

# SOLAR ELECTRIC SUBMERSIBLE PUMP D.C. POWERED



## OWNERS MANUAL

INSTALLATION AND OPERATION

SWP SERIES

MANUFACTURED BY:

Aquatec International, Inc.

17422 Pullman Street

Irvine, Ca. 92614

United States of America

Phone #: (949)225-2200

[www.aquatec.com](http://www.aquatec.com)

# AQUATEC SWP SERIES

## SOLAR ELECTRIC SUBMERSIBLE PUMP

### D.C. POWERED



#### FEATURES & BENEFITS

- ✓ Made in USA with proven Aquatec design and quality.
- ✓ SWP-4000 Fits well casings 4" or larger. SWP-6000 fits well casings 6" or larger.
- ✓ Pump is protected from moisture intrusion by double o-ring seals.
- ✓ Capable of pumping from depths of up to 230 ft/70M (SWP-4000), and 120 ft/37M (SWP-6000).
- ✓ Able to operate with voltage up to 30 VDC.
- ✓ Rugged Stainless Steel shell construction for optimum durability and corrosion resistance.
- ✓ Factory installed 36" (91 cm) of 12 ga. motor leads eliminate failure from improperly field-installed leads.
- ✓ Dual-size port outlet can accommodate ½" (15mm) hose barb and ½" drop pipe (0.622" ID) or 5/8" (18mm) hose barb.
- ✓ Anti-wicking cable entrance protects the motor from an incorrectly installed splice.
- ✓ Over-sized eyelet for easy installation of safety line.
- ✓ Built-in 50 mesh stainless steel screen to prevent debris intrusion.
- ✓ Field serviceable with our full line of repair kits.
- ✓ Warranty of 12 months from date of purchase not to exceed 18 months from date of manufacture.
- ✓ Recyclable packaging

## SUBMERSIBLE PUMP PRODUCT INFORMATION

The Aquatec SWP Series submersible pump that you have purchased is manufactured from quality components in our Irvine California manufacturing facility. All of the materials of construction are potable water safe. The pump is designed to operate on any 12-30 VDC power source, including direct-to-panel operation up to 60 cell panels or an array outputting a maximum of 30 VDC, or a 12 or 24 VDC battery bank. (See table in performance section of this booklet).

Installation of the product is simple and does not require any special tools. The instructions included in this booklet will ensure ease of installation and maintenance.

The submersible pump is ideal for remote off the grid locations for home and livestock water needs. The Aquatec SWP Series are electric positive displacement diaphragm pumps. Internal over pressure protection is included in the design of the pump to protect all components in the installation. The maximum pump diameter of the SWP-4000 is 3-3/4 inches (95mm), designed to fit into a standard 4 inch well casing. The maximum pump diameter of the SWP-6000 is 5 inches (127mm), designed to fit into a standard 6 inch well casing.

### COMPONENTS NEEDED FOR INSTALLATION

**Power supply:** At 30 VDC, the SWP-4000 pump draws 3.7 amps (111 watts), and the SWP-6000 draws 5.0 amps (150 watts). The voltage range of operation is 12 volts min. to 30 volts max. The suggested solar panel/array for best performance would be 180 watts or larger. A larger wattage solar panel/array would best support the pump performance on a partial sunny day. The solar panel(s) should be located as close as possible to the pump, in an area that ideally receives direct sunshine from 10am to 3pm. See chart below for performance:

### Aquatec SWP-4000 Submersible Pump Performance

Pressure		Flow @ 12 Vdc			Flow @ 24 Vdc			Flow @ 30 Vdc		
HEAD (FT/M)	PSI/BAR	GPM	LPM	AMPS	GPM	LPM	AMPS	GPM	LPM	AMPS
20/6	9/6	0.62	2.35	1.3	1.35	5.11	1.3	1.70	6.44	1.40
40/12	17/1.2	0.60	2.27	1.6	1.32	5.00	1.6	1.65	6.25	1.70
60/18	26/1.8	0.58	2.20	1.8	1.28	4.84	1.8	1.60	6.06	1.90
80/24	35/2.4	0.57	2.15	2.0	1.25	4.73	2.0	1.55	5.87	2.10
100/30	43/3.0	0.56	2.12	2.3	1.22	4.62	2.3	1.50	5.68	2.40
120/37	52/3.6	0.53	2.00	2.5	1.20	4.54	2.5	1.48	5.60	2.60
140/43	61/4.2	0.52	1.97	2.6	1.15	4.35	2.6	1.42	5.37	2.80
160/49	69/4.8	0.51	1.93	2.8	1.12	4.24	2.8	1.40	5.30	3.00
180/55	78/5.4	0.49	1.85	3.1	1.08	4.09	3.1	1.35	5.11	3.20
200/61	87/6.0	0.48	1.82	3.3	1.06	4.01	3.3	1.30	4.92	3.40
230/70	100/6.9	0.43	1.63	3.5	1.00	3.79	3.5	1.25	4.73	3.70

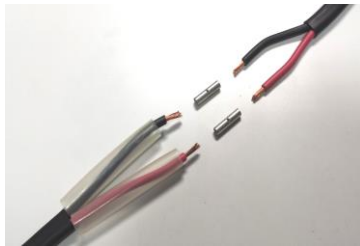
### Aquatec SWP-6000 Submersible Pump Performance

Pressure		Flow @ 12 Vdc			Flow @ 24 Vdc			Flow @ 30 Vdc		
HEAD (FT/M)	PSI/BAR	GPM	LPM	AMPS	GPM	LPM	AMPS	GPM	LPM	AMPS
0/0	9/6	2.10	7.95	0.80	4.00	15.14	2.00	5.00	18.92	2.00
20/6	9/6	1.75	6.62	1.70	3.80	14.38	2.50	4.70	17.80	2.50
40/12	17/1.2	1.60	6.05	2.30	3.40	12.87	3.30	4.50	17.03	3.10
60/18	26/1.8	1.40	5.30	3.00	3.20	12.11	3.50	3.90	14.76	3.70
80/24	35/2.4	1.30	4.92	3.50	3.10	11.73	4.30	3.70	14.00	4.30
100/30	43/3.0	1.20	4.54	3.90	2.90	11.00	4.80	3.50	13.25	4.60
120/37	52/3.6	1.10	4.16	4.40	2.80	10.60	5.10	3.30	12.50	5.00

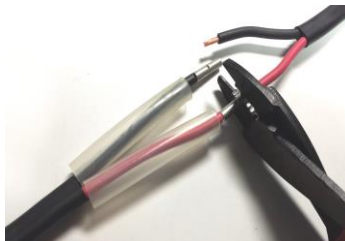
## Cable and splice:

Location of the solar panels should be close to the pump application for limited voltage drops through wire run lengths. The suggested wire gauge is #10 AWG jacketed Submersible cable. It is important to make a quality water-tight splice to connect the electrical conducting wires to the submersible pump lead wires. Improper sealing of the splice may allow water intrusion which will damage the pump motor and/or cause reduced pump performance.

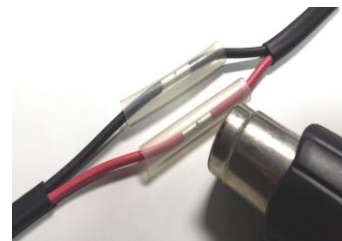
## Water Proof Wire Splice Kit



1



2



3, 4

Use general guidelines detailed by each manufacturer.

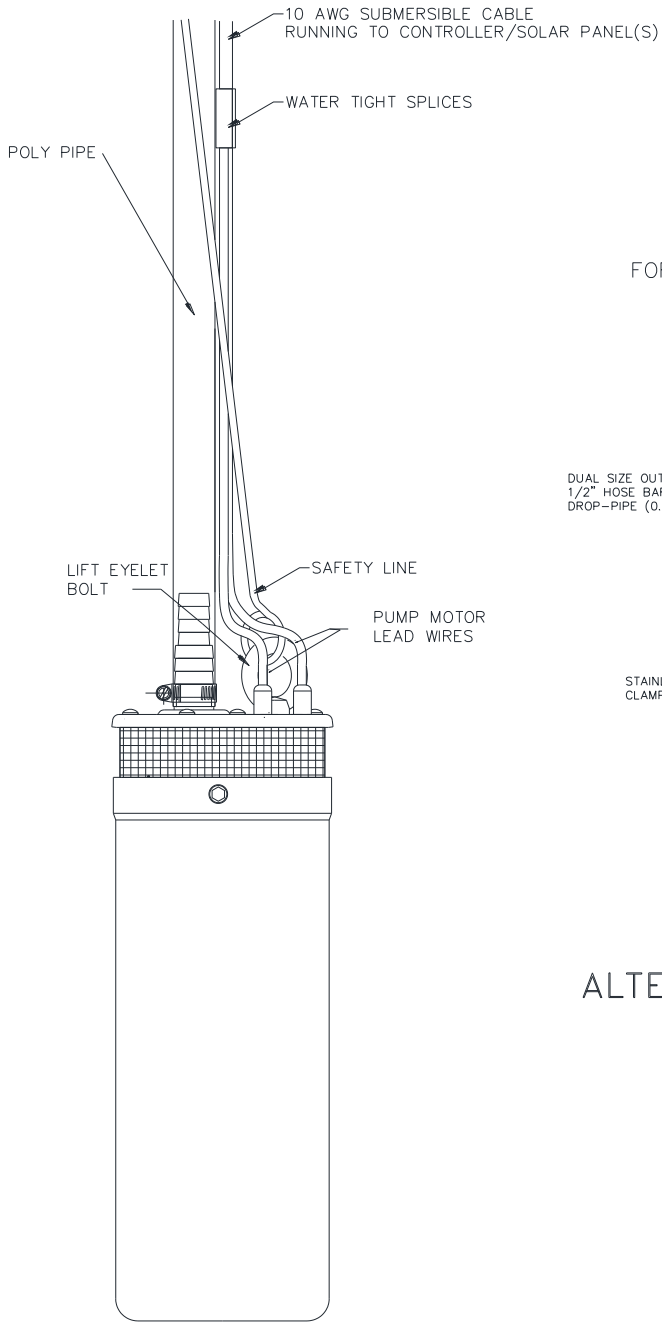
- 1) Place shrink sleeving on both wires of one cable end to be spliced.
- 2) Crimp connectors to join both cable ends.
- 3) Move shrink sleeving to center of connectors and apply heat starting from the middle and working towards the ends.
- 4) A seal is achieved when material flows from the ends of the tubes.

**Discharge line:** The hose or pipe should be pressure rated for 150 psi (105 M head). If using rigid drop pipe for the discharge line it is recommended to use a 6 in. (15 cm) length of flexible hose to connect to the pump outlet fitting secured with a stainless steel clamp. Then, to the other end of the short 6 in. (15 cm) hose connect a ½” NPT x ½” Barb fitting secured with another stainless steel clamp. If using flexible discharge tubing you may connect directly to the dual size stainless steel outlet nipple which fits ½” hose barb tubing (0.50 inch ID) or ½” Poly pipe (.62 inch ID, which is equivalent to 5/8” (18mm) hose barb tubing). (See figure1). To determine total dynamic head/delivery see chart. (Fig. 2) Use no larger than ¾” (20mm) drop pipe.

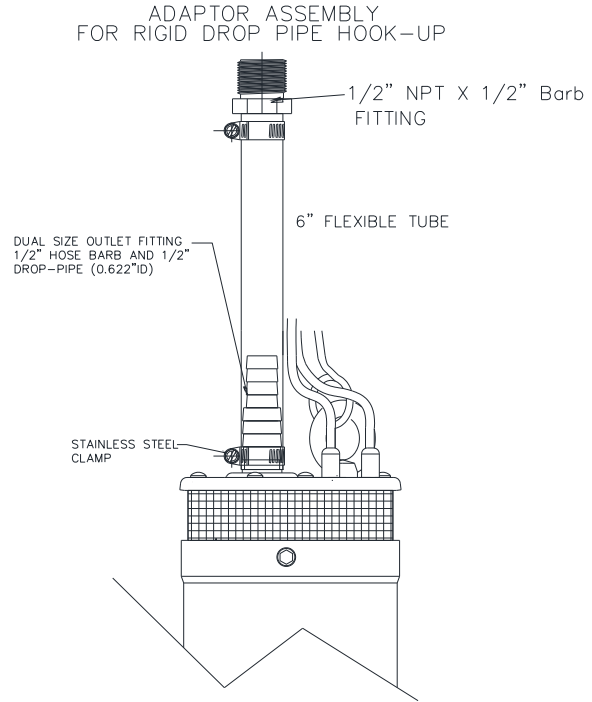
**Safety line:** Install safety line (for lowering and retrieving pump) through the pump eye bolt. Band the Safety line, hose and electrical cable together with tie wraps every 10 feet (3 Meters) to prevent damage to lines when installing the pump. (See fig. 2) Tie the safety line to a secure point and use this line to lower or raise the pump, in order to not cause excessive stretch to the pump cable or delivery pipe.

#### PUMP INSTALLATION IN WELL

1. Lay out the assembly components on a clean ground surface and begin assembly. Connect the drop pipe or hose to the pump outlet fitting. See fig. 1.
2. Using a submersible splice kit make a water tight splice joining the drop cable to the pump lead wires. See details on page.
3. Connect the safety line to eye bolt on the pump.
4. Band all of the above items together as shown in fig.2.
5. If used in a well that has high sand content, a sand shroud may be necessary to prevent pump damage.
6. Lower the assembly into the well.
7. Install check valves every 100 feet (30 M) of vertical elevation to relieve pressure on the internal pump components.
8. Tie off the safety line to a secure point.
9. A sand filter sock is required if the pump is drawing from a source containing sand/silt/mud. (i.e. pond, creek, bottom of tank, etc.) Excessive mud, sand, silt may damage the diaphragm and could void the warranty.
10. When used in an open-source application (see fig. 3), placement in a container such as a bucket or barrel can help isolate the pump from sediment.



STANDARD INSTALLATION  
USING POLY PIPE



ALTERNATIVE INSTALLATION  
USING RIGID PIPE

FIG. 1

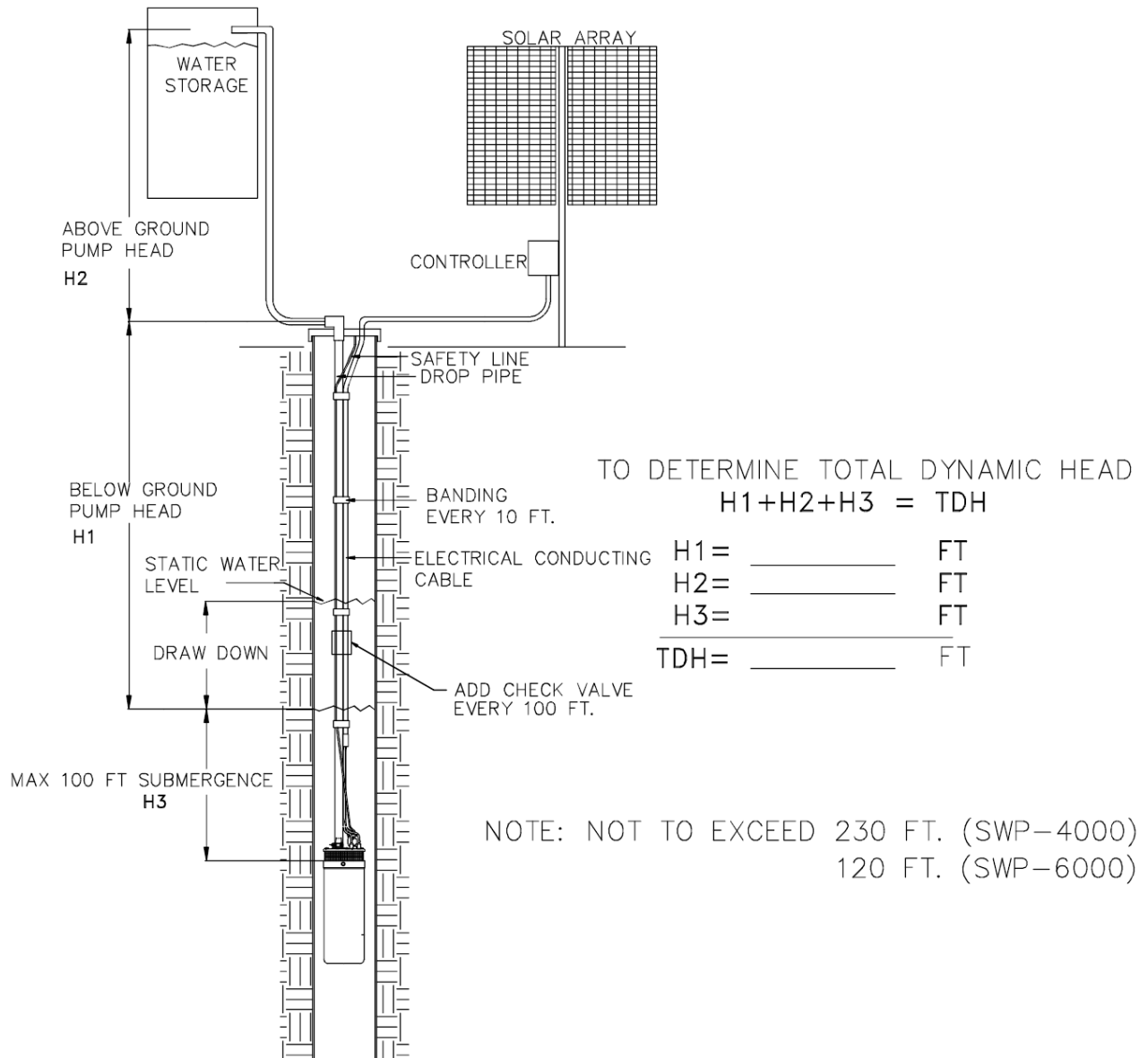
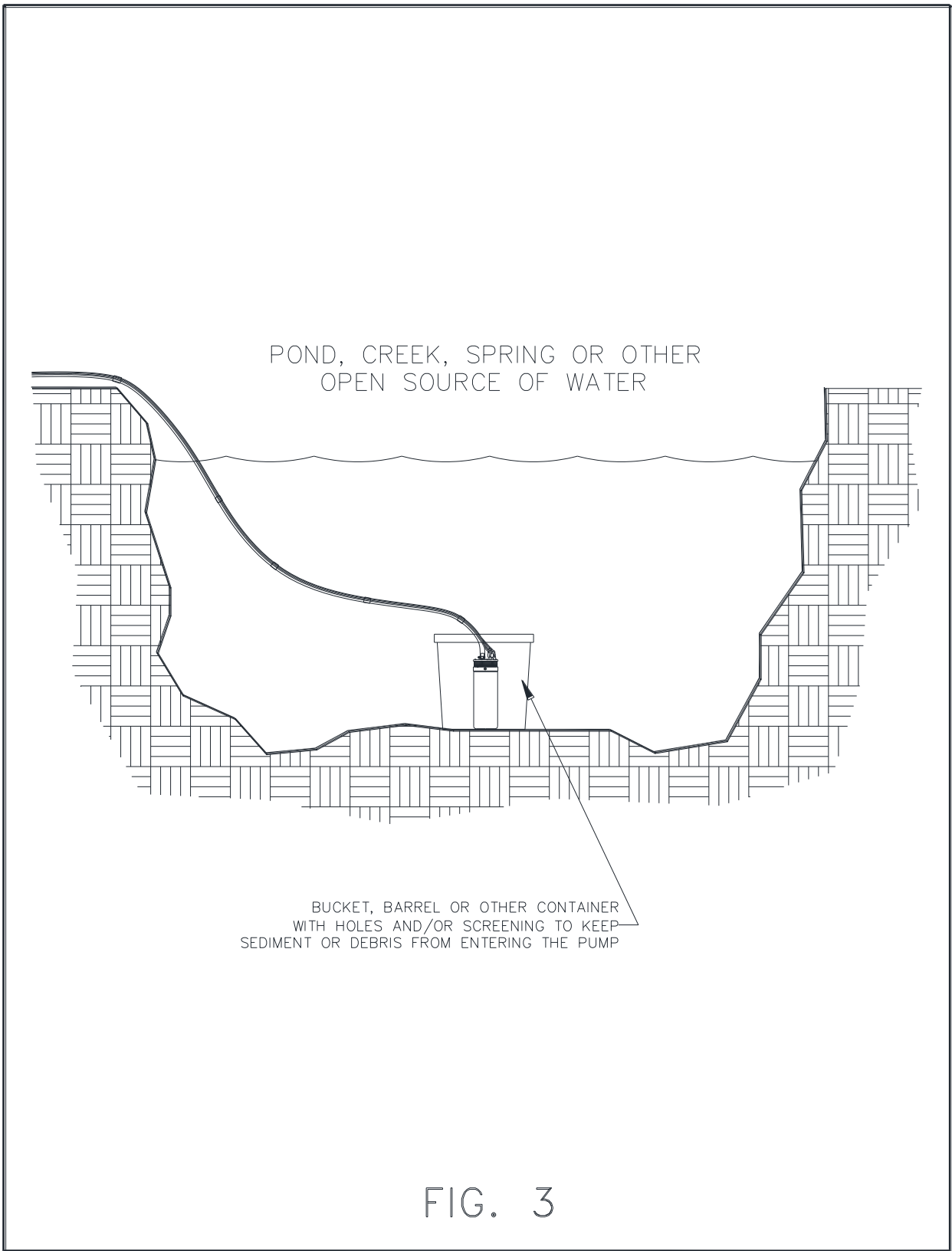
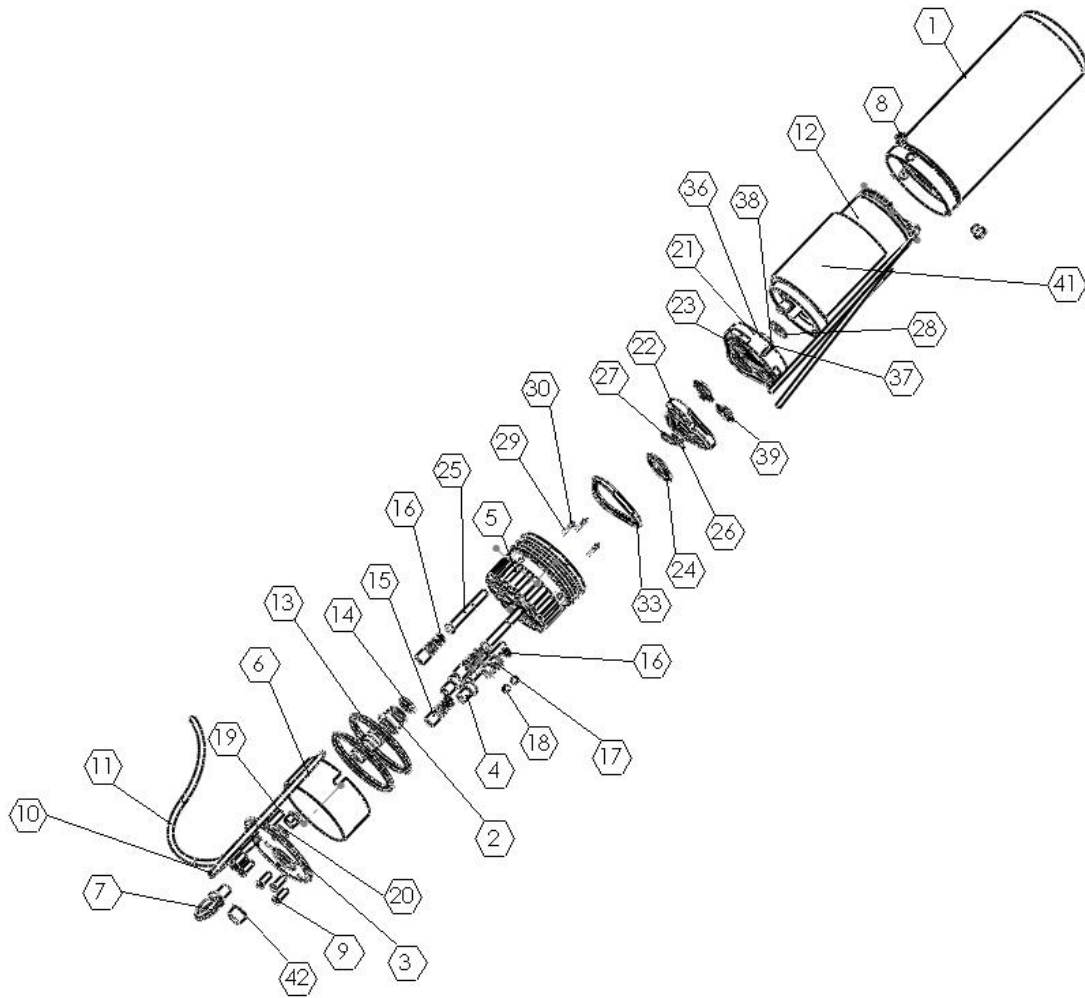


FIG. 2







## **Available Replacement Parts Kits for SWP-4000:**

SWP4000VHA (Includes items 22, 24, 26, 27 and 39)

SWP4000LHA (Includes items 21, 23, 36, 37 and 38)

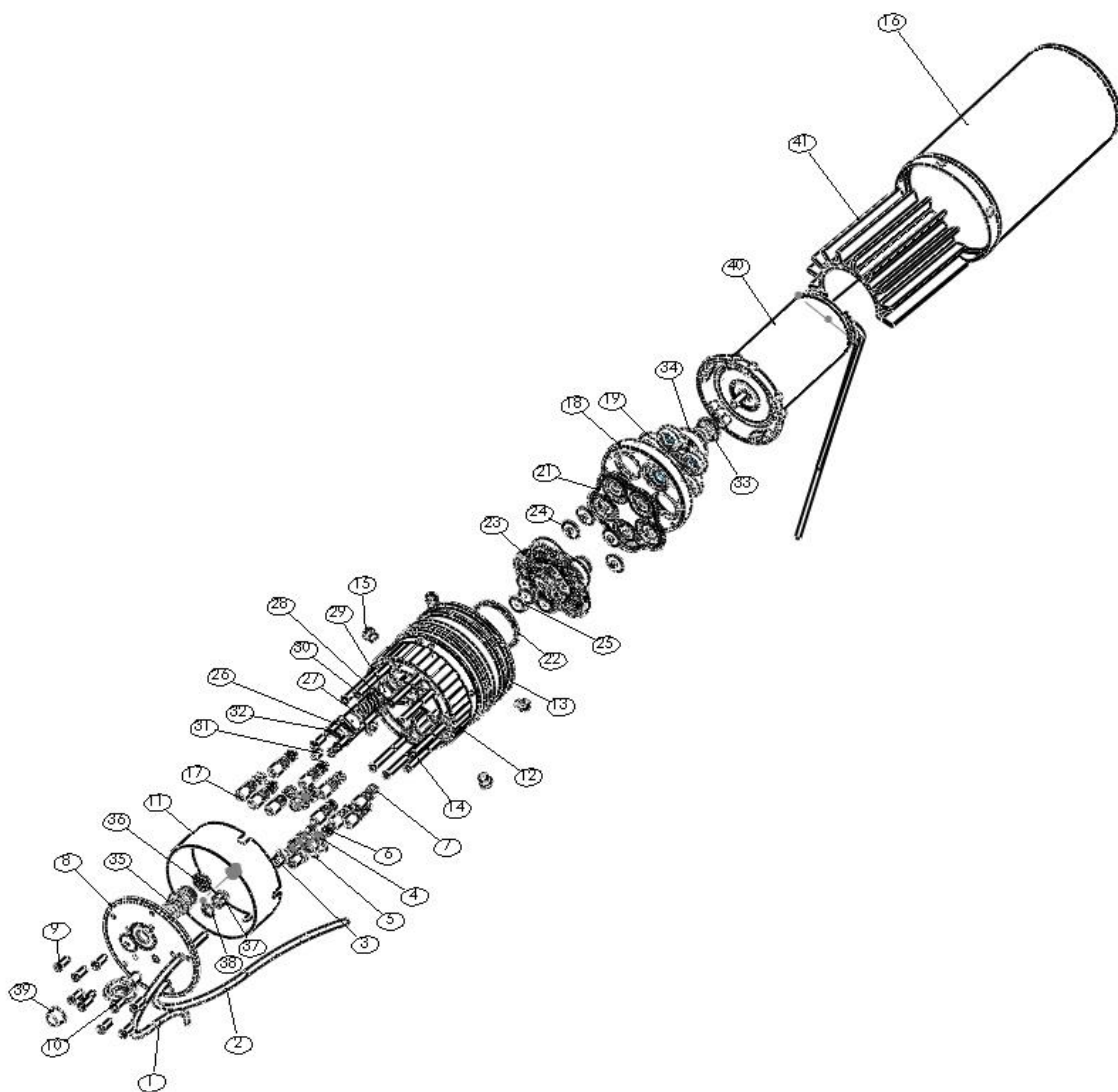
SWP4000SKA (Includes item 6)

SWP4000MTR (Includes item 12)

SWP4000EBK (Includes replacement rear endbell assembly for motor)

## SWP-4000 Parts List

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	50-093-01	CAN	1
2	50-096	OUTLET FITTING	1
3	50-090	COVER LID	1
4	52-086	WIRE GROMMET	2
5	61-317	PUMPHEAD	1
6	50-091	STRAINER SCREEN	1
7	11-180	LIFT EYE BOLT	1
8	11-182	CAP SCREW- CAN	3
9	11-143	SCREWS-COVER LID	7
10	20-344	12 GA. BLACK JACKET WIRE	1
11	20-345	12 GA. RED JACKET WIRE	1
12	M70-573 HT	MOTOR	1
13	52-056-16	O-RING- PUMPHEAD	2
14	52-056-15	O-RING- OUTLET FIT.	1
15	51-318	PLUG- BOLT HOLE	3
16	52-056-06	O-RING- BOLT HOLE PLUG	6
17	50-092	WIRE CONNECTOR PIN	2
18	11-179	SET SCREWS-WIRE CONNECTOR	4
19	10-291	NUT-LIFT EYE BOLT FITTING.	1
20	10-292	LOCK WASHER-LIFT EYE BOLT	1
21	50-094	HOUSING - WOBBLER	1
22	51-319-01	VALVE HOUSING	1
23	52-068	DIAPHRAGM	1
24	52-056-01	O-RING VALVE HOUS.	1
25	11-181	SCREW- PUMPHEAD	3
26	52-089	VALVE- OUTLET ROUND	1
27	52-088	VALVE- OUTLET 1/2 ROUND	1
28	12-230	WASHER-MOTOR THRUST	1
29	13-030	SPRING POPPET-BYPASS	3
30	51-298-01	POPPET-BYPASS	3
33	52-076	O-RING VALVE HOUS. PRE SHAPED	1
36	50-024-4	CAM	1
37	10-237	BEARING	1
38	50-034-02	WOBBLER	1
39	52-083	VALVE- INLET	3
41	50-101	HEAT SINK	1
42	51-304	PLUG CAP FOR SHIPPING	1



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## **Available Replacement Parts Kits for SWP-6000:**

SWP6000VHA (Includes items 22, 23, 24 and 25)

SWP6000LHA (Includes items 18, 19, 21, 33 and 34)

SWP6000SKA (Includes item 11)

SWP6000MTR (Includes items 40)

SWP6000EBK (Includes replacement rear endbell assembly for motor)

## SWP-6000 Parts List

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	20-345	12 GA. RED JACKET WIRE	1
2	20-344	12 GA. BLACK JACKET WIRE	1
3	52-086	WIRE GROMMET	2
4	50-092	WIRE CONNECTOR PIN	2
5	11-179	SET SCREWS-WIRE CONNECTOR	4
6	52-056-06	O-RING- WIRE CONNECTOR	2
7	52-056-06	O-RING- BOLT HOLE PLUG	20
8	50-098	COVER LID	1
9	11-143	SCREWS-COVER LID	10
10	11-180	LIFT EYE BOLT	1
11	50-099	STRAINER SCREEN	1
12	61-333	PUMPHEAD	1
13	52-056-18	O-RING- PUMPHEAD	2
14	11-133	SCREW- PUMPHEAD	10
15	11-182	CAP SCREW- CAN	5
16	50-100	CAN	1
17	51-318	PLUG- BOLT HOLE	10
18	60-057-02	HOUSING - WOBBLER	1
19	50-277-02	WOBBLER	1
21	52-065	DIAPHRAGM	1
22	52-056-02	O-RING VALVE HOUS.	1
23	51-198	VALVE HOUSING	1
24	52-077	VALVE- INLET	5
25	52-074	VALVE- OUTLET	5
26	61-233	HOUSING- BYPASS	1
27	51-235	PLUNGER- BYPASS	1
28	51-234	POPPET- BYPASS	1
29	52-048	DIAPHRAGM- BYPASS	1
30	10-265	SPRING- BYPASS	1
31	11-153-01	SET SCREW- BYPASS	1
32	11-111	SCREW- BYPASS COV.	4
33	50-024-3	CAM	1
34	10-237	BEARING	1
35	50-096	OUTLET FITTING	1
36	52-056-15	O-RING- OUTLET FIT.	1
37	10-291	NUT-LIFT EYE BOLT FITTING.	1
38	10-292	LOCK WASHER-LIFT EYE BOLT	1
39	51-304	PLUG CAP-FOR SHIPPING	1
40	M70-573 HT	MOTOR	1
41	50-103	HEATSINK	1

# **TECHNICAL SPECIFICATIONS:**

**MODEL NUMBERS:** SWP-4000 & SWP-6000

**PUMP DESIGN:** Positive Displacement 3 Chamber Diaphragm Pump (SWP-4000)  
Positive Displacement 5 Chamber Diaphragm Pump (SWP-6000)

**MOTOR:** Permanent Magnet DC

**VOLTAGE:** 24 VDC Nominal (12-30 VDC)

**WATTS:** 110W (SWP-4000), 150W (SWP-6000)

**AMPS:** 4.5 Max (SWP-4000), 5.8 Max (SWP-6000)

Note: To maximize operating life, limit pump operating amps to 3.7 (SWP-4000) and 5.0 (SWP-6000)

**FUSE:** 7.5 Amp (Automotive)

**MAXIMUM LIFT:** 230 ft. (70M) Vertical (SWP-4000), 120 ft. (37M) Vertical (SWP-6000)

**MAXIMUM SUBMERGENCE:** 100 ft. (30M)

**OUTLET PORT:** Dual Port for ½" (15mm) hose barb tubing (0.50 inch ID) or ½" Poly pipe (.62 inch ID, which is equivalent to 5/8" (18mm) hose barb tubing)

**INLET:** 50 Mesh Stainless Steel Screen

**MATERIALS:** High Grade Stainless Steel Shell, NSF Compliant, Potable Water Safe Materials

**TYPICAL APPLICATION:** Well or Open Source Solar Water Pumping

## **PACKAGED SPECIFICATIONS:**

**WEIGHT:** 10 LBS. / 4.5 kg (SWP-4000), 12-1/2 LBS. / 5.7 kg (SWP-6000)

**LENGTH:** 16.5" (41.9 cm)

**WIDTH:** 7" (17.8 cm)

**HEIGHT:** 6" (15.2 cm)

<b>Troubleshooting Guide</b>		
<b>Fault</b>	<b>Possible Cause</b>	<b>How to Correct</b>
<b>Pump operates but there is no flow or reduced flow</b>	<b>1) Low voltage</b>	<b>1) Check power supply for proper voltage</b>
	<b>2) Water supply out</b>	<b>2) Ensure pump is installed below the water level (maximum submergence 100 ft / 30 meters)</b>
	<b>3) Clogged filter screen</b>	<b>3) Clean debris from pump suction screen</b>
	<b>4) Fluid path in plumbing is restricted or damaged/leaking</b>	<b>4) Check for punched hose or clogged tubing. Check for tubing/clamp leaks or tears</b>
	<b>5) Pump is worn</b>	<b>5) Inspect components</b>
<b>Pump will not operate</b>	<b>1) Faulty power supply</b>	<b>1) Ensure adequate power supply</b>
	<b>2) Wire connection fault</b>	<b>2) Inspect wire connections and fuses</b>

# WARRANTY

**Aquatec Water Systems, Inc.** ("Aquatec") warrants its products to be free from defects in material and workmanship under the following terms:

**All Aquatec SWP submersible solar pumps:** The warranty will last for a period of eighteen months from date of manufacture. Aquatec's obligation under this warranty shall be limited to replacing or repairing at Aquatec's discretion, any such product or part which must be returned to Aquatec's factory with a Return Material Authorization Number (RMA), transportation charges approved by Aquatec or prepaid, and which upon examination, is found to Aquatec's satisfaction to have been defective under the terms of this warranty. No credit will be allowed against future purchases for items returned as defective under the terms of Aquatec's warranty.

This warranty does not extend to any products, which have been altered or modified outside the Aquatec factory, nor does it apply to units that are returned in an unassembled condition. The warranty guarantees that products will perform to Aquatec's flow and pressure specifications throughout the life of the warranty. The warranty does not cover abnormal wear, such as sand/silt/mud damage, damage from chemical attack (contaminated water), or damage from excessive submersion. If the returned product is found not to be defective under the conditions of this warranty, a charge will be made for repair or replacement.

This is a Limited Warranty. It covers the product only and the extent of the coverage is limited to the cost of the product. As the manufacturer has no control over shipping, handling and installation, the warranty cannot cover any damage caused by these factors.

This warranty is in lieu of all other warranties, expressed or implied, and no person is authorized to give any other warranty or assume obligation or liability in Aquatec's behalf. Aquatec shall not be liable for any indirect, incidental or consequential damages of any kind incurred by the reason of the use or sale of any defective product and part.

**AQUATEC INTERNATIONAL, INC.**

**17422 PULLMAN STREET IRVINE, CA, 92**



**(949)225-2200, (949)225-2222 fax** **aquatec**

**[www.aquatec.com](http://www.aquatec.com)**