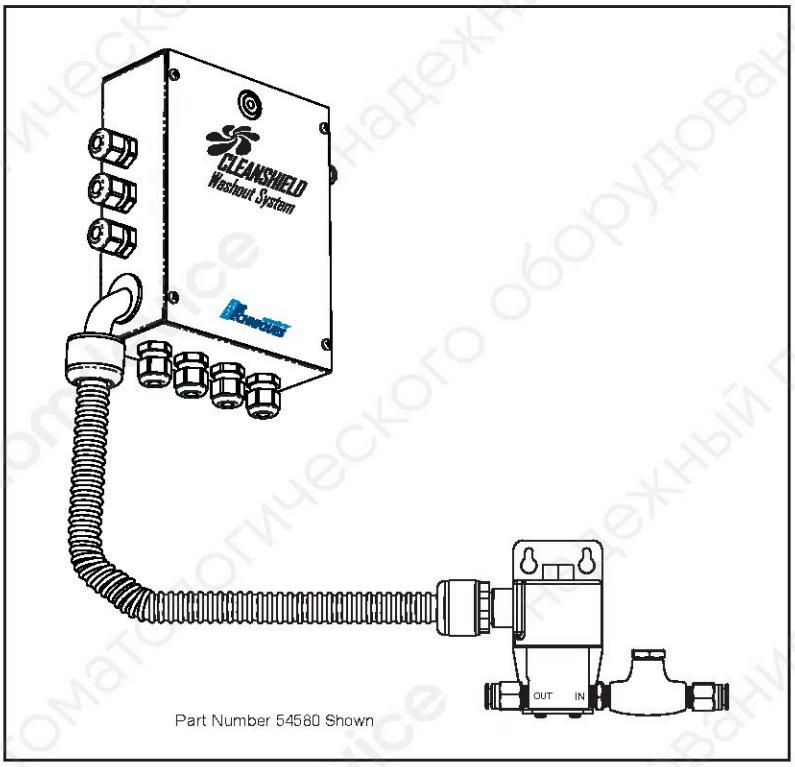
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CLEANSHIELD Washout System

Part Numbers: 54580 and 54580-2



Part Number 54580 Shown

INSTALLATION and OPERATION INSTRUCTIONS

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WARRANTY

The CleanShield Washout System is warranted to be free from defects in material and workmanship from the date of installation for a period of twelve (12) months.

Any item returned to our factory through your authorized Air Techniques dealer, will be repaired or replaced at our option at no charge provided that our inspection shall indicate it to have been defective. Dealer labor, shipping and handling charges are not covered by this warranty.

This warranty does not apply to damage due to shipping, misuse, careless handling or repairs by other than authorized service personnel. Warranty void if installed or serviced by other than your authorized Air Techniques dealer service personnel. Air Techniques, Inc. is not liable for indirect or consequential damage or loss of any nature in connection with this equipment.

This warranty is in lieu of all other warranties expressed or implied. No representative or person is authorized to assume for us any liability in connection with the sale of our equipment.

ON-LINE WARRANTY REGISTRATION

Quickly and easily register the CleanShield Washout System on-line. Just have your product model and serial numbers available. Then go to the Air Techniques web site, **www.airtechniques.com**, click the **warranty registration** link and complete the registration form. This on-line registration ensures a record for the warranty period and helps us keep you informed of product updates and other valuable information.

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Introduction

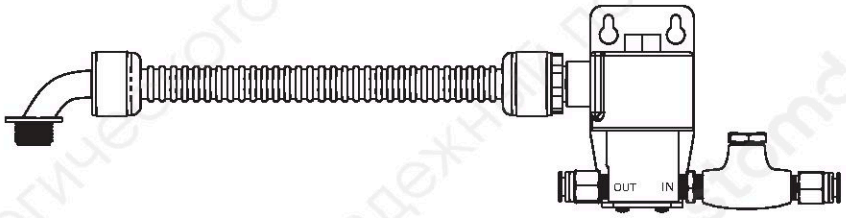
This document provides the instructions to install and operate the CleanShield Washout System, P/N 54580 and 54580-2, which is an optional accessory for cleaning the CAS Tank used with all STS Dry Vacuum Systems and VacStar Dental Vacuum Systems equipped with a Guardian Amalgam Collector. The CleanShield Washout System, P/N 54580 is used with a single CAS tank while the washout system, P/N 54580-2, allows connection of two CAS tanks. The CleanShield Washout System automatically controls the washout cycle of a CAS Tank to ensure proper daily tank maintenance. When properly set up, the system turns the washout solenoid on when the vacuum pump is turned off. The resultant water flow from the solenoid is sent to the spray nozzle inside of the CAS tank. This action rinses the float, flapper valve and side walls of the tank preventing debris from building up, keeping the check valve clean. The CleanShield Washout System is hereafter referred to as the system in this manual. Review and follow the guidelines included in this manual to ensure that the system performs to the highest level of service.

System Components Supplied

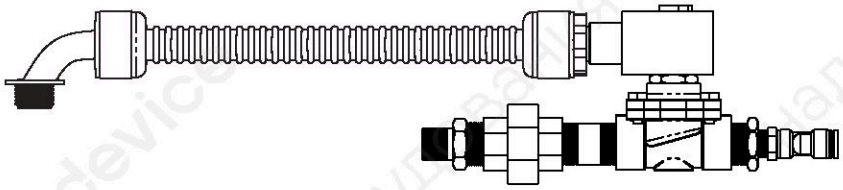
As shown below, CleanShield Washout System, P/N 54580,consists of a Control Module Assembly, P/N 54590; Solenoid Assembly, P/N 54520 and accessory kit P/N 54582. CleanShield Washout System, P/N 54580-2, uses the same Control Module Assembly, P/N 54590 with a different Solenoid Assembly, P/N 54550 and accessory kit, P/N 54582-2. Unpack each component of the delivered System and inspect for physical damage such as scratches, damaged connectors, etc. If any damage is noted, immediately notify your Air Techniques authorized dealer immediately so corrective action can be taken.

Make sure to save all packaging material in case repackaging and shipment is necessary.

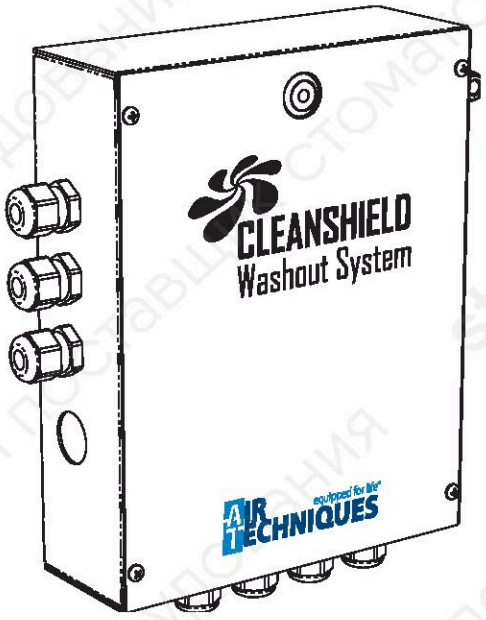
Verify that all items shown below were received. If any item is missing, notify your Air Techniques authorized dealer.



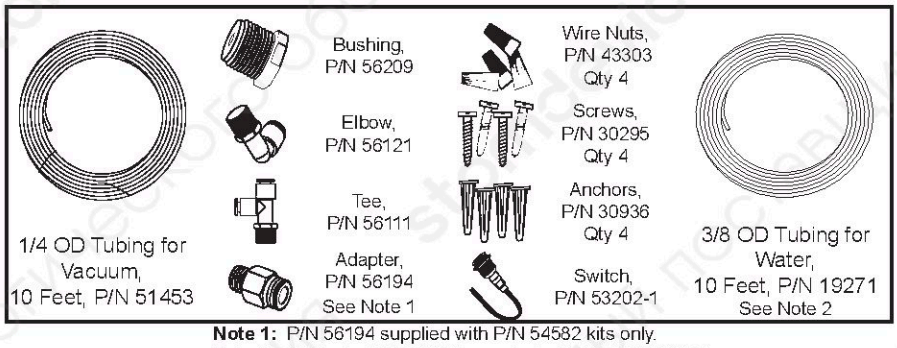
Solenoid Assembly, P/N 54520 (supplied with P/N 54580 systems)



Solenoid Assembly, P/N 54550 (supplied with P/N 54580-2 systems)



CleanShield Control Module Assembly, P/N 54590



Note 1: P/N 56194 supplied with P/N 54582 kits only.
Note 2: 20 Feet of P/N 19271 supplied with P/N 54582-2 kits.

CleanShield Accessory Kit, P/N 54582 (supplied with P/N 54580 systems)
CleanShield Accessory Kit, P/N 54582-2 (supplied with P/N 54580-2 systems)

CleanShield Washout System Supplied System Components

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SITE REQUIREMENTS

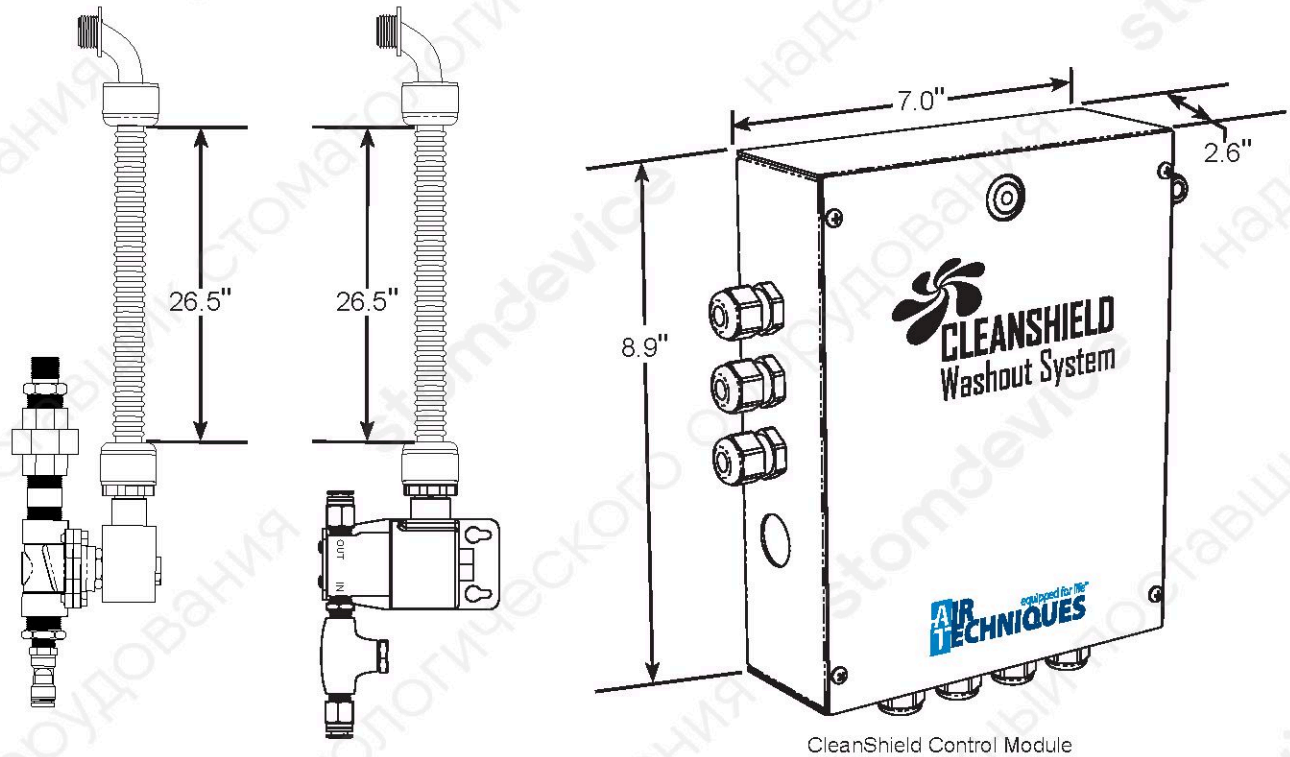
Electrical Input

Wire size AWG	#18 AWG, use #16 AWG for any 24V circuits exceeding 150 feet
Voltage	24 VAC
Frequency	50/60 Hz

Environment Conditions:

Operating Conditions	Indoor use at altitudes up to 2000m Temperature 5 to 40° C (41 to 104° F). Max relative humidity 80% for temperatures up to 31° C, decreasing linearly to 50% relative humidity at 40° C. Supply voltage fluctuation of +/- 10% of nominal voltage.
IEC 61010 Classification	Installation Category Class II Pollution Degree 2

DIMENSIONS



Solenoid Assembly, P/N 54550, Cable Length

Solenoid Assembly, P/N 54520, Cable Length

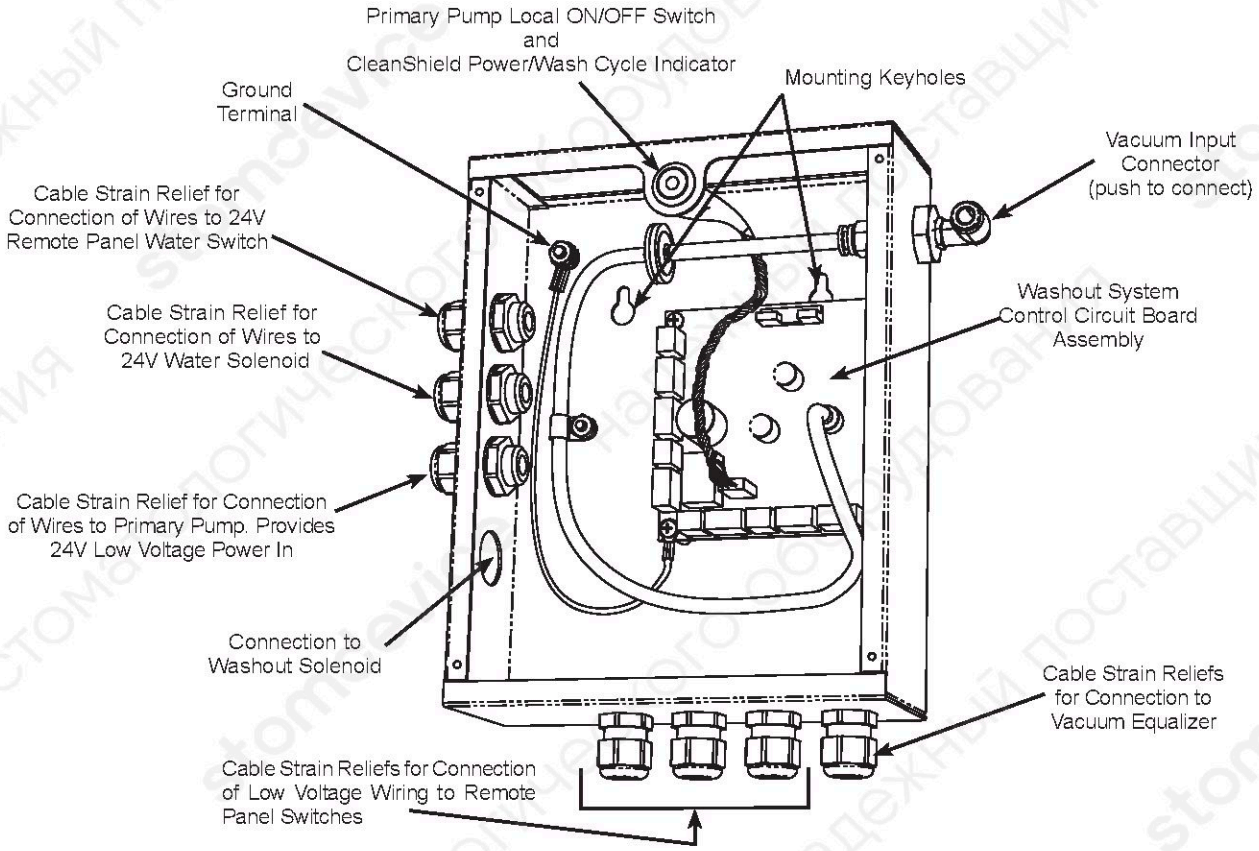
CleanShield Control Module Assembly, P/N 54590, Dimensions

Note: Allow 6 Inches for wiring connection clearance on left and bottom sides of box.

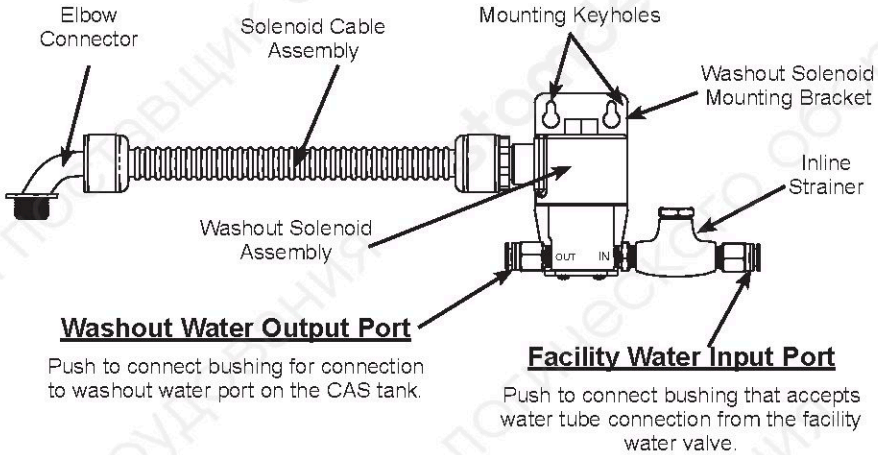
CleanShield Washout System Component Dimensions

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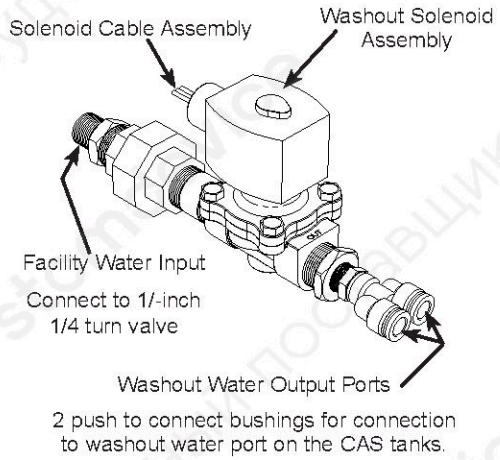
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CleanShield Control Module Assembly, P/N 54590, Key Parts Identification



Solenoid Assembly, P/N 54520, Key Parts Identification



Solenoid Assembly, P/N 54550,
Key Parts Identification

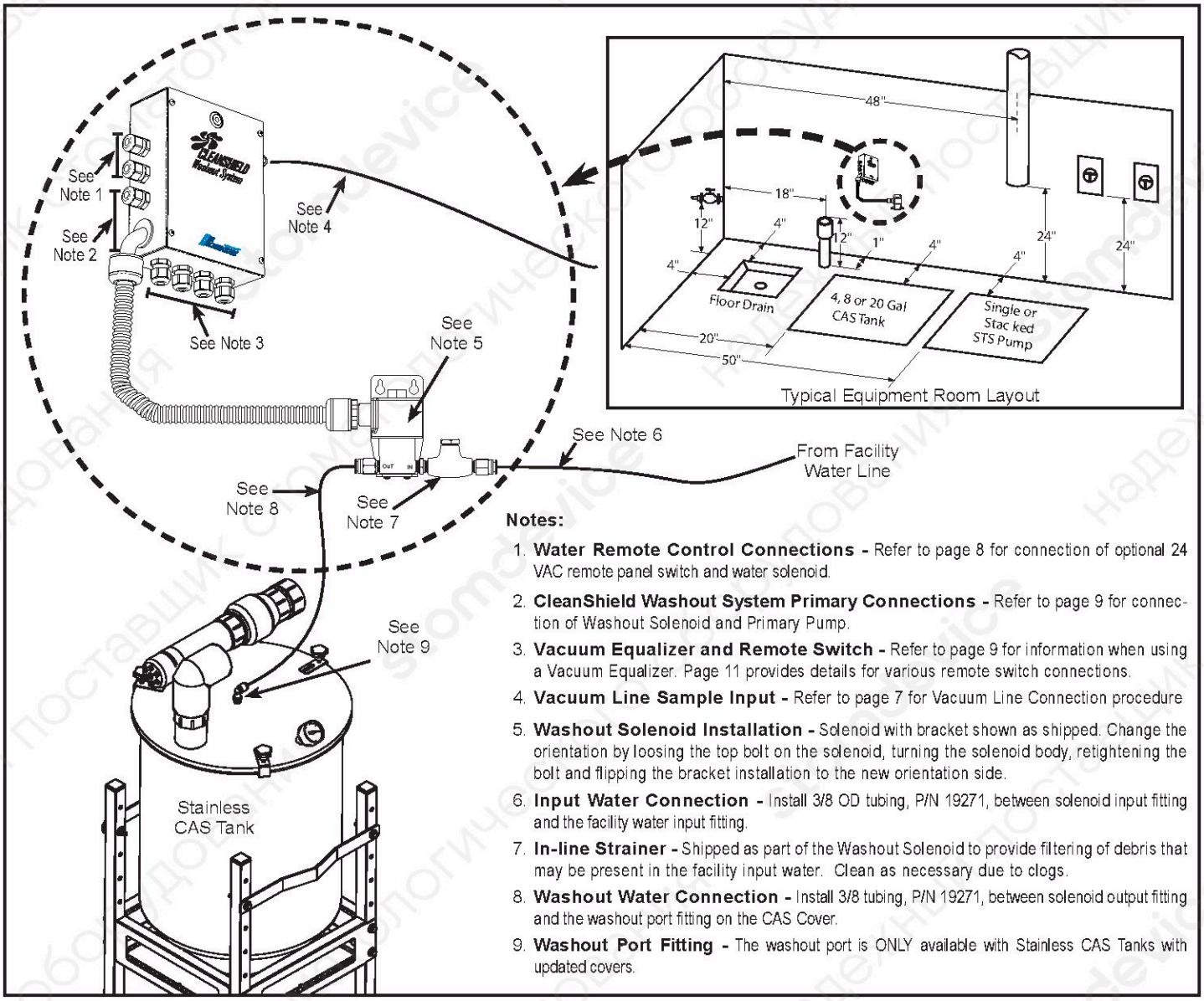
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INSTALLATION INFORMATION

The CleanShield Washout System can be installed with new or existing vacuum systems manufactured by Air Techniques. As shown below by the typical equipment layout, the system is hung on the wall between the facility water supply and the CAS Tank. In addition to the water connection at the washout solenoid, electrical and vacuum connections must also be made at the control module. Review the important considerations listed below and refer to the drawings and descriptions on the following pages to setup and install the system:

1 The CleanShield system can ONLY be install on vacuum systems using stainless steel CAS Tanks with washout port fittings.
2 The CleanShield system can ONLY be used with 24 VAC low voltage solenoids.
3 To avoid electrical shorting from dripping water, always make sure to install the Control Module assembly above the facility water supply line.
4 The pump is turned on from a remote location as connected from either the Primary Pump Local ON/OFF Switch located on the CleanShield Control Module Assembly or the Designated Remote Control Panel Switch.
5 Use standard industry guidelines for working with electrical circuits, plumbing and on electronic equipment as necessary.
6 Make sure to efficiently use space by making connections as short and direct as possible to meet your particular site requirements.



Notes:

1. **Water Remote Control Connections -** Refer to page 8 for connection of optional 24 VAC remote panel switch and water solenoid.
2. **CleanShield Washout System Primary Connections -** Refer to page 9 for connection of Washout Solenoid and Primary Pump.
3. **Vacuum Equalizer and Remote Switch -** Refer to page 9 for information when using a Vacuum Equalizer. Page 11 provides details for various remote switch connections.
4. **Vacuum Line Sample Input -** Refer to page 7 for Vacuum Line Connection procedure
5. **Washout Solenoid Installation -** Solenoid with bracket shown as shipped. Change the orientation by loosing the top bolt on the solenoid, turning the solenoid body, retightening the bolt and flipping the bracket installation to the new orientation side.
6. **Input Water Connection -** Install 3/8 OD tubing, P/N 19271, between solenoid input fitting and the facility water input fitting.
7. **In-line Strainer -** Shipped as part of the Washout Solenoid to provide filtering of debris that may be present in the facility input water. Clean as necessary due to clogs.
8. **Washout Water Connection -** Install 3/8 tubing, P/N 19271, between solenoid output fitting and the washout port fitting on the CAS Cover.
9. **Washout Port Fitting -** The washout port is ONLY available with Stainless CAS Tanks with updated covers.

CleanShield Washout System Installation Connections

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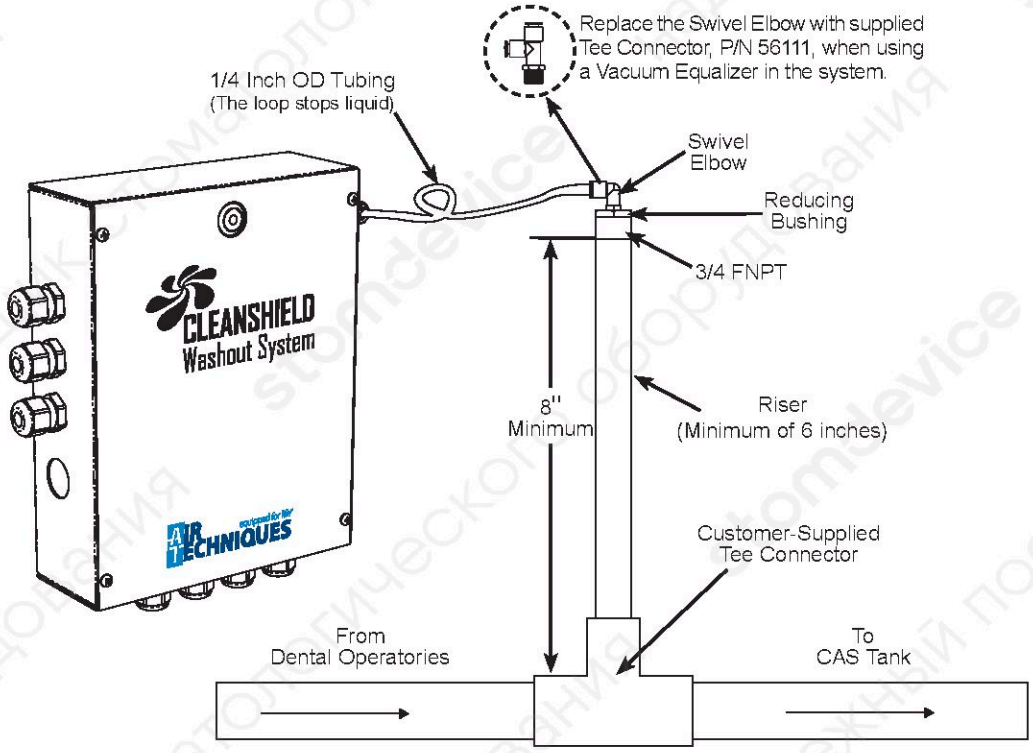
Vacuum Line Connection

The CleanShield Washout System needs to sample the vacuum level in the facility vacuum line between the dental operatories and the CAS storage tank. This is accomplished by placing a tee connector (not supplied) in the vacuum line within 10 feet of the CAS storage tank.

As shown below, install the customer-supplied tee connector into the vacuum line making sure to position the tee connector with the open leg pointed up with a minimum of a six inch rise terminating in a ¾ inch FNPT.

Connect the tee connector using the supplied parts provided in accessory kit P/N 54582.

1. Perform step 2 only when installing the CleanShield Washout System alone. When installing the CleanShield Washout System along with a Vacuum Equalizer, skip step 2 and proceed to step 3.
2. Install the CleanShield Washout System alone as follows:
   a. Install the ¾ MNPT x ¼ FNPT Reducing Bushing, P/N 56209, into the top of the tee connector.
   b. Install the ¼ MNPT x ¼ Push to Connect Swivel Elbow, P/N 56121, into the Reducing Bushing.
      Note: It is recommended to create a loop in the tubing. Looping the tubing helps to ensure that liquids do not reach the equipment.
   c. Install the ¼ inch OD tubing, P/N 51453, between the ¼ inch swivel elbow on the tee assembly and the ¼ inch swivel elbow on the right side of the CleanShield Control Module Assembly.
3. Install the CleanShield Washout System along with a Vacuum Equalizer as follows:
   a. Remove the tubing and Push to Connect Swivel Elbow from the tee assembly used to connect the Vacuum Equalizer. If necessary, replace the reducing bushing with the ¾ MNPT x ¼ FNPT Reducing Bushing, P/N 56209.
   b. Install the ¼ MNPT x ¼ Push to Connect Tee, P/N 56111, into the tee assembly.
      Note: It is recommended to create a loop in the tubing. Looping the tubing helps to ensure that liquids do not reach the equipment.
   c. Install the ¼ inch OD tubing, P/N 51453, between the Push to Connect Tee, P/N 56111, on the tee assembly and the ¼ inch swivel elbow on the right side of the CleanShield Control Module Assembly. Reconnect the tubing connected to the Vacuum Equalizer removed in step 3.a.



Vacuum Line Tee Connector Installation

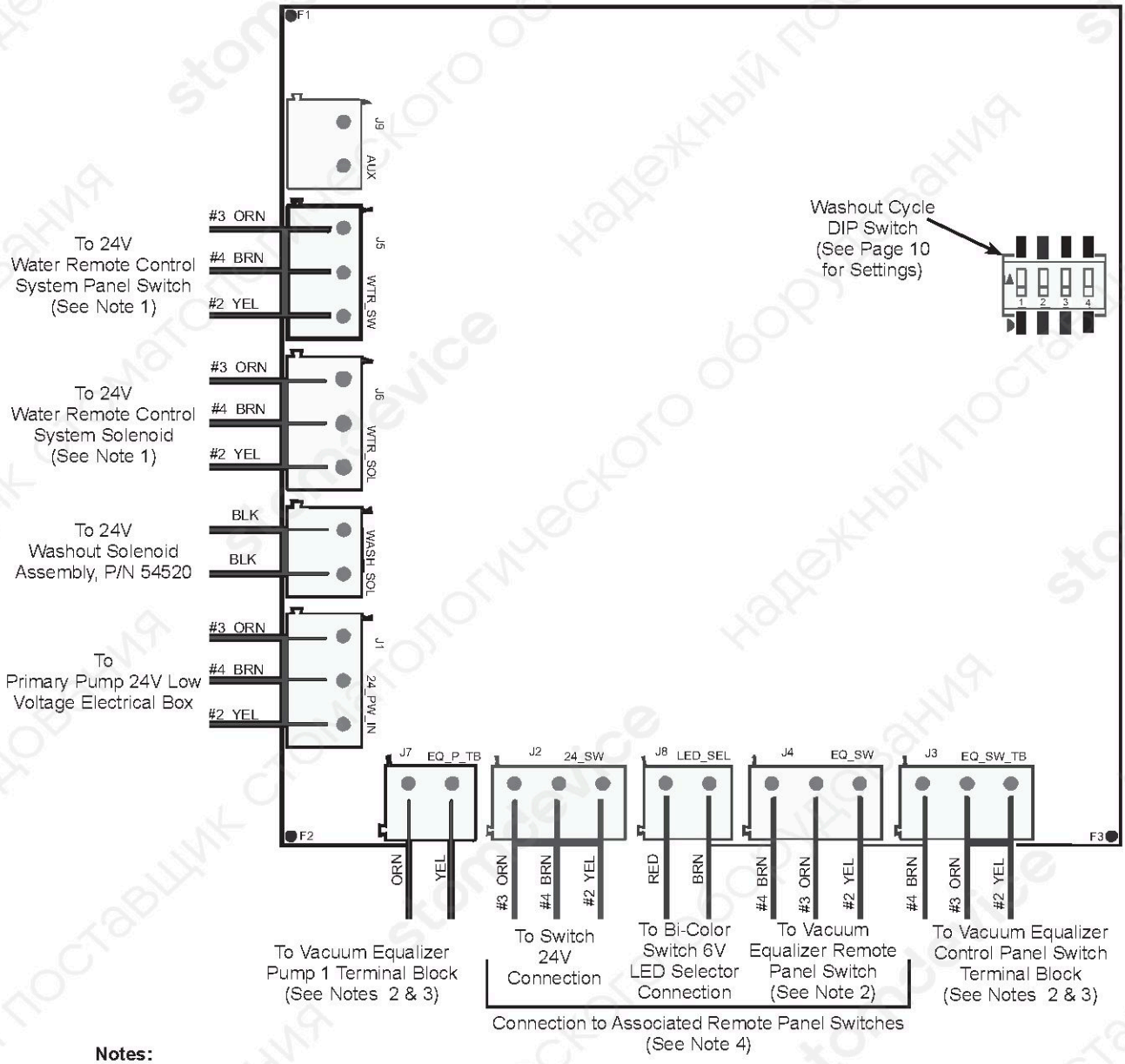
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Electrical Setup Connections

The CleanShield Washout System has a flexible design that allows it to provide the automatic tank washing function directly from the switch on the control module or via remote panel switches. The system can also be used with a Vacuum Equalizer, P/N 56200, another optional accessory for use with vacuum systems manufactured by Air Techniques.

The illustration below shows the connections to the Washout System Control Circuit Board Assembly for the various system configurations. Refer to this drawing and the descriptions on the following pages to setup the electrical connections for your particular installation.



Notes:

1. The Water Remote Control System is optional equipment and purchased separately. The Water Remote Control System remotely controls the application of facility water. See accessories. The CleanShield system can ONLY be used with 24 VAC low voltage solenoids.
2. The Vacuum Equalizer is optional equipment and purchased separately. The Vacuum Equalizer automatically regulates the facility vacuum level. See accessories.
3. This connection re-routes primary pump control to the Vacuum Equalizer pump terminal block when the optional Vacuum Equalizer is installed in the system.
4. The CleanShield Washout System is designed to accept various remote switches. See Detailed remote panel switch wiring configurations provided on page 9.
5. When the optional Vacuum Equalizer is installed in the system, this connection is used to connect the CleanShield Washout system to the control panel switch terminal block on the Vacuum Equalizer.

CleanShield Washout System Electrical Connections

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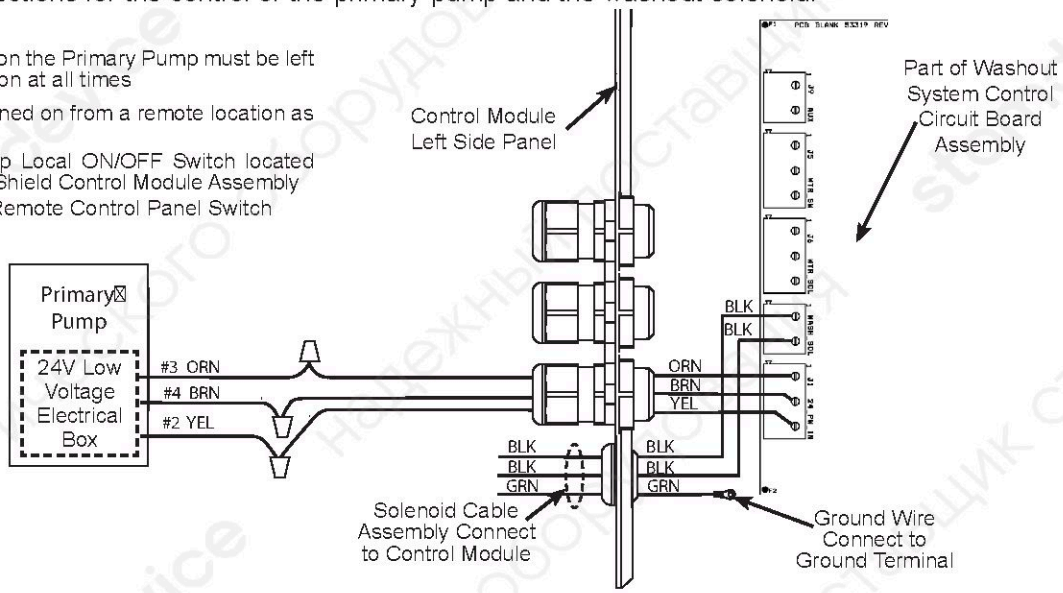
System Primary Connections

The primary connections shown below are wiring connections that must be made in any configuration of the system. This wiring includes connections for the control of the primary pump and the washout solenoid.

Important: Circuit Breaker on the Primary Pump must be left in the ON position at all times

The pump is turned on from a remote location as connected:

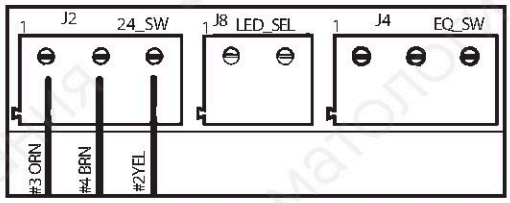
1. Primary Pump Local ON/OFF Switch located on the CleanShield Control Module Assembly
2. Designated Remote Control Panel Switch



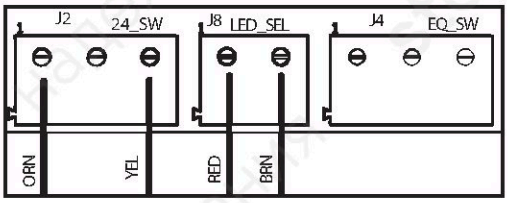
CleanShield Washout System Primary Connections

Remote Panel Switch Wiring Configurations

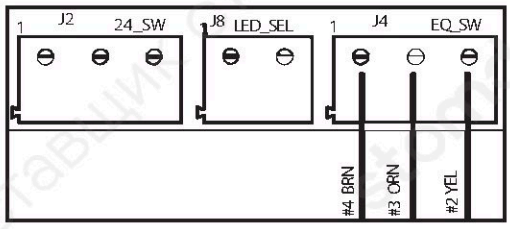
The following illustrations show the wiring connections for each of the five types of remote switches supported by the CleanShield Washout System.



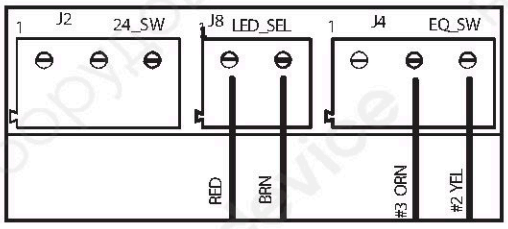
24-Volt Switch Connection



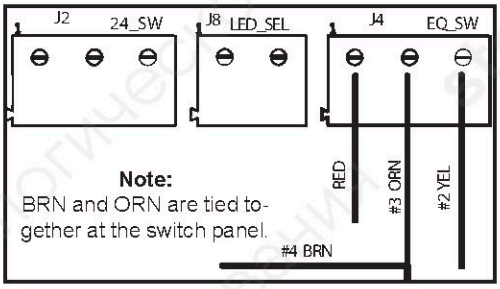
Bi-Color Switch Connection



Retro Equalizer Switch Connection



Bi-Color Switch Connection for Equalizer



Bi-Color Equalizer Switch Connection
for Existing 18/3 Wiring (Wired as Green indicator only)

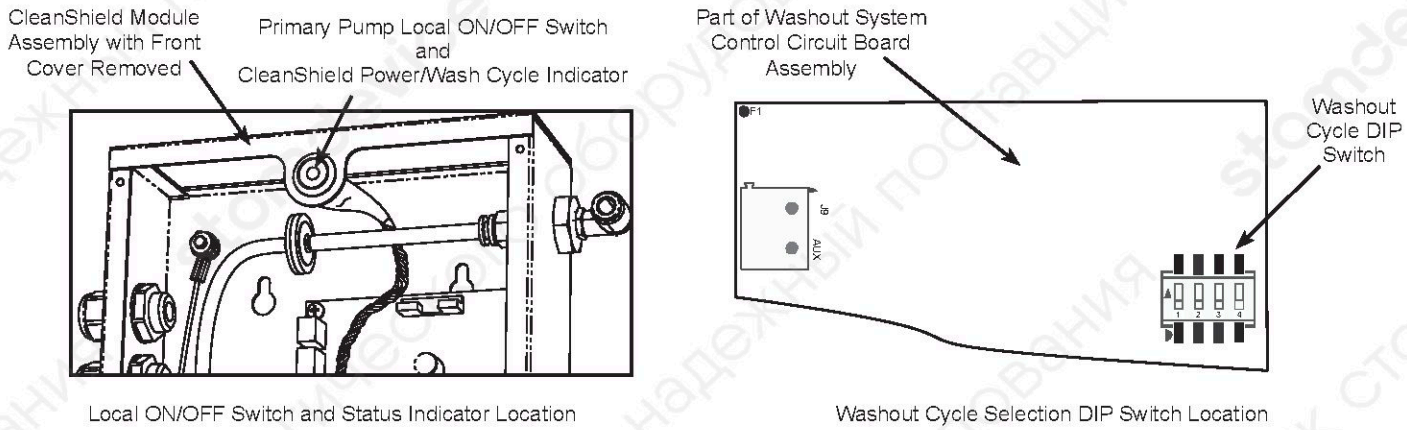
CleanShield Washout System Remote Panel Switch Wiring Configurations

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Introduction

Controls and indicators for the system is limited to the single front panel switch/indicator and the internal DIP switch described below.



CleanShield Washout System Control and Indicator Locations

Local ON/OFF Switch and Cycle Status Indicator

When connected, this push button switch/indicator is used to activate and deactivate the primary pump. The primary pump is active when the switch is pressed. The switch is not used and should not be pressed in when the system is controlled from a designated Remote Control Panel Switch. The state of the bi-color LED Indicator of the switch shows the operational status as listed below.

CleanShield Power/Wash Cycle Indicator

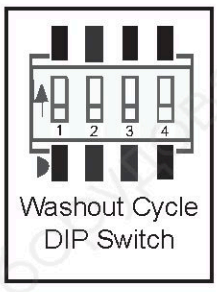
LED Indicator	Operational State	Power	Pump	Wash Out Cycle
Extinguished	No Power (OFF)	OFF	OFF	OFF
Flashing Green	Idle	ON	OFF	OFF
Illuminated Green	Primary Pump ON	ON	ON	OFF
Illuminated Yellow	Washout Cycle Running	ON	OFF	ON

Washout Cycle Selection DIP Switch

This DIP switch is used to set the operational parameters of the washout cycle. As shown below, positions 1 and 2 sets the Vacuum Low Time and positions 3 and 4 sets the Washout Run Time.

The Vacuum Low Time is the amount of time in minutes that the system waits after detecting no vacuum before initiating a washout cycle. The system is factory set to have a Vacuum Low Time of 5 minutes (4 gallon CAS tank).

The Washout Run Time is the amount of time in minutes that the washout cycle will run after the cycle has been initiated. The system is factory set to have a Washout Run Time of 2 minutes (8 gallon CAS tank).



Washout Cycle DIP Switch Settings

DIP Switch Position Settings		Vacuum Low Time (Minutes)	CAS Tank Size (Gallons)	DIP Switch Position Settings		Washout Run Time (Minutes)
Position 1	Position 2			Position 3	Position 4	
↓	↓	5 (Default)	4	↓	↓	1
↓	↑	7.5	8	↓	↑	2 (Default)
↑	↓	10	20	↑	↓	3
↑	↑	12.5	20 (with Amalgam Separator)	↑	↑	4

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WATER FLOW RATES

CleanShield Water Usage per CAS at Different Building Water Pressures

CAS Tank Size	Water Flow Rate Maximum (GPM)	Water Pressure in PSI						
		20 PSI	30 PSI	40 PSI	50 PSI	60 PSI	80 PSI	100 PSI
4 gallon	1 Minute Flow Rate (GPM)	1.84	2.25	2.6	2.91	3.18	3.68	4.11
8 gallon	2 Minute Flow Rate (GPM)	3.68	4.5	5.2	5.82	6.36	7.36	8.22
20 gallon	3 Minute Flow Rate (GPM)	5.52	6.75	7.8	8.73	9.54	11.04	12.33

OPERATING INFORMATION

Operating Instructions:

Once the CleanShield is correctly installed, wired and powered it monitors the vacuum level in the facility vacuum line between the dental operatories and the CAS storage tank. When the CleanShield determines that there has been no vacuum for the duration of the Vacuum Low Time (see Washout Cycle Selection DIP Switch Settings on page 10) it initiates a Washout Cycle.

During a Washout Cycle the Water Remote Control System Solenoid (See Note 1 on page 8) is activated if it is wired into the CleanShield. The Washout Solenoid is then activated for the duration of the Washout Run Time (see Washout Cycle Selection DIP Switch Settings on page 10). The resulting water flow sprays the inside of the CAS tank rinsing the float, flapper valve and side walls of the tank. This prevents debris from building up and keeps the check valve clean to help promote trouble free operation of the vacuum system.

If the facility vacuum level returns during the Washout Cycle or the Washout Run Time has elapsed the Water Remote Control System Solenoid, if installed, is restored to its previous state and the Washout Solenoid is de-activated. The Washout Cycle will not be initiated again until a high vacuum level is detected in the facility vacuum line.

The Primary Pump's circuit breaker must be kept in the ON position. Activation of the Primary Pump will be controlled by the Local ON/OFF switch if no remote panel switch is used. For all other Primary Pump remote activation configurations (See Remote Panel Switch Wiring Configurations on page 9) be sure to leave the Local ON/OFF switch in the OFF position.

In-line Strainer - This strainer protects the Washout Solenoid from debris present in the facility input water. Clean the strainer as necessary due to clogs .

ACCESSORIES

Accessories/Equipment Options.

The following lists the ordering number and description for accessory components available for use with the CleanShield Washout System. Contact an authorized Air Techniques' dealer for information.

Part No.	Description
54075	Kit, CAS Replacement Cover
54061	Kit, Washout Connector
56200	Vacuum Equalizer
24V Low Voltage Remote Control Panel Kits:	
53111	Kit, 1-Switch Plate
53133	Kit, 2-Switch Plate
53250	Kit, 3-Switch Plate
53251	Kit, 4-Switch Plate
Remote Water Control Valve System Configurations:	
53170	24V, 1-Inch Water Valve Filter System with 5 Micron Filter Element
53173	24V, 1-Inch Water Valve Filter System without Filter
53020	24V, 3/4-Inch Water Valve Filter System with 5 Micron Filter Element
53021	24V, 3/4-Inch Water Valve without Filter

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❑ Digital Imaging

- Digital Radiography
- Intraoral Camera
- Caries Detection Aid
- Intraoral X-ray
- Film Processors

❑ Utility Room

- Dry Vacuums
- Wet Vacuums
- Air Compressors
- Amalgam Separator
- Utility Accessories
- Utility Packages

❑ Merchandise

- Evacuation System Cleaner
- Imaging Accessories
- Chemistry
- Processor Accessories

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