

SERVICE GUIDE

A-dec 311, 411, and 511 Dental Chairs

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Regulatory Information

The *Regulatory Information and Specifications* document (p/n 86.0221.00) is delivered with A-dec dental device equipment as mandated by agency requirements. If you need this information, please go to the Document Library at www.a-dec.com. This document includes:

- Serial number identification
- Software revisions
- Deluxe touchpad help messages
- Intended application and use statements
- Identification of symbols
- Environmental specifications
- Classification of equipment
- Electrical rating and electromagnetic information
- Chair load capacity

Product Service

For product service information, please contact your local authorized A-dec dealer. To find your local dealer, visit www.a-dec.com.

A-dec 311, 411, and 511 Dental Chairs Service Guide

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Overview

Customer Service

For questions not addressed in this document, contact A-dec Customer Service using contact information for your region.

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www.a-dec.com.au

Web Contact

Partner Resources websites: www.a-dec.biz

Other Sources of Information

A-dec Dental Chairs Service Reference

The *A-dec 311, 411, and 511 Dental Chairs Service Guide* is a companion to the *A-dec 311, 411, and 511 Dental Chairs Service Reference* (p/n 86.0381.00). The service reference contains illustrated parts breakdown content. Circuit board components and flow diagrams are in both documents.

Other A-dec Service Documents

The *A-dec 300, 400, and 500 Delivery Systems Service Guide* (p/n 86.0382.00) contains service, maintenance, and troubleshooting content. The *A-dec 300, 400, and 500 Delivery Systems Service Reference* (p/n 86.0383.00) contains illustrated parts breakdown content. Circuit board components and flow diagrams are in both documents. These documents include cuspidors, floor boxes, and support centers.

The *A-dec Dental Lights and Monitor Mounts Service Guide* (p/n 86.0326.00) contains service, maintenance, and troubleshooting content for A-dec dental lights and monitor mounts. The *A-dec Dental Lights and Monitor Mounts Service Reference* (p/n 86.0328.00) contains illustrated parts breakdown content. Circuit board components and flow diagrams are in both documents.

Genuine A-dec Parts Catalog

The *Genuine A-dec Service Parts Catalog*, p/n 85.5000.00, provides part number and ordering information for A-dec serviceable parts. This catalog details service parts for current products and products which are no longer manufactured but are still supported. Refer to this catalog for additional details on parts found in the service guide.

Electronic Documentation

The latest versions of A-dec documents are available as electronic documents on the A-dec website (www.a-dec.com). On the website, select Document Library in the upper-right corner of the page. Check this location for the most current technical information about A-dec products.

A-dec Dental Chairs



A-dec 311 Dental Chair



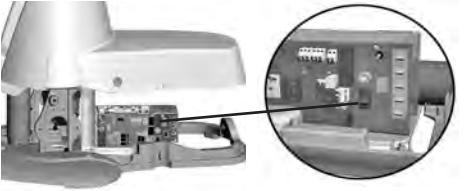
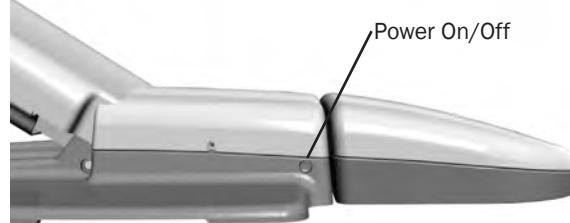
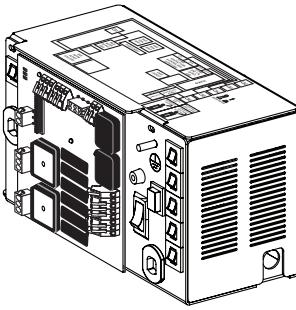
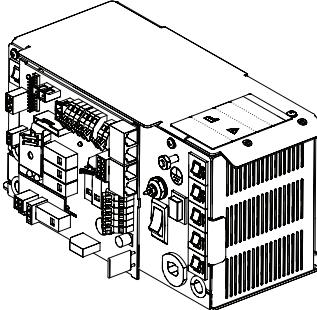
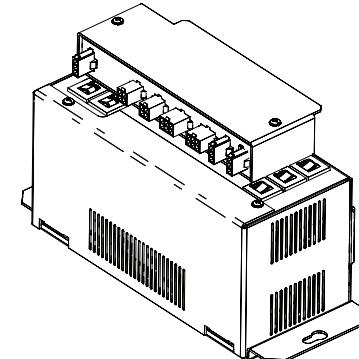
511 A-dec Dental Chair



411 A-dec Dental Chair

311 Chair with integrated floor box shown. An optional contoured floorbox is available.

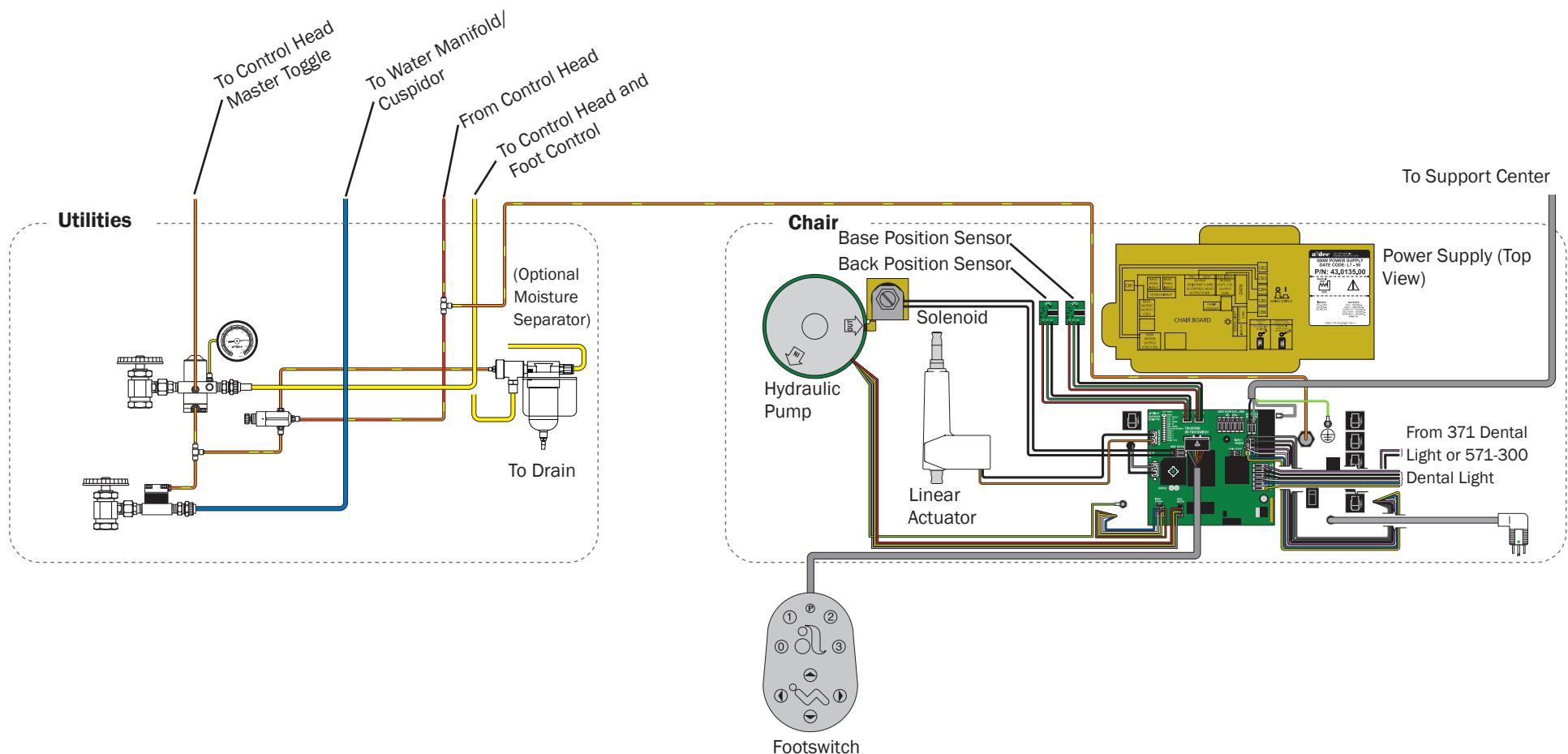
Chair Comparison Chart

	A-dec 311 Chair	A-dec 411 Chair	A-dec 511 Chair		
On/Off Button Location	 <p>The image shows a close-up of the A-dec 311 chair's base mechanism. An arrow points from the text "On/Off Button Location" to a circular inset showing the internal electrical components where the button is located.</p>		 <p>The image shows a side view of the A-dec 511 chair's base. A callout line points to the "Power On/Off" button located on the left side of the base.</p>		
Power Supplies	 <p>The image shows a top-down view of the A-dec 311 power supply unit, which is a large, rectangular metal box with various ports and ventilation grilles.</p> <p>311 Power Supply (Before August 2013)</p>	 <p>The image shows a top-down view of the A-dec 311/411 power supply unit, which is a larger, more complex metal box with multiple power outlets and ventilation grilles.</p> <p>311/411 Power Supply (Effective August 2013)</p>	 <p>The image shows a top-down view of the A-dec 511 power supply unit, which is a smaller, rectangular metal box with a single power outlet and a ventilation grille.</p>		
Double Articulating Headrests/Neck Support	 <p>The image shows a side view of the neck support mechanism of the A-dec 311 headrest.</p> <p>Neck Support</p>	 <p>The image shows a side view of the locking knob mechanism of the A-dec 311 headrest.</p> <p>Locking Knob</p>	 <p>The image shows a side view of the locking knob mechanism of the A-dec 411 headrest.</p> <p>Locking Knob</p>	 <p>The image shows a side view of the lever release mechanism of the A-dec 411 headrest.</p> <p>Lever Release</p>	 <p>The image shows a side view of the lever release mechanism of the A-dec 511 headrest.</p> <p>Lever Release</p>

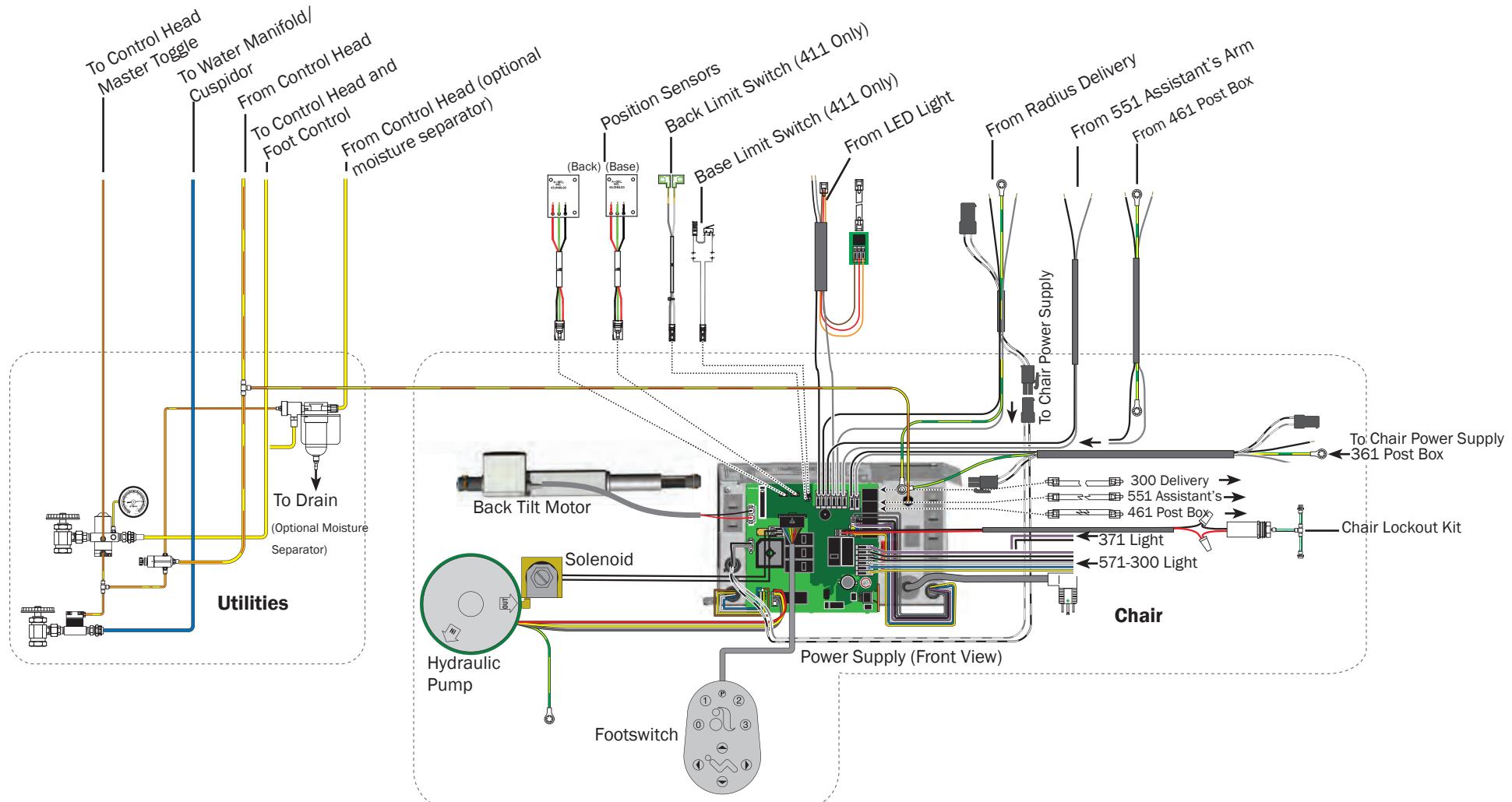
	A-dec 311 Chair	A-dec 411 Chair	A-dec 511 Chair
Stop Switch Location	(not applicable)	 <p>Stop Switch</p>	
Chair Drive System	Hydraulic Base Electrical Back	Hydraulic Base Hydraulic Back	
Armrests	Two-Position Armrest	Multi-Position Armrest	

Flow Diagrams

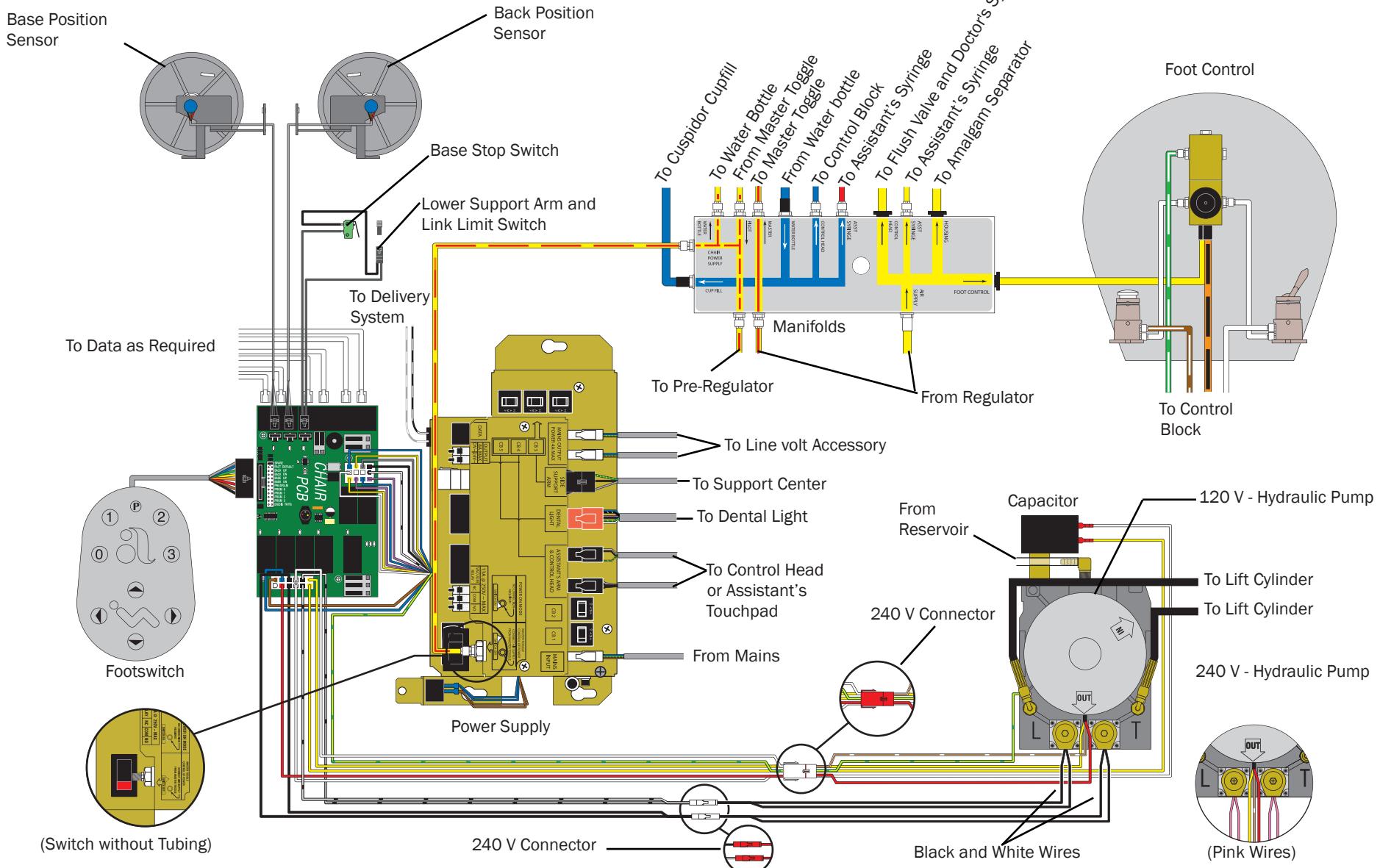
311 Chair Flow Diagram (Before 2013)



311/411 Chair Flow Diagram (Effective 2013)



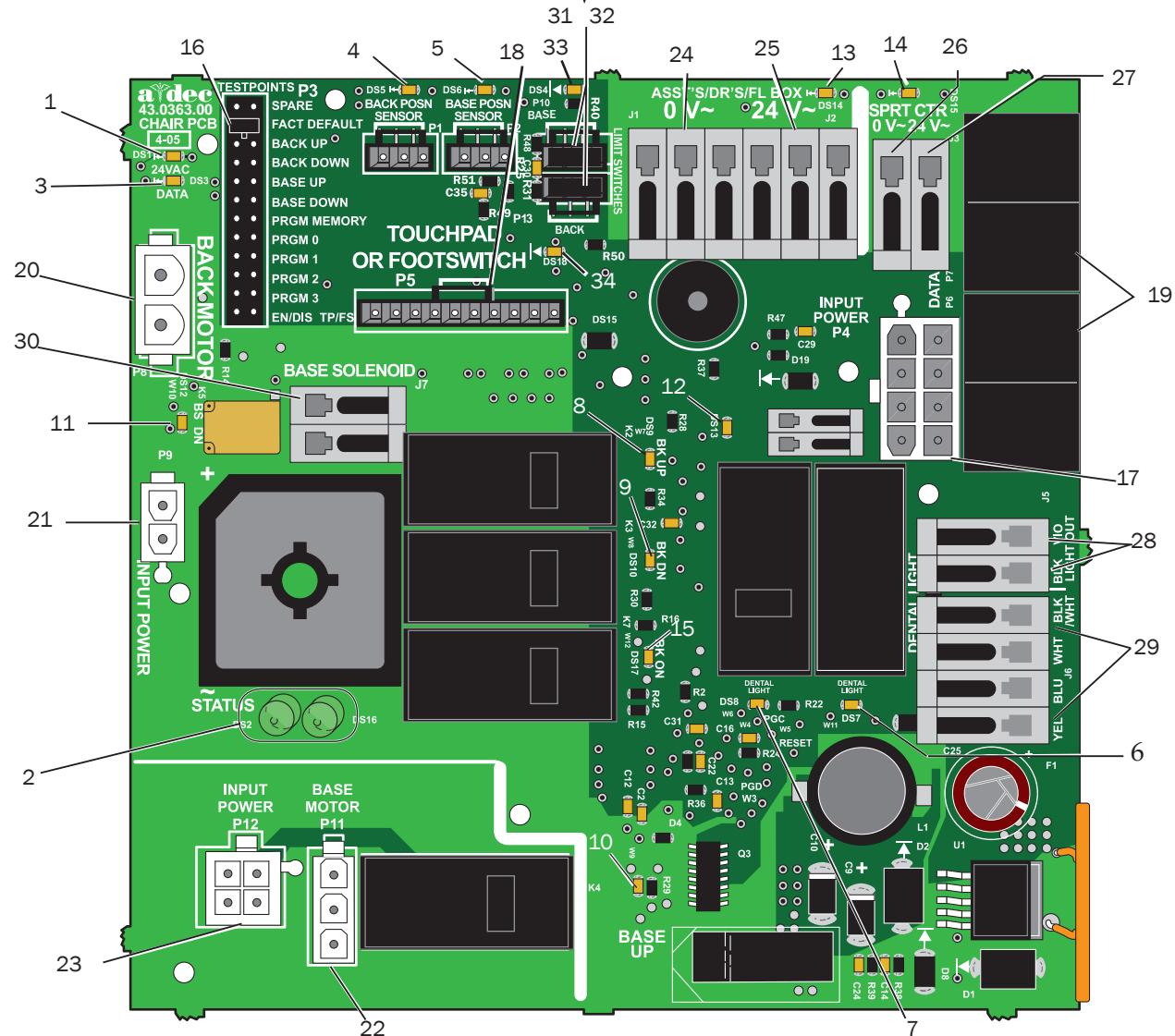
511 Chair Flow Diagram



Circuit Board Components

311/411 Chair Circuit Board

Effective July 2013: Jumpers are required on P10 and P13 for the 311 chair.



311/411 Chair Circuit Board LED Identification

LED	Status	Description
DS1, DS14, and DS15 - AC power LED	Off	No 24 VAC power, tripped circuit breaker, power supply turned off
	Green, steady	24 VAC present
DS2 and DS16- Status LED	Off	System is not functioning, no power, or circuit board has failed
	Blue, steady	Normal operation
	Blue, single blink	Duty cycle limit of chair back has been exceeded
	Blue, double blink	Jumper is in factory mode
DS3 - Data LED	Off	No DCS communication, not connected to the DCS, or DCS has failed
	Green, steady	Detects active DCS
	Green, blinking	Valid DCS Message
DS13 - Chair lockout	Off	Open, (normal)
	Red, on	Closed, (activated)
DS5, DS6 - Chair position sensors	Off	Position Sensor: not connected or bad connection; moving in wrong direction; limited range of motion
	Yellow, steady	Normal operation
	Yellow, fast blink	Upper end of travel
	Yellow, slow blink	Lower end of travel
DS9, DS10, DS11, DS12, DS17- Chair relay LEDs	Off	Relay is off
	On	Relay is on
DS7, DS8 - Dental light relay LEDs	Off	Relay is off
	On	Relay is on

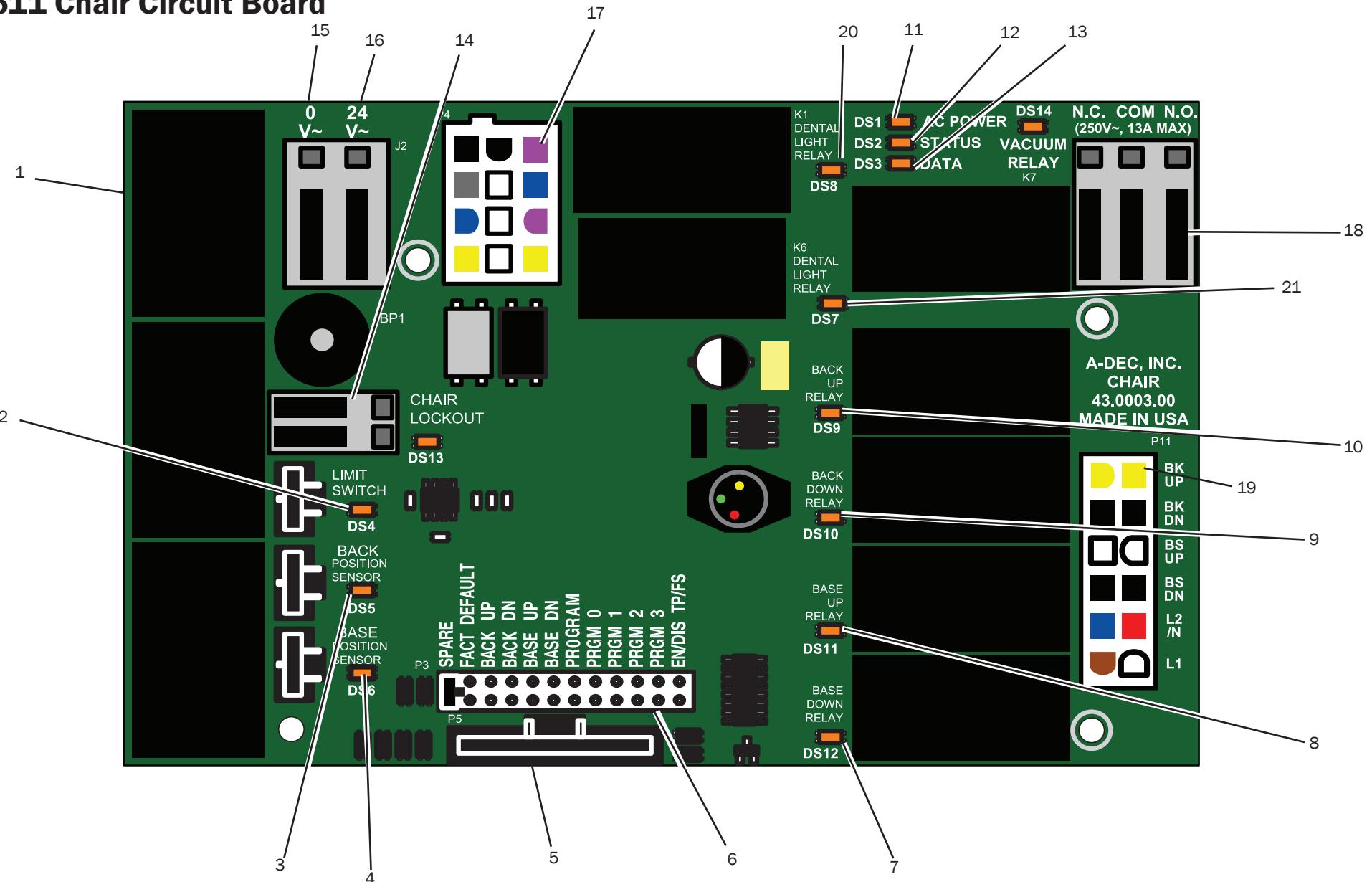


CAUTION: Circuit boards are sensitive to static electricity. Electrostatic Discharge (ESD) precautions are required when touching a circuit board or making connections to or from the circuit board. Circuit boards should be installed only by an electrician or qualified service person.

311/411 Chair Circuit Board Identification

Item	Description	Item	Description
1	DS1 - AC power LED (CB1)	18	P5 - touchpad or footswitch connector
2	DS2, DS16 - status LEDs	19	P6/P7 - data ports
3	DS3 - data LED	20	P8 - back motor connector
4	DS5 - back position sensor, LED/ P1 Connector	21	P9 - input power connector
5	DS6 - base position sensor LED/ P2 connector	22	P11 - base motor connector
6	DS7 - dental light LED/Relay K6	23	P12 - input power connector
7	DS8 - dental light LED/Relay K1	24	J1 - 0 VAC terminal strip (output) for Assistant's, doctor's, floor box
8	DS9 - back up LED/Relay K2	25	J2 - 24 VAC terminal strip (output) for assistant's, doctor's and floor box
9	DS10 - back down LED/relay K3	26	J3 - 0 VAC terminal strip (output) for support center
10	DS11 - base up LED/relay K4	27	J3 - 24 VAC terminal strip (output) for support center
11	DS12 - base down LED/relay K5	28	J5 - dental light output terminal strip
12	DS13 - chair lockout LED/terminal strip J4	29	J6 - dental light input terminal strip
13	DS14 - AC power LED (CB4)	30	J7 - base solenoid terminal strip
14	DS15 - AC power LED (CB5)	31	P10 - Jumper - 311 chair only
15	DS17 - back on LED/Relay K7	32	P13 - Jumper - 311 chair only
16	P3 - testpoints header	33	DS4 - Base stop switch
17	P4 - input power connector	34	DS 18 - Back stop switch

511 Chair Circuit Board



511 Chair Circuit Board LED Identification

LED	Status	Description
DS1 - AC power LED	Off	No 24 VAC power, tripped circuit breaker, power supply turned off, no line voltage
	Green, steady	24 VAC at the terminal strip
DS2 - Status LED	Off	System is not functioning, no power or circuit board has failed
	Green, steady	Normal operation
DS3 - Data LED	Off	No DCS communication, not connected to the DCS, or DCS has failed
	Green, steady	Detects active DCS
	Green, blinking	Valid DCS message
DS4 - Chair limit switch	Off	Closed, (normal)
	Red	Open, (activated)
DS13 - Chair lockout	Off	Open, (normal)
	Red	Closed, (activated)
DS5 + DS6 - Chair position sensors	Off	Position Sensor: Not connected or bad connection; moving in wrong direction; limited range of motion; or cable is not on the pulley
	Yellow, steady	Normal operation
	Yellow, fast blink	Upper end of travel
	Yellow, slow blink	Lower end of travel
DS9, DS10, DS11, DS12 - Chair relay LEDs	Off	Relay is off
	On	Relay is on
DS7, DS8 - Dental light relay LEDs	Off	Relay is off
	On	Relay is on
DS14 - Vacuum relay LED	Off	Relay is off
	On	Relay is on

511 Chair Circuit Board Identification

Item	Description	Item	Description
1	P7, P8, P9 - data ports	11	DS1 - AC power LED
2	DS4 - stop switch LED (limit switch)/P10 connector	12	DS2 - status LED
3	DS5 - back position sensor LED/P1 connector	13	DS3 - data LED
4	DS6 - base position sensor LED/P2 connector	14	DS13 - chair lockout LED/terminal strip J1
5	P5 - footswitch connector	15	J2 - 0 VAC terminal strip (output)
6	P3 - testpoints header	16	J2 - 24 VAC terminal strip (output)
7	DS12 - base down LED/relay K5	17	P4 - Input power/dental light connector
8	DS11 - base up LED/relay K4	18	J3 - vacuum relay K7 output terminal strip
9	DS10 - back down LED/relay K3	19	P11 - pump motor/solenoid connector
10	DS9 - back up LED/relay K2	20	DS8 - dental light LED relay/K1
		21	DS7 - dental light LED relay/K6



CAUTION: Circuit boards are sensitive to static electricity. Electrostatic Discharge (ESD) precautions are required when touching a circuit board or making connections to or from the circuit board. Circuit boards should be installed only by an electrician or qualified service person.

311 Chair Service, Adjustments, and Maintenance

Chair Covers (311)



DANGER Turn off the power to the system before you continue with this procedure. Failure to do so can result in electrical shock.



WARNING Turn off the power to the system before you continue with this procedure. Failure to do so can result in product damage, serious injury, and/or death.



WARNING The utility cover needs to be securely replaced when service is complete. Verify that the cover is correctly re-attached and secured into place.



CAUTION When removing or replacing covers, take care not to damage any wiring or tubing. Verify that the covers are secure after replacing them.

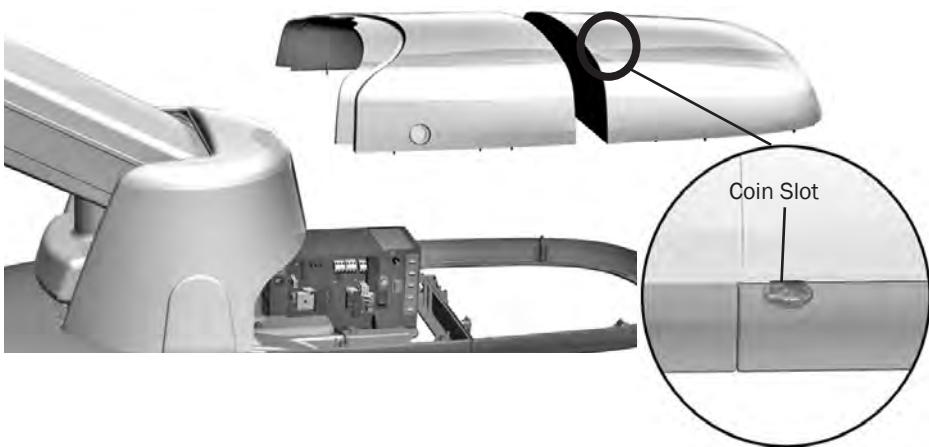
Integrated Floor Box Cover Removal

To access the on/off button and power supply on chairs with an integrated floor box cover, pull the utility cover out at the cover posts and lift the cover off .



Contoured Floor Box Cover Set Removal

To access the on/off button and power supply on chairs with a contoured floor box cover set, first remove the front floor box cover. Grasp the cover on both sides and pull up. If needed, use a large coin in the integrated coin slot to gently separate the contoured floor box cover from the frame. Then remove the power supply cover.



CAUTION Take care not to damage the cover when using the coin slot.

Lift Arm Covers Removal

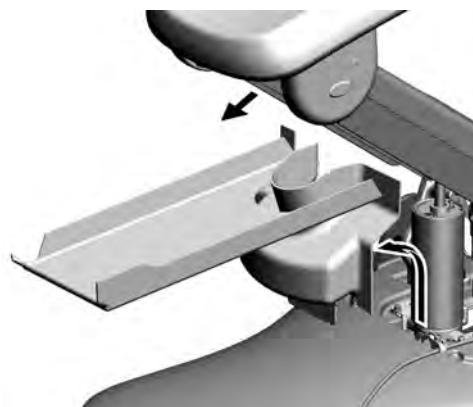
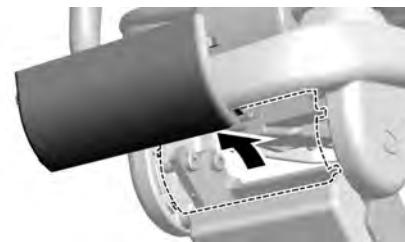
If the utility cover is installed, remove it before beginning this procedure.

1. Raise the chair base all the way up.

2. With your thumbs on the top of the upper lift arm cover, grasp from the bottom and pull up and push in to disengage tabs from slots.



3. Lift out the upper lift arm cover.
4. Remove the lift arm and lower lift arm cover.

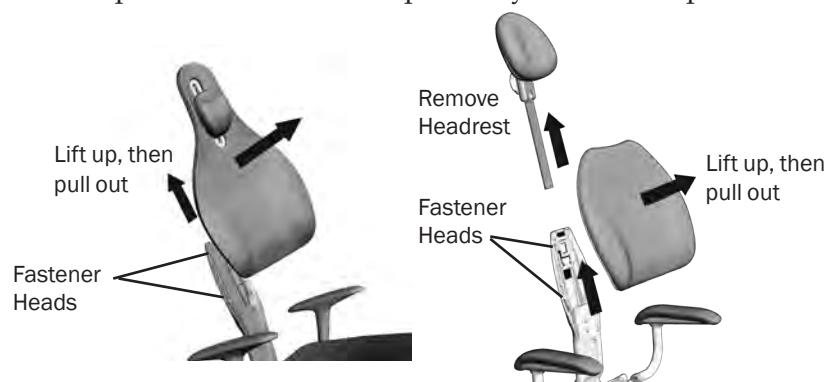


Upholstery (311)

Back Upholstery Removal/Attachment

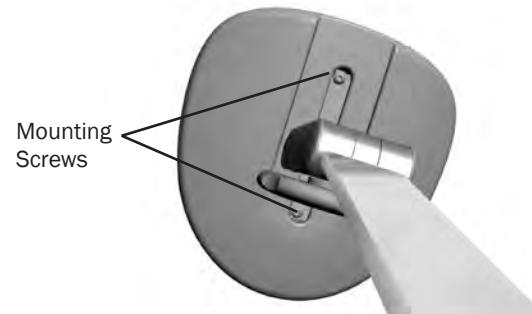
To remove the upholstery, firmly grasp the bottom edge of the armature and lift up, then lift the upholstery away from the chair back support.

To reattach, place the key holes in the armature over the large fastener heads, then push down until the upholstery inserts into position.



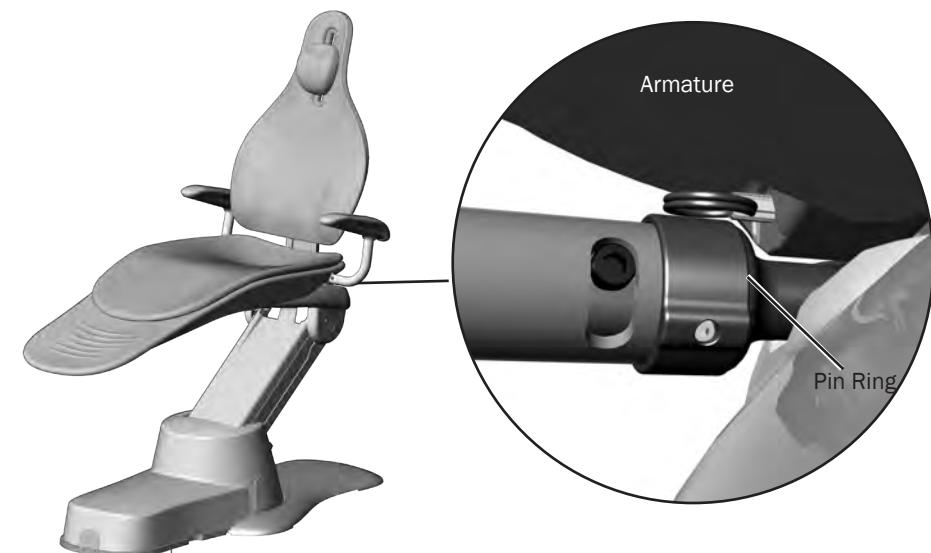
Headrest Upholstery Removal/Attachment

To remove the headrest upholstery, position the headrest to access the two screws on the back, loosen the screws and remove the upholstery. To reattach, position the headrest to access the screws, place the upholstery on the headrest, insert and tighten the screws.



Seat Upholstery Removal/Attachment

To remove the seat upholstery, pull the pins out on both sides of the seat armature, then lift the seat and move it away.



CAUTION When replacing the upholstery, ensure the pins are completely in place. The pin ring should be flush with the seat armature.

Factory Default Routine (311)

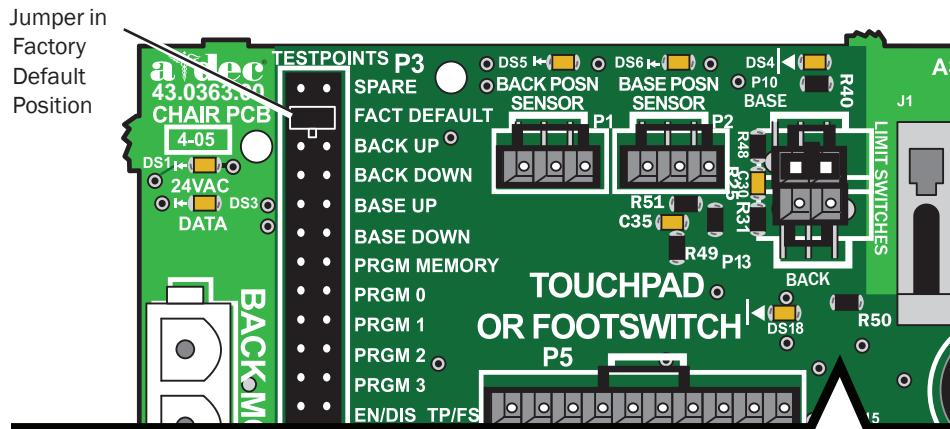
After installing a new chair, circuit board, or position sensor, run the factory default routine. The routine:

- Sets the chair base and back upper limits
- Calculates new preset positions based on actual range of motion of the chair
- Verifies that the position sensors work correctly

To start the factory default routine, place the spare jumper in the factory default position on the P3 test points of the chair circuit board.



CAUTION Circuit boards and position sensors are static-sensitive and require ESD handling precautions.



When running the factory default routine, the chair:

1. Moves base down.
2. Moves base up.
3. Moves back down.
4. Moves back up.
5. Moves base and back to mid position.
6. Moves back and base down.
7. Moves base and back to mid position.
8. Moves base and back to Entry/Exit.
9. Three beeps confirm the routine completed successfully.

Once the routine completes, place the jumper into the Spare position on P3.

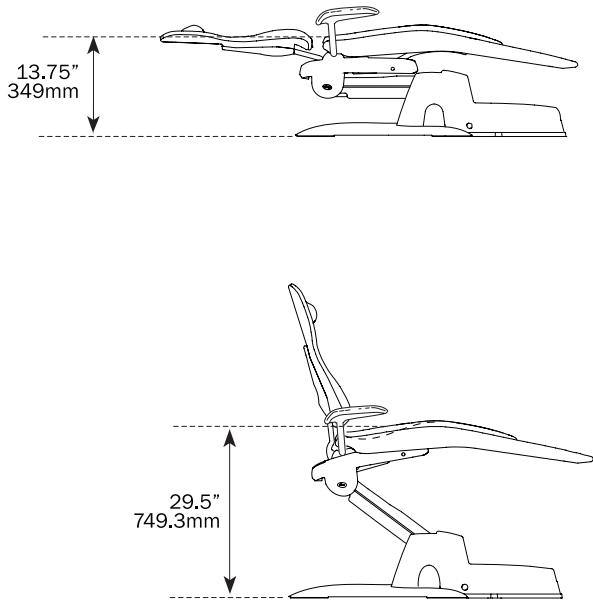


NOTE The jumper must remain in the factory default position to complete the factory default routine. The status LEDs on the standard and deluxe touchpads and the chair circuit board double blink while the factory default routine is running and after the routine is complete. When the routine is complete, three beeps sound. If the routine stops prematurely, one beep sounds.

Chair Drive System (311)

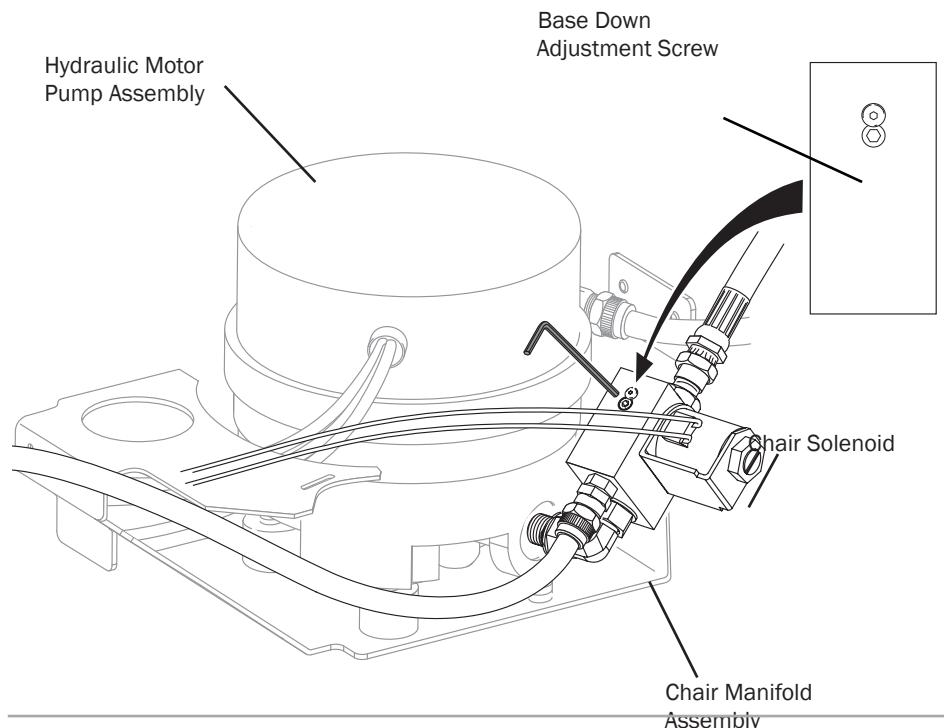
The hydraulic chair system controls the base movement of the chair. An electro-mechanical tilt actuator controls the back movement.

The chair seat has a vertical range of 13.75" (349 mm) to 29.5" (749 mm) above the floor.



Chair Manifold Adjustment System (311)

Use a 3/32" hex key, to move the base down adjustment screw to change the base down [chair] speed. Turning the screw clockwise (tightening) decreases the base down speed. Turning the screw counter-clockwise increases the base down speed.



NOTE Make sure that you do not over tighten the adjustment screw. If the screw is too tight, the chair may not move.

Hydraulic Fluid Replenishment (311)

Follow the steps below to add hydraulic fluid.



CAUTION Use only A-dec hydraulic fluid, p/n 61.0197.00.



CAUTION If the hydraulic cylinder needs to be replaced, or if there has been a significant loss of hydraulic fluid, contact A-dec Customer Service. The steps to replace the hydraulic cylinder are complicated and specific.

1. Raise the chair to its highest level.
2. Use a 3/16" hex key to remove the fill plug from the top of the hydraulic cylinder.

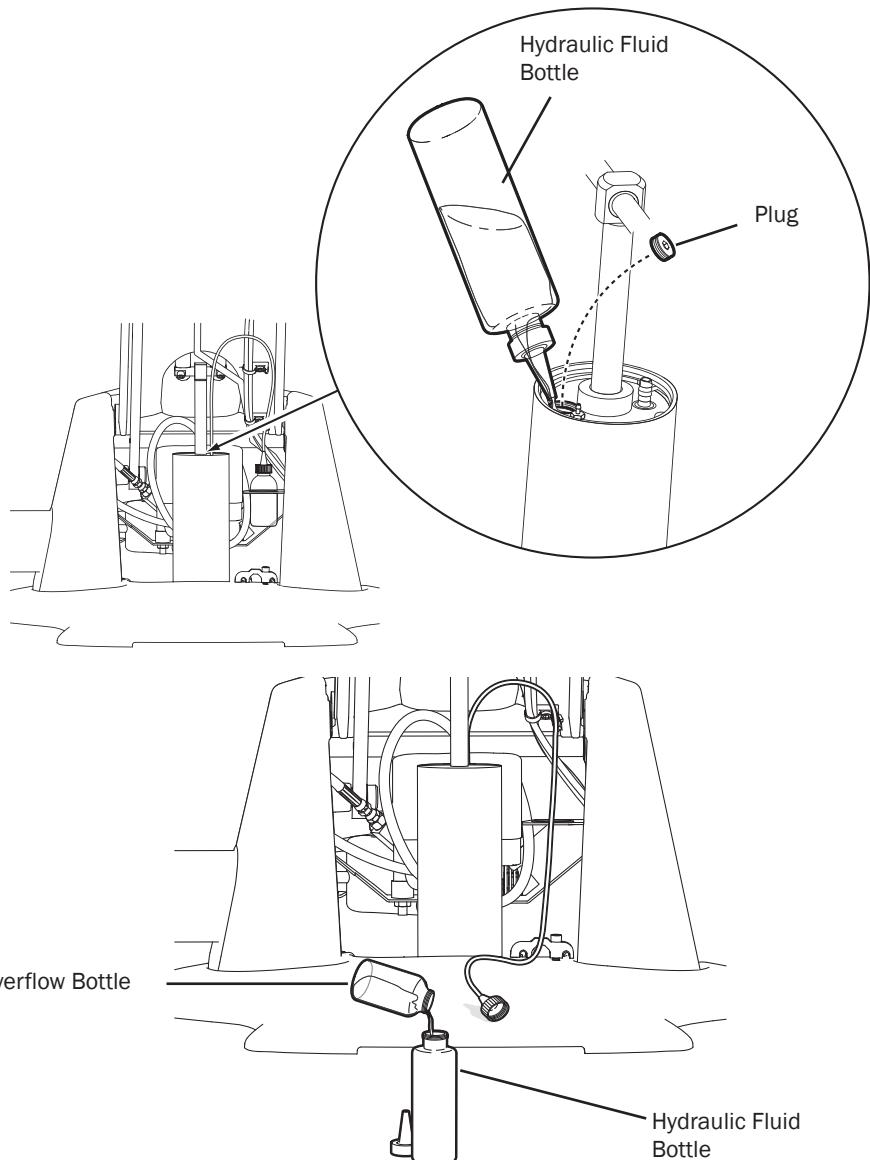


NOTE It may be difficult to measure exactly to the thread level. You may want an absorbent towel available to soak up some of the fluid if it seems too full.

3. Fill the hydraulic fluid to the plug thread level.
4. Replace the fill plug.
5. Lower the chair fully. The overflow bottle will capture any excess fluid.
6. Raise the chair.
7. Remove the overflow bottle from the bracket.
8. Empty the overflow bottle.
9. Return the overflow bottle to the bracket.
10. Run the factory default routine. (See page 19.)



NOTE Allow the chair to settle before operating. This allows the air bubbles to separate from the oil. If you use the chair and it makes noises, repeat steps 1 through 10 above.



Capacitor Replacement (311/411)

The hydraulic system used for the chair's base movement is operated using a motor capacitor, located in the power supply of the chair. There are three specific capacitors for different line voltage ranges. The chair motor capacitor can be replaced within the power supply.



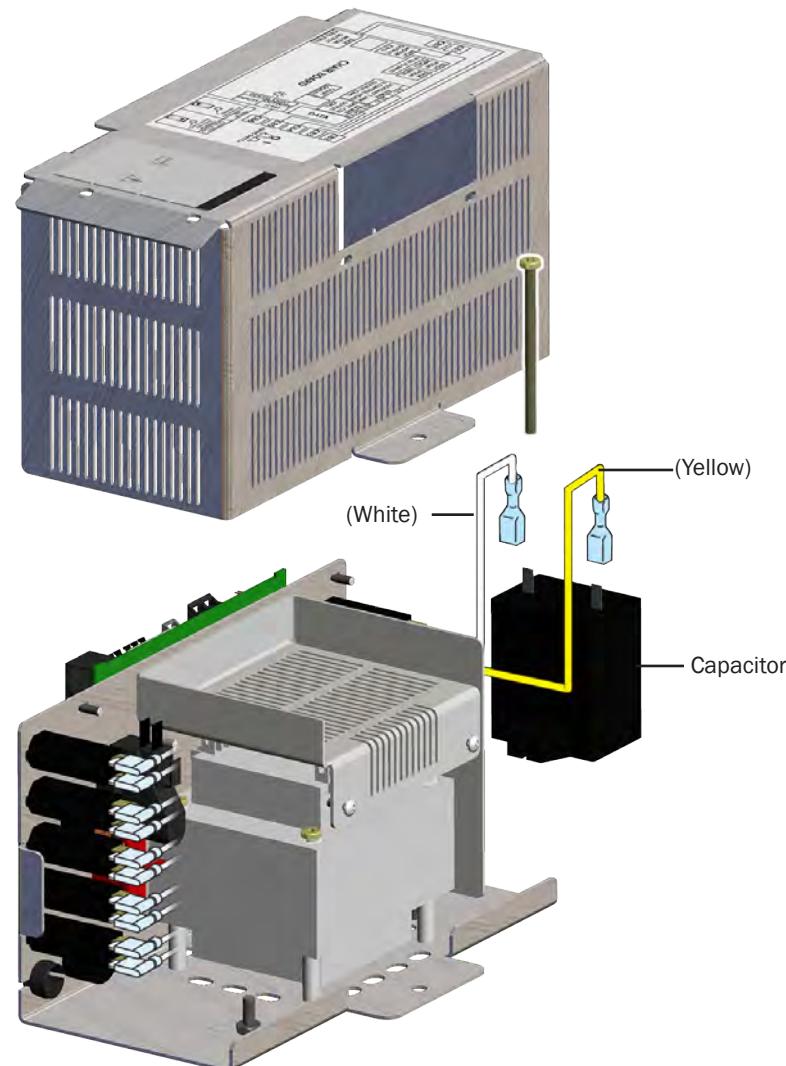
DANGER Turn off the power to the system before you continue with this procedure. Failure to do so can result in electrical shock.



WARNING Turn off the power to the system before you continue with this procedure. Failure to do so can result in product damage, serious injury, and/or death.

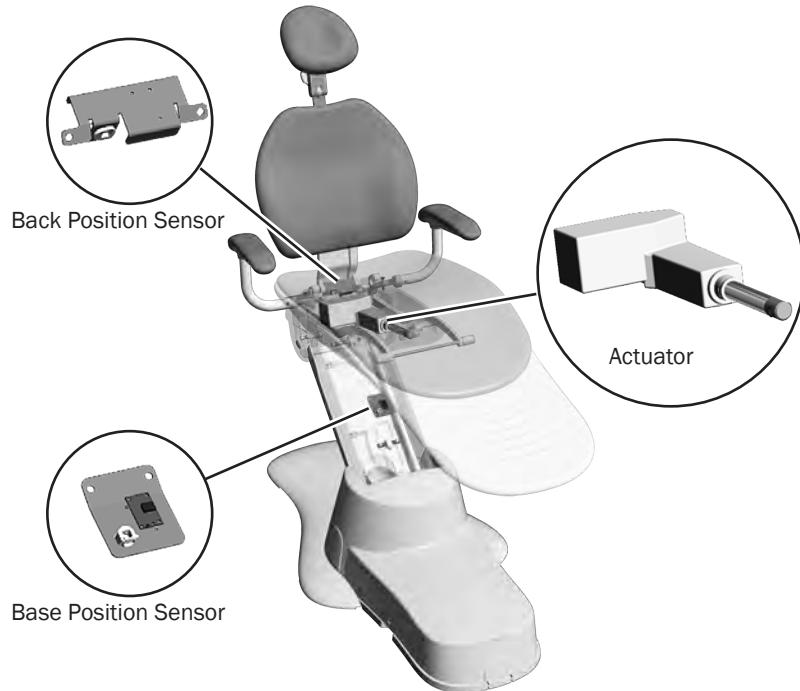
Chair Input Voltages

Mains Chair Input Voltage	A-dec Capacitor Part Number
100 VAC	90.1198.00
110 - 120 VAC	90.1199.00
220 - 240 VAC	90.1200.00



Motor Driven Electro-Mechanical Actuator (311)

The back-up and back-down movements are controlled with an electro-mechanical tilt actuator, which is located under the seat of the chair.



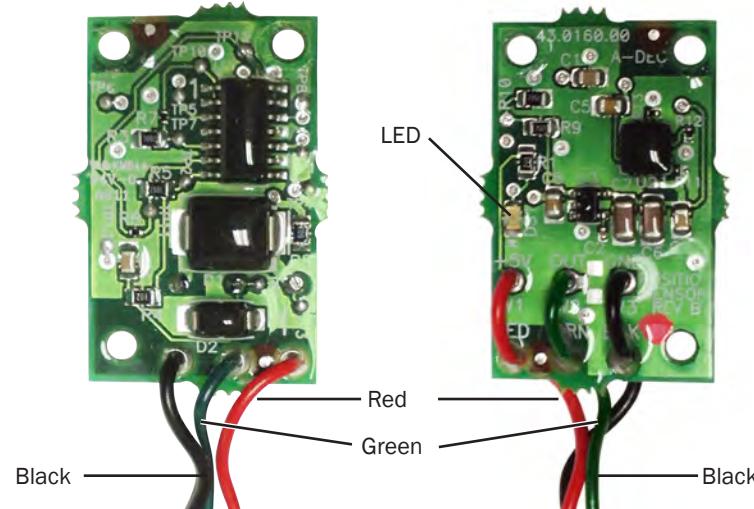
Position Sensor (311/411)

The position sensor circuit boards provide positioning data to the chair board. There is a position sensor for the back and a position sensor for the base.



CAUTION The position sensors can be inadvertently installed upside down. Improper installation will limit the chair's functionality.

A diagnostic LED is provided on the chair board for each position sensor. Refer to Chair Circuit Board LED Identification, see page 12 for information. An additional LED, indicating power, is present on each position sensor circuit board.



Factory Default Routine

If a position sensor or chair board are replaced, run the factory default. For instructions on running the factory default, see page 19.

Limp Along Feature

There are two position sensors, one for the base of the chair and one for the back of the chair. If there is a problem or malfunction with a position sensor, the limp along feature allows the operator to move the chair in the up direction for one to three second intervals by pushing the manual control buttons on the touchpad or footswitch. Refer to Chair Circuit Board LED Identification, page 12 for further information. When in limp along mode, presets will not function.

Solenoid (311)

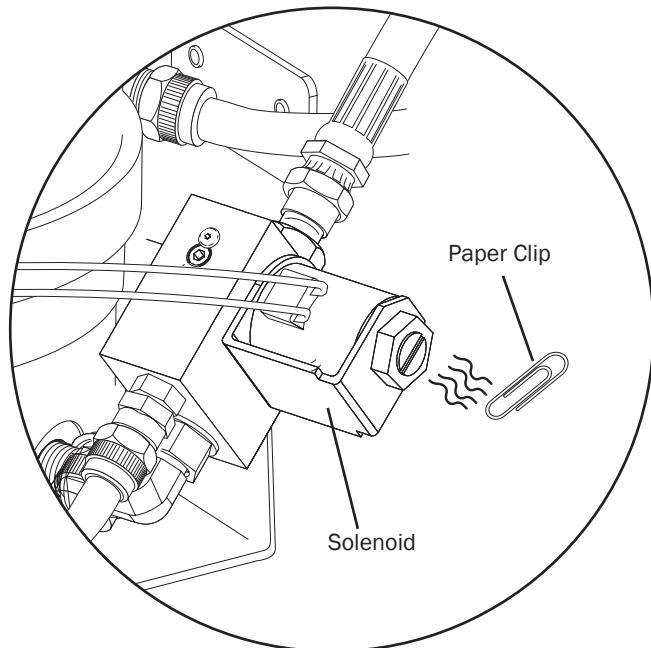
p/n: 62.0317.00 21.6 VDC

Solenoid Testing

A solenoid is energized during base down function. To determine if a solenoid has failed, check for coil resistance using magnetic pull or volt/ohm meter test.

Magnetic Pull Test for Coil Resistance

1. Hold a paper clip loosely in your hand.
2. Activate the solenoid by pressing base down on the footswitch or touchpad.
3. If there is a pull on the paper clip, the solenoid is being energized.



Volt/Ohm Meter Test for Coil Resistance



DANGER Turn off the power to the system before you continue with this procedure. Failure to do so can result in electrical shock.

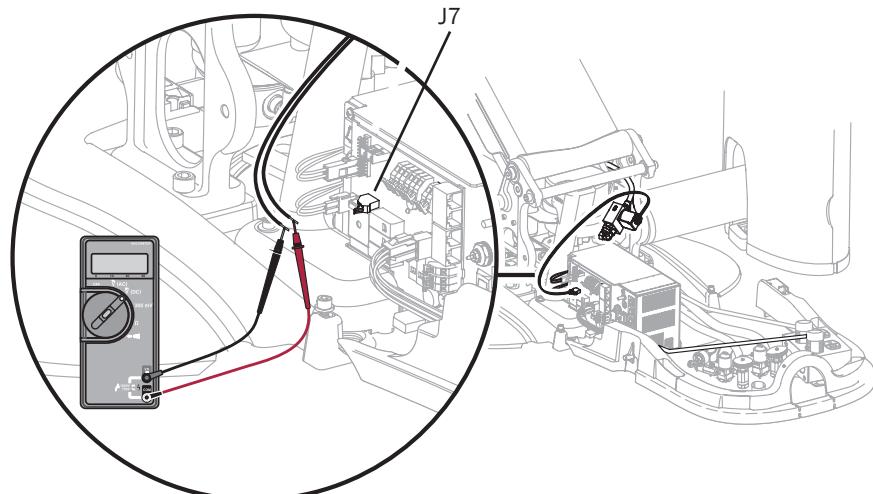


WARNING Turn off the power to the system before you continue with this procedure. Failure to do so can result in product damage, serious injury, and/or death.

1. Disconnect the solenoid power at the chair board's base solenoid terminal strip (J7).

2. Place one Ohm meter probe on each of the solenoid wires.

Solenoid = $38 \text{ Ohms } (\Omega) \pm 4 \text{ Ohms } (\Omega)$



Solenoid Assembly Replacement (311)



CAUTION The circuit board is static sensitive. ESD precautions are required. The circuit board should be installed by an electrician or qualified service personnel.



WARNING Lower the chair base to the mechanical limit before removing the solenoid.

Remove the Solenoid Assembly:

When replacing a solenoid wipe up any fluid and replace existing O-rings on the solenoid base.

1. Remove the utility cover(s).
2. To minimize pressure in the hydraulic system, lower the chair base to the mechanical limit.



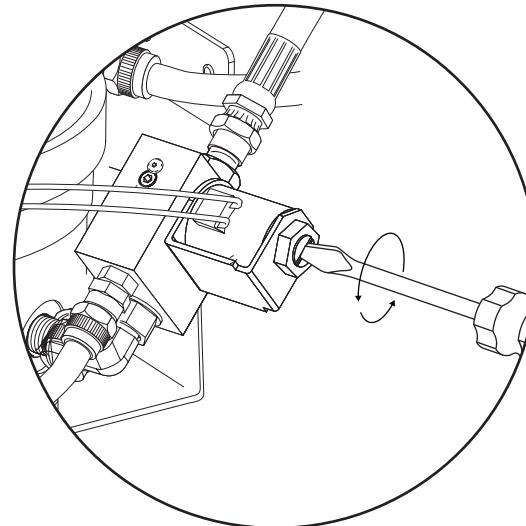
DANGER Turn off the power to the system before you continue with this procedure. Failure to do so can result in electrical shock.



WARNING Turn off the power to the system before you continue with this procedure. Failure to do so can result in product damage, serious injury, and/or death.

3. Disconnect the solenoid from the chair circuit board terminal strip J7.
4. Loosen the nut on the solenoid and use a screw driver to remove the solenoid assembly.

5. Wipe up any fluid and replace existing O-rings on the solenoid base.



Install the New Solenoid Assembly:

1. Install the new solenoid.
2. Reconnect the solenoid to the chair circuit board, terminal strip J7. It does not matter which solenoid wire goes into which terminal. The solenoid will work either way.
3. Turn on the power.
4. Move the chair up and down to ensure there are no leaks.
5. Reinstall the utility cover.

Headrest Adjustments (311)

The chair features one of two choices of backrest: a thin-line back with patient-adjustable neck support or a thin-line back with double-articulating headrest.

Patient-Adjustable Neck Support Removal/Attachment

Neck support cushions manufactured prior to October 2013 can be repositioned in the track. To reposition, place your thumb against the neck support armature and pull the cushion out from the track. Flip the cushion around and insert it back into the track. The cushion includes a graphic on the back that depicts proper orientation for shorter or taller patients.

Reposition Neck Support



Double-Articulating Headrest (311/411)

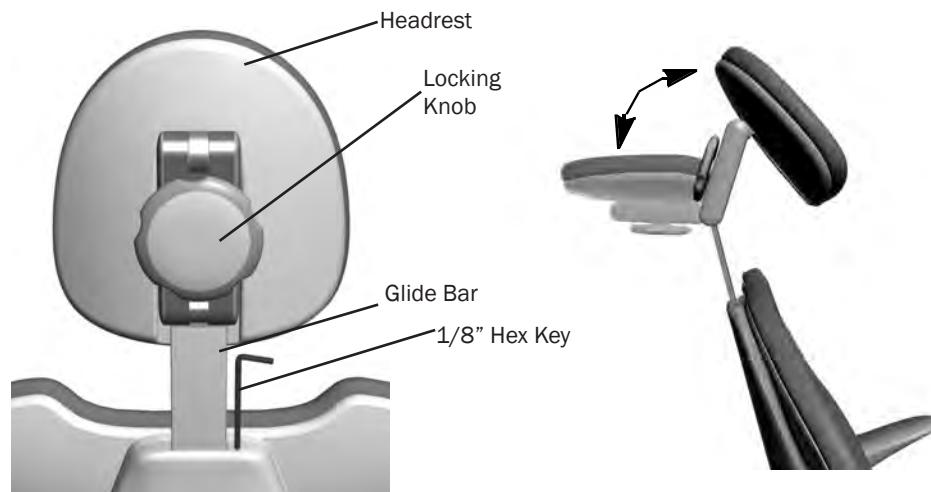
Headrest Adjustment

The double-articulating headrest offers a "glide" feature, as well as manual articulation. The locking knob allows you to adjust the headrest for a full range of positions.

Release the headrest by turning the locking knob to the left, then adjust the headrest for a proper fit. Lock the headrest in the desired position by turning the knob to the right. For minor height adjustment, slide the headrest cushion up and down. For additional height adjustment, reposition the glide bar.

Glide Bar Tension Adjustment

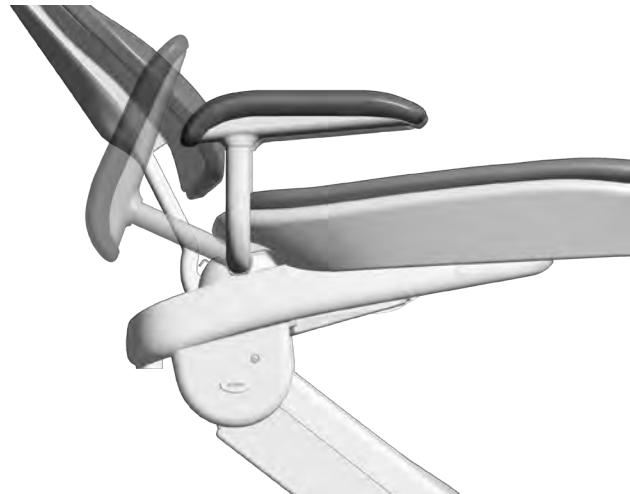
A double-articulating headrest may be difficult to move or may drift downward because of the amount of tension on its glide bar. To adjust the tension, use a 1/8" hex key and turn the tension adjustment screw to the right to increase friction or to the left to decrease friction.



Two-Position Armrest Adjustments (311)

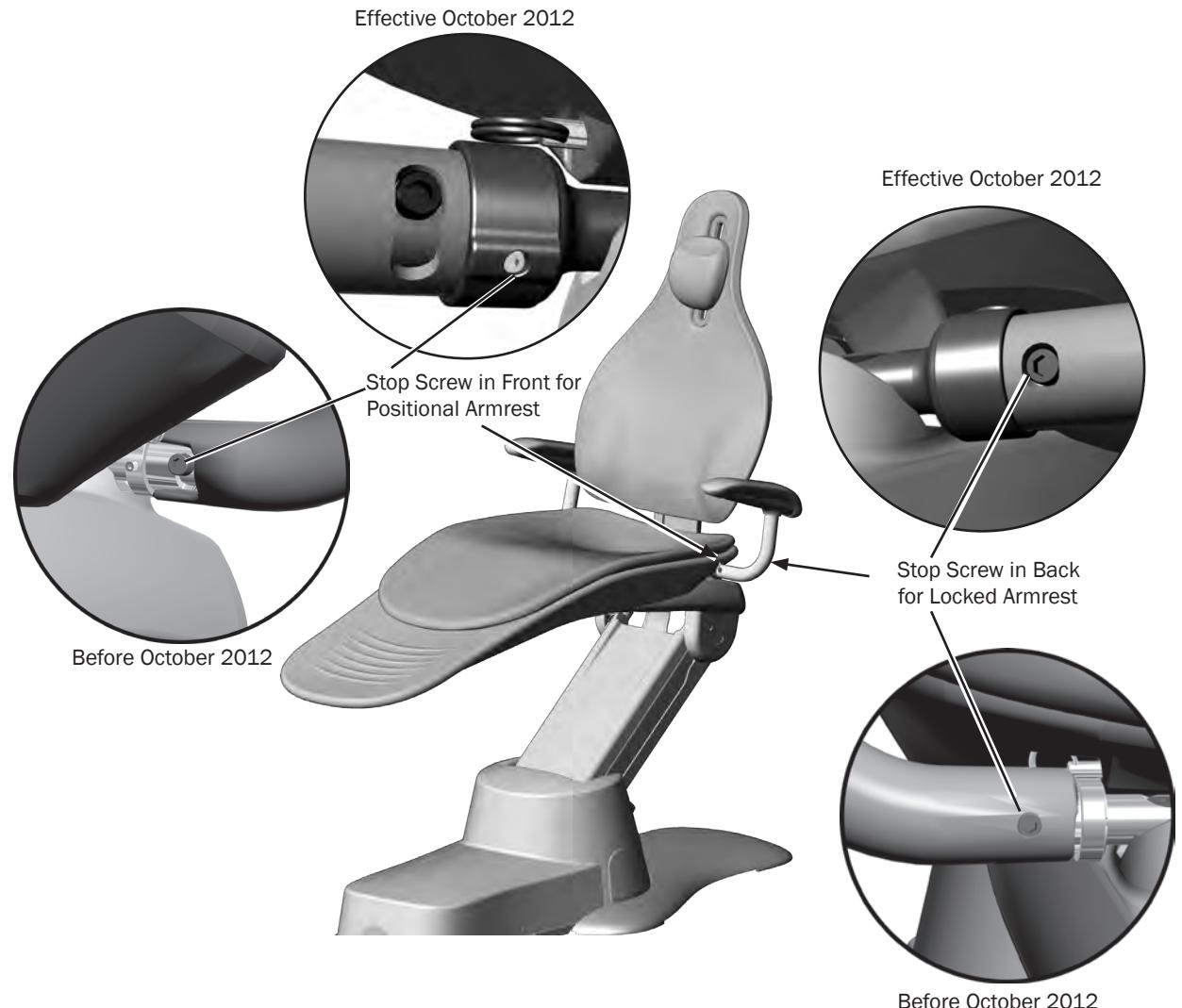
Armrests Repositioning

Pull or push the armrests to reposition them in the forward or backward position. The armrests can also be locked into the upright position.



Armrests Locking

The armrests can be unlocked from the upright position. Using a 3/16" hex key, remove the rotational stop screw from the back of the armrest and install it in the front of the armrest.



411 Chair Service, Adjustments, and Maintenance

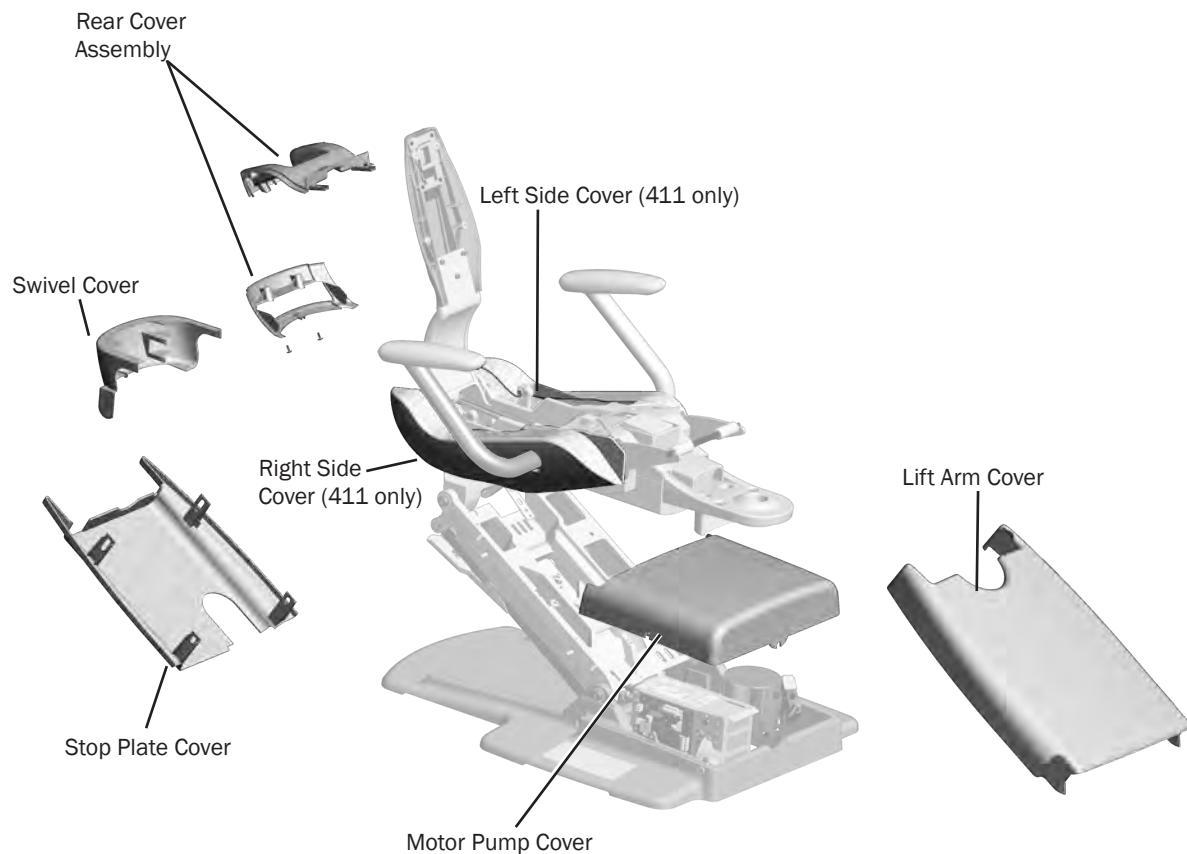
Chair Covers

Remove the chair motor pump, lift arm and stop plate covers in the following order:



CAUTION When removing or replacing covers, take care not to damage any wiring or tubing. Verify that the covers are secure after replacing them.

1. Motor Pump Cover: Remove the screw from each side of the cover and lift up.
2. Lift Arm Cover: Position the chair so it is raised half way up. Pull one side of the cover until it releases from the lift arm. To replace, align one side of the cover with the lift arm and insert it into place. Ensure both sides are firmly attached.
3. Stop Plate: Pull one side of the cover until it releases from the lift arm. To replace, slide one side of the cover over the post on the lift arm and attach.



Upholstery (411)

Back Upholstery Removal/Attachment

To remove the back, firmly grasp the bottom edge of the cushion and lift up, then lift the upholstery out and away from the chair back support.

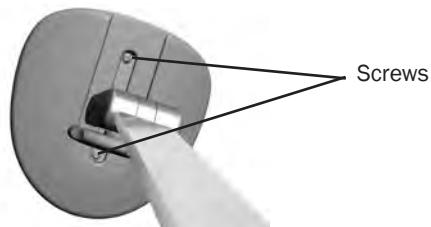
To reattach the back upholstery, place the key holes on the cushion over the large fastener heads, then push down until it inserts into position.



Headrest Upholstery Removal/Attachment

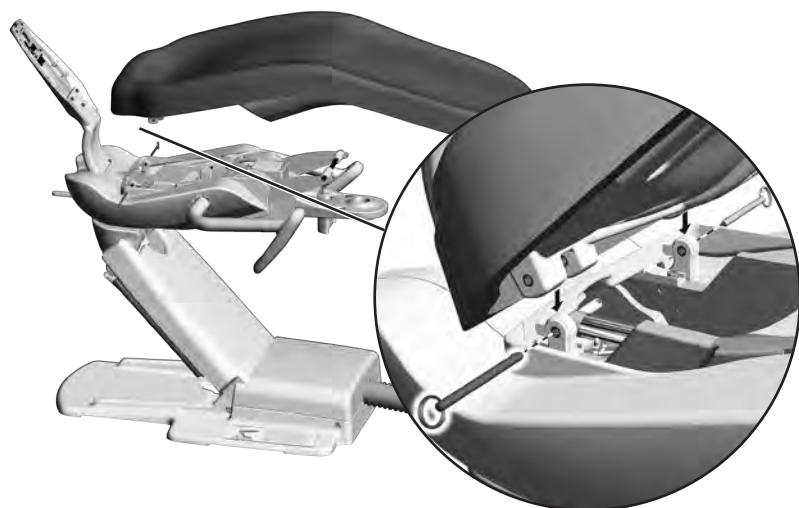
Locking knob and lever release headrests are used with the A-dec 411. The headrest upholstery installs the same way for both styles. The locking knob headrest is shown.

To remove the headrest upholstery, position the headrest to access the two screws on the back, loosen the screws, and remove the upholstery. To reattach, position the headrest to access the screws, place the upholstery on the headrest, then insert and tighten the screws.



Seat Upholstery Removal/Attachment

To remove the seat upholstery, move the armrests forward and pull out the side covers. Remove the pins that are under the chair frame, then lift upholstery off of the frame. To reattach, move the armrests forward, line up the holes in the seat upholstery with the holes in the chair frame. Push the pins through the seat upholstery and chair frame until the rings touch the seat, then reinstall the covers.



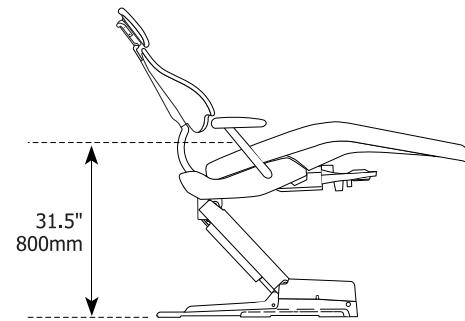
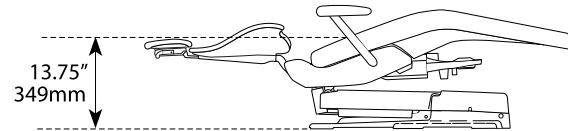
Chair Drive System (411)

The hydraulic chair system controls the base movement of the chair. An electro-mechanical tilt actuator controls the back movements.

The chair seat has a vertical range of 13.75" (349 mm) to 31.5" (800 mm) above the floor.



NOTE You cannot adjust the speed of the chair.



Hydraulic System (411)

The hydraulic system deactivates automatically at the upper and lower extremes of travel. The system is leak-free during transportation, storage, and operation. The hydraulic system consists of hydraulic fluid reservoir, hydraulic cylinders, and motor-driven hydraulic pump with solenoids.



CAUTION Use only A-dec hydraulic fluid, p/n 61.0197.00.

Hydraulic Fluid Reservoir Replenishment (411)

The hydraulic fluid reservoir is located in the lift arm of the chair under the stop plate cover. You can see the fluid level in the reservoir through the sides of the reservoir.

Add hydraulic fluid to the reservoir:

1. Raise the chair to the full base up position.
2. Fill the reservoir with hydraulic fluid to the top of the fluid level indicator.
3. Move the chair down and up after fluid has been added.



CAUTION Do not overfill.



Factory Default Routine (411)

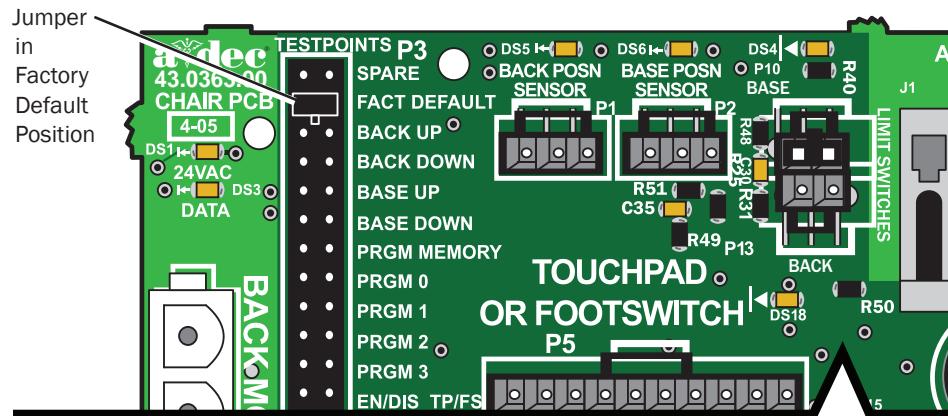
After installing a new chair, circuit board, or position sensor, run the factory default routine. The routine:

- Sets the chair base and back upper limits
- Calculates new preset positions based on actual range of motion of the chair
- Verifies that the position sensors work correctly

To start the factory default routine, place the spare jumper in the factory default position on the P3 test points of the chair circuit board.



CAUTION Circuit boards and position sensors are static-sensitive and require ESD handling precautions.



When running the factory default routine, the chair:

1. Moves base down.
2. Moves base up.
3. Moves back down.
4. Moves back up.
5. Moves base and back to mid position.
6. Moves back and base down.
7. Moves base and back to mid position.
8. Moves base and back to Entry/Exit.
9. Three beeps confirm the completed successfully.

Once the routine completes, place the jumper into the Spare position on P3.



NOTE The jumper must remain in the factory default position to complete the factory default routine. The status LEDs on the standard and deluxe touchpads and the chair circuit board double blink while the factory default routine is running and after the routine is complete. When the routine is complete, three beeps sound. If the routine stops prematurely, one beep sounds.

Capacitor Replacement (311/411)

The hydraulic system used for the chair's base movement is operated using a motor capacitor, located in the power supply of the chair. There are three specific capacitors for different line voltage ranges. The chair motor capacitor can be replaced within the power supply.



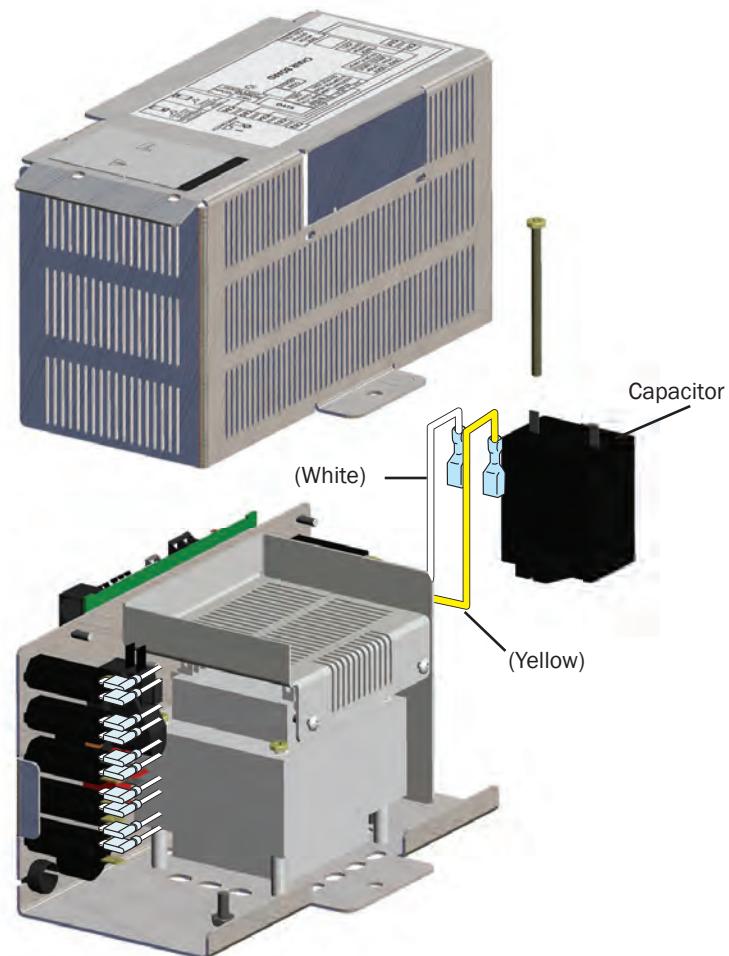
DANGER Turn off the power to the system before you continue with this procedure. Failure to do so can result in electrical shock.



WARNING Turn off the power to the system before you continue with this procedure. Failure to do so can result in product damage, serious injury, and/or death.

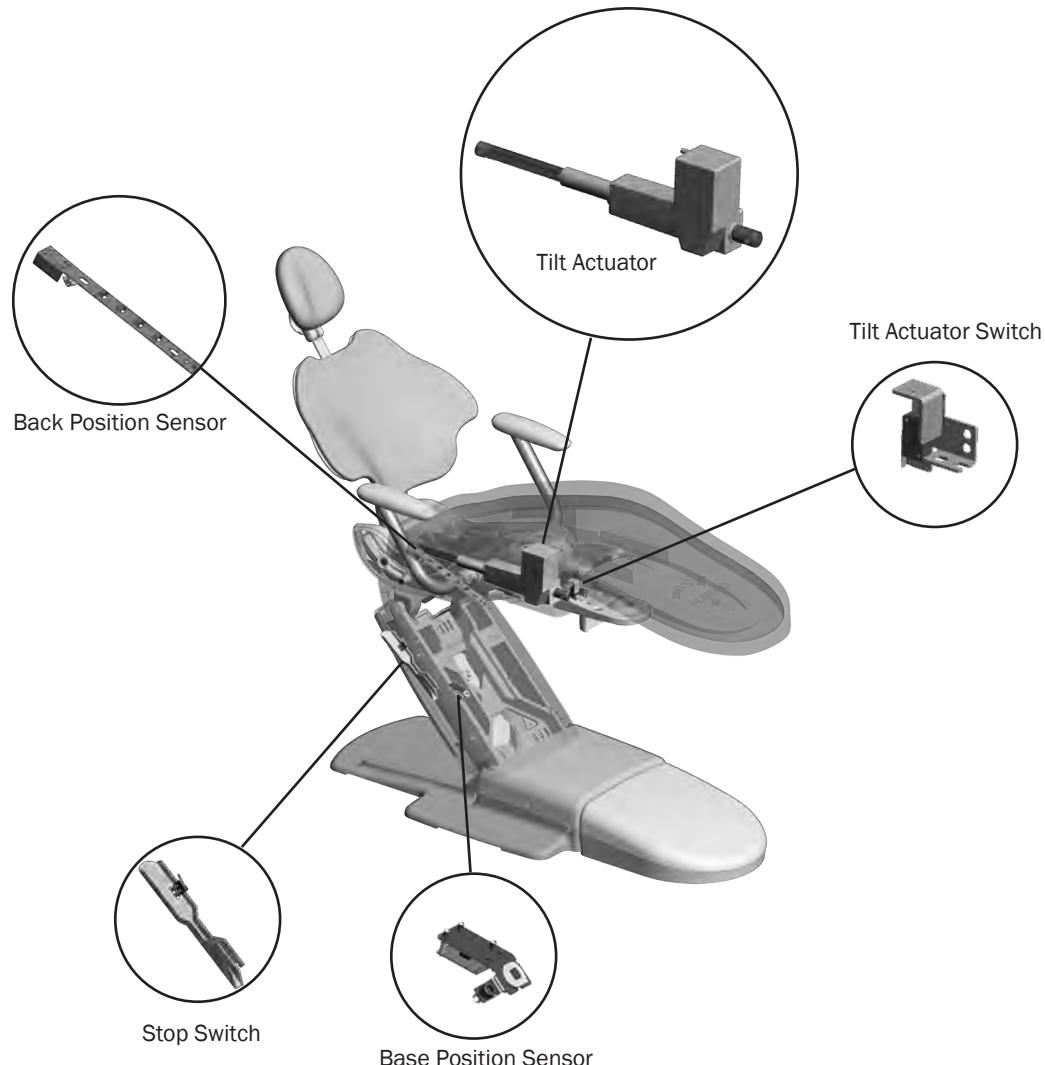
Chair Input Voltages

Mains Chair Input Voltage	A-dec Capacitor Part Number
100 VAC	90.1198.00
110 - 120 VAC	90.1199.00
220 - 240 VAC	90.1200.00



Motor Driven Electro-Mechanical Actuator (411)

The back-up and back-down movements are controlled with an electro-mechanical tilt actuator, which is located under the seat of the chair. Reference the chart below to identify the location of actuators and switches.



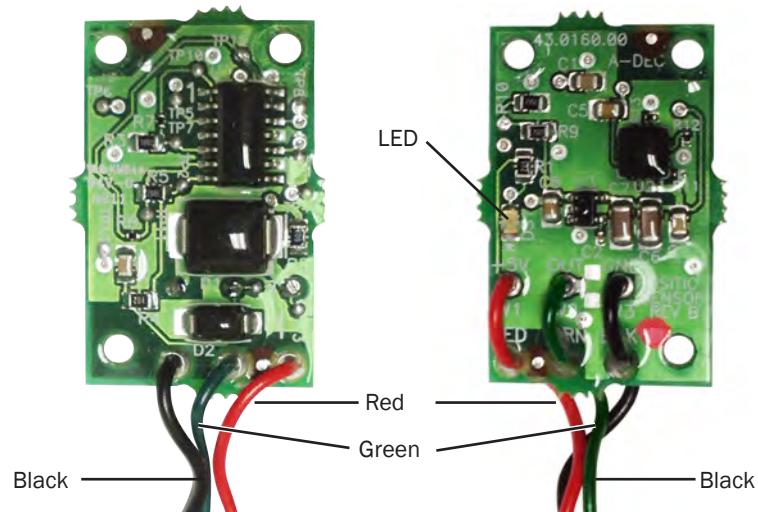
Position Sensor (311/411)

The position sensor circuit boards provide positioning data to the chair board. There is a position sensor for the back and a position sensor for the base.



CAUTION The position sensors can be inadvertently installed upside down. Improper installation will limit the chair's functionality.

A diagnostic LED is provided on the chair board for each position sensor. Refer to Chair Circuit Board LED Identification, see page 12 for information. An additional LED, indicating power, is present on each position sensor circuit board.



Factory Default Routine

If a position sensor or chair board are replaced, run the factory default. For instructions on running the factory default, see page 32.

Limp Along Feature

There are two position sensors, one for the base of the chair and one for the back of the chair. If there is a problem or malfunction with a position sensor, the limp along feature allows the operator to move the chair in the up direction for one to three second intervals by pushing the manual control buttons on the touchpad or footswitch. Refer to Chair Circuit Board LED Identification, page 12 for further information. When in limp along mode, presets will not function.

Solenoid (411)

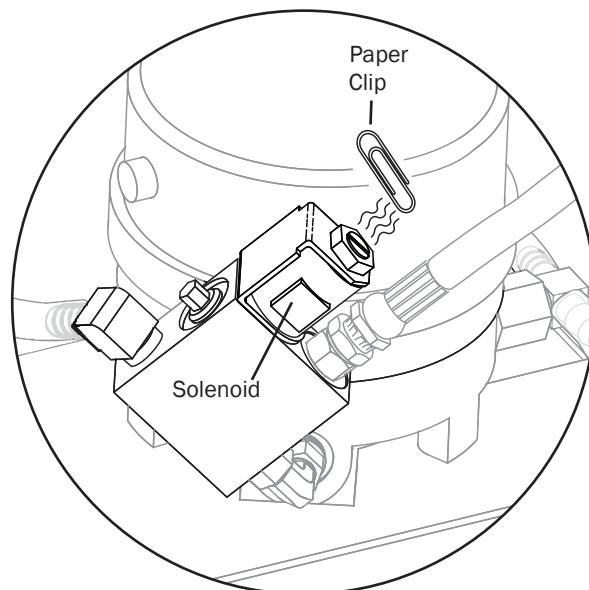
p/n: 62.0317.00 21.6 VDC

Solenoid Testing

A solenoid is energized during base down function. To determine if a solenoid has failed, check for coil resistance using magnetic pull or volt/ohm meter test.

Magnetic Pull Test for Coil Resistance

1. Hold a paper clip loosely in your hand.
2. Activate the solenoid by pressing base down on the footswitch or touchpad.
3. If there is a pull on the paper clip, the solenoid is being energized.



Volt/Ohm Meter Test for Coil Resistance



DANGER Turn off the power to the system before you continue with this procedure. Failure to do so can result in electrical shock.



WARNING Turn off the power to the system before you continue with this procedure. Failure to do so can result in product damage, serious injury, and/or death.

1. Disconnect the solenoid power at the chair board's base solenoid terminal strip (J7).
2. Place one Ohm meter probe on each of the solenoid wires.
Solenoid = 38 Ohms (Ω) \pm 4 Ohms (Ω)



Solenoid Assembly Replacement (411)



CAUTION The circuit board is static sensitive. ESD precautions are required. The circuit board should be installed by an electrician or qualified service personnel.



WARNING Lower the chair base to the mechanical limit before removing the solenoid.

Remove the Solenoid Assembly:

When replacing a solenoid wipe up any fluid and replace existing O-rings on the solenoid base.

1. Remove the utility cover(s).
2. To minimize pressure in the hydraulic system, lower the chair base to the mechanical limit.



DANGER Turn off the power to the system before you continue with this procedure. Failure to do so can result in electrical shock.



WARNING Turn off the power to the system before you continue with this procedure. Failure to do so can result in product damage, serious injury, and/or death.

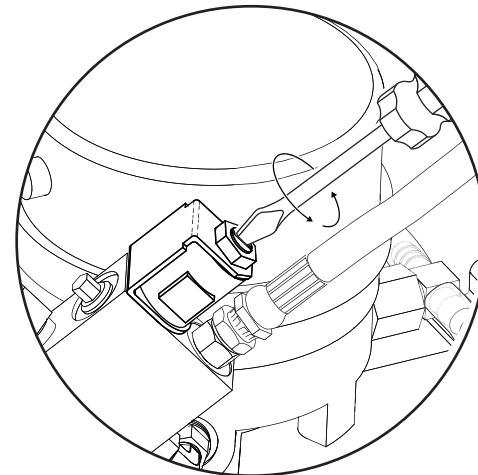
3. Disconnect the solenoid from the chair circuit board, terminal strip J7.

4. Loosen the nut on the solenoid and use a screw driver to remove the failed solenoid assembly.



NOTE Cover the solenoid with a rag. Fluid is still under pressure when removing the solenoid.

5. Wipe up any fluid and replace existing O-rings on the solenoid base.



Install the New Solenoid Assembly:

1. Install the new solenoid.
2. Reconnect the solenoid to the chair circuit board, terminal strip J7. It does not matter which solenoid wire goes into which terminal. The solenoid will work either way.
3. Turn on the power.
4. Move the chair up and down to ensure there are no leaks.
5. Reinstall the utility cover.

Chair Stop Plate (411)

Stop Switch

If an object presses against the chair stop plate as the chair is lowered, a stop switch will interrupt and reverse the chair motion. If the object becomes lodged, press base up on the footswitch or touchpad. Remove the object and resume normal chair operation.



WARNING Be sure to turn off power to the chair and disconnect it from its power source before replacing the stop switch.



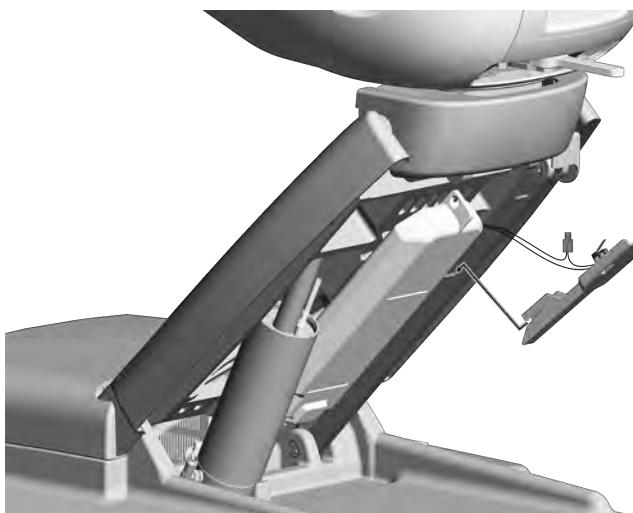
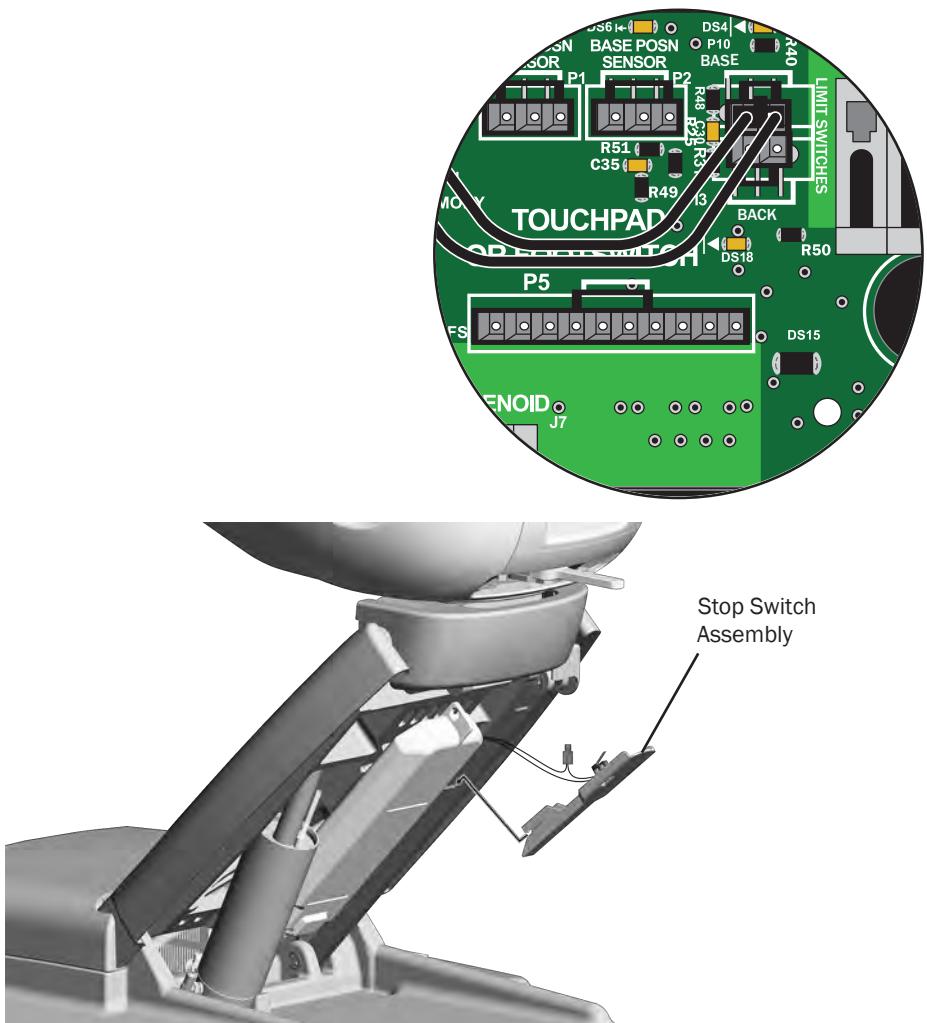
CAUTION Use cable ties to secure wires to the lift arm to prevent kinking and pinching.



Chair Stop Plate

Chair Bump-Up Feature (411)

The chair stop plate triggers the chair to move upwards if it was moving down when the stop plate switch was activated.



Stop Switch Assembly

Double-Articulating Headrest (311/411)

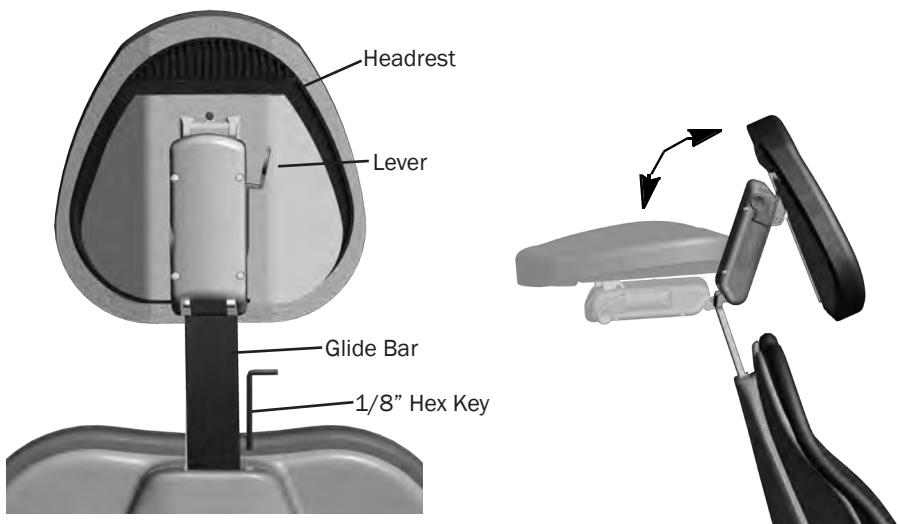
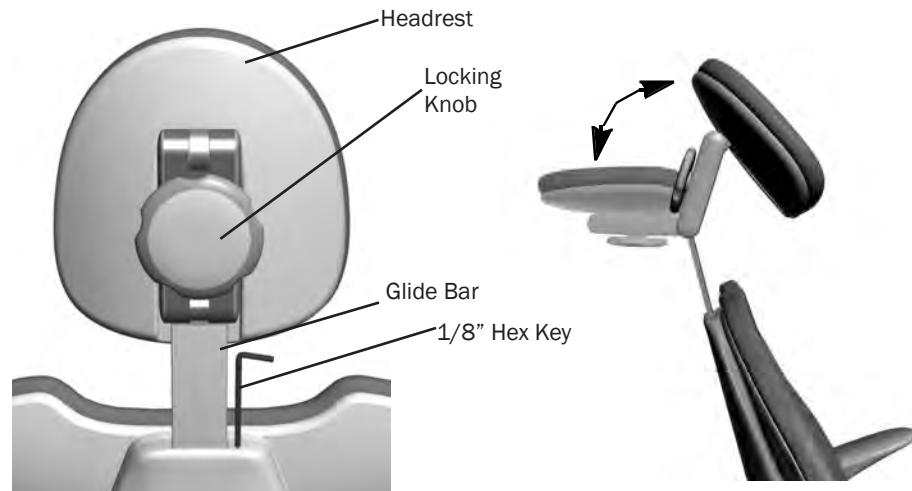
Headrest Adjustment

The double-articulating headrest offers a “glide” feature, as well as manual articulation. The locking knob allows you to adjust the headrest for a full range of positions.

Release the headrest by turning the locking knob to the left, then adjust the headrest for a proper fit. Lock the headrest in the desired position by turning the knob to the right. For minor height adjustment, slide the headrest cushion up and down. For additional height adjustment, reposition the glide bar.

Glide Bar Tension Adjustment

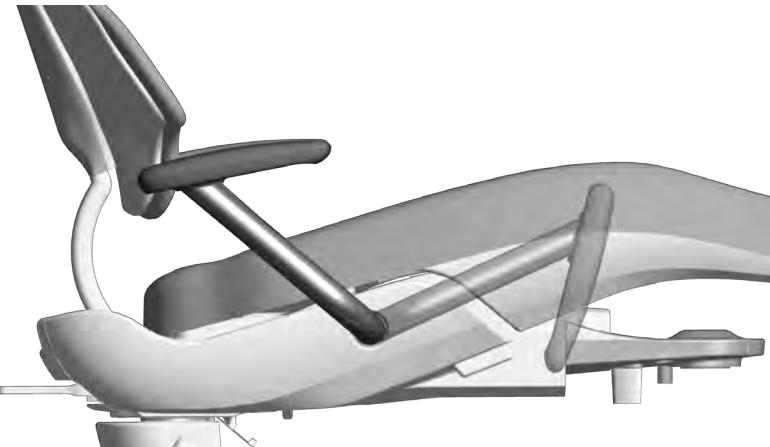
A double-articulating headrest may be difficult to move or may drift downward because of the amount of tension on its glide bar. To adjust the tension, use a 1/8" hex key and turn the tension adjustment screw to the right to increase friction or to the left to decrease friction.



Armrest Adjustments (411)

Two-Position Armrests Adjustment

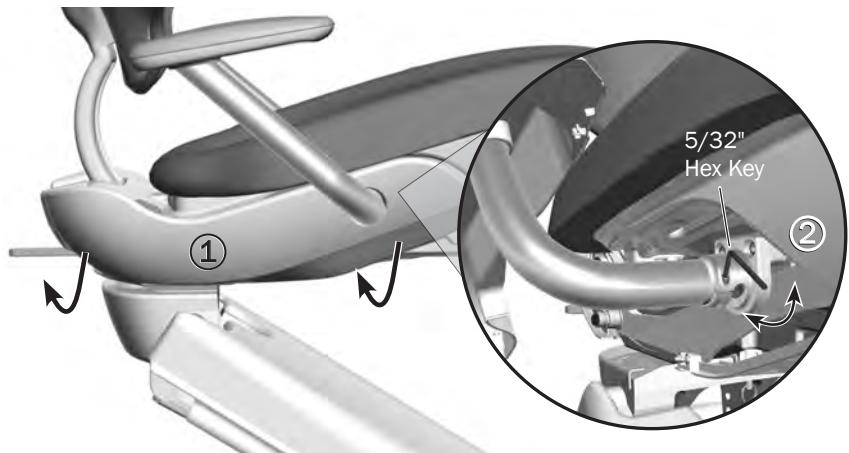
Push or pull the armrests to reposition them in the forward or back position



Arm Rest Rotation Tension Adjustment

If the armrests become loose or are difficult to move, you can adjust the rotation tension. To adjust each armrest:

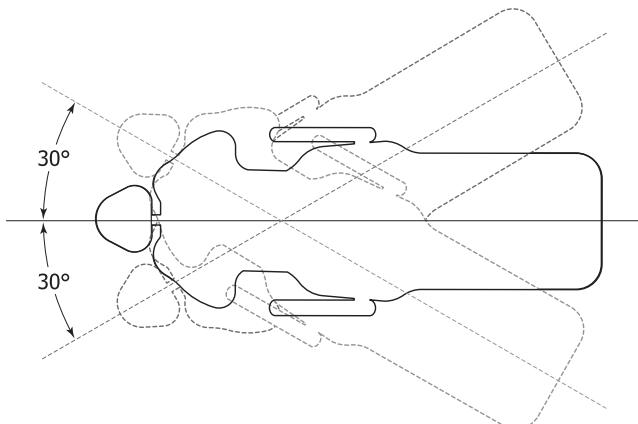
1. Remove the chair side cover by pulling on the left and lower right sides of the cover. Pull the cover out of the way to access the adjustment screw.
2. Use a $5/32"$ hex key and turn clockwise to tighten or counterclockwise to loosen the armrest tension. Only a small adjustment is needed to significantly increase or decrease tension.



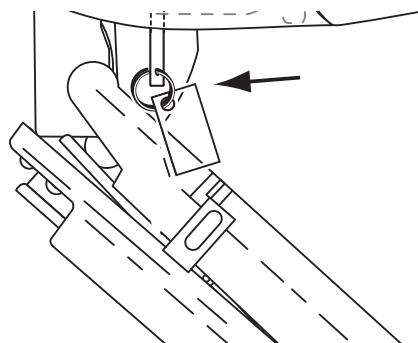
Swivel Brake Adjustment (411)

Swivel Brake

The chair can rotate to any position within 30° either side of center. The chair swivel break locks the chair in the selected position. To engage the brake, push the brake lever firmly to the left. To release the swivel brake, push the brake lever to the right.



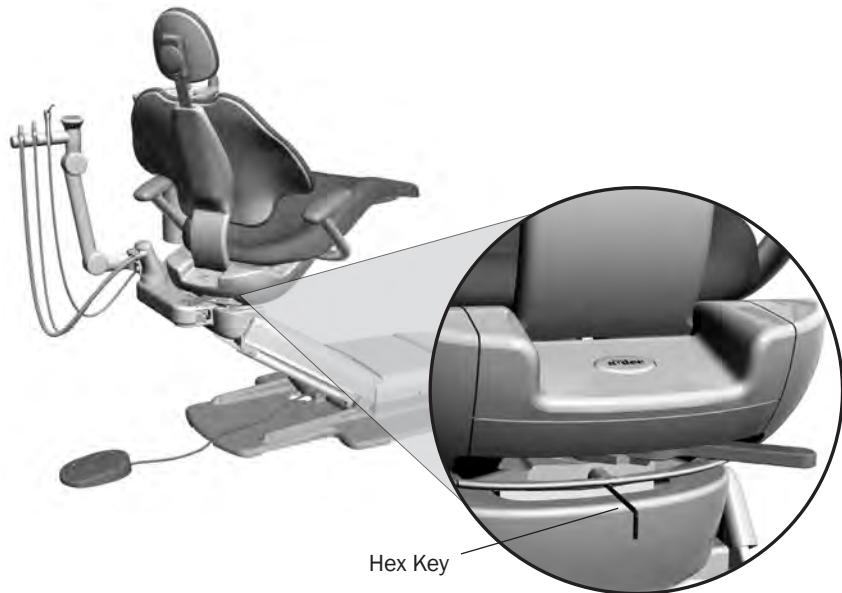
NOTE To disable the swivel feature, reinstall the shipping pin.



Swivel Brake Tension Adjustment

If the chair swivels left or right with the brake engaged, or is difficult to move with the brake disengaged, adjust the swivel brake tension. Properly tensioned, the brake handle should be in the middle when it is fully engaged. To make the adjustment:

1. Move the brake handle to the right.
2. If the chair includes a back mount module, swivel the chair to access the adjustment screw.
3. Use a 7/64" hex key with a long shaft to turn the tension adjustment screw clockwise to increase brake friction or counterclockwise to decrease brake friction. Only a small adjustment is needed to significantly increase or decrease tension.



511 Chair Service, Adjustments, and Maintenance

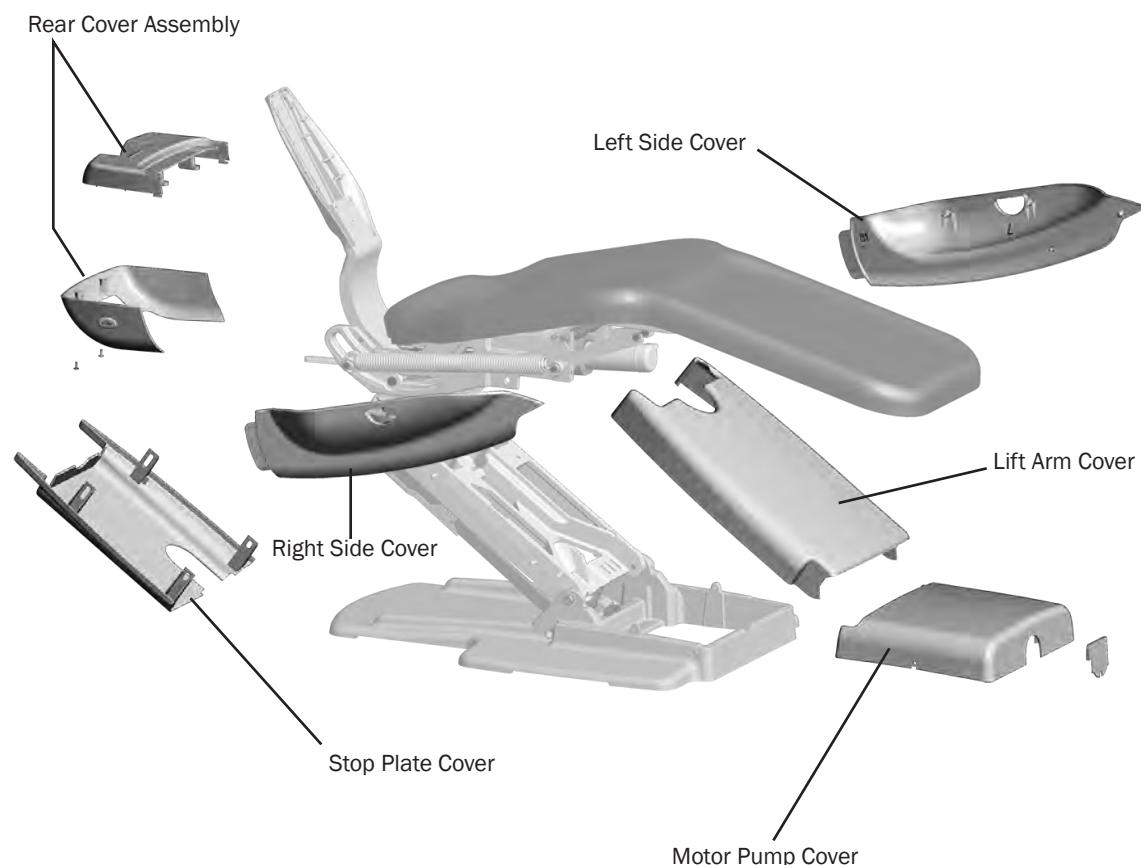
Chair Covers (511)

Remove the chair motor pump, lift arm and stop plate covers in the following order:



CAUTION When removing or replacing covers, take care not to damage any wiring or tubing. Verify that the covers are secure after replacing them.

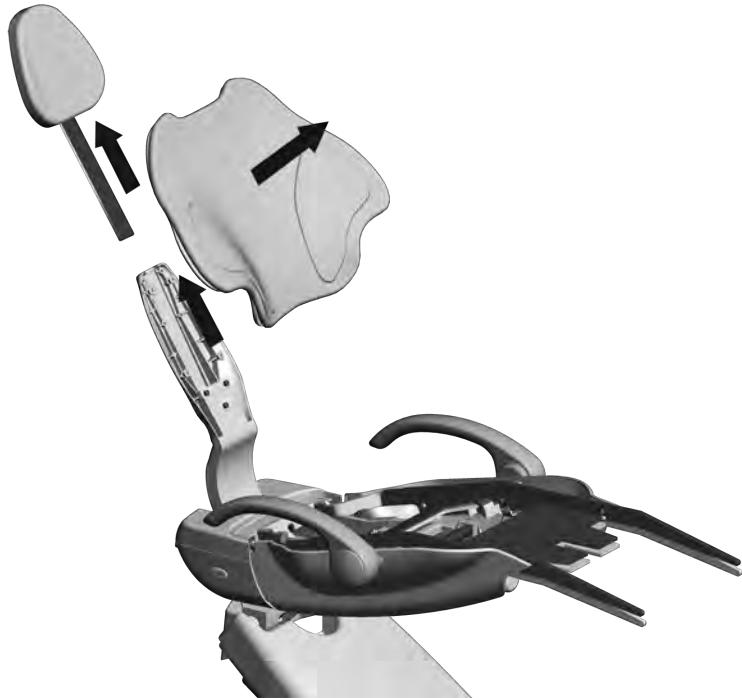
1. Motor Pump Cover: Remove the screws from each side and lift up.
2. Lift Arm Cover: Position the chair so that it is raised half way up. Pull one side of the cover until it releases from the lift arm. To replace, align one side of the cover with the lift arm and insert it into place. Ensure both sides are firmly attached.
3. Stop Plate: Pull one side of the cover until it releases from the lift arm. To replace, slide one side of the cover over the post on the lift arm and attach.



Upholstery (511)

Back Upholstery Removal/Attachment

To remove the back, firmly grasp the bottom edge of the cushion and lift up, then lift the upholstery out and away from the chair back support. To reattach the back upholstery, place the key holes on the cushion over the large fastener heads, then push down until it inserts into position.

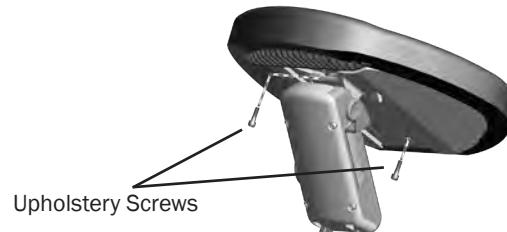


Headrest Upholstery Removal/Attachment

To remove the headrest upholstery, position the headrest to access the two screws on the back, loosen the screws, and remove the upholstery. To reattach the headrest upholstery, position the headrest to access the screws, place the upholstery on the headrest, then insert and tighten the screws.

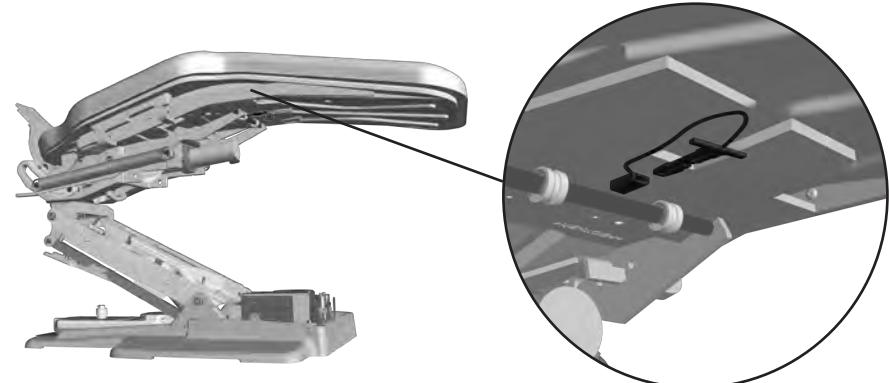


CAUTION Do not remove the positioning mechanism screws or plate. The brake assembly will fall out.



Seat Upholstery Removal/Attachment

To remove the seat, first remove the plastic clip under the seat frame, then lift the toe of the seat to unhook it from the chair carriage, and move it away. To reattach, place the two seat upholstery hooks under the chair carriage, then push the toeboard back and down until the lock is through the seat frame. Insert the clip into the lock.



Factory Default Routine (511)

After installing a new chair, circuit board, or position sensor, run the factory default routine. The routine:

- Sets the chair base and back upper limits
- Calculates new preset positions based on actual range of motion of the chair
- Verifies that the position sensor work correctly

To start the factory default routine, place the spare jumper in the factory default position on the P3 test points of the chair circuit board.

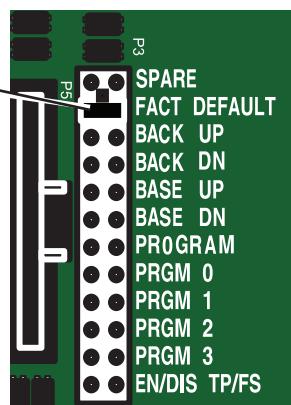


CAUTION Circuit boards and position sensors are static-sensitive and require ESD handling precautions.



NOTE The jumper must remain in the factory default position to complete the factory default routine. The status LEDs on the standard and deluxe touchpads and the chair circuit board double blink while the factory default routine is running and after the routine is complete. When the routine is complete, three beeps sound. If the routine stops prematurely, one beep sounds.

Jumper in Factory Default Position



When running the factory default routine the chair:

1. Moves base down
2. Moves base up
3. Moves back down
4. Moves back up
5. Moves base and back to Position 0
6. Beeps three times



NOTE One beep indicates the routine failed to complete. See page 56 for troubleshooting.

Chair Drive System (511)

Hydraulic Cylinders

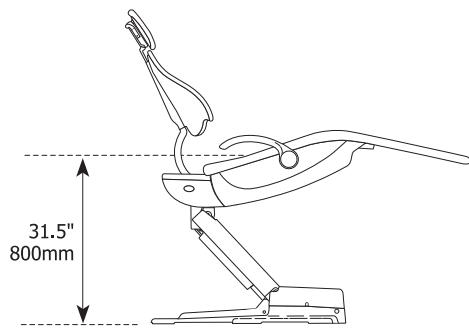
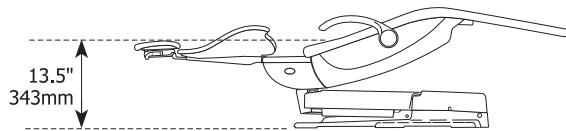
The hydraulic cylinders operate during the base up and back up functions. Springs and gravity retract the piston during base down and back down functions.

The chair seat has a vertical range of 13.5" (343 mm) to 31.5" (800 mm) above the floor.

Motor Driven Hydraulic Pump

During base and back up functions, the hydraulic pump transfers hydraulic fluid from the reservoir to the base and back hydraulic cylinders. Solenoids, mounted to the pump assembly, control the flow of hydraulic fluid back to the reservoir during base and back down functions.

NOTE You cannot adjust the speed of the chair.



Hydraulic System (511)

The hydraulic system deactivates automatically at the upper and lower extremes of travel. The system is leak-free during transportation, storage, and operation. The hydraulic system consists of hydraulic fluid reservoir, hydraulic cylinders, and motor-driven hydraulic pump with solenoids.



CAUTION Use only A-dec hydraulic fluid, p/n 61.0197.00.

Hydraulic Fluid Reservoir Replenishment (511)

The hydraulic fluid reservoir is located in the lift arm of the chair under the stop plate cover. You can see the fluid level in the reservoir through the sides of the reservoir. Add hydraulic fluid to the reservoir:

1. Raise the chair to the full base up and back up position.
2. Fill the reservoir with hydraulic fluid to the top of the fluid level indicator.



CAUTION Do not overfill.

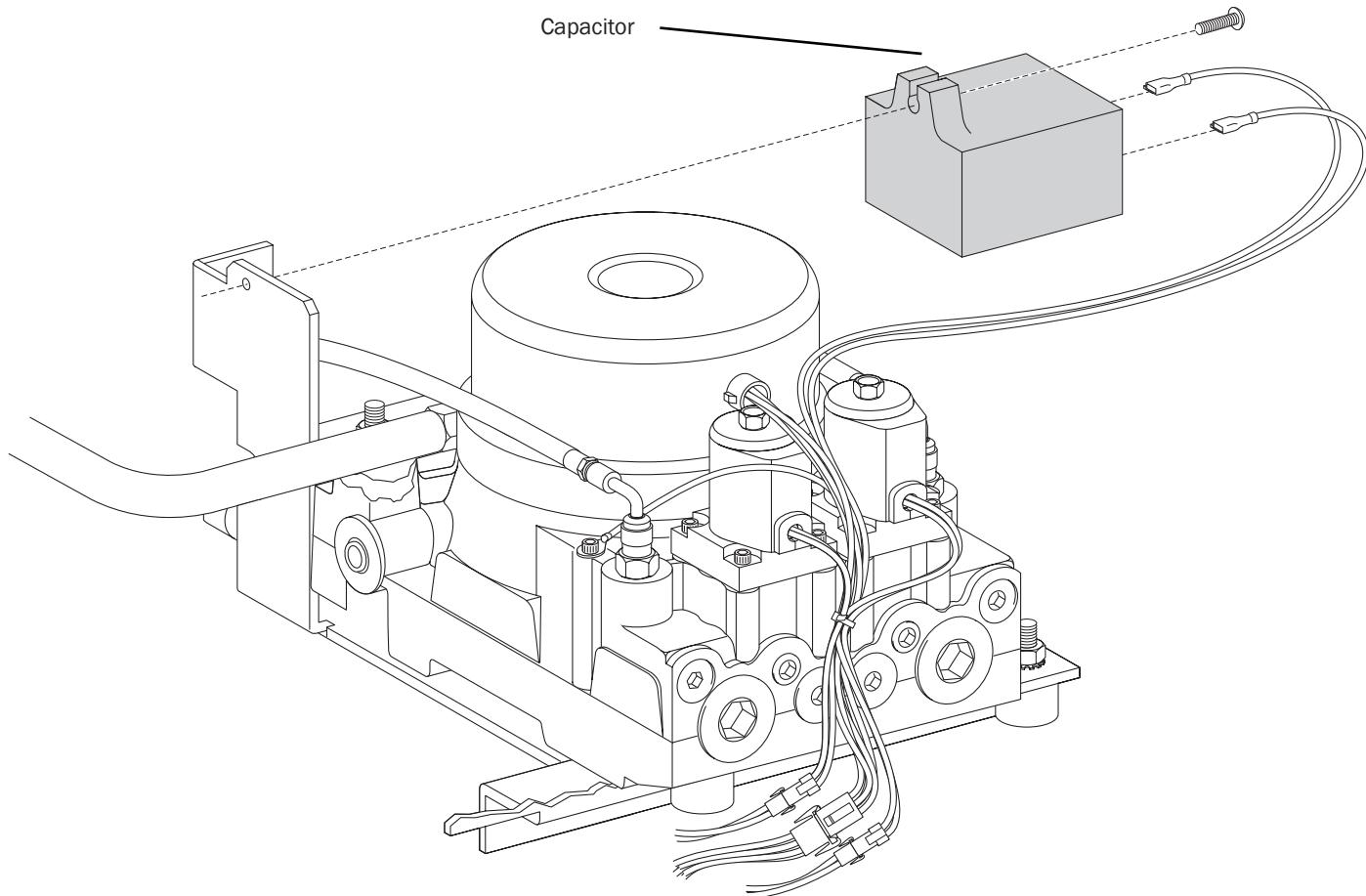
3. Move the chair down and up after fluid has been added.



Capacitor (511)

p/n: 041.642.00, 100 VAC, 041.643.00, 110 - 120 VAC, 041.644.00, 220 - 240 VAC

The capacitor is energized during chair base up or back up functions.



Solenoid (511)

p/n: 90.1070.00, 110 - 120 VAC, 90.1071.00, 220 - 240 VAC

Solenoid Testing

A solenoid is energized during base down and back down functions. To determine if a solenoid has failed, check for coil resistance using magnetic pull or volt/ohm meter test.

Magnetic Pull Test for Coil Resistance

1. Hold a paper clip loosely in your hand.
2. Activate the solenoid by pressing base down or back down on the footswitch or touchpad.
3. If there is a pull on the paper clip, the solenoid is being energized.

Volt/Ohm Meter Test for Coil Resistance



DANGER Turn off the power to the system before you continue with this procedure. Failure to do so can result in electrical shock.



WARNING Turn off the power to the system before you continue with this procedure. Failure to do so can result in product damage, serious injury, and/or death.

1. Disconnect the solenoid power at the 2-position connector.
2. Place on Ohm meter probe on each solenoid connector terminals.
 - 100 - 120 VAC = 177 Ohms \pm 18 Ohms
 - 220 - 240 VAC = 845 Ohms \pm 85 Ohms

Solenoid Assembly Replacement (511)



CAUTION The circuit board is static sensitive. ESD precautions are required. The circuit board should be installed by an electrician or qualified service personnel.



WARNING Lower the chair base to the mechanical limit before removing the solenoid.

Remove the Solenoid Assembly:

When replacing a solenoid wipe up any fluid and replace existing O-rings on the solenoid base.

1. Remove the utility cover(s).
2. To minimize pressure in the hydraulic system, lower the chair base and back to the mechanical stops.

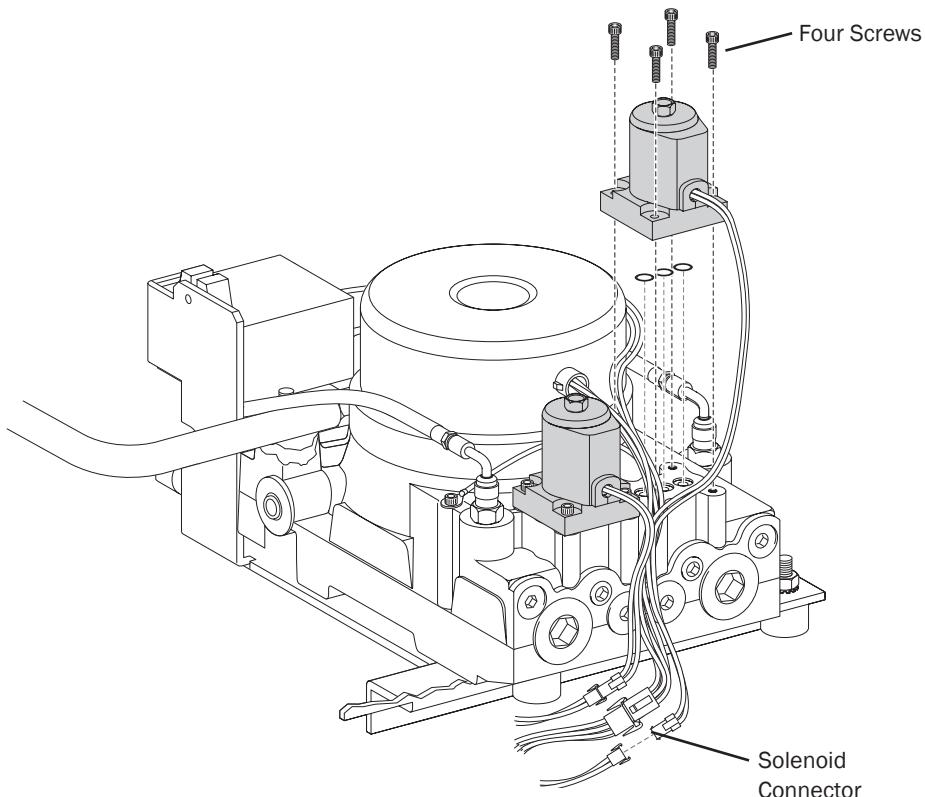


DANGER Turn off the power to the system before you continue with this procedure. Failure to do so can result in electrical shock.



WARNING Turn off the power to the system before you continue with this procedure. Failure to do so can result in product damage, serious injury, and/or death.

3. Disconnect the solenoid connector.
4. Use a 9/64" hex wrench to remove the four screws that fasten the solenoid assembly.
5. Wipe up any fluid and replace three O-rings on the solenoid base.

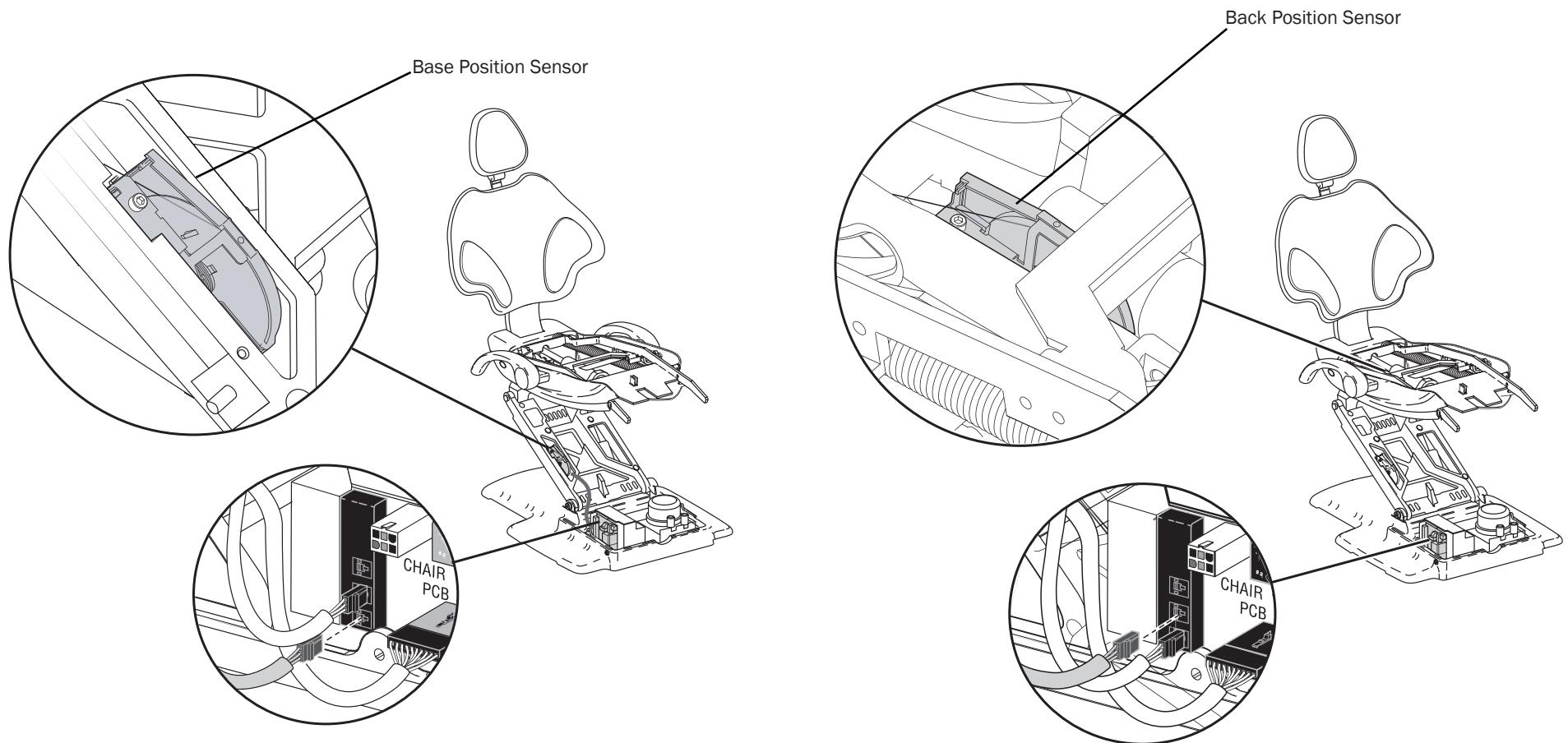


Install the New Solenoid Assembly:

1. Insert the new solenoid and fasten it with the four screws.
2. Reconnect the solenoid connector.
3. Turn on the power.
4. Run the chair through its full range of motion to check for leaks.
5. Reinstall the utility cover.

Position Sensors (511)

The position sensor and cable assembly eliminates position float (a slight change or variation in the pre-programmed positions). The chair uses the same position sensor assembly for both lift and tilt requirements. If a position sensor fails, the limp-along feature allows the operator to position the chair for one second intervals by pushing the manual control buttons on the touchpad or footswitch.



Chair Stop Plate (511)

Stop Switch

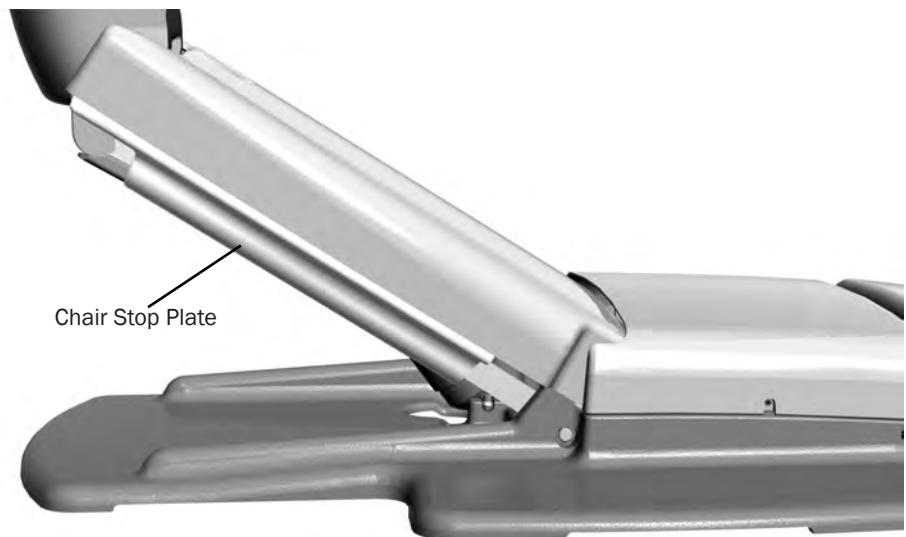
If an object presses against the chair stop plate as the chair is lowered, a stop switch will interrupt and reverse the chair motion. If the object becomes lodged, press base up on the footswitch or touchpad. Remove the object and resume normal chair operation.



WARNING Be sure to turn off power to chair and disconnect it from its power source before replacing the stop switch.

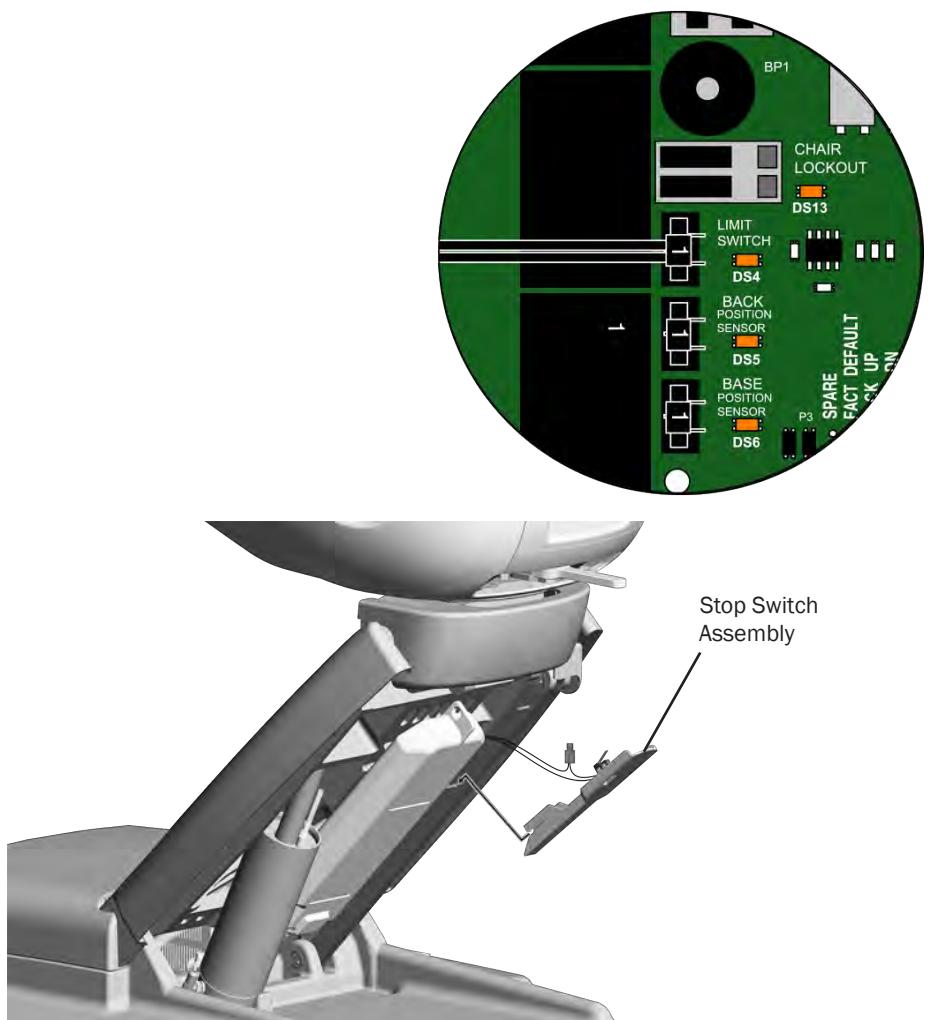


CAUTION Use cable ties to secure the wires to the lift arm to prevent kinking and pinching.



Chair Bump-Up Feature (511)

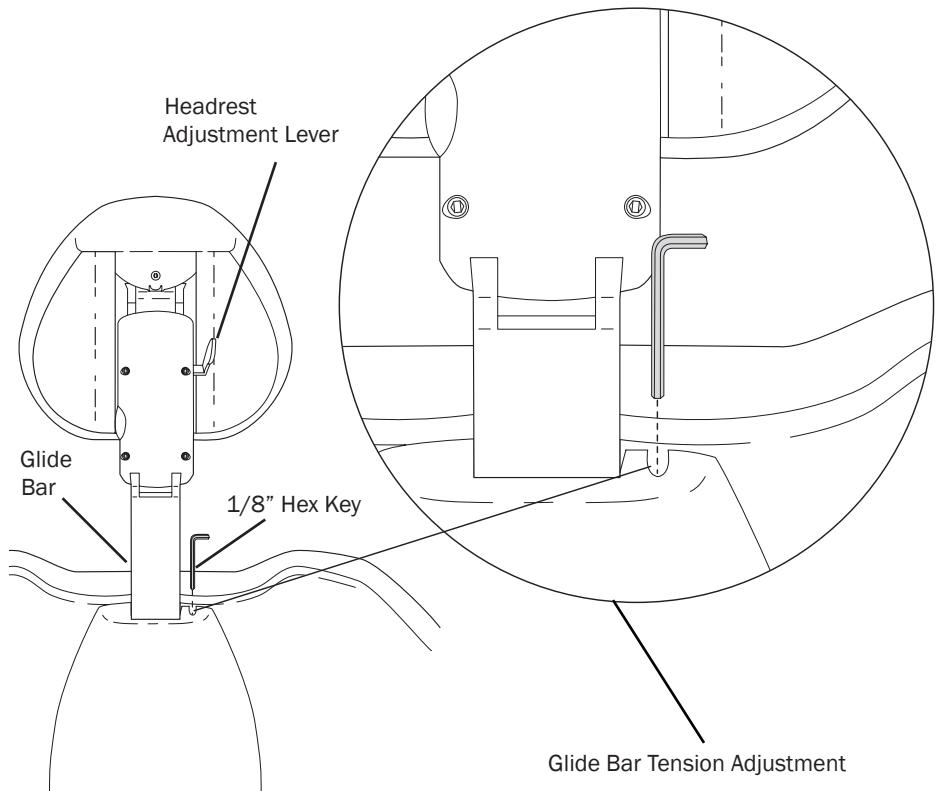
The chair stop plate and the assistant's arm trigger the chair to move upwards if it was moving down when the stop plate switch was activated.



Headrest Adjustment (511)

The headrest adjustment lever allows you to use one hand to adjust the headrest. When the lever is released, the headrest holds its position.

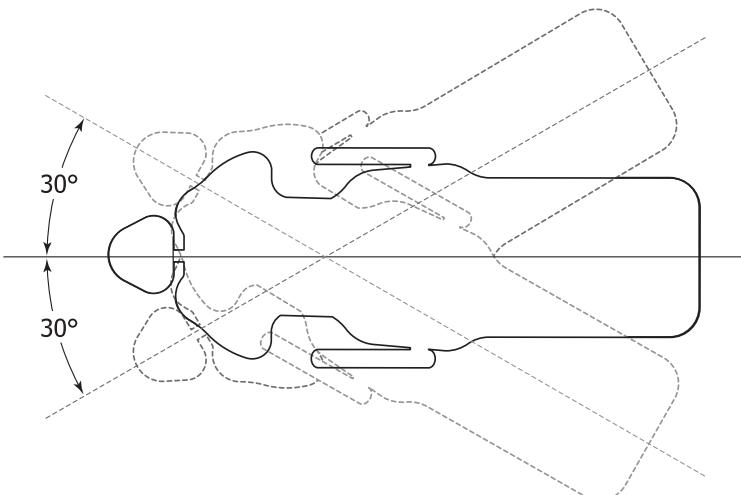
If the headrest drifts downward, or if it is difficult to move up or down, adjust the glide bar tension. To adjust the tension, use a 1/8" hex key and turn the tension adjustment screw clockwise to increase friction or counterclockwise to decrease friction.



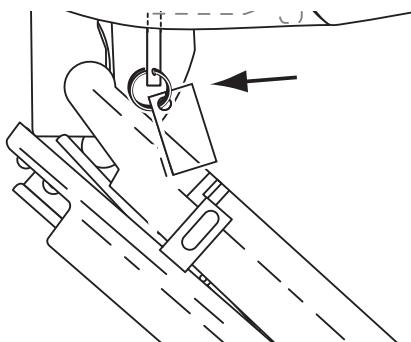
Swivel Brake Adjustment (511)

Swivel Brake Operation

The chair can rotate to any position within 30° either side of center. The chair swivel brake keeps the chair from moving. To engage the brake, push the brake lever firmly to the left. To release the swivel brake, push the brake lever to the right.



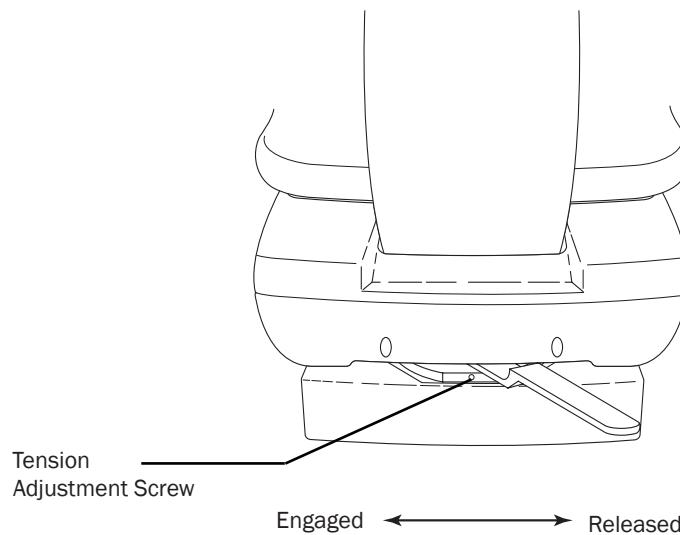
NOTE To disable the swivel feature, reinstall the shipping pin.



Swivel Brake Tension Adjustment

If the chair swivels left or right with the brake engaged, or is difficult to move with the brake disengaged, adjust the swivel brake tension. Properly tensioned, the brake handle should be in the middle when it is fully engaged. To make the adjustment:

1. Move the brake handle to the right.
2. Use a 7/64" hex key to turn the tension adjustment screw clockwise to increase brake friction or counterclockwise to decrease brake friction. Only a small adjustment is needed to significantly increase or decrease tension.



Chair Programming

Overview

A-dec dental chairs can be operated by the A-dec touchpads (Standard, 300 Deluxe, or 500 Deluxe) or the footswitch. Chair functions are similar whether used with an A-dec touchpad or footswitch.

**A-dec Standard Touchpad
(Current Model)**



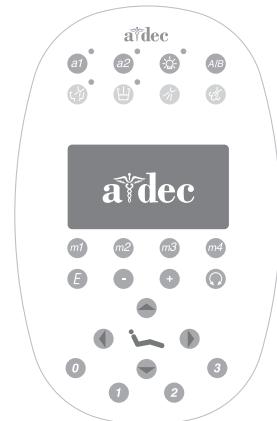
**A-dec Standard Touchpad
(Original Model)**



**A-dec 500 Deluxe Touchpad
(Current Model)**



**A-dec 500 Deluxe Touchpad
(Original Model)**



A-dec 300 Deluxe Touchpad



A-dec Footswitch



System Status Light

On chairs with an A-dec delivery system, the A-dec logo on the touchpad indicates the system status. A solid blue status light indicates that power is on.

A blinking blue status light could indicate that something is lodged under the chair, activating the stop plate or limit switch. Once the object is removed, the status light returns to solid blue.

A blinking blue status light could also indicate that a jumper is in the factory default position on the chair circuit board. See page 56 for troubleshooting.



A-dec Logo/
Status Light

Chair Positioning

Chair Direction Buttons

The touchpad or footswitch provide manual and programmed controls for A-dec chair positioning. The direction arrows allow you to manually move the chair base and back up and down.

Footswitch	Standard and 500 Deluxe Touchpad	300 Deluxe Touchpad	Action
			Back Down
			Base Down
			Back Up
			Base Up

Programmable Chair Buttons/Factory Presets

Chair position buttons are factory preset to automatically move the chair.

Footswitch Buttons	Touchpad Buttons	Description
		Entry/Exit: Automatically positions chair for entry/exit and turns off dental light.
		Treatment 1: Automatically positions the chair base and back down and turns on the dental light.
		Treatment 2 (not available on 300 Deluxe touchpad): Automatically positions the chair base and back and turns on the dental light.
		X-ray/Rinse: Automatically toggles between the X-ray/Rinse and the current chair position. The dental light turns off when the chair is positioned for X-ray/Rinse and turns on when it returns to its last position.

Program Chair Preset Buttons



NOTE To stop the chair at any point, push any chair positioning button on the footswitch or touchpad.

To program the chair presets Entry/Exit, Treatment 1, and Treatment 2:

1. Move the chair to its desired position.
2. Press and release the Program button. One beep indicates programming mode.
3. Press the button you want to program and you hear three beeps confirming the button has been set.

Customize the X-Ray/Rinse Button

The X-ray/Rinse button functions either as x-ray/rinse or as another preset position (Treatment 3). To change the function of the X-ray/Rinse button:

1. Press and hold the Program and X-ray/Rinse buttons simultaneously for three seconds.
 - One beep indicates the button has been configured as Treatment 3.
 - Three beeps indicate that the X-ray/Rinse button has been configured as the x-ray/rinse function (toggles between the x-ray/rinse and the previous position.)
2. Program the preset position as instructed under "Program Chair Preset Buttons" above.

Troubleshooting

Overview

This section contains troubleshooting information to assist in diagnosing the problems that are most likely to occur. This information is not intended to be all inclusive. Contact A-dec Customer Support if troubleshooting assistance is required. (See page 4 for contact information.)

Troubleshooting Contents

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No Power to the Chair

Before using the troubleshooting table, verify that the:

- Chair is plugged in.
- On/off button is in the on position.
- All pilot air tubing is connected and has no kinks.
- Circuit breakers are not tripped.
- Compressor is on.

Symptom	Troubleshooting	Problem/Indicator	Possible Solution
Power supply circuit breakers are tripped even after resetting them	Verify pilot air is connected to the power supply and the air manual shutoff valve is fully open Verify the master toggle is in the on position and the bypass switch is activated	Disconnected pilot air tubing No pilot air to the power supply or the bypass switch not activated	Reconnect the pilot air tubing. 311 Only: Set the master toggle to the on position and activate the bypass switch. 511 only: Move the pilot air switch and then connect the pilot air..
	Verify for tripped breakers CB1 and CB2 If circuit breakers still trip after resetting, disconnect all cables including the power connectors P4, P9 and P12 from the chair board. Then: 1. Reset the circuit breaker. 2. Reconnect the cables one at a time, observing which one causes the circuit to trip.	Bad cable	Identify the wiring problem and repair or replace the cable.
	1. Disconnect all power cables including the chair circuit breaker connector (P4) from the power supply. 2. Reset the circuit breaker. 3. Reconnect the power cables one at a time, observing which one causes the circuit breaker to trip.	If a power supply circuit breaker continues to trip with all cables disconnected from the chair board (P4, P9, and P12), the power supply may be bad.	Bad circuit breaker or cable. Identify the wiring problem circuit, and repair or replace as needed. The power supply is bad. Replace the power supply.

Partial Base Up and Back Up Movement

Before using the troubleshooting table, verify that the:

- Wires are all connected.
- Position sensors are connected.
- The jumper is the spare position on the chair board.

Symptom	Troubleshooting	Problem/Indicator	Possible Solution
Base/back up begins but stops (limp along feature)	Verify if there is an A-dec LED Dental Light in use	An A-dec Dental Light can cause problems with chair movement because of electronic interference	Add conduit to the entire length of the cable. Contact A-dec Customer Support for instructions. (See page 4.)
	Disconnected position sensor connections to the chair board or failed position sensor	Bad position sensor	Reconnect the position sensors to the chair board. Replace the bad position sensor with a complete assembly
Base or back does not move to full up position	Position sensor LED for that function on the chair board is flashing	Optional height limit has been reached	<ol style="list-style-type: none"> 1. Place the jumper in P3 (factory default) on the test point header. The chair will automatically establish the soft stops. 2. Wait for the factory default to complete. It will beep three times to signal completion. 3. Place the jumper back in the spare position. Verify the chair operates normally. 4. Program the chair presets. <p>If you know the height limit has been reached, remove the height limit:</p> <ol style="list-style-type: none"> 1. Move the jumper in the P3 position of the test point header to EN/DIS TP/FS. 2. Hold the base up button for three seconds to remove the height limit. One beep confirms it has been removed.
	511 only: Check for position sensor cables that are damaged or loose	Chair does not move into full up position because of position sensor cables	Replace the position sensor assembly
Limited or no chair functions from using the footswitch	Check that the chair operates using the touchpad or test points (P3).	Damaged footswitch connector or wiring or damaged footswitch membrane Disconnected or failed position sensor (affects presets)	Replace the footswitch connector or wiring.. If the footswitch connector and wiring are not damaged, replace the membrane.

No Base and Back Down Movement

Before using the troubleshooting table, verify that:

- There are no obstructions under the chair.
- The foot control screws are firmly installed.



Symptom	Troubleshooting	Problem/Indicator	Possible Solution
Base down and back down do not function	511 Chair Only: Check if the DS4 red LED is illuminated	<i>Limit Switch for Chair:</i> <ul style="list-style-type: none">• The red LED DS4 is off and the base down and program positions function• If the red LED DS4 is illuminated	Replace the limit switch assembly. Replace the chair circuit board.
	Check if the relay clicks and DS12 LED is illuminated	<i>Limit Switch for Support Side:</i> <ul style="list-style-type: none">• The red LED DS4 is off and the chair functions• The DS4 is illuminated.	Replace the support limit switch. Replace the chair limit switch assembly.
	Check solenoid(s) using the volt/Ohm meter test for coil resistance. For instructions: 311 chair: see page 24 411 chair: see page 36 511 chair: see page 48	If the solenoid does not meet the correct resistance value, the solenoid is faulty.	Replace the solenoid. 311 chair, see page 25 411 chair, see page 37 511 chair, see page 49

No Back Movement

Before using the troubleshooting table, verify that the wires are connect at P8.

Symptom	Troubleshooting	Problem/Indicator	Possible Solution
311/411 only: Back does not move but base movement is normal	Check connections at P8 on the chair board	If DS 17 is not illuminated there may be loose connections The motor may not be connected to P8	Reconnect loose connections
411 only: Check that the DS10 LED status light is red		If DS 10 is not red, limit switch may be loose or faulty	Replace the wire harness or replace the limit switch.

Non-Functioning Chair Preset Positions

Symptom	Troubleshooting	Problem/Indicator	Possible Solution
Chair presets do not function	Disconnected position sensor	Disconnected or failed position sensor	Connect wires correctly at P1 (back) and P2 (base) Reconnect any unconnected wires Replace the bad position sensor

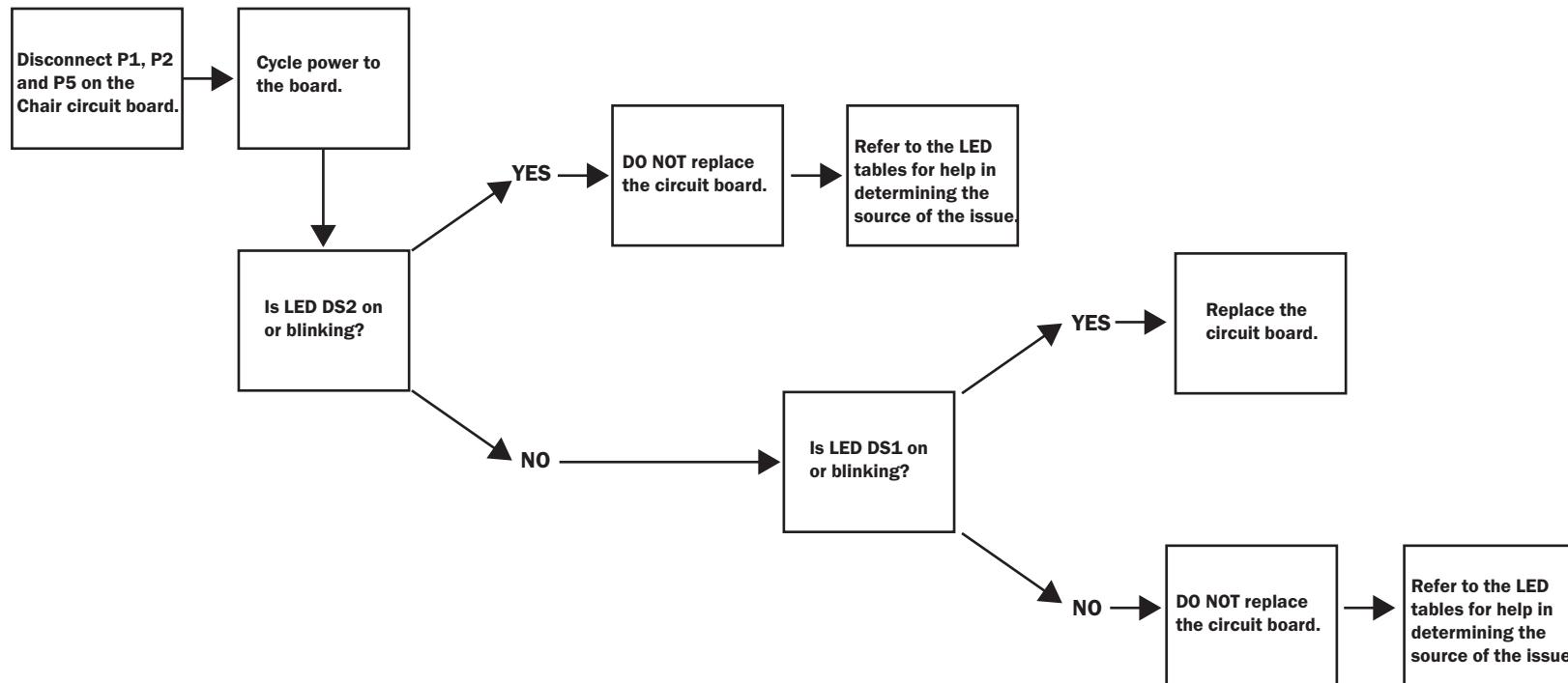
Chair "Growling" Noise or Noisy Hydraulic Cylinder

Symptom	Troubleshooting	Problem/Indicator	Possible Solution
511 only: The chair makes a growling noise when base or back up is pressed 311/411: The chair makes a growling noise when base up is pressed	Check the hydraulic fluid level	Chair is low on hydraulic fluid.	Refill the hydraulic fluid. 311 Chair: see page 21 411 Chair: see page 31 511 Chair: see page 46
511 only: The chair's hydraulic tilt cylinder area is noisy		The rod bearing may need to be lubricated.	Contact A-dec Customer Service. See page 4.

Chair Circuit Board Diagnostics

If you suspect that a circuit board may need replacing, use this circuit board replacement flowchart. Refer to one of the LED Identification tables for help with diagnostics:

- 311/411 Chair Circuit Board LED Identification table, see page 13
- 511 Chair Circuit Board LED Identification table, see page 15





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