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391 -001 thru -002

Otolaryngology Chair

Ritter® by MIDMARK

Serial Number Prefixes:
EN, PD & V

Service and Parts Manual

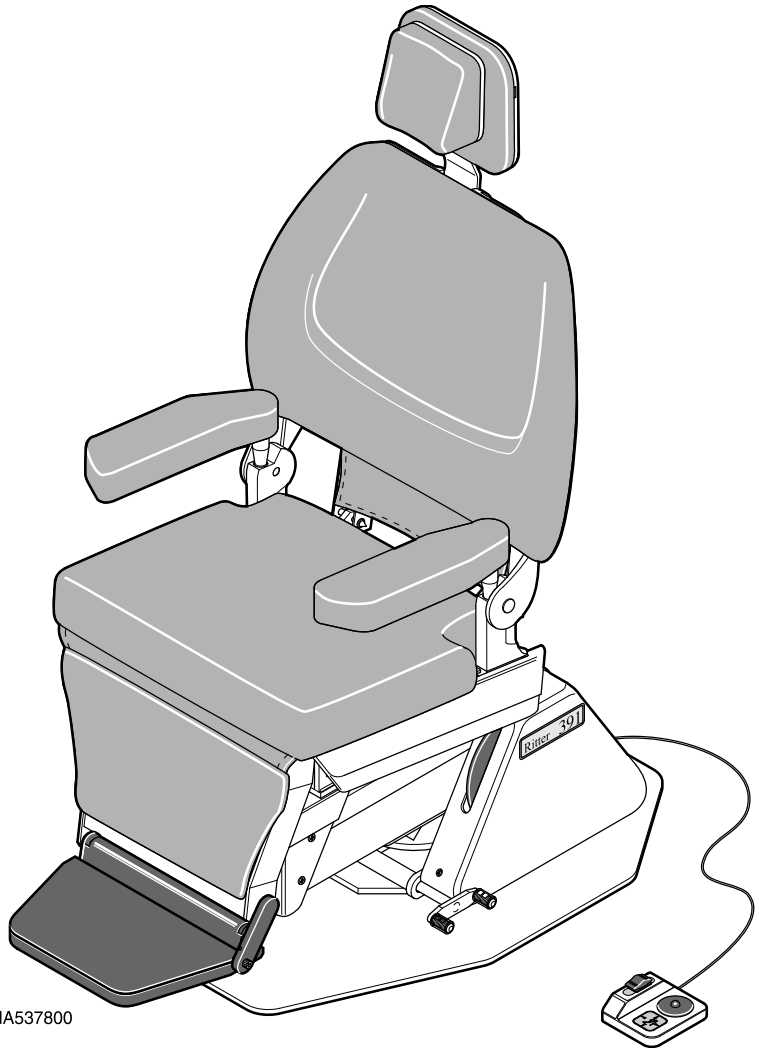
NO LONGER IN PRODUCTION

Some service parts may not be available for this product.

391 -001 thru -002

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MA537800

NOTE:
Sterling Grey *painted parts* are no longer available. *Check manual* and use Pebble Grey *painted parts* if available.

FOR USE BY MIDMARK TRAINED TECHNICIANS ONLY

SF-1596

Part No. 004-0113-00 Rev. J (5/1/14)

Style B

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General Safety Instructions

Safety First: The primary concern of Midmark Corporation is that this chair is maintained with the safety of the patient and staff in mind. To assure that services and repairs are completed safely and correctly, proceed as follows:

(1) Read this entire manual before performing any services or repairs on this chair.

(2) Be sure you understand the instructions contained in this manual before attempting to service or repair this chair.

Safety Alert Symbols

Throughout this manual are safety alert symbols that call attention to particular procedures. These items are used as follows:



DANGER

A DANGER is used for an imminently hazardous operating procedure, practice, or condition which, if not correctly followed, will result in loss of life or serious personal injury.



WARNING

A WARNING is used for a potentially hazardous operating procedure, practice, or condition which, if not correctly followed, could result in loss of life or serious personal injury.



CAUTION

A CAUTION is used for a potentially hazardous operating procedure, practice, or condition which, if not correctly followed, could result in minor or moderate injury. It may also be used to alert against unsafe practices.



EQUIPMENT ALERT

An EQUIPMENT ALERT is used for an imminently or potentially hazardous operating procedure, practice, or condition which, if not correctly followed, will or could result in serious, moderate, or minor damage to unit.

NOTE

A NOTE is used to amplify an operating procedure, practice or condition.

Warranty Instructions

Refer to the Midmark “Limited Warranty” printed in the Installation and Operation Manual for warranty information. Failure to follow the guidelines listed below will void the warranty and/or render the 391 Otolaryngology Chair unsafe for operation.

- In the event of a malfunction, do not attempt to use the examination chair until necessary repairs have been made.
- Do not attempt to disassemble chair, replace malfunctioning or damaged components, or perform adjustments unless you are one of Midmark’s authorized service technicians.
- Do not substitute parts of another manufacturer when replacing inoperative or damaged components. Use only Midmark replacement parts.

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SECTION I
GENERAL INFORMATION

1.1 Scope of Manual

This manual contains detailed troubleshooting, scheduled maintenance, maintenance, and service instructions for the 391 Otolaryngology Chair. This manual is intended to be used by Midmark's authorized service technicians.

1.2 How to Use Manual

A. Manual Use When Performing Scheduled Maintenance.

(1) Perform inspections and services listed in Scheduled Maintenance Chart (Refer to para 3.1).

(2) If a component is discovered to be faulty or out of adjustment, replace or adjust component in accordance with maintenance / service instructions (Refer to para 4.1).

B. Manual Use When Unit Is Malfunctioning And Cause Is Unknown.

(1) Perform an operational test on chair (Refer to para 2.1).

(2) Perform troubleshooting procedures listed in Troubleshooting Guide (Refer to para 2.2).

(3) If a component is discovered to be faulty or out of adjustment, replace or adjust component in accordance with maintenance / service instructions (Refer to para 4.1).

C. Manual Use When Damaged Component Is Known.

(1) Replace or adjust component in accordance with maintenance / service instructions (Refer to para 4.1).

1.3 Description Of 391 Otolaryngology Chair

A. General Description (See Figure 1-1).

The Model 391 Otolaryngology Chair is primarily used in examination rooms for general examinations and minor procedures on the head and neck areas. The chair positions are adjustable thru use of electromechanical motors. The operator can initiate movement using one of two chair mounted membrane touch pads or optional foot control.

B. Major Serviceable Components (See Figure 1-1).

The major serviceable components of the chair are the membrane touch pads (1, Figure 1), headrest locking assembly (2), back up limit switch (3), back down program limit switch (4), back motor (5), back capacitor (6), base motor (7), base capacitor (8), base rotation turntable bearings (9), rotation foot lock (10), foot control (11) (optional) which includes switches, base up program limit switch (12), base down limit switch (13), base up limit switch (14), PC circuit board (15), fuses (16), and lamp transformer (17).

C. Theory of Operation (120 VAC Units) (See Figure 5-1 for wiring diagram and Figure 5-2 for electrical schematic).

Electrical Power:
Line voltage (120 VAC) is supplied to the chair's PC circuit board thru the chair's power cord and a terminal board. There is a 1/2 amp line input fuse on the PC circuit board which protects the board's circuitry from power spikes or excessive current draw. A transformer on the PC circuit board reduces the line voltage to 12 VDC. The 12 VDC provides power to operate the circuitry on the PC circuit board, limit switches, membrane switch panel, and optional foot control.

Operation of Membrane Switch Panel:
The PC circuit board supplies 12 VDC to one side of each of the normally open (N.O.) switches in the membrane switch panel. When the operator presses a membrane switch, the N.O. contacts for that switch are closed, completing a circuit; this allows the 12 VDC signal to return to the PC circuit board, activating the function the operator selected.

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SECTION I
GENERAL INFORMATION

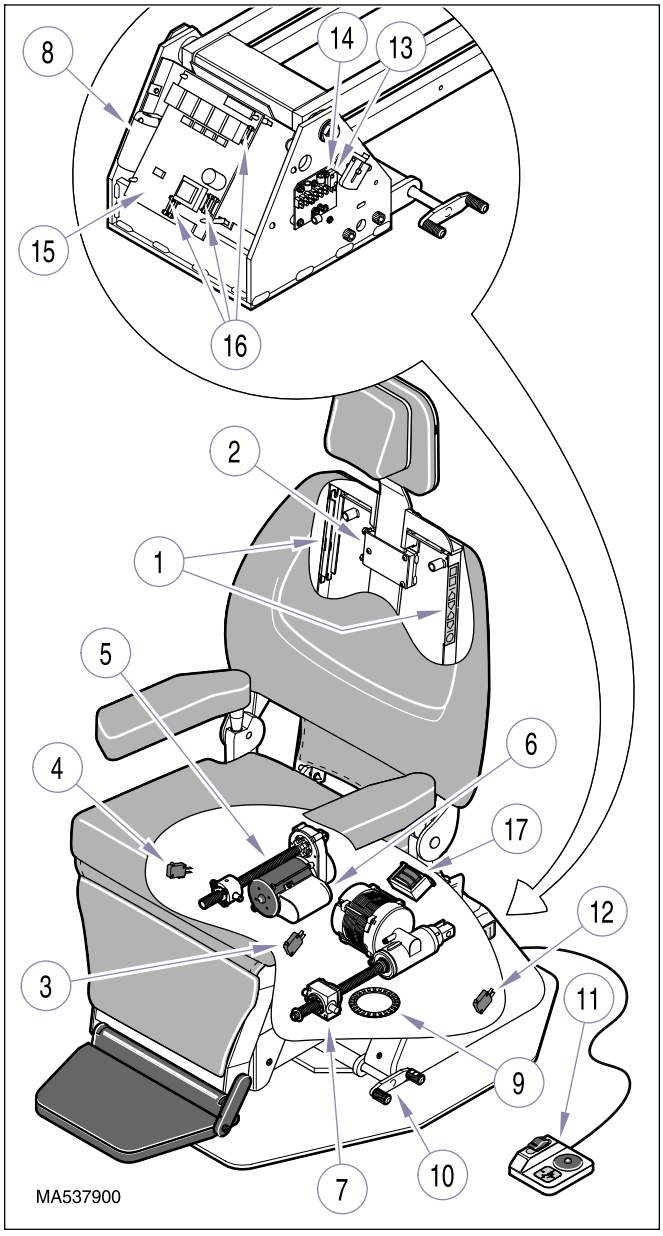


Figure 1-1. Major Components

Operation of Foot Control:
The PC circuit board supplies 12 VDC to the common terminals of the four N.O. switches (BACK UP, BACK DOWN, BASE UP, BASE DOWN) and the N.O. AUTO EXIT / AUTO OPERATE program switch. When the operator depresses one of the switches, the N.O. contacts for that switch are closed, completing a circuit; this allows the 12 VDC signal to return to the circuit board, activating the function the operator selected. Two manual functions may be activated at once by pushing the foot pedal in between two functions.

Back Up Function Operation:
When the operator depresses the BACK UP switch on either the membrane switch panel or foot control, the N.O. switch closes, allowing the 12 VDC signal to return to the PC circuit board, enabling the function. When the Back Up function is enabled, the PC circuit board energizes the Back Up relay coil. Line voltage (115 VAC) is continuously supplied to one of the output contacts of the Back Up relay. So, when the N.O. output contacts of the relay close, 115 VAC is applied across the windings of the back motor causing it to run.

The PC circuit board also monitors the Back Up limit switch. When not tripped, the N.C. Back Up limit switch completes a closed circuit, allowing a 12 VDC signal (supplied by the PC circuit board) to return to the PC circuit board which allows the Back Up function to continue to run. When the N.C. switch is tripped (indicating the back motor is at its “up” limit), the limit switch circuit opens, stopping the 12 VDC signal from returning to the PC circuit board. The PC circuit board then deenergizes the Back Up relay, causing the back motor to stop.

Back Down Function Operation:
When the operator depresses the BACK DOWN switch on either the membrane switch panel or foot control, the N.O. switch closes, allowing the 12 VDC signal to return to the PC circuit board, enabling the function. When the Back Down function is enabled, the PC circuit board energizes the Back Down relay coil. Line voltage (115 VAC) is continuously supplied to one of the output contacts of the Back Down relay. So, when the N.O. output contacts of the relay close, 115 VAC is applied across the windings of the back motor causing it to run. When the back motor reaches its “down” limit, a N.C. limit switch located internally within the back motor opens, opening the motor winding circuit and causing the back motor to stop. When the operator releases the BACK DOWN switch, the PC circuit board then deenergizes the Back Down relay.

Base Up Function Operation:
When the operator depresses the BASE UP switch on either the membrane switch panel or foot control, the N.O. switch closes, allowing the 12 VDC signal to return to the PC circuit board, enabling the function. When the Base Up function is enabled, the PC circuit board energizes the Base Up relay coil. Line voltage (115 VAC) is continuously supplied to one of the output contacts of the Base Up relay. So, when the N.O. output contacts of the relay close, 115 VAC is applied across the windings of the base motor causing it to run.

The PC circuit board also monitors the Base Up limit switch. When not tripped, the N.C. Base Up limit switch

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completes a closed circuit, allowing a 12 VDC signal (supplied by the PC circuit board) to return to the PC circuit board, which allows the Base Up function to continue to run. When the N.C. limit switch is tripped (indicating the base motor is at its "up" limit), the switch circuit opens, stopping the 12 VDC signal from returning to the PC circuit board. The PC circuit board then deenergizes the Base Up relay, causing the base motor to stop.

Base Down Function Operation:
When the operator depresses the BASE DOWN switch on either the membrane switch panel or foot control, the N.O. switch closes, allowing the 12 VDC signal to return to the PC circuit board, enabling the function. When the Base Down function is enabled, the PC circuit board energizes the Base Down relay coil. Line voltage (115 VAC) is continuously supplied to one of the output contacts of the Base Down relay. So, when the N.O. output contacts of the relay close, 115 VAC is applied across the windings of the base motor causing it to run.

The PC circuit board also monitors the Base Down limit switch. When not tripped, the N.C. Base Down Limit Switch completes a closed circuit, allowing a 12 VDC signal (supplied by the PC circuit board) to return to the PC circuit board which allows the Base Down function to continue to run. When the N.C. limit switch is tripped (indicating the base motor is at its "down" limit), the switch circuit opens, stopping the 12 VDC signal from returning to the PC circuit board. The PC circuit board then deenergizes the Base Down relay, causing the base motor to stop.

Auto Exit Function Operation:
When the operator depresses the AUTO EXIT switch on either the membrane switch panel or foot control, the N.O. switch closes, allowing the 12 VDC signal to return to the PC circuit board, enabling the function. When the Auto Exit function is enabled, the PC circuit board energizes the Base Down and Back Up relay coils. Line voltage (115 VAC) is continuously supplied to one of the output contacts on each of the two relays. So, when the N.O. output contacts of the two relays close, 115 VAC is applied across the windings of the base and back motors causing them to run.

The PC circuit board also monitors the Base Down and Back Up limit switches. When not tripped, the N.C. switches complete a closed circuit, allowing a 12 VDC signal (supplied by the PC circuit board) to return to the PC circuit board which allows the Base Down and Back Up functions to continue to run. When the N.C. switches are tripped (indicating the motors are at the "Exit" position), the switch circuits open, stopping the 12 VDC signals from returning to the PC circuit board. The PC circuit board then deenergizes the Base Down and Back Up relays, causing the motors to stop.

Auto Operate Function Operation:
When the operator depresses the AUTO OPERATE switch on either the membrane switch panel or foot control, the N.O. switch closes, allowing the 12 VDC signal to return to the PC circuit board, enabling the function. When the Auto Operate function is enabled, the PC circuit board energizes the Base Up and Back Down relay coils. Line voltage (115 VAC) is continuously supplied to one of the output contacts on each of the two relays. So, when the N.O. output contacts of the two relays close, 115 VAC is applied across the windings of the base and back motors causing them to run.

The PC circuit board also monitors Base Up Program limit switch and Back Down Program limit switch. When not tripped, the N.C. switches complete a closed circuit, allowing a 12 VDC signal (supplied by the PC circuit board) to return to the PC circuit board which allows the Base Up and Back Down functions to continue to run. When the N.C. limit switches are tripped, indicating the motors have reached their *manually* programmed positions (both of the limit switch stops can be manually adjusted by the operator to "program" a desired exam / procedure position), the limit switch circuits are opened stopping the 12 VDC signals from returning to the PC circuit board. The PC circuit board then deenergizes the Base Up and Back Down relays, causing the motors to stop.

Lamp Function Operation:
When the operator depresses the Lamp On / Off switch on the membrane switch panel, the N.O. switch closes, allowing the 12 VDC signal to return to the PC circuit board, enabling the function. When the lamp function is enabled, the PC circuit board energizes the Lamp relay coil. Line voltage (115 VAC) is continuously supplied to one of the output contacts of the Lamp relay. So, when the N.O. output contacts of the relay close, 115 VAC is applied across the lamp transformer's primary input leads. The lamp transformer reduces the voltage to 12.7 VAC which is output from the transformer's secondary leads. The 12.7 VAC is applied across the lamp bulb, causing it to illuminate. When the operator presses the Lamp On / Off switch again, the lamp relay is deenergized, causing the lamp bulb to extinguish.

Fuses:
There are three operational fuses on the PC circuit board. The line input 1/2 amp fuse protects the board's low voltage circuitry from power spikes or excessive

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current draw. A spare 1/2 amp fuse is located directly to the left side of the operational fuse. The motor 10 amp fuse protects the board's high voltage circuitry and motors from power spikes or excessive current draw. A spare 10 amp fuse is located directly to the left side of the operational fuse. The lamp 1/2 amp fuse protects the board's lamp circuitry, lamp transformer, and lamp components from power spikes or excessive current draw. This fuse is the same as the line input 1/2 amp fuse; therefore the spare line input fuse can also be used as the spare for the lamp 1/2 amp fuse.

General Motor Information:
Both the base motor and back motor have a capacitor in the motor winding circuit which provide motor start and motor run power.

The base and back motors have directional windings. When an up function is selected, power is applied across the windings in one direction, causing the motor to run forward. When a down function is selected, power is applied across the windings in the opposite direction, causing the motor to run backward.

The motors have a ball screw which turns when the motor runs. A nut, mounted on the ball screw is either retracted or advanced when the ball screw turns (depending on if an up or down function was selected).

Besides the external limit switches which are designed to stop the chair functions at the chair's mechanical limits, the back motor also contains internal limit switches to prevent the motor from reaching its mechanical limit and damaging the motor. These limit switches are factory set and should not require any adjustments.

Each motor has a thermal overload switch which will activate if the motor is run continuously and overheats. The motors are not designed for continuous operation. The normal cool off period for the thermal overload switches is 10 - 20 minutes.

1.4 Standard Torque Specifications

The following standard torque specifications in Table 1-1 apply to the hardware used on the unit unless otherwise listed elsewhere in the service procedures or parts illustrations:

Table 1-1. Torque Specifications

Hardware Size	Torque Values
#6	11 to 21 inch / lbs. (1.2 to 2.3 N•M)
#8	20 to 30 inch / lbs. (2.2 to 3.3 N•M)
#10	32 to 42 inch / lbs. (3.6 to 4.8 N•M)
1/4 inch	75 to 85 inch / lbs. (8.5 to 9.6 N•M)
5/16 inch	18 to 22 ft. / lbs. (24.4 to 29.8 N•M)
3/8 inch	31 to 35 ft. / lbs. (42.0 to 47.5 N•M)
1/2 inch	50 to 60 ft. / lbs. (67.8 to 81.4 N•M)

1.5 Specifications

Factual data for the 391 Otolaryngology Chair is provided in Table 1-2. Also, see Figure 1-2.

Table 1-2. Specifications

Description	Data
Weight of a Unit:	
Without Shipping Carton	355 lbs (161.0 kg)
With Shipping Carton	367 lbs (166.5 kg)
Shipping Carton:	42 in. "L" x 29 in. "W" x 35 in. "H" (106.7 cm x 73.7 cm x 88.9 cm)
Dimensions (See Figure 1-2):	
Chair Top Length	69 in. (175.2 cm)
Chair Top Length (headrest extended)	75.5 in. (191.8 cm)
Base	23.5 in. "W" x 34 in. "L" (59.7 cm x 86.4 cm)
Chair Top Width	25.5 in. (64.7 cm)
Overall Width	25.5 in. (64.7 cm)
Chair Adjustment (See Figure 1-2):	
Base	360° rotation (max)
Max. Headrest Height (backrest up):	63 in. (160 cm)
Min. Headrest Height (backrest up):	50 in. (127 cm)
Max. Headrest Height (backrest down):	38 in. (96.5 cm)
Min. Headrest Height (backrest down):	25 in. (63.5 cm)
Max. Footrest Height (backrest down):	31 in. (78.7 cm)
Min. Footrest Height (backrest down):	18 in. (45.7 cm)
Min. Footrest Height (backrest up):	4 in. (10 cm)
Back Section (manual)	14° to 82° (max)
Back Section (program)	22° to 82° (max)
Weight Capacity (Maximum):	325 lbs. (147.4 kg)
Electrical Requirements:	115 VAC Nominal 110-126 VAC, 60 HZ, 8.0 amp, single phase
Power Consumption (max):	120 VAC @ 8 amps= 960 Watts

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SECTION I
GENERAL INFORMATION

Fuse Rating:

Line Input Fuse ..... 0.5 amp, 250 VAC
5 x 20mm, Type Slo-Blo

Motor Fuse .....10.0 amp, 250 VAC
5 x 20mm, Type Slo-Blo

Lamp Fuse .....0.5 amp, 250 VAC
5 x 20mm, Type Slo-Blo

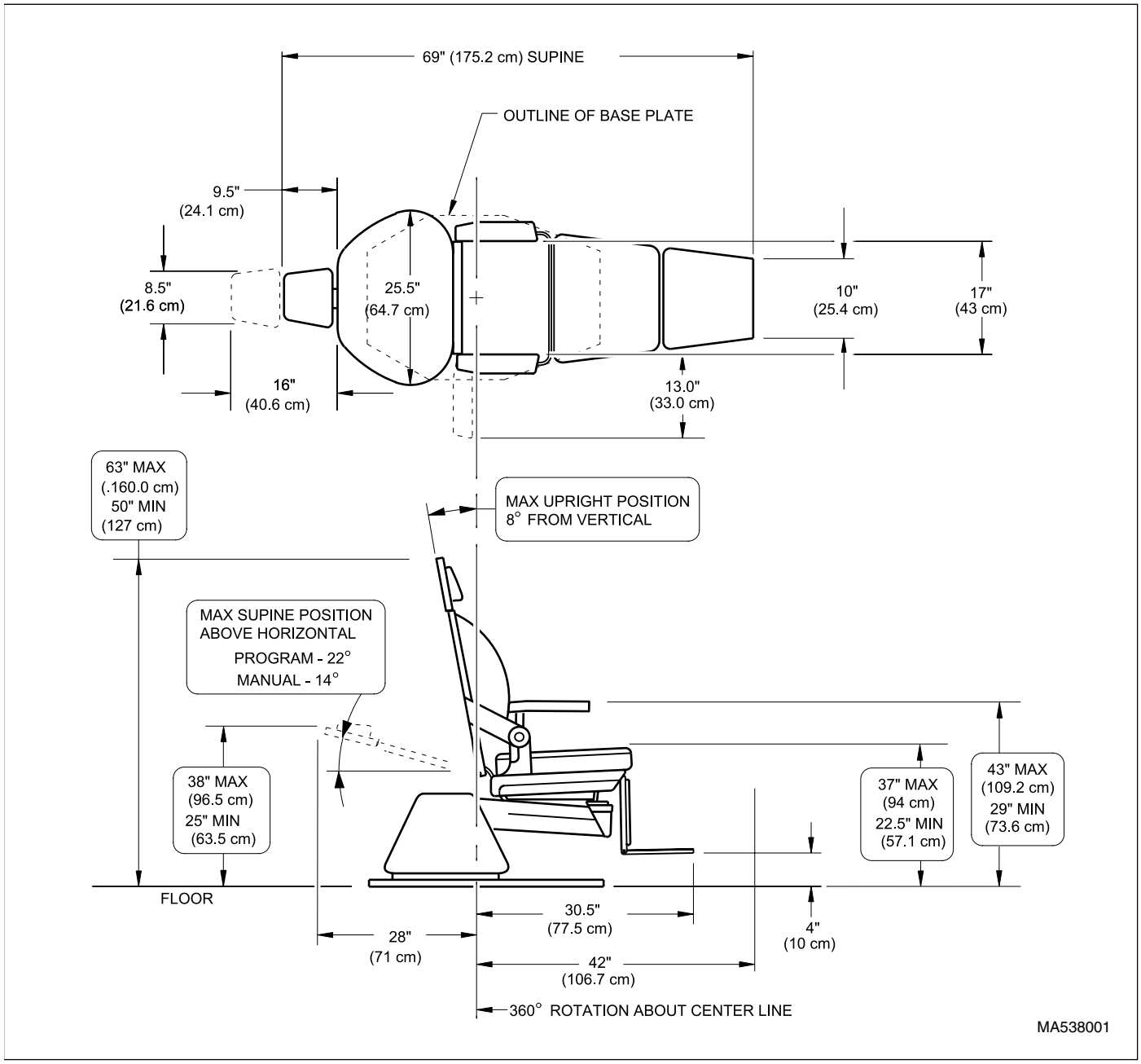


Figure 1-2. Dimensions

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SECTION I
GENERAL INFORMATION

1.6 Parts Replacement Ordering

If a replacement part is required, order the part directly from the factory as follows:

(1) Refer to Figure 1-3 to determine the location of the model number and serial number of the chair and record this data. Refer to the Parts List to determine the item numbers of the parts, part numbers of the parts, descriptions of the parts, and quantities of parts needed and record this data (Refer to para 6.1).

NOTE
Ask the Purchasing Department of the company that owns the chair for this information. Otherwise, this information may be obtained from the dealer that sold the chair.

(2) Determine the installation date of the chair and record this data. Call Midmark with the recorded information and ask for the Medical Products Technical Services Department. See back cover of this manual for the phone number or use the Fax Order Form (See page 7-2 for Fax Order Form).

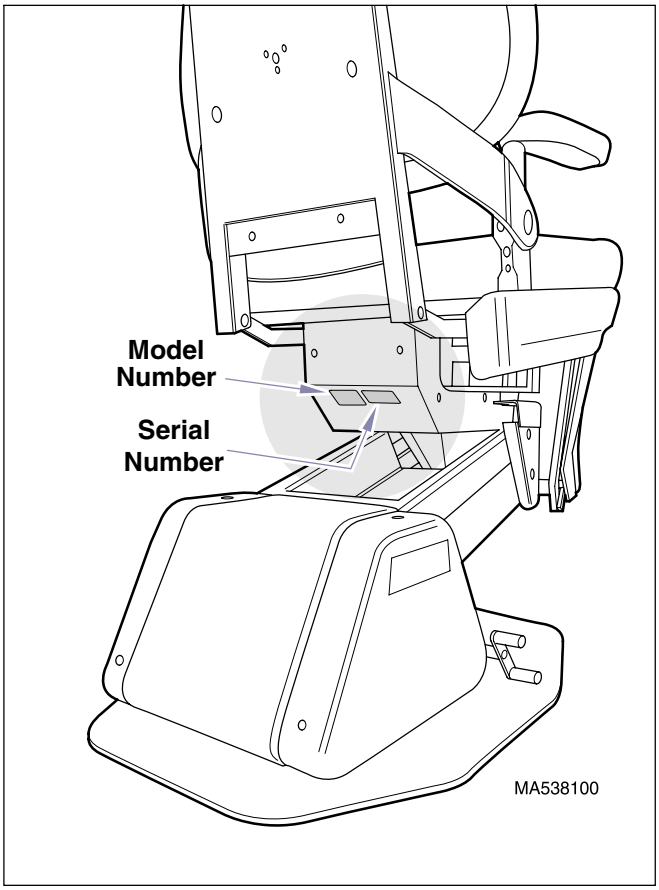


Figure 1-3. Model Number / Serial Number Location

1.7 Special Tools

Table 1-3 lists all of the special tools needed to repair the chair, how to obtain the special tools, and the purpose of each special tool.

Table 1-3. Special Tool List

Description of Special Tool	Manufacturer's Name / Address / Phone	Manufacturer's Part Number	Purpose of Special Tool
Multimeter *	Commercially Available	Any Type	Used to perform continuity and voltage checks.
Steel Bar	Commercially Available	Any Type	Used to support chair top when base motor is being removed.
Supports	Commercially Available	Any Type	Used to support the chair top so rotation bearing may be removed.
Protractor *	Commercially Available	Any Type	Used to measure the angle of a chair section so that its limit switch can be adjusted to stop the chair section at the desired angle.
Torque Wrench *	Commercially Available	Any Type	Used to tighten nuts or screws to specified values.
** Tool should be calibrated annually to ensure proper specifications are met.*			

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SECTION II
TESTING AND TROUBLESHOOTING

2.1 Operational Test (See Figure 2-1)

In order to effectively diagnose a malfunction of chair, it may be necessary to perform an operational test as follows:

WARNING
Refer to the Operator's Manual for complete instructions on operating the chair. Failure to do so could result in personal injury.

NOTE
The Operational Test, for the most part, only describes what ***should*** happen when chair is operated. If the chair does something other than described, a problem has been discovered. Refer to Troubleshooting Guide to determine cause of problem and its correction.

(1) Plug chair power cord into a grounded, non-isolated, correctly polarized outlet, that has proper voltage for chair.

(2) Depress Back Up, Back Down, Base Up, and Base Down buttons on membrane switch panel.

Observe. The chair should move in direction corresponding to button being depressed. No motor should make excessive squealing noises. Movement should be steady and should match the speed and range of motions listed below:
Chair Speeds (±1 second):
Back Up to Back Down.....15 seconds
Back Down to Back Up.....15 seconds
Base Up to Base Down .....15 seconds
Base Down to Base Up .....15 seconds

Range of Motion (±2°):
Back Up..... up to 82° (above horizontal)
Back Down ..... down to 14° (above horizontal)
See Table 1-2 for maximum and minimum heights

(3) Place a 325 lbs (147.4 kgs) weight on center of seat section of chair.

Observe. The seat section should not drift downward under weight.

(4) Depress Base Up and Base Down buttons on membrane switch panel.

Observe. The base motor should not squeal or make excessive noise when lifting weight. The base motor should be able to lift weight. Movement should be steady.

(5) Remove weights from chair. Then, place a 100 lbs (45.4 kgs) weight on center of back section of chair (with back section at approximately 45º above horizontal).

(6) Depress Back Up and Back Down buttons on membrane switch panel.

Observe. The back motor should not squeal or make excessive noise when lifting weight. The back motor should be able to lift weight. Movement should be steady.

(7) Remove weights from chair.

(8) Run Back Up function all the way up and Base Down function all the way down.

NOTE
Both the Back Down Program and Base Up Program limit switches are manually adjustable limit switches which allow an operator to "manually program" where chair will stop when using Auto Operate function.

(9) Depress Auto Operate button on membrane switch panel.

Observe. The Back Down function should run until its limit switch is tripped (Back Down Program limit switch), stopping it. The Base Up

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SECTION II
TESTING AND TROUBLESHOOTING

function should run until its limit switch is tripped (Base Up Program limit switch), stopping it. Check both limit switches to verify that they were tripped.

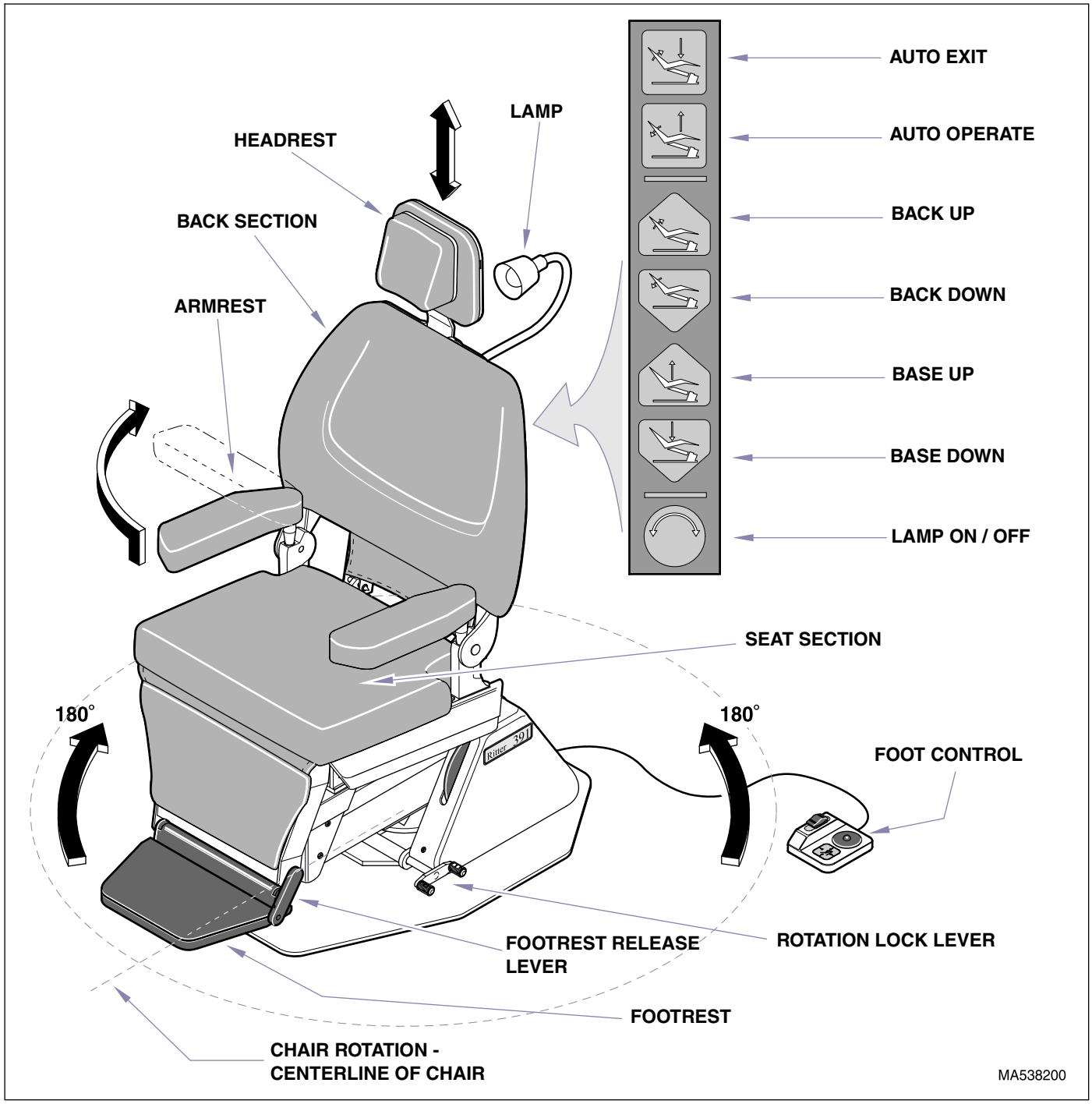


Figure 2-1. Operational Test

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(10) Depress Auto Exit button on membrane switch panel.

Observe. The Back Up function should run until its limit switch trips (Back Up limit switch), stopping it. The Base Down function should run until its limit switch trips (Base Down limit switch), stopping it. Check both limit switches to verify that they were tripped.

(11) On chairs which have an optional exam lamp, depress Lamp On / Off button on membrane switch panel. After a few seconds, depress Lamp On / Off button again.

Observe. The lamp should illuminate. When Lamp On / Off button is depressed second time, lamp should turn off.

(12) Slide headrest in and out stopping at different positions. Push gently against headrest at each position.

Observe. The headrest should not require excessive force to position. When in a position, the headrest should not move when a slight pressure is applied.

(13) Rotate chair top in one direction. Then rotate chair top in opposite direction.

Observe. The chair top should rotate smoothly and easily; not requiring excessive force. The chair top should be able to be rotated 360° or 180° in each direction from centerline of chair.

(14) Depress Rotation Lock lever to locked position. Attempt to rotate chair top.

Observe. The chair top should not be able to be rotated when Rotation Lock lever is engaged.

(15) Raise footrest into stowed position. Then depress Footrest Release lever and lower footrest.

Observe. The footrest should automatically lock into stowed position when it is raised. When Footrest Release lever is depressed, footrest should be released and be able to be lowered.

(16) Raise each armrest up approximately 3/8 in. (9.5 mm) to release armrest and then rotate the armrest out of way to side. Return each armrest back to normal locked position.

Observe. The armrests should be able to be raised and rotated out of way easily and should not require excessive force. When armrests are returned to their normal position, armrests should lower down into a “locked” position. The armrests should not have excessive side-to-side play.

(17) Depress Back Up, Back Down, Base Up, Base Down, Auto Exit, and Auto Operate buttons on foot control.

Observe. When each of the buttons on foot control are depressed, appropriate function should activate.

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2.2 Troubleshooting Procedures

Table 2-1 is a Troubleshooting Guide which is used to determine the cause of the malfunction.

Problem	Symptom	Probable Cause	Check	Correction
Chair will not operate when ***any*** function is selected (from any of the membrane switch panels or foot control switches).	When a membrane switch panel or foot control switch is pressed, nothing happens and relays cannot be heard energizing).	Power cord is not plugged into facility wall outlet.	Check to see if power cord is plugged in.	Plug power cord into facility wall outlet.
		Facility circuit breaker providing power to chair is tripped.	Check to see if facility circuit breaker is tripped. One way of checking this is to plug a lamp into wall outlet that chair was plugged into.	If facility circuit breaker is tripped, determine what caused circuit breaker to trip, correct problem, and then reset / replace circuit breaker.
		Wire connections are loose.	Check all wiring connections from power cord to terminal board to PC circuit board. Use a multimeter to perform a continuity check on wires. Check for 115 VAC line voltage across pins 1 and 4 of connector J1.	Clean any dirty connections. Tighten any loose connections. Replace any damaged connections. Refer to Figures 5-1 and 5-2.
		1/2 amp line input fuse is blown.	See E, Figure 2-2 for location of line input fuse. Perform continuity check on fuse.	Replace blown line input fuse. ***NOTE:*** There is a spare fuse located directly to the left of the line input fuse which may be used.
		PC circuit board is malfunctioning.	Replace suspect PC circuit board with known working PC circuit board.	Replace PC circuit board. Refer to para 4.7.
No actions can be initiated from membrane switch panel or foot control.	Chair has power, but no functions can be initiated from membrane switch panel and foot control.	PC circuit board is malfunctioning.	Replace suspect PC circuit board with known working PC circuit board.	Replace PC circuit board. Refer to para 4.7.
No chair movement can be initiated, but lamp works.	Chair has power, but only the lamp function is operable.	Motor circuit 10 amp fuse is blown.	See D, Figure 2-2 for location of motor circuit fuse. Perform continuity check on fuse.	Replace blown motor circuit fuse. ***NOTE:*** There is a spare fuse located directly to the left of the motor circuit fuse which may be used.

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Problem	Symptom	Probable Cause	Check	Correction
One or more functions cannot be initiated from membrane switch panels.	Some functions can be initiated with membrane switch panel, but at least one cannot.	Membrane switch panel is malfunctioning (a switch membrane is malfunctioning).	Replace suspect membrane switch panel with known working membrane switch panel ***or*** refer to Figure 2-2 and use a jumper wire to jump pins of connector J2: B1 & B2 (Auto Exit), B1 & B3 (Auto Operate), B1 & B4 (Back Up), B1 & B5 (Back Down), B1 & B6 (Base Up), B1 & B7 (Base Down), B1 & B8 (Lamp), Each function should operate when jumped.	If all functions operate correctly when jumped, then fault is in the membrane switch panel. If so, replace membrane switch panel. Refer to para 4.13. If a function still does not work even when jumpered, fault is in motor circuit or PC circuit board. Continue troubleshooting using this guide.

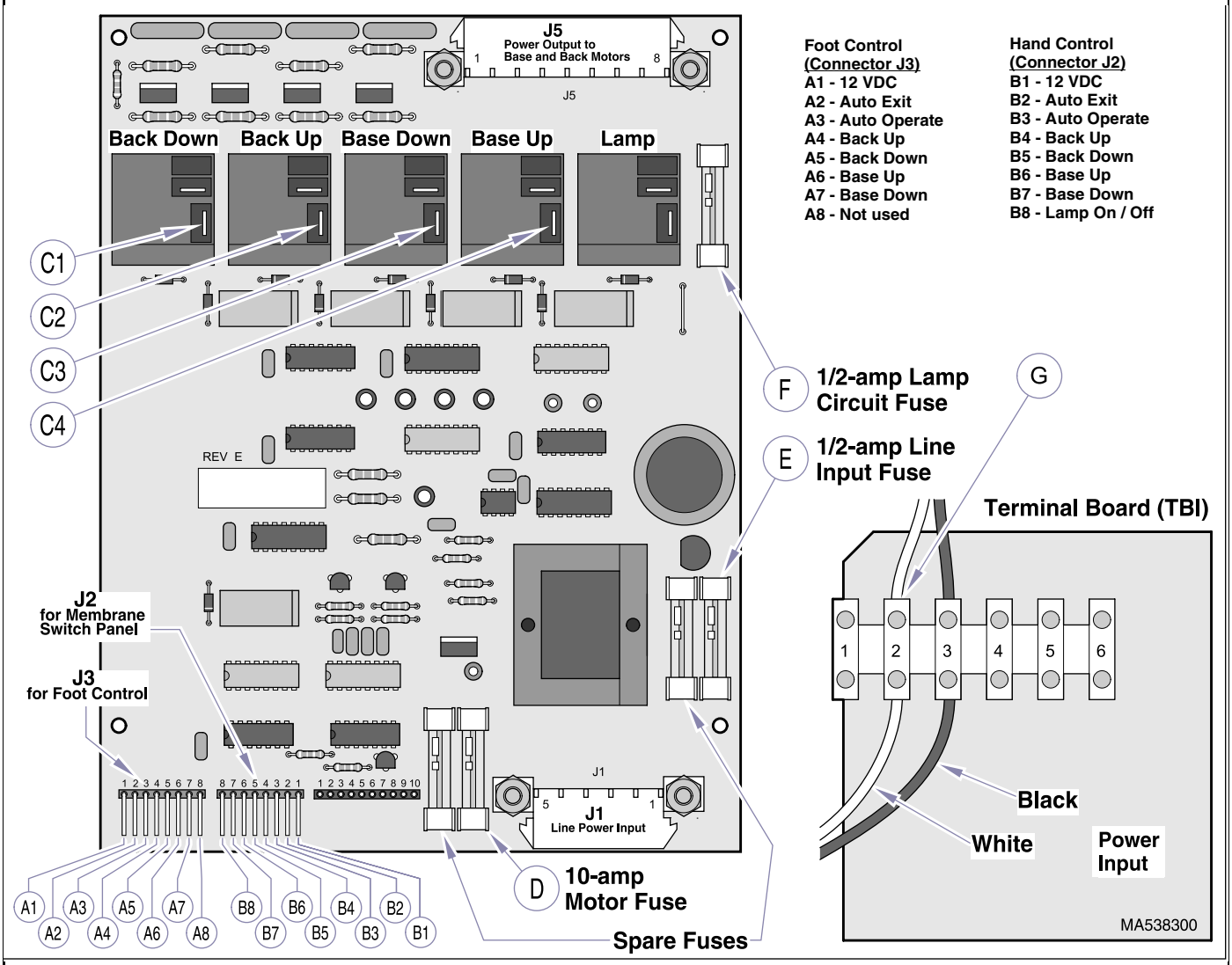


Figure 2-2. Troubleshooting Test Points

Problem	Symptom	Probable Cause	Check	Correction
		Wire connections loose.	Check all wiring connections between membrane switch panel and PC circuit board.	Clean any dirty connections. Tighten or repair any loose or damaged connections.
		PC circuit board is malfunctioning.	Replace suspect PC circuit board with known working PC circuit board.	Replace PC circuit board. Refer to para 4.7.
One or more functions cannot be initiated from foot control.	Some functions can be initiated with foot control, but at least one cannot.	Foot control is malfunctioning (a foot control switch is malfunctioning).	Perform a continuity check on each N.O. foot control switch in foot control (when switch is pressed, switch circuit should be closed).	If foot control switch does not pass continuity check, replace switch. Refer to para 4.14.
			Refer to Figure 2-2 and use a jumper wire to jump pins of connector J3: A1 & A2 (Auto Exit), A1 & A3 (Auto Operate), A1 & A4 (Back Up), A1 & A5 (Back Down), A1 & A6 (Base Up), A1 & A7 (Base Down), Each function should operate when jumped.	If all functions operate correctly when jumped, then fault is in foot control switch of non-operating function. If so, replace malfunctioning foot control switch. Refer to para 4.14. If a function still does not work even when jumpered, fault is in motor circuit or PC circuit board. Continue troubleshooting using this guide.
		Wire connections loose.	Check all wiring connections between foot control switches and PC circuit board.	Clean any dirty connections. Tighten or repair any loose or damaged connections.
		PC circuit board is malfunctioning.	Replace suspect PC circuit board with known working PC circuit board.	Replace PC circuit board. Refer to para 4.7.
BACK UP ***and*** BACK DOWN functions do not work. All other functions work.	When BACK UP and BACK DOWN buttons are pressed, chair will not move (all other functions work).	Thermal overload switch in back motor is activated or malfunctioning.	Refer to Figure 5-1. Check for continuity between white & red and white & black motor leads.	Wait 10 to 20 minutes to allow back motor to cool and the thermal overload switch to reset. If continuity does not return, replace back motor. Refer to para 4.6.
		Back capacitor is weak or blown.	Replace suspect back capacitor with known working back capacitor.	Replace back capacitor. Refer to 4.5.
		Wiring connections loose.	Check all wiring connections to back motor.	Clean any dirty connections. Tighten any loose connections. Replace any damaged connections.
		Back motor is malfunctioning.	Replace suspect back motor with known working back motor assembly.	Replace back motor. Refer to para 4.6.

Problem	Symptom	Probable Cause	Check	Correction
BACK UP function works, but BACK DOWN function does not ***or*** BACK DOWN function works, but BACK UP function does not. All other functions work.	Back motor runs in one direction, but not the other.	PC circuit board is malfunctioning (relay for up or down function on PC circuit board is malfunctioning).	Refer to Figure 2-2 for this check. Use a jumper wire to jump Test Points C2 and G; the Back Up function should run. Use a jumper wire to jump Test Points C1 and G; the Back Down function should run. If the motor runs when a relay is jumped, the fault is in the membrane switch panel, wiring, or PC circuit board. If the motor does not run when a relay is jumped, the fault is in the wiring or back motor.	Replace PC circuit board. Refer to para 4.7.
		Wiring connections loose.	Check all wiring connections from PC circuit board to back motor assembly.	Clean any dirty connections. Tighten any loose connections. Replace any damaged connections.
		Back motor is malfunctioning.	Replace suspect back motor with known working back motor.	Replace back motor. Refer to para 4.6.
		Back motor internal limit switches are malfunctioning (stuck open).	There are no spare parts available for internal limit switches.	Replace back motor. Refer to para 4.6.
		Membrane switch panel is malfunctioning (BACK UP or BACK DOWN switch membrane is malfunctioning).	Replace suspect membrane switch panel with known working membrane switch panel ***or*** Refer to Figure 2-2 and use a jumper wire to jump pins of connector J2: B1 & B4 (Back Up), B1 & B5 (Back Down), Each function should operate when jumped.	If both functions operate correctly when jumped, then fault is in the membrane switch panel. If so, replace membrane switch panel. Refer to para 4.13. If a function still does not work even when jumpered, fault is in motor circuit or PC circuit board.
		Back Up Limit Switch is malfunctioning or is out of adjustment.	Perform continuity check on N.C. Back Up Limit Switch and check limit switch adjustment.	Replace N.C Back Up Limit Switch. Refer to para 4.11.
		Back Down or Back Up motor internal limit switch is malfunctioning or out of adjustment.	Perform continuity check on motor internal limit switches and check internal limit switch adjustment.	Adjust / replace internal limit switch.
BASE UP ***and*** BASE DOWN functions do not work. All other functions work.	When BASE UP and BASE DOWN buttons are pressed, chair will not move (all other functions work).	Thermal overload switch in back motor is activated or malfunctioning.	Refer to Figure 5-1. Check for continuity between blue & red and blue & black motor leads.	Wait 10 to 20 minutes to allow back motor to cool and the thermal overload switch to reset. If continuity does not return, replace back motor. Refer to para 4.6.
		Base capacitor is weak or blown.	Replace suspect base capacitor with known working back capacitor.	Replace base capacitor. Refer to 4.2.

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Problem	Symptom	Probable Cause	Check	Correction
		Wiring connections loose.	Check all wiring connections to base motor assembly.	Clean any dirty connections. Tighten any loose connections. Replace any damaged connections.
		Base motor assembly is malfunctioning.	Replace suspect base motor assembly with known working base motor assembly.	Replace base motor. Refer to para 4.3.
	Base motor runs, but its shaft does not turn.	Base motor worm wheel is broken.	Check worm wheel in base motor.	Replace base motor worm wheel. Refer to para 4.4.
BASE UP function works, but BASE DOWN function does not ***or*** BASE DOWN function works, but BASE UP function does not. All other functions work.	Base motor runs in one direction, but not the other.	PC circuit board is malfunctioning (relay for up or down function on PC circuit board is malfunctioning).	Refer to Figure 2-2 for this check. Use a jumper wire to jump Test Points C4 and G; the Base Up function should run. Use a jumper wire to jump Test Points C3 and G; the Base Down function should run. If the motor runs when a relay is jumped, the fault is in the membrane switch panel, wiring, or PC circuit board. If the motor does not run when a relay is jumped, the fault is in the wiring or base motor.	Replace PC circuit board. Refer to para 4.7.
		Wiring connections loose.	Check all wiring connections from PC circuit board back motor assembly.	Clean any dirty connections. Tighten any loose connections. Replace any damaged connections.
		Base motor is malfunctioning.	Replace suspect base motor with known working base motor.	Replace base motor. Refer to para 4.3.
		Base motor internal limit switches are malfunctioning (stuck open).	There are no spare parts available for internal limit switches.	Replace base motor. Refer to para 4.3.
		Membrane switch panel is malfunctioning (BASE UP or BASE DOWN switch membrane is malfunctioning).	Replace suspect membrane switch panel with known working membrane switch panel ***or*** Refer to Figure 2-2 and use a jumper wire to jump pins of connector J2: B1 & B6 (Base Up), B1 & B7 (Base Down), Each function should operate when jumped.	If both functions operate correctly when jumped, then fault is in the membrane switch panel. If so, replace membrane switch panel. Refer to para 4.13. If a function still does not work even when jumpered, fault is in motor circuit or PC circuit board.
		Base Up Limit Switch is malfunctioning or is out of adjustment.	Perform continuity check on N.C. Base Up Limit Switch and check limit switch adjustment (should be a closed circuit when limit switch is *not* tripped).	Adjust or replace N.C. Base Up Limit Switch. Refer to para 4.9 or 4.8.

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Problem	Symptom	Probable Cause	Check	Correction
		Base Down Limit Switch is malfunctioning or is out of adjustment (causing an open circuit).	Perform continuity check on N.C. Base Down Limit Switch and check limit switch adjustment (should be a closed circuit when limit switch is *not* tripped).	Adjust or replace N.C. Base Down Limit Switch. Refer to para 4.9 or 4.8.
Auto Operate function does not work properly.	Nothing happens when Auto Operate button is pressed (all other functions work).	Membrane switch panel is malfunctioning (Auto Operate switch membrane is malfunctioning).	Replace suspect membrane switch panel with known working membrane switch panel ***or*** Refer to Figure 2-2 and use a jumper wire to jump pins of connector J2: B1 & B3 (Auto Operate), The Auto Operate function should operate when jumped.	If Auto Operate function operates correctly when jumped, then fault is in the membrane switch panel. If so, replace membrane switch panel. Refer to para 4.13. If a function still does not work even when jumpered, fault is in motor circuit or PC circuit board.
		Wiring connections loose.	Check all wiring connections to membrane switch panels, Back Down Program limit switch, and Base Up Program limit switch.	Clean any dirty connections. Tighten any loose connections. Replace any damaged connections.
		Back Down Program limit switch is malfunctioning (causing open circuit).	Perform continuity check on the N.C. Back Down Program limit switch (should be a closed circuit when limit switch is *not* tripped).	Replace Back Down Program limit switch. Refer to para 4.12.
		Back Down Program limit switch is already tripped (limit switch is not adjusted to stop back section at operator's desired position).	Check with operator to see if operator is aware that the back section can be manually adjusted to be stopped where desired in the Auto Operate function.	Show the operator how to manually adjust the Back Down Program limit switch (Refer to Back Programming Procedure in the Installation Manual).
		Back Down Program limit switch trip arm is not contacting back programming plate.	Check to see if Back Down Program limit switch trips when it contacts the back programming plate.	Adjust the Back Down Program limit switch so it trips properly when it contact the back programming plate. Refer to para 4.12.
		Base Up Program limit switch is malfunctioning (causing open circuit).	Perform continuity check on the N.C. Base Up Program limit switch (should be a closed circuit when limit switch is *not* tripped).	Replace Base Up Program limit switch. Refer to para 4.10.
		Base Up Program limit switch is already tripped (limit switch is not adjusted to stop base function at operator's desired position).	Check with operator to see if operator is aware that the base section can be manually adjusted to stop where desired in the Auto Operate function.	Show the operator how to manually adjust the Base Up limit switch (Refer to Base Programming Procedure in the Installation Manual).
		PC circuit board is malfunctioning.	Replace suspect PC circuit board with known working PC circuit board.	Replace PC circuit board. Refer to para 4.7.

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Problem	Symptom	Probable Cause	Check	Correction
Auto Exit function does not work properly.	Nothing happens when Auto Exit button is pressed (all other functions work).	Membrane switch panel is malfunctioning (Auto Exit switch membrane is malfunctioning).	Replace suspect membrane switch panel with known working membrane switch panel ***or*** Refer to Figure 2-2 and use a jumper wire to jump pins of connector J2: B1 & B2 (Auto Exit), The Auto Exit function should operate when jumped.	If Auto Exit function operates correctly when jumped, then fault is in the membrane switch panel. If so, replace membrane switch panel. Refer to para 4.13. If a function still does not work even when jumpered, fault is in motor circuit or PC circuit board.
		Wiring connections loose.	Check all wiring connections to membrane switch panels.	Clean any dirty connections. Tighten any loose connections. Replace any damaged connections.
		PC circuit board is malfunctioning.	Replace suspect PC circuit board with known working PC circuit board.	Replace PC circuit board. Refer to para 4.7.
Lamp does not work.	Chair works properly, except for lamp function.	Bulb is burned out.	Check to see if bulb is burned out.	Replace bulb. See Operator's manual for lamp bulb replacement.
		Lamp circuit fuse is blown.	See F, Figure 2-2 for location of lamp circuit fuse. Perform continuity check on fuse.	Replace blown fuse.
		Wiring connections loose.	Refer to Figures 5-1 and 5-2 and check all wiring connections from PC circuit board to lamp socket.	Clean any dirty connections. Tighten any loose connections. Replace any damaged connections.
		Membrane switch panel is malfunctioning (Lamp switch membrane is malfunctioning).	Replace suspect membrane switch panel with known working membrane switch panel ***or*** Refer to Figure 2-2 and use a jumper wire to jump pins of connector J2: B1 & B8 (Lamp On / Off), The lamp function should operate when jumped.	If Lamp function operates correctly when jumped, then fault is in the membrane switch panel. If so, replace membrane switch panel. Refer to para 4.13. If a function still does not work even when jumpered, fault is in lamp transformer or PC circuit board.
		Transformer is malfunctioning.	Refer to Figure 5-2 and measure the voltage output of lamp transformer secondary leads. The output voltage should be 12.7 VAC $\pm$ 0.2 VAC.	Replace lamp transformer. Refer to para 4.16.
		Lamp socket is broken or corroded.	Check lamp socket for corrosion or broken components.	Replace lamp socket.
		PC circuit board is malfunctioning (relay for lamp function on PC circuit board is malfunctioning).	Replace suspect PC circuit board with known working PC circuit board. NOTE: Do not try to jumper relay - will cause short and blown lamp fuse.	Replace PC circuit board. Refer to para 4.7.

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Problem	Symptom	Probable Cause	Check	Correction
Back or base function drifts by itself.	Motor operates properly otherwise.	Motor brake is malfunctioning.	Replace suspect motor with known working motor.	Replace base motor (Refer to para 4.3) or back motor (Refer to para 4.6).
A function's button has to be pressed twice to get the function to move.	After a function's button is depressed, a click is heard (relay being deenergized) but the function does not activate. Depressing the button the second time causes the function to activate.	One of motor's "backup" limit switches is tripping before its "primary" limit switch, causing the motor to stop running, but since "primary" limit switch does not trip, PC circuit board does not receive signal to stop function by deenergizing its relay; so the function's relay remains energized.	Check to make sure the "primary" limit switches for both program functions trip before their "backup" limit switches. Listed below are the "primary" and then "backup" limit switches for the program functions. **Auto Exit function** ***"primary"*** - Back Up limit switch ***"backup"*** - internal limit switch for Back Up **Auto Operate function** ***"primary"*** - are the Base Up Program limit switch and Back Down Program limit switch ***"backup"*** - are the Base Up limit switch and internal limit switch for Back Down **Back Up function** ***"primary"*** - back up limit switch ***"backup"*** - internal limit switch for Back Up **Back Down function** ***"primary"*** - internal limit for Back Down ***"backup"*** - none **Base Up function** ***"primary"*** - base up limit switch ***"backup"*** - none **Base Down function** ***"primary"*** =base down limit switch ***"backup"*** = none	Adjust the "primary" limit switch so it trips before the "backup" limit switch. Refer to various limit switch adjustments.
Chair moves fine for light patient, but will not move or moves slowly for very heavy patient.	Heavy patients cause chair to malfunction.	Chair overloaded with too heavy of a patient.	Maximum weight capacity is 325 lbs (147.4 kg).	Inform chair operator of weight limitation.
		Low voltage is being supplied to chair.	Check voltage at wall receptacle - should be 115 ± 10% (103.5 to 126.5 VAC).	Correct low voltage situation at wall receptacle.
		Capacitor for suspect function is weak.	Replace suspect capacitor with known working capacitor.	Replace base capacitor (refer to para 4.2) or back capacitor (refer to para 4.5).
		Motor ball screw threads are dry or dirty, causing friction.	Check for foreign matter on ball screw threads. Check for lack of lubricant on ball screw threads.	Clean all foreign matter off of ball screw threads. Coat ball threads with STP treatment oil or equivalent. If motor is still lacking power, replace it.

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Problem	Symptom	Probable Cause	Check	Correction
Whirling or squeaking noise is heard when a motor is being run.	Noisy motor.	Foreign matter on ball screw threads and / or lack of lubricant.	Check for foreign matter on ball screw threads. Check for lack of lubricant on ball screw threads.	Clean all foreign matter off of ball screw threads. Coat ball threads with STP treatment oil or equivalent. If motor is still noisy, replace it.
Headrest is difficult to adjust or does not stay in position.	Excessive force is required to position the headrest.	Headrest slide is too tight and needs adjusted.	Check adjustment of headrest slide.	Adjust the headrest slide assembly. Refer to para 4.18.
	Headrest does not lock into a position or slides downward on own.	Headrest slide is too loose and needs adjusted.	Check adjustment of headrest slide.	Adjust the headrest slide assembly. Refer to para 4.18.
Rotational base not working.	Brake is off, but chair top is binding when rotated.	Brake is out of adjustment (needs loosened).	Check adjustment of brake.	Adjust brake. Refer to para 4.17.
		Base rotation bearing is dirty, contaminated, or worn.	Check base rotation bearing for wear or contamination.	Clean or replace base rotation bearing. Refer to para 4.21.
	Brake lever is difficult to engage.	Brake is out of adjustment (needs loosened).	Check adjustment of brake.	Adjust brake. Refer to para 4.17.
	Chair top can still be rotated when BRAKE lever is in locked position.	Brake is out of adjustment (needs tightened).	Check adjustment of brake.	Adjust brake. Refer to para 4.17.
Footrest Release lever is not latching.	When the footrest is raised into the stowed position, the footrest release lever does not automatically lock the footrest in that position.	The groove in the footlatch which houses the footlatch spring is dirty with foreign matter.	Check for foreign matter in footlatch spring groove.	Clean the footlatch spring groove. Refer to para 4.19.
		The footlatch spring is weak or broken.	Check for a weak or broken footlatch spring.	Replace footlatch spring. Refer to para 4.19.
Armrest is not working properly.	Armrest is hard to raise, rotate, or will not lock into place when returned to normal armrest position.	There is dirt, burrs, corrosion, or foreign matter in the armrest bearing or armrest post.	Check for dirt, burrs, corrosion, or foreign matter in the armrest bearing.	Clean the armrest post and armrest bearing. Use crocus cloth or a file to remove any burrs.

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SECTION III
SCHEDULED MAINTENANCE

3.1 Scheduled Maintenance

Table 3-1 is a Scheduled Maintenance Chart which lists the inspections and services that should be performed periodically on the 391 Otolaryngology Chair. These inspections and services should be performed as often as indicated in the chart.

Interval	Inspection or Service	What to Do
Semi-annually	Obvious damage	Visually check condition of chair for obvious damage such as: cracks in components, missing components, dents in components, or any other visible damage which would cause chair to be unsafe to operate or would compromise its performance. Repair chair as necessary.
	Fasteners / hardware	Check chair for missing or loose fasteners / hardware. Replace any missing hardware and tighten any loose hardware as necessary.
	Warning and instructional decals	Check for missing or illegible decals. Replace decals as necessary.
	Pivot points / moving parts / accessories	Lubricate all exposed pivot points, moving parts, and accessories with silicone based lubricant.
	Membrane switch panels	Check each switch on both membrane switch panels for proper operation. Depress each membrane switch while observing the chair to make sure selected function operates when its button is depressed. If any membrane switch does not work, replace membrane switch panel. Refer to para 4.13.
	Foot control	Check each switch on foot control for proper operation. Depress each foot control switch while observing chair to make sure selected function operates when its button is depressed. If any foot control switch does not work, replace malfunctioning switch. Refer to para 4.14 or 4.15.
	Base and back motors	Check both motors for proper operation in up and down directions. Listen for excessive noise; if motor makes excessive noise (squealing or whirling sound), clean all foreign matter off of ball screw threads and then coat ball threads with STP treatment oil or equivalent. If motor is weak or hums, replace its capacitor. Refer to para 4.2 or 4.5.
	Headrest slide mechanism	Check headrest slide mechanism for proper operation by sliding headrest up and down. Headrest should not take excessive force to move but should require a slight force to begin movement. If necessary, adjust headrest slide assembly. Refer to para 4.18.
	Rotation bearing	Check rotation bearing for proper operation. Release footrest release lever and then rotate chair top. Chair top should rotate smoothly and easily without any binding 180° in each direction from centerline of chair. If binding occurs, loosen rotation brake or clean or replace rotation bearing. Refer to para 4.17 or 4.21. Move footrest release lever to brake position and attempt to rotate chair top. Chair top should not be able to be moved. If necessary, tighten rotation brake. Refer to para 4.17.
	Footrest	Check footrest for proper operation. Raise footrest up into stowed position to see if footrest release lever automatically locks footrest in that position. Depress footrest release lever and check that footrest releases properly. If not, clean or replace footrest spring & groove. Refer to para 4.19. Coat footrest spring and groove with silicone based lubricant.
	Armrest	Check armrest for proper operation. Raise armrest and rotate to the side. Then, rotate armrest forward to its normal armrest position and allow it to lower into its locked position. If armrest is hard to raise, rotate, or will not lock into place when returned to normal armrest position, clean armrest post and armrest bearing. Use crocus cloth or a file to remove any burrs. Coat armrest post and armrest bearing with silicone based lubricant.

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SECTION III
SCHEDULED MAINTENANCE

Interval	Inspection or Service	What to Do
	Limit switches.	Check to make sure the “primary” limit switch for each function trips before its “backup” limit switch. Listed below are the “primary” and then “backup” limit switches for each function. **Auto Exit function** ***“primary”*** - Back Up limit switch ***“backup”*** - internal limit switch for Back Up and safety bail limit switches (2) for Base Down. **Auto Operate function** ***“primary”*** - are the Base Up Program limit switch and Back Down Program limit switch ***“backup”*** - are the Base Up limit switch and internal limit switch for Back Down **Back Up function** ***“primary”*** - back up limit switch ***“backup”*** - internal limit switch for Back Up **Back Down function** ***“primary”*** - internal limit for Back Down ***“backup”*** - none **Base Up function** ***“primary”*** - base up limit switch ***“backup”*** - none **Base Down function** ***“primary”*** =base down limit switch ***“backup”*** = none If necessary, adjust a “primary” limit switch to trip before a “backup” limit switch.
	Lamp	Check lamp for proper operation. Turn lamp on and check for burned out bulb. If burned out, replace bulb. Check light output of bulb. If bulb intensity seems too low, check voltage level. There should be 12.7 VAC $\pm$ 0.2 VAC across lamp socket terminals. If not, replace lamp transformer. Refer to para 4.16.
	Upholstery	Check all upholstery for rips, tears, or excessive wear. Replace cushions as necessary.
	Accessories	Check that all accessories have all of their components and that they function properly. If necessary, repair or replace the accessory.
	Operational Test	Perform an Operational Test to determine if the chair is operating within its specifications (Refer to para 2.1). Replace or adjust any malfunctioning components.

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SECTION IV
MAINTENANCE / SERVICE INSTRUCTIONS

4.1 Introduction

WARNING
Refer to the Operator Manual for complete instructions on operating the examination chair. Failure to do so could result in personal injury.

NOTE
Perform an operational test on the examination chair after the repair is completed to confirm the repair was properly made and that all malfunctions were repaired.

The following paragraphs contain removal, installation, repair, and adjustment procedures for the examination chair.

4.2 Base Capacitor Removal / Installation

A. Removal

(1) Unplug chair power cord from wall outlet receptacle.

(2) Remove three screws (1, Figure 4-1) and R.H. base cover (2) from center base cover (3).

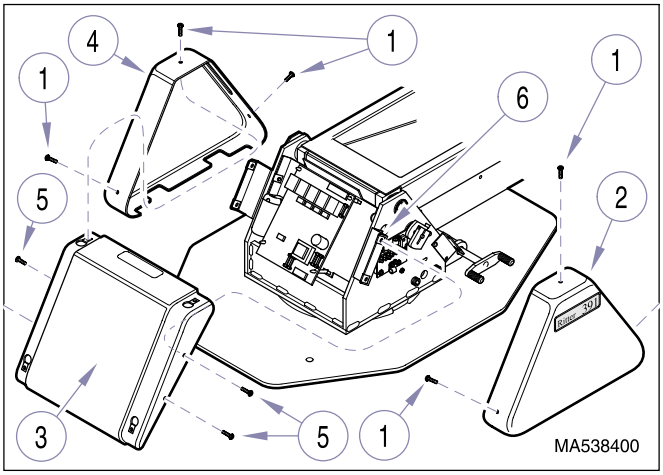


Figure 4-1. Covers Removal / Installation

(3) Remove three screws (1) and L.H. base cover (4) from center base cover (3).

(4) Remove four screws (5) and center base cover (3) from two cover mounting brackets (6).

(5) Using a screwdriver, pry tab (A, Figure 4-2) of mounting bracket (1) outward and separate base capacitor (2) from mounting bracket.

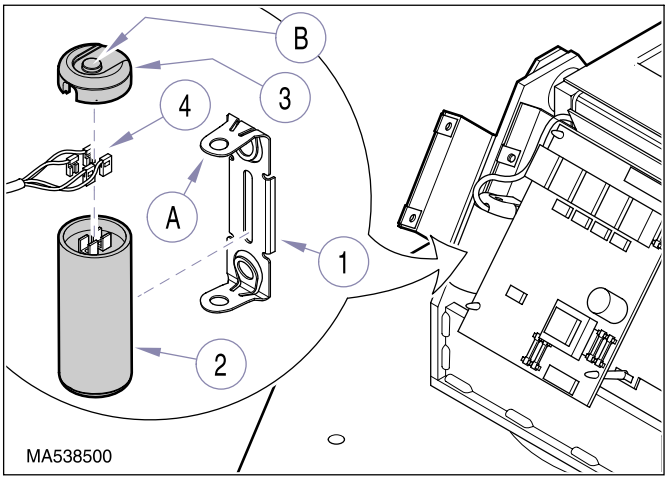


Figure 4-2. Base Capacitor Removal / Installation

(6) Remove capacitor cap (3) from base capacitor (2).

WARNING
The capacitor contains stored electricity. Never touch terminals of capacitor, even if power has been disconnected. Always discharge capacitor before touching capacitor terminals or wires. Failure to comply with these instructions could result in serious personal injury or death.

(7) Discharge base capacitor (2).

(8) Tag and disconnect four wires (4) from terminals of base capacitor (2). Remove base capacitor.

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B. Installation

(1) Connect four wires (4, Figure 4-2) to terminals of base capacitor (2); two to each terminal as tagged during removal.

(2) Install capacitor cap (3) on base capacitor (2).

(3) Position bottom of base capacitor (2) on mounting bracket (1) and then push top of capacitor inward. Using a screwdriver, force tab (A) of mounting bracket down over catch (B) of capacitor cap (3). Make sure base capacitor is held firmly in place.

(4) Install center base cover (3, Figure 4-1) on cover two mounting brackets (6) and secure with four screws (5).

(5) Install L.H. base cover (4) on center base cover (3) and secure with three screws (1).

(6) Install R.H. base cover (2) on center base cover (3) and secure with three screws (1).

(7) Plug chair power cord into wall outlet receptacle.

4.3 Base Motor Removal / Installation

A. Removal

(1) Unplug chair power cord from wall outlet receptacle.

(2) Remove three screws (1, Figure 4-3) and R.H. base cover (2) from center base cover (3).

(3) Remove three screws (1) and L.H. base cover (4) from center base cover (3).

(4) Remove four screws (5) and center base cover (3) from two cover mounting brackets (6).

(5) Remove four screws (1, Figure 4-4) and two cover mounting brackets (2) from mounting plate (3).

NOTE
Cut any cable ties or remove any cables from cable clamps which are restricting movement of mounting plate (3) when its left side is being pulled outward.

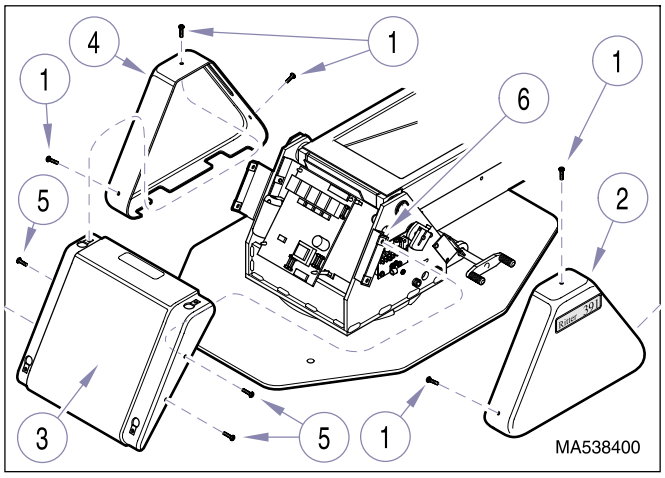


Figure 4-3. Base Covers Removal / Installation

(6) Carefully pull outward on left side of mounting plate (3) and position so base motor (4) can be accessed (as shown in illustration).

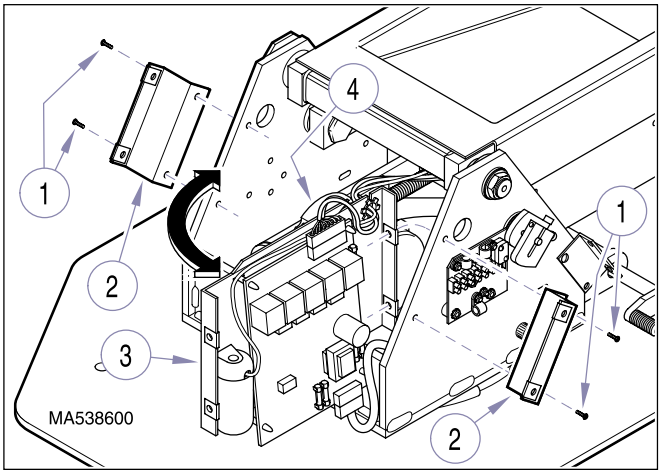


Figure 4-4. Base Motor Access

(7) Remove four screws (1, Figure 4-5); two from each side of seat cover bottom (2).

(8) Pull outward on one corner of seat cover bottom (2); then pull outward on corner of bottom lift arm cover (3) until it clears standoff (4). Repeat step for other corner and remove bottom lift arm cover (3) from chair.

(9) ***If base motor is operable:***

a. Plug chair power cord into wall outlet receptacle.

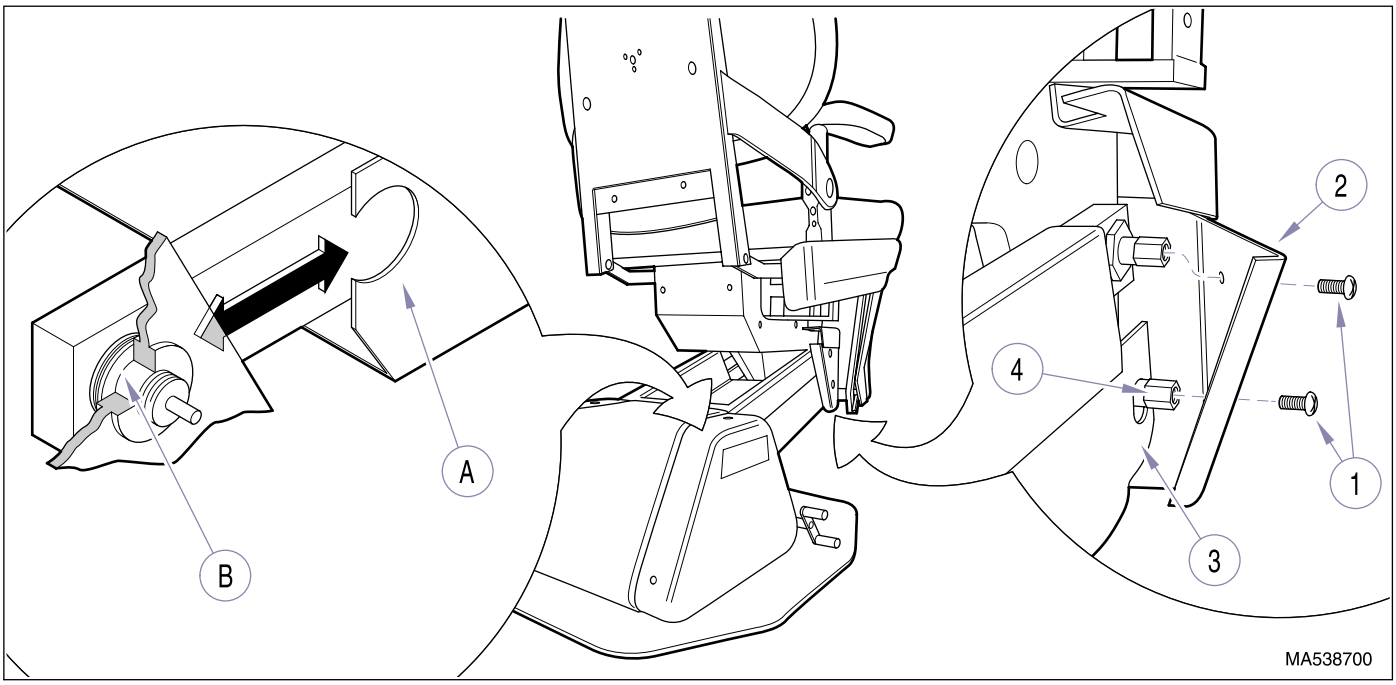


Figure 4-5. Lift Arms Covers Removal / Installation

b. Raise BASE UP function all the way up.

c. Remove four screws (1, Figure 4-6), lockwashers (2), and trunnion retainer plate (3) from lift arms assembly (4).

DANGER

Make sure that the chair top is securely supported before starting to remove base motor. Failure to do so could result in chair top collapsing, which could cause serious personal injury or death.

NOTE

The steel bar portion of the headrest support makes a good steel bar for the following step.

d. Insert steel bar (A) or similar object between platform weldment (5) and lift arms assembly (4). Then, lower BASE DOWN function down until platform weldment (5) is being supported by the steel bar.

e. Continue to lower BASE DOWN function until trunnion arms (B) come out of trunnion slots (C).

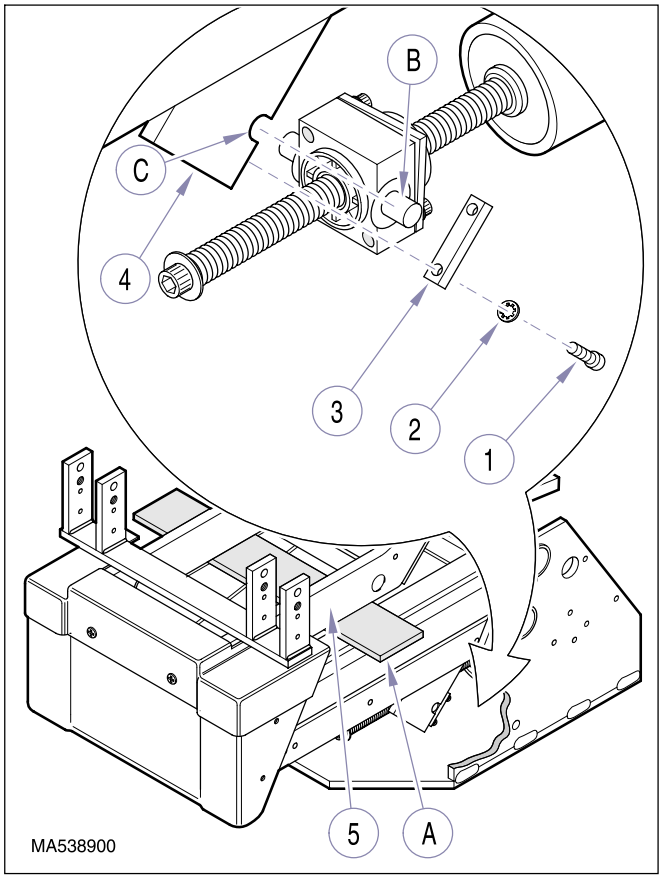


Figure 4-6. Base Motor Trunnion Removal / Installation

(10) ***If base motor <u>is not</u> operable:***

a. Lay chair over on its side or secure chair top by placing supports (such sawhorses) under the foot section and back section of table.

b. Remove four screws (1, Figure 4-6), lockwashers (2), and trunnion retainer plate (3) from lift arms assembly (4).

DANGER
Make sure that the chair top is securely supported before starting to remove base motor. Failure to do so could result in chair top collapsing which could cause serious personal injury or death.

c. Use a jack or manually raise chair top until trunnion arms (B) come out of trunnion slots (C). Allow chair top to lower back on supports.

(11) Remove locknut (1, Figure 4-7) and cable clamp (2) from screw (3). Then, remove cable clamp from base motor wire harness (4).

(12) Disconnect base motor wire harness (4) from wire harness (5).

(13) Remove two retaining rings (6) and pin (7) securing clevis of base motor (8) to mounting bracket (9).

(14) Remove screw (10), lockwasher (11), and ground wire (12) from base motor (8).

(15) Remove two washers (13); one from each side of trunnion (14).

B. Installation

(1) Install two washers (13, Figure 4-7); one on each side of trunnion (14).

NOTE
The new base motor may come with a ground wire (12). If so, remove the new ground wire and use the existing ground wire on the chair.

(2) Attach ground wire (12) to base motor (8) with lockwasher (11) and screw (10).

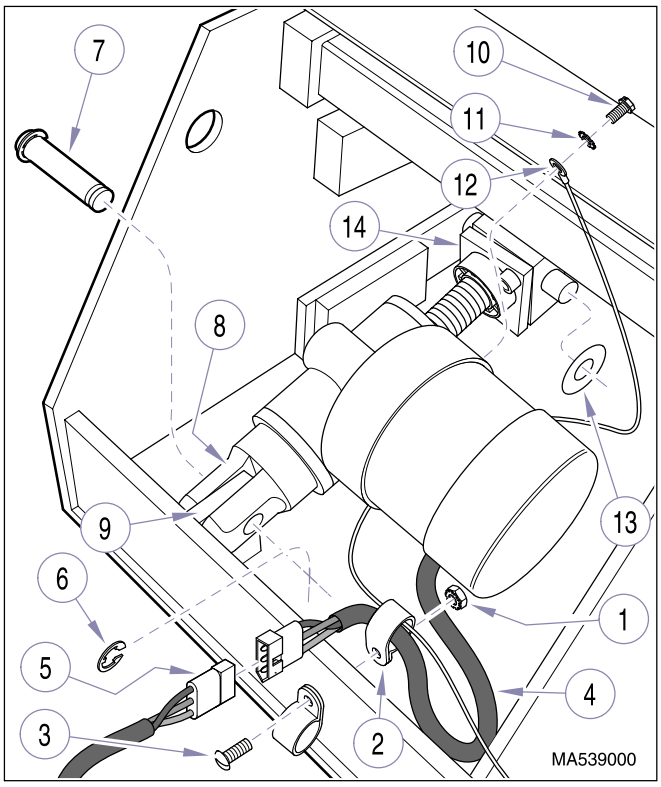


Figure 4-7. Base Motor Removal / Installation

(3) Attach clevis of base motor (8) to mounting bracket (9) with pin (7) and two retaining rings (6).

(4) Connect base motor wire harness (4) to wire harness (5).

(5) Install cable clamp (2) on base motor wire harness (4). Then, install cable clamp on screw (3) and secure with locknut (1).

(6) Plug chair power cord into wall outlet receptacle.

WARNING
Make sure trunnion arms (B) are fully seated in trunnion slots (C) before proceeding to step 8. Failure to do so could allow chair to collapse, resulting in serious personal injury or death.

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(7) Raise BASE UP function up while guiding trunnion arms (B, Figure 4-6) into trunnion slots (C). Make sure trunnion arms are fully seated in trunnion slots, before proceeding to the next step.

(8) Raise BASE UP function all the way up and remove steel bar (A) or other type of supports.

(9) Install trunnion retainer plate (3) on lift arms assembly (4) and secure with four lockwashers (2) and screws (1).

(10) Pull outward on one corner of seat cover bottom cover (2, Figure 4-5); then install bottom lift arm cover (3) on standoff (4), making sure cutout (A) is mounted on lift arms joint (B). Repeat step for other corner of bottom lift arm cover.

(11) Install four screws (1); two on each side of seat cover bottom (2).

(12) Position mounting plate (3, Figure 4-4) back in its normal position, making sure all wire harnesses are routed correctly.

(13) Secure mounting plate (3) in place with two cover mounting brackets (2) and four screws (1).

(14) Install center base cover (3, Figure 4-3) on two cover mounting brackets (6) and secure with four screws (5).

(15) Install L.H. base cover (4) on center base cover (3) and secure with three screws (1).

(16) Install R.H. base cover (2) on center base cover (3) and secure with three screws (1).

(17) Plug chair power cord into wall outlet receptacle.

4.4 Base Motor Worm Gear Removal / Installation

A. Removal

(1) Remove base motor (Refer to para 4.3).

(2) Using a 3mm Allen Wrench, remove two setscrews (1, Figure 4-8) and then unscrew clevis (2) from motor housing (3).

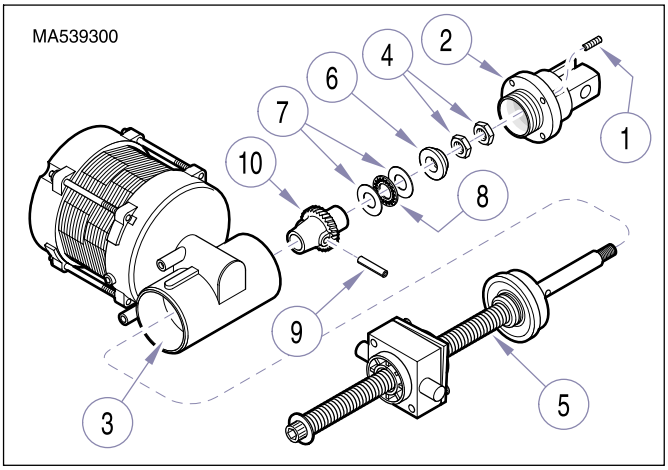


Figure 4-8. Worm Gear Removal / Installation

(3) Remove two nuts (4) from screw shaft (5).

(4) Using a rubber mallet, gently drive screw shaft (5) out of motor housing (3).

(5) Remove retaining ring (6), two bearing races (7), and bearing (8) from motor housing (3).

(6) Using a 3/16" punch and hammer, drive out roll pin (9) and remove worm wheel (10) from screw shaft (5).

(7) Inspect inside motor housing (3) for broken worm wheel pieces, metal shavings, or any other foreign debris. Remove any debris. Inspect screw shaft (5) for burrs. Remove any burrs with a file.

B. Installation

(1) Install worm wheel (10) on screw shaft (5) and then, using a hammer and 3/16" punch, secure with roll pin (9), making sure ends of roll pin are flush with worm wheel.

NOTE
There may be excess grease in the motor housing which may be used for the following step.

(2) Coat surfaces of two bearing races (7), bearing (8), and worm wheel (10) with high temperature bearing grease.

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(3) Insert screw shaft (5) into motor housing (3) as far as possible by hand. Then, using a rubber mallet, gently tap screw shaft (5) in until fully seated in motor housing.

(4) Install one bearing race (7), bearing (8), one bearing race (7), and retaining ring (6) on end of screw shaft (5).

(5) Coat threads of two nuts (4) with removable threadlocking adhesive (Loctite 242).

(6) Install first nut (4) on screw shaft (5) and tighten until finger tight. Then, using a wrench, tighten nut 1/4 additional turn.

(7) Install second nut (4) on screw shaft (5) until finger tight. Then, while holding first nut (4) in place, tighten second nut against first nut.

(8) Screw clevis (2) into motor housing (3) and tighten until finger tight. Then, unscrew clevis slightly until the next closest setscrew (1) holes are aligned with setscrew holes on motor housing (3). Secure clevis in this position with two setscrews (1).

(9) Install base motor (Refer to para 4.3).

4.5 Back Capacitor Removal / Installation

A. Removal

(1) Unplug chair power cord from wall outlet receptacle.

(2) Separate velcro of seat cushion (1, Figure 4-9) from velcro of seatrest plate (2) and remove seat cushion from chair.

(3) Remove four screws (3), washers (4), and seatrest plate (2) from L.H. & R.H. support weldments (5).

(4) Remove two locknuts (6) and partially separate housing (7) from back motor (8).

(5) Carefully and gently pry back capacitor (9) out of housing (7).

WARNING
The capacitor contains stored electricity. Never touch terminals of capacitor, even if power has been disconnected. Always discharge capacitor before touching capacitor terminals or wires. Failure to comply with these instructions could result in serious personal injury or death.

(6) Discharge back capacitor (9).

(7) Disconnect one wire (10) from each terminal group of back capacitor (9).

B. Installation

(1) Connect one wire (10) to each terminal group of back capacitor (9).

(2) Remove backing and attach foam spacer (11) to back capacitor (9).

(3) Position back capacitor (9) in housing (7); then install housing on back motor (8) and secure with two locknuts (6).

(4) Install seatrest plate (2) on L.H. & R.H. support weldments (5) and secure with four washers (4) and screws (3).

(5) Install seat cushion (1) on seatrest plate (2), making sure to align velcro of both parts.

(6) Plug chair power cord into wall outlet receptacle.

4.6 Back Motor Removal / Installation

A. Removal

(1) Unplug chair power cord from wall outlet receptacle.

(2) Separate velcro of seat cushion (1, Figure 4-10) from velcro of seatrest plate (2) and remove seat cushion from chair.

(3) Remove four screws (3), washers (4), and seatrest plate (2) from L.H. & R.H. support weldments (5).

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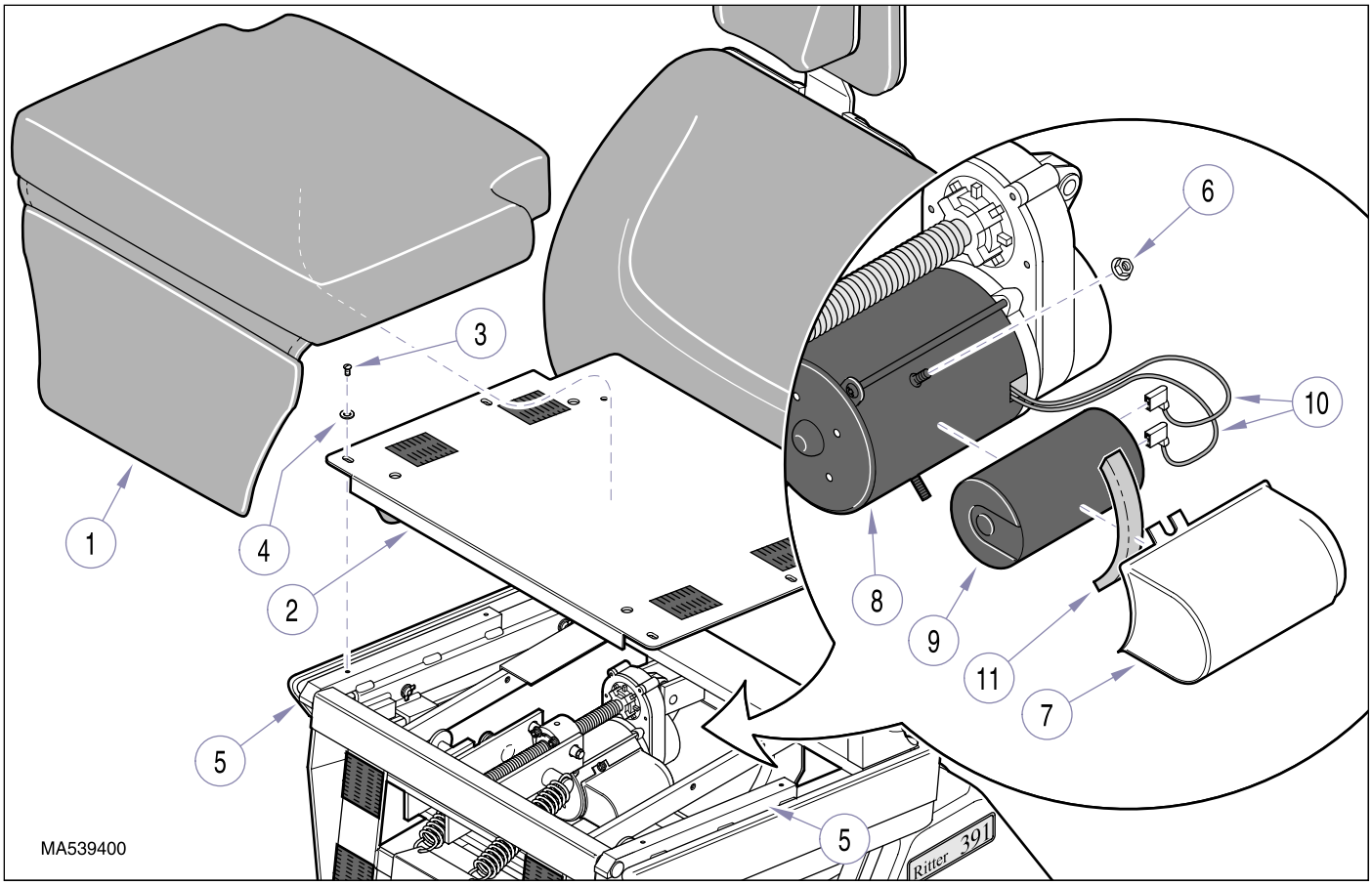


Figure 4-9. Back Capacitor Removal / Installation

(4) Disconnect motor wire harness (6) from wire harness (7).

(5) Remove locknut (8), screw (9), three ground wires (10) and lock washer (11) from platform weldment (12).

WARNING
Do not try to keep the chair top from moving by holding onto the foot section. You will not be able to hold it and it will move, severely pinching your hand. Failure to heed this advice could result in a crushed hand or broken hand and / or fingers.

(6) While supporting ***the top*** of back section (1, Figure 4-11) to prevent it from lowering, remove two retaining rings (2), top motor pin (3), washer (4), and separate back motor (5) from clevis (6).

(7) Carefully lower the back section (1) down, making sure back section is lowered completely before releasing. Back motor (5) may catch on platform weldment (7), seemingly indicating it is completely lowered, when in fact it isn't; this is a dangerous situation.

(8) Remove two screws (8), trunnion bushings (9), and back motor (5) from clevis (10).

(9) If worn or broken, remove two bushings (11); one from each arm of clevis (6).

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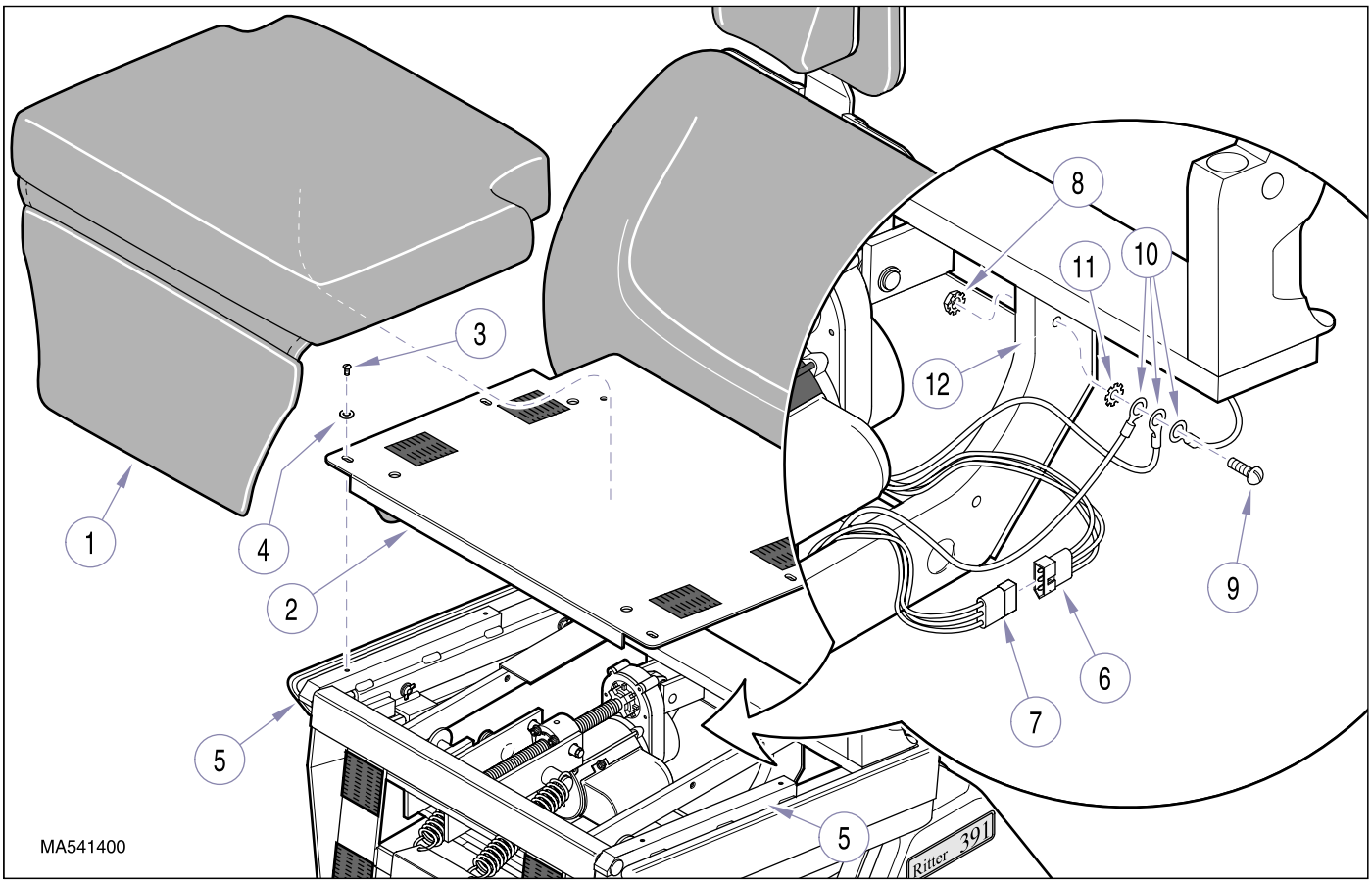


Figure 4-10. Back Motor Wire Harness Disconnection / Connection

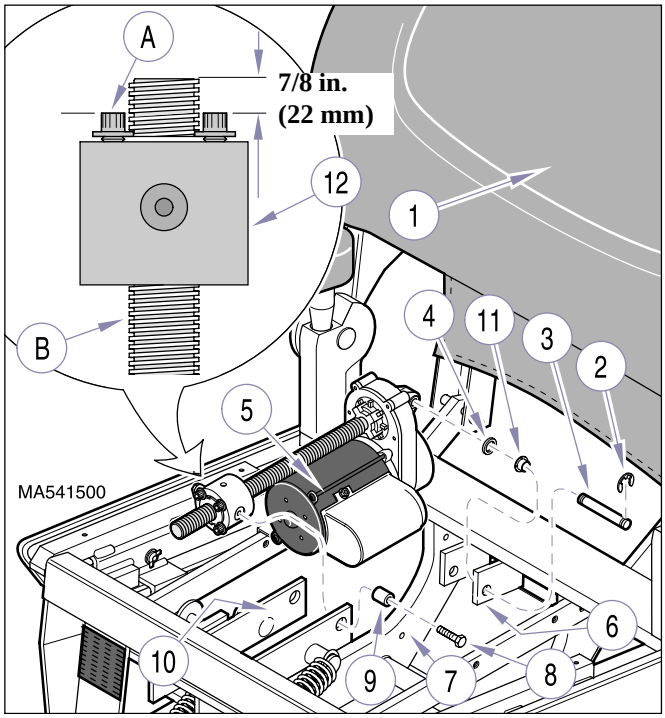


Figure 4-11. Back Motor Removal / Installation

B. Installation

(1) If removed, install two bushings (11, Figure 4-11); one in each arm of clevis (6).

NOTE
Steps 2 thru 6 are designed to make sure back motor is against its down internal limit switch with trunnion block positioned at end of motor shaft threads before back motor is installed into chair. Failure to do so will result in back motor being stopped by internal limit switch before normal end of travel is reached, limiting chair movement.

(2) Temporarily connect motor wire harness (6, Figure 4-10) to wire harness (7).

(3) Plug chair power cord into wall outlet receptacle.

(4) Run BACK DOWN function until back motor is stopped by motor's internal limit switch.

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(5) Unplug chair power cord from wall outlet receptacle.

(6) Manually adjust trunnion block (12, Figure 4-11) until end of motor shaft (B) extends 7/8 in. (22 mm) past four screws (A) on trunnion block.

CAUTION
Two of the four screws holes in trunnion block (12) in which screws (8) may be screwed into contain setscrews. Rotate trunnion block (12) as necessary so screws (8) are installed in set of holes which do not have the setscrews. Failure to do so could result in screws (8) not being screwed in fully. Also, screws may force setscrews in motor shaft, damaging motor shaft.

(7) Position back motor (5) in chair; then secure trunnion block (12) in clevis (10) with two trunnion bushings (9) and screws (8).

(8) Lift upward on back section (1) as necessary to align support bracket of back motor with clevis (6). Then secure back motor in place with washer (4), top motor pin (3), and two retaining rings (2).

(9) If disconnected, connect motor wire harness (6, Figure 4-10) to wire harness (7).

(10) Connect three ground wires (10) to platform weldment (12) with lockwasher (11), screw (9), and locknut (8).

(11) Run the Back Up function all the way up while observing to make sure the external Back Up limit switch trips before the internal limit switch. If necessary, refer to Base Up limit switch adjustment, para 4.9.

(12) Install seatrest plate (2) on L.H. & R.H. support weldments (5) and secure with four washers (4) and screws (3).

(13) Install seat cushion (1) on seatrest plate (2), making sure to align velcro of both parts.

4.7 PC Circuit Board Removal / Installation

A. Removal

(1) Unplug chair power cord from wall outlet receptacle.

(2) Remove three screws (1, Figure 4-12) and R.H. base cover (2) from center base cover (3).

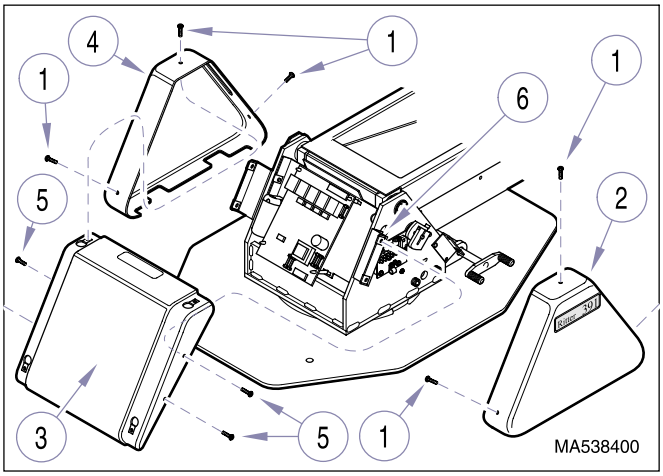


Figure 4-12. Covers Removal / Installation

(3) Remove three screws (1) and L.H. base cover (4) from center base cover (3).

(4) Remove four screws (5) and center base cover (3) from cover mounting bracket (6).

(5) Tag and disconnect foot control harness (1, Figure 4-13) and membrane panel harness (2) from PC circuit board (3).

(6) Disconnect limit switch harness (4), power harness (5), and motor harness (6) from PC circuit board (3).

(7) Using a screwdriver, depress locking tab (A) of standoff (7) while pulling upward on that corner of PC circuit board (3) to release it. Repeat for three remaining standoffs (7) and remove PC circuit board (3) from chair.

(8) Inspect four standoffs (7). If a locking tab (A) on a standoff is broken, remove broken standoff from mounting plate (8).

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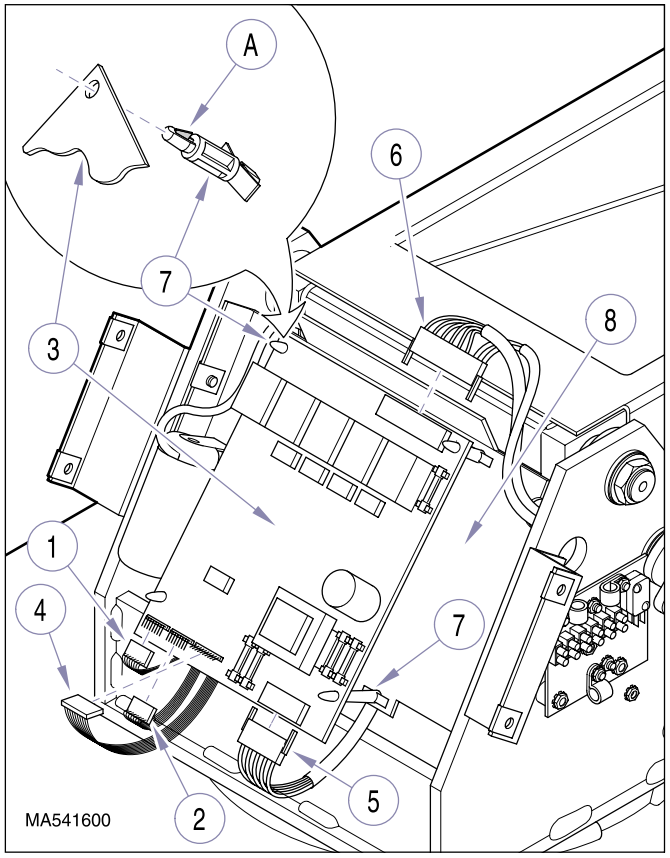


Figure 4-13. PC Circuit Board Removal / Installation

B. Installation

(1) If any were removed, install new standoffs (7, Figure 4-13) on mounting plate (8).

(2) Position PC circuit board (3) on four standoffs (7). Push down on corners of PC circuit board until locking tabs (A) of four standoffs (7) pop out, locking PC circuit board in place.

(3) Connect motor harness (6), power harness (5), and limit switch harness (4) to PC circuit board (3).

(4) Connect membrane panel harness (2) and foot control harness (1) to PC circuit board (3).

(5) Install center base cover (3, Figure 4-12) on cover mounting bracket (6) and secure with four screws (5).

(6) Install L.H. base cover (4) on center base cover (3) and secure with three screws (1).

(7) Install R.H. base cover (2) on center base cover (3) and secure with three screws (1).

(8) Plug chair power cord into wall outlet receptacle.

4.8 Base Up & Base Down Limit Switch Removal / Installation

A. Removal

(1) Unplug chair power cord from wall outlet receptacle.

(2) Remove three screws (1, Figure 4-14) and R.H. base cover (2) from center base cover (3).

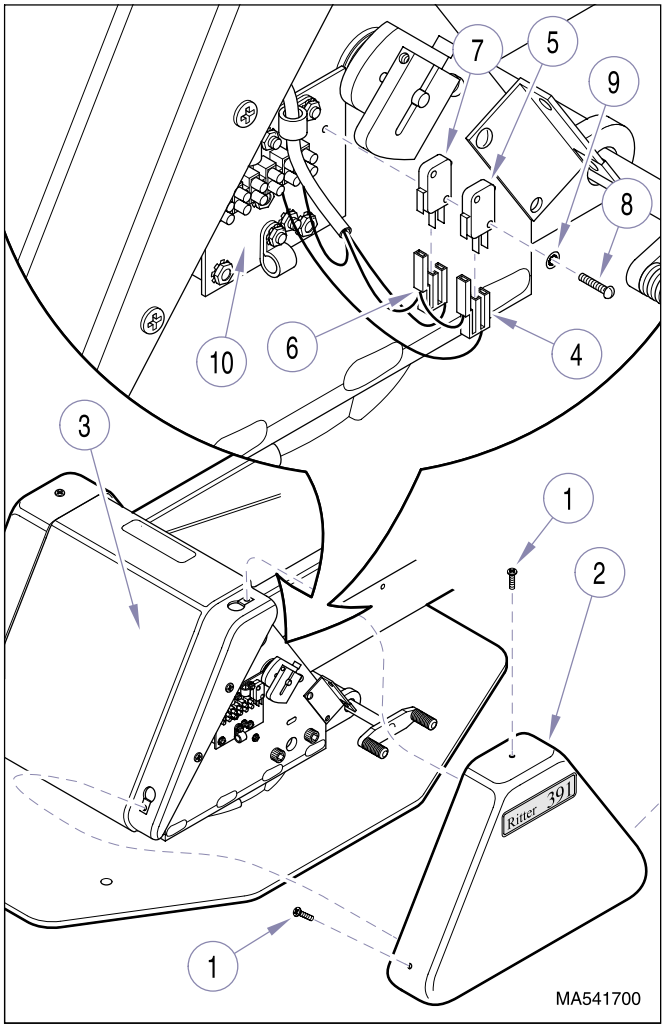


Figure 4-14. Base Up & Base Down Limit Switch Removal / Installation

(3) Tag and disconnect connector (4) from base down limit switch (5).

(4) Tag and disconnect connector (6) from base up limit switch (7).

(5) Remove two screws (8), lockwashers (9), base down limit switch (5) and base up limit switch (7) from electrical connection plate (10).

B. Installation

EQUIPMENT ALERT
Do not overtighten screws (8). Overtightening screws can cause plastic housing of limit switch to crack.

(1) Install base up limit switch (7) and base down limit switch (5) on electrical connection plate (10) and secure with two lockwashers (9) and screws (8).

(2) Connect connector (6) to base up limit switch (7).

(3) Connect connector (4) to base down limit switch (5).

(4) Install R.H. base cover (2) on center base cover (3) and secure with three screws (1).

(5) Plug chair power cord into wall outlet receptacle.

4.9 Base Up & Base Down Limit Switch Adjustment

A. Limit Switch Adjustment

WARNING
The following adjustment procedure must be made with electrical power present. Live line voltage is present on the terminal board besides the limit switches. Use extreme caution not to touch any bare wires or terminals while making adjustments. Doing so could result in electrical shock which could result in severe personal injury or death.

(1) Remove three screws (1, Figure 4-15) and R.H. base cover (2) from center base cover (3).

(2) Loosen screw (4) and rotate cam (5) ***up*** off of trip button (A) of base up limit switch (6).

CAUTION
If base motor reaches its limit, release the Base Up button quickly; the motor is binding at this point and damage to motor could occur.

(3) Raise Base Up function as far as possible without binding motor.

(4) Lower Base Down function approximately 1/2 in. (12.7 mm).

NOTE
Cam (5) should be rotated above trip button (A) of base up limit switch (6) and then be rotated downward as it is being adjusted against trip button of limit switch. Failure to adjust base up limit switch in this manner will result in limit switch being tripped incorrectly because of direction cam rotates.

(5) Rotating in downward direction, adjust cam (5) so that it "just" trips trip button (A) of base up limit switch (6); then tighten screw (4) to secure cam in this position.

(6) Loosen screw (7) and rotate cam (8) ***down*** off of trip button (B) of base down limit switch (9).

CAUTION
Do not run Base Down function any lower than specified in step 7. Doing so could allow the chair to physically collide with itself, damaging the motor, covers, or other components.

(7) Lower Base Down function until Measurement (C) is 4 in. (10.2 cm).

NOTE
Cam (8) should be rotated below trip button (B) of base down limit switch (9) and then be rotated upward as it is being adjusted against trip button of limit switch. Failure to adjust base down limit switch in this manner will result in limit switch being tripped incorrectly because of direction cam rotates.

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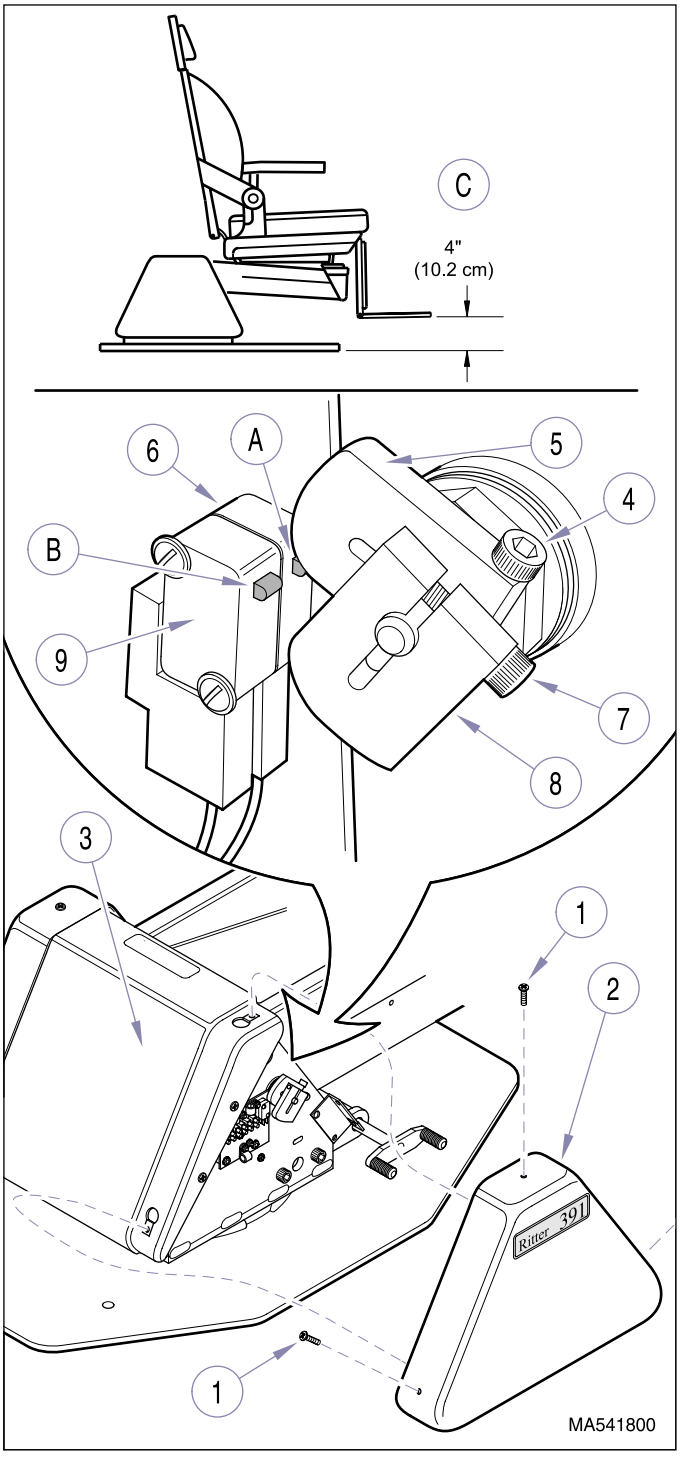


Figure 4-15. Base Up & Base Down Limit Switch Removal / Installation

(8) Rotating in an upward direction, adjust cam (8) so that it "just" trips trip button (B) of base down limit switch (9); then tighten screw (7) to secure cam in this position.

(9) Install R.H. base cover (2) on center base cover (3) and secure with three screws (1).

4.10 Base Up Program Limit Switch Removal / Installation

A. Removal

(1) Remove three screws (1, Figure 4-16) and L.H. base cover (2) from center base cover (3).

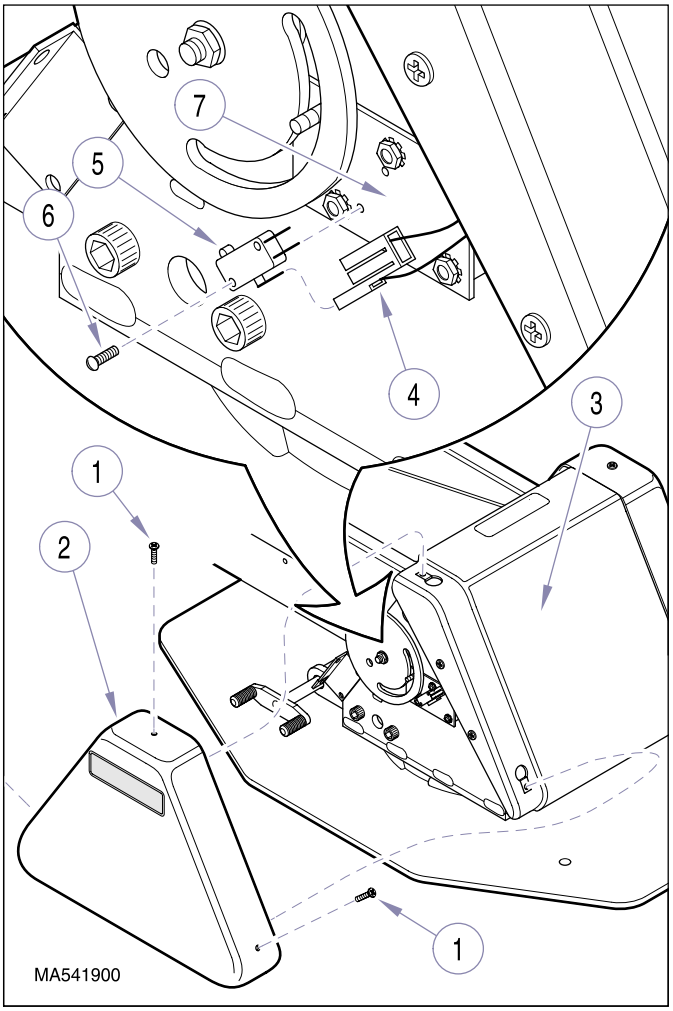


Figure 4-16. Base Up Program Limit Switch Removal / Installation

(2) Disconnect wire harness (4) from base up program limit switch (5).

(3) Remove two screws (6) and base up program limit switch (5) from program plate (7).

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B. Installation

EQUIPMENT ALERT
Do not overtighten screws (6). Overtightening screws can cause plastic housing of limit switch to crack.

(1) Install base up program limit switch (5) on program plate (7) and secure with two screws (6).

(2) Connect wire harness (4) to base up program limit switch (5).

(3) Install L.H. base cover (2) on center base cover (3) and secure with three screws (1).

4.11 Back Up Limit Switch Removal / Installation / Adjustment

A. Removal

(1) Raise Base Up function all the way up and lower Back Down function all the way down.

(2) Unplug chair power cord from wall outlet receptacle.

(3) Perform steps 2 and 3 of para 4.6 to gain access to top side of limit switch.

(4) Disconnect switch harness (1, Figure 4-17) from back up limit switch (2).

(5) Remove two screws (3), nut bar (4), back up limit switch (2), two washers (5), and actuator (6) from limit switch plate (7).

B. Installation

(1) Assemble two screws (3), actuator (6), and two washers (5) on back up limit switch (3).

EQUIPMENT ALERT
Do not overtighten screws (8). Overtightening screws can cause plastic housing of limit switch to crack.

(2) Install assembled back up limit switch (2) and nut bar (4) on limit switch plate (7) and secure by tightening two screws (3).

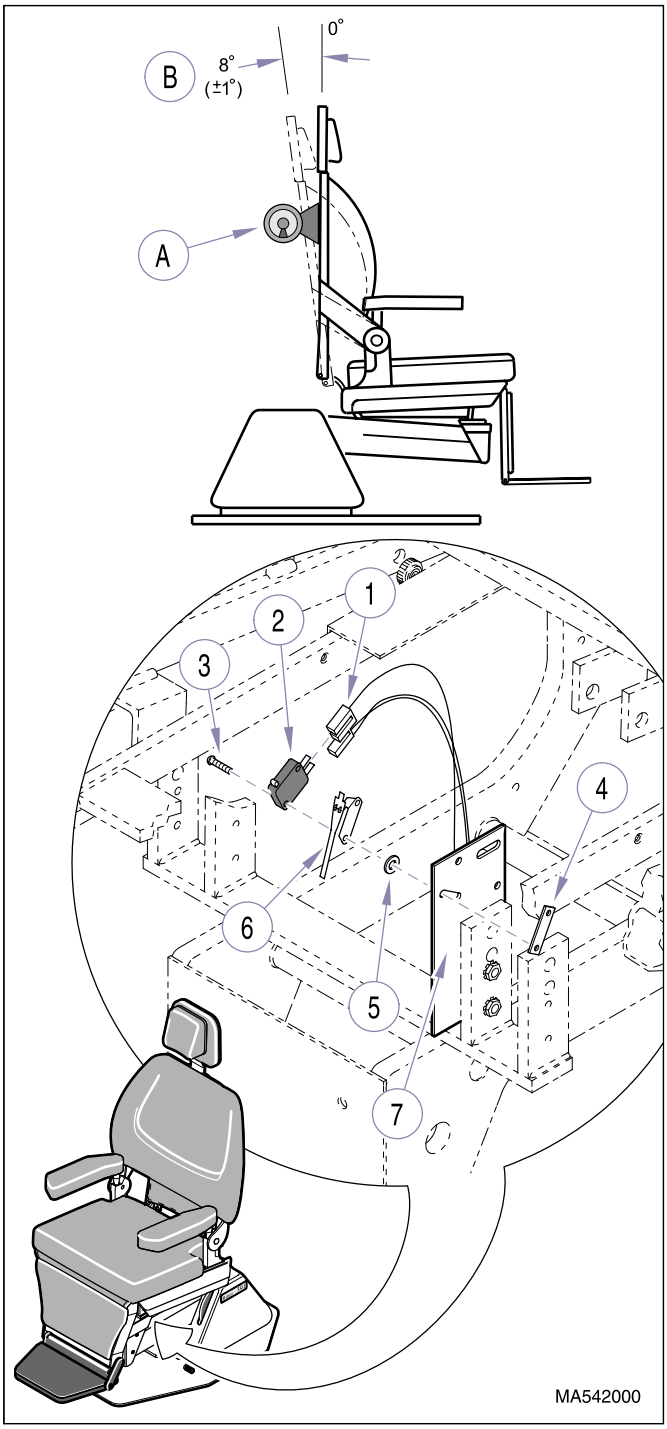


Figure 4-17. Back Up Limit Switch Removal / Installation

(3) Connect switch harness (1) to back up limit switch (2).

C. Adjustment

(1) Raise Back Up function all the way up (until back up limit switch is tripped).

(2) Using a protractor (A), measure Angle (B) on chair back weldment; angle should be -8° (±1°) from vertical.

NOTE
If chair back weldment angle is more than -8° from vertical, limit switch is being tripped too early. If chair back weldment angle is less than -8° from vertical, limit switch is not being tripped soon enough.

(3) Loosen two screws (3) and adjust back up limit switch (2) to trip earlier or later. Retighten two screws (3).

(4) Repeat steps 2 and 3 until Angle (B) measures -8° (±1°) from vertical.

(5) Perform steps 11 and 12 of para 4.6 to install seatrest plate.

4.12 Back Down Program Limit Switch Removal / Installation / Adjustment

A. Removal

(1) Raise Base Up all the way up and lower Back Down function all the way down.

(2) Unplug chair power cord from wall outlet receptacle.

(3) Perform steps 2 and 3 of para 4.6 to gain access to top side of limit switch.

(4) Remove two locknuts (1, Figure 4-18), screws (2), and limit switch bracket (3) from platform weldment (4).

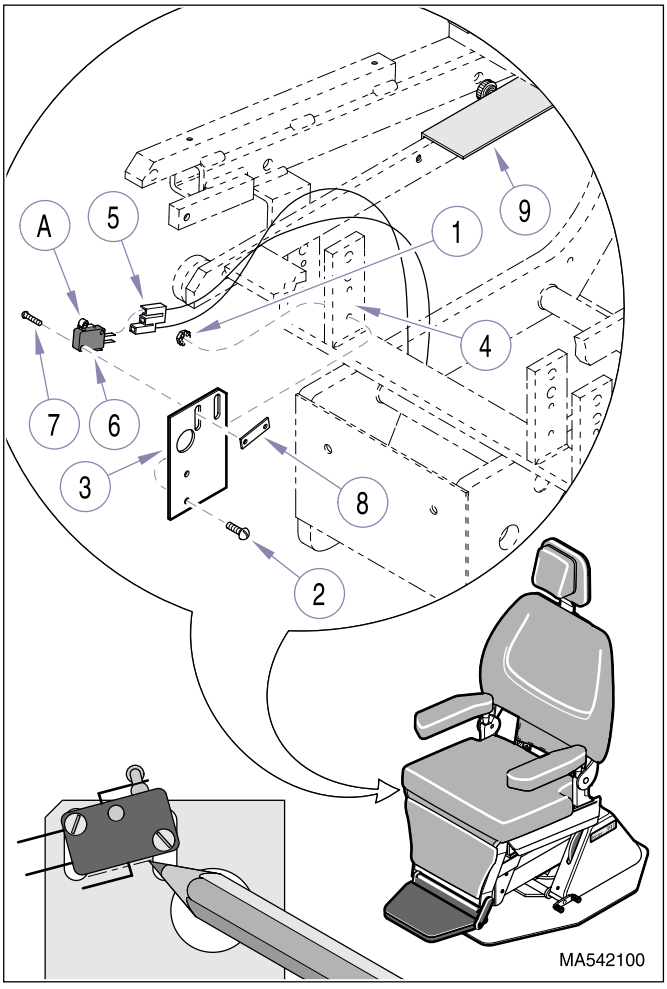


Figure 4-18. Back Down Program Limit Switch Removal / Installation / Adjustment

(5) Disconnect wire harness (5) from back down program limit switch (6).

NOTE
Matchmarking the back down program limit switch's location on the limit switch bracket will make installation faster and easier and possibly eliminate the need to make adjustments, which are difficult since the mounting screws (7) are not easily accessed.

(6) Using a pen or pencil, matchmark outline of back down program limit switch (6) on limit switch bracket (3).

NOTE
Older units have a separate limit switch and switch actuator while newer units have a limit switch which includes a built in switch actuator. The new style limit switch is being sent out as a replacement for old style limit switches and switch actuators which are no longer available.

(7) Remove two screws (7), nut bar (8), and back down program limit switch (6) from limit switch bracket (3).

B. Installation

(1) Install back down program limit switch (6) on limit switch bracket (3) and loosely secure with two screws (7) and nut bar (8).

(2) Align back down program limit switch (6) with match marks made during removal and then tighten two screws (7) to secure limit switch in place.

(3) Connect wire harness (5) to back down program limit switch (6).

(4) Install limit switch bracket (3) on platform weldment (4) and secure with two screws (2) and locknuts (1).

C. Adjustment

NOTE
This adjustment refers to an up or down adjustment of the limit switch trip arm so that it can make proper contact with the operator adjustable programming plate. It is not referring to an adjustment of the limit switch to get it to trip earlier or later - the programming plate can be adjusted to do that.

(1) Run Auto Operate function and observe. If trip arm (A) is too low and does not trip when it comes into contact with programming plate (9), back down program limit switch needs adjusted.

(2) Remove two locknuts (1), screws (2), and limit switch bracket (3) from platform weldment (4).

(3) Loosen two screws (7) and adjust back down program limit switch (6) upward as necessary. Tighten two screws (7) to secure back down program limit switch (6) in place.

(4) Install limit switch bracket (3) on platform weldment (4) and secure with two screws (2) and locknuts (1).

(5) Repeat steps 1 thru 4 until trip arm (A) is satisfactorily tripped when it comes into contact with programming plate (9).

(6) Perform steps 11 and 12 of para 4.6 to install seatrest plate.

4.13 Membrane Switch Panel Removal / Installation

A. Removal

(1) Unplug chair power cord from wall receptacle.

(2) Remove back upholstery by pulling back upholstery (1, Figure 4-19) approximately 1 in. (2.5 cm) toward head of chair and then lifting upholstery straight off of four locking rings (2).

(3) Disconnect wire harness (3) from membrane switch panel (4).

(4) Remove two locknuts (5) and remove membrane switch panel (4) from two studs (6).

B. Installation

CAUTION
When replacing membrane switch panel on patients right hand side of chair, make sure star washer (A) and ground wire (B) are re-installed on the bottom stud (6) as shown.

(1) Install membrane switch panel (4) on two studs (7) and secure with two locknuts (5).

(2) Connect wire harness (3) to membrane switch panel (4).

(3) Install back upholstery by positioning back upholstery (1) on four locking rings (2) and then pushing back upholstery approximately 1 in. (2.5 cm) toward foot end of chair to lock the back upholstery into place on locking rings.

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(4) Plug chair power cord into wall receptacle.

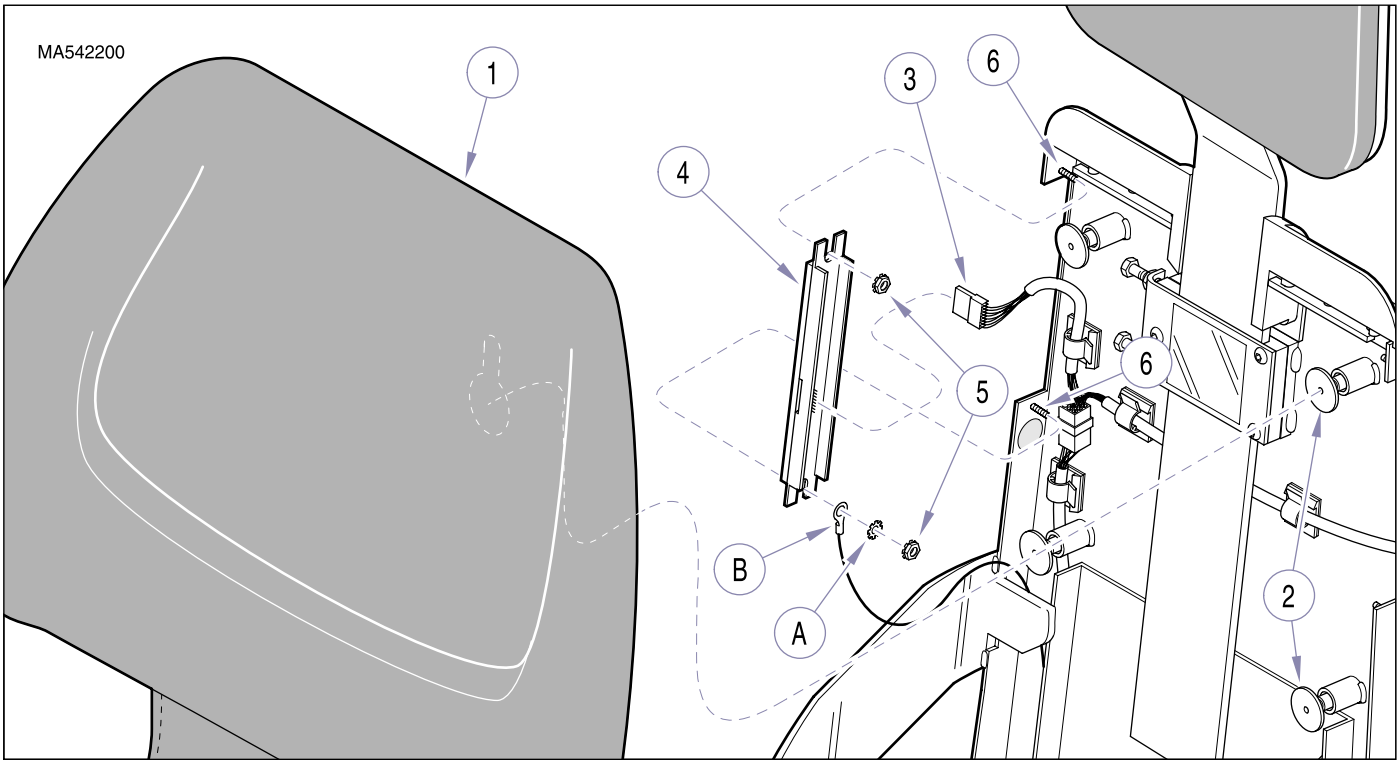


Figure 4-19. Membrane Switch Panel Removal / Installation

4.14 Typical Manual Footswitch Removal / Installation

A. Removal

(1) Unplug chair power cord from wall outlet receptacle.

(2) Remove five screws (1, Figure 4-20), base plate (2), and insulation (3) from footswitch housing (4).

(3) Remove two nuts (5) and actuator (6) from two studs (7).

(4) Pull footswitch (8) off of two studs (7); then tag and disconnect two wires (9) from terminals of footswitch (8).

B. Installation

(1) Connect two wires (9) to terminals of footswitch (8).

(2) Install footswitch (8) and actuator (6) on two studs (7) and secure with two nuts (5).

(3) Install insulation (3) and base plate (2) on footswitch housing (4) and secure with five screws (1).

(4) Plug chair power cord into wall outlet receptacle.

4.15 Auto Exit / Operate Footswitch Removal / Installation

A. Removal

(1) Unplug chair power cord from wall outlet receptacle.

(2) Remove five screws (1, Figure 4-21), base plate (2), and insulation (3) from footswitch housing (4).

(3) Tag and disconnect three wires (5) from terminals of footswitch (6).

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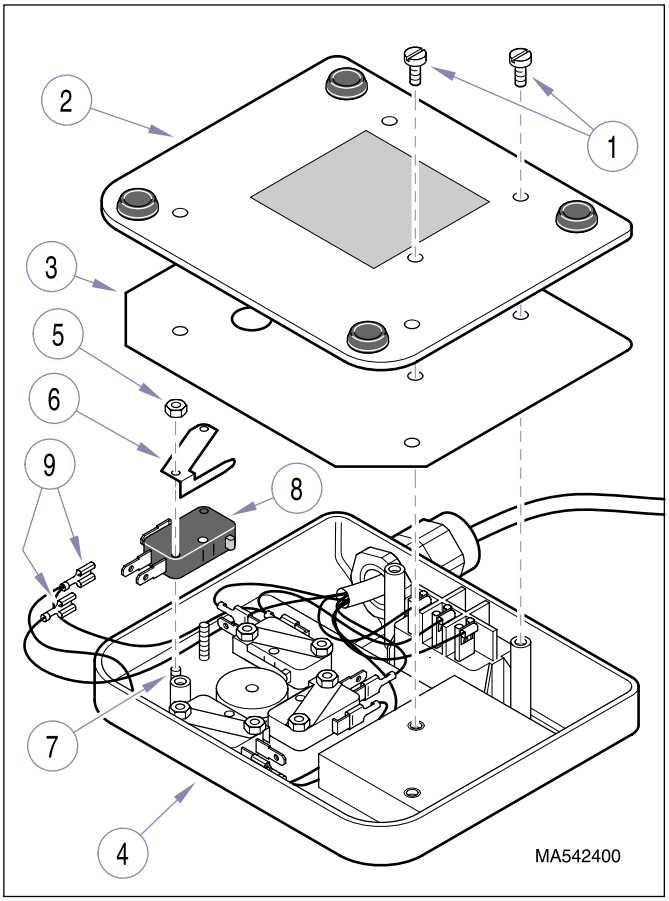


Figure 4-20. Manual Footswitch Removal / Installation

(4) While simultaneously pushing in on four locking tabs (A) of footswitch (6), push footswitch out of footswitch housing (4).

B. Installation

CAUTION
Make sure the footswitch is installed in the same orientation as shown in illustration. Failure to do so will result in incorrect actions when the Auto Operate or Auto Exit functions are selected.

(1) Push footswitch (6) into footswitch housing (4) until it snaps into place and is fully seated.

(2) Connect three wires (5) to terminals of footswitch (6).

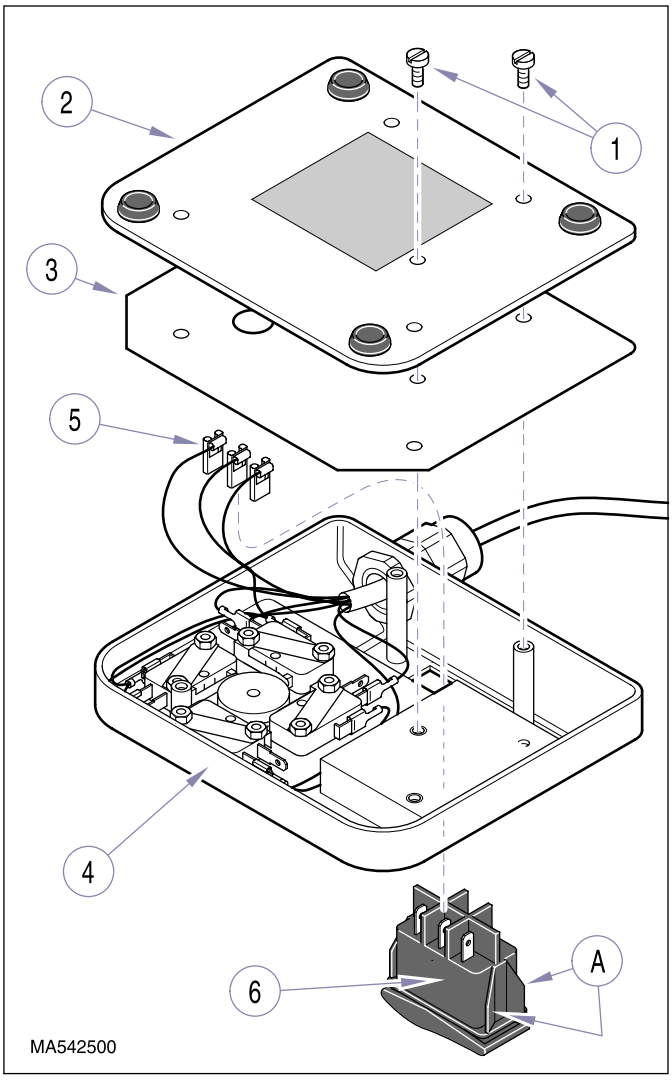


Figure 4-21. Auto Exit / Operate Switch Removal / Installation

(3) Install insulation (3) and base plate (2) on footswitch housing (4) and secure with five screws (1).

(4) Plug chair power cord into wall outlet receptacle.

4.16 Lamp Transformer Removal / Installation

A. Removal

(1) Unplug chair power cord from wall outlet receptacle.

(2) Remove three screws (1, Figure 4-22) and R.H. base cover (2) from center base cover (3).

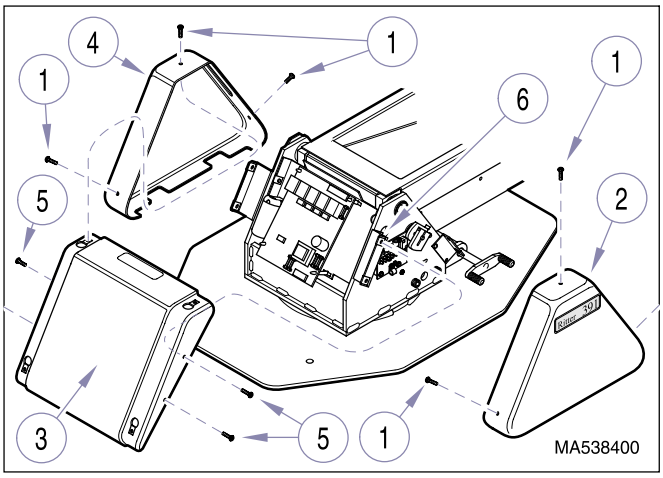


Figure 4-22. Covers Removal / Installation

(3) Remove three screws (1) and L.H. base cover (4) from center base cover (3).

(4) Remove four screws (5) and center base cover (3) from two cover mounting brackets (6).

(5) Remove four screws (1, Figure 4-23) and two cover mounting brackets (2) from mounting plate (3).

NOTE
Cut any cable ties or remove any cables from cable clamps which are restricting movement of mounting plate (3) when its left side is being pulled outward.

(6) Carefully pull outward on left side of mounting plate (3) and position so lamp transformer (4) can be accessed (as shown in illustration).

(7) Disconnect two transformer harnesses (5) from two wire harnesses (6).

NOTE
The following step is necessary to allow top of PC circuit board to be slightly separated from mounting plate (3) so that the mounting hardware for lamp transformer may be accessed.

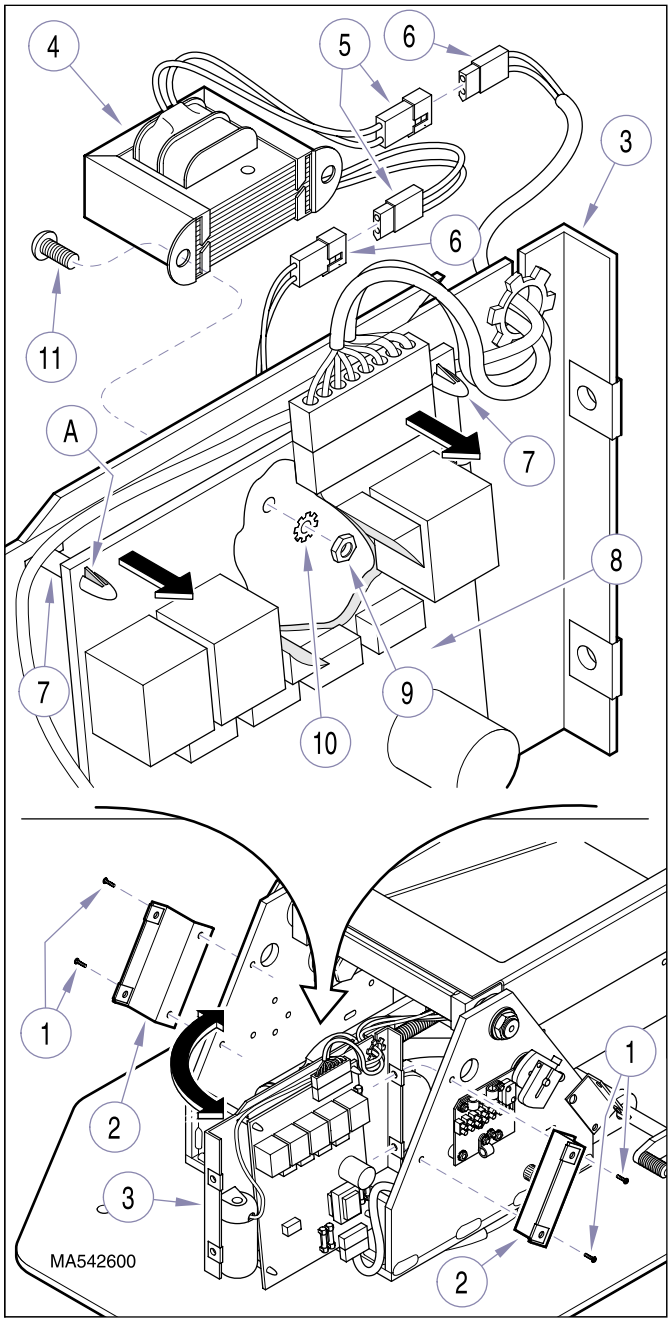


Figure 4-23. Lamp Transformer Removal / Installation

(8) Using a screwdriver, depress two top locking tabs (A) of standoffs (7) while pulling upward on those two corners of PC circuit board (8) to release it from standoffs. Pull outward slightly on top of PC circuit board (8) to gain access to nuts (9) in following step.

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(9) Remove two nuts (9), lockwashers (10), screws (11), and lamp transformer (4) from mounting plate (3).

B. Installation

(1) Install lamp transformer (4, Figure 4-23) on mounting plate (3) and secure with two screws (11), lockwashers (10), and nuts (9).

(2) Push down on two top corners of PC circuit board (8) until locking tabs (A) of two standoffs (7) pop out, locking PC circuit board in place.

(3) Connect two transformer harnesses (5) to two wire harnesses (6).

(4) Position mounting plate (3) back in its normal position, making sure all wire harnesses are routed correctly.

(5) Secure mounting plate (3) in place with two cover mounting brackets (2) and four screws (1).

(6) Install center base cover (3, Figure 4-22) on two cover mounting brackets (6) and secure with four screws (5).

(7) Install L.H. base cover (4) on center base cover (3) and secure with three screws (1).

(8) Install R.H. base cover (2) on center base cover (3) and secure with three screws (1).

(9) Plug chair power cord into wall outlet receptacle.

4.17 Rotation Brake Adjustments

(Dual Brake Pedal w/ Two Brake Shoes)

A. Removal

(1) Raise Base Up function all way up.

WARNING
Always disconnect the power cord from the outlet receptacle before removing any of the table's covers/shrouds or making any repairs to prevent the possibility of electrical shock. Failure to comply with these instructions could result in personal injury.

(2) Unplug chair power cord from wall outlet.

(3) Remove three screws (1, Figure 4-22) and R.H. base cover (2).

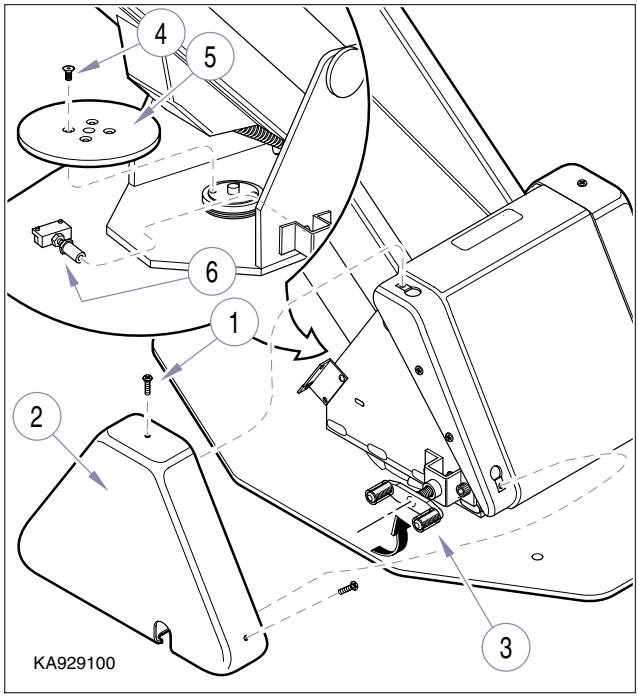


Figure 4-22. Lock Block Removal.

(4) Place brake lever (3) in *unlocked* position.

(5) Remove four screws (4) and disc lock (5).

(6) Remove lock block assembly (6).

(7) Unscrew lock block (1,Figure 4-23) from lock stud (2).

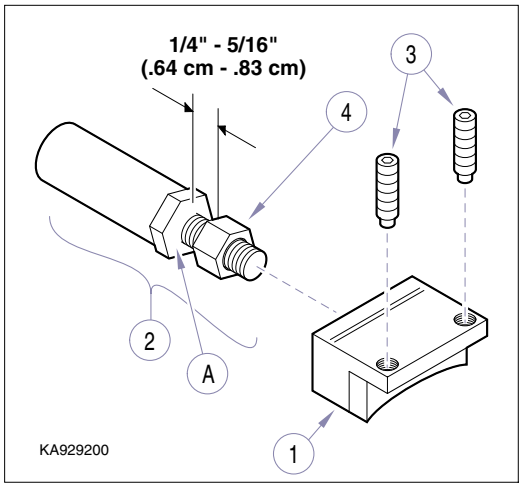


Figure 4-23. Lock Block Disassembly.

(8) Remove two set screws (3) from lock block (1).

B. Adjustment

(1) Loosen two screws (5, Figure 4-24) securing rotational lock bracket (6) to upright housing assembly (2

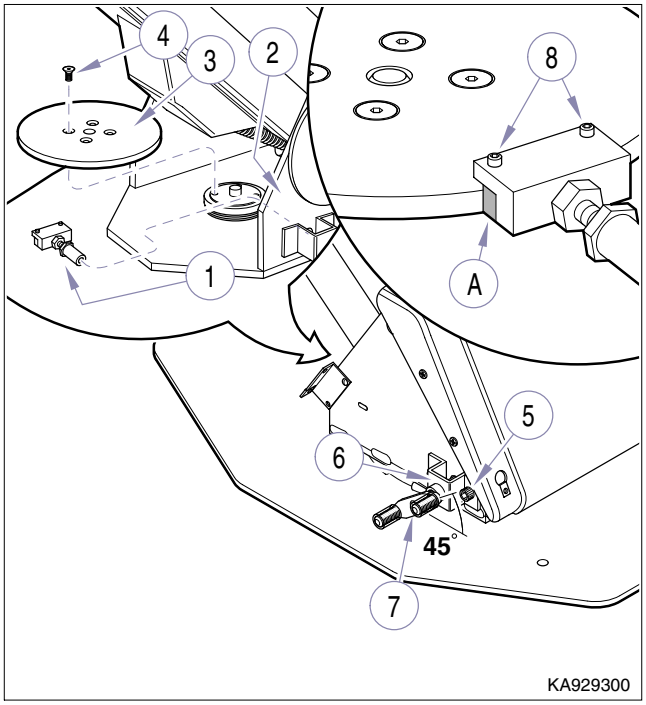


Figure 4-24. Rotational Brake Adjustment

(2) Position brake lever (7) so that it is at a 45° angle as shown in illustration.

NOTE
Make sure brake shoe (A) is seated correctly against disc lock (3). Nylon tipped set screws (8) must be adjusted to hold lock block assembly (1) in a level position to prevent uneven wear on brake shoe (A). For adjustment to work correctly, brake lever must continue to be pushed on firmly while screws are being tightened.

(3) While pulling upward on brake lever (7), push inward to force brake shoe (A) and set screws (8) firmly against disc lock (3); then tighten two screws (5).

(4) Position brake lever in *Brake* position and check adjustments.

(Dual Brake Pedal with One Brake Shoe)

C. Adjustment

(1) Raise Base Up function all the way up.

(2) Unplug chair power cord from wall outlet receptacle.

(3) Remove three screws (1, Figure 4-25) and R.H. base cover (2) from center base cover (3)

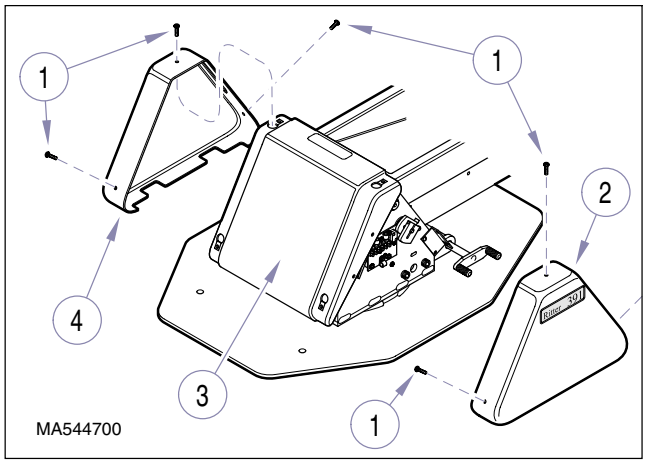


Figure 4-25. Covers Removal / Installation

(4) Loosen two screws (1, Figure 4-26) on left side of chair and two screws (2) on right side of chair.

(5) Position brake lever (3) so that it is at a 45° angle as shown in illustration.

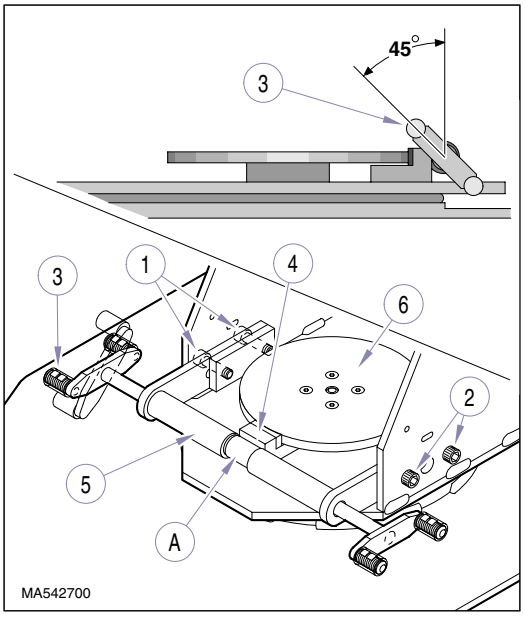


Figure 4-26. Brake Rotation Adjustment

(6) Make sure brake shoe (4) is in cam cutout (A) of brake cam (5).

NOTE
Make sure brake shoe (4) is seated correctly against brake cam (5). For the adjustment to work correctly, the brake cam must continue to be pushed on firmly while screws (1 and 2) are being tightened.

(7) While maintaining 45° angle of brake lever (3), push brake cam (5) to force brake shoe (4) firmly against brake disc (6). Then, while holding brake cam (5) firmly in place against brake disc (6), tighten two screws (1) and then two screws (2). Tighten screws to 40 ft-lbs (54.2 N•m).

(8) Install L.H. base cover (4, Figure 4-25) on center base cover (3) and secure with three screws (1).

(9) Install R.H. base cover (2) on center base cover (3) and secure with three screws (1).6

4.18 Headrest Slide Adjustment

A. Adjustment

(1) Raise Back Up function all the way up.

(2) Remove back upholstery by pulling back upholstery (1, Figure 4-27) approximately 1 in. (2.5 cm) toward head of chair and then lifting upholstery straight off of four locking rings (2).

(3) Loosen two jam nuts (3).

CAUTION
Tighten or loosen two adjustment screws (4) evenly to allow for full and even surface contact of friction tangs. Failure to do so could result in uneven friction braking.

(4) If headrest assembly (A) slides down by itself or moves too easily, increase headrest slide friction setting by tightening two adjustment screws (4).

If headrest assembly (A) requires excessive force to position, decrease headrest slide friction setting by loosening two adjustment screws (4).

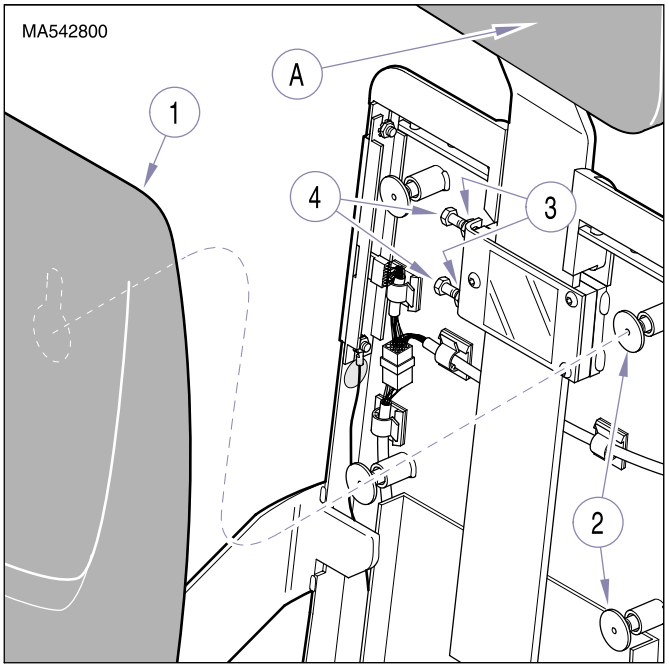


Figure 4-27. Headrest Slide Adjustment

(5) Test friction setting by sliding headrest assembly (A) in and out. Repeat step (4) until desired friction setting is achieved.

(6) While holding adjustment screws (4) stationary with a wrench, tighten jam nuts (3).

(7) Install back upholstery by positioning back upholstery (1) on four locking rings (2) and then pushing back upholstery approximately 1 in. (2.5 cm) toward foot end of chair to lock the back upholstery into place on locking rings.

4.19 Footlatch Spring Removal / Installation

A. Removal

(1) Remove shoulder screw (1, Figure 4-28) and foot platform lever (2) from foot platform (3).

(2) Loosen setscrew (4) and remove spring lock pad (5) and footlatch spring (6) from foot platform lever (2).

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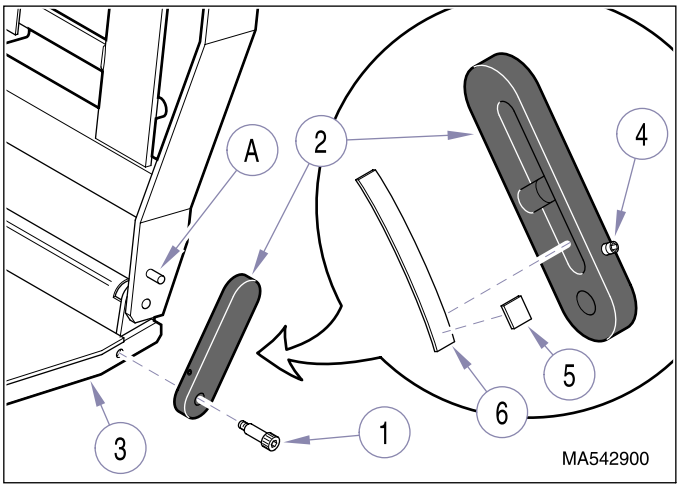


Figure 4-28. Footlatch Spring Removal / Installation

B. Installation

CAUTION
Make sure the concave of footlatch spring (6) faces downward. Failure to do so could result in footlatch release lever not working properly.

(1) Position footlatch spring (6) and spring lock pad (5) in groove of foot platform lever (2), making sure end of footlatch spring and spring lock pad are located under setscrew (4). Tighten setscrew (4) to secure footlatch spring and spring lock pad in place.

(2) Install foot platform lever (2) on foot platform (3) and secure with shoulder screw (1), making sure stop pin (A) is inserted under footlatch spring (6).

(3) Raise the foot platform. When the foot platform is raised, the foot platform lever (2) should automatically snap into locked position.

4.20 Back Section Pivot Bearings Removal / Installation

A. Removal

(1) Raise BACK UP function all the way up.

(2) Remove retaining ring (1, Figure 4-29) from each pin (2).

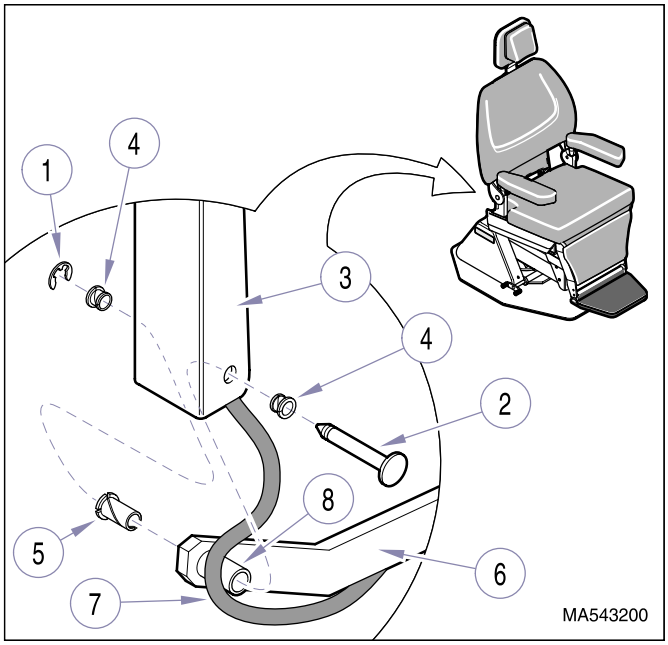


Figure 4-29. Back Section Pivot Bearings Removal / Installation

(3) While supporting chair back weldment (3), remove pins (2). Then, remove two short bearings (4) from each chair back weldment (3) and one long bearing (5) from each tow bar (6).

B. Installation

(1) Install one long bearing (5) in each tow bar (6).

(2) Install two short bearings (4) in each chair back weldment (3).

CAUTION
On patient's right hand side of table, make sure wire harness (7) is routed behind spacer (8).

(3) Align end of each tow bar (6) with chair back weldment (3); then, install two pins (2) and secure with retaining rings (1). On patient's right hand side of table, make sure wire harness (7) is routed behind spacer (8).

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4.21 Base Rotation Bearing Removal / Installation

A. Removal

(1) Remove three screws (1, Figure 4-30) and R.H. base cover (2) from center base cover (3).

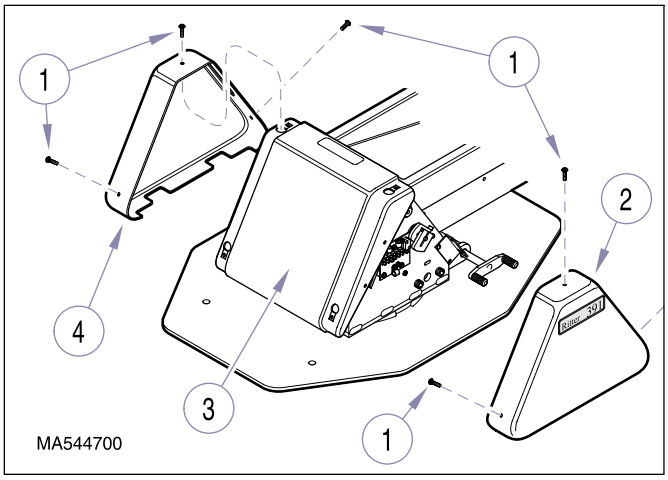


Figure 4-30. Covers Removal / Installation

(2) Remove three screws (1) and L.H. base cover (4) from center base cover (3).

(3) Raise BASE UP function all the way up.

(4) Lower BACK DOWN function all the way down.

(5) Loosen four screws (1, Figure 4-31) and pull brake cam (2) away from center of table.

(6) Remove brake shoe (3) from brake cam cutout (A).

WARNING
Make sure that the chair top is securely supported before starting to remove base plate (6). Failure to do so could result in chair top falling, which could cause serious personal injury.

(7) Place one support (B) under foot section (4) and one support (B) under back section (5) of chair.

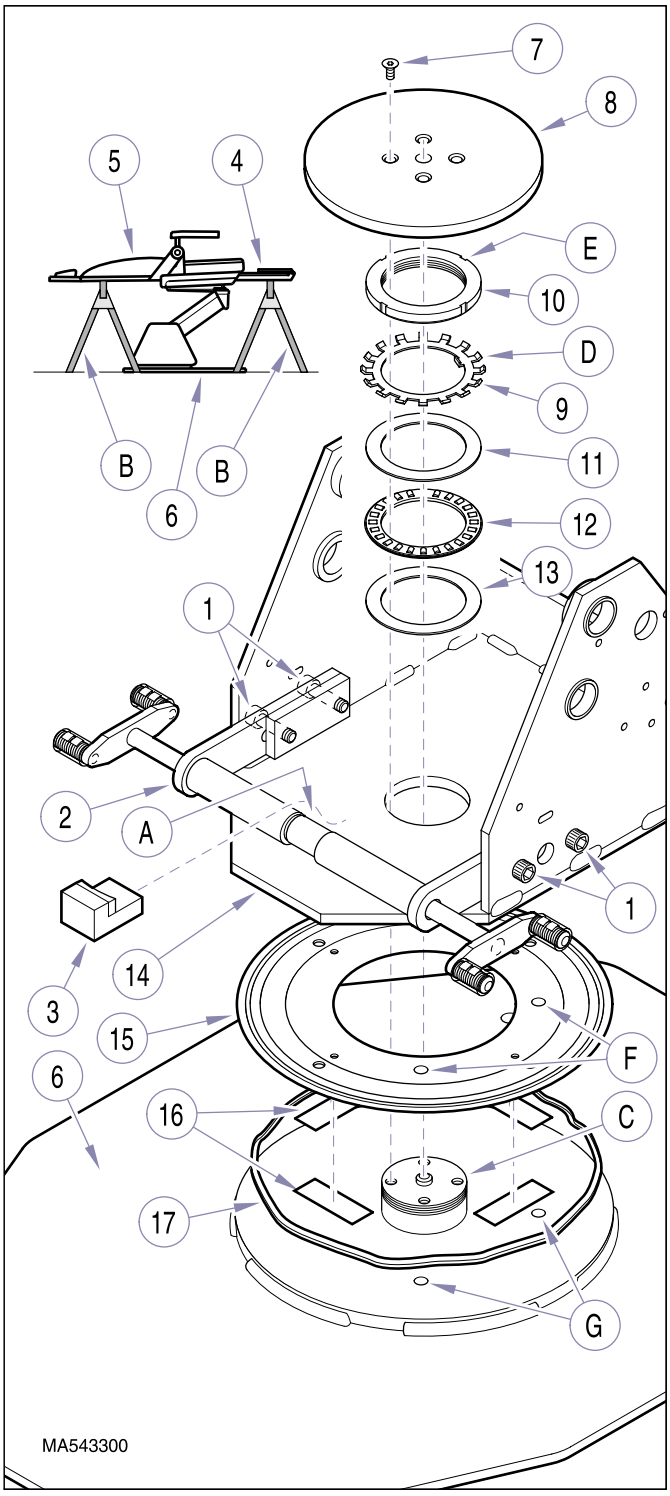


Figure 4-31. Base Rotation Bearing Removal / Installation

(8) Lower BASE DOWN function until weight of chair top is firmly on supports (B); but base plate (6) is still on floor.

(9) Remove four screws (7) and brake disc (8) from base plate hub (C).

NOTE
If locking tab (D) that needs to be bent down is in a hard to reach position, the base plate can be raised off of the floor slightly by lowering the BASE DOWN function; then the base plate (6) can be rotated until the locking tab can be reached.

(10) Bend locking tab (D) of lock ring (9) out of locking slot (E) of lock nut (10).

(11) Using a hammer and punch, remove locking nut (10) from base plate hub (C).

(12) Remove lock ring (9), bearing race (11), bearing (12) and bearing race (13) from base plate hub (C).

WARNING
Do not get under chair top or put hands or feet under chair top while performing following step. Also, make sure supports are firmly under foot and back sections and do not move. Failure to do so could result in severe personal injury if chair top slips off supports and falls.

(13) Run BASE DOWN function to raise base weldment (14) off of base plate hub (C).

(14) Pull base plate (6) out from under base weldment (14).

(15) Pry rotation bearing (15) off of base plate (6).

B. Installation

(1) Clean mating surfaces of base plate (6, Figure 4-31) and rotation bearing (15) with warm water and soap solution. Using clean rag, wipe off excess water and then allow parts to air dry.

(2) Attach four pieces of two sided tape (16) to bottom of rotation bearing (15). Then, apply a bead of RTV sealant (17) to the bottom of rotation bearing.

(3) Align two locator holes (F) of rotation bearing with two locator holes (G) of base plate (6); then install rotation bearing (15) on base plate (6).

(4) Position base plate (6) under base weldment (14).

(5) Run BASE UP function to lower base weldment (14) on base plate hub (C). Lower base weldment until it rests firmly on base plate hub and then remove supports (B) from under foot section (4) and back section (5).

(6) Apply bearing grease to bearing races (11 and 13) and bearing (12).

NOTE
Tapered edge of lock nut (10) should be facing downward while concave of lock ring (9) should be facing upward.

(7) Install bearing race (13), bearing (12), bearing race (11), lock ring (9), and lock nut (10) on base plate hub (C).

(8) Using a hammer and punch, tighten lock nut (10) until lock nut becomes hard to turn, but bearing (12) still turns freely without binding when chair top is rotated.

(9) Back off lock nut (10) approximately 1/8 turn. Then align closest locking tab (D) of lock ring (9) with a locking slot (E) of lock nut (10).

(10) Using a hammer and punch, bend locking tab (D) of lock ring (9) into locking slot (E) of lock nut (10), locking lock nut in place.

(11) Install brake disc (8) on base plate hub (C) and secure with four screws (7).

(12) Install brake shoe (3) in brake cam cutout (A).

(13) Adjust the rotation brake (Refer to para 4.17).

(14) Install L.H. base cover (4, Figure 4-30) on center base cover (3) and secure with three screws (1).

(15) Install R.H. base cover (2) on center base cover (3) and secure with three screws (1).

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4.22 Base Motor Trunnion / Drive Nut Removal / Installation

A. Removal

(1) Remove base motor (Refer to para 4.3).

(2) Using an 8mm allen wrench, remove socket head screw (1, Figure 4-32), flat washer (2), and lockwasher (3) from motor shaft (4).

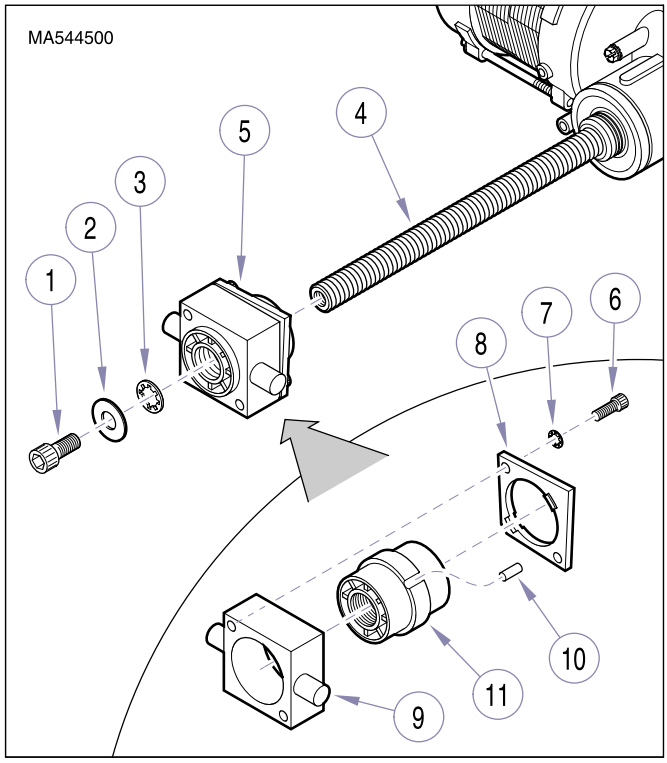


Figure 4-32. Base Motor Trunnion / Drive Nut Removal / Installation

(3) Unscrew trunnion assembly (5) from motor shaft (4).

B. Disassembly

(1) Using a 3/16” allen wrench, remove two socket head screws (6), lockwashers (7), and trunnion plate (8) from trunnion (9).

(2) Remove pin (10) and drive nut (11) from trunnion (9).

C. Assembly

(1) Install drive nut (11) and pin (10) in trunnion (9).

(2) Install trunnion plate (8) on trunnion (9) and secure with two lockwashers (7) and socket head screws (6).

D. Installation

(1) Screw trunnion assembly (5) on motor shaft (4), making sure it is oriented as shown in illustration.

(2) Using an 8mm allen wrench, install lockwasher (3), flat washer (2), and socket head screw (1) on motor shaft (4).

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SECTION V
SCHEMATICS AND DIAGRAMS

5.1 Electrical Schematics / Wiring Diagrams

Figure 5-1 illustrates the wiring connections between the components in the 120 VAC chair. Figures 5-2 and 5-3 illustrate the current flow between the main PC board plug connectors and related circuitry. Figures 5-4 thru 5-6 show the current flow between the main PC board and TB1 terminal board and related components.

J2 Pin Out for Membrane Switch

Pin	Color	Function
1	Black	12 Volt DC
2	Blue	Auto Exit
3	Brown	Auto Operate
4	Green	Back Up
5	Orange	Back Down
6	Red	Base Up
7	White	Base Down
8	Yellow	Light Switch

J3 Pin Out for Foot Switch

Pin	Color	Function
1	Brown	12 Volt DC
2	Blue	Auto Exit
3	Orange	Auto Operate
4	Green	Back Up
5	Black	Back Down
6	Red	Base Up
7	White	Base Down
8	-	Open

J4 Pin Out for Program, Operation and Limit Switches

Pin	Color	Function
1	Red	800 to 860 Ohms to Ground
2	Black	800 to 860 Ohms to Ground Base Up Program Operation Switch Closed
3	Brown	800 to 860 Ohms to Ground
4	Green	800 to 860 Ohms to Ground Back Down Program Operation Switch Closed
5	White	12 VDC from Back Up Limit Switch
6	Red	12 VDC out to Back Up Limit Switch
7	Black	Return 12 VDC from Back Up Limit Switch
8	Green	Return 12 VDC from Base Down Limit Switch
9	Red	12 VDC out to Base Up and Base Down Limit Switches
10	Black	Return 12 VDC from Base Up Limit Switch

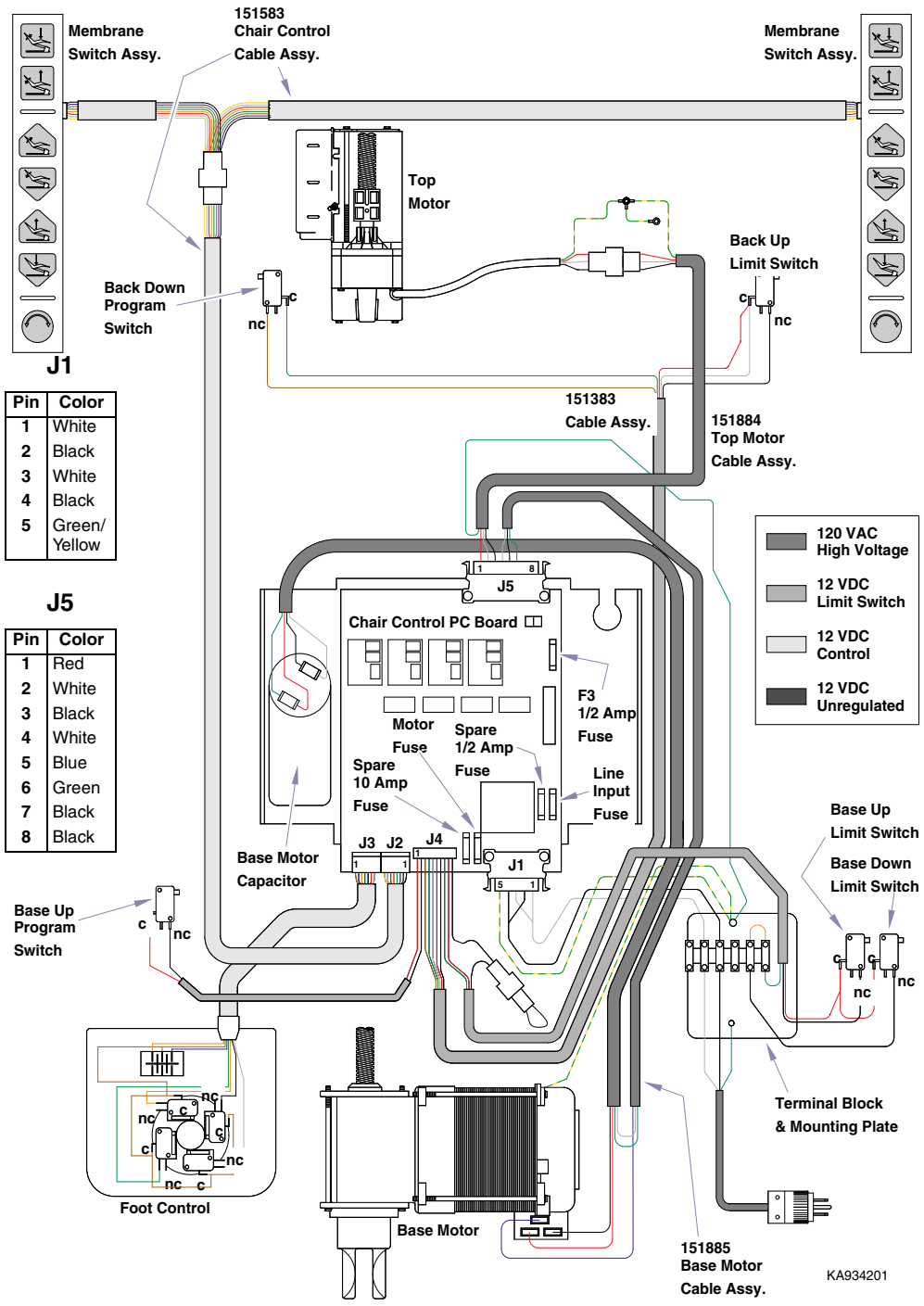


Figure 5-1. Wiring Diagram (120 VAC Units) Thru Serial Numbers V160530

SECTION V
SCHEMATICS AND DIAGRAMS

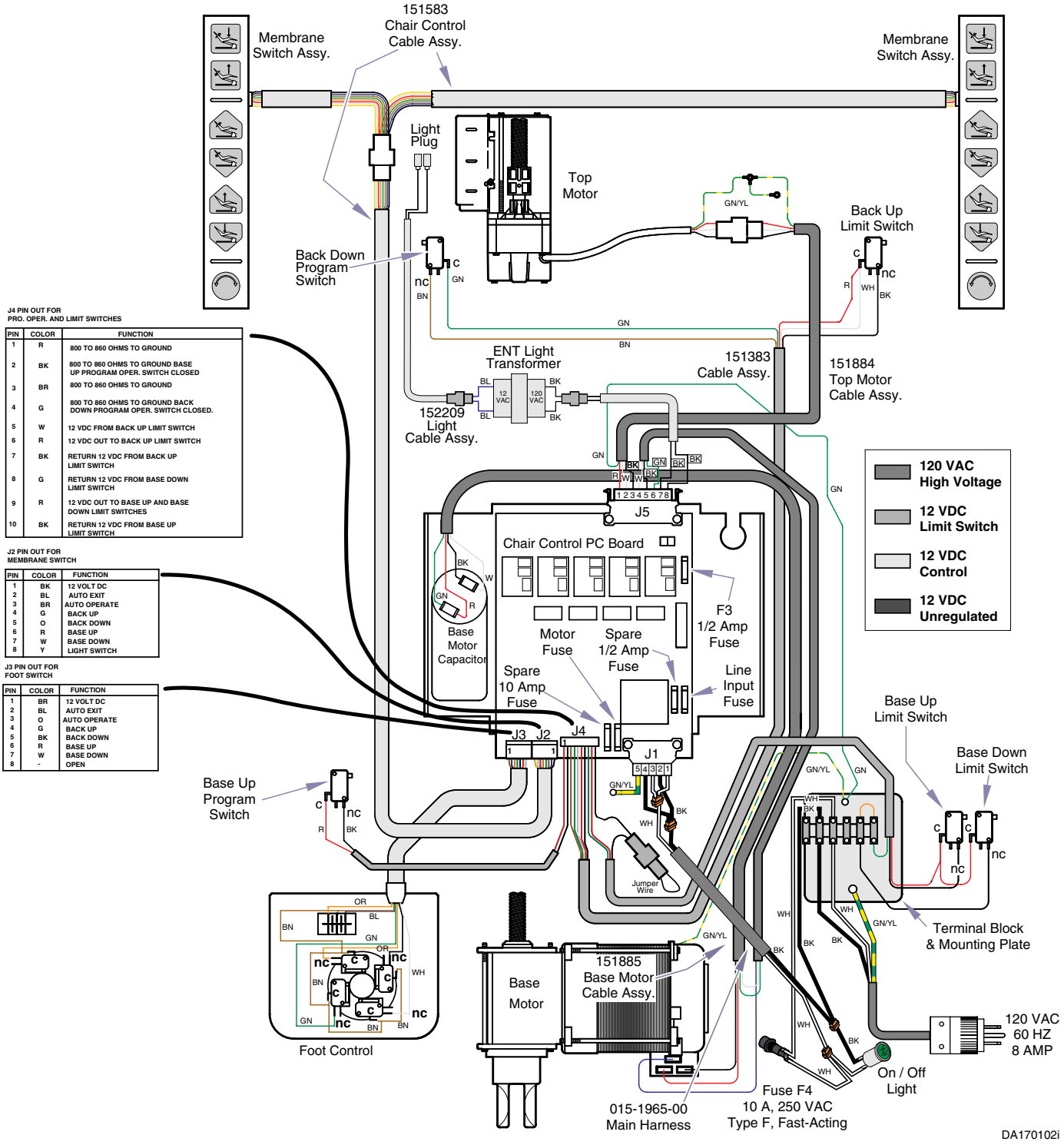


Figure 5-2. Wiring Diagram Model 391-002 (ENT) (120 VAC Units) From Serial Numbers V160531 to V2933395

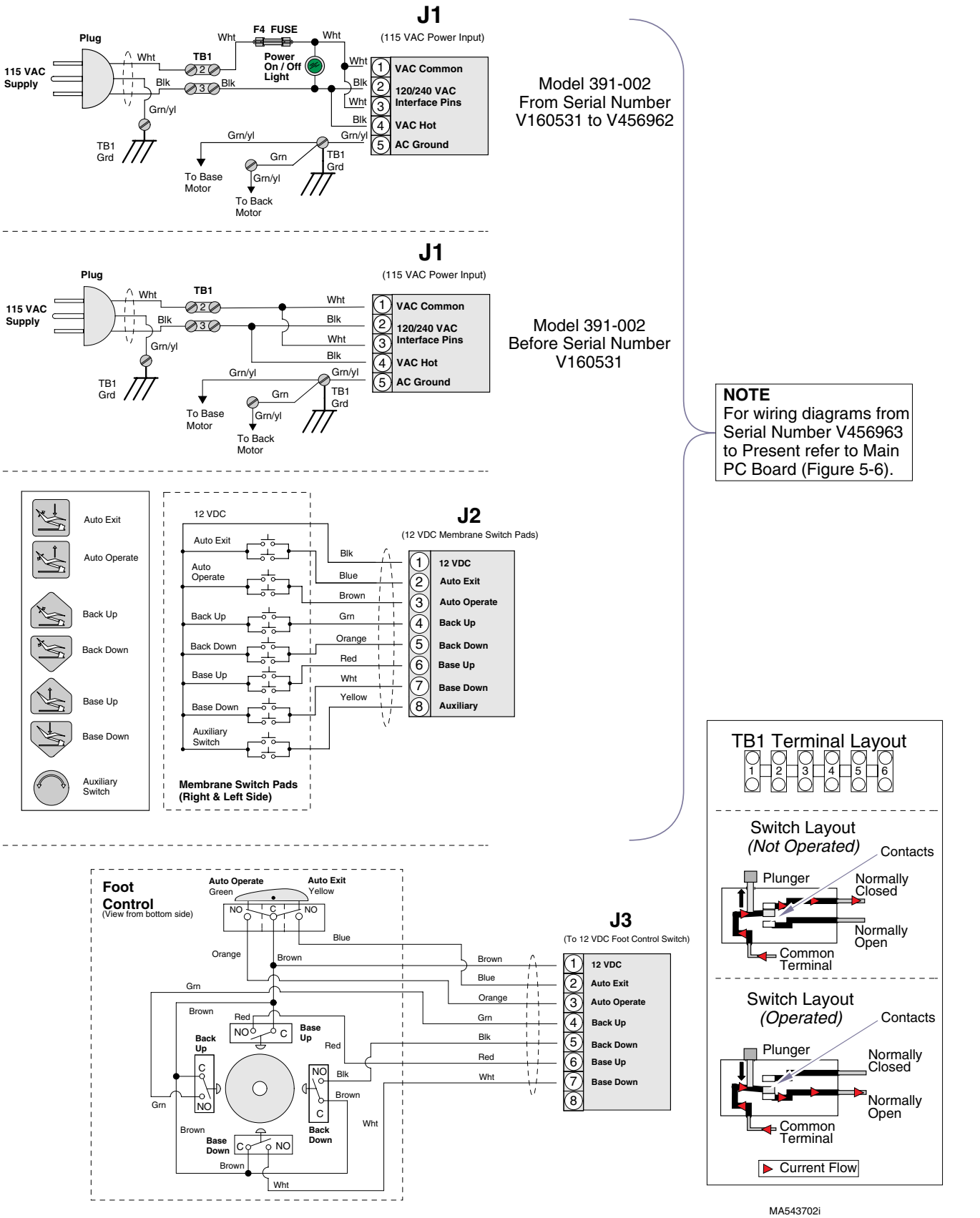


Figure 5-3. Main P.C. Board Plug Connectors (J1, J2, J3)

SECTION V
SCHEMATICS AND DIAGRAMS

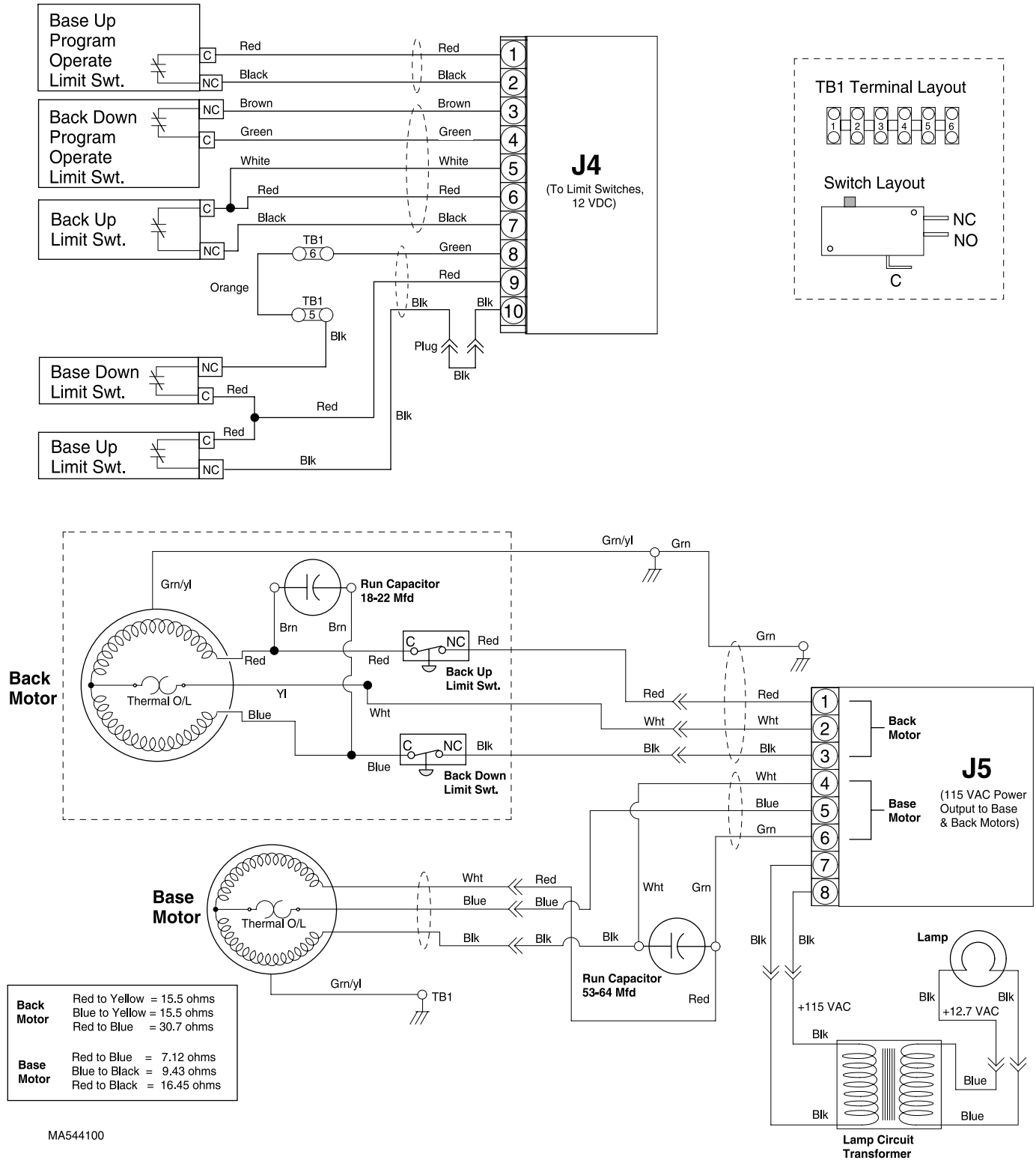


Figure 5-4. Main P.C. Board Plug Connectors (J4, J5)

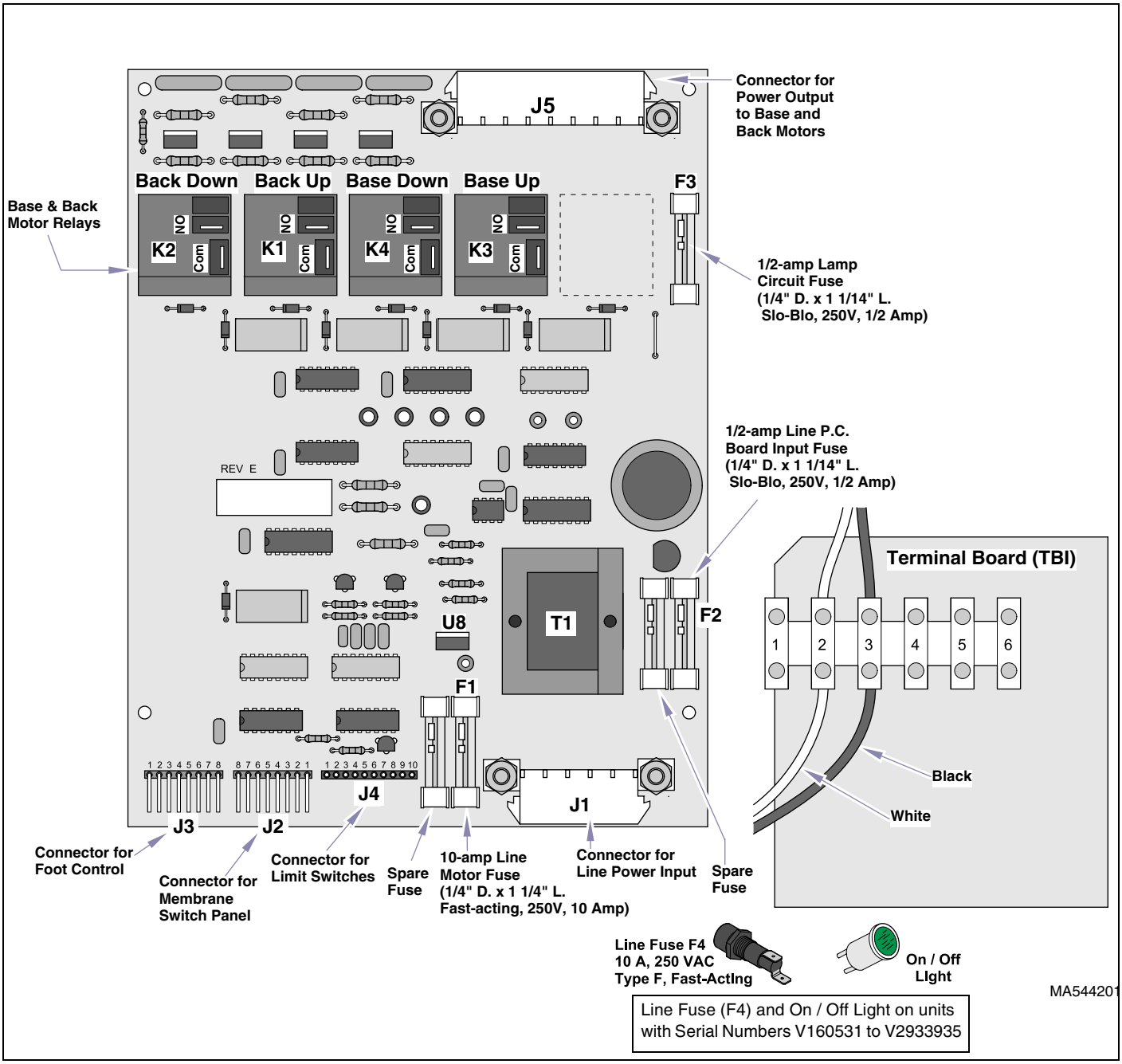
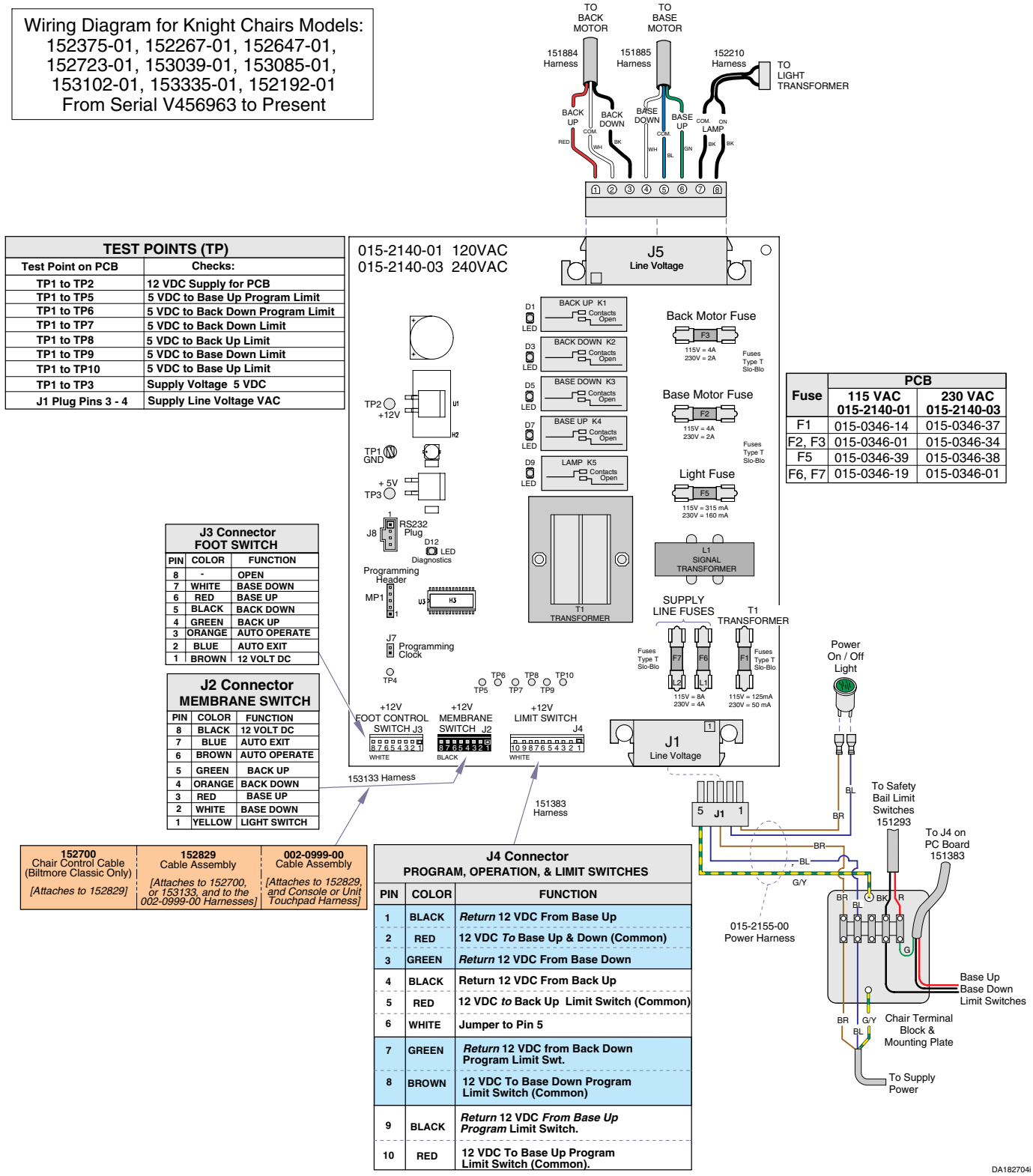


Figure 5-5. Main P.C. Board Component and Plug Layout From Serial Number V160531 to V456962.

SECTION V
SCHEMATICS AND DIAGRAMS

Wiring Diagram for Knight Chairs Models:
152375-01, 152267-01, 152647-01,
152723-01, 153039-01, 153085-01,
153102-01, 153335-01, 152192-01
From Serial V456963 to Present



TEST POINTS (TP)	
Test Point on PCB	**Checks:**
TP1 to TP2	12 VDC Supply for PCB
TP1 to TP5	5 VDC to Base Up Program Limit
TP1 to TP6	5 VDC to Back Down Program Limit
TP1 to TP7	5 VDC to Back Down Limit
TP1 to TP8	5 VDC to Back Up Limit
TP1 to TP9	5 VDC to Base Down Limit
TP1 to TP10	5 VDC to Base Up Limit
TP1 to TP3	Supply Voltage 5 VDC
J1 Plug Pins 3 - 4	Supply Line Voltage VAC

Fuse	PCB	
	115 VAC 015-2140-01	230 VAC 015-2140-03
F1	015-0346-14	015-0346-37
F2, F3	015-0346-01	015-0346-34
F5	015-0346-39	015-0346-38
F6, F7	015-0346-19	015-0346-01

J3 Connector FOOT SWITCH

PIN	COLOR	FUNCTION
8	-	OPEN
7	WHITE	BASE DOWN
6	RED	BASE UP
5	BLACK	BACK DOWN
4	GREEN	BACK UP
3	ORANGE	AUTO OPERATE
2	BLUE	AUTO EXIT
1	BROWN	12 VOLT DC

J2 Connector MEMBRANE SWITCH

PIN	COLOR	FUNCTION
8	BLACK	12 VOLT DC
7	BLUE	AUTO EXIT
6	BROWN	AUTO OPERATE
5	GREEN	BACK UP
4	ORANGE	BACK DOWN
3	RED	BASE UP
2	WHITE	BASE DOWN
1	YELLOW	LIGHT SWITCH

152700 Chair Control Cable (Biltmore Classic Only) [Attaches to 152829]	152829 Cable Assembly [Attaches to 152700, or 153133, and to the 002-0999-00 Harnesses]	002-0999-00 Cable Assembly [Attaches to 152829, and Console or Unit Touchpad Harness]

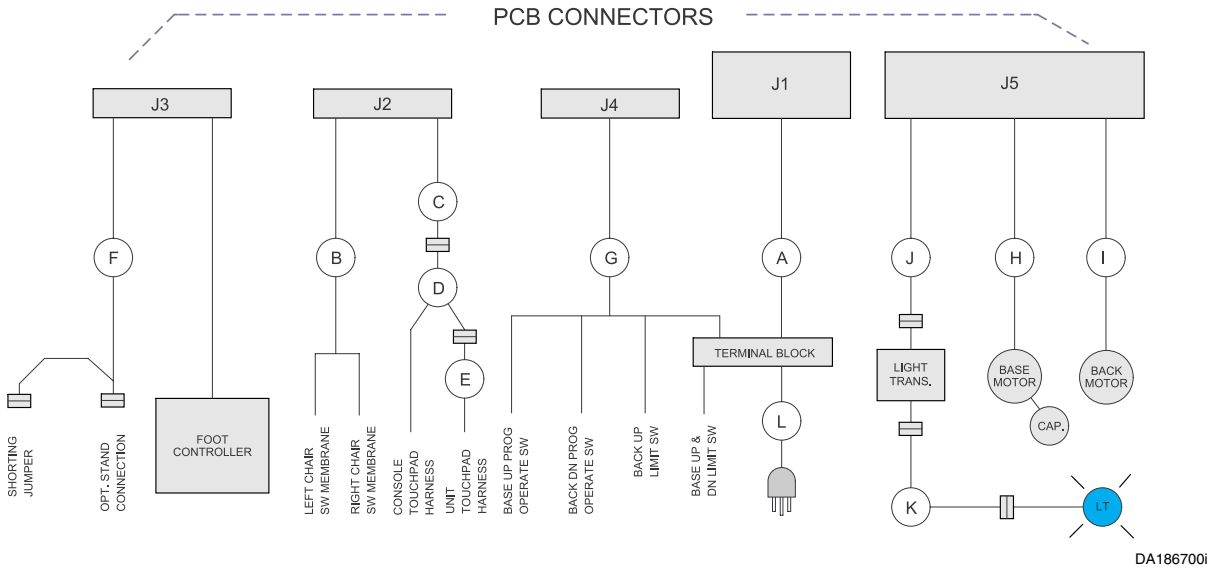
J4 Connector
PROGRAM, OPERATION, & LIMIT SWITCHES

PIN	COLOR	FUNCTION
1	BLACK	*Return* 12 VDC From Base Up
2	RED	12 VDC *To* Base Up & Down (Common)
3	GREEN	*Return* 12 VDC From Base Down
4	BLACK	Return 12 VDC From Back Up
5	RED	12 VDC *to* Back Up Limit Switch (Common)
6	WHITE	Jumper to Pin 5
7	GREEN	*Return* 12 VDC from Back Down Program Limit Swt.
8	BROWN	12 VDC To Base Down Program Limit Switch (Common)
9	BLACK	*Return* 12 VDC *From Base Up Program* Limit Switch.
10	RED	12 VDC To Base Up Program Limit Switch (Common).

Figure 5-6. Main P.C. Board Component and Plug Layout (120 VAC Units) From Serial Numbers V456963 to Present

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WIRE HARNESS DIAGRAM CHART												
MODEL	A	B	C	D	E	F	G	H	I	J	K	L
153102-01	015-2155-00	N/A	153133	152829	002-0999-00	FOOT CTRL.	151383	151885	151884	N/A	N/A	015-1526-00
152375-01	015-2155-00	151583	N/A	N/A	N/A	151843	151383	151885	151884	N/A	N/A	015-1526-00
152267-01	015-2155-00	151583	N/A	N/A	002-0999-00	OPT. FT. CTRL.	151383	151885	151884	152210	152209	151454-01
152647-01	015-2155-00	N/A	152700	152829	002-0999-00	FOOT CTRL.	151383	151885	151884	N/A	N/A	015-1526-00
152723-01	015-2155-00	N/A	152700	152829	002-0999-00	FOOT CTRL.	151383	151885	151884	N/A	N/A	151454-01
153039-01	015-2155-00	N/A	152700	152829	002-0999-00	FOOT CTRL.	151383	151885	151884	N/A	N/A	151454-01
153085-01	015-2155-00	151583	N/A	N/A	N/A	FOOT CTRL.	151383	151885	151884	152210	152209	015-1526-00
153335-01	015-2155-00	N/A	152700	152829	002-0999-00	FOOT CTRL.	151383	151885	151884	N/A	N/A	151454-01
152192-01	015-2155-00	151583	N/A	N/A	N/A	OPT. FT. CTRL.	151383	151885	151884	152210	152209	015-1526-00

Figure 5-7. Wire Harness Diagram Chart From Serial Number V456963 to Present.

SECTION V
SCHEMATICS AND DIAGRAMS

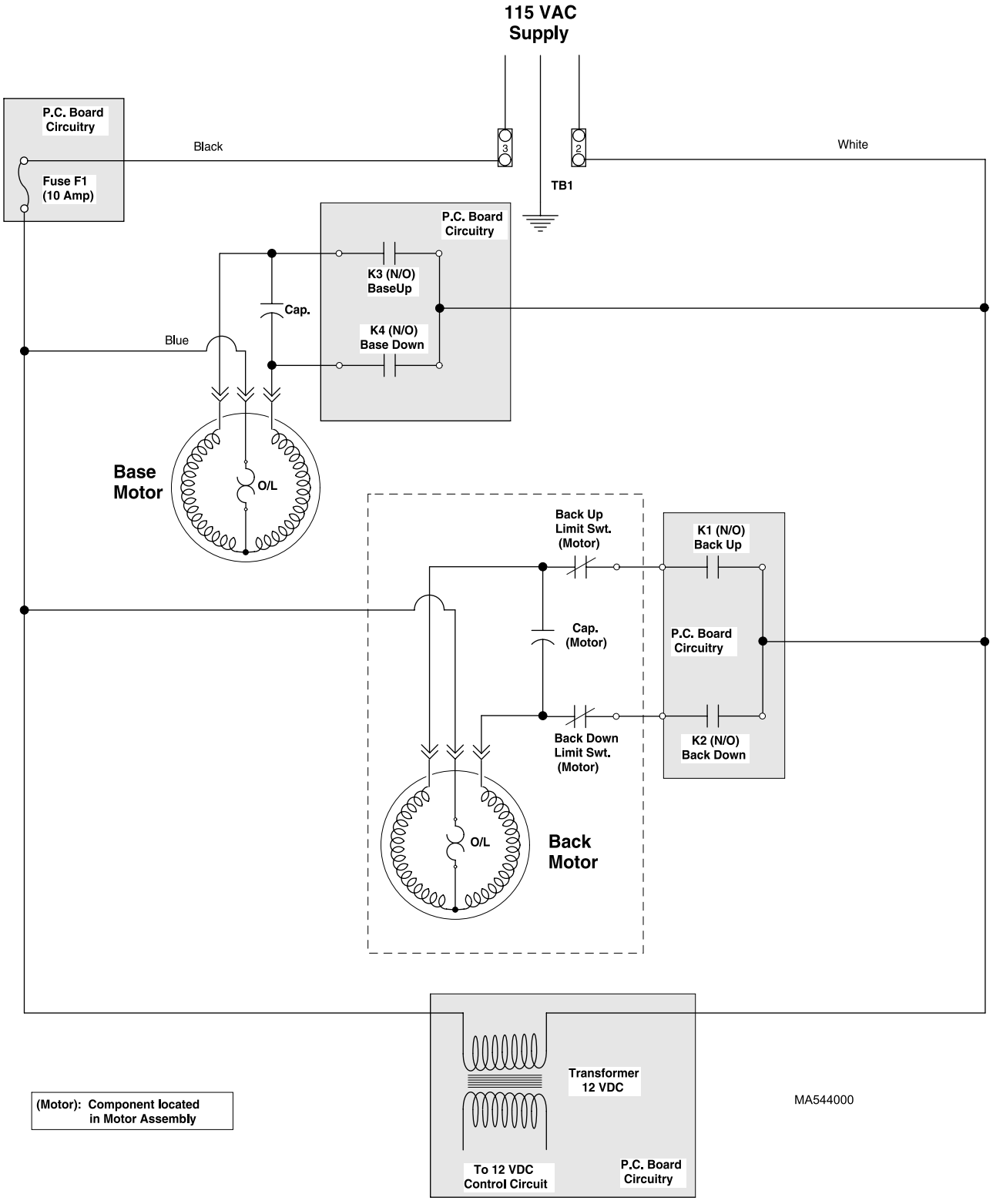


Figure 5-8. 115 VAC Motor Circuit

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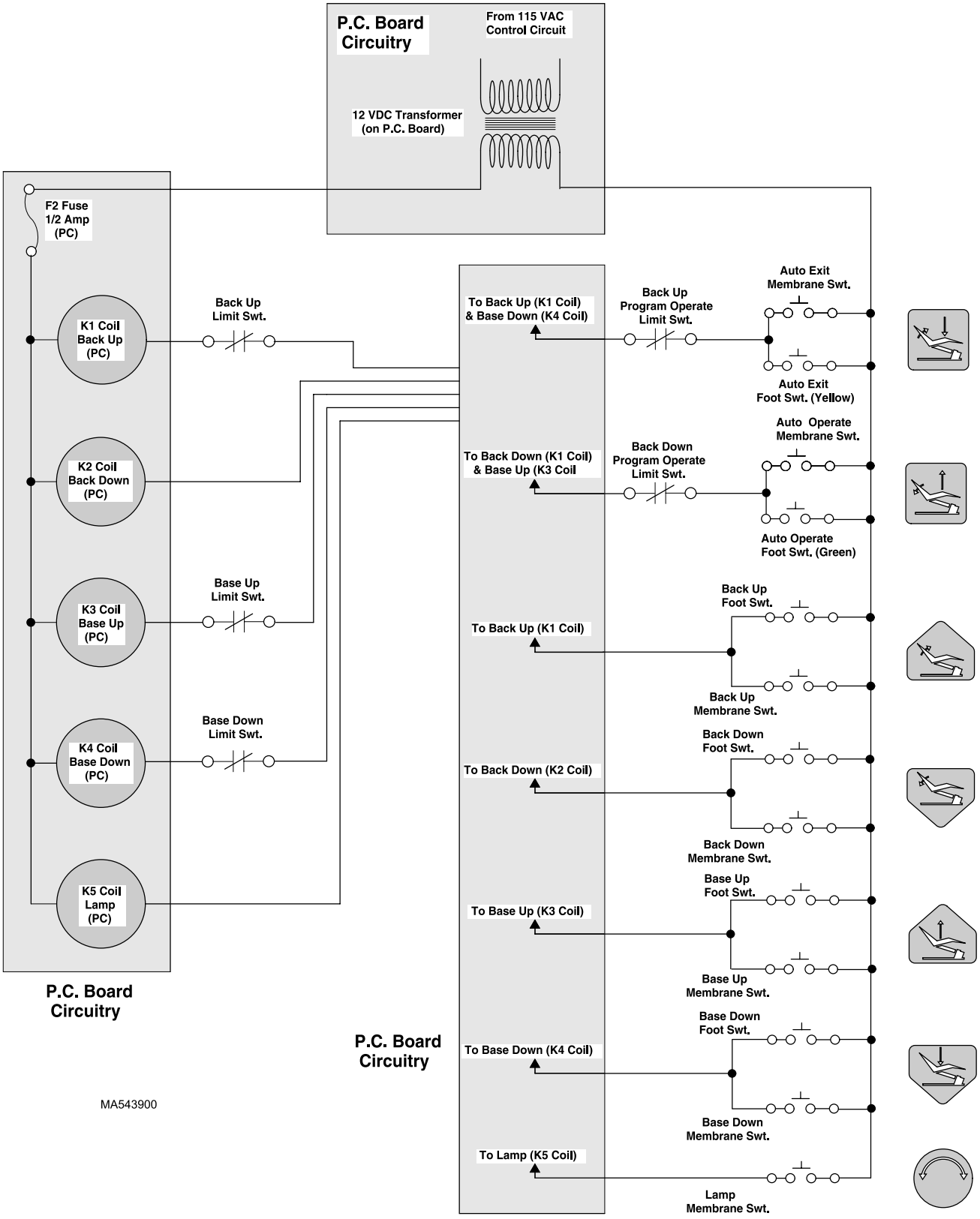


Figure 5-9. Membrane Switch Connections

SECTION V
SCHEMATICS AND DIAGRAMS

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SECTION VI
PARTS LIST

6.1 Introduction

The illustrated parts list provides information for identifying and ordering the parts necessary to maintain the unit in peak operating condition. Refer to paragraph 1.5 for parts ordering information.

6.2 Description of Columns

The Item column of the parts list gives a component its own unique number. The same number is given to the component in the parts illustration. This allows a part number of a component to be found if the technician can visually spot the part on the illustration. The technician simply finds the component in question on the illustration and notes the item number of that component. Then, he finds that item number in the parts list. The row corresponding to the item number gives the technician the part number, a description of the component, and quantity of parts per subassembly. Also, if a part number is known, the location of that component can be determined by looking for the item number of the component on the illustration.

The Part No. column lists the MIDMARK part number for that component.

The Description column provides a physical description of the component.

The Qty. column lists the number of units of a particular component that is required for the subassembly. The letters “AR” denote “as required” when quantities of a particular component cannot be determined, such as: adhesive.

Bullets { • } in the Part No. column and the Description column show the indenture level of a component. If a component does not have a bullet, it is a main component of that illustration. If a component has a bullet, it is a subcomponent of the next component listed higher in the parts list than itself that does not have a bullet. Likewise, if a component has two bullets, it is a subcomponent of the next component listed higher in the parts list than itself that has only one bullet.

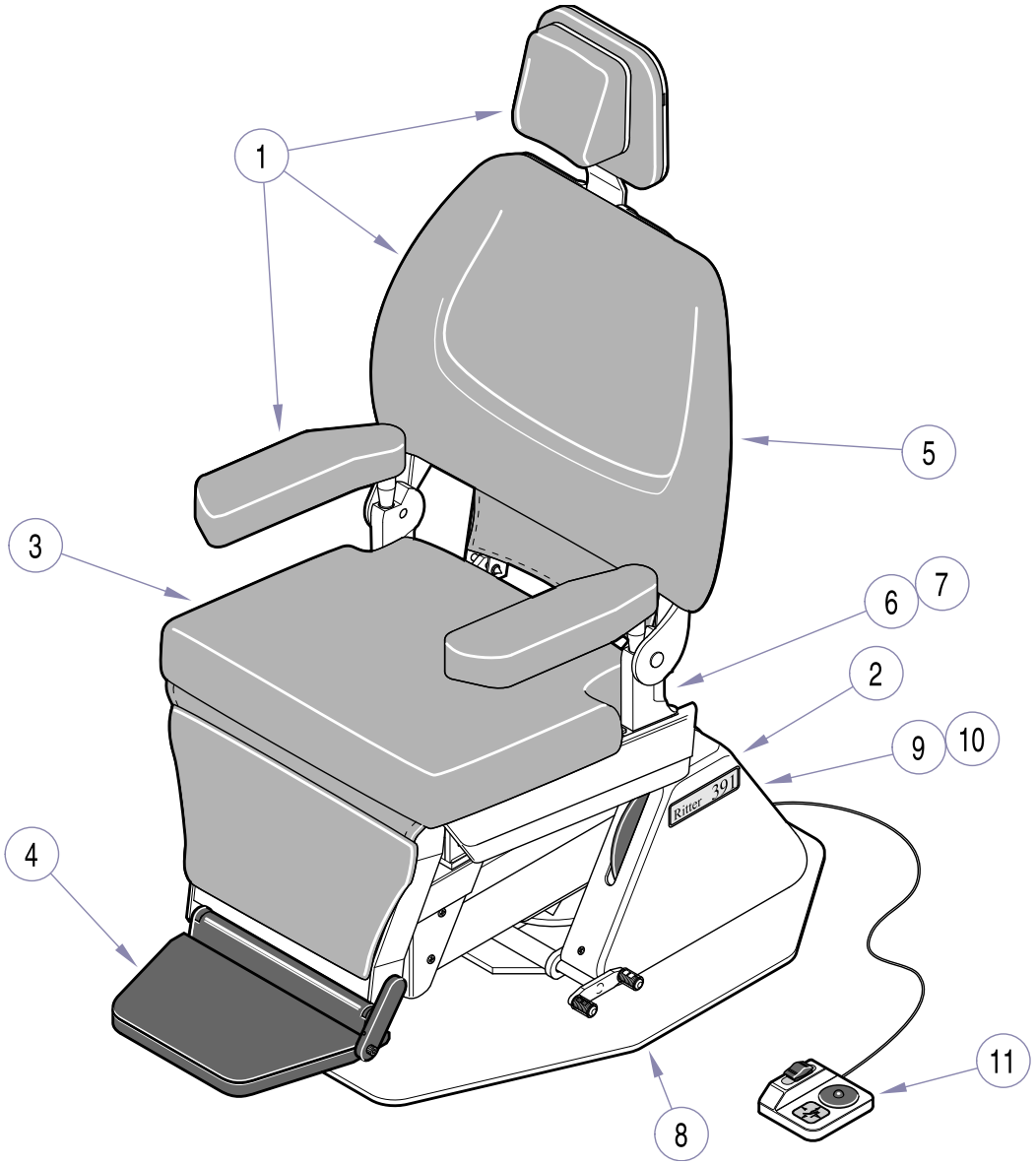
6.3 Torque Specifications and Important Assembly Notes

When specific assembly torque specifications, measurements, or procedures have been identified, by our engineering department, as required to assure proper function of the unit, those torque specifications measurements, and procedures will be noted on the parts illustrations. Adherence to these requirements is essential.

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Pictorial Index



Note: This model uses Sterling Grey painted components **(Serial number prefix "EN")** that are no longer Available (N.L.A.). Substitute Pebble Grey painted parts, located elsewhere in this manual, when necessary.

MA536100

Used on Units with Serial Numbers EN1000 thru Present
Used on Units with Serial Numbers V2200 thru Present

Item	Part No.	Description	Page
	153085	391-001 Power ENT Chair (Sterling Grey) [Serial Number Prefix "EN"]	
1		• Upholstery Components	6-3
2		• Covers	6-4
3		• Seat Components	6-5
4		• Leg and Foot Rest Components	6-6
5		• Back Components	6-7
6		• Top Electrical Components	6-8
7		• Top Motor Assembly	6-9
8		• Base Components	6-10
9		• Base Electrical Components	6-11
10		• Base Motor Assembly	6-12
11		• Footswitch	6-13

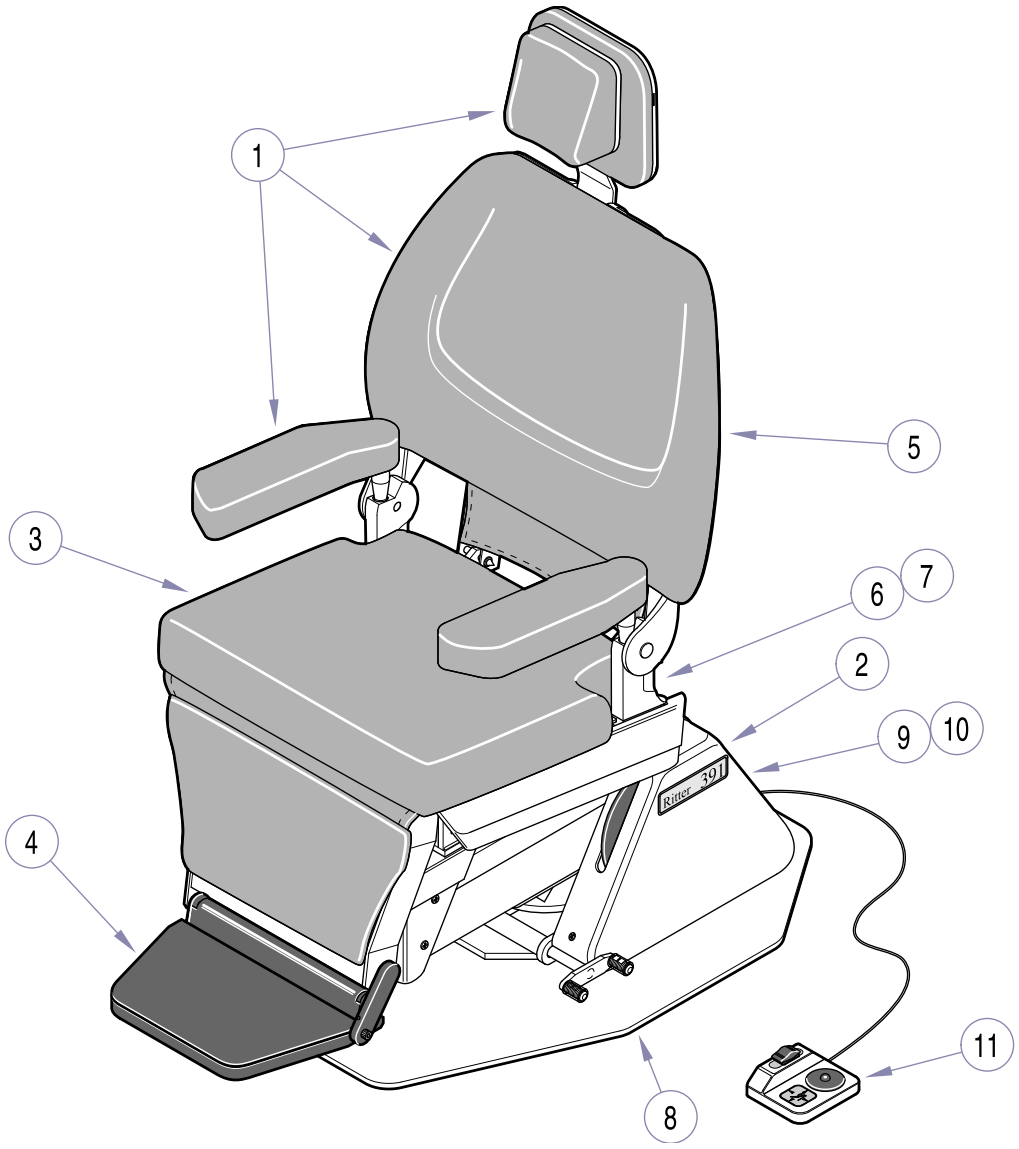
Item	Part No.	Description	Page
		OPTIONAL ACCESSORIES Refer to MEDICAL ACCESSORY BOOK {004-0096-00}	
12	9A240001	Sunnex Lamp	9A240
13	9A240002	Extended Neck Lamp	9A240
14	~~152634~~	Double Articulating Headrest	~~152634~~
15	152565	IV Armboard	152565
16		Single Articulating Headrest:	
	154045	*w/ Vacu-Form Upholstery*	154045
	154050	*w/Plush Upholstery*	154050

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Pictorial Index



NOTE: This model uses Pebble Grey painted components **(Serial number prefix "PD" & "V").**

MA536100

Used on Units with Serial Numbers PD1000 thru Present
Used on Units with Serial Numbers V2200 thru Present

Item	Part No.	Description	Page
	153085-01	391-002 Power ENT Chair (Pebble Grey) [Serial Number Prefix "PD"]	
1		• Upholstery Components	6-3
2		• Covers	6-4
3		• Seat Components	6-5
4		• Leg and Foot Rest Components	6-6
5		• Back Components	6-7
6		• Top Electrical Components	6-8
7		• Top Motor Assembly	6-9
8		• Base Components	6-10
9		• Base Electrical Components	6-11
10		• Base Motor Assembly	6-12
11		• Footswitch	6-13

Item	Part No.	Description	Page
		OPTIONAL ACCESSORIES Refer to MEDICAL ACCESSORY BOOK {004-0096-00}	
12	9A240001	Sunnex Lamp	9A240
13	9A240002	Extended Neck Lamp	9A240
14	154087	Double Articulating Headrest	154087
15	~~154088~~	IV Armboard	~~154088~~
16	154078	Single Articulating Headrest	154078

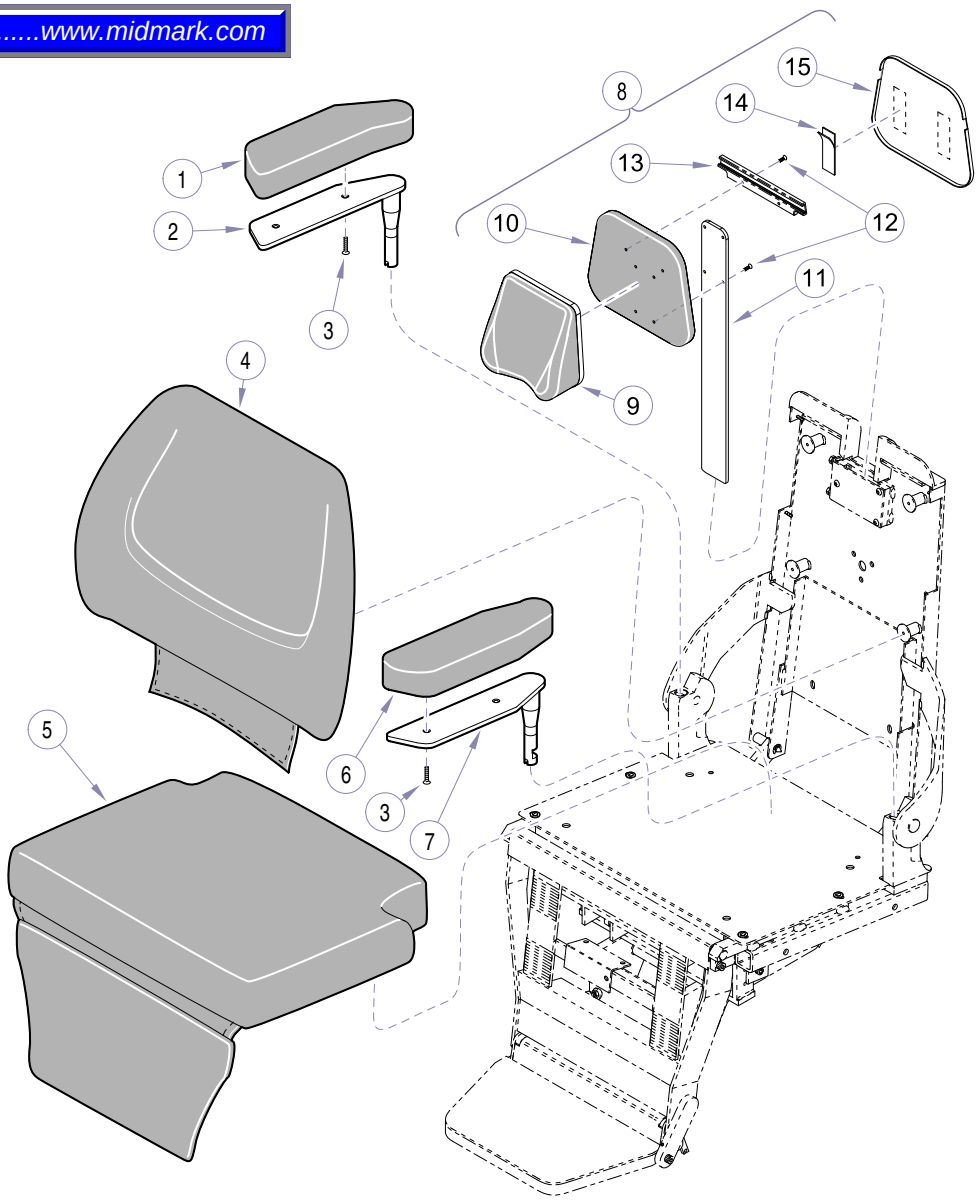
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Upholstery Components

Color Selector.....www.midmark.com



NOTE: This model uses Sterling Grey painted components **(Serial number prefix "EN")** that are no longer Available (N.L.A.). Substitute Pebble Grey painted parts, located elsewhere in this manual, when necessary.

MA504302i

Item	Part No.	Description	Qty
	~~154083-***~~	Upholstery Kit (Includes Items 1 thru 8)	1
1	• ~~149883Vxx~~	• R.H. Armrest Cushion (*Specify Color	1
2	• ~~151236-00~~	• R.H. Armrest Weldment	1
3	• ~~151783-50~~	• Screw (2 per Armrest)	4
4	• ~~154096-***~~	• Back Cushion Assembly	1
5	• ~~152220Vxx~~	• Seat and Leg Cushion (*Specify Color)	1
6	• ~~149882Vxx~~	• L.H. Armrest Cushion (*Specify Color)	1
7	• ~~151235-00~~	• L.H. Armrest Weldment	1
8	• 154077-***	• Magnetic Head Rest Assembly (*Specify Color [includes items 9 thru 15])	1
9	• • 154089***	• • Magnetic Pillow Assembly (Vacuform [*Specify Color])	1
	• • 154091***	• • Magnetic Pillow Assembly (Plush [*Specify Color])	1
10	• • 154090***	• • Magnetic Headrest Frame Assembly (Vacuform [*Specify Color])	1
	• • 154092***	• • Magnetic Headrest Frame Assembly (Plush [*Specify Color])	1
11	• • 120988-50	• • Headrest Tang	1
12	• • 121784	• • Screw (#10-32 x 5/8" Ft. Hd. Cap)	6
13	• • 121493-50	• • Headrest Receptacle	1
14	• • 275184	• • Foam Tape	1.5"
15	• • 121536-01	• • Back Cover	1

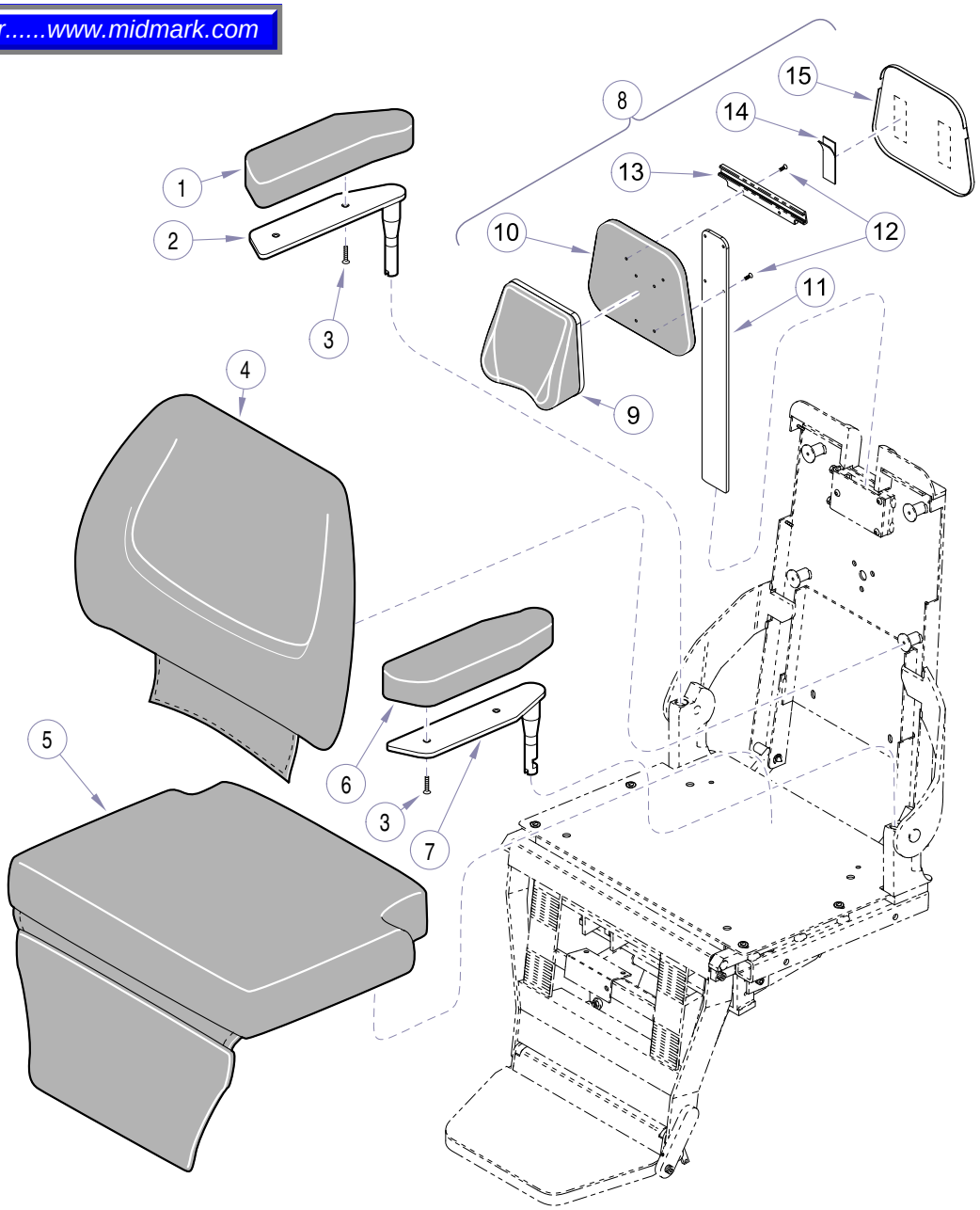
*** Click on the Color Selector link above to see available colors.**
Always Specify Model & Serial Number

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Upholstery Components

Color Selector.....www.midmark.com



NOTE: This model uses Pebble Grey painted components **(Serial number prefix "PD" & "V").**

MA504302i

Item	Part No.	Description	Qty
	~~154083-***~~	Upholstery Kit (Includes Items 1 thru 8)	1
	~~154097-***~~	Upholstery Kit (Includes Items 1 thru 7)	
1	• ~~149883Vxx~~	• R.H. Armrest Cushion (*Specify Color	1
2	• ~~151236-00~~	• R.H. Armrest Weldment	1
3	• ~~151783-50~~	• Screw (2 per Armrest)	4
4	• ~~154096-***~~	• Back Cushion Assembly	1
5	• ~~152220Vxx~~	• Seat and Leg Cushion (*Specify Color)	1
6	• ~~149882Vxx~~	• L.H. Armrest Cushion (*Specify Color)	1
7	• ~~151235-00~~	• L.H. Armrest Weldment	1
8	• 154077-***	• Magnetic Head Rest Assembly (*Specify Color [includes items 9 thru 15])	1

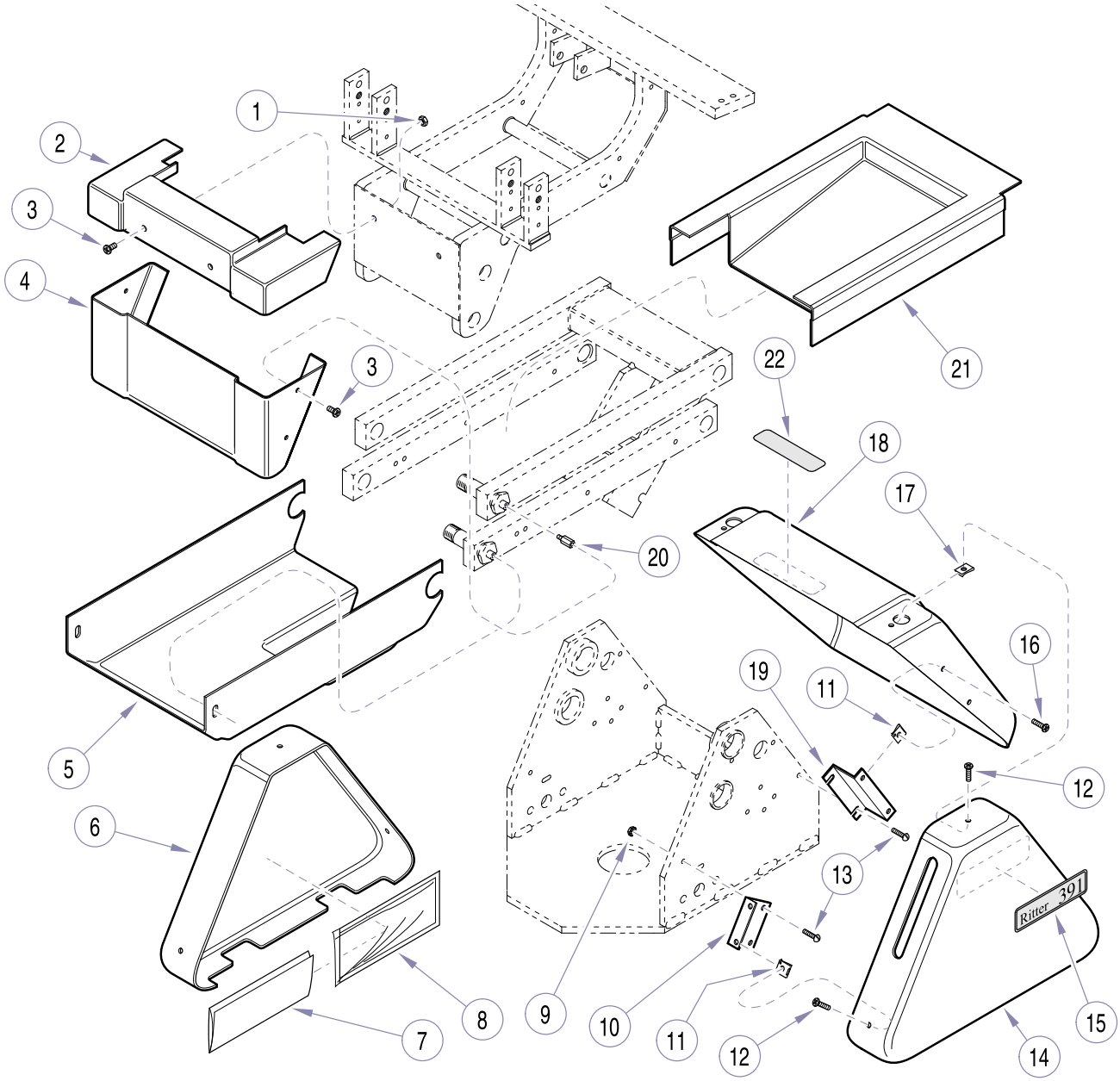
Item	Part No.	Description	Qty
9	• • 154089***	• • Magnetic Pillow Assembly (Vacuform [*Specify Color])	1
	• • 154091***	• • Magnetic Pillow Assembly (Plush [*Specify Color])	1
10	• • 154090***	• • Magnetic Headrest Frame Assembly (Vacuform [*Specify Color])	1
	• • 154092***	• • Magnetic Headrest Frame Assembly (Plush [*Specify Color])	1
11	• • 120988-50	• • Headrest Tang	1
12	• • 121784	• • Screw (#10-32 x 5/8" Ft. Hd. Cap)	6
13	• • 121493-50	• • Headrest Receptacle	1
14	• • 275184	• • Foam Tape	1.5"
15	• • 121536-01	• • Back Cover	1

*** Click on the Color Selector link above to see available colors.**
Always Specify Model & Serial Number

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Covers



NOTE: This model uses Sterling Grey painted components **(Serial number prefix "EN")** that are no longer Available (N.L.A.). Substitute Pebble Grey painted parts, located elsewhere in this manual, when necessary.

MA508300

Used on Units with Serial Numbers EN1000 thru EN1084

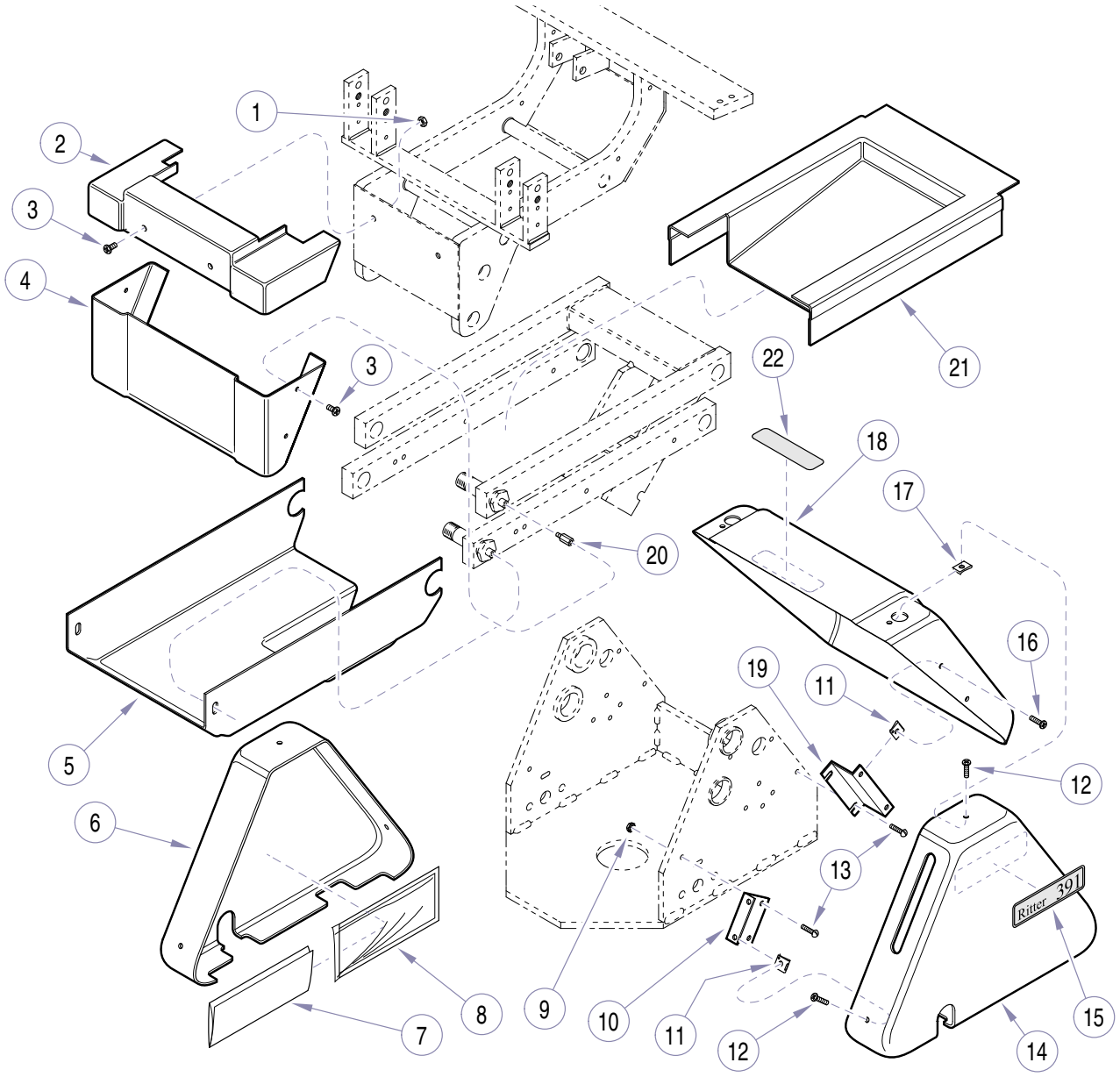
Item	Part No.	Description	Qty
1	P507	Nut	2
2	121040	Seat Frame Cover	1
3	121981-50	Screw	6
4	121028	Seat Cover Bottom	1
5	121026	Bottom Lift Arm Cover	1
6	122061	Left Base Cover	1
7	TP1664	Wiring Diagram	1
8	134550	Plastic Sleeve	1
9	122357	Locknut	2
10	121963-2	Cover Mounting Bracket	2
11	121972	Nut Clip	6
12	121980-50	Screw	6
13	040-0010-183	Screw	6
14	122069	Base Cover (w/Disc Cutout)	1
15	122538	391 Name Plate	2
16	121980-5	Screw	4
17	121971	Nut Clip	4
18	121888	Center Base Cover	1
19	121887-2	Cover Mounting Bracket	2
20	119610	Standoff	4
21	121027	Top Lift Arm Cover	1
22	134969	Electrical Shock Label	1

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Covers



NOTE: This model uses Sterling Grey painted components **(Serial number prefix "EN")** that are no longer Available (N.L.A.). Substitute Pebble Grey painted parts, located elsewhere in this manual, when necessary.

MA508301i

Used on Units with Serial Numbers EN1085 thru Present
Used on Units with Serial Numbers V2200 thru Present

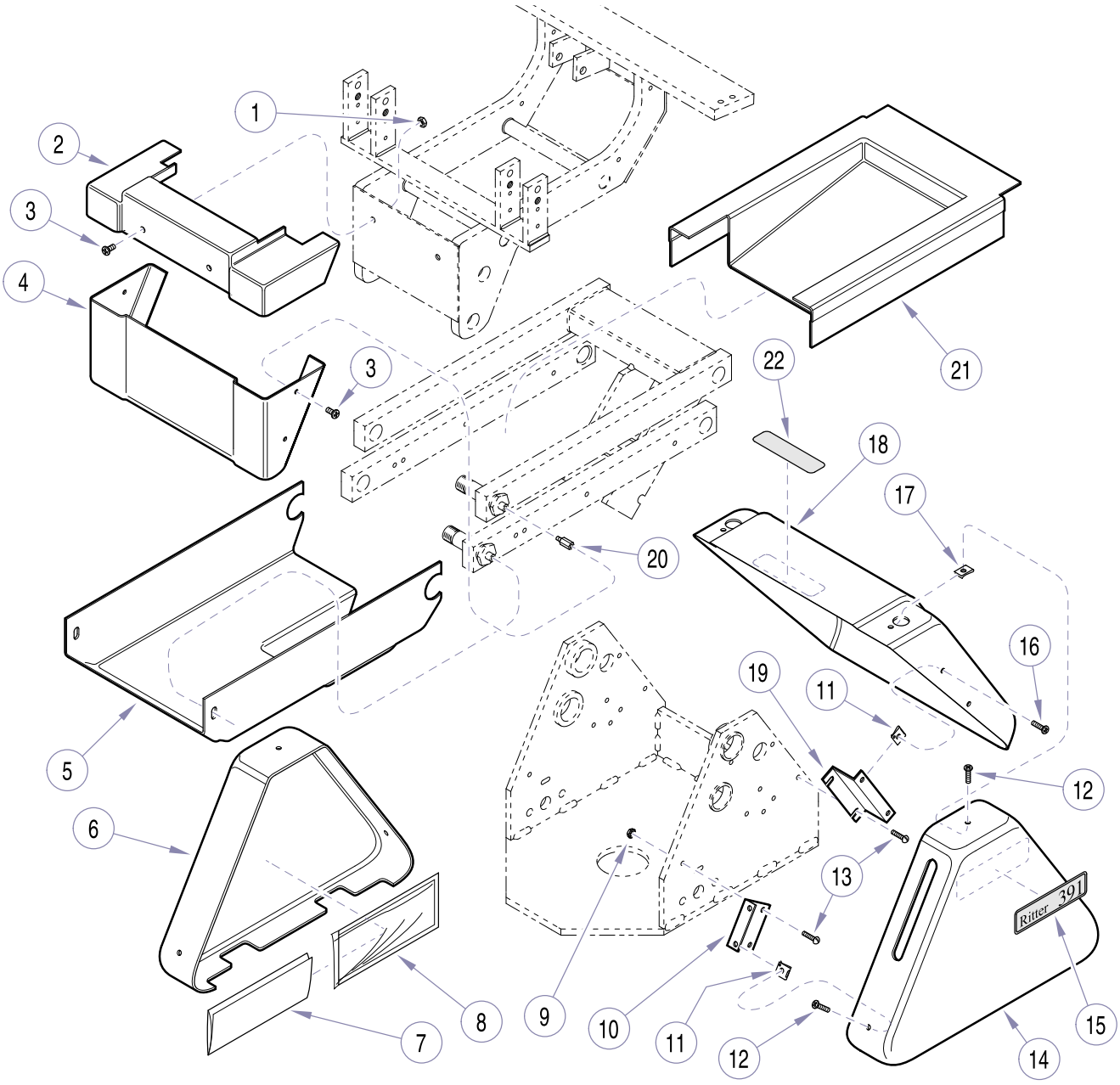
Item	Part No.	Description	Qty
1	P507	Nut	2
2	121040	Seat Frame Cover	1
3	121981-50	Screw	6
4	121028	Seat Cover Bottom	1
5	121026	Bottom Lift Arm Cover	1
6	122061	Left Base Cover	1
7	TP1664	Wiring Diagram	1
8	134550	Plastic Sleeve	1
9	122357	Locknut	2
10	121963-2	Cover Mounting Bracket	2
11	121972	Nut Clip	6
12	121980-50	Screw	6
13	040-0010-183	Screw	6
14	122889	Right Base Cover	1
15	122538	391 Name Plate	2
16	121980-5	Screw	4
17	121971	Nut Clip	4
18	121888	Center Base Cover	1
19	121887-2	Cover Mounting Bracket	2
20	119610	Standoff	4
21	121027	Top Lift Arm Cover	1
22	134969	Electrical Shock Label	1

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Covers



NOTE: This model uses Pebble Grey painted components **(Serial number prefix "PD" & "V").**

MA508300

Used on Units with Serial Numbers PD1000 thru PD1303

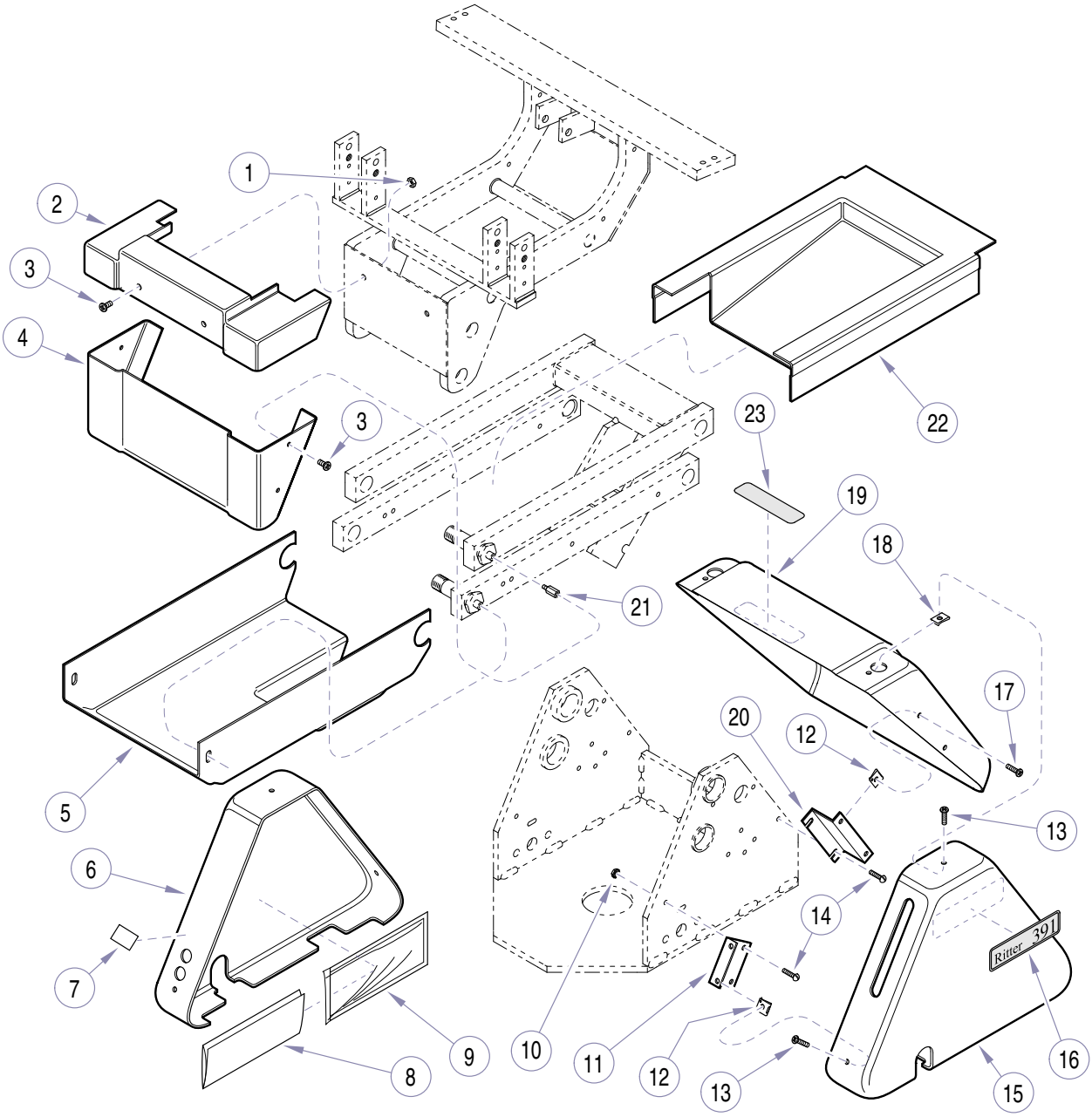
Item	Part No.	Description	Qty	Item	Part No.	Description	Qty
1	P507	Nut	2	12	121980-50	Screw	6
2	121040-01	Seat Frame Cover	1	13	040-0010-183	Screw	6
3	121981-50	Screw	6	14	121889-01	Base Cover (w/Disc Cutout)	1
4	121028-01	Seat Cover Bottom	1	15	122538	391 Name Plate	2
5	121026-01	Bottom Lift Arm Cover	1	16	121980-5	Screw	4
6	121890-01	Left Base Cover	1	17	121971	Nut Clip	4
7	TP1664	Wiring Diagram	1	18	121888-01	Center Base Cover	1
8	134550	Plastic Sleeve	1	19	121887-2	Cover Mounting Bracket	2
9	122357	Locknut	2	20	119610	Standoff	4
10	121963-2	Cover Mounting Bracket	2	21	121027-01	Top Lift Arm Cover	1
11	121972	Nut Clip	6	22	561-0262-01	Electrical Shock Label	1

Always Specify Model & Serial Number

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Covers



NOTE: This model uses Pebble Grey painted components

MA508303i

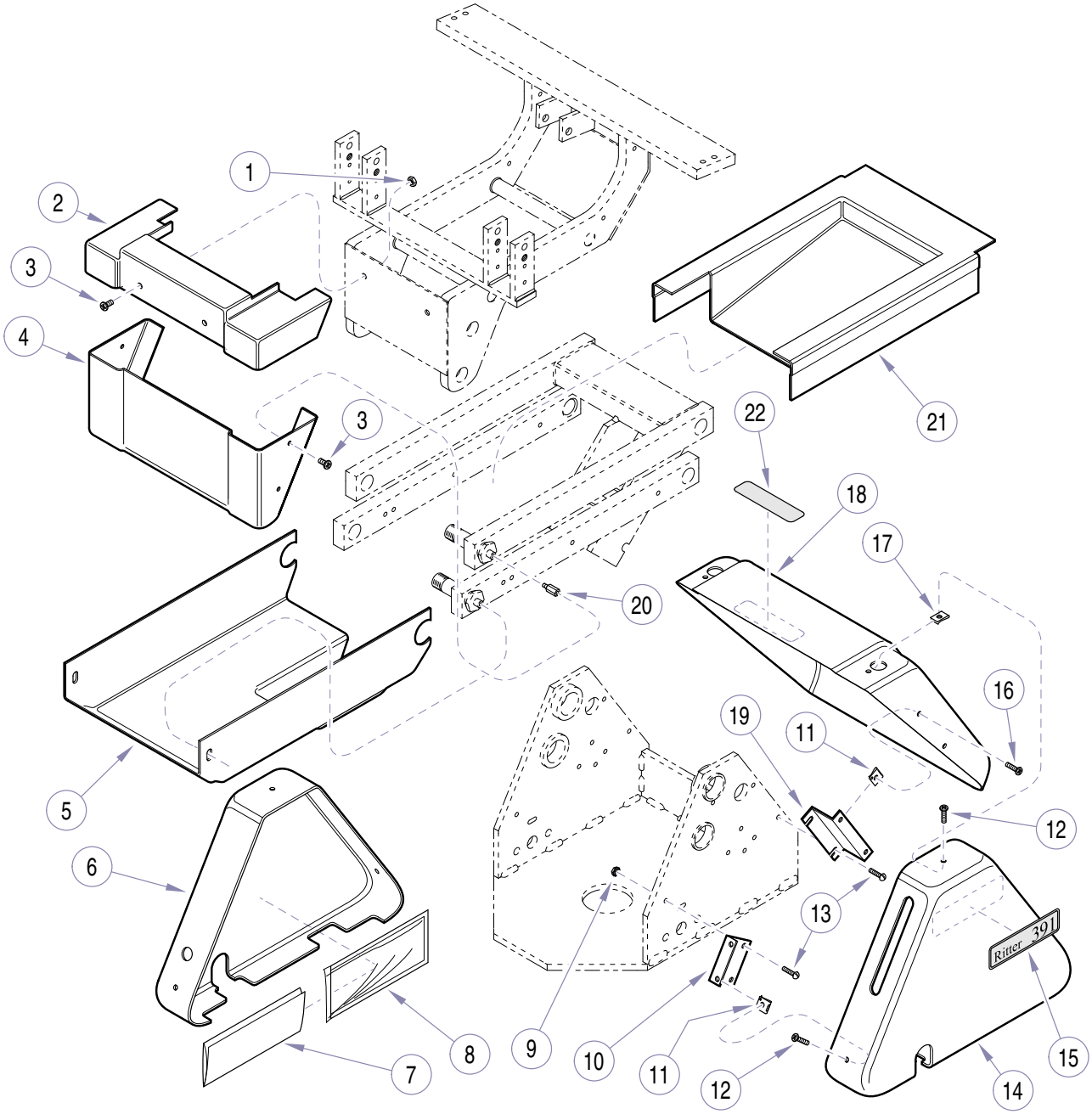
Used on Units with Serial Numbers PD1304 thru Present
Used on Units with Serial Numbers V2200 thru V456962

Item	Part No.	Description	Qty
1	P507	Nut	2
2	121040-01	Seat Frame Cover	1
3	121981-50	Screw	6
4	121028-01	Seat Cover Bottom	1
5	121026-01	Bottom Lift Arm Cover	1
6	053-1611-00-216	Left Base Cover	1
7	061-0808-05	Label, Fuse Replacement (120 VAC)	1
8	TP1664	Wiring Diagram	1
9	134550	Plastic Sleeve	1
10	122357	Locknut	2
11	121963-2	Cover Mounting Bracket	2
12	121972	Nut Clip	6
13	121980-50	Screw	6
14	040-0010-183	Screw	6
15	121889-01	Right Base Cover	1
16	122538	391 Name Plate	2
17	121980-5	Screw	4
18	121971	Nut Clip	4
19	121888-01	Center Base Cover	1
20	121887-2	Cover Mounting Bracket	2
21	119610	Standoff	4
22	121027-01	Top Lift Arm Cover	1
23	561-0262-01	Electrical Shock Label	1

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NOTE: This model uses Pebble Grey painted components

MA508304i

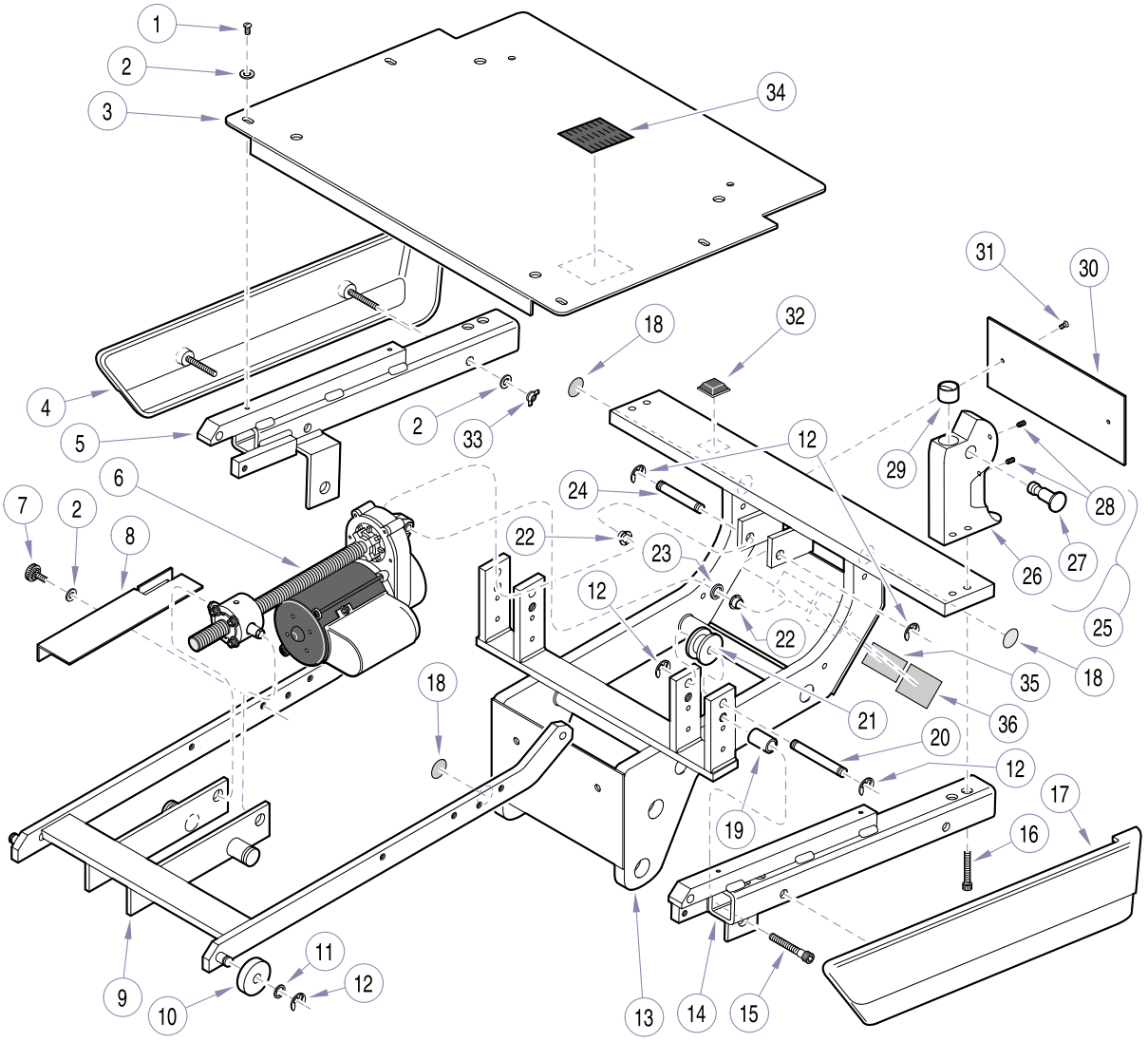
Used on Units with Serial Numbers V456963 thru Present

Item	Part No.	Description	Qty
1	P507	Nut	2
2	121040-01	Seat Frame Cover	1
3	121981-50	Screw	6
4	121028-01	Seat Cover Bottom	1
5	121026-01	Bottom Lift Arm Cover	1
6	053-1808-00-216	Left Base Cover	1
7	TP1664	Wiring Diagram	1
8	134550	Plastic Sleeve	1
9	122357	Locknut	2
10	121963-2	Cover Mounting Bracket	2
11	121972	Nut Clip	6
12	121980-50	Screw	6
13	040-0010-183	Screw	6
14	121889-01	Right Base Cover	1
15	122538	391 Name Plate	2
16	121980-5	Screw	4
17	121971	Nut Clip	4
18	*(N.L.A.)*	Center Base Cover	1
19	121887-2	Cover Mounting Bracket	2
20	119610	Standoff	4
21	121027-01	Top Lift Arm Cover	1

Always Specify Model & Serial Number

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Seat Components



NOTE:: This model uses Sterling Grey painted components **(Serial number prefix "EN")** that are no longer Available (N.L.A.). Substitute Pebble Grey painted parts, located elsewhere in this manual, when necessary.

MA493700

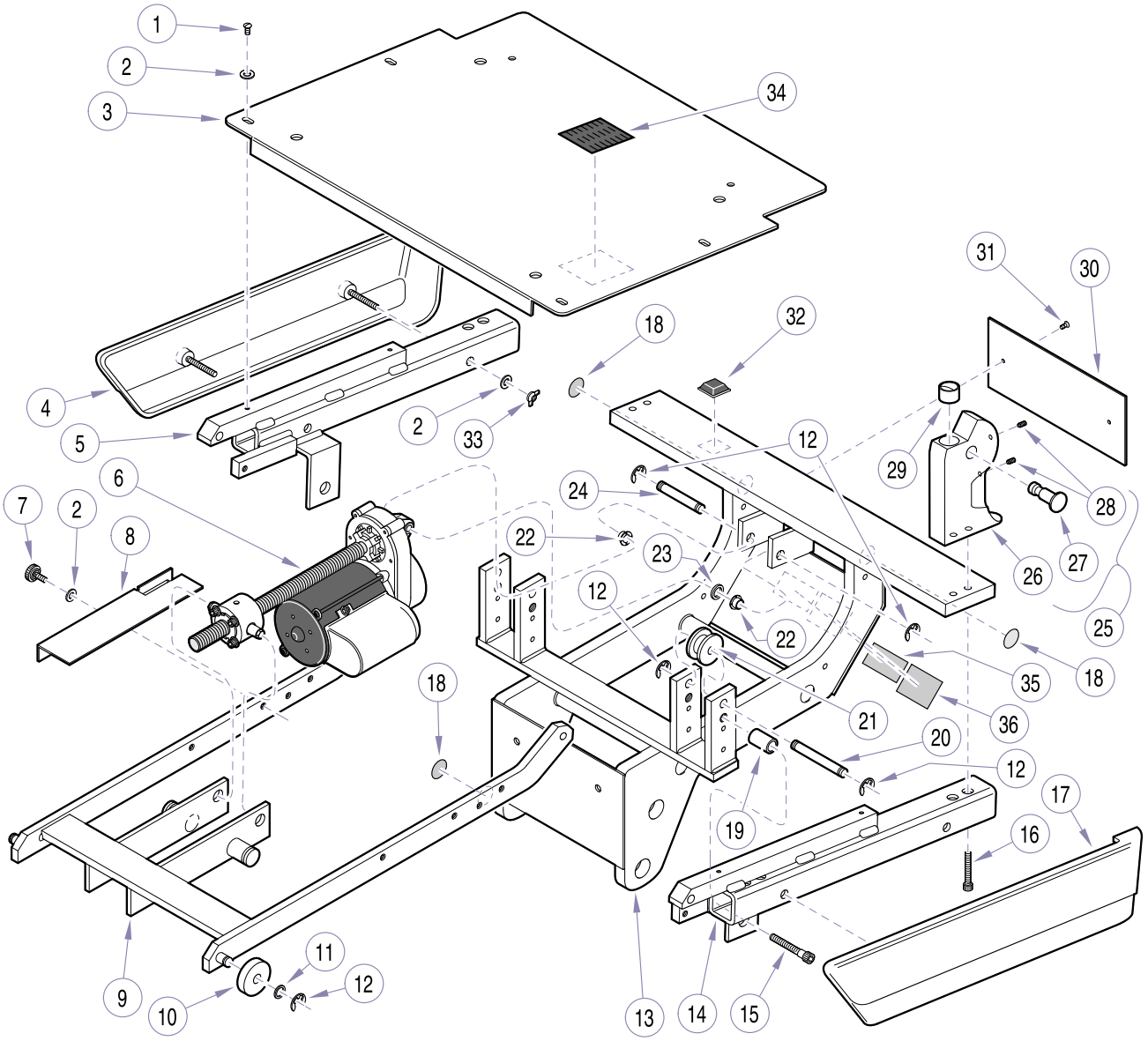
Item	Part No.	Description	Qty
1	122815	Screw	4
2	P1673	Washer	10
3	*(N.L.A.)*	Seatrest Plate	1
4	122667-1	Right Trim Panel	1
5	*(N.L.A.)*	Right Support Weldment	1
6		Top Motor Assembly (See "Top Motor Assembly" Elsewhere)	1
7	149730	Thumb Screw Assembly	2
8	119588-1	Programing Plate	1
9	151441-50	Tow Bar	1
10	119531	Tow Bar Roller	2
11	106270	Washer	2
12	042-0007-00	Retaining Ring	8
13	*(N.L.A.)*	Platform Weldment	1
14	*(N.L.A.)*	Left Support Weldment	1
15	115300	Screw	2
16	107995	Screw	4
17	*(N.L.A)*	Left Trim Panel	1
18	112504	Ground Label	3
19	119399	Spacer	2
20	118656-2	Roller Shaft	2
21	118662	Tow Bar Roller	2
22	053-0114-00	Bushing	2
23	122056	Washer	1
24	119741-2	Top Motor Pin	1
25	152345	Hip Post Assy. (Incl. Items 26 thru 29)	2
26	• *(N.L.A.)*	• Hip Post	1
27	• *(N.L.A)*	• Pin	1
28	• 121299	• Set Screw (Apply 042-0024-00 Loctite)	1
29	• 115865	• Bearing	1
30	*(N.L.A.)*	Motor Access Cover	1
31	004-0006-97	Screw	2
32	108965	Bumper	2
33	122998	Hex Nut (on older units was a wing nut, replace with hex nut)	4
34	177771	Velcro Hook	4
35	102687	Serial Number Nameplate	1
36	TPW1354	Rating Nameplate	1

Always Specify Model & Serial Number

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Seat Components



NOTE: This model uses Pebble Grey painted components **(Serial number prefix "PD" & "V").**

MA493700

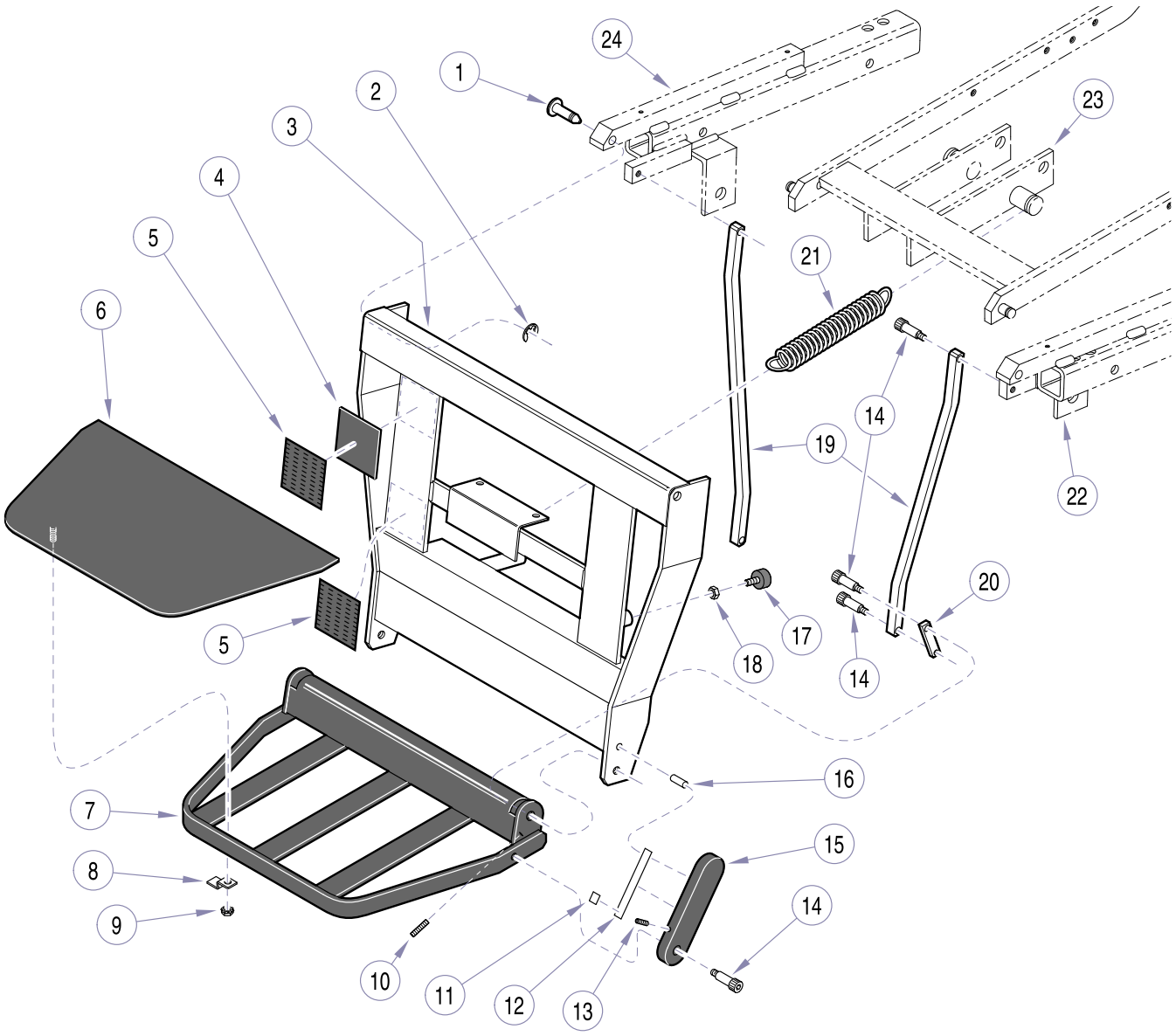
Item	Part No.	Description	Qty
1	122815	Screw	4
2	P1673	Washer	10
3	119408-00	Seatrest Plate	1
4	122667-00	Right Trim Panel	1
5	150518-00	Right Support Weldment	1
6		Top Motor Assembly (See "Top Motor Assembly" Elsewhere)	1
7	149730	Thumb Screw Assembly	2
8	119588-00	Programing Plate	1
9	151441-50	Tow Bar	1
10	119531	Tow Bar Roller	2
11	106270	Washer	2
12	042-0007-00	Retaining Ring	8
13	*(N.L.A.)*	Platform Weldment	1
14	150517-00	Left Support Weldment	1
15	115300	Screw	2
16	107995	Screw	4
17	122668-00	Left Trim Panel	1
18	112504	Ground Label	3
19	119399	Spacer	2
20	118656-2	Roller Shaft	2
21	118662	Tow Bar Roller	2
22	053-0114-00	Bushing	2
23	122056	Washer	1
24	119741-2	Top Motor Pin	1
25	152345-01	Hip Post Assy. (Incl. Items 26 thru 29)	2
26	• 115834-00	• Hip Post	1
27	• 121642-00	• Pin	1
28	• 121299	• Set Screw (Apply 042-0024-00, Loctite)	1
29	• 115865	• Bearing	1
30	118659-00	Motor Access Cover	1
31	004-0006-97	Screw	2
32	108965	Bumper	2
33	122998	Hex Nut (on older units was a wing nut, replace with hex nut)	4
34	177771	Velcro Hook	4
35	102687	Serial Number Nameplate	1

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Leg and Foot Rest Components



NOTE: This model uses Sterling Grey painted components **(Serial number prefix "EN")** that are no longer Available (N.L.A.). Substitute Pebble Grey painted parts, located elsewhere in this manual, when necessary.

MA497300

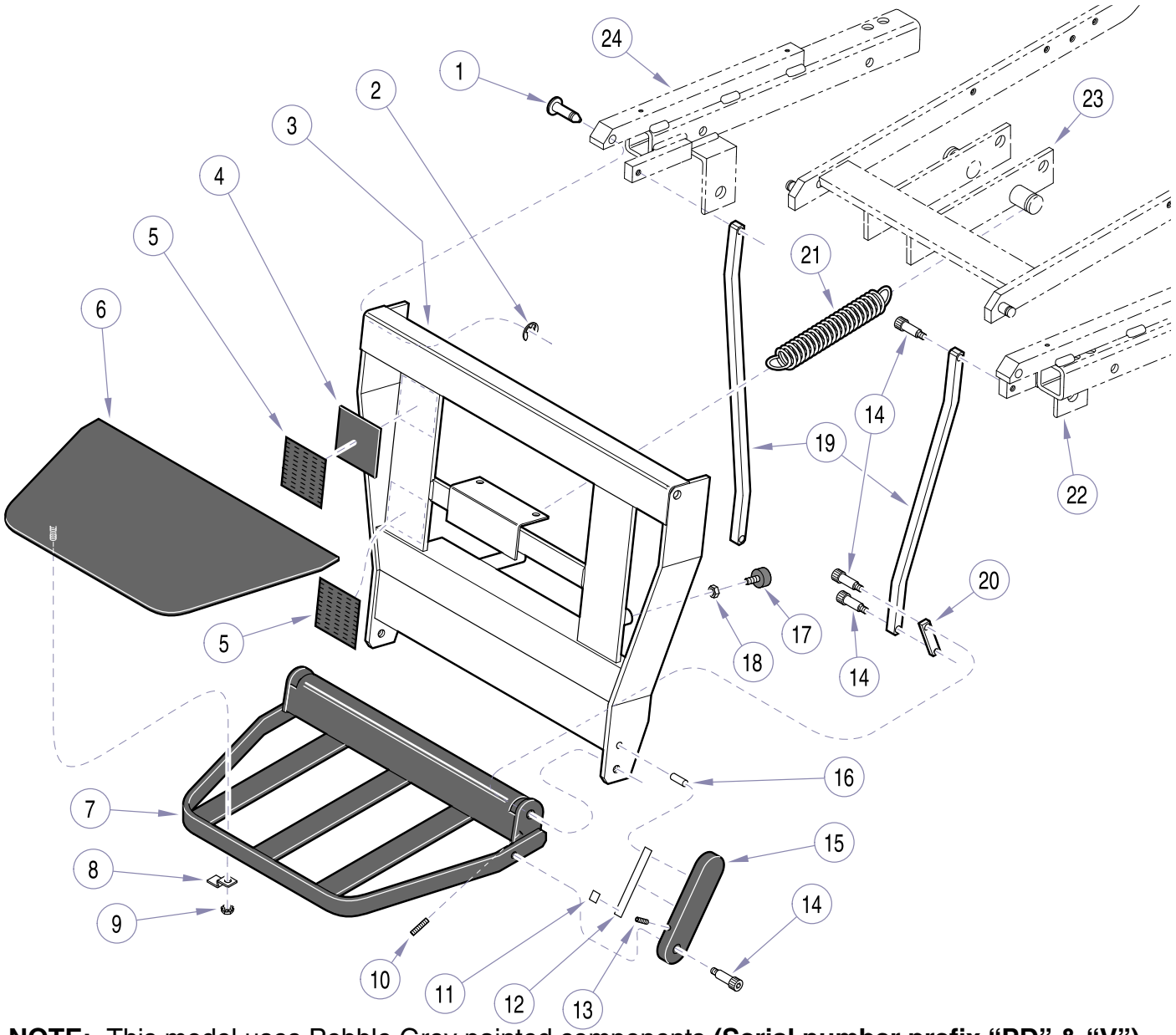
Item	Part No.	Description	Qty
1	118576-2	Pivot Pin	2
2	042-0007-00	Retaining Ring	2
3	*(N.L.A.)*	Leg Rest	1
4	119788	Velcro Spacer	2
5	053-0131-00	Velcro Hook	4
6	120855-1	Foot Platform Cover	1
7	150521	Foot Platform	1
8	120854-2	Clamp	4
9	122357	Lock Nut	4
10	100041	Adjusting Screw	2
11	119799	Spring Lock Pad	1
12	119779	Footlatch Spring	1
13	120044	Set Screw	1
14	118665-6	Shoulder Screw	7
15	119780-1	Foot Platform Link	1
16	117518	Groove Pin	1
17	053-1256-00	Stud Bumper	2
18	P1215	Nut	2
19	*(N.L.A.)*	Foot Rest Link	2
20	118658-50	Foot Rest Lever	2
21	118900	Spring	2
22		Left Support Weldment (See "Seat Components" Elsewhere)	1
23		Tow Bar Assembly (See "Seat Components" Elsewhere)	1
24		Right Support Weldment (See "Seat Components" Elsewhere)	1

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Leg and Foot Rest Components



NOTE: This model uses Pebble Grey painted components **(Serial number prefix "PD" & "V").**

MA497300

Used on Units with Serial Numbers V1000 thru V67971

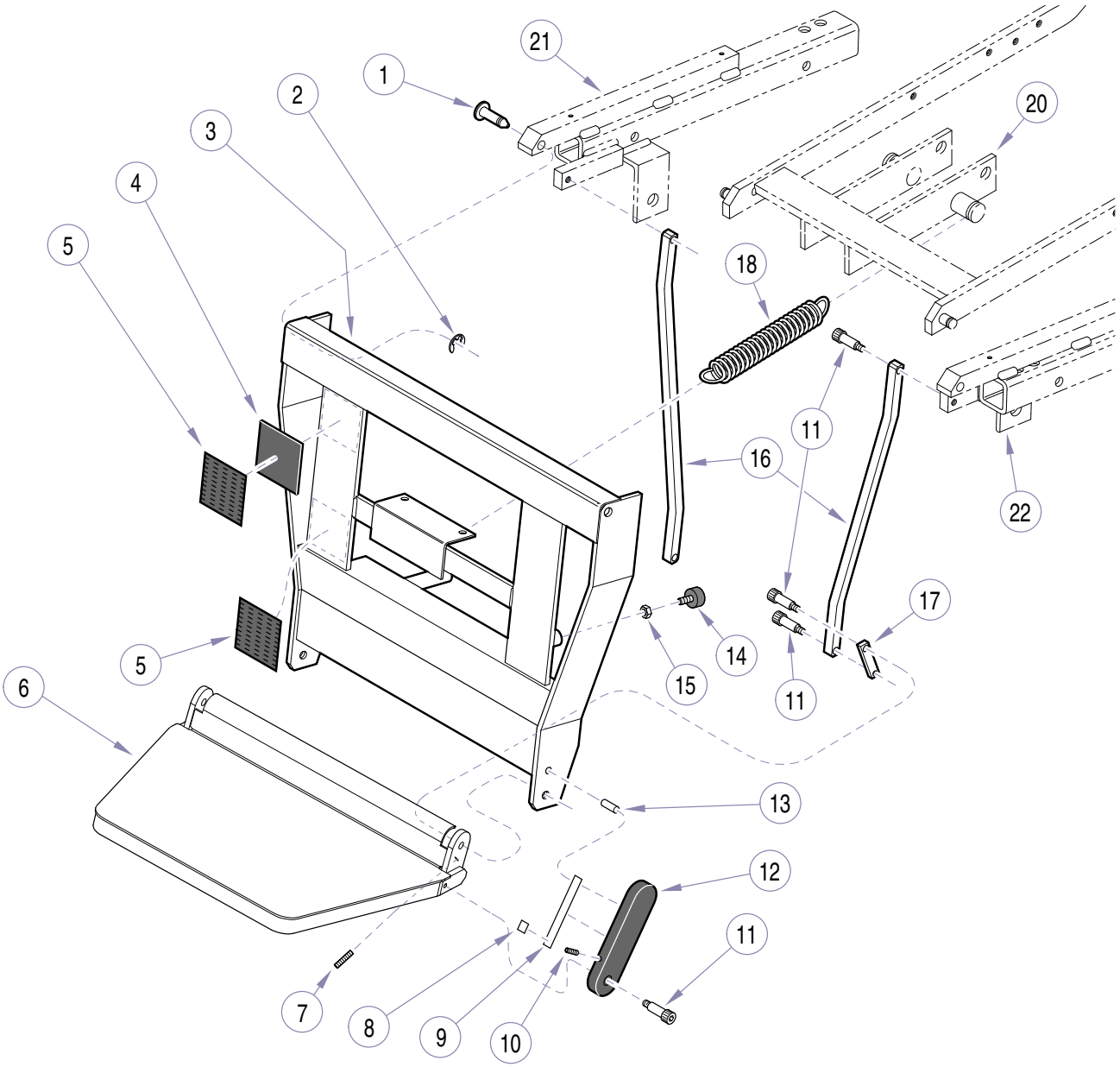
Item	Part No.	Description	Qty
1	118576-2	Pivot Pin	2
2	042-0007-00	Retaining Ring	2
3	150509-00	Leg Rest	1
4	119788	Velcro Spacer	2
5	053-0131-00	Velcro Hook	4
6	120855-00	Foot Platform Cover	1
7	150521-00	Foot Platform	1
8	120854-2	Clamp	4
9	122357	Lock Nut	4
10	100041	Adjusting Screw	2
11	119799	Spring Lock Pad	1
12	119779	Footlatch Spring	1
13	120044	Set Screw	1
14	118665-6	Shoulder Screw	7
15	119780-00	Foot Platform Link	1
16	117518	Groove Pin	1
17	053-1256-00	Stud Bumper	2
18	P1215	Nut	2
19	118657-00	Foot Rest Link	2
20	118658-50	Foot Rest Lever	2
21	118900	Spring	2
22		Left Support Weldment (See "Seat Components" Elsewhere)	1
23		Tow Bar Assembly (See "Seat Components" Elsewhere)	1
24		Right Support Weldment (See "Seat Components" Elsewhere)	1

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Leg and Foot Rest Components



NOTE: This model uses Pebble Grey painted components **(Serial number prefix "PD" & "V").**

MA497301

Used on Units with Serial Numbers V67972 thru Present

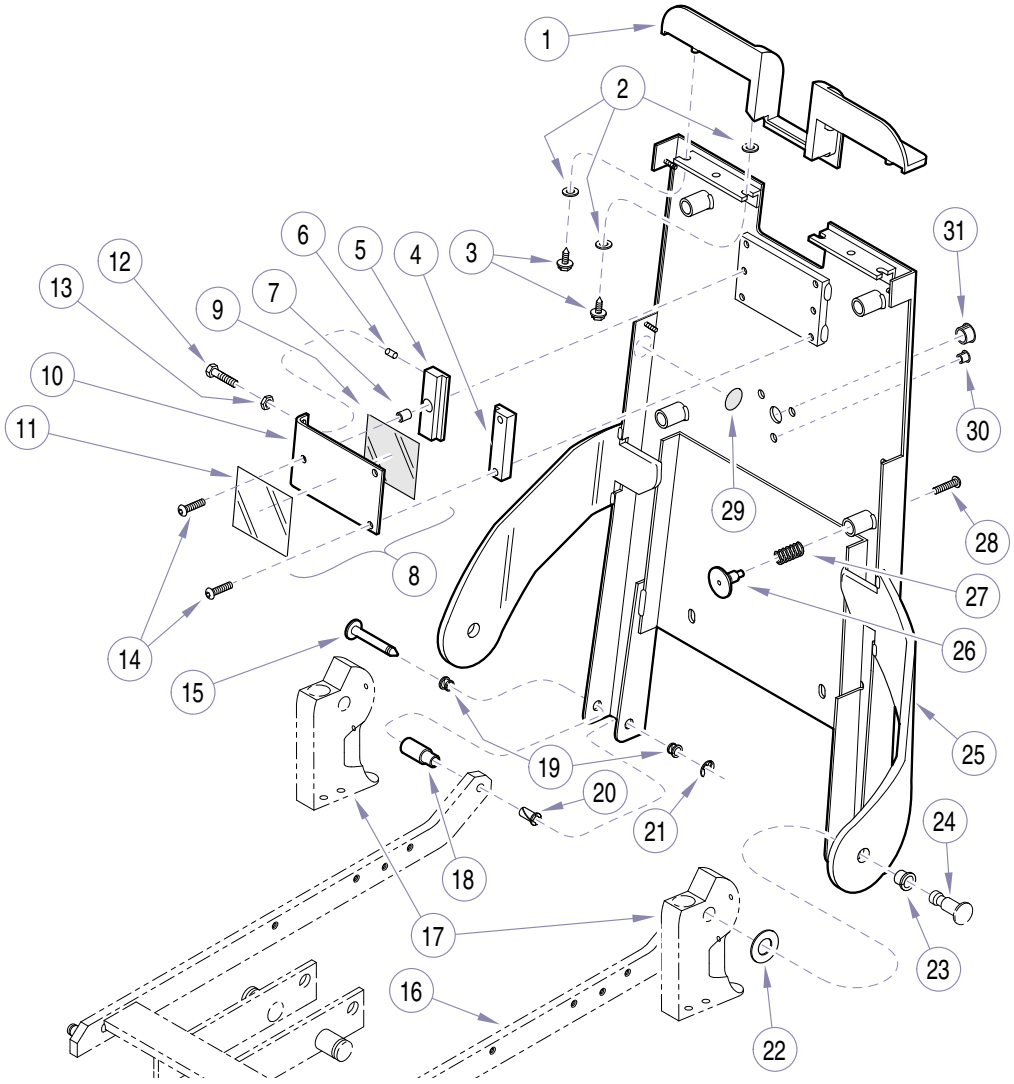
Item	Part No.	Description	Qty
1	118576-2	Pivot Pin	2
2	042-0007-00	Retaining Ring	2
3	150509-00	Leg Rest	1
4	119788	Velcro Spacer	2
5	053-0131-00	Velcro Hook	4
6	150521-00	Foot Platform	1
7	100041	Adjusting Screw	2
8	119799	Spring Lock Pad	1
9	119779	Footlatch Spring	1
10	120044	Set Screw	1
11	118665-6	Shoulder Screw	7
12	119780-00	Foot Platform Link	1
13	117518	Groove Pin	1
14	053-1256-00	Stud Bumper	2
15	P1215	Nut	2
16	118657-00	Foot Rest Link	2
17	118658-50	Foot Rest Lever	2
18	118900	Spring	2
19		Left Support Weldment (See "Seat Components" Elsewhere)	1
20		Tow Bar Assembly (See "Seat Components" Elsewhere)	1
21		Right Support Weldment (See "Seat Components" Elsewhere)	1

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Back Components



NOTE: This model uses Sterling Grey painted components **(Serial number prefix "EN")** that are no longer Available (N.L.A.). Substitute Pebble Grey painted parts, located elsewhere in this manual, when necessary.

MA497402i

Item	Part No.	Description	Qty
1	119398	Chair Back Bezel	1
2	P1673	Washer	6
3	120297	Screw	4
4	120944	Fixed Tang Guide	1
5	120975	Floating Tang Guide	1
6	120976	Tang Guide Compensator	2
7	120985	Standoff	1
8	152094	Tang Guide Plate Assembly (Includes Items 9 thru 11)	1
9	• 120981	• Tang Bearing	1
10	• 120955-50	• Tang Guide Plate	1
11	• 121055	• Headrest Adjustment Label	1
12	108850	Screw	2
13	P1215	Nut	2
14	121052	Screw	3
15	120670 *	Pin	2
16		Tow Bar (See "Seat Components" Elsewhere)	1
17		Hip Post Assembly (See "Seat Components" Elsewhere)	2
18	119266-2	Tow Bar Spacer	2
19	120672 *	Bearing	4
20	120671 *	Bearing	2
21	120673 *	Retaining Ring	2
22	121374	Washer	2
23	118590	Bearing	2
24		Pin (See "Seat Components" Elsewhere)	1
25	151204-1	Chair Back Weldment	1
26	~~121004-2~~	Stud	4
27	~~121005~~	Spring	4
28	~~151783-50~~	Screw	4
29	112504	Ground Label	1
30	120241	Plug	3
31	120236	Plug	1

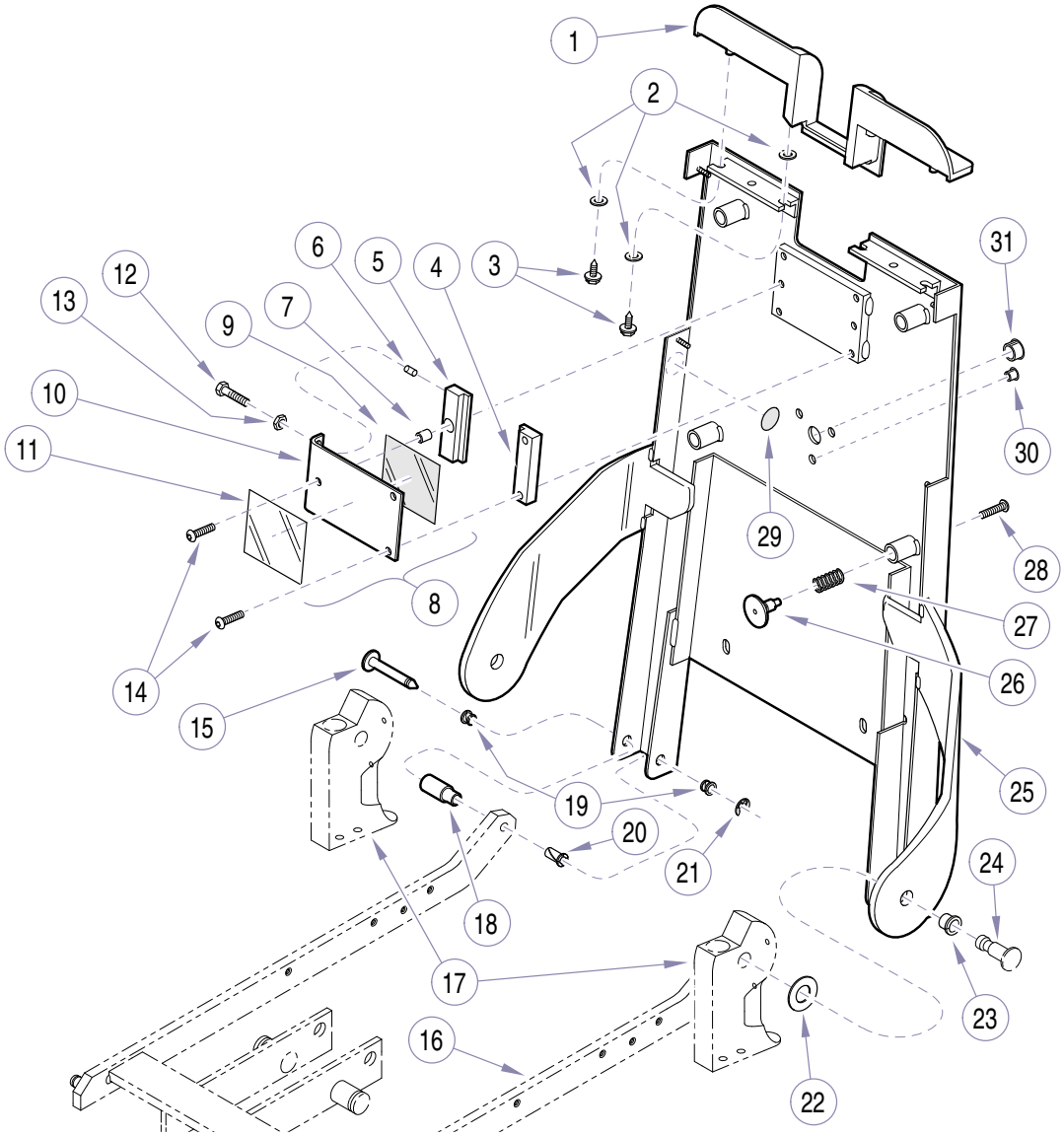
* Available in Kit 151949

Always Specify Model & Serial Number

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Back Components



NOTE: This model uses Pebble Grey painted comp. **(Serial number prefix "PD" & "V").**

MA497402I

Item	Part No.	Description	Qty
1	119398-01	Chair Back Bezel	1
2	P1673	Washer	6
3	120297	Screw	4
4	120944	Fixed Tang Guide	1
5	120975	Floating Tang Guide	1
6	120976	Tang Guide Compensator	2
7	120985	Standoff	1
8	152094-01	Tang Guide Plate Assembly (Includes Items 9 thru 11)	1
9	• 120981	• Tang Bearing	1
10	• 120955-50	• Tang Guide Plate	1
11	• 121055	• Headrest Adjustment Label	1
12	108850	Screw	2
13	P1215	Nut	2
14	121052	Screw	3
15	120670 *	Pin	2
16		Tow Bar (See "Seat Components" Elsewhere)	1
17		Hip Post Assembly (See "Seat Components" Elsewhere)	2
18	119266-2	Tow Bar Spacer	2
19	120672 *	Bearing	4
20	120671 *	Bearing	2
21	120673 *	Retaining Ring	2
22	121374	Washer	2
23	118590	Bearing	2
24		Pin (See "Seat Components" Elsewhere)	1
25	030-1400-00	Chair Back Weldment	1
26	~~121004-2~~	Stud	4
27	~~121005~~	Spring	4
28	~~151783-50~~	Screw	4
29	112504	Ground Label	1
30	053-1702-00-216	Plug	3
31	120236-00	Plug	1

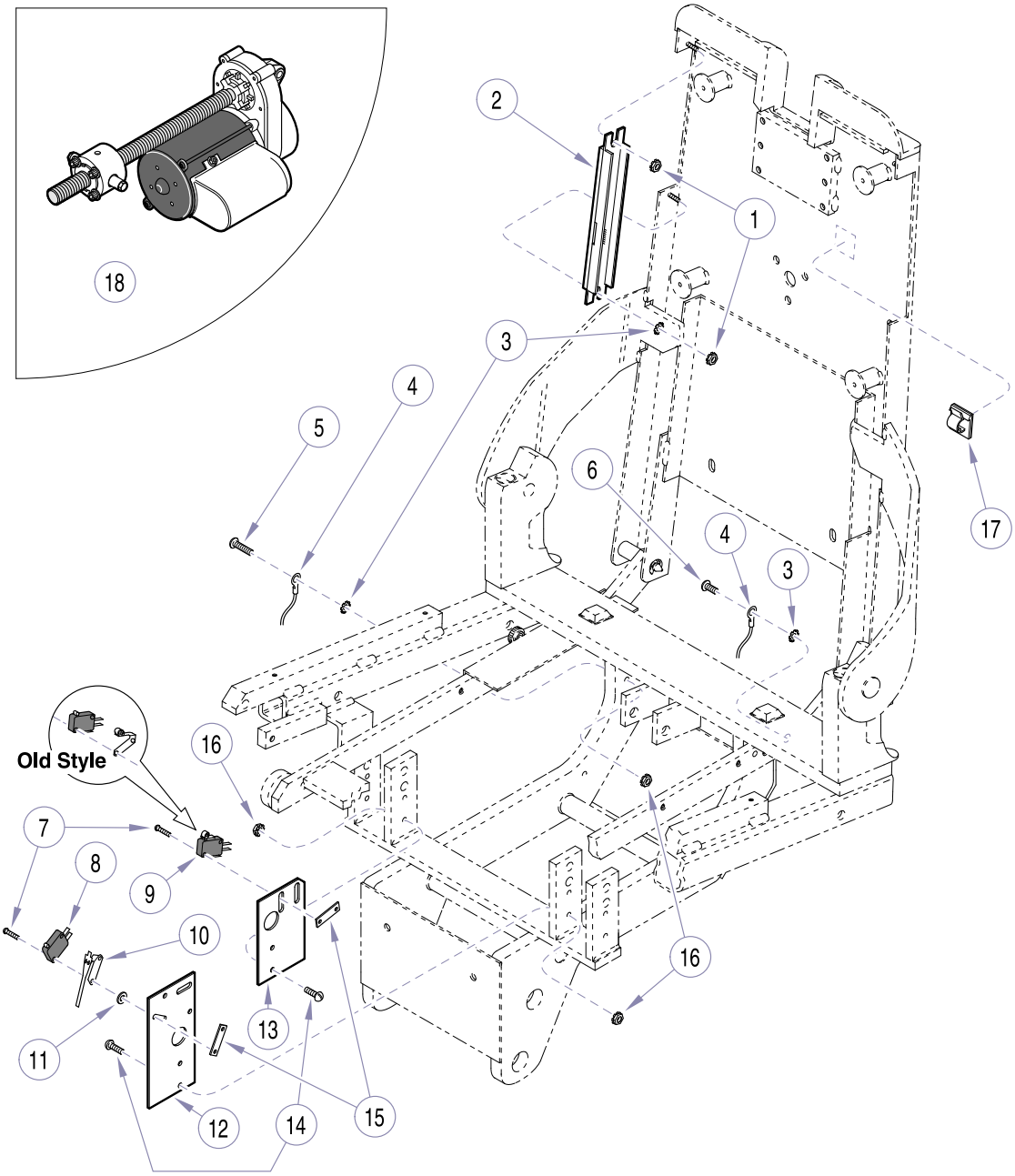
* Available in Kit 151949

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Top Electrical Components



NOTE: This model uses Sterling Grey painted components **(Serial number prefix "EN")** that are no longer Available (N.L.A.). Substitute Pebble Grey painted parts, located elsewhere in this manual, when necessary.

MA504700

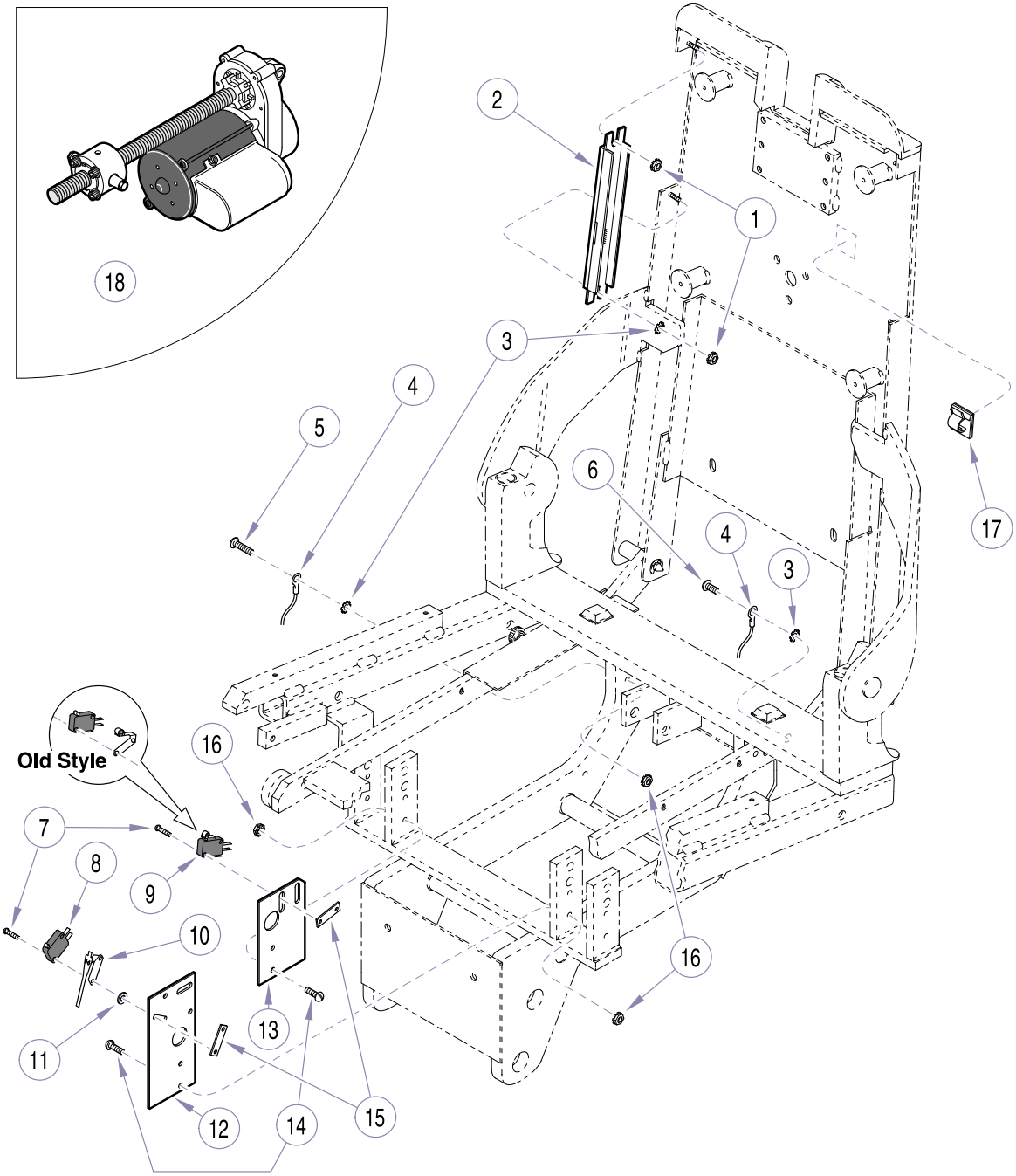
Item	Part No.	Description	Qty
1	122358	Lock Nut	1
2	151584	Membrane Switch Assembly	2
3	P14718	Lock Washer	4
4		Ground Wire (See wiring diagram in Section V)	3
5	040-0010-147	Screw	2
6	040-0010-74	Screw	3
7	152373	Screw	4
8	146978	Micro Switch	1
9	122994	Micro Switch w/ Roller (replaces old style)	1
10	119633	Actuator	1
11	045-0001-93	Washer	2
12	119494-2	Limit Switch Plate (Seat Upright)	1
13	119495-2	Limit Switch Bracket (Seat Recline)	1
14	040-0010-183	Screw	4
15	4P429	Nut Bar	2
16	122357	Lock Nut	6
17	109191	Cord Clip	6
18		Top Motor Assembly (See "Top Motor Assembly" Elsewhere. See "Seat Components" for connecting hardware.)	1
19	115896	Cable Tie (Not Shown)	4

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Top Electrical Components



NOTE: This model uses Pebble Grey painted components **(Serial number prefix "PD" & "V").**

MA504700

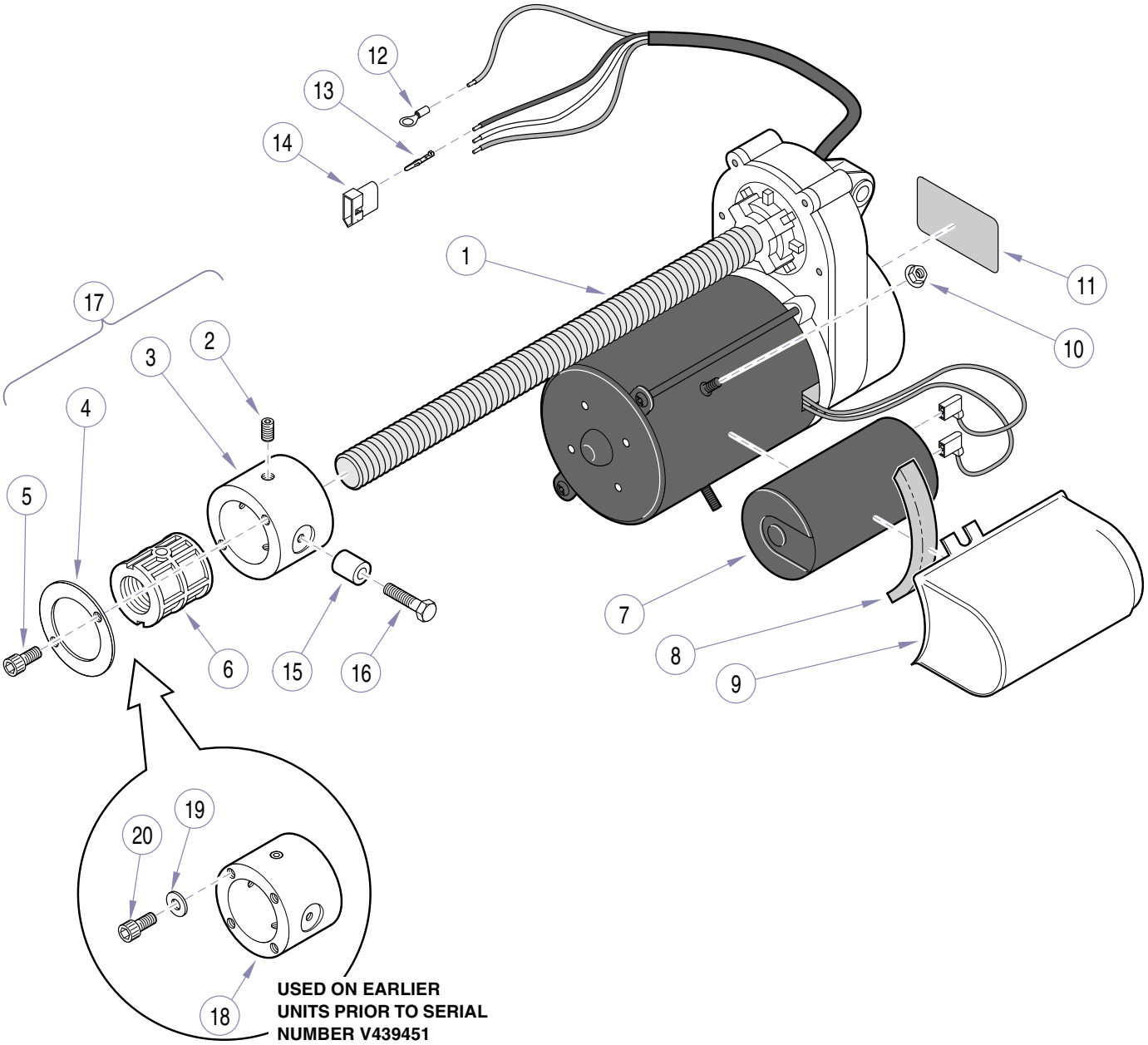
Item	Part No.	Description	Qty
1	122358	Lock Nut	1
2	151584-01	Membrane Switch Assembly	2
3	P14718	Lock Washer	4
4		Ground Wire (See wiring diagram in Section V)	3
5	040-0010-147	Screw	2
6	040-0010-74	Screw	3
7	152373	Screw	4
8	146978	Micro Switch	1
9	122994	Micro Switch w/ Roller (replaces old style)	1
10	119633	Actuator	1
11	045-0001-93	Washer	2
12	119494-2	Limit Switch Plate (Seat Upright)	1
13	119495-2	Limit Switch Bracket (Seat Recline)	1
14	040-0010-183	Screw	4
15	4P429	Nut Bar	2
16	122357	Lock Nut	6
17	109191	Cord Clip	6
18		Top Motor Assembly (See "Top Motor Assembly" Elsewhere. See "Seat Components" for connecting hardware)	1
19	115896	Cable Tie (Not Shown)	4

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Top Motor Assembly



MA496901i

Used on Units with Serial Numbers V439451 thru Present

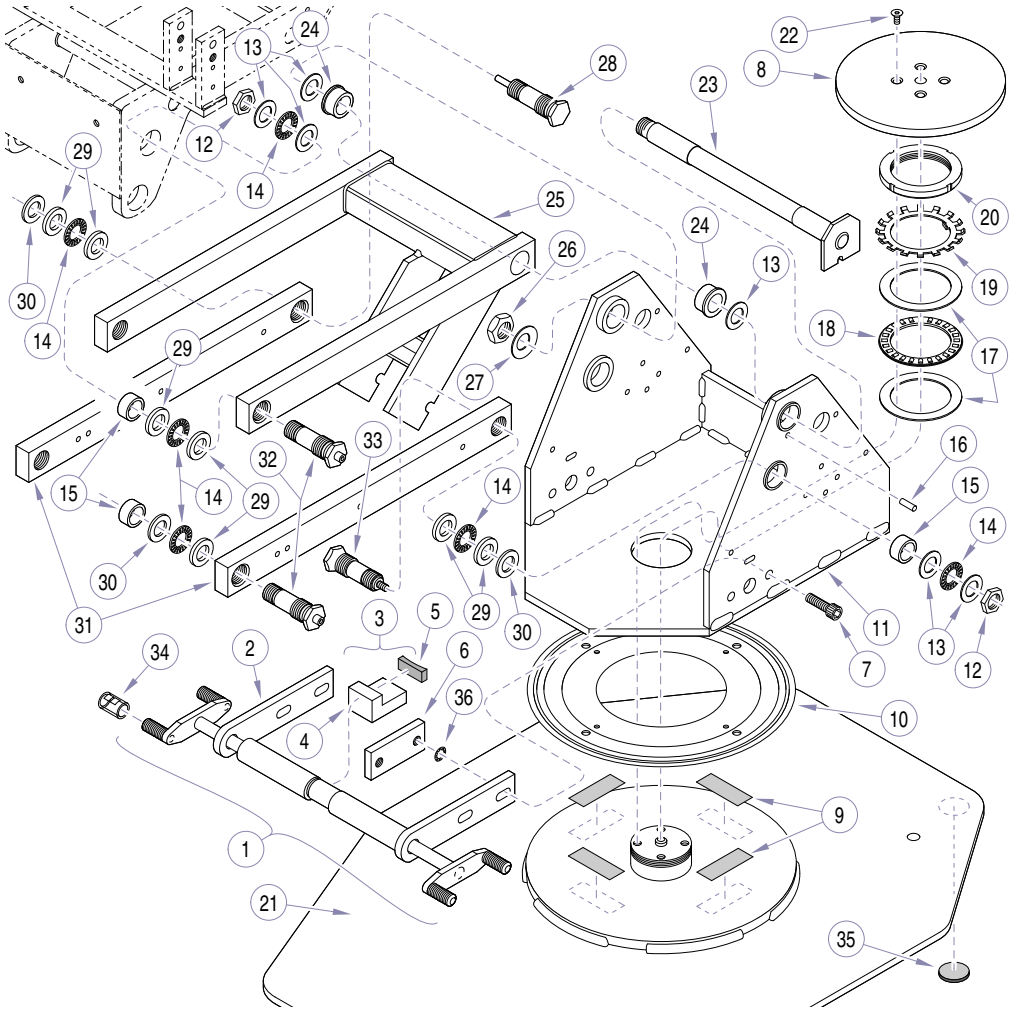
Item	Part No.	Description	Qty
1	151390	Top Motor Assembly (Includes items 2 thru 14)	1
2	• 120102	• Set Screw	2
3	• 119702	• Trunnion Block	1
4	• 050-7121-00	• Stainless Steel Washer	1
5	• 117636	• Screw	2
6	•	• Threaded Insert	1
7	• 120106	• Capacitor (30 MFD)	1
8	•	• Foam Spacer	1
9	•	• Housing	1
10	•	• Nut	2
11	• TP1157	• Motor Label	1
12	• P17087	• Terminal (#10)	1
13	• 101928	• Terminal (Male)	3
14	• 101927	• Connector	1
15	119848-2	Trunnion Bushing	2
16	108850	Screw	2
17	002-1067-00	Trunnion Block Kit (Includes items 2, 3, 4 and 5)	1
18	119702-2	Trunnion Block (Early units only)	1
19	118047	Washer (Early units only)	4
20	117636	Screw (Early units only)	4

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Base Components



TORQUE LEGEND	
ITEM#	TORQUE
7	40 FT-LBS (54.2 N•M)
12	10 FT-LBS (13.6 N•M)
20	80 FT-LBS (108.5 N•M)
28, 32, 33	75 FT-LBS (101.7 N•M)

NOTE: This model uses Sterling Grey painted components **(Serial number prefix "EN")** that are no longer Available (N.L.A.). Substitute Pebble Grey painted parts, located elsewhere in this manual, when necessary.

MA506000

Used on Units with Serial Numbers EN1000 thru EN1084

Item	Part No.	Description	Qty
1	152280	Dual Brake Assy (Includes Items 2 thru 8)	1
2	• 152277-1	• Brake Cam Assy (Apply 185171 Magnalube)	1
3	• 152276	• Brake Shoe Assy (Incl. Items 4 an 5)	1
4	• • 121216-2	• • Brake Shoe (Apply 185171 Magnalube)	1
5	• • 119880	• • Brake Lining	1
6	• 121215-1	• Brake Nut Plate	2
7	• 111911	• Screw	4
8	• 119896	• Brake Disk	1
9	275184	Double Sided Tape	A/R
10	117150	Lazy Susan Bearing	1
11	*(N.L.A.)*	Upright Housing Assy	1
12	119031-2	Nut	6
13	119034 *	Thrust Race (1/32")	14
14	119033 *	Thrust Bearing (Apply 185171 Manalube)	12
15	119058	Bearing	6
16	117518	Groove Pin	1
17	119295	Bearing Race	2
18	119297	Thrust Bearing	1
19	119296	Bearing Lock Washer	1
20	052-0592-00	Locknut w/hole	1
21	152642	Baseplate	1
22	157122	Screw	4
23	149296-2	Shaft Assy	1
24	117086	Flange Bearing	2
25	151159-50	Lift Arm Weldment	1
26	041-0625-00	Nut	1
27	111534	Washer	1
28	151336	Groove Pin Pivot Screw Assy	1
29	119035 *	Thrust Race (1/8")	10
30	155287 *	Washer	4
31	*(N.L.A.)*	Parallel Arm	2
32	120024-2	Pivot Screw	2
33	151326	Cam Stud Pivot Screw Assy	1
34	122627	Sleeve	4
35	118286	Chair Base Pad	4
36	C3454	Washer	4

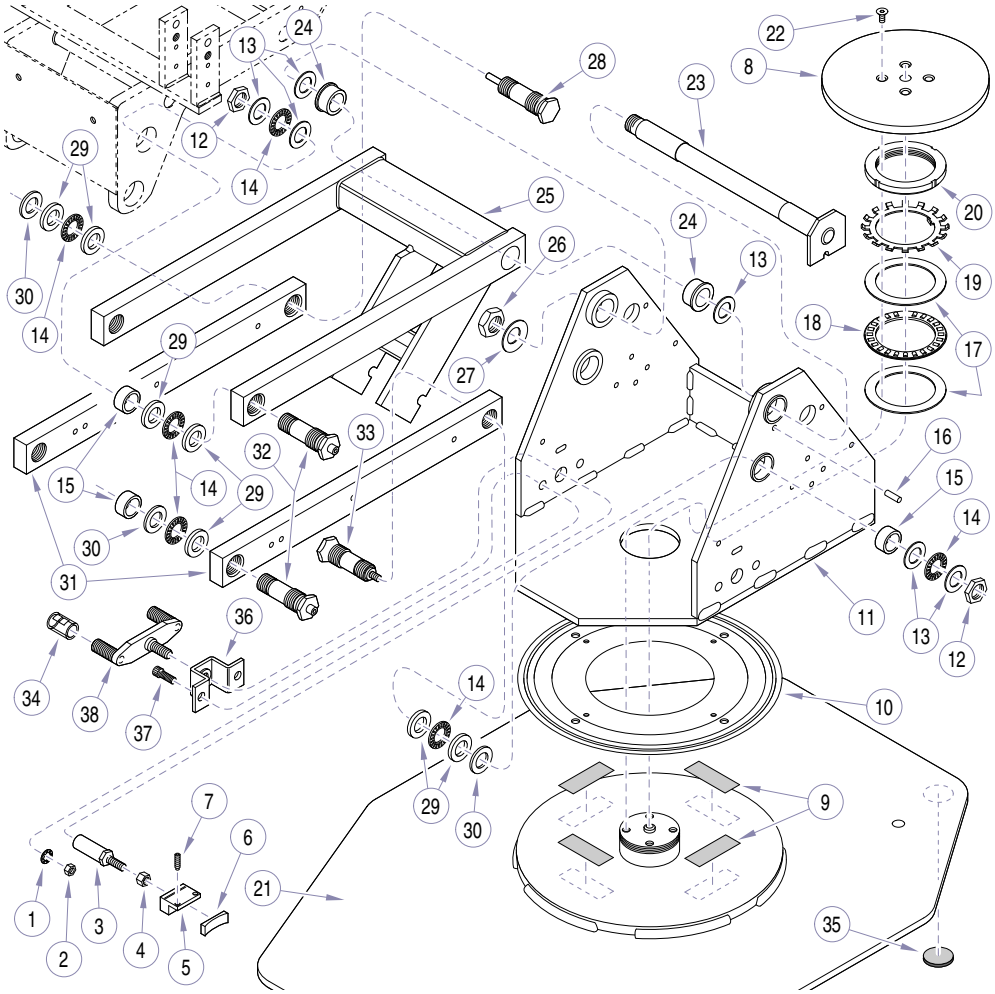
* Available in Kit 152621

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Base Components



TORQUE LEGEND	
ITEM#	**TORQUE**
12	**10 FT-LBS (13.6 N•M)**
20	**80 FT-LBS (108.5 N•M)**
28, 32, 33	**75 FT-LBS (101.7 N•M)**

NOTE: This model uses Sterling Grey painted components **(Serial number prefix "EN")** that are no longer Available (N.L.A.). Substitute Pebble Grey painted parts, located elsewhere in this manual, when necessary.

MA506001i

Used on Units with Serial Numbers EN1085 thru Present

Item	Part No.	Description	Qty
1	C4507	Lock Washer	4
2	C1269	Nut	4
3	119882-2	Rotation Lock Stud	2
4	119513	Nut	2
5	151446	Rotation Block Assy (Includes Item 7)	2
6	•	• Brake Lining	1
7	121148	Set Screw	4
8	119896	Brake Disk	1
9	275184	Double Sided Tape	A/R
10	117150	Lazy Susan Bearing	1
11	*(N.L.A.)*	Upright Housing Assy	1
12	119031-2	Nut	6
13	119034 *	Thrust Race (1/32")	14
14	119033 *	Thrust Bearing (Apply 185171 Manalube)	12
15	119058	Bearing	6
16	117518	Groove Pin	1
17	119295	Bearing Race	2
18	119297	Thrust Bearing	1
19	119296	Bearing Lock Washer	1
20	052-0592-00	Locknut w/hole	1
21	152642	Baseplate	1
22	157122	Screw	4
23	149296-2	Shaft Assy	1
24	117086	Flange Bearing	2
25	151159-50	Lift Arm Weldment	1
26	041-0625-00	Nut	1
27	111534	Washer	1
28	151336	Groove Pin Pivot Screw Assy	1
29	119035 *	Thrust Race (1/8")	10
30	155287 *	Washer	4
31	*(N.L.A.)*	Parallel Arm	2
32	120024-2	Pivot Screw	2
33	151326	Cam Stud Pivot Screw Assy	1
34	122627	Sleeve	4
35	118286	Chair Base Pad	4
36	*(N.L.A.)*	Bracket Assy	1
37	C5253	Screw	2
38	*(N.L.A.)*	Lever Assy (Apply 185171 Magnalube to Threads)	1

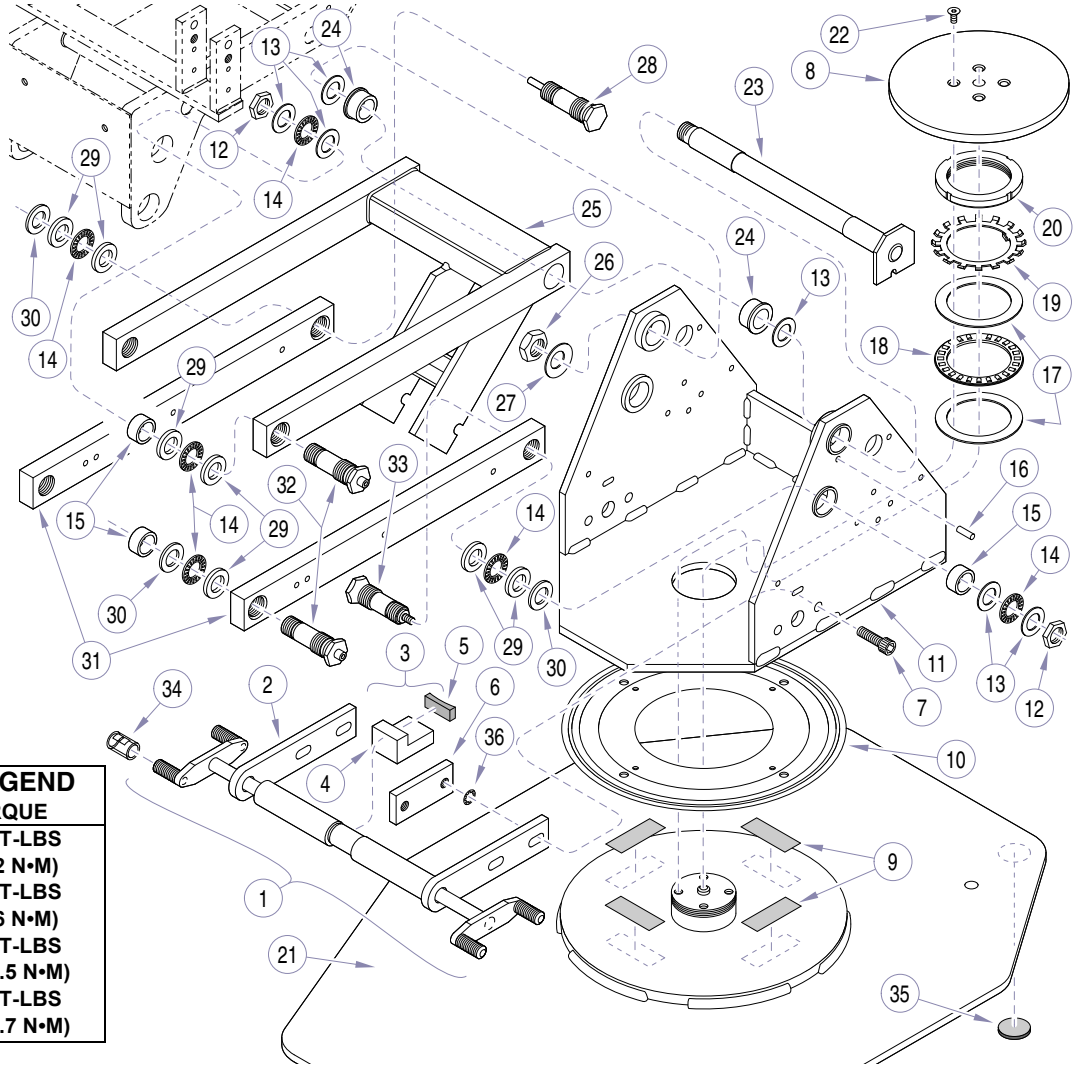
* Available in Kit 152621

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Base Components



TORQUE LEGEND	
ITEM#	**TORQUE**
7	**40 FT-LBS (54.2 N•M)**
12	**10 FT-LBS (13.6 N•M)**
20	**80 FT-LBS (108.5 N•M)**
28, 32, 33	**75 FT-LBS (101.7 N•M)**

NOTE: This model uses Pebble Grey painted components **(Serial number prefix "PD" & "V").**

MA506000

Used on Units with Serial Number PD1000 thru PD1303

Item	Part No.	Description	Qty
1	152280-01	Dual Brake Assy (Includes Items 2 thru 8)	1
2	• 152277-00	• Brake Cam Assy (Apply 185171 Magnalube)	1
3	• 152276	• Brake Shoe Assy (Incl. Items 4 an 5)	1
4	• • 121216-2	• • Brake Shoe (Apply 185171 Magnalube)	1
5	• • 119880	• • Brake Lining	1
6	• 121215-00	• Brake Nut Plate	2
7	• 111911	• Screw	4
8	• 119896	• Brake Disk	1
9	275184	Double Sided Tape	A/R
10	117150	Lazy Susan Bearing	1
11	151168-00	Upright Housing Assy	1
12	119031-2	Nut	6
13	119034 *	Thrust Race (1/32")	14
14	119033 *	Thrust Bearing (Apply 185171 Manalube)	12
15	119058	Bearing	6
16	117518	Groove Pin	1
17	119295	Bearing Race	2
18	119297	Thrust Bearing	1
19	119296	Bearing Lock Washer	1
20	052-0592-00	Locknut w/hole	1
21	152642-00	Baseplate	1
22	157122	Screw	4
23	149296-2	Shaft Assy	1
24	117086	Flange Bearing	2
25	151159-00	Lift Arm Weldment	1
26	041-0625-00	Nut	1
27	111534	Washer	1
28	151336	Groove Pin Pivot Screw Assy	1
29	119035 *	Thrust Race (1/8")	10
30	155287 *	Washer	4
31	121521-00	Parallel Arm	2
32	120024-2	Pivot Screw	2
33	151326	Cam Stud Pivot Screw Assy	1
34	122627	Sleeve	4
35	118286	Chair Base Pad	4
36	C3454	Washer	4

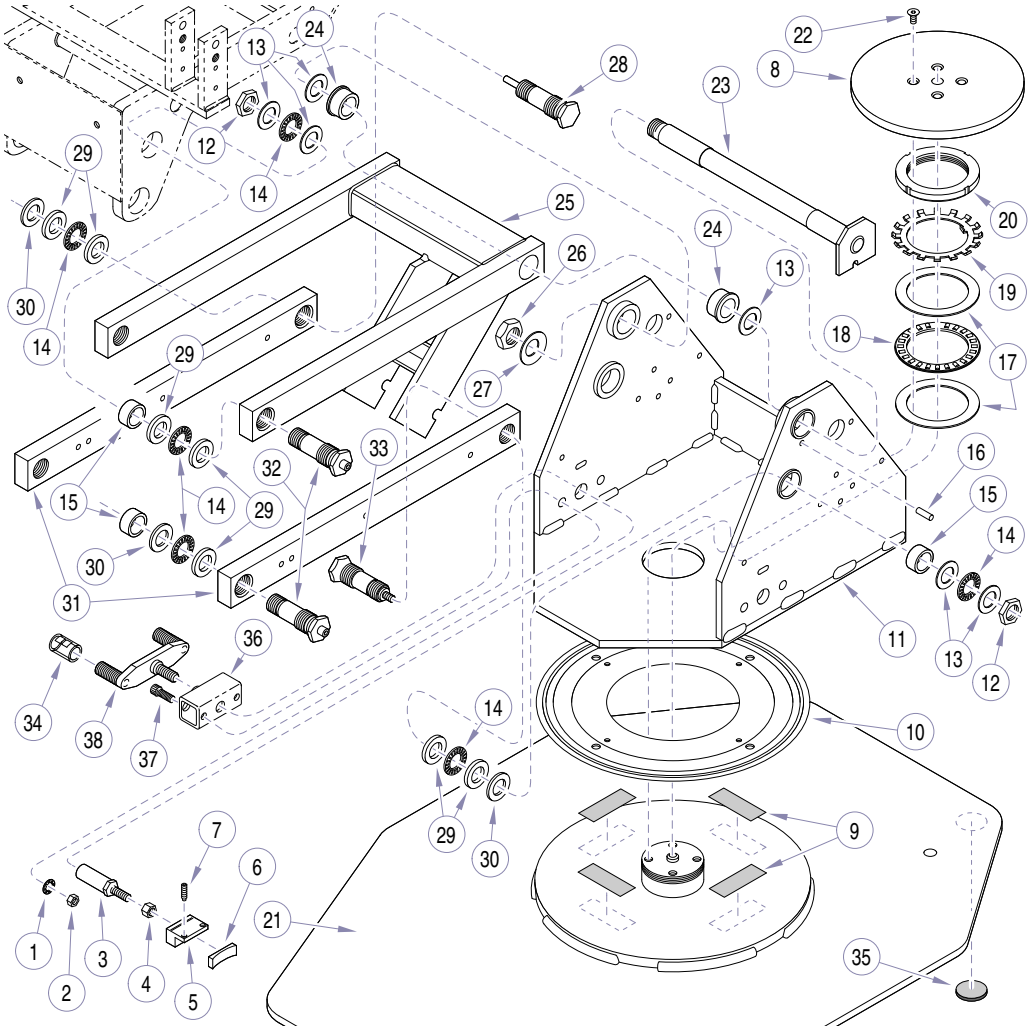
* Available in Kit 152621

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Base Components



TORQUE LEGEND	
ITEM#	TORQUE
12	10 FT-LBS (13.6 N•M)
20	80 FT-LBS (108.5 N•M)
28, 32, 33	75 FT-LBS (101.7 N•M)

NOTE: This model uses Pebble Grey painted components **(Serial number prefix "PD" & "V").**

MA506003i

Used on Units with Serial Number PD1304 thru Present
Used on Units with Serial Numbers V2200 thru V87416

Item	Part No.	Description	Qty
1	C4507	Lock Washer	4
2	C1269	Nut	4
3	119882-2	Rotation Lock Stud	2
4	119513	Nut	2
5	151446	Rotation Block Assy (Includes Item 7)	2
6	•	• Brake Lining	1
7	121148	Set Screw	4
8	119896	Brake Disk	1
9	275184	Double Sided Tape	A/R
10	117150	Lazy Susan Bearing	1
11	151168-00	Upright Housing Assy	1
12	119031-2	Nut	6
13	119034 *	Thrust Race (1/32")	14
14	119033 *	Thrust Bearing (Apply 185171 Manalube)	12
15	119058	Bearing	6
16	117518	Groove Pin	1
17	119295	Bearing Race	2
18	119297	Thrust Bearing	1
19	119296	Bearing Lock Washer	1
20	052-0592-00	Locknut w/hole	1
21	152642-00	Baseplate	1
22	157122	Screw	4
23	149296-2	Shaft Assy	1
24	117086	Flange Bearing	2
25	151159-00	Lift Arm Weldment	1
26	041-0625-00	Nut	1
27	111534	Washer	1
28	151336	Groove Pin Pivot Screw Assy	1
29	119035 *	Thrust Race (1/8")	10
30	155287 *	Washer	4
31	121521-00	Parallel Arm	2
32	120024-2	Pivot Screw	2
33	151326	Cam Stud Pivot Screw Assy	1
34	122627	Sleeve	4
35	118286	Chair Base Pad	4
36	030-1808-00-216	Bracket Assy	2
37	C5253	Screw	4
38	151447-00	Lever Assy (Apply 185171 Magnalube to Threads)	2

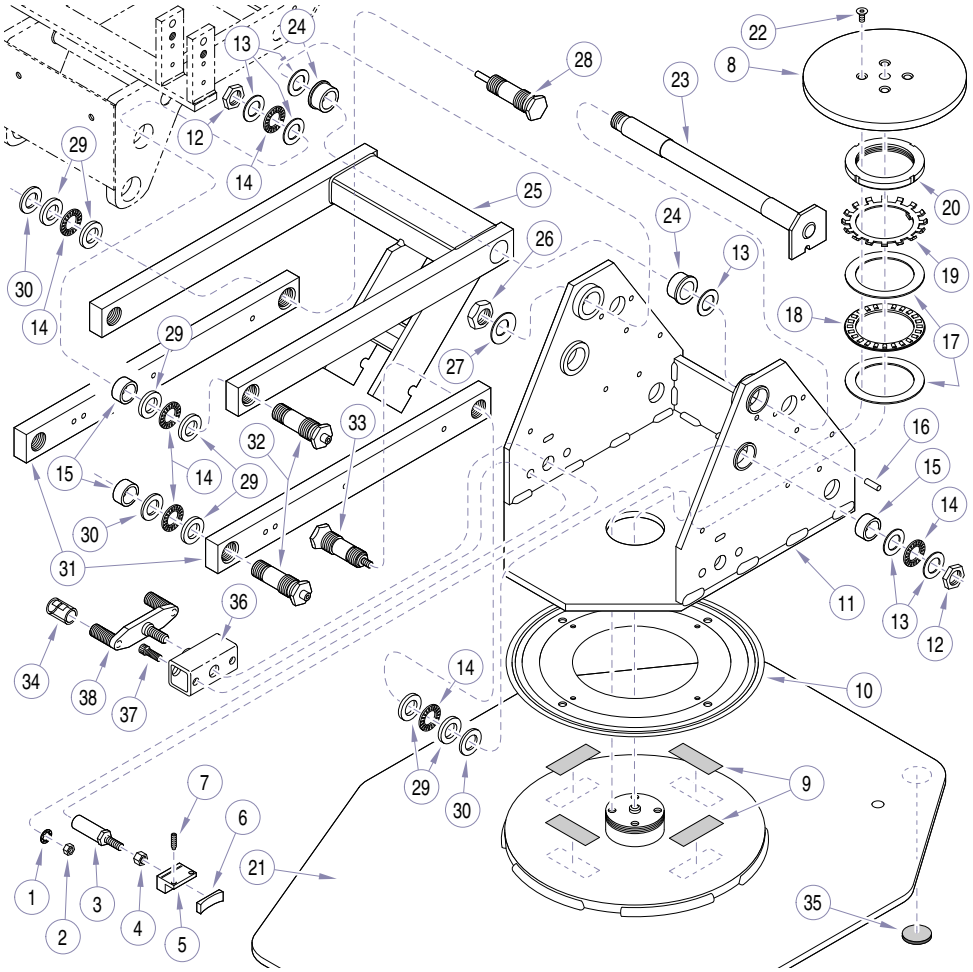
* Available in Kit 152621

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Base Components



TORQUE LEGEND	
ITEM#	**TORQUE**
12	**10 FT-LBS (13.6 N•M)**
20	**80 FT-LBS (108.5 N•M)**
28, 32, 33	**75 FT-LBS (101.7 N•M)**

NOTE: This model uses Pebble Grey painted components **(Serial number prefix "PD" & "V").**

MA506004i

Used on Units with Serial Numbers V87417 thru Present

Item	Part No.	Description	Qty
1	C4507	Lock Washer	4
2	C1269	Nut	4
3	119882-2	Rotation Lock Stud	2
4	119513	Nut	2
5	151446	Rotation Block Assy (Includes Item 7)	2
6	•	• Brake Lining	1
7	121148	Set Screw	4
8	119896	Brake Disk	1
9	275184	Double Sided Tape	A/R
10	117150	Lazy Susan Bearing	1
11	030-1563-50	Upright Housing Assy	1
12	119031-2	Nut	6
13	119034 *	Thrust Race (1/32")	14
14	119033 *	Thrust Bearing (Apply 185171 Manalube)	12
15	119058	Bearing	6
16	117518	Groove Pin	1
17	119295	Bearing Race	2
18	119297	Thrust Bearing	1
19	119296	Bearing Lock Washer	1
20	052-0592-00	Locknut w/hole	1
21	152642-00	Baseplate	1
22	157122	Screw	4
23	149296-2	Shaft Assy	1
24	117086	Flange Bearing	2
25	151159-00	Lift Arm Weldment	1
26	041-0625-00	Nut	1
27	111534	Washer	1
28	151336	Groove Pin Pivot Screw Assy	1
29	119035 *	Thrust Race (1/8")	10
30	155287 *	Washer	4
31	121521-00	Parallel Arm	2
32	120024-2	Pivot Screw	2
33	151326	Cam Stud Pivot Screw Assy	1
34	122627	Sleeve	4
35	118286	Chair Base Pad	4
36	030-1808-00-216	Bracket Assy	2
37	C5253	Screw	4
38	151447-00	Lever Assy (Apply 185171 Magnalube to Threads)	2

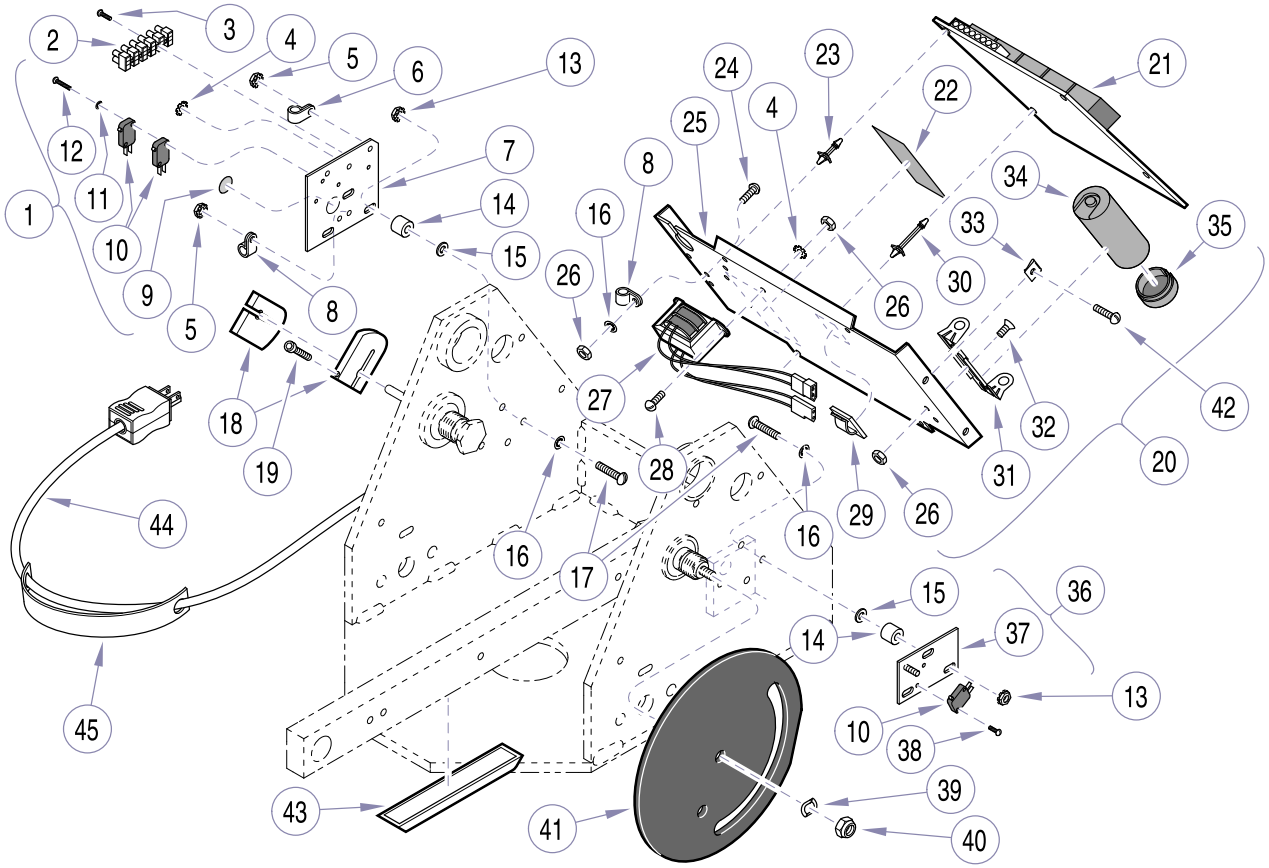
* Available in Kit 152621

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Base Electrical Components



NOTE: This model uses Sterling Grey painted components **(Serial number prefix "EN")** that are no longer Available (N.L.A.). Substitute Pebble Grey painted parts, located elsewhere in this manual, when necessary.

MA510400

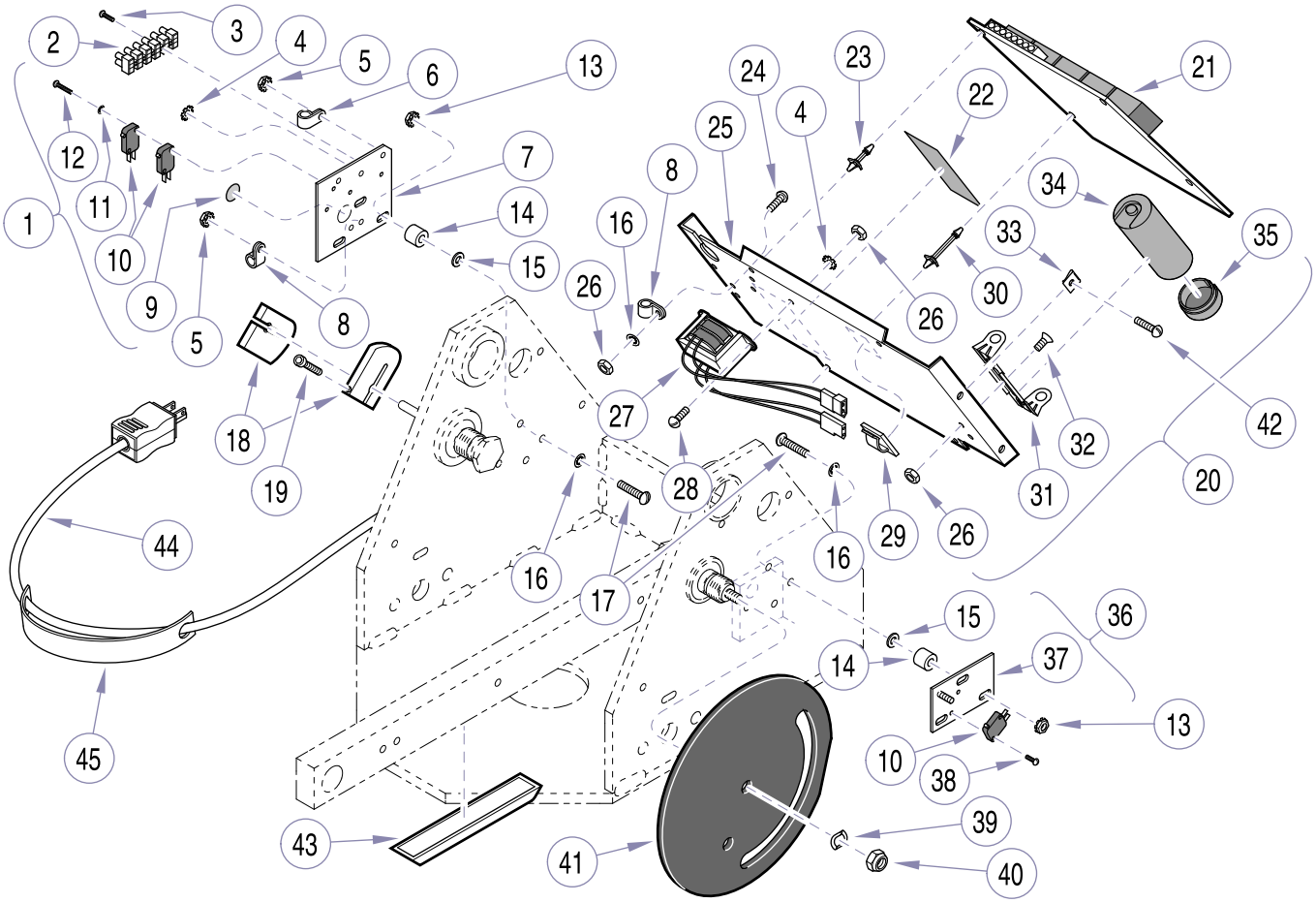
Item	Part No.	Description	Qty
1	151415	Electrical Plate Assy (Includes Items 2 thru 12)	1
2	• 119483	• Terminal Block	1
3	• 004-0004-25	• Screw	2
4	• P14718	• Lock Washer	4
5	• 122358	• Lock Nut	5
6	• 121655	• Cable Clamp	2
7	• 151179	• Electrical Connection Plate	1
8	• 121656	• Cable Clamp	4
9	• 112504	• Ground Label	2
10	• 146978	• Micro Switch	3
11	• 105155	• Lock Washer	2
12	• 155668	• Screw	2
13	122357	Lock Nut	8
14	121719	Spacer	6
15	P1673	Washer	6
16	P12575	Lock Washer	7
17	117601	Screw	8
18	119378	Cam	2
19	109104	Screw	2
20	152206	Chair PC Board Assy (Includes Items 4, 8, 16 and 21 thru 35)	1
21	• 152207	• Chair PC Board	1
22	• 119986	• Fuse Warning Label	1
23	• 119690	• Snap-in Support (short)	2
24	• 040-0010-183	• Screw	1
25	• 121054-2	• Mounting Plate	1
26	• P507	• Nut	5
27	• 152211	• ENT Light Transformer Assy	1
28	• 040-0010-74	• Screw	3
29	• 109191	• Cord Clip	7
30	• 121068	• Snap-in Support (long)	2
31	• 113045	• Capacitor Bracket	2
32	• C5287	• Screw	2
33	• 104621	• Tinnerman Nut	4
34	• 116618	• Capacitor (53-64 MFD / 330 V)	1
35	• 111868	• Capacitor End Cap	1
36	152373	Program Plate Assy (Includes Items 10, 37 and 38)	1
37	• 121321-2	• Program Plate	1
38	• 122806	• Screw	2
39	117706	Spring Washer	1
40	119593	Lock Nut	1
41	121322	Program Switch Cam	1
42		Screw (See "Covers" elsewhere)	4
43	119589	Latching Duct	2
44	150121	Power Cord (Includes Item 45)	1
45	• 134384	• Warning Tag	1
46	115896	Cable Tie (Not Shown)	3
47		Base Motor Assy (Not Shown) (See "Base Motor Assembly" elsewhere)	1

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Base Electrical Components



NOTE: This model uses Pebble Grey painted components **(Serial number prefix "PD" & "V").**

MA810400

Used on Units with Serial Numbers V1000 thru V87416

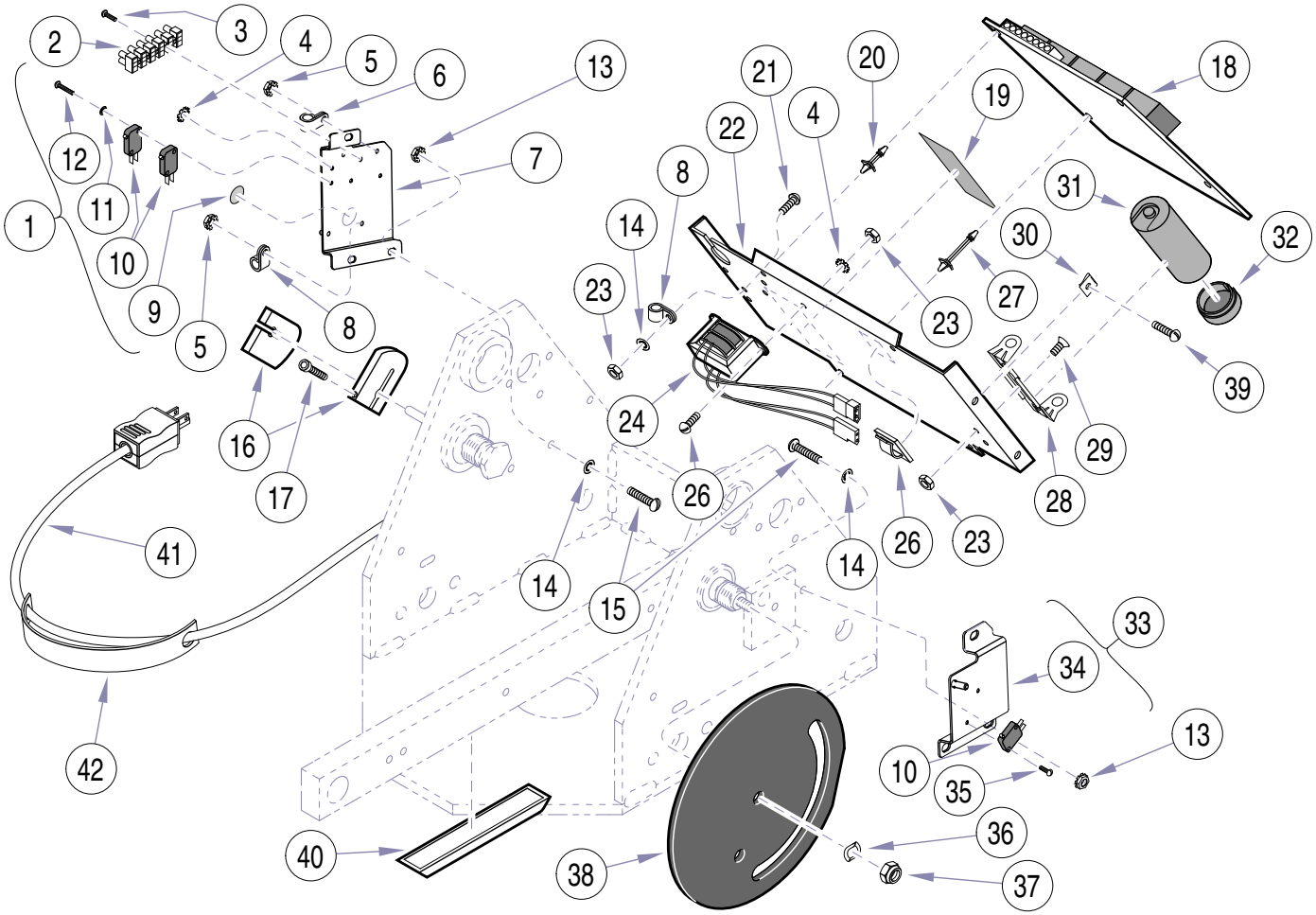
Item	Part No.	Description	Qty
1	151415	Electrical Plate Assy (Includes Items 2 thru 12)	1
2	• 119483	• Terminal Block	1
3	• 004-0004-25	• Screw	2
4	• P14718	• Lock Washer	4
5	• 122358	• Lock Nut	5
6	• 121655	• Cable Clamp	2
7	• 151179	• Electrical Connection Plate	1
8	• 121656	• Cable Clamp	4
9	• 112504	• Ground Label	2
10	• 146978	• Micro Switch	3
11	• 105155	• Lock Washer	2
12	• 155668	• Screw	2
13	122357	Lock Nut	8
14	121719	Spacer	6
15	P1673	Washer	6
16	P12575	Lock Washer	7
17	117601	Screw	8
18	119378	Cam	2
19	109104	Screw	2
20	152206	Chair PC Board Assy (Includes Items 4, 8, 16 and 21 thru 35)	1
21	• 152207	• Chair PC Board	1
22	• 119986	• Fuse Warning Label	1
23	• 119690	• Snap-in Support (short)	2
24	• 040-0010-183	• Screw	1
25	• 121054-2	• Mounting Plate	1
26	• P507	• Nut	5
27	• 152211	• ENT Light Transformer Assy	1
28	• 040-0010-74	• Screw	3
29	• 109191	• Cord Clip	7
30	• 121068	• Snap-in Support (long)	2
31	• 113045	• Capacitor Bracket	2
32	• C5287	• Screw	2
33	• 104621	• Tinnerman Nut	4
34	• 116618	• Capacitor (53-64 MFD / 330 V)	1
35	• 111868	• Capacitor End Cap	1
36	152373	Program Plate Assy (Includes Items 10, 37 and 38)	1
37	• 121321-2	• Program Plate	1
38	• 122806	• Screw	2
39	117706	Spring Washer	1
40	119593	Lock Nut	1
41	121322	Program Switch Cam	1
42		Screw (See "Covers" elsewhere)	4
43	119589	Latching Duct	2
44	015-1526-00	Power Cord (Includes Item 45)	1
45	• 061-0743-00	• Warning Tag	1
46	115896	Cable Tie (Not Shown)	3
47		Base Motor Assy (Not Shown) (See "Base Motor Assembly" elsewhere)	1

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Base Electrical Components



NOTE: This model uses Pebble Grey painted components **(Serial number prefix "PD" & "V").**

MA510406i

Used on Units with Serial Numbers V87417 thru V160530

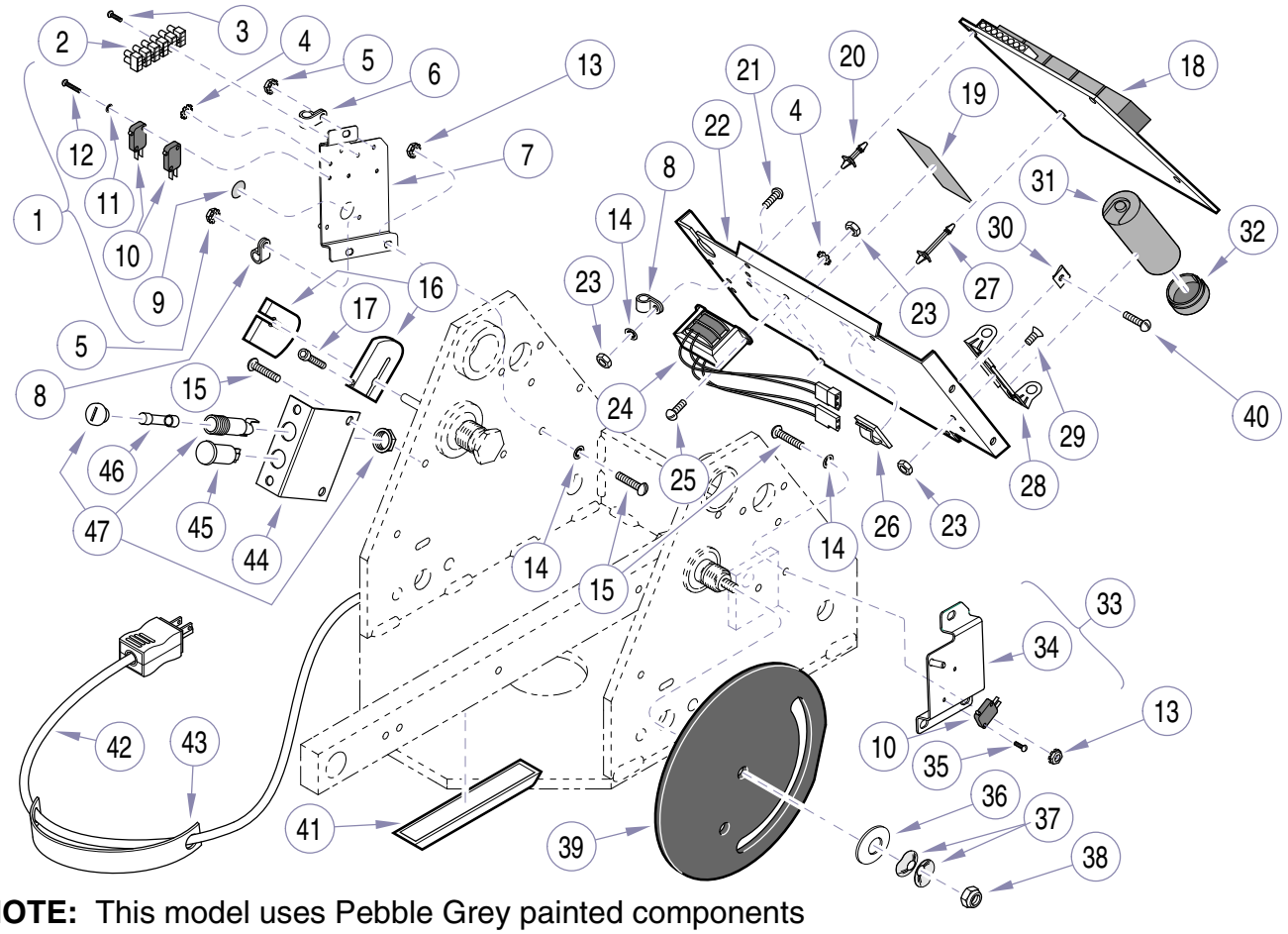
Item	Part No.	Description	Qty
1	151415	Electrical Plate Assy (Includes Items 2 thru 12)	1
2	• 119483	• Terminal Block	1
3	• 004-0004-25	• Screw	2
4	• P14718	• Lock Washer	4
5	• 122358	• Lock Nut	5
6	• 121655	• Cable Clamp	2
7	• 050-5856-01-216	• Electrical Connection Plate	1
8	• 121656	• Cable Clamp	4
9	• 112504	• Ground Label	2
10	• 146978	• Micro Switch	3
11	• 105155	• Lock Washer	2
12	• 155668	• Screw	2
13	122357	Lock Nut	8
14	P12575	Lock Washer	7
15	117601	Screw	8
16	119378	Cam	2
17	109104	Screw	2
18	002-1029-00	Chair PC Board Kit	1
19	119986	Fuse Warning Label	1
20	119690	Snap-in Support (short)	2
21	040-0010-183	Screw	1
22	121054-2	Mounting Plate	1
23	P507	Nut	5
24	015-2178-00	ENT Light Transformer Assy	1
25	040-0010-74	Screw	3
26	109191	Cord Clip	7
27	121068	Snap-in Support (long)	2
28	113045	Capacitor Bracket	2
29	C5287	Screw	2
30	104621	Tinnerman Nut	4
31	116618	Capacitor (53-64 MFD / 330 V)	1
32	111868	Capacitor End Cap	1
33	152373	Program Plate Assy (Includes Items 10, 34 and 35)	1
34	• 050-5865-01-216	• Program Plate	1
35	• 122806	• Screw	2
36	117706	Spring Washer	1
37	119593	Lock Nut	1
38	121322	Program Switch Cam	1
39		Screw (See "Covers" elsewhere)	4
40	119589	Latching Duct	2
41	015-1526-00	Power Cord (Includes Item 42)	1
42	• 061-0743-00	• Warning Tag	1
43	115896	Cable Tie (Not Shown)	3
44		Base Motor Assy (Not Shown) (See "Base Motor Assembly" elsewhere)	1

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Base Electrical Components



NOTE: This model uses Pebble Grey painted components

MA510404i

Used on Units with Serial Numbers V160531 thru V456962

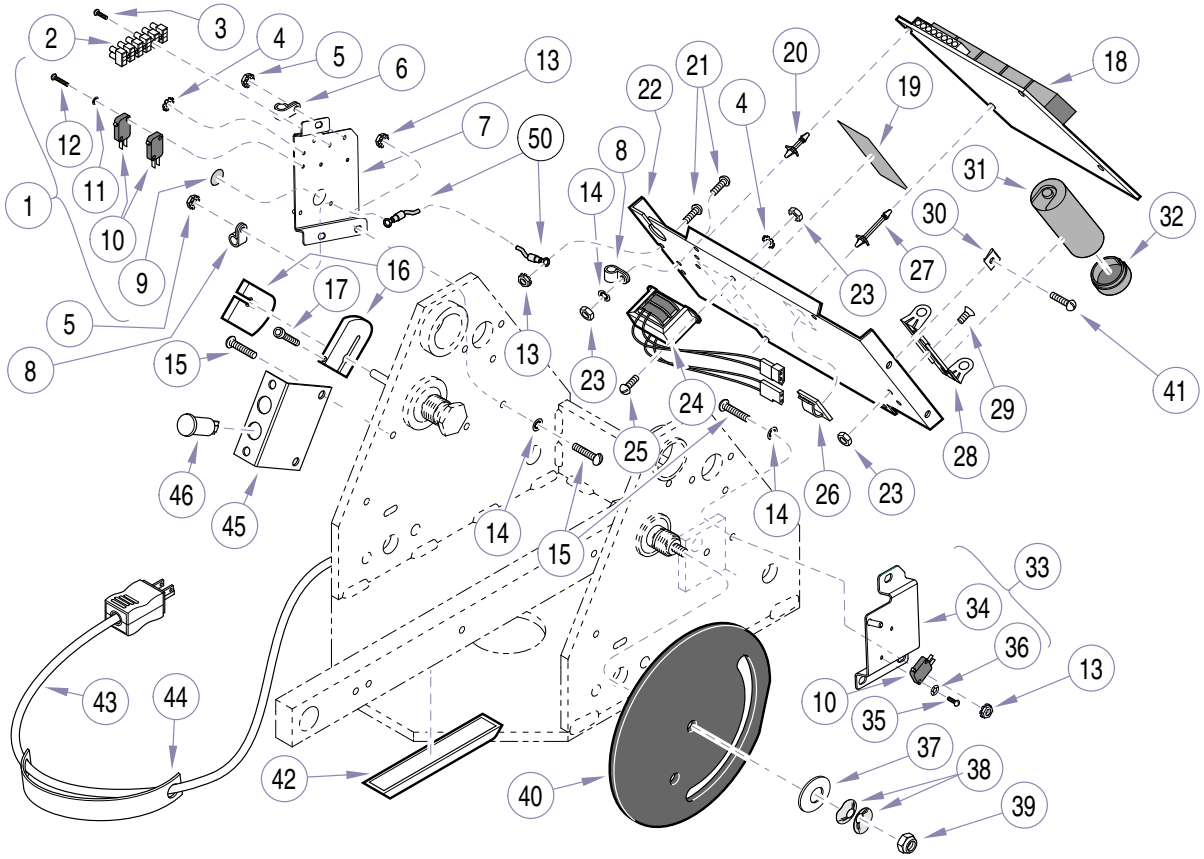
Item	Part No.	Description	Qty
1	151415	Electrical Plate Assy (Includes Items 2 thru 12)	1
2	• 119483	• Terminal Block	1
3	• 004-0004-25	• Screw	2
4	• P14718	• Lock Washer	4
5	• 122358	• Lock Nut	5
6	• 121655	• Cable Clamp	2
7	• 050-5856-01-216	• Electrical Connection Plate	1
8	• 121656	• Cable Clamp	4
9	• 112504	• Ground Label	2
10	• 146978	• Micro Switch	3
11	• 105155	• Lock Washer	2
12	• 155668	• Screw	2
13	122357	Lock Nut	8
14	P12575	Lock Washer	7
15	117601	Screw	8
16	119378	Cam	2
17	109104	Screw	2
18	002-1029-00	Chair PC Board Kit	1
19	119986	Fuse Warning Label	1
20	119690	Snap-in Support (short)	2
21	040-0010-183	Screw	1
22	121054-2	Mounting Plate	1
23	P507	Nut	5
24	015-2178-00	ENT Light Transformer Assy	1
25	040-0010-74	Screw	3
26	109191	Cord Clip	7
27	121068	Snap-in Support (long)	2
28	113045	Capacitor Bracket	2
29	C5287	Screw	2
30	104621	Tinnerman Nut	4
31	116618	Capacitor (53-64 MFD / 330 V)	1
32	111868	Capacitor End Cap	1
33	152373	Program Plate Assy (Includes Items 10, 34 and 35)	1
34	• 050-5865-01-216	• Program Plate	1
35	• 122806	• Screw	2
36	053-1159-00	Washer, Thrust *(Delrin)*	1
37	525-0063-00	Washer, Belleville	2
38	119593	Lock Nut	1
39	121322	Program Switch Cam	1
40		Screw (See “Covers” elsewhere)	4
41	119589	Latching Duct	2
42	015-1526-00	Power Cord (Includes Item 45)	1
43	• 061-0743-00	• Warning Tag	1
44	122074-50	Bracket	1
45	015-1304-00	Light, Power ON (120 VAC)	1
46	121169	Fuse (10 Amp, 250 VAC, Type F)	1
47	122541	Fuseholder	1
48	115896	Cable Tie (Not Shown)	3
49		Base Motor Assy (Not Shown) (See “Base Motor Assembly” elsewhere)	1

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Base Electrical Components



NOTE: This model uses Pebble Grey painted components

MA510407i

Used on Units with Serial Numbers V456963 thru Present

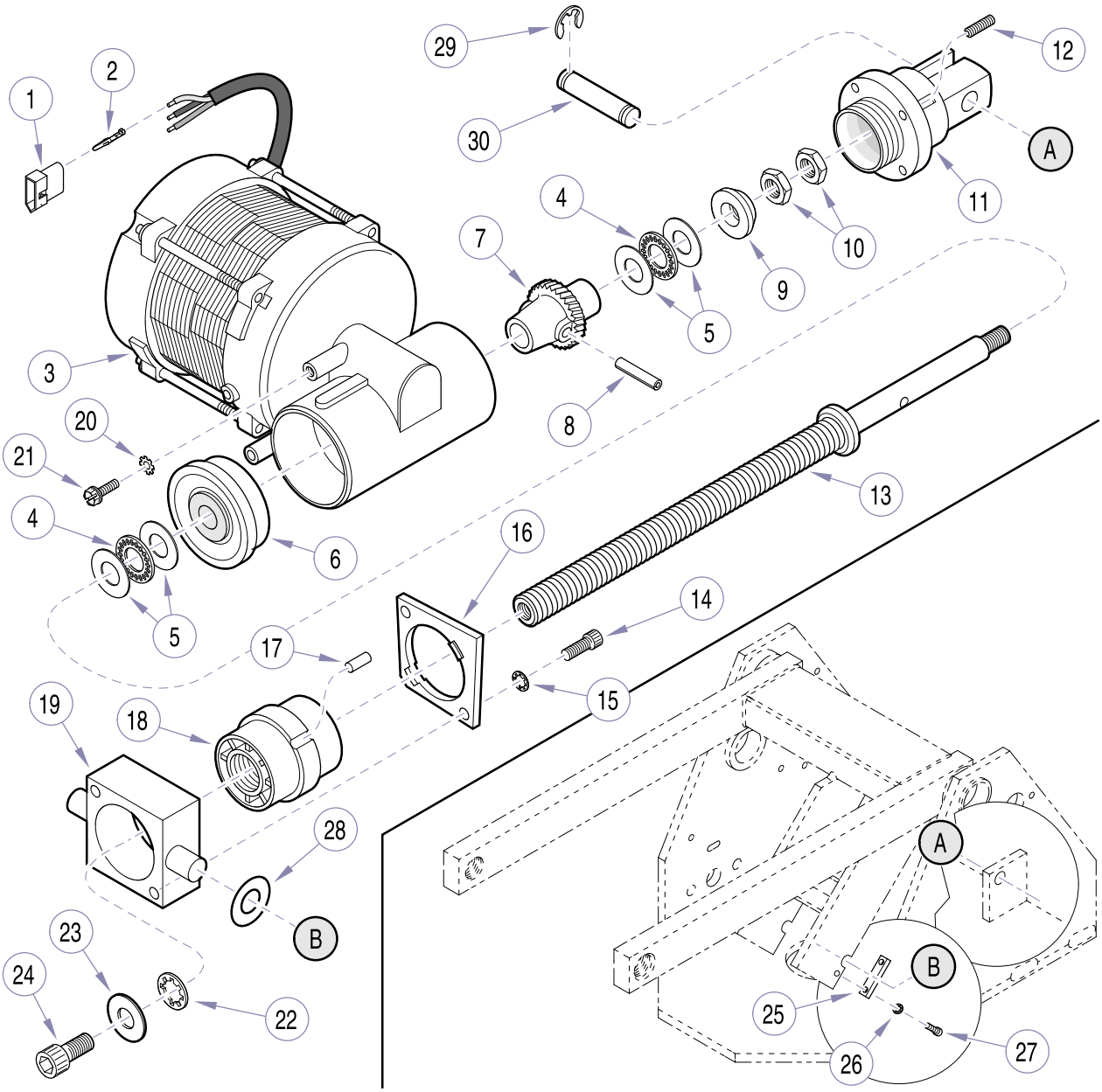
Item	Part No.	Description	Qty
1	151415	Electrical Plate Assy (Includes Items 2 thru 12)	1
2	• 119483	• Terminal Block	1
3	• 004-0004-25	• Screw	2
4	• P14718	• Lock Washer	4
5	• 122358	• Lock Nut	5
6	• 121655	• Cable Clamp	2
7	• 050-5856-01-216	• Electrical Connection Plate	1
8	• 121656	• Cable Clamp	4
9	• 112504	• Ground Label	2
10	• 146978	• Micro Switch	3
11	• 105155	• Lock Washer	2
12	• 155668	• Screw	2
13	122357	Lock Nut	9
14	P12575	Lock Washer	7
15	117601	Screw	8
16	119378	Cam	2
17	109104	Screw	2
18	015-2140-01	Chair PC Board	1
19	016-0979-00	Fuse Reference Label	1
20	119690	Snap-in Support (short)	2
21	040-0010-183	Screw	2
22	121054-2	Mounting Plate	1
23	P507	Nut	5
24	015-2178-00	ENT Light Transformer Assy	1
25	040-0010-74	Screw	3
26	109191	Cord Clip	7
27	• 121068	• Snap-in Support (long)	2
28	• 113045	• Capacitor Bracket	2
29	• C5287	• Screw	2
30	• 104621	• Tinnerman Nut	4
31	• 116618	• Capacitor (53-64 MFD / 330 V)	1
32	• 111868	• Capacitor End Cap	1
33	152373	Program Plate Assy (Includes Items 10,34,35 and 36)	1
34	• 050-5865-01-216	• Program Plate	1
35	• 122806	• Screw	2
36	• 105155	• Washer, Internal Lock	2
37	053-1159-00	Washer, Thrust *(Delrin)*	1
38	525-0063-00	Washer, Belleville	2
39	119593	Lock Nut	1
40	121322	Program Switch Cam	1
41		Screw (See “Covers” elsewhere)	4
42	119589	Latching Duct	2
43	015-1526-00	Power Cord (Includes Item 44)	1
44	• 061-0743-00	• Warning Tag	1
45	122074-50	Bracket	1
46	015-1304-00	Light, Power ON (120 VAC)	1
47		Fuses *(Refer to Section 5, Schematics and Diagrams)*	6
49	115896	Cable Tie (Not Shown)	3
50	150150	Ground Wire (8")	1
51		Base Motor Assy (Not Shown) (See “Base Motor Assembly” elsewhere)	1

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Base Motor Assembly



MA514900

Item	Part No.	Description	Qty
	152402	Base Motor Assembly (Includes Items 1 thru 24)	
1	• 101927	• Connector	1
2	• 101928	• Terminal (Male)	3
3	• 121756	• Base Motor (120V) (Includes Items 4 thru 13)	1
4	• •	• • Thrust Bearing	2
5	• •	• • Bearing Race	4
6	• •	• • Bearing	1
7	• • 118624 *	• • Worm Wheel	1
8	• • 118625 *	• • Roll Pin	1
9	• •	• • Retaining Ring	1
10	• •	• • Nut	2
11	• •	• • Clevis	1
12	• •	• • Set Screw	2
13	• •	• • Screw Shaft	1
14	• 108041	• Screw	2
15	• C2563	• Lock Washer	2

Item	Part No.	Description	Qty
16	• 117159-2	• Trunnion Plate	1
17	• 122060 **	• Pin	1
18	• 116912	• Drive Nut	1
19	• 121524-2 **	• Trunnion	1
20	• P14718	• Lock Washer	1
21	• 121794	• Screw	1
22	• C3454	• Lock Washer	1
23	• P50096	• Washer	1
24	• 117195	• Screw	1
25	120557-2	Trunnion Retainer Plate	2
26	P12575	Lock Washer	4
27	040-250-07	Screw	4
28	121510	Washer	2
29	042-0007-00	Retaining Ring	2
30	117149-2	Bottom Motor Pin	1

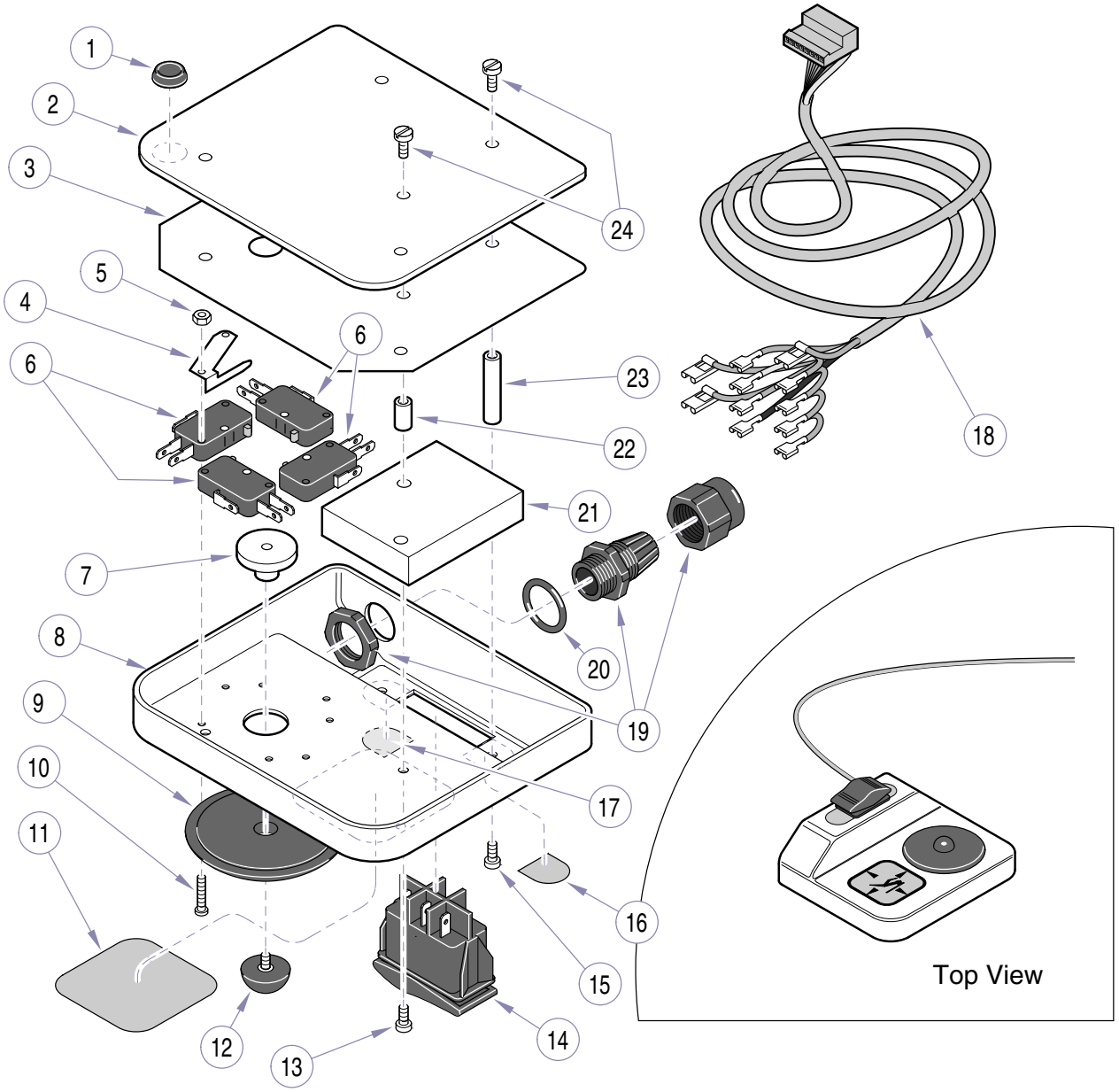
* Available in Kit 150459
** Available in Kit 152708

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Footswitch



NOTE: This model uses Sterling Grey painted components **(Serial number prefix "EN")** that are no longer Available (N.L.A.). Substitute Pebble Grey painted parts, located elsewhere in this manual, when necessary.

MA492302

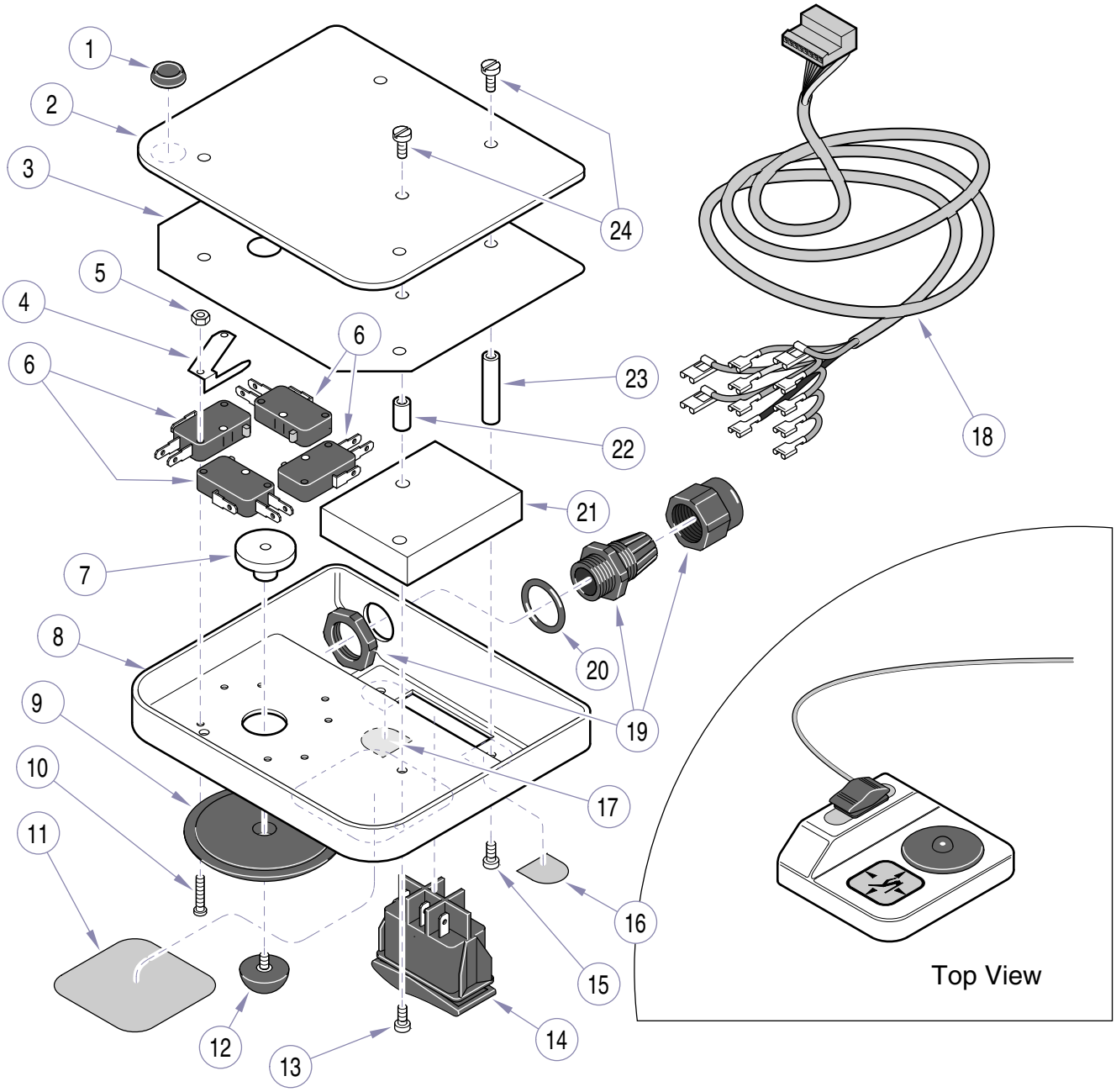
Item	Part No.	Description	Qty
	152713	Footswitch Assembly (Includes Items 1 thru 26)	1
1	• 119891	• Foot	4
2	• 120832-50	• Base Plate	1
3	• 121300	• Insulation	1
4	• 120046	• Actuator (Includes Item 6)	4
5	• •	• • Nut	2
6	• 146978	• Micro Switch	4
7	• 121383-2	• Activator	1
8	• 121998	• Footswitch Housing	1
9	• 121382	• Control Pad	1
10	• 113502	• Stud	8
11	• 120836	• Operating Label	1
12	• 120837	• Bumper	1
13	• 120861	• Stud	3
14	• 120839	• Rocker Switch	1
15	• 120898	• Stud	2
16	• 120848	• Green Label	1
17	• 122071	• Yellow Label	1
18	• 152715	• Cable Assembly (Includes Items 20 and 21)	1
19	• • 120653	• • Strain Relief Clamp	1
20	• • P12349	• • O-Ring	1
21	• 120858-1	• Counter Weight	1
22	• 120859	• Standoff (Short)	3
23	• 120860	• Standoff (Long)	2
24	• 040-0006-98	• Screw	5
25	• 115896	• Cable Tie (Not Shown)	2

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Footswitch



NOTE: This model uses Pebble Grey painted components **(Serial number prefix "PD" & "V").**

MA492300

Item	Part No.	Description	Qty
	002-1859-00	Footswitch Assembly (Includes Items 1 thru 26)	1
1	• 119891	• Foot	4
2	• 120832-50	• Base Plate	1
3	• 121300	• Insulation	1
4	• 120046	• Actuator (Includes Item 6)	4
5	• •	• • Nut	2
6	• 146978	• Micro Switch	4
7	• 121383-2	• Activator	1
8	• 121998-01	• Footswitch Housing	1
9	• 121382	• Control Pad	1
10	• 113502	• Stud	8
11	• 061-0806-00	• Operating Label	1
12	• 120837	• Bumper	1
13	• 120861	• Stud	3
14	• 120839	• Rocker Switch	1
15	• 120898	• Stud	2
16	• 120848	• Green Label	1
17	• 122071	• Yellow Label	1
18	• 015-1530-00	• Cable Assembly (Includes Items 20 and 21)	1
19	• • 120653	• • Strain Relief Clamp	1
20	• • P12349	• • O-Ring	1
21	• 120858-50	• Counter Weight	1
22	• 120859	• Standoff (Short)	3
23	• 120860	• Standoff (Long)	2
24	• 040-0006-98	• Screw	5
25	• 115896	• Cable Tie (Not Shown)	2

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SECTION VI
PARTS LIST

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FAX ORDERING FORM

(SERVICE PARTS ONLY)

NOTES:

- **ALL BLOCKED AREAS MUST BE COMPLETED.**
- **USE FOR NON-WARRANTY FAX ORDERS ONLY. WARRANTY ORDERS MUST BE TELEPHONED IN (1-800-MIDMARK).**

ATTENTION: SERVICE DEPARTMENT FAX#: 877-249-1793

ACCT #: _____ **P.O. #:** _____ **DATE:** _____

NAME: _____ **SHIP TO:** _____

ADDRESS: _____

CITY, ST.: _____

CONTACT: _____

PHONE: _____

☐ **NON-EMERGENCY ORDER - TO SHIP WITHIN 72 HOURS IF PART(S) IN STOCK.**

☐ **EMERGENCY ORDER - TO SHIP WITHIN 24 HOURS IF PART(S) IN STOCK (IF ORDER IS RECEIVED BEFORE 1:00 P.M. E.S.T).**

SEND NOTIFICATION IF PARTS ARE NOT AVAILABLE TO SHIP WITHIN 24 HOURS VIA E-MAIL OR FAX TO: _____

METHOD OF SHIPMENT **OTHER** _____

UPS	FED EX
☐ NEXT DAY A.M.	☐ NEXT DAY A.M.
☐ NEXT DAY P.M.	☐ NEXT DAY P.M.
☐ 2ND DAY	☐ 2ND DAY
☐ GROUND	☐ ECONOMY

QTY.	PART #	DESCRIPTION (SPECIFY COLOR OF ITEM IF APPLICABLE)	COLOR CODE	PRICE/PER

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