Welcome to the electronic version of the 2003 edition of the A-dec Decade, Cascade, and Performer Service Guide. This service guide provides an easy to use source of technical information for servicing and maintaining A-dec products.
Below are the titles of the sections of the service guide. Click on the title of a section to view it, or click on the bookmarks tab on the left of the window. Both thumbnails and bookmarks are available in each one of the sections for navigation between sections and to the table of contents (TOC).

- General Information (table of contents located here)
- Handpiece Controls
- Foot Controls
- Assistant's Instrumentation
- Post Boxes & Cuspidors
- Floor Boxes & Power Supplies
- Dental Lights
- Chairs
- Accessories
- Cascade Master
- Performer (Performer table of contents located here)

A-dec Service Guide

2003 Edition

85.0812.00, 2003

Copyright

2601 Crestview Drive, Newberg, OR 97132, USA
Printed in USA.

Trademarks

85.0812.00, 2003

Product Identification Symbols

Recognized by Underwriters Laboratories Inc.® with respect to electric shock, fire and mechanical hazards only in accordance with UL 2601-1. Recognized with respect to electric shock, fire, mechanical and other specified hazards only in accordance with CAN/CSA C22.2, No. 601.1.

UL listed to US (UL 544) and Canadian (CAN/CSA C22.2, No. 125) safety standards.

Classified by Underwriters Laboratories Inc. with respect to electric shock, fire and mechanical hazards only in accordance with UL 2601-1. Classified with respect to electric shock, fire, mechanical and other specified hazards only in accordance with CAN/CSA C22.2, No. 601.1.

Conforms to European Directives (refer to Declaration Statement).

Protective earth (ground).

Functional earth (ground).

Attention, consult accompanying documents.

TYPE B APPLIED PART.

Class II equipment.

Classification of Equipment (EN 60601-1)

Types of Shock Protection

Class I Equipment
(Dental Chairs, Dental Lights, & Power Supplies)

Class II Equipment
(Chair, Wall, & Cart-Mounted Delivery Systems)

Degree of Shock Protection

Type B Applied Part (Delivery Systems Only)

Degree of Protection From Water Ingress

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)

Environmental

Storage Temperature:	-40°C to 70°C (-40°F to 158°F)
Relative Humidity:	95% maximum
Operating Temperature:	10°C to 40°C (50°F to 104°F)
Relative Humidity:	95% maximum

Electromagnetic Compatibility

This equipment has been tested and found to comply with the limits for medical devices in EN60601-1-2. These limits are designed to provide reasonable protection against harmful interference in a typical medical installation. Contact A-dec customer service if you have any questions.

Flammable Gasses

Not suitable for use in the presence of a flammable anesthetic mixture with air, oxygen, or nitrous oxide.

Warranty

A-dec warrants its products and A-dec/W&H handpieces against defects in material or workmanship for one year from time of delivery. A-dec's sole obligation under the warranty is to provide parts for the repair, or at its option, to provide the replacement product (excluding labor). The buyer shall have no other remedy. (All special, incidental, and coincidental damages are excluded.)

Written notice of breach of warranty must be given to A-dec within the warranty period. The warranty does not cover damage resulting from improper installation or maintenance, accident or misuse. The warranty does not cover damage resulting from the use of cleaning, disinfecting or sterilization chemicals and processes. The warranty also does not cover light bulbs. Failure to follow instructions provided in A-dec's Operation and Maintenance Instructions (Owner's Guide) may void the warranty.

A-dec warrants A-dec dental chair cylinders, both lift and tilt, for ten years from the date of purchase of the chair or the cylinder. This warranty is retroactive to A-dec chair cylinders already in the field. The warranty covers chair cylinders A-dec finds to have manufacturing related irregularities. Stool cylinders are covered under A-dec's one-year warranty.

No other warranties as to merchantability or otherwise are made.

Return Merchandise

U.S. and Canadian dealers wishing to return overstock (unopened) merchandise to A-dec for credit consideration must include a copy of the original invoice number. A return authorization form from an A-dec territory manager must be included with serial numbered equipment or A-dec/W&H handpieces. A 15% restocking fee will be assessed. Merchandise that cannot be returned for credit includes parts assembled to the dental unit, chair, light, or cabinet; obsolete parts; and specials. Preference Collection dental furniture cannot be returned for credit.

In the case of a defective warranty item, a copy of the replacement invoice, serial number of the unit under which it was replaced, and a description of the symptoms of the defect must be returned with the part to: A-dec Inc., 2601 Crestview Drive, Newberg, Oregon 97132, USA.

About this Service Guide

Welcome

Welcome to the 2003 edition of the *A-dec Service Guide*. This guide provides an easy to use source of technical information for servicing and maintaining A-dec products.

Intended Audience

This guide is intended for both newly trained and seasoned service technicians responsible for the installation and maintenance of A-dec products. We assume you understand the operation of dental equipment, know how to follow flow diagrams, and have performed basic maintenance on dental or medical equipment.

About this Guide

This service guide contains

- Part number information on serviceable parts
- Flow diagrams for the routing of tubing and wiring
- Exploded part illustrations showing sequence of assembly
- Step-by-step instructions for troubleshooting common problems, and
- Adjustments and product maintenance information.

Conventions

A number of items and instructions appear throughout this document. The formatting conventions are designed to make it quick and easy to find and understand information.

- References to sections appear in italic type, e.g., *Identifying HVEs*
- Names of documents appear in italic type e.g., *Genuine A-dec Service Parts Catalog*
- Important supplemental information about the current topic appears as a note, e.g.,
  NOTE: Low voltage from duplex receptacle...

Information Sources

There are a number of other related documents in the A-dec documentation set.

Genuine A-dec Service Parts Catalog

The *Genuine A-dec Service Parts Catalog* (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 in use. Refer to this catalog for additional details on parts highlighted in this guide.

Preference Collection Technical Packet

The *Preference Collection Technical Packet* (86.0142.00) contains information specifically related to Preference Collection dental furniture. The content is intended to assist you in specifying required plumbing, utilities, framing and construction requirements and installation for Preference Collection units.

Tech Talk

The *Tech Talk* newsletter provides information relating to A-dec products including documentation changes, product changes, product enhancements, issues and resolutions.

A-dec Illustrated Parts Breakdown

The *A-dec Illustrated Parts Breakdown (IPB)* contains illustrated, exploded views of assemblies with part numbers and descriptions for associated parts.

Electronic Documentation

Electronic versions (PDF files) of our documentation (installation instructions, service guide, technical information) can be viewed or downloaded from the *Partner Resources* section of the A-dec website. Check this location for current detail on products and technical information.

OrderNet

OrderNet is a simple, convenient online ordering system that is available 24 hours-a-day. OrderNet can be used to place quick orders for service parts or used to configure product and prepare proposals. Order acknowledgements are e-mailed as soon as you place your order.

Getting Support

Contacting Customer Service

If you have a question that has not been addressed in this document, please contact the customer service number for your area. Contact information for each customer service region is as follows:

U.S. and Canada

Customer service for the U.S. and Canada is available from 5 a.m. to 5 p.m. Pacific Standard Time (PST) to answer any questions you may have about A-dec equipment. Peak business hours are between 8 a.m. and 2 p.m. PST.

2601 Crestview Drive, Newberg, Oregon 97132, USA

Telephone: 1 (800) 547-1883

FAX: 1 (503) 538-0276

Partner Resources Website ***www.a-dec.biz*** General Website ***www.a-dec.com***

International

2601 Crestview Drive, Newberg, Oregon 97132 USA

Telephone: (503) 538-9471

FAX: (503) 538-5911

Partner Resources Website ***www.a-dec.biz*** General Website ***www.a-dec.com***

Getting Support

A-dec Dental U.K., Ltd.

Austin House

11 Liberty Way

Nuneaton, Warwickshire, England CV11 6RZ

Telephone: 0800 ADEC UK (2332-85) Within UK

44 24 7635 0901 Outside UK

FAX: 44 24 7634 5106

Partner Resources Website ***www.a-dec.biz*** General Website ***www.a-dec.com***

A-dec Australia

41-43 Bowden Street

Alexandria, NSW 2015, Australia

Telephone: 61 (0)2 9699 4600

FAX: 61 (0)2 9699 4700

Partner Resources Website ***www.a-dec.biz*** General Website: ***www.a-dec.com.au***

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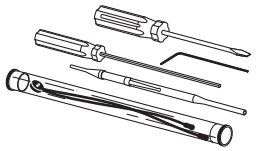
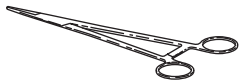
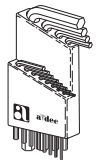
Identifying Tools and Service Parts

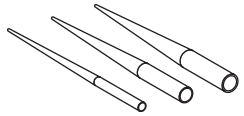
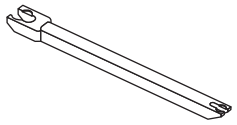
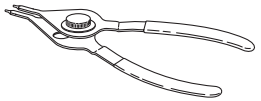
This section details the tools that make servicing or installing A-dec equipment faster and easier. For more information on A-dec recommended tools, refer to the *Genuine A-dec Service Parts Catalog*, P/N 85.5000.00.

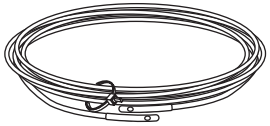
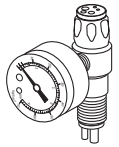
While other suppliers may offer parts for A-dec equipment, these parts might not provide the function and reliability you and your customers expect. We recommend using only A-dec service parts when replacing parts on A-dec equipment. This ensures the best performance possible.

Tools

The table below describes tools, their function, and part number.

Use this tool...	When...		Part Number
Fiber-optic Installation Tool Kit	installing dual voltage intra-oral light source and adjusting voltage		90.0383.00
Hemostat	troubleshooting or repairing a unit to stop air/water flow through tubing		009.008.00
Hex 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)

Use this tool...	When...		Part Number
O-ring Tools	providing quick field repairs, these tools fit the four smallest o-ring sizes used in A-dec equipment		009.013.00
Panel Mount Gauge	checking air/water pressure valves		026.118.00
Silicone Lubricant (high quality silicone base grease, pkg of 6)	lubricating internal moving parts such as o-rings, oral evacuator valves, and bushings		98.0090.01
Sleeve Tool	securing 1/4" tubing sleeves and 1/8" uni-clamps		98.0072.00
Snap Ring Tool	installing and removing internal and external snap rings — fits all snap rings used in A-dec equipment		009.007.00

Use this tool...	When...		Part Number
Tubing Stripper	installing handpiece tubing used to separate the extruded air and water lines		009.035.00
Umbilical Stringer	stringing additional tubing or wiring into existing umbilical assemblies (12' stringer with threading holes on both ends)		009.015.00
Valve Test Syringe	making quick tests of pilot operated valves use to apply a static pressure of 5 - 75 psi		98.0050.01
Drive Air Pressure Gauge	adjusting handpiece drive air pressure, 0-60 psi. Will not fit the Borden 3-hole coupler.		50.0271.00

Identifying A-dec Tubing

This section identifies the tubing type used when servicing A-dec products. Allow adequate length when installing to avoid crimping or bending of tubing. The use of the appropriate tools can improve the ease of tubing installation or replacement (see *Identifying Tools and Service Parts*).

Using Suggested Fittings

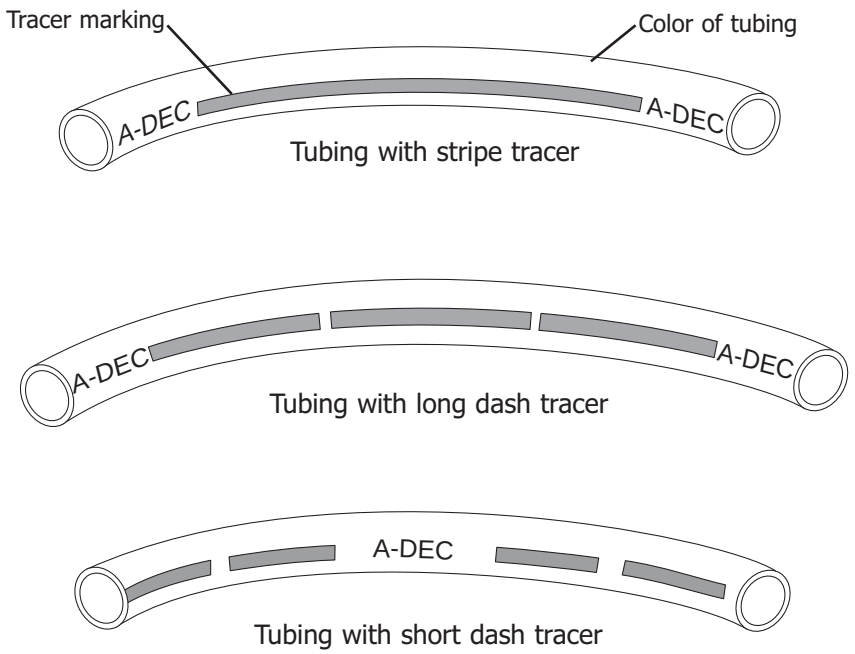
Unit-clamps or tubing sleeves must be used to ensure a good seal and to prevent tubing from coming off barbs.

For 1/4" polyurethane tubing, use 1/4" barbs with sleeves and 1/4" Poly-Flo fittings.

For 3/8" Polyurethane tubing, use 3/8" Poly-Flo fittings.

Identifying Tubing Detail

When identifying tubing, the body color of the tubing is the "tubing color". The line and/or the A-dec name printed on the tubing are the "tracer markings". These two details will identify the type of tubing you will need and its use.



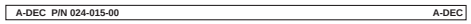
Tubing Identification Details

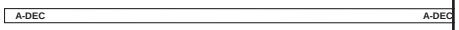
Identifying Tubing Functions

When installing or replacing tubing, allow enough length to avoid crimping or bending. Uni-clamps or tubing sleeves must be used to ensure a good seal and to prevent tubing from coming off barbs. The following table lists the different types of tubing and their function.

Tubing Function	Description	Tubing Color	Part Number
Unregulated Air	Continuous, filtered, unregulated air — 1/8" OD from the air regulator to On/Off toggle		036.013.03
Pilot Air	Filtered unregulated air controlled by master On/Off toggle — 1/8" OD		036.009.04
Regulated Air Supply	Continuous, filtered, regulated air — 1/8" OD		036.003.03
Regulated Air Supply	Regulated air — 1/4" OD		036.032.02
Regulated Air Supply	Regulated air — 3/8" OD		036.031.02

Tubing Function	Description	Tubing Color	Part Number
Pilot Air	Pilot air tubing used only on early Performer I units — 1/4" OD		036.105.00
Regulated Air (40 psi)	Regulated air at 40 psi — 1/8" OD		036.044.03
Drive Air	Drive air for pressure gauge — 1/8" OD		036.010.03
Drive Air	Drive air for foot control — 1/4" OD		036.052.03
Drive Air	Handpiece drive air (clear) — 1/4" OD		036.066.03
Chip Blower Air	Air for chip blower — 1/8" OD		036.014.02

Tubing Function	Description	Tubing Color	Part Number
Signal Air, Coolant Air	Signal air/air coolant from foot control, signal air for cuspidor cup filler and vacuum actuator — 1/8" OD		036.006.03
Signal Air, Water Coolant	Signal air/water coolant from foot control, signal air for cuspidor bowl rinse — 1/8" OD Signal		036.018.03
Air, Coolant Air	Coolant — 1/4" OD		036.056.03
Unregulated Air	Unregulated air to flexarm brake — 1/8" OD		036.020.03
Signal Air, Coolant Water	Signal air (clear) from foot control relay to wet/dry toggle — 1/8" OD		024.015.04
Water Supply	Coolant water supply, flush water — 1/8" OD		036.004.03
Oral Cavity Water	Oral cavity water, with/without water heater — 1/8" OD		036.005.03

Tubing Function	Description	Tubing Color	Part Number
Water Supply	Regulated water, water to bowl rinse — 1/4" OD		036.053.03
Water Supply	Unregulated water — 3/8" OD		036.054.03
Return Water	Return water, tank water heater, water to gravity drain drip tube from syringes — 1/8" OD		036.011.03
Miscellaneous	Miscellaneous line (white) for use with A-dec authorized accessories — 1/8" OD		036.019.03
Hydraulic System Supply	Low pressure hydraulic system supply for chair (clear) — 3/8" OD		036.035.00

Handpiece Controls

Controls

This section provides information related to the servicing, maintenance, and adjustment of handpiece controls. Detail on how to service control heads, control blocks, and troubleshoot specific problems related to them is presented.

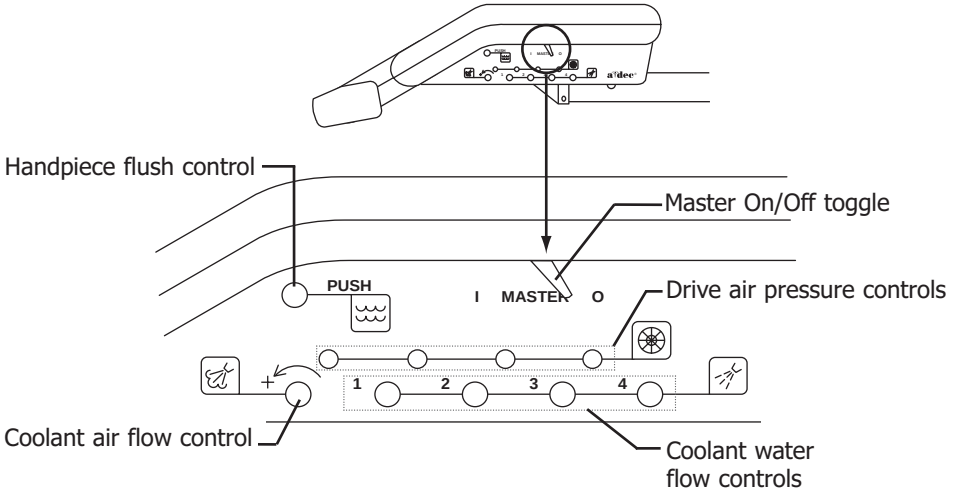
Holders

Additional information covered in this section includes assembly, service, and maintenance information for A-dec handpiece holders. Flow diagrams, replacement part information, and troubleshooting tips are presented.

Making Handpiece Control Adjustments

Location of Control Adjustments

The control adjustments for the handpiece flush control, drive air pressure, coolant air flow, and coolant water flow are located on the side of the control head.



Location of Control Adjustments on the Control Head

Operators Adjustments

Use the adjustment key to make adjustments, with the exception of the drive air pressure. The adjustment key will not fit the drive air control ports. This was done to prevent unintentional changes to drive air settings. To adjust the drive air, use a 3/32" hex key.

Adjusting Coolant Water

Using the adjustment key or a 1/8" hex key, follow these steps to adjust the coolant water flow for each handpiece. Turn the key clockwise to decrease the coolant water flow and counterclockwise to increase the coolant water flow.

Task	Description
1	Insert the key into the adjustment port for the handpiece being adjusted.
2	Turn clockwise until it seats softly.
3	Move the foot control's wet/dry toggle to the ON position (toward blue dot).
4	Run the handpiece at medium speed.
5	Adjust the coolant water until 2-3 drops per second are visible.

Adjusting Coolant Air

Using the adjustment key (or a 1/8" hex key), follow these steps to adjust the coolant air flow for each handpiece. Turn the key clockwise to decrease the coolant air flow and counterclockwise to increase the coolant air flow.

Task	Description
1	Insert the key into the adjustment port (one location for all handpieces).
2	Run the handpiece at medium speed.
3	Adjust the coolant air by turning the key counterclockwise (until a fine mist is visible around the bur).

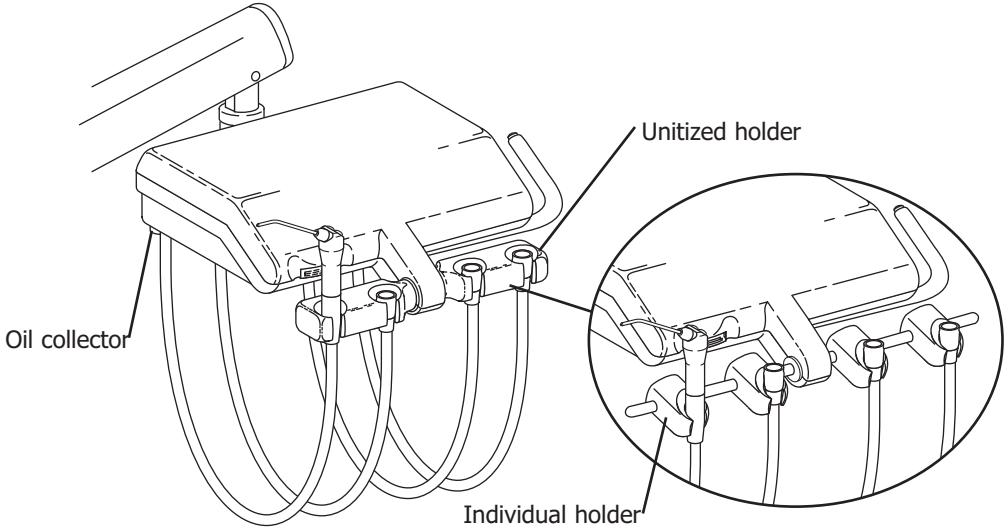
Adjusting Drive Air

Follow these steps to adjust the drive air using a 3/32" hex key.

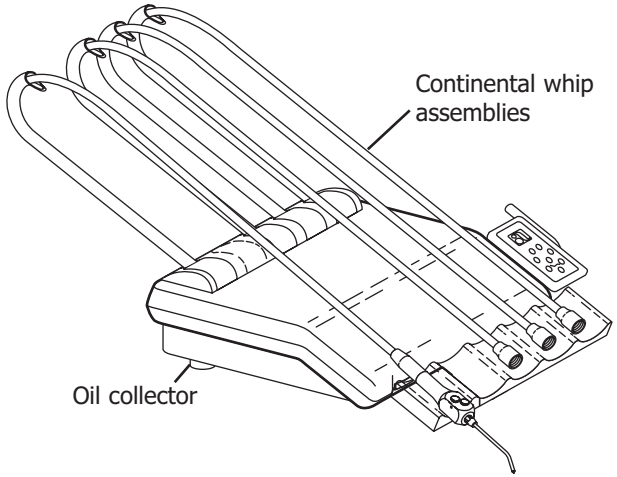
Task	Description
1	Install the handpiece on a drive air pressure gauge.
2	Locate drive air control for the handpiece being adjusted and insert the hex key.
3	Install the handpiece gauge on the coupler.
4	Move the foot control's wet/dry toggle to OFF (away from blue dot) and fully depress the foot control cover.
5	Turn the drive air control counterclockwise until the handpiece is running slightly above the manufacturer's specified drive air pressure, then turn clockwise until it is at the specified pressure.
6	Repeat adjustments 1-5 for each handpiece position.

Working with Delivery Systems

The following pages provide instructions and service information on parts associated with A-dec's delivery systems.



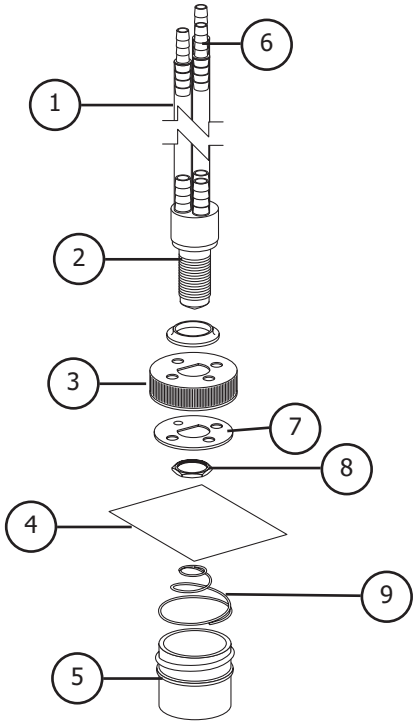
Cascade Traditional Delivery System



Cascade Continental Delivery System

Oil Collector

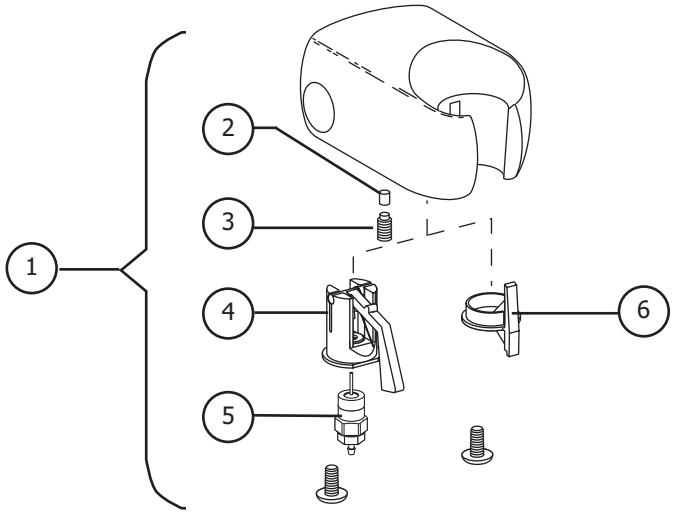
Item #	Part Number	Description
1	—	Clear tubing, 1/4"
2	—	Oil collector manifold
3	24.0416.00	Cap
4	—	Gauze pad
5	052.023.00	Jar
6	023.045.02	Inline barbs
7	—	Deflector spacer
8	006.009.00	Nut
9	013.090.00	Spring



Oil Collector

Individual Holder

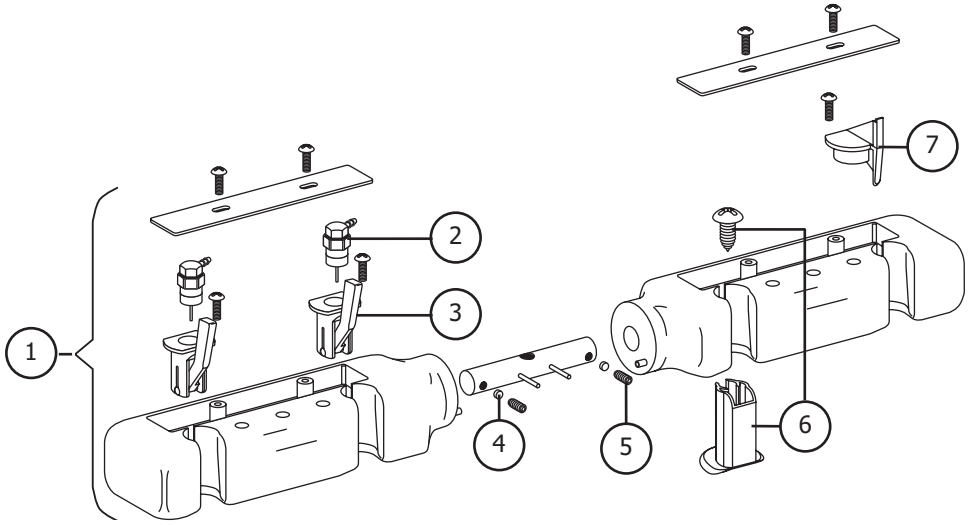
Item #	Part Number	Description
1	99.0583.00 99.0584.00	Auto holder assy Assistant's holder assy
2	45.0403.00	Friction pad
3	007.056.00	Setscrew, socket cup point
4	99.0590.00	Actuator, auto holder
5	33.0025.01	Air bleed valve (individual)
6	99.0587.00	Slot plug



Individual Holder

Unitized Holder

Item #	Part Number	Description
1	99.0603.00 99.0604.00 99.0605.00 99.0606.00	Traditional, 3-position Traditional, 4-position Traditional, 5-position Traditional, 6-position
2	33.0132.00	Air bleed valve (unitized)
3	99.0590.00	Actuator, auto holder
4	45.0403.00	Friction pad
5	007.056.00	Setscrew, socket cup point
6	99.0607.00	Plug and screw
7	99.0587.00	Slot plug

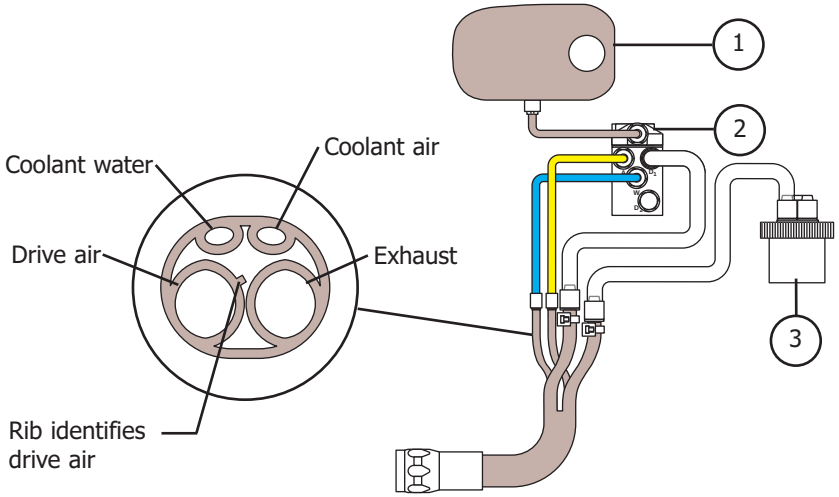


Unitized Holder (Two and Three-Position)

NOTE: Complete holder replacement is recommended if a holder is broken. For more information on service parts, see the *Genuine A-dec Service Parts Catalog* (P/N 85.5000.00) or contact customer service.

Traditional Holder

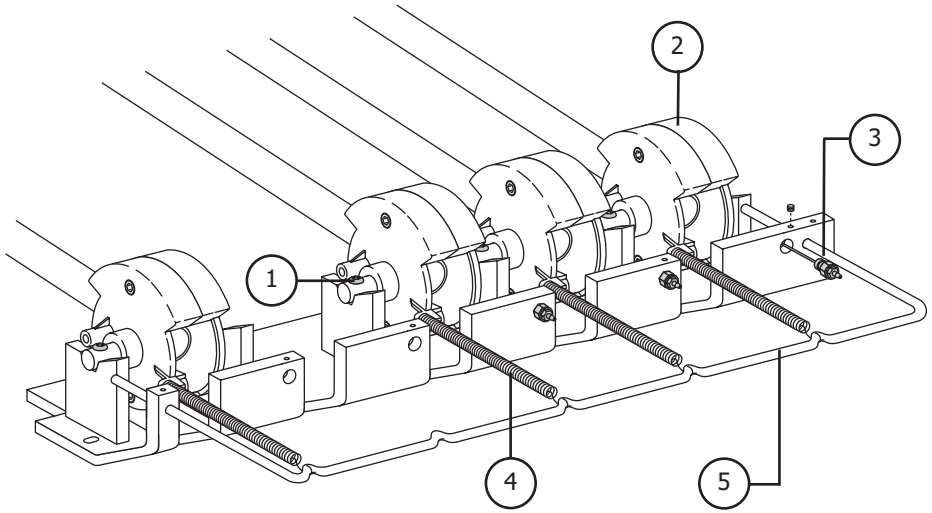
Item #	Part Number	Description
1	99.0584.00	Single molded holder, assistant, Surf 4
	99.0583.00	Single molded holder, auto, Surf 4
	99.0629.00	2-position unitized holder, LH
	99.0619.00	3-position unitized holder, LH
	99.0628.00	2-position unitized holder, RH
	99.0618.00	3-position unitized holder, RH
2	38.0509.00	Century Plus control block
3	24.0410.00	Oil collector



Holder and Handpiece Tubing to Control Block

Cascade Continental Whip Assembly

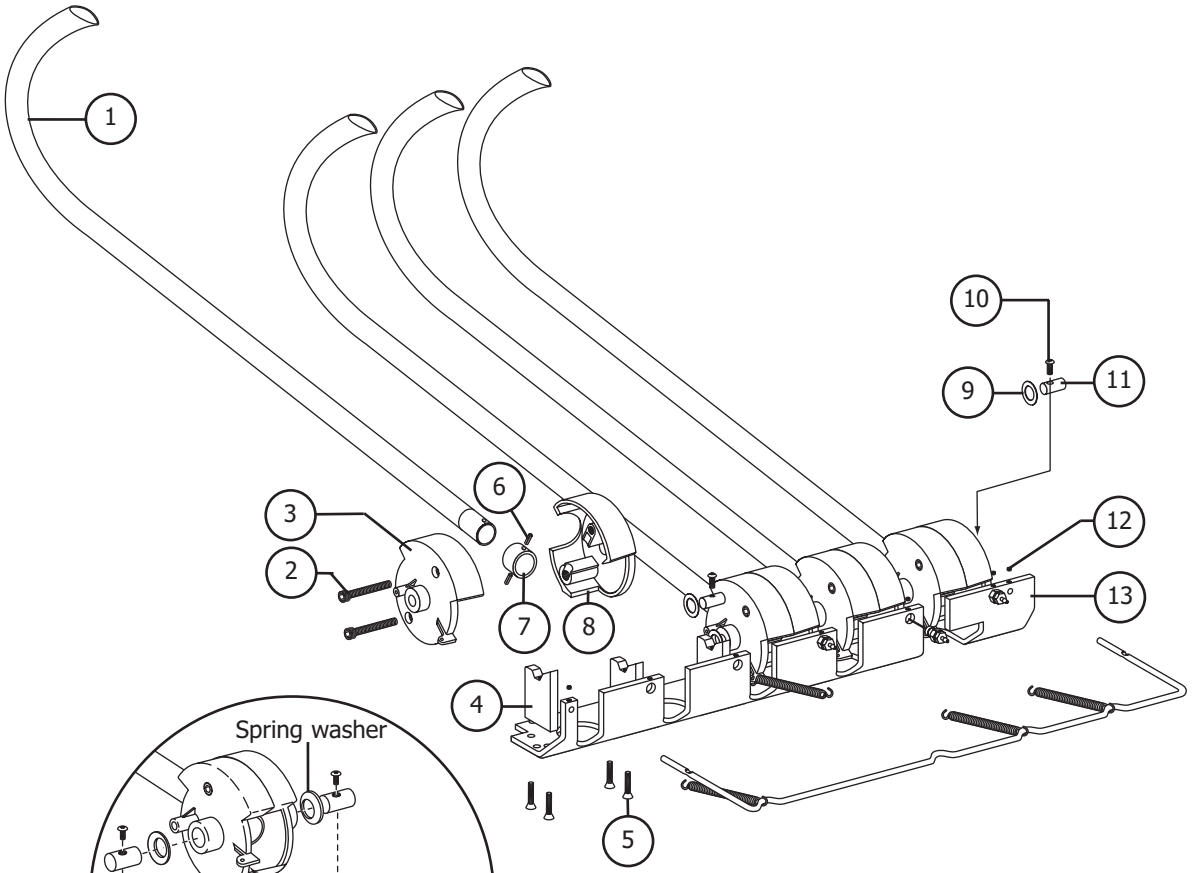
Item #	Part Number	Description
1	002.034.01	Screw, button head socket
2	39.1054.00	Continental whip assembly
3	33.0025.01	Air bleed valve, long stem
4	013.015.00 013.027.00	Spring, Red (standard 3 lb pull) Spring, Green (optional 4 lb pull)
5	39.1053.00	Spring rod

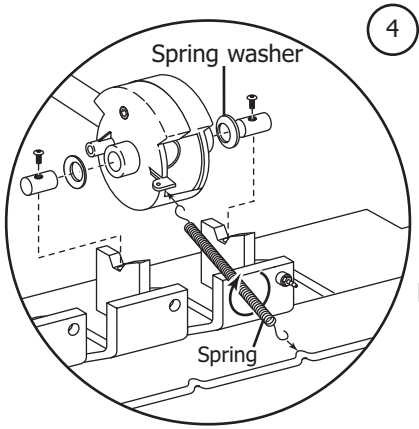


Continental Whip Assembly

Continental Whip

Item #	Part Number	Description
1	39.1060.00	Whip
2	001.026.00	Screw, socket head
3	75.0066.00	Pivot wheel
4	39.1055.00	Post
5	001.121.01	Screw, socket head
6	011.091.00	Spring pin
7	39.1059.00	Whip ring
8	75.0067.00	Pivot wheel
9	004.162.00	Spring washer
10	002.034.01	Screw, button head
11	39.1050.00	Short pin
12	007.010.00	Setscrew
13	39.1052.00	Mounting bracket





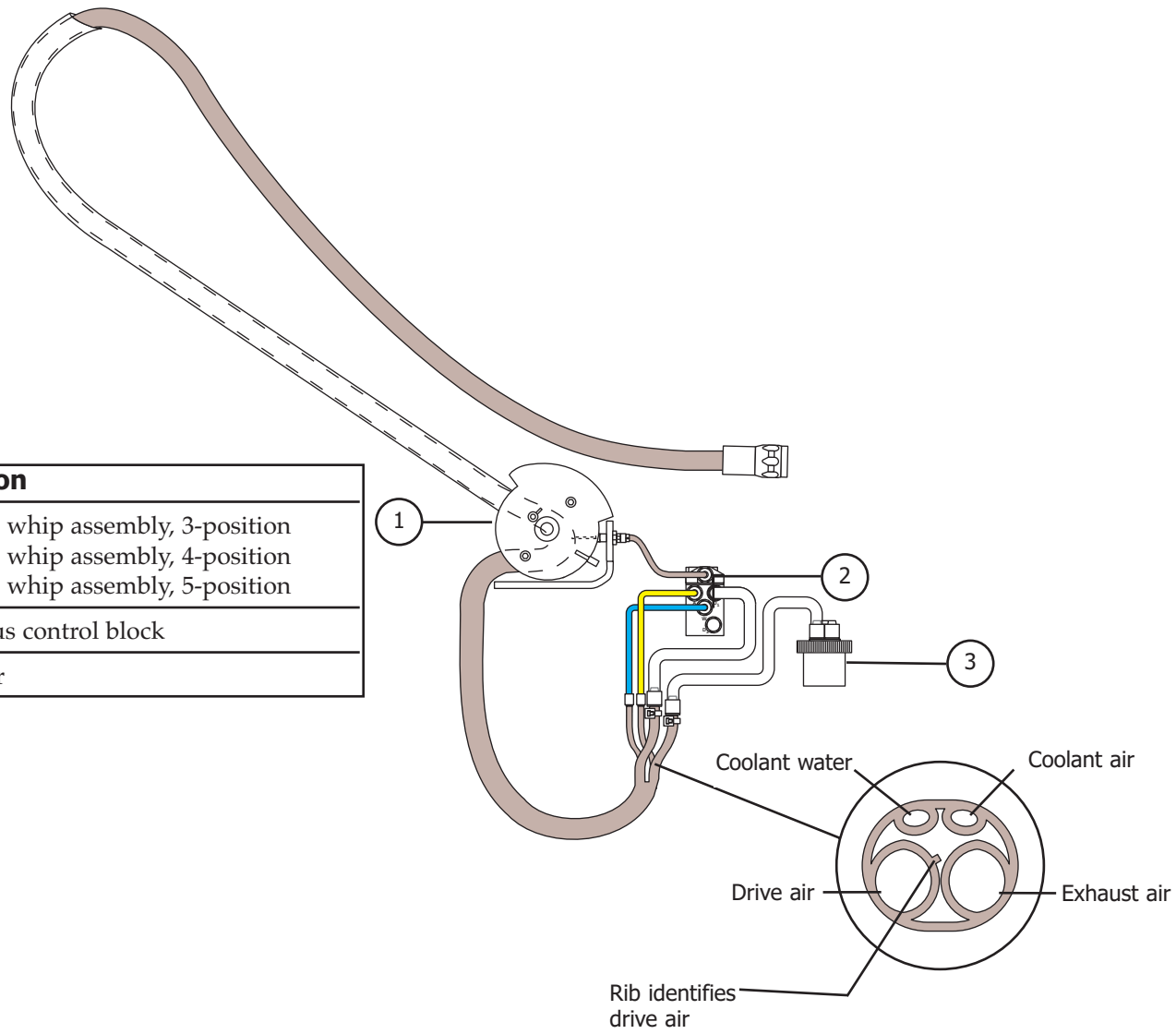
NOTE: Spring washer curve is towards the whip assembly(ies).

NOTE: Pre-load the spring by rotating it clockwise until both hooks point up.

34.1054.00 Continental Whip Assembly

Continental Holder

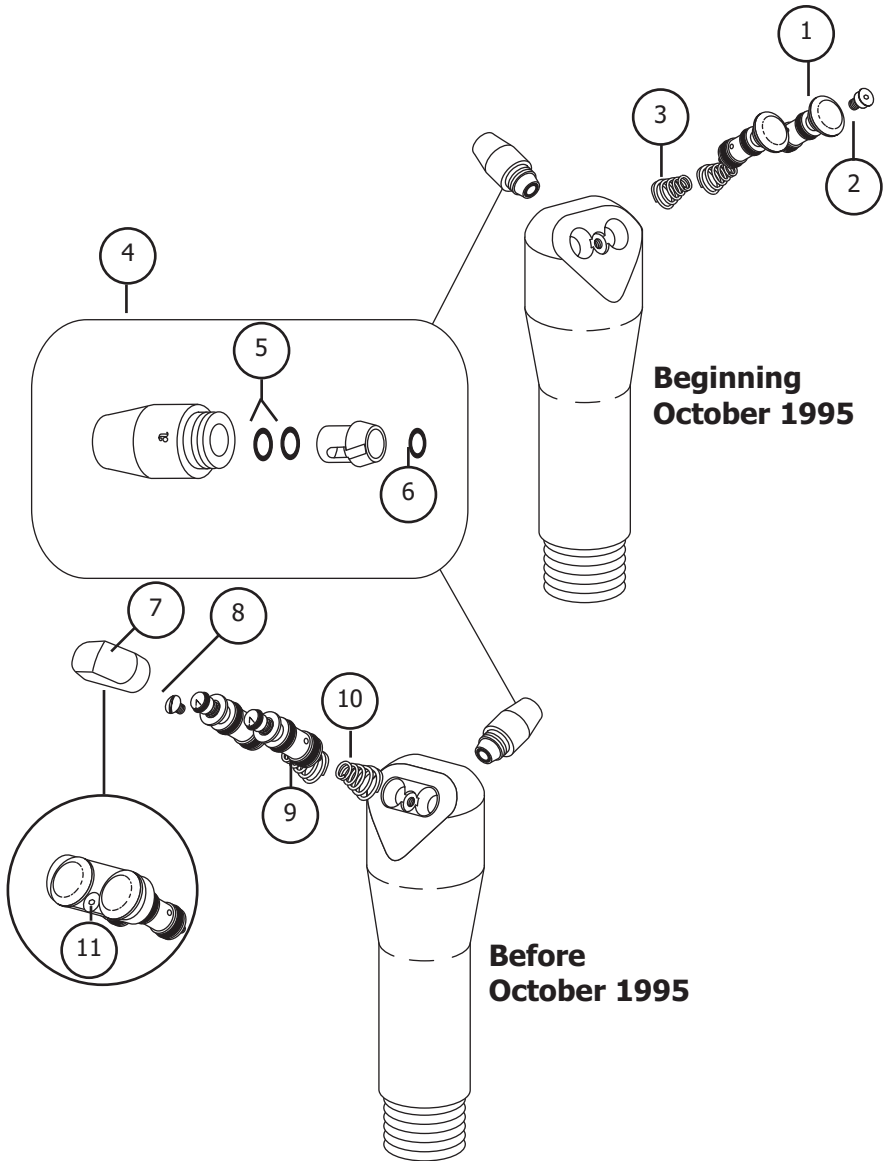
Item #	Part Number	Description
1	99.0613.00 99.0614.00 99.0615.00	Continental whip assembly, 3-position Continental whip assembly, 4-position Continental whip assembly, 5-position
2	38.0509.00	Century Plus control block
3	24.0410.00	Oil collector



Holder and Handpiece Tubing to Control Block

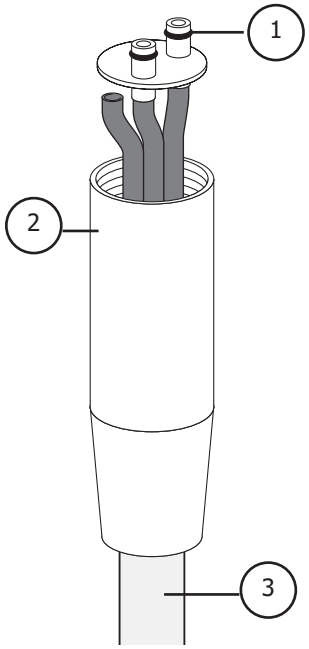
Autoclavable Syringe

Item #	Part Number	Description
	23.1011.00	Autoclavable syringe head assembly
	23.1150.00	Autoclavable syringe assembly and 7' tubing
	23.1099.00	Autoclavable syringe service kit, 2 button
	23.1012.00	Autoclavable syringe service kit, soft button
1	23.1232.01	Valve assembly with o-rings, autoclavable
2	23.1193.01	Screw pkg 5
3	013.064.01	Spring pkg 10
4	23.1112.00	Syringe tip retainer, non-locking
5	035.048.01	O-ring pkg 10
6	034.003.01	O-ring pkg 10
7	23.1028.00	Soft button, autoclavable
8	001.002.01	Screw pkg 5
9	23.1021.01	Valve assembly with o-rings pkg 2
10	013.064.01	Spring pkg 10
11	23.1194.00	Two-button valve conversion kit



Syringe Terminal, 2 Barb, Non-Quick Disconnect

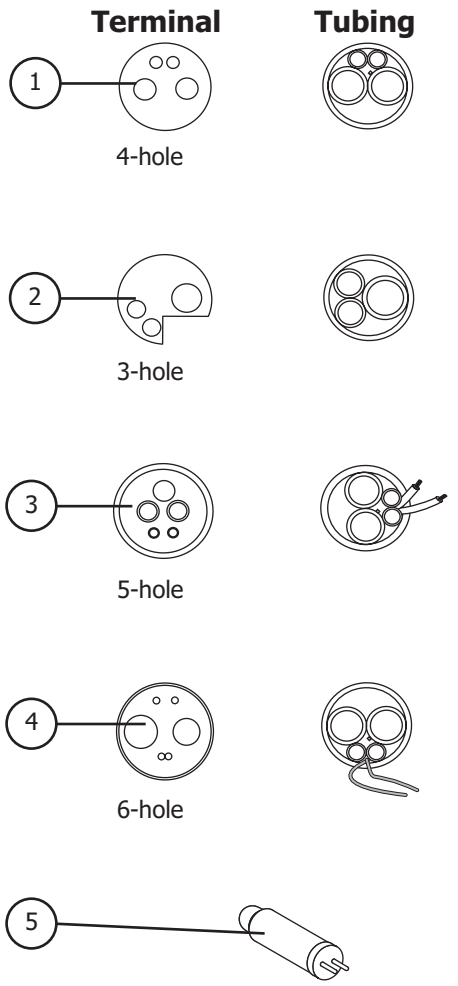
Item #	Part Number	Description
1	030.002.02	O-ring pkg 10
2	23.1015.00	Handle
3	024.155.02	Syringe tubing assembly, straight 7'



23.1208.00

Tubing to Terminal

Item #	Part Number	Description
1	98.0879.00	Four-hole tubing (straight) with Midwest terminal, 84" (2134mm), Surf 4
2	98.0882.00	Three-hole tubing (straight) with Borden terminal, 84" (2134mm), Surf 4
3	98.0262.02	Fiber-optic tubing (straight, with bulb) 84" (2134mm), Surf 4
4	98.0885.00	Fiber-optic tubing (straight), six pin, 84" (2134mm), Surf 4
5	041.317.00	Fiber-optic lamp, Xenon 3.5V, .75 amp

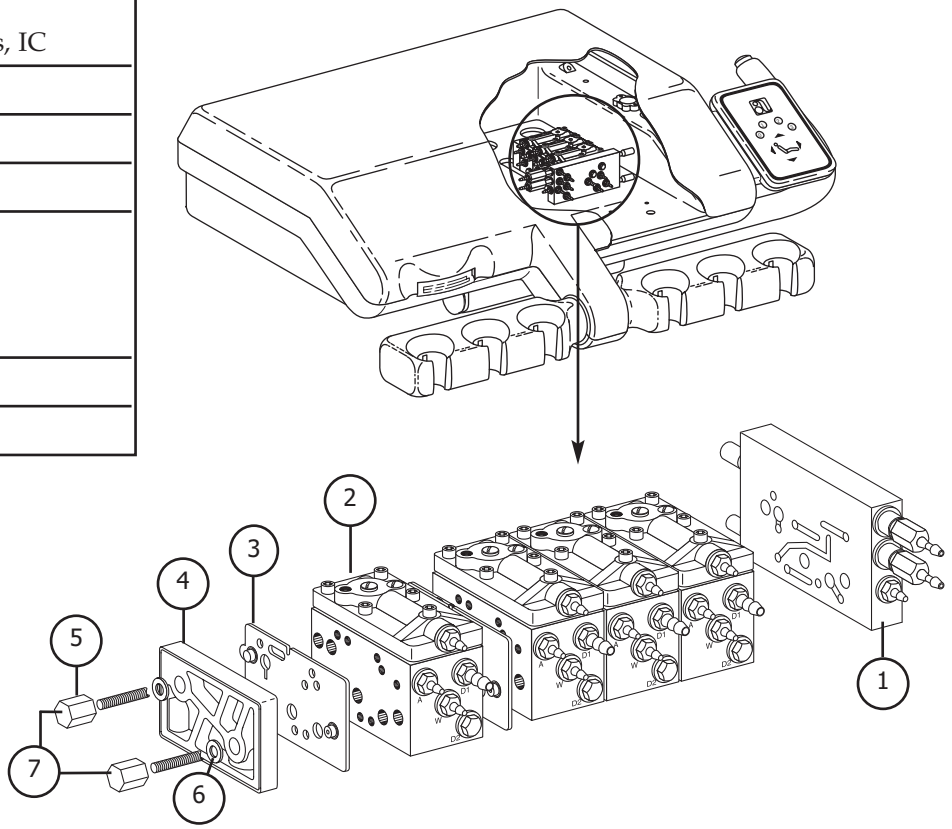


Tubing Terminals

Working with the Century Plus Control Assembly

The A-dec Century Plus handpiece control system incorporates a master block, handpiece flush, and air bleed functions into the control block system, reducing external tubing and connections. The following pages provide illustrations, flow diagrams, and service information on parts that are used to maintain and adjust the control block assembly.

Item #	Part Number	Description
1	38.0524.00 38.0528.00	Manifold assembly Manifold assembly, Century Plus, IC
2	38.0509.00	Century Plus control block
3	38.0507.01	Gasket
4	38.0505.00	End cap
5	38.0504.06 38.0504.07 38.0504.08 38.0504.09	Tie bolt kit, 2 block Tie bolt kit, 3 block Tie bolt kit, 4 block Tie bolt kit, 5 block
6	004.036.00	Nylon float washer
7	38.0508.00	Nut, special

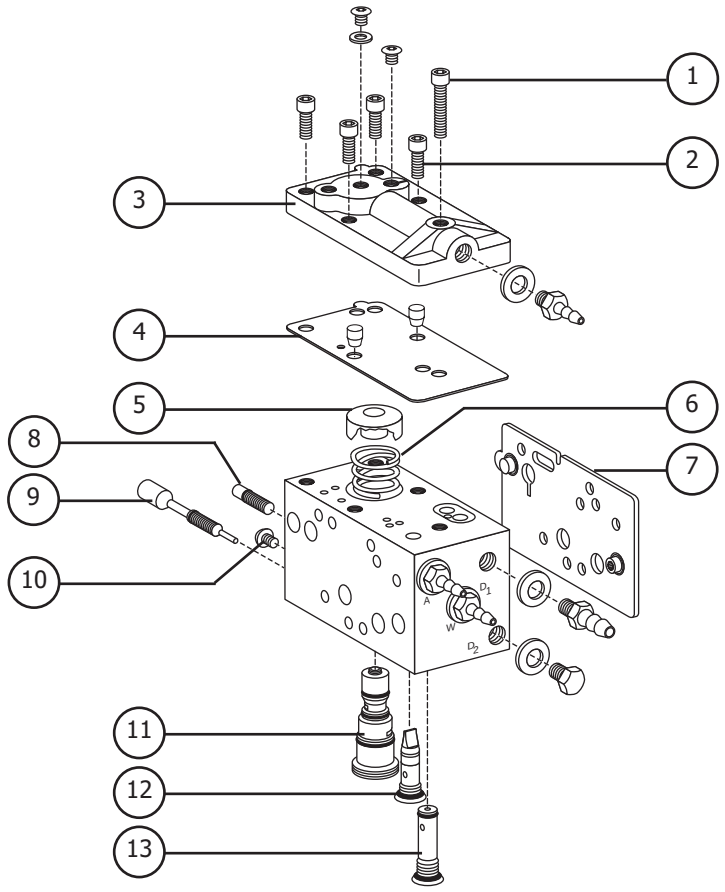


Century Plus Control Block Assembly

Century Plus Control Block

For information about Century Plus handpiece control kits or A-dec replacement parts, refer to the *Genuine A-dec Service Parts Catalog,* P/N 85.5000.00.

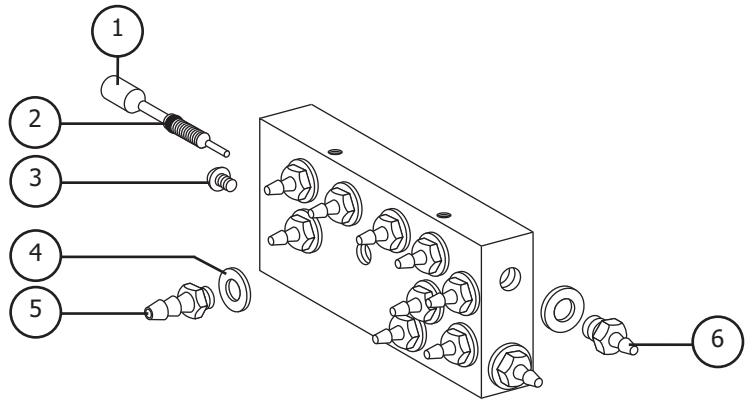
Item	Part Number	Description
1	001.021.01	Screw, socket head
2	001.024.01	Screw, socket head
3	38.0546.00	Cap assembly
4	38.0519.01	Diaphragm
5	38.0514.00	Water valve actuator
6	013.021.00	Spring, compression
7	38.0507.01	Molded side gasket
8	38.0510.00 035.034.01	Drive air flow adjustment stem Drive air flow adjustment stem w/o-ring
9	38.0516.00 035.034.01	Water flow adjustment stem Water flow adjustment stem w/o-ring
10	002.118.00	Screw, button head
11	38.0520.00	Water valve cartridge assembly
12	38.0518.00	Check valve (with duckbill) cartridge
13	38.0517.00	Air bleed cartridge (with o-rings)



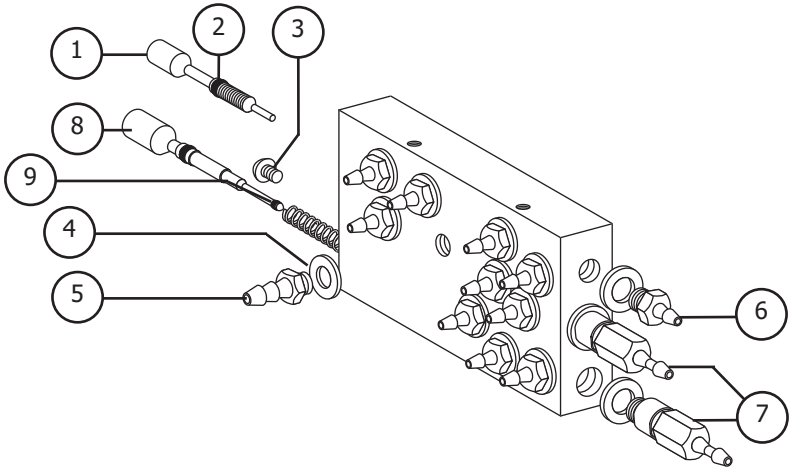
Century Plus Control Block Serviceable Parts

Century Plus Control Block

Item #	Part Number	Description
1	38.0526.00	Air coolant stem with o-rings
2	030.003.02	O-ring
3	002.118.00	Screw, button head
4	004.005.02	Washer
5	023.001.03	Barb, 1/4"
6	023.004.03	Barb, 1/8"
7	38.0555.00 38.0555.00	Syringe water flow control barb assembly Syringe air flow control barb assembly
8	38.0525.00	Flush valve stem with o-rings
9	034.001.01	O-ring, E, .029 10 x .040 W



38.0528.00 Century Plus Control Block Manifold for Decade Carts

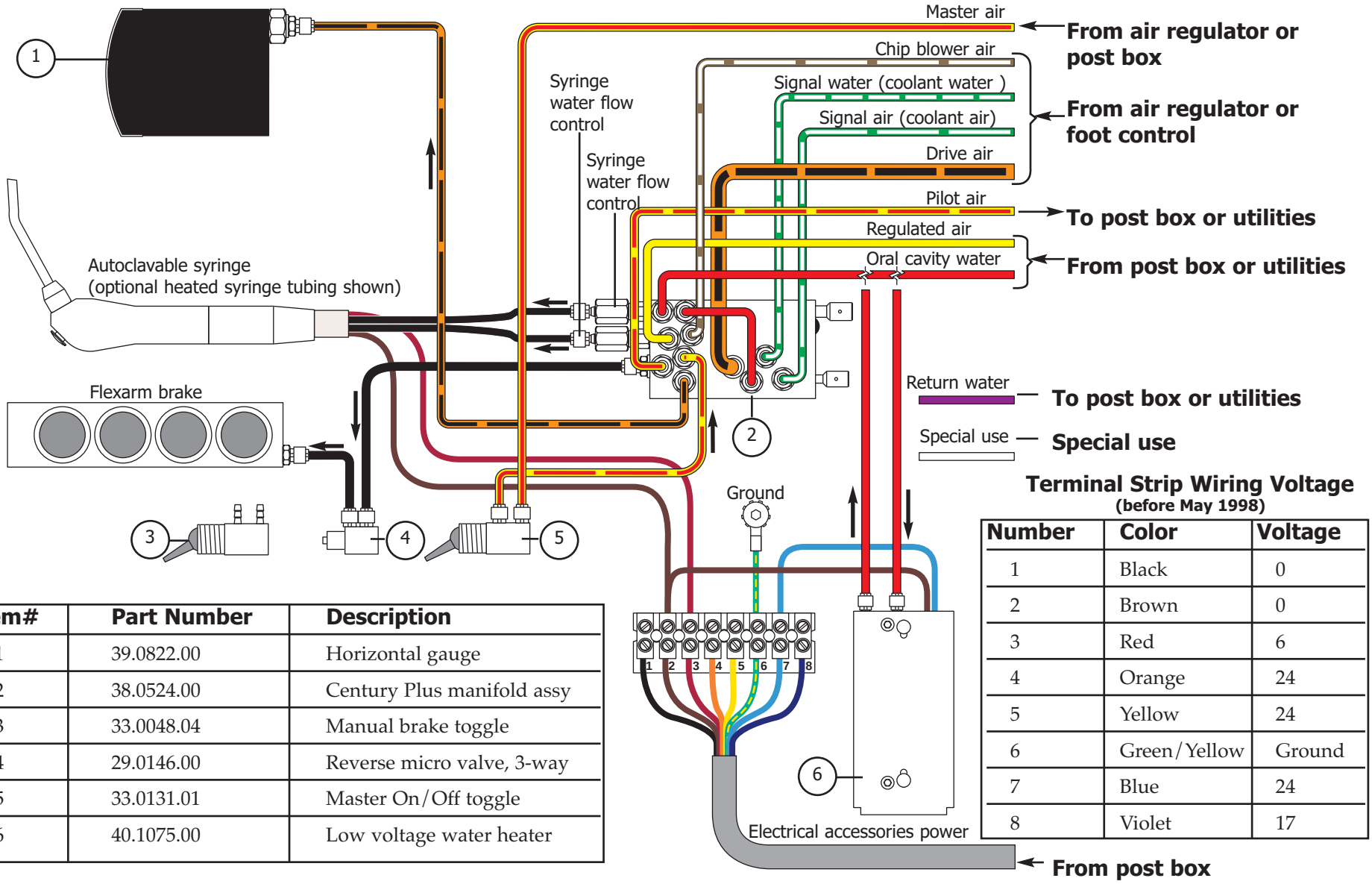


38.0524.00 Century Plus Control Block Manifold for Cascade

Handpiece Controls

Control Block Flow Diagram

Before May 1999



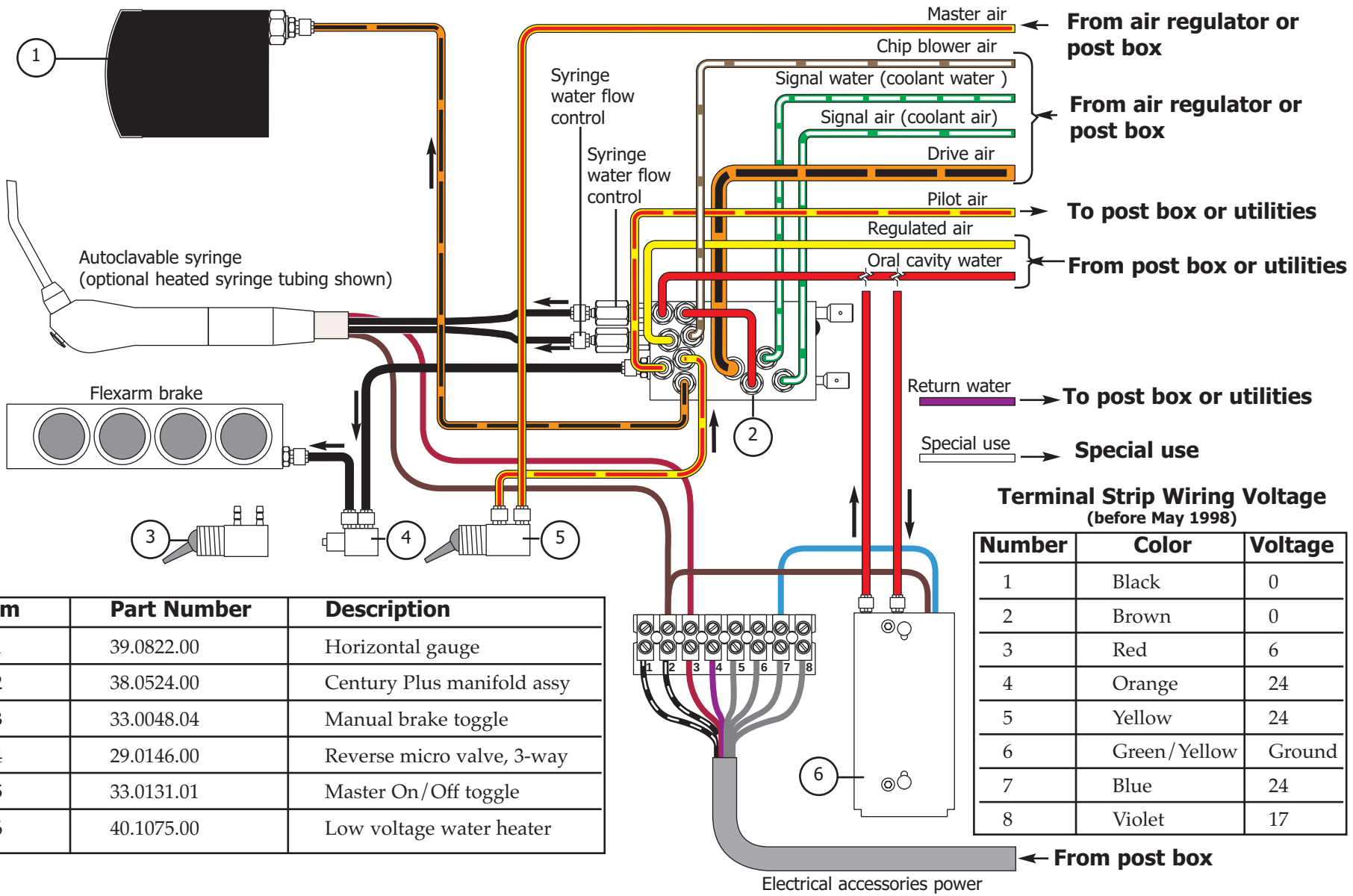
Item#	Part Number	Description
1	39.0822.00	Horizontal gauge
2	38.0524.00	Century Plus manifold assy
3	33.0048.04	Manual brake toggle
4	29.0146.00	Reverse micro valve, 3-way
5	33.0131.01	Master On/Off toggle
6	40.1075.00	Low voltage water heater

Terminal Strip Wiring Voltage
(before May 1998)

Number	Color	Voltage
1	Black	0
2	Brown	0
3	Red	6
4	Orange	24
5	Yellow	24
6	Green/Yellow	Ground
7	Blue	24
8	Violet	17

Control Block Flow Diagram

After April 1998



Item	Part Number	Description
1	39.0822.00	Horizontal gauge
2	38.0524.00	Century Plus manifold assy
3	33.0048.04	Manual brake toggle
4	29.0146.00	Reverse micro valve, 3-way
5	33.0131.01	Master On/Off toggle
6	40.1075.00	Low voltage water heater

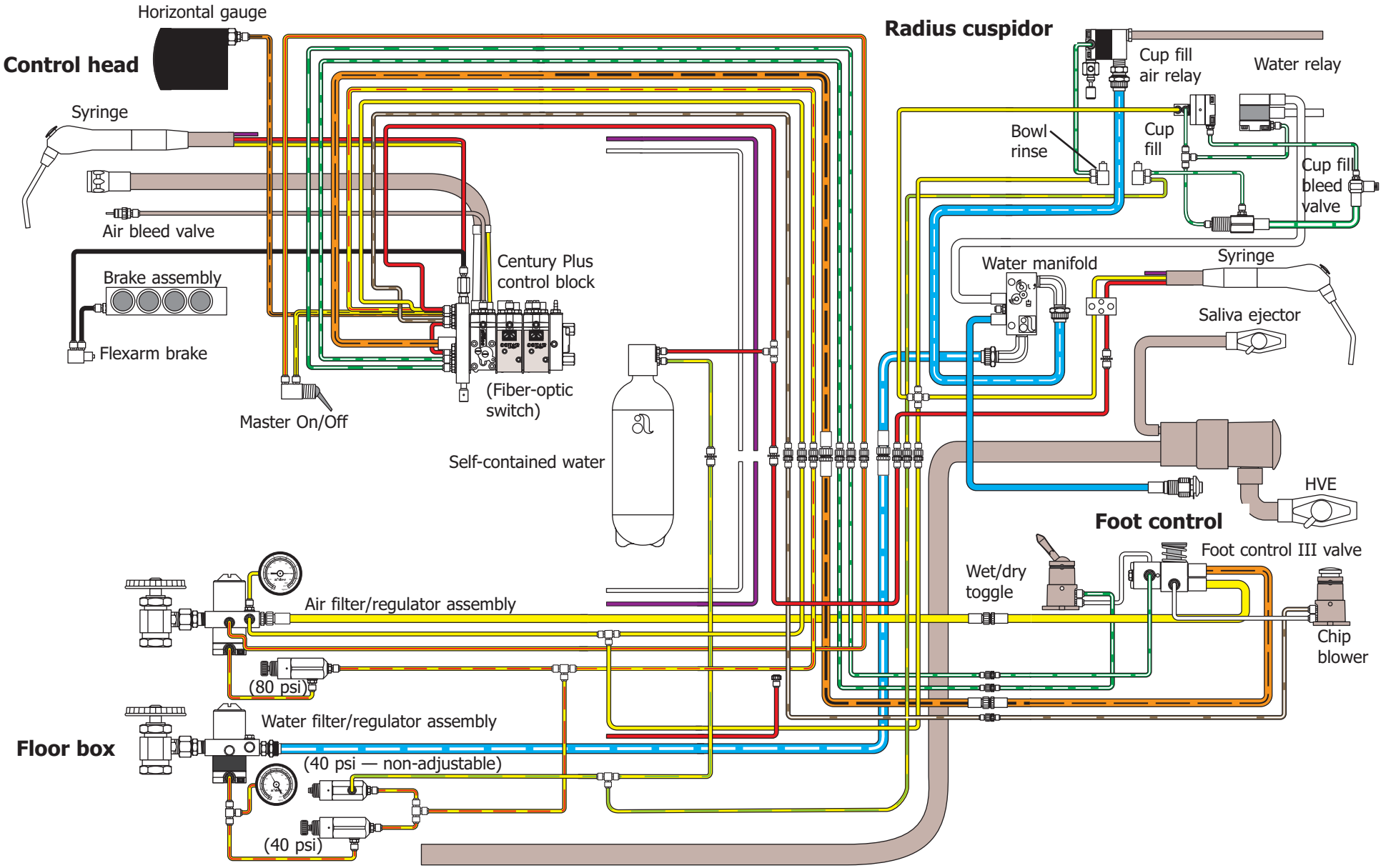
Terminal Strip Wiring Voltage
(before May 1998)

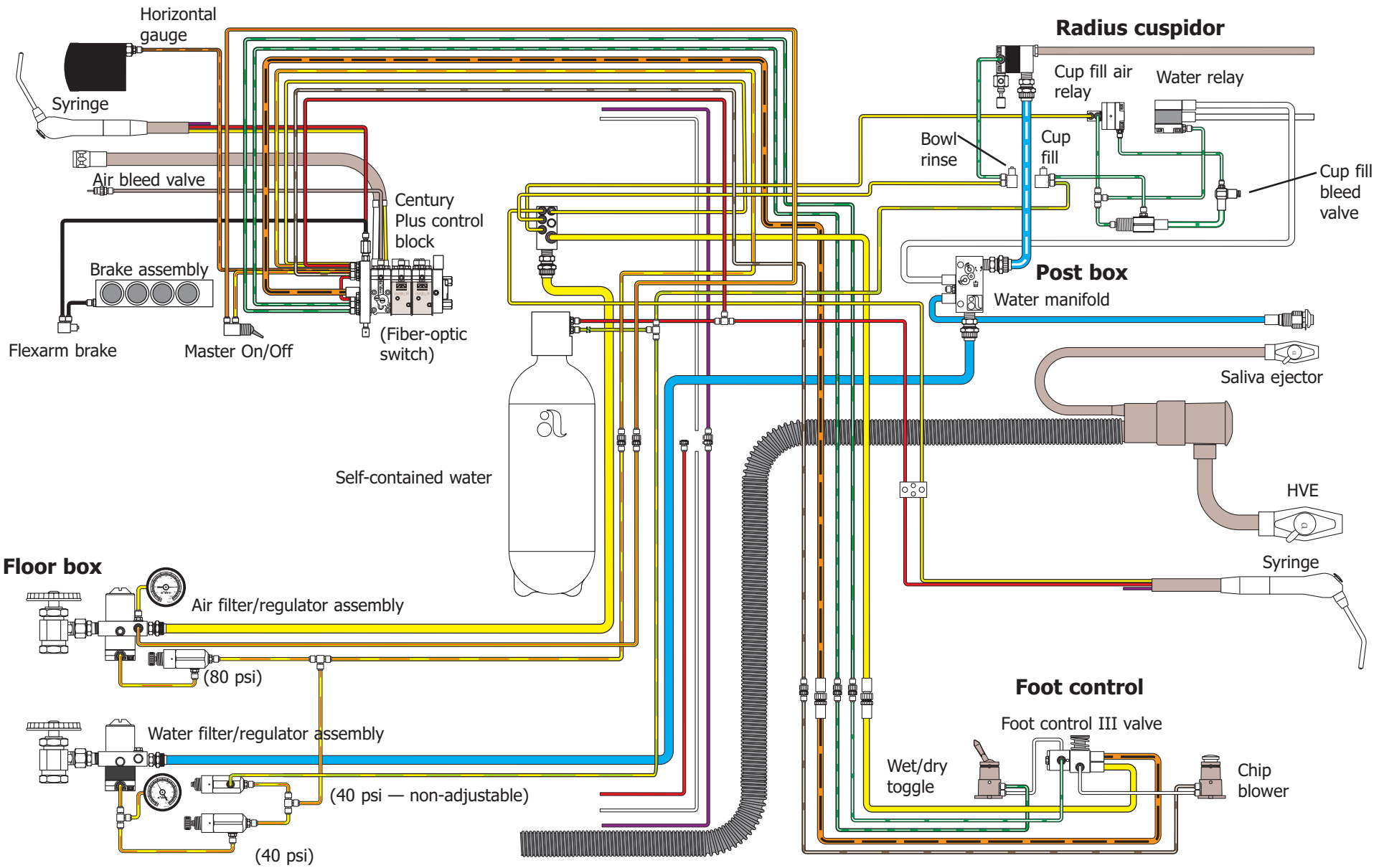
Number	Color	Voltage
1	Black	0
2	Brown	0
3	Red	6
4	Orange	24
5	Yellow	24
6	Green/Yellow	Ground
7	Blue	24
8	Violet	17

Handpiece Controls

Radius Delivery System Flow Diagram

After November 1999

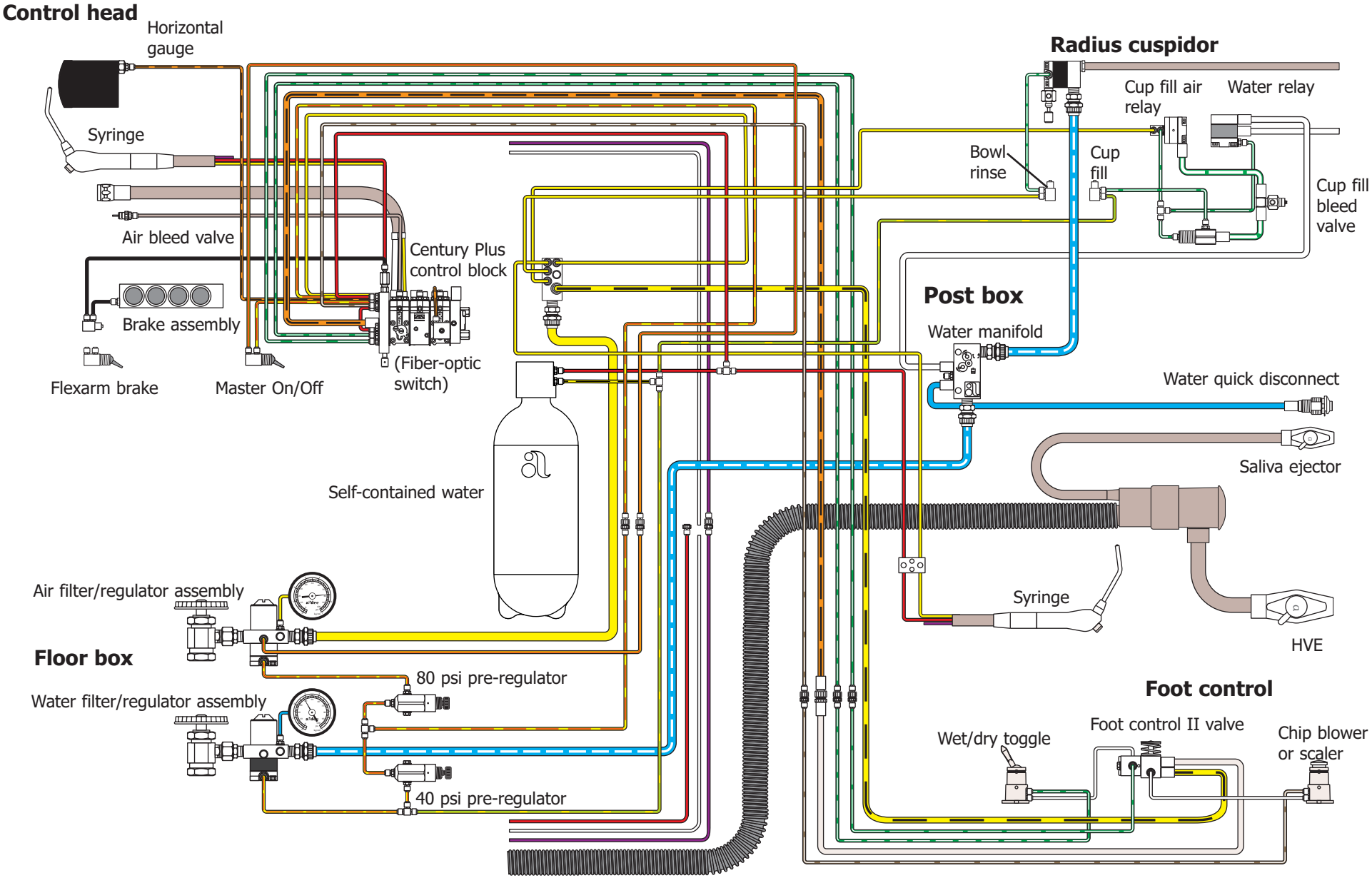



Control head
Horizontal gauge
Syringe
Air bleed valve
Century Plus control block
Brake assembly
Flexarm brake
Master On/Off
(Fiber-optic switch)
Radius cuspidor
Cup fill air relay
Water relay
Bowl rinse
Cup fill
Cup fill bleed valve
Post box
Water manifold
Saliva ejector
HVE
Syringe
Self-contained water
Floor box
Air filter/regulator assembly
(80 psi)
Water filter/regulator assembly
(40 psi — non-adjustable)
(40 psi)
Foot control
Foot control III valve
Wet/dry toggle
Chip blower

Handpiece Controls

Cascade Delivery System Flow Diagram

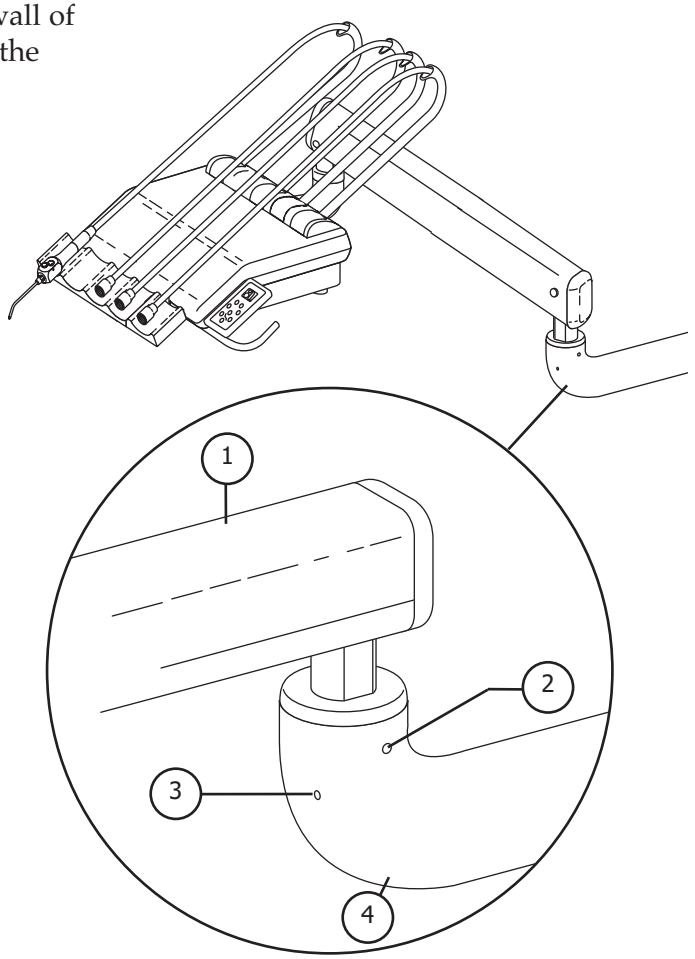
Before December 1999



Adjusting Horizontal Drift (Cascade)

To eliminate horizontal drift of the control head, adjust the tension setscrew. This causes the cup point to seat itself against the wall of the internal bushing. Use a 3/32" hex key for adjusting both the tension and the retaining/alignment setscrews.

Item #	Part Number	Description
1	35.1514.00	Flexarm assembly
2	007.024.00	Tension setscrew
3	007.058.00	Retaining/alignment setscrew
4	35.1386.00	Rigid arm post assembly

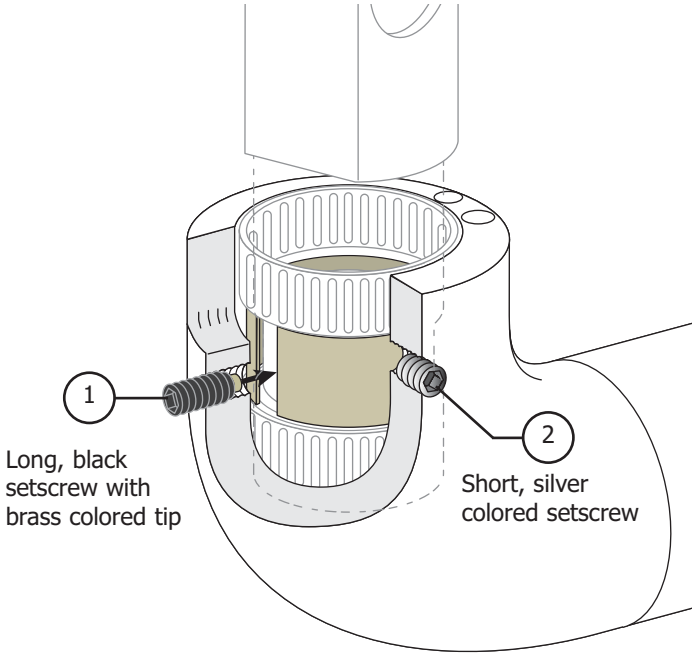


Cascade Control Head Flexarm

Adjusting the Tension Setscrew (Cascade)

Follow these steps to adjust the tension setscrew.

Task	Description
1	Remove the tension setscrew and the retaining /alignment setscrew. Reinstall both, making sure they are in the correct locations. Do not tighten.
2	Tighten the tension setscrew until it comes to a stop. Then tighten it an additional quarter turn (20 - 24 inch pounds).
	NOTE: It is important to repeat step two. Loosen the setscrew and repeat the step twice. This will ensure the setscrew is seated.
3	Check flexarm tension and adjust the setscrew to achieve the desired result.



Adjustment Setscrews

Adjusting the Retaining/ Alignment Setscrew (Cascade)

Follow these points to adjust the retaining/ alignment setscrew.

- Tighten the retaining alignment setscrew until it passes through the opening of the bushing and presses against the knuckle.
- Loosen the setscrew a quarter turn.

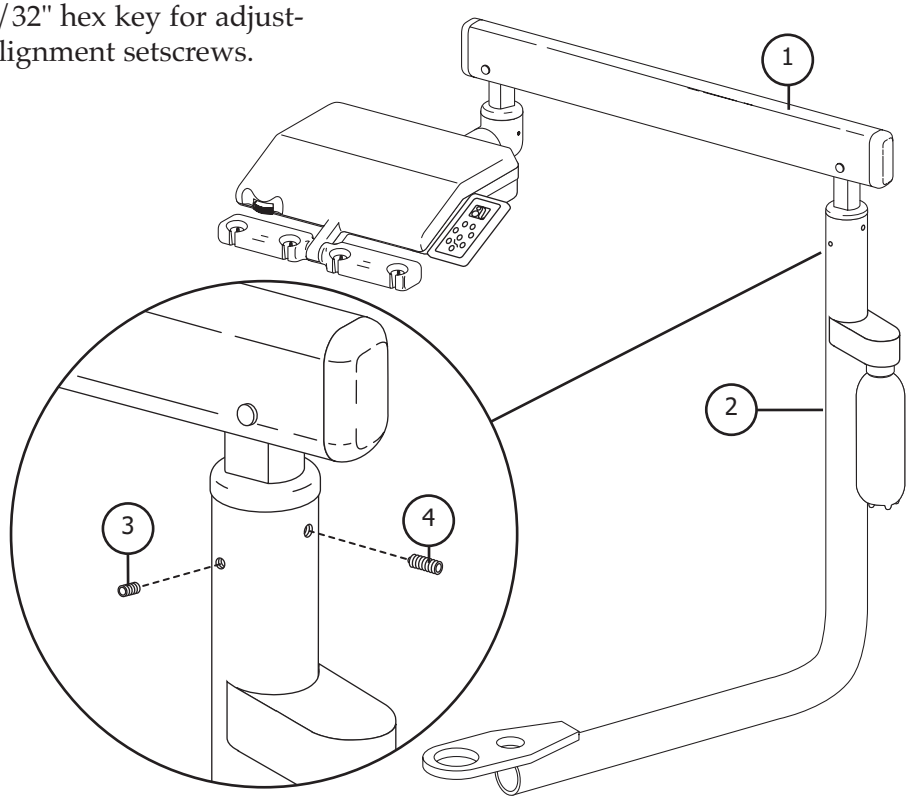
NOTE: The brass colored tip on the end of the retaining alignment setscrew shouldn't touch the knuckle when loosened a quarter turn.

Item #	Part Number	Description
1	007.058.00	Retaining/ alignment setscrew
2	007.024.00	Tension setscrew

Adjusting Horizontal Drift (Radius)

To eliminate horizontal drift of the control head, adjust the tension setscrew. This causes the cup point to seat itself against the wall of the internal bushing. Use a 3/32" hex key for adjusting both the tension and the retaining/alignment setscrews.

Item #	Part Number	Description
1	35.1514.00	Flexarm assembly
2	35.1611.01	Unit mount post assembly
3	007.024.00	Tension setscrew
4	007.058.00	Retaining/alignment setscrew, Black

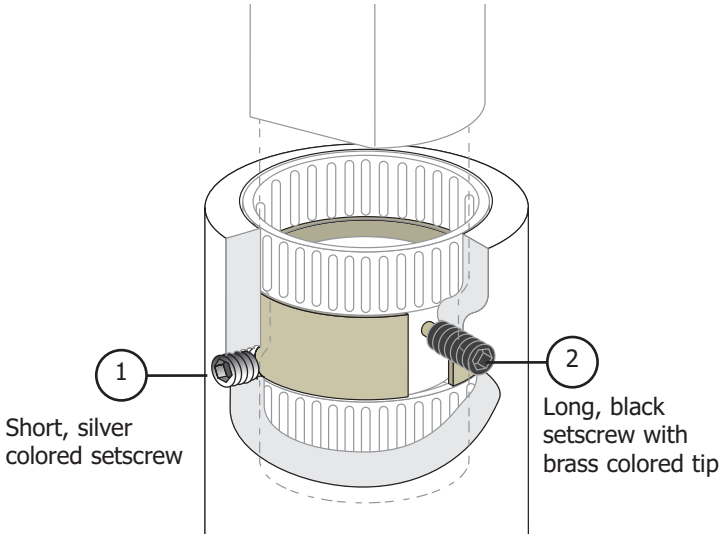


Cascade Control Head Flexarm

Adjusting the Tension Setscrew (Radius)

Follow these steps to adjust the tension setscrew.

Task	Description
1	Remove the tension setscrew and the retaining /alignment setscrew. Reinstall both, making sure they are in the correct locations. Do not tighten.
2	Tighten the tension setscrew until it comes to a stop. Then tighten it an additional quarter turn (20 - 24 inch pounds).
	NOTE: It is important to repeat step two. Loosen the setscrew and repeat the step twice. This will ensure the setscrew is seated.
3	Check flexarm tension and adjust the setscrew to achieve the desired result.



Adjustment Setscrews

Adjusting the Retaining/Alignment Setscrew (Radius)

Follow these points to adjust the retaining/ alignment setscrew.

- Tighten the retaining alignment setscrew until it passes through the opening of the bushing and presses against the knuckle.
- Loosen the setscrew a quarter turn.

NOTE: The brass colored tip on the end of the retaining alignment setscrew shouldn't touch the knuckle when loosened a quarter turn.

Item #	Part Number	Description
1	007.024.00	Tension setscrew
2	007.058.00	Retaining/ alignment setscrew

Troubleshooting Handpiece Controls

Tips and troubleshooting information are listed in the following charts to assist in diagnosing handpiece control problems. These charts are not intended to cover every situation, but do include the most common problems you may encounter.

Problem	Action
Holder(s) is difficult or too easy to rotate	Adjust the tension by loosening or tightening the friction pad setscrew (see *Individual and Unitized Holder*).
Whip assembly(ies) doesn't actuate the bleed valve(s)	**Task** **Descriptions** 1 Verify spring washers are installed between the whip assembly(ies) and mounting posts. If missing, install them between the whip assemblies and the whip mounting posts (see *Continental Whip*). 2 Add washers to both sides of the wheel assembly(ies). • Remove the button-head screw from the appropriate pin and post. • Slide the pin away from the whip assembly. • Install the spring washer between the wheel and post with curved side toward the whip assembly (see *Continental Whip*). • Slide the pin into the pin opening in the whip assembly. Secure the pin with the screw removed above. • Repeat for each whip assembly with whisker valve actuation. If this does not resolve the problem, go to step 3. 3 Inspect the air bleed valves and replace those that are defective. 4 Test the whip assemblies with the control head cover in place. Make sure the handpieces activate and deactivate as the whip assembly is pulled and released.

Problem	Action
Whip assemblies don't move freely or interfere with cover	Check for an improperly aligned mounting bracket. Slightly loosen the two screws securing the assembly in place (underside of control head). Do not remove the cover. Move the whip assembly until it moves freely.
Water leaks from the water vent hole on control blocks	Follow these steps to check for water leaks. **Task Descriptions** 1 Check for a failed water valve cartridge • determine which block is leaking • exchange the water valve cartridge with a known good one, and • test the unit. 2 If the water leakage has stopped, replace the failed water valve cartridge. Retest the unit and make sure there are no more leaks. If water is still leaking, continue with step 3. 3 Remove the water flow adjustment stem from the control block and inspect the o-ring and stem. Replace defective parts and test the unit. If water is still leaking, continue with step 4. 4 Check for a leaking valve stem • Tighten the valve stem to make sure it's not leaking and test the unit. • If the valve stem is still leaking, exchange it with a known good one and test the unit. • If the water leakage has stopped, replace the failed valve stem cartridge. • Test the unit. 5 Check for loose tie bolts.

Problem	Action
Coolant water is leaking from one handpiece control block	Follow these steps to check if coolant water is leaking. **Task** **Descriptions** 1 Remove the valve stem from the control block and inspect the o-ring and stem. 2 Replace defective parts and test the unit. If water is still leaking, continue with step 3. 3 Check for a leaking valve stem • Tighten the valve stem to make sure its not leaking. Test the unit. • If the valve stem still leaks, exchange the cartridge with a known good one. Retest the unit.
Air or water leakage from one of the valve assemblies	Replace the valve assemblies.
Air or water leakage from the syringe nut assembly	Check the following steps to stop leakage from the syringe nut assembly. • Make sure the syringe nut assembly is properly installed and tightened. Use a 5/32" hex key to tighten. • Replace o-rings, and syringe nut assembly.
No air and/or water from the syringe	Check the following steps to fix the syringe. • Check to make sure the master On/Off toggle and the air and water supplies are turned ON. • Check tubing for kinks or breaks.

Foot Controls

Overview

This section provides information for servicing A-dec foot controls. It includes tubing flow diagrams, exploded illustrations, and troubleshooting tips for Foot Control I, II and III.

Working with Foot Controls

A foot control is a foot-operated regulator. Handpieces are operated by using a foot control. A-dec foot controls are actuated by applying foot pressure on the foot control disk. The pressure applied to the disk pushes down on a valve assembly allowing air to flow from the valve to handpiece turbines. This turns on air and water coolant.

Foot Control Valves

The A-dec foot control valve has gone through a number of changes over the years. The type of foot control you have will determine the valve configuration.

In A-dec Foot Control I, the valve assembly is hex-shaped and uses a piston to actuate the handpieces. Foot Control II changed the body style of the valve assembly to a square shape and used a stem assembly for actuation. The Foot Control III valve assembly is also square but uses a piston for actuation.

In Foot Control I and Foot Control III, the piston seats the exhaust vent against the poppet and pushes it away from the inlet seat, which opens the valve. When pressure to the foot control cover is released the piston returns, closing the inlet and exhausting any pressure from the outlet side of the valve.

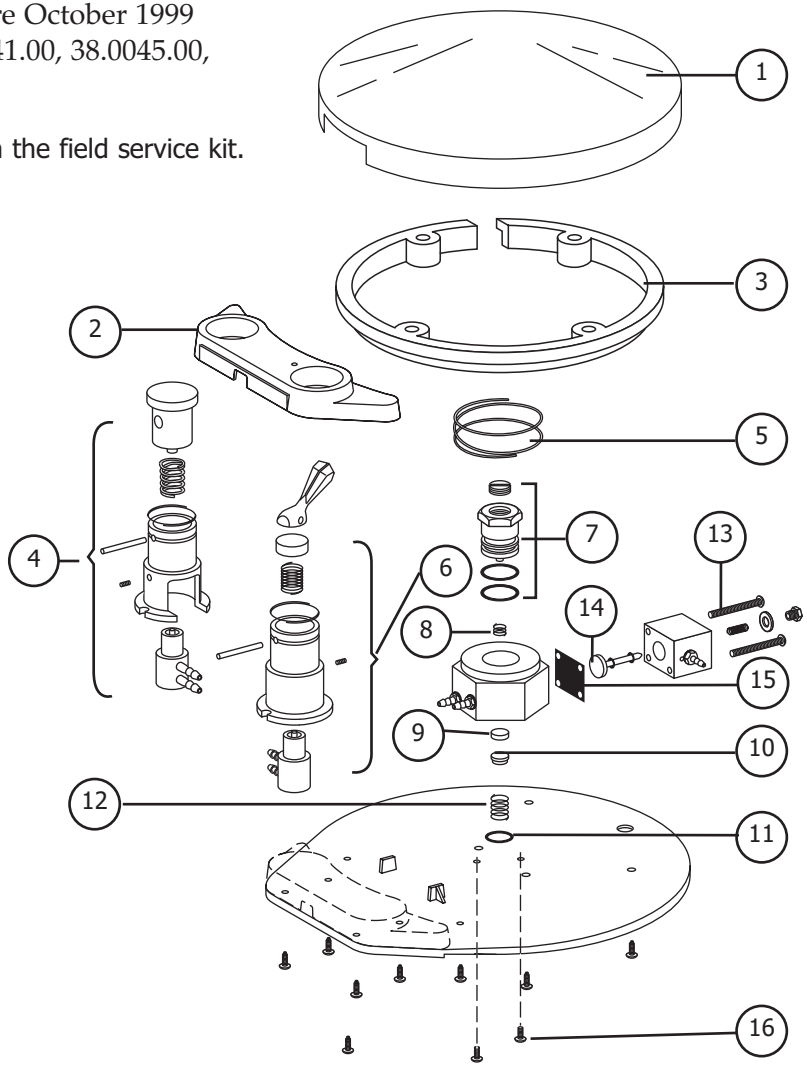
In Foot Control II, the foot pressure on the stem assembly passes the fluted surfaces of the stem to below the inlet o-ring seat, allowing air to flow to the outlet. When foot pressure is released the stem returns, sealing the inlet at the o-ring. Pressure from the outlet side of the valve is exhausted as the fluted stem moves above the outlet o-ring seal.

Foot Control I

This information applies to foot controls used before October 1999 (38.0010.00, 38.0035.00, 38.0039.00, 38.0040.00 38.0041.00, 38.0045.00, 38.0050.00, 38.0053.00 and 38.0061.00).

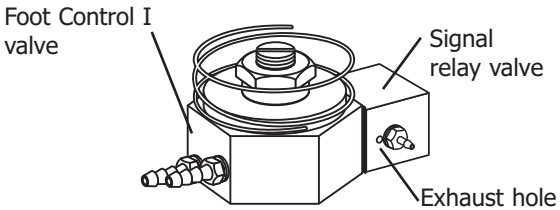
NOTE: Asterisk (*) signifies parts that are included in the field service kit.

Item #	Part Number	Description
—	90.0010.00	Foot Control I field service kit
1	22.0110.00	Foot control cover, fits all foot controls
2	38.0320.00 (01, 02) 38.0321.00 (01, 02)	Foot control housing, 1-hole Foot control housing, 2-hole
3	22.0120.00	FC I retaining ring (includes screws)
4	38.0610.00 38.0612.00	Chip blower valve Scaler valve
*5	22.0135.00	Spring
6	38.0604.00	Wet/dry toggle valve
7	22.0081.00	Piston assembly
*8	22.0580.00	Spring
*9	22.0060.00	Plastic poppet
10	22.0050.00	Spring cap
*11	030.016.02	O-ring pkg 10
*12	22.0040.00	Spring
*13	10.0440.00	Spring
*14	22.0778.00	Signal relay valve stem
*15	38.0054.02	Diaphragm pkg 10
16	002.015.00	Screw, pan head phillips pkg 2

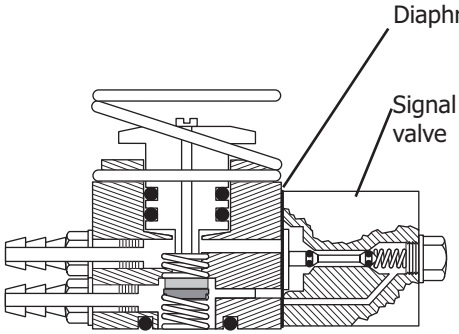


Foot Control I

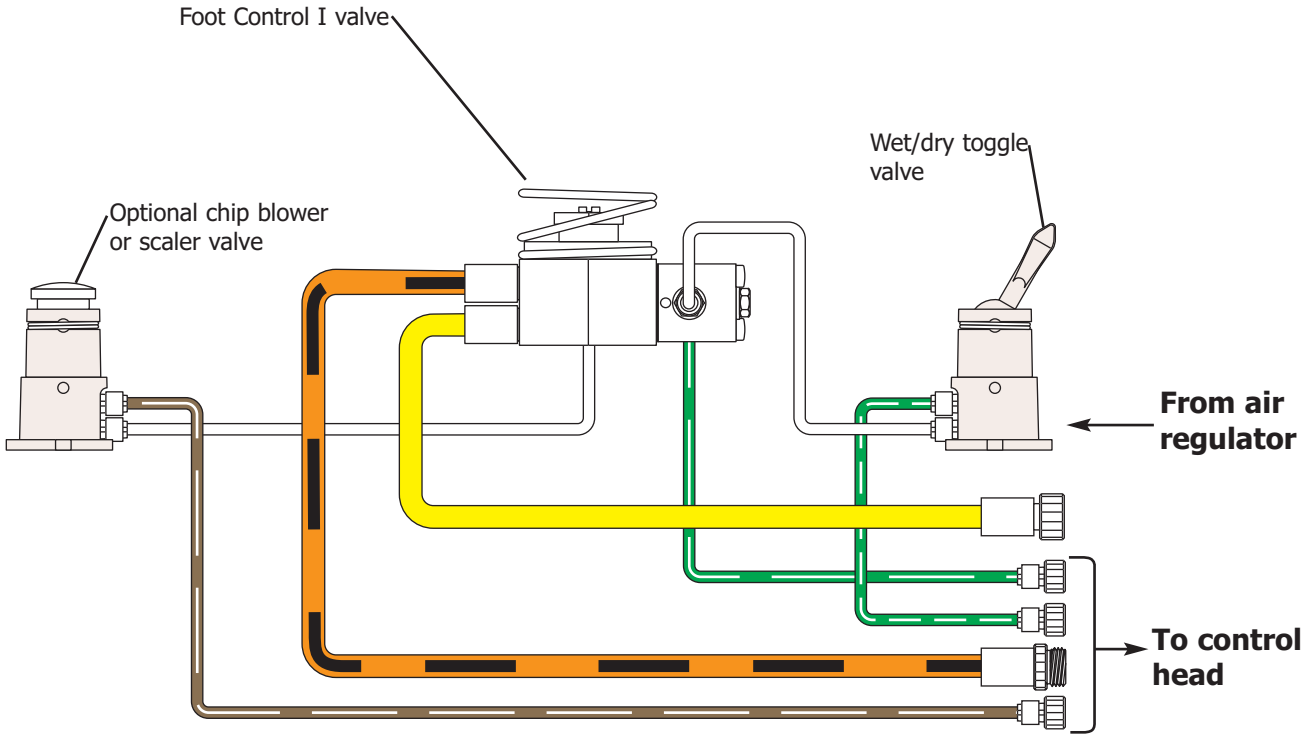
Foot Control I Flow Diagram



Foot Control I Valve Assembly



Foot Control I Cross View



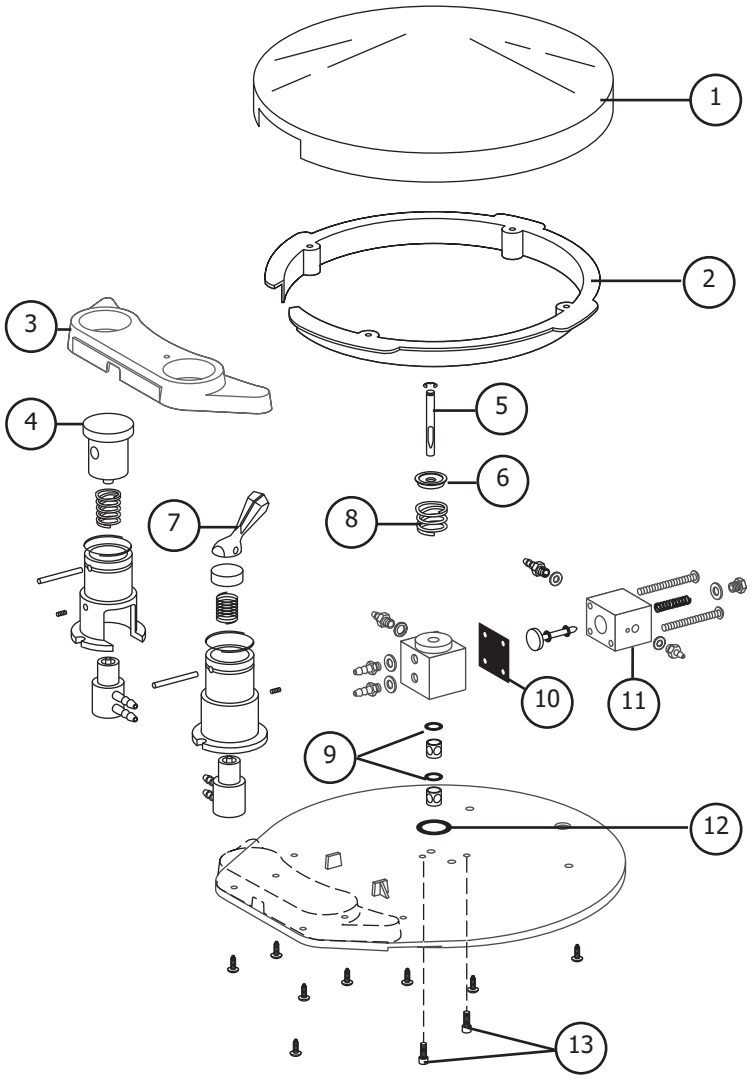
Foot Control II

NOTE: Asterisk (*) signifies parts that are included in the field service kit.

Item #	Part Number	Description
—	90.0312.00	Foot control II field service kit
1	22.0110.00	Foot control cover, fits all foot controls
2	38.0237.00	Retaining ring, internal, Black
3	38.0320.00 (01, 02)	Foot control housing, 1-hole
	38.0321.00 (01, 02)	Foot control housing, 2-hole
4	38.0610.00 38.0612.00	Chip blower valve Scaler valve
*5	38.0246.00	Stem with E-ring
*6	38.0552.00	Ring return valve stem
7	38.0604.00	Wet/dry toggle valve
*8	013.011.00	Spring
*9	030.008.02	O-ring, AS568-008
*10	38.0054.02	Diaphragm
11	38.0056.00	Replacement signal relay valve
*12	030.012.02	O-ring, AS568-012
13	003.078.00	Socket head screw

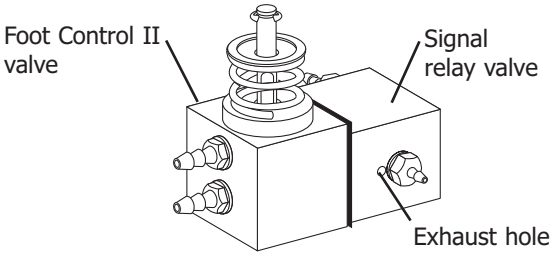
WARNING

Turn the master On/Off toggle to the **OFF** position and bleed system air pressure **before** removing the foot control disc to prevent the foot control stem from being forcefully ejected.

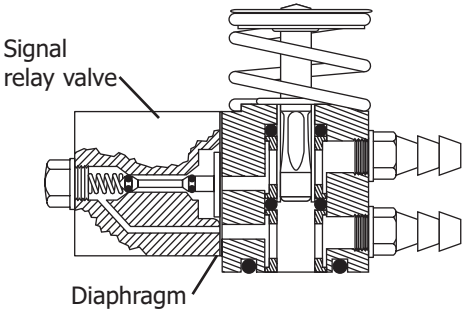


Foot Control II

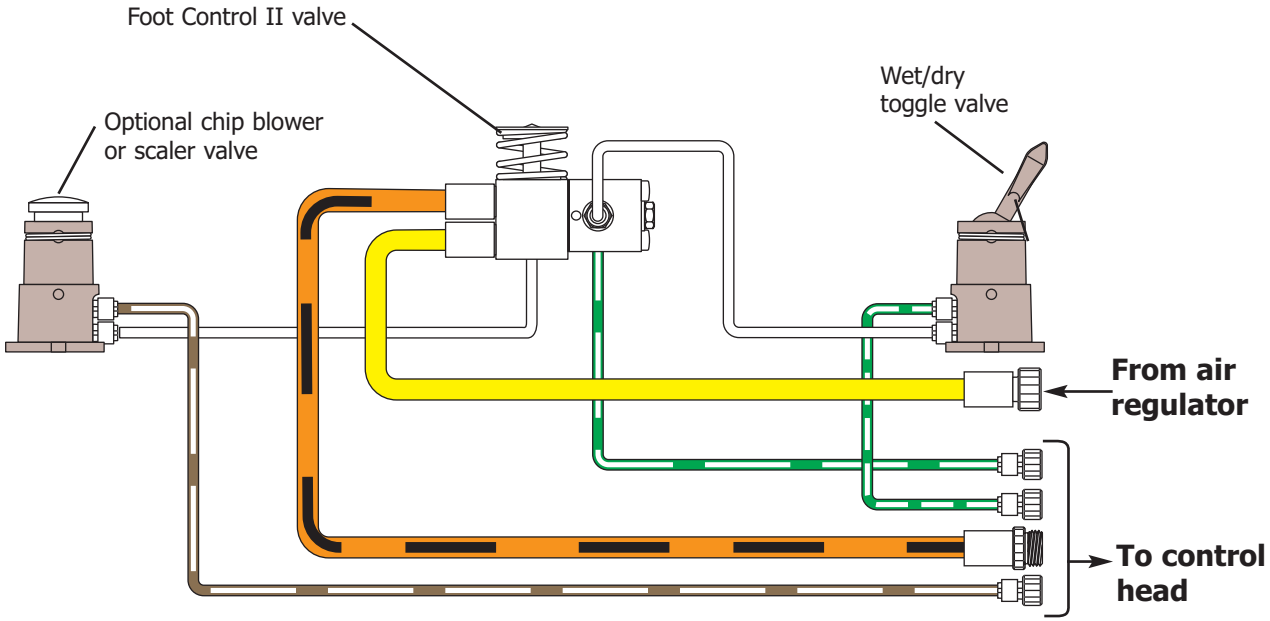
Foot Control II Flow Diagram



Foot Control II Valve Assembly



Foot Control II Cross View



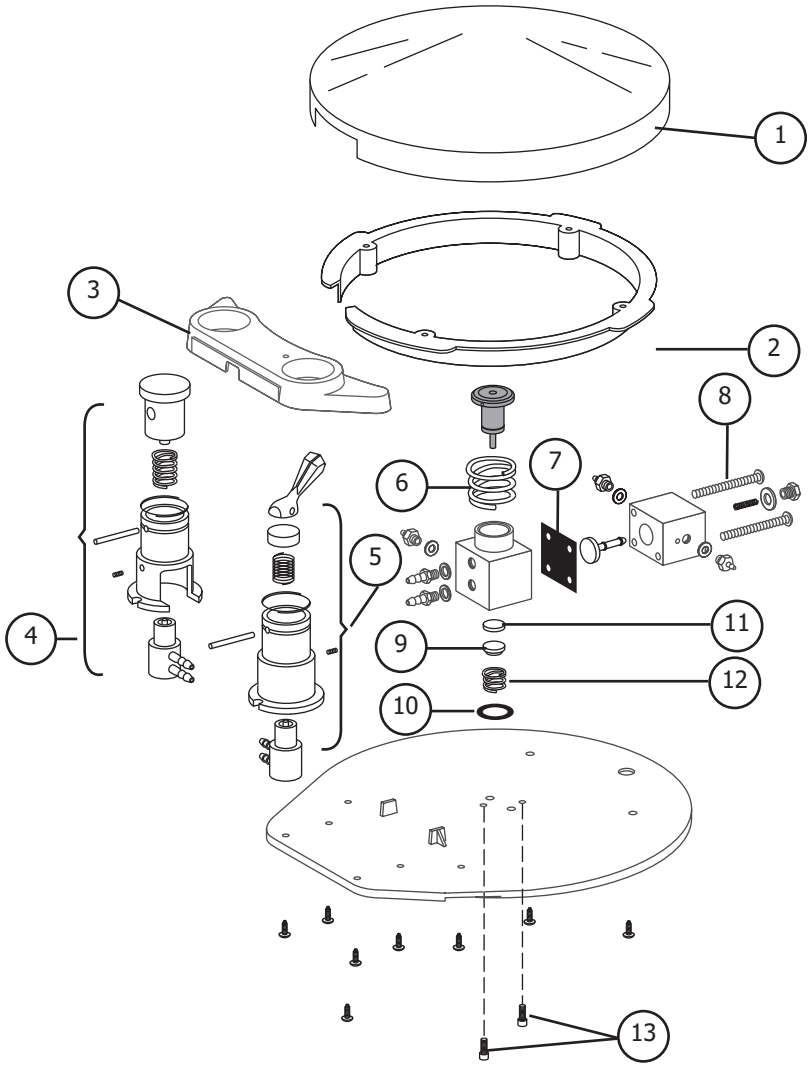
WARNING

When working on Foot Control II, move the master On/Off toggle to the OFF position and bleed the system of air pressure. Do this before removing the foot control disc to prevent the foot control stem from being forcefully ejected from the foot control valve.

Foot Control III

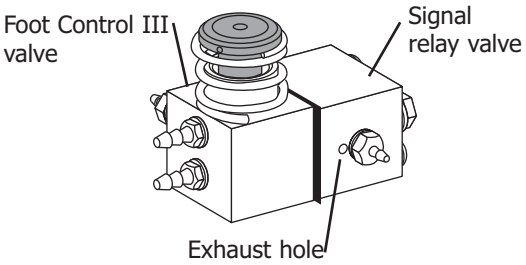
Use of Foot Control III began in March 1999.

Item #	Part Number	Description
—	90.0593.00	Foot Control III field service kit
—	38.1764.00	International conversion kit
1	22.0110.00	Foot control cover, fits all foot controls
2	38.0237.00	Retaining ring, internal, Black
3	38.0763.00 38.0321.00 (01, 02)	Foot control housing, 1-hole, Dark Surf Foot control housing, 2-hole
4	38.0610.00 38.0612.00	Chip blower valve Scaler valve
5	38.0604.00	Wet/dry toggle valve
6	013.011.00	Spring, helical compression
7	38.0054.02	Diaphragm
8	10.0440.00	Spring
9	22.0050.00	Spring cap
10	030.012.02	O-ring, AS568-012
11	22.0060.00	Poppet, plastic
12	22.0580.00	Spring
13	003.078.00	Socket head screw

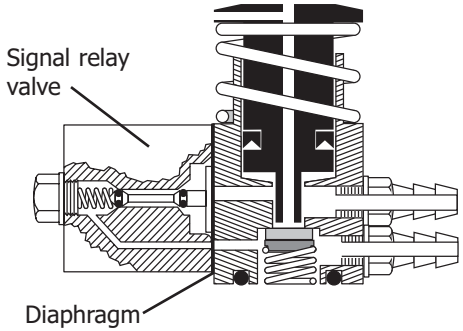


Foot Control III

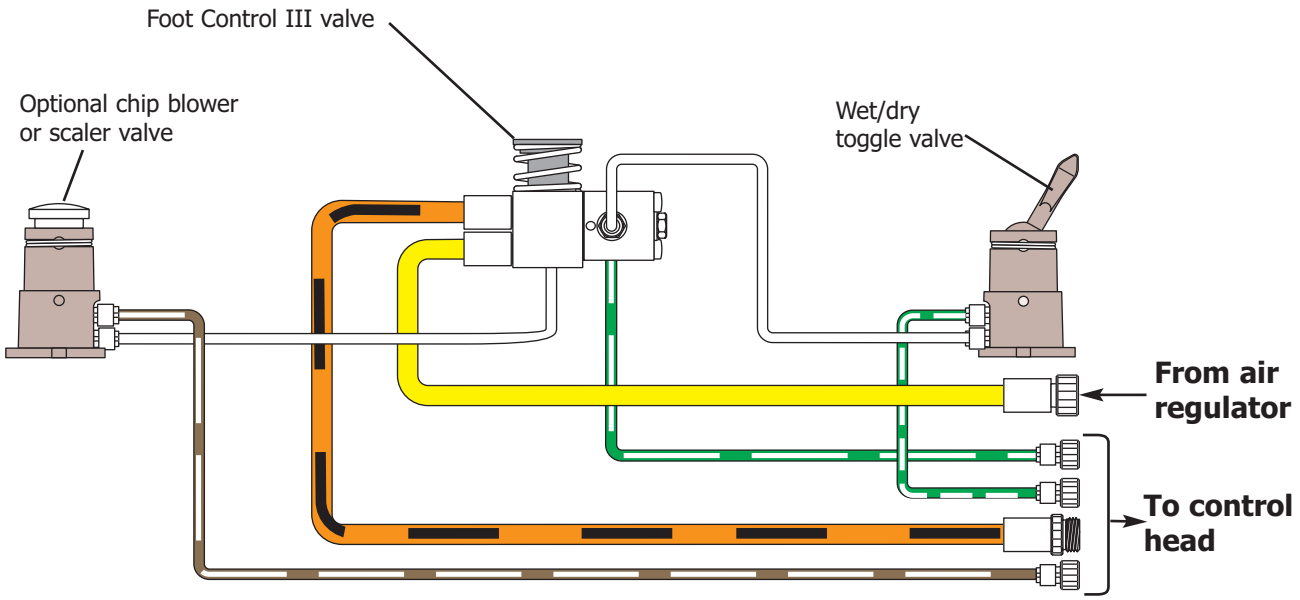
Foot Control III Flow Diagram



Foot Control III Valve Assembly



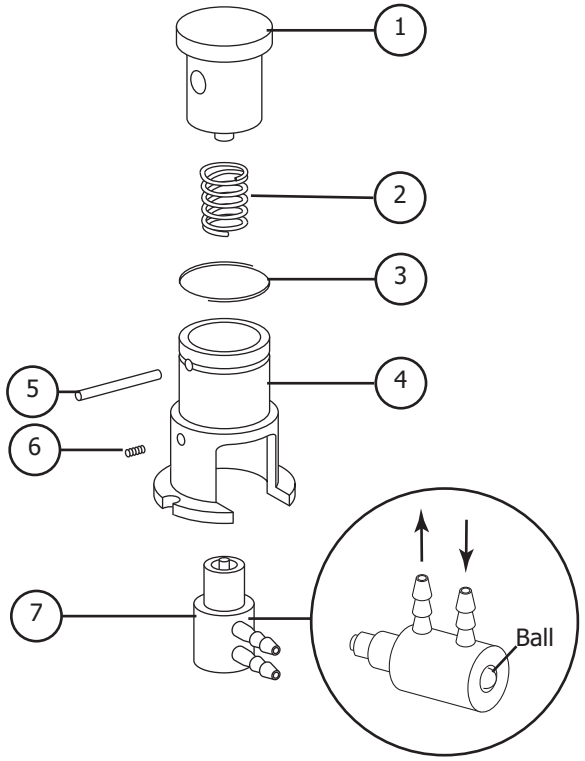
Foot Control III Cross View



Recognizing Parts for Chip Blower/Scaler Valve Assemblies

The chip blower is used to send a jet of air through the handpiece, to remove accumulated debris. Parts available for the chip blower/scaler valve assembly are detailed in the table.

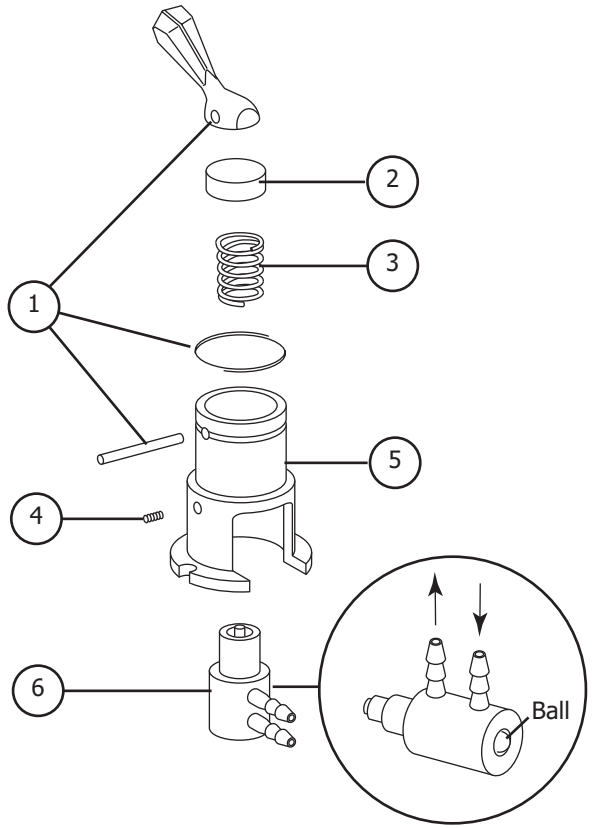
Item #	Part Number	Description
1	38.0070.00	Valve actuator button
2	22.0040.00	Spring
3	010.056.00	Retainer, spring
4	38.0072.03	Valve holder, Dark Surf
5	011.016.00	Pin
6	007.002.01	Set screw, socket cup point
7	33.0134.00 33.0138.00	2-way micro-valve (for chip blower - brass ball) 3-way micro-valve (for scaler - stainless steel ball)
—	38.0510.00	Chip blower valve
—	38.0612.00	Scaler valve assembly



Chip Blower Valve or Scaler Valve Assembly

Wet/Dry Valve Assembly

Item #	Part Number	Description
1	38.0075.03	Toggle kit (includes the spring, retainer and pin)
2	38.0066.00	Cap, spring
3	22.0040.00	Spring
4	007.002.01	Set screw, socket cup point
5	38.0072.03	Valve holder, Dark Surf
6	33.0138.00	3-way micro-valve (stainless steel ball)
—	38.0604.00	Wet/dry valve assembly
—	38.0075.03	Service kit



Wet/Dry Toggle Valve Assembly

Troubleshooting Foot Controls

Tips and troubleshooting information are listed in the following charts to assist in diagnosing foot control problems. These charts are not intended to cover every situation, but do try to include the most common problems you may encounter.

Problem	Action
Audible leakage when foot control is **not** being used	Do these steps in the order listed, until the leakage has stopped. **Task** **Descriptions** 1 Check mounting screws in the bottom of the baseplate to make sure they are tight. • If leakage has stopped, test unit. • If there is still audible leakage, continue with step 2. 2 Remove the cover and check the internal tubings for secure connections. 3 Check for leakage from the exhaust holes on the signal relay valve. If there is leakage, do the following • move the master On/Off toggle to the OFF position and bleed the system of air pressure • inspect the stem and o-rings for debris or defects, and • inspect the seat for debris or defects. 4 Replace any defective parts. Lubricate the o-rings, reassemble and test the foot control. 5 Check for leakage around the diaphragm. If there is leakage, do the following: • Tighten the two screws securing the signal relay valve to the foot control valve. If there's still leakage, replace the diaphragm.

Problem	Action
Audible leakage when foot control is in use	Do these steps in the order listed, until the leakage has stopped. **Task** **Descriptions** 1 Check for a failed diaphragm. • Tighten the two screws securing the signal relay valve to the foot control valve. If there is still leakage replace the diaphragm. • If there is still audible leakage, continue with step 2. 2 Check for leakage from the exhaust holes on the signal relay valve. If there is leakage, do the following • move the master On/Off toggle to the OFF position and bleed the system of air pressure • inspect the stem and o-rings for debris or defects, and • inspect the seat for debris or defects. 3 Replace any defective parts. Lubricate the o-rings, reassemble and test the foot control. 4 Check the outlet barb and tubing on the signal relay valve. Tighten the barb, or replace the tubing.

Problem	Action
Inadequate air flow	Check these in the following order. **Task** **Descriptions** 1 Check the air pressure. If the air pressure drops by more than 15 psi when syringe air button and foot control are depressed • Check for pinched foot control tubing. • Check for a plugged filter in the air filter/regulator (floor box). • Check for obstructed outlet barb on signal relay valve. 2 Move the master On/Off toggle to the OFF position and bleed the system of air pressure. 3 Remove debris and replace any defective parts in the valve assembly. Lubricate the o-rings, reassemble, and test the foot control.
Coolant water continues after release of foot control	Check these in the following order. 1 Check for a sticky signal relay valve. 2 Move the master On/Off toggle to the OFF position and bleed the system of air pressure. 3 Remove the signal relay valve, clean and lube the parts, and reassemble. 4 Test foot control. 5 Check for a kinked/plugged tubing somewhere between the foot control relay and the control head.

Problem	Action
Sluggish foot control	Follow these steps to test the response on the foot control.

Task	Descriptions
1	Check the valve stem to see if it is sticking.
2	Move the master On/Off toggle to the OFF position and bleed the system of air pressure.
3	Remove the signal relay valve, clean and lube the parts, and reassemble.
4	Test foot control.

Foot Controls

Notes

Foot Controls

Notes

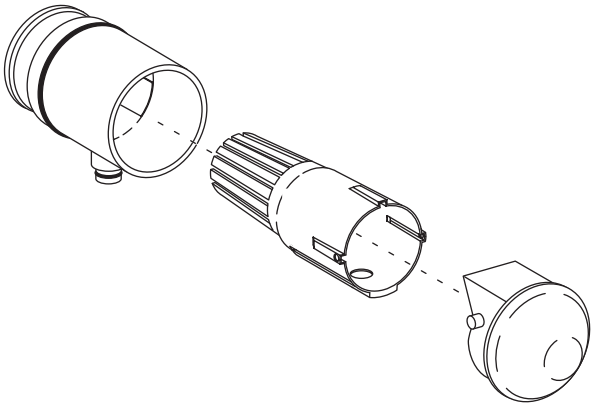
Assistant's Instrumentation

Overview

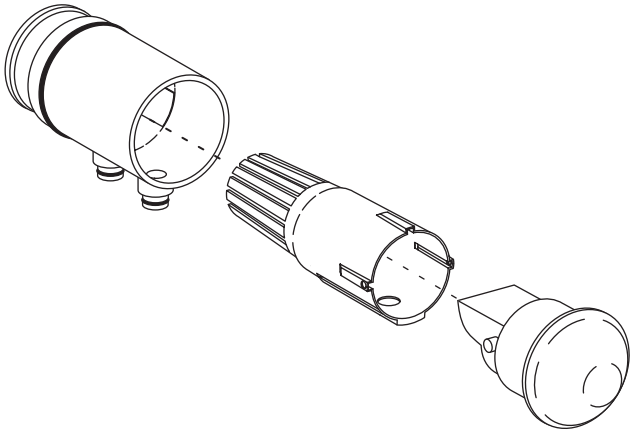
This section provides illustrations that will help you to identify the assistant's instrumentation (Cascade solids collector, HVEs, and saliva ejectors). Additional information includes descriptions and part numbers for the parts that are used to service, maintain, and adjust the equipment.

Identifying Vacuum Canisters

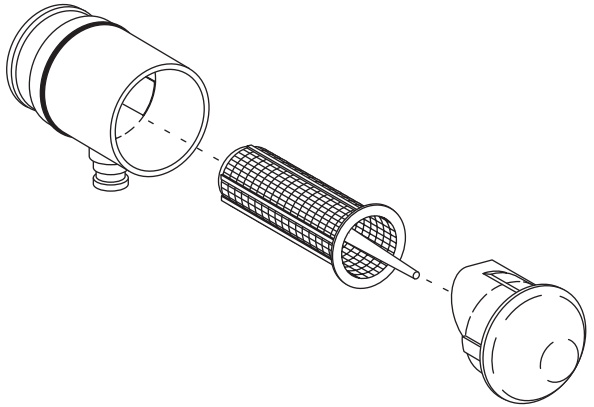
Solids collectors collect the large pieces of debris that could clog suction hoses. The following pages provide illustrations and service parts information on solids collectors used on Cascade delivery systems.



Single HVE Cascade Solids Collector



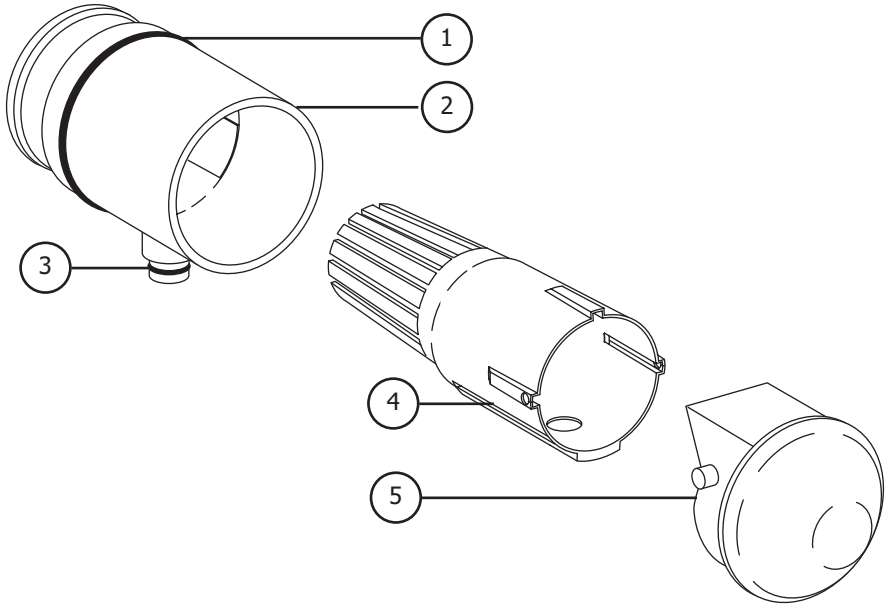
Dual HVE Cascade Solids Collector



15mm HVE Cascade Solids Collector

Single HVE Cascade Solids Collector

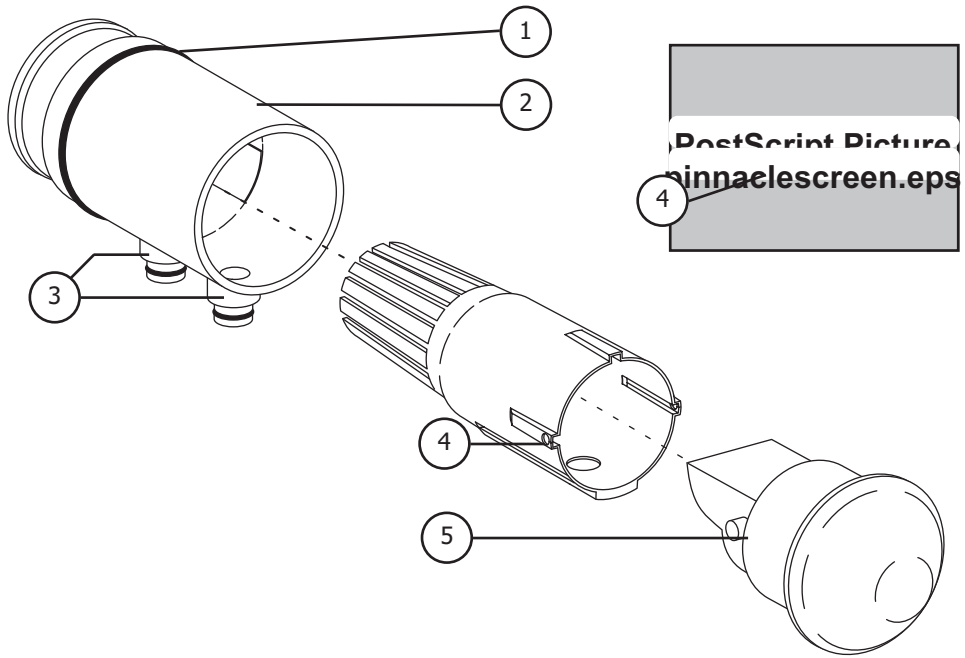
Item #	Part Number	Description
1	030.027.01	O-ring pkg 10
2	75.0078.00	Vacuum canister, single
3	030.014.02	O-ring pkg 10
4	11.1007.00	Vacuum screen
5	11.1016.00	Vacuum cap
—	11.1017.00	Vacuum cup and screen kit



Single HVE Cascade Solids Collector

Dual HVE Cascade Solids Collector

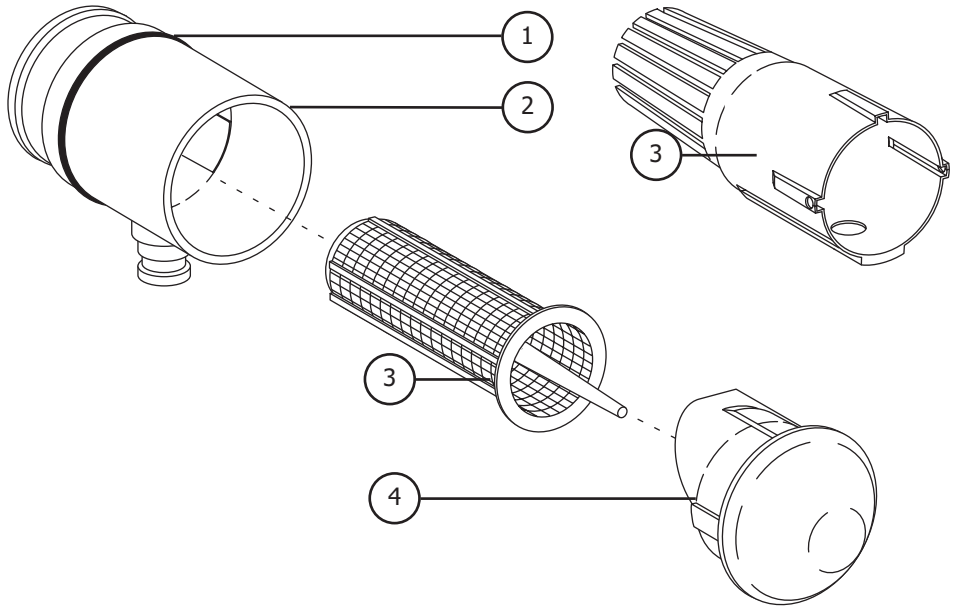
Item #	Part Number	Description
1	030.027.01	O-ring pkg 10
2	75.0932.00	Vacuum canister, dual
3	030.014.02	O-ring pkg 10
4	11.1007.00 11.1191.00	Vacuum screen Vacuum screen, Pinnacle
5	11.1018.00	Vacuum cap
—	11.1019.00	Dual vacuum cap and vacuum screen



Dual HVE Cascade Solids Collector

15mm HVE Cascade Solids Collector

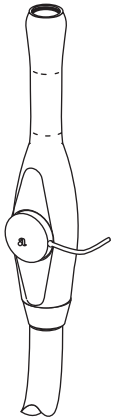
Item #	Part Number	Description
1	030.027.01	O-ring pkg 10
2	12.1123.00	Vacuum canister, 15mm
3	11.1191.00 11.1007.00	Vacuum screen, Pinnacle Vacuum screen
4	11.1192.00	Vacuum cap



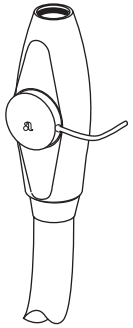
15mm HVE Cascade Solids Collector

Identifying HVEs

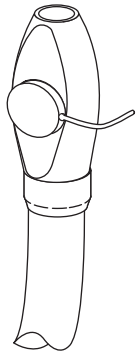
The most efficient method of removing the water spray from three-way syringes and handpieces, along with debris from the patient's mouth is with a high-volume evacuator (HVE). The following pages provide illustrations and service parts information on HVEs.



Autoclavable HVE with Long Tip Holder

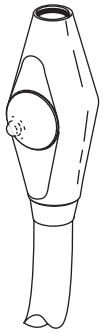


Autoclavable HVE

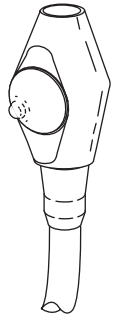


Autoclavable HVE with Large Bore (15mm)

Non-Autoclavable Easy-Clean HVE Valve with Long Tip Holder



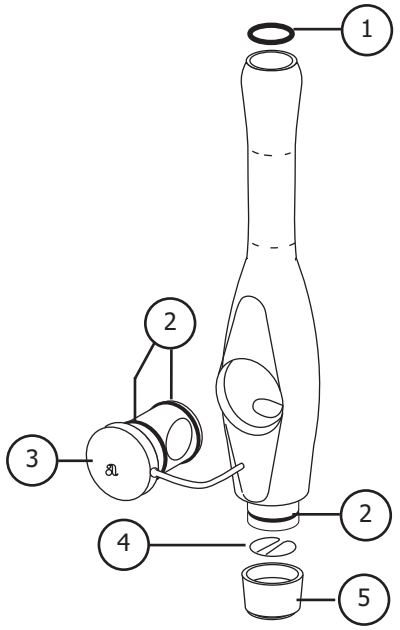
Non-Autoclavable Easy-Clean HVE Valve



Non-Autoclavable Easy-Clean HVE with Large Bore (15mm)

Autoclavable HVE with Long Tip Holder

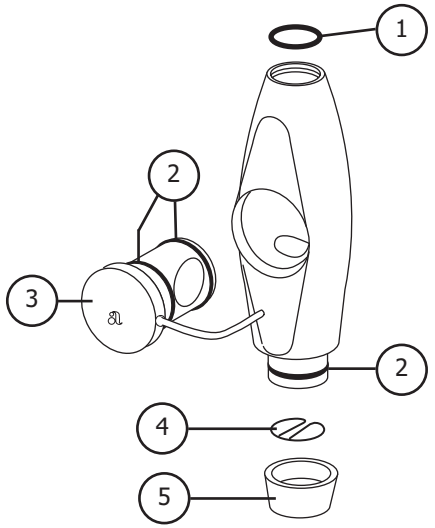
Item #	Part number	Description
1	034.013.01	O-ring pkg 10
2	034.014.01	O-ring pkg 10
3	11.1074.00	Rotary assembly
4	11.0998.01	Screen pkg 5
5	11.1027.00	Tailpiece, Dark Surf



11.1177.00
11.1178.00 (with 7' Dark Surf Tubing)

Autoclavable HVE

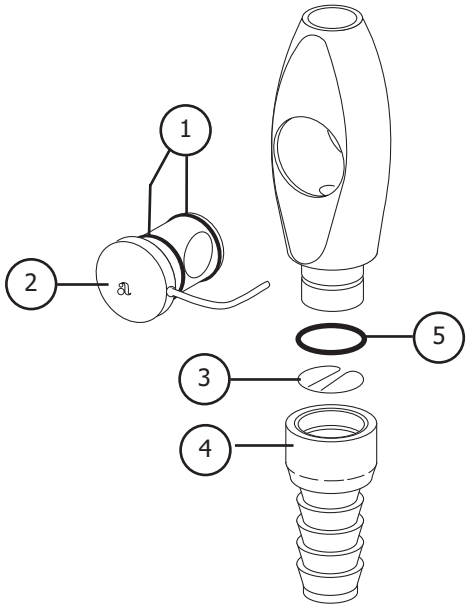
Item #	Part number	Description
1	034.013.01	O-ring pkg 10
2	034.014.01	O-ring pkg 10
3	11.1074.00	Rotary assembly
4	11.0998.01	Screen pkg 5
5	11.1027.00 11.0989.00	Tailpiece, Surf Tailpiece, Gray



11.1075.00
11.1025.02 (with 7' Dark Surf Tubing)

Autoclavable with 15mm HVE

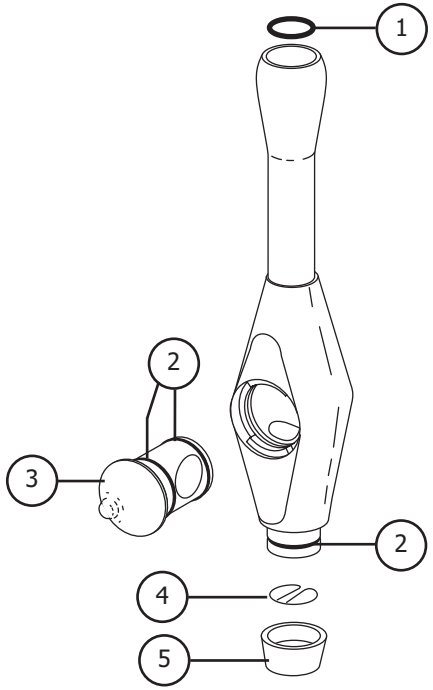
Item #	Part Number	Description
1	034.019.01	O-ring pkg 10
2	12.1116.00	Rotary assembly
3	12.1109.01	Screen pkg 5
4	12.1121.00	Tailpiece
5	034.018.02	O-ring pkg 10



12.1125.00
12.1132.00 (with 7' Tubing)

Non-Autoclavable Easy-Clean HVE with Long Tip Holder

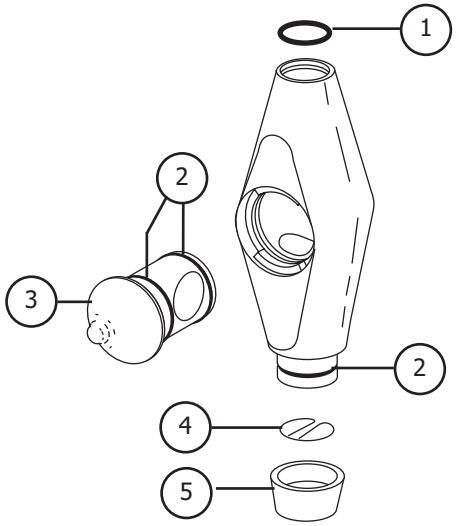
Item #	Part Number	Description
1	030.013.02	O-ring pkg 10
2	030.014.02	O-ring pkg 10
3	11.0983.00	Rotary assembly
4	11.0998.01	Screen pkg 5
5	11.1027.00 11.0989.00	Tailpiece, Surf Tailpiece, Gray



Only Service Parts are Available

Non-Autoclavable Easy-Clean HVE Valve

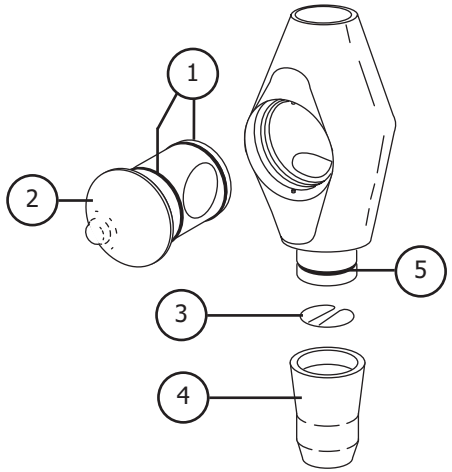
Item #	Part Number	Description
1	030.013.02	O-ring pkg 10
2	030.014.02	O-ring pkg 10
3	11.0983.00	Rotary assembly
4	11.0998.01	Screen pkg 5
5	11.1027.00 11.0989.00	Tailpiece, Surf Tailpiece, Gray



Only Serviceable Parts are Available

Non-Autoclavable Easy-Clean 15mm HVE

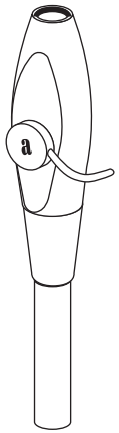
Item #	Part Number	Description
1	030.016.02	O-ring pkg 10
2	11.0994.00	Rotary assembly
3	11.0998.01	Screen pkg 5
4	11.0992.00	Tailpiece
5	030.014.02	O-ring pkg 10



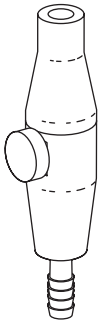
11.1015.00
11.1132.00 (with 7' Dark Surf Tubing)

Identifying Saliva Ejectors

The saliva ejector uses suction to remove a limited amount of fluid from the patient's mouth. It can also be used to hold the tongue away from the working site and keep an area dry for placement of material that takes a long time to cure. The following pages provide illustrations and service parts information on A-dec's saliva ejectors.



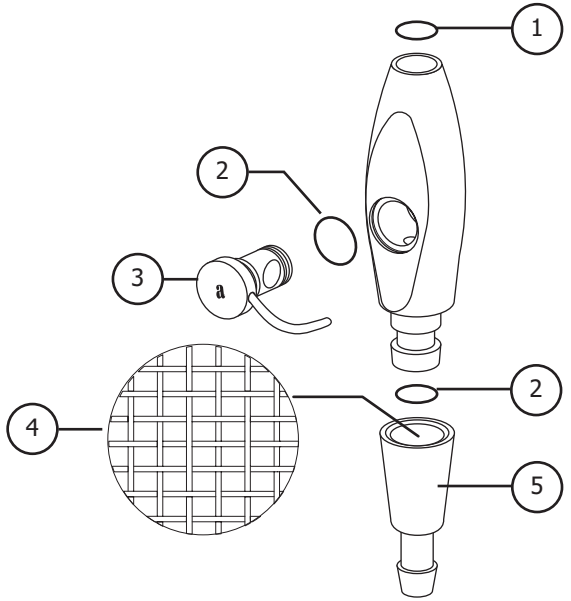
Autoclavable Saliva Ejector



Non-Autoclavable Saliva Ejector

Autoclavable Saliva Ejector

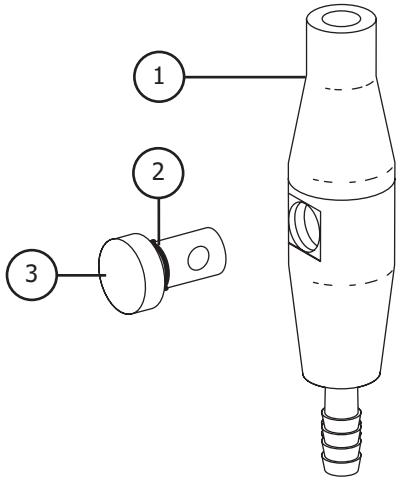
Item #	Part Number	Description
1	034.107.01	O-ring pkg 10
2	034.012.01	O-ring pkg 10
3	12.1093.00	Selector valve rotary
4	11.1235.01	Optional screen pkg 10
5	12.1088.00	Tailpiece



12.1100.00
12.0910.06 (with 7' Dark Surf Tubing)

Non-Autoclavable Saliva Ejector

Item #	Part Number	Description
1	12.0183.00 12.0183.01	Tip holder, Black Tip holder, Gray
2	030.010.02	O-ring pkg 10
3	12.0182.00	Rotary Assembly



Only Serviceable Parts are Available

Troubleshooting Cup Fill, Bowl Rinse, and Valve Controls

Tips and troubleshooting information are listed to assist in distinguishing cuspidor and valve control problems.

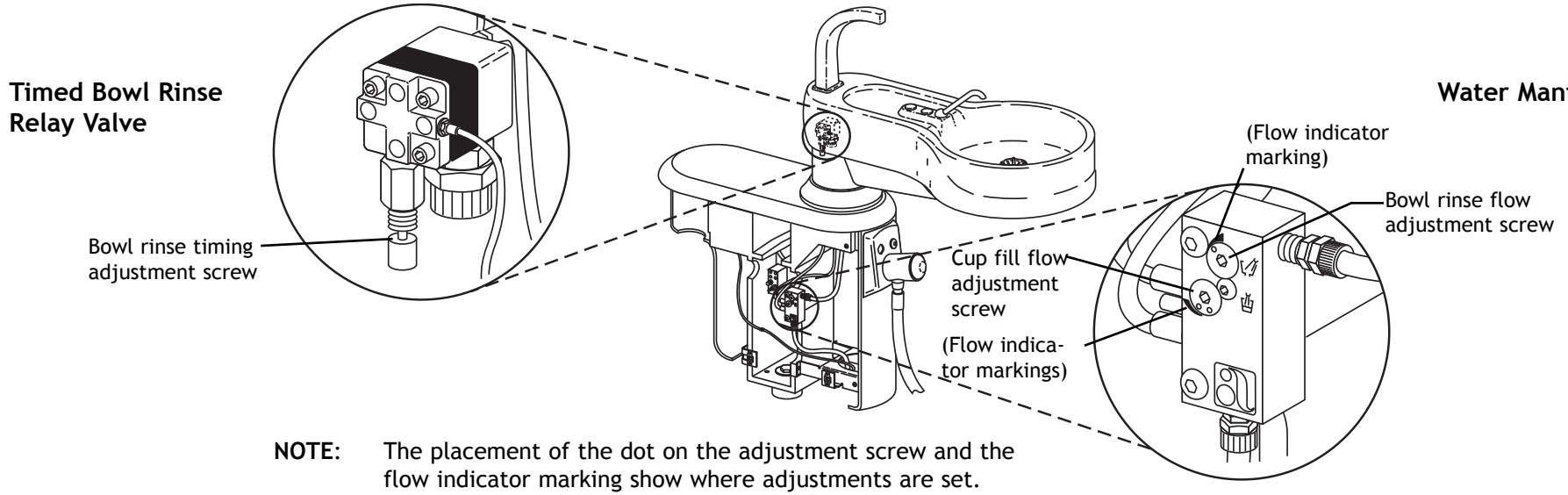
Problem	Action
Burst of water from cup fill or bowl rinse when first used	Check water pressure from floor box. If below 30 psi • adjust water pre-regulator to 30-40 psi, and • retest cup fill or bowl rinse function.
Inconsistent cup fill function	Check for cup fill stabilization kit installation. If the kit is not installed, install it (P/N 90.0456.00)
Air leak around the lo-flo needle valve	If air leaks around the lo-flo needle valve • tighten any loose connections • replace defective parts, and • test cup fill function.
Moisture in air lines or valves	If moisture is present in the air lines or valves • dry out or replace all tubings or valves • determine source of moisture and replace defective parts, and • test cup fill function.
Bowl rinse timing is incorrect, too short or too long	Adjust the bowl rinse timing. After locating the timing adjustment (under the cuspidor bowl housing) • increase the bowl rinse by turning the adjustment screw clockwise, or • decrease the bowl rinse by turning the adjustment screw counterclockwise.

Adjusting the Bowl Rinse and Cup Fill Flow

The bowl rinse time can be adjusted by turning the timed bowl rinse relay adjustment screw (accessed from the underside of the cuspidor housing).

The cup fill and bowl rinse flow can be adjusted by turning the adjustment screw, found on the water manifold, inside the post box.

To...	Do this...
Increase bowl rinse time	Adjust screw clockwise (tighten)
Decrease bowl rinse time	Adjust screw counterclockwise (loosen)
Increase cup fill or bowl rinse flow	Adjust screw clockwise
Increase cup fill or bowl rinse flow	Adjust screw counterclockwise



NOTE: The placement of the dot on the adjustment screw and the flow indicator marking show where adjustments are set.

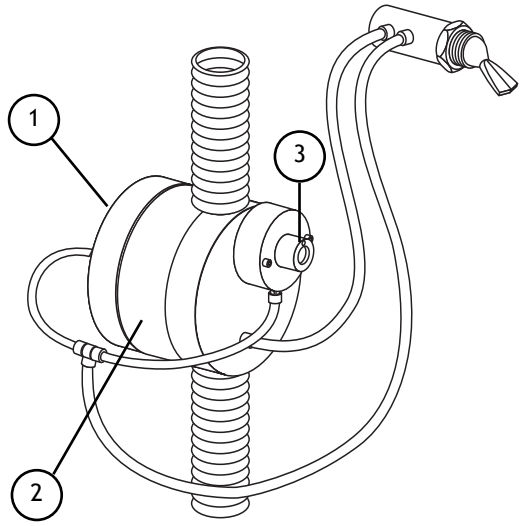
Adjustment Screw Locations

Adjusting the Vacuum Drain Valve

The vacuum drain valve has been pre-set at the factory. Varying water or vacuum conditions may require further adjustment if vacuum drain valve does not turn off or water backs up into the cuspidor bowl.

To adjust the drain valve:

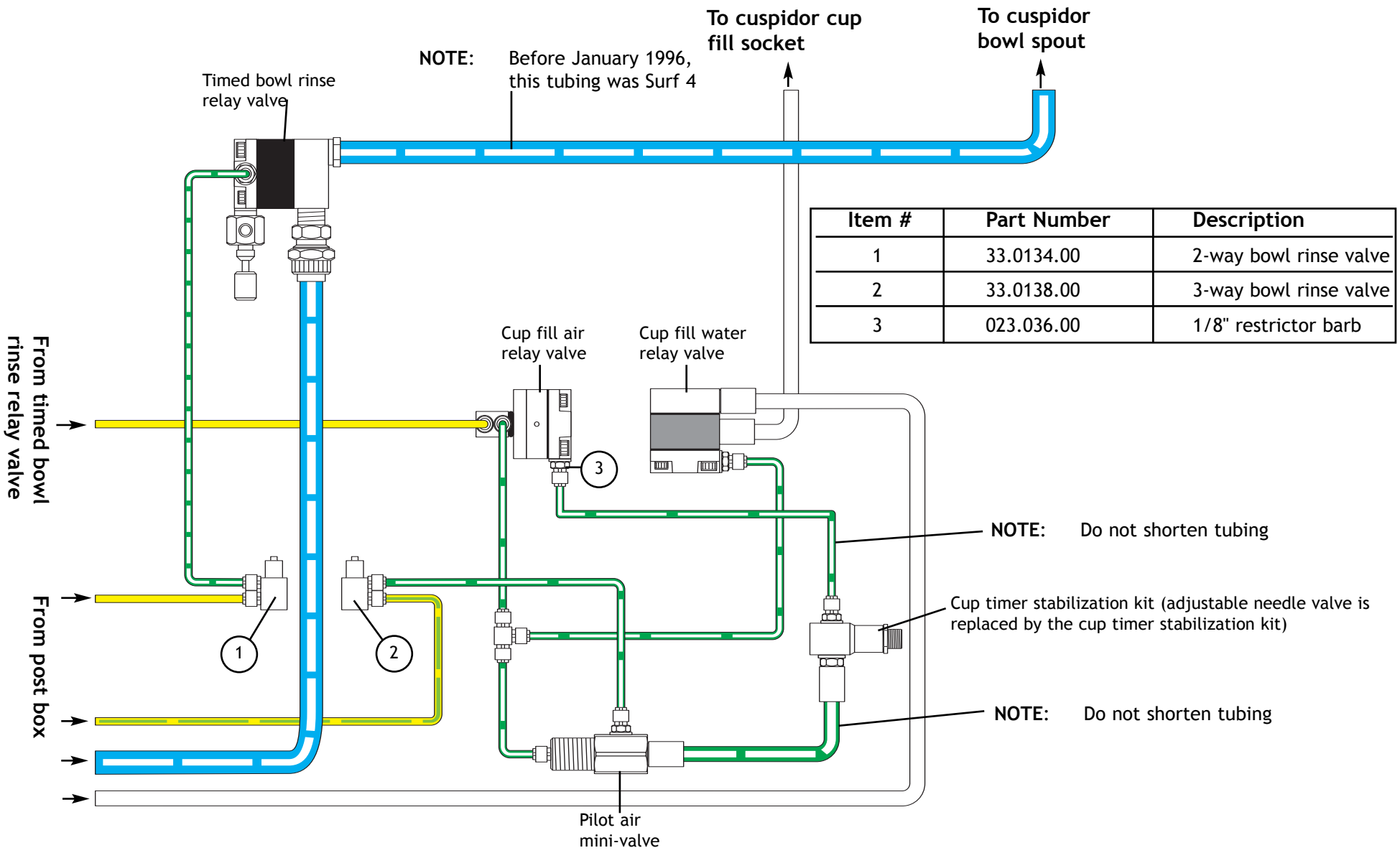
Task	Description
1	Use a standard screwdriver to turn the water sensing adjustment screw clockwise until you hear the actuator beginning to open. **NOTE**: When the valve is open, the diaphragm in it may vibrate, causing a high pitch noise.
2	Turn the adjustment screw counterclockwise until you hear the vacuum drain valve close; then turn the screw 1/8" counterclockwise.
3	Test for correct function by rinsing the cuspidor. If water backs up into the cuspidor bowl • Turn the adjustment screw slightly clockwise to decrease the amount of water required to open the valve, or • Turn the adjustment screw counterclockwise to increase the amount of water required to open the valve.



Vacuum Drain Assembly

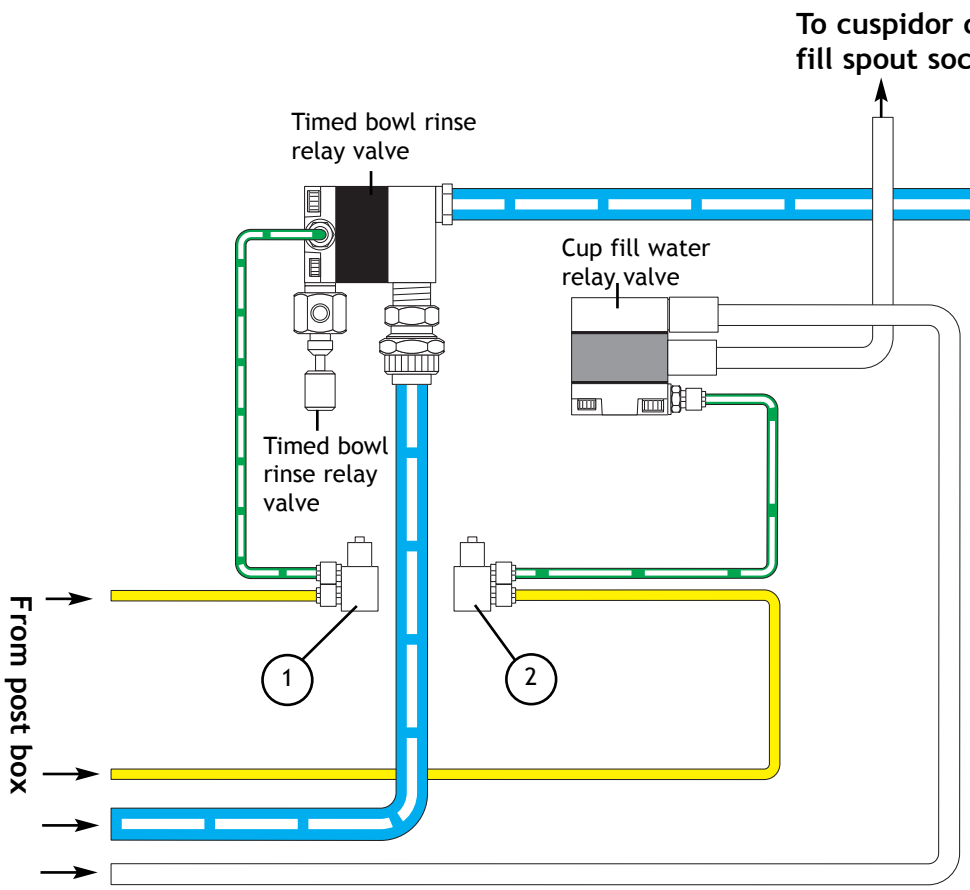
Item #	Description
1	Water sensor body
2	Vacuum drain valve
3	Water sensor adjustment screw

Automatic Cuspidor Flow Diagram



Item #	Part Number	Description
1	33.0134.00	2-way bowl rinse valve
2	33.0138.00	3-way bowl rinse valve
3	023.036.00	1/8" restrictor barb

Manual Cuspidor Flow Diagram

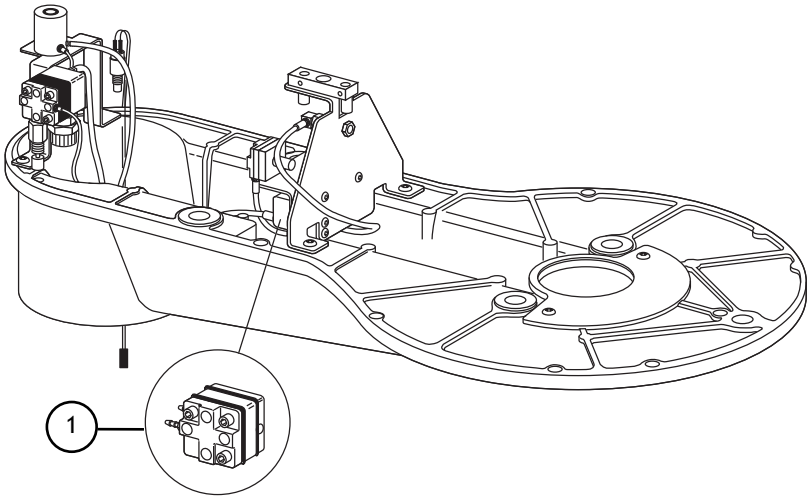


NOTE: Before January 1996, this tubing was Surf 4

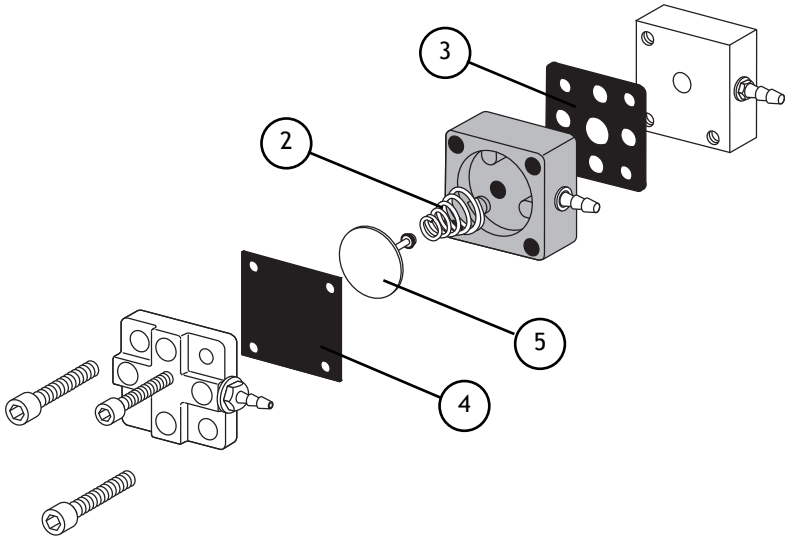
Item #	Part Number	Description
1	33.0134.00	2-way bowl rinse valve
2	33.0138.00	3-way bowl rinse valve

Cup Fill Water Relay Valve

Item #	Part Number	Description
1	12.0934.00	Cup fill water relay valve assy
2	013.032.00	Spring
3	24.0137.01	Nine-hole gasket pkg 10
4	24.0440.02	Diaphragm pkg 10
5	24.0132.00	Delrin piston with o-ring



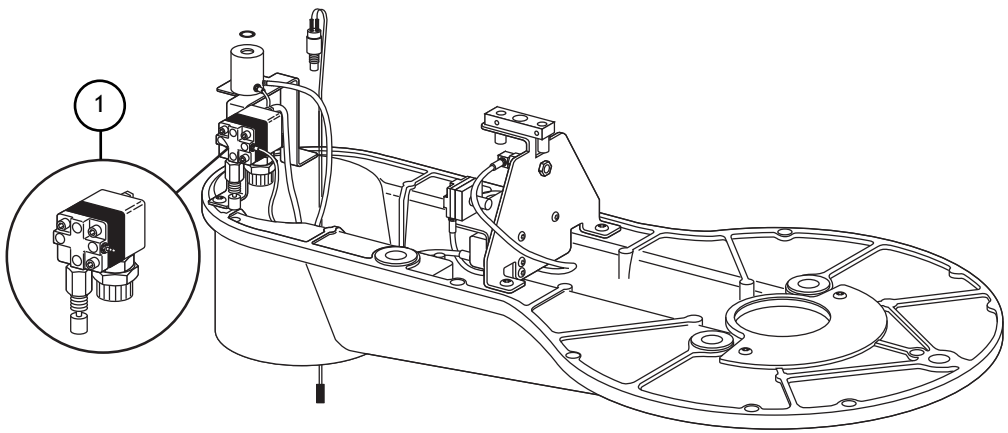
Location Of Cup Fill Relay Valve



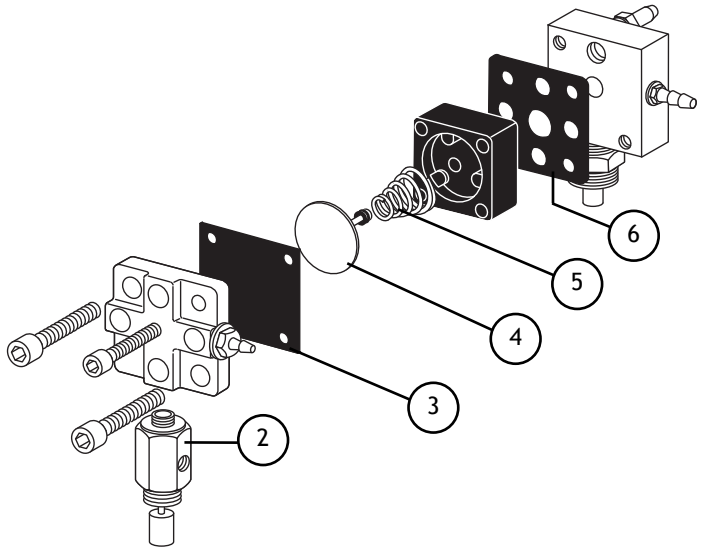
12.0934.00 Cup Fill Relay Valve

Timed Bowl Rinse Relay Valve

Item #	Part Number	Description
1	12.0913.00	Timed bowl rinse relay valve
2	12.0920.00	Needle valve assembly
3	22.0440.02	Diaphragm pkg 10
4	24.0132.00	Delrin piston with o-ring
5	013.032.00	Spring
6	24.0137.01	Nine-hole gasket pkg 10



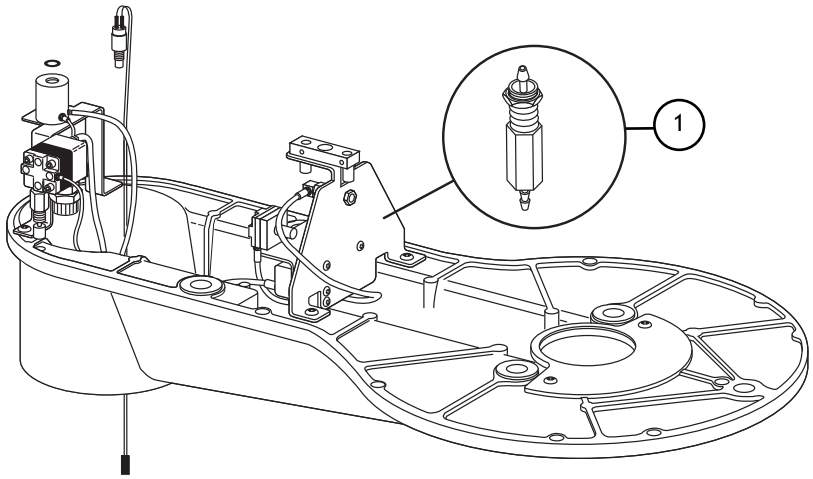
Location of Timed Bowl Rinse Relay Valve



12.0913.00 Timed Bowl Rinse Relay Valve

Pilot Air Mini-Valve

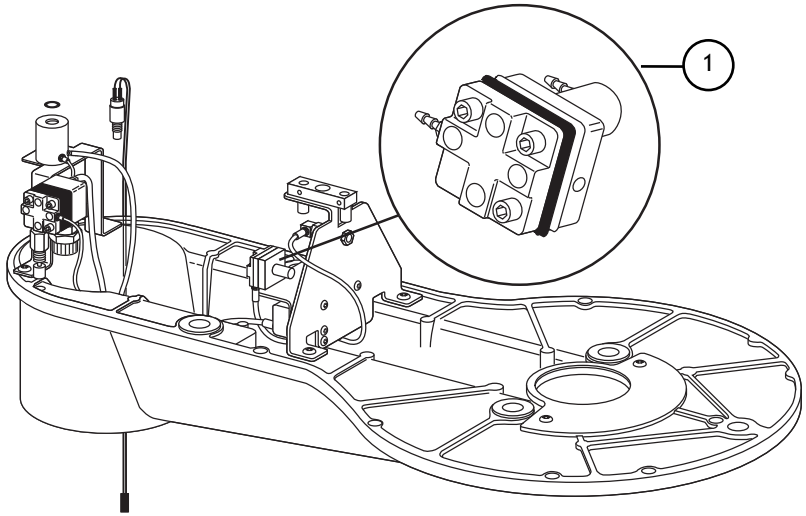
Item #	Part number	Description
1	12.0953.00 12.0954.01	Pilot air mini-valve (vitreous china) Pilot air mini-valve (phenolic)



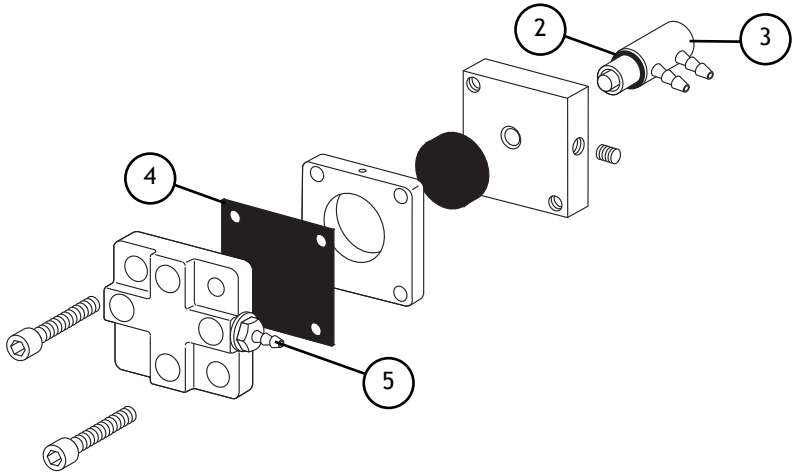
Location of Pilot Air Mini-Valve

3-Way Restricted Diaphragm Valve

Item #	Part number	Description
1	33.0160.00	3-way restricted diaphragm valve
2	030.010.02	O-ring pkg 10
3	33.0138.00	3-way micro-valve
4	22.0440.02	Diaphragm pkg 10
5	023.036.00	Restrictor barb



Location of 3-Way Restricted Diaphragm Valve

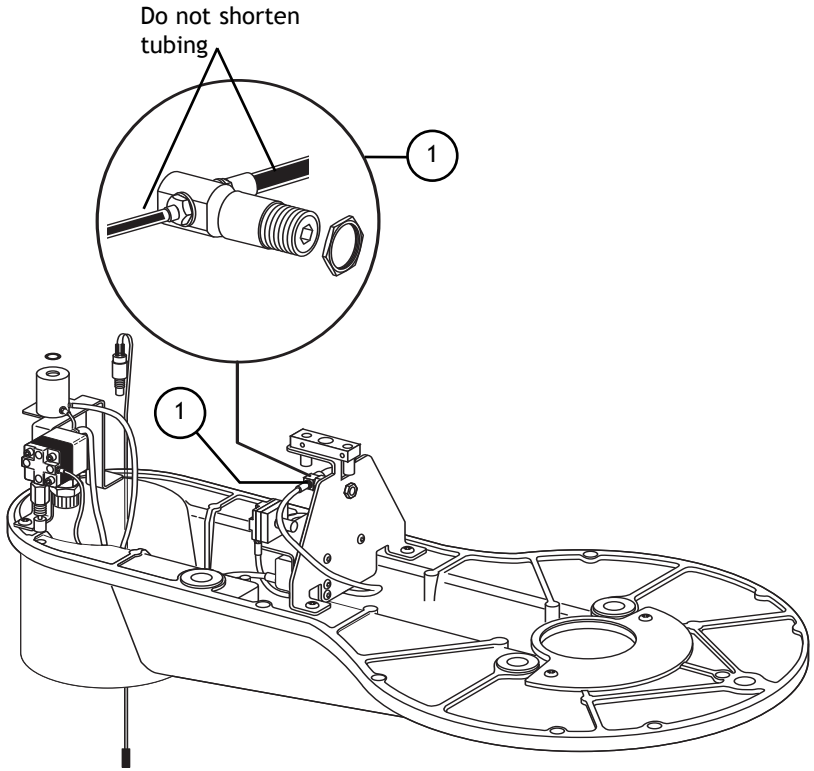


33.0160.00 3-Way Restricted Diaphragm Valve

Cup Fill Stabilization Kit
(After January 2000)

Item #	Part Number	Description
1	90.0456.00 12.0953.00 12.0954.01	Cup timer stabilization kit (replace on phenolic cuspidor and on vitreous china cuspidor)

Note: Part number 13.0402.01 is a sub-assembly contained in the 90.0456.00 cup fill stabilization kit. Other part numbers included in the stabilization kit are not shown.

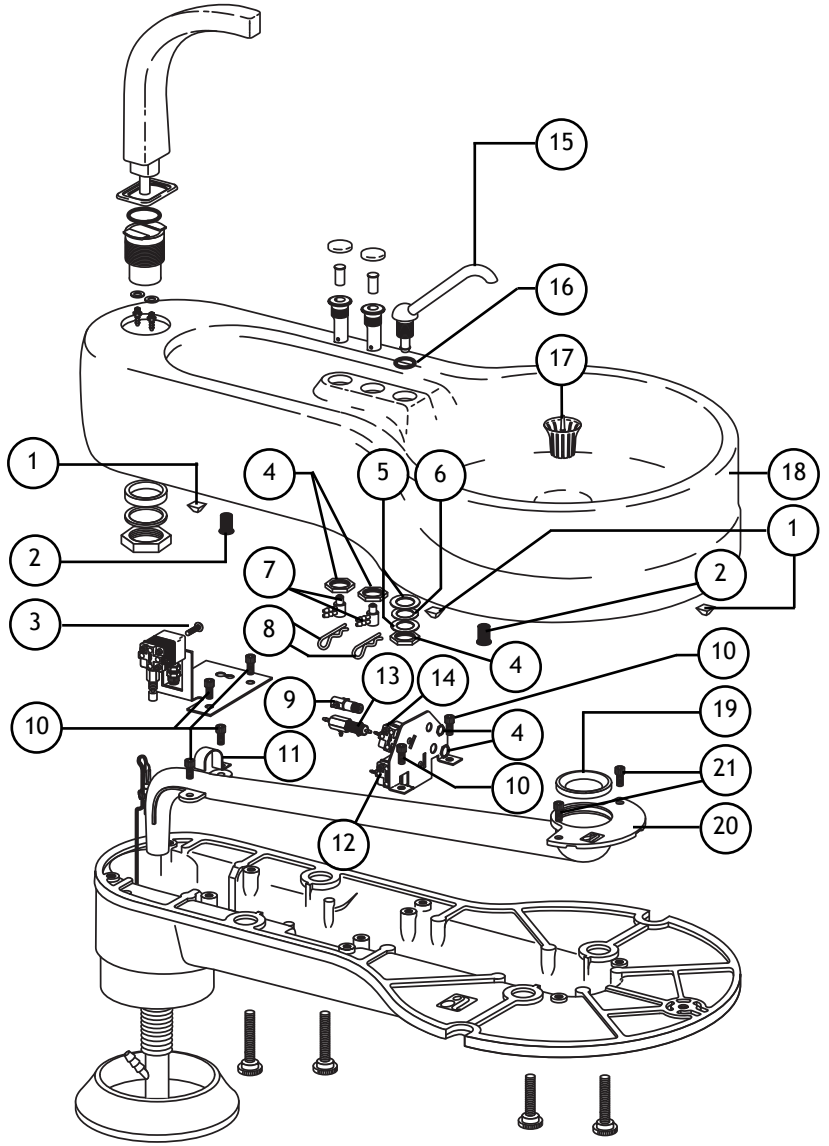


90.0456.00 Cup Fill Stabilization Kit

Cascade Cuspidor

(Vitreous China) Starting with/after serial number A650244

Item #	Part Number	Description
1	017.019.00	Bumper
2	006.133.01	Expansion nut
3	001.056.00	Screw, pan head phillips
4	006.009.00	Hex nut
5	004.140.00	Washer
6	004.068.00	Washer
7	33.0138.00	3-way micro-valve, cup-fill valve assy
8	011.082.00	Clip pin
9	90.0456.00	Cascade cup timer stabilization kit
10	001.016.01	Screw, socket head
11	12.0914.00	Tubing clip
12	12.0934.00	Cup fill relay assembly
13	12.0953.00	Mini, air pilot valve assembly
14	33.0160.00	3-way restricted diaphragm valve
15	12.1031.00	Bowl spout
16	030.014.02	O-ring
17	75.0035.01	Screen pkg
18	12.1035.00	Cuspidor bowl housing (starting w/ serial number A650244)
19	12.1024.00	Seal
20	75.0052.00	Drain tube
21	12.1054.02	Mount screw assembly

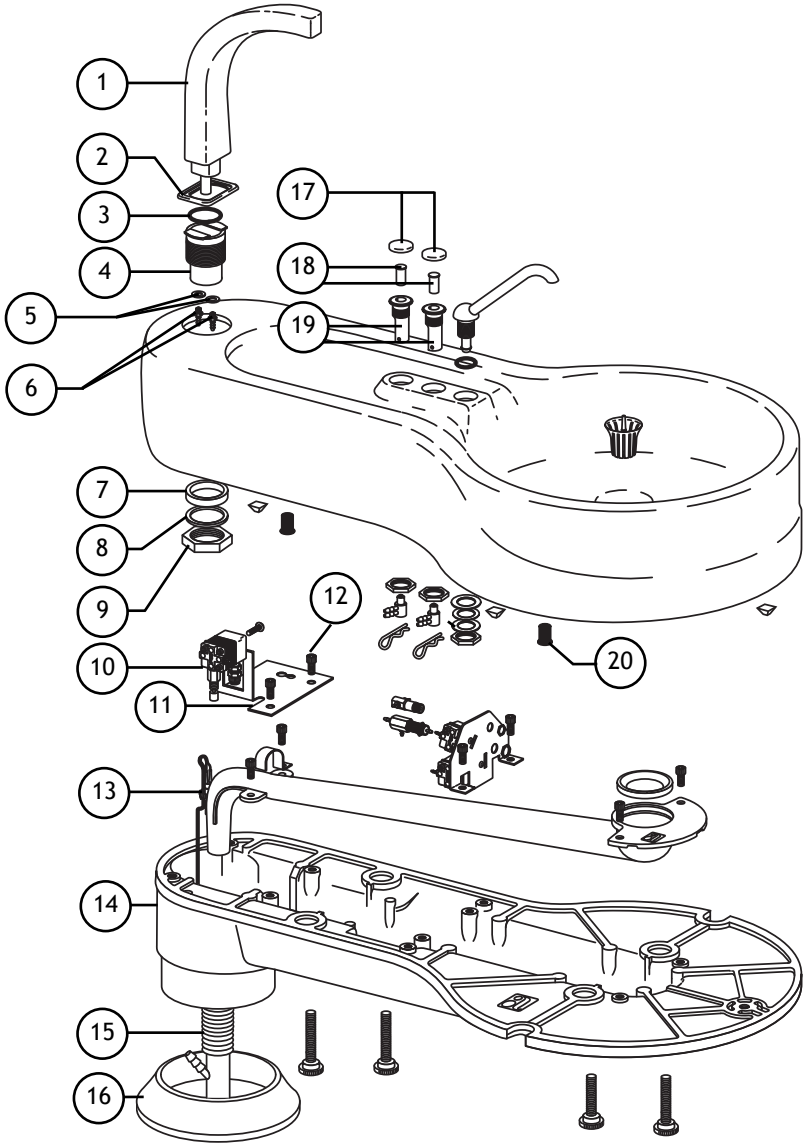


Cascade 7284 and Radius 7285 Cuspidor

Cascade Cuspidor

(Vitreous China) Starting with/after serial number A650244

Item #	Part Number	Description
1	75.0039.00	Contoured spout
2	75.0145.01	Gasket pkg 5
3	030.011.02	O-ring
4	12.1040.00	Socket
5	004.005.02	Washer
6	023.004.03	Barb, 1/8" pkg 10
7	004.203.00	Washer, BUNA-N
8	004.126.00	Washer, nylon
9	006.134.00	Hex nut
10	12.0913.00	Air timed bowl relay assembly
11	12.1042.00	Bracket
12	001.016.01	Screw, socket head
13	12.0915.00	N.O. momentary switch assembly
14	12.1144.00	Baseplate
15	024.152.01	Convoluted tubing
16	75.0060.00	Trim ring
17	75.0091.00	Button
18	12.1079.00	Valve actuator
19	12.1080.00	Valve retainer
20	12.1054.02	Mounting screw

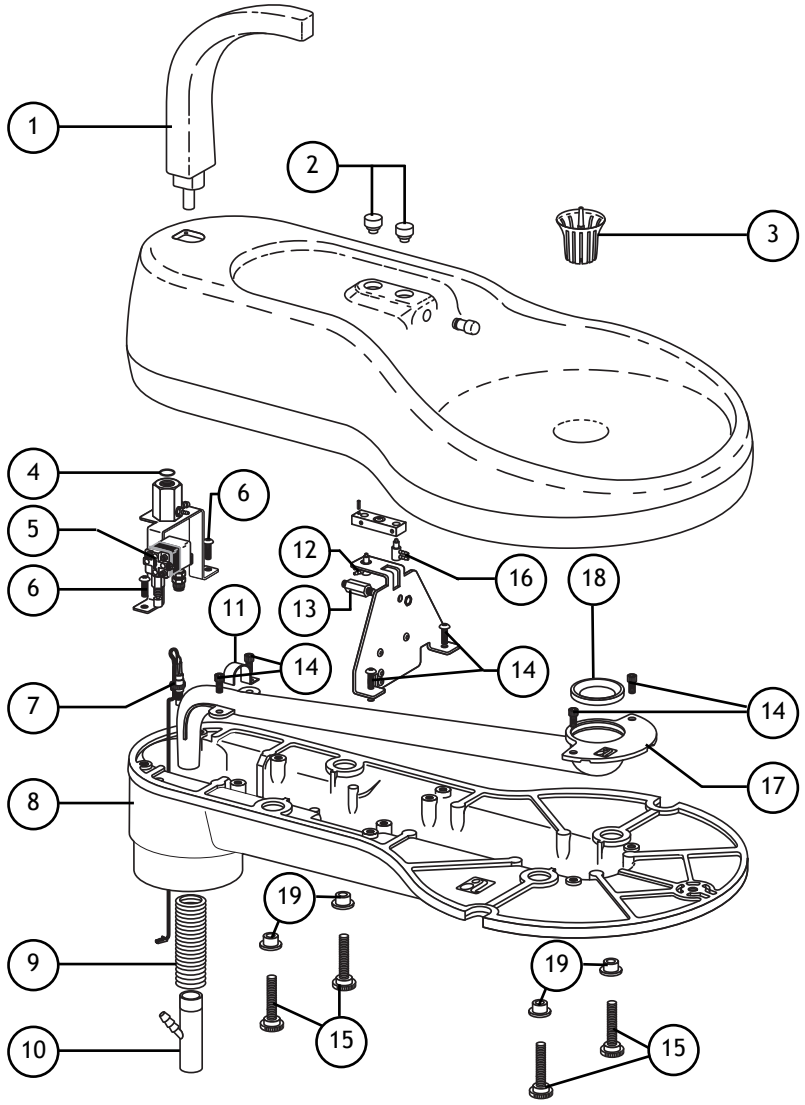


Cascade 7284 and Radius 7285 Cuspidor

Cascade Cuspidor

(Phenolic) Before serial number A650244

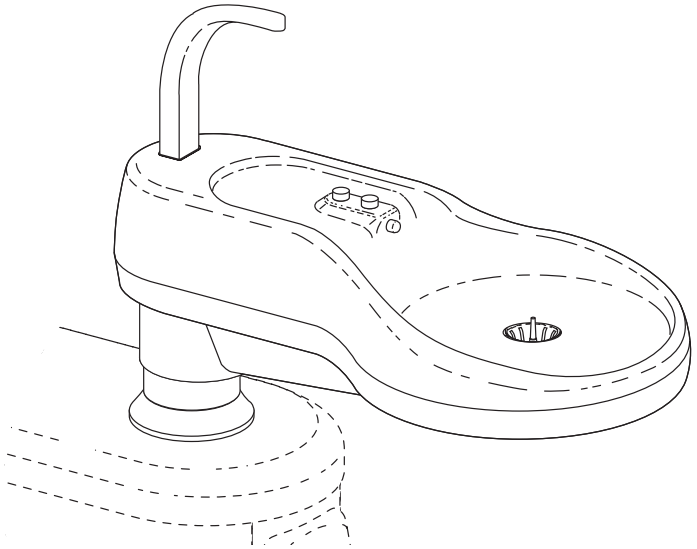
Item #	Part number	Description
1	75.0039.00	Contoured spout
2	12.0908.01	Button with actuator
3	75.0035.01	Screen
4	030.011.02	O-ring
5	12.0913.00	Timed bowl rinse valve
6	001.016.01	Screw, button head socket
7	12.0915.00	N.O. momentary switch assembly
8	12.1144.00	Baseplate
9	024.152.01	Convoluted tubing, Surf 4, 10'
10	40.0783.00	Y-adapter
11	12.0914.00	Tubing clip
12	33.0138.00	3-way micro-valve, cup-fill assembly (replace as a complete assembly)
13	12.0954.01	Lo-flo needle valve
14	001.016.01	Screw, socket head
15	12.1054.02	Mount screw assembly
16	33.0134.00	2-way micro-valve, cup-fill assembly (replace as a complete assembly)
17	75.0052.00	Drain tube
18	12.1024.00	Seal
19	006.133.01	Expansion mounting nut pkg 4



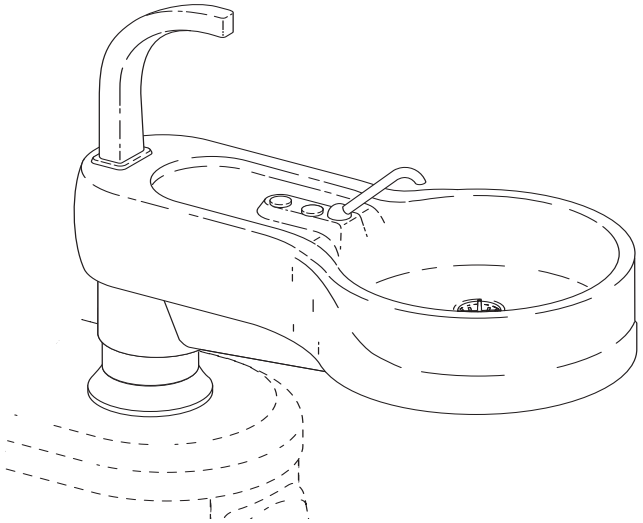
Cascade Cuspidor

Identifying Cuspidors

The following pages provide instructions, descriptions, part numbers, and flow diagrams that will assist you while servicing and troubleshooting cuspidor assemblies. Information for both Cascade and Cascade Radius cuspidors are shown.



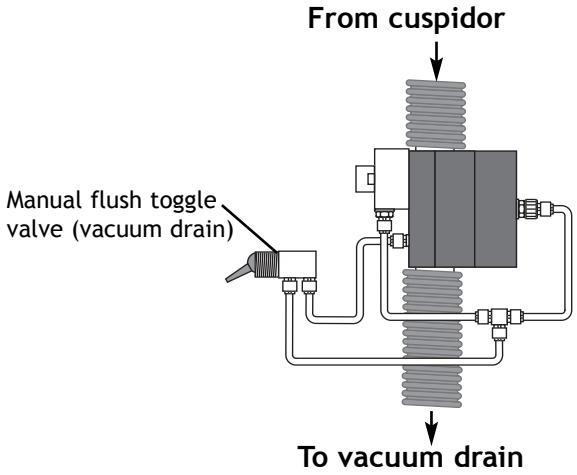
Cascade (Phenolic) Cuspidor



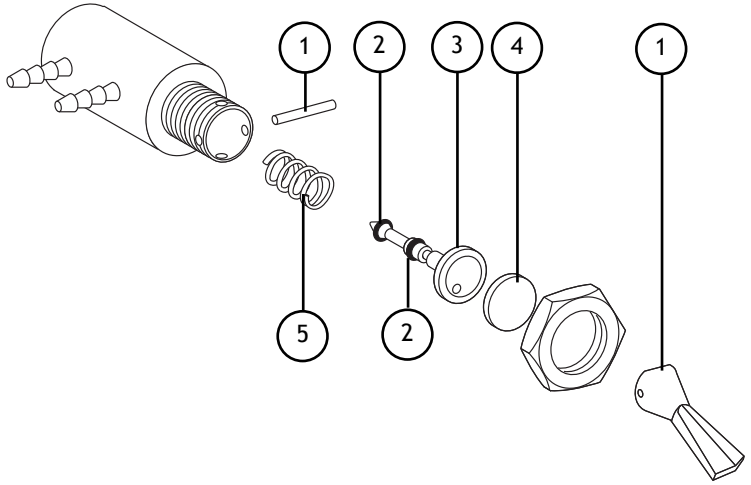
Cascade 7284 and Radius 7285 (Vitreous china) Cuspidor

Manual Flush Toggle Valve

Item #	Part Number	Description
1	33.0037.01	Toggle and pin kit
2	030.001.02	O-ring pkg 10
3	29.0830.00	Stem with o-rings, 2-way
4	33.0007.00	Disk, brass
5	013.055.00	Spring



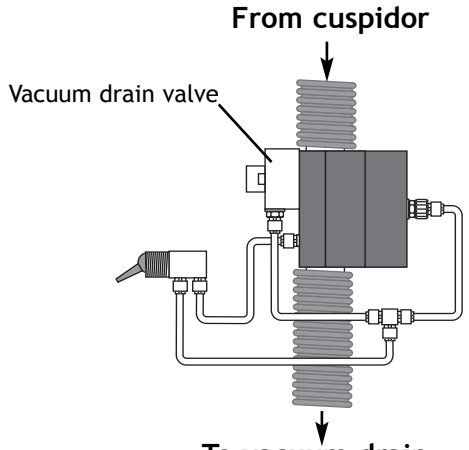
Vacuum Drain Manual Flush Toggle Valve Flow



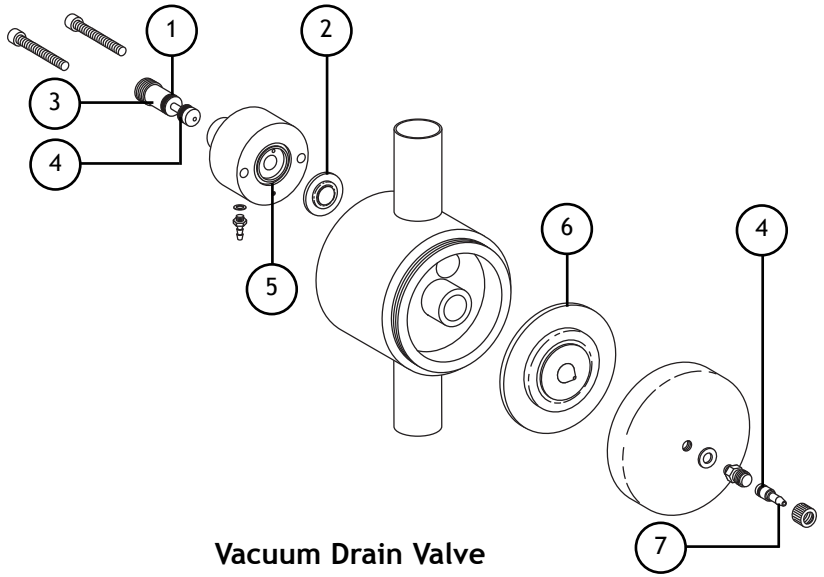
Vacuum Drain Manual Flush Toggle Valve Assembly

Vacuum Drain Valve

Item #	Part Number	Description
1	030.004.02	O-ring pkg 10
2	40.1082.00	Diaphragm, sensor
3	40.1086.00	Sensor stem with o-rings
4	030.003.02	O-ring pkg 10
5	030.001.02	O-ring pkg 10
6	40.1081.00	Diaphragm, vacuum
7	023.084.00	Male QD barb, with o-ring, 1/8"



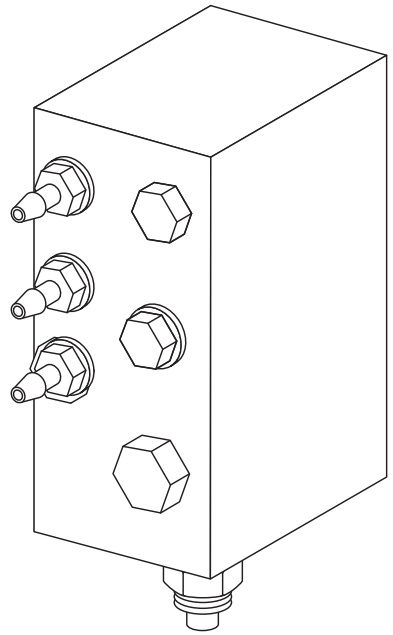
Vacuum Drain Valve



Vacuum Drain Valve

Air Manifold Assembly

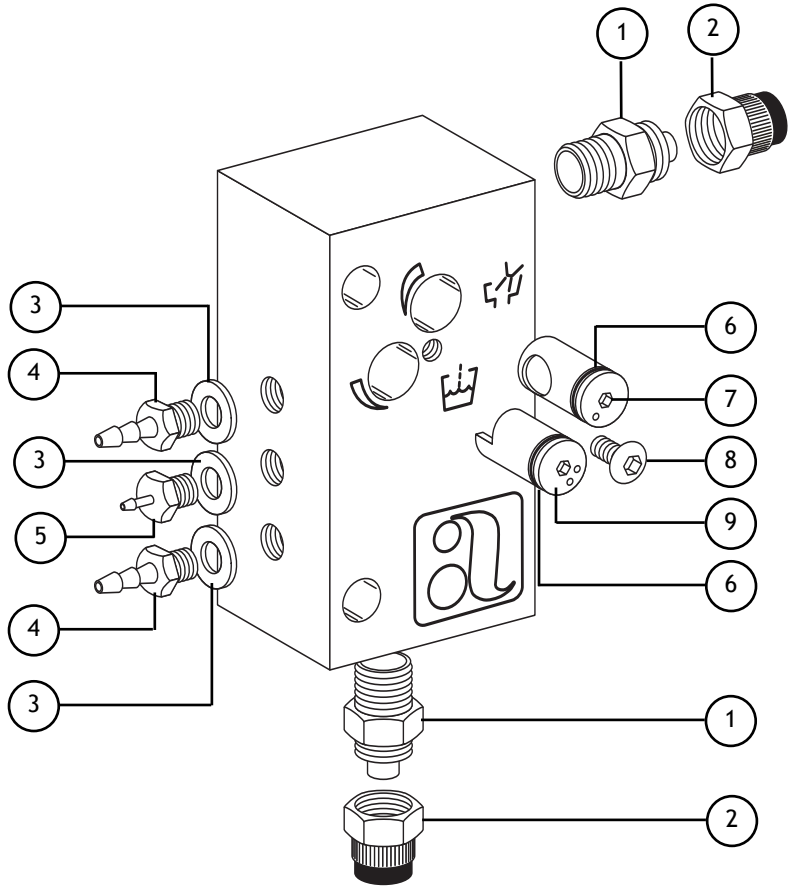
NOTE: Replace the air manifold as a complete assembly.



75.0138.00 Air Manifold Assembly

Water Manifold Assembly

Item #	Part Number	Description
1	022.065.00	Adapter
2	022.014.01	Nut with sleeve
3	004.005.01	Washer
4	023.001.03	Barb, 1/4" pkg 10
5	023.004.03	Barb, 1/8" pkg 10
6	030.009.02	O-ring pkg 10
7	75.0108.00	Stem, fine flow adjustment
8	002.105.00	Screw, button head socket
9	75.0115.00	Stem, flow adjustment

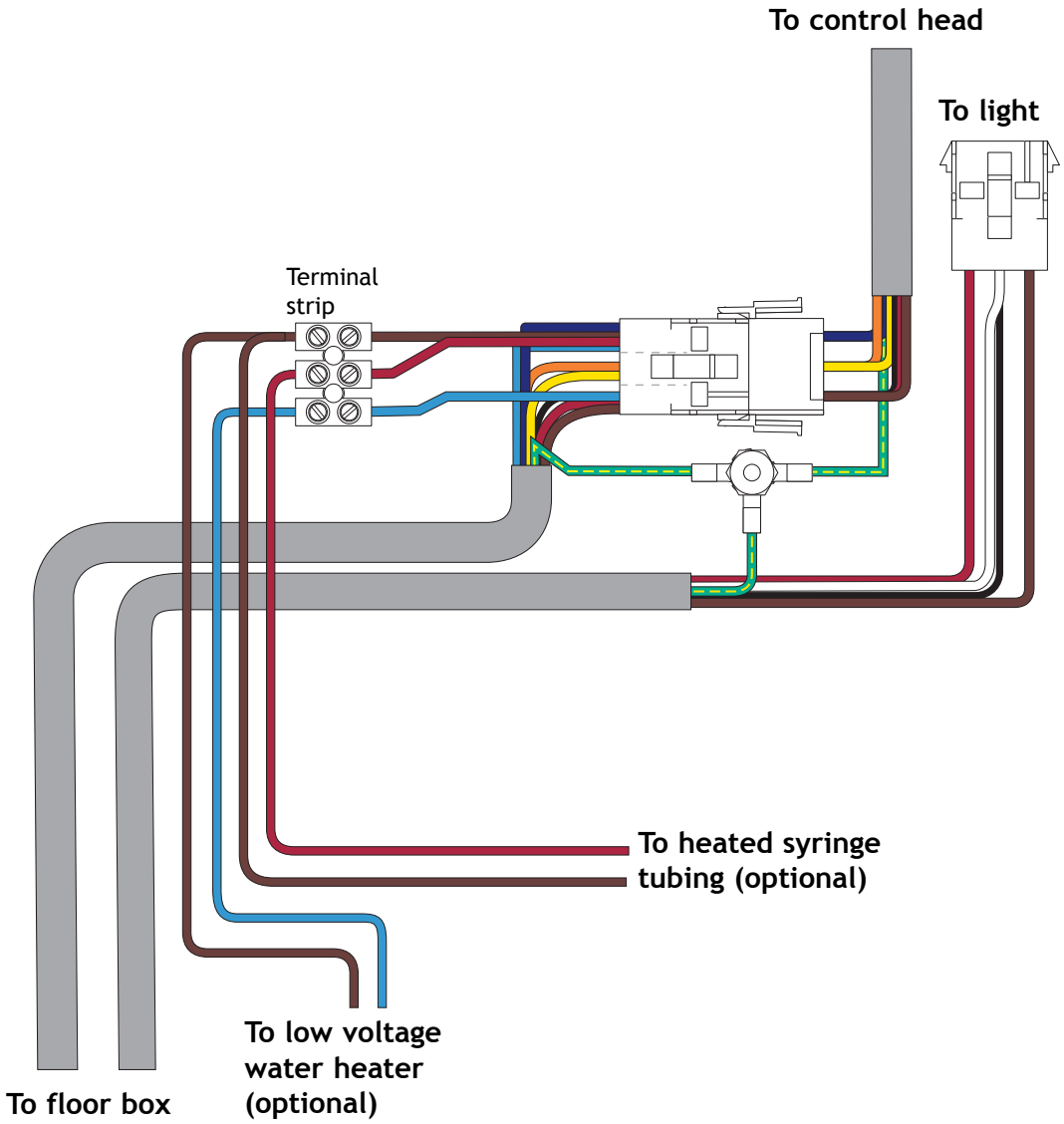


75.0113.00 Water Manifold Assembly

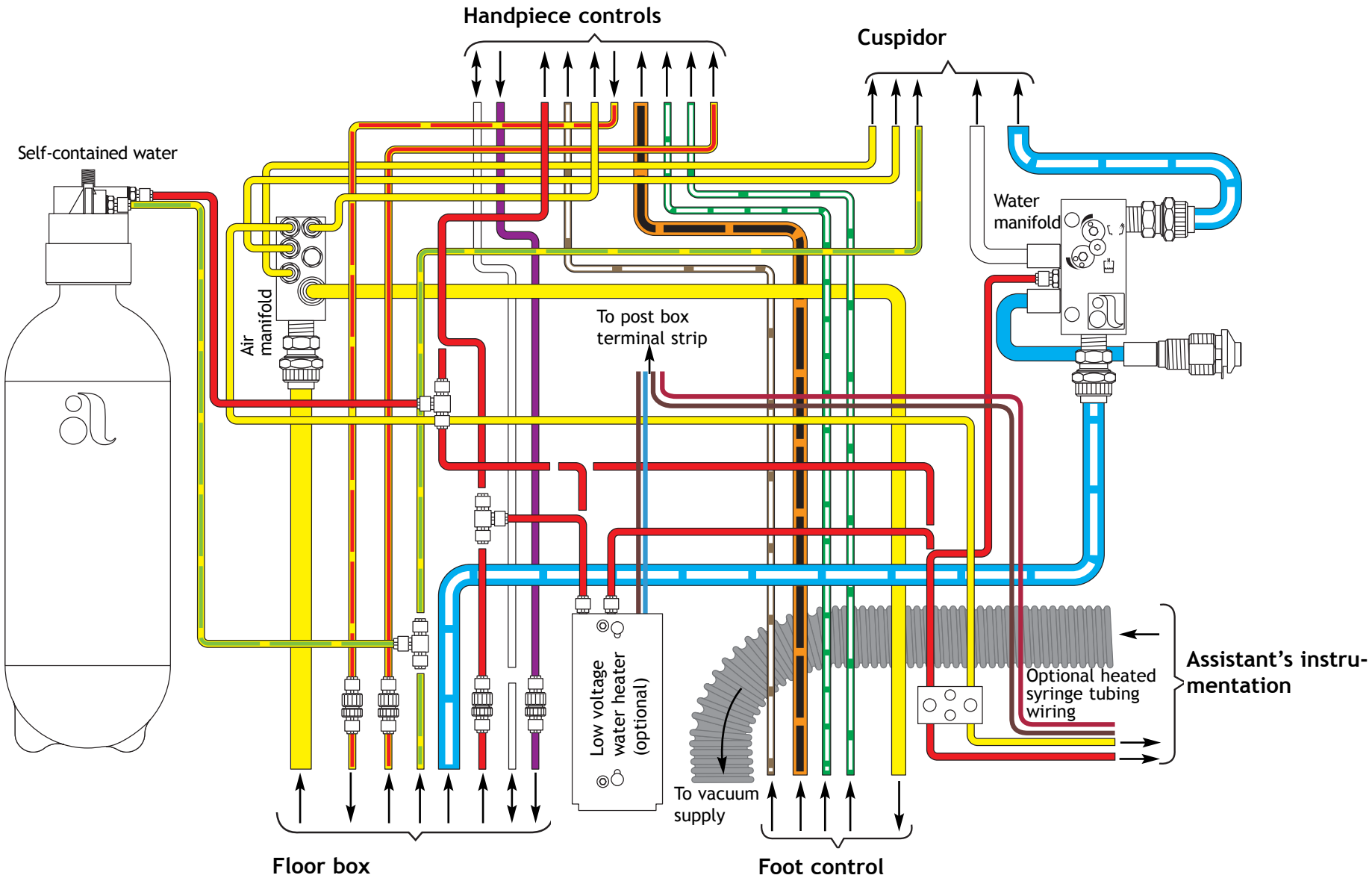
Post Box Electrical Flow Diagram

Terminal Strip Wiring Voltage

Wire Color	Voltage
Black or Brown	0
Blue or Grey	24
Red	6

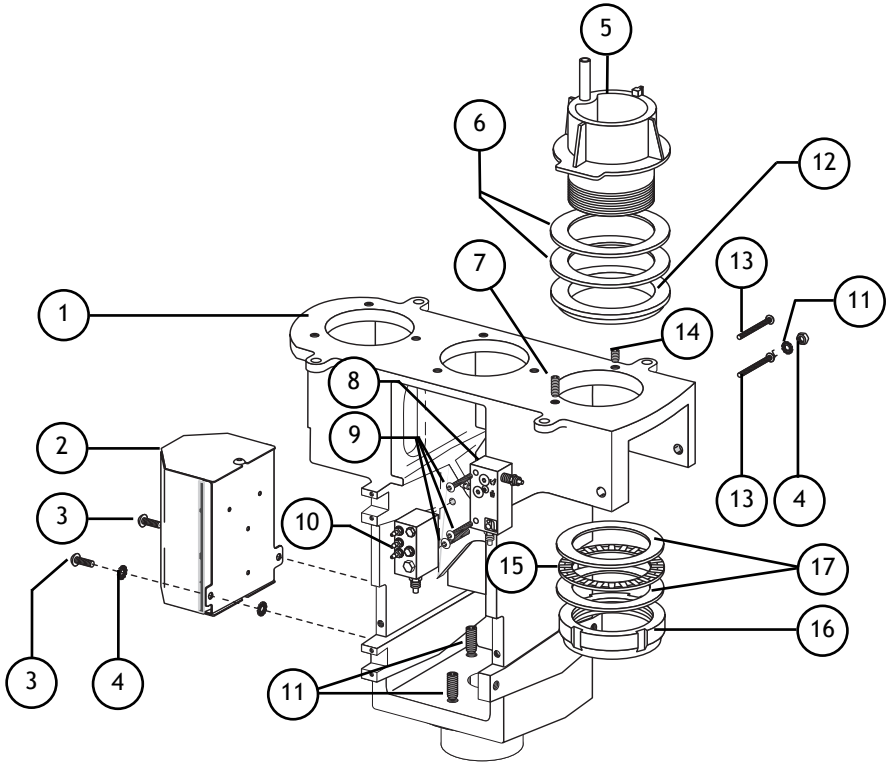


Post Box Air and Water Flow Diagram



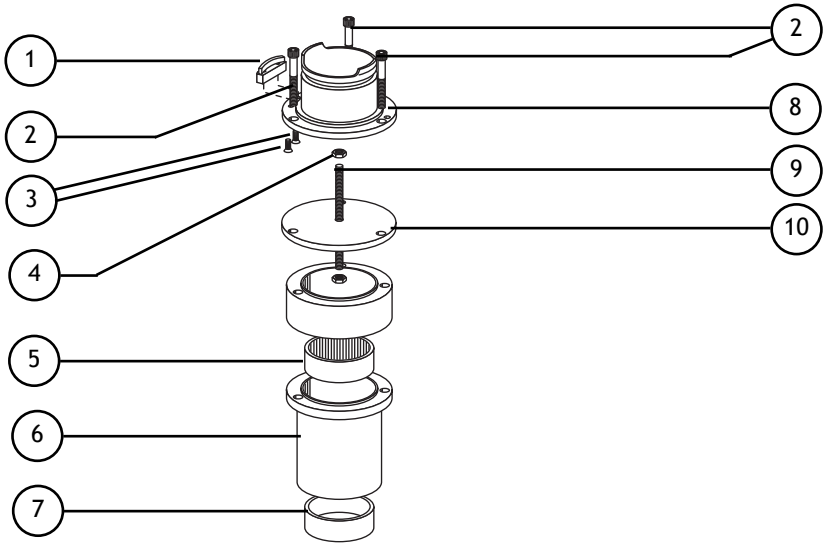
Cascade International Post Box

Item #	Part Number	Description
1	75.0139.00	Post box frame, master
2	47.1234.00	Electrical assembly
3	005.012.03	Screw, button head
4	004.076.00	Lock washer
5	12.0931.00	Pivot hub
6	016.108.00	Race, thrust bearing
7	007.023.00	Setscrew, 1/4-20 X 3/4
8	75.0113.00	Water manifold assembly
9	005.124.00	Screw, button head socket
10	75.0138.00	Air manifold assembly, w/o QDs
11	007.029.00	Setscrew, 3/8-16 X 1
12	12.0911.00	Cuspidor pivot bushing
13	005.110.00	Screw, button head, socket
14	007.017.00	Setscrew, 1/4-20 X 1/4
15	016.044.00	Needle, thrust bearing
16	61.0954.00	Lock nut



Inside Cascade International Post Box

Cascade International Post Box

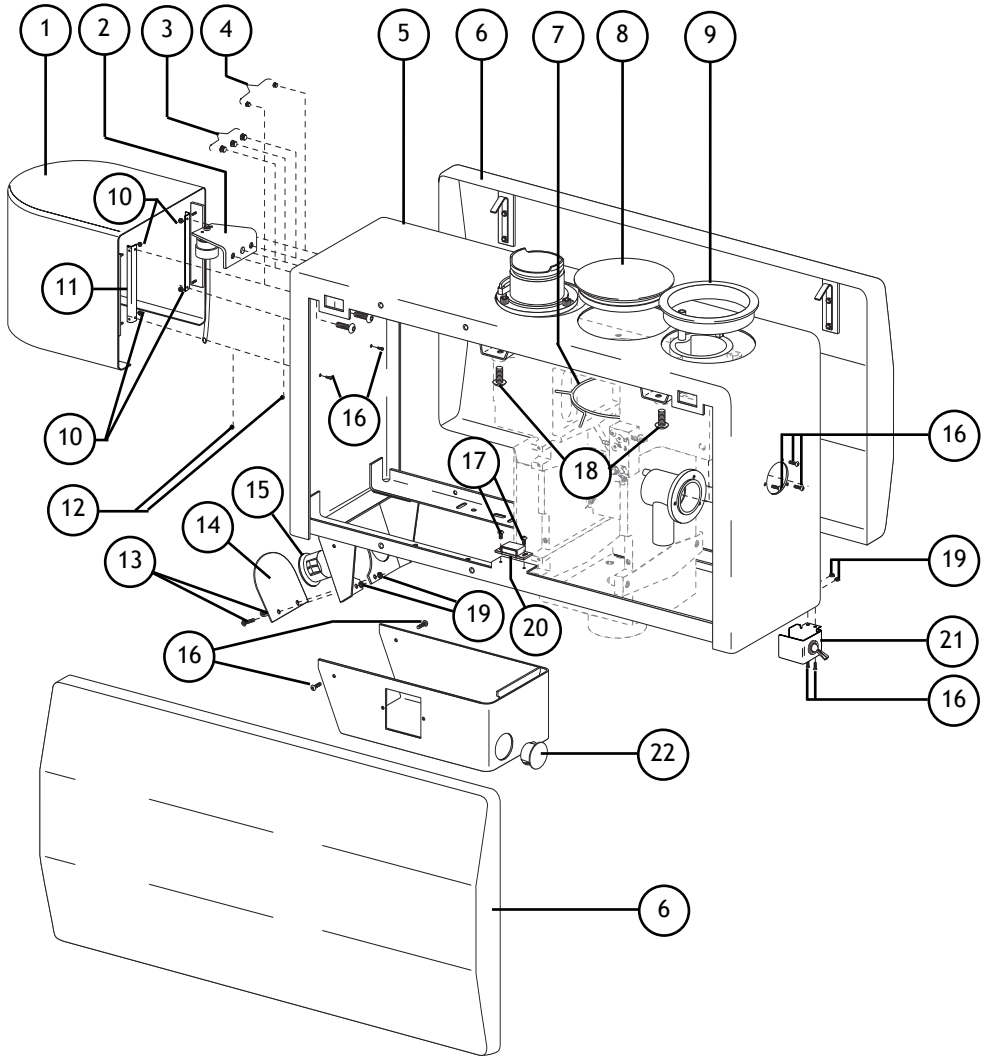


Inside Cascade International Post Box

Item #	Part Number	Description
1	75.0127.00	Stop
2	002.147.00	Screw, socket head
3	001.122.01	Screw, flat head socket
4	006.002.00	Hex nut
5	016.101.00	Roller bearing
6	75.0125.00	Carrier bearing
7	016.100.00	Sleeve bearing
8	75.0126.00	Mounting hub
9	75.0129.01	Rod
10	75.0128.00	Bearing hub spacer

Cascade International Post Box

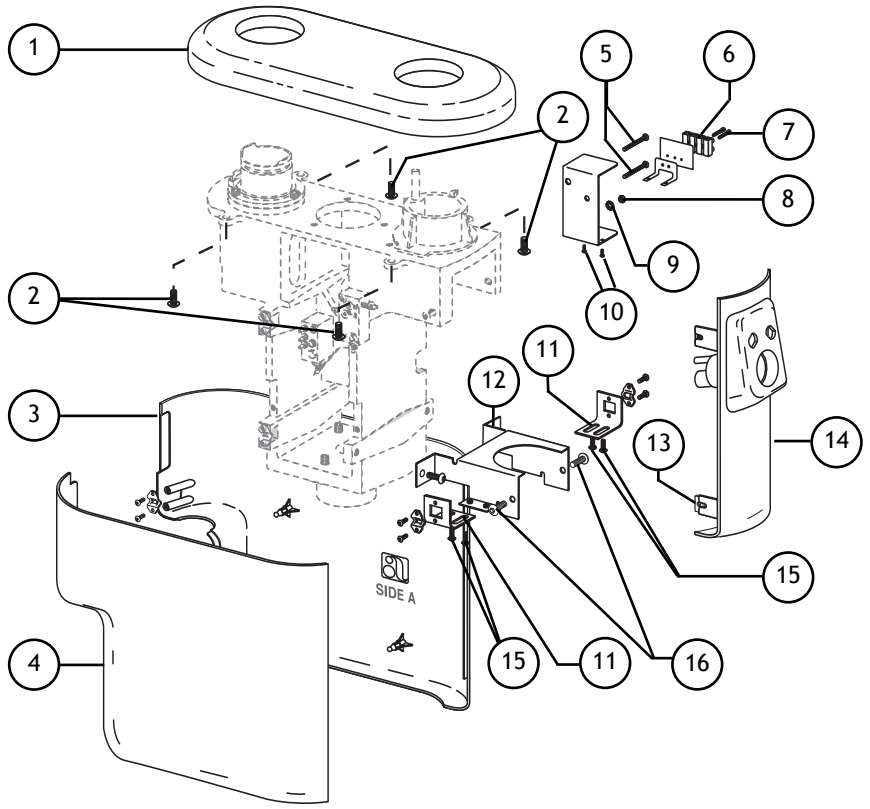
Item #	Part Number	Description
1	41.1112.00	Water bottle housing assy
2	47.1237.00	Cap
3	018.035.02	Hole plug, 1/4"
4	028.013.02	Hole plug, 5/32"
5	41.1200.00	Utility box weldment
6	41.0364.01	Side cover assembly
7	47.1349.00	Hole plug clamp
8	47.1348.00	Hole plug, 3-1/2"
9	41.1111.00	Trim ring
10	006.015.00	Hex nut
11	41.1114.00	Mounting bracket
12	028.013.02	Hole plug, 5/32"
13	005.138.00	Screw, button head socket
14	41.1436.00	Umbilical bracket hole cover
15	018.062.02	Hole plug, 1-3/8"
16	001.103.00	Screw, button head socket
17	002.097.00	Screw, button head, special
18	005.012.03	Screw, button head socket
19	006.016.00	Hex nuts, Kep
21	47.1347.00	Master toggle bracket



Outside Cascade International Post Box

Cascade Post Box

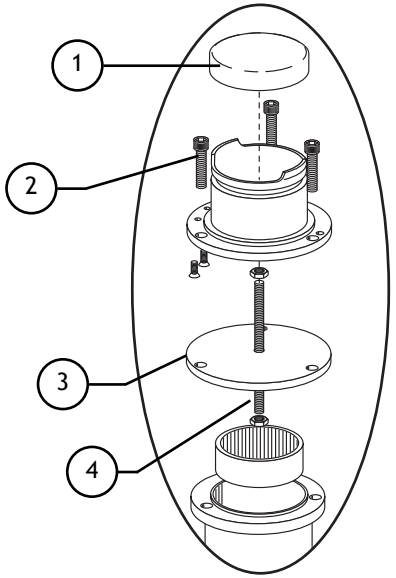
Item #	Part Number	Description
1	75.0068.00	Top cover
2	005.012.03	Screw, button head
3	75.0069.00	Side cover A
4	75.0070.00	Side cover B
5	005.110.00	Screw, button head
6	041.631.00	Terminal strip
7	001.021.00	Screw, socket head
8	006.002.00	Hex nut
9	004.076.00	Lock washer
10	002.097.00	Screw, button head socket, special
11	75.0110.00	Side front bracket
12	75.0102.00	Umbilical bracket
13	75.0117.00	Nut plate
14	75.0071.00 47.1938.00 12.0165.00 12.0163.00	Vacuum housing w/vacuum Vacuum housing Int'l, w/o vacuum Vacuum housing assembly Vacuum housing w/o vacuum
15	002.015.00	Screw, pan head, phillips
16	005.012.03	Screw, button head



Outside Cascade Post Box

Cascade Post Box

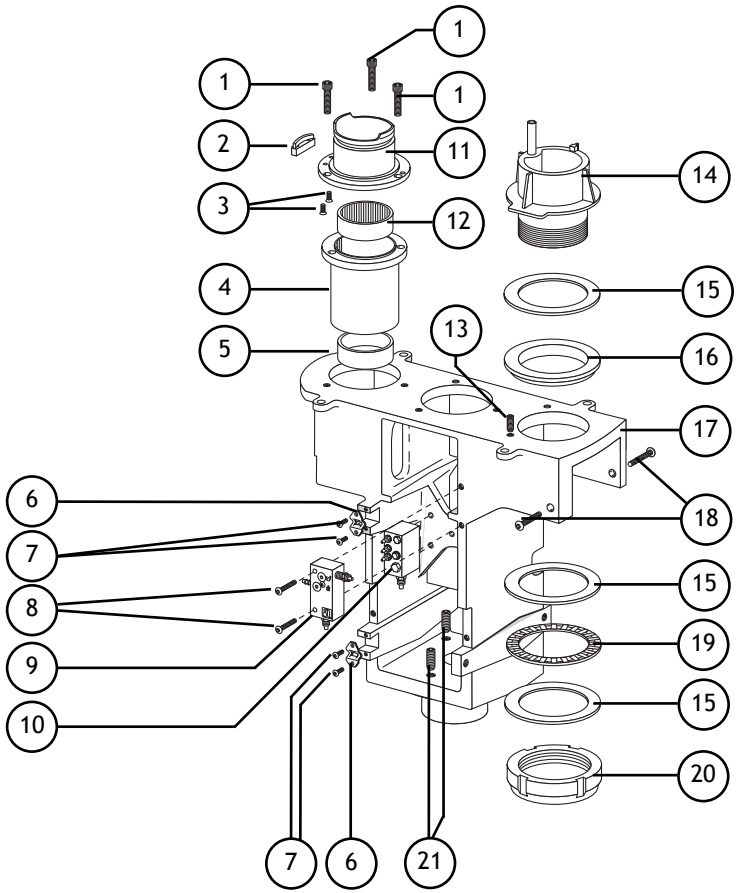
Item #	Part Number	Description
1	75.0089.00	Trim ring
2	006.002.00	Hex nut
3	75.0128.00	Spacer, bearing hub
4	75.0129.01	Rod



Inside Cascade Post Box

Cascade Post Box

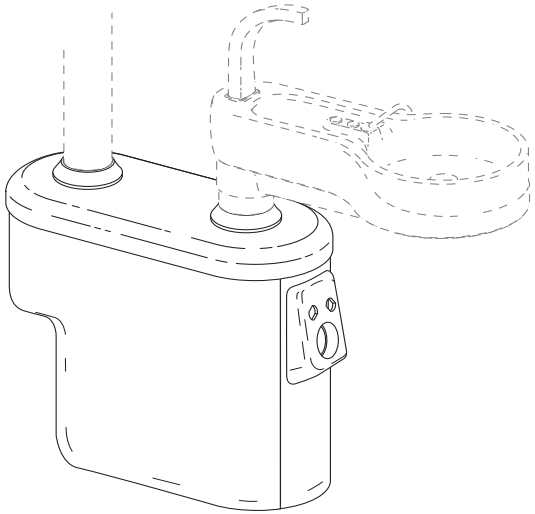
Item #	Part Number	Description
1	001.009.00	Screw, socket head
2	75.0127.00	Stop
3	001.122.01	Screw, flat head socket
4	75.0125.00	Bearing carrier
5	016.100.00	Bearing sleeve
6	005.012.03	Screw, button head
6	042.221.00	Ball spring
7	002.118.00	Screw, button head
8	005.124.00	Screw, button head
9	75.0113.00	Water manifold assembly
10	75.0138.00	Air manifold assembly, w/o QDs
11	75.0126.00	Mounting hub
12	016.101.00	Roller bearing
13	007.023.00	Setscrew, 1/4-20
14	12.0931.00	Pivot hub
15	016.108.00	Thrust bearing, race
16	12.0911.00	Bushing
17	75.0139.00	Frame
18	005.010.01	Screw, button head
19	016.044.00	Thrust bearing, needle
20	61.0954.00	Lock nut
21	007.059.00	Setscrew, 3/8-16



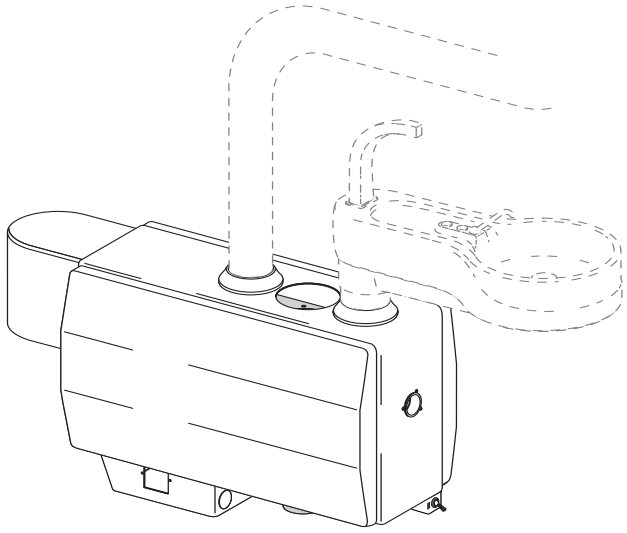
Inside Cascade Post Box

Identifying Post Boxes

The following pages provide instructions, descriptions, part numbers, and flow diagrams that will assist you while servicing and troubleshooting post box assemblies. Information for both Cascade domestic and Cascade international post boxes are shown.



Cascade Post Box



Cascade International Post Box

Post Boxes and Cuspidors

Overview

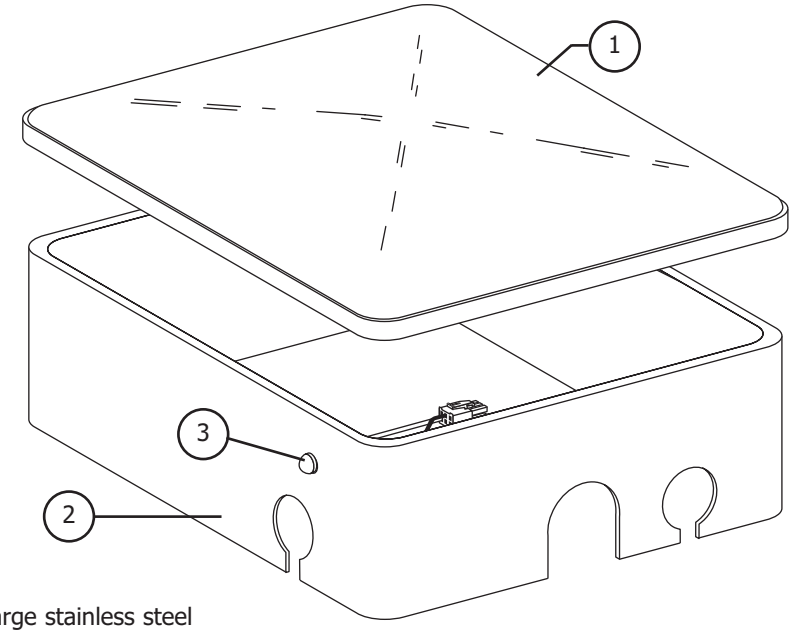
This section provides information related to servicing, maintaining, and adjusting post boxes and cuspidors. Details on how to troubleshoot specific problems relating to post boxes and cuspidors are presented. For more information on service parts, see the *Genuine A-dec Service Parts Catalog*, P/N 85.5000.00 or contact customer service.

Floor Boxes and Power Supplies

This section provides information useful for servicing, adjusting, and maintaining floor boxes and related assemblies. Additional information presented includes flow diagrams, exploded drawings of the floor box components with service parts references, and troubleshooting detail.

Stainless Steel Floor Box

Item #	Part Number	Description
1	30.0380.01	Cover, small stainless steel floor box
	41.0407.00	Cover, medium stainless steel floor box
	41.0413.00	Cover, large stainless steel floor box
2	41.0034.00	Frame with cover and mounting kit
	41.0408.00	Frame with plugs
	41.0414.00	Frame
3	041.582.00	Indicator light (beginning 8/98)
—	47.1260.00	Indicator light assembly (before 8/98)

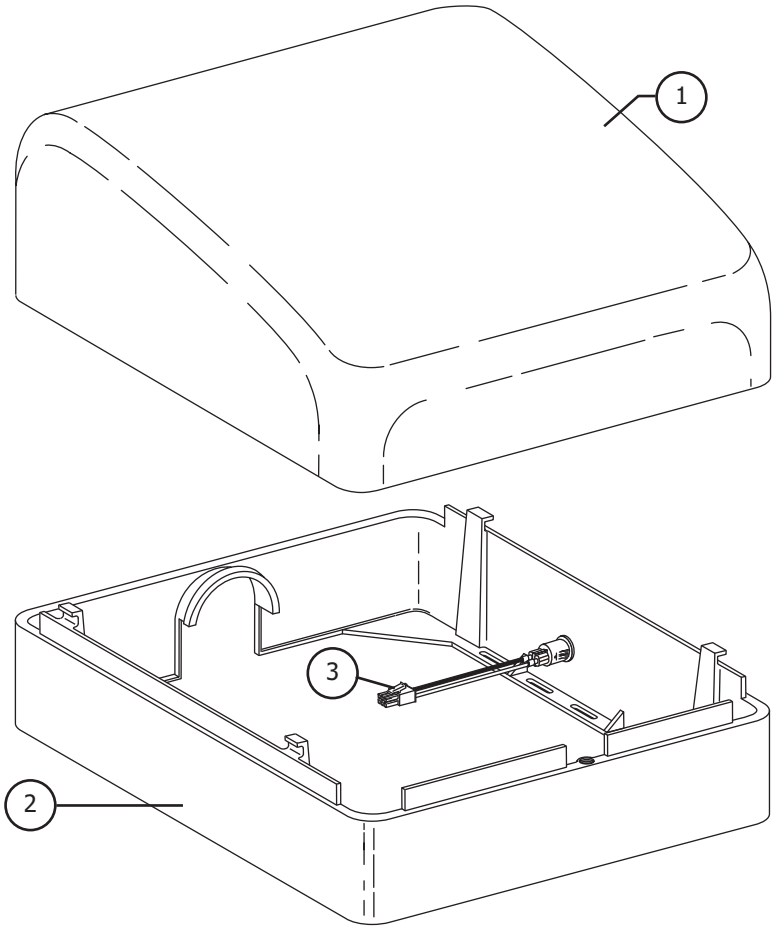


(Large stainless steel floor box shown)

Stainless Steel Floor Box with Indicator Light

Cascade Contoured Floor Box

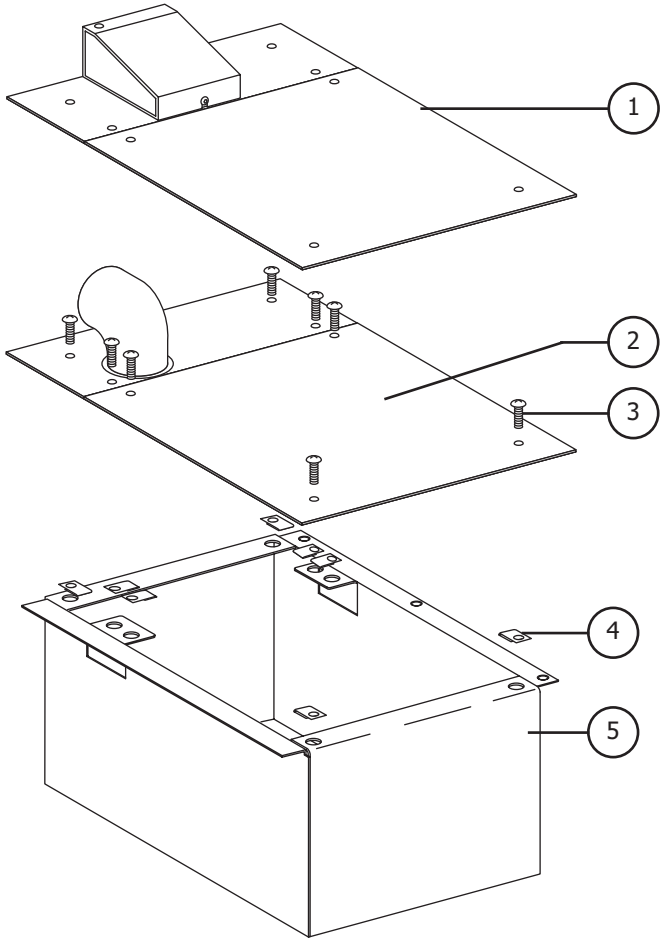
Item #	Part number	Description
1	41.0416.00	Cover
2	41.0417.00	Frame
	47.1256.00	Frame, International, dual hole
3	47.1260.00	Indicator light assembly



Cascade Contoured Floor Box with Indicator Light

Flush-Mount Floor Box

Item #	Part Number	Description
1	41.1413.00	Cover with 2" umbilical connector
2	41.1179.00	Cover with 1-3/4" umbilical elbow
3	001.202.01	Screws pkg 8
4	006.122.01	Retainer nut pkg 8
5	41.1173.00	Flush-mount box

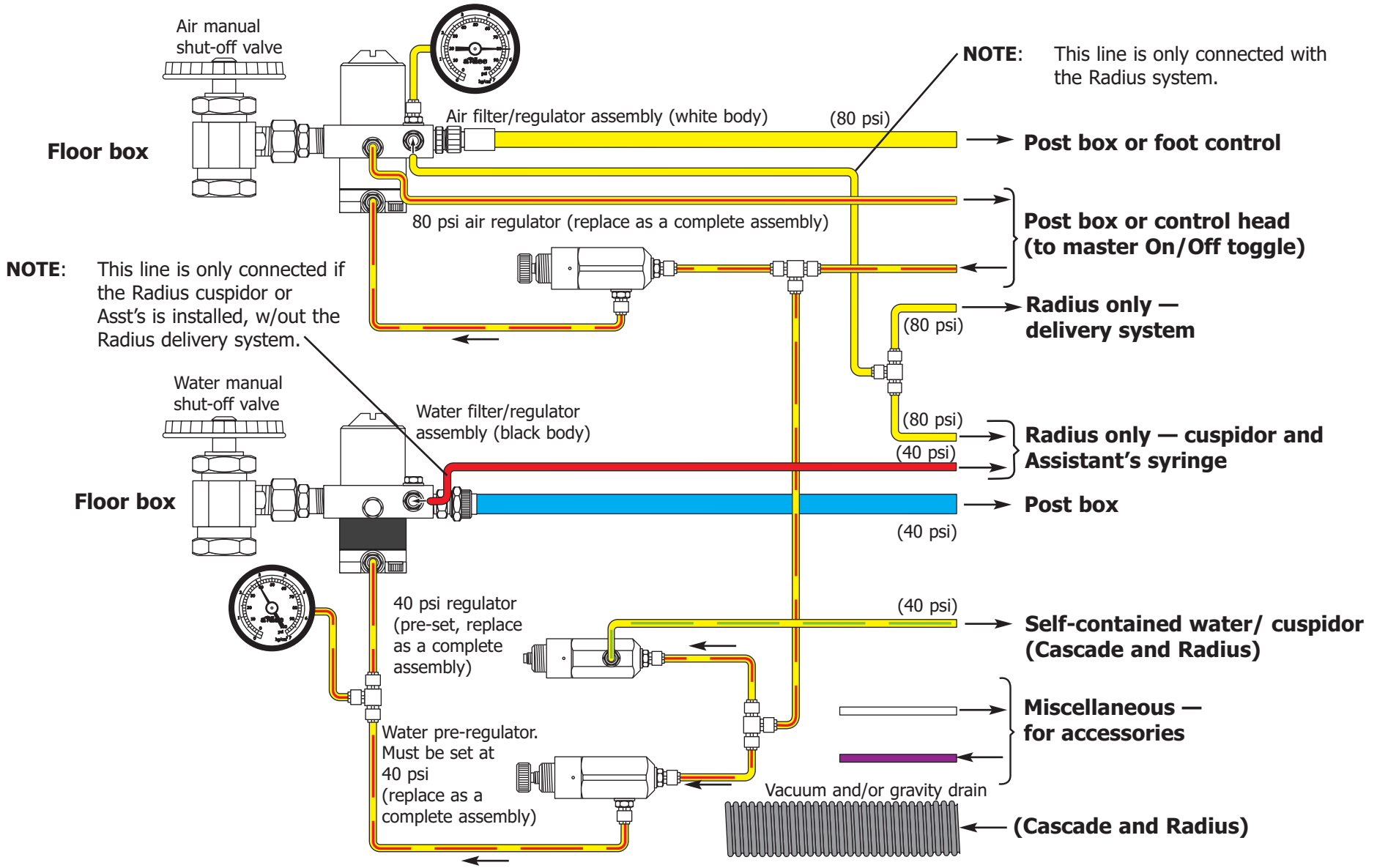


Cascade Contoured Floor Box with 1-3/4" and 2" Umbilical Elbow Assembly

Floor Boxes and Power Supplies

Plumbing Diagram

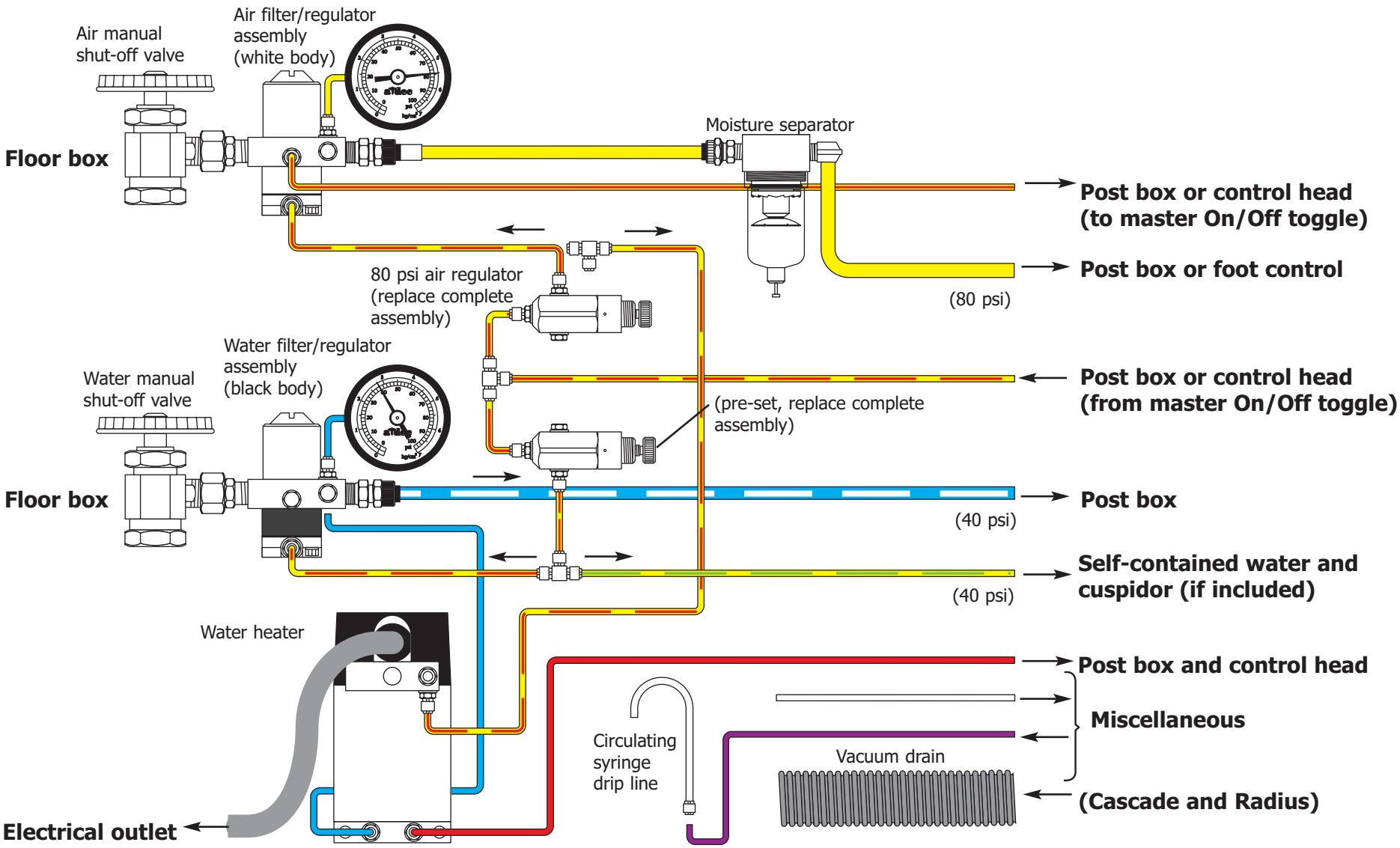
After November 1999



Floor Boxes and Power Supplies

Plumbing Diagram

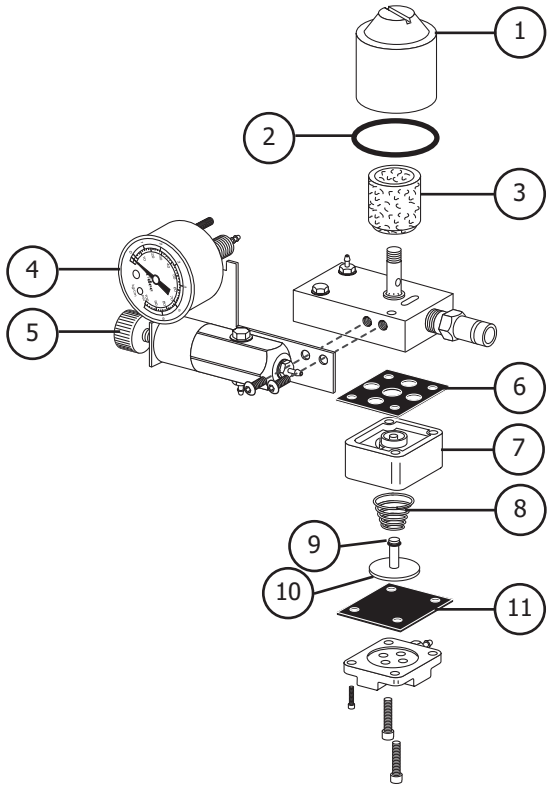
Before December 1999



Air Filter/Regulator Assembly

Item #	Part number	Description
1	24.0229.00	Filter housing
2	030.019.03	O-ring pkg 10
3	24.0234.01	Filter element pkg 6
4	026.118.00	Panel mount gauge kit (0-100 psi)
5	24.0182.02	Pre-regulator, 80 psi, relieving
6	24.0137.01	9-hole gasket pkg 10
7	24.0135.00	Air filter/regulator body, White
8	22.0460.00	Spring, conical
9	030.003.02	O-ring pkg 10
10	24.0132.00	Piston with o-ring
11	22.0440.02	Diaphragm pkg 10

NOTE: To increase air pressure, turn the pre-regulator knob clockwise while reading the air pressure gauge. To decrease, turn the knob counterclockwise. See Adjusting Regulators for more details.

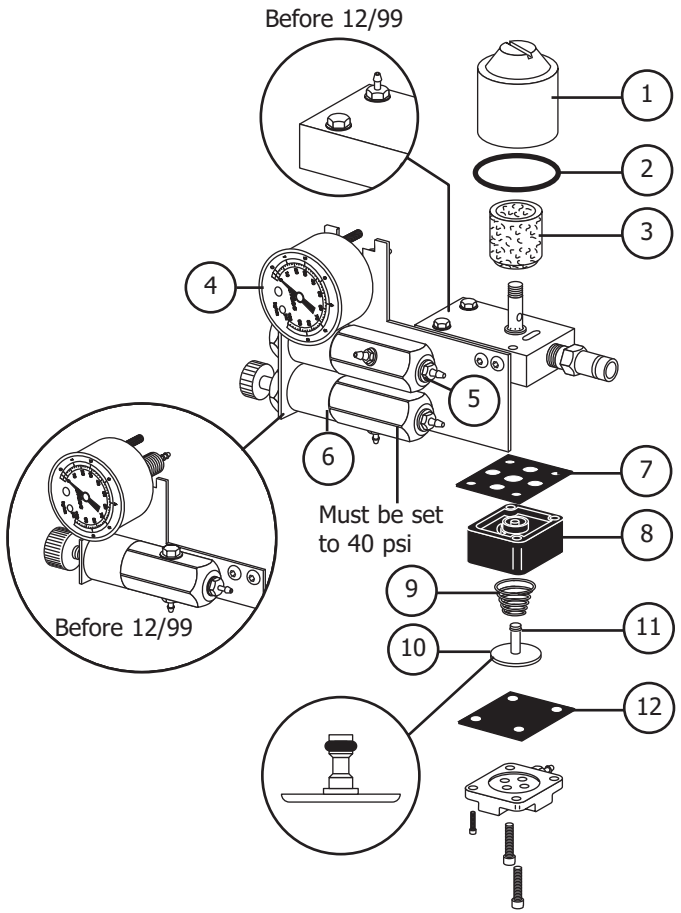


Air Filter/ Regulator Assembly

Water Filter/Regulator Assembly

Item #	Part number	Description
1	24.0229.00	Filter housing
2	030.019.03	O-ring pkg 10
3	24.0234.01	Filter element pkg 6
4	026.118.00	Panel mount gauge kit, 0—100 psi
5	24.0388.02	Regulator, 40 psi, relieving
6	24.0182.02	Pre-regulator, 80 psi, relieving
7	24.0137.01	Gasket, 9-hole, pkg 10
8	24.0355.00	Water filter/regulator body (black)
9	013.032.00	Spring, conical
10	24.0132.00	Piston with o-ring
11	030.003.02	O-ring pkg 10
12	22.0440.02	Diaphragm pkg 10

NOTE: To increase water pressure, turn the pre-regulator knob clockwise while reading the water pressure gauge. To decrease, turn the knob counterclockwise. See Adjusting Regulators for more details.



Water Filter/ Regulator Assembly

Adjusting Regulators

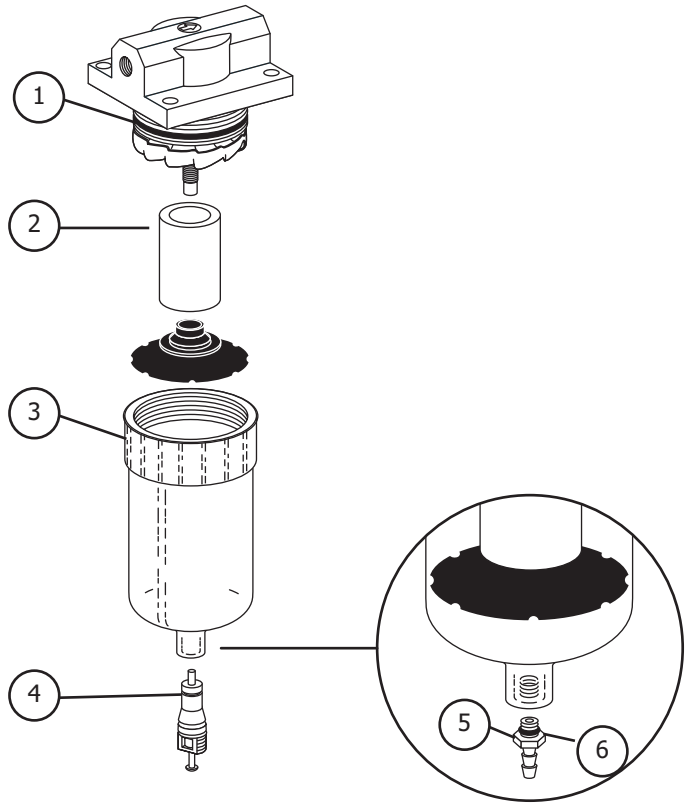
The air and water pre-regulators are located in the floor box. Before making adjustments, verify that the air compressor is ON, and that it maintains 125 psi.

If the air pressure is lower than 80 psi, refer to the compressor instructions. Some compressors, especially older ones, produce a maximum of 60-80 psi. Adjustments on this type of compressor should be done when air pressure is near or reaches maximum psi. A-dec systems will usually function in this pressure range, although at a reduced performance.

Task	Description
1	Be sure manual shutoff valves are fully open (turned counterclockwise).
2	Turn the system ON and check pressures. • Air pressure should be 70 - 80 psi. • Water pressure should be 35 - 40 psi.
3	Operate the syringe.
4	Watch the gauges for a drop in pressure. In units manufactured before December 1999, replace the filters if: • Air pressure drops by more than 15 psi. • Water pressure drops by more than 10 psi.
5	Adjust the air or water pressure as required by turning the pre-regulator knob: • Clockwise to increase pressure. • Counterclockwise to decrease pressure. **NOTE**: The gauge will not indicate a change in pressure when decreasing system air or water pressure, until pressure from the system is relieved. Activate the syringe for a few seconds and check the gauge. Repeat this process each time a decrease adjustment is made.

Manual Moisture Separator

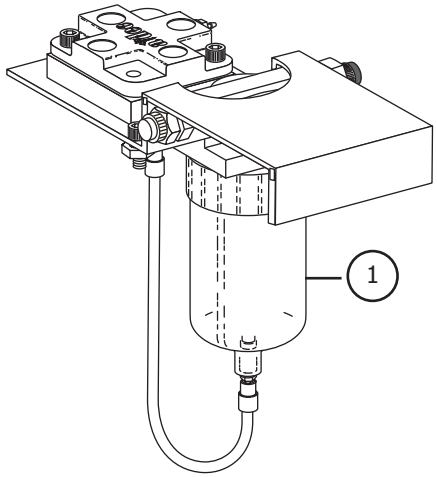
Item #	Part number	Description
1	030.023.02	O-ring pkg 10
2	97.0280.02	Filter element pkg 6
3	97.0290.00	Bowl assembly
4	026.033.01	Valve core, short pkg 10
5	023.066.00	Barb, 1/8"
6	035.026.01	O-ring special pkg 10



Manual Moisture Separator

Automatic Moisture Separator

Item #	Part number	Description
1	97.0290.00	Bowl assembly with seal



90.1027.03 Automatic Moisture Separator

Troubleshooting Floor Boxes

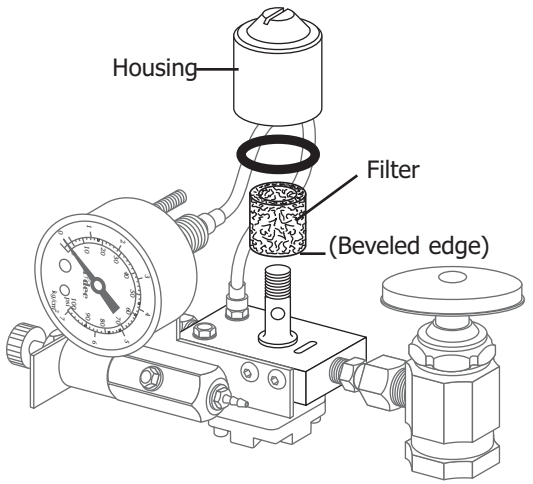
Troubleshooting information for floor boxes is listed in the following charts.

Problem	Action
Unit air pressure drops when unit is in use	Check for a plugged filter element in air filter/regulator following these steps:

CAUTION

When replacing a filter element, be sure to install the new filter with the beveled side towards the manifold. The unit may not work properly if the filter is installed incorrectly.

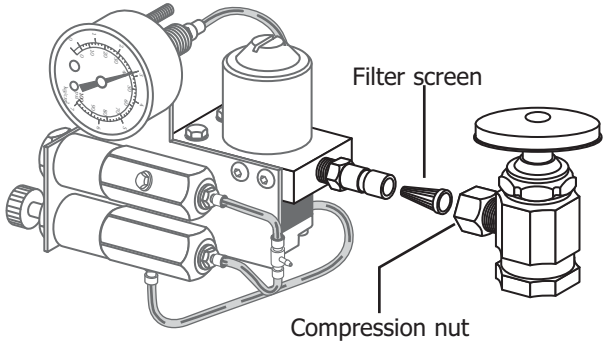
Task	Description
1	Flip the master On/Off toggle to the ON position and remove the floor box cover.
2	Locate and observe the air pressure gauge in the floor box and press the syringe air button. If the air pressure drops by more than 15 psi, the air filter is clogged.
3	Inspect the element. • With the master On/Off toggle in the OFF position, close the air manual shutoff valve. Bleed the system of air and water pressure. • Remove the air regulator filter housing from the regulator assembly. • Remove the filter element and discard it.
4	Replace the element (beveled edge of filter faces the manifold).



Replacing the Filter Element

Problem	Action
Low unit water pressure	Check for a plugged filter element in the water filter/regulator assembly, or a plugged water filter screen in the manual shutoff valve (used before November 1999).

Task	Description
1	Flip the master On/Off toggle to the ON position and then remove the floor box cover.
2	Locate and observe the water pressure gauge in the floor box and press the syringe water button. If the water pressure gauge drops by more than 10 psi, the water filter element and/or the water filter screens are clogged and must be replaced.
3	Replace the water filter element. • With the master On/Off toggle in the OFF position, close the water manual shutoff valve. Bleed the system of air and water pressure. • Remove the water regulator filter housing. • Replace filter and reinstall the filter housing.
4	Inspect the water filter screen. • With the master On/Off toggle in the OFF position, close the manual shutoff valves. Bleed the system of air and water pressure. • Loosen the compression nut and remove the water filter regulator assembly. • Remove the filter screen and discard it. • Reinstall the water filter regulator assembly and tighten the compression nut.
5	Open the water manual shutoff valve and flip the master On/Off toggle to the ON position. Check the fitting for leaks.



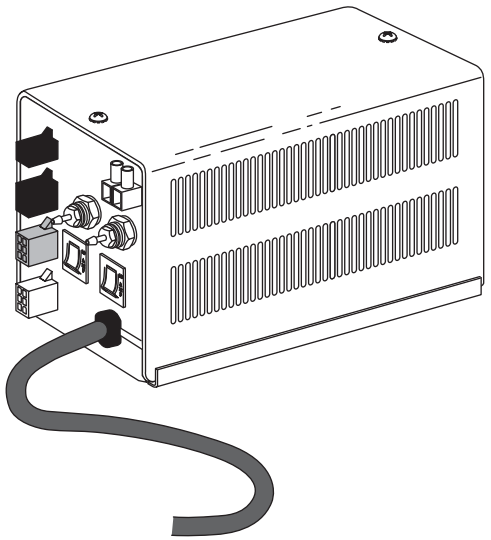
Replacing the Water Filter Screen

Replacing 300-Watt Power Supplies

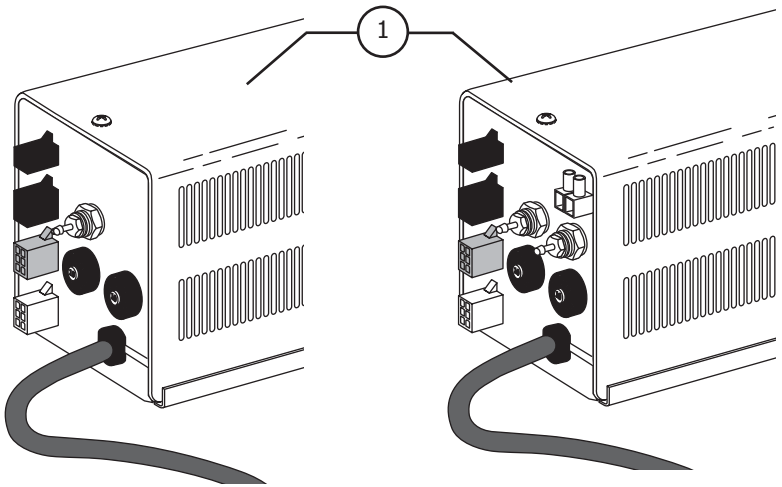
Item #	Part number	Description
1	28.1434.00	100 VAC
2	28.1435.00 28.1436.00	110-120 VAC 220-240 VAC

This section provides information to assist in troubleshooting, replacing and making adjustments to A-dec power supplies. Flow diagrams illustrate how to connect power supplies to the unit after testing or replacement. These diagrams cover all of the A-dec power supplies, except the 80-watt power supply, which is covered in the *Performer (PR)* section.

NOTE: There are no serviceable parts on A-dec power supplies. Replacement of the complete assembly is required.



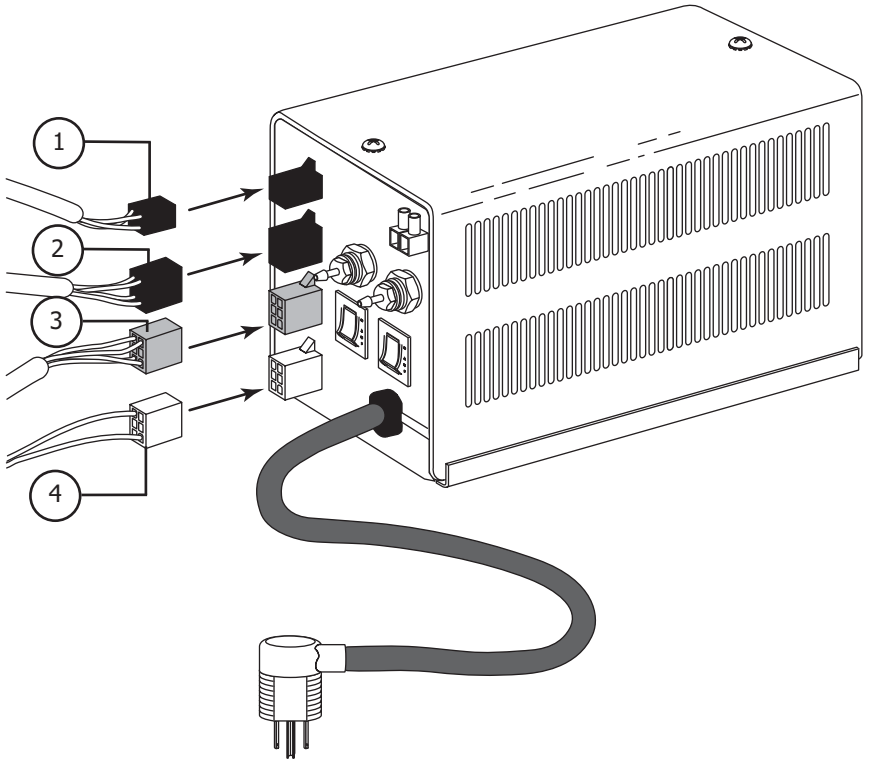
May 1998 — May 1999



After May 1999

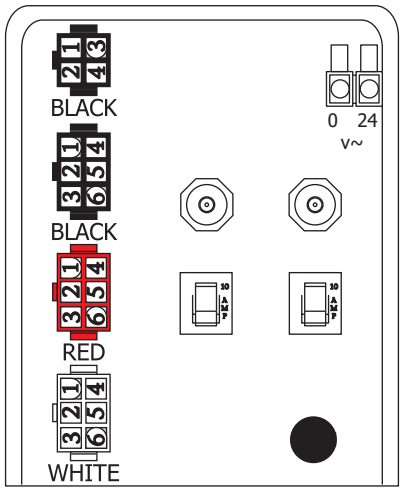
300-Watt Power Supply Cable

Item #	Description
1	Auxiliary cable (4 pin, Black connector)
2	Handpiece control cable (6-pin, Black connector)
3	Dental light cable (6-pin, Red connector)
4	Indicator light cable (6-pin, White connector)



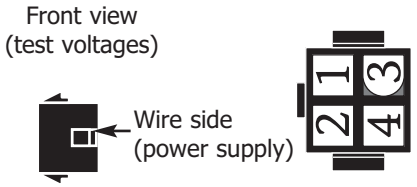
Cable Connections to the 300-Watt Power Supply

300-Watt Connector/Pin Locations



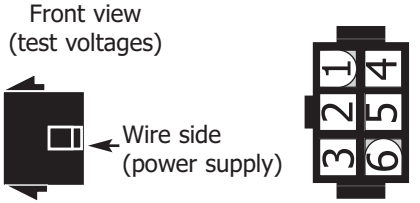
Connector/Pin Locations on the 300-Watt Power Supply

Pin	Voltage	Wire
1	0 VAC	Black/White (switched)
4	6 VAC	Red
3	24 VAC	Gray



Black 4-Pin Connector (Auxiliary Cable)

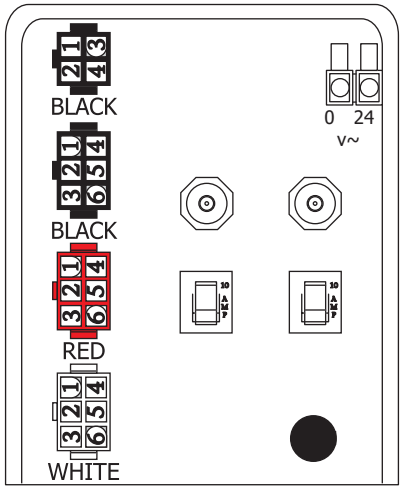
Pin	Voltage	Wire
1	Ground	Green/Yellow
2	0 VAC	Black/White
3	0 VAC	Black/White
4	6 VAC	Red
5	17 VAC	Violet
6	24 VAC	Gray



Black 6-Pin Connector (Handpiece Control)

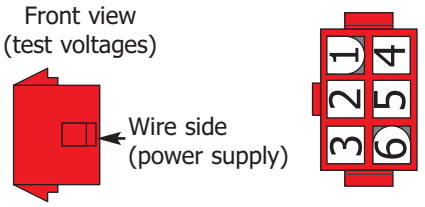
Floor Boxes and Power Supplies

300-Watt Connector/Pin Locations



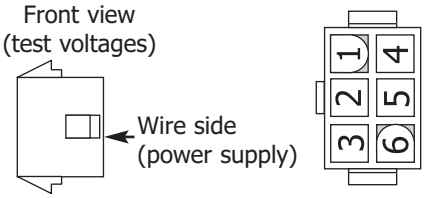
Connector/Pin Locations on the 300-Watt Power Supply

Pin	Voltage	Wire
1	Ground	Green/Yellow
2	0 VAC	Black/White
3	15 VAC	Green
4	16 VAC	Blue
5	17 VAC	Violet
6	10.8/12.1 VAC	White



Red 6-Pin Connector (Dental Light)

Pin	Voltage	Wire
1	Ground	Green/Yellow
2	0 VAC	Black
3	10.8/12.1 VAC	White
4	10.8 VAC	Orange
5	12.1 VAC	Yellow
6	12.1 VAC	Yellow

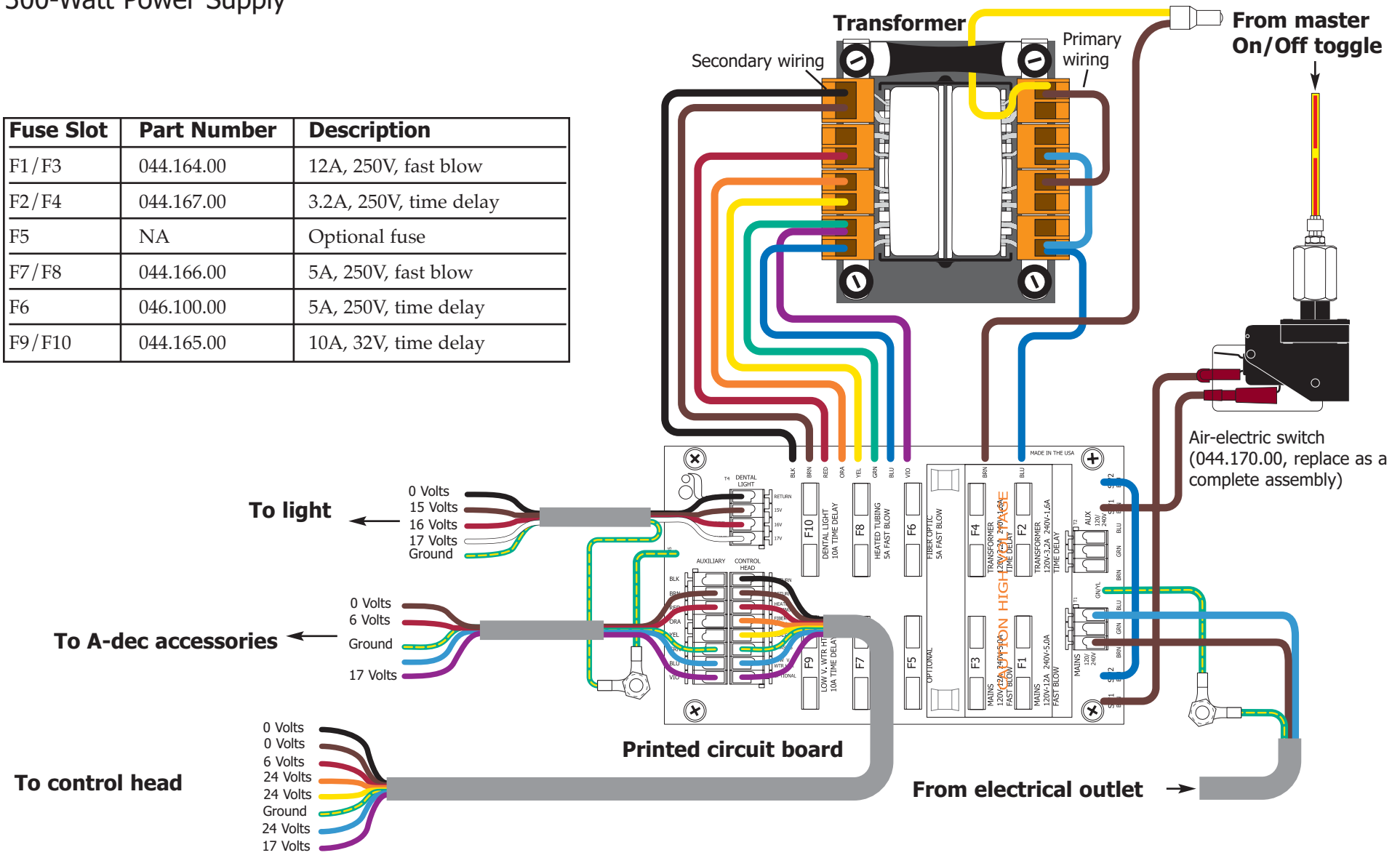


White 6-Pin Connector (Indicator Light)

120 Volt Before May 1998

300-Watt Power Supply

Fuse Slot	Part Number	Description
F1/F3	044.164.00	12A, 250V, fast blow
F2/F4	044.167.00	3.2A, 250V, time delay
F5	NA	Optional fuse
F7/F8	044.166.00	5A, 250V, fast blow
F6	046.100.00	5A, 250V, time delay
F9/F10	044.165.00	10A, 32V, time delay



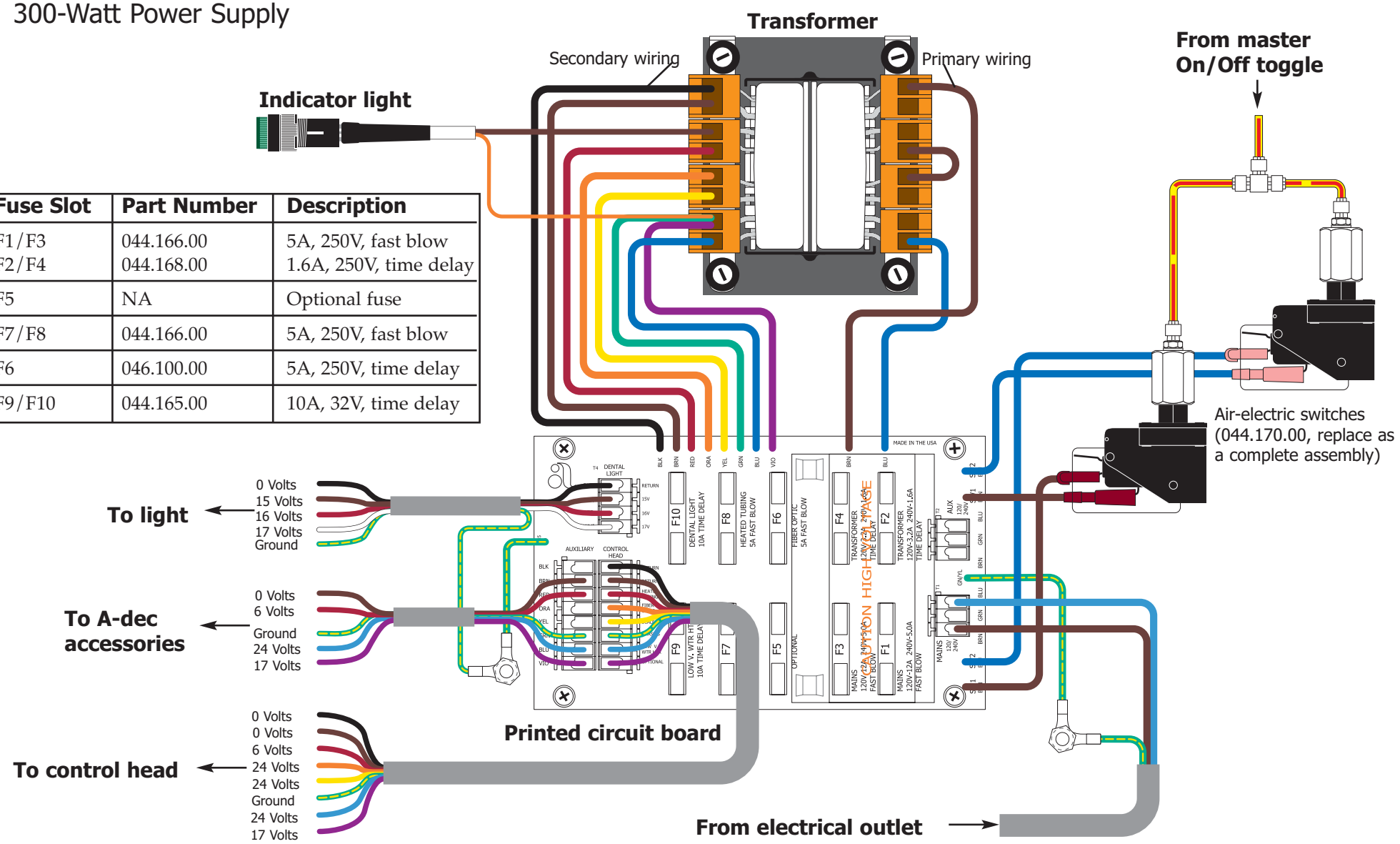
Floor Boxes and Power Supplies

Flow Diagram

240 Volt Before May 1998

300-Watt Power Supply

Fuse Slot	Part Number	Description
F1/F3 F2/F4	044.166.00 044.168.00	5A, 250V, fast blow 1.6A, 250V, time delay
F5	NA	Optional fuse
F7/F8	044.166.00	5A, 250V, fast blow
F6	046.100.00	5A, 250V, time delay
F9/F10	044.165.00	10A, 32V, time delay

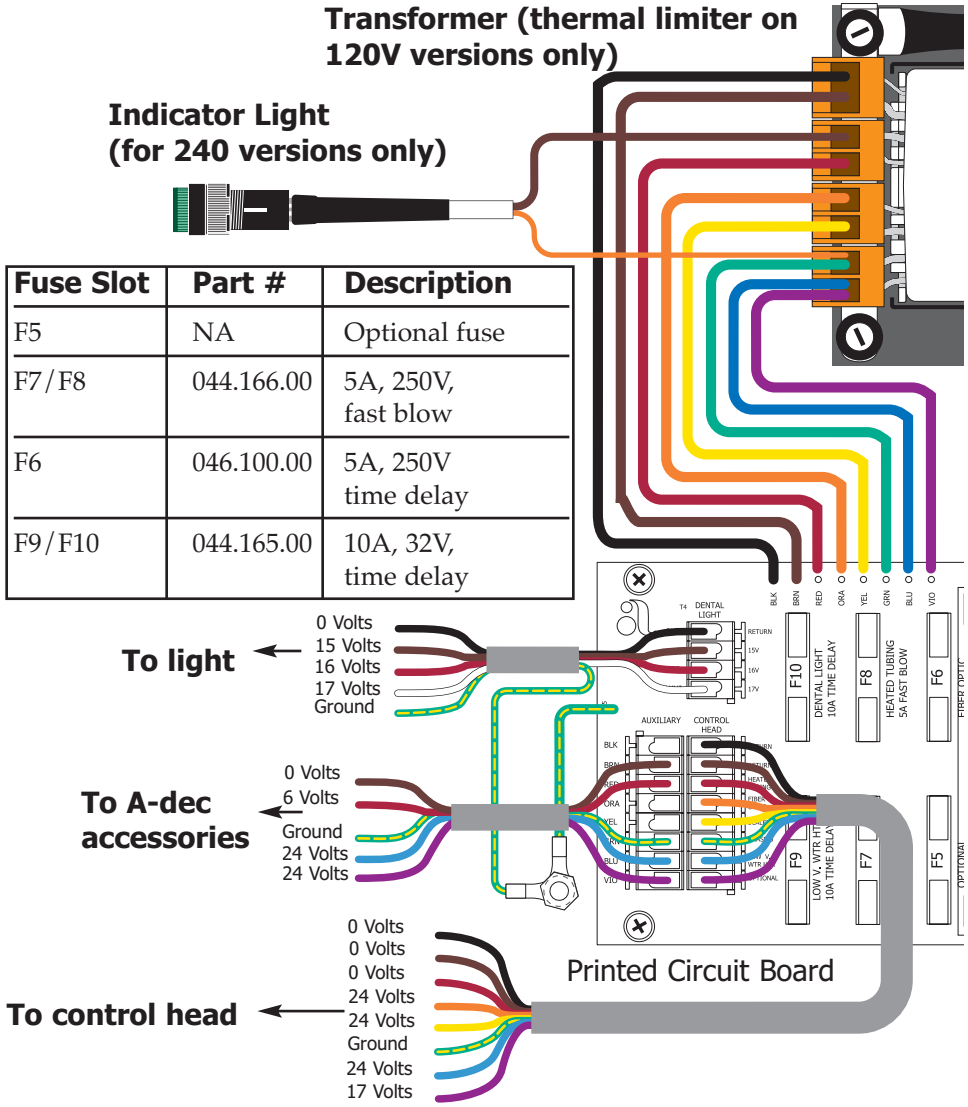


Floor Boxes and Power Supplies

300-Watt Power Supply

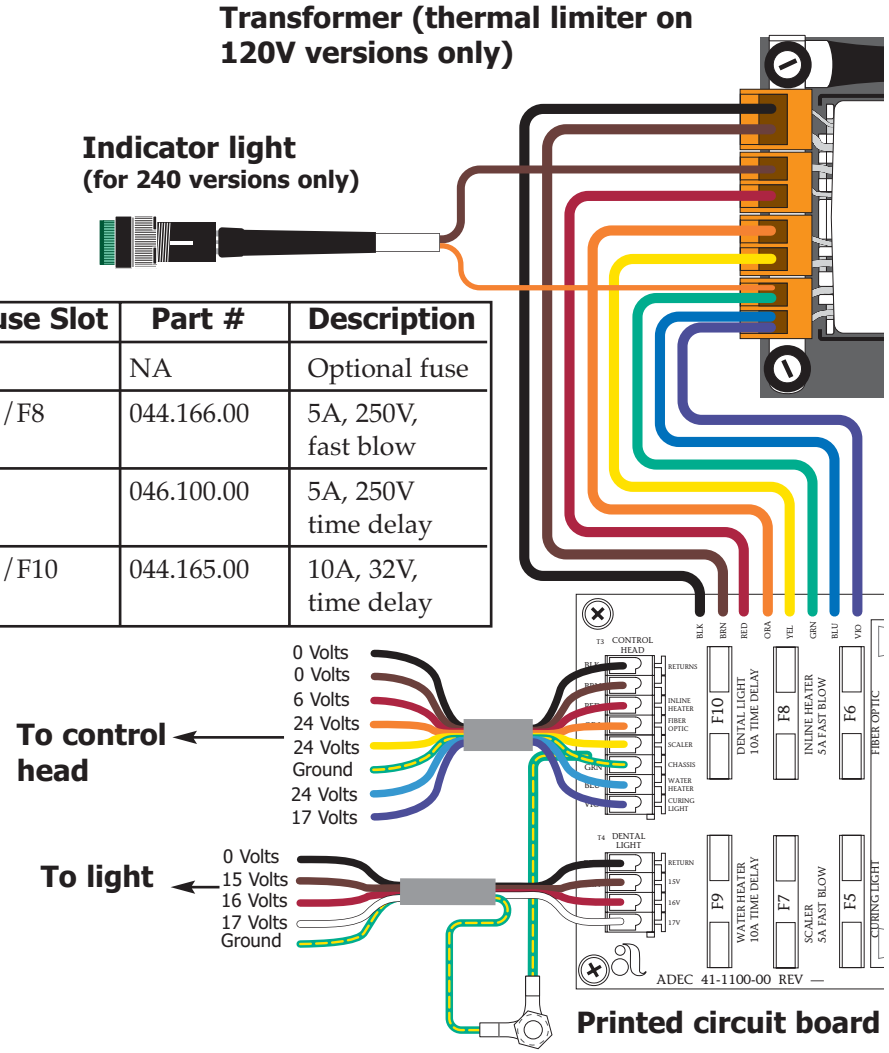
NOTE: F6 fuse (violet wire) position is different compared to later versions of circuit boards.

Fuse Slot	Part #	Description
F5	NA	Optional fuse
F7/F8	044.166.00	5A, 250V, fast blow
F6	046.100.00	5A, 250V time delay
F9/F10	044.165.00	10A, 32V, time delay



NOTE: F6 Fuse (violet wire) variations before May 1998

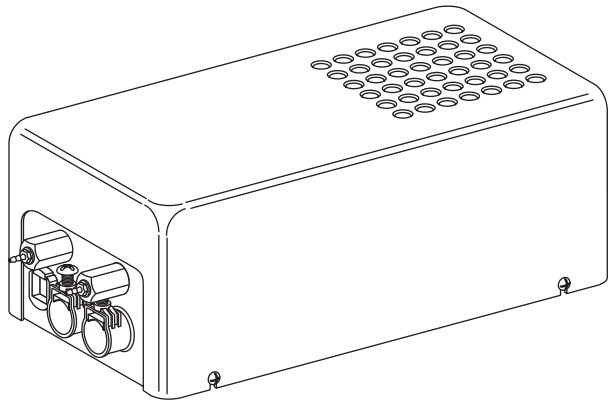
Fuse Slot	Part #	Description
F5	NA	Optional fuse
F6/F8	044.166.00	5A, 250V, fast blow
F6	046.100.00	5A, 250V time delay
F9/F10	044.165.00	10A, 32V, time delay



Replacing 150-Watt Power Supplies

The 150-watt power supply was used on equipment built before June 1998. It is no longer available for replacement. To convert from a 150-watt power supply to the new 300-watt order, an adapter kit P/N 90.1012.00 and the appropriate 300-watt power supply.

NOTE: These combinations are acceptable since not all accessories are used at the same time.



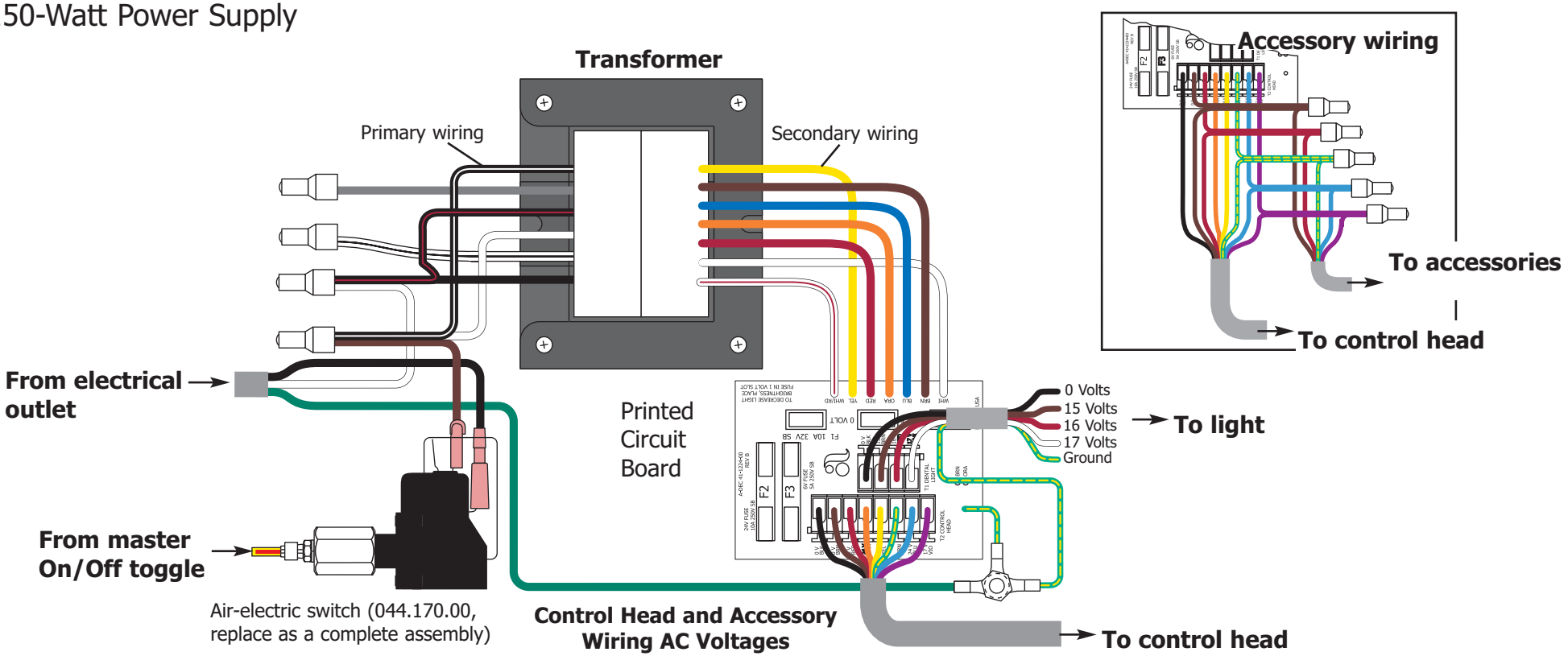
Before June 1998

Acceptable Accessory Combinations that Exceed 150-Watts

Fiber Optic (10W)	Scaler (60W)	Dental Light (95W)	One Low Voltage Water Heater (90W)	Curing Light (120W)	Electric Handpiece (80W)
X				X	X
X	X	X			
X	X		X		
X	X			X	

120 Volt Before June 1998

150-Watt Power Supply



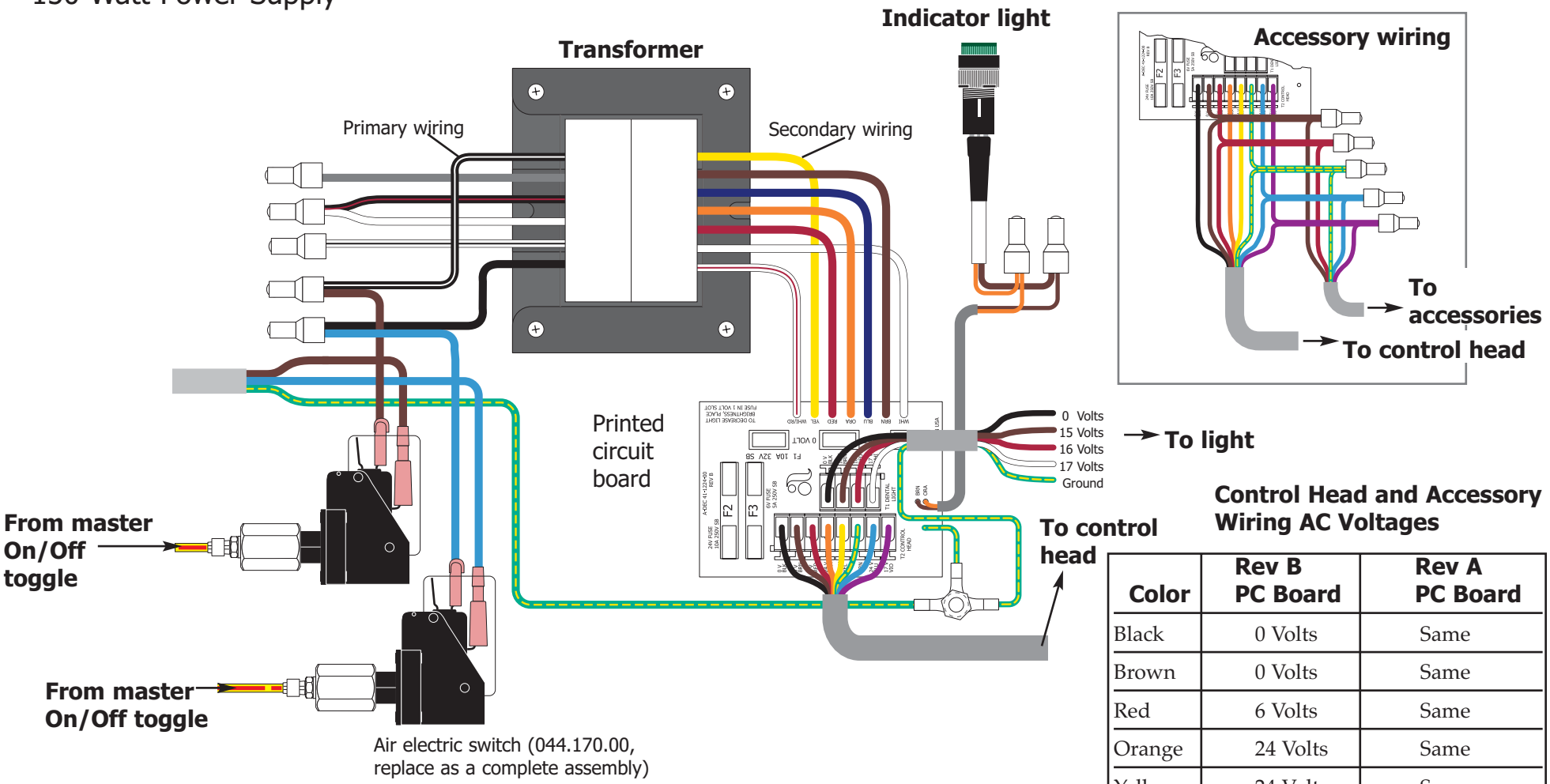
Color	Rev B PC Board	Rev A PC Board
Black	0 Volts	Same
Brown	0 Volts	Same
Red	6 Volts	Same
Orange	24 Volts	Same
Yellow	24 Volts	Same
Ground	0 Volts	Same
Blue	24 Volts	Same
Violet	17 Volts	24 Volts

Floor Boxes and Power Supplies

Flow Diagram

240 Volt Before June 1998

150-Watt Power Supply



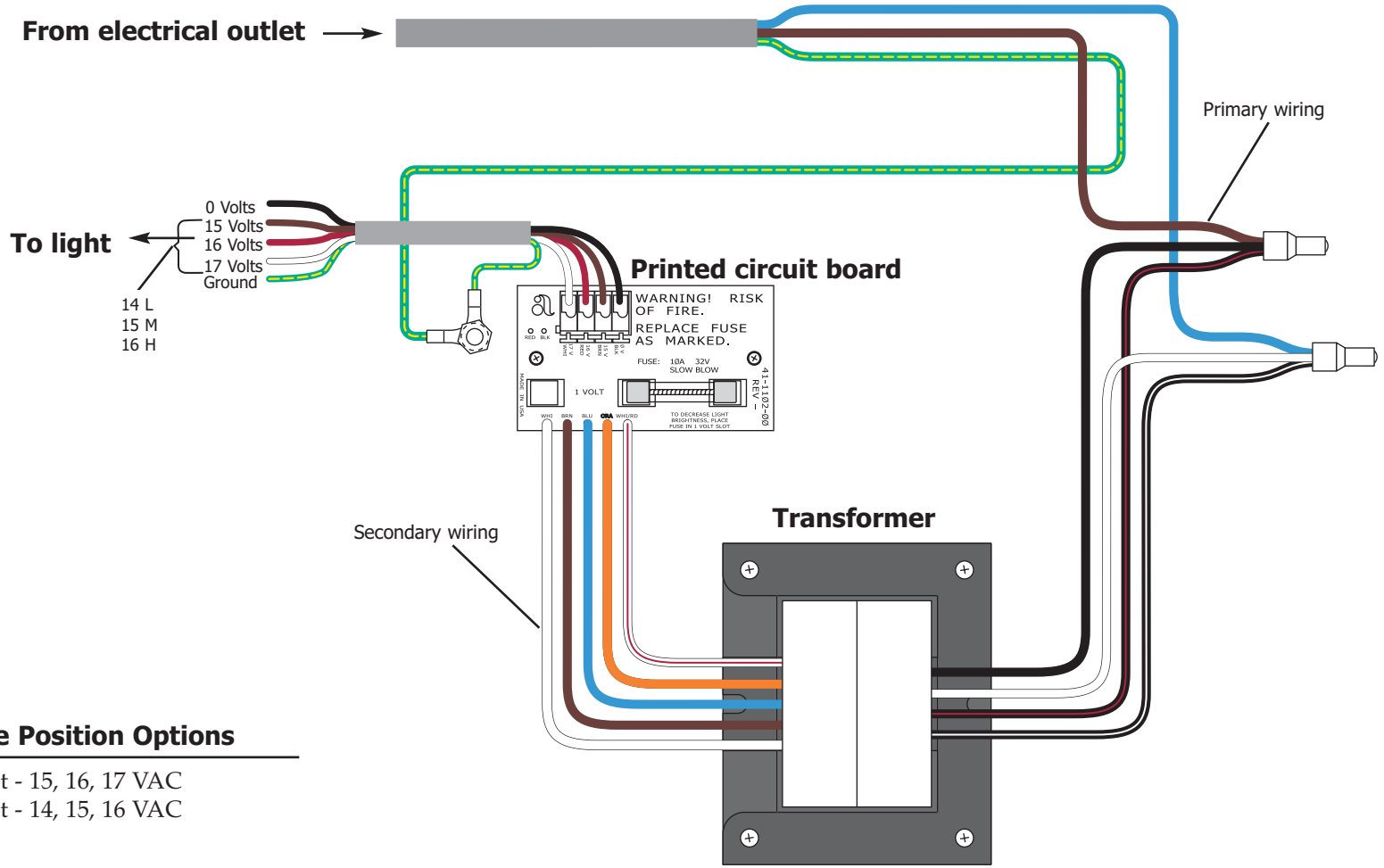
Control Head and Accessory Wiring AC Voltages

Color	Rev B PC Board	Rev A PC Board
Black	0 Volts	Same
Brown	0 Volts	Same
Red	6 Volts	Same
Orange	24 Volts	Same
Yellow	24 Volts	Same
Ground	0 Volts	Same
Blue	24 Volts	Same
Violet	17 Volts	24 Volts

NOTE: Refer to the Acceptable Accessory Combinations that exceed 150-watts chart in Replacing 150-Watt Power Supplies.

120 Volt
After May 1998

100-Watt Power Supply



Fuse Position Options

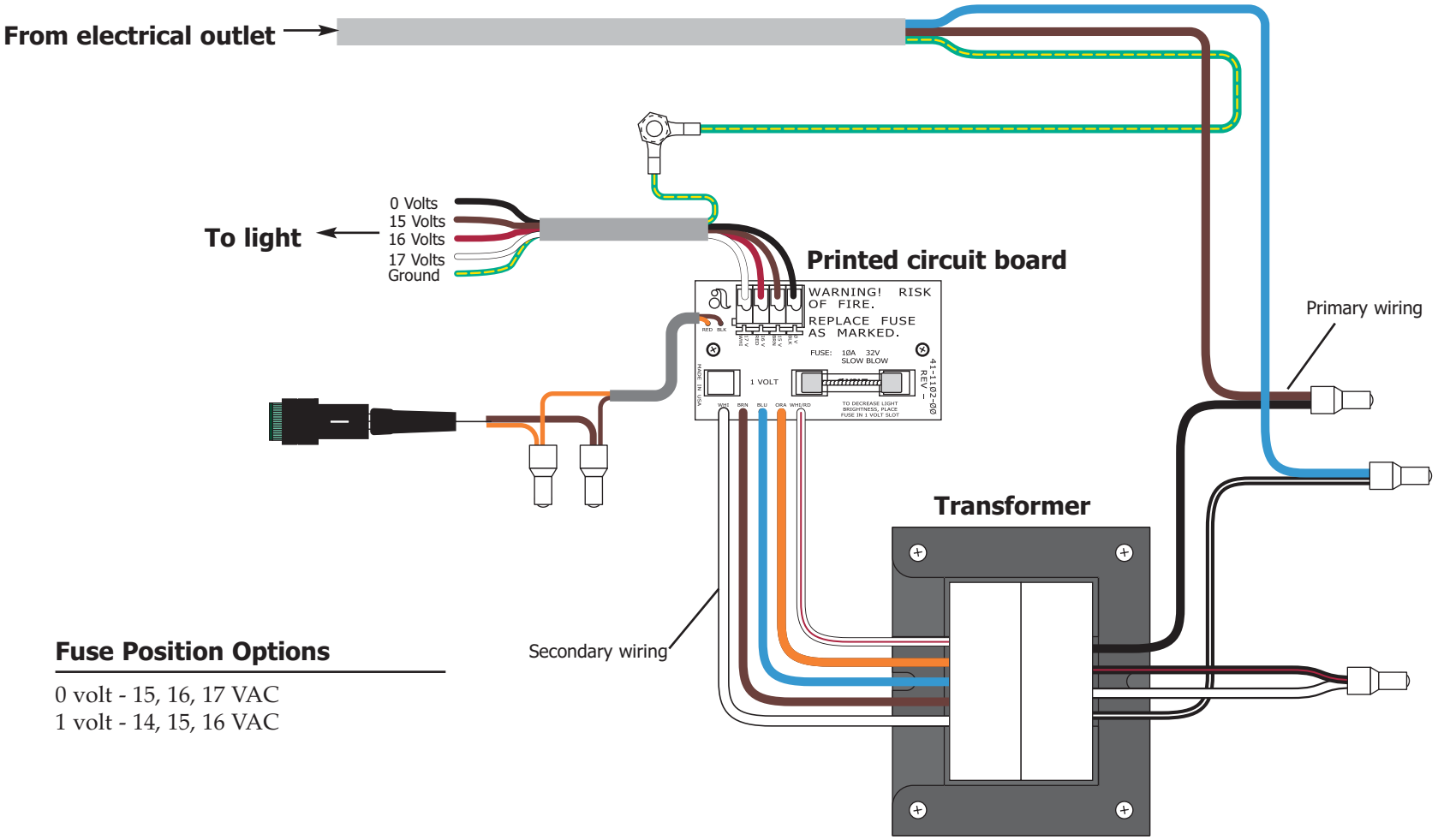
0 volt - 15, 16, 17 VAC
1 volt - 14, 15, 16 VAC

Floor Boxes and Power Supplies

Flow Diagram

240 Volt
After May 1998

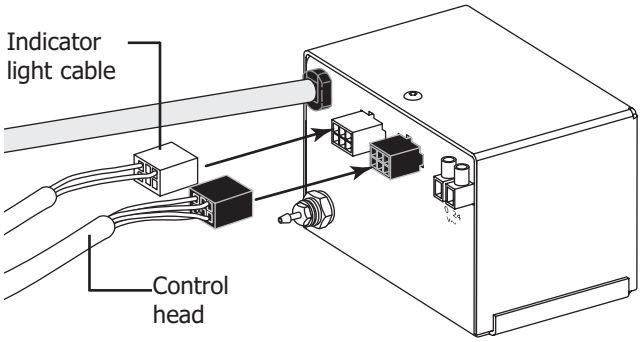
100-Watt Power Supply

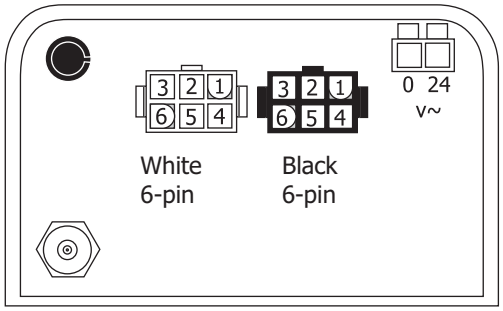


Fuse Position Options

0 volt - 15, 16, 17 VAC
1 volt - 14, 15, 16 VAC

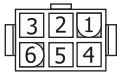
Identifying 25-Watt Connector/Pin Locations





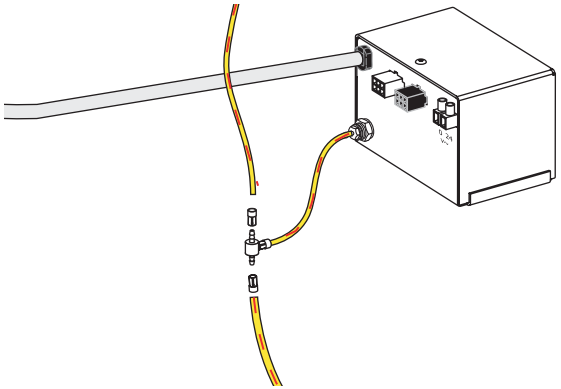
25-Watt Power Supply Cables and Connectors

White 6-pin Connector (Indicator Light)

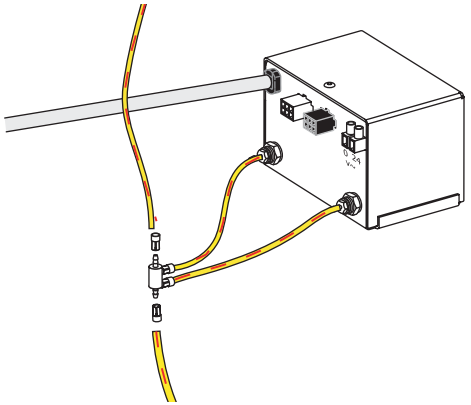


Pin	Voltage	Wire
1		
2	0 VAC	Black
3		
4		
5		
6	12.1 VAC	Gray

100 and 110-120 VAC Power Supply Plumbing



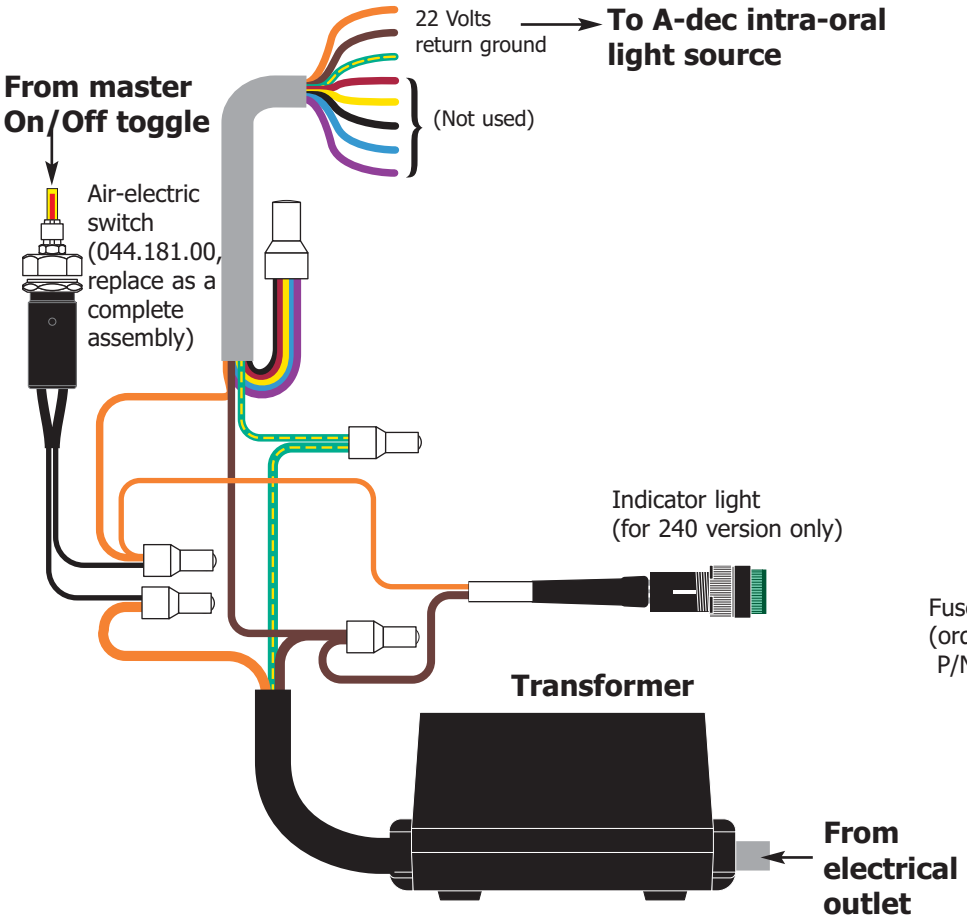
220-240 VAC Power Supply Plumbing



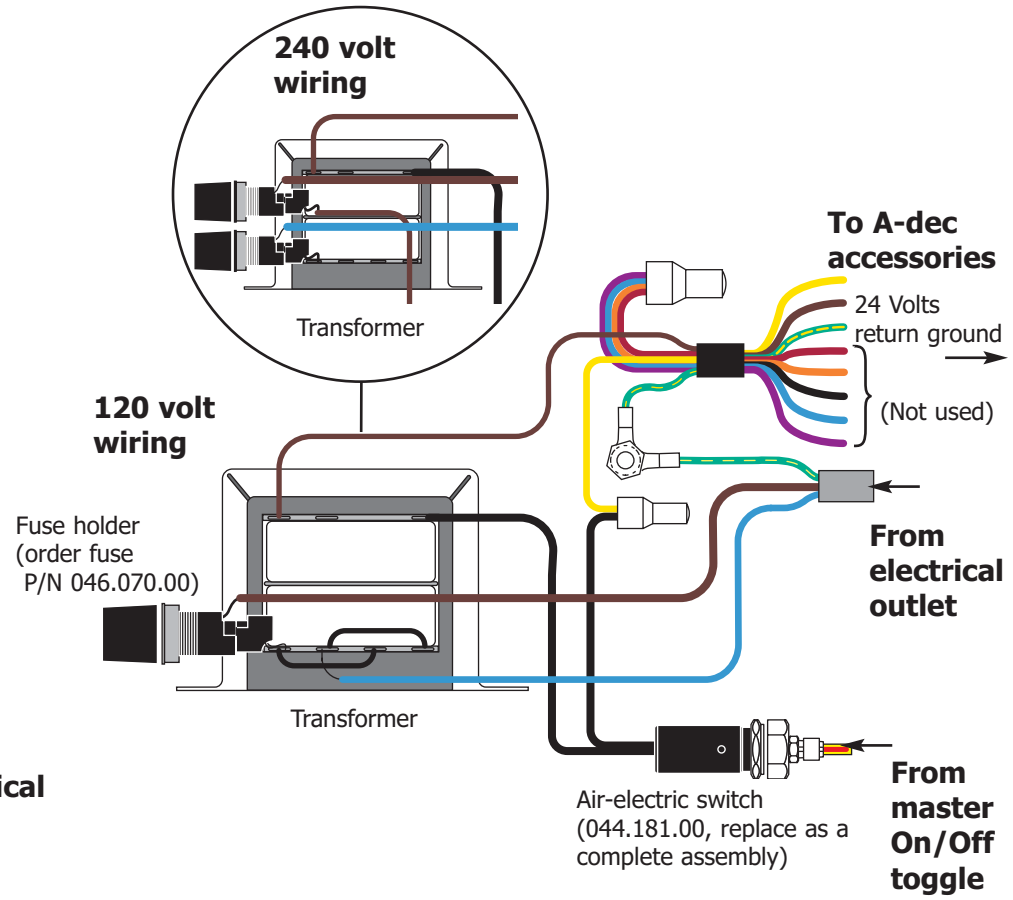
Black 6-pin Connector (Delivery System)

Pin	Voltage	Wire
1		Ground green/yellow
2	0 VAC	Black
3		
4		
5		
6	24 VAC	Yellow

17-Watt Power Supply



60-Watt Power Supply



Troubleshooting Power Supplies

Troubleshooting information for power supplies is listed in the following charts.

Problem	Action
Power supply is not working	Follow these steps to determine the problem with the power supply. **Task** **Description** 1 Plug in power supply and check for: • An indicator light that is ON, if present. • Working accessories. • Proper input line voltage (100 VAC, 110-120 VAC or 220-240 VAC). 2 Measure output voltages. • If all are correct, check for loose connections. • If some are correct, check circuit breakers. 3 Check for a tripped circuit breaker. 4 Reset the circuit breaker. **NOTE**: If the power supply is receiving line voltage and the output voltages are all 0 VAC, then an internal protector in the transformer has been tripped. Replace the entire power supply. 5 Check pilot air tubing (at the air-electric switch) air pressure. It should have a minimum of 60 psi. If not check for kinks, pinches or leakage. Replace any damaged tubing. 6 Check that the air-electric switch works properly by listening for a clicking sound. If it isn't, the power supply has failed. Replace the power supply. 7 Check for a failed power supply by removing the cover and visually inspecting the power supply for any visible damage (burnt wires, broken terminal strips or burn spots). 8 Replace the power supply.

Problem	Action
Some electrical accessories are not working	Follow these steps to check fuses for continuity and the range of AC power on the electrical outlet.

Task Description

1 Check for blown fuses:

- Unplug the power supply and remove the cover.
- Locate the appropriate accessory fuse, remove it and test for continuity.
- Replace any blown fuses.

2 Replace the power supply cover and plug in the power cord. Test the accessories that weren't functioning to ensure the problem has been fixed.

3 Check for normal AC power at the electrical outlet.

- If the AC power is within the correct range, the power supply has failed. Replace the power supply.
- If the AC power is not within the correct range, have a certified electrician correct the problem.

Nominal Mains AC Voltage Ranges

Voltage	Range
100	90-110 Volts
120	108-132 Volts
220	198-242 Volts
240	216-264 Volts

Problem	Action
None of the electrical accessories are working	Follow these steps to determine the problem when none of the electrical accessories work.

Task Description

1 Check for power at the electrical outlet. If not check the following points.

- Wall switches that may be turned off, or where appropriate, circuit breakers that may have tripped.
- Normal AC power at the electrical outlet (see chart). If the AC power is within the correct range, the power supply has failed. Replace the power supply. If the AC power is not within the correct range, have a certified electrician correct the problem.

Nominal Mains AC Voltage Ranges

Voltage	Range
100	90-110 Volts
110	99-121 Volts
120	108-132 Volts
220	198-242 Volts
240	216-264 Volts

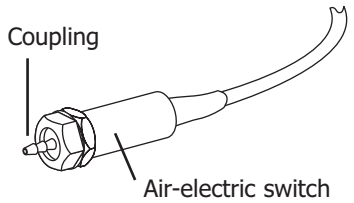
2 Check for blown fuses:

- Unplug the power supply and remove the cover.
- Locate the appropriate accessory fuse, remove it and test for continuity.
- Replace any blown fuses.

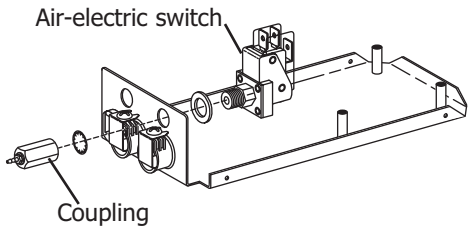
3 Replace the power supply cover and plug in the power cord. Test the accessories that weren't functioning to ensure the problem has been fixed.

4 Check for a failed power supply by removing the cover and visually inspecting the power supply for any visible damage (burnt wires, broken terminal strips or burn spots). Replace the failed power supply.

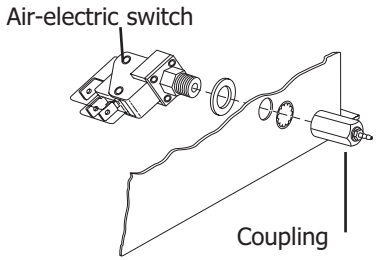
Problem	Action
None of the electrical accessories are working	5 Check pilot air tubing (at the air-electric switch) air pressure. It should have a minimum of 60 psi. If not, check for kinks, pinches or damage. Replace any damaged tubing. 6 Check that the air-electric switch works properly by listening for a clicking sound. • If it isn't, replace the air-electric switch (below) by removing the power supply cover and air switch coupling. Disconnect the failed switch and install a new one. Reinstall the coupling and power supply cover



17-Watt Air-Electric Switch



150-Watt Air-Electric Switch



300-Watt Air-Electric Switch

Replacing the Air-Electric Switch

- If the air-electric switch is working, visually inspect the power supply by removing the cover and look for any visible damage (burnt wires, broken terminal strips or burn spots.) Replace failed power supply.

7 Test voltages at the transformer secondary terminal strip.

- Plug in the power supply and remove the cover.
- Test for AC voltage at each wire contact on the transformer secondary terminal strip (use only the probes of a volt-ohm meter). The specified voltage for each position is either labeled on or below the terminal strip. The AC voltages for red, green and, violet wires should be within 1.5 volts of the specified voltage. The AC voltages for orange, yellow, and blue wires should be within 2.5 volts of the specified voltage.

Floor Boxes and Power Supplies

Notes

Dental Lights

Overview

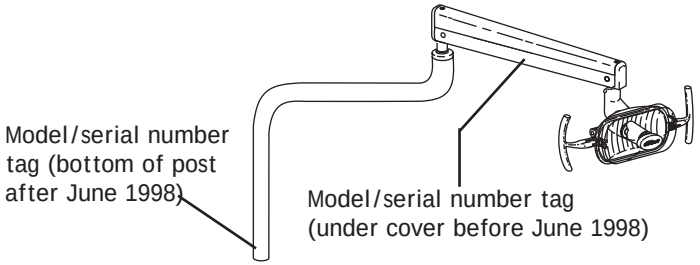
This section presents the Pre-Cascade and Cascade dental lights and their specifications. Detail on how to service and adjust lights and troubleshoot specific problems is presented. For more information on service parts, see the *Genuine A-dec Service Parts Catalog* or contact customer service.

If you are looking for information about the Performer dental light, please see *Performer (PR)*.

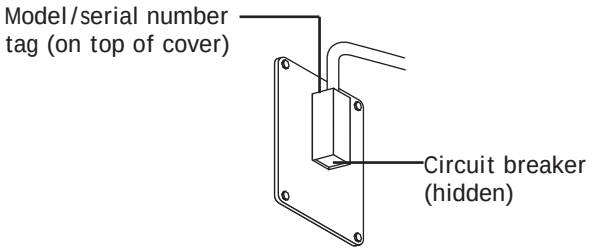
Locating Model/ Serial Number and Circuit Breakers

NOTE: Circuit breakers (post June 1998) and fuses (before June 1998) are located in the power supply.

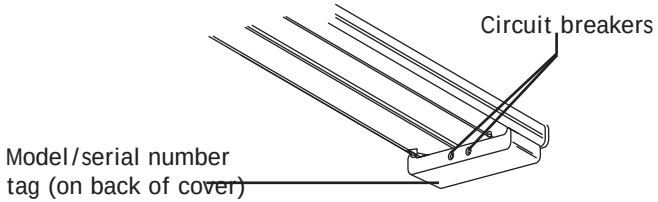
The model/serial number tags identify the light model and manufacture date. If you have difficulty locating the model/serial number or circuit breaker locations on the lights, the following examples may be helpful. The circuit breakers automatically interrupt the flow of electricity to the light if an over-current condition occurs.



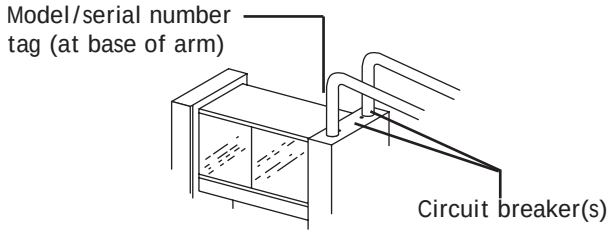
Unit Mount and Radius Lights



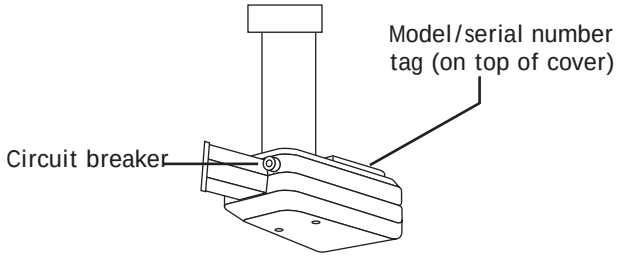
Wall Mount



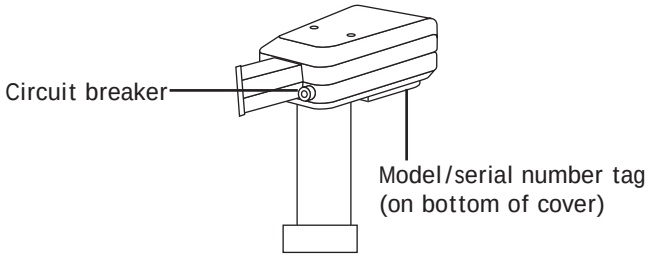
Track Light



Preference



Ceiling Light

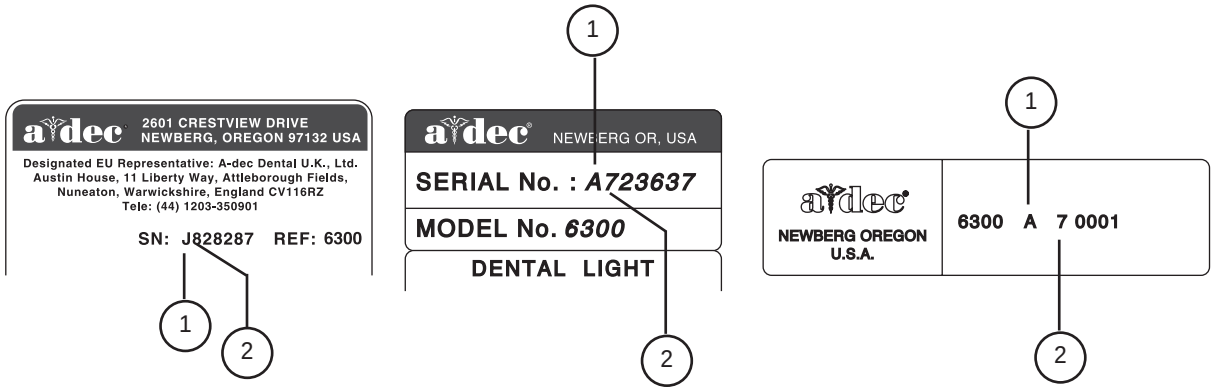


Post Mount

Reading Manufacture Dates

Different versions of the light can be distinguished by month and year manufactured. This information is included in the serial number of each dental light.

The following examples show how to identify the month and year in which a light was manufactured.

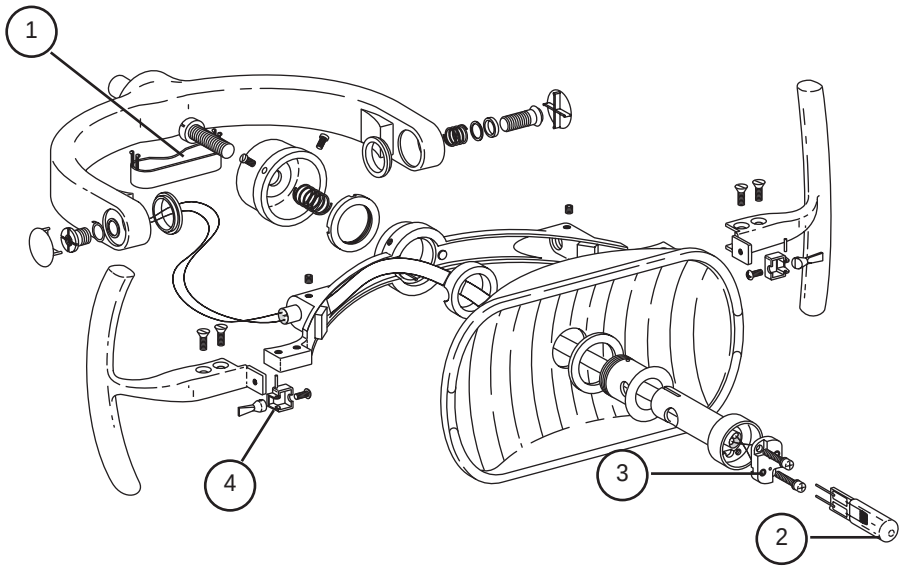


Serial/Model Number Label

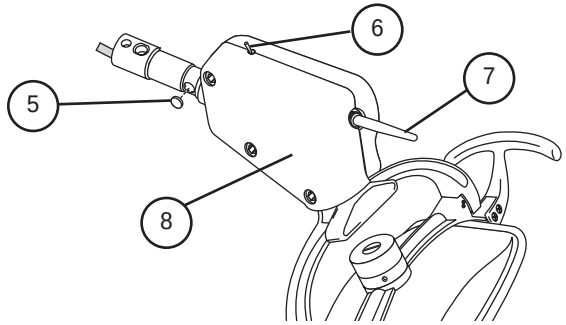
Item #	Description
1	Month of manufacture The first letter of the serial number indicates the month the product was manufactured; e.g., A is January.
2	Last digit of the year manufactured, e.g., 7 is 1997

Cascade Light Head

Item #	Part Number	Description
1	28.1004.00	Bulb and holder
2	041.179.01	Bulb
3	90.0463.01	Lamp socket kit
4	28.1012.00	Bracket assembly (2 required)
5	28.0679.01	Pivot stop
6	90.1043.00	Intensity switch kit
7	90.1039.00	On/Off switch kit
8	28.1464.01	Switch housing kit



Cascade Light Head

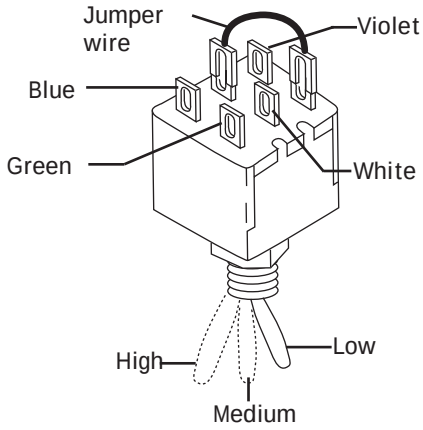


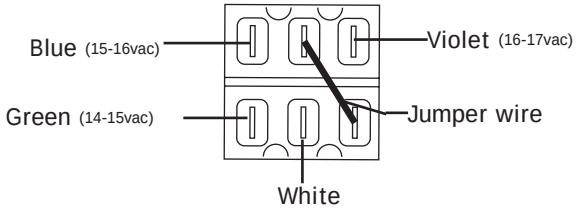
Cascade Light Head

Identifying Intensity Switch Connections (Cascade)

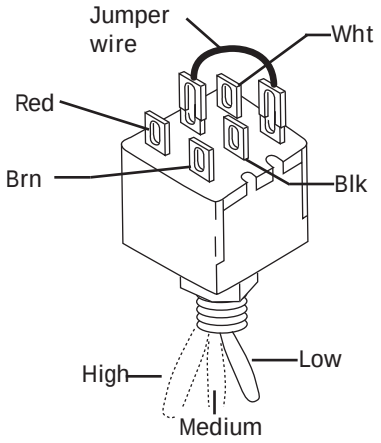
The three-position intensity switch is used to set light intensity at one of three settings: low, medium, or high. The replacement kit for the intensity switch is P/N 90.1043.00.

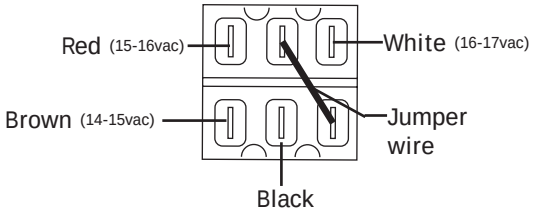
The following illustrations identify the connections for attaching appropriate wires from the intensity switch to the dental light.





After September 1998

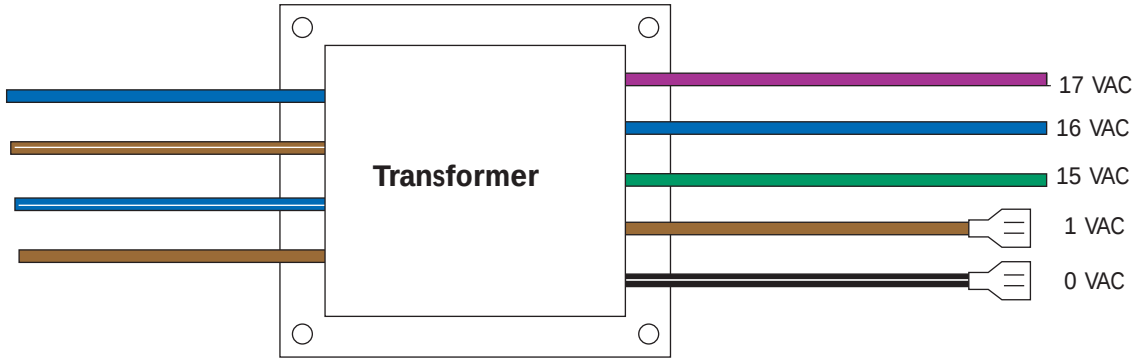




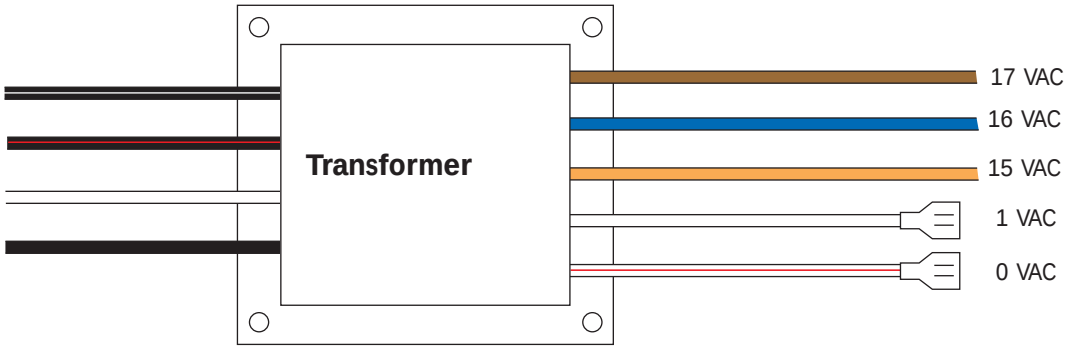
Before September 1998

Wiring Transformer, (110-120 VAC, 240 VAC)

The transformer converts incoming source power to the correct voltage to power the dental light head. The wiring diagram shows the wiring changes for the transformers.



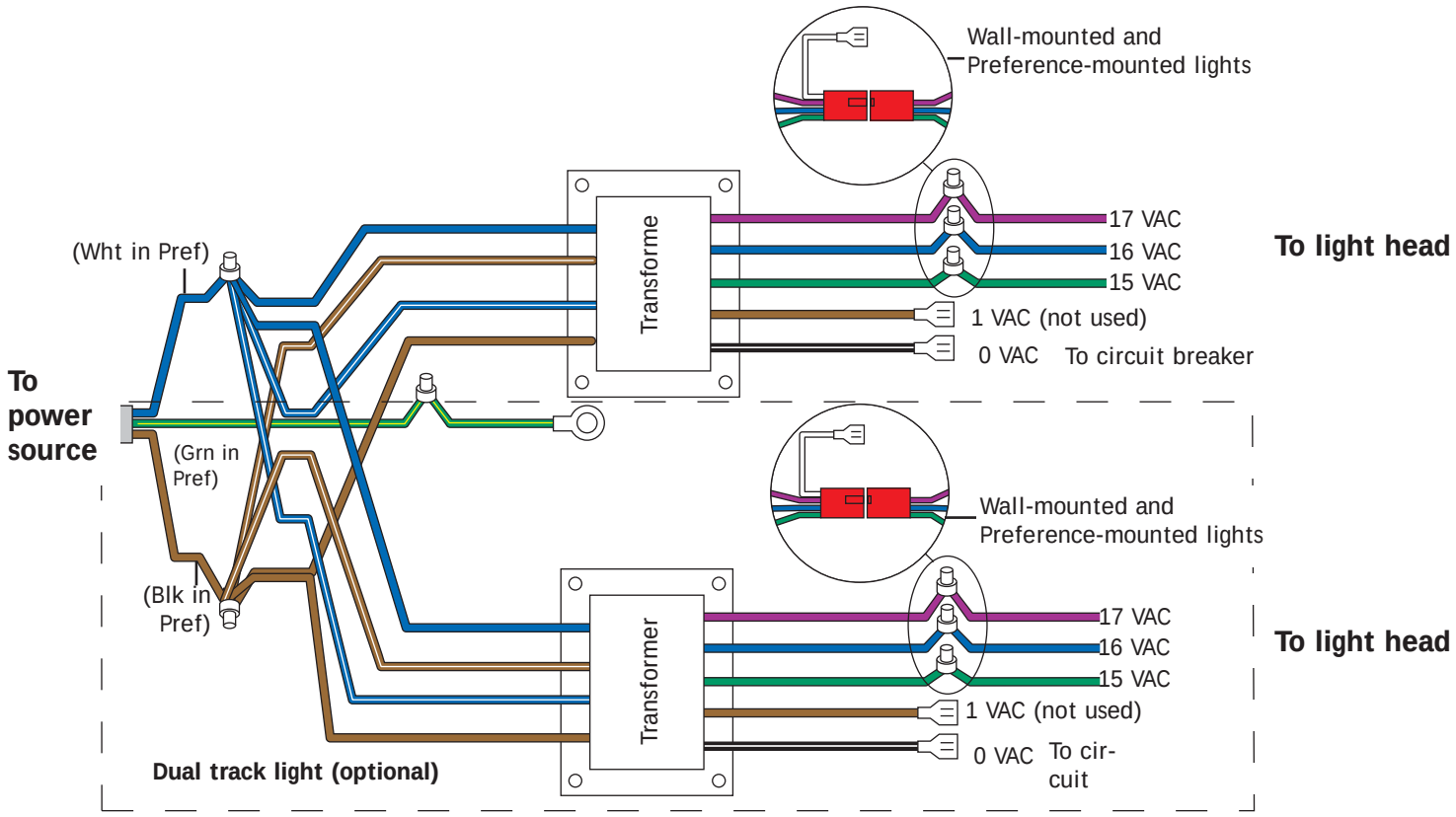
After September 1998



Before September 1998

NOTE: The power transformer had lower output voltages and no “1 VAC” tap before January 1989.

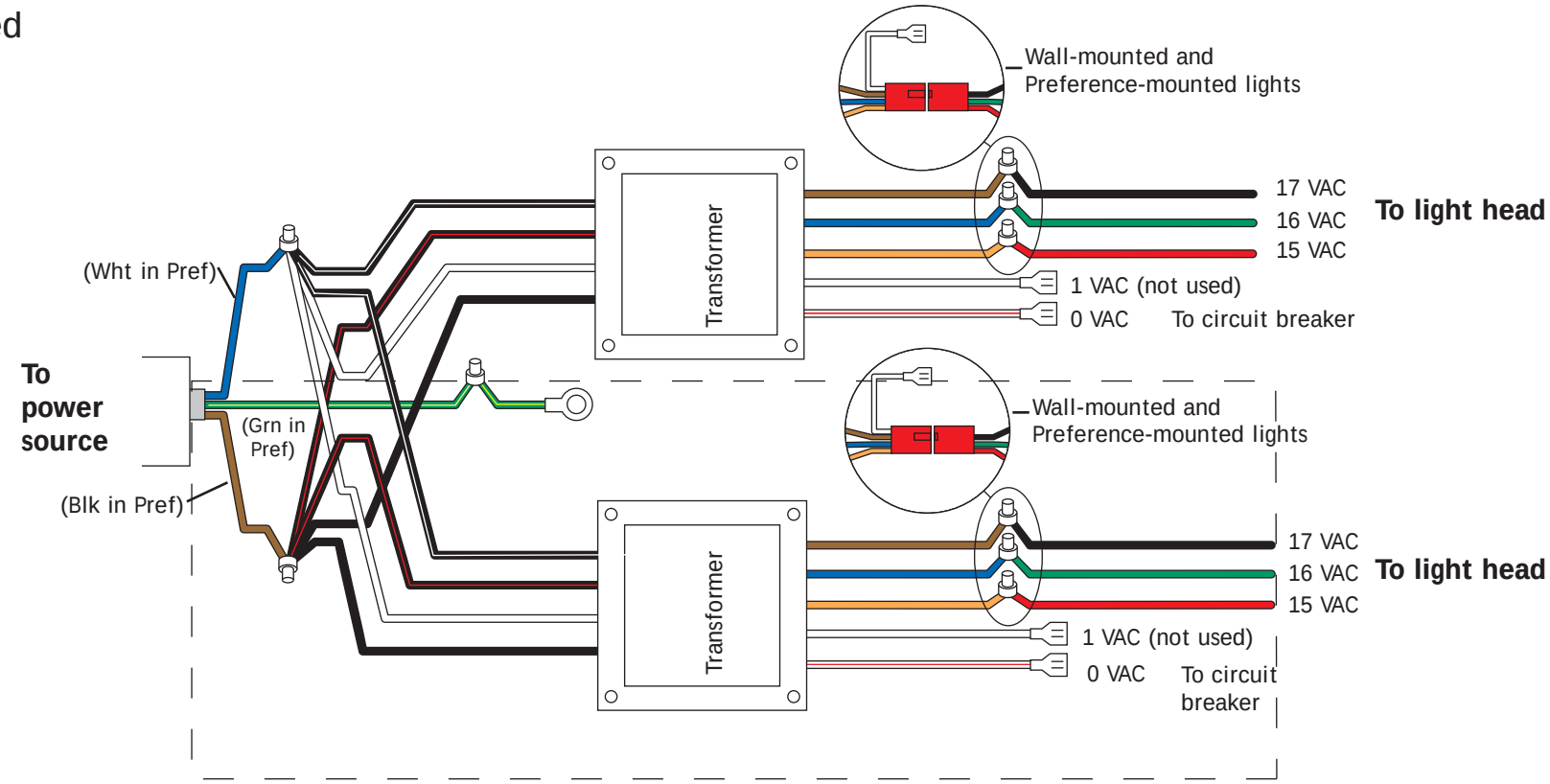
Wall-Mount, Single/Dual Track, Preference, and Ceiling-Mounted Lights



After September 1998

NOTE: Voltages shown are assuming 120/240 VAC. Secondary voltages measured without the lamp inserted will register 1.2 VAC higher.

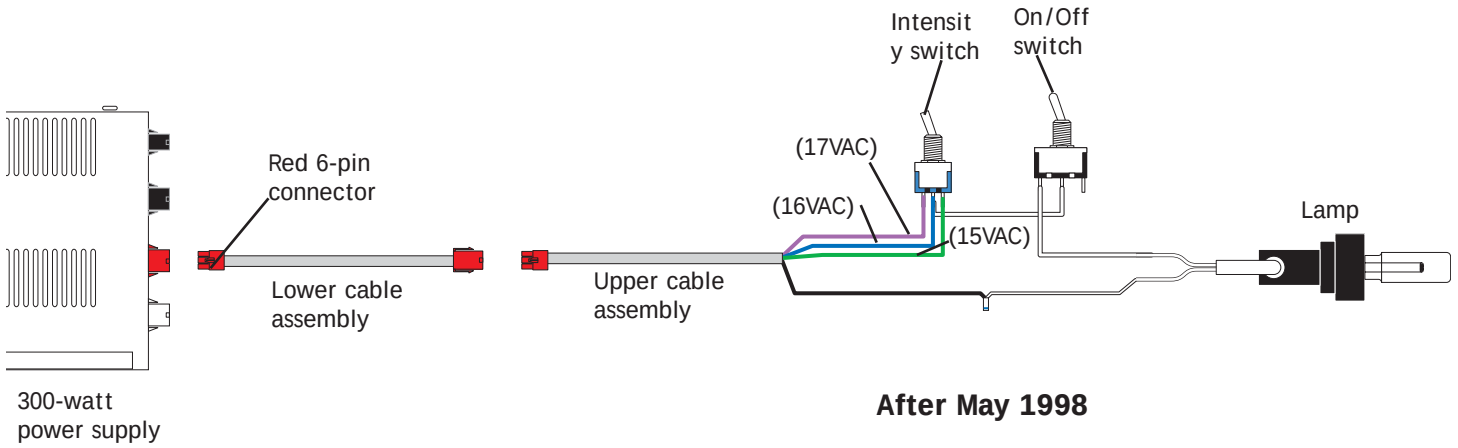
Wall-Mount, Single/Dual Track and Preference Mounted Lights



January 1989 to September 1998

NOTE: Voltages shown are assuming 120/240 VAC. Secondary voltages measured without the lamp inserted will register 1.2 VAC higher.

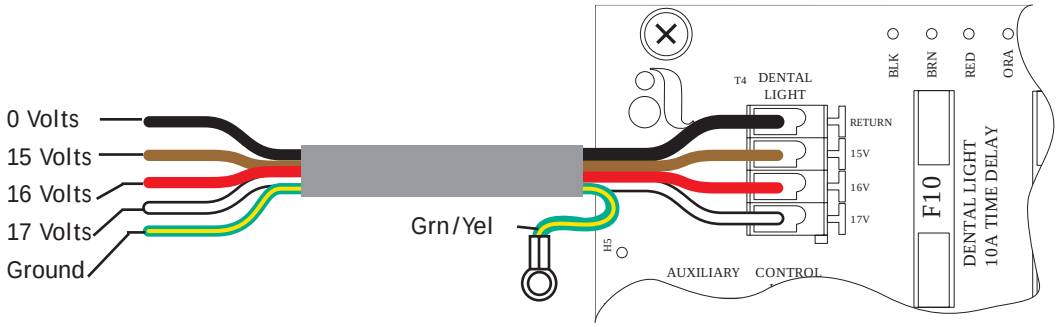
Cascade Unit and Radius-Mounted Lights



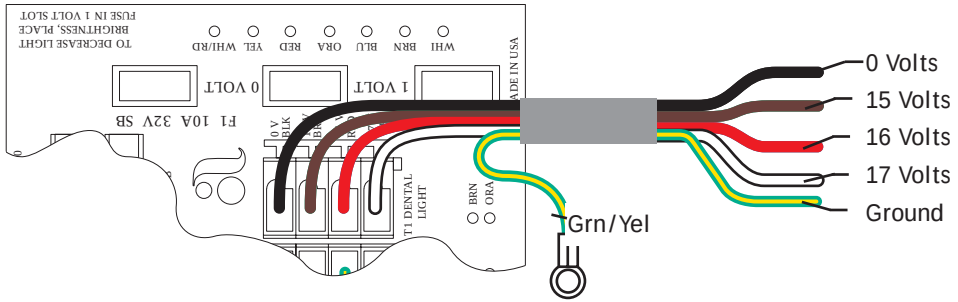
After May 1998

NOTE: Voltages shown are assuming 120/240 VAC. Secondary voltages measured without the lamp inserted will register 1.2 VAC higher.

Cascade Unit and
Radius-Mounted Lights



300W before May 1998



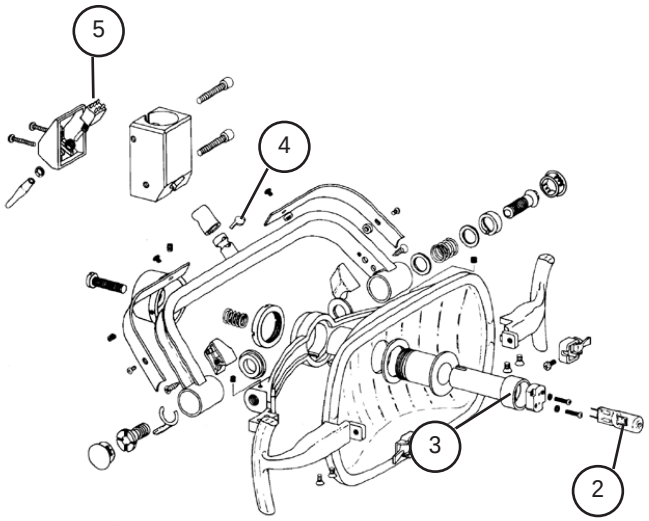
150W before May 1998

NOTE: Voltages shown are assuming 120/240 VAC. Secondary voltages measured without the lamp inserted will register 1.2 VAC higher.

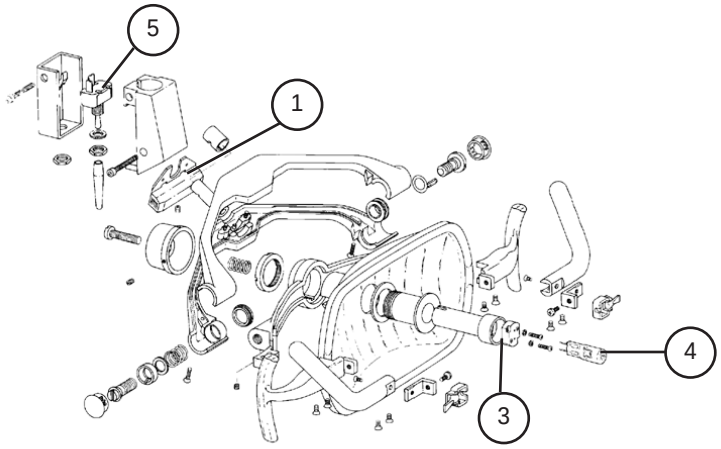
Dental Lights

Pre-Cascade Lights

Item #	Part Number	Description
1	28.0704.00	Bulb with holder
2	041.179.01	Bulb
3	90.0463.01	Lamp socket kit
4	28.0545.01	Pivot stop
5	90.0372.00	Light switch service kit
6	28.1012.00	Lens bracket assembly(2 required)



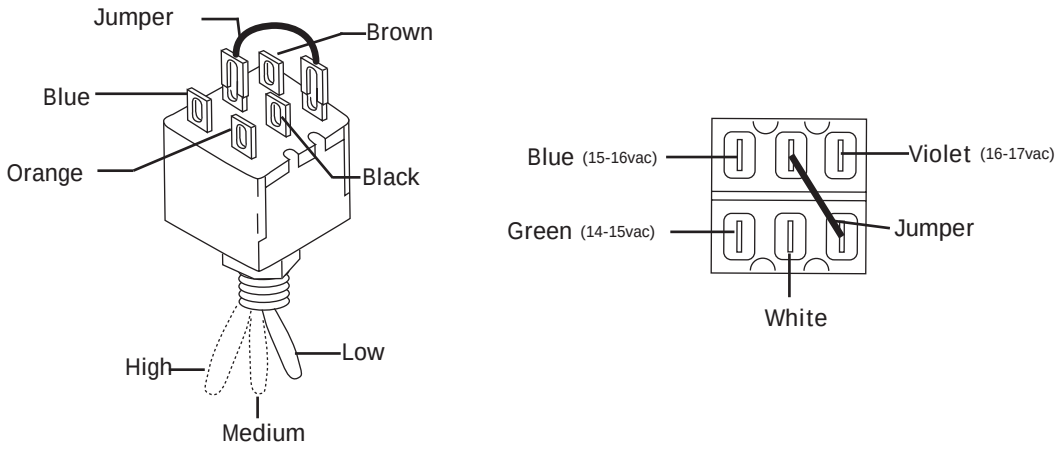
March 1985 to October 1987



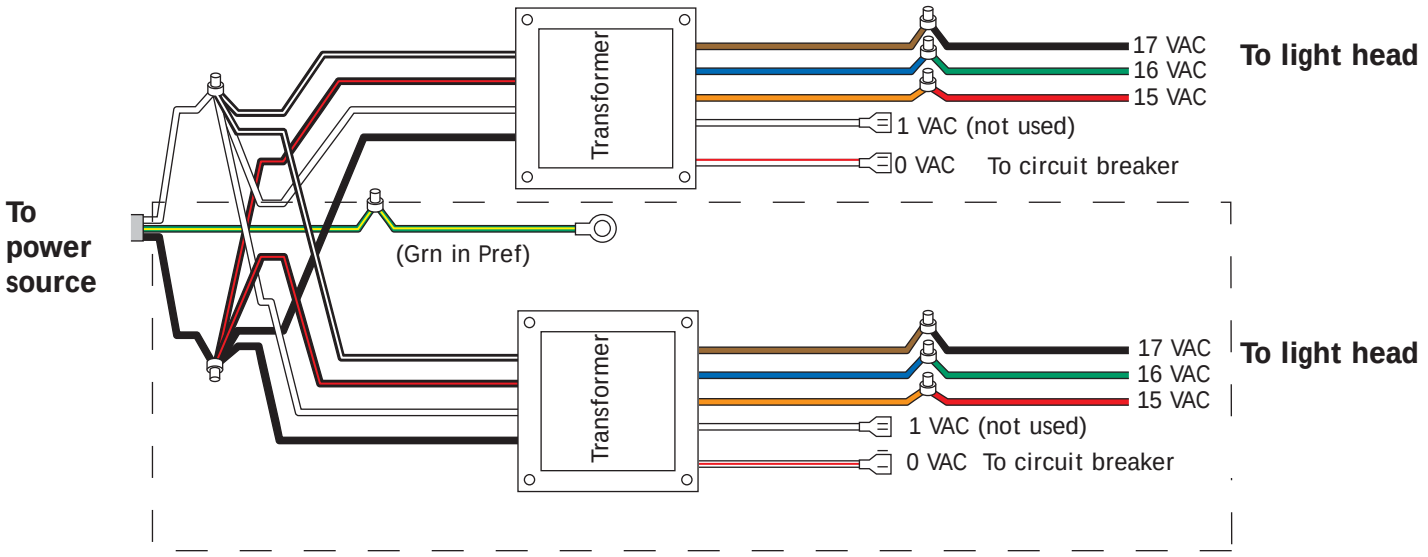
October 1987 to February 1994

Identifying Intensity Switch Connections (Pre-Cascade)

The illustration identifies the intensity switch connections for Pre-Cascade units.



Wall-Mount, Single/Dual Track and Preference-Mounted Lights

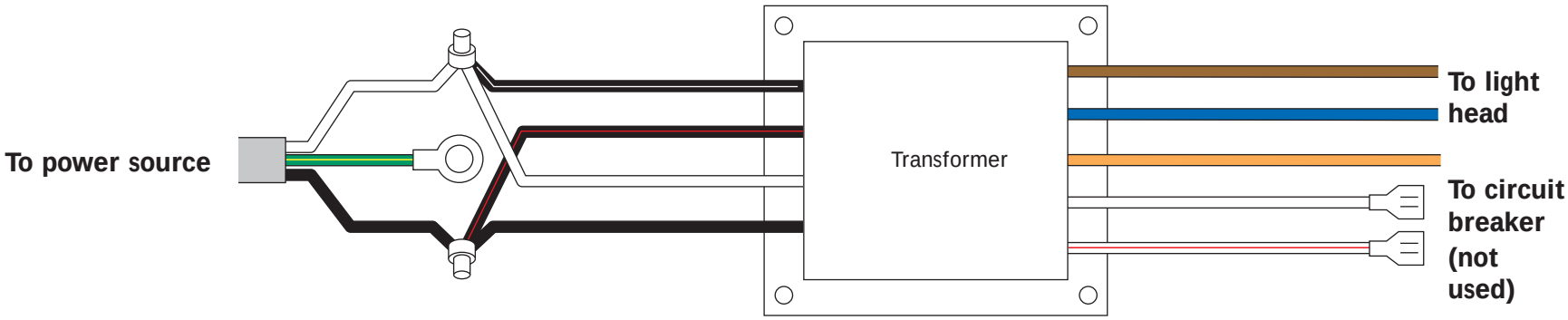


Before January 1989

NOTE: Voltages shown are assuming 120/240 VAC. Secondary voltages measured without the lamp inserted will register 1.2 VAC higher.

Dental Lights

Post, Ceiling, and
Excellence-Mounted Lights

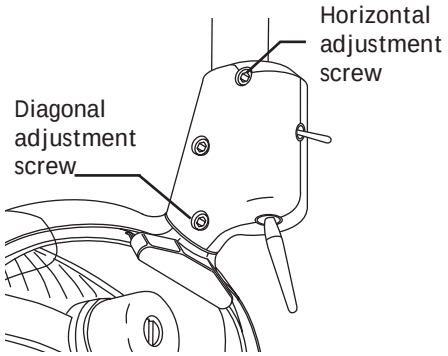


Before January 1989

Adjusting Diagonal and Horizontal Tension

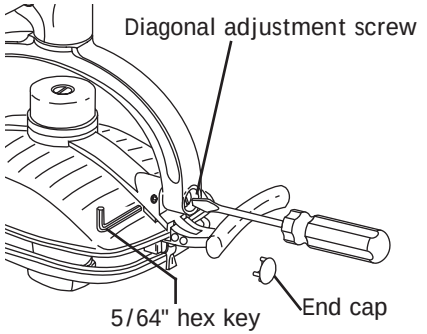
To adjust diagonal movement, use a 5/32" hex key to turn the adjustment screw at the bottom of the switch housing. Eliminate all movement in the diagonal axis by tightening the screw until it stops.

To adjust horizontal movement, use a 5/32" hex key to turn the adjustment screw at the top of the switch housing.



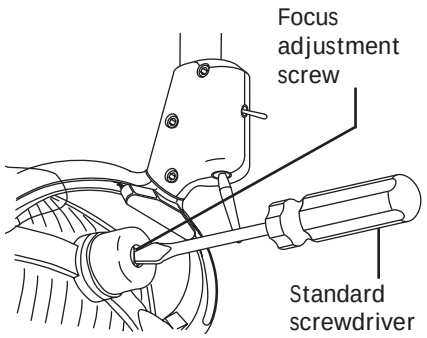
Adjusting Vertical Tension

To adjust vertical movement, use a 5/64" hex key to loosen the setscrew on the right side of the light head. Remove the end cap. Use a large flat-blade screwdriver to turn the adjustment screw under the end cap. If the light head moves too easily, or tends to drift out of position, increase the tension by turning the screw clockwise. When the desired tension is achieved, reinstall the end cap and retighten the setscrew.



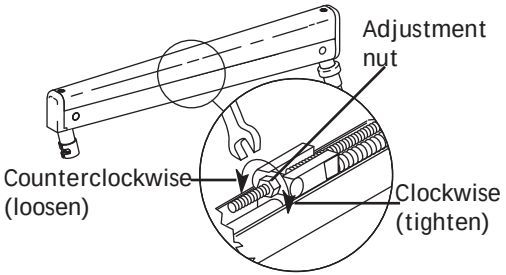
Focusing the Light

The focus of the light is adjusted at the factory for proper illumination at 27" from the oral cavity. If the light requires focusing to suit the user's style of practice, place a white towel over the chair headrest and position the light at the distance from the towel required by the user. Using a large screwdriver or coin, turn the focus adjusting screw until the light pattern is uniform
in brightness without shadowing. The range of adjustment is 18" to 31".



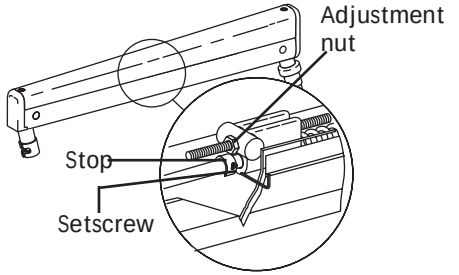
Adjusting the Flexarm

Remove the screw from the rear end cap, then remove the front end cap and cover from the arm. Using a 1/2" open end wrench, turn the tension adjustment nut inside the arm. If the arm moves too easily, or tends to drift up or down by itself, tighten the nut by turning it clockwise. If the arm tension is too stiff, loosen the nut by turning it counterclockwise.



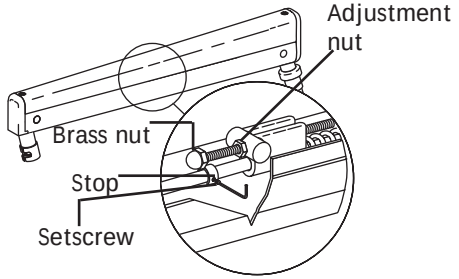
Adjusting Flexarm Travel (Limit Up)

The upward motion of the flexarm can be adjusted by adding a Travel Stop Limit Kit (P/N 90.1044.00). To order this kit, contact A-dec customer service at 1-800-547-1883.



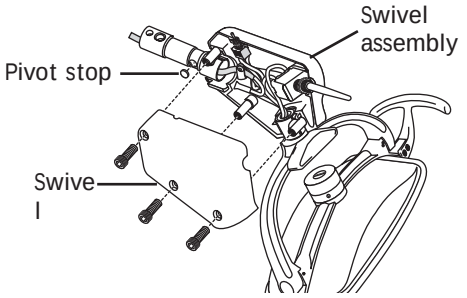
Adjusting Flexarm Travel (Limit Down)

The downward motion of the flexarm can be adjusted by adding a Travel Stop Limit Kit (P/N 90.1044.00). To order this kit, contact A-dec customer service at 1-800-547-1883.



Converting Right/Left (Cascade)

Remove the swivel cover. Remove the pin screw from the swivel assembly, then pull the swivel assembly and light head down until you are able to access the pivot stop. Remove the pivot stop, and install it in the opposite side of the extension arm. Reassemble and adjust.

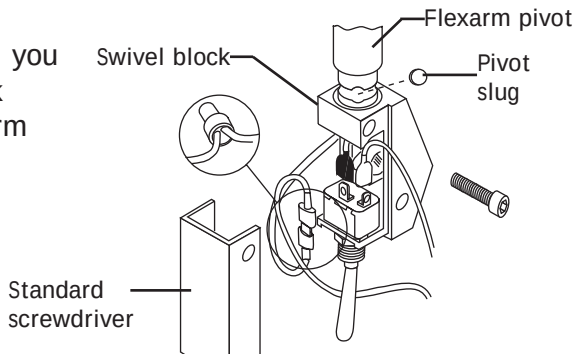


WARNING

Be sure the light flexarm is all the way up before beginning a right/left conversion. The flexarm is spring loaded and will move rapidly upward if the light head is removed.

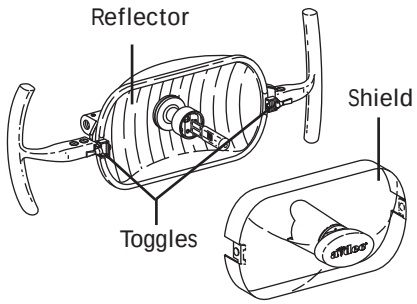
Converting Right/Left (Pre-Cascade)

Remove the On/Off switch housing cover. Remove the top screw in the swivel block. Pull the swivel block down until you are able to access the pivot slug. Do not remove the block from the flexarm pivot. Remove the pivot slug from the arm and install it on the opposite side of the flexarm pivot. Reassemble and adjust.



Cleaning the Shield and Reflector

Allow the light to cool. Use a 100% cotton 2 x 2 gauze pad or a soft, dry, lint-free cloth to wipe the outside surface of the shield. For more thorough cleaning, release the toggles on either side of the shield to remove the shield from the light. Use water or diluted water-based cleaning solutions and cloth described above to
carefully wipe the shield and reflector surfaces using very light pressure. Rinse with a soft, dampened cloth.

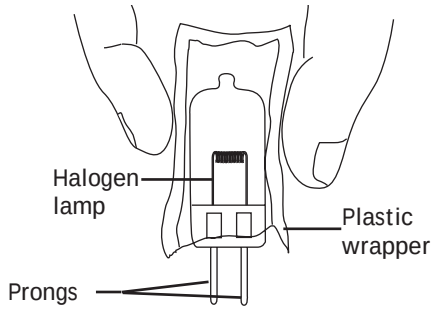


CAUTION

Do not use abrasive or chlorine-based cleaners (such as household bleach). Do not rub heavily, clean when hot, or soak these items in cleaning solution. Do not clean the black metal mask inside the light shield. Any residue from the cloth or cleaning solution will cause it to smoke when hot.

Replacing a Lamp

Move the On/Off switch to the OFF position, and allow the lamp to cool before touching. Point the light head to the ceiling and release the toggles on the light shield to remove. Carefully remove the old lamp and discard. Pull the plastic spare lamp holder from the light head yoke and remove the new lamp from the holder. Use the wrapper to prevent touching the lamp while installing. If the lamp is touched, clean with alcohol. Reinstall the shield and test the light for proper operation.



CAUTION

Use of halogen bulbs other than A-dec P/N 041.179.01 (OSRAM HLX 64640, 150W 24V) may result in damage to the bulb socket.

Troubleshooting Dental Lights

Tips and troubleshooting information are listed in the following charts to assist in diagnosing dental light problems. These charts are not intended to cover every situation, but do include the most common problems you may encounter.

Problem	Action
Light head is sloppy or difficult to position	Adjust the appropriate axis tension.
Flexarm drifts	Adjust the flexarm counterbalance.
Track light trolley drifts	Using shims, level the track light ceiling pallet.
Track trolley light bounces back when pushed to the end of the track	Check power cable in track for proper routing.
Light intensity is too dim, inconsistent, or the color is distorted	Follow these steps. **Task** **Description** 1 Clean the reflector and shield. 2 Check the shield for abrasions and replace, if necessary. 3 Replace the lamp if discolored.

<table>
<tr><th>Problem</th><th>Action</th></tr>
<tr><td>Unsatisfactory light pattern</td><td>Follow these steps to determine the problem.

Task Description

1 Focus the light

2 Clean the reflector and shield.

3 Check the shield for abrasions and replace if necessary.</td></tr>
<tr><td>Light does not function</td><td>Use these points to determine why the light doesn’t work.

<table>
<tr><th>If . . .</th><th>Then . . .</th></tr>
<tr><td>No power to the light</td><td>Check to make sure the dental light is connected to a working source of power.

Check to make sure all electrical switches are in the ON position and the input voltage selector switch is set properly.

Make sure the power supply air-electric switch has sufficient air pressure to</td></tr>
<tr><td>Defective socket</td><td>Measure the voltage at the socket.</td></tr>
<tr><td>Lamp has failed</td><td>Replace the lamp.</td></tr>
<tr><td>Blown fuse or tripped circuit break-</td><td>Check to see if fuse has blown or circuit breaker has tripped.</td></tr>
<tr><td>No power to the transformer</td><td>Check for loose connections at the transformer.

Measure the transformer output volt-</td></tr>
</table>
</td></tr>
</table>

Problem	Action
One or more intensity positions do not function	Use these points to identify and correct intensity.

If . . .	Then . . .
Transformer not supplying one or more voltages	Check for loose connections at the transformer. Measure the transformer output voltages.
No power to the intensity switch	Measure the voltages at the intensity switch.
No power to the On/Off switch to the lamp, and no voltage measured at the On/Off switch to the lamp	Replace intensity and On/Off switch. Measure the transformer output voltages.
No power to the On/Off switch to the lamp, and a voltage is measured at the On/Off switch to the lamp	Replace the socket.

Dental Lights

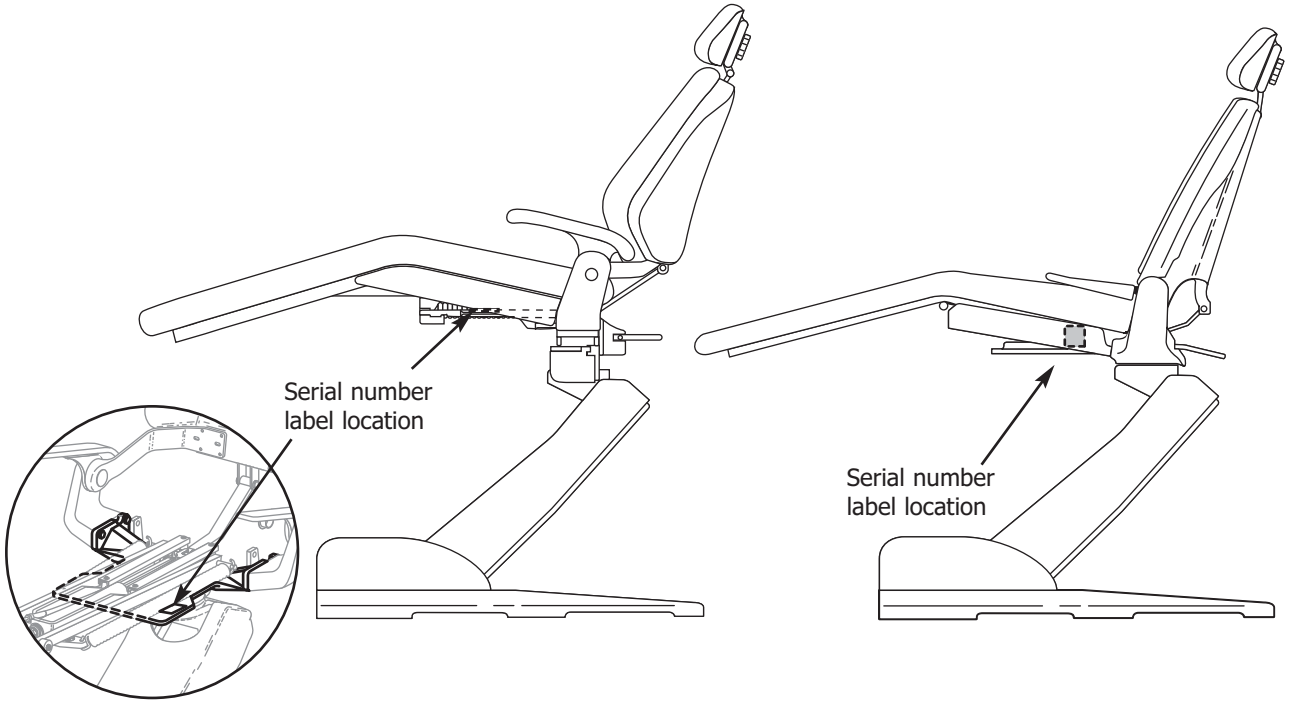
Notes

A-dec model 1040, 1021 and 8000 chairs are electronically controlled, hydraulically powered dental chairs. Buttons on both the touchpad and 8-button footswitch and actuators on the 8-function footswitch are used to position and program auto-positioning functions into the chair. The hydraulic system is controlled by the electronic control module using relays and solenoid-actuated valves.

This section provides information related to locating serial/model numbers, servicing, maintenance, and adjustment of chairs. Detail on how to service chairs and troubleshoot specific problems related to them is presented.

Locating Serial/Model Number

The serial/model number tags identify the chair model and manufacture date. The label can be found either on the top surface of a chair's upper structure (raise the toeboard) or on the right-hand side of the upper structure. If you have difficulty locating the serial/model number label, the following example may be helpful.



Decade 1021/1011 Chair

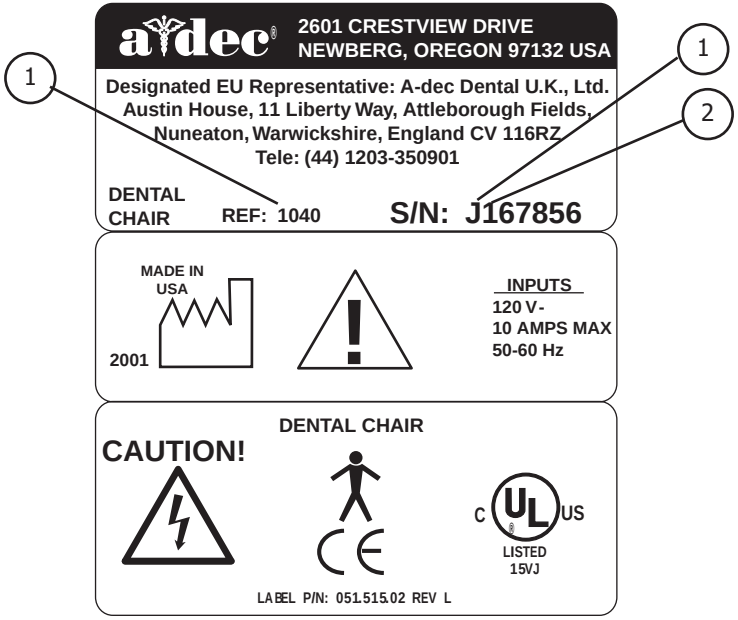
Cascade 1040 Chair

Reading the Manufacture Date

Different models of the chair can be identified by referring to the "REF" number. Each chair is further identified by its month and year of manufacture.

This example shows how to identify the model and month and year of manufacture of the chair.

Item #	Description
1	Model number
2	The first letter of the serial number indicates the month the product was manufactured; e.g., A is January.
3	First digit indicates the year of manufacture.



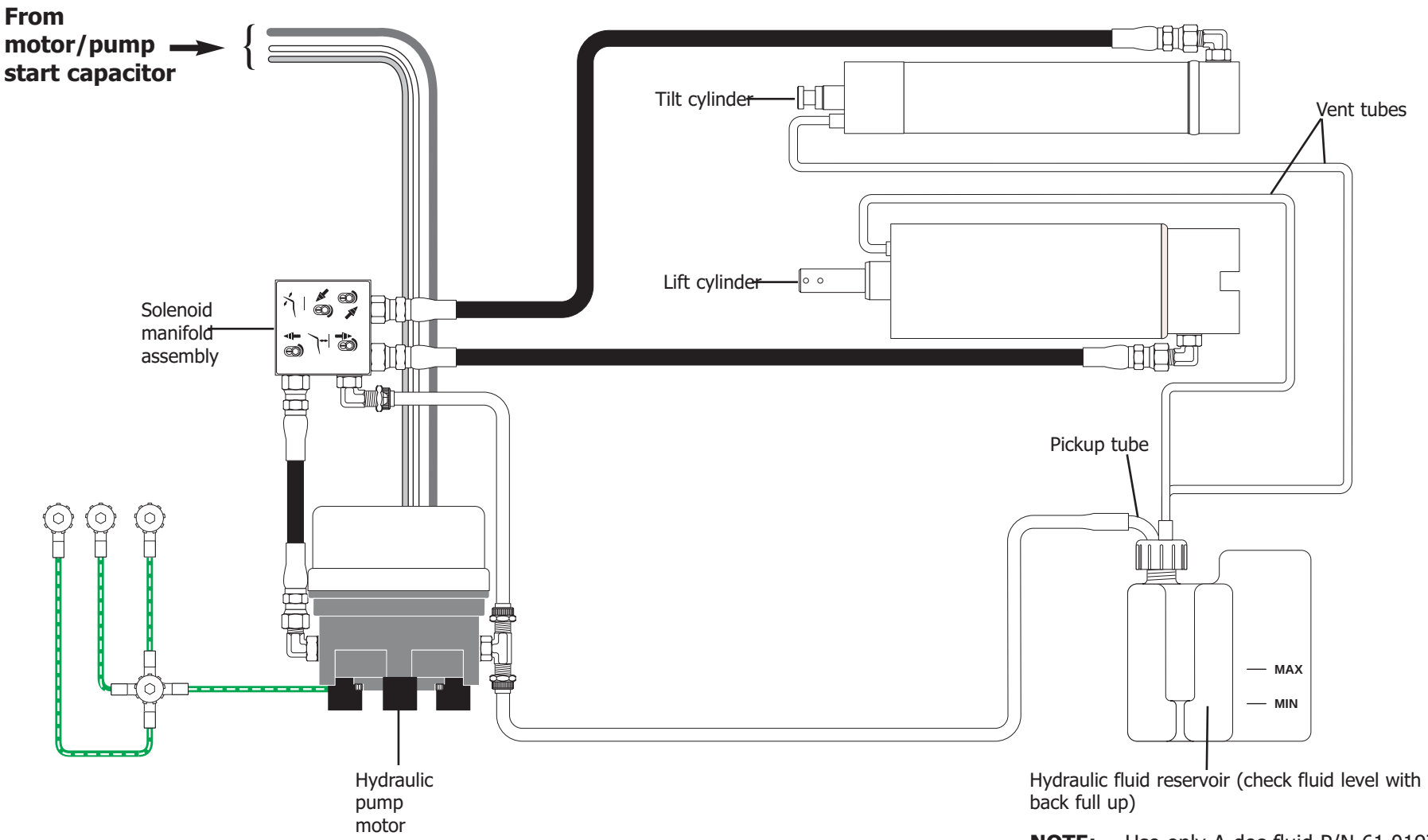
Serial/Model Number Label

Working with Hydraulics

The hydraulic system consists of the following:

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

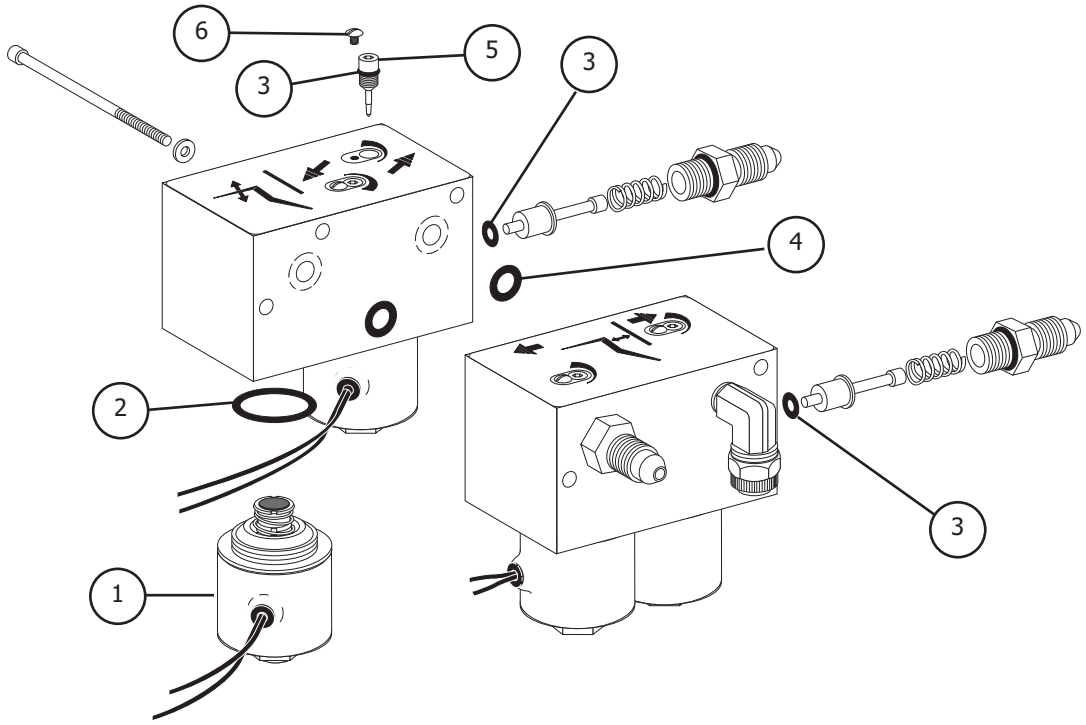
Hydraulic System Flow Diagram



NOTE: Use only A-dec fluid P/N 61.0197.00.

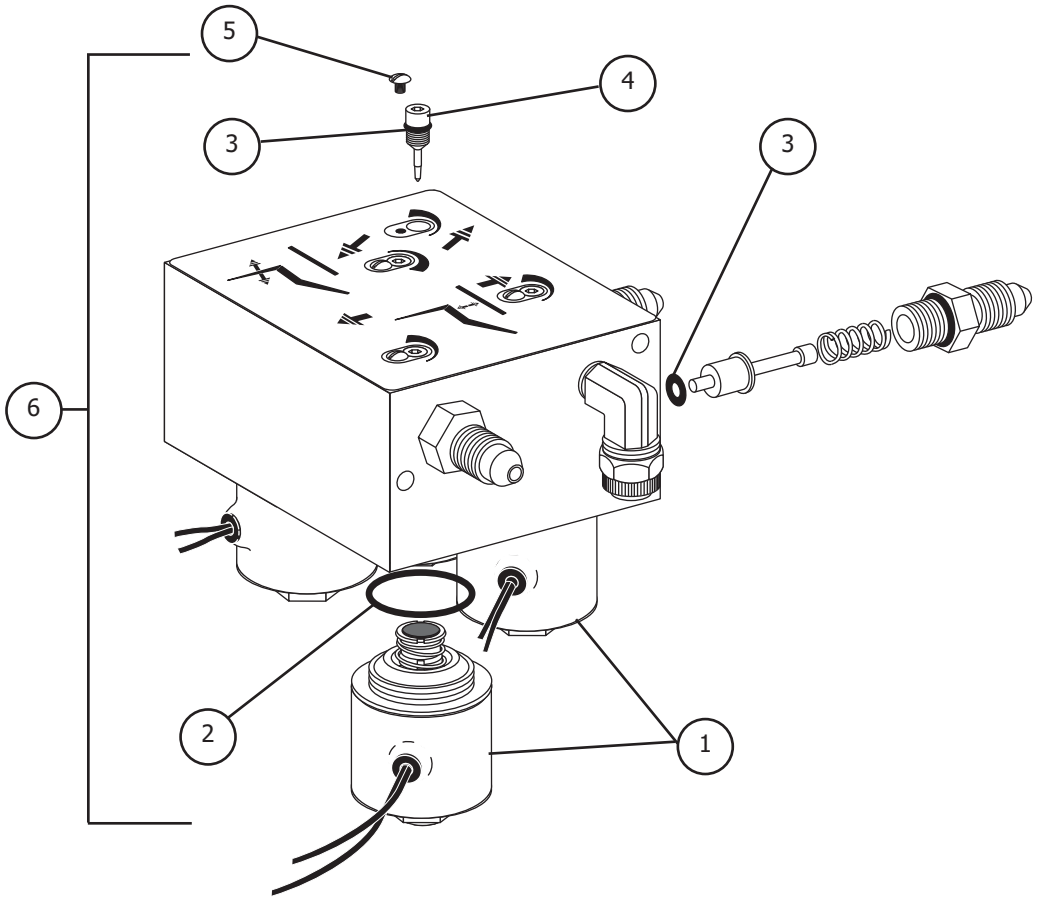
Hydraulic Manifold

Item #	Part Number	Description
1	61.1335.00 61.1336.00 61.1337.00	Solenoid, (8-watt, 100V, Yellow wires) Solenoid, (8-watt, 120 V, Black wires) Solenoid, (8-watt, 240 V, Red wires)
2	035.041.02	O-ring, special pkg 10
3	030.004.02	O-ring, AS568-004 pkg 10
4	030.010.00	O-ring, AS568-010 (only on dual-block manifolds)
5	61.0460.00	Flow adjust screw with o-ring
6	001.002.00	Screw, truss-head slot



Hydraulic Manifold

Item #	Part Number	Description
1	61.1335.01 61.1336.01 61.1337.01	Solenoid, (8-watt, 100V, Yellow wires) Solenoid, (8-watt, 120V, Black wires) Solenoid, (8-watt, 240V, Red wires)
2	030.015.02	O-ring, pkg 10
3	030.004.02	O-ring, AS568-004 pkg 10
4	61.0460.00	Flow adjust screw with o-ring
5	002.118.01	Screw, button-head, socket
6	61.1332.00 61.1333.00 61.1334.00	Manifold assy, hyd, 100V Manifold assy, hyd, 120V Manifold assy, hyd, 240V



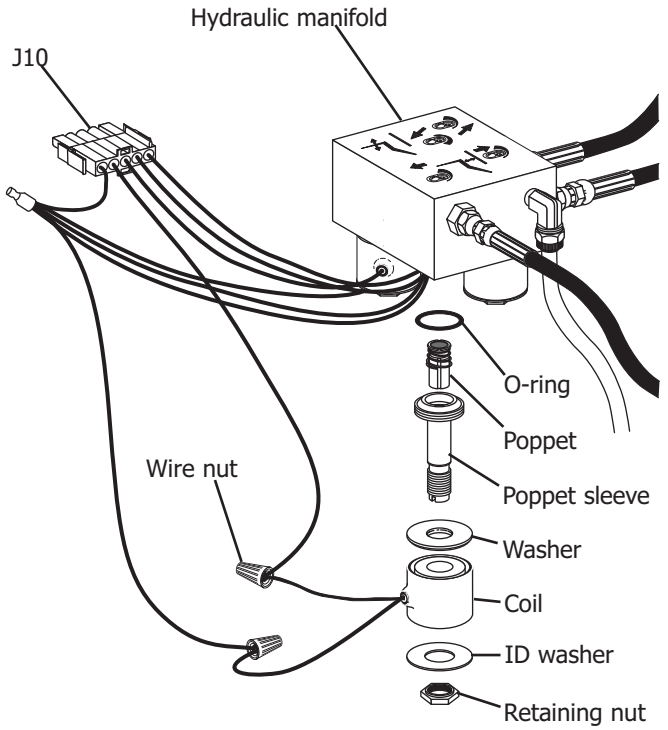
Removing a Solenoid

WARNING

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

The following steps will guide you through the removal of a solenoid.

Task	Description
1	Lower the chair base and back to the full down position to depressurize the hydraulic system. Remove the motor pump cover, then unplug the chair.
2	If necessary, remove the two mounting screws that secure the manifold to the hydraulic tray. Rotate the manifold so the solenoids are accessible.
3	Using a flat blade screwdriver and a 9/16" wrench, remove the defective solenoid.
4	Cut the defective solenoid wires 3" (74mm) from the coil and discard.
5	Remove the old o-ring from the solenoid cavity and completely dry the cavity. Replace the o-ring (refer to Solenoid installation instructions for correct o-ring).



Removing a Solenoid

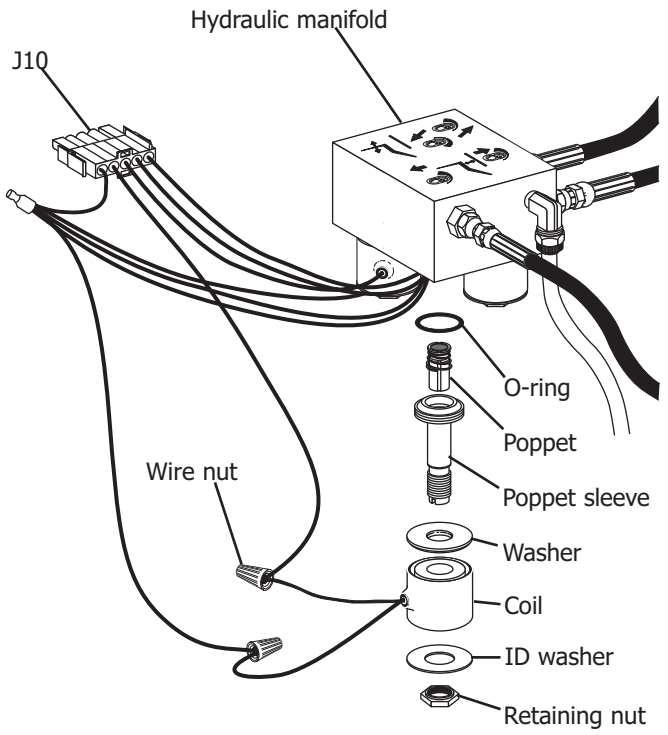
Replacing a Solenoid

WARNING

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

The following steps will guide you through replacing a solenoid.

Task	Description
1	Install the new solenoid stem and poppet into the manifold and tighten to 35-40 in lb (.11085-.2284 Nm). Position the remaining solenoid parts on the stem and secure by tightening the retaining nut to 25-30 in lb (.14275-.1713 Nm).
2	Cut the solenoid wires 3" (75 mm) from the coil. Install the stripped wires from the solenoid and the connector housing into a wire nut. Repeat for the remaining wire.
3	Using the mounting screws, secure the manifold to the hydraulic tray.
4.	Plug in the chair. Test the chair functions to ensure proper operations and that no fluid leakage occurs. Reinstall the motor pump cover.



Replacing a Solenoid

Adjusting the Hydraulic Manifold

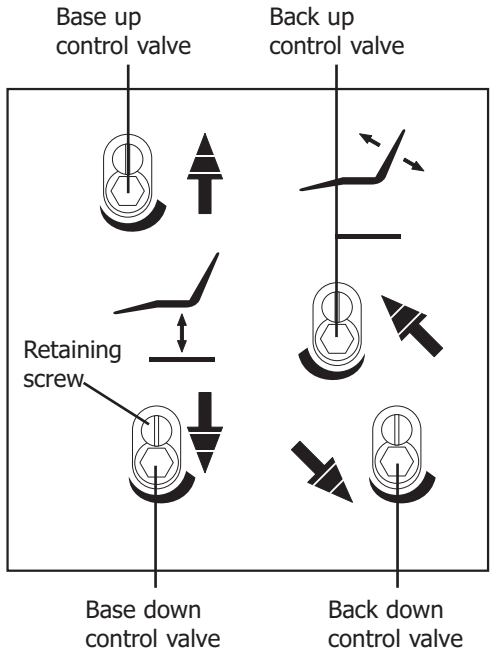
The hydraulic manifold incorporates four speed control valves, which restrict or divert the flow of hydraulic fluid to and from the lift and tilt cylinders.

NOTE: The speed control valves are hex drive.

CAUTION

Do not completely close a speed control valve. The motor/pump could overheat and become damaged from pumping against a closed valve. Do not remove retaining screw from the control valves.

To adjust...	Do this...
Base up speed	Turn base up control valve: clockwise to decrease speed, or counterclockwise to increase speed.
Base down speed	Turn base down control valve: clockwise to decrease speed, or counterclockwise to increase speed
Back up speed	Turn back up control valve counterclockwise to decrease speed, or clockwise to increase speed. **NOTE:** This is opposite of the other three control valves. Turning the back up valve counterclockwise too far may prevent the back from moving up.
Back down speed	Turn the back down control valve: clockwise to decrease speed, or counterclockwise to increase speed.



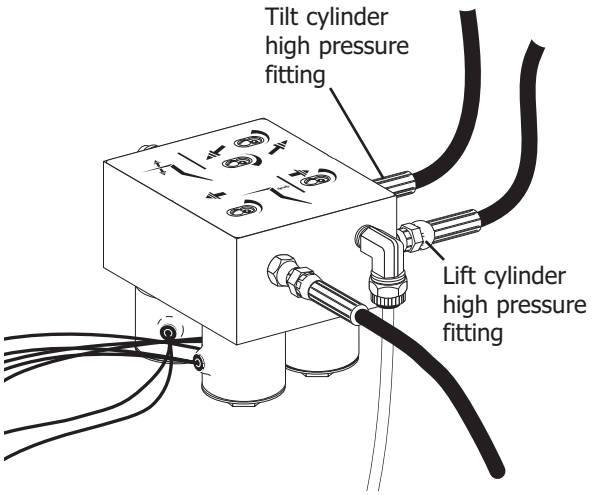
Adjusting the Hydraulic Manifold

Correcting Hydrostatic Lock

Hydraulic lock occurs based on the following conditions:

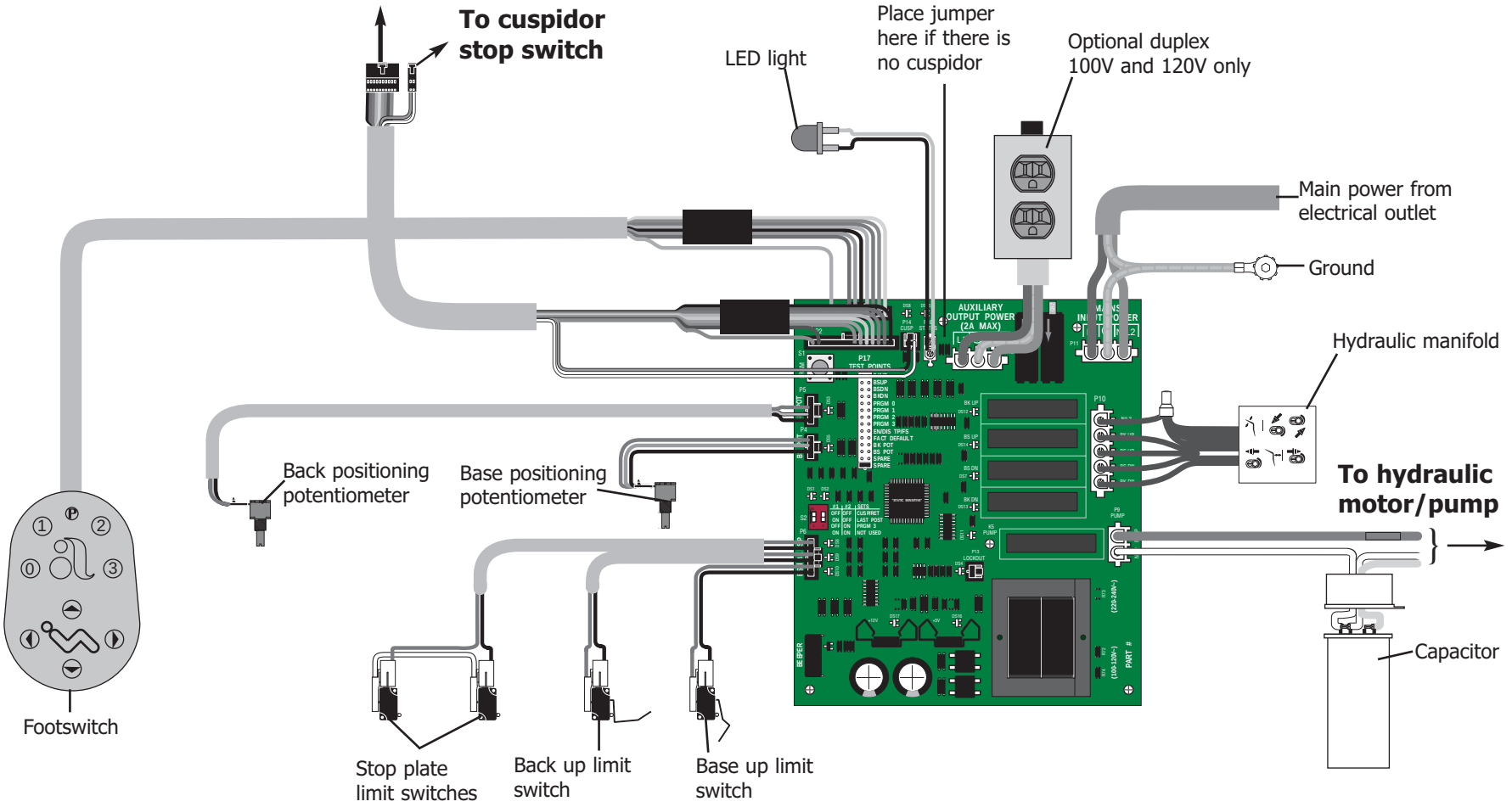
- chair base or back is stuck in full up position
- limit switch not activated, or
- down solenoid poppet is unable to open based on excess hydraulic pressure.

Task	Description
1	Remove the motor/pump cover from the chair.
2	Fit a 5/8" wrench to the high pressure outlet port (either lift or tilt, whichever is in hydrostatic lock) of the hydraulic manifold. Hold the port still and use a 9/16" wrench to loosen the hose fitting.
3	Place a shop rag around the fitting to absorb the fluid.
4	Carefully loosen the fitting counterclockwise until oil begins to leak from the fitting. Retighten the fitting. Operate the down function. A second release of hydraulic fluid may be required.
5	Adjust the limit switch that caused the hydrostatic lock (refer to *Adjusting the Base Up Limit Switch*). In some cases, it may be necessary to remove and replace the limit switch. Adjust the new limit switch as needed. Also ensure that the large gear/actuator is securely installed and not slipping.
6	Cycle the chair a couple of times to verify it is no longer in hydrostatic lock.

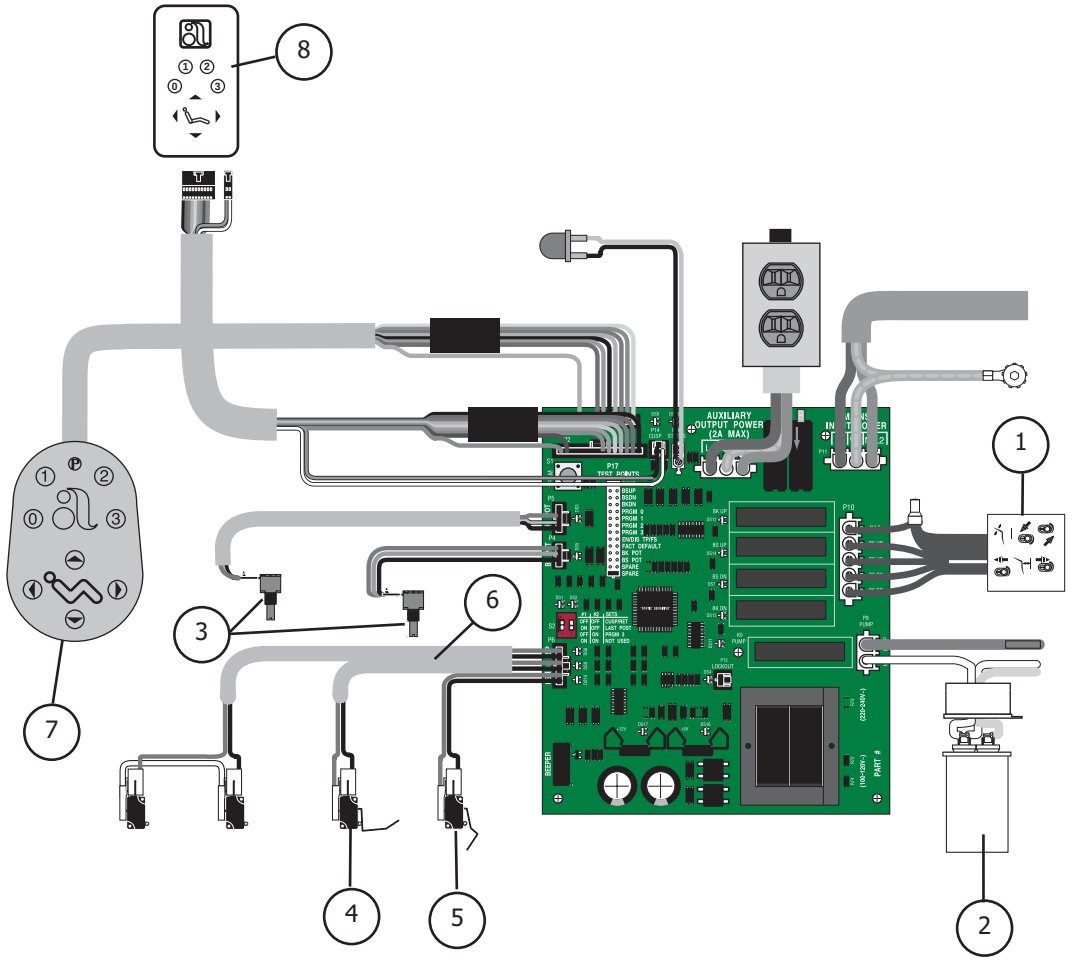


Correcting Hydrostatic Lock

NOTE: If there is no cuspidor, remove jumper from cable and place on board



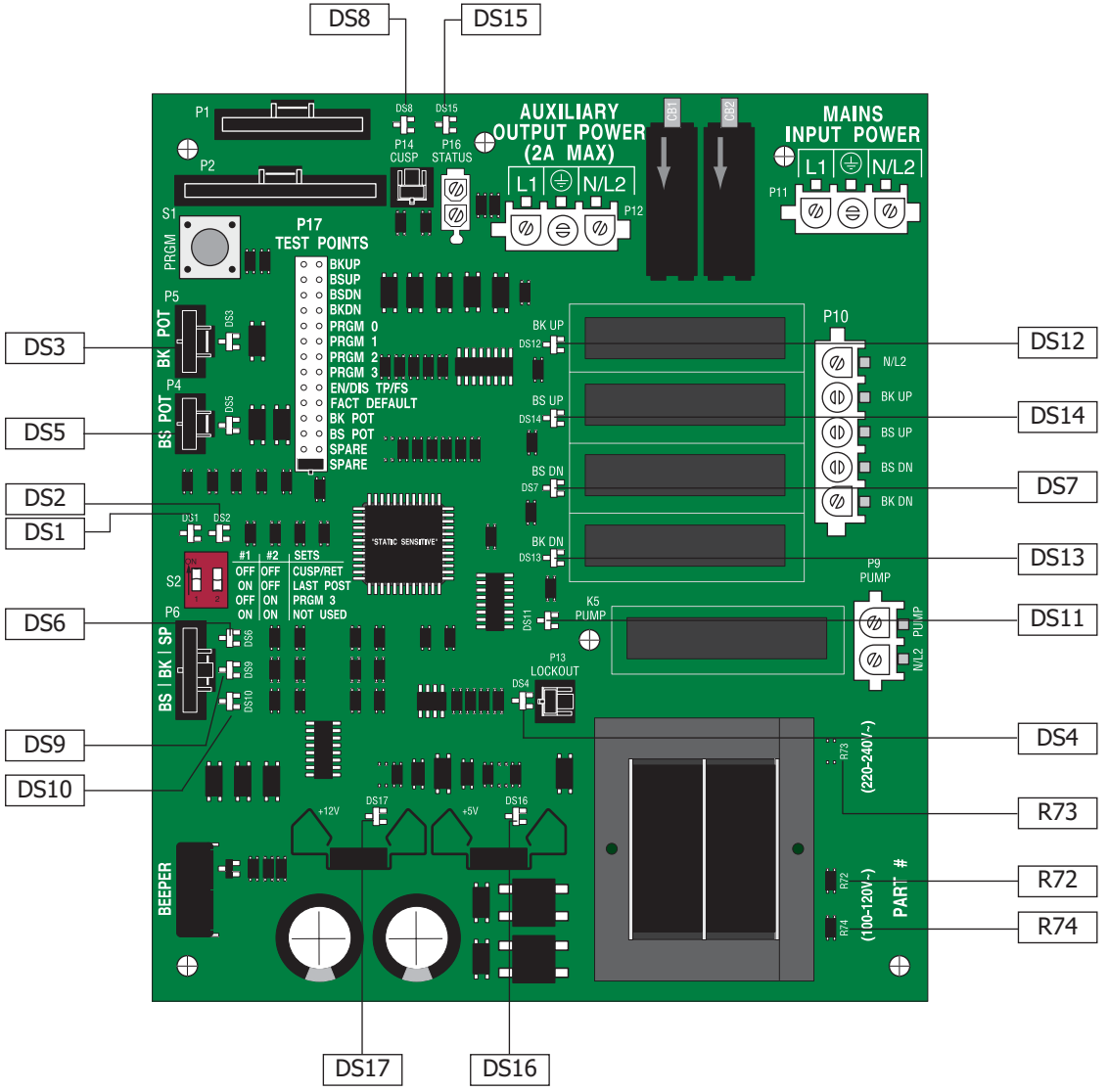
Item #	Part Number	Description
1	61.1332.00 61.1333.00 61.1334.00	100V, Yellow wires 120V, Black wires 240V, Red wires
2	90.1031.00 90.1034.00	Capacitor with boot (100-120V) Capacitor with boot (240V)
3	041.372.00	Positioning potentiometer
4	61.2065.00	Back up limit switch
5	044.184.01	Base up limit switch
6	61.2099.00	Cable assy, tilt switch (1040) only
7	61.3043.00	8-button footswitch
8	39.1045.00 39.1385.00 39.1090.00 39.1090.00	Chair touchpad Performer touchpad Cascade Master with cuspidor Cascade Master w/o cuspidor



To Replace Circuit Board P/N	Order this kit
61.2510.00 61.1214.01 61.1373.01	90.1029.00 (100-120V)
61.2512.00 61.1217.01	90.1029.01(220-240V)

LEDs

NOTE: Refer to Testing Factory Defaults for more details.



LED	Description	Information Communicated
DS1 DS2	S2 (red DIP switch) is ON	Switch is ON
DS3	Back Potentiometer LED ON	Back potentiometer is functioning normally when the chair back is moving
DS4	Handpiece Lockout LED ON	Lockout enabled
DS5	Base Potentiometer LED ON	Base potentiometer is functioning normally when the chair base is moving
DS6	Chair Stop Plate Limit Switch LED ON	Chair stop plate limit switch activated
DS7 DS11 DS12 DS13 DS14	Base Down LED Pump LED Back Up LED Back Down LED Base Up LED	Relay is ON when LED is ON and the function is moving
DS8	Cuspidor Limit Switch LED ON	Cuspidor limit switch activated, or jumper is missing
DS9	Back Up Limit Switch LED ON	Back Up limit switch activated
DS10	Base Up Limit Switch LED ON	Base Up limit switch activated
DS15	Status LED ON	ON: Normal operation OFF: Microcontroller is not functioning. Verify voltage regulator LEDs (DS16 and DS17) are ON. Is the chair plugged in? Circuit breaker tripped? Slow Blink: Check cuspidor (DS8) and stop plate (DS6) limit switch LEDs Fast Blink: Check handpiece lockout (DS4) LED Double Blink: A SPARE jumper is in the FACT DEFAULT position
DS16	5V Regulator LED OFF	1. Power to circuit board is OFF, or 2. There is a short in the cable to the base or back potentiometer. Disconnect all cables except the power cable. Plug the cables in one at a time (the LED will turn ON when the problem is fixed).
DS17	12V Regulator LED OFF	1. Power to circuit board is OFF, or 2. There is a short in the cable to the status light or limit switch (the LED will turn ON when the problem is fixed).

Testing and Programming the Circuit Board

WARNING

The chair will begin to move automatically during this test; to avoid injury or equipment damage, remove all possible obstructions and maintain a safe distance from the chair. To interrupt the chair cycle, press any button on the touchpad or footswitch, or activate the chair stop plate.

Follow these steps to test and program the chair circuit board.

Task	Description
1	Insert the SPARE jumper into the FACT DEFAULT location (on P17). Result: The chair will cycle the base and back movements and automatically reprogram the memory positions to the factory settings (position 0 to entry/exit; 1 and 2 to the same pre-programmed positions; and 3 to cuspidor/return). If the circuit board beeps three times, continue with step two. If the circuit board beeps just once, the chair cycle has been interrupted. Diagnose and correct any errors, then press either circuit breaker for five seconds to restart the cycle (refer to *Testing Factory Defaults*).
2	Move the jumper from the FACT DEFAULT location (on P17) back to the SPARE location. **NOTE:** The jumper must be in the SPARE position for normal chair functions and safe operation.
3	Press "1" on the touchpad or footswitch, or the green position on the 8-function footswitch. Result: The chair will move to the operating position.
4	Press "0" on the touchpad or footswitch, or the red button on the 8-function footswitch. Result: The chair will move to the entry/exit position. **NOTE:** The chair programmable position buttons can be reprogrammed to the desired positions as specified by the dental team.

Testing Factory Defaults

The table lists conditions and corrective actions for testing the factory defaults for LEDs.

Problem

Factory Default test will not start (LEDs DS15, DS16 and DS17 are Off)

If . . .	Then . . .
Transformer thermal limiter is open	Wait for transformer to cool off.
Circuit breaker is tripped	Reset circuit breaker (short circuit fault currents may damage the circuit breaker and prevent it from resetting).

Factory Default test will not start (LED DS15 is Off; DS16 and DS17 are ON)

If . . .	Then . . .
Input voltage is too low or is outside the required range	Verify input voltage and voltage selection resistors (100-120VAC=R72 and R74) (220-240VAC=R73).
Microcontroller is not functioning	Replace the circuit board.

Factory Default test will not start (LED DS15 is blinking; DS16 and DS17 are ON)

If . . .	Then . . .
Input voltage is too low or is outside the required range	Verify input voltage and voltage selection resistors (100-120VAC=R72 and R74) (220-240VAC=R73).
Microcontroller is not functioning	Replace the circuit board.

Problem	Action

Factory Default test halts during the BASE UP test and the PCB board beeps one time

If . . .	Then . . .
Input voltage is too low or is outside the required range	Verify input voltage and voltage selection resistors (100-120VAC=R72 and R74 (220-240VAC=R73).
Base Up limit switch is activated	Verify switch operation.
Motor thermal limiter is open, motor is hot	Wait for motor to cool off.
Motor capacitor is defective	Test capacitor and replace, if needed.
Base Up solenoid is defective	Test solenoid and replace, if needed.
Base is in hydrostatic lock	Refer to *Correcting Hydrostatic Lock*.
Potentiometer is not changing voltage	Verify potentiometer LED comes ON when base is moving. Check potentiometer mechanical drive and electrical connections.

Factory Default test halts during the BACK DOWN test and PCB board beeps one time

If . . .	Then . . .
Stop plate limit switch is activated	Verify switch operation.
Stop plate is jammed	Remove and reinstall the stop plate.
Back Down solenoid is defective	Test solenoid and replace if needed.
Back is in hydrostatic lock	Refer to *Correcting Hydrostatic Lock*.
Potentiometer is not changing voltage	Verify potentiometer LED is ON when back is moving. Check potentiometer mechanical drive and electrical connections.

Problem | **Action**

Factory Default test halts during the BACK UP test

If . . .	Then . . .
Back up limit switch is activated	Verify switch operation.
Back Up solenoid is defective	Test solenoid and replace, if needed.
Back is in hydrostatic lock	Refer to the *Correcting Hydrostatic Lock*.
Potentiometer is not changing voltage	Verify potentiometer LED is ON when back is moving. Check potentiometer mechanical drive and electrical connections.

Factory Default test halts during the BASE DOWN test

If . . .	Then . . .
Stop plate limit switch is activated	Verify switch operation.
Base Down solenoid is defective	Test solenoid and replace if needed.
Base is in hydrostatic lock	Refer to *Correcting Hydrostatic Lock*.
Potentiometer is not changing voltage	Verify potentiometer LED is ON when base is moving. Check potentiometer mechanical drive and electrical connections.

Chair moves by itself when power is turned ON

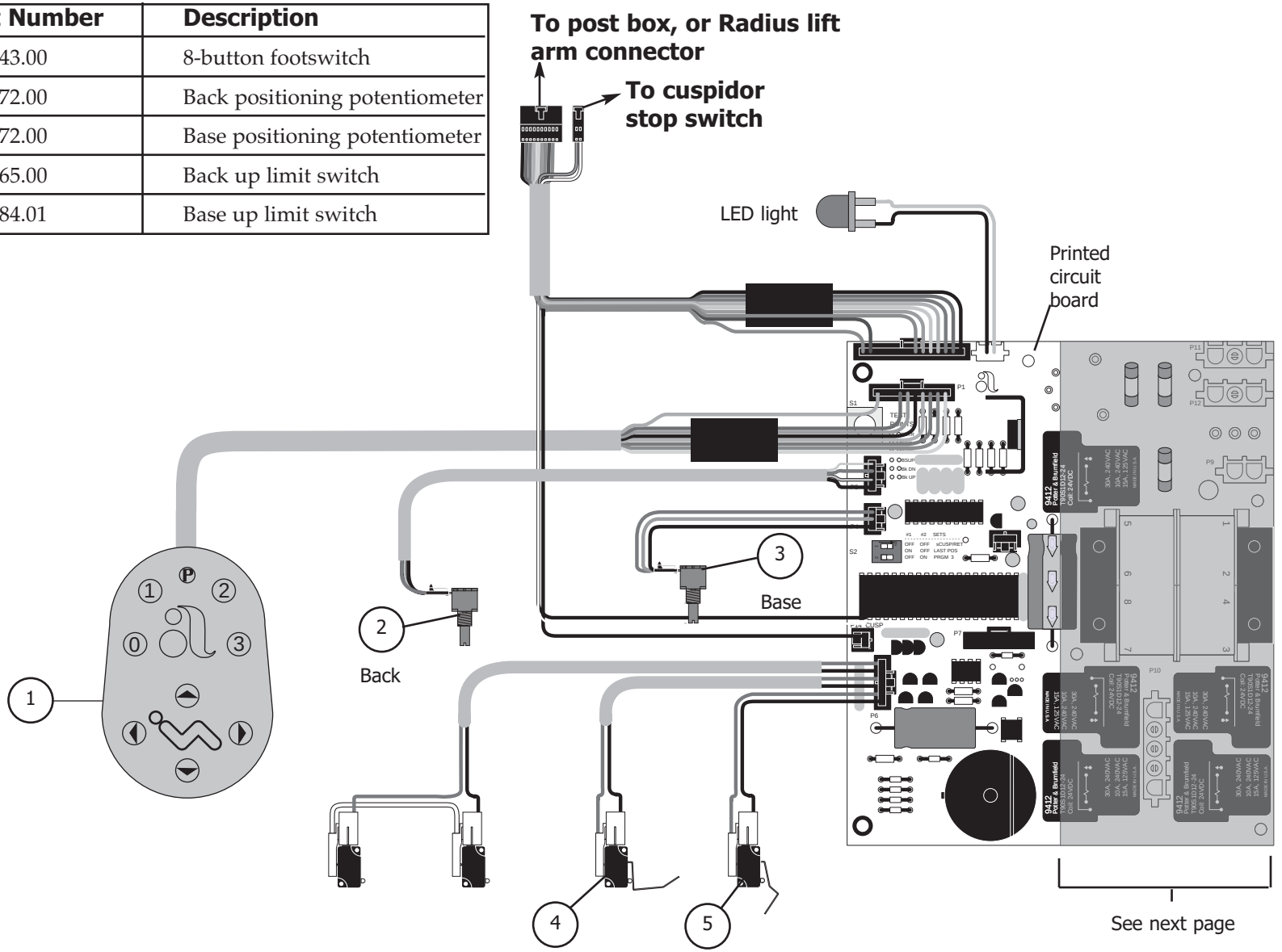
If . . .	Then . . .
The jumper is in FACT DEFAULT position	Verify that the jumper is in the SPARE position.
Short circuit in touchpad or footswitch	Unplug the touchpad and footswitch; reset the circuit breaker. If the problem isn't repeated, the touchpad or footswitch may have shorted.
Short circuit on circuit board	Replace the circuit board.

Identifying New Features

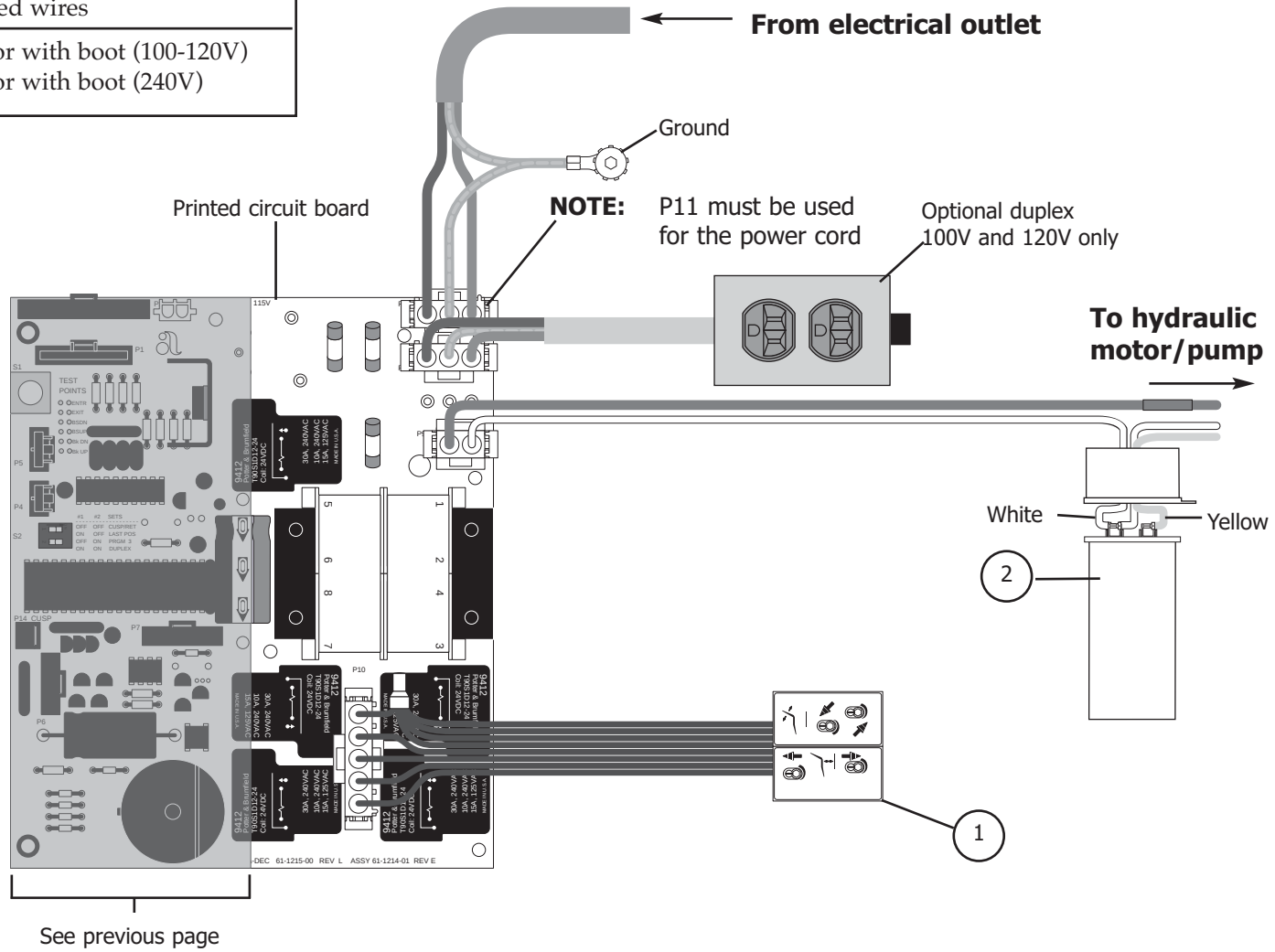
The chart provides information on new features and associated programming on the PCB.

Feature	Programming
Raise the chair with the stop plate limit switch	Plug the chair into an electrical outlet. Tap the chair stop plate three times within five seconds and hold on the third tap. Result: The chair base will continue to rise as long as the stop plate is held in. This function is automatically disabled after five minutes but is re-enabled upon each power up. To reset the five-minute timer, depress either circuit breaker until the LEDs turn OFF, then release the circuit breaker.
Enable and disable touchpad and footswitch buttons	Place the SPARE jumper in the EN/DIS TP/FS position of the Test Points header P17. Push the buttons to be Enabled or Disabled (PRGM, PRGM 0, PRGM 1, PRGM 2, PRGM 3). Result: One beep indicates the button is disabled. Three beeps indicate the button in enabled. Place the SPARE jumper back into the SPARE position of the Test Points header P17.
Handpiece lockout	Plumb a normally open air-electric switch (kit P/N 61.1384.00) to the air-coolant tubing (green with long white dashes). Insert the two position connector from the air-electric switch into P13 Lockout (next to the transformer)
Diagnostic LEDs	See *Diagnostic LEDs for the Circuit Board*.
Test Points Header	Use a SPARE jumper to test the chair manual functions (BKUP, BSUP, BSDN, BKDN). BK POT and BS POT points allow test meter check of potentiometer voltages and measurement of the analog DC voltage from pin 2 of the potentiometer.

Item #	Part Number	Description
1	61.3043.00	8-button footswitch
2	041.372.00	Back positioning potentiometer
3	041.372.00	Base positioning potentiometer
4	61.2065.00	Back up limit switch
5	044.184.01	Base up limit switch



Item #	Part Number	Description
1	 61.1332.00 61.1333.00 61.1334.00	Hydraulic manifold with 100V, Yellow wires 120 V, Black wires 240 V, Red wires
2	90.1031.00 90.1034.00	Capacitor with boot (100-120V) Capacitor with boot (240V)



Fuse Table for Old-style Circuit Boards (no LEDs)

Actual Size 

Slo-Blo Fuses 3AG, 1 1/4" X 1/4" (31.75mm X 6.35mm)

Amps	Description	Where used	Part Number
.125	3AG, Slo-Blo, 250V	Chairs, 100/120V	041.360.00
.150	3AG, Slo-Blo, 250V	Chairs, 240V	046.126.00
.300	3AG, Slo-Blo, 250V	1040, 1030 Chairs 100/120V 1010/1015/1020/1021 Chair, 120V 1010/1020 Chair, 100V 1005 Priority Chair 240V	046.069.00
.375	3AG, Slo-Blo, 250V	Transformer 120V/24V Accessory	046.021.00
.600	3AG, Slo-Blo, 250V	1005 Priority Chair 100/120V	046.070.00
5.0	3AG, Slo-Blo, 250V	Chairs 240V UK	046.100.00

Actual Size 

Time Lag Fuses, 5mm X 20mm (1/5" X 3/4")

Amps	Description	Where used	Part Number
.040	Time Lag, 250V	Chairs 230V*	044.194.00
.063	Time Lag, 250V	Chairs 115V*	044.193.00
6.30	Time Lag, 250V	Chairs 230V*	044.147.00
10.0	Time Lag, 250V	Chairs 115V*	044.192.00

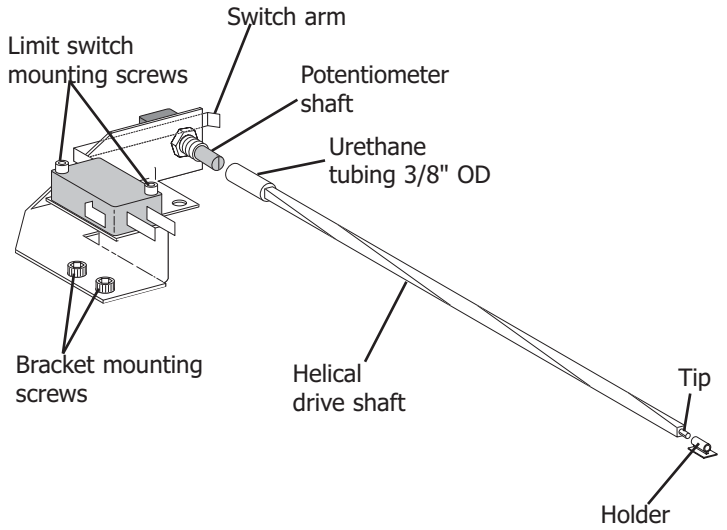
*Decade chairs after E863254; Cascade chairs after E863116

NOTE: There are no replaceable fuses on the following circuit boards: 90.1029.00 (100-120V) and 90.1029.01 (220-240V).

Removing the Helical Drive Shaft (Cascade 1040 Chair)

Follow these steps to remove the limit switch and the helical drive shaft from the potentiometer shaft.

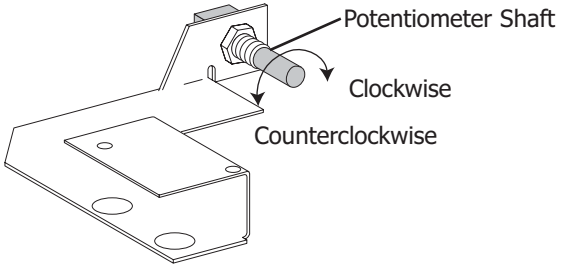
Task	Description
1	Position the chair back full down and remove the seat upholstery.
2	Disconnect the limit switch wiring harness from the limit switch.
3	Remove the limit switch mounting screws and limit switch from the bracket. Lower the toeboard, if necessary, to access the rear mounting screw. Do not bend the switch arm.
4	Remove the bracket mounting screws.
5	Remove the helical drive shaft from the potentiometer shaft. While holding the helical shaft, reach underneath the chair to th base of the backrest. Grasp the bracket and pull it away from the helical shaft.
6	Remove the helical drive shaft from the chair by moving it toward the chair backrest and then slightly to the side to dislodge it from the holder and guide.



Cascade 1040 Back Positioning Potentiometer and Limit Switch

Adjusting the Potentiometer (Cascade 1040 Chair)

Turn the potentiometer shaft counterclockwise until it will no longer turn. Then turn the shaft clockwise 1/8 of a turn.



Setting the Back Potentiometer on the Cascade 1040 Chair

Reinstalling the Helical Drive Shaft (Cascade 1040 Chair)

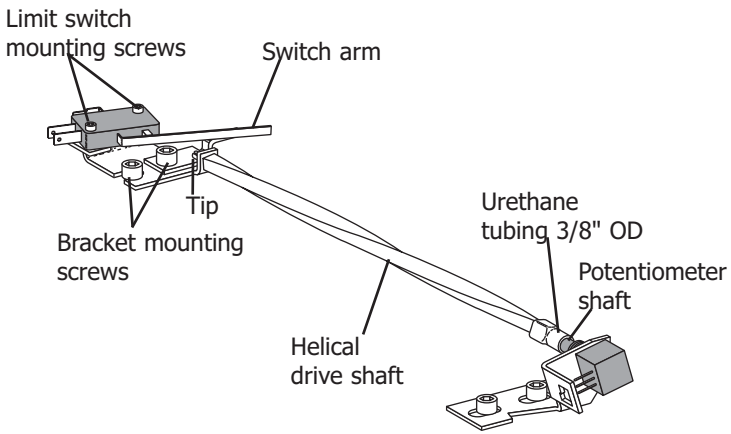
Follow these steps to reinstall the back positioning potentiometer helical shaft and adjust the limit switch.

Task	Description
1	Reinstall the helical drive shaft by fully inserting the tip through the guide and into the holder.
2	Install the helical shaft onto the potentiometer shaft.
3	Reinstall the mounting screws, being careful not to pinch any wires.
4	Reinstall the limit switch on the bracket and reconnect it with the wiring harness.
5	Ensure the positioning potentiometer electrical connections are complete.
6	Reprogram the auto-positioning functions (refer to *Programming the Chair*).
7	Reinstall the upholstery.

Removing the Helical Drive Shaft (Decade 1011/1021 Chairs)

Follow these steps to remove the limit switch and helical drive shaft from the chair.

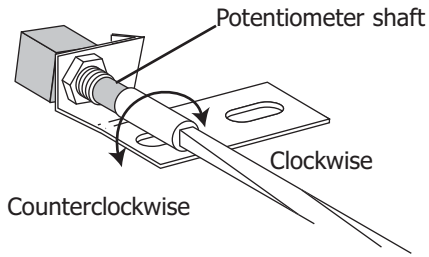
Task	Description
1	Position the chair back full up and remove the seat upholstery.
2	Disconnect the limit switch wiring harness from the limit switch.
3	Remove the limit switch mounting screws and limit switch from the bracket. Do not bend the switch arm.
4	Remove the bracket mounting screws.
5	Remove the helical drive shaft from the potentiometer shaft. While holding the helical shaft, reach underneath the chair to the base of the backrest. Grasp the bracket and pull away from the helical shaft.
6	Remove the helical drive shaft from the chair by moving it toward the chair backrest and then slightly to the side to dislodge it from the holder and guide.



Decade 1011/1021 Back Positioning Potentiometer and Limit Switch

Adjusting the Potentiometer (Decade 1011/1021 Chairs)

Turn the potentiometer shaft clockwise until it will no longer turn. Then turn the shaft counterclockwise 1/8 of a turn.



Setting the Back Potentiometer on the Decade 1011/1021 Chair

Reinstalling the Helical Shaft (Decade 1011/1021 Chairs)

Follow these steps to reinstall the back positioning potentiometer helical shaft and to reposition the limit switch.

Task	Description
1	Reinstall the helical drive shaft by fully inserting the tip through the guide and into the holder.
2	Install the helical shaft onto the potentiometer shaft.
3	Reinstall the mounting screws, being careful not to pinch any wires.
4	Reinstall the limit switch on the bracket and reconnect it with the wiring harness.
5	Ensure the positioning potentiometer electrical connections are complete.
6	Reprogram the auto-positioning functions (refer to *Programming the Chair*).
7	Reinstall the upholstery.

Working with the Back and Base Positioning Potentiometers

The back and base positioning potentiometers (pots) perform two tasks for the controller:

- Provide the controller with a voltage level representing the current position of the chair base and back. The voltage level is stored by the controller for later reference during auto-positioning.
- Tell the controller where the chair base and back are currently positioned. The controller compares the current voltage level to the voltage level stored during auto-positioning programming.

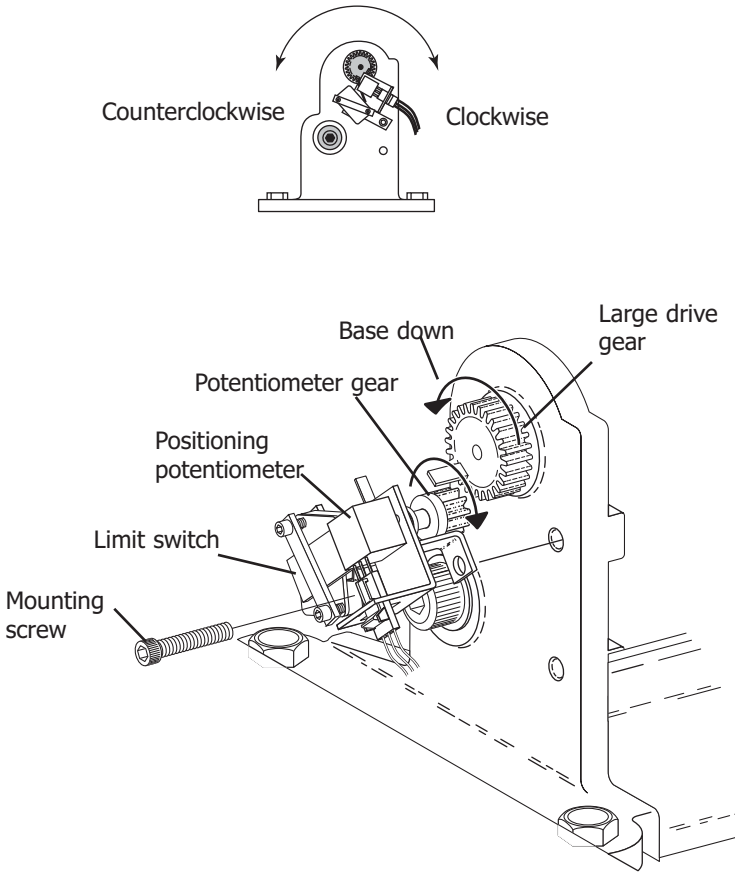
The base positioning pot is gear-driven by movement of the chair lift arm. The back positioning pot is driven by movement of the chair back.

Adjusting the Base Positioning Potentiometer

Follow these steps to adjust the base positioning potentiometer.

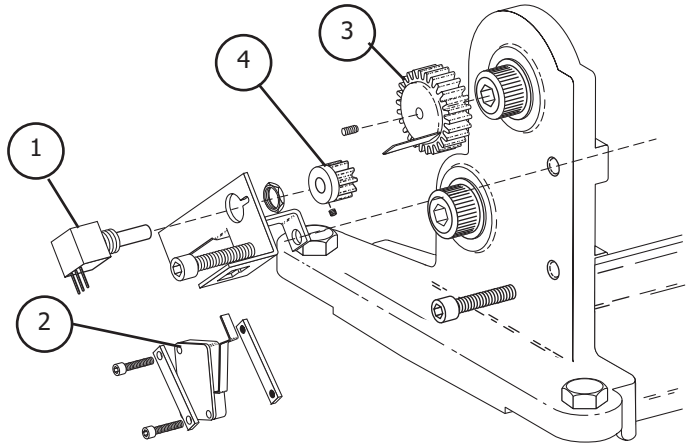
Task	Description
1	Remove the motor/pump cover and position the chair base down.
2	Remove the mounting screw.
3	Turn the potentiometer gear clockwise until it stops.
4	Align the potentiometer assembly, then turn the potentiometer gear counterclockwise two teeth (relative to one tooth on the large drive gear).
5	Ensure all electrical connections to the limit switch and positioning potentiometer are properly connected
6	Raise the chair base while observing the two gears for binding.
7	Reinstall the motor/pump cover and reprogram the pre-positioning functions.

NOTE: Do not raise the base to full up until you have adjusted the base up limit switch (see Adjusting the Base Up Limit Switch).



Adjusting the Base Positioning Potentiometer

Base Positoning Potentiometer



Replacing Base Positioning Potentiometer, Limit Switch and Gears

Item #	Part Number	Description
1	041.372.00	Potentiometer w/nut 5K ohm, +20%, 1W
2	044.184.01	Limit switch, modified
3	61.1295.00	Gear, 24 pitch 30 tooth
4	61.1222.00	Potentiometer gear

Working with the Back Up and Base Up Limit Switches

The chair base and back up limit switches detect when the maximum allowed up travel is reached. The two limit switches are normally closed enabling the base and back up relay circuits. If an up limit switch is opened, two things occur:

- The base or back up function relay is disabled causing the up function solenoid to shut off the flow of hydraulic fluid to the cylinder.
- The controller, sensing that a back up or base up relay has been disabled, turns off the hydraulic pump.

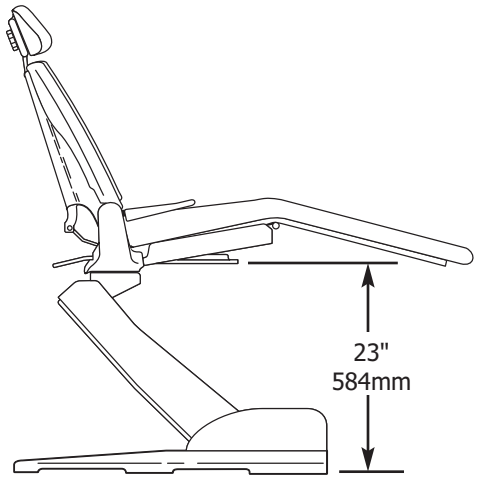
The base up limit switch is actuated by a pin located on the positioning potentiometer drive gear. The back up limit switch is actuated by a glide block, which is part of the back tilt mechanism.

Adjusting the Base Up Limit Switch

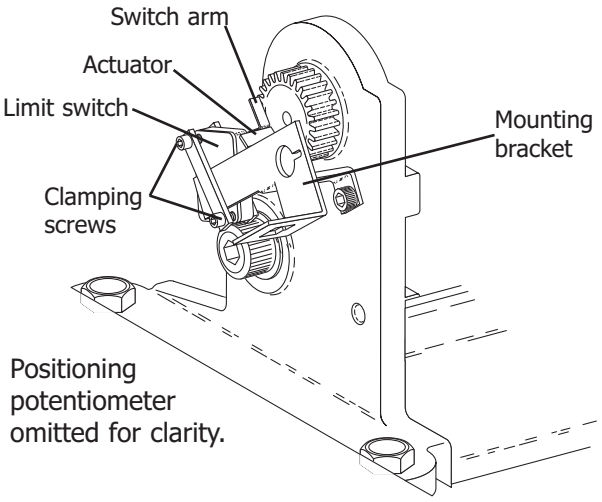
Follow these steps for adjusting the base up limit switch.

NOTE: For correct limit switch actuation, the actuator tab on the large gear should be at approximately the 5:30 clock position when the chair is full base down.

Task	Description
1	Remove the motor/pump cover.
2	Loosen the two screws clamping the limit switch to the mounting bracket.
3	Position the chair base up until the distance from the floor to the base of the upper chair casting is 23" (584mm).
4	Push the limit switch against the actuator on the drive gear until the switch opens (clicks).
5	Tighten the clamping screws, making sure they do not hit the gear.
6	Lower the chair base down until the limit switch has closed, then raise the chair full base up. Check the distance between from the floor to the base of the upper chair casting to ensure it is 23" (584mm).



Raising the Chair to the Correct Base Up Height



NOTE: Positioning potentiometer omitted for clarity.

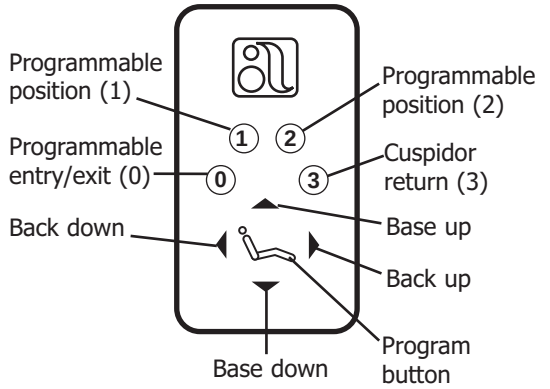
Adjusting the Base Up Limit Switch

Programming the Chair

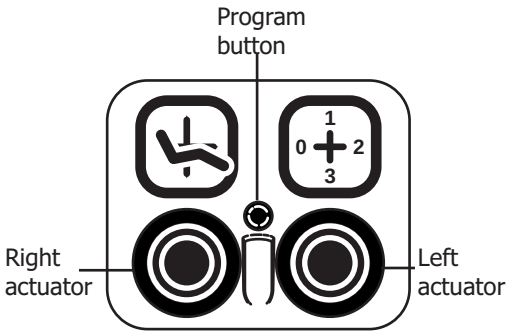
Follow these steps to set the auto-positioning for the chair.

Task	Description
1	Use the footswitch or touchpad to set the chair at the desired position for base and back.
2	Press and release the program button. Result: You will hear a single beep.
3	Within four seconds, press an automatic position button (0, 1, 2, or 3) on the footswitch or touchpad to store the chair position. On an 8-function footswitch, move the actuator to the desired position. Result: You will hear three beeps confirming that the function has been programmed.

NOTE: PCBs manufactured before 1994, do not beep. Test the programming by trying it.

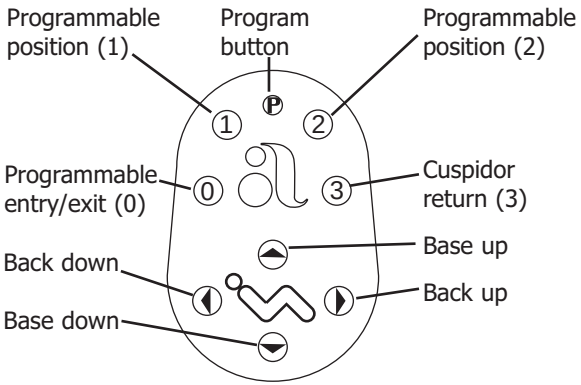


Chair Touchpad



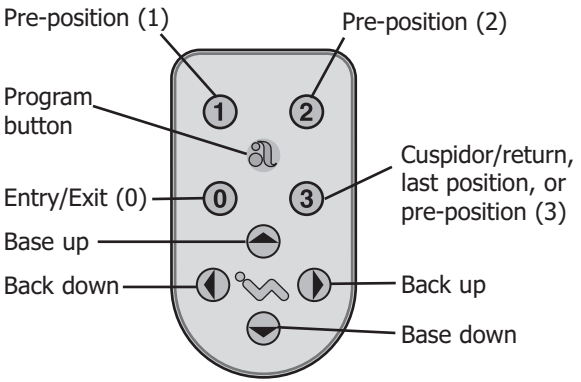
8-Function Footswitch

Replacement membrane P/N 61.2189.00



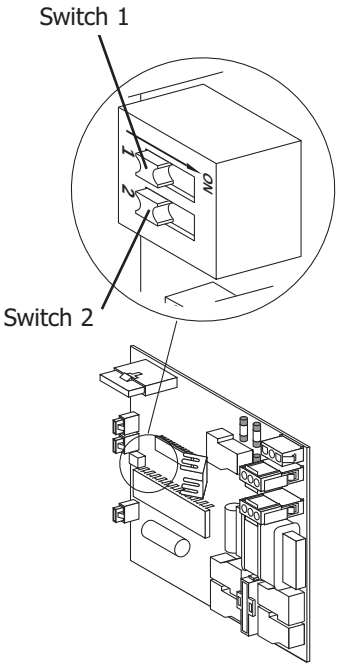
8-Button Footswitch

Replacement membrane P/N 61.3048.00



Performer III Touchpad

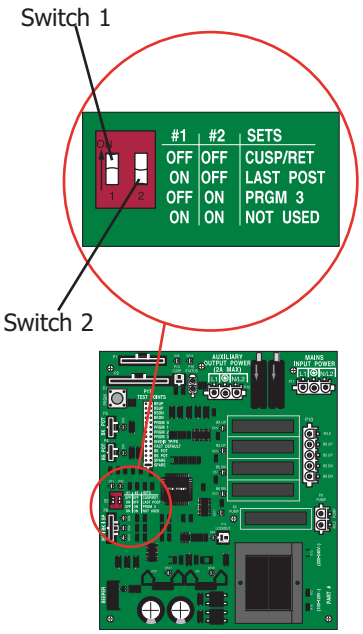
Programming Function 3



Function 3 DIP Switch before 2000

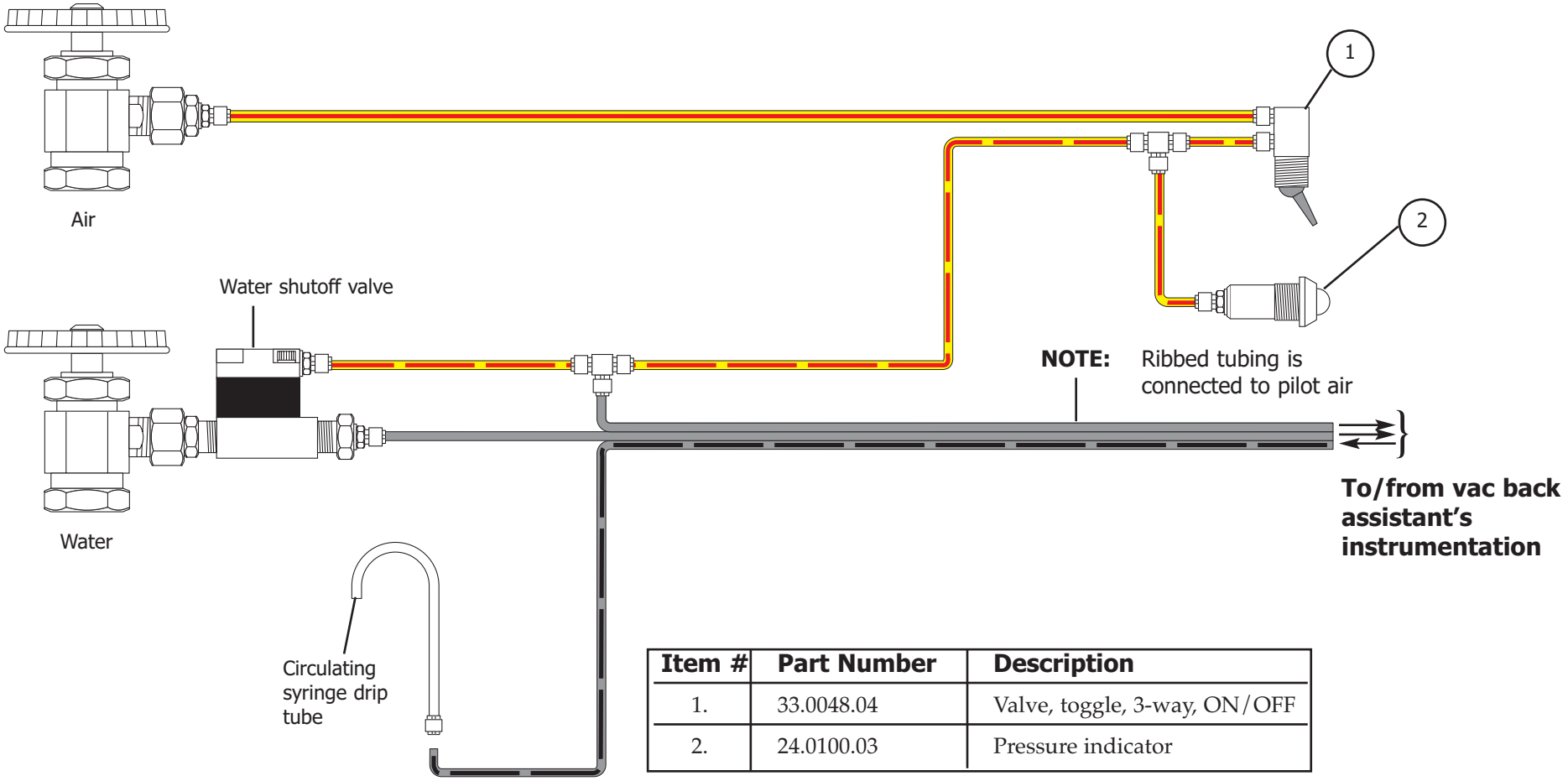
Function	Description	Programming
Cuspidor/Return **NOTE:** Chairs with S/N J467728 and later are factory set with function 3 as cuspidor/return	Used to raise the chair back to a programmable upright position providing the patient access to the cuspidor. Momentarily pushing button 3 on the touchpad or 8-button footswitch, or moving the actuator to position three on the 8-function footswitch, returns the back to the previous position.	Switches 1 and 2 are OFF.
Last Position	A non-programmable position that simply moves the chair base and back to their previous positions.	Switch 1 is ON and switch 2 is OFF. Go back and forth between two positions by momentarily moving the righthand actuator on the 8-function footswitch to position 3 or pressing number 3 on the touchpad or 8-button footswitch.
Programmable Position **NOTE:** Chairs up to S/N J467727 are factory set with function 3 as a programmable position	This option is used to set the base and back to a predesignated position. It allows this function to be programmed like 0, 1, and 2.	Switch 1 is OFF and switch 2 is ON. Move the chair to the desired position. Press and release the program button. After the beep, push button 3 on the touchpad or 8-button footswitch or move the actuator to position 3 on the 8-function footswitch. The single beep confirms the position is programmed.

Programming Function 3



Function 3 DIP Switch after 2000

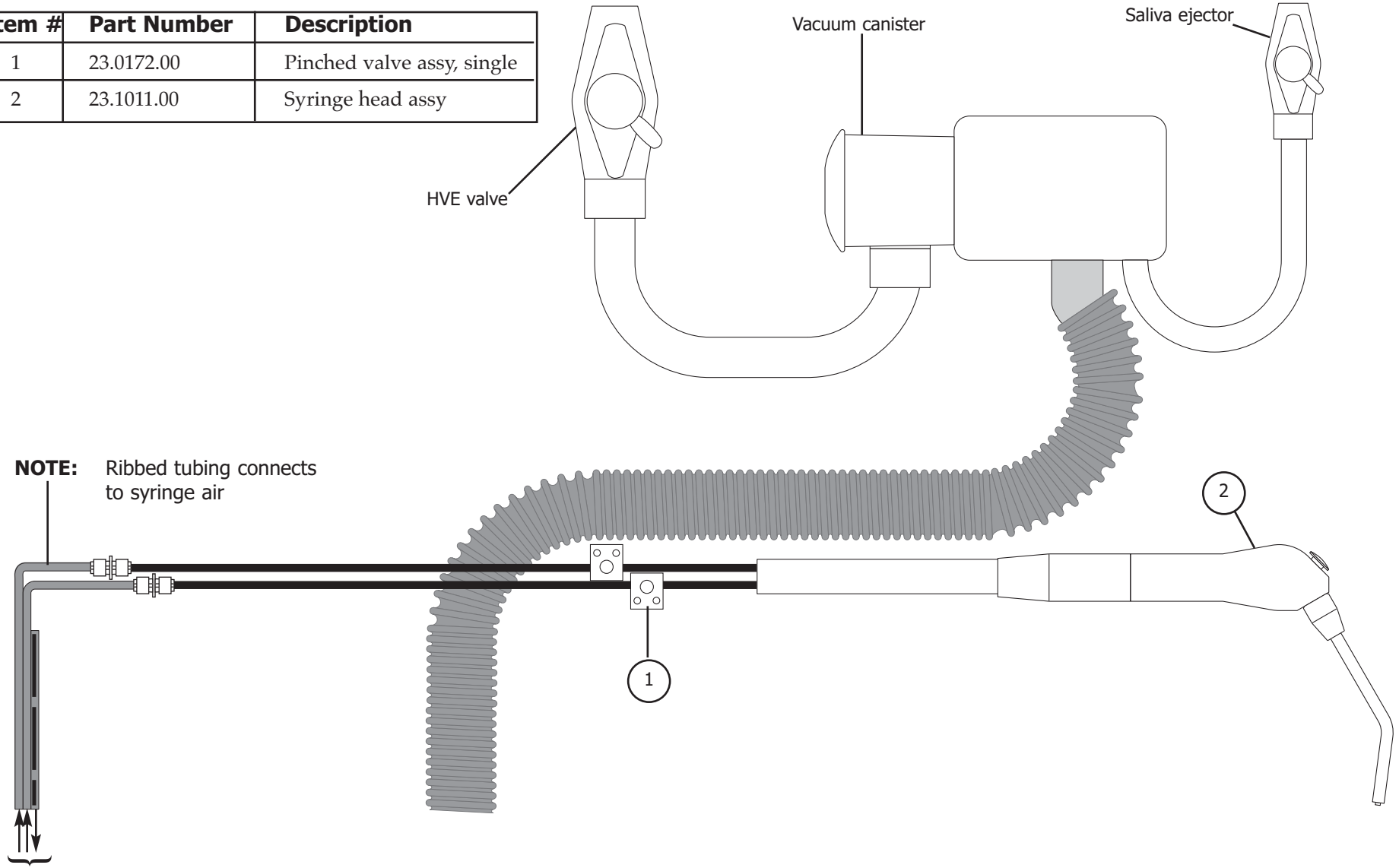
Function	Description	Programming
Cuspidor/Return	Used to raise the chair back to a programmable upright position providing the patient access to the cuspidor. Momentarily pushing button 3 on the touchpad or 8-button footswitch, or the actuator to position 3 on the 8-function footswitch will return the back to the previous position.	Both switches 1 and 2 are OFF.
Last Position	A non-programmable position that simply moves the chair base and back to their previous positions.	Switch 1 is ON and switch 2 is OFF. Go back and forth between two positions by momentarily pushing the right hand rocker button to position 3 or pressing number 3 on the touchpad.
Programmable Position	Used to set the base and back to a predesignated position.	Switch 1 is OFF and switch 2 is ON. Move the chair to the desired position. Press and release the program button. After the tone, push button 3 on the touchpad or footswitch or move the actuator to position 3 on the 8-function footswitch. The audible tone confirms the position is programmed.

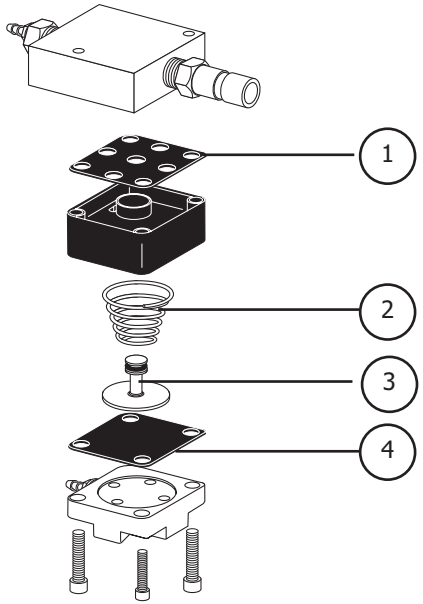


Item #	Part Number	Description
1.	33.0048.04	Valve, toggle, 3-way, ON/OFF
2.	24.0100.03	Pressure indicator

Cascade 1040 Vac Back Assistant's Instrumentation

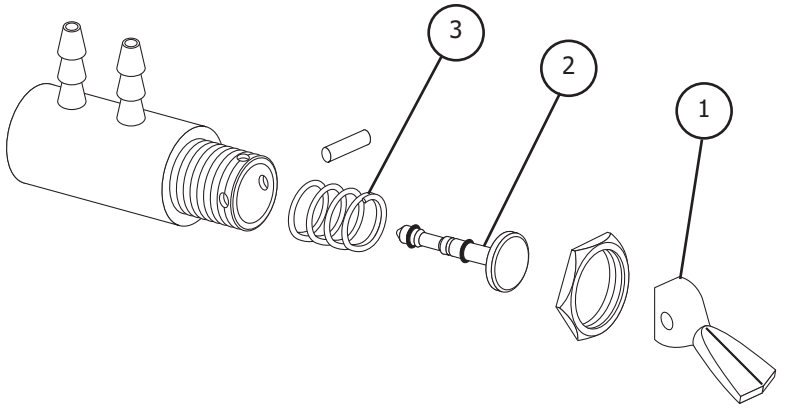
Item #	Part Number	Description
1	23.0172.00	Pinched valve assy, single
2	23.1011.00	Syringe head assy





Water Shutoff Valve
34.0031.00

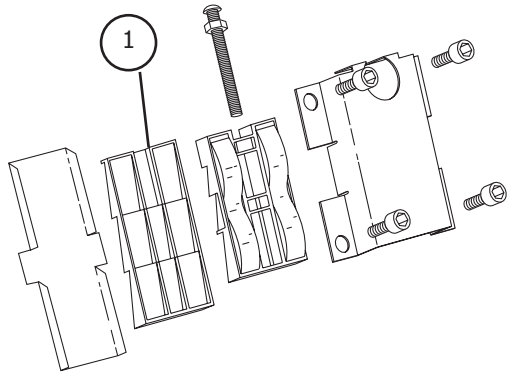
Item #	Part Number	Description
1	24.0137.01	9-hole gasket, pkg 10
2	013.032.00	Spring, conc, comp, .260/.350 OD
3	24.0132.00	Piston with O-ring, Delrin
4	24.0440.02	Diaphragm, pkg 10



3-Way Toggle Valve
33.0048.04

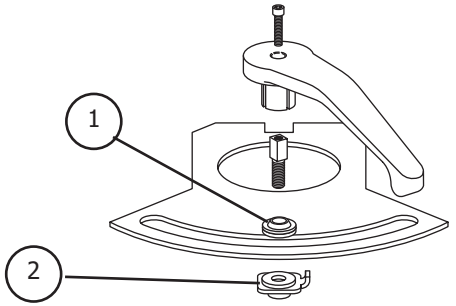
Item #	Part Number	Description
1	33.0031.01	Toggle with pin, Gray
2	29.0840.00	Stem with O-rings, 3-way
3	22.0040.00	Spring, comp., .300 OD x .40

Cascade 1040 Glide Bar Tension Block



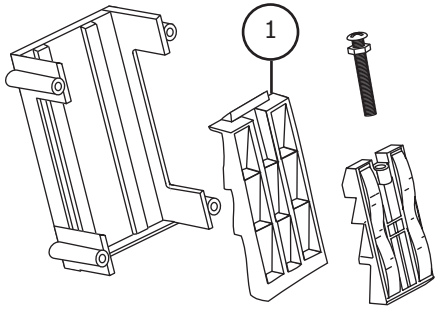
Item #	Part Number	Description
1	61.1569.00	Wearpad, sliding wedge

Cascade 1040 Swivel Brake 61.2055.00



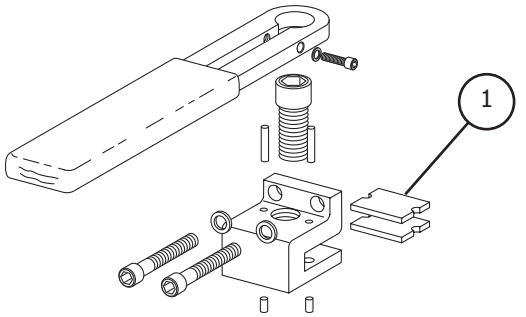
Item #	Part Number	Description
1	61.1228.00	Thrust washer-brake pad assy
2	61.2227.00	Nut-brake pad assy

Decade 1011/1021 Glide Bar Tension Block



Item #	Part Number	Description
1	61.1569.00	Wearpad, sliding wedge

Decade 1011/1021 Swivel Brake 61.1538.01



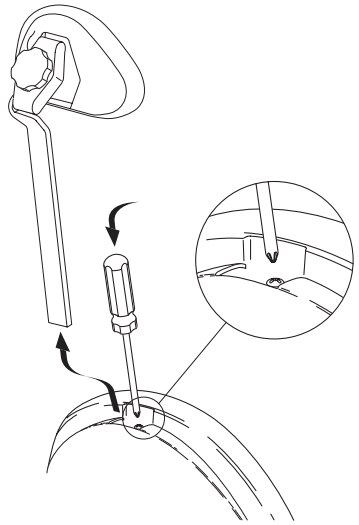
Item #	Part Number	Description
1	61.1537.01	Replacement brake pads

Adjusting the Double-Articulating Headrest

Follow these steps to adjust the headrest.

Task	Description
1	Adjust the glide bar until the headrest moves freely yet maintains its position.
2	Turn the screw clockwise to increase friction and hold the headrest more securely.
3	Turn the screw counterclockwise to decrease friction and allow the headrest to move up and down more freely. The Decade chair adjustment screw is located in back of the glide bar.

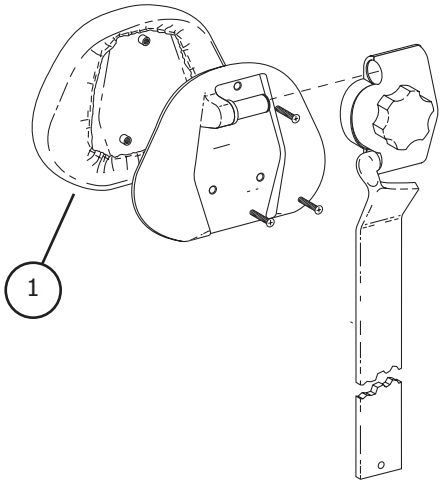
NOTE: Use a phillips head screwdriver to adjust the glide bar tension. You may need to remove the back upholstery to access the adjustment screw.



Adjust Cascade 1040 Headrest Glide Bar Tension

Upholstery Replacement

Item #	Part Number	Description
1	61.2116.XX	Double articulating headrest upholstery
—	61.3046.00	Conversion kit, 1040 screw-on headrest cushion. Applies to chairs with the wire formed headrest cushion (S/N E442969 and before).



Double-Articulating Headrest 61.2265.00

Troubleshooting PCBs with no LEDs

Diagnostic information is presented in the following charts.

Problem	Action
Chair is inoperative	1 Do any relays on the printed circuit board click? Refer to *Testing Relay Click*. YES: Go to step 2. NO: Go to step 3. 2 Is the base/back all the way down? YES: Go to *Base or Back Up Function is Inoperative*. NO: Go to step 3. 3 Has the solenoid fuse blown (120V only)? YES: Replace the fuse. Check for shorted solenoids or shorted wiring to the solenoids (refer to *Testing Solenoid Continuity and Testing Wiring Harness Continuity*). Retest chair functions. NO: Go to step 4. 4 Complete the steps outlined in *Testing Magnetic Pull*. Is there magnetic pull at each solenoid? YES: Go to step 5. NO: Remove and replace the faulty solenoid (refer to *Removing a Solenoid* and *Replacing a Solenoid*). Retest chair functions. 5 Is the chair in hydrostatic lock? YES: Remedy hydrostatic lock (refer to *Correcting Hydrostatic Lock*). Retest chair functions. NO: Check for and replace a faulty manifold or valve.

Problem	Action
Chair is inoperative	6 Is the printed circuit board fuse(s) blown? YES: Remove and replace the fuse, then check the potentiometer wiring for damage, shorts, or improper wiring. If the fuse blows again, disconnect the potentiometer wiring at P4 and P5 on the printed circuit board. If the fuse still blows, remove and replace the printed circuit board. Otherwise remove and replace the potentiometer wiring. NO: Check the condition of the stop plate limit switches and wiring. Check the printed circuit board connector P6 (limit switches). Unplug the chair from its power outlet and plug it in again. If the chair is still inoperative, make sure there is power at the outlet. If the preceding steps do not solve the problem, go to step 7. 7 Disconnect the footswitch and, if installed, the touchpad. Use the printed circuit board test points to activate chair up functions (refer to *Using Chair Test Points*). Does the chair work now? YES: If there is a footswitch only, remove and replace the footswitch. If there is a touchpad only, remove and replace the touchpad. If there is both a footswitch and touchpad, go to step 8. NO: The printed circuit board is faulty, remove and replace the printed circuit board. 8 Reconnect the footswitch to the printed circuit board. Using the footswitch, operate the chair. Does the chair work properly? YES: Remove and replace the touchpad. NO: Go to step 9. 9 Reconnect the touchpad to the printed circuit board. Using the touchpad, operate the chair. Does the chair work properly? YES: Remove and replace the footswitch. NO: The printed circuit board is faulty, remove and replace the printed circuit board.

Problem	Action
Base or back up function is inoperative	1 Is the chair base or back up? YES: Go to step 2. NO: Go to step 3. 2 Has the up limit switch activated (opened)? Refer to *Testing Limit Switch Continuity* and *Testing Limit and Stop Switches Voltage*. YES: Normal chair operation, check base up limit switch adjustment (refer to *Adjusting the Base Up Limit Switch*). The back up limit switch is not adjustable. NO: The chair may be in hydraulic lock. Remedy the hydrostatic lock (refer to *Correcting Hydrostatic Lock*). 3 Has the solenoid fuse blown (120V only)? YES: Replace the fuse. Complete *Testing Solenoid Continuity*. Replace shorted solenoids or shorted wiring to the solenoids, as necessary. NO: Go to step 4. 4 Is the motor/pump hot? YES: Wait 20 minutes for the thermal limiter to reset. If the Up function works, check for other problems. If the Up function is still inoperative, go to step 5. NO: Go to step 5. 5 Does a relay on the printed circuit board click (refer to *Testing Relay Click*)? YES: Go to step 6. NO: Go to step 7. 6 Complete the steps outlined in *Testing Magnetic Pull*. Is there magnetic pull at the solenoid? YES: Go to step 12. NO: The solenoid is faulty. Remove and replace the solenoid (refer to *Removing a Solenoid* and *Replacing a Solenoid*).

Problem	Action
Base or back up function is inoperative	7 Disconnect the footswitch and, if installed, the touchpad. Use the printed circuit board test points to activate chair up function (refer to *Using Chair Test Points*). Does a relay on the printed circuit board click (refer to *Testing Relay Click*)? YES: Go to step 8. NO: Go to step 10. 8 Does the UP function work? YES: If there is a footswitch only, remove and replace the footswitch. If there is a touchpad only, remove and replace the touchpad. If there is both a footswitch and touchpad, go to step 9. NO: Go to step 11. 9 Reconnect the footswitch to the printed circuit board. Using the footswitch, operate the chair. Does the UP function work? YES: Remove and replace the touchpad. NO: Go to step 10. 10 Reconnect the touchpad to the printed circuit board. Using the touchpad, operate the chair. Does the UP function work? YES: Remove and replace the footswitch. NO: Go to step 11. 11 Complete the steps for *Testing Magnetic Pull*. Is there magnetic pull at the solenoid? YES: Go to step 14. NO: Remove and replace the faulty solenoid(s) (refer to *Removing a Solenoid* and *Replacing a Solenoid*).

Problem	Action
Base or back up function is inoperative	12 Is the limit switch faulty or open (refer to *Testing Limit Switch Continuity* and *Testing Limit and Stop Switches Voltage*)? YES: Adjust or remove and replace the limit switch. Adjust the base up limit switch (refer to *Adjusting the Base Up Limit Switch*). NO: Go to step 13. 13 Is the limit switch wiring faulty (refer to *Testing Wiring Harness Continuity*)? YES: Repair or replace the limit switch wiring. NO: Unplug the chair and plug it back in. If the problem remains, the printed circuit board is faulty, replace the printed circuit board. 14 Is there an open in the limit switch wiring (*refer to Testing Wiring Harness Continuity*)? YES: Repair or replace the wiring. NO: Go to step 15. 15 Is the base up limit switch out of adjustment? YES: Adjust the limit switch (refer to *Adjusting the Base Up Limit Switch*). The back up limit switch is not adjustable. NO: Go to step 16. 16 Is there noise from the motor/pump? YES: Go to step 17. NO: Go to step 18.

Problem	Action
Base or back up function is inoperative	17 Is the motor current more than 5 Amps (refer to *Testing the Motor/Pump*)? YES: The motor/pump is faulty. Remove and replace the motor/pump. NO: Remove and replace the motor/pump capacitor. Test the Up function. If it still does not work,the manifold is faulty. Remove and replace it. 18 Is there an open or short in the motor/capacitor wiring (refer to *Testing Wiring Harness Continuity*)? YES: Contact an A-dec customer service representative for proper repair procedures of the motor/pump capacitor wiring. NO: The printed circuit board is faulty, remove and replace the printed circuit board.
Base or back down function is inoperative	1 Try an Up function first, then a Down function. Is the base or back still up? YES: Go to step 2. NO: Go to step 3. 2 Has the limit switch activated (opened) (refer to *Testing Limit Switch Continuity* and *Testing Limit and Stop Switches Voltage*)? YES: Go to step 3. NO: The chair may be in hydrostatic lock. Remedy hydrostatic lock (refer to *Correcting Hydrostatic Lock*). Retest chair functions. 3 Does a relay on the printed circuit board click (refer to *Testing Relay Click*)? YES: Go to step 7. NO: Go to step 4.

Problem	Action
Base or back down function is inoperative	4 Disconnect the footswitch and, if installed, the touchpad. Use the printed circuit board test points to activate chair down functions (refer to *Using Chair Test Points*). Does the down function work? YES: If there is a footswitch only, remove and replace the footswitch. If there is a touchpad only, remove and replace the touchpad. If there is both a footswitch and touchpad, go to step 5. NO: Check condition of stop and/or cuspidor limit switches and wiring (refer to *Testing Limit and Stop Switches Voltage*, *Testing Limit Switch Continuity*, and *Testing Wiring Harness Continuity*). Check the printed circuit board connector P6 (limit switches). Unplug the chair and plug it back in. If the problem remains, the printed circuit board is faulty. Replace the printed circuit board. 5 Reconnect the footswitch to the printed circuit board. Using the footswitch, operate the chair. Does the chair down function work? YES: Remove and replace the touchpad. NO: Go to step 6. 6 Reconnect the touchpad to the printed circuit board. Using the touchpad, operate the chair. Does the chair down function work? YES: Remove and replace the footswitch. NO: Check condition of stop switch and/or cuspidor limit switch and wiring (refer to *Testing Limit and Stop Switches Voltage*, *Testing Limit Switch Continuity*, and *Testing Wiring Harness Continuity*). Check the printed circuit board connector P6 (limit switches). Unplug the chair and plug it back in. If the problem remains, the printed circuit board is faulty. Replace the printed circuit board. 7 Complete the steps for *Testing Magnetic Pull*. Is there magnetic pull at each solenoid? YES: Replace faulty manifold/valve. NO: Go to step 8. 8 Has the solenoid fuse blown (120V only)? YES: Replace the fuse. Complete the steps for *Testing Solenoid Continuity*. Replace shorted solenoids or shorted wiring to the solenoids as necessary. NO: Replace the faulty solenoid.

Problem	Action
Back moves for base only function or base moves for back only function	1 Disconnect the footswitch and, if installed, the touchpad. Use the printed circuit board test points to activate chair functions (refer to *Using the Chair Test Points*). Does the chair work properly now? YES: If there is a footswitch only, remove and replace the footswitch. If there is a touchpad only, remove and replace the touchpad. If there is both a footswitch and touchpad, go to step 2. NO: The printed circuit board is faulty. Replace the printed circuit board. 2 Reconnect the footswitch to the printed circuit board. Using the footswitch, operate the chair. Does the chair work properly? YES: Remove and replace the touchpad. NO: Go to step 3. 3 Reconnect the touchpad to the printed circuit board. Using the touchpad, operate the chair. Does the chair work properly? YES: Remove and replace the footswitch. NO: The printed circuit board is faulty. Remove and replace the printed circuit board.
Only chair function is base up	1 Are the stop plate limit switches activated? YES: Go to step 2. NO: Go to step 3. 2 Is the stop plate stuck? YES: Remove obstruction from the stop plate. NO: Go to step 3. 3 Check the connections and the limit switches (refer to *Testing Limit and Stop Switches Voltage*, *Testing Limit Switch Continuity*, and *Testing Wiring Harness Continuity*). Are wire connections or limits switches faulty? YES: Repair or replace components, as necessary. NO: Go to step 4.

Problem	Action
Only chair function is base up	4 If there is a cuspidor, check for proper activation of the limit switch when gently lifting up on the cuspidor bowl. Is there a clicking sound? YES: Go to step 5. NO: Replace the switch (refer to *Post Boxes and Cuspidors (PB)* for the part number). 5 Disconnect the 2-pin connector at P14 on the printed circuit board. Gently short across P14 with a small flat-blade screwdriver. Does the chair operate correctly? YES: Replace the cuspidor cable (P/N 41.1148.00). NO: Replace the printed circuit board.
Unable to program auto-positioning	1 Review auto-positioning procedures (refer to *Programming the Chair*). Does the chair move when you try to program it? YES: Check for shorted wires at footswitch connector P2, and at touchpad connector P1, if installed, on the printed circuit board (refer to *Testing Wiring Harness Continuity*). NO: Go to step 2. 2 Does the chair move to the wrong position? YES: Go to *Incomplete auto-positioning cycle*. NO: Go to step 3. 3 Disconnect the footswitch and, if installed, the touchpad. Use the printed circuit board test points to program the chair (refer to *Using Chair Test Points*). Did the chair program satisfactorily? YES: If there is a footswitch only, remove and replace the footswitch. If there is a touchpad only, remove and replace the touchpad. If there are both a footswitch and touchpad, go to step 7. NO: Go to step 6. 4 Reconnect the footswitch to the printed circuit board. Using the footswitch, program the chair. Did the chair program satisfactorily? YES: Remove and replace the touchpad. NO: Go to step 5.

Problem	Action
Unable to program auto-positioning	5 Reconnect the touchpad to the printed circuit board. Using the touchpad, program the chair. Did the chair program satisfactorily? YES: Remove and replace the footswitch. NO: Go to step 6. 6 Is there an open or short in the positioning potentiometer wiring (refer to *Testing Wiring Harness Continuity*)? YES: Repair positioning potentiometer wiring. NO: Go to step 7. 7 Are there any poor or reversed potentiometer connections (refer to *Testing Positioning Potentiometer Voltage*)? YES: Repair positioning potentiometer connections. NO: The printed circuit board is faulty. Replace the printed circuit board.
Unable to program auto-positioning for the touchpad and footswitch	1 Disconnect the footswitch and try to operate the automatic functions from the touchpad. Does the touchpad work properly? YES: Replace the footswitch. NO: Go to step 2. 2 Plug the footswitch back in and disconnect the touchpad. Try to operate the automatic functions from the foot control. Does the footswitch work properly? YES: Replace the touchpad. NO: Call your A-dec customer service representative for assistance.

Problem	Action
Incomplete auto-positioning cycle	1 Has a new printed circuit board been installed? YES: Reprogram the chair printed circuit board. NO: Go to step 2. 2 Has a new potentiometer been installed? YES: Verify that the positioning potentiometer has been installed correctly and that positions have been properly programmed. NO: Go to step 3. 3 Does base or back travel time exceed 40–45 seconds? YES: Adjust the manifold speed control valves (refer to *Adjusting the Hydraulic Manifold*). NO: Go to step 4. 4 Is the back stopping short of full upright? YES: Positioning potentiometer is defective or in deadband. Adjust the potentiometer (refer to *Adjusting the Base Positioning Potentiometer*). NO: Go to step 5. 5 Does the base or back only go in one direction? YES: Check for faulty positioning potentiometers, wiring, and connections. NO: Go to step 6. 6 Does the base or back go in the wrong direction? YES: Go to step 7. NO: Go to step 8. 7 Is the potentiometer mechanical drive slipping? YES: Tighten the gear setscrew, or replace the connecting tubing, and then adjust the potentiometer (refer to *Adjusting the Base Positioning Potentiometer*). NO: Go to step 8.

Problem	Action
Incomplete auto-positioning cycle	8 Does the base or back shut off at the same time? YES: The printed circuit board is faulty. Replace the printed circuit board. NO: Go to step 9. 9 Is the potentiometer resistance 0–5K ± 20% ohm (Ω)? Refer to *Testing Positioning Potentiometer Continuity*, *Testing Wiring Harness Continuity*, and *Testing Base and Back Positioning Potentiometer Voltage.* YES: Go to step 10. NO: Positioning potentiometer is faulty. Replace the potentiometer. 10 Are the potentiometer wiring and connections equal to 0Ω (refer to *Testing Positioning Potentiometer Continuity, Testing Wiring Harness Continuity and Testing Base and Back Positioning Potentiometer Voltage*)? YES: Go to step 11. NO: Repair or replace the wiring and connections. 11 Is the potentiometer mechanical drive slipping? YES: Tighten the gear setscrew, or replace the connecting tubing, and then adjust the potentiometer. NO: Go to step 12. 12 Are the potentiometers turning? YES: The printed circuit board is faulty. Replace the printed circuit board. NO: Check for a loose or damaged potentiometer mount or improper adjustment (refer to *Adjusting the Base Positioning Potentiometer* and *Adjusting the Base Up Limit Switch*).

Problem	Action
Auto-positioning function is inoperative	1 Reprogram the chair auto-positioning settings (refer to *Programming the Chair*). Does the chair go to the wrong position? YES: Go to *Incomplete auto-positioning cycle*. NO: Go to step 2. 2 Disconnect the footswitch and, if installed, the touchpad. Use the printed circuit board test points to activate chair auto functions (refer to *Using Chair Test Points*). Does the chair function properly? YES: If there is a footswitch only, remove and replace the footswitch. If there is a touchpad only, remove and replace the touchpad. If there is both a footswitch and touchpad, go to step 3. NO: Unplug the chair and plug it back in. If the problem remains, the printed circuit board is faulty. Replace the printed circuit board 3 Reconnect the footswitch to the printed circuit board. Using the footswitch, operate the chair. Does the chair work properly now? YES: Remove and replace the touchpad. NO: Go to step 4. 4 Reconnect the touchpad to the printed circuit board. Using the touchpad, operate the chair. Does the chair work properly now? YES: Remove and replace the footswitch. NO: Unplug the chair and plug it back in. If the problem remains, the printed circuit board is faulty, remove and replace the printed circuit board.

Problem	Action
Auto-positioning for one or more functions is inoperative on a unit with both a footswitch and a touchpad	1 Unplug the footswitch and try to operate the automatic functions from the touchpad. Does the touchpad work properly? YES: Replace the footswitch. NO: Go to step 2. 2 Plug the footswitch back in and disconnect the touchpad. Try to operate the automatic functions from the foot control. Does the footswitch work properly? YES: Replace the touchpad. NO: The printed circuit board is faulty. Replace the printed circuit board.

Using Chair Test Points

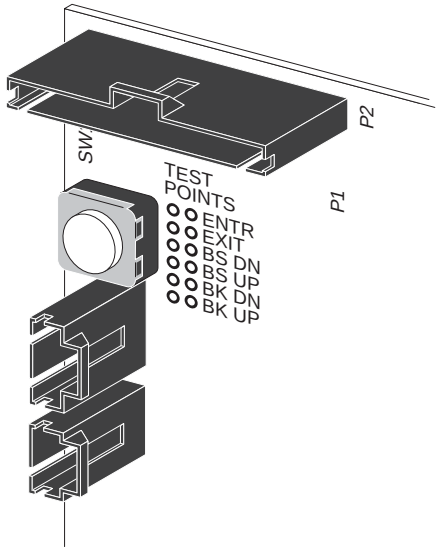
WARNING

Hazardous AC voltages are present on the printed circuit board. Do not touch any part on the printed circuit board except the test points.

- The chair test points are used to test chair function without a footswitch connected to the printed circuit board.
- To access the test points, you must remove the motor/pump housing and the circuit board cover.
- Short the test points next to the function you wish to test.

NOTE: New style test positions
ENTR = Position 0 (Red)
EXIT = Position 2 (Green)

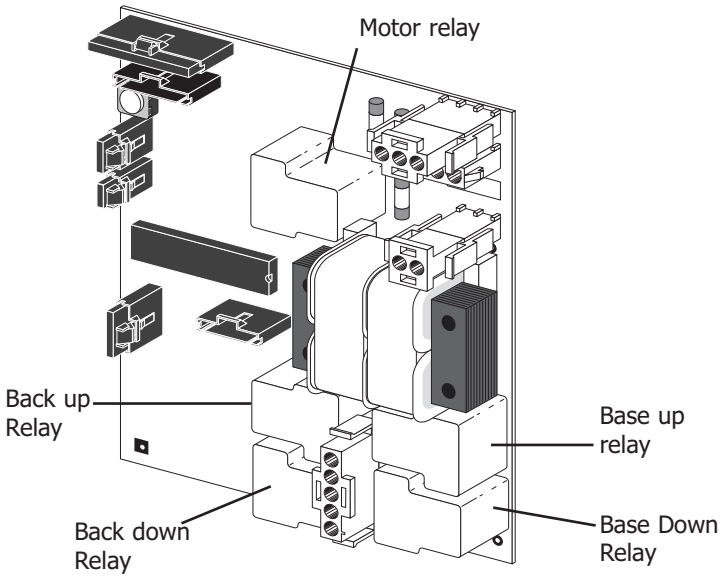
NOTE: Old style test positions
ENT = Position 0
EX = Position 2



NOTE: Connector P1 omitted for clarity.

Testing Relay Click

- When you activate any function, you should hear a clicking noise coming from the printed circuit board.
- The motor relay is activated only for base up and back up functions.



Printed Circuit Board Relays

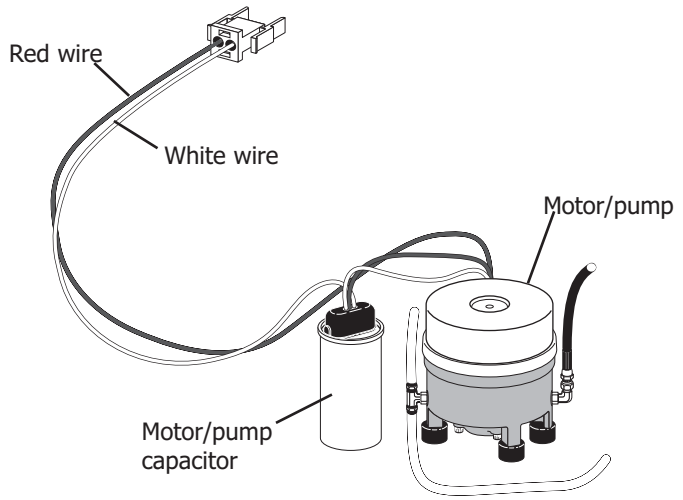
Testing the Motor/Pump

NOTE: This test requires the use of a current pickup probe.

- Clip the probe onto the red wire going to the motor/pump.
- Activate a base up or back up function.

Result: You should read 5 Amps (maximum) of current for 120V motor/pump.

You should read 2.5 Amps (maximum) of current for 240V motor/pump.

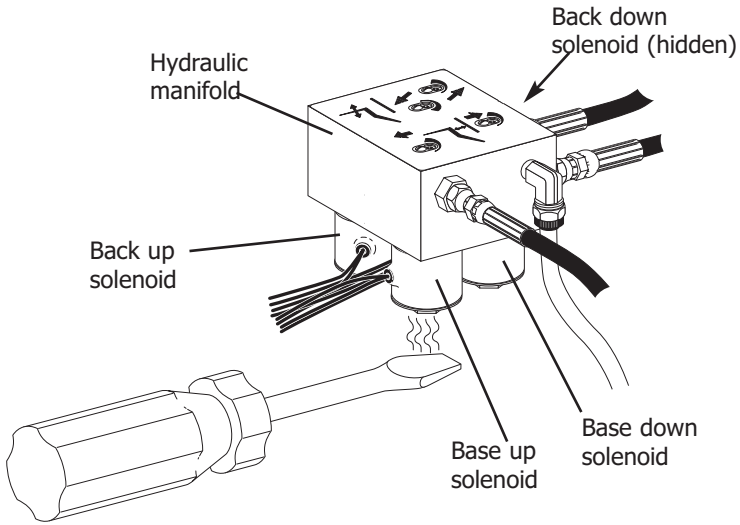


Motor/Pump Test

Testing Magnetic Pull

- While holding the tip of screwdriver near a solenoid, activate the appropriate chair function.

Result: You should feel the tug of the magnetic field generated around the solenoid.



Magnetic Pull Test

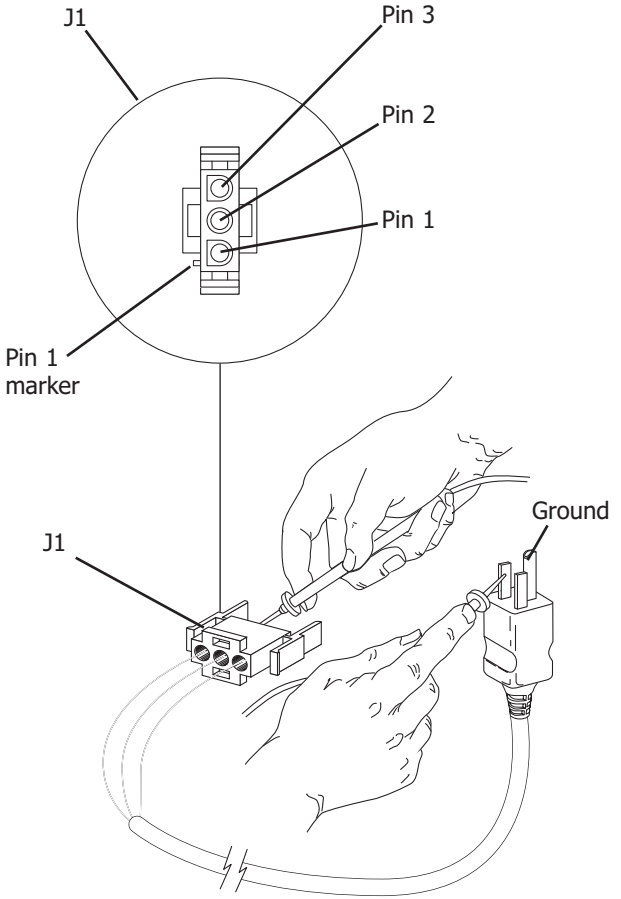
Testing Power Cord Continuity

WARNING

Hazardous AC voltages are present on the printed circuit board. Make sure power has been removed from the chair before proceeding. Failure to remove power from the chair may result in serious injury from electrical shock.

Follow these steps to test power cord continuity.

Task	Description
1	Disconnect the power cord (J1) from the chair printed circuit board.
2	Touch a volt-ohmmeter (VOM) probe to pin 1 of J1 and the other probe to first one and then the other blade of the power plug. Result: One blade should read 1/2 ohm or less, the other blade should read infinite (∞) resistance. If both blades read infinite (∞) resistance, the power cord is defective and must be replaced.
3	Touch a VOM probe to pin 3 of J1 and repeat the second step.
4	Touch a VOM probe to pin 2 or J1 and the other probe to ground on the plug. Result: The resistance should be 1/2 ohm or less.



Power Cord Continuity Test

Testing Limit Switch Continuity

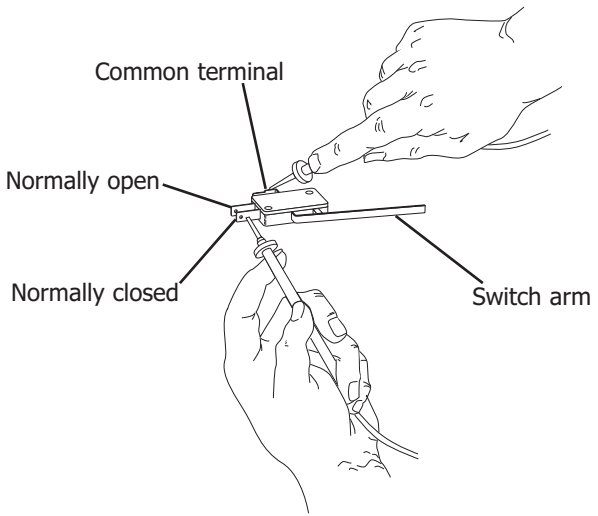
WARNING

Hazardous AC voltages are present on the printed circuit board. Make sure power has been removed from the chair before proceeding. Failure to remove power from the chair may result in serious injury from electrical shock.

Follow these steps to test limit switch continuity.

Task	Description
1	Disconnect the wiring harness from the limit switch. It is not necessary to remove the limit switch.
2	Touch a volt-ohmmeter (VOM) probe to the common terminal and the other probe to the normally open terminal and then to the normally closed terminal.
	Result: The normally closed terminal should give a reading of 1/2 ohm (Ω) or less.
	The normally open terminal should read infinite (∞)resistance.
	If both terminals indicate infinite (∞) resistance or indicate 1/2 ohm (Ω) or less, the switch is defective and must be replaced.

NOTE: If you are replacing a base up limit switch, adjust the switch after replacement (refer to Adjusting the Base Up Limit Switch).



Limit Switch Continuity Test

Testing Positioning Potentiometer Continuity

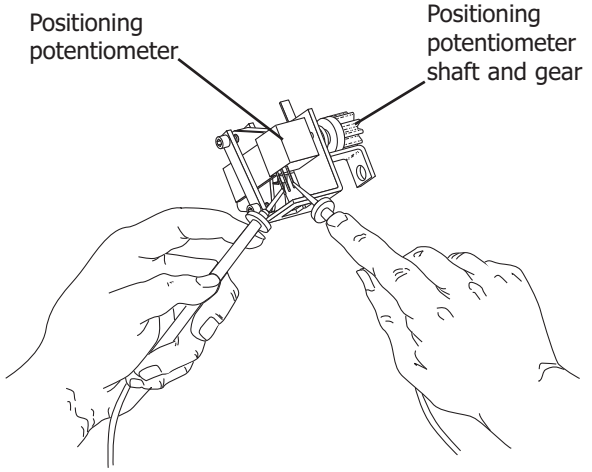
WARNING

Hazardous AC voltages are present on the printed circuit board. Make sure power has been removed from the chair before proceeding. Failure to remove power from the chair may result in serious injury from electrical shock.

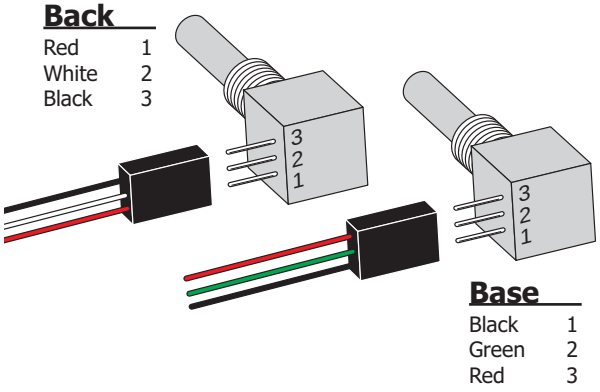
NOTE: If you are replacing a positioning potentiometer, refer to Adjusting the Base Positioning Potentiometer and Adjusting the Base Up Limit Switch.

Follow these steps to test positioning potentiometer continuity.

Task	Description
1.	Disconnect the wiring harness from the positioning potentiometer and remove the potentiometer assembly from the chair.
2.	Touch a volt-ohmmeter (VOM) probe to an outside pin of the potentiometer and the other probe to the other outside pin.
	Result: The resistance of the potentiometer should be approximately 4-6 KΩ (5KΩ+20%).
	If the potentiometer resistance is outside the limits, the potentiometer is defective and must be replaced.
3.	Move one probe to the center pin of the potentiometer.
4.	While observing the VOM, turn the potentiometer fully one direction and then the other.
	Result: Your VOM should indicate a smooth increase or decrease in resistance as you turn the shaft.
	If the resistance fluctuates in a jerky manner while the shaft is being turned, the potentiometer is defective and must be replaced.



Positioning Potentiometer Continuity Test



Cascade and Decade Positioning Potentiometer Wiring

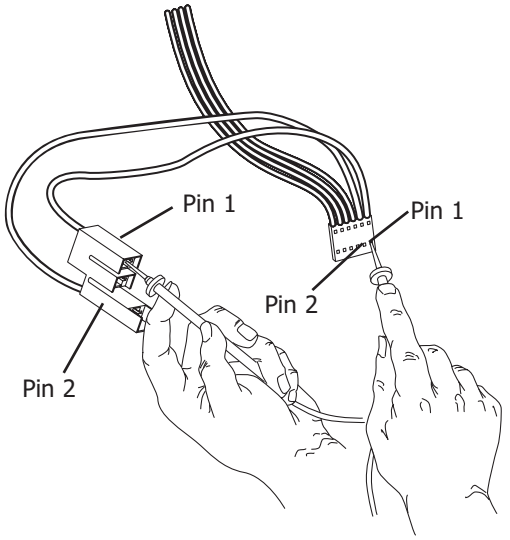
Testing Wiring Harness Continuity

WARNING

Hazardous AC voltages are present on the printed circuit board. Make sure power has been removed from the chair before proceeding. Failure to remove power from the chair may result in serious injury from electrical shock.

Follow these steps to test wiring harness continuity.

Task	Descriptions
1	Disconnect the wiring harness from the limit switch or positioning potentiometer and the printed circuit board. Do not remove from chair.
2	Touch a volt-ohmmeter (VOM) probe to pin 1 at one end of the harness and the other probe to pin 1 at the other end of the harness. Result: The VOM should read 1/2 ohm (Ω) or less. If the VOM indicates (∞) or fluctuating resistance, the harness is defective and must be replace.
3	Repeat the steps for each wire in the harness.



Positioning Potentiometer Continuity Test

Testing Solenoid Continuity

WARNING

Hazardous AC voltages are present on the printed circuit board. Make sure power has been removed from the chair before proceeding. Failure to remove power from the chair may result in serious injury from electrical shock.

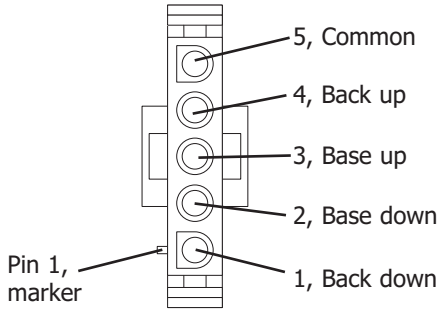
Use these points to test solenoid continuity.

- Disconnect the solenoid wiring harness (J10) from the printed circuit board.
- Touch a volt-ohmmeter (VOM) probe to pin 5 of J10 and the other probe to the pin for suspect solenoid.

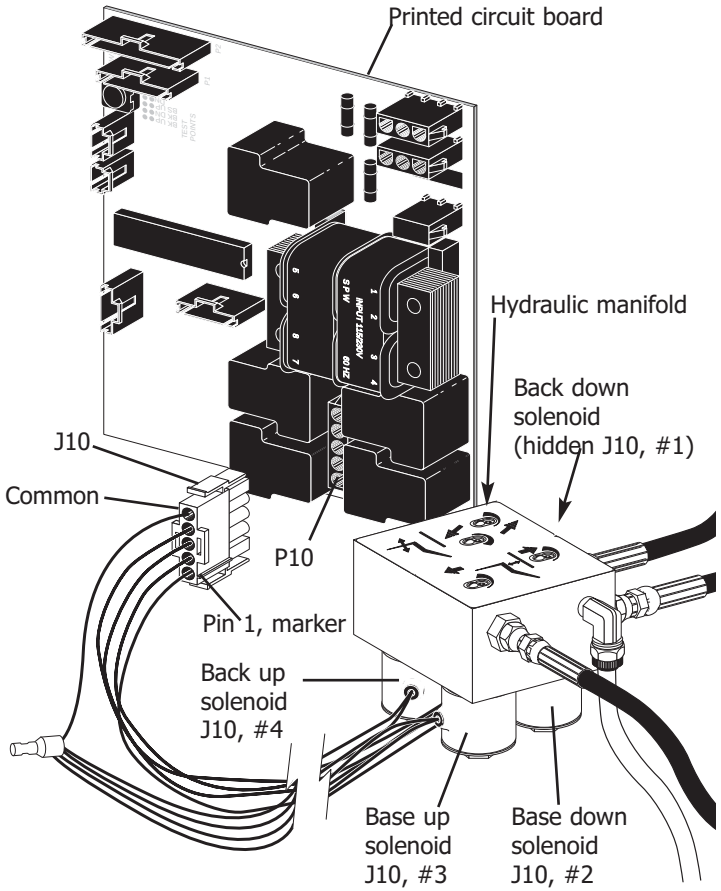
  Result: The resistance of the solenoid should be inside the range specified in the table.

  If the resistance is outside the specified range, the solenoid is defective and must be replaced.

Voltage	Resistance (Ω)	Range (Ω)
100V	220	200-250
120V	300	275-325
240V	1250	1100-1300



Solenoid Connector J10



Solenoid Continuity Test

Testing Base and Back Positioning Potentiometer Voltage

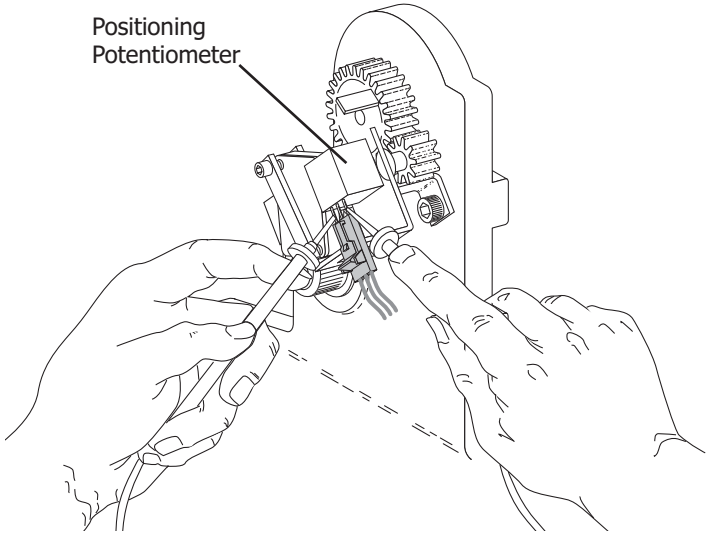
WARNING

Hazardous AC voltages are present on the printed circuit board. Make sure power has been removed from the chair before proceeding. Failure to remove power from the chair may result in serious injury from electrical shock.

- Touch the black probe of the volt-ohmmeter (VOM) to the top pin of the potentiometer and the red probe to the lower pin.

  Result: The voltage available should be approximately 5V (±1V).

  If the voltage is zero, the positioning potentiometer wiring harness or the chair printed circuit board should be replaced.



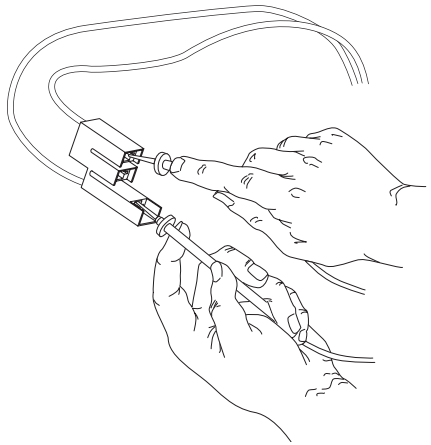
Positioning Potentiometer Voltage Test

Testing Limit and Stop Switches Voltage

- Disconnect the connector from the switch. Be sure to pull on the connector and not the wiring.
- Touch a volt-ohmmeter (VOM) probe to one pin of the connector and the other to the remaining pin.

  Result: The voltage available should be 5V (±1V) for PCBs with no LEDs, 12V (±1V) for PCBs with LEDs.

  If the voltage is zero, the switch wiring harness or the chair printed circuit board must be replaced.



Limit and Stop Switches Voltage Test

Chairs

Notes

Accessories

This section provides descriptions, service, maintenance and adjustment detail on the following accessories:

- Dual voltage intra-oral light source
- Single voltage intra-oral light source
- Cascade scaler
- Tooth dryer
- Self-contained water system
- Low voltage water heater/heated syringe system
- Curing light.

Identifying the Accessories

Dual/Single Voltage Intra-Oral Light Source

The A-dec Intra-oral light sources provide electrical power to illuminate handpiece light bulbs. The dual voltage control has two potentiometers to allow operation of two different bulb requirements. The single voltage light source has a single potentiometer to adjust output voltage. Both units have a low and a bright output that must be adjusted when in bright mode. Refer to the following table for specifications.

Intra-Oral Light Source Specifications

	Single	Dual
Output	2.9-4.25 VAC at 0.8 amps	3.0-5.6 VAC at 1.4 amp
Input	24 VAC	24 VAC
Power Consumption	17 watts	17 watts

Tooth Dryer

A-dec's warm air tooth dryer provides warm air, for tooth preparation. It is sterilizable, has no moving or electrical parts, and functions by routing 60 psi of air pressure through its vortex tube. The warm air flows out of the tip at 125°F/ 51.7°C and 135°F/57°C while the cool air is exhausted. The tooth dryer should be connected to a tooth dryer end cap or relay and a dedicated tooth dryer tubing for optimum performance.

Accessories

Self-Contained Water System

The self-contained water system provides a closed water supply system separate from the municipal system. When supplied with 40 psi of air pressure, it provides treatment water to the control block system and syringe. It also allows for water line asepsis and air purging of the control system.

Low Voltage Water Heater/ Heated Syringe System

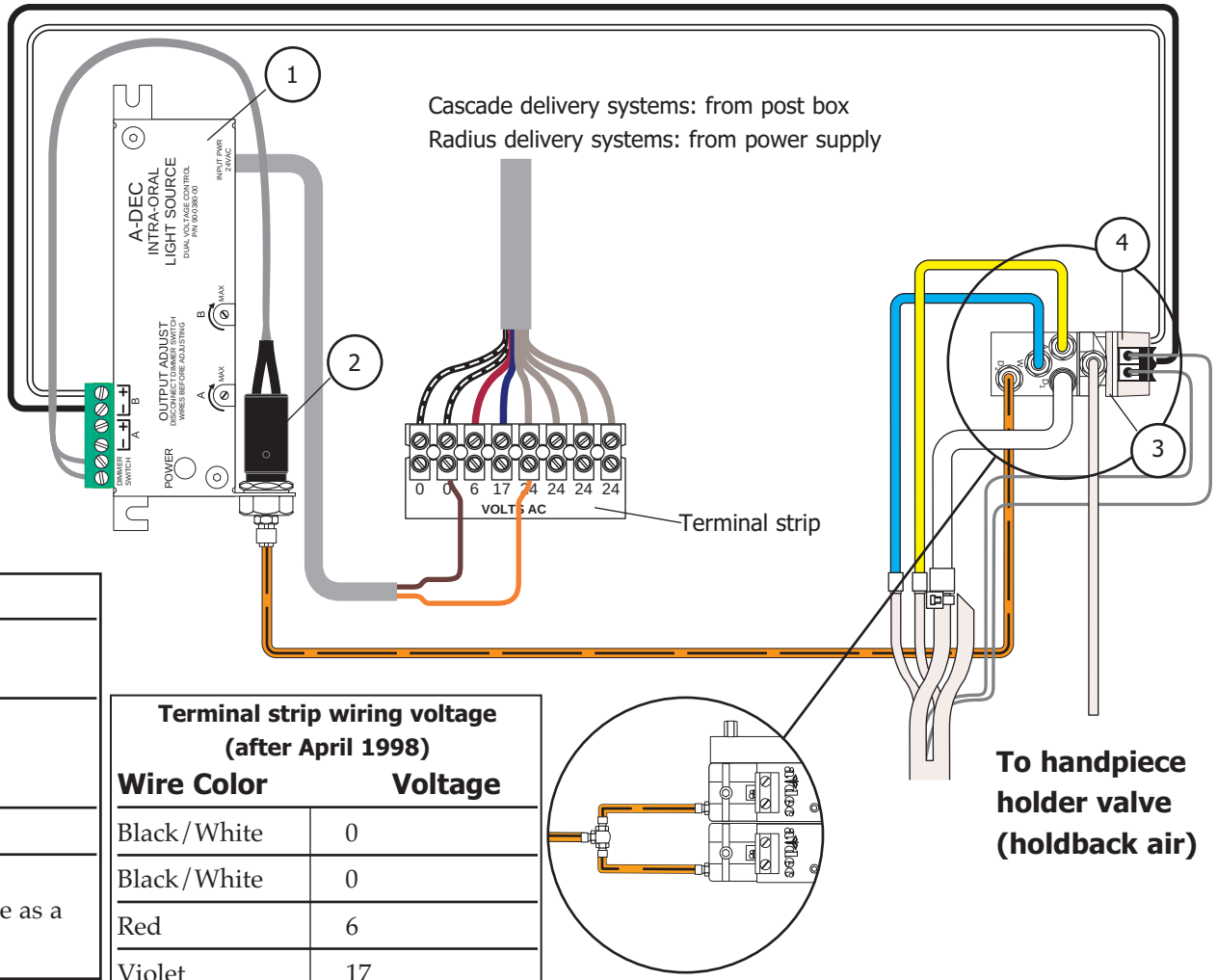
The low voltage water heater/heated syringe tubing system provides instant heated water (90°F/32.2°C) to the unit handpiece control and syringe.

Specifications	
Low Voltage Water Heater	24 VAC
Syringe Tubing	6 VAC

Dual Voltage Intra-Oral Light Source

NOTE: Confirm that the bulb requires no more than 1.3 amps before connecting any lighted handpiece or coupler to the A-dec dual voltage intra-oral light source. When additional lighted handpieces are connected to the control, an additional handpiece select switch and shuttle valve (026.074.01) will be installed for each additional handpiece.

After April 1998



Item #	Part Number	Description
1	90.0380.00	Intra-oral light source, dual voltage
2	044.159.00	Air-electric switch (replace as a complete assembly)
3	75.0911.01	Switch diaphragm
4	75.0909.00	Intra-oral light source switch (replace as a complete assembly)

Terminal strip wiring voltage (after April 1998)

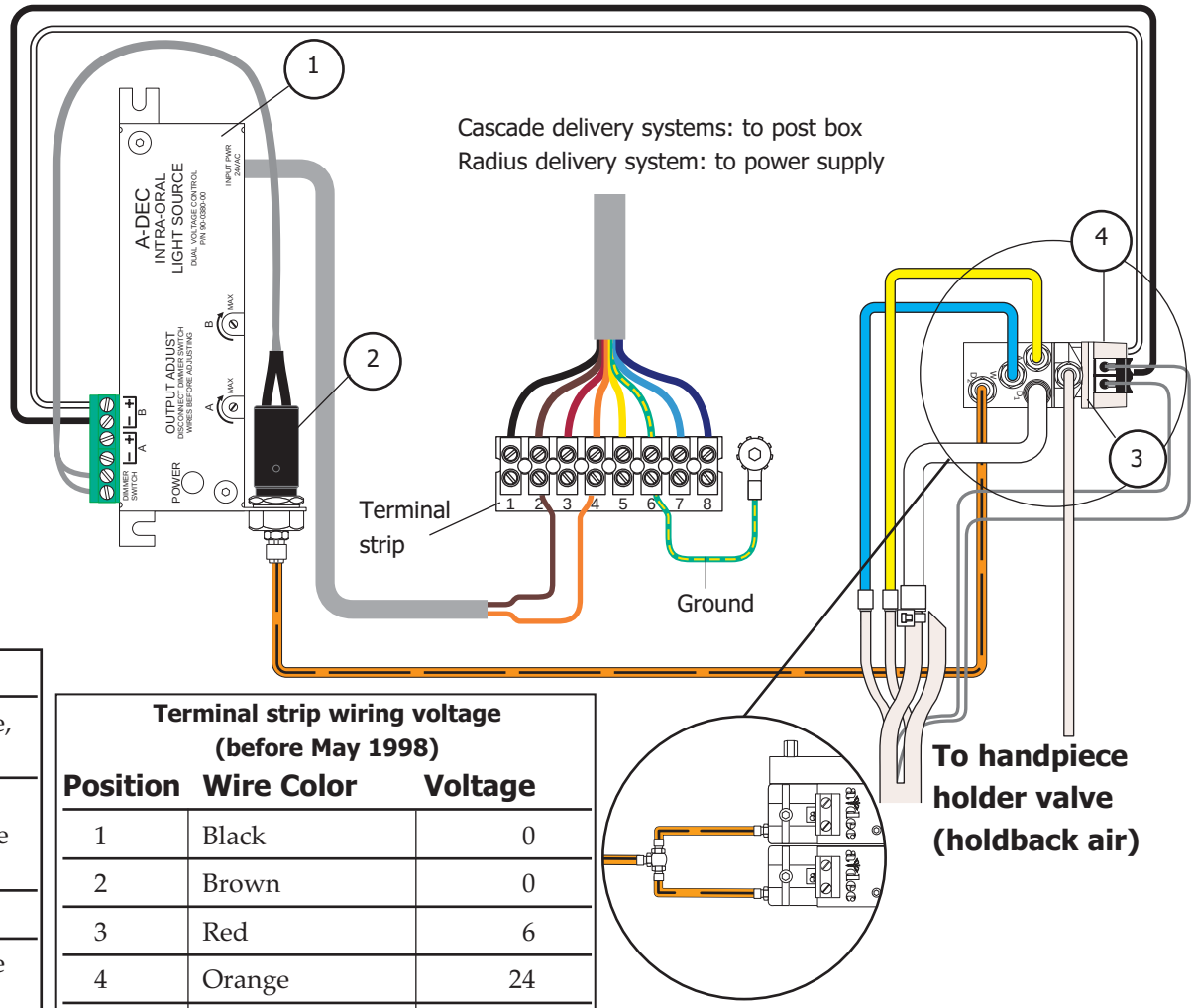
Wire Color	Voltage
Black/White	0
Black/White	0
Red	6
Violet	17
Gray	24
Gray	24
Gray	24
Gray	24

Before May 1998

Dual Voltage Intra-Oral Light Source

NOTE: Confirm that the bulb requires no more than 1.3 amps before connecting any lighted handpiece or coupler to the A-dec dual voltage intra-oral light source. When additional lighted handpieces are connected to the control, an additional handpiece select switch and shuttle valve (026.074.01) will be installed for each additional handpiece.

NOTE: Voltages should be adjusted while the foot control is being stepped on. This ensures the DIOLS is in bright mode. Do not measure voltage at the end of the tubing. It is necessary to have a bulb installed and illuminated for an accurate reading.



Item #	Part Number	Description
1	90.0380.00	Intra-oral light source, dual voltage
2	044.159.00	Air-electric switch (replace as a complete assembly)
3	75.0911.01	Switch diaphragm
4	75.0909.00	Intra-oral light source switch (replace as a complete assembly)

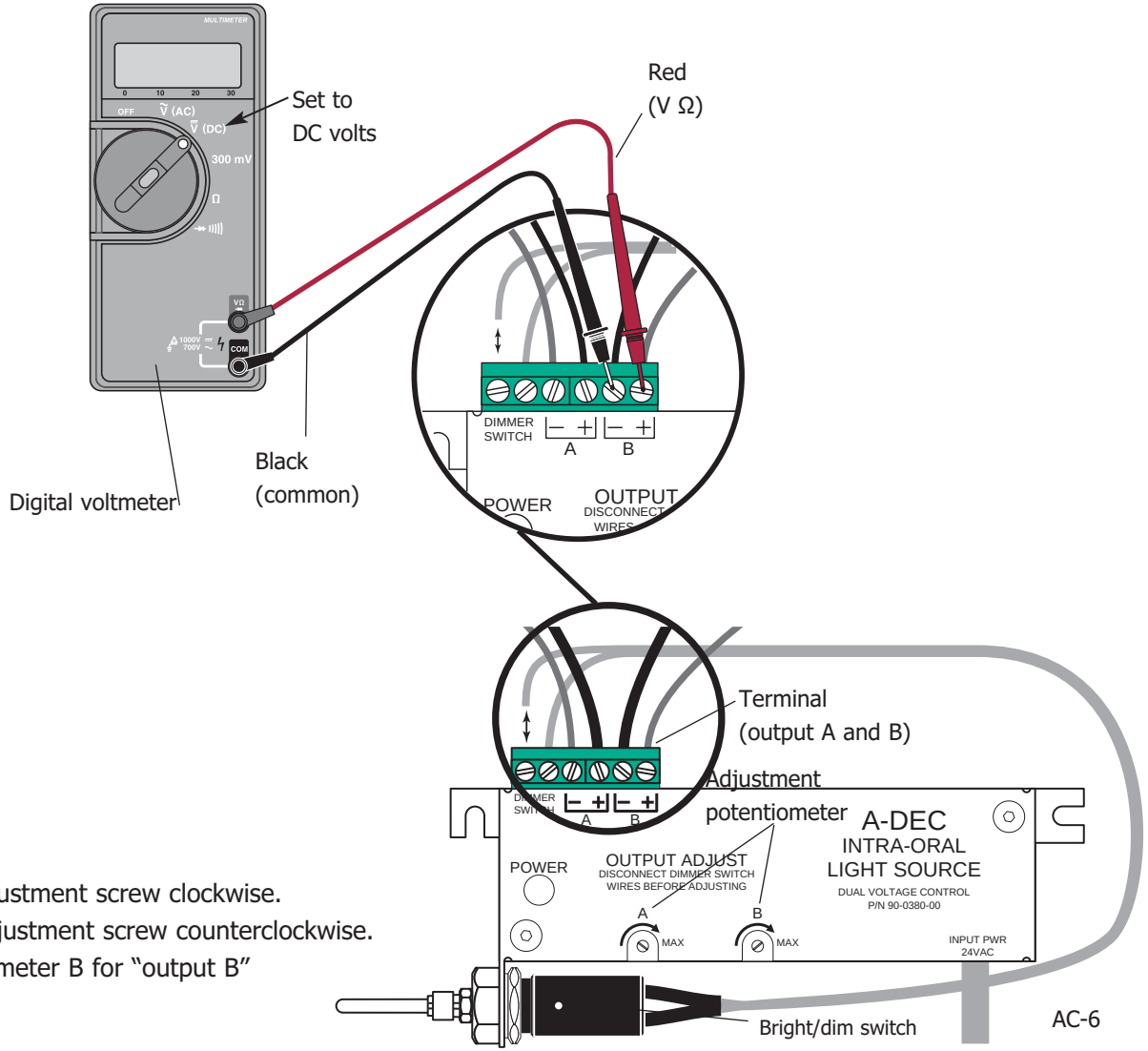
Terminal strip wiring voltage (before May 1998)

Position	Wire Color	Voltage
1	Black	0
2	Brown	0
3	Red	6
4	Orange	24
5	Yellow	24
6	Green & Yellow	Ground
7	Blue	24
8	Violet	17

Adjusting the Dual Voltage Intra-Oral Light Source (DIOLS)

Length and Voltage Table		
Wire length in A-dec tubing		Voltage at terminal strip* A-dec/W&H, Bien Air, or other bulbs rated at 3.5V
(in)	(cm)	VDC +/- .02
48	122	3.51
54	137	3.54
60	152	3.56
66	168	3.59
72	183	3.62
78	198	3.65
84	213	3.67
90	229	3.69
96	244	3.71
102	259	3.74
108	274	3.76
114	290	3.79
120	305	3.82
126	320	3.85
132	335	3.87
138	351	3.90
144	366	3.93
150	381	3.96
156	396	3.99

*Voltage is measured at output terminal of IOLS with bulb lit. (Unit must be in bright mode when adjusting the output voltage if the function is used. Disconnect one of the bright/dim switch wires temporarily to enable the bright mode. Reconnect the wire after any adjustments are made.)



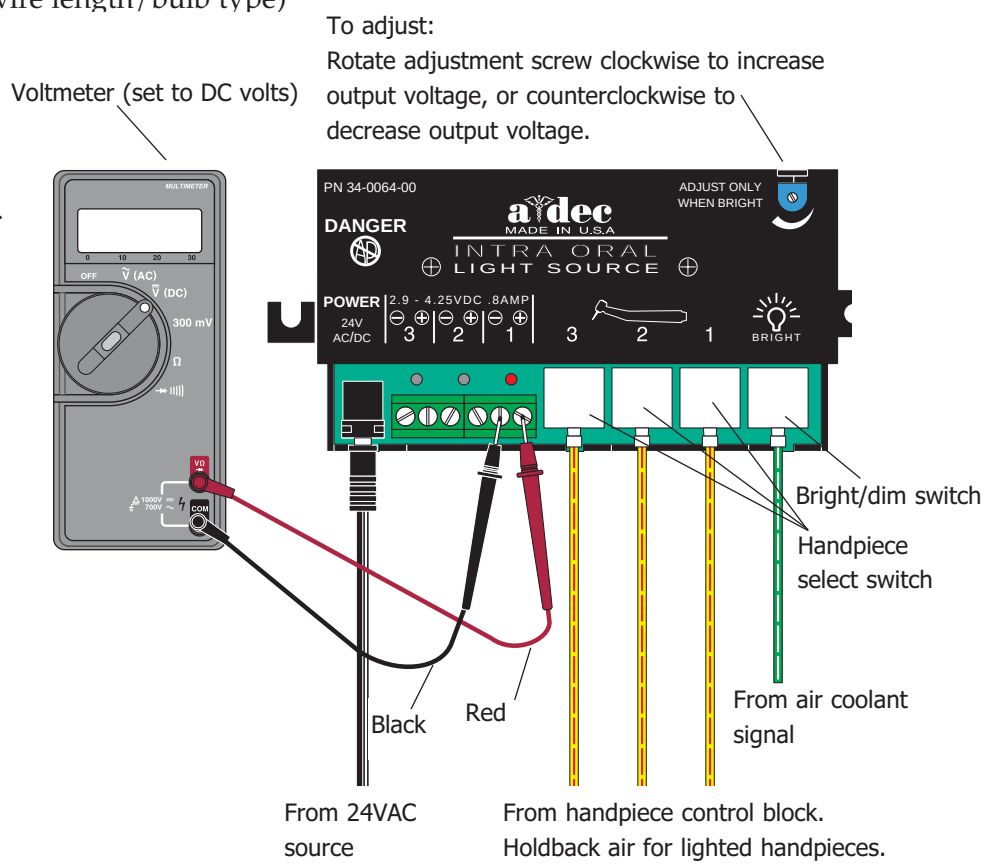
NOTE: Increase the terminal voltage by rotating the adjustment screw clockwise.
Decrease the terminal voltage by rotating the adjustment screw counterclockwise.
Use potentiometer A for "output A" and potentiometer B for "output B"

Adjusting the Single Voltage Intra-Oral Light Source (SIOLS)

NOTE: Voltages should be adjusted while the foot control is being stepped on. This ensures the SIOLS is in bright mode. If measuring voltage at the end of the tubing, use A-dec/W&H tools. It is necessary to have a bulb installed and illuminated for an accurate reading.

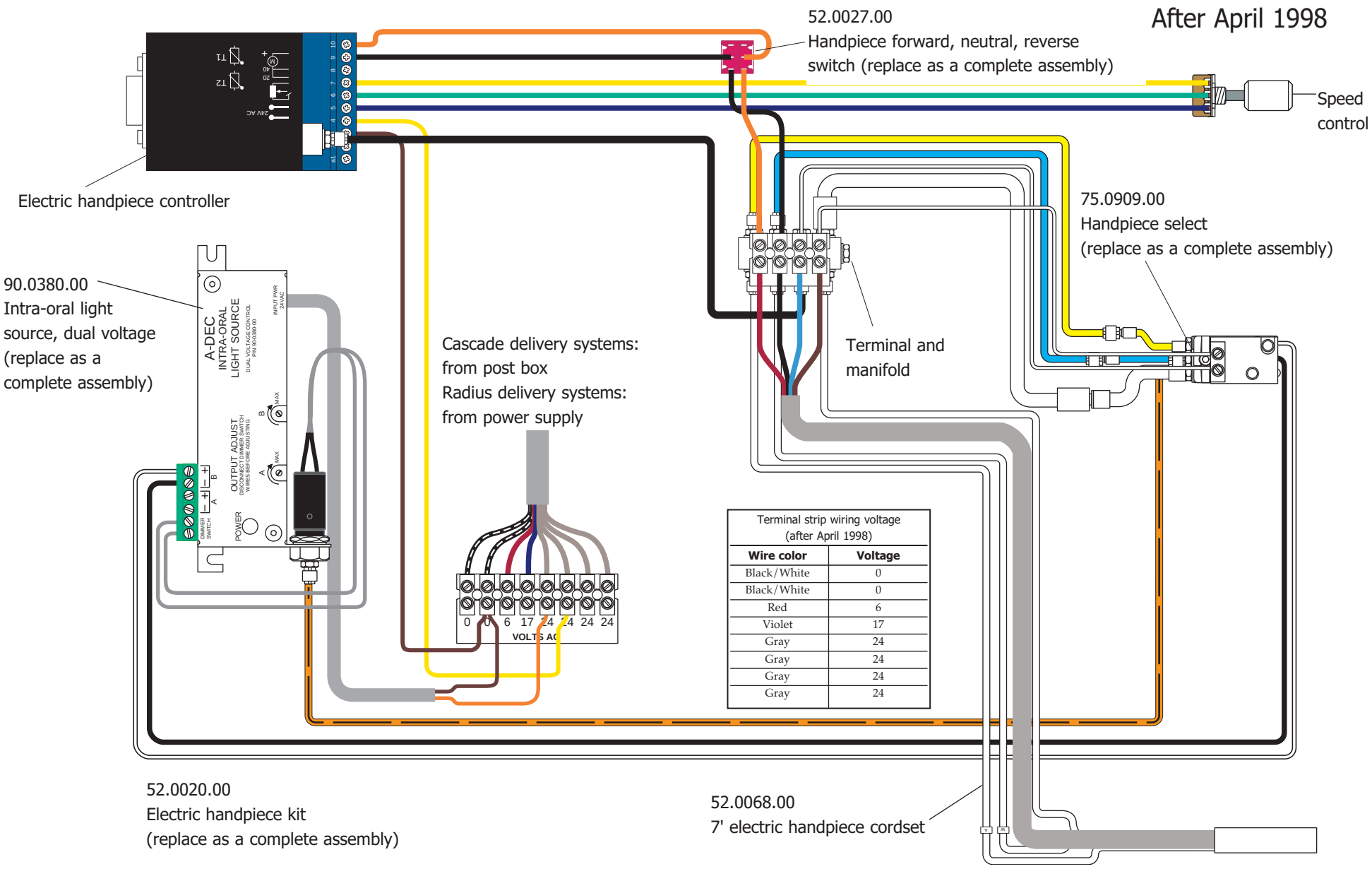
Adjust the SIOLS by following these steps.

Task	Description
1	Determine the handpiece wire length and the bulb type. (Wire length and bulb type should be the same for each lighted handpiece position.)
2	Find the corresponding (wire length/bulb type) terminal voltage in the "Length/Voltage Table" on page AC-6.
3	Remove a lighted handpiece from its holder.
4	Move the wet/dry toggle on the foot control to the OFF position, away from the blue dot. Step on the foot control.
5	Using an adjustment screwdriver, adjust the brightness potentiometer until the voltmeter displays the voltage set from the Length/Voltage Table on page AC-6.
6	Replace the handpiece in its holder. All lighted handpieces have been adjusted.



NOTE: For handpiece select switches, unlighted positions must be connected to pilot air.

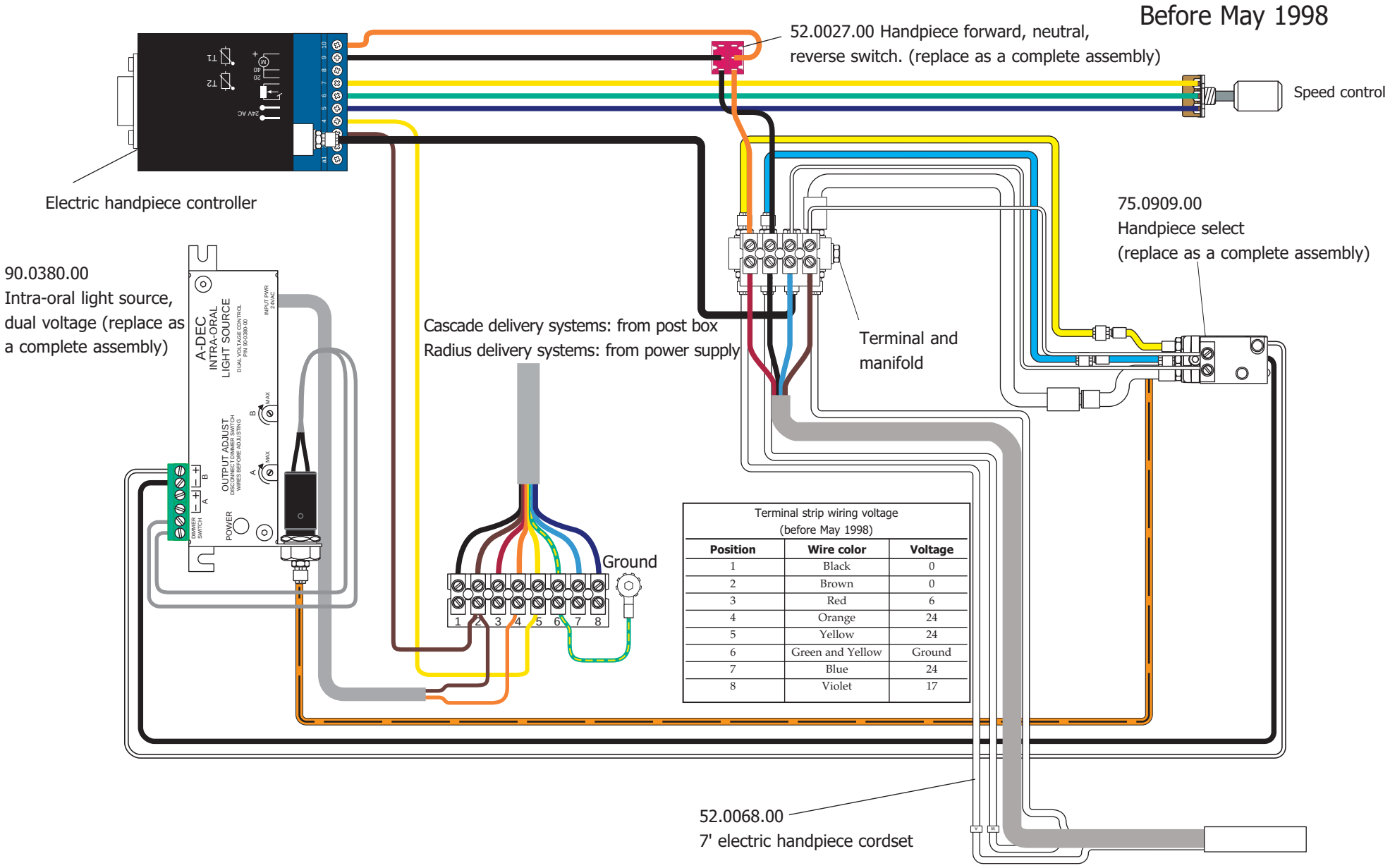
Electric Handpiece Plumbing and Wire Diagram



Terminal strip wiring voltage (after April 1998)

Wire color	Voltage
Black/White	0
Black/White	0
Red	6
Violet	17
Gray	24
Gray	24
Gray	24
Gray	24

Electric Handpiece Plumbing and Wire Diagram



Terminal strip wiring voltage (before May 1998)

Position	Wire color	Voltage
1	Black	0
2	Brown	0
3	Red	6
4	Orange	24
5	Yellow	24
6	Green and Yellow	Ground
7	Blue	24
8	Violet	17

Adjusting Handpieces

Measurement can be done at the handpiece or the Roto-Quick with the use of special tools. When measuring at this point, the voltage should be 3.2 V. Tool #C709 is a RA-24 bulb with arms used to attach the volt meter probes. Tool # C679 is a cutout sleeve for the Synea L handpieces. This can be exchanged for the standard sleeve, connected to the Roto-Quick and allows access for the probes onto the contacts.

*The air pressure adjustment screw is located under the sleeve opposite the bulb. It is factory set at 2.2 bar (representing 32 psi). If air pressure needs to reach 45 psi, adjust the screw to 3.0 bar to compensate for higher pressure.

A-dec/W&H Handpiece Drive Air and Light Voltage Settings

Handpiece Model	Voltage Setting (DC)	Drive Air Pressure (psi)	Factory Setting at Bulb Pins
898 RM or 898 RM	3.2	32	N/A
898LE	3.2	45	3.0 bar
896	3.2	32*	2.2 bar*
All Synea models	3.2	45	3.0 bar
Low-speed motors	3.2	45	N/A
Electric motors	3.2	55-60	N/A
Tooth dryer	N/A	60	N/A

NOTE: Voltages should be adjusted while the foot control is being stepped on. This ensures the SIOLS is in bright mode. If measuring voltage at the end of the tubing, use A-dec/W&H tools. It is necessary to have a bulb installed and illuminated for an accurate reading.

Maintaining Handpieces

The information in the following charts assists in maintaining handpieces properly.

Step	Action
Cleaning	Follow these points to properly maintain handpieces. With water switched off, run handpiece 20 to 30 seconds to blow all water out of spray tubes using the foot control. If the spray tubes are not dry, they may become clogged with calcium deposits during heat sterilization. After removing the handpiece from the dental unit, remove the bur and thoroughly clean external surfaces with a soft brush and alcohol or soap and water. Use of disinfectant may have a harmful effect on the finish of the handpiece. **CAUTION** Do not immerse handpieces under water or in any cleaning solutions. Do not ultrasonically clean handpieces.
Lubricating	Install the proper spray cap onto the A-dec/W&H spray oil can. Shake the can before use. Spray for approximately one second into the drive air port of the handpiece or the back end of the handpiece. While spraying, visible debris may be expelled from the handpiece head. If this occurs, repeat the spraying in one second intervals until no visible debris is expelled.
Run	After lubrication, the handpiece should be attached to a handpiece tubing and run for 30 seconds to remove all excess oil. Excess oil will be discharged from the handpiece during this running. Wipe excess oil off with a soft cloth.

Step	Action
Sterilization	Sterilize handpieces in instrument packaging up to (275°F) 135°C. Handpieces should be dry when they are removed from the sterilizer. Do not use dry heat or chemical immersion sterilization. There is no need to lubricate after sterilization. **CAUTION** Handpieces should be lubricated before every sterilization. In the case of motors that may not be sterilized between patients, it is important to lubricate after every 30 minutes of use or 2 times per day, i.e., first thing in the morning and again at mid-day.
Assistina	The Assistina automatically combines steps 1-4 of the manual method into a single cycle. If debris is expelled from the handpiece head during the cycle, keep cycling the handpiece until no visible debris is expelled. Only use W&H lubricant and cleaning liquid. Handpieces should be dry when they are removed from the sterilizer. Do not use dry heat or chemical immersion sterilization.

Troubleshooting High-Speed Handpieces

The following detail provides diagnostic information for high-speed handpieces.

Problem	Action
Turbine does not rotate	Follow these steps. **Task** **Description** 1 Check drive air. 2 Check head for dents that interfere with turbine rotation. 3 Check push button cap for dents blocking turbine.
Excessive noise, vibration	Follow these steps. 1 Check drive air pressure. 2 Check head for dents that interfere with turbine rotation. 3 Check bur for damage. 4 Bearings are worn/damaged, replace turbine.
Poor cutting performance	Follow these steps to determine the problem. 1 Check air pressure. 2 Check bur quality. 3 Check flow resistance of exhaust air (in tubing). 4 Check for blockage or leakage in drive air tube. 5 Check position of pressure regulation screw.

Problem	Action
Bur cannot be inserted into chuck	Check the following points if the bur cannot be inserted into the chuck: • Check bur size. • Check bur for damage.
Bur is not held sufficiently (walks out)	Follow these steps. **Task** **Description** 1 Check bur size. 2 Check how far the bur is extended. 3 Check for excessive load.
Bur cannot be removed from the chuck	Follow these steps to determine why the bur can't be removed. 1 Check the bur for ”grabbed“ cotton. 2 Check bur size. 3 Check for excessive load.
No water spray	Follow these steps. 1 Remove handpiece/Roto-Quick from tubing. 2 Determine if tubing has water flow. 3 Check Roto-Quick for water flow. 4 Check handpiece spray tube for clogs. 5 Check water supply.

Problem	Action
Inconsistent spray	Follow these steps. **Task** **Description** 1 Check Roto-Quicks small o-ring. Replace if missing or worn. 2 Check connection between the Roto-Quick and tubing. 3 Check for air in water line.
Poor water atomization	Follow these steps. 1 Check water pressure. 2 Check chip air pressure. 3 Check chip air line for blockage. 4 Check chip air line for damage.
No light	Follow these steps to determine why there is no light. 1 Check bulb. If the bulb appears to be burned out or damaged, replace the light bulb. 2 Check Roto-Quick connection. 3 Check gold ring position on Roto-Quick. (Autoclaving can alter ring position.) 4 Check delivery system fiber-optics.
Low light intensity	Follow these steps to check the light intensity. 1 Check bulb. If the bulb appears to be dim or damaged, replace the light bulb. 2 Check light source voltage setting. 3 Check fiber-optic surface for dirt or scratches.

Problem	Action
Bulb life is too short	Check light source voltage setting.
Handpiece turns too hard on the Roto-Quick coupler	Follow these steps. **Task** **Description** 1 Check tip of Roto-Quick for bends. 2 Check for incorrect Roto-Quick o-ring. 3 Check to see if ball bearing swivel is turning freely.
Handpiece does not hold on Roto-Quick	Follow these steps to determine why the handpiece doesn't hold. 1 Check claw sleeve on Roto-Quick, for breaks or being out-of-round. 2 Check tip of Roto-Quick for bends 3 Check that handpiece sleeve is screwed in firmly.
Lighted handpiece turbine turns slowly when another lighted handpiece is used	Replace the shuttle valve between the Century Plus control block D2 ports.
Push button gets hot	Check for dents in head of handpiece or debris in headcap, turbine could be touching push button while operating.

Maintaining the Electric Motor

Voltage for the light bulb should not be set higher than 3.2 volts. (Measured at bulb pins when bulb is lit and in bright mode.)

Drive air pressure should be set to 50 psi.

CAUTION

Do not sterilize the motor. Do not lubricate the motor.

Attachments should be removed from the motor when not in use. (Leaving attachments on the motor allows lubricant from the attachment to leak into the motor and interfere with internal components.)

The motor should always be removed from the tubing when lines are flushed. (If left ON, fluids can seep between the motor seal and the tubing terminal and corrode the electrical components. This results in decreased or complete failure of the motor, tubing and/or fiber-optic performance.)

External cleaning of the motor should be done with warm soapy water and/or a cotton swab with alcohol. (The outer sheath can be removed and sterilized if needed.)

The practice of "feathering" the foot control to adjust motor speed places extra strain on the motor and causes a significant reduction in the air flow that cools the motor. This can cause premature failure that may require factory repair. Motor speed should only be adjusted by turning the speed control on the motor controller assembly.

It is important to flush and air purge the unit at the end of each day, to ensure that the terminal on the electric motor tubing/cordset is dry afterward. The tubing can be hung upside-down overnight or blown dry with air from the syringe. Fluids left sitting on the terminal can cause corrosion of electrical components.

Troubleshooting the Electric Motor

The following detail provides diagnostic information for electric motors.

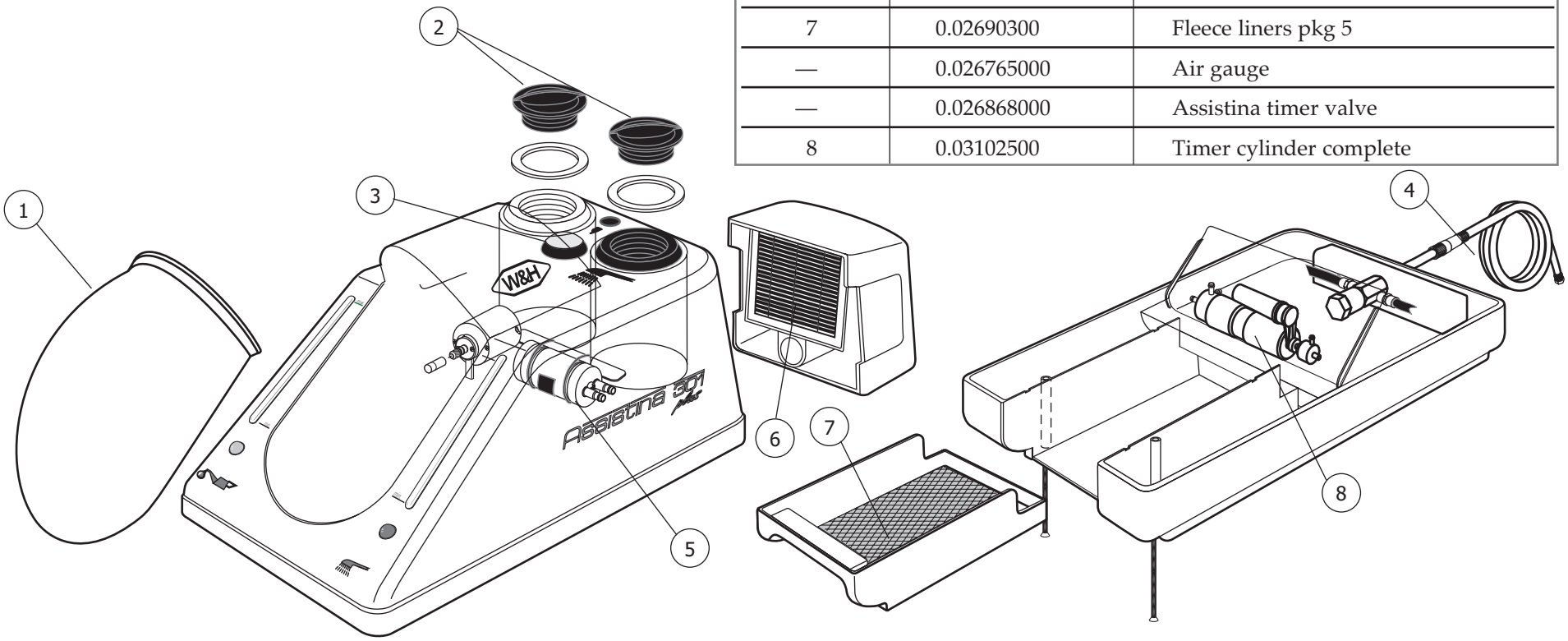
Problem	Action
Motor starts but does not run at maximum speeds	Check the speed control and adjust in the maximum clockwise position. Check for 24V on number 9 and 10 positions on the blue terminal strip in the motor control box.
Motor is heating up during use	Follow these steps. **Task** **Description** 1 Check drive air on the pressure gauge; should be 55 psi. 2 Check that motor seats in the handpiece holder properly. 3 Use full pressure on the foot control rather than “feathering” the foot control.
Motor runs at full speed but cannot be controlled with the speed control	Check the transistor on the PC board. If burned, do not use. Return board to A-dec.

Problem	Action
Light does not work	Follow these steps to determine why the light doesn't work. **Task** **Description** 1 Check black button on motor, should be depressed. The light should illuminate. 2 Check bulb. 3 Check blue and black wires connected to green connector. 4 Check voltage at green connector; should be 3.5 volts. 5 Check voltage at end of tubing. To check voltage, remove motor from tubing. 6 Install the motor and test.
Water is leaking	Follow these steps to determine why water is leaking. 1 Check that motor sleeve is snapped down in locked position. 2 Check o-rings of motor stem. 3 Check that the motor is threaded tightly onto the tubing nut.

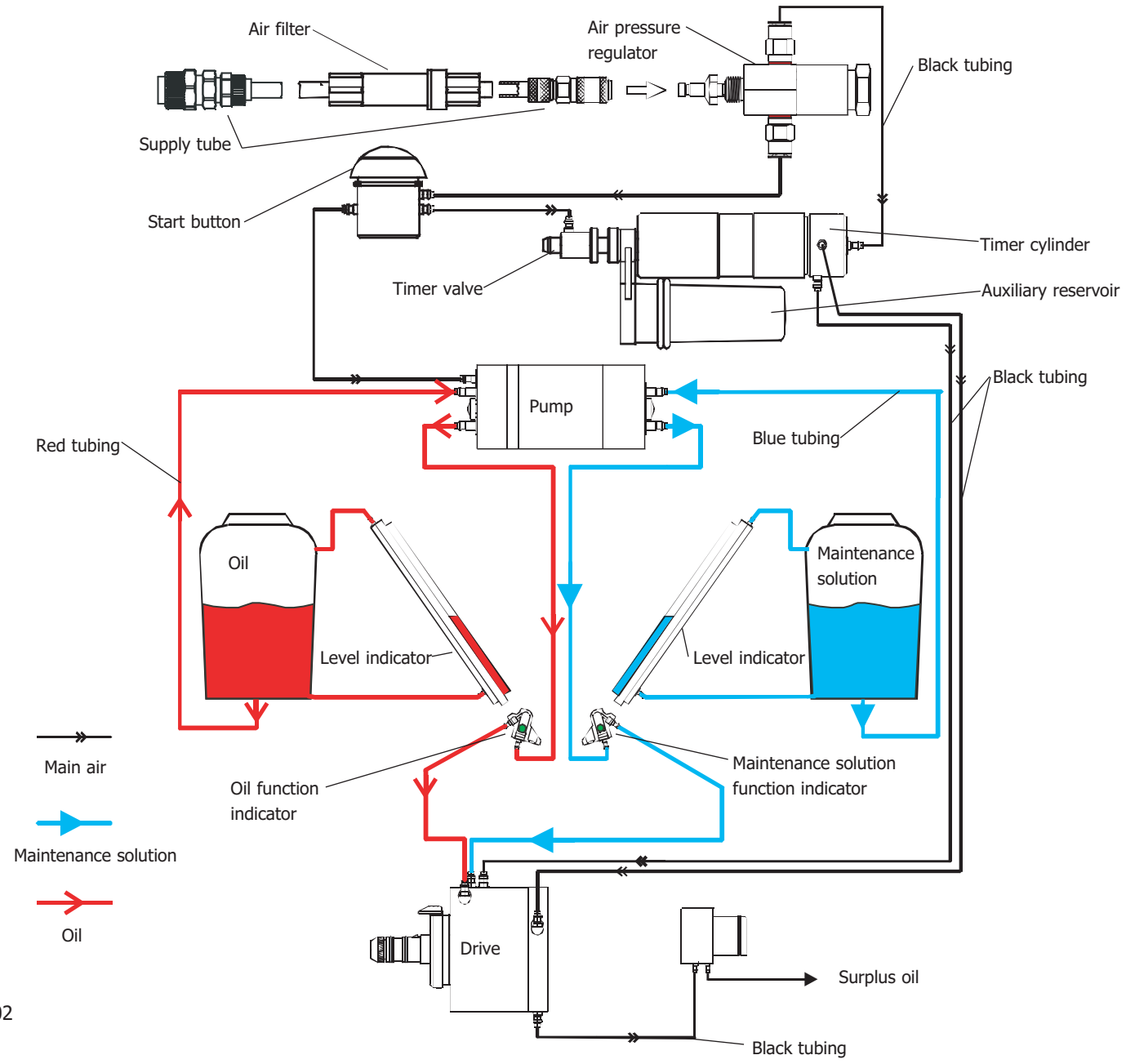
Problem	Action
Rough running at lower speeds, lack of power, torquing of motor when starting	Check circuit board dip switches. Before May 2, 2000, switches may have been set in the incorrect position. They are very small on the front of the circuit board. The correct position is #1 towards ON, and #2 towards OFF. Check the internal potentiometer. Two potentiometers with slots on the end are located behind the dip switches. The left one controls the speed of the motor, and rarely needs to be adjusted. The right one controls how much voltage is fed to the motor. Using a standard screwdriver, while the motor is running, turn the screw (could be clockwise or counterclockwise) on the voltage potentiometer until the motor smooths out.
Motor does not turn	Follow these steps. **Task** **Description** 1 Check the forward, neutral, and reverse switch. 2 Make sure the direction control toggle is not in the center position. 3 Check to see if the transformer plug is connected to the socket. 4 Check the speed control and adjust in the maximum clockwise position. 5 Check to see if the dental unit master switch is ON. 6 Check drive air on the pressure gauge; should be at 55 psi. 7 Check transformer fuse. 8 Check the dip switch settings. 9 Check wire connections.

Assistina

Item	Part Number	Description
1	0.02699900 0.02699901	Dome Dome, special for longer handpieces
2	0.02681600	Reservoir cap (lock screw)
3	0.02683500 0.02683900	Push button assembly O-ring for push button assembly
4	0.02697030 0.02675200	Assistina supply tube (includes filter) Filter only
5	0.03102000	Assistina dosage pump
6	0.026705000	Assistina aerosol filter
7	0.02690300	Fleece liners pkg 5
—	0.026765000	Air gauge
—	0.026868000	Assistina timer valve
8	0.03102500	Timer cylinder complete



A-dec/W&H Assistina Plumbing Diagram



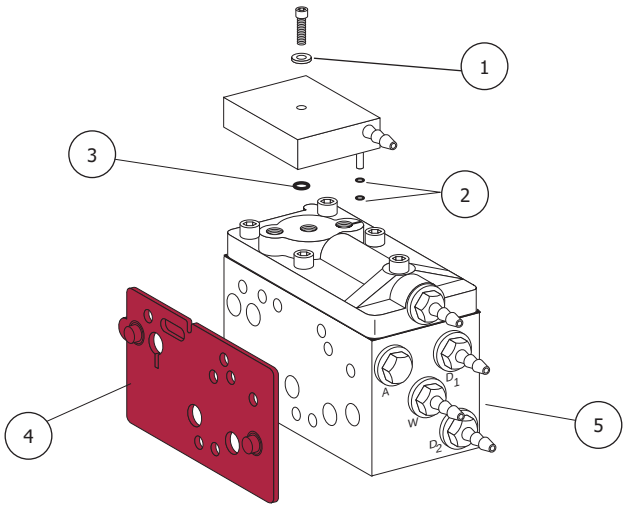
Troubleshooting the Assistina

The following detail provides diagnostic information for troubleshooting the Assistina.

Problem	Action
Excessive lubricant in handpiece	Follow these steps to check for excessive lubricant. **Task** **Description** 1 Is the user holding the button down for only two full seconds? 2 Check o-rings on main shaft. 3 Check o-ring on adapters/couplings. 4 Check that couplings are screwed on tightly to the universal adapter. 5 Check air lines for excessive oil or leaks.
Running too long or too short	Follow these steps. 1 Is the user pushing the button down for a full two seconds? 2 Check for water in the timer cylinder, unscrew end of cylinder, and drain. 3 Check timer cylinder for dirt and debris.
Sticking start button	Follow these steps to see why the start button sticks. 1 Check to make sure covers are vented. Older machines develop a vacuum inside the chamber. Drill a small hole in each cap. 2 Check that the transport seals in both covers are removed. 3 Remove upper half of machine by removing the two screws under the front. Remove start button assembly by pushing up firmly from the underside while turning the ring counterclockwise on the top. Clean and lubricate the push button o-rings. Reassemble.

Century Plus Scaler Block

Item	Part Number	Description
1	004.078.00	Nylon washer, flat
2	030.001.02	O-ring pkg 10
3	030.003.02	O-ring pkg 10
4	38.0550.01	Scaler side gasket, molded (Red) pkg 5
5	—	Century Plus control block refer also to *Handpiece Controls (HC)*
—	38.0537.01	Century Plus scaler block service kit



38.0549.00
Century Plus Scaler Block

Wire and Plumbing Diagram

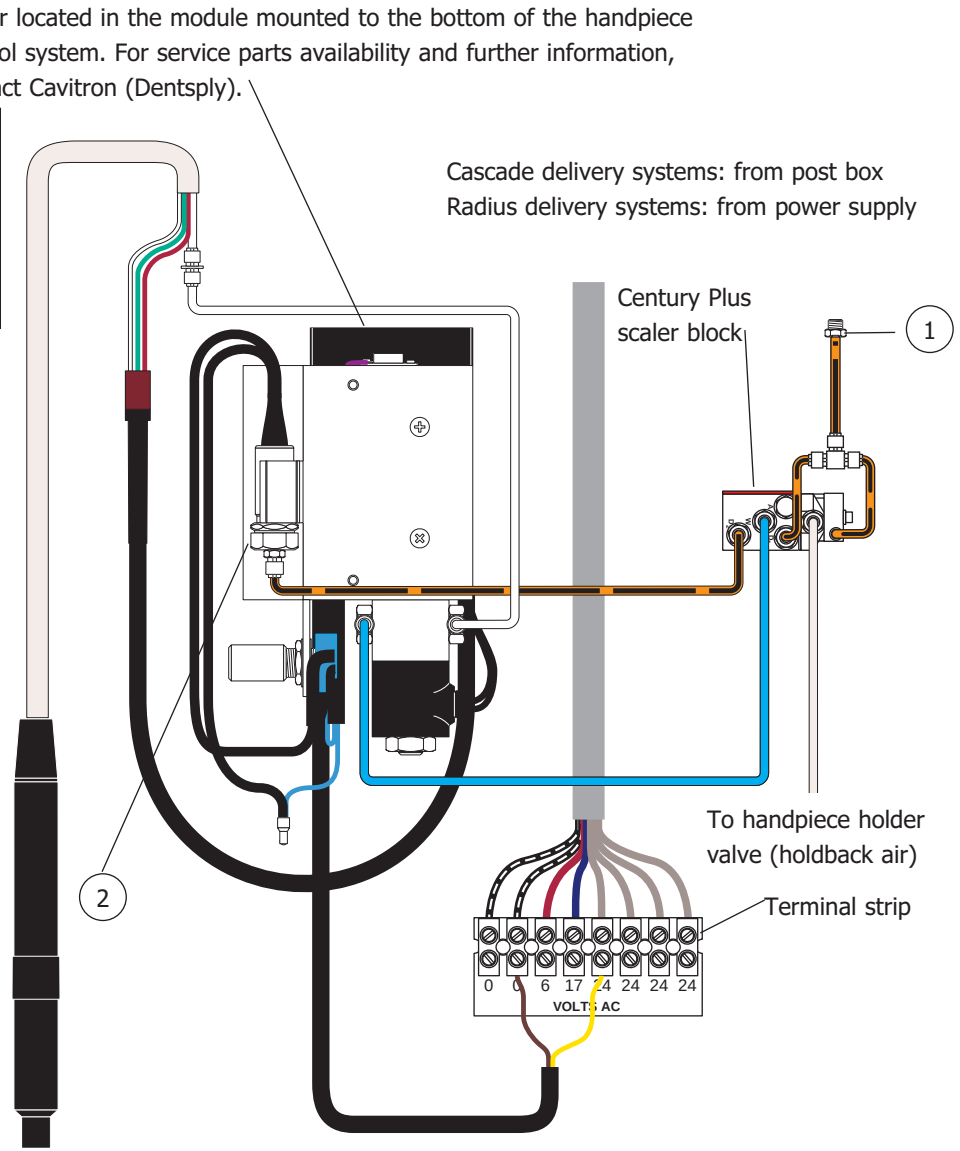
After April 1998

Scaler System
(Cascade)

Item	Part Number	Description
1	023.036.00	Air bleed barb
2	044.158.00	Normally open air-electric switch (replace as a complete assembly)

Terminal strip wiring voltage
(after April 1998)

Wire color	Voltage
Black/White	0
Black/White	0
Red	6
Violet	17
Gray	24
Gray	24
Gray	24
Gray	24



Before May 1998

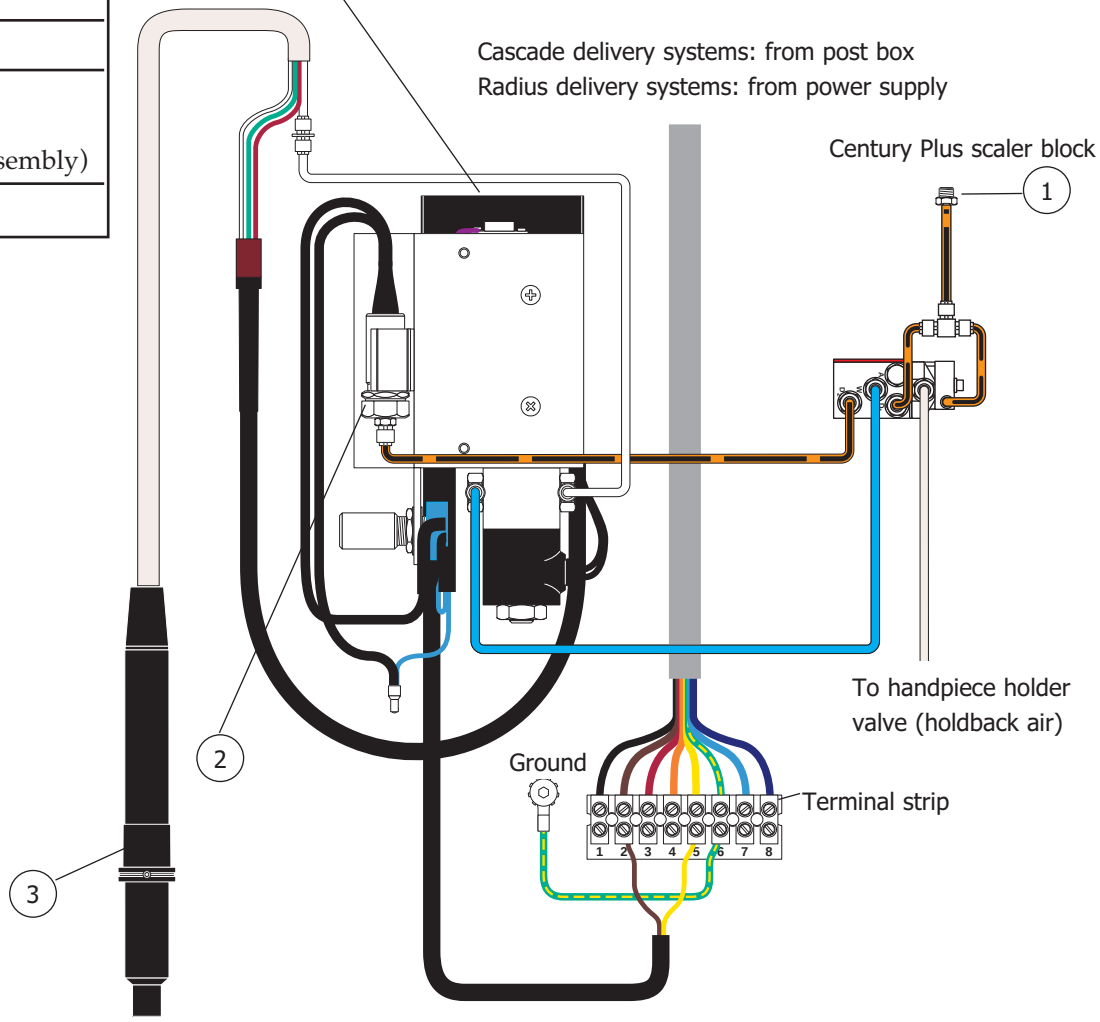
Scaler System
(Cascade)

Scaler located in the module mounted to the bottom of the handpiece control system.
For service parts availability and further information, contact Cavitron (Dentsply).

Item	Part No.	Description
1	023.036.00	Air bleed barb
2	044.158.00	Normally open air-electric switch (replace as a complete assembly)
3	40.0325.00	Scaler handpiece collar

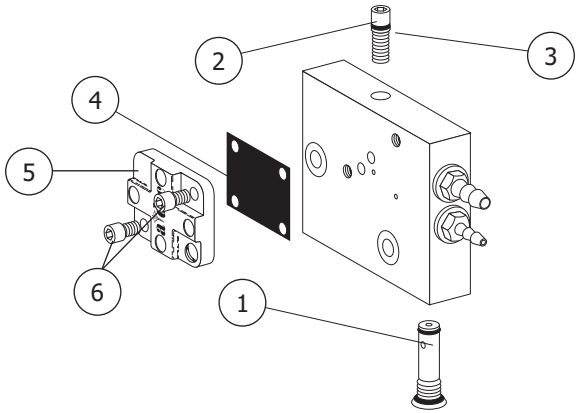
Terminal strip wiring voltage
(before May 1998)

Wire color	Voltage
Black	0
Brown	0
Red	6
Orange	24
Yellow	24
Green & Yellow	Ground
Blue	24
Violet	17

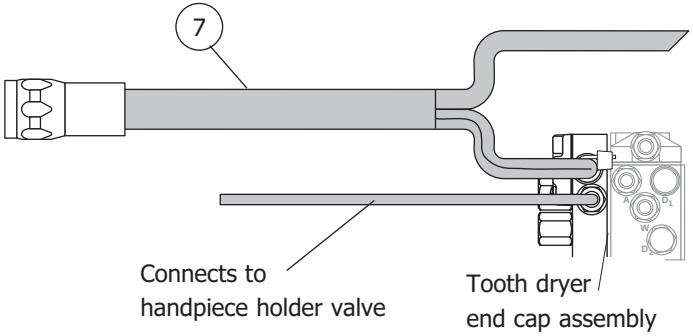


Tooth Dryer Block

Item	Part Number	Description
1	38.0517.00	Air bleed cartridge with o-rings
2	38.0510.00	Drive air flow adjustment screw without o-ring
3	035.034.01	O-ring, special pkg 10
4	38.0054.02	Diaphragm pkg 10
5	38.0181.00	Valve cover
6	002.128.00	Screw
7	98.0012.02	Tooth dryer tubing assembly



38.0535.00 Tooth Dryer End Cap



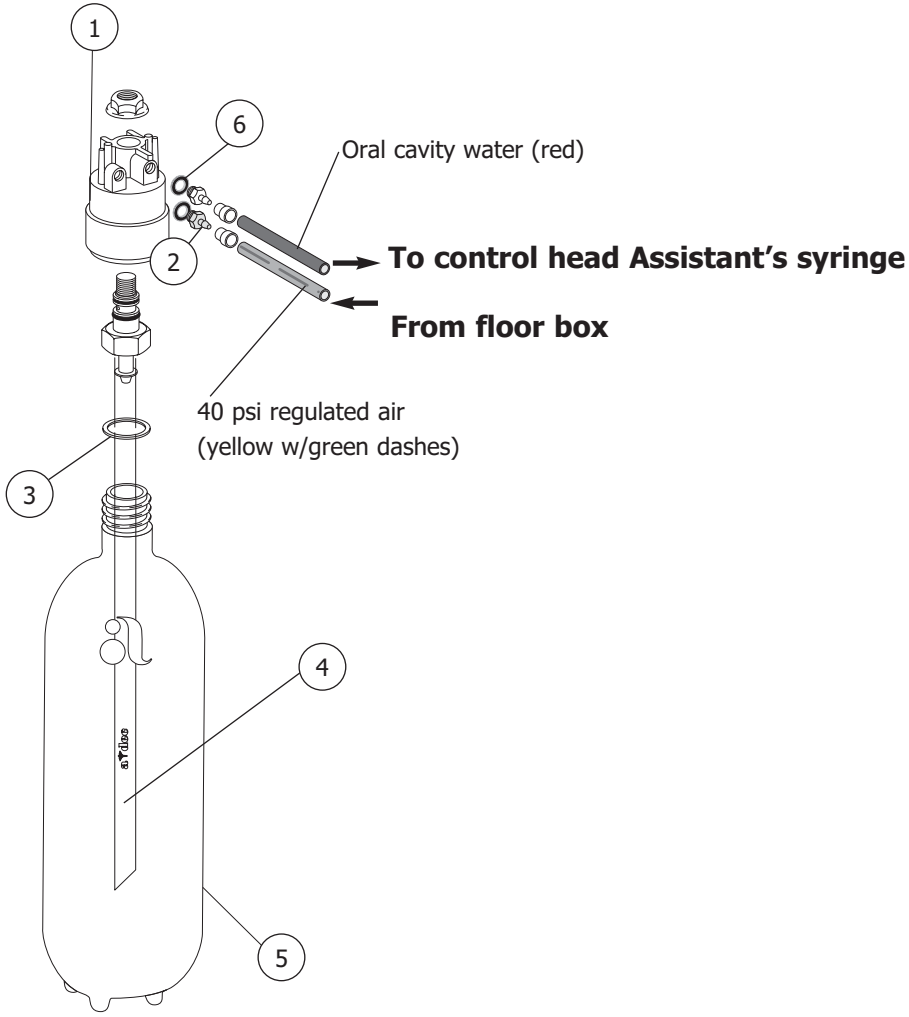
Tooth Dryer System

Self-Contained Water System

Item	Part Number	Description
1	14.0408.00	Cap assembly replacement
2	023.070.00	Bleed barb
3	004.137.00	Gasket
4	14.0332.01	Pick up tubes pkg 6
5	14.0416.00	Water bottle
6	004.182.00	Washer

WARNING

Use only A-dec self-contained water bottles on units. Using glass or plastic bottles can pose a serious safety hazard. Bottles should be pressurized to only 40 psi. Do not connect components that require a continuous water supply.

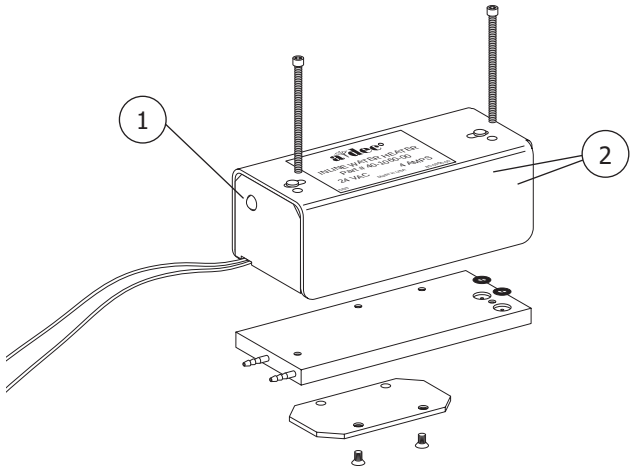


Radius Self-Contained Water Supply System

Low Voltage Water Heater

NOTE: The low voltage water heater must lie flat to be effective.

Item	Part Number	Description
1	40.1060.00	Water heater, low voltage
2	033.003.01	O-ring, viton pkg 10



Low Voltage Water Heater

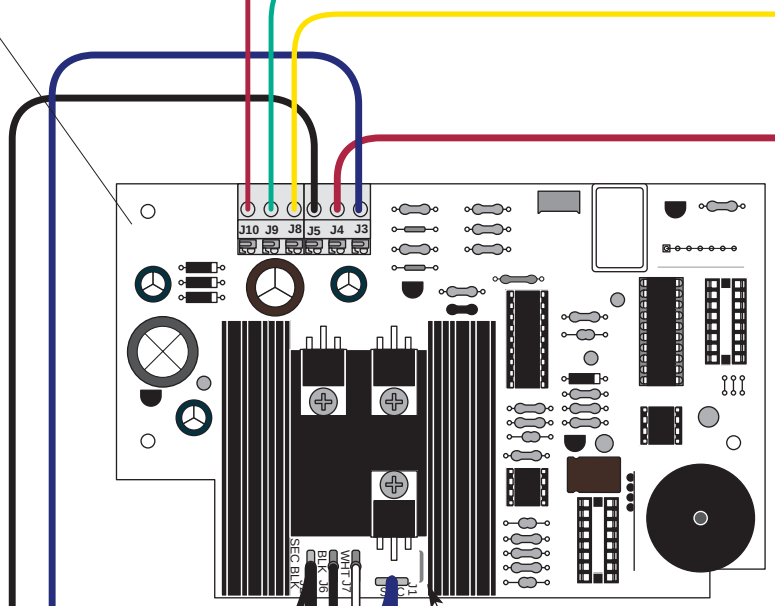
Curing Light Wire and Plumbing Diagram

To curing light handpiece

Curing light and cord assembly (Contact Demetron for service parts and information.)

NOTE: All curing light circuit board installations must include a drip shield, A-dec P/N 11.1140.00.

Curing light circuit board (Contact Demetron for service parts and information.)



Fusible link

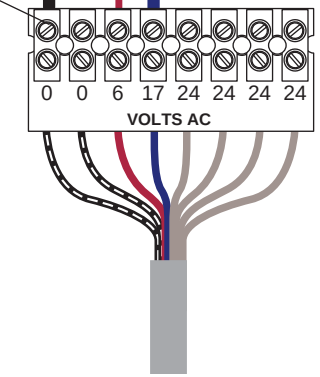
Terminal strip wiring voltage (after April 1998)

Wire Color	Voltage
Black/White	0
Black/White	0
Red	6
Violet	17
Gray	24
Gray	24
Gray	24
Gray	24

After April 1998

NOTE *Voltages are measured using the black (terminal position 1 or 2) as common

Terminal strip



Cascade delivery systems: from post box
Radius delivery systems: from power supply

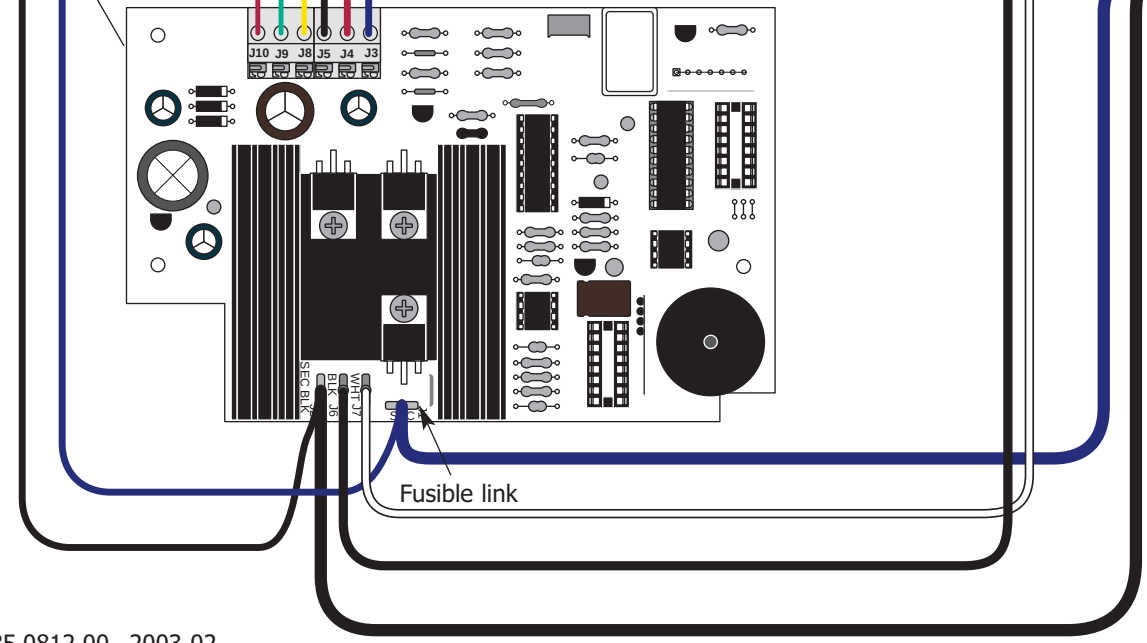
Curing Light Wire and Plumbing Diagram

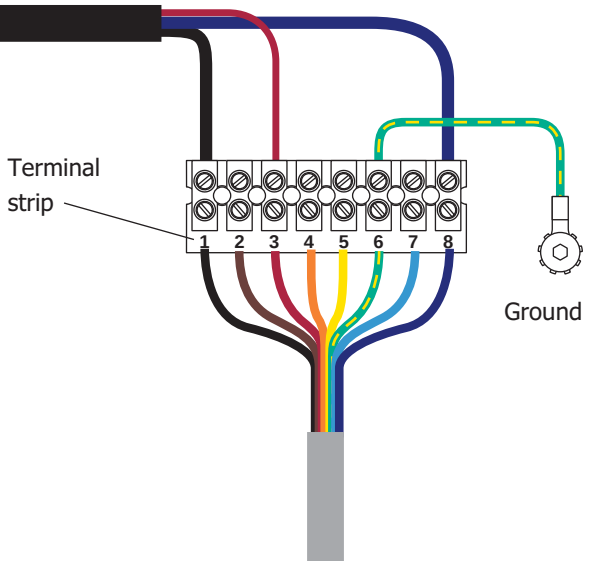
Connected to curing light handpiece

Curing light and cord assembly (Contact Demetron for service parts and information.)

NOTE: All curing light circuit board installations must include a drip shield, A-dec P/N 11.1140.00.

Curing light circuit board (Contact Demetron for service parts and information.)





Cascade delivery systems: from post box
Radius delivery systems: from power supply

Before May 1998

Terminal strip wiring voltage (before May 1998)

Position	Wire Color	Voltage
1	Black	0
2	Brown	0
3	Red	6
4	Orange	24
5	Yellow	24
6	Green &Yellow	Ground
7	Blue	24
8	Violet	17

NOTE: *Voltages are measured using the black or brown (terminal position 1 or 2) as common

Troubleshooting the Curing Light

Troubleshooting information for the curing light is listed in the following charts.

Problem	Action	
	If . . .	**Then . . .**
Curing light does not function (no fan, no light, and no timer signal 20 seconds after the trigger was pulled)	No power	Check to make sure the system is plugged in, and the main's power is available. Check to make sure the master On/Off toggle is in the ON position, and regulated air set to 80 psi.
	Loose connections in curing light handpiece	Place the master On/Off toggle in the OFF position. Disassemble the curing light handpiece and inspect all connections for loose wires. Reconnect or repair any loose wires and re-test the curing light. Replace the curing light handpiece (P/N 21095) available only from Demetron.
	Loose connections to the curing light circuit board	Place the master On/Off toggle in the OFF position. Lower the curing light circuit board assembly and inspect all connections for loose wires. Reconnect or repair any loose wires and re-test the curing light.

Problem	Action	
	If . . .	**Then . . .**
Curing light does not function (no fan, no light, and no timer signal 20 seconds after the trigger was pulled)	Electrical damage to the curing light circuit board has failed.	Place the master On/Off toggle in the OFF position. If damage is visible replace the circuit board from Demetron.
	Power interrupted to curing light circuit board **NOTE**: Line voltage from duplex receptacle should be approximately: • 100 VAC at 60 Hz • 120 VAC at 60 Hz • 240 VAC at 50 Hz	Place the master On/Off toggle in the OFF position. Check the AC voltages at the circuit board, test pin connections. (Pull the trigger 4-6 times for adequate test time.) J2 (common) and J4 ≈ 6 VAC (logic) J2 (common) and J1 ≈ 17 VAC (fan/light).
	If AC voltages are less than: 5.2 VAC at J2-J4 16.2 VAC at J2-J1	Check the 6 Volt and 17 Volt fuses in the power supply (refer to *Post Boxes & Cuspidors (PB).* Check for an open in the delivery system wiring harness refer to *Post Boxes & Cuspidors (PB).*

Problem	Action	
	If . . .	**Then . . .**
Curing light does not function (no fan, no light, and no timer signal 20 seconds after the trigger was pulled)	Blown fusible link on the curing light circuit board	Place the master On/Off toggle in the OFF position. Inspect the fusible link by gently pulling the protective sleeve and wire. If damaged, the protective sleeve will fall off. If the fusible link is broken or damaged, replace the curing light circuit board (P/N 20622) from Demetron.
	Power interrupted from curing light circuit board to curing light handpiece **NOTE:** If testing with a True RMS Meter, J6 (black, common) and J7 (white) ≈ 12.8 VAC (light) If AC voltages are less than: 11 VDC at J9-J10 9 VAC at J6-J7	Place the master On/Off toggle in the ON position. Check the AC voltages at the circuit board, test pin connections. (Pull the trigger 4-6 times for adequate test time.) J9 (green) and J10 (red) ≈ 12VDC (fan) J6 (black, Common) and J7 (white) ≈11VAC (light). Replace the circuit board (P/N 20622) from Demetron.
	Circuit interrupted through the trigger switch There is no continuity	Place the master On/Off toggle in the OFF position. Check the continuity through the curing light handpiece trigger switch. Test at the curing light circuit board connections: J8 (yellow) to J9 (green). Replace the curing light handpiece and cord set (P/N 21095) from Demetron.

Problem

The curing light does not illuminate when activated (fan and 20 second timer signal function)

NOTE: With the exception of the above notations, all Demetron curing light assemblies and components should be replaced through Kerr/Demetron. If you are not able to correct the problem, contact A-dec customer service.

Action

If . . .	Then . . .
Light bulb does not function	Place the master On/Off toggle in the OFF position. Open the handpiece and examine the bulb. If the bulb appears to be burned out or damaged, replace the light bulb from Demetron.
Thermostat does not function There is no continuity	Place the master On/Off toggle in the OFF position. Check the continuity of the curing light handpiece. Test at the curing light circuit board connections: J6 (black, common) to J7 (white) = Continuity. Replace the curing light handpiece and cord set (P/N 21095) from Demetron.
Interruption of power to the curing light bulb. **NOTE**: If testing with a True RMS Meter, J6 (black, common) and J7 (white) ≈ 12.8 VAC (light) If AC voltages are less than: 9 VAC at J6-J7	Place the master On/Off toggle in the ON position. Check the AC voltages across the curing light handpieces. Test the white and black wires at the circuit board connections: (Pull the trigger 4-6 times for adequate test time.) J6 (black, common) to J7 (white) = 11VAC. Replace the circuit board (P/N 20622) from Demetron.

Cascade Master Series

Overview

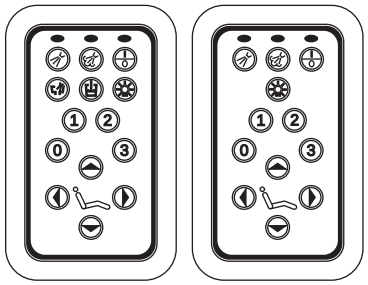
The Cascade Master Series option consists of five components, which control standard chair and delivery system functions. These components include: master touchpad, master 17-watt power supply, master circuit board, solenoid valve manifolds, and master dental light air-electric switches. This section presents details on how to service the components and troubleshoot specific problems.

Identifying the Components

This overview provides a brief description of each of the five master series components.

Master Touchpads

The master touchpad controls low voltage electrical signals that activate chair functions in the same manner as the standard chair touchpad. It also sends low voltage electrical signals to a bank of solenoid valves, which control the air pilot signals used to activate various delivery system functions, the dental light, and, optionally cuspidor functions.



Master Touchpads

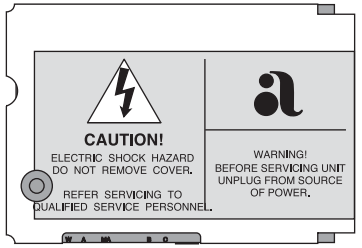
Master 17-Watt Power Supply

The master 17-watt power supply connects directly to the power mains and provides power to the master circuit board.

Master 17-Watt Power Supply

Master Circuit Board

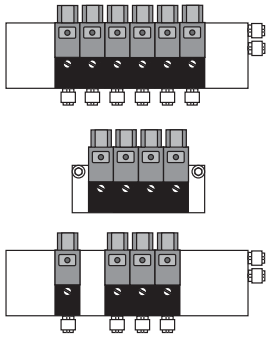
The master circuit board receives electrical signals from the master touchpad to activate or deactivate a desired function. It then sends a low voltage electronic signal to the appropriate solenoid valve, opening or closing it to control air flow to the balance of the delivery system.



Master Circuit Boards

Solenoid Valve Manifolds

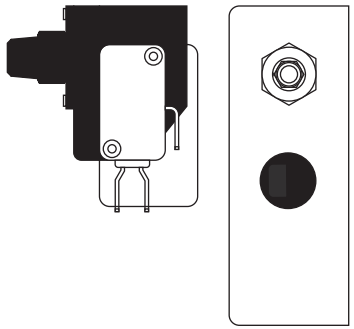
The solenoid valve manifolds can contain a maximum of six normally closed solenoids, which control the pilot air signals used to activate standard Cascade unit and cuspidor functions. Each solenoid valve receives an electrical signal from the master circuit board, which causes it to open (no signal causes the solenoid to close). Each of the solenoid valves have an indicator that lights when the valve receives an electrical signal from the master circuit board. This signal causes the valve to open or close thereby controlling the flow of the pilot air signal through the valve.



Solenoid Valve Manifolds

Master Dental Light Air Electric Switches

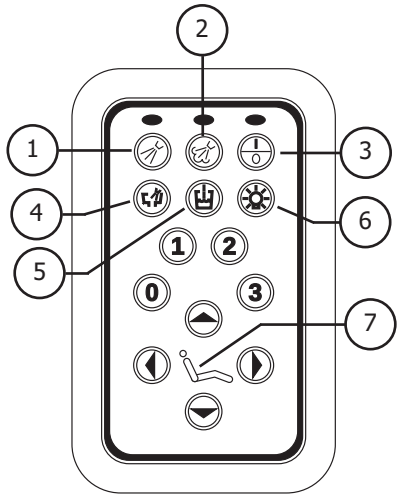
The master dental light air-electric switch is connected in the common return for the light. It receives a pilot air signal from the solenoid valve manifold. This signal closes the normally open switch, which completes the electrical circuit, allowing the dental lamp to light.



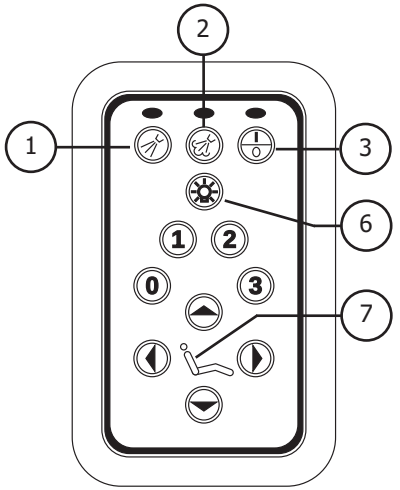
Master Dental Light Air-Electric Switches

Master Touchpad

Item #	Description
1	Coolant air On/Off
2	Coolant water On/Off
3	Master On/Off
4	Cuspidor bowl rinse
5	Cuspidor cup fill
6	Dental light On/Off
7	Program button



Master Touchpad with Cuspidor Functions



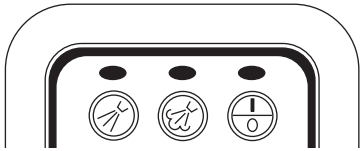
Master Touchpad without Cuspidor Functions

Using the Master Touchpad

Master On/Off

Air, water and electrical power to the handpiece control system, and dental light are turned ON or OFF when this button is pressed. An electrical signal is sent from the touchpad to the circuit board, which opens the master air solenoid valve, allowing the pilot air to activate the system.

Indicators



When the master On/Off, Air Coolant On/Off, and Water Coolant On/Off buttons are pressed, the indicator above the individual function switch (on the master touchpad) illuminates to indicate the function is ON.

Coolant Air On/Off

Air coolant to the handpieces is turned ON or OFF when the button is pressed. An electrical signal is sent from the touchpad to the circuit board which, opens the air coolant signal solenoid, allowing the air coolant to flow to the handpiece control block. Handpiece air coolant can then be adjusted. Refer to *Handpiece Control*s *(HC)* for adjustment instructions.

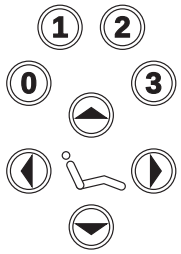
Coolant Water On/Off

Water coolant to the handpieces is turned ON or OFF when this button is pressed. An electrical signal is sent from the touchpad to the circuit board, which opens the water coolant signal solenoid, allowing the water coolant signal air to flow to the handpiece control block. This opens the water valve when the foot control is pressed. Handpiece coolant water can then be adjusted in the normal manner.

Dental Light On/Off

The dental light is turned ON or OFF when this button is pressed. An electrical signal is sent from the touchpad to the circuit board, which opens the dental light solenoid. Air from the solenoid closes the dental light air-electric switch, turning the light ON. Light intensity and other adjustments are the same as A-dec dental lights. Refer to *Dental Lights (LI)* for adjustment instructions.

Chair Controls



The Cascade master touchpad chair controls are identical to the standard A-dec chair touchpad. Refer to the *Chairs (CH)* section for chair programming instructions.

Cuspidor Cup Fill

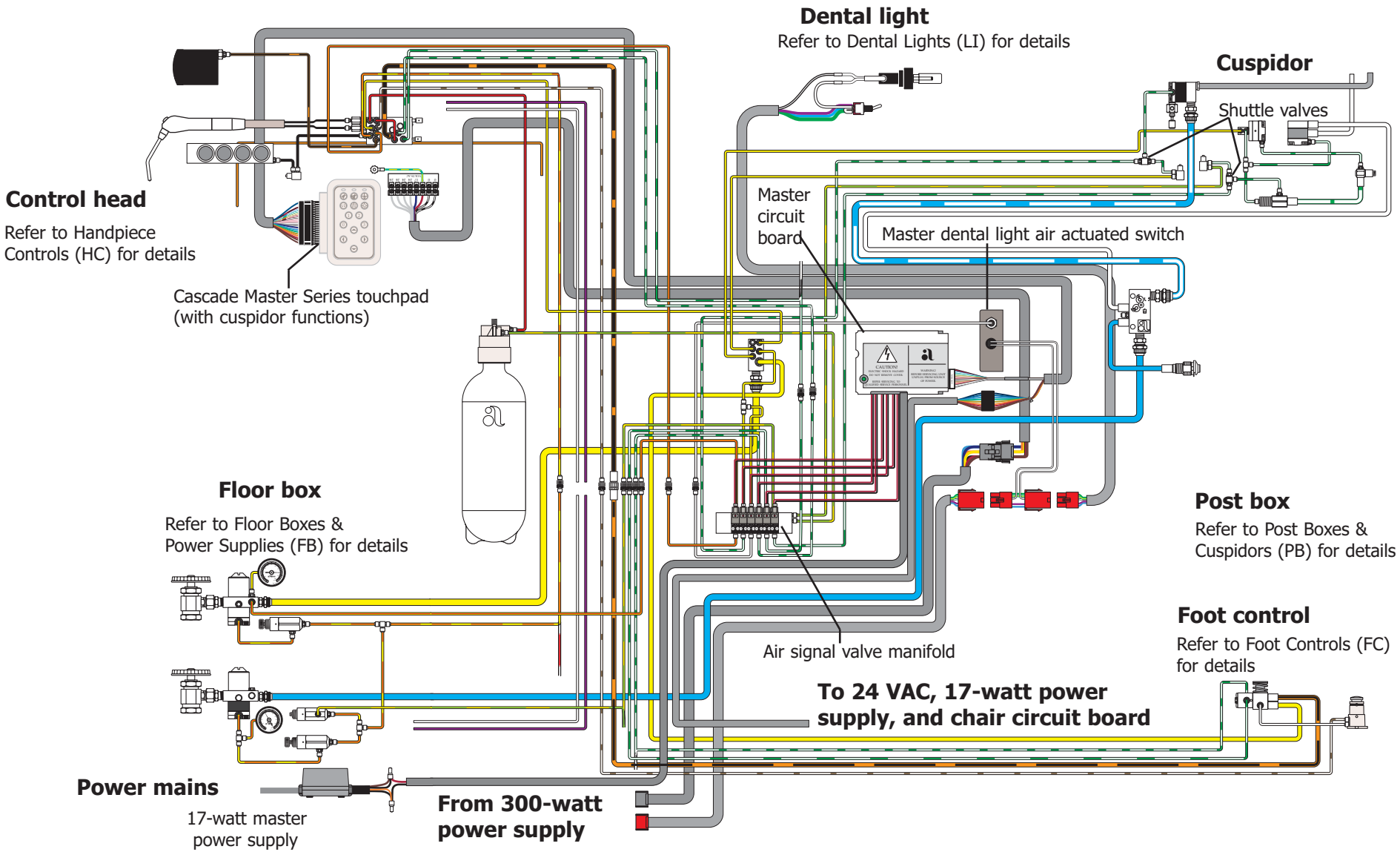
The cuspidor cup fill function may be accomplished by pressing the manual button on the top of the cuspidor or by pressing the touchpad button. An electrical signal is sent from the touchpad to the circuit board, which opens the cup fill signal valve, allowing the pilot air signal to flow to the cup fill circuit in the cuspidor. Cup fill functions may then be adjusted. Refer to *Post Boxes & Cuspidors (PB)* for adjustment instructions.

Cuspidor Bowl Rinse

The cuspidor bowl rinse function may be accomplished by pressing the manual button on the top of the cuspidor or by pressing the touchpad button. An electrical signal is sent from the touchpad to the circuit board, which opens the bowl rinse signal valve, allowing the pilot air signal to flow to the bowl rinse circuit in the cuspidor. Bowl rinse functions may then be adjusted in the normal manner.

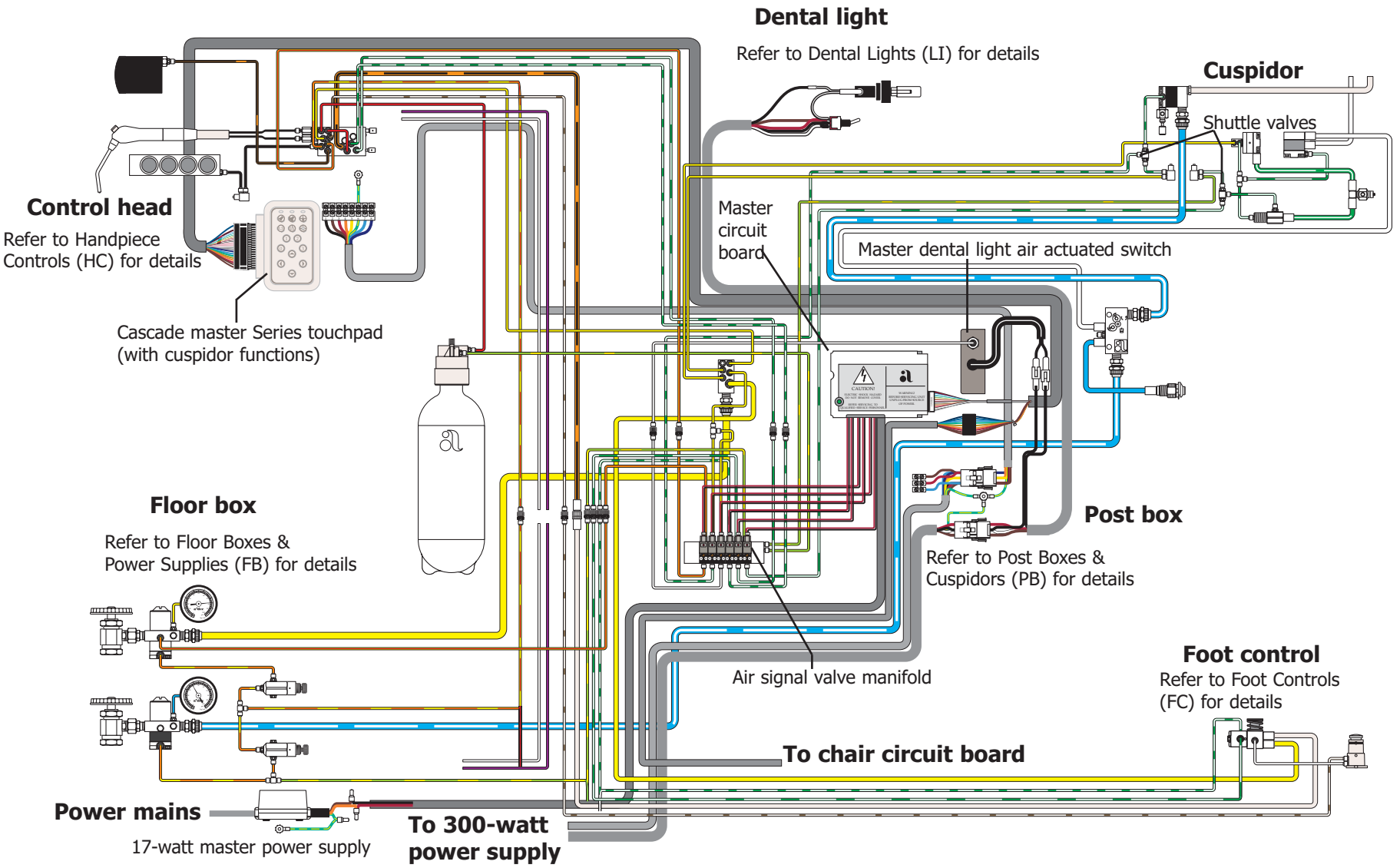
Cascade Delivery System Flow Diagram

After November 1999



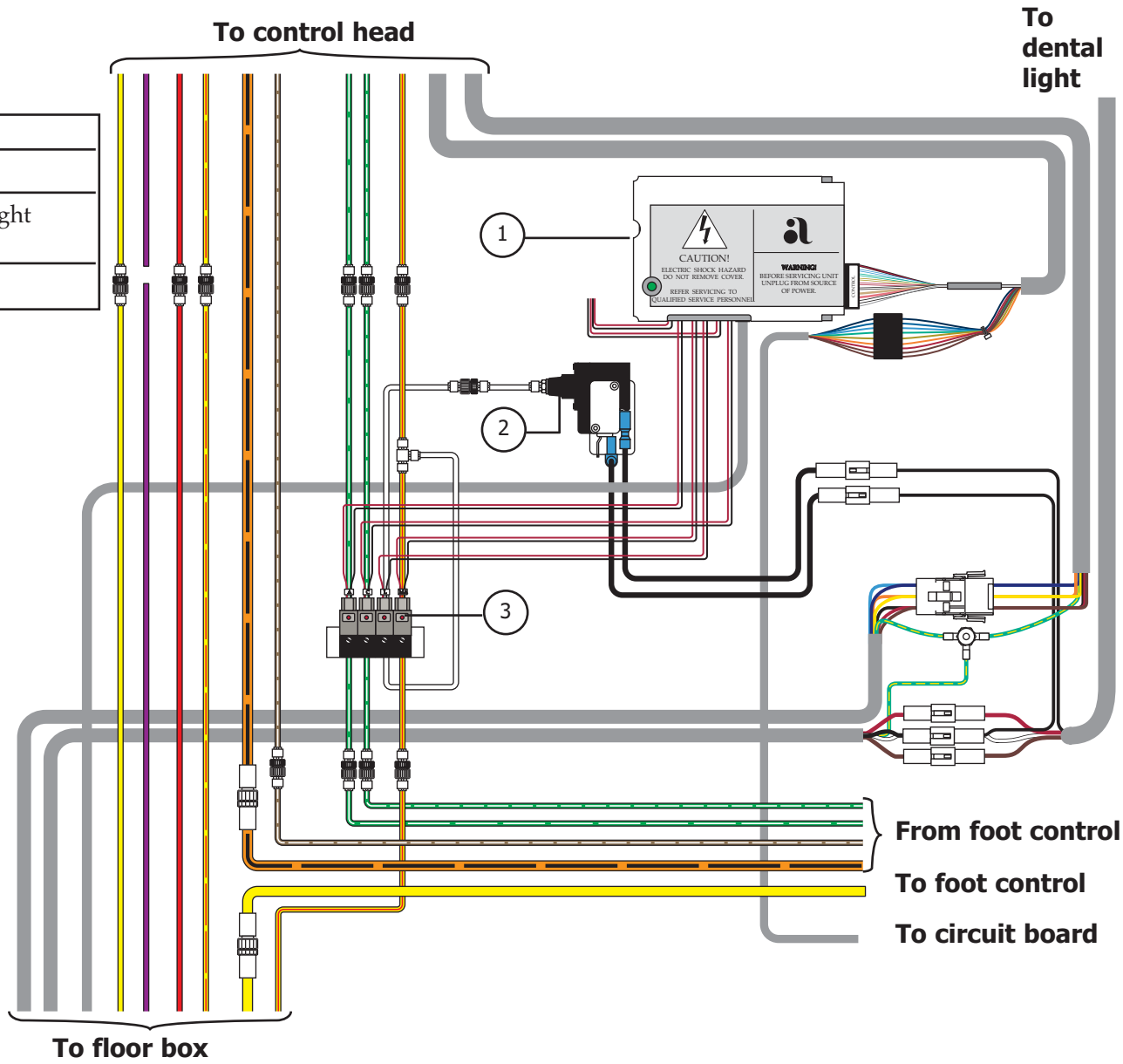
Cascade Delivery System Flow Diagram

Before November 1999



Chair-Mount Adapter

Item #	Part #	Description
1	75.0957.00	Master circuit board
2	044.170.00	Radius master dental light air-actuated switch
3	046.147.00	Solenoid



Installing a Solenoid

The solenoid valves control the air pilot signals that activate standard Cascade unit and cuspidor functions. The following steps will guide you through the procedure for installing a solenoid.

Removing a Solenoid

Task Description

To remove a solenoid:

1 Turn OFF the unit.

2 Press down on the wire connector lever and gently pull the connector out of the solenoid.

3 Remove the two screws which secure the solenoid to the manifold.

4 Remove the solenoid from the manifold.

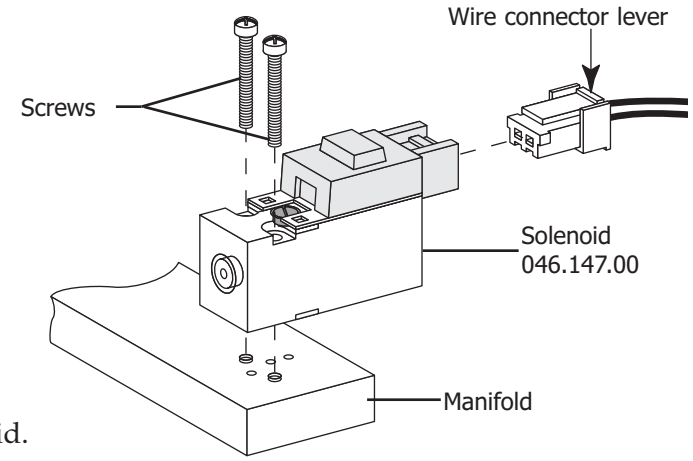
Replacing a Solenoid

To replace a solenoid:

1 Install the new solenoid on the manifold.

2 Screw in the two screws to secure the solenoid.

3 Replace the wire connector to the solenoid.



Removing or Replacing a Solenoid

Servicing the Unit

Before servicing the unit:

- Ensure that a minimum of 60 psi of air is being supplied to the unit. The indicators on the individual solenoid valves will light when air pressure is above 30 psi. The unit will not function unless the air pressure is above 60 psi.
- Ensure that the unit is ON. The indicator above the button should be illuminated when the unit is ON. If the indicator is not illuminated, press the master On/Off button.

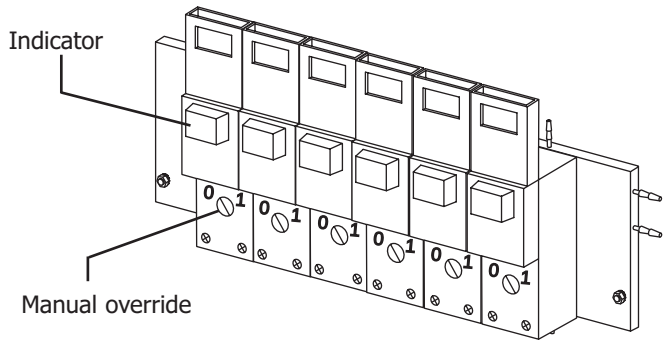
Opening a Solenoid

To manually open a solenoid, carefully turn the solenoid valve's manual override selector (orange) a quarter turn clockwise, to the ON (1) position. Do not force the override On/Off selector beyond the ON (1) position.

CAUTION

Use minimal force when manually opening a solenoid. Excessive force, or turning the override selector too far, will permanently damage the solenoid.

When a solenoid is manually opened, the indicator will not illuminate. The function will remain ON until the unit is turned OFF or the manual override selector has been returned to the OFF (0) position.



Troubleshooting Cascade Master Series

Tips and troubleshooting information are listed in the following charts to assist in diagnosing Cascade Master Series problems. The charts are not intended to cover every situation, but include the most common problems you may encounter.

Problem: The Master On/Off, coolant air, or coolant water touchpad function do not work

Action

Manually open the function's solenoid. Refer to *Opening a Solenoid*.

If . . .	Then . . .
Function doesn't work when the solenoid valve is manually opened	Refer to *Handpiece Controls (HC)* for troubleshooting information.
Function operates properly when the solenoid valve is overridden	Refer to the specific function in this section.

Problem: Cup fill and bowl rinse functions do not work from the touchpad

Action

Activate the cup fill and bowl rinse functions by pressing the control buttons on the top of the cuspidor. Refer to *Post Boxes and Cuspidors*.

CAUTION

Do not override the cup fill or bowl rinse solenoids. This will cause water to continually flow at the cuspidor.

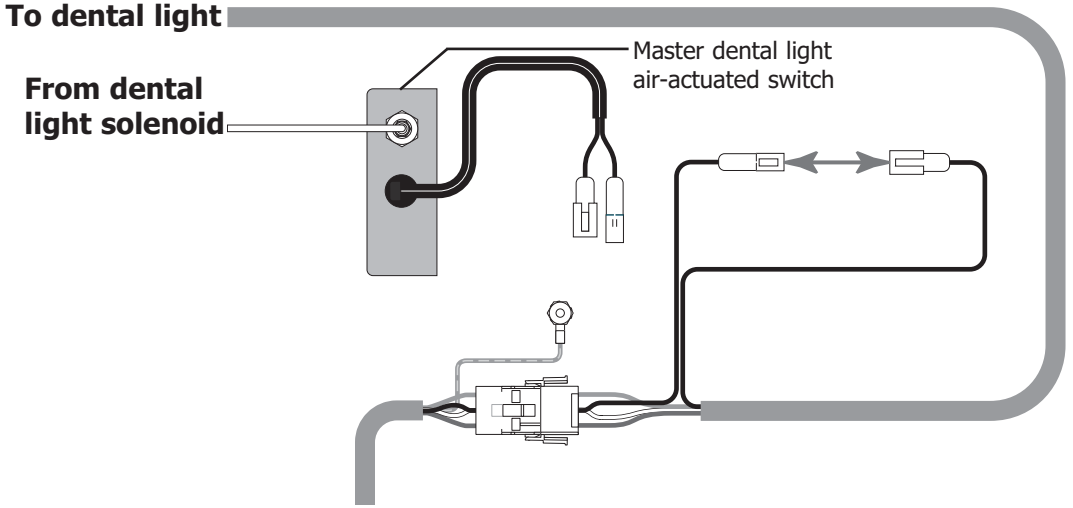
If . . .	Then . . .
Control buttons on top of the cuspidor do not work	Refer to *Post Boxes & Cuspidors (PB)* for troubleshooting information.
Control buttons on top of the cuspidor do work	Refer to specific function in this section.

Problem	Action

Dental light On/Off touchpad functions do not work

Follow these steps to determine the problem with the touchpad functions.

Task	Description
1	Disconnect the dental light from its power supply.
2	Disconnect the two black wires from the master dental light air-actuated switch, and connect the wire from the wiring connector to the black wire going to the light.
3	Re-connect the dental light to its power source.



If . . .	Then . . .
Light does not illuminate	Refer to *Dental Lights (LI)* for troubleshooting information.
Light does illuminate	Refer to the Touchpad Troubleshooting section.

<table>
<tr><th>Problem</th><th>Action</th></tr>
<tr><td>Chair touchpad functions do not work</td><td>The Cascade Master Series touchpad chair functions are identical to the standard chair touchpad functions. Refer to Chairs (CH) for troubleshooting information.</td></tr>
<tr><td>Unit does not work when the master On/Off control is pressed</td><td>Check the Master circuit board. The LED should be ON.

If the LED is OFF:

Check the mains input voltage to the 17-watt power supply:
• 120 VAC should be +10% 50-60 Hz, .14 Amps
• 230 VAC should be +10% 50-60 Hz, .07 Amps

<table><tr><th>If . . .</th><th>Then . . .</th></tr><tr><td>Main input voltage does not meet the above specification or is absent</td><td>Contact a local electrical contractor to correct the power condition.</td></tr><tr><td>Main input voltage does meet the above specification</td><td>Check the 17-watt power supply output voltage.</td></tr></table>
Check the 17-watt power supply output voltage:
• It should be 22 VAC, 65 Amps.

<table><tr><th>If . . .</th><th>Then . . .</th></tr><tr><td>Power supply output is 22 VAC</td><td>Master circuit board has malfunctioned and must be replaced.</td></tr><tr><td>Master 17-watt power supply output is not 22 VAC</td><td>17-watt power supply must be replaced.</td></tr></table></td></tr>
</table>

Problem | **Action**

Unit does not work when the master On/Off control is pressed

If LED is ON:

Check air pressure being supplied to the unit. It should be 60 psi (minimum) at the floor box utilities.

If . . .	Then . . .
Air pressure meets specifications, and the selected function operates when solenoid is opened manually	Replace the solenoid. Refer to *Replacing a Solenoid*.
Air pressure does not meet the above specification	Refer to *Floor Boxes & Power Supplies (FB)* for utility information.

Master dental light does not illuminate when the solenoid valve is manually opened

Check to see if the Master circuit board and the 17-watt power supply both function.

Check the indicator on the Master dental light solenoid valve.

If . . .	Then . . .
Indicator lights when the function is activated at the touchpad	Master dental light air-actuated switch has failed and must be replaced.
Indicator does not light when the dental light button is pressed on the touchpad	Dental light solenoid has malfunctioned and must be replaced.

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Troubleshooting Performer II Chair PR-19
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Troubleshooting Cuspidors PR-99
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Troubleshooting Water Saliva Ejectors PR-111
Adjusting Holder Tension PR-120
Adjusting Tension on the Assistant's Arm PR-120
Troubleshooting Assistant's Instrumentation PR-121

This section provides descriptions, service, maintenance, adjustment, and troubleshooting detail on the Performer product line.

Identifying A-dec Tubing

This section identifies the tubing type used when servicing A-dec products. Allow adequate length when installing to avoid crimping or bending of tubing. The use of the appropriate tools can improve the ease of tubing installation or replacement.

Using Suggested Fittings

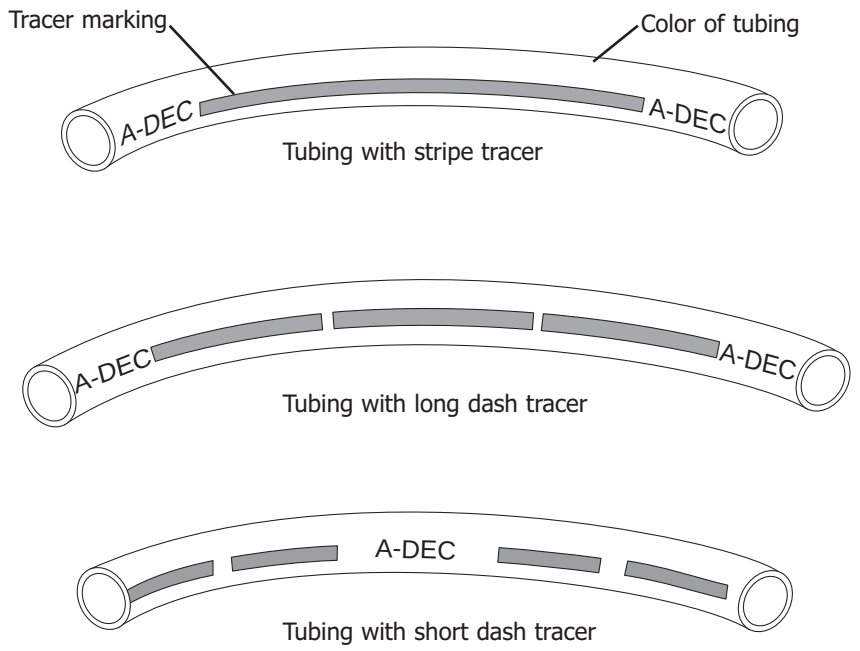
Unit-clamps or tubing sleeves must be used to ensure a good seal and to prevent tubing from coming off barbs.

For 1/4" polyurethane tubing, use 1/4" barbs with sleeves and 1/4" Poly-Flo fittings.

For 3/8" Polyurethane tubing, use 3/8" Poly-Flo fittings.

Identifying Detail

When identifying tubing, the body color of the tubing is the “tubing color”. The line and/or the A-dec name printed on the tubing are the “tracer markings”. These two details will identify the type of tubing you will need and its use.



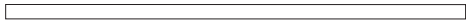
Tubing Identification Details

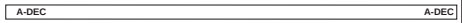
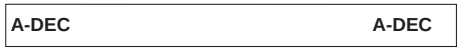
Identifying Tubing Functions

When installing or replacing tubing, allow enough length to avoid crimping or bending. Unit-clamps or tubing sleeves must be used to ensure a good seal and to prevent tubing from coming off barbs.
The following table lists the different types of tubing and its function.

Tubing Function	Description	Tubing Color	Part Number
Unregulated Air	Continuous, filtered, unregulated air — 1/8" OD from the air regulator to On/Off toggle		036.013.03
Pilot Air	Filtered unregulated air controlled by Master On/Off toggle —1/8" OD		036.009.04
Regulated Air Supply	Continuous, filtered, regulated air —1/8" OD		036.003.03
Regulated Air Supply	Regulated air — 3/8" OD		036.103.03
Regulated Air Supply	Regulated air — 3/8" OD		036.031.02
Regulated Air (40 psi)	Regulated air at 40 psi to pressurize the water bottle — 1/8" OD		036.044.03

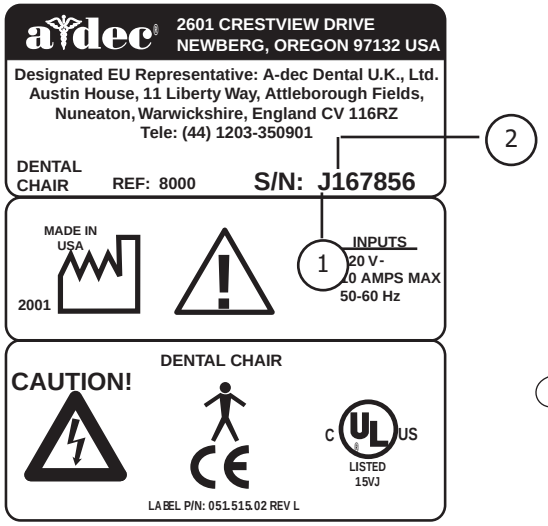
Tubing Function	Description	Tubing Color	Part Number
Drive Air	Drive air for pressure gauge — 1/8" OD		036.010.03
Drive Air	Drive air for foot control — 1/4" OD		036.052.03
Drive Air	Handpiece drive air (clear) — 1/4" OD		036.066.03
Chip Blower Air	Air for chip blower — 1/8" OD		036.014.02
Signal Air, Coolant Air	Signal air/air coolant from foot control, signal air for cuspidor cup filler and vacuum actuator — 1/8" OD		036.006.03
Signal Air, Water Coolant	Signal air/water coolant from foot control, signal air for cuspidor bowl rinse — 1/8" OD Signal		036.018.03

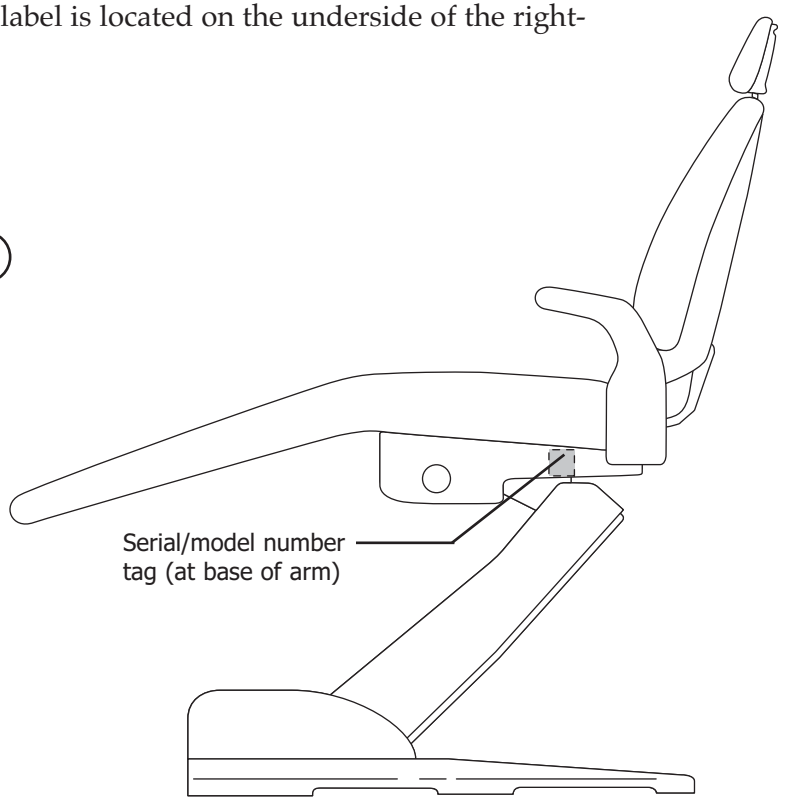
Tubing Function	Description	Tubing Color	Part Number
Signal Air, Coolant Water	Signal air (clear) from foot control relay to wet/dry toggle — 1/8" OD		024.015.04
Water Supply	Coolant water supply, handpiece water — 1/8" OD		036.004.03
Oral Cavity Water	Oral cavity water — 1/8" OD		036.005.03
Water Supply	Regulated water, water to bowl rinse — 1/4" OD		036.053.03
Water Supply	Unregulated water — 3/8" OD		036.033.02
Return Water	Return water, tank water heater, water to gravity drain drip tube from syringes — 1/8" OD		036.011.03

Tubing Function	Description	Tubing Color	Part Number
Miscellaneous	Miscellaneous line (white) for use with A-dec authorized accessories — 1/8" OD		036.019.03
Hydraulic System Supply	Low pressure hydraulic system supply for chair (clear) — 3/8" OD		036.035.00

Locating Serial/Model Number Labels

The serial/model number label identifies the chair model and the month and year in which the chair was manufactured. This label is located on the underside of the right-hand arm rest support.

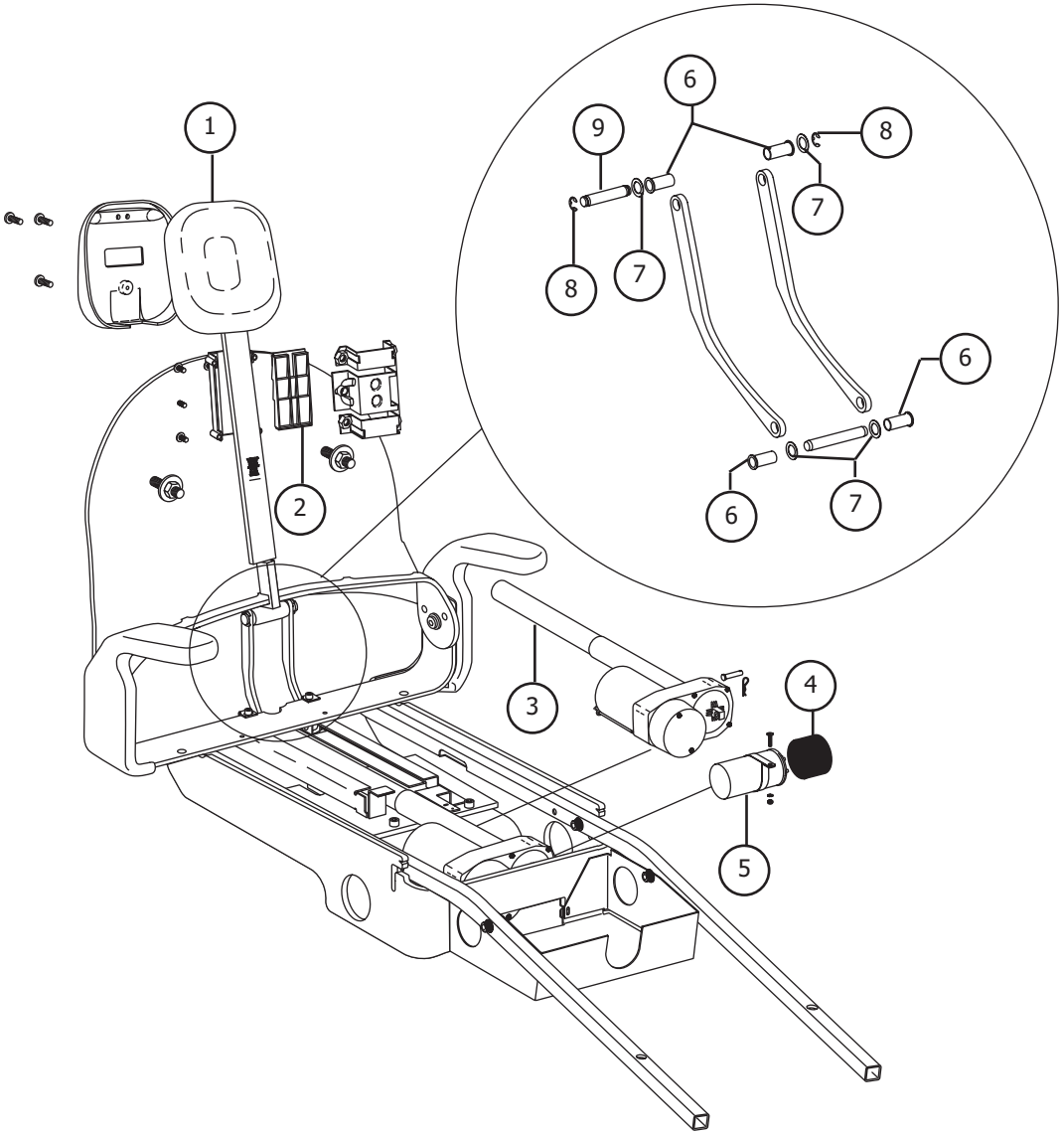




Item #	Description
1	Month of manufacture
	The first letter of the serial number indicates the month the product was manufactured; e.g., A is January.
2	Last digit of the year manufacture

Performer I Upper Structure

Item #	Part Number	Description
1	(Obsolete)	Single articulating headrest
	61.2116.XX	Double articulating headrest
2	61.1569.00	Wear pad, sliding wedge molded
3	61.2409.00	115V tilt actuator
3	61.2410.00	230V tilt actuator
4.	041.529.00	Capacitor boot
5	90.1035.00	115V tilt actuator capacitor
	90.1036.00	230V tilt actuator capacitor
6	61.2181.00	Bearing, flanged
7	004.035.00	Washer, flat, nylatron
8	010.040.01	E-ring, retaining
10	61.2425.00	Pivot pin, back link

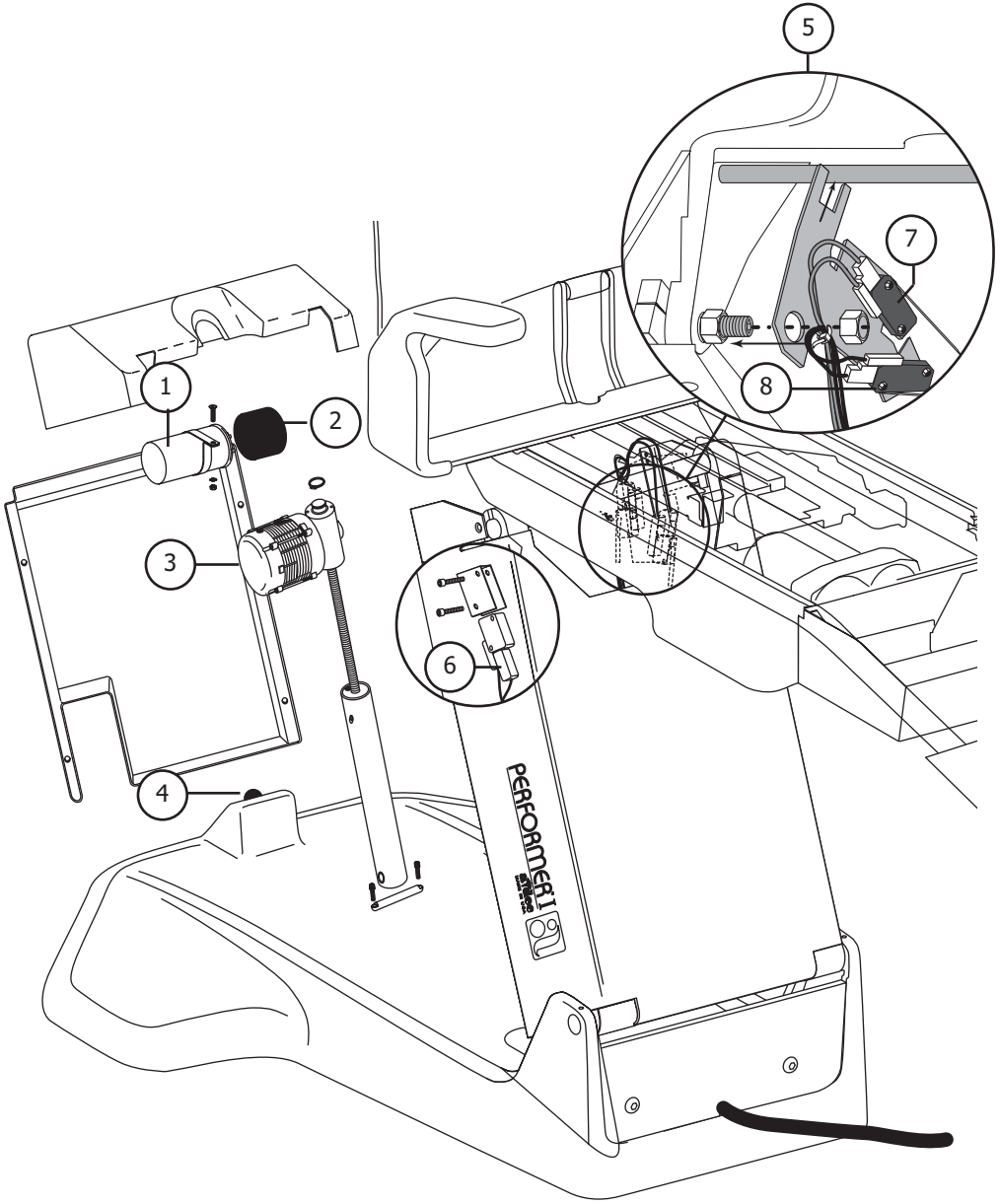


WARNING

High voltages are present at motor and limit switch connections. Unplug the chair before servicing. Failure to do so could result in serious injury.

Performer I Base Structure

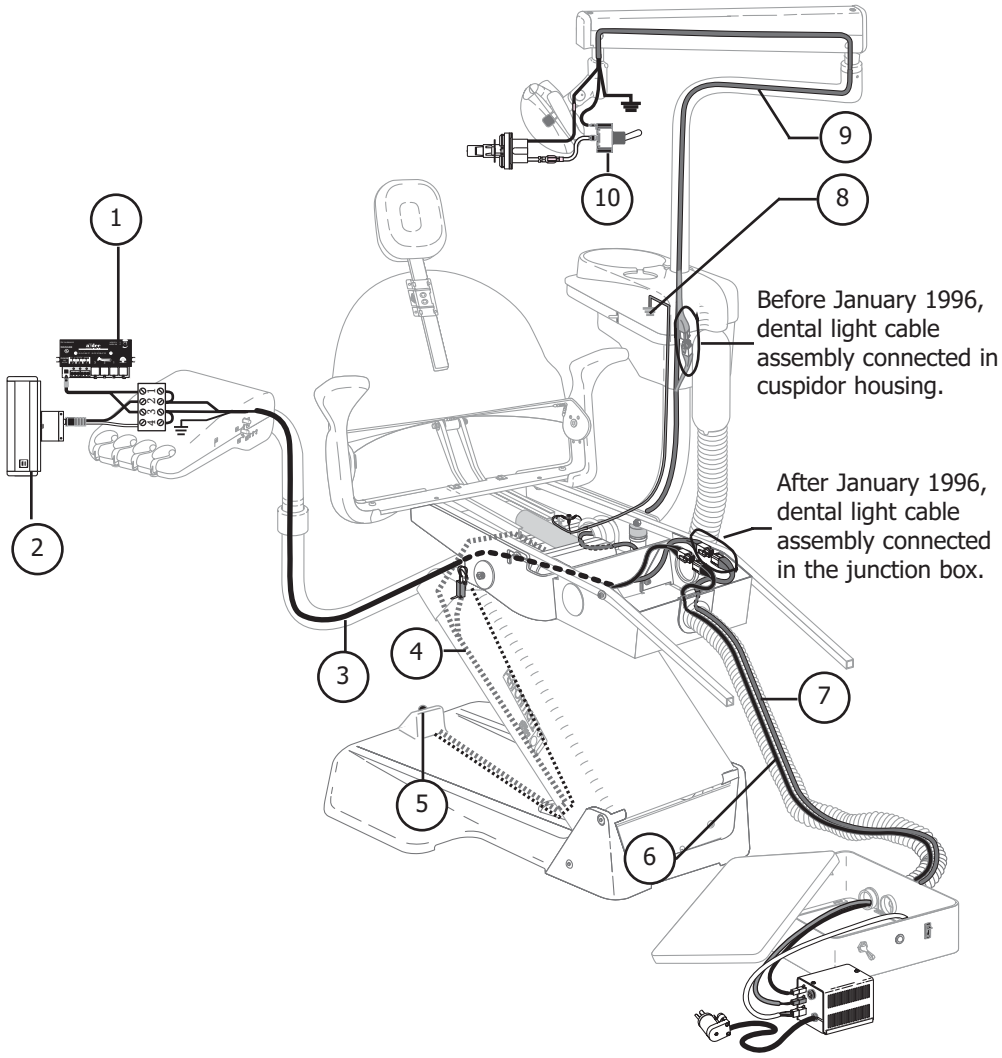
Item #	Part Number	Description
1	041.583.00	240V base capacitor (after June 1998)
—	041.517.00	240V base capacitor (before June 1998)
—	041.504.00	440V base capacitor
2	041.529.00	115V capacitor boot
3	61.2469.00	115V base actuator
—	61.2470.00	230V actuator
4	61.2483.00	Joystick chair control
5	90.1000.00	Base limit switch kit
6	044.183.00	Base down, shutoff switch
7	044.184.00	Base up limit switch (Red)
8	044.184.00	Base down limit switch (Black)

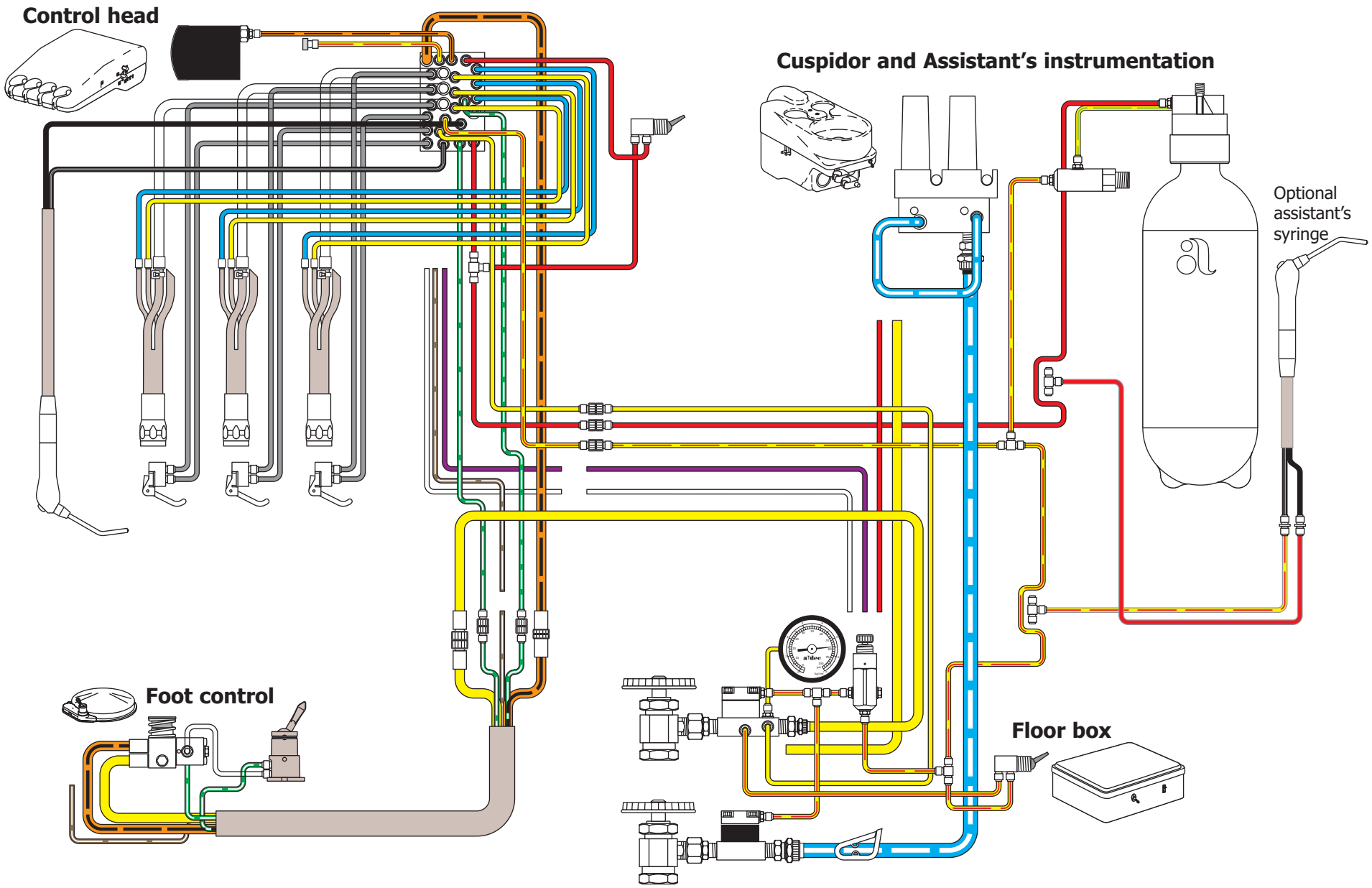


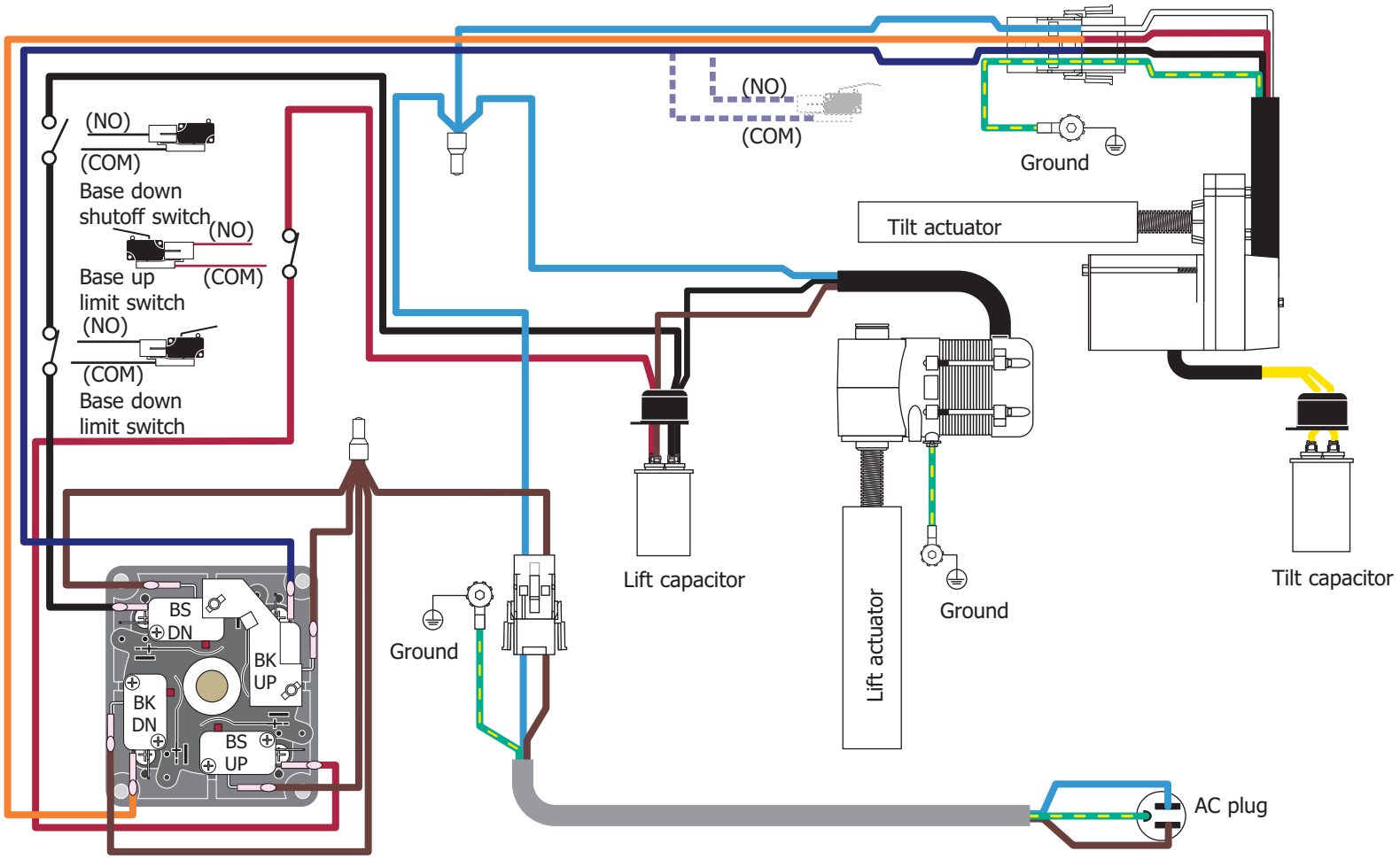
NOTE: If the chair limit switch bracket assembly is not located in the upper lift arm of the chair, it will need to be replaced with a base limit switch kit, P/N 90.1000.00.

Performer I Electronics

Item #	Part Number	Description
1	76.1005.00	Intra-oral light source kit
2	76.8000.00	Bitewing x-ray viewer
3	35.1673.00	Cable assembly
4	61.2582.00	Wire harness assembly
5	61.2483.00	Joystick, auto exit
6	35.1567.00	Cable assembly
7	28.1244.00	Cable assembly, dental light
8	41.1444.00	Ground wire assembly (after April 1999)
9	90.1054.00	Cable assembly
10	90.1039.00	On/Off switch




Control head
Cuspidor and Assistant's instrumentation
Optional assistant's syringe
Foot control
Floor box



WARNING

High voltages are present at motor and limit switch connections. Unplug the chair before servicing. Failure to do so could result in serious injury.

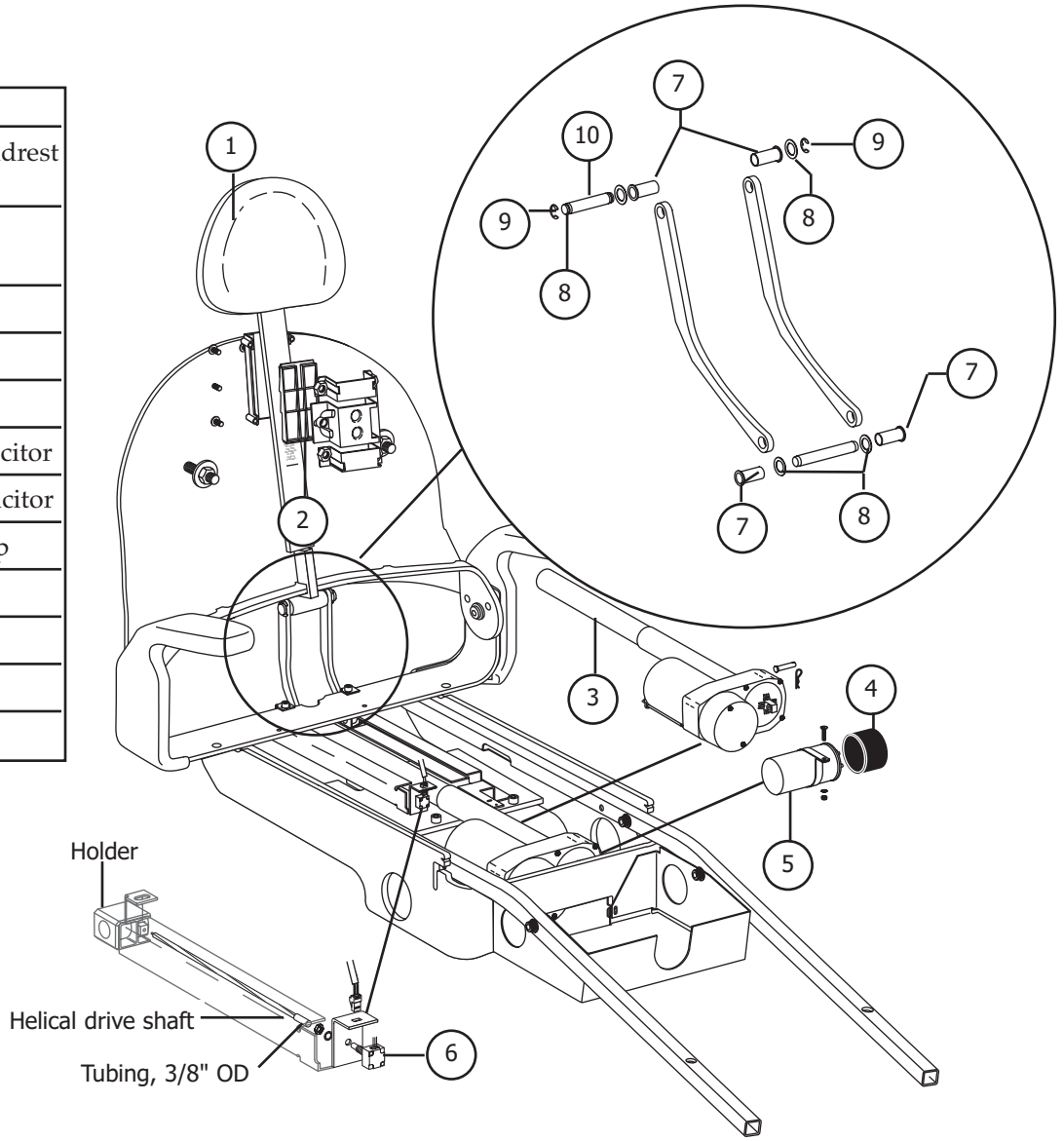
Troubleshooting Performer I Chair

Tips and troubleshooting information are listed to assist in distinguishing Performer I chair problems.

Problem	Action
Chair back is inoperative	Follow these steps to determine the problem with the chair back. **Task** **Description** 1 Make sure system power is ON. 2 Check power and connections. 3 Check for bad capacitors.
Chair base is inoperative	Follow these steps to determine the problem with the chair base. 1 Make sure system power is ON. 2 Check power and connections. 3 Check for bad capacitors.
Noisy motor	Follow these steps to check the motor. 1 Check for loose mounts. 2 Adjust base screw drive nut. 3 Replace motor.

Performer II Upper Structure

Item #	Part Number	Description
1	—	Single articulating headrest
2	61.1569.00	Wear pad, sliding wedge molded
3	61.2409.00	115V tilt actuator
	61.2410.00	230V tilt actuator
4	041.529.00	Capacitor boot
5	90.1035.00	115V tilt actuator capacitor
	90.1036.00	230V tilt actuator capacitor
6	041.372.00	Potentiometer, back up
7	61.2181.00	Bearing, flanged
8	004.035.00	Washer, flat, nylatron
9	010.040.01	E-ring, retaining
10	61.2425.00	Pivot pin, back link



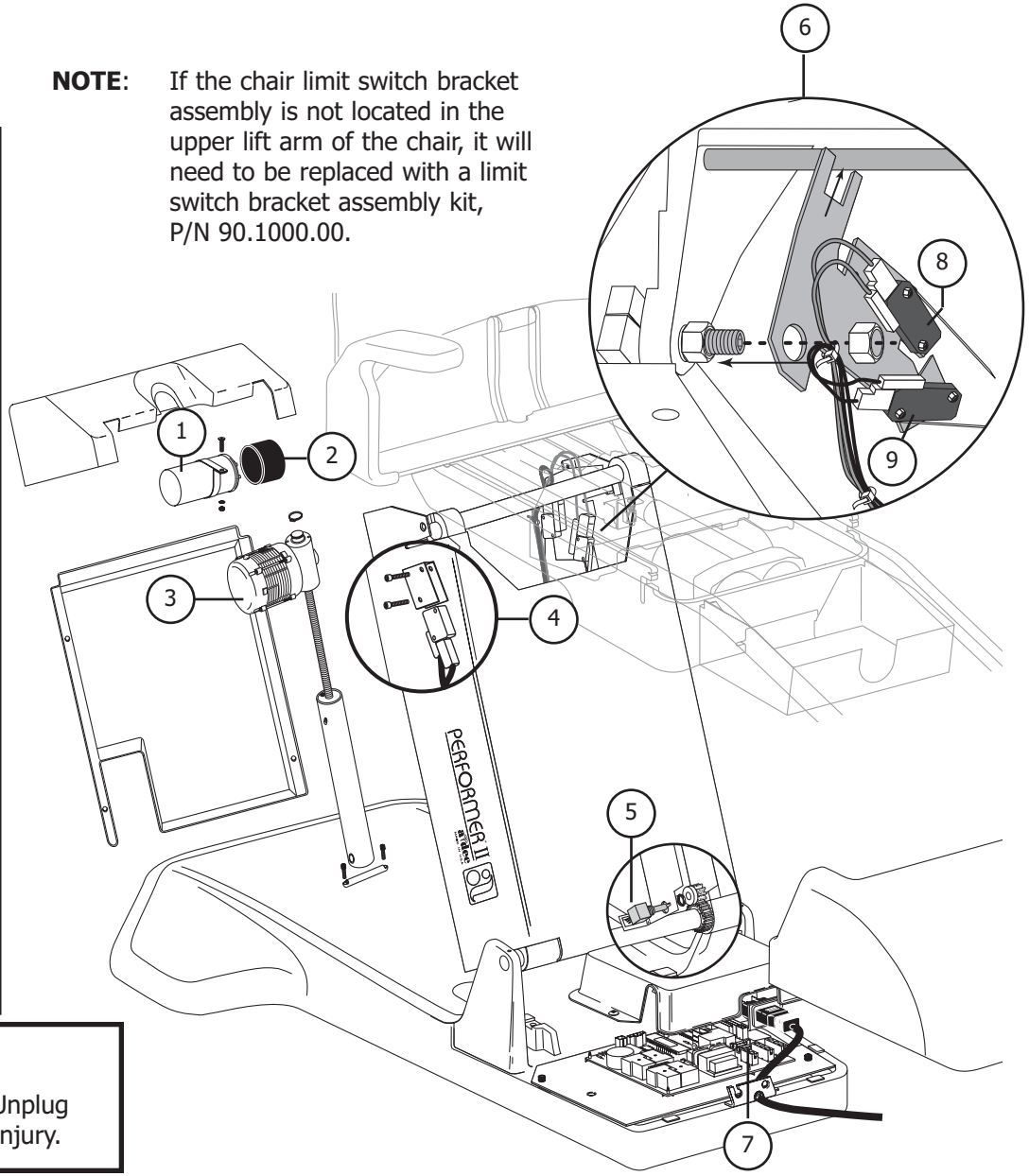
WARNING

High voltages are present at motor and limit switch connections. Unplug the chair before servicing. Failure to do so could result in serious injury.

Performer II, Base Structure

Item #	Part Number	Description
1	041.583.00	240V base capacitor (after June 1998)
	041.517.00	240V base capacitor (before June 1998)
	041.504.00	440V base capacitor
2	041.529.00	115V capacitor boot (after June 1998)
	041.529.00	115V capacitor boot (before June 1998)
3	61.2469.00	115V base actuator
	61.2470.00	230V base actuator
4	—	Base down shutoff switch
5	041.372.00	Potentiometer, base up
6	90.1000.00	Base limit switch kit
7	90.1029.00	100V/120V, PCB, chair
	90.1029.01	220V/240V, PCB, chair
8	044.184.00	Base up limit switch (Red)
9	044.184.00	Base down limit switch (Black)

NOTE: If the chair limit switch bracket assembly is not located in the upper lift arm of the chair, it will need to be replaced with a limit switch bracket assembly kit, P/N 90.1000.00.

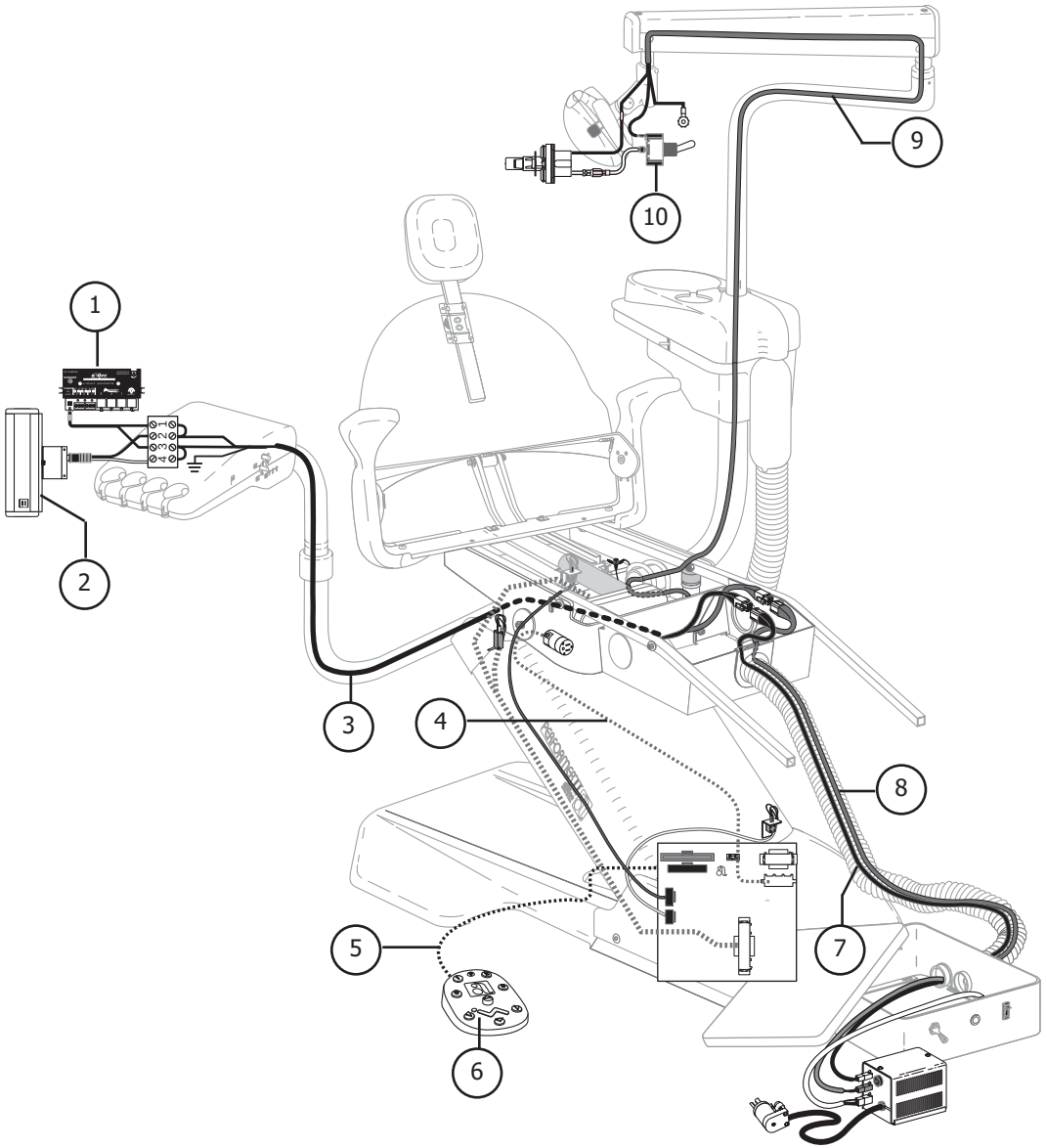


WARNING

High voltages are present at motor and limit switch connections. Unplug the chair before servicing. Failure to do so could result in serious injury.

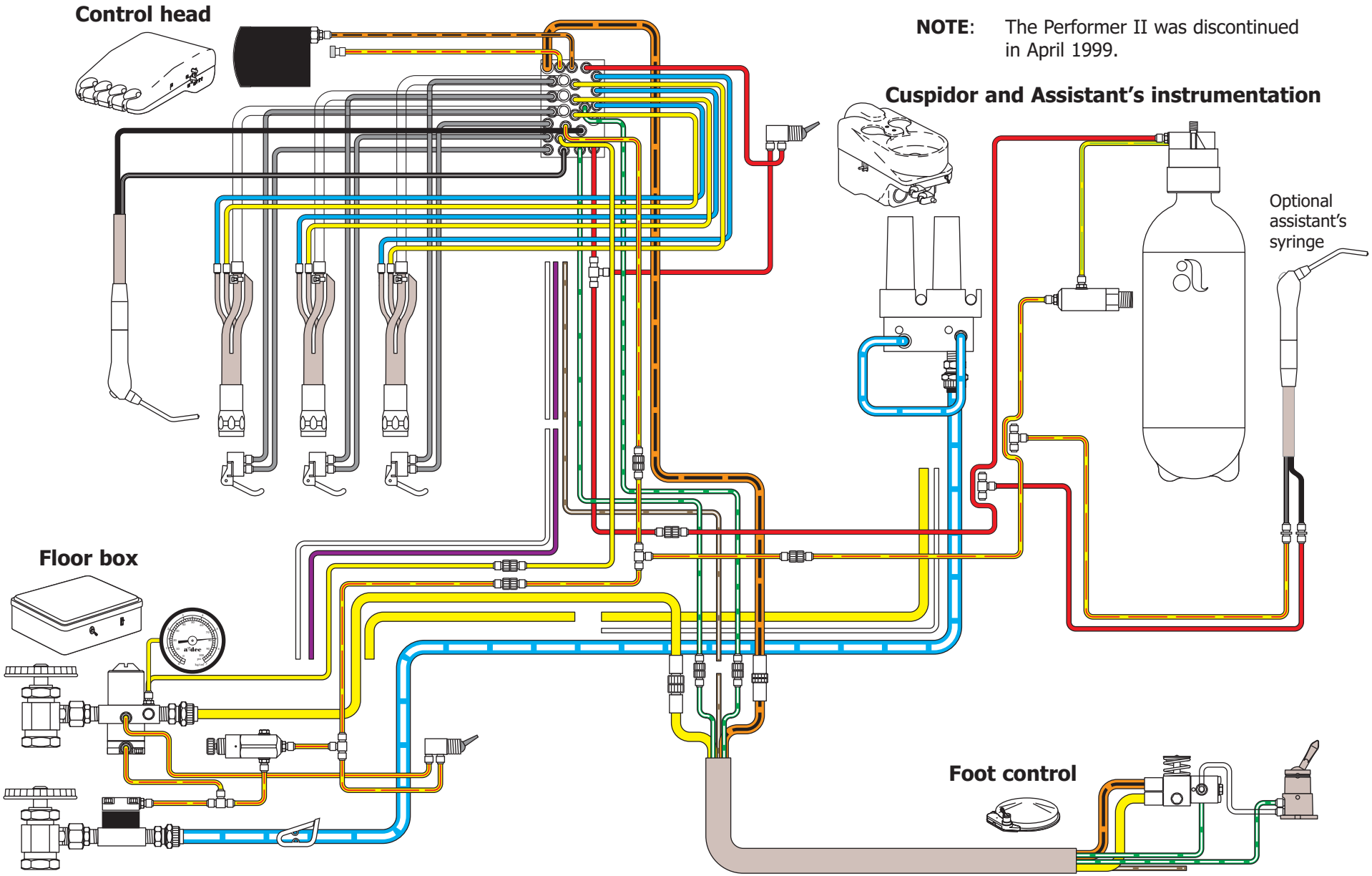
Performer II Electronics

Item #	Part Number	Description
1	76.1005.00	Intra-oral light source kit
2	76.8000.00	Bitewing x-ray viewer
3	35.1673.00	Cable assembly, control head
3	28.1264.00	Power cord, 115V
4	28.1276.00	Power cord, 230V
5	61.2108.00	Cable assembly, footswitch
6	61.3043.00	Button footswitch
7	35.1567.00	Cable assembly, accessory power
8	28.1244.00	Cable assembly, dental light lower
9	90.1054.00	Cable assembly, dental light upper
10	90.1039.00	On/Off switch

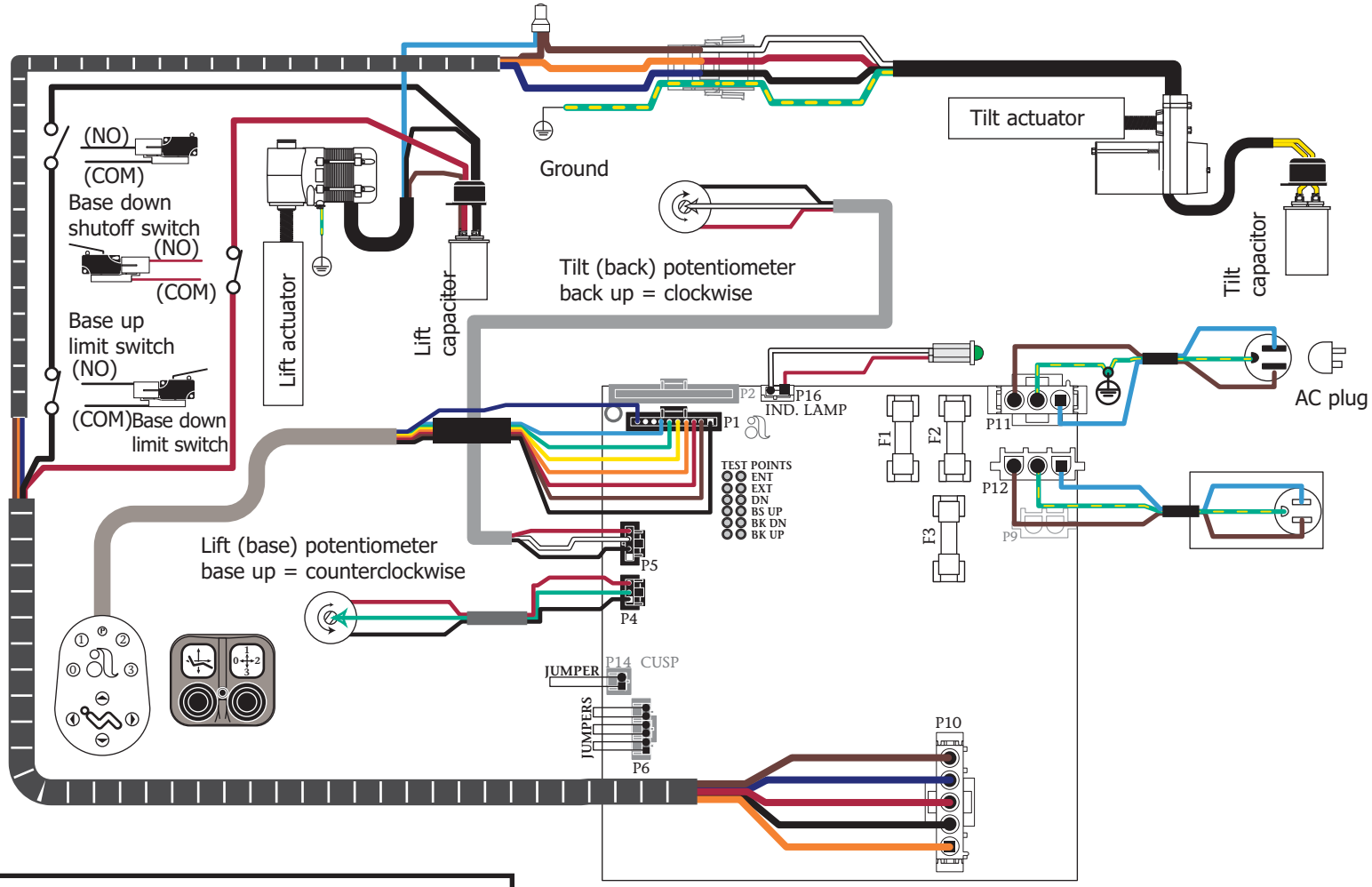


NOTE: Performer II chair discontinued in April 1999.

Performer II Flow Diagram



Performer II Electrical Flow Diagram



WARNING

High voltages are present at motor and limit switch connections. Unplug the chair before servicing. Failure to do so could result in serious injury.

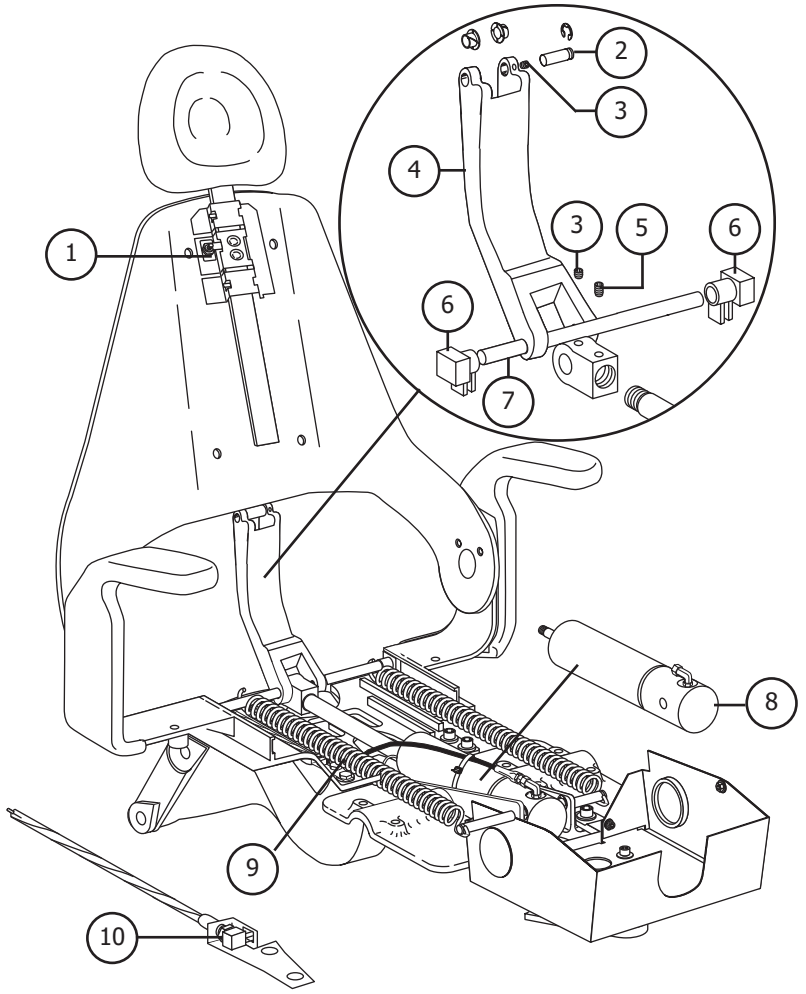
Troubleshooting Performer II Chair

Tips and troubleshooting information are listed to assist in distinguishing Performer II chair problems.

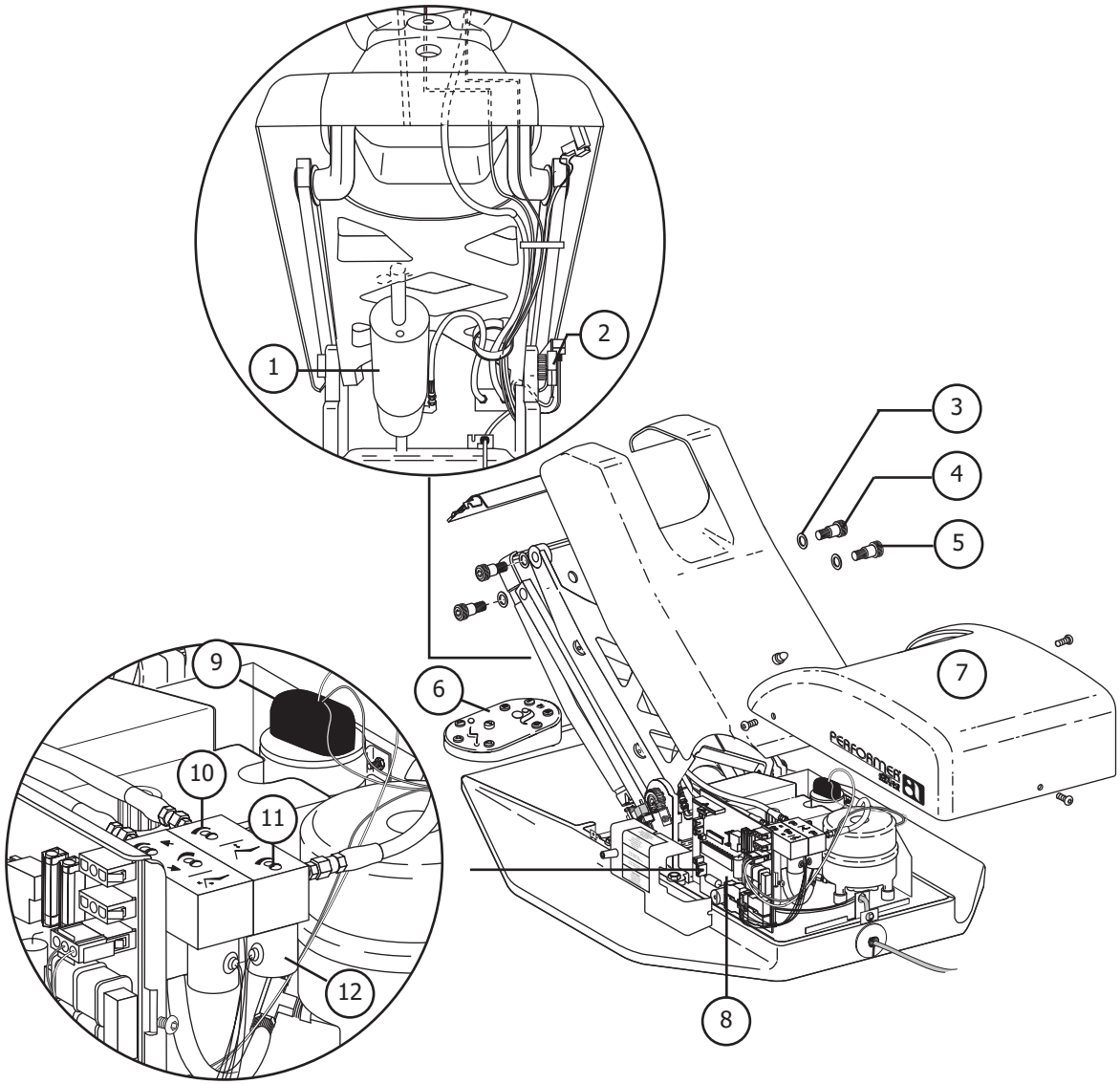
Problem	Action
Chair back or base is inoperative	Follow these steps. **Task** **Description** 1 Make sure system power is ON. 2 Check power and connections. 3 Check for bad fuses on the circuit board. 4 Operate chair from printed circuit board test points. 5 Check for bad capacitors.
Noisy motor	Follow these steps. 1 Check for loose mounts. 2 Adjust base screw drive nut. 3 Replace motor.
Automatic positions erratic	• Check potentiometers and wiring • Replace the circuit board

Performer III Upper Structure

Item #	Part Number	Description
1	006.122.01	Retainer nut
2	61.2740.00	Pin
3	007.069.00	Setscrew
4	61.2741.01	Back link
5	007.042.00	Setscrew
6	61.2082.00	Slide
7	61.2693.00	Tilt rod
8	61.2050.01	Tilt cylinder
9	013.054.00	Spring
10	041.372.00	Potentiometer



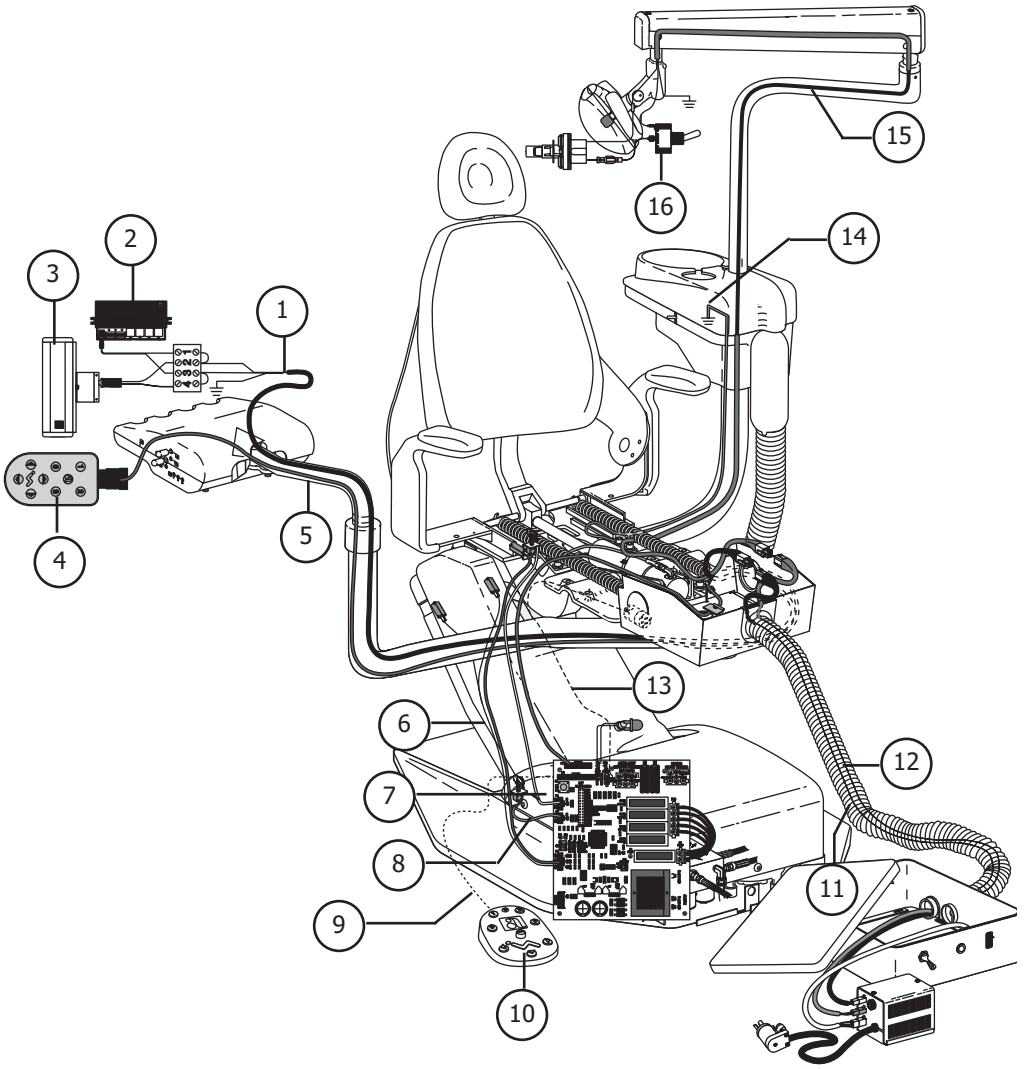
Performer III Lower Structure

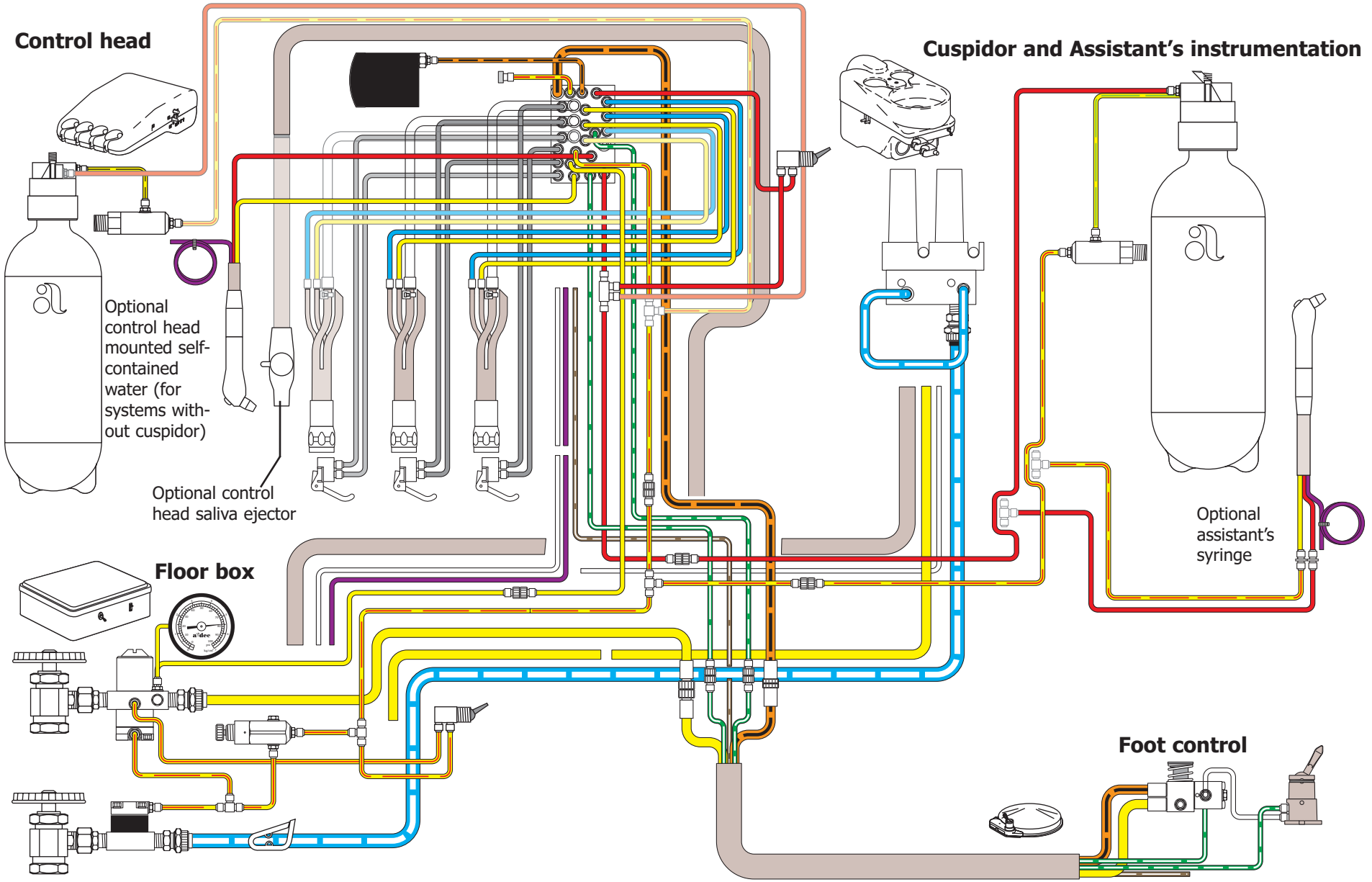


Item #	Part Number	Description
1	61.1287.00	Lift cylinder
2	044.184.01	Base up limit switch
3	004.148.00	Flat washer
4	001.165.00	Socket shoulder screw
5	001.164.00	Socket shoulder screw
6	61.3043.00	Button foot switch
7	61.2142.00	Pump cover
8	90.1029.00	PCB, 120V
	90.1029.01	PCB, 240V
9	90.1032.00	Capacitor (after 6/1/98)
	90.1033.00	Capacitor (before 6/1/98)
	90.1034.00	Base capacitor
10	61.0460.00	Flow adjustment screw
11	001.002.01	Truss head screw
	002.118.02	Button head screw
12	61.1335.00	Solenoid, 100V, Yellow wires
	61.1336.00	Solenoid, 120V, Black wires
	61.1337.00	Solenoid, 240V, Red wires

Performer III Electronics

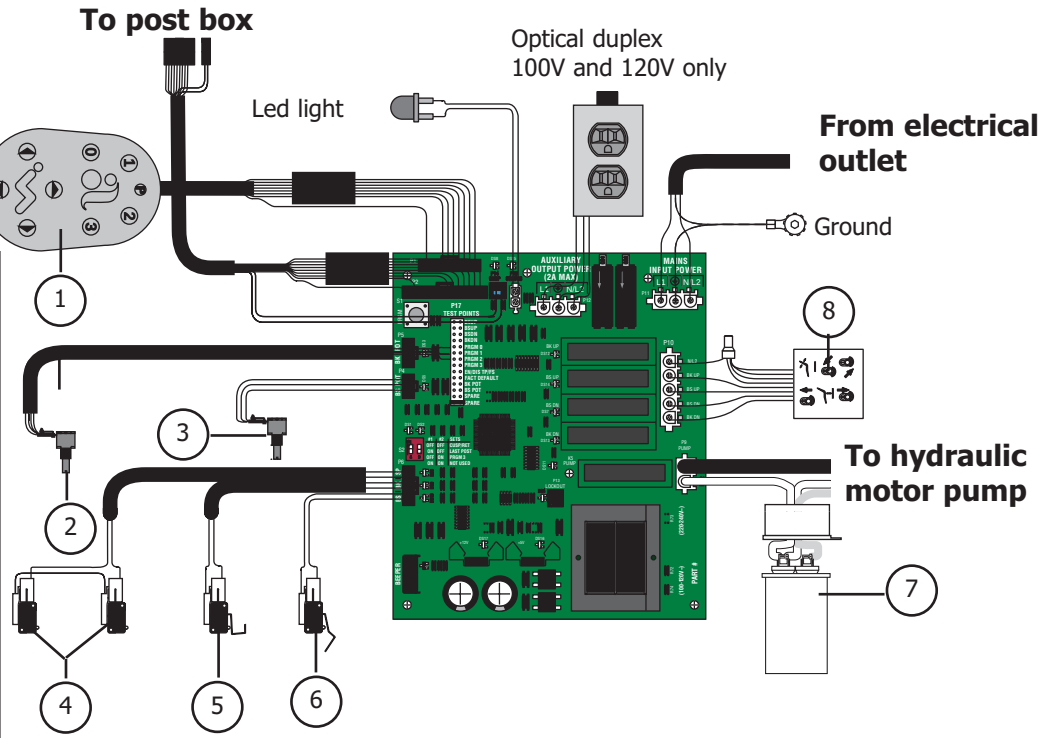
Item #	Part Number	Description
1	35.1673.00	Cable assembly, control head
2	76.1005.00	Single volt intra-oral light source
3	76.8100.00	Bitewing viewer
4	39.1385.00	Touchpad
5	76.0144.00	Cable assembly, touchpad
6	61.2099.00	Limit switch, back up
7	61.1503.00	Back electric wiring cable
8	61.1502.00	Base electric wiring cable
9	61.2108.00	Cable assembly, foot switch
10	61.3043.00	Button footswitch
11	35.1567.00	Cable assembly, accessory power
12	28.1244.00	Cable assembly, dental light, lower
13	28.1264.00	Power cord, 115V
13	28.1276.00	Power cord, 230V
14	41.1444.00	Ground wire assembly
15	90.1054.00	Cable assembly, dental light, upper
16	90.1039.00	On/Off switch, dental light




Control head
Optional control head mounted self-contained water (for systems without cuspidor)
Optional control head saliva ejector
Cuspidor and Assistant's instrumentation
Optional assistant's syringe
Floor box
Foot control

Performer III (LEDs)

Item #	Part Number	Description
1	61.3043.00	8-function footswitch
2	041.372.00	Positioning potentiometer, back
3	041.372.00	Positioning potentiometer, base
3	28.1264.00	Power cord, 115V
4	—	Safety stop limit switch
5	61.2065.00	Back up limit switch (1040 only)
6	044.184.01	Base up limit switch (1040 only)
7	90.1031.00 90.1034.00	Capacitor with boot (100-120V) Capacitor with boot (240V)
8	61.1332.00 61.1333.00 61.1334.00	Manifold assembly, hyd, 100V Manifold assembly, hyd, 120V Manifold assembly, hyd, 240V

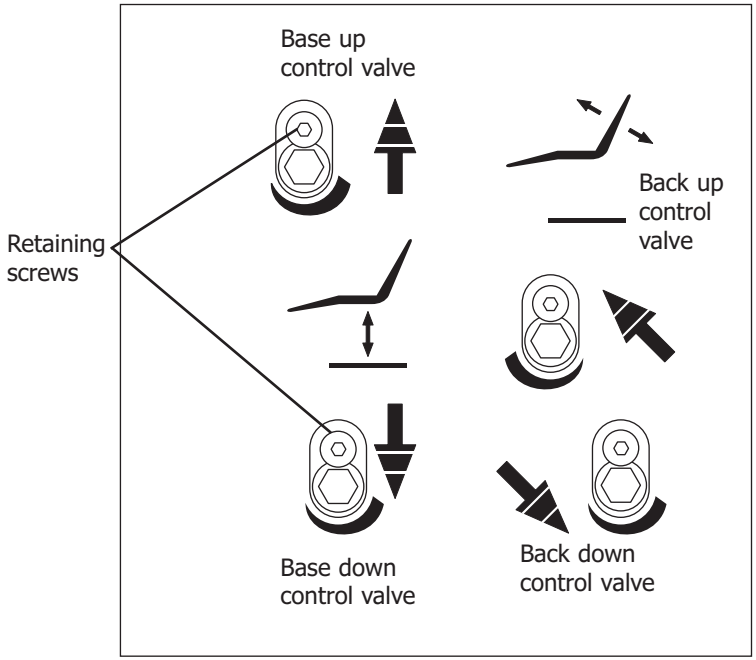


Adjusting the Hydraulic Manifold

The hydraulic manifold incorporates four speed control valves which restrict or divert the flow of hydraulic fluid to and from the lift and tilt cylinders.

NOTE: The speed control valves are hex drive.

To adjust...	Do this...
Base up speed	Turn base up control valve: clockwise to decrease speed, or counterclockwise to increase speed.
Base down speed	Turn base down control valve: clockwise to decrease speed, or counterclockwise to increase speed
Back up speed	Turn back up control valve counterclockwise to decrease speed, or clockwise to increase speed. Back down speed. Turn the back down control valve, clockwise to decrease speed, or counterclockwise to increase speed. **NOTE**: This is opposite of the other three control valves. Turning the back up valve counterclockwise too far may disable this function.



CAUTION

Do not remove retaining screw from the manifold. Do not completely close a speed control valve. The motor/pump could overheat and become damaged from pumping against a closed valve.

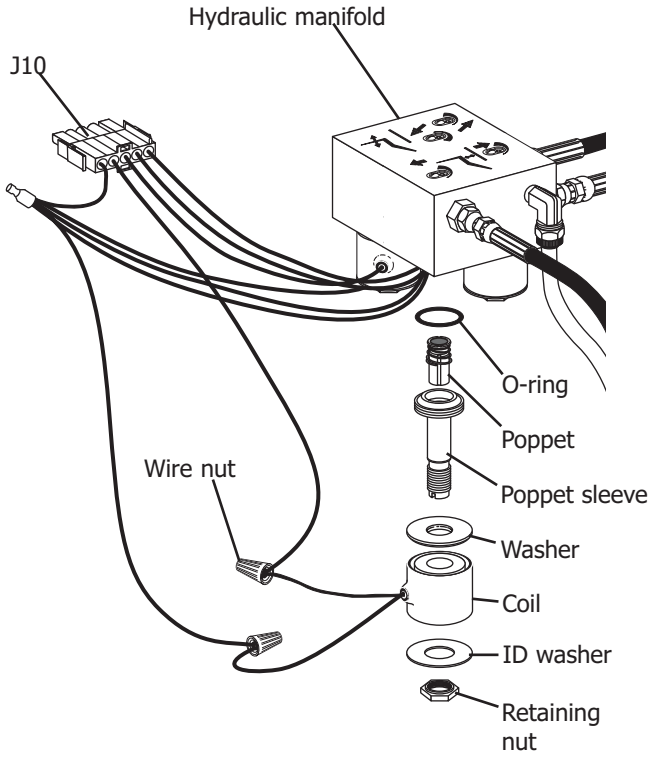
Installing a Solenoid

The following steps will guide you through the procedure for installing a solenoid.

Removing a Solenoid

To remove a solenoid:

1. Lower the chair base and back to the full down position to depressurize the hydraulic system. Remove the motor pump cover, then unplug the chair.
2. If necessary, remove the two mounting screws that secure the manifold to the hydraulic tray. Rotate that manifold so the solenoids are accessible.
3. Using a flat blade screwdriver and a 9/16" wrench, remove the defective solenoid.
4. Cut the defective solenoid wires 3" (74mm) from the coil and discard.
5. Remove the old o-ring from the solenoid cavity and clean out any excess oil. Replace the o-ring with the correct o-ring provided in the kit.



WARNING

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

Replacing a Solenoid

To replace a solenoid:

1 Install the new solenoid stem and poppet into the manifold and tighten to 35-40 in lb (.11985–.2284 Nm). Position the remaining solenoid parts on the stem and secure by tightening the retaining nut to 25-30 in lb (.14275–.1713 Nm).

2 Cut the solenoid wires 3" (75 mm) from the coil. Install the stripped wires from the solenoid and the connector housing into a wire nut. Repeat for the remaining wire.

3 Using the mounting screws, secure the manifold to the hydraulic tray.

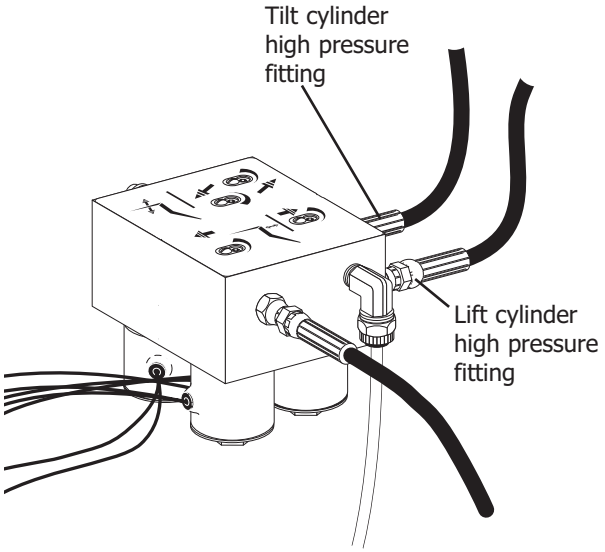
4. Plug in the chair. Test the chair functions to ensure proper operation and that no fluid leakage occurs. Reinstall the motor pump cover.

Correcting Hydrostatic Lock

Hydraulic lock occurs based on the following conditions:

- chair base or back is stuck in full up position
- limit switch not activated, or
- down solenoid poppet is unable to open based on excess hydraulic pressure.

Task	Description
1	Remove the motor/pump cover from the chair.
2	Fit a 5/8" wrench to the high pressure outlet port (either lift or tilt, whichever is in hydrostatic lock) of the hydraulic manifold. Hold the port still and use a 9/16" wrench to loosen the hose fitting.
3	Place a shop rag around the fitting to absorb the fluid.
4	Carefully loosen the fitting counterclockwise until oil begins to leak from the fitting. Retighten the fitting. Operate the down function. A second release of hydraulic fluid may be required.
5	Adjust the limit switch that caused the hydrostatic lock (refer to *Adjusting the Base Up Limit Switch*). In some cases it may be necessary to remove and replace the limit switch. Adjust the new limit switch as needed. Also ensure that the large gear/actuator is securely installed and not slipping.
6	Cycle the chair a couple of times to verify it is no longer in hydrostatic lock.

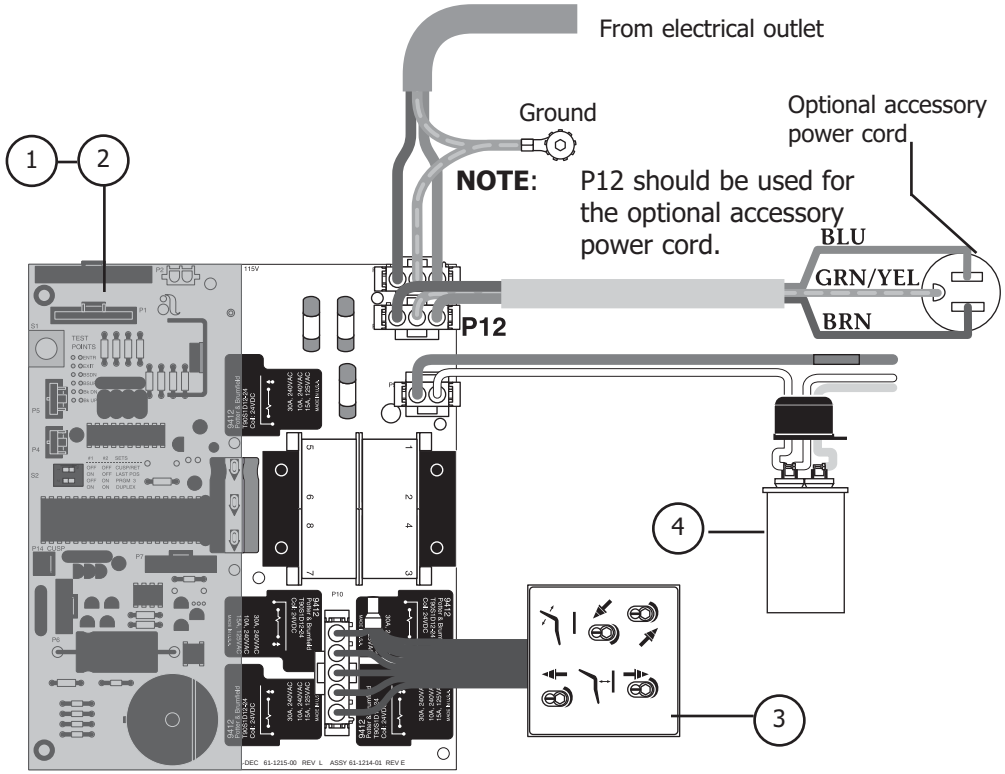


Correcting Hydrostatic Lock

Performer III (No LEDs)

Item #	Part Number	Description
1	61.2512.00	Printed circuit board, 240V
2	61.2510.00	Printed circuit board, 100-120V
3	61.1333.00	Hydraulic manifold, 120V
3	61.1334.00	Hydraulic manifold, 240V
4	90.1031.00	Capacitor

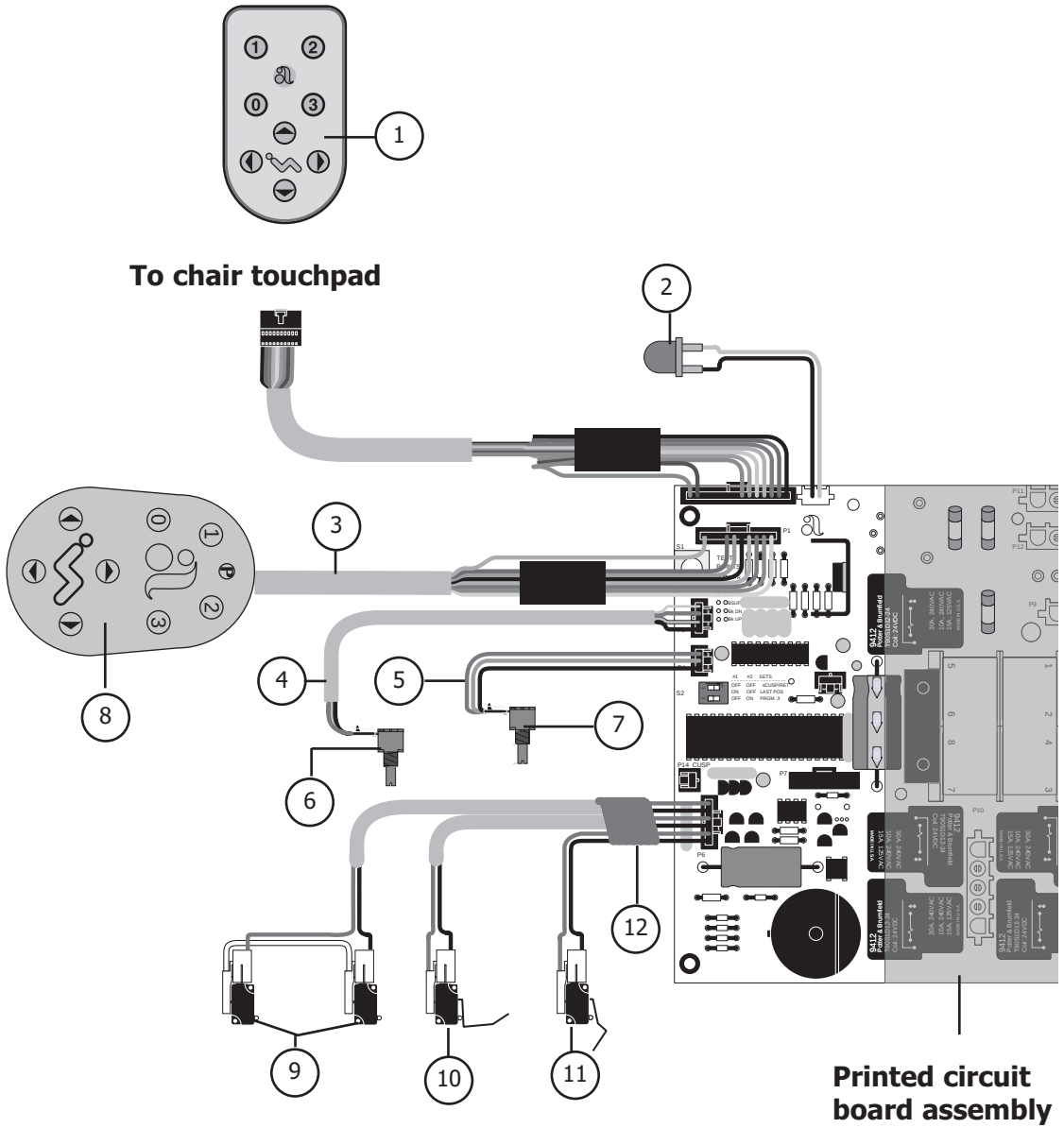
To Replace Circuit Board Part Number	Order this kit
61.2510.00 61.1214.01 61.1373.01	90.1029.00 (100-120V)
61.2512.00 61.1217.01	90.1029.01(220-240V)



Performer III Electrical Diagram

Performer III (No LEDs)

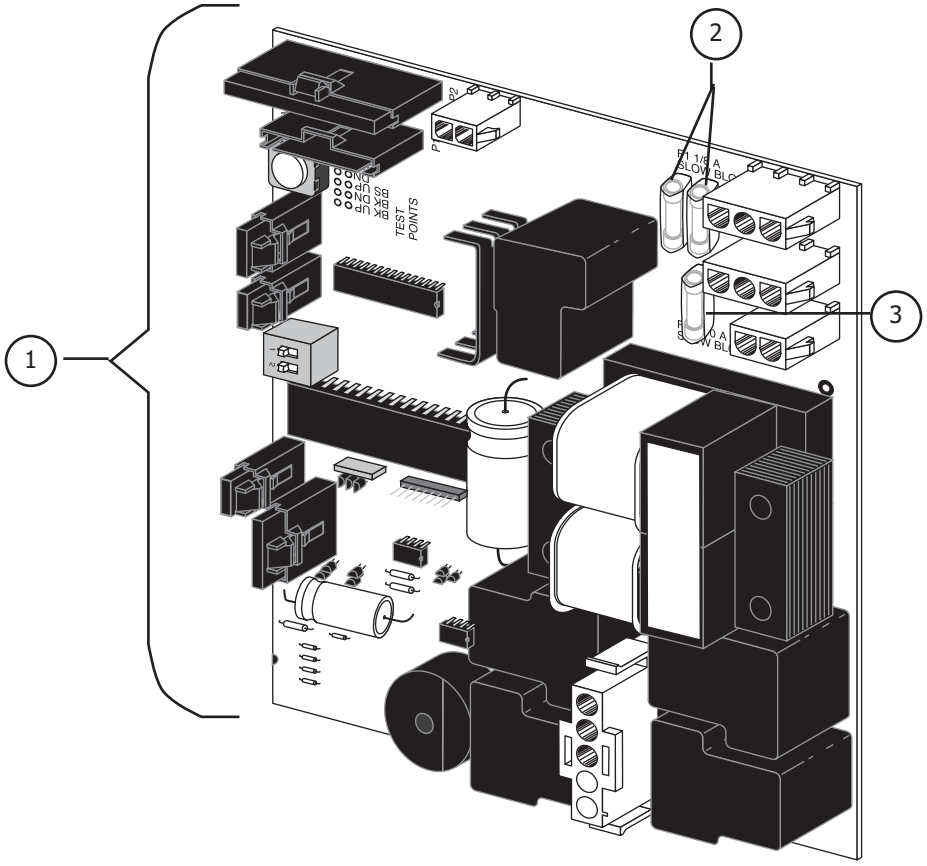
Item #	Part Number	Description
1	39.1385.00	Chair touchpad kit
2	041.582.00	LED light
3	61.2108.00	Cable assembly, button footswitch
4	61.1503.00	Cable assembly, potentiometer, back up
5	61.1502.00	Cable Assembly, potentiometer, base up
6	041.372.00	Potentiometer, back
7	041.372.00	Potentiometer, base
8	61.3043.00	Button footswitch
8	61.3048.00	Button footswitch, membrane
8	61.3049.00	Button footswitch, boot
9		Limit switch, safety
10	044.184.00	Limit switch, back up
11	044.184.01	Limit switch, base up
12	61.2099.00	Cable assembly, limit switch



Performer III (No LEDs)

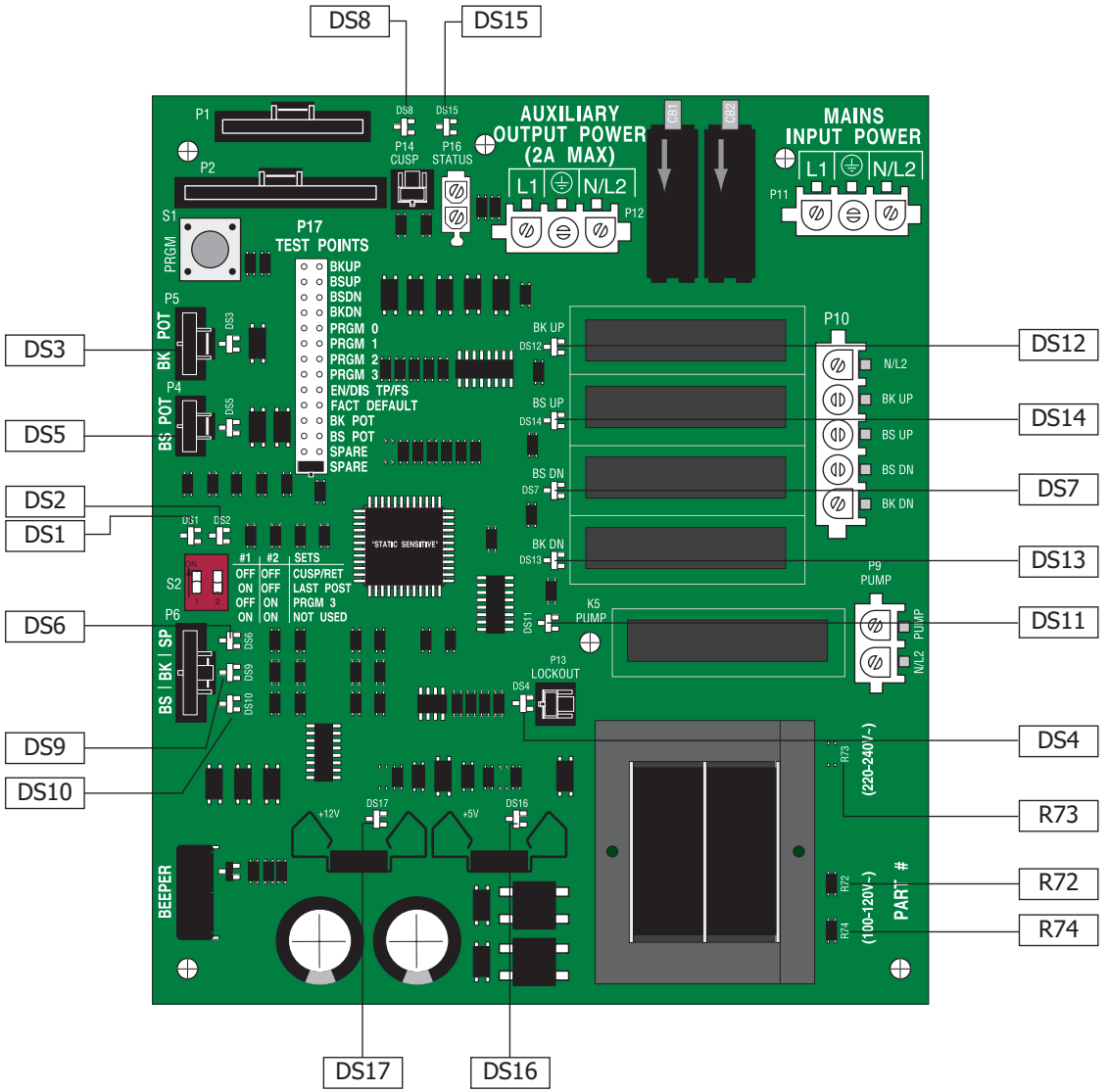
Item #	Part Number	Description
1	90.1029.00	Circuit board assembly, 100V-120V
	90.1029.01	Circuit board assembly, 240V
2	044.192.00	Fuse, 10 A, 5x20 mm time lag, 240V (61.2510.00 CBA, 120V)
	044.147.00	Fuse, 6.3 A (61.2512.00 CBA, 240V)
3	044.193.00	Fuse, .063 A, 5x20MM, time lag, 250V (61.2510.00 CBA, 120V)
	044.194.00	Fuse, .040A (61.2512.00 CBA, 240V)

NOTE: Refer to the *Genuine A-dec Service Parts Catalog* for information on fuses that worked on previous styles of printed circuit boards. There are no replacement fuses on the following circuit boards: 61.2774.00 (100-120V) and 61.2774.01 (220-240V).



LEDs

NOTE: Refer to *Testing Factory Defaults* for more details.



LED	Description	Information Communicated
DS1 DS2	S2 (red DIP switch) is ON	Switch is ON
DS3	Back Potentiometer LED ON	Back potentiometer is functioning normally when the chair back is moving
DS4	Handpiece Lockout LED ON	Lockout enabled
DS5	Base Potentiometer LED ON	Base potentiometer is functioning normally when the chair base is moving
DS6	Chair Stop Plate Limit Switch LED ON	Chair stop plate limit switch activated
DS7 DS11 DS12 DS13 DS14	Base Down LED Pump LED Back Up LED Back Down LED Base Up LED	Relay is ON when LED is ON and the function is moving
DS8	Cuspidor Limit Switch LED ON	Cuspidor limit switch activated, or jumper is missing
DS9	Back Up Limit Switch LED ON	Back Up limit switch activated
DS10	Base Up Limit Switch LED ON	Base Up limit switch activated
DS15	Status LED ON	ON: Normal operation Off: Microcontroller is not functioning. Verify voltage regulator LEDs (DS16 and DS17) are ON. Is the chair plugged in? Circuit breaker tripped? Slow Blink: Check cuspidor (DS8) and stop plate (DS6) limit switch LEDs Fast Blink: Check handpiece lockout (DS4) LED Double Blink: A SPARE jumper is in the FACT DEFAULT position
DS16	5V Regulator LED OFF	1 Power to circuit board is OFF, or 2 There is a short in the cable to the base or back potentiometer. Disconnect all cables except the power cable. Plug the cables in one at a time (the LED will turn ON when the problem is fixed).
DS17	12V Regulator LED OFF 1	1 Power to circuit board is OFF, or 2. There is a short in the cable to the status light or limit switch (the LED will turn ON when the problem is fixed).

Testing and Programming the Circuit Board

WARNING

The chair will begin to move automatically during this test; to avoid injury or equipment damage, remove all possible obstructions and maintain a safe distance from the chair. To interrupt the chair cycle, press any button on the touchpad or footswitch, or activate the chair stop plate.

Follow these steps to test and program the chair circuit board.

Task	Description
1	Insert the SPARE jumper into the FACT DEFAULT location (on P17). Result: The chair will cycle the base and back movements and automatically reprogram the memory positions to the factory settings (position 0 to entry/exit; 1 and 2 to the same pre-programmed positions; and 3 to cuspidor/return). If the circuit board beeps three times, continue with step two. If the circuit board beeps just once, the chair cycle has been interrupted. Diagnose and correct any errors, then press either circuit breaker for five seconds to restart the cycle (refer to *Testing Factory Defaults*).
2	Move the jumper from the FACT DEFAULT location (on P17) back to the SPARE location. **NOTE:** The jumper must be in the SPARE position for normal chair functions and safe operation.
3	Press "1" on the touchpad or footswitch or green position on the 8-function footswitch. Result: The chair will move to the operating position.
4	Press "0" on the touchpad or footswitch, or the red button on the 8-function footswitch. Result: The chair will move to the entry/exit position. **NOTE:** The chair programmable position buttons can be reprogrammed to the desired positions as specified by the dental team.

Testing Factory Defaults

The table lists conditions and corrective actions for testing the factory defaults for LEDs.

Problem	Action
Factory Default test will not start (LEDs DS15, DS16 and DS17 are Off)	

If . . .	Then . . .
Transformer thermal limiter is open	Wait for transformer to cool off.
Circuit breaker is tripped	Reset circuit breaker (short circuit fault currents may damage the circuit breaker and prevent it from resetting).

Problem	Action
Factory Default test will not start (LED DS15 is Off; DS16 and DS17 are ON)	

If . . .	Then . . .
Input voltage is too low or is outside the required range	Verify input voltage and voltage selection resistors (100-120VAC=R72 and R74) (220-240VAC=R73).
Microcontroller is not functioning	Replace the circuit board.

Problem	Action
Factory Default test will not start (LED DS15 is blinking; DS16 and DS17 are ON)	

If . . .	Then . . .
Input voltage is too low or is outside the required range	Verify input voltage and voltage selection resistors (100-120VAC=R72 and R74) (220-240VAC=R73).
Microcontroller is not functioning	Replace the circuit board.

Problem | **Action**

Factory Default test halts during the BASE UP test and the PCB board beeps one time

If . . .	Then . . .
Input voltage is too low or is outside the required range	Verify input voltage and voltage selection resistors (100-120VAC=R72 and R74 (220-240VAC=R73).
Base Up limit switch is activated	Verify switch operation.
Motor thermal limiter is open, motor is hot	Wait for motor to cool off.
Motor capacitor is defective	Test capacitor and replace, if needed.
Base Up solenoid is defective	Test solenoid and replace, if needed
Base is in hydrostatic lock	Refer to *Correcting Hydrostatic Lock.*
Potentiometer is not changing voltage	Verify potentiometer LED comes ON when base is moving. Check potentiometer mechanical drive and electrical connections.

Factory Default test halts during the BACK DOWN test and PCB board beeps one time

If . . .	Then . . .
Stop plate limit switch is activated	Verify switch operation.
Stop plate is jammed	Remove and reinstall the stop plate.
Back Down solenoid is defective	Test solenoid and replace, if needed
Back is in hydrostatic lock	Refer to *Correcting Hydrostatic Lock.*
Potentiometer is not changing voltage	Verify potentiometer LED is ON when back is moving. Check potentiometer mechanical drive and electrical connections.

Problem	Action

Factory Default test halts during the BACK UP test

If . . .	Then . . .
Back up limit switch is activated	Verify switch operation.
Back Up solenoid is defective	Test solenoid and replace, if needed.
Back is in hydrostatic lock	Refer to the *Correcting Hydraulic Lock*.
Potentiometer is not changing voltage	Verify potentiometer LED is ON when back is moving. Check potentiometer mechanical drive and electrical connections.

Factory Default test halts during the BASE DOWN test

If . . .	Then . . .
Stop plate limit switch is activated	Verify switch operation.
Base Down solenoid is defective	Test solenoid and replace, if needed.
Base is in hydrostatic lock	Refer to *Correcting Hydraulic Lock*.
Potentiometer is not changing voltage	Verify potentiometer LED is ON when base is moving. Check potentiometer mechanical drive and electrical connections.

Chair moves by itself when power is turned ON

If . . .	Then . . .
The jumper is in FACT DEFAULT position	Verify that the jumper is in the SPARE position.
Short circuit in touchpad or footswitch	Unplug the touchpad and footswitch; reset the circuit breaker. If the problem isn't repeated, the touchpad or footswitch may have shorted.
Short circuit on circuit board	Replace the circuit board.

Identifying New Features

The chart provides information on new features and associated programming on the PCB.

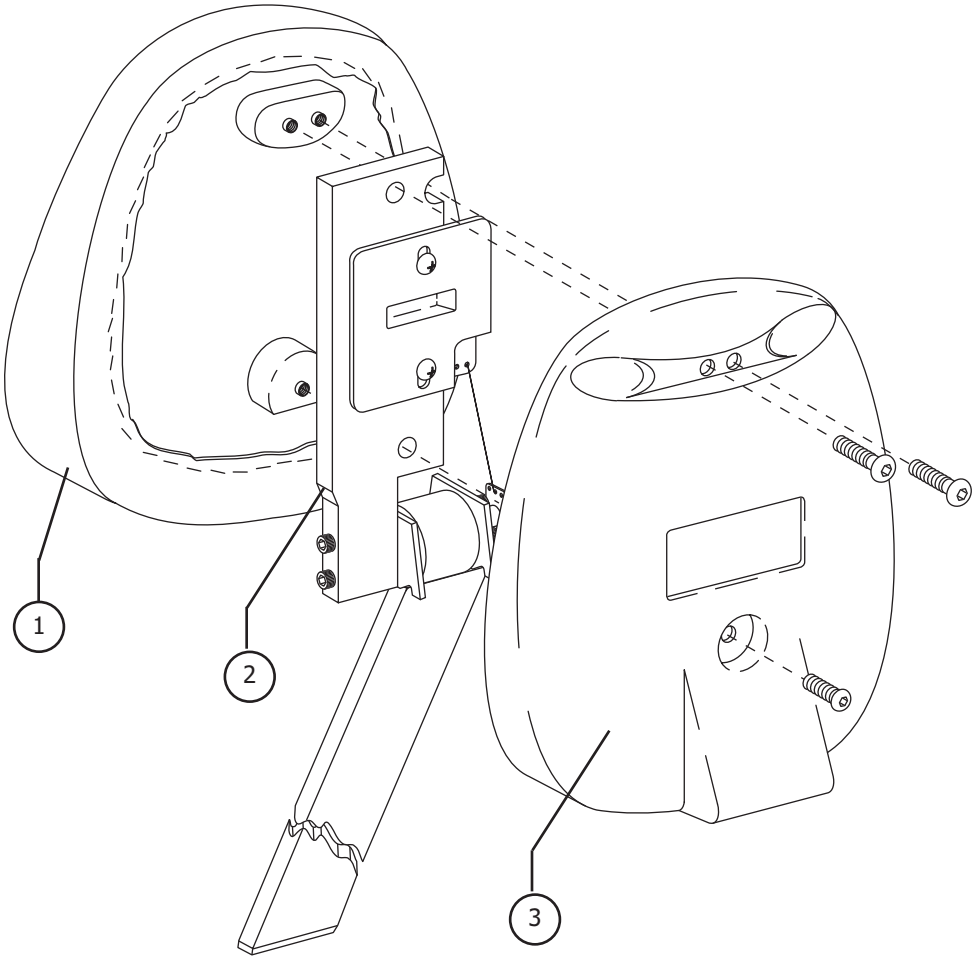
Feature	Programming
Raise the chair with the stop plate limit switch	Plug the chair into an electrical outlet. Tap the chair stop plate three times within five seconds and hold on the third tap. Result: The chair base will continue to rise as long as the stop plate is held in. This function is automatically disabled after five minutes but is re-enabled upon each power up. To reset the five-minute timer, depress either circuit breaker until the LEDs turn OFF, then release the circuit breaker.
Enable and disable touchpad and footswitch buttons	Place the SPARE jumper in the EN/DIS TP/FS position of the Test Points header P17. Push the buttons to be Enabled or Disabled (PRGM, PRGM 0, PRGM 1, PRGM 2, PRGM 3). Result: One beep indicates the button is disabled. Three beeps indicate the button in enabled. Place the SPARE jumper back into the SPARE position of the Test Points header P17.
Handpiece lockout	Plumb a normally open air-electric switch (kit P/N 61.1384.00) to the air-coolant tubing (green with long white dashes). Insert the two position connector from the air-electric switch into P13 Lockout (next to the transformer).

Feature	Programming
Diagnostic LEDs	See *Performer III Diagnostic LEDs for the Circuit Board*.
Test Points Header	Use a SPARE jumper to test the chair manual functions (BKUP, BSUP, BSDN, BKDN). BK POT and BS POT points allow test meter check of potentiometer voltages and measurement of the analog DC voltage from pin 2 of the potentiometer.

Single-Articulating Headrest
(Discontinued)

Item #	Part Number	Description
1	61.2355.XX	Formed headrest upholstery assy
2		Not a serviceable part
3	61.2350.00	Headrest cover

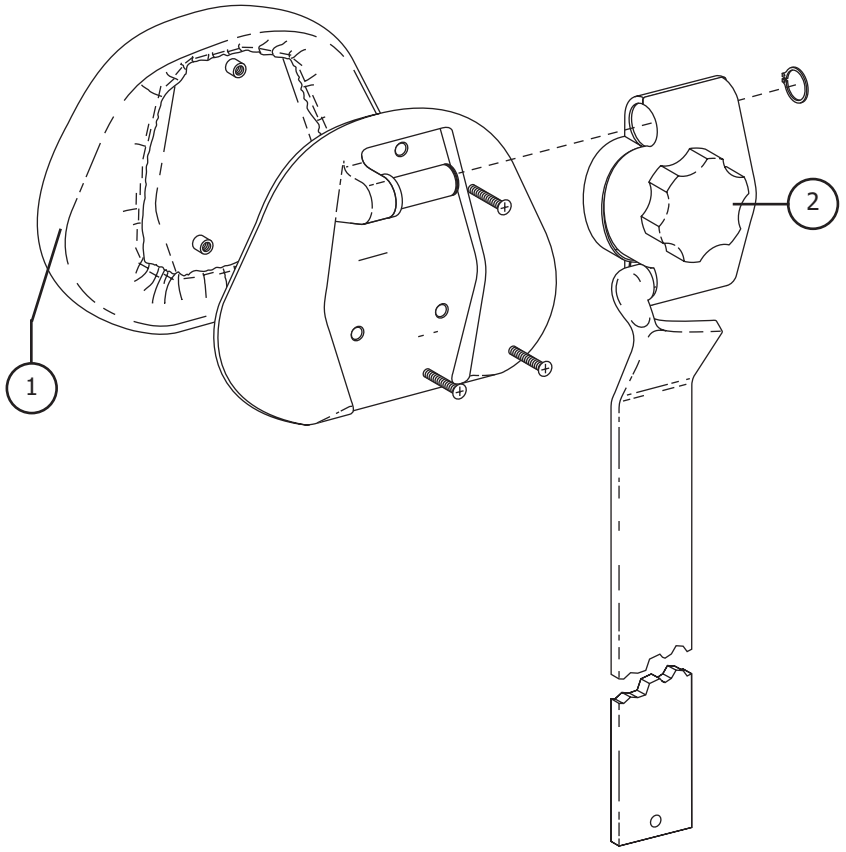
NOTE: For upholstery color availability, refer to the current *A-dec Standard Upholstery Guide*.



Double-Articulating Headrest

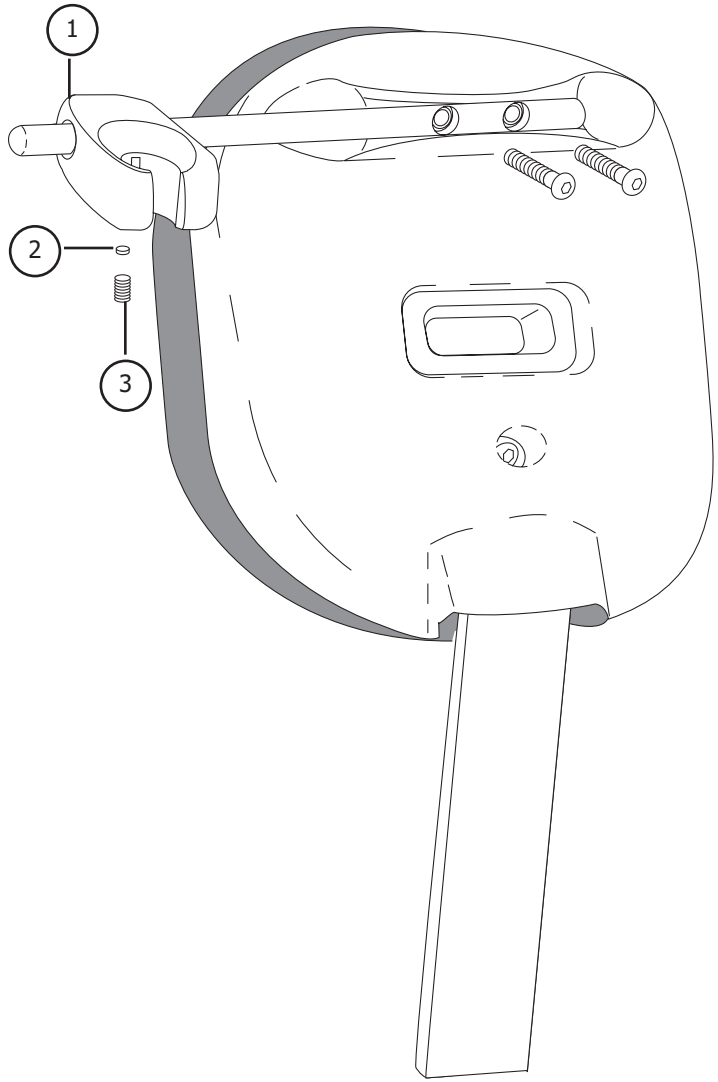
Item #	Part Number	Description
1	61.2116.XX	Formed headrest upholstery assy
2	027.035.01	Height adjustment knob, Gray
	027.035.00	Height adjustment knob, Black

NOTE: For upholstery color availability, refer to the current *A-dec Standard Upholstery Guide*.



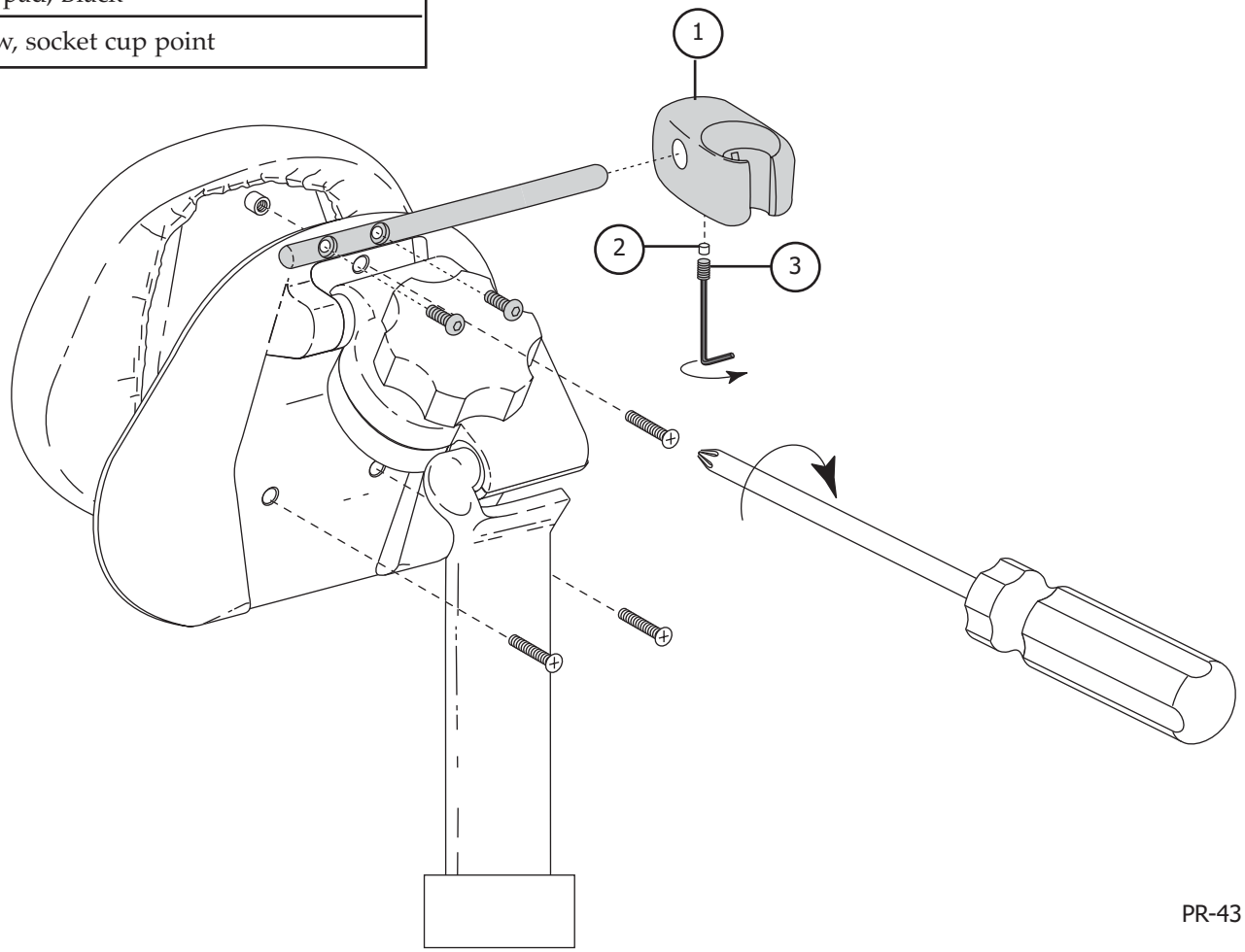
Headrest Instrument Holder
(For single-articulating headrest)

Item #	Part Number	Description
1	99.0584.00	Cascade individual assistant's holder (includes friction pad and setscrew)
2	45.0403.00	Friction pad, Black
3	007.042.00	Set screw, socket cup point



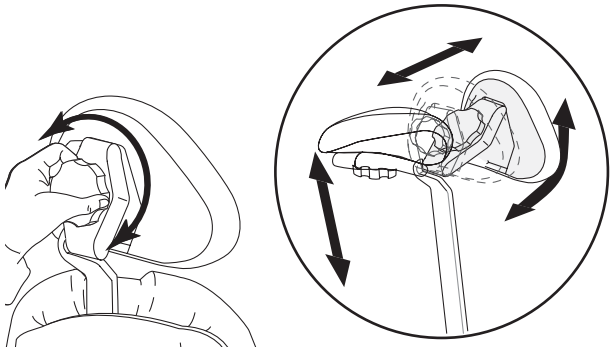
Headrest Instrument Holder Kit
(For double-articulating headrest)

Item #	Part Number	Description
1	99.0584.00	Cascade individual assistant's holder (includes friction pad and setscrew)
2	45.0403.00	Friction pad, Black
3	007.042.00	Set screw, socket cup point



Using the Headrest

The double articulating headrest offers complete versatility in head positioning. This headrest allows the doctor/assistant to position the headrest to fit the nape of the patient's neck, and to tilt to the head to almost any position.

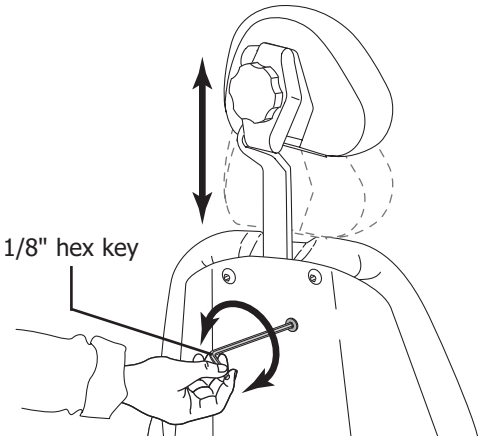


Adjusting Headrest Position

Loosen the knob on the back of the headrest. Move the headrest into the desired position. Tighten the headrest knob.

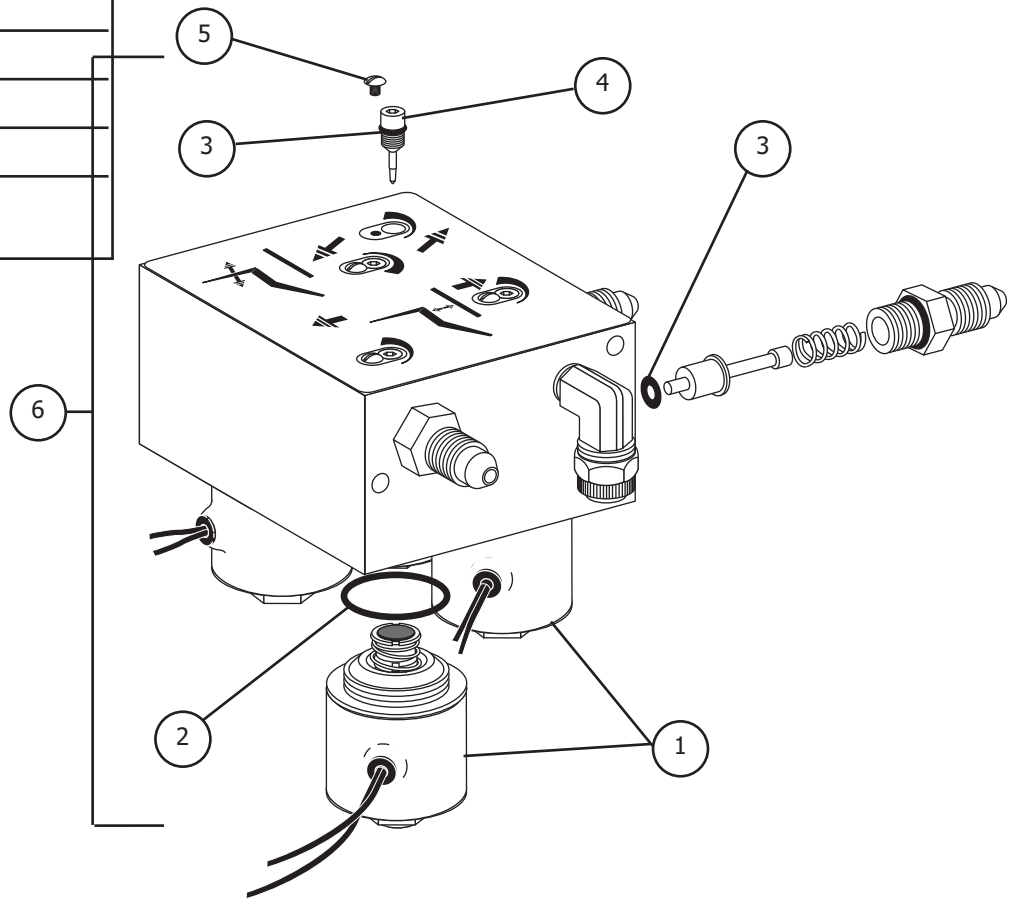
Adjusting Headrest Glide Bar Tension

The headrest should move freely while positioning yet maintain its position when set. Turn the tension adjustment screw clockwise to increase friction and hold the headrest more securely. Turn the tension adjustment screw counterclockwise to decrease friction and allow the headrest to move up and down more freely.

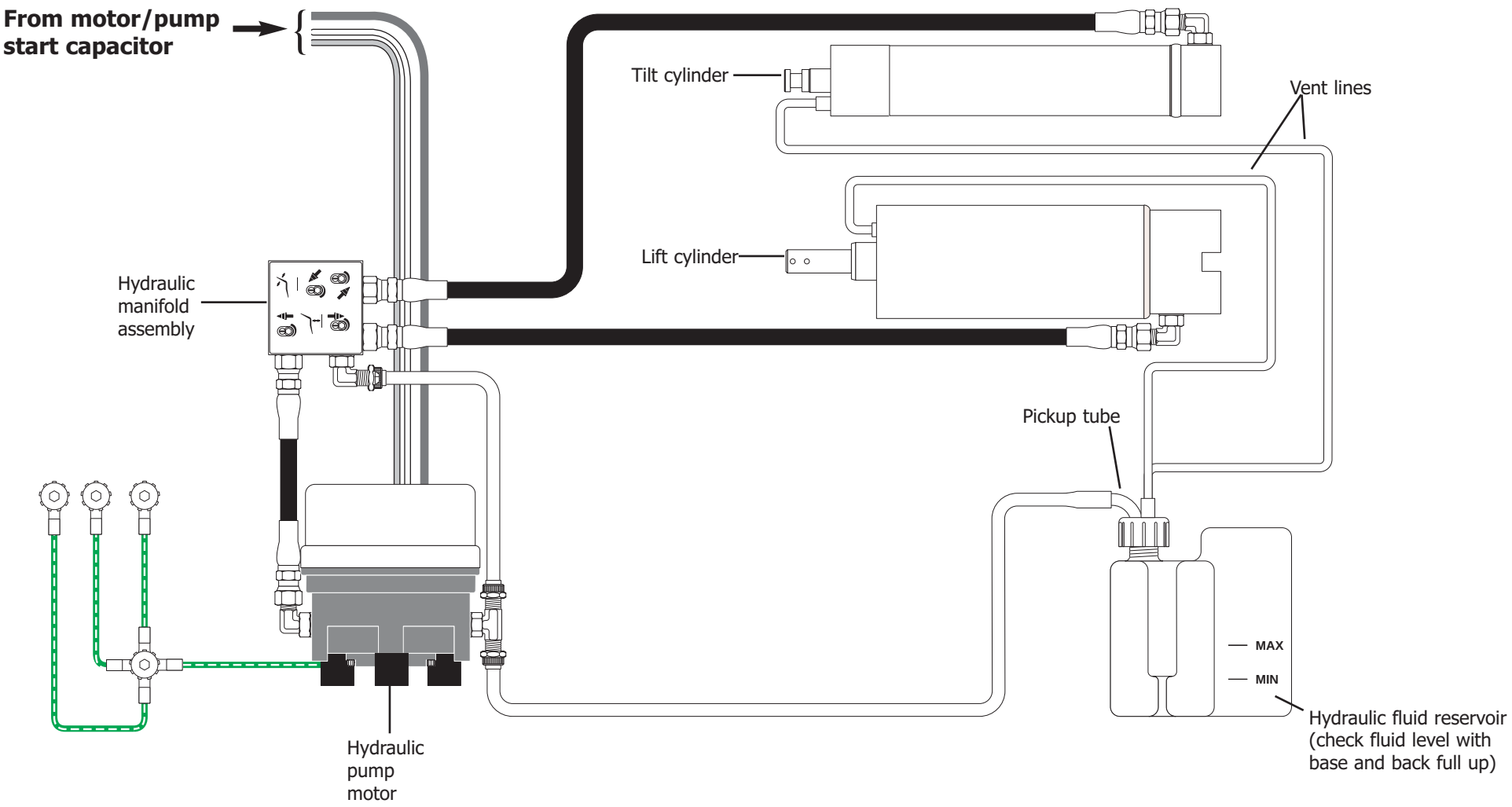


Hydraulic Manifold

Item #	Part Number	Description
1	61.1335.00 61.1336.00 61.1337.00	Solenoid, 8-watt, 100V, Yellow wires Solenoid, 8-watt, 120 V, Black wires Solenoid, 8-watt, 240 V, Red wires
2	030.015.02	O-ring pkg 10
3	030.004.02	O-ring, AS568-004 pkg 10
4	61.0460.00	Flow adjust screw with o-ring
5	002.118.01	Screw, button-head, socket
6.	61.1333.00 61.1334.00	Manifold assy, hyd, 120V Manifold assy, hyd, 240V



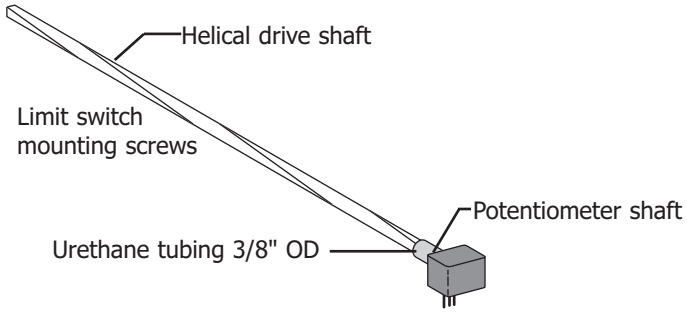
NOTE: Use only A-dec fluid P/N 61.0197.00.

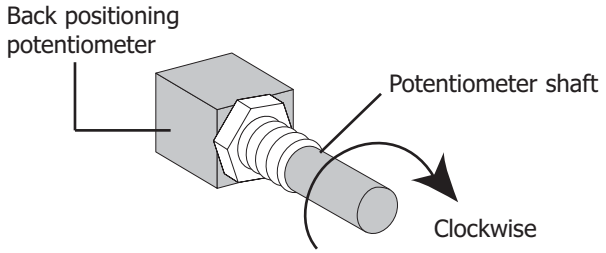


Removing the Helical Drive Shaft

Follow these steps to remove the limit switch and the helical drive shaft from the potentiometer shaft.

Task	Description
1	Position the chair back full down, loosen the four screws under the toeboard and remove the seat upholstery.
2	Raise the toeboard assembly and disconnect the limit switch wiring harness from the limit switch.
3	Remove the limit switch mounting screws and limit switch from the bracket. Lower the toeboard, if necessary, to access the rear mounting screw. Do not bend the switch arm.
4	Remove the bracket mounting screws. Manually raise or lower the toeboard for access if necessary.
5	Remove helical drive shaft from potentiometer shaft. While holding the helical shaft, reach underneath the chair to the base of the backrest. Grasp the bracket and pull away from the helical shaft.
6	Remove the helical drive shaft from the chair by moving it toward the chair backrest and then slightly to the side to dislodge it from the holder and guide.



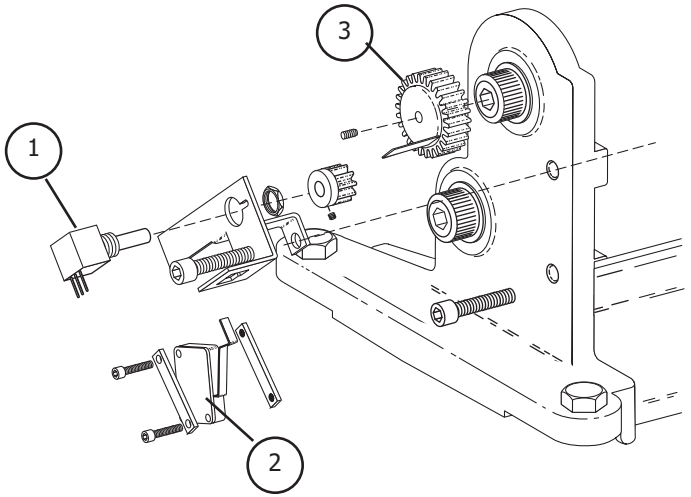


Base Positioning Potentiometer and Limit Switch

Item #	Part Number	Description
1	041.372.00	Potentiometer, 5K Ohm, +20%, 1W, w/nut
2	044.049.01	Limit switch, modified
3.	61.1295.00	Gear, 24 pitch, 30 tooth

CAUTION

Ensure that the large drive gear is secure (does not turn) on the head of the bolt. Do not over tighten (or "bottom" out) the setscrew.

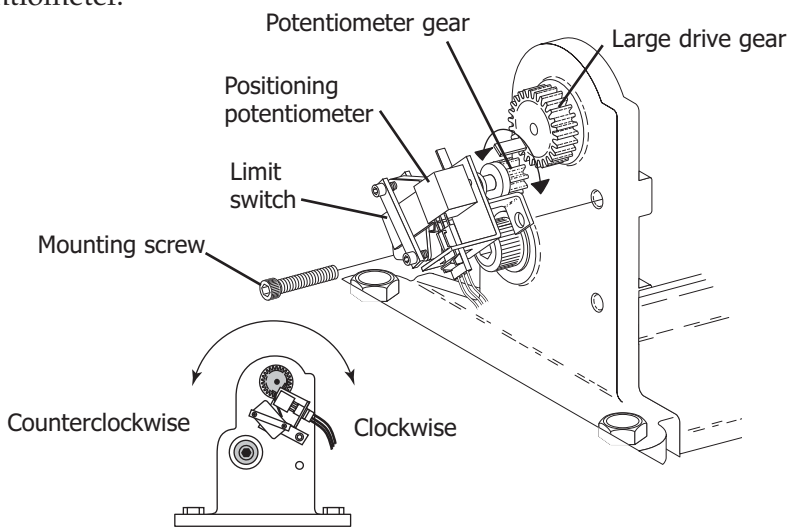


Replacing Base Positioning Potentiometer, Limit Switch and Gear

Adjusting the Base Positioning Potentiometer

Follow these steps to adjust the base positioning potentiometer.

Task	Description
1	Remove the motor/pump cover and position the chair base down.
2	Remove the mounting screw.
3	Turn the potentiometer gear clockwise until it stops.
4	Align the potentiometer assembly, then turn the potentiometer gear counterclockwise two teeth (relative to one tooth on the large drive gear).
5	Ensure all electrical connections to the limit switch and positioning potentiometer are complete.
6	Raise the chair base while observing the two gears for binding.



Adjusting the Base Positioning Potentiometer

NOTE: Do not raise the base to full up until you have checked the base up limit switch for proper adjustment (see *Adjusting the Base Up Limit Switch*).

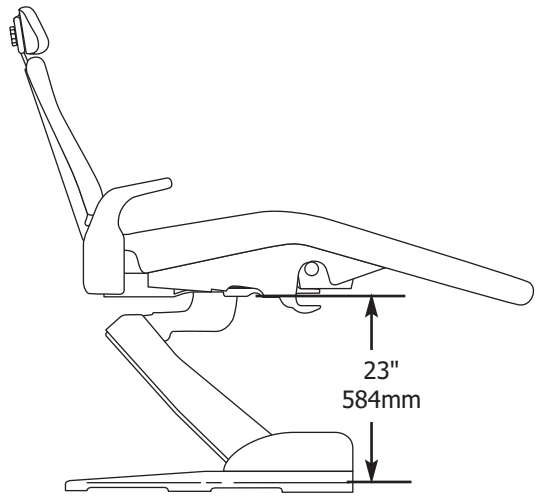
CAUTION

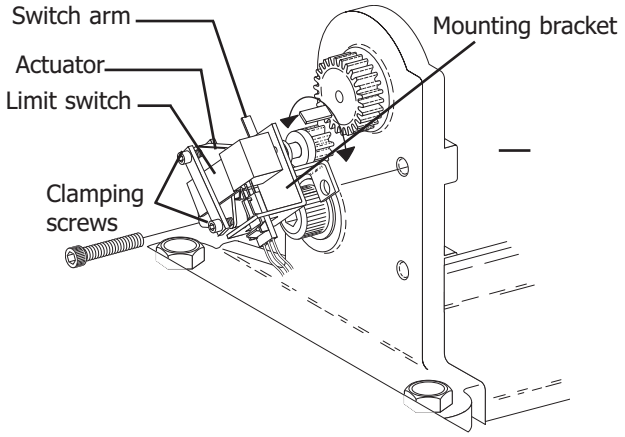
Ensure that the large drive gear is secure (does not turn) on the head of the bolt. Do not over tighten (or "bottom" out) the setscrew.

Adjusting the Base up Limit Switch

To adjust the base up limit switch, do the following.

Task	Description
1	Remove the motor/pump cover.
2	Loosen the two screws clamping the limit switch to the mounting bracket.
3	Position the chair base up until the distance from the floor to the base of the upper chair casting is 23" (584mm).
4	Push the limit switch against the actuator on the drive gear until the switch opens (clicks). **NOTE**: For correct limit switch actuation, the actuator tab on the large gear should be at the 5:30 clock position when the chair is full base down.
5	Tighten the clamping screws, making sure they do not hit the gear.
6	Lower the chair base down until the limit switch has closed, then raise the chair full base up. Check the distance from the floor to the base of the chair casting to ensure it is 23" (584mm).



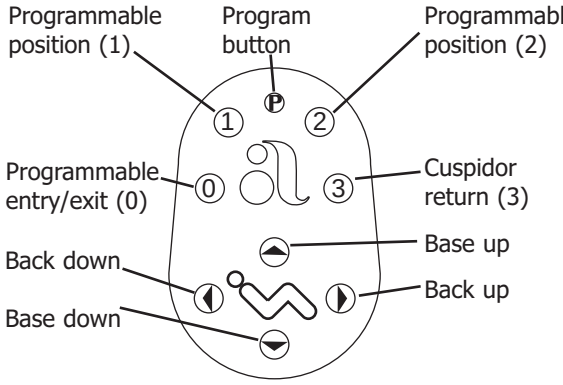


NOTE: Positioning potentiometer omitted for clarity.

Programming the Chair

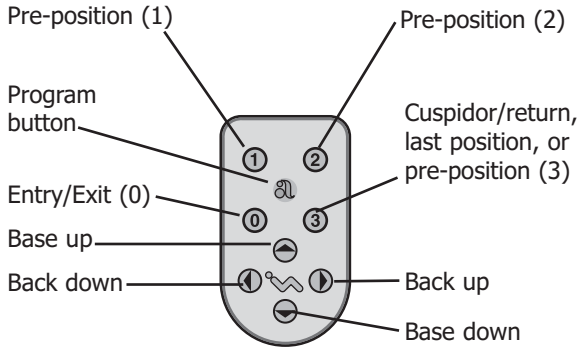
Follow these steps to set the auto-positioning for the chair.

Task	Description
1	Use the footswitch or touchpad to set the chair at the desired position for base and back.
2	Press and release the program button. Result: You will hear a single beep.
3	Within four seconds, press an automatic position button (0, 1, 2, or 3) on the footswitch or touchpad to store the chair position. On an 8-function footswitch, move the actuator to the desired position. Result: You will hear three beeps confirming that the function has been programmed. **NOTE:** PCBs manufactured before 1994, do not beep. Test the programming by trying it.



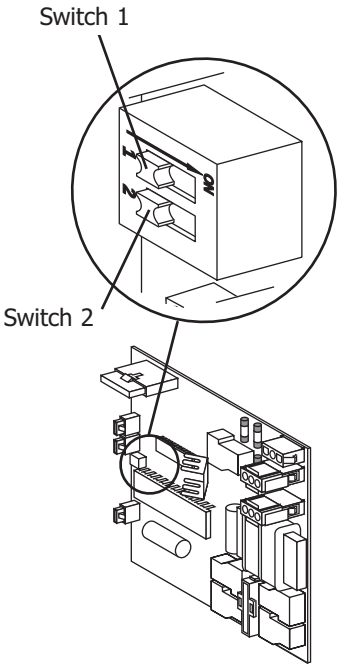
8-Button Footswitch

Replacement membrane P/N 61.3048.00



Performer III Touchpad

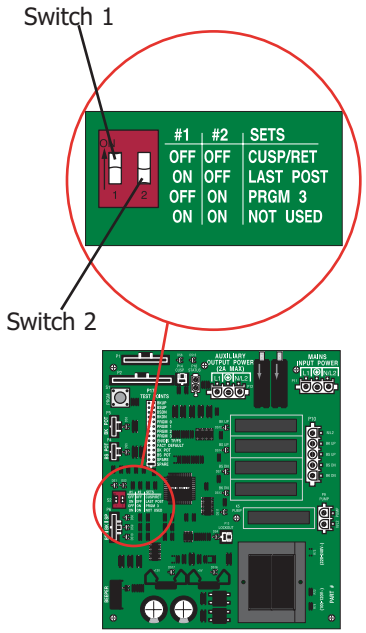
Programming Function 3



Function 3 DIP Switch before 2000

Function	Description	Programming
Cuspidor/Return **NOTE:** Chairs with S/N J467728 and later are factory set with function 3 as cuspidor/return	Used to raise the chair back to a programmable upright position providing the patient access to the cuspidor. Momentarily pushing button 3 on the touchpad or 8-button footswitch, or moving the actuator to position three on the 8-function footswitch, returns the back to the previous position.	Switches 1 and 2 are OFF.
Last Position	A non-programmable position that simply moves the chair base and back to their previous positions.	Switch 1 is ON and switch 2 is OFF. Go back and forth between two positions by momentarily moving the righthand actuator on the 8-function footswitch to position 3 or pressing number 3 on the touchpad or 8-button footswitch.
Programmable Position **NOTE:** Chairs up to S/N J467727 are factory set with function 3 as a programmable position	This option is used to set the base and back to a predesignated position. It allows this function to be programmed like 0, 1, and 2.	Switch 1 is OFF and switch 2 is ON. Move the chair to the desired position. Press and release the program button. After the beep, push button 3 on the touchpad or 8-button footswitch or move the actuator to position 3 on the 8-function footswitch. The single beep confirms the position is programmed.

Programming Function 3

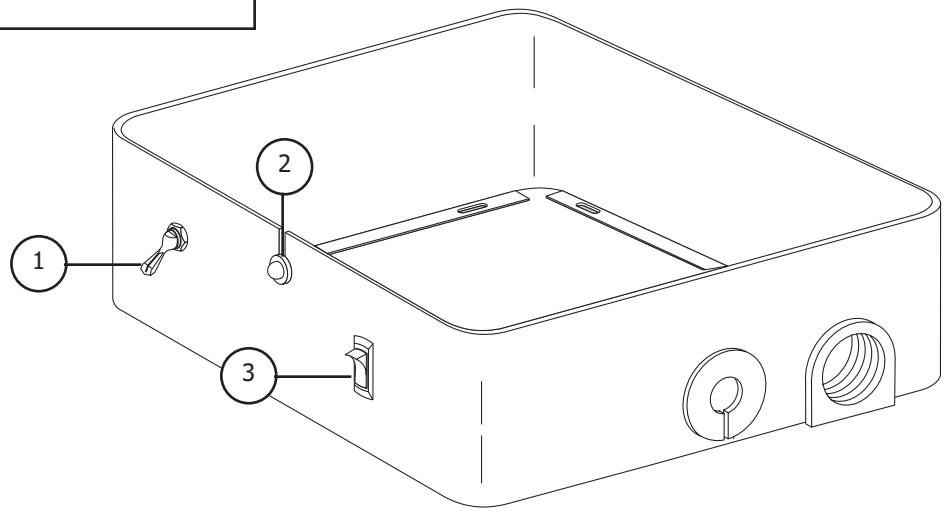


Function 3 DIP Switch after 2000

Function	Description	Programming
Cuspidor/Return	Used to raise the chair back to a programmable upright position providing the patient access to the cuspidor. Momentarily pushing button 3 on the touchpad or 8-button footswitch, or the actuator to position 3 on the 8-function footswitch will return the back to the previous position.	Both switches 1 and 2 are OFF.
Last Position	A non-programmable position that simply moves the chair base and back to their previous positions.	Switch 1 is ON and switch 2 is OFF. Go back and forth between two positions by momentarily pushing the right hand rocker button to position 3 or pressing number 3 on the touchpad.
Programmable Position	Used to set the base and back to a predesignated position.	Switch 1 is OFF and switch 2 is ON. Move the chair to the desired position. Press and release the program button. After the tone, push button 3 on the touchpad or footswitch or move the actuator to position 3 on the 8-function footswitch. The audible tone confirms the position is programmed.

Floor Box

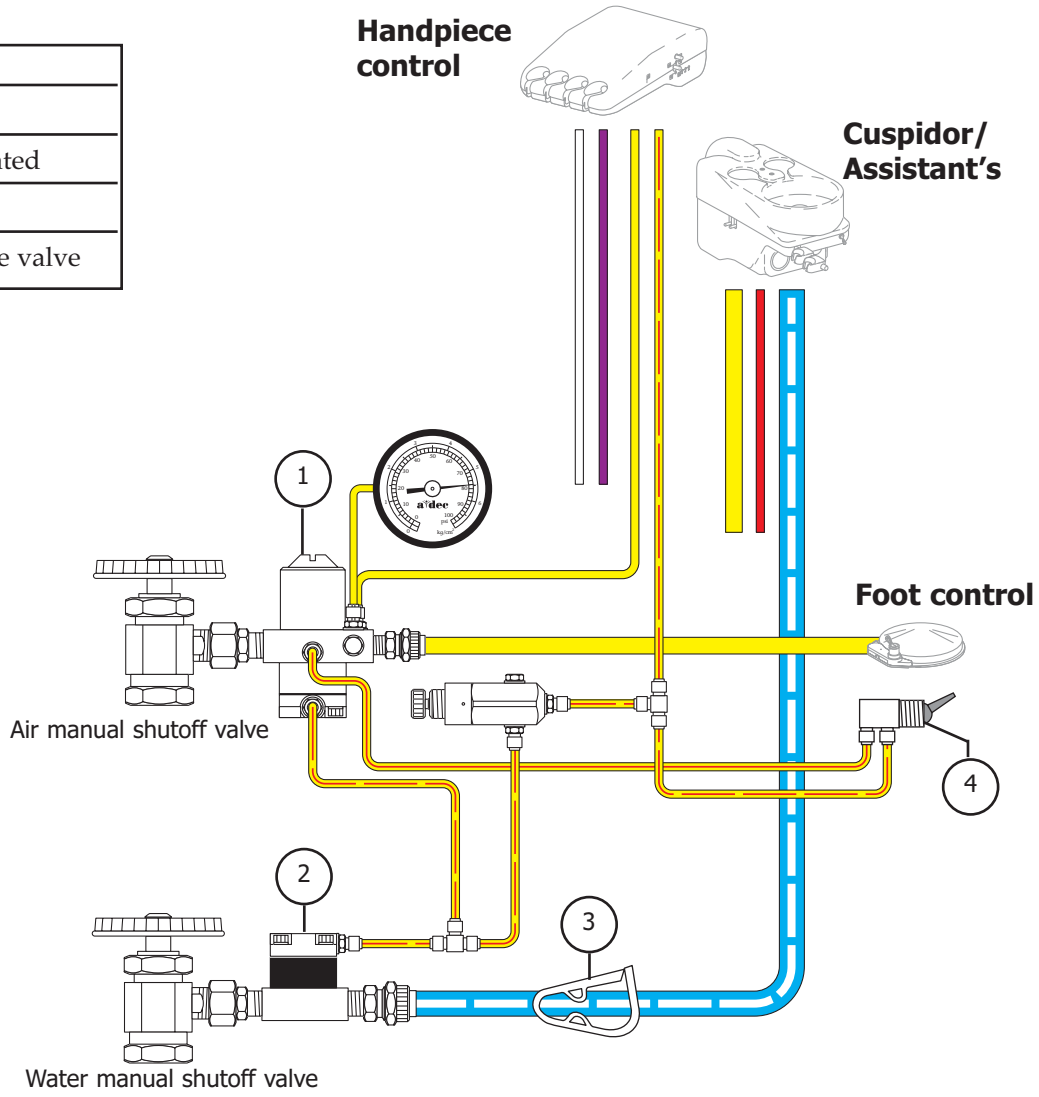
Item #	Part Number	Description
1	33.0048.03	Master On/Off (3-way) toggle valve
2	041.582.00	12 volt green light; not installed on all floor boxes (replace as a complete assembly)
3	041.512.00	Light intensity rocker switch (replace as a complete assembly)
	90.1045.00	Kit, intensity light switch cable.



Floor Box

Item #	Part Number	Description
1	24.0469.00	Air filter/regulator valve
2	34.0033.00	Water shutoff valve, air operated
3	025.052.00	Pinch clamp
4.	33.0048.03	Master On/Off (3-way) toggle valve

NOTE: Do not connect the water shutoff valve (34.0033.00) when the unit does not include a cuspidor or a water quick disconnect.

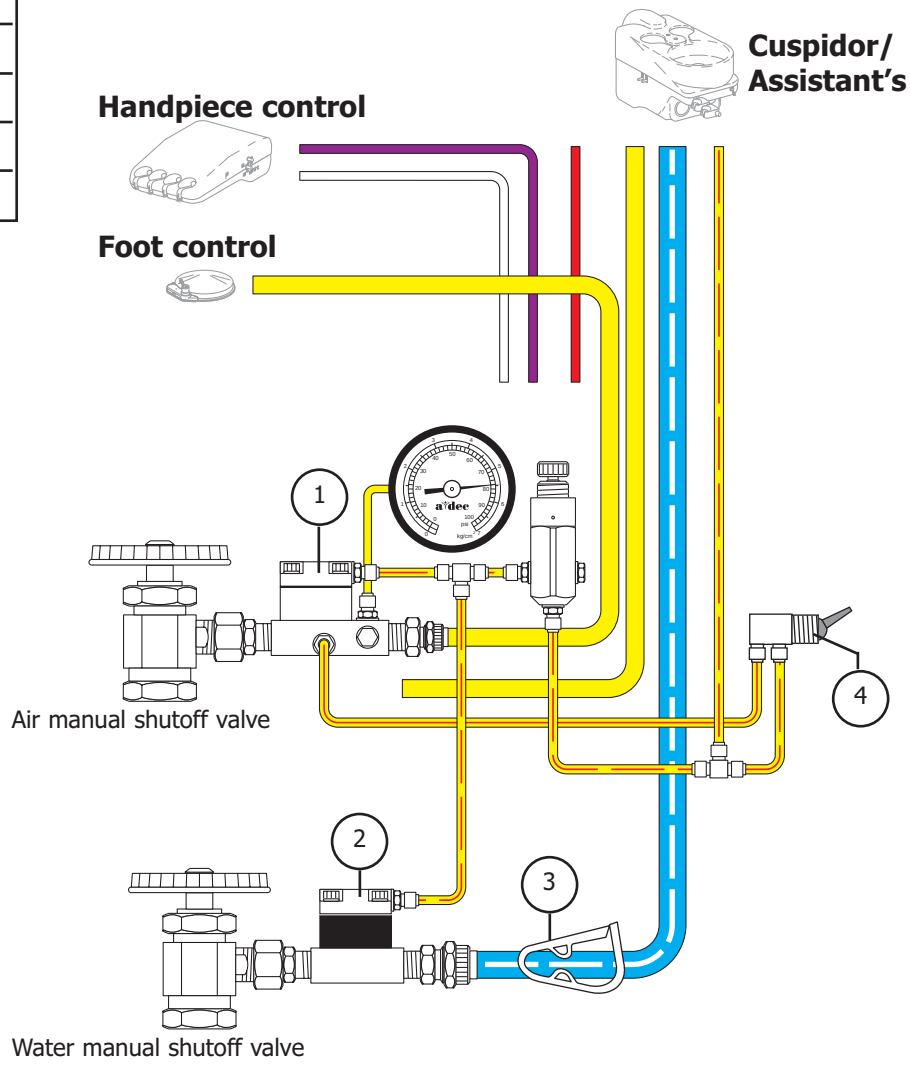


After December 1995
(only with the International Performer I chair)

Floor Box

Item #	Part Number	Description
1	24.0372.00	Air regulator valve
2	34.0033.00	Water shutoff valve, air operated
3	025.052.00	Pinch clamp
4	33.0048.03	Master On/Off (3-way) toggle valve

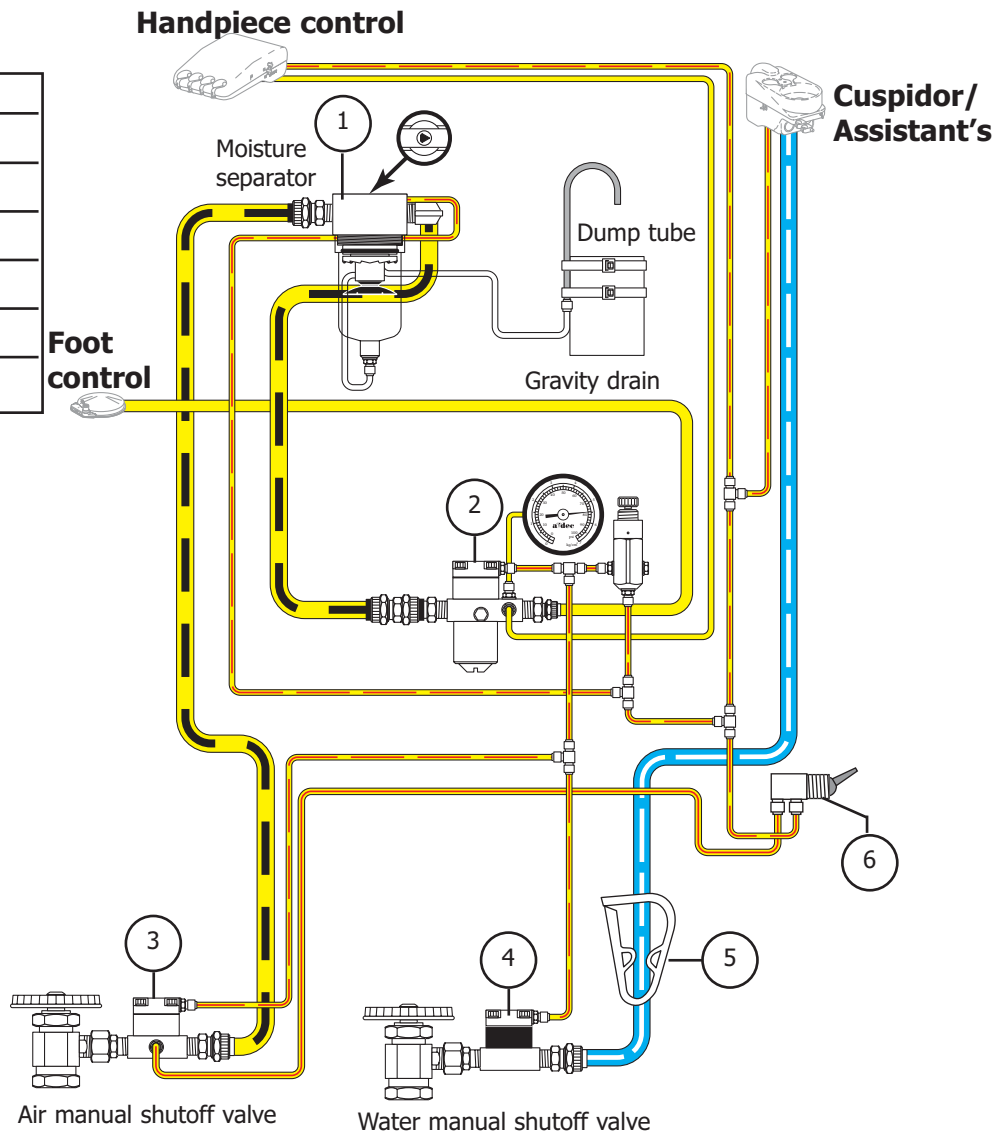
NOTE: Do not connect the water shutoff valve (34.0033.00) when the unit does not include a cuspidor or a water quick disconnect.



Floor Box with Automatic Moisture Separator

Item #	Part Number	Description
1	90.1027.03	Automatic moisture separator
2	24.0469.00	Air filter/regulator valve
3	34.0037.00	Air shutoff valve, air operated
4	34.0033.00	Water shutoff valve, air operated
5	025.052.00	Pinch clamp
6	33.0048.03	Master On/Off (3-way) toggle valve

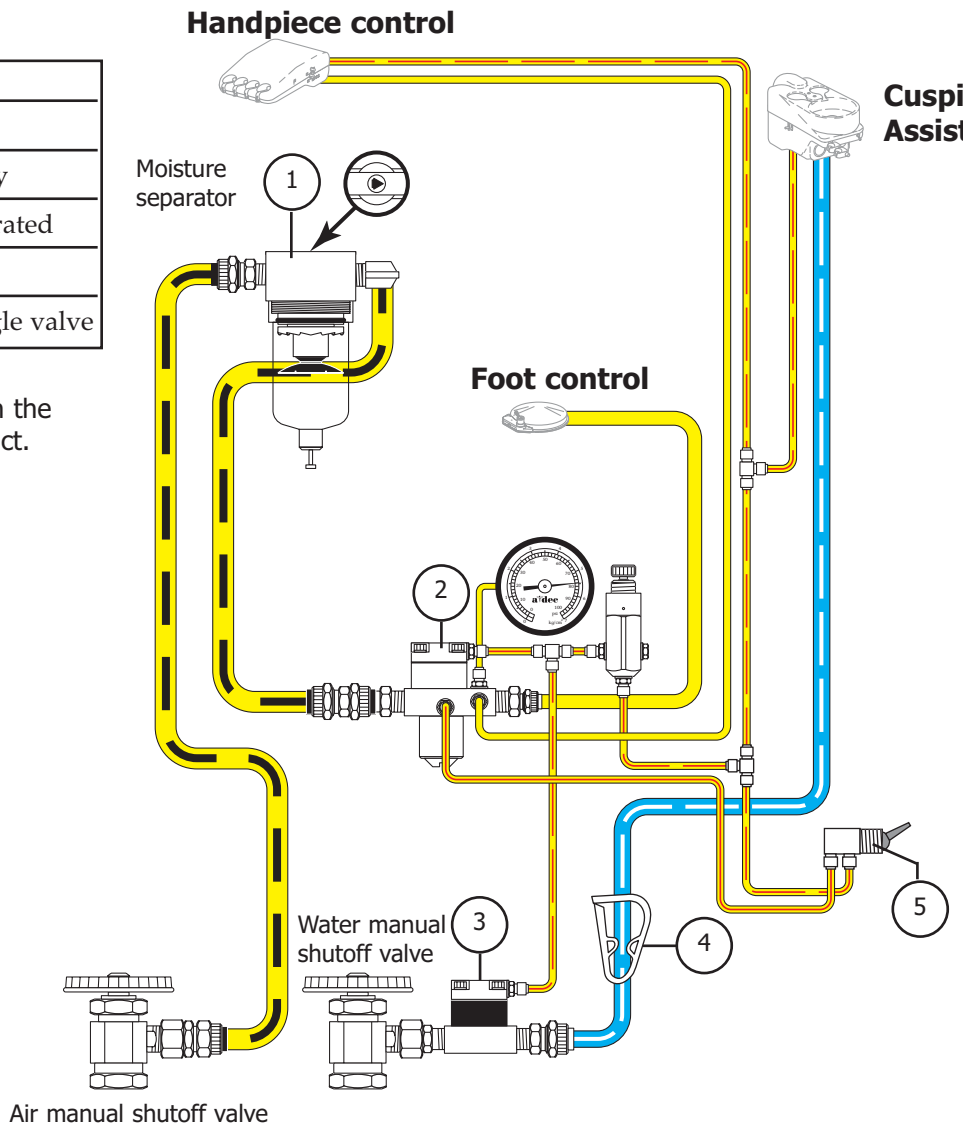
NOTE: Do not connect the water shutoff valve (34.0033.00) when the unit does not include a cuspidor or a water quick disconnect.



Floor Box with Manual Moisture Separator

Item #	Part Number	Description
1		Moisture separator
2	24.0469.00	Air filter/regulator assembly
3	34.0033.00	Water shutoff valve, air operated
4	025.052.00	Pinch clamp
5	33.0048.03	Master On/Off (3-way) toggle valve

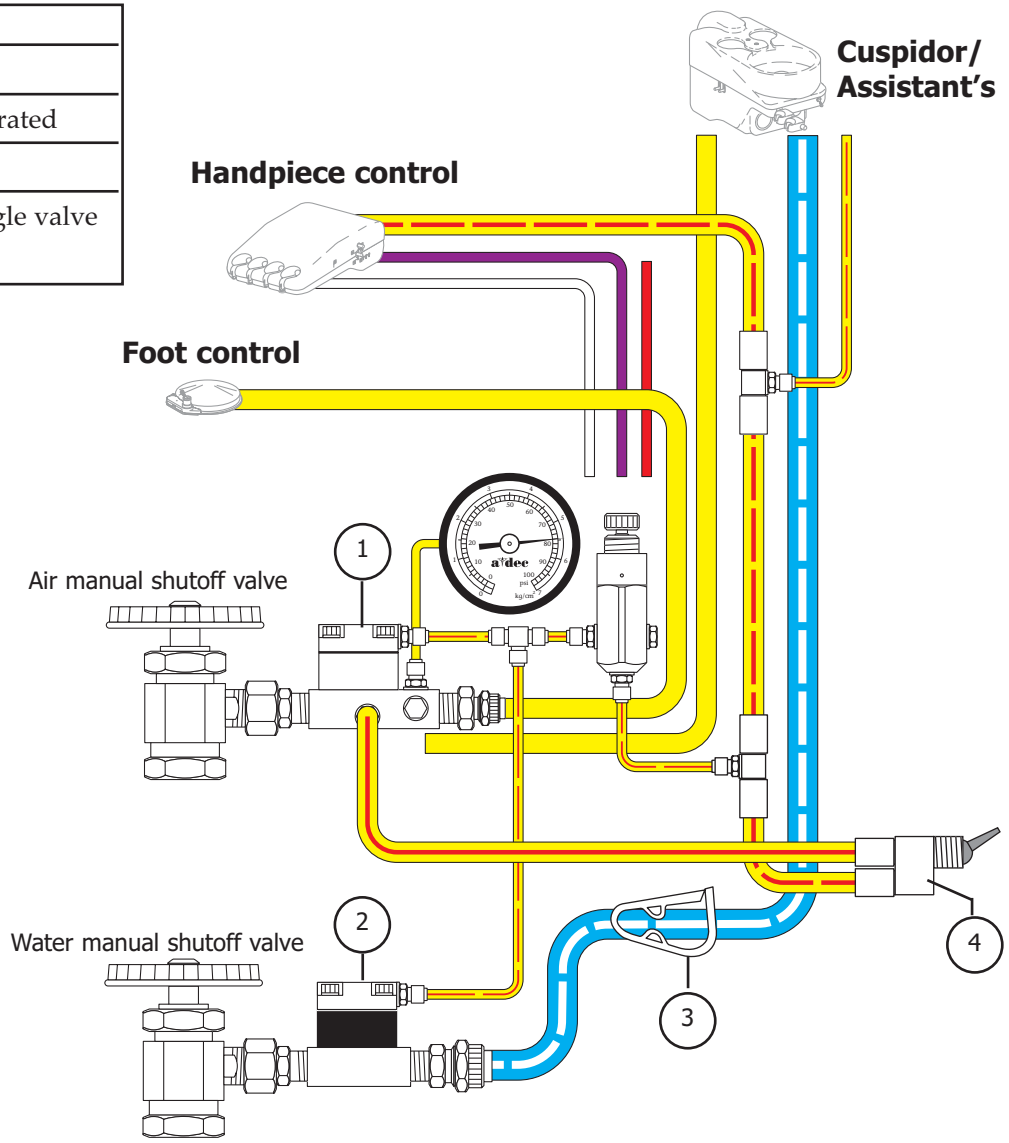
NOTE: Do not connect the water shutoff valve (34.0033.00) when the unit does not include a cuspidor or a water quick disconnect.



Floor Box

Item #	Part Number	Description
1	24.0372.00	Air regulator valve
2	34.0033.00	Water shutoff valve, air operated
3	025.052.00	Pinch clamp
4	33.0080.01	Master On/Off (3-way) toggle valve with 4" barbs

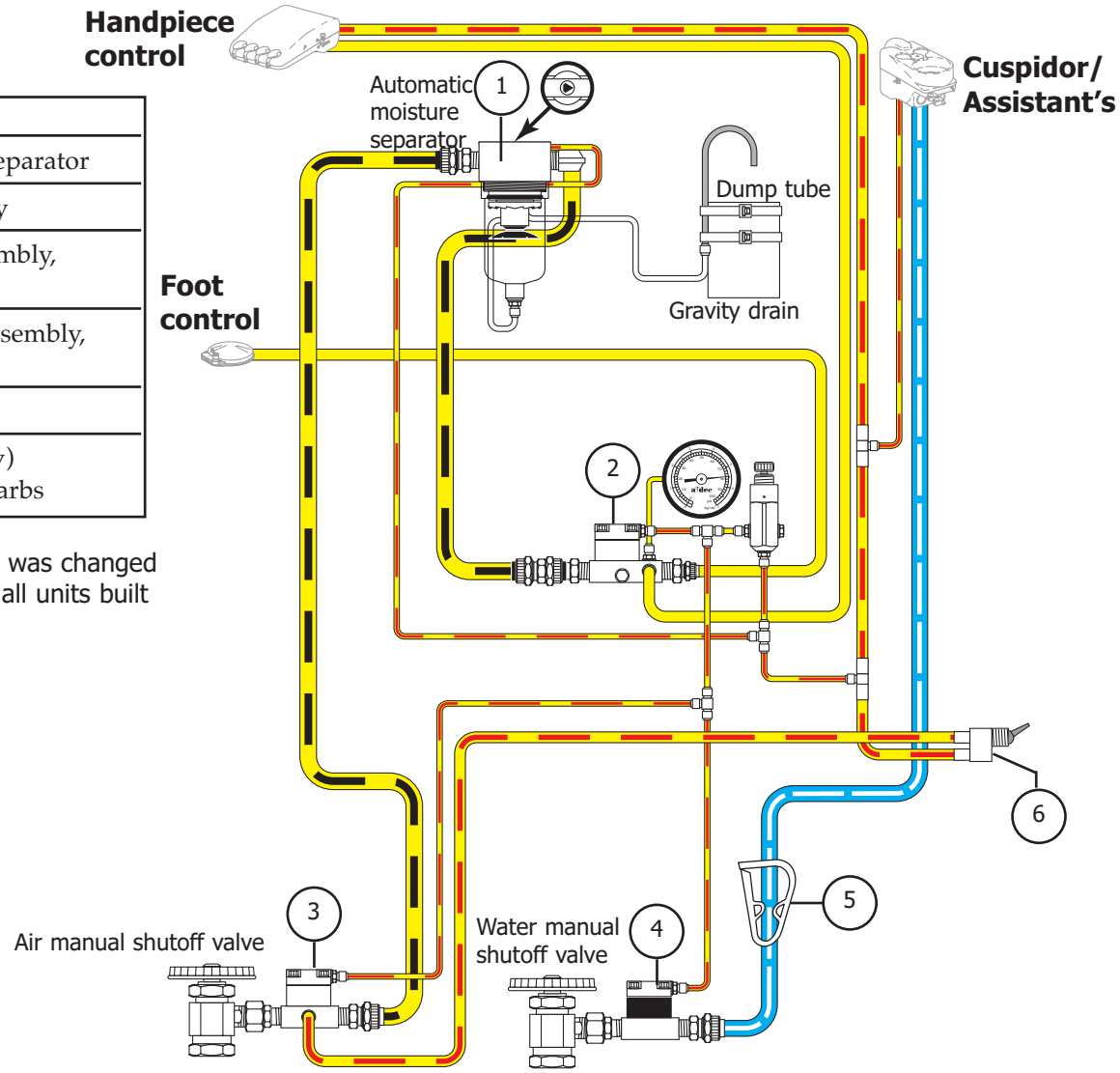
NOTE: The 1/4" ID pilot air tubing (yellow with red dashes) was changed to 1/8" ID pilot air tubing (yellow with red stripe) in all units built after December 1995.



Floor Box with Automatic Moisture Separator

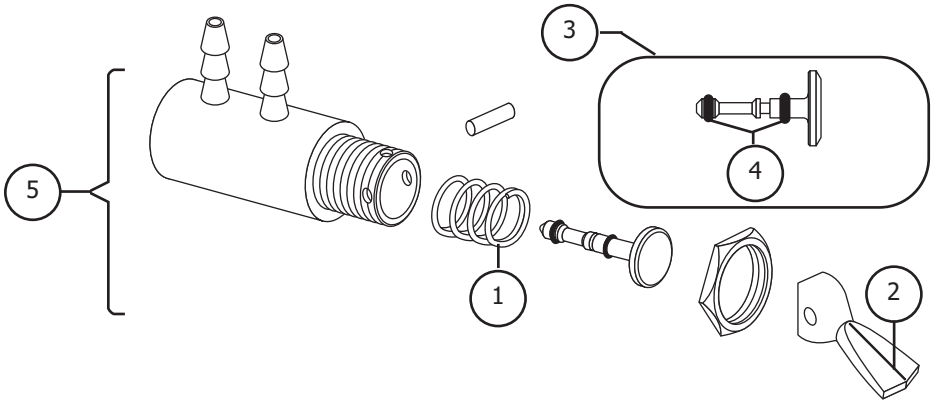
Item #	Part Number	Description
1	90.1027.03	Automatic moisture separator
2	24.0469.00	Air regulator assembly
3	34.0037.00	Air shutoff valve assembly, air operated
4	34.0033.00	Water shutoff valve assembly, air operated
5	025.052.00	Pinch clamp
6	33.0080.01	Master On/Off (3-way) toggle valve with 4" barbs

NOTE: The 1/4" ID pilot air tubing (yellow with red dashes) was changed to 1/8" ID pilot air tubing (yellow with red stripe) in all units built after December 1995.



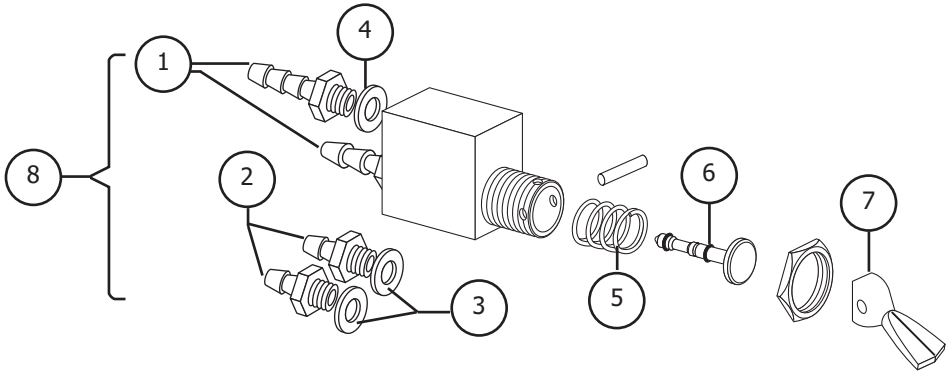
Master On/Off Toggles with Valve, 3-way

Item #	Part Number	Description
1	22.0040.00	Spring
2	33.0031.01	Gray toggle and pin
3	29.0840.00	Stem with o-rings, 3-way
4	030.001.02	O-ring pkg 10
8	33.0048.03	Master On/Off toggle, 3-way



After December 1995

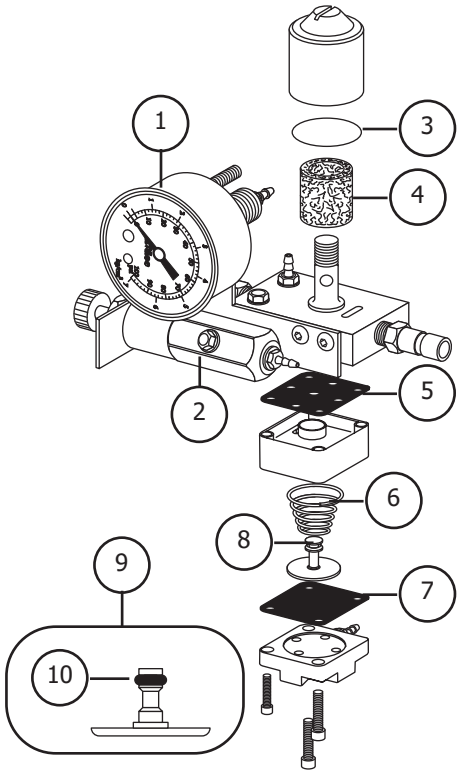
Item #	Part Number	Description
1	023.001.03	Barb, 1/4" pkg 10
2	023.004.03	Barb, 1/8" pkg 10
3	004.005.02	Washer pkg 10
4	004.005.02	Washer pkg 10
5	22.0040.00	Spring
6	29.0840.00	Stem with O-ring, 3-way
7	33.0031.01	Gray toggle with pin
8	33.0080.01	Master On/Off Toggle, 3-way



After January 1996

Air Filter/Regulator Valve

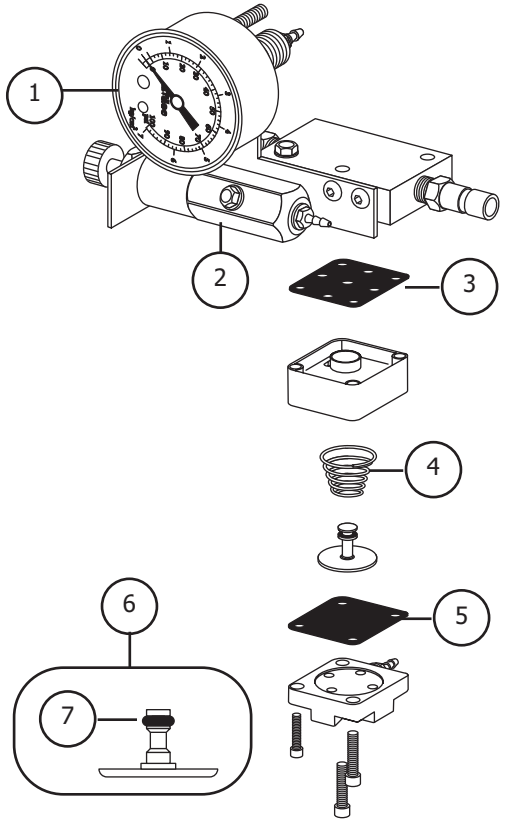
Item #	Part Number	Description
1	026.118.00	Gauge, 0-100 psi
2	24.0182.02	Pre-regulator, 80 psi, relieving
3	030.019.03	O-ring pkg 10
4	24.0234.01	Filter element pkg 6
5	24.0137.01	Gasket, 9-hole pkg 10
6	22.0460.00	Spring conical
7	22.0440.02	Diaphragm pkg 10
8	24.0132.00	Piston with o-ring
9	030.003.02	O-ring pkg 10



24.0469.00

Air Regulator Valve

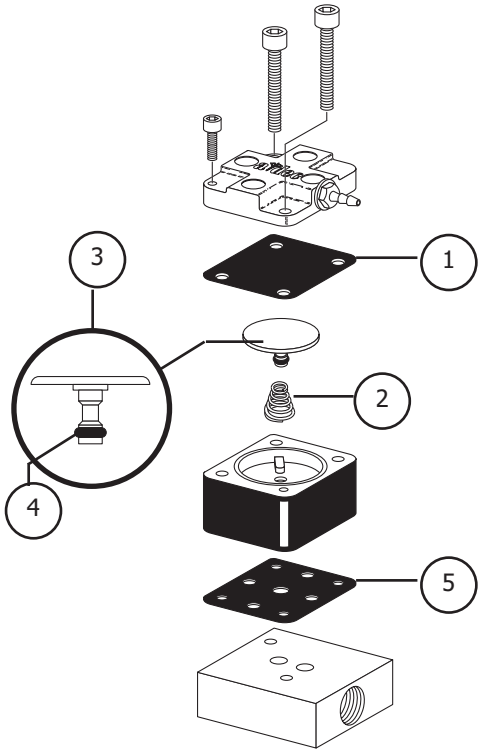
Item #	Part Number	Description
1	026.118.00	Gauge, 0-100 psi
2	24.0182.02	Pre-regulator, 80 psi, relieving
3	24.0137.01	Gasket, 9-hole pkg 10
4	22.0460.00	Spring conical
5	22.0440.02	Diaphragm pkg 10
6	24.0132.00	Piston with o-ring
7	030.003.02	O-ring pkg 10



24.0363.04

Water Shutoff Valve, Air Operated

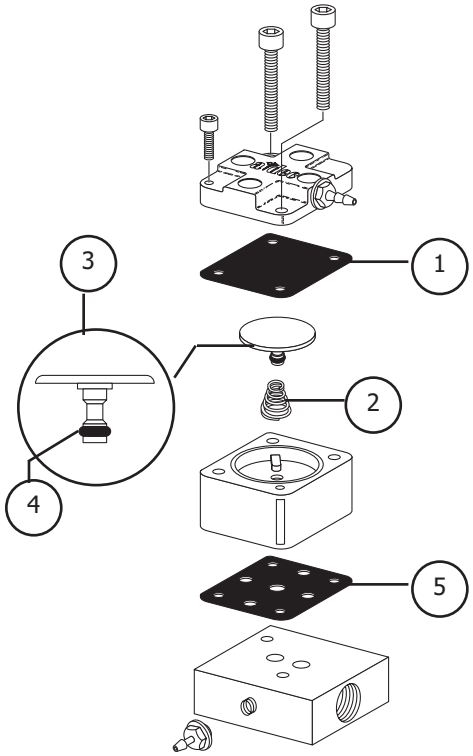
Item #	Part Number	Description
1	22.0440.02	Diaphragm pkg 10
2	013.032.00	Spring conical
3	24.0132.00	Piston with O-ring
4	030.003.02	O-ring pkg 10
5	24.0137.01	Gasket, 9-hole pkg 10



34.0033.00

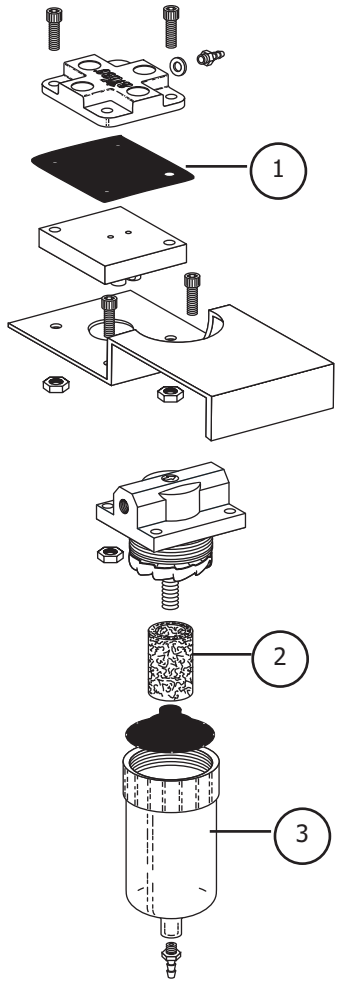
Air Shutoff Valve, Air Operated

Item #	Part Number	Description
1	22.0440.02	Diaphragm pkg 10
2	22.0460.00	Spring conical
3	24.0132.00	Piston with o-ring
4	030.003.02	O-ring pkg 10
5	24.0137.01	Gasket, 9-hole pkg10



Automatic Moisture Separator

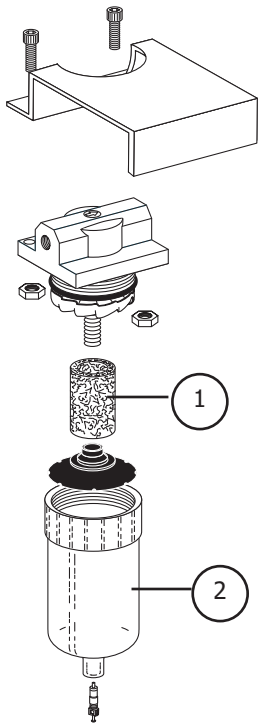
Item #	Part Number	Description
1	22.0440.02	Diaphragm pkg 10
2	97.0280.02	Filter element pkg 6, 5 micron filtration (not a bacterial filter)
3	97.0290.00	Bowl with seal



90.1027.30

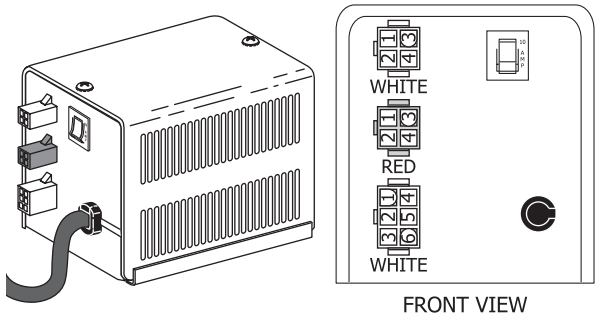
Manual Moisture Separator

Item #	Part Number	Description
1	97.0280.02	Filter element pkg 6, 5 micron filtration (not a bacterial filter)
2	97.0290.00	Bowl with seal



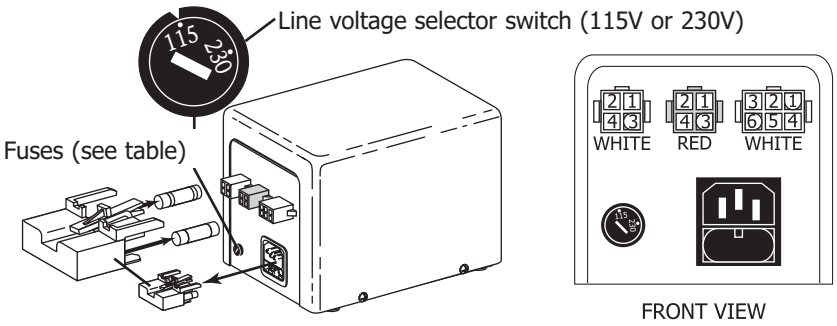
80-Watt Power Supply

NOTE: No serviceable parts. Replace as a complete assembly.



After January 1998

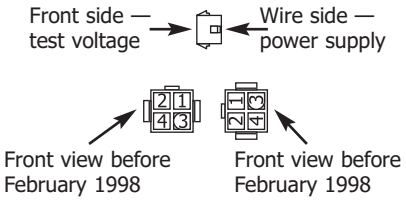
28.1345.00	**115 VAC .80A, 50-60Hz**
47.2030.00	**100 VAC, .90A, 50-60Hz**
47.2031.00	**230 VAC, .40A, 50-60Hz**

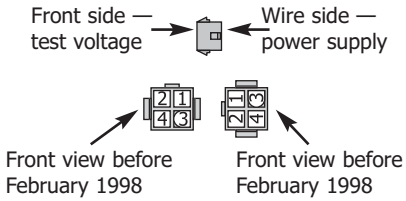


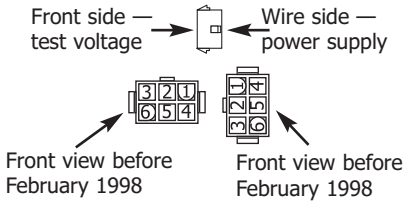
Before February 1998
80-Watt, 115/230 Volt Switchable

WARNING

Make sure the line voltage selector switch is set on the correct voltage (115V or 230V).







Wire Before Feb 98	Voltage	Wire After Feb 98
1 Grn/Yel	Ground	1 Grn/Yel
2 Black	0 VAC	2 Black
3 Red	24 Volts	3 Gray
4 Orange	Not used	4 Open

White 4-Pin Connector

Wire Before Feb 98	Voltage	Wire After Feb 98
1 Grn/Yel	Ground	1 Grn/Yel
2 Brown	0 VAC	2 Black
3 Open	Not used	3 Open
4 Open	10.8/12.1	4 White

Red 4-Pin Connector

Wire Before Feb 98	Voltage	Wire After Feb 98
1 Grn/Yel	Ground	1 Grn/Yel
2 White	0 VAC	2 Black
3 Orange	10.8/12.1 V	3 White
4 Yellow	10.8 V	4 Orange
5 Violet	12.1 Volts	5 Yellow
6 Red	12.1 Volts	6 Yellow

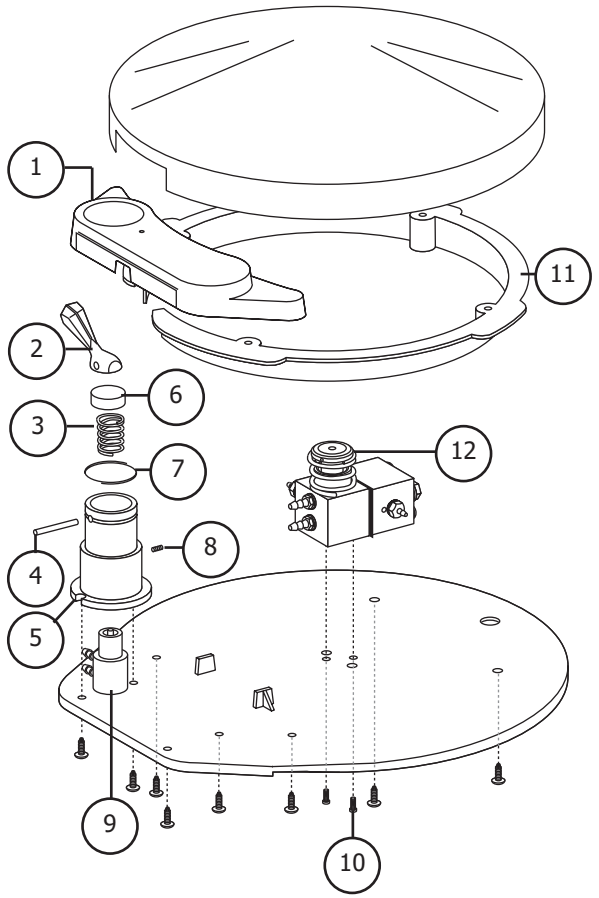
White 6-Pin Connector

Selector Switch Voltage/Fuse Table

Mains Voltage	Part Number	Description
115 VAC	044.191.00	1.25 A Time Lag Fuse, 5 x 20 mm Replaces 044.148.00.
230 VAC	044.190.00	630 mA Time Lag Fuse, 5 x 20 mm Replaces 044.185.00.

Foot Control III

Item#	Part number	Description
1	38.0320.02	Foot control housing
2	38.0075.03	Toggle and pin, dark surf
3	22.0040.00	Spring
4	011.016.00	Pin
5	38.0072.03	Valve holder, dark surf
6	38.0066.00	Cap
7	010.056.00	Retainer
8	007.002.00	Setscrew pkg 10
9	33.0138.00	Micro-valve
10	003.078.00	Screws, valve mounting
11	38.0237.00	Retaining ring, internal
*12	38.0760.00	FC3 piston

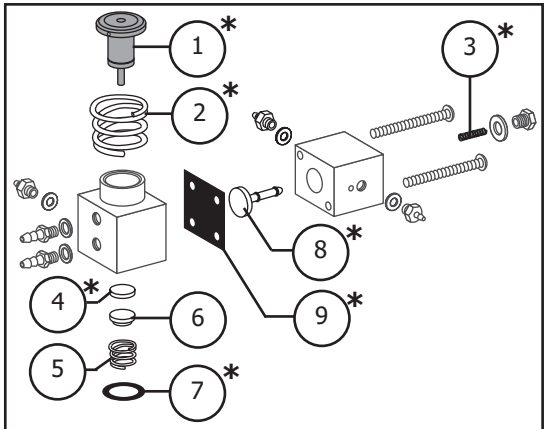


NOTE: * Parts included in Foot Control III service kit.
** Parts not used in foot controls after 12/96. All parts in the 38.0607.01 are included in Foot Control II service kit.

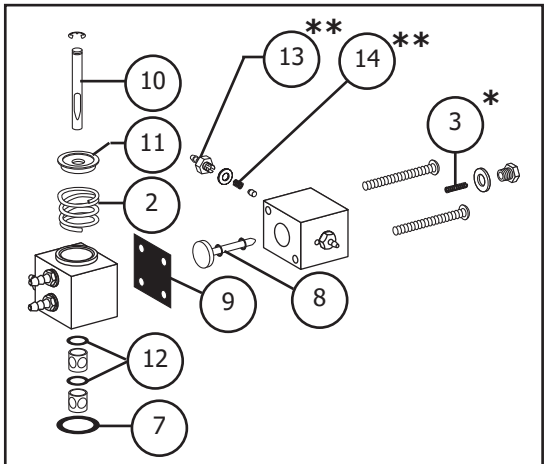
Foot Control II &III Valves

Item#	Part number	Description
*1	38.0760.00	FC3 piston
*2	013.011.00	Spring
*3	10.0440.00	Spring
*4	22.0060.00	Poppet
*5	22.0580.00	Spring
6	22.0050.00	Spring cap
*7	030.012.02	O-ring
*8	22.0778.00	Stem with o-rings
*9	38.0054.02	Diaphragm pkg 10
10	38.0246.00	Stem with E-ring
11	38.0552.00	Ring return, valve stem
12	030.008.02	O-ring pkg 10
**13	023.040.00	Check valve barb, slotted
**14	013.053.00	Spring

NOTE: * Parts included in Foot Control III service kit.
** Parts not used in foot controls after 12/96. All parts in the 38.0607.01 are included in Foot Control II service kit.



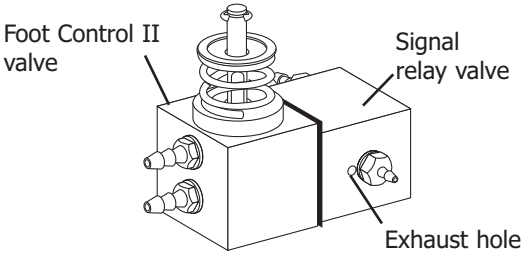
Foot Control III Valve



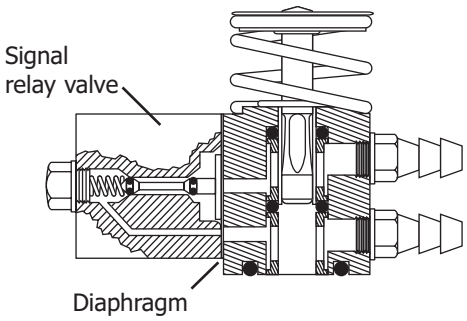
Foot Control II Valve

Foot Control II

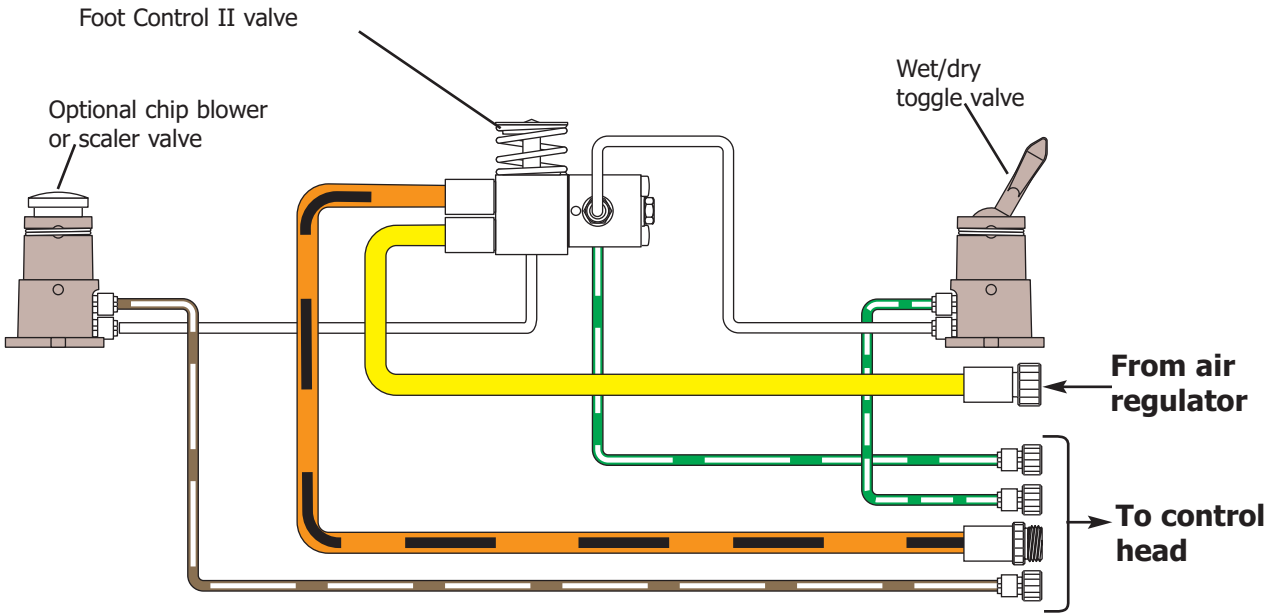
Foot Control I and II were used on A-dec equipment before October 1999. These units are no longer available.



Foot Control II Valve Assembly



Foot Control II Cross View

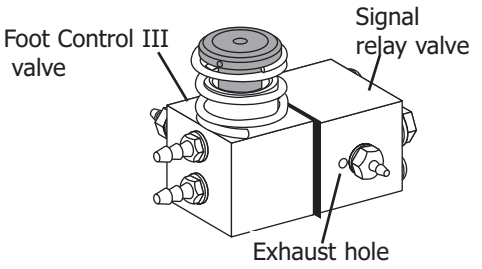


WARNING

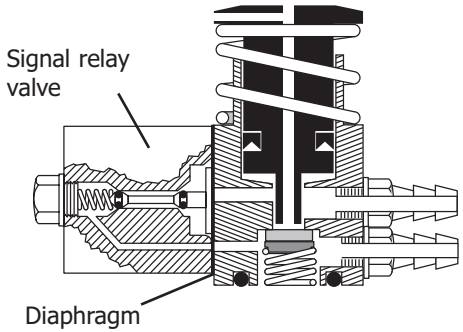
When working on Foot Control II, move the master On/Off toggle to the OFF position and bleed the system of air pressure. Do this before removing the foot control disc to prevent the foot control stem from being forcefully ejected from the foot control valve.

Foot Control III

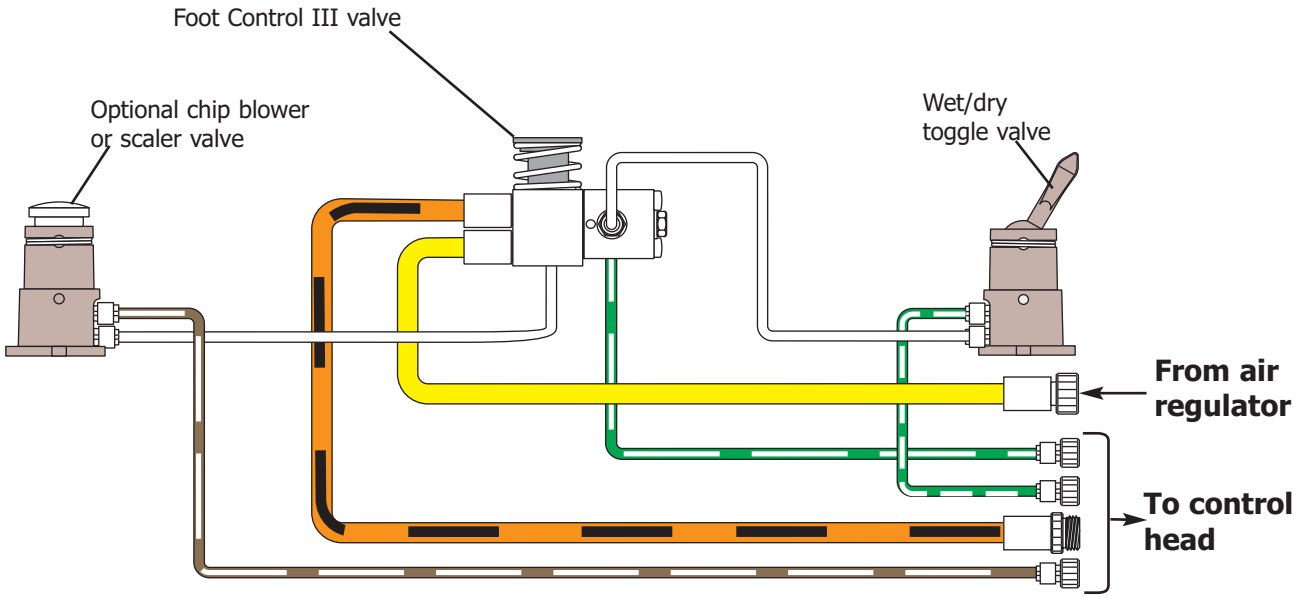
Use of Foot Control III began in March 1999. A service kit, P/N 90.0593.00, and an international conversion kit, P/N 38.1764.00, are available for Foot Control III.



Foot Control III Valve Assembly



Foot Control III Cross View



Troubleshooting Foot Controls

Tips and troubleshooting information are listed in the following charts to assist in diagnosing foot control problems. These charts do not cover every situation, but do try to include the most common problems you may encounter. In most cases, it is recommended rebuilding the whole foot control using the appropriate service kit. This normally solves the problem and saves time.

Problem	Action
Audible leakage when foot control is **not** being used	Do these steps in the order listed, until the leakage has stopped. **Task** **Descriptions** 1 Check mounting screws in the bottom of the baseplate to make sure they are tight. • If leakage has stopped, test unit. • If there is still audible leakage, continue with step 2. 2 Remove the cover and check the internal tubings for secure connections. 3 Check for leakage from the exhaust holes on the signal relay valve. If there is leakage, do the following • move the master On/Off toggle to the OFF position and bleed the system of air pressure • inspect the stem and o-rings for debris or defects, and • inspect the seat for debris or defects. 4 Replace any defective parts. Lubricate the o-rings, reassemble and test the foot control. 5 Check for leakage around the diaphragm. If there is leakage, do the following: • Tighten the two screws securing the signal relay valve to the foot control valve. If there's still leakage, replace the diaphragm.

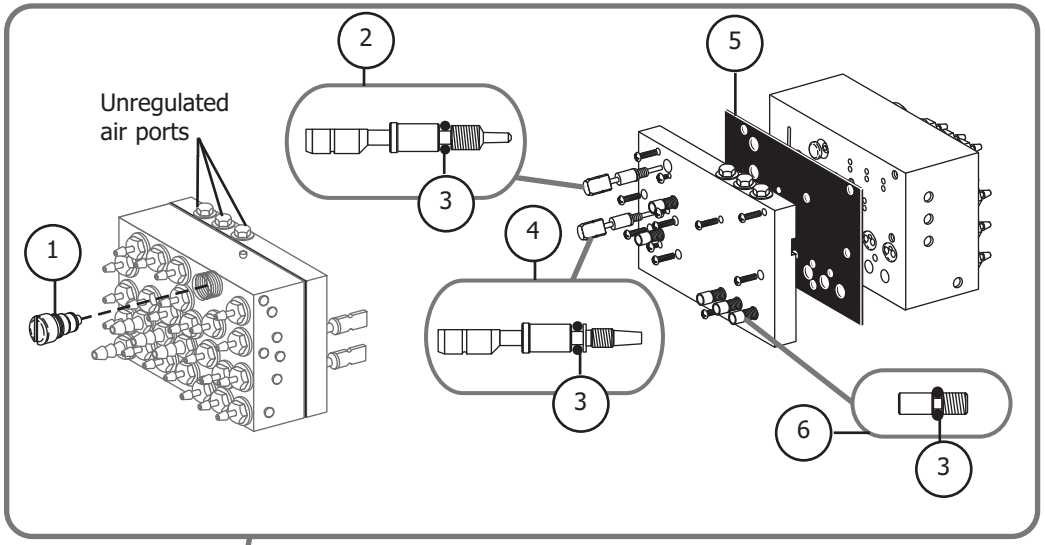
Problem	Action
Audible leakage when foot control is in use	Complete the following steps in this chart to stop leakage. **Task** **Descriptions** 1 Check for a failed diaphragm. • Tighten the two screws securing the signal relay valve to the foot control valve. If there's still leakage, replace the diaphragm. • If there is still audible leakage, continue with step 2. 2 Check for leakage from the exhaust holes on the signal relay valve. If there is leakage, do the following: • move the master On/Off toggle to the OFF position and bleed the system of air pressure • inspect the stem and o-rings for debris or defects, and • inspect the seat for debris or defects. 3 Replace any defective parts. Lubricate the o-rings, reassemble and test the foot control. 4 Check the outlet barb and tubing on the signal relay valve. Tighten the barb, or replace the tubing.

Problem	Action
Inadequate air flow	Check these in the following order. **Task** **Descriptions** 1 Check the air pressure. If the air pressure drops by more than 15 psi when syringe air button and foot control are depressed • Check for pinched foot control tubing. • Check for a plugged filter in the air filter/regulator (floor box). • Check for obstructed outlet barb on signal relay valve. 2 Move the master On/Off toggle to the OFF position and bleed the system of air pressure. 3 Remove debris and replace any defective parts in the valve assembly. Lubricate the o-rings, reassemble, and test the foot control.
Coolant water continues after release of foot control	Check these in the following order. 1 Check for a sticky signal relay valve. 2 Move the master On/Off toggle to the OFF position and bleed the system of air pressure. 3 Remove the signal relay valve, clean and lube the parts, and reassemble. 4 Test foot control. 5 Check for a kinked/plugged tubing somewhere between the foot control relay and the control head.

Problem	Action
Sluggish foot control	Check the following points to test the response on the foot control. • Move the master On/Off toggle to the OFF position and bleed the system of air pressure. • Remove the signal relay valve, clean and lube the parts, and reassemble. • Test foot control.

Control Block Assembly With Tubing

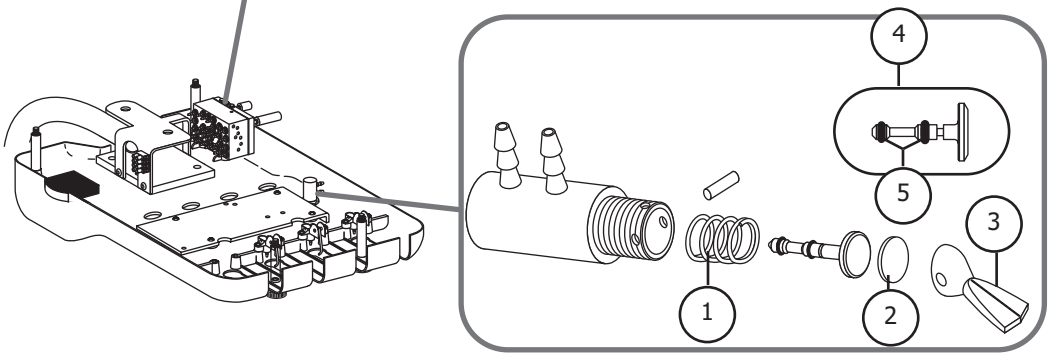
Item #	Part Number	Description
	38.1775.00	*Performer control block service kit
*1	38.0717.00	Water relay valve assembly
2	38.0712.00	Coolant water stem with o-ring
3	030.004.02	O-ring pkg 10
4	38.0713.00	Coolant air stem with o-ring
*5	38.0711.01	Control block diaphragm pkg 5
6	38.0766.02	Flow control screw with o-ring pkg 5



38.0729.00

Handpiece Flush Toggle Valve, 2-Way Momentary

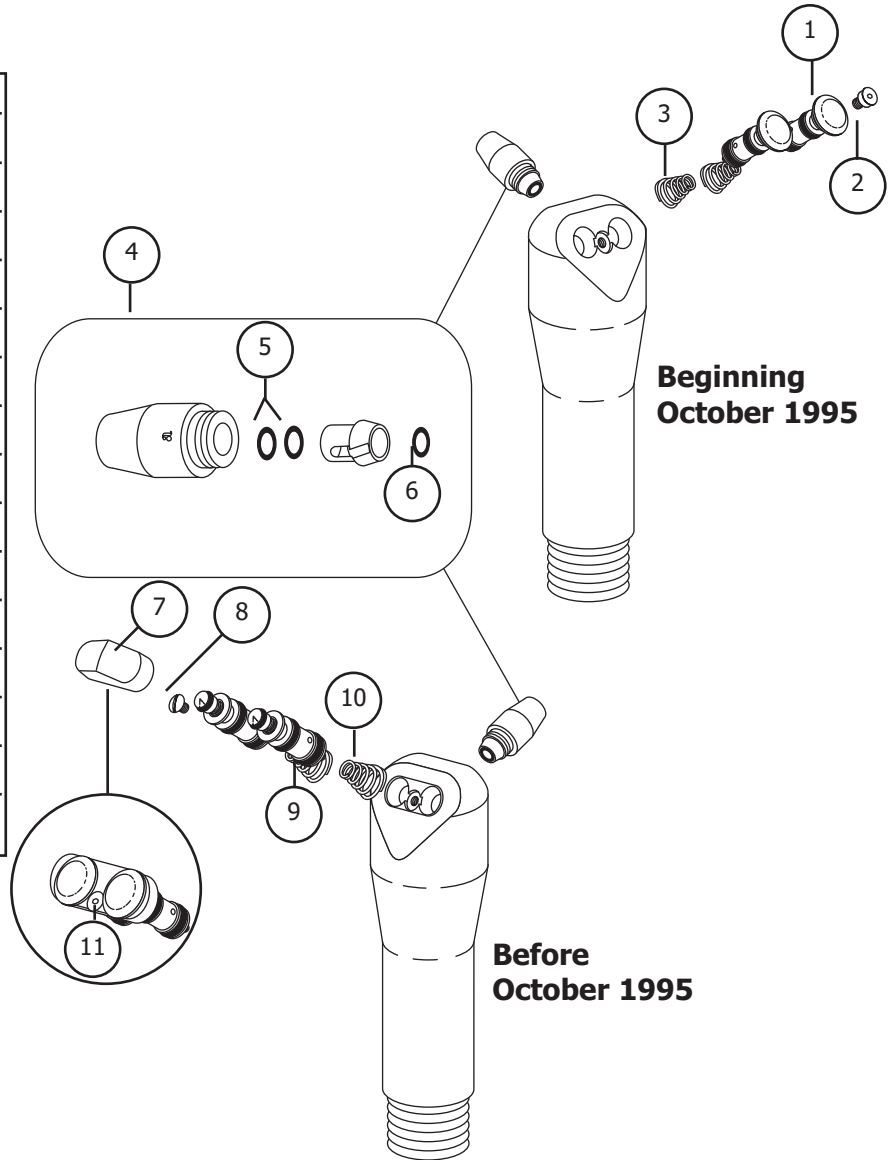
Item #	Part Number	Description
1	013.055.00	Spring, compression
2	33.0007.00	Disk
3	33.0037.01	Straight pin and toggle lever, momentary
4	29.0830.00	Stem with o-ring, 2-way
5	030.001.02	O-rings pkg 10



33.0009.03

Autoclavable Syringe

Item #	Part Number	Description
	23.1011.00	Autoclavable syringe head assembly
	23.1150.00	Autoclavable syringe assembly and 7' tubing
	23.1099.00	Autoclavable syringe service kit, 2 button
	23.1012.00	Autoclavable syringe service kit, soft button
1	23.1232.01	Valve assembly with o-rings, autoclavable
2	23.1193.01	Screw pkg 5
3	013.064.01	Spring pkg 10
4	23.1112.00	Syringe tip retainer, non-locking
5	035.048.01	O-ring pkg 10
6	034.003.01	O-ring pkg 10
7	23.1028.00	Soft button, autoclavable
8	001.002.01	Screw pkg 5
9	23.1021.01	Valve assembly with o-rings pkg 2
10	013.064.01	Spring pkg 10
11	23.1194.00	Two-button valve conversion kit



Troubleshooting the Control Block

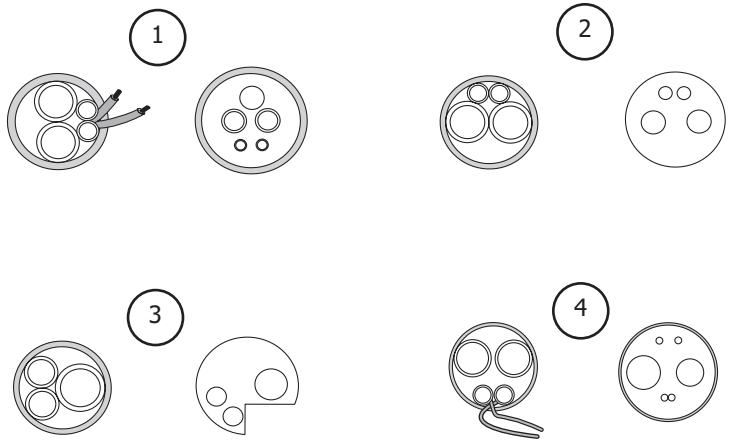
Tips and troubleshooting information are listed to assist in distinguishing control block problems.

Problem	Action
Water leakage at the coolant water stem	Follow these points to stop leakage at the coolant water stem. • Replace the o-ring. • Replace the stem.
Water leakage at the water relay valve or handpiece	Replace the valve.
Audible air leakage at the flow control screws or coolant air stem	Follow these points to stop leakage at the flow control screws or coolant air stem. • Replace the o-ring. • Replace the stem.
Water leakage at the control block	Follow these steps to stop leakage at the control block. **Task** **Description** 1 Check to make sure control block assembly screws are tight. 2 Check to make sure all barbs are tight and the washers are not damaged. 3 Replace the diaphragm. 4 Replace the stem o-rings.
Water leakage at the flow control screw	Follow these steps to stop leakage at the flow control screw. 1 Replace water relay. 2 Replace the o-ring. 3 Replace the stem.

Problem	Action
Water leakage from all handpieces when removed from holder	Follow these steps to stop leakage from handpieces. **Task** **Description** 1 Replace the water relay valve. 2 Replace the stem. 3 Replace the o-rings on the stem.
Water leakage around flush toggle valve barbs	Replace the toggle valve.
No water from flush toggle valve outlet barb	Follow these steps to flush the toggle valve outlet barb. 1 Check the water supply in the self-contained water bottle. 2 Make sure air pressure at the bottle is 40 psi. 3 Replace the toggle valve. **WARNING** Turn the master On/Off toggle to the OFF position and bleed system air pressure before removing the foot control disc to prevent the foot control stem from being forcefully ejected.

Handpiece Tubing Assembly

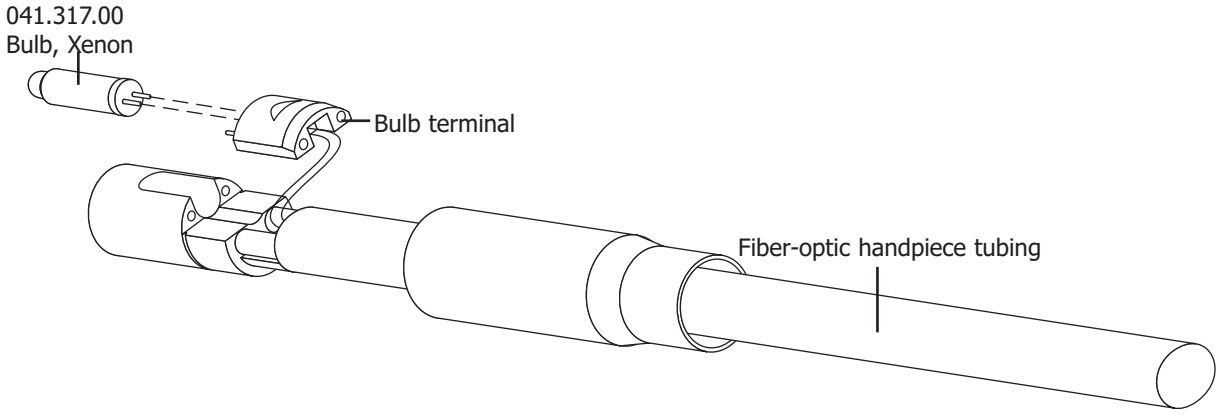
Item #	Part Number	Description
1	98.0262.02	Straight 4-hole fiber-optic tubing with bulb, 7' (2134 mm)
2	98.0879.00	Straight 4-hole tubing with Midwest terminal, 7' (2134 mm)
3	98.0882.00	Straight 3-hole tubing with Borden terminal, 7' (2134 mm)
4	98.0885.00	Straight 4-hole, fiber-optic tubing, six pin, 7' (2134mm)



CAUTION

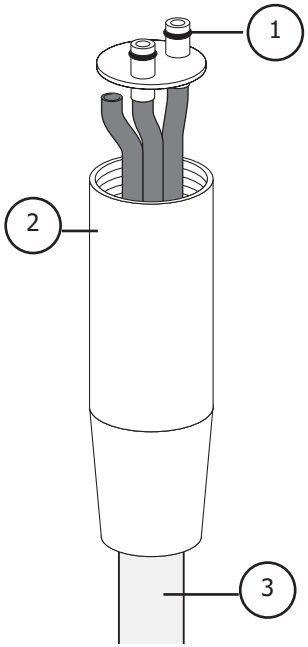
Do not touch the glass of the bulb. Finger oils limit bulb life. If you inadvertently touch the glass, gently clean with cotton soaked in ethyl or isopropyl alcohol.

Fiber-Optic Bulb



Syringe Terminal, 2 Barb, Non-Quick Disconnect

Item #	Part Number	Description
1	030.002.02	O-ring pkg 10
2	23.1015.00	Handle
3	024.155.02	Syringe tubing assembly, straight 7'



23.1208.00

Troubleshooting Syringes

Tips and troubleshooting information are listed to assist in distinguishing syringe problems.

Problem	Action
Air or water leakage from one of the valve assemblies	Replace the valve assemblies.
Air or water leakage from the syringe nut assembly	Check the following steps to stop leakage from the syringe nut assembly. **Task** **Description** 1 Make sure the syringe nut assembly is properly installed and tightened. Use a 5/32" hex key to tighten. 2 Replace o-rings. 3 Replace the syringe nut assembly.
No air and/or water from the syringe	Check the following steps to fix the syringe. 1 Check to make sure the master On/Off toggle is in the ON position. 2 Check to make sure the air and water supplies are turned ON. 3 Check tubing for kinks or breaks.

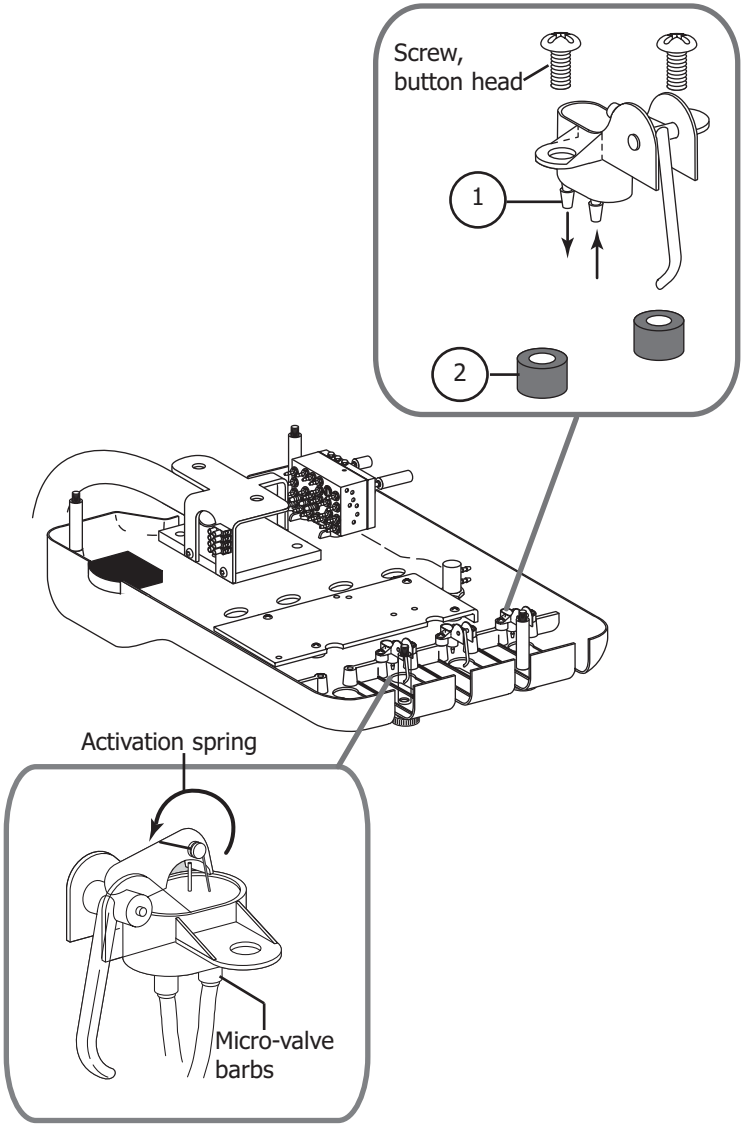
Working with the Holder Valve Assembly

Item #	Part Number	Description
1	99.0627.00	Micro-valve assembly with tubing
2	004.186.00	Washer

Holder Valve Activation, Third Handpiece Position

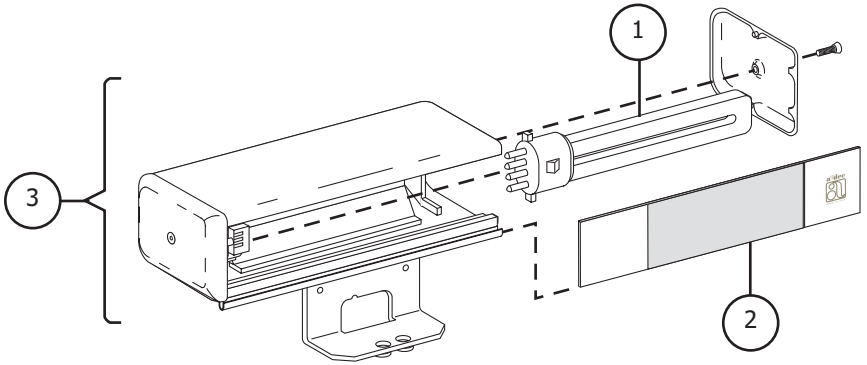
Follow these points to activate the third holder position

- Rotate the activation spring counterclockwise.
- Align the spring so it is parallel to the micro-valve barbs (straight down).



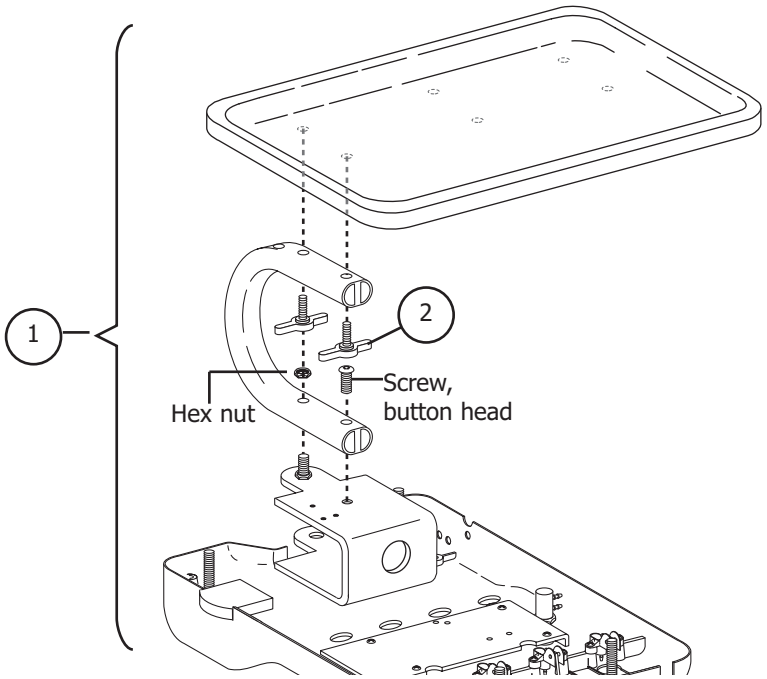
Bitewing Viewer

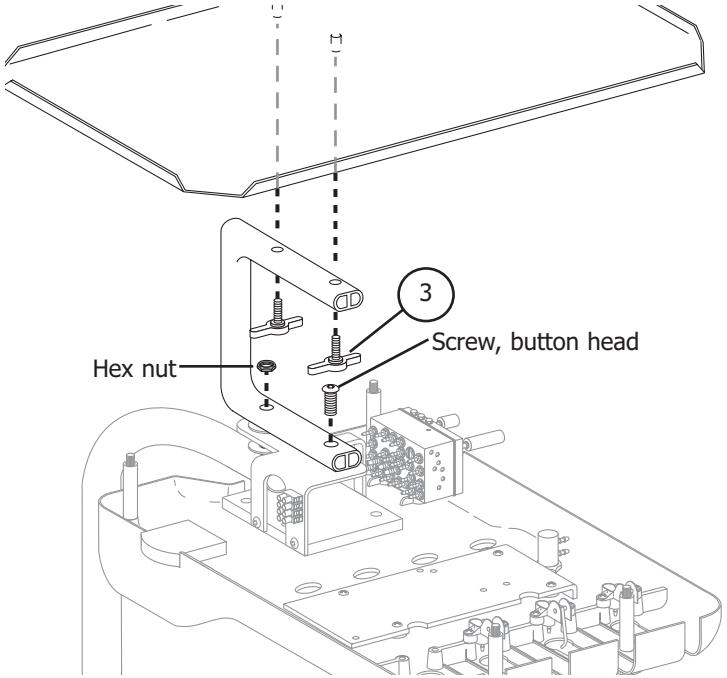
Item #	Part Number	Description
1	041.501.00	Fluorescent bulb 4100K 9W
2	76.8001.00	Lens, bitewing viewer
3	76.8100.00	Bitewing viewer, 24 VAC, .5A, 50-60Hz



Tray Holder

Item #	Part Number	Description
1	39.1380.00	Molded tray holder
2	027.070.00	Knob assembly
3	027.062.00	Knob assembly

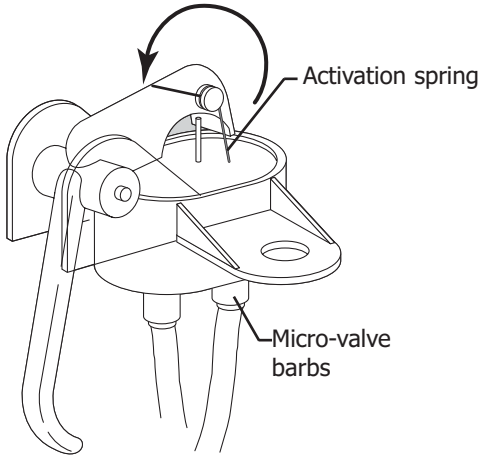




Activating the Holder Valve

The third handpiece position can be changed from inactive to active by performing a simple adjustment.

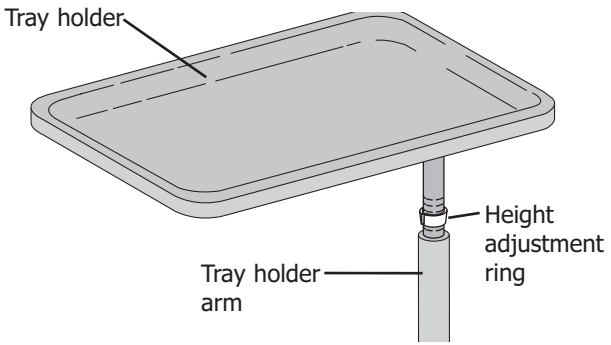
Step	Action
1	Rotate the activation spring clockwise
2	Align the spring so it is parallel to the micro-valve barbs (straight down)



Holder Valve Activation

Adjusting the Accessory Tray Holder Height

Lift the tray holder to access the height adjustment ring. Slide the height adjustment ring to the desired position. Lower the tray holder onto the arm.

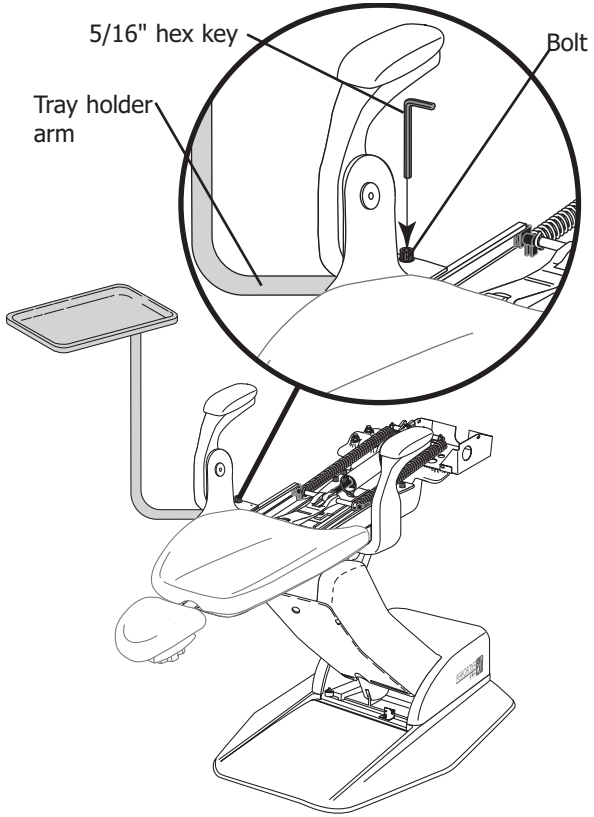


Adjusting the Accessory Tray Holder Arm Tension

Remove the chair seat/toeboard upholstery. Locate the tray holder arm mounting bolt. Turn the bolt until the desired tension is achieved.

- Clockwise to tighten
- Counterclockwise to loosen

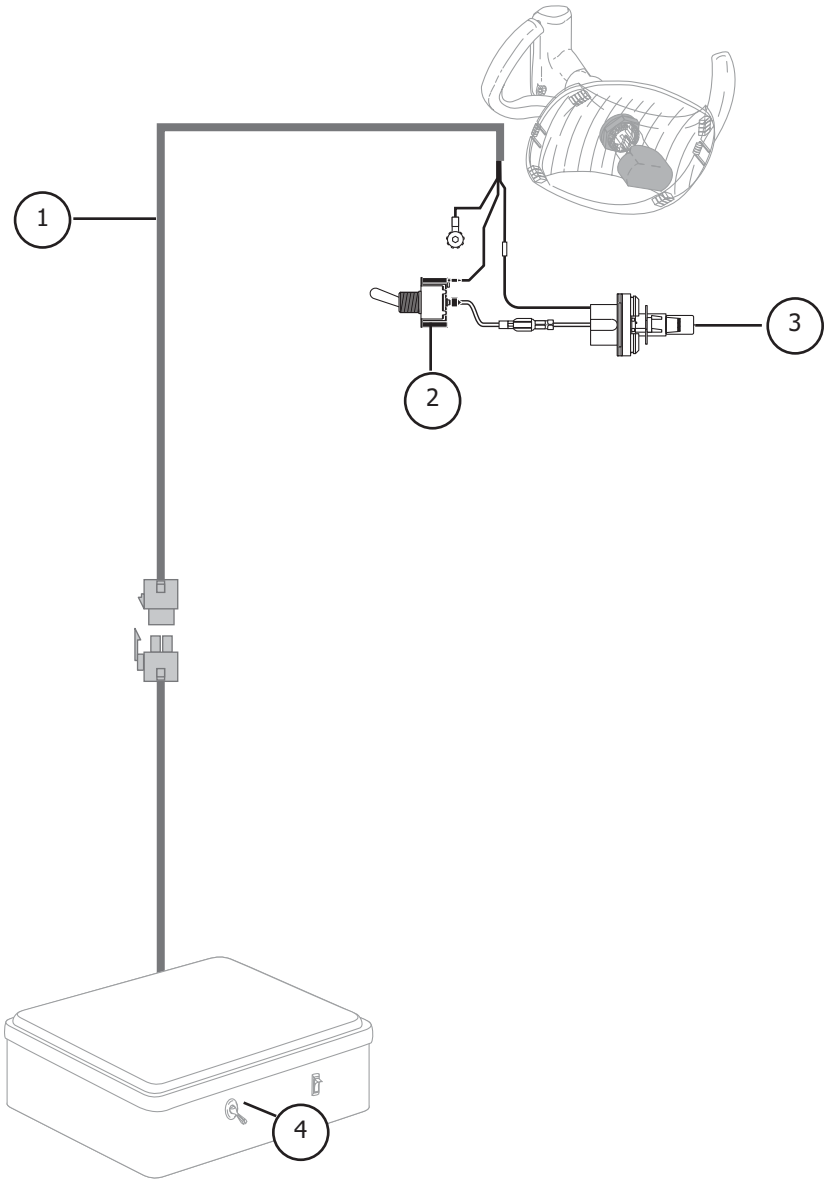
Reinstall the chair seat /toeboard upholstery.



Dental Light

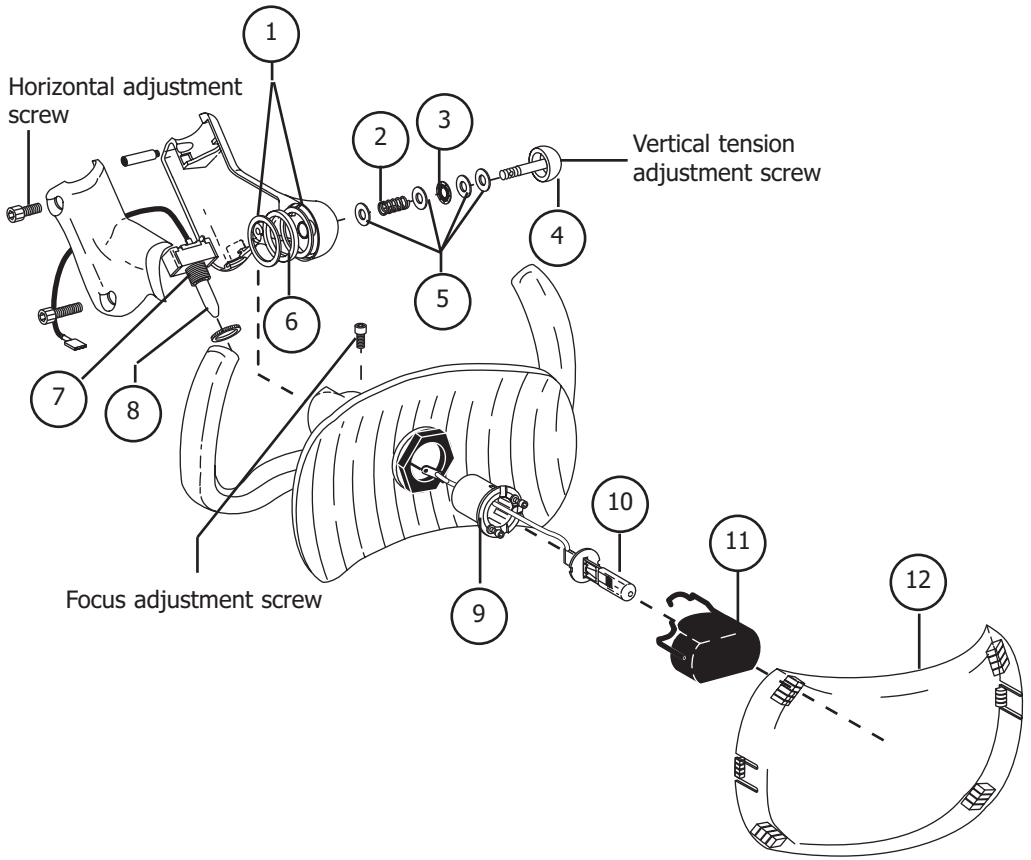
Item #	Part Number	Description
1	90.1054.00	Cable assembly
2	90.1039.00	Toggle switch kit
3	041.513.00	12 volt, 55-watt halogen bulb
4	90.1045.00	Kit, Light intensity rocker switch with cable

NOTE: Dental light connections are made in the cuspidor/assistant's housing, the chair junction box, and the floor box. Refer to the appropriate section for all connector locations.



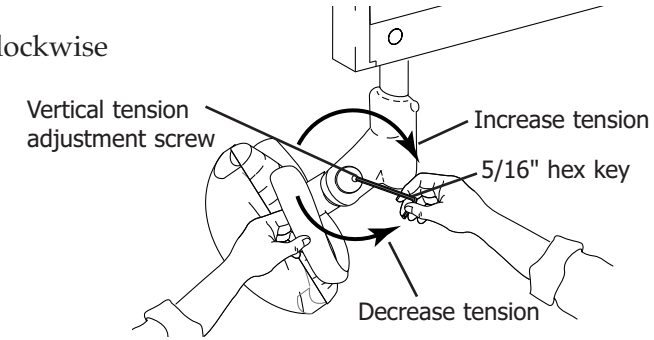
Dental Light

Item #	Part Number	Description
1	004.207.00	Washer, flat
2	013.100.00	Spring
3	016.054.00	Bearing, thrust
4	28.1172.00	Compression bolt
5	016.053.00	Washer, thrust
6	28.1175.01	Washer, thrust
7	90.1039.00	Toggle switch kit
8	28.1188.00	Handle, On/Off switch
9	28.1289.00	Bulb socket and insulation
10	041.513.00	12 volt, 55-watt halogen bulb
11	28.1213.00	Bulb cap assembly
12	28.1166.00	Reflector shield



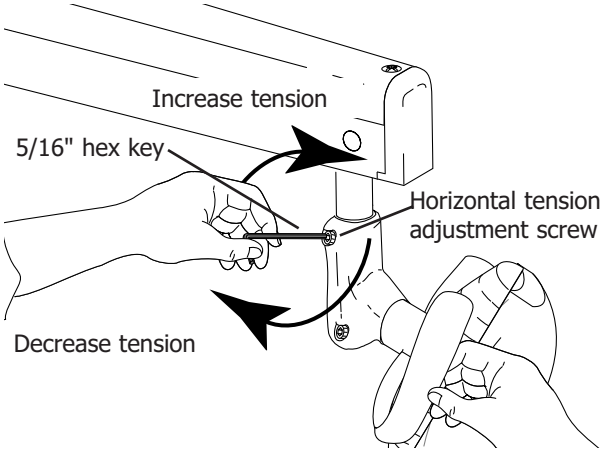
Adjusting the Light Head Vertical Tension

Turn the vertical tension adjustment screw clockwise to increase tension. Turn counterclockwise to decrease tension.



Adjusting the Light Head Horizontal Tension

Turn the horizontal tension adjustment screw clockwise to increase tension. Turn counterclockwise to decrease tension.

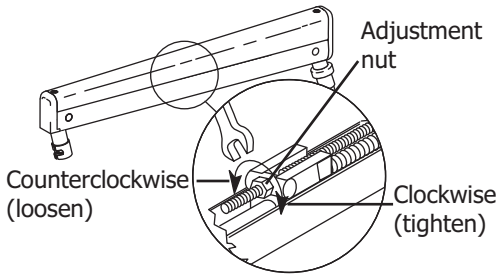


Focusing the Light

Loosen the focus adjustment screw. Move the bulb socket in or out of the reflector housing until the light is focused. Tighten the focus adjustment to fully secure the bulb socket.

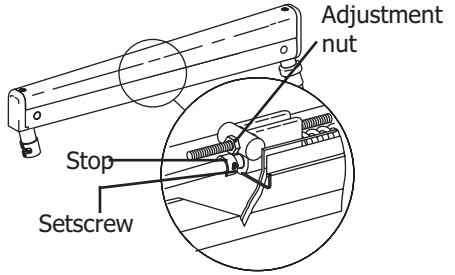
Adjusting the Flexarm

Remove the screw from the rear end cap, then remove the front end cap and cover from the arm. Using a 1/2" open end wrench, turn the tension adjustment nut inside the arm. If the arm moves too easily, it tends to drift up or down by itself, tighten the nut by turning it clockwise. If the arm tension is too stiff, loosen the nut by turning it counterclockwise.



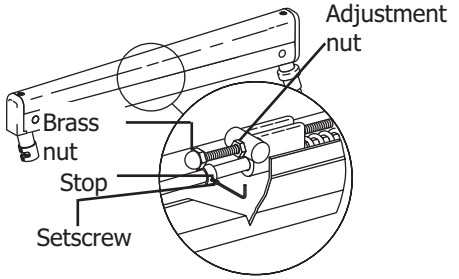
Adjusting the Flexarm Travel (Limit Up)

The upward motion of the flexarm can be adjusted by adding a Travel Stop Limit Kit (P/N 90.1044.00). To order this kit contact A-dec customer service at 1-800-547-1883.



Adjusting the Flexarm Travel (Limit Down)

The downward motion of the flexarm can be adjusted by adding a Travel Stop Limit Kit (P/N 90.1044.00). To order this kit contact A-dec customer service at 1-800-547-1883.



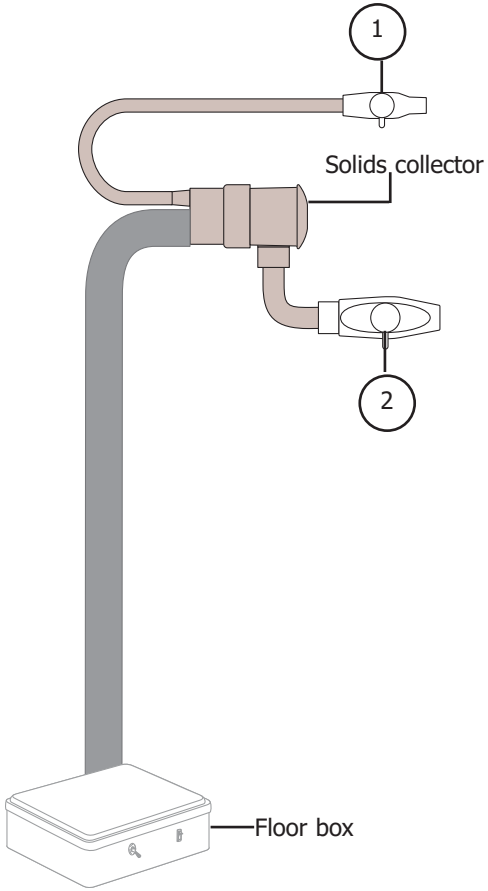
Troubleshooting Dental Lights

Tips and troubleshooting information are listed to assist in distinguishing dental light problems.

Problem	Action
No light	Follow these steps to fix the dental light. **Task** **Description** 1 Make sure the system is plugged in and turned ON. 2 Check the 80-watt power supply for power. 3 Check the bulb, replace if necessary. 4 Check all the light wire harness connections. 5 Check voltage intensity and On/Off switches. 6 Check the voltage at the bulb.
Dim light	Follow these steps to fix the dental light. 1 Check cleanliness of bulb, shield, and reflector. 2 Check the bulb, replace if necessary. 3 Check intensity switch voltages. 4 Check 80-watt power supply output voltage.

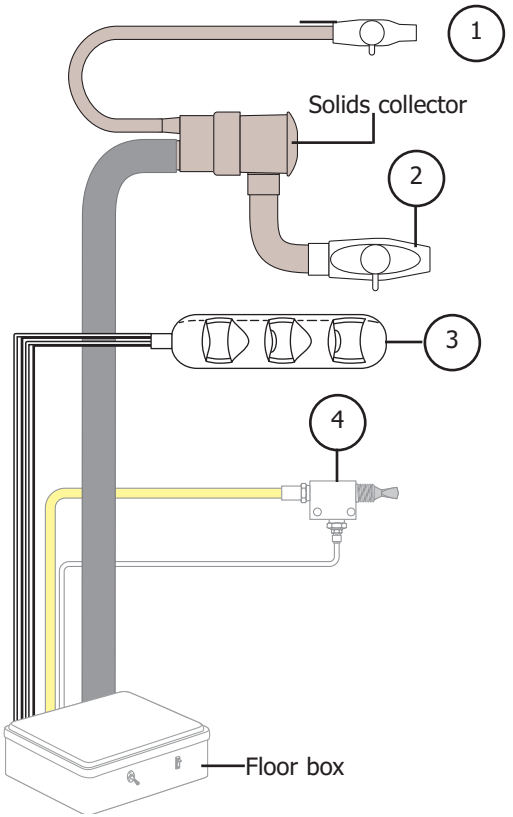
Cuspidor for Central Vacuum

Item #	Part Number	Description
1	12.0910.06	Autoclavable saliva ejector with 7' tubing
2	11.1025.02	Autoclavable HVE with 7' tubing



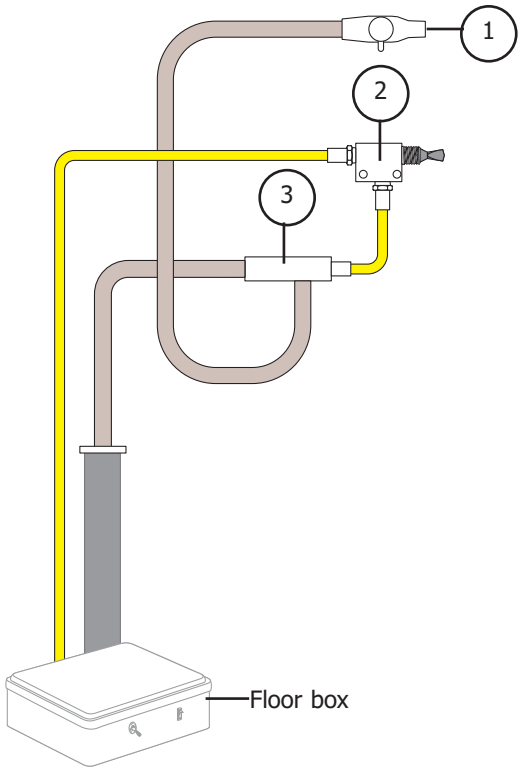
Cuspidor (Single Operatory Vacuum)

Item #	Part Number	Description
1	12.0910.06	Autoclavable saliva ejector with 7' tubing
2	12.1132.00	Autoclavable HVE with 7' tubing
3	12.1122.00	Auto-electric holder, 3-position (after Nov 1997)
4	12.1071.00	3-way valve assembly (before Nov 1997)



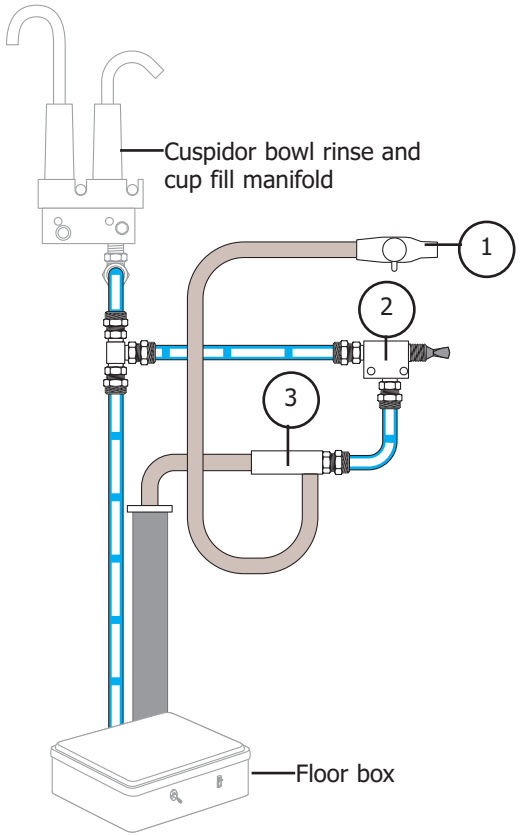
Cuspidor with Air Saliva Ejector

Item #	Part Number	Description
1	12.0910.06	Autoclavable saliva ejector with 7' tubing
2	12..1070.00	2-way valve assembly
3	11.1105.00	Air saliva ejector



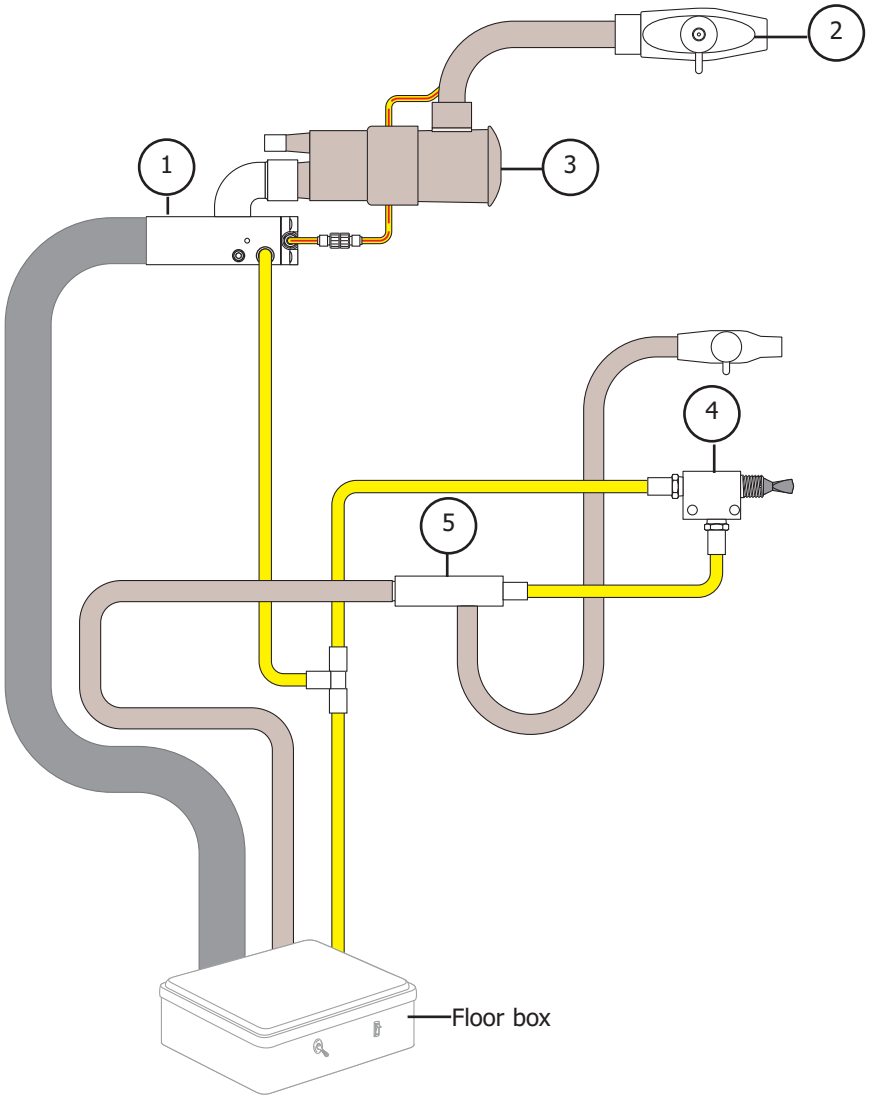
Cuspidor with Water Saliva Ejector

Item #	Part Number	Description
1	12.0910.06	Autoclavable saliva ejector with 7' tubing
2	12..1073.00	2-way valve assembly
3	12.0500.00	Water saliva ejector



Cuspidor with Air Saliva Ejector, Air Vacuum Generator and AVS

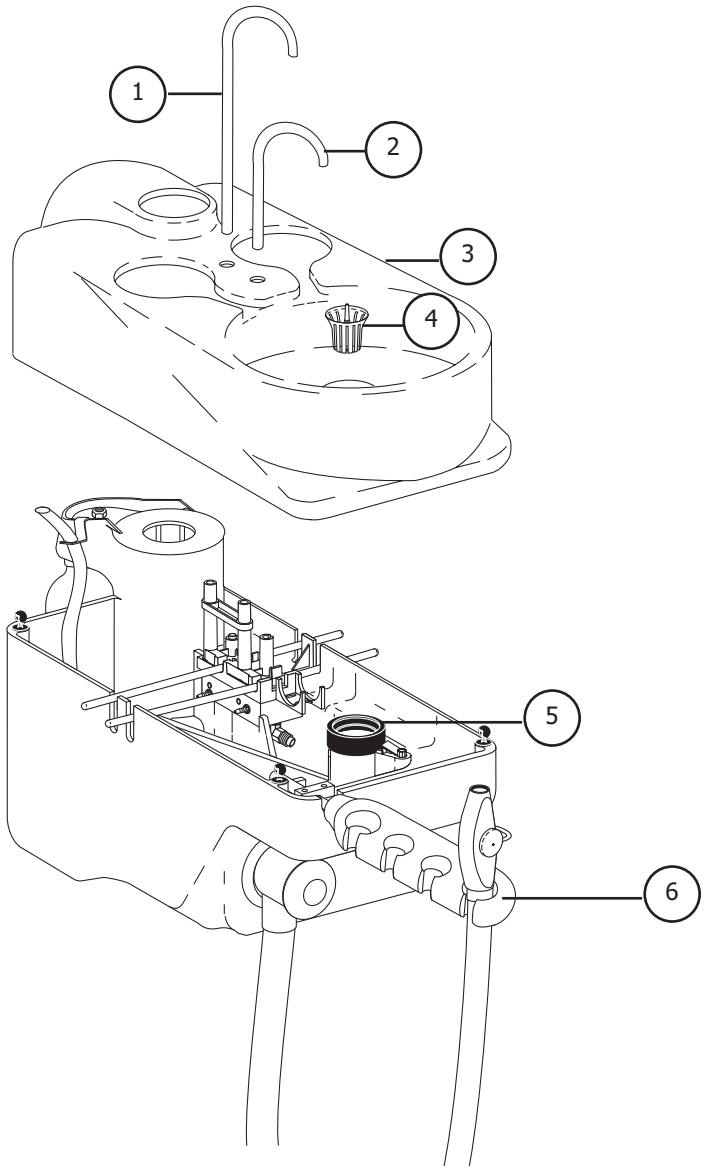
Item #	Part Number	Description
1	11.1100.00	Air vacuum generator
2	11.1127.01	Performer AVS with 7' tubing
3	12.0910.06	Autoclavable saliva ejector with 7' tubing
4	12.1070.00	2-way valve assembly
5	11.1105.00	Air saliva ejector



Performer Cuspidor Assembly

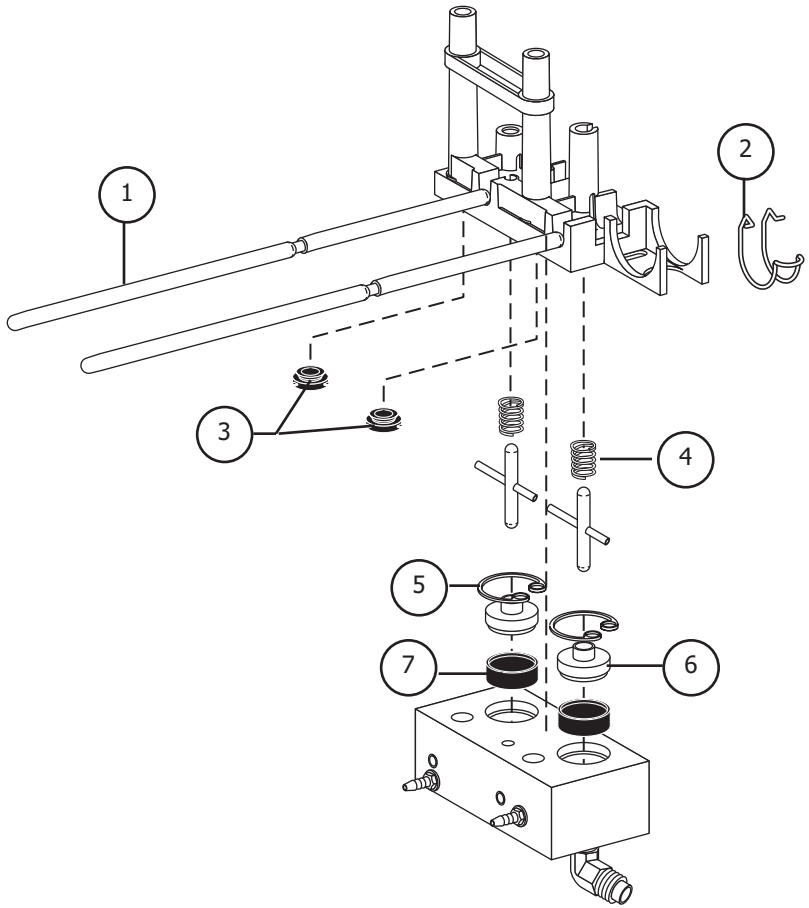
Item #	Part Number	Description
1	12.0985.00	Cup fill spout
2	12.0986.00	Bowl rinse spout
3	76.2011.00	Cuspidor/bowl assembly
4	75.0035.01	Bowl screen pkg 5
5	12.0991.00	Drain seal
6	12.1020.00 12.1056.00 99.0584.00 12.1207.00 12.1210.00	Holder, 3-position, fixed Holder, 4-position, fixed Holder, single, assistant's, fixed Holder, 4-position, rotating Holder, 3-position, rotating

NOTE: The spout(s) is not fully seated in the housing. Make sure the spout is fully installed.



Cuspidor Bowl Rinse and Cup Fill Manifold

Item #	Part Number	Description
1	12.0977.01	Activator rod pkg 2
2	12.1016.00	Clip
3	12.0988.00	Water spout seal
4	013.004.00	Spring
5	010.045.02	Retaining ring, internal pkg 10
6	12.0983.00	Diaphragm retainer
7	12.0982.01	Diaphragm, water manifold



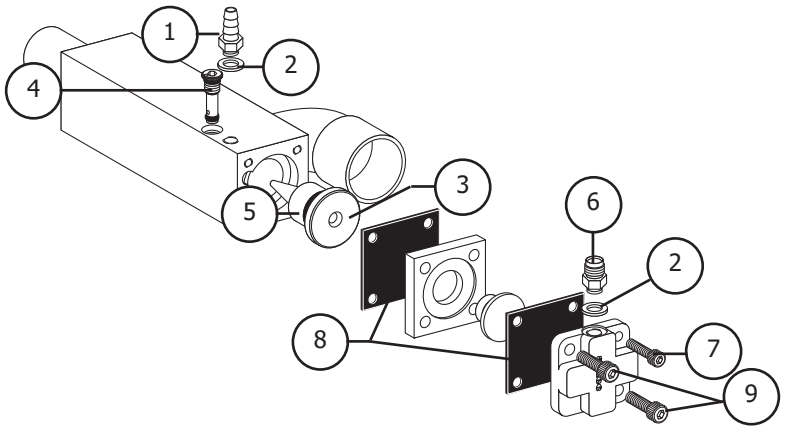
Troubleshooting Cuspidors

Tips and troubleshooting information are listed to assist in distinguishing cuspidor problems.

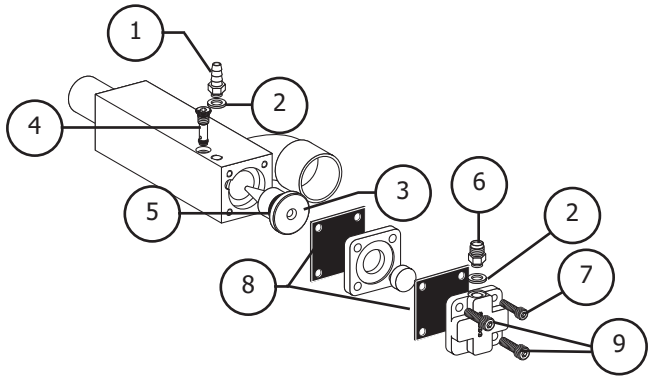
Problem	Action
Spout(s) eject from cuspidor housing	The spout(s) is not fully seated. Make sure the spout is fully installed and test again.
Cup fill or bowl rinse run continuously	Follow these points to stop the cup fill or bowl rinse from continuously running. • Replace the activator rod, if bent. • Replace the spring.
Water leaks from the spout tips or from the cuspidor housing	Follow these points to stop leakage from the spout tips or cuspidor housing. • Replace the diaphragm(s). • Replace the spring(s).
Water seeps around the spouts	Follow these points to stop leakage from the spout. • Check the spouts to make sure they are fully seated. • Replace the water spout seals.
No water	Follow these steps to correct a no water problem. **Task** **Description** 1 Make sure the water shutoff valve is fully turned ON. 2 Check supply lines and pinch valves. 3 Check for plugged passages.

Air Vacuum Generator

Item #	Part Number	Description
1	023.001.03	Barb, 1/4 " pkg 10
2	004.005.02	Washer pkg 10
3	11.1085.00	Jet
4	38.0517.00	Air bleed cartridge without o-ring
5	030.012.02	O-ring pkg 10
6	023.089.00	Quick disconnect, 1/8" female
7	001.021.00	Screw
8	22.0440.02	Diaphragm pkg 10
9	001.042.00	Screw



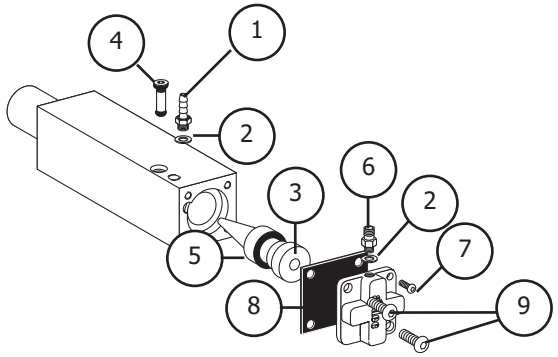
11.1100.00
Used in 76.2310.00 Cuspidors
after November 1995



11.1100.00
Used in 76.2300.00 Cuspidors
between August 1995 to November 1995

Air Vacuum Generator

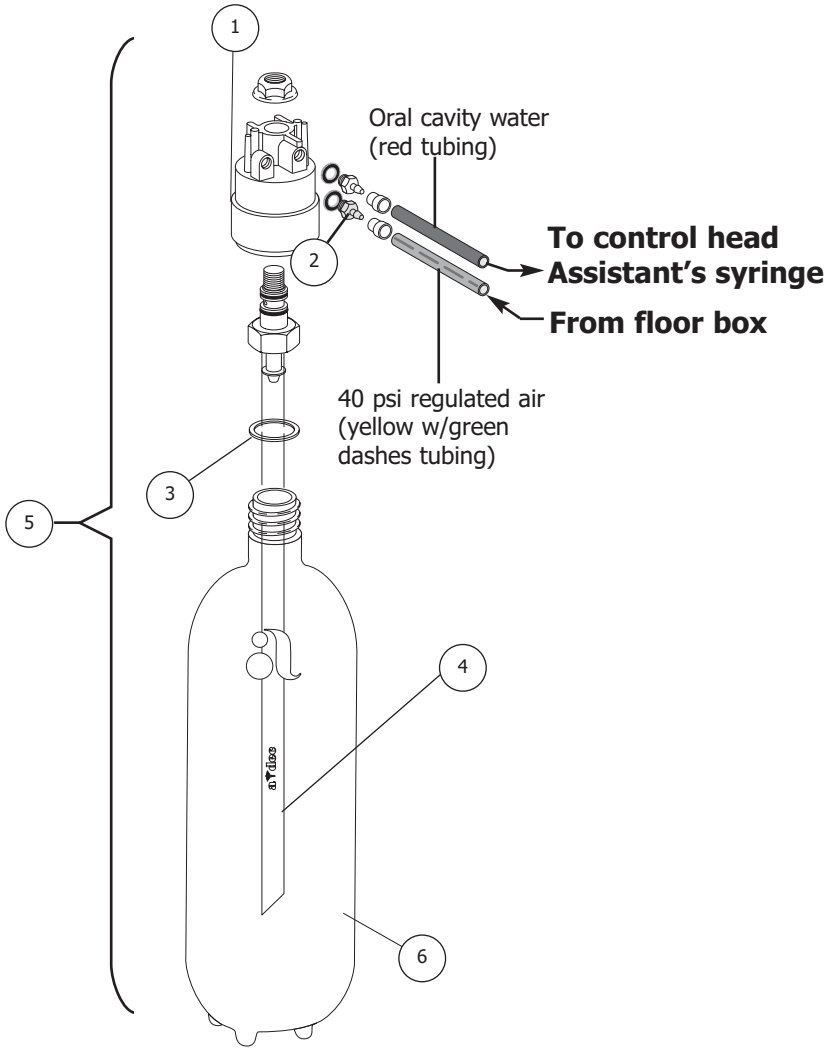
Item #	Part Number	Description
1	023.001.03	Barb, 1/4" pkg 10
2	004.005.02	Washer pkg 10
3	11.1085.00	Jet
4	38.0517.l00	Air bleed cartridge without o-ring
—	38.0735.00	Air bleed cartridge without o-ring
5	030.012.02	O-ring pkg 10
6	023.089.00	Quick disconnect, 1/8" female
7		Screw
8	22.0440.02	Diaphragm pkg 10
9		Screw



11.1100.00 **Used in 76.2300.00 Cuspidors between April 1995 to August 1995**

Self-Contained Water System

Item #	Part Number	Description
1	14.0408.00	Cap assembly replacement
2	023.070.00	Restrictor barb
3	004.137.00	Washer
4	14.0332.01	Pick up tubes, pkg 6
5	14.0416.00	Self-contained water service kit
6	90.0460.00	Water bottle pkg 2 with caps



Self-Contained Water Supply System

Troubleshooting Air Vacuum Generator

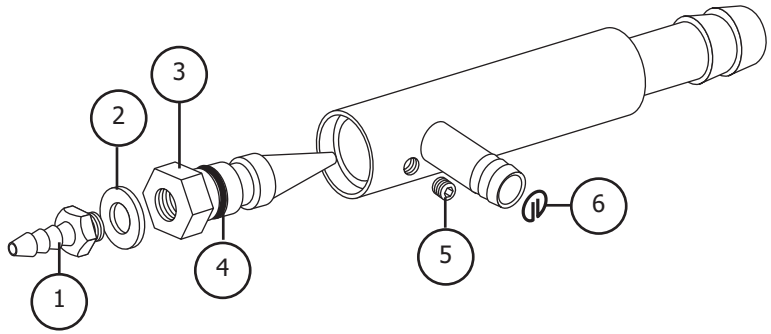
Tips and troubleshooting information are listed to assist in distinguishing air vacuum generator problems.

Problem	Action
Air leakage at the cap	Follow these steps to correct air leakage at the cap. **Task** **Description** 1 Replace the diaphragm. 2 Replace the jet o-ring. 3 Replace the bleed cartridge.
Air leakage at the vacuum body	Follow these points to correct air leakage at the vacuum body. • Clean the jet. • Replace the jet.
No vacuum	Follow these points when there is no vacuum. • Replace the air bleed cartridge. • Replace the diaphragm.

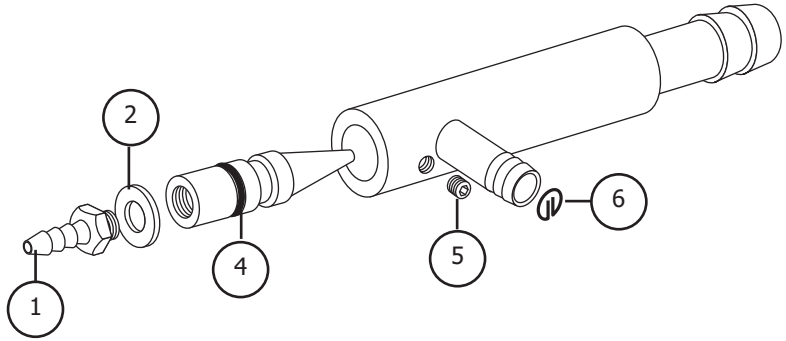
Problem	Action
Vacuum will not shut off	Follow these points when vacuum will not shut off. • Replace the o-ring. • Replace the jet.
Air leakage at the jet	Follow these points if there is air leakage at the jet. • Replace the o-ring. • Replace the jet.

Air Saliva Ejector

Item #	Part Number	Description
1	023.001.03	Barb, 1/4" pkg 10
2	004.005.02	Washer pkg 10
3	11.1108.00	Jet
4	030.010.02	O-ring pkg 10
5	007.002.01	Setscrew pkg 10
6	11.1111.01	Screen, spring clip pkg 5



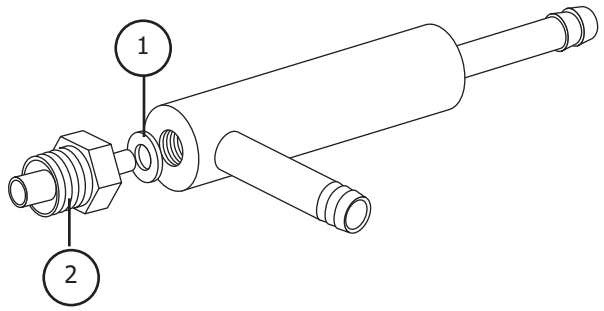
11.1105.00 **Used in 76.2110.00 and 76.2310.00 Cuspidors after July 1995**



11.1105.00 **Used in 76.2110.00 and 76.2310.00 Cuspidors before July 1995**

Water Saliva Ejector

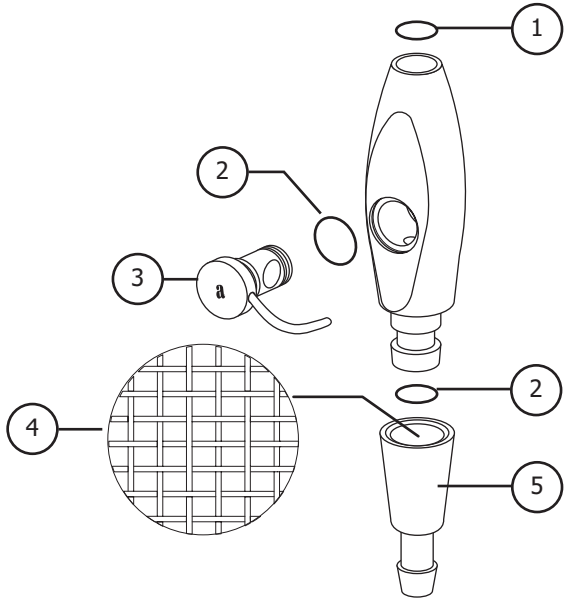
Item #	Part Number	Description
1	004.005.02	Washer pkg 10
2	12.0496.00	Nozzle, water saliva ejector



12.0500.00 Used in 76.2210.00 Cuspidors

Autoclavable Saliva Ejector

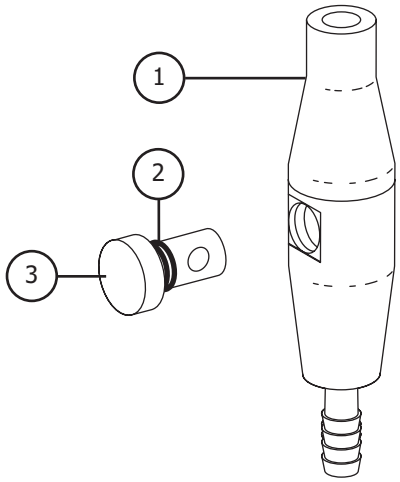
Item #	Part Number	Description
1	034.107.01	O-ring pkg 10
2	034.012.01	O-ring pkg 10
3	12.1093.00	Selector valve rotary
4	11.1235.01	Optional screen pkg 10
5	12.1088.00	Tailpiece



12.1100.00
12.0910.06 (with 7' Dark Surf Tubing)

Non-Autoclavable Saliva Ejector

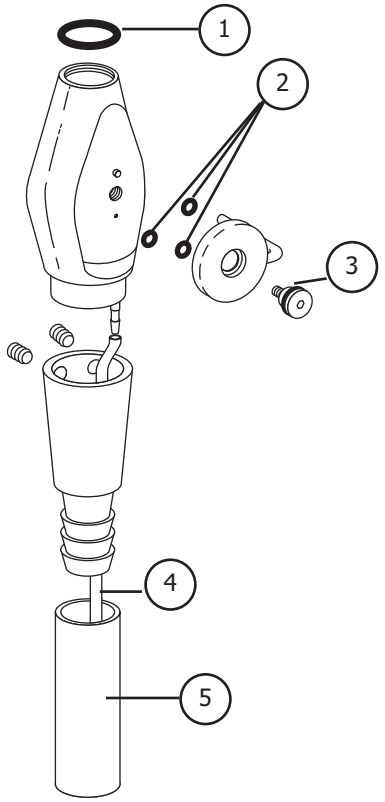
Item #	Part Number	Description
1	12.0183.00 12.0183.01	Tip holder, Black Tip holder, Gray
2	030.010.02	O-ring pkg 10
3	12.0182.00	Rotary Assembly



Only Serviceable Parts are Available

Non-Autoclavable Saliva Ejector

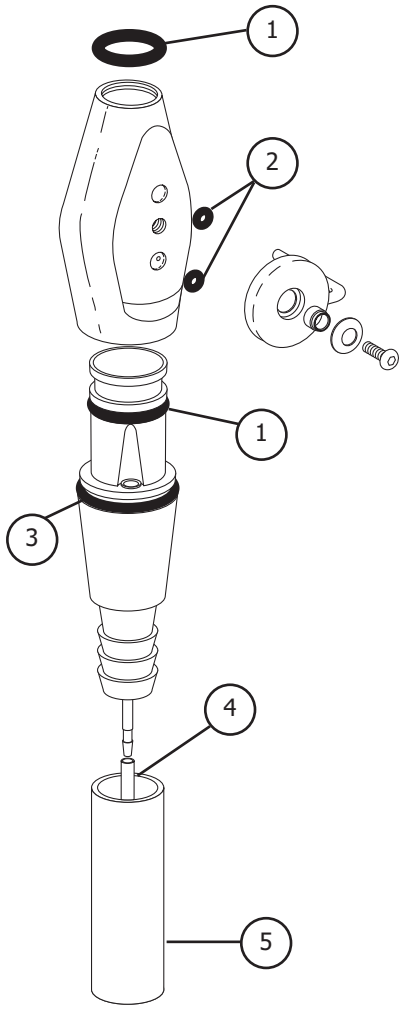
Item #	Part Number	Description
1	030.013.02	O-ring pkg 10
2	030.002.02	O-ring pkg 10
3	035.049.01	O-ring pkg 10
4	036.003.03	Yellow tubing, 1/8" OD
5	024.162.01	AVS tubing 1/2" ID



11.1127.01 Performer AVS with 7' Tubing (After October 1995)

Non-Autoclavable Saliva Ejector

Item #	Part Number	Description
1	030.013.02	O-ring (package of 10)
2	030.002.02	O-ring (package of 10)
3	030.017.00	O-ring
4	036.003.03	Yellow tubing 1/8" ID
5	024.162.01	AVS tubing 1/2" ID



Performer AVS (Before October 1995)

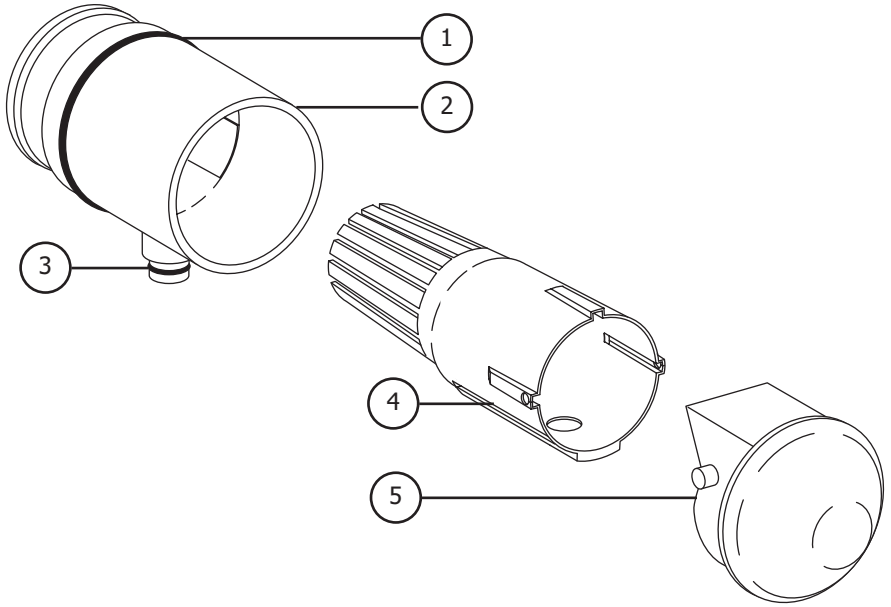
Troubleshooting Water Saliva Ejectors

Tips and troubleshooting information are listed to assist in distinguishing water saliva ejector problems.

Problem	Action
Water leakage at the saliva ejector body	Follow these points when water is leaking from the saliva ejector body. • Tighten the nozzle. • Replace the washer.

Single HVE Solids Collector

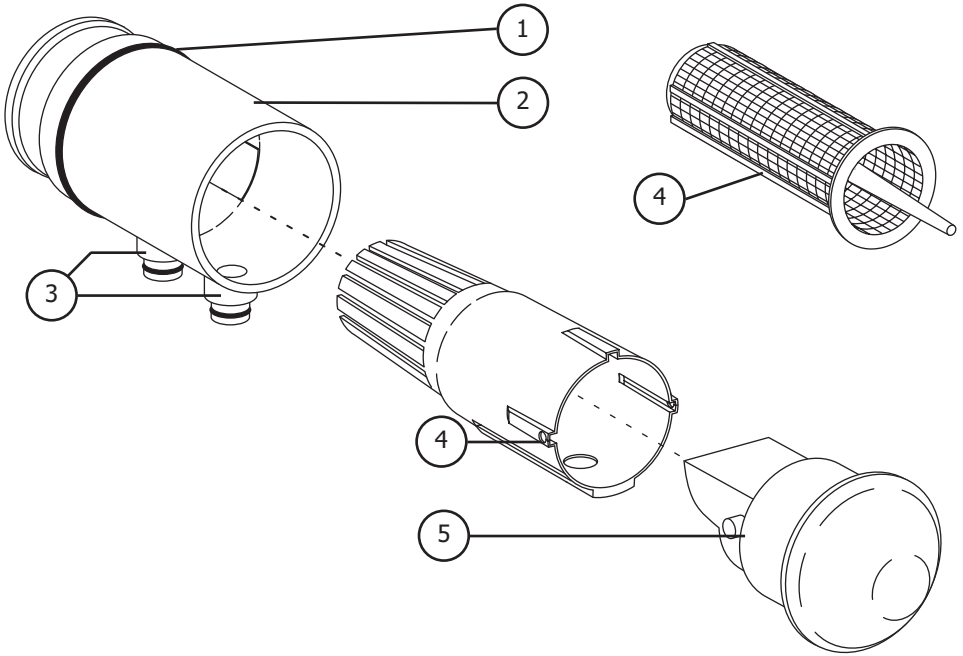
Item #	Part Number	Description
1	030.027.01	O-ring pkg 10
2	75.0078.00	Vacuum canister, single
3	030.014.02	O-ring pkg 10
4	11.1007.00	Vacuum screen
5	11.1016.00	Vacuum cap
—	11.1017.00	Vacuum cup and screen kit



Single HVE Solids Collector

Dual HVE Solids Collector

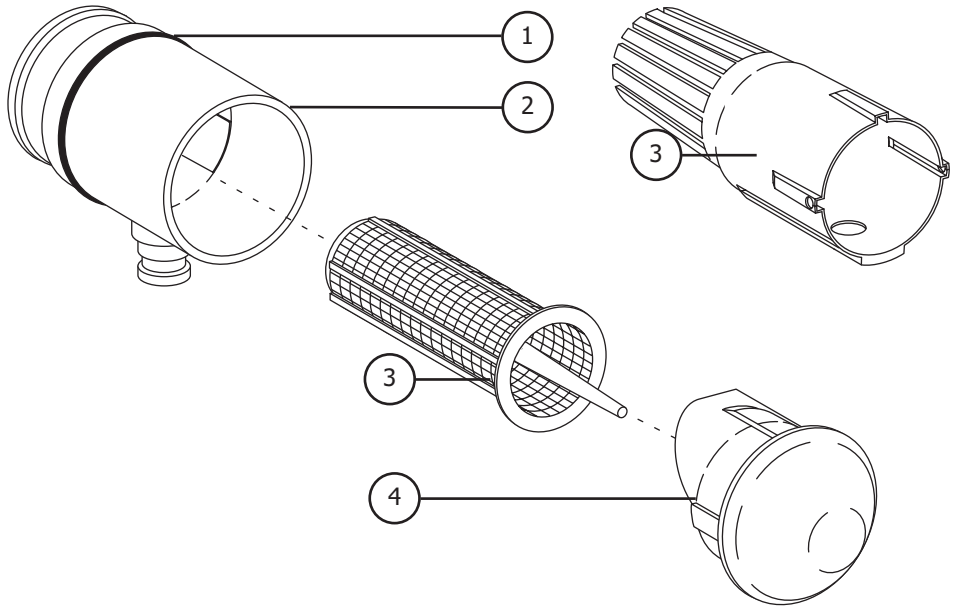
Item #	Part Number	Description
1	030.027.01	O-ring pkg 10
2	75.0932.00	Vacuum canister, dual
3	030.014.02	O-ring pkg 10
4	11.1007.00 11.1191.00	Vacuum screen Vacuum screen, Pinnacle
5	11.1018.00	Vacuum cap
—	11.1019.00	Dual vacuum cap and vaccum screen



Dual HVE Solids Collector

15mm HVE Cascade Solids Collector

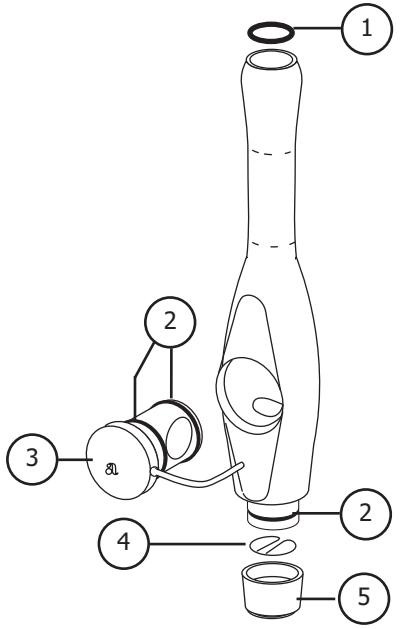
Item #	Part Number	Description
1	030.027.01	O-ring pkg 10
2	12.1123.00	Vacuum canister, 15mm
3	11.1191.00 11.1007.00	Vacuum screen, Pinnacle Vacuum screen
4	11.1192.00	Vacuum cap



15mm HVE Cascade Solids Collector

Autoclavable HVE with Long Tip Holder

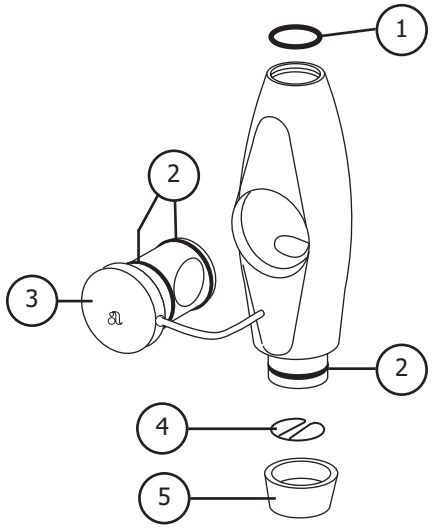
Item #	Part number	Description
1	034.013.01	O-ring pkg 10
2	034.014.01	O-ring pkg 10
3	11.1074.00	Rotary assembly
4	11.0998.01	Screen pkg 5
5	11.1027.00	Tailpiece, Dark Surf



11.1177.00
11.1178.00 (with 7' Dark Surf Tubing)

Autoclavable HVE

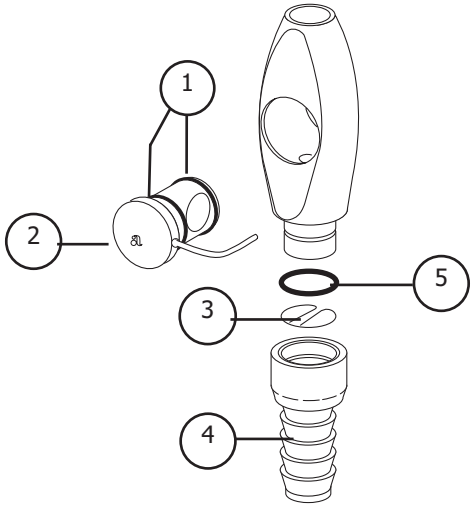
Item #	Part number	Description
1	034.013.01	O-ring pkg 10
2	034.014.01	O-ring pkg 10
3	11.1074.00	Rotary assembly
4	11.0998.01	Screen pkg 5
5	11.1027.00 11.0989.00	Tailpiece, Surf Tailpiece, Gray



11.1075.00
11.1025.02 (with 7' Dark Surf Tubing)

Autoclavable with 15mm HVE

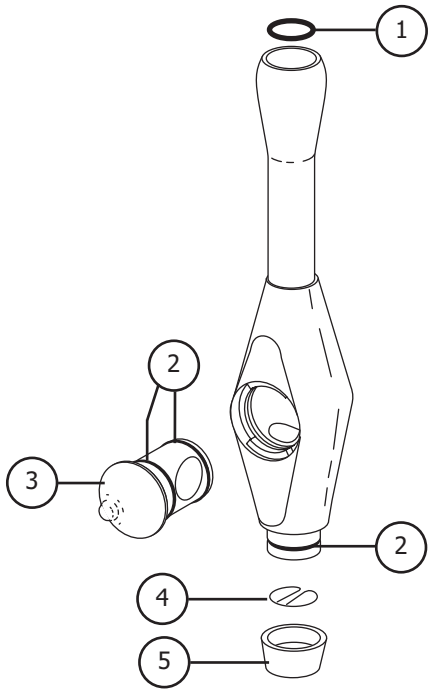
Item #	Part Number	Description
1	034.019.01	O-ring pkg 10
2	12.1116.00	Rotary assembly
3	12.1109.01	Screen pkg 5
4	12.1121.00	Tailpiece
5	034.018.02	O-ring pkg 10



12.1125.00
12.1132.00 (with 7' Tubing)

Non-Autoclavable Easy-Clean HVE with Long Tip Holder

Item #	Part Number	Description
1	030.013.02	O-ring pkg 10
2	030.014.02	O-ring pkg 10
3	11.0983.00	Rotary assembly
4	11.0998.01	Screen pkg 5
5	11.1027.00 11.0989.00	Tailpiece, Surf Tailpiece, Gray

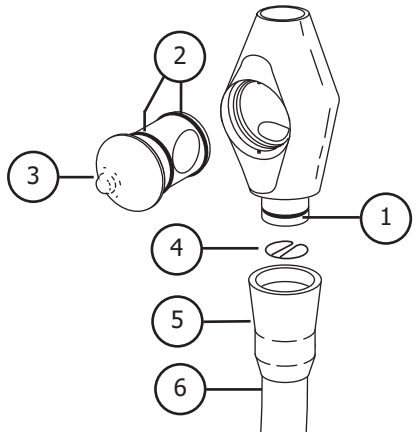


Only Service Parts are Available

Easy-Clean HVE for 15mm Valve

(Non-Autoclavable)

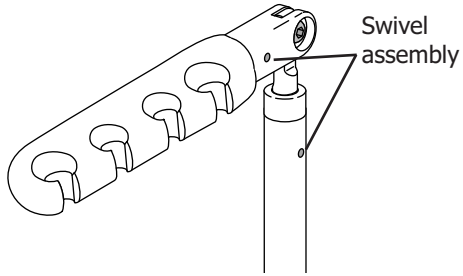
Item #	Part Number	Description
1	030.014.02	O-ring pkg 10
2	030.016.02	O-ring pkg 10
3	11.0994.00	Rotary assembly
4	11.0998.01	Screen pkg 5
5	11.099200	Tailpiece
6	024.177.01	Tubing, 5 mm, Dark Surf



Only Service Parts

Adjusting Holder Tension

Locate the holder tension adjustment setscrews on the holder and the assistant's arm. Adjust the setscrew tension until the desired resistance is achieved.

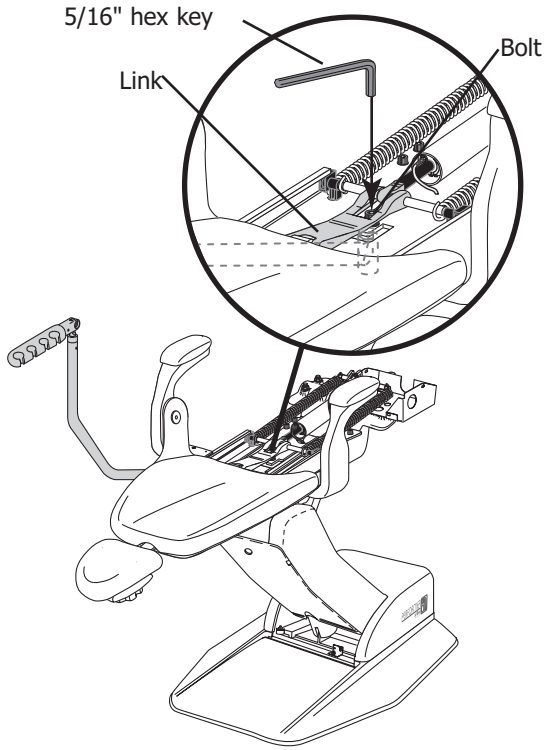


Adjusting Tension on Assistant's Arm

Remove the chair seat/toeboard upholstery. Lower the chair back to nearly full down so that the gap in the link arm aligns with the mounting hole. Locate the assistant's arm mounting bolt. Turn the bolt until the desired tension is achieved.

- Clockwise to tighten
- Counterclockwise to loosen

Reinstall the chair seat/toeboard upholstery. Return the chair to the exit/entry position (back up/base down) by pressing "0" on the footswitch or touchpad.



Troubleshooting Assistant's Instrumentation

Tips and troubleshooting information are listed to assist in distinguishing assistant's instrumentation problems.

Problem	Action
Water or vacuum leakage at HVE valve	Follow these points to correct water or vacuum leakage at the HVE valve. • Ensure rotary assembly is fully inserted into the o-ring groove side of the HVE valve body. • Replace the o-rings.
Water or vacuum leakage at any of the assistant's instrumentation	Follow these points to correct water or vacuum leakage from the assistant's instrumentation. • Ensure rotary assembly is fully inserted into the saliva ejector body. • Replace the o-rings.
Water pressure is low	Follow these steps to correct low water pressure. **Task** **Description** 1 Make sure air supply to the cap assembly is 40 psi. 2 Make sure the restricter barb (brass) is not plugged. Replace, if plugged. 3 Check the cap for damage. Replace if damaged or brittle.

Problem	Action
Air leaks from bottle/cap	Follow these steps to correct air leaks from the bottle/cap. 1 Make sure bottle is tight. 2 Check bottle threads for wear. 3 Make sure the 40 psi air supply tubing (yellow with green dashes) is not damage. 4 Check the restricter barb for leakage at the cap.

Conclusion

Thank you for taking time to use the *A-dec Service Guide*. We would appreciate any feedback or comments you have about this document.

Please mail, email or phone us with your concerns. You can reach us at:

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