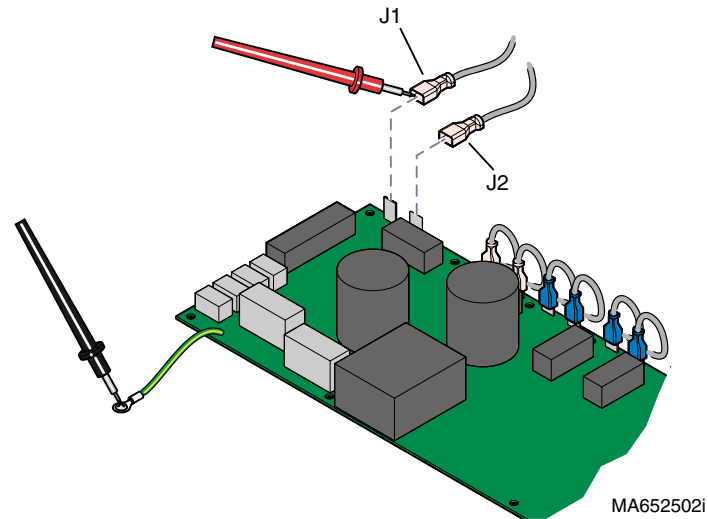
Meter Reading	Status	Required Action
1 to 10 $\Omega$		Actuator motor - OK. Perform <b>Motor Ground Test</b>
OL -or- less than 1 $\Omega$		Replace motor*.

\*Replacement instructions are provided with the part. They are also available on Documark.com, or by clicking on the link in the blue box.

**Refer To:** **Page**  
PC Board Test ..... B-9

**www.Documark.com:** **File Name**  
Base Actuator / Motor  
Replacement ..... 003-1739-00

### Motor Ground Test



#### Motor Ground Test

**Step 1:** Place one meter probe on actuator wire (J1). Place other meter probe on PC board ground wire. Check meter reading. (Repeat for J2)

Meter Reading	Status	Required Action
OL -or- more than 1 M $\Omega$		Motor harness - OK. Perform <b>PC Board Test</b>
less than 1 $\Omega$		Replace motor*.

# Component Testing & Repair

## Base Actuator / Limit Switches - continued

### PC Board Test

#### PC Board Test

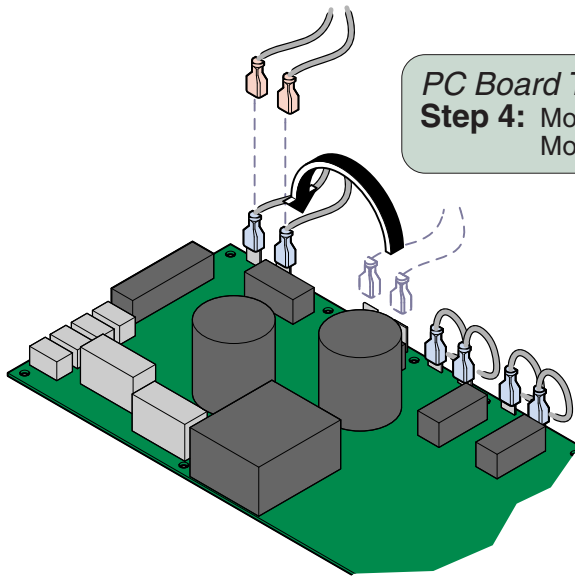
**Step 1:** Move **BACK** section so that it is approx. halfway between its maximum & minimum positions.

#### PC Board Test

**Step 3:** Tag, then disconnect base actuator wires from J1 & J2.

#### PC Board Test

**Step 4:** Move wire from J3 to J1.  
Move wire from J4 to J2.

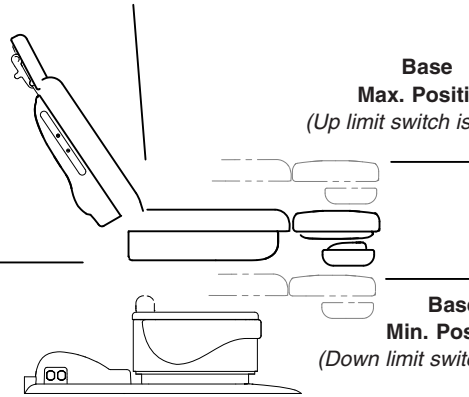


Back Section  
Max. Position

Base  
Max. Position  
(Up limit switch is tripped)

Back Section  
Min. Position

Base  
Min. Position  
(Down limit switch is tripped)



[www.Documark.com](http://www.Documark.com):

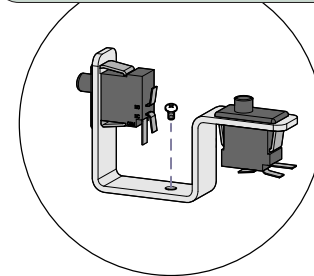
File Name

PC Board Replacement ..... 003-1490-00

#### PC Board Test

**Step 2:** This test **cannot** be performed if either base limit switch is tripped.

If necessary, remove switch bracket.  
(Switch wires **must** remain connected)



**Equipment Alert**  
The back limit switches will not stop movement during this test.  
**Do not run past max. / min. positions.**

#### PC Board Test

**Step 5:** Press & hold Base Up button for 5 seconds.

Does **back section** move up briefly, then stop & "beep"?  
If **YES**, go to Step 6.  
If **NO**, replace PC Board\*.

#### PC Board Test

**Step 6:** Press & hold Base Down button for 5 seconds.

Does **back section** move down briefly, then stop & "beep"?  
If **YES**, PC Board is OK.  
If **NO**, replace PC Board\*.



\*Replacement instructions are provided with the part. They are also available on Documark.com, or by clicking on the link in the blue box.

Models:  
Serial Numbers:

ALL

Base Actuator /  
Limit Switches

# Component Testing & Repair

## Back Actuator / Limit Switches

### Isolating a Malfunction

This illustration shows the back limit switches and the three serviceable components of the back actuator. Use the table below to isolate the malfunction.

<b>Problem</b>	<b>Required Action</b>
Motor runs, but makes grinding noise.	Clean / lube actuator threads. Replace actuator if necessary*.
Motor runs, but table does not move.	Inspect / replace motor coupler*.
Motor does not run.	Check limit switch wire connections. - <i>If OK...</i> Perform <b>Actuator Motor Test</b> .

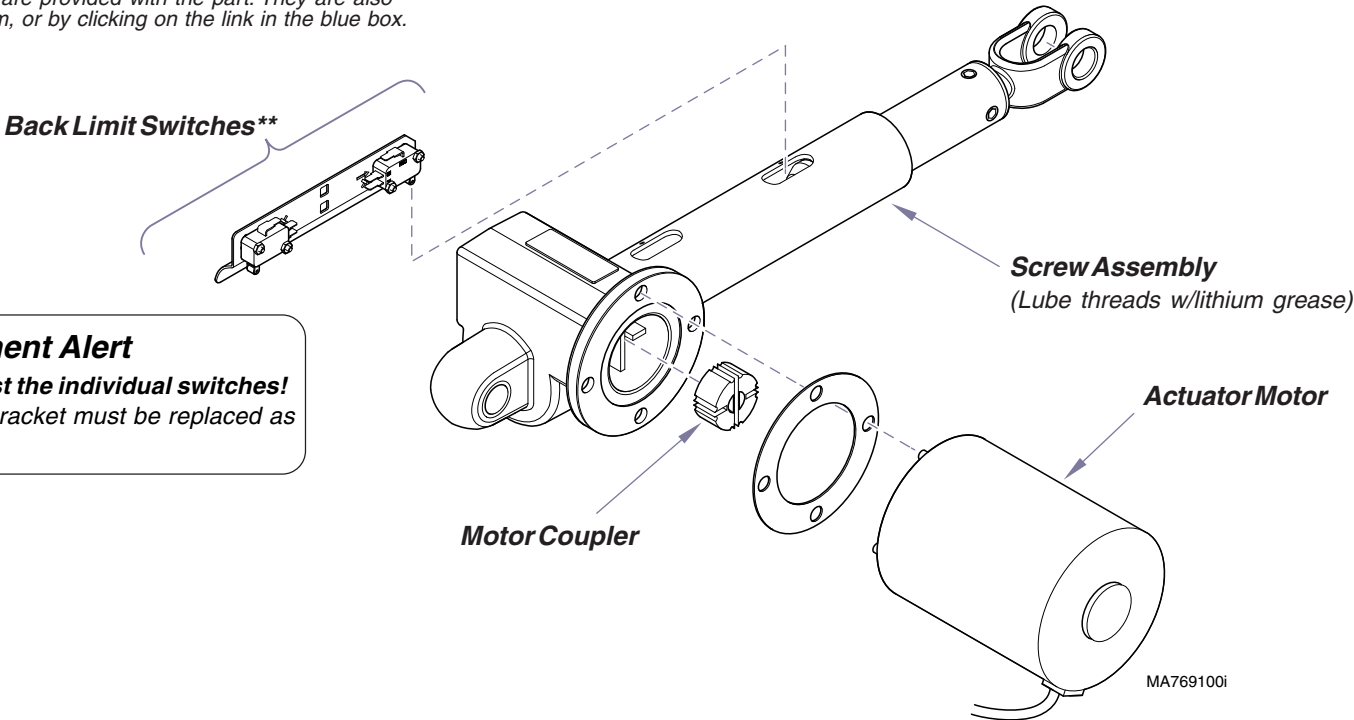
\*Replacement instructions are provided with the part. They are also available on Documark.com, or by clicking on the link in the blue box.

<b>Back Actuator / Limit Switches</b>	<b>Page</b>
Isolating a Malfunction .....	B-10
Limit Switch / Harness Test .....	B-11
Actuator Motor Test .....	B-12
PC Board Test .....	B-13
Access Procedures ( <i>Cover Removal</i> ) ....	C-1
Wiring Diagrams .....	D-1
Exploded View / Part Numbers .....	E-20

<b>www.Documark.com:</b>	<b>File Name</b>
Back Actuator / Motor Replacement .....	003-1738-00

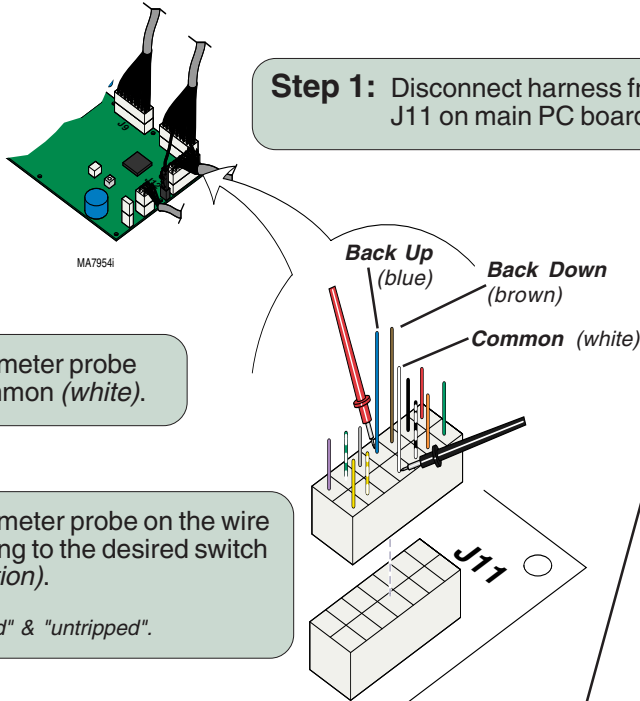
**! \*\* Equipment Alert**  
**Do not adjust the individual switches!**  
 The limit switches & bracket must be replaced as a complete assembly.



<b>Refer To:</b>	<b>Page</b>
Actuator Motor Test .....	B-12

## Back Actuator / Limit Switches - continued

### PC Board Harness Test



**Step 1:** Disconnect harness from J11 on main PC board

**Step 2:** Place one meter probe on the common (*white*).

**Step 3:** Place other meter probe on the wire corresponding to the desired switch (see illustration).  
 Note: Check switch "tripped" & "untripped".

**Back Down switch "untripped"... - OR -  
 Back Up Switch "tripped"...**  
 Meter Reading      Req'd Action

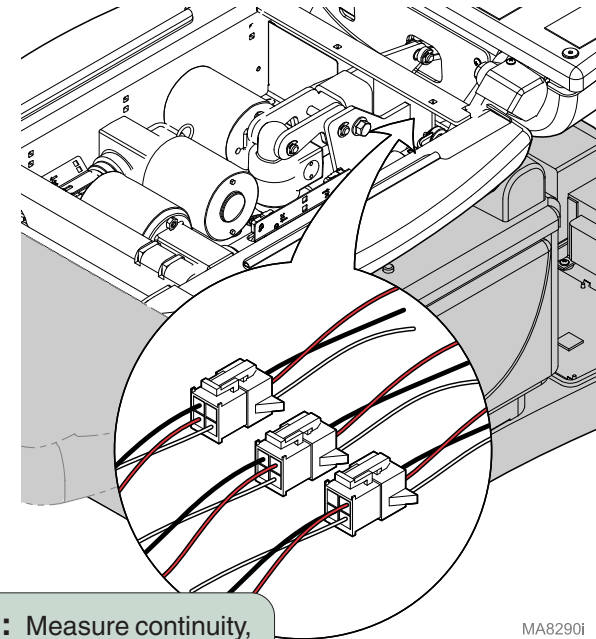
<b>OL</b>	Perform <b>Limit Switch Harness Test</b>
<b>less than 10 Ω</b>	Limit switch / harness - OK Perform <b>Actuator Motor Test</b>

**Back Down switch "tripped"... - OR -  
 Back Up Switch "untripped"...**

<b>less than 10 Ω</b>	Perform <b>Limit Switch Harness Test</b>
<b>OL</b>	Limit switch / harness - OK Perform <b>Actuator Motor Test</b>

### Limit Switch Harness Test

**Step 1:** Unplug the appropriate limit switch harness.



**Step 2:** Measure continuity,

Meter reading should be...

<b>Actuator Full Up</b>	White to Black - Open White to Red - Closed
<b>Actuator Full Down</b>	White to Black - Closed White to Red - Open
<b>Actuator Midway Point</b>	White to Black - Closed White to Red - Closed

**Models:** ALL  
**Serial Numbers:**

**Back Actuator /  
 Limit Switches**

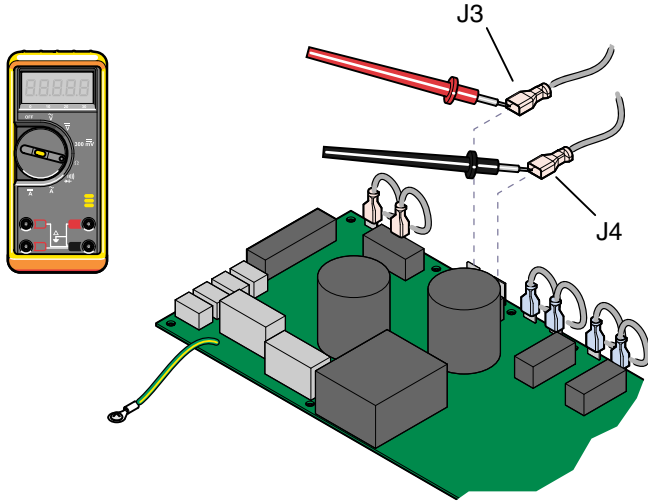
# Component Testing & Repair

## Back Actuator / Limit Switches - continued

### Actuator Motor Test

#### Actuator Motor Test

**Step 1:** Tag / disconnect back actuator wires (J3 & J4).



#### Actuator Motor Test

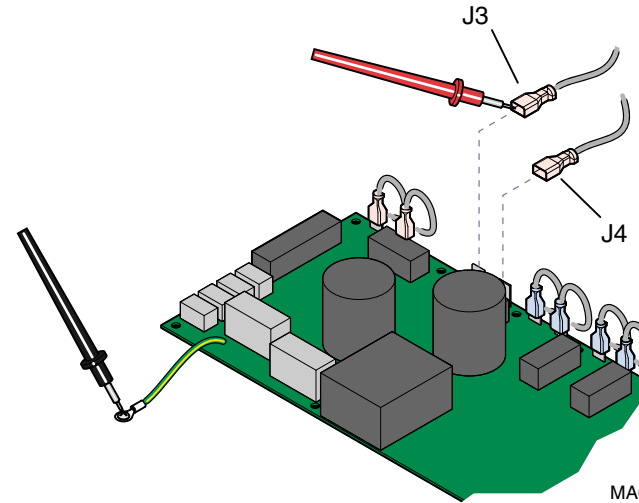
**Step 2:** Place meter probes on actuator wires. Check meter reading.

**Meter Reading**      **Status**      **Required Action**

1 to 10 $\Omega$		Actuator motor - OK. Perform <b>Motor Ground Test</b>
OL -or- less than 1 $\Omega$		Replace motor*.

\*Replacement instructions are provided with the part. They are also available on Documark.com, or by clicking on the link in the blue box.

### Motor Ground Test



#### Motor Ground Test

**Step 1:** Place one meter probe on actuator wire (J3). Place other meter probe on PC board ground wire. Check meter reading. (Repeat for J4)

**Meter Reading**      **Status**      **Required Action**

OL -or- more than 1 M $\Omega$		Motor harness - OK. Perform <b>PC Board Test</b>
less than 1 $\Omega$		Replace motor*.

#### Refer To:

PC Board Test ..... B-13

#### Page

#### www.Documark.com:

Back Actuator / Motor

#### File Name

Replacement ..... 003-1738-00



# Component Testing & Repair

## Back Actuator / Limit Switches - continued

### PC Board Test

#### PC Board Test

**Step 1:** This test cannot be performed with the back section in the max. or min. position.

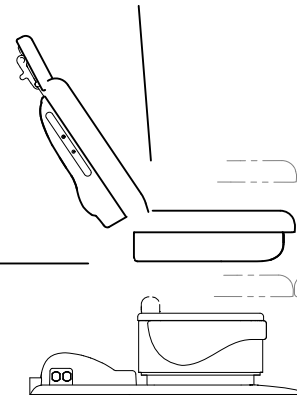
If necessary, reposition the back section.  
Refer to: *Base Actuator - PC Board Test*

[www.Documark.com](http://www.Documark.com):

File Name

PC Board Replacement ..... 003-1490-00

Back Section  
Max. Position



Base  
Max. Position

Base  
Min. Position

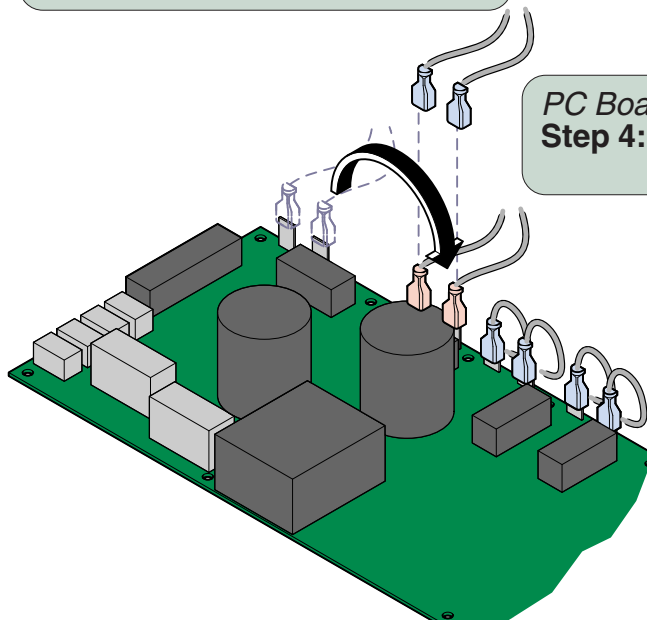
Back Section  
Min. Position

#### PC Board Test

**Step 2:** Move the **BASE** function so that it is approx. halfway between the maximum & minimum positions.

#### PC Board Test

**Step 3:** Tag, then disconnect back actuator wires from J3 & J4.



#### PC Board Test

**Step 4:** Move wire from J1 to J3.  
Move wire from J2 to J4.



#### Equipment Alert

The base limit switches will not stop movement during this test.

**Do not run past max. / min. positions.**

Back Up

Back Down



#### PC Board Test

**Step 5:** Press & hold Back Up button for 5 seconds.

Does the **base** move up, then stop & "beep"?

If **YES**, go to Step 6.

If **NO**, replace PC Board\*.

#### PC Board Test

**Step 6:** Press & hold Back Down button for 5 seconds.

Does the **base** move down, then stop & "beep"?

If **YES**, PC Board is OK.

If **NO**, replace PC Board\*.

\*Replacement instructions are provided with the part. They are also available on Documark.com, or by clicking on the link in the blue box.

Models:  
Serial Numbers:

ALL

Back Actuator/  
Limit Switches

B-13

# Component Testing & Repair

## Tilt Actuator / Limit Switch

### Isolating a Malfunction

This illustration shows the Tilt Down Limit Switch and the three serviceable components of the tilt actuator. Use the table below to isolate the malfunction.

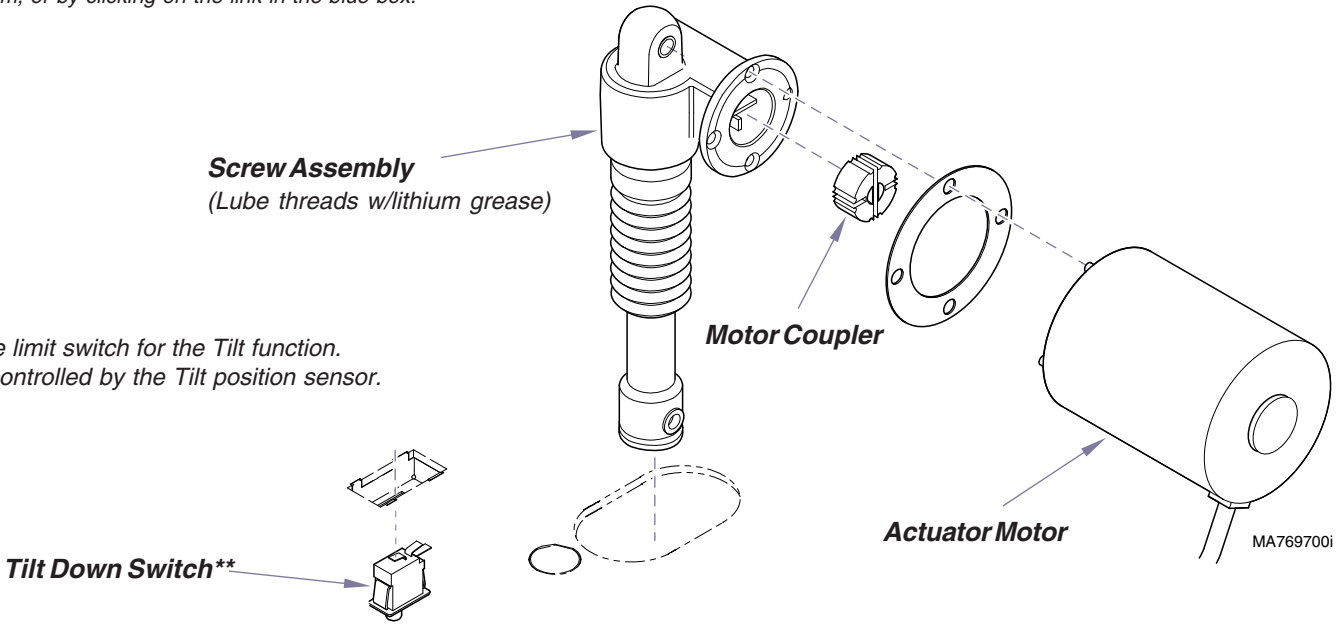
<b>Problem</b>	<b>Required Action</b>
Motor runs, but makes grinding noise.	Clean / lube actuator threads. Replace actuator if necessary*.
Motor runs, but table does not move.	Inspect / replace motor coupler*.
Motor does not run.	(Up <i>only</i> ) Perform <b>Position Sensor Test (at Tilt Sensor)</b> (Down <i>only</i> ) Perform <b>Limit Switch Test</b> . - If OK, (Up / Down) Perform <b>Actuator Motor Test</b> .

<b>Tilt Actuator / Limit Switch</b>	<b>Page</b>
Isolating a Malfunction .....	B-14
Limit Switch / Harness Test .....	B-15
Actuator Motor Test .....	B-17
PC Board Test .....	B-18
Position Sensor Test .....	B-31
Access Procedures ( <i>Cover Removal</i> ) ....	C-1
Wiring Diagrams .....	D-1
Exploded View / Part Numbers .....	E-21

<b>www.Documark.com:</b>	<b>File Name</b>
Tilt Actuator / Motor Replacement .....	003-1742-00

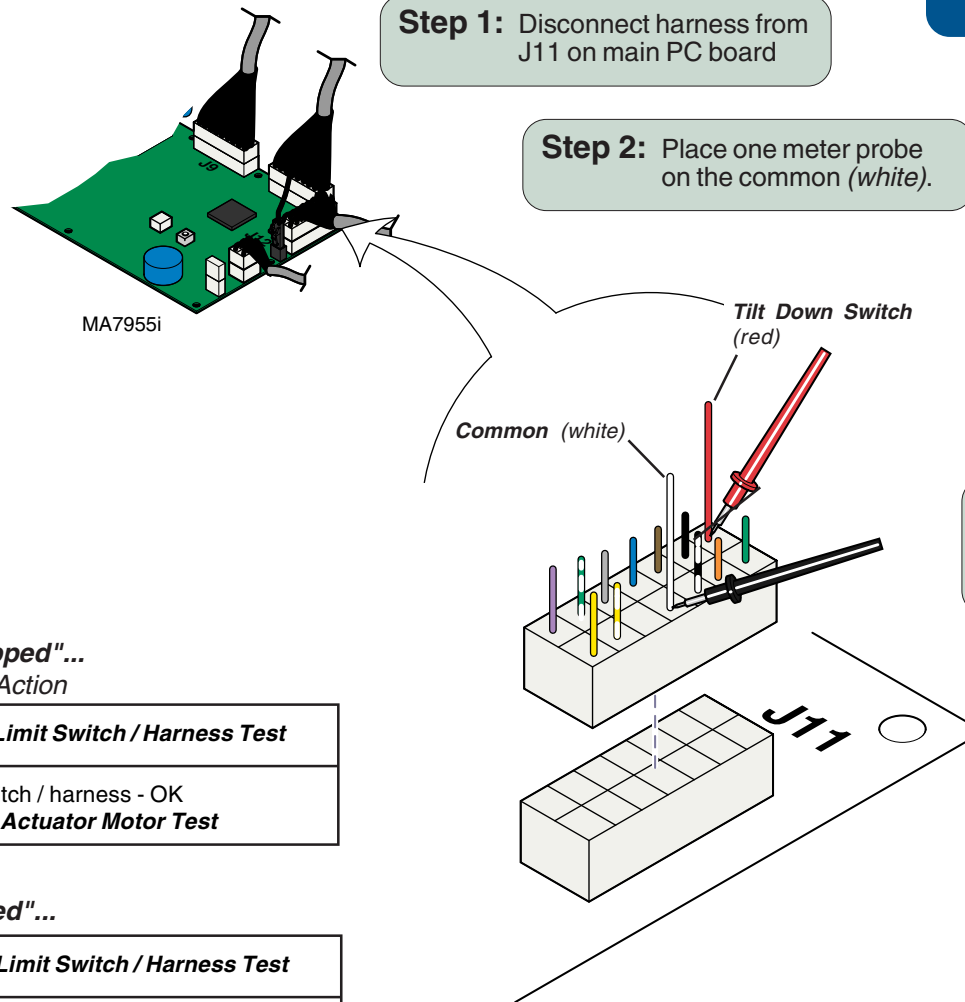
\*Replacement instructions are provided with the part. They are also available on Documark.com, or by clicking on the link in the blue box.



## Tilt Actuator / Limit Switch - continued

### PC Board Harness Test

Refer To:	Page
Limit Switch Continuity Test .....	B-16
Actuator Motor Test .....	B-17



#### Tilt Down Switch "untripped"...

Meter Reading    Req'd Action

<b>OL</b>	Perform <b>Limit Switch / Harness Test</b>
<b>less than 10 Ω</b>	Limit switch / harness - OK Perform <b>Actuator Motor Test</b>

#### Tilt Down Switch "tripped"...

<b>less than 10 Ω</b>	Perform <b>Limit Switch / Harness Test</b>
<b>OL</b>	Limit switch / harness - OK Perform <b>Actuator Motor Test</b>

Models:  
Serial Numbers:

ALL

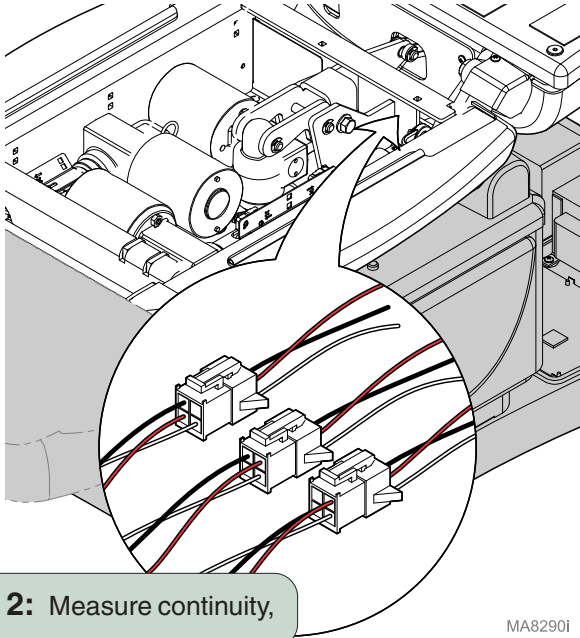
Tilt Actuator /  
Limit Switch

# Component Testing & Repair

## Tilt Actuator / Limit Switch - continued

### Limit Switch Harness Test

**Step 1:** Unplug the appropriate limit switch harness.



**Step 2:** Measure continuity,

MA8290i

*Meter reading should be...*

<b>Actuator Full Up</b>	White to Black - Open
	White to Red - Closed
<b>Actuator Full Down</b>	White to Black - Closed
	White to Red - Open
<b>Actuator Midway Point</b>	White to Black - Closed
	White to Red - Closed

### Limit Switch Test

**Step 1:** Tag & disconnect wires from switch.



**Step 2:** Place meter probes on **COM** and **NC** terminals.

*Note:* Check switch 'tripped' and 'untripped'.

#### With switch 'tripped'...

Meter Reading	Status	Required Action
<b>OL</b>		Limit switch - OK
<b>less than 5 Ω</b>		Replace switch

#### With switch 'untripped'...

Meter Reading	Status	Required Action
<b>OL</b>		Replace switch
<b>less than 5 Ω</b>		Limit switch - OK Perform <b>Actuator Motor Test</b>

**Refer To:**

Actuator Motor Test ..... B-17

**Page**

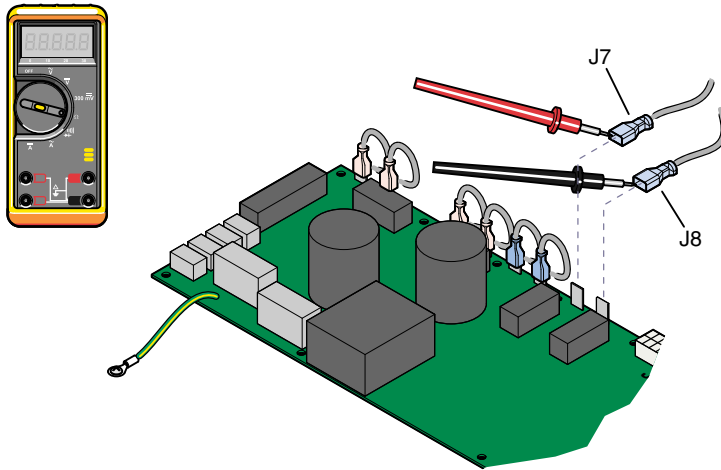
B-17

## Tilt Actuator / Limit Switch - continued

### Actuator Motor Test

#### Actuator Motor Test

**Step 1:** Tag, then disconnect tilt actuator wires (J7 & J8).



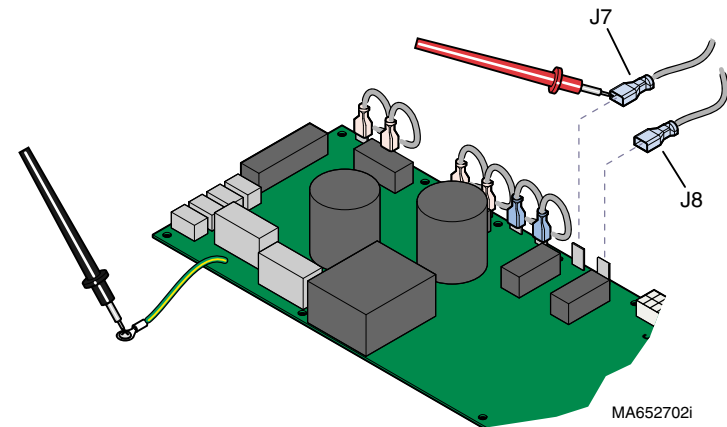
#### Actuator Motor Test

**Step 2:** Place meter probes on actuator wires. Check meter reading.

Meter Reading	Status	Required Action
1 to 10 $\Omega$		Actuator motor - OK. Perform <b>Motor Ground Test</b>
OL -or- less than 1 $\Omega$		Replace motor*.

\*Replacement instructions are provided with the part. They are also available on [Documark.com](http://Documark.com), or by clicking on the link in the blue box.

### Motor Ground Test



#### Motor Ground Test

**Step 1:** Place one meter probe on actuator wire (J7). Place other meter probe on PC board ground wire. Check meter reading. (Repeat for J8)

Meter Reading	Status	Required Action
OL -or- more than 1 M $\Omega$		Motor harness - OK. Perform <b>PC Board Test</b>
less than 1 $\Omega$		Replace motor*.

**Refer To:** [Page](#)  
PC Board Test ..... B-18

**www.Documark.com:** [File Name](#)  
Tilt Actuator / Motor  
Replacement ..... 003-1742-00

Models:  
Serial Numbers:

ALL

Tilt Actuator /  
Limit Switch

# Component Testing & Repair

## Tilt Actuator / Limit Switch - continued

### PC Board Test

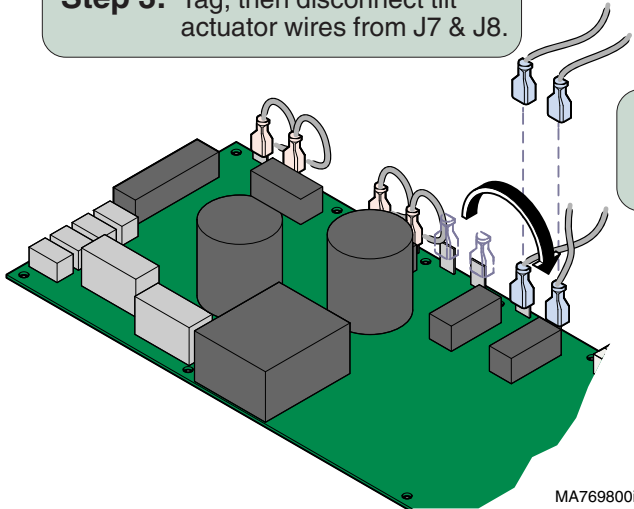
#### PC Board Test

**Step 1:** This test cannot be performed with the tilt function in the max. or min. position.

If necessary, reposition the tilt function. Refer to: *Foot Actuator - PC Board Test*

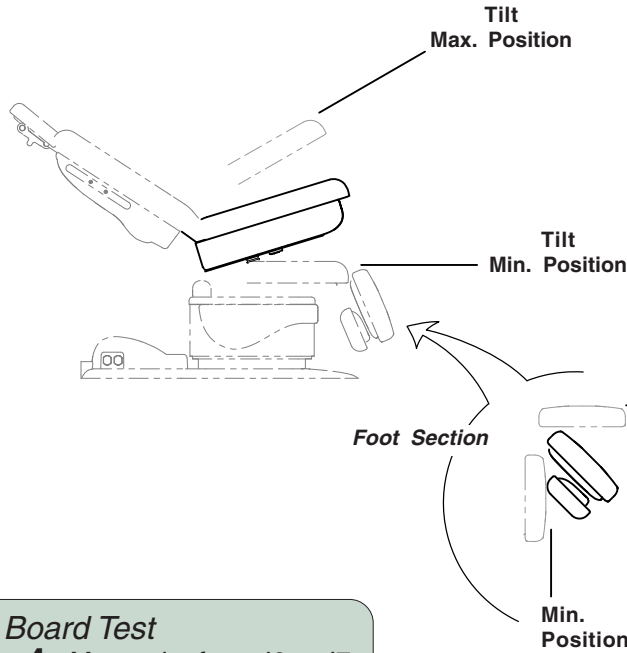
#### PC Board Test

**Step 3:** Tag, then disconnect tilt actuator wires from J7 & J8.



#### PC Board Test

**Step 4:** Move wire from J6 to J7. Move wire from J5 to J8.



[www.Documark.com](http://www.Documark.com):

File Name

PC Board Replacement ..... 003-1490-00

#### PC Board Test

**Step 2:** Move the FOOT section halfway between the max. & min. positions.



#### Equipment Alert

The foot limit switches will not stop movement during this test.

**Do not run past max. / min. positions.**



#### PC Board Test

**Step 5:** Press & hold Tilt Up button for 5 seconds.

Does the **foot section** move up, then stop & "beep"?

If **YES**, go to Step 6.

If **NO**, replace PC Board\*.

#### PC Board Test

**Step 6:** Press & hold Tilt Down button for 5 seconds.

Does the **foot section** move down, then stop & "beep"?

If **YES**, PC Board is OK.

If **NO**, replace PC Board\*.

\*Replacement instructions are provided with the part. They are also available on [Documark.com](http://Documark.com), or by clicking on the link in the blue box.

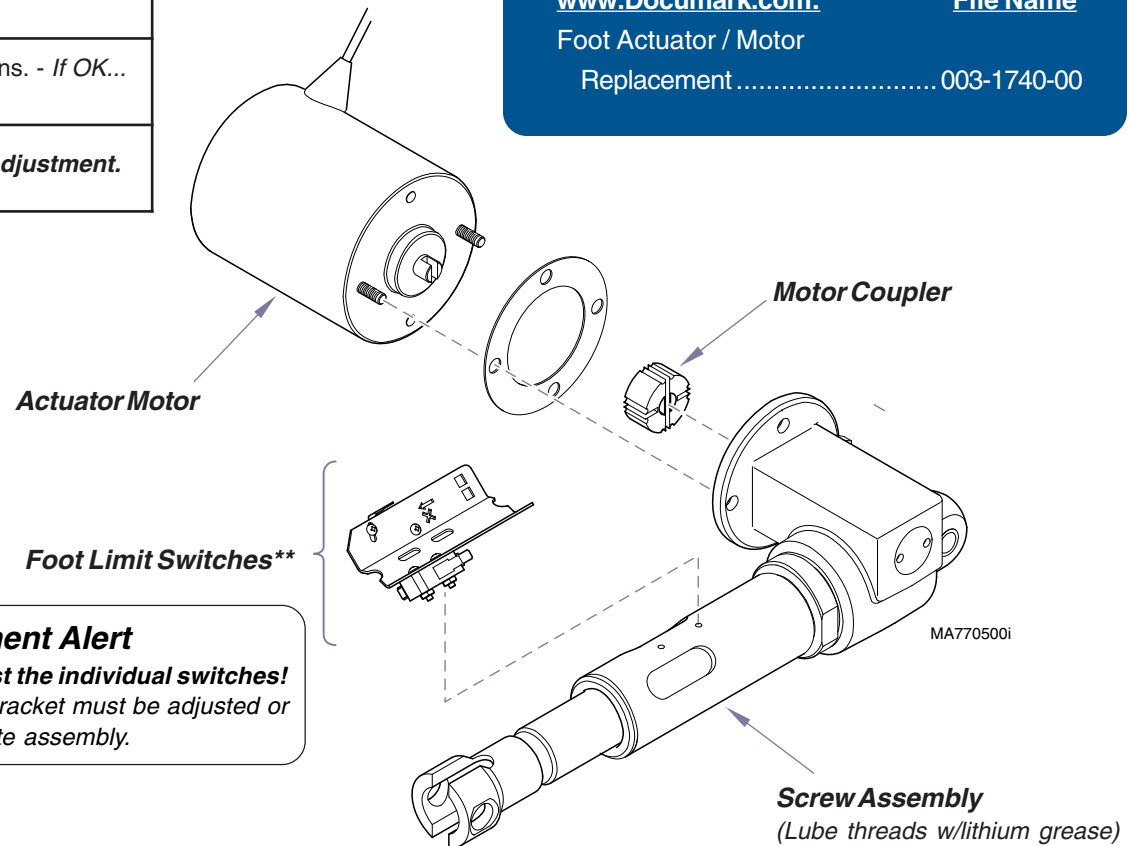
## Foot Actuator / Limit Switches

### Isolating a Malfunction

This illustration shows the foot limit switches and the three serviceable components of the foot actuator. Use the table below to isolate the malfunction.

<b>Problem</b>	<b>Required Action</b>
Motor runs, but makes grinding noise.	Clean / lube actuator threads. Replace actuator if necessary*.
Motor runs, but table does not move.	Inspect / replace motor coupler*.
Motor does not run.	Check limit switch wire connections. - <i>If OK...</i> Perform <b>Actuator Motor Test</b> .
Actuator runs past max / min position.	Perform <b>Limit Switch Bracket Adjustment</b> .

\*Replacement instructions are provided with the part. They are also available on Documark.com, or by clicking on the link in the blue box.



**! \*\* Equipment Alert**  
**Do not adjust the individual switches!**  
The limit switches & bracket must be adjusted or replaced as a complete assembly.

<b>Foot Actuator / Limit Switches</b>	<b>Page</b>
Isolating a Malfunction .....	B-19
Limit Switch / Harness Test .....	B-20
Actuator Motor Test .....	B-21
PC Board Test .....	B-22
Limit Switch Bracket Adjustment .....	B-23
Access Procedures ( <i>Cover Removal</i> ) ...	C-1
Wiring Diagrams .....	D-1
Exploded View / Part Numbers .....	E-22

<a href="http://www.Documark.com">www.Documark.com:</a>	<b>File Name</b>
Foot Actuator / Motor Replacement .....	003-1740-00

**Models:** ALL  
**Serial Numbers:**

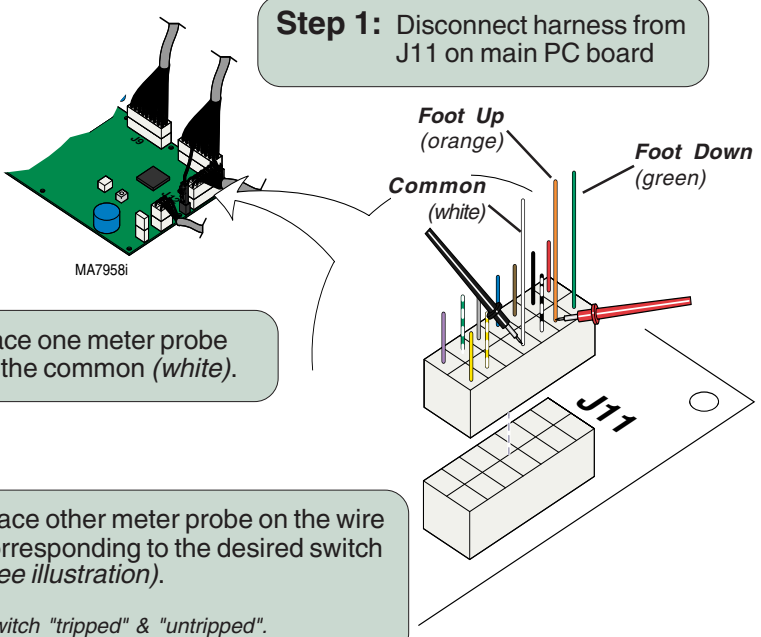
**Foot Actuator /  
Limit Switches**

# Component Testing & Repair

## Foot Actuator / Limit Switch - continued

### PC Board Harness Test

**Refer To:** Actuator Motor Test ..... **Page** B-21



**Step 1:** Disconnect harness from J11 on main PC board

**Step 2:** Place one meter probe on the common (white).

**Step 3:** Place other meter probe on the wire corresponding to the desired switch (see illustration).  
 Note: Check switch "tripped" & "untripped".

**With switch "tripped"...**  
 Meter Reading    Req'd Action

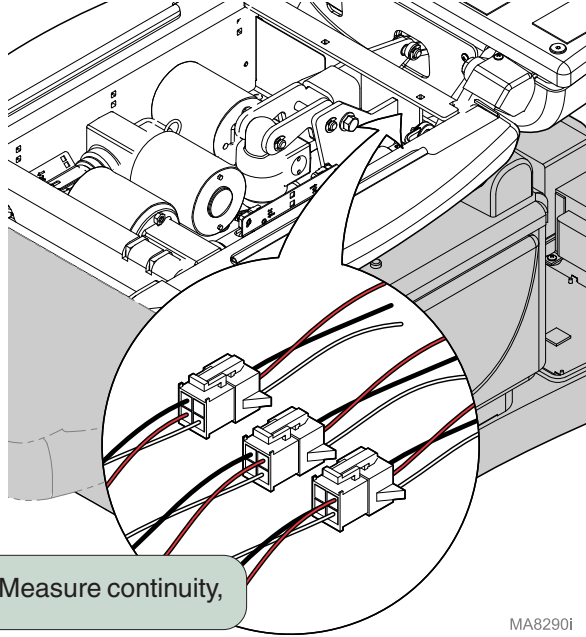
<b>OL</b>	Perform <b>Limit Switch Harness Test</b>
<b>less than 10 Ω</b>	Limit switch / harness - OK Perform <b>Actuator Motor Test</b>

**With switch "untripped"...**

<b>less than 10 Ω</b>	Perform <b>Limit Switch Harness Test</b>
<b>OL</b>	Limit switch / harness - OK Perform <b>Actuator Motor Test</b>

### Limit Switch Harness Test

**Step 1:** Unplug the appropriate limit switch harness.



**Step 2:** Measure continuity,

**Meter reading should be...**

<b>Actuator Full Up</b>	White to Black - Open White to Red - Closed
<b>Actuator Full Down</b>	White to Black - Closed White to Red - Open
<b>Actuator Midway Point</b>	White to Black - Closed White to Red - Closed

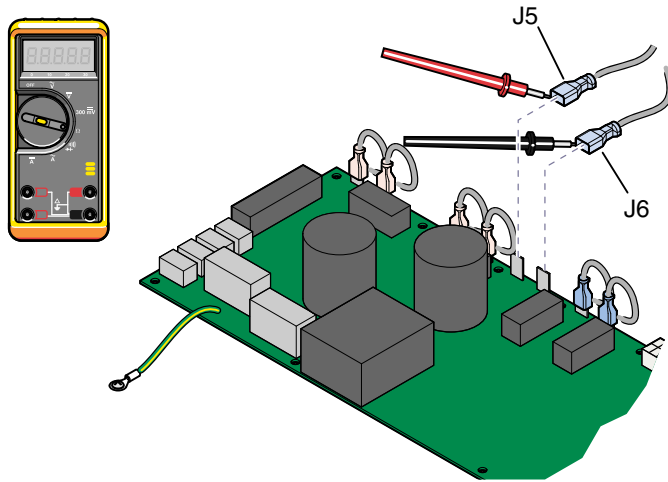


## Foot Actuator / Limit Switches - continued

### Actuator Motor Test

#### Actuator Motor Test

**Step 1:** Tag / disconnect foot actuator wires (J5 & J6).



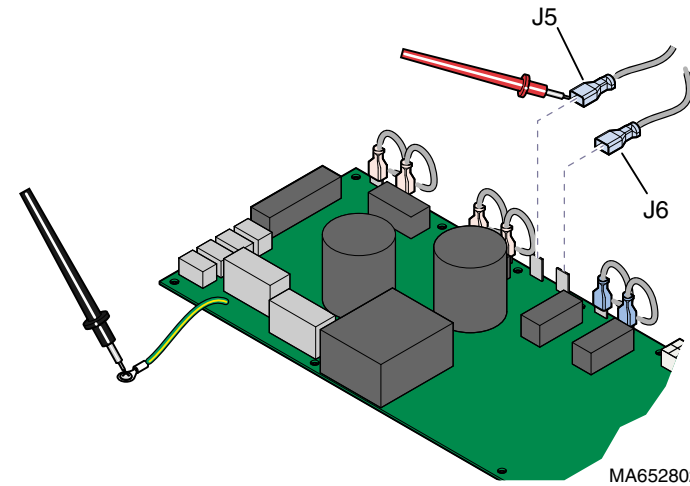
#### Actuator Motor Test

**Step 2:** Place meter probes on actuator wires. Check meter reading.

Meter Reading	Status	Required Action
1 to 10 $\Omega$		Actuator motor - OK. Perform <b>Motor Ground Test</b>
OL -or- less than 1 $\Omega$		Replace motor*.

\*Replacement instructions are provided with the part. They are also available on [Documark.com](http://Documark.com), or by clicking on the link in the blue box.

### Motor Ground Test



#### Motor Ground Test

**Step 1:** Place one meter probe on actuator wire (J5). Place other meter probe on PC board ground wire. Check meter reading. (Repeat for J6)

Meter Reading	Status	Required Action
OL -or- more than 1 M $\Omega$		Motor harness - OK. Perform <b>PC Board Test</b>
less than 1 $\Omega$		Replace motor*.

**Refer To:** [Page](#)  
PC Board Test ..... B-22

**www.Documark.com:** [File Name](#)  
Foot Actuator / Motor  
Replacement ..... 003-1740-00

Models:  
Serial Numbers:

ALL

Foot Actuator /  
Limit Switches

# Component Testing & Repair

## Foot Actuator / Limit Switches - continued

### PC Board Test

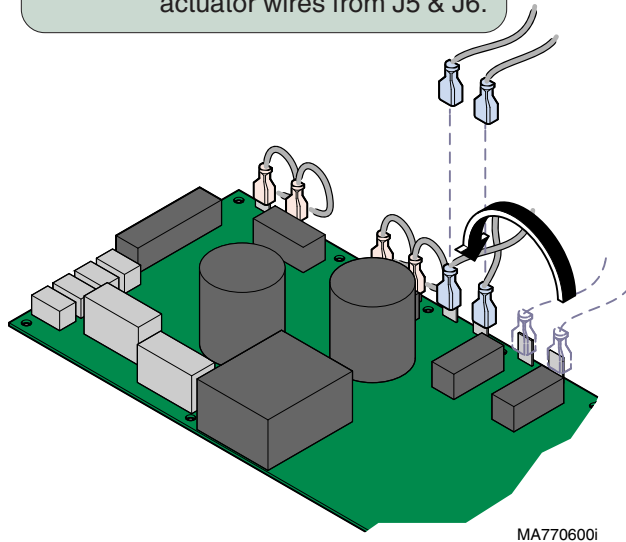
#### PC Board Test

**Step 1:** This test cannot be performed with the foot function in the max. or min. position.

If necessary, reposition the foot section.  
Refer to: *Tilt Actuator - PC Board Test*

#### PC Board Test

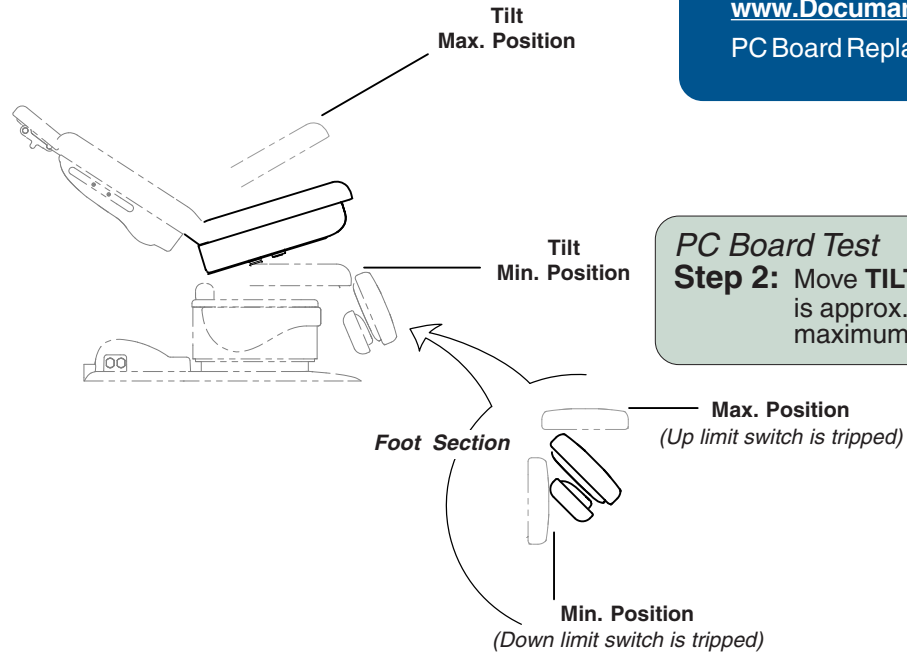
**Step 3:** Tag / disconnect foot actuator wires from J5 & J6.



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#### PC Board Test

**Step 4:** Move brown wire from J7 to J6.  
Move blue wire from J8 to J5.



[www.Documark.com](http://www.Documark.com):

File Name

PC Board Replacement ..... 003-1490-00

#### PC Board Test

**Step 2:** Move **TILT** function so that it is approx. halfway between its maximum & minimum positions.



#### Equipment Alert

The foot limit switches will not stop movement during this test.

**Do not run past max. / min. positions.**



#### PC Board Test

**Step 5:** Press & hold Foot Up button for 5 seconds.

Does the **tilt function** move up, then stop & "beep"?  
If **YES**, go to Step 6.  
If **NO**, replace PC Board\*.

#### PC Board Test

**Step 6:** Press & hold Foot Down button for 5 seconds.

Does the **tilt function** move down, then stop & "beep"?  
If **YES**, PC Board is OK.  
If **NO**, replace PC Board\*.

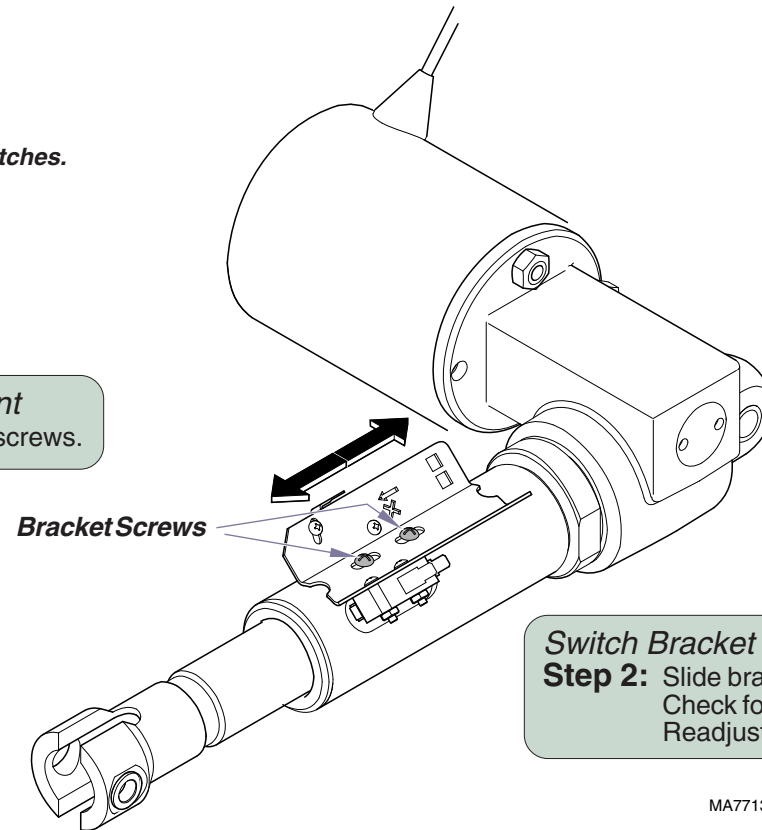
\*Replacement instructions are provided with the part. They are also available on Documark.com, or by clicking on the link in the blue box.

## Foot Actuator / Limit Switches - continued

### Limit Switch Bracket Adjustment

The foot limit switch adjustment is critical to ensure proper operation (tolerance: 0.030").  
**Do not attempt to adjust the individual switches.**

**Switch Bracket Adjustment**  
**Step 1:** Loosen two bracket screws.



**Switch Bracket Adjustment**  
**Step 2:** Slide bracket assembly forward / backward.  
Check for proper operation.  
Readjust as necessary.

MA771300i

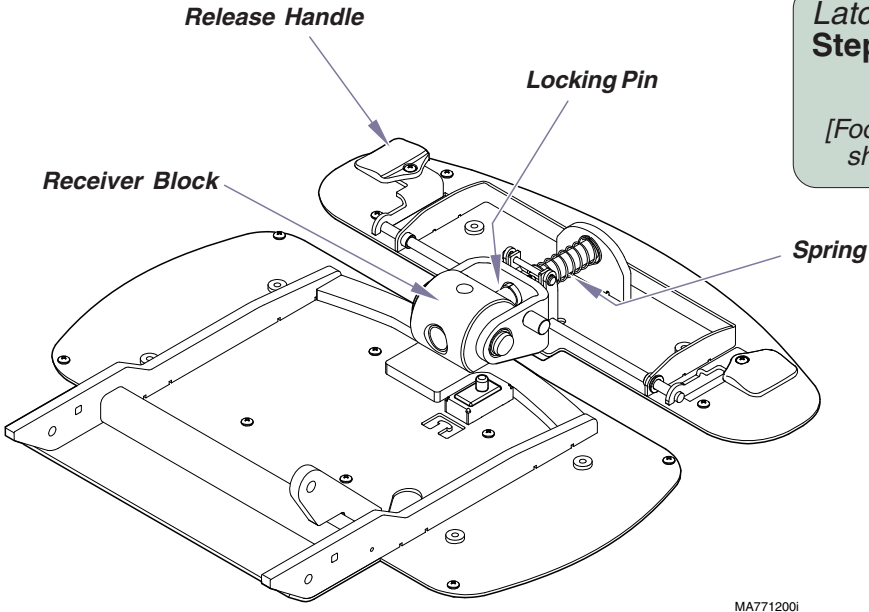
# Component Testing & Repair

## Foot Extension / Limit Switch

### Latch Inspection

**Equipment Alert**  
The weight capacity of the foot extension is 120 lbs (54 kg). Exceeding this limit may result in equipment damage.

**Latch Inspection**  
**Step 1:** Remove foot extension cover (not shown). Squeeze release handle(s).  
*[Linkage should retract locking pin, disengaging it from the receiver block]*



**Latch Inspection**  
**Step 2:** Move the foot extension to both locking positions (stowed / extended).  
*[Foot extension should move freely. Spring tension should engage the locking pin in each position]*

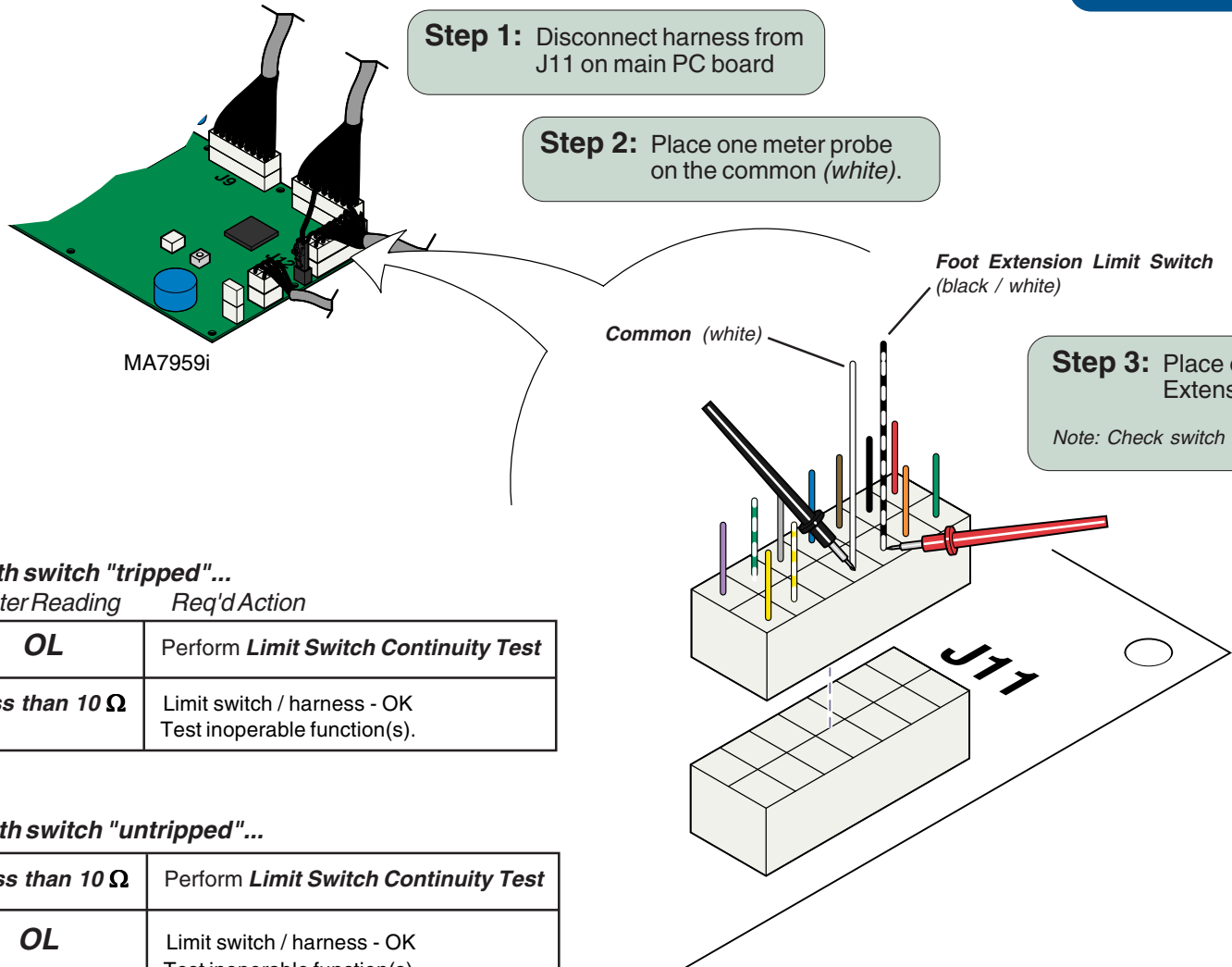
**Latch Inspection**  
**Step 3:** Remove any debris restricting movement. Tighten any loose fasteners. Replace any damaged components.

Foot Extension / Limit Switch	Page
Latch Inspection .....	B-24
Limit Switch / Harness Test .....	B-25
Access Procedures (Cover Removal) ...	C-1
Wiring Diagrams .....	D-1
Exploded View / Part Numbers:	
Foot Extension (incl. latch) .....	E-7
Leg Section (incl. limit switch) .....	E-8

<b>Refer To:</b>	<b>Page</b>
Limit Switch Continuity Test .....	B-26

## Foot Extension / Limit Switch - continued

### Limit Switch / Harness Test



#### With switch "tripped"...

Meter Reading    Req'd Action

<b>OL</b>	Perform <b>Limit Switch Continuity Test</b>
<b>less than 10 Ω</b>	Limit switch / harness - OK Test inoperable function(s).

#### With switch "untripped"...

<b>less than 10 Ω</b>	Perform <b>Limit Switch Continuity Test</b>
<b>OL</b>	Limit switch / harness - OK Test inoperable function(s).

<b>Models:</b>	<b>ALL</b>
<b>Serial Numbers:</b>	

**Foot Extension /  
Limit Switch**

# Component Testing & Repair

## Foot Extension / Limit Switch - continued

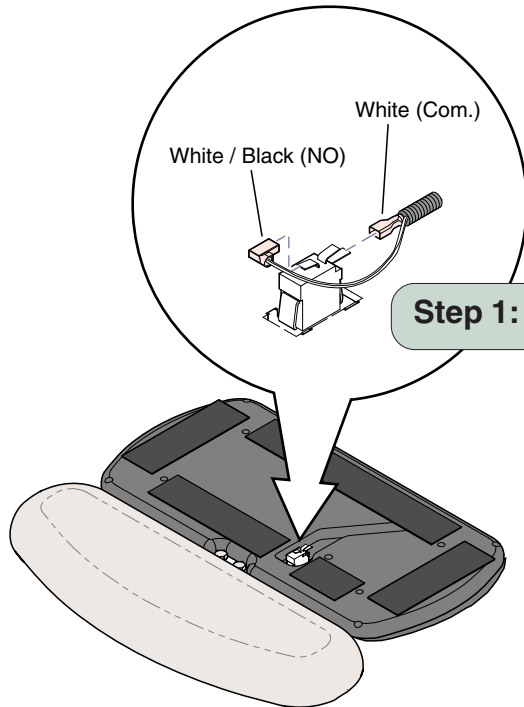
### Limit Switch Continuity Test

#### Before performing test...

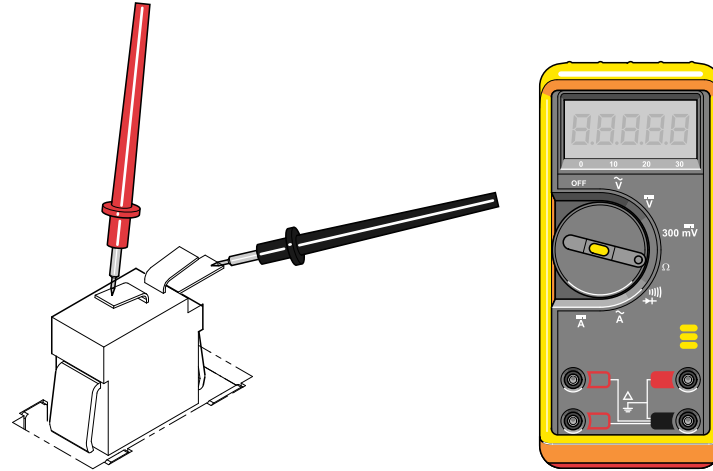
#### Inspect limit switch wire connections

Tighten any loose connections.  
Replace any damaged wire harnesses

1st ✓



**Step 1:** Tag / disconnect wires.



MA771400i

**Step 2:** Place meter probes on **COM** and **NO** terminals.

*Note:* Check switch 'tripped' and 'untripped'.

#### With switch 'tripped'...

Meter Reading	Status	Required Action
OL		Replace switch
less than 5 $\Omega$		Limit switch - OK

#### With switch 'untripped'...

Meter Reading	Status	Required Action
OL		Limit switch - OK
less than 5 $\Omega$		Replace switch

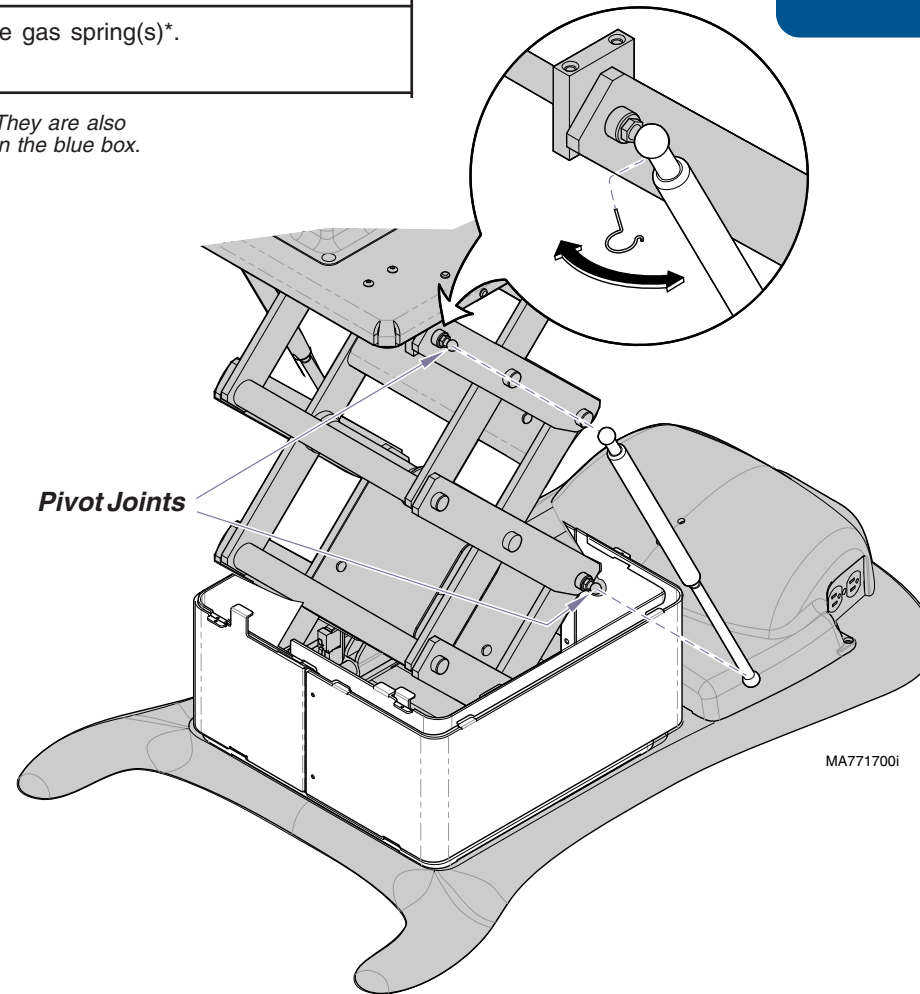
## Gas Springs

### Isolating a Malfunction

<b>Problem</b>	<b>Required Action</b>
Squeaking, grinding sound coming from pivot joints.	Clean / lube pivot joints. (lubricant: lithium grease)
Diminished lifting capacity. (Base actuator - OK)	Replace gas spring(s)*.

\*Replacement instructions are provided with the part. They are also available on [Documark.com](http://Documark.com), or by clicking on the link in the blue box.

<b><u>Gas Springs</u></b>	<b><u>Page</u></b>
Isolating a Malfunction .....	B-27
Access Procedures (Cover Removal)....	C-1
Exploded View / Part Numbers .....	E-14
<b><u>www.Documark.com:</u></b>	<b><u>File Name</u></b>
Gas Spring Replacement .....	003-1741-00

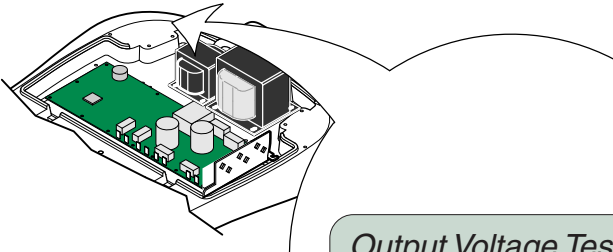


# Component Testing & Repair

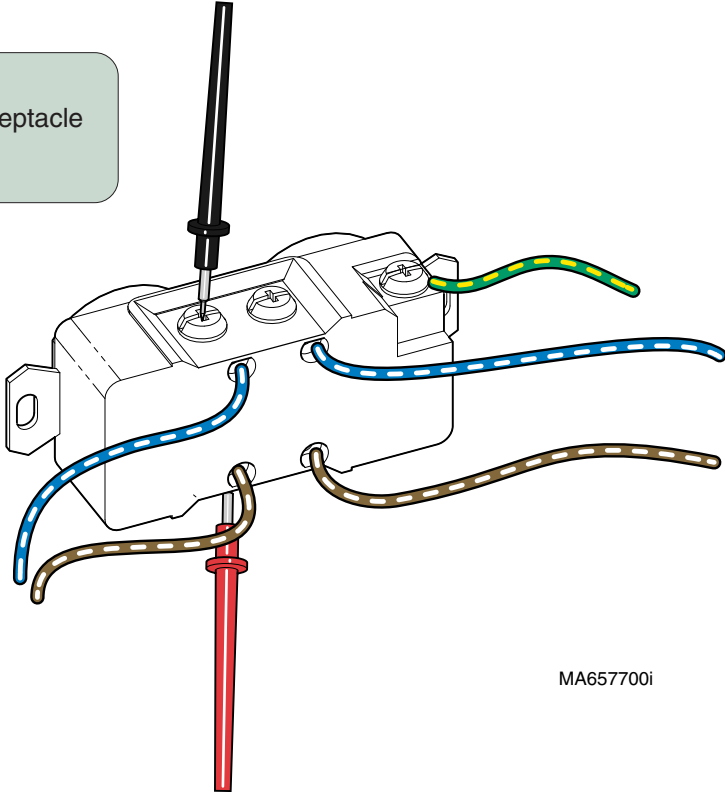
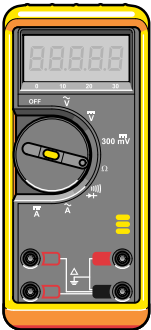
## Isolation Transformer / Chair Receptacles

[NOTE: This transformer affects chair receptacles only].

### Output Voltage Test



**Output Voltage Test**  
**Step 1:** Place meter probes on receptacle screws (top & bottom).  
 Check meter reading.



MA657700i

<u>Isolation Transformer</u>	<u>Page</u>
Output Voltage Test .....	B-28
Access Procedures (Cover Removal) ....	C-1
Wiring Diagrams .....	D-1
Exploded View / Part Numbers .....	E-26

Meter Reading	Status	Required Action
120 (±12) VAC		Transformer - OK Replace receptacle(s).
less than 108 VAC		If table power light is ON, replace transformer. If not, check supply voltage.



## Main System Transformer

[NOTE: This transformer affects all table functions (except table receptacles)].

### Output Voltage Test

#### Main System Transformer Page

Output Voltage Test ..... B-29

Resistance Test ..... B-30

Access Procedures (Cover Removal) .... C-1

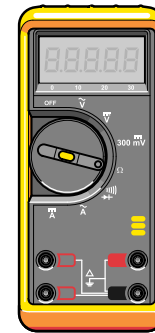
Wiring Diagrams ..... D-1

Exploded View / Part Numbers:

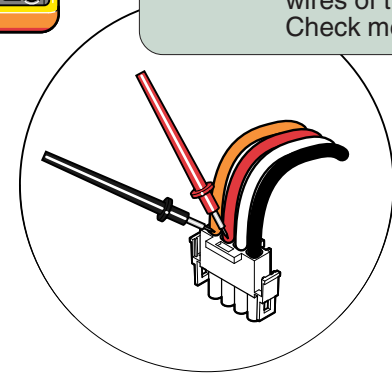
Standard Base ..... E-15

Rotational Base ..... E-16

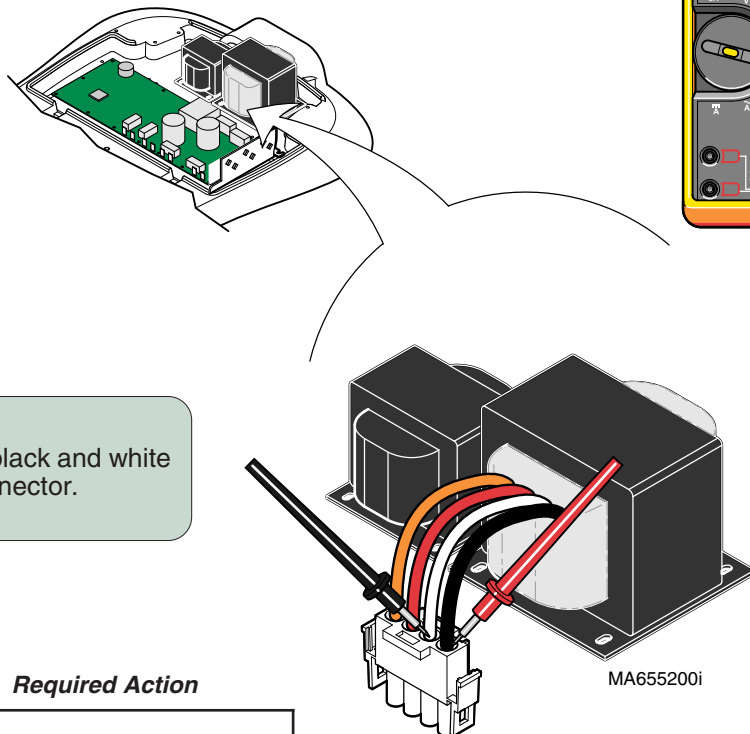
**Output Voltage Test**  
**Step 1:** Set meter to 200 VAC.



**Output Voltage Test**  
**Step 3:** Place meter probes on red and orange wires of transformer connector. Check meter reading.



**Output Voltage Test**  
**Step 2:** Place meter probes on black and white wires of transformer connector. Check meter reading.



[Black & White Wires] Meter Reading	Status	Required Action
42 to 58 VAC		Transformer - OK
less than 42 VAC more than 58 VAC		Perform <b>Resistance Test</b>

[Red & Orange Wires] Meter Reading	Status	Required Action
23 to 43 VAC		Transformer - OK
less than 23 VAC		Perform <b>Resistance Test</b>

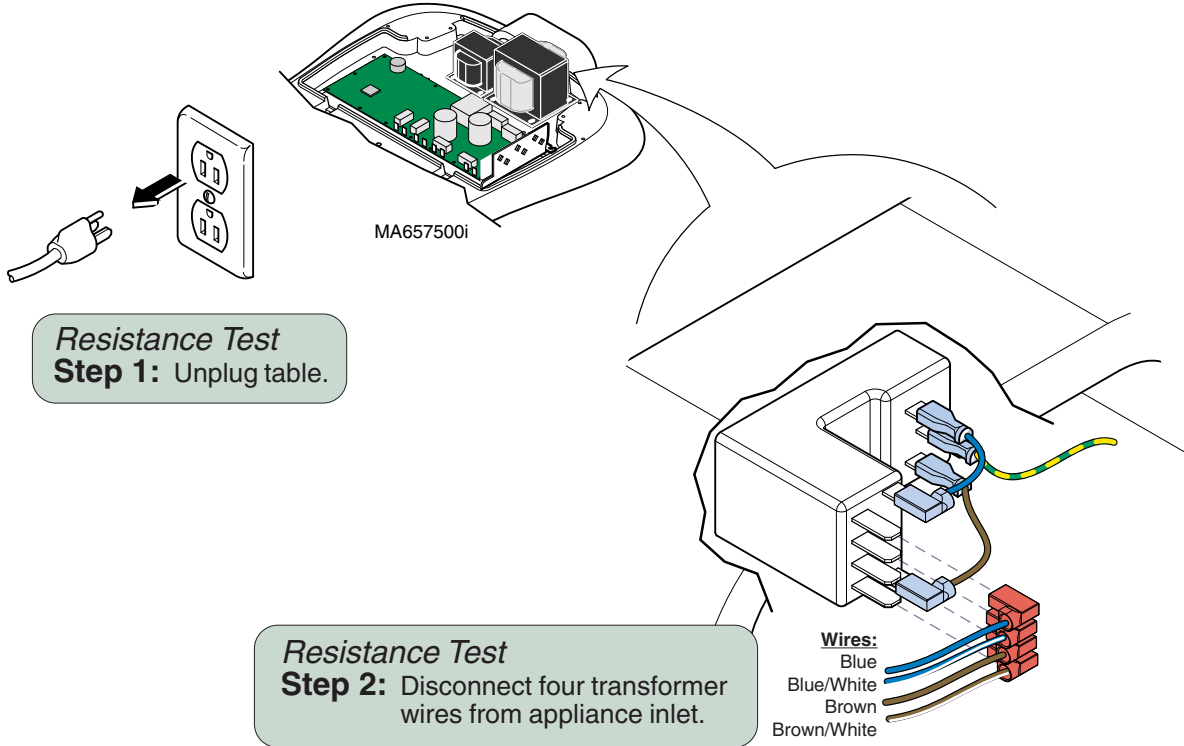
**Models:** ALL  
**Serial Numbers:**

**Main System Transformer**

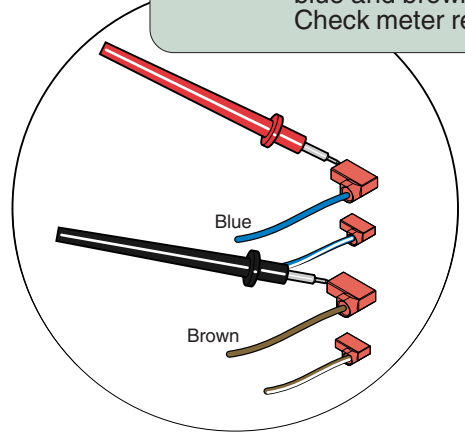
# Component Testing & Repair

## Main System Transformer - continued

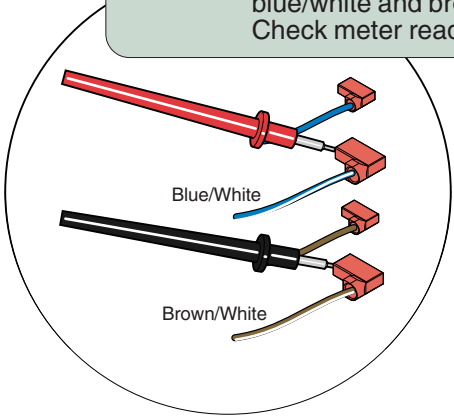
### Resistance Test



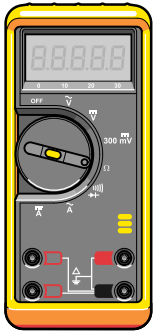
**Resistance Test Step 5:** Place meter probes on blue and brown wires. Check meter reading.



**Resistance Test Step 4:** Place meter probes on blue/white and brown/white wires. Check meter reading.



**Resistance Test Step 3:** Set meter to 200 Ω.



Meter Reading	Status	Required Action
less than 10 Ω		Transformer - OK
OL -or- more than 10 Ω		Replace transformer.

## Position Sensors

### Testing

**Step 1:** Verify position sensor shoulder bolts are tight (50 ft-lbs).

**Note:** This step does not apply to the Base position sensor.

**Step 2:** Perform **Output Voltage Test (at Sensor)**.

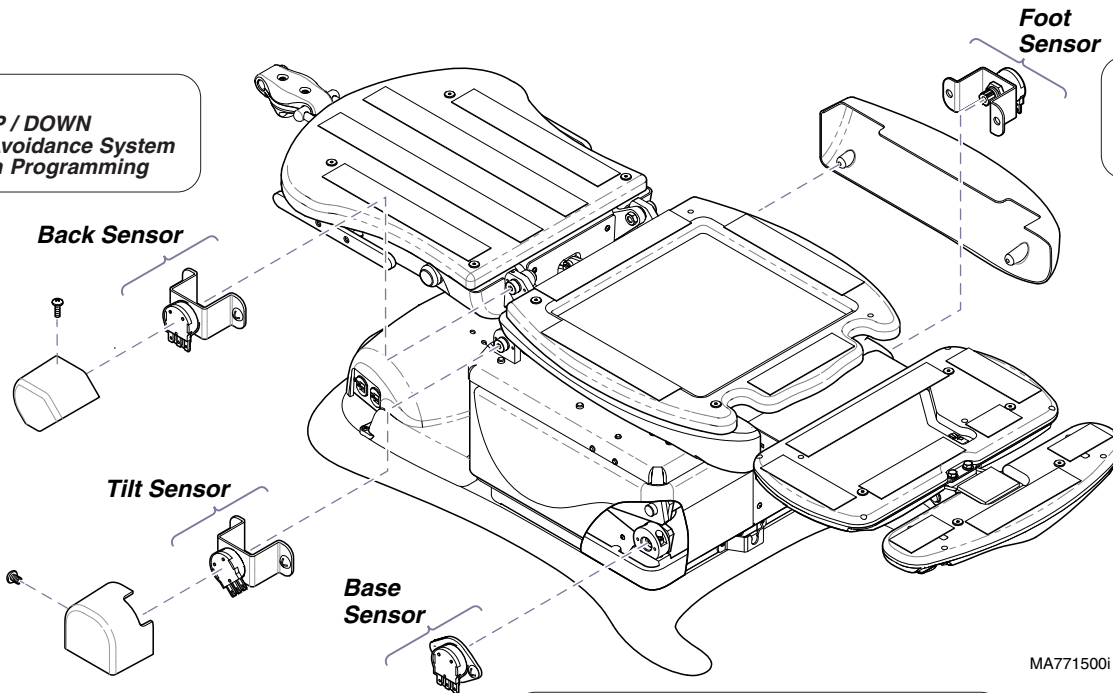
**Note:** This test must *always* be performed first.  
The results from this test determine the next required action.

Position Sensors	Page
Testing .....	B-31
Location .....	B-31
Output Voltage Test (at Sensor) .....	B-32
Access Procedures (Cover Removal) ....	C-1
Wiring Diagrams .....	D-1
Exploded View / Part Numbers .....	E-18

### Location

#### Back Sensor

Affected Functions: **Back UP / DOWN**  
Crash Avoidance System  
Position Programming



#### Foot Sensor

Affected Functions: **Foot UP / DOWN**  
Crash Avoidance System  
Position Programming

#### Tilt Sensor

Affected Functions: **Tilt UP / DOWN**  
Crash Avoidance System  
Position Programming

#### Base Sensor

Affected Functions: **Base UP / DOWN**  
Crash Avoidance System  
Position Programming  
"Home" Function

MA771500i

Models:  
Serial Numbers:

ALL

Position Sensors

# Component Testing & Repair

## Position Sensors - continued

### Output Voltage Test (at Sensor)

**Note: If Tilt is stuck in Down position...**

Disconnect the White and Black wires at J7 & J8 on Main PC Board. Connect Black wire to J7 and White wire to J8. Perform Output Voltage Test on Tilt Up function by pressing the Tilt DOWN button.



**Caution: Do not run Tilt Up function beyond the halfway position.**

Reconnect White wire to J7 and Black wire to J8. Perform Output Voltage Test on the Tilt Down function.

**Go to:**

**Page**

Output Voltage Test (at PC Board) ..... B-33

Supply Voltage Test (at Sensor) ..... B-34

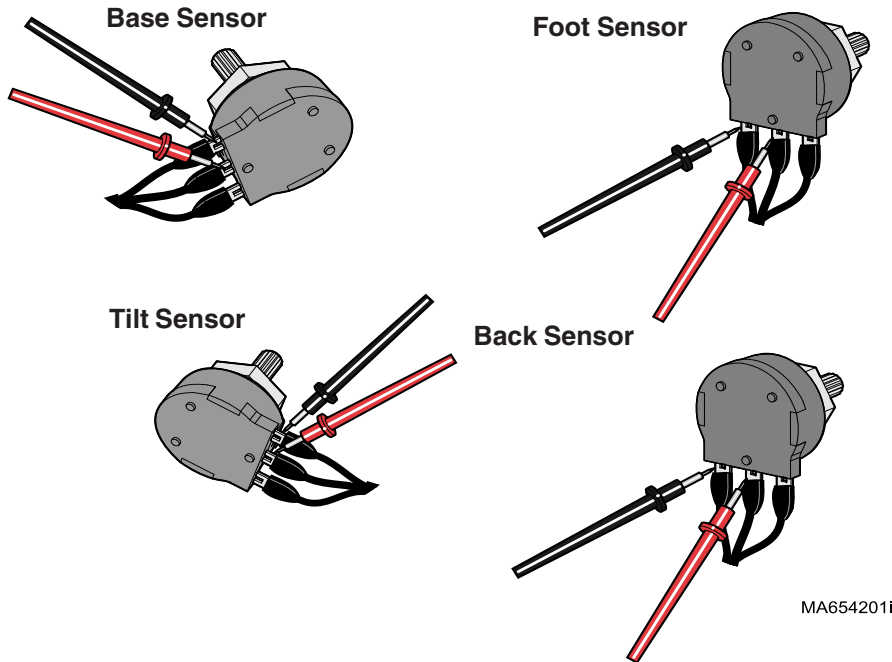
**Output Voltage Test**

**Step 1:** Set meter to 20 VDC. Place meter probes on proper terminals.  
(See appropriate illustration)

**Output Voltage Test**

**Step 2:** Run desired function up & down.  
Watch meter reading as function moves.

**Note:** Each sensor has a different voltage range.



MA654201i

Meter Reading	Position Sensor Status	Required Action
Voltage steadily increases / decreases as function moves up / down		Perform <b>Output Voltage Test</b> (at PC Board)
Voltage does not change, or changes erratically as function moves up / down		Perform <b>Supply Voltage Test</b> (at Sensor)

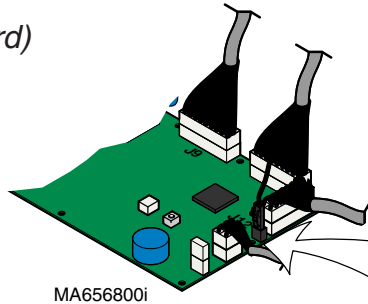
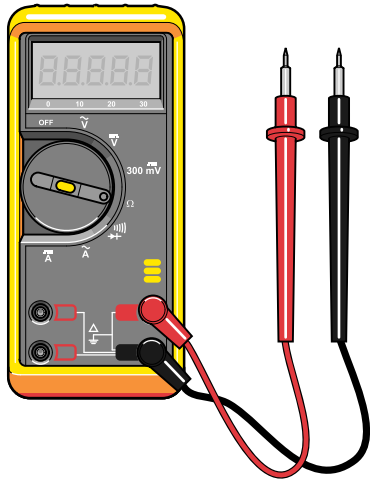
# Component Testing & Repair

[www.Documark.com](http://www.Documark.com): File Name  
PC Board Replacement ..... 003-1490-00

## Position Sensors - continued

### Output Voltage Test (at PC Board)

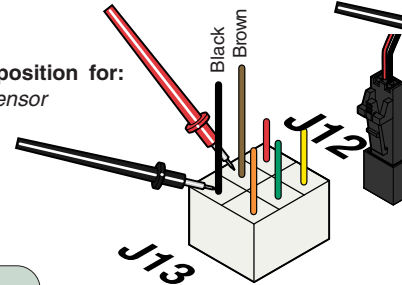
**Output Voltage Test**  
**Step 1:** Set meter to VDC.



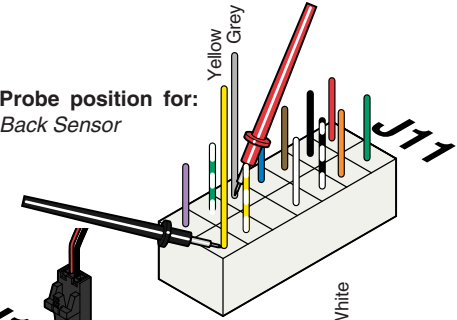
**Output Voltage Test**  
**Step 2:** Place meter probes on proper wires.  
(See appropriate illustration)

**Output Voltage Test**  
**Step 3:** Run desired function up & down.  
Watch meter reading as function moves.  
**Note:** Each sensor has a different voltage range.

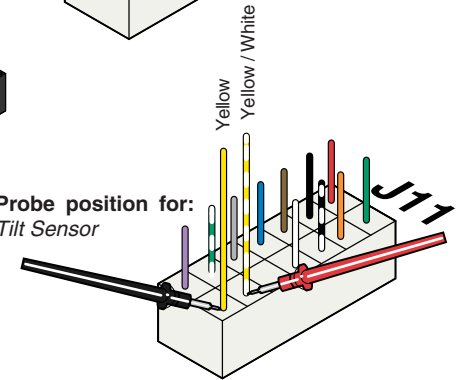
Probe position for:  
Base Sensor



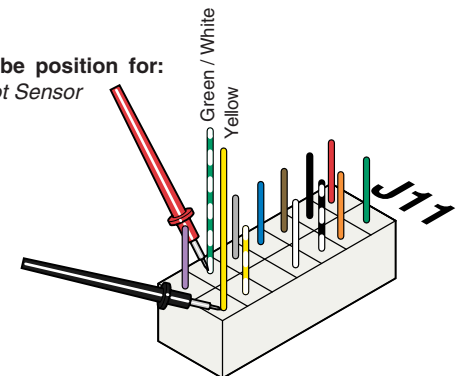
Probe position for:  
Back Sensor



Probe position for:  
Tilt Sensor



Probe position for:  
Foot Sensor



Meter Reading	PC Board Status	Required Action
Voltage does not change, or changes erratically as function moves up / down		Check wire harness (connections, damage, etc)
Voltage steadily increases / decreases as function moves up / down		Replace PC Board*.

\* Before replacing PC board, be sure shoulder bolt at the position sensor pivot point is tight. If bolt is loose, tighten it, then recalibrate PC board & check for proper operation.

Models: ALL  
Serial Numbers:

Position Sensors

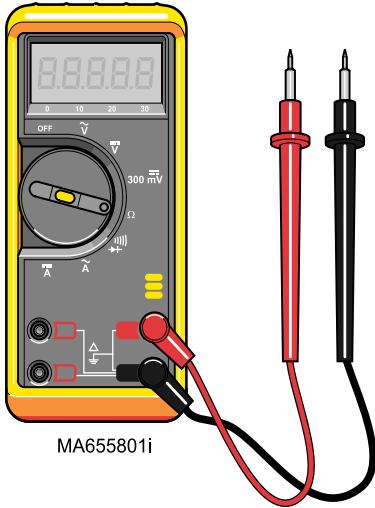
# Component Testing & Repair

## Position Sensors - continued

### Supply Voltage Test (at Sensor)

#### Supply Voltage Test

**Step 1:** Set meter to 20 VDC.

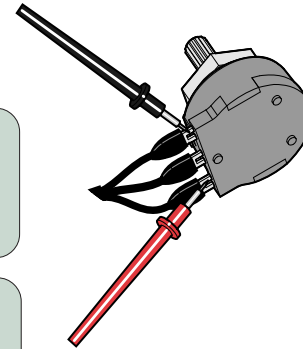


MA655801i

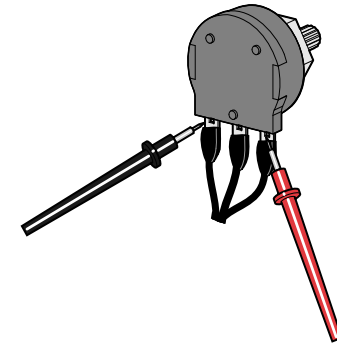
**Supply Voltage Test**  
**Step 2:** Place meter probes on proper terminals.  
 (See appropriate illustration)  
 Check meter reading.

**Supply Voltage Test**  
**Step 3:** With meter probes in same position,  
 run BASE function to max / min. position.  
 Check reading as function moves.

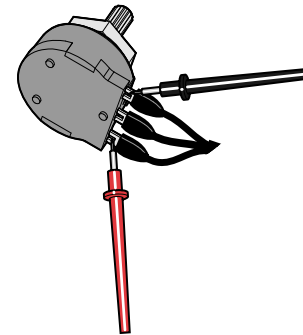
Base Sensor



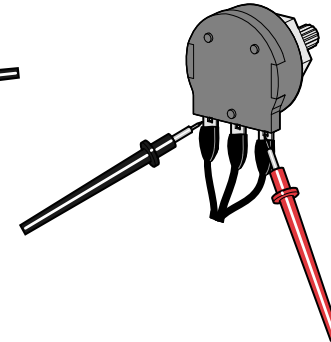
Foot Sensor



Tilt Sensor



Back Sensor



Meter Reading	Position Sensor Status	Required Action
2 to 4 VDC		1. <b>Position Sensor Adjustment</b> 2. Replace position sensor*.
less than 2 VDC more than 4 VDC		Perform <b>Supply Voltage Test</b> (at PC Board)
Reading changes erratically as BASE moves up / down		Perform <b>Supply Voltage Test</b> (at PC Board)

\*Replacement instructions are provided with the part. They are also available on Documark.com, or by clicking on the link in the blue box.

**Go To:** **Page**  
 Supply Voltage Test (at PC Board) ..... B-35  
 Position Sensor Adjustment ..... B-36

**www.Documark.com:** **File Name**  
 Position Sensor Replacement .... 003-1473-00

# Component Testing & Repair

## Position Sensors - continued

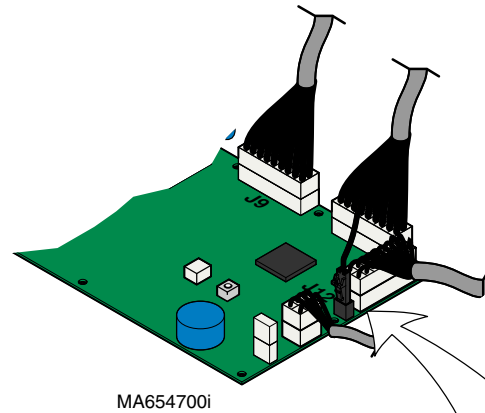
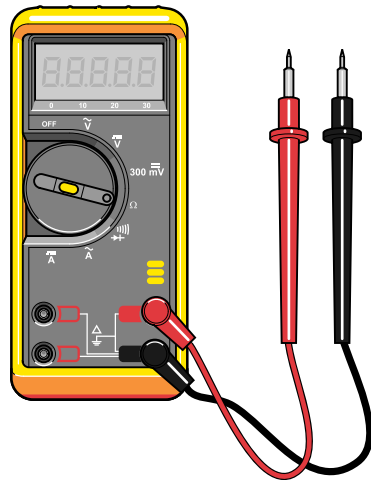
### Supply Voltage Test (at PC Board)

[www.Documark.com](http://www.Documark.com):

File Name

PC Board Replacement ..... 003-1490-00

**Supply Voltage Test**  
**Step 1:** Set meter to 20 VDC .



MA654700i

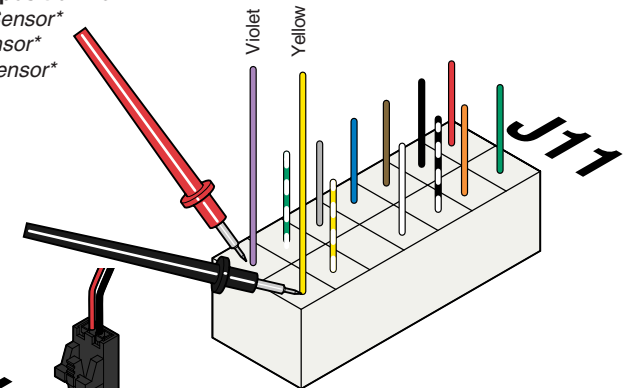
**\* Attention (Back / Tilt / Foot only)**  
If initial reading is less than 2VDC or more than 4VDC, unplug J11 connector & check meter reading at pins on PC board (same location).

If reading is:  
2 to 4 VDC      Replace sensor wire harness.  
< 2 VDC        Replace PC board.  
> 4 VDC        Replace PC board

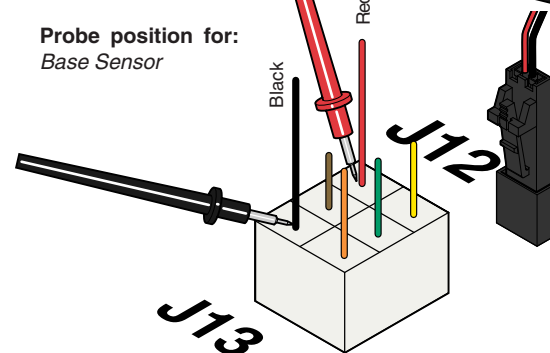
**Supply Voltage Test**  
**Step 2:** Place meter probes on proper wires.  
(See appropriate illustration)

Probe position for:

Back Sensor\*  
Tilt Sensor\*  
Foot Sensor\*



Probe position for:  
Base Sensor



Meter Reading	PC Board Status	Required Action
2 to 4 VDC		Replace wire harness between: (sensor & junction board) - or (junction board & PC board)
less than 2 VDC more than 4 VDC		Replace PC board*.

\*Replacement instructions are provided with the part. They are also available on Documark.com, or by clicking on the link in the blue box.

Models:  
Serial Numbers:

ALL

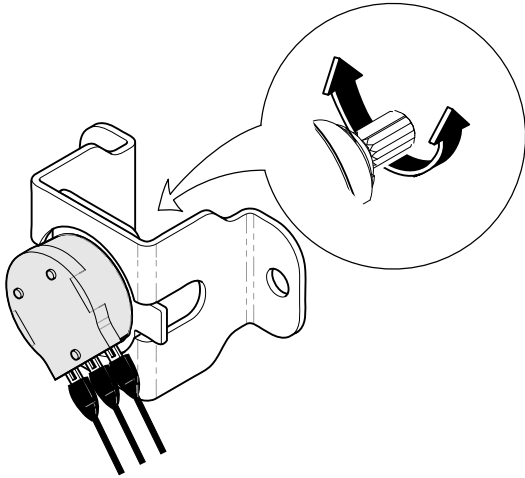
Position Sensors

B-35

# Component Testing & Repair

## Position Sensors - continued

### Adjustment

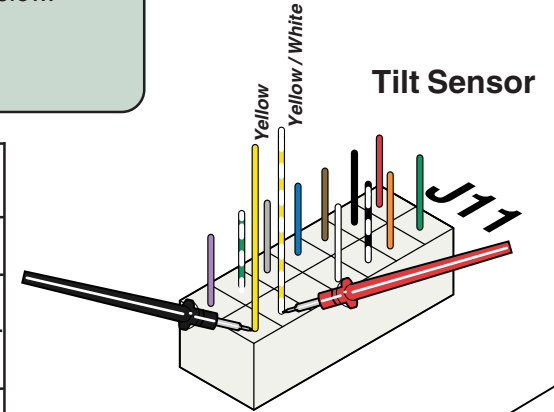


### Adjustment

**Step 2:** Position corresponding table function as indicated (*see Note*).  
Turn sensor knob until voltage matches the chart below.

Note: Base / Back / Foot functions: *all the way UP*  
Tilt function: *all the way DOWN*

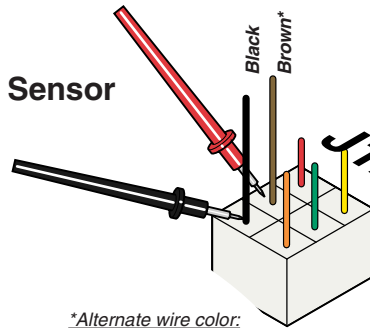
SENSOR	FUNCTION POSITION	VOLTAGE READING
BASE	<i>all the way UP</i>	1.7 to 2.1 VDC
BACK	<i>all the way UP</i>	2.4 to 2.6 VDC
TILT	<i>all the way DOWN</i>	1.8 to 2.1 VDC
FOOT	<i>all the way UP</i>	2.4 to 2.6 VDC



### Adjustment

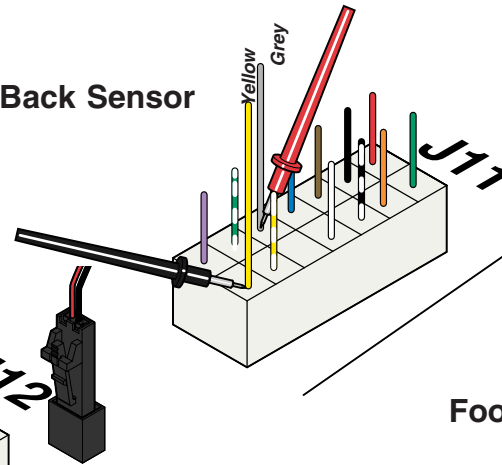
**Step 1:** Remove main PC board cover.  
Place meter probes as shown to test desired sensor.

### Base Sensor

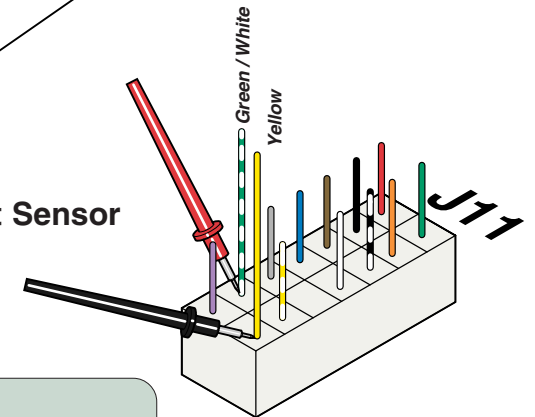


\*Alternate wire color:  
Blue

### Back Sensor



### Foot Sensor



### Adjustment

**Step 3:** Perform PC Board Calibration.  
[Refer to PC Board in Section B].

MA80601



## Main PC Board

### Error Codes

If the PC Board detects a malfunction in the electrical system, the two Error Code LEDs on the PC Board will flash in a specific sequence to identify the cause of the problem.

#### How to Display an Error Code

##### **If you suspect a problem with a specific function...**

- Remove PC Board cover / locate Error Code LEDs
- Press hand/foot control button for desired function.

##### If an electrical malfunction is detected:

- Function will stop moving.
- You will hear a "beep".
- Error Code LEDs will flash error code sequence.

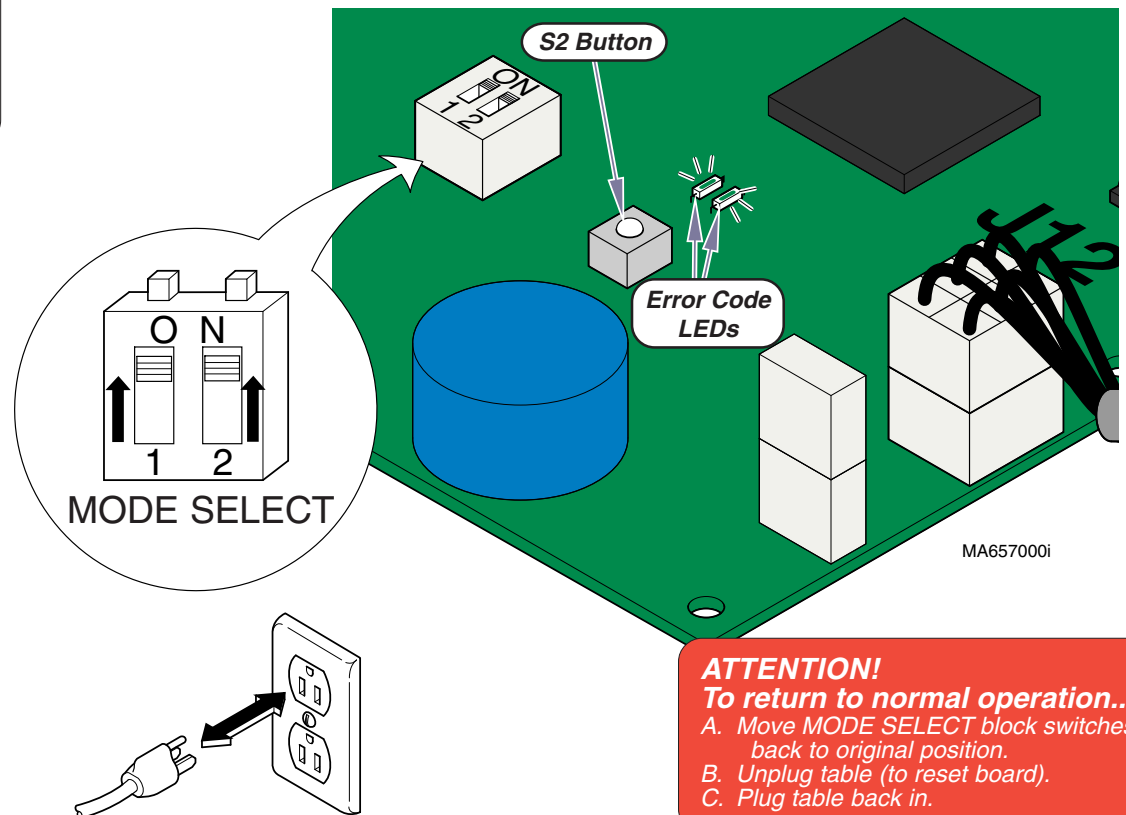
#### How to Recall Last Five Error Codes

##### **To recall the last five error codes ...**

- Move both MODE SELECT switches to ON (up).
- Unplug table (to reset PC Board), then plug back in.
- Press and release S2 Button.  
(To repeat error codes, press S2 Button again)  
(To erase all error codes from memory, press & hold S2 Button until you hear three "beeps")

##### If there are error codes stored in the system memory:

- Error Code LEDs will flash the sequence of the five most recent error codes.  
(You will hear three "beeps" between each error code)



### Main PC Board

### Page

#### Error Codes:

How To Display / Recall Last Five Error Code Identification (Error Code Charts) .....	B-37
Calibration Procedure .....	B-39
Child Lock-Out Mode .....	B-40
Access Procedures (Cover Removal) ....	C-1
Wiring Diagrams .....	D-1
Exploded Views / Part Numbers:	
Standard Base .....	E-15
Rotational Base .....	E-16

**ATTENTION!**  
**To return to normal operation...**  
 A. Move MODE SELECT block switches back to original position.  
 B. Unplug table (to reset board).  
 C. Plug table back in.

Models:  
Serial Numbers:

ALL

Main PC Board

# Component Testing & Repair

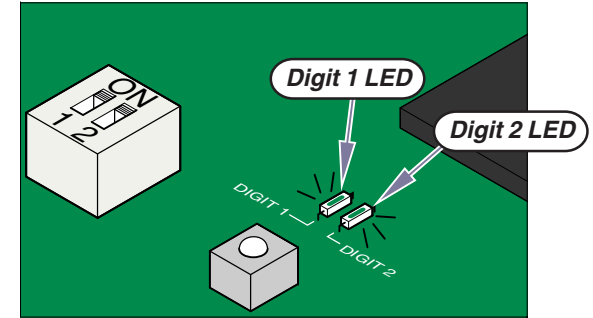
## Main PC Board - continued

### Error Codes - continued

#### Identification

**Digit 1 LED:** This LED identifies the function or mode during which the error was detected. (ex. Base / Back / Tilt / Foot, Programming Mode, Calibration Mode, Software System)  
Record the number of times this LED flashes before Digit 2 LED begins to flash.

**Digit 2 LED:** This LED identifies cause of the error. (ex. actuator motor overload, treatment pan out, etc.)  
Record the number of times this LED flashes before Digit 1 LED flashes again.



MA657200i

Locate the two digit error code in the charts below:

(# of flashes) Digit 1 LED	Table Function	(# of flashes) Digit 2 LED	Cause of the Error
1	BASE	1	Function in potential crash position
2	BACK	2	Actuator motor run time exceeded max. limit
3	TILT	3	Position sensor did not move when function was activated
4	FOOT	4	Position sensor reading is out of acceptable range
5	(not used)	5	Actuator motor overload
6	(not used)	6	Function failed during calibration
7	Programming Mode	1	Position Button (1,2,3, or 4) not pressed within 5 seconds.
2		Incorrect button pressed while in Programming Mode.	
3		Position cannot be programmed (possible "crash" position)	

(# of flashes) Digit 1 LED	Table Function	(# of flashes) Digit 2 LED	Cause of the Error
8	Calibration Mode	1	Calibration was not successful
		2	Incorrect button pressed while in Calibration Mode.
	Error Recall Mode	3	Incorrect button pressed while in Error Recall Mode.
9	Software System	1	Software malfunction
		2	Software malfunction
		3	Software malfunction
		4	Foot Down function activated w/ foot extension folded out.
		5	Hand/foot control button pressed while in Child Lock-Out Mode
		9	Disregard this error.

# Component Testing & Repair

## Main PC Board - continued

### Calibration Procedure

During the Calibration Procedure, the PC Board records the voltage readings from the position sensors as *the base, back, and foot* actuators move to their maximum, then minimum positions. Note: The tilt actuator will only move momentarily as it clears the tilt down limit switch and then returns to the minimum position. You will hear a steady pattern of "beeps" as the table moves during calibration. When successful calibration is complete, the table will stop moving and you will hear three "beeps".

You **must** calibrate the PC Board in the following situations:

- After replacing the PC Board
- After replacing any of the position sensors
- After any of the position sensors are removed or disconnected



#### Equipment Alert

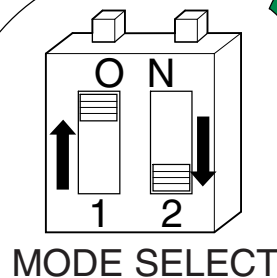
On models with rotational base, remove PC board cover before performing the calibration procedure.

#### Calibration Procedure

**Step 1:** Move the foot section to the stowed position.

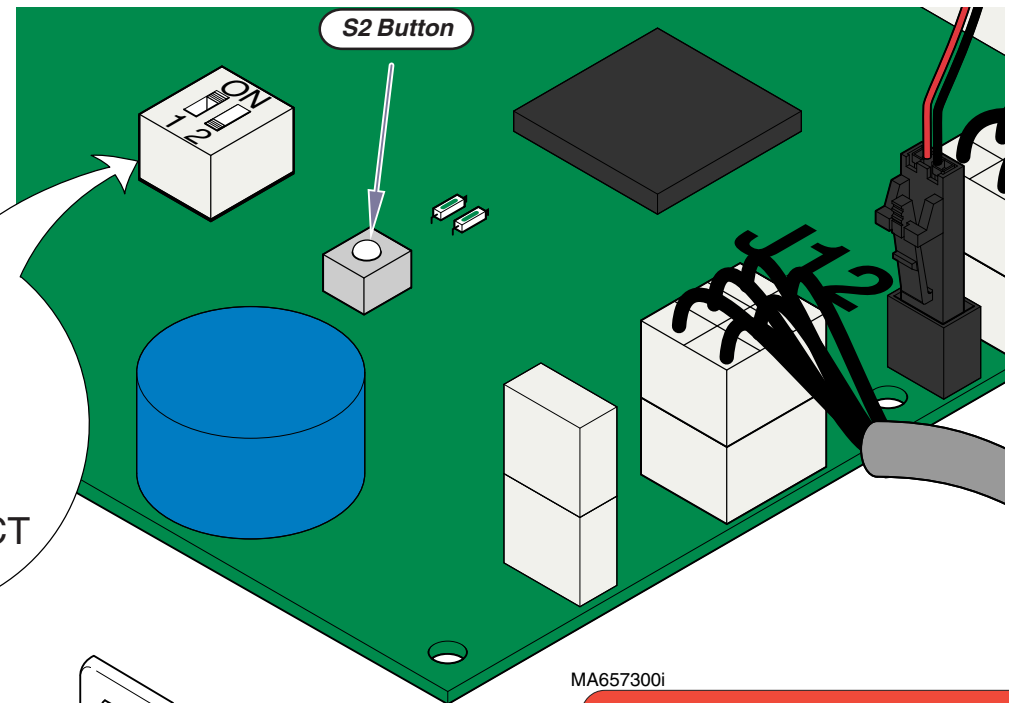
#### Calibration Procedure

**Step 2:** Move MODE SELECT switches:  
Switch 1 - ON (up)  
Switch 2 - off (down)



#### Calibration Procedure

**Step 4:** Wait 5 seconds, then press S2 Button.



#### Calibration Procedure

**Step 3:** Unplug table (to reset PC Board), then plug table back in.

MA657300i

#### ATTENTION!

To return to normal operation...

- A. Move MODE SELECT block switches back to original position.
- B. Unplug table (to reset board).
- C. Plug table back in.

Models:  
Serial Numbers:

ALL

Main PC Board

B-39

# Component Testing & Repair

## Main PC Board - continued

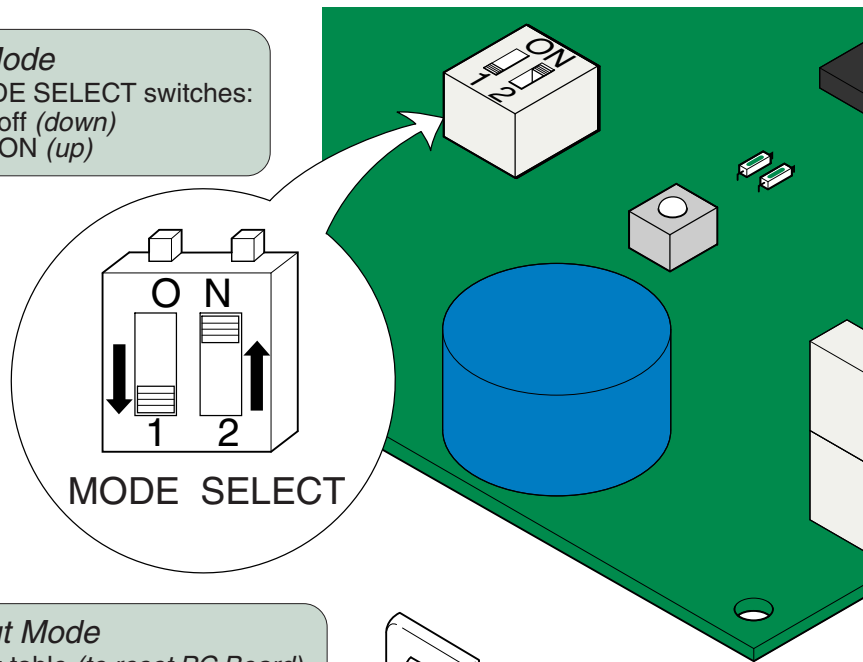
### Child Lock-Out Mode (Programmable models only)

This feature allows the user to lock-out the hand & foot controls to prevent unauthorized use.

[NOTE: When the table is in Child Lock-Out Mode, the Position "4" button cannot be used to store a programmed position.]

#### Child Lock-Out Mode

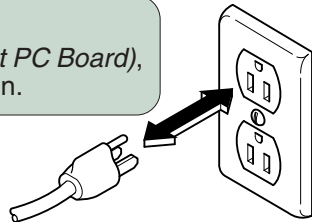
**Step 1:** Move MODE SELECT switches:  
Switch 1 - off (down)  
Switch 2 - ON (up)



MA657400i

#### Child Lock-Out Mode

**Step 2:** Unplug table (to reset PC Board), then plug table back in.



#### Child Lock-Out Mode

##### Step 3: To lock hand / foot controls...

Press & hold "4" button on hand / foot control.  
(After 5 seconds you will hear a "beep".  
This indicates the controls are locked)

Note: If a button is pressed while controls are locked, you will hear a "beep".

##### To unlock hand / foot controls...

Press & hold "4" button on hand / foot control.  
(After 5 seconds you will hear a "beep".  
This indicates the controls are unlocked)

#### Position "4" Button



#### To deactivate Child Lock-Out Mode...

- Move MODE SELECT switches:  
Switches 1 & 2 - off (down).
- Unplug table (to reset board).
- Plug table back in.

## Rotational Base Brake System

### Magnet Position Adjustment

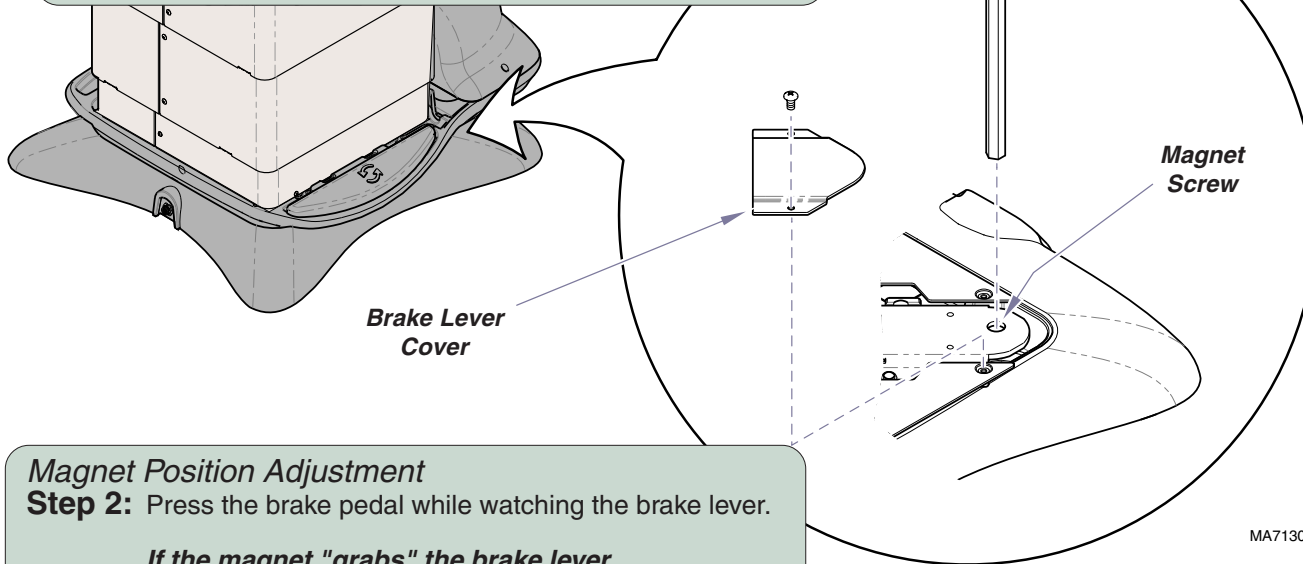
If the rotational brake will not unlock, the electro-magnet may be out of adjustment.

#### Magnet Position Adjustment

**Step 1:** Rotate the base to access the brake lever cover.  
Remove brake lever cover.

**Note:** If the brake will not release, the base can still be rotated manually by applying additional force.

The brake lever cover is located between the upper & lower base castings at the patient's left rear corner.



#### Magnet Position Adjustment

**Step 2:** Press the brake pedal while watching the brake lever.

**If the magnet "grabs" the brake lever...**  
Tighten the magnet screw 1/4 turn.

**If the magnet does not "grab" the brake lever...**  
Loosen the magnet screw 1/4 turn.

Check for proper operation. Repeat if necessary.

<u>Rotational Base Brake System</u>	<u>Page</u>
Magnet Position Adjustment .....	B-41
Rotational Brake Electrical Test /	
Fuse Location .....	B-42
Electro-magnet Test .....	B-43
EMI Filter Board Test .....	B-44
Brake Pedal Switch Access .....	B-45
Separating Upper & Lower	
Base Castings .....	B-46
Brake Lever & Electro-magnet	
Access .....	B-51
Foot Control Inlet / Power Inlet /	
EMI Filter Board Access .....	B-52
Wiring Diagrams .....	D-1
Exploded View / Part Numbers:	
Upper Section .....	E-16
Lower Section .....	E-17

**Models:** 641 (-004 & -005)  
**Serial Numbers:** All

**Rotational Base  
Brake System**

# Component Testing & Repair

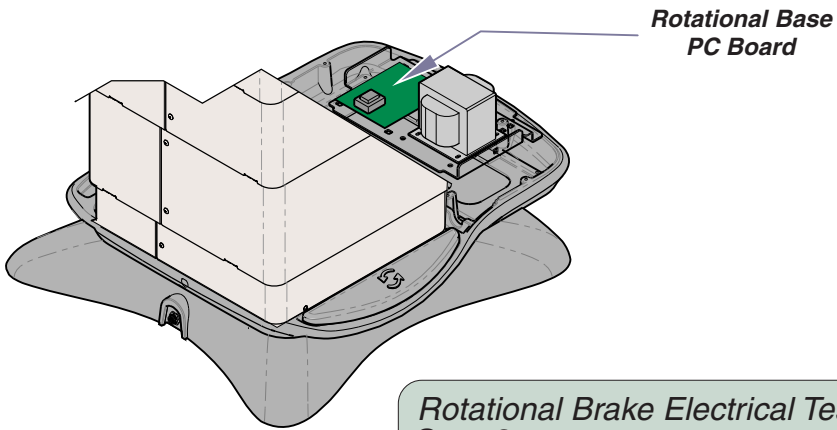
## Rotational Base Brake System - continued

### Rotational Brake Electrical Test / Fuse Location

#### Rotational Brake Electrical Test

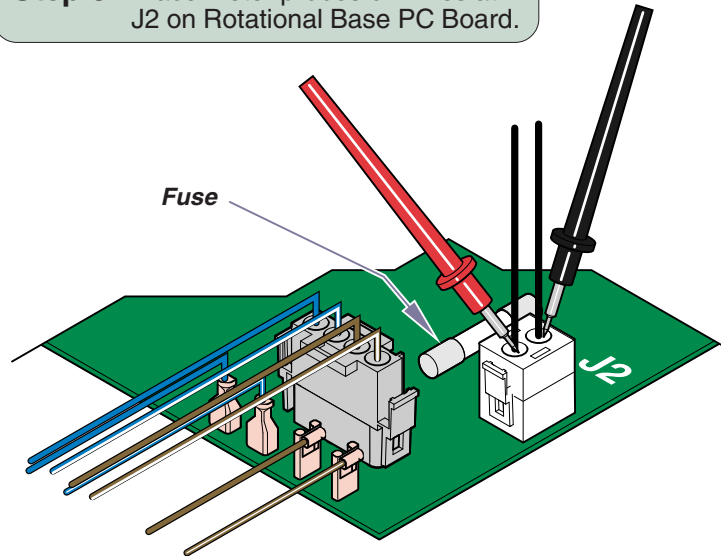
**Step 1:** Remove PC board cover.

Refer to: Section C - PC Board Cover



#### Rotational Brake Electrical Test

**Step 3:** Place meter probes on wires at J2 on Rotational Base PC Board.



#### Refer to:

#### Page

Electro-magnet Test ..... B-43

Access Procedures (Cover Removal) .... C-1



#### Rotational Brake Electrical Test

**Step 2:** Set meter to VAC.

#### Rotational Brake Electrical Test

**Step 4:** Check voltage.

**Note:** If no voltage is detected, press & release the brake pedal - check voltage again.

Meter Reading	Status	Required Action
15 - 21 VAC		PC board is OK. Perform <i>Electro-magnet Test</i> .
0 VAC		Check Rot. Base PC board fuse. If fuse is OK, replace PC board.

MA713100i

## Rotational Base Brake System - continued

### Electro-magnet Test

**Refer to:**

**Page**

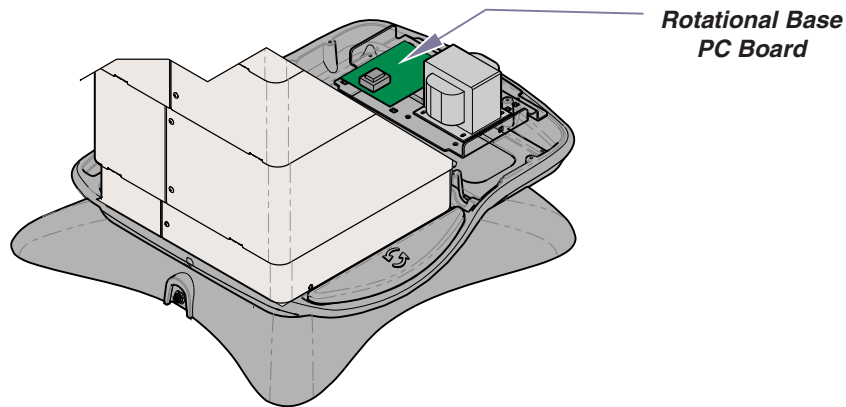
Electro-magnet Access ..... B-51

Access Procedures (Cover Removal) .... C-1

**Electro-magnet Test.**

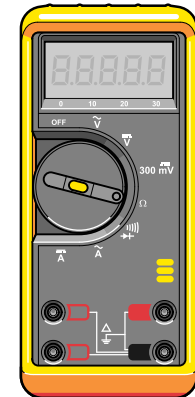
**Step 1:** Remove PC board cover.

Refer to: Section C - PC Board Cover



**Electro-magnet Test.**

**Step 2:** Set meter to  $\Omega$ .

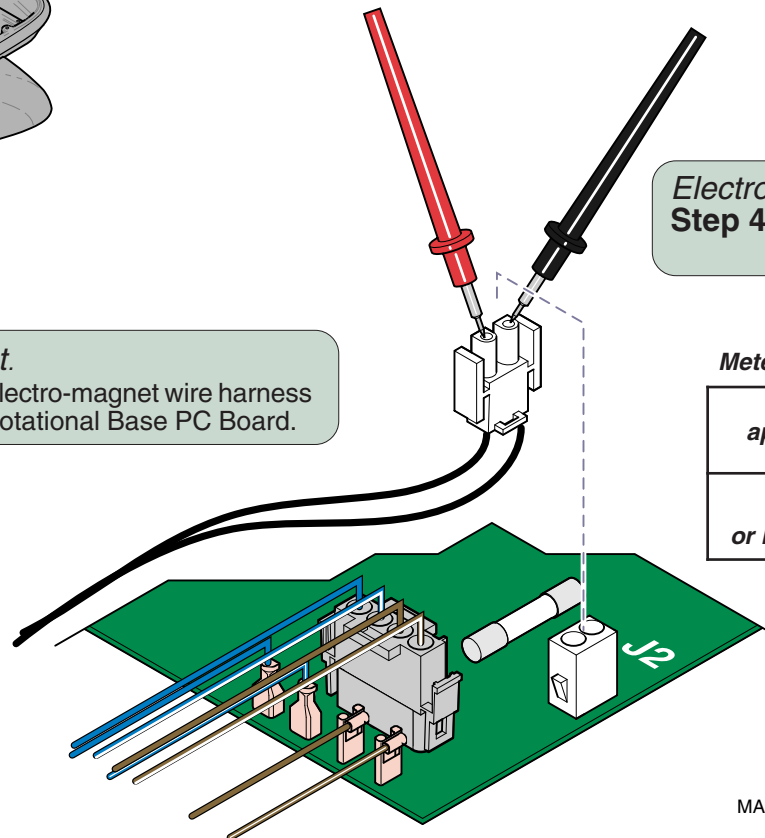


**Electro-magnet Test.**

**Step 4:** Place meter probes on wire harness.

**Electro-magnet Test.**

**Step 3:** Disconnect electro-magnet wire harness from J2 on Rotational Base PC Board.



**Meter Reading**

**Status**

**Required Action**

approx. 10 $\Omega$		Electro-magnet is OK. Check mechanical components.
OL - or less than 5 $\Omega$		Inspect magnet wire harness. If OK, replace electro-magnet.

MA713200i

**Models:**  
**Serial Numbers:**

**641 (-004 & -005)**  
All

**Rotational Base  
Brake System**

# Component Testing & Repair

## Rotational Base Brake System - continued

### EMI Filter Board Test

This test allows you to check for line voltage coming thru the EMI filter board without separating the upper & lower base castings.

**Refer to:**

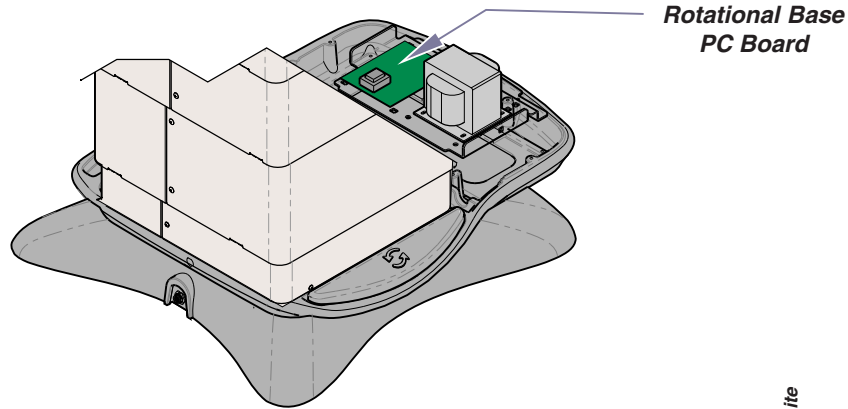
**Page**

Primary Fuses .....	B-2
EMI Filter Board Access .....	B-52
Access Procedures ( <i>Cover Removal</i> ) ....	C-1

**Rotational Brake Electrical Test.**

**Step 1:** Remove PC board cover.

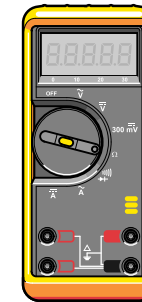
Refer to: Section C - PC Board Cover



Rotational Base  
PC Board

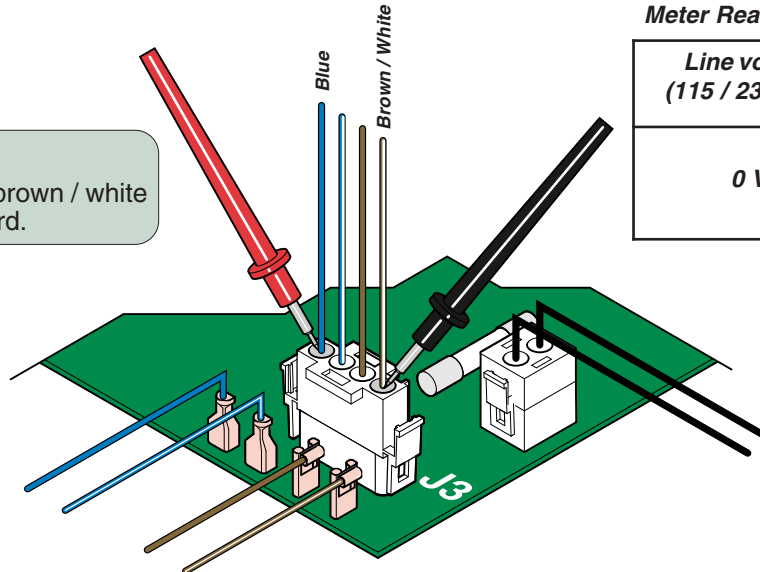
**Rotational Brake Electrical Test**

**Step 2:** Set meter to VAC.



**Rotational Brake Electrical Test**

**Step 3:** Place meter probes on blue wire and brown / white wire at J3 on Rotational Base PC Board.



Meter Reading	Status	Required Action
Line voltage (115 / 230 VAC)		EMI Filter board is OK. Check connections to main PC board.
0 VAC		Check primary fuses & wire harness. If fuses & harness are OK, replace EMI filter board.

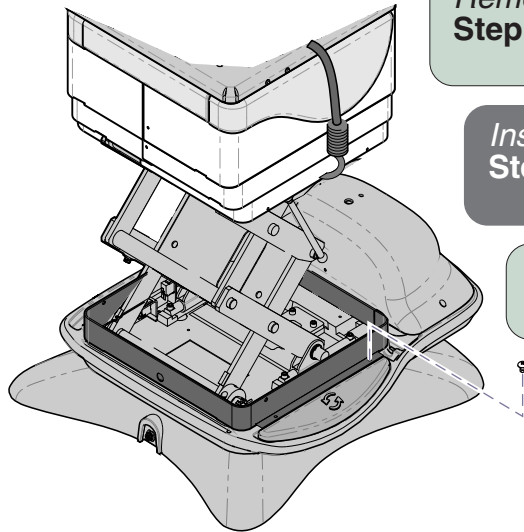
MA717800i



## Rotational Base Brake System - continued

### Brake Pedal Switch Access

**Refer To:** Access Procedures (Cover Removal) .... C-1  
**Page**



#### Removal.

**Step 1:** Raise base shrouds.  
Refer to: Section C - Base Shrouds

#### Installation

**Step 3:** Secure shroud spacer w/ two screws.  
Lower base shrouds.

#### Removal.

**Step 2:** Remove two screws from shroud spacer.

#### Installation

**Step 2:** Install brake pedal.  
Connect wires to proper terminals.

#### Removal.

**Step 3:** Remove brake pedal.

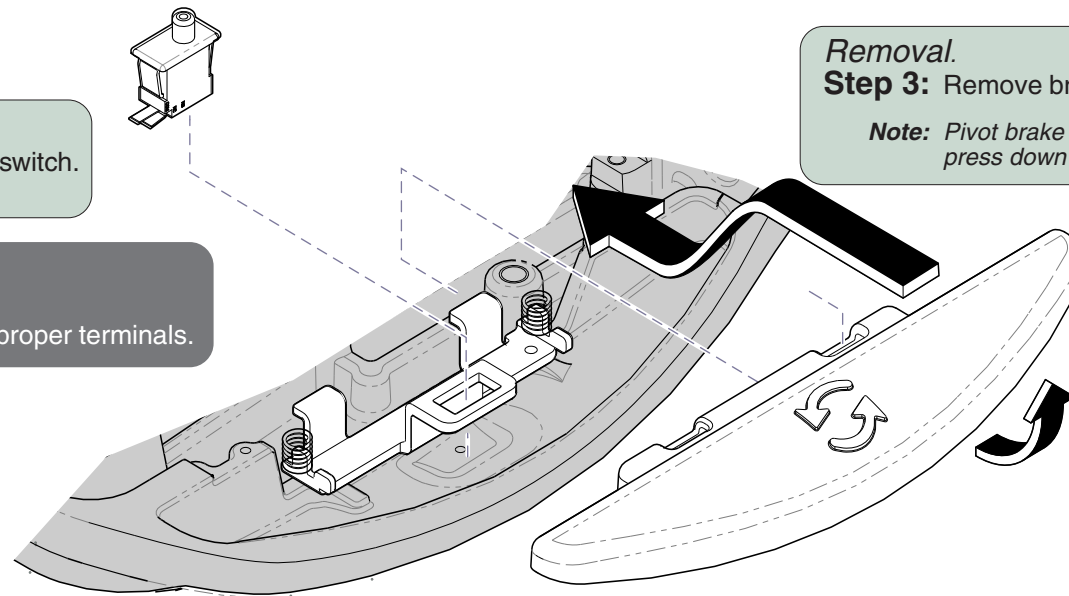
**Note:** Pivot brake pedal toward column, then press down and push forward to release.

#### Removal.

**Step 4:** Tag & disconnect wires from switch.  
Remove switch.

#### Installation

**Step 1:** Install switch.  
Connect wires to proper terminals.



**Models:**  
**Serial Numbers:**

**641 (-004 & -005)**  
All

MA715000i

**Rotational Base  
Brake System**

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# Component Testing & Repair

## Rotational Base Brake System - continued

### Separating Upper & Lower Base Castings

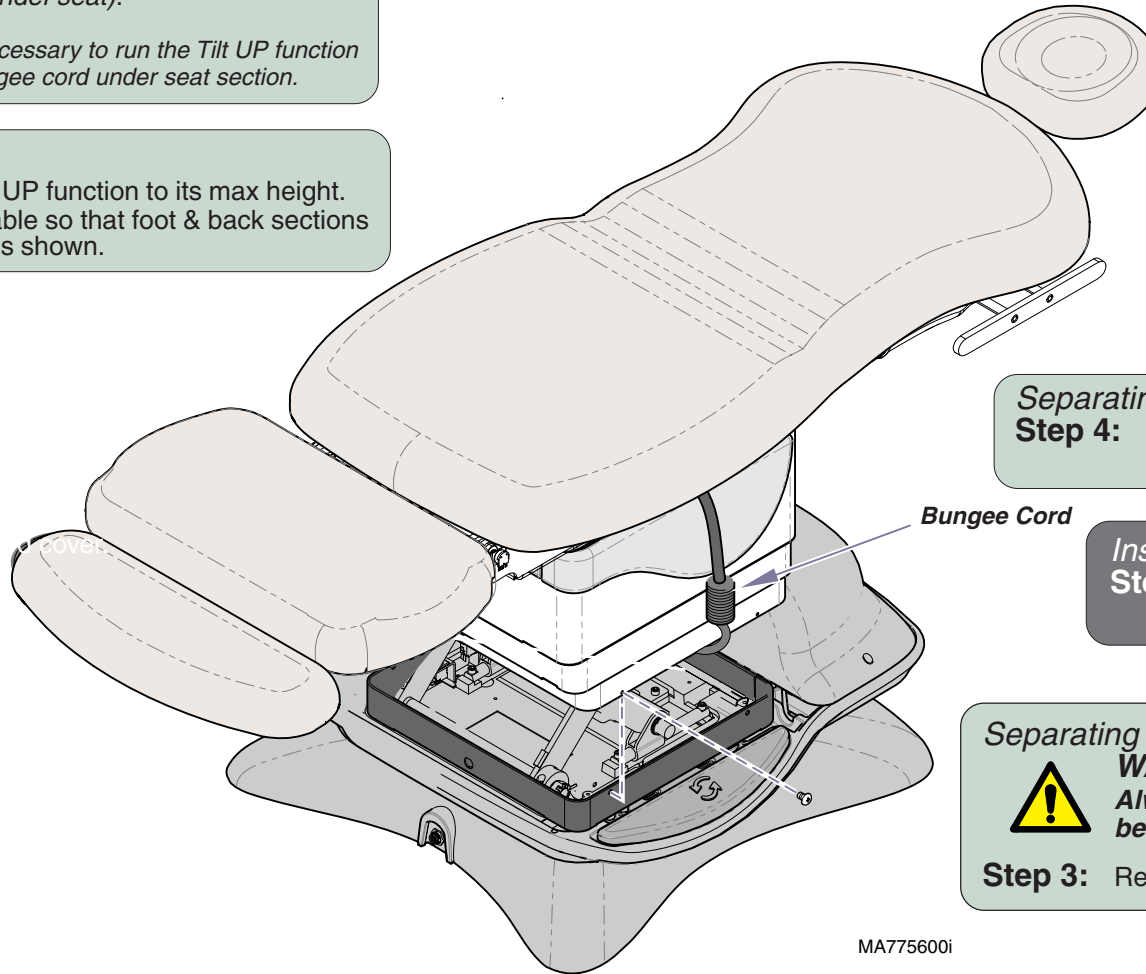
#### Separating

**Step 1:** Route bungee cord across top of base column (*under seat*).

**Note:** It may be necessary to run the Tilt UP function to route bungee cord under seat section.

#### Separating

**Step 2:** Run Base UP function to its max height. Position table so that foot & back sections are level as shown.



#### Separating

**Step 4:** Raise shrouds, then attach bungee cord hooks under shrouds on both sides.

#### Installation

**Step 10:** Remove bungee cord. Secure inner shrouds w/screws.

#### Separating



#### WARNING

**Always disconnect table power cord before removing any covers or shrouds.**

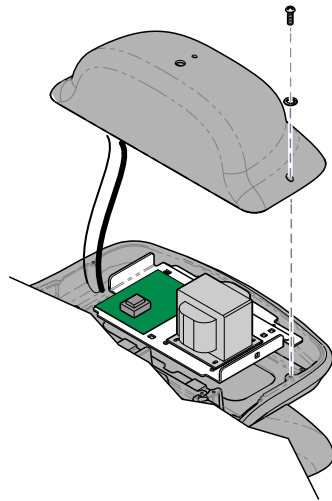
**Step 3:** Remove bottom screws from inner shrouds.

*Procedure continued on following page...*

# Component Testing & Repair

## Rotational Base Brake System - continued

### Separating Upper & Lower Base Castings - continued



#### Removal

**Step 5:** Partially separate PC board cover.

*Note:* Do not disconnect wire harnesses.

#### Installation

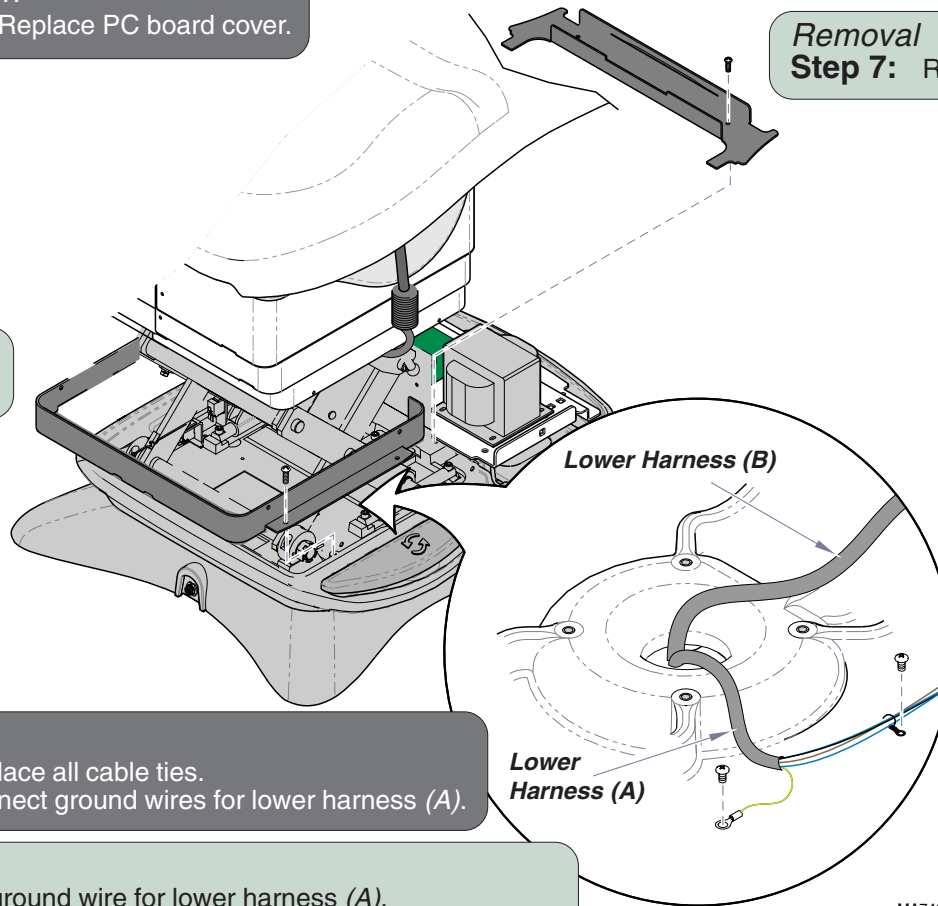
**Step 9:** Replace PC board cover.

#### Removal

**Step 6:** Remove shroud spacer.

#### Installation

**Step 8:** Install shroud spacer.



#### Installation

**Step 6:** Replace all cable ties.  
Connect ground wires for lower harness (A).

#### Removal

**Step 8:** Disconnect ground wire for lower harness (A).  
Remove cable ties securing lower harnesses (A & B) to base.

#### Installation

**Step 7:** Install wire harness cover.

#### Removal

**Step 7:** Remove wire harness cover.

MA7466001

Procedure continued on following page...

**Models:**  
**Serial Numbers:**

**641 (-004 & -005)**  
All

**Rotational Base  
Brake System**

**B-47**

# Component Testing & Repair

## Rotational Base Brake System - continued

### Separating Upper & Lower Base Castings - continued

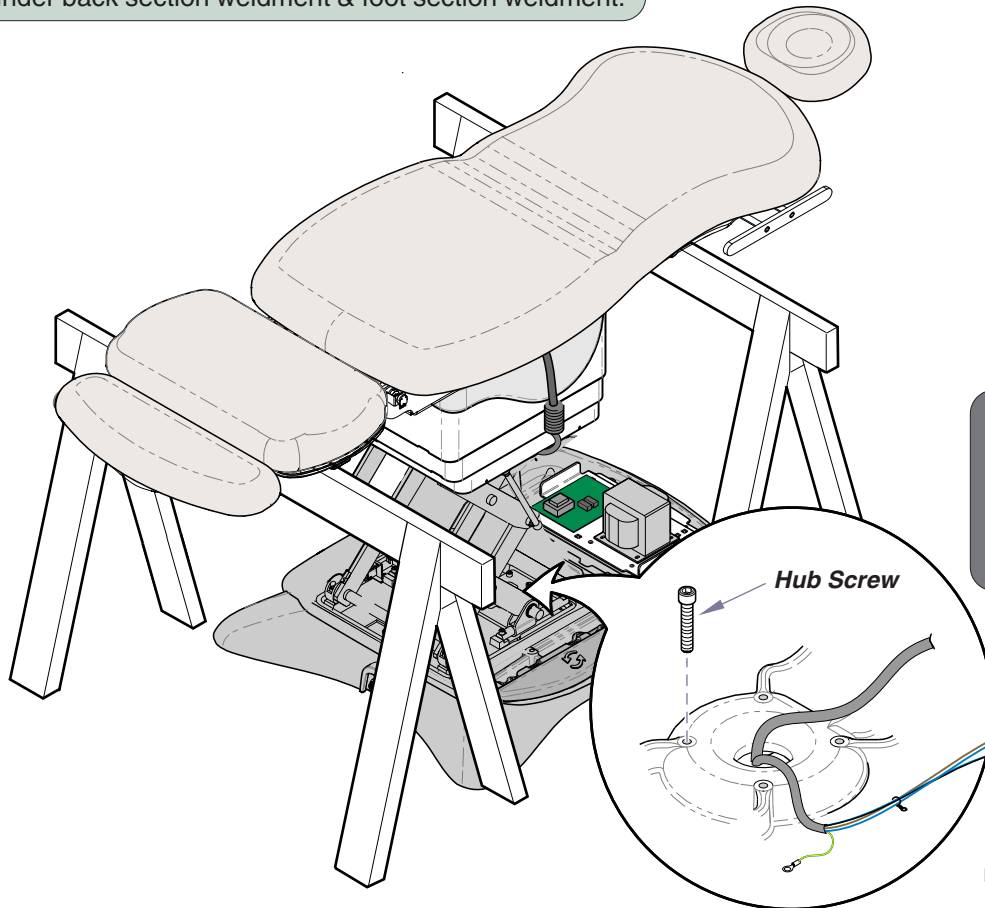
#### Removal



#### CAUTION

The table weighs approx. 540 lbs (244 kg).  
Use supports designed for this amount of weight.

**Step 9:** Position sawhorses (or other suitable supports) under back section weldment & foot section weldment.



#### Installation



#### WARNING

Disconnect the table power cord before performing the remaining Installation steps.

**Step 5:** Install four hub screws.

#### Removal



#### CAUTION

The table top / upper base is not secured once the hub screws are removed. Hold onto the table when performing the following steps.

**Step 10:** Remove four hub screws.

MA775700i

Procedure continued on following page...

# Component Testing & Repair

## Rotational Base Brake System - continued

### Separating Upper & Lower Base Castings - continued

#### Removal & Installation



#### WARNING

The Removal & Installation steps on this page require power to be connected to the table. Avoid all contact with wiring & electrical components.



Base UP

Base DOWN

#### Removal



#### Equipment Alert

The two lower wire harnesses are still connected to upper casting. Running the Base Down function too long may result in damage to the table.

**Step 11:** Press **Base DOWN** button on hand or foot control until upper and lower base castings separate slightly.

#### Installation



#### CAUTION

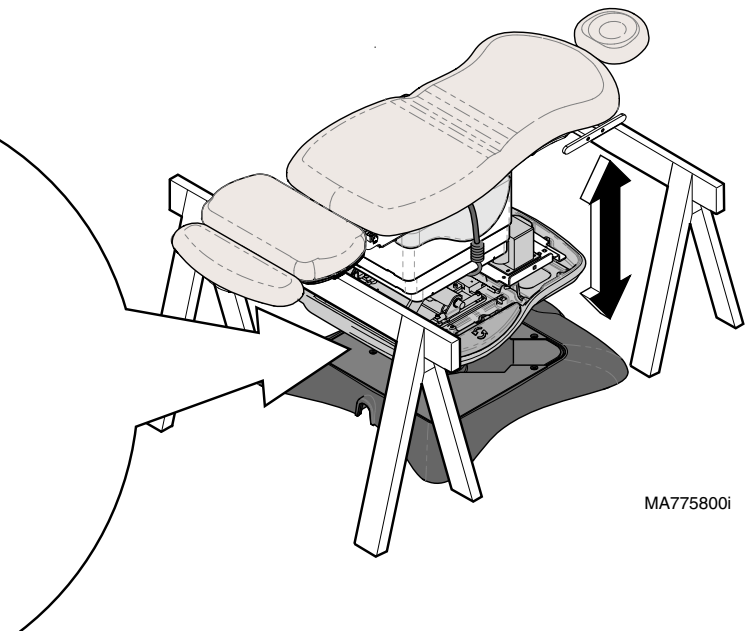
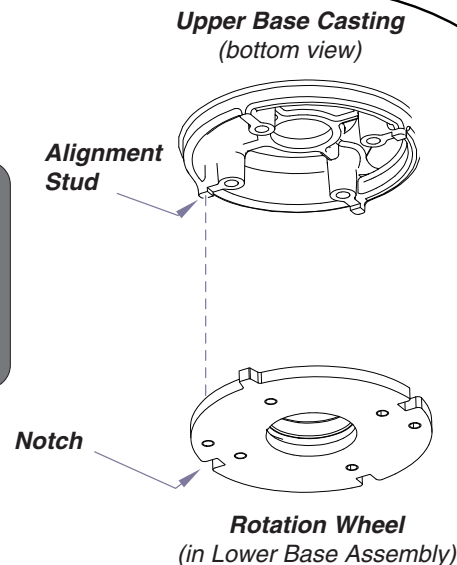
The table top / upper base is not secured until the hub screws are installed. Hold onto the table when performing the following steps.

**Step 3:** Press **Base UP** button on hand / foot control until table raises (slightly) off of sawhorses.

#### Installation

**Step 4:** Carefully adjust table top until alignment studs on bottom of upper casting lock into the notches on the rotation wheel.

**Note:** You will feel table top drop into place when alignment studs engage notches.



MA775800i

Procedure continued on following page...

Models:  
Serial Numbers:

641 (-004 & -005)  
All

Rotational Base  
Brake System

B-49

# Component Testing & Repair

## Rotational Base Brake System - continued

### Separating Upper & Lower Base Castings - continued

#### Removal & Installation

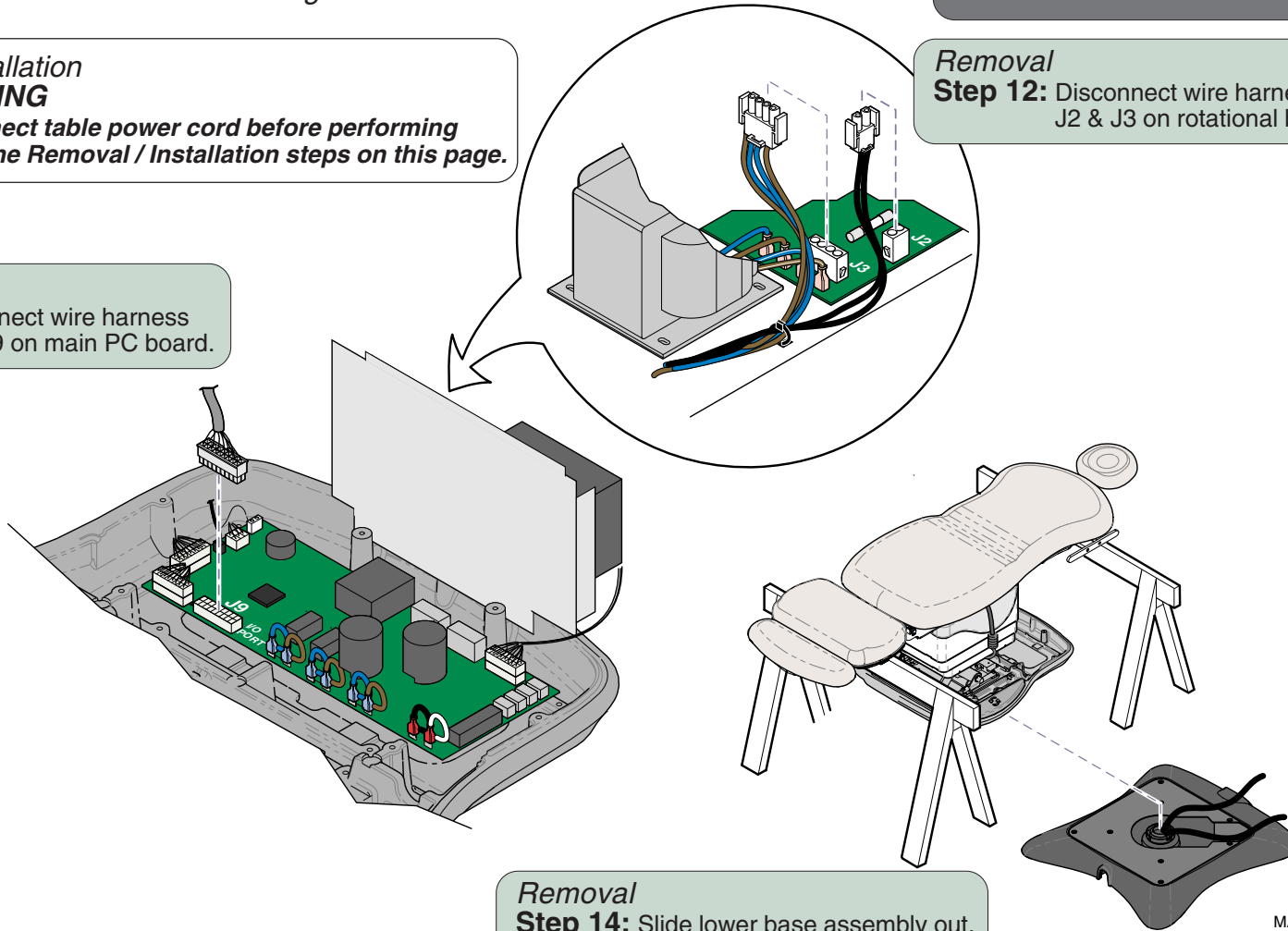


#### WARNING

Disconnect table power cord before performing any of the Removal / Installation steps on this page.

#### Removal

**Step 13:** Disconnect wire harness from J9 on main PC board.



#### Removal

**Step 14:** Slide lower base assembly out.

#### Installation

**Step 1:** Slide lower base assembly under table.

**Note:** To ease installation, align the new lower base assembly in the same position as the old base.

#### Installation

**Step 2:** Route wire harnesses thru upper casting. Reconnect all wire harnesses as shown.

#### Removal

**Step 12:** Disconnect wire harness from J2 & J3 on rotational base PC board.

MA775900i

Rotational Base  
Brake System

Models:  
Serial Numbers:

641 (-004 & -005)  
All

## Rotational Base Brake System - continued

### Brake Lever & Power Electro-magnet Access

Refer To:	Page
Separating Upper & Lower Base Castings .....	B-46

#### Brake Lever Removal

**Step 1:** Separate upper & lower base castings.  
Refer to: Section B - Rot. Base Brake System.

#### Brake Lever Removal

**Step 2:** Remove corner cover & top cover from lower base assembly.

#### Brake Lever Installation

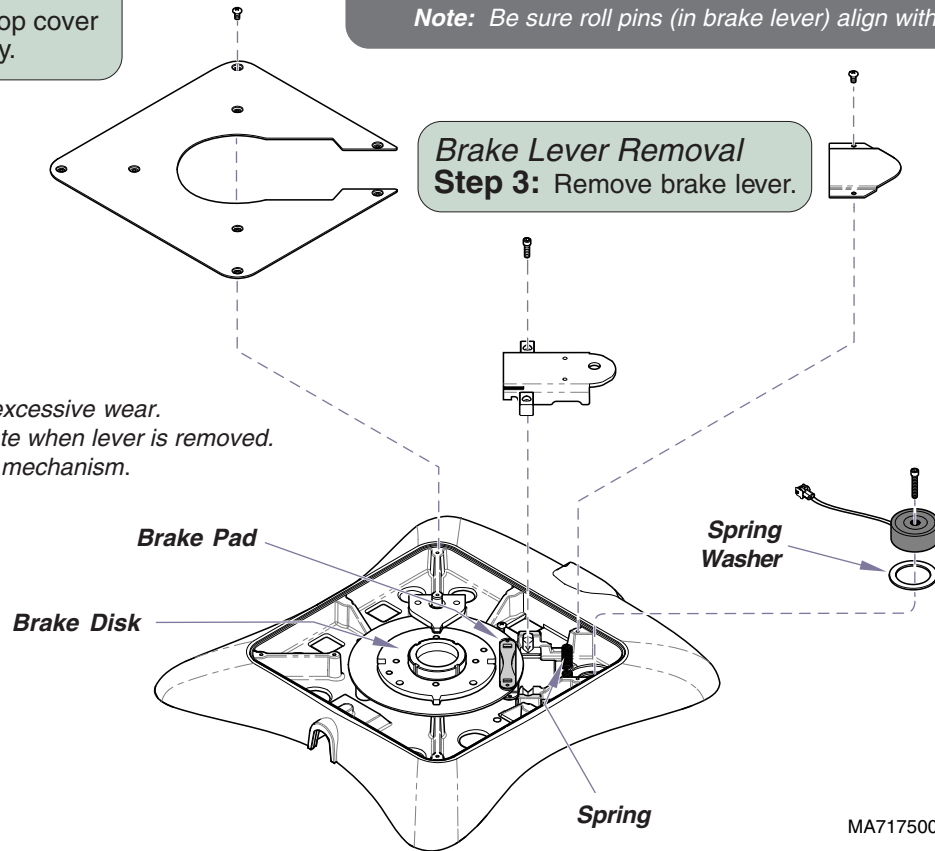
**Step 1:** Position brake lever so that it aligns w/ slots in brake pad.  
Secure lever with two screws.

**Note:** Be sure roll pins (in brake lever) align with springs

#### Brake Lever Removal

**Step 3:** Remove brake lever.

**Attention:** Check brake pad for excessive wear.  
Brake disk should rotate when lever is removed.  
Remove any debris in mechanism.



#### Electro-magnet Removal

**Step 1:** Remove brake lever.

#### Electro-magnet Removal

**Step 2:** Disconnect magnet wire harness.  
Remove magnet.

#### Electro-magnet Installation

**Step 1:** Connect magnet wire harness.  
Install magnet.

**Note:** Be sure spring washer is in place under magnet.

**Models:** 641 (-004 & -005)  
**Serial Numbers:** All

**Rotational Base  
Brake System**

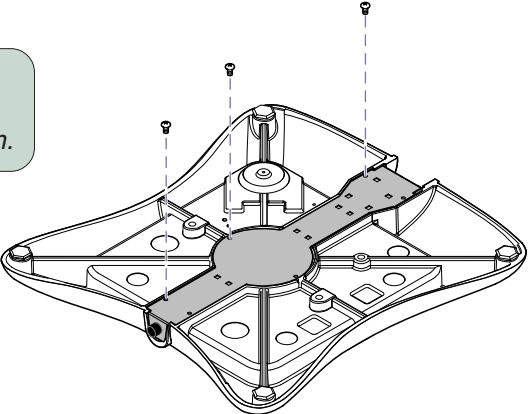
# Component Testing & Repair

## Rotational Base Brake System - continued

### Foot Control Inlet / Power Inlet / EMI Filter Board Access

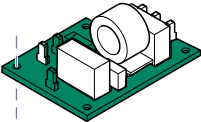
Refer To:	Page
Separating Upper & Lower Base Castings .....	B-46

**Removal (all)**  
**Step 1:** Separate upper & lower base castings.  
Refer to: Section B - Rot. Base Brake System.

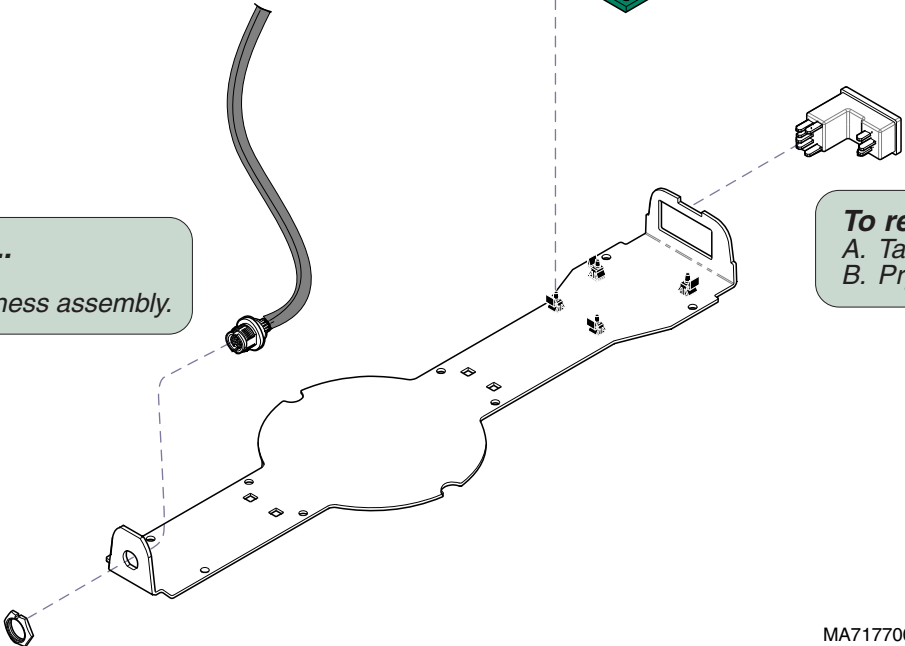


**Removal (all)**  
**Step 2:** Turn lower base casting upside down.  
Remove bottom cover.

**To remove EMI filter board...**  
A. Tag & disconnect all wires to board.  
B. Remove board from mtg. studs.



**To remove foot control inlet...**  
A. Unscrew lock nut.  
B. Remove foot control inlet / harness assembly.

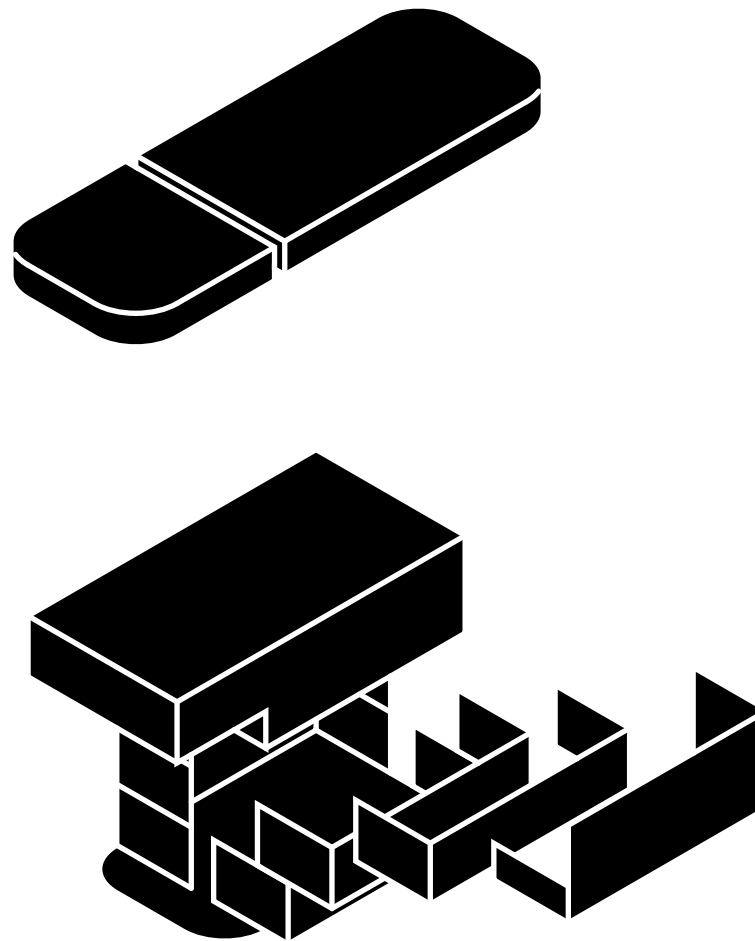


**To remove power inlet...**  
A. Tag & disconnect all wires to power inlet.  
B. Pry power inlet out of bottom cover.

MA717700i



## *Access Procedures*



<u>Removing &amp; Installing:</u>	<u>Page</u>
PC Board Cover:	
<i>models w/ Standard Base</i> .....	C-2
<i>models w/Rotational Base</i> .....	C-3
Base Shrouds:	
<i>Raising (w/bungee cord)</i> .....	C-4
<i>Lowering / Removing / Installing</i> .....	C-5
Upholstery .....	C-6

# Access Procedures

## PC Board Cover (models w/ Standard Base)

### Removal / Installation



#### Caution

Unplug power cord before removing PC Board cover.

#### Installation

**Step 3:** Position cover.  
Secure with two screws.

#### Removal

**Step 1:** Remove two screw(s) and partially separate cover.

**Note:** You *must* perform Step 2 before cover can be completely removed.

#### Installation

**Step 2:** Connect wire harnesses to J9 & J12 on PC Board.

#### Removal

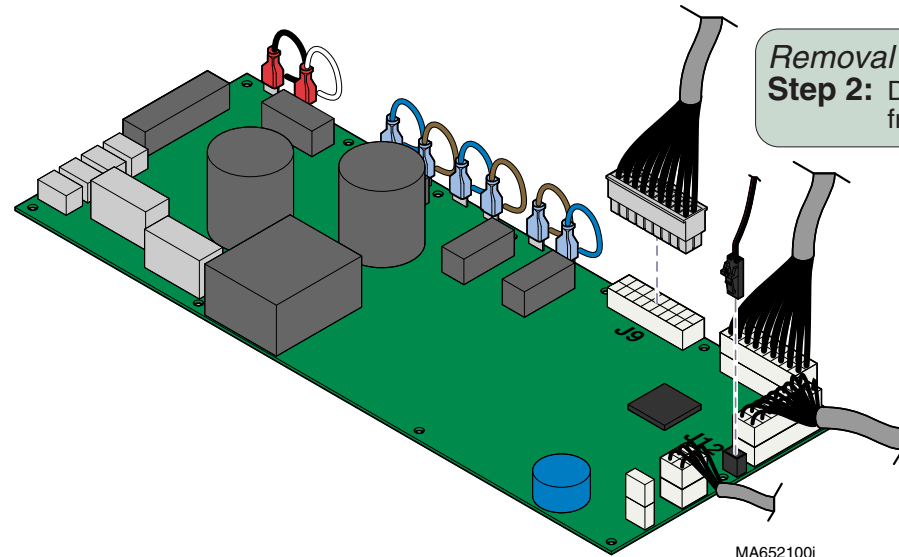
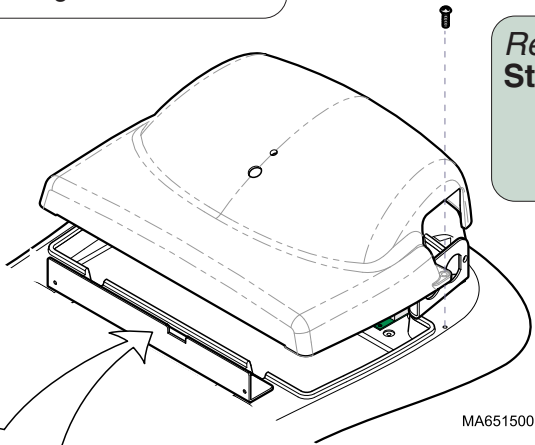
**Step 2:** Disconnect wire harnesses from J9 & J12 on PC Board.

#### Removal (if necessary)

**Step 3:** Remove wire harness cover.

#### Installation (if necessary)

**Step 1:** Install wire harness cover.

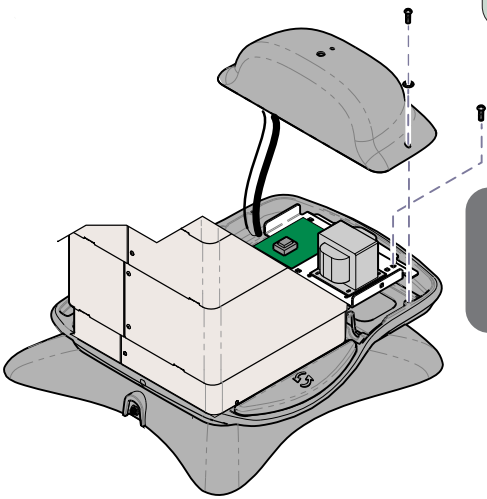


# Access Procedures

## PC Board Cover (models w/ Rotational Base)

### Removal / Installation

**Caution**  
Unplug power cord before removing PC Board cover.



**Removal Step 1:** Remove two screw(s) and partially separate cover.  
*Note:* You *must* perform Step 3 before cover can be completely removed.

**Removal Step 2:** Remove two screw(s) from transformer mtg. plate.

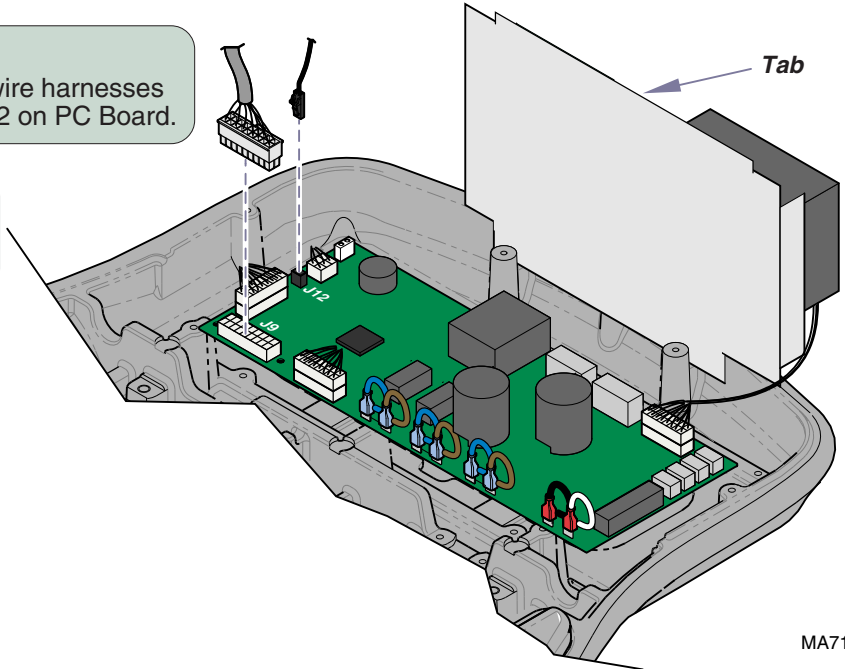
**Installation Step 3:** Secure transformer mtg. plate. Position cover. Secure with two screws.

**Removal Step 4:** Disconnect wire harnesses from J9 & J12 on PC Board.

**Installation Step 1:** Connect wire harnesses to J9 & J12 on PC Board.

**Installation Step 2:** Position transformer mtg. plate so that tab is engaged.

**Removal Step 3:** Pull transformer mtg. plate out to disengage tab. Prop mtg. plate up behind two standoffs as shown.



MA713300i

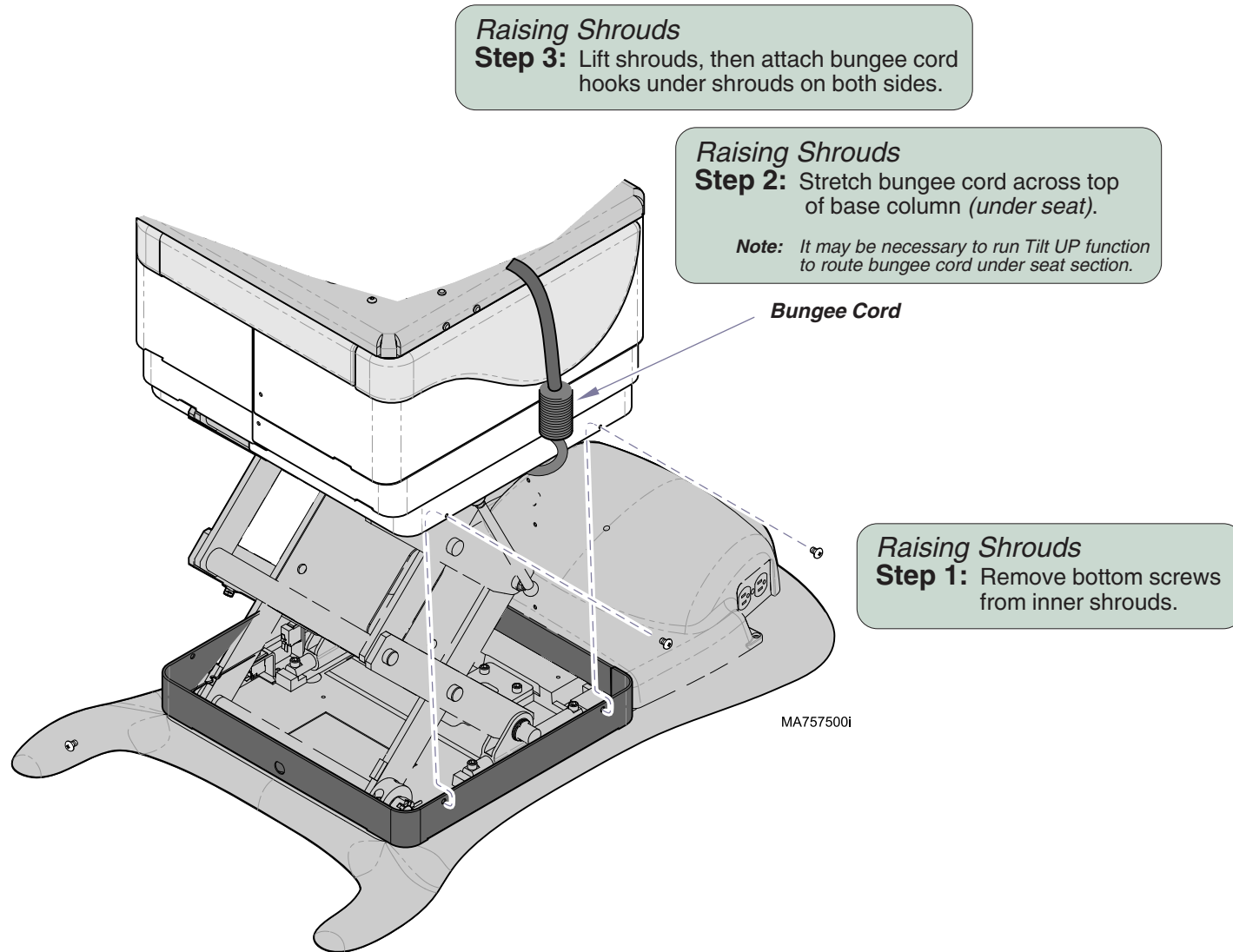
**Models:** 641 (-004 & -005)  
**Serial Numbers:** all

**PC Board Cover**  
(Rotational Base)

# Access Procedures

## Base Shrouds

Raising (w/ bungee cord)



## Base Shrouds - continued

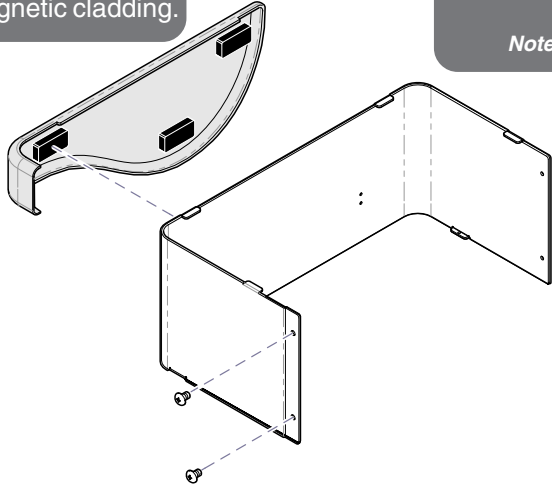
Lowering / Removal / Installation

### Lowering / Removal

**Step 1:** Remove magnetic cladding (3 pcs).

### Installation

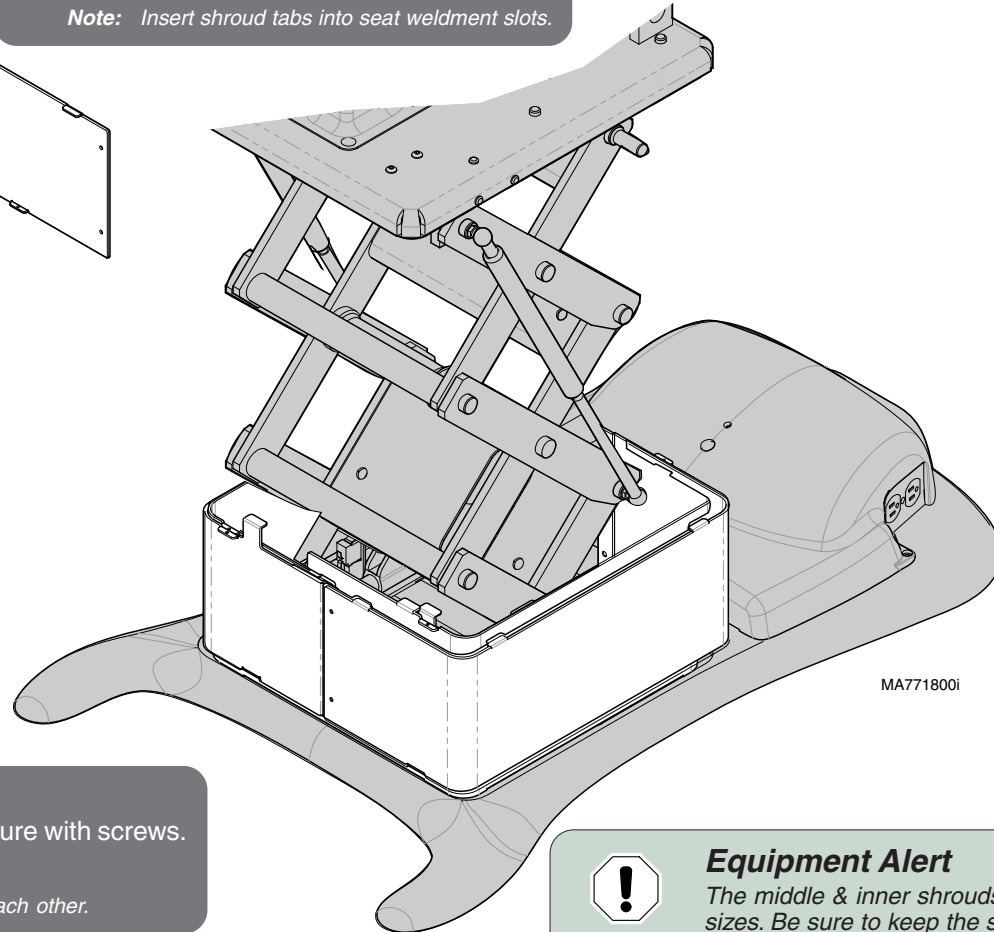
**Step 3:** Install magnetic cladding.



### Installation

**Step 2:** Position outer shrouds.  
Secure with screws at both ends.

*Note:* Insert shroud tabs into seat weldment slots.



### Equipment Alert

Lower the base before performing Step 2.  
This will prevent the shrouds from falling  
when the outer shrouds are removed.

### Lowering / Removal

**Step 2:** Remove screws from outer shrouds only.  
Pull shrouds outward to disengage tabs.

### Installation

**Step 1:** Position inner shrouds, then secure with screws.  
Repeat for middle shrouds

*Note:* Be sure shroud tabs stack on top of each other.



### Equipment Alert

The middle & inner shrouds sets are different  
sizes. Be sure to keep the sets together.

### Removal

**Step 3:** Remove screws from inner & middle shrouds.

**Models:**  
**Serial Numbers:**

**ALL**

**Base Shrouds**

# Access Procedures

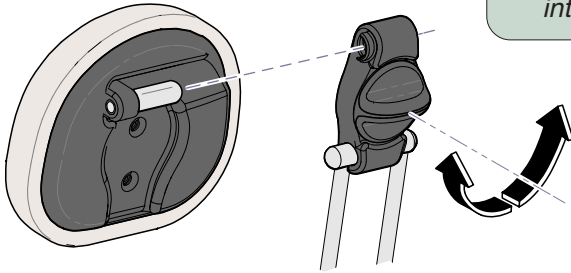
## Upholstery

### Removal / Installation

**NOTE:** Upholstery is fastened with velcro. To remove, simply pull desired section away from mounting surface.

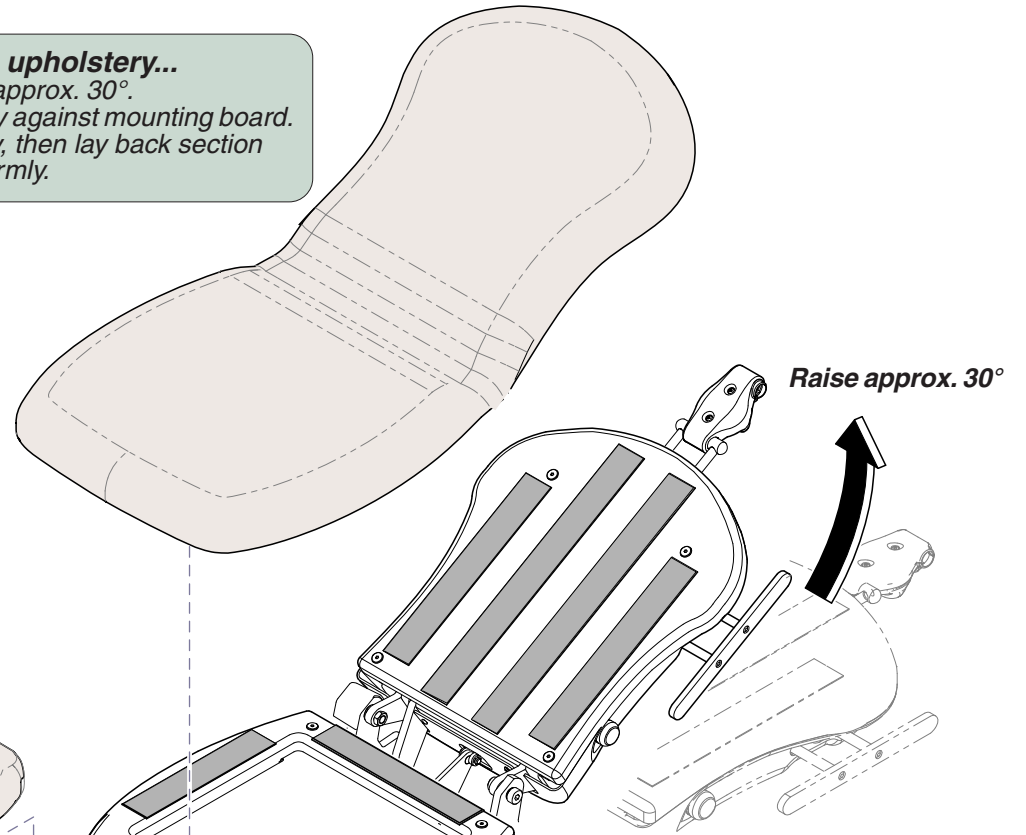
#### To install seat / back section upholstery...

- Raise back section of table to approx. 30°.
- Position front of seat upholstery against mounting board.
- Press seat section down firmly, then lay back section into position and press down firmly.



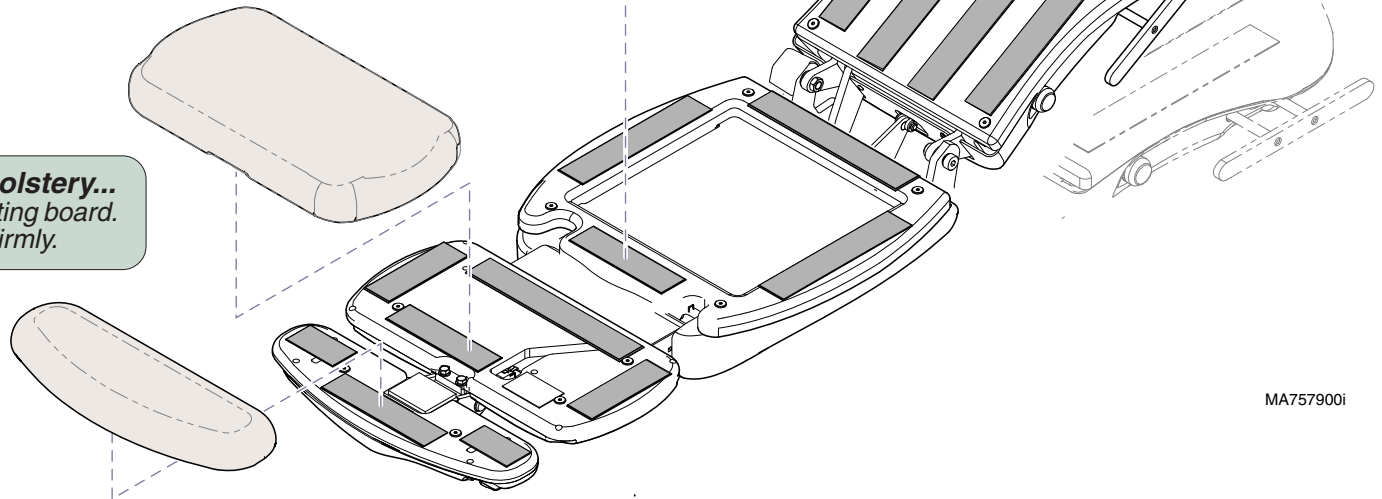
#### To install headrest assembly...

- Loosen headrest adjustment knob.
- Insert mounting stud into headrest fixture.
- Position headrest as desired.
- Tighten headrest adjustment knob.



#### To install foot rest / extension upholstery...

- Position upholstery section with mounting board.
- Lay upholstery flat, then press down firmly.



MA757900i

# Section D

## Wiring Diagrams

### Model

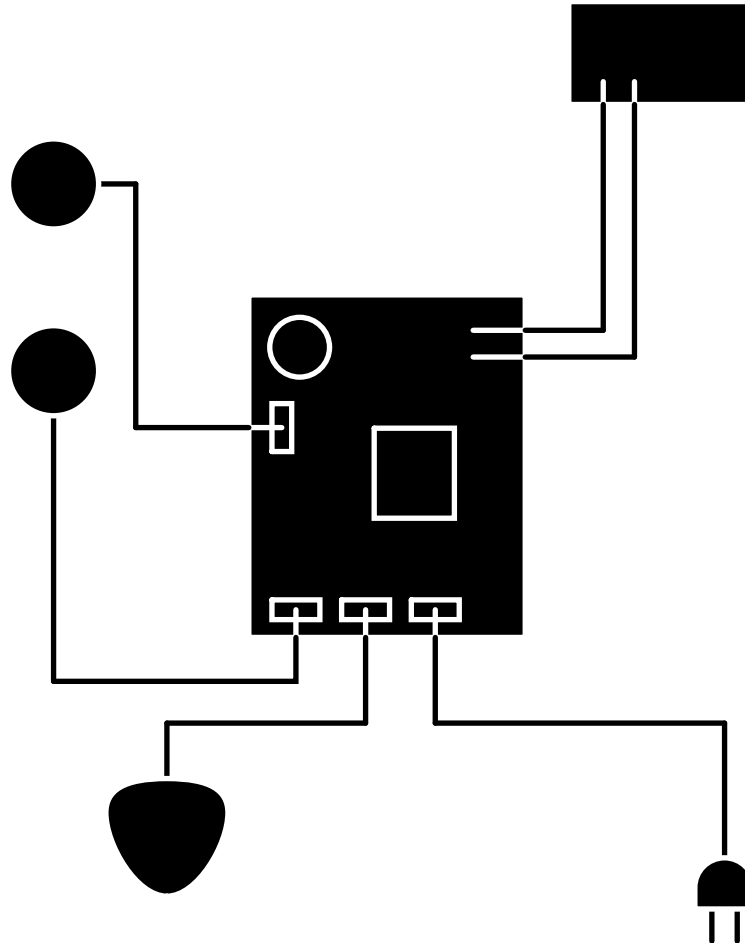
### Page

641:

(-002) ..... D-2

(-003) ..... D-3

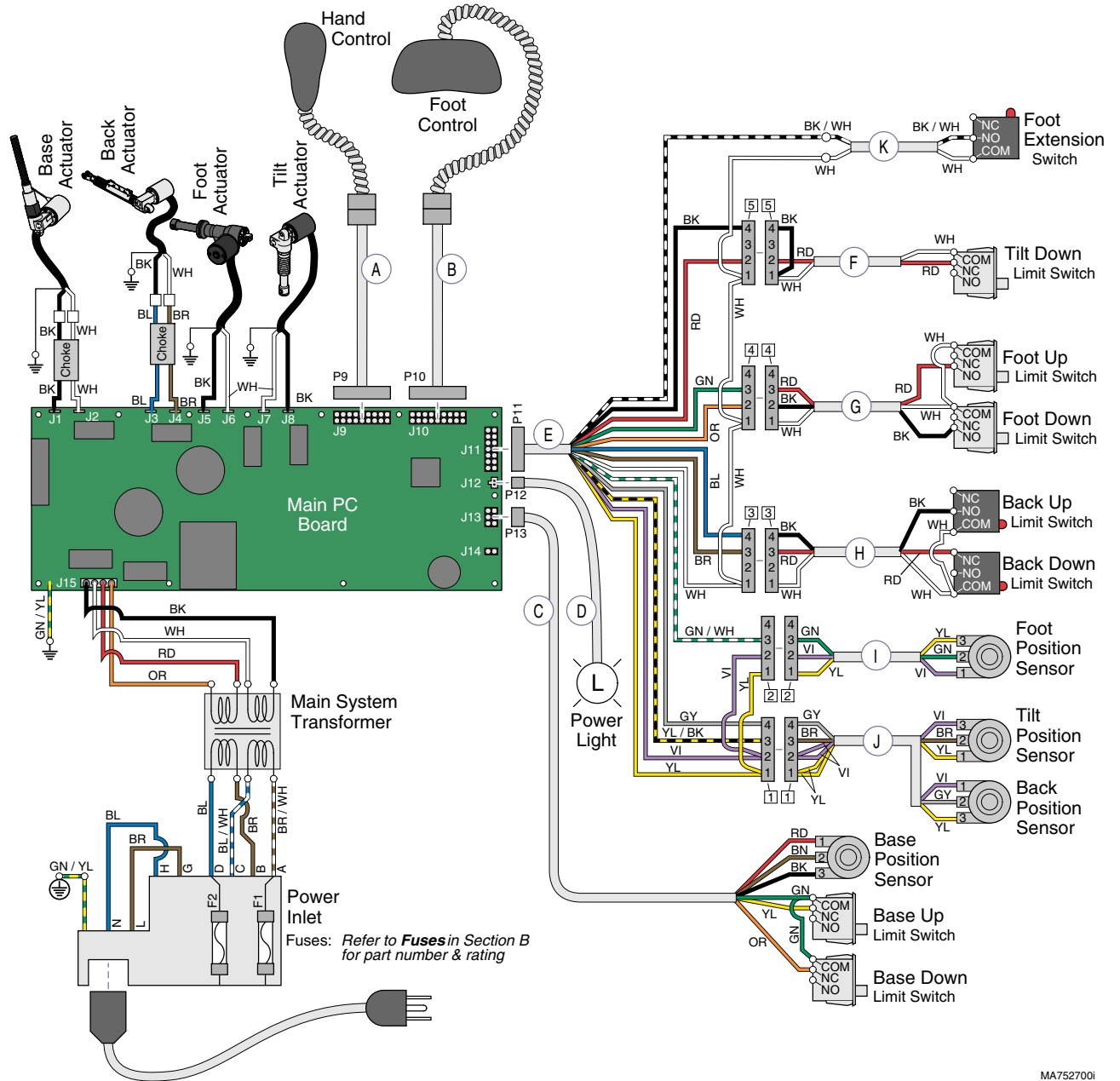
(-004 & -005) ..... D-4



# Wiring Diagrams

Refer To: Page  
 Primary Fuses ..... B-2

Item	Harness Description <i>(sensors &amp; switches not included)</i>	Part Number
A	Connection Port Harness <i>[short - head end]</i>	002-1110-00
B	Connection Port Harness <i>[long - foot end]</i>	002-1110-01
C	Position Sensor / Limit Switch Harness - BASE	015-1821-00
D	Power Light Harness <i>[includes green light]</i>	015-1793-00
E	'PC Board to Junction Board' Harness	015-1937-00
F	Tilt Limit Switch Harness	015-2107-00
G	Foot Limit Switch Assembly <i>[includes harness &amp; two switches]</i>	015-2098-00
H	Back Limit Switch Assembly <i>[includes harness &amp; two switches]</i>	015-2097-00
I	Position Sensor Harness - FOOT	015-1773-00 <i>(incl. sensor)</i>
J	Position Sensor Harness - TILT & BACK	015-1761-00 <i>(incl. both sensors)</i>
K	Foot Extension Switch Harness	015-2106-00



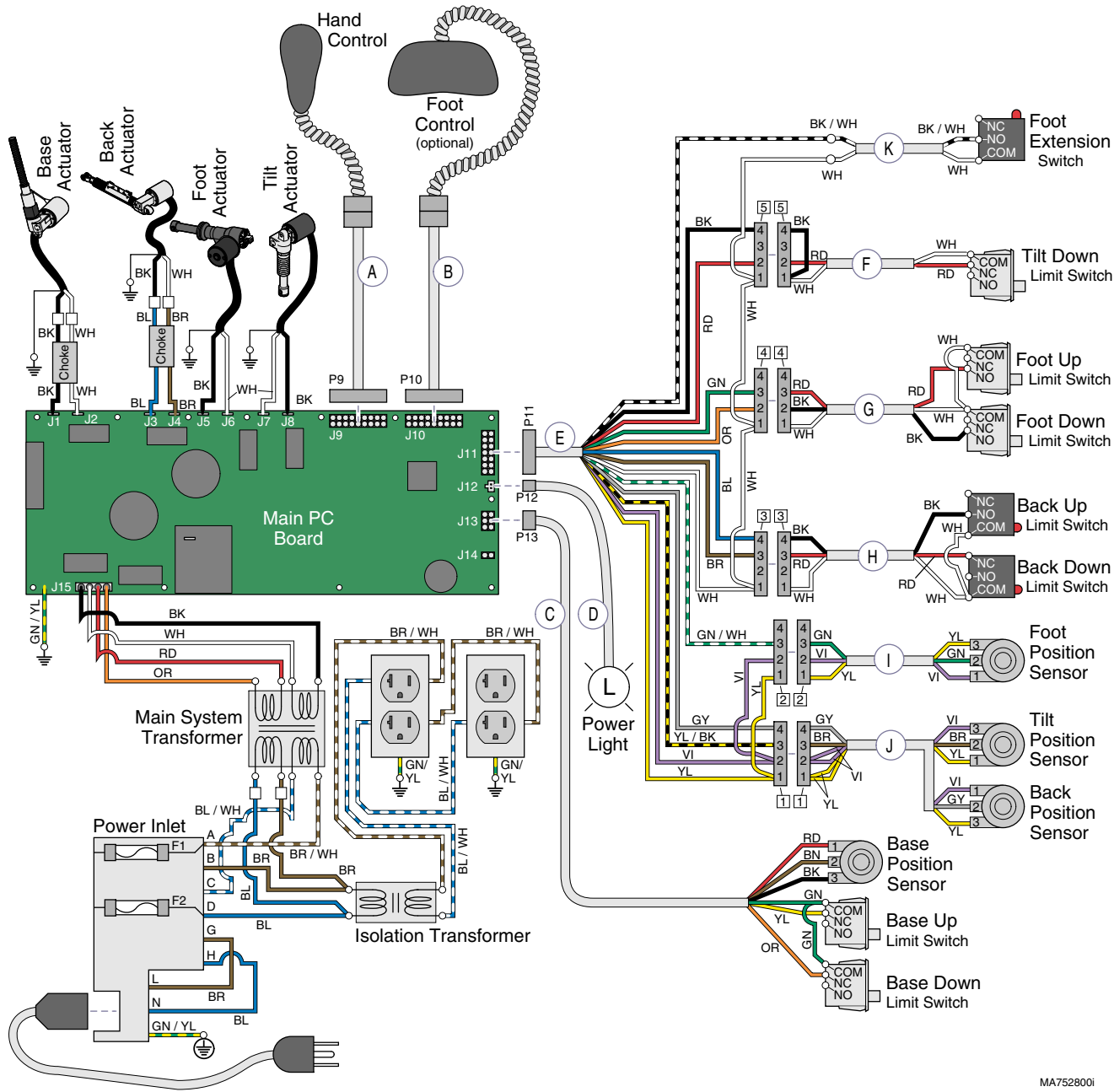
Fuses: Refer to **Fuses** in Section B for part number & rating

MA7527001



# Wiring Diagrams

**Refer To:** **Page**  
 Primary Fuses ..... B-2



Item	Harness Description <i>(sensors &amp; switches not included)</i>	Part Number
A	Connection Port Harness <i>[short - head end]</i>	002-1110-00
B	Connection Port Harness <i>[long - foot end]</i>	002-1110-01
C	Position Sensor / Limit Switch Harness - BASE	015-1821-00
D	Power Light Harness <i>[includes green light]</i>	015-1793-00
E	'PC Board to Junction Board' Harness	015-1937-00
F	Tilt Limit Switch Harness	015-2107-00
G	Foot Limit Switch Assembly <i>[includes harness &amp; two switches]</i>	015-2098-00
H	Back Limit Switch Assembly <i>[includes harness &amp; two switches]</i>	015-2097-00
I	Position Sensor Harness - FOOT <i>(incl. sensor)</i>	015-1773-00
J	Position Sensor Harness - TILT & BACK <i>(incl. both sensors)</i>	015-1761-00
K	Foot Extension Switch Harness	015-2106-00

MA752800i

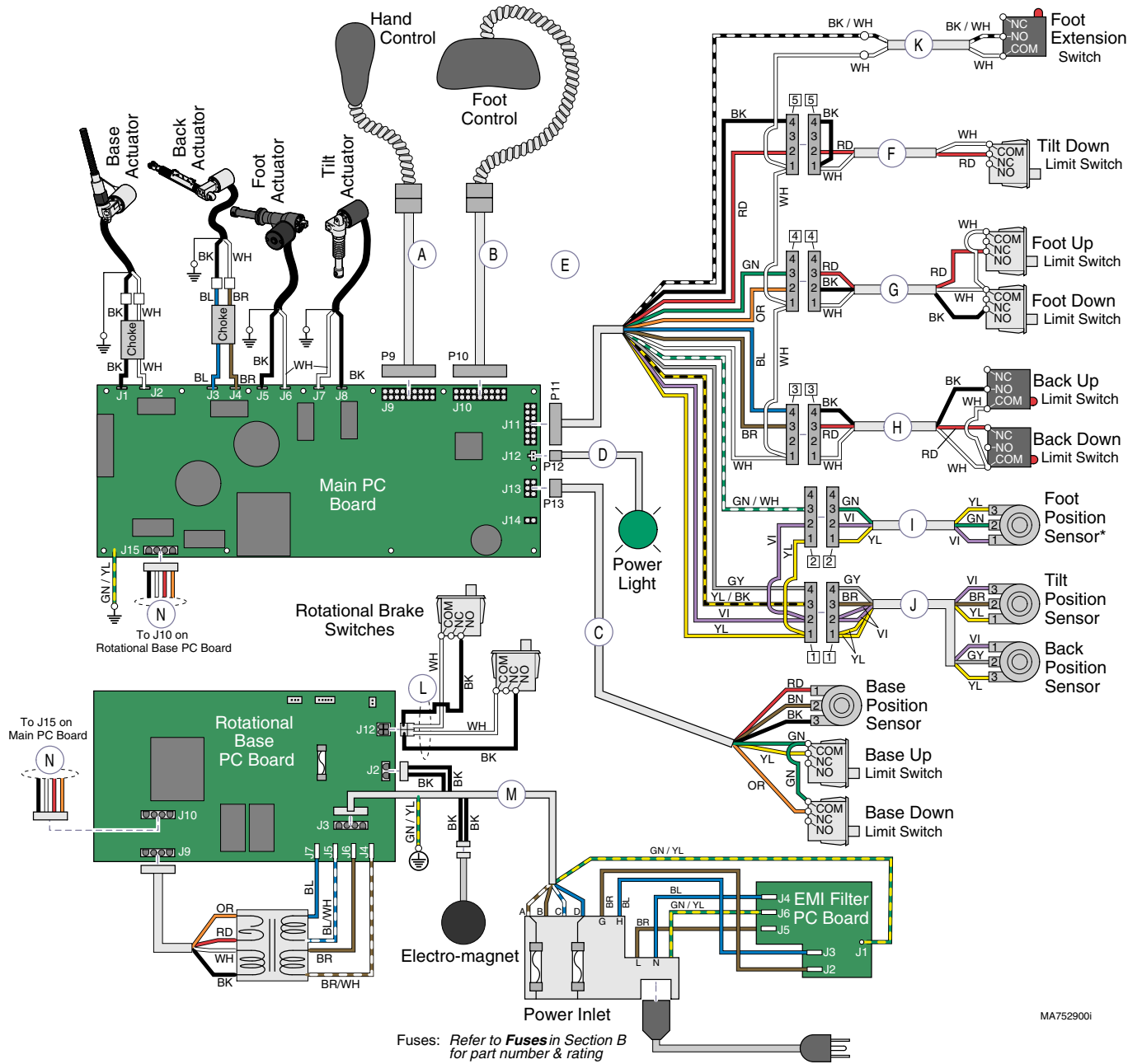
**Models:** 641 (-003)  
**Serial Numbers:** all

**Wiring Diagrams**

# Wiring Diagrams

Refer To: **Page**  
 Primary Fuses ..... B-2

Item	Harness Description <i>(sensors &amp; switches not included)</i>	Part Number
A	Connection Port Harness <i>[short - head end]</i>	002-1110-02
B	Connection Port Harness <i>[long - foot end]</i>	002-1110-03
C	Position Sensor / Limit Switch Harness - BASE	015-1821-00
D	Power Light Harness <i>[includes green light]</i>	015-1793-00
E	'PC Board to Junction Board' Harness	015-1937-00
F	Tilt Limit Switch Harness	015-2107-00
G	Foot Limit Switch Assembly <i>[includes harness &amp; two switches]</i>	015-2098-00
H	Back Limit Switch Assembly <i>[includes harness &amp; two switches]</i>	015-2097-00
I	Position Sensor Harness - FOOT	015-1773-00 <i>(incl. sensor)</i>
J	Position Sensor Harness - TILT & BACK	015-1761-00 <i>(incl. both sensors)</i>
K	Foot Extension Switch Harness	015-2106-00
L	Brake Switch Harness	015-1967-00
M	Rotational Base PC Board - Power Inlet	015-1966-00
N	Rotational Base PC Board - Main PC Board	015-1968-00



MA7529001

# Section E

## *Exploded Views & Parts Lists*

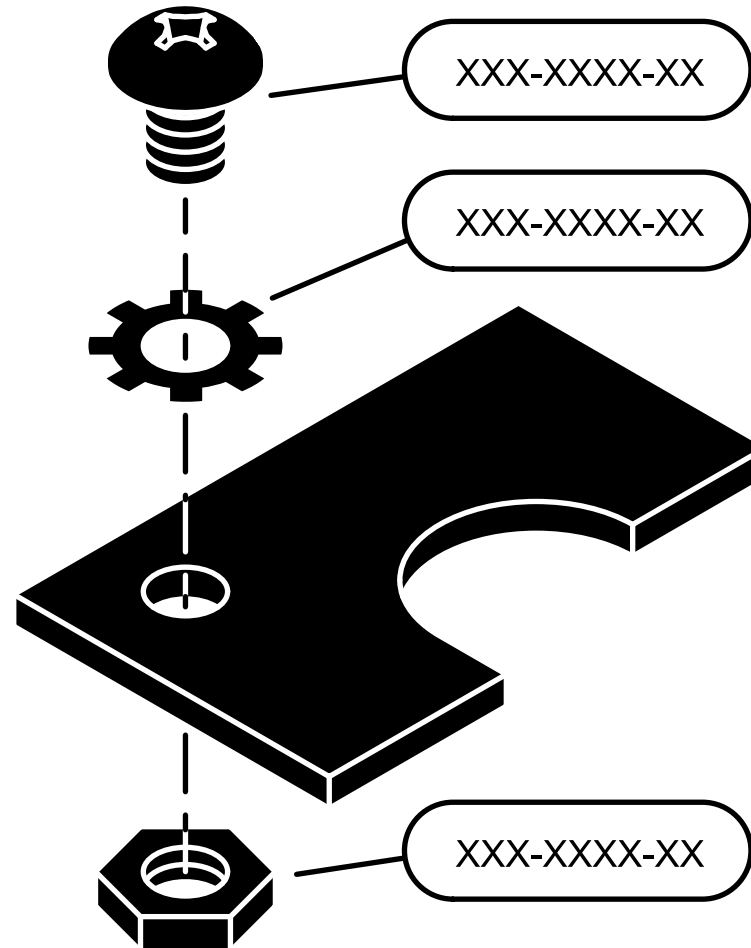
**Model**

**Page**

**641:**

*Standard Base (-002/-003) ..... E-2*

*Rotational Base (-004/-005) ..... E-3*



# 641 (-002 / -003)

## w/ Standard Base

### Upholstered Top:

- Premium ..... E-4
- Ultra-Premium ..... E-5

### Position

- Sensors ..... E-18

### Actuators / Limit Switches:

- Base (w/limit switches) ..... E-19
- Back (w/limit switches) ..... E-20
- Tilt (w/limit switch) ..... E-21
- Foot (w/limit switches) ..... E-22

- Leg Section ..... E-8

- Foot Extension ..... E-7

### Standard Base

- Components ..... E-15

*includes:  
main PC board, power cord,  
fuses, main transformer, etc.*

- Hand Control ..... E-25

### Foot Control:

- Linear-style ..... E-23
- Disc-style ..... E-24

### Scissor

- Components ..... E-14

*includes:  
base limit switches & gas springs*

- Adjustment Knobs ..... E-11

### Headlock

- Assembly ..... E-6

- Back Section ..... E-10

- Seat Section ..... E-9

### Column Top

- Components ..... E-13

*includes:  
upper glides & wire routing strap*

- Base Shrouds ..... E-12

### Optional Features

- Chair Receptacles ..... E-26
- Optional Headrests ..... E-27
- Paper Roll Holder ..... E-28

# 641 (-004 / -005)

## w/ Rotational Base

### Upholstered Top:

Premium ..... E-4  
Ultra-Premium ..... E-5

### Position

Sensors ..... E-18

### Actuators / Limit Switches:

Base (w/limit switches) ..... E-19  
Back (w/limit switches) ..... E-20  
Tilt (w/limit switch) ..... E-21  
Foot (w/limit switches) ..... E-22

Leg Section ..... E-8

Foot Extension ..... E-7

### Rotational Base:

Upper Section ..... E-16

includes:  
main PC board, brake switches,  
main transformer, rotation control  
PC board, etc.

### Rotational Base:

Lower Section ..... E-17

includes:  
brake, rotation bearings, etc.

Hand Control ..... E-25

### Foot Control:

Linear-style ..... E-23  
Disc-style ..... E-24

### Scissor

Components ..... E-14

includes:  
base limit switches & gas springs

Adjustment Knobs ..... E-11

Headlock  
Assembly ..... E-6

Back Section ..... E-10

Seat Section ..... E-9

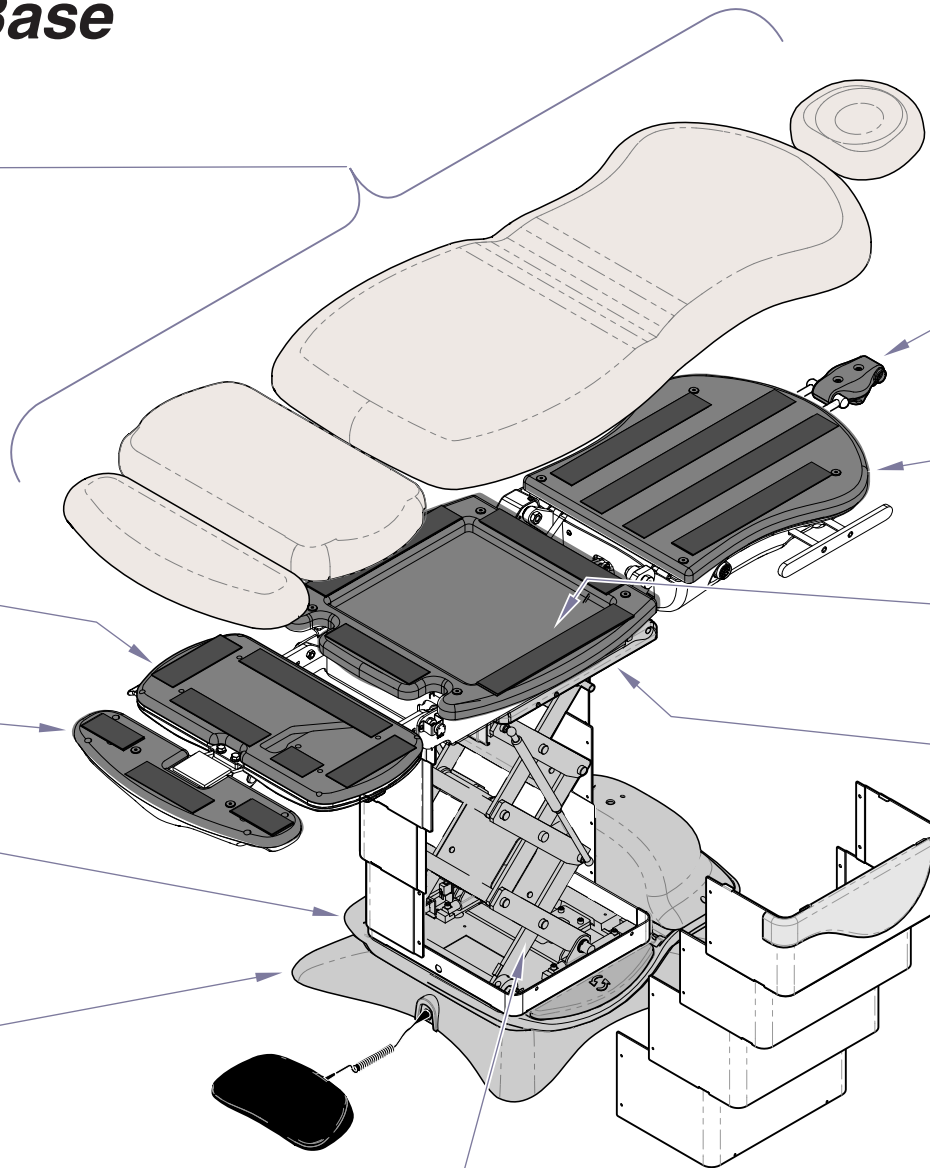
Column Top  
Components ..... E-13

includes:  
upper glides & wire routing strap

Base Shrouds ..... E-12

### Optional Features

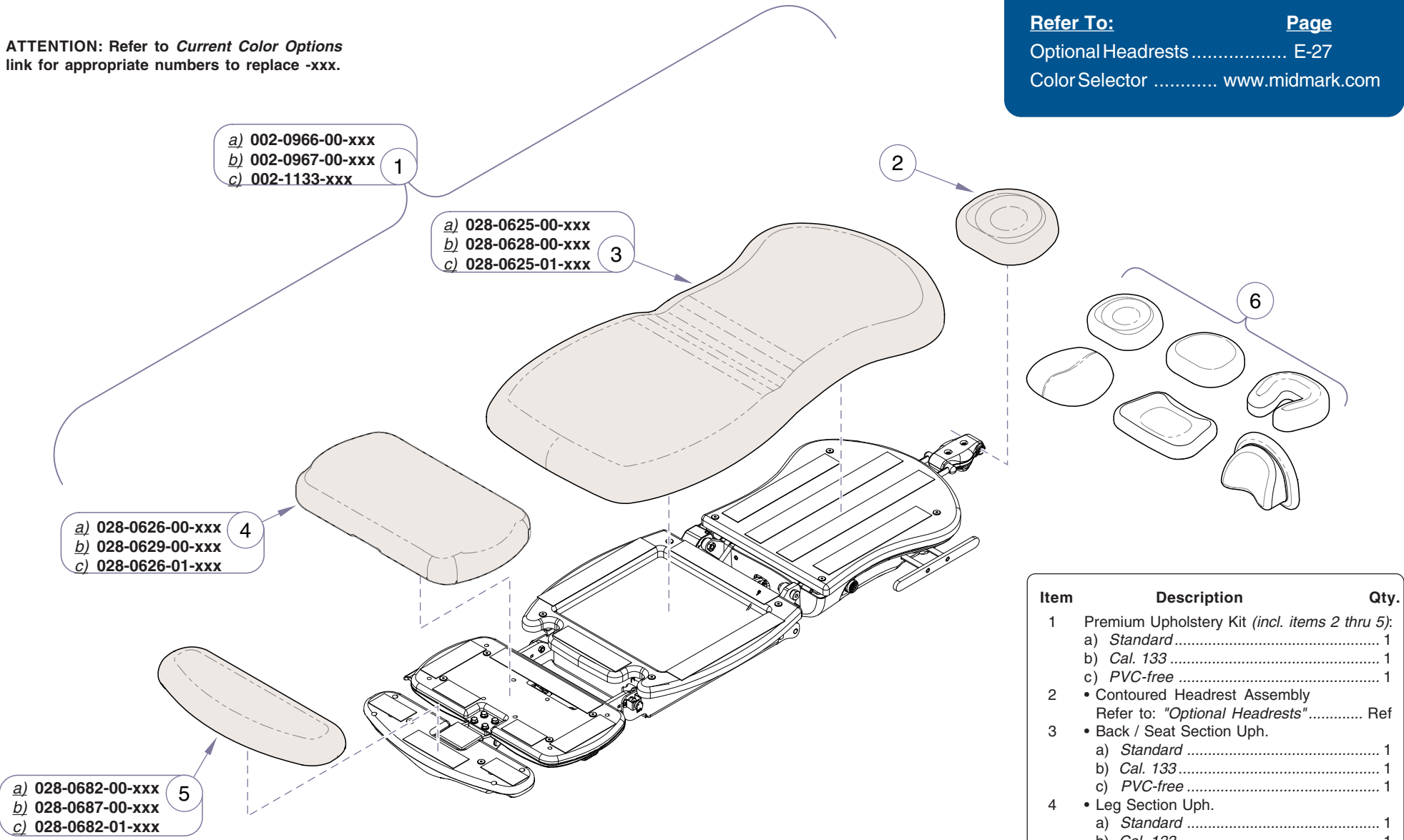
Chair Receptacles ..... E-26  
Optional Headrests ..... E-27  
Paper Roll Holder ..... E-28



\* Indicates multiple pages due to a serial number break for the parts illustration

ATTENTION: Refer to *Current Color Options* link for appropriate numbers to replace -xxx.

**Refer To:** **Page**  
 Optional Headrests ..... E-27  
 Color Selector ..... www.midmark.com



- 1  
 a) 002-0966-00-xxx  
 b) 002-0967-00-xxx  
 c) 002-1133-xxx

- 3  
 a) 028-0625-00-xxx  
 b) 028-0628-00-xxx  
 c) 028-0625-01-xxx

- 4  
 a) 028-0626-00-xxx  
 b) 028-0629-00-xxx  
 c) 028-0626-01-xxx

- 5  
 a) 028-0682-00-xxx  
 b) 028-0687-00-xxx  
 c) 028-0682-01-xxx

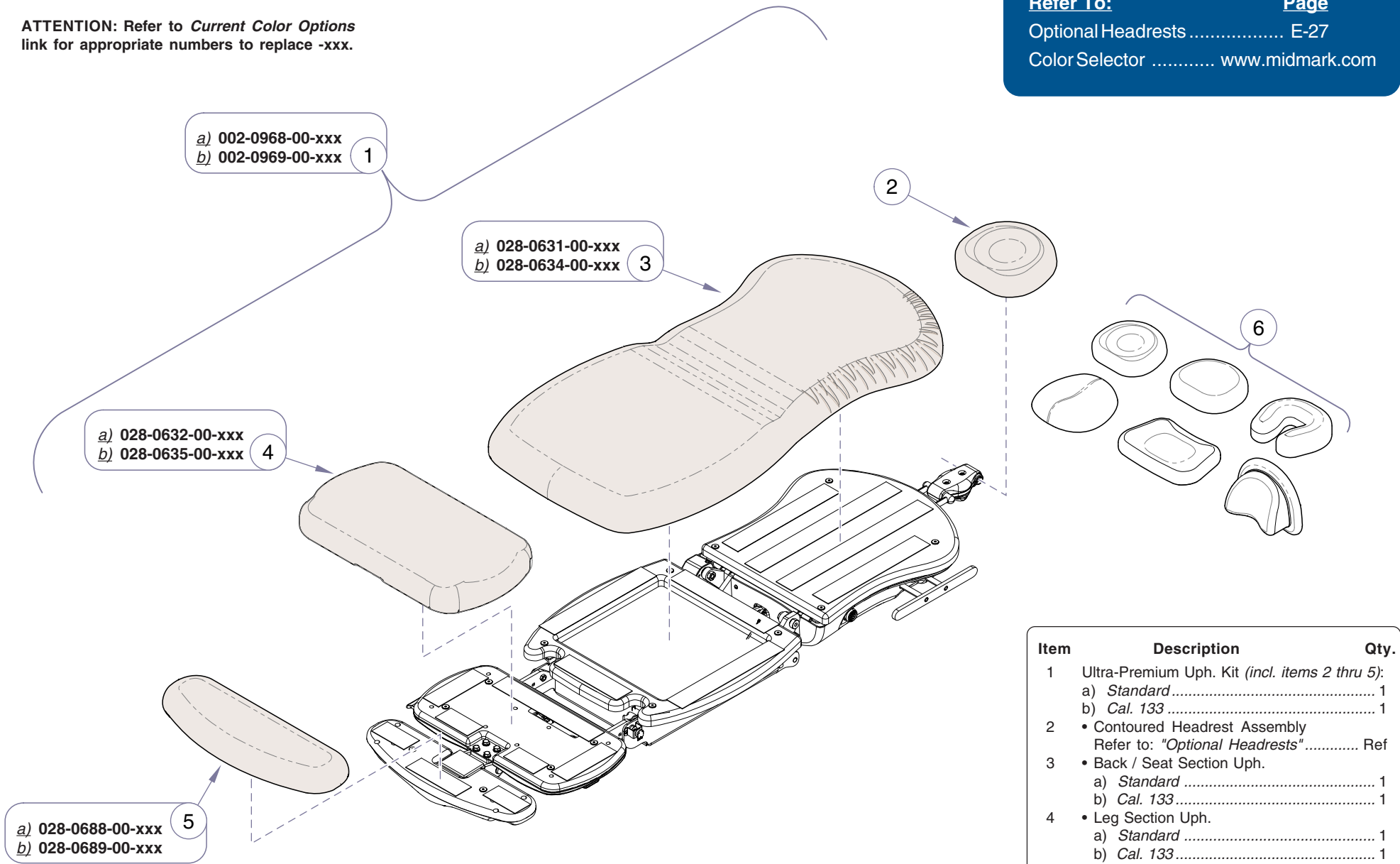
Item	Description	Qty.
1	Premium Upholstery Kit (incl. items 2 thru 5):	
	a) Standard .....	1
	b) Cal. 133 .....	1
	c) PVC-free .....	1
2	• Contoured Headrest Assembly Refer to: "Optional Headrests" .....	Ref
3	• Back / Seat Section Uph.	
	a) Standard .....	1
	b) Cal. 133 .....	1
	c) PVC-free .....	1
4	• Leg Section Uph.	
	a) Standard .....	1
	b) Cal. 133 .....	1
	c) PVC-free .....	1
5	• Foot Extension Uph.	
	a) Standard .....	1
	b) Cal. 133 .....	1
	c) PVC-free .....	1
6	Refer to: "Optional Headrests" .....	Ref

**Always Specify Model & Serial Number**

MA761500I

ATTENTION: Refer to *Current Color Options* link for appropriate numbers to replace -xxx.

**Refer To:** **Page**  
 Optional Headrests ..... E-27  
 Color Selector ..... www.midmark.com



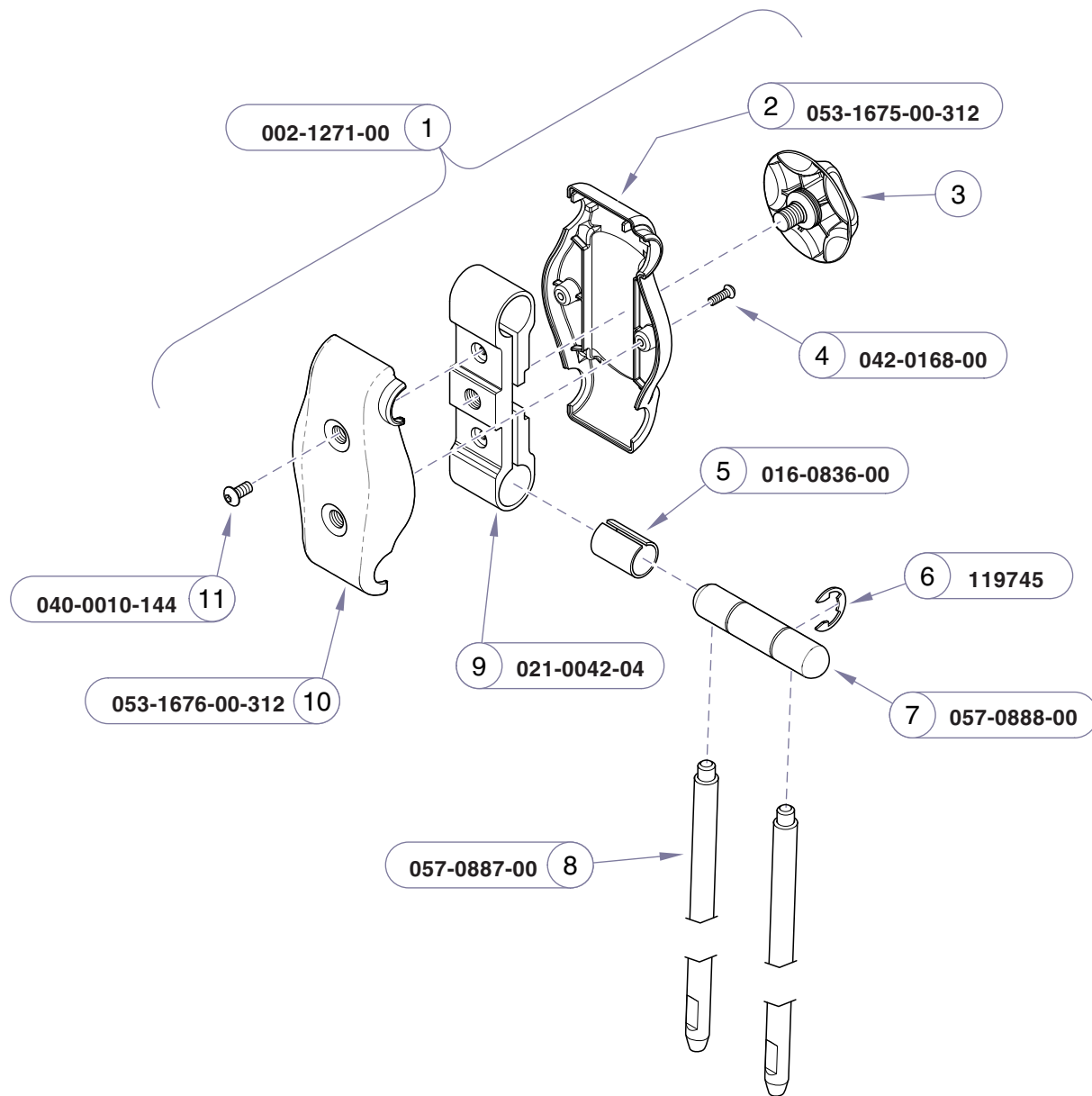
Item	Description	Qty.
1	Ultra-Premium Uph. Kit (incl. items 2 thru 5):	
	a) Standard	1
	b) Cal. 133	1
2	• Contoured Headrest Assembly	
	Refer to: "Optional Headrests"	Ref
3	• Back / Seat Section Uph.	
	a) Standard	1
	b) Cal. 133	1
4	• Leg Section Uph.	
	a) Standard	1
	b) Cal. 133	1
5	• Foot Extension Uph.	
	a) Standard	1
	b) Cal. 133	1
6	Refer to: "Optional Headrests"	Ref

**Always Specify Model & Serial Number**

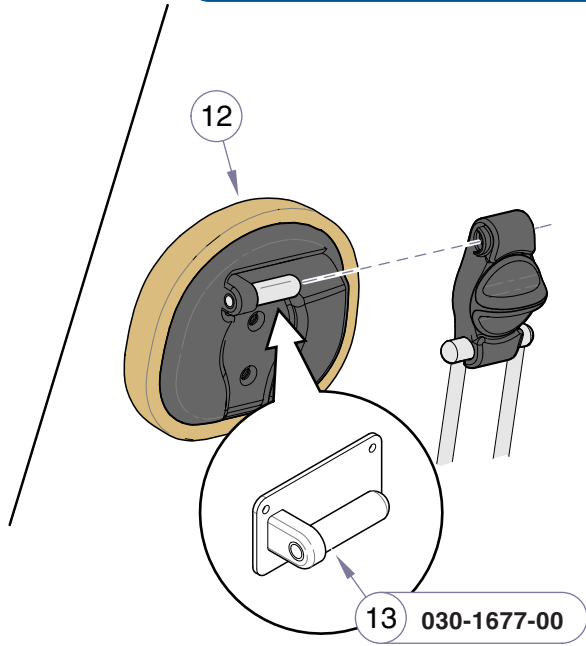
MA761600I

**Models:** | **All**  
**Serial Numbers:** |

**Upholstered Top:**  
**Ultra-Premium**



Refer To:	Page
Upholstered Top:	
Premium .....	E-4
Ultra-Premium .....	E-5
Adjustment Knob Assembly .....	E-11



Item	Description	Qty.
1	Headlock Assembly (includes items 2 thru 11) .....	1
2	• Headlock Housing: Back .....	1
3	• Refer to: "Adjustment Knob Assy" .....	Ref
4	• Screw (3.5 mm x 10mm) .....	2
5	• Sleeve Bearing .....	2
6	• E-ring (0.75" dia.) .....	2
7	• Headlock Pivot .....	1
8	• Headlock Shaft (apply red Loctite) .....	2
9	• Headrest Clamp .....	2
10	• Headlock Housing: Front .....	1
11	• Screw (#10-32 x 1/2") .....	2
12	Refer to: "Upholstered Top" .....	Ref
13	Head Pivot Weldment .....	1

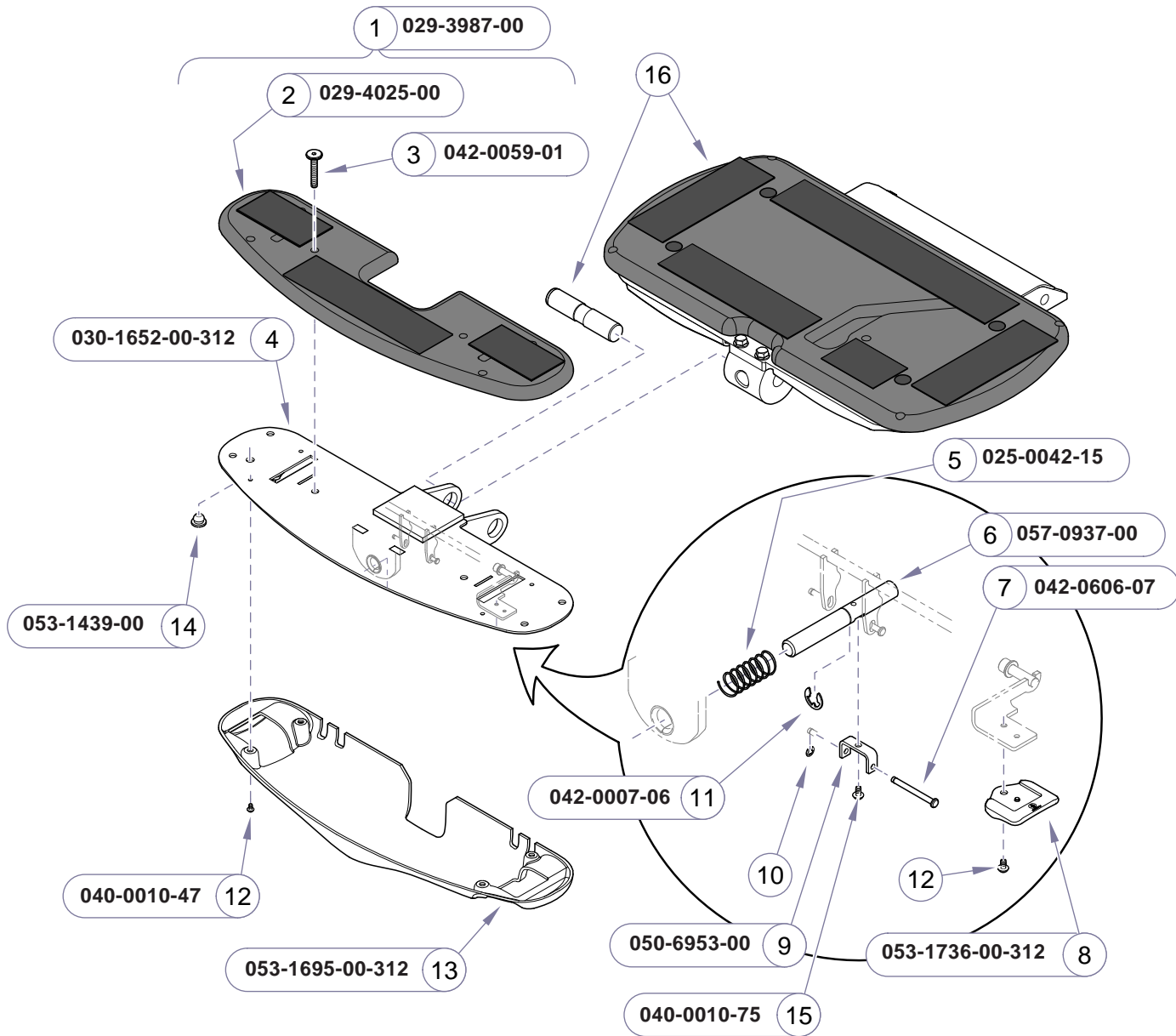
**Always Specify Model & Serial Number**

MA761700i

**Headlock Assembly**

**Models:** All  
**Serial Numbers:**





Item	Description	Qty.
1	Foot Extension Assembly (incl. items 2 thru 14)	1
2	• Foot Ext. Substrate (incl. velcro)	1
3	• Screw	2
4	• Foot Ext. Weldment	1
5	• Spring	1
6	• Locking Pin	1
7	• Clevis Pin (incl. item 10)	1
8	• Handle	2
9	• Bracket	1
10	• E-ring (small)	Ref
11	• E-ring (large)	1
12	• Screw (#10-24 x 3/8")	6
13	• Bottom Cover	1
14	• Stem Bumper	2
15	• Screw (#10-24 x 3/8")	1
16	Refer to: "Leg Section"	Ref

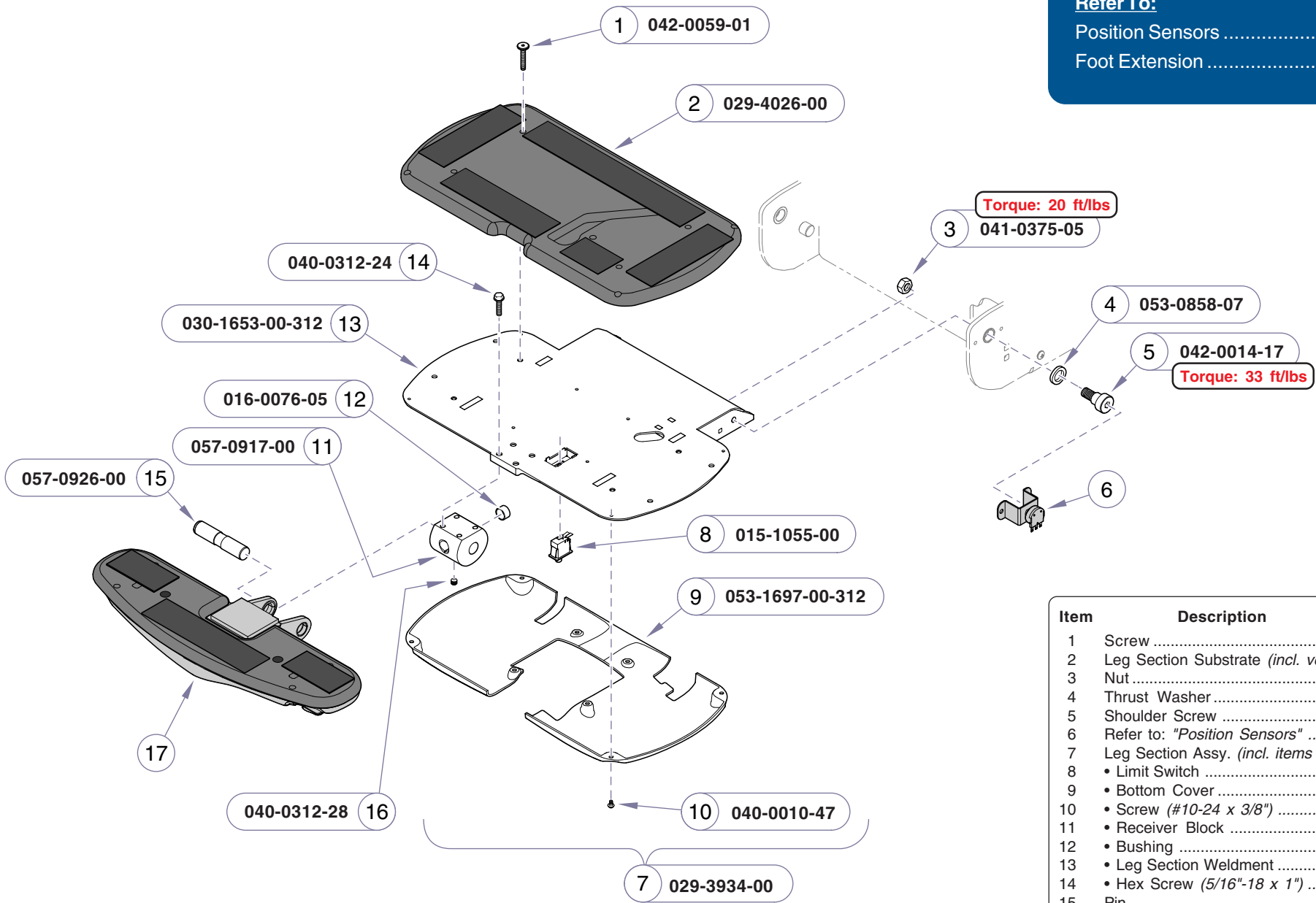
Always Specify Model & Serial Number

MA764401i

Models: All  
 Serial Numbers:

Foot Extension

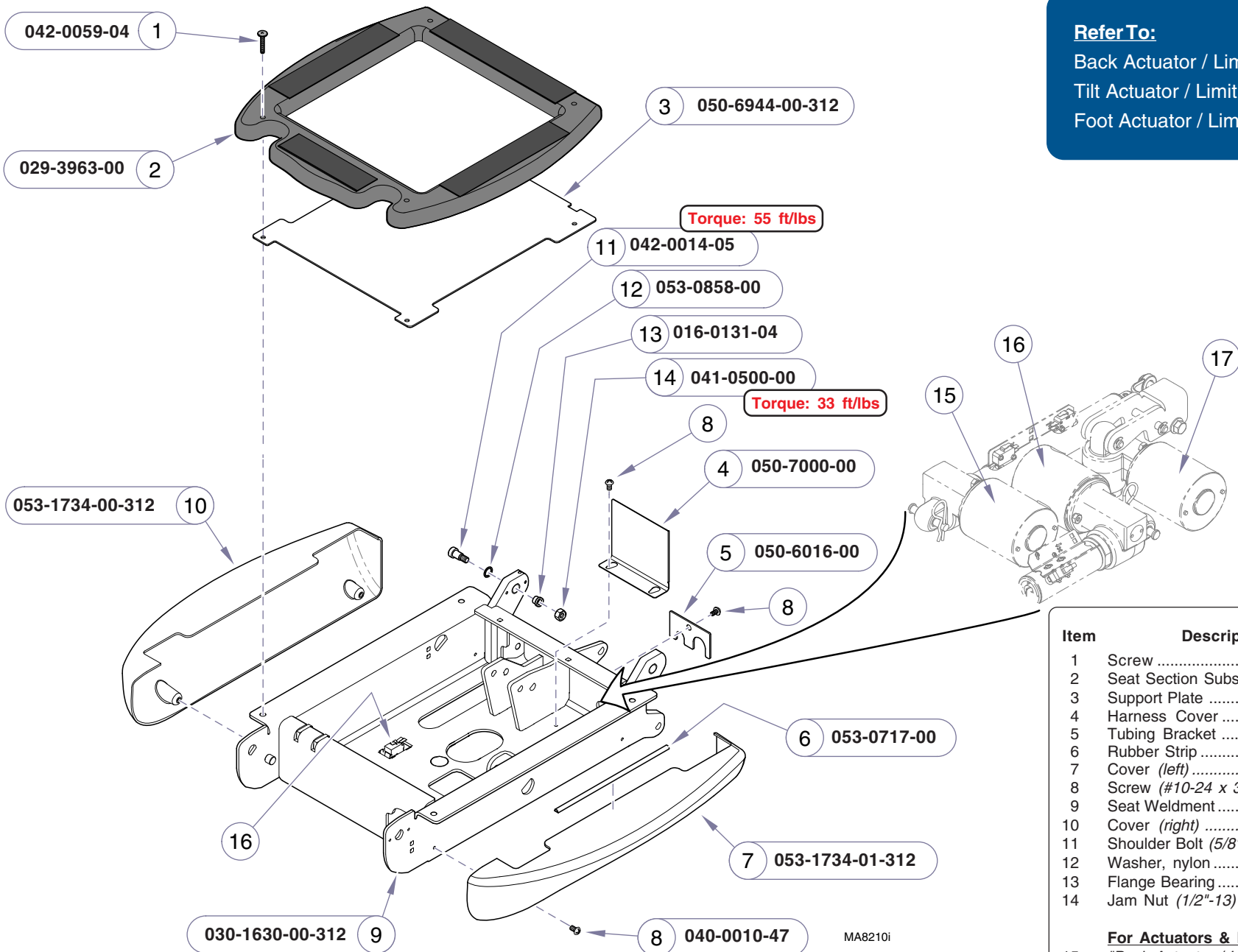
<b>Refer To:</b>	<b>Page</b>
Position Sensors .....	E-18
Foot Extension .....	E-7



Item	Description	Qty.
1	Screw .....	4
2	Leg Section Substrate (incl. velcro) .....	1
3	Nut .....	2
4	Thrust Washer .....	1
5	Shoulder Screw .....	2
6	Refer to: "Position Sensors" .....	Ref
7	Leg Section Assy. (incl. items 8 thru 14) ....	1
8	• Limit Switch .....	1
9	• Bottom Cover .....	1
10	• Screw (#10-24 x 3/8") .....	4
11	• Receiver Block .....	1
12	• Bushing .....	1
13	• Leg Section Weldment .....	1
14	• Hex Screw (5/16"-18 x 1") .....	4
15	Pin .....	1
16	Set Screw .....	1
17	Refer to: "Foot Extension" .....	Ref

**Always Specify Model & Serial Number**

MA764600i

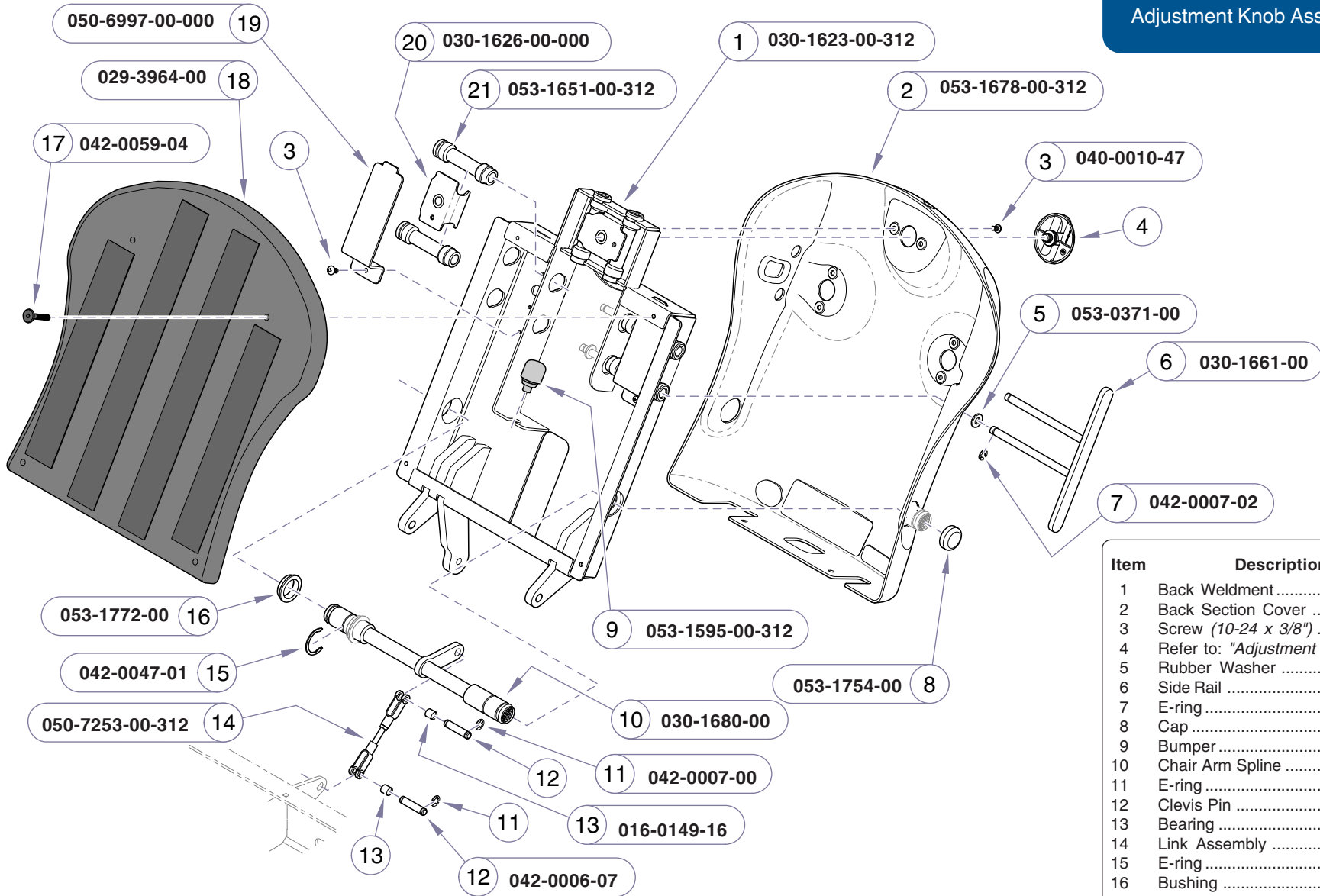


**Refer To:** **Page**  
 Back Actuator / Limit Switches .... E-20  
 Tilt Actuator / Limit Switch ..... E-21  
 Foot Actuator / Limit Switches .... E-22

Item	Description	Qty.
1	Screw .....	1
2	Seat Section Substrate .....	1
3	Support Plate .....	1
4	Harness Cover .....	1
5	Tubing Bracket .....	1
6	Rubber Strip .....	2
7	Cover (left) .....	1
8	Screw (#10-24 x 3/8") .....	7
9	Seat Weldment .....	1
10	Cover (right) .....	1
11	Shoulder Bolt (5/8" x 3/4") .....	2
12	Washer, nylon .....	1
13	Flange Bearing .....	2
14	Jam Nut (1/2"-13) .....	2
<b>For Actuators &amp; Limit Switches, refer to:</b>		
15	"Back Actuator / Limit Switches" .....	Ref
16	"Foot Actuator / Limit Switches" .....	Ref
17	"Tilt Actuator / Limit Switch" .....	Ref
<b>Always Specify Model &amp; Serial Number</b>		

**Models:** | **All**  
**Serial Numbers:** |

**Seat Section**



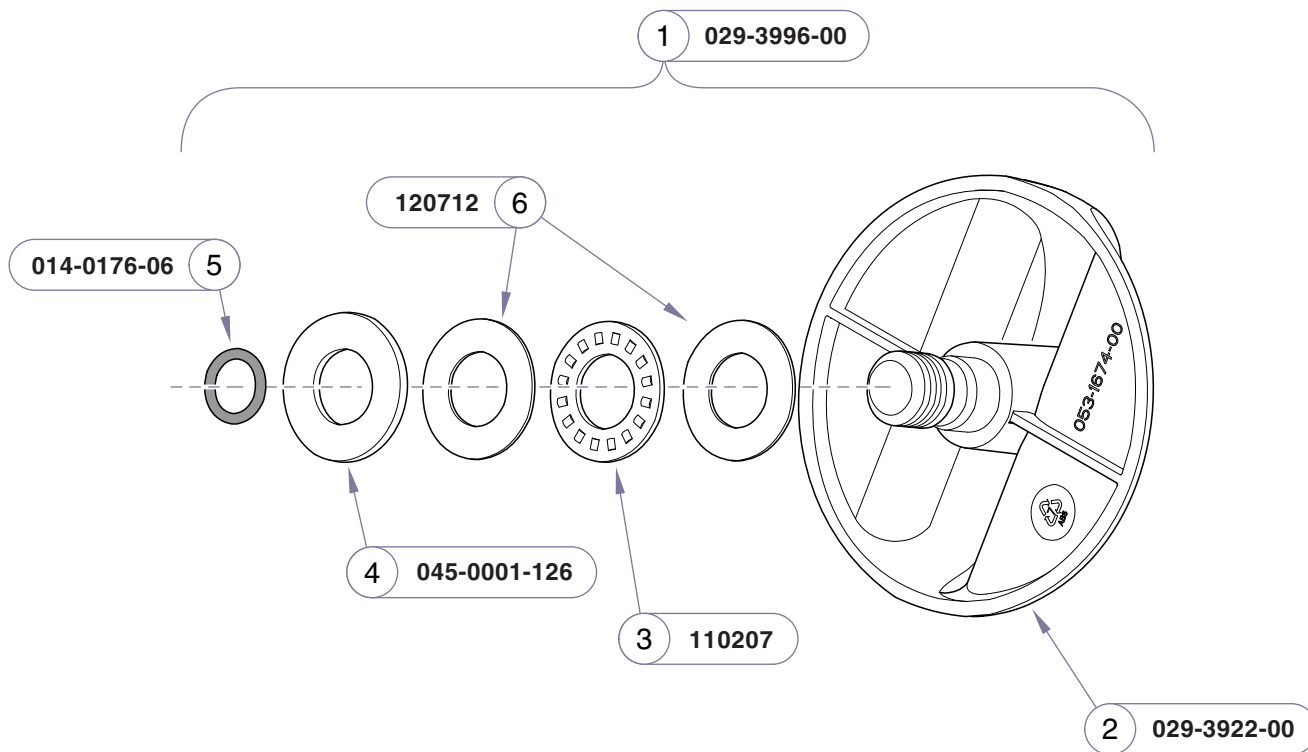
Item	Description	Qty.
1	Back Weldment .....	1
2	Back Section Cover .....	1
3	Screw (10-24 x 3/8") .....	8
4	Refer to: "Adjustment Knob Assembly" .. Ref	
5	Rubber Washer .....	2
6	Side Rail .....	2
7	E-ring .....	2
8	Cap .....	2
9	Bumper .....	1
10	Chair Arm Spline .....	1
11	E-ring .....	4
12	Clevis Pin .....	2
13	Bearing .....	2
14	Link Assembly .....	1
15	E-ring .....	2
16	Bushing .....	2
17	Screw .....	4
18	Back Substrate .....	1
19	Clamp Retainer .....	2
20	Clamp .....	3
21	Bushing .....	6

**Always Specify Model & Serial Number**

MA765300i

**E-10** Back Section

**Models:** All  
**Serial Numbers:**



Item	Description	Qty.
1	Knob Assembly ( <i>incl. items 2 thru 6</i> ) .....	4
2	• Knob Handle .....	1
3	• Needle Thrust Bearing .....	1
4	• Spring Washer .....	1
5	• O-ring .....	1
6	• Thrust Washer .....	2

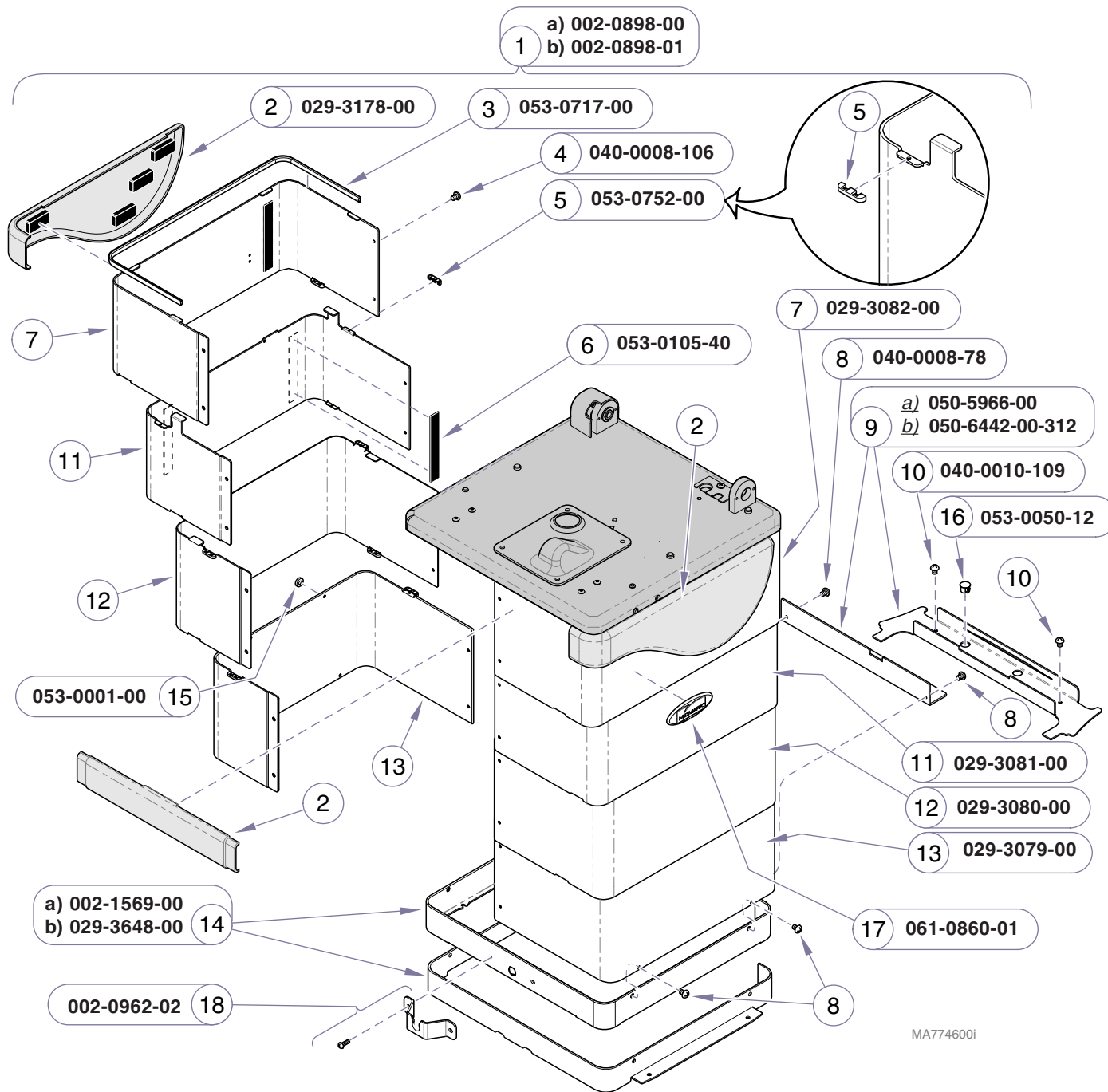
**Always Specify Model & Serial Number**

MA765500i

**Models:** | **All**  
**Serial Numbers:** |

**Adjustment Knob  
 Assembly**

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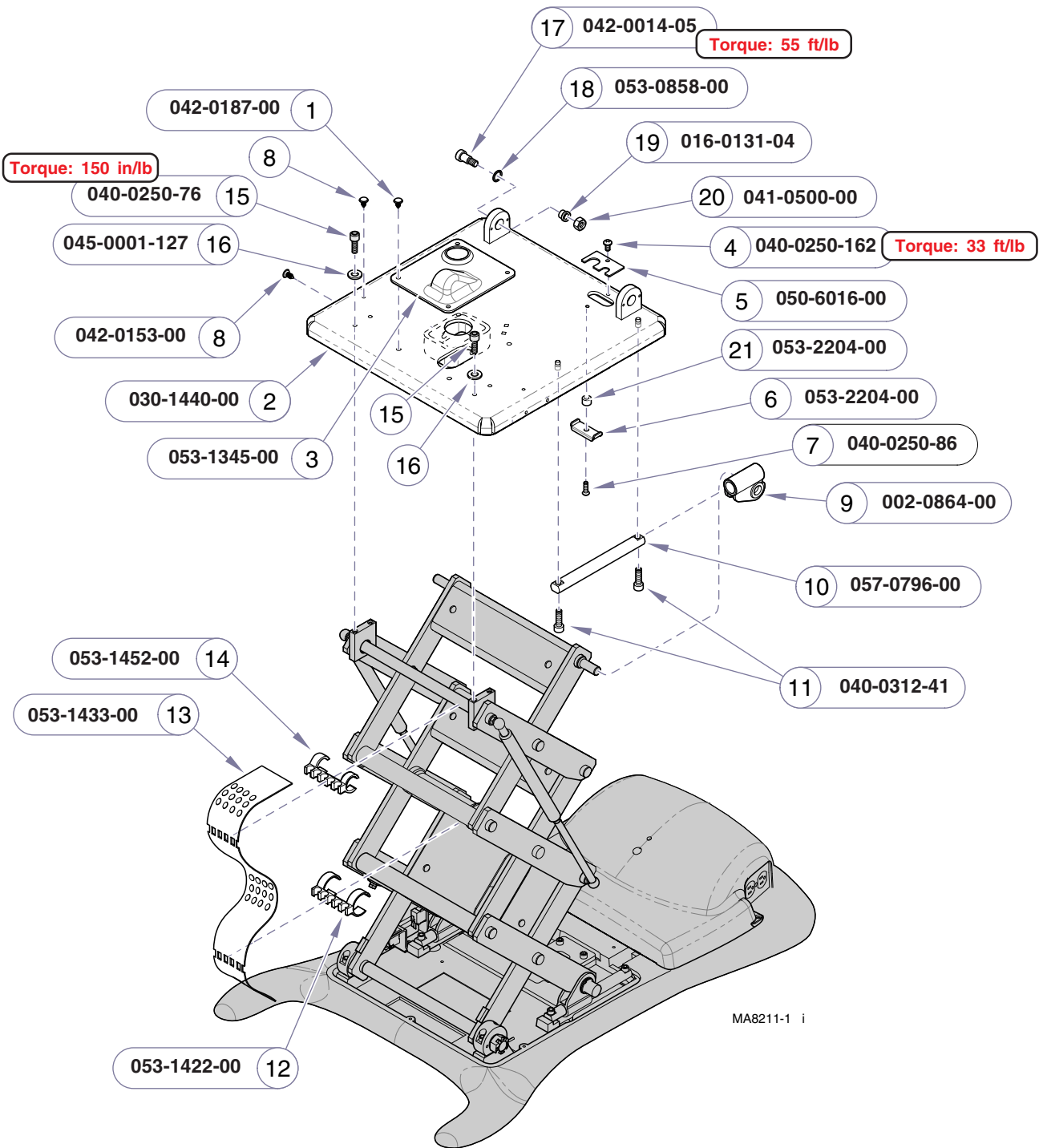


**NOTE:**

Shroud assemblies include all Snap-on-Guides (item 5) and nutserts.

Item	Description	Qty.
1	Shroud Set (incl. items 2 thru 17):	
	a) Standard base .....	1
	b) Rotational base .....	1
2	• Cladding Set (includes RH, LH, & front pieces) .....	1
3	• Outer Shroud Seal .....	2
4	• Screw (#8-32 x 1/4" truss head) .....	10
5	• Snap-on-guide .....	24
6	• Velcro Loop .....	4
7	• Outer Shroud Assembly .....	2
8	• Screw (#8-32 x 1/4" Pan Head) .....	10
9	• Wire Harness Cover:	
	a) Standard base .....	1
	b) Rotational base .....	1
10	• Screw .....	2
11	• Middle Outer Shroud Assembly .....	2
12	• Middle Inner Shroud Assembly .....	2
13	• Inner Shroud .....	2
14	• Shroud Spacer:	
	a) Standard base (incl. two #8-32 x 3/8" screws) .....	1
	b) Rotational base .....	1
15	• Bumper .....	2
16	• Hole Plug .....	2
17	• Midmark Nameplate .....	1
18	Control Cord Bracket Kit (incl. bracket, two #8-32 x 3/8" screws, & two nuts) .....	1

Always Specify Model & Serial Number

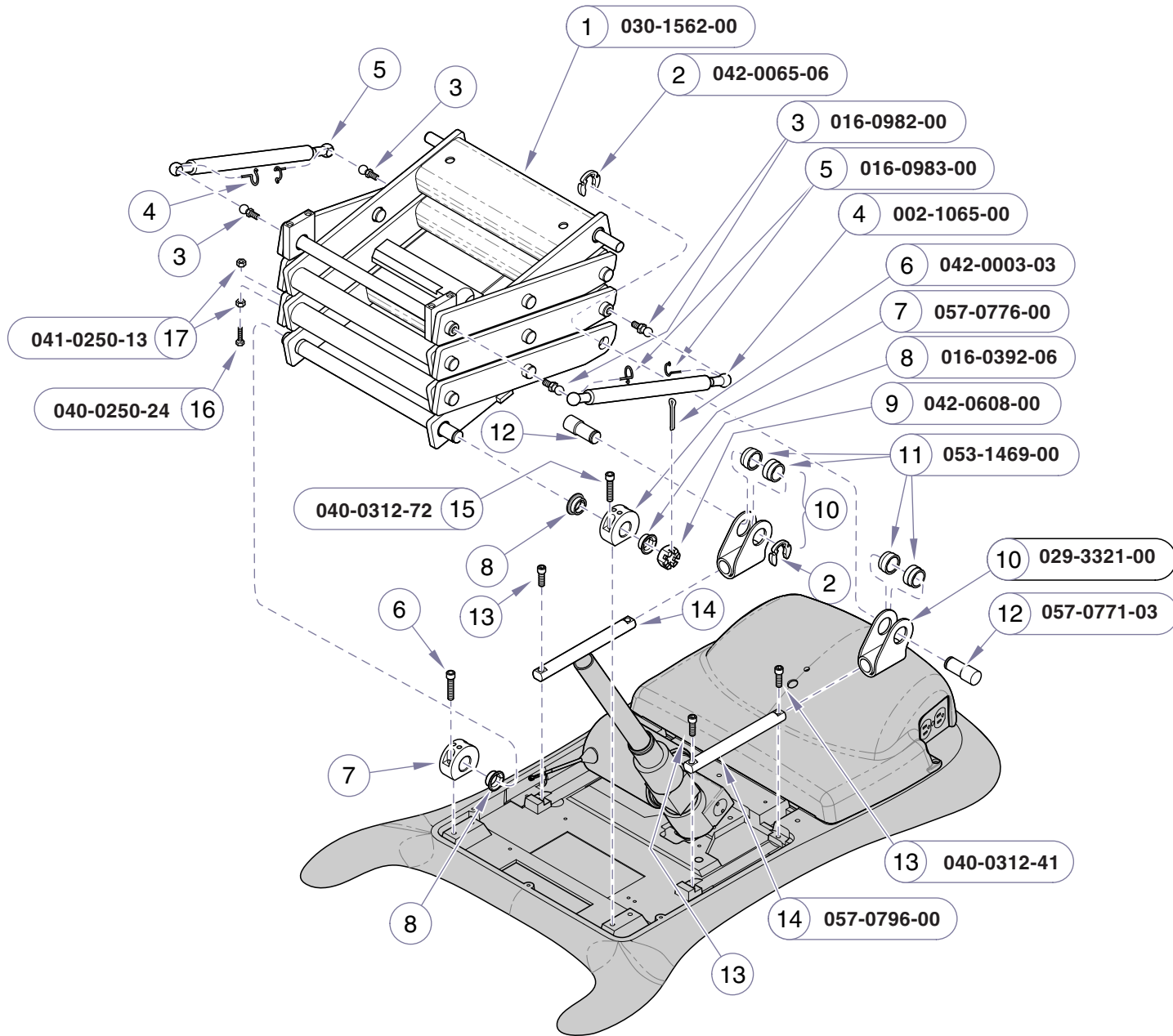


Item	Description	Qty.
1	Barbed Push Fastener .....	4
2	Column Adaptor Weldment .....	1
3	Screw Tip Cover .....	1
4	Screw (1/4-20 x 1/2" Phillips) .....	1
5	Corrugated Tubing Bracket .....	1
6	Cable Restraint Clamp .....	1
7	Screw (1/4-20 x 3/4" Phillips Head) .....	1
8	Rivot Drive .....	6
9	Upper Glide Kit (incl. two glides) .....	1
10	Guide Bar .....	2
11	Cap Screw (5/16-18 1" Socket Head) .....	4
12	Lower Wire Clamp .....	2
13	Wire Ribbon Guide .....	1
14	Upper Wire Clamp .....	2
15	Cap Screw (1/4-20 x 3/4" Socket Head) (Note: apply permanant thread adhesive) ..	4
16	Washer .....	4
17	Shoulder Bolt (5/8" x 3/4") .....	2
18	Washer, nylon .....	1
19	Flange Bearing .....	2
20	Jam Nut (1/2"-13) .....	2
21	Spacer .....	1

**Always Specify Model & Serial Number**

**Models:** All  
**Serial Numbers:**

**Column Top Assembly**



Item	Description	Qty.
1	Scissors Assembly .....	1
2	Clip Ring (3/4") .....	2
3	Gas Spring Ball Stud .....	4
4	Gas Spring Kit (includes two springs & four ball clips) ....	1
5	• Gas Spring Ball Clip .....	4
6	Cotter Pin .....	1
7	Main Bearing Housing .....	2
8	Flange Bearing .....	3
9	Slotted Nut .....	1
10	Slide Weldment (incl. item 11) .....	2
11	• Bearing Insert .....	2
12	Guide Shaft .....	2
13	Bolt (5/16-18 x 1") socket head cap .....	4
14	Guide Bar .....	2
15	Bolt (5/16-18 x 1-1/2") socket head cap ....	4
16	Limit Switch Actuator Bolt (1/4-20 x 1") .....	1
17	Nut (1/4-20) .....	2

**Always Specify Model & Serial Number**

MA760800i

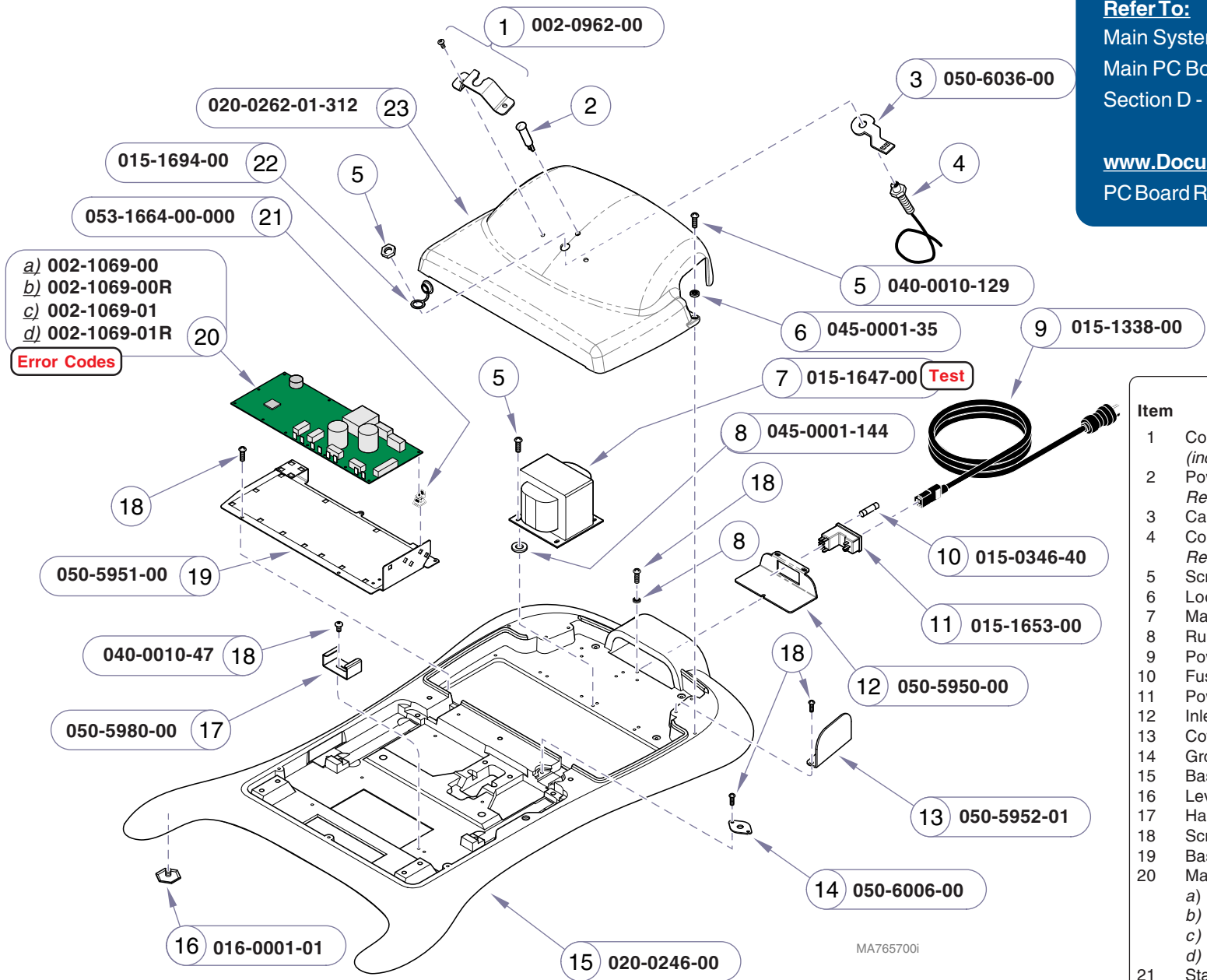
**Scissor Components**

**Models:** | **All**  
**Serial Numbers:** |



**Refer To:** **Page**  
 Main System Transformer **Test** ..... B-25  
 Main PC Board - **Error Codes** ..... B-33  
 Section D - Wiring Diagrams ..... D-1

**www.Documark.com:** **File Name**  
 PC Board Replacement ..... 003-1490-00



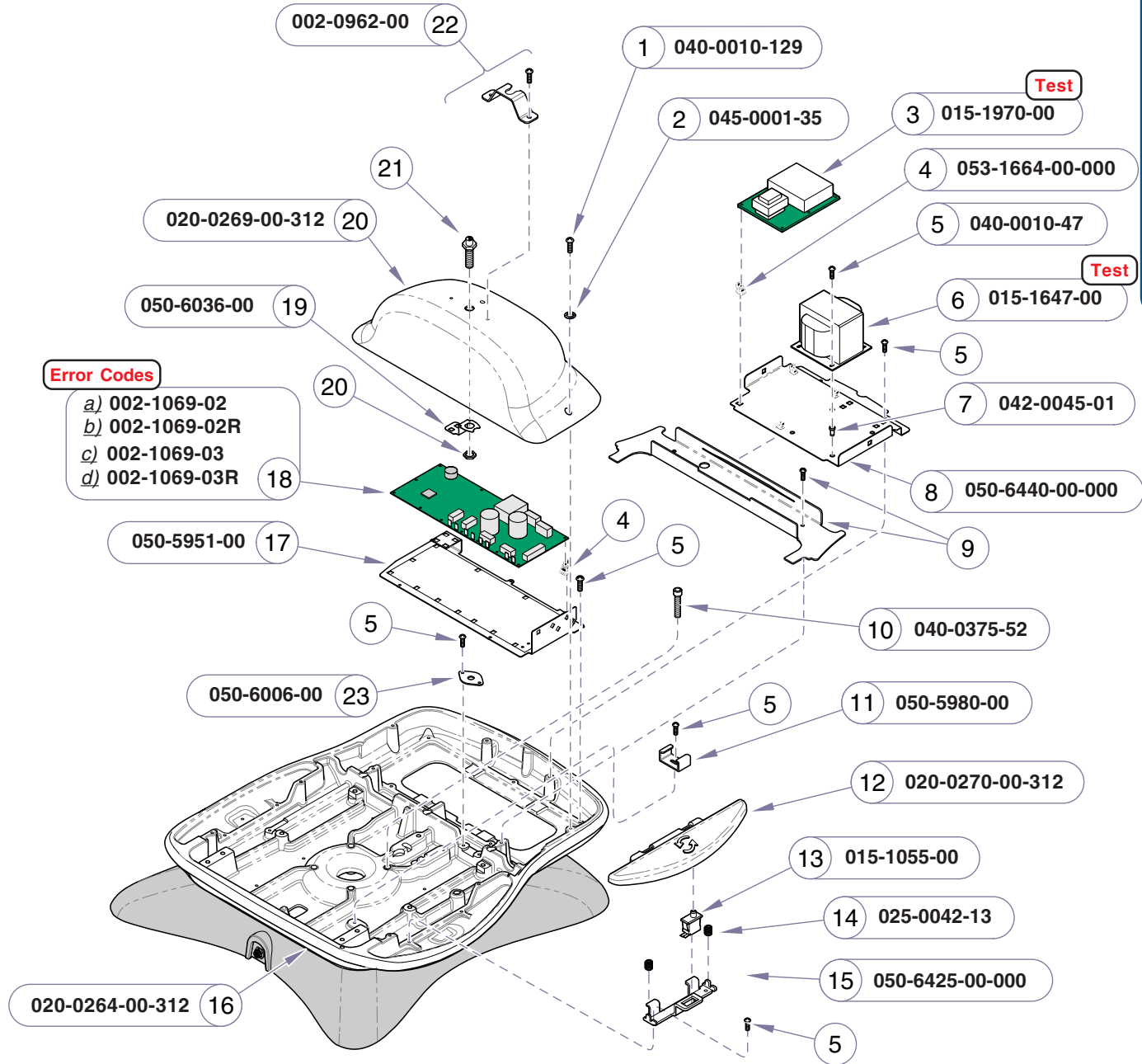
- a) 002-1069-00
  - b) 002-1069-00R
  - c) 002-1069-01
  - d) 002-1069-01R
- Error Codes**

Item	Description	Qty.
1	Control Cord Bracket Kit (incl. bracket & #10-24 x 1/2" screws) .....	1
2	Power Light (w/wire harness) Refer to: "Section D" .....	Ref
3	Cable Holder .....	1
4	Connection Port (includes nut) Refer to: "Section D" .....	Ref
5	Screw (10-24 x 1/2") .....	6
6	Lockwasher .....	3
7	Main System Transformer .....	1
8	Rubber Washer .....	4
9	Power Cord (N. American 120V, 8 ft) .....	1
10	Fuse (6.3A, 250V, Type "T", 5 x 20mm) ....	2
11	Power Inlet .....	1
12	Inlet Plate .....	1
13	Cover Plate (models w/o receptacles) .....	2
14	Grounding Plate .....	1
15	Base Casting .....	1
16	Leveling Feet .....	4
17	Harness Clip .....	1
18	Screw (#10-24 x 3/8") .....	12
19	Base Plate .....	1
20	Main PC Board:	
	a) Non-Programmable .....	1
	b) Non-Programmable (Refurbished) .....	1
	c) Programmable .....	1
	d) Programmable (Refurbished) .....	1
21	Standoff .....	12
22	Dust Cap .....	1
23	PC Board Cover .....	1

Always Specify Model & Serial Number

**Models:** 641 (-002 & -003)  
**Serial Numbers:** All

**Standard Base Components**



**Error Codes**

- a) 002-1069-02
- b) 002-1069-02R
- c) 002-1069-03
- d) 002-1069-03R

Refer To:	Page
Main System Transformer <b>Test</b> .....	B-25
Main PC Board - <b>Error Codes</b> .....	B-33
Rot. Base PC Board <b>Test</b> .....	B-38
Section D - Wiring Diagrams .....	D-1
Base Shrouds .....	E-12

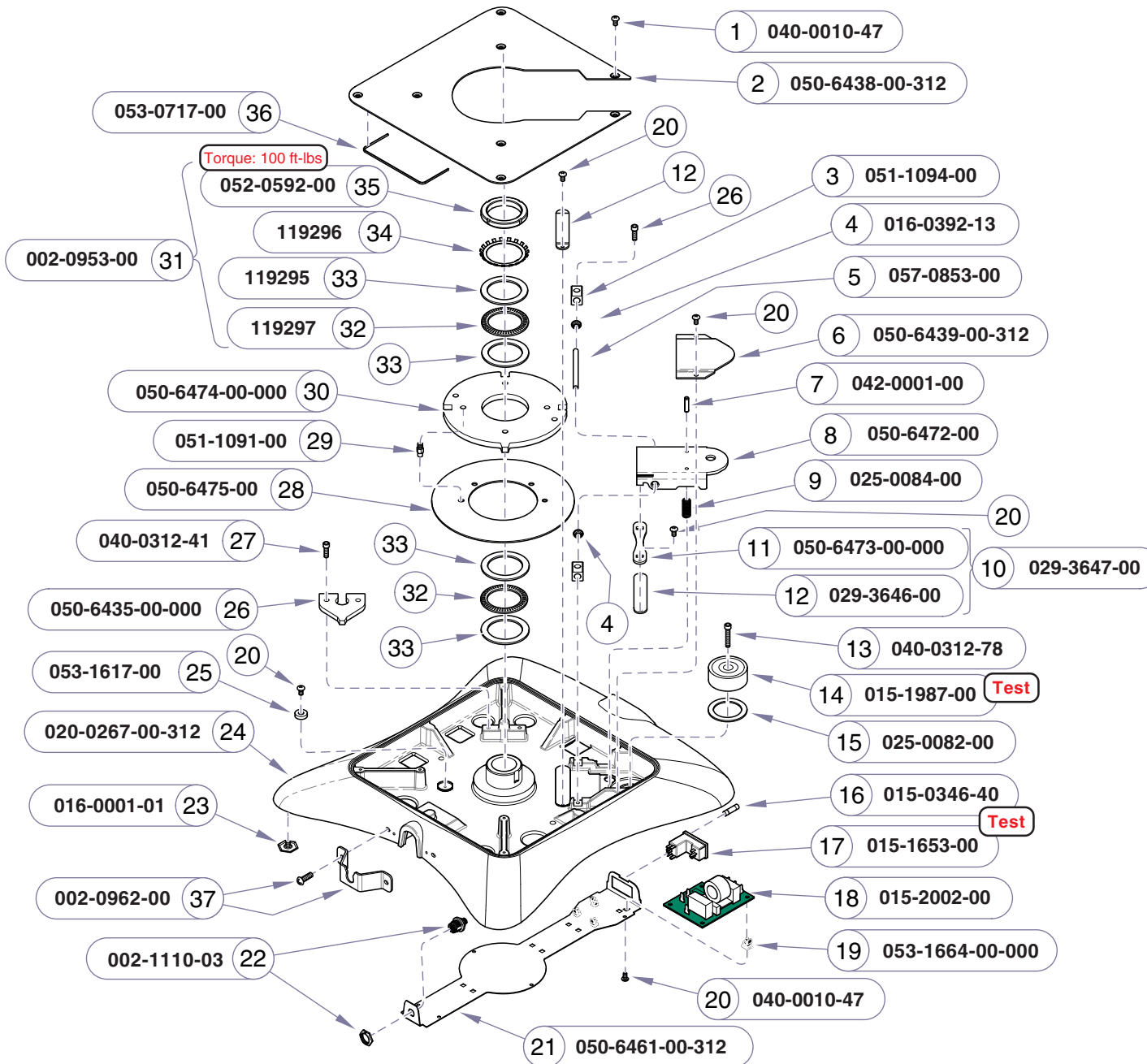
www.Documark.com:	File Name
PC Board Replacement .....	003-1490-00

Item	Description	Qty.
1	Screw (10-24 x .50 tt) .....	2
2	Lockwasher (#10 Int. tooth) .....	2
3	Rotation Control PC Board Assy. ....	1
4	PC Board Standoff .....	16
5	Screw (Pan hd phl. 10-24 X 3/8") .....	18
6	Main System Transformer Assy. ....	1
7	Nutsert (10-24) .....	4
8	Transformer Bracket .....	1
9	Refer to: Base Shrouds .....	Ref.
10	Bolt (3/8"-16 x 2") .....	4
11	Harness Clip .....	1
12	Brake Pedal .....	2
13	Limit Switch .....	2
14	Compression Spring .....	4
15	Switch Hinge Bracket .....	2
16	Upper Base Casting .....	1
17	PC Board Base Plate .....	1
18	Main PC Board:	
	a) Non-Programmable .....	1
	b) Non-Programmable (Refurbished) .....	1
	c) Programmable .....	1
	d) Programmable (Refurbished) .....	1
19	Cable Holder .....	1
20	PC Board Cover .....	1
21	ConnectionPort / Wiring Harness (incl. nut) (Refer to Section D) .....	Ref.
22	Control Cord Bracket Kit (incl. bracket & screws) .....	1
23	Grounding Plate .....	1

**Always Specify Model & Serial Number**

**Rotational Base:**  
Upper Section

**Models:** 641 (-004 & -005)  
**Serial Numbers:** All



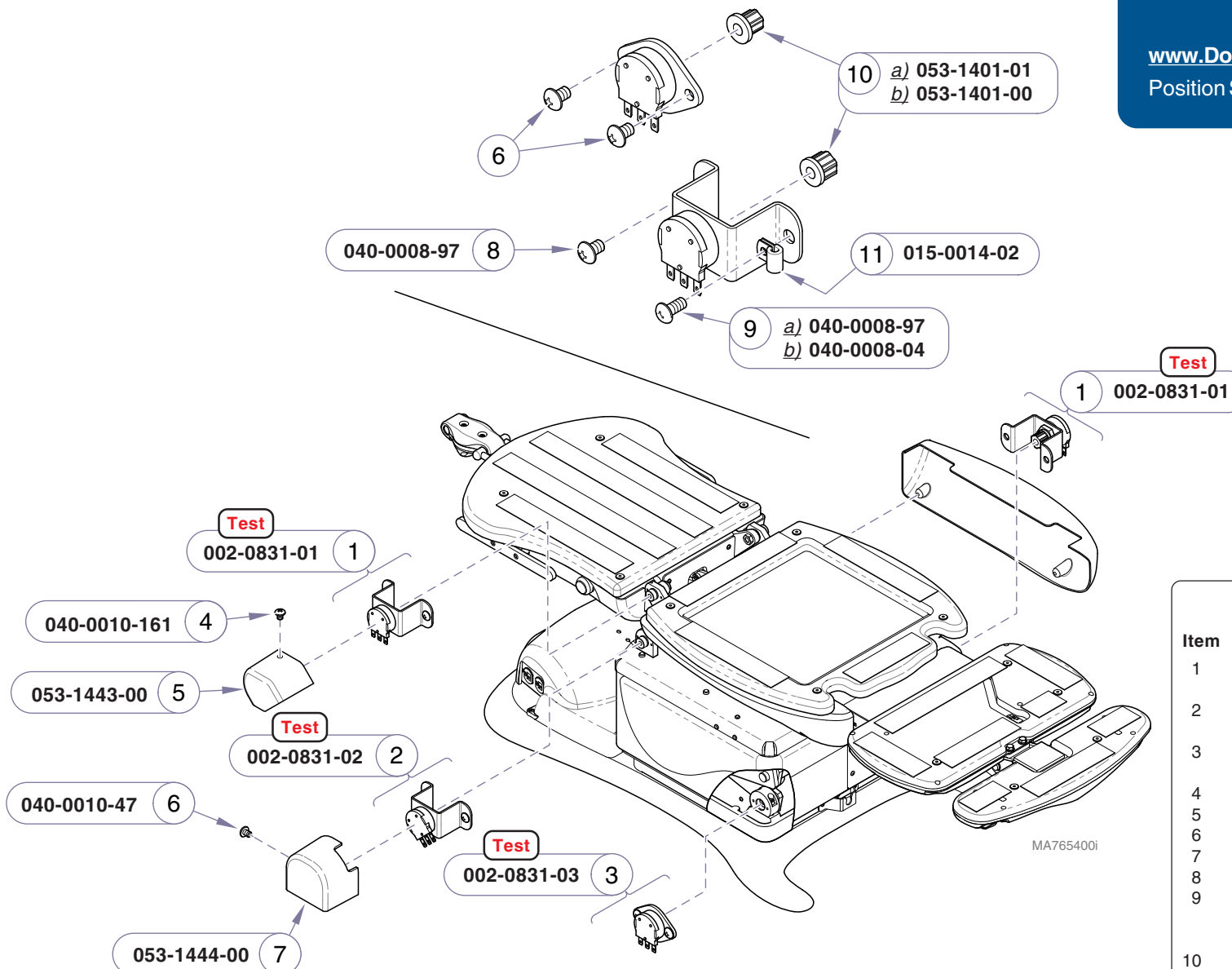
Item	Description	Qty.
1	Screw(#10-24 x 3/8")	5
2	Rotational Base Cover	1
3	Shaft Mount	2
4	DU Bearing	2
5	Bearing Shaft	2
6	Brake Lever Cover	1
7	Roll Pin	2
8	Brake Lever	1
9	Spring	2
10	Swivel Plate Assy (incl. items 11 & 12)	1
11	• Swivel Plate	1
12	• Brake Pad Assembly	2
13	Cap Screw (5/16"x18 x1 3/4")	1
14	Electromagnet Assembly	1
15	Wave Spring	1
16	Fuse (250V, 6.3A, Type-T, Slo-Blo)	2
17	Power Inlet	1
18	EMI Filter Board	1
19	PC Board Standoff	4
20	Screw(#10-24 x 3/8")	14
21	Wire Trough Cover	1
22	I/O Harness Assembly	1
23	Leveling Screw	4
24	Lower Base	1
25	Delrin Spacer	1
26	Rotational Stop Bracket	1
27	Screw (5/16"-18 x 1")	4
28	Brake Disc	1
29	Brake Disc Shoulder Screw (apply Loctite 262 to threads)	2
30	Rotation Wheel	1
31	Bearing Kit (incl. items 32 thru 35)	1
32	• Thrust bearing	2
33	• Race Washer (2.75 id X 3.62 od)	4
34	• Lockwasher	1
35	• Lock Nut	1
36	Outer Seal	3
37	Control Cord Bracket Kit (incl. bracket & screws)	1

MA761300i

**Always Specify Model & Serial Number**

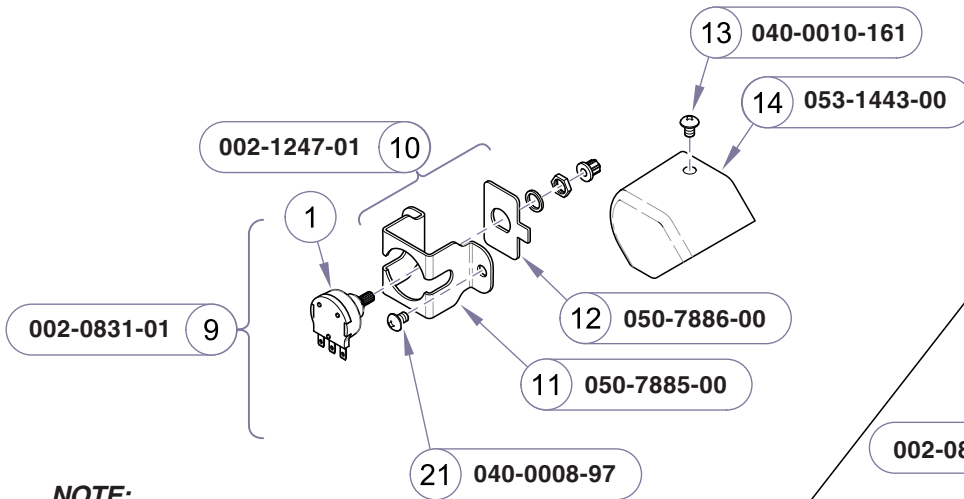
**Models:** 641 (-004 & -005)  
**Serial Numbers:** All

**Rotational Base:**  
 Lower Section

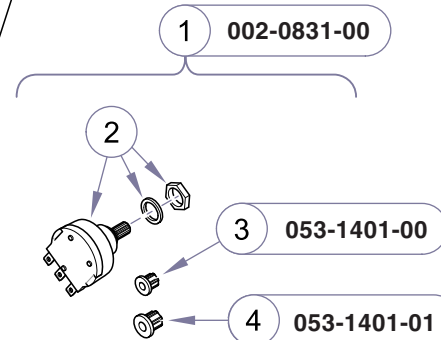
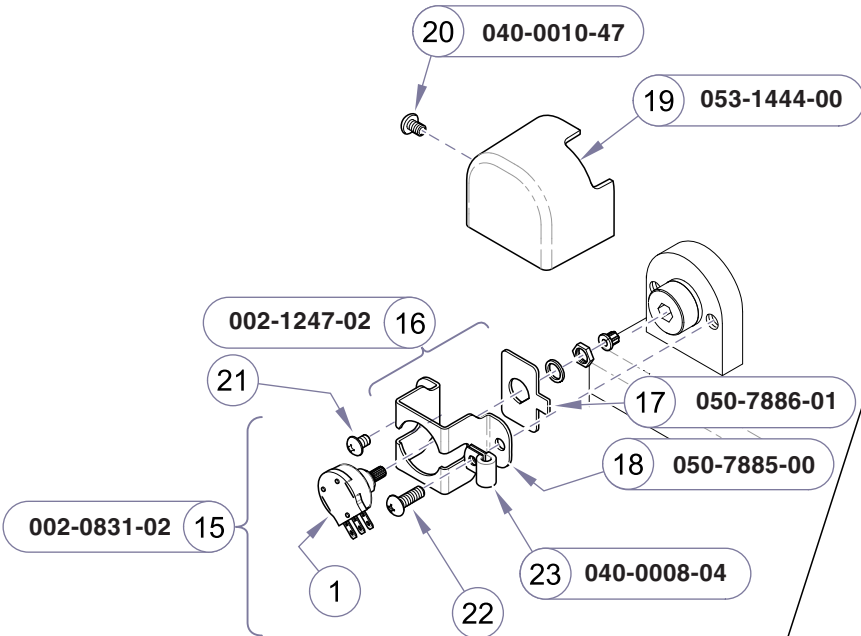
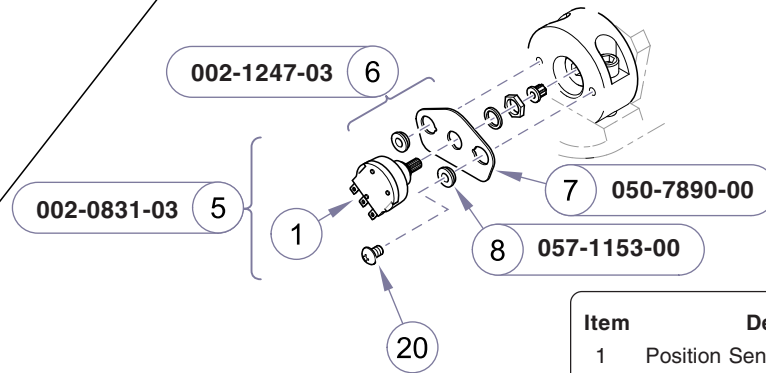


Item	Description	Qty.
1	Back / Foot Sensor Kit (w/Bracket) (incl. sensor, bracket, coupler) .....	2
2	Tilt Sensor w/Bracket Kit (incl. sensor, bracket, coupler) .....	1
3	Base Sensor Kit (w/Bracket) (incl. sensor, bracket, coupler) .....	1
4	Screw (#10-24 x 1/4") .....	2
5	Cover (Back Sensor) .....	1
6	Screw (#10-24 x 3/8") .....	3
7	Cover (Tilt Sensor) .....	1
8	Screw (#10-24 x 3/8") .....	5
9	Screw:	
	a) Back & Foot (#8-32 x 1/4") .....	3
	b) Tilt (#8-32 x 3/8") .....	1
10	• Coupler:	
	a) Back / Tilt / Base .....	1
	b) Foot .....	1
11	Wire Clamp (Tilt Sensor only) .....	1

**Always Specify Model & Serial Number**



**NOTE:**  
 Only programmable models  
 have foot position sensor.



Item	Description	Qty.
1	Position Sensor <u>Only</u> Kit (includes items 2 thru 4) .....	4
2	• Position Sensor (incl. washer & nut) .....	1
3	• Coupler (small: for Foot) .....	1
4	• Coupler (large: for Base / Back / Tilt) .....	1
5	BASE Sensor Kit w/Bracket (includes items 1 & 6) .....	1
6	• Bracket Kit: BASE (incl. items 7 & 8) .....	1
7	• • Mounting Plate .....	1
8	• • Flange Bushing .....	2
9	BACK / FOOT Sensor Kit w/Bracket (includes items 1 & 10) .....	2
10	• Bracket Kit: BACK / FOOT (includes items 11 & 12) .....	2
11	• • Bracket .....	1
12	• • Mounting Plate .....	1
13	Screw (#10-24 x 1/4") .....	1
14	Cover (BACK Sensor) .....	1
15	TILT Sensor Kit w/Bracket (includes items 1 & 16) .....	1
16	• Bracket Kit: TILT (includes items 17 & 18) .....	1
17	• • Bracket .....	1
18	• • Mounting Plate .....	1
19	Cover (TILT Sensor) .....	1
20	Screw (#10-24 x 3/8") .....	3
21	Screw (#8-32 x 1/4") .....	5
22	Screw (#8-32 x 3/8") .....	1
23	Wire Clamp .....	1

Always Specify Model & Serial Number

MA8048I

**Models:** 641  
**Serial Numbers:** V775313 thru present

Position Sensors

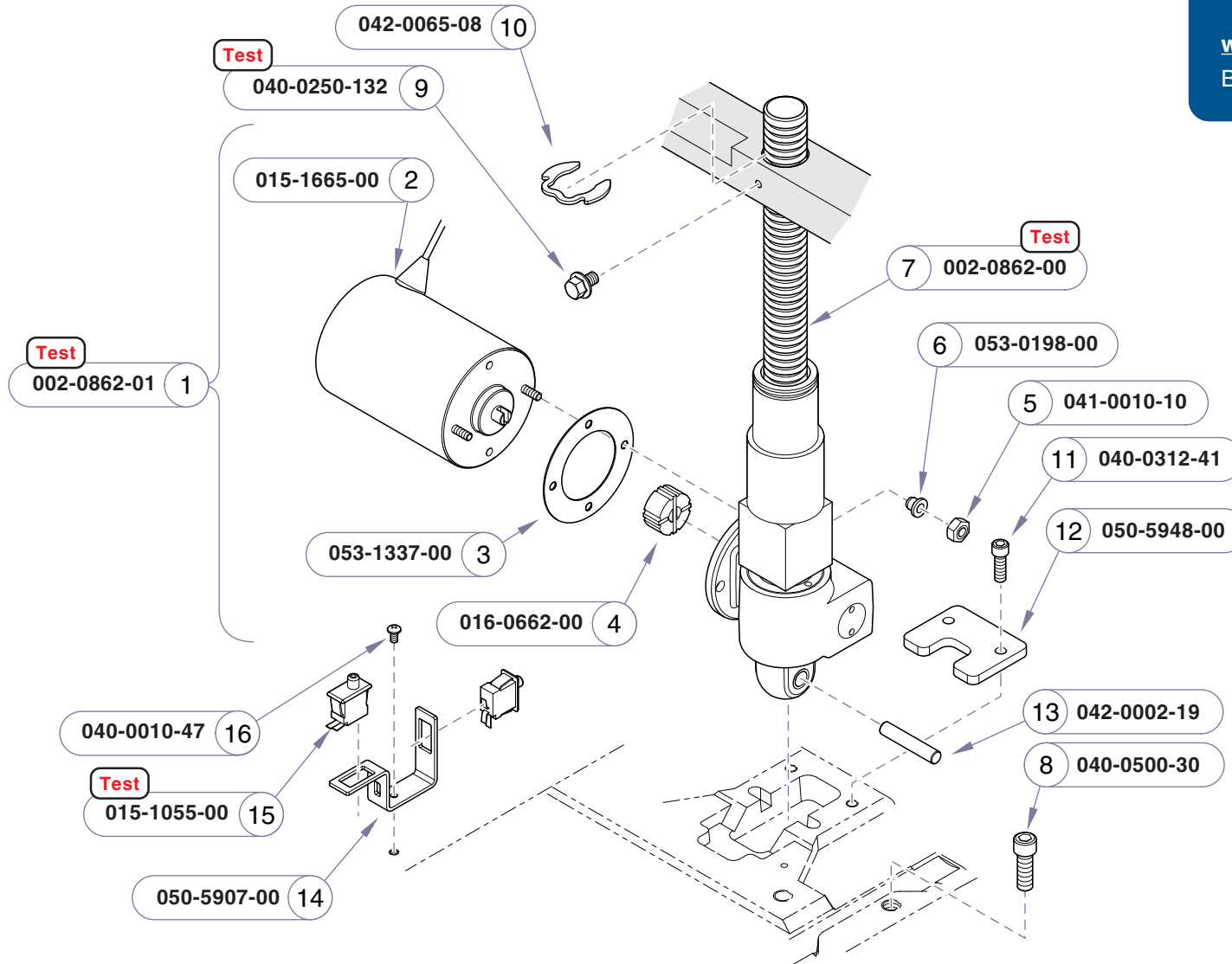
E-18.1

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Always Specify Model & Serial Number



**Models:** |  
**Serial Numbers:** |



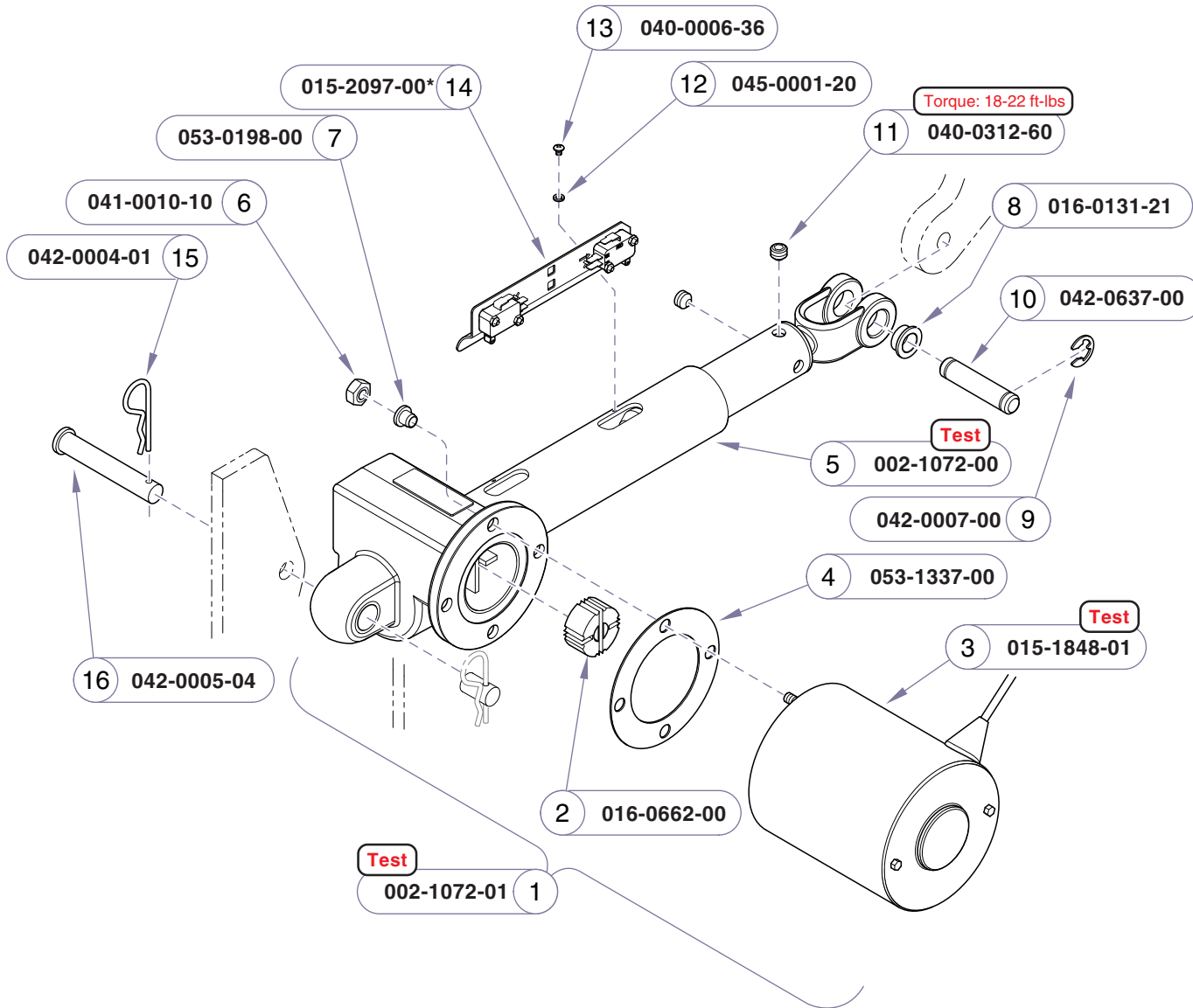
Item	Description	Qty.
1	Base Actuator Kit (includes items 2 thru 7) .....	1
2	• Motor .....	1
3	• Motor Isolator .....	1
4	• Coupler .....	1
5	• Nut .....	2
6	• Shoulder Washer .....	2
7	• Actuator Kit w/o motor (includes item 8) .....	1
8	• • Stop Bolt .....	1
9	Hex Bolt (1/4"-20 x 3/8") .....	1
10	Klip Ring .....	1
11	Screw (5/16"-18 x 1") .....	2
12	Retaining Plate .....	1
13	Dowel Pin .....	1
14	Limit Switch Bracket .....	1
15	Limit Switch .....	2
16	Screw (#10-32 x 3/8") .....	1

Always Specify Model & Serial Number

MA7656001

Models: | All  
 Serial Numbers: |

Base Actuator /  
 Limit Switches



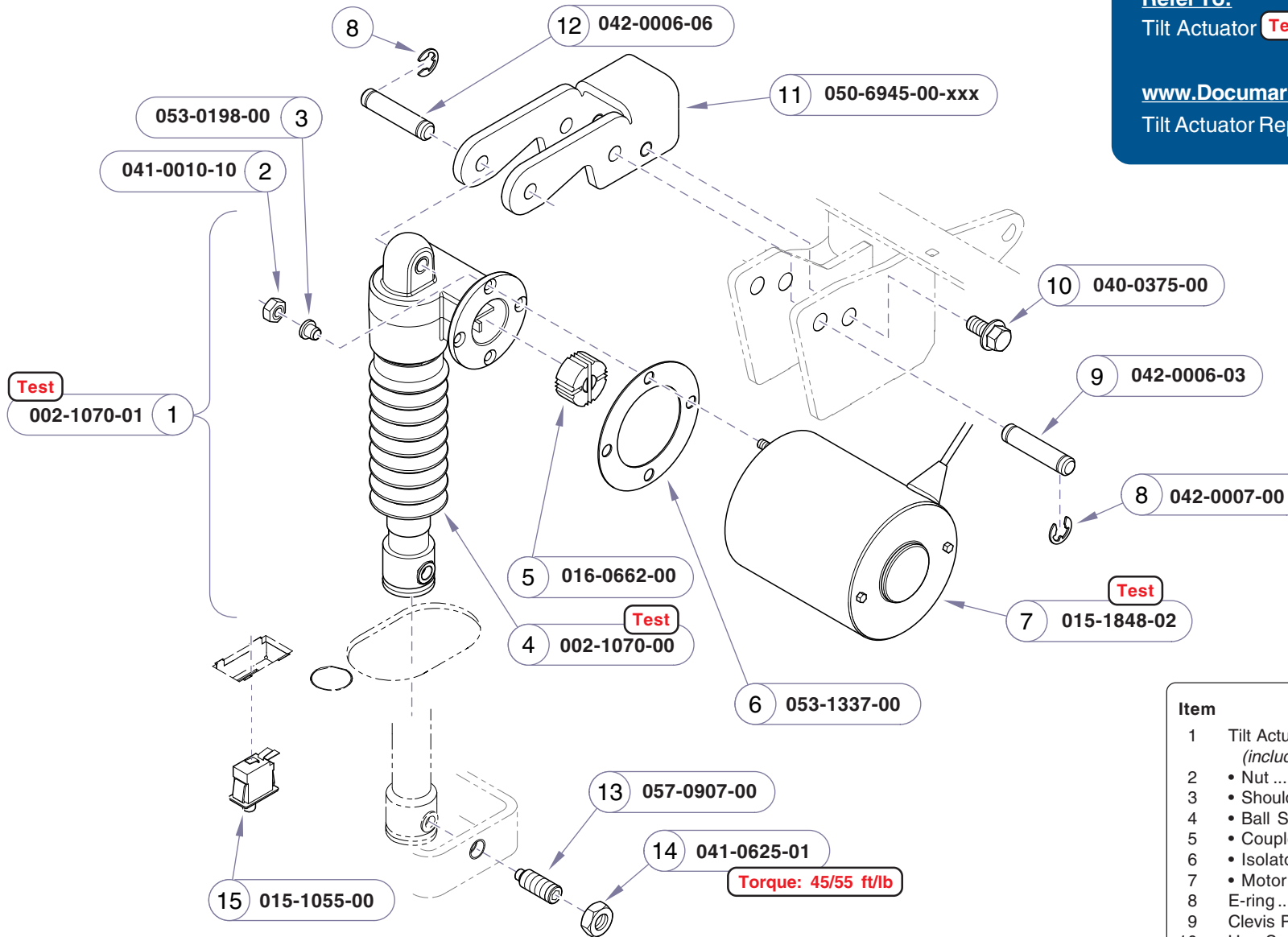
\*The foot limit switch adjustment is critical to ensure proper operation (tolerance: 0.030").  
**Do not attempt to adjust the individual switches.**

Item	Description	Qty.
1	Back Actuator Kit (includes items 2 thru 7) .....	1
2	• Coupler .....	1
3	• Motor .....	1
4	• Isolator .....	1
5	• Actuator Kit w/o motor .....	1
6	• Nut .....	2
7	• Shoulder Washer .....	1
8	• Bushing .....	2
9	Crescent Ring .....	2
10	Clevis Pin .....	1
11	Set Screw (5/16 - 18 x 1/4) .....	2
12	Lock Washer .....	2
13	Screw (#6-32 x 3/16") .....	2
14	Limit Switch Assembly (incl. switches, bracket, & harnesses) ....	1
15	Cotter Pin .....	1
16	Clevis Pin .....	1

**Always Specify Model & Serial Number**

MA7648001





Note: The Tilt UP limit is controlled by the Tilt Position Sensor.

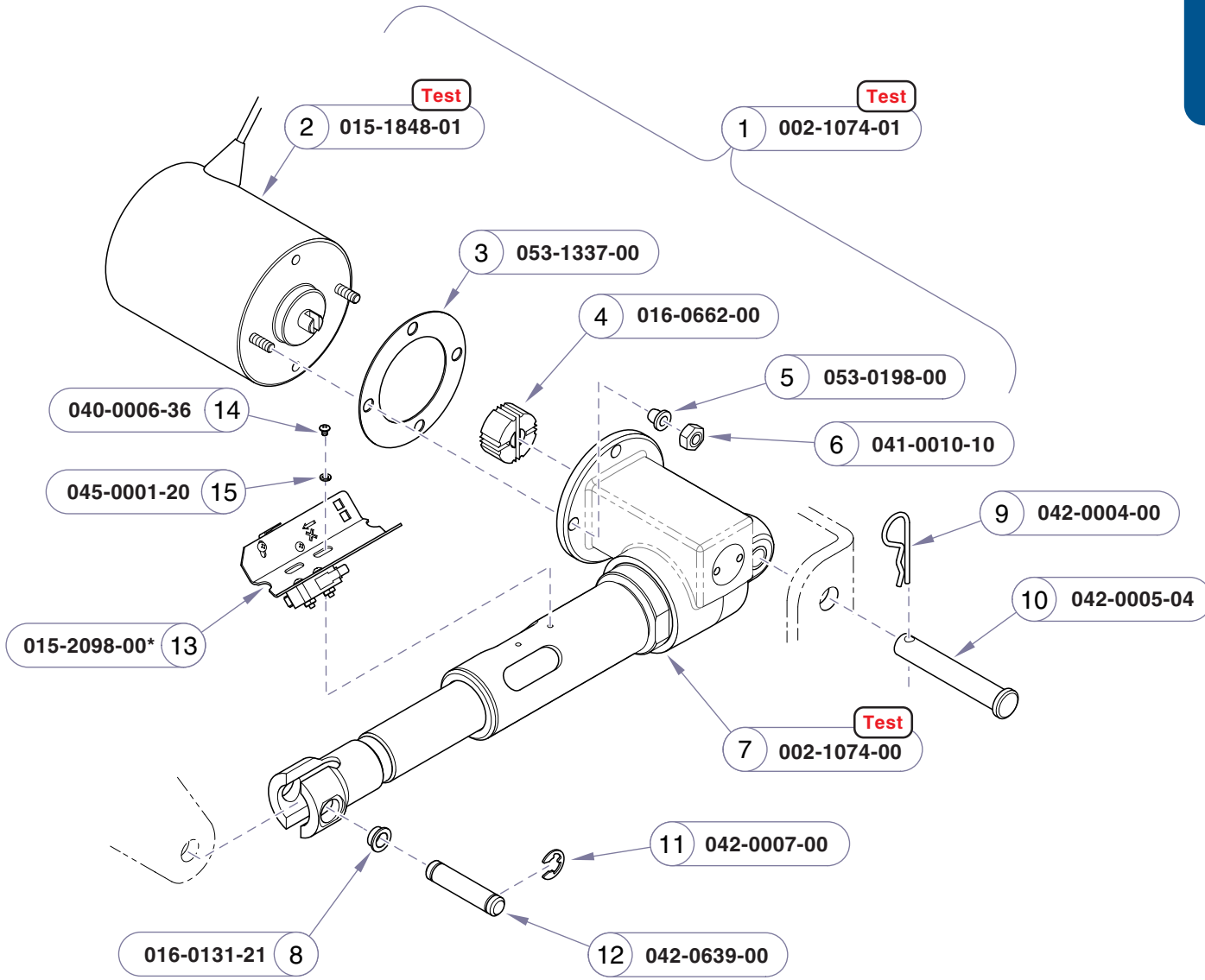
Item	Description	Qty.
1	Tilt Actuator Kit (includes items 2 thru 7) .....	1
2	• Nut .....	2
3	• Shoulder Washer .....	2
4	• Ball Screw Assembly .....	1
5	• Coupler .....	1
6	• Isolator .....	1
7	• Motor .....	1
8	E-ring .....	4
9	Clevis Pin .....	1
10	Hex Screw (3/8"-16 x 3/4") .....	2
11	Bracket .....	1
12	Clevis Pin .....	1
13	Pivot Screw .....	2
14	Nut .....	2
15	Limit Switch (Tilt Down) .....	1

**Always Specify Model & Serial Number**

MA765100i

Models: All  
 Serial Numbers:

**Tilt Actuator /  
 Limit Switch**



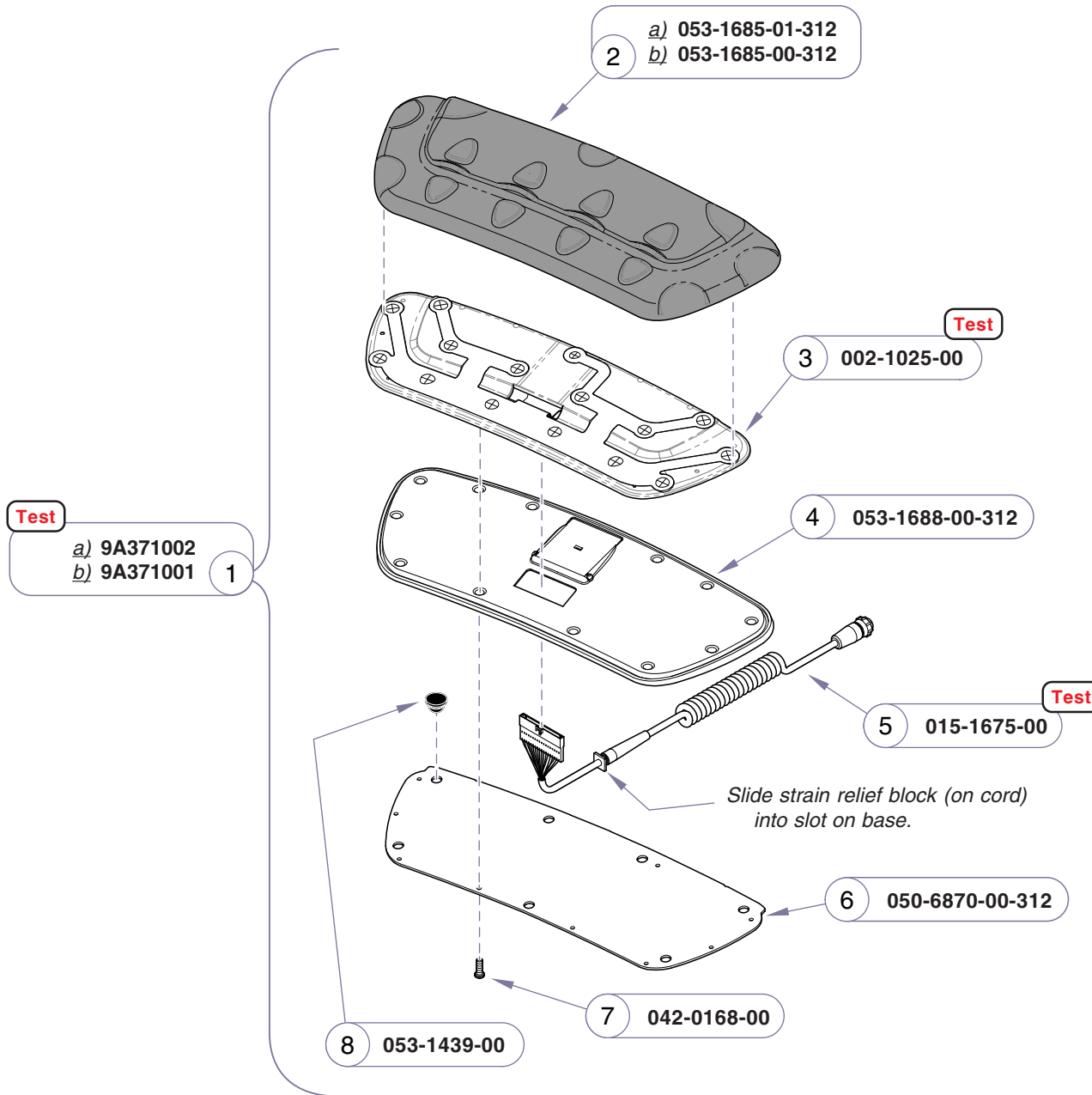
*\*The foot limit switch adjustment is critical to ensure proper operation (tolerance: 0.030").  
 Do **not** attempt to adjust the individual switches.*

Item	Description	Qty.
1	Foot Actuator Kit (includes items 2 thru 8) .....	1
2	• Motor .....	1
3	• Isolator .....	1
4	• Coupler .....	1
5	• Shoulder Washer .....	2
6	• Nut .....	2
7	• Ball Screw Assembly .....	1
8	• Bushing .....	2
9	Cotter Pin .....	1
10	Clevis Pin .....	1
11	Crescent Ring .....	2
12	Clevis Pin .....	1
13	Limit Switch Assembly (incl. switches, bracket, & harnesses) ....	1
14	Screw (#6-32 x 3/16") .....	2
15	Lock Washer .....	2

**Always Specify Model & Serial Number**

MA765000i

Refer To:	Page
Foot Control <b>Test</b> .....	B-3
Control Cord Continuity <b>Test</b> .....	B-5



**Attention:** Verify foot control style (Disc / Linear) when ordering parts.

Item	Description	Qty.
1	Linear-Style Foot Control Assembly (includes items 2 thru 9):	
	a) Non-Programmable .....	1
	b) Programmable .....	1
2	• Keypad Assembly:	
	a) Non-Programmable .....	1
	b) Programmable .....	1
3	• Switch Membrane Kit .....	1
4	• Base .....	1
5	• Cord .....	1
6	• Base Plate .....	1
7	• Screw (3.5 mm x 10mm) .....	10
8	• Stem Bumper .....	7
9	• IPX1 Label (not shown) .....	1

**Always Specify Model & Serial Number**

**NOTE:** The linear-style foot control comes standard with all 641 models.

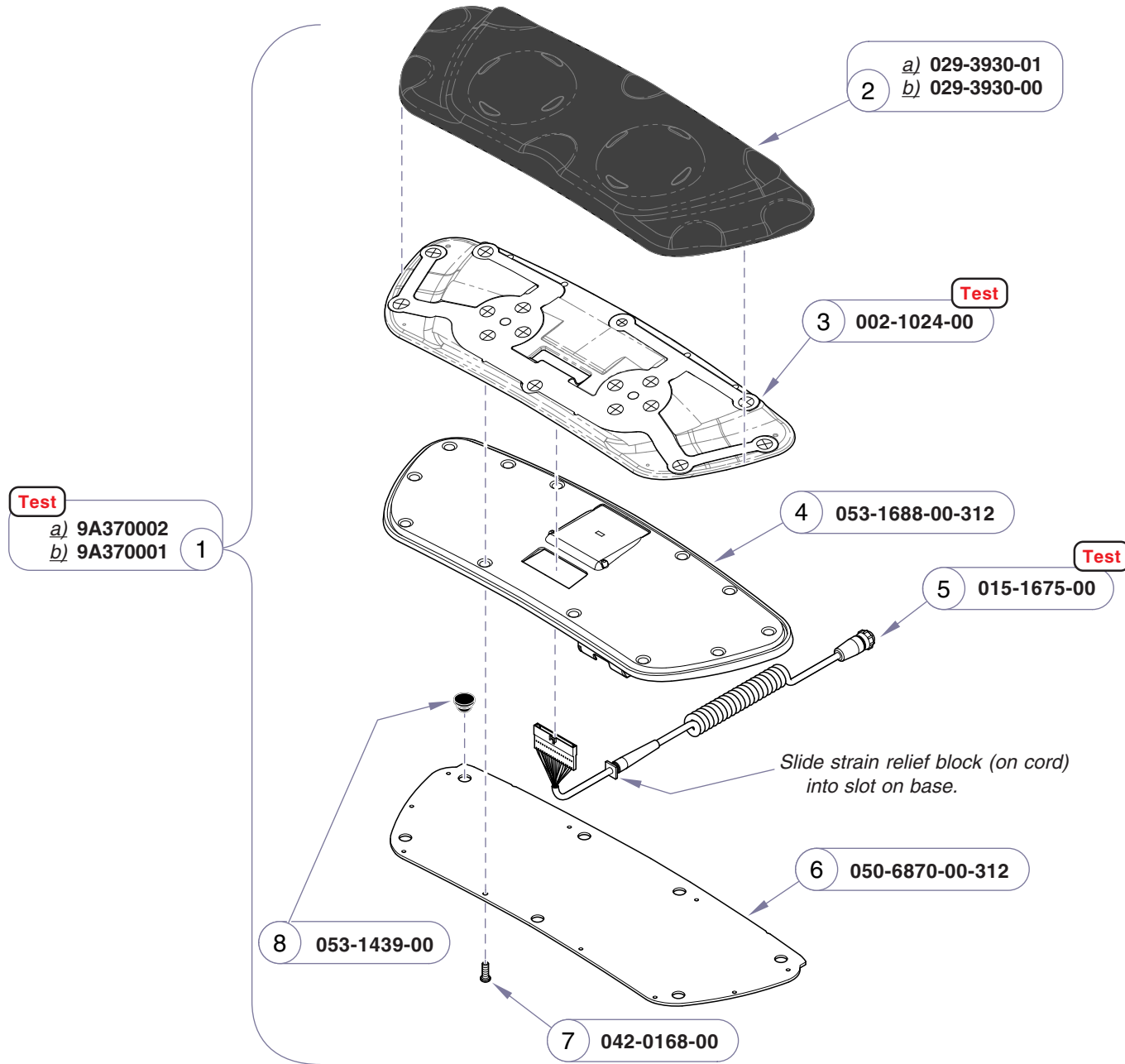
MA760600i

**Models:**  
**Serial Numbers:**

**ALL**

**Foot Control**  
**(Linear-Style)**

Refer To:	Page
Foot Control <b>Test</b> .....	B-3
Control Cord Continuity <b>Test</b> .....	B-5

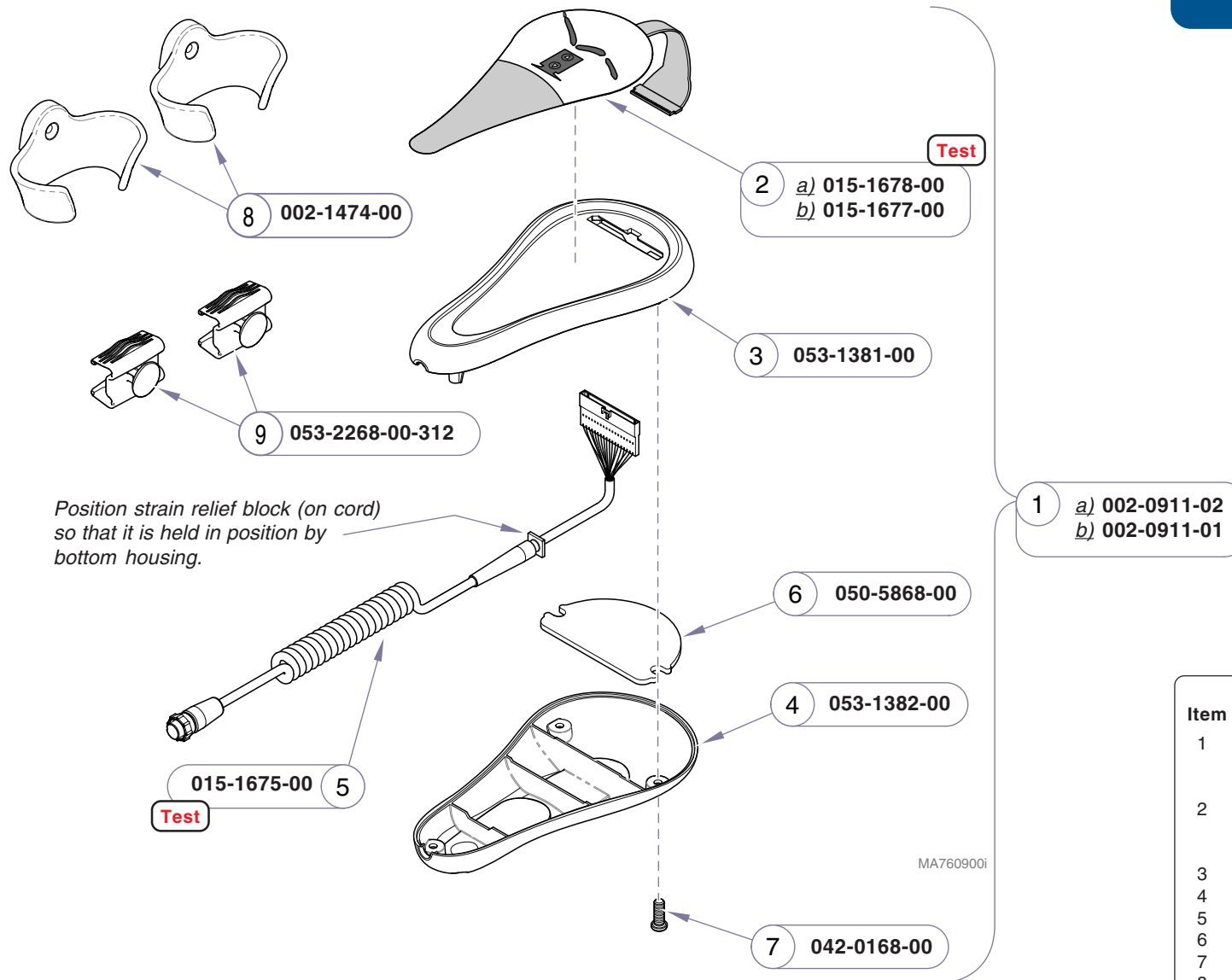


**Attention:** Verify foot control style (Disc / Linear) when ordering parts.

Item	Description	Qty.
1	Disc-Style Foot Control Assembly (includes items 2 thru 9):	
	a) Non-Programmable .....	1
	b) Programmable .....	1
2	• Keypad Assembly:	
	a) Non-Programmable .....	1
	b) Programmable .....	1
3	• Switch Membrane Kit .....	1
4	• Base .....	1
5	• Cord .....	1
6	• Base Plate .....	1
7	• Screw (3.5mm x 10mm) .....	10
8	• Stem Bumper .....	5
9	• IPX1 Label (not shown) .....	1

**Always Specify Model & Serial Number**

MA760700i



1 a) 002-0911-02  
 b) 002-0911-01

2 a) 015-1678-00  
 b) 015-1677-00

3 053-1381-00

8 002-1474-00

9 053-2268-00-312

6 050-5868-00

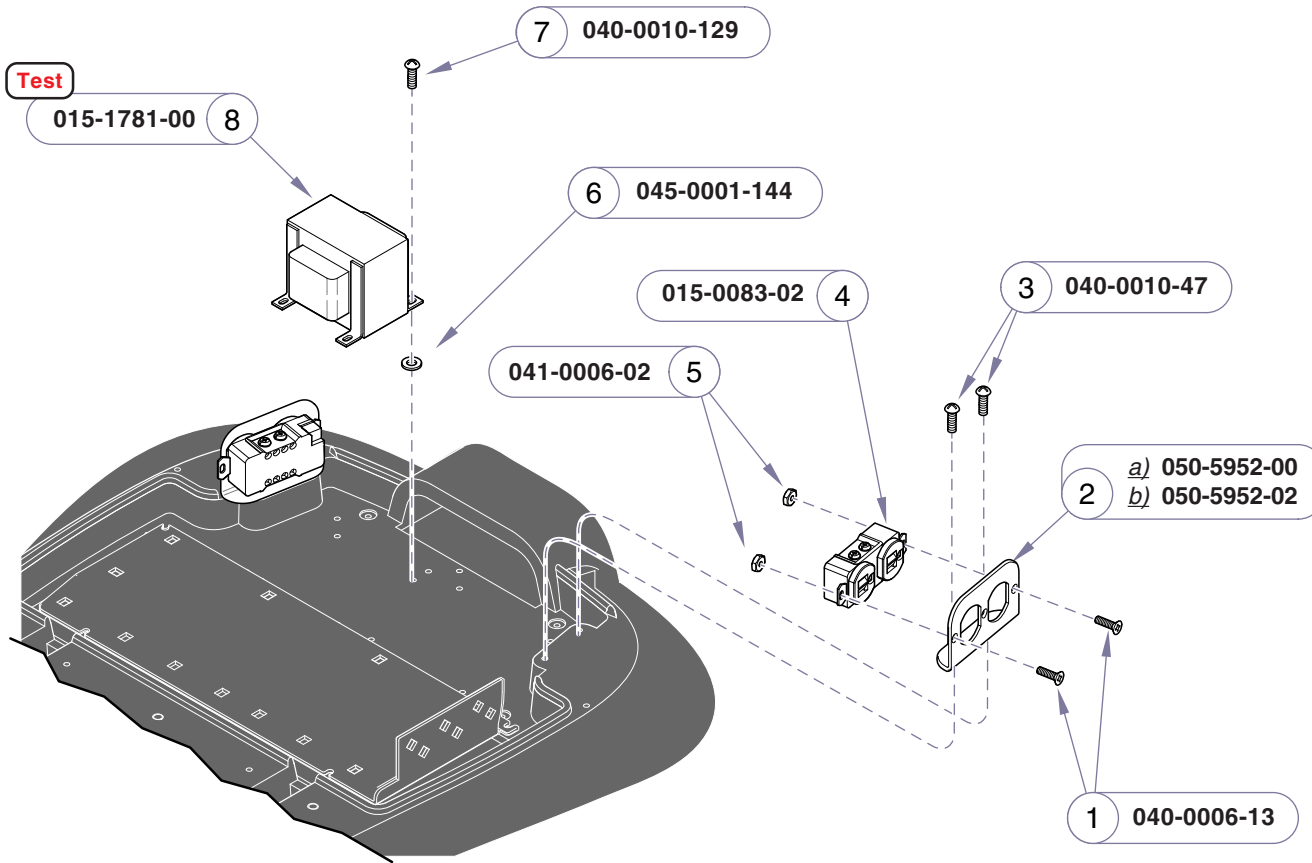
4 053-1382-00

015-1675-00 5  
**Test**

7 042-0168-00

Item	Description	Qty.
1	Hand Control Assy. (incl. items 2 thru 8)	
	a) Programmable .....	1
	b) Non-Prog. ....	1
2	• Touch Pad:	
	a) Programmable .....	1
	b) Non-Prog. ....	1
3	• Top Housing .....	1
4	• Bottom Housing .....	1
5	• Retractable Cord Assembly .....	1
6	• Hand Control Weight .....	1
7	• Screw (3.5 x 10) .....	4
8	• Kit, Hand Control Holsters (Includes Items 9) .....	1
9	• Siderail Hand Control Brackets .....	2

**Always Specify Model & Serial Number**



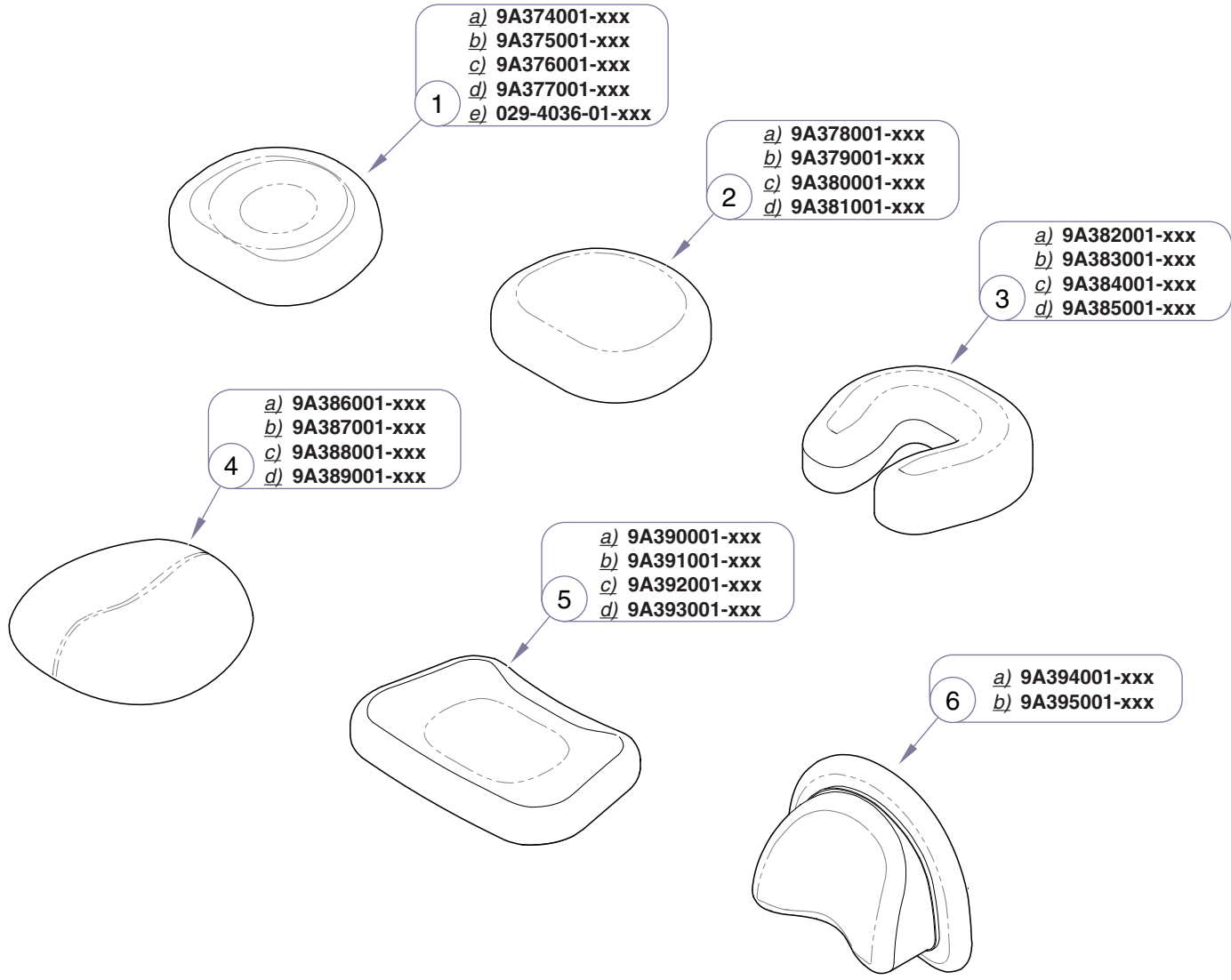
Item	Description	Qty.
1	Screw (6-32 x self-tap) .....	4
2	Receptacle Plate .....	2
3	Screw (10-24 x 3/8" pan head) .....	4
4	Duplex Receptacle .....	2
5	Nut (6-32 hex) .....	4
6	Rubber Washer .....	4
7	Screw (10-24 x 1/2" Phillips) .....	4
8	Isolation Transformer .....	1

**Always Specify Model & Serial Number**

MA658102i

ATTENTION: Refer to *Current Color Options* link for appropriate numbers to replace -xxx.

**Refer To:**  
Color Selector ..... [www.midmark.com](http://www.midmark.com)

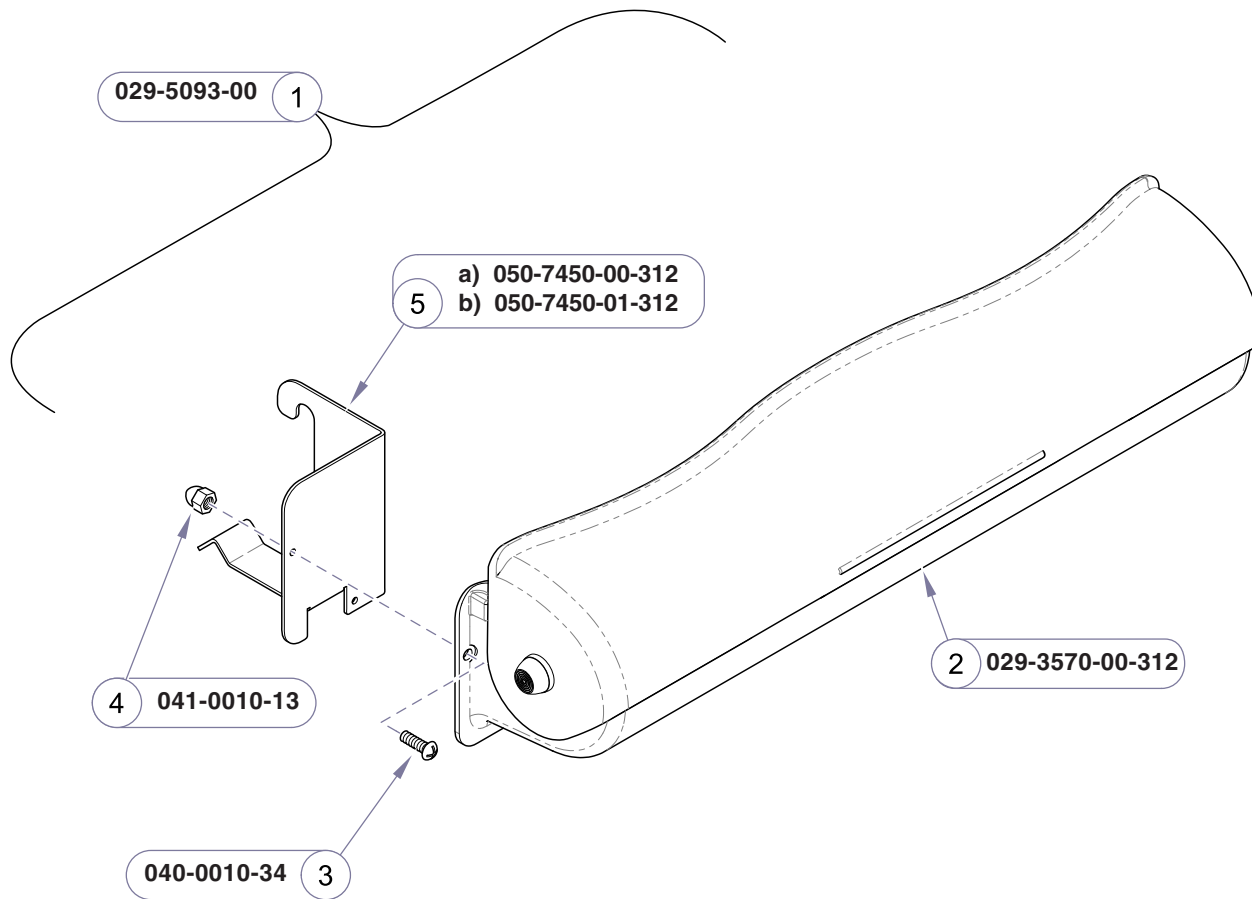


Item	Description	Qty.
1	Contoured Headrest ( <i>standard on all 641s</i> ):	
	a) Premium .....	1
	b) Premium (Cal. 133) .....	1
	c) Ultra-Premium .....	1
	d) Ultra-Premium (Cal. 133) .....	1
	e) PVC-free .....	1
2	Flat Headrest	
	a) Premium .....	1
	b) Premium (Cal. 133) .....	1
	c) Ultra-Premium .....	1
	d) Ultra-Premium (Cal. 133) .....	1
3	U-Shaped Headrest	
	a) Premium .....	1
	b) Premium (Cal. 133) .....	1
	c) Ultra-Premium .....	1
	d) Ultra-Premium (Cal. 133) .....	1
4	Oval-shaped Headrest	
	a) Premium .....	1
	b) Premium (Cal. 133) .....	1
	c) Ultra-Premium .....	1
	d) Ultra-Premium (Cal. 133) .....	1
5	Rectangular-shaped Headrest	
	a) Premium .....	1
	b) Premium (Cal. 133) .....	1
	c) Ultra-Premium .....	1
	d) Ultra-Premium (Cal. 133) .....	1
6	Magnetic Headrest	
	a) Premium .....	1
	b) Ultra-Premium .....	1

**Always Specify Model & Serial Number**

**Models:** | **The accessory headrests are compatible with all 641 models.**  
**Serial Numbers:**

**Optional Headrests**



**NOTE:**  
 The Paper Roll Holder was optional at the initial release of this product. It became standard equipment from serial number V842432 thru present.

MA783401i

Item	Description	Qty.
1	Paper Roll Holder Assembly (includes item 2 thru 5) .....	1
2	• Paper Roll Housing .....	1
3	• Screw (#10-24 x 3/8") .....	4
4	• Acorn Nut .....	4
5	• Hanger Clip	
	a) <i>L.H.</i> .....	1
	b) <i>R.H.</i> .....	1

**Always Specify Model & Serial Number**









Midmark Corporation  
60 Vista Drive  
P.O. Box 286  
Versailles, OH 45380-0286  
937-526-3662  
Fax 937-526-5542  
[www.midmark.com](http://www.midmark.com)



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