

## Installation, Operation and Maintenance Instructions

# Model SPV

**Description and Specifications:** The Model SPV is a vertically mounted, end suction, single stage, back pull-out, centrifugal pump. Pumps are intended to be mounted in a contained sump and to operate with the impeller located below the level of the liquid in the sump. Connections are NPT threaded. All wetted metal pump parts are 18-8, 304SS or better. Impellers may be open or enclosed. O-rings and any seal parts may be Buna, Viton, or EPR. Motors are NEMA 56J frame, with a C-Face mounting flange and a threaded shaft. All pumps have a shaft extension that is threaded onto the motor shaft. No mechanical seals or packing are used. The SPV uses a throttle bushing of Carbon, bronze or Nitronic 60 to reduce leakage around the shaft extension.

**Operating limits:** The model SPV is designed for a maximum pressure of 120 PSIG at 200F. Motor is limited to 20 starts per hour, evenly distributed.

**Notice:** Upon receipt of this equipment, inspect the carton and the equipment for any damages that might have occurred during shipment and notify the carrier immediately. Damage that occurs during shipment is not the responsibility of American Stainless Pumps. Failure to notify the carrier will place responsibility on you for any repairs or damages occurring during shipment.

**Safety Instructions:** To avoid serious or fatal injury and/or property damage, read and follow all instructions in this manual. Review all instructions and warnings included in this manual before attempting any work on this pump or pump/motor assembly. Do not remove or alter any decals.

**Warning:** This pump is not designed for use with hazardous liquids or flammable liquids. This pump allows the pumped liquid to exit the pump at the throttle bushing. When the bushing is worn and pressures are high, the pressurized liquid may spray up the shaft and into the motor and out of the sump. Keeping a minimum level of liquid above the pump throttle bushing will reduce the chance of spraying liquid out of the pump.

**The motor used to drive this pump is an electrical device connected to a potentially lethal voltage power source. Take all precautions required when working with or on the motor and its power source, including but not limited to:**

1. Always disconnect and lockout the electrical power source before attempting any connection, maintenance or repairs. Failure to do so can cause electrical shocks, burns and death.
2. Install, ground and wire motors in accordance with all local and national electrical codes.
3. Install an all leg disconnect switch near the motor for quick access.
4. The electrical supply must match the motor nameplate specifications and the motor must be wired per the wiring diagram on the motor to match the selected voltage. **Incorrect wiring can cause fire and motor damage and will void the warranty.**
5. Most single phase motors will have automatic thermal protection switches wired in the motor. These switches will open and stop the motor if the motor overheats. As the motor cools, these switches will close and start the motor automatically and unexpectedly.
6. Motors that do not have thermal overloads must have a properly sized contactors or magnetic starters and overload switches (or fuses) in the starter panel. Three phase motors require all leg protection.
7. Use only stranded copper wire to motor and ground. Wire size must limit the maximum voltage drop to 10% of the motor nameplate voltage at the motor terminals.
8. Three phase motors can rotate in either direction. The pump will operate properly only in one direction (clockwise when looking from the motor end, counter-clockwise when viewed from the pump end). **Operating the pump in the reverse rotation will damage or destroy the pump and motor and voids the warranty.**

### Installation:

-Locate the pump as low in the sump as possible. The pump impeller must be submerged below the liquid level to begin operation. **This pump is not self-priming and will not pump air.**

-Protect the pump and motor from freezing. If the liquid in the pump freezes the pump casing may be damaged.

-Allow adequate space around the unit for service and ventilation.

-Units are designed to be installed vertically only with the motor on top and out of the sump. **Liquid spraying from the sump will damage the motor and can cause a shock, burns or death.**

## Rotation:

The model SPV will operate properly only in one direction (clockwise when looking from the motor end, counter-clockwise when viewed from the pump end). **Operating the pump in the reverse rotation may cause the impeller or the shaft extension to unscrew, breaking the shaft, damaging the pump and/or the motor and voids the warranty.**

- Three phase motors can rotate in either direction. Single phase motors normally only rotate in the proper direction.
- To check rotation, you must observe the motor shaft from the back of the motor. Remove the end cover from the back of the motor by prying off the cap or removing screws on the end shield. Quickly switch on and off the motor and watch the shaft rotation as it slows down. Motor shaft should be turning in the clockwise direction when viewed from the back of the motor.
- If your three-phase motor is turning in the wrong direction, interchange any two of the three motor power wires. This should reverse the rotation. If a single-phase motor is turning in the wrong direction, it has been wired wrong internally. Consult the motor manufacturer or American Stainless Pumps for instructions.
- Check the rotation again. If it is correct, replace the end cover.

## Operation:

- Pump must be completely submerged before starting. A minimum of 6 inches of submergence above the suction of the pump is recommended. Do not run the pump dry as the lower bushing may seize onto the shaft.
- Do not operate the pump at or near zero flow.** At zero flow, heat will build up in the pump and can cause extreme damage to the pump, property damage and/or possible injury to operating personal. Minimum flows of 10% of the pumps best efficiency point are recommended unless otherwise authorized by ASP.
- Do not operate the pump beyond the flow rates shown on published curves. Noisy pumps or the sounds of “pumping rocks” may be signs of cavitation or operation beyond the pump capacity.
- Check pump and motor for vibration. Vibration may be a sign of misalignment, a bent shaft, pipe strain, insufficient mounting or operation beyond the pumps capacity.

## Maintenance:

There is no scheduled maintenance required.

- The SPV has one throttle bushing in the lower column flange that restricts the flow of liquid out of the pump case. When vibration exceeds allowable levels, or when too much liquid is leaking past the bushing, the throttle bushing and the shaft extension may need to be replaced.
- Bearings in the motors are usually permanently grease lubricated and cannot be regreased (some large motors may have grease fittings).
- O-Rings and lip seals (optional) may harden with age and need to be replaced when they leak.

## Piping:

All piping must be independently supported. No piping loads may be carried by the pump.

Piping should be at least the same size as the pump connections.

- Do not use any suction valve for throttling the pump. This will cause loss of prime and damage to the pump that is not covered by warranty.
- All joints must be air tight. Use Teflon tape and/or pipe joint compound to insure no air can leak into the pump.
- Be sure that the sump liquid level is sufficient to prevent vortices from drawing air into the pump.
- Be sure there is at least 2 inches of clearance between the pump suction and the bottom of the sump.
- Install a valve on the discharge line for use in regulating the pump flow and for isolating the pump during maintenance and inspection.

## Disassembly: **Disconnect and lockout the electrical power before attempting any disassembly. Casing may contain hazardous fluids. Drain and flush and take necessary precautions.**

Prior to disassembly, note or take pictures of the mounting and piping arrangement so you can reassemble the system. You may wish to mark the location of clamps and other mounting parts to one another for reference when assembling.

1. Remove the pump from the sump. Remove any piping, column clamps and mounting plates if they interfere with the disassembly operation. Disassembly and assembly will be easier if all piping is removed and the pump is lying on its side on a bench, with blocks available to support the pump.
2. Pump disassembles from the bottom.
3. Remove the eight (8) case bolts (Item 7CS) with a wrench or socket and remove the case. Inspect the casing O-Ring and replace if damaged or hardened. Inspect the impeller suction O-Ring and replace if worn or damaged. You may need an awl or other sharp pointed tool to get the impeller O-Ring out of the case groove.
4. The locking screw is used to prevent the impeller from unthreading if started in the wrong direction. The locking screw is installed with removable thread locker to prevent it from coming out during operation. The locking screw and all of the shaft threads are all right hand threads. Turn counter clockwise to unthread and clockwise to tighten.

## Disassembly (continued)

5. After removing the locking screw, remove the impeller by turning the impeller counterclockwise (when looking at the impeller from the pump end) while holding the shaft. Using a screwdriver in the shaft extension through hole, or vise grips as needed, hold the shaft extension tightly against rotation while turning the impeller with a gloved hand for protection or with a strap wrench. **Do not apply any heat to the components.** A sharp, not too hard striking blow with a hammer and screwdriver against the vane tips may release the impeller when high torque is not sufficient. Do not strike hard enough to damage the impeller vanes.
6. Remove the four bolts holding the column assembly to the motor and slide the column assembly off and over the shaft.
7. Unthread the shaft extension from the motor threaded end. The shaft extension threads are held to the motor threads with thread locker. Use vise grips to hold the motor shaft and put a screwdriver or other round piece through the hole in the shaft extension to unthread the two shafts. If there is no hole in the shaft extension, use vise grips on the shaft extension as well. Replace the shaft extension if worn more than 0.008 inches at the bushing area. If the pump came with a lip seal at the top of the column, inspect the lip seal. Replace if damaged or hardened.
8. If the throttle bushing is worn so that the bore is larger than 0.650 inches in any direction, it should be replaced. The bushing is pressed in place and will require a hydraulic press and a long piece of pipe or bar to remove it from the lower column flange. The diameter of the pipe or bar should be smaller than the inside diameter of the bushing shoulder (1.25" max.) so that the pressing operation will not damage the column flange.

## Assembly

-Assembly of the pump shaft extension and column assembly is easier with the motor placed on its back and the pump parts can be lowered over the shafts without having to support the assembly. After the column assembly is bolted to the motor, the rest of the assembly can be done horizontally if you have blocks to support the column.

-It is considered good practice to replace the O-Rings and optional lip seals whenever you have to disassemble the pump. If all O-Rings and seals are in good condition, you may reuse the parts.

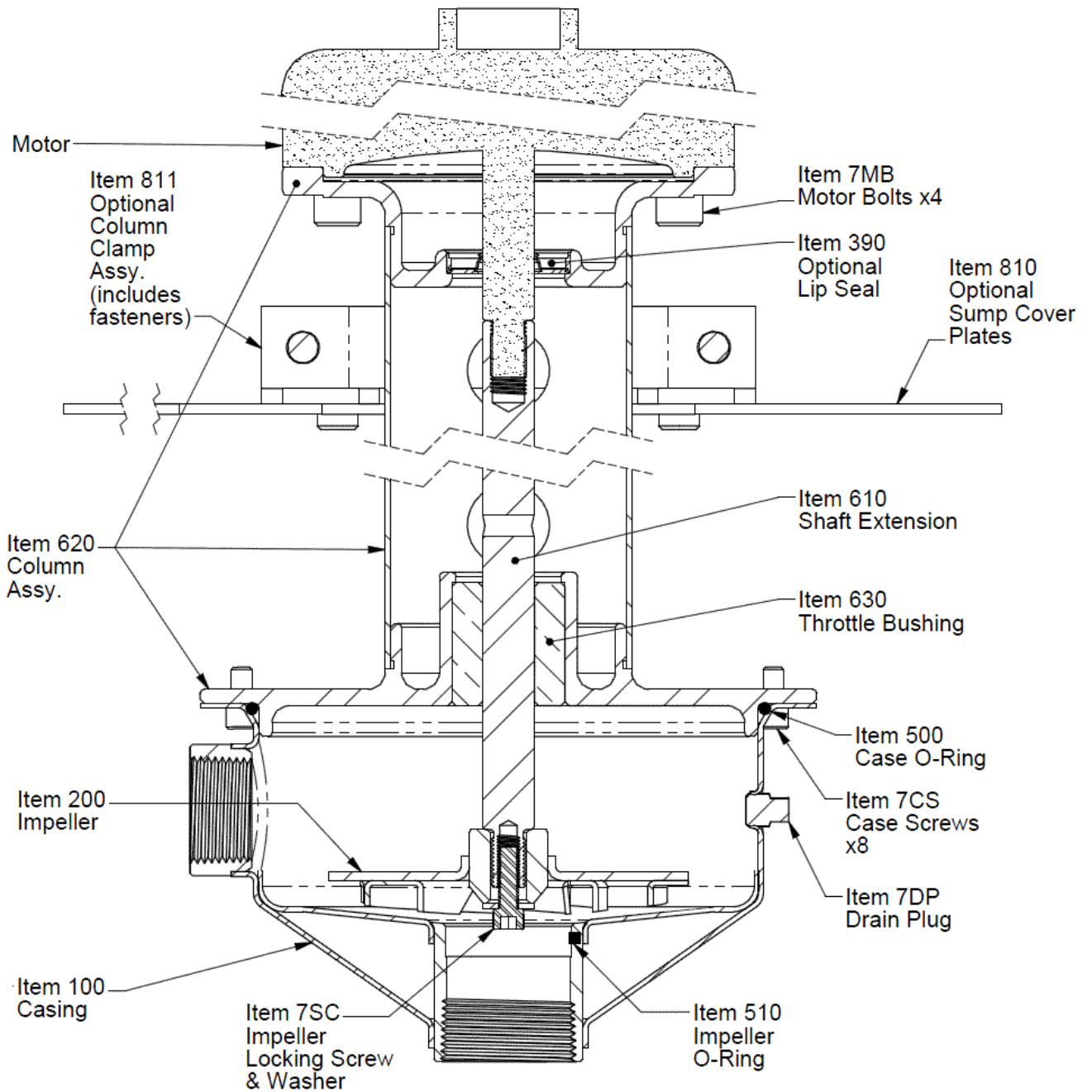
1. Press a new throttle bushing into the column assembly if needed.
2. Clean the threads on the motor shaft and shaft extension if dirty. Apply a small amount of removable thread locker onto the motor shaft threads. Thread the shaft extension onto the motor shaft and tighten with vise grips and/or a round dowel through the shaft extension hole. Spin the shaft assembly to insure the shaft does not run out in excess of 0.020 inch.
3. Install the column assembly onto the motor with the four motor bolts using a 5/16" Allen wrench. You may use the low profile button head socket screws that came with the pump or socket headed or hex head screws. Tighten the bolts to approx. 10 ft-lbs.
4. Thread the impeller onto the shaft extension. The impeller has right hand threads. Be sure the impeller hub is tight against the shoulder of the shaft extension. If you leave the impeller loose, when the motor starts up, the impeller will tighten up on the shaft so tightly that you may not be able to remove it later. You will need to hold the shaft securely while tightening the impeller.
5. Install the impeller locking screw with removable locking compound on the threads to prevent this screw from unthreading during operation. The locking screw has right hand threads.
6. Install the new or inspected Case O-Ring onto the column register.
7. Install the new or inspected impeller O-Ring into the case suction groove. Replace if brittle, damaged or misshapen.
8. Install the case onto the column assembly. Do not force the case over the impeller. It is easy to pinch the suction O-Ring when installing.
9. Install the (8) case bolts. Tighten the case bolts to approx. 8 ft-lbs. Make sure the impeller rotates freely
10. Install the discharge piping, the mounting clamps and mounting plates as required for the installation.

**Limited Warranty:** American Stainless Pumps (ASP) warrants that its manufactured products are made of first class materials and in a skillful and workmanlike manner, and when properly installed and maintained, will operate as proposed in the company's written documents. This warranty is in effect for a period of two years from shipment.

-ASP will pass through to its customers any warranties granted by the manufacturers of motors and mechanical seals but does not itself warrant these items.

-There are no other warranties, expressed or implied, except for the warranties given here. ASP does not warranty against corrosion or erosion of its products when placed in service. Under no circumstances will ASP be liable for any penalties or any incidental or consequential damages caused by the failure of its products, by late delivery or by any other causes. This warranty may not be modified verbally by any employee or agent of ASP.

## Model SPV Cross Section



Item No	Part	Materials
100	Casing	304 SS
200	Impeller (Enclosed or open)	304 SS
500	Casing O-Ring	Buna N (std) or Viton or EPR
510	Impeller O-Ring	Buna N (std) or Viton or EPR
610	Shaft Extension	304SS
620	Column Assembly	304SS
630	Throttle Bushing	Nitronic 60, Carbon or Bronze
7CS	Case Screw	304 SS
7MB	Motor Bolt	304SS
7SC	Impeller Locking Screw (3 phase motors only)	304SS