

General Information about Solar Pumping of Water



Questions to begin the design of a solar pumping system for animal watering.

Developed by Gary L. Hawkins, Ph.D.

To start with I usually ask the following questions and based on them we look and re-ask the same or different questions.

1. County Name, City Name, GPS location
2. What is the elevation difference from the water elevation to the storage tank
3. What type of animal will be watered?
4. How many animals – currently?
5. What are plans for expansion?
6. If plans are to expand, what is planned expansion number?
7. What type storage tank, volume, pressure?
8. What is the height from the storage tank to the watering trough?
9. Will the system need to be automated
10. What size pipe is proposed to transfer water from the water to the tank and to the trough

The answers to these questions are then used to design the system and get a recommendation for the equipment that is needed. As the system is being designed, more questions may arise as well.

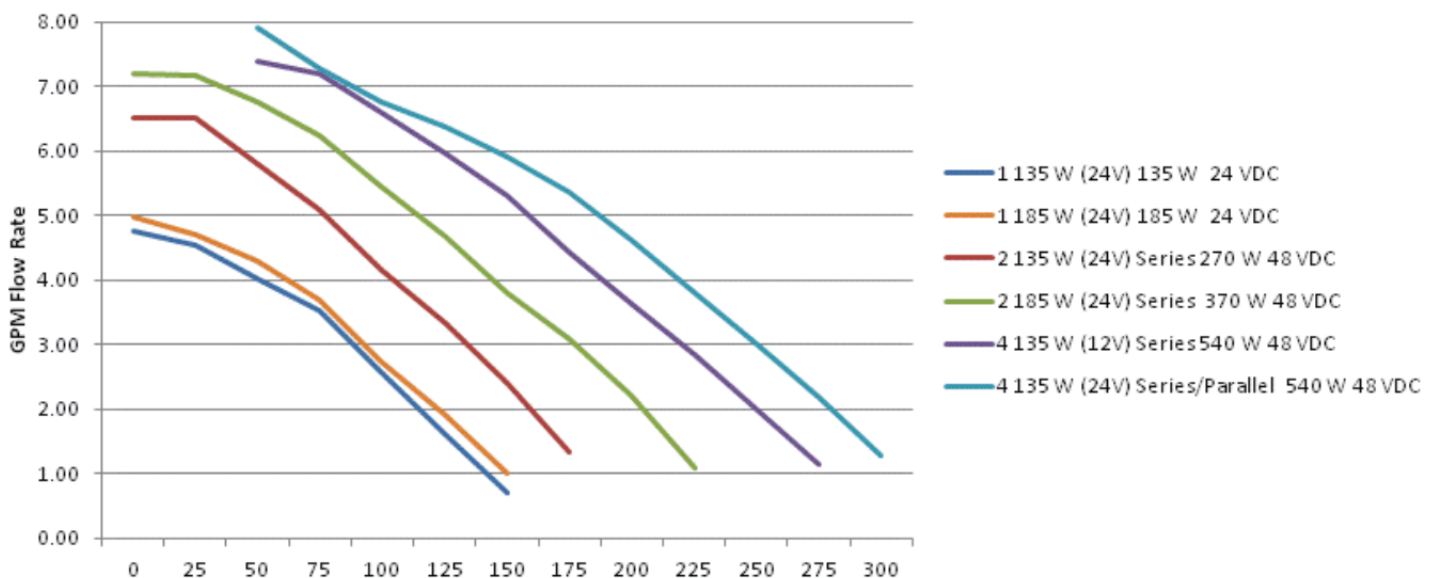
Solar Pump

The pump shown and used here is a:

- Sun Rotor SR 6 Pump
- DC Pump
- 24 Volt DC operation
- Power range 135 – 405 watts
- Max. Functional lift – 250 feet
- Max. Flow – 6.9 gpm (100ft)
- 3 inch diameter



SunRotor SR-6 Solar Pump



Disconnect Switch

The disconnect switch used here is:

- Used to interrupt power when work needs to be done



Control Panel

The control panel used here is:

- Designed for aboveground installation
- Controls flow of power to pump
- Well level switch (float valve) can be used to protect pump from running dry (not used here)



Water Tank and Trough

The water trough is connected to the storage tank
Level switch (float switch) is used to control pump for filling the tank

Pressure in tank “feeds” the trough

Distance from pump to tank and tank to trough can be hundreds of feet
if the right pipe size is used

Solar Panels

Solar panels come in different sizes defined by watts

- Panels used here are 175 watt panels
- Panel output is 12 volts
- Panel amperage output is 5.6 amps
- Panels are connected in series to double voltage not amperage

Batteries

This system does not use batteries as shown here.

If water is required at night, there are three options (in order of preference):

1. A pressurized tank large enough to handle need (most preferred)
2. A generator interface box
3. Batteries

Pump Specifications:

General or basic price based on dealer --- in the range of \$3500

Sun Rotor Submersible Pumps

SunRotor SR4 Pump (Helical Rotor Submersible Pump)

Panels	Configuration	Watts	Nominal Voltage	TDH Lift - Feet / GPM Flow Rate																				
				0	25	50	75	100	125	150	175	200	225	250	275	300								
1	135 W (24V)	135 W	24 VDC	5.3	5.1	4.5	3.8	3.0	1.8	1.2														
1	185 W (24V)	185 W	24 VDC	5.5	5.4	4.8	4.1	3.1	2.5	1.8	1.1													
2	185 W (24V) Parallel	370 W	24 VDC	5.8	5.7	5.5	5.1	4.6	4.0	3.6	3.0	2.2	1.3	0.6										
2	185 W (24V) Series	370 W	48 VDC	7.4	7.3	7.0	6.4	5.7	5.0	4.3	3.5	2.7	1.7	0.5										
3	135 W (12V) Series	405 W	36 VDC			7.8	7.4	6.9	6.3	5.6	4.9	4.2	3.4	2.6	1.3	0.7								

SunRotor SR6 Pump (Helical Rotor Submersible Pump)

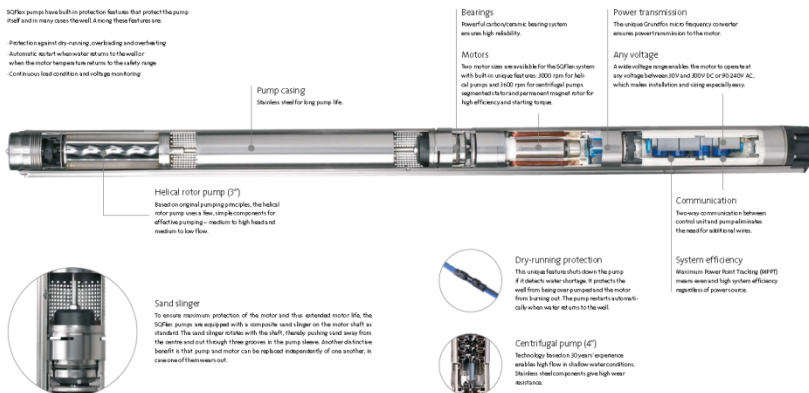
Panels	Configuration	Watts	Nom. V	TDH Lift - Feet / GPM Flow Rate																				
				0	25	50	75	100	125	150	175	200	225	250	275	300								
1	135 W (24V)	135 W	24 VDC	4.77	4.55	4.02	3.52	2.57	1.60	0.69														
1	185 W (24V)	185 W	24 VDC	4.97	4.71	4.29	3.69	2.73	1.90	1.00														
2	135 W (24V) Series	270 W	48 VDC	6.5	6.5	5.8	5.1	4.2	3.3	2.4	1.3													
2	185 W (24V) Series	370 W	48 VDC	7.2	7.2	6.8	6.2	5.4	4.7	3.8	3.1	2.2	1.1											
4	135 W (12V) Series	540 W	48 VDC			7.4	7.2	6.6	6.0	5.3	4.4	3.6	2.9	2.0	1.1									
4	135 W (24V) Series/Parallel	540 W	48 VDC			7.9	7.3	6.8	6.4	5.9	5.4	4.6	3.8	3.0	2.2	1.3								

SunRotor SR11 (Centrifugal Submersible Pump)

Panels	Configuration	Watts	Nom. V	TDH Lift - Feet / GPM Flow Rate																					
				10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220
1	185 W (24V)	185 W	24 VDC	7.9	7.2	6.6	6.0	5.0	4.2	3.3	1.9														
2	135 W (24V) Series	270 W	48 VDC	9.8	9.4	8.9	8.2	7.4	6.7	6.1	5.0	4.1	3.3	2.1	1.3	0.4									
2	185 W (24V) Series	370 W	48 VDC	10.5	10.3	9.7	9.2	8.5	8.0	7.3	6.7	5.8	5.4	4.4	3.7	2.9	1.7								
3	135 W (12V) Series	405 W	36 VDC	11.6	11.2	10.7	10.1	9.8	9.2	8.7	8.0	7.5	6.9	6.3	5.5	5.0	4.2	3.6	3.0	2.1	1.5				
4	135 W (12V) Series	540 W	48 VDC	12.74	12.45	11.93	11.65	11.05	10.26	9.69	9.17	8.69	8.17	7.52	7.05	6.51	5.78	5.63	4.88	3.79	2.86	2.73	1.53		
4	185 W (24V) Series/Parallel	740 W	48 VDC	12.7	12.3	12.0	11.7	11.2	10.7	10.1	9.7	9.2	8.7	8.1	7.5	7.2	6.6	6.0	5.4	4.7	4.2	3.5	2.7	2.0	1.4

Grundfos SQFlex Solar Pumps

- Voltage range from 30-300 volts
- Flow range from 2.9 – 80 gpm
- Total dynamic head 6 – 400 feet



Lorentz Solar Submersible Pumps

Submersible Solar Pumps

PS150 C



Lift up to 65 ft
Flow rate up to
1,330 US Gal./h
12-24 V DC

▷ [more](#)

PS200 HR



Lift up to 160 ft
Flow rate up to
720 US Gal./h
24-48 V DC

▷ [more](#)

PS600 HR/C



Lift up to 580 ft
Flow rate up to
2,930 US Gal./h
48-72 V DC

▷ [more](#)

PS1200 HR/C



Lift up to 770 ft
Flow rate up to
5,300 US Gal./h
72-96 V DC

▷ [more](#)

PS1800 HR/C



Lift up to 810 ft
Flow rate up to
14,000 US Gal./h
72-96 V DC

▷ [more](#)

PS4000 HR/C



Lift up to 1,130 ft
Flow rate up to
19,000 US Gal./h
168-192 V DC

▷ [more](#)

PSk



Lift up to 520 ft
Flow rate up to
35,000 US Gal./h

▷ [more](#)