



A-dec Radius® Delivery System on Performer® Chair

INSTALLATION GUIDE

Installation Overview

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Introduction

This document contains installation instructions for installing an A-dec Radius delivery system on an A-dec Performer III dental chair. This guide contains the following sections:

- Before You Begin
- Recommended Tools
- Installation Steps

Figure 1 Radius 2132 (Continental) Delivery System & Performer III Chair



Things To Do Before You Begin

Before starting the installation:

1. Check with local building and code authorities about installation requirements. They differ from country to country.



CAUTION Certain agencies may require the dental chair to be anchored to the floor when the Radius delivery system is installed. See "Appendix I" on page 17.

2. Check that manual air and water shut-off valves are installed.
3. Use the templates provided in the *Dental Furniture Technical Packet*, P/N 86.0142.00, to install the utilities.

Recommended Tools

- Magnetic leveling device
- 3/8" and 9/16" open-ended wrench
- 15/16" socket and ratchet
- Phillips and large flat-blade screwdrivers
- Hex key set
- Pliers
- Diagonal cutters

Installation Steps

■ Install the Chair

1. Remove the chair from the pallet and position the chair pump housing toward the floor box installation area.



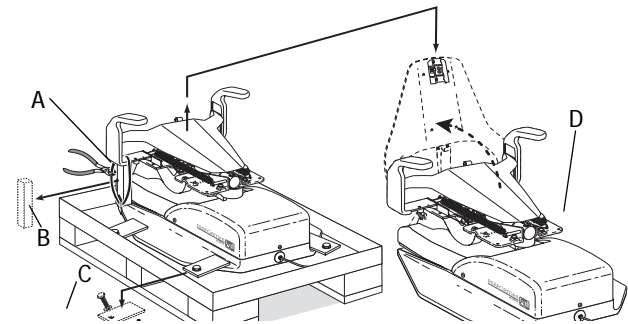
CAUTION Certain agencies may require the dental chair to be anchored to the floor when the Radius delivery system is installed. See "Appendix I" on page 17.

2. Remove the shipping strap, brace and all packaging materials (see Figure 2).
3. Connect the backrest and link arm to the chair:
 1. Lift the chair back into position.
 2. Insert the bushings into the backrest bracket (see Figure 3).
 3. Align the link arm and backrest bracket.
 4. Push the link pin through the link arm and backrest bracket.
 5. Align the link pin groove with the setscrew. Tighten the setscrew to secure the link pin to the link arm.
4. Raise the chair to the maximum base up position:
 1. Plug the chair into its power source.
 2. Tap the chair stop plate three times within five seconds, hold on the third tap (see Figure 4).



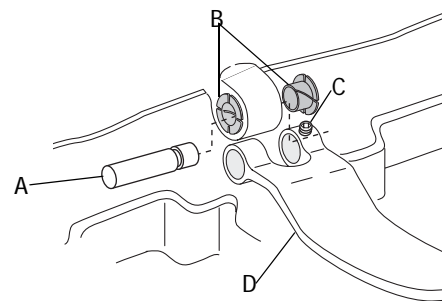
NOTE The chair base continues to rise as long as you press on the stop plate. This function automatically disables after five minutes, but re-enables each time you power up the chair.

Figure 2 Unpackage the Chair



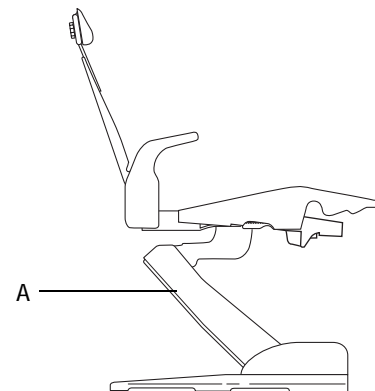
(A) Shipping Strap; (B) Shipping Brace; (C) Shipping Anchor; (D) Chair Pump Housing

Figure 3 Connect the Back Rest and Link Arm



(A) Link Pin; (B) Bushings; (C) Setscrew; (D) Link Arm

Figure 4 Raise The Chair Base Up



(A) Stop Plate

5. Unplug the chair.



ELECTRICAL WARNING Hazardous AC voltages are present on the circuit board. DO NOT touch any part of the circuit board other than at the test points.

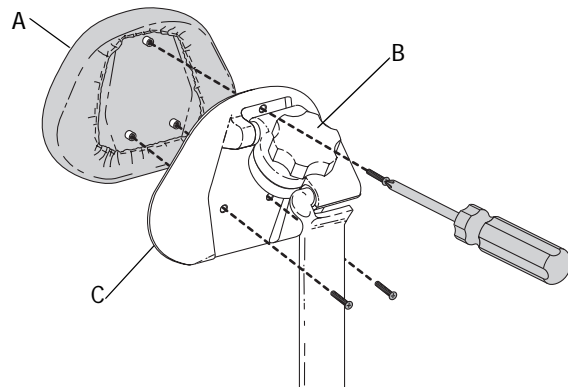
6. Install the headrest:

1. Align the headrest upholstery with the headrest plate, then secure it to the plate. Use three Phillips-head screws (see Figure 5).
2. Turn the headrest tension adjustment screw to change the headrest glide bar tension (see Figure 6):
 - Right to increase tension
 - Left to decrease tension

7. Install the arm caps

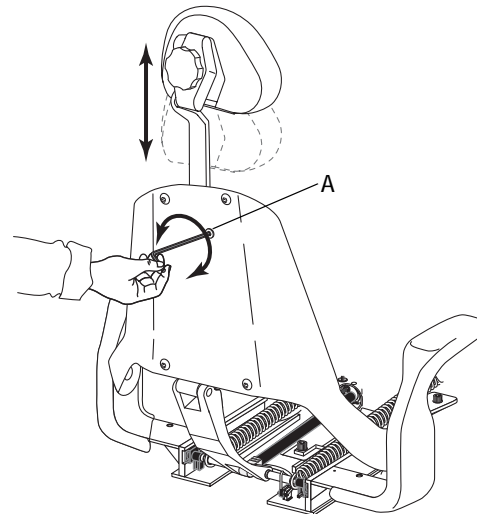
1. Align the arm caps with the holes in the armrests (see Figure 7).
2. Secure the arm caps. Use two flat-head screws per arm cap. Fully tighten the screws so the arm caps do not move.

Figure 5 Install the Headrest



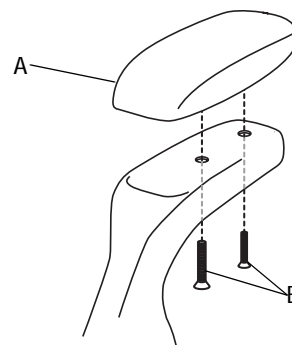
(A) Headrest Upholstery; (B) Headrest Position Adjustment Knob; (C) Headrest Plate

Figure 6 Adjust Headrest Glidebar Tension



(A) Headrest Tension Adjustment Screw

Figure 7 Install Arm Caps



(A) Arm Caps; (B) Screws



■ **Remove the Chair Stop Plate**

Remove the chair stop plate. Hold the sides of the stop plate, then firmly pull down and away from the back of the chair (see Figure 8).

■ **Assemble the Radius Unit**



TIP For an easier assembly, complete these steps prior to removing the Radius unit from the packaging.

1. Align the unit mount arm hub with the flexarm knuckle and firmly press the arms together (see Figure 9). It may be necessary to loosen the retaining setscrew in the mount arm.
2. Remove the tape securing the two setscrews in the unit mount arm. Tighten the retaining setscrew (see Figure 10).
3. Position the shipping strap located in the control head ship carton around the unit. Do not remove the strap until the unit installation is complete.

Figure 8 Remove the Chair Stop Plate

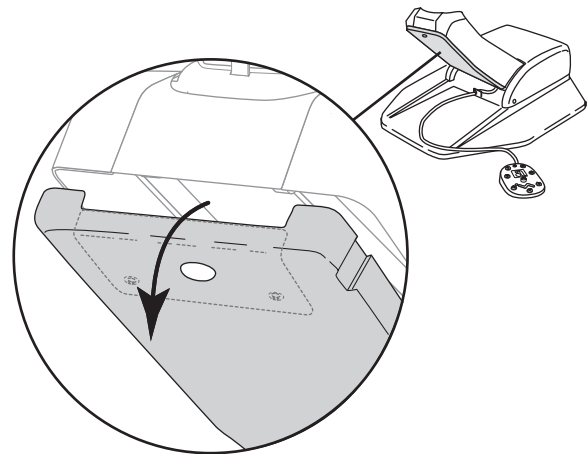
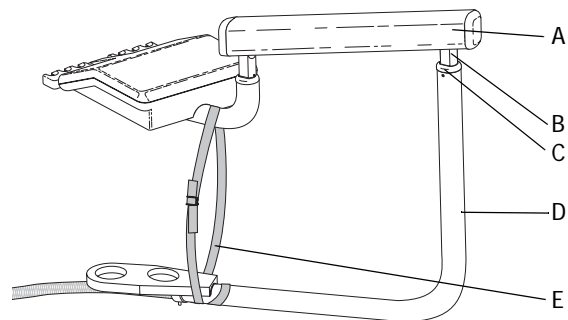
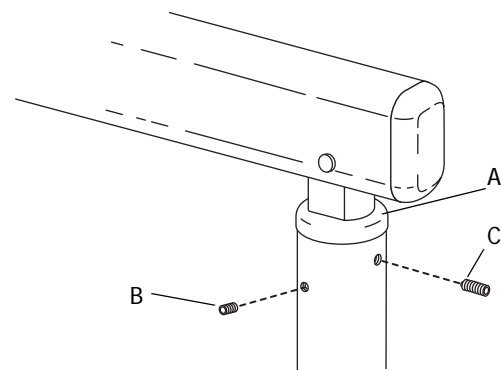


Figure 9 Assemble the Radius Unit; Secure with Strap



(A) Flexarm; (B) Flexarm Knuckle; (C) Arm Hub;
(D) Unit Mount Arm; (E) Shipping Strap

Figure 10 Tighten Setscrews



(A) Arm Hub; (B) Tension Setscrew; (C) Retaining Setscrew

■ Install the Radius Mount Arm

1. Apply red Loctite to the stud.
2. Install stud in unit mount (see Figure 11).
3. Install pivot hub, threaded side down.
4. Apply Lubriplate to the outside surface of the pivot hub.
5. Install the bearing races, cap and nut in the sequence shown (see Figure 11).
6. Tighten the lock nut securely. The unit mount arm should easily rotate but not drift.

■ Route the Chair Umbilical

Route the umbilical from the delivery system arm through the chair (see Figure 12).

■ Adjust the Rigid Arm

To eliminate horizontal drift of the control head, adjust the tension setscrew, using a 3/32" hex key. Adjusting the tension setscrew causes the cup point to seat itself against the wall of the internal bushing.

1. Verify the color and location of setscrews (see Figure 13).
2. Tighten the tension setscrew until it comes to a stop (see Figure 13).
3. Tighten the setscrew an additional quarter turn (to 20-24 inch pounds).
4. Loosen the setscrew and repeat steps 2 and 3 twice to seat the setscrew.
5. Check flexarm tension and tighten or loosen setscrew for desired result.



NOTE To ensure the setscrew seats, complete Steps 2 and 3 two additional times.

Figure 11 Install the Radius Mount Arm

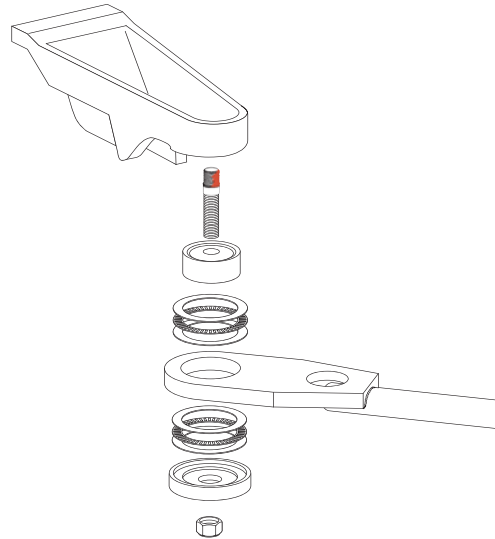


Figure 12 Route the Chair Umbilical

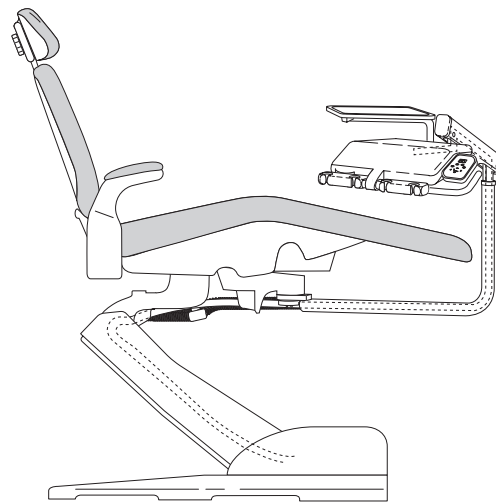
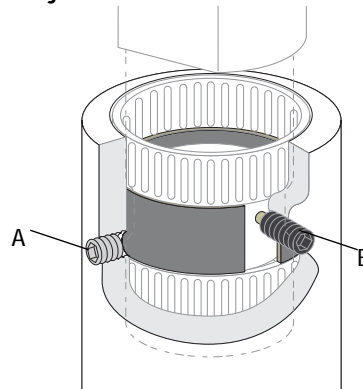


Figure 13 Adjust Radius Setscrew



(A) Tension Setscrew (Brass, Short); Retaining Setscrew (Black, Long With Brass Tip)

- With a 3/32" hex key, tighten the retaining/alignment setscrew until it passes through the opening of the bushing and presses against the knuckle.



NOTE The brass colored tip on the end of the retaining/alignment setscrew should not touch the knuckle when loosened a quarter turn. The tension setscrew is positioned lower than the retaining/alignment setscrew.

- Loosen the setscrew a quarter turn.

Install the Rotation Stops



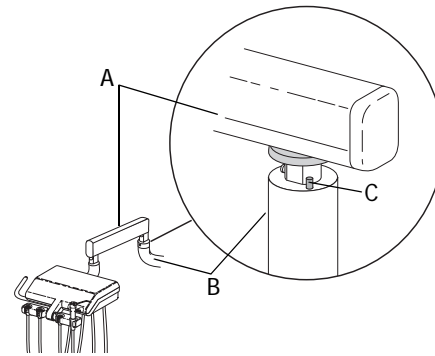
NOTE The rigid arm rotation stop pins must be installed to meet agency stability requirements.

- Install the rotation stop pins in the mount arm and the rigid arm (see Figure 14). Install the pins with the large diameter end down.



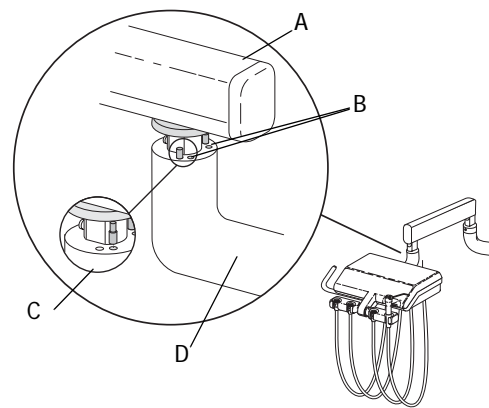
NOTE The two control head rotation stop pins are optional. If you install the pins in the two holes near each other, the Continental control head has a wider range of movement for trans-thorax positioning. This option is only available on Continental control heads (see Figure 15).

Figure 14 Rotation Stop Mount Arm



(A) Flexarm; (B) Rigid arm; (C) Rotation Stop Pin

Figure 15 Rotation Stop Control Head



(A) Flexarm; (B) Trans-Thorax Positioning Holes; (C) Rotation Pins for Standard Positioning; (D) Control Arm

■ Install the Cuspidor

1. Insert two U-bolts through the chair structure and install a washer, split washer and hex nut to each end of the U-bolts (see Figure 16).



NOTE You can install the cuspidor on either side of the chair. To correctly orient the cuspidor arm, ensure the cutout on the upper section faces the outside.

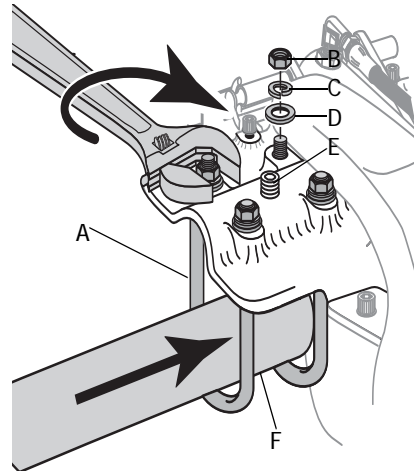
2. Install the 3/8" adjusting screw.
3. Insert the cuspidor post through the U-bolts and begin tightening the hex nuts until snug.



CAUTION Use care in tightening the nuts on the U-bolt. Damage can result if nuts are tightened past 25 ft. lb. (34N m).

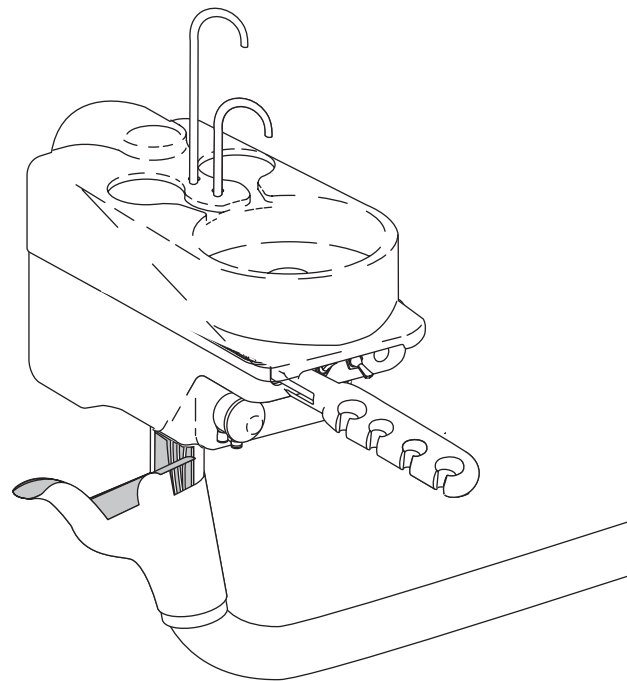
4. Level the post by tightening/loosening the adjusting screw.
5. Slide the cuspidor arm cover on the post (see Figure 17).
6. Install the lower housing.
7. Route the tubing through the post.
8. Slide the cuspidor onto the cuspidor post.
9. Install the cup fill and bowl rinse spouts.
10. Snap cuspidor arm cover in place.
11. Install water bottle on cuspidor unit.

Figure 16 Install the Cuspidor Post



(A) U-bolt; (B) Hex Nut; (C) Split Washer; (D) Washer; (E) Adjusting Screw; (F) Cuspidor Post

Figure 17 Place Cover on Post and Install Lower Housing



■ **Install the Dental Light**

To install, refer to the instructions that came with the dental light.



TIP To ease routing the light power cord through the cuspidor arm, tape the wire to the white threader tubing in the cuspidor umbilical, then pull the wiring through the arm.

■ **Plumb the Delivery System**

1. Install the drain elbows to connect the cuspidor drain tubing and the chair umbilical drain tubing (see Figure 18). Secure with white retaining clamps. Use pliers to fasten tightly.



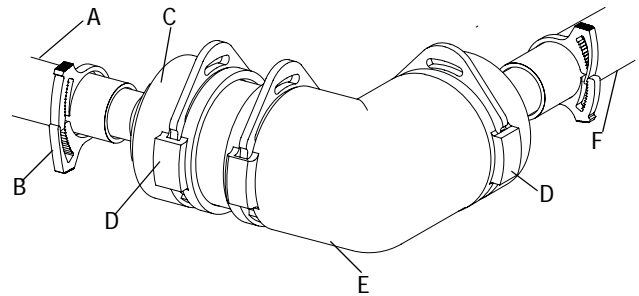
TIP Mark the vacuum and the cuspidor drain tubing for ease in connecting as you complete plumbing at the floor box later in the installation process.

2. Connect wiring from the cuspidor umbilical to the chair umbilical.
3. Connect the tubing from the cuspidor umbilical to the chair umbilical. Use the connectors provided:
 - 1/4" blue tubing
 - 1/4" yellow tubing
 - 1/8" red tubing
 - 1/8" yellow/green stripe tubing
 - 1/8" yellow/red stripe tubing
4. Cable tie the chair and arm umbilical together, then cable tie the bundle to the chair upper structure (see Figure 19).
5. Use the wire clips to secure the umbilical to the lift arm (see Figure 20).



CAUTION Take care that the tubing is not pinched or stressed. Failure to properly secure can result in damage.

Figure 18 Install Drain Elbows



(A) Drain Tubing From Cuspidor Umbilical; (B) Retaining Ring; (C) Tubing Connector; (D) Durr Clip; (E) Drain Elbow; (F) Drain Tubing From Chair Umbilical

Figure 19 Cable Tie Umbilical to Upper Chair Structure

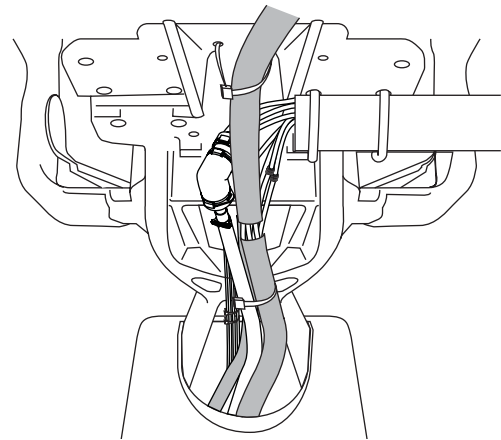
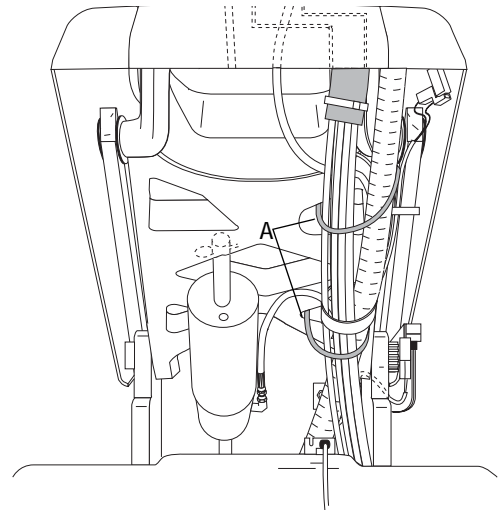


Figure 20 Clip Umbilical to Lift Arm



(A) Umbilical Clip

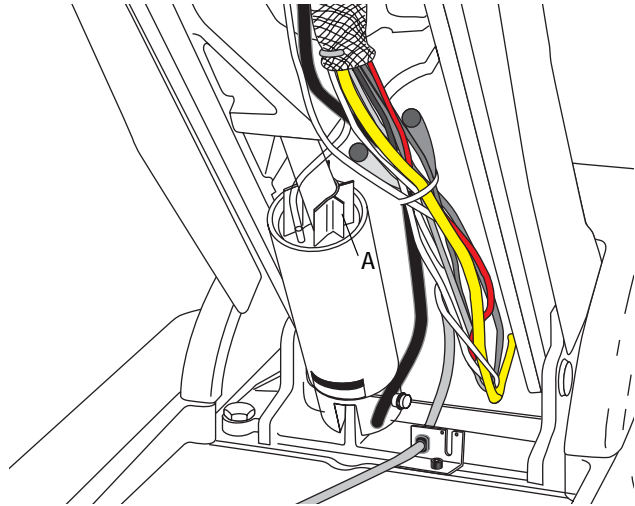
■ **Install the Base Limit Stop**

1. Insert the base limit stop over the lift cylinder rod.
2. Rotate the base limit stop to straddle the vent tube (see Figure 21).

■ **Install the Foot Control**

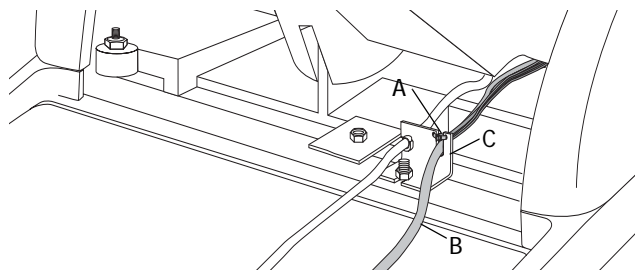
1. Locate the strain relief bracket on the back of the chair base plate, just below the lift arm (see Figure 22).
2. Install the foot control tubing into the slot in the strain relief bracket.
3. Connect the tubing from the foot control to the tubing of corresponding color and dash pattern from the chair umbilical (see Figure 23).
4. At the umbilical, gently pull the tubing to eliminate excessive slack.
5. Insert a small cable tie through the two holes at the top of the strain relief to secure the foot control.

Figure 21 Install the Base Limit Stop



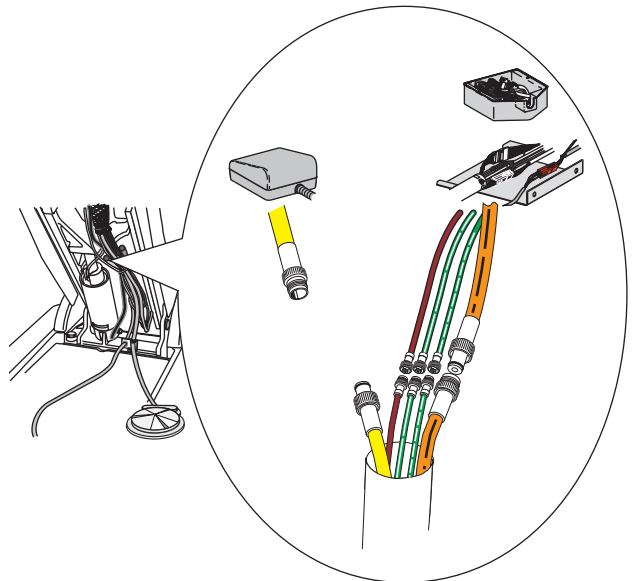
(A) Base Limit Stop

Figure 22 Connect the Foot Control Tubing



(A) Small Cable Tie; (B) Foot Control Tubing; (C) Strain Relief Bracket

Figure 23 Foot Control Connections



■ **Install the floor box**

Depending on the configuration selected, install a contoured floor box or a stainless steel floorbox.

1. Remove the floor box cover (see Figure 24).
2. Position the floor box over the utilities:
 1. Measure the external convolute to match the distance between the chair and the floor box frame.
 2. Cut off excess convolute.
 3. Screw the umbilical connector over the end of the conduit (see Figure 26).
 4. Place the floor box over the convolute, so that the umbilical connector is positioned inside the floor box.

For a stainless steel floor box:

5. Install the liquid separator:
 1. Remove the plug from the air vacuum system and install the barb (see Figure 27).
 2. Connect the 1/4" yellow air tubing from the umbilical.

Figure 24 Remove Floor Box Cover

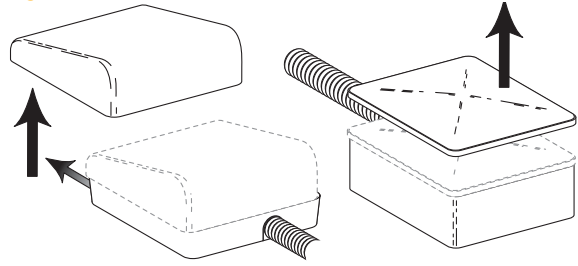
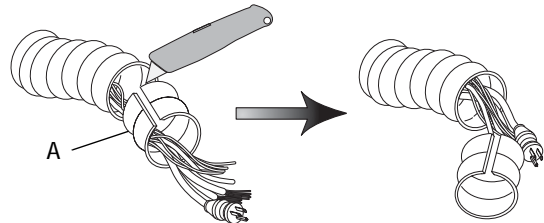
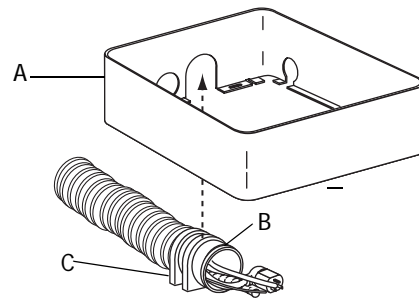


Figure 25 Shorten Umbilical



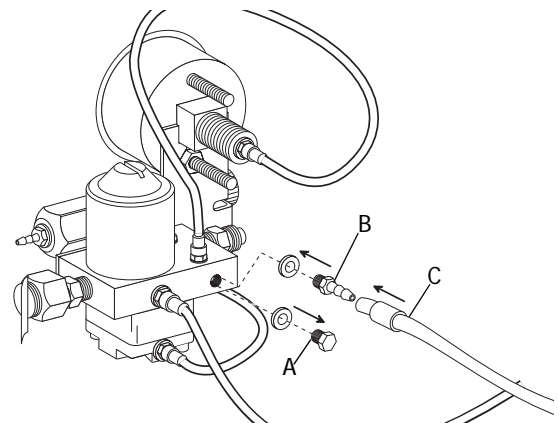
(A) Convolute sheathing

Figure 26 Place Convolute in Floor Box



(A) Floor Box; (B) Umbilical Connector; (C) Umbilical Retaining Clip

Figure 27 Install the Air Tubing Barb



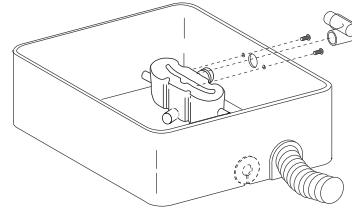
(A) Air Vacuum Plug; (B) Air Tubing Barb; (C) Air Tubing

3. Place the liquid separator in the floor box and connect to the elbow. Use the screws included (see Figure 28).
4. Connect the HVE drain tube from the umbilical to the vinyl drain tubing. Use the inline connector provided. Install the other end of the vinyl drain tube to the liquid separator (see Figure 29).
5. Install the saliva ejector drain tubing from the umbilical to the liquid separator.
6. Install the cuspidor drain tubing from the umbilical to the drain fitting.
7. Install the liquid separator drain tubing and connect to the drain fitting.

■ **Connect the utilities**

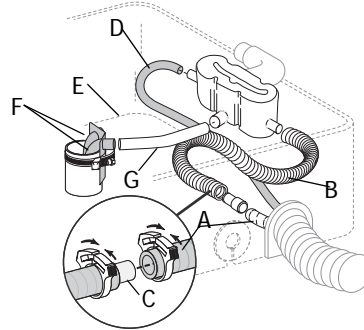
1. Route the air/water manifold tubing through the convolute to the floor box (see Figure 30 and Figure 31)
2. Purge the manual shutoff valves of debris.

Figure 28 Install the Liquid Separator and Elbow



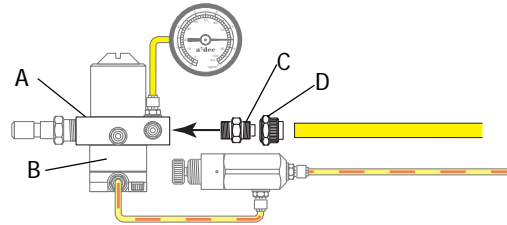
(A) Liquid Separator; (B) Elbow

Figure 29 Connect Drains



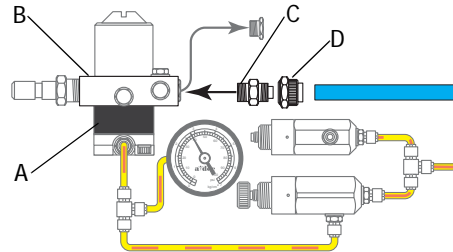
(A) HVE Drain Tube; (B) Vinyl Drain Tubing; (C) Inline Connector; (D) SE Drain Tube; (E) Cuspidor Drain Tube (F) Drain Fitting (G) Saliva Ejector Drain Tubing

Figure 30 Air Filter/Regulator Connections



(A) Manifold; (B) Air Filter/Regulator Assembly (white body); (C) Apply Loctite; (D) Pipe Fitting

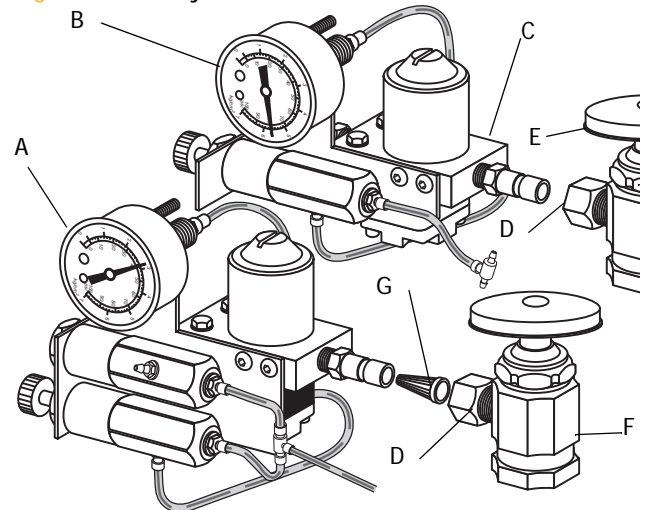
Figure 31 Water Filter/Regulator Connections



(A) Water Filter/Regulator Assembly (black body); (B) Manifold; (C) Apply Loctite; (D) Pipe Fittings (for units with high-volume water QD)

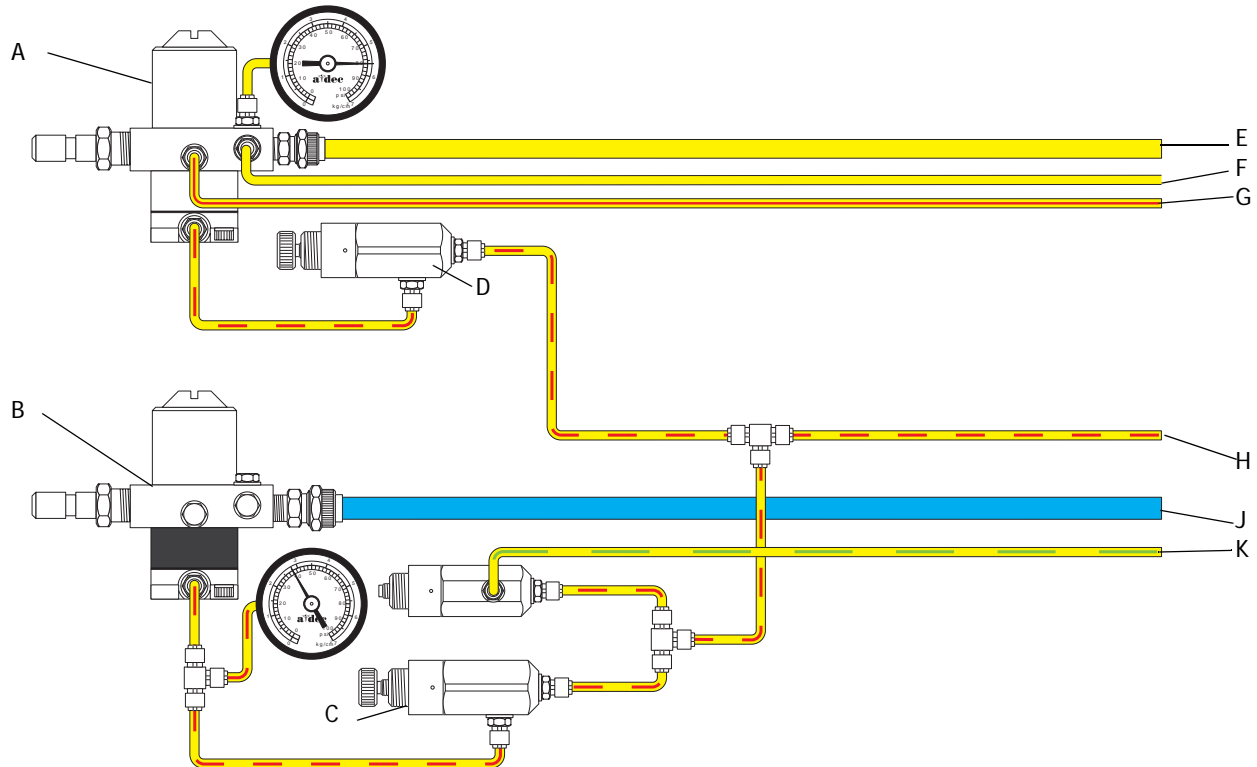
3. Attach the air/filter regulator to the manual air shut-off valve (see Figure 32).
4. Trim the master air and supply air and install them to the air/filter regulator in the floor box. Leave enough length for servicing and future use.
5. Trim the pilot air, and install the gauge and pre-regulator assembly.
6. Fully open the manual air shut-off valve.
7. Plug in the chair power cord. Connect the tubing from the control head umbilical to the tubing of the same color and dash pattern in the floor box (see Figure 33).
8. Join the 6-pin connectors (black) in the floor box.
9. Connect the touchpad cable to the matching connector inside the floor box.
10. Check the system air pressure gauges in the utility center. Air pressure should be 80 psi (551 kPa) and water pressure should be 40 psi (276 kPa).

Figure 32 Utility Connections



(A) Water Filter/Regulator; (B) Air Filter/Regulator; (C) Manifold (filter element); (D) Hex Nut; (E) Manual Air Shutoff Valve; (F) Screen (water only); (G) Manual Water Shutoff Valve

Figure 33 Plumbing Diagram



(A) Air Filter/Regulator Assembly; (B) Water Filter/Regulator Assembly; (C) 40 psi Regulator; (D) 40 psi Preset Regulator (non-adjustable); (E) Air Supply (yellow 1/4"); (F) 1/8" yellow; (G) 1/8" yellow/red stripe; (H) 1/8" yellow/red dash; (J) Water Supply (1/4" blue); (K) 1/8" yellow/green dash

■ **Secure the Floor Box**

Secure the floor box to the floor using four screws.

■ **Test the Unit**

1. Fill a self-contained water bottle with the water specified by the doctor.



NOTE The doctor may object to putting office water through the unit. Check with the doctor, as to water usage, before filling the water bottle.

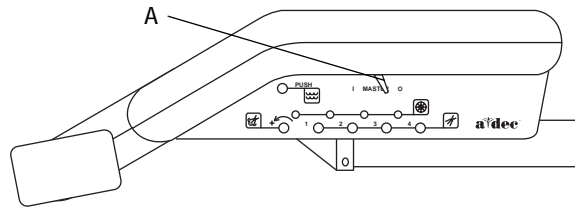
2. Fully open both the air and water manual shutoff valves. Check plumbing connections for leakage.
3. Move the master On/Off toggle to the On position (see Figure 34).
4. Operate the syringe while checking all plumbing connections for leakage (see Figure 35).
5. Plug in the power supply if applicable.
6. Test all instrumentation. Refer to the appropriate equipment Owner's Guide for testing and adjustment procedures.

■ **Level the Radius Control Head**

To level the Radius control head:

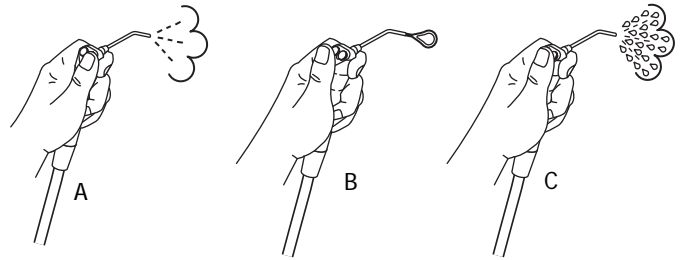
1. Place the control head in the most commonly-used position.
2. Place a level on the control head cover (see Figure 36).
3. Unscrew the arm endcap and remove.
4. Remove the locking screw. Use a hex key.
5. Adjust the control head level. Use the hex key:
 - Tighten the adjustment screw to move the end up
 - Loosen the adjustment screw to move the end down
6. Once the control head is level, replace the locking screw and arm endcap.

Figure 34 HDS Controls



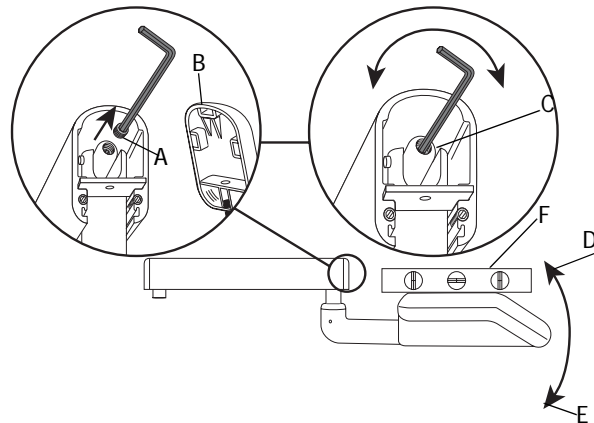
(A) Master On/Off Toggle

Figure 35 Syringe Operation



(A) Air; (B) Water; (C) Spray

Figure 36 Level the Radius Control Head



(A) Locking Screw; (B) End Cap; (C) Adjustment Screw; (D) Tighten to Move Up; (E) Loosen to Move Down (F) Place Level on Control Head

■ Install the Backrest and Seat Upholstery



NOTE The Performer III chair offers two choices in backrest upholstery; the narrow backrest and the contoured backrest. The installation procedures are the same for both.

1. Align the backrest upholstery with the backrest.
2. Secure the upholstery to the backrest. Use the four button-head screws.
3. Align the threaded inserts in the toeboard upholstery with the four mounting holes in the chair casting.
4. Secure the upholstery to the chair. Use the four mounting screws.

■ Before Leaving the Facility

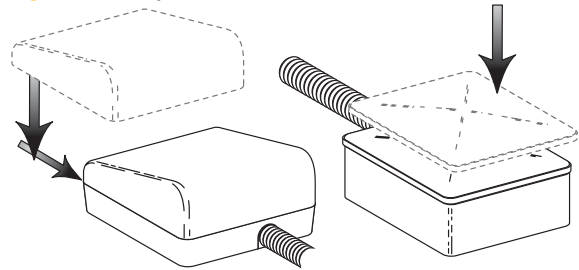
1. Replace the chair stop plate.
2. Replace the floor box cover (see Figure 37).



CAUTION Do not pinch or kink the tubing or wiring.

3. Distribute the *Instructions for Use* and instruct the dental team in the operation and maintenance of the equipment.

Figure 37 Replace Floor Box Cover



Adjustments

The cup fill and bowl rinse flow time is factory pre-set. To adjust the cup fill or bowl rinse flow time:

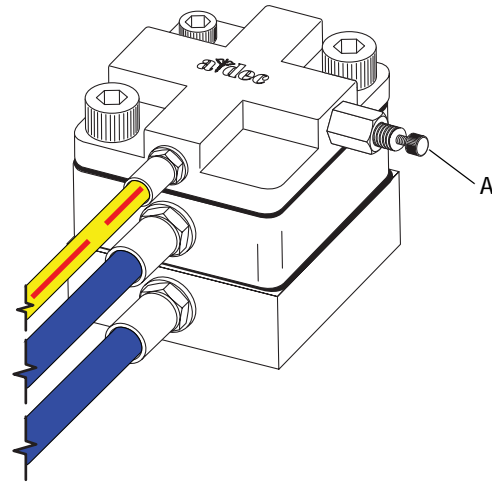
1. Locate the cup fill or bowl rinse flow adjustment in the cuspidor lower housing (see Figure 38).



NOTE Each adjustment attaches to the respective cup fill/bowl rinse tubing.

2. Turn the control knob to adjust:
 - Turn right to increase run time
 - Turn left to decrease run time

Figure 38 Adjust Bowl Rinse and Cup Fill



(A) Control Knob

Appendix I

Anchor the Chair

Recommended Tools

- Marker
- Hand drill
- 1/2" masonry bit or 3/8" pilot bit

Anchor the Chair to the Floor

1. Place the chair in the desired location. Remove the chair stop plate.
2. Position the anchor bracket between the foot control tubing bracket and the lift cylinder.
3. Mark the drill location and remove.

Anchor to a Concrete Floor

1. Using a 1/2" masonry bit, drill a 4" (101 mm) deep hole for the floor anchor (see Figure 38).
2. Insert the expandable concrete anchor from the kit into the hole.
3. Reposition the chair.
4. Place the anchor bracket on the chair's base and align with the expandable concrete anchor.
5. Insert the anchor bolt from the kit through the anchor bracket and into the expandable concrete anchor. Tighten the bolt until it is snug against the anchor bracket.

Anchor to a Wood Floor

1. Using a 3/8" pilot bit, drill a 2" (50 mm) deep hole for the floor anchor (see Figure 39).
2. Reposition the chair.
3. Place the anchor bracket on the chair's base and align the anchor with the hole.
4. Insert the anchor bolt from the kit through the anchor bracket and into the hole. Tighten the bolt until it is snug against the anchor bracket.

Figure 38 Anchor to Concrete

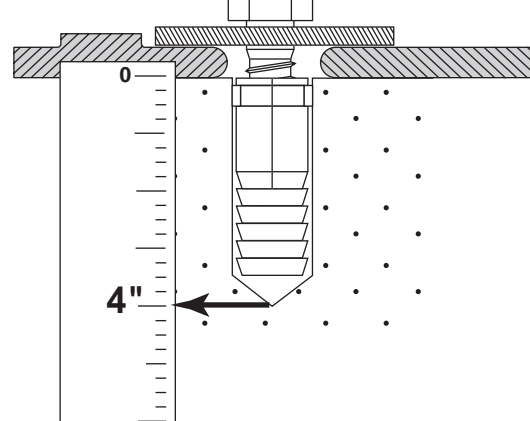
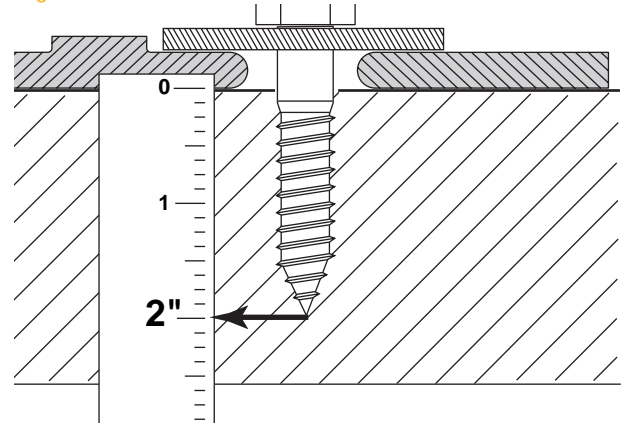












Figure 39 Anchor to Wood





Identification of Symbols

Symbol	Description
	Recognized by Underwriters Laboratories Inc. with respect to electric shock, fire and mechanical hazards only in accordance with UL 60601-1 (2601-1) and under mutual recognition agreement with CAN/CSA C22.2, No. 601.1.
	Classified by Underwriters Laboratories Inc. with respect to electric shock, fire and mechanical hazards only in accordance with UL 60601-1 (2601-1) and under mutual recognition agreement with CAN/CSA C22.2, No. 601.1.
	UL listed to UL 61010A-1, BS EN 61010-2-010 and Canadian (CAN/CSA C22.2, No. 1010.1-92) safety standards.
	Conforms to applicable European Directives (refer to Declaration of Conformity).
	Protective earth (ground).
	Functional earth (ground).
	Attention, consult accompanying documents. No user serviceable parts. Attention, line voltage. Only licensed electrician should remove cover.
	Type B applied part.
	Class II equipment.
	Caution: Metal surfaces can be hot during and following the dry cycle.

Classification of Equipment (EN-60601-1)

Type/Mode	Classification
Types of shock protection	CLASS I EQUIPMENT: Dental chairs, dental lights, and power supplies CLASS II EQUIPMENT: Chair, wall, and cart-mounted delivery systems
Degree of shock protection	TYPE B APPLIED PART: Delivery systems only
Degree of protection against water ingress	ORDINARY EQUIPMENT: All products
Mode of operation	CONTINUOUS OPERATION: All models except dental chairs CONTINUOUS OPERATION WITH INTERMITTENT LOADING: Dental chairs - 5% duty cycle
Flammable Gasses:	Not suitable for use in the presence of a flammable anesthetic mixture with air, oxygen, or nitrous oxide, where such gasses may accumulate in concentration (closed space).

Electrical Rating

Type	Specification
Volts:	100/110-120/220-240 VAC
Frequency	50-60 Hz
Current:	As configured and specified in equipment manual (products labeled 15A or greater require dedicated circuit, identified in distribution panel).

Environmental Specifications

Temperature/Humidity	Specification
Storage/Transportation	Temperature: -40°C to 70°C (-40°F to 158°F) - Relative humidity: 80% for up to 31°C, decreasing linearly to 50% at 40°C.
Operating	Temperature: 10°C to 40°C (50°F to 104°F) - Relative humidity: 80% for up to 31°C, decreasing linearly to 50% at 40°C.
Indoor Use	Altitude up to 2,000M (6,563 ft.), installation category II, pollution degree 2. (UL 61010A-1 and CAN/CSA C22.2, No. 1010.1-92 only)

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