

PS200 *Mini*

SOLAR WATER PUMP

"The World's Most Economical Solar Pump"

- Lift from as deep as 165 ft (50 m)
- Maximum 3,785 gallons per day (10 m³)
- *Mini* eliminates the costs of fuel, delivery, engine maintenance, and pollution.
- In many cases it COSTS LESS than a conventional pump and generator installation
- Great reliability and life expectancy
- Helical Rotor wet end, brushless motor (maintenance free)
- High resistance to sand and corrosion
- Fits 4" and larger well casings
- Wide voltage range for 24 to 48V systems (2-4 solar modules in series) Only one controller for solar direct or battery systems

>> HIGH EFFICIENCY = LOWER COST

Mini pumps more water per watt than other solar pumps and KEEPS IT UP year after year.

>> RELIABLE AND MAINTENANCE-FREE

Mini eliminates the weakest links in solar pumping by using a helical rotor (progressing cavity) pump and a brushless, water-filled motor – *No failure-prone diaphragms, no flooded-motor failures.*

JUST SAY NO!

- NO to annual diaphragm replacement**
- NO to motor brush replacement**
- NO to delicate plugs that fail**
- NO to pistons, cams, flapper valves**
- NO to plastic parts**
- NO to electronics in the well**

Pump: 3-phase brushless DC-motor on bottom, helical-rotor pump head and check valve on top. Typical model shown.

Controller: Maximum power tracking, 3-phase variable speed controller in sealed plastic housing



>> DIRECT REPLACEMENT for SOLAR DIAPHRAGM PUMPS

Mini can replace less reliable diaphragm pumps, to eliminate frequent repairs, and to increase the water production, too. In most cases, you can use the existing solar array. Refer to the performance table, and compare the solar (minimum PV watts) requirement with the existing equipment.

>> *Mini* INCLUDES

- Pump
- Pump controller
- Complete illustrated instruction manual

>> *Mini* OPTIONS

- Submersible cable splice kit
- Low-water probe

Submersible Pump System PS200



>> DEEP WELL APPLICATIONS

Mini can be submersed as deep as necessary. Submersion depth does not affect the performance or place additional stress on the pump or motor.

>> SURFACE WATER APPLICATIONS

Mini can be installed in a stream, pond, tank or shallow well, in any position.

>> DRY RUN PROTECTION

A low water probe (included) turns pump off to prevent dry-run damage. Reset is automatic after 20 minutes. The PS200 Controller has an RPM limit adjustment to reduce the maximum flow rate to about 50%, to help match a limited water source.

>> SAND AND SILT TOLERANCE

Mini has high resistance to wear from sand, clay, etc. that may occur in a properly constructed water well. However, a concentration of solids greater than 2% (by volume) may cause blockage in the pump or the drop pipe, especially at low flow rates. Do not use *Mini* to clean out a dirty well.

>> CONTROLLER DISPLAY

Lights indicate: system on, pump on, tank full, water source low, overload, and battery low.

>> STORAGE REQUIREMENT

A storage tank (not included) should be sized to supply a minimum of 5-10 days water supply, depending on climate and application. Water storage is generally more economical than energy storage in batteries.

>> BATTERY SYSTEMS

LOW-VOLTAGE DISCONNECT prevents battery damage from over-discharge. This feature is included in the controller.

Disconnect - Reconnect 22V-26V and 44V-48V

>> DROP PIPE

Pump has 1" NPT outlet. If water is dirty, consider a smaller size drop pipe to increase the flow velocity. This helps exhaust solid particles and prevent accumulation in the pipe. When considering reduced pipe size, consult a pipe sizing (friction loss) chart. Pipe can be of any standard material, rigid or flexible. A torque arrestor is NOT required.

>> PUMP CABLE and SPLICE

The pump requires standard submersible cable, 3-wire + ground (total 4 wires). Connection to the pump is made using industry-standard splicing methods.

>> DIMENSIONS & WEIGHTS

PUMP & MOTOR

- Diameter: 3.78" (96 mm)
- Height: 20" - 32" (500-800 mm) depending on model
- Weight: 25 lbs (11.5 kg) or less, depending on model

CONTROLLER

- Controller: 10" x 7" x 4" (260 x 175 x 100 mm)
- 3 conduit holes: 1/2", 3/4", and 1 1/4" KO
- Weight: 3.6 lbs (1.5 kg)
- Enclosure: gasket-sealed, weatherproof

>> WETTED MATERIALS

316 stainless steel, chromium, NBR rubber, natural rubber, POM, polyurethane (cable)

>> TEMPERATURE LIMITS

- Pump: water temp. 57° F to 82° F (13° C to 28° C)
Other ranges are available by special request.
- Controller: Ambient -22° F to 131° (-30° C to 55° C)

>> NEED MORE WATER or GREATER LIFT?

Consider the standard System PS600 or PS1200 the instead of the PS200 *Mini* system. These systems use more power, to pump as high as 760 ft (230m) or to produce a maximum of 34,000 gallons per day (120 m³). They are also appropriate for pressurizing applications. Request separate specification sheets.

>> INSTALLATION

Install the pump by the same methods and materials used for conventional submersible pumps. The solar array requires nuts-and-bolts assembly and standard wiring practice. The PS200 *Mini* instruction manual is clearly illustrated. No special product training is required.

>> WARRANTY

TWO YEAR manufacturer's warranty against defects in materials and workmanship.

PS200 for 24V Battery

total lift [ft]	total lift [m]	Pump Model	GPM	Watts	Wire size AWG
16	5	HR-04	1.5	24	#12
		HR-07	2.0	37	
		HR-14	4.6	40	
33	10	HR-04	1.4	29	#12
		HR-07	2.0	42	
		HR-14	4.4	55	
50	15	HR-04	1.3	34	#12
		HR-07	1.8	50	
		HR-14	4.0	74	
65	20	HR-04	1.2	38	#12
		HR-07	1.7	60	
		HR-14	3.3	91	
100	30	HR-04	1.1	48	#12
130	40	HR-04	1.0	58	#10
165	50	HR-04	0.9	65	#10

PS200 for 48V Battery

total lift [ft]	total lift [m]	Pump Model	GPM	Watts	Wire size AWG
16	5	HR-04	2.9	55	#12
		HR-07	4.5	90	
		HR-14	10.1	130	
33	10	HR-04	2.7	70	#12
		HR-07	4.4	100	
		HR-14	9.5	165	
50	15	HR-04	2.7	80	#12
		HR-07	4.2	115	
		HR-14	9.2	195	
65	20	HR-04	2.6	90	#12
		HR-07	4.1	135	
100	30	HR-04	2.5	105	#10
		HR-07	3.8	160	
130	40	HR-04	2.3	125	#10
		HR-07	3.6	190	
165	50	HR-04	2.1	140	#10
165	50	HR-04	1.9	160	#10

Submersible Pump System PS200



PS200 for 24V SOLAR-DIRECT

6 kWh/m ² /day solar radiation on tilted surface							
total lift [ft]	Pump Model	peak GPM	PV Watts / [G / day]			cable size AWG	
			80	120	150		
16	5	HR-04	1.9	840	915	960	12
		HR-07	3.4	960	1440	1680	
33	10	HR-04	1.7	790	865	960	12
		HR-07	3.4	935	1245	1295	
50	15	HR-04	1.6	695	840	960	12
		HR-07	3.2	840	1200	1245	
65	20	HR-04	1.5	600	790	935	12
		HR-07	3.2	575	915	1175	
82	25	HR-04	1.5	525	720	840	12
100	30	HR-04	1.5	455	670	745	12
130	40	HR-04	1.3		480	600	10
165	50	HR-04	1.3	see 36-48V table			10

PS200 for 24V SOLAR-DIRECT

4 kWh/m ² /day solar radiation on tilted surface								
total lift [ft]	Pump Model	peak GPM	PV Watts / [G / day]			cable size AWG		
			80	120	150			
16	5	HR-04	1.9	525	600	670	12	
		HR-07	3.4	480	840	1125		
33	10	HR-04	1.7	480	550	620	12	
		HR-07	3.4	405	720	1005		
50	15	HR-04	1.6	430	480	575	12	
		HR-07	3.2	360	670	935		
65	20	HR-04	1.5	335	380	525	12	
		HR-07	3.2	260	600	885		
82	25	HR-04	1.5	260	360	500	12	
100	30	HR-04	1.5	190	285	480	12	
130	40	HR-04	1.3	X		240	430	10
165	50	HR-04	1.3	see 36-48V table			10	

PS200 for 36-48V SOLAR-DIRECT

6 kWh/m ² /day solar radiation on tilted surface							
total lift [ft]	Pump Model	peak GPM	PV Watts / [G / day]			cable size AWG	
			150	200	250		
16	5	HR-04	3.2	1660	1740	1925	12
		HR-07	5.2	2245	2510	2770	
		HR-14	9.5	2905	3960	4755	
33	10	HR-04	3.1	1585	1715	1845	12
		HR-07	5.0	2110	2375	2640	
		HR-14	9.0	2375	3435	4225	
50	15	HR-04	3.0	1450	1585	1795	12
		HR-07	4.9	1845	2190	2510	
		HR-14	8.7	2110	2905	3695	
65	20	HR-04	3.0	1450	1635	1740	12
		HR-07	4.8	1585	1980	2375	
82	25	HR-04	3.0	1320	1480	1635	12
		HR-07	4.6	1320	1715	2110	
100	30	HR-04	2.9	1135	1295	1530	12
130	40	HR-04	2.9	790	1055	1320	10
165	50	HR-04	2.8	525	790	1110	10

PS200 for 36-48V SOLAR-DIRECT

4 kWh/m ² /day solar radiation on tilted surface							
total lift [ft]	Pump Model	peak GPM	PV Watts / [G / day]			cable size AWG	
			150	200	250		
16	5	HR-04	3.2	1265	1425	1690	12
		HR-07	5.2	1240	1845	2245	
33	10	HR-04	3.1	1185	1320	1585	12
		HR-07	5.0	1110	1585	1980	
50	15	HR-04	3.0	1055	1215	1505	12
		HR-07	4.9	1030	1585	1955	
65	20	HR-04	3.0	925	1110	1425	12
		HR-07	4.8	870	1450	1845	
82	25	HR-04	3.0	685	950	1345	12
		HR-07	4.6	X		660	
100	30	HR-04	2.9	525	790	1265	12
130	40	HR-04	2.9	445	630	925	10
165	50	HR-04	2.8	340	525	790	10

>> NOTES FOR SOLAR-DIRECT APPLICATIONS

PV WATTS = The minimum solar (PV) array rating required. An array of lesser wattage may be unable to start the pump satisfactorily. More PV watts will allow the pump to reach full flow rate in lower sunlight conditions. Up to 300 watts can be installed. To allow unexpected draw down, a pump can handle an additional 15% lift beyond the specifications.

A smaller pump type that can produce the required flow will have better performance during low light periods, while the larger pump may be not able to start.

WIRE SIZES Cable Size = the minimum required wire size for the cable from the controller to the pump, based on a distance of vertical lift + 30 ft.

Variations:

GREATER LENGTH: for each 150% increase, the next larger wire size is required.

VERTICAL LIFT = total dynamic head = the vertical distance from the draw-down level of the water source, to the pipe outlet or top of storage tank + pipe friction losses.

>> How To Order a PS200 Pump System

- Order controller PS200 (LOR-04002) for PS200 Mini systems.
- Choose Pump and Temperature Class appropriate for your application.
 - HR-04-2 pump for 57°-82° F water temperatures, order Item LOR-01016
 - HR-04-3 pump for 78°-100° F water temperatures, order Item LOR-01018
 - HR-07-2 pump for 57°-82° F water temperatures, order Item LOR-01028
 - HR-07-3 pump for 78°-100° F water temperatures, order Item LOR-01030
 - HR-14-2 pump for 57°-82° F water temperatures, order Item LOR-01034
 - HR-14-3 pump for 78°-100° F water temperatures, order Item LOR-01036

>> Optional Equipment

- Well probe sensor (LOR-03002)
- Submersible Splice Kit (DSP-02502)
- Disconnect and Junction box (LOR-03004)