

SOTERA

SYSTEMS

SV Series

Stainless Steel Chemical Transfer Pump

115 VOLT AC / 12 VOLT DC

Models

SV20A1RDBSD

SV20A1RDNSD

Table of Contents

Owners Installation, Operation, and Safety Manual.....	1
Table of Contents.....	2
Thank You!.....	2
About This Manual.....	2
Safety Information.....	3
About Diesel Exhaust Fluid (DEF).....	3
Installation.....	4
Pump Only.....	4
Pump with Tote Mount.....	5
Drum Mount Option.....	5
Wiring Procedure.....	6
AC Receptacle.....	6
DC Wiring.....	6
Operating Instructions.....	6
Trouble Shooting.....	7
Technical Information / Specifications.....	11
Fluid Compatibility.....	12
Safety Testing Approvals.....	12

Thank You!

Thank you for your purchase of the SV Series Chemical and Fluid Transfer pump! Your Sotera product comes with over 80 years of pump manufacturing experience behind it, providing you the value that comes with superior performance, user friendly design, long service life, and solid, simple engineering. Experience that gives you peace of mind.

Rest Easy – It’s Tuthill!

About This Manual

From initial concept and design through its final production, your Sotera pump is built to give you years of trouble free use. To insure it provides that service, **it is critical that you read this entire manual prior to attempting to install or operate your new pump.** Become familiar with the terms and diagrams, and pay close attention to the highlighted areas with the following labels:



WARNING! Emphasizes an area in which personal injury or even death could result from failure to follow instructions properly. Mechanical damage may also occur.



IMPORTANT! These boxes contain information that illustrates a point that may save time or may be key to proper operation, or clarifies a step.



CAUTION! Failure to observe a “Caution” can cause damage to the equipment.

At Sotera, your satisfaction with our products is paramount to us. If you have questions or need assistance with your product, please contact us at 1-800-634-2695 (M-F 8 AM–5 PM EST).

Safety Information



WARNING! To ensure safe and proper operation of your equipment, it is critical to read and adhere to all of the following safety warnings and precautions. Improper installation or use of this product can cause serious bodily injury or death!

- 1) Maintaining the purity of Diesel Exhaust Fluid is critical; as such, it is imperative once the system is assembled, it must remain sealed to insure the integrity of the fluid. Breaking the seal on the system can lead to fluid contamination.
- 2) After dispensing DEF be certain to drain all the fluid from the nozzle, making sure it is pointing downward when stored in the nozzle boot. DEF remaining in the nozzle tip and exposed to air will crystallize and can plug the nozzle.
- 3) **DO NOT** lay the dispensing nozzle on the ground or any surface that may contaminate the nozzle tip as this can compromise the purity of the DEF.
- 4) Inlet and outlet threads are BSPP style and require no special sealant.
- 5) Storage tanks should be securely anchored to prevent shifting or tipping when full or empty.
- 6) The pump motor is equipped with thermal overload protection; if overheated, the motor will shut off to prevent damage to the windings. If this happens, **TURN THE PUMP OFF!** When the motor cools, it will restart without warning if the power is on.



WARNING! This pump is not for use with fluids that have a flash point below 100°F (37.8°C, i.e.: gasoline, alcohol). Refer to NFPA 325M (Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids) for flash points of common liquids. Static electricity buildup and discharge could result in arc and explosion.



WARNING! DO NOT use the pump with fluids intended for human consumption.

About Diesel Exhaust Fluid (DEF)

The Sotera SV pump is designed to pump AUS32 (Aqueous Urea Solution 32.5%), better known as Diesel Exhaust Fluid, or "DEF".

DEF is used by modern diesel engines which are equipped with an SCR (Selective Catalytic Reduction) system. DEF never comes into contact with the fuel; the common misconception is that it is an additive. DEF is carried onboard the vehicle in its own storage tank. It is injected into the exhaust gases as a post combustion process through an SCR where it breaks harmful NOx (Nitrous Oxide) emissions down into mostly nitrogen and oxygen.

Because the specific purity of the DEF solution is critical to the catalytic reaction, the Sotera SV pump is designed to maintain the integrity by using components made of materials that will not taint or alter the solutions chemical structure.



IMPORTANT! After initial assembly and installation, flush the entire dispensing system by pumping 5 – 10 gallons of DEF through it. This purges the system of air, and insures any impurities that may have been in the system are washed out. Dispose of the DEF used to flush the system using approved DEF handling procedures; do not return the fluid to the drum or tote, or use it in a vehicle.

Installation

The SV pump is designed to offer a variety of mounting possibilities, including as a Drum Pumping Station, and as a Tote Pumping Station. It also features an integral bypass valve to help minimize wear when the pump is operating with the nozzle closed.



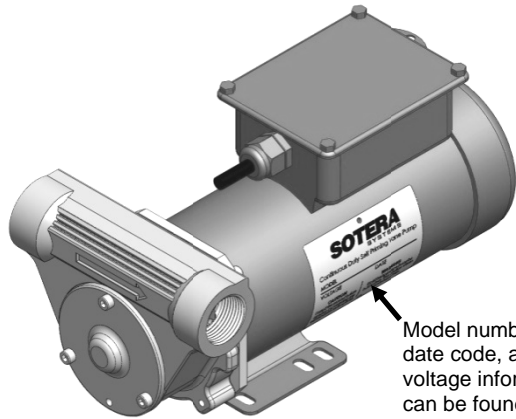
CAUTION! Threaded pipe joints and connections must be sealed with the appropriate sealant or sealant tape for the fluid being pumped to minimize the possibility of leaks.

Pump Only



CAUTION! DO NOT mount the pump in a manner or location that will allow it to sit in standing or flowing water, or rain. Extended exposure to water can and will damage the motor.

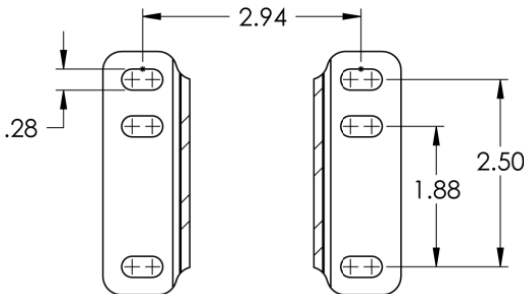
The SV Stainless Steel pump is designed for year round use indoors and out. The pump should be bolted securely to a solid, stationary surface using at least 4 bolts.



The SV Stainless Steel pump can be installed horizontally or vertically, allowing a variety of mounting options.



CAUTION! If the pump is to be mounted vertically, it must be mounted with the pump end **DOWN**. Mounting the pump end up may cause premature wear and motor failure.



Pump Base Mounting Hole Configuration

Pump with Tote Mount

For convenience and ease of exchange, Sotera offers a Tote Mount package that provides a solid, easy to use dispensing platform for your SV needs while allowing quick, easy moves from one tote tank to the next.

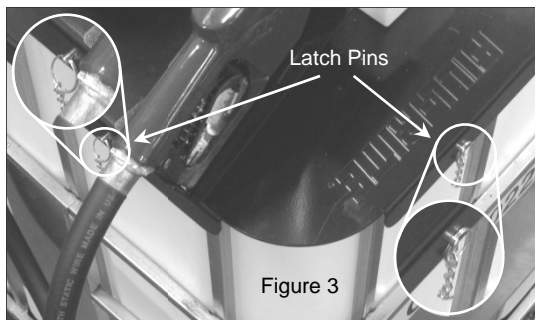


Figure 3

The Tote Mount package includes a SV pump, digital meter, hoses, nozzle, mounting platform, and hose support retractor. The Tote Mount is designed to fit snugly against the top framework of most tote tanks, and latches into position using two locking pins that connect to the tote tank framework (figure 3).

Once installed, use the hand knob at the rear of the mount platform to tighten the mount firmly against the tote rails (assembly instructions are included with the Tote Mount Kit).

Drum Mount Option

Sotera offers an optional Drum Mount package that works in conjunction with the Tote Mount to provide pumping ability from barrels and drums. This package provides a stable, secure platform for the Tote Mount, positioning it over the container for convenience and efficiency (figure 4).

The Tote Mount fits on top of the Drum Mount, securing to the framework as it does a tote tank. Latch it securely into place with the latching pins (as in figure 3 above), and use the knob at the rear (item A) to tighten the platform to the Drum Mount.

The Drum Mount features a base plate that will accept up to a 55 gallon drum in the base, allowing it to move freely with the entire unit. Lift the lock bar (item B) off the positioning posts and slide the drum into position. Reinstall the bar. Connect the suction side hose (not included) to the drum adapter (not included). Be certain the connection is sealed to insure proper draw of fluid and to maintain the integrity of the SV.

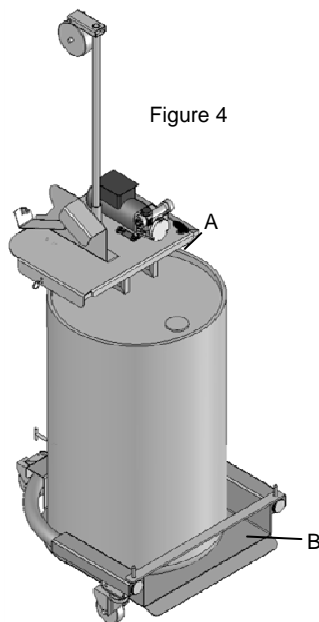


Figure 4

Electrical Wiring

Wiring Procedure



WARNING! Electrical wiring should be performed **ONLY** by a licensed electrician in compliance with local, state, and national electrical code NEC/ANSI/NFPA 70, NFPA30, and NFPA 30A, as appropriate to the intended use of the pump. Threaded rigid conduit, sealed fittings, and conductor seal should be used. The pump must be properly grounded. Improper installation or use of this pump can result in serious bodily injury, or death!



CAUTION! All pumps should operate at the rated nameplate voltage. Power should be supplied to the pump from a dedicated 20 amp circuit breaker. No other equipment should be powered by this circuit. Wiring must be of sufficient size to carry the correct current for the pump. Voltage drop will vary with distance to pump and size of wire; refer to the National Electrical Code (NEC), or local codes, for voltage drop compensation to be sure you are using the correct size wire for your application.

AC Receptacle

AC pumps are equipped with a conventional 110 VAC 3-prong grounded plug. This pump can be plugged into any conventional grounded receptacle. The receptacle circuit must be protected with a 20 amp circuit breaker.



WARNING! THIS PRODUCT MUST BE GROUNDED! DO NOT defeat the ground prong on the plug by using an adapter, or otherwise modifying the plug. **DO NOT** plug this appliance into an ungrounded receptacle.

DC Wiring

DC pumps are connected to the power source by way of the power cord. The power cord terminates in red and black alligator clamps; connect the red clamp to the positive post of the DC power source, and the black clamp to the negative post.

Operating Instructions

1. If so equipped, reset Meter to "0" (do not reset while in use as this can cause damage to the meter).
2. Remove dispensing nozzle from nozzle boot.
3. Move the switch lever to the "ON" position to power the pump.
4. Insert the dispensing nozzle into the container to be filled.
5. Operate the nozzle to dispense fluid; release nozzle when the desired amount of fluid has been dispensed.
6. Move switch lever down to the "OFF" position to turn off the pump.
7. Remove the dispensing nozzle from the container and store it in the nozzle boot.



CAUTION! Always keep the nozzle in contact with the container being filled **during the filling process** to minimize the possibility of static electricity build up or discharge.

Trouble Shooting

The following "Trouble Shooting" guide is provided to offer basic diagnostic assistance in the event you encounter abnormal service from your Tuthill product.



WARNING! DO NOT open or attempt to repair the motor on your Tuthill pump. Return it to the place of purchase for service. Opening the motor case can compromise the integrity of the Explosion Proof construction (if equipped with an Explosion Proof motor) and will void any existing warranty and certification (UL listing).



WARNING! Be certain all power to the pump is turned off prior to performing any service or maintenance.



IMPORTANT! When performing diagnosis and repairs to a SV pump, it is very important you take the necessary steps to guarantee the purity of the SV fluid.

- 1) Maintaining the purity of DEF is critical; as such, it is imperative once the system is assembled, it must remain sealed to insure the integrity of the fluid. **Breaking the seal on the system can lead to fluid contamination.**
- 2) After dispensing DEF be certain to drain all the fluid from the nozzle, making sure it is pointing downward when stored in the nozzle boot. DEF remaining in the nozzle tip and exposed to air will crystallize and can plug the nozzle.
- 3) **DO NOT** lay the dispensing nozzle on the ground or any surface that may contaminate the nozzle tip as this can compromise the purity of the DEF.
- 4) Standard threads on the SV pump are BSPP style and require no special sealant; if your pump was special ordered with NPT threads, use the appropriate thread sealant for the fluid you are pumping.
- 5) Use new latex gloves and work in as clean and dust free an environment as possible to reduce the risk of airborne contaminants entering the DEF pump, hose, and container.
- 6) To minimize the amount of fluid returning to the storage tank prior to service, **turn the pump off**, and open the nozzle into a container to drain the fluid in the hose. Pull the hose down to maximize the amount of fluid drained from the system. When the flow has stopped, close the nozzle.
- 7) DEF crystallizes when exposed to air; therefore, it is desirable to minimize the amount of time the DEF wetted components in the delivery system (pump, hose, meter, and nozzle) are open.
- 8) After repairs have been completed and the system reassembled, flush the entire dispensing system by pumping 5 – 10 gallons of DEF through it. This purges the system of air, and insures any impurities that may have entered the system are washed out. Dispose of the DEF used to flush the system using approved DEF handling procedures; do not return the fluid to the drum or tote, or use it in a vehicle. **Any repair requiring the sealed system to be opened will require this procedure!**

Symptom	Cause	Cure
Pump won't prime.	1. Suction line problem.	Check for leaks in suction line
	2. Bypass valve open.	Remove and inspect valve; must move freely & be free of debris.
	3. Vanes sticking.	Check vanes and slots for nicks, burrs and wear.*
	5. Excessive rotor or vane wear.	Inspect rotor & vanes for excessive wear or damage; replace if necessary.*
	6. Outlet blocked.	Check pump outlet, hose, nozzle & filter for blockage.
	7. Vapor Lock	Reduce vertical and horizontal distance from pump to liquid; remove automatic nozzle.
	2. Suction line problem.	Check suction line for leaks or restrictions; it may be too small, too long or not airtight.
	3. Bypass valve sticking.	Remove and inspect valve; must move freely & be free of debris.
	4. Vanes sticking.	Check vanes and slots for wear.
	5. Excessive rotor or vane wear.	Inspect rotor & vanes for excessive wear or damage; replace if necessary.*
	6. Hose or nozzle damage.	Replace hose or nozzle.
Pump runs slowly.	1. Incorrect voltage.	Check incoming line voltage while pump is running.
	2. Vanes sticking.	Inspect vanes and slots for nicks, burrs and wear.*
	3. Wiring problem.	Check for loose connections.
	4. Motor problem.	Return to place of purchase.
Motor stalls.	1. Bypass valve sticking.	Remove and inspect valve; must move freely & be free of debris.
	2. Low voltage.	Check incoming line voltage while pump is running.
	3. Excessive rotor or vane wear.	Check rotor & vanes for excessive wear or damage.*
	4. Debris in pump cavity.	Clean debris from pump cavity.
	3. Restricted suction pipe.	Remove and clean pipe.
	4. Motor failure.	Return to place of purchase.
Motor Inoperative.	5. Pump rotor lock-up.	Clean and check pump rotor and vanes.
	1.No power	Check incoming power.
	2. Switch failure.	Return to place of purchase.
	3. Motor failure.	Return to place of purchase.
Fluid leakage.	4. Incorrect/loose wiring.	Check wiring.
	5. Bad o-ring gasket.	Check all o-ring gaskets.
	6. Dirty shaft seal.	Clean seal & seal cavity.
	7. Bad shaft seal.	Replace seal.
	8. Incompatible fluid.	Refer wetted parts list to fluid manufacturer.
Pump hums but will not operate.	9. Loose fasteners.	Tighten fasteners.
	10. Motor Failure	Return to place of purchase.
	11.Broken Key.	Remove any debris and replace key.
	12. Rotor Vanes locked in SV crystals.	*See detailed explanation on page 9.

Bold text indicates repairs that are not serviceable by the owner; pump must be returned to the point of purchase for repairs.

***IMPORTANT INFORMATION ON DEF “CRYSTAL LOCKED” ROTORS:** DEF will crystallize almost immediately upon contact with air; if air gets to the DEF in the rotor cavity, it can crystallize the DEF and lock the rotor in place. If this occurs, the following procedure will clear the vanes of crystals and return the pump to operation:

- 1) Remove the strainer cover
- 2) Pour de-ionized water into the strainer opening; the DEF crystals will dissolve instantly.
- 3) Reinstall strainer cover and torque to 50 inch lbs.
- 4) Pump at 5 - 10 gallons of DEF through the system to flush the water from the

Bold text indicates repairs that are not serviceable by the owner; pump must be returned to the point of purchase for repairs.

If you have questions regarding installing, operating, or servicing your product, please feel free to contact our Customer Service Department at 1-800-634-2695 (M-F 8 AM–5 PM EST). You can also reach us on the World Wide Web at “www.tuthill.com”.



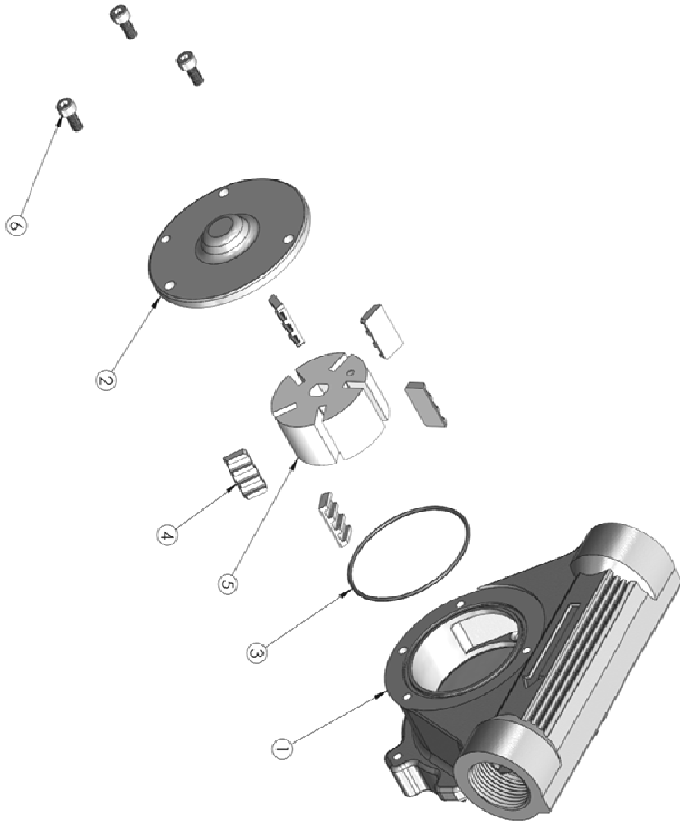
WARNING! DO NOT open or attempt to repair the motor on your Tuthill pump. Return it to the place of purchase for service. Opening the motor case can compromise the integrity of the construction and will void any existing warranty and certification (UL listing).

Replacement Parts

Proper maintenance and repairs will help keep your Sotera product running for a long time. The following parts are available should the need arise, and can be obtained through your Sotera distributor (for DEF applications, maintaining the purity of the fluid is paramount, so we encourage you to use only genuine Sotera parts any time your pump needs service to maintain the integrity of its construction and your DEF).

Kit #	Description	Contents
KITFR32V	SV Pump Rotor Kit	#1 Pump Housing (not included in kit)
		#2 Rotor Cover
		#3 O-ring Seal
		#4 Rotor Vane
		#5 Rotor
		#6 Fastening Hardware
		#7 Sleeve Bearing
		#8 Fastening Hardware

SV Series Pump Rotor Assembly



Tuthill Product Warranty

Tuthill Transfer Systems (“Manufacturer”) warrants each consumer buyer of its Sotera products (“Buyer”) from the date of invoice or sales receipt, that goods of its manufacture (“Goods”) shall be free from defects of materials and workmanship. Duration of the warranty is as follows:

- Heavy Duty Products – Two Years
- Standard Duty Products – One Year
- Economy Duty Products – One Year
- Cabinet Pumps, Parts, and Accessories – One Year

Manufacturers sole obligation under the foregoing warranties will be limited to either – at Manufacturers option – repairing or replacing defective goods (subject to limitations hereinafter provided) or refunding the purchase price for such Goods theretofore paid by the buyer, and Buyers exclusive remedy for breach of any such warranties will be enforcement of such obligations of the Manufacturer. If the Manufacturer so requests the return of such Goods, the Goods will be redelivered to the manufacturer in accordance with Manufacturers instructions FOB Factory. The remedies contained herein shall constitute the sole recourse of the Buyer against the Manufacturer for breach of warranty. **IN NO EVENT SHALL THE MANUFACTURER’S LIABILITY FOR ANY CLAIM FOR DAMAGES ARISING OUT OF THE MANUFACTURE, SALE, DELIVERY, OR USE OF THE GOODS EXCEED THE PURCHASE PRICE.** The foregoing warranties will not extend to goods subject to misuse, neglect, accident, improper installation or maintenance, or have been repaired by anyone other than the Manufacturer or its authorized representative. **THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OF MERCHANTABILITY, FITNESS FOR PURPOSE OF ANY OTHER TYPE, WHETHER EXPRESSED OR IMPLIED.** No person may vary the forgoing warranties or remedies, except in writing signed by a duly authorized officer of the Manufacturer. The Buyer’s acceptance of delivery of the Goods constitutes acceptance of the foregoing warranties and remedies, and all conditions and limitations thereof.

Model Number		UPC Bar Code	
Manufacture Date		Serial Number	

Technical Information / Specifications

SV Pump & Motor Features & Specifications

- Inlet: 3/4" BSPP or 1" NPT
- Outlet: 3/4" BSPP or 1" NPT
- Stainless steel housing, rotor, rotor cover, bypass spring, and motor shaft
- Vanes, seals, and all other non-metallic parts made of approved co-polymer
- Automatic bypass valve
- Continuous duty 1/2HP or 1/4HP AC motor with capacitor start
- 1/2HP DC motor
- AC - 115VAC – 60Hz/1Ø
- DC - 12VDC
- Thermal overload protection and heavy duty switch

SV Pump & Motor Performance

- Pressure ~ 20 PSI (2.07 bar) bypass valve setting (up to 40 cps viscosity)
- 20 GPM (75 LPM) for the following models:
 - SVA1D-N10-SD
 - SVA1D-B07-SD
 - SVD1D-N10-SD
 - SVD1D-B07-SD
- 10 GPM (38 LPM) for the following models:
 - SVA2D-N10-SD
 - SVA2D-B07-SD
- TDH = 46 feet at bypass valve rating
- Operating temperature 40° – 120°F* (4° C - 49° C)

Overall Dimensions:

AC DEF Pump: 6" wide X 6" high x 12" deep.

DC DEF Pump: 14.15" wide X 16.6" high x 14" deep.

Shipping Weight:

AC DEF Pump: 25 lbs.

DC DEF Pump: 25 lbs.

Fluid Compatibility

Diesel Exhaust Fluid (Aqua Urea 32.5% solution) Diesel Fuel Mineral Spirits
Stoddard Solvents



IMPORTANT! If in doubt about compatibility of a specific fluid, contact supplier of fluid to check for any adverse reactions to the following wetted materials:

Stainless Steel Fluorocarbon Polypropylene Polyoxymethylene



WARNING! This pump is not for use with fluids that have a flash point below 100°F (37.8°C, i.e.: gasoline, alcohol). Refer to NFPA 325M (Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids) for flash points of common liquids. Static electricity buildup and discharge could result in arc and explosion.

Safety Testing Approvals

The **Sotera** line of pumps have been safety tested for compliance to the standards set forth by UL Laboratories.

