

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



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Overview

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Product Service

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

Regulatory Information

Warranty information is provided in the *Regulatory Information, Specifications, and Warranty* document (p/n 86.0221.00), which is available in 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 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	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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Web Contact

Partner Resources websites: www.a-dec.biz.

Other Sources of Information

A-dec 311, 411, and 511 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 (Version A) Dental Chair



A-dec 311 (Version B) Dental Chair

An optional contoured floor box is also available.

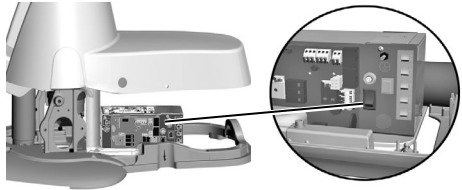
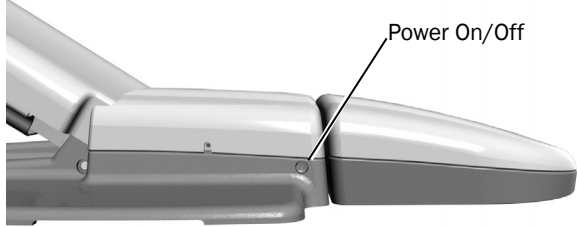
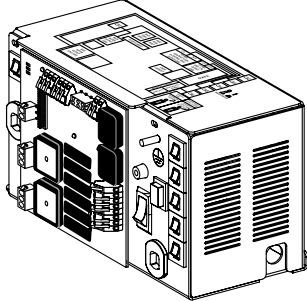
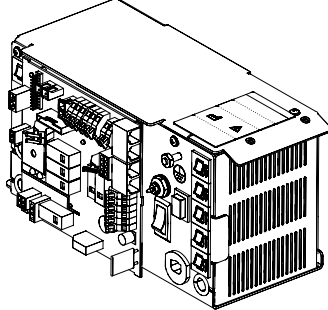
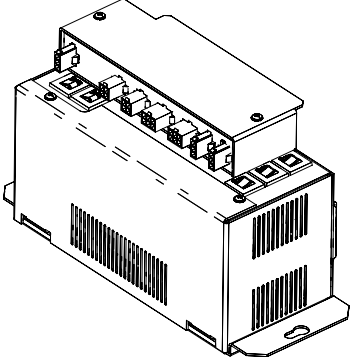
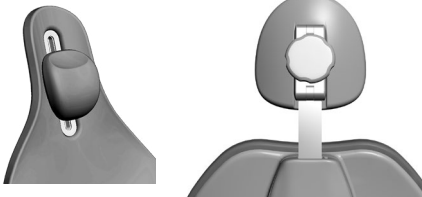
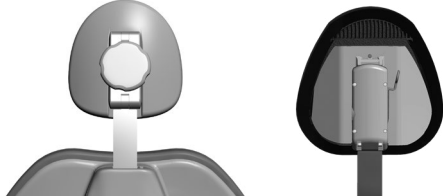



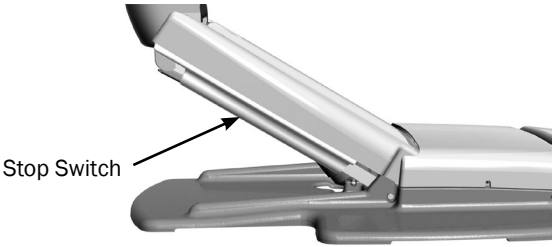
A-dec 411 Dental Chair



A-dec 511 Dental Chair

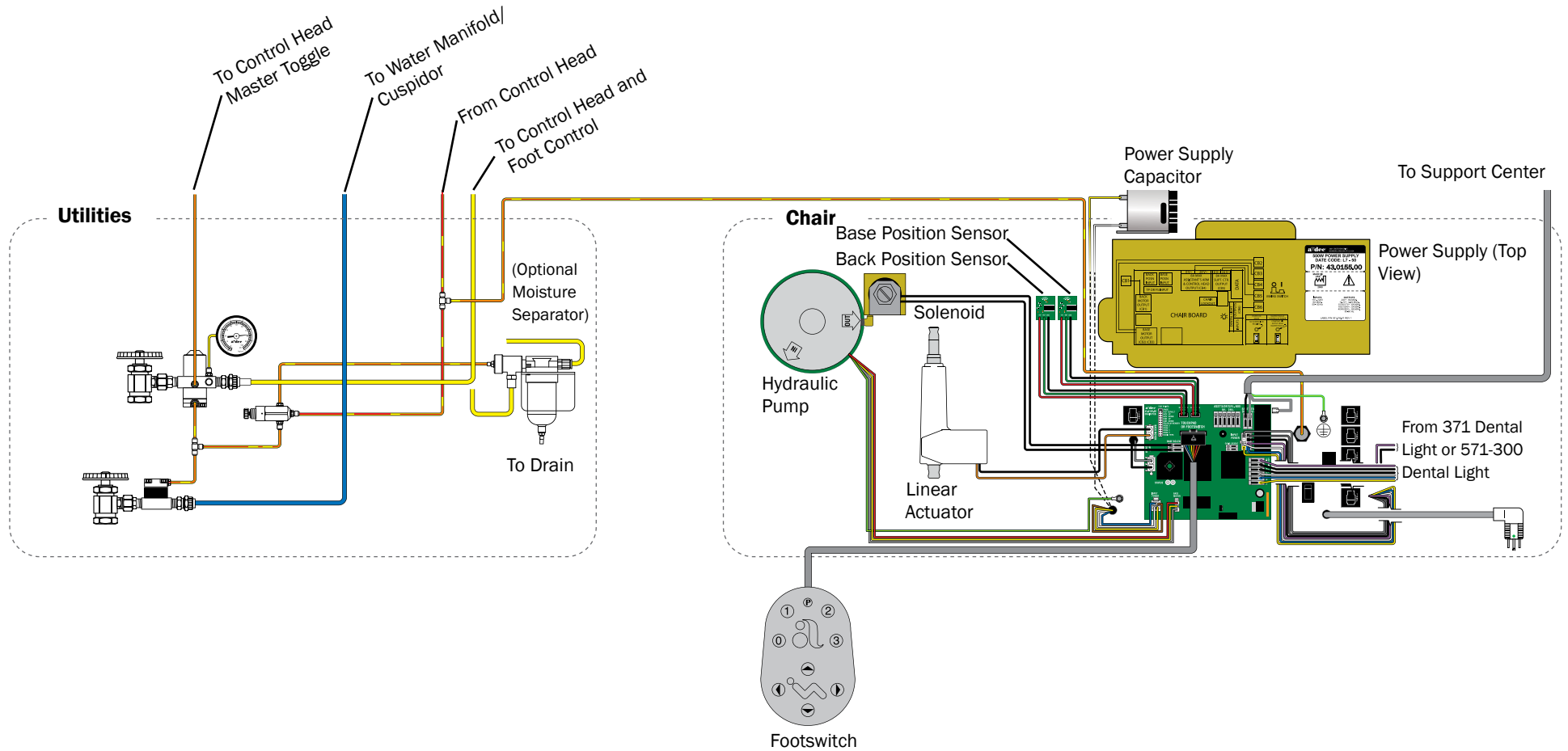
Chair Comparison Chart

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

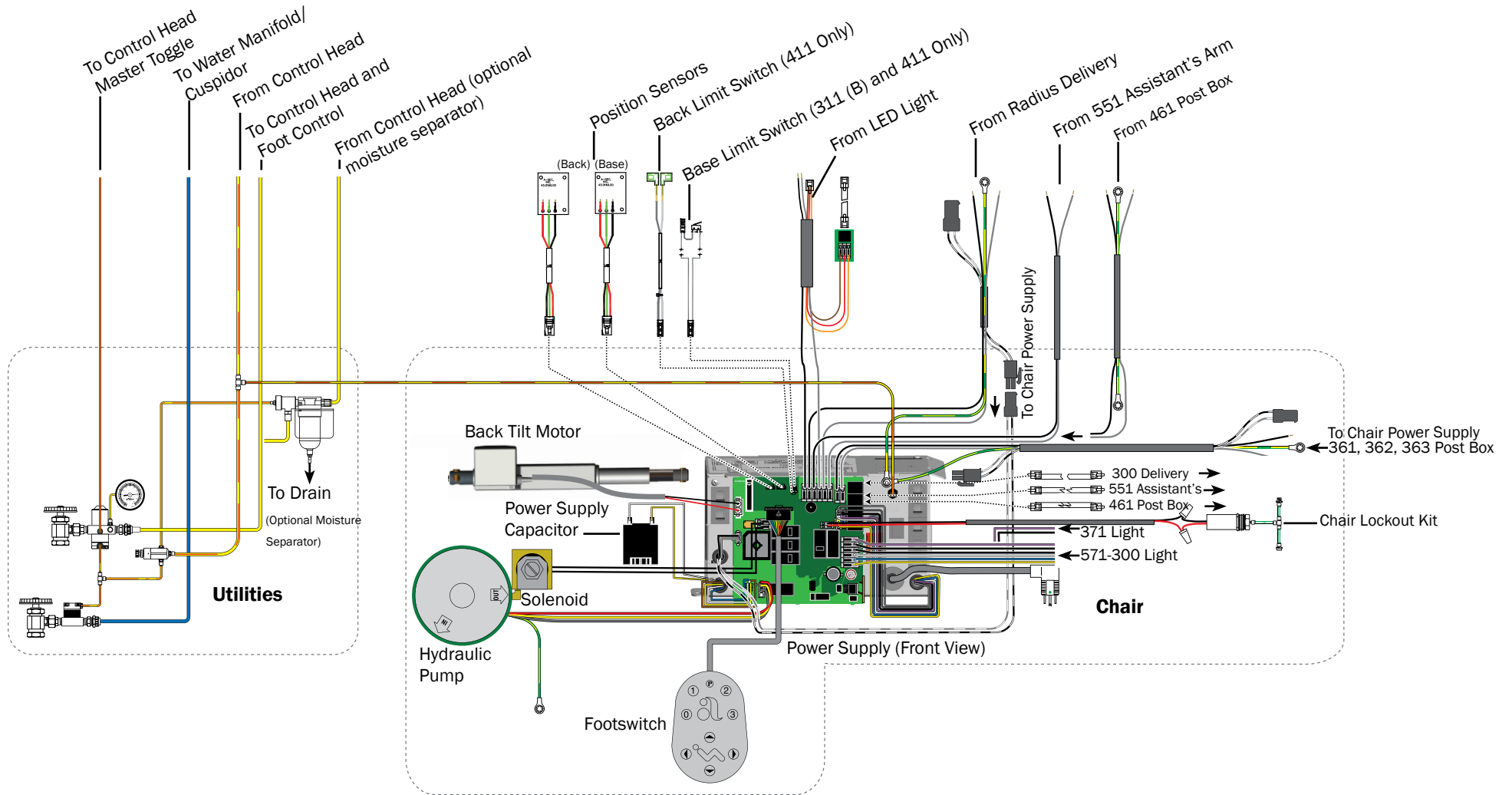
	A-dec 311 (Version A) Chair	A-dec 411/311 (Version B) Chair	A-dec 511 Chair
Stop Switch Location	(not applicable)		
Chair Drive System		Hydraulic Base Electrical Back	Hydraulic Base Hydraulic Back
Armrests		Two-Position Armrest	Multi-Position Armrest

Flow Diagrams

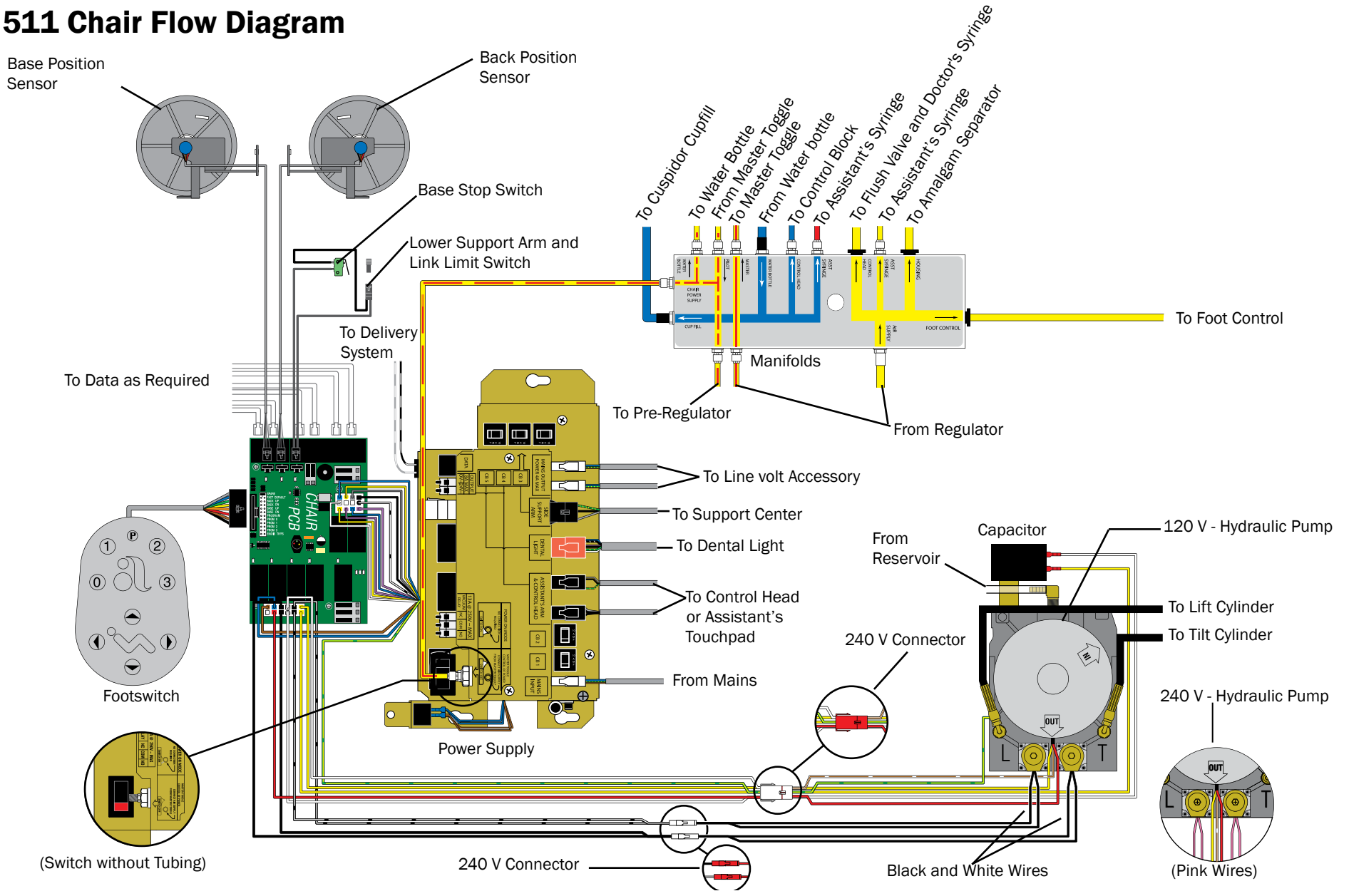
311 (A) Chair Flow Diagram (Before March 2013)



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

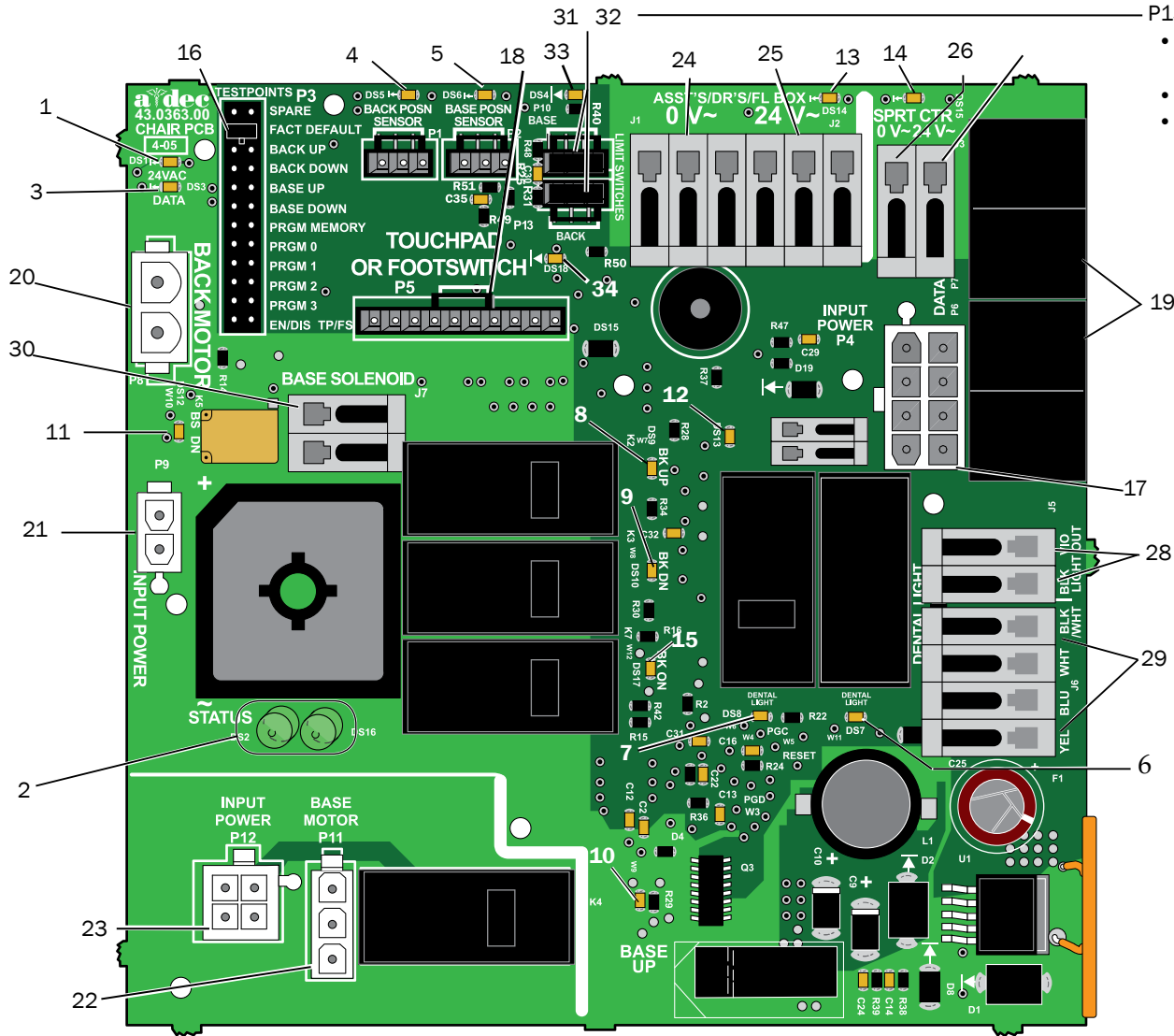


511 Chair Flow Diagram



Circuit Board Components

311 (A and B)/411 Chair Circuit Board



- P13 and DS4:
- 311 (A): Effective July 2013: Jumpers are required on P10 and P13 for the 311 (A) chair.
 - 311 (B): Jumpers are required on P13 only.
 - 411: No jumpers required. 411 has a base and a back limit switch.

311 (A and B)/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

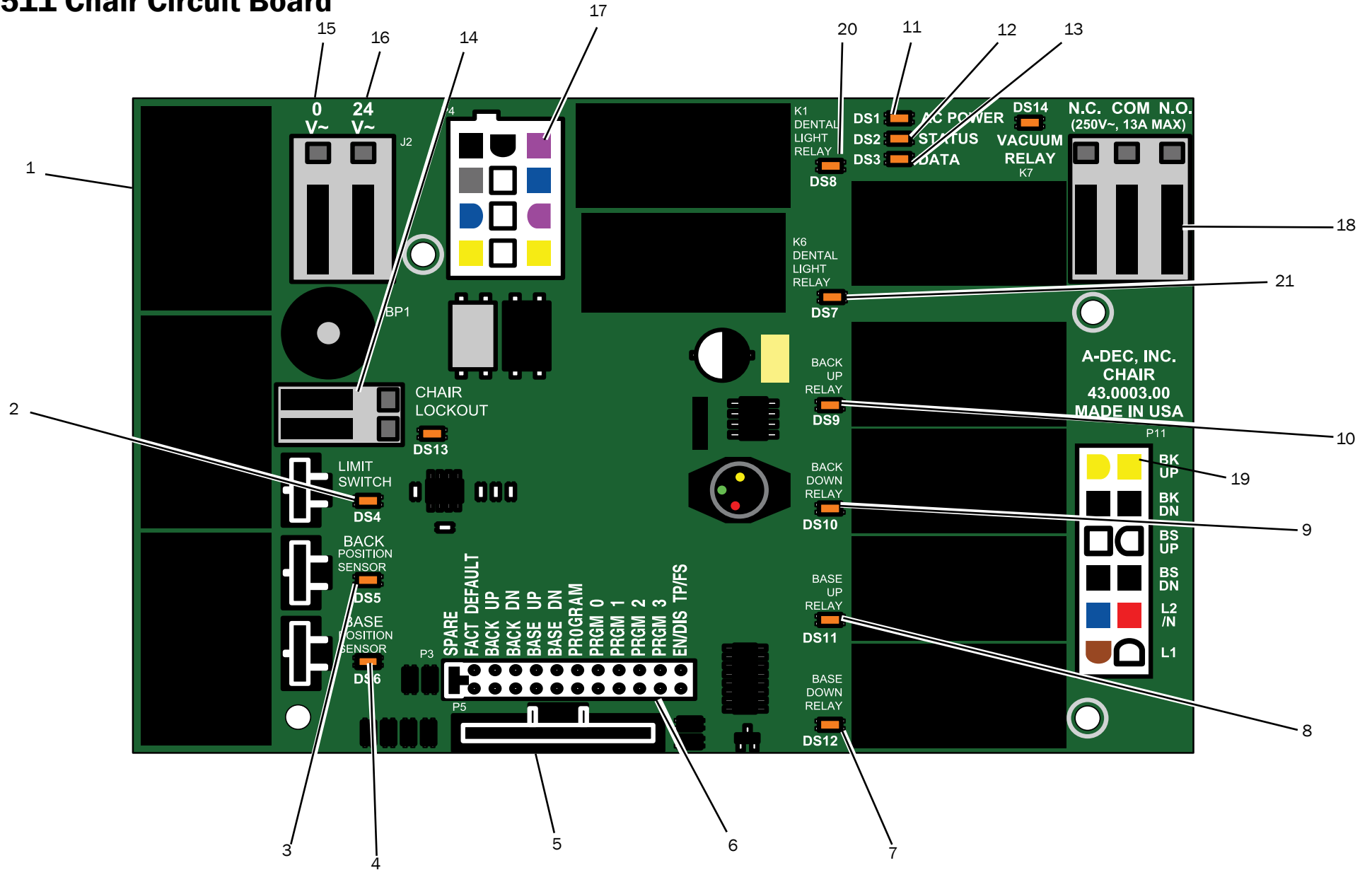


CAUTION: Circuit boards are sensitive to static electricity. Electrostatic Discharge (ESD) precautions are required when touching a circuit board or making connections to or from the circuit board. Circuit boards should be installed only by an electrician or qualified service person.

311 (A and B)/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 (A) 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



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 (A) Chair Service, Adjustments, and Maintenance

Chair Covers [311 (A)]



DANGER Failure to turn off the power before you begin this procedure can lead to electrical shock.



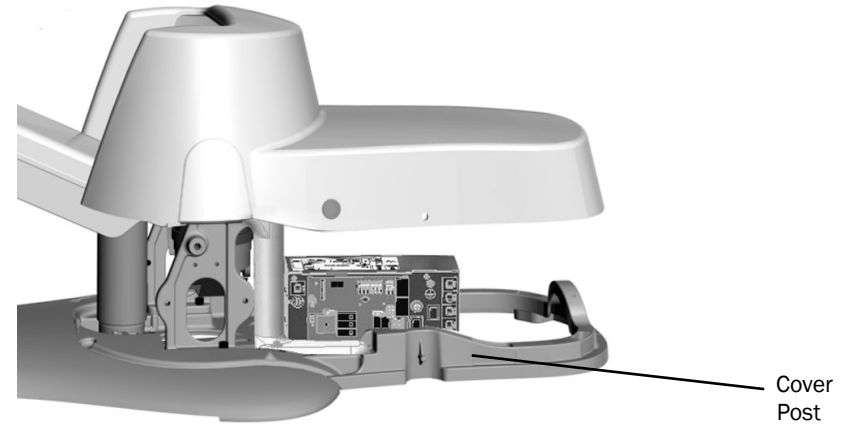
WARNING Failure to turn off the power before you begin this procedure can lead to product damage and result in serious injury or death.



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

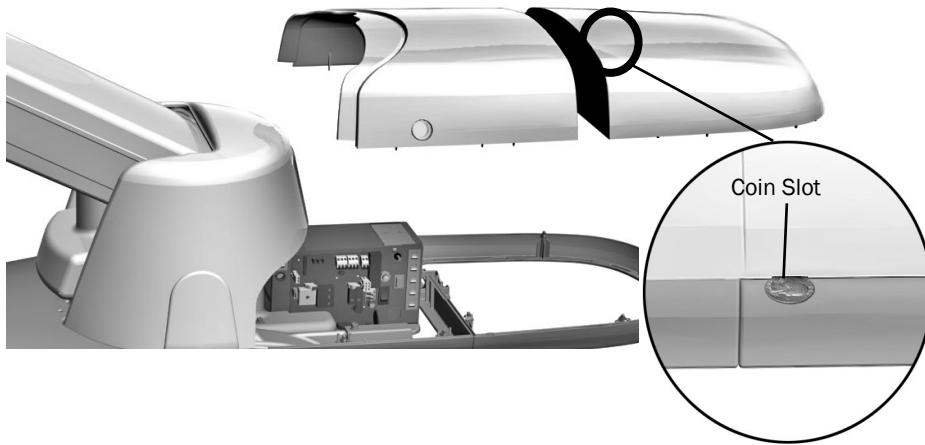
Integrated Floor Box Cover Removal

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.



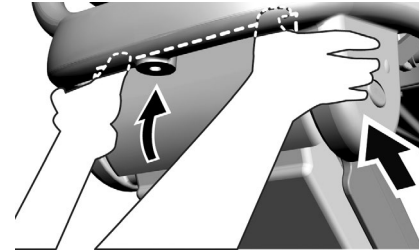
CAUTION Take care not to damage the cover when using the coin slot.

Lift Arm Covers Removal

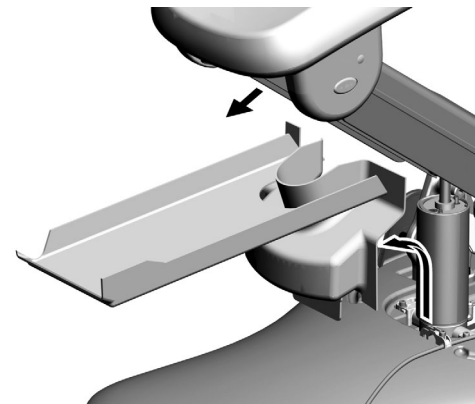
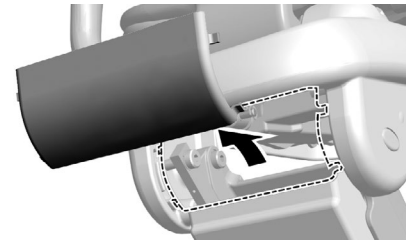
If the utility cover is installed, remove it before beginning this procedure.

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.



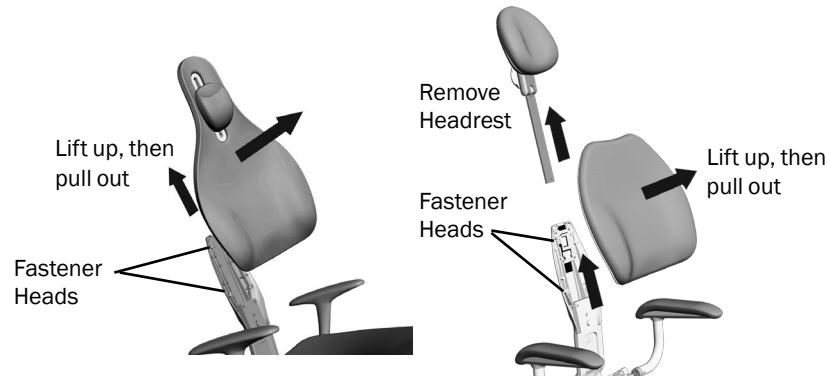
3. Lift out the upper lift arm cover.
4. Remove the lift arm and lower lift arm cover.



Upholstery [311 (A)]

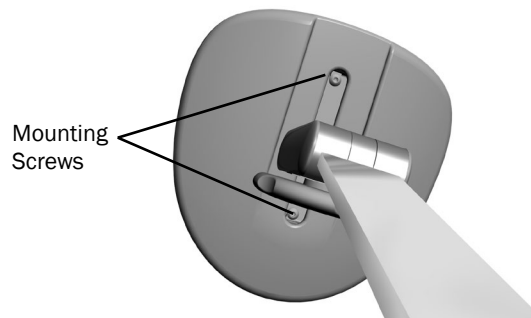
Back Upholstery Removal/Attachment

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.

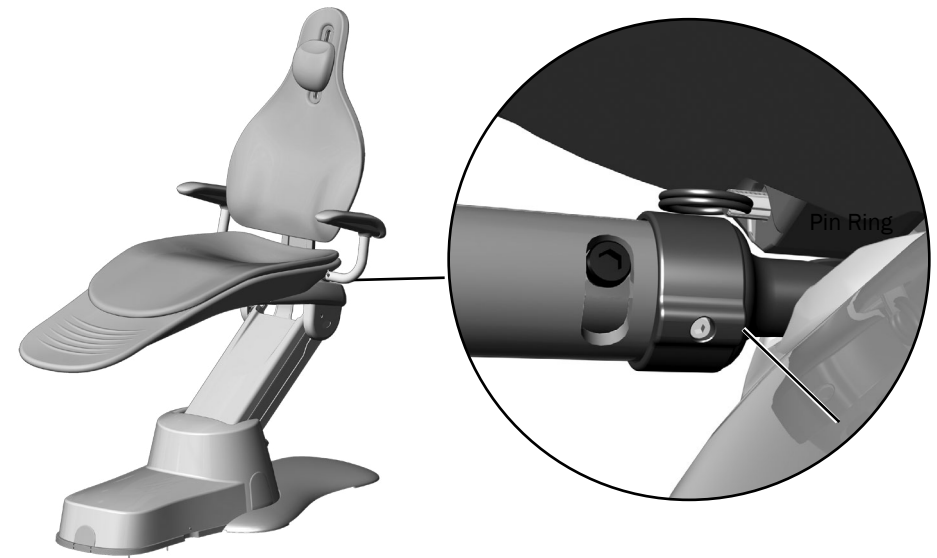


Seat Upholstery Removal/Attachment

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 (A and B) and 411]



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

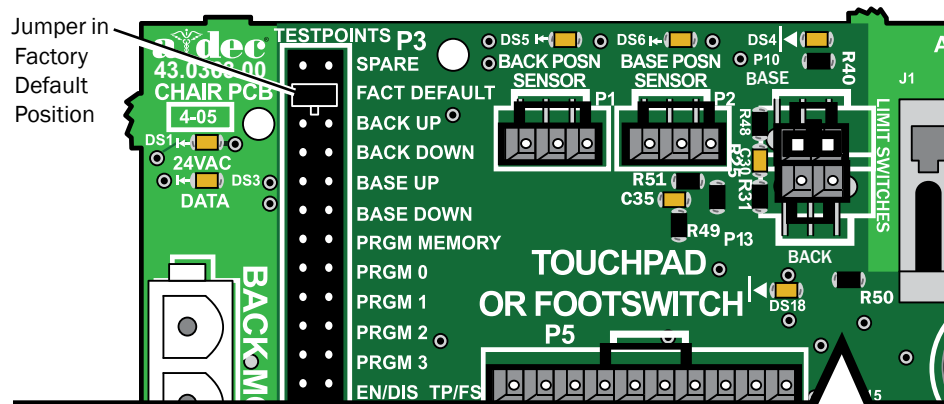
After installing a new chair, circuit board, or position sensor, run the factory default routine. The routine:

- 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.



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.



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.

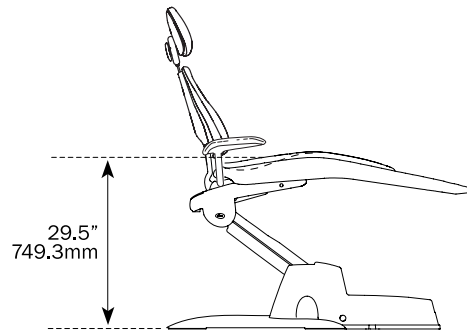
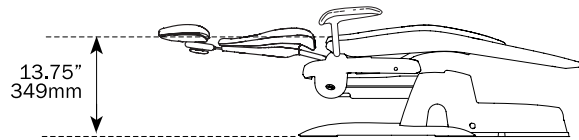


NOTE One beep indicates the routine failed to complete. See page 56 for troubleshooting.

Chair Drive System [311 (A)]

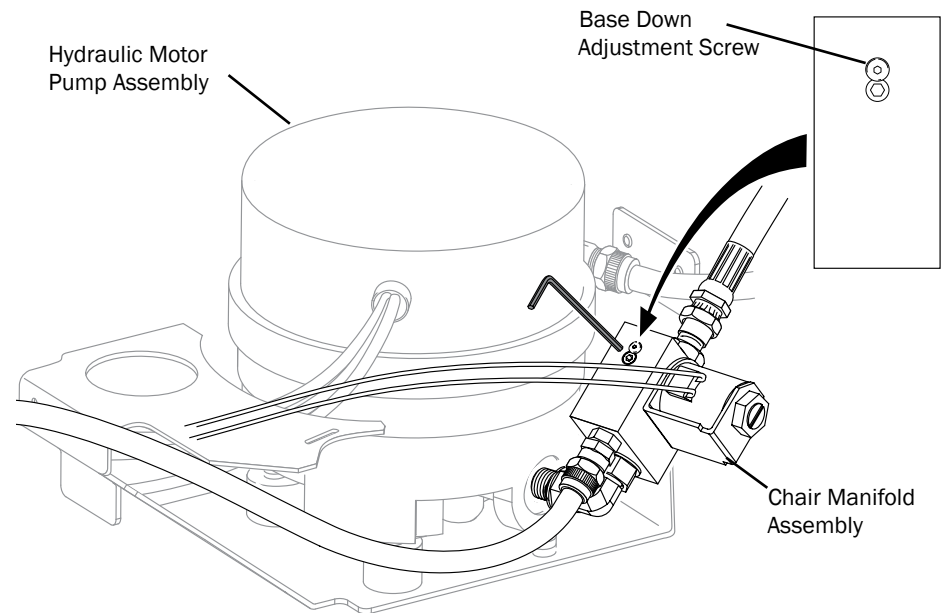
The hydraulic chair system controls the base movement of the chair. An electro-mechanical tilt actuator controls the back movement.

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 (A)]

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 [311 (A)]

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.

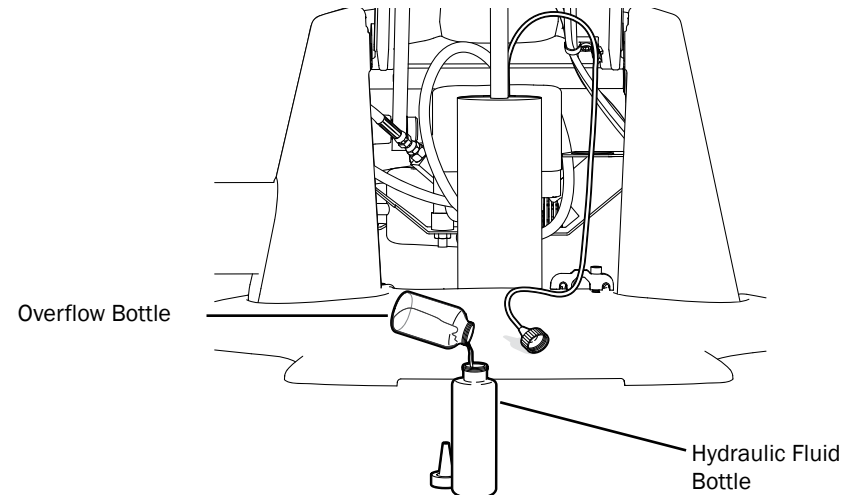
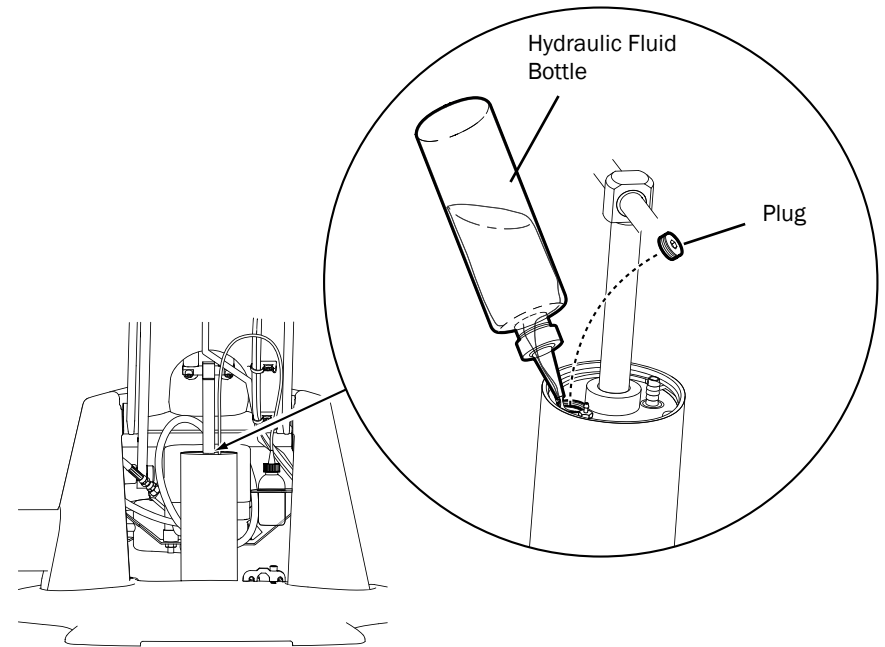


NOTE It may be difficult to measure exactly to the thread level. You may want an absorbent towel available to soak up some of the fluid if it seems too full.

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 (A and B)/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.



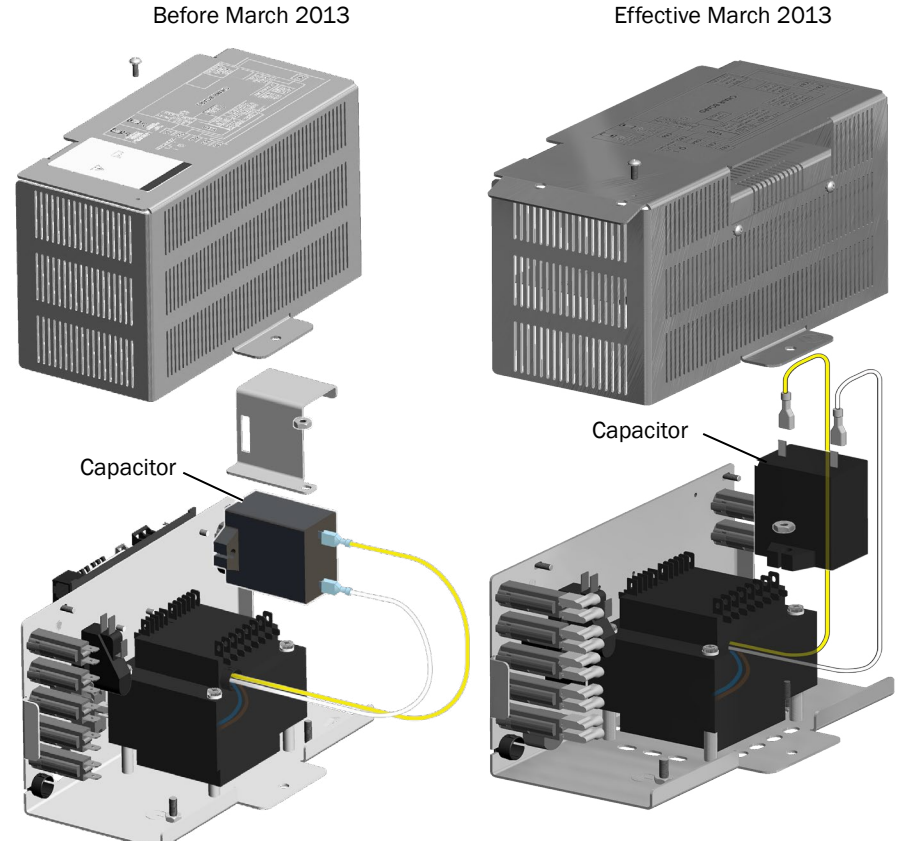
DANGER Turn off the power to the system before you continue with this procedure. Failure to do so can result in electrical shock.



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.

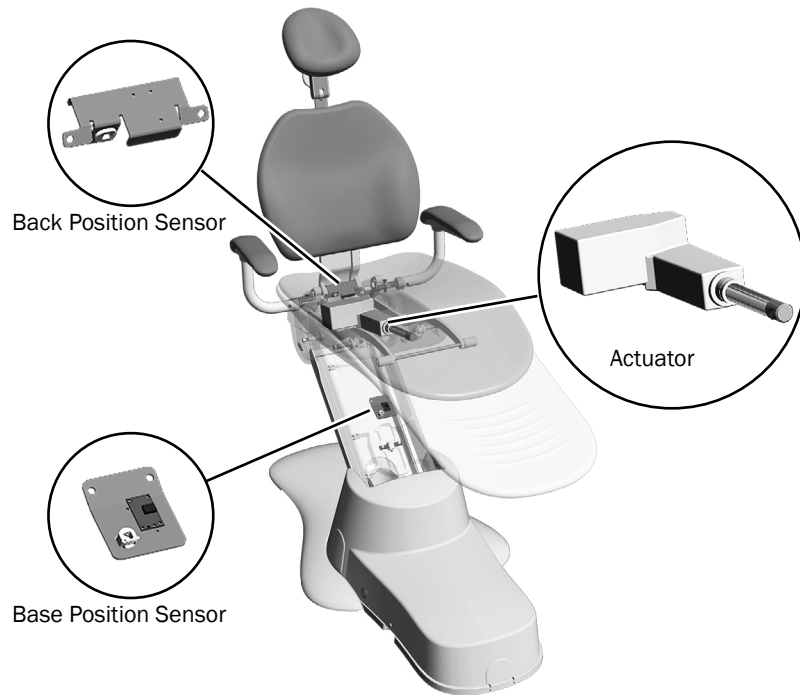
Chair Input Voltages

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 (A and B)/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.



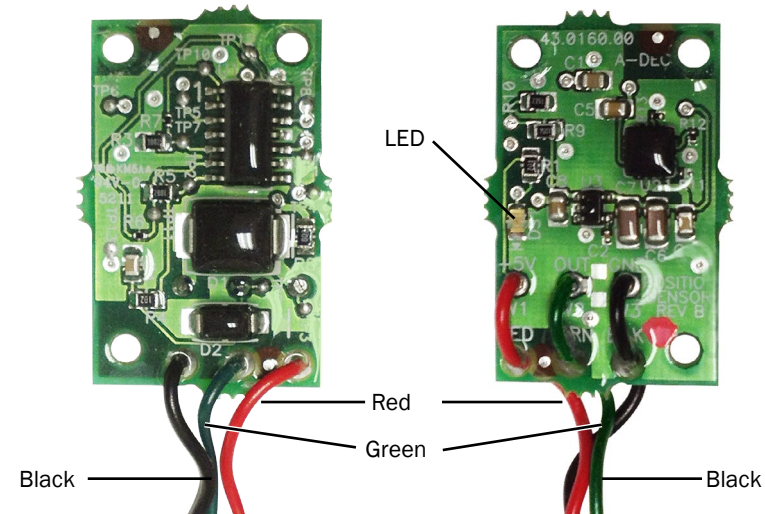
Position Sensor [311 (A and B)/411]

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 is 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 on page 12 for further information. When in limp along mode, presets will not function.

Solenoid [311 (A)]

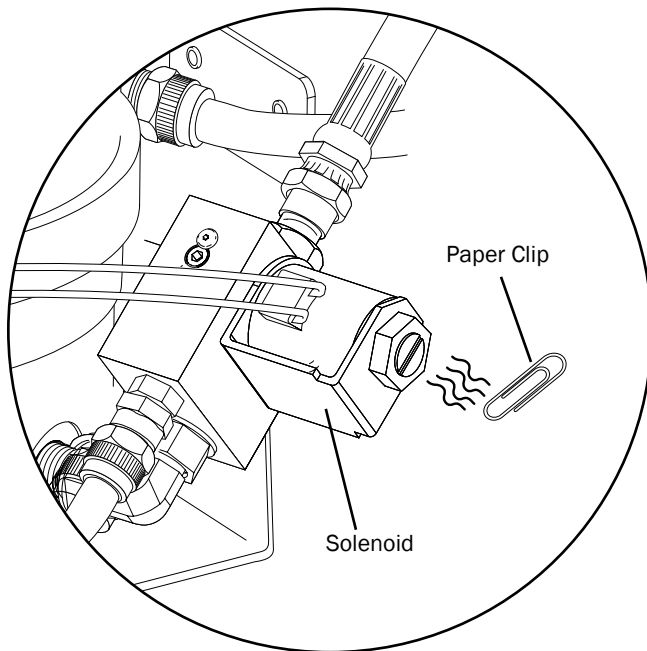
p/n: 62.0317.00 21.6 VDC

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

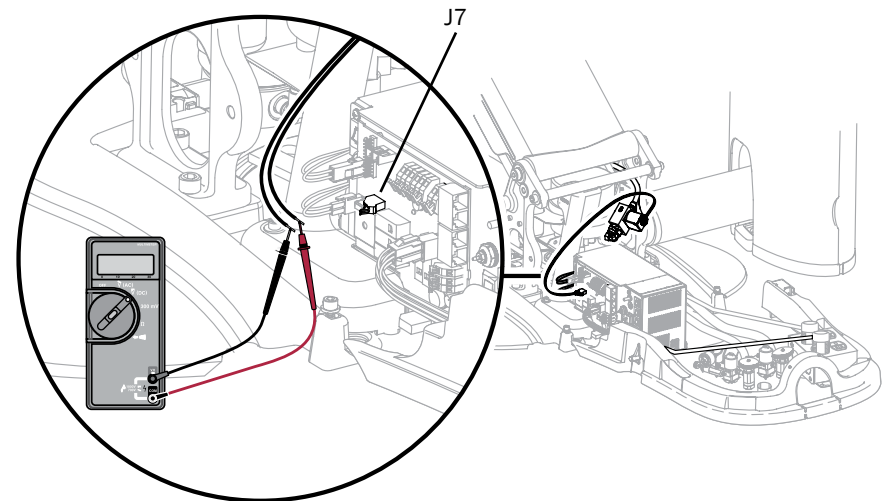


DANGER Turn off the power to the system before you continue with this procedure. Failure to do so can result in electrical shock.



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 [311 (A)]



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.



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



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



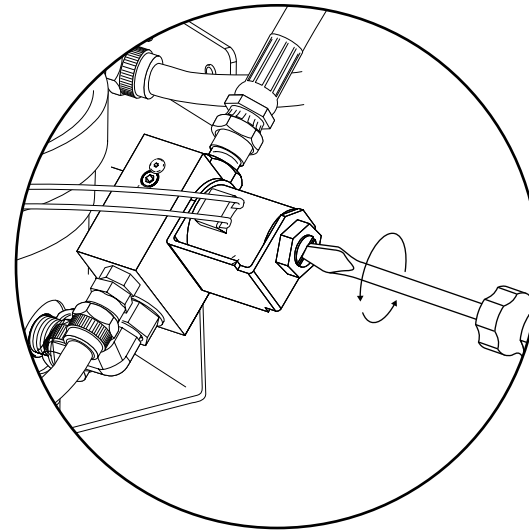
WARNING Turn off the power to the system before you continue with this procedure. Failure to do so can result in product damage, serious injury, and/or death.

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 [311 (A)]

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.

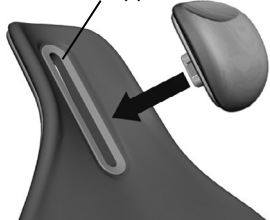
Reposition Neck Support

Neck Support Track



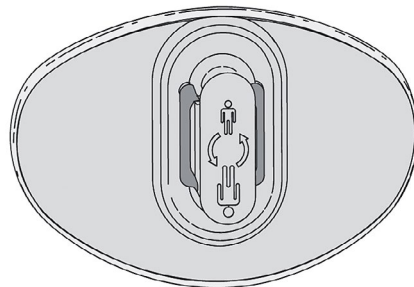
Note: This neckrest can rotate/mount two ways.

Neck Support Track



Note: This neckrest can only mount one way.

Before October 2013



Effective October 2013



Dual-Articulating Headrest [311 (A and B)/411]

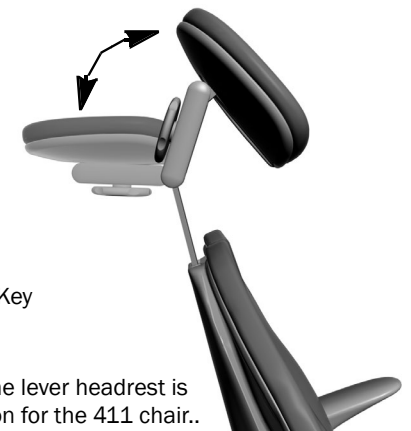
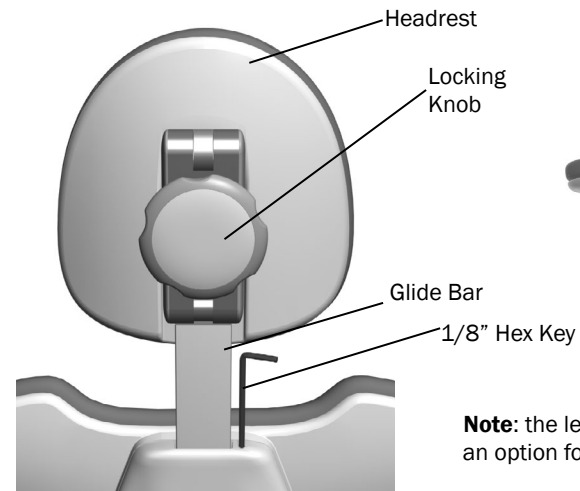
Headrest Adjustment

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.

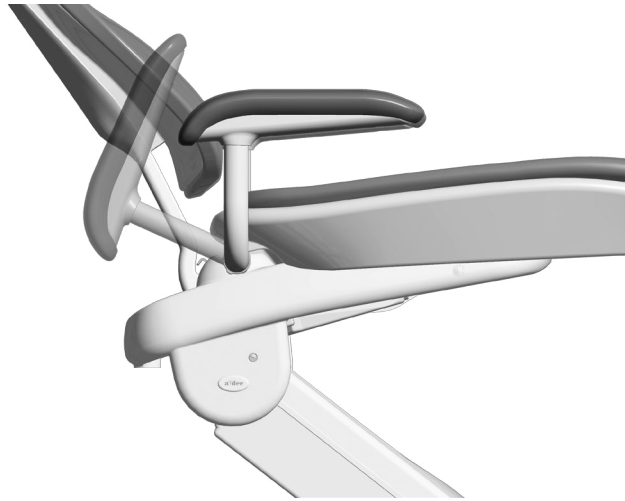


Note: the lever headrest is an option for the 411 chair..

Two-Position Armrest Adjustments [311 (A)]

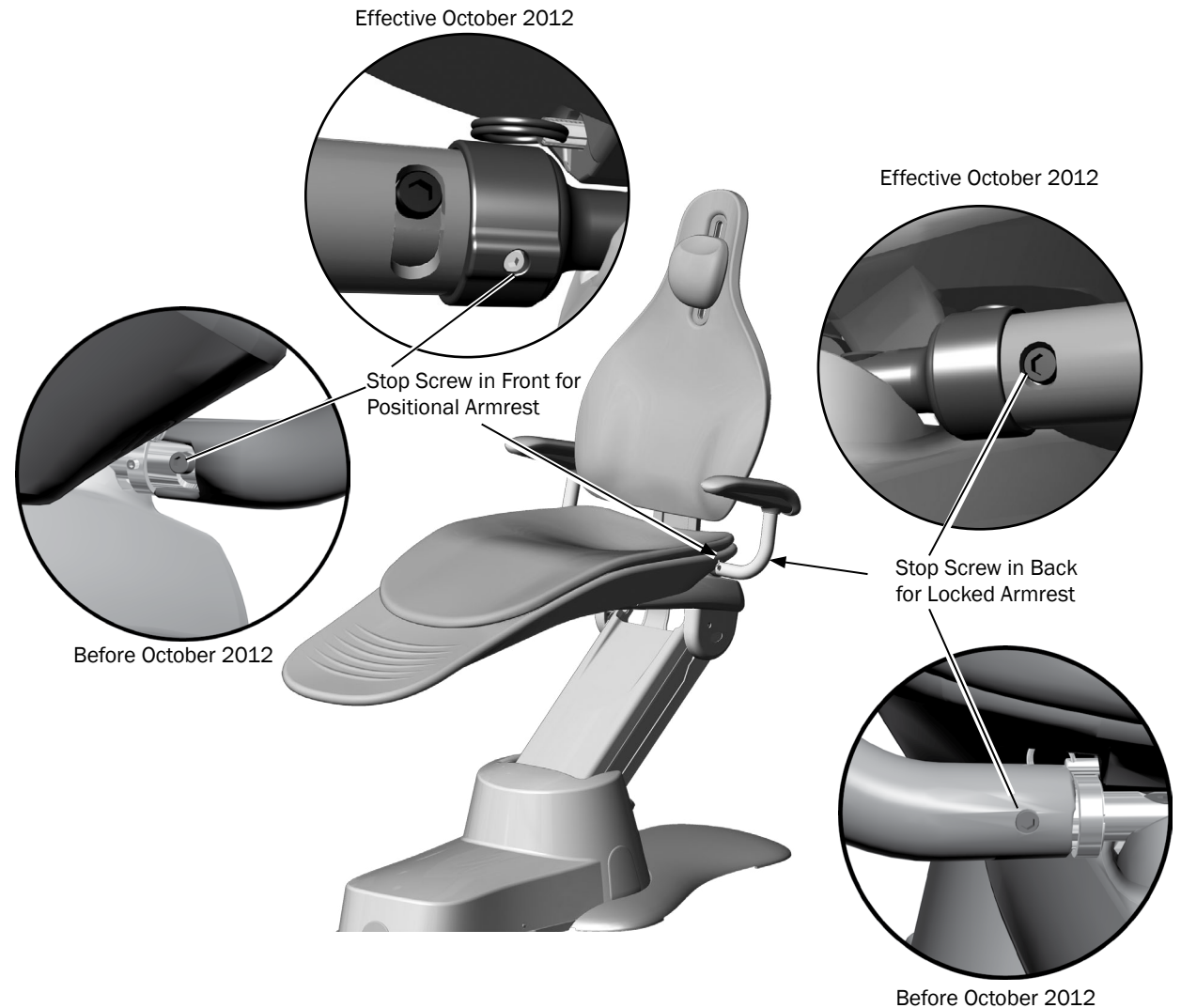
Armrests Repositioning

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.



311 (B) and 411 Chairs Service, Adjustments, and Maintenance

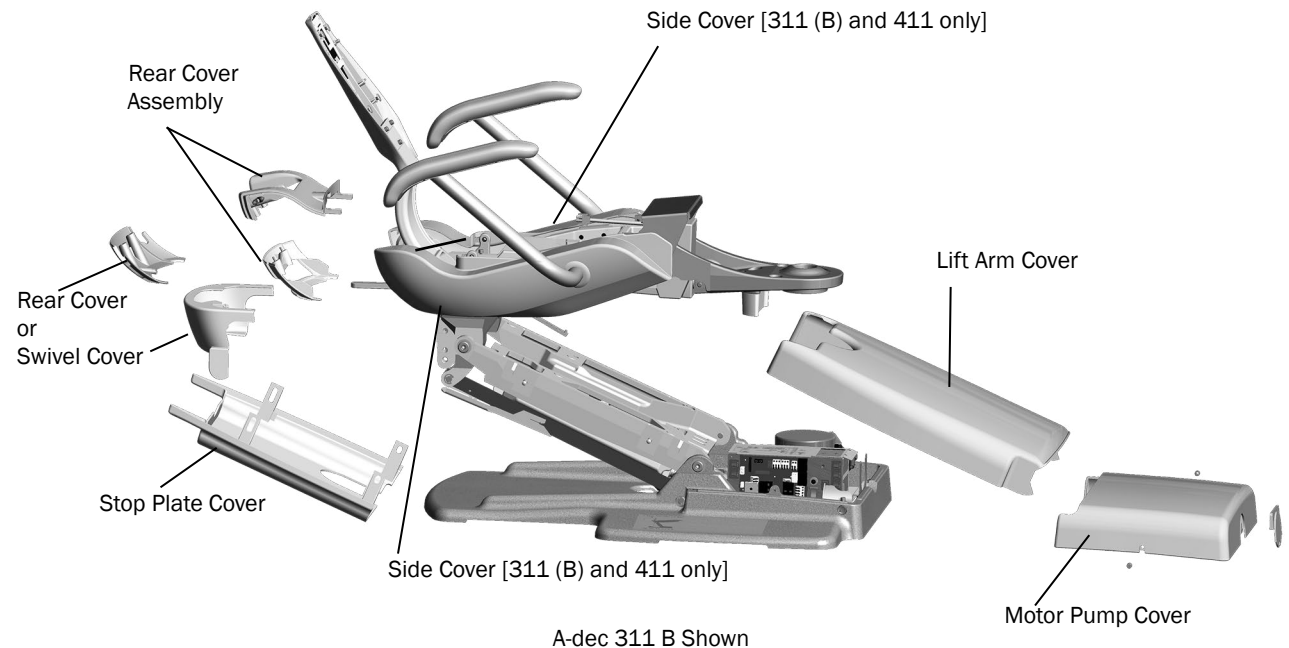
Chair Covers

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 [311 (B) and 411]

Back Upholstery Removal/Attachment



NOTE The 311 (B) and 411 upholstery backs are not interchangeable.

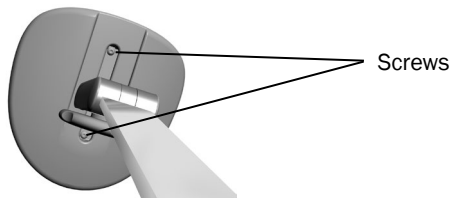
To remove the back, firmly grasp the bottom edge of the cushion and lift up, then lift the upholstery out and away from the chair back support. To reattach the back upholstery, place the key holes on the cushion over the large fastener heads, then push down until it inserts into position.



Headrest Upholstery Removal/Attachment

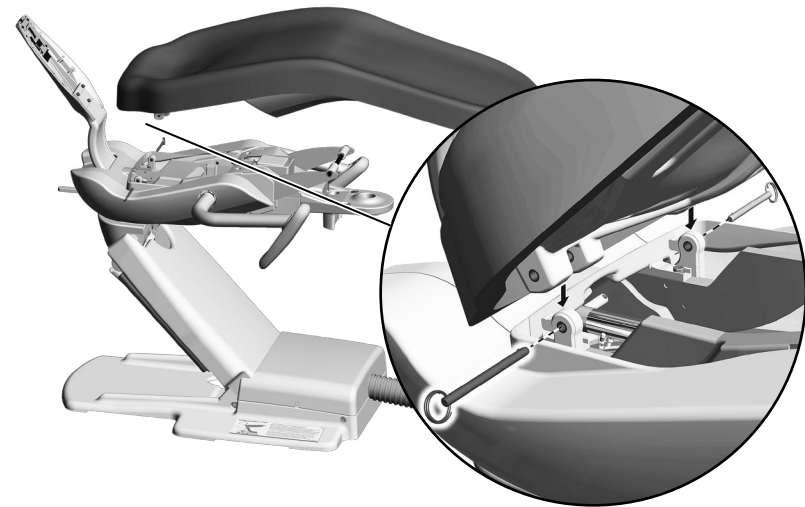
Locking knob and lever release headrests are used with the A-dec 311 (B) and 411. The headrest upholstery installs the same way for both styles. The locking knob headrest is shown.

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



A-dec 411 Shown

Chair Drive System [311 (B) and 411]

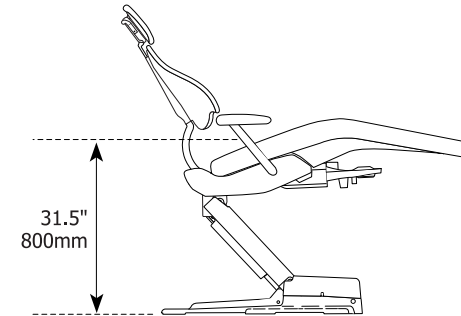
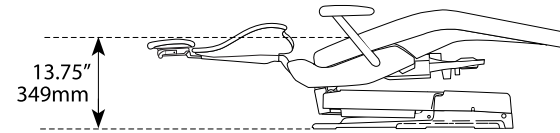
The hydraulic chair system controls the base movement of the chair. An electro-mechanical tilt actuator controls the back movements.

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

311 (B) and 411 (effective January 2015) include an adjustable BASE DOWN speed adjustment: To adjust the BASE DOWN: Use a 3/32" hex key to adjust the speed.

To slow the base down, turn the set screw clockwise.

To speed up the base down, turn the screw counterclockwise.



Hydraulic System [311 (B) and 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 [311 (B) and 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.

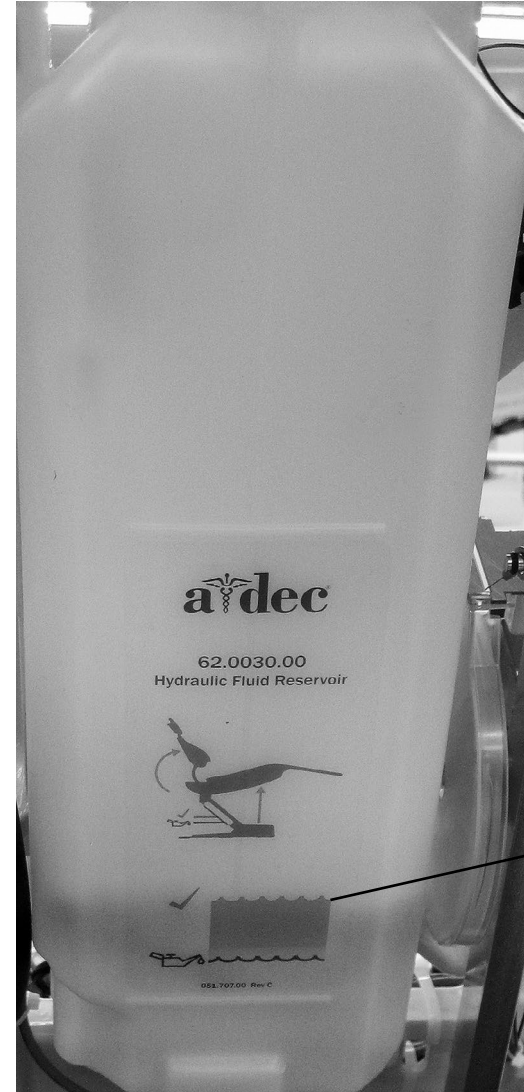
Add hydraulic fluid to the reservoir:

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 (A and B) and 411]



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

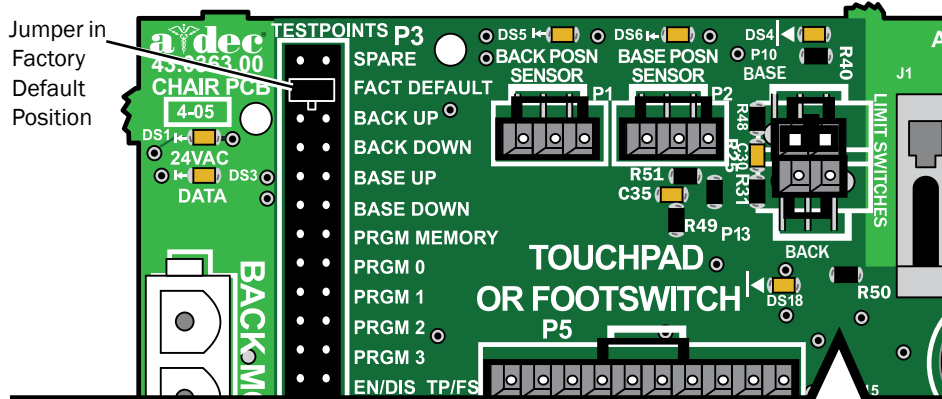
After installing a new chair, circuit board, or position sensor, run the factory default routine. The routine:

- 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.



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.



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.



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

Capacitor Replacement [311 (B)/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.



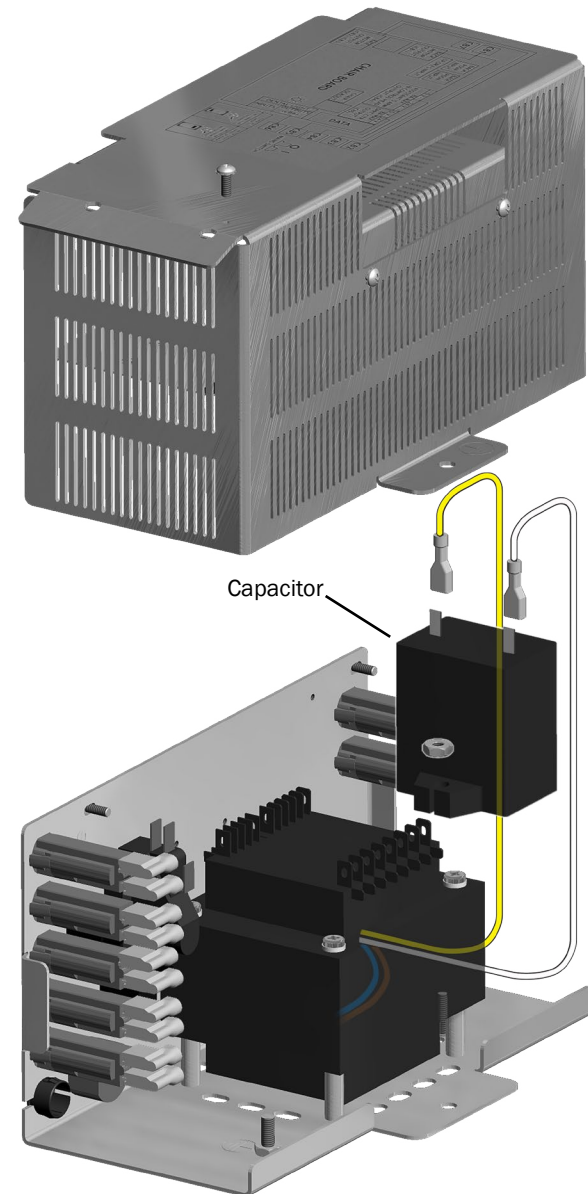
DANGER Turn off the power to the system before you continue with this procedure. Failure to do so can result in electrical shock.



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.

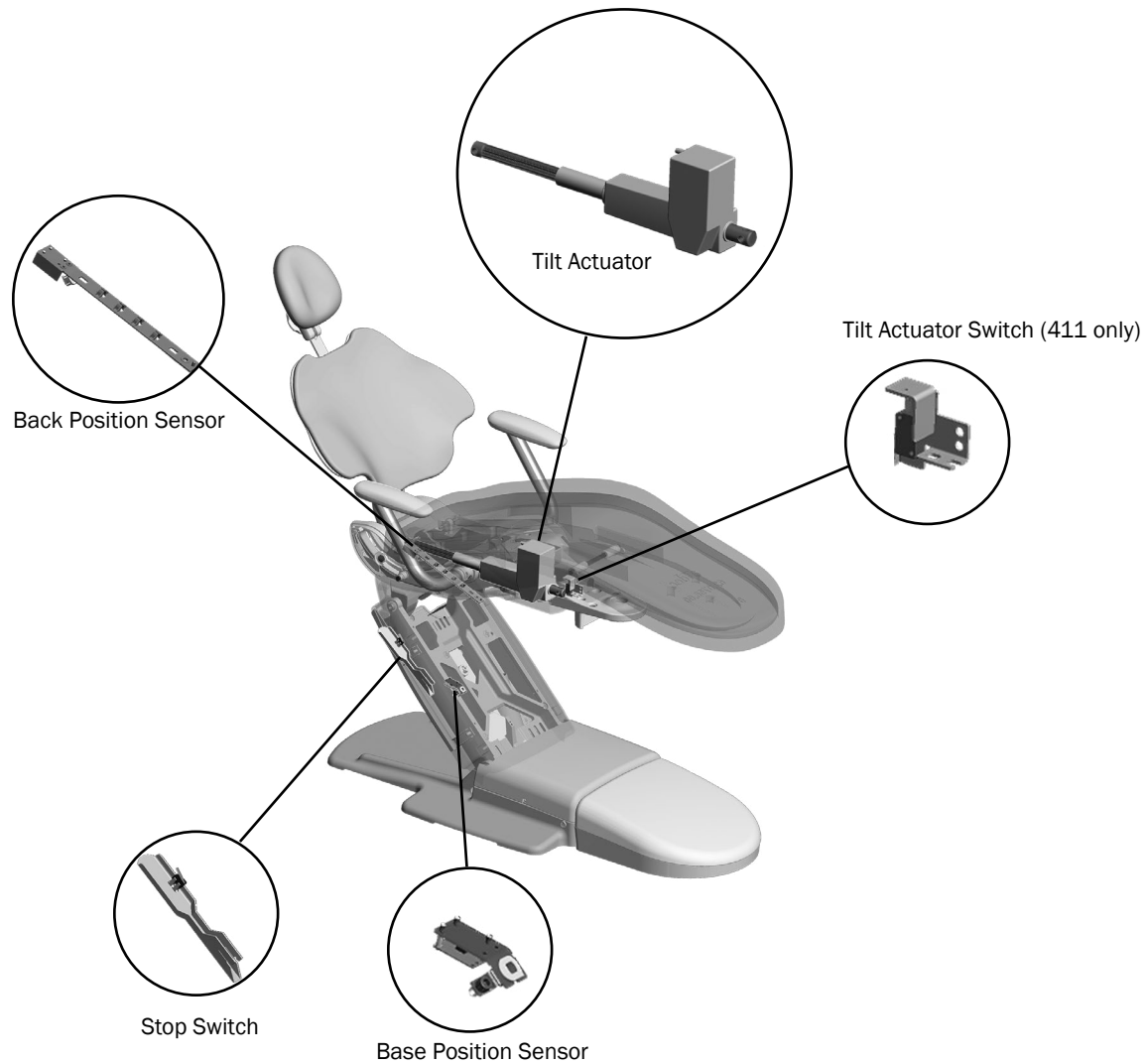
Chair Input Voltages

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 (B) and 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 411 shown

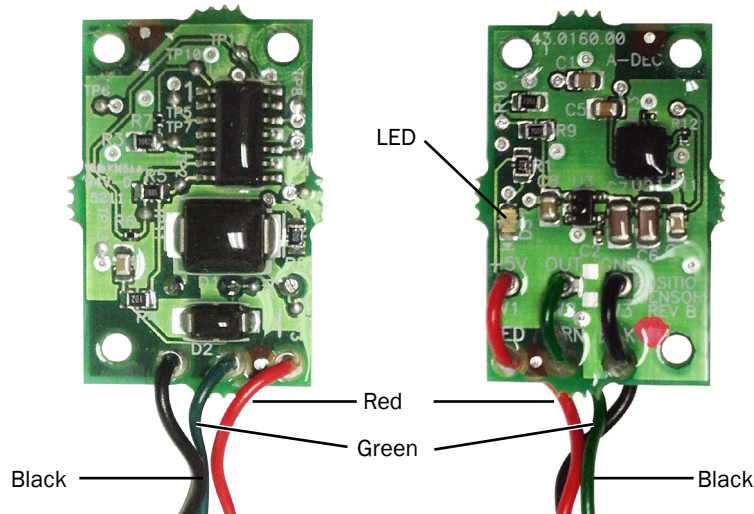
Position Sensor [311 (A and B)/411]

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 [311 (B) and 411]

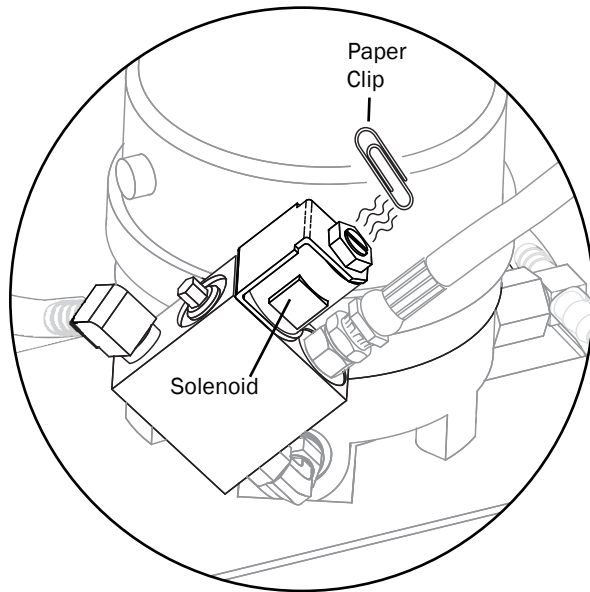
p/n: 62.0317.00 21.6 VDC

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

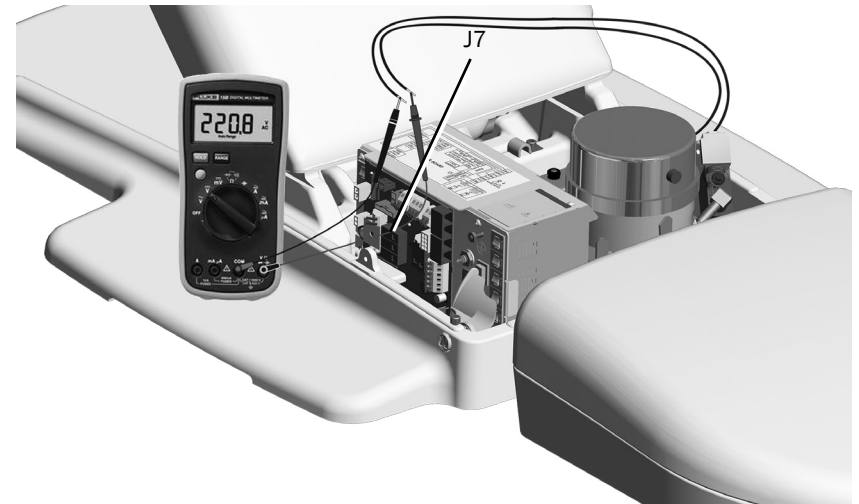


DANGER Turn off the power to the system before you continue with this procedure. Failure to do so can result in electrical shock.



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 [311 (B) and 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.

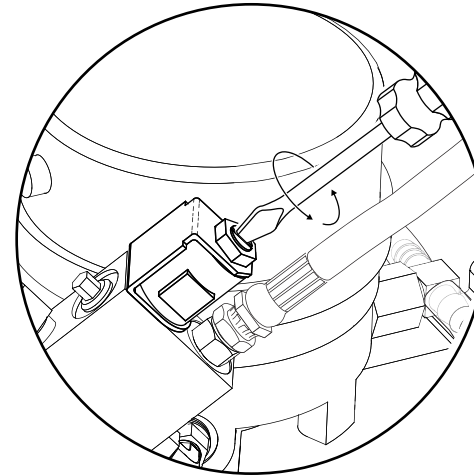
3. Disconnect the solenoid from the chair circuit board, terminal strip J7.

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 [311 (B) and 411]

Stop Switch

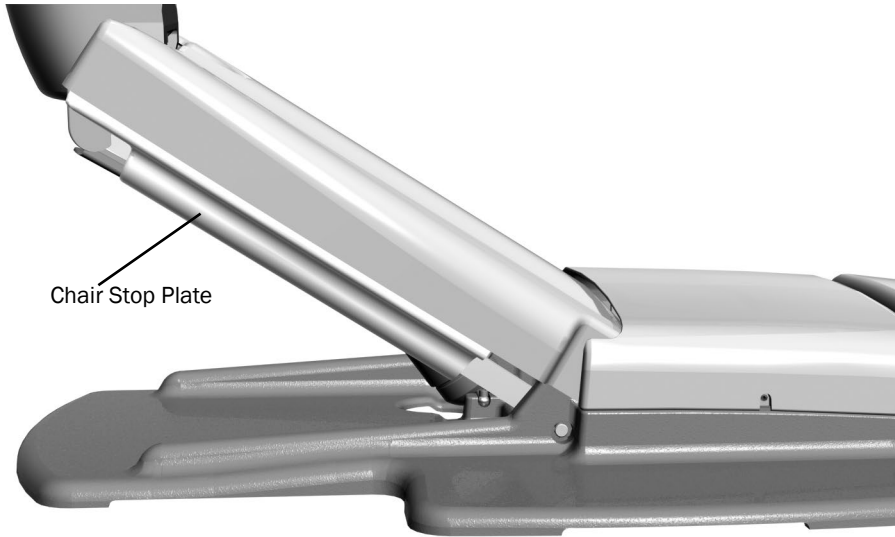
If an object presses against the chair stop plate as the chair is lowered, a stop switch will interrupt and reverse the chair motion. If the object becomes lodged, press the base up button on the footswitch or touchpad. Remove the object and resume normal chair operation.



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

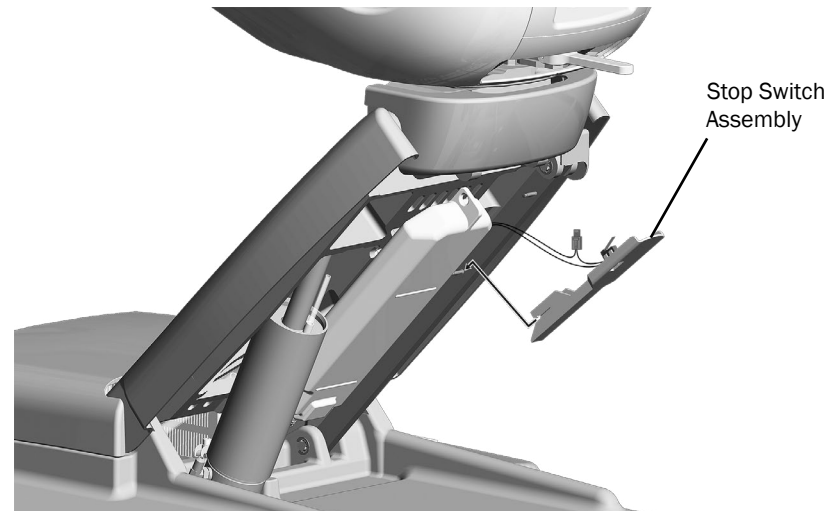
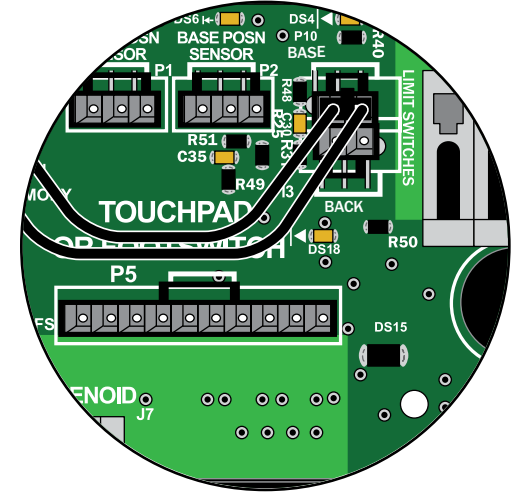


CAUTION Use cable ties to secure wires to the lift arm to prevent kinking and pinching.



Chair Bump-Up Feature [311 (B) and 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 411 Shown

Dual-Articulating Headrest [311 (A)/311 (B)/411]

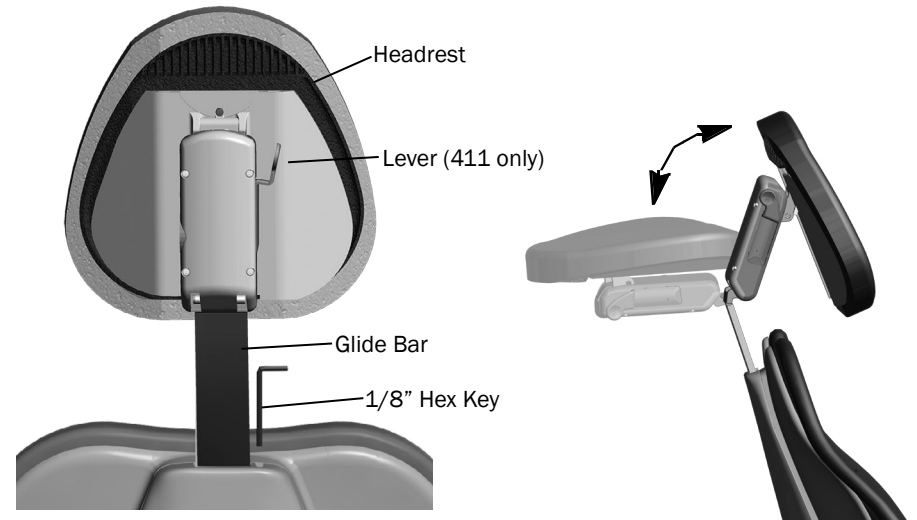
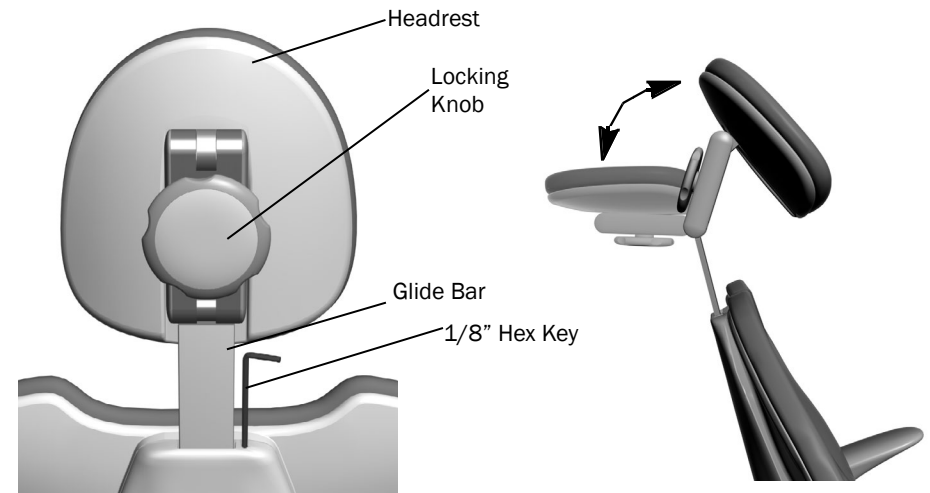
Headrest Adjustment

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 [311 (B) and 411]

Two-Position Armrests Adjustment

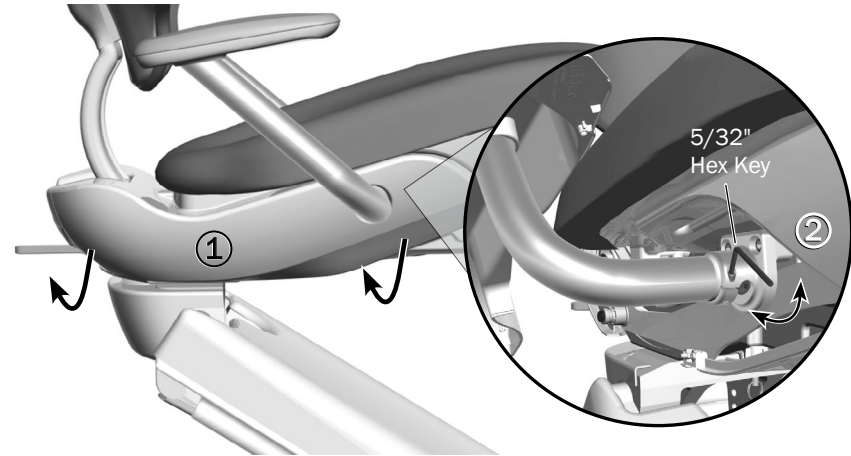
Push or pull the armrests to reposition them in the forward or back position



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.



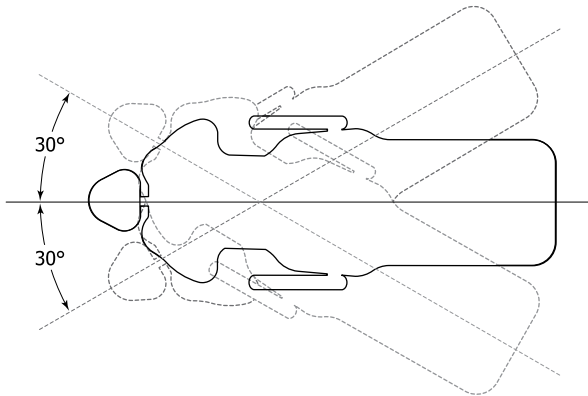
Swivel Brake Adjustment [311 (B) and 411]

Swivel Brake

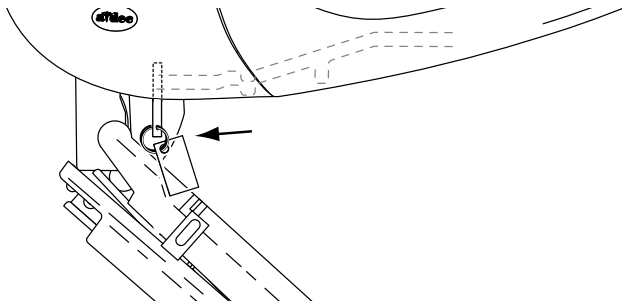
The chair can rotate to any position within 30° either side of center. The chair swivel brake locks the chair in the selected position. To engage the brake, push the brake lever firmly to the left. To release the swivel brake, push the brake lever to the right.



NOTE The 311 (Version B) Dental Chair may not have the swivel break feature.



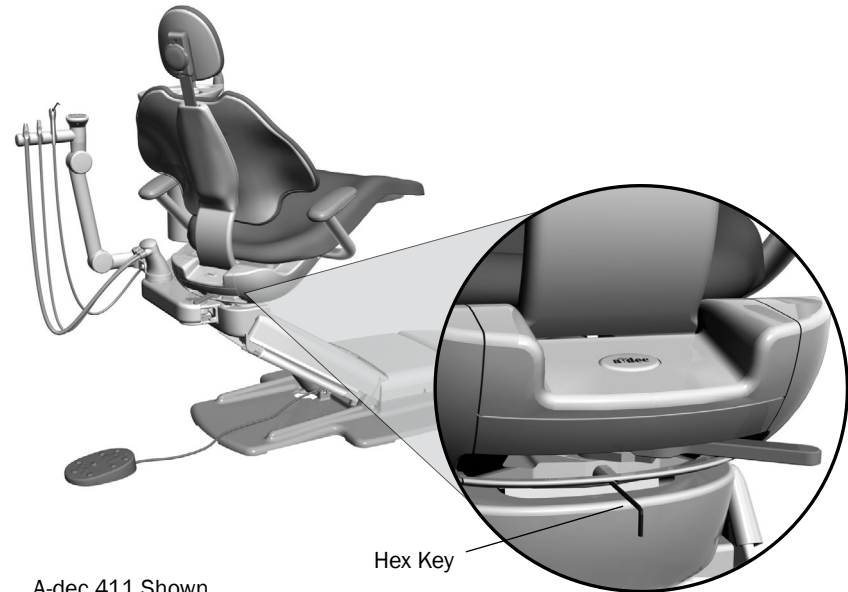
NOTE To disable the swivel feature, reinstall the shipping pin.



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

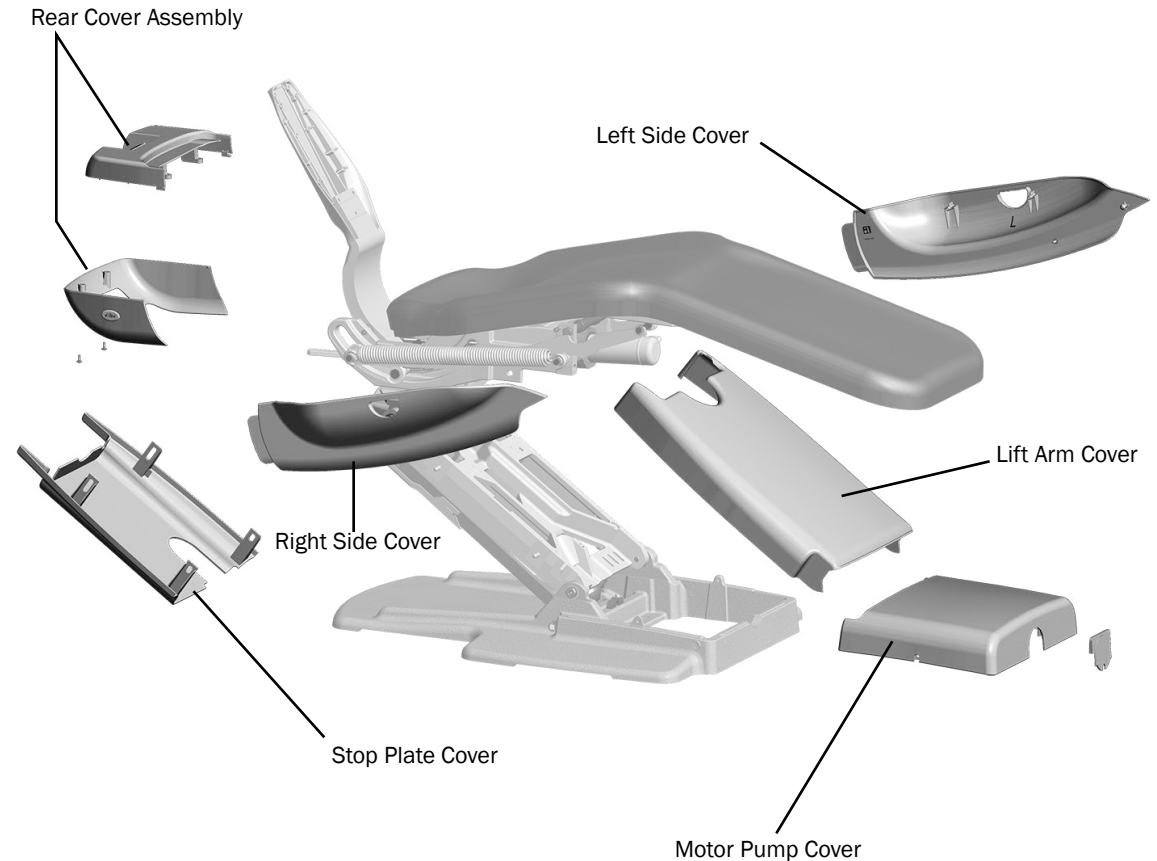
Chair Covers (511)

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.

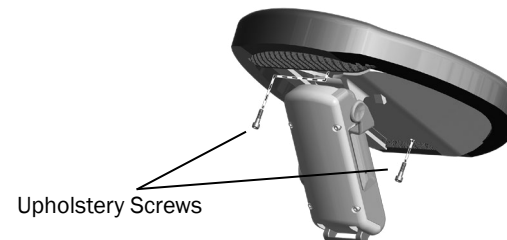


Headrest Upholstery Removal/Attachment

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.

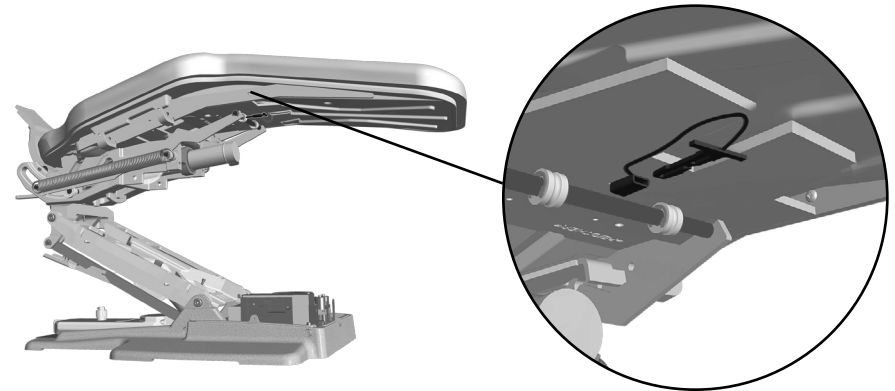


CAUTION Do not remove the positioning mechanism screws or plate. The brake assembly will fall out.



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 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 Position 0
6. Beeps three times

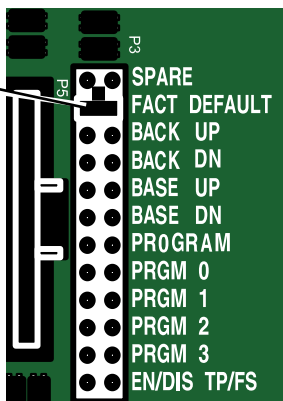


NOTE One beep indicates the routine failed to complete. See page 56 for troubleshooting.



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

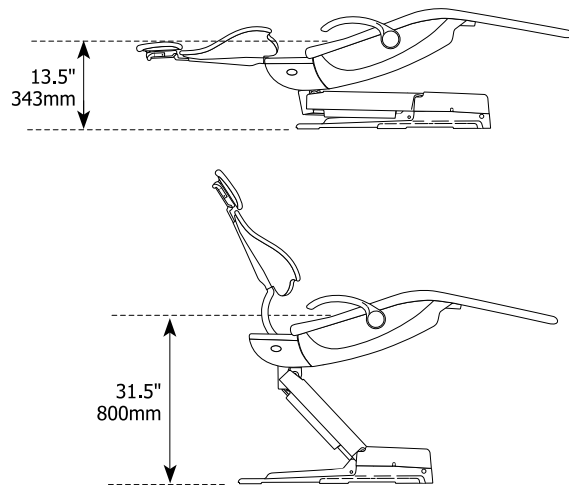


Chair Drive System (511)

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)

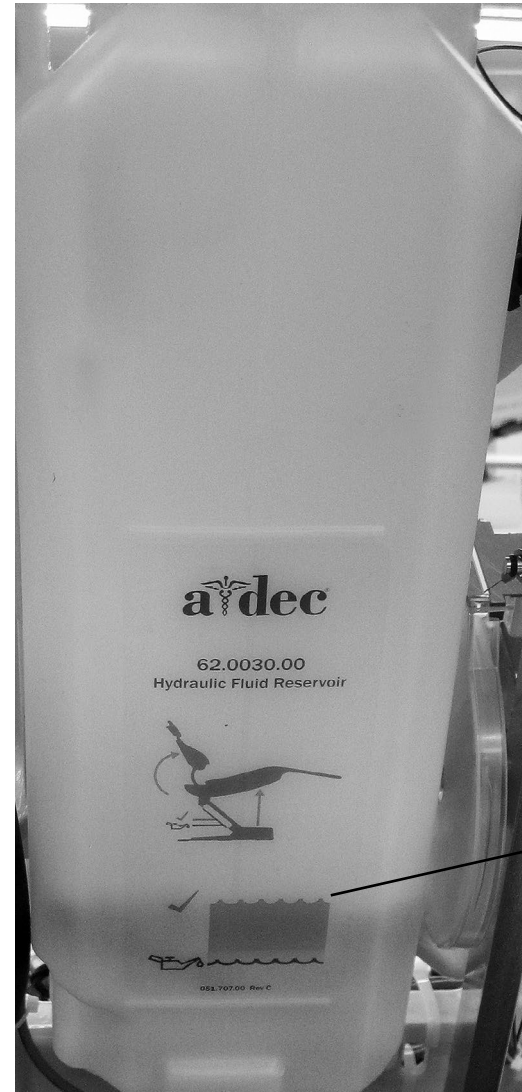
The hydraulic fluid reservoir is located in the lift arm of the chair under the stop plate cover. You can see the fluid level in the reservoir through the sides of the reservoir. Add hydraulic fluid to the reservoir:

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.

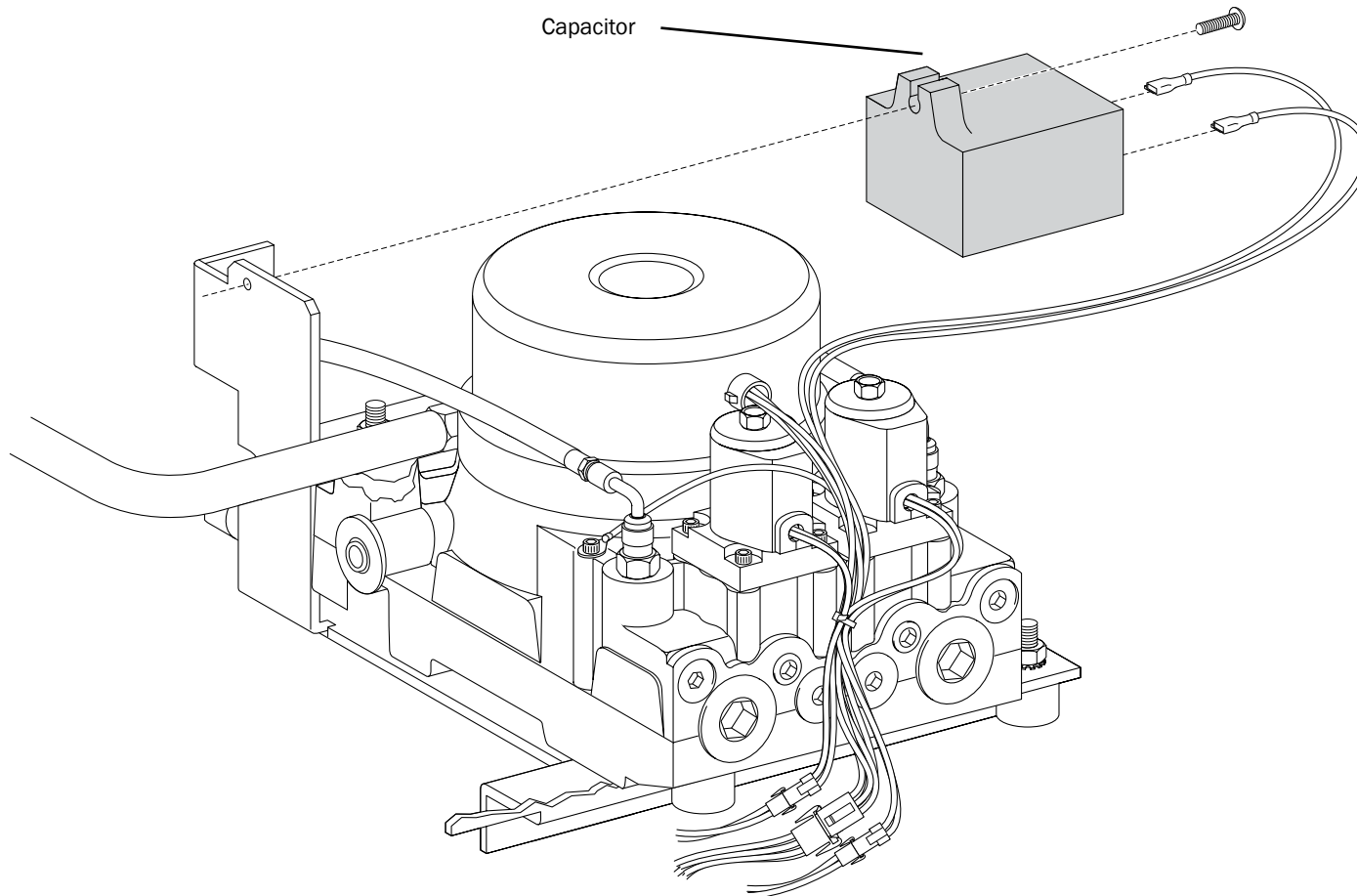


Fluid Level Indicator

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 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.



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.

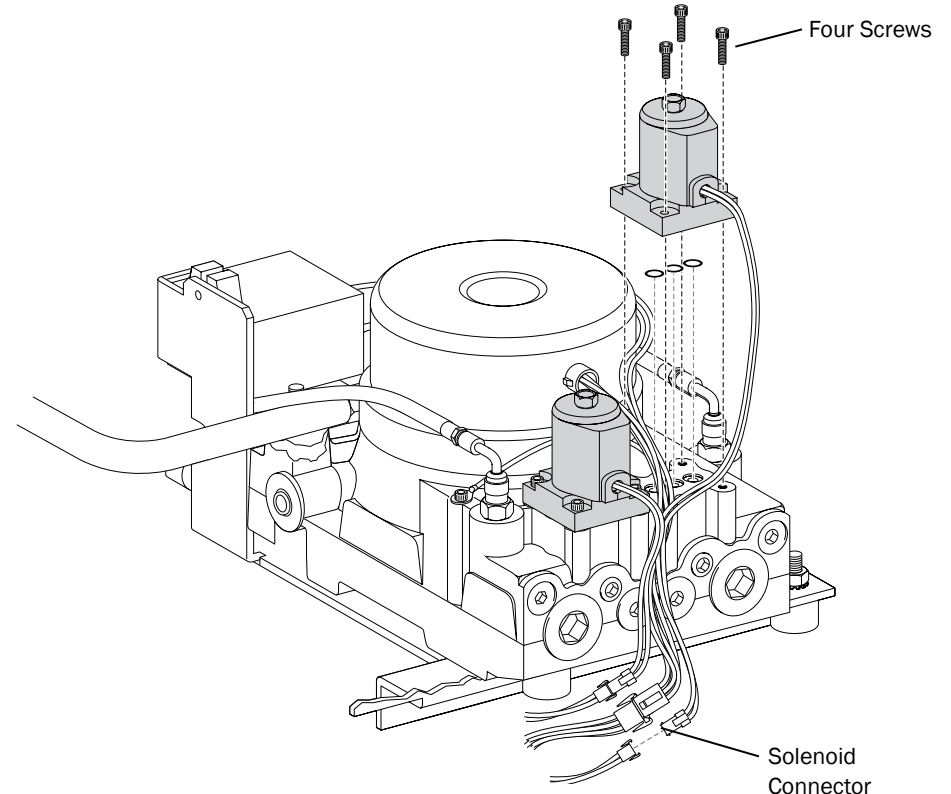


DANGER Turn off the power to the system before you continue with this procedure. Failure to do so can result in electrical shock.



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 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.

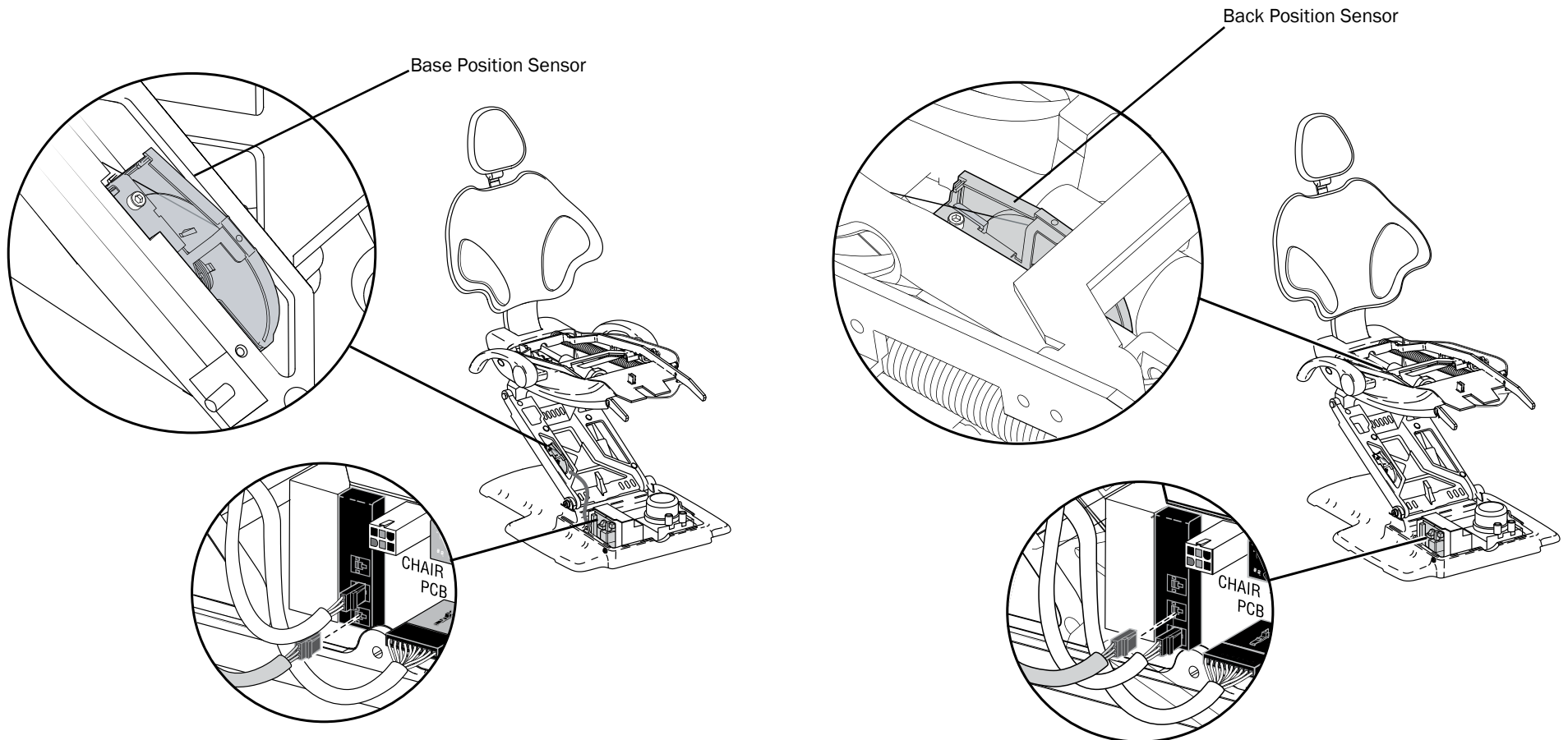


Install the New Solenoid Assembly:

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 (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

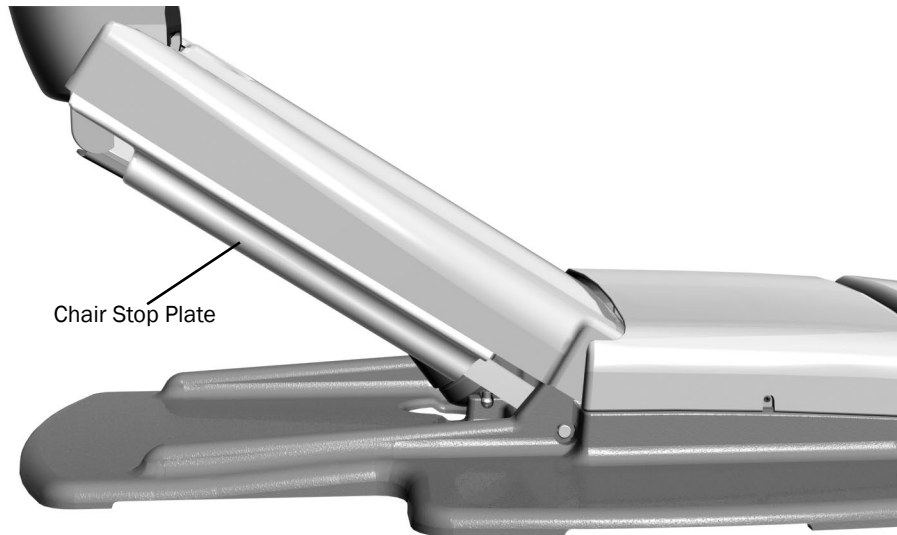
If an object presses against the chair stop plate as the chair is lowered, a stop switch will interrupt and reverse the chair motion. If the object becomes lodged, press base up on the footswitch or touchpad. Remove the object and resume normal chair operation.



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

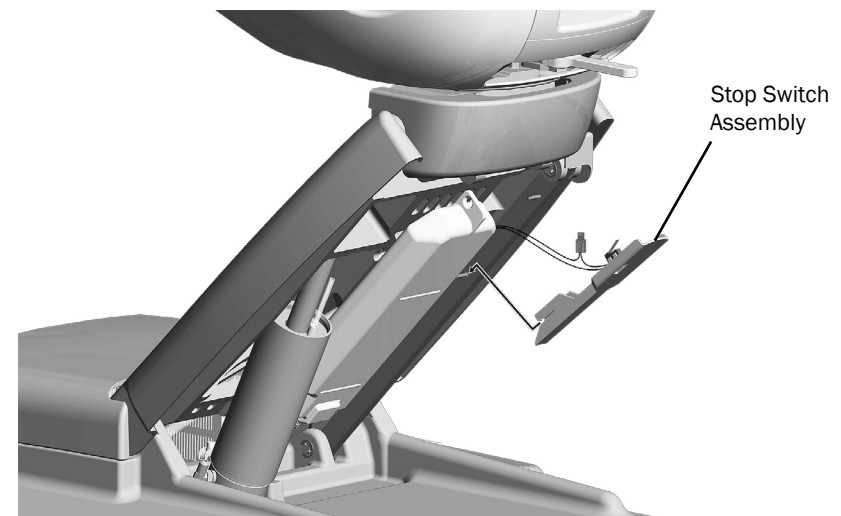
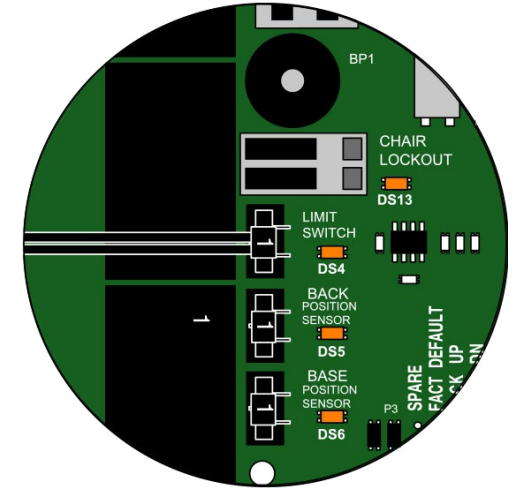


CAUTION Use cable ties to secure the wires to the lift arm to prevent kinking and pinching.



Chair Bump-Up Feature (511)

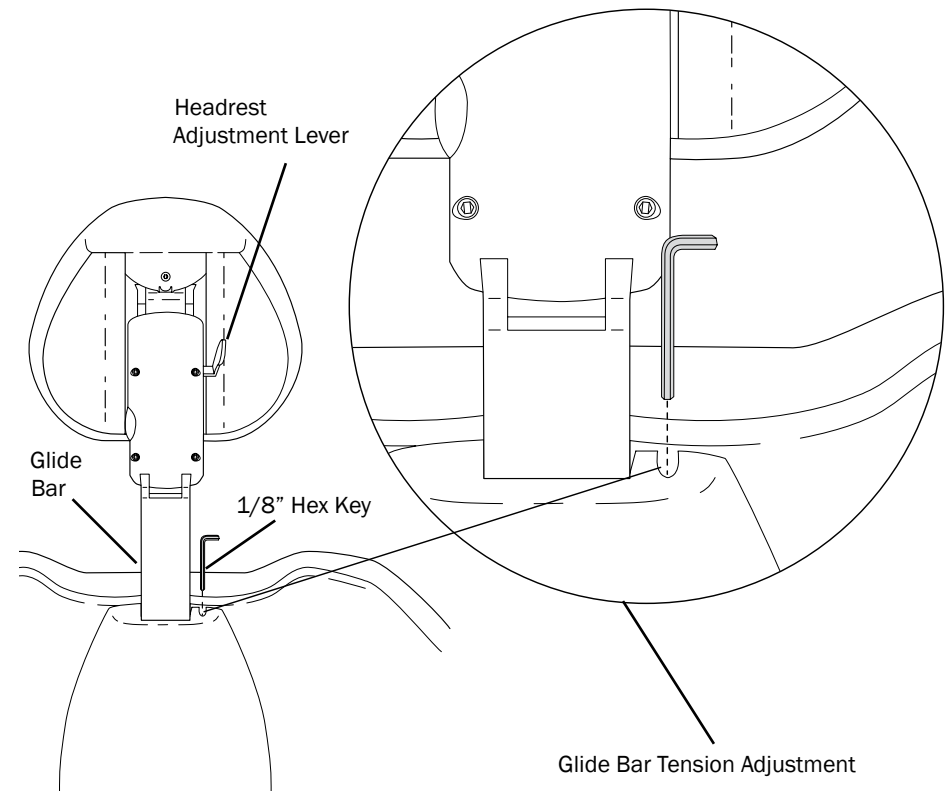
The chair stop plate and the assistant's arm trigger the chair to move upwards if it was moving down when the stop plate switch was activated.



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.

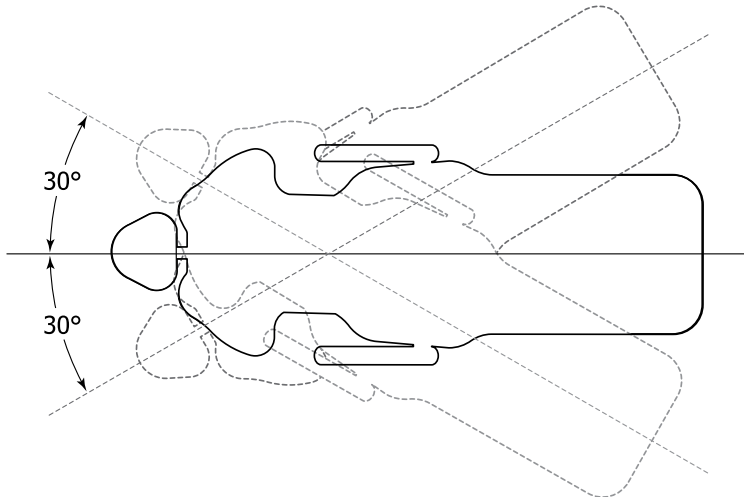
If the headrest drifts downward, or if it is difficult to move up or down, adjust the glide bar tension. To adjust the tension, use a 1/8" hex key and turn the tension adjustment screw clockwise to increase friction or counterclockwise to decrease friction.



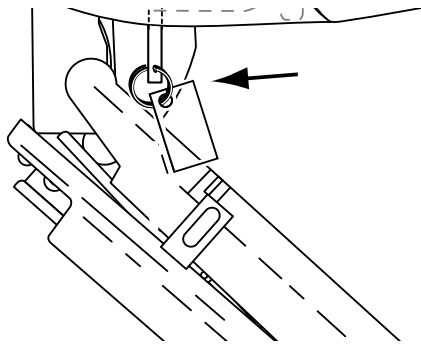
Swivel Brake Adjustment (511)

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.



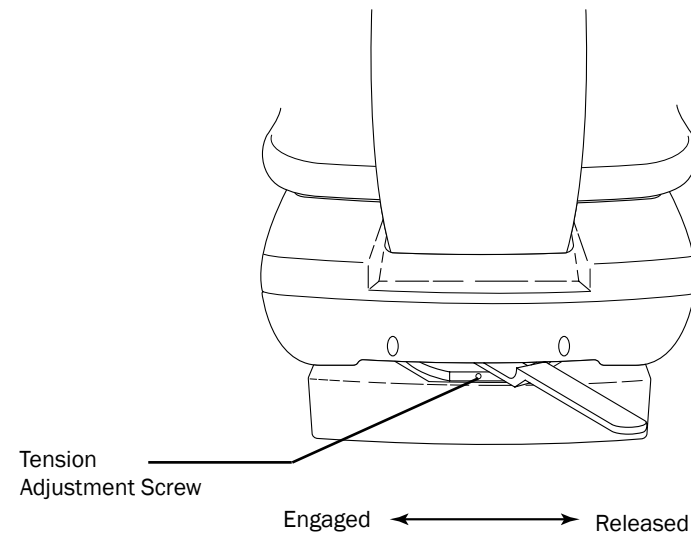
NOTE To disable the swivel feature, reinstall the shipping pin.



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

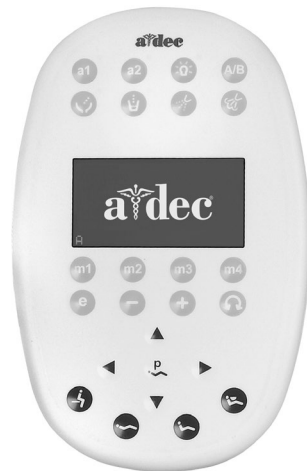
Overview

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 500 Deluxe Touchpad
(Current Model)**



A-dec 300 Deluxe Touchpad



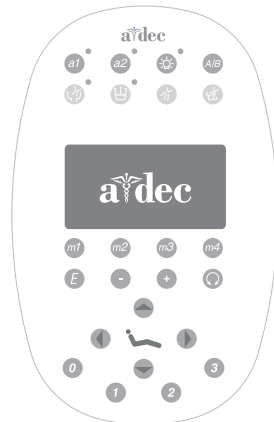
A-dec Footswitch



**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. See page 56 for troubleshooting.



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 Service if troubleshooting assistance is required. See page 4 for contact information.

A-dec 311 (A and B) and 411 Dental Chairs Troubleshooting

A-dec 311 (A and B) and 411 Dental Chairs		
Symptom	Check	Possible Solution
No power .	Check the circuit breakers on the integrated 300 watt power supply.	If circuit breakers are tripped, reset them. If they still trip after resetting, disconnect all cables from the chair circuit board and: <ol style="list-style-type: none"> 1. Reset the circuit breaker. 2. Reconnect the cables one at a time, observing which one causes the circuit to trip. Replace the faulty cable or power supply.
No power, circuit breakers are not tripped.	Check that the master toggle is on and the power switch at the base of the chair is on.	Press the power button at the base of the chair. If the symptoms are unchanged, follow the steps below.
	Check for air pressure at the air electric switch or that the air electric pressure is functional.	If there is a yellow tubing going to the air electric switch on the power supply: <ol style="list-style-type: none"> 1. Turn the master toggle off and bleed the air from the system. 2. Remove the yellow tubing from the air electric switch on the power supply. 3. Turn the master toggle on and check for air. <ul style="list-style-type: none"> • If there is no air, troubleshoot the air supply. • If there is air, bypass the air electric switch by flipping the rocker switch below the tubing connection. If power is present with the switch bypassed, replace the air electric switch.
Chair “limps along.” The base or back moves only about one inch (a few centimeters) at a time, and then stops.	Check the position sensor.	<ol style="list-style-type: none"> 1. Check the power LED on the position sensor circuit board. It should be on. If it is off, the position sensor may be unplugged, not receiving power from the circuit board, or may have a faulty cable. 2. Check the diagnostic LED on the chair circuit board for the position sensor. 3. Check the position sensor circuit board for signs of moisture or damage. 4. Contact Customer Service.
Chair “loses memory.” Manual functions or preset functions randomly stop.	Check to see if there is a DCS compatible light connected to the system.	<ol style="list-style-type: none"> 1. Unplug the data cable from the chair circuit board to the light and test the system. 2. If the system functions, run an external data cable from the circuit board to the chair and test the system again. <ul style="list-style-type: none"> • If the system functions, replace the data cable. • If the system doesn't function, contact Customer Service.

A-dec 311 (A and B) and 411 Dental Chairs

Symptom	Check	Possible Solution
Base doesn't move to the full range of motion.	Check that the position sensor wires are connected and not damaged.	Reconnect or replace the position sensor. If the base still doesn't move to the full range of motion, follow the steps below.
	Check to see if an optional height limit has been set.	Optional height limits can be set to prevent the base from travelling the full range of motion. Running factory default will not remove optional height limits. To remove: Move the jumper on the testpoints from the SPARE position to EN/DS/TP/FS. <ol style="list-style-type: none">1. Press and hold the button on the touchpad or footswitch that is not functioning correctly. For example, if the base is not travelling the full range of motion, press and hold the base up button.<ul style="list-style-type: none">• One beep confirms a height limit is removed, three beeps confirms a new height limit has been set.2. Remove the jumper from EN/DS/TP/FS and test the system function again.
Limited or no movement from the footswitch.	Check for a broken or disconnected footswitch cable.	Reconnect or replace the footswitch cable.
No back up or down movement.	Check if the chair back motor is disconnected.	Plug in the chair back motor and test the chair movement again.
	With the motor plugged in, check the voltage output from the chair circuit board to the motor.	<ol style="list-style-type: none">1. Set meter leads in the back side of the white Molex connector attached to the motor.2. The reading should be 20-22 VDC. If voltage is not present, check the incoming power to the circuit board and replace the chair circuit board if needed.
No base up movement.	Check the chair movement with testpoints.	Remove the touchpad or footswitch cable and move the chair with the testpoints on the chair circuit board.
		If the chair moves from the testpoints on the circuit board, see "Limited or no movement from footswitch."
		If the chair doesn't move from the testpoints, check the circuit board for loose or broken wire connections going from the circuit board to the pump. Reconnect the cables. If wire connections are functioning correctly, replace the capacitor.

A-dec 311 (A and B) and 411 Dental Chairs		
Symptom	Check	Possible Solution
No base down movement.	Check the A-dec logo on the touchpad or the status LED on the chair circuit board to see if the status light is blinking.	<p>If the status LED is blinking, see "No base or back down function, up functions work normally."</p> <p>If the status LED is not blinking, check the touchpad and/or footswitch cables and move the chair from the testpoints on the circuit board to see if the chair moves.</p> <p>If the chair moves, see "limited or no movement from the footswitch."</p> <p>Is DS12 illuminated when the base down is pressed?</p> <ul style="list-style-type: none"> • No – replace the chair circuit board • Yes – look for kinked hydraulic hoses. If hoses are not kinked, replace the solenoid.
No base or back down movement, up moves normally.	Check the A-dec logo on the touchpad or the status LED on the chair circuit board to see if it is flashing.	<p>If the LED is flashing, a safety switch has been activated. Remove any obstructions from the chair path and test the system.</p> <p>If the chair works, no further repairs are needed.</p> <p>If the chair doesn't function, check the limit switch connections on the chair circuit board (DS4 and DS18). Is DS4 illuminated?</p> <p>311 (A) chair: If DS4 or DS18 is illuminated, make sure jumpers are installed in P10 and P13. Replace jumpers if they are not installed on the chair circuit board. If the problem persists, replace the chair circuit board.</p> <p>311 (B) chair: If DS4 is illuminated, check the wire harness and connection for the base limit switch. Remove the wire harness, and place a jumper in P10. Does the DS4 go off?</p> <ul style="list-style-type: none"> • Yes – remove the jumper and replace the base limit switch. • No – replace the chair circuit board. <p>If DS18 is illuminated, check to see that there is a jumper installed in P13. Replace the jumper if needed. If DS18 still doesn't turn off, replace the chair circuit board.</p> <p>411 chair: If DS4 or DS18 is illuminated, remove wire harness and place a jumper in P10 or P13. Does DS4 or DS18 turn off?</p> <ul style="list-style-type: none"> • Yes – replace the base limit switch. • No – replace the chair circuit board.

A-dec 511 Dental Chairs Troubleshooting

A-dec 511 Dental Chair		
Symptom	Check	Possible Solution
No power.	Check the circuit breakers on the integrated 300 watt power supply.	<p>If the circuit breakers are tripped, reset them. If they still trip after resetting, disconnect all cables from the chair circuit board and:</p> <ol style="list-style-type: none"> 1. Reset the circuit breaker. 2. Reconnect the cables one at a time, observing which one causes the circuit to trip. 3. Replace faulty cable or power supply.
No power, circuit breakers are not tripped.	Check the master toggle is on and the power switch at the base on the chair is on.	Press power button at the base of the chair. If symptoms persist, follow the steps below.
	Check for air pressure at the air electric switch or that the air electric pressure is functional.	<p>If there is a yellow tubing going to the air electric switch on the power supply:</p> <ol style="list-style-type: none"> 1. Turn the master toggle off and bleed the air from the system. 2. Remove the yellow tubing from the air electric switch on the power supply. 3. Turn the master toggle on and check for air. <ul style="list-style-type: none"> • If there is no air, troubleshoot the air source. • If there is air, bypass the air electric switch by flipping the rocker switch below the tubing connection. If power is present with the switch bypassed, replace the air electric switch.
Chair “limps along.” The base or back moves only about one inch at a time then stops.	Check the base or back position sensor cable.	Replace the position sensor as needed. Contact customer service for possible warranty replacement.
Chair “loses memory.” Manual functions or preset functions randomly stop.	Check to see if there is a DCS compatible light connected to the system.	<ol style="list-style-type: none"> 1. Unplug the data cable from the chair circuit board to the light and test the system. 2. If it the system functions, run an external data cable from the chair circuit board to the chair and test the system again. <ul style="list-style-type: none"> • If the system functions, replace the data cable. • If the system doesn't function, contact Customer Service.

A-dec 511 Dental Chair		
Symptom	Check	Possible Solution
Base or back does not move to the full range of motion.	Check that the position sensor wires are connected and not damaged.	Reconnect or replace the position sensor.
	Check that the position sensor cables are connected to the right position on the chair circuit board and are not swapped.	The back position sensor should be connected at P1 and the base position sensor should be connected at P2.
Base only does not move to the full range of motion.	Check to see if an optional height limit has been set.	<p>Optional height limits can be set to prevent the base from travelling the full range of motion. Running factory default will not remove optional height limits. To remove:</p> <ol style="list-style-type: none"> 1. Move the jumper on the testpoints from the SPARE position to EN/DS/TP/FS. 2. Press and hold the base up or base down button on the touchpad or footswitch. For example, if the base is not going up all the way, press and hold the base up button. <ul style="list-style-type: none"> • One beep confirms a height limit is removed, three beeps confirms a new height limit has been set. 3. Remove the jumper from EN/DS/TP/FS and test the system again.
Limited or no chair functions from the footswitch.	Check for a broken or disconnected footswitch cable.	Reconnect or replace the footswitch cable.
	Check the footswitch functions.	<p>Unplug the footswitch cable from the chair circuit board and test chair functions from the testpoints on the chair.</p> <p>If the chair works from the testpoints and there is no damage to the footswitch cable, replace the footswitch membrane.</p>
No base or back up movement. Base down moves normally.	Check the motor and capacitor connections at the chair circuit board.	<p>High voltage warning: If the relay clicks and DS9 (for back) or DS11 (for base) illuminates, check the voltage going to the pump as follows:</p> <ol style="list-style-type: none"> 1. Turn off power to the chair. 2. Place meter leads in the back of the white Molex connector going to the pump. <ul style="list-style-type: none"> • Red wire = neutral • Yellow wire = back up • White wire with red stripe = base up 3. Turn the chair on and activate either base up or back up. The reading should be around 120 VAC. 4. If the voltage is correct, replace the capacitor.

A-dec 511 Dental Chair

Symptom	Check	Possible Solution
No base or back down movements. Base up moves normally.	Check the A-dec logo on the touchpad or the status LED on the chair circuit board to see if it is flashing.	<p>If the status LED is flashing: A safety switch has been activated. Remove any obstructions from the chair path and test the system. If the chair functions, no further repairs are needed.</p> <p>If the chair does not function, check the limit switch connection on the circuit board (DS4). Is DS4 illuminated? Yes – Remove the limit switch wire harness from P10. Install a jumper into the limit switch position P10. Does the LED turn off? <ul style="list-style-type: none">• No- replace the chair circuit board.• Yes- remove the jumper and plug in the limit switch connector. Replace the limit switch.</p> <p>Note: If there is equipment mounted on the back of the chair, there are two different limit switches. <ul style="list-style-type: none">• Safety plate limit switch- under the safety plate• Lower support arm switch- mounted on a plate underneath the brake handle.To determine which switch has failed, disconnect the two switches and place the jumper in the safety plate switch wire harness. Does DS4 on the chair circuit board turn off? <ul style="list-style-type: none">• Yes – replace the lower support arm limit switch.• No – replace the safety plate limit switch.</p> <p>If the status LED is not flashing: Remove touchpad or footswitch and operate the chair from the testpoints on the chair circuit board. If the chair functions, see “Limited or no functions from the footswitch.”</p> <p>If the chair does not function, check DS10 (for back) or DS12 (for base) to see if they turn on and you hear an audible "click" when the relay activates. If so, check the following: <ol style="list-style-type: none">1. Check for kinks or pinches in the hydraulic hose.2. Check for a defective solenoid by swapping the solenoid electrical connections. For example, if the base won't go down, swap the base and back solenoid cables, and then press back down. Does the base go down? <ul style="list-style-type: none">• Yes – replace the chair circuit board.• No – replace the solenoid.</p>

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Symptom	Check	Possible Solution
No chair functions at all	Check that the two screws on the bottom of the foot control are secure.	If they are loose, tighten the screws and test the chair functions again.
	Check DS3 on the chair circuit board	If DS3 is illuminated, disconnect the data cable from the chair circuit board. Does DS3 turn off? <ul style="list-style-type: none">• Yes- the chair lockout signal is being generated from the delivery system. Call Customer Service.• No- the chair lockout signal is being generated at the chair circuit board. Replace the chair circuit board.

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

