

# PS1200

# LORENTZ

*"The World's Most Economical Solar Pump"*

## RELIABLE AND MAINTENANCE-FREE

PS1200 eliminates the weakest links in solar pumping by using helical rotor (progressing cavity) and centrifugal pump ends and a brushless and water-filled motor.

*No failure-prone diaphragms, no flooded-motor failures and no electronics in the well !*

- Lift from as deep as 760 ft (230 m)
- Maximum 25,000 gallons per day (135 m<sup>3</sup>)
- PS1200 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
- High resistance to sand and corrosion
- Fits 4" and larger well casings
- Wide voltage range for 72 to 96V systems (6-8 solar modules in series)

### >> DEEP WELL APPLICATIONS

The pump 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

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

### >> DRY RUN PROTECTION

An optional low water probe turns pump off to prevent dry-run damage. Reset is automatic after 20 minutes. The PS1200 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

The pump 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 the pump to clean out a dirty well.

### >> CONTROLLER

MPPT, well probe and float-/remote switch terminals. Lights indicate: system on, pump on, pump speed, tank full, water source low, overload, and battery low. Protected against reverse polarity, overload and high temperature.

### >> BATTERY SYSTEMS

Choose the PS600 System for 48V battery systems, or the PS200 for 24V or 48V battery systems.

### >> 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.

### >> DROP PIPE

1" NPT pump outlet on most pumps—see sizing chart for specifics. 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

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: 17" x 7" x 6" (425 x 175 x 150 mm)
- 3 conduit holes: 1/2", 3/4", and 1 1/4" KO
- Weight: 11 lbs (4.8 kg)
- Enclosure: gasket-sealed, weatherproof

### >> WETTED MATERIALS

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

### >> TEMPERATURE LIMITS

- Pump: Specify Temperature Class on order
  - Class 1 46° F to 72° F
  - Class 2 64° F to 90° F
  - Class 3 82° F to 104° F
- Controller: Ambient -22° F to 131° (-30° C to 55° C)



### >> INSTALLATION

Install the pump by the same methods and materials used for conventional submersible pumps. The PS1200 instruction manual is clearly illustrated. No special product training is required.

### >> OPTIONAL EQUIPMENT:

Low-water probe  
4 wire submersible cable splice kit, 3 wire + ground  
Disconnect and Junction box

**>> TWO YEAR MANUFACTURER'S WARRANTY**  
against defects in materials and workmanship

# PS1200 SIZING TABLE for Solar Direct Systems



Ver: 05/01/13

Fixed and single axis tracked Systems

VERTICAL LIFT	16 Feet 5m		33 Feet 10m		50 Feet 15m		65 Feet 20m		100 Feet 30m		133 Feet 40m		165 Feet 50m		200 Feet 60m		230 Feet 70m	
	Fixed	Tracked	Fixed	Tracked	Fixed	Tracked	Fixed	Tracked	Fixed	Tracked	Fixed	Tracked	Fixed	Tracked	Fixed	Tracked	Fixed	Tracked

## US Gallons x 1000 / day

PEAK SUN hours/day	7.5	11.1	16.1	5.8	7.9	6.0	7.7	4.7	6.9	3.7	5.3	1.8	2.3	1.6	2.2	1.5	2.1	1.3	1.8																	
	6.0	9.8	14.0	5.0	6.9	4.8	6.3	4.0	5.2	2.6	3.7	1.7	2.2	1.5	2.0	1.3	1.8	1.1	1.5																	
	4.5	8.5	11.6	4.2	5.8	3.7	5.0	2.6	3.6	1.6	2.1	1.6	2.1	1.2	1.6	1.1	1.5	0.9	1.3																	
<b>350 Wp</b>	C-BF-04				HR-14								HR-04																							
GPM	21.0				12.3				10.6				9.5				7.9				3.5				3.3				2.9				2.6			
Wire size / max. length	#12 / 200ft																#12 / 230ft																			

PEAK SUN hours/day	7.5	12.4	18.0	6.9	8.3	6.3	8.0	5.3	7.7	4.2	6.1	2.3	3.3	1.8	2.3	1.6	2.2	1.5	2.0																	
	6.0	11.0	15.5	5.8	7.1	5.2	6.7	4.5	6.3	3.2	4.5	2.0	2.8	1.6	2.1	1.4	1.9	1.3	1.7																	
	4.5	9.5	13.0	4.6	6.2	4.0	5.4	3.7	5.0	2.1	2.9	1.7	2.3	1.3	1.9	1.2	1.6	1.1	1.4																	
<b>420 Wp</b>	C-BF-04				HR-14								HR-07				HR-04																			
GPM	23.0				11.4				11.0				10.0				9.0				5.3				3.4				3.0				2.7			
Wire size / max. length	#12 / 150ft																#12 / 230ft																			

PEAK SUN hours/day	7.5	13.7	20.0	7.9	10.0	7.1	9.2	5.8	8.0	4.8	6.9	3.7	5.3	2.9	3.8	2.3	3.3	1.6	2.3																	
	6.0	12.2	17.2	6.5	8.5	5.8	7.7	5.0	7.1	4.0	4.9	2.6	3.7	2.3	3.2	1.9	2.6	1.5	2.0																	
	4.5	10.6	14.5	5.0	6.9	4.2	5.8	4.0	5.6	3.2	4.2	1.9	2.5	1.5	2.0	1.3	1.7	1.2	1.6																	
<b>480 Wp</b>	C-BF-04				HR-20								HR-14				HR-07																			
GPM	25.0				15.0				14.5				11.1				9.5				7.4				5.3				5.0				4.4			
Wire size / max. length	#12 / 150ft																#12 / 200ft																			

PEAK SUN hours/day	7.5	17.0	24.5	11.6	17.0	8.4	10.3	7.0	8.0	5.7	7.6	4.5	6.5	3.6	5.0	2.6	3.8	2.3	3.3																	
	6.0	14.8	21.0	9.5	13.5	7.1	9.1	6.0	7.5	4.7	6.3	3.6	5.0	2.8	3.8	2.3	3.2	1.9	2.8																	
	4.5	12.7	17.4	7.4	10.0	5.8	7.9	5.0	6.6	3.7	5.0	2.6	3.6	2.1	2.6	1.9	2.5	1.6	2.3																	
<b>660 Wp</b>	C-BF-04				HR-20								HR-14				HR-07																			
GPM	30.0				28.0				15.0				11.4				11.0				10.5				10.0				5.3				5.2			
Wire size / max. length	#12 / 150ft																#10 / 300ft																			

PEAK SUN hours/day	7.5	18.5	26.4	13.2	18.8	9.5	13.5	7.7	10.6	6.6	9.5	5.3	7.7	4.7	6.8	2.9	3.8	2.7	3.8																	
	6.0	16.4	23.3	11.4	15.6	7.4	10.6	6.9	9.5	5.8	7.9	4.8	6.6	3.7	5.0	2.6	3.7	2.4	3.4																	
	4.5	14.0	20.0	9.3	12.4	5.3	7.4	6.1	8.5	4.6	6.3	4.1	5.6	2.4	3.2	2.4	3.3	2.1	2.9																	
<b>720 Wp</b>	C-BF-04				HR-20								HR-14				HR-07																			
GPM	31.0				29.0				25.0				14.3				14.0				11.4				10.2				5.4				5.3			
Wire size / max. length	#10 / 250ft																#10 / 300ft																			

PEAK SUN hours/day	7.5	20.3	29.3	14.5	21.1	10.8	15.8	8.4	10.6	7.1	10.0	5.9	7.9	5.0	7.1	2.8	3.8	2.7	3.8																	
	6.0	18.5	26.4	13.0	18.5	9.5	13.5	7.9	10.6	6.6	9.3	5.6	7.4	4.2	6.1	2.7	3.8	2.6	3.7																	
	4.5	16.6	23.3	11.4	15.6	7.9	10.8	7.4	10.0	6.1	8.2	4.8	6.3	3.4	4.8	2.5	3.5	2.4	3.4																	
<b>840 Wp</b>	C-DF-03				C-BF-04								HR-20				HR-14				HR-07															
GPM	43.0				32.0				29.5				14.5				14.2				11.4				10.3				5.4				5.3			
Wire size / max. length	#10 / 250ft																#10 / 300ft																			

PEAK SUN hours/day	7.5	22.5	33.0	19.0	27.7	12.7	18.5	11.1	15.8	8.1	10.6	6.6	9.5	5.5	7.7	4.4	6.6	3.0	3.8																	
	6.0	20.6	29.1	15.9	22.5	11.1	15.9	9.5	13.5	7.4	9.8	5.8	7.9	4.8	6.6	3.7	5.6	2.7	3.8																	
	4.5	18.8	25.4	12.4	17.2	9.5	13.0	7.9	10.8	6.6	8.7	4.8	6.3	4.0	5.3	3.0	4.2	2.6	3.6																	
<b>1000 Wp</b>	C-DF-03				C-BF-04								HR-20				HR-14				HR-07															
GPM	45.0				42.0				30.0				27.0				14.3				13.8				10.4				10.0				5.3			
Wire size / max. length	#10 / 250ft																#10 / 300ft																			

PEAK SUN hours/day	7.5	25.0	35.0	21.0	33.0	14.0	20.0	12.4	17.4	8.7	10.6	7.0	10.0	5.8	7.9	4.7	6.8	3.2	3.8																	
	6.0	23.3	32.0	18.5	27.2	13.0	18.5	11.1	15.3	8.2	10.6	6.3	8.7	5.3	7.1	4.2	6.1	3.0	3.8																	
	4.5	21.1	28.3	15.6	21.1	11.9	16.4	9.5	13.0	7.4	10.0	5.6	7.4	4.8	6.3	3.7	5.0	2.9	3.8																	
<b>1200 Wp</b>	C-DF-03				C-BF-04								HR-20				HR-14				HR-07															
GPM	45.0				42.0				31.0				28.0				14.3				13.8				10.4				10.0				5.3			
Wire size / max. length	#10 / 250ft																#10 / 300ft																			

MORE WATER

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**System Voltage:** 72 -96V nominal, e.g. 6 to 8 standard 12V modules wired in series.  
Voc 200Vmax.  
**LIFT LIMITS**  
These systems are selected for optimum performance. To allow unexpected drawdown, each system can handle an additional 15% lift.

### HOW DAILY WATER VOLUME IS CALCULATED

Daily volume is calculated by integrating real flow vs. realistic solar (PV) output through the day. (peak sun hours/day = kWh/sq.m/day)  
Calculations include a 10% PV output degradation (heat, dirt etc). Cable losses are included at maximum allowable length. The solar array is fixed at tilt angle = latitude of the location. For central USA, seasonal adjustment of the tilt angle increases daily volume by about 8% summer, 5% winter. Flow rates may vary +/- 10%.

Specifications are subject to change. Please use the newest version.

### METRIC WIRE

	nearest larger equivalent
AWG	mm <sup>3</sup>
#18	1
#12	4
#10	6
#8	10
#6	16

# PS1200 SIZING TABLE for Solar Direct Systems



Ver: 05/01/13

Fixed and single axis tracked Systems

265 Feet 80m		300 Feet 90m		330 Feet 100m		400 Feet 120m		460 Feet 140m		530 Feet 160m		600 Feet 180m		660 Feet 200m		760 Feet 230m		VERTICAL LIFT
Fixed	Tracked	Fixed	Tracked	Fixed	Tracked	Fixed	Tracked	Fixed	Tracked	Fixed	Tracked	Fixed	Tracked	Fixed	Tracked	Fixed	Tracked	

## US Gallons x 1000 per day

1.00	1.35	0.90	1.32	0.85	1.24	0.79	1.14	0.71	1.06
0.87	1.16	0.79	1.06	0.71	1.03	0.66	0.87	0.53	0.77
0.74	1.00	0.69	0.92	0.58	0.79	0.45	0.61	0.34	0.48
HR-04H		HR-03		HR-03		HR-03H		HR-03H	
2.2		2.0		1.9		1.8		1.7	
#10 / 500ft									

1.24	1.82	1.19	1.42	1.06	1.32	0.98	1.32	0.79	1.11	0.61	0.85	0.45	0.63
1.02	1.44	0.98	1.24	0.85	1.10	0.79	1.08	0.66	0.91	0.53	0.71	0.36	0.50
0.79	1.06	0.77	1.03	0.63	0.87	0.61	0.85	0.53	0.71	0.45	0.58	0.26	0.37
HR-04H		HR-03		HR-03		HR-03H		HR-03H		HR-03H		HR-03H	
2.5		2.1		2.0		1.9		1.8		1.6		1.4	
#10 / 400ft		#10 / 500ft		#10 / 500ft		#8 / 750ft		#8 / 750ft		#8 / 750ft		#8 / 750ft	

1.51	2.17	1.45	2.11	1.32	1.85	1.19	1.72	0.87	1.19	0.74	1.06	0.61	0.79	0.50	0.71	0.42	0.61
1.27	1.77	1.16	1.72	1.00	1.40	0.90	1.27	0.79	1.06	0.63	0.87	0.50	0.66	0.42	0.58	0.34	0.48
1.03	1.37	0.87	1.19	0.69	0.92	0.58	0.79	0.69	0.92	0.50	0.66	0.40	0.53	0.32	0.42	0.26	0.34
HR-04H		HR-03		HR-03		HR-03H		HR-03H		HR-03H		HR-03H		HR-03H		HR-03H	
3.2		3.0		2.7		2.5		1.9		1.7		1.6		1.6		1.5	
#10 / 450ft		#10 / 500ft		#10 / 500ft		#8 / 750ft		#8 / 750ft		#8 / 750ft		#8 / 750ft		#8 / 750ft		#8 / 750ft	

2.11	3.04	1.72	2.32	1.45	2.06	1.35	1.96	1.19	1.69	0.87	1.22	0.85	1.14	0.79	1.08	0.55	0.98
1.72	2.44	1.45	1.96	1.29	1.76	1.07	1.53	0.92	1.31	0.79	1.10	0.74	0.99	0.66	0.87	0.48	0.75
1.32	1.85	1.19	1.59	1.14	1.45	0.79	1.11	0.66	0.92	0.71	0.98	0.63	0.85	0.53	0.66	0.40	0.53
HR-07		HR-04H		HR-04H		HR-03H		HR-03H		HR-03H		HR-03H		HR-03H		HR-03H	
5.0		3.4		3.3		3.2		3.1		1.8		1.8		1.8		1.7	
#10 / 300ft		#10 / 450ft		#10 / 450ft		#8 / 750ft		#8 / 750ft		#8 / 750ft		#8 / 750ft		#8 / 750ft		#8 / 750ft	

2.5	3.6	2.3	3.3	1.59	2.30	1.51	2.17	1.40	1.85	0.98	1.32	0.92	1.24	0.87	1.11	0.79	1.06
2.2	3.0	2.0	2.8	1.53	2.11	1.32	1.80	1.16	1.59	0.92	1.25	0.87	1.15	0.79	1.03	0.66	0.90
1.9	2.5	1.6	2.1	1.45	1.96	1.06	1.43	0.92	1.24	0.87	1.19	0.79	1.06	0.71	0.95	0.53	0.71
HR-07		HR-04H		HR-04H		HR-03H		HR-03H		HR-03H		HR-03H		HR-03H		HR-03H	
5.2		5.0		3.3		3.2		3.2		1.8		1.8		1.8		1.7	
#10 / 350ft		#10 / 500ft		#10 / 500ft		#8 / 750ft		#8 / 750ft		#8 / 750ft		#8 / 750ft		#8 / 750ft		#8 / 750ft	

2.6	3.7	2.5	3.6	2.1	3.2	1.9	2.8	1.59	1.98	1.11	1.37	1.06	1.32	0.98	1.16	0.87	1.11
2.4	3.2	2.2	3.1	1.9	2.8	1.7	2.4	1.37	1.85	1.02	1.31	0.95	1.23	0.89	1.12	0.81	1.05
2.1	2.8	1.9	2.6	1.7	2.3	1.5	2.0	1.16	1.59	0.92	1.24	0.85	1.14	0.79	1.08	0.74	1.00
HR-07		HR-04H		HR-04H		HR-03H		HR-03H		HR-03H		HR-03H		HR-03H		HR-03H	
5.2		5.0		4.8		4.6		3.2		1.8		1.8		1.8		1.7	
#10 / 400ft		#10 / 500ft		#10 / 500ft		#8 / 750ft		#8 / 750ft		#8 / 750ft		#8 / 750ft		#8 / 750ft		#8 / 750ft	

2.7	3.8	2.6	3.6	2.4	3.3	2.3	3.2	1.72	2.11
2.5	3.5	2.4	3.3	2.1	2.9	2.0	2.8	1.53	1.96
2.4	3.2	2.1	2.9	1.9	2.5	1.8	2.4	1.32	1.80
HR-07		HR-04H		HR-04H		HR-03H		HR-03H	
5.2		5.0		4.8		4.6		3.2	
#10 / 300ft		#10 / 400ft		#10 / 400ft		#10 / 500ft		#10 / 500ft	

3.0	3.8	2.9	3.6	2.6	3.3	2.5	3.2	1.85	2.30
2.8	3.8	2.6	3.4	2.4	3.1	2.3	2.9	1.69	2.25
2.7	3.8	2.4	3.3	2.1	2.9	2.0	2.6	1.51	2.03
HR-07		HR-04H		HR-04H		HR-03H		HR-03H	
5.2		5.0		4.8		4.6		3.2	
#10 / 300ft		#10 / 400ft		#10 / 400ft		#10 / 500ft		#10 / 500ft	

**INSTRUCTIONS**  
(1) Find the LIFT you require, and read the column below it.

PEAK SUN	7.5
hours/day	6.0
	4.5
<b>350 Wp</b>	
GPM	
Wire size/max. length	

PEAK SUN	7.5
hours/day	6.0
	4.5
<b>420 Wp</b>	
GPM	
Wire size/max. length	

PEAK SUN	7.5
hours/day	6.0
	4.5
<b>480 Wp</b>	
GPM	
Wire size/max. length	

PEAK SUN	7.5
hours/day	6.0
	4.5
<b>660 Wp</b>	
GPM	
Wire size/max. length	

PEAK SUN	7.5
hours/day	6.0
	4.5
<b>720 Wp</b>	
GPM	
Wire size/max. length	

PEAK SUN	7.5
hours/day	6.0
	4.5
<b>840 Wp</b>	
GPM	
Wire size/max. length	

PEAK SUN	7.5
hours/day	6.0
	4.5
<b>1000 Wp</b>	
GPM	
Wire size/max. length	

PEAK SUN	7.5
hours/day	6.0
	4.5
<b>1200 Wp</b>	
GPM	
Wire size/max. length	

### Conversions for Flow:

1m<sup>3</sup> / 0.003785 = US Gallons  
 1m<sup>3</sup> / 0.004546 = Imp Gallons  
 LPM / 3.785 = US Gallon per minute  
 LPM / 4.546 = Imp Gallon per minute  
**Conversion for Lift / Length:**  
 1m = 3.3ft

### WIRE SIZES

Cable layout is calculated to stay within 4% power loss.  
 PUMP CABLE, EXAMPLE: #10 / 400ft = maximum allowable length (controller to pump) for that wire size.  
 VARIATIONS  
 GREATER LENGTH: for each 150% increase, the next larger wire size is required.  
 SHORTER LENGTH: for each 33% decrease, the next smaller wire is allowed.

ARRAY TO CONTROLLER if <20 ft.: #10min  
 CONTROLLER TO LOW-WATER PROBE: #18 min. 2-conductor  
 CONTROLLER TO FLOAT SWITCH: #18 min. 2-conductor

(2) Find the DAILY VOLUME you require.  
 at 7.5 peak sun hrs/day  
 at 6.0 peak sun hrs/day  
 at 4.5 peak sun hrs/day  
 (For more water, look further down the column.)

(3) Use the PEAK FLOW RATE for pipe sizing.

Daily solar radiation:  
 7.5 = moderately dry summer weather

(4) Wire size / max. length (see below)

MORE WATER

**Battery Systems:**  
 48V choose PS600 system  
 24-48V choose PS200 system

Pump Outlet Pipe Size	
HR-03H, 04H	1" NPT
HR-04, 07	1.1/4"
HR-14, 20	1.1/2"
C-BF-04	1.1/2"
C-DF-03	2"