

AC WATER PUMPING

Careful planning of your water system ahead of time will save a lot of headaches and possibly a lot of money in the future. Many people have called after they installed their pump, only to find out they will now need to purchase a larger inverter than they had planned on, or a transformer to run their new 230 VAC pump. We will be glad to help you with your water system design or talk to your well man to explain why you need a 115 VAC Grundfos Soft-Start pump, rather than the 230 VAC pump he has in his truck! When calling for help with your water system design please have the following information at hand:

- Type of Power System - 120 VAC, 120/240VAC or 12/ 24 VDC
- Horizontal Distance from Well to Home
- Depth of Well
- Static Water Level (Distance from Ground Surface to Water Level in Well)
- Elevation from Top of Well to Home
- Pressurized System?
- Pipe Size (if already installed)

AC WATER PUMPING

Most locations in New England will require a deep well and a submersible pump. A 1500 watt inverter will power a 115 volt soft-start AC submersible pump. If you already have a 230 volt pump you'll need a 240/120VAC inverter, or the OutBack PSX-240 step-up transformer to use with a 120VAC inverter. If you provide us with the well specifications listed above, we will recommend the Grundfos model AC pump and wire size that you can take to your well pump installer. Our pumping design will be for your alternative energy home powered by a inverter. The well man's design will be for a suburban home without an inverter. We sell efficient deep well pumps that are picked specifically to run on an inverter. We have good prices on these pumps. Buy one from us if you're at all uncertain as to which one to get from your well man.

A submersible must be set at the proper depth. The Grundfos 115V pumps can be set up to 140' below the pressure tank. Often the pressure tank is at the same level as the top of the well so the above distances become the depth the pump is set in the well. If you must set your pump deeper than 140' you will need to use a 230 VAC pump with a step-up transformer, if you only have a 120VAC inverter.

If you have a shallow or dug well you can use the 115VAC shallow pump shown below, or possibly a DC suction pump. Call for details and a design that will work for you.

921-007 Shallow Well Pump \$429
1/2 hp 115v 5 gpm
Capacitor Start



OutBack Auto-Transformer

746-012 PSX-240 6.0 kW Transformer \$539

Specially designed to step up modified sine wave inverter output to 240 VAC. A good solution for running 240 VAC equipment such as a large submersible pump.



It can also be used to balance the output of a 240 volt 6 kW generator to achieve full 120 volt 30 amp output.

Call Toll Free: (800) 914-4131

Grundfos Soft-Start Pumps

Grundfos makes an SQ line of submersible pumps noted for their ability to "soft-start" i.e. not draw any extra starting current. This means the Grundfos 1/2 hp SQ pumps can run reliably on a 1500 watt DR inverter. The SQ pumps will fit into a 3" well casing and are protected from dry running, overvoltage, under-voltage and overtemperature. They are constructed of stainless steel with polyimide vanes and valves.

Listed below are models from 1/2 to 1 hp which will pump a nominal 5 gpm from 40' to 500' at 30 to 50 psi. Of course the gpm varies with the depth and pressure required. The 1/2 hp pump is available in 115 VAC model; all the pumps are available in 230 VAC models.



Grundfos SQ Pumps						
Item No.	HP	Volts	Service Factor Watts	Max Depth 50psi @2 gpm	Min Inverter	Price
5 GPM Models						
923-090	1/2	115	552	25	1000W	\$719
923-091	1/2	230	576	25	1000W	\$719
923-140	1/2	115	736	110	1000W	\$729
923-141	1/2	230	768	110	1000W	\$729
923-180	1/2	115	1012	175	1500W	\$749
923-181	1/2	230	1032	175	1500W	\$749
923-230	1/2	230	1224	260	1500W	\$879
923-270	1/2	230	1488	325	2400W	\$899
923-320	3/4	230	1704	395	2400W	\$919
923-360	1	230	2160	475	3600W	\$1049
923-410	1	230	2448	545	3600W	\$1099
923-450	1.5	230	2664	645	3600W	\$1109
10 GPM Models						
923-110	1/2	115	759	30	1000W	\$669
923-111	1/2	230	720	30	1000W	\$669
923-160	1/2	115	920	105	1500W	\$679
923-161	1/2	230	960	105	1500W	\$679
923-200	3/4	230	1440	155	2000W	\$769
923-240	3/4	230	1872	245	2800W	\$809
923-290	1	230	2328	310	3500W	\$899
923-330	1.5	230	2664	395	3500W	\$919

AC Pump Installation

Most of us will want to have an AC pumping system for a "real" home water system, especially throughout the north east. Our wells tend to be between 100 and 200 feet deep with a static level of 20' to 50'. This is an ideal situation for a 1/2 hp AC submersible pump. It will not be as efficient as a DC pump, but, given you will have a large inverter anyway, the reliability of an AC system can't be beat. Following are installation and design parameters for AC pumping systems.

AC Pump Installation Kit

921-001 \$99

This kit contains all the parts necessary to install your AC pump except for the pipe, wire and pump rope (all of which depend on well depth and distance between the well and house). Included in the kit are a torque arrestor, 6 wire guides, a pitless adapter, 3 1" male adapters, a heat shrink splice kit and 8 stainless steel clamps.



Tank Installation Kit

540-001 **Tank Installation Kit** \$99

This tank installation kit consists of all the parts attached to the pressure tank manifold. Included in the kit are a check valve, a ball valve, a pressure gauge, a pressure switch, a drain cock, and a relief valve. Be sure to get the proper size manifold for your tank.



You will need a tank "tee" to go with this kit. Tees must be sized for the specific tank used: both male or female and thread size. Tees usually cost about \$15 to \$20.



FLEXCON FLEX-LITE Diaphragm Storage Tanks

These are fiberglass water storage tanks with a butyl rubber inner liner. They are precharged with air to 38 psi. Their draw-down between pump cycles is listed in the chart below. Models FL 5 to FL12 can be UPSed. Models FL 17 and larger must be freighted.

Part No.	Model No.	Capacity in Gals/ Connection	Drawdown in Gallons		Height Inches	Diameter Inches	Weight Lbs	Price
			20-40psi	30-50psi				
540-015	FL 5	15.0 /1"	6	5.1	25.6	16.5	19	\$289
540-022	FL 7	22 /1"	6.7	5.9	34.1	16.5	24	\$279
540-035	FL 12	35 /1"	14.1	11.9	48.9	16.5	33.5	\$389
540-050	FL 17	50 /1.25"	20.1	22.1	43.3	21.4	47	\$589
540-065	FL 22	65 /1.25"	26.1	18	51.3	21.4	47.9	\$699
540-082	FL 28	82 /1.25"	32.6	27.6	64.7	21.4	69.5	\$839
540-090	FL 30	90 /1.25"	36.2	30.6	57.0	24.2	77	\$839

SINGLE PHASE MOTORS – MAXIMUM WIRE LENGTH										
Motor Rating		Copper Wire Size								
Volts	HP	14	12	10	8	6	4	2	0	00
115V	1/2	134	212	333	522	810	1240	1890	2550	
	3/4	100	159	249	390	608	930	1410	1910	
230V	1/2	404	641	1003	1575	2450	3750	5710		
	3/4	293	473	740	1161	1810	2760	4210	5680	
	1	248	392	617	968	1507	2300	3510	4730	5920

		DEPTH TO PUMPING WATER LEVEL (LIFT) IN FEET																					
PUMP MODEL	HP	PSI	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	340	400	460			
SSQ/SQE05A-180	1/2	0			7.9	7.5	7.1	6.7	6.2	5.6	5.1	4.4	3.8	2.6	1.1								
		20	7.8	7.4	7	6.5	6.1	5.5	4.9	4.2	3.3	2.9	0.8										
		30	7.3	6.9	6.5	5.9	5.4	4.8	4.1	3.2	2	0.2											
		40	6.9	6.5	5.9	5.4	4.7	4	3.1	2	0.1												
		50	6.3	5.8	5.3	4.6	3.8	2.9	1.6														
		60	5.7	5.1	4.4	3.6	2.6	1.2															
SHUT-OFF PSI:			110	102	93	84	76	67	58	50	41	33	24	15	7								
SSQ/SQE05B-230	1/2	0			8	7.7	7.3	6.9	6.5	6.1	5.6	5.1	4.6	4.1	3.4	2.8	0.8						
		20		8	7.6	7.1	6.8	6.3	5.9	5.4	5	4.5	3.9	3.3	2.6	1.8	0.6						
		30	7.9	7.5	7.1	6.7	6.3	5.9	5.4	4.9	4.4	3.8	3.1	2.4	1.5								
		40	7.5	7.1	6.7	6.3	5.8	5.4	4.9	4.3	3.7	3.1	2.3	1.4									
		50	7	6.6	6.2	5.8	5.3	4.8	4.2	3.6	2.9	2.2	1.2										
		60	6.5	6.1	5.6	5.1	4.6	4.1	3.4	2.8	2	0.9											
SHUT-OFF PSI:			143	134	126	117	108	100	91	82	74	65	56	48	39	30	22	4					

DC WATER PUMPING

12V or 24V DC Water Pumping

If you have a shallow well or spring that is not too far from your home and have a small PV system without an inverter, then use a 12 volt or 24 volt DC pump. A DC suction pump can lift water from a depth of about 12 to 14 feet maximum and pressurize a system, although at a slower rate than an AC pump. A DC submersible pump can be set as deep as 230' but will have only 1 to 2 gpm output. DC pumps can also be used effectively to pressurize an existing gravity flow system. The best part about DC pumps is the low amount of power needed per gallon of water pumped.

NOTE: All the pumps on this page require special input and output fittings. SHURflo recommends that flexible tubing be used on the input and output sides of these pumps as well. Please consider our installation kits on page 61 for use with these pumps.

SHURflo

SHURflo DC Water Pumps

SHURflo water pumps are diaphragm pumps. They can run dry and not harm themselves. They do not need a filter, only an intake strainer. Because these pumps come out of the industrial sector, they are mass produced and less expensive than other DC pumps. They will draw water up vertically about 12 feet and self-prime from that height as well. They have an internal check valve and a pressure switch that will turn the pump on at about 28 PSI and off at 40 PSI. For a pressurized system a foot valve is required on the pipe at the bottom of the well to maintain prime. The addition of an expansion tank allows the system to be more efficient and easier on the pump (except for the new Smart Sensor pump). SHURflo pumps should last about 3 to 5 years in a PV home. They come with a one year warranty. The pump head is easily replaced if a problem should occur.

SHURflo 144 DC Pump

- | | | |
|----------|--------------------------------|-------|
| 922-144A | SHURflo 144 | \$139 |
| | 12 volts, 3 GPM, 6-8 amps draw | |
| 922-144B | SHURflo 144 | \$139 |
| | 24 volts, 3 GPM, 3-5 amps draw | |



This pump is a lighter duty pump than the 145/534. It will turn on at 28 PSI and off at 40 PSI. It can be used without a pressure tank, coming on when the faucet is on and shutting off when the faucet is turned off. However, we always recommend the use of even

a small pressure tank to smooth the flow. Good for occasional use in cabins or where the water system is not in daily use. One year warranty.

SHURflo 9300 Series Submersible Pump

- | | |
|---------|-------|
| 921-101 | \$749 |
|---------|-------|

This pump can produce up to 2 GPM from depths up to 230 feet when run on 24 volts. It will run on two 50 watt modules as well as on a battery system. Featuring strong lightweight construction, it has a corrosion proof housing with stainless steel fasteners. It will run on 12 or 24 volts and can run dry without damage. The pump requires a 4" or larger well casing.



SHURflo 145 12VDC Pump

- | | | |
|---------|--|-------|
| 922-145 | SHURflo 145 | \$199 |
| | 12 volts, 4.5A open-flow to 9A @ 45psi | |
| | 3.6 gpm open-flow to 2 gpm @ 45psi | |

The 145 pump is the work-horse of the SHURflo line. This is the pump to use for a full home system if your well is suitable, or for pressurizing gravity feed systems. Maximum inlet pressure is 30 psi. The 145 will self-prime from 9 vertical feet (but we have found it will work reasonably well from 12 to 15 vertical feet). It includes an integrated pressure switch and check valve. The pressure switch is preset to turn off at 45 psi and turn back on at 25 psi. The 145 has a heavy duty DC motor, now manufactured by SHURflo, with a heavy duty cooling heat sink. This pump should last 5 years under daily use. Even then its likely only the pump head will need replacing. It has a one year warranty.



SHURflo 534 24VDC Pump

- | | | |
|---------|--|-------|
| 922-534 | SHURflo 534 | \$209 |
| | 24 volts, 3.0A open-flow to 5A @ 45psi | |
| | 3.6 gpm open-flow to 2.2 gpm @ 45psi | |

The 534 is the 24 volt equivalent to the 12V 145.

SHURflo 5050 12VDC Pump

- | | | |
|----------|---|-------|
| 922-5012 | SHURflo 5000 12VDC | \$209 |
| | 12 volts, 6.5A open-flow to 17A @ 60psi | |
| | 5.3 gpm open-flow to 3.4 gpm @ 60psi | |

Shurflo's new 5000 Series pumps include a unique diaphragm design whereby solid pistons are co-molded to the pump diaphragm, forming a leak proof molecular bond for ultimate durability and pumping efficiency. They feature a heavy-duty sealed motor, with a self-priming pump head. The pump can run dry without damage and for added safety, incorporates thermal overload protection. The pump will be available in 24VDC in the near future.

10"L x 5"W x 4"H.

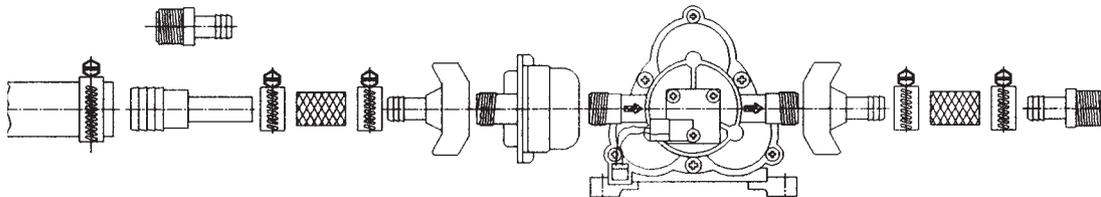


SHURflo Installation Kit

922-001 Install Kit for Pump Models 144 - 12V&24V, 145 and 534 \$25

One idiosyncrasy of diaphragm pumps is noise. They are not loud to listen to but they may transmit vibrations through your plumbing system. This problem is solved with some flexible pipe between the pump and the home plumbing. We offer an installation kit with all the necessary parts to install the pump while minimizing noise transmission.

This kit consists of one intake strainer, two 18" long pieces of high pressure flexible hose, and the fittings and clamps needed to install a SHURflo pump in a home. On the intake side, our last fitting goes into a standard one inch poly underground piping. We also include a 1/2 inch threaded fitting to begin the intake side. On the output side of the pump our last fitting goes to a standard 1/2 inch pipe fitting. You must then go to your pressure tank etc. Installation instructions and diagrams are included.



510-001 Filter Screen For SHURflo Pumps \$9

SHURflo strongly recommends the use of a filter screen at the input of their diaphragm pumps. If any foreign matter should lodge itself under a diaphragm lip, the resulting loss of suction could severely damage the pump. If you do not need the above installation kit, please be sure to at least purchase this filter screen.



922-002 Pump Head Kit For 2088 SHURflo Pumps \$79

This pump head is usually all that is needed to repair any of the SHURflo pumps we carry. If you're really remote, bring a spare along with you. The pump head includes the pressure switch and check valve, as well as the entire diaphragm section of the pump.



922-007 Upper Housing with Pressure Switch For 2088 SHURflo Pumps \$25

Same as above but without diaphragm drive. Typically used to replace a defective pressure switch.

Diaphragm / Drive Kit 922-003 For SHURflo Pumps \$29.00

This kit can be used to repair SHURflo Model 144, 145 or 534 type pumps. It would be used to replace a defective diaphragm, if your pump head housing and pressure switch were still serviceable.



Float Switch 520-002 12,24,120 or 230V 13A \$59

This single pole single throw float switch can be used to turn a pump on or off depending on the level of liquid in your container. The float is tethered to the side of the tank and is activated depending on the depth of liquid. Wiring and mechanical installations are included.



Valve Kit for 9300 Submersible Pump 922-006 For SHURflo 9300 Pump \$27.00

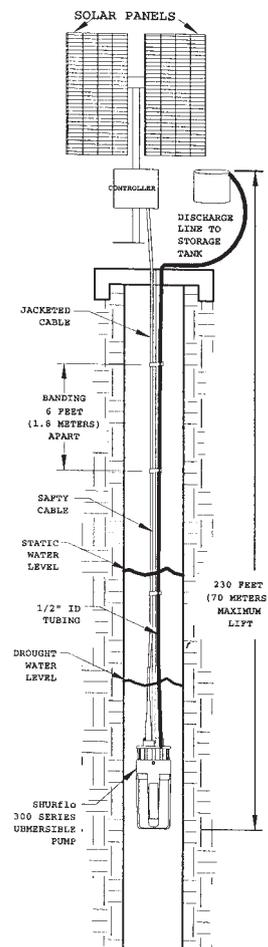
Used to repair 9300 pump.



DC Pump Notes

When hooking up a DC pump, which has relatively lower suction capabilities when compared with an AC pump, you must take extra care with the input suction line. First, the suction line cannot afford to have any vacuum leaks. Any air getting into the suction line will severely hamper the pump's operation. Second, there should be no ups and downs in the input pipe-line. Any "hump" in this line is a place where air can migrate out of the water or otherwise collect, to form an eventual vapor lock. This can put a severe strain on the pump, and cause the pump to fail. If your pump suddenly seems weak or extra noisy, check your suction line for vapor lock or vacuum leaks.

SHURflo 9300 DC Submersible Pump Installation



DC WATER PUMPING

Flowlight Booster Pump

The Flowlight Booster Pump provides city water pressure anywhere. It has been a standard in home renewable energy systems since 1986. It is economical for domestic water supply, drip irrigation and water purification.

A booster pump is far more cost effective than an elevated tank, providing pressure equivalent to over 100 feet of elevation. The Flowlight booster pump can provide 3 to 5.5 gallons per minute at pressure as high as 65 psi from shallow water sources.

This DC pump uses one third to one half the energy of a conventional AC pump, and eliminates the high starting surges that push inverters to the limit. It is more powerful, quieter, and much more durable than plastic RV/ Marine pumps.

Wearing parts are replaceable, and typically last 5 to 10 years. Overall life expectancy is 15 to 20 years. Flowlight's complete instruction manual and Easy installation kit make this pump simple for anyone to install and service, with no previous experience.

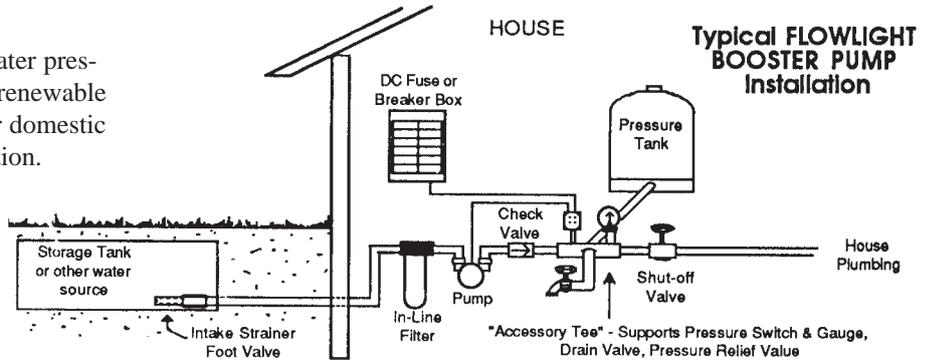
920-012	Flowlight Booster Pump 12VDC	\$711
920-024	Flowlight Booster Pump 24VDC	\$711
920-007	Easy Installation Kit	\$118
920-005	10" In-Line Filter w/Cartridge	\$44
920-006	10" Filter Cartridges-2 Pack	\$19
920-003	Dry Run Switch	\$87
920-001	Booster Pump Replacement Head	\$326
920-002	Booster Pump Replacement Brushes	\$45pr

Please remember to specify voltage when ordering a booster pump. They are available in both 12 and 24 volts DC. A "low flow" model is also available. This model should be used when suction runs are difficult, such as long horizontal runs or suction depths from 16 to 18 feet. Call for advice.

Standard Model 2920				
Pressure - PSI	30	40	50	65
Flow Rate - GPM	4.5	4.5	4.6	4.1
Current Draw - Amps				
@ 12 Volts	13	15	16	22
@ 24 Volts	6.5	7.5	8	11
Watt-Hrs per Gallon	0.6	0.67	0.75	1.10



Flowlight Booster Pump shown with In-Line Filter and Easy Installation Kit



DRILLED WELL 6 INCH CASING

