

# NLZ Electric Motor Control Modules for A-dec 300/500/Performer Delivery Systems

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A-dec 300 Delivery System Shown



NLZ BA Electric Motor Control Module



### Product Models and Versions Covered in This Document

| Models          | Versions | Description     |
|-----------------|----------|-----------------|
| 332/333/336/342 | A        | Delivery System |
| 334/335         | A/B      | Delivery System |
| 532/533/541     | A/B      | Delivery System |
| 542             | A        | Delivery System |
| Performer®      | B        | Delivery System |

# Before You Begin

## Important Information



**NOTE** NLZ electric motors are compatible only with the following revisions of A-dec touchpads and control heads:

- 300 deluxe touchpad Rev G or newer
- 500 deluxe plus touchpad
- 500 deluxe touchpad Rev L or newer and 500 control head Rev F and newer

## Recommended Tools

- Phillips head screwdriver
- Hex key set
- Anti-static wrist strap
- Diagonal cutters
- Hemostats

## Installation Instructions by Delivery System Family

Go to the section for your type of system:

**A-dec 332/333/334/ 335/336/342/Performer B . . . 2**  
**A-dec 532B/533B/541B . . . . . 8**  
**A-dec 532A/533A/541A/542 . . . . . 25**

# A-dec 332/333/334/335/ 336/342/Performer B

## Remove the Covers



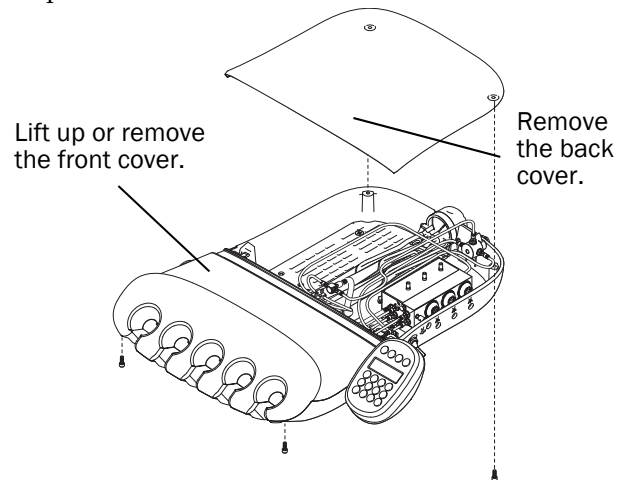
**CAUTION** Failure to turn off or disconnect the power before you begin this procedure can lead to electrical shock.

1. Turn off the power to the system.



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

2. Remove the delivery system covers.
  - (1) Use a 7/64" hex key to remove the screw securing the back cover.
  - (2) Remove the back cover.
  - (3) Use a 7/64" hex key to loosen the screws securing the front cover.
    - Traditional: Remove the front cover.
    - Continental<sup>®</sup>: Lift up the front cover.
3. If necessary, install the deluxe touchpad and Continental whip assembly. Follow the instructions provided in the kits that came with those components.

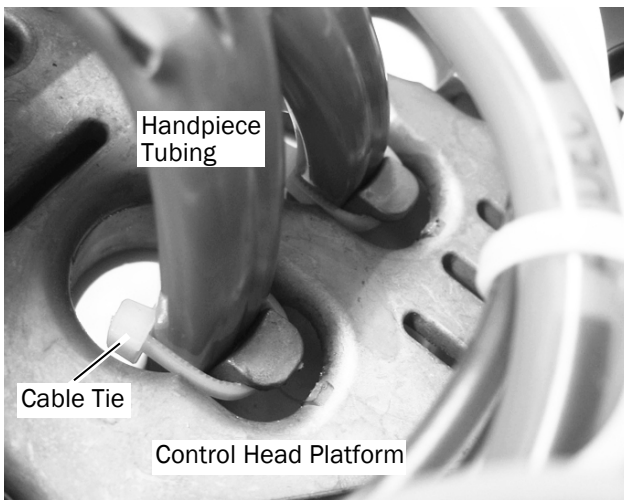


## Install the Handpiece Tubing

|                                   |   |
|-----------------------------------|---|
| 332/334/336/342/Performer B ..... | 3 |
| 333/335 .....                     | 3 |

### 332/334/336/342/Performer B

1. Route the tubing up through the bottom of the control head platform and into the control head.
2. Install a cable tie to serve as a strain relief, allowing enough slack to make adjustments in the tubing position.
3. Adjust the tubing length so it drapes evenly with the syringe tubing.
4. Tighten the cable tie to secure the tubing in place.

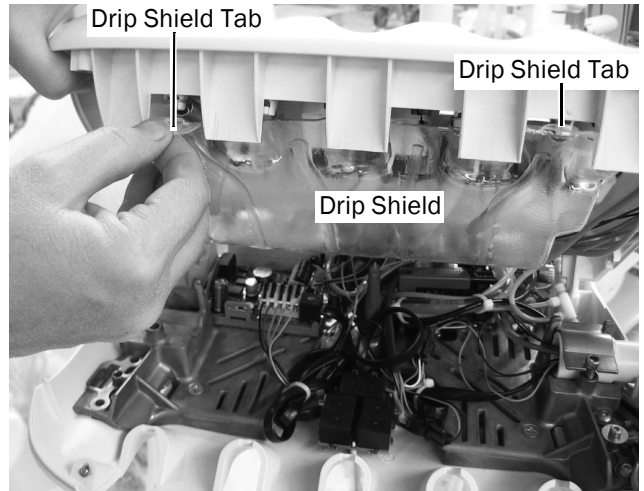


**NOTE** Do not overtighten the cable ties around the handpiece tubing as this can restrict air and water flow.

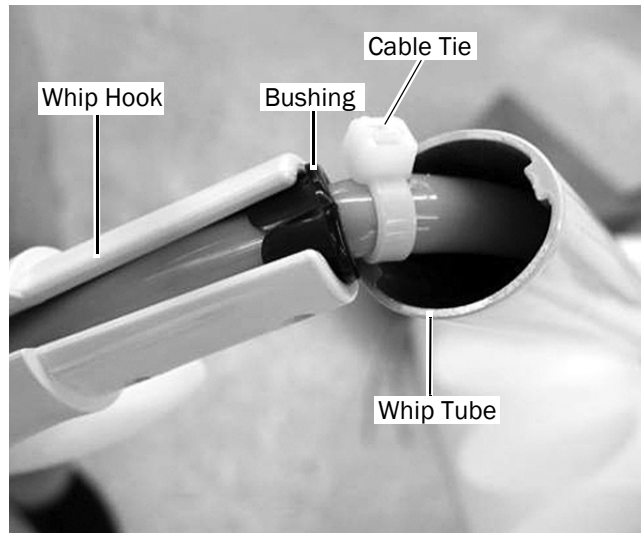
**Next Step** Continue with “Connect the Handpiece Tubing to the Control Block” on page 5.

### 333/335

1. Pull the drip shield down from the front cover to access the tubing.



2. Remove the whip hook. Insert the handpiece tubing into the whip tube and route it into the control head.
3. Squeeze the handpiece tubing into the whip hook. Adjust the length until it drapes evenly with the syringe tubing.
4. Install the black cable bushing and the cable tie.
5. Pull the tubing until the cable tie touches the cable bushing.
6. Reinstall the whip hook.



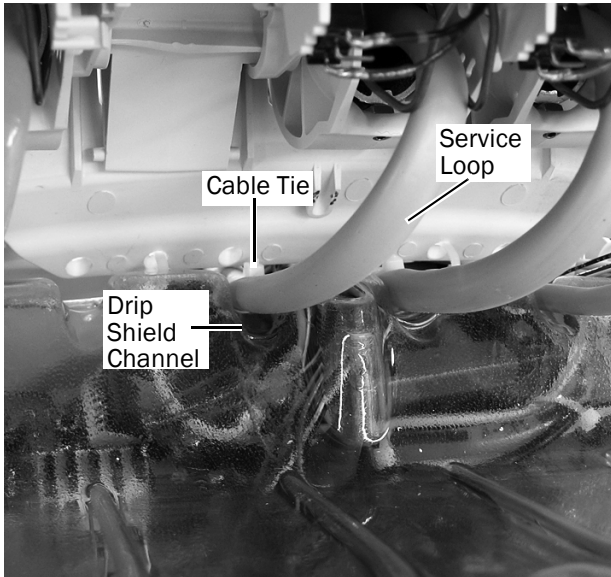
7. Use a cable tie to secure the tubing to the drip shield channel. Make sure to leave a service loop so the tubing does not kink. Trim the cable tie when finished.



**NOTE** Do not overtighten the cable ties around the handpiece tubing as this can restrict air and water flow.

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8. Reinstall the drip shield on the front cover.

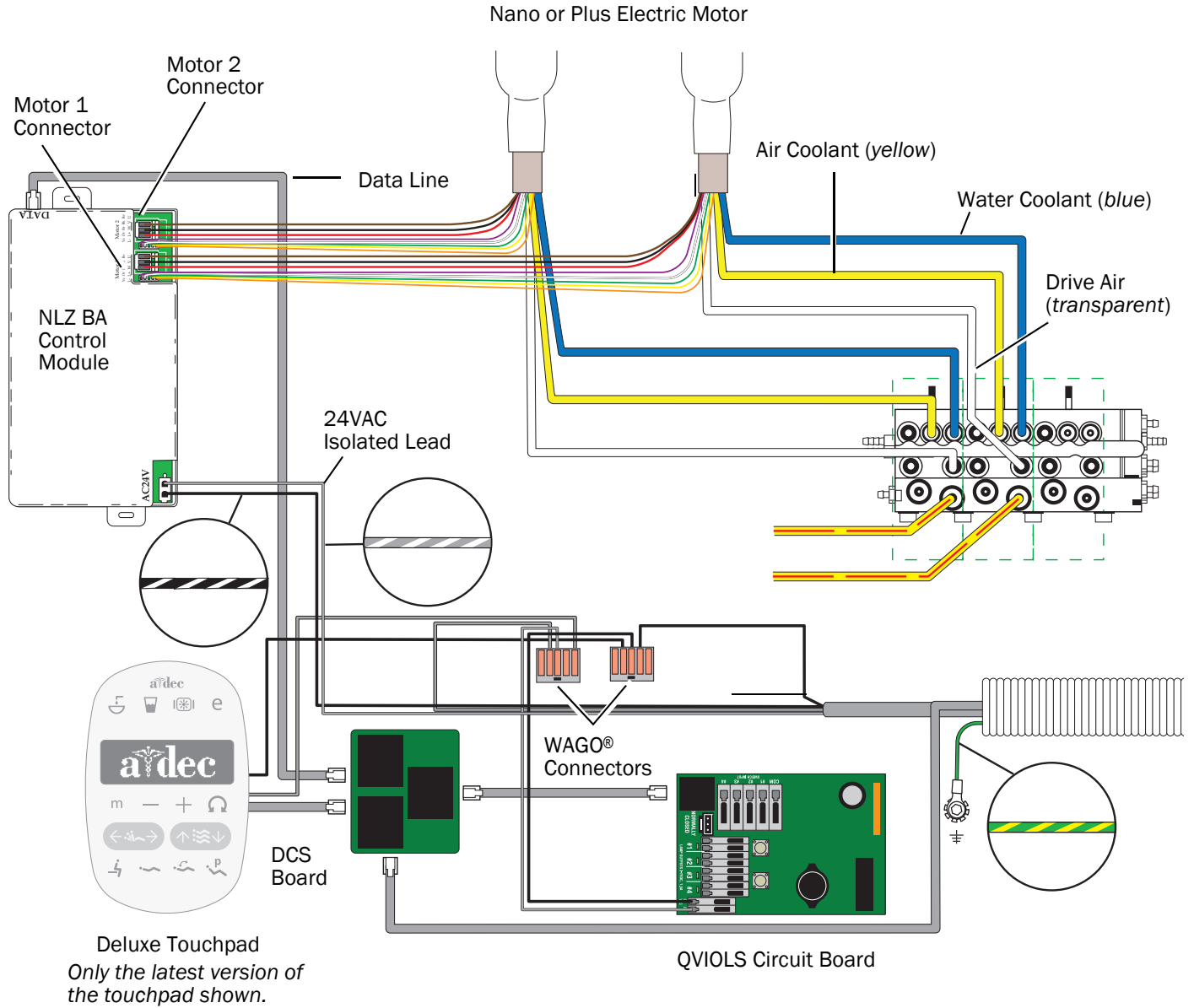


**Next Step** Continue with "Connect the Handpiece Tubing to the Control Block" on page 5.

## Connect the Handpiece Tubing to the Control Block

Use the flow diagram below to study the tubing and wire connections before connecting the handpiece.

NLZ BA Control Module on A-dec 332/333/334/335/336/342/Performer B Flow Diagram





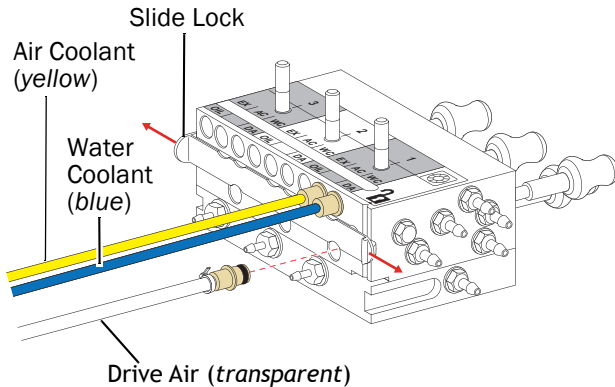
**ATTENTION** Circuit boards are sensitive to static electricity. Electrostatic Discharge (ESD) precautions are required when touching a circuit board or making connections to or from the circuit board. Circuit boards should be installed only by an electrician or qualified service person.

1. Secure a grounding strap to your wrist and the other end to a grounding location in the control head.
2. Open the slide lock and connect the handpiece tubing to the appropriate position on the control block.
  - Yellow tubing to air coolant port.
  - Blue tubing to water coolant port.
  - Transparent tubing to the drive air port.



**NOTE** Do not trim the handpiece tubing. Carefully coil the tubing in the control head for future use and servicing.

3. Close the slide lock.

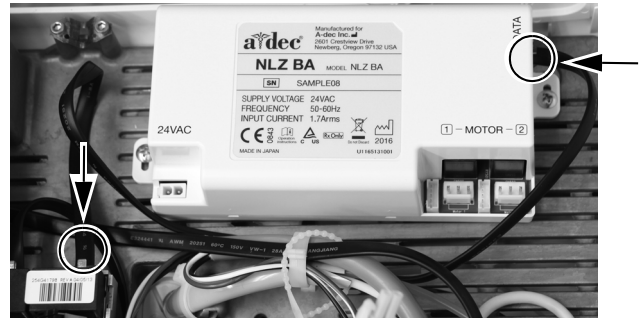


## Install the Control Module and Connect the Wires

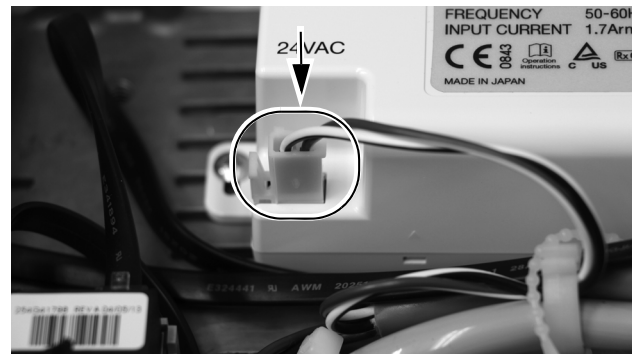
1. Position the control module in the rear of the control head.
2. Use two self tapping screws to mount the control module to the control head.



3. Plug the data line into the control module and into the DCS board.



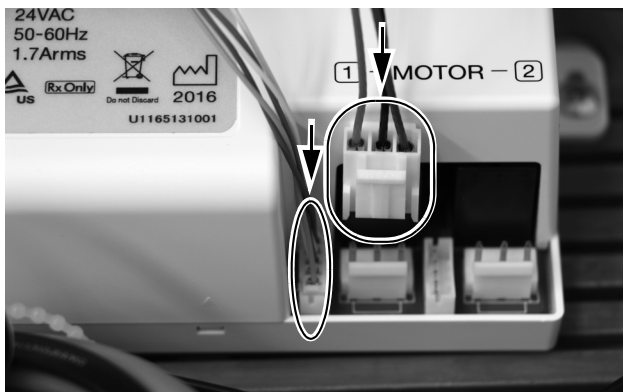
4. Plug in the AC power.



5. Plug in the electric motor's wire connectors into their positions on the control module.



**NOTE** For a single motor on the NLZ BA control module, use the Motor 1 connectors. If installing two motors, use the Motor 1 connectors for the first motor and the Motor 2 connectors for the second motor.



## Program the A-dec 300 Deluxe Touchpad



1. Turn on the power to the system.
2. To enter **System Setup**, press the **m** and **e** buttons at the same time for three seconds and then press **▶**.



**NOTE** Use the minus **–** or plus **+** buttons to change menu options. Press **▶** to make a selection.

3. In the **System Setup** menu, select **Handpieces**.
4. Select **Holder Setup**.
5. On Traditional systems, lift the motor. On Continental systems, pull the whip forward.
6. Select **Electric**.
7. Select **Motor Number 1** (position 1 on the control module).
8. Select the motor type.
9. Set the installed cable length and save the settings. You should hear three beeps. Move the whip back or return the motor to its holder.
10. For systems with two electric motors, repeat steps 3 through 9 and select motor number 2.
11. Press **◀** until the A-dec logo appears, indicating that you are no longer in the **System Setup** menu.

**Next Step** Continue with “Adjust and Test” on page 32.

## A-dec 532B/533B/541B

### Turn off the Power



**CAUTION** Failure to turn off or disconnect the power before you begin this procedure can lead to electrical shock.

1. Use the master toggle to turn off the power to the system.



**NOTE** The master toggle for the 541 is located under the work surface.



### Prepare the System

|            |    |
|------------|----|
| 532B ..... | 8  |
| 533B ..... | 11 |
| 541B ..... | 14 |

### 532B

1. Swivel the touchpad to the side.

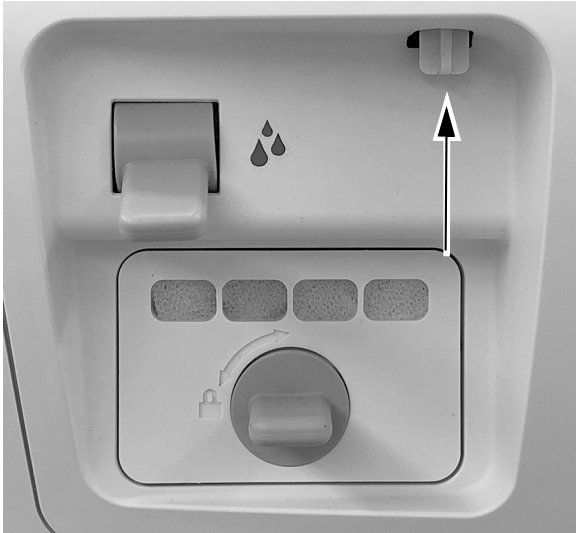






**CAUTION** When removing or replacing covers, take care not to damage any wiring or tubing. Verify that the covers are secure after replacing them.

2. Push up on the cover release at the back of the control head.

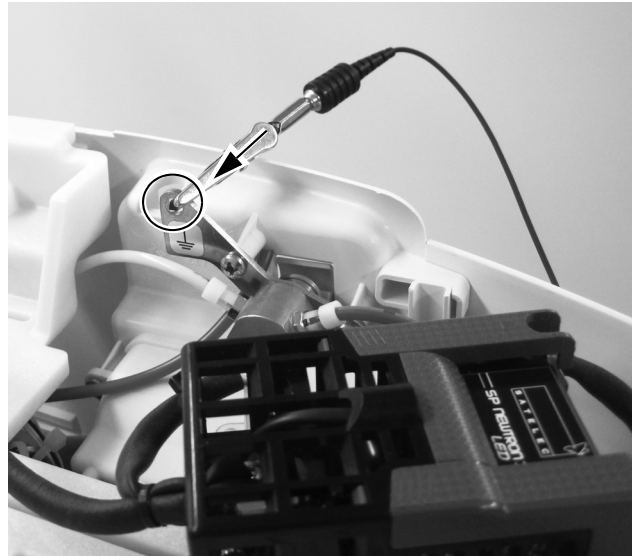


3. Lift the top cover off the control head.

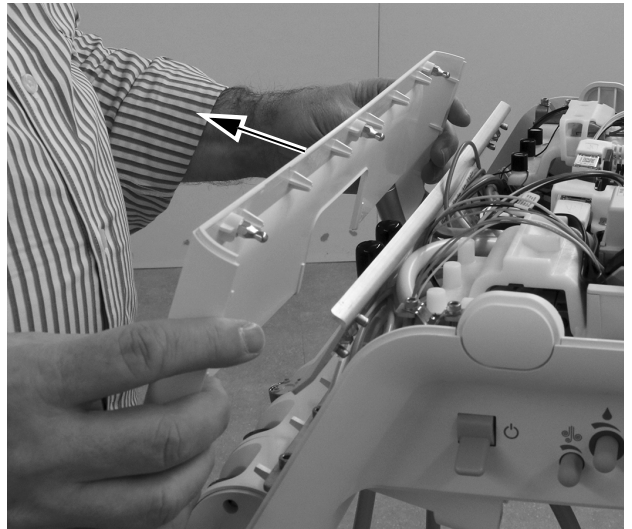


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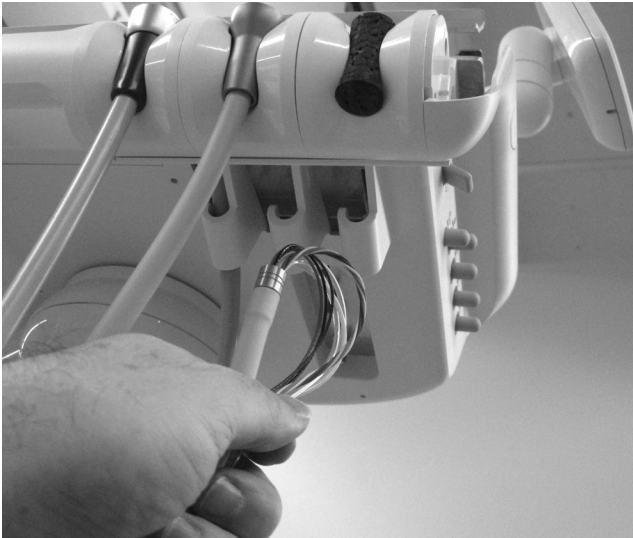
4. Secure a grounding strap to your wrist and connect the other end to the grounding lug mounted on the flush toggle at the back of the control head.



5. Pull the front cover off the control head.



6. Place the tubing in the appropriate holder.
7. Create a loop at the wire-end of the tubing so the sheath can be used to pull the tubing through the control head.



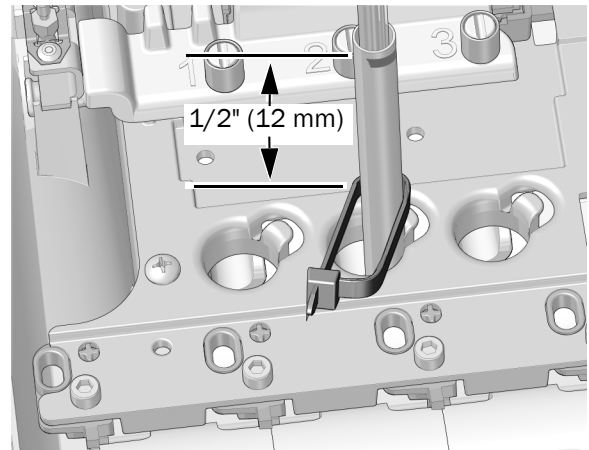
8. Adjust the drape of the tubing to match the drape of the other tubing on the control head and mark the tubing sheath about 1/2" (12 mm) above the chassis.



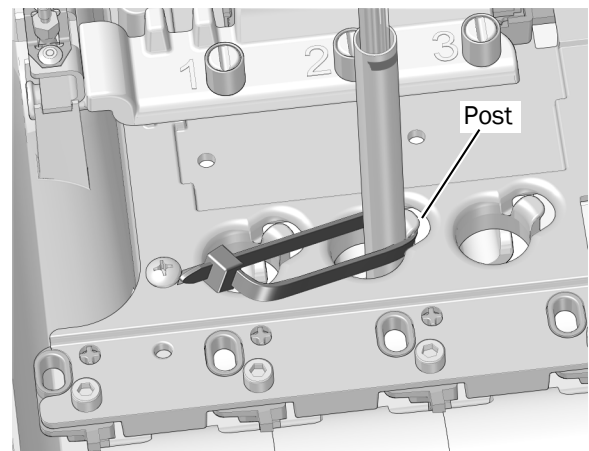
9. Cut off the tubing sheath at the mark.



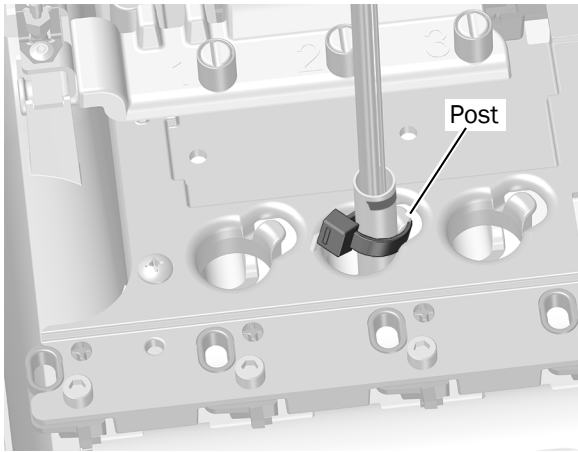
10. Insert the tubing up through the chassis. Place a cable tie around the tubing about 1/2" (12 mm) below the mark on the tubing. Do not tighten the cable tie until instructed. Leave a large loop as shown.



11. Position the cable tie loop around the post at the edge of the tubing hole in the chassis. Be sure the loop in the cable tie is behind the post.



12. Push the cable tie down so it is below the top of the post. Tighten the cable tie, ensuring the cable tie remains around the post. Cut off the excess cable tie.

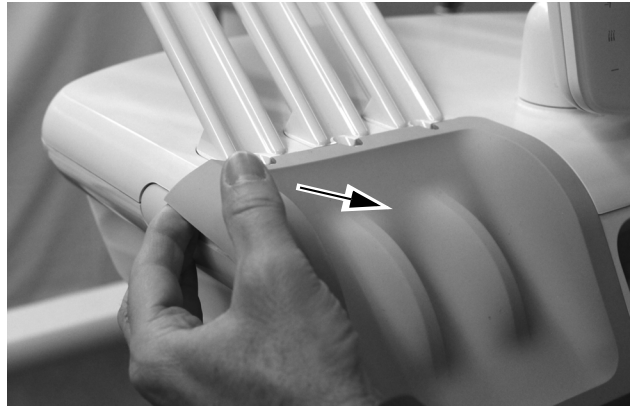


**Next Step**

Continue with "Route the Tubing and Wires" on page 15.

**533B**

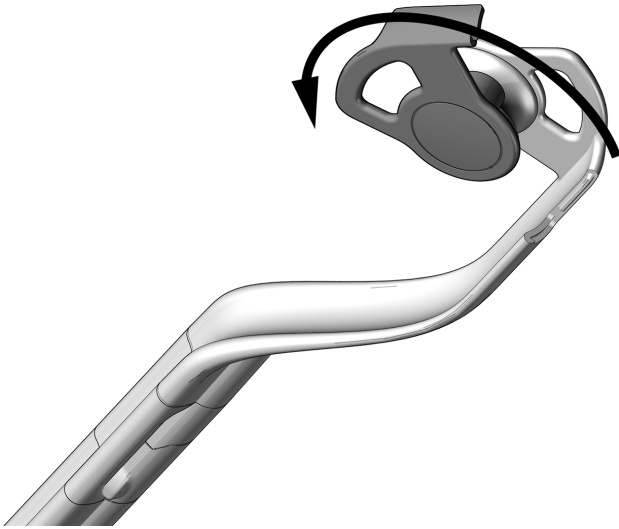
1. Lift the corner of the instrument pad on the side of the delivery system on which you are going to install the electric motor.



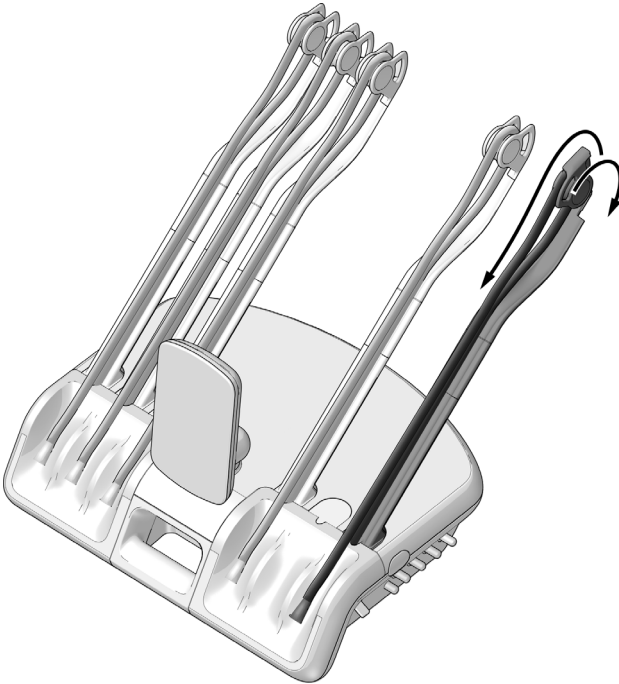
2. Carefully pull the instrument pad away from the control head.



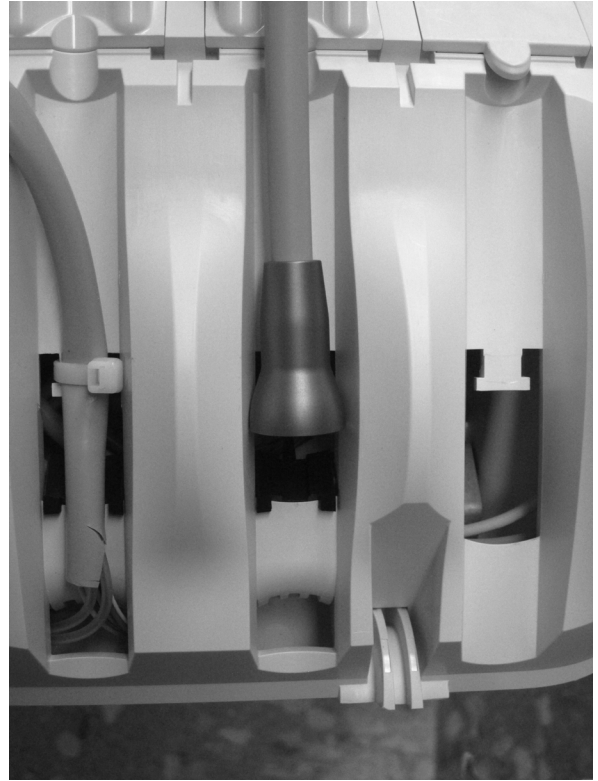
3. Rotate the side of the tubing guide forward.



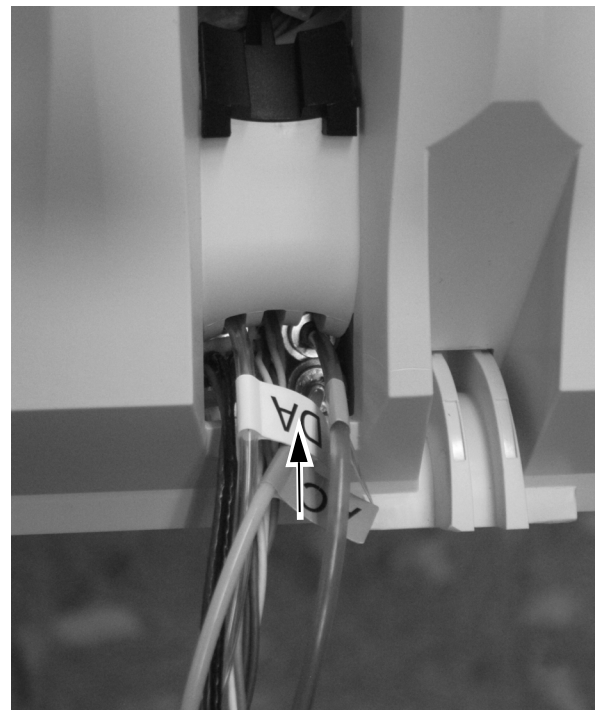
4. Route the tubing through the whip assemblies.
5. Close the tubing guide and make sure it snaps shut.



6. Place the handpiece and tubing onto the control head, adjusting the position of the handpiece tubing nut as shown.

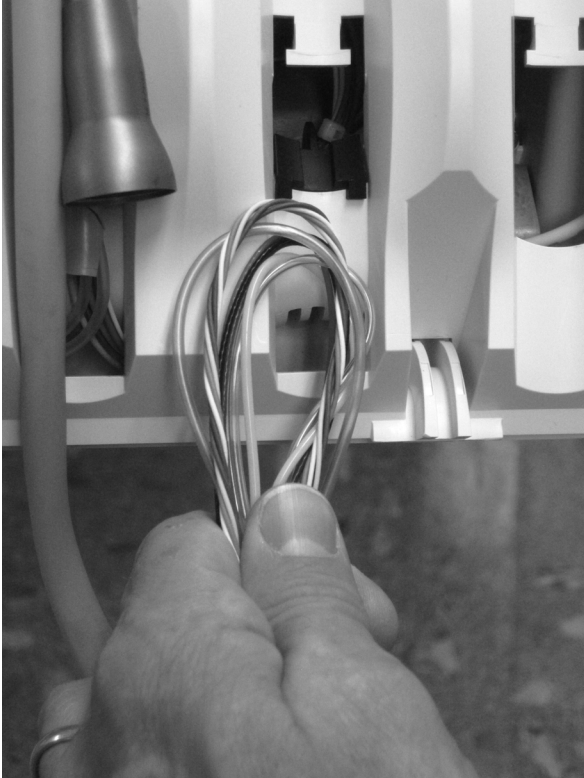


7. Insert the wires and tubing from the handpiece tubing into the bottom opening in the control head.



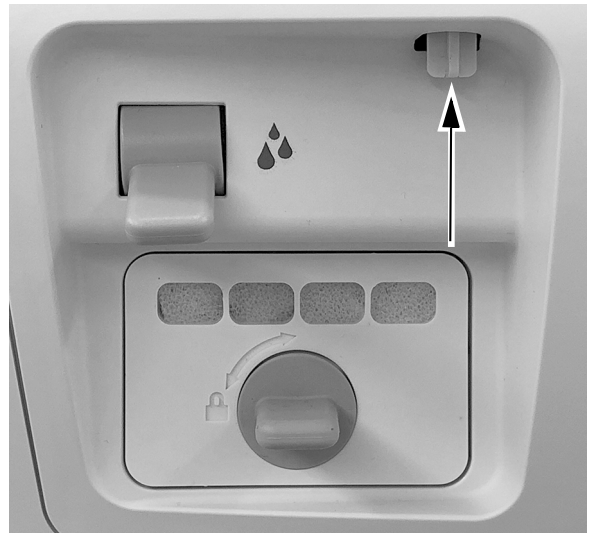
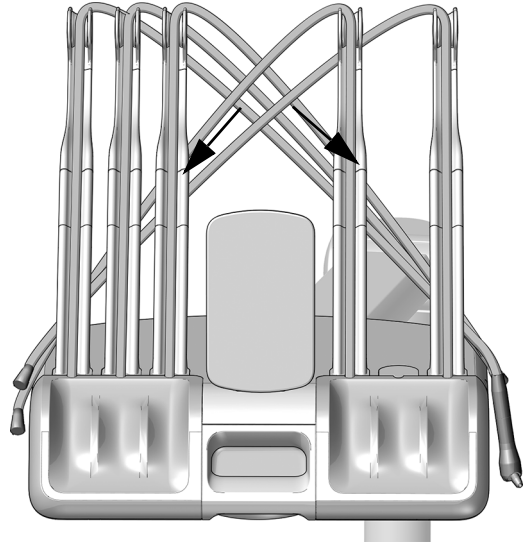


**TIP** Create a loop in the bundle to enable easier routing.



**CAUTION** To avoid damaging the syringe or other installed handpieces, be careful to lay each handpiece tubing behind the whips on the opposite side of the control head before you lift the top of the control head.

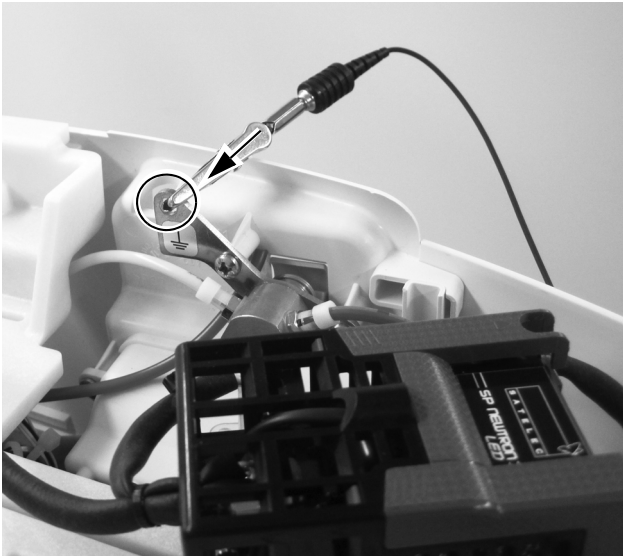
8. Push up on the cover release at the back of the control head and lift the top cover up from the control head and rotate the cover all the way forward.



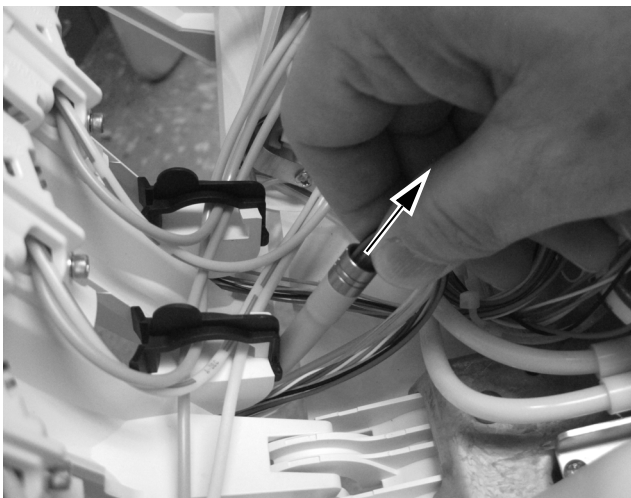


**ATTENTION** Circuit boards are sensitive to static electricity. Electrostatic Discharge (ESD) precautions are required when touching a circuit board or making connections to or from the circuit board. Circuit boards should be installed only by an electrician or qualified service person.

9. Secure a grounding strap to your wrist and connect the other end to the grounding lug mounted on the flush toggle at the back of the control head.



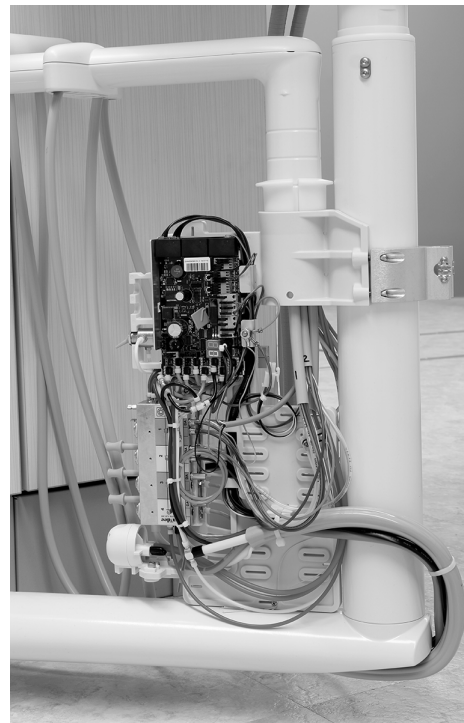
10. From the backside of the top cover, pull the handpiece tubing through the hole in the top cover.



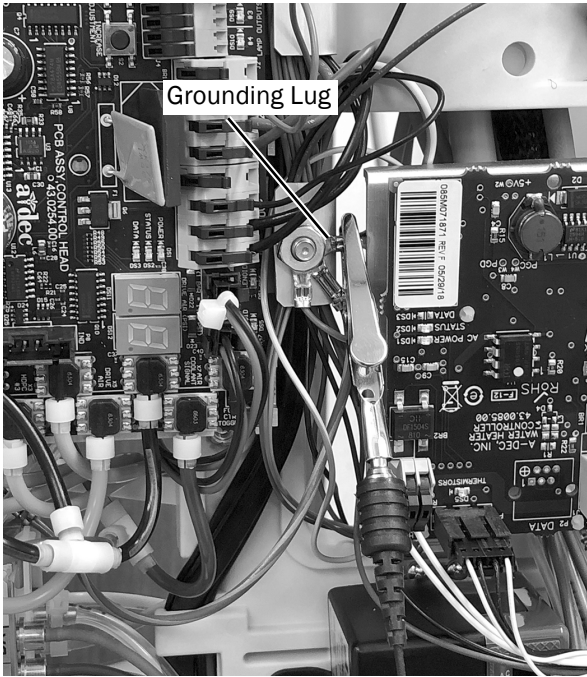
**Next Step** Continue with "Route the Tubing and Wires" on page 15.

## 541B

1. Pull the side covers out at the bottom and pull them away from the delivery system.



- Place a grounding strap snugly on one wrist and connect the other end of the grounding strap to the grounding lug located near the edge of the control head circuit board.



**Next Step**

Continue with "Route the Tubing and Wires" on page 15.

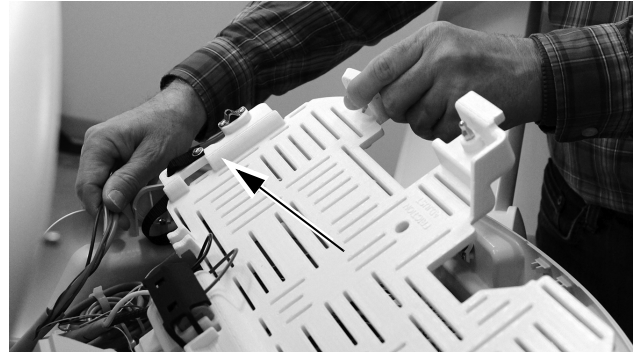
## Route the Tubing and Wires

See the section for your delivery system:

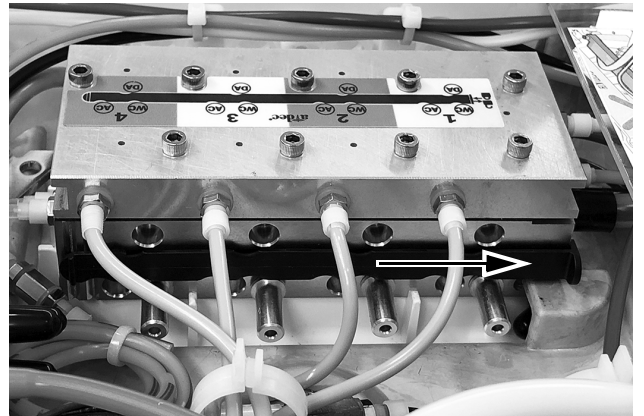
|                        |           |
|------------------------|-----------|
| <b>532B/533B</b> ..... | <b>15</b> |
| <b>541B</b> .....      | <b>16</b> |

### 532B/533B

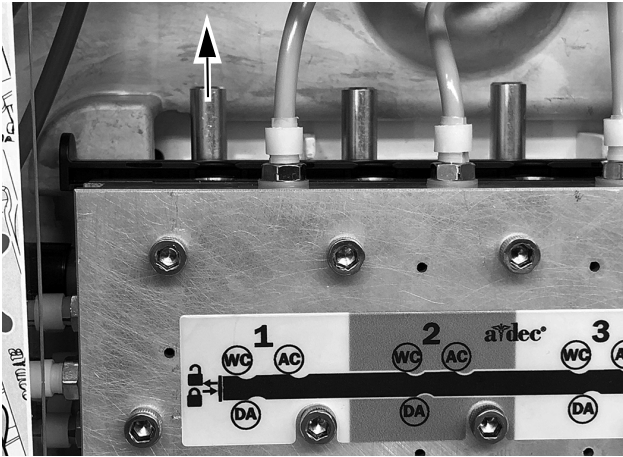
- Rotate the module shelf all the way up.



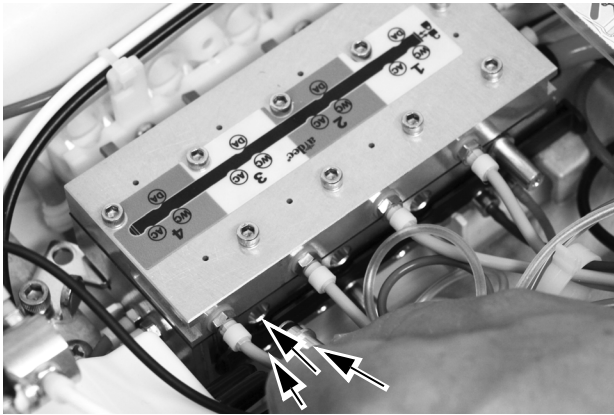
- Route the tubing and wires from the handpiece tubing through the control head:
  - Air-coolant, water, and drive air tubing goes under the shelf. Use the loops as a guide for routing.
  - The wires go above the shelf.
- Move the slide lock to the open position. In the open position, cutouts in the slide lock align with the ports in the control block.



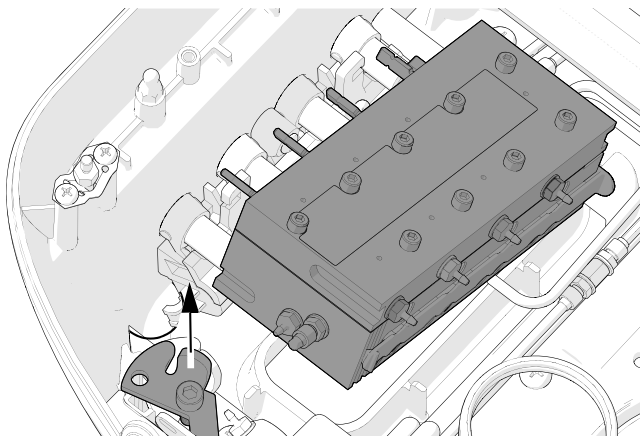
4. Remove the plug from the water coolant (WC) port on the control block at the desired location.



5. Install a barb in the water coolant, air coolant, and drive air positions on the control block.



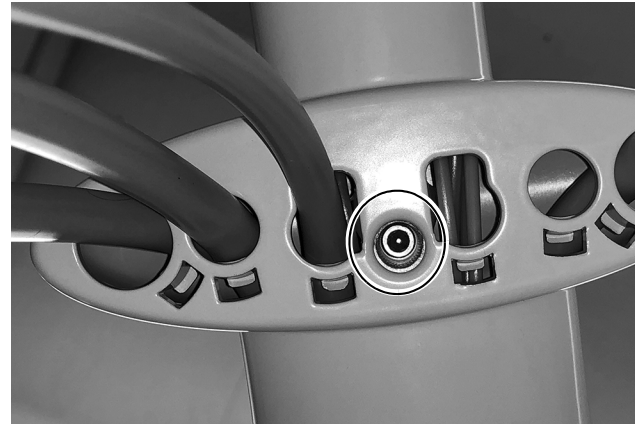
**TIP** Loosen the screw securing the lock to turn the control block on its side. To do this you must first remove the adjustment knobs from the side of the control head.



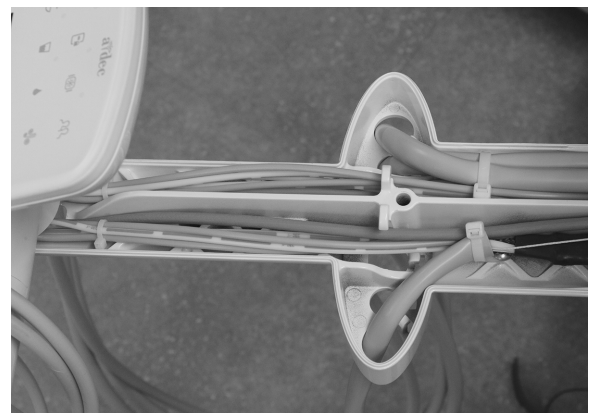
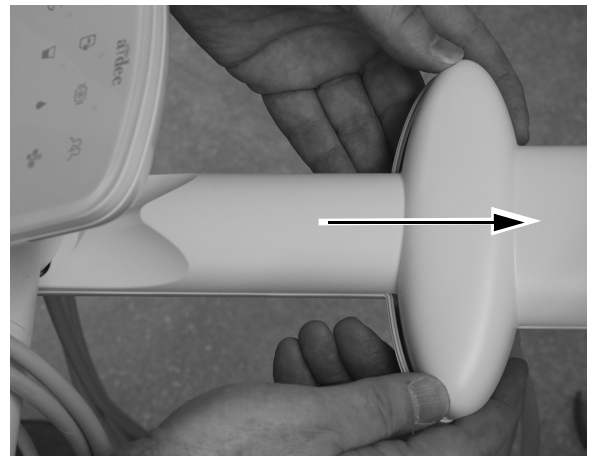
**Next Step** Continue with "Connect the Handpiece Tubing to the Control Block" on page 19.

### 541B

1. On the underside of the instrumentation arm, use a 5/32" hex key to remove the screw that secures the top cover on the instrumentation arm.

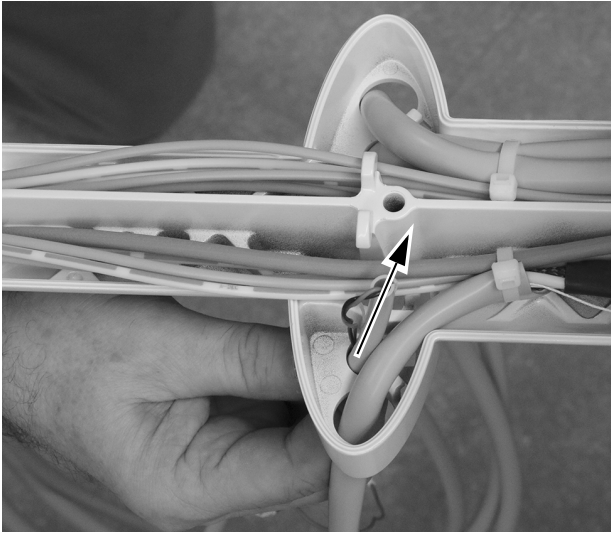


2. Slide the top cover away from the touchpad and remove the top cover.

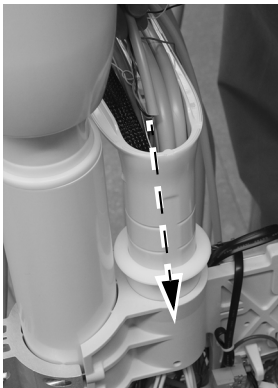




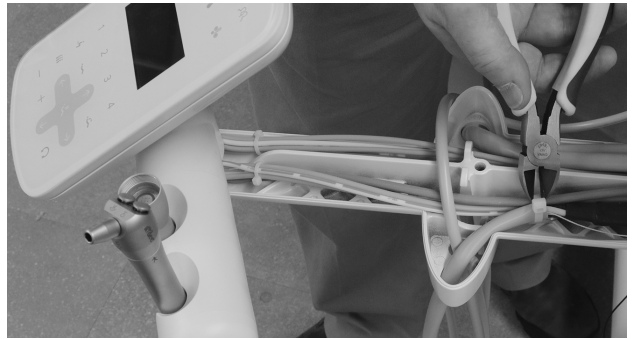
3. Insert the handpiece tubing up through a open hole in the instrumentation arm and pull the tubing up through the arm.



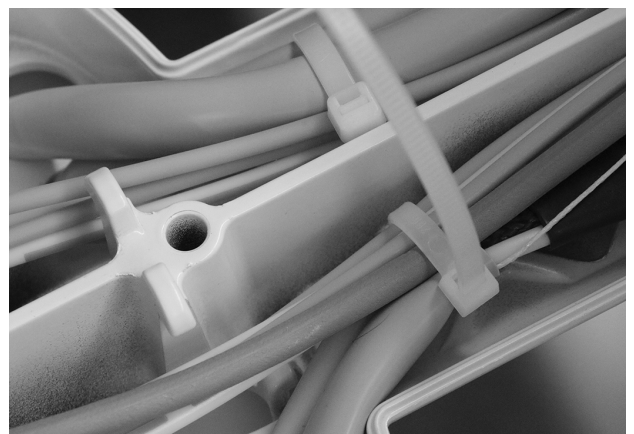
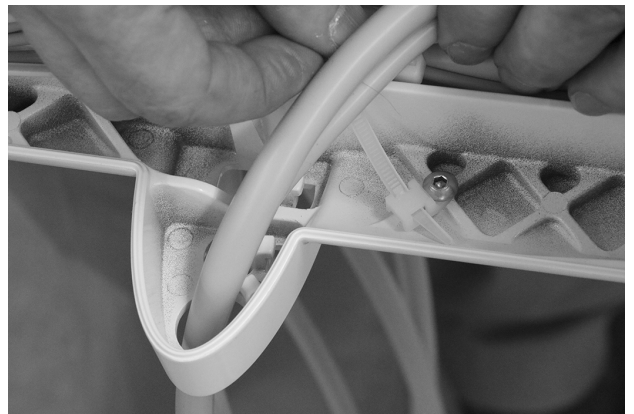
4. Pull the handpiece tubing up through the instrumentation arm and route it down through the vertical post of the arm.



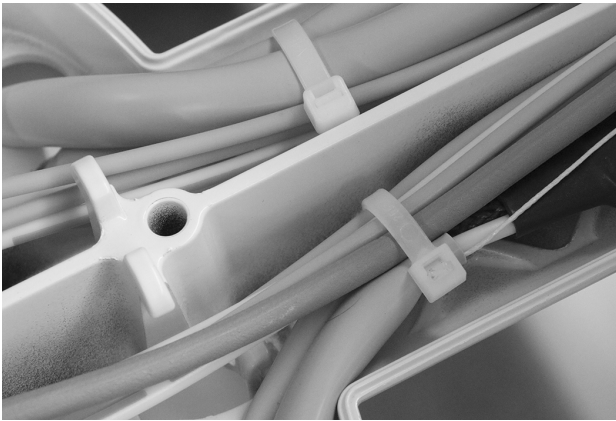
5. Use a pair of diagonal cutters to cut the cable tie that secures the handpiece tubing on the same side of the holder assembly as the handpiece will be installed.



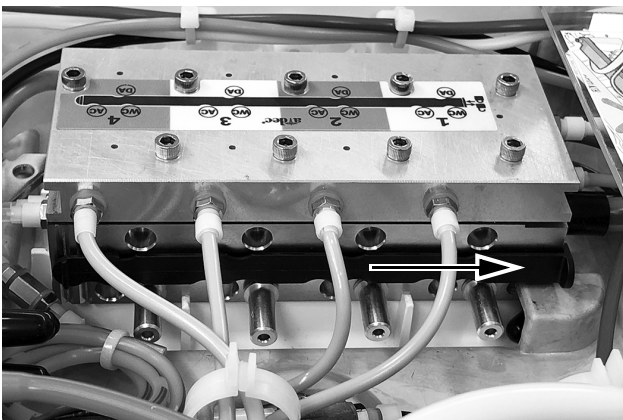
6. Pull the handpiece tubing up through the instrumentation arm so that it matches the drape of other handpieces. Secure the tubing to the instrumentation arm by passing a cable tie through the cable tie hold down and wrapping it around the tubing.



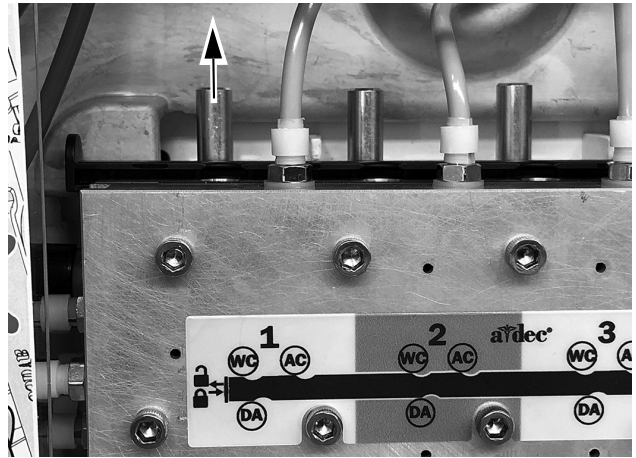
7. Tighten the cable tie so it is snug. Use diagonal cutters to trim the excess cable tie.



8. Route the tubing and wires from the handpiece tubing through the control center.
9. Move the slide lock to the open position. In the open position, cutouts in the slide lock align with the ports in the control block.



10. Remove the plug from the water coolant (WC) port on the control block at the desired location.

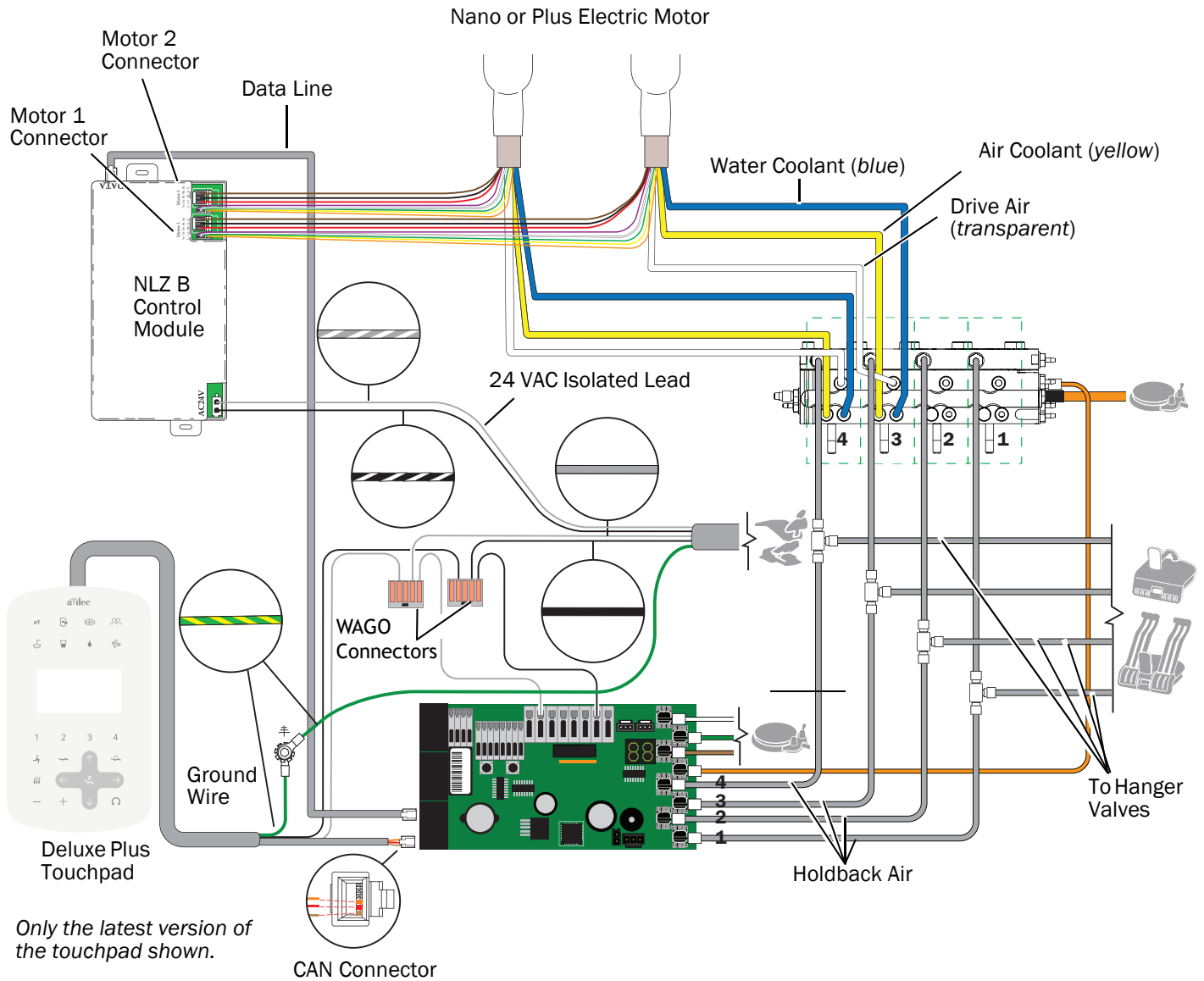


**Next Step** Continue with "Connect the Handpiece Tubing to the Control Block" on page 19.

## Connect the Handpiece Tubing to the Control Block

Use the flow diagram below to study the tubing and wire connections before connecting the handpiece.

### NLZ BA Control Module on A-dec 532B/533B/541B Flow Diagram

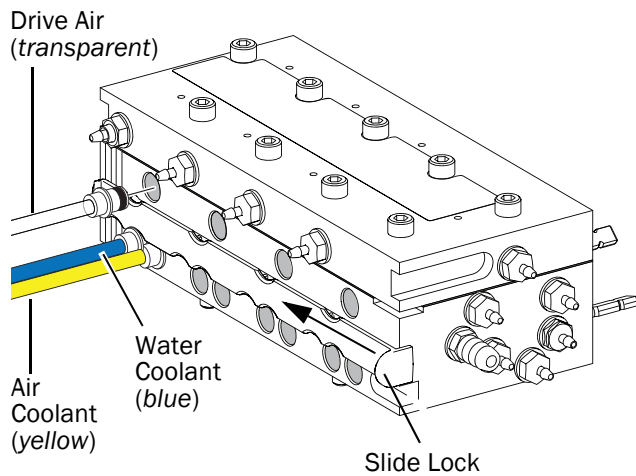


1. Connect the handpiece tubing to the appropriate position on the control block.
  - Blue tubing to air water port.
  - Yellow tubing to air coolant port.
  - Transparent tubing to the drive air port.



**NOTE** Do not trim the handpiece tubing. Carefully coil the tubing in the control head for future use and servicing.

2. Close the slide lock.



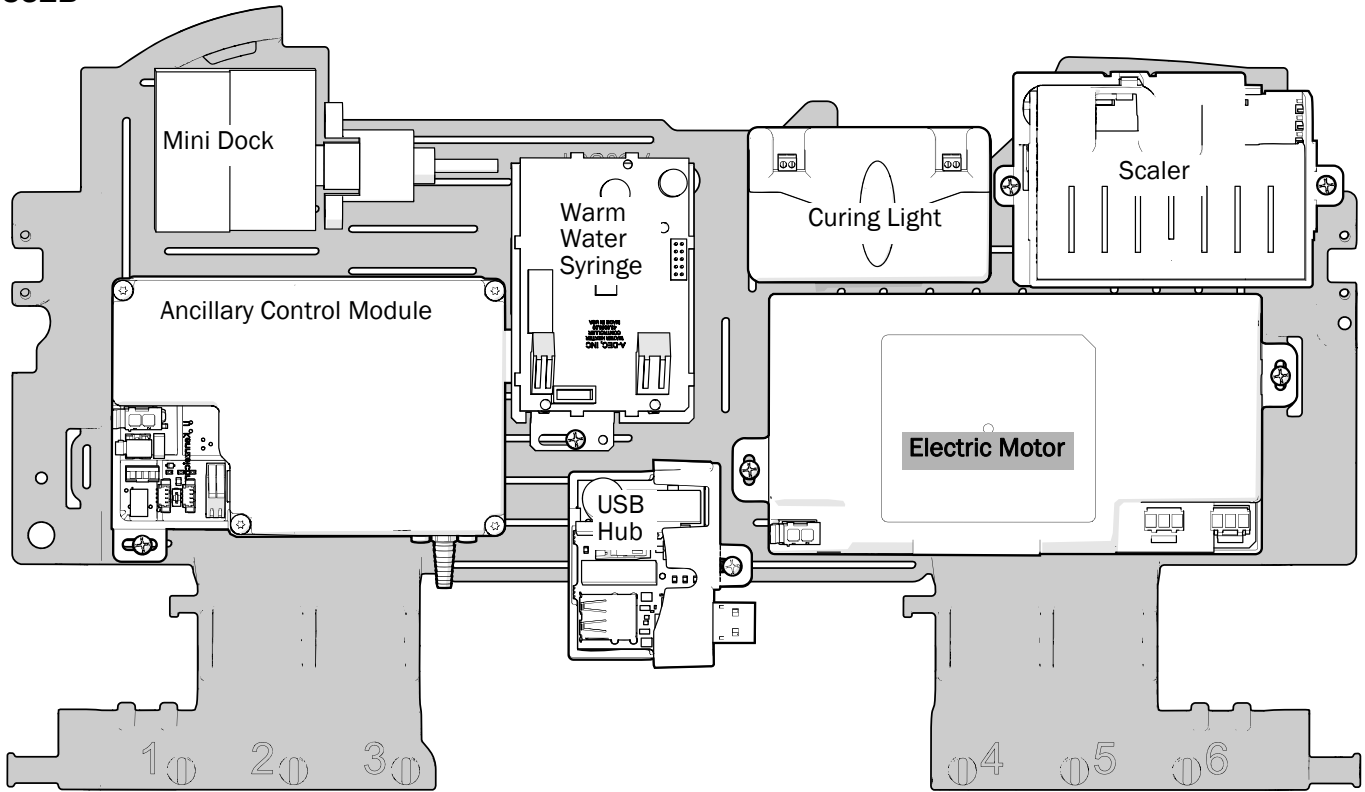
3. If necessary, secure the control block to the control head.
4. Lower the module shelf.

**Next Step** Continue with “Position the Control Module” on page 21.

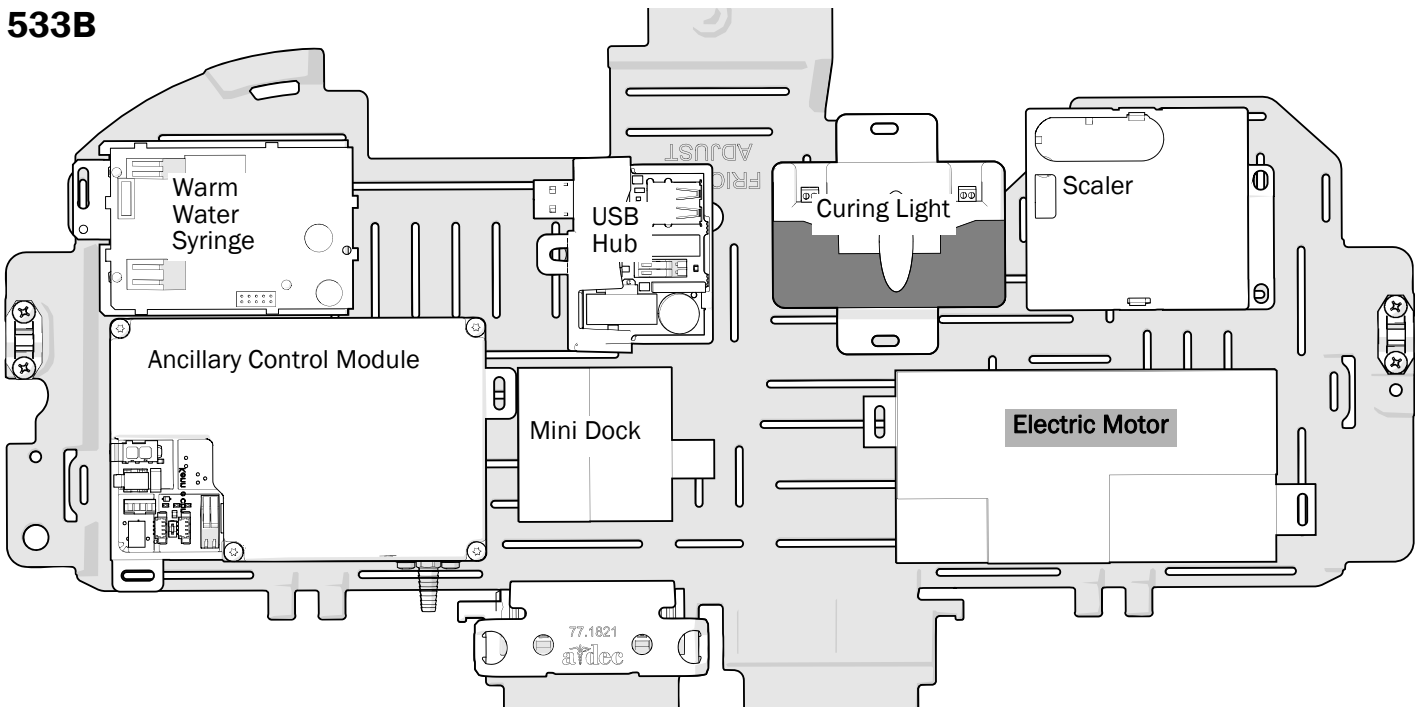
## Position the Control Module

To ensure maximum flexibility for future installations, place the control module on the module shelf as shown below.

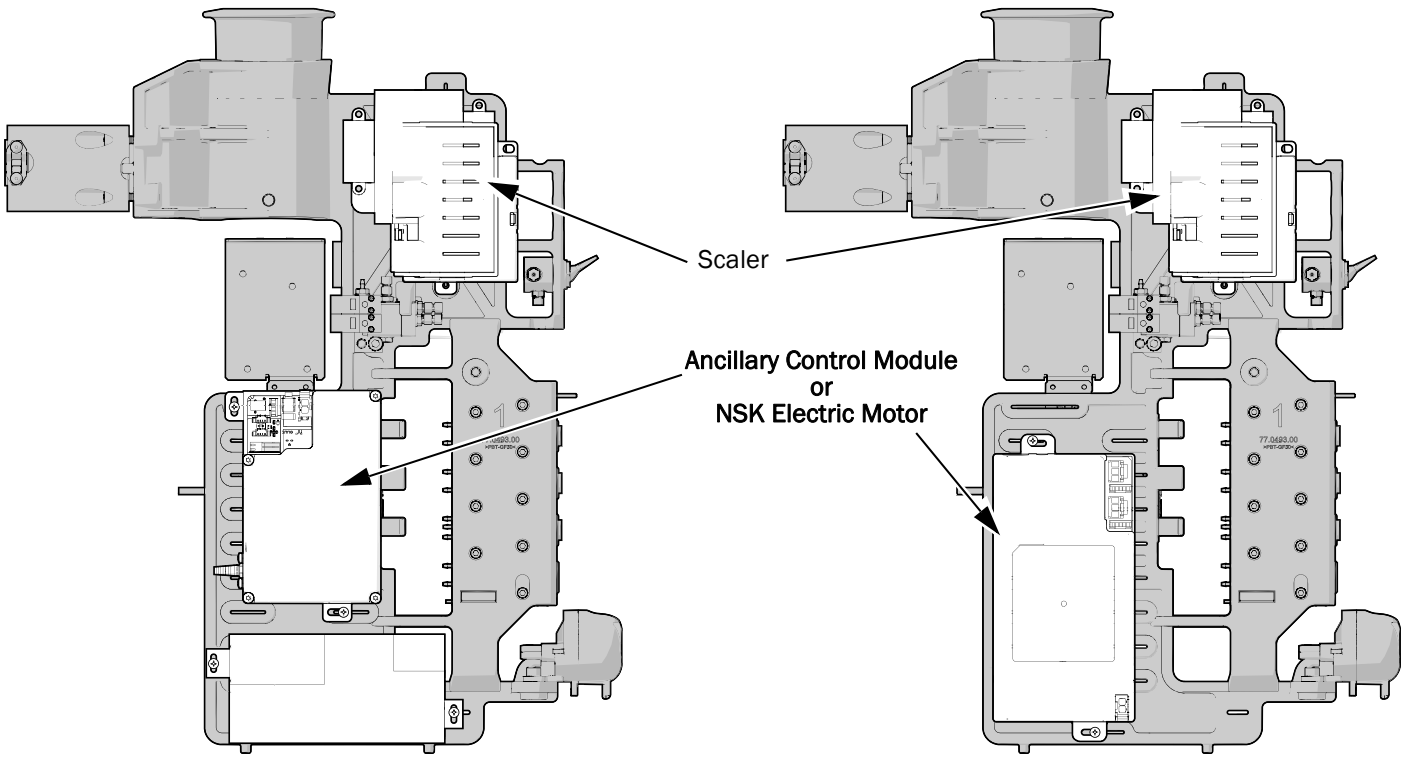
### 532B



### 533B



# 541B



## Mount the Control Module

### 532B/533B

1. Position the control module in the rear of the control head.
2. Use two self-tapping screws to mount the control module to the control head.



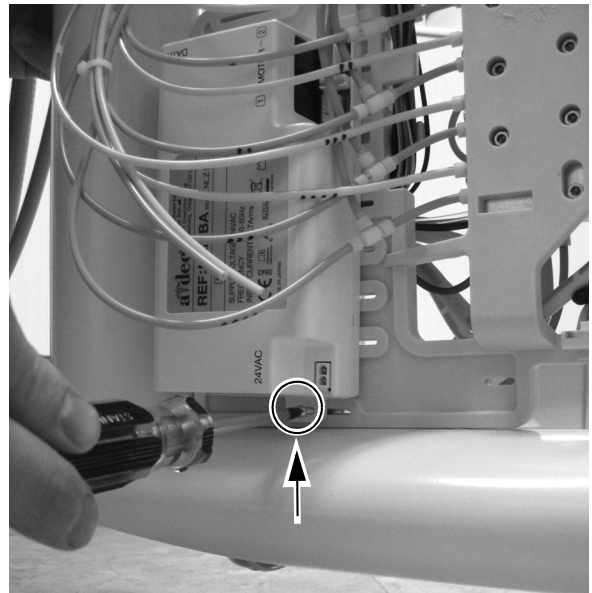
**Next Step** Continue with “Connect the Wires” on page 24.

### 541B

1. Use a stainless steel screw and the cutout at the top of the control module to secure it to the 12 o’clock frame. Ensure the left edge of the cutout is aligned with the right edge of the slot in the mounting frame.



2. Use a second stainless steel screw to secure the bottom part of the control module to the mounting frame. Ensure the left edge of the cutout is aligned with the left edge of the slot in the mounting frame.



**Next Step** Continue with “Connect the Wires” on page 24.

## Connect the Wires

The pictures in this section show a 532B but the steps for the 533B/541B are the same.

1. Plug in the data line to the port on the control module and into the DCS board.



2. Plug in the AC power.



3. Plug in the electric motor's white connectors to their positions on the control module.



**NOTE** For a single motor on the NLZ BA control module, use the Motor 1 connectors. If installing two motors, use the Motor 1 connectors for the first motor and the Motor 2 connectors for the second motor.



**Next Step** Continue with "Program the A-dec 500 Deluxe/Deluxe Plus Touchpads" on page 31.

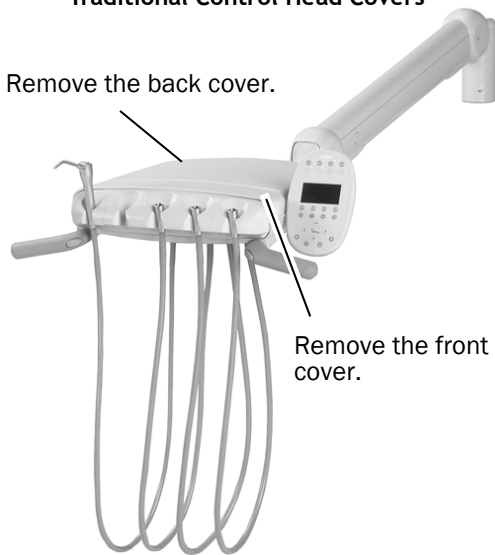


## A-dec 532A/533A/541A/542

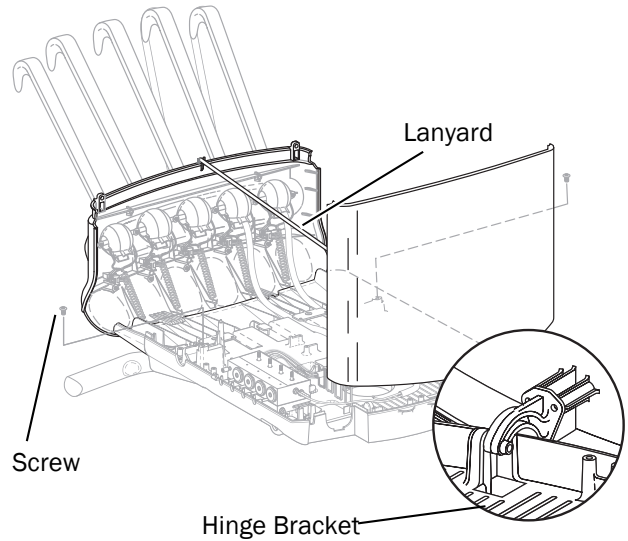
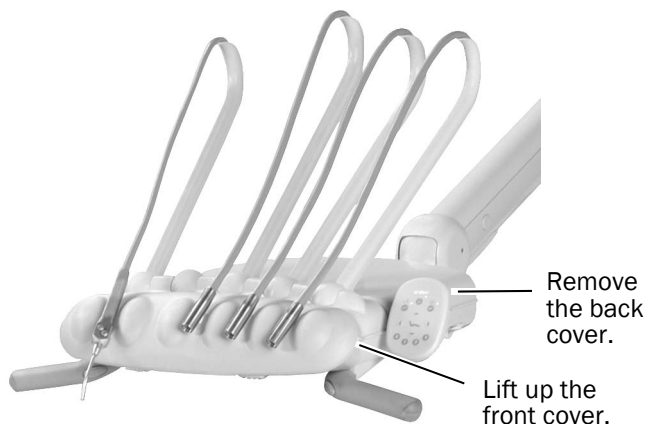
### Remove the Covers

1. Lift the control head cover up and back.
2. Pinch the hinge bracket to remove the cover.
3. Remove the two hex screws and:
  - For Traditional: Pull forward and up to remove the control head top cover.
  - For Continental: Pivot the cover forward, ensuring the lanyard is connected to the cover and control head to prevent strain on the cover hinges.

#### Traditional Control Head Covers



#### Continental Control Head Covers



4. If necessary, install the deluxe touchpad and Continental whip assembly. Follow the instructions provided in the kits that came with those components.

## Install the Handpiece Tubing

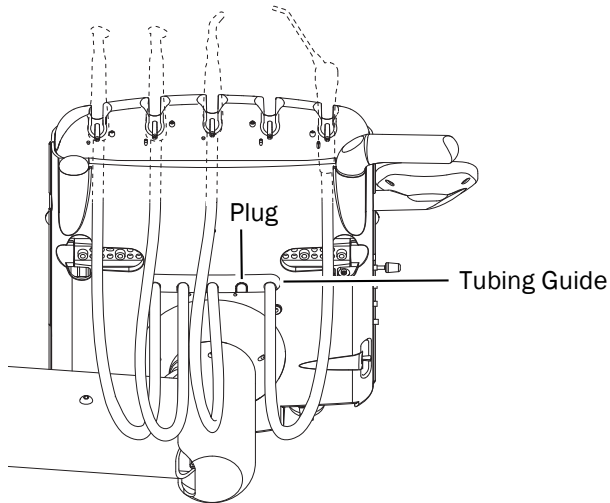
Continue with the section for your type of delivery system:

**532A/541A/542** ..... 26

**533A** ..... 27

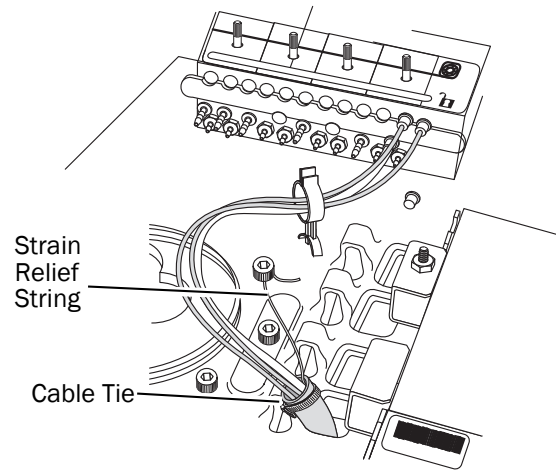
### 532A/541A/542

1. Remove the tubing guide from the underside of the control head.
2. Twist and remove the plug from the guide.
3. Insert the handpiece tubing into the guide.
4. Replace the guide in the control head.
5. Adjust the length of the tubing so it drapes evenly with the syringe tubing.



6. Use a cable tie to secure the tubing to the control head structural platform.
7. Use the screw from the kit to secure the strain relief string to the structural platform.

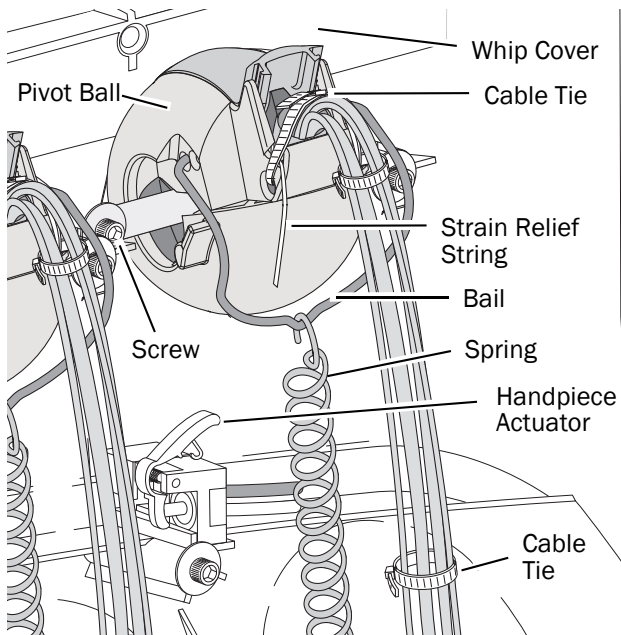
8. Ensure the handpiece actuator lever on the holder is released.



**Next Step** Continue with "Connect the Handpiece Tubing to the Control Block" on page 28.

**533A**

1. Remove the spring from the bail.
2. Use a 7/16" hex key to remove one screw and loosen the other on each side of the whip pivot.
3. Remove the whip cover.
4. Insert the handpiece tubing into the whip.
5. Route the handpiece tubing through the pivot toward the control head.
6. Install the whip back, starting at the pivot end of the whip.
7. Route the tubing to the slot right of the whip and then under the control head circuit board.
8. Use a cable tie to secure the tubing to the control head structural platform.
9. Adjust the length of the tubing so it drapes evenly with the syringe tubing.
10. Use a cable tie to secure the tubing at the base of the whip.
11. Secure the strain relief string to the whip assembly.
12. Ensure the handpiece actuator lever on the holder is released.

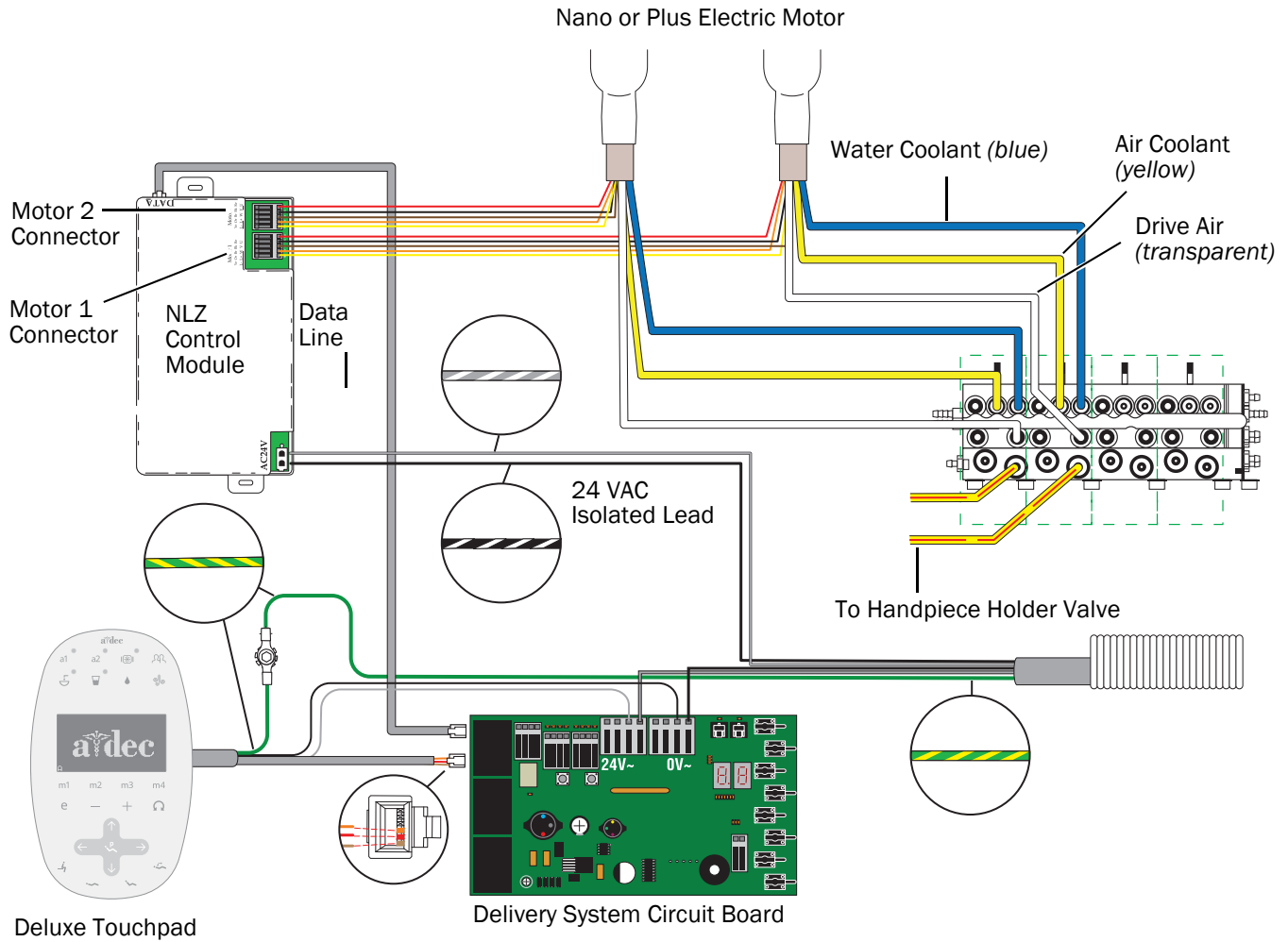


**Next Step** Continue with "Connect the Handpiece Tubing to the Control Block" on page 28.

## Connect the Handpiece Tubing to the Control Block

Use the flow diagram below to study the tubing and wire connections before connecting the handpiece.

A-dec 500 NLZ BA Control Module Flow Diagram

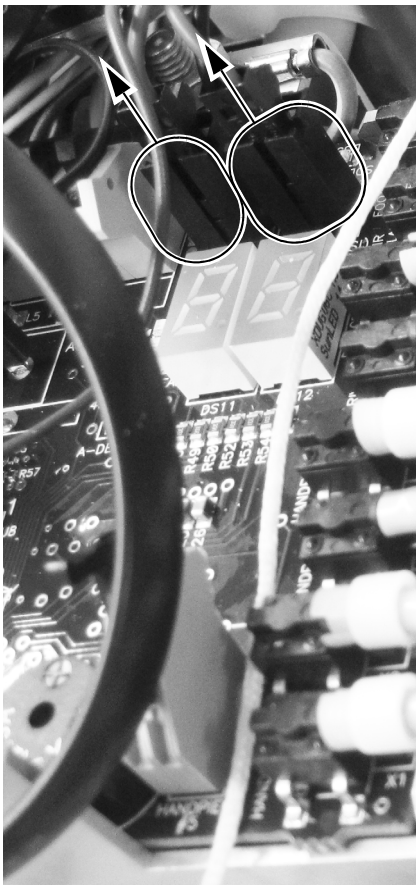


Only the latest version of the touchpad shown.

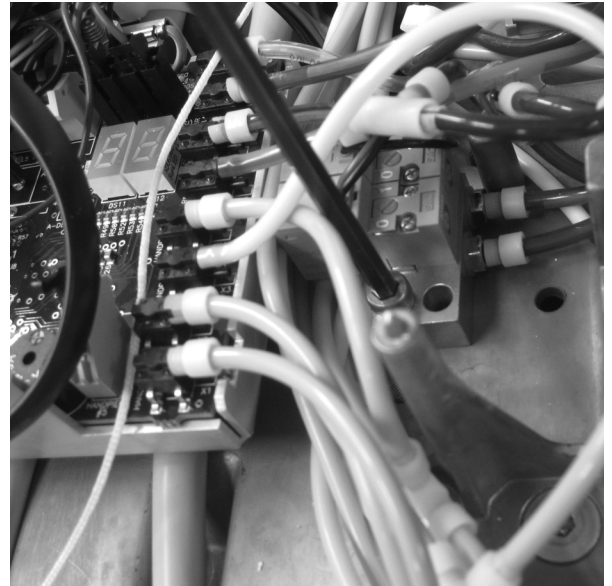


**ATTENTION** Circuit boards are sensitive to static electricity. Electrostatic Discharge (ESD) precautions are required when touching a circuit board or making connections to or from the circuit board. Circuit boards should be installed only by an electrician or qualified service person.

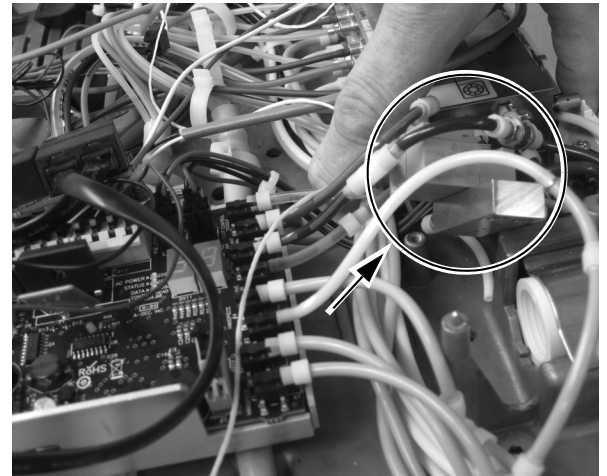
1. Secure a grounding strap to your wrist and the other end to a grounding location in the control head.
2. When routing the tubing to the control block:
  - (1) Disconnect the P4 water solenoid and the P5 air solenoid connectors.



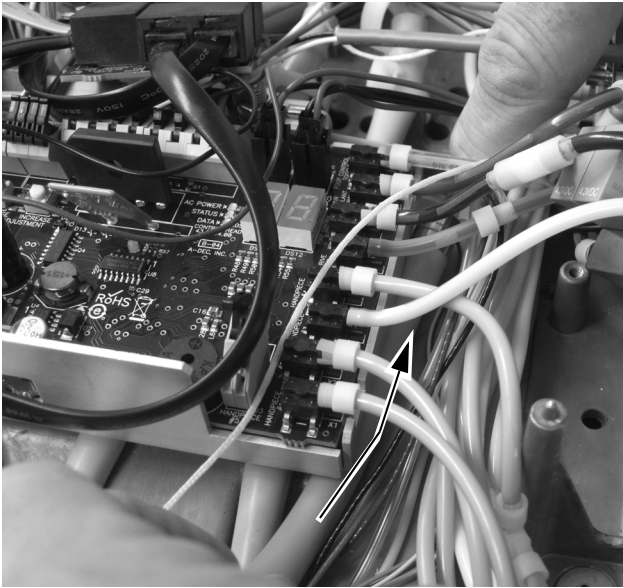
- (2) Use a 9/64" hex key to remove the screw securing the solenoid to the control head.



- (3) Move the solenoid to the side to create space for routing the tubing.



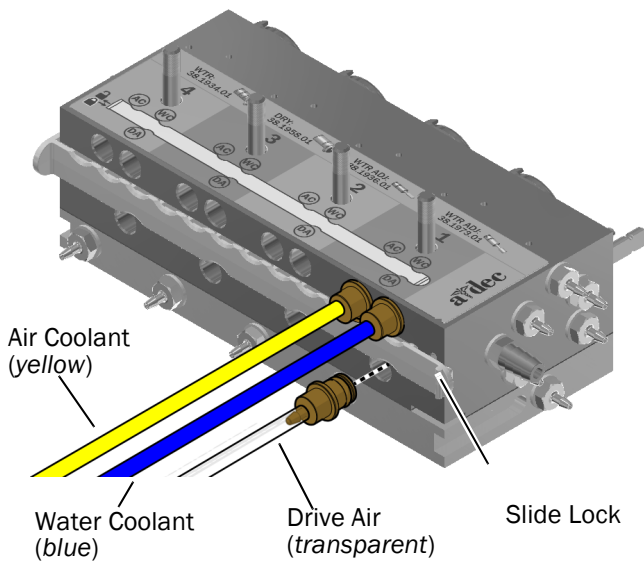
- Route the tubing under the control module.



- Open the slide lock and connect the handpiece tubing to the appropriate position on the control block.
  - Yellow tubing to air coolant port.
  - Blue tubing to water coolant port.
  - Transparent tubing to the drive air port.

**NOTE** Do not trim the handpiece tubing. Carefully coil the tubing in the control head for future use and servicing.

- Close the slide lock.



## Install the Control Module and Connect the Wires

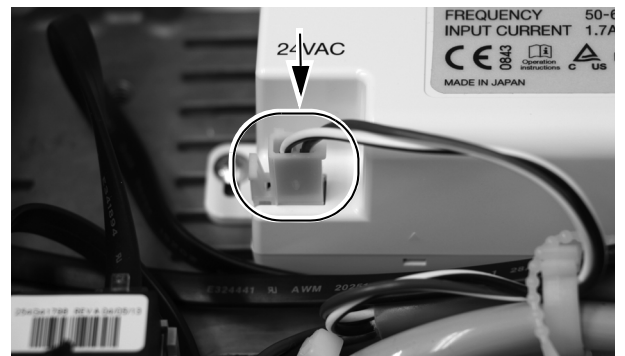
- Position the control module in the rear of the control head.
- Use two self-tapping screws to mount the control module to the control head.



- Plug in the data line to the port on the control module and into the DCS board.



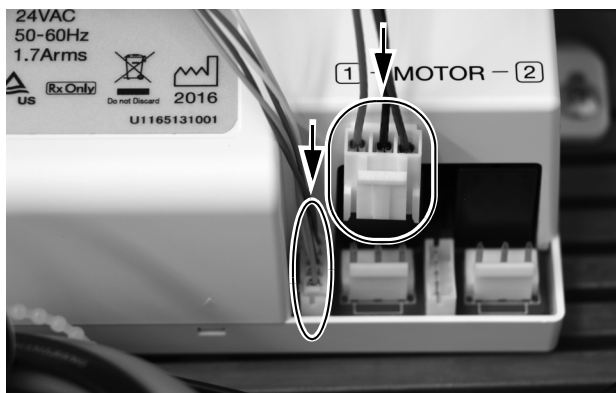
- Plug in the AC power.



5. Plug in the electric motor's wire connectors to their positions on the control module.



**NOTE** For a single motor on the NLZ BA control module, use the Motor 1 connectors. If installing two motors, use the Motor 1 connectors for the first motor and the Motor 2 connectors for the second motor.



## Program the A-dec 500 Deluxe/Deluxe Plus Touchpads



Deluxe Plus Touchpad Shown

1. Turn on the power to the system using the master toggle.
2. On the deluxe plus touchpad main screen, press and hold and at the same until a **System Setup** screen appears.
3. Press .
4. Press again to select **Handpieces**.
5. Press to select **Holder Setup**.
6. On Traditional systems, lift the motor. On Continental systems, pull the whip forward.
7. Select **Electric**.
8. Select **Motor Number 1** (position 1 on the control module).
9. Select the motor type.
10. Set the installed cable length and save the settings. You should hear three beeps. Move the whip back or return the motor to its holder.
11. For systems with two electric motors, repeat steps 3 through 9 and select motor number 2.
12. Press until you see the A-dec logo.

**Next Step** Continue with “Adjust and Test” on page 32.

## Adjust and Test

### Adjust the Drive Air Pressure

1. Fully depress the foot control.
2. Adjust the drive air flow (controls are on the top of the control block) to the handpiece manufacturer's specifications.



**NOTE** Use the digital pressure readout on the delivery system circuit board (A-dec 500 only) to accurately adjust the drive air for the handpiece tubings. You can also display the pressure on the deluxe touchpad by pressing minus — and the plus + buttons at the same time. Adjust to 60-75 PSI for proper operation.

### Test the Handpiece



**CAUTION** Check the motor for damage and loose parts before each use. Do not use the motor if it is damaged.

1. Select the handpiece.
2. Verify that the motor functions with all of the motor option settings on the deluxe touchpad. These include:
  - Motor speed
  - Motor direction



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

3. Replace the covers.

### Error Codes

| Flashing Cycle | Description  | Solution   |
|----------------|--|--|
| 1 flash        | Electronics temperature error                              | Allow to cool; then restart  |
| 2 flashes      | Overload at the motor                                      | Allow to cool; then restart  |
| 3 flashes      | Motor not recognized if starting the electric motor system | Check supply hose and electric motor connections   |
| 4 flashes      | Blocked motor  | Check transmission instrument and motor. Replace or repair faulty part(s) / component(s) |
| 5 flashes      | Various system errors                                      | Check and replace or repair faulty part(s) / component(s)                                |

### Regulatory Information and Warranty

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

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86.0674.00 Rev C  
 Date of Issue 2021 05-07  
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