

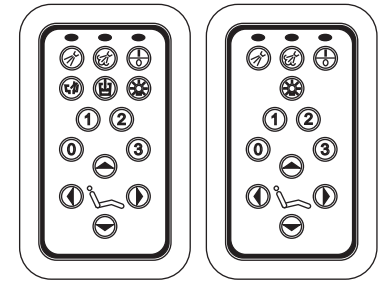
The Cascade Master Series option consists of five components, which control standard chair and delivery system functions. These components include: master touchpad, master 17-watt power supply, master circuit board, solenoid valve manifolds, and master dental light air-electric switches. This section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

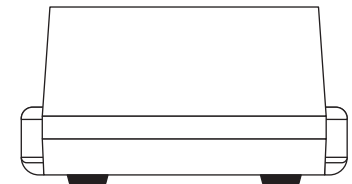
The master touchpad controls low voltage electrical signals that activate chair functions in the same manner as the standard chair touchpad. It also sends low voltage electrical signals to a bank of solenoid valves, which control the air pilot signals used to activate various delivery system functions,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



Master Touchpads

Master 17-Watt Power Supply

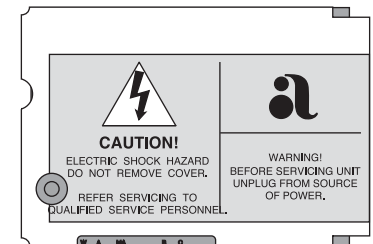
The master 17-watt power supply connects directly to the power mains and provides power to the master circuit board.



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.



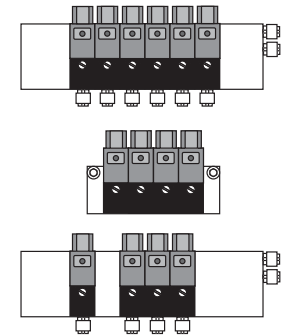
Master Circuit Boards

Cascade Master Series

Components

Solenoid Valve Manifolds

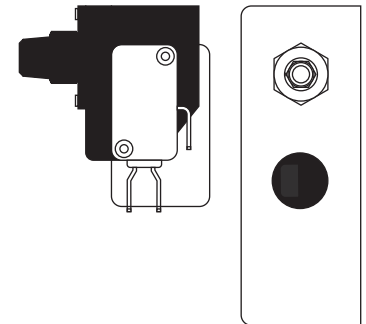
The solenoid valve manifolds can contain a maximum of six normally closed solenoids, which control the pilot air signals used to activate standard Cascade unit and cuspidor functions. Each solenoid valve receives an electrical signal from the master circuit board, which causes it to open (no signal causes 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

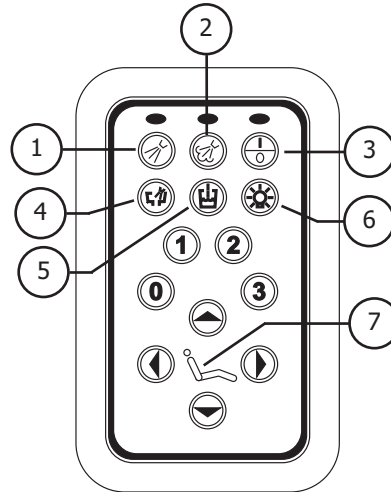
The master dental light air-electric switch is connected in the common return for the light. It receives a pilot air signal from the solenoid valve manifold. This signal closes the normally open switch, which completes the electrical circuit, allowing the dental lamp to light.



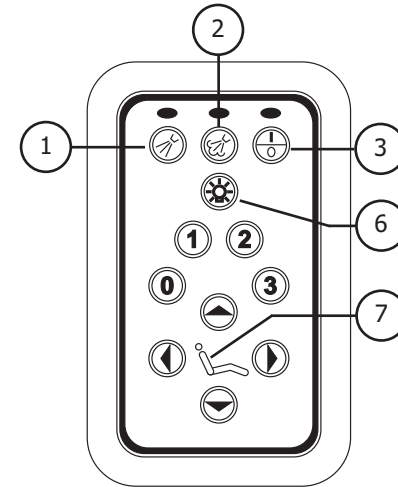
Master Dental Light Air-Electric Switches

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**

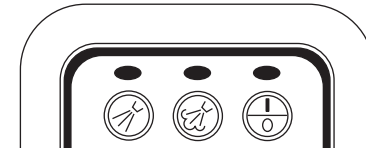
Using the Master Touchpad

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 Controls (HC)* for adjustment instructions.

Coolant Water On/Off



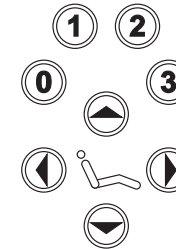
Water coolant to the handpieces is turned ON or OFF when this button is pressed. An electrical signal is sent from the touchpad to the circuit board, which opens the water coolant signal solenoid, allowing the water coolant signal air to flow to the handpiece control block. This opens the water valve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

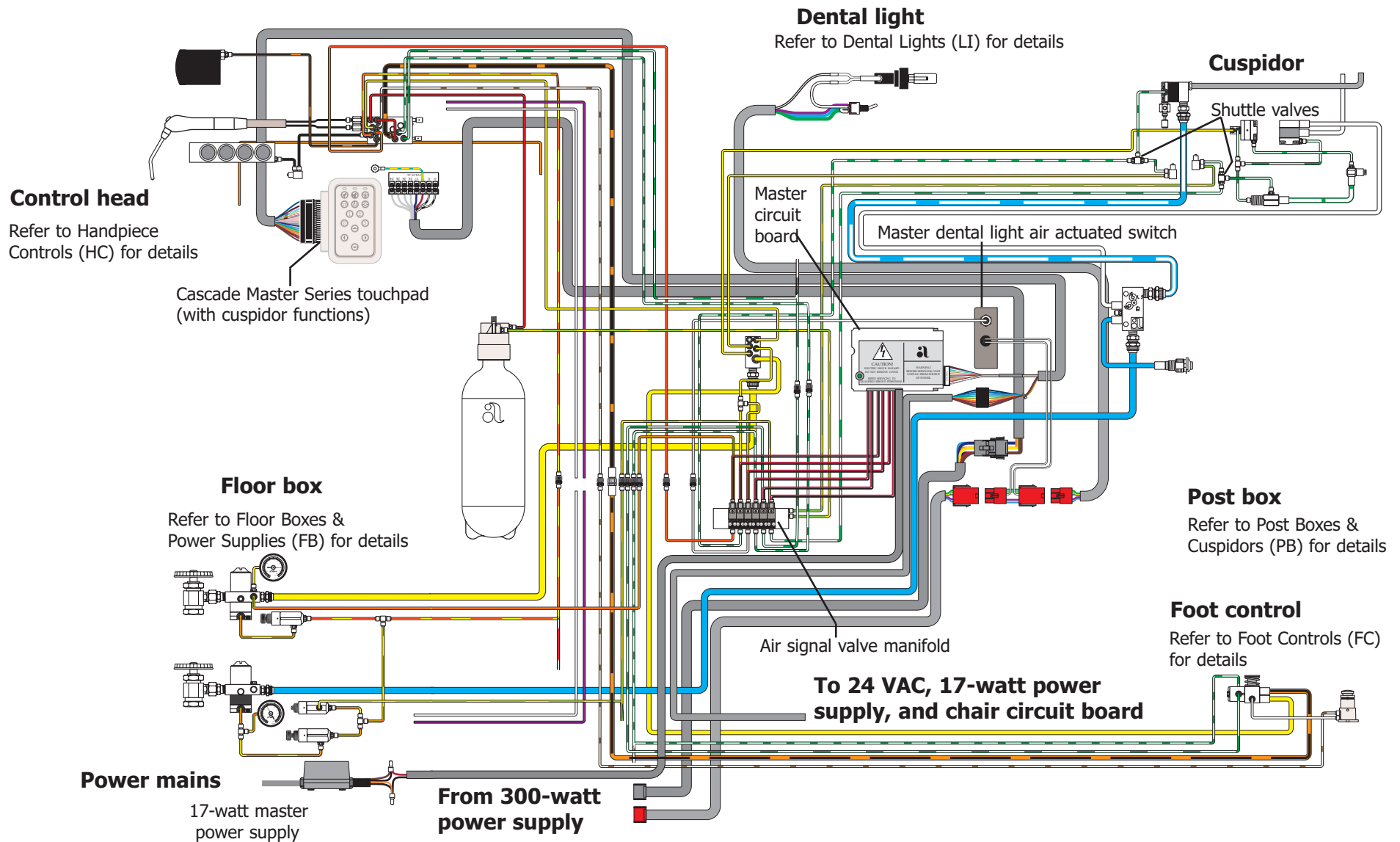
Cuspidor Bowl Rinse



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.

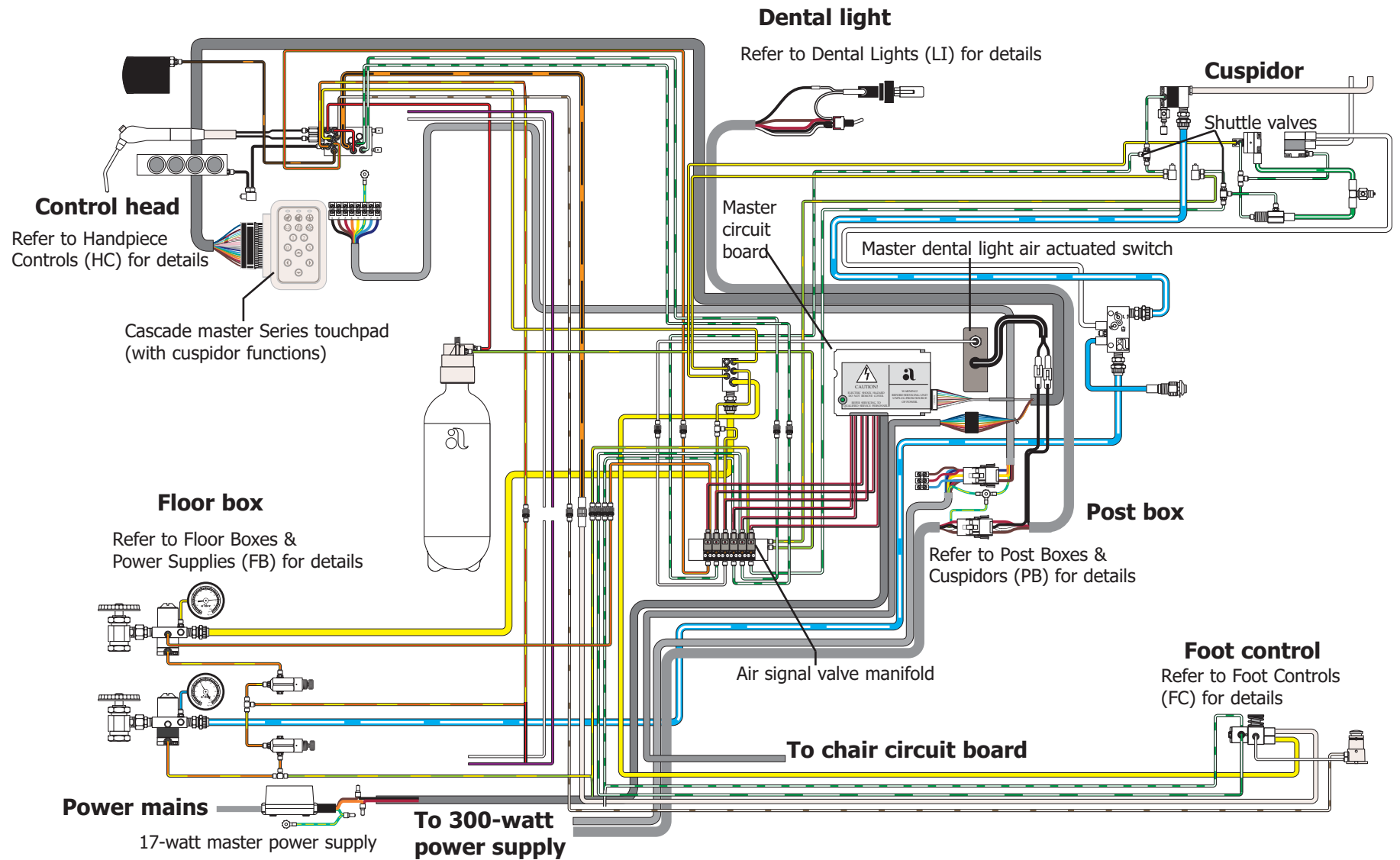
Cascade Master Series

Cascade Delivery System Flow Diagram After November 1999



Cascade Master Series

Cascade Delivery System Flow Diagram Before November 1999

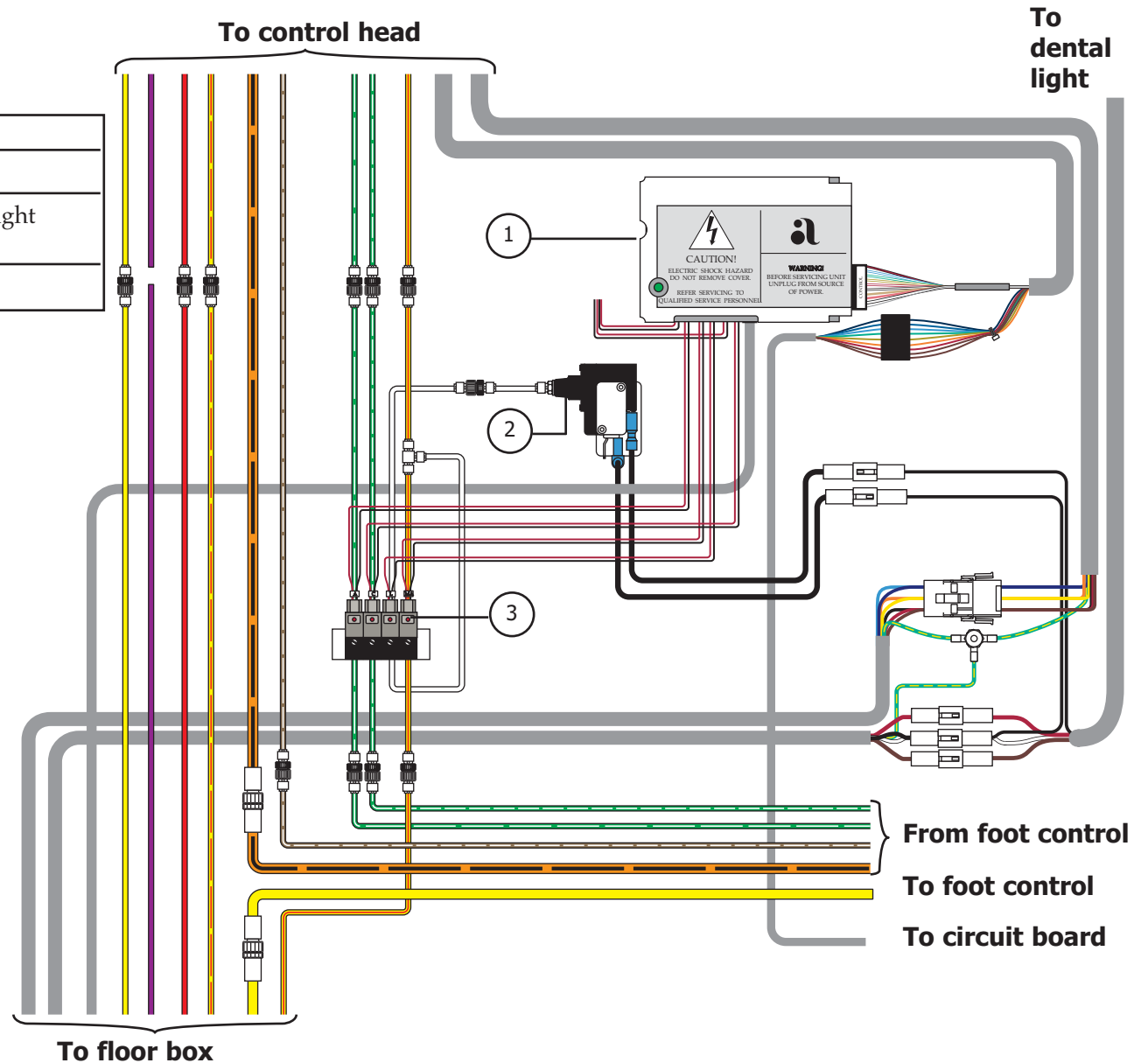


Cascade Master Series

Radius Delivery System Flow Diagram

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

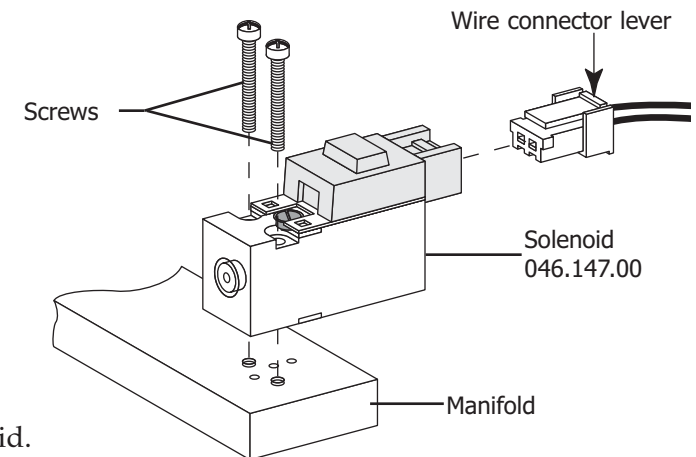
To remove a solenoid:

- 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.

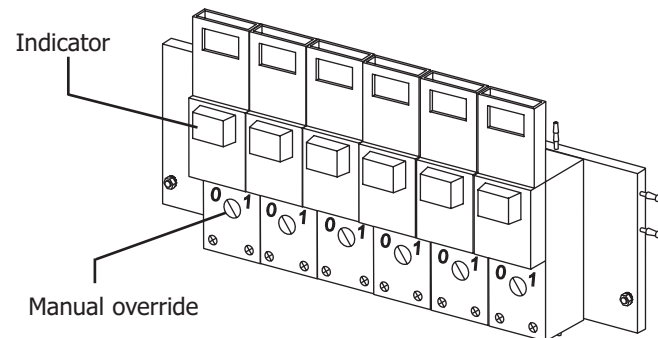
Opening a Solenoid

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	Action						
<p>The Master On/Off, coolant air, or coolant water touchpad function do not work</p>	<p>Manually open the function's solenoid. Refer to <i>Opening a Solenoid</i>.</p> <table border="1"> <thead> <tr> <th>If . . .</th> <th>Then . . .</th> </tr> </thead> <tbody> <tr> <td>Function doesn't work when the solenoid valve is manually opened</td> <td>Refer to <i>Handpiece Controls (HC)</i> for troubleshooting information.</td> </tr> <tr> <td>Function operates properly when the solenoid valve is overridden</td> <td>Refer to the specific function in this section.</td> </tr> </tbody> </table>	If . . .	Then . . .	Function doesn't work when the solenoid valve is manually opened	Refer to <i>Handpiece Controls (HC)</i> for troubleshooting information.	Function operates properly when the solenoid valve is overridden	Refer to the specific function in this section.
If . . .	Then . . .						
Function doesn't work when the solenoid valve is manually opened	Refer to <i>Handpiece Controls (HC)</i> for troubleshooting information.						
Function operates properly when the solenoid valve is overridden	Refer to the specific function in this section.						
<p>Cup fill and bowl rinse functions do not work from the touchpad</p>	<p>Activate the cup fill and bowl rinse functions by pressing the control buttons on the top of the cuspidor. Refer to <i>Post Boxes and Cuspidors</i>.</p> <div style="border: 2px solid black; padding: 10px; text-align: center;"> <p>CAUTION</p> <p>Do not override the cup fill or bowl rinse solenoids. This will cause water to continually flow at the cuspidor.</p> </div> <table border="1"> <thead> <tr> <th>If . . .</th> <th>Then . . .</th> </tr> </thead> <tbody> <tr> <td>Control buttons on top of the cuspidor do not work</td> <td>Refer to <i>Post Boxes & Cuspidors (PB)</i> for troubleshooting information.</td> </tr> <tr> <td>Control buttons on top of the cuspidor do work</td> <td>Refer to specific function in this section.</td> </tr> </tbody> </table>	If . . .	Then . . .	Control buttons on top of the cuspidor do not work	Refer to <i>Post Boxes & Cuspidors (PB)</i> for troubleshooting information.	Control buttons on top of the cuspidor do work	Refer to specific function in this section.
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Control buttons on top of the cuspidor do not work	Refer to <i>Post Boxes & Cuspidors (PB)</i> for troubleshooting information.						
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Problem

Dental light On/Off touchpad functions do not work

Action

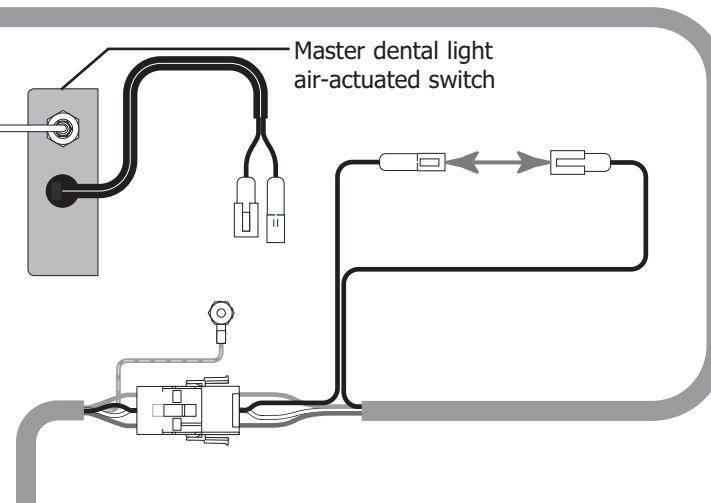
Follow these steps to determine the problem with the touchpad functions.

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.

To dental light

From dental light solenoid



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

Problem	Action												
Chair touchpad functions do not work	The Cascade Master Series touchpad chair functions are identical to the standard chair touchpad functions. Refer to <i>Chairs (CH)</i> for troubleshooting information.												
Unit does not work when the master On/Off control is pressed	<p>Check the Master circuit board. The LED should be ON.</p> <p>If the LED is OFF:</p> <p>Check the mains input voltage to the 17-watt power supply:</p> <ul style="list-style-type: none"> • 120 VAC should be +10% 50-60 Hz, .14 Amps • 230 VAC should be +10% 50-60 Hz, .07 Amps <table border="1"> <thead> <tr> <th>If . . .</th> <th>Then . . .</th> </tr> </thead> <tbody> <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> </tbody> </table> <p>Check the 17-watt power supply output voltage:</p> <ul style="list-style-type: none"> • It should be 22 VAC, 65 Amps. <table border="1"> <thead> <tr> <th>If . . .</th> <th>Then . . .</th> </tr> </thead> <tbody> <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> </tbody> </table>	If . . .	Then . . .	Main input voltage does not meet the above specification or is absent	Contact a local electrical contractor to correct the power condition.	Main input voltage does meet the above specification	Check the 17-watt power supply output voltage.	If . . .	Then . . .	Power supply output is 22 VAC	Master circuit board has malfunctioned and must be replaced.	Master 17-watt power supply output is not 22 VAC	17-watt power supply must be replaced.
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Power supply output is 22 VAC	Master circuit board has malfunctioned and must be replaced.												
Master 17-watt power supply output is not 22 VAC	17-watt power supply must be replaced.												

Problem	Action						
<p>Unit does not work when the master On/Off control is pressed</p>	<p>If LED is ON:</p> <p>Check air pressure being supplied to the unit. It should be 60 psi (minimum) at the floor box utilities.</p> <table border="1"> <thead> <tr> <th>If . . .</th> <th>Then . . .</th> </tr> </thead> <tbody> <tr> <td> <p>Air pressure meets specifications, and the selected function operates when solenoid is opened manually</p> </td> <td> <p>Replace the solenoid. Refer to <i>Replacing a Solenoid</i>.</p> </td> </tr> <tr> <td> <p>Air pressure does not meet the above specification</p> </td> <td> <p>Refer to <i>Floor Boxes & Power Supplies (FB)</i> for utility information.</p> </td> </tr> </tbody> </table>	If . . .	Then . . .	<p>Air pressure meets specifications, and the selected function operates when solenoid is opened manually</p>	<p>Replace the solenoid. Refer to <i>Replacing a Solenoid</i>.</p>	<p>Air pressure does not meet the above specification</p>	<p>Refer to <i>Floor Boxes & Power Supplies (FB)</i> for utility information.</p>
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<p>Air pressure does not meet the above specification</p>	<p>Refer to <i>Floor Boxes & Power Supplies (FB)</i> for utility information.</p>						
<p>Master dental light does not illuminate when the solenoid valve is manually opened</p>	<p>Check to see if the Master circuit board and the 17-watt power supply both function.</p> <p>Check the indicator on the Master dental light solenoid valve.</p> <table border="1"> <thead> <tr> <th>If . . .</th> <th>Then . . .</th> </tr> </thead> <tbody> <tr> <td> <p>Indicator lights when the function is activated at the touchpad</p> </td> <td> <p>Master dental light air-actuated switch has failed and must be replaced.</p> </td> </tr> <tr> <td> <p>Indicator does not light when the dental light button is pressed on the touchpad</p> </td> <td> <p>Dental light solenoid has malfunctioned and must be replaced.</p> </td> </tr> </tbody> </table>	If . . .	Then . . .	<p>Indicator lights when the function is activated at the touchpad</p>	<p>Master dental light air-actuated switch has failed and must be replaced.</p>	<p>Indicator does not light when the dental light button is pressed on the touchpad</p>	<p>Dental light solenoid has malfunctioned and must be replaced.</p>
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