

A-dec 200 Service Guide

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Overview

This guide provides service information for the A-dec 200 dental system, including the chair, programming, delivery system, cuspidor and support center, assistant's instrumentation, utilities, and dental light. Users of this guide should understand basic operation and maintenance of dental and medical equipment.



CAUTION Possible injury or equipment damage. Service to be performed by trained personnel only.

Get Support

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

International Customer Service

2601 Crestview Drive
Newberg, Oregon 97132
Telephone: 1 (503) 538-9471 or 1 (503) 538-7478
Fax: (503) 538-5911
Internet: www.a-dec.com

Other Sources of Information

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. Service documents include:

- *A-dec 200 Service Reference* (p/n 86.0324.00)
- *A-dec Dental Lights and Monitor Mounts Service Guide* (p/n 86.0326.00)
- *A-dec Dental Lights and Monitor Mounts Service Reference* (p/n 86.0328.00)
- *A-dec 300, 400, and 500 Delivery Systems Service Guide* (p/n 86.0382.00)
- *A-dec 300, 400, and 500 Delivery Systems Service Reference* (p/n 86.0383.00)
- *A-dec 311, 411, and 511 Dental Chairs Service Guide* (p/n 86.0380.00)
- *A-dec 311, 411, and 511 Dental Chairs Service Reference* (p/n 86.0381.00)

Electronic Documentation

The latest versions of A-dec service documents, product installation guides, and instructions for use 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.

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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.

Regulatory Information

Regulatory information mandated by agency requirements 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.

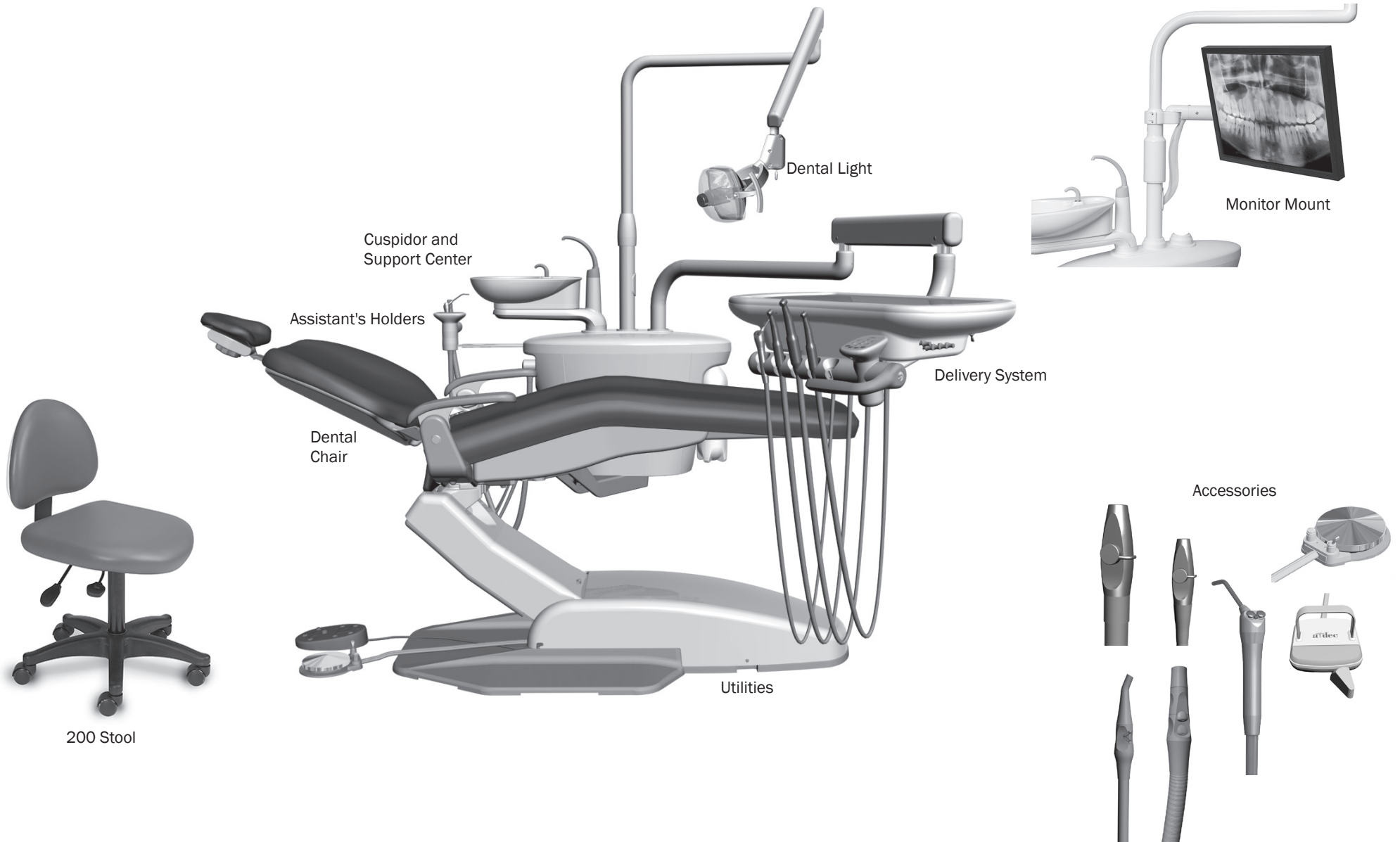
Product Models and Versions Covered in This Document

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
200	A	Dental Chair
200	A	Delivery System
200	A	Support System
200	A	Assistant's Instrumentation
200	B	Dental Light
200	A	Monitor Mount
200	A	Stool

A-dec 200 System Map

A-dec 200 basic system configuration

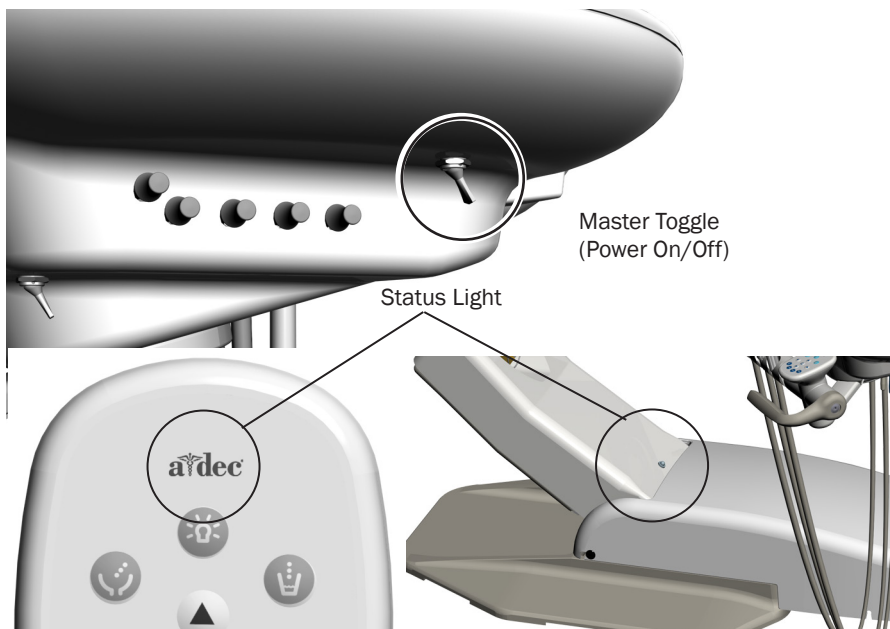


Dental Chair

Dental Chair Overview

Power and Status

The chair and system are controlled by the master toggle on the delivery system. The power should always be turned off for service. When the A-dec logo on the touchpad or the status light on the chair lift arm are illuminated, the system is on and ready for use. If the status light blinks, the limit switch has been activated.

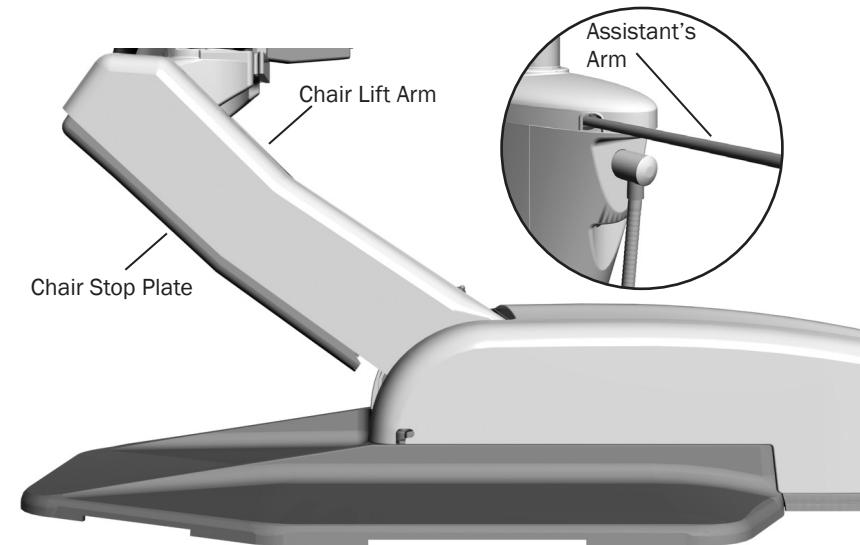


Limit Switch

Activated stop switches may halt the chair or prevent it from moving. To help ensure uninterrupted chair motion:

- Remove any potential obstructions under the chair and attached modules.
- Avoid pressing the foot control disc or lever.
- Keep handpieces properly seated in their holders.

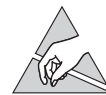
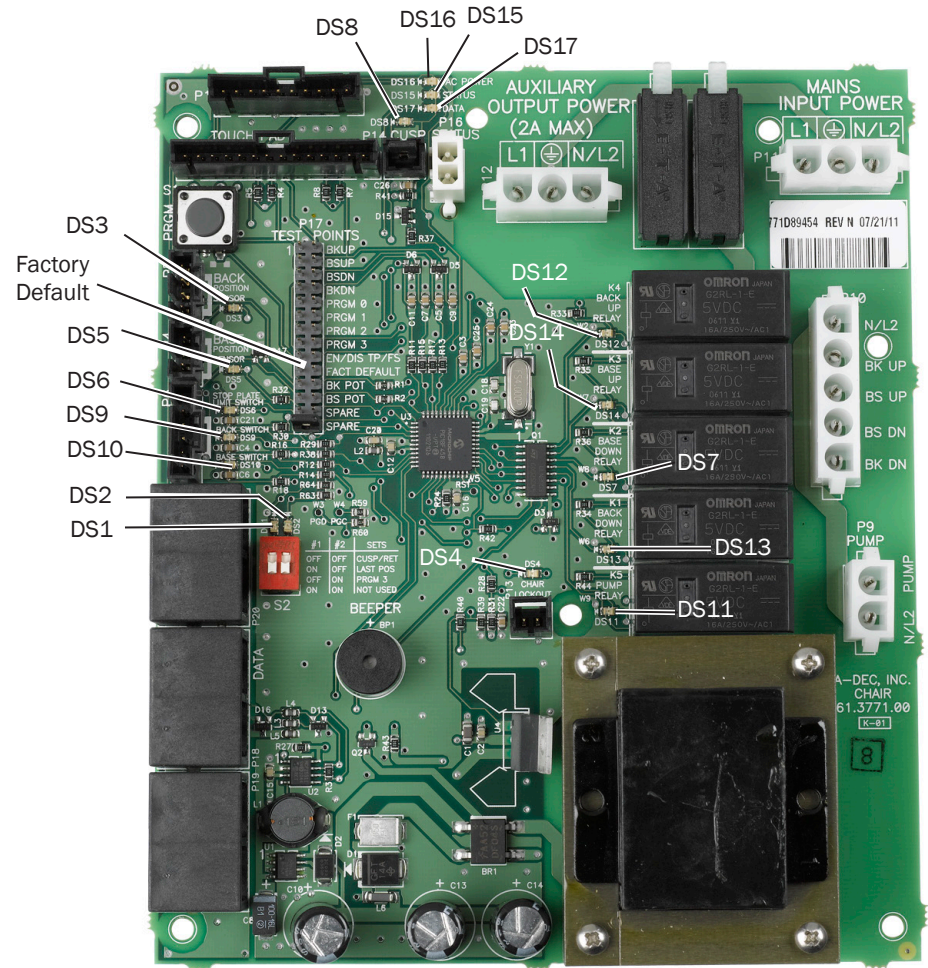
If the chair stops unexpectedly, check the actions listed above to correct the condition. If the downward movement of the chair stopped because of an obstruction, use the touchpad or footswitch to raise the chair and remove the obstruction.



Chair Circuit Board Components

LED Identification

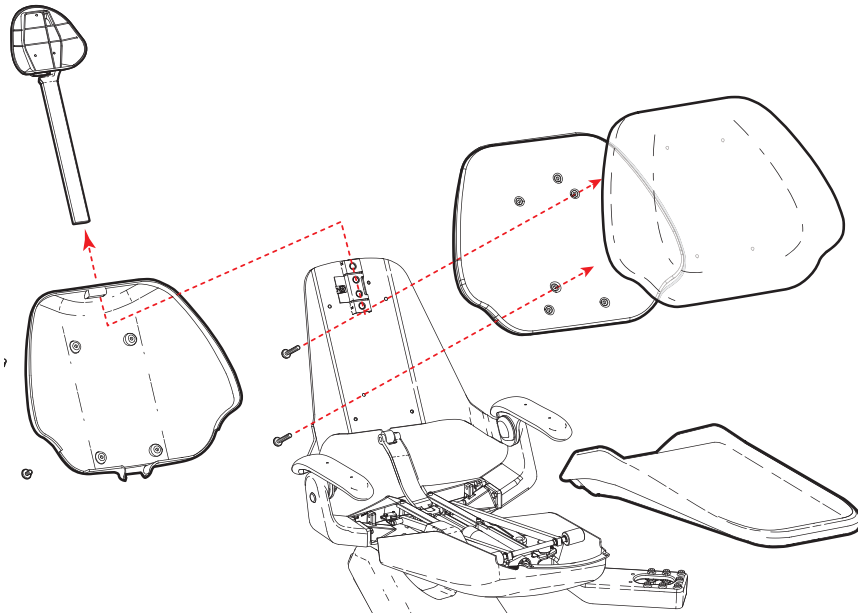
LED	Status	Description
DS16 - AC POWER	Off	No 24 VAC power, tripped circuit breaker, power supply turned off, no line voltage
	Green, steady	24 VAC at the terminal strip
DS15 - STATUS	Off	System is not functioning, no power or circuit board has failed
	Green, steady	Normal operation
DS17 - DATA	Off	No DCS communication, not connected to the DCS, or DCS has failed
	Green, steady	Detects active DCS
DS6 STOP PLATE LIMIT SWITCH	Off	Closed, (normal)
	Red	Open, (activated)
DS4 - CHAIR LOCKOUT	Off	Open, (normal)
	Red	Closed, (activated)
DS3 Base and DS5 Back- Position sensors	Off	Position sensor is idle
	Yellow, steady	Position sensor is moving correctly
	Yellow fast blink	Upper end of travel
DS7, DS13, DS12, DS14 - Chair relay LEDs	Off	Relay is off
	On	Relay is on
DS8 - Cuspidor Limit Switch	Off	Limit switch is off (inactive)
	Yellow, steady	Limit switch is on (active) (Hard wired or via DCS)
DS9 - Back and DS10 Base - Limit switch	Off	Limit switch is off (inactive)
	Yellow, steady	Limit switch is on (active)
DS11 - Pump Motor Relay	Off	Pump motor relay is off (inactive)
	Yellow, steady	Pump motor relay is on (active)
DS1, DS2	UP	A switch in UP is on (active)
	DN	A switch in the DN position is off (inactive)



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.

Remove the Upholstery and Covers

1. Remove the headrest from the chair back.
2. Remove the back cover screws that mount it to the back and back armature, and remove the back cover.
3. Remove the two screws that secure the armature to the chair back pan and remove the back upholstery and armature.
4. Remove the two ball pins from underneath the seat at the rear to remove the seat upholstery.



Factory Default Routine

When a new circuit board is installed in the chair, factory default routine needs to be run to learn the range of motion of the chair. The routine:

- Sets the base and back upper limits
- Calculates new presets based on actual range of motion of the chair
- Verifies that the potentiometers work

To start the factory default routine, place the spare jumper in the factory default position on the P17 test points of the chair circuit board (see "Chair Circuit Board Components" on page 7 for reference).

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. Successful factory default beeps three times/failed factory default beeps one time.



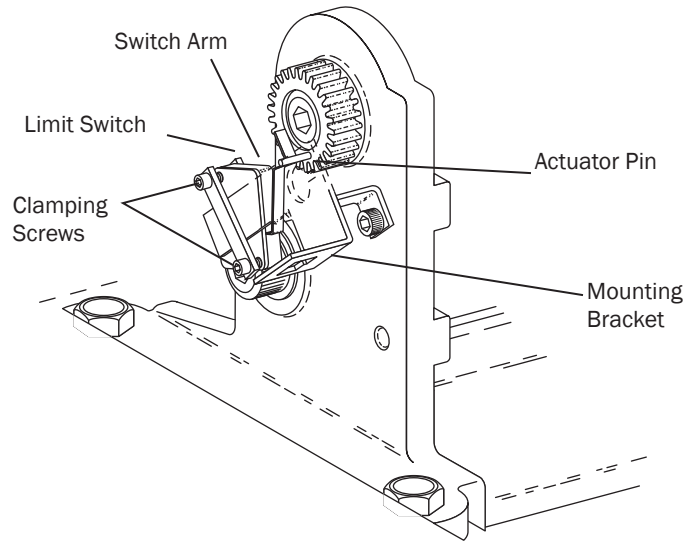
NOTE The jumper must remain in the factory default position to complete the factory default routine. The status LEDs on the touchpad and the chair circuit board double blink while the factory default routine is running and after the routine is complete.

Potentiometers

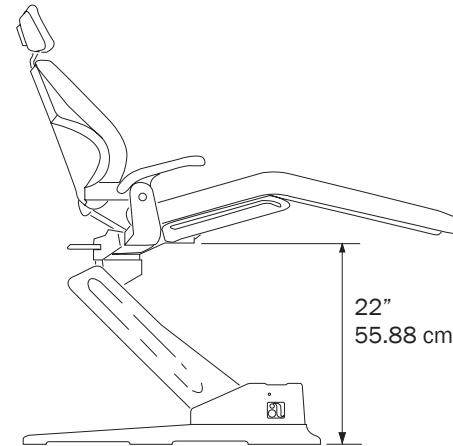
Potentiometers provide the controller with the chair base and back position values. The controller saves the chair values with current position values for the pre-position and auto-return functions.

Adjust the Base Up Limit Switch

1. Remove the motor pump cover.
2. Loosen the two screws clamping the limit switch to the mounting bracket.



3. Position the chair as shown.



4. Push the limit switch against the actuator on the drive gear until the switch opens (clicks), then tighten the clamping screws.
5. Position the chair base down until the limit switch has closed, then position the chair full base up. Check the distance between the top of the base plate to the flat area around the threaded stud the chair adapter mounts to. If the distance is incorrect, repeat steps 2 through 4.

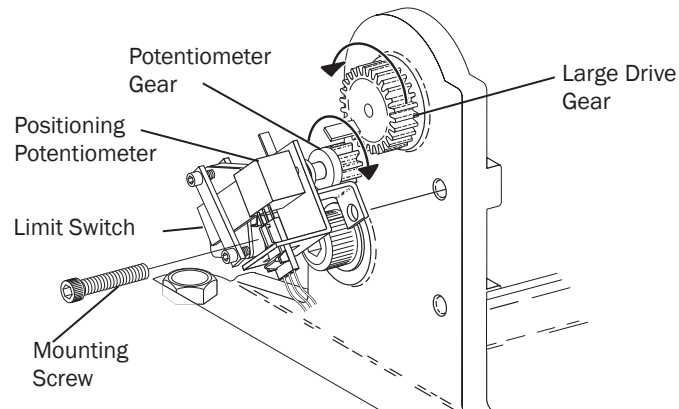
Adjust the Base Positioning Potentiometer

1. Remove the motor pump cover and position the chair base down.
2. Use a 3/16" hex key to remove the limit switch and potentiometer assembly mounting screw.
3. Turn the potentiometer gear clockwise until it stops.
4. Align the potentiometer assembly, then turn the potentiometer gear clockwise two teeth.
5. Reinstall the limit switch and potentiometer assembly. Make sure the potentiometer gear does not turn and the two gears mesh properly.
6. Ensure that the electrical connections to the limit switch and positioning potentiometer are property set.
7. While observing the two gears for binding, lower the chair base.



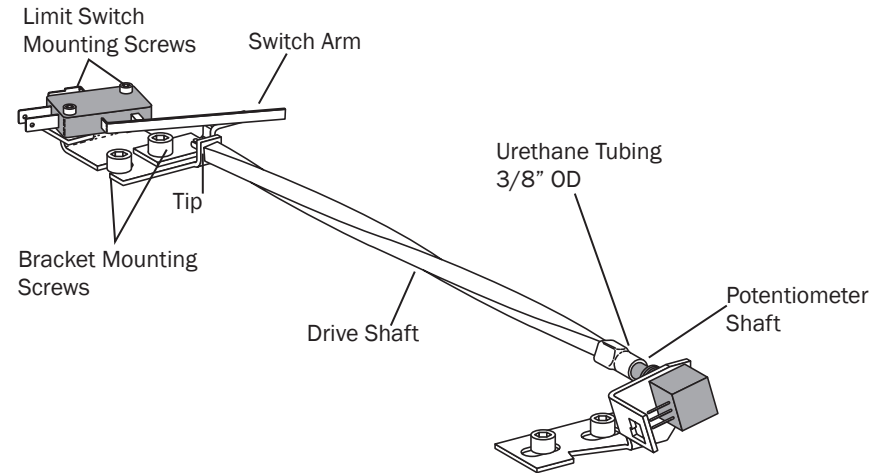
CAUTION Do not raise to the full base up position until after you have checked the base up limit switch for proper adjustment. The chair may go into hydraulic lock if not adjusted properly.

8. Reinstall the cover, and program the auto-positioning functions.

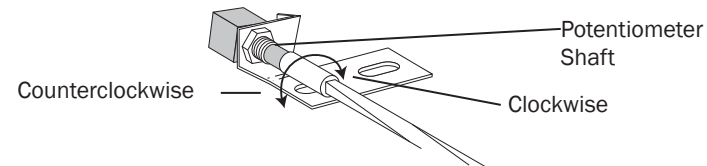


Adjust the Back Potentiometer

1. Position the chair back to its full up position.
2. Disconnect the limit switch wiring harness from the limit switch.
3. Remove the limit switch mounting screws and limit switch from the bracket. Do not bend the switch arm.
4. Remove the bracket mounting screws.
5. Remove the drive shaft from the potentiometer shaft.
6. Remove the drive shaft from the chair by moving it toward the chair backrest, and slightly to the side to dislodge it from the holder.



7. Turn the potentiometer shaft clockwise until it no longer turns, then turn the shaft counterclockwise 1/8" of a turn.

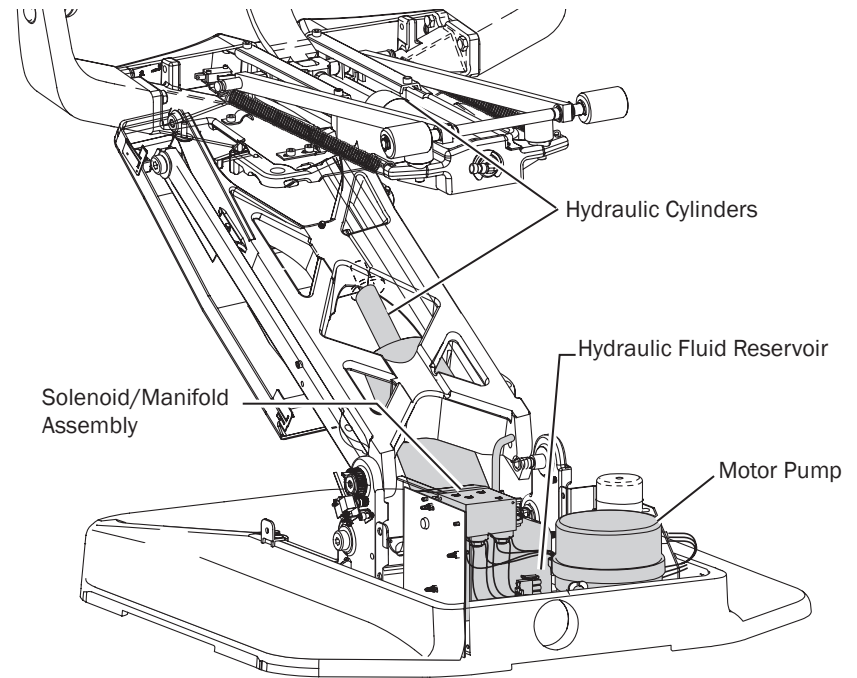


8. Reinstall the shaft

Hydraulic System

The hydraulic system consists of:

- **Hydraulic fluid reservoir:** The fluid level in the reservoir can be seen through the sides of the reservoir and is serviced via a top fill cap.
- **Hydraulic cylinders:** The hydraulic cylinders control the base lift and back functions. Springs and gravity retract the rod during base and back down functions.
- **Motor-driven hydraulic pump:** The hydraulic pump and the starter capacitor supply hydraulic fluid from the reservoir, under pressure, to the chair lift and tilt hydraulic cylinders for back up and base up functions.
- **Solenoid/manifold assembly:** This assembly gates hydraulic fluid to and from the two cylinders. Depending on the chair function called for, the controller selects which solenoid-actuated manifold valves are opened or closed. The solenoid/manifold assembly also includes four adjustable needle valves used to restrict or divert the flow of hydraulic fluid to and from the lift and tilt cylinders. These valves provide the rate of travel adjustment for chair base and back movement.

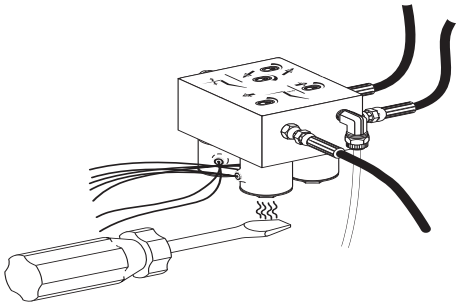


NOTE If cable ties are present in the product and you need to remove them for servicing, make sure to replace the ties after service is completed.

Solenoids

Test the Solenoid

To test the magnetic pull of the solenoid hold the tip of screwdriver near a solenoid and activate the appropriate chair function. You should feel the tug of the magnetic field generated around the solenoid.



Remove and Replace the Solenoid

1. Lower the chair base and back to the full down position. Remove the motor pump cover, then unplug the chair.



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

2. Use a pair of wire cutters, cut the wiring to the faulty solenoid at about mid point between the solenoid and connector P10.
3. Use a 9/16" wrench, remove the solenoid retaining nut and slide the coil off the poppet sleeve.



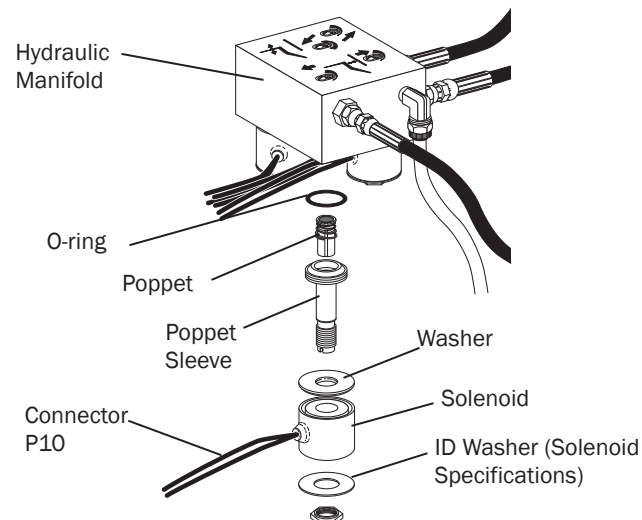
CAUTION Use caution when removing and replacing the coil. The poppet sleeve is easily bent. Even slight bending of the sleeve will result in the malfunction of the solenoid valve.

4. Use a flat-tipped screwdriver, loosen and then remove the sleeve and poppet from the manifold assembly.



WARNING To prevent the possibility of over-heating and failure, replace the entire solenoid assembly.

5. Remove the O-ring from inside the manifold, and install a new O-ring. Wipe any excess off from the manifold.
6. Install a new sleeve and poppet; tighten the poppet sleeve using a flat-tipped screwdriver.
7. Install a new coil on the plunger. Do not overtighten the retaining nut.
8. Strip approximately 1/4" of insulation from the wires cut in step 2, and install a crimp-on butt-type connector on each wire.
9. On the new solenoid, cut the wiring to length allowing enough to reach the crimped-on connectors. Strip approximately 1/4" of insulation from the wires and crimp each wire into a connector.

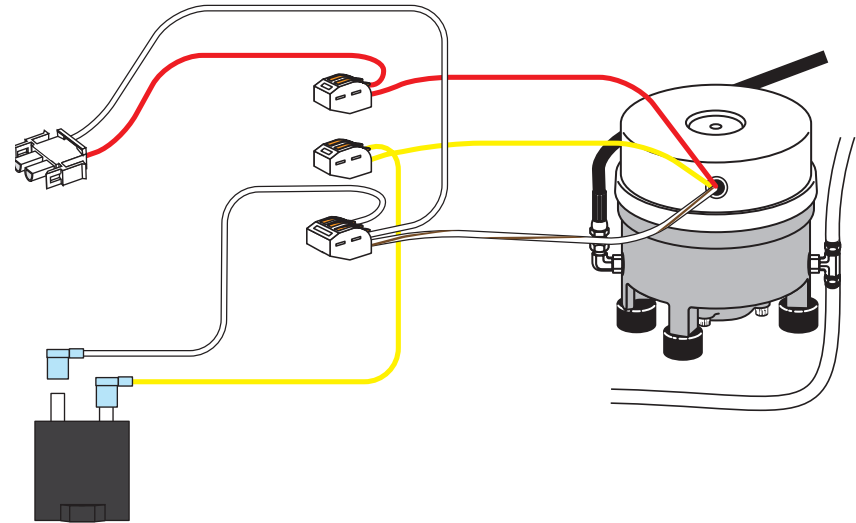


Test the Motor Pump

This test requires the use of a AC Current Probe.

- Clip the probe onto the red wire going to the motor pump.
- Use the footswitch or touchpad to raise the chair.

You should read 5 Amps (maximum) of current for 120 V motor pump, or 2.5 Amps (maximum) of current for 240 V motor pump.

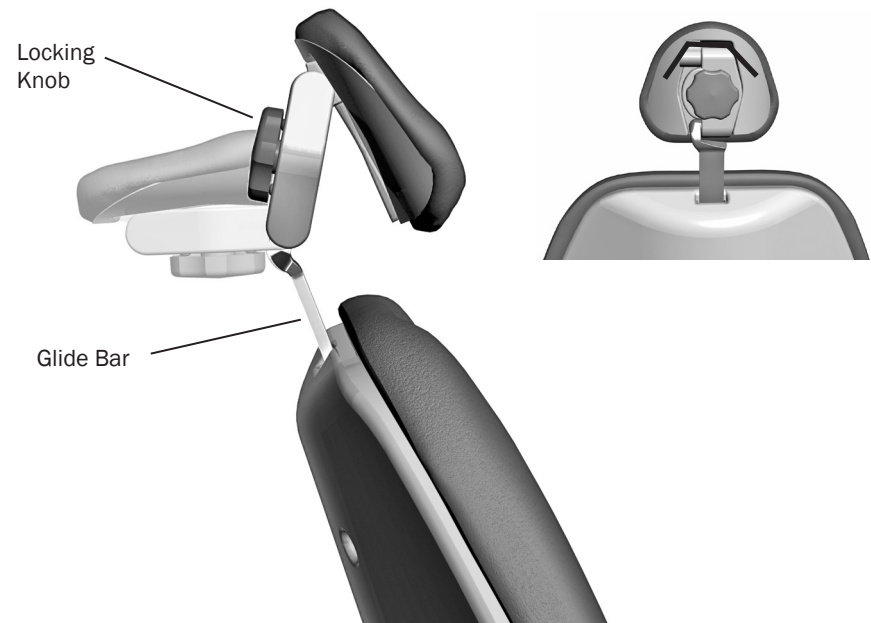


Headrest Adjustments

Release the headrest by turning the locking knob counterclockwise. Then adjust the headrest for a proper fit. Lock the headrest in the desired position by turning the knob clockwise. For height adjustment, slide the headrest and glide bar up or down.

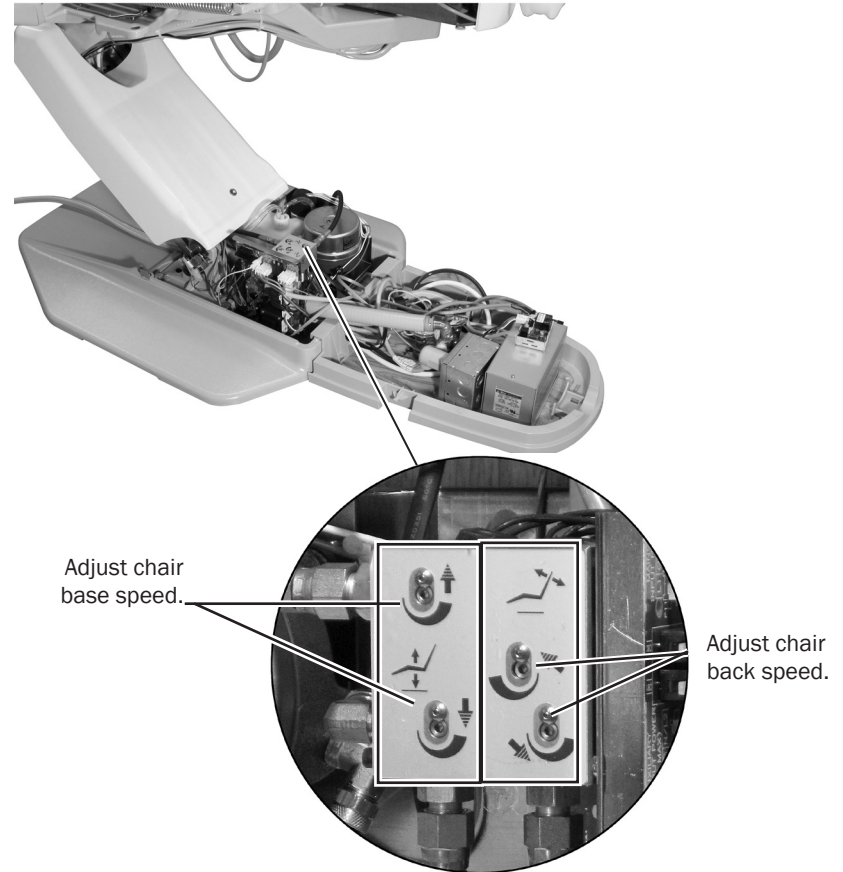


WARNING When the glidebar has reached its maximum recommended working height, a warning will be visible on the patient's side of the glide bar. Do not use the headrest in a position where this warning is visible.



Chair Speed Adjustments

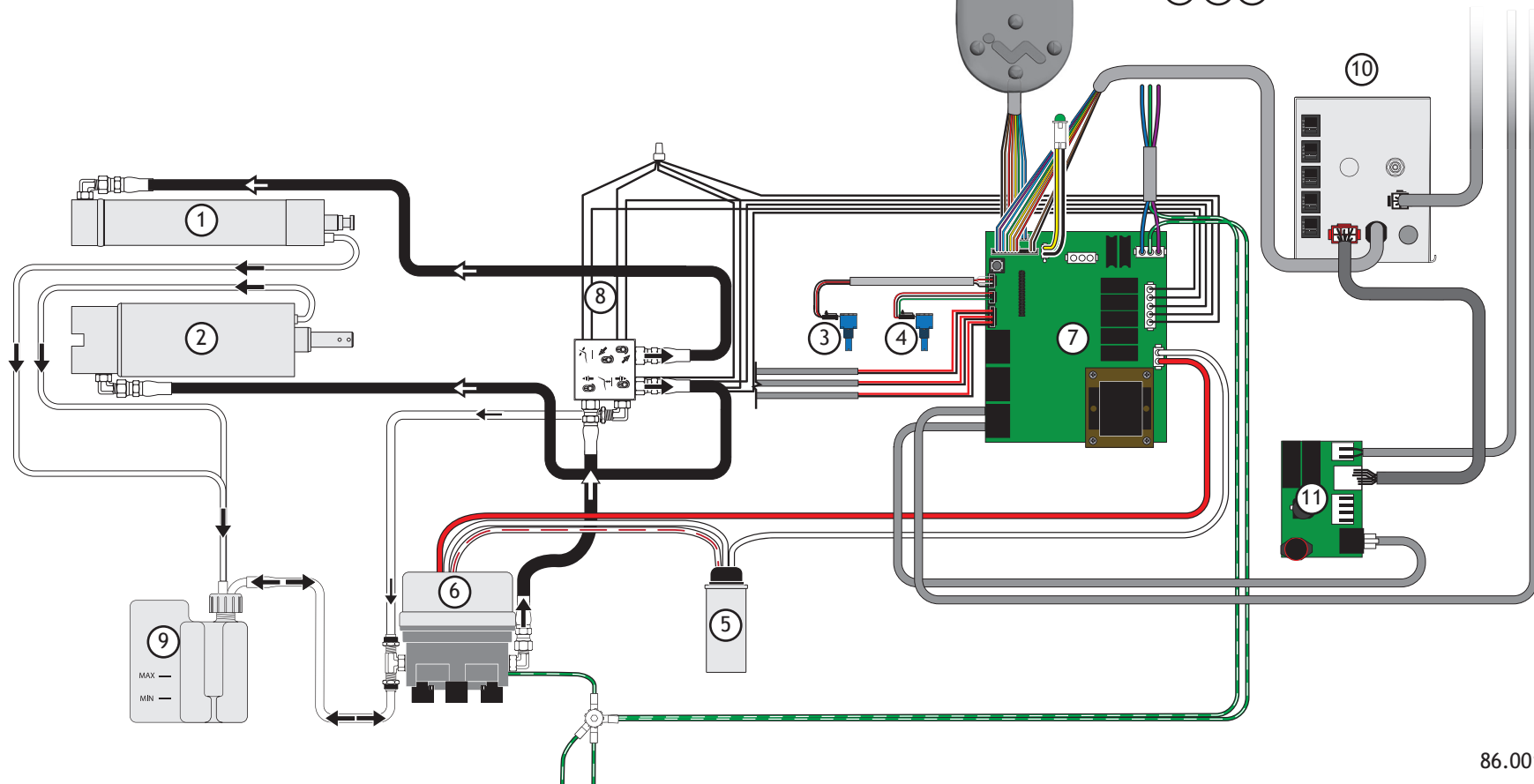
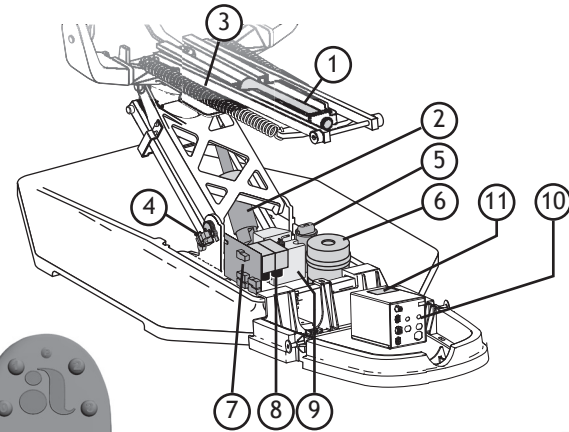
The speed for moving the chair seat and back can be adjusted. Use a 3/32" hex key to adjust the chair base speed and back speed on the manifold.



NOTE If cable ties are present in the product and you need to remove them for servicing, make sure to replace the ties after service is completed.

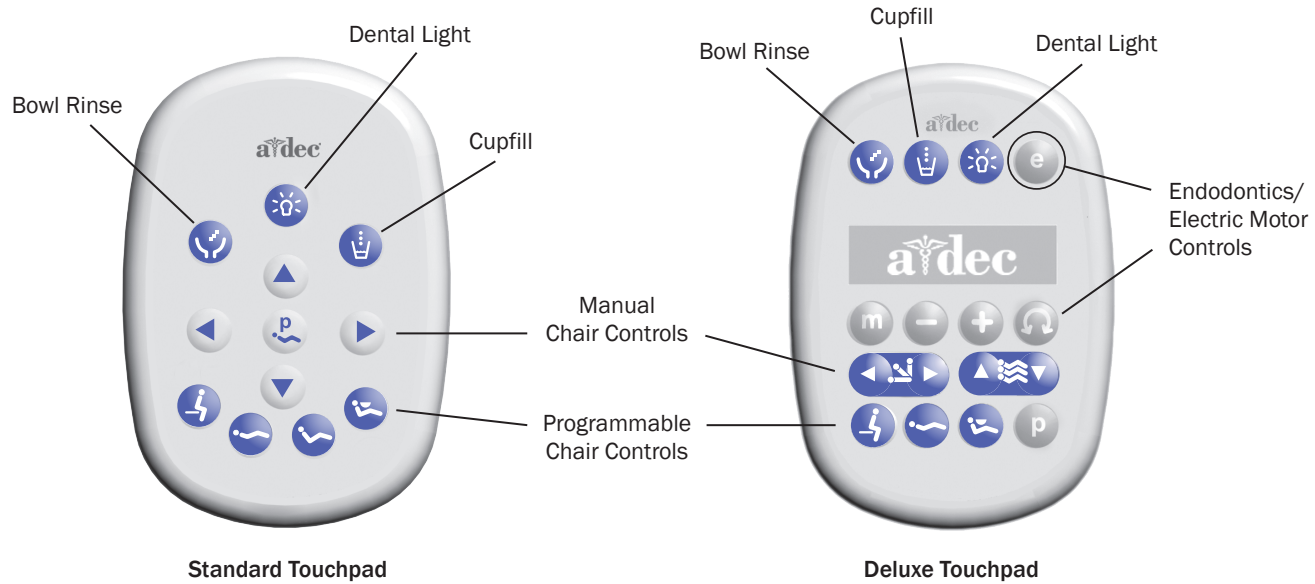
Dental Chair Flow Diagram

Item	Description	Item	Description
1	Tilt cylinder	7	Chair circuit board
2	Lift cylinder	8	Hydraulic manifold
3	Back potentiometer	9	Hydraulic fluid reservoir
4	Base potentiometer	10	Power supply
5	Capacitor	11	Light circuit board
6	Motor pump		







Programming

Your A-dec 200 system may include a standard or deluxe touchpad, or both. The standard touchpad operates the chair, cuspidor, and dental light functions. The deluxe touchpad adds functions for electric motors and other integrated clinical devices. Both touchpads provide manual and programmable controls.

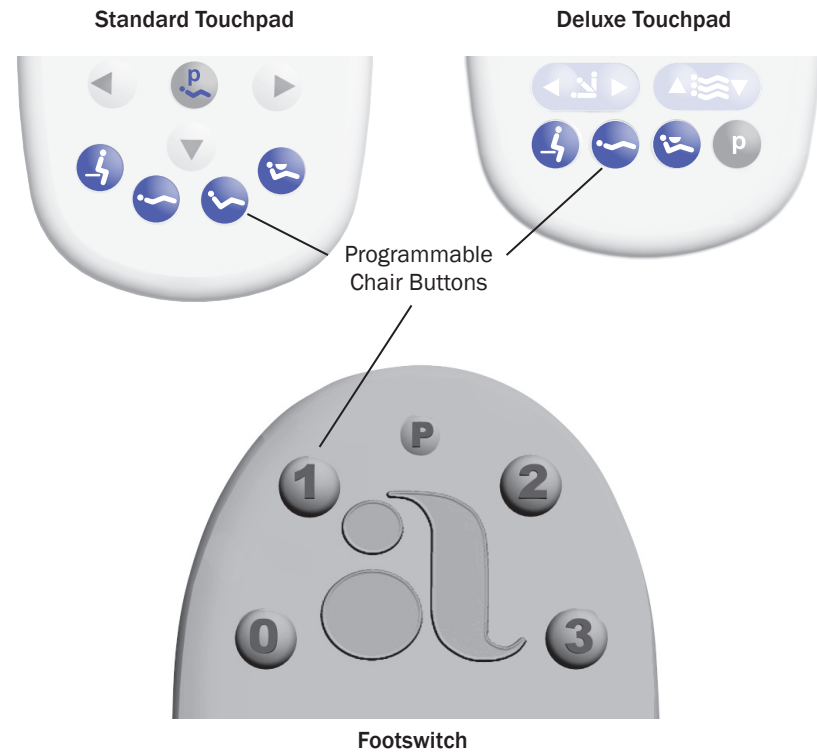


Programmable Chair Positions

The chair can be moved manually or by using the programmed presets from the footswitch or optional touchpad. The programmable buttons vary depending on which device is used to control the chair:




Footswitch/Touchpad	Description and Action
0 / 	Entry/Exit: Positions the chair for patient entry/exit. On systems with a doctor's touchpad, also turns the dental light off.
1 / 	Treatment 1: Positions the chair base and back down. On systems with a doctor's touchpad, also turns the dental light on.
2 / 	Treatment 2*: Positions the chair base down and back up. On systems with a doctor's touchpad, also turns the dental light on.
3 / 	X-Ray/Rinse: Moves the chair to either x-ray or rinse position. Press again to move the chair to the previous position. On systems with a doctor's touchpad, also turns the dental light off or back on.

* Note: The deluxe touchpad does not include a Treatment 2 button.





Reprogram Entry/Exit, Treatment 1 and 2 Buttons

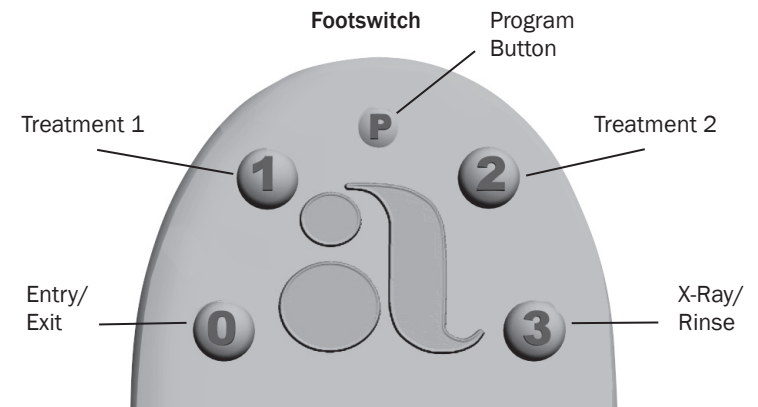
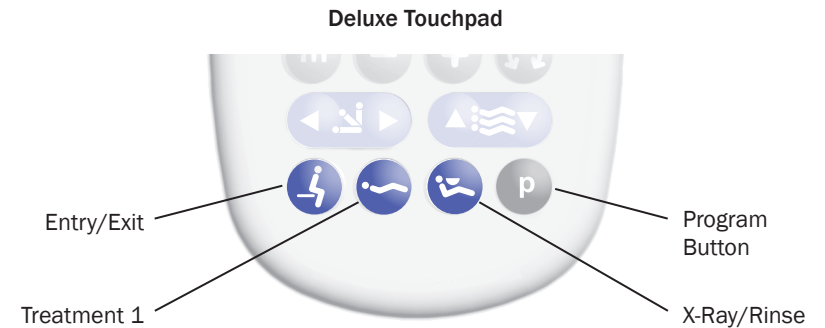
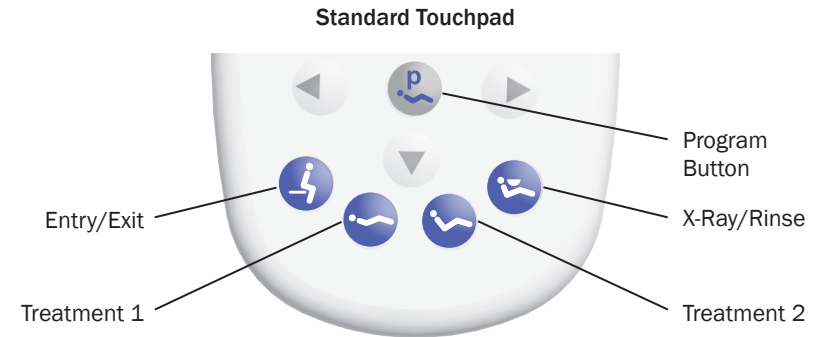
To change the factory preset chair positions assigned to the entry/exit and treatment buttons (🦽, 🪲, 🪲*):

1. Use the manual controls to position the chair as desired.
2. Press and release  or . One beep indicates that the programming mode is on.
3. Within five seconds, press the chair position button you wish to reprogram (for example, press ). Three beeps confirm that the new setting is programmed into memory.

Note: The deluxe touchpad does not include a Treatment 2 button.



The x-ray/rinse button () is preset to move the chair and patient into an upright position for x-rays or cuspidor access. A second press of  returns the chair to the previous position (back only).




If you'd like to change this function to an additional programmable chair position, contact your authorized A-dec dealer.






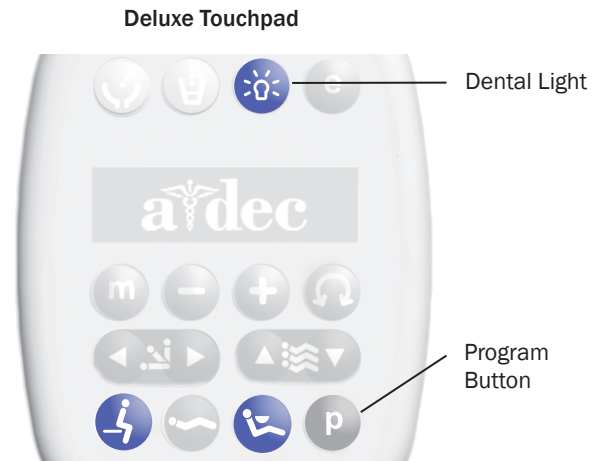
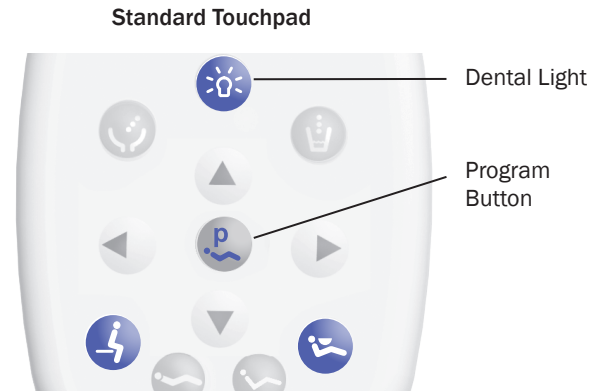
Dental Light Auto On/Off Feature

The auto on/off feature turns the A-dec light on once the chair reaches a preset treatment position.

When you press  or , the dental light turns off and the chair moves to that preset position.

To disable the auto on/off feature, press and hold the program button ( or ) and  at the same time for three seconds until you hear one beep.

To enable the auto on/off feature, press and hold  or  and  at the same time for three seconds until you hear three beeps.



Electric Handpiece Settings

(Deluxe touchpad only)

Standard Mode

To activate the electric motor, lift the handpiece from the holder. The touchpad screen displays the previous settings used for that handpiece position. Standard mode provides four factory preset speeds for electric motors:

Memory Setting	Factory Preset Speed
m1	2,000 rpm
m2	10,000 rpm
m3	20,000 rpm
m4	36,000 rpm

You can reprogram these memory settings with your own specific preset speeds. A total of eight customized settings per handpiece is possible (four in standard mode and four in endodontics mode).

To program the handpiece setting:

1. Press **+** or **-** until the rpm setting you want displays on the touchpad screen.
2. Press **P** to save it to memory. One beep sounds.
3. Press **m** to display the m1 through m4 memory settings. When the desired memory setting displays, press **P**. Three beeps confirm the setting.



Endodontics Mode

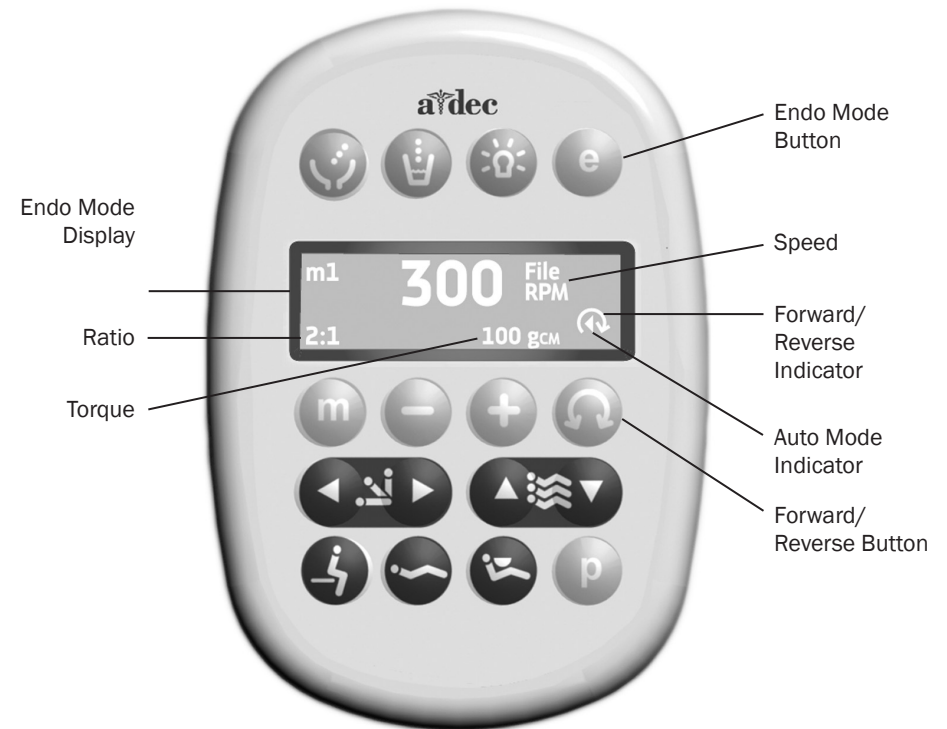
In addition to handpiece speed adjustments, the Endodontics mode allows you to change a number of settings based on the specific file and desired handpiece behavior. Icons on the touchpad screen reflect the settings.



NOTE For more information regarding speed and torque limits for a specific file, consult the file manufacturer.

To change a setting:

1. Lift the handpiece from the holder.
2. If the touchpad screen does not display the Endodontics mode, press **e**.
3. To change settings in Endodontics mode, press **+** or **-**. A white reverse video box is displayed on the touchpad screen.
4. Use the chair positioning buttons to move from setting to setting on the touchpad screen.
5. Use **+** or **-** to change the setting as desired.
6. To set the speed limit, torque limit, and ratio into memory, press **p**. One beep sounds.
7. Press **m** to display the memory settings m1 through m4. When the desired memory setting is displayed, press **p**. Three beeps confirm the setting.



Forward/Reverse Button

The forward/reverse button changes the electric motor's direction. The system defaults to the forward position when you return the motor to the holder or turn off the system. In reverse mode, the screen icon flashes continuously.

Endo Mode Touchpad Screen Icons

Icon	Setting	Description
	Speed	Setpoint for file speed limit. For more information, consult your file manufacturer.
	Torque	Setpoint for file torque limit. For more information, consult your file manufacturer.
	Torque Units	Toggles between newton centimeters (N-cm) and gram centimeters (g-cm). Adjusting this setting for one handpiece changes it for all handpiece settings. Note: 1 Ncm = 102 gcm.
	Ratio	Sets the handpiece ratio. For more information, consult your handpiece manufacturer.
	Auto Modes	Adjusting this setting for one handpiece changes it for all handpiece settings. The auto mode indicator displays inside of the forward/reverse indicator.
	Auto Stop	When the file reaches the torque limit, the motor shuts off.
	Auto Reverse	When the file reaches the torque limit, the motor stops and reverses direction.
	Auto Forward	When the file reaches the torque limit, the motor stops, reverses 3 turns, then changes back to forward again. <i>Note: If the file is stuck, the auto forward cycle repeats three times before the motor stops.</i>



CAUTION A-dec | W&H endodontic attachments have a special feature due to their ball-bearing design. Their life-long efficiency factor is stable and known; therefore, the A-dec Endodontics system is able to control and display file torque very accurately. All other handpieces have unknown life-long efficiency factors and therefore stated torque values are approximate.

Touchpad Help Messages

The deluxe touchpad screen displays help messages for disabled operations. When a help message appears, record the screen message and the function you were performing in case service is required. For complete details on help messages, see the *Regulatory Information, Specifications, and Warranty* document (p/n 86.0221.00) available in the Document Library at www.a-dec.com.



Other Handpiece and Accessory Settings

Auto-Off Delay – determines how long the handpiece light remains on if the foot control is released. The default setting is 5 seconds.

On When Selected – specifies whether the handpiece light turns on or remains off when the handpiece is removed from the holder. The default setting is on.

On in Endo – specifies whether the handpiece light turns on or off when the endo mode is selected. The default setting is off, which is recommended to reduce heat and extend bulb life.

Ultrasonic Colors – for Acteon® ultrasonic instruments, specifies whether color-coded tip categories are on or off. The default is on.

Voltage Adjustment – allows for customized light output voltage for each handpiece position. The default setting is 3.2 VDC.

Cuspidor Cupfill and Bowl Rinse

The cuspidor cupfill and bowl rinse functions are dependent on your specific configuration.





Standard Cuspidor

Press and hold the cupfill button on the cuspidor for the desired amount of water. Release the button to stop the flow.


Press the bowl rinse button on the cuspidor once for a 15-second rinse. For continuous rinse, hold the button down. When you release the button, the water will continue to flow for 15 additional seconds.

Cuspidor with Touchpad

If your system includes a doctor's touchpad, you can use the buttons on the touchpad or the cuspidor to operate and program bowl rinse and cupfill functions:

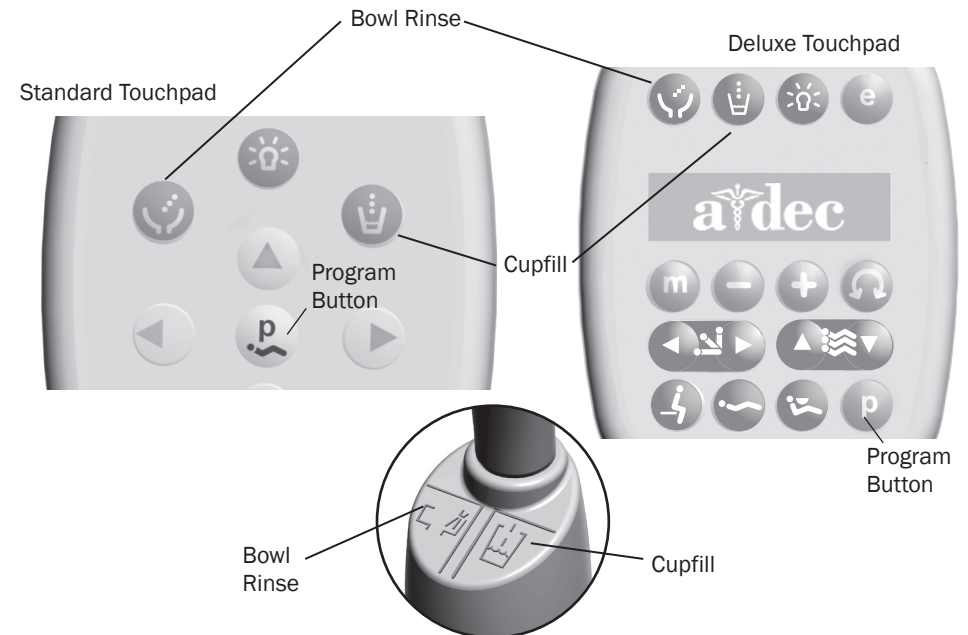
Button	Description and Action
 / 	<p>Cupfill Button:</p> <ul style="list-style-type: none"> Press and release the cupfill button for a timed operation. The factory preset is a 2.5-second fill. Press and hold the cupfill button for manual operation.
 / 	<p>Bowl Rinse Button:</p> <ul style="list-style-type: none"> Press the bowl rinse button for a timed operation. The factory preset is a 30-second rinse. Press and hold the bowl rinse button for manual operation.



TIP Press  twice in less than two seconds to activate the continuous operation mode. Press the button once to end the continuous bowl rinse mode.

To reprogram the timed cupfill or bowl rinse functions

1. Press the program button the touchpad or press and hold both the cupfill and bowl rinse buttons on the cuspidor. Release them when you hear one beep.
2. Press and hold the cupfill or bowl rinse button for the desired time.
3. Release the button. You'll hear three beeps confirming the program has changed.



Delivery System

Delivery System Overview

A-dec 200 delivery system has been designed to mount on the A-dec 200 Support Center. The support center mounts to the chair using a post mount. The A-dec 200 delivery system provides the air and water used to operate the handpieces, syringes and accessories, and electrical power and data control of other modules.

The A-dec 200 standard configuration has a balanced flexarm with manual brake, three handpiece control block positions, a control head with room to house integrated accessories, and an autoclavable syringe.



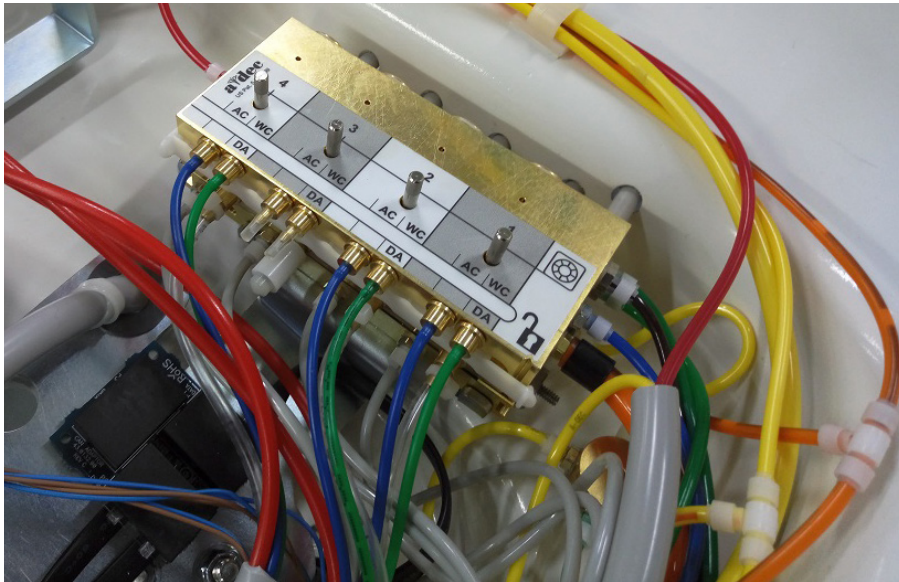
A-dec Tubing

A-dec products use four sizes of outside diameter tubing: 1/8", 1/4", 5/16", and 3/8". The A-dec 200 delivery system uses A-dec silicone or vinyl handpiece tubing. See "Handpiece Tubing Replacement" on page 34 for instructions on replacing tubing.

A-dec Handpiece Tubing Cross Reference Table

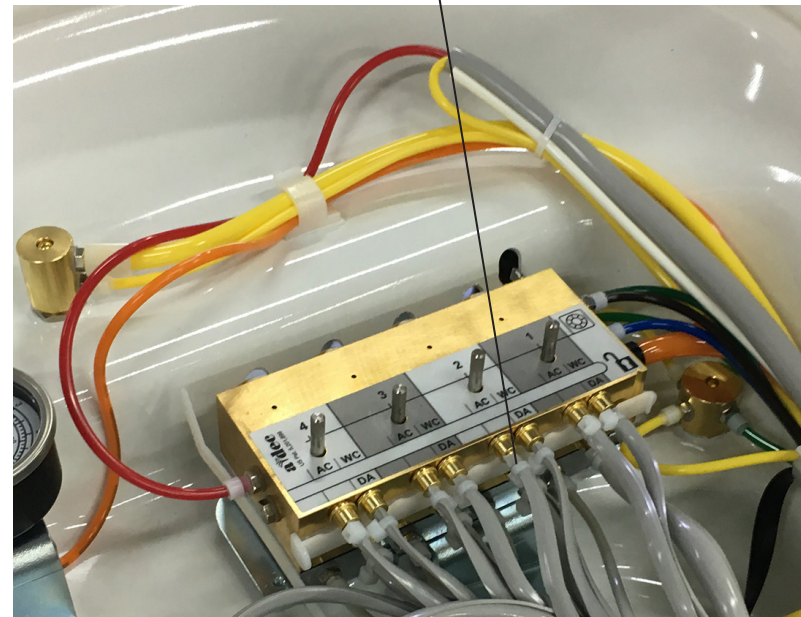
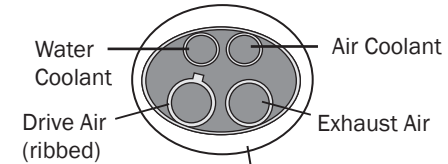
Color	Function
Clear	Drive air
Green	Water coolant
Blue	Air coolant

A-dec Silicone Tubing



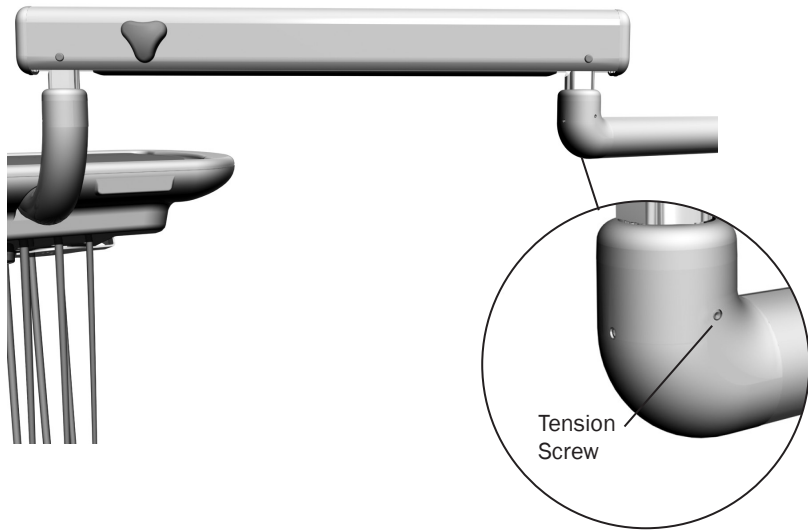
The handpiece tubing connects to the control block using tubing connectors and the appropriate A-dec tubing.

Vinyl Tubing



Flexarm Adjustments

If the control head flexarm begins to drift right or left, use a 3/32" hex key to adjust the tension setscrew. Turn the screw clockwise to tighten or counterclockwise to loosen the tension.



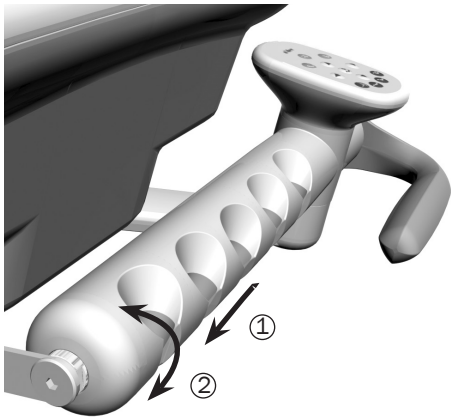
Holder Adjustments

Adjust the Holder

Rotate the holders independently. Pull the holder slightly away from the adjacent one, rotate to the desired position, then release.



CAUTION Twisting the holder without pulling it away from the adjacent one will damage the mechanism.

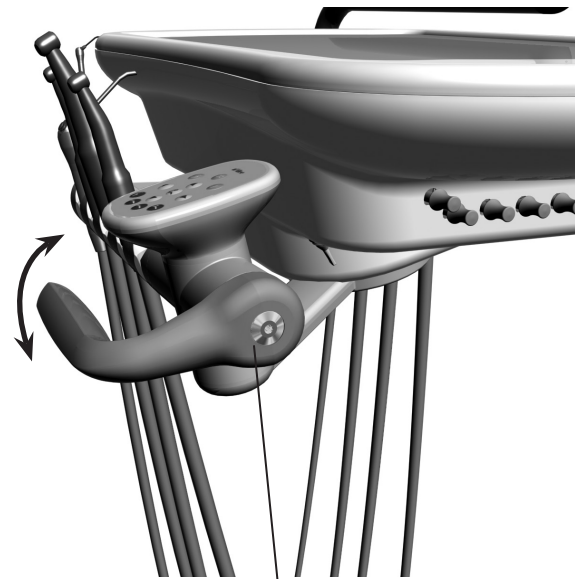


Adjust the Handle

Use a 5/32" hex key to adjust the handle position. Turn the adjustment screw counterclockwise to loosen, position the handle, and then tighten the screw to secure the handle in place.



CAUTION Make sure the handle is flush against the holder before tightening the adjustment screw.



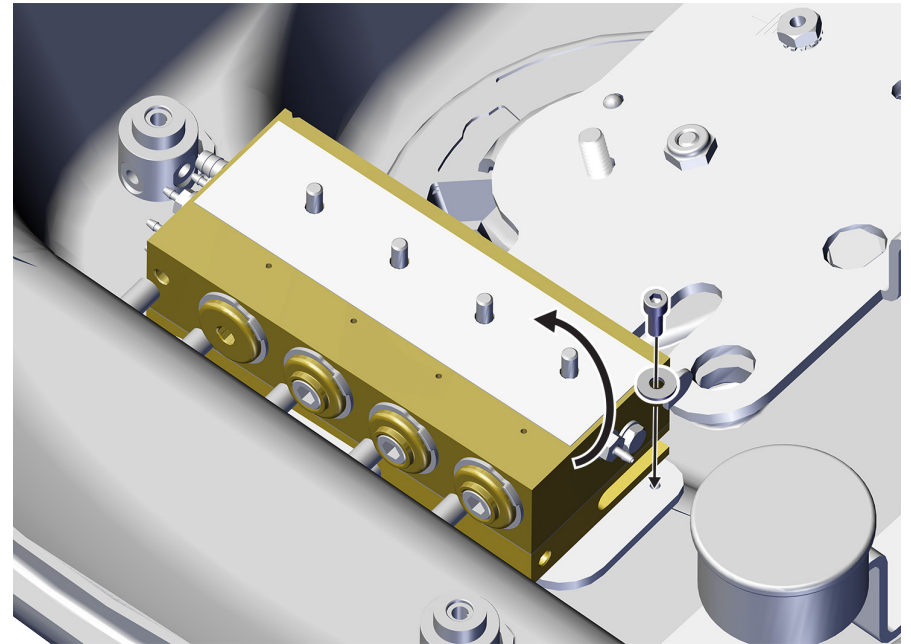
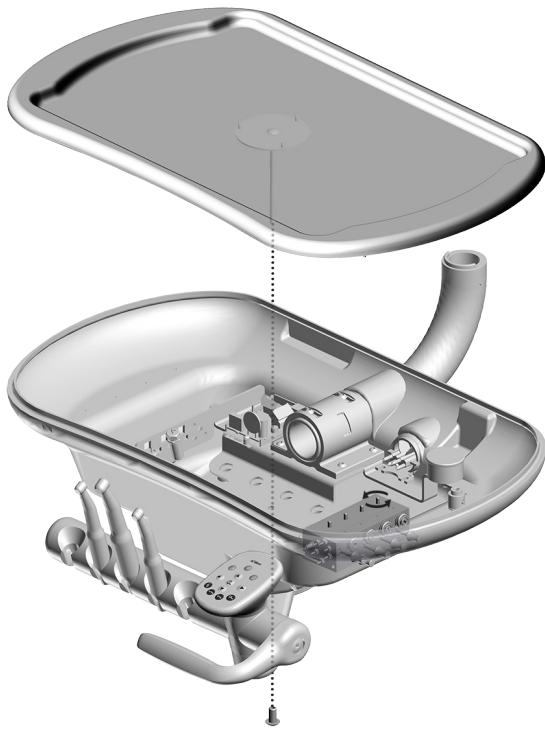
Adjustment
Screw

Control Block

The control block might need to be removed to service the control head. For example, you may need to remove the control block to change a diaphragm, to change the cartridge, or to service O-rings.

Remove the Control Block

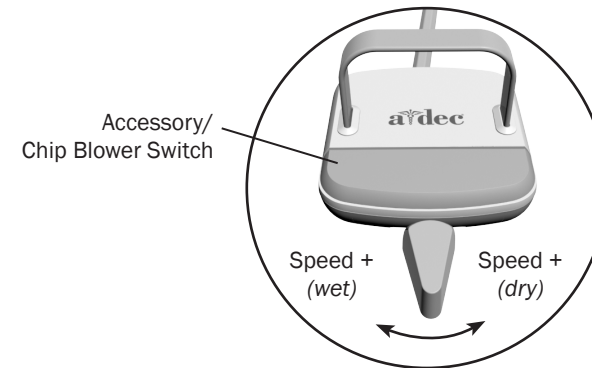
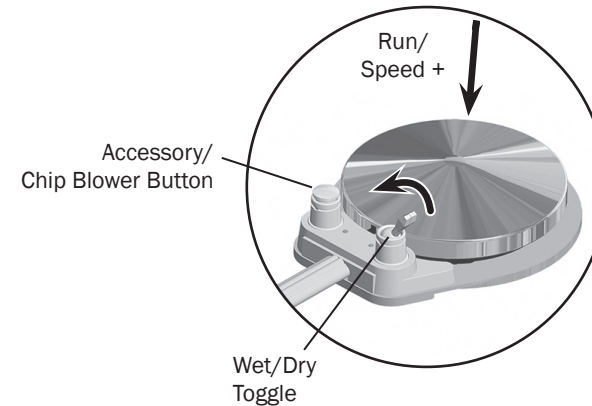
1. Remove the cover.
2. Loosen the screw that secure the control block to the control delivery system frame.
3. Lift the control block up from the base of the control center.



Handpiece Control Adjustments

To activate a handpiece, lift it from the holder. Use the foot control to perform the desired handpiece operation.

Control	Operation	Procedure
Disc Foot Control	Run a handpiece.	Press on the disc. Push down to increase speed.
	Run a handpiece with or without water coolant.	Move the wet/dry toggle toward the blue dot for wet operation or away from the blue dot for dry operation. Then press on the disc.
	Run the optional accessory or chip blower.	Press the accessory/chip blower button.*
	Operate the intraoral camera.	Press on the disc to capture an image.*
Lever Foot Control	Run a handpiece with water coolant.	Move the lever to the left. Move farther to increase speed.
	Run a handpiece without water coolant.	Move the lever to the right. Move farther to increase speed.
	Run the optional accessory or chip blower.	Press the accessory/chip blower switch.*
	Operate the intraoral camera.	Move the lever to the left or right to capture an image.*



* Contact your authorized A-dec dealer for questions about the operation or configuration of your integrated A-dec accessories.

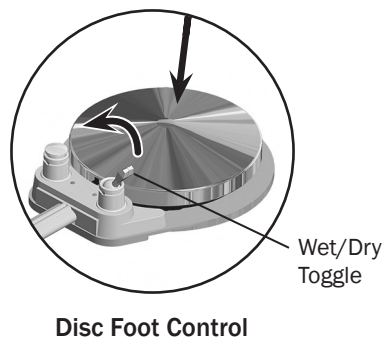
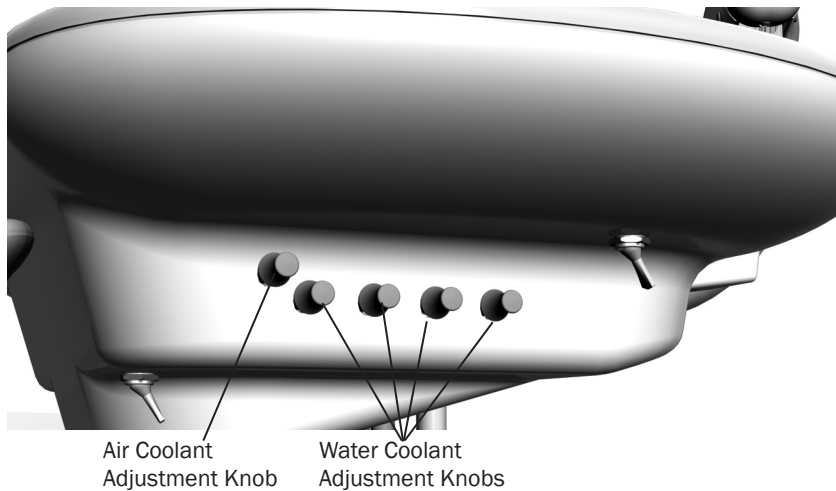
For handpiece coolant adjustments, see page 31.



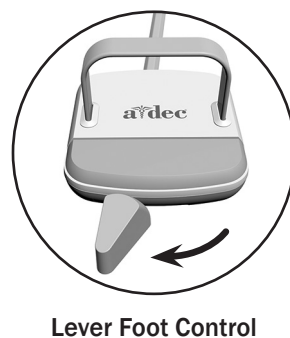
NOTE The lever foot control function can be reversed by a technician (change left direction to dry, right direction to wet). For more details, contact your authorized A-dec dealer.

Handpiece Coolant Adjustments

The air coolant knob on your delivery system simultaneously adjusts air flow to all handpiece positions. Each water coolant knob adjusts water flow to a single position. Use the following process to adjust for the desired handpiece coolant atomization:



Disc Foot Control



Lever Foot Control

1. Insert a bur into the handpiece you are adjusting.



CAUTION When performing this procedure, do not attempt to completely shut off the water or air flow. The adjustment knobs are not designed to completely shut off flow and can damage the control block if you apply too much force.

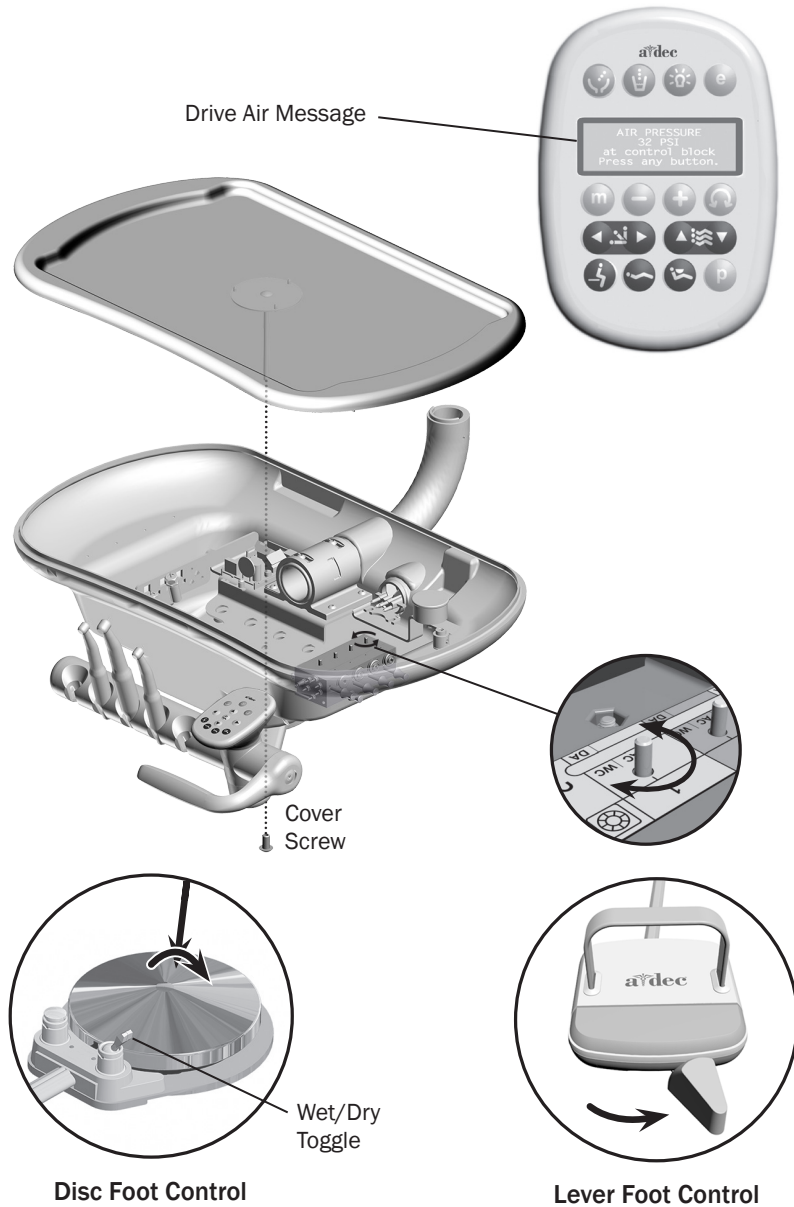
2. Turn the air coolant adjustment knob clockwise until coolant flow stops.
3. Lift the handpiece from the holder and do one of the following:
 - On a disc foot control: flip the wet/dry toggle to water (toward the blue dot) and press the disc all the way down.
 - On a lever foot control: move the lever all the way to the left.
4. Locate the water coolant adjustment knob for the handpiece position you are adjusting and turn it clockwise until coolant flow stops.
5. Slowly turn the water coolant adjustment knob counterclockwise until water droplets are expelled from every water port on the handpiece head. Return the handpiece to the holder.
6. Repeat steps 3 through 5 for each handpiece.
7. To set the air coolant for the system, lift the handpiece from the holder.
8. Turn the air coolant adjustment knob counterclockwise until you achieve the desired atomization at the cutting surface of the bur.



CAUTION Do not continue turning the air coolant adjustment knob counterclockwise after the air coolant stops increasing. The stem may come out of the control block.

9. If you require more water coolant, increase the water output in step 5 as needed.

Handpiece Drive Air Adjustments



You can check drive air pressure on the deluxe touchpad screen by pressing the plus (+) and minus (-) buttons at the same time. For systems with a standard touchpad, and for the most accurate drive air measurement, use a handpiece pressure gauge (A-dec p/n 50.0271.00) attached to the handpiece tubing.



NOTE A handpiece pressure gauge can be attached to the handpiece tubing for exact drive air measurement, or if you do not have a deluxe touchpad. One bar equals 14.5 psi.

To adjust the pressure for each handpiece:

1. Remove the control head cover screws. Remove the cover and locate the drive air pressure controls inside.
2. Lift the handpiece from the holder.
3. Do one of the following:
 - On a disc foot control: flip the wet/dry toggle to water (toward the blue dot) and press the disc all the way down.
 - On a lever foot control: move the lever all the way to the left.
4. With the handpiece running, watch the deluxe touchpad readout or handpiece pressure gauge.
5. Adjust the handpiece drive air pressure to meet manufacturer's specifications. Turn the control stem clockwise to decrease flow and counterclockwise to increase flow.



CAUTION See your handpiece documentation for the drive air pressure specification. Exceeding manufacturer's recommendations increases the risk of damage and may significantly decrease the life of your handpiece components.

Oil Collector

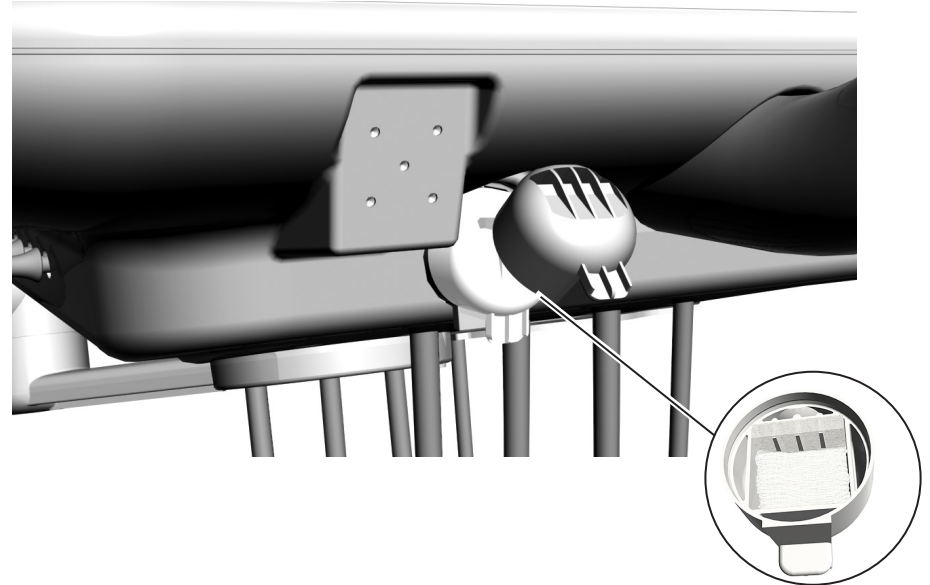
The oil collector needs to be serviced once a week for normal use and more often for heavier use. To service:

1. Unsnap the oil collector cover located under the control head and discard the old gauze.



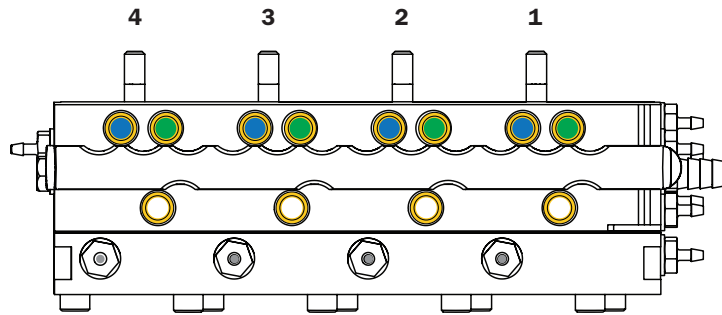
CAUTION Do not remove the foam pad located inside the oil collector cover.

2. Fold a new gauze pad (51 mm x 51 mm [2" x 2"]) into quarters and place inside the cover.
3. Snap the oil collector cover closed.



Handpiece Tubing Replacement

1. Remove the delivery system cover.
2. Cut the handpiece tubing you are replacing from the colored A-dec tubing/control block.
3. Pull the old handpiece tubing out of the control head.
4. Route the new handpiece tubing through the base of the control head.
5. Connect the new handpiece tubing to the control block using the connectors and colored tubing previously used.
 - Blue tubing to the air coolant port
 - Green tubing to the water coolant port
 - Clear tubing to the drive air port



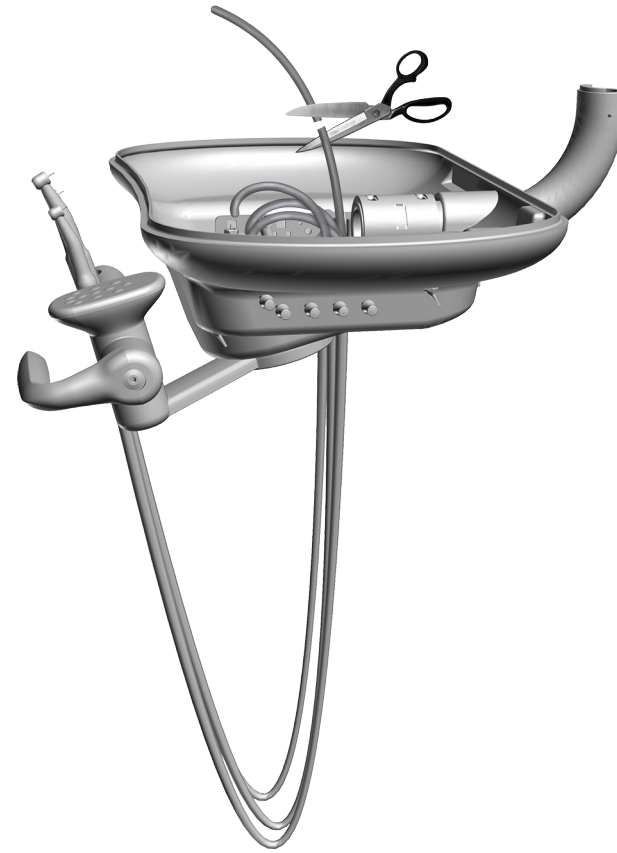
6. Replace the delivery system cover.



NOTE Vinyl tubing is not color coded. For vinyl tubing identification, see "A-dec Tubing" on page 26.

Adjust Tubing Length

1. Adjust the length of the tubing so it drapes with syringe tubing.
2. Insert the tubing in the tubing retainers.



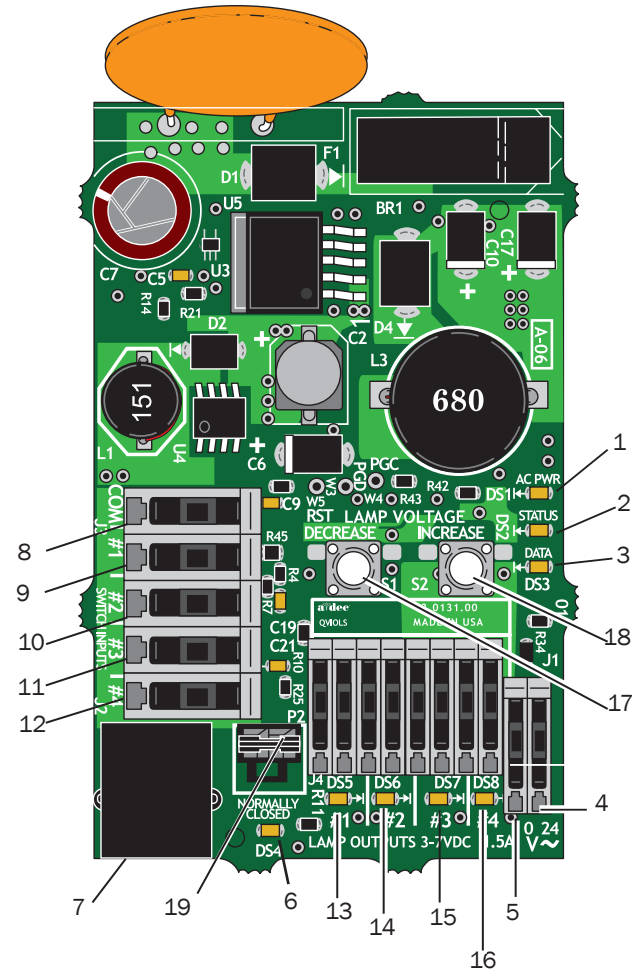
Quad Voltage Intraoral Light Source (QVIOLS)

Part Number: 90.1168.00

The quad voltage intraoral light source (QVIOLS) provides four independent fiber optic voltage outputs. Each output is adjustable from 3 VDC to 7 VDC at 1.5 Amps. Only one output can be on at a time. Activating an input on the QVIOLS turns on its respective output.

QVIOLS Circuit Board Descriptions

Item	Description
1	DS1 AC Power LED
2	DS2 Status LED
3	DS3 Data LED
4	J1 - 24 VAC Input
5	J1 - 0 VAC Input
6	DS4 - normally closed LED (displays as yellow when P2 jumper is installed)
7	P1 Data Port
8	J3 Switch input Common
9	J3 Switch Input #1
10	J2 Switch Input #2
11	J2 Switch Input #3
12	J2 Switch Input #4
13	J4 Light Source Output #1
14	J4 Light Source Output #2
15	J5 Light Source Output #3
16	J5 Light Source Output #4
17	S1 Decrease Lamp Output
18	S2 Increase Lamp Output
19	P2 normally closed jumper



NOTE On the A-dec 200 product, a jumper should always be located within P2, and DS4 should be 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.

Intraoral Light Source Adjustments

The intraoral light source (IOLS) voltage adjustment on the A-dec 200 doctor's delivery system is located on the QVIOLS circuit board. Each output voltage is preset to 3.2 VDC at the lamp terminals when the lamp is on.



WARNING The Intraoral Light Source Length and Voltage, page 37, is only valid for devices rated for 3.5 VDC and 0.75 Amp 26 AWG wires. For devices drawing a different amount of current, requiring a different voltage, or with a different wire gauge, please contact A-dec Customer Service. See "Get Support" on page 3.

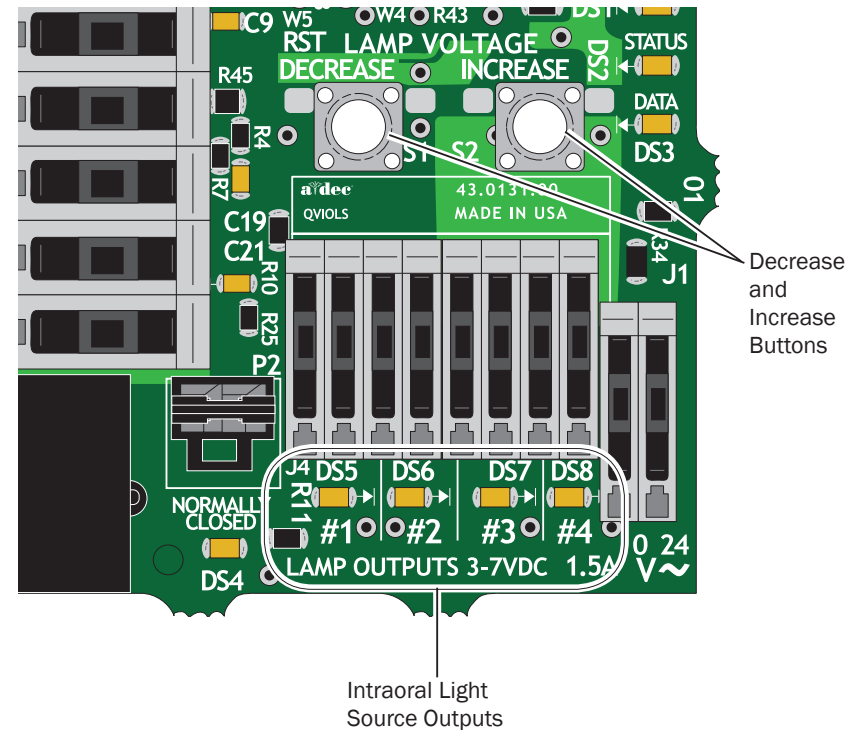
1. Use a 7/64" hex key to remove the control head cover.
2. Set the voltmeter to DC voltage and place its probes on the IOLS output terminals for the handpiece you are testing.
3. Lift the handpiece from its holder.



NOTE When the intraoral light source output is on, its respective LED is illuminated. For example, LED DS6 is illuminated when handpiece #2's intraoral light source is activated.

4. Use the buttons behind the terminal to adjust the voltage according to the Intraoral Light Source Length and Voltage, page 37.

Intraoral Light Source Voltage



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.

Intraoral Light Source Length and Voltage

Length and Voltage						
Voltage at terminal strip A-dec/W&H, Bien Air or other bulbs rated at 3.5 V			Voltage at terminal strip A-dec/W&H, Bien Air or other bulbs rated at 3.5 V			
Wire length in A-dec tubing		VDC +/- .02	Wire length in A-dec tubing		VDC +/- .02	
(in)	(cm)		(in)	(cm)		
48	122	3.40	108	274	3.69	
54	137	3.43	114	290	3.72	
60	152	3.46	120	305	3.75	
66	168	3.49	126	320	3.78	
72	183	3.52	132	335	3.81	
78	198	3.55	138	351	3.84	
84	213	3.58	144	366	3.87	
90	229	3.61	150	381	3.90	
96	244	3.64	156	396	3.93	
102	259	3.67				



NOTE The above table pertains to fiber-optics powered with 26 AWG wires, 0.75 Amp loads, and a desired bulb voltage of 3.2 VDC. For fiber-optics powered with 26 AWG wires and other ratings, use the equation:

$T = (Z \times 0.006 \times Y) + X$ where:

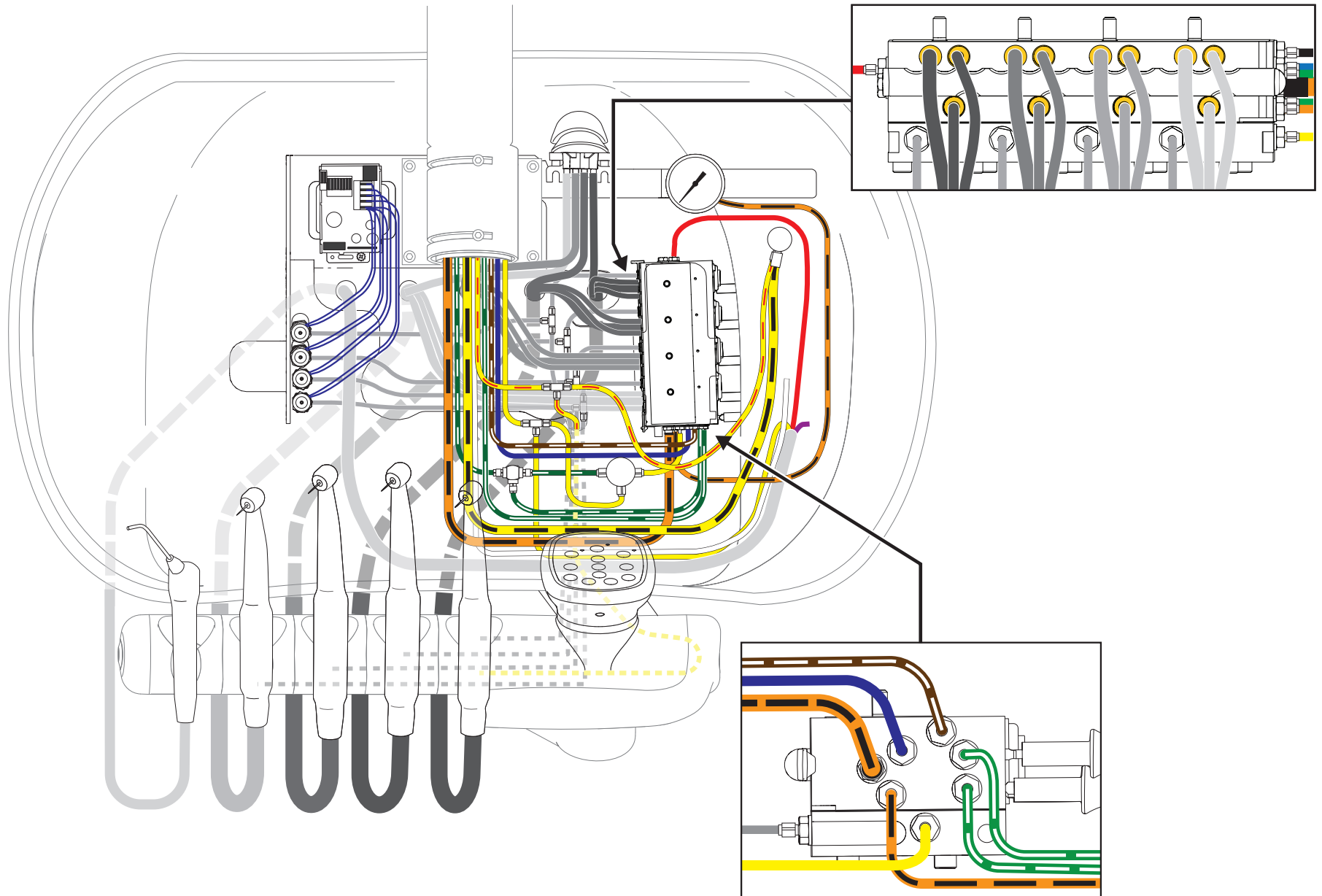
T: Terminal strip voltage(VDC)

X: Desired voltage at lamp (VDC)

Y: Rated lamp/load current (in Amps)

Z: Length of 26 AWG wire (inches) from terminal trip to lamp

Delivery System Flow Diagram



Cuspidor and Support Center

Cuspidor and Support Center Overview

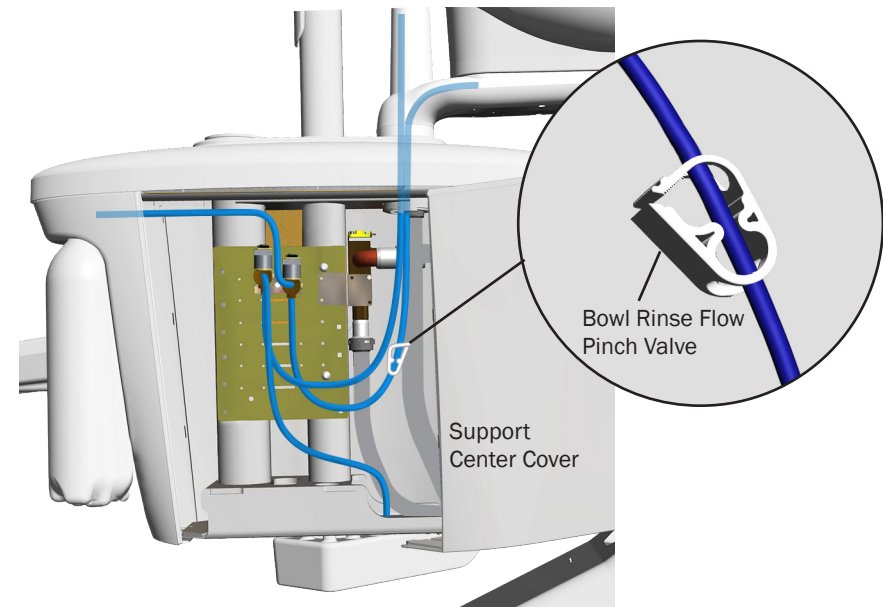
A-dec 200 Support Center provides chair side mounting of the A-dec 200 Delivery System, Cuspidor, A-dec 200 Dental Light, and Assistant's Instrumentation. The support center mounts to the A-dec 200 chair using a post mount.



Adjust the Bowl Rinse Flow

Adjustments to the cuspidor bowl rinse flow are made inside the support center. To adjust the flow:

1. Loosen the two thumb screws at the bottom of the support center and carefully pull the cover out.
2. With the cuspidor bowl rinse on, tighten or loosen the pinch valve to adjust the flow.
3. For the best rinsing action, adjust the flow pattern by rotating the bowl rinse.



Adjust the Cuspidor Cupfill and Bowl Rinse

For adjustment information, see "Cuspidor Cupfill and Bowl Rinse" on page 24.

Self-Contained Water System

The self-contained water system provides water to the handpieces, syringes, and cuspidor cupfill. The system includes a 2 liter water bottle that mounts to the support center and offers a way to ensure the quality of treatment water.



WARNING Use only A-dec self-contained water bottles. Do not use any other bottles, including glass or plastic beverage bottles. Do not use damaged bottles. These can pose a serious safety hazard while pressurized. A-dec plastic water bottles cannot withstand heat sterilization. Attempting to do so will damage the bottle and your sterilizer.



CAUTION Use caution when using the self-contained water system with accessories that require and uninterrupted water supply (such as scalers) as these could get damaged without a continuous water source. Do not use saline solutions, mouth rinses, or any chemical solutions (not specified in this guide) in your A-dec self-contained water system. These may damage the system components and cause your dental unit to fail.

Adjust the Water Bottle

To remove the bottle: Turn the bottle counterclockwise.

To install the bottle: Turn the bottle so that the A-dec logo faces away from the chair, then rotate the bottle to the right 1-1/2 turns, taking care not to overtighten.



CAUTION Do not over tighten the water bottle or you can strip its threads. It is normal to hear a hissing sound for up to two minutes while the bottle pressurizes.



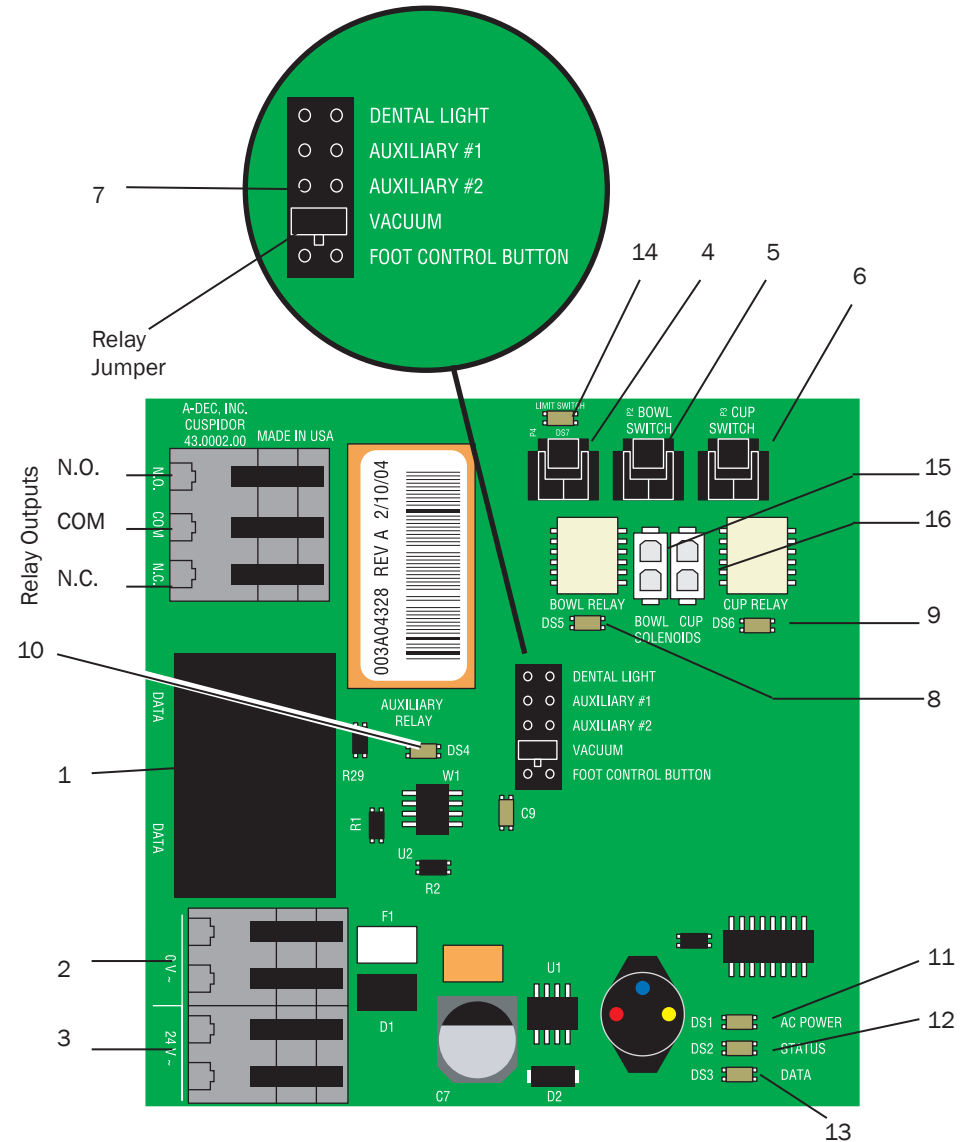
Cuspidor Circuit Board With Touchpad

p/n 90.1079.00

Item	Description
1	P5 - DCS terminals
2	J1 - Ø VAC terminal strip
3	J1 - 24 VAC terminal strip
4	P4 - Cuspidor limit switch connector
5	P2 - Bowl rinse switch connector
6	P3 - Cupfill switch connector
7	P1 A-dec relay selection header
8	DS5 - Bowl rinse relay LED
9	DS6 - Cupfill relay LED
10	DS4 - Auxiliary relay LED
11	DS1 - AC power LED
12	DS2 - Status LED
13	DS3 - Data LED
14	DS7 - Limit switch LED
15	P6 - Bowl rinse solenoid connector
16	P7 - Cupfill solenoid connector



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.



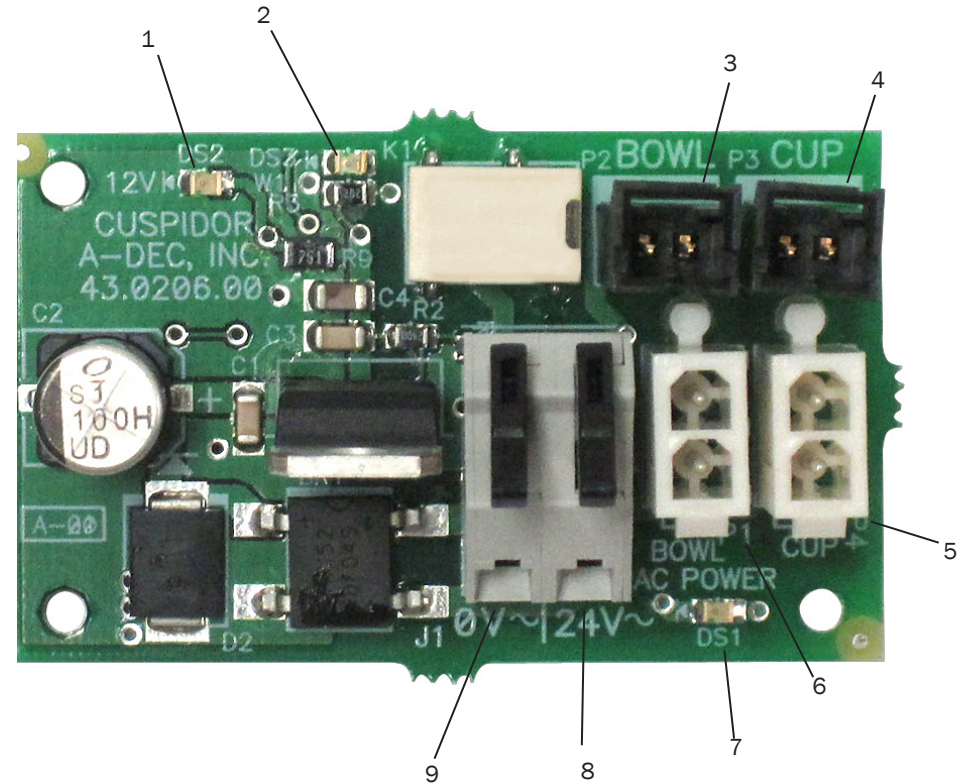
Cuspidor Circuit Board Without Touchpad

p/n 77.1128.00

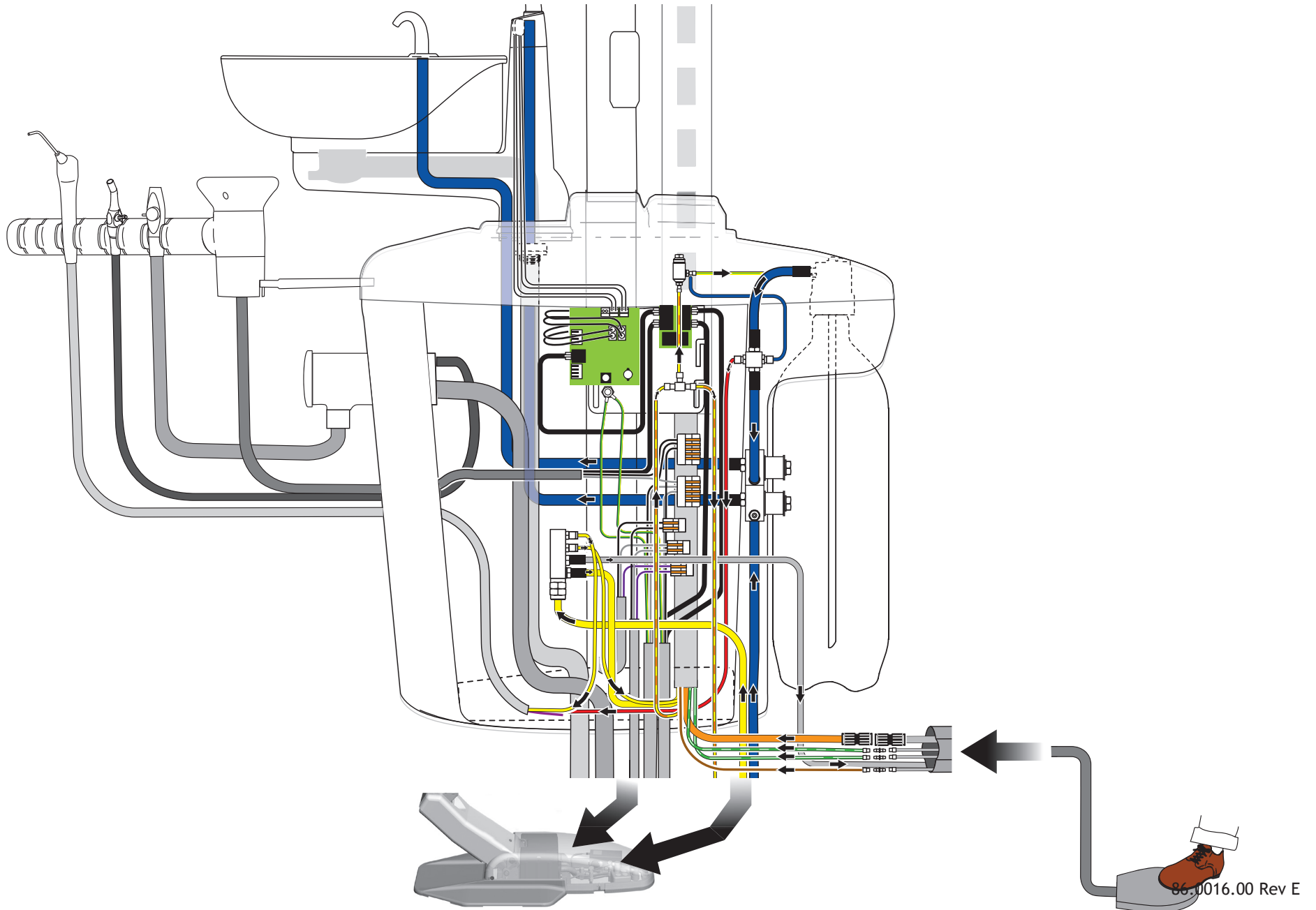
Item	Description
1	DS2 - Status LED
2	DS3 - Data LED
3	P2 - Bowl rinse switch connector
4	P3 - Cupfill switch connector
5	P4 - Cupfill solenoid
6	P1 Bowl rinse solenoid
7	DS1 - AC power LED
8	J1 - 24 VAC terminal strip
9	J1 - 0 VAC terminal strip



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.



Support Center, Cuspidor and Water Bottle Flow Diagram



Assistant's Instrumentation

Assistant's Instrumentation Product Overview

The A-dec 200 assistant's instrumentation is equipped with an autoclavable syringe, high volume evacuator (HVE), and saliva ejector (SE). Some configurations may include an optional dual HVE or instrumentation that supports a chair-side or single-operator vacuum system. Integrated into the support center is the solids collector, which connects with the HVE and SE to separate solids from the evacuated material.

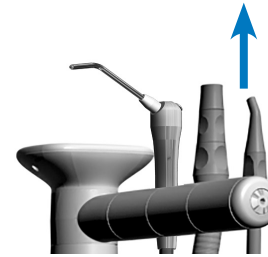
The assistant's vacuum instruments disconnect from the tubing for easy cleaning, and they are fully autoclavable.



Auto-air Holder

Each handpiece in the holder assembly automatically activates when you lift it from its holder.

Holders provide vacuum On/Off switching for users whose vacuum system requires this functionality. The vacuum pump activates automatically when you lift the HVE or SE from the holder. The vacuum turns off when you place the HVE or SE back into the holder.



Assistant's Holder Positioning



CAUTION Twisting the holder without pulling it away from the adjacent one will damage the mechanism.

The Instrument holders rotate independently to allow customized positioning for each handpiece. Pull the holder slightly away from the adjacent one, rotate to the desired position, and then release.



NOTE Auto-air holders rotate together. Standard holders rotate individually.

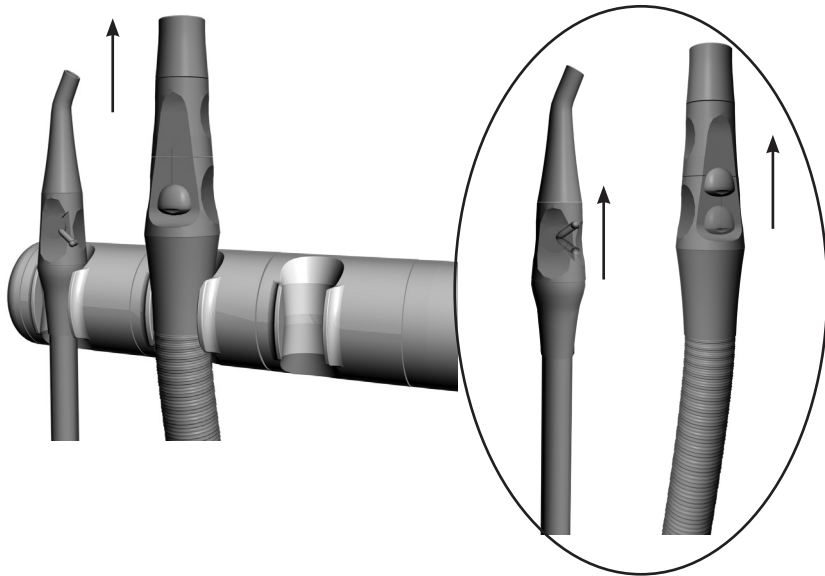


Vacuum Instrumentation

To use the HVE and SE, lift the holder from the valve to activate the vacuum.

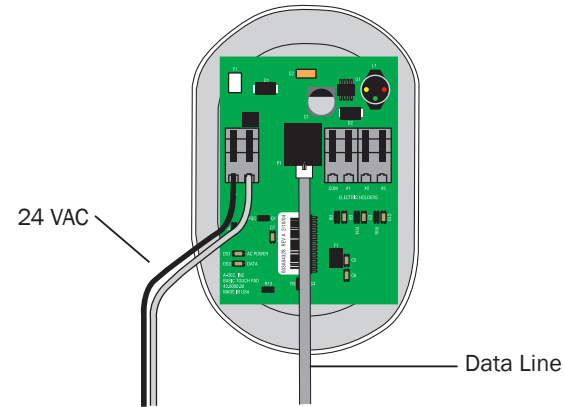


NOTE Lifting the handpiece from the holder only activates the vacuum with auto-air switches.



Assistant's Touchpad Connections

The assistant's instrumentation uses a standard touchpad that serves as a single touch surface for controlling the chair, dental light, and cuspidor. The touchpad can rotate 340° for access and visibility.



Solids Collector

The solids collector helps stop solids from entering the central vacuum system.



Danger

DANGER Infectious waste may be present. Follow asepsis protocol to prevent cross contamination.

Replace Solids Collector Screen

1. Turn off vacuum or open the HVE control valve.
2. Remove the solids collector cap.
3. Remove the solids collector screen.
4. Discard the screen according to your local regulations.



CAUTION Do not empty the screen into the cuspidor. Doing so could plug the drain.

5. Insert the new screen in the collector and replace the cap.



CAUTION Ensure that the solids collector cap is inserted properly. Failure to do so will not allow for proper suction.



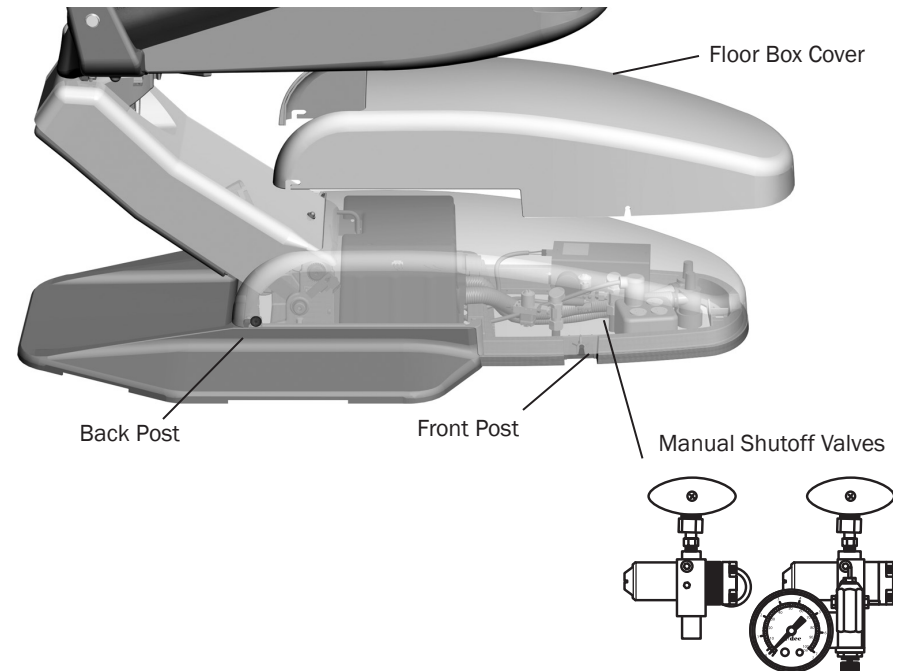
Utilities

Utilities Overview

The utilities for your system are located under the chair floor box. To access the utilities, pull the floor box cover up at the front posts, and then forward and up to slide the cover off the back posts.

Shutoff Valves

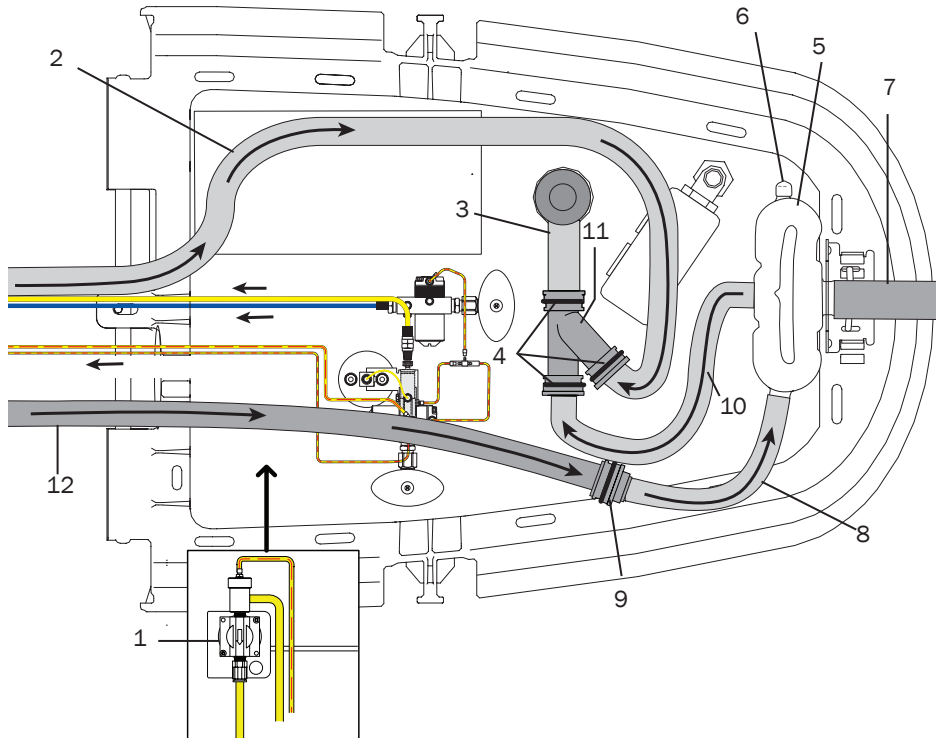
Manual shutoff valves control the air and water to the system. To prevent leaks, these valves should remain fully open (turned counterclockwise) except while servicing the system. Air and water pass through separate filters before entering the regulators. Replace these filters when they become clogged and cause restricted flow.



NOTE If cable ties are present in the product and you need to remove them for servicing, make sure to replace the ties after service is completed.

Gauge and Pre-Regulator

The pre-regulator controls the air and water pressure in the unit. The gauge displays the unit air pressure.

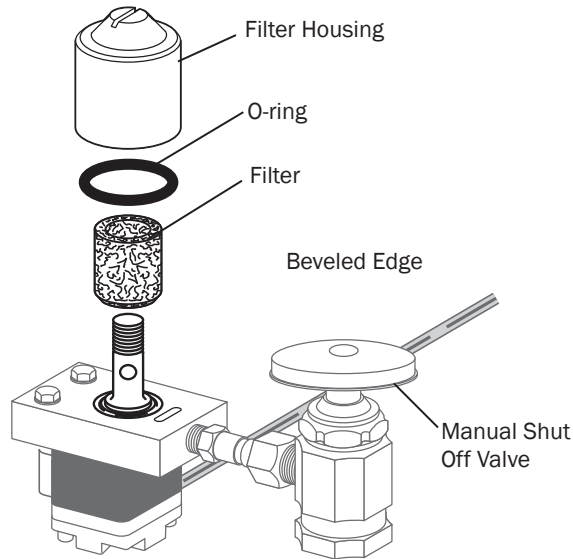


Utilities Descriptions

Item	Description	Item	Description
1	Moisture separator (optional)	7	Air exhaust
2	Cuspidor drain tube	8	5/8" exhaust tube
3	20 mm tube to drain	9	Durr adapter
4	Connector clips (four)	10	20 mm tube to liquid separator drain
5	Liquid separator tank	11	Y connector
6	Cap	12	Exhaust tube

Air and Water Filters Replacement

Air and water pass through separate filters before entering the regulators. Replace a filter when it becomes clogged and causes restricted flow.



To replace the filter:

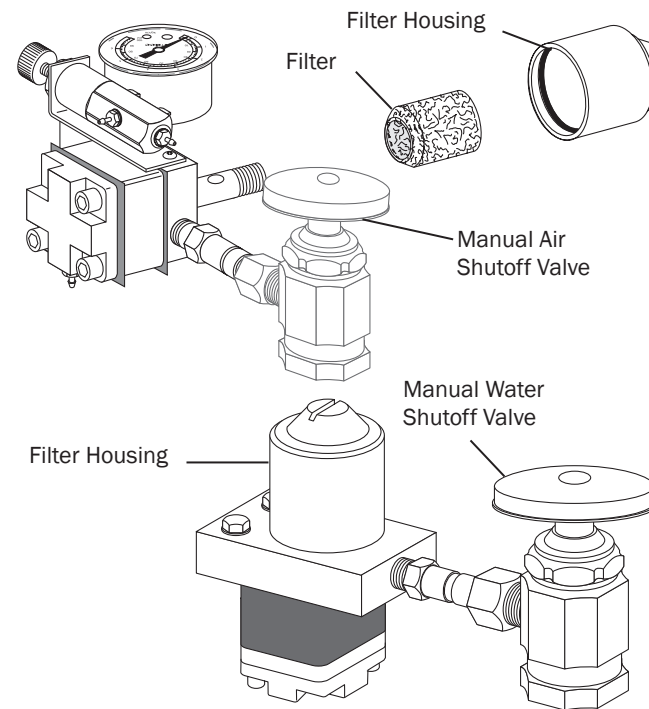
1. Turn off the master toggle and close the manual shutoff valves (turn clockwise).
2. Bleed the system of air and water pressure by operating the syringe buttons until air and water no longer flow.
3. Using a standard screwdriver, remove the filter housing from the air or water filter pre-regulator assembly and remove the filter.
4. Replace the filter if it is clogged or discolored. Install the filter with the beveled edge facing the manifold.



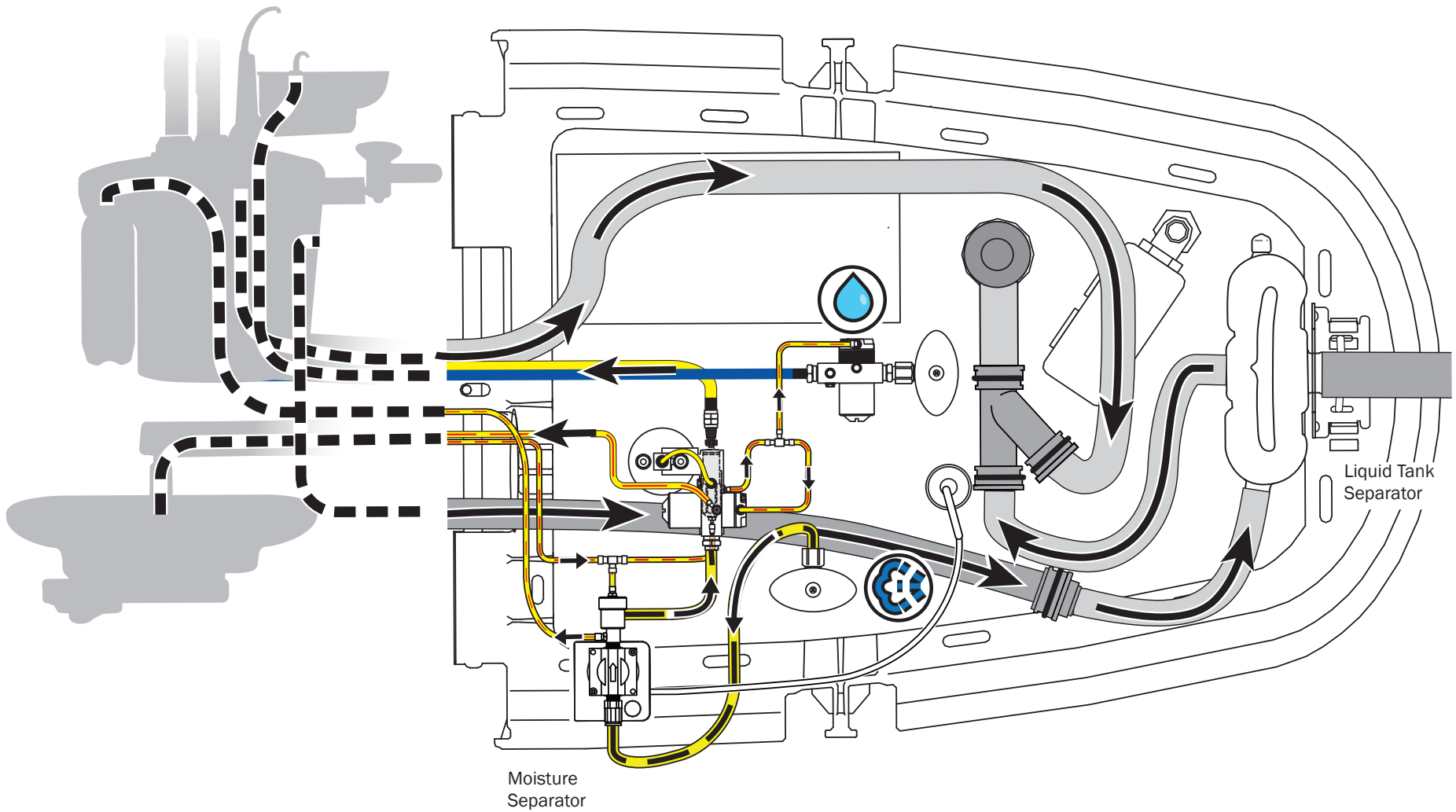
CAUTION To ensure proper delivery system operation, install the filter with the beveled edge facing the manifold.



NOTE Turn the pre-regulator knob clockwise to increase pressure and counterclockwise to decrease pressure. Read the pressure gauge while adjusting. Water pressure will increase/decrease by half of the gauge indication.



Floor Box Options Flow Diagram



A-dec 200 Dental Light



Dental Light Specifications

- Electrical (Transformer Output):
 - A-dec 200: 12.1/16/17 VAC
- Bulb: Quartz Xenon Halogen, single-end
- Rating: 17 V/95 W
- Color temperature: 4800 Kelvin
- Heat output: 325 BTU/Hour
- Light Pattern: 230 mm x 110 mm at 700 mm (9" x 4.3" at 27.6")
- Nominal Light Intensity:
 - Composite: 5,500 lux (511 fc)
 - High: 20,000 lux (1858 fc)
 - Heat Output: 325 BTU/hour

For information about dental lights other than the A-dec 200 Dental Light, reference the *A-dec Dental Lights and Monitor Mounts Service Guide*, p/n 86.0326.00.

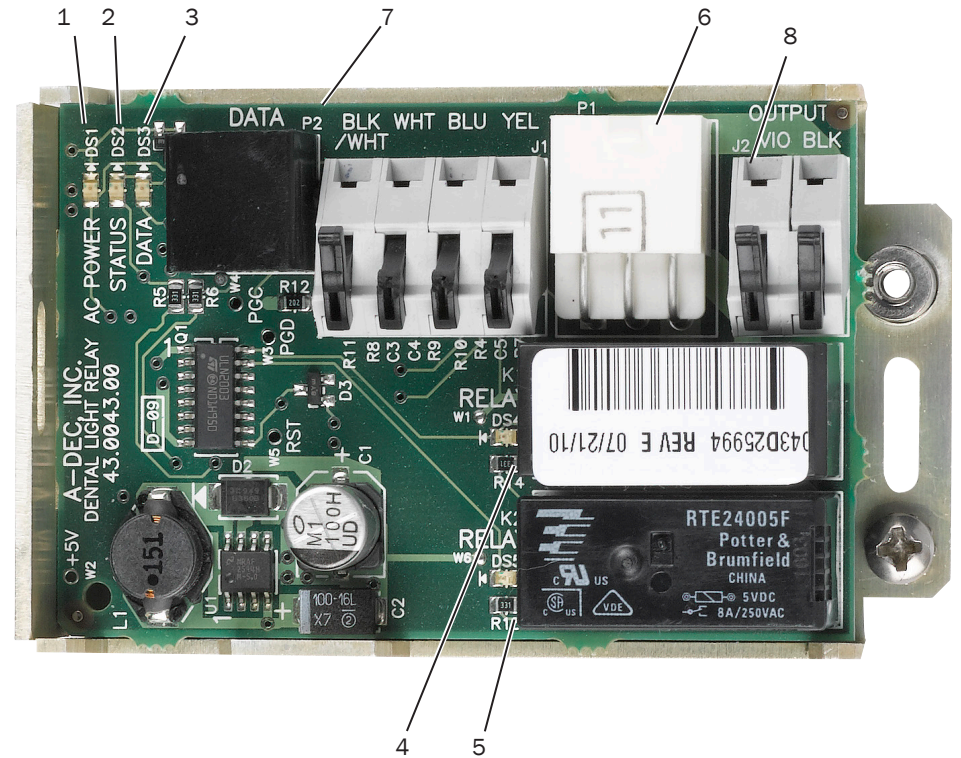
Dental Light Relay Circuit Board

p/n 90.1171.00

Item	Description
1	DS1 - AC power LED
2	DS2 - Status LED
3	DS3 - Data LED
4	DS4 - Dental light relay LED
5	DS5 - Dental light relay LED
6	P1 - Input power
7	P2 - Data port
8	J2 - Toggle switch inputs



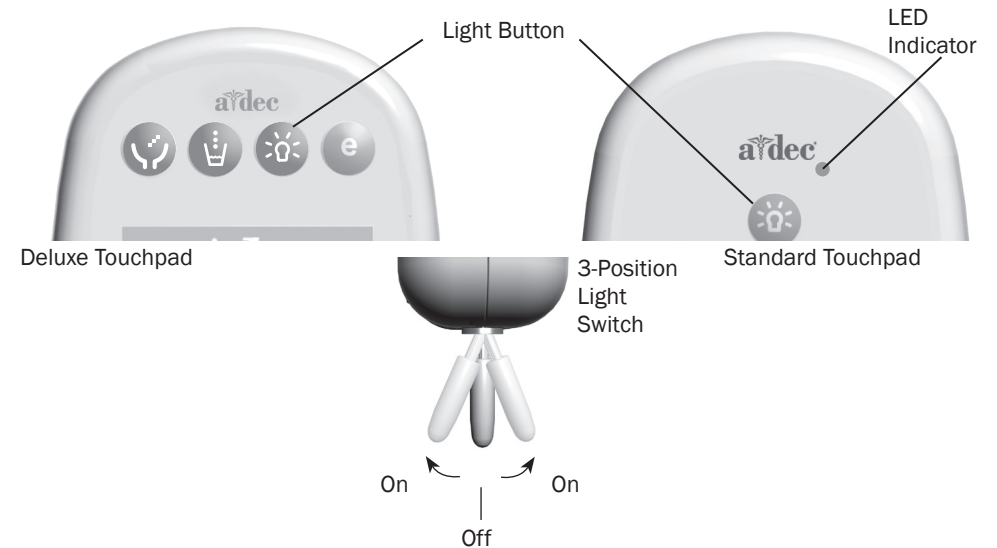
CAUTION Circuit boards are sensitive to static electricity. Electrostatic Discharge (ESD) precautions are required when touching a circuit board or making connections to or from the circuit board. Circuit boards should be installed only by an electrician or qualified service person.



Dental Light Operation

The A-dec 200 dental light can be operated from the manual 3-position switch or the optional touchpad. The dental light is always off when the manual switch is in the center location. To turn the light on from the touchpad, press and release the dental light button. Press and hold the button to turn the light off.

The dental light features two intensities: high and composite (low). For systems without a touchpad, flip the 3-position switch to either side of center to select the intensity. On the touchpad, press the light button to choose the intensity. When the light is in the composite setting, the LED indicator on the standard touchpad flashes.



WARNING Take appropriate precautions when operating and maintaining the dental light. Avoid contact with components that may become hot when the light is on. To avoid burns, touch only the light handles and switches during operation. Always turn off the light and allow it to cool completely before maintenance or service.

Rotation Adjustments



WARNING Always turn off the dental light and allow it to cool completely before maintenance or service.

If the light head is difficult to position, moves too easily, or tends to slip out of position, you can adjust the horizontal, diagonal, and vertical rotation tension.

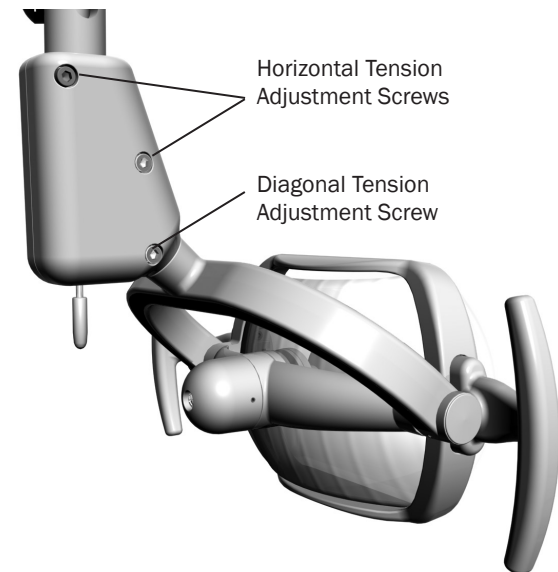
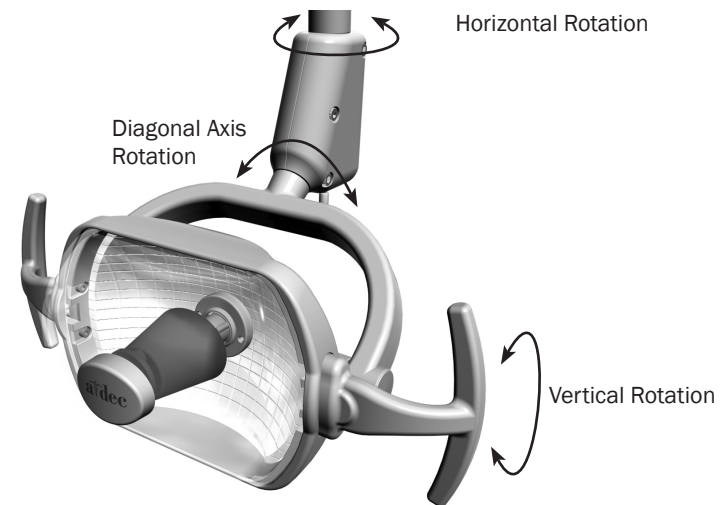
Horizontal Rotation

1. Use a hex key to make left/right rotation adjustments, beginning with the top screw on both sides of the switch housing.
2. If the light head moves too easily, or tends to drift out of position, increase the tension by turning the screws right.
3. If the light is difficult to move, loosen the tension by turning the screws left.

Diagonal Axis Rotation

For diagonal axis rotation, adjust the screws at the bottom of the switch housing.

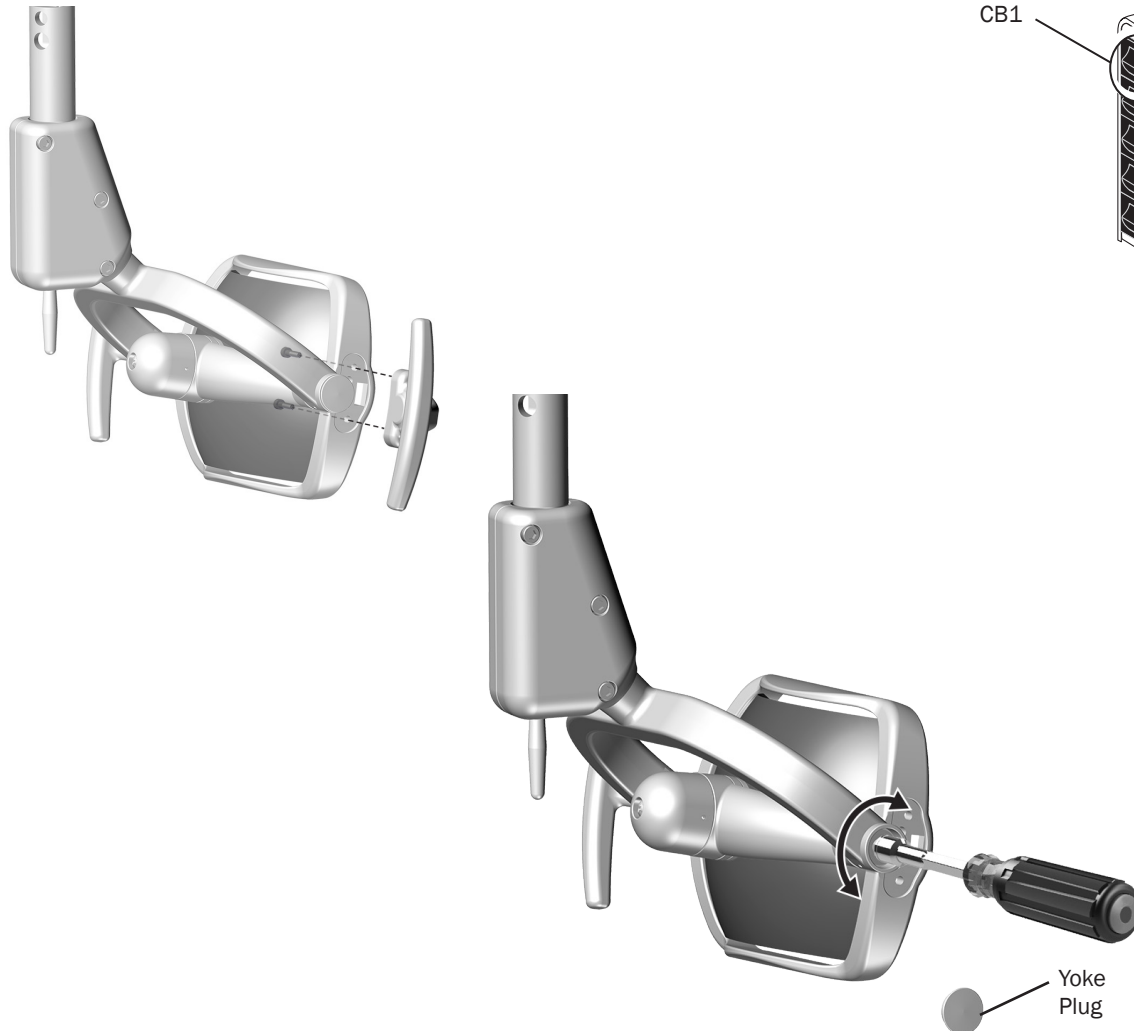
1. If the light head moves too easily, or tends to drift out of position, increase the tension by turning the screw right.
2. If the light head is difficult to move, loosen the tension by turning the screw left.
3. To eliminate all movement in the diagonal axis, tighten the adjustment screw until it is tight.



Vertical Adjustment

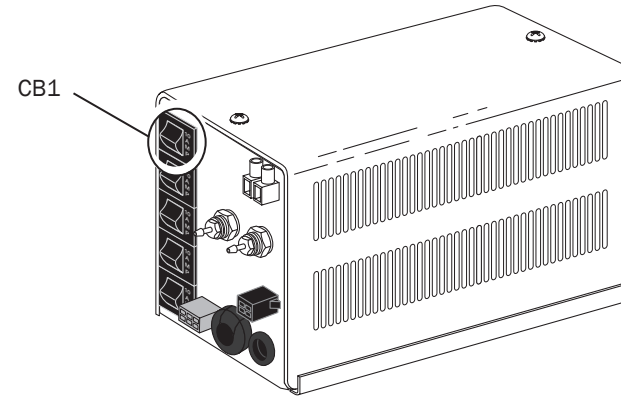
For vertical rotation tension, follow these steps:

1. Use a screw driver to remove the light handle.
2. Remove the yoke plug on one side of the light.
3. Using a 5/16" nut driver, turn the adjustment nut clockwise to increase tension or counterclockwise to decrease tension.
4. Reinstall the yoke plug and the handle.



Circuit Breaker Location

A circuit breaker will interrupt the flow of electricity under abnormal conditions. If the circuit breaker should trip, inspect the wiring to ensure there are no shorts, and reset by pushing the circuit breaker. The circuit breaker for the dental light is located on the power supply.



Dental Light Wire Connections on the 200 Dental Chair With Touchpad

Terminal	Voltage	Terminal Label	Wire
J2	17/12/16 VAC	VIO	Violet
J2	0 VAC	BLK	Black

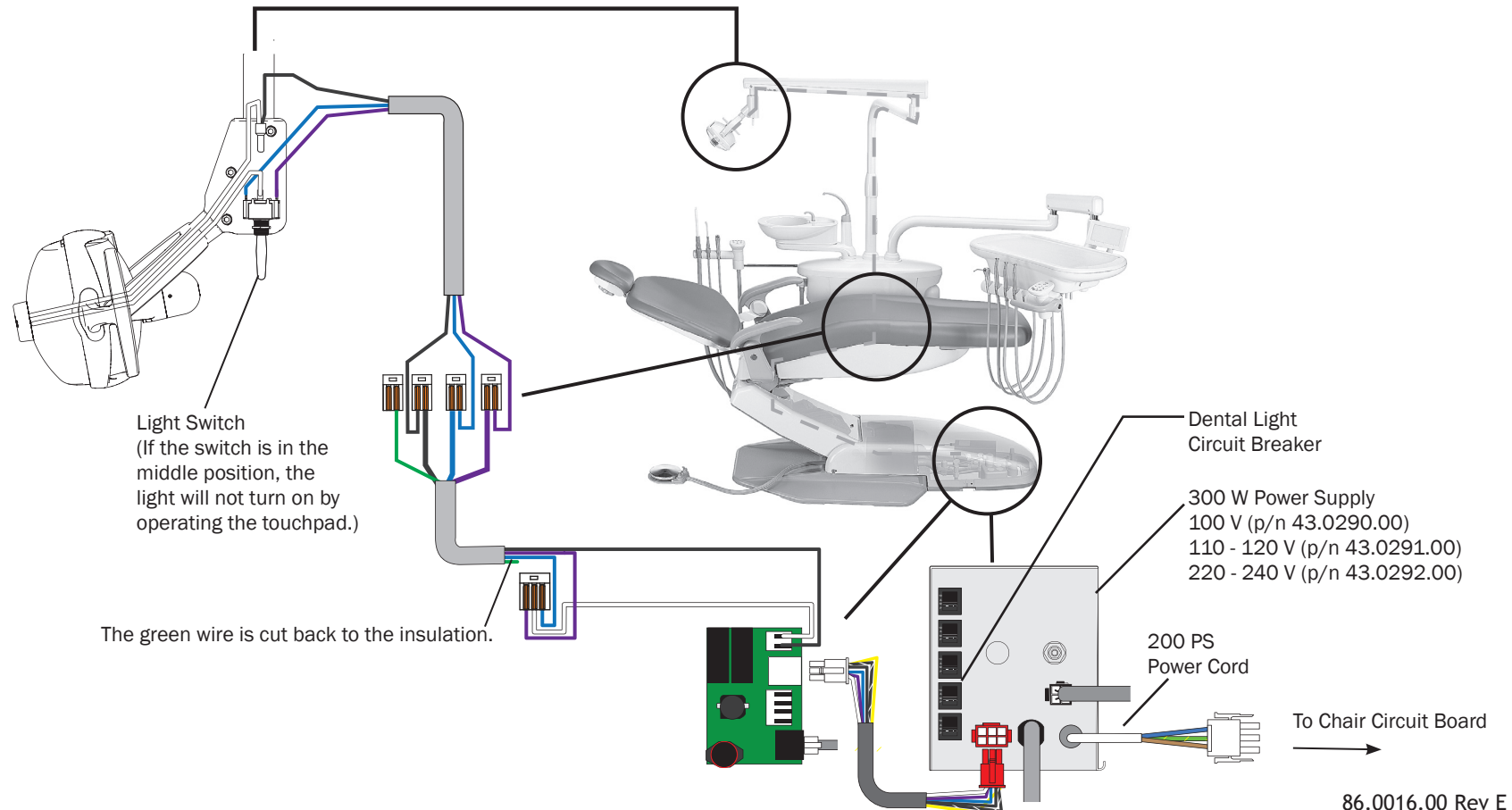
See "Chair Circuit Board Components" on page 7 to identify dental light connections on the chair circuit board.



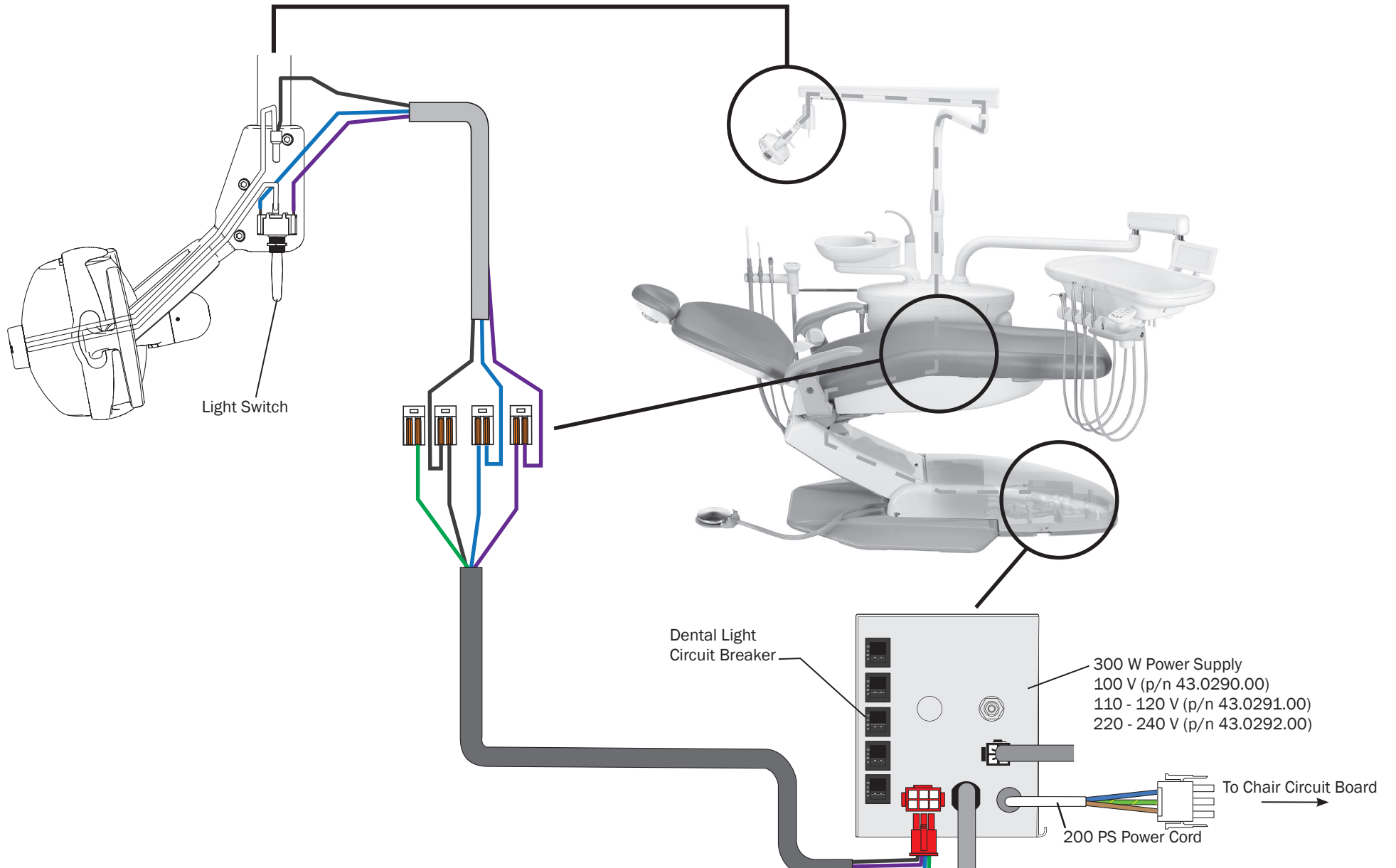
NOTE The LED indicator must be connected to the power supply for the dental light circuit board to function correctly.



NOTE For field installation of power supply, cut off the existing white connector and strip the wires.



Dental Light Wire Connections on the 200 Dental Chair Without Touchpad



Troubleshooting

Dental Chair Troubleshooting

Symptom	Check	Possible Solution
No chair base or back functions.	Check whether it is the base or the back that won't function.	If only downward movement is impeded, check to see if a limit switch is triggered (red LED on the chair board).
	Check the speed adjustments on the hydraulic manifold.	Refer to Chair Speed Adjustments, page 15.
	Check the magnetic pull on the hydraulic solenoids when activated.	Refer to Test the Solenoid, page 12.
	Check the hydraulic lock.	Release the hydraulic lock: <ol style="list-style-type: none"> 1. Remove the motor pump cover. 2. Insert a 5/8" wrench into the high pressure outlet port (either lift or tilt, whichever is in hydrostatic lock) of the hydraulic manifold. 3. Hold the port still and use a 9/16" wrench to loosen the hose fitting. 4. Place a shop rag around the fitting to absorb the fluid. 5. Carefully loosen the fitting counterclockwise until oil begins to lead from the fitting. 6. Operate the down function. A second release of hydraulic fluid may be required. 7. Adjust the limit switch that caused the hydrostatic lock. In some cases, it may be necessary to remove the replace the limit switch. 8. Cycle the chair a couple of times to verify it is no longer in hydraulic lock.
No power to the chair but the office still has power.	Check that the chair is plugged in and the Mains button is in the on position.	Plug in the chair or turn on the Mains power.
	Check that the chair circuit board breakers have not tripped.	Refer to the Chair Circuit Board Components, page 7. Reset any chair circuit breakers that have tripped.
Chair status light is off.	Check the chair board.	<ol style="list-style-type: none"> 1. Disconnect all data cables from the board. 2. Turn off the chair, and then turn on the chair. If the Status light is still off, you may need to replace the circuit board. If the Status light turns on, there may be a problem with the data communication.

Dental Chair Troubleshooting

Symptom	Check	Possible Solution
Chair drifts down.	Check whether the problem is the hydraulic system.	<p>Unplug the chair.</p> <p>If the chair continues to drift, check for fluid in the vent line going from the cylinder to the reservoir. A small amount of fluid is acceptable. Pinch off the line to see if the chair stops drifting. If it does stop, replace the cylinder. If not:</p> <ol style="list-style-type: none"> 1. Move the base all the way down. 2. Use a 5/16" hex key to remove the high pressure hose and fitting, and check the check valve for any visible damage. The valve may need to be replaced. 3. If the chair continues to drift, remove the solenoid and check the plunger. At the end of the plunger, there is a rubber tip. Check for an indentation on the rubber tip and replace if needed.
Chair makes an abnormal noise when moving.	Check the hydraulic cylinder's shaft.	<p>Lubricate the shaft.</p> <p>While moving the chair base up and down, hold the hoses to make sure they are not touching the lift arm cover. If so, apply a cable tie to hold the hoses in place.</p>
	Check the chair rear cover.	Some chairs manufactured prior to March 2011 may have included a rear cover that was not properly trimmed. If the rear cover contacts the lift arm cover or makes a noise as the base moves to the highest position, it may need to be replaced.
	Check the hydraulic oil.	If the oil is under the low fluid mark, it may cause abnormal noise. Fill the hydraulic oil to the fluid mark.

Delivery System Troubleshooting

Symptom	Check	Possible Solution
Sputtering water from syringe and handpieces	The O-ring on the water bottle barb pickup tube.	If faulty, replace the O-ring.
	The pickup tube.	If damaged, replace the pickup tube.
Intermittent water coolant to handpieces	The O-rings in the handpiece coupler.	If faulty, replace the O-rings.
	The water air coolant pressure.	If necessary, adjust the water or air coolant.
	The length of the water bottle pickup tube.	If too long, use diagonal cutters to shorten the tube.
	The pickup tube.	If damaged, replace the pickup tube.
Water leaks from a vent hole in the control block when a wet handpiece is in use.	The water coolant cartridge.	If damaged, replace the cartridge.
A handpiece drips water while in its holder.	The handpiece or coupler.	Remove the handpiece and coupler and retest the water coolant flow. If the dripping stops, replace the coupler O-ring or handpiece.
	The water coolant cartridge.	If faulty, replace the coolant cartridge.
Water stops when a handpiece is in use.	The control block diaphragm.	If faulty, replace the diaphragm.
Water leaks from the water coolant stem.	The O-ring on the water coolant stem.	If faulty, replace the stem.

Touchpad LEDs

The touchpad screen, touchpad LEDs, and LEDs on the circuit boards verify the DCS status. The LEDs use color and blinking to indicate the module status.

LED	Status
Status (LED Logo)	Off = system is not functioning powered on (device is disconnected, no power, or dead touchpad board)
	Blue steady = normal condition (ready for use)
	Blue double blink = jumper is in the factory default position on the chair circuit board.
	Blue slow blink = chair, cuspidor or lower support arm stop switch is activated.
Dental light	Off = dental light is off
	Yellow steady = dental light is on in high or medium intensity
	Yellow slow blink = dental light is on in composite intensity or cure safe mode
Bowl Rinse or Auxiliary #1	Off = auxiliary #1 off or bowl rinse is off
	Yellow - auxiliary #1 is on or bowl rinse is on
Cupfill or Auxiliary #2	Off = Cupfill is Off or auxiliary #2 is Off
	Yellow - Cupfill is on or Auxiliary #2 is on
AC Power LED (DS1)	Off = No 24 VAC power. The circuit breaker could be tripped; power supply could be turned off; there could be no voltage.
Data LED (DS3)	Off = No data communication.
	Green steady = Active communication is detected.
	Green blinking = Valid data message.

Off = Function is turned off, device is disconnected, no power or failed circuit board; Blue Steady = Normal Operation; Yellow = Normal

Circuit Board LED Chart

LED	A-dec Relay	Cuspidor	QVIOLS/Delivery System
AC power	Off = no 24 VAC power, open circuit breaker, power supply turned off, no line voltage Green steady = 24 VAC power at terminal strip		
Status	Off = system is not functioning, no power or circuit board has failed Green steady = normal condition		Off = System is not functioning, no power or circuit board has failed. Green steady = normal condition Green continuous blinking = Two or more handpieces are activated Green single blink = Switch Input #4 configured for handpiece switch input (normal) Green triple blink = Switch Input #4 configured for drive air input
Data (DCS)	Off = no data communication, not connected to the data line connector, data line is not functioning Green steady = detects active data bus Green blinking = valid data bus message		
A-dec relay module	Off = Relay is off Yellow = Relay is on	Off = relay is off Yellow = relay is on	N/A
Bowl rinse/cupfill relays	N/A	Off = relay is off Yellow = relay is on	N/A
Cuspidor stop limit switch	N/A	Off = closed (normal) Red = open (activated)	N/A
IOLS output	N/A	N/A	Off = IOLS voltage off Yellow = IOLS voltage is on
Ultrasonic instrument relay (500)	N/A	N/A	Off = ultrasonic instrument relay is off Yellow = ultrasonic instrument relay is on

Dental Light Troubleshooting

Symptom	Check	Possible Solution
Light does not work (Halogen light)	Check for voltage at the bulb socket or check that the bulb is discolored.	If voltage is present, replace the bulb. If the socket is faulty, replace it. If bulb is discolored, replace it.
	Check the dental light circuit breaker to verify if it has been tripped or the power supply has failed.	<ul style="list-style-type: none"> If the circuit breaker tripped, reset it. If the circuit breaker trips again, disconnect P4, J5, and J6 on the chair board. If the circuit breaker trips again, replace the power supply. If the circuit breaker does not trip, reconnect P4. If the circuit breaker now trips, replace the chair circuit board. If the circuit breaker does not trip, reconnect the connections to J5. If the circuit breaker now trips, replace the chair circuit board. If the circuit breaker does not trip, reconnect the connections to J5. If the circuit breaker trips, replace the dental light.
	The bulb socket is faulty.	Replace the socket.
Light works from the touchpad(s) but not from the dental light switches. (Halogen and LED lights)	Loose connection in the dental light wiring harness.	Verify that the wiring is connected properly.
		Check the connections at the dental light switches and terminals on the circuit board.
Light works from the dental light switches but not from touchpad. (Halogen and LED lights)	Faulty data line from the touchpad to the circuit board.	Temporarily substitute a known good data line from the touchpad to the circuit board, if the light works from the touchpad, determine and replace any bad bypassed data lines.

Dental Light Troubleshooting

Symptom	Check	Possible Solution
Light intensity is dim, inconsistent, or the color is distorted. (Halogen and LED lights)	Check that the reflector or light shield are not damaged.	Inspect the dental light shield and reflector for damage or contamination. Replace or clean as necessary. CAUTION: Abrasives, disinfectants or chlorine damage the shield and reflector. Refer to the Instructions for Use for cleaning instructions.
	Check that the mains voltage is not low.	Verify the mains voltage is within specifications: 100/110-120/220-240 VAC
Unsatisfactory light pattern. (Halogen lights)	Check whether the light is out of focus or if the reflector or light shield are damaged.	<ol style="list-style-type: none"> 1. Focus the light. 2. Check the light shield for severe abrasions, and replace if necessary. 3. Clean the reflector and light shield.
Light does not turn on for lights without touchpad functionality. (LED lights)	Check: <ul style="list-style-type: none"> • That there is power • That the circuit breaker is not tripped • That the power supply turned on with line voltage • That the driver or LED array boards are not faulty 	If the LED (DS1) on the driver board is not lit, check for voltage at J1 on the driver board. If voltage is present at J1, reset the switch connections at J3 on the driver board. If the connections at J2 on the driver board are not lit, replace the driver board or the LED array board.
Light does not turn on for lights with touchpad functionality. (LED lights)	Check: <ul style="list-style-type: none"> • That there is power • That the circuit breaker is not tripped • That the power supply turned on with line voltage • That the driver or LED array boards are not faulty 	If the LED (DS1) on the driver board is not lit, check for voltage at J1 on the driver board. If voltage is present at J1, check that the STATUS LED (DS2) is lit. If it is not lit, replace driver board. If voltage is present at J1, check the switch connections at J3 on the driver board. If the DATA LED (DS3) is lit, check the connections at J4. Check that other CAN functions operate throughout the chair. Check connections at J2 on the driver board. Replace the driver board of LED array board.
Light turns on but does not switch between high and composite mode. (LED lights)	Check that the driver or LED boards are not faulty.	Replace the driver board or LED array board.



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