

STSTM

SUPER TURBINE SUCTION

DUAL STAGE DRY VACUUM SYSTEM WITH THE CYCLONIC ACTION SEPARATOR (CASTM)

STS-5 with 8 Gallon CAS Tank, P/N 54500

STS-10 with 8 Gallon CAS Tank, P/N 54700

Triple STS-5 with 20 Gallon CAS Tank, P/N 54136

STS-20 with two 20 Gallon CAS Tanks, P/N 54144



USER'S MANUAL



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CONGRATULATIONS

Congratulations on the purchase of your new **STS™** Dual Stage Dry Vacuum System (Super Turbine Suction). The STS is a dry vacuum pump that produces high-volume air flow with multiple users online. The STS is a medical dry vacuum pump which is designed for use in a dental facility. The **CAS™** (Cyclonic Action Separator) tank will ensure that no liquids or foams enter the vacuum pump. The relief valve is easily accessible on the CAS. The patented vacuum relief valve maintains a constant uniform vacuum. The powerful permanent split capacitor motor, with a highly reliable contactor and powerful transformer can be depended upon to start every time. Your STS vacuum system and CAS separator tank are easily installed and maintained.

This manual provides operation, installation, and maintenance instructions for the support of the STS Dual Stage Dry Vacuum System. Review and follow the guidelines included in this User Manual to ensure that the system provides the highest level of service.

The **STS™** and **CAS™** are warranted to be free from defects in material and workmanship from the date of installation for a period as follows

- Standard Warranty: 3 years (36 months) on complete unit.
- Extended Warranty: 2 years (24 months) all pumps, motors and housings.
- Total 5-year Warranty on all pumps, motors and housings.

Any item returned to our factory through an authorized distributor, 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 is void if equipment is installed or serviced by other than dealer service personnel authorized by Air Techniques. Air Techniques, Inc. is not liable for indirect or consequential damages 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 your new STS on-line. Just have your product model and serial numbers available. Then go to the Air Techniques web site, www.airtechniques.com/dental, click the **warranty registration** link and complete the registration form. This on-line registration ensures a record for the warranty period and helps Air Techniques keep you informed of product updates and other valuable information.

SAFETY INSTRUCTIONS

Use of the STS not in conformance with the instructions specified in this manual may result in permanent failure of the unit.

WARNING: To prevent fire or electrical shock, do not expose this appliance to rain in or moisture.

All user serviceable items are described in the maintenance section.

Manufacturing date code on serial number label is in the format Month YYYY.

ATTENTION USERS:



Alerts users to important Operating and Maintenance instructions. Read carefully to avoid any problems.



Warns users of hot surfaces. There is a danger of burns. Work near these surfaces only after they have cooled down.



Warns users that uninsulated voltage within the unit may be of sufficient magnitude to cause electric shock.



Indicates the ON and OFF position for the Equipment power switch.



Indicates protective Earth Ground for the Equipment power switch.



MEDICAL ELECTRICAL EQUIPMENT

WITH RESPECT TO ELECTRICAL SHOCK, FIRE, MECHANICAL AND OTHER SPECIFIED HAZARDS ONLY
IN ACCORDANCE WITH UL-60601-1, CAN/CSA C22.2 NO.601.1
66CA

SIZING GUIDE

Choosing the correct size **STS™** to meet practice depends on the number of air users and the anticipated air demand. To assure optimum operation, the demands should not exceed the number of air handpiece users shown below. Each chart lists the number of simultaneous High Volume Evacuators (HVEs) and Saliva Ejectors (SEs) that can be used in specific STS systems.

Recommended Number of Simultaneous Users

1 HVE = 2 SE's / 1 HVE = 2 Nitrous Scavengers			
STS-5	STS-10	Triple STS-5	STS-20
HVE's + SE's	HVE's + SE's	HVE's + SE's	HVE's + SE's
5 + 0	10 + 0	15 + 0	20 + 0
4 + 2	9 + 2	14 + 2	18 + 4
2 + 6	7 + 6	12 + 6	13 + 14
0 + 10	5 + 10	9 + 12	10 + 20
	3 + 14	6 + 18	8 + 24
	1 + 18	2 + 26	5 + 30
	0 + 20	0 + 30	0 + 40

KEY PARTS IDENTIFICATION

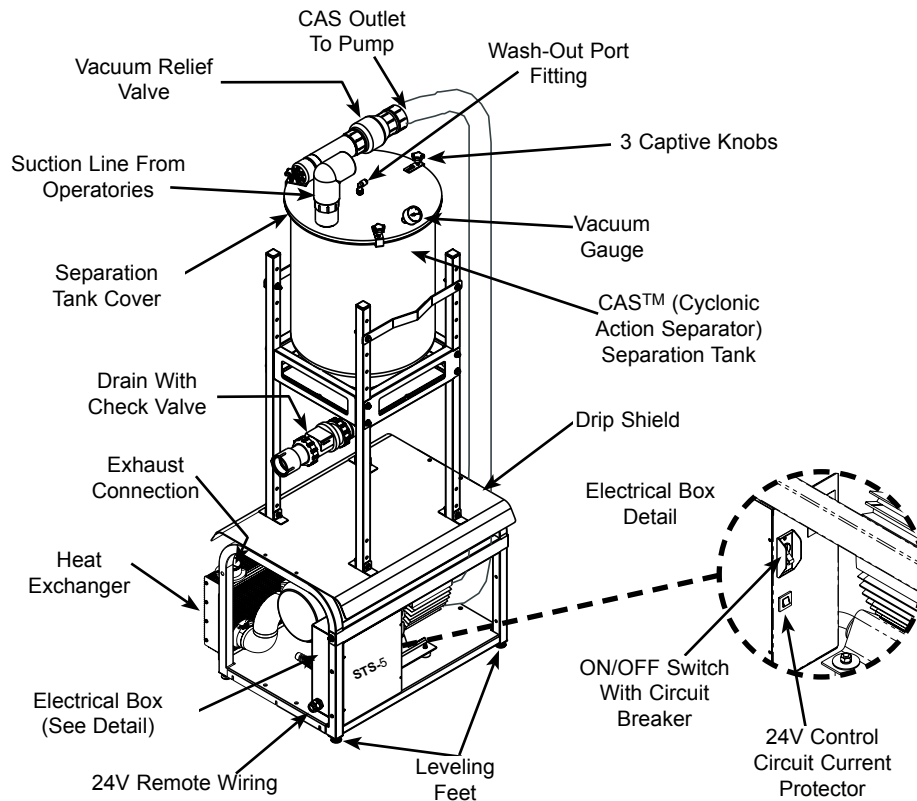


Figure 1. STS-5 with 8 Gallon CAS Main Parts Location

SPECIFICATIONS

SITE REQUIREMENTS

ELECTRICAL	STS-5	STS-10	Triple STS-5	STS-20
Minimum Circuit Breaker Rating	20A	20A (Qty 2)	20A (Qty 3)	20A (Qty 4)
Wire Size AWG Minimum Gauge	#12	#12AWG (Qty 2)	#12AWG (Qty 3)	#12AWG (Qty 4)
Receptacle	NEMA 6-15 R	NEMA 6-15 R (Qty 2)	NEMA 6-15 R (Qty 3)	NEMA 6-15 R (Qty 4)
PLUMBING				
Exhaust Vent Pipe with Heat Exchanger	2-Inch Schedule 40 Pipe	One 3-Inch or two 2-Inch Schedule 40 Pipe	One 4-Inch or three 2-Inch Schedule 40 Pipe	One 4-Inch or four 2-Inch Schedule 40 Pipe
Exhaust Vent Pipe without Heat Exchanger (Note 1)	2-Inch Metal Pipe	One 3-Inch or two 2-Inch Metal Pipe	One 4-Inch or three 2-Inch Metal Pipe	One 4-Inch or four 2-Inch Metal Pipe
Suction Line Riser Diameter Internal Diameter	1/2 Inch	1/2 Inch	1/2 Inch	1/2 Inch
Branch Line Diameter Internal Diameter Minimum	1 Inch	1 Inch	1 Inch	1 Inch
Main Line Diameter ID (Note 2)	1-1/2 to 2 Inches	2 to 2-1/2 Inches	2 to 2-1/2 Inches	2-1/2 to 3 Inches
Main Line End Fitting at STS/CAS	1-1/2-Inch FNPT	1-1/2-Inch FNPT	1-1/2-Inch FNPT	1-1/2-Inch FNPT
Drain Line	1-1/2-Inch Schedule 40 Pipe	1-1/2-Inch Schedule 40 Pipe	1-1/2-Inch Schedule 40 Pipe	1-1/2-Inch Schedule 40 Pipe
CAS Wash-Out Water Line	1/2-Inch FNPT Shut-off Valve	1/2-Inch FNPT Shut-off Valve	1/2-Inch FNPT Shut-off Valve	1/2-Inch FNPT Shut-off Valve

- NOTES:** 1. Recommended pipe includes wrought iron pipe (black and galvanized) and copper pipe type M.
 2. Smaller diameter acceptable for existing installations but the larger diameter is preferred for new construction.
 All main lines should terminate with an accessible plumbing cleanout.

PRODUCT SPECIFICATIONS

ELECTRICAL	STS-5	STS-10	Triple STS-5	STS-20
Voltage (Minimum/Maximum)	200/250	200/250	200/250	200/250
Full Load	13 Amps	26 Amps	39 Amps	52 Amps
Starting Load	65 Amps	130 Amps	195 Amps	260 Amps
Frequency	60 Hz	60 Hz	60 Hz	60 Hz
Maximum Vacuum	15 InHg	15 InHg	15 InHg	15 InHg
Preset Vacuum Level	10 InHg	10 InHg	10 InHg	10 InHg
Maximum Exhaust Air Flow	40 SCFM	80 SCFM	120 SCFM	160 SCFM
BTU per Hour	6,825	13,649	20,475	27,298
Watts per Hour	2000	4000	6000	8000
Horsepower (each pump)	1.75 kW or 2.3 HP (each STS-5 pump)			
CAS SPECIFICATIONS				
Working Liquid Capacity	8 Gallon plus adequate foam capacity	20 Gallon plus adequate foam capacity	Two 20 Gallon tanks each with adequate foam capacity	
Tank Material	304 Stainless Steel (All systems)			
SYSTEM ENVIRONMENTAL CONDITIONS				
Exhaust Fan Requirements	600 CFM Minimum	1200 CFM Minimum	1800 CFM Minimum	2400 CFM Minimum
Operating Temperature	40 to 104°F or 10 to 40°C (All systems)			
Storage Temperature	0 to 150°F or -18 to 66°C (All systems)			
Relative Humidity	90%, no condensation (All systems)			
IEC601-1 CLASSIFICATION				
Class 1, Transportable, Continuous Operation. Protection against ingress of liquids -Ordinary Equipment not suitable for use in the presence of flammable anaesthetic mixture(s).				
All STS vacuums comply with NFPA 99C level 3 requirements				

INSTALLATION INFORMATION



Grounding reliability can only be achieved when the equipment is connected to a receptacle marked HOSPITAL ONLY or HOSPITAL GRADE.

For new installations it is recommended to follow the following guidelines:

- Suction line from the operatories to be a minimum of 1-1/2" diameter and must be sloped (1/4" minimum for every 10') toward the separation tank. The suction line should not have any sharp right angle bends.
- The suction line should be connected to the CAS separation tank with a short run of 1-1/2" diameter flexible tubing.
- STS systems can replace water ring pumps with smaller diameter piping in existing installations.
- The drain on the base of the separation tank must be connected to an open floor drain capable of handling 10 gallons in 30 seconds. Drain pipe size 1-1/2" schedule 40.
- The drain line should be a short run with a minimum slope of 1/4" for every 10' toward the drain (avoid any sharp right angle bends).



Models with heat exchanger use schedule 40 pipe for connection to vent. If heat exchanger is removed, use black pipe, galvanized pipe or copper pipe type M metal pipe for vent connection.

- The vent line should be 2" diameter pipe for a single STS, 3" diameter pipe for a dual system and 4" diameter pipe for the Triple STS-5 and STS-20 systems. The vent should be sloped 1/4" per 10' towards the pump. Vent line must be capable of handling vapors and liquids.
- The outside vent must be protected from rain and animals.
- A flexible air exhaust hose is provided to connect to the 2" diameter vent pipe and heat exchanger. Hose clamps are provided to secure hose to heat exchanger and pipe.
- Wash-out water supplied via 1/2" copper tubing terminated with a 1/2" FNPT shut-off valve providing water pressure between 20 and 100 psi.
- Wash-out port on the CAS cover is a 3/8" push to connect elbow that connects to the water supply via supplied 10 foot 3/8" Poly tubing and 1/2" x 3/8" push to connect adapter.
- Refer to pages 9 through 11 for mounting and securing instructions.



Any time the power to the STS is turned OFF the CAS tank will automatically drain.

OPERATING INFORMATION

- The STS may be turned "ON/OFF" from a single, convenient location within the dental office using a Remote Control Panel. Remote wiring must be done by a licensed electrician in accordance with local codes.
- The vacuum level is factory preset at 10 in Hg (inches of mercury). This is the reading on the gauge when all HVE's and SE's are CLOSED. If this setting needs to be adjusted contact your dealer to readjust the setting.
- The unit is capable of running continuously. To conserve electricity, the system may be turned off when not in use.
- The CAS tank has been designed to collect the fluids evacuated during a normal operating day. If an excessive amount of fluids are collected in the CAS, the protective mechanism in the CAS will interrupt the vacuum flow in order for the tank to automatically drain. This process takes approximately 30 seconds. To restore the vacuum to full operation turn OFF the power to the STS for a minimum of 10 seconds and then turn back ON.
- Perform the daily maintenance procedures to Clean Vacuum Lines and Washout Tank.
- Turn the power OFF at the end of the day. This will drain collected liquids in the CAS separation tank.

STS SYSTEM CONFIGURATIONS

Configuration Dimensions. Figure 2 shows the space requirements for the installation of the various STS model configurations. Please note that all CAS heights can be increased by 4 inches and decreased by 6 inches using the adjusting holes in the 4-rail support assembly.

Physical Characteristics

	CAS Tank		STS-5	STS-10	Triple STS-5	STS-20
	8 Gallon	20 Gallon	Single STS-5 Pump	Two STS-5 Pumps Stacked	Three STS-5 Pumps Stacked	Two STS-5 Pumps Stacked 2 Times
Width	23.25 in	22.00 in	23.50 in.	23.50 in.	23.50 in.	24.25 in. (each Stack)
Depth	18.75 in	16.00 in.	19.50 in	19.50 in	19.50 in.	19.50 in. (each Stack)
Height	41.00 in.	62.00 in.	17.00 in.	34.00 in.	51.00 in.	34.00 in.(each Stack)
Weight	40 Lbs.	70 Lbs.	125 Lbs	250 Lbs	375 Lbs	250 Lbs. (each Stack)

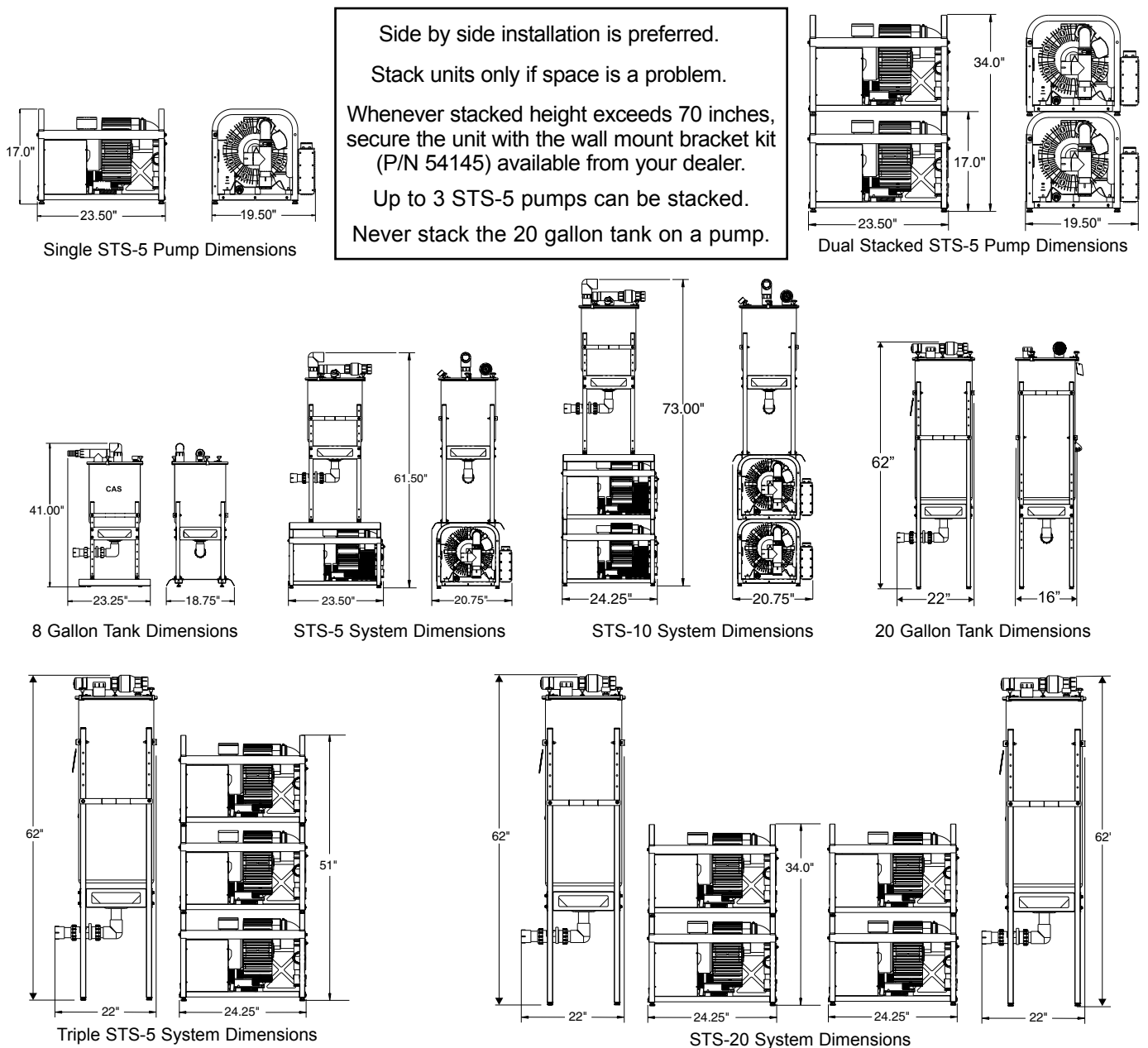


Figure 2. STS-5, STS-10, Triple STS-5 and STS-20 System Configuration Dimensions

PIPE FLOW SCHEMATIC

Figure 3 shows the overall functional flow of STS systems with a CAS tank. Inlet and outlet connections to the tank is made at the top of the tank. This arrangement provides flexibility in installation, makes maintenance easier and adds to overall tank efficiency.

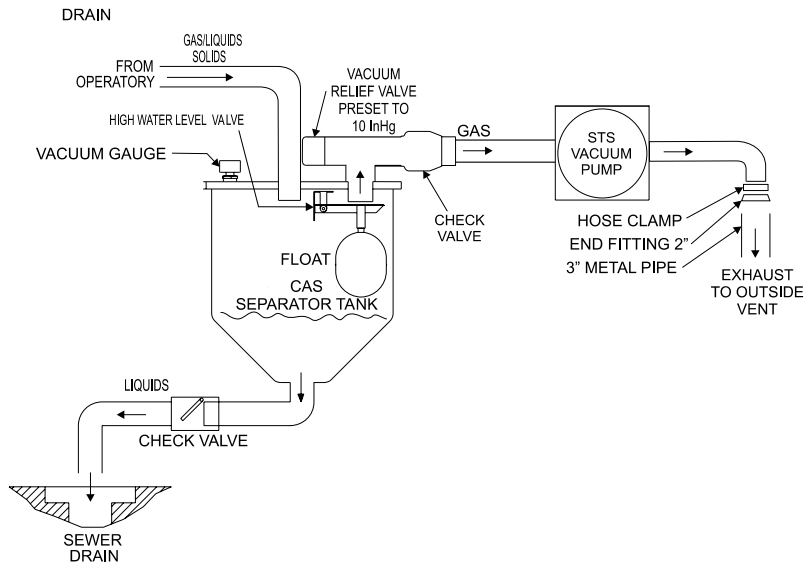


Figure 3. STS with Stainless 8 Gallon CAS Functional Flow Diagram

INSTALLATION

Figure 4 shows the typical setup of a stacked STS system.

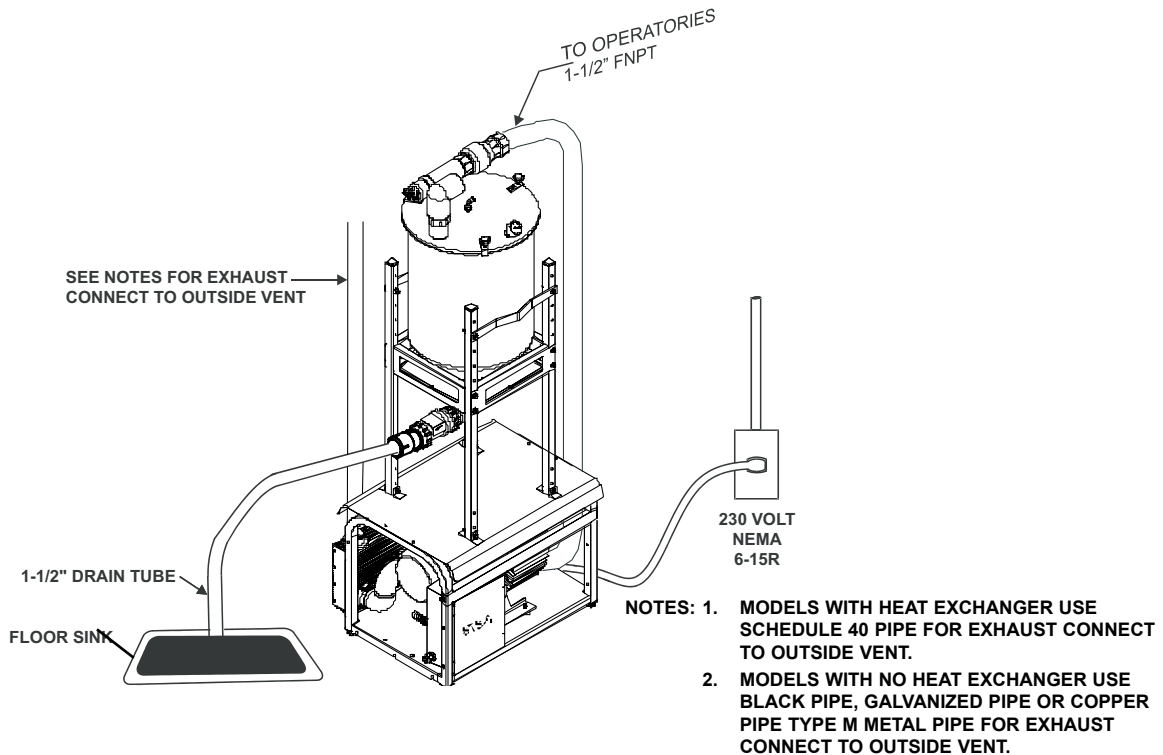


Figure 4. Typical STS-5 with Stainless 8 Gallon CAS Stacked Completed Installation (Shown with heat exchanger installed)

SINGLE STS (STS-5) HOSE INSTALLATION.

Note: Each kit provides the required hoses, clamps and adapters. No schedule 40 PVC pipe is included. Refer to page 22 for the contents of each kit. If more than 10 feet of hose is needed, order P/N 54521 (order by the foot)

Installation Accessory Packs . Figure 5 shows the pipe and hose connections required for all STS configuration installations using accessory packs as follows:

CAS Tank Accessory Pack, P/N 54120 - used to make the following connections:

Between the suction line and CAS tank. Item (1) on figure 5.

Between the CAS tank and STS pump. Item (2) on figure 5.

Between the CAS tank and drain line. Item (3) on figure 5.

STS Pump Accessory Pack, P/N 54150 supplied with associated STS pump, used to connect each pump to the facility vent line, item (4) on figure 5.

Connection Procedure. Installation of a single STS model configurations consist of making connections between a single 8 gallon CAS tank, P/N 54300, and a STS pump, P/N 54180. Refer to Figure 5 for the connection diagram and perform the following procedure.

1. Refer to Figure 2 and determine the installation footprint dimensions and connection requirements. Place the CAS tank and STS pump in position.
2. If installing side-by-side configuration, proceed to step 4. If stacking, perform step 3.
3. When stacking the CAS tank on top of a STS pump, refer to Figure 6 and secure the tank to pump using supplied hardware. When stacking any STS system, make sure to secure installation with the wall mount bracket kit (P/N 54145) available from your dealer.
4. Measure and record distance between each connection point. Cut the supplied hose to the length required for each connection.
5. Using industry standard techniques, install pipe to hose adapters as shown in Pipe Connection Diagram Figure 5.
6. Install hoses and secure with associated clamps.

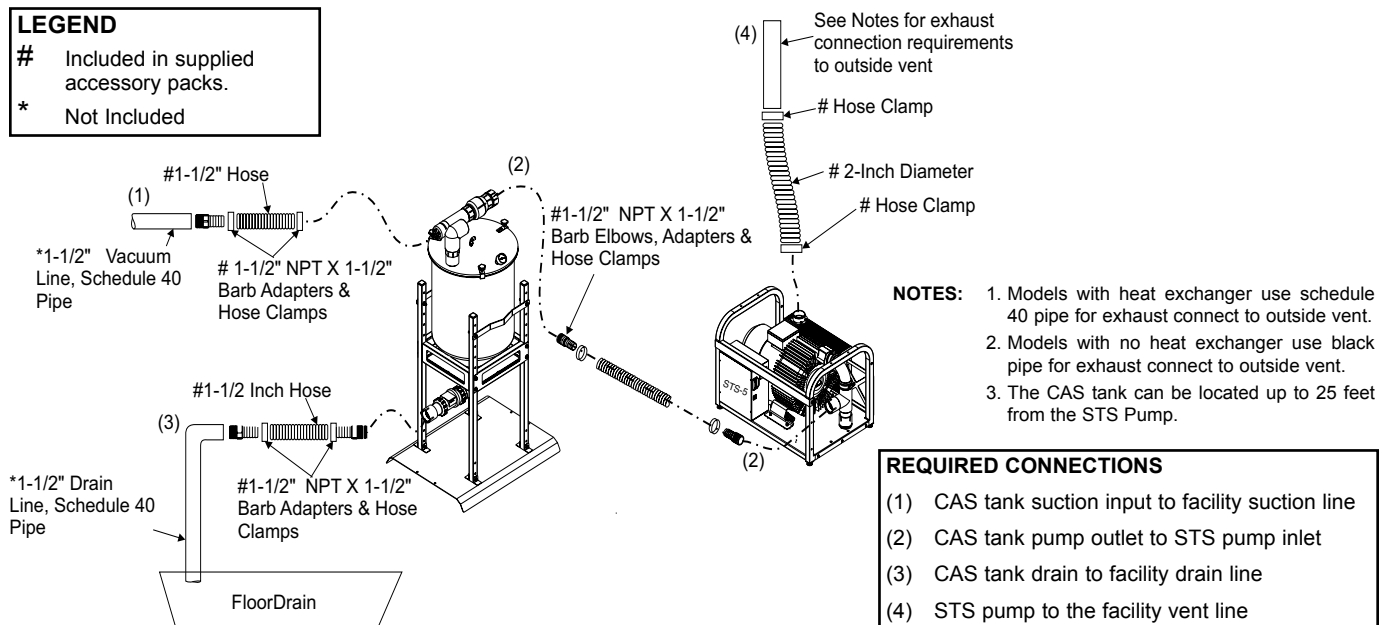


Figure 5. STS Pump and CAS Tank Pipe Connection Diagram

INSTALLATION

DUAL STS (STS-10) HOSE INSTALLATION.

Note: Each kit provides the required hoses, clamps and adapters. No schedule 40 PVC pipe is included. Refer to page 22 for the contents of each kit. If more than 10 feet of hose is needed, order P/N 54521 (order by the foot)

Installation Accessory Packs . Figure 5 shows the pipe and hose connections required for a dual STS configuration installation using accessory packs as follows:

CAS Tank Accessory Pack, P/N 54120 - used to make the following connections:

Between the suction line and CAS tank. Item (1) on figure 5.

Between the CAS tank and combined STS pumps. Item (2) on figure 5.

Between the CAS tank and drain line. Item (3) on figure 5.

STS Pump Accessory Pack, P/N 54150 supplied with associated STS pump, used to connect each pump to the facility vent line, item (4) on figure 5.

STS Dual Manifold Accessory Kit; P/N 54400 - used to connect two STS pumps together either side-by-side or stacked.

Connection Procedure. Installation of the dual STS model configuration consists of making connections between a single 8 gallon CAS tank P/N 54300, and two STS pumps, P/N 54180. Refer to Figure 5 and perform the following procedure. The tank and associated pumps can be stacked or installed side-by-side depending on the size of the installation site. When stacking the CAS tank and two STS pumps, refer to Figures 6 and 7 showing the method to secure the tank and pumps. In any case, the hose connections between the suction line and CAS tank, the CAS tank and drain line and pump to the facility vent line are identical as shown by Figure 5. Use the STS™ Dual Manifold Accessory Kit; P/N 54400 to connect the two STS pumps together for connection to the CAS tank as shown by Figure 8. Refer to Figures 5 through 8 and perform the following procedure.

1. Install check valves supplied in Dual Manifold Accessory Kit; P/N 54400, on both pumps as shown by Figure 8.
2. Refer to Figure 2 and determine the installation footprint dimension and connection requirements. Place the CAS tank and STS pumps in position.
3. If installing side-by-side configuration (recommended), proceed to step 6. If stacking, perform step 4.
4. Stack the two STS pumps as shown by Figure 7 and secure the pumps together using supplied hardware.
5. Refer to Figure 6 and stack the CAS tank onto the two STS pumps. Secure the tank to the top pump using supplied hardware. When stacking any STS system, make sure to secure installation with the wall mount bracket kit (P/N 54145) available from your dealer.
6. Measure and record distance between each connection point as shown in the corresponding Pipe Connection Diagram (Figures 5 and 8).
7. Cut the supplied hose to the length required for each connection.
8. Using industry standard techniques, install pipe to hose adapters as shown in the corresponding Pipe Connection Diagram (Figures 5 and 8).
9. Install hoses and secure with associated clamps.
10. Use a reducing Y or tee adapter to connect each pump vent tube to the common 3-inch exhaust vent line.

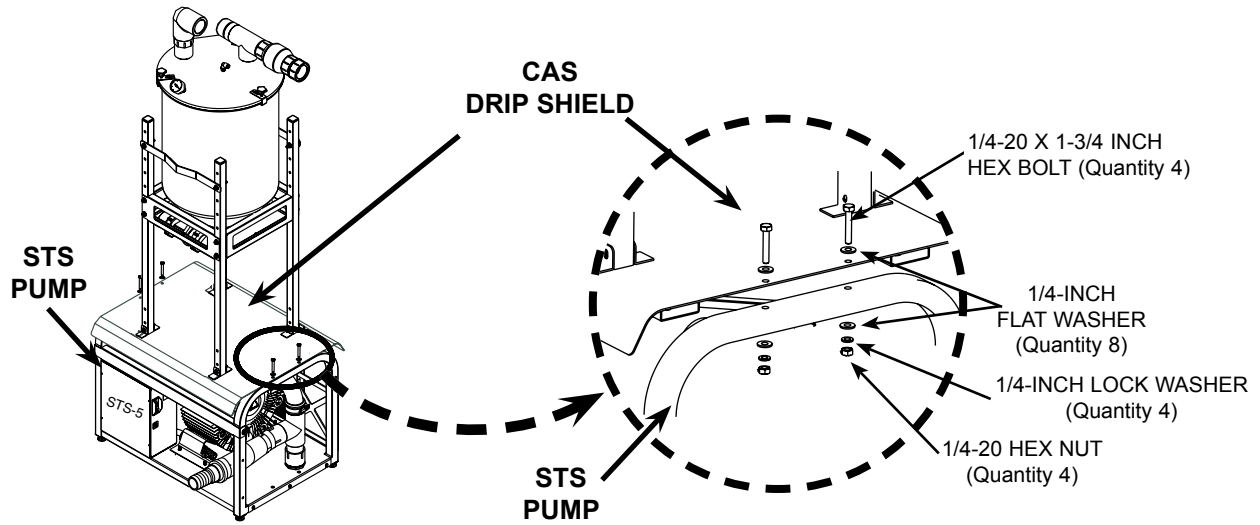


Figure 6. Stacking the CAS on Top of a STS Pump Hardware Detail

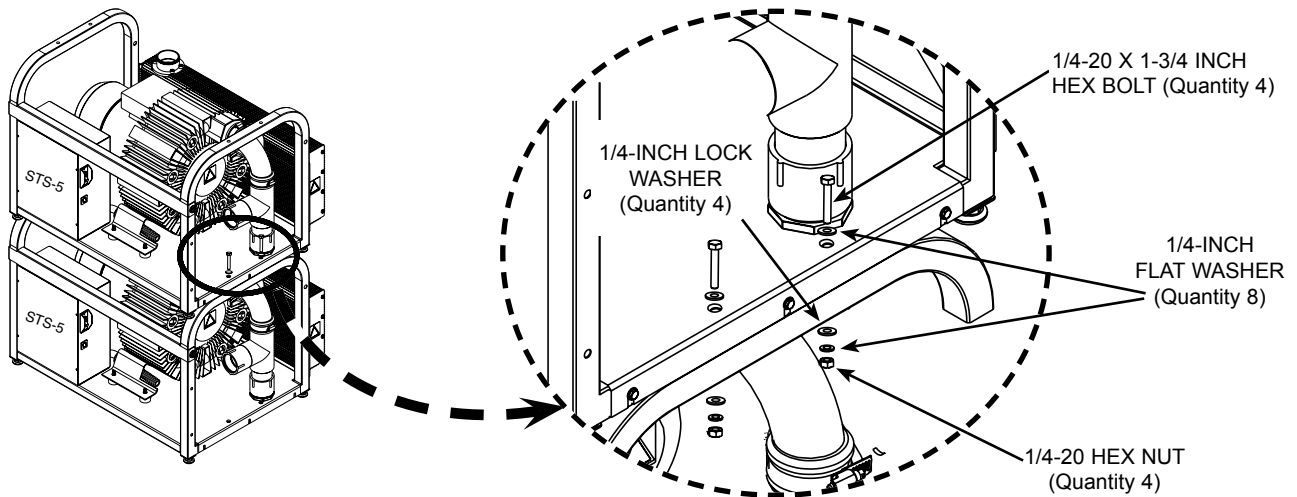


Figure 7. Stacking Two STS Pumps Hardware Detail

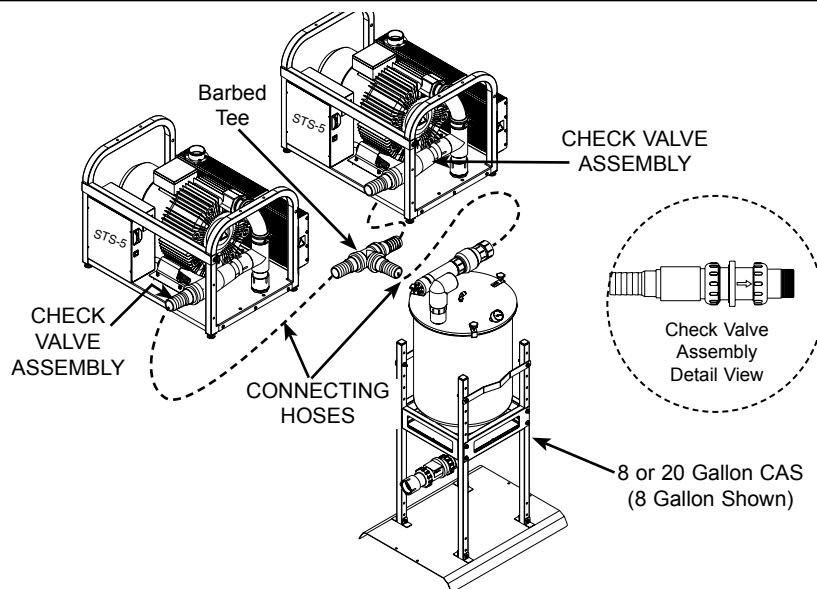


Figure 8. Pump Combining Using Accessory Kit, P/N 54400

INSTALLATION

Triple STS-5 and STS-20 HOSE INSTALLATION.

Note: Each kit provides the required hoses, clamps and adapters. No schedule 40 PVC pipe is included. Refer to page 22 for the contents of each kit. If more than 10 feet of hose is needed, order P/N 54521 (order by the foot)

Installation Accessory Packs . Figure 5 shows the pipe and hose connections required for a dual STS configuration installation using accessory packs as follows:

CAS Tank Accessory Pack, P/N 54120 - used to make the following connections:

Between the suction line and CAS tank. Item (1) on figure 5.

Between the CAS tank and combined STS pumps via the user-supplied Pump/Tank Connection Manifold. Item (2) on figure 5.

Between the CAS tank and drain line. Item (3) on figure 5.

STS Pump Accessory Pack, P/N 54150 for unit with heat exchanger or 54150N for unit without heat exchanger - supplied with associated STS pump, used to connect each pump to the facility vent line, item (4) on figure 5.

Triple STS-5 Accessory Kit; P/N 54421 - used to connect three STS pumps together either side-by-side or stacked.

STS -20 Accessory Kit; P/N 54422 - used to connect four STS pumps together as 2 stacked pairs installed side-by-side.

Connection Procedure. Installation of the dual STS model configuration consists of making connections between a single 20 gallon CAS tank P/N 54300, and three or four STS pumps, P/N 54180. Refer to Figure 5 and perform the following procedure. The tank and associated pumps can be stacked or installed side-by-side depending on the size of the installation site. When stacking the STS pumps, refer to Figure 7 showing the method to secure the pumps. In any case, the hose connections between the suction line and CAS tank, the CAS tank and drain line and pump to the facility vent line are identical as shown by Figure 5. Use the Triple STS-5 Accessory Kit; P/N 54421 to connect the three STS pumps together for connection to the CAS tank as shown by Figure 10. Use the STS -20 Accessory Kit; P/N 54422 to connect the four STS pumps together for connection to the CAS tank as shown by Figure 10. Refer to Figures 5 and 9 through 11 and perform the following procedure.

1. Fabricate a Pump/Tank Connection Manifold (as shown by Figure 9) using check valves supplied in associated accessory Kit
2. Refer to Figure 2 and determine the installation footprint dimension and connection requirements. Place the CAS tank and STS pumps in position.
3. Using Figure 7 as a guide, stack and secure the pumps together using supplied hardware.
4. Measure and record distance between each connection point as shown in the corresponding connection detail diagram (Figures 10 and 11).
5. Cut the supplied hose to the length required for each connection.
6. Using industry standard techniques, install pipe to hose adapters as shown in the corresponding connection detail diagram (Figures 10 and 11).
7. Install hoses and secure with associated clamps.
8. Use a reducing Y or tee adapter to connect each pump vent tube to the common 4-inch exhaust vent line.

INSTALLATION

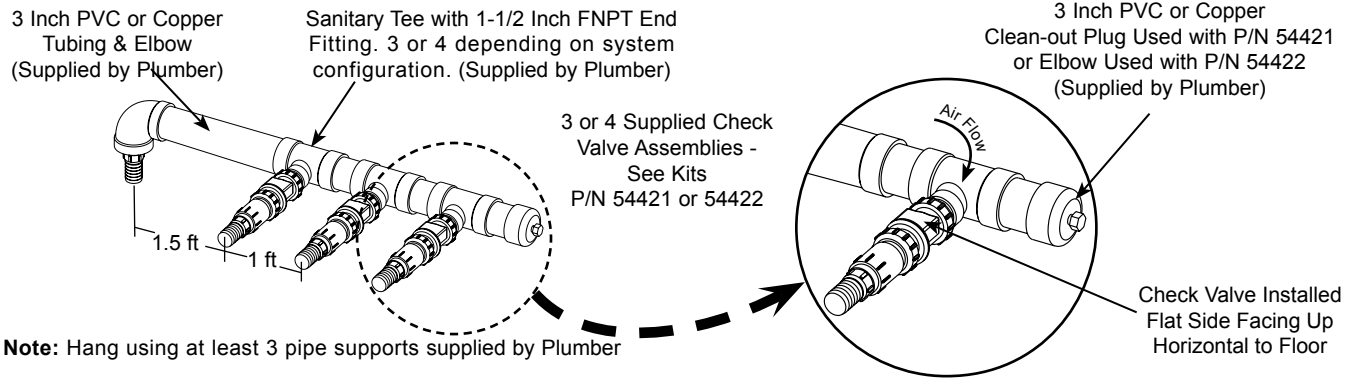


Figure 9. Pump/Tank Connection Manifold Using Accessory Kits P/N 54421 or 54422

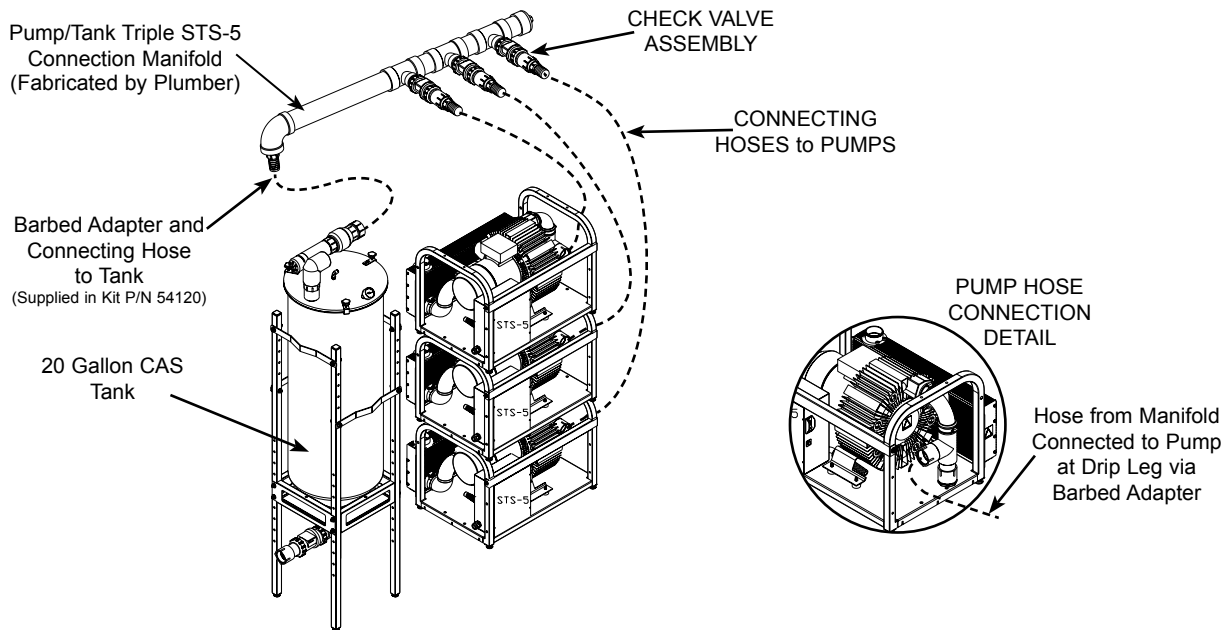


Figure 10. Triple STS-5 Pump Connection Detail Using Accessory Kit P/N 54421

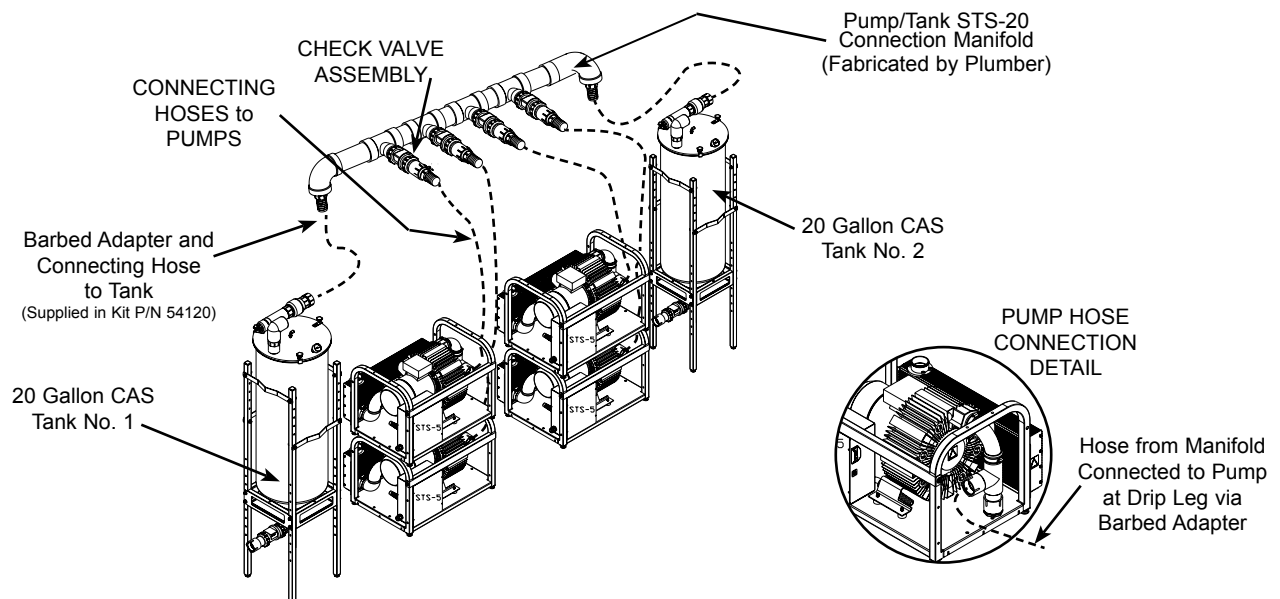


Figure 11. STS-20 Pump Connection Detail Using Accessory Kit P/N 54422

ELECTRICAL BOX PARTS IDENTIFICATION

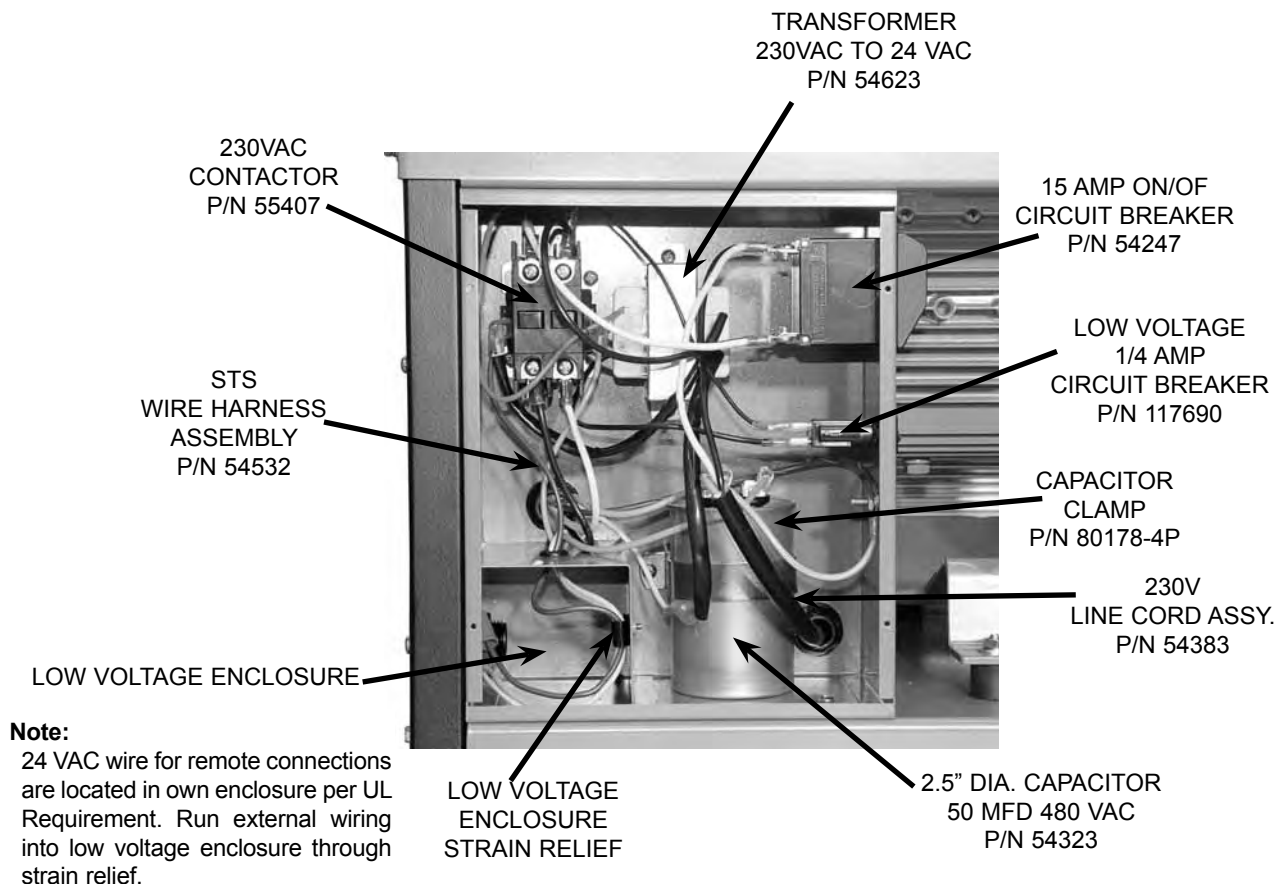


Figure 12. STS-5 Electrical Box Parts Location

ELECTRICAL CONNECTIONS



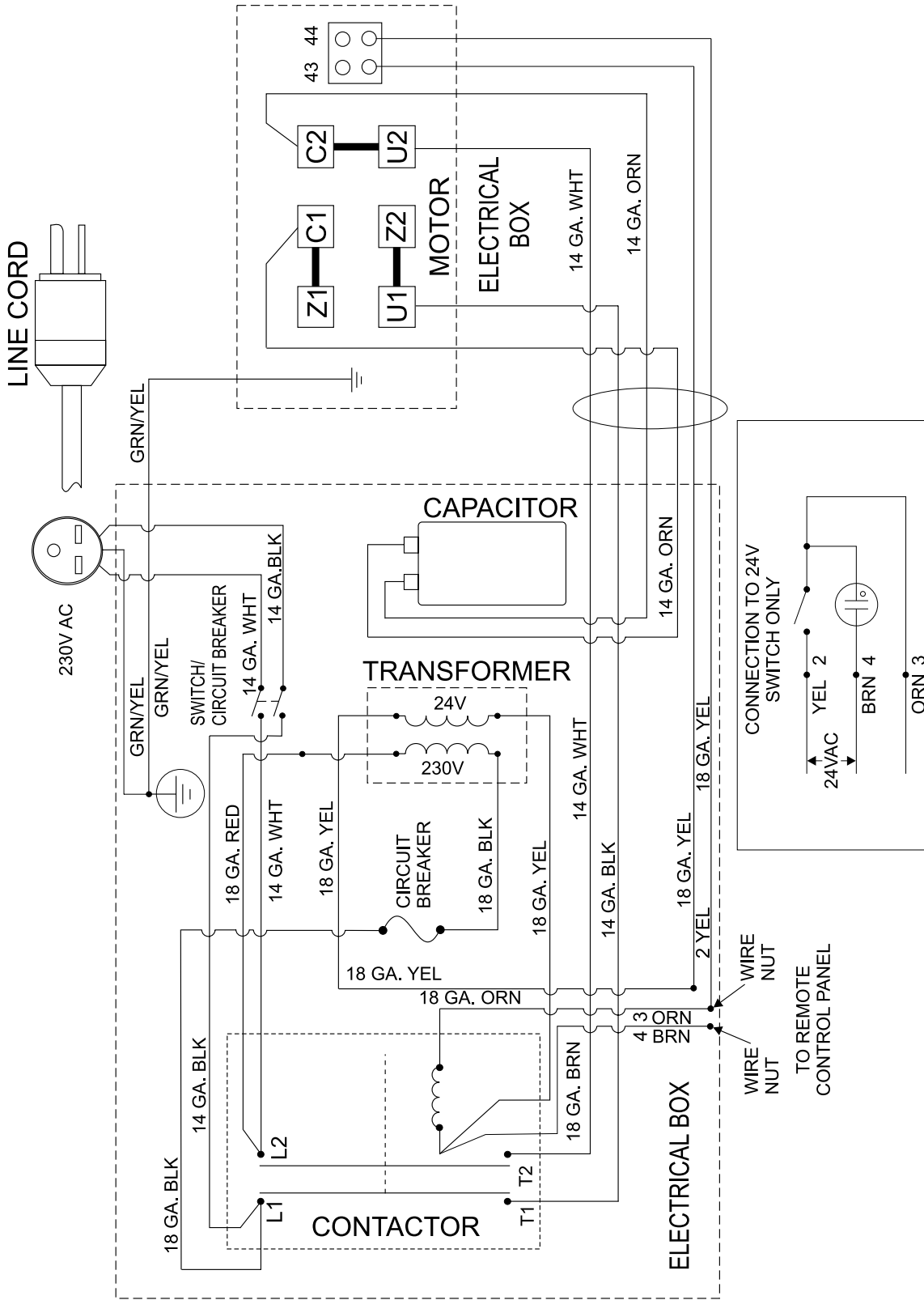
Remove all power to the system prior to working within the electrical box. Contacting high voltage can cause serious injury or even death



All systems must be wired directly from an electrical box that complies with local electrical codes

Figures 9 and 10 show the parts identification and associated schematic of the electrical box used in STS-5 system pumps. Refer to the figures when making electrical connections or replacing a defective component isolated as a result of performing troubleshooting procedures.

Please note that a Boost/Buck Transformer must be installed if the facility power is below the minimum 200V required prime input power.



NOTE: ALL REMOTE PANEL (24V SWITCH) WIRES SHOULD BE CONNECTED INTERNAL TO THE ELECTRICAL BOX. USE PROVIDED STRAIN RELIEF.

Figure 13. Electrical Box Schematic for STS-5 and STS-10 Models

MAINTENANCE

Warning: Cleaning agents that contain bleach or foam should not to be used in this system. These cleaners will leech mercury from amalgam and pollute our environment. Please use non-foaming, non leaching, and biodegradable Clean Stream (pn# 57850) for proper cleaning.

Caution: Solids collector may contain biologically hazardous material. Wear protective gloves. Dispose of waste in approved bio-hazard container.

Initial Maintenance

After installation, clean the vacuum lines with Clean Stream Cleaner. This is especially necessary when a new system is being installed into existing dental system piping. Using Clean Stream Cleaner helps the STS system to remove any built up deposits in the piping system. Perform the initial cleaning by performing the daily maintenance procedure provided below.

Maintenance-Free STS Pumps

All STS pumps are designed for maintenance-free operation. The pump features a powerful permanent split capacitor motor, with a highly reliable contactor and powerful transformer. The motor is completely water and oil-free and provides a dependable operation requiring no scheduled maintenance.

Preventive Maintenance

Whenever a service technician fulfills a repair call at the customer site routine checks should also be performed to detect general overall wear, and replacement of parts should be made if necessary before a failure causes a prolonged shut-down. This preventive maintenance program will aid in dependable equipment operation and help reduce breakdown.

Scheduled Maintenance

Since a well-organized maintenance program aids dependable equipment operation and reduces breakdown to a minimum, it is essential that the maintenance instructions be followed completely. The routine cleaning will remove any built up deposits in the piping system and the tank inspection will verify proper drainage before a failure causes a prolonged shut-down.

- Daily**
1. Clean drain lines from the operatory to the Buffer tanks with Clean Stream Cleaner by performing the procedure provided on the next page.
 2. Rinse out each tank with water via the wash-out fitting on the tank top cover

- Weekly**
1. Check for noise and leaks.
 2. Clean exterior surfaces
 3. Make sure that no flammable, corrosive, or combustible materials are stored in the equipment room (especially in the area around the equipment).

- Monthly**
1. Check tubing for kinks or cracks.
 2. Check drip leg for liquids on exhaust line.

Important: Evidence of buildup at the base drain or liquids reaching the float assembly most likely means that a stricter adherence to the daily maintenance procedure is required.

If problems are found during tank inspection, perform the daily maintenance Tank Washout procedure as necessary to remove buildup at the base drain. Reinspect to verify proper tank drainage.

- Semi-Annually** Check for buildup at the base of the CAS tank entering the drain to verify proper drainage.

- Yearly** Perform interior CAS tank inspection to verify proper drainage before a failure causes a prolonged shut-down by performing the procedure provided on page 18.

Warning: The following steps must be performed while wearing skin and eye protection designed for handling typical Haz-Mat material. Use care at all times to prevent spillage.

Caution: Use only Clean Stream Cleaner to maintain the system vacuum lines. Do not use chlorine bleach or solutions of sodium hypochlorite to disinfect the STS system. These materials may result in damage or destruction of equipment or loss of system performance.

Daily Maintenance - Clean Vacuum Lines

Clean all vacuum lines in the vacuum system with Clean Stream Cleaner **daily** as part of the overall preventive maintenance program. This helps to maintain the cleanliness of the CAS tank as well as the vacuum lines and tubing throughout the system. Using the 2.5 liter bottle of Clean Stream Cleaner, PN 57850 and the Clean Stream dispenser system, PN 57665.

Required - Not Supplied

<u>Part No.</u>	<u>Description</u>
57850	2.5 Liter Bottle Clean Stream Cleaner (125 applications)
57665	Clean Stream Dispenser System 1 Bottle with o-rings and caps 1 Saliver Ejector Adapter 1 High-Volume Actuator Adapter 1 Small Suction Hose Adapter 1 Large Suction Hose Adapter



Part No. 57850



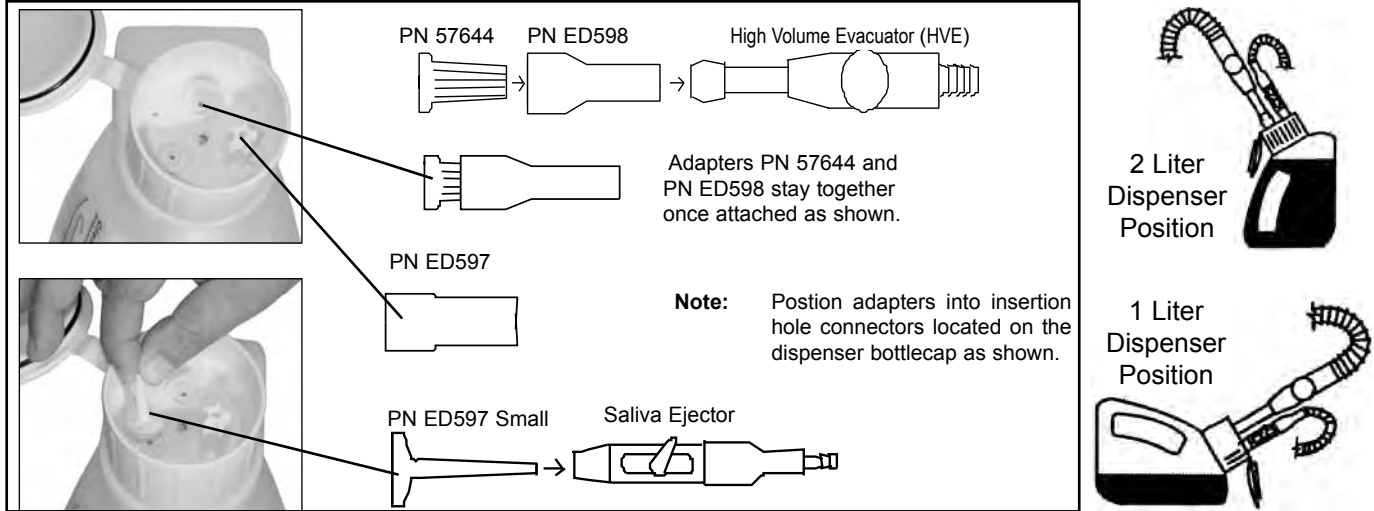
Clean Stream Dispenser System,
Part No. 57665

Procedure. Prepare the cleaning solution and clean the system daily by performing the following steps.

Note: The Clean Stream Dispenser can hold a maximum of 2 liters of solution for cleaning up to 2 operatories. Mix solution quantity as necessary.

1. Fill the Clean Stream dispenser with tap water as applicable;
 - a. to the line marked 1 L for 1 operatory
 - b. to the line marked 2 L for 2 operatories
2. Using the 20ml measuring line in the Clean Stream Cleaner bottlecap, add the Clean Stream Cleaner concentrate to the dispenser as applicable;
 - a. for 1 operatory, add 20ml of Clean Stream concentrate to the 1 liter of water
 - b. for 2 operatories, add 40ml of Clean Stream concentrate to the 2 liters of water
3. As shown below, the interior of the Clean Stream dispenser bottlecap is configured with three holes for the insertion of HVEs and SEs via provided adapters as follows.
 - a. attach saliva ejector to smallest atomizing adapter
 - b. attach 1 or 2 high volume ejectors to respective adapter(s)
4. Refer to illustrations below and place dispenser in the 2-liter vertical position or the 1-liter horizontal position as necessary.
5. With the vacuum pump on and handpiece valves open, aspirate the Clean Stream solution from dispenser.
6. After each cleansing procedure, disconnect the handpieces and rinse the dispenser.
7. Record task completion on Operator System Task Log provided on page 16.

MAINTENANCE



Daily Maintenance Procedure - Tank Washout

Refer to Figure 8 and perform the procedures to remove any solids trapped in the CAS tank.

1. Turn OFF the power to the STS.
2. Remove the plug from the wash-out port fitting on the top cover of the CAS tank.
3. Connect the 3/8-inch tubing from the water supply to the CAS wash-out port fitting.
4. Turn the water on and run the water through the CAS for approximately 2 minutes.
5. Turn off the water making sure to completely close the water valve.
6. Prior to restarting the STS do one of the following:
 - a. Leave the 3/8-inch tubing connected to the wash-out port fitting. Make sure water valve is completely closed.
 - b. Disconnect 3/8-inch tubing from the wash-out port fitting and making sure to replace plug.

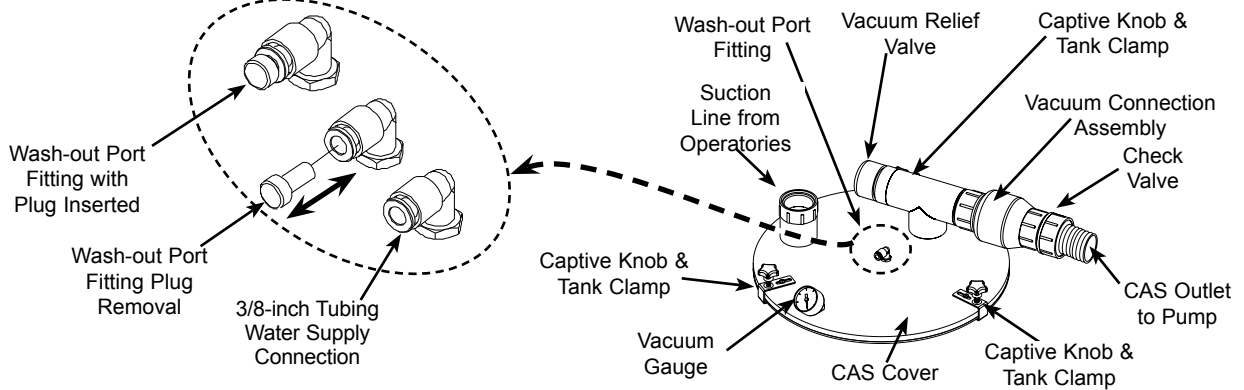


Figure 14. Stainless CAS Washout Port Detail

Yearly Maintenance Procedure - Tank Interior Inspection

1. Turn off the power to the CAS.
2. Loosen the 3 captive knobs holding the cover to the tank.
3. Carefully remove the cover ensuring that the gasket remains firmly attached to the tank flange.
4. Inspect tank interior for buildup at the base drain and/or any evidence that liquids have reached the float assembly.
5. Prior to replacing the cover, inspect the gasket to ensure a clean smooth surface.
6. Install cover and finger tighten the 3 captive knobs. Do not over tighten knobs.
7. Verify all hoses are securely connected.
8. Perform the daily maintenance Tank Washout procedure as necessary.

MAINTENANCE



Over or under adjustment of the Vacuum Relief Valve can degrade overall system operation. Adjustments should only be made to keep the suction level at the factory-set 10 InHg level, which is adequate to provide optimum operation.

Vacuum Relief Valve Adjustment

The STS system vacuum level is factory set at 10 InHg (inches of Mercury) as shown by the Vacuum Gauge. This suction level is more than adequate to provide a properly sized system service for a multiple-user dental facility. Whenever the suction level varies above or below the factory set point, adjustments can be made as necessary via the Vacuum Relief Valve. Refer to Figure 9 and adjust the system suction level by performing the following:

1. Access Vacuum Relief Valve by removing Vacuum Relief Valve Cap from the Vacuum Connection Assembly.
2. Hold Adjusting Nut with a 7/16-inch open-end wrench.
3. Using a flat screwdriver, adjust suction level as follows:
 - a. Increase suction by turning adjusting screw clockwise in no more than 1/4 increments.
 - b. Decrease suction by turning adjusting screw counterclockwise in no more than 1/4 increments.

Vacuum Relief Valve Cleaning

A dirty or clogged Vacuum Relief Valve degrades the STS system suction level. Clean the Vacuum Relief Valve by removing Vacuum Relief Valve Cap and carefully pulling the valve from the Vacuum Connection Assembly. Blow out accumulated solid deposits using clean low pressure compressed air.

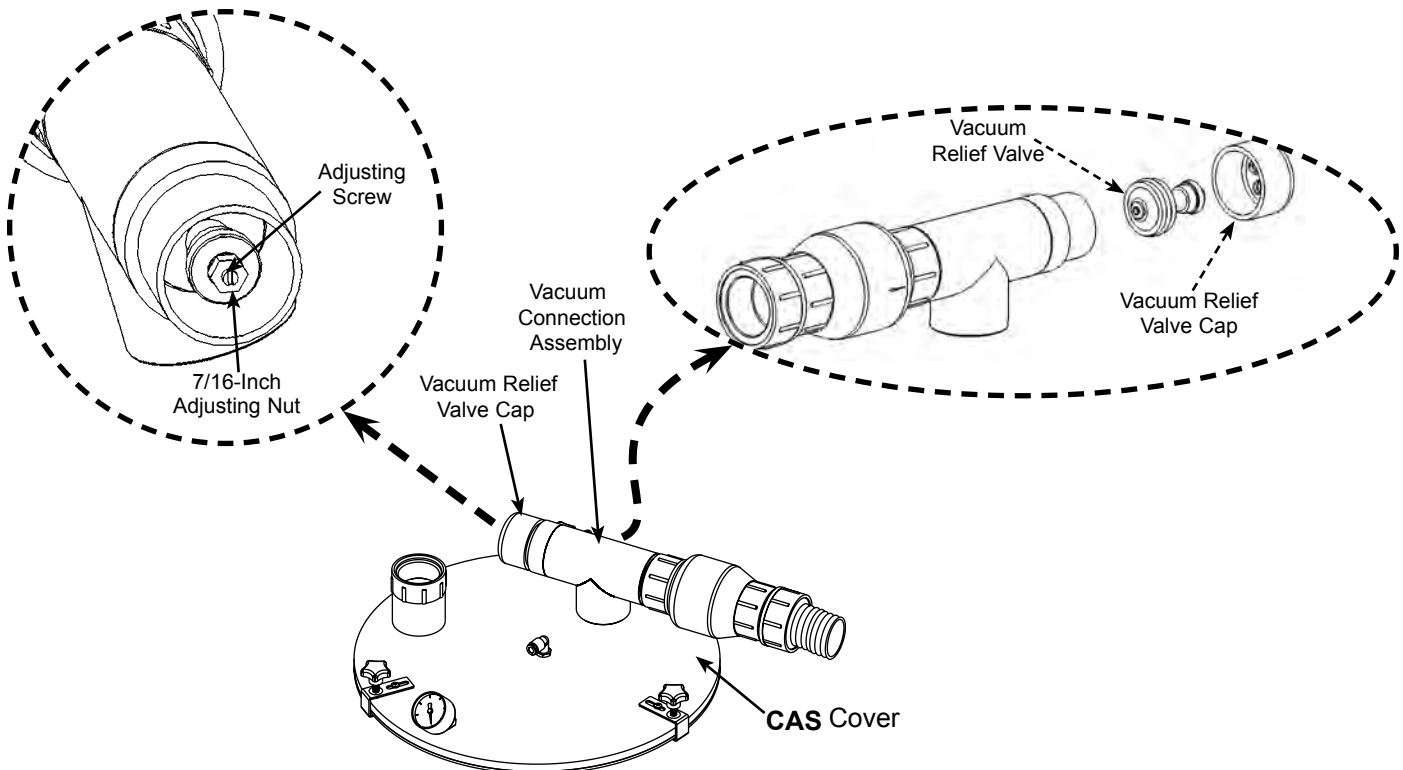


Figure 15. Vacuum Relief Valve Adjustment and Cleaning Detail

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTIONS
1. No suction.	<ul style="list-style-type: none"> a. Pump not turned on. b. Pump not running. c. CAS separator tank full. d. CAS hooked up backwards. e. Drain check valve clogged. f. Clogged drain. g. Kinked or collapsed suction hose. h. Separator tank is full and will not drain. 	<ul style="list-style-type: none"> a. Turn pump on.. b. Call your authorized Air Techniques dealer for repair service. c. Shut unit "OFF" for 10 seconds then turn back "ON". d. Connect hose from STS to swivel tee fitting on CAS. e. Call your authorized Air Techniques dealer for repair service. f. Call your local plumber. g. Check the suction line from the unit to the separation tank and the separation tank to the operatory line. If clogged, collapsed or kinked call your authorized Air Techniques dealer for repair service. h. Tank must be hooked up to an open drain. If hooked to an open drain and tank won't drain call your authorized Air Techniques dealer for repair service.
2. Poor or low suction	<ul style="list-style-type: none"> a. Restricted air exhaust. b. Restricted air suction. 	<ul style="list-style-type: none"> a. Check air exhaust pipe to make sure it conforms to specifications. Check and clear possible restrictions in exhaust line. b. Check the suction line from the unit to the separation tank and the separation tank to the operatory line. If clogged, collapsed or kinked call your authorized Air Techniques dealer for repair service.
3. Excessive suction	<ul style="list-style-type: none"> a. Relief valve set high or stuck closed. b. Relief valve screen clogged. 	<ul style="list-style-type: none"> a. Call your authorized Air Techniques dealer for repair service. b. Call your authorized Air Techniques dealer for repair service.
4. Pump does not run.	<ul style="list-style-type: none"> a. Site circuit breaker is "OFF". b. Pump circuit breaker is "OFF". c. Low voltage circuit breaker is open. d. Low voltage remote switch turned "OFF", or not connected properly. e. Electrical problem. 	<ul style="list-style-type: none"> a. Turn "ON" the site circuit breaker. b. Turn "ON" the pump circuit breaker. c. If the white section of the circuit breaker is visible, it is tripped. Flip this section back in to reset breaker. d. Make sure remote switch is turned "ON" or if not using remote, switch yellow and orange wires twisted together. e. Call your authorized Air Techniques dealer for repair service.

ACCESSORIES/OPTIONS

Accessories/Equipment Options. The following lists the ordering number and description for accessory components available to maintain the STS product family. Contact an authorized Air Techniques' dealer for information.

<u>Part No.</u>	<u>Description</u>
54400	Installation Kit, Dual System
54075	Kit, CAS Replacement Cover
54061	Kit, Washout Connector
56200	Vacuum Equalizer
A1048	Guardian for existing CAS separation tank
54199	Kit, Remote Vacuum Relief Valve Assembly
54218	Pre-Installation Guide, STS and CAS (Models Triple STS-5, -20 & -30)

INSTALLATION ACCESSORY KITS

STS™ Pump Accessory Pack; P/N 54150, Contents -
(used on STS-5 & STS-10 Pumps **with** heat exchanger installed)

<u>Part No.</u>	<u>Component Description</u>	<u>Quantity</u>
57253	Barbed Adapter, 1-1/2-Inch MNPT by 1-1/2 Inch	1
56057	2 1/4-Inch Diameter Hose, 17 Inch Long, 1 Inch Wide Cuff	1
89324	Hose Clamp, 1-9/16- 2-1/2 Inch Maximum by 1/2 Inch	2
57234	1-1/2-Inch Street Elbow 1-1/2 Inches NPT	1
57169	1.31 to 2.25-Inch Diameter Hose Clamp	1
54340	STS-5, STS-10, Triple STS-5 and STS-20 User's Manual	1



STS™ Pump Accessory Pack; P/N 54150N, Contents -
(used on STS-5 & STS-10 Pumps **with no** heat exchanger installed)

<u>Part No.</u>	<u>Component Description</u>	<u>Quantity</u>
57253	Barbed Adapter, 1-1/2-Inch MNPT by 1-1/2 Inch	1
54184	2 1/4-Inch Diameter Hose, 36 Inch Long, 1 Inch Wide Cuff	1
89324	Hose Clamp, 1-9/16- 2-1/2 Inch Maximum by 1/2 Inch	2
57234	1-1/2-Inch Street Elbow 1-1/2 Inches NPT	1
57169	1.31 to 2.25-Inch Diameter Hose Clamp	1
54340	STS-5, STS-10, Triple STS-5 and STS-20 User's Manual	1



CAS™ Tank Accessory Pack; P/N 54120, Contents -

<u>Part No.</u>	<u>Component Description</u>	<u>Quantity</u>
54521	1-1/2 Diameter Hose; Clear with Blue Helix Spiral Tubing	10 FT
57169	1.31 to 2.25-Inch Diameter Hose Clamp	5
57253	Barbed Adapter, 1-1/2-Inch MNPT X 1-1/2 Inch	4
57234	1-1/2-Inch Street Elbow 1-1/2" NPT	1
31453	1/4-20 X 1-3/4-Inch HEX Head Bolt, Grade 5	4
30610	1/4-Inch Plated Flat Washer	8
30222	1/4-Inch Plated Split Lock Washer	4
30049	1/4-20, Plated HEX Nut	4



INSTALLATION ACCESSORY KITS

STS™ Dual Manifold Accessory Kit; P/N 54400, Contents -

<u>Part No.</u>	<u>Component Description</u>	<u>Quantity</u>
54129	Check Valve; 1-1/4 Inch to 1-1/2 Inch, Modified. Includes: Connector Adapter, 54234 PVC Pipe Length, 54291 Barbed P Connector Adapter, 57253	2
54128	PVC Tee PCONN, 1-1/2 Inch FNPT All Sides: D. Includes: Barbed P Connector Adapter, 57253	1
55222	PVC P Connector Adapter, 1-1/2 Inch MNPT X 1-1/2 Inch SPG	2
54521	1-1/2 Diameter Hose; Clear with Blue Helix Spiral Tubing	6 FT
57169	Hose Clamp, 1.31 - 2.25 Inch Diameter.	5
31454	1/4-20 X 2-3/4-Inch, HEX Head Bolt, Grade 5, Plated	4
30958	1/4-Inch Flat Washer, 18-8 ST	8
30920	1/4-Inch Split Lock Washer, 18-8 ST	4
30049	1/4-20, Plated HEX Nut	4



Triple STS -5 Accessory Kit; P/N 54421, Contents

<u>Part No.</u>	<u>Component Description</u>	<u>Quantity</u>
54129	Check Valve Assy	3
55222	Adapter	3
52553S	Barb	3
57169	Hose Clamp	6
54521	1-1/2 Diameter Hose; Clear with Blue Helix Spiral Tubing	15 ft
31454	Bolt	8
30958	Flat Washer	16
30220	Split Washer	8
30049	Nut	8
54402	Instructions	1



STS -20 Accessory Kit; P/N 54422, Contents

<u>Part No.</u>	<u>Component Description</u>	<u>Quantity</u>
54129	Check Valve Assy	4
55222	Adapter	4
52553S	Barb	4
57169	Hose Clamp	8
54521	1-1/2 Diameter Hose; Clear with Blue Helix Spiral Tubing	20 ft
31454	Bolt	8
30958	Flat Washer	16
30220	Split Washer	8
30049	Nut	8
54402	Instructions	1



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