



# SHURFLO® RV FRESH WATER PUMP - TRAIL KING II

## INSTALLATION & OPERATION MANUAL FOR USE ON RV / CARAVANS

MODEL SERIES 4029 & 4009

SHURFLO water pumps meets all essential health and safety standards and are in conformance with European standards for Electromagnetic Compatibility (EMC). Specific declarations of conformity are available on request.

### INSTALLATION GUIDELINE DETAILS

The goal of installation is quiet pump operation, achieving desired water flow, low back pressure and easy maintenance. This can be accomplished by following these guidelines:

- Pump should be located in an area that is dry & provides adequate ventilation.
- Mount on a **solid surface** in an **accessible location** for strainer cleaning and pump maintenance.
- Use **flexible high-pressure hose** on the pump inlet and outlet [such as **SHURFLO Kit 94-591-01**].
- The pump inlet- and outlet- ports and strainer **should not** be connected to rigid plastic pipe; otherwise the normal pump action will transmit cavitation through rigid plumbing causing noise and possible loosening or cracking components.
- The pump must be installed with an adequate 50-mesh **strainer** [such as SHURFLO 255 series strainers].
- Plumbing must have a minimum Inner Diameter of **13mm [1/2"]**. Smaller ID plumbing will cause cavitation, high back-pressure, low flow and noise.

### MOUNTING

- Mount the pump on a solid surface to prevent vibration and noise.
- Mount the pump within 1.8 Meters [6 feet] of the water storage tank for best performance and pump life. Although the pump can pull further, the further it pulls the harder it runs increasing vibration and noise, and reducing output and pump life.
- Mount the pump in a space of at least 1 cubic foot for adequate ventilation to prevent the electric motor overheating.

- 1/2" Male threaded models are intended to be used with SHURFLO swivel barb fittings which seal with an internal taper when hand tightened. CAUTION: Sealers and Teflon tape may act as a lubricant causing cracked housings or stripped threads due to over tightening. Sealer may enter the pump inhibiting valve action, causing no prime or shut-off. A failure due to foreign debris is not covered under warranty.

- Reduce restrictions on the pump inlet and outlet. This includes any shut-off valves, winterizing valves and elbows with smaller inner diameters.

- There is no requirement to use an accumulator tank with 4009 Series by-pass pumps.

- The pump is designed for intermittent duty only. Do not use these pumps for running a Reverse-Osmosis [RO] filtration system. High pressure and continuous duty usage will shorten the life of the pump and is not covered under warranty.

- Wire Size is 16 GA the **MINIMUM**, 12 GA is recommended (please **See Wire Chart** in Electrical Section [back page figure-1] for wire sizing).

- The minimum power circuit requirement is 10 Amps.

- **Reduce restrictions on the inlet and outlet.** This includes small inner diameter shut-off valves, winterizing valves and elbows.

### PLUMBING

- Installation of a strainer prior to the pump inlet is required to prevent debris from entering the pump. If a strainer is not installed prior to the pump then the warranty is not valid.

- For noise and vibration reduction use at least 0.5M [18 in.] of 13mm [ 1/2" ] I.D. flexible high-pressure hose connected to both inlet- and outlet- ports. These hose should be anchored where it meets the hard plumbing to reduce plumbing vibration. The pump ports and strainer should not be connected to rigid plastic pipe.

- Installation of a check valve between the pump and the water heater (if applicable) will prevent damages to the pump and the city water entry due to high pressure spikes from the water heater.

### ELECTRICAL

- The pump works best on an individual filtered circuit, protected by the fuse or breaker specified on the pump label.

- A 15-Amp switch is recommended and should be attached to the positive lead.

- Proper wire sizing is required for good pump operation. If the wire is too small, low voltage will affect the pump performance and can create hazard.

- **SHUT OFF POWER TO THE PUMP WHEN LEAVING THE RV/CARAVAN UNATTENDED.**

## PUMP W/ ADJUSTABLE PRESSURE SWITCH "OPERATION"

Restrictions in a plumbing system may cause the pump to rapid cycle (ON/OFF within 2 sec.) during low flow demands. Cycling should be minimized to prevent pulsating flow and to achieve maximum pump life. To determine if adjustment is necessary, turn tap on to lower than average flow of water. The pump should cycle, but its "OFF time" must be 2 seconds or longer. If the cycling is correct, leave well enough alone. If the pump is cycling rapidly increase the setting by turning the screw clockwise (1/2 TURN to 3/4 TURN MAX.) until the pump operates for 1 second with at least 2 seconds "OFF time". If cycling cannot be minimized consider removing plumbing restrictions or simply install a SHURFLO Accumulator.

## PUMP W/ ADJUSTABLE BY-PASS & ADJUSTABLE PRESSURE SWITCH "OPERATION"

The pump operates normally up to about 1 Bar [15 psi] by-pass pressure, where a spring-loaded by-pass valve opens, allowing flow back from the output side to the input side, providing smooth, steady flow with virtually no cycling, all the way down to a trickle. As a faucet is opened, the pressure will drop, the by-pass will close and full flow is achieved. This allows good flow, even with today's commonly used restrictive showers and pullout sprayer faucets. Performance will vary, of course, depending on the voltage to the pump: lower voltage = lower flow, higher voltage = higher flow. Always be cautious and practice electrical safety. It is always best to shut off power to the pump when leaving the RV/Caravan unattended.

## ABOUT THE BY-PASS

The by-pass is a spring loaded diaphragm that, when open allows water from the discharge side back to the inlet side. If the switch or by-pass are adjusted too much, the by-pass and switch shut-off can overlap and **THE PUMP WILL NOT SHUT OFF**. Screwing the switch screw in clockwise will raise the shut-off pressure. Unscrewing the switch screw counterclockwise will lower the pump shut-off pressure. Screwing the by-pass screw in will raise the pressure at which the by-pass starts and raise the full by-pass pressure. Unscrewing the by-pass screw counterclockwise will lower the pressure at which by-pass starts and lower the full by-pass pressure.

**WARNING: If full by-pass is reached before the shut-off setting, the pump will not shut off.** Full by-pass pressure setting should be at least 0.48 bars [7 psi] higher than pump shut off pressure.

## MAINTENANCE

Checking and cleaning the strainer, normal sanitizing and winterizing and occasional checking all plumbing hardware and fittings for tightness is all that is normally required. Lack of sanitizing is the number one reason for premature pump failure and poor performance over time. Lack of sanitizing will cause scale build-up on the diaphragm and valves, causing low flow and leak back (occasionally pump cycling with no faucets open or tank filling up when hooked up to city water).

## SANITIZING

Potable water systems require periodic maintenance to keep components working properly and deliver a consistent flow of fresh water. Sanitizing is recommended: prior to storing, after a period of storage, or any time the system is opened or contaminated, as follows: **NOTE: Check your Vehicle Owner's Manual for specific instructions. By-pass any filters or remove filter cartridges.**

1. Determine the amount of common household bleach needed to sanitize the tank.
  - A) 2 ounces of bleach per 15 gallons tank size: 60 gallon tank [15 x 4] = 4 x 2 ounces = 8 ounces of bleach.
  - B) 1 ml bleach per 1 liter tank size: 300 liter tank = 300 milliliters of bleach.
2. Mix the bleach with water in a container such as a gallon jug. If tank is filled through a pressurized fitting, pour the bleach into the hose before attaching the hose to the city water entry.
3. Pour the bleach solution into the tank and fill the tank with potable water. Rock the RV back and forth to coat top and sides of potable water tank.
4. Open all faucets (Hot & Cold) allowing the water to run until the odor of chlorine is detected. Allow four (4) hours of contact time to disinfect completely. Doubling the solution concentration allows for a contact time of one (1) hour.
5. Drain the tank. Refill the tank and flush the system once or twice until the odor has decreased. The residual chlorine odor and taste is not harmful.

## WINTERIZING

**Refer to the vehicle owner's manual for specific winterizing instructions.**

If water is allowed to freeze in the system, serious damage to the plumbing and pump may occur. Failures of this type will void the warranty. The best guarantee against damage is to completely drain the pump and perform the following:

1. Drain the water tank. If the tank doesn't have a drain valve, open all faucets allowing the pump to operate until the tank is empty.
2. Open all the faucets (including the lowest valve or drain in the plumbing), allow the pump to purge the water from the plumbing, and then turn the pump OFF.
3. Using a pan to catch the remaining water, remove the plumbing at the pump's inlet/outlet ports. Turn the pump ON, allowing it to operate until the water is expelled. Turn OFF power to the pump once the plumbing is emptied. Do not reconnect the pump plumbing. Make a note at tank filler as a reminder: "Plumbing is disconnected".
4. All faucets must be left open to guard against any damage.
5. Potable anti-freeze may be poured down drains and toilets to protect p-traps and toilet seals. Sanitize the plumbing system before putting the plumbing system back in service.

## TROUBLESHOOTING

---

**Vibration induced by driving can loosen plumbing, strainers and pump hardware. Check for system components that are loose. Also, refer to the chart below for trouble-shooting tips.**

### PUMP WILL NOT START/ BLOWS CIRCUIT

- ✓ Electrical connections, fuse or breaker, main switch, and ground connection.
- ✓ Is the motor hot? Thermal breaker may have triggered; it will reset when cool.
- ✓ Is voltage present at the switch? Bypass pressure sw. Does the pump operate?
- ✓ Charging System for correct voltage ( $\pm 10\%$ ) and good ground.
- ✓ For an open or grounded circuit, or motor; or improperly sized wire.
- ✓ For seized or locked diaphragm assembly (water frozen?).

### WILL NOT PRIME/SPUTTERS (No discharge/Motor runs)

- ✓ Is the strainer clogged with debris?
- ✓ Is there water in the tank, or has air collected in the hot water heater?
- ✓ Is the inlet tubing/plumbing sucking in air at plumbing connections (vacuum leak)?
- ✓ Is inlet/outlet plumbing severely restricted or kinked? Restrictive valves?
- ✓ Proper voltage with the pump operating ( $\pm 10\%$ ).
- ✓ For debris in pump inlet/outlet valves or swollen/dry valves.
- ✓ Pump housing for cracks or loose drive assembly screws.

### RAPID CYCLING

- ✓ For restrictive plumbing and flow restrictions in faucets/shower heads.
- ✓ Water filter/purifier should be on separate feed line.
- ✓ Shut-off pressure set too low.

### PUMP WILL NOT SHUT-OFF / RUNS WHEN NOZZLE IS CLOSED

- ✓ Output side (pressure) plumbing for leaks, and inspect for leaky valves or toilet.
- ✓ For air trapped in outlet side (water heater) or pump head.
- ✓ For correct voltage to pump ( $\pm 10\%$ ).
- ✓ For loose drive assembly or pump head screws.
- ✓ Are the valves held open by debris or is the rubber swollen?
- ✓ Pressure switch operation. By-pass set higher than shut-off.

### NOISY OR ROUGH OPERATION

- ✓ For plumbing which may have vibrated loose.
- ✓ For a restricted inlet (clogged strainer, kinked hose, restrictive valves).
- ✓ Is the pump plumbed with rigid pipe causing noise to transmit?
- ✓ Does the mounting surface amplify noise (flexible)? Does it bang like a drum?
- ✓ For mounting feet that are loose or are compressed too tight.
- ✓ For air in the system. Check all fixtures for air and bleed system.
- ✓ The motor with pump head removed. Is noise from motor or pump head?

### LEAKS FROM PUMP HEAD OR SWITCH

- ✓ For loose screws at switch or pump head.
- ✓ Switch diaphragm ruptured or pinched.
- ✓ For punctured diaphragm if water is present in drive assembly.

## SERVICE KITS (see page 24)

---

1. Pressure switch
2. Switch/Check valve and Upper Housing
3. Valve assembly
4. Drive assembly
5. Motor
6. Check valve (not shown)

## REPAIR KITS

NUMBER	4029-110-X02	4029-110-X03	4029-110-X04	4029-181-X32	4009-101-X32	4009-101-X54	4009-101-A65	4009-101-X87	4009-131-X54
1	94-806-00	94-806-01	94-806-02	94-890-00	94-890-00	94-890-01	94-800-05	94-890-02	94-890-01
2	94-890-13	94-890-14	94-890-15	94-890-07	94-890-07	94-890-09	94-800-00	94-890-08	94-890-09
3	94-800-01	94-800-01	94-800-01	94-800-01	94-800-01	94-800-01	94-800-01	94-800-01	94-800-01
4	94-890-16	94-890-16	94-890-16	94-800-02	94-800-02	94-800-02	94-800-02	94-800-02	94-800-02
5	94-11-307-00CE	94-11-307-00CE	94-11-307-00CE	94-11-189-005	94-11-302-00CE	94-11-302-00CE	94-11-302-00CE	94-11-302-00CE	94-11-303-00
Check Valve (N/S)	94-800-03	94-800-03	94-800-03	94-800-03	94-800-03	94-800-03	94-800-03	94-800-03	94-800-03
1, 2, 3, 4	94-890-10	94-890-11	94-890-12	94-890-05	94-890-05	94-890-04	94-800-04	94-890-06	94-890-04

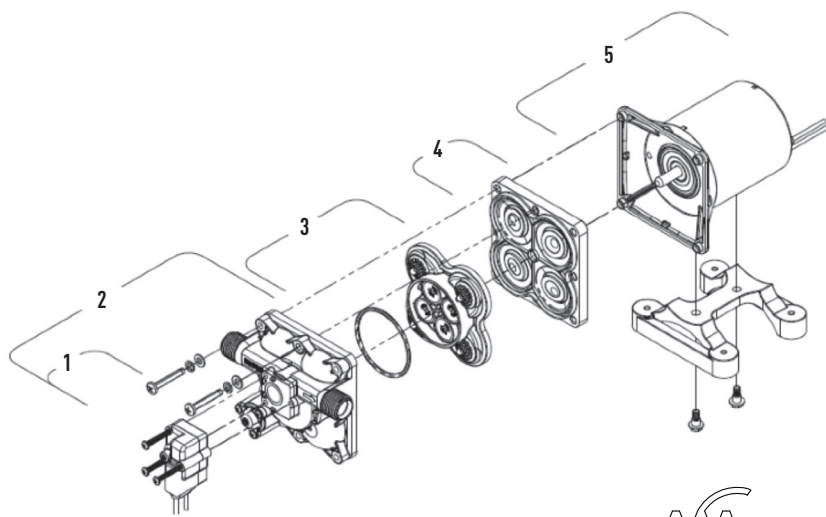


Figure - 1

Feet [m]		AWG [mm <sup>2</sup> ]	
0-25	[0-7.6]	16	[1.3]
25-50	[7.6-15.2]	14	[2.1]
50-70	[15.2-21.3]	12	[3.3]
70-110	[21.3-33.5]	10	[5.3]

Minimum Wire Size for a 10% voltage drop on a 12VDC, 10 Amp Circuit. Length is the distance from the power source to pump and back to ground.

