

A-dec DV Dry Vacuum

Service Guide

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Overview

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Regulatory Information and Warranty

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



For quick access to this document online, scan, tap, or click this QR code, which points to: a-dec.com/regulatory-guide.

Product Service

Product service is available through your local authorized A-dec dealer. For service information, or to locate an authorized dealer, contact A-dec at 1.800.547.1883 in the USA and Canada or +1.503.538.7478 worldwide, or visit www.a-dec.com.

Product Models and Versions Covered in This Document*

Models	Versions	Description
DV5/DV7	n/a	Dry Vacuum
DV10/DV12		

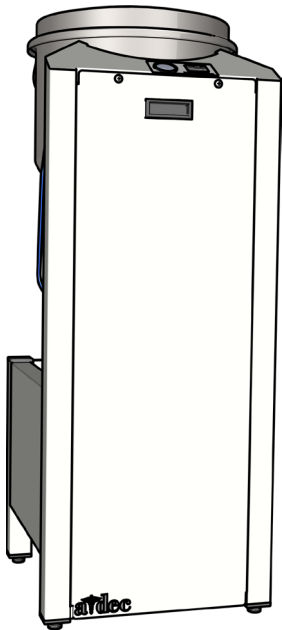
*Some product models, versions, and options in this document may not be available in certain regions.

Requirements

Description of Operation

- The dry vacuum system has a variable speed vacuum pump that reduces electrical consumption. The integrated separator tank and firmware allow for fully automated operation.
- The vacuum creation and operation is free from water and oil.
- The vacuum motor is controlled by a vacuum sensor connected to the separator tank. The speed of the motor will increase or decrease to maintain the pre-set vacuum level.
- The vacuum system has an automated tank washdown maintenance cycle that starts within 1 minute of the system being turned off. The washdown solenoid opens to allow fresh water to spray into the tank, rinsing the tank free from debris. This cycle runs for 20 seconds on units manufactured before April 2022. The cycle runs for 80 seconds on units manufactured in April 2022 and later.
- The integrated separation tank has been designed to collect the fluids evacuated during a normal operating day. If an excessive amount of fluids (10 gallons) is collected, the float switch in the separator will stop the vacuum in order for the tank to automatically drain. This process takes about 10 seconds. The vacuum will automatically restart after the drain cycle.

Vacuum Models



Single Vacuum Models

Model	Number of Users
DV5	1 - 5
DV7	5 - 7
DV10	7 - 10
DV12	10 - 12



Tandem Vacuum Models

Model	Number of Users
DV5t	7 - 10
DV7t	10 - 14
DV10t	14 - 20
DV12t	20 - 24



NOTE Multiple vacuums can be combined. Contact A-dec Customer Service for information.

Site Specifications and Sizing Information

								Units Manufactured Before March 2022	
Model	Max Users	CFM @8"Hg	Set "Hg	Total HP	Voltage Range	Amps Max	Breaker Size	Amps Max	Breaker Size
DV5	5	35	10	1.7	200-240 VAC	9.8	20	14.1	20
DV7	7	57	10	1.7		15	20	20.6	30
DV10	10	74	10	3.4		17	30	22	30
DV12	12	92	10	3.4		17	30	24	30

Model	Dims - WxDxH Installed	Weight Installed	Dims - WxDxH Packaged	Weight Packaged	Sound db(A) Max	Sound db(A) Average	BTU/Hr Max
DV5	18 x 19.5 x 49.5"	152 lbs	24 x 31 x 55"	183	62.8	57.4	5,700
DV7	18 x 19.5 x 49.5"	152 lbs	24 x 31 x 55"	183	70.0	57.4	6,800
DV10	18 x 19.5 x 49.5"	191 lbs	24 x 31 x 55"	214	63.2	58.3	8,700
DV12	18 x 19.5 x 49.5"	191 lbs	24 x 31 x 55"	214	70.5	58.3	10,436

Effective March 2022

Acceptable voltage range is 200-240 VAC. Voltage outside of that range will require a buck-boost transformer that provides an incoming voltage adjustment of +/- 10%.

Model	Size	Transformer p/n
DV5/DV7/DV10/DV12	.5 KVA	E0275

HVAC Requirements

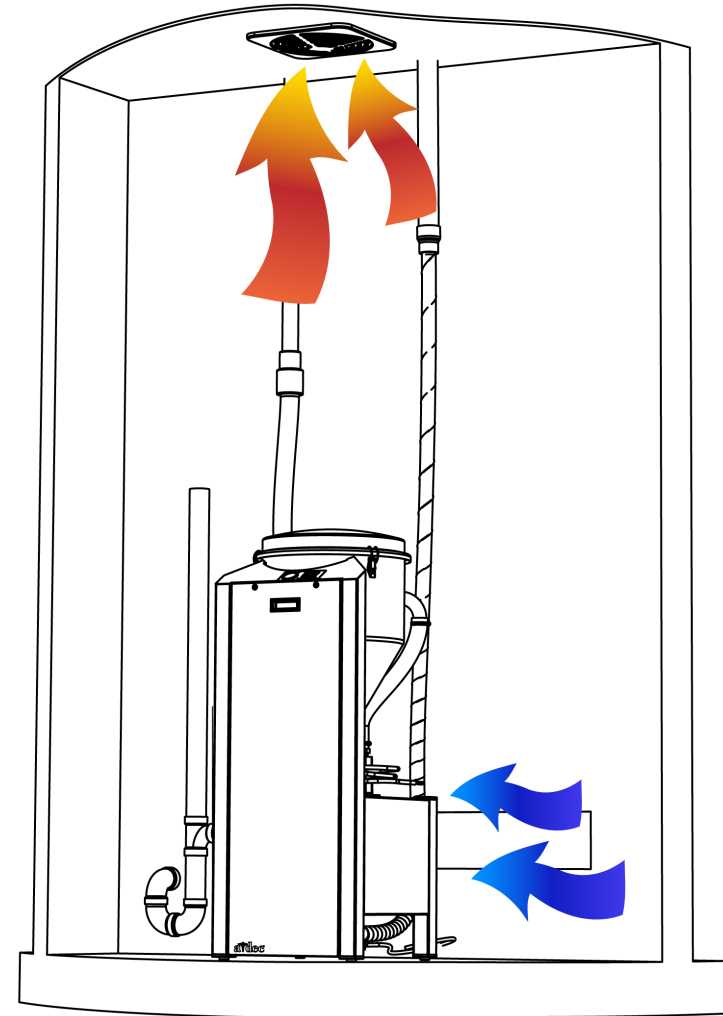
Adequate cooling air is required. All vacuum models are installed and operated in a thermostatically or otherwise stable ambient temperature environment. Forced air and HVAC input are recommended for use in addition to an exhaust fan if normal ambient temperatures vary from specified operating temperature range.

The operating temperature range of the vacuum is 40° F to 104° F or 4.4 to 40° C.

Vacuum life is directly affected by the operating temperature.

Model	Maximum Heat Rejection (BTU/Hr)	Average Heat Rejection (BTU/Hr)	CFM Cooling Fan *
DV5	5,700	1,425	200
DV7	6,800	1,700	230
DV10	8,700	2,175	350
DV12	10,346	2,175	400

* Based on 80° F/27° C cooling air available and 100° F/38° C maximum mechanical room temperature. This does not account for overall mechanical room size and additional heat sources. Consult an HVAC specialist for proper temperature range.



Operate

Turn On/Turn Off Power

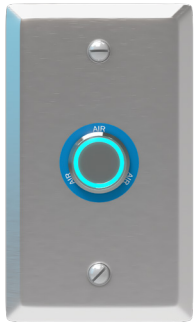


NOTE If you turn off the vacuum unit for long periods of non-use, like an extended office shutdown, ensure that the power remains connected. The vacuum will automatically turn on, momentarily, every 12 hours to prevent components from seizing. This also helps extend the life of the motor.

Master Power Switch

The master power switch turns the vacuum on or off. It also overrides the other remote power functions. If your vacuum is connected to remote LED push-button controls or a Smart Shield touchscreen, this switch should be in the REMOTE position.

LED Push-Button Control
(single-button)



LED Push-Button Control
(four-button)



LED Push-Button Controls

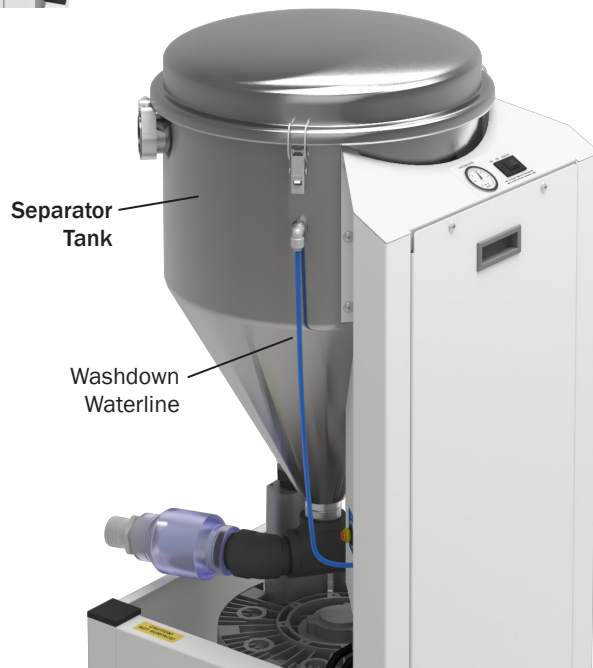
If you have LED push-button controls, press the button once to turn the vacuum unit on or off. Each button controls a separate vacuum. Blue LED lighting indicates that the vacuum is on. If the LED does not illuminate, check and verify that the master power switch on the vacuum is in the REMOTE position.

Optional Smart Shield Touchscreen Controls

For configurations with the Smart Shield touchscreen, use the power switch icon at the bottom of the screen or tap the VAC icon to turn the vacuum unit on or off. If the Smart Shield does not operate, check and verify that the master power switch on the vacuum is in the REMOTE position. For more information on the touchscreen, see "Smart Shield Touchscreen Controls" on page 9.



Vacuum Gauge and Operation



Vacuum Gauge

The vacuum gauge is located next to the master power switch on the top panel of the vacuum. This gauge provides a real-time level of the negative pressure inside the separator tank. The DV dry vacuum is factory preset to maintain 10 inHg (34 kPa) during normal operation.



NOTE The accuracy of the vacuum gauge reading is plus or minus 2.

Vacuum Startup and Normal Operation

At initial startup, the vacuum motor runs until the system reaches the factory preset of 10 inHg (34 kPa). As vacuum instruments are opened and closed, the motor rpm will increase or decrease (depending on demand) to maintain that level.



NOTE You may hear the vacuum motor frequently speeding up or slowing down as it compensates for various levels of demand. This is normal. However, if the motor does not slow down after all vacuum instruments are closed, or if your system is unable to consistently maintain 10 inHg (34 kPa), see "Troubleshooting Tasks" on page 26 or contact A-dec Customer Service.

Separator Tank Drain and Washdown Cycles



NOTE Washdown is required for Endodontic offices.

The vacuum removes liquid from the air and collects it in the separator tank. When more than 10 gallons (38 L) are collected, a float switch in the tank stops the vacuum and drains the tank. When the float switch is tripped, the system will drain for 10 seconds. At that time the vacuum will start up again.

To initiate a washdown cycle, you must turn off the vacuum, which drains the system before starting the washdown cycle. Combined, the two cycles take approximately 2 minutes. The drain cycle takes approximately 45 seconds. The washdown cycle varies depending on the date of manufacturing.

- March 2022 and prior – 60 seconds
- After March 2022 – 80 seconds

A-dec recommends that you turn off the vacuum to activate this process at least once a day. For more information, see “Regular Maintenance Tasks” on page 22.

Use the A-dec Evacuation System Cleaner to keep your vacuum running at its optimal level while limiting costly downtime. A-dec does not endorse other manufacturers’ evacuation line cleaning products. We have only tested the A-dec Evacuation System Cleaner for compatibility with A-dec dental units, ICV®, and vacuum system.

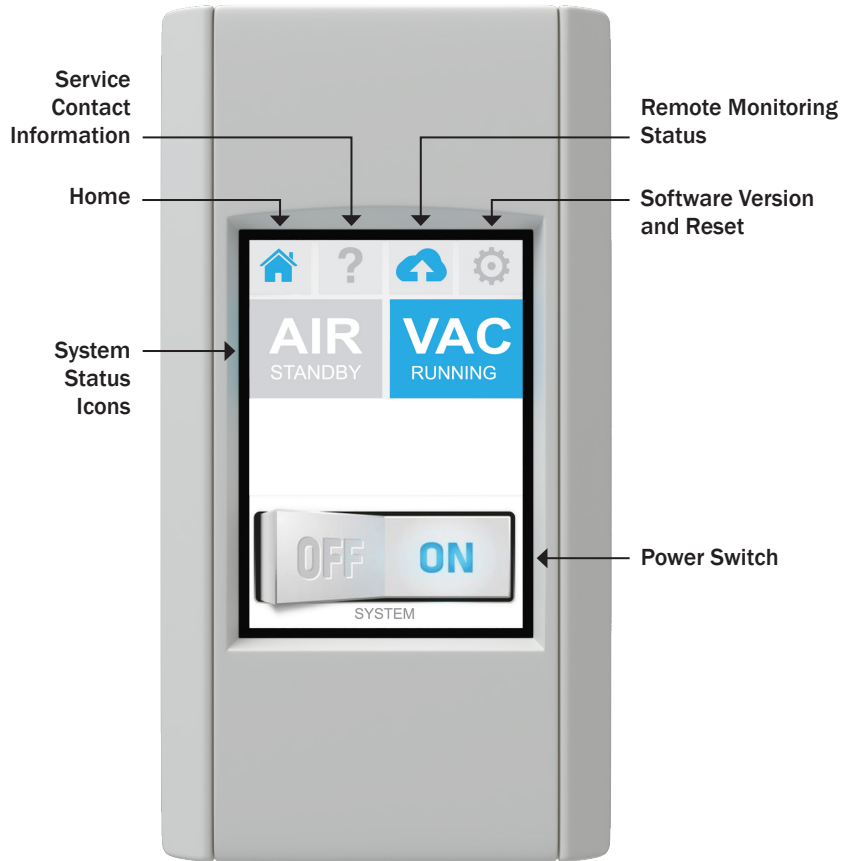


A-dec Evacuation System Cleaner
 p/n: 91.0060.00 - 33 fl oz (976 mL) 12 bottles
 p/n: 91.0061.00 - 128 fl oz (3.78 L) 4 bottles



CAUTION Do not clean the vacuum lines with oxidizing or acidic cleaners with a pH less than 6 or greater than 8 (including bleach, chlorine, iodine and peroxide). These may lead to the dissolution of solid mercury which can corrode and damage components in your system. Use a non-foaming vacuum-line cleaner and always follow the manufacturer’s instructions.

Smart Shield Touchscreen Controls

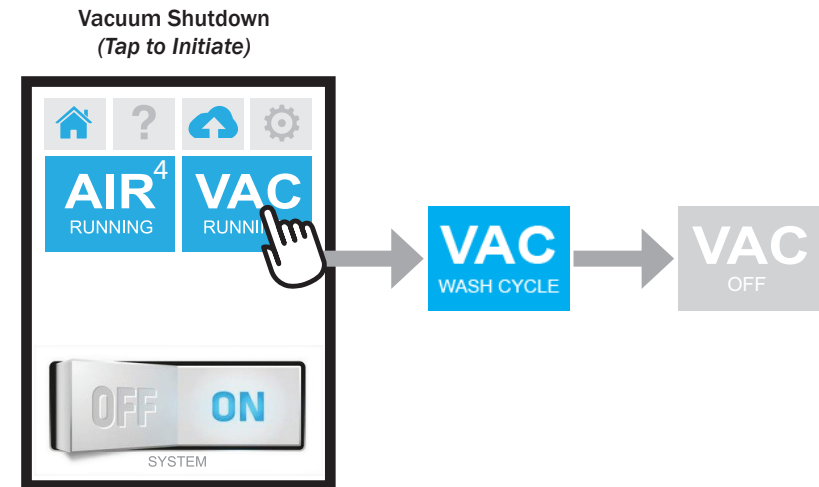


The optional Smart Shield touchscreen provides power control and system status of your mechanical room equipment.

Tap the on/off switch icon at the bottom of the screen to turn on or turn off all connected equipment at the same time. Tap the blue system status icons to turn on or turn off individual equipment. These status icons also dynamically change according to the operational state of the equipment.

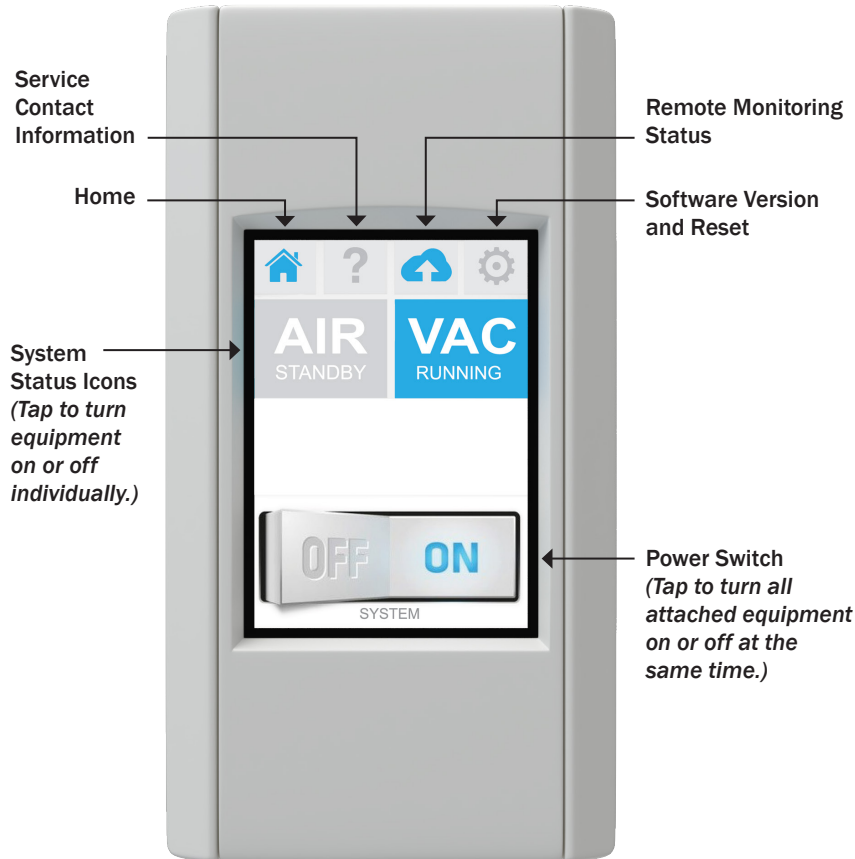
Vacuum Startup and Shutdown

When you turn on the vacuum system, Smart Shield displays the VAC RUNNING icon. When you tap the VAC RUNNING icon, the VAC OFF icon appears, indicating the start of the separator tank drain cycle. Once the drain cycle is complete, the VAC WASH CYCLE icon appears, indicating the start of the washdown cycle. After that cycle is complete, the VAC OFF icon reappears.



NOTE If the Smart Shield does not operate, check and verify that the master power switch on the vacuum is in the REMOTE position. For more information, see "Troubleshooting Tasks" on page 26.

Smart Shield Touchscreen Controls *(continued)*

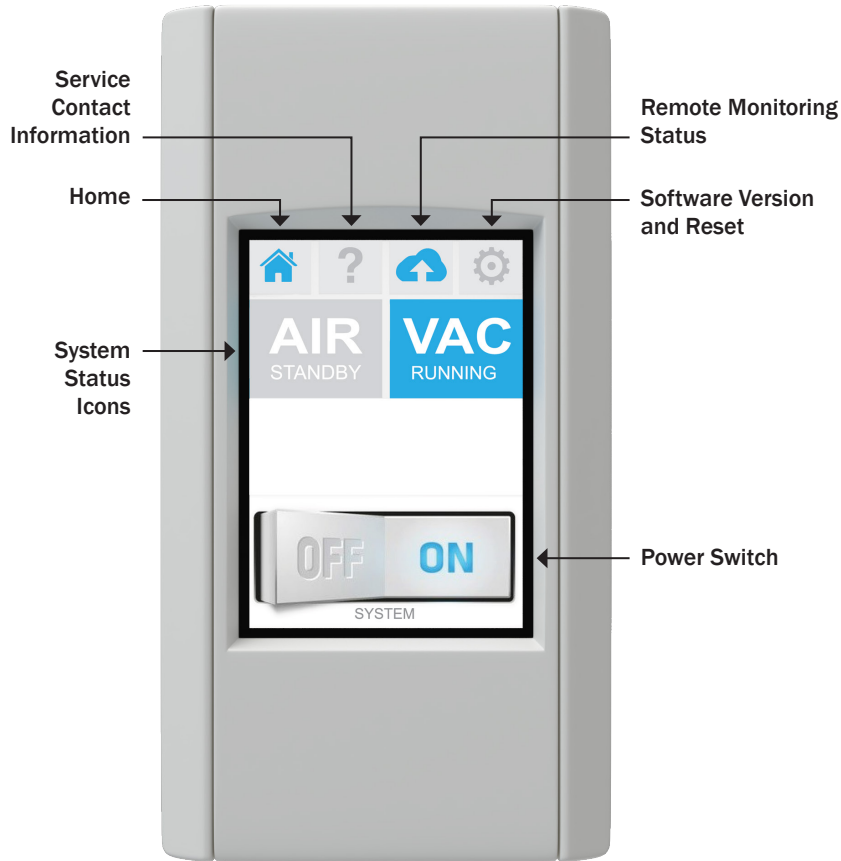


NOTE If additional warning icons appear on your screen and are not shown here, contact A-dec Customer Service for more information.


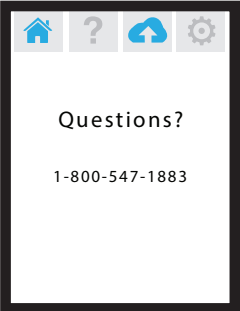

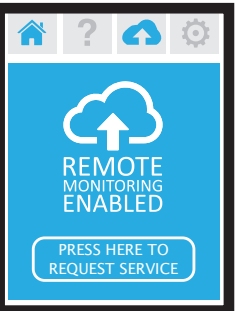

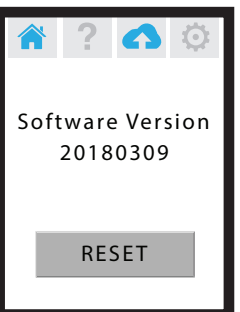
Vacuum System Status Icons

Icon	State/Status
	Displays during initial system startup and normal operation mode.
	MANUAL appears on status icons when the master power switch on the vacuum is in the ON or OFF position. To control power through the Smart Shield touchscreen, ensure that the master power switch on the vacuum is in the REMOTE position.
	Displays when the vacuum is turned off from the Smart Shield touchscreen controls.
	Displays after the vacuum is turned off and the drain cycle is complete.
	Displays when the annual maintenance interval is reached. This caution/reminder is reset whenever power to the system is disconnected.
	Displays when there is a fault in the system. Contact A-dec Customer Service.

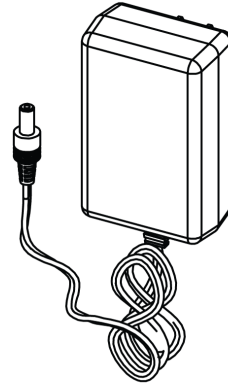
Smart Shield Touchscreen Controls *(continued)*



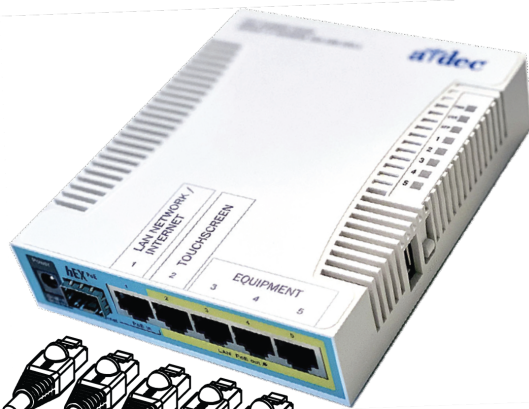
Additional Smart Shield Functions

Icon	State/Status
	 <p>Displays the A-dec, Inc. contact information.</p>
	 <p>Displays your status as enabled if you are registered with the remote monitoring service. For questions, contact A-dec Customer Service.</p>
	 <p>Displays software version. The reset button turns off the screen, reboots the software, and reloads the equipment status. You can use RESET during specific faults with the equipment. For more information, see "Troubleshooting Tasks" on page 26 .</p>

Mechanical Room Controls



48 V Power Supply
with 8' Cord



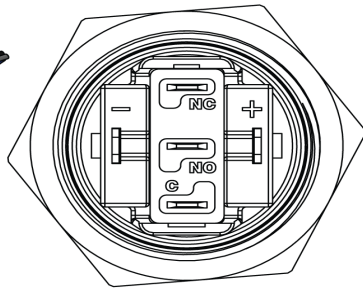
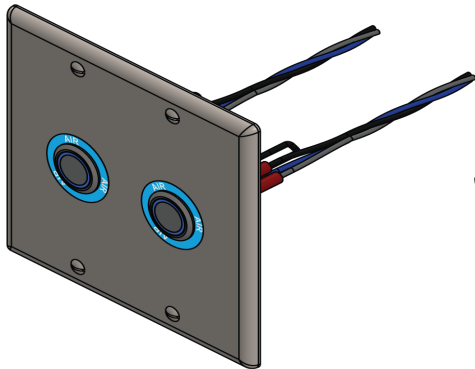
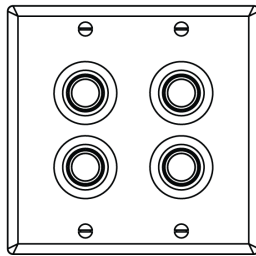
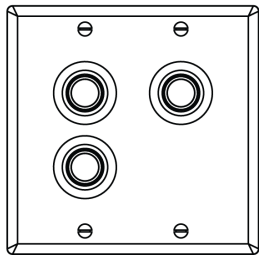
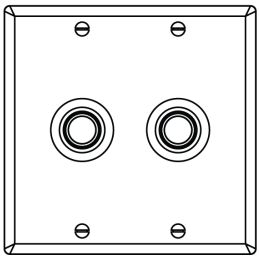
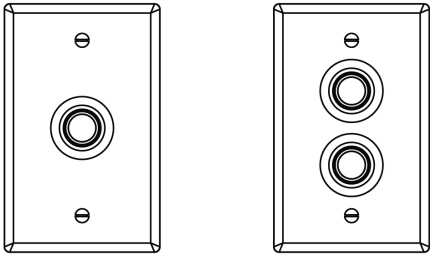
- Internet/LAN
- Smart Shield Touchscreen
- Compressor, Vacuum, Water Valve, or Smart Hub Extender



NOTE The firmware in the smart hub was updated in March 2020 to include a dedicated port for the touchscreen. If the system has connectivity issues, A-dec recommends updating to this firmware.

Mechanical Room Controls *(continued)*

LED Push-Button Controls



- Gray
- + Black - Run Signal
- NO Blue - 24 V Power
- C Orange - Stop/Close (optional)
- NC



Mechanical Room Controls *(continued)*

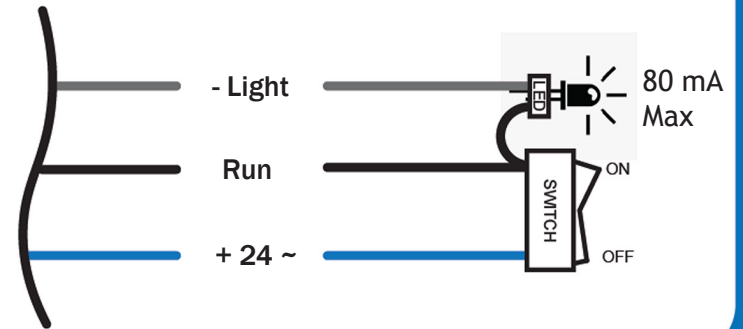
Mechanical Room 24 V Competitive Cross Reference

Mtg/Wire	A	B (Light)	C
A-dec	Blue + 24 VDC	Gray - Light	Black Run Signal
AirTechniques	Yellow	Brown	Orange
Midmark	Blue	White	Red
Dental EZ	Black	Brown	Yellow
Matrix	Red	Blue	White
Apollo	Blue	White	Red
Tech West	Blue	White	Red

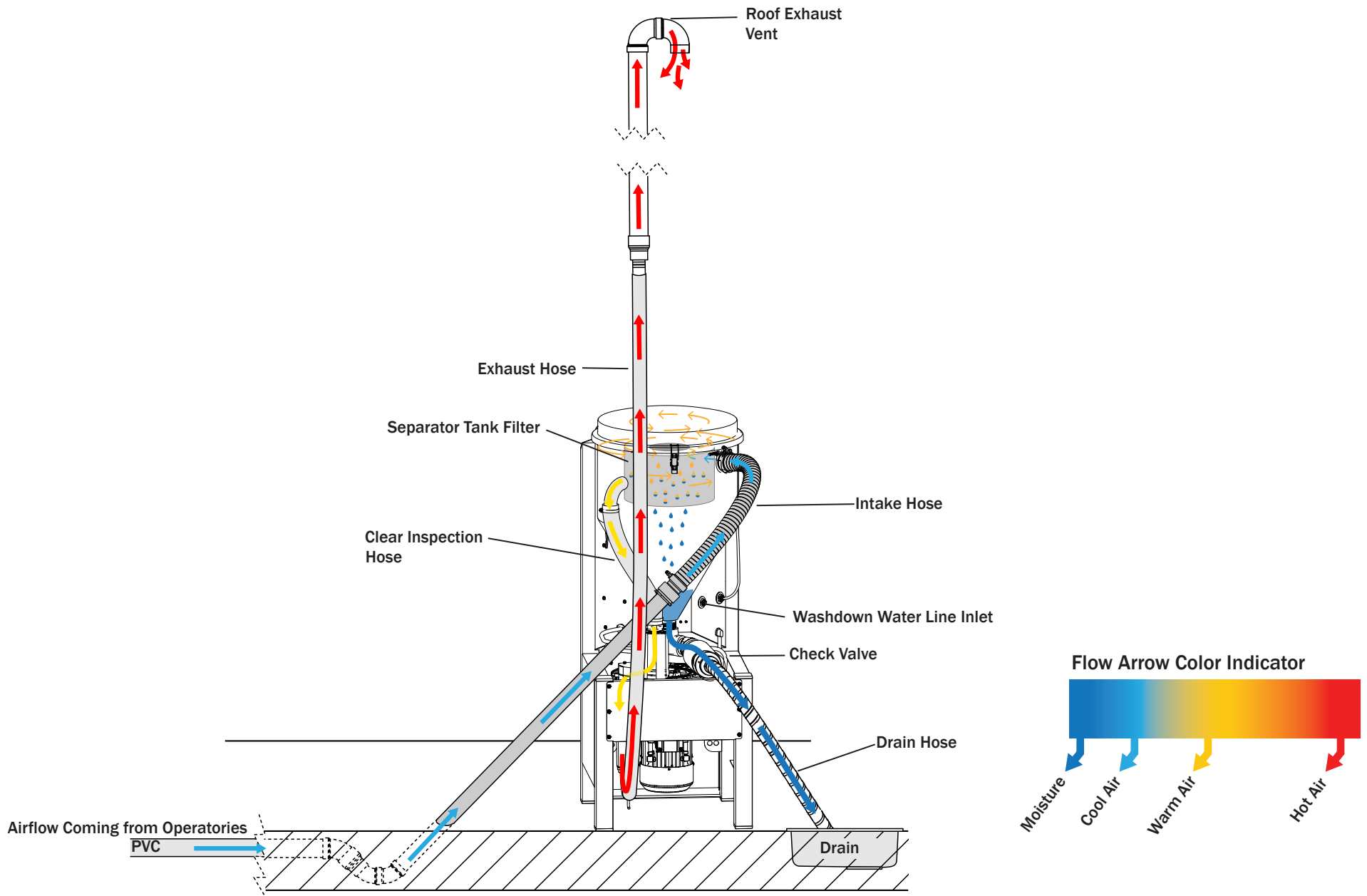
Remote Panel 24 VAC Wiring

Do Not Tie Together

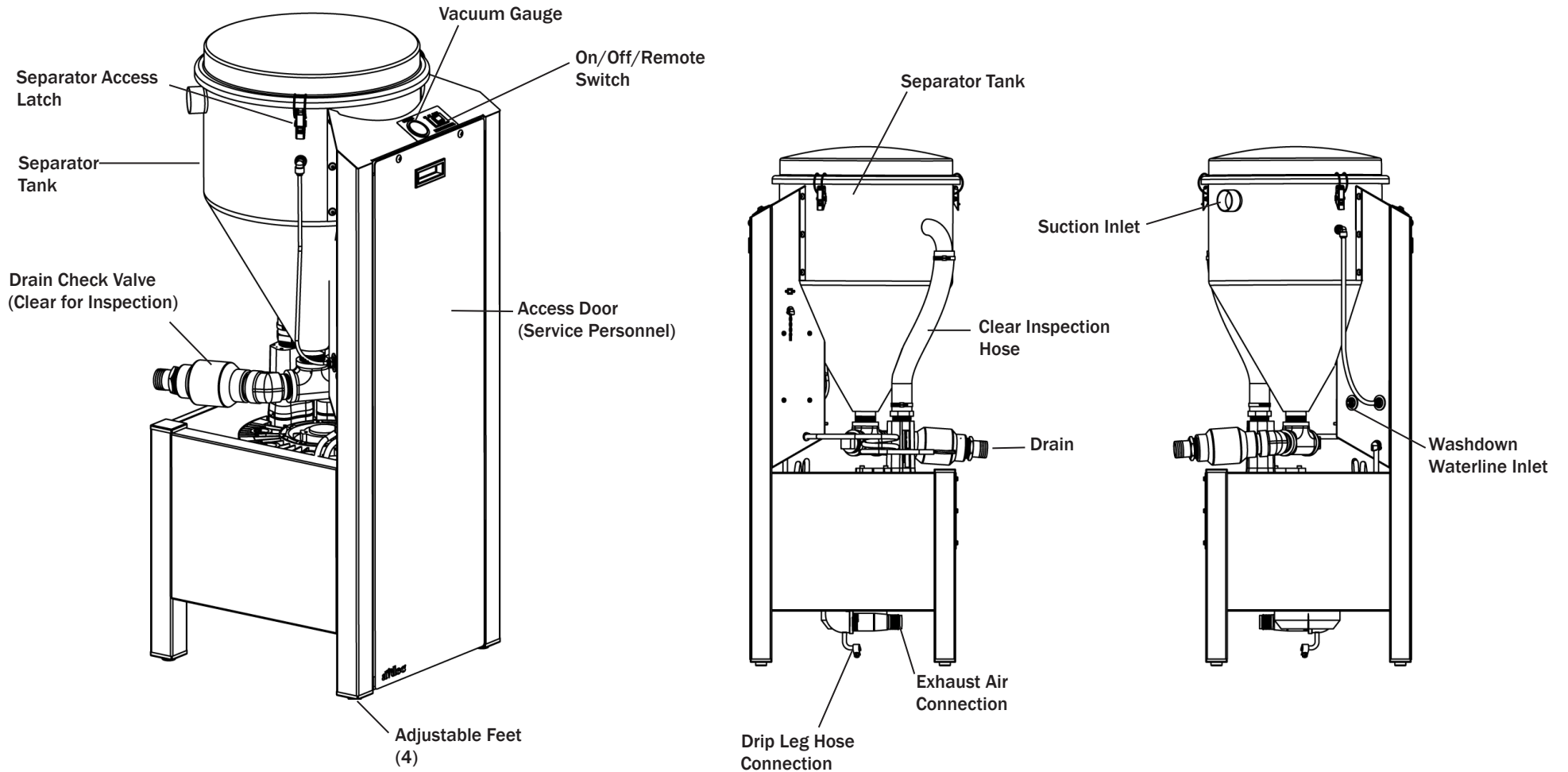
Remote Panel 24 VAC Wiring



Flow Diagram

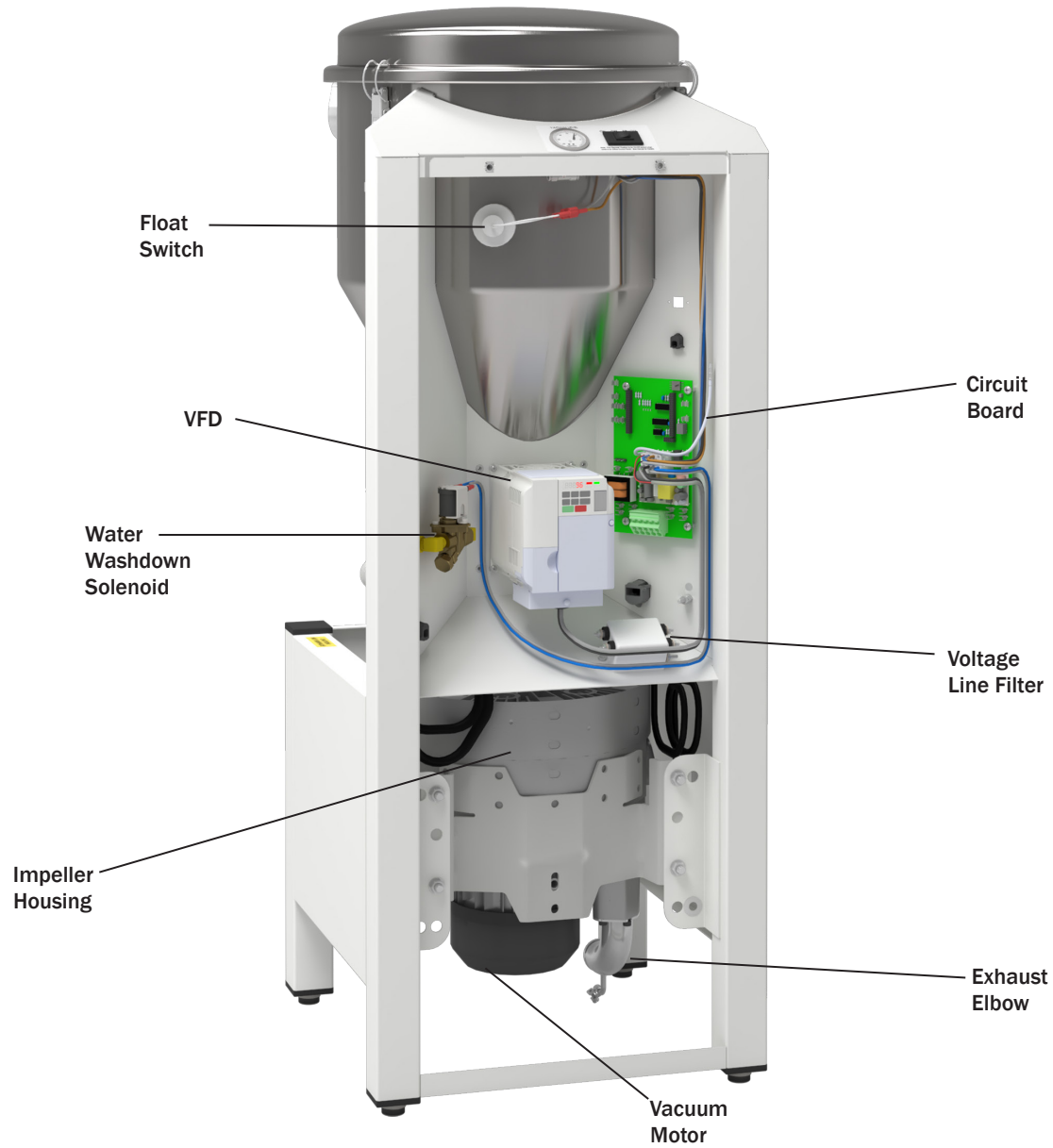


Components



Components *(continued)*

Front Components

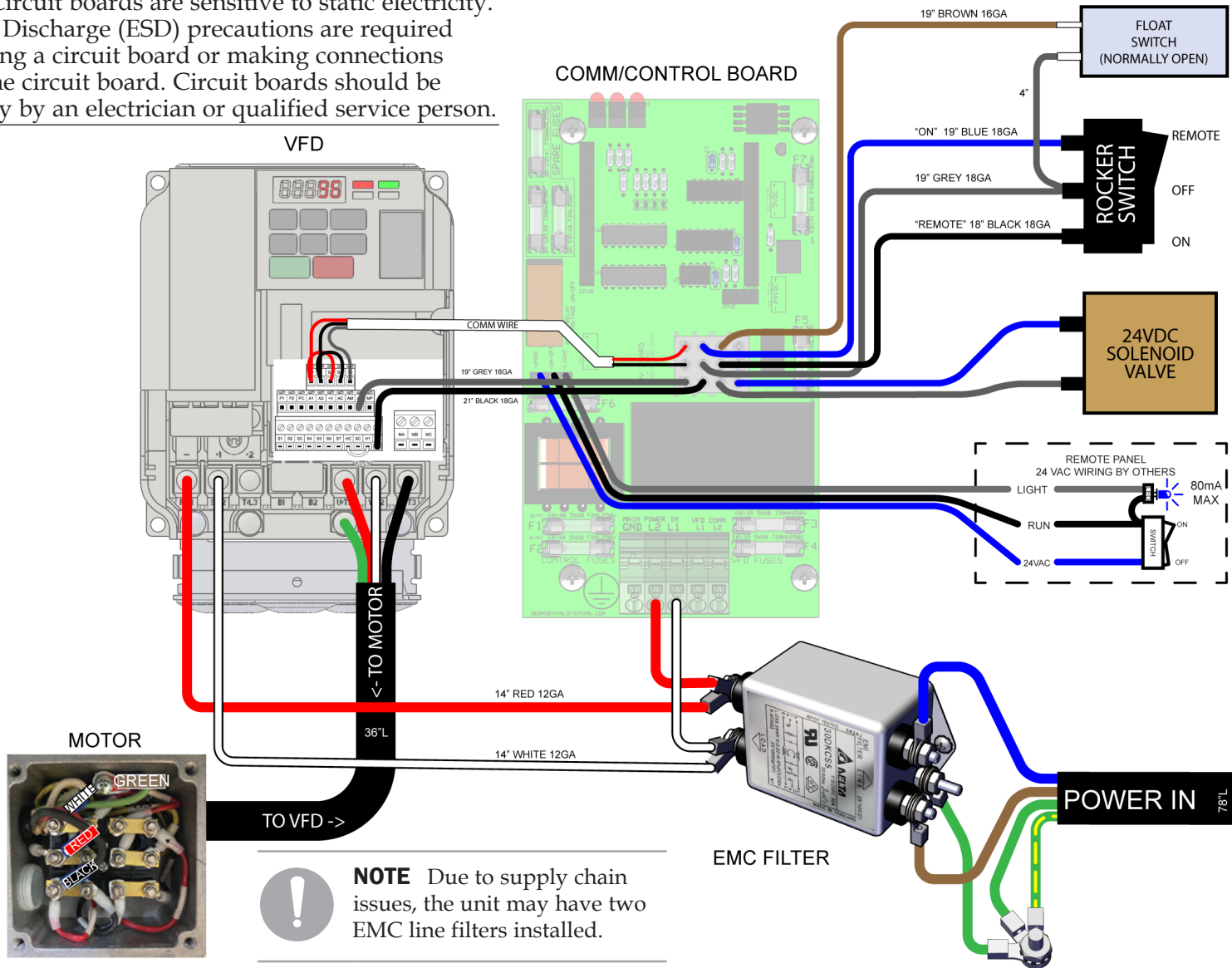


Wiring Diagram

Effective April 2021



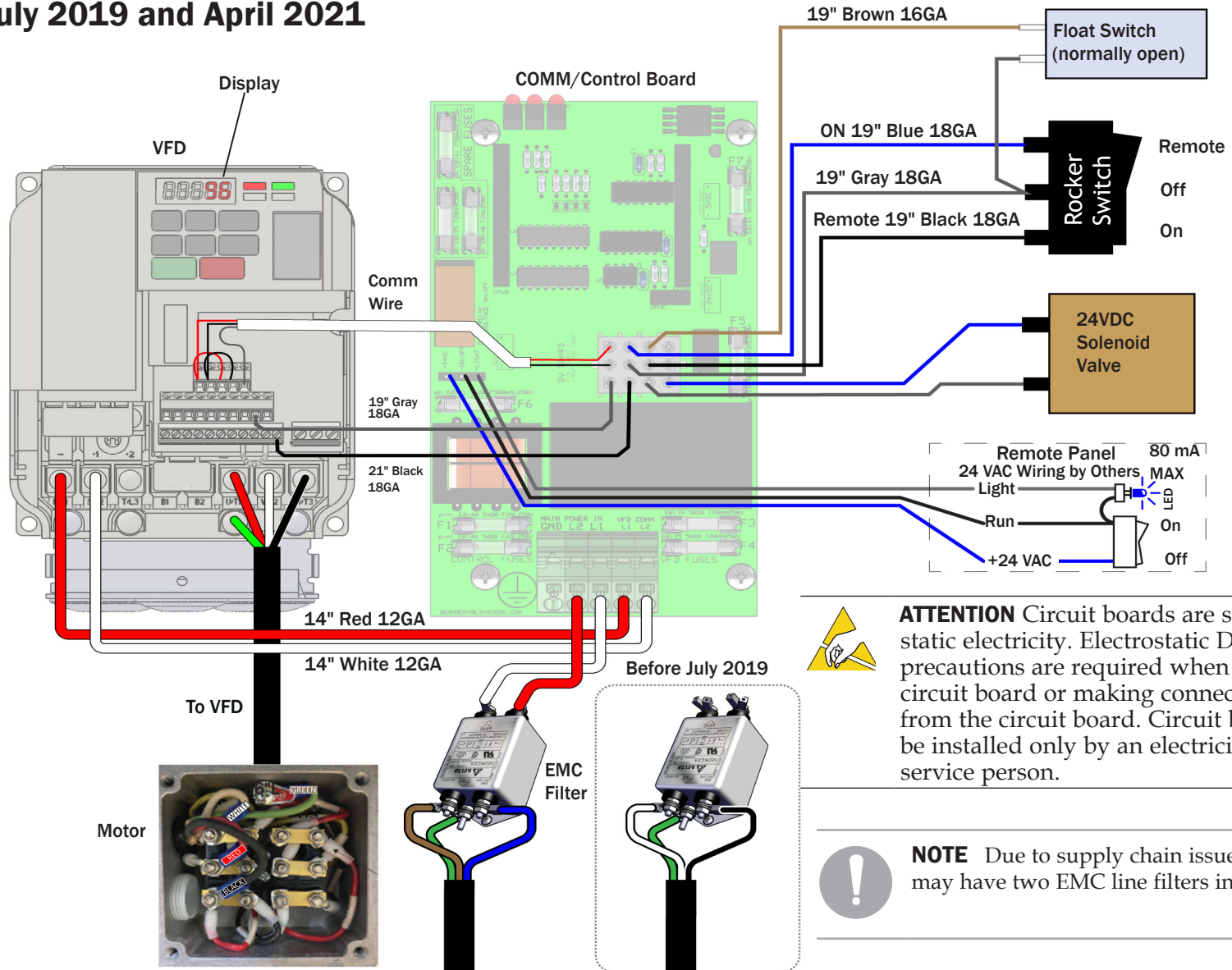
ATTENTION Circuit boards are sensitive to static electricity. Electrostatic Discharge (ESD) precautions are required when touching a circuit board or making connections to or from the circuit board. Circuit boards should be installed only by an electrician or qualified service person.



NOTE Due to supply chain issues, the unit may have two EMC line filters installed.

Wiring Diagram

Between July 2019 and April 2021



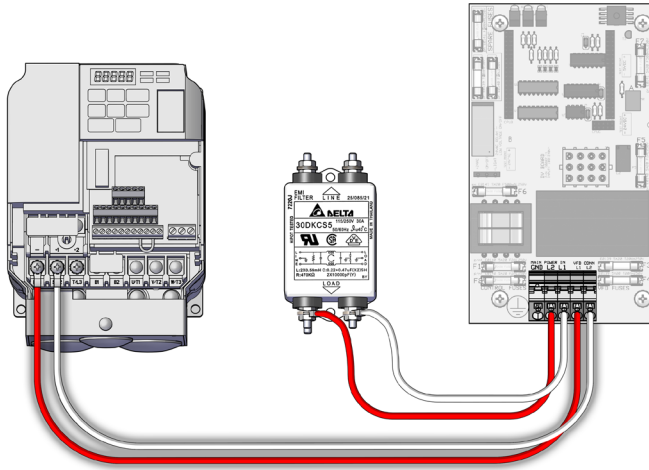
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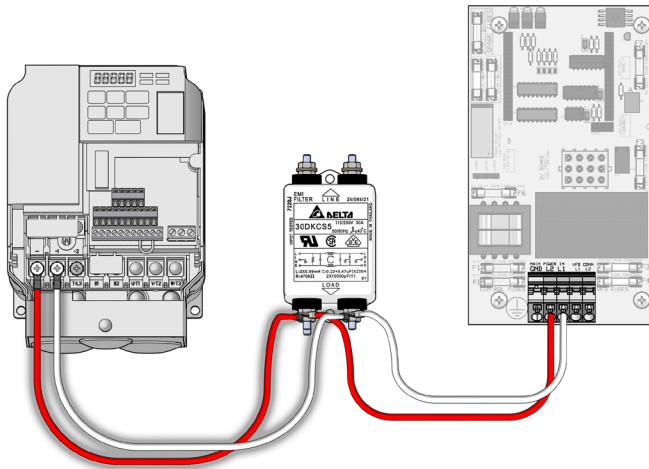
NOTE Due to supply chain issues, the unit may have two EMC line filters installed.

Wiring Bypass Configurations

The following wiring bypass configuration was introduced in April 2021 to prevent the occasional fuse failure of F3/F4 due to amperage that was drawing beyond the undersized fuses. Kits are available at no cost for units produced between July 2019 and April 2021.



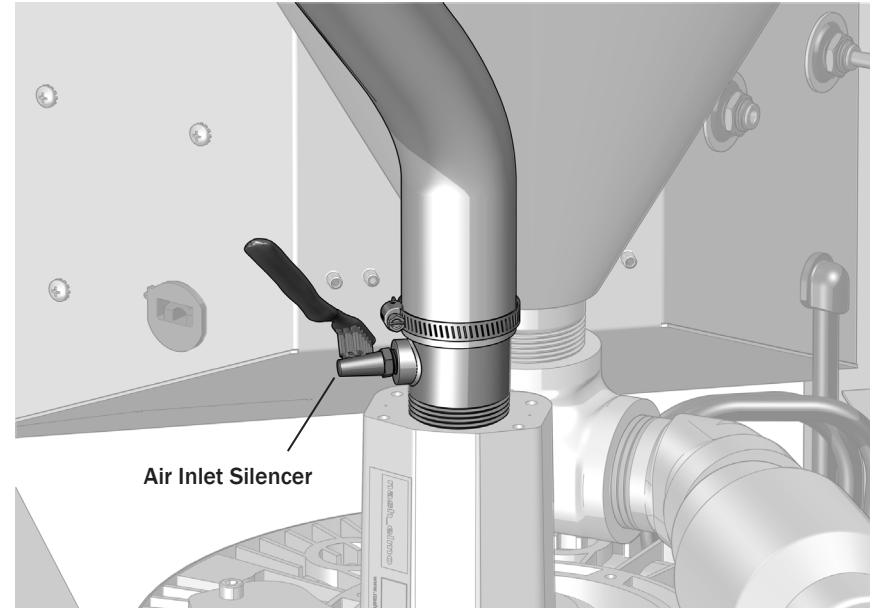
Before the Kit Installation



After the Kit Installation

Air Inlet (Effective March 2022)

The air inlet was added to the vacuum in March 2022 to increase the internal airflow and lower the blower internal operating temperature in the vacuum piping system, resulting in little to no leakage. The air inlet silencer should be removed and cleaned at least once a year. You can also use ultrasonic cleaning for the air inlet screen.



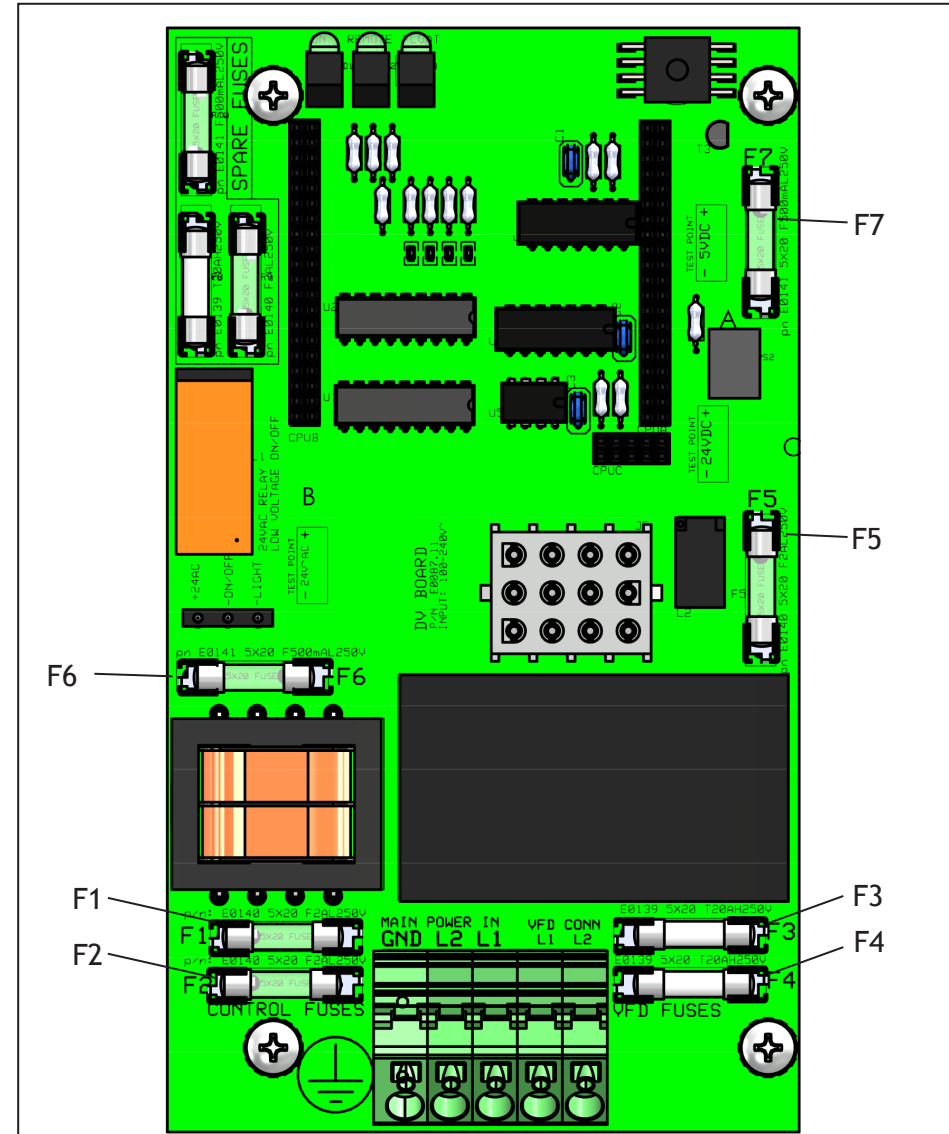
Fuse Identification

Fuse ID	Purpose	Part Number	Description	Fuse ID
F1	Low volt switch transformer (24 Vac) and CPU board	E0140	FUSE GLASS 2A 250 VAC 5 x 20 mm	F2AL250V
F2				
F3	VFD (Variable Frequency Drive)	E0139	FUSE CERAMIC 20A 250 VAC 5 x 20 mm	T20AH250V
F4				
F5	Washdown solenoid and CPU board power feed (2V)	E0140	FUSE GLASS 2A 250 VAC 5 x 20 mm	F2AL250V
F6	Low volt switch	E0141	FUSE GLASS 500mA 250VAC 5X20 mm	F500mAL250V
F7	CPU board (5V)			



NOTE To verify the fuse is good, the fuse must be removed from the board to test for continuity.

COMM/Control Board



Maintain/Troubleshoot

Regular Maintenance Tasks



WARNING Before performing any maintenance function, turn off the vacuum unit and disconnect main power to the vacuum. Failure to do so may result in injury or equipment damage.

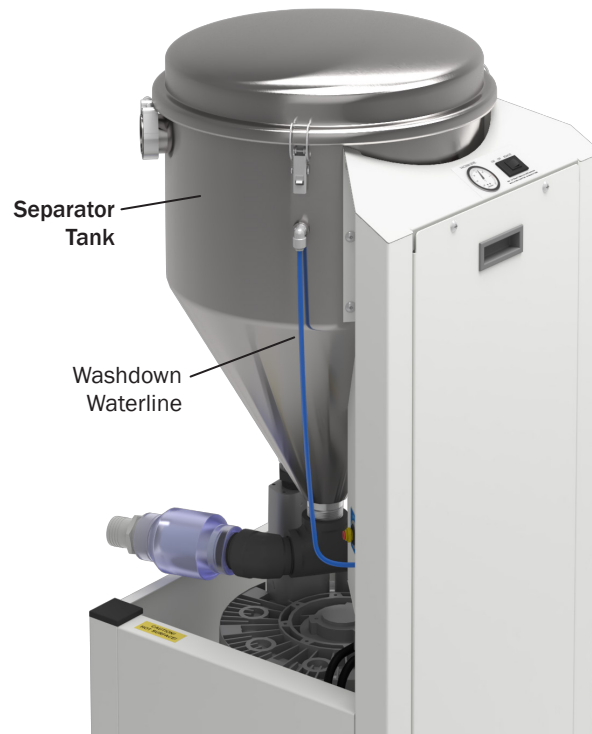
Do not open the service panel or service the vacuum for issues other than those described in this section, or you may risk injury or equipment damage. All other service requires a qualified service technician from your authorized A-dec dealer.



CAUTION Use A-dec's Evacuation System Cleaner (see "Separator Tank Drain and Washdown Cycles" on page 8) when cleaning the vacuum lines. If using another cleaner, do not use oxidizing or acidic cleaners with a pH less than 6 or greater than 8 (including bleach, chlorine, iodine and peroxide). These may lead to the dissolution of solid mercury which can corrode and damage components in your system. **Use a non-foaming vacuum-line cleaner** and always follow the manufacturer's instructions.



NOTE Washdown is required for Endodontic offices.



To keep your vacuum system running smoothly, be sure to schedule a service checkup with your authorized A-dec dealer every year. And although the DV dry vacuum requires very little maintenance, see the table below for important recommended maintenance tasks.

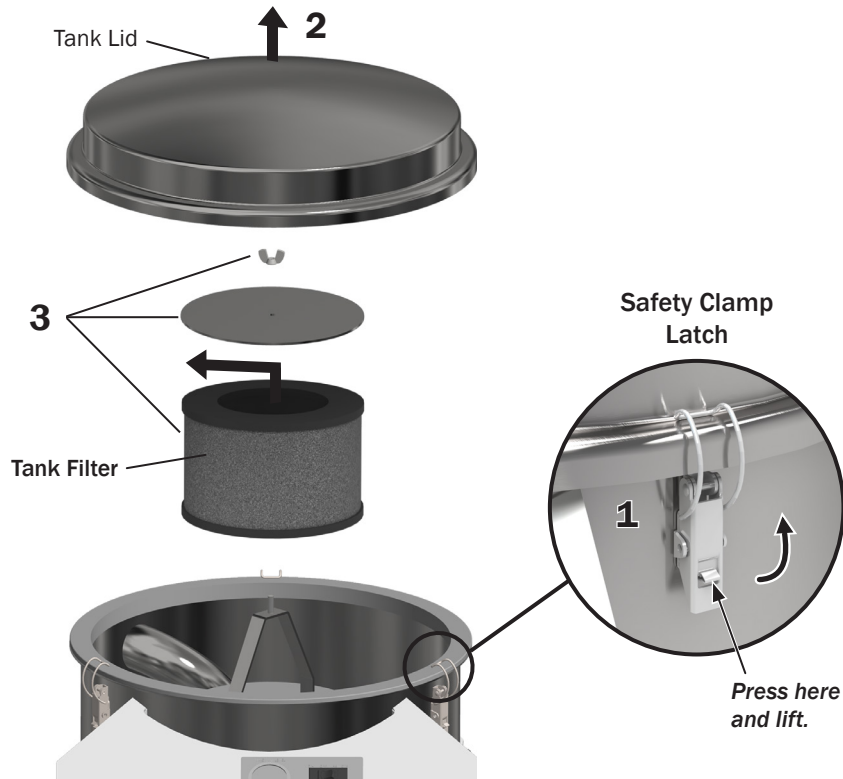
Frequency	Item	Task/Procedure
Once or Twice Daily	Vacuum-Line Cleaning	Follow your normal vacuum-line cleaning protocols to help prevent debris from settling in the vacuum plumbing.
	Separator Tank Drain and Rinse	Turn off the vacuum at the end of the day (<i>from the master power switch or remote on/off controls</i>) to initiate the separator tank drain and rinse cycles. For busier days and larger clinics, turn off the vacuum once at lunchtime and once at the end of the day. This will also help you avoid an unplanned shutoff/drain cycle during a procedure.

Regular Maintenance Tasks *(continued)*



WARNING Infectious biohazardous waste may be present. Follow asepsis and all personal protective equipment (PPE) protocols to prevent cross contamination.

In addition to biohazardous waste, the separator tank filter can capture and retain amalgam particles. Follow your local regulations when you dispose of the old filter.



Frequency	Maintenance Items	Task/Procedure
Weekly	Tubing Connections	Check for clean, clear tubing and listen for any noticeable vacuum leaks.
Monthly	Exterior Case and Tubing Connections	Use a dry, lint-free cloth to dust off and clean the exterior. Check for clean, clear tubing and listen for any noticeable vacuum leaks.
Yearly	Tank Filter (vacuum produced before March 2022 shown in image on this page)	<p>For vacuums produced before March 2022, please ensure that the filter is centered on the platform.</p> <p>Replace the tank filter* once a year. Before following these steps, turn off the vacuum and wait a few minutes to ensure that the drain and rinse cycle have finished, then disconnect main power to the vacuum.</p> <ol style="list-style-type: none"> 1. Press and release the three safety clamp latches securing the tank lid. 2. Remove the lid and <i>(as per your infection control protocols)</i> carefully set it aside. Ensure that the tank is empty. 3. Remove the wing-nut and plate, then remove the tank filter <i>(dispose of according to your local regulations)</i> and replace with a new one. <p>* For the separator tank filter replacement kit, order p/n A0049.</p>
	Vacuum Drain Check	Change the drain check valve. See "Troubleshooting Tasks" on page 26.
	Air Inlet	Brush or rinse the air inlet silencer to remove any dust or debris. You can also use ultrasonic cleaning for the air inlet.

Tank Filter (March 2022 and earlier)



Frequency	Maintenance Items	Task/Procedure
Yearly	Tank Filter	<p>Replace the separator tank filter* once a year. Turn off power to the vacuum and wait a few minutes before following these steps (to ensure the drain and rinse cycle have finished):</p> <ol style="list-style-type: none"> 1. Release the three clamps securing the separator tank lid to the tank. 2. Remove the lid and ensure that the tank is empty. 3. Remove the tank filter and replace with a new one. <p><i>*For the separator tank filter replacement kit, order p/n A0049.</i></p>

Annual Check Valve Change



CAUTION Never remove the check valve without first inspecting the inside of the tank to ensure that there are no residual liquids still trapped inside of the tank.

1. Turn off the vacuum and make sure power has been disconnected.
2. Ensure the tank has been drained of fluids.
3. Remove the check valve.
4. Install the new check valve and ensure that the valve flow direction and mounted positions are correct.




NOTE Ensure the check valves are installed correctly according to the markings on the manifold that indicate which side should be up, and an arrow indicating the airflow goes from the manifold to the vacuum.

Flow Points
Towards Drain



Troubleshooting Tasks

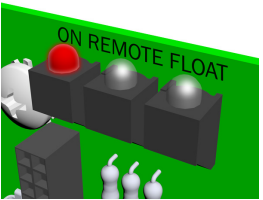
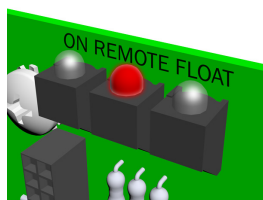
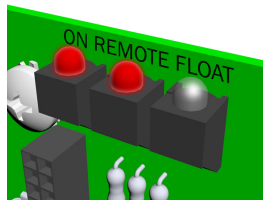
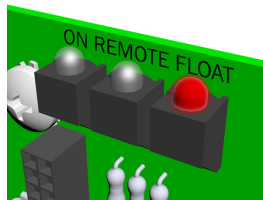
The following table is intended to help you identify common issues with your vacuum that may or may not require attention.

Condition	Potential Cause	Procedure/Remedy
Vacuum motor runs continuously with little to no suction.	Leak in the vacuum system.	Close all vacuum instruments and listen for leaks throughout the system. Check the vacuum gauge. If the vacuum runs continuously and cannot reach or consistently maintain 10 inHg (34 kPa) (or your adjusted preset level), contact A-dec Customer Service. Note: Check this when all instruments are closed and the system is at a rest.
	Pinched or kinked vacuum tubing.	Check to see if the dental equipment tubing is pinched or kinked. If the tubing is damaged, contact A-dec Customer Service.
	Stuck separator tank drain check valve (open).	Turn off the vacuum to initiate a drain and rinse cycle. If this does not remedy the condition, contact A-dec Customer Service.
Vacuum motor won't run while the master power switch is on.	Stuck separator tank float switch.	Turn off the vacuum to initiate a drain and rinse cycle. If this does not remedy the condition, contact A-dec Customer Service.
	Vacuum is in power safe mode. <i>(Note: power safe mode occurs when the vacuum loses power and cannot restart within 15 seconds.)</i>	To resume normal operation: <ol style="list-style-type: none"> 1. Turn off the vacuum master power switch. 2. Disconnect the power to the vacuum for 3 minutes. 3. Reconnect the power. 4. Turn on the vacuum master power switch or put it in the REMOTE position. Resume normal use. If this does not remedy the condition, contact A-dec Customer Service.
LED push-button or Smart Shield controls do not function.	Master power switch on the vacuum is not in the REMOTE position.	Ensure that the master power switch on the vacuum is in the REMOTE position. If it is, and you have push-button controls, contact A-dec Customer Service. If the master power switch is in the REMOTE position and you have the Smart Shield touchscreen, see the remedy below.
	Communication disruption/fault between system and Smart Shield touchscreen.	Tap on  at the top of the touchscreen, then tap RESET. If this does not resolve the condition, unplug the Smart Hub router power cord, wait 10 seconds, then plug it back in (note: this will reset the annual maintenance reminder to 12 months). If this does not resolve the condition, contact A-dec Customer Service.

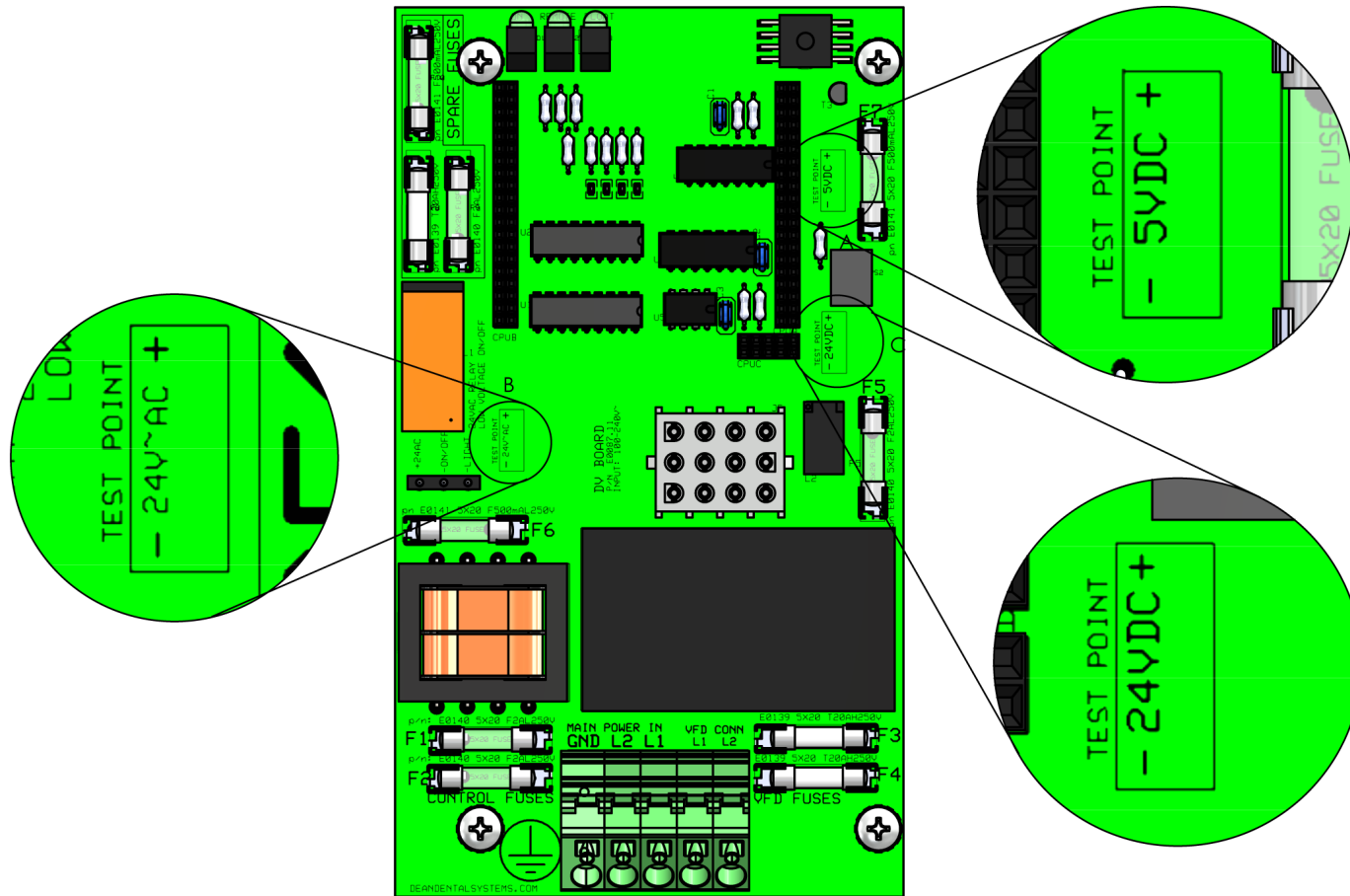
Variable Frequency Drive Codes

Code	Description	Procedure/Remedy
CALL/CE	Communication error	Contact your authorized A-dec dealer or A-dec Customer Service at 1.800.547.1883.
oL1	Motor overload	Contact your authorized A-dec dealer or A-dec Customer Service at 1.800.547.1883.
oL2	Drive overload	Contact your authorized A-dec dealer or A-dec Customer Service at 1.800.547.1883.
ov	Over voltage	If this is a recurring issue, consult a qualified electrician to adjust to the correct incoming voltage. If the problem persists, contact your authorized A-dec dealer or A-dec Customer Service at 1.800.547.1883.
oH1	Overheat	Ensure that the room temperature is lower than 104 °F (40 °C). Ensure that the vacuum has adequate space for ventilation. See the <i>A-dec DV Dry Vacuum Installation Guide</i> . Power cycle the vacuum. Ensure the vacuum is off for a minimum of 3 minutes, and then operate the vacuum in the power safe mode. If the problem persists, contact your authorized A-dec dealer or A-dec customer service at 1.800.547.1883.
oC	Overcurrent	Consult a qualified electrician to adjust to the correct voltage. If the problem persists, contact A-dec Customer Service at 1.800.547.1883.
Uv/Uv_	Under voltage	If this is a recurring issue, consult a qualified electrician to adjust to the correct incoming voltage. Power cycle the vacuum. Ensure the vacuum is off for a minimum of 3 minutes. If the problem persists, contact your authorized A-dec dealer or A-dec customer service at 1.800.547.1883.

Status Lights

Status Lights on the Internal Circuit Board	Mean This...
	<p>The vacuum has been turned on at the local switch, and is running.</p>
	<p>The Remote switch to the vacuum, either the Smart Shield touchscreen or the LED Push-Buttons, has been enabled from the local switch. The On signal is not detected from the Remote switch, so the vacuum is not running.</p>
	<p>The Remote switch to the vacuum, either the Smart Shield touchscreen or the LED Push-Buttons, has been enabled from the local switch. The On signal is detected from the Remote switch, so the vacuum is running.</p>
	<p>The Float switch is on, which stops the vacuum because water has filled up the vacuum's tank. The vacuum starts 10 seconds after the water level has dropped enough to turn the Float switch off, then this light turns off.</p>

Circuit Board Electrical Test Locations



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

Initial Startup Checklist



WARNING Keep hands clear of moving parts. The vacuum can start automatically without warning.

- Inspect unit for any visible signs of damage that may have occurred in shipment or during installation.
- Verify the electrical connection attachments, and that incoming line voltage is between 200 and 240 VAC.
- Activate main disconnect switch or circuit breaker.
- Turn on the vacuum, and ensure unit starts. If it does not start, refer to “Status Lights” on page 28.
- Check the gauge on the front of the vacuum for proper vacuum level. See the **Set "HG** column in the table “Site Specifications and Sizing Information” on page 4.
- Check that all of the HVEs and SEs have proper suction.
- Check for leaks in all connections and the piping system.

Turn off the vacuum.

- Optional - Verify washdown operation begins 45-60 seconds after turning off the vacuum. Listen for the solenoid to open the water line and look at the drain check valve to confirm that the water is draining.
- Verify the Drain hose flows cleanly and has no low spots to trap debris.
- If remote buttons or a touchscreen are in use:
 - Switch the rocker to the remote position.
 - Verify the system turns on /off with remote switches or touchscreen.
- If the system uses remote monitoring, call A-dec Customer Service to confirm it is reporting.



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