**PS1800 Centrifugal Pumping Systems**

**General Data and Sizing Tables**

The curve shows the performance range of 4 models at 1800Wp solar array.

- irradiation of 6kWh/m² on a tilted surface
- ambient temperature 30°C

Solar tracking will improve performance by aprox 40% in summer month’s

**Application:**
- drinking water supply
- livestock watering
- pond management
- irrigation
- village water supply

**Controller PS1800**
- controlling of the pump system and monitoring of the operating states
- mounted at surface (no submerged electronic parts)
- two control inputs for well probe (dry running protection), float or pressure switches, remote control etc.
- automatic reset 20 minutes after well probe turns pump off
- protected against reverse polarity, overload and high temperature
- speed control, max. pump speed adjustable to reduce flow rate to approx. 30 %
- solar operation: integrated MPPT (Maximum Power Point Tracking)
- battery operation: low voltage disconnect and restart after battery has recovered
- max. efficiency 92 % (motor + controller)
- enclosure: IP 54 (sealed, weatherproof)

**Motor ECDRIVE 1200 HR / C**
- brushless DC motor
- no electronics inside motor
- water filled
- IP68, pressure balanced, max. submersion unlimited
- dynamic slide bearings, material: carbon/ceramic
- wetted material: stainless steel (AISI 316), POM, rubber, cable drinking water approved

**Pump End (PE)**
- high life expectancy
- none-return valve
- dry running protection (optional)
- material: stainless steel (AISI 316)

Errors excepted and possible alterations without prior notice

**Solar Pumping System / Capacity Diagram**

6kWh/m²/day, 1800Wp solar array

<table>
<thead>
<tr>
<th>Pump</th>
<th>Lift Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>SJ17-2</td>
<td>0-15m / 50 ft</td>
</tr>
<tr>
<td>SJ12-4</td>
<td>5-15m / 50 ft</td>
</tr>
<tr>
<td>SJ8-7</td>
<td>15-30m / 83 ft</td>
</tr>
<tr>
<td>SJ5-12</td>
<td>30-65m / 215 ft</td>
</tr>
<tr>
<td>SJ1-25</td>
<td>70-90m / 300 ft</td>
</tr>
</tbody>
</table>

Curve is based on irradiation 6kWh/m² day, tilted surface
Pump ends:
SJ-xx = centrifugal pump
Motor: brushless DC, maintenance free, max water temp. 25°C (80°F) 30°C (86°F) for systems below 1200Wp solar array

LORENTZ offers standard solar pump solutions up to 230m (760ft) head and special solutions up to 750m (2500ft) head. Ask for charts

1 USG = 3,8L
1 ImpG = 4,5L

~ larger flow = SJ17-2

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**Ver. 080204**
Calculation of system performance is based on:
- non tracked PV-generator, (see ETATRACK for increasing performance)
- 11h standard solar day
- ambient average temperature of 30°C
- 13,3% Generator efficiency
- 1% cable loss
System Performance
An irradiation value and the required head in meters are given for a certain solar pumping system.
By connecting the point for the power output in Wp of the solar array with an irradiation value, move vertical upwards to the intersection with the required head curve, then horizontal to the left to find the daily quantity of water that can be pumped (m³/day)

Or the other way:

By starting from the daily required water amount horizontally to the intersection of the required head, then vertically down to the intersection with the expected solar irradiation, then horizontally to the left to find the required output of the solar array.

Instantaneous Output
From the above curves, the maximum quantity of water in m³/h for a given solar array size in Wp and head in meters / ft can be found. Add at least 25% to the DC power to account for dirt, heat and other losses of the solar array.

Pump
Centrifugal multistage direct coupled on a LORENTZ brushless submersible motor. The pump is made from stainless steel with water lubricated rubber bearings. A non return valve is included.

Motor
The LORENTZ submersible motor, type EC 1200-C is a 2 pole synchronous brushless DC motor. Slide ring bearing and ceramic thrust bearings are water lubricated.
The motor raw earth magnets are hermetically sealed in stainless steel and encapsulated in synthetic resin.
The motor is pressure compensated and there are no practical depth limitations for submergence.
No electronics are inside the motor and the entire motor is water filled.

Data:
Voltage: 3 X 100V electronically commutated
Power: 1,6kW / 2,2HP
Efficiency: 92% max

Controller
Mounted at surface,
Well probe and float switch terminals
MPPT (max. power point tracking)
Overload, temperature and reverse polarity protected
Pump Speed control from 30% to full
LED indicate status, pump speed water level, overload etc.

6 to 8 standard 12V modules can be connected in series. e.g. nom. Voltage 72 to 90V, max system Voltage Umax=200V. For Systems above 1200Wp Solar array size min. 7 or 8 panels have to be wired in series.
Direct operated PV-Pump System:
Solar Pump System PS1800 C-SJ5-12
C-SJ5-12

Calculation of system performance is based on:
- non tracked PV-generator, (see ETATRACK for increasing performance)
- 11h standard solar day
- ambient average temperature of 30°C
- 1% cable loss

US GPD m³/day
13000  50
12000  45
11000  40
10000  35
9000   30
8000   25
7000   20
6000   15
5000   10
4000   5
3000
2000
1000

Wp
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
2200

Irradiation on a tilted surface kWh/m²/day
2 3 4 5 6 7 8 9

40/132 Head Metres/Feet
50/165
60/197
70/230

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System Performance
An irradiation value and the required head in meters are given for a certain solar pumping system. By connecting the point for the power output in Wp of the solar array with an irradiation value, move vertical upwards to the intersection with the required head curve, then horizontal to the left to find the daily quantity of water that can be pumped (m³/day).

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- 1% cable loss

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**Direct operated PV-Pump System:**

Solar Pump System PS1800 C-SJ12-4

**C-SJ12-4**

Calculation of system performance is based on:

- non tracked PV-generator, (see ETATRACK for increasing performance)
- 11h standard solar day
- ambient average temperature of 30°C
- 1% cable loss

<table>
<thead>
<tr>
<th>US GPD m³/day</th>
<th>Head</th>
<th>Metres /Ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5000</td>
<td>7.5</td>
<td>25</td>
</tr>
<tr>
<td>4850</td>
<td>10</td>
<td>33</td>
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<tr>
<td>4000</td>
<td>12.5</td>
<td>41</td>
</tr>
<tr>
<td>3486</td>
<td>15</td>
<td>49.5</td>
</tr>
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**Diagram:**

- Irradiation on a tilted surface
- kWh/m²/day
- Wp

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System Performance
An irradiation value and the required head in meters are given for a certain solar pumping system.
By connecting the point for the power output in Wp of the solar array with an irradiation value, move vertical upwards to the intersection with the required head curve, then horizontal to the left to find the daily quantity of water that can be pumped (m³/day)

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Efficiency: 92% max

Controller
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Well probe and float switch terminals
MPPT (max. power point tracking)
Overload, temperature and reverse polarity protected
Pump Speed control from 30% to full
LED indicate status, pump speed water level, overload etc.
6 to 8 standard 12V modules can be connected in series. E.g. nom. Voltage 72 to 96V, max system Voltage Umax= 200V
Direct operated PV-Pump System:
Solar Pump System PS1800 C-SJ17-2
C-SJ17-2

Calculation of system performance is based on:
- non tracked PV-generator, (see ETATRACK for increasing performance)
- 11h standard solar day
- ambient average temperature of 30°C
- 13,3% Generator efficiency
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**US GPD m³/day**

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<tbody>
<tr>
<td>5000</td>
<td></td>
</tr>
<tr>
<td>7000</td>
<td></td>
</tr>
<tr>
<td>9000</td>
<td></td>
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<td>23000</td>
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<tr>
<td>25000</td>
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**Irradiation on a tilted surface kWh/m²/day**

- 7.5/25
- 10/33
- 12.5/41
- 15/49

**Wp**

- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

**Head Metres /Ft.**

- 220
- 200
- 180
- 160
- 140
- 120
- 100
- 80
- 60
- 40
- 20

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Systems above 1200Wp require 8 panels wired in series for nom 96V