

A-dec 311/411/511 Dental Chairs Service Guide

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Overview

Copyright and Regulatory Information

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Regulatory Information

For required regulatory information and the A-dec warranty, see the *Regulatory Information, Specifications, and Warranty* document (p/n 86.0221.00) available in the Resource Center at www.a-dec.com.

Product Service

Product service is available through your local authorized A-dec dealer. For service information, or to locate an authorized dealer, contact A-dec at 1.800.547.1883 in the USA and Canada or 1.503.538.7478 worldwide, or visit www.a-dec.com.

Product Models and Versions Covered in This Document

A-dec uses product versions to indicate significant changes to a product model. Modifications identified by a change to the product version include, but are not limited to, significant changes to features and options, and product compatibility.

Models	Versions	Description
311	A/B	Dental Chairs
411	A	Dental Chairs
511	A/B	Dental Chairs



Customer Service Information

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

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Other Sources of Information

Other Service Documents

Service Reference documents contain illustrated parts breakdown content and are companions to Service Guides, which contain information for product service, maintenance, and troubleshooting including circuit board components and flow diagrams. To access service documents, Service documents are available in the Resource Center at www.a-dec.com.

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 service documents, product installation guides, and instructions for use are available as electronic documents available in the Resource Center at www.a-dec.com.

A-dec Dental Chairs and Stools

311A



311B



An optional
contoured floor
box is also
available.

411



511A



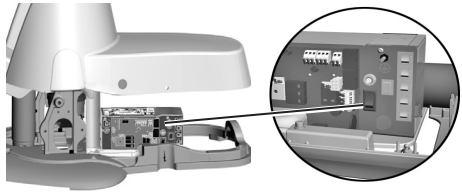
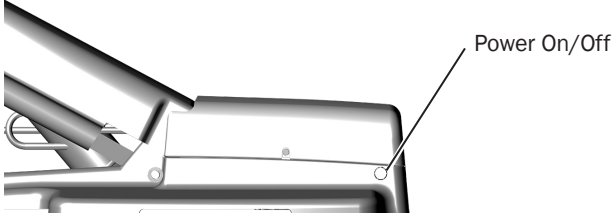
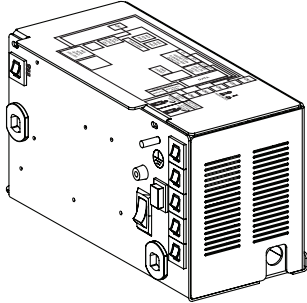
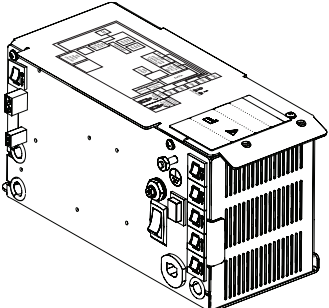
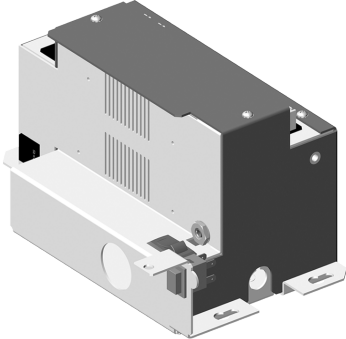





511B




521/522



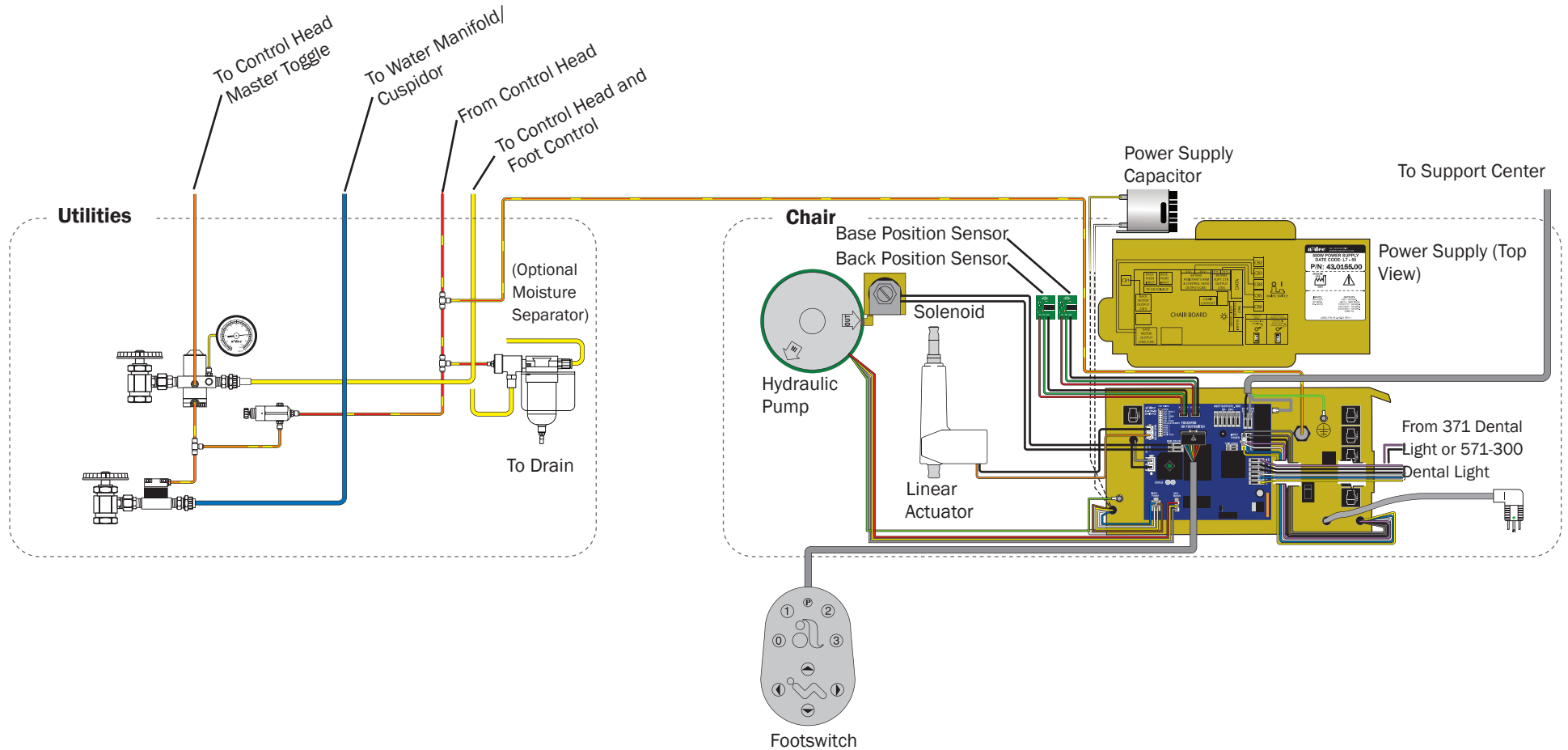
Chair Comparison Chart

	A-dec 311A Chair	A-dec 311B/411 Chair	A-dec 511A/B Chair
On/Off Button Location			
Power Supplies	 <p>311 Power Supply (Before March 2013)</p>	 <p>311A/311B/411A Power Supply (Effective March 2013)</p>	
Dual Articulating Headrests/ Neck Support	 <p>Neck Support</p>  <p>Locking Knob</p>	 <p>Locking Knob</p>  <p>Lever Release</p>	 <p>Lever Release</p>

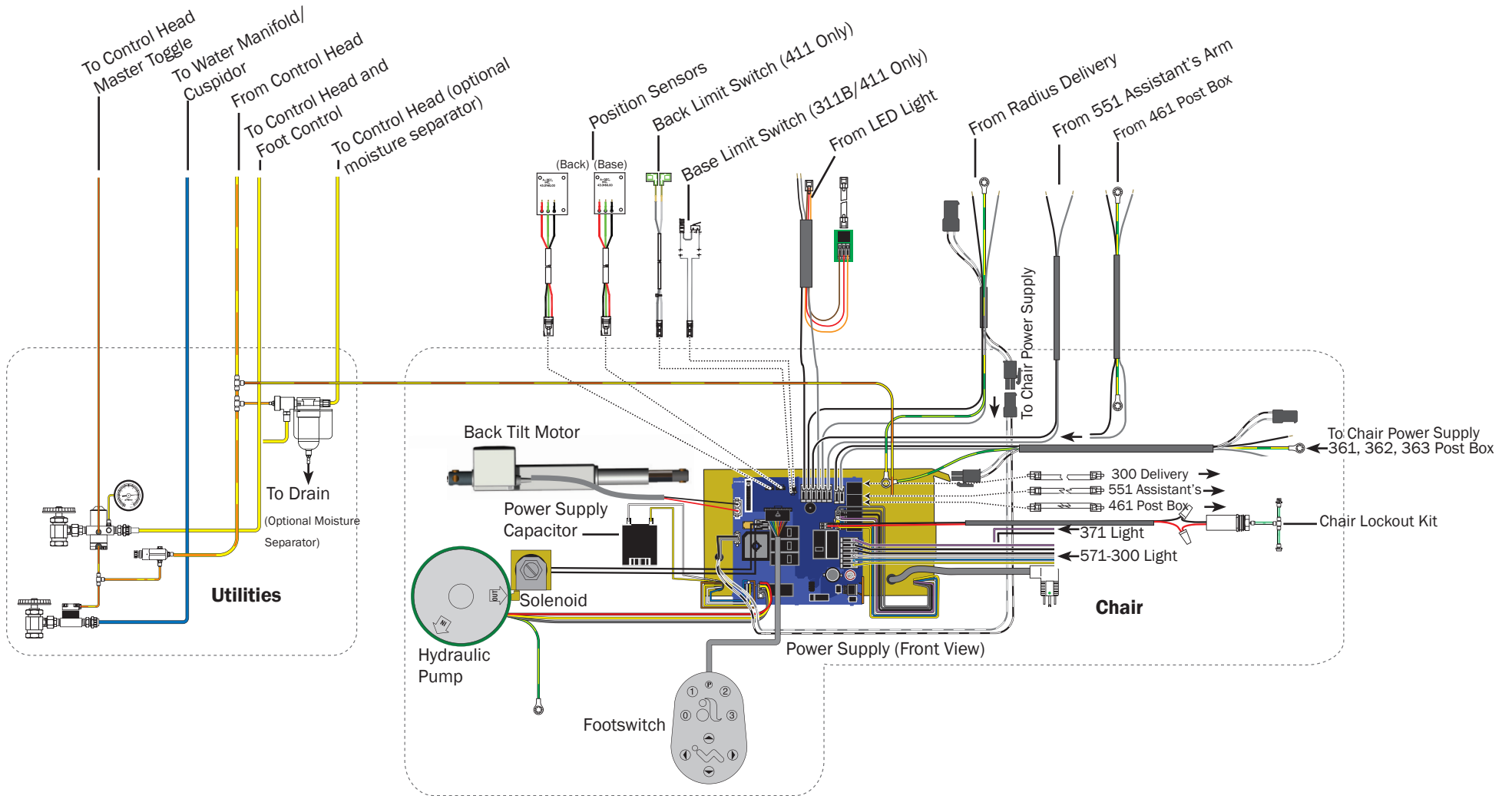
	A-dec 311A Chair	A-dec 311B/411 Chair	A-dec 511A/B Chair	
Stop Switch Location	(not applicable)			
Chair Drive System		Hydraulic Base Electric Back	Hydraulic Base Hydraulic Back	
Armrests		Two-Position Armrest	Three or Multi-Position Armrest 511A	Two-Position Armrest 511B

Flow Diagrams

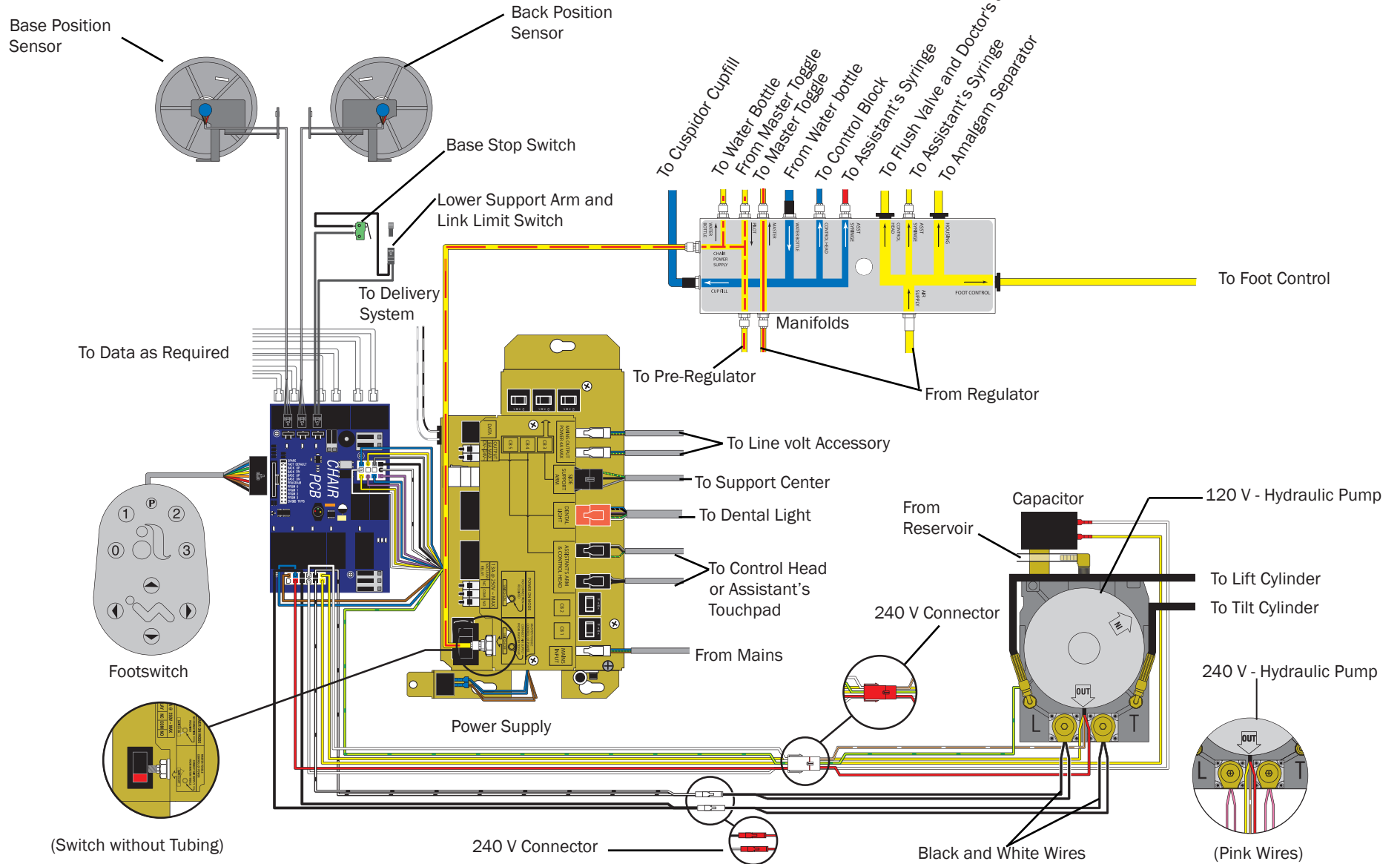
311A Chair Flow Diagram (Before March 2013)



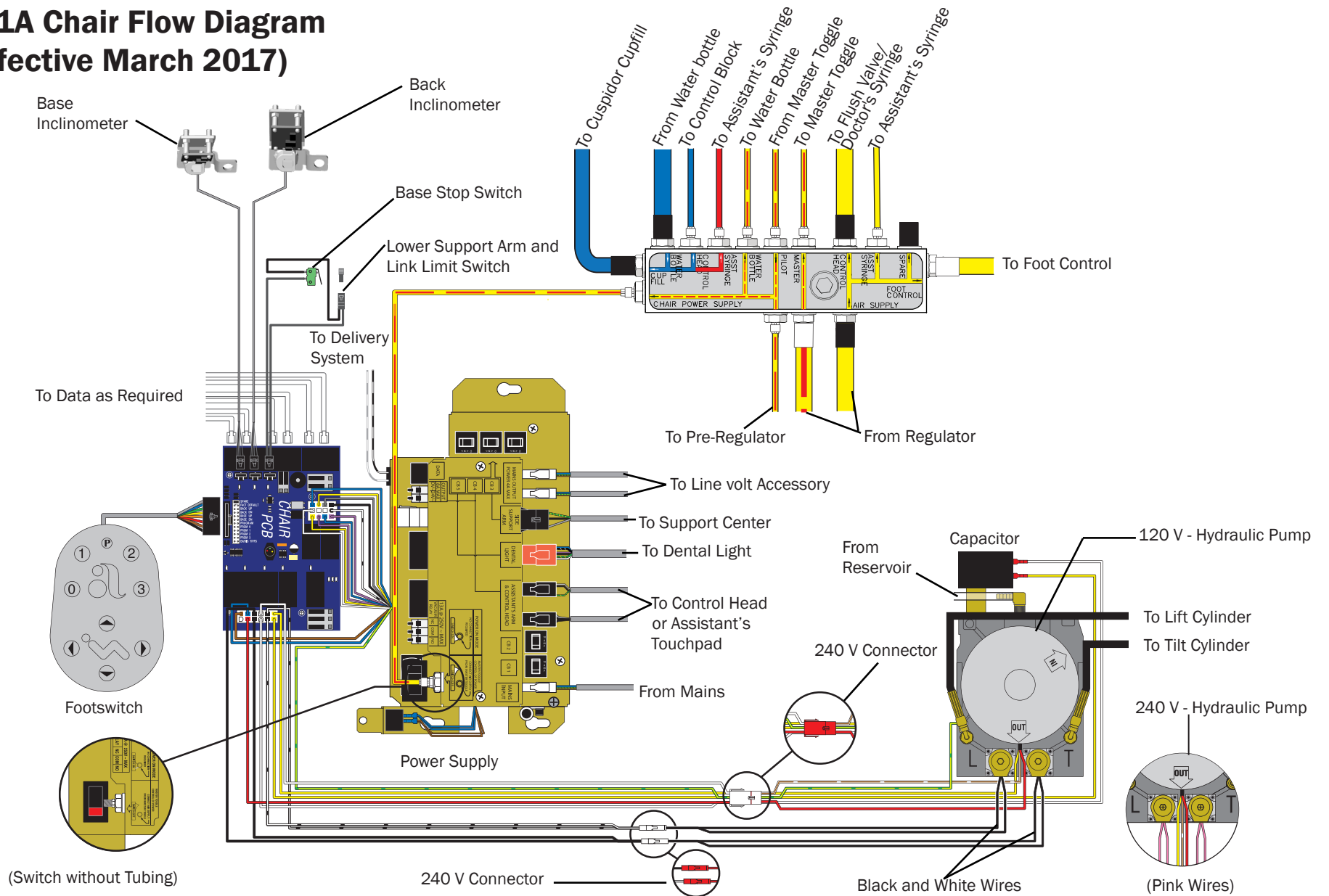
311A (Effective March 2013)/311B/411 Chair Flow Diagram



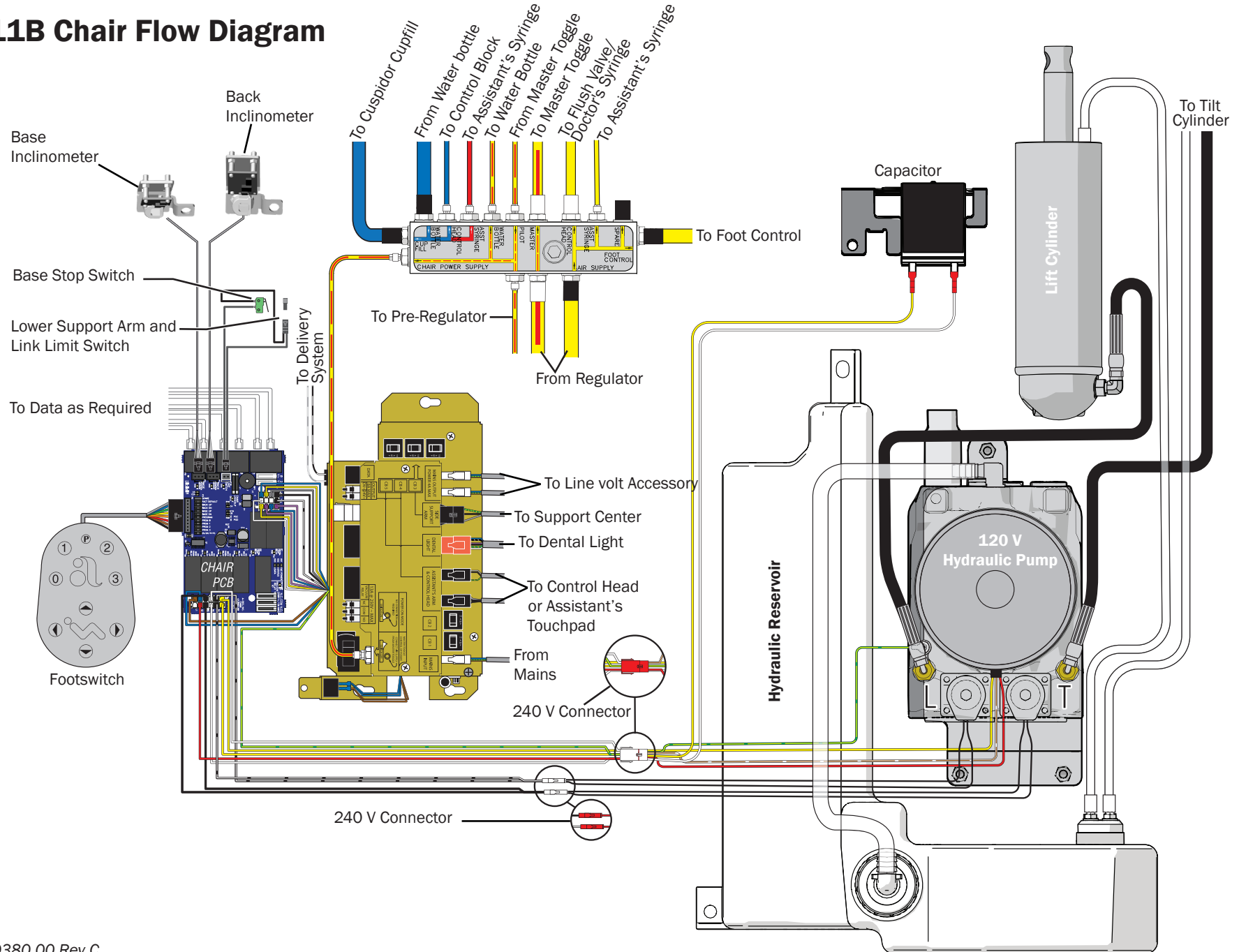
511A Chair Flow Diagram (Before March 2017)



511A Chair Flow Diagram (Effective March 2017)



511B Chair Flow Diagram



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

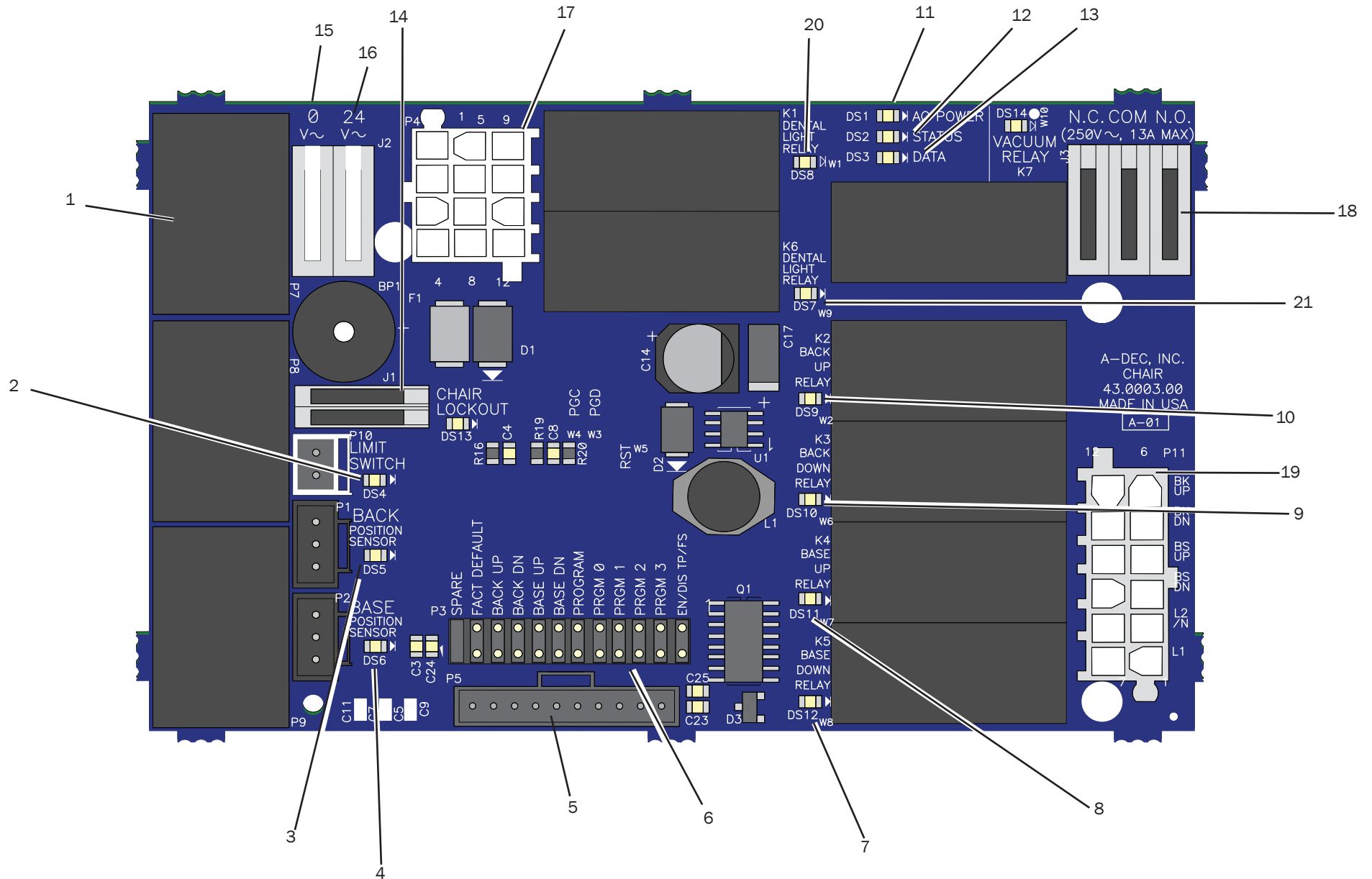


ATTENTION Circuit boards are sensitive to static electricity. Electrostatic Discharge (ESD) precautions are required when touching a circuit board or making connections to or from the circuit board. Circuit boards should be installed only by an electrician or qualified service person.

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 - 311A chair only
15	DS17 - back on LED/Relay K7	32	P13 - Jumper - 311 (A and B) chairs
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



ATTENTION 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.

311A Chair Service, Adjustments, and Maintenance

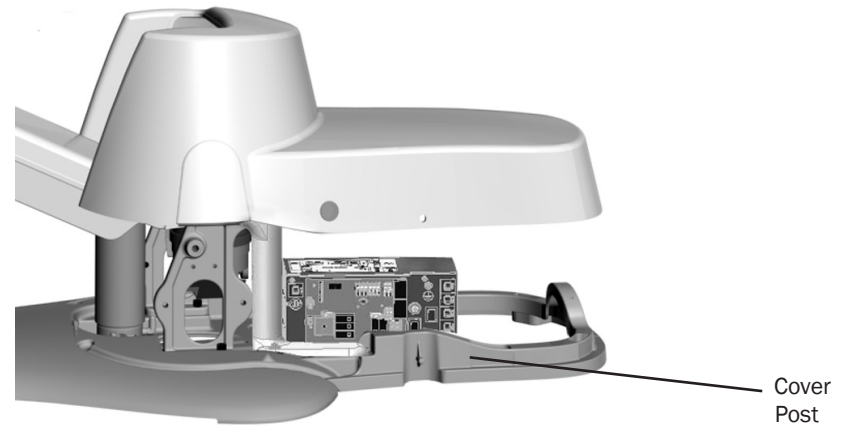
Chair Covers 311A



CAUTION When you remove or replace the cover, take care not to damage any wiring or tubing. Verify that the cover is secure after you replace it.

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 .

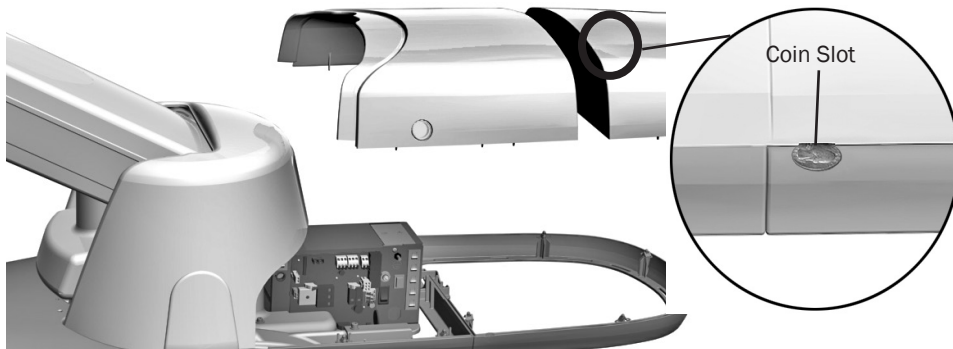


Contoured Floor Box Cover Set Removal

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 When you remove or replace the cover, take care not to damage any wiring or tubing. Verify that the cover is secure after you replace it.



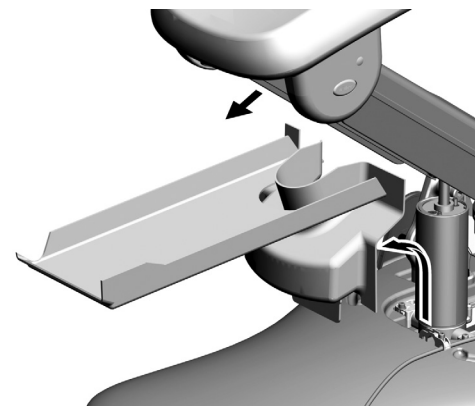
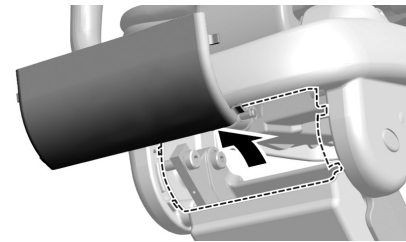
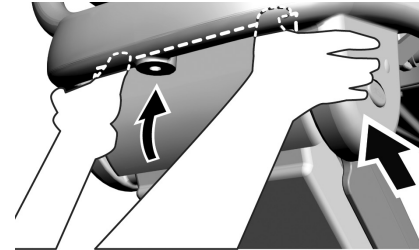
CAUTION Take care not to damage the cover when using the coin slot.

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.

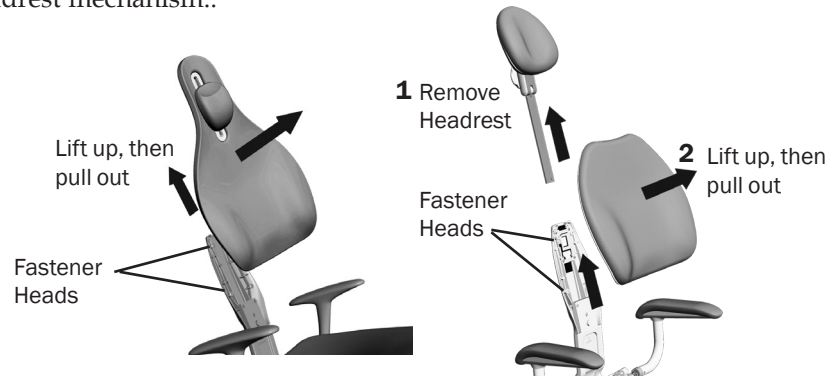


Upholstery 311A

Back Upholstery Removal/Attachment

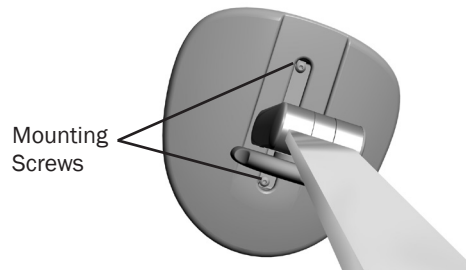
To remove the upholstery, remove the headrest mechanism first. Then firmly grasp the bottom edge of the back upholstery armature, lift up, then lift the upholstery away from the chair back support.

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



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.

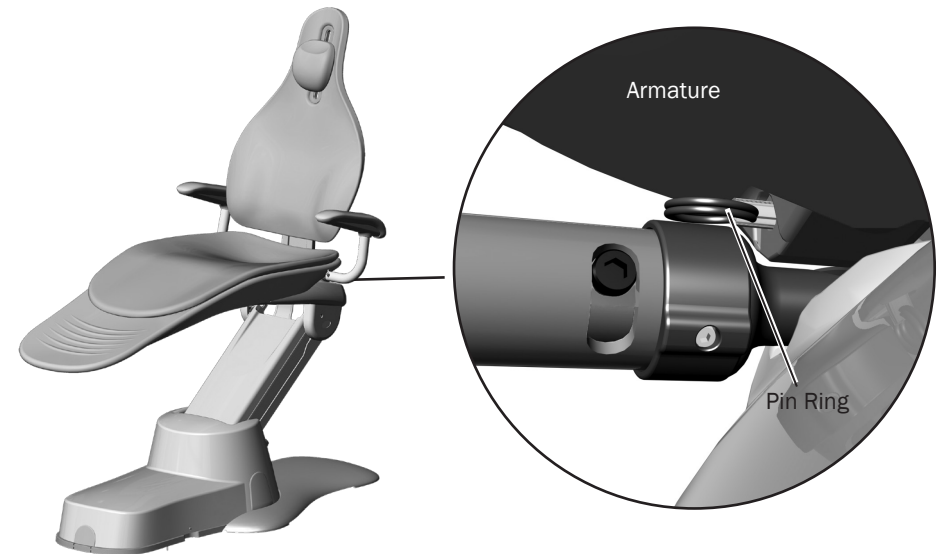


Seat Upholstery Removal/Attachment

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 you remove or replace the cover, take care not to damage any wiring or tubing. Verify that the cover is secure after you replace it.



Factory Default Routine 311/411



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

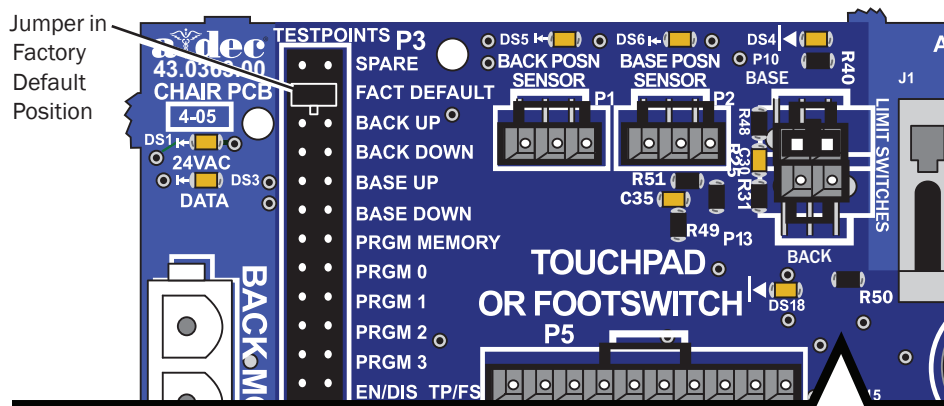


CAUTION 311B Only: Before running factory default, make sure the backrest, back upholstery, and head rest are installed. Without this weight, the back actuator will not function properly. The back actuator will disengage and the trolley will not move with the actuator, which could result in the chair not completing the factory default or improper backrest preset angles.

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.



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.



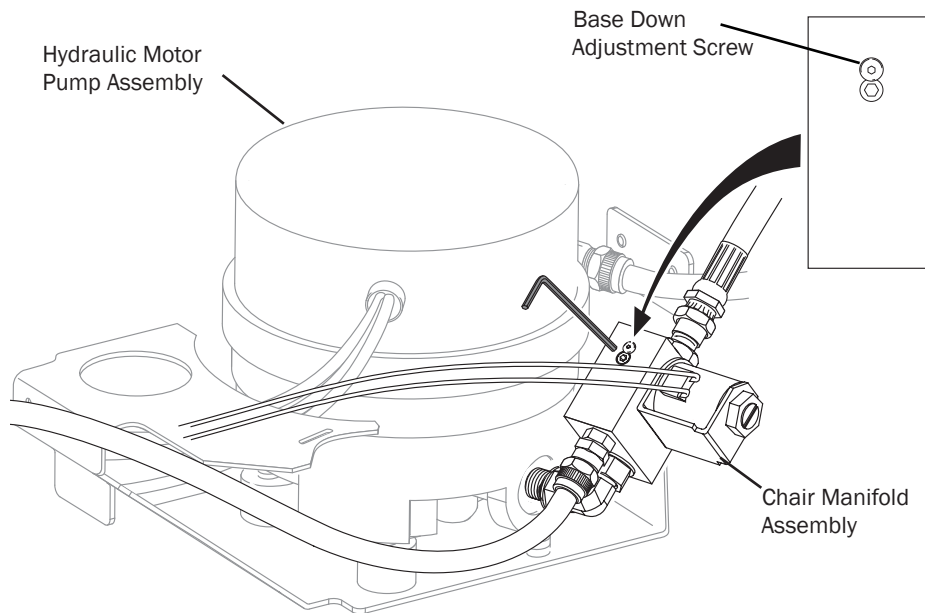
NOTE The jumper must remain in the factory default position to complete the factory default routine. The status LEDs on the standard and deluxe touchpads and the chair circuit board double blink while the factory default routine is running and after the routine is complete. When the routine is complete,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



ATTENTION 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.

Chair Manifold Adjustment System 311A

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 Do not over tighten the adjustment screw. If the screw is too tight, the chair may not move.

Hydraulic Fluid Replenishment 311A



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.

Follow the steps below to add hydraulic fluid.

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.

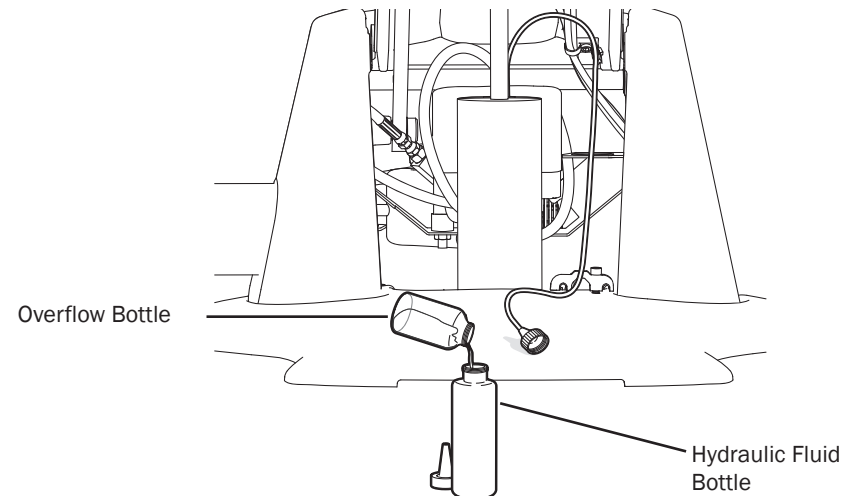
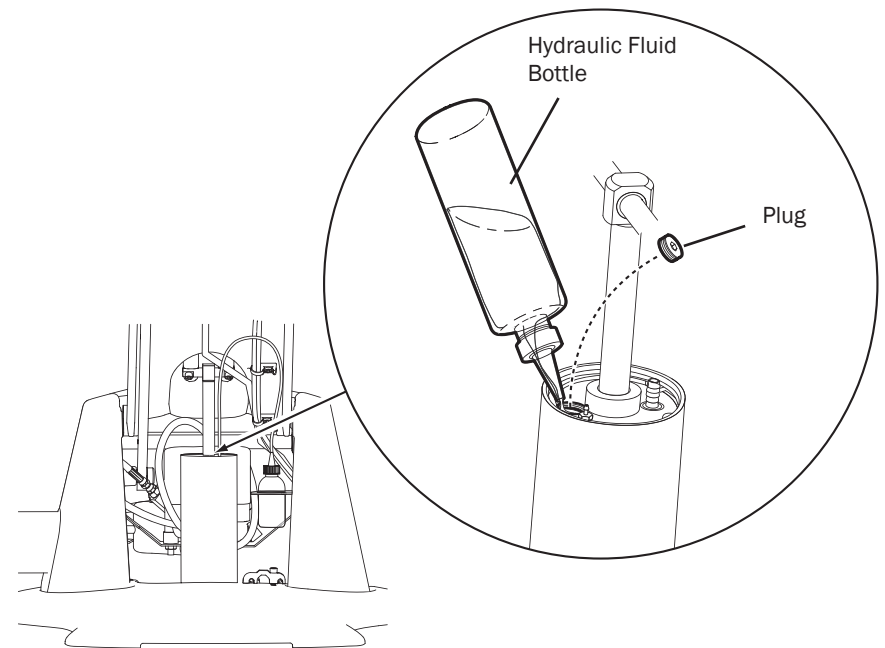


NOTE It may be difficult to measure exactly to the thread level. You may want an absorbent towel available to soak up some of the fluid if it seems too full.

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 20.)



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

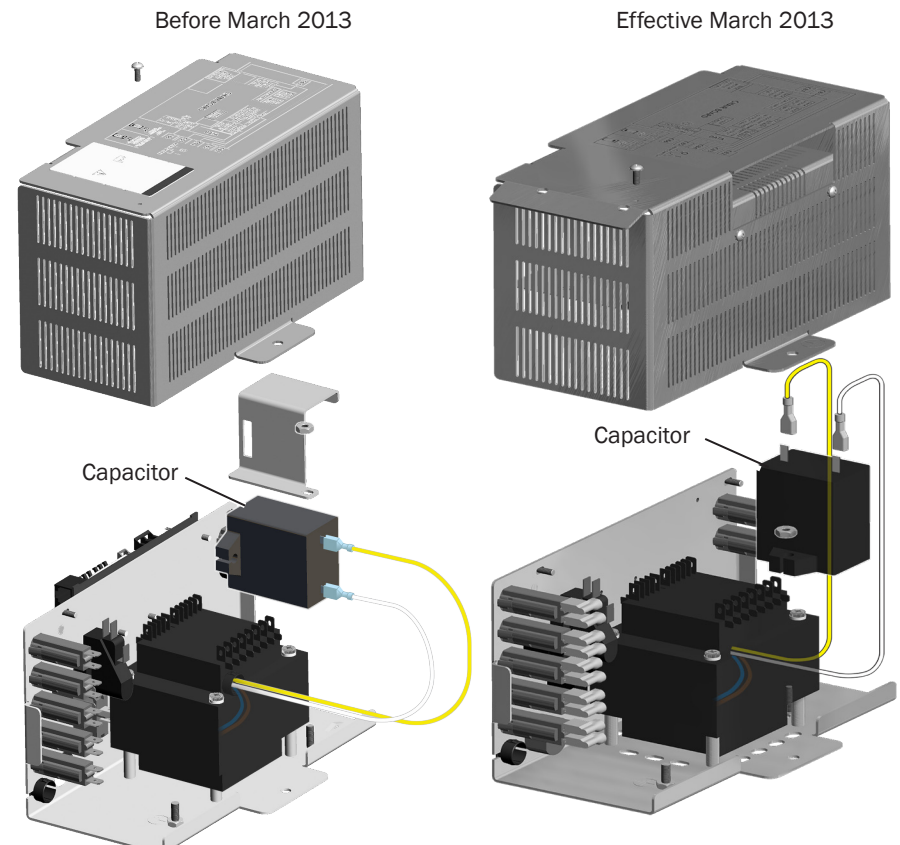
The hydraulic system used for the chair's base movement is operated using a motor capacitor, located in the power supply of the chair. There are three specific capacitors for different line voltage ranges. The chair motor capacitor can be replaced within the power supply.



WARNING Failure to turn off the power before you begin this procedure can lead to product damage and result in serious injury 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



Solenoid 311A

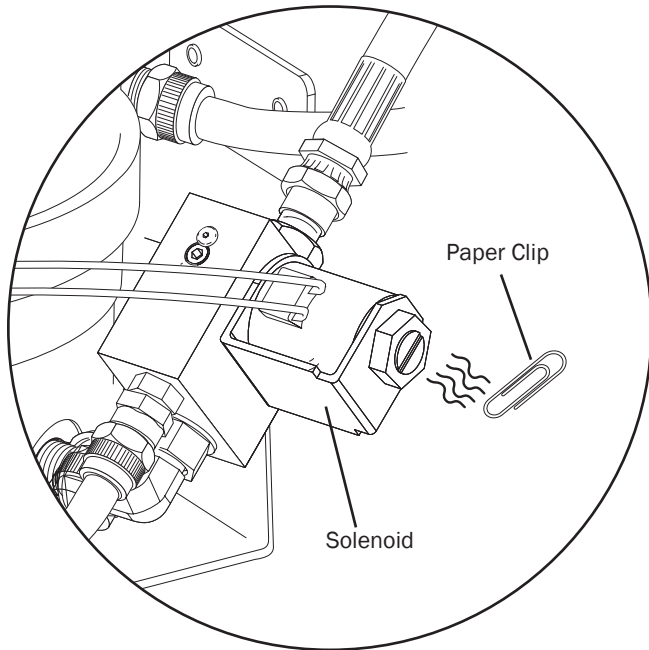
p/n: 62.0317.00 21.6 VDC

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.

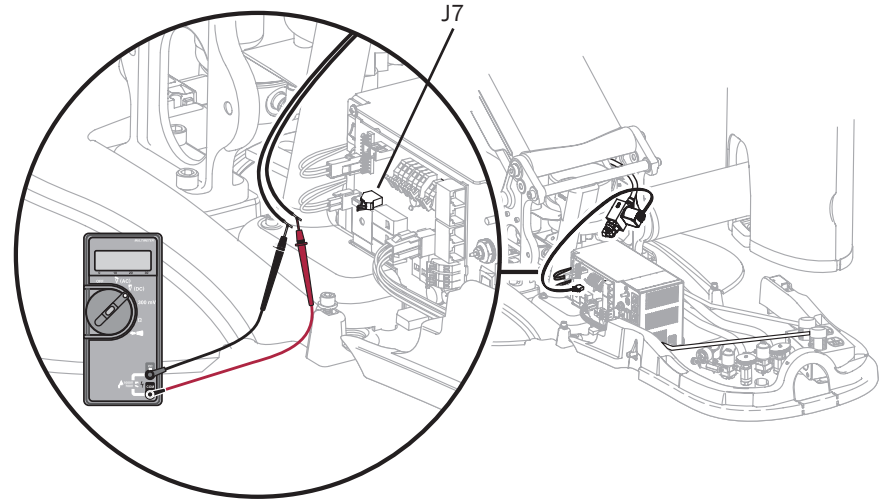


Volt/Ohm Meter Test for Coil Resistance



WARNING Failure to turn off the power before you begin this procedure can lead to product damage and result in serious injury 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 311A



ATTENTION 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.



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

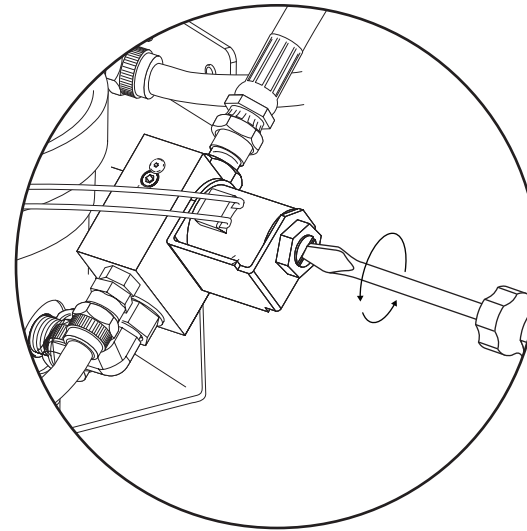


WARNING Failure to turn off the power before you begin this procedure can lead to product damage and result in serious injury or death.

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
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 311A

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

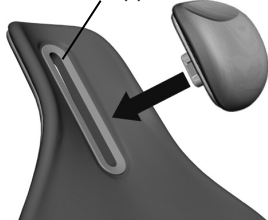
Reposition Neck Support

Neck Support Track



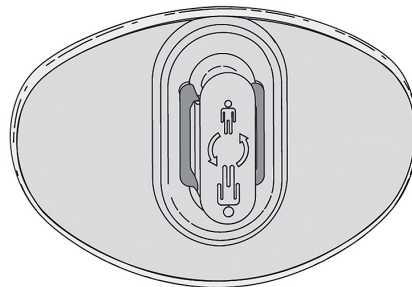
Note: This neckrest can rotate/mount two ways.

Neck Support Track



Note: This neckrest can only mount one way.

Before October 2013



Effective October 2013



Dual-Articulating Headrest 311/411

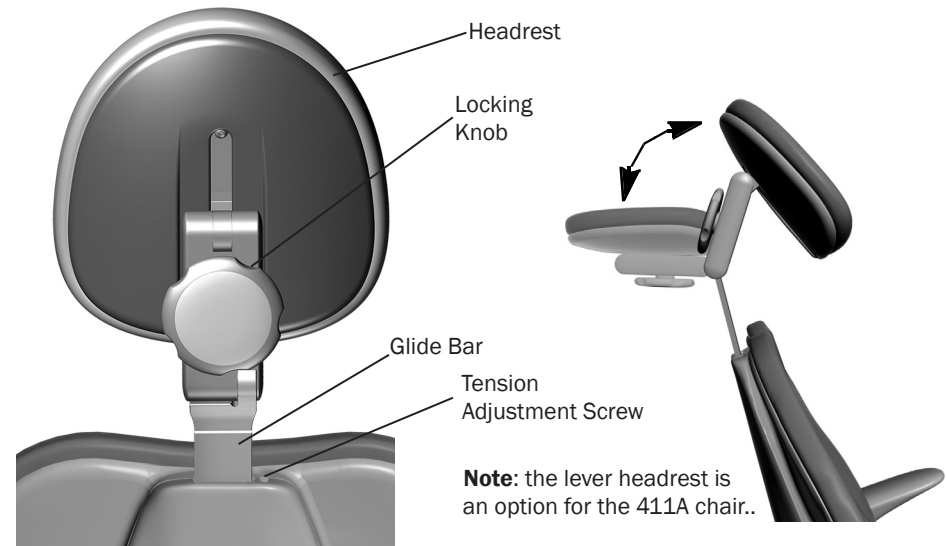
Headrest Adjustment

The dual-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.

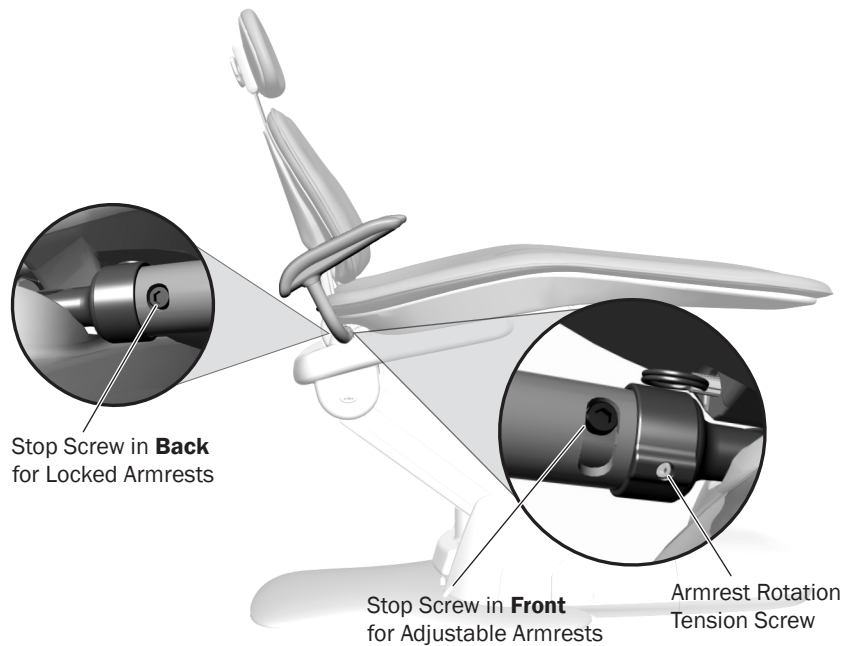
Glide Bar Tension Adjustment

A dual-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.



Note: the lever headrest is an option for the 411A chair..

Armrest Adjustments 311A



The armrests come locked from the factory, but can be unlocked to allow for easier patient entry/exit and to improve operator access while working direct. To unlock the armrests, use a 3/16" hex key to remove the stop screw from the back of the armrest. Install the stop screw in the front of the armrest.

If the unlocked armrests become loose or are difficult to move, you can adjust the rotation tension. Use a 1/8" hex key and turn clockwise to tighten or counterclockwise to loosen the rotation tension screw.

311B/411 Chairs Service, Adjustments, and Maintenance

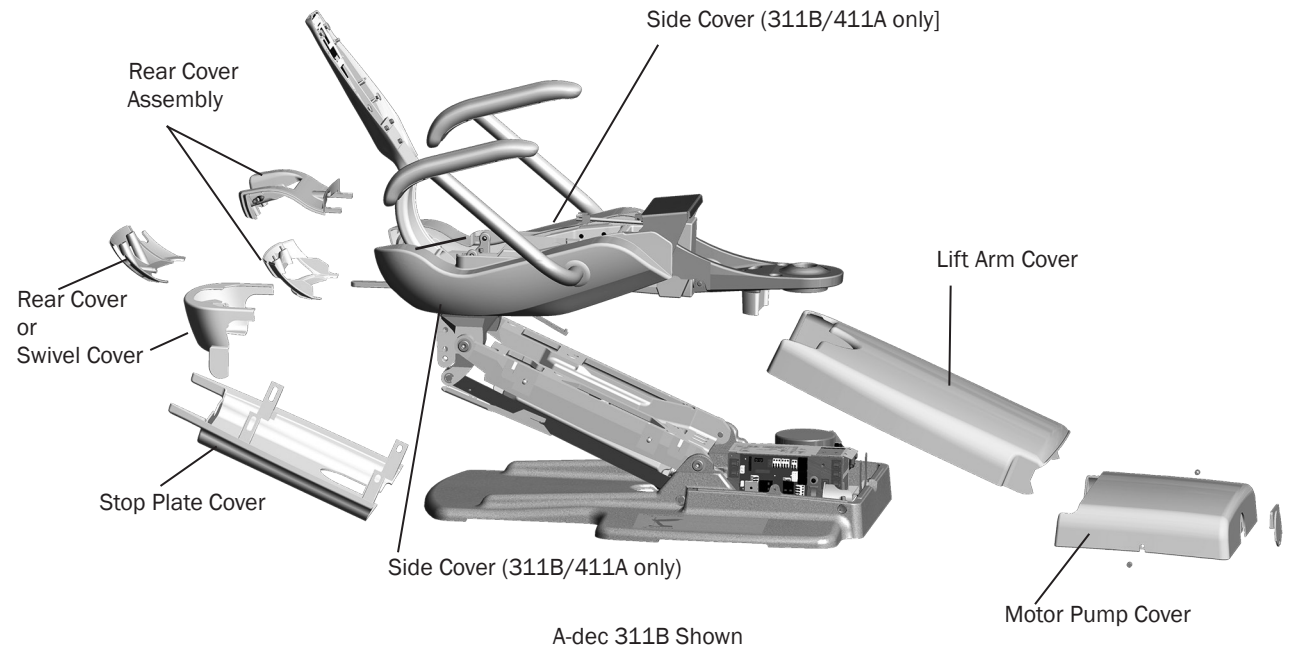
Chair Covers



CAUTION When you remove or replace the cover, take care not to damage any wiring or tubing. Verify that the cover is secure after you replace it.

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

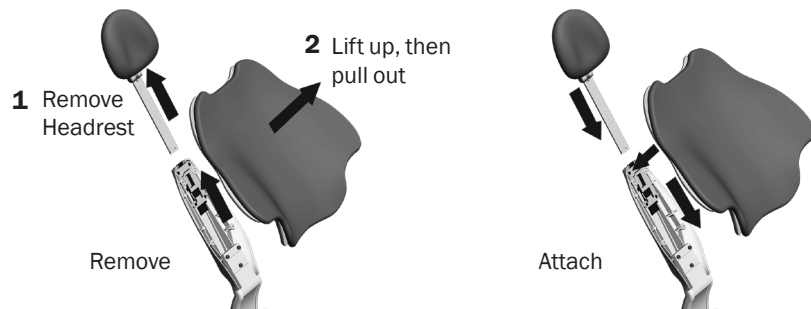
1. **Motor Pump Cover:** Remove the screw from each side of the cover and lift up.
2. **Lift Arm Cover:** Position the chair so it is raised half way up. Pull one side of the cover until it releases from the lift arm. To replace, align one side of the cover with the lift arm and insert it into place. 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 311B/411

Back Upholstery Removal/Attachment

To remove the upholstery, remove the headrest mechanism first. Then firmly grasp the bottom edge of the back upholstery armature, 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, before replacing the headrest mechanism.



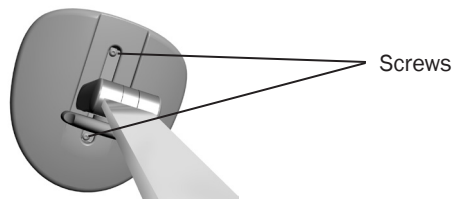
NOTE The 411 upholstery backs are not compatible with 311B.

Headrest Upholstery Removal/Attachment

Locking knob and lever release headrests are used with the A-dec 311B and 411. The headrest upholstery installs the same way for both styles. The locking knob headrest is shown.

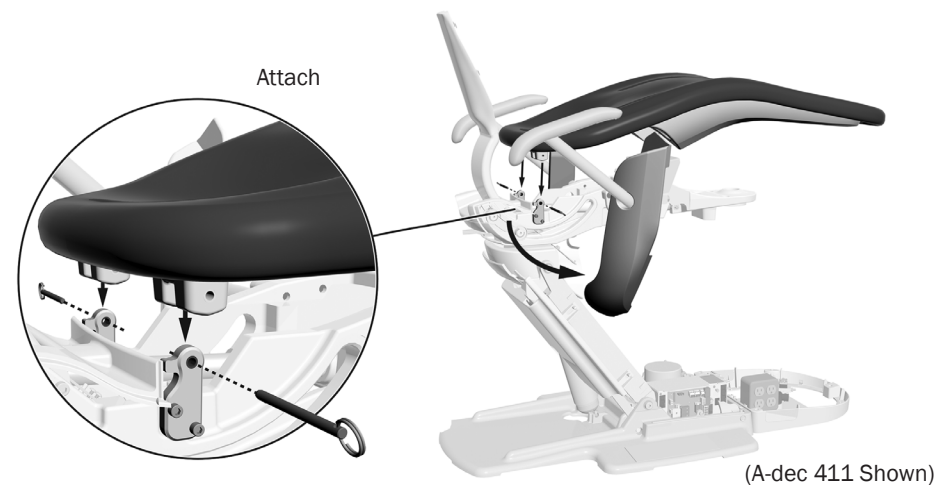
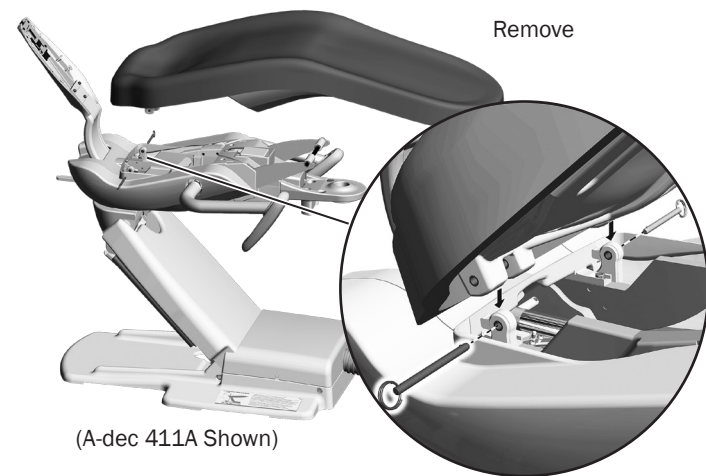
To remove the headrest upholstery, position the headrest to access the two screws on the back, loosen the screws, and remove the upholstery.

To attach the headrest upholstery, 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.



Hydraulic System 311B/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 311B/411

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

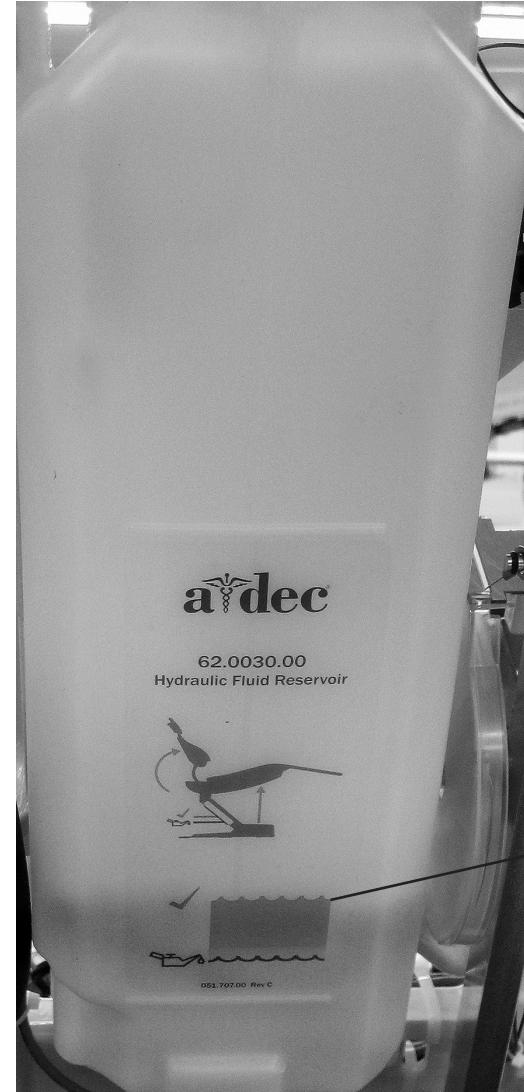
Add hydraulic fluid to the reservoir:

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.



CAUTION Do not overfill.

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



Fluid Level
Indicator

Factory Default Routine 311/411



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

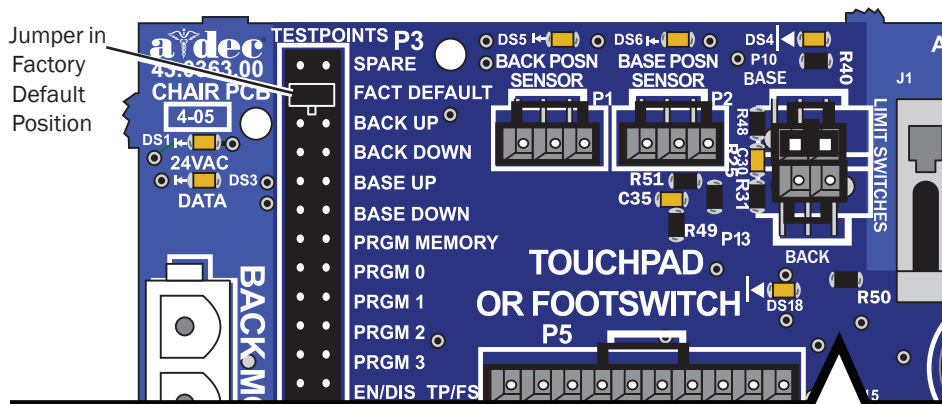
After installing a new chair, circuit board, or position sensor, run the factory default routine. The routine:

- 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.



ATTENTION 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.



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.

Capacitor Replacement 311B/411

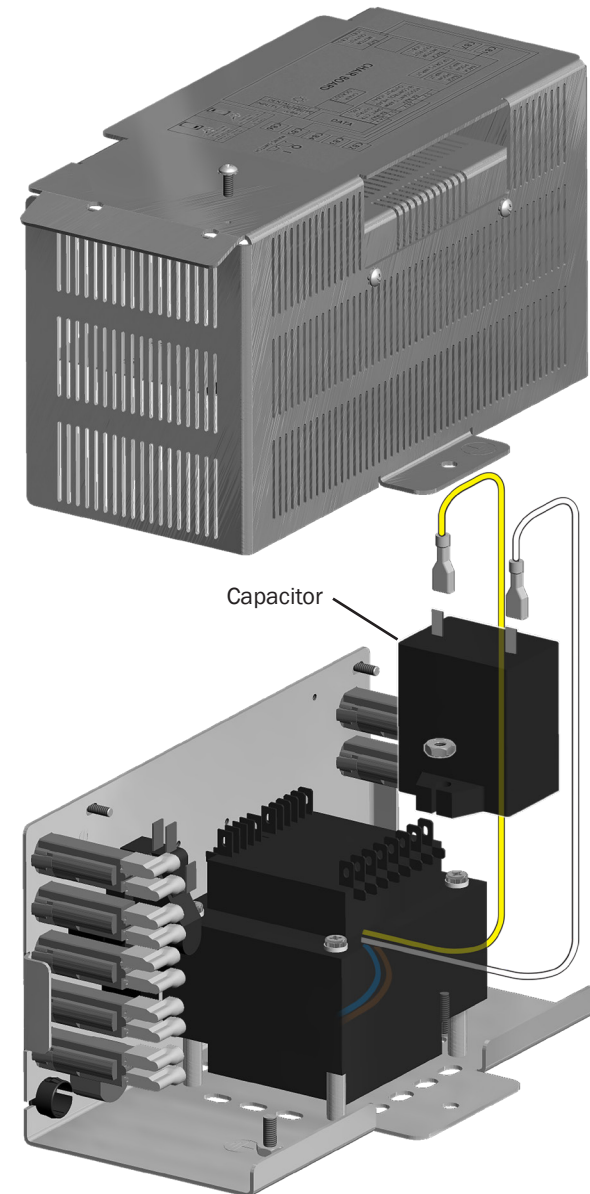
The hydraulic system used for the chair's base movement is operated using a motor capacitor, located in the power supply of the chair. There are three specific capacitors for different line voltage ranges. The chair motor capacitor can be replaced within the power supply.



WARNING Failure to turn off the power before you begin this procedure can lead to product damage and result in serious injury or death.

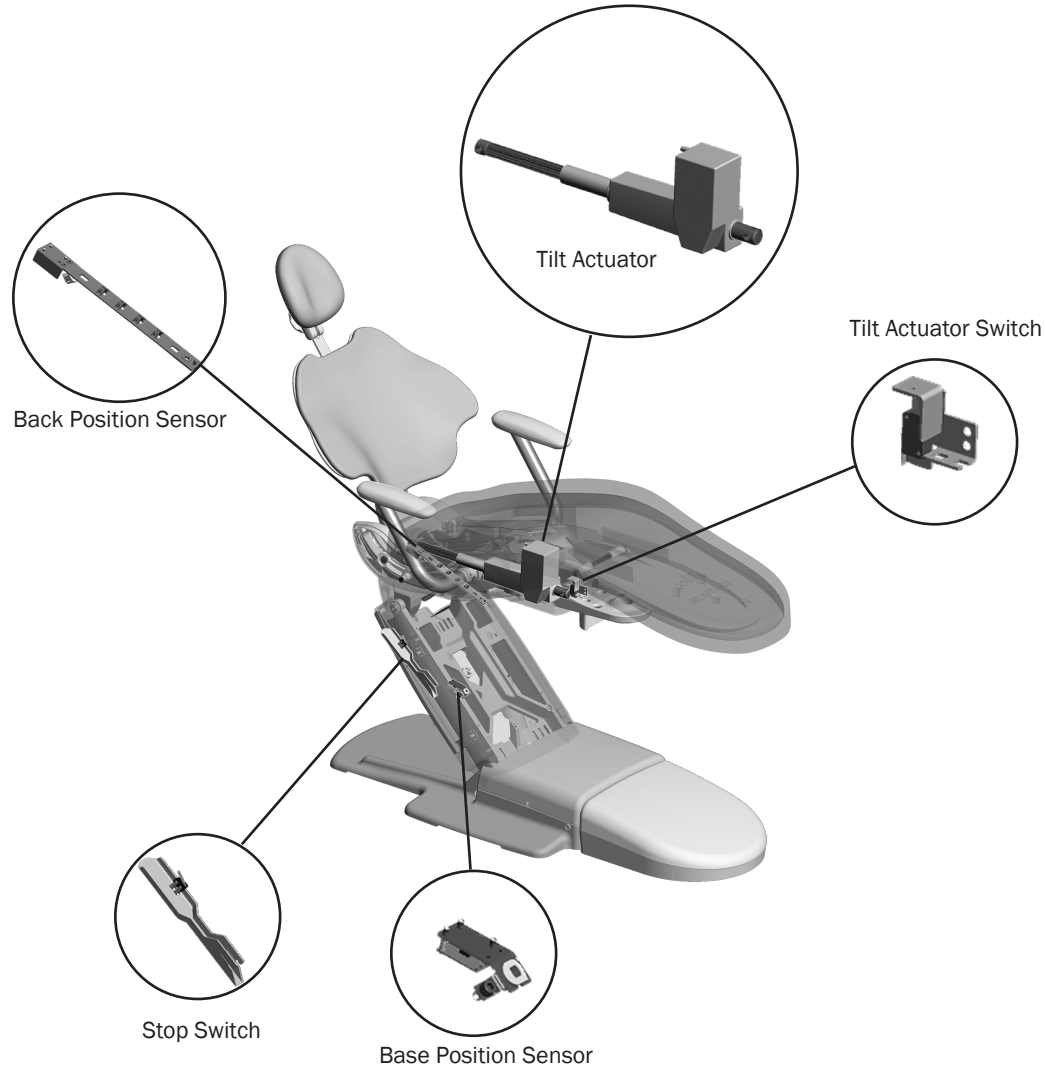
Chair Input Voltages

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 311/411

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.



A-dec 411A shown

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.

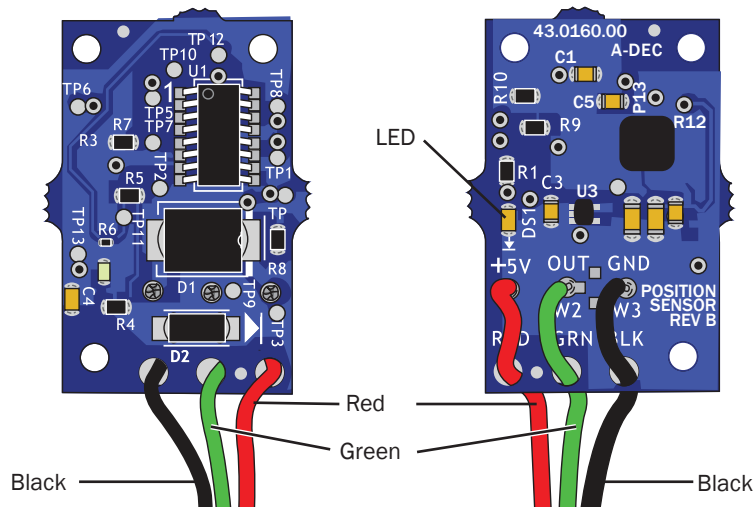
A diagnostic LED is provided on the chair board for each position sensor. Refer to Chair Circuit Board LED Identification, see page 13 for information. An additional LED, indicating power, is present on each position sensor circuit board.

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 31.

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 13 for further information. When in limp along mode, presets will not function.



Solenoid 311B/411

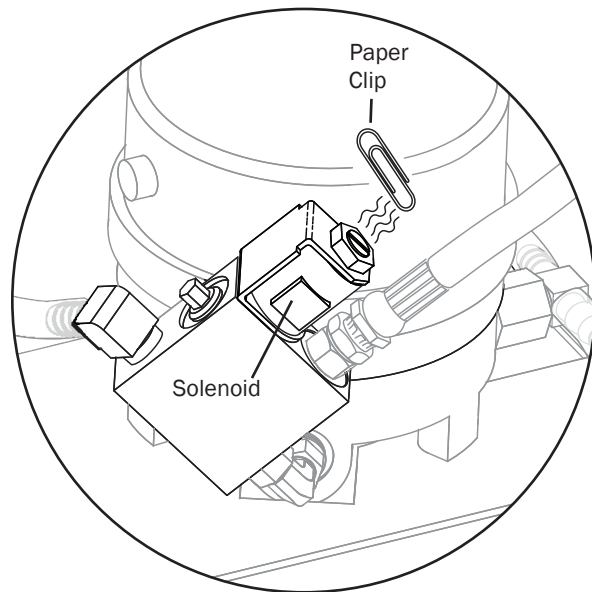
p/n: 62.0980.00 21.6 VDC

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.

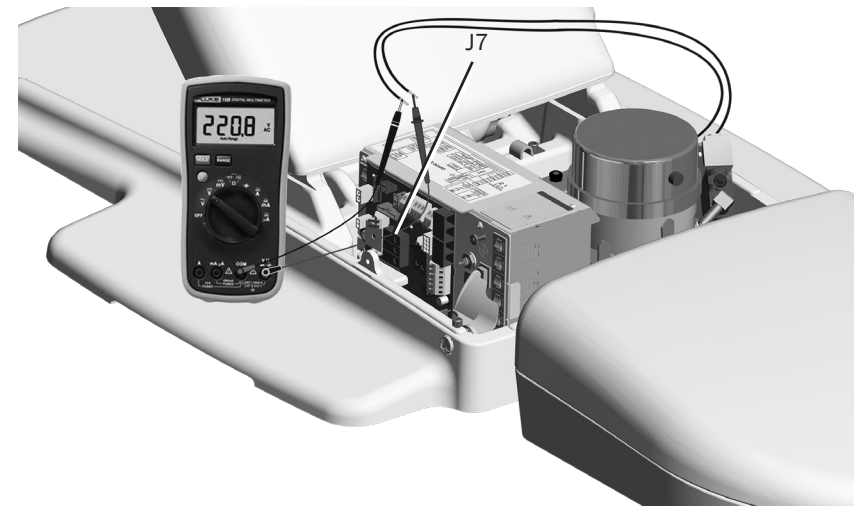


Volt/Ohm Meter Test for Coil Resistance



WARNING Failure to turn off the power before you begin this procedure can lead to product damage and result in serious injury 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 = 35 Ohms (Ω) \pm 6.6 Ohms (Ω)



Solenoid Assembly Replacement 311B/411



ATTENTION 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.



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



WARNING Failure to turn off the power before you begin this procedure can lead to product damage and result in serious injury or death.

Remove the Solenoid Assembly:

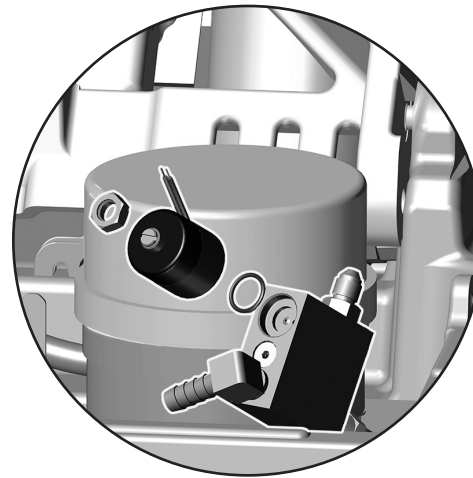
When replacing a solenoid wipe up any fluid and replace existing O-rings on the solenoid base.

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

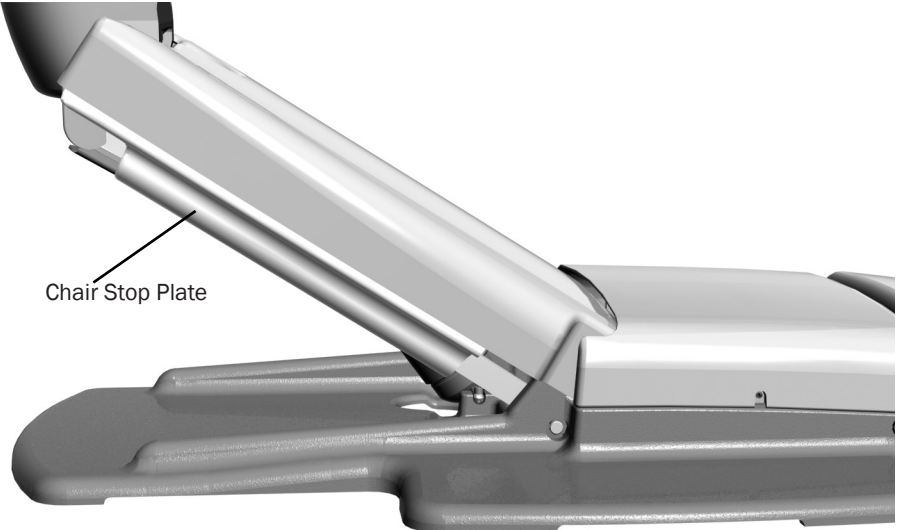
1. Install the new solenoid.
2. Reconnect the solenoid to the chair circuit board, terminal strip J7. It does not matter which solenoid wire goes into which terminal. The solenoid will work either way.
3. Turn on the power.
4. Move the chair up and down to ensure there are no leaks.
5. Reinstall the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

Chair Stop Plate 311B/411

Stop Switch

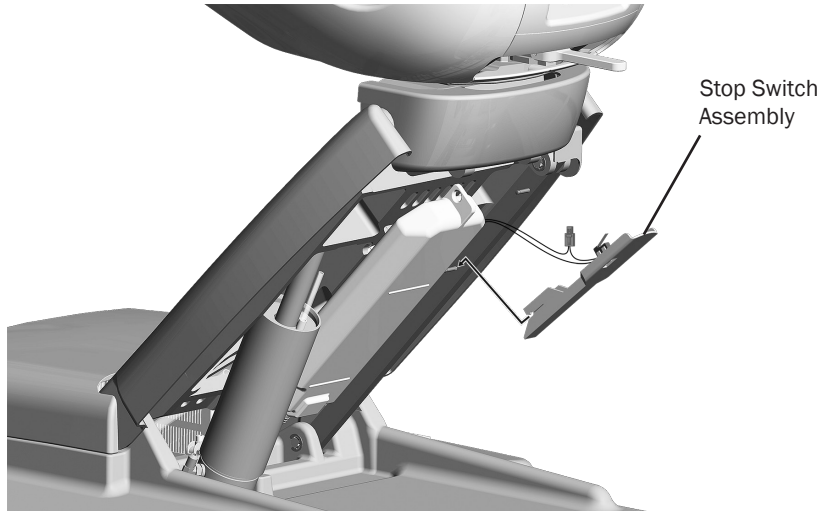
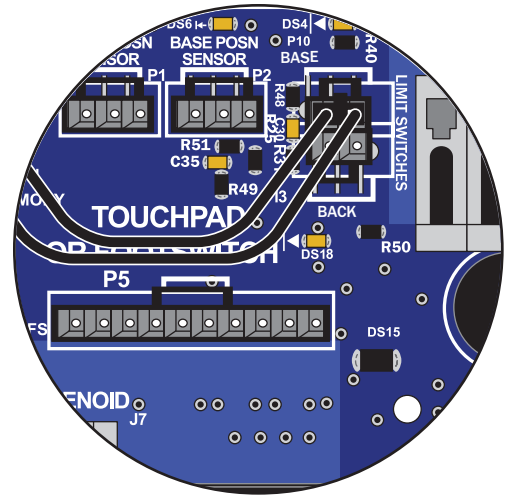
If an object presses against the chair stop plate as the chair is lowered, a stop switch will interrupt and reverse the chair motion. If the object becomes lodged, press the base up button on the footswitch or touchpad. Remove the object and resume normal chair operation.

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



Chair Bump-Up Feature 311B/411

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



A-dec 411A Shown

Dual-Articulating Headrest 311/411

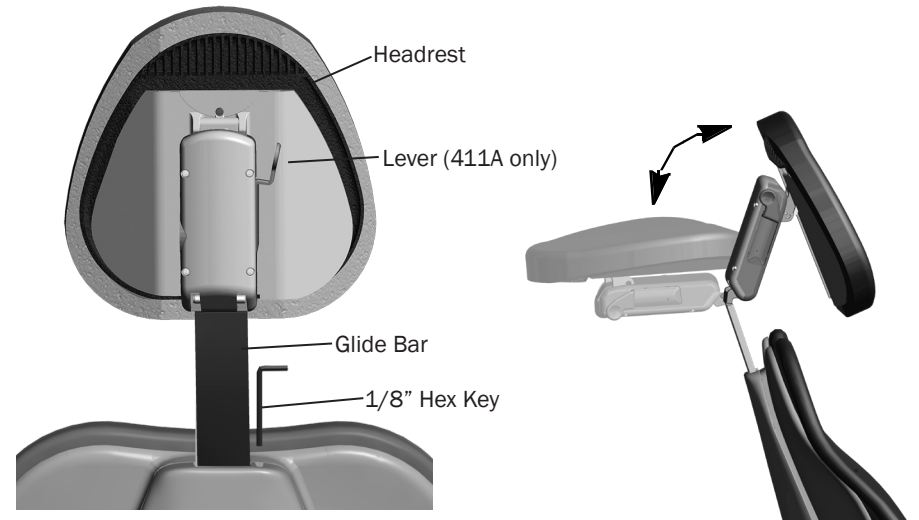
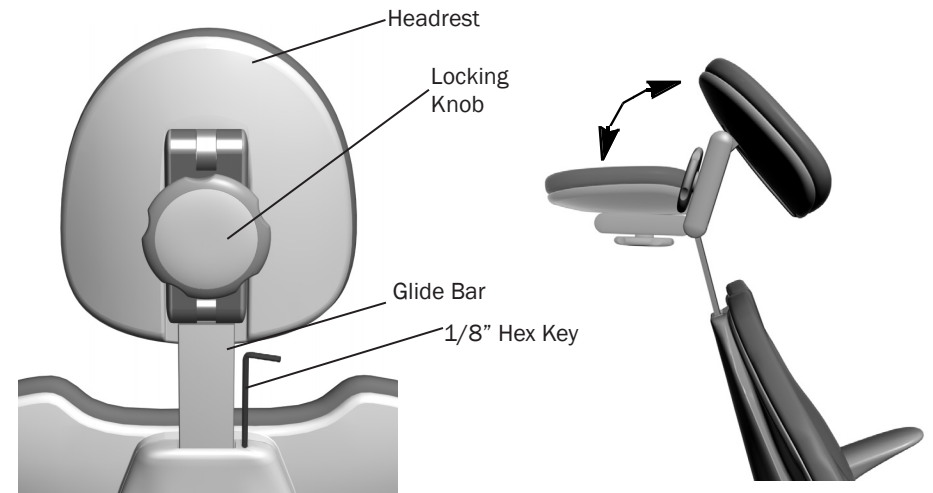
Headrest Adjustment

The dual-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

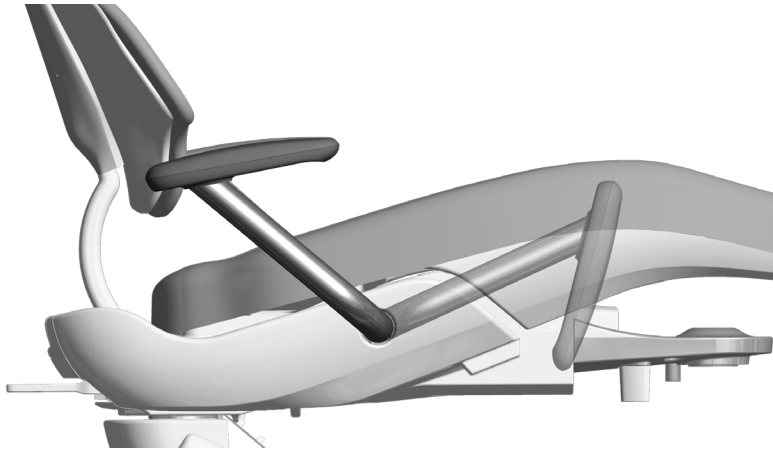
A dual-articulating headrest may be difficult to move or may drift downward because of the amount of tension on its glide bar. To adjust the tension, use a 1/8" hex key and turn the tension adjustment screw to the right to increase friction or to the left to decrease friction.



Armrest Adjustments 311B/411

Two-Position Armrests Adjustment

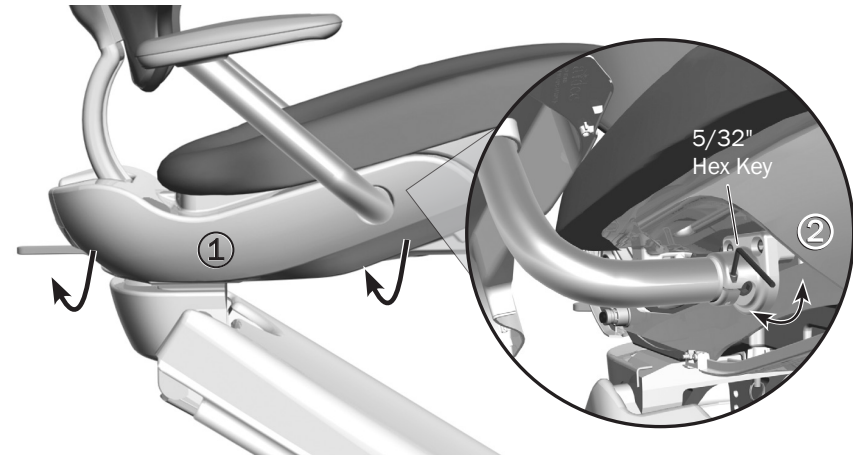
Push or pull the armrests to reposition them in the forward or back position



Armrest 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.



A-dec 411 Shown

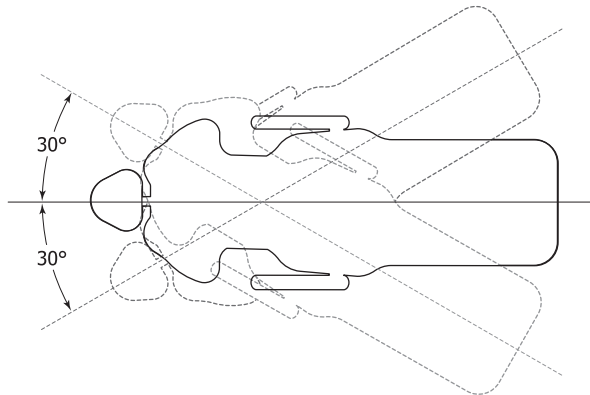
Swivel Brake Adjustment 311B/411

Swivel Brake

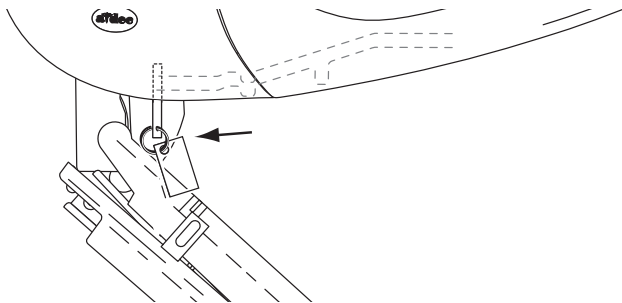
The chair can rotate to any position within 30° either side of center. The chair swivel brake locks the chair in the selected position. To engage the brake, push the brake lever firmly to the left. To release the swivel brake, push the brake lever to the right.



NOTE The 311B Dental Chair may not have the swivel brake feature.



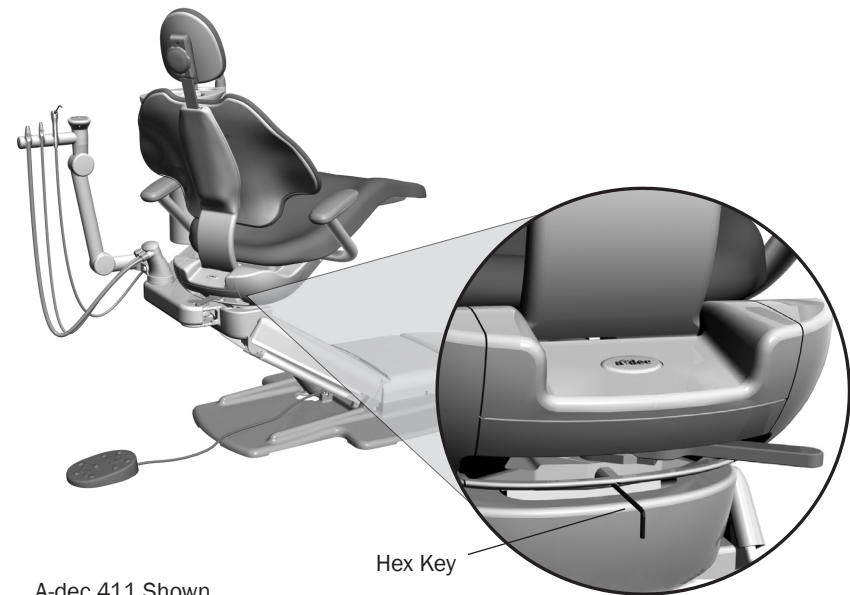
NOTE To disable the swivel feature, remove the swivel brake and replace it with the Swivel Lock Kit, p/n 62.1143.00.



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.



A-dec 411 Shown

511 Chair Service, Adjustments, and Maintenance

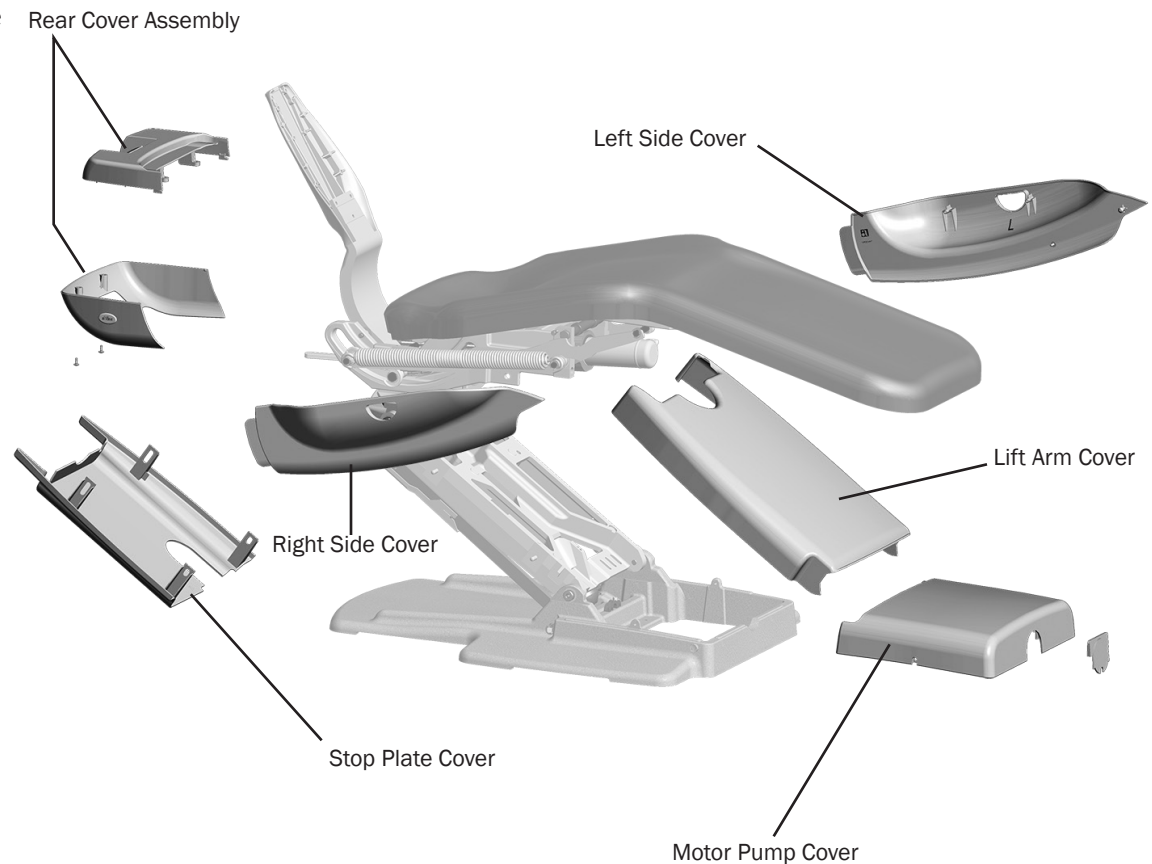
Chair Covers 511A



CAUTION When you remove or replace the cover, take care not to damage any wiring or tubing. Verify that the cover is secure after you replace it.

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

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.



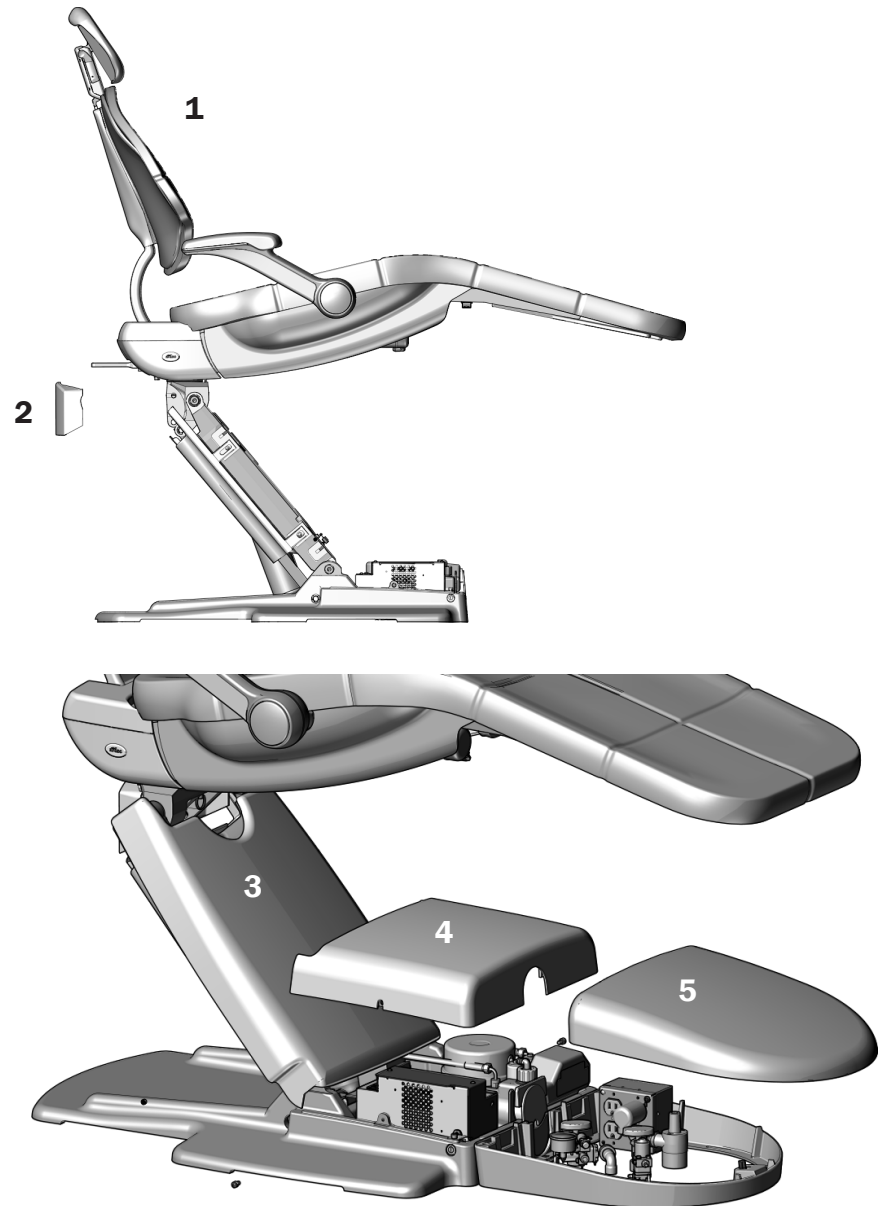
Chair Covers 511B



CAUTION When you remove or replace the cover, take care not to damage any wiring or tubing. Verify that the cover is secure after you replace it.

Remove Chair and Floor Box Covers:

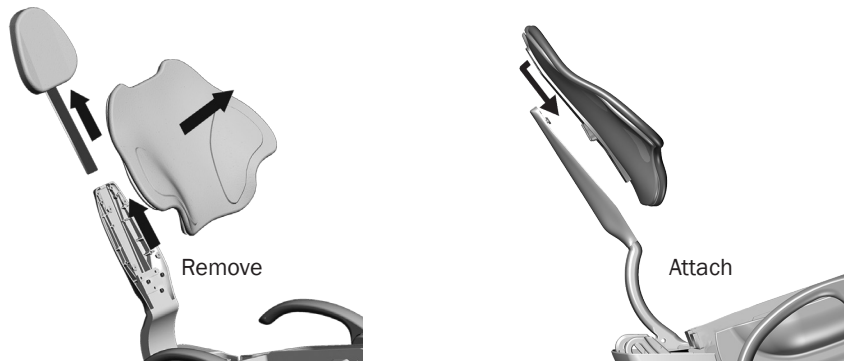
1. Raise the chair to full base up.
2. Snap the mount cover in place on the chair.
3. Snap the lift arm cover onto the casting tabs.
4. Use a hex key and two screws to attach the pump cover.
5. Snap the floor box cover into place..



Upholstery 511A

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.

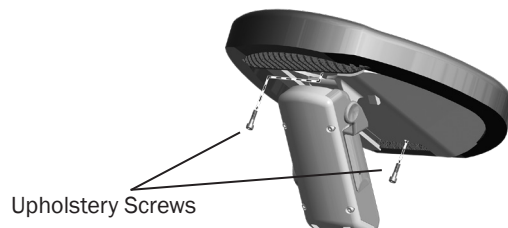


Headrest Upholstery Removal/Attachment

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.

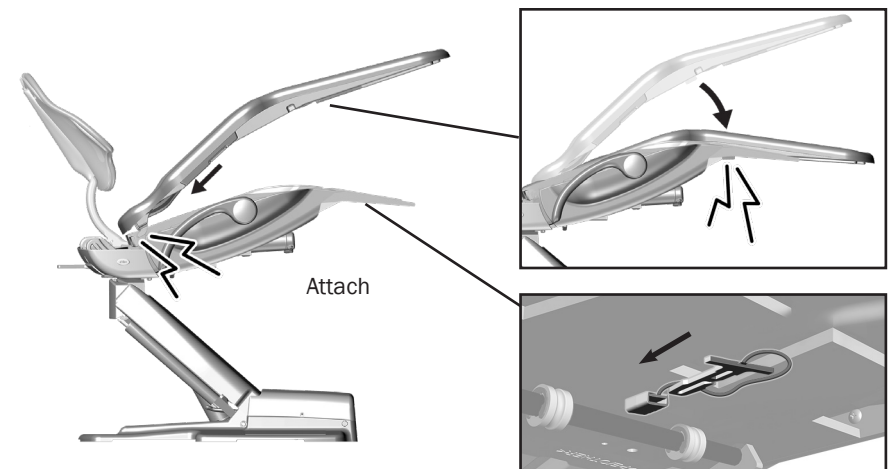
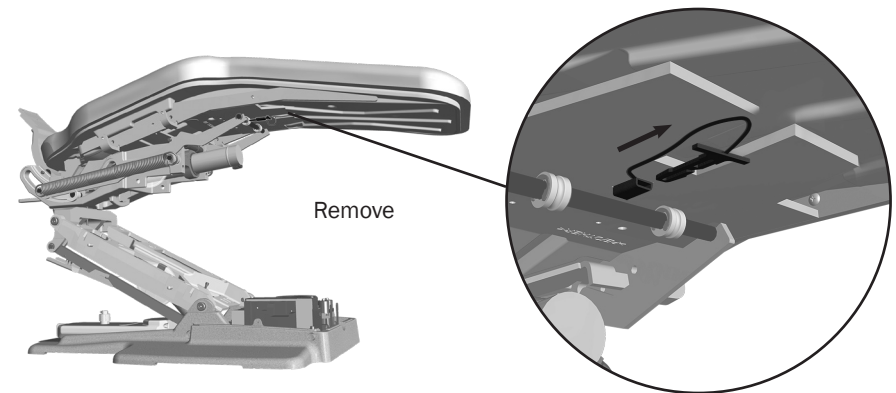


CAUTION Do not remove the positioning mechanism screws or plate. The brake assembly will fall out.



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.

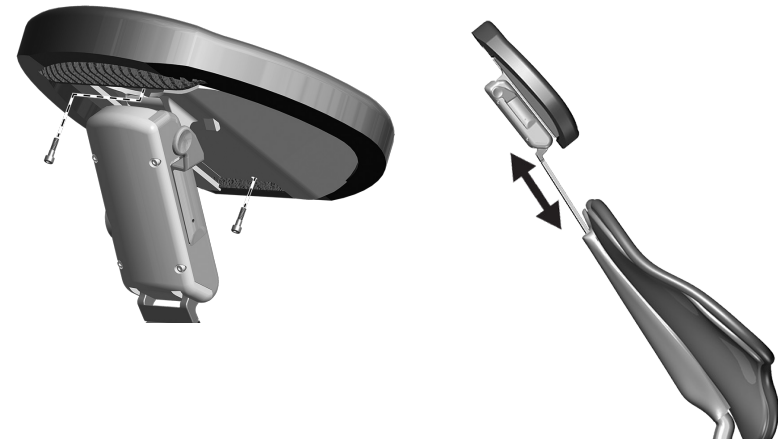


Upholstery 511B

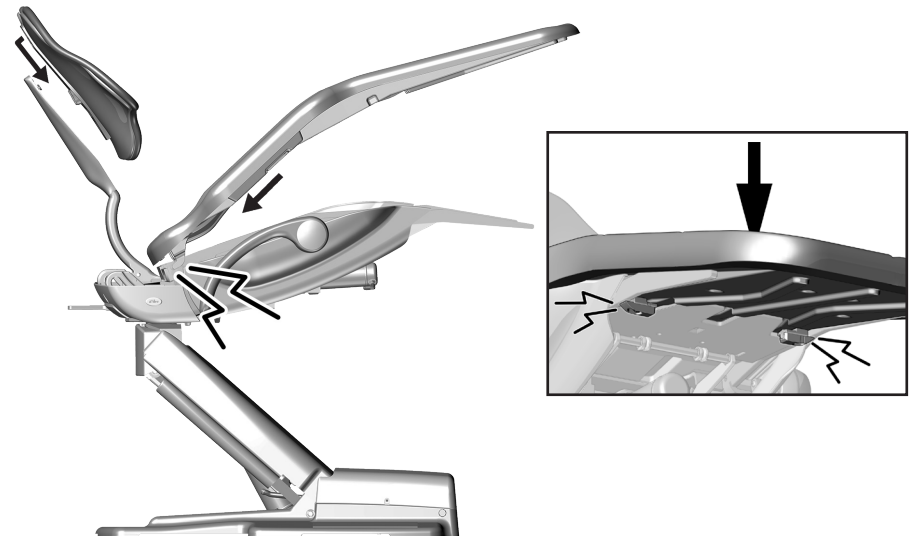
Back Upholstery Removal/Attachment



Headrest Upholstery Removal/Attachment



Seat Upholstery Removal/Attachment



Factory Default Routine 511

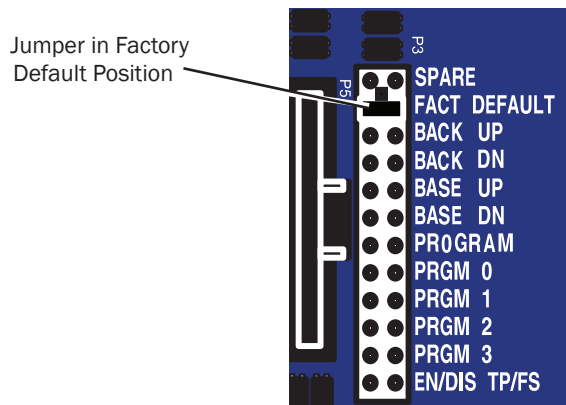
After installing a new chair, circuit board, or position sensor, run the factory default routine. The routine:

- 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 works

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.

To run Factory Default:

1. Locate the test points (P3).
2. Remove all jumpers from the test points.
3. Place the jumper from SPARE in the FACT DEFAULT position and leave it there until the routine completes. The status LEDs on the touchpad and chair circuit board double blink while Factory Default is running and after the routine is complete.
4. When Factory Default completes and the chair beeps 3 times, move the jumper back to SPARE. If the chair beeps once then stops, the Factory Default routine was not completed successfully.



When running the factory default routine the chair:

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



ATTENTION 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.

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.



511A

Fluid Level Indicator

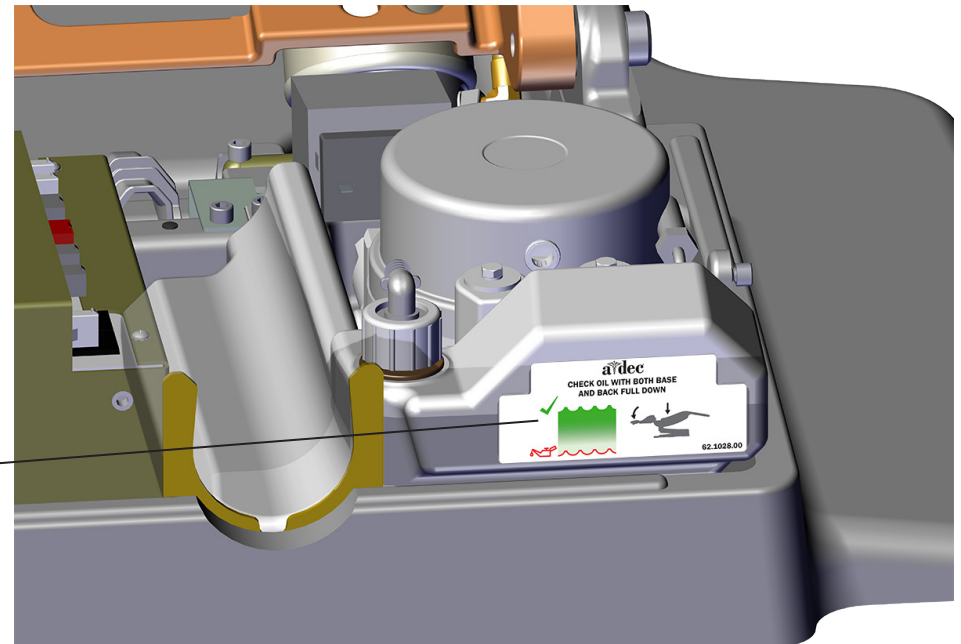
Hydraulic Fluid Reservoir Replenishment 511

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



CAUTION Do not overfill.

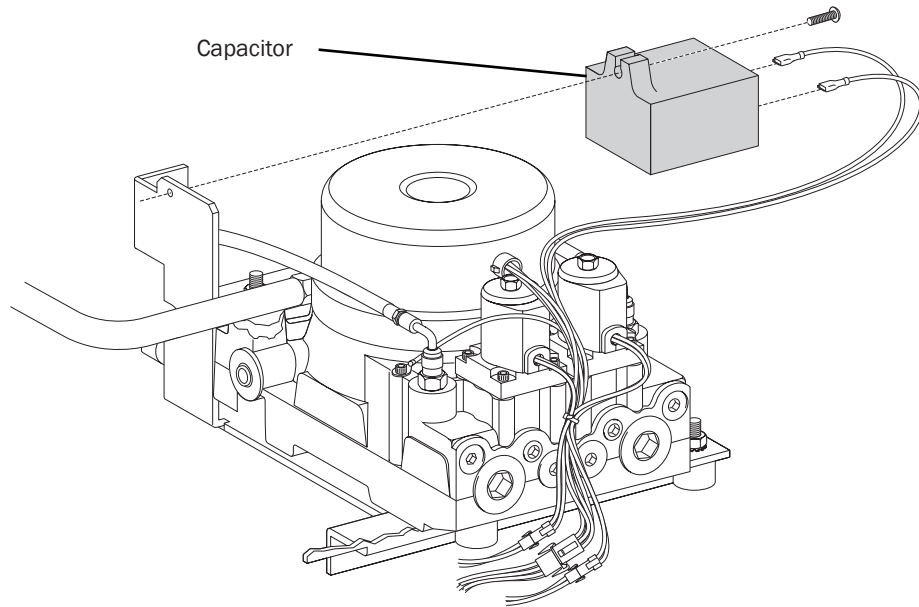
1. 511A: Raise the chair to the full base-up and back-up position. 511B: Lower the chair to the full base-down and back-down position.
2. Fill the reservoir with hydraulic fluid to the top of the fluid level indicator.
3. Move the chair down and up after fluid has been added.



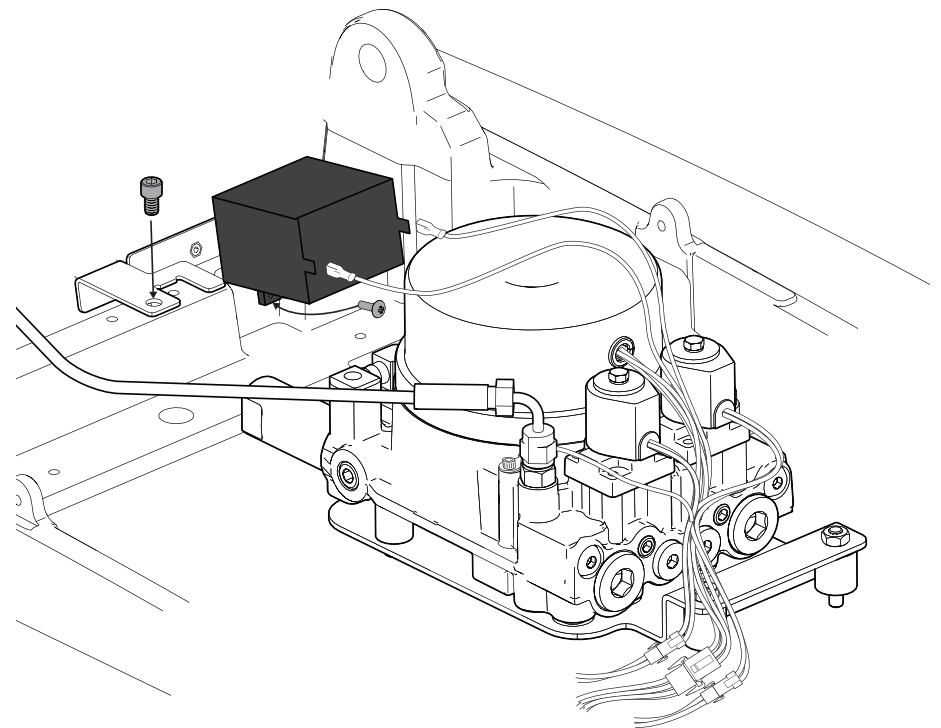
511B

Capacitor 511

The capacitor is energized during chair base up or back up functions
p/n: 041.642.00 200V, 041.643.00 220V, 041.644.00 420V



511A



511B

Solenoid 511

p/n: 90.1070.00, 110 - 120 VAC

p/n: 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



WARNING Failure to turn off the power before you begin this procedure can lead to product damage and result in serious injury 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



ATTENTION 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.



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

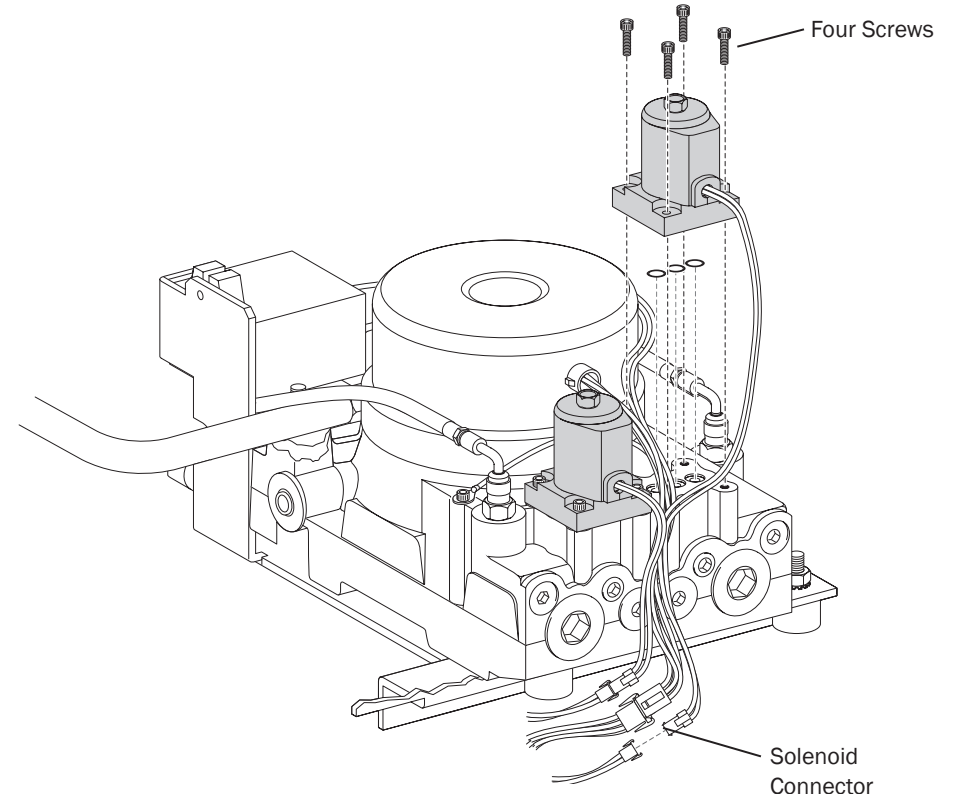


WARNING Failure to turn off the power before you begin this procedure can lead to product damage and result in serious injury or death.

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



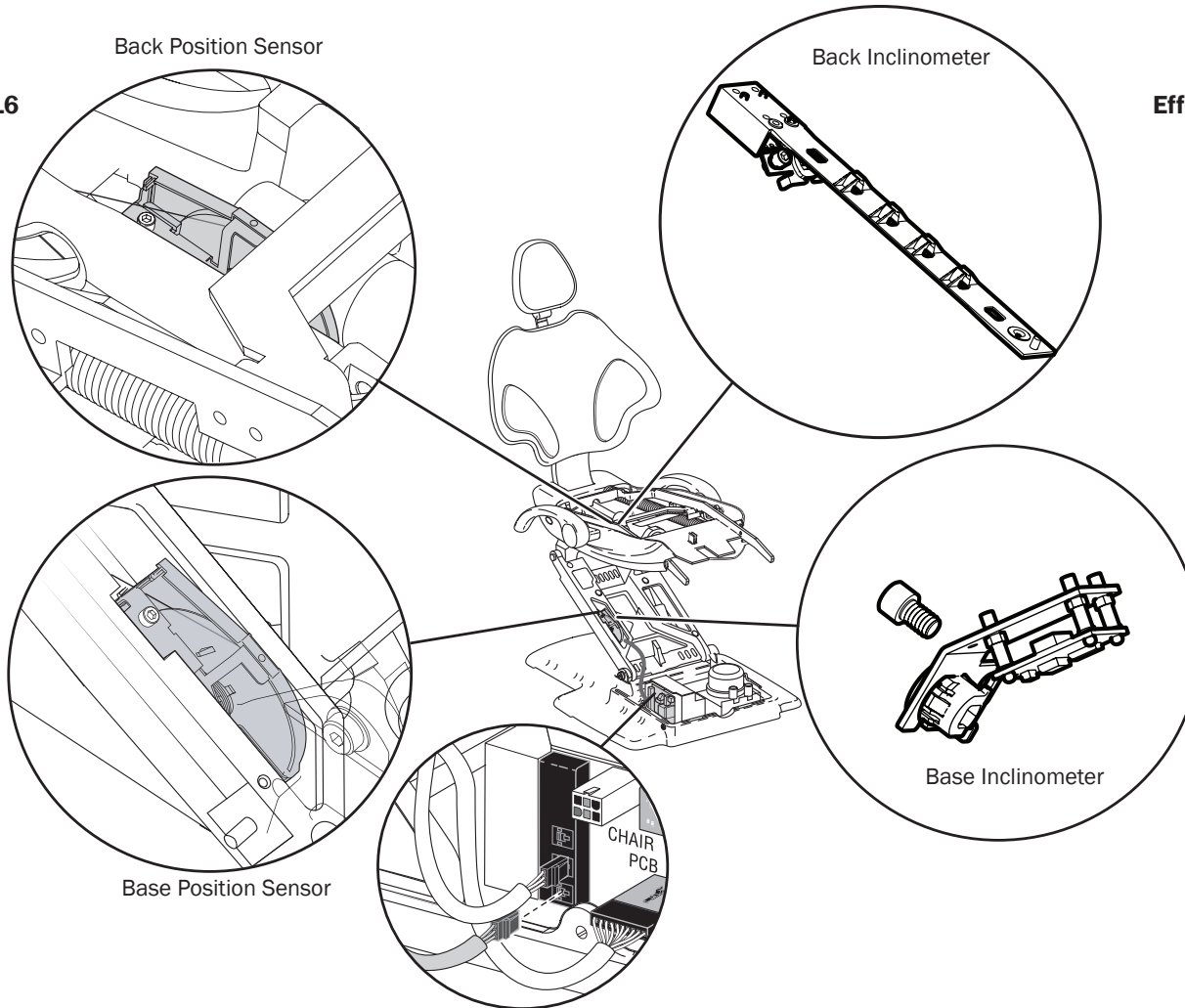
Install the New Solenoid Assembly:

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/Inclinometers 511

The inclinometer and cable assembly eliminates position float (a slight change or variation in the pre-programmed positions). The chair uses the same inclinometer assembly for both lift and tilt requirements. If an inclinometer 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.

Before October 2016



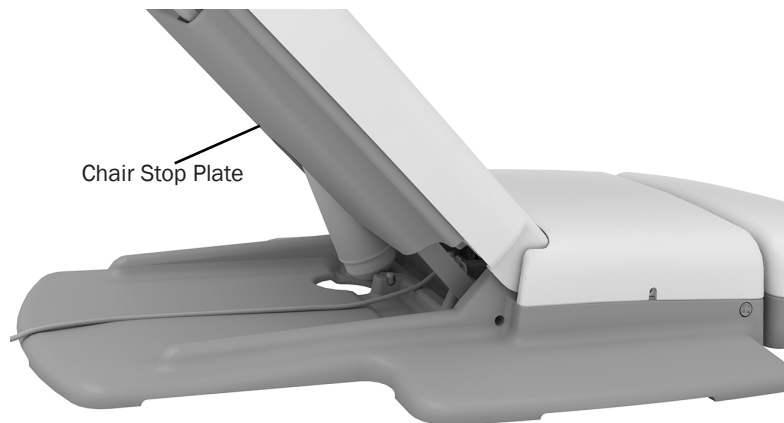
Chair Safety Features 511

A-dec dental chairs and systems include safety features (like the chair stop plate) that may stop or prevent the chair from moving. This may occur due to any of the following:

- There's an obstruction under the chair.
- The foot control disc or lever is pressed.
- A handpiece isn't properly in its holder.

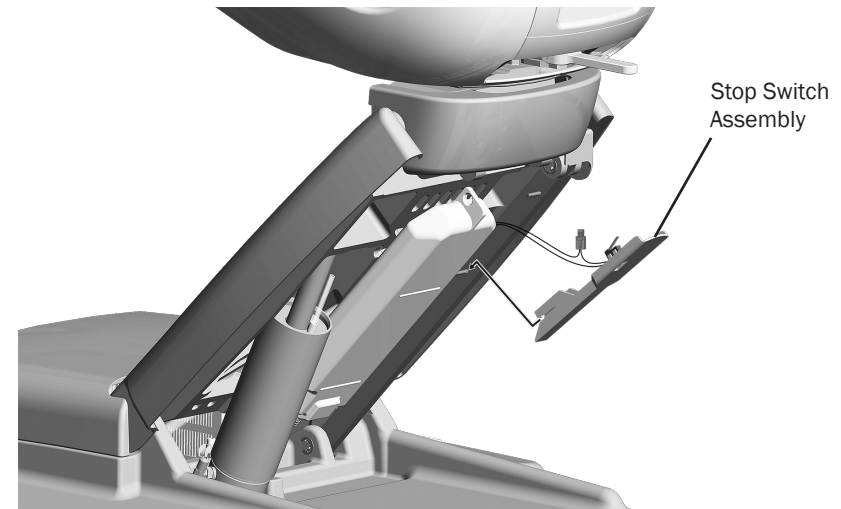
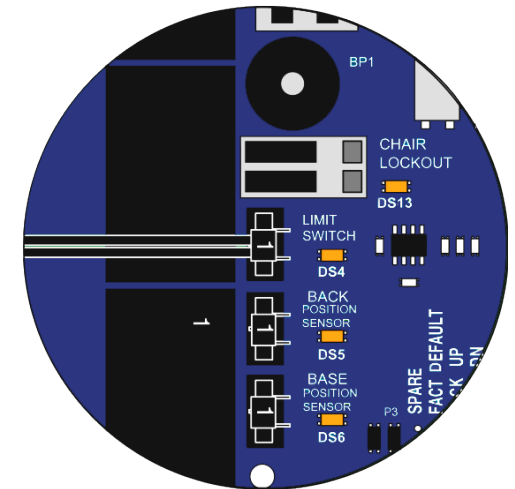
If the Chair Stops Unexpectedly or Won't Move

Check for and correct any of the conditions listed above. If an obstruction is blocking chair movement, use the touchpad or footswitch to raise the chair, then remove the obstruction.



Chair Bump-Up Feature 511

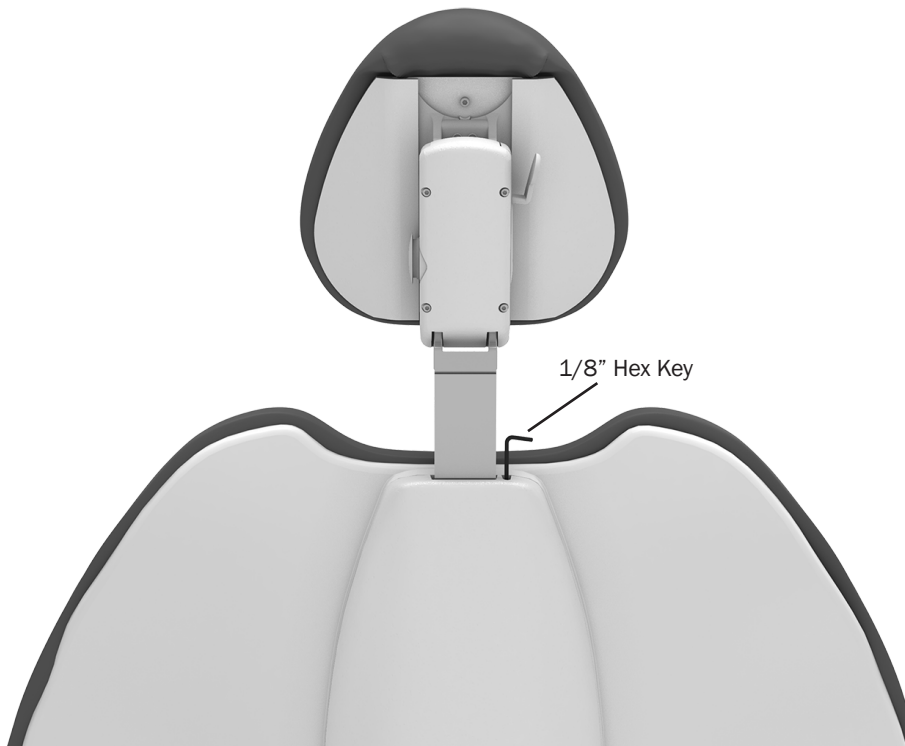
The chair stop plate and the assistant's arm trigger the chair to move upwards if it was moving down when the stop plate switch was activated.



Adjust the Headrest Glidebar Tension 511

If the headrest drifts downward, or if it is difficult to move up or down, adjust the glide bar tension.

Use a 1/8" hex key to adjust the tension. Clockwise increases the tension.



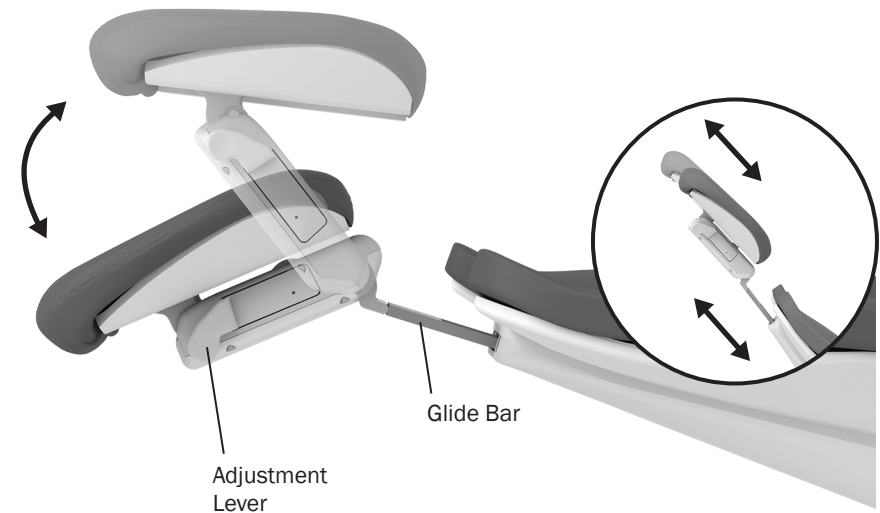
Position the Headrest 511

The dual-articulating gliding headrest includes several features you can use to improve access to the oral cavity and increase patient comfort. Use the glide bar to accommodate a variety of patient heights. Simply pull up or push down on the headrest until it is in the desired position. The gliding headrest cushion provides additional height adjustment.



WARNING If the glide bar has exceeded its maximum recommended working height, a warning line will be visible on the patient's side of the glide bar. Do not use the headrest in a position where this warning line is visible.

You can easily adjust the headrest angle using one hand. Press the adjustment lever to position the headrest. Release, and the headrest holds its position.

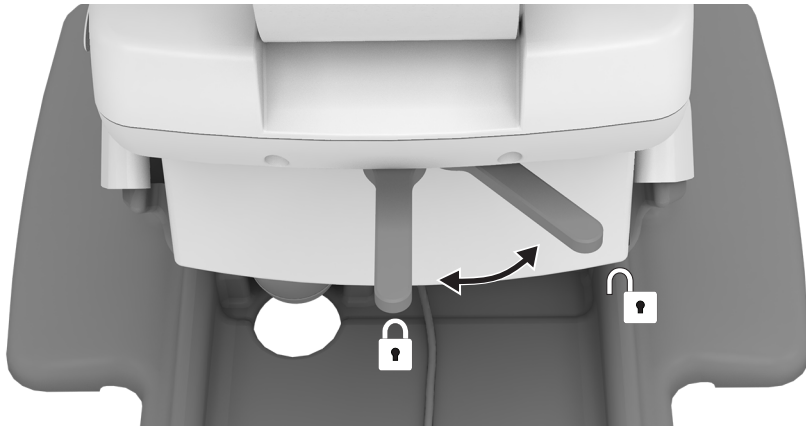


Adjust the Chair Swivel Brake 511

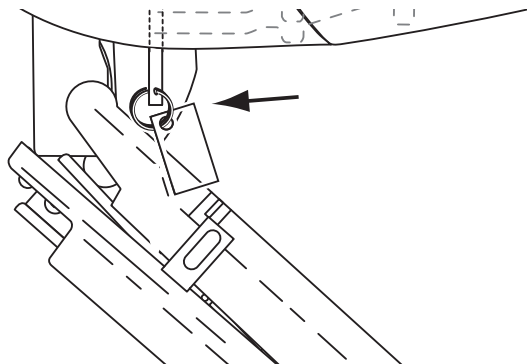
Swivel Brake Operation

The chair can rotate to any position within 30° either side of center. The chair swivel brake restricts rotation of the chair to keep the chair from moving during a procedure.

To release the swivel brake, pull the brake lever to the right. To engage the brake, pull the brake lever to the left.



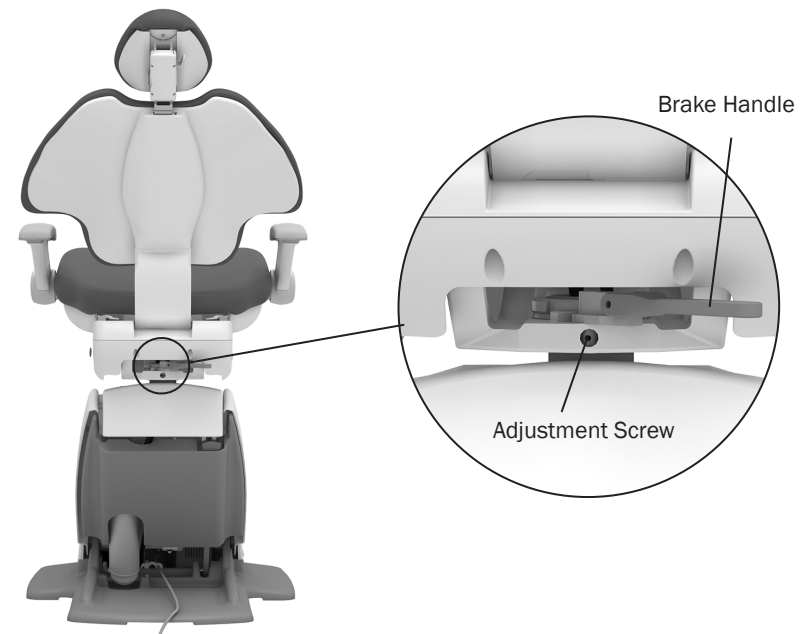
NOTE To disable the swivel feature, remove the swivel brake and replace it with the Swivel Lock Kit, p/n 62.1143.00.



Adjust the Chair Swivel Brake Tension

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:

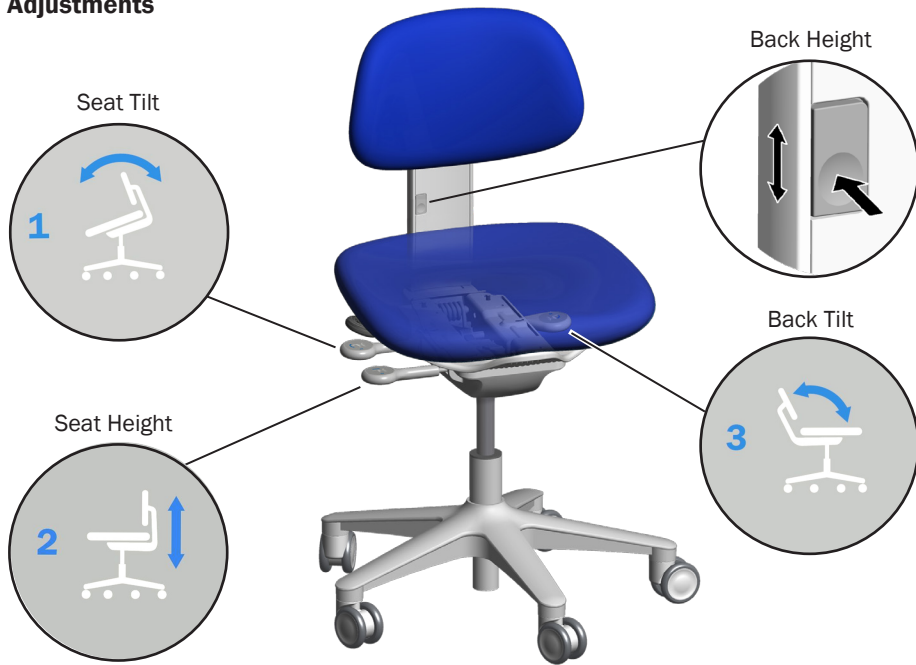
1. Move the brake handle to the right.
2. If the chair includes a back mount module, swivel the chair to access the adjustment screw.
3. Use a 7/64" hex key and turn the tension adjustment screw clockwise to increase brake friction or counterclockwise to decrease brake friction. Only a small. Adjustment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



Stools Adjustment

Doctor's Stool 521

Adjustments

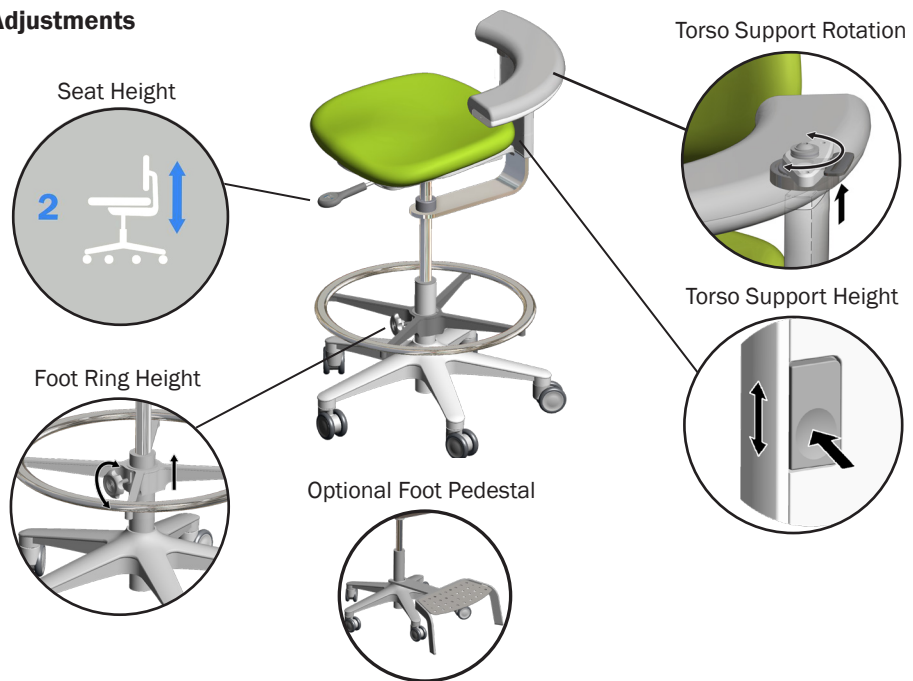


Optional Armrests



Assistant's Stool 522

Adjustments



Adjustments with Optional Back Rest



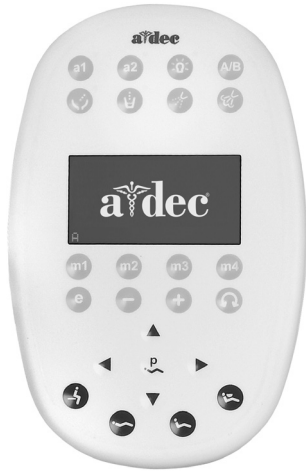
Chair Touchpads/Footswitches

A-dec dental chairs can be operated by the A-dec touchpad or the footswitch. Chair functions are similar whether used with an A-dec touchpad or footswitch.

A-dec Deluxe Plus Touchpad



A-dec 500 Deluxe Touchpad (Current Model)



A-dec Standard Touchpad (Current Model)



A-dec 300 Deluxe Touchpad



A-dec Footswitch (Current Model)



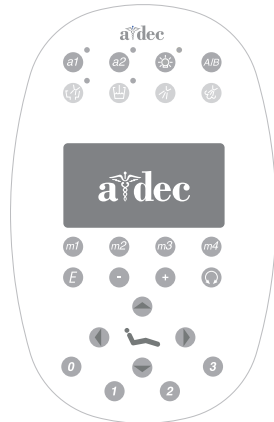
A-dec Footswitch (Original Model)



A-dec Standard Touchpad (Original Model)



A-dec 500 Deluxe Touchpad (Original Model)



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.

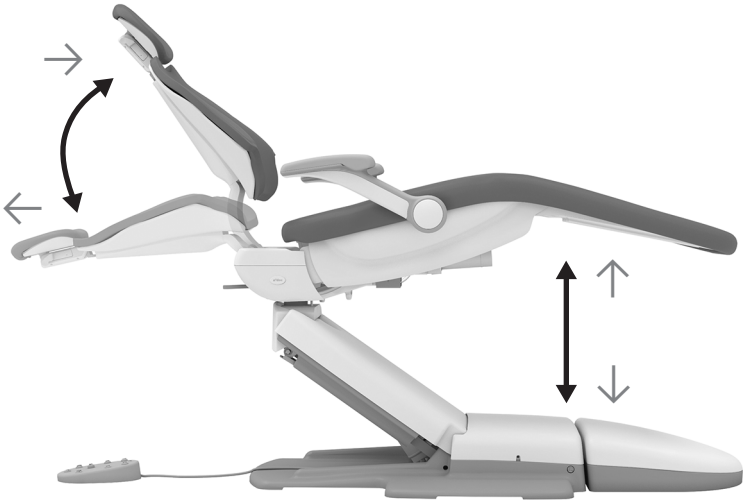
A double blinking blue status light could also indicate that a jumper is in the factory default position on the chair circuit board.



A-dec Logo/Status Light
(A-dec Deluxe Plus status light does not illuminate.)

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

Position the Chair with Preset Controls

















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

1. Move the chair to its desired position.
2. Press and hold Program button. One beep indicates the program mode is on.
3. Within five seconds, press the chair preset icon you want to customize. Three beeps indicate the new setting is saved.

Customize the X-Ray/Rinse Position

The X-ray/Rinse preset toggles between the x-ray/rinse position and the chair's previous position. To change the preset position to function as a customized chair preset position:

1. Press and hold the Program and X-ray/Rinse buttons at the same time.
 - One beep indicates the X-ray/Rinse is set as another customizable chair position.
 - Three beeps indicate the X-ray/Rinse has been configured as the x-ray/rinse preset.
2. To customize the preset position, see the previous section, "Customize the Chair Preset Positions."

Footswitch Buttons		Touchpad Buttons	Deluxe Plus Touchpad Icons	Preset Name	Factory Setting
				Entry/Exit	Positions chair for patient entry/exit and turns off dental light.
				Treatment 1	Positions the chair base and back down and turns on the dental light.
				Treatment 2	Positions the chair base and back and turns on the dental light. (This is not available on 300 Deluxe touchpad.):
				X-ray/Rinse	Moves the chair to either x-ray or rinse position. A second press moves the chair to the previous position.



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