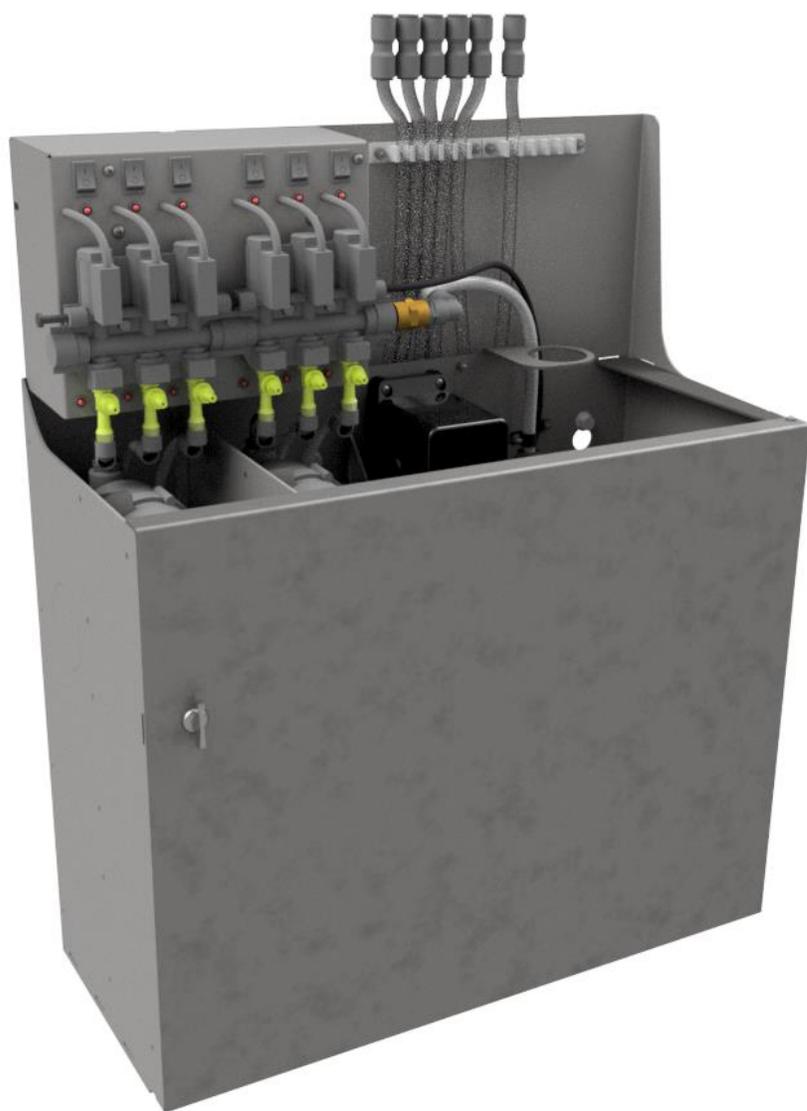


COMPACT PUMP STATION - Model 1A201002



Installation, Operations, & Maintenance Manual

Vacutech, LLC

5/1/2019

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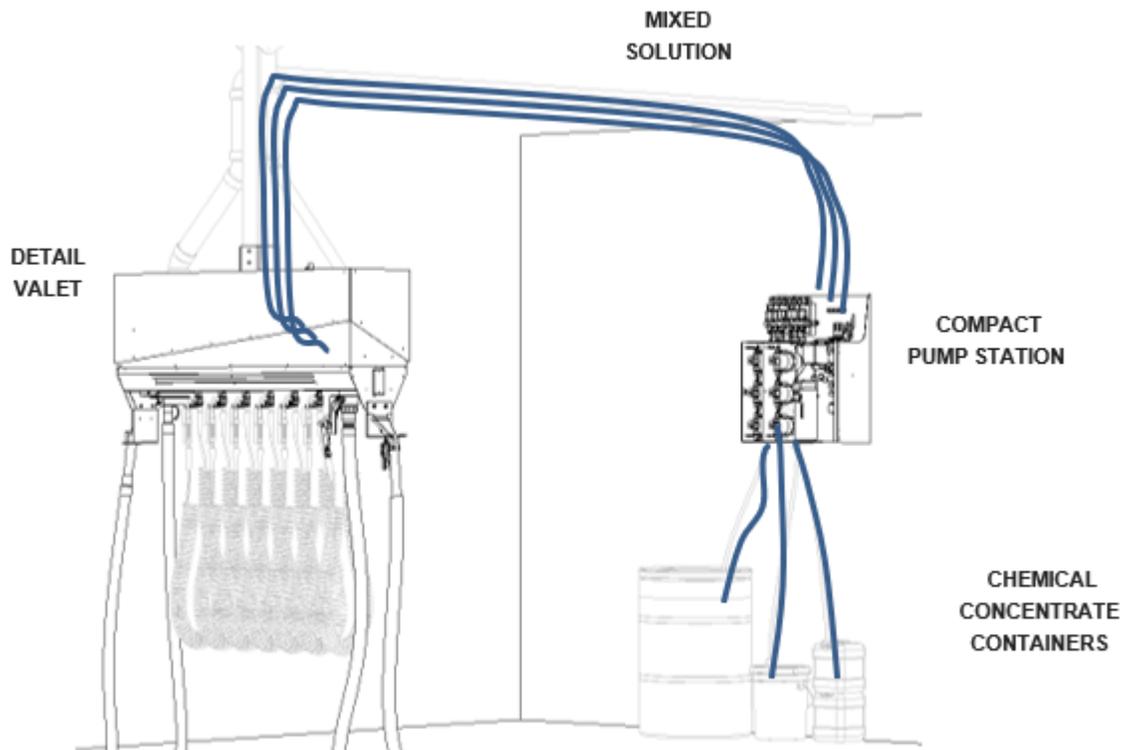
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List of Acronyms

AC	Alternating Current
CPS	Compact Pump Station
FPT	Female Pipe Thread
ID	Inside Diameter
NPT	National Pipe Tapered Thread
MPT	Male Pipe Thread
OD	Outside Diameter
OSHA	Occupational Safety and Health Administration
PSI	Pounds per Square Inch
VAC	Voltage – Alternating Current

1.0 Introduction

Vacutech LLC, (**Vacutech**) thanks you for choosing us to fulfill your chemical dispensing needs. The **Vacutech** Compact Pump Station (CPS) provides an economical and effective means of mixing chemical solutions for low pressure applications. The CPS draws a Chemical Concentrate from any factory container and mixes it with water at a pre-set ratio to generate a Mixed Solution. The Mixed Solution is pumped through tubing to low pressure dispensing applicators, such as hand trigger spray nozzles hanging on a Detail Valet. The small footprint of the CPS minimizes the space required in equipment rooms.



This manual provides the basic information needed for the installation of a **Vacutech** CPS and a basic understanding of the mixing process. The contents of this manual will aid in the effective operation and maintenance of your **Vacutech** CPS to ensure years of dependable service.

This manual is organized as follows: Following a discussion on receiving and a diagram of the overall system, is a presentation of safety considerations. An overview of the chemical mixing process, followed by an operational sequence of the **Vacutech** CPS, is then presented. Basic installation requirements, followed by operational and maintenance instructions, are then provided. Finally, a list of replacement parts is supplied, followed by the **Vacutech** warranty and service information.

1.1 Receiving

Prior to unloading, visually inspect your **Vacutech** equipment for dents, scratches, or other damage which may have occurred during shipment. Any observed damage should be photographed and documented with the transport company prior to their departure. Additionally, notification of damage should be made to

Vacutech at the earliest opportunity. The equipment received should be compared to packing lists, with any variances reported to **Vacutech**. It is the customer's responsibility to file damage claims and shortage reports with the carrier who is responsible for the equipment during transit.

1.2 Vacutech Compact Pump Station Diagram

A diagram of your **Vacutech** CPS is shown in Figure 1.2.1 & Figure 1.2.2

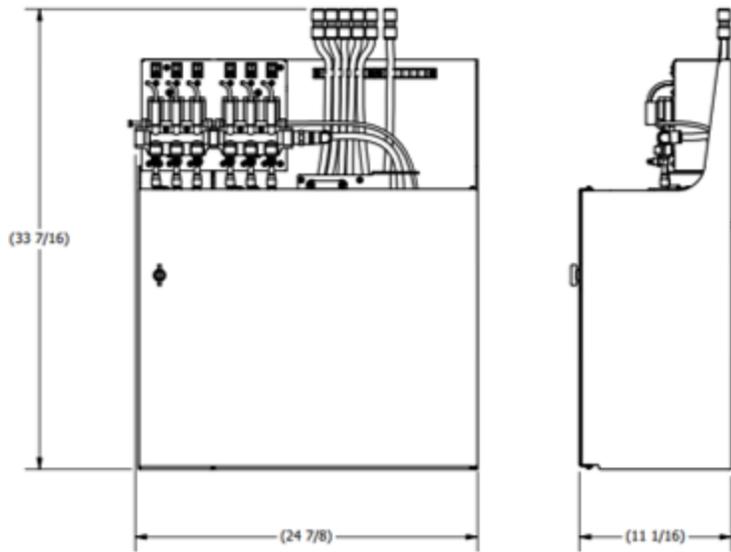


Figure 1.2.1 – Vacutech Compact Pump Station Diagram (Door Closed)

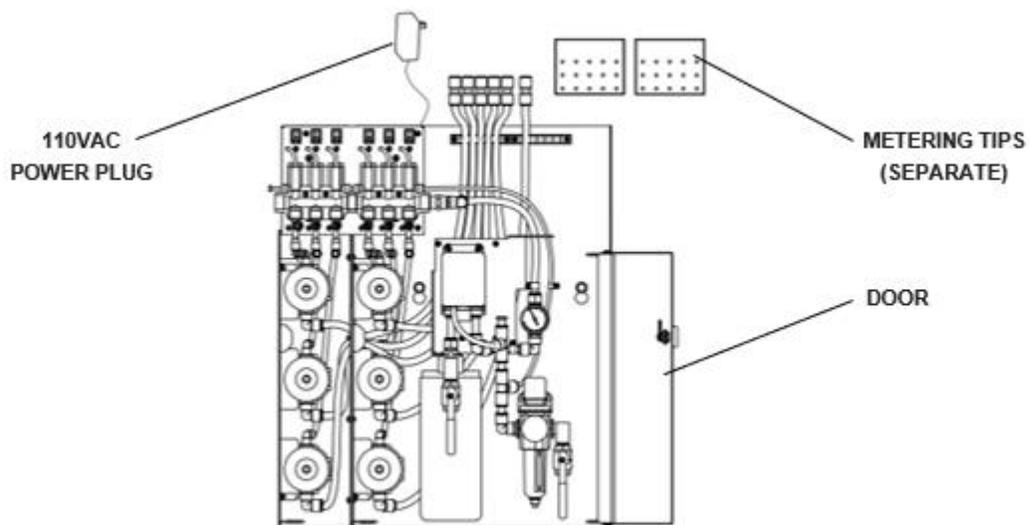


Figure 1.2.2 – Vacutech Compact Pump Station Diagram (Door Open)

2.0 Safety Precautions

All **Vacutech** equipment must be installed and maintained by qualified personnel, familiar with the equipment and this manual. **Vacutech** is not responsible for malfunctions or equipment failures resulting from improper installation or maintenance. Site-specific, OSHA-compliant safety procedures should be developed for your facility, with proper training provided to personnel prior to installation, operation, maintenance, or service of your equipment.

Warning! When using electrical and pressurized equipment, basic safety precautions must always be followed to reduce the risk of fire, electrical shock, and injury. Your company should develop site-specific, OSHA-compliant procedures for proper isolation of all energy sources associated with your CPS system with all operations and maintenance personnel appropriately trained.

Before startup or servicing of your **Vacutech** CPS, the following safety items need to be considered:

- **Guarding:** Do not operate this equipment without all guards in place and access doors properly secured.
- **House Keeping:** The work area around the CPS should be kept clean and free of flammable liquids, gases, and materials.
- **Pressure:**
 - Do not start the system prior to installation being complete (with all tube and piping connected and tightened). High positive pressures associated with the Compact Pump Station may result in high pressure spray and/or bodily injury.
 - A lockable isolation valve must be installed between the source of compressed air and the CPS
 - The compressed air isolation valve for the CPS must be closed and the air system must be relieved of pressure and verified before accessing the system for service.

Warning! This equipment has automatic controls that could actuate the CPS at any time if not properly isolated.

- **Electrical:**
 - A separate lockable electrical disconnect must be installed for the system in accordance with NEC and local codes.
 - Electrical troubleshooting and service must be performed by a certified electrician.
 - The electrical disconnect must be properly disconnected, locked out and tagged out, and verified prior to accessing any disconnect box or control panel.
- **Inspections:** Inspections should be performed daily, as well as prior to and during startup, to check for any damage. If any damage is observed the system should immediately be shut down and must be repaired by authorized personnel.
- **Parts: Warning!** Use of replacement parts from any source other than **Vacutech** could result in damage to your equipment and may void the equipment warranty.

Chemical Compatibility: Prior to use, ensure all diluted chemicals are compatible with the butyl rubber and polyethylene internal components of the CPS. Use of chemicals which are not compatible could result in damage to your equipment and may void the equipment warranty.

3.0 System Overview

The Compact Pump Station consists of three systems: A Water System, a Pneumatic System, and a Chemical Mixing System. The CPS requires a 110VAC Electrical Power Source, a Compressed Air Source, Potable Water, and Concentrated Chemical as Inputs, and delivers Mixed Solution(s) as the primary outputs. Filtered Air and Filtered Water are optional outputs.

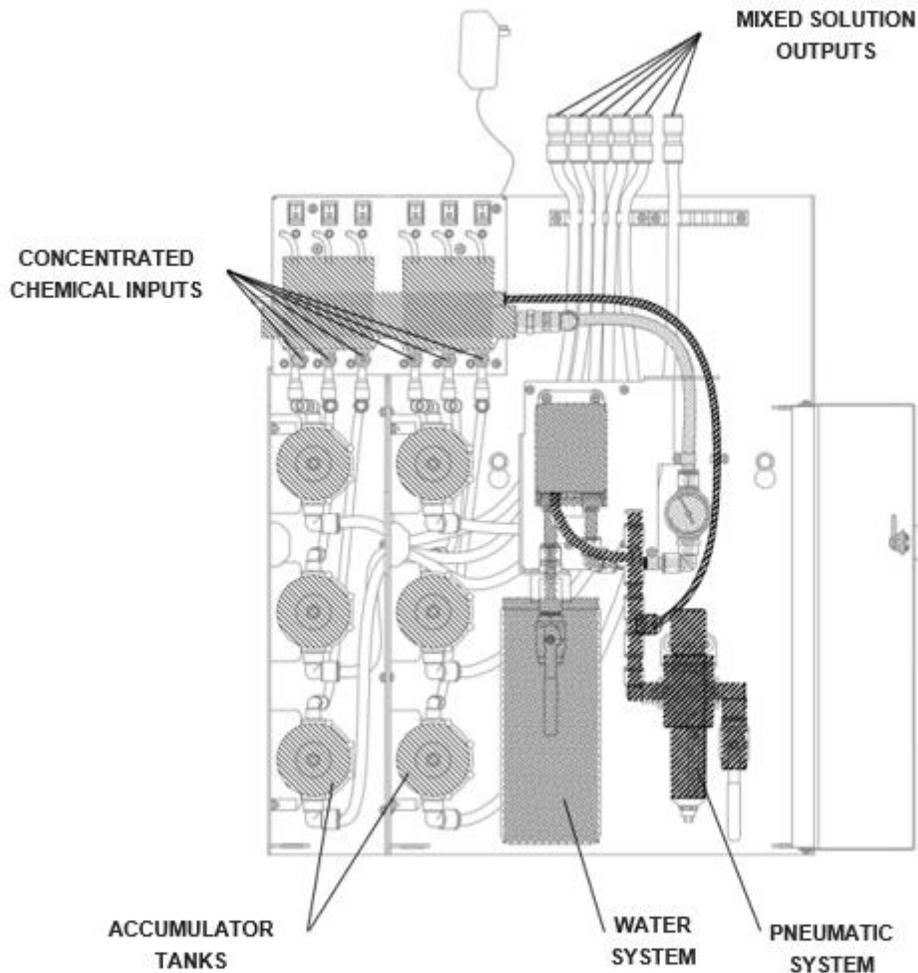


Figure 3.0.1 – Vacutech Compact Pump Station Diagram (Door Open)

3.1 Water System

Source water is mixed with a Chemical Concentrate from any factory container into a Mixed Solution. An optional auxiliary water port is provided for water delivery to detail valets.

- A. Source Water connects to CPS through ½" FPT ball valve and passes into Water Filter;

- B. Filtered water passes through Water Booster Pump;
- C. Filtered water stops at Solenoid Valve, until Solenoid Valve opens.
- D. (Optional) Filtered water passes into delivery tubing connected to hot water heater(s) within the detail valet. If this outlet port is not to be used, ensure that the port is properly capped prior to initial startup of the system.

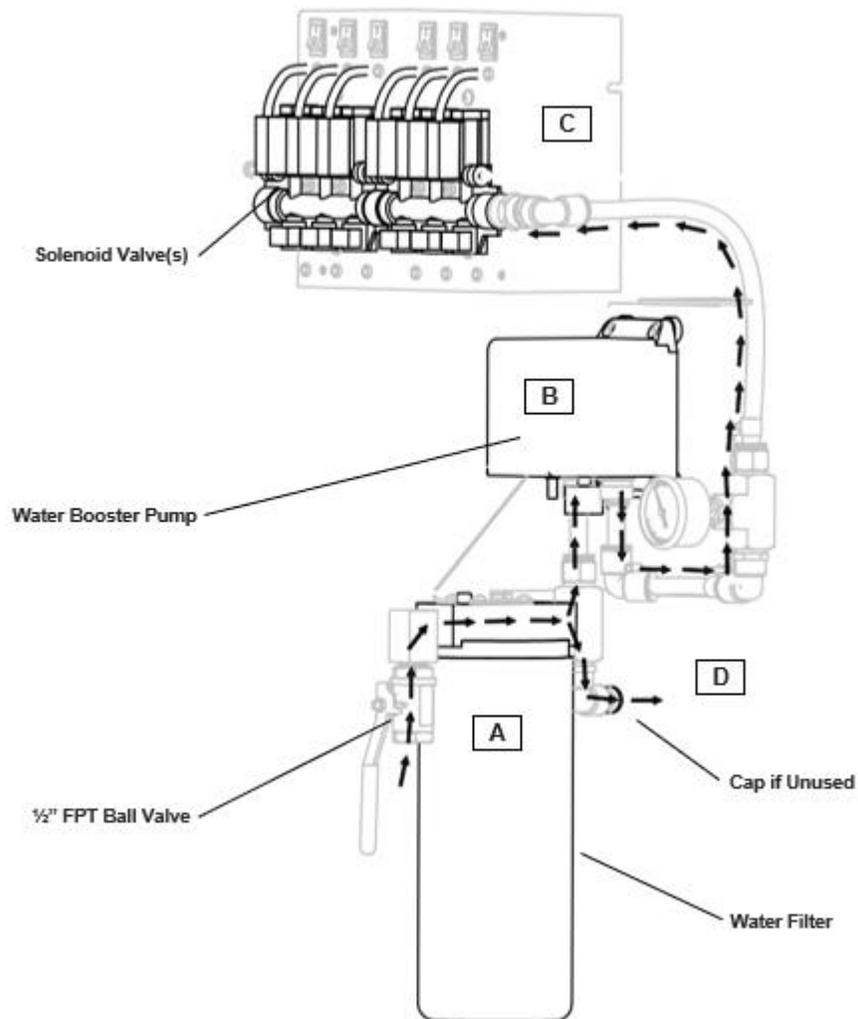


Figure 3.1.1 – CPS Water System

3.2 Pneumatic System

The Water Booster Pump and Solenoid Valves are pneumatically operated and require a clean and dry Compressed Air Source.

- A. Compressed Air Source connects to 1/2" FPT Ball Valve;
- B. Air passes through Air Filter Regulator and is regulated to 90 PSI;
- C. Regulated air energizes on-demand Water Booster Pump;
- D. Regulated air flow operates Solenoid Valve(s).

- E. (Optional) If an air system option is designed for the project, a secondary regulator connects into the filtered compressed air line. The Secondary Regulator regulates air from 90 PSI to a safe pressure for air gun nozzles or other uses. If this outlet port is not to be used, ensure that the port is properly capped prior to initial startup of the system.

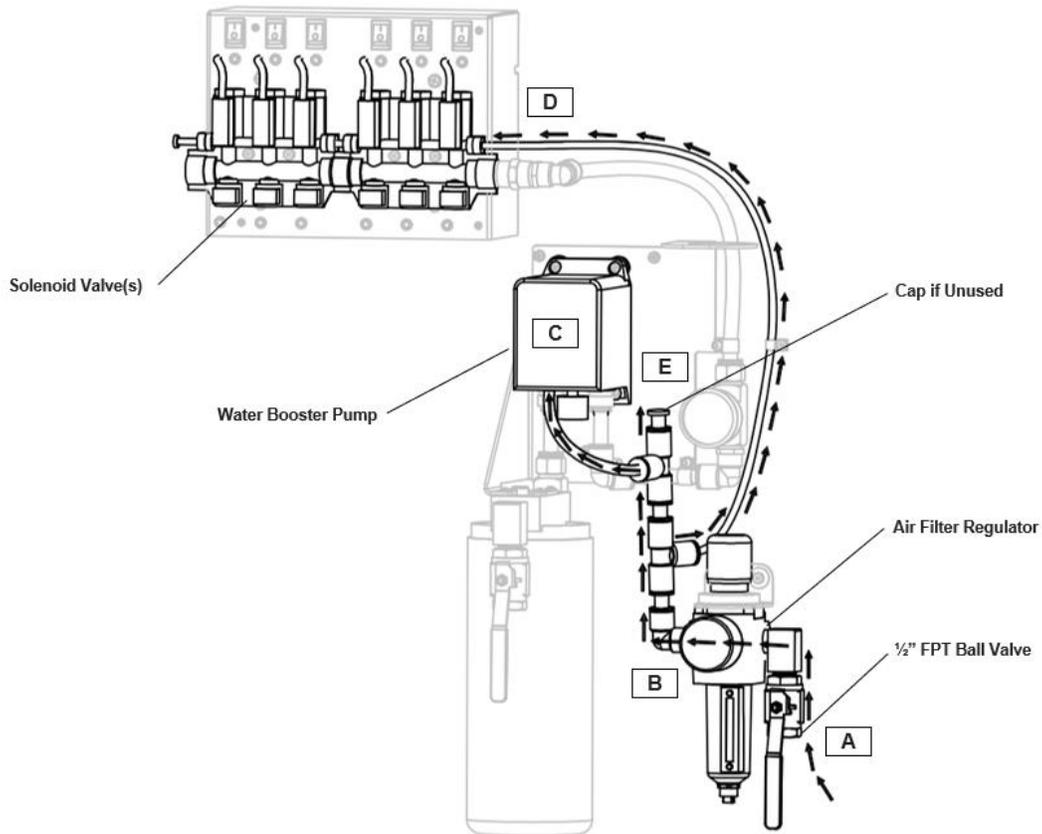


Figure 3.2 – CPS Pneumatic System

3.3 Chemical Mixing System

When the power switch is placed in the “ON” position for a given Mixed Solution (Reference Figure 3.3.1):

1. System is powered on, power LED lights up;
2. If pressure in an Accumulator Tank is low, the Pressure Switch attached to that tank sends a signal to the associated Solenoid to activate it;
3. The associated Injector LED lights up, indicating the Solenoid is open;
4. The open Solenoid feeds High Pressure Water to the associated injector (see Figure 3.3.2) which draws chemical concentrate through the metering tip (see Figure 3.3.3);
5. Water and Chemical Concentrate are combined into a Mixed Solution and exit the Injector;
6. Tank & connected tubing fills with Mixed Solution, until Pressure Switch set point is reached and Pressure Switch closes the associated Solenoid Valve;
7. Process repeats as mixed solution is used

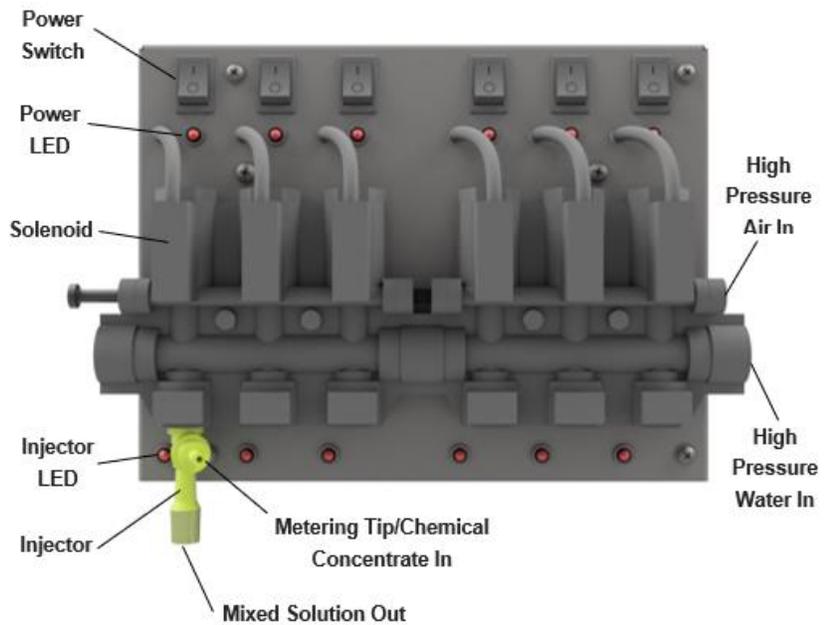


Figure 3.3.1 – Injector Assembly



Figure 3.3.3 – Metering Tip

A metering tip sets the desired ratio of chemical to water.

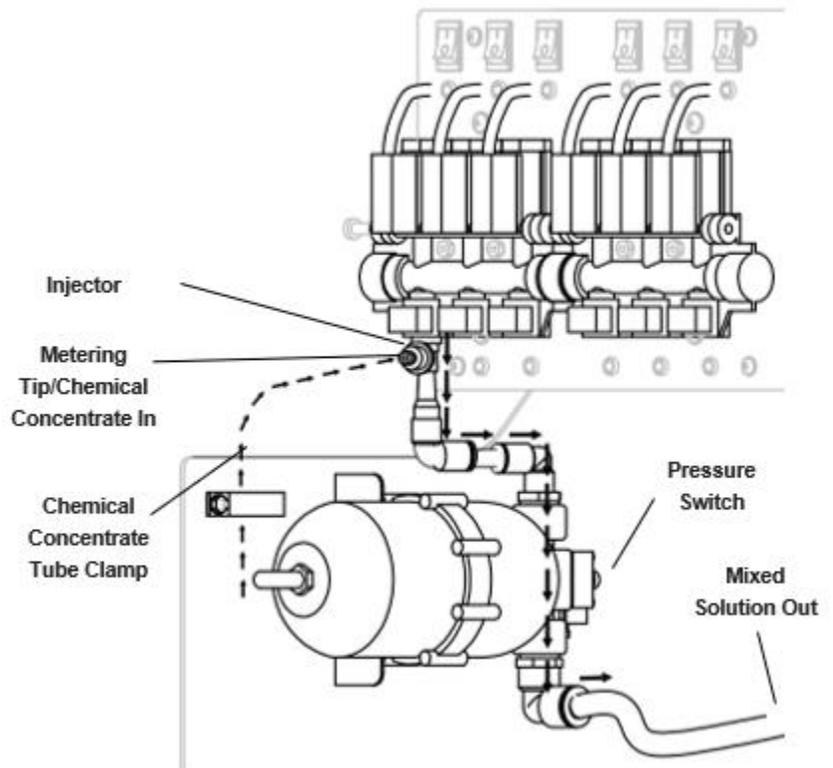


Figure 3.3.2 – Injector Assembly & Tank

4.0 Installation

All **Vacutech** equipment must be installed and maintained by qualified personnel, familiar with the equipment and this manual. **Vacutech** is not responsible for issues or equipment failures resulting from improper installation or maintenance.

The **Vacutech** CPS typically ships as a complete unit. CPS Door, Injector Assembly, Tubing, Water Filter, Electrical Cords, Switches and LED Lights should be inspected visually for damage prior to installation.

4.1 System Requirements

Electrical Power	110VAC 15AMP circuit (GFCI recommended)
Compressed Air	20 CFM @ 90 PSI clean (40-micron filtration), dry (dew point -40 °F), no air lubrication required, ½" FPT Connection
Water	40 PSI water in, 2 GPM ½" FPT Connection

Table 4.1.1 – System Requirements

4.2 Tools Required

A standard SAE socket set, and 1 roll of Teflon pipe tape are required for installation.

4.3 Mounting

The **Vacutech** CPS weighs between 70 and 150 pounds, depending on the CPS model, and is equipped with mounting holes for use with 3/8" mounting hardware. The **Vacutech** CPS is designed to be mounted to a wall or elevated stand. The CPS is not designed for floor mount applications and will not function properly if mounted in such a configuration.

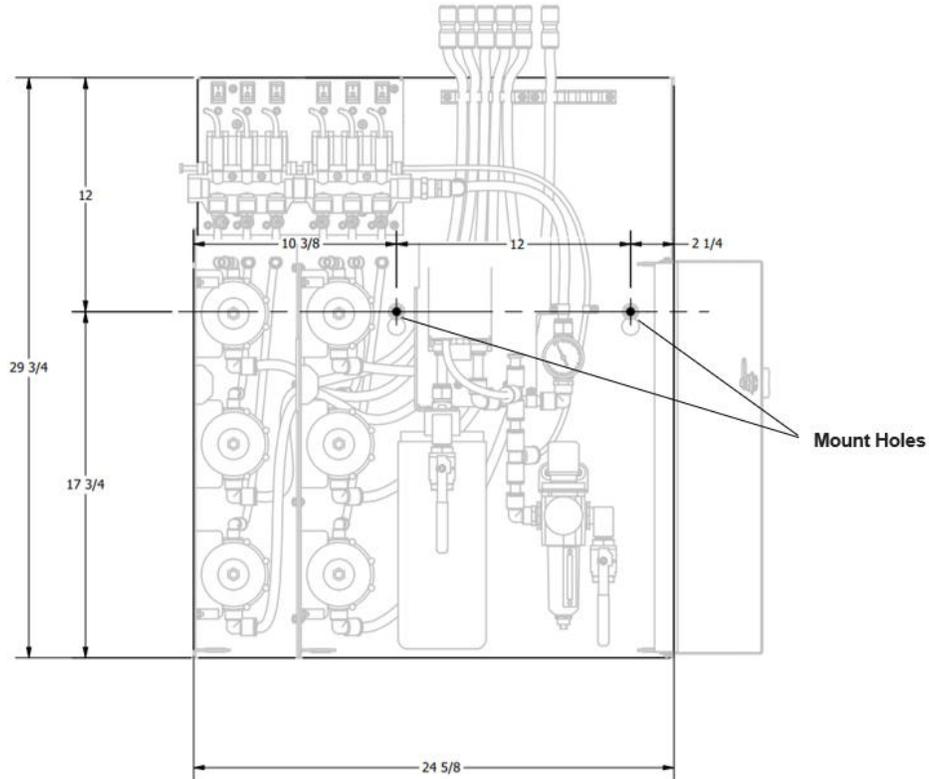


Figure 4.4.1 – CPS Mounting Diagram

4.4 Connections

The **Vacutec** CPS requires Water, Compressed Air Source, and Chemical Concentrate to Inlets. The CPS also requires a 110VAC Electrical Power Source.

The CPS delivers Mixed Solution(s) as the primary outputs. Filtered Air and Filtered Water are (optional) outputs. All outlets are sized for $\frac{1}{2}$ " O.D. Tube.

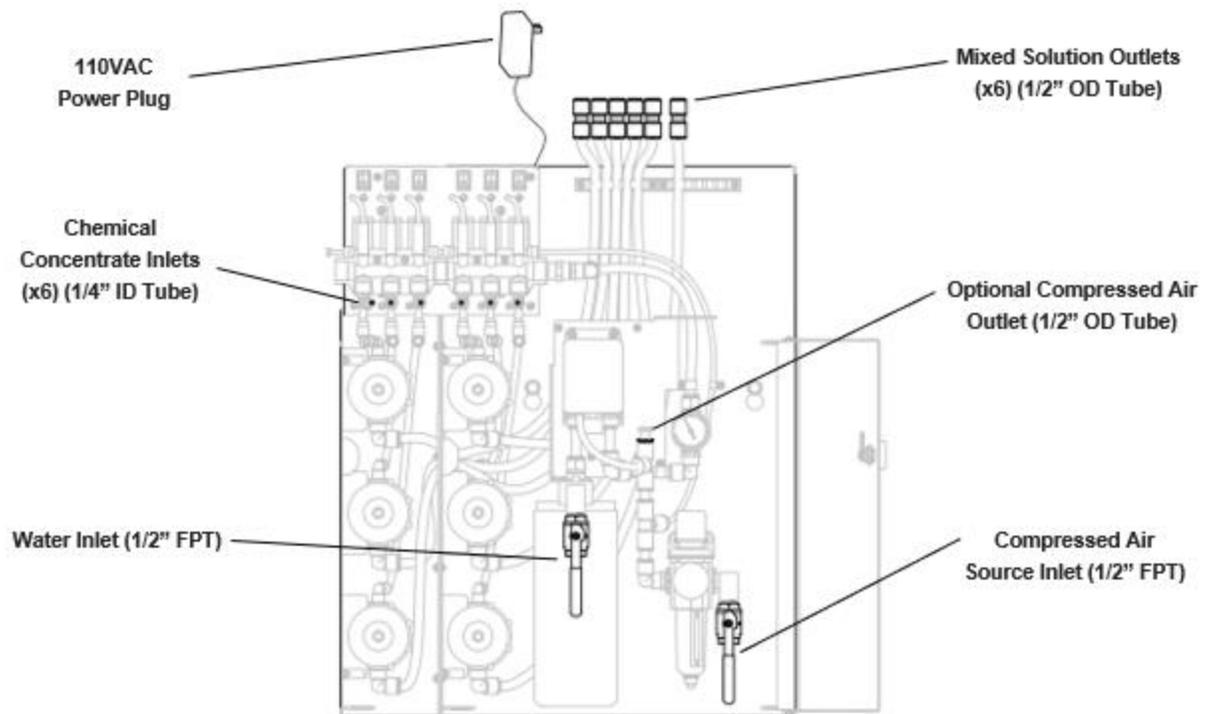


Figure 4.5.1 – CPS Compressed Air, Chemical Concentrate & Electrical Power Connections

Figure 4.5.2 – CPS Water Outlet Connection (Optional)

The following section describes the CPS connections step by step.

1. Connect air from Compressed Air Source to ½" FPT Ball Valve
2. Connect water from Water Source to ½" FPT Ball Valve
3. Identify Metering Tip to be used with each chemical. Thread in appropriate Metering Tip into injector before connecting tubing to Chemical Concentrate. **Figure 4.5.3** illustrates the metering tip screwed into the barb end of the injector. **Table 4.5.4** displays dilution ratios as a guide for choosing a metering tip.

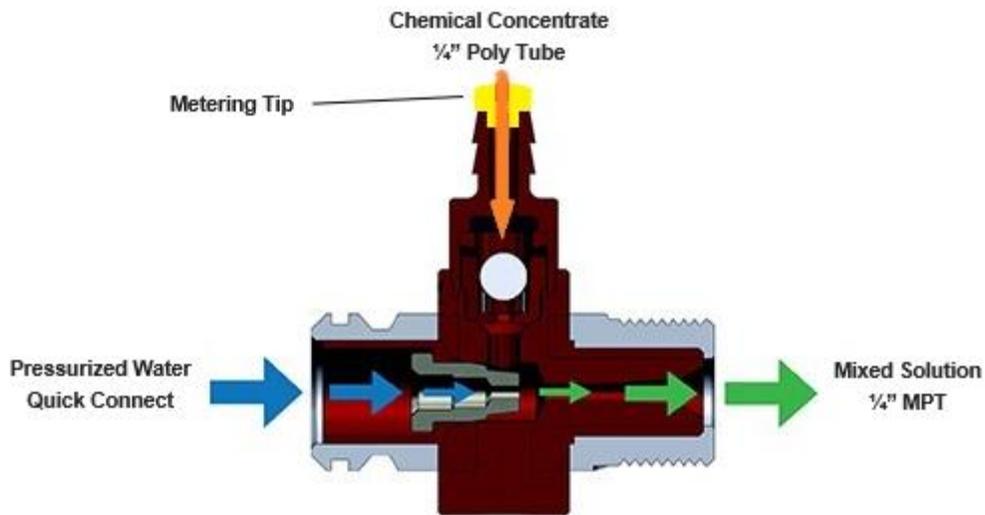


Figure 4.5.3 – A cross section view of the Injector

INJECTOR COLOR		DILLUTION RATIO
COPPER		1:104
PUMKPIN		1:82
BURGUNDY		1:67
LIME		1:57
TAN		1:57
ORANGE		1:44
TURQUOISE		1:31
PINK		1:24
LIGHT BLUE		1:17
BROWN		1:15
RED		1:12
WHITE		1:12
GREEN		1:11
BLUE		1:10

Table 4.5.4 – Chemical Dilution Ratio Guide

NOTE: Dilution ratios given are based on drawing water through the metering tips and may differ from other systems. The above chart should be used as a starting point for system configuration. Results

will also vary when drawing chemicals due to differences in viscosity and temperature. There may be slight variations of performance in injectors and metering tips that are unavoidable due to manufacturing tolerances.

4. After metering tips are installed, push ¼" tubing over barb, and route tubing to chemical concentrate

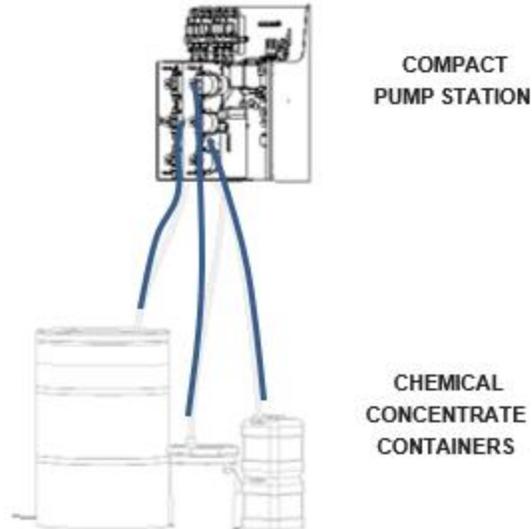


Figure 4.5.5 – Tubing routed from Injector to Chemical Concentrate

5. Route ½" OD tubing from Mixed Solution Outlets to chemical distribution system or nozzles

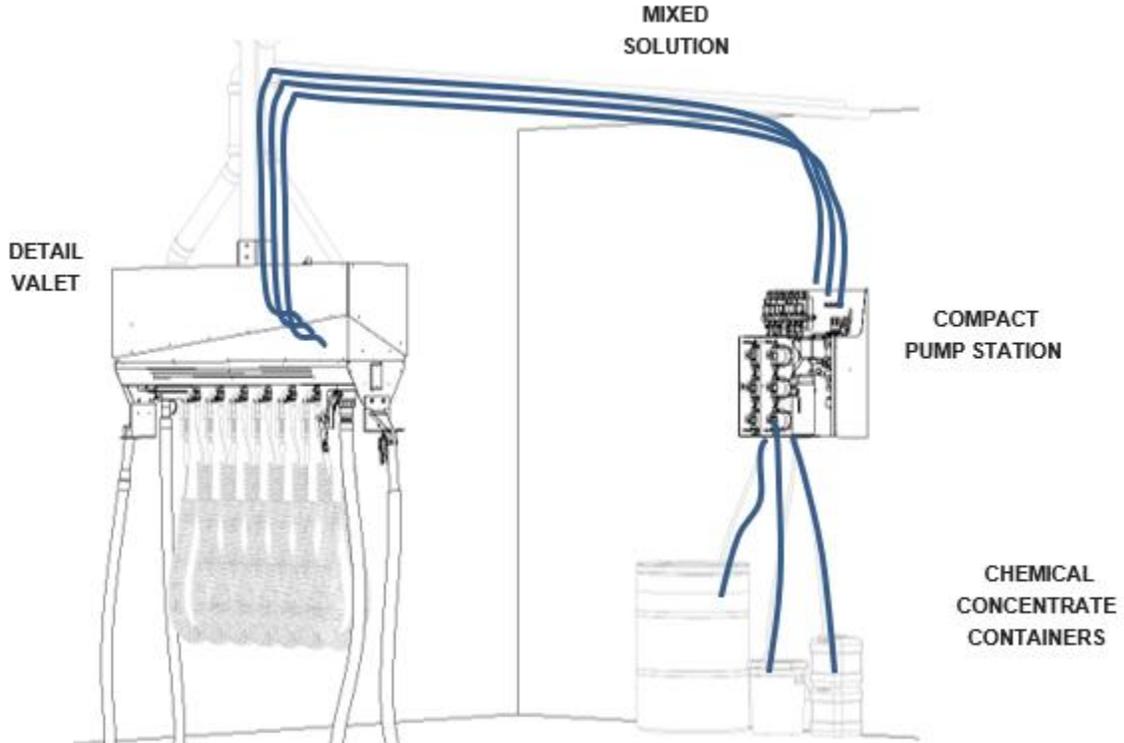


Figure 4.5.6 – Tubing routed from Injector to Chemical Concentrate

6. Connect Electrical Plug to outlet (GFCI Outlet recommended) making sure switches are in off position prior to connection.

5.0 Operation

The **Vacutech** CPS requires minimal effort to start-up and operate. However, it is important to perform some simple pre-operational inspection steps prior to starting in order to protect your equipment. Some simple operational adjustments will optimize the performance of the **Vacutech** CPS for your application.

5.1 Pre-Operation Inspection

Prior to startup, the following steps should be taken:

1. Securely connect Delivery tubing leaving the CPS and seal all connections, outlets, and nozzles;
2. Ensure that all valves on the CPS are in the closed position;
3. Check that injector metering tips are installed, Chemical Concentrate tubing is connected to injectors, and tubing is submerged in chemical factory container;
4. Place all switches in the "OFF" position;
5. Check electrical power supply is plugged in;
6. Ensure compressed air supply and source water supply are connected.

5.2 First Time Startup

These steps should be taken during initial startup of the **Vacutech** CPS (having at least two people available during startup is recommended). Check the system for leaks at each step. If a leak occurs, stop, shutdown and isolate the system, and repair the leak before proceeding.

1. Slowly open the valve at the water source inlet. Filtered water will flow to water booster pump. Check for leaks around CPS, and at receiving end of tubing.
 - a. Optional: Unless capped, filtered water will flow into delivery tubing. Check for leaks around CPS, and at delivery end of tubing
 - b. **Note:** Ensure valve fitting stays facing forward when turning handle, or it may prevent door from closing.
2. Slowly open the valve at the compressed air source inlet. Compressed air will flow into Filtered Regulator and Water Booster Pump.
 - a. The regulated pressure for Filtered Regulator should be set at 90PSI.
 - b. If air hisses and escapes around regulator, the compressed air supply is too high. Regulate the supply to a lower PSI
 - c. The Booster Pump will activate and build pressure
3. Turn the power switch of each of the lines to the "On" position
 - a. Chemical Concentrate will be drawn from the factory container up the tube through the metering tip and into the Injector. Mixed solution will fill the tank and the delivery tubing.

Check for leaks around CPS, and at delivery end of tubing. Check the consistency of the Mixed Solution at the receiving end. Continue this step for additional solution lines.

6.0 Maintenance

The CPS is designed to minimize maintenance. However, over the life of the CPS, service may be required to ensure your CPS continues to function properly. Use only replacement parts from **Vacutech** for proper sizing and operation as well as to prevent damage to equipment. Follow the below maintenance schedule to maximize system function and longevity.

6.1 Monthly

- Inspect hoses and fittings for water/chemical leaks and replace as needed;
- Check Accumulator Tank Air Pressure, ensuring tank is free of liquid when doing so by turning off each tank's associated solenoid and dispensing the liquid in each line until it flow ceases;
- Check/drain primary air regulator/filter separator and replace as needed; and,
- Check water filter and replace as needed.

6.2 Semi-Annually

- Check and replace injector metering tips as needed;

6.3 Annually

- Inspect water booster pump for leaks. If leaks are present, order and install replacement/spare parts as necessary.

Warning! – Use of replacement parts from any source other than **Vacutech** could result in damage to your equipment and may void the equipment warranty.

7.0 Troubleshooting

7.1 Injector Issues

PROBLEM	POTENTIAL CAUSES	SOLUTIONS
Insufficient Nozzle Pressure	Insufficient Water Supply	Verify water inlet is at 40 PSI water in, 2 GPM. Verify water filter is functioning properly.
	Insufficient Air Supply	Verify inlet air is at 20 CFM @ 90 PSI Verify air filter is functioning properly.
Insufficient Nozzle Pressure	Malfunctioning Booster Pump	Verify booster pump is functioning properly.
	Solenoid valve malfunction	Ensure sufficient Compressed Air Supply. Ensure valve receiving signal. Replace Pressure Switch
Improper Chemical Dilution	Clogged Injector	Remove injector and blow out debris with compressed air.
	Accumulator Tank Malfunction	Check Accumulator Tank for Leaks. Verify bladder pressure.
	Clogged chemical feed	Check chemical hose, metering tip, and hose barb for debris or clogs.
	System Leaks	Check chemical hose and fittings for leaks.

8.0 Replacement Parts

Table 8.1 presents replacement components for the **Vacutech** CPS.

Description	Qty	UoM
Water Filter	1	Ea
Air Particulate Filter	1	Ea
Pressure Switch	6	Ea
Accumulator Tank	6	Ea
Injector	6	Ea
Metering Tip Kit	1	Ea
Booster Pump	1	Ea

Table 8.1 – Vacutech CPS Replacement Parts

9.0 Warranty

Vacutech Limited Warranties

General Limited Warranty on Equipment: Subject to the terms and conditions set forth herein, Vacutech, LLC (“Vacutech”) warrants to the original purchaser (“Purchaser”) of Vacutech central vacuum systems or related equipment (the “Equipment”) that, for a period of two (2) years from the date of shipment (the “General Warranty Period”), the Equipment will be free from material defects in parts and workmanship; provided, however, if Vacutech factory trained personnel install the Equipment, the foregoing General Warranty Period shall be extended for an additional one year period, for a total limited warranty period of three (3) years from the date of shipment (collectively, the “General Limited Warranty”). This General Limited Warranty does not cover Vac Star Direct Drive Turbines, variable frequency devices (VFDs) or Services, which are addressed separately below.

Limited Warranty on Turbines: Subject to the terms and conditions set forth herein, Vacutech warrants to a Purchaser of any Equipment containing a Vac Star Direct Drive Turbine (“Turbines”) that, for a period of three (3) years from the date of shipment, the Turbines will be free from material defects in materials and workmanship (the “Turbine Limited Warranty”).

Limited Warranty on Services: Subject to the terms and conditions set forth herein, Vacutech warrants to a Purchaser of installation services (the “Services”) that it shall perform the Services in a professional and workmanlike manner in accordance with industry standards for similar services (the “Services Limited Warranty”) and that such Services shall be warranted for a period of one (1) year from the final date of installation.

Manufacturer’s Warranty on Variable Frequency Devices (VFD): To the extent permitted, Vacutech hereby assigns to a Purchaser of a Variable Frequency Device (VFD) the manufacturer’s warranty for any such VFD, subject to the terms and conditions set forth therein (the “VFD Manufacturer’s Warranty”). Vacutech will provide Purchaser with a copy of such warranty upon request. Other than the foregoing assignment of warranty, VFDs ARE SOLD “AS-IS” AND VACUTECH MAKES NO WARRANTY FOR VFDs, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Limited Warranty on Powdercoat. Subject to the terms and conditions set forth herein, the Company warrants to Dealer, for a period of one (1) year from the final date of installation that the powdercoat will be free from material defects; provided, however that Vacutech will not be responsible for: (i) discoloration due to heat; (ii) rusting caused by chips or gouges on the powder coating surface; (iii) damage caused by improper use by customers or the owner or, (iv) damage caused by the use of abrasive cleaners, bleach or chemicals.

Furthermore, products powdercoated using red, yellow, orange and purple are known to be more susceptible to color fade as a result of exposure to ultraviolet light and other environmental conditions. As a result, neither Vacutech, nor the powder coat manufacturer, can guarantee or warranty these color choices against color fade. In an effort to maximize the color and gloss retention characteristics, Vacutech uses the most advanced powder coat finishes available. The color and gloss retention characteristics can be prolonged by the regular use of an automotive wax with UV protection on all powder coated surfaces. Vacutech will not be responsible for the fading, color degradation, or other finish imperfections, which arise after installation as a result of the customer’s, color selection.

Limitations and Exclusions. The General Limited Warranty, the Turbine Limited Warranty, the Limited Services Warranty (collectively the “Limited Warranties”) and the VFD Manufacturer’s Warranty are only

available to the original Purchaser and none of them are transferrable. The VFD Manufacturer's Warranty is subject to terms and conditions, including limitations and exclusions, provided by the manufacturer. The Limited Warranties do not cover any of the following: normal wear and tear; damage or accidents resulting from freight damage; damage or accidents arising from failure to follow precautionary safety measures; abuse, misuse or modification of the Equipment; improper electrical connections; misapplication; improper installation (if not installed by Vacutech); connection to separator not manufactured by Vacutech; dismantling or attempts to repair Equipment by any person not factory-trained and certified by Vacutech; or any defects, damage or other harm that is not the result of the acts or omissions of Vacutech. Routine maintenance of the Equipment is required. Purchaser and its representatives are solely responsible for testing and determining the suitability of the Equipment for the intended use and purpose, even if Vacutech may have suggested the Equipment, and Vacutech assumes no responsibility for use of the Equipment outside of the normal course of business or unintended use of the Equipment.

Remedies and Procedures. In the event of a breach of either the General Limited Warranty or the Turbine Limited Warranty which Vacutech determines to be covered by an applicable Limited Warranty, Vacutech will, at its option, (a) replace, or (b) repair, the defective Equipment or Turbine, as applicable. In the event of a breach of the Services Limited Warranty which Vacutech determines to be covered by the Services Limited Warranty, Vacutech will, at its option, (i) re-perform such Services or (ii) credit or refund the price of such Services for the price paid. Any claim regarding breach of a Limited Warranty must be received by Vacutech before the expiration of the applicable warranty period. Vacutech reserves the right to inspect and investigate the alleged breach prior to any remedy being provided. Vacutech may require Purchaser to return the allegedly defective Equipment or Turbine to Vacutech's factory for inspection, or Vacutech may elect to ship a new part to Purchaser; in either case, Purchaser is responsible for freight. If Vacutech determines that the claims are not covered by any applicable Limited Warranty, Purchaser will be notified and will be provided with the cost of repairs, replacement or re-performance, as applicable. Vacutech reserves the right to charge reasonable amounts for travel and labor associated with investigation of invalid claims. Warranty claims should be submitted via email to warranty@vacutechllc.com, or via phone at 1-800-917-9444.

Exclusive Remedies; Disclaimer. The Limited Warranties and the remedies set forth above are the sole and exclusive warranties and remedies for a breach therefore, and Vacutech shall have no other liability to Purchaser or any other person or entity. Any efforts by Vacutech beyond the obligations provided for herein will not in any way change the limitation of remedies and damages stated in this Limited Warranty, and no agent, reseller, or other representative of Vacutech is authorized to change any warranty, expressed or implied, of Vacutech. To the extent permitted by law, all express and implied warranties (including implied warranties of merchantability, fitness for a particular purpose and non-infringement) other than the express limited warranties set forth above are expressly disclaimed. Upon the expiration of the applicable limited warranty period, any and all applicable implied warranties are disclaimed.

Limitations of Liability. Vacutech shall not have any liability to purchaser or any other person or entity for incidental, consequential, indirect or special damages of any description, including without limitation, loss of revenue or lost profits, whether arising out of warranty (including any implied warranties), breach of contract, strict liability, negligence, other tort, or otherwise, and regardless of whether such damage was foreseeable and whether Vacutech had been advised of the possibility of such damages, and notwithstanding the failure of any agreed or other remedy of its essential purpose. In no event will Vacutech's aggregate liability arising out of related to the equipment or services, as applicable, sold to purchaser, exceed the total amounts paid by purchaser for the equipment or services, as applicable.

10.0 Customer Service

The **Vacutech** team wants your business to be successful. That's why we take a personal interest in your goals and your requirements when designing the custom central vacuum system you need.

We walk you through every step of the design process from your first call. And because installation is crucial in a system's success, we offer installation services.

Vacutech also provides warranties and options for continued system maintenance.

We can also service or repair most manufacturers' central vacuum equipment.

Contact us today to learn more about central vacuum system design, manufacturing, installation, warranties and servicing.

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Or, visit our Customer Resources website for more information:

<http://www.vacutechllc.com/customer-resources/>