



## A-dec 500<sup>®</sup> Service Guide

Including ICV<sup>®</sup> and Clinical Products

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Regulatory information is provided with A-dec equipment as mandated by agency requirements. This information is delivered in the equipment's *Instructions for Use* or the separate *Regulatory Information and Specifications* document. If you need this information, please go to the Document Library at [www.a-dec.com](http://www.a-dec.com).

## Product Service

For service information, contact your local authorized A-dec dealer. To find your local dealer, go to [www.a-dec.com](http://www.a-dec.com).

## Service Reference

This document is a companion to the *A-dec 500 Service Reference* (p/n 86.0329.00). The Service Reference contains tubing, flow diagrams, and illustrated parts breakdown content. Circuit board component information is available in both this document and the Service Reference.

A - DEC 500  
SERVICE GUIDE



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# INTRODUCTION

## Inside This Guide

This guide is intended for newly trained and seasoned service technicians responsible for installing and maintaining A-dec products. The technician should understand dental equipment operation, how to use flow diagrams, and how to perform basic maintenance on dental or medical equipment.

Inside this guide you will find the tools, maintenance, adjustments, and troubleshooting information for A-dec 500 products.

## Document Conventions



**NOTE** Notes indicate additional information, and when it is important that instructions are followed.



**CAUTION** Caution indicates when failure to follow instructions could result in damage to product or minor injury.



**TIP** Tips indicate tips or tricks to make installation, use, or maintenance easier.



**DANGER** Danger indicates warnings of dangerous voltage and of certain electrical shock.



**WARNING** Warning indicates potential severe injury or death if instructions are not followed properly.



**IMPORTANT** Important indicates areas in which to refer to or use specific instructions.



**BIOHAZARD** Biohazard indicates potential infection if instructions are not properly followed.

## Get Support

### Customer Service

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

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[www.a-dec.co.uk](http://www.a-dec.co.uk)

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Mascot, NSW 2020  
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Tel: (02) 8332 4000  
1.800.225.010  
[www.a-dec.com.au](http://www.a-dec.com.au)

### Web Contact

Partner Resources websites: [www.a-dec.biz](http://www.a-dec.biz)

## Other Sources of Information

### 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 still supported. Refer to this catalog for additional details on parts found in the service guide addendum.

### A-dec Dental Furniture Technical Packet

The *A-dec Dental Furniture Technical Packet*, P/N 86.0142.00, contains information specifically related to dental furniture. The content is intended to assist you in specifying plumbing, utilities, framing and construction requirements for installation of dental furniture.

### A-dec Illustrated Parts Breakdown

The *A-dec Illustrated Parts Breakdown* (IPB), P/N 85.0851.00, contains illustrated, exploded views of assemblies with part numbers and descriptions for associated parts for products produced before A-dec 500.

### Electronic Documentation

Electronic versions (PDF files) of our documentation (installation instructions, service guides, technical information) can be viewed or downloaded from the A-dec website ([www.a-dec.com](http://www.a-dec.com)). Check this location for current detail on products and technical information.

# Serial, Model Numbers, Color Identification

## Serial and Model Numbers

Product serial and model number information can be found on the serial/model number labels. When contacting customer service, the serial number helps identify the product and when it was manufactured.

The first letter of the serial number indicates the month the product was manufactured. For products manufactured *before* June 2011, the first digit of the serial number indicates the year of manufacture (for example, L0 = December 2010). For products manufactured June 2011 and *after*, the first two digits indicate the year of manufacture (for example, 11F = June 2011).

Use Table 1 and Figure 2 to reference how to identify serial/model number information.

Figure 1. Serial/Model Number Locations on A-dec 500

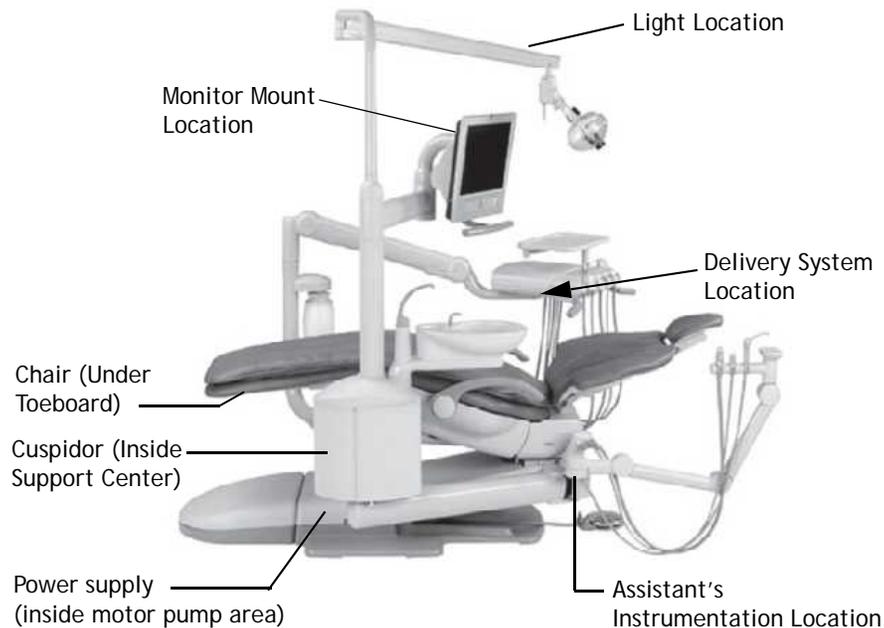
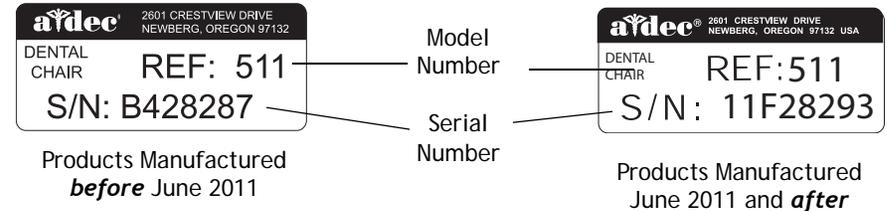


Table 1. Month Identification Table

Letter	Month	Letter	Month
A	January	G	July
B	February	H	August
C	March	I	September
D	April	J	October
E	May	K	November
F	June	L	December

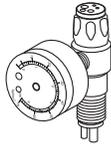
Figure 2. Serial Number Label Examples

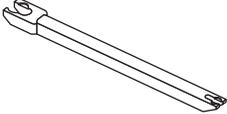
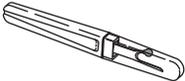


## Service Tools

Table 3 lists the types of tools available from A-dec for servicing A-dec equipment and their recommended use:

**Figure 3. Recommended Tools**

Tool	Task	Part Illustration	Part Number
Drive air pressure gauge	Adjusting handpiece drive air pressure, 0-60 psi (4.13 bar). This gauge does not fit the Borden 3-hole coupler		50.0271.00
Hemostat	Troubleshooting or repairing a unit to stop air or water flow through tubing		009.008.00
Hex wrench or key set	Servicing or installing A-dec equipment (plastic case included)		009.018.00
Loctite®	Installing threaded fasteners to prevent loosening		060.001.00 (Red 271) 060.002.00 (Blue 242)
O-ring tools	Replacing O-rings during quick field repairs (fits the four smallest O-ring sizes)		009.013.00
Panel mount gauge	Checking air/water pressure  Can also be used as an inline pressure gauge for testing purposes		026.118.00

Tool	Task	Part Illustration	Part Number
Silicone lubricant	Lubrication of internal moving parts such as O-rings, oral evacuator valves, and bushings		98.0090.01
Sleeve tool	Aid in securing 1/4" tubing sleeves and 1/8" uni-clamps		98.0072.00
Snap ring tool	Installation and removal of internal and external snap rings (fits all snap rings used in A-dec equipment)		009.007.00
Tubing stripper	Separation of the extruded air and water lines in vinyl tubing		009.035.00
Umbilical stringer	Route additional tubing or wiring through existing umbilical assemblies (12' [3.66 mm] stringer with threading holes on both ends)		009.015.00
Valve test syringe	Quick tests of pilot operated valves; used to apply a static pressure of 5-75 psi (.34-5.17 bar, package of 4)		98.0050.01



# DENTAL CHAIR

This section provides information related to servicing, maintenance, and adjustments of the A-dec 511 chair. For information on service parts, see the *Genuine A-dec Service Parts Catalog* (p/n 85.5000.00) or contact A-dec customer service.

## Contents

- Product Overview, page 8
- Service, Usage, and Adjustments, page 10

Figure 4. A-dec 511 Dental Chair

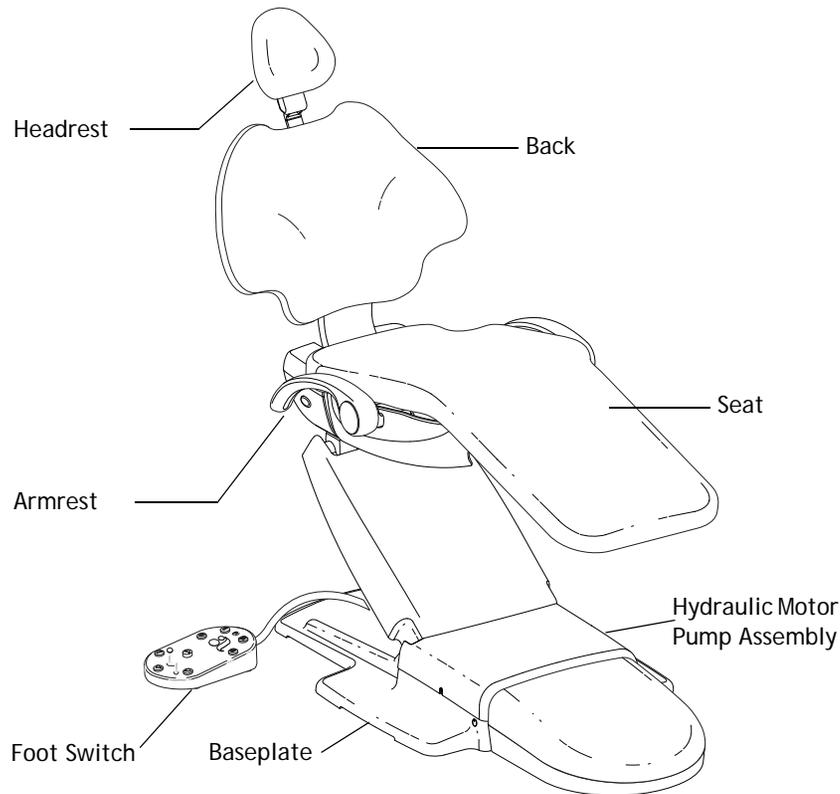


## Product Overview

### A-dec 511 Chair

The A-dec 511 chair provides a range of movements to position the patient for dental treatment. The chair offers seat and back support, adjustable head support, and movable arm support, and a footswitch and/or touchpad(s) control the chair movement.

Figure 5. A-dec 511 Chair Features



### A-dec 511 Chair Specifications

#### Load Capacity

Patient Load: 400 lb. (181 kg) maximum

Accessory Load: 250 lb. (113 kg) maximum

Specifications are subject to change without notice.

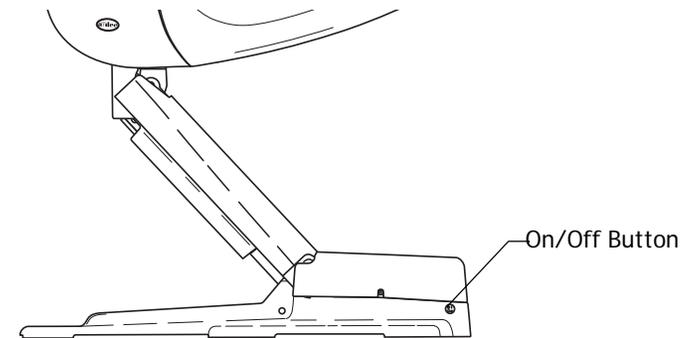


**NOTE** Ensure the chair is bolted to the floor after installation.

#### Power On/Off Button

The power on/off button is located on the base of the chair, and is the main disconnect that completely shuts down the electrical systems. When the button is pressed in, power is on. When the button is out, power is off.

Figure 6. On/Off Button



#### Limp-Along Feature

If there is a problem or malfunction, the limp-along feature allows the operator to move the chair in the up direction for one second intervals by pushing the manual control buttons on the touchpad or footswitch.

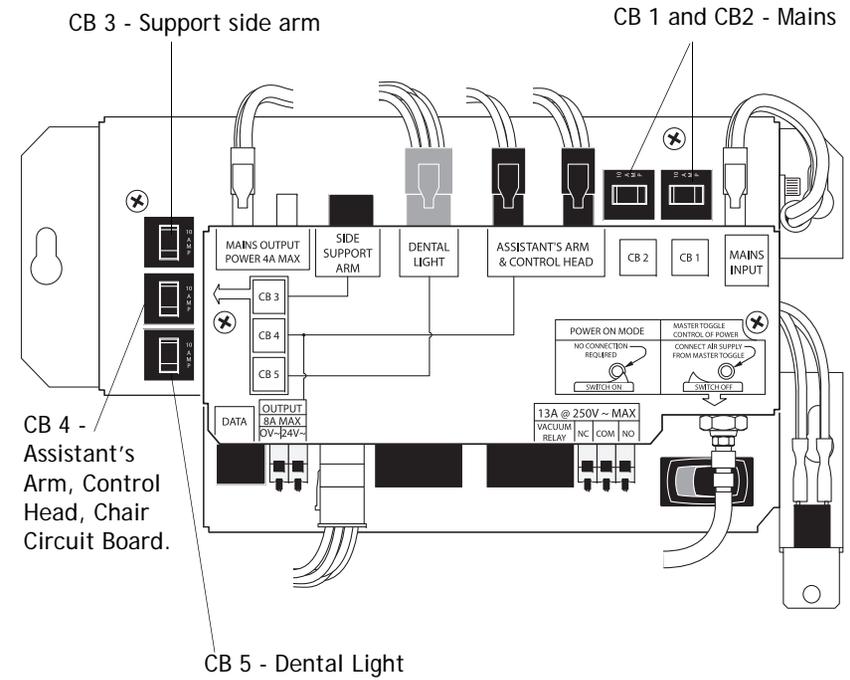
## Chair Power Supply

The 300-watt power supply comes standard with the A-dec 511 chair. It is located in the motor pump area of the chair. The total available auxiliary load is a maximum of 4 Amps.



**NOTE** The electric switch connects the power supply to pilot air.

**Figure 7. Chair Power Supply Circuit Breaker Identification**



# Service, Usage, and Adjustments

## Chair Covers

The A-dec 511 chair motor pump, lift arm and stop plate covers are removed in the following order:

### 1. Motor Pump Cover

- To remove: Remove screw from each side and lift up.
- To replace: Replace cover, and attach with two screws.

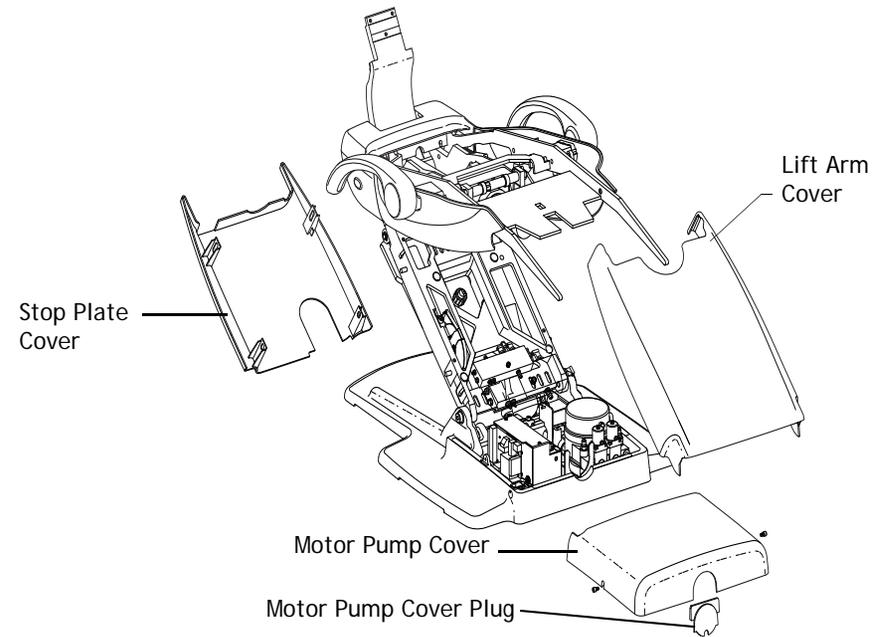
### 2. Lift Arm Cover

- To remove: 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 snap into place. Ensure both sides are firmly attached.

### 3. Stop Plate

- To remove: 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.

Figure 8. A-dec 511 Chair Covers



## Factory Default Routine

When a new circuit board is installed in the chair, the circuit board needs to run the factory default routine 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 P3 test points of the chair circuit board.

When running the factory default routine the chair:

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



**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.

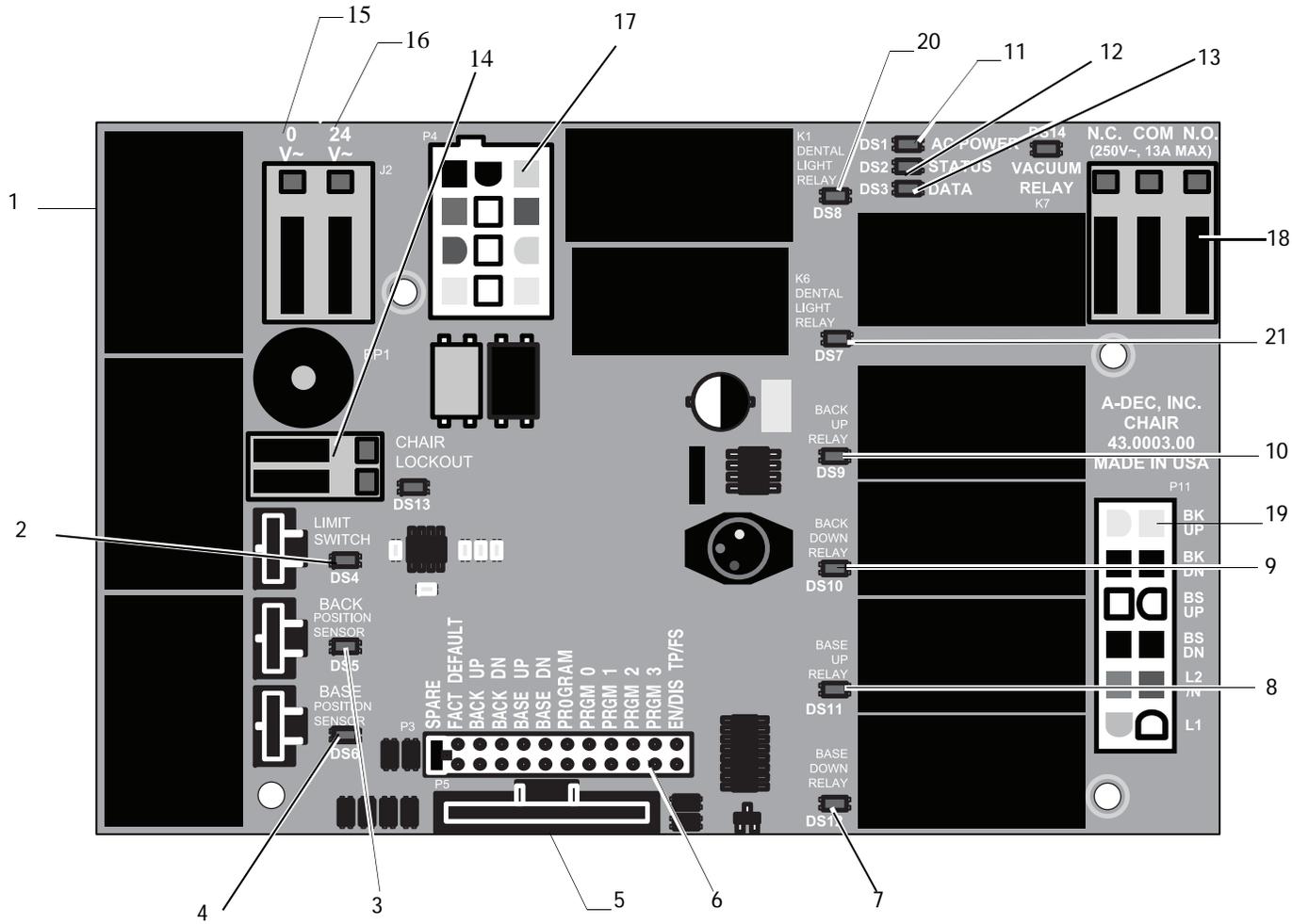
---

## Chair Circuit Board Components

Part No: 90.1072.00

Item	Description
1	P7, P8, P9 - Data line ports
2	DS4 - Stop switch LED (limit switch) and P10 connector
3	DS5 - Back potentiometer LED and P1 connector
4	DS6 - Base potentiometer LED and P2 connector
5	P5 - Footswitch connector
6	P3 - Test points
7	DS12 - Base down LED and relay K5
8	DS11 - Base up LED and relay K4
9	DS10 - Back down LED and relay K3
10	DS9 - Back up LED and relay K2
11	DS1 - AC power LED
12	DS2 - Status LED
13	DS3 - Data LED
14	DS13 - Chair lockout LED and terminal strip J1
15	J2 - 0 VAC terminal strip (output)
16	J2 - 24VAC terminal strip (output)
17	P4 - Input power and dental light connector
18	J3 - Vacuum relay K7 and output terminal strip
19	P11 - Pump motor and solenoid connector
20	DS8 - Dental light LED and relay K1
21	DS7 - Dental light LED and relay K6

Figure 9. A-dec 511 Chair Circuit Board Components



## LED Identification

This table describes the LEDs on the chair circuit board.

Figure 10. LED Identification Table

LED	Status	Description
DS1 - AC power LED	Off	No 24 VAC power, tripped circuit breaker, power supply turned off, no line voltage
	<b>Green</b> , steady	24VAC at the terminal strip
DS2 - Status LED	Off	System is not functioning, no power or circuit board has failed
	<b>Green</b> , steady	Normal operation
DS3 - Data LED	Off	No DCS communication, not connected to the DCS, or DCS has failed
	<b>Green</b> , steady	Detects active DCS
	<b>Green</b> , blinking	Valid DCS Message
DS4 - Chair limit switch	Off	Closed, (normal)
	<b>Red</b>	Open, (activated)
DS13 - Chair lockout	Off	Open, (normal)
	<b>Red</b>	Closed, (activated)
DS5 + DS6 - Chair potentiometers	Off	Potentiometer: <ul style="list-style-type: none"> <li>• Not connected or bad connection</li> <li>• Moving in wrong direction</li> <li>• Limited range of motion, or</li> <li>• Cable is not on wheel</li> </ul>
	<b>Yellow</b> , steady	Normal operation
	<b>Yellow</b> , fast blink	Upper 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

## The Hydraulic System

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
- Motor-driven hydraulic pump with solenoids

### Hydraulic Fluid Reservoir

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. A top fill cap allows you to add fluid. The hydraulic system holds 40 ounces (2.5 pints [1.18 l]) of hydraulic fluid. To fill the reservoir:

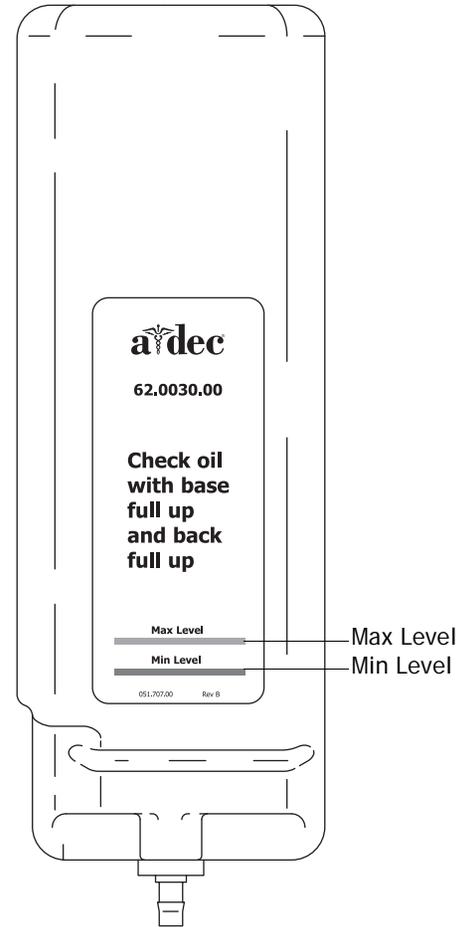
1. Place the chair in the full base and back up position.
2. Fill to the green Max line. See Figure 11.



**CAUTION** Do not overfill.

3. Cycle the chair after the reservoir is filled.

Figure 11. Hydraulic Fluid Reservoir



## 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 travels vertically from a low point of 13.5" (343 mm) to a high point of 31.5" (800 mm) above the floor. See Figure 12.

## Motor Driven Hydraulic Pump

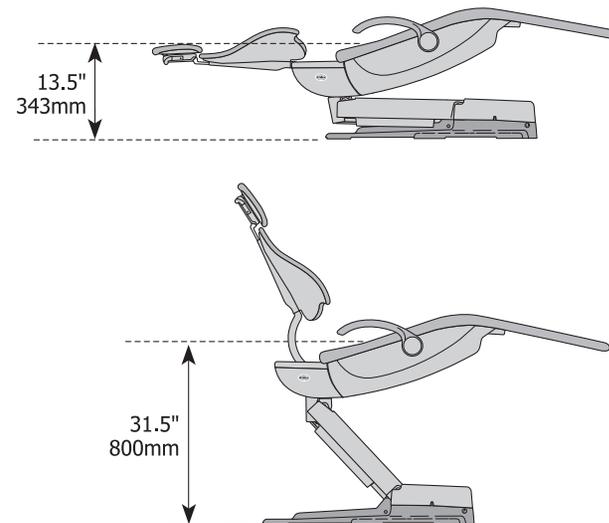
The hydraulic pump takes hydraulic fluid from the reservoir and pressurizes it to extend the chair lift and tilt hydraulic cylinders for back and base up functions. The bi-directional pump rotates one direction for Base Up and the opposite direction for Back Up.

The solenoids mounted to the pump assembly gate hydraulic fluid from the two cylinders. Depending on the chair Down function, the controller selects which solenoid-actuated manifold valves are open or closed. The 100-120 VAC pump and 220-240 VAC pump are equipped with an automatic reset 110°C (230°F) thermal limiter. There are no serviceable parts on the hydraulic pump other than the solenoids.



**NOTE** You cannot adjust the speed of the chair.

**Figure 12. Hydraulic Cylinder Operation**

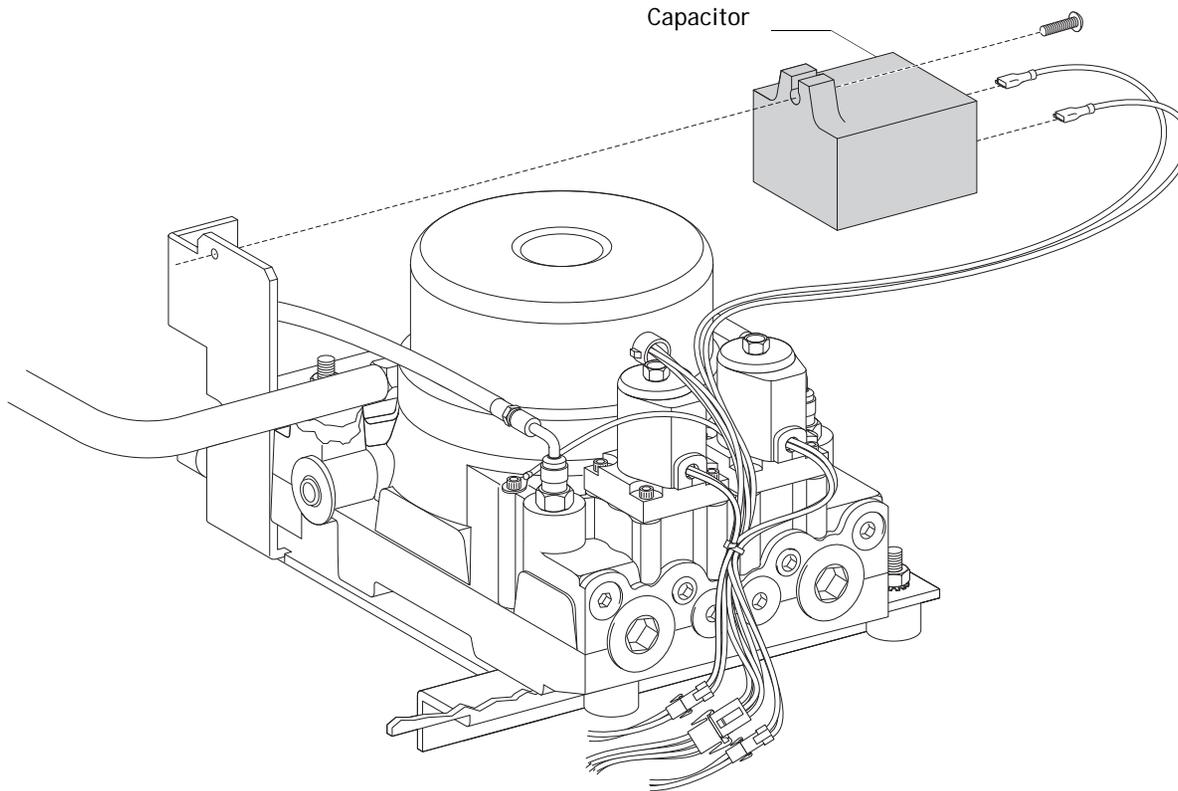


## Capacitor

Part Number: 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.

Figure 13. A-dec 511 Chair Capacitor



## Solenoids

Part No: 90.1070.00, 110 - 120 VAC, 90.1071.00, 220 - 240 VAC

### Test Solenoids

A solenoid is energized during **Base Down** and **Back Down** functions. To check for a failed solenoid, test the solenoids using a volt/ohm meter or magnetic pull test:

### Magnetic Pull

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.

### Coil Resistance

Disconnect the solenoid power at the 2-position connector. Place an Ohm meter probe on each solenoid connector terminals.

- 100 - 120 VAC = 177 Ohms  $\pm$  18 Ohms
- 220 - 240 VAC = 845 Ohms  $\pm$  85 Ohms



**NOTE** If the solenoid is hot, then the resistance reads higher.

**NOTE** When replacing a solenoid, wipe up any oil, and replace existing O-rings on the solenoid base.



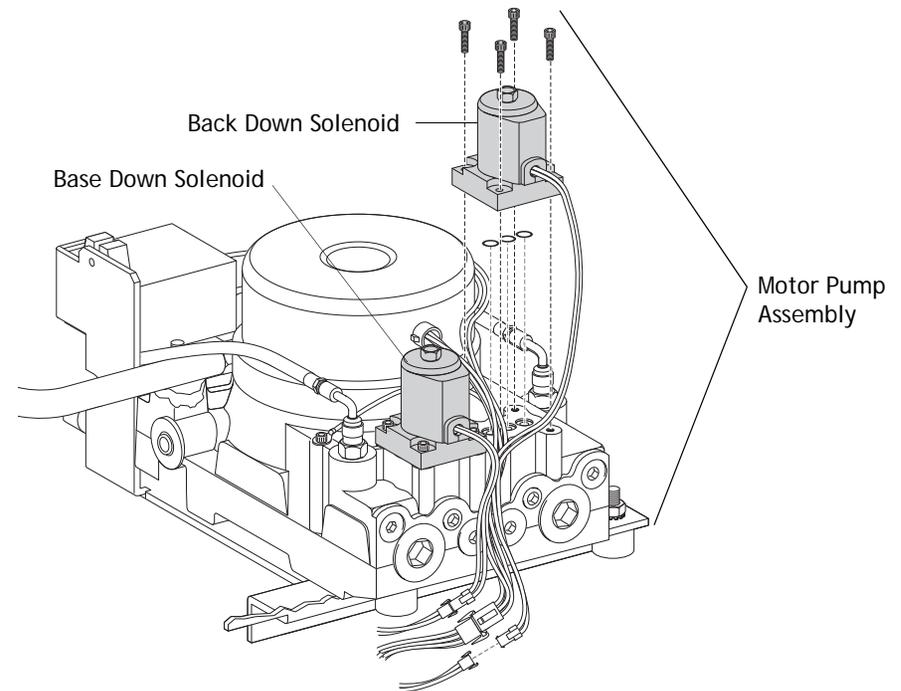
**WARNING** The solenoid coils are powered by line voltage (100, 120, or 240 VAC). Failure to unplug the chair may result in serious injury from electrical shock.



**WARNING** You must depressurize the base or back system prior to removing the solenoid.

1. Depressurize base or back system.
2. Remove the failed solenoid coil.
3. Replace with the operating solenoid coil.
4. Lower the chair base and back.

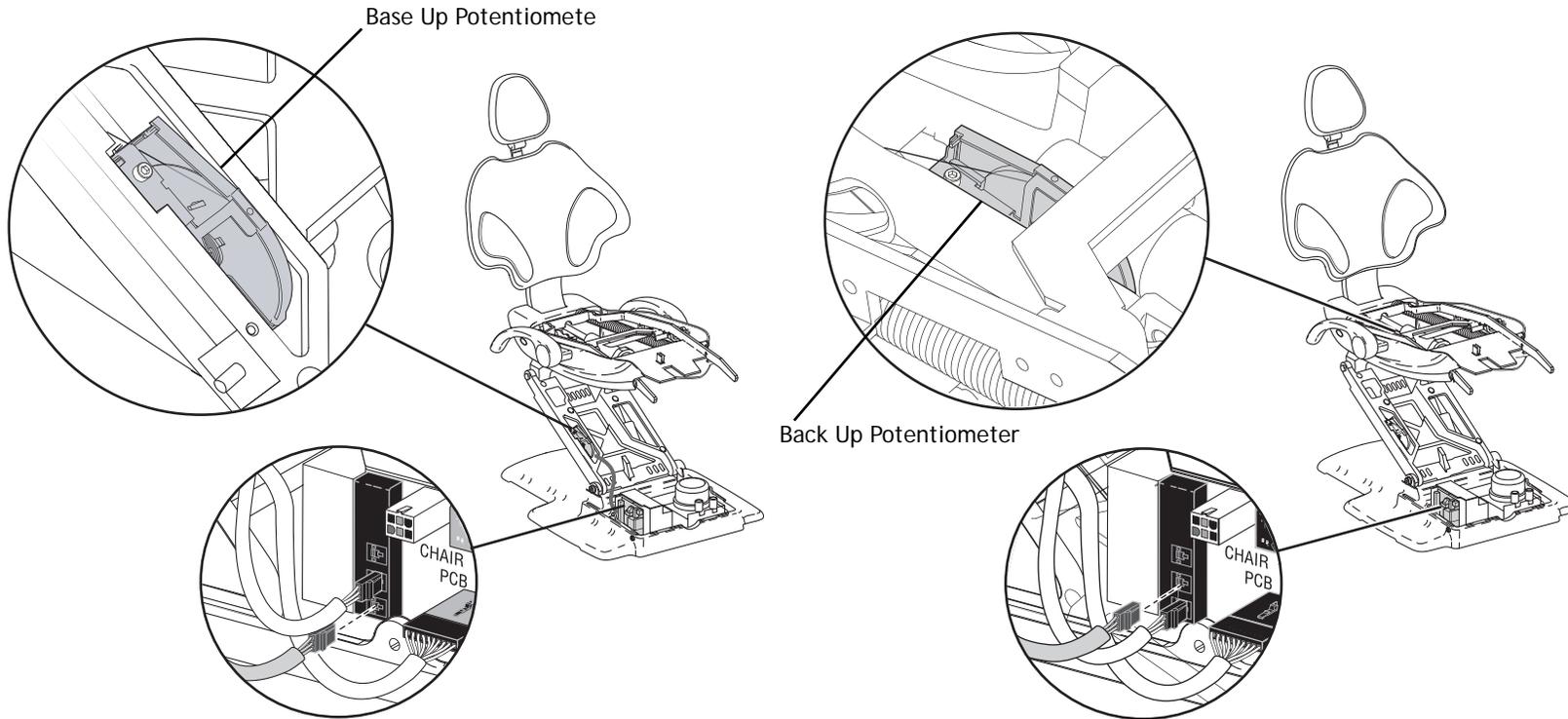
Figure 14. A-dec 511 Chair Solenoids



## Potentiometer

The potentiometer and cable assembly is a simple, accurate unit, which eliminates position float. "Float" is a slight change or variation in the pre-programmed positions. The chair uses the same potentiometer assembly for both lift and tilt requirements. If a potentiometer should fail, 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.

Figure 15. Location of Chair Base Up and Back Up Potentiometers



## Chair Stop Plate

The chair stop switch stops chair movement when you press the stop plate. Should anything inadvertently become lodged under the chair, press Base Up on the touchpad or footswitch to raise the chair so you can remove the object. As long as you apply pressure to the stop plate, the chair does not move down.

The stop plate has only one switch. The switch and all other parts snap into place for easy removal or replacement. No tools are required.



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

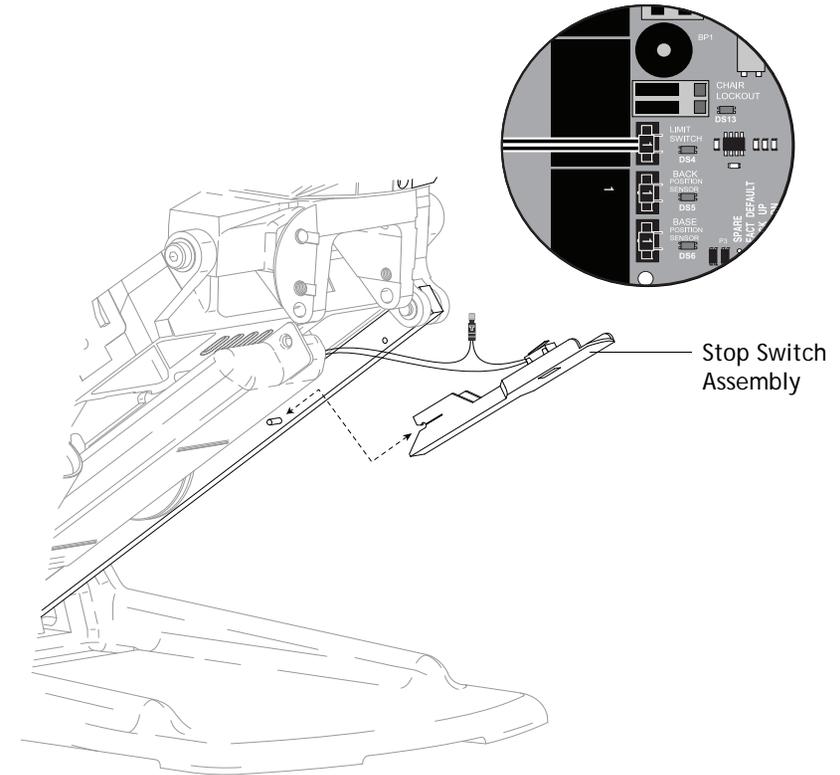


**CAUTION** Cable tie the wires to the lift arm to prevent kinking and pinching.

## Chair Bump-Up Feature

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.

Figure 16. A-dec 511 Chair Stop Plate



## Swivel Brake Adjustment

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.

Figure 17. Chair Swivel

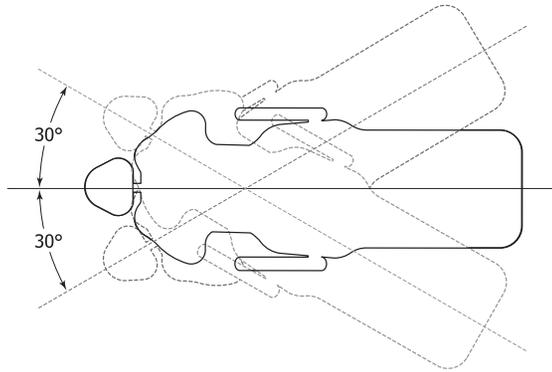
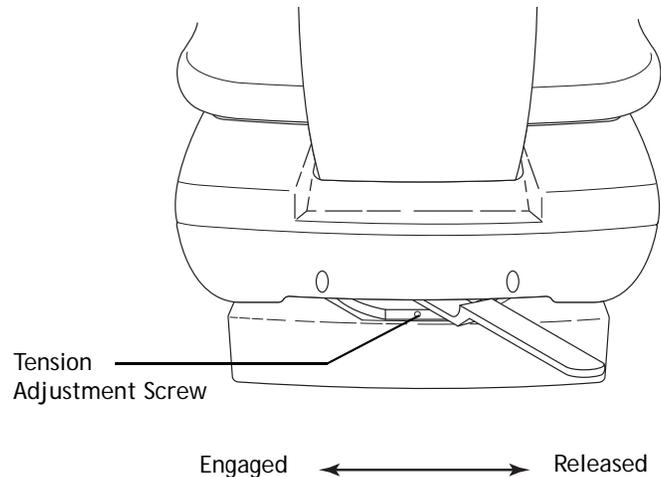


Figure 18. Swivel Brake Tension Adjustment



## Tension Adjustment

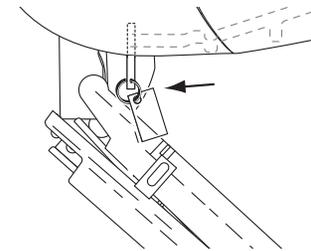
If the chair swivels left or right with the brake engaged or if it is difficult to move with the brake disengaged, adjust the swivel brake tension. To adjust the tension, use a 5/32 hex key and turn the tension adjustment screw;

- Clockwise to increase brake friction.
- Counterclockwise to decrease brake friction.

If you cannot obtain proper adjustment through rotation of the hex key, replace the brass brake pad by removing the brake handle and using a hex key to disengage the pad. Remove the old pad and replace with new one. Replace the brake handle and handle retainer.

---

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

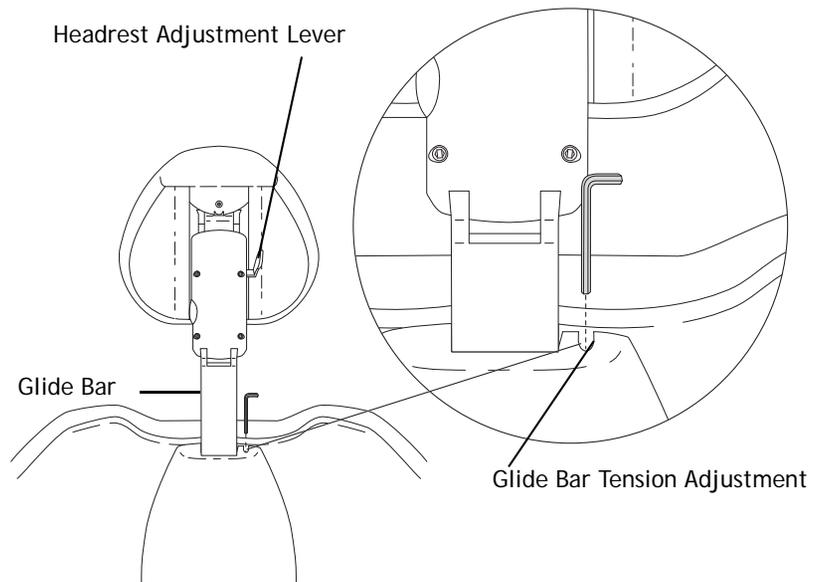


## Headrest Adjustment

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.

**Figure 19. Headrest Adjustments**



# PROGRAMMING

The A-dec 500 touchpad centralizes treatment room controls into one touch surface. The standard touchpad controls the chair, cuspidor, and dental light functions. The deluxe touchpad adds controls for the handpieces, electric motors, and other options.

For information on service parts, see the *Genuine A-dec Service Parts Catalog* (p/n 85.5000.00) or contact A-dec customer service.

## Programming Contents

- Status Icon, page 24
- Chair Positioning, page 24
- Cuspidor Functions, page 26
- Dental Light, page 27
- Electric Handpiece Settings (Deluxe Touchpad Only), page 28
- Technician Setup Options, page 32
- Touchpad Circuit Board Components, page 37

Figure 20. Standard and Deluxe Touchpads



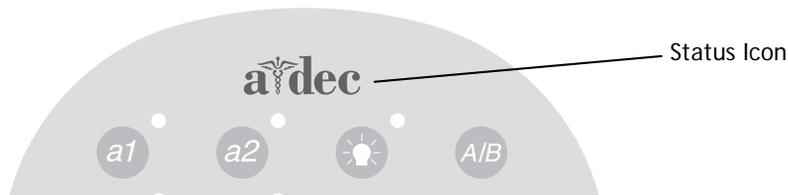
Note: Touchpad symbols are proprietary to A-dec Inc.

## Status Icon

The A-dec logo indicates the system status.

- Solid blue – normal operation and power is on.
- Blinking – chair stop plate or cuspidor limit switch is active. The icon returns to solid blue once you remove any obstructions.
- Double blink – jumper is on the factory default position on the chair circuit board. The icon returns to solid blue once the jumper is removed.

Figure 21. Status Icon



## Chair Positioning

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

Table 2. Manual Chair Buttons

Icon	Action
⬇️ Or ◀️	Back down
⬇️ Or ▼	Base down
⬆️ Or ▶️	Back up
⬆️ Or ▲	Base up

## Position Buttons

Chair position buttons are factory preset to automatically move the chair. Four programmable chair buttons, which can be easily customized, automatically move the chair into a factory preset position.

Table 3. Programmable Chair Buttons /Factory Presets

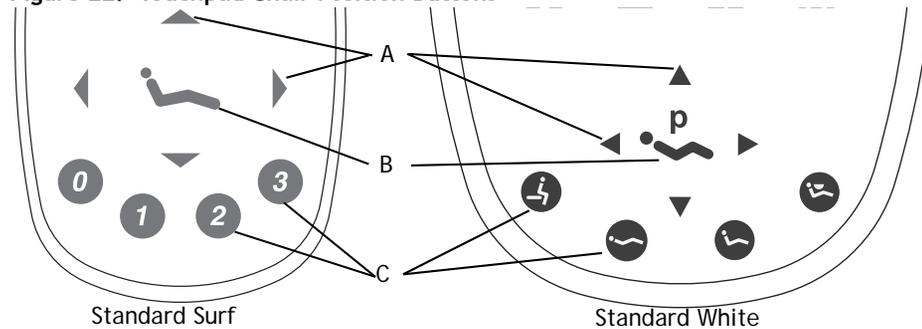
Button	Position Description
0 Or	<b>Entry/Exit:</b> Automatically positions chair for entry/exit and turns off dental light.
1 Or	<b>Treatment 1:</b> Automatically positions the chair base and back down and turns on the dental light.
2 Or	<b>Treatment 2: (Standard touchpad only):</b> Automatically positions the chair base and back and turns on the dental light.
3 Or	<b>X-ray/Rinse:</b> Automatically positions the chair for either x-ray or rinse. Toggles between the x-ray/rinse and the last manual position, and turns off the dental light.

## Program Chair Preset Positions

To program Entry/Exit, Treatment 1, and Treatment 2 buttons:

1. Use the manual buttons to move the chair into the desired position.
2. Press and release the program button (⏪ or ⏩). One beep indicates programming mode.
3. Press the chair position you want to program (for example 0 or ⏪ for entry/exit). Three beeps indicate the button has been set.

Figure 22. Touchpad Chair Position Buttons



(A) Manual Chair Buttons; (B) Program Buttons; (C) Programmable Chair Buttons

## 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:

1. Press and hold the program button (⏪ or ⏩) and 3 or ⏪ at the same time 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 Positions."



**NOTE** If the X-Ray/Rinse button is changed to a preset position, it operates the same as Treatment buttons 1 and 2.

# Cuspidor Functions

## Cupfill

The cupfill function controls water flow from the cuspidor into a cup.

Figure 23. Cupfill and Bowl Rinse Buttons

Button	Description
 or 	<p><b>Cupfill Button:</b> Controls water flow from the cuspidor into a cup.</p> <ul style="list-style-type: none"> <li>Press the cupfill button for a timed operation. The factory preset is a 2.5 second fill.</li> <li>Press and hold the cupfill button for manual operation.</li> </ul>
 or 	<p><b>Bowl Rinse Button:</b> Provides rinse water for the cuspidor bowl.</p> <ul style="list-style-type: none"> <li>Press the bowl rinse button for a timed operation. The factory preset is a 30 second rinse.</li> <li>Press and hold the bowl rinse button for manual operation.</li> </ul>
	<p><b>TIP</b> Press the bowl rinse button twice in less than two seconds to activate the continuous operation mode. Press the button once to end the continuous bowl rinse mode.</p>

## Customize Cupfill and Bowl Rinse

To program the cupfill and bowl rinse timing:

1. Press and release the Program button ( or ) or at the cuspidor press and hold both the cupfill and bowl rinse buttons located near the spout. One beep indicates programming mode.
2. Press and hold the cupfill or bowl rinse button for the desired time.
3. Release the button. Three beeps confirm the setting.



**NOTE** Cupfill and bowl rinse functions are not available on standard touchpads that use auxiliary buttons (  or  ) along with an A-dec relay module. In this case, use the cuspidor-mounted buttons or the deluxe touchpad to control automated cuspidor functions.

# Dental Light

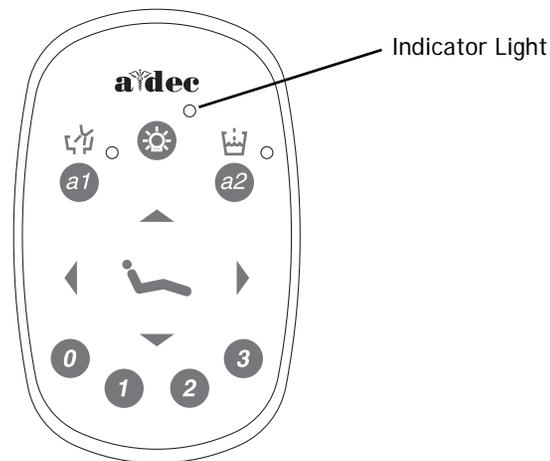
The dental light button on the touchpad allows you to turn the dental light on or off, and change intensity. You can turn the dental light on or off from either the touchpad or the dental light.

Figure 24. Dental Light Button

Button	Description
	<b>Dental Light Button:</b> Functions as a three-way on/off switch and toggles between intensity settings.

Press  to toggle between high and composite or medium and composite. When the dental light is in composite mode, the indicator light next to the button blinks. See Figure 25. Press and hold  for one second to turn the dental light off.

Figure 25. Dental Light Composite Mode



## Dental Light Auto Feature

The dental light has an auto on/off feature. When you use a programmed chair position, the dental light turns on when the chair reaches operating position. Press Entry/Exit ( or ) or X-ray/rinse ( or ) and the dental light automatically turns off.



**NOTE** If the X-ray/Rinse button is changed to a preset position, the dental light auto feature operates the same as Treatment buttons 1 and 2.

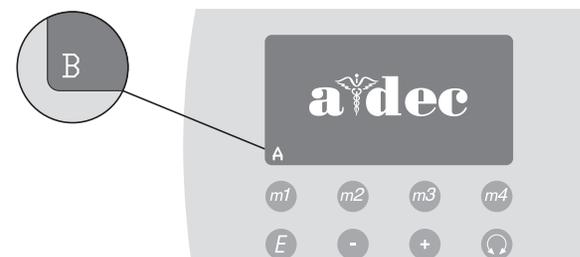
To activate/deactivate:

Press and hold the light () and the program ( or ) buttons at the same time for three seconds. One beep confirms the dental light auto feature is off.

## A and B Buttons

Deluxe touchpads include an A/B button () that offers two separate sets of programmable settings. The currently active set is indicated by the A or B in the touchpad display. See Figure 26.

Figure 26. A/B Selection



## Electric Handpiece Settings (*Deluxe Touchpad Only*)

### Standard Mode Programming

Activate the electric motor by lifting the handpiece from the holder. The settings that appear are the ones last used for that handpiece position. This table lists the factory presets for electric handpieces:

**Table 4. Electric Motor Presets (Standard Mode)**

Memory Button	Preset Speed	Air Coolant	Water Coolant
M1	2,000 RPM	on	on
M2	10,000 RPM	on	on
M3	20,000 RPM	on	on
M4	36,000 RPM	on	on

The A-dec Deluxe touchpad allows you to program four memory buttons with your specific RPM setting. The total range is 300 - 36,000 RPM. With the A/B button, you can program two settings for each memory button, for a total of 8 customized settings per handpiece (the endodontic mode offers an additional 8 memory settings).



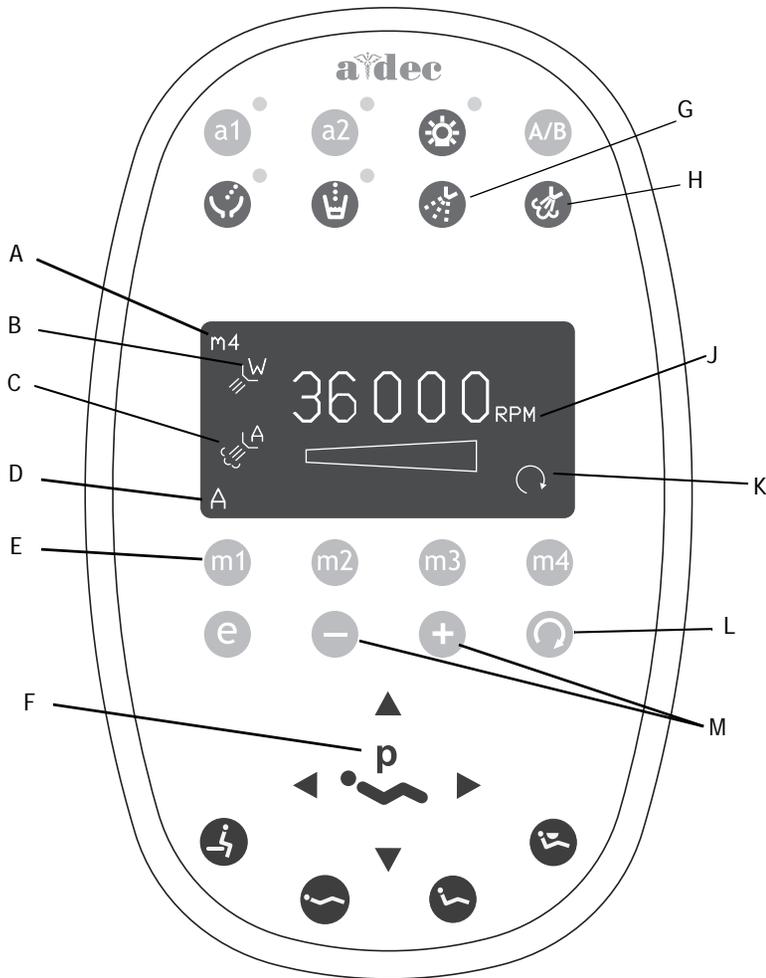
**NOTE** If two operators use the delivery system, be sure to select the correct operator set (A or B) before changing any memory settings. The currently active set is indicated by the A or B in the touchpad display. See Figure 27 on page 29.

To program the handpiece setting:

1. Lift the handpiece from the holder.
2. If the touchpad screen does not display standard mode, press the Endodontics Mode Toggle button.
3. Press the minus (-) and plus (+) buttons to adjust the RPM. The RPM values are displayed in the display screen. See Figure 27.
4. If desired, use the toggle buttons on the touchpad to change air and water settings.
5. To place the setting into memory, press the program button ( or ). One beep sounds.
6. Select the desired memory setting (m1, m2, m3, or m4). Three beeps confirm the setting.

# Standard Mode Display Settings

Figure 27. Program Handpiece Standard Mode Settings



Item	Description	Item	Description
A	Memory Setting Indicator	G	Water Coolant Button
B	Water Coolant Indicator	H	Air Coolant Button
C	Air Coolant Indicator	J	Speed Limit Setting
D	A/B Operator Indicator	K	Forward/Reverse Indicator
E	Memory Buttons (m1 - m4)	L	Forward/Reverse Toggle Button
F	Program Button	M	Adjustment Buttons

## Forward/Reverse Button

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



**NOTE** You can also use the foot control as a forward/reverse toggle. When the motor has stopped, tap the accessory (chip/air) button to change the direction.

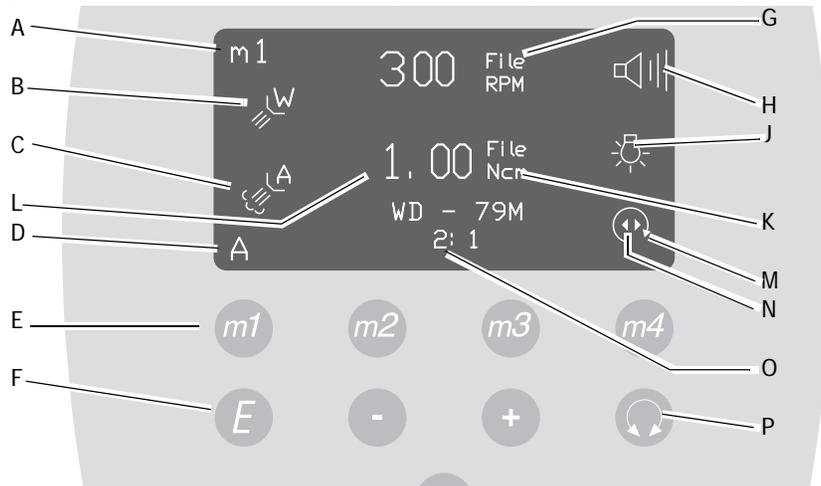
## Endodontics Mode

Endodontics mode allows you to change a number of settings based on the specific file and desired handpiece behavior.



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

**Figure 28. Endodontics Mode Touchpad Screen (Deluxe Surf Shown)**



To program the endodontics memory settings:

1. Lift the handpiece from the holder.
2. If the touchpad window is not in endodontics mode, press the Endodontics Mode Toggle button. The endodontics screen is displayed.
3. Press the plus (+) or minus (-) button to activate the endodontics change mode. A white reverse video box appears.
4. Use the chair positioning buttons to move from setting to setting in the touchpad window.
5. Use the + and - buttons to change the setting as desired.
6. To place the speed limit, torque limit and ratio into memory (optional), press the program button (Ⓜ or Ⓟ), then the memory button you want to set. Three beeps confirm the setting.

Item	Description	Item	Description
A	Memory Setting Indicator	J	Handpiece Light Indicator
B	Water Coolant Indicator	K	File Torque Unit Indicator
C	Air Coolant Indicator	L	File Torque Limit
D	Operator Status Indicator	M	Forward/Reverse Indicator
E	Memory Button	N	Torque Mode Indicator
F	Endodontics Mode Toggle Button	O	Handpiece Ratio Setting
G	File Speed Setting	P	Forward/Reverse Toggle Button
H	Warning Beep Indicator		

## Endodontics Mode Settings

This table lists and defines the touchpad window icons for endodontics mode.

Figure 29. Endodontics Mode Settings

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 Ncm (Newton centimeters) and gcm (Gram centimeters). Adjusting this setting for one handpiece changes it for all handpiece settings. 1 Ncm=102 gcm
	Ratio	Sets the handpiece ratio. For more information, consult your handpiece manufacturer.
	Air Coolant	On/Off—when active, supplies air coolant to the handpiece.
	Water Coolant	On/Off—when active, supplies water coolant to the handpiece.
	Light Source	Enables/disables endodontics handpiece light source.
	Torque Mode	Adjusting this setting for one handpiece changes it for all handpiece settings. This icon appears with the forward/reverse indicator.
	Auto off	Auto-off—the motor stops when the file speed reaches the torque limit.
	Auto reverse	Auto-reverse—the motor stops and reverses direction when the file reaches the torque limit.
	Auto forward	Auto-forward—when the file reaches the torque limit, the motor stops, reverses 3 turns, then changes back to forward again. <b>Note:</b> If the file is stuck, this cycle repeats three times before the motor stops.
	Beeper	On/Off—when active, warning beep sounds when you approach torque limit and double beeps when the file auto-reverses. Adjusting this setting for one handpiece changes it for all handpiece positions.



**NOTE** The A-dec/W&H WD-79M endodontics attachment has a special feature due to its ball-bearing design. Its 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.

## Technician Setup Options

The deluxe touchpad allows service technician access to adjust handpiece and touchpad settings for user preferences.

### Using Touchpad Buttons for Navigation

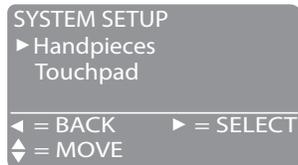
Chair button functions become navigation buttons while you are in setup mode. You will use the back up (▶) back down (◀) base up (▲) and base down (▼) buttons to navigate the setup screens.

### Holder Setup

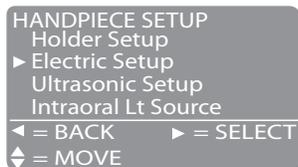
You can set up how handpieces are configured for each handpiece holder.

To set up handpiece holders:

1. From the deluxe touchpad main screen, press and hold the A/B (A/B) and Program (Ⓜ or Ⓟ) buttons at the same time for three seconds; then press ▶ to begin. You see the **System Setup** screen.
2. Press the ▼ or ▲ to select **Handpieces**, and press ▶.



3. From the **Handpiece Setup** screen, press ▼ or ▲ to select to select **Holder Setup**, and press ▶.



4. Lift the desired handpiece from the holder.

5. Press ▶. Three beeps confirm the setup for the handpiece is complete.
6. Return the handpiece to the holder.
7. Repeat steps 4 through 7 to set up each handpiece.
8. When you are finished setting up handpieces, press ◀ until you see the A-dec logo.

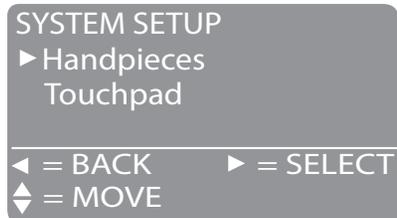
## Electric Options Setup

You can change display information and how the functions operate with the electric motor. The following options are available:

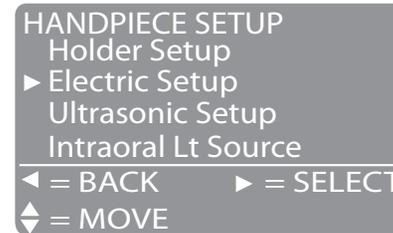
- **Torque Units:** Select how to display the units, either Ncm (Newtons per centimeters) or gcm (gram per centimeters).
- **Endo Handpiece Auto Mode:** Configure how the electric motor reacts when the torque limit is reached.
  - **Auto Forward:** Motor will stop, reverse three turns, and return forward again.
  - **Auto Reverse:** Motor will reverse.
  - **Auto Stop:** Motor will stop.
- **Auto Reverse Beep:** Enable to hear two beeps when the motor exceeds its torque threshold and automatically reverses direction.
- **Torque Warning:** Enable to hear a continuous beep when the motor exceeds 75% of the torque threshold.

To set up electric options:

1. From the deluxe touchpad main screen, press and hold the A/B (A/B) and Program (P or P) buttons at the same time for three seconds; then press ► to begin. You see the **System Setup** screen.
2. Press the ▼ or ▲ to select **Handpieces**, and press ►.



3. From the **Handpiece Setup** screen, press ▼ or ▲ to select to select **Electric Setup**, and press ►.



4. From the **Electric Setup** screen, press minus (-) or plus (+) to highlight an option, such as **Torque Units**, and press ►.



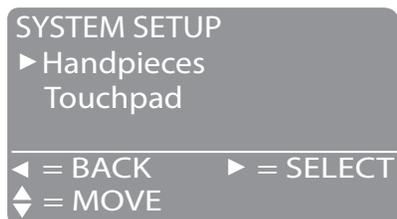
5. Specify other electric handpiece options by pressing minus (-), plus (+), and ► to move through the screens. Once the setup is complete, three beeps confirm the setting for all handpieces.
6. When all settings are complete, press ◀ until you see the A-dec logo.

## Ultrasonic Setup

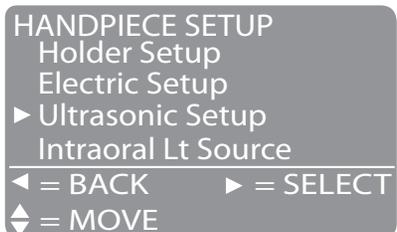
You can select whether to turn on or off the ultrasonic colors.

To set up ultrasonic colors:

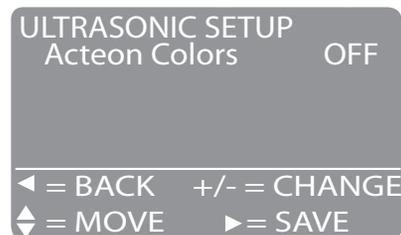
1. From the deluxe touchpad main screen, press and hold the A/B (A/B) and Program (👉 or 👈) buttons at the same time for three seconds; then press ▶ to begin. You see the **System Setup** screen.
2. Press the ▼ or ▲ to select **Handpieces**, and press ▶.



3. From the **Handpiece Setup** screen, press ▼ or ▲ to select to select **Ultrasonic Setup**, and press ▶.



4. Press minus (-) or plus (+) to display On or Off, and press ▶. Three beeps confirm the setting has been programmed.



5. Press ◀ until you see the A-dec logo.

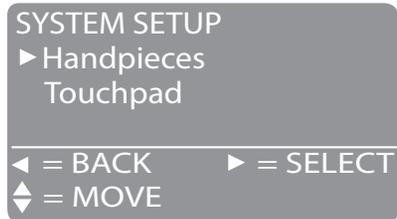
## Light Source Setup

The following light source options are available:

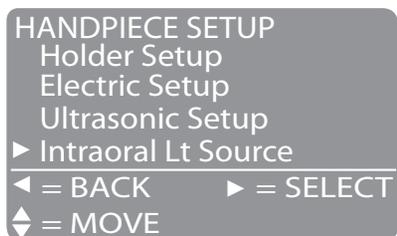
- **On When Selected:** Specify whether the intraoral light source turns on or remains off when the handpiece is removed from the holder.
- **Auto Off Delay:** Determine how long the light remains on when the foot control is released. This time is reset when you use the drive air again or replace and pick up the handpiece. The factory setting is five seconds.
- **On in Endo:** Specify whether the intraoral light source turns on or off when in endodontics mode. Because most endodontics handpieces do not have light pipes, it is recommended that Off is selected to reduce heat and to extend bulb life.

To set up the light source:

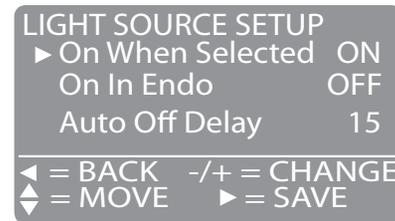
1. From the deluxe touchpad main screen, press and hold the A/B (A/B) and Program (P) or (P) buttons at the same time for three seconds; then press ► to begin. You see the **System Setup** screen.
2. Press the ▼ or ▲ to select **Handpieces**, and press ►.



3. From the **Handpiece Setup** screen, press ▼ or ▲ to select to select **Intraoral Lt Source**, and press ►.



4. Lift the desired handpiece from the holder.
5. From the **Light Source Setup** screen, withdraw the desired handpiece from the holder and press ►.
6. From the Light Source Setup screen, press minus (-) or plus (+) to select the desired option, for example, **On When Selected**, and press ►.



7. Specify other light source options for the handpiece by pressing minus (-), plus (+), and ► to move through the screens. Once the setup is complete, three beeps confirm the setting.
8. Return the handpiece to the holder.
9. Repeat steps 3 through 7 to configure each handpiece.
10. When you are finished setting up handpieces, press ◀ until you see the A-dec logo.

## Touchpad Setup

Use the touchpad setup to change the contrast of the touchpad screen display. You can also specify whether to display help messages in the technical mode help screens.

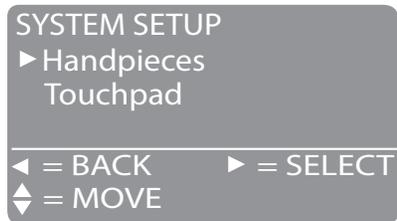
The help messages are listed in the Troubleshooting section of this document. Refer to 500 Deluxe Touchpad Help Messages, page 126, for definitions of the messages and any related troubleshooting procedures.



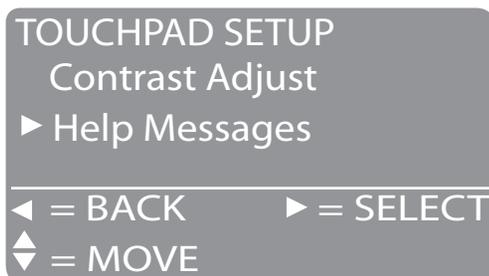
**NOTE** Help messages should only be set to On for technician use.

To set up touchpad options:

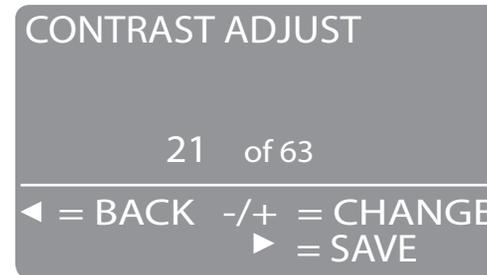
1. From the deluxe touchpad main screen, press and hold the A/B (A/B) and Program (P) or (P) buttons at the same time for three seconds; then press ► to begin. You see the **System Setup** screen.
2. Press the ▼ or ▲ to select **Touchpad**, and press ►.



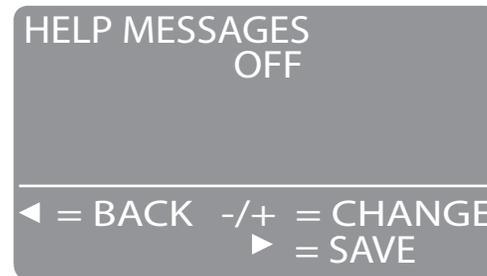
3. From the **Touchpad Setup** screen, press minus (-) or plus (+) to highlight **Contrast Adjust** or **Help Messages**:



- Select **Contrast Adjust** to adjust the contrast on the screen. Press minus (-) or plus (+) to adjust the contrast.



- Select **Help Messages** and press minus (-) or plus (+) to turn on or off the technician help messages.



4. Press ►. Three beeps confirm the setting has been programmed.

## Technician Help Messages

The 500 deluxe touchpad allows technicians to view help messages. For the message descriptions, see page 126 in the Troubleshooting section.

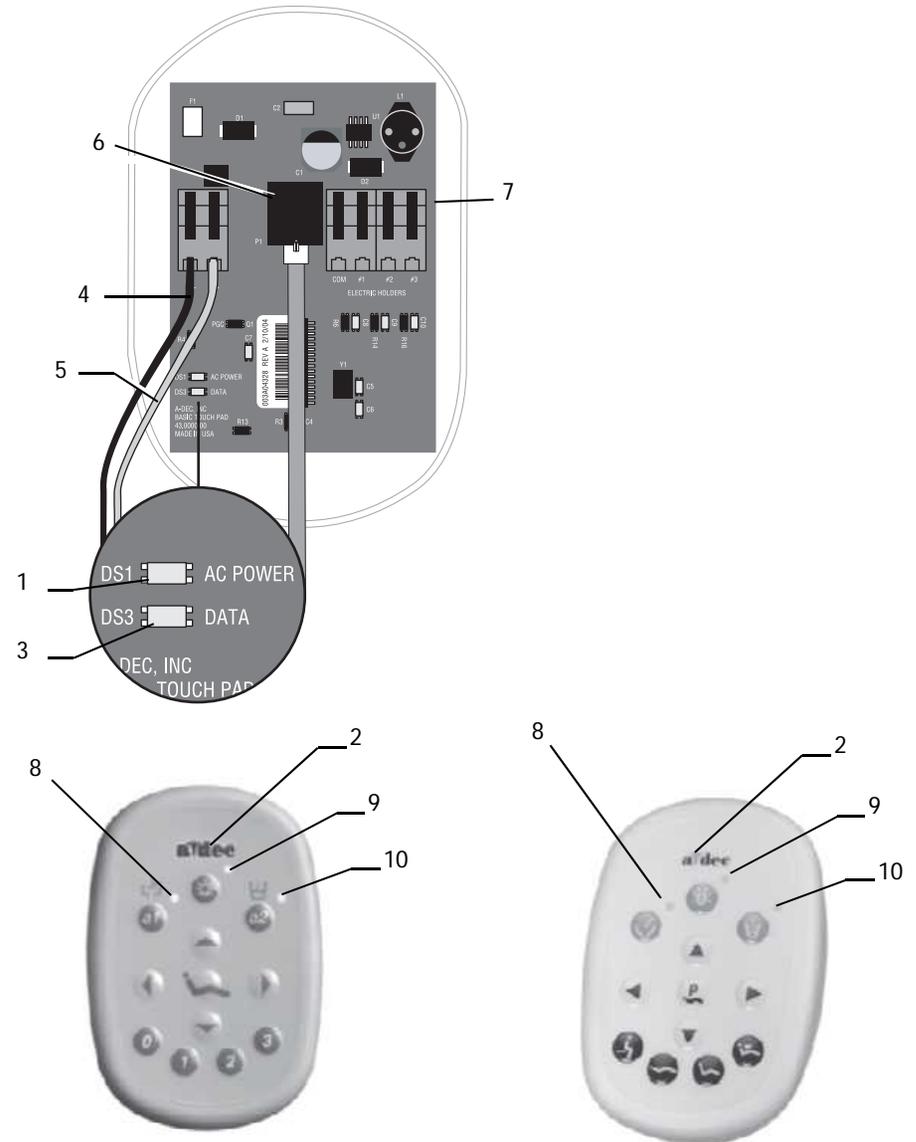
# Touchpad Circuit Board Components

## Standard Touchpad

The standard touchpad has two LEDs for communicating status (AC Power and Data). The touchpad circuit board's Status LED is the A-dec icon, visible on the touchpad. Check the chair circuit board LEDs, as well as the touchpad, when troubleshooting.

Item	Description
1	DS1 - AC power LED
2	DS2 - Status LEDs
3	DS3 - Data LED
4	J1 - 0 VAC terminal strip
5	J1 - 24VAC terminal strip
6	P1 - Data line port (DCS)
7	J2 - Electric holder terminal strip
8	DS7 - Auxiliary 1 and bowl rinse LED
9	DS8 - Dental light LED
10	DS9 - Auxiliary 2 and cupfill LED

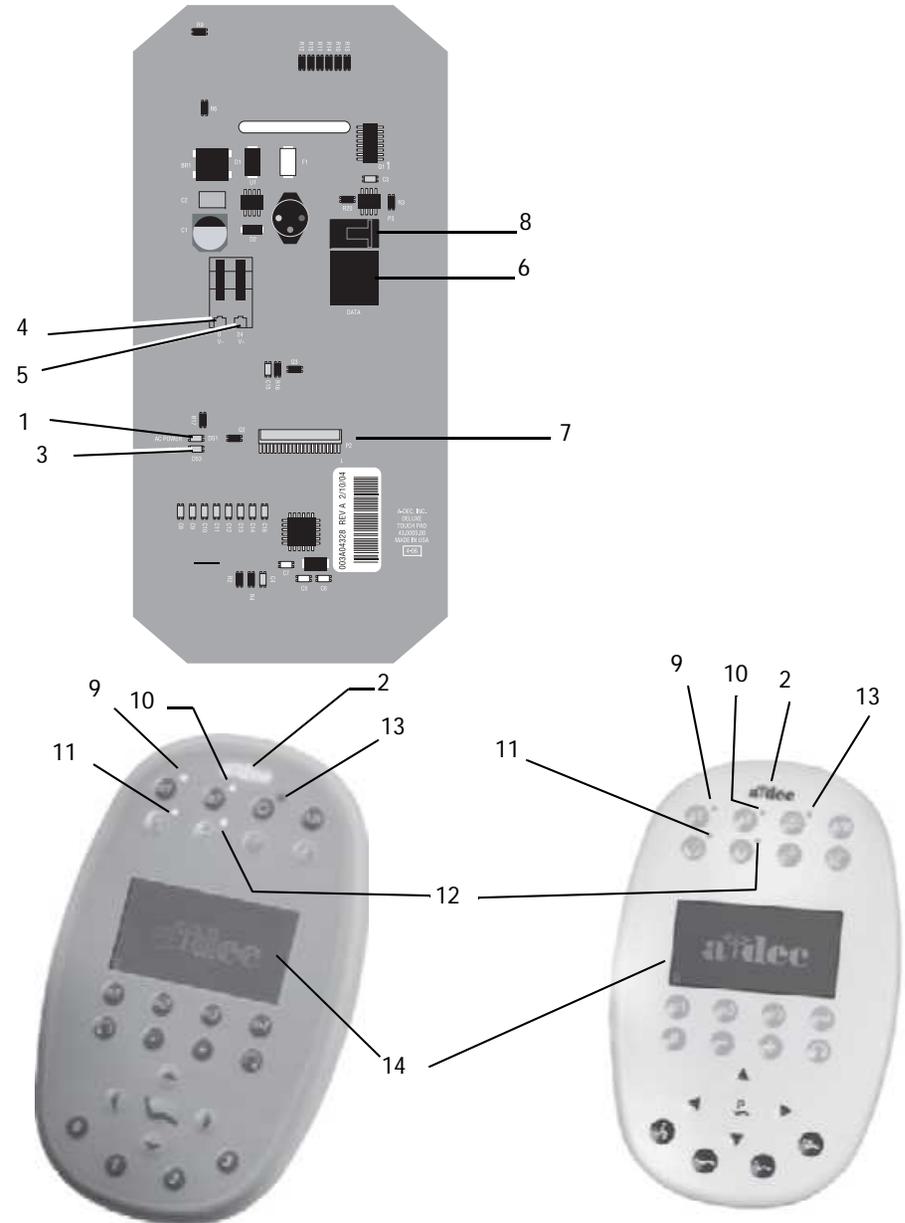
Figure 30. Standard Touchpad Circuit Board Components



## Deluxe Touchpad

Item	Description
1	DS1 - AC power LED
2	DS2 - Status LEDs
3	DS3 - Data LED
4	J1 - 0 VAC terminal strip
5	J1 - 24VAC terminal strip
6	P1 - Data line port (DCS)
7	P2 - LCD display connector
8	P3 - LCD back light power connector
9	DS6 - Auxiliary 1 LED
10	DS7 - Auxiliary 2 LED
11	DS8 - Bowl rinse LED
12	DS9 - Cupfill LED
13	DS10 - Dental light LED
14	LCD display

Figure 31. Deluxe Touchpad Circuit Board Components



## DELIVERY SYSTEMS

A-dec 500 delivery systems regulate the air and water used to operate handpieces, syringes, and accessories. Delivery system options include Front-mounted delivery, both Traditional (model 532) and Continental (model 533); side mounted (model 542) and 12 O'clock, duo delivery (model 541) and assistant's Instrumentation (model 545).

### Delivery Systems Overview

**Front (Chair) Mounted:** The doctor's side of the A-dec 500 system includes both the Traditional (model 532) and Continental<sup>®</sup> (model 533) delivery systems, the front-mount monitor (model 531), and self-contained water system. The A-dec 532 and 533 delivery systems have been designed to mount only to the A-dec 511 chair and communicate with the entire A-dec 500 product line through the Data Communications System (DCS).

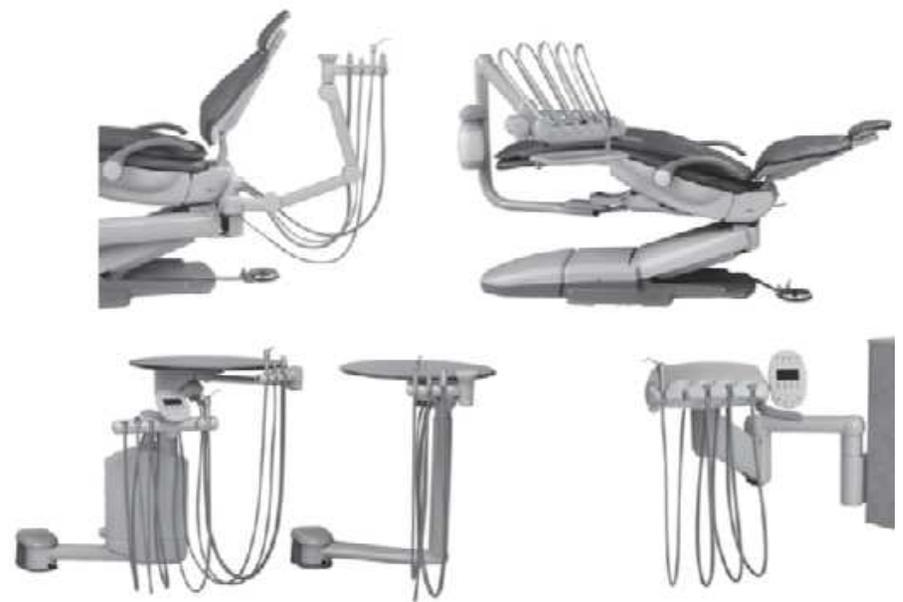
**Side Mounted:** The A-dec 542 side delivery system is designed to mount to a wall or to a Preference Collection<sup>®</sup> or Preference Slimline<sup>™</sup> cabinet. An optional tray holder can be installed. When installed, the tray holder positions over the control head.

**12 O'clock, duo delivery and assistants:** The A-dec 12 O'clock system features two models. The A-dec models 541 and 545 are floor-mounted delivery systems that install with a variety of Preference Collection<sup>®</sup> and Preference Slimline<sup>™</sup> cabinets.

### Contents

- Chair-Mounted Delivery Systems (532/533), page 40
- Side-Mounted Delivery Systems (542), page 46
- 12 O'Clock Delivery Systems (541 and 545), page 50
- A-dec 500 Delivery Systems Common Features, page 57

Figure 32. 500 Delivery Systems



## Chair-Mounted Delivery Systems (532/533)

The chair-mounted system features two models, the A-dec Traditional (model 532) and Continental (model 533). Both models are chair-mounted delivery systems that install on the A-dec 511 chair. The standard configuration includes:

- Balanced flexarm with air brake
- Four handpiece control block positions
- Control head with room to house integrated accessories
- Autoclavable saliva ejector
- Autoclavable syringe (option of warm water syringe)
- 2-liter self-contained water system with quick-disconnect water bottle
- Standard multi-function touchpad (optional) or deluxe multi-function touchpad (optional)

**Figure 33. Chair-Mounted Delivery Systems**

### A-dec 500 Chair Mounted Delivery Systems



### A-dec 300 Radius Chair Mounted Delivery System

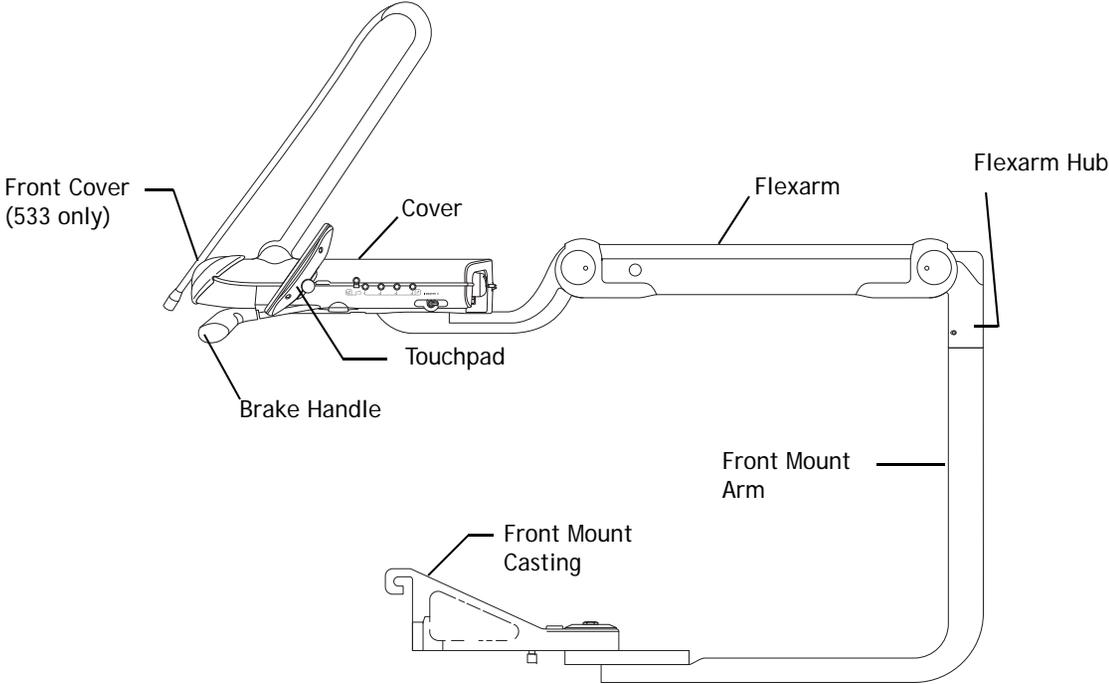
(Refer to the *A-dec 300 Service Supplement*, p/n 86.0273.00, for information about this option.)



# Product Overview (532/533)

The A-dec 500 delivery systems and front-mount monitor both mount to the A-dec 511 chair. This mounting structure provides left/right capabilities for both the delivery system and the monitor.

Figure 34. Delivery system and front-mount arm components



## Service, Usage, and Adjustments (532/533)

### Covers

The delivery system covers are designed for easy access to control components.

#### Delivery System Cover

To open the delivery system cover, lift up on the center tab on the back of the delivery system cover and then, lift up the tabs on both sides of the delivery system cover. To remove the cover, pinch the hinge brackets at the cover base.

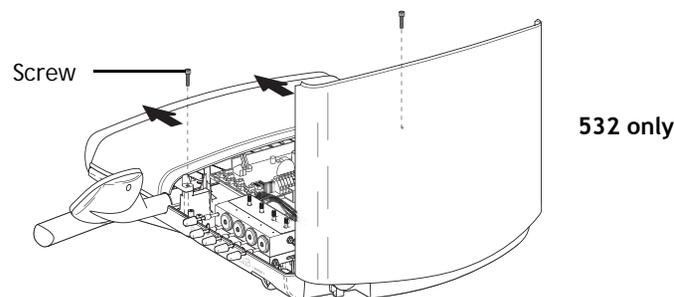
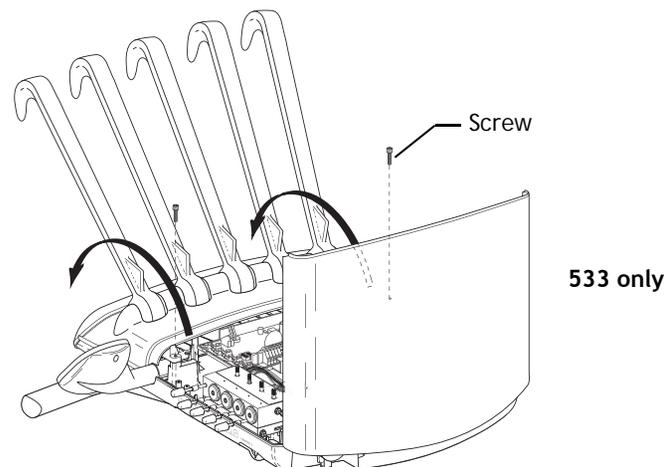
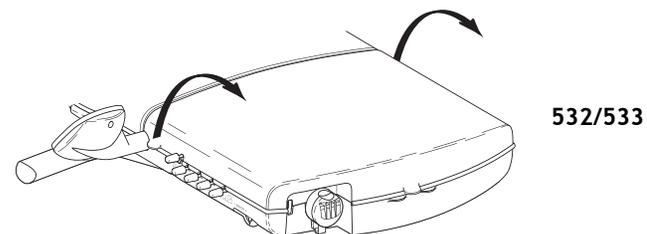
#### Delivery System Front Cover – Continental

To open the delivery system cover, move the whips forward and remove the two screws holding the front cover in place. Open the front cover carefully, until the lanyard is taut.



**CAUTION** Remove handpieces from the delivery system before opening the delivery system front cover.

Figure 35. Open the Delivery System Cover and Front Covers



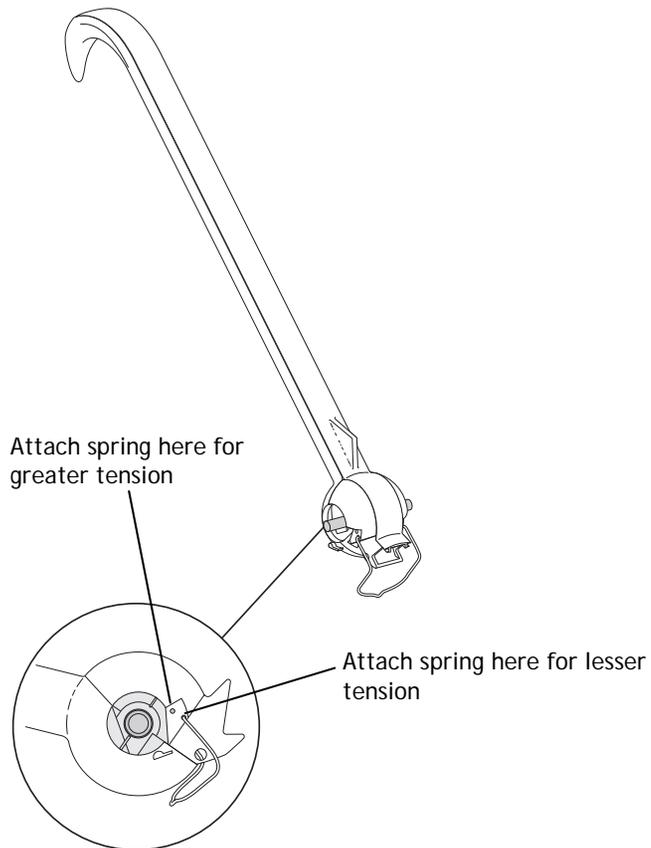
(Refer to the A-dec 300 Supplement p/n 86.0273.00 for information about the front mounted A-dec 300 Radius delivery system option.)

## Whip Assembly

Part Number: 77.0291.01/77.0291.02

Adjust the whip return tension by placing the bail in two different locations. You can remove the whip cover for easy handpiece tubing replacement. To reinstall the whip cover, fully extend the whip and attach the back starting at the ball end and work toward the handpiece end.

Figure 36. Whip Assembly with Adjustable Bail Position



## Continental Tray Holder (533 only)

Part Number: 77.0294.01

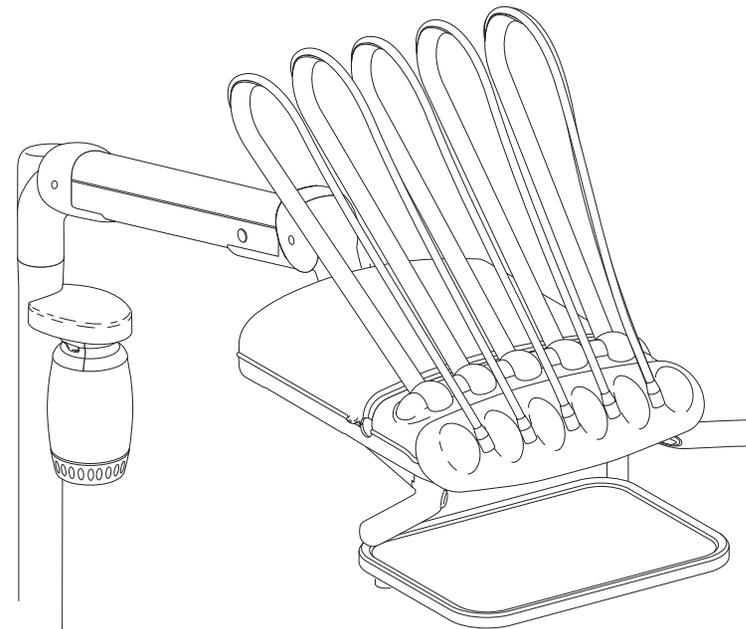
Continental tray holders can be mounted on the left or right side below the delivery system.

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 **NOTE** Standard delivery systems use the Traditional tray holders. For information on Traditional tray holders, page 63.

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Figure 37. Continental Tray Holder Components



## Adjustments (532/533)

### Level Adjustment

1. Position all front-mount modules, (e.g., delivery system, flexarm, tray holder assemblies) to align with the centerline of the chair.
2. Use the bubble level (if applicable) to determine when the correct front mount adjustments have been made.
3. Loosen the stabilizing screws and flanged nuts.
4. Adjust the leveling cam for side-to-side leveling.
5. Use one of the leveling bolts to adjust the front-to-back leveling. Assure both bolts are touching the casting when the delivery system is level front-to-back.
6. Tighten the leveling cam securely.
7. Tighten the stabilizing screws until the screws make contact with the casting when all of the front mount leveling adjustments have been made. Do not overtighten.



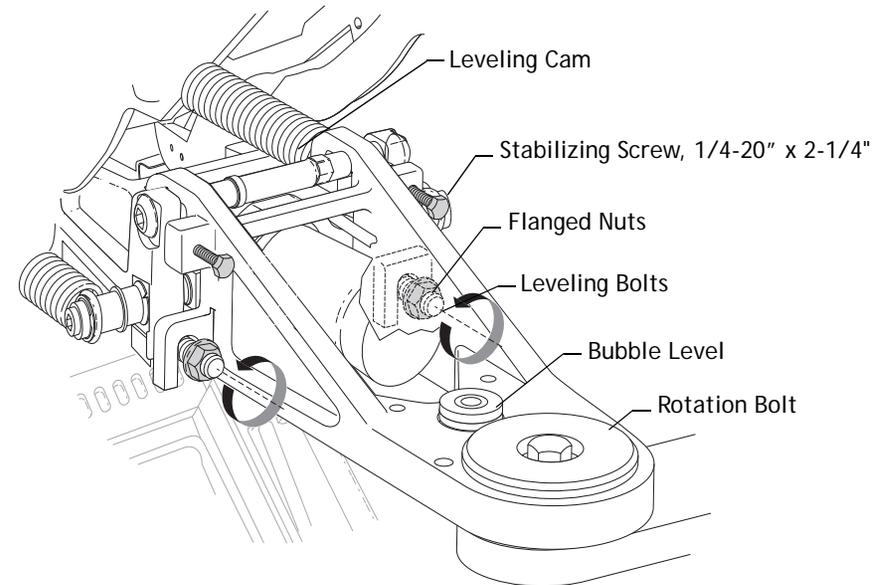
**NOTE** You may need to lower the back to improve access.

8. Securely tighten the flanged nuts.

### Tension Adjustment

If the front-mount arm drifts, adjust the front-mount tension. To adjust the front mount tension, tighten or loosen the rotation bolt connecting the front-mount arm to the front-mount casting. Turning the rotation bolt right increases the tension on the arm and left decreases the tension.

**Figure 38. Leveling and Adjusting the Front Mount Arm**



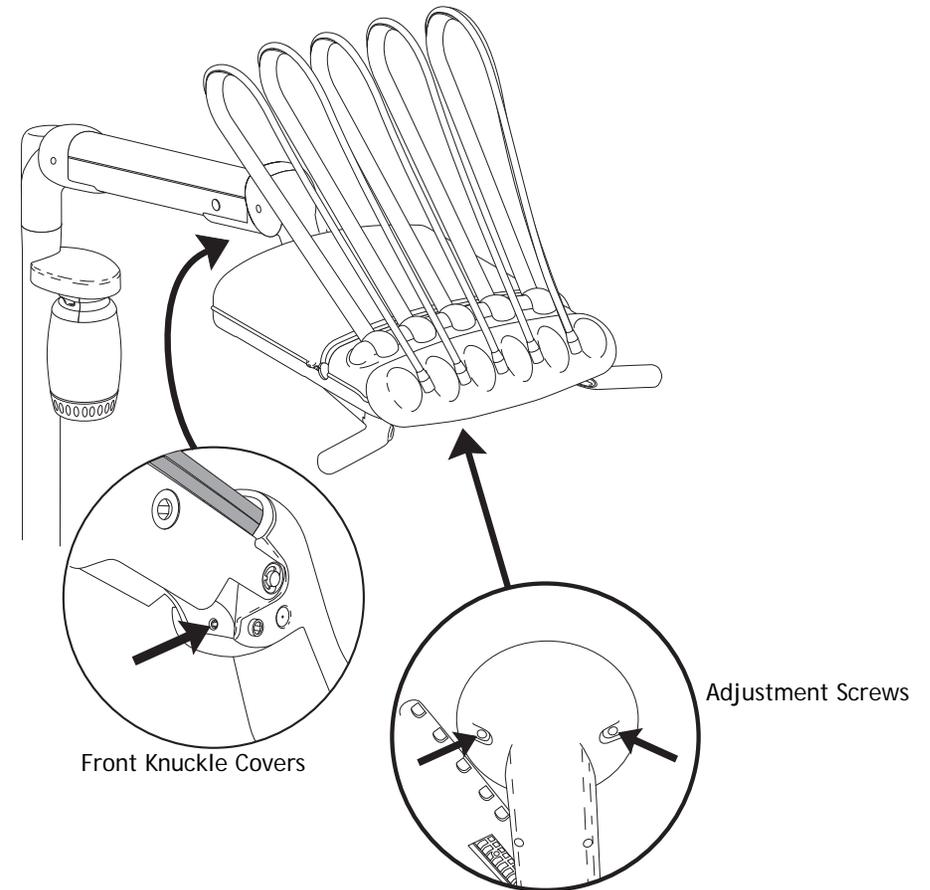
## Front-to-Back Leveling

1. Remove the flexarm front knuckle covers.
2. Position the delivery system in line with the flexarm.
3. Tighten or loosen the adjustment screw on the underside of the front knuckle until the delivery system is level front-to-back.
4. Replace the covers.

## Side-to-Side Leveling

Alternately tighten and loosen the two leveling screws on the underside of the delivery system until it is level side-to-side. Tighten both screws when level.

**Figure 39. Level the Delivery System in Two Locations**



## Side-Mounted Delivery Systems (542)

The side-mounted system features the A-dec 542 delivery system. This delivery system can be used with a variety of Preference and Slimline cabinets as well as a wall mount option. The standard configuration includes:

- Balanced flexarm with air brake
- Four handpiece control block positions
- Control head with room to house integrated accessories
- Autoclavable saliva ejector
- Autoclavable syringe (option of warm water syringe)
- 2-liter self-contained water system with quick-disconnect water bottle
- Standard multi-function touchpad (optional) or deluxe multi-function touchpad (optional)
- An optional tray holder (not shown) can be installed.

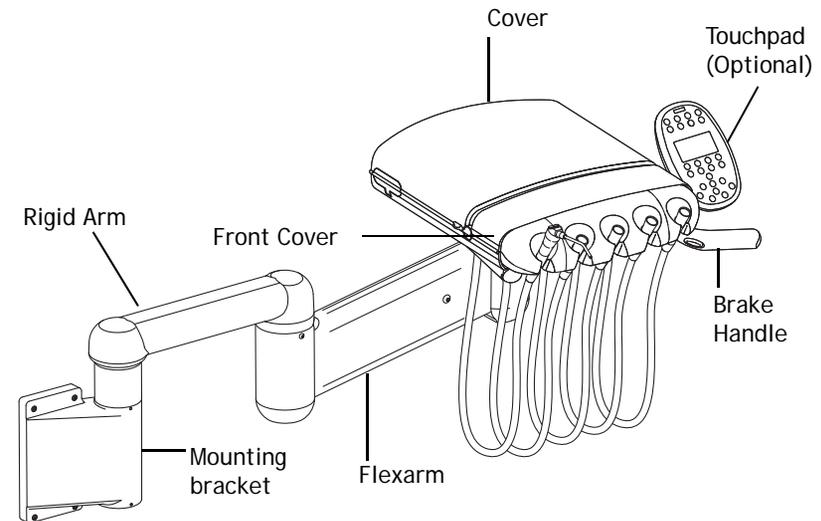
Figure 40. Chair/Side Systems



Figure 41. Side-mounted 542 Delivery System



Figure 42. Delivery System and Mount Components - 542





## Service, Usage, and Adjustments (542)

### Flexarm Counterbalance

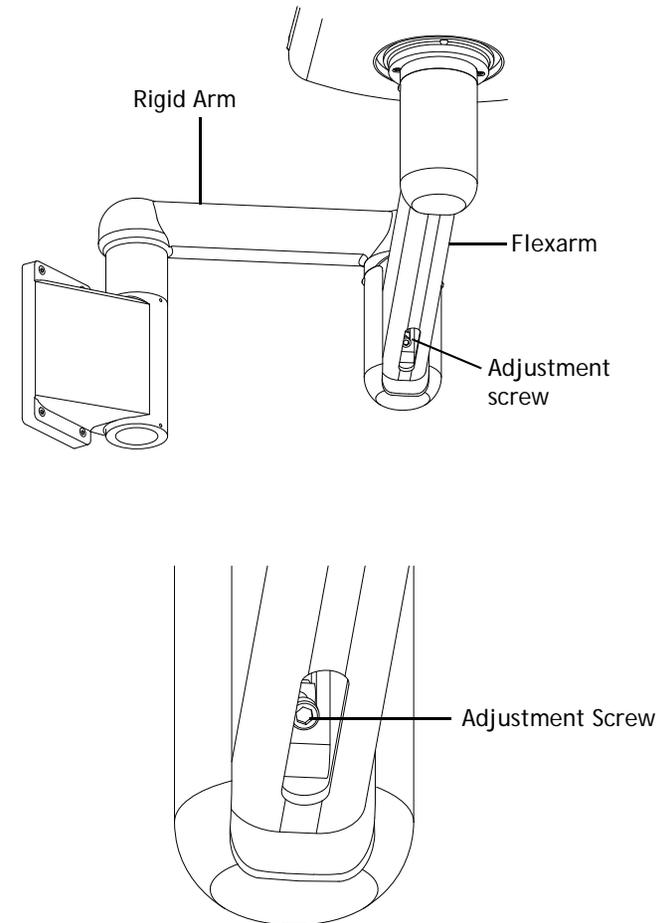
Adjust the flexarm counterbalance if the control head on the A-dec 542 Side Delivery System drifts up against the cabinet or drops when the master switch is turned off.



**NOTE** If the delivery system is not mounted under a cabinet, adjust the counterbalance to the midpoint of the operating position. Load the tray holder with a typical load before adjusting the flex arm counterbalance.

1. Load the control head for normal use attaching handpieces and placing a loaded tray on the tray holder.
2. Move the control head to the lowest position.
3. Turn the master on/off toggle off. If the control head drifts up against the cabinet, the counterbalance needs adjustment.
4. Insert a hex key into the adjustment screw.
  - Turn the hex key to the right to increase the upward drift.
  - Turn the hex key to the left to reduce the upward drift.

Figure 44. Flexarm Counterbalance



## Remove the Covers

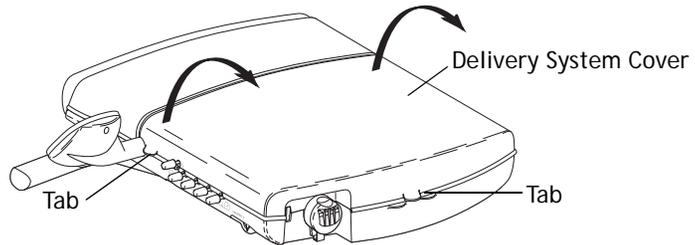
1. Lift up on the tabs at the back (center) and on both sides of the delivery system cover and open the cover. See Figure 45.
2. Pinch the hinge brackets at the cover base to remove the cover.
3. Remove the two screws holding the delivery system front cover in place. See Figure 45.
4. Slide the front cover forward and lift up.



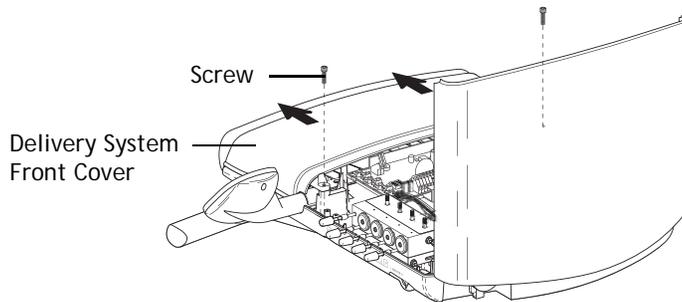
**CAUTION** Remove handpieces from the delivery system before opening the delivery system front cover.

**Figure 45.** Remove Covers

- 1) Lift on tabs and open cover.



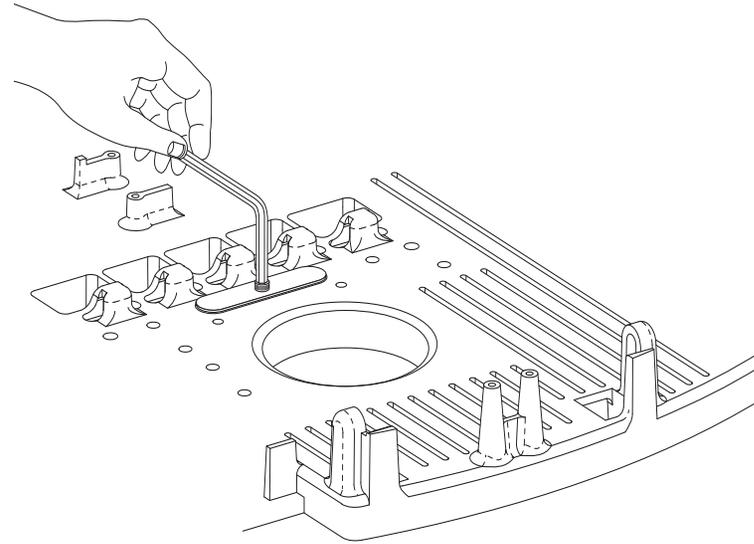
- 2) Remove screws, slide front cover forward and lift up.



## Rotational Tension Adjustment

Tighten or loosen the friction adjustment screw located in the center of the delivery system structural platform to adjust the rotational tension.

**Figure 46.** Adjusting the Delivery System Rotation Tension



## 12 O’Clock Delivery Systems (541 and 545)

The 12 O’clock system features two models, the A-dec 541 duo delivery and the A-dec 545 assistant’s instrumentation. Both models are floor-mounted delivery systems that install with a variety of Preference Collection<sup>®</sup> and Preference Slimline<sup>™</sup> cabinets. The standard configuration includes

- Height-adjustable round worksurface
- Multi-position assistant’s instrument holder
- Autoclavable saliva ejector
- Autoclavable syringe (option of warm water syringe)
- Autoclavable HVE (choice of single/dual)
- 2-liter self-contained water system with quick-disconnect water bottle
- Solids collector
- No touchpad (optional), standard multi-function touchpad (optional) or deluxe multi-function touchpad (optional)

In addition to the assistant’s instrumentation features, the 541 duo delivery system includes:

- Four handpiece control block positions
- Control center with room to house integrated ancillary equipment
- Multi-voltage intraoral light source
- Wet/dry foot control with chip blower/accessory button
- Height-adjustable, multi-position doctor’s instrument holder

Optional tray and instrumentation holders are available. Both mount on the round worksurface.

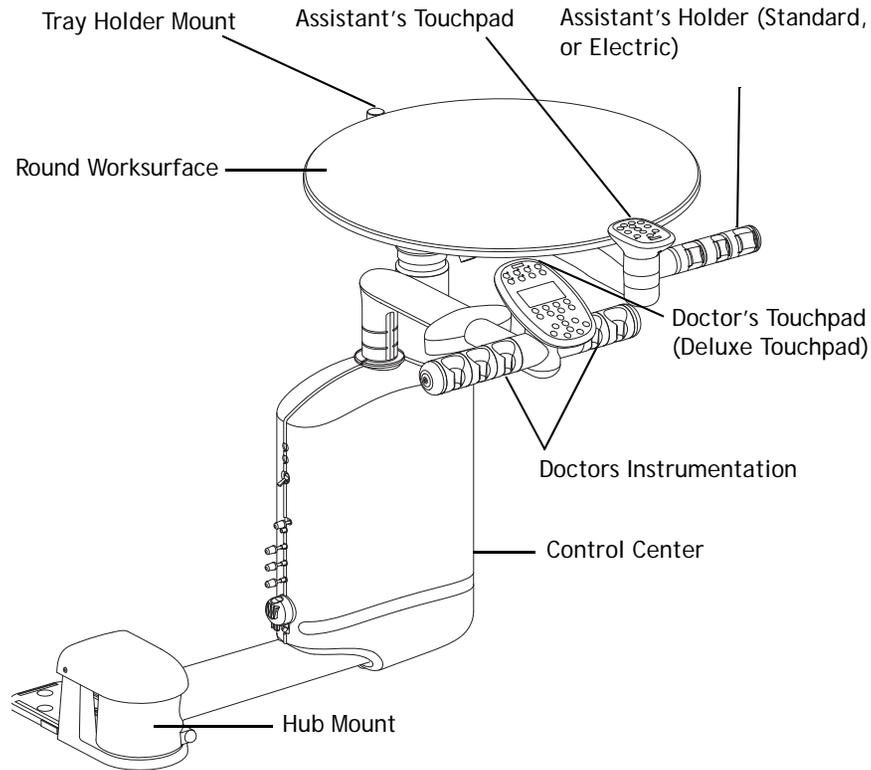
Figure 47. 12 O’clock Delivery Systems



# Product Overview (541 and 545)

## A-dec 541 12 O'Clock Duo Delivery System

Figure 48. Delivery System Components - 541

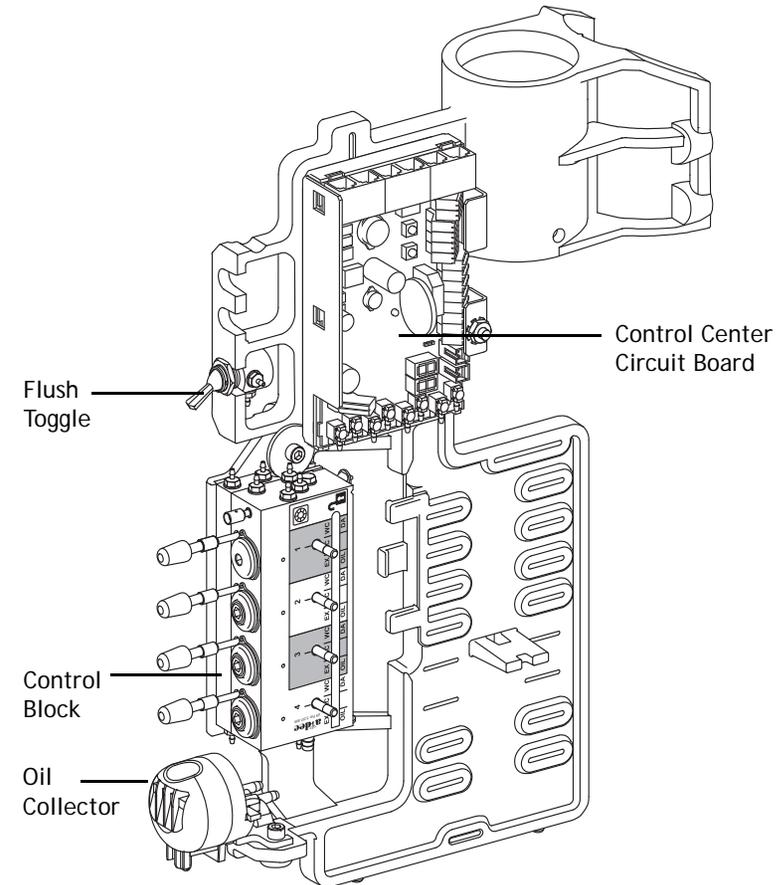


## A-dec 541 Internal Components



**NOTE** For information on the master on/off toggle, refer to Master On/Off Toggle, page 62.

Figure 49. Internal Components

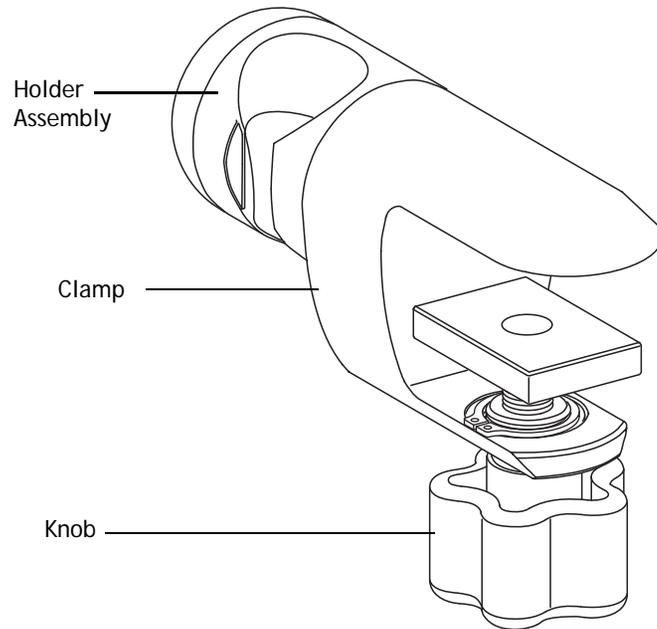


## Flex-Holder

**Part Number: 99.0705.00/99.0705.01 (Syringe/Saliva Ejector), 99.0706.00/99.0706.01 (Standard HVE), 99.0707.00/99.0707.01 (15 mm HVE)**

The flex-holder can mount to a variety of worksurfaces. The mounting location versatility allows you to locate an additional holder where you need it.

**Figure 50. Flex-Holder**



## Control Center Covers

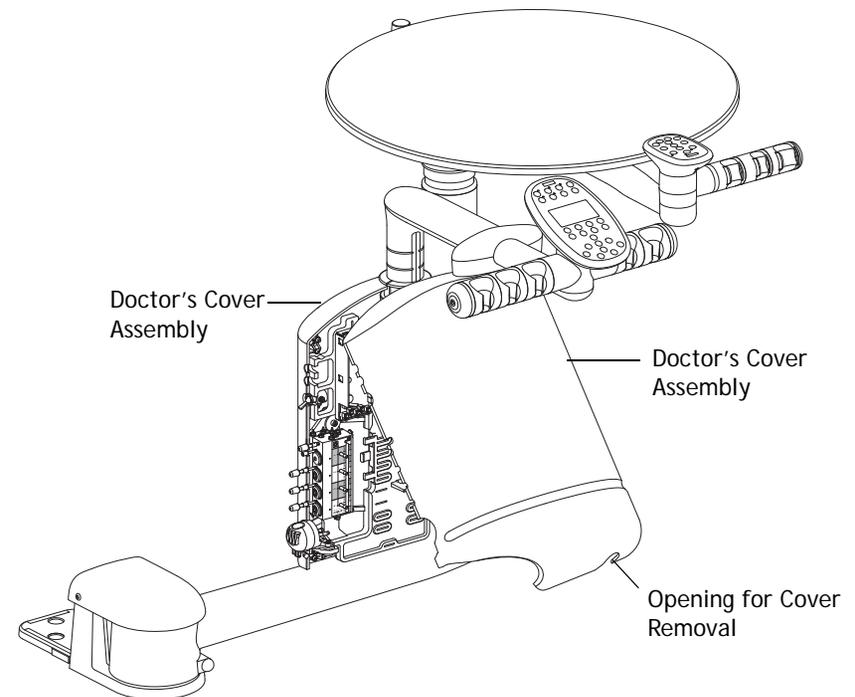
Some adjustments to the 541 duo delivery require the removal of covers. To remove covers, locate the hole directly under the control center and pull the covers apart.

To replace covers, position a cover over the control center and snap into place, then position the other cover and snap the two covers together.



**NOTE** Make sure the umbilical tubing is contained inside the covers and not pinched.

**Figure 51. Control Center 541 Cover Removal**



## Doctor's Holder

The doctor's holder is a configurable design. The holder configurations available from A-dec are:

- Two on the left side of the rotation hub and three on the right, syringe at left-most position
- Three on the left side of the rotation hub and two on the right, syringe at right-most position

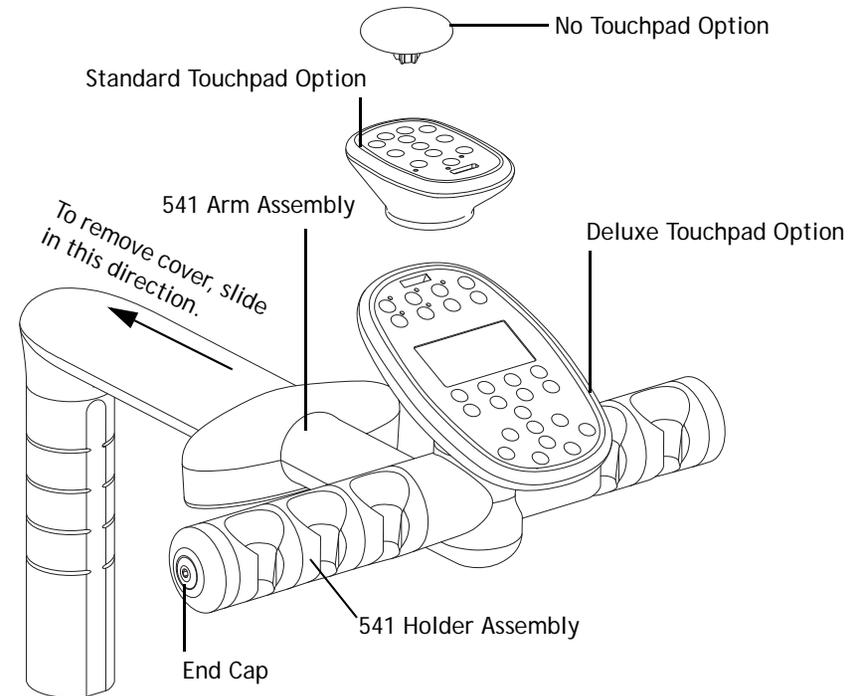
The holders use a pneumatic A-dec 500 microvalve for handpiece activation. The microvalve located in the syringe position is unplumbed and can be used as a replacement valve. A maximum of four valves connect to the holdback air system on the control block. These valves can be locked out or activated as needed.

The top cover of the 541 arm assembly is easily removed by sliding it backwards and lifting off.



**CAUTION** Do not pinch any wires or tubings when reinstalling the cover.

**Figure 52. Doctor's Holder Assembly**



# Service, Usage, and Adjustments (541 and 545)

## Level the Arm Assembly and Worksurface

### Level the Arm Assembly Front To Back

1. Position the arm perpendicular to the cabinet. See Figure 53.



**NOTE** Make sure the arm assembly is in line with the worksurface and perpendicular to the cabinet before leveling

2. Place the level on the hub, parallel to the arm.
3. Loosen and tighten the mounting screws as necessary.



**TIP** The support arm balances on a pivot. To raise or lower the long side of the arm, adjust the screw nearest the cabinet. See Figure 55. Once the arm is level, tighten the second screw to hold the arm in place.

### Level the Arm Assembly Side To Side

Position the arm parallel to the cabinet. See Figure 54.

4. Place level on the hub, parallel to the arm.
5. Loosen and tighten the mounting screws as necessary. See Figure 55.

Figure 53. Leveling - Arm Assembly Leveling Front to Back

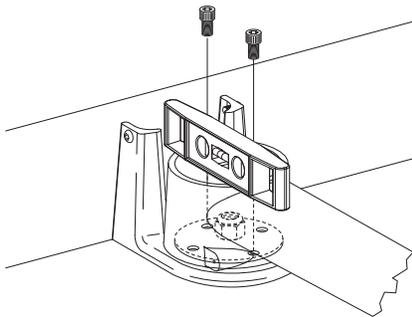


Figure 54. Adjustment - Arm Assembly Leveling Side to Side

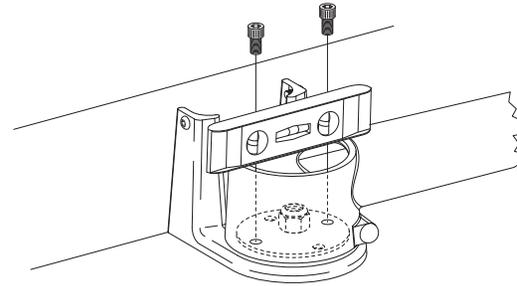
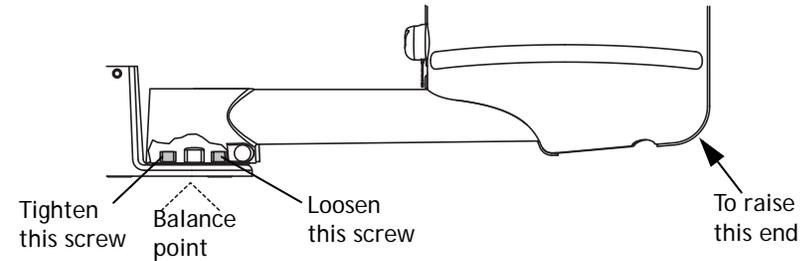


Figure 55. Level the Hub



## Level Round Worksurface

To level the round worksurface, adjust the two set screws in the worksurface support housing until the surface is level. See Figure 56.



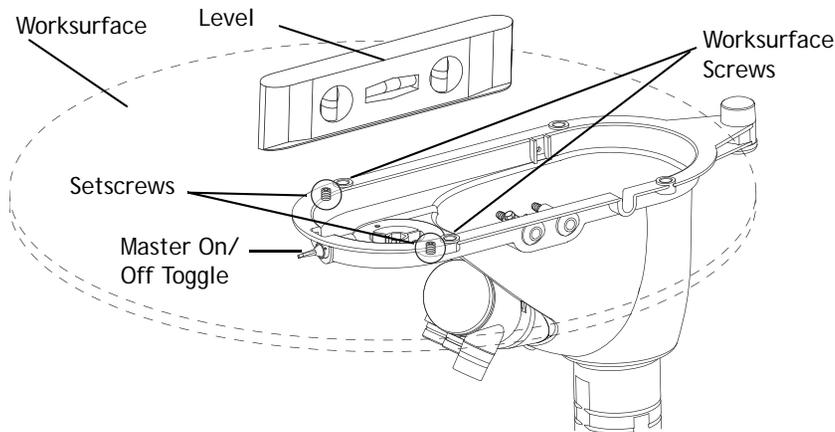
**NOTE** Ensure that the arm assembly is level before leveling the worksurface.

1. Place the worksurface arm in a typical working position and center a level on the round worksurface over the support housing.
2. Loosen the worksurface screws on the side nearest the master on/off toggle.
3. Use a 1/8" hex key to adjust the two setscrews in the worksurface support housing until the surface is level.
4. Tighten the worksurface screws until the worksurface is secure.



**NOTE** Do not overtighten the worksurface screws or the level may change.

Figure 56. Level Work Surface



## Worksurface Height

To adjust the height of the worksurface or the instrumentation arm:

1. Lift the upper part of the vertical post.
2. Slide the height adjustment ring to the desired position.
3. Lower the vertical post onto the ring.



**NOTE** The height adjustment range for the worksurface is 2-1/2" (63.5 mm) and the doctor's instrumentation arm is 3" (76.2 mm).

Figure 57. Worksurface and Doctor's Instruments Height Adjustment - 541

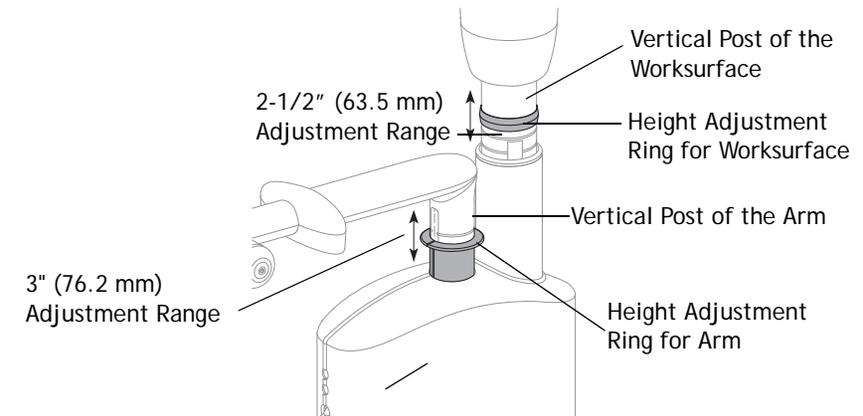
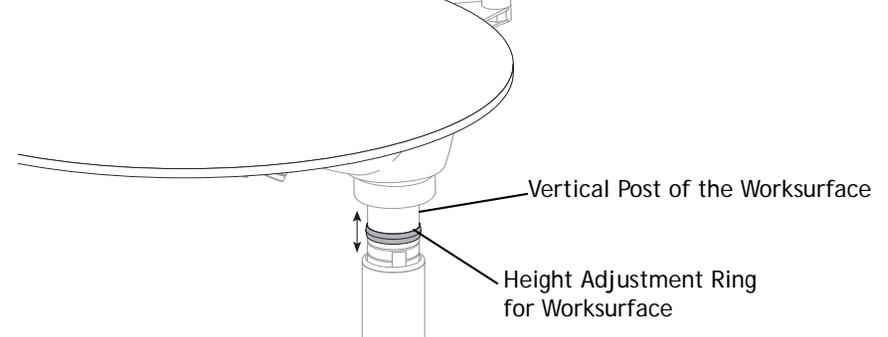


Figure 58. Worksurface Height Adjustment - 545



## Instrumentation Arm Positioning

The A-dec 500 instrumentation holders offer horizontal and vertical positioning. Each holder rotates for independent angle adjustment.

### Position Holders

You can customize the position of each holder on the holder assembly arm:

1. Pull holder slightly away from the adjacent holder.
2. Twist to the desired position and release See Figure 60.



**NOTE** Doctor's and assistant's holders adjust in the same manner.

Figure 59. Instrumentation Arm Positioning

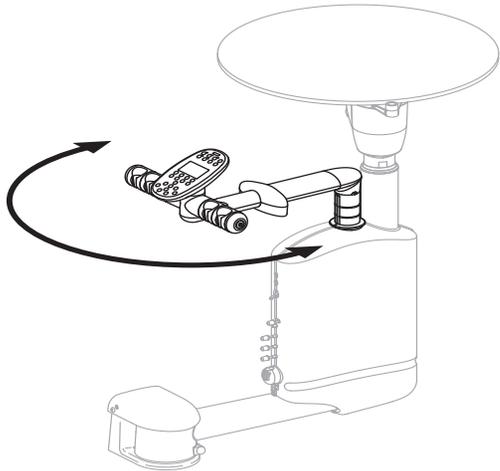
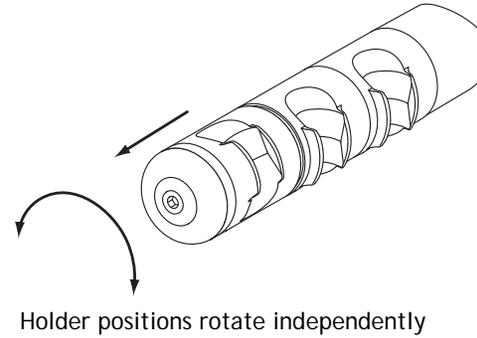


Figure 60. Instrument Holder Positioning



# A-dec 500 Delivery Systems Common Features

A-dec 500 delivery systems have features in common, including:

- Tubing
- Quick-connect fittings
- Data communication system
- Control components
- Master on/off toggle
- System accessories

Figure 61. A-dec 500 Delivery System Common Features



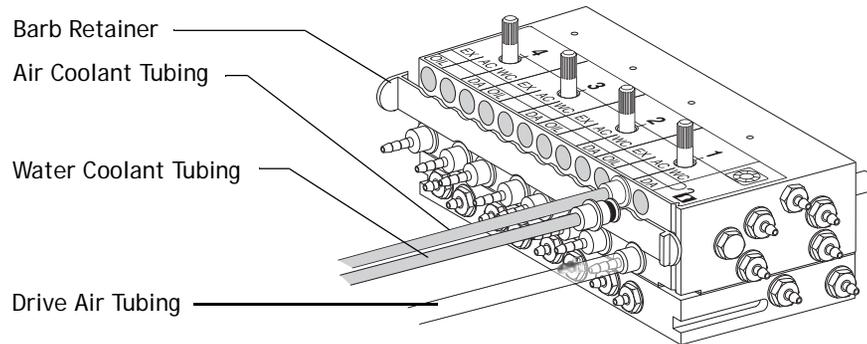
## Product Overview (All Delivery Systems)

### A-dec Tubing

A-dec products use four sizes of tubing: 1/8" OD, 1/4" OD, 3/8" OD and 5/16" OD. A-dec 500 products use the 5/16" OD for all high flow air and water applications.

Starting with A-dec 500, products use silicone handpiece tubing. The silicone handpiece tubing uses a European color code for air (blue) and water (green) that differs from the current U.S. standard.

**Figure 62. Handpiece Tubing Connections**



### Quick Connect Fittings

A-dec 500 products use quick-connect fittings for some tubing connections. These fittings provide fast, secure, push-on installation of tubing. These quick-connects also make removal of tubing during servicing easy.

### Connect Tubing

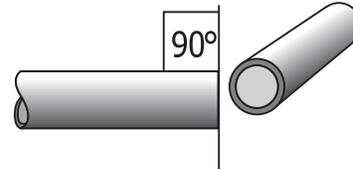
To connect tubing using the quick-connects:

1. Cut the tubing square, to ensure a secure connection.
2. Push the tubing into the connector until it can go no further.
3. Pull gently on the tubing to verify grip action.

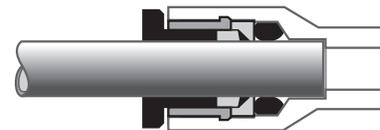
### Disconnect Tubing

1. Depressurize the unit.
2. Push and hold the release ring on the fitting connector.
3. Remove the tubing from the connector.

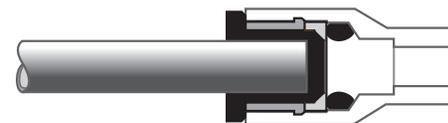
**Figure 63. Make a Square Cut**



**Figure 64. Push Tubing Into the Fitting**



**Figure 65. Remove Tubing From the Fitting Connector**

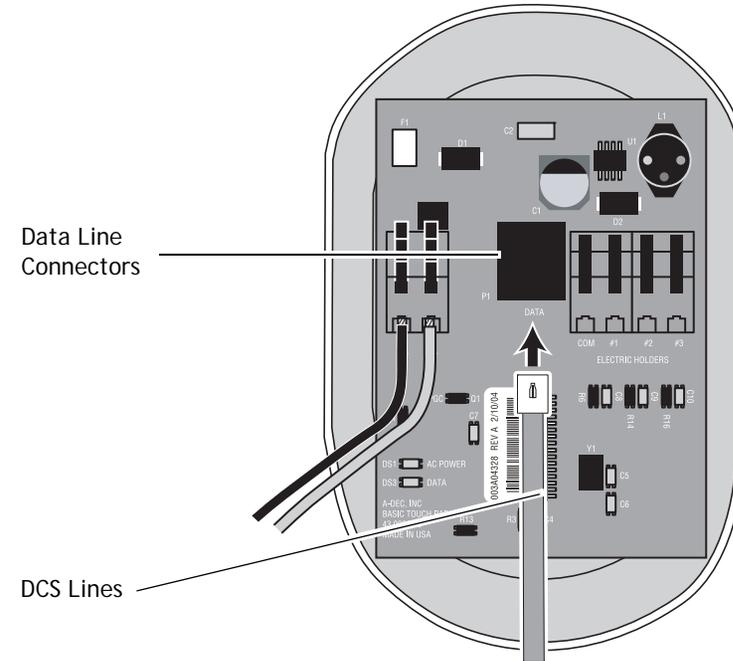


## Data Communication System

A-dec 500 equipment uses an electronic communication tool, the Data Communication System (DCS). The DCS allows each module to communicate with the other modules and automatically detects when modules are added. For example, when connecting a cuspidor to the system, the DCS automatically recognizes the cuspidor module without any programming or setting changes.

You can plug any module into the data line connector on the circuit board. The circuit board recognizes which module has been plugged in and allows operation of that module to begin. Should a module malfunction or fail to work, the DCS maintains service to the rest of the modules. Other modules continue to function in spite of the one that has failed.

Figure 66. DCS Line and Connector



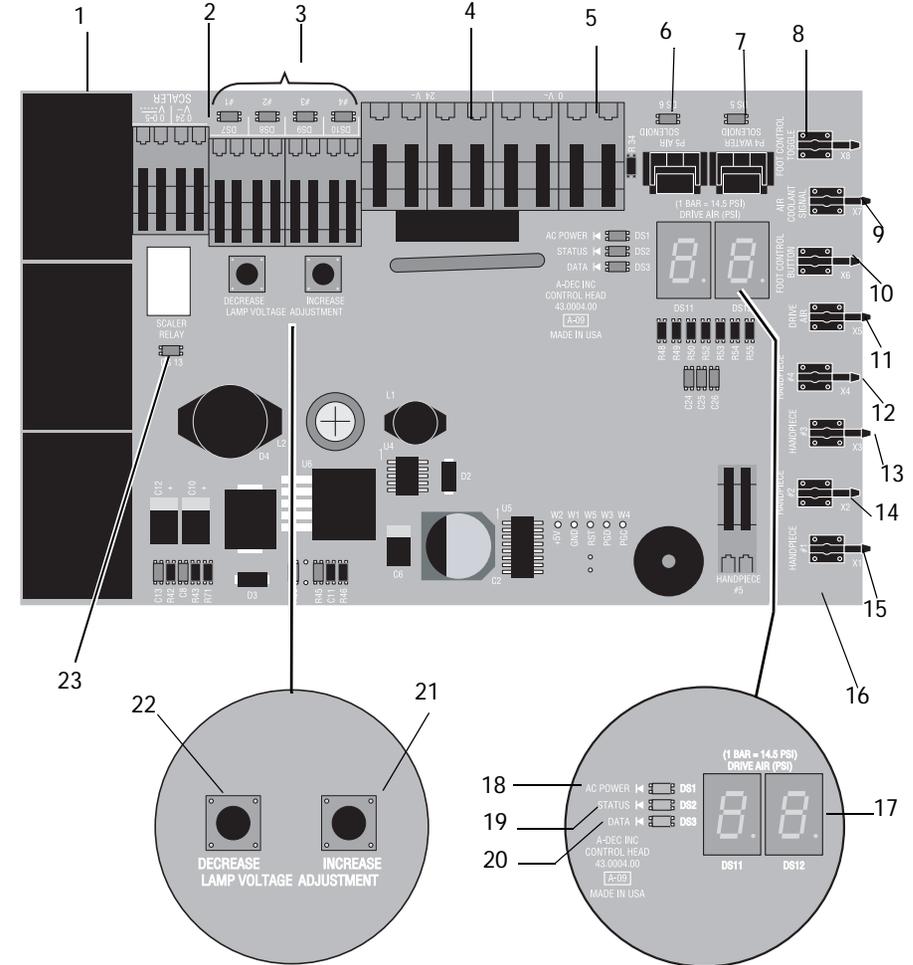
# Circuit Board Components

Part Number: 90.1076.00

Table 5. Delivery System Circuit Board Components

Item	Description
1	P1, P2, P3 - Data line ports (DCS)
2	J6 - ultrasonic instrument power terminal strip
3	J4, J5 - Intraoral light source strip and LEDs DS7, DS8, DS9, DS10
4	J2 - 24 VAC terminal strip
5	J2 - 0 VAC terminal strip
6	DS6 - Air coolant solenoid LED and connector
7	DS5 - Water coolant solenoid LED and connector
8	X8 - Water coolant signal transducer (foot control toggle)
9	X7 - Air coolant signal transducer
10	X6 - Accessory button (foot control) signal transducer
11	X5 - Drive air signal transducer
12	X4 - Handpiece 4, holdback transducer
13	X3 - Handpiece 3, holdback transducer
14	X2 - Handpiece 2, holdback transducer
15	X1 - Handpiece 1, holdback transducer
16	J3 - Handpiece 5, terminal strip
17	DS11, DS12 - Drive air LED display
18	DS1 - AC Power LED
19	DS2 - Status LED
20	DS3 - Data LED
21	S2 - Increase intraoral light source voltage adjustment
22	S1 - Decrease intraoral light source voltage adjustment
23	DS13 - ultrasonic instrument relay LED

Figure 67. Delivery System Circuit Board

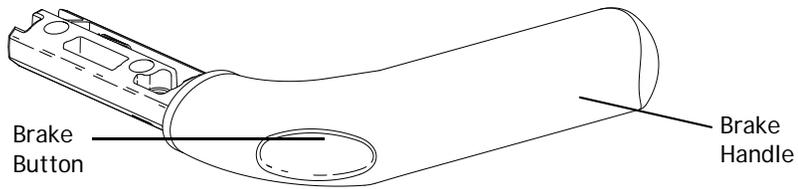


## Brake Handle

Part Number: 77.0104.03 (White) 77.0104.01 (Surf)

The brake handle activates a replaceable microvalve, releasing pressure on the brake inside the flexarm.

Figure 68. Brake Handle Components

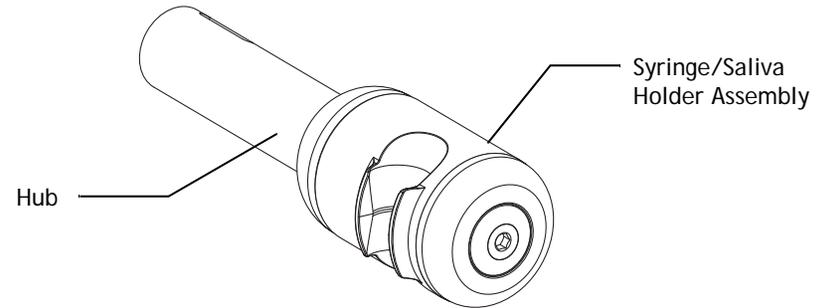


## Accessory Holder

Part Number: 99.0681.01 (White) 99.0681.00 (Surf); Standard,  
99.0684.01 (White) 99.0684.00 (Surf) Auto-electric

The accessory holder is either an active or non-active position on the delivery system. It can be mounted on either side of the delivery system, opposite the touchpad. Auto-electric holders have a power source at the terminal for handpiece position 5 on the delivery system circuit board.

Figure 69. Accessory Holder Components



## Master On/Off Toggle

Part Number: 33.0175.01 (White) 33.0048.05 (Surf)

The master on/off toggle is located on the worksurface support of the 541 delivery system and on the side of the 532, 533 and 542 delivery systems. The toggle operates with unregulated air and supplies air to the control block for holdback air. When the master toggle is off, the delivery system does not have power.

Figure 70. Master On/Off Toggle – 541

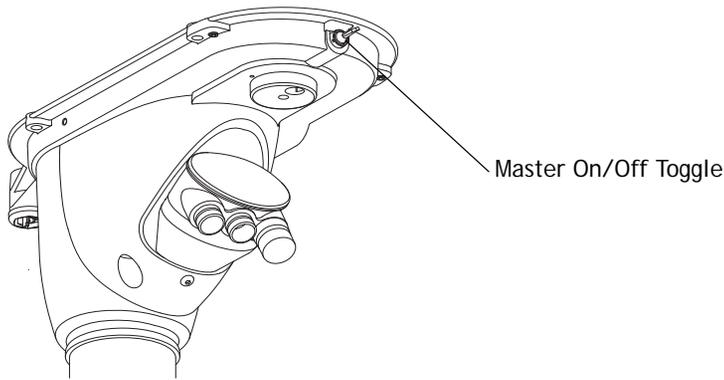
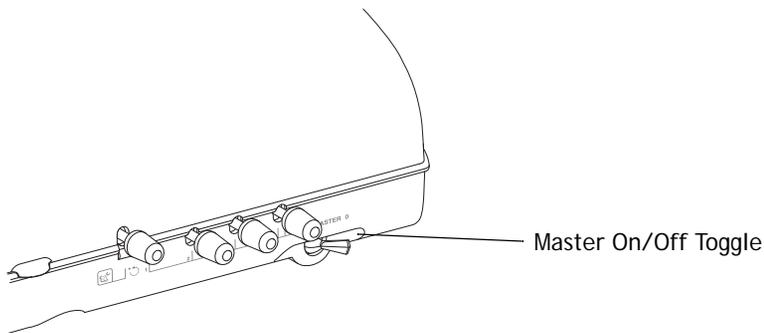


Figure 71. Master On/Off Toggle – 532/533/542



## Flush Toggle

Part Number: 33.0168.01 (White) 33.0168.00 (Surf)

The flush toggle is located on side of the 541 12 O'clock duo delivery system and on the back of the 532, 533 and 542 delivery systems. The flush toggle uses holdback air to operate handpiece flush functions. When the momentary valve is on, the holdback air is exhausted and air signal is sent toward the water cartridge.

- If the handpiece is in the holder (holdback active), the flush is not activated.
- If the handpiece is out of the holder (holdback exhausted), the flush operates.

Figure 72. Flush Toggle – 541

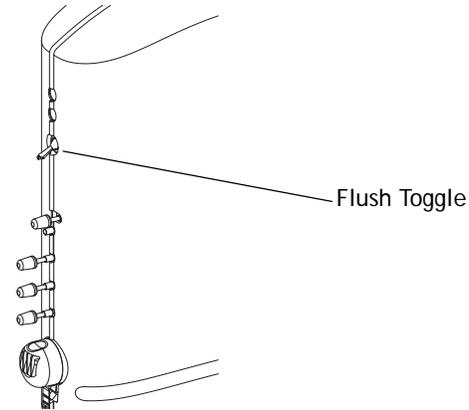
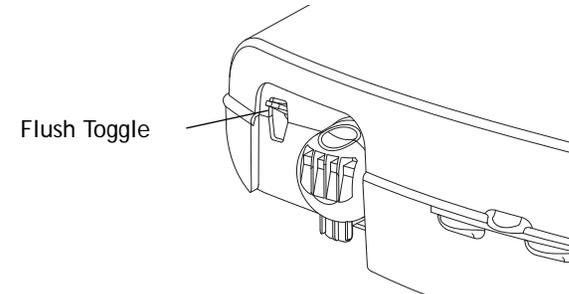


Figure 73. Flush Toggle – 532/533/542

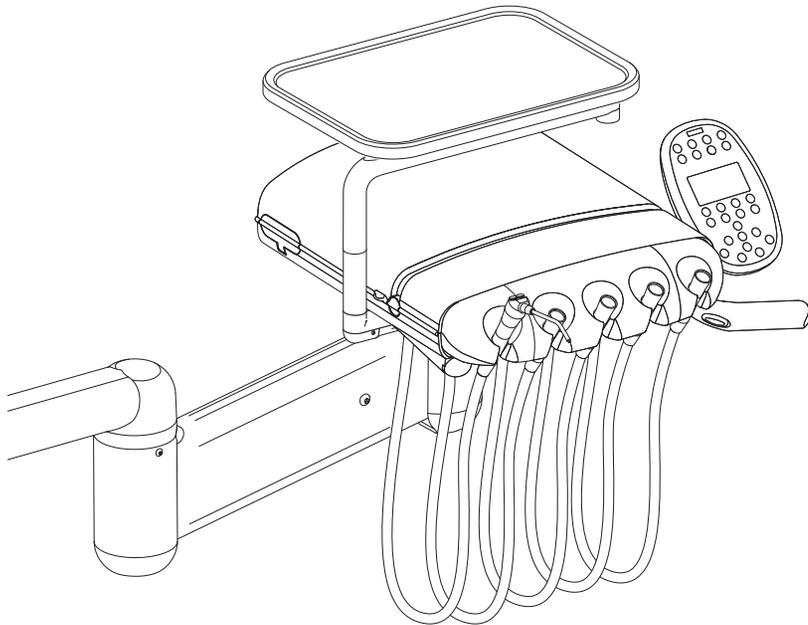


## Traditional Tray Holder

Part Number: 77.1024.00 (White) 77.0294.00 (Surf); 77.1023.00 (White) 77.0295.00 (Surf)

The traditional tray holder can be mounted on the left or right side below the delivery system.

Figure 74. Traditional Tray Holder Components



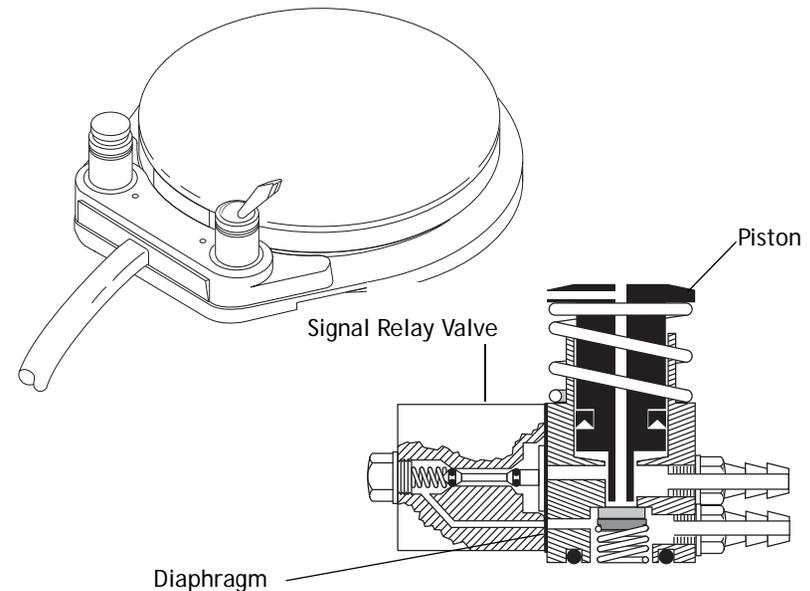
## Foot Control

Part Number: 38.1829.01 (White) 38.1805.01 (Surf); 38.1829.00 (White) 38.1805.00 (Surf)

The A-dec 500 foot control operates handpieces by applying pressure on the foot control. As pressure is applied, the black piston exhaust vent seals against the poppet, then pushes the poppet away from the inlet seat, and when unseated, regulated air flows through the valve and out to the delivery system as drive air.

Regulated air is sent through the relay block to the delivery system as air coolant signal. When pressure is released from the foot control, the poppet reseals the inlet and pressure is exhausted from the outlet side of the valve and up through the piston.

Figure 75. A-dec Foot Control



## Self-Contained Water Bottle

Part Number: 14.0468.01 (White)/14.0468.00 (Surf)

The A-dec self-contained water system is a closed system, which isolates treatment water from the municipal water supply. The A-dec 500 water bottle is designed to prevent cross-contamination during refilling. The pickup tube is located inside the bottle assembly and is not exposed to outside contaminants. Air pressure forces water from the water bottle into the pick-up tube. Water is distributed to the delivery system, syringe, handpieces and assistant's syringe.



**WARNING** Use only A-dec water bottles. Do not use other brands, or damaged bottles. They can pose a serious safety hazard if broken while pressurized. The A-dec plastic water bottles cannot withstand heat sterilization. Attempting to do so damages the bottle and the sterilizer.

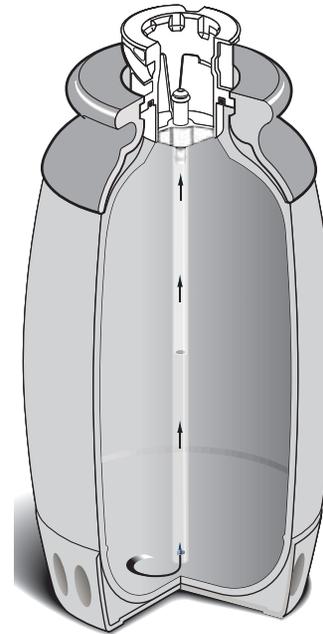
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**CAUTION** Use caution when using the self-contained water system with any dental units equipped with components that might fail when the water supply is interrupted. Some types of ultrasonic instruments and water heaters are examples of components that can be permanently damaged if operated without a continuous water source. A-dec does not recommend using saline solutions, mouth rinses, or any chemical solutions, not specified by A-dec, in the A-dec self-contained water system. These may damage the water system components and cause the failure of the dental unit.

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Figure 76. Self-Contained Water Bottle



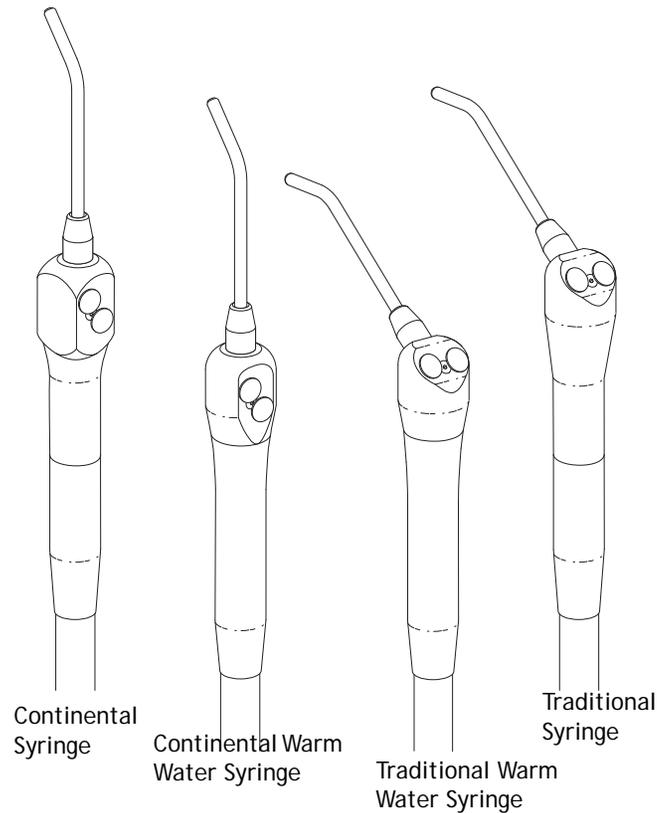
## Standard Syringe

Continental and Traditional autoclavable syringes have serviceable air and water button valves. The tip retaining nuts have replaceable O-rings. See the *A-dec 500 Service Reference* (p/n 86.0329.00) for the warm water syringes' illustrated parts breakdown. See the *Illustrated Parts Breakdown* (p/n 85.0851.00) for Continental and Traditional syringe parts.



**WARNING** Turn off and bleed the system of air and water before servicing the syringe. The use of disposable syringe tips in A-dec syringe tip nuts is not recommended.

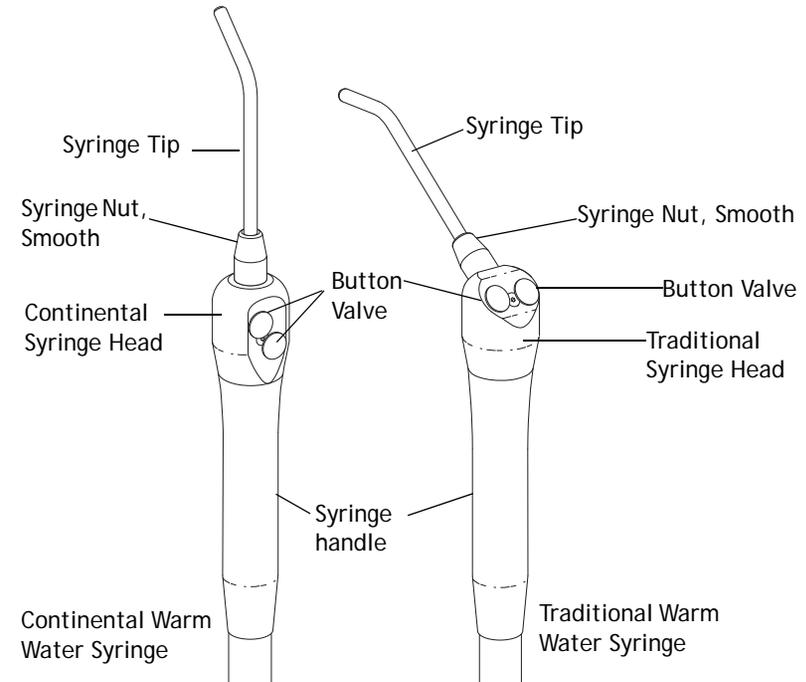
Figure 77. Autoclavable Syringes



## Warm Water Syringe

The Continental and Traditional warm water syringe share many of the same components. The syringe head is the only component specific to each model of syringe.

Figure 78. Warm Water Syringe



## Syringe Temperature Selection Input

The warm water syringe temperature selection input allows the technician to select the estimated patient cheek temperature between a minimum temperature of 82.4°F (28°C) and a maximum temperature of 100.4°F (38°C).

### Warm Water Syringe Specifications

There are five positions ranging from minimum to maximum for temperature variations.

**Table 6. Warm Water Syringe Temperature Selections**

Jumper Selection	Estimated Temperature at Patient's Cheek
5 (maximum)	100.4°F (38°C)
4	96.8°F (36°C)
3	93.2°F (34°C)
2	89°F (32°C)
1 (minimum)	86.0°F (30°C)
No jumper	82.4°F (28°C)

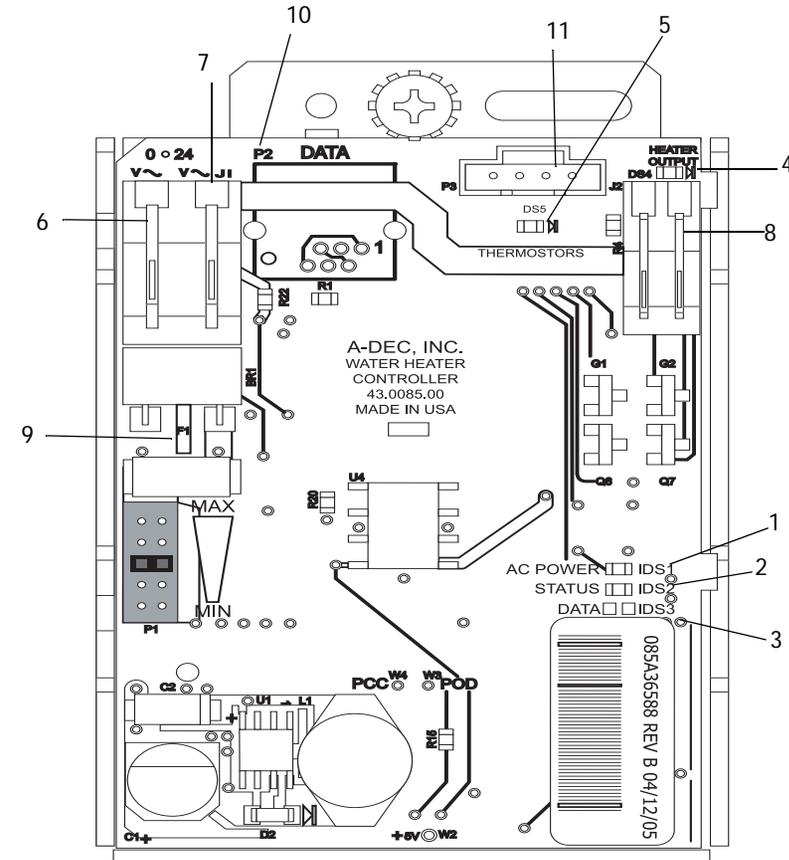


**NOTE** If two jumpers are installed, the micro controller averages the two selections together. If three or more are installed, only the lowest two jumpers are recognized.

**Table 7. Warm Water Syringe Circuit Board**

Item	Description
1	DS1—AC power LED
2	DS2—Status LED
3	DS3—Data LED - NOT USED (reserved for future use)
4	DS4—Heater output LED
5	DS5—Thermistors (temperature sensors) LED
6	J1—0 VAC terminal strip
7	J1—24 VAC terminal strip
8	J2—Heater output terminal strip
9	P1—Temperature selection header
10	P2—Data line port (DCS) - NOT USED - (reserved for future use)
11	P3—Thermistors (temperature sensors) connector

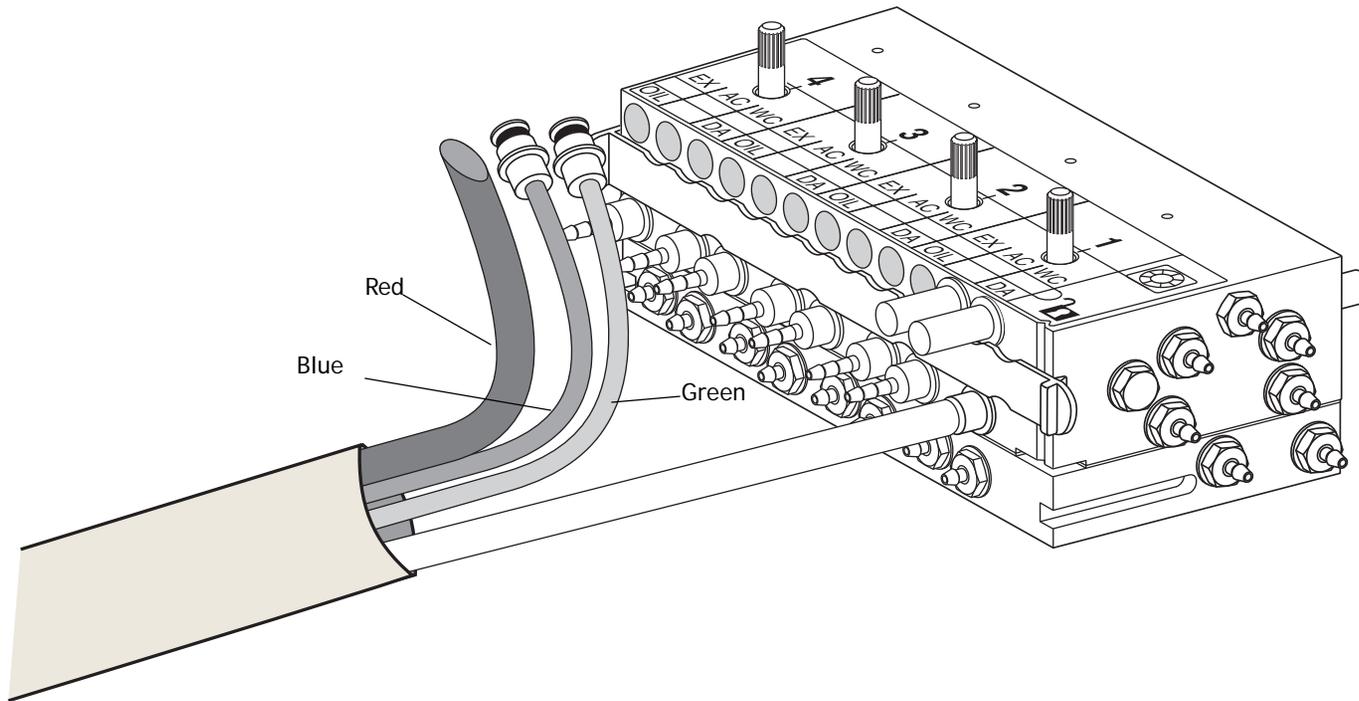
**Figure 79. Warm Water Syringe Circuit Board**



## Tooth Dryer

The A-dec warm air tooth dryer needs a dedicated four-hole handpiece tubing and a minimum of 60 psi compressed air to operate properly. The tooth dryer is only plumbed to the drive air on the control block. Remove the barb from the exhaust tubing (red) and cut the tubing at an angle to reduce noise. Anchor, but do not pinch, the exhaust tubing to the structural platform using a cable tie. There are no moving parts in the tooth dryer, only cleaning is needed.

**Figure 80. Connecting the Tooth Dryer to the Control Block Drive Air**



## Service, Usage, and Adjustments (Common Features)

### Control Block

Part Number: 38.1776.00

All A-dec 500 delivery systems use the same control block assembly for adjusting handpiece air and water coolant flow. The adjustment controls for air and water coolant are located on the side of the delivery system.

Figure 81. Control Block – 541

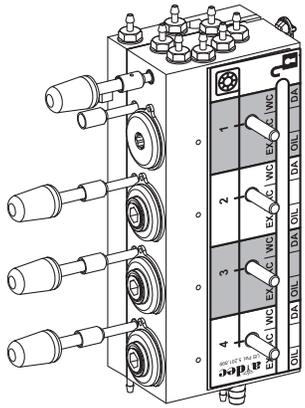
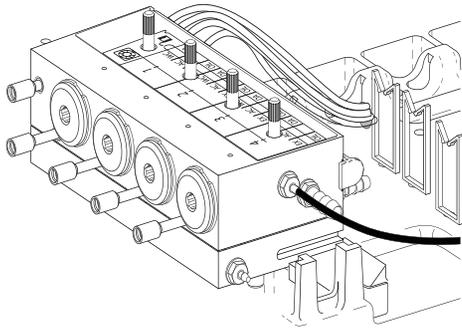


Figure 82. Control Block – 532/533/542



### Air Coolant

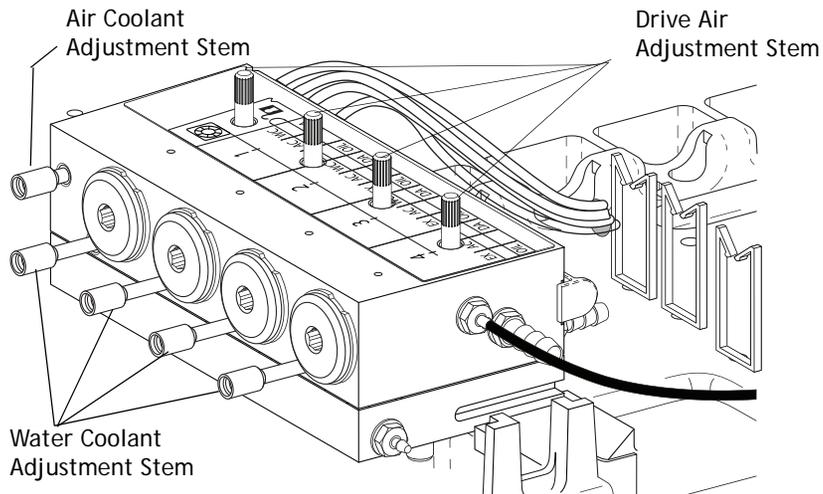
Adjusting the air coolant for one handpiece sets it for all of the positions.

1. Flip the wet/dry toggle on the foot control to the on position.
2. Install a bur into a handpiece and activate the position.
3. Fully depress the foot control.
4. Adjust the air coolant adjustment key to create a cooling mist at the bur.

## Water Coolant

1. Flip the wet/dry toggle on the foot control to the ON position.
2. Install a bur into the handpiece and activate the position.
3. Fully depress the foot control.
4. Turn the water coolant adjustment key to adjust the flow to fit the operator's needs.
5. Repeat steps two through four for each wet handpiece.

**Figure 83. Location of the Air and Water Coolant Adjustments**



## Drive Air

1. Use a handpiece pressure gauge to adjust the drive air for each handpiece tubing.
2. Install a bur into the handpiece and activate the position.
3. Fully depress the foot control.
4. Adjust the drive air flow (controls are on the top of the control block).

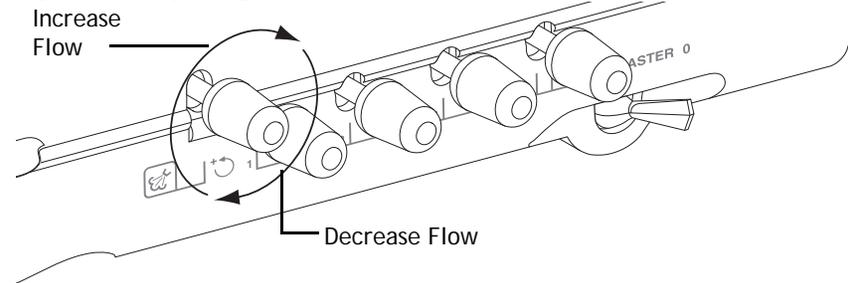
Air turbine handpieces should be set to 40 psi. EA-50LT electric micromotors (controller) should be set to a minimum of 60 psi.

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**NOTE** The digital gauge inside the delivery system reads drive air pressure only at the control block. For accurate handpiece pressure settings, use a pressure gauge at the end of the handpiece tubing.

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**Figure 84. Adjusting Flow**

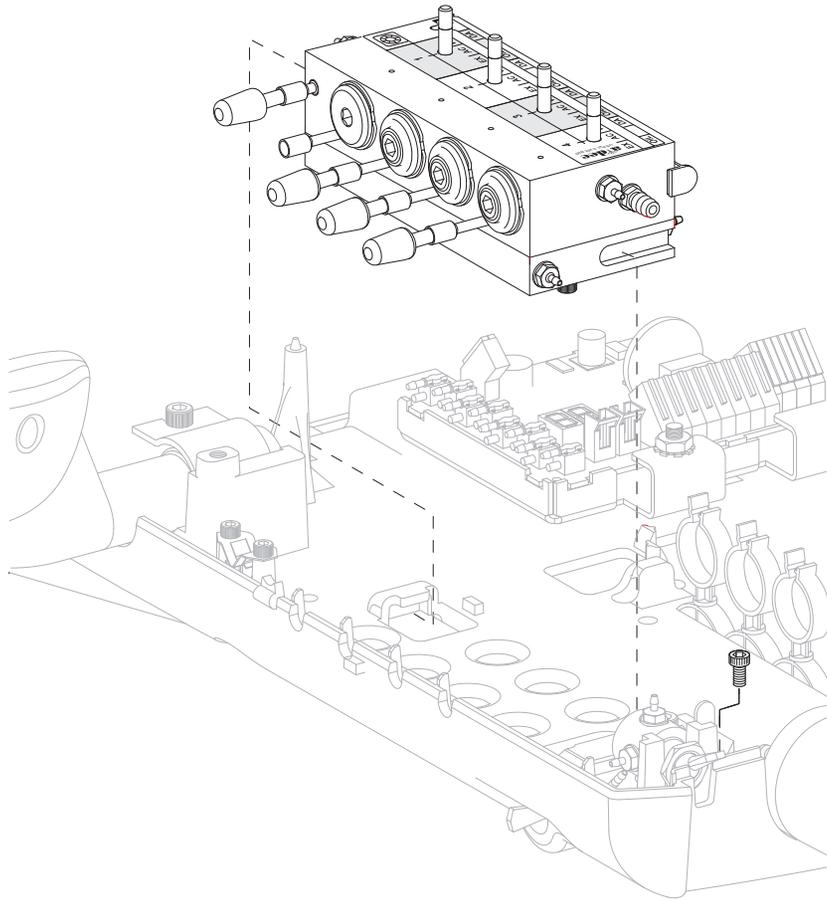


## Remove the Control Block

### 532/533/542 Delivery Systems

1. Loosen the hex screw holding the master on/off toggle mounting bracket to the delivery system platform.
2. Slide the bracket toward the back of the delivery system.
3. Lift the control block from the back, unhooking the front of the block.

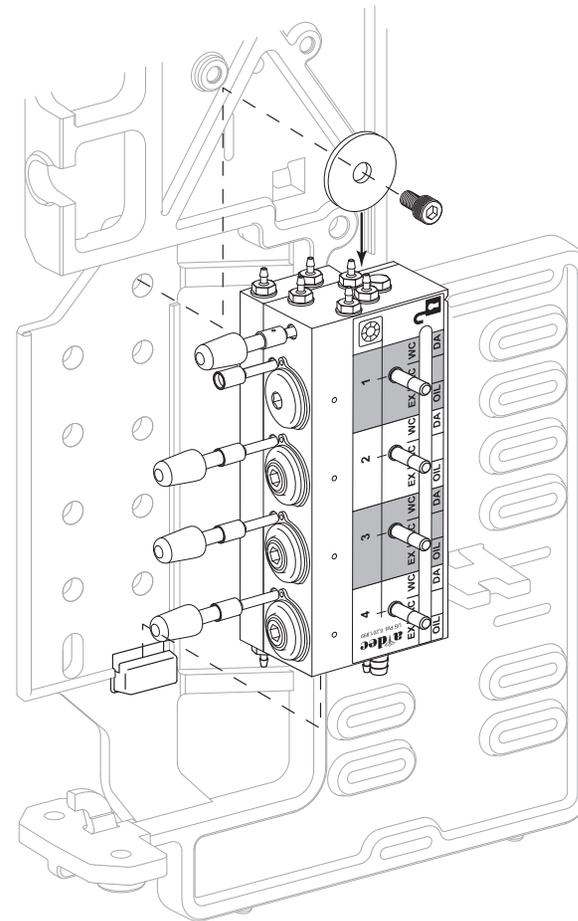
Figure 85. Remove Control Block on 532/533/542 Delivery Systems



### 541 Delivery System

1. Loosen and remove the hex screw and washer that secures the control block to the control center frame.
2. Slide the control block up so that the frame tab is no longer connected in the control block mounting slot.

Figure 86. Remove Control Block on 541 Delivery System



## Tray Holder

### Adjust Tray Holder Tension

- To tighten the rotational tension of the tray holder, turn the hex bolt under the tray to the right.
- To loosen the rotational tension, turn it to the left.
- To adjust the rotational tension of the tray arm, tighten or loosen the hex bolt at the delivery system end of the arm.

### Level Delivery System Tray

1. Use the adjustment screw to level side-to-side. See Figure 87.
2. Use the adjustment screws to level front-to-back. See Figure 88.

Figure 87. Side-To-Side Tray Level

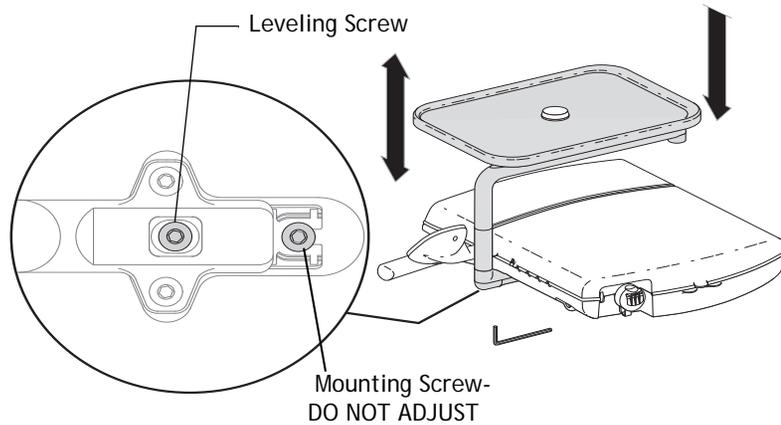
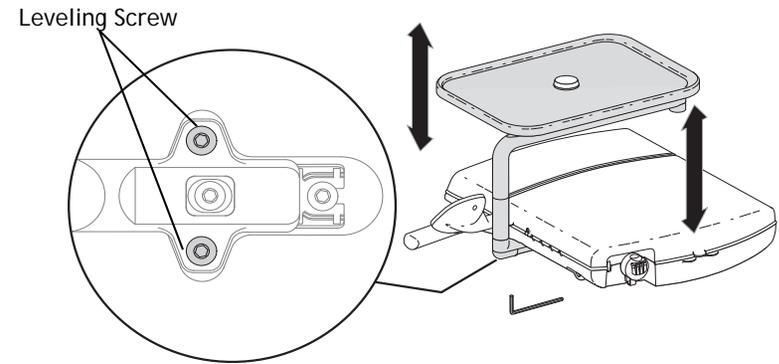


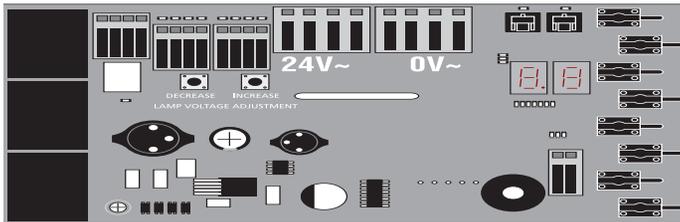
Figure 88. Front-To-Back Tray Level



## Intraoral Light Source Voltage

The intraoral light source voltage adjustment on the A-dec 500 doctor's delivery system is located on the delivery system circuit board. The voltage is preset to 3.2 volts at the lamp terminals when the lamp is on.

Figure 89. Intraoral Light Source Voltage



## Intraoral Light Source Length and Voltage

Table 8. Length and Voltage Table

Wire length in A-dec tubing			Wire length in A-dec tubing		
(in)	(cm)	Voltage at terminal strip A-dec/W&H, Bien Air or other bulbs rated at 3.5V (On)	(in)	(cm)	Voltage at terminal strip A-dec/W&H, Bien Air or other bulbs rated at 3.5V (On)
		VDC +/- .02			VDC +/- .02
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** Table 8 pertains to fiber-optics powered with 26AWG wires, 750mA loads, and a desired bulb voltage of 3.2VDC. For fiber-optics powered with 26AWG 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 26AWG wire (inches) from terminal strip to lamp

## ASSISTANT'S INSTRUMENTATION (551 AND 545)

The A-dec 551 assistant's instrumentation is equipped with either a short or long assistant's arm for easy positioning of instrumentation. Both arms are equipped with a touchpad and a holder assembly with independent positioning features. The solids collector, located at the base of the arm, is also a part of the assistant's instrumentation.

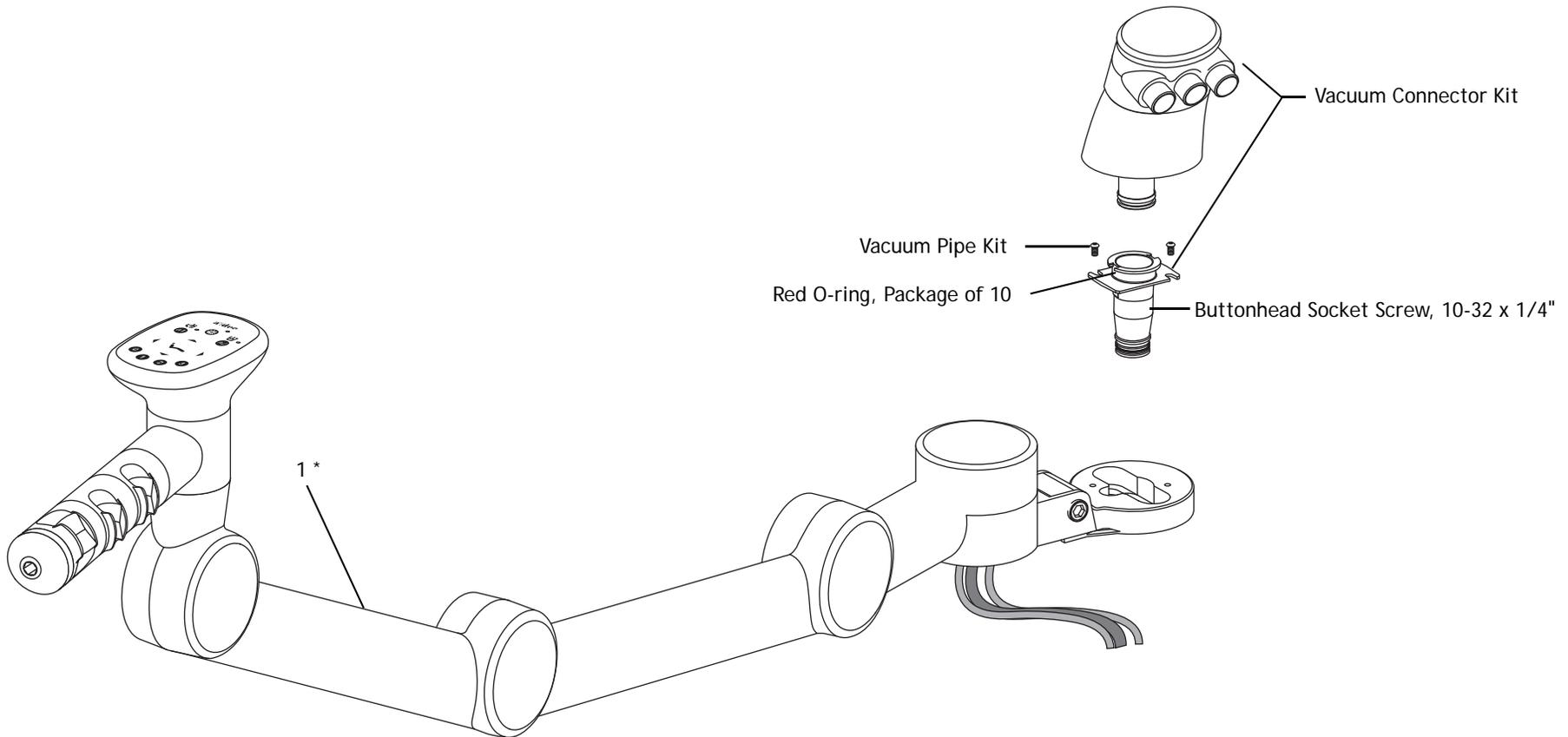
The A-dec 545 assistant's instrumentation is floor-mounted and installs with a variety of Preference Collection<sup>®</sup> and Preference Slimline<sup>™</sup> cabinets. The standard configuration for 545 has a height-adjustable round worksurface, multi-position assistant's instrument holder, autoclavable saliva ejector, autoclavable syringe (option of warm water syringe), autoclavable HVE (choice of single/dual), 2-liter self-contained water system with quick-disconnect water bottle, solids collector, standard multi-function touchpad (optional) and no touchpad (optional).

Figure 90. Assistant's Instrumentation



## Product Overview (551)

Figure 91. 551 Assistant's Long Arm Assembly with a Single 3 Position Holder Assembly



\* Item 1:

- Long arm with single 3-position or 4-position standard holder, or dual 2-position standard holder
- Short arm with single 3-position or 4 position standard holder, or dual 2-position standard holder

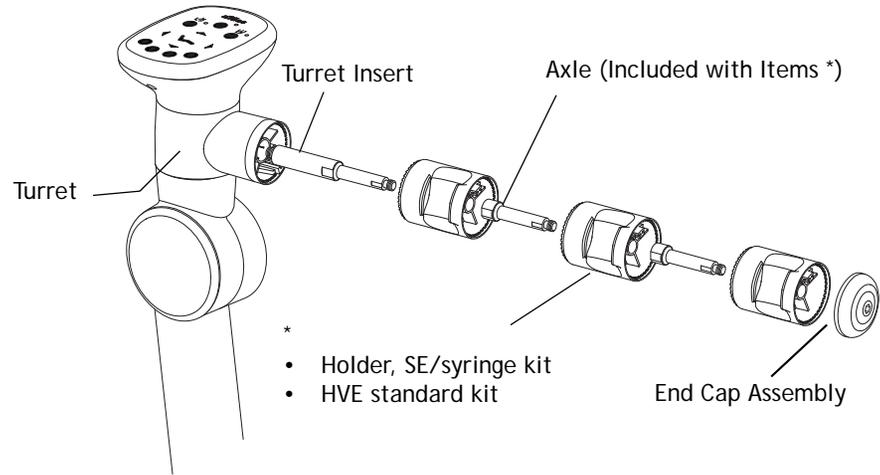
## Holders

There are two types of assistant's holders, standard and electric.

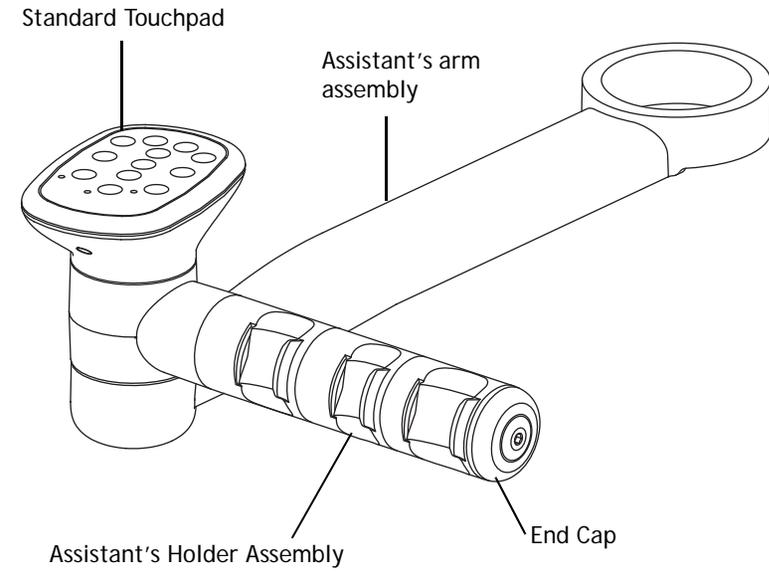
### Standard Holder

The touchpad does not need to be removed when disassembling the standard holder.

**Figure 92. Standard Assistant's Holder Components**



**Figure 93. Standard Holder Assembly**



## Electric Holder

Each handpiece in the holder assembly automatically activates when you lift it from its holder. The electric holders provide vacuum on/off switching for users whose vacuum system requires this functionality. The vacuum pump activates when the high volume evacuator (HVE) or saliva ejector (SE) are lifted from their holders, and turns off when replaced into their holders.

Figure 94. Electric Assistant's Holder Components

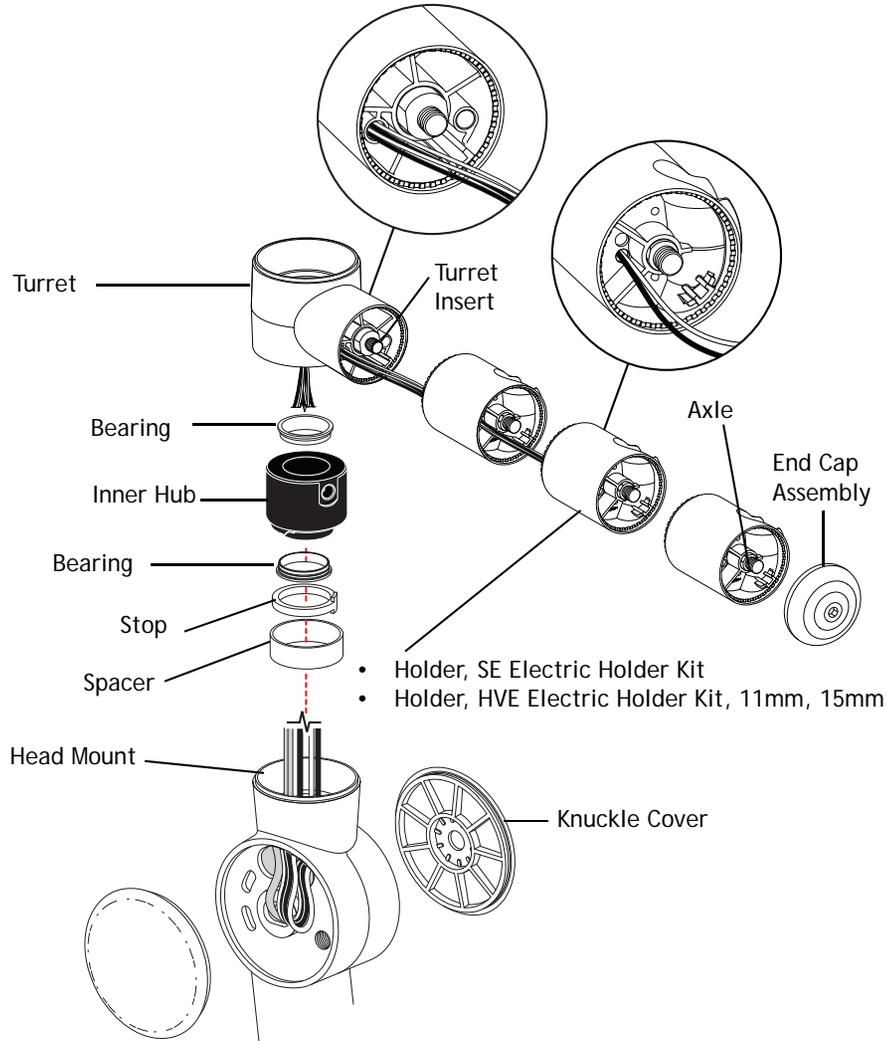


Figure 95. Single Electric Holder Assembly

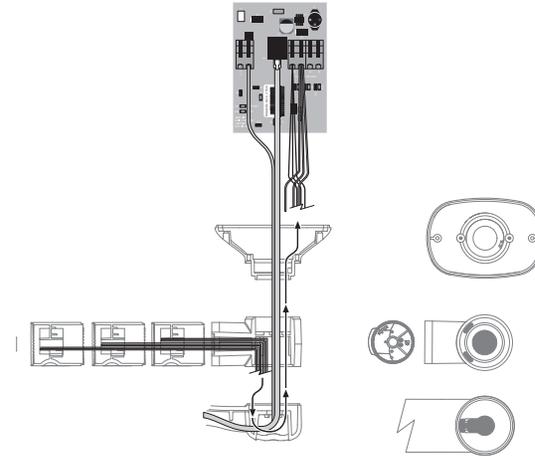
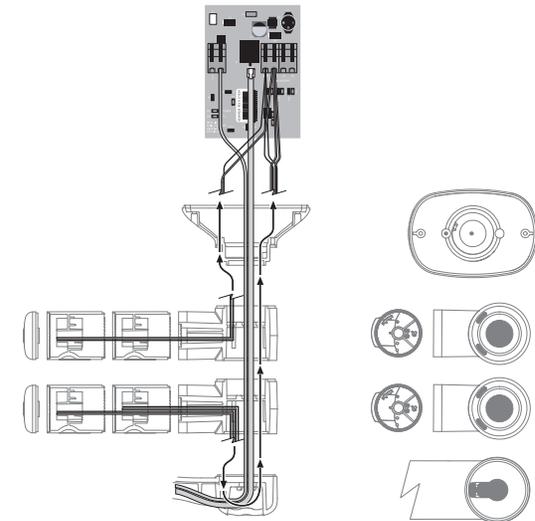


Figure 96. Dual Electric Holder Assembly



**CAUTION** When reassembling the electric holder, rotate all holders, holder assemblies and the touchpad to ensure there is enough service loop in the wires to prevent them from breaking.

## Assistant's Touchpad

The assistant's instrumentation uses a standard touchpad that allows for control of the chair, dental light, and cuspidor or A-dec relay module(s). The touchpad can rotate 340° for access and visibility.

Item	Part Number	Description
1	90.1078.00	Standard touchpad with circuit board
2	77.0335.01 77.0335.00	Touchpad base, white Touchpad base, gray
3	025.002.01	Cable tie, package of 10
4	041.663.00	Cable bushing
5	77.0123.00	Bolt
6	99.0651.00	Spline
7	004.173.00	Washer, Nylatron
8	003.078.00	Screw, socket head, 4-40 x 1/4"
9	004.237.00	Washer, wave
10	004.060.00	Washer

Figure 97. Assistant's Touchpad

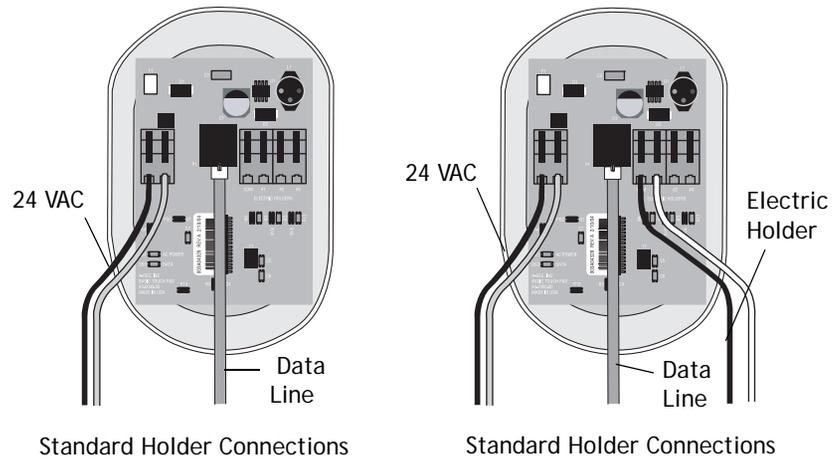
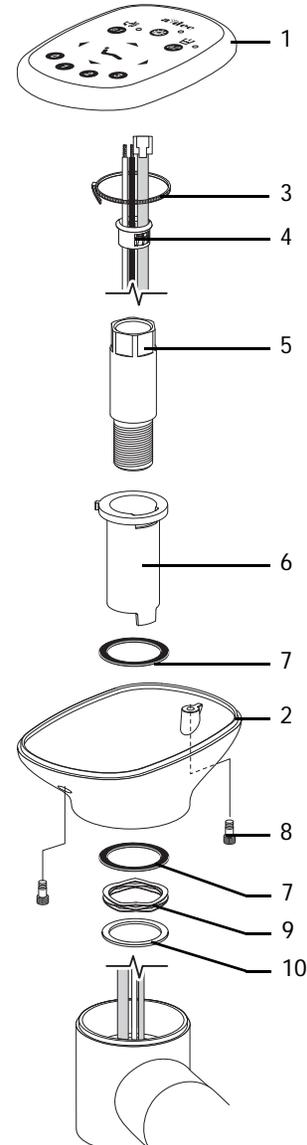


Figure 98. Electric Assistant's Touchpad Components



## Solids Collector

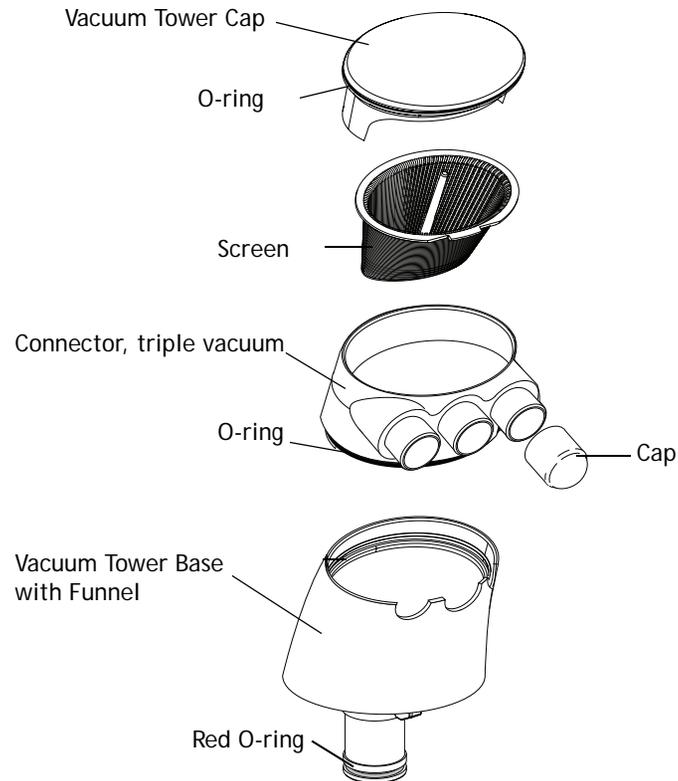
The solids collector screen prevents solids from entering the central vacuum system when the HVE or SE are used. If the vacuum system performance is less than optimal, verify that the screen has been replaced.



**CAUTION** Use appropriate gloves when handling contaminated parts.

1. Lift off the screen and cap, then twist off the triple vacuum connector.
2. Turn the vacuum tower base to face the back of the chair and lift up.

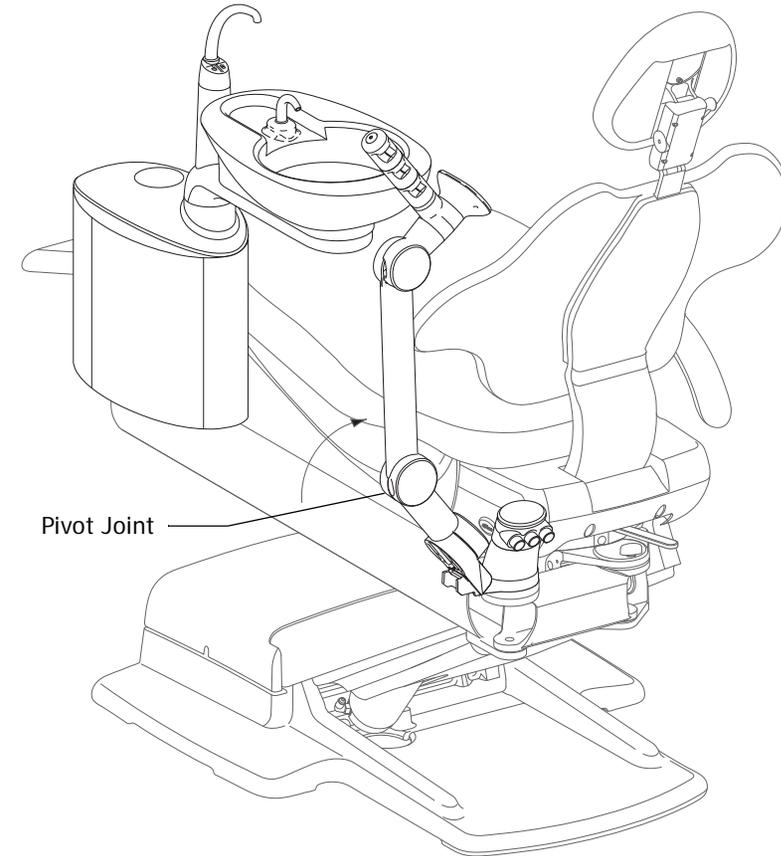
**Figure 99. Solids Collector Components**



## Tip-Up Feature

The pivot joint, located close to the support link, allows the entire arm to tip up, when it contacts an object.

**Figure 100. 551 Assistant's Arm Tip-Up Feature**



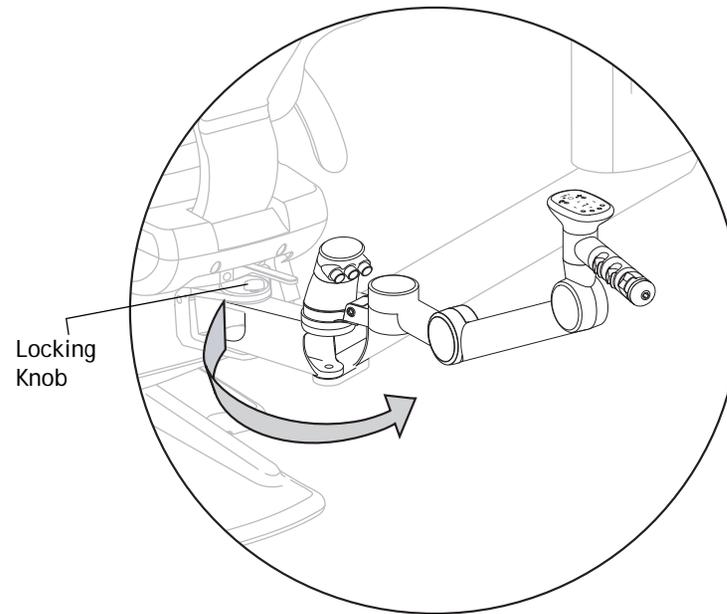
# Adjustments (551)

## Left or Right Conversion

The assistant's instrumentation can be easily positioned to the opposite side of the chair. To reposition the assistant's instrumentation:

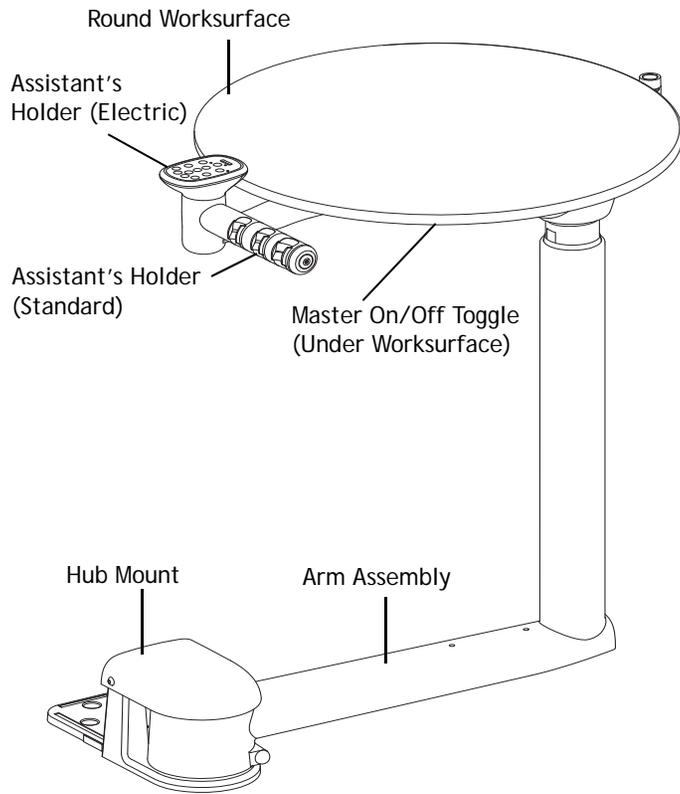
1. Loosen the support link locking knob located under the swivel brake handle.
2. Unsnap the support link cover, and reposition the arm to the opposite side. If the support side system includes a support center, tip up the assistant's arm so the support center can swing past it when repositioning the assistant's arm.
3. Reattach the support link cover; tighten the support link locking knob.

Figure 101. Reposition the Assistant's Arm



## Product Overview (545)

Figure 102. 545 Assistant's Instrumentation



## Solids Collector

The solids collector screen prevents solids from entering the central vacuum system when the HVE or SE is used. A regularly maintained solids collector is necessary for optimal performance of the vacuum system. If the vacuum system performance is less than optimal, verify that the screen has been replaced.

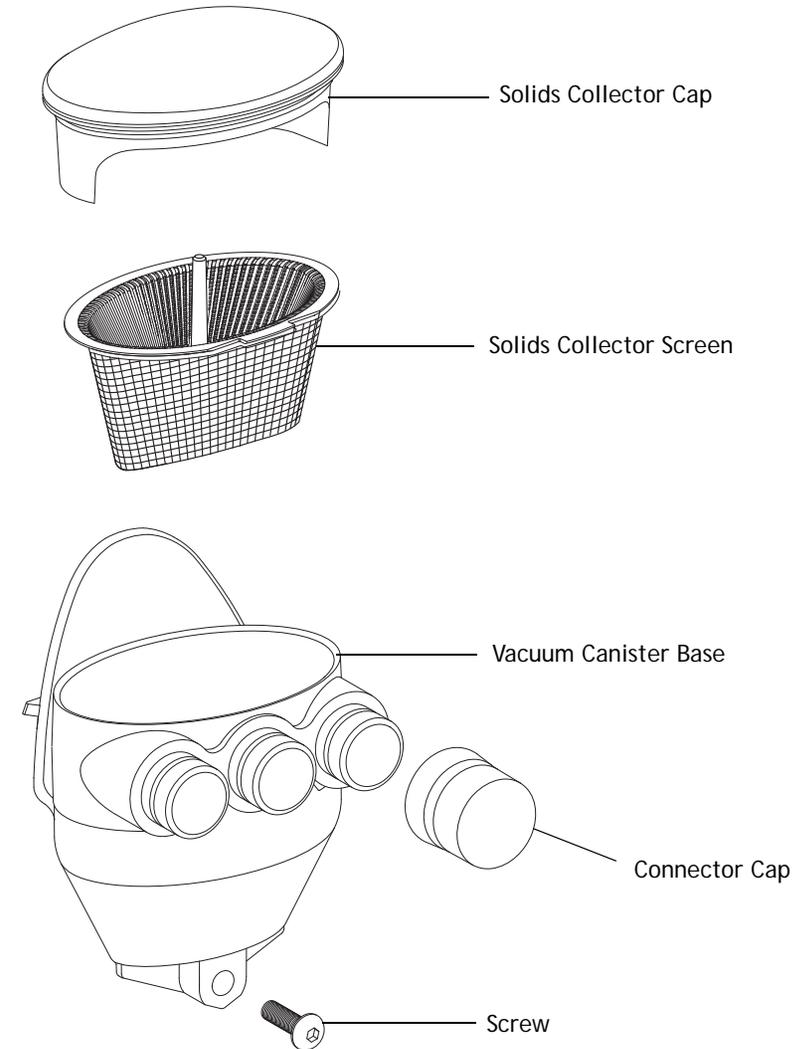


**CAUTION** Use appropriate gloves when handling contaminated parts.

### Remove Solids Collector and Replace 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 local regulations.
5. Insert new screen in the collector and replace the cap.

**Figure 103. Solids Collector**



## Leveling (545)

### Arm Assembly

#### Front-To-Back

1. Position the arm perpendicular to the cabinet. See Figure 104.



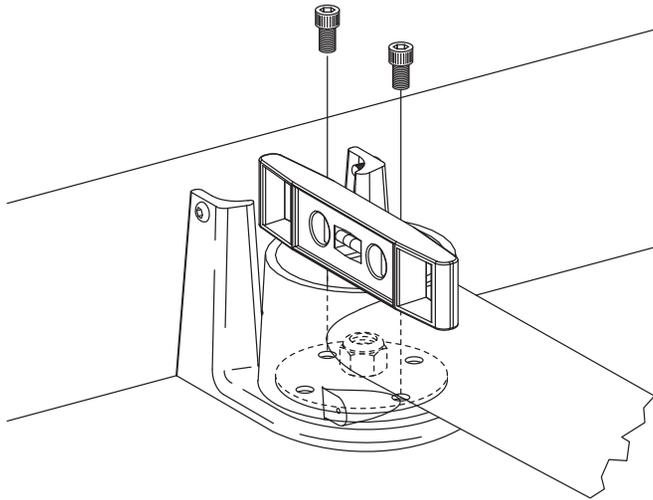
**NOTE** Make sure the arm assembly is in line with the worksurface and perpendicular to the cabinet before leveling

2. Place the level on the hub, parallel to the arm.
3. Loosen and tighten the mounting screws as necessary.



**TIP** The support arm balances on a pivot. To raise or lower the long side of the arm, adjust the screw nearest the cabinet. See Figure 106. Once the arm is level, tighten the second screw to hold the arm in place.

Figure 104. Leveling - Arm Assembly Leveling Front to Back



#### Side To Side

1. Position the arm parallel to the cabinet. See Figure 105.
2. Place level on the hub, parallel to the arm.
3. Loosen and tighten the mounting screws as necessary. See Figure 106.

Figure 105. Adjustment - Arm Assembly Leveling Side to Side

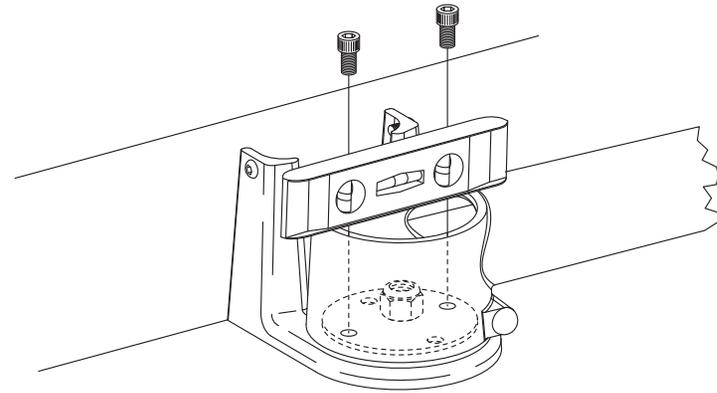
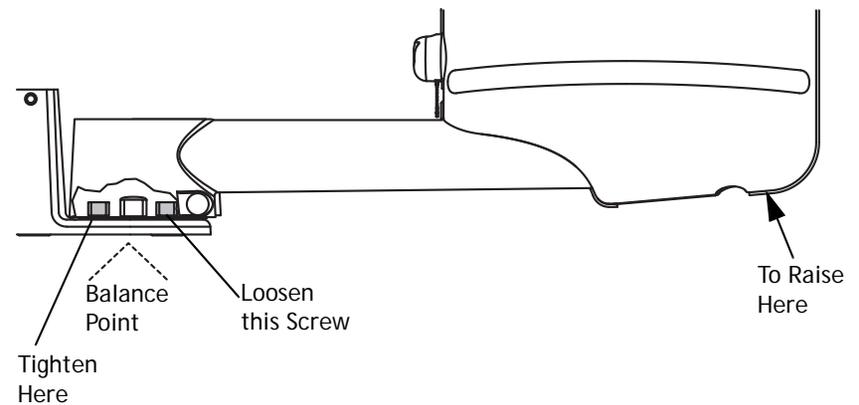


Figure 106. Level the Hub



## Worksurface

### Level Round Worksurface

To level the round worksurface, adjust the two set screws in the worksurface support housing until the surface is level. See Figure 107.



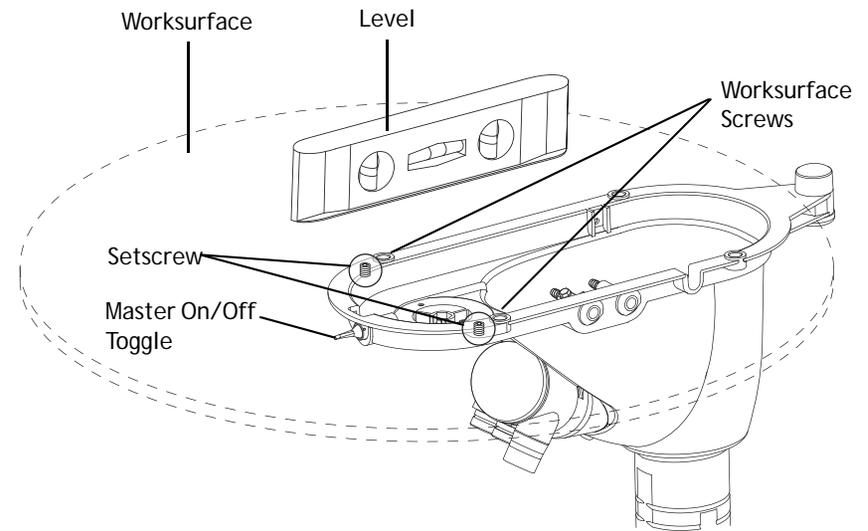
**NOTE** Ensure that the arm assembly is level before leveling the worksurface.

1. Place the worksurface arm in a typical working position and center a level on the round worksurface over the support housing. See Figure 107.
2. Loosen the worksurface screws on the side nearest the master on/off toggle.
3. Adjust the two setscrews in the worksurface support housing until the surface is level. Use a 1/8" hex key. See Figure 107.
4. Tighten the worksurface screws until the worksurface is secure.



**NOTE** Do not overtighten the worksurface screws, or the level may change.

Figure 107. Level Work Surface



## Adjustments (545)

### Worksurface Height

#### Worksurface and Instrumentation Arm Height

The A-dec 12 O'clock system has an arm you can adjust for efficient operation and comfort. To adjust the height of the worksurface or the instrumentation arm:

1. Lift the upper part of the vertical post.
2. Slide the height adjustment ring to the desired position.
3. Lower the vertical post onto the ring.



**NOTE** The height adjustment range for the worksurface is 2-1/2" (63.5 mm); for the doctor's instrumentation arm, 3" (76.2 mm).

Figure 108. Worksurface and Doctor's Instruments Height Adjustment - 545

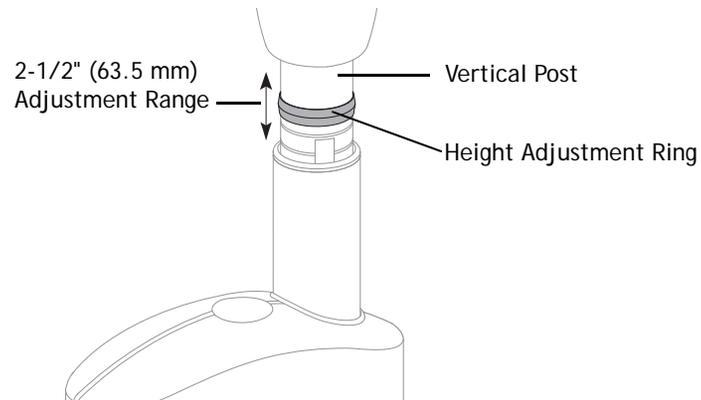
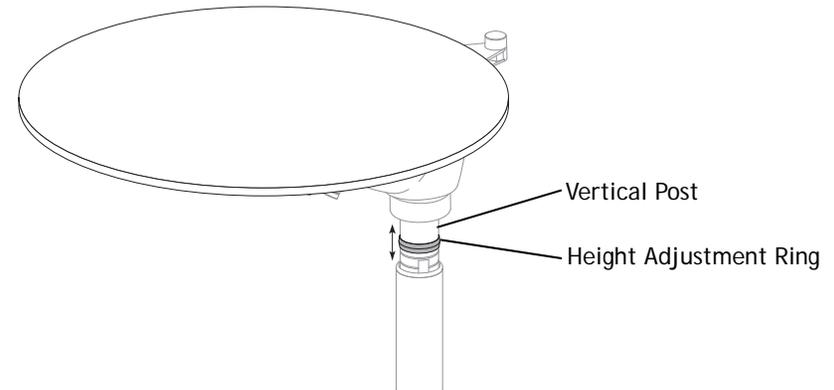


Figure 109. Worksurface Height Adjustment - 545



## Instrumentation Arm Positioning

The A-dec 500 instrumentation holders offer horizontal and vertical positioning. Each holder rotates for independent angle adjustment. See Figure 110.

### Assistant's Arm

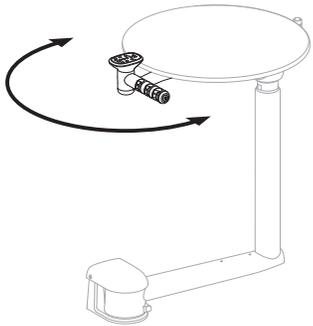
To adjust the assistant's arm tension:

1. Tighten or loosen the screw located under the assistant's arm.
2. Check the adjustment. See Figure 111.

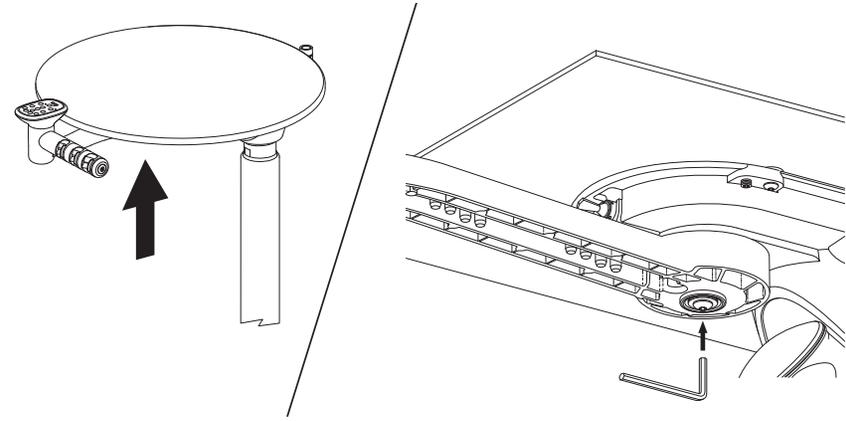
To position individual holders: You can customize the position of each holder on the holder assembly arm:

1. Pull holder slightly away from the adjacent holder.
2. Twist to the desired position and release. See Figure 112.

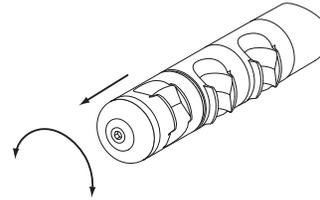
**Figure 110. Instrumentation Arm Positioning**



**Figure 111. Assistant's Arm Adjustment**



**Figure 112. Instrument Holder Positioning**



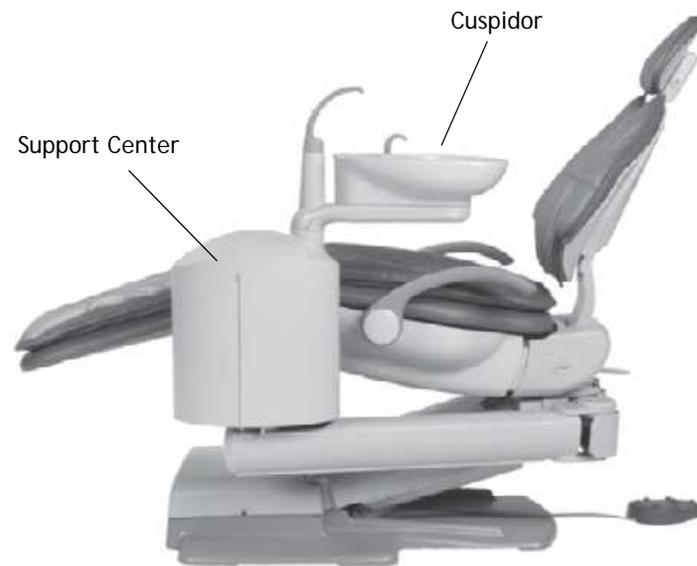
Holder positions rotate independently



## CUSPIDOR

The cuspidor is installed on the lower support arm. The support side-mounted water bottle and the cuspidor circuit board are inside the support center. This section provides information related to servicing, maintenance and adjustments for the cuspidor.

**Figure 113. 561 Cuspidor and Support Center**



# Product Overview

The support center houses the cuspidor's fill/rinse manifold, cuspidor circuit board, and support side water bottle. The cuspidor is preset with an automatic timed cupfill and bowl rinse. You can program both the cupfill and the bowl rinse functions.

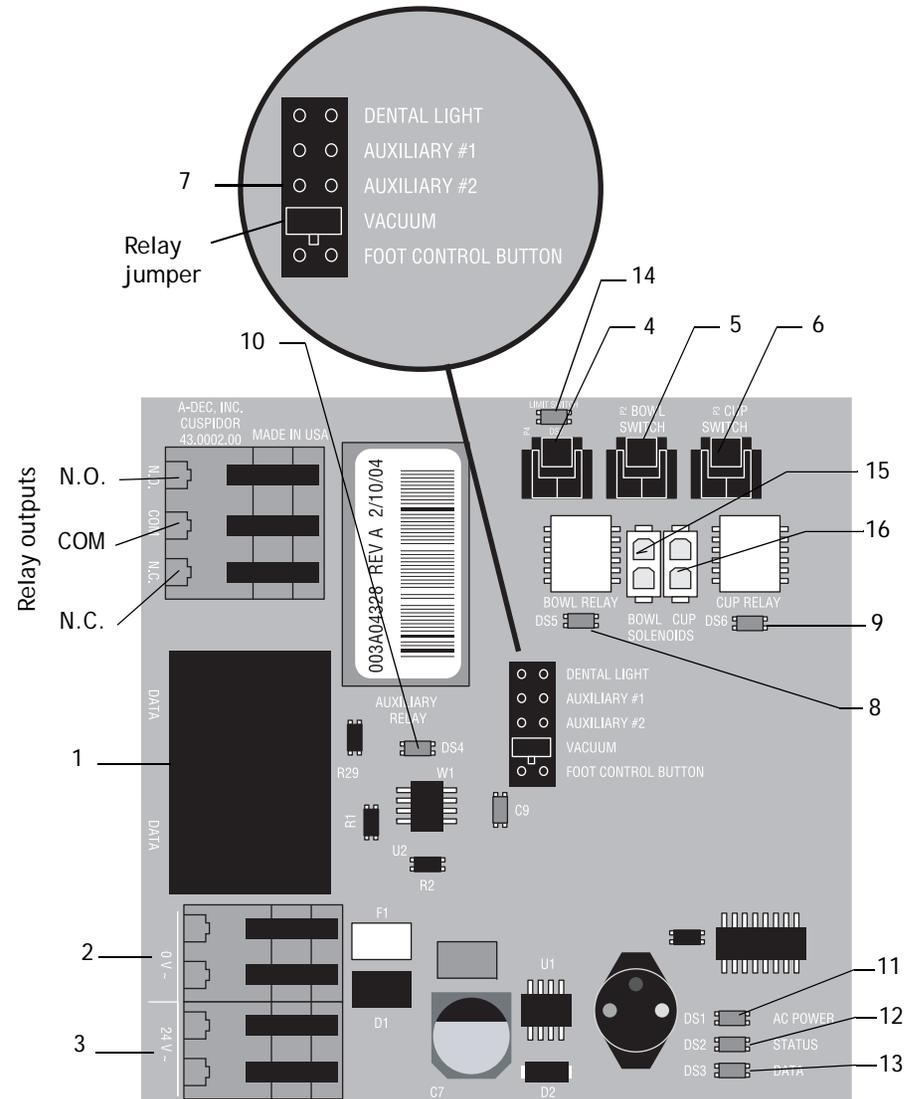
## Cuspidor Circuit Board Components

Part Number: 90.1079.00

The cuspidor circuit board controls the bowl rinse and cupfill solenoids. The LEDs on the circuit board indicate the status of the cuspidor and can be used for troubleshooting. The circuit board is also equipped with a built-in A-dec relay. The built-in relay functions exactly like the A-dec relay module.

Item	Description
1	P5 - DCS terminals
2	J1 - 0 VAC terminal strip
3	J1 - 24VAC 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

Figure 114. Cuspidor Circuit Board Components



# Service, Usage, and Adjustments

## Cupfill Functions

- A quick press of the cupfill button activates a timed operation.
- A long press activates a manual operation.



**NOTE** The cupfill will only run a maximum of two minutes in the manual operation mode.

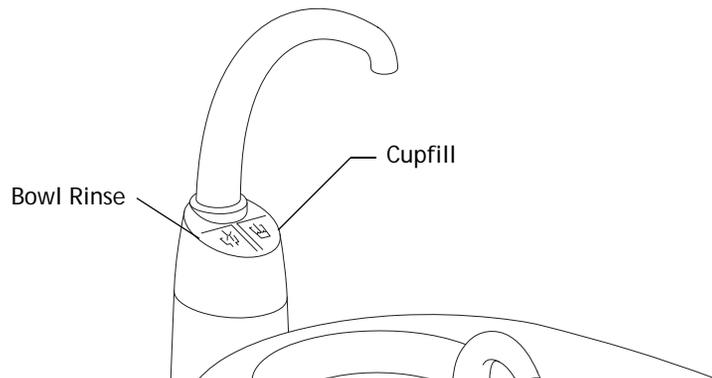
## Bowl Rinse Functions

- A quick press of the bowl rinse button activates a timed operation.
- A long press activates the manual operation.
- Two presses in less than two seconds, activates the continuous operation. Press the bowl rinse button once to stop the continuous operation.



**NOTE** There is no maximum time limit for this function.

Figure 115. Cuspidor Buttons for Cupfill and Bowl Rinse

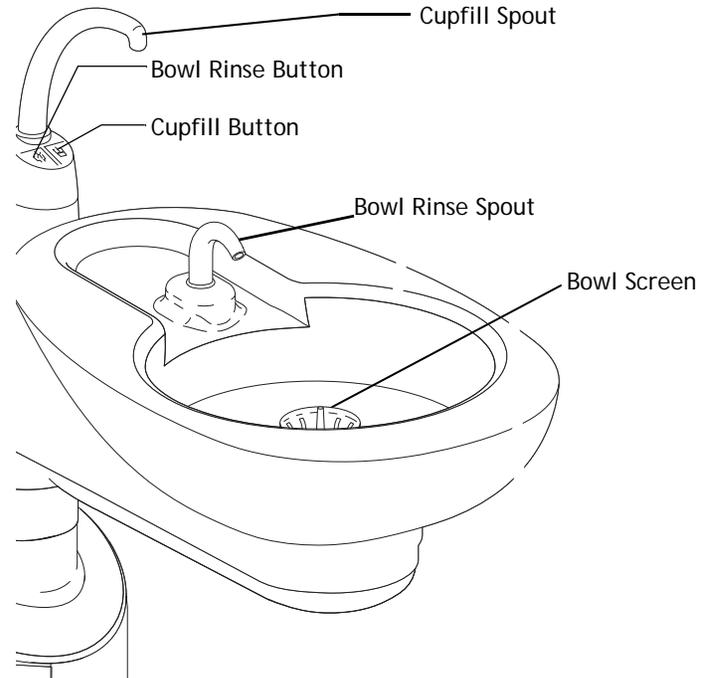


## Cupfill and Bowl Rinse Timing

Cupfill and bowl rinse functions can be reprogrammed using a touchpad or footswitch program button and the appropriate button on the cuspidor.

1. Press the Program button. One beep indicates programming mode is ready.
2. Press and hold the Cupfill or Bowl Rinse button for the desired amount of time.
3. Release the button. Three beeps indicate the programmed time has been changed.

Figure 116. Cuspidor Programming Features





# FLOOR BOX

This section provides information related to servicing, maintenance and adjustments. For information on service parts, see the *Genuine A-dec Service Parts Catalog* (p/n 85.5000.00) or contact A-dec customer service.

## Product Overview

The floor box contains the air and water manual shutoff valves, filters, air and water regulators, pressure pre-regulator, vacuum and gravity drains.

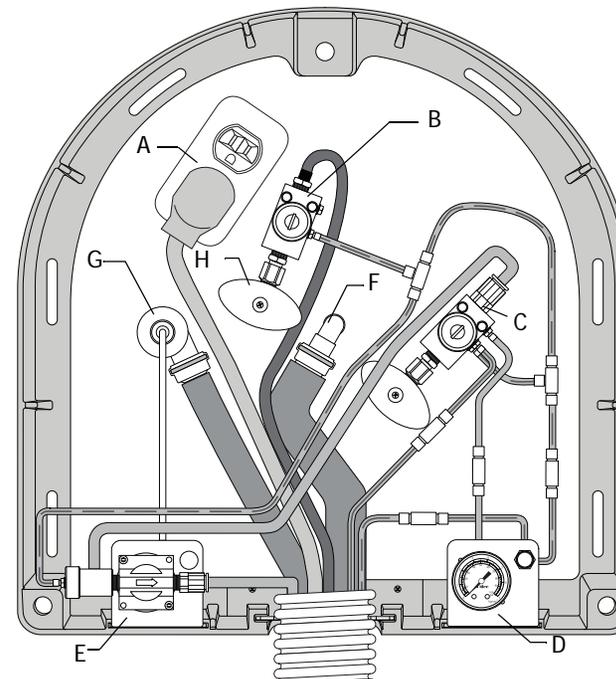
### Air and Water Manual Shutoff Valves

Shutoff valves supply the air and water to the unit. To prevent leaks, these valves should remain fully open (turned counterclockwise) except while the unit is being serviced.

### Gauge and Pre-Regulator

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

**Figure 117. Identification of the Floor Box Utilities**



Item	Description	Item	Description
A	Electrical Duplex Outlet	E	Moisture Separator (optional)
B	Water Filter Regulator (cuspidor only)	F	Vacuum Drain
C	Air Filter Regulator	G	Cuspidor Drain
D	Gauge and Pre-regulator Assembly	H	Manual Shutoff Valves

# Service, Usage, and Adjustments

## Filter Element

A clogged filter reduces the amount of air and water pressure available to the unit. To replace:

1. Move the master on/off toggle to the off position.
2. Close the manual shutoff valves.
3. Bleed the system of air and water pressure by operating the syringe buttons until air and water no longer flow.
4. Remove the filter housing from the air and/or water regulator assembly with a flat blade screwdriver.
5. Replace the filter if it is visibly clogged or discolored.
6. Install the new filter with the beveled edge toward the manifold.

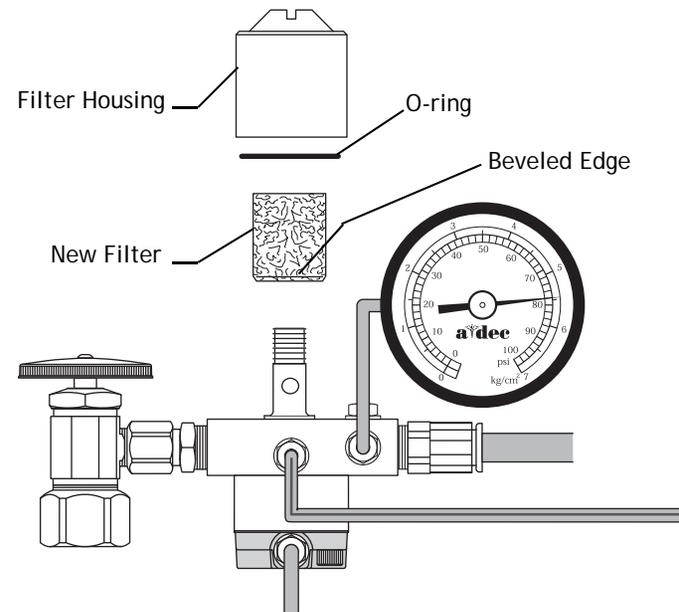


**CAUTION** Be sure to install the new filter with the beveled side toward the manifold. The unit may not work properly if installed incorrectly.



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

Figure 118. Replacing the Filter



## SUPPORT SIDE FEATURES

This section of the service guide contains service information for the A-dec 500 Support Side System. This section provides information related to servicing, maintenance, and adjustments. For information on service parts, see the *Genuine A-dec Service Parts Catalog* (p/n 85.5000.00) or contact A-dec customer service.

**Figure 119. Support Side Features**

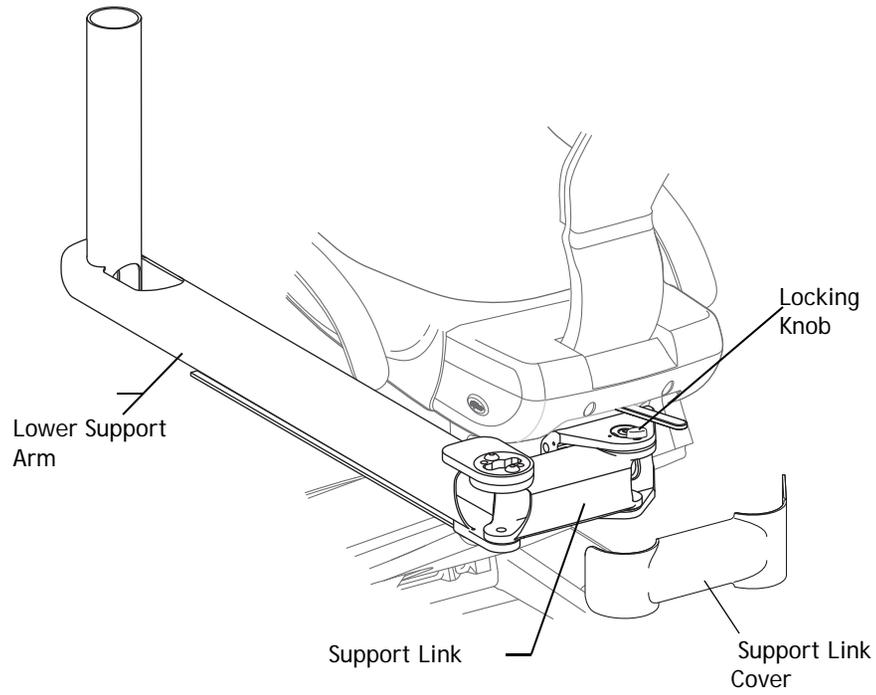


## Product Overview

### Components

The A-dec 500 support side system includes the support link and the lower support arm. The support link is the hub for all modules that mount off the back of the chair. The A-dec 561 cuspidor, monitor mount, and A-dec 571 dental light require both a support link and a lower support arm. The 551 assistant's instrumentation requires only a support link.

**Figure 120. Identifying the Support Link and Lower Support Arm**



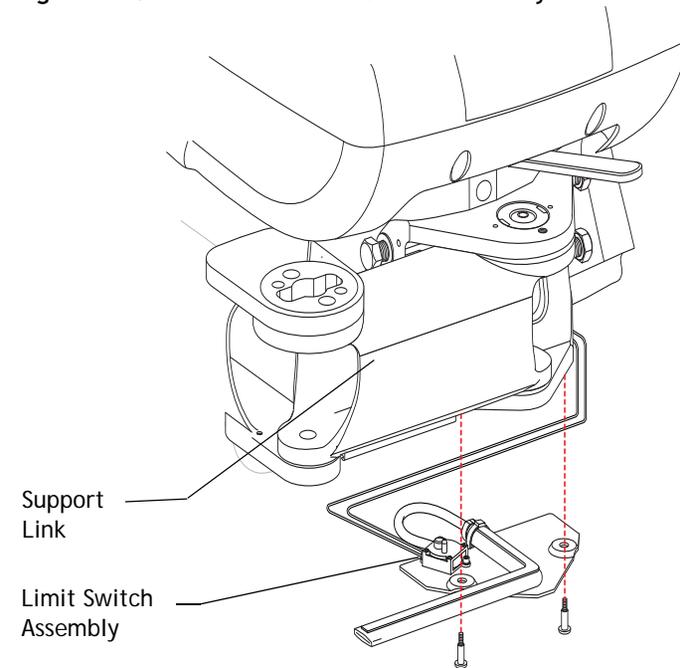
### Limit Switch Operation

When pressed, the support side limit switch stops chair movement immediately. Be sure to power off the chair and disconnect it from its power source before replacing the limit switch.

### Bump-Up Feature

The chair moves up approximately 1" if the chair is moving down when the switch is activated.

**Figure 121. Remove the Limit Switch Assembly**



# Adjustments/Maintenance

## Leveling

The support link mounts with four bolts to the back of the chair. Two dowel pins mount a leveling bar to the back of the chair. The leveling bar levels the support link and lower support arm. See Figure 123 on page 96 for location of leveling bar.

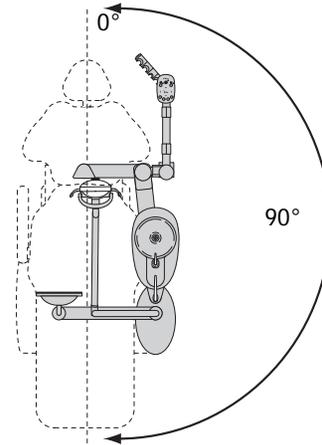
## To level the support link and lower support:

To rotate the support side modules up to 90° right or left of the chair, loosen the locking knob on the support link.

Level the support link and lower support arm by adjusting the leveling bar in the support link assembly. Note where the support system will be positioned before leveling:

- If the support system is used both in a left and right positions, level the equipment with the modules positioned 90° to the back of the chair.
- If the support system is used in a stationary position, level the equipment with the modules in a normal operating position.

**Figure 122. Positioning Support Side Modules for Leveling**



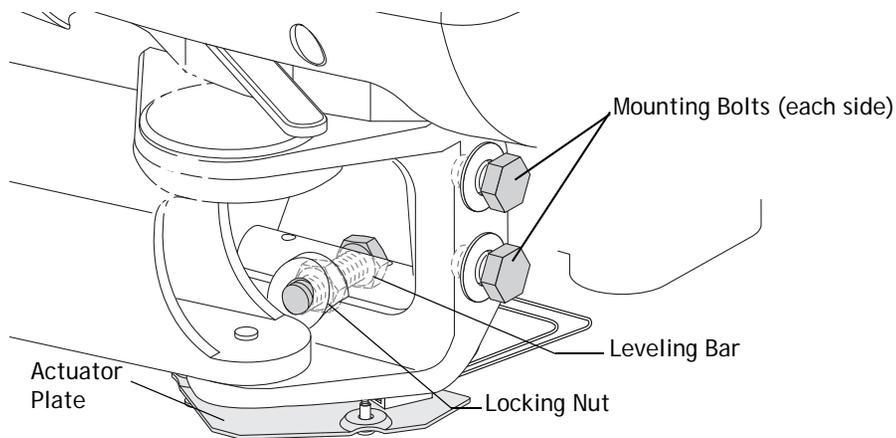
## Support Link and Lower Support Arm Leveling



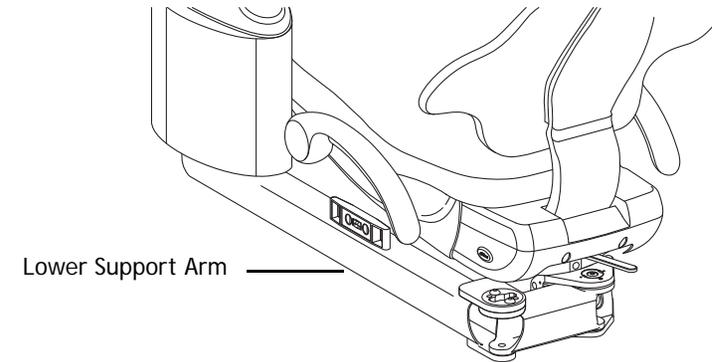
**NOTE** The limit switch assembly may have to be removed. Be sure to power off the chair and disconnect it from its power source before replacing the limit switch.

1. Loosen the two stand off screws securing the actuator plate. Allow the plate to hang free.
2. Loosen the four mounting bolts on the support link.
3. Loosen the locking nut.
4. Place a level parallel on the lower support arm, and adjust the leveling bar until the lower support arm is level.
5. Tighten the locking nut against the leveling bar (see Figure 123).
6. Tighten the four mounting bolts (see Figure 123) as tight as possible (65 ft -lb of torque).
7. Reattach the actuator plate using the two stand off screws.

**Figure 123. Tighten the Locking Nut Against the Leveling Bar**



**Figure 124. Place Level Parallel on the Lower Support Arm**





## CLINICAL PRODUCTS

The A-dec 500 delivery system was designed as a platform for integrating accessory devices like the electric micromotor, intraoral camera, ultrasonic instruments, and curing light. Each accessory has a place on the delivery system structural platform and communicates with the data communication system. A-dec and the accessory manufacturers jointly engineered these products for reliability, serviceability and ease of installation.

### Contents

- EA-50LT and EA-51LT Electric Micromotor, page 98
- O-ring Replacement, page 98
- Bushing Replacement, page 98
- EA-51LT Bulb Replacement, page 100

## EA-50LT and EA-51LT Electric Micromotor

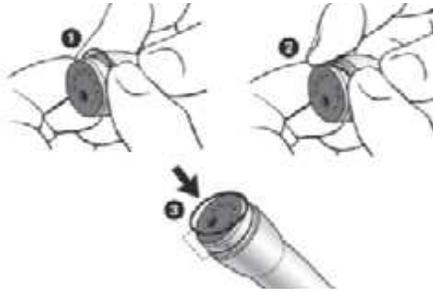
### O-ring Replacement

Part Number: 54.0200.00

#### Micromotor Tubing Terminal O-ring Replacement

1. Squeeze the O-ring firmly between thumb and forefinger to form a loop.
2. Slide the O-ring up and off the tubing terminal.
3. Slide on the new O-ring.

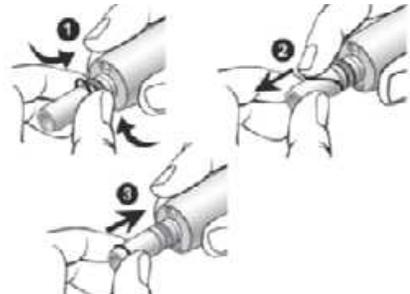
Figure 125. Steps to Remove and Replace the O-ring on the Tubing Terminal



#### Micromotor O-ring Replacement

1. Squeeze an O-ring firmly between thumb and forefinger to form a loop.
2. Slide the O-ring up and off the micromotor.
3. Slide on a new O-ring and position it in the groove.
4. Change all O-rings at the same time.

Figure 126. Steps to Replace the O-rings on the Micromotor



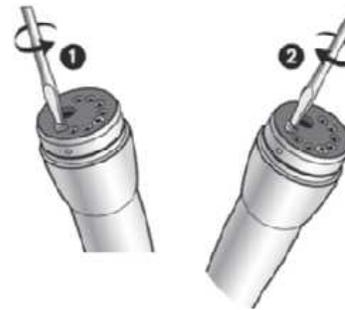
### Bushing Replacement

Part Number: 54.0198.00

#### Micromotor Tubing Insert Bushing Replacement

1. Unscrew and remove the threaded bushing (see Figure 127).
2. Screw the new threaded bushing into the tubing terminal. Don't over tighten.

Figure 127. Steps to Remove and Replace the Bushing



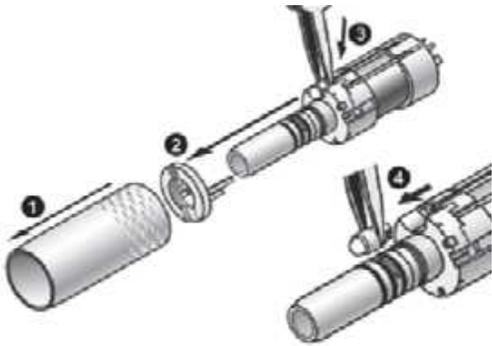
## EA-50LT Bulb Replacement



**CAUTION** Remove the micromotor from the handpiece tubing to change and dispose of the defective bulb.

1. Remove the micromotor sheath by sliding off in the direction indicated.
2. Remove the locking ring.
3. Position the tweezers between the bulb and the bulb holder.
4. Slide out the bulb.

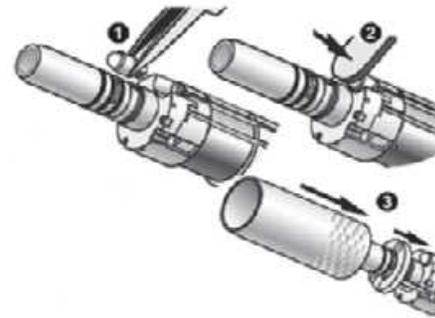
Figure 128. Steps to Remove the Bulb from the EA-50LT



## Replace Bulb

1. Hold the new bulb firmly in the tweezers with the flat side facing the micromotor and the dot facing out.
2. Insert the bulb into the bulb holder, and push into place with the tweezers' handle.
3. Replace the locking ring and micromotor sheath

Figure 129. Steps to Replace the Bulb in the EA-50LT



## EA-51LT Bulb Replacement

### Remove Bulb



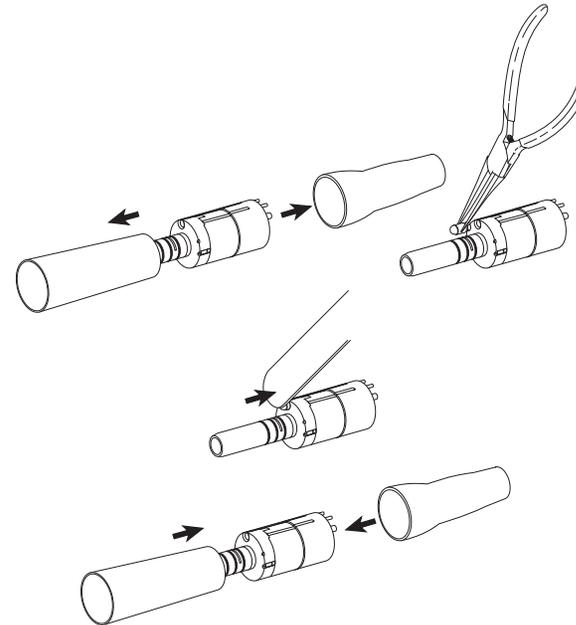
**CAUTION** Remove the motor from the handpiece tubing to change the bulb.

1. Remove the motor sheath by sliding off in the direction indicated.
2. Position the pliers between the bulb and the bulb holder.
3. Slide out the bulb carefully.

### Replace Bulb

1. Hold the new bulb firmly in the pliers with the flat side facing the motor and the dot facing out.
2. Insert the bulb into the holder; push into place with the pliers handle.
3. Replace the motor sheath.

**Figure 130. Steps to Remove and Replace the Bulb from the EA-51LT**



## ICV

This section provides information related to servicing, maintenance and adjustments. For information on service parts, see the *Genuine A-dec Service Parts Catalog* (85.5000.00) or contact A-dec customer service.

**Figure 131.** ICV



## Product Overview (ICV)

ICV helps to keep the vacuum lines clear of debris using the dental office's vacuum lines. A timer in the system automatically shuts off the flow of the cleaner after one dose enters the vacuum system. (A dose is predetermined from the manufacturer of the cleaner). Bleach and water are not recommended due to the reaction of bleach on the HVE and saliva ejector valve body and o-rings. Contact the vacuum pump manufacturer for recommended cleaning solutions.

## Vacuum Requirements

- Wet Vacuum Pump 10+/- 2" of Hg at 9 SCFM (34 +/- 7 kpa at 255 sl/min)
- Dry/Semi-dry 4.5+/- 1" of Hg at 12 SCFM (16 +/- 3.5 kpa at 340 sl/min)



**NOTE** Standard cubic foot per minute (SCFM). Standard liter per minute (sl/min).

**Figure 132. ICV Components**

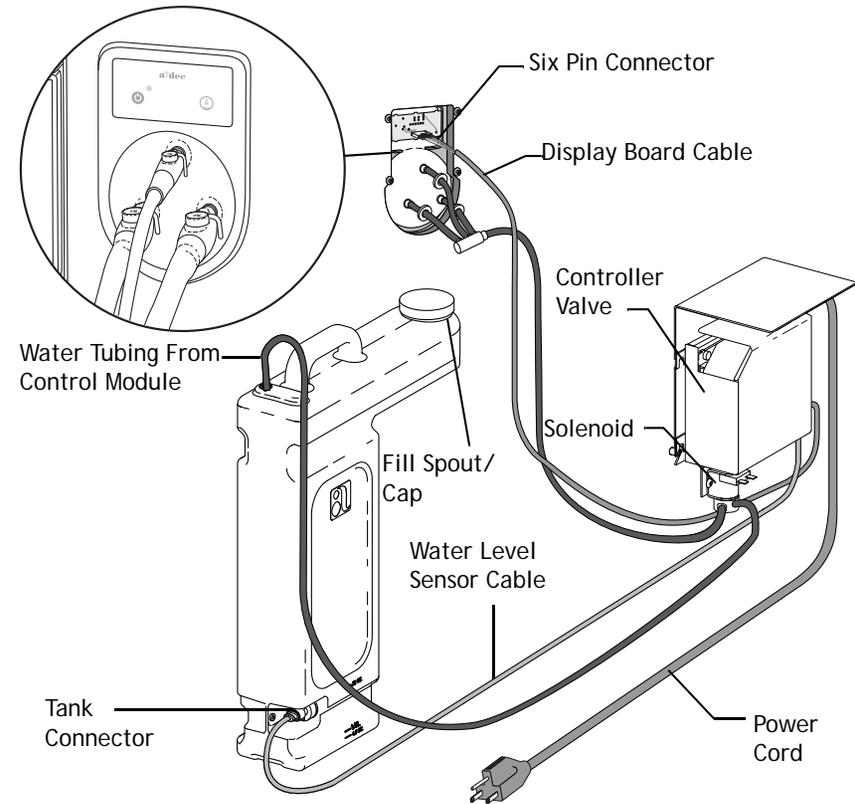
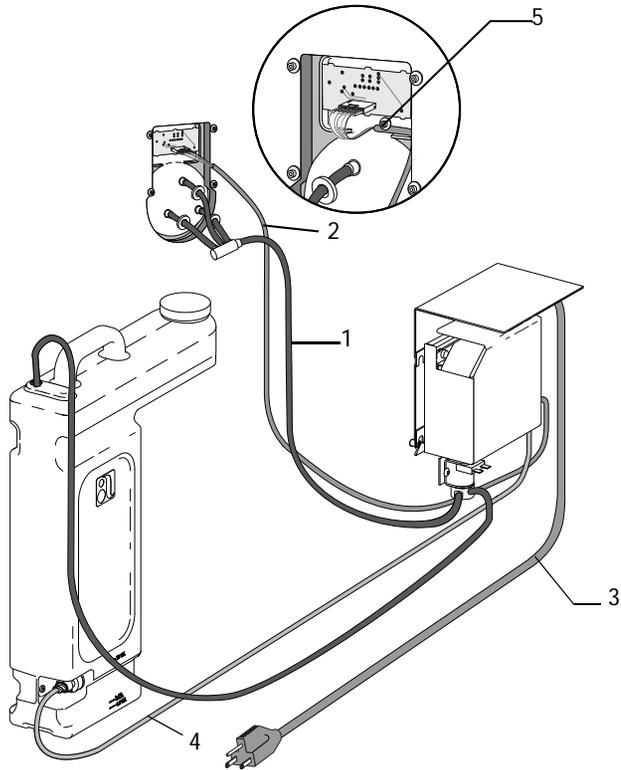


Figure 133. ICV Tubing and Cables

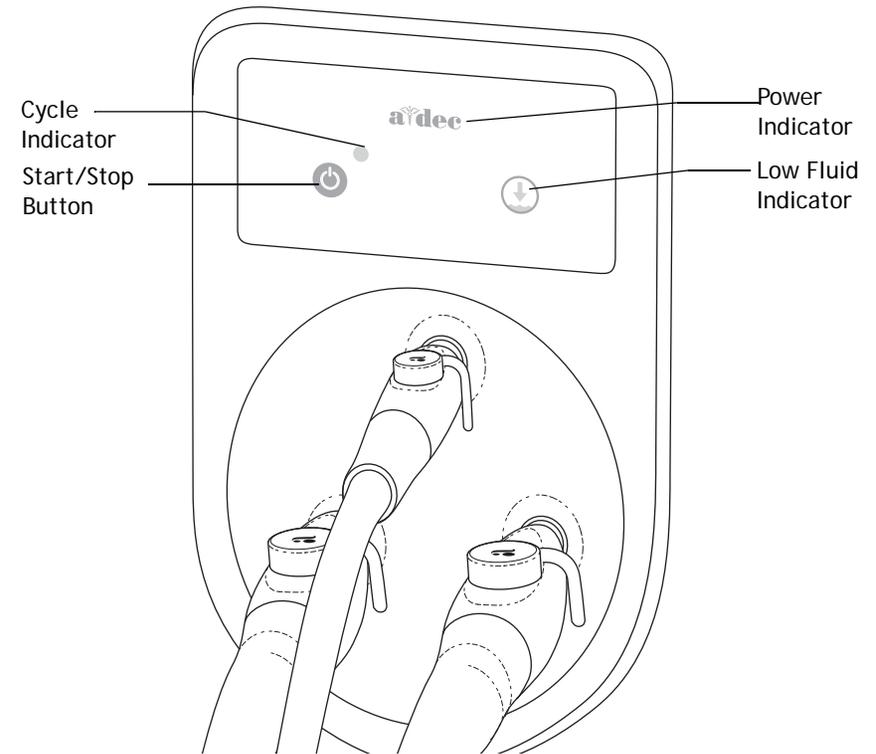


Item	Description
1	Tubing, blue, 5/16" Tubing same throughout; cut to length.
2	Cable assembly, display circuit board 120"
3	Power cord assembly, 120V Power cord assembly, 220V
4	Float switch cable assembly
5	Used for strain relief

## ICV Display Pane

The ICV display panel shows the cycle status and fluid level at any given time. The vacuum pump must be on for ICV operation.

Figure 134. ICV Display Panel



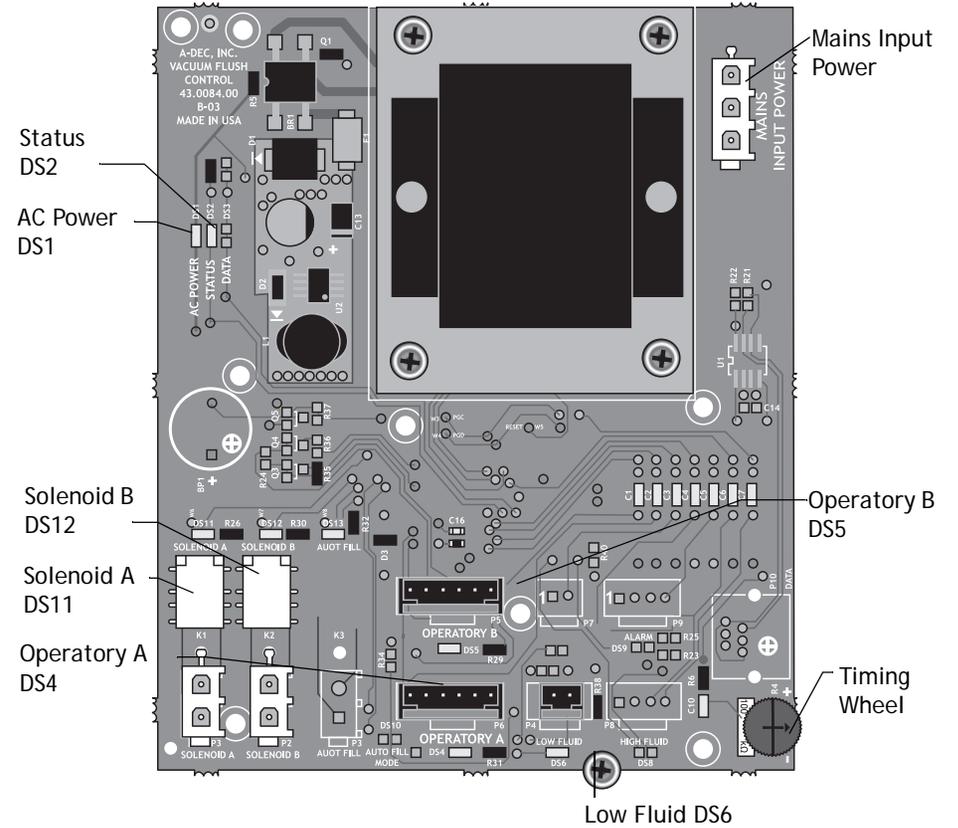
# Service, Usage, and Adjustments (ICV)

## ICV Control Circuit Board

Table 9. ICV Control Circuit Board Functions

LED	ICV Control Circuit Board
AC Power LED - DS1	Off = No mains voltage, open circuit breaker P11 not plugged in Green Steady = Mains voltage present
Status LED - DS2	Off = System is not functioning, no power to circuit board, or circuit board has failed Green Steady = Normal condition
Operator A - DS4	Off = Operator A is not running Yellow Steady = Operator A is running
Operator B - DS5	Off = Operator B is not running Yellow Steady = Operator B is running
Low Fluid - DS6	Off = The fluid switch is closed (reservoir has sufficient fluid) Red Steady = The low fluid switch is unplugged or open. (reservoir low on fluid)
Solenoid A - DS11	Off = Operator A solenoid is off Yellow Steady = Operator A solenoid is on
Solenoid B - DS12	Off = Operator B solenoid is off Yellow Steady = Operator B solenoid is on

Figure 135. ICV Control Circuit Board

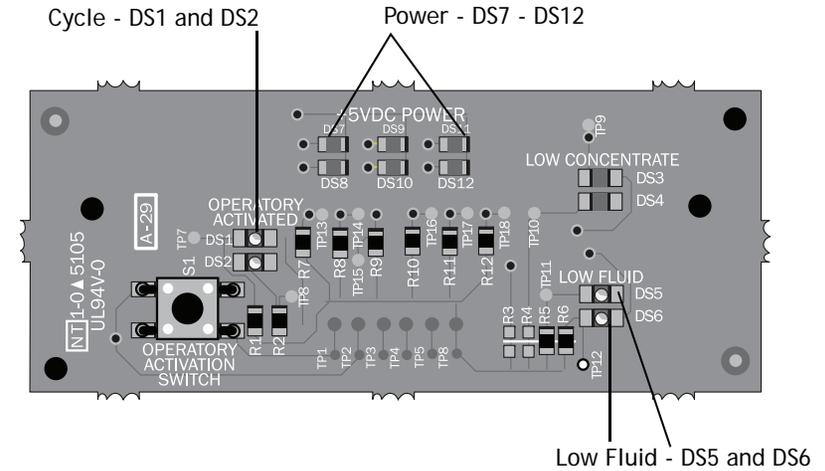


# ICV Display Circuit Board

Table 10. ICV Display Circuit Board

LED	ICV Display Circuit Board
Cycle - DS1 and DS2	Off = Solenoid is closed Yellow Steady = Solenoid is open
Low fluid - DS5 and DS6	Off = The low fluid switch is closed; reservoir has sufficient fluid Red Steady = The low fluid switch is unplugged or open (reservoir low on fluid)
Power - DS7 - DS12	Off = ICV control board is off, P1 disconnected from display board, respective control connector (P4 or P5) is disconnected Blue Steady = Power is present to display circuit board

Figure 136. ICV Display Circuit Board



## Adjustments

### Cycle Time Test

1. Check the front panel. The A-dec blue logo should be illuminated. The amber low fluid indicator light should be on if the tank is empty, low or disconnected.
2. Test and adjust the cycle time:
  - (1) Disconnect the tubing and sensor from the tank; remove the tank and fill with three liters of water (three tick marks on the tank).
  - (2) Reinstall the tank and plug in the tubing and sensor. The low fluid indicator light should turn off.
  - (3) Place one or more vacuum tubings on the ICV connectors and open the valves.



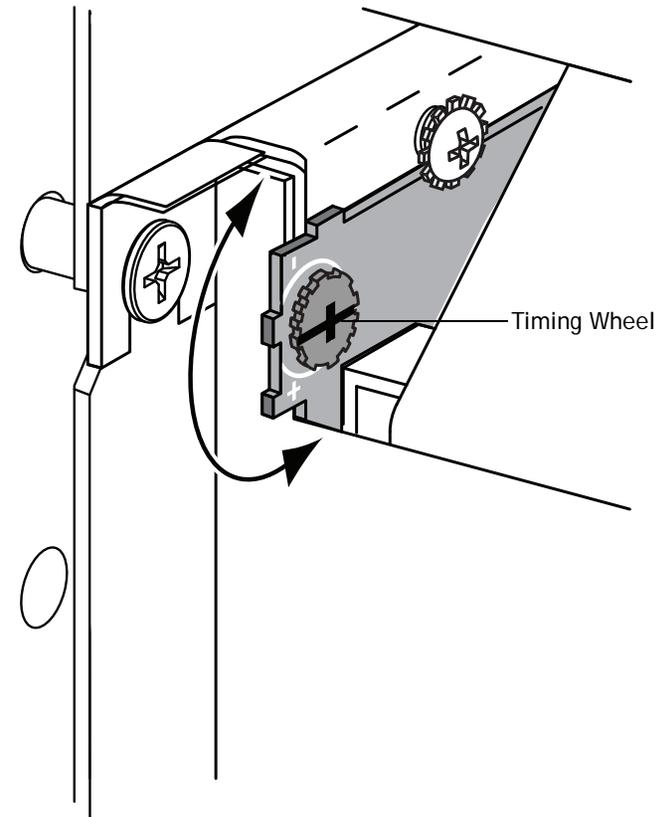
**CAUTION** Once activated, the normal operation of the ICV requires a minimum of one tubing attached with the valve open.

3. Press the Start/Stop button and time the length of the cycle.

### Cycle Time Adjustment

The time is adjustable from 20 to 150 seconds. Recalibrate the cycle time by adjusting the timing wheel on the control module (see Figure 137). Adjust the time so that one dose of fluid is removed from the tank per cycle. A dose is predetermined from the manufacturer of the cleaner. Re-time if necessary.

Figure 137. Adjust Timing



# TROUBLESHOOTING

This section contains tips for troubleshooting common problems.

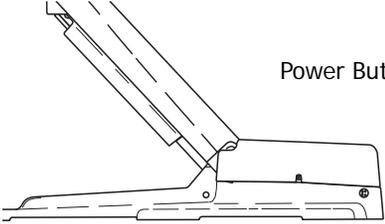
- To effectively diagnose and repair problems: Define the problem as precisely as possible. What happens when the problem occurs. Is it a problem with the dental unit air, water or is it electrical? Is it user-related?
- Gather information: Define the details of the problem and air, water or electrical system involved. When did the problem occur? Did anything change? Is the problem reproducible? Does it happen intermittently or all the time?
- Try to remove variables by simplifying the issue into smaller pieces, until the piece is small enough that you can more easily find a solution. For example: disconnecting the data cables and footswitch from the chair circuit board permits you to use the circuit board test points to verify that the chair circuit board functions properly on its own.

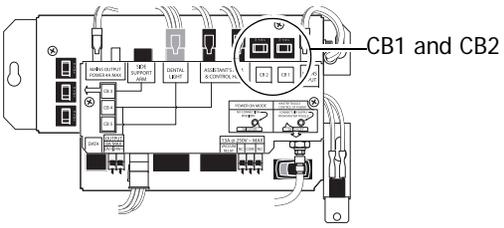
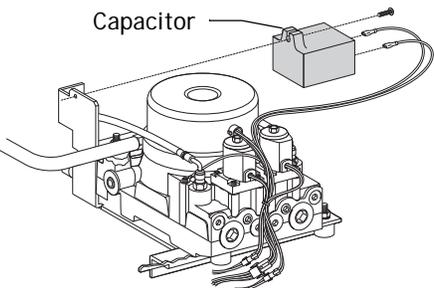
## Contents

- Dental Chair, page 108
- Delivery Systems, page 114
- Circuit Board Troubleshooting and LED Diagnostics, page 122
- Touchpad Diagnostics, page 123
- 500 Deluxe Touchpad Help Messages, page 126
- Cuspidor, page 139
- Floor Box, page 145
- Clinical Products, page 146
- ICV, page 156

## Dental Chair

This table contains tips and troubleshooting information to assist in diagnosing chair problems. The information in this section is not intended to cover every situation, but does include the most common problems that you may encounter. Refer to on pages 11-13 for information on LEDs for the chair circuit board. You will need this information as you complete these procedures.

Problem	Possible Cause	Action
No power to chair or unit. Office still has power.	The chair is unplugged.	<ol style="list-style-type: none"> <li>1. Verify power is available at the outlet.</li> <li>2. Plug chair in to power source.</li> </ol>
	The power button is in off position.	Press in power button.
 <p>The diagram shows a side view of the dental chair's control panel. A rectangular button is located on the panel, with a small square symbol on its top surface. A label 'Power Button' with a leader line points to this button.</p>		
	No pilot air to power supply.	<ol style="list-style-type: none"> <li>1. Check air regulator pressure gauge for 80 psi.</li> <li>2. Verify master on/off toggle is in the on position.</li> <li>3. Verify pilot air is connected to the power supply and air manual shutoff valve is fully open.</li> </ol>

Problem	Possible Cause	Action
No power to chair or unit. Office still has power.	Power supply circuit breaker CB1 or CB2 has tripped.	<ol style="list-style-type: none"> <li>1. Check circuit breaker and reset.</li> <li>2. If the circuit breaker trips again:               <ol style="list-style-type: none"> <li>(1) disconnect all power cables, including the chair circuit breaker connector P4, from the power supply.</li> <li>(2) Reset the circuit breaker.</li> <li>(3) Reconnect the power cables one at a time observing which one causes the circuit breaker to trip.</li> <li>(4) Identify the wiring problem circuit, and repair or replace as needed.</li> </ol> </li> </ol>
		
	Power supply has failed	If circuit breaker trips with all output cables disconnected, replace the power supply.
No base and back up function. The motor relay clicks. Base and back up LEDs (DS9 or DS11) turn on. The chair base and back down functions work.	Disconnected capacitor.	<ol style="list-style-type: none"> <li>1. Verify the base up or back up relay clicks and the LED (DS9 or DS11) on the chair circuit board is illuminated.</li> <li>2. Check capacitor connections.</li> <li>3. Turn power off if disconnected.</li> <li>4. Reconnect cables.</li> </ol> <p><b>WARNING</b> Discharge the capacitor with an insulated screwdriver across the connectors before disconnecting or connecting the cables.</p>
		
	Failed capacitor.	Replace the capacitor with one of correct voltage.

Problem	Possible Cause	Action
No base or back down. Relay clicks and DS12 LED illuminates.	Failed base down solenoid coil.	<ol style="list-style-type: none"> <li>1. Check for magnetic pull while operating base or back down function.</li> <li>2. Check for correct resistance value at solenoid connector: <ul style="list-style-type: none"> <li>• 100 - 120 VAC, 177 Ohms <math>\pm</math> 18 Ohms</li> <li>• 220 - 240 VAC, 845 Ohms <math>\pm</math> 85 Ohms</li> </ul> </li> <li>3. Replace solenoid.</li> </ol> <p><b>WARNING</b> Depressurize system before replacing the failed solenoid. To operate chair to full Base Down and Back Down, switch the good solenoid coil for the failed one and operate the function until full down position is reached.</p>
Back down is pressed, base moves or base down is pressed, back moves.	The base and back solenoid connectors are switched.	Connect the solenoids correctly.
Base or back moves up for only one second, no automatic buttons work (limp-along feature). DS5 - (back) not illuminated DS6 - (base) not illuminated	The potentiometer for that movement is disconnected.	<ol style="list-style-type: none"> <li>1. Check potentiometer connections to the chair circuit board.</li> <li>2. Reconnect if disconnected.</li> </ol>
	Failed potentiometer.	<ol style="list-style-type: none"> <li>1. Check for resistance. The resistance should be 10K ohms +/- 1500 ohms.</li> <li>2. Replace the potentiometer as a complete assembly.</li> </ol>
Base Down and programmed positions do not work, but the chair back functions. A-dec status icon is flashing. DS4 red LED on the chair circuit board is illuminated.	Limit switch for chair is activated.	Check for obstruction under chair and remove.
	Limit switch for chair has failed.	<p>Disconnect the chair limit switch connector at the chair circuit board and insert a jumper.</p> <ul style="list-style-type: none"> <li>• If the red LED (DS4) goes out and the chair base down and program positions work, replace limit switch assembly.</li> <li>• If the red LED (DS4) stays lit, replace the chair circuit board.</li> </ul>
	Support side arm limit switch is activated.	Check for obstruction under support side arm and remove.
	Support side arm limit switch has failed.	<p>Disconnect the support side limit switch wiring from the chair limit switch connector and insert a jumper.</p> <ul style="list-style-type: none"> <li>• If the red LED (DS4) goes out and the chair works, replace the side support limit switch.</li> <li>• If the red LED (DS4) stays lit, then replace the chair limit switch assembly.</li> </ul>

Problem	Possible Cause	Action
No chair movement from a touchpad. The touchpad status A-dec logo icon and chair circuit board status LED (DS2) are illuminated.	Touchpad DCS is interrupted.	<ol style="list-style-type: none"> <li>1. Verify the chair operates with the footswitch. If a footswitch is not installed, use the chair circuit board test points.</li> <li>2. Disconnect all data lines from the chair circuit board except the delivery circuit board data line. Check the chair circuit board data LED (DS3). <ul style="list-style-type: none"> <li>• If the data LED is off, temporally connect a known good data line between the touchpad and the chair circuit board.</li> <li>• If the chair circuit board data LED comes on and the chair operates normally, remove and replace the data line in the unit.</li> <li>• If the chair circuit board data LED stays off, remove and replace the touchpad.</li> </ul> </li> </ol> <p><b>NOTE</b> The data and power to the control head mounted touchpad are routed via the control head circuit board. Power is supplied using black/gray wires.</p>
No chair movement from the touchpad, status icon is not illuminated.	Faulty touchpad.	Verify AC power to chair and that chair can be operated from the footswitch or other touchpad. Verify 24 VAC to touchpad circuit board. If 24 VACs present, replace the touchpad.
	Faulty touchpad power cable.	Verify the AC power LED (DS1) is illuminated on the delivery system circuit board or chair circuit board. Verify the touchpad functions normally by using an external touchpad power cable. Replace the touchpad power cable, if needed.
Base or back does not move to full up position. The position sensor LED for that function on the chair circuit board is flashing.	Position sensor connection (P1 and P2) on the chair circuit board are switched.	Connect potentiometers to correct chair circuit board locations: P1 – Back potentiometer P2 – Base potentiometer
Base or back does not move to full up position. The position sensor LED for that function on the chair circuit board is flashing.	The chair soft stops are not established.	<ol style="list-style-type: none"> <li>1. Place the jumper in the factory default position in the P3 test header. The chair automatically establishes the soft stops for the chair base and back. When factory default completes, the chair beeps three times to indicate success.</li> <li>2. Place the jumper back in the spare position on the test header and verify the chair operates normally.</li> <li>3. Program the chair presets.</li> </ol>
Unable to change chair programmed positions.	Position sensor connections (P1 and P2) on the chair circuit board are switched.	Connect potentiometers to correct board locations: P1 – Back potentiometer P2 – Base potentiometer
	The potentiometer for that movement is disconnected.	<ol style="list-style-type: none"> <li>1. Check potentiometer connections to the chair circuit board.</li> <li>2. Reconnect if disconnected.</li> </ol>
	Failed potentiometer.	<ol style="list-style-type: none"> <li>1. Check for resistance. The resistance should be 10K ohms +/- 1500 ohms.</li> <li>2. Replace the potentiometer as a complete assembly.</li> </ol>

Problem	Possible Cause	Action
The three-tap feature used at installation no longer works.	The three tap feature is disabled.	The three tap feature is disabled when a powered touchpad has been connected to the DCS, a footswitch is installed or the test points have been used to move the chair.  To re-enable the three tap feature: <ol style="list-style-type: none"> <li>1. Disconnect the DCS touchpad connections.</li> <li>2. Disconnect the footswitch.</li> <li>3. Cycle power to the chair.</li> </ol>
No or limited chair functions from footswitch.	Footswitch connector/wiring is damaged.	Verify chair operates from a touchpad or the test points (P3). Replace the footswitch connector and/or wiring assembly.
	Footswitch membrane is damaged.	Check footswitch connectors and membrane, replace as necessary.
The chair makes a growling noise when Base Up or Back Up is pressed.	Chair is low on hydraulic fluid.	<ol style="list-style-type: none"> <li>1. Remove motor pump, lift arm and stop plate covers.</li> <li>2. Check fluid level with chair base and back up by viewing the reservoir from the back of the chair.</li> <li>3. Add fluid to maximum level.</li> </ol> <p><b>CAUTION</b> Use only A-dec hydraulic fluid, p/n 61.0197.00.</p>
	Hydraulic hose from reservoir to pump is pinched.	<ol style="list-style-type: none"> <li>1. Inspect all hydraulic hoses, ensure they are not being pinched in any position.</li> <li>2. If the supply tube between the pump and the reservoir is kinked, order and install kit p/n 90.1100.00.</li> </ol>
	Motor pump has an obstruction or is damaged.	If chair continues to growl, lower base and add up to 4 oz (.12 l) more fluid. If noise continues, replace motor assembly.
A button on a touchpad does not work. Function works from other location(s).	Faulty touchpad.	<ol style="list-style-type: none"> <li>1. Verify the touchpad circuit board is snapped into the plastic cover.</li> <li>2. Verify the function does work from other locations (footswitch, chair test points, light switches, cuspidor buttons).</li> <li>3. If the function still does not work, replace the touchpad.</li> </ol>
The automatic positions do not work, the A-dec logo is flashing, double blinks.	The jumper is in the factory default position on the chair circuit board test points (P3).	Move the jumper from the factory default position to the "spare" position on the test points.
The chair will not move up from the full base down with the foot control under the stop plate.	The automatic chair lockout feature has been activated by air coolant from the foot control.	<ol style="list-style-type: none"> <li>1. Raise the control head cover and disconnect the delivery system data line.</li> <li>2. Use the assistant's touchpad or footswitch to raise the chair.</li> <li>3. Remove the foot control from under the chair lift arm.</li> </ol> <p><b>NOTE</b> Revision D and later chair circuit boards will bump up if the foot control and chair limit switch is activated at the same time.</p>
The chair glide bar slides down or is difficult to lift up.	The glide needs adjusting or the wear pads need replacing.	Adjust or replace the glide bar components as necessary.

Problem	Possible Cause	Action
Headrest does not lock or is difficult to unlock.	The headrest needs adjustment or needs replacing.	If the operating lever is too tight, adjust for slight play in movement. If the headrest still does not work correctly, replace it as an assembly. No field service to locking components.
Armrest(s) do not lock in up position or are difficult to operate.	Armrest is damaged.	Replace armrest assembly.
Circuit breaker 1 or 2 opens.	Electrical short in a module.	<ol style="list-style-type: none"> <li>1. Disconnect all modules from the power supply.</li> <li>2. Reset the circuit breaker.</li> <li>3. Reconnect modules one at a time until circuit breaker trips. Refer to troubleshooting for that module.</li> </ol>
Circuit breaker does not reset.	Faulty circuit breaker.	Replace the power supply.
Chair brake does not hold.	Brake needs adjusting or the pad needs replacing.	Adjust or replace brake components as necessary.



**WARNING** The hydraulic system must be depressurized before removing the solenoid. To depressurize the hydraulic system, remove the failed solenoid coil and replace with the operating solenoid coil. Lower the chair base and back.



**WARNING** The solenoid coils are powered by line voltage (100, 100 - 120, or 220 - 240 VAC). Failure to unplug the chair may result in serious injury from electrical shock.



**NOTE** When replacing a solenoid, wipe up any oil, and replace existing O-rings on the solenoid base.

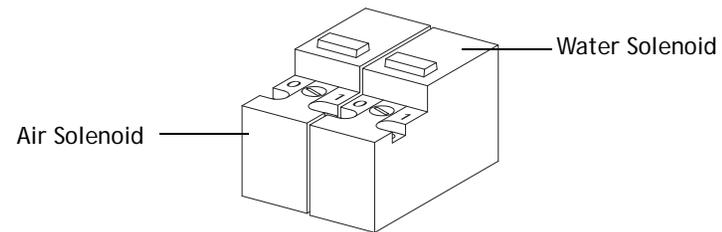
## Delivery Systems

Table contains tips and troubleshooting information to assist you in diagnosing the most common delivery system problems that you may encounter.

Problem	Possible Cause	Action
No water to all handpieces and the syringe.	Empty water bottle.	Refill bottle with treatment water.
	Kinked air or water tubing.	Check the water and air tubings for kinks or obstructions.
	Restrictor setscrew plugged in the water bottle receptacle.	Remove the restrictor setscrew and use air to blow out debris. If the restrictor setscrew cannot be cleared, replace it.
Failed self-contained water system regulator.		<p>To test for failure:</p> <ol style="list-style-type: none"> <li>1. Remove the restrictor setscrew from the water bottle receptacle and install a 1/8" barb and washer.</li> <li>2. Using 1/8" tubing, connect an air pressure gauge to the barb.</li> </ol> <p>The pressure gauge should indicate between 35-40 psi. If not, replace the water bottle receptacle.</p>

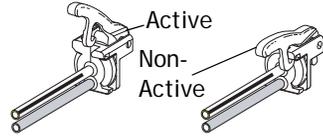
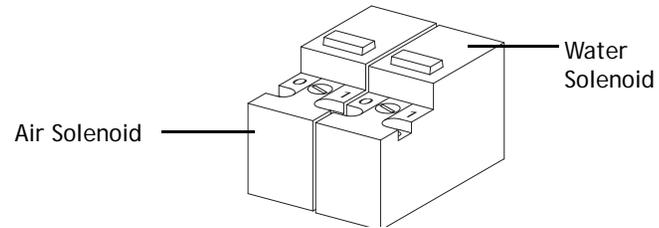
Problem	Possible Cause	Action
No water coolant to all the handpieces.	Empty water bottle.	Fill the water bottle with treatment water.
	The wet/dry toggle on the foot control is in the dry position.	Standard or no touchpad: <ol style="list-style-type: none"> <li>1. Pick up a wet handpiece.</li> <li>2. Move the wet/dry toggle to the wet (blue dot) position.</li> </ol> Deluxe touchpad: <ol style="list-style-type: none"> <li>1. Pick up a wet handpiece.</li> <li>2. Verify that the water coolant icon appears on the touchpad screen.</li> <li>3. If not, flip the wet/dry toggle on the foot control or press the water coolant button on the touchpad.</li> </ol>
No water coolant air signal from the foot control wet/dry toggle (standard or no touchpad).	Water coolant air signal shuttle valve faulty.	Check for air leaking from the flush toggle valve when the foot control is stepped on. If a leak is present, replace the shuttle valve.
		Check the clear tubing from the foot control for kinks or obstructions: <ol style="list-style-type: none"> <li>1. Disconnect the clear tubing from the in-line barb in the chair lift arm.</li> <li>2. With the wet/dry toggle in the wet position (toward blue dot), step on the foot control. There should be ~80 psi (5.52 bar) of air at the tubing end.</li> <li>3. If no air is present, check:               <ul style="list-style-type: none"> <li>• Wet/dry toggle</li> <li>• Plugged barbs</li> <li>• Adequate air supply</li> </ul> </li> </ol>
Water coolant flow controls require adjustment.		See Adjust Water Flow Coolant in Delivery System section.

Problem	Possible Cause	Action
No water coolant to all the handpieces.	Water coolant solenoid does not activate. LED (DS5) is not on (deluxe touchpad).	Verify the water solenoid (DS5) on the control head circuit board is on (deluxe touchpad). Deluxe touchpad: <ol style="list-style-type: none"><li>1. Activate handpiece.</li><li>2. Flip the foot control wet/dry toggle or press the water coolant button.</li><li>3. Verify the water coolant icon displays on the touchpad and there is water coolant to the handpiece.</li><li>4. If no coolant, verify LED (DS5) is lit.<ul style="list-style-type: none"><li>• If not lit, replace the control head circuit board.</li><li>• If lit, use a small flat tipped screwdriver to manually override (open) the water solenoid.</li></ul></li></ol>



<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
No water coolant to one handpiece.	Water coolant adjustment stem closed or requires adjustment.	See Handpiece Control Adjustments in Delivery System section.
	Water coolant not activated.	Standard or no touchpad: <ol style="list-style-type: none"> <li>1. Activate handpiece.</li> <li>2. Flip the foot control wet/dry toggle toward the blue dot.</li> <li>3. Verify the handpiece has water coolant.</li> </ol> Deluxe touchpad: <ol style="list-style-type: none"> <li>1. Activate handpiece.</li> <li>2. Flip the foot control wet/dry toggle or press the water coolant button.</li> <li>3. Verify the water coolant icon displays on the touchpad and there is water coolant to the handpiece.</li> <li>4. If no coolant, verify LED (DS5) is lit.</li> <li>5. If not, replace the control head circuit board.</li> </ol>
	Plugged handpiece tubing, terminal or coupler.	<ol style="list-style-type: none"> <li>1. Remove handpiece and coupler from tubing.</li> <li>2. Operate foot control with water coolant on.</li> <li>3. Check to see if water is coming out of the handpiece tubing.</li> <li>4. If no water, check for water coolant at the handpiece position on the control block.</li> </ol>
	Failed water coolant cartridge.	Exchange the failed cartridge with known good cartridge and test the handpiece position.
Sputtering water from syringe and handpieces.	Dry cartridge is in the handpiece water cartridge position of the control block.	Replace the dry cartridge with a water cartridge.
	Faulty or dirty O-ring on barb of water bottle pickup tube.	Replace the O-ring. Apply a thin application of silicone grease to the new O-ring.
	Damaged pick-up tube.	Replace pick-up tube.
Intermittent water coolant to handpieces.	Faulty O-rings on handpiece coupler.	Replace the O-rings on the handpiece coupler.
Intermittent water coolant to handpieces.	Water coolant pressure too low, or air coolant pressure too high.	Adjust water and air coolant as required. See Handpiece Control Adjustments in Delivery System section.
	Water bottle pickup tube too long.	Shorten the pickup tube with a diagonal cut at the end.
Water leaks from vent hole in control block when a wet handpiece is in use.	Faulty water coolant cartridge.	<ol style="list-style-type: none"> <li>1. Replace water coolant cartridge with known good cartridge.</li> <li>2. If water continues to leak from vent hole, inspect the control block for debris or scratches.</li> <li>3. Replace if necessary.</li> </ol>

Problem	Possible Cause	Action
A wet handpiece drips water while in its holder.	Faulty water coolant cartridge.	<ol style="list-style-type: none"> <li>1. Replace water coolant cartridge with known good cartridge.</li> <li>2. If water continues to leak from handpiece, inspect the control block for debris or scratches.</li> <li>3. Replace if necessary.</li> </ol>
	Faulty handpiece or coupler.	<ol style="list-style-type: none"> <li>1. Remove handpiece and coupler.</li> <li>2. Reset water coolant flow.</li> </ol>
	Faulty control block diaphragm.	Replace the diaphragm.
Water leaks from the water coolant stem.	Damaged O-rings on water coolant stem.	Replace the stem or the O-rings on the stem.
Water continues to flow after foot control is released.	Restricted water coolant tube in the handpiece or coupler.	<ol style="list-style-type: none"> <li>1. Remove handpiece and coupler.</li> <li>2. Retest water coolant flow.</li> </ol>
	Pinched tubing in the foot control.	Check that the green tube with the long dash is not pinched between the foot control and the control head.
	Water coolant flow set too high.	See Handpiece Control Adjustments in Delivery System section.
	The foot control relay valve sticks.	Install a foot control field service kit in the foot control.
Any handpiece drips when lifted from holder. Foot control is not activated.	Faulty flush toggle valve.	<ol style="list-style-type: none"> <li>1. Check for 80 psi air to flush valve.</li> <li>2. Replace O-rings on flush valve stem or replace the flush toggle valve.</li> </ol>
	Faulty control block diaphragm.	Replace the control block diaphragm.
Water continues to flow after foot control is released only in air/water combined mode.	Faulty relay stem in foot control relay.	Install a foot control field service kit in the foot control p/n 90.0593.00.
	Pinched tubing in the foot control.	Check that green long dash tubing is not kinked or pinched in the umbilical between the foot control and the control head.
	Water coolant flow set too high.	See Handpiece Control Adjustments in Delivery System section.
	The foot control relay valve sticks.	Install a foot control field service kit in the foot control.
Cannot flush one or more handpiece tubings.	A dry cartridge is in place for this handpiece.	Change the dry cartridge to a water cartridge.
	Handpiece or coupler plugged.	Remove handpiece and coupler and test flush.
Excessive water coolant at all wet handpieces. Water coolant flow adjustments do not affect flow.	Flush water hold back has failed.	<ol style="list-style-type: none"> <li>1. Check for 80 psi air out of the flush valve to the control block.</li> <li>2. Check for pinched yellow tube between the flush valve and the control block.</li> <li>3. If no pinched tubing, replace the flush valve.</li> </ol>

Problem	Possible Cause	Action
DCS does not recognize new handpiece (deluxe touchpad only).	Handpiece not configured.	Configure handpiece. Configure handpiece as "other" if type of handpiece not listed in the configuration selections.
	Holder valve is inactive (locked open).	Activate the holder valve by unhooking the valve arm.
		
Holder valve does not exhaust holdback air when the handpiece is picked up.	Replace failed holder valve.	
Unable to combine air and water coolant functions with the foot control wet/dry toggle, or by pressing the coolant button on the touchpad (deluxe touchpad).	Deluxe touchpad is not programmed for combined air/water coolant function.	<ol style="list-style-type: none"> <li>1. Press and hold the Program button and either the air or water coolant button simultaneously for three seconds.</li> <li>2. Three beeps signal the functions are now combined.</li> </ol>
Unable to combine air and water coolant functions with the foot control wet/dry toggle, or by pressing the coolant button on the touchpad (deluxe touchpad).	One of the coolant solenoids has failed or is disconnected from the delivery system circuit board.	<ol style="list-style-type: none"> <li>1. Activate a handpiece.</li> <li>2. Verify the coolant LEDs (DS5 and DS6) are illuminating on the delivery system circuit board. <ul style="list-style-type: none"> <li>• If not, verify that the solenoid is connected to the delivery system circuit board.</li> <li>• If connected, replace the solenoid and verify coolant operation.</li> </ul> </li> </ol> <p><b>NOTE</b> Use a small flat tipped screwdriver to manually override (open) the water solenoid if you do not have a spare solenoid.</p>
		

Problem	Possible Cause	Action
Buttons on the touchpad do not work. The status icon LED is on.	Faulty data port on the control head circuit board for touchpads mounted on the control head, otherwise there is a faulty data port on the chair circuit board.	Move data line to different data port.
	Faulty data line from touchpad to control head circuit board chair circuit board.	Replace data line with known good data line.
	Faulty touchpad.	<ol style="list-style-type: none"> <li>1. Verify the touchpad circuit board is seated securely into the touchpad cover.</li> <li>2. If touchpad still does not function, replace with known good touchpad.</li> </ol>
Touchpad does not operate chair, cuspidor or light functions.	Faulty data line from delivery system circuit board to chair circuit board.	Replace delivery system data line.

Problem	Possible Cause	Action
Touchpad status icon does not light when the master on/off toggle is on.	No power to chair.	Verify the chair is plugged in, the power button is on and the pilot tubing is connected to the power supply air-electric switch.
	No power to touchpad.	<ol style="list-style-type: none"> <li>1. Verify that DS1 is illuminated on the delivery system circuit board.</li> <li>2. If DS1 is not illuminated, check for 24 VAC across J1 and J2 on the circuit board.</li> <li>3. Check for an open circuit breaker on the 300W power supply.</li> </ol>
Deluxe touchpad screen is blank. The status LED icon is on.	Contrast needs adjustment.	For deluxe touchpads manufactured before June 2006:
		<ol style="list-style-type: none"> <li>1. Press and hold the + and Program buttons for three seconds. The contrast adjustment screen appears.</li> <li>2. Adjust the contrast with the + and - buttons.</li> <li>3. Press Program to exit and return to normal operating screen.</li> </ol> <p>Both A and B settings are changed with this adjustment.</p>
		For deluxe touchpads manufactured after May 2006:
		<ol style="list-style-type: none"> <li>1. Press the Program and A/B button simultaneously until the touchpad switches to the handpiece configuration routine.</li> <li>2. Press Back-up (select) to enter system set up.</li> <li>3. Press Base-down to move the cursor to touchpad, then press Select.</li> <li>4. Follow the instructions on the screen to adjust the screen contrast as needed.</li> <li>5. To exit the handpiece configuration routine, press and release Back-down (cancel) until the A-dec logo appears on the touchpad screen.</li> </ol> <p>Both A and B settings are changed with this adjustment.</p>
Low air pressure to syringe or handpieces when in use.	Plugged filter on air filter regulator.	Replace the filter.
Handpiece holder valve leaking air.	Faulty holder valve.	<ol style="list-style-type: none"> <li>1. Verify the holder valve is not plumbed backward.</li> <li>2. Replace holder valve.</li> </ol>
Handpiece holder valve not exhausting.	Holder valve locked.	Verify the holder valve is active (unlocked).
	Faulty holder valve.	Replace holder valve.

# Circuit Board Troubleshooting and LED Diagnostics

## Circuit Board Replacement

If you suspect that a circuit board may need replacing, do not replace the board in a system before you use the circuit board replacement flow chart (see Figure 138). The flow chart is intended to be used with the circuit boards listed below (Table 11).

Table 11. Circuit Boards

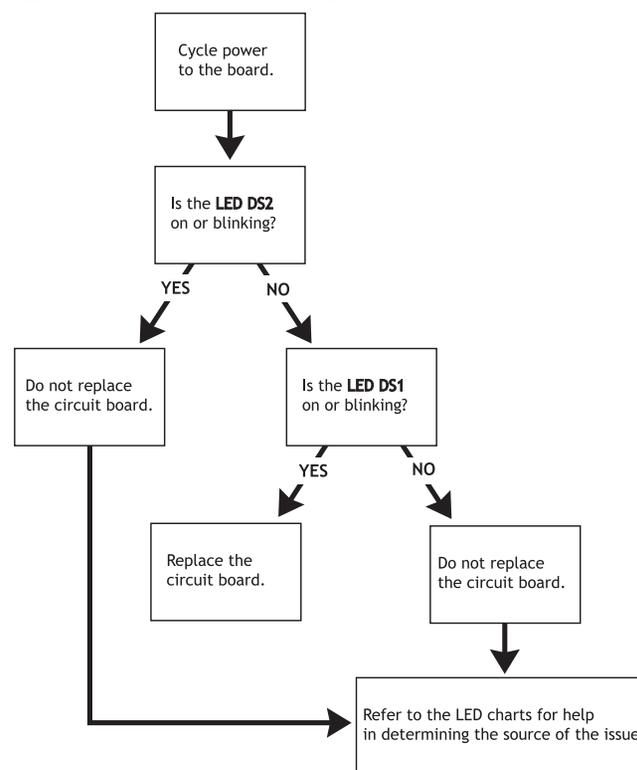
Circuit Board/Part Number	Before Following the Flow Chart...
311 Chair (43.0149.00) 511 Chair (43.0003.00)	Disconnect P1 and P2 (Back and Base Position Sensors) and P5 (Touchpad or Footswitch)
300 Deluxe Touchpad (43.0114.00) 500 Deluxe Touchpad (43.0107.00)	Disconnect P3 (LCD Backlight)
Standard Touchpad (43.0000.00)	N/A
QVIOLS (43.0131.00)	N/A
Cuspidor (43.0137.00)	N/A
A-dec Relay Module (43.0001.00)	N/A
Cascade/Decade/Performer (61.3773.00)	Verify the part number; disconnect P1 and P2 (Touchpad or Footswitch) and P4 and P5 (Back and Base Position Sensors)
Control Head (43.0004.00)	N/A
Dental Light Relay (43.0043.00)	N/A
Warm Water Syringe(43.0085.00)	N/A
ICV Control (43.0084.00, 43.0084.01)	Disconnect P4 and P5 (Operator A and Operator B)
ICC Dryer Control Board (43.0105.00)	Disconnect P8 (Temperature)

## Circuit Board Troubleshooting



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

Figure 138. Circuit Board Replacement Flowchart



# Touchpad Diagnostics

Table contains tips and troubleshooting information to assist in diagnosing DCS problems. This table is not intended to cover every situation, but includes the most common problems that you may encounter.

LED	Assistant's Touchpad and Standard Touchpad	Deluxe Touchpad
Status (A-dec logo)	Off = system is not functioning	
	<b>Blue steady</b> = normal condition (ready for use)	
	<b>Blue double blink</b> = jumper is in the factory default position on the chair circuit board	
	<b>Blue slow blink</b> = chair, cuspidor or lower support arm stop switch is activated	
Dental light	Off = dental light is off	
	<b>Yellow steady</b> = dental light is on in high or medium intensity	
	<b>Yellow slow blink</b> = dental light is on in composite intensity	
Auxiliary #1 or bowl rinse	Off = auxiliary #1 is off or bowl rinse is off	N/A (see bowl rinse)
	<b>Yellow</b> - auxiliary #1 is on or bowl rinse is on	N/A (see bowl rinse)
Auxiliary #2 or cupfill	Off = auxiliary #2 is off or cupfill is off	N/A (see cupfill)
	<b>Yellow</b> = auxiliary #2 is ON or cupfill is ON	N/A (see cupfill)
Bowl rinse	N/A (shared with auxiliary #1 above)	Off = bowl rinse is off
		<b>Yellow</b> = bowl rinse is on
Cupfill	N/A (shared with auxiliary #2 above)	Off = cupfill is off
		<b>Yellow</b> = cupfill is on
Auxiliary #1 or #2	N/A (shared with auxiliary #1 or #2 above)	Off = auxiliary device is off
		<b>Yellow</b> = auxiliary device is on

Off = Function is turned off, device is disconnected, no power or failed circuit board; **Blue steady** = Normal operation; **Yellow** = advisory

LED	A-dec Relay Module	Dental Light	Cuspidor	Delivery System	Chair
AC power	Off = no 24 VAC power, open circuit breaker, power supply turned off, no line voltage <b>Green steady</b> = 24 VAC power at terminal strip				
Status	Off = system is not functioning, no power or circuit board has failed <b>Green steady</b> = normal condition				Off = system is not functioning, no power or circuit board has failed <b>Green steady</b> = normal condition <b>Green double blink</b> = jumper is in the factory default position
Data (DCS)	Off = no data communication, not connected to the data line connector, data line is not functioning <b>Green steady</b> = active DCS is detected <b>Green blinking</b> = valid DCS message				
A-dec relay module	Off = Relay is off <b>Yellow</b> = Relay is on	N/A	Off = relay is off <b>Yellow</b> = relay is on	N/A	N/A
Bowl rinse/cup fill relays	N/A	N/A	Off = relay is off <b>Yellow</b> = relay is on	N/A	N/A
Cuspidor stop switch	N/A	N/A	Off = closed (normal) <b>Red</b> = open (activated)	N/A	N/A
IOLS output	N/A	N/A	N/A	Off = IOLS voltage is off <b>Yellow</b> = IOLS voltage is on	N/A
ultrasonic instrument relay	N/A	N/A	N/A	Off = ultrasonic instrument relay is off <b>Yellow</b> = ultrasonic instrument relay is on	N/A
Air/water coolant solenoids	N/A	N/A	N/A	Off = solenoid is off <b>Yellow</b> = solenoid is on	N/A
Chair or lower support arm stop switch	N/A	N/A	N/A	N/A	Off = closed (normal) <b>Red</b> = open (activated)
Chair lockout	N/A	N/A	N/A	N/A	Off = closed (normal) <b>Red</b> = open (activated)

LED	A-dec Relay Module	Dental Light	Cuspidor	Delivery System	Chair
Vacuum relay	N/A	N/A	N/A	N/A	Off = vacuum relay is off Yellow = vacuum relay is on
Dental light	N/A	DS4 off DS5 off Dental Light Off	N/A	N/A	DS8 off DS7 off Dental Light Off
		DS4 on DS5 off Dental Light High Intensity			DS8 on DS7 off Dental Light High Intensity
		DS4 off DS5 on Dental Light Composite			DS8 off DS7 on Dental Light Composite
		DS4 on DS5 on Dental Light Medium			DS8 on DS7 on Dental Light Medium
Chair position sensors	N/A	N/A	N/A	N/A	Off = sensor not connected, bad connection, moving in wrong direction, limited range of motion, or cable not on wheel Yellow steady = normal operation Yellow fast blink = Upper end of travel
Back and base relays	N/A	N/A	N/A	N/A	Off = relay is off Yellow = relay is on

## 500 Deluxe Touchpad Help Messages

Help messages appear on the deluxe touchpad screen. This table lists the messages, a brief description of the message, and possible resolutions. Technician messages can be turned on or off.

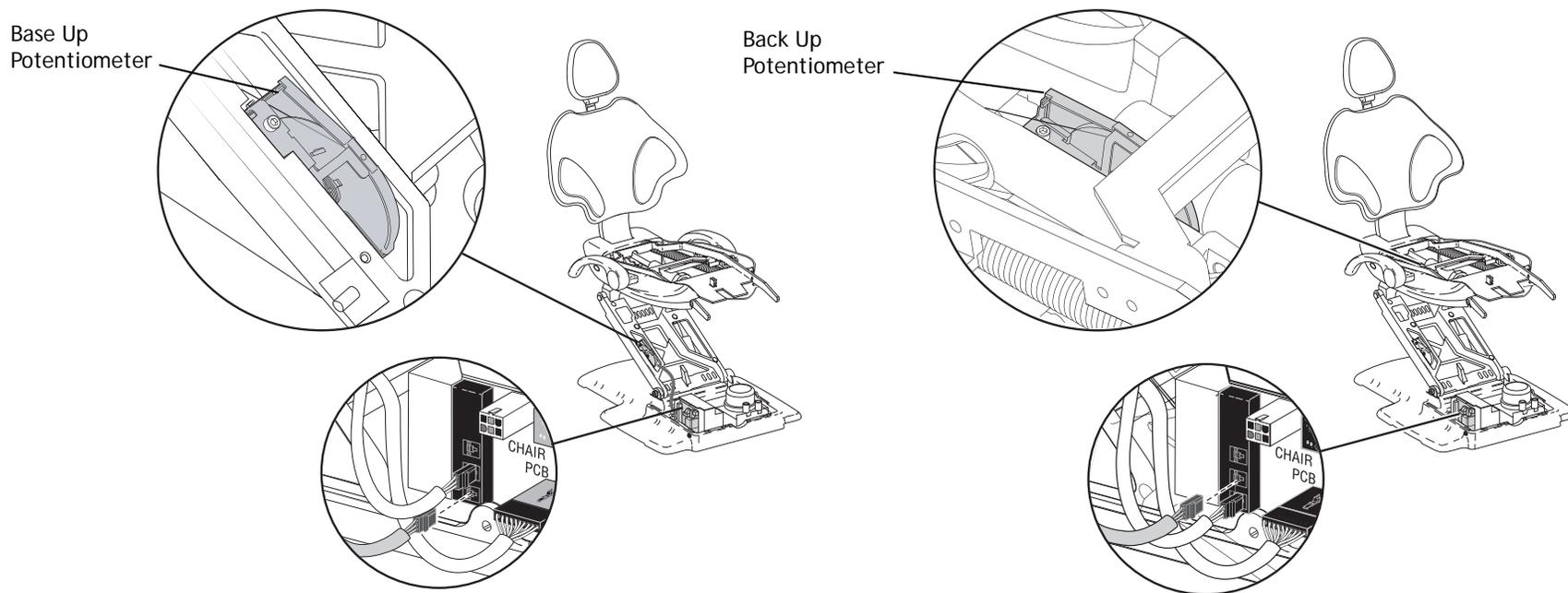
Message	Description	Possible Resolution
Electric Handpiece number exceeds controller's output channels. Run setup.	A system has a motor controller that supports only one electric handpiece but has two handpieces configured as Electric.	<ul style="list-style-type: none"> <li>Run Handpiece Setup for each configurable position.</li> <li>For systems with a single electric motor controller, limit electric handpiece setup to one.</li> <li>For systems requiring two electric handpieces, a dual-motor controller is required.</li> </ul>
Motor controller can't support motor. Run Setup and pick compatible motor.	The motor type that is configured is not compatible with the motor controller being used.	<ul style="list-style-type: none"> <li>Run the touchpad's Handpiece Setup for each electric handpiece and verify that the motor type is configured correctly.</li> <li>For an EA30 Electric Handpiece with an EA3.1 or EA3.1E Motor Controller, if the EA30 is not offered, then the EA30 must be set up as an EA40 Electric Handpiece.</li> </ul>
Endo not supported on this motor. Press any button.	The motor type configured for the electric handpiece does not support endodontics functionality. This message appears if the e button is pressed while a non-endodontics electric handpiece is in use.	<ul style="list-style-type: none"> <li>No action is required if the e button is pressed on a system that does not have an endodontics electric handpiece.</li> <li>For systems that have an endodontics electric handpiece, run Handpiece Setup for each electric handpiece and verify that the motor type is configured correctly.</li> </ul>
No data communication with electric handpiece motor controller.	The touchpad is unable to communicate through DCS with the electric handpiece motor controller.	<ul style="list-style-type: none"> <li>For systems <i>without</i> a motor controller, run the touchpad's Handpiece Setup for each handpiece and verify no handpieces are configured as an Electric type. Any handpieces configured as Electric will need to be changed to their appropriate type.</li> <li>For systems <i>with</i> a motor controller, verify the motor controller is connected to the DCS (data) system and is powered on. Verify data connections between the motor controller and the touchpad. <ul style="list-style-type: none"> <li>If either the motor controller's data LED (C) is off and/or the touchpad data LED (DS3) is off, connect a working data line from the touchpad to the motor controller.</li> <li>If the LEDs are now on, check each data line within the system and replace any data lines.</li> </ul> </li> </ul>
This button is disabled.	A touchpad button that has been disabled was pressed. The touchpad will operate as normal without using the disabled button.	<p>To enable a disabled button:</p> <ol style="list-style-type: none"> <li>On chair circuit board, place the jumper in the EN/DIS TP/FS position (Testpoint header, P3).</li> <li>Push the button to enable. Three beeps confirm the button has been enabled. (Note that one beep indicates a button has been disabled.)</li> <li>Repeat steps 1 and 2 for all buttons that are disabled.</li> <li>When finished, place the jumper in the SPARE position (Testpoint header, P3).</li> </ol>

Message	Description	Possible Resolution
Too many handpieces in use Control head Assistant	Only one handpiece configured as ultrasonic instrument, turbine, or electric can be removed at a time.	<ul style="list-style-type: none"> <li>• If two handpieces configured as ultrasonic instrument, turbine, or electric are removed at the same time, no action is required.</li> <li>• Verify that only one handpiece configured as a ultrasonic instrument, Turbine, or Electric is removed at a time. Run the touchpad's Handpiece Setup for any handpieces that need to be reconfigured.</li> <li>• Verify all handpiece locations configured for ultrasonic instrument, Turbine, or Electric have handpieces in their holders, and their respective holder switch is activated.</li> <li>• Verify that the control head switch handpiece holder air switches and tubing are plumbed correctly.</li> <li>• Verify that control head holder positions without handpieces have a holder valve that is inactive (locked).</li> <li>• Verify that the assistant's instrumentation with auto-electric switches are properly wired, configured, and activated when not in use.</li> </ul>
Chair will not move while foot control is in use.	A chair movement button (manual or preset) has been activated while the foot control is in use. The chair will not move when a handpiece is withdrawn and the foot control is pressed at the same time.	<ul style="list-style-type: none"> <li>• No action is required if the chair movement button (manual or preset) was inadvertently activated while the foot control is in use.</li> <li>• On the chair circuit board, verify that the DS13 is off when the foot control is not pressed. <ul style="list-style-type: none"> <li>• If DS13 is on when foot control is not pressed, verify any local air electric switch connected to the CHAIR LOCKOUT terminal strip (J4) on the chair board is not activated.</li> <li>• A closed logic signal into CHIAR LOCKOUT terminal strip (J4) will activate the chair lockout feature, turning on DS13. Verify that wiring and plumbing of any local connection to J4 on the chair board are correct.</li> </ul> </li> </ul>
Chair in Factory Default mode.	The jumper on the chair circuit board's Testpoint header, P3, is in the Factory Default (FACT DEFAULT) position.	After the factory default has been completed successfully (verified by hearing three beeps at the end of the routine) the jumper should be placed back into the SPARE position on the chair circuit board's Testpoint header, P3.
Chair in Enable/Disable mode.	The jumper on the chair circuit board's Testpoint header, P3, is in the Enable/Disable (EN/DIS TP/FS) position.	After enabling or disabling either the optional height limit of the chair or a button on a touchpad or footswitch, no action is required. When not in use, the Testpoint header, P3, jumper should be placed into the SPARE position on the chair circuit board.
Too many buttons pressed.	Three or more buttons are activated on a touchpad or footswitch. Two buttons of opposite functions are pressed at the same time (such as pressing Base UP and Base Down at the same time).	<ul style="list-style-type: none"> <li>• Verify that only two buttons on any touchpad are being pressed at the same time. Verify the footswitch or any other touchpad buttons are not inadvertently activated.</li> <li>• Verify that two touchpad or footswitch buttons that are opposite functions are not pressed at the same time.</li> <li>• If this message appears and only one button is pressed: <ul style="list-style-type: none"> <li>• Disconnect all other touchpads and footswitches from the system.</li> <li>• Verify the deluxe touchpad's circuit board mounting to the overlay/bezel to ensure that there is no inadvertent activation of other deluxe touchpad buttons. If the problem remains, replace touchpad and overlay (kit, p/n 90.1185.00).</li> <li>• Reconnect other touchpads and footswitches one at time to identify the source of activation.</li> </ul> </li> </ul>

Message	Description	Possible Resolution
<p><b>Chair back position sensor OR motor not moving.</b></p>  	<p>The system has detected that the back motor is not moving when activated or the back position sensor is not functioning correctly.</p>	<ul style="list-style-type: none"> <li>• Disconnect the back position sensor, (BACK POSN SENSOR), P1, from the chair circuit board.</li> <li>• On the chair circuit board, place the jumper on the Testpoint header, P3, into the BACK UP position. If the back does not move when the jumper is placed in the BACK UP position, place the Testpoint header, P3, jumper into the BACK DOWN position. <ul style="list-style-type: none"> <li>• If the back does not move regardless of the jumper being placed in BACK UP or BACK DOWN, verify that the back motor wiring connection to BACK MOTOR connector, P8, is correct. Reset the back motor circuit breaker, CB1, if tripped. <ul style="list-style-type: none"> <li>• If the circuit breaker trips again, disconnect the back motor connector P8, input power connector, P9, and base solenoid wires from J7 on the chair circuit board. Reset the circuit breaker.</li> <li>• If the circuit breaker trips again, replace the power supply. If the circuit breaker does not trip, reconnect the disconnected connections to P8, P9, and J7 one at a time until the source of what is causing the trip is found. Check the wiring of the device and replace the assembly if no incorrect wiring is found.</li> </ul> </li> </ul> </li> <li>• If the back moves with the jumper placed in either BACK UP or BACK DOWN:</li> <li>• Reconnect the back position sensor (BACK POSN SENSOR, P1).</li> <li>• At the chair circuit board, verify that the back and base position sensor connectors (BACK and BASE POSN SENSOR P1 and P2) are not swapped with each other.</li> <li>• Verify the mounting of the position sensor, which should be mounted using three standoffs. See Chair Base Up and Back Up Potentiometers Locations, page 129 for correct mounting illustrations.</li> <li>• If P1 and P2 are not swapped, replace the back position sensor (kit, p/n 90.1183.00).</li> </ul>

Message	Description	Possible Resolution
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Chair Base Up and Back Up Potentiometers Locations



**NOTE** It is important that the position sensors and their brackets are orientated correctly, and the bracket is connected securely and properly to the chair.

Chair back position sensor moving backward.	The system has detected that the back position sensor is moving backward.	<ul style="list-style-type: none"> <li>Verify the mounting of the potentiometers. See Chair Base Up and Back Up Potentiometers Locations, page 129, for correct mounting illustrations.</li> <li>Verify the chair circuit board's back and base potentiometer connectors P1 and P2 are not swapped with each other.</li> <li>If mounting and connections are correct, replace the back position sensor (kit, p/n 90.1183.00).</li> </ul>
Chair back position sensor disconnected.	The system has detected that the back position sensor, P1, is unplugged from the chair circuit board.	<ul style="list-style-type: none"> <li>Reconnect the chair circuit board's back position sensor, (BACK POSN SENSOR, P1).</li> <li>Verify the mounting of the position sensor, which should be mounted using three standoffs. See Chair Base Up and Back Up Potentiometers Locations, page 129, for correct mounting illustrations.</li> <li>Cycle Power to the system.</li> <li>Disconnect and reconnect the back position sensor (BACK POSN SENSOR, P1).</li> <li>If mounting and connections are correct, replace the back position sensor (Kit, p/n 90.1183.00).</li> </ul>

Message	Description	Possible Resolution
Chair back position sensor above range.	The system has detected that the back position sensor's value is greater than the expected maximum value.	<ul style="list-style-type: none"> <li>• Verify the mounting of the position sensor, which should be mounted using three standoffs. See Chair Base Up and Back Up Potentiometers Locations, page 129, for correct mounting illustrations.</li> <li>• At the chair circuit board, verify that the back and base position sensor connectors, P1 and P2, are not swapped with each other.</li> <li>• On the chair circuit board, run factory default by placing the jumper in the Testpoint header, P3, FACT DEFAULT position. When the factory default routine is completed successfully, three beeps sound. One beep sounds if the factory default routine does not complete successfully.</li> <li>• If the factory default routine does not complete successfully, replace the position sensor (Kit, p/n 90.1183.00).</li> </ul>
Chair back position sensor below range.	The system has detected that the back position sensor's value is lower than the expected minimum value.	<ul style="list-style-type: none"> <li>• Verify the mounting of the position sensor, which should be mounted using three standoffs. See Chair Base Up and Back Up Potentiometers Locations, page 129, for correct mounting illustrations.</li> <li>• At the chair circuit board, verify that the back and base position sensor connectors, P1 and P2, are not swapped with each other.</li> <li>• On the chair circuit board, run factory default by placing the jumper in the Testpoint header, P3, FACT DEFAULT position. When the factory default routine is completed successfully, three beeps sound. One beep sounds if the factory default routine does not complete successfully.</li> <li>• If the factory default routine does not complete successfully, replace the position sensor (Kit, p/n 90.1183.00).</li> </ul>
Chair back at upper limit.	The chair back has reached its upper limit.	<ul style="list-style-type: none"> <li>• No action is required if this message appears when the back up is activated when the chair is at its back upper limit.</li> <li>• If the message appears and the chair back is not at the upper limit: <ul style="list-style-type: none"> <li>• Verify the mounting of the position sensor, which should be mounted using three standoffs. See Chair Base Up and Back Up Potentiometers Locations, page 129, for correct mounting illustrations.</li> <li>• At the chair circuit board, verify that the back and base position sensor connectors, P1 and P2, are not swapped with each other.</li> <li>• On the chair circuit board, run the factory default by placing the jumper in the Testpoint header, P3, FACT DEFAULT position. When the factory default routine is completed successfully, three beeps sound. One beep sounds if the factory default routine does not complete successfully.</li> <li>• If the factory default routine does not complete successfully, replace the position sensor (Kit, p/n 90.1183.00).</li> </ul> </li> </ul>

Message	Description	Possible Resolution
Chair back at lower limit.	The chair back has reached its lower limit	<p>The chair back software limit should not be reached during normal operation.</p> <ul style="list-style-type: none"> <li>Verify the mounting of the position sensor, which should be mounted using three standoffs. See Chair Base Up and Back Up Potentiometers Locations, page 129, for correct mounting illustrations. <ul style="list-style-type: none"> <li>At the chair circuit board, verify that the back and base position sensor connectors, P1 and P2, are not swapped with each other.</li> <li>On the chair circuit board, run the factory default by placing the jumper in the Testpoint header, P3, FACT DEFAULT position. When the factory default routine is completed successfully, three beeps sound. One beep sounds if the factory default routine does not complete successfully.</li> <li>If the factory default routine does not complete successfully, replace the position sensor (kit, p/n 90.1183.00).</li> </ul> </li> </ul>
<p><b>Chair base position sensor OR motor not moving.</b></p>  	<p>The system has detected that the base motor is not moving when activated or the base position sensor is not functioning correctly.</p>	<ul style="list-style-type: none"> <li>Verify the mounting of the position sensor, which should be mounted using three standoffs. See Chair Base Up and Back Up Potentiometers Locations, page 129, for correct mounting illustrations.</li> <li>Disconnect the base position sensor, P2, from the chair circuit board.</li> <li>On the chair circuit board, place the jumper on the Testpoint header, P3, into the BASE UP position.</li> </ul> <p>If the base does not move up:</p> <ul style="list-style-type: none"> <li>Check the base motor wiring connections. Verify that the base motor is connected properly to the chair circuit board connector, P11, BASE MOTOR. Verify that the base motor input power, P12, INPUT POWER is properly connected to the chair circuit board.</li> <li>Verify that the base motor capacitor is properly connected.</li> </ul> <p>If the base does move, place the Testpoint header, P3, jumper into the BASE DOWN position.</p> <ul style="list-style-type: none"> <li>If the base does not move down: <ul style="list-style-type: none"> <li>On the chair circuit board, verify that the AC POWER LED, DS1, is on.</li> <li>If the LED is off, verify circuit breaker CB2 is not tripped.</li> <li>Verify that the wiring to the INPUT POWER connector, P9, on the chair circuit board.</li> <li>If the base does not move down when the jumper is placed in the BASE DOWN position and DS1 is on, check the base solenoid wiring. Verify that the base solenoid is connected properly to the base solenoid terminal, J7, BASE SOLENOID.</li> </ul> </li> <li>If the connections to the Base Solenoid are correct, test the solenoid to verify it is operating correctly.</li> <li>If the base does move with the jumper placed in either BASE UP and BASE DOWN: <ul style="list-style-type: none"> <li>Reconnect the base position sensor, P2.</li> <li>At the chair circuit board, verify that the back and base position sensor connectors, P1 and P2, are not swapped with each other.</li> <li>Verify the mounting of the position sensor.</li> <li>If mounting and connections are correct, replace the base position sensor (kit, p/n 90.1183.00).</li> </ul> </li> </ul>

Message	Description	Possible Resolution
Chair base position sensor moving backward.	The system has detected that the base position sensor is moving backward.	<ul style="list-style-type: none"> <li>• Verify the mounting of the position sensor, which should be mounted using three standoffs. See Chair Base Up and Back Up Potentiometers Locations, page 129, for correct mounting illustrations.</li> <li>• At the chair circuit board, verify that the back and base position sensor connectors, P1 and P2, are not swapped with each other.</li> <li>• If mounting and connections are correct, replace the base position sensor (kit, p/n 90.1183.00).</li> </ul>
Chair base position sensor disconnected.	The system has detected that the base position sensor, P2, is unplugged from the chair circuit board.	<ul style="list-style-type: none"> <li>• At the chair circuit board, reconnect the base position sensor, P2.</li> <li>• Verify the mounting of the position sensor, which should be mounted using three standoffs. See Chair Base Up and Back Up Potentiometers Locations, page 129, for correct mounting illustrations.</li> <li>• Cycle Power to the system.</li> <li>• Disconnect and reconnect the base position sensor (BASE POSN SENSOR P2).</li> <li>• If mounting and connections are correct, replace the base position sensor (kit, p/n 90.1183.00).</li> </ul>
Chair base position sensor above range.	The system has detected that the base position sensor's value is greater than the expected maximum value.	<ul style="list-style-type: none"> <li>• Verify the mounting of the position sensor, which should be mounted using three standoffs. See Chair Base Up and Back Up Potentiometers Locations, page 129, for correct mounting illustrations.</li> <li>• At the chair circuit board, verify that the back and base position sensor connectors, P1 and P2, are not swapped with each other.</li> <li>• On the chair circuit board, run the factory default by placing the jumper in the Testpoint header, P3, FACT DEFAULT position. When the factory default routine is completed successfully, three beeps sound. One beep sounds if the factory default routine does not complete successfully.</li> <li>• If the factory default routine does not complete successfully, replace the position sensor (kit, p/n 90.1183.00).</li> </ul>
Chair base position sensor below range.	The system has detected that the base position sensor's value is lower than the expected maximum value.	<ul style="list-style-type: none"> <li>• Verify the mounting of the position sensor, which should be mounted using three standoffs. See Chair Base Up and Back Up Potentiometers Locations, page 129, for correct mounting illustrations.</li> <li>• At the chair circuit board, verify that the back and base position sensor connectors, P1 and P2, are not swapped with each other.</li> <li>• On the chair circuit board, run the factory default by placing the jumper in the Testpoint header, P3, FACT DEFAULT position. When the factory default routine is completed successfully, three beeps sound. One beep sounds if the factory default routine does not complete successfully.</li> <li>• If the factory default routine does not complete successfully, replace the position sensor (kit, p/n 90.1183.00).</li> </ul>

Message	Description	Possible Resolution
Chair base at upper limit.	The chair base has reached its upper limit.	<ul style="list-style-type: none"> <li>• No action is required if this message appears when the base up is activated when chair is at its base upper limit.</li> <li>• If the message appears and the chair base is not at the upper limit: <ul style="list-style-type: none"> <li>• Verify the mounting of the position sensor, which should be mounted using three standoffs. See Chair Base Up and Back Up Potentiometers Locations, page 129, for correct mounting illustrations.</li> <li>• At the chair circuit board, verify that the back and base position sensor connectors, P1 and P2, are not swapped with each other.</li> <li>• On the chair circuit board, run the factory default by placing the jumper in the Testpoint header, P3, FACT DEFAULT position. When the factory default routine is completed successfully, three beeps sound. One beep sounds if the factory default routine does not complete successfully.</li> <li>• If the factory default routine does not complete successfully, replace the position sensor (Kit, p/n 90.1183.00).</li> <li>• If the factory default routine completes successfully and the chair still does not reach its base upper limit, verify that the optional height limit has not been set: <ul style="list-style-type: none"> <li>• On the chair circuit board, move the jumper on Testpoint header, P3, to the EN/DIS TP/FS position.</li> <li>• Press and hold the base up button on any touchpad if you want to set or remove the upper limit.</li> <li>• After 3 seconds, one beep sounds if the optional height limit has been removed. Three beeps indicate that the optional upper limit has been set. Repeat the above steps to remove the optional height limit.</li> <li>• When the optional height limit is removed, re-run factory default.</li> </ul> </li> </ul> </li> </ul>

Message	Description	Possible Resolution
Chair base at lower limit.	The chair base has reached its lower limit.	<ul style="list-style-type: none"> <li>• No action is required if the chair base down optional height limit has been set, and the base down is at that set limit. In this case, the message appears as informational to let the user know the chair is at its lower limit. If the chair base down optional height limit has not been set, or you are unsure whether it has been set, and the chair is not moving to its full base down:               <ul style="list-style-type: none"> <li>• Verify the mounting of the position sensor, which should be mounted using three standoffs. See Chair Base Up and Back Up Potentiometers Locations, page 129, for correct mounting illustrations.</li> <li>• At the chair circuit board, verify that the back and base position sensor connectors (BACK and BASE POSN SENSOR P1 and P2) are not swapped with each other.</li> <li>• On the chair circuit board, run factory default by placing the jumper in the Testpoint header, P3, FACT DEFAULT position. When the factory default routine completes, three beeps sound. One beep sounds if the factory default routine did not successfully complete.</li> <li>• If the factory default routine does not complete successfully, replace the position sensor (kit, p/n 90.1183.00).</li> <li>• If the factory default routine completes successfully and the chair still does not reach its base lower limit, verify that the optional height limit has not been set:                   <ul style="list-style-type: none"> <li>• On the chair circuit board, move the jumper on Testpoint header, P3, to the EN/DIS TP/FS position.</li> <li>• Press and hold the base down button on any touchpad if you want to set or remove the lower limit.</li> <li>• After 3 seconds, one beep sounds if the optional height limit has been removed. Three beeps indicate that the optional lower limit has been set. Repeat the above steps to remove the optional height limit.</li> <li>• When the optional height limit is removed, re-run factory default.</li> </ul> </li> </ul> </li> </ul>
Chair back and base position sensor cables are interchanged.	The system has determined that the back and base position sensor cables are swapped.	<ul style="list-style-type: none"> <li>• On the chair circuit board, swap the back and base position sensor connectors (BACK and BASE POSN SENSOR P1 and P2). Verify the back position sensor is connected into P1 and the base position sensor is connected into P2.</li> <li>• On the chair circuit board, run factory default by placing the jumper on the Testpoint header, P3, into the FACT DEFAULT position. When the factory default routine completes successfully, three beeps sound. One beep sounds if the factory default routine does not complete successfully.</li> </ul>

Message	Description	Possible Resolution
Chair is already at that position.	This message is displayed if the user activates a preset when the chair's back and base are already at the preset's location.	<ul style="list-style-type: none"> <li>No action is required if chair is at the preset location that was programmed or the preset button was inadvertently activated.</li> <li>If chair is not at the preset location, verify that the position sensors are working correctly. <ul style="list-style-type: none"> <li>Run the chair back through the full range of motion.</li> <li>Verify that the back LED, DS5, is on during the entire range of base travel. If the LED turns off during travel from the lower limit to the upper limit, replace the back position sensor.</li> <li>Verify that the base LED, DS6, is on during the entire range of base travel. The LED will fast blink at the upper limit and momentarily turn off when at the lower limit of travel. If the LED turns off during travel from the lower limit to the upper limit, replace the base position sensor.</li> </ul> </li> </ul> <p><b>NOTE</b> The LED will fast blink at the upper limit and may momentarily turn off when at the lower limit of travel. This is standard operation.</p>
Function halted by additional button press.	This message is displayed if a button is pressed that is halting movement to a preset location.	<ul style="list-style-type: none"> <li>No action is required if button is inadvertently activated during preset movement.</li> <li>If no button was inadvertently activated during preset movement, verify the touchpad and footswitch connections: <ul style="list-style-type: none"> <li>Disconnect all touchpad and footswitch connections.</li> <li>Reconnect one touchpad and/or footswitch at a time until the source of the problem is identified.</li> <li>Verify that the touchpad is securely snapped into the housing.</li> </ul> </li> </ul>
No data communication with A-dec chair circuit board.	A chair movement button was pressed and the touchpad is not connected to a DCS (data) enabled chair circuit board.	<ul style="list-style-type: none"> <li>No action is required if a button is pressed on a system that does not have a DCS (data) enabled chair circuit board, or is not connected to a DCS (data) enabled chair circuit board.</li> <li>If a DCS (data) enabled chair circuit board is connected, verify that the deluxe touchpad is connected to the chair circuit board with a DCS line or a series of lines and connectors. <ul style="list-style-type: none"> <li>Verify that both the deluxe touchpad circuit board's and chair circuit board's data LEDs DS3, are on.</li> <li>If the data LED, DS3, is off on either circuit board, connect a known good data line directly from the deluxe touchpad to the chair circuit board.</li> <li>If the data LEDs now are on, check each data line within the system.</li> <li>Replace any malfunctioning data lines.</li> </ul> </li> </ul>
Chair cannot move due to time limit. Release button and try again.  	This message appears if the base or back is continuously run (on) for over 30 seconds in the base up, back down, or back up directions. This message also appears if the base down is continuously run (on) for over 45 seconds in the base down direction.	<ul style="list-style-type: none"> <li>Verify that the chair is connected properly to the rated Mains Voltage (rated correctly for the power supply and motor).</li> <li>Verify the chair system is on a dedicated circuit breaker (rated for the proper current).</li> <li>If this message appears after the base down travel is complete, verify that the solenoid is properly adjusted</li> </ul>

Message	Description	Possible Resolution
No data communication with Dental light circuit board	The dental light button on a touchpad was pressed, but the touchpad is not connected with the DCS (data) system to a circuit board that supports dental light functions. The following boards support dental light functions: 311 Chair circuit board 511 Chair circuit board Cuspidor circuit board (built-in A-dec relay module) A-dec relay module Dental light relay circuit board	<ul style="list-style-type: none"> <li>No action is required if button is pressed on system that does not have a circuit board with dental light functionality (311 Chair circuit board, 511 Chair circuit board, dental light relay board) or that does not have dental light functionality configured (cuspidor circuit board or A-dec relay module).</li> <li>If the system includes a board with dental light functionality and/or is configured for dental light functionality, verify that the touchpad is connected to the board with a DCS (data) line or a series of lines and connectors.</li> <li>Verify that both the touchpad's circuit board and other supporting circuit board's data LEDs, DS3, are on. <ul style="list-style-type: none"> <li>If the data LED, DS3, is off on either circuit board, connect a known good data line directly from the touchpad to the board.</li> <li>If the data LEDs are now on, check each data line within the system.</li> <li>Replace any malfunctioning data lines.</li> </ul> </li> </ul>
A-dec Relay is Offline	The A-dec relay board is disconnected from the DCS (data) system, had failed, or does not have power.	<ul style="list-style-type: none"> <li>No action required if button pressed is on a system that does not have an A-dec relay board installed.</li> <li>If the system includes a board with dental light functionality and/or is configured for dental light functionality, verify that the touchpad is connected to the board with a DCS (data) line or a series of lines and connectors.</li> <li>Verify that both the touchpad's circuit board and other supporting circuit board's data LEDs, DS3, are on. <ul style="list-style-type: none"> <li>If the data LED, DS3, is off on either circuit board, connect a known good data line directly from the touchpad to the board.</li> <li>If the data LEDs are now on, check each data line within the system.</li> <li>Replace any malfunctioning data lines.</li> </ul> </li> </ul>
Cuspidor is Offline	The cuspidor circuit board is disconnected from the DCS (data) system, had failed, or does not have power.	<ul style="list-style-type: none"> <li>No action required if button pressed is on a system that does not have an A-dec cuspidor circuit board installed.</li> <li>If the system includes a board with dental light functionality and/or is configured for dental light functionality, verify that the touchpad is connected to the board with a DCS (data) line or a series of lines and connectors.</li> <li>Verify that both the touchpad's circuit board and other supporting circuit board's data LEDs, DS3, are on. <ul style="list-style-type: none"> <li>If the data LED, DS3, is off on either circuit board, connect a known good data line directly from the touchpad to the board.</li> <li>If the data LEDs are now on, check each data line within the system.</li> <li>Replace any malfunctioning data lines.</li> </ul> </li> </ul>
Chair disabled by ChairStop Switch	This message appears if the 511 chair's limit switch is activated.	<ul style="list-style-type: none"> <li>Move the chair in a direction so that the limit switch is no longer activated.</li> <li>Verify the limit switch wiring if the message appears and the limit switch is not activated.</li> </ul> <p><b>NOTE</b> On the 511 chair circuit board, DS4, LIMIT SWITCH, will be on when the limit switch is activated and off when not activated.</p>

Message	Description	Possible Resolution
Chair disabled by Cuspidor Stop Function	The cuspidor is not positioned correctly or the switch is disconnected or broken.	Attempt to position the cuspidor into place. If this does not fix the problem, see the troubleshooting information for Cuspidors beginning on page 139.
A-dec Relay Module not configured for this function	A button was pressed for a function that the A-dec relay module controls, but is not configured for.	<ul style="list-style-type: none"> <li>• If the dental light button is pressed when this message appears: <ul style="list-style-type: none"> <li>• No action is required if the system configuration doesn't support this function and a button was inadvertently pressed.</li> <li>• If the system has a dental light wired to a 311 chair board, 511 chair board, or dental light relay board and uses an A-dec relay module for a non-dental light purpose, verify data (DS3) is on for all circuit boards. <ul style="list-style-type: none"> <li>• If the data LED, DS3, is off on any board, connect a known good data line directly from the deluxe touchpad to the chair circuit board or dental light relay board.</li> <li>• If the data LED is now is on, check each data line within the system.</li> <li>• Replace any bad data lines.</li> </ul> </li> <li>• If the user chooses to use the A-dec relay module to activate the dental light: <ul style="list-style-type: none"> <li>• Place the jumper on the A-dec relay module in Testpoint header, P1, Dental Light position.</li> </ul> </li> </ul> </li> <li>• If either the cupfill/Auxiliary 1 or bowl rinse/Auxiliary 2 button is pressed when this message appears: <ul style="list-style-type: none"> <li>• No action is required if the system configuration doesn't support this function and a button is inadvertently pressed.</li> <li>• If the user chooses to use the A-dec relay module to activate Auxiliary 1 or Auxiliary 2, place the jumper on the A-dec relay module's Testpoint header, P1, into the position for the intended purpose, Auxiliary 1 or Auxiliary 2.</li> <li>• If this message appears and it was preferred to activate the cupfill or bowl rinse function on the cuspidor, and an A-dec relay module is in the system and used for a function other than Auxiliary 1 and Auxiliary 2, verify data (DS3) is on for the deluxe touchpad and cuspidor circuit boards. <ul style="list-style-type: none"> <li>• If the data LED, DS3, is off on either board, connect a known good data line directly from the deluxe touchpad to the cuspidor circuit board.</li> <li>• If the data LED is now is on, check each data line within the system.</li> <li>• Replace any bad data lines.</li> </ul> </li> </ul> </li> </ul>

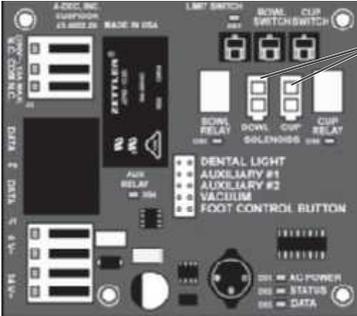
Message	Description	Possible Resolution
Too many handpieces. Hang up unused hdpcs.	In various Setup mode options, only one handpiece can be removed at a time.	<ul style="list-style-type: none"> <li>• If two handpieces configured as ultrasonic instrument, Turbine, or Electric are removed at the same time, no action is required.</li> <li>• Verify that only one handpiece configured as a ultrasonic instrument, Turbine, or Electric is removed at a time. Run the touchpad's Handpiece Setup for any handpieces that need to be reconfigured.</li> <li>• Verify all handpiece locations configured for ultrasonic instrument, Turbine, or Electric have handpieces in their holders, and their respective holder switch is activated.</li> <li>• Verify that the control head switch handpiece holder air switches and tubing are plumbed correctly.</li> <li>• Verify that control head holder positions without handpieces have a holder valve that is inactive (locked).</li> <li>• Verify that the assistant's instrumentation with auto-electric switches are properly wired, configured, and activated when not in use.</li> </ul>
Ehpc Controller is Offline.	This help message is displayed in the Setup routine when the deluxe touchpad is unable to communicate through DCS with the Electric Handpiece Motor Controller.	<ul style="list-style-type: none"> <li>• For systems without a Motor Controller, run Handpiece Setup on the deluxe touchpad for each handpiece and verify that no handpieces are configured as an Electric type. Any handpieces configured as Electric will need to be changed to their appropriate type.</li> <li>• For systems with a Motor Controller, verify the Motor Controller is connected to the DCS (data) system and is powered on. Verify data connections between the Motor Controller and deluxe touchpad.</li> <li>• If either the Motor Controller's data LED (C) is off and/or the deluxe touchpad's data LED (DS3) is off, connect a known (good) data line from the deluxe touchpad to the Motor Controller.</li> <li>• If the LEDs are now on solid, check each data line within the system.</li> <li>• Replace any bad data line.</li> </ul>
There is no IOLS for this hdpc. Please rtn hdpc.	This help message is displayed in the Setup routine when a handpiece can't be configured for Intraoral Light Source.	Only the four holder positions (1 through 4) of the control head circuit board can be configured for IOLS.
<p><b>Power loss during use. Settings may have changed. Press a button to continue.</b></p> 	An electric handpiece or ultrasonic instrument is out of its holder at the time that power is turned on to the system.	<ul style="list-style-type: none"> <li>• This message may display while a handpiece is being used, after a temporary loss of power to the system. Verify that applicable handpiece settings are correct. Settings may have changed.</li> <li>• This message may display when a system's power is turned on. <ul style="list-style-type: none"> <li>• Verify that electric handpieces and ultrasonic instruments are properly located in their holders when the system power is turned on.</li> <li>• Verify the control head's electrical switch wiring to the QVIOLS or deluxe touchpad (if no QVIOLS is present).</li> <li>• Verify that the applicable handpiece's settings are correct. Settings may have changed.</li> </ul> </li> </ul>

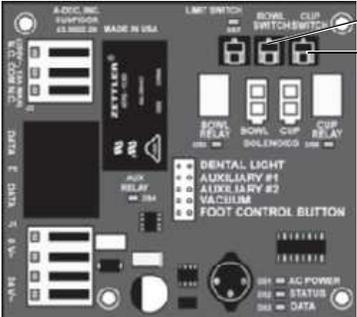
# Cuspidor

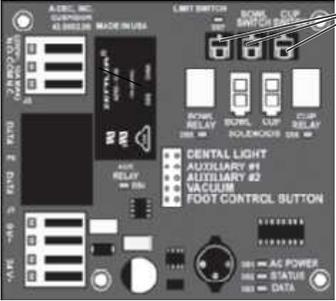
Table contains tips and troubleshooting information to assist in diagnosing cuspidor problems. This table is not intended to cover every situation, but includes the most common problems that you may encounter.

Problem	Possible Cause	Action
DS1 - AC Power LED	Off	No 24 VAC power, tripped circuit breaker, power supply turned off, no line voltage.
	<b>Green</b> , steady	24 VAC at terminal strip.
DS2 - Status LED	Off	System is not functioning, no power or circuit board has failed.
	<b>Green</b> , steady	Normal condition.
DS3 - Data LED	Off	No DCS communication, not connected to the data communication system, the DCS has failed.
	<b>Green</b> , steady	Active DCS detected.
	<b>Green</b> , blinking	Valid DCS message.
DS4 - Auxiliary relay LED	Off	Auxiliary relay is off.
	<b>Yellow</b>	Auxiliary relay is on.
DS5, DS6 - Bowl rinse/cupfill relays	Off	Relay is off.
	<b>Yellow</b>	Relay is on.
DS7 - Cuspidor limit switch LED	Off	Limit switch is not activated (closed).
	<b>Red</b>	Limit switch is activated (open).
Water drips from the cupfill spout	The cupfill solenoid has failed.	<ol style="list-style-type: none"> <li>1. Using the master on/off toggle, turn the unit off.</li> <li>2. Use a syringe to bleed the dental unit water pressure.</li> <li>3. Remove the cupfill solenoid and replace.</li> </ol>
Water drips from the bowl rinse spout	The bowl rinse solenoid has failed.	<ol style="list-style-type: none"> <li>1. Flip the master on/off toggle to the off position.</li> <li>2. Use a syringe to bleed the dental unit water pressure.</li> <li>3. Replace the bowl rinse water solenoid.</li> </ol>

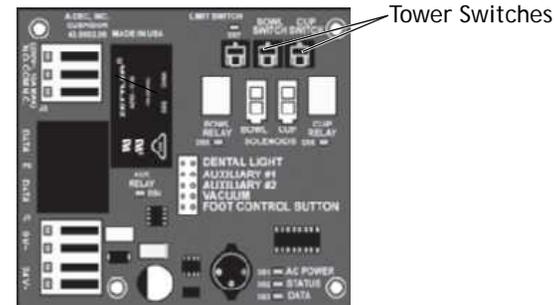
Problem	Possible Cause	Action
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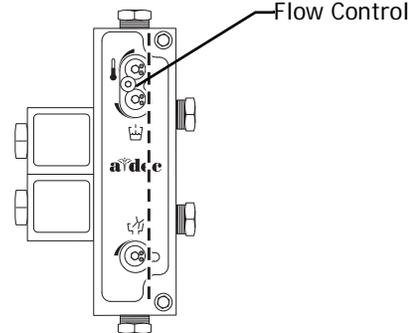
<p>Cupfill and bowl rinse functions are switched.</p>	<p>The cuspidor water solenoid connectors are reversed on the cuspidor circuit board.</p>	<p>Switch water solenoid connections at P6 and P7.</p>  <p>Water Solenoid Connections</p>
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<p>Cupfill and bowl rinse functions are switched at the tower buttons only (touchpads operate normally).</p>	<p>The cuspidor tower switch connectors are reversed on the cuspidor circuit board.</p>	<p>Switch tower switch connections at P2 and P3.</p>  <p>Bowl Rinse Switch Cupfill Switch</p>
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Problem	Possible Cause	Action
Water runs constantly from either the cupfill or bowl rinse spout. The red LED (DS7) is illuminated on the cuspidor circuit board.	The cuspidor stop switch connector is reversed with one of the cuspidor tower switch connectors.	<p>The red LED (DS7) on the cuspidor circuit board is illuminated.</p> <ol style="list-style-type: none"> <li>1. Disconnect all three switch connectors from the cuspidor circuit board. One at a time, connect each of the switch connectors to the cuspidor circuit board until the red LED goes out.</li> <li>2. Connect one of the remaining switch connectors to P3 on the cuspidor circuit board, and the other switch connector to P2.</li> <li>3. Verify that a cupfill cycle runs when requested from the cuspidor tower cupfill button.</li> <li>4. If the bowl rinse runs, swap the two switch connections to the cuspidor circuit board.</li> </ol>
		
Cupfill spout sputters air/water.	The self-contained water bottle is empty or nearly empty.	Refill the bottle.
The cupfill spout sputters excessively.	The cuspidor air trap valve is faulty.	Remove and replace the air trap valve.
Cuspidor works but the red LED (DS7) on the cuspidor circuit board is illuminated.	The cuspidor stop switch is activated or the wiring is faulty.	<ol style="list-style-type: none"> <li>1. Remove any obstacles from under the cuspidor bowl.</li> <li>2. Disconnect the cuspidor stop switch from P4 on the cuspidor circuit board; install the jumper from P1 on the cuspidor circuit board.</li> <li>3. If the red LED on the cuspidor circuit board goes out, the cuspidor stop switch or wiring is faulty and must be replaced.</li> </ol>

Problem	Possible Cause	Action
Bowl rinse button on the cuspidor tower does not work. The function does work from the touchpad.	Cuspidor tower bowl rinse button assembly is faulty or is disconnected from the cuspidor circuit board P2 connector.	<p>Visually inspect the cuspidor circuit board. Ensure that the cuspidor tower switches are connected.</p> <ul style="list-style-type: none"> <li>• P2 - Bowl rinse switch</li> <li>• P3 - Cupfill switch</li> </ul> <p>If the switches are connected, check the continuity of the bowl rinse switch with an Ohm meter. With the bowl rinse switch held down (closed), it should measure less than ten Ohms. If it measures "open" across the closed switch, remove and replace the bowl rinse switch assembly (p/n 43.0010.00).</p> <p><b>NOTE</b> Switching switch assemblies at P2 and P3 allows verification that the switch assembly is defective.</p>
Cupfill button on the cuspidor tower does not work. The function does work from the touchpad.	Cuspidor tower cupfill button assembly is faulty or is disconnected from the cuspidor circuit board P3 connector.	<p>Visually inspect the cuspidor circuit board, ensure that the cuspidor tower switches are connected:</p> <ul style="list-style-type: none"> <li>• P2 - Bowl Rinse Switch</li> <li>• P3 - Cupfill Switch</li> </ul> <p>If the switches are connected, check the continuity of the cupfill switch with an Ohm meter. With the cupfill switch held down (closed), it should measure less than ten Ohms. If it measures "open" across the closed switch, remove and replace the cupfill switch assembly (p/n 43.0010.00).</p> <p><b>NOTE</b> Switching switch assemblies at P2 and P3 allows verification that the switch assembly is defective.</p>



Problem	Possible Cause	Action
Inadequate or excessive cupfill water flow	The cupfill water flow needs adjustment	Open the cupfill flow controls for full water flow. Turn the flow controls to adjust the water flow.
		
Inadequate or excessive cupfill water flow (continued).	The self-contained water system 40 psi regulator has failed	<p>Test the 40 psi regulator:</p> <ol style="list-style-type: none"> <li>1. Turn the dental unit off using the master on/off toggle.</li> <li>2. Remove the water bottle from the dental unit and set it aside.</li> <li>3. Remove the air bleed setscrew from the water bottle receptacle assembly and set it aside.</li> <li>4. Install an 1/8" barb with washer in the port where the air bleed setscrew was removed.</li> <li>5. Connect an air pressure gauge to the 1/8" barb using the 1/8" tubing.</li> <li>6. Turn the dental unit ON. The air pressure reading on the gauge should be 35 - 40 psi.</li> </ol> <p>If a reading of 35-40 psi could not be obtained at the air bleed setscrew port, the water bottle receptacle is faulty and must be replaced.</p>
Inadequate or excessive cupfill water flow (continued).	The self-contained water system 40 psi regulator has failed.	<p>If a reading of 35 - 40 psi could not be obtained at the air bleed setscrew port, the 40 psi regulator is faulty and must be replaced as follows:</p> <ol style="list-style-type: none"> <li>1. Turn the dental unit off using the master on/off toggle on the delivery system.</li> <li>2. Remove the water bottle cap assembly from the post or side support.</li> <li>3. Remove and replace the water bottle receptacle.</li> <li>4. Reinstall the water bottle cap assembly and water bottle.</li> <li>5. Turn the dental unit on and test the cupfill function for adequate water pressure.</li> </ol>
Inadequate or excessive cupfill water flow (continued).	The self-contained water system air bleed set screw is partially clogged with debris.	<ol style="list-style-type: none"> <li>1. Use the master on/off toggle, to turn the dental unit off, and remove the water bottle.</li> <li>2. Remove the air bleed setscrew from the water bottle cap assembly and clean it of debris, or replace it.</li> <li>3. Reinstall the setscrew in the water bottle cap assembly and replace the water bottle.</li> <li>4. Turn the dental unit on and test the cupfill function.</li> </ol>

Problem	Possible Cause	Action
Inadequate bowl rinse water flow.	The bowl rinse water flow must be adjusted.	Adjust the bowl rinse flow clockwise to increase water flow, or counterclockwise to decrease flow, (one full turn from minimum to maximum).
	The water filter element is partially plugged.	Check for plugged water regulator filter element. <ol style="list-style-type: none"> <li>1. Close the city water manual shut-off valve in the floor box and bleed the cuspidor bowl rinse water pressure, using the bowl rinse function.</li> <li>2. Turn the dental unit off using the master on/off toggle on the delivery system and remove the water regulator filter element cap. Remove and discard the filter element.</li> <li>3. Install a new filter element on the water regulator and reinstall the filter cap.</li> <li>4. Open the city water manual shut-off valve. Turn the dental unit on using the master on/off toggle, and test the bowl rinse function for adequate water flow.</li> </ol>
	There is a kinked hose.	Check for a restriction downstream from the filter. Locate and eliminate any kinks in the blue 5/16" bowl rinse water tube.
Bowl rinse function does not work from the cuspidor tower and/or the touchpad bowl rinse button. The cupfill function does work.	The bowl rinse relay on the cuspidor circuit board has failed.	At the cuspidor circuit board, swap the water solenoid connectors at P6 and P7. Press the cupfill button on any touchpad or the cupfill switch on the cuspidor tower, if the bowl rinse runs, remove and replace the cuspidor circuit board.
	The cuspidor data line is damaged.	Ensure that the cuspidor tower switches are connected: <ul style="list-style-type: none"> <li>• P2 - Bowl rinse switch</li> <li>• P3 - Cupfill switch</li> </ul> Disconnect the data line from the cuspidor and press the bowl rinse switch on the cuspidor tower. If the bowl rinse runs, remove and replace the cuspidor data line.
	The bowl rinse solenoid has failed.	Remove and replace the bowl rinse water solenoid.
Cupfill function does not work from the cuspidor tower and/or from any touchpad cupfill button. The bowl rinse function does work.	The cupfill relay on the cuspidor circuit board has failed.	Swap the water solenoid connectors at P6 and P7, at the cuspidor circuit board. Press Bowl Rinse on any touchpad or the bowl rinse switch on the cuspidor tower. If the cupfill runs, remove and replace the cuspidor circuit board.
	The cuspidor data line is damaged.	Ensure that the cuspidor tower switches are connected correctly: <ul style="list-style-type: none"> <li>• P2 - Bowl rinse switch</li> <li>• P3 - Cupfill switch</li> </ul> Disconnect the data line from the cuspidor and press the cupfill switch on the cuspidor tower. If the cupfill runs, remove and replace the cuspidor data line.
	The cupfill water solenoid has failed.	Remove and replace the cupfill water solenoid.

# Floor Box

Table contains tips and troubleshooting information to assist in diagnosing floor box problems. This table is not intended to cover every situation, but includes the most common problems that you may encounter.

Problem	Possible Cause	Action
Unit air pressure drops when unit is in use.	Plugged filter element in air filter/regulator.	<ol style="list-style-type: none"><li data-bbox="997 349 2005 381">1. Flip the master on/of toggle to the on position and remove the floor box cover.</li><li data-bbox="997 381 2005 446">2. Locate and observe the air pressure gauge in the floor box while pressing the syringe air button.</li></ol> If the air pressure drops more than 15 psi, the air filter is clogged. Replace filter.

# Clinical Products

## Warm Water Syringes

This table contains tips and troubleshooting information to assist you in diagnosing the most common warm water syringe problems that you may encounter.

Problem	Possible Cause	Action
Water is cold or at room temperature (not heated).	No 24 VAC power to the warm water circuit board.	<ul style="list-style-type: none"> <li>If DS1 (AC power) is off, check for 24 VAC at J1.</li> <li>If no 24 VAC at J1, then verify power to the system, check for tripped circuit breakers and adequate air pressure at power supply air-electric switches.</li> </ul>
	Warm water circuit breaker has failed	<ul style="list-style-type: none"> <li>If DS1 (AC power) is on and DS2 (Status) is off, turn system off and back on.</li> <li>If DS2 (status) remains off, then replace the circuit board.</li> </ul>
	Heater wire is disconnected or broken.	<ol style="list-style-type: none"> <li>Verify heater wires connected to J2.</li> <li>Check continuity of heater wires with Ohm meter. (3.7 Ohms @ 77°F (25°C)).</li> <li>If heater wires are broken, replace the syringe tubing assembly.</li> </ol>
	Thermistor wires are disconnected or broken.	<ol style="list-style-type: none"> <li>Verify thermistor wires are connected to P3.</li> <li>Check continuity of thermistor wires with an Ohm meter. (3.7 Ohms @ 77°F (25°C))</li> <li>If thermistor wires are broken, replace the syringe tubing assembly.</li> </ol>
Water is warm, but not warm enough.	Jumper on the warm water circuit board is missing (P1).	<ol style="list-style-type: none"> <li>Verify there is a black jumper on the temperature header (P1).</li> <li>If no jumper, add a jumper to header P1.</li> </ol>
	Jumper setting on the temperature header (P1) is too low.	<ol style="list-style-type: none"> <li>Move the jumper on P1 one position toward "MAX" and test the syringe.</li> <li>Repeat until desired water temperature is reached.</li> </ol>
Water is too hot.	Jumper setting on the temperature header (P1) is too high.	<ol style="list-style-type: none"> <li>Move the jumper on P1 one position toward "MIN" and test the syringe.</li> <li>Repeat until desired water temperature is reached.</li> </ol> <p><b>NOTE</b> The micro controller averages the two selections together if two jumpers are installed. Only the lowest two jumpers are recognized if three or more are installed.</p>
	One or both thermistors are not in contact with the syringe heated tubing.	Replace the syringe tubing assembly.

This table contains tips and troubleshooting information to assist you in diagnosing the most common warm water syringe problems that you may encounter.

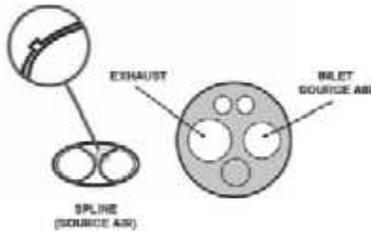
**Table 12. Warm Water Syringe Circuit Board LEDs**

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
DS1 AC power	Off	No 24 VAC power.
	<b>Green</b> , steady	24 VAC at the terminal strip.
DS2 Status	Off	System is not functioning.
	<b>Green</b> , steady	Normal operation.
DS3 Not used	Off	Reserved for future use.
DS4 Heater output	Off	Heater output is off.
	<b>Green</b> steady or blinking	Heater output is on when LED is on.
DS5 Thermistors	Off	Thermistors are not connected to P3.
	<b>Yellow</b> , steady	Normal operation.
	<b>Yellow</b> , blinking	One or both thermistors at high temperature threshold. Water heater is disabled.

## Tooth Dryer

Table contains tips and troubleshooting information are listed in the table to assist in diagnosing tooth dryer problems. This table is not intended to cover every situation, but includes the most common problems that may be encountered.

Problem	Possible Cause	Action
Tooth dryer is not producing warm air.	Drive air pressure set too low.	Measure the drive air pressure at the handpiece. Set it between 60 and 80 psi for correct tooth dryer function.
	Tooth dryer has internal contamination.	<ol style="list-style-type: none"> <li>1. Remove the tooth dryer from the handpiece tubing.</li> <li>2. Spray electronics degreaser into the exhaust port of the tooth dryer for five to ten seconds.</li> <li>3. Shake out the excess degreaser.</li> <li>4. Dry the tooth dryer by placing it back on its own dedicated handpiece tubing and operate the tooth dryer for ten to fifteen seconds.</li> </ol>
	Drive air is connected to the exhaust tube on the tooth dryer.	Ensure the splined tube of the dedicated handpiece tubing is connected to drive air.



The diagram illustrates the internal components of a tooth dryer. It shows a circular cross-section with three main ports: a top port labeled 'EXHAUST', a bottom port labeled 'INLET (SOURCE AIR)', and a side port labeled 'SPLINE (SOURCE AIR)'. A splined tube is shown inserted into the side port, and a separate tube is shown connected to the top exhaust port.

Tooth dryer tip fell off.	Teflon tip glue has failed during sterilization.	Glue tip back in place with an instant adhesive.
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## A-dec Intraoral Camera

(October 2003- January 2007)

This table contains tips and troubleshooting information are listed in the table to assist in diagnosing A-dec intraoral camera (October 2003 -January 2007) problems. This table is not intended to cover every situation, but includes the most common problems that may be encountered.

Problem	Possible Cause	Action
Camera LEDs turn on, then off.	Video input and output cable connectors on the back of the camera module are reversed.	Verify video input and output are on the correct connectors on the back of the camera module.
Camera is not functioning.	Monitor is not turned on.	Turn ON monitor.
	Monitor is not receiving power.	Replace power cord to monitor.
Camera is not functioning, the monitor is on. Camera is removed from tubing but color bars are displayed.	Camera is faulty.	Replace the camera.
	The monitor is not receiving a signal, or is malfunctioning.	Check the video connection, and make sure the monitor is set to the correct video mode.
		Connect a known good video cable to the monitor. If it works, install the new cable.
	Connect the monitor to another device (TV or PC). If the monitor functions, the problem is the result of another issue.	
One or more LEDs do not illuminate when camera is in use.	The LED has burned out.	If two LEDs do not illuminate, replace the camera. You can use the camera with one LED burned out, but the image is darker.
Monitor image is blurry.	The transparent side of the disposable barrier is not sticking to the camera lens.	Adjust the disposable barrier so the transparent side is sticking to the camera lens.
Monitor image is indistinct or "rolls."	Monitor settings are incorrect.	Refer to the monitor owner's manual for factory default and settings instruction.
	Monitor and camera video standards do not match.	Replace the monitor with one whose video standard matches the standard marked on the camera (NTSC or PAL).
	Monitor uses outdated technology.	Install a newer model of monitor marked on the camera (NTSC or PAL).

## Sopro Intraoral Cameras (717 and 595)

Table contains tips and troubleshooting information to assist in diagnosing Sopro 717 and 595 intraoral camera problems. The table is not intended to cover every situation, but includes the most common problems that you may encounter.

Problem	Possible Cause	Action
No video.	No power to DockMU module	<ol style="list-style-type: none"> <li>1. Check for 24 VAC at input of DockMU module.</li> <li>2. If no volt or voltage less than 24 VAC correct power supply issue.</li> </ol>
	Problem with monitor or computer	Verify proper operation of monitor or computer.
	Problem with video cable or USB cord	<ol style="list-style-type: none"> <li>1. Substitute a known good video cable or USB cord.</li> <li>2. If problem corrected, replace video cable or USB cord.</li> </ol>
	Defective DockMU module	<ol style="list-style-type: none"> <li>1. Substitute another DockMU module.</li> <li>2. If problem corrected, replace DockMU module.</li> </ol>
Camera does not "go live"	Camera or cord connector damaged	<ol style="list-style-type: none"> <li>1. Inspect camera and cord connector for twisting or damage.</li> <li>2. If damaged repair camera or replace cord.</li> </ol>
	Camera defective	<ol style="list-style-type: none"> <li>1. Try another camera.</li> <li>2. If problem corrected, have camera repaired.</li> </ol>
	Air electric switch or wiring	<ol style="list-style-type: none"> <li>1. Place a jumper between terminals 1 &amp; 2.</li> <li>2. If camera goes live check wiring and air electric switch for proper operation. Repair as needed.</li> </ol>
	Camera cord connections to DockMU	Verify Camera cord wires are properly connected at DockMU module. Repair as needed.
	DockMU module defective	<ol style="list-style-type: none"> <li>1. Try another DockMU module.</li> <li>2. If problem corrected, replace DockMU module.</li> </ol>
	Camera cord	<ol style="list-style-type: none"> <li>1. Substitute another camera cord.</li> <li>2. If problem corrected, replace camera cord.</li> </ol>
Dust or black dot in image	Camera has dust in lens	Have camera repaired.
Poor image quality	Monitor	<ol style="list-style-type: none"> <li>1. Verify monitor properly connected and adjusted.</li> <li>2. Correct monitor wiring and adjustment as needed.</li> </ol>
	Camera	<ol style="list-style-type: none"> <li>1. Substitute another camera.</li> <li>2. If problem corrected, have camera repaired.</li> </ol>
Cannot freeze image (touchfreeze)	DockMU setting	<ol style="list-style-type: none"> <li>1. DockMU jumper not set to touchfreeze.</li> <li>2. Set jumper to touchfreeze.</li> </ol>

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
	DockMU wiring	<ol style="list-style-type: none"> <li>1. Check green and yellow wire connections at DockMU.</li> <li>2. Repair as needed.</li> </ol>
	Camera	<ol style="list-style-type: none"> <li>1. Substitute another camera.</li> <li>2. If problem corrected, have camera repaired.</li> </ol>
Cannot freeze image (footpedal)	DockMU setting	<ol style="list-style-type: none"> <li>1. DockMU jumper not set to footpedal.</li> <li>2. Set jumper to footpedal.</li> </ol>
	DockMU wiring	<ol style="list-style-type: none"> <li>1. Check blue and violet wire connections at DockMU pins 9 &amp; 10.</li> <li>2. Repair as needed.</li> </ol>
	Air electric switch	<ol style="list-style-type: none"> <li>1. Check air electric switch and associated wiring for proper operation.</li> <li>2. Repair as needed.</li> </ol>

## SP Newtron

Table contains tips and troubleshooting information to assist in diagnosing SP Newtron ultrasonic instrument problems. The table is not intended to cover every situation, but includes the most common problems that you may encounter.

Problem	Possible Cause	Action
No water.	Water turned off.	Check that water is turned on.
	Obstruction in tip or wrong tip.	<ol style="list-style-type: none"> <li>1. Remove tip from handpiece.</li> <li>2. Check for water. If water adequate replace tip. Make sure tip has a water port. Tips designed to be used without water may not have a water port.</li> </ol>
	Obstruction in handpiece.	<ol style="list-style-type: none"> <li>1. Remove handpiece from cord.</li> <li>2. Check for water. If no water, replace handpiece.</li> </ol>
	Obstruction in line.	<ol style="list-style-type: none"> <li>1. Remove handpiece and tip.</li> <li>2. If no water, disconnect handpiece tubing water connection.</li> <li>3. If water is present at connection point, replace handpiece tubing.</li> <li>4. If no water present at handpiece tubing connection, check unit water supply.</li> </ol>
Handpiece leaks water.	Tip without water port.	If tip type does not have a water port, turn off water or use tip with water port.
	Water leak at handpiece connector.	<ol style="list-style-type: none"> <li>1. Replace small handpiece o-ring.</li> <li>2. Inspect handpiece tubing for cracks around water port. If cracked, replace handpiece tubing.</li> <li>3. If handpiece still leaks, replace handpiece.</li> </ol>
No vibration or low vibration power.	Defective, worn, or broken tip.	Try new tip. If vibration is correct, replace tip.
	Defective handpiece.	Try another handpiece. If vibration ok replace handpiece.

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
	Broken wires in handpiece tubing.	<ol style="list-style-type: none"> <li>1. Disconnect handpiece tubing connector at SP Newtron module.</li> <li>2. Check for continuity between orange wire and center pin of handpiece connector.</li> <li>3. Check for continuity between black wire and left pin of handpiece connector.</li> <li>4. If either wire is open, replace handpiece tubing.</li> </ol>
	No power to module.	<ol style="list-style-type: none"> <li>1. Select ultrasonic instrument and depress foot pedal.</li> <li>2. Check for 24VAC at SP Newtron harness grey and black wires.</li> <li>3. If no volt or if voltage less than 24 VAC, correct power supply issue.</li> </ol>
	Power level low or missing (digital).	<ol style="list-style-type: none"> <li>1. Set digital display to 100% power level. Check voltage at blue and brown wires. Note the brown wire is the ground reference. Voltage should change from 0 to 5 volts as foot pedal is depressed (0 - 100%).</li> <li>2. Repair or correct wiring as needed.</li> </ol>
	Power level low or missing (potentiometer).	<ol style="list-style-type: none"> <li>1. Check white and brown wires resistance should change from 0 to 4.7k ohms as power level is adjusted from 1 to 10.</li> <li>2. Repair wiring or potentiometer.</li> </ol>
	Defective SP Newtron module.	<ol style="list-style-type: none"> <li>1. Substitute another SP Newtron module.</li> <li>2. If vibration is correct, replace module.</li> </ol>

## MiniLED

Table contains tips and troubleshooting information to assist in diagnosing MiniLED curing light problems. The table is not intended to cover every situation, but includes the most common problems that you may encounter.

Problem	Possible Cause	Action
No power to handpiece (Green HP LED is off).	No power to MiniLED module.	Check for 24 VAC at input of MiniLED module. If no volt or if voltage is less than 24 VAC, correct power supply issue.
	No power output at MiniLED module.	<ol style="list-style-type: none"> <li>1. Check for 5 VDC at MiniLED module output.</li> <li>2. If no voltage or voltage is low, replace MiniLED module.</li> </ol>
	Broken wires in MiniLED cord.	<ol style="list-style-type: none"> <li>1. Disconnect MiniLED cord wires at MiniLED module.</li> <li>2. Check for continuity between Red wire and center circle of HP connector.</li> <li>3. Check for continuity between black wire and outer ring of HP connector.</li> <li>4. If either wire is open, replace MiniLED cord.</li> </ol>
	Defective MiniLED handpiece.	Replace or repair MiniLED handpiece.
Low (Blue) curing light output.	Low power to MiniLED module.	<ol style="list-style-type: none"> <li>1. Check for 24 VAC at input of MiniLED module.</li> <li>2. If no volt or if voltage less than 24 VAC, correct power supply issue.</li> </ol>
	Low power output at MiniLED module.	<ol style="list-style-type: none"> <li>1. Check for 5 VDC at MiniLED module output.</li> <li>2. If no voltage or voltage is low, replace MiniLED module.</li> </ol>
	Defective MiniLED handpiece.	Replace or repair MiniLED handpiece.
Cannot start cure cycle or change modes.	Defective MiniLED handpiece.	Replace or repair MiniLED handpiece.
Light guide loose in handpiece.	Defective MiniLED handpiece.	Replace or repair MiniLED handpiece.

## EA-50/51LT Electric Micromotor

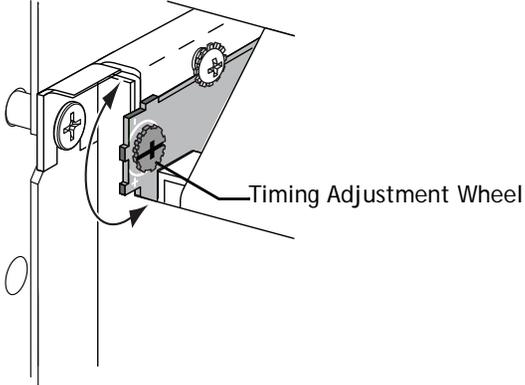
This table contains tips and troubleshooting information to assist in diagnosing electric micromotor problems. The table is not intended to cover every situation, but includes the most common problems that you may encounter.

Problem	Possible Cause	Action
Micromotor does not function.	Handpiece position is not programmed for electric handpiece on deluxe touchpad.	Program handpiece position for electric handpiece one if it is wired to terminal one on the micromotor controller. Program as electric handpiece two if it is wired to terminal two on the micromotor controller.
	Deluxe touchpad is programmed incorrectly.	Program handpiece position for electric handpiece one if it is wired to terminal one on the micromotor controller. Program as electric handpiece two if it is wired to terminal two on the micromotor controller.
	Micromotor is malfunctioning.	<ol style="list-style-type: none"> <li>1. Verify the "R" (ready) LED is lit and green indicating micromotor is supplied 24 VAC.</li> <li>2. Verify the "C" (communication) LED is lit and green indicating a good data cable.</li> <li>3. Replace the micromotor. If the replacement micromotor functions correctly, return problem motor to A-dec.</li> </ol>
	Faulty data line from micromotor controller to delivery system circuit board.	Verify the error LED on the micromotor controller is blinking red. Replace the data line.
Light is not working.	Bulb is burned out.	Replace bulb with dimple facing out.
Micromotor gets too warm to hold.	Water coolant is off.	Turn air and water coolant ON. If the problem continues, contact A-dec Customer Service.
	Drive air set too low.	Verify drive air is set at 60 psi.
Micromotor lacks cutting power with carbide burs.	Motor is in reverse.	Change setting on deluxe touchpad to "forward."
Micromotor lacks cutting power.	Drive air set too low.	Verify drive air is set at 60 psi.
Water leaking between micromotor and handpiece.	Defective O-rings.	Change all three O-rings.
Air or water leaking between micromotor and tubing.	Defective O-ring in tubing insert.	Change O-ring in tubing insert.

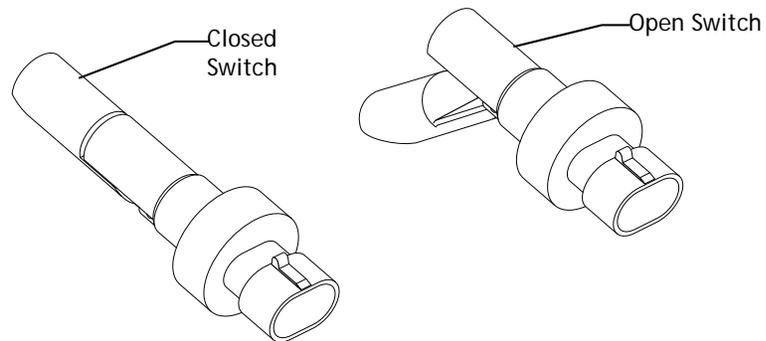
## ICV

This table contains tips and troubleshooting information to assist in diagnosing ICV problems. The table is not intended to cover every situation, but includes the most common problems that you may encounter.

Problem	Possible Cause	Action
ICV is not starting and the panel power (status) indicator is OFF.	Panel wiring harness is not connected to the controller circuit board.	Verify that the panel wiring harness is properly connected to the controller and panel circuit board and that it is not damaged.
	No power to the controller circuit board.	<ol style="list-style-type: none"> <li>1. Verify DS1 (AC Power) on the controller circuit board is ON.</li> <li>2. If DS1 is OFF, verify mains power is available at P11.</li> <li>3. Verify that the mains circuit breaker is not tripped.</li> </ol>
	ICV controller circuit board failure.	Remove and replace the controller circuit board.
ICV is not starting and the panel power (status) indicator is ON.	Panel wiring harness is not properly connected to the controller circuit board.	<ol style="list-style-type: none"> <li>1. Verify that the panel wiring harness is properly connected to the controller and panel circuit board.</li> <li>2. Verify the continuity of the panel to controller wiring harnesses.</li> </ol>
	Temporary/permanent controller circuit board failure.	<ol style="list-style-type: none"> <li>1. Verify DS1 (AC power) on the controller circuit board is ON.</li> <li>2. Verify DS2 (status) on the controller circuit board is ON. <ul style="list-style-type: none"> <li>• If DS2 is OFF and DS1 in ON, cycle power to the circuit board by disconnecting mains power from P11 for five seconds. Reconnect the power.</li> <li>• If DS1 is ON and DS2 remains OFF, replace the controller circuit board.</li> <li>• If DS1 and DS2 are ON, disconnect the tank fluid level sensor at P6.</li> <li>• Verify DS6 is ON.</li> </ul> </li> <li>3. If DS6 remains OFF with the level sensor disconnected, cycle power to the circuit board by disconnecting mains power from P11 for five seconds. <ul style="list-style-type: none"> <li>• Reconnect power.</li> <li>• If DS6 remains OFF with the fluid level sensor disconnected, replace the controller circuit board.</li> </ul> </li> </ol>
	Panel wiring harness or panel circuit board failure.	<ol style="list-style-type: none"> <li>1. Disconnect the panel wiring harness from P4 (Operator A) on the controller circuit board (P5 for Operator B).</li> <li>2. Verify the continuity of the panel to controller wiring harnesses.</li> <li>3. Momentarily short pin 1 to pin 2 on P4 or P5. If a flush cycle starts, remove and replace the panel circuit board. If a flush cycle will not start, remove and replace the controller circuit board.</li> </ol> <p><b>TIP</b> Use a circuit board jumper (p/n 041.427.01) to momentarily short the pins.</p>
	For a dual panel configuration, trying to run both panels simultaneously.	Only one panel can run at a time. If a flush cycle is started at one panel, that panel must complete its timed cycle before the second panel starts.

Problem	Possible Cause	Action
Flush cycle is too long or too short	Flush cycle timing requires adjustment.	Turn the timing adjustment wheel towards the “-” to decrease the flush cycle run time; towards the “+” to increase.  <b>TIP</b> The cycle run time can be adjusted from 20 seconds to 150 seconds.
		
The low fluid indicator on the panel is always ON.	Low fluid in the fluid reservoir.	Verify the reservoir is not low on fluid. On the side of the reservoir, verify the fluid level is above the 32 oz. mark.
	The reservoir fluid level sensor switch is disconnected or not properly connected to the controller circuit board.	Verify the reservoir fluid level sensor connections from the controller circuit board to the reservoir fluid level sensor.

Problem	Possible Cause	Action
	The reservoir fluid level sensor has failed or is installed upside down in the fluid reservoir.	The reservoir fluid level sensor is a normally open switch. When the float on the switch is raised, the switch closes. Check the continuity of the switch. The switch should close when the float is raised; open when the float is allowed to drop.  <b>CAUTION</b> Do not remove the reservoir fluid level sensor from the tank until the reservoir has been emptied of fluid.  <b>TIP</b> Installing a circuit board jumper (p/n 041.427.01) at P6 on the controller circuit board should result in DS6 turning off. If DS6 does not turn off, remove and replace the controller circuit board.



Problem	Possible Cause	Action
The low fluid Indicator on the panel is always OFF.	Shorted connection to the reservoir fluid level sensor.	Verify the reservoir fluid level sensor connections from the controller circuit board to the reservoir fluid level sensor.
	The reservoir fluid level sensor has failed.	The reservoir fluid level sensor is a normally open switch. When the float on the switch is raised, the switch closes. Check the continuity of the switch. The switch should close when the float is raised; open when the float is allowed to drop.  <b>CAUTION</b> Do not remove the reservoir fluid level sensor from the reservoir until the reservoir has been emptied of fluid.
	Temporary/permanent controller circuit board failure.	Disconnect reservoir fluid level sensor from P6 on the controller circuit board, verify DS6 is ON. <ul style="list-style-type: none"> <li>If DS6 is ON, the reservoir fluid level sensor or wiring has failed.</li> <li>If DS6 is OFF, reconnect the level sensor to P6 and cycle power to the circuit board by disconnecting mains power from P11 for 5 seconds. After reconnecting power verify DS2 is ON and that DS6 remains off.</li> <li>Disconnect reservoir fluid level sensor from P6 on the controller PCB, verify DS6 is ON. If DS6 is off, replace the controller circuit board.</li> </ul>
The ICV activates, but no fluid is used.	Fluid supply tubing to the panel has become disconnected or kinked.	Verify the tubing connections and that there are no kinks in the tubing.
	Solenoid is not properly connected to the controller circuit board.	Verify solenoids connections and wiring. Check the solenoid connections at P1 and P2 on the controller circuit board.
	Solenoid has failed.	Check the resistance of the solenoid coil for 20 Ohms +/- 2 Ohms
	Controller circuit board solenoid relay failure.	<ul style="list-style-type: none"> <li>For single treatment room configurations; move the panel and solenoid connections on the controller circuit board to the available operatory position.</li> <li>For dual treatment room configurations; temporarily swap the panel and solenoid connections on the controller circuit board.</li> </ul>

This table contains tips and troubleshooting information to assist in diagnosing ICV problems. The table is not intended to cover every situation, but includes the most common problems that you may encounter.

Icon/LED	ICV Panel A or B
Power (A-dec logo)	Off = ICV is not functioning. <b>Blue steady</b> = normal condition (ready for use).
Cycle indicator	Off = Flush cycle is not running. <b>Yellow steady</b> = Flush cycle is running.
Low fluid	Off = Fluid reservoir has sufficient fluid. <b>Yellow steady</b> = Fluid reservoir is low on fluid.

This table contains tips and troubleshooting information to assist in diagnosing ICV problems. The table is not intended to cover every situation, but includes the most common problems that you may encounter.

LED	Status	Description
DS1 AC power	OFF	No mains voltage, open circuit breaker, mains power P11 is disconnected.
	<b>Green Steady</b>	Mains voltage is present.
DS2 status	OFF	System is not functioning, no power to circuit board or the circuit board has failed.
	<b>Green Steady</b>	Normal condition.
DS4 panel A indicator	OFF	Panel A is not being used.
	<b>Yellow Steady</b>	Panel A is being used.
DS5 panel B indicator	OFF	Panel B is not being used.
	<b>Yellow Steady</b>	Panel B is being used.
DS6 low fluid indicator	OFF	Fluid level sensing switch is closed; the tank has sufficient fluid.
	<b>Red Steady</b>	Fluid level sensing switch is open; the tank has insufficient fluid.
DS11 solenoid A indicator	OFF	Panel A solenoid is not energized.
	<b>Yellow Steady</b>	Panel A solenoid is energized.
DS12 solenoid B indicator	OFF	Panel B solenoid is not energized.
	<b>Yellow Steady</b>	Panel B solenoid is energized.





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