

# PS1800 Centrifugal Pumping Systems



## General Data and Sizing Tables

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

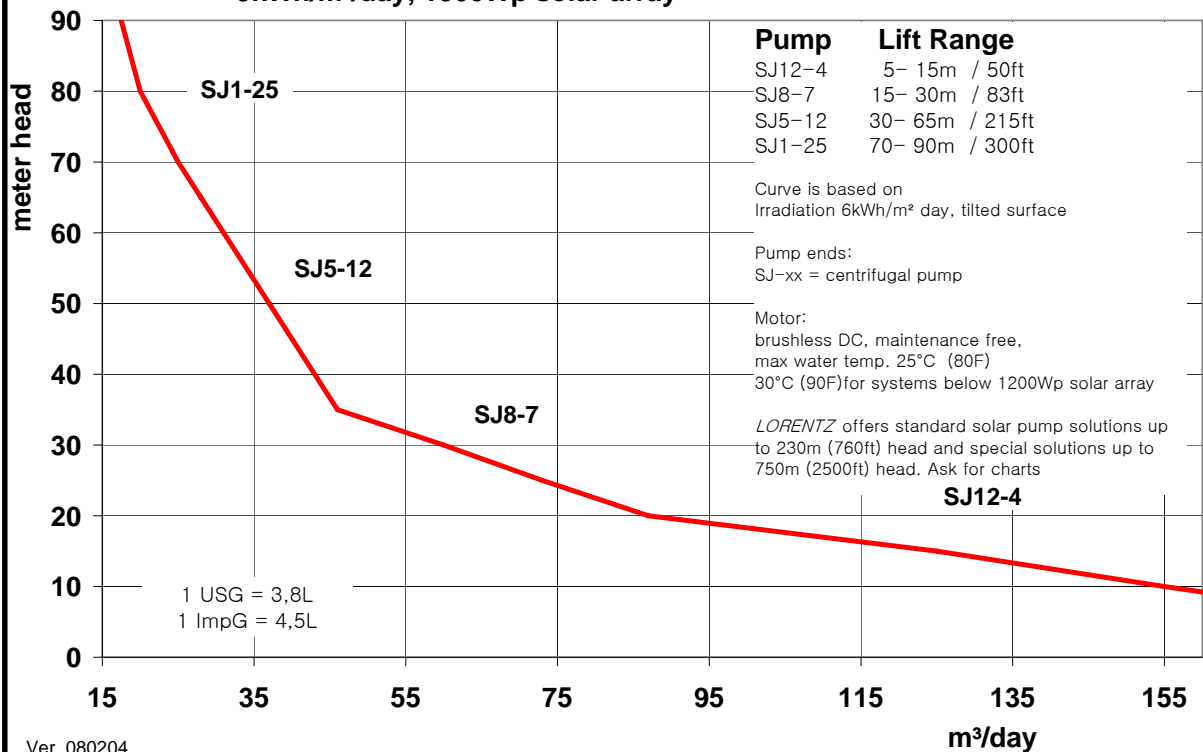
- irradiation of 6kWh/m<sup>2</sup> on a tilted surface
- ambient temperature 30°C

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

Application:

- drinking water supply
- livestock watering
- pond management
- irrigation
- village water supply

### Solar Pumping System / Capacity Diagram 6kWh/m<sup>2</sup>/day, 1800Wp solar array



#### 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

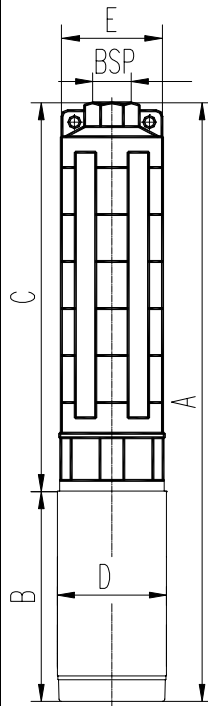
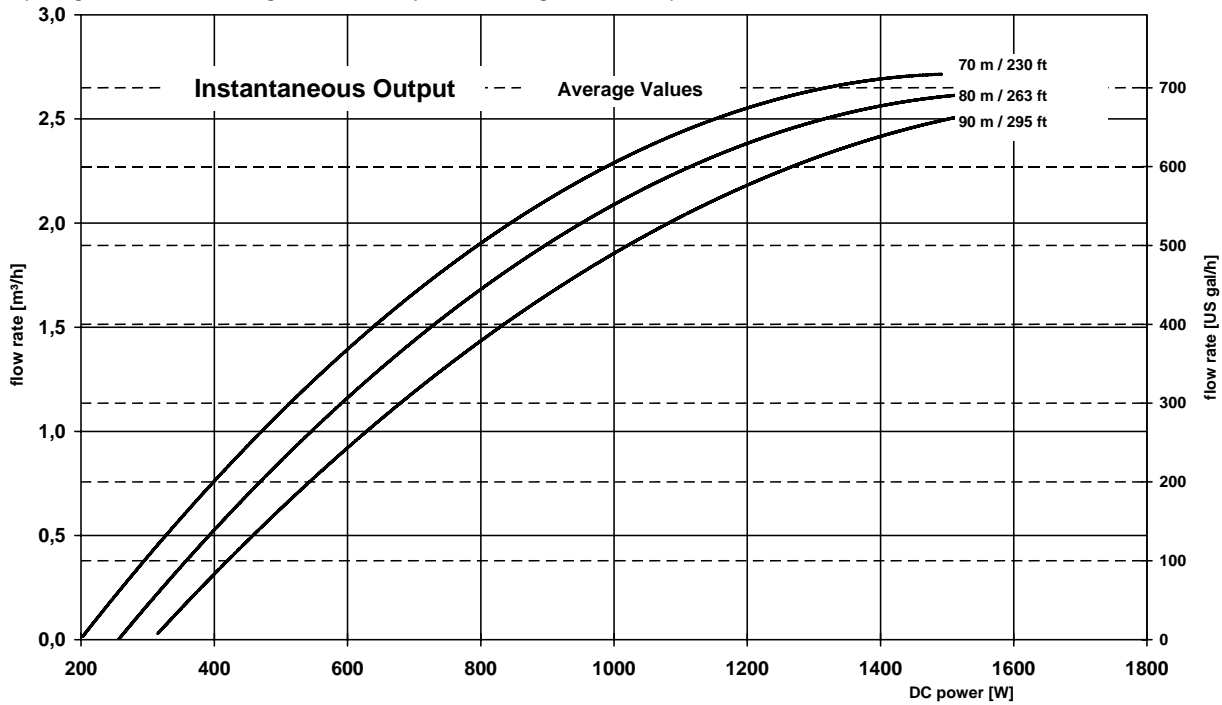
#### Pump End (PE)

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

Errors excepted and possible alterations without prior notice

## PS1800 C-SJ1-25 (Item No. 1156 ) for Solar Operation

(Solar generator: Nominal voltage 72 to 96 V DC, open circuit voltage max. 200V DC)



Pump Type	Dimensions [mm]					Minimum Internal Diameter of Borehole	Weight
	A	B	C	D	E <sub>max</sub>		
SJ 1A-25	882	186	696	96	98	1 1/4"	16 kg

### 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 W<sub>p</sub> 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 ( m<sup>3</sup>/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 m<sup>3</sup>/h for a given solar array size in W<sub>p</sub> 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 trust 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

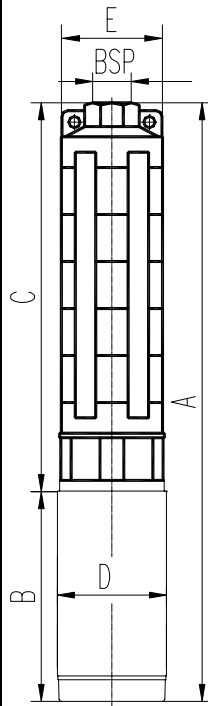
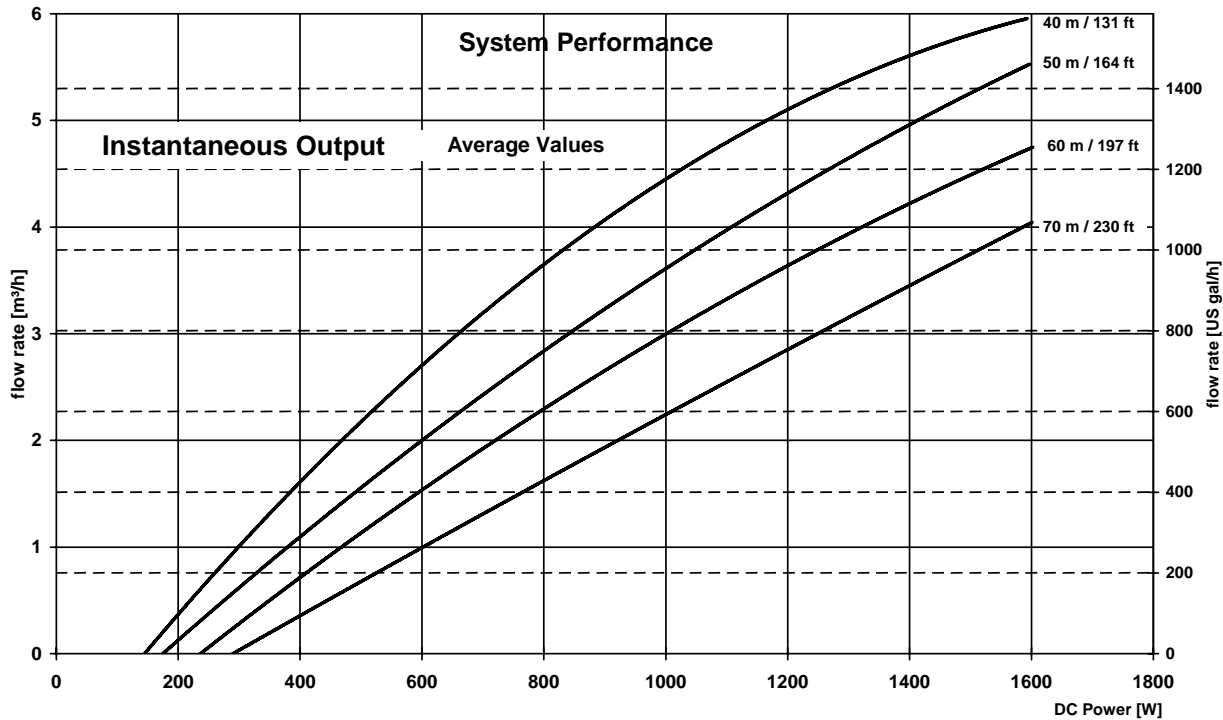
Pump Speed control from 30% to full

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 96V, max system Voltage U<sub>max</sub>= 200V. For Systems above 1200W<sub>p</sub> Solar array size min. 7 or 8 panels have to be wired in series.**

## PS1800 C-SJ5-12 (Item No. 1163) for Solar Operation

(Solar generator: Nominal voltage 72 to 96 V DC, open circuit voltage max. 200V DC)



Pump Type	Dimensions [mm]						Minimum Internal Diameter of Borehole	Weight
	A	B	C	D	E <sub>max</sub>	BSP		
SJ 5A-12	612	186	426	96	98	1 1/2"	4" (104mm)	13,5 kg

### 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 trust 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

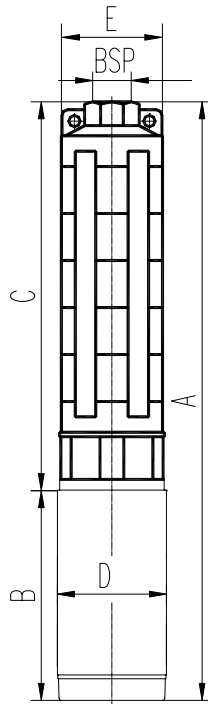
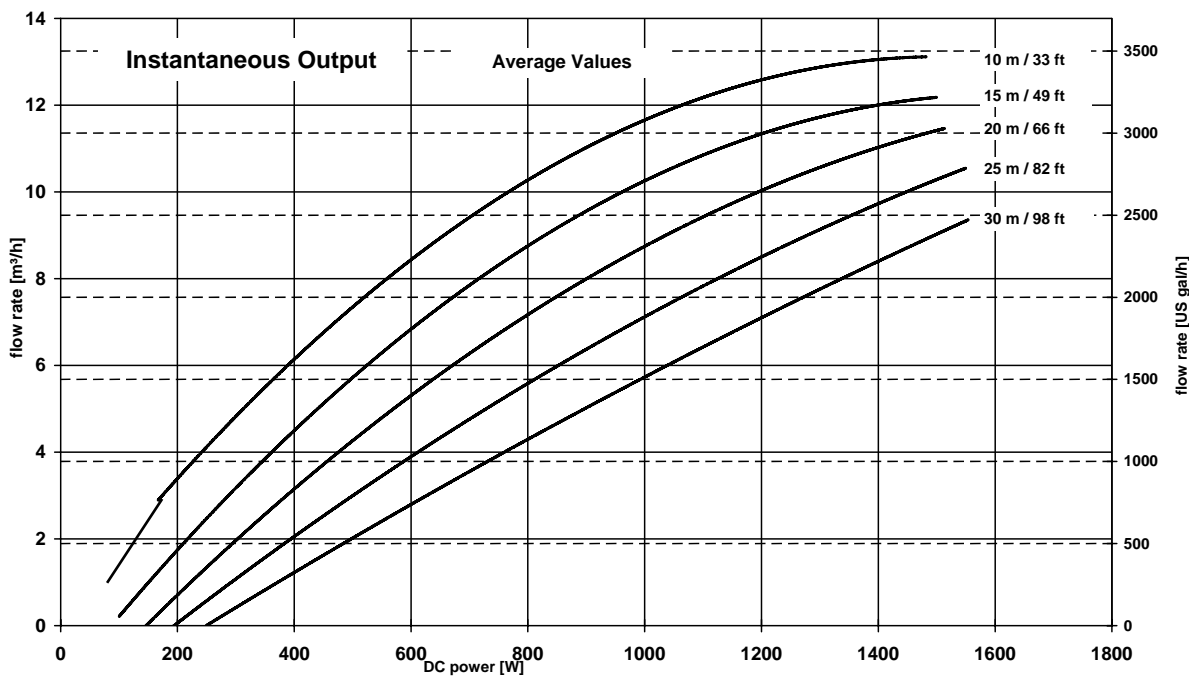
### Controller

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 96V, max system Voltage U<sub>max</sub>= 200V. For Systems above 1200Wp Solar array size min. 7 or 8 panels have to be wired in series.**

## PS1800 C-SJ8-7 (Item No. 1169) for Solar Operation

(Solar generator: Nominal voltage 72 to 96 V DC, open circuit voltage max. 200V DC)



Pump Type	Dimensions [mm]						Minimum Internal Diameter of Borehole	Weight
	A	B	C	D	E <sub>max</sub>	BSP		
SJ 8A-7	685	186	415	96	98	2"	4" (104mm)	13,5 kg

### 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  $W_p$  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 ( $m^3/day$ )

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  $m^3/h$  for a given solar array size in  $W_p$  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 trust 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

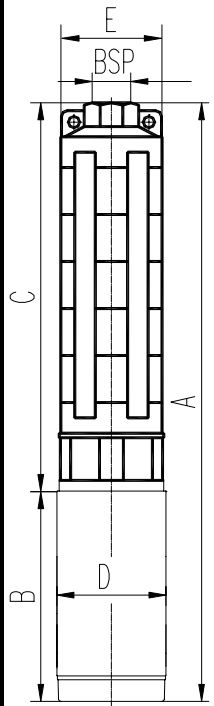
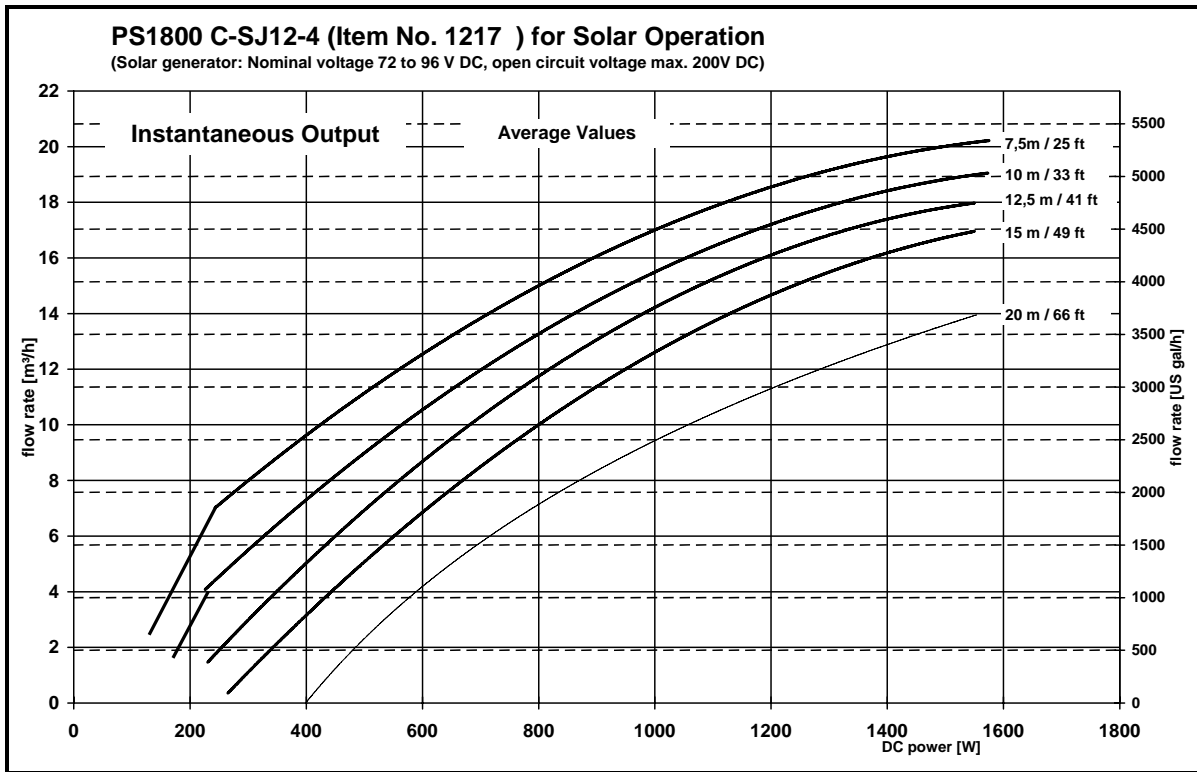
MPPT ( max. power point tracking)

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 96V, max system Voltage  $U_{max}$ = 200V. For Systems above 1200Wp Solar array size min. 7 or 8 panels have to be wired in series.**



Pump Type	Dimensions [mm]						Minimum Internal Diameter of Borehole	Weight
	A	B	C	D	E <sub>max</sub>	BSP		
SJ 12A-4	666	186	480	96	98	2"	4" (104mm)	13 kg

### 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  $W_p$  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 ( $m^3/day$ )

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  $m^3/h$  for a given solar array size in  $W_p$  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

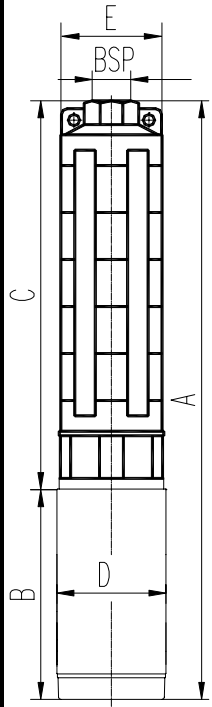
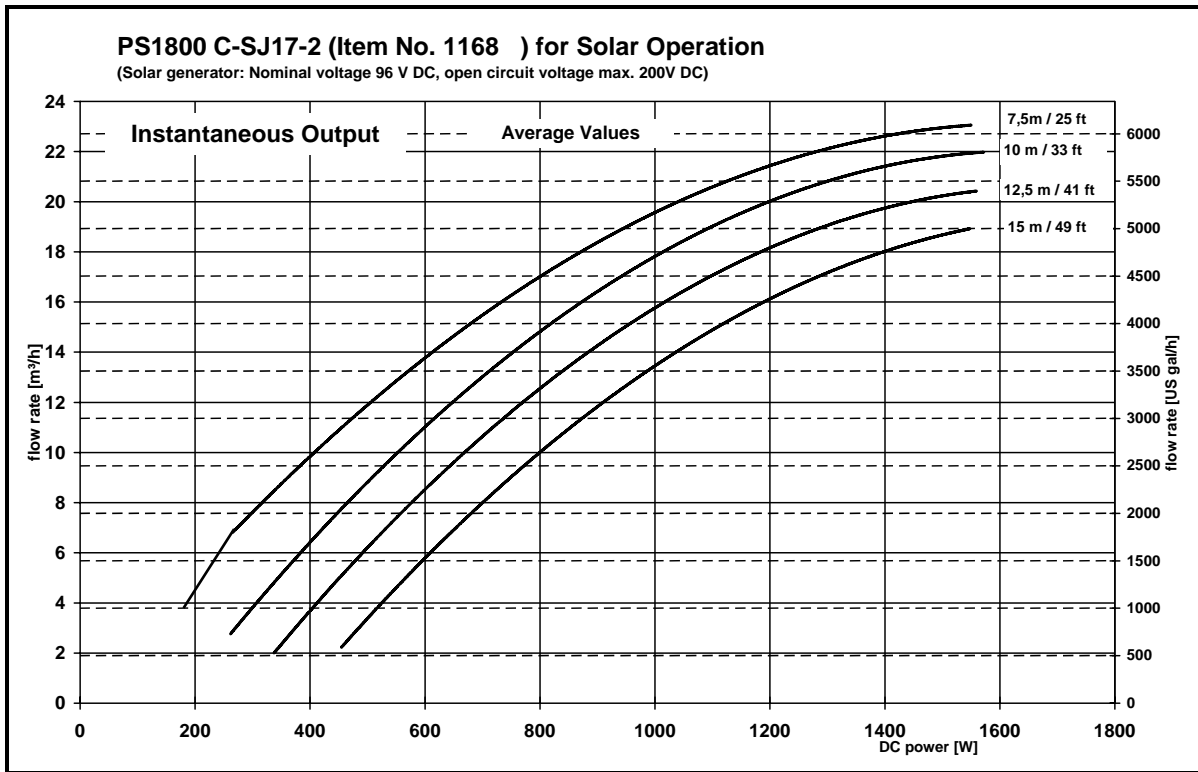
The LORENTZ submersible motor, type EC 1200-C is a 2 pole synchronous brushless DC motor. Slide ring bearing and ceramic trust bearings are water lubricated. The motor raw earth magnets are hermetically sealed in stainless steel and encapsulated in synthetic resin. The motor is pressure compensated and 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 96V, max system Voltage  $U_{max} = 200V$



Pump Type	Dimensions [mm]						Minimum Internal Diameter of Borehole	Weight
	A	B	C	D	E <sub>max</sub>	BSP		
SJ 17-5	578	186	392	128	98	3"	5" (130mm)	15,5 kg

### 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  $W_p$  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 ( $m^3/day$ )

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  $m^3/h$  for a given solar array size in  $W_p$  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 trust 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.

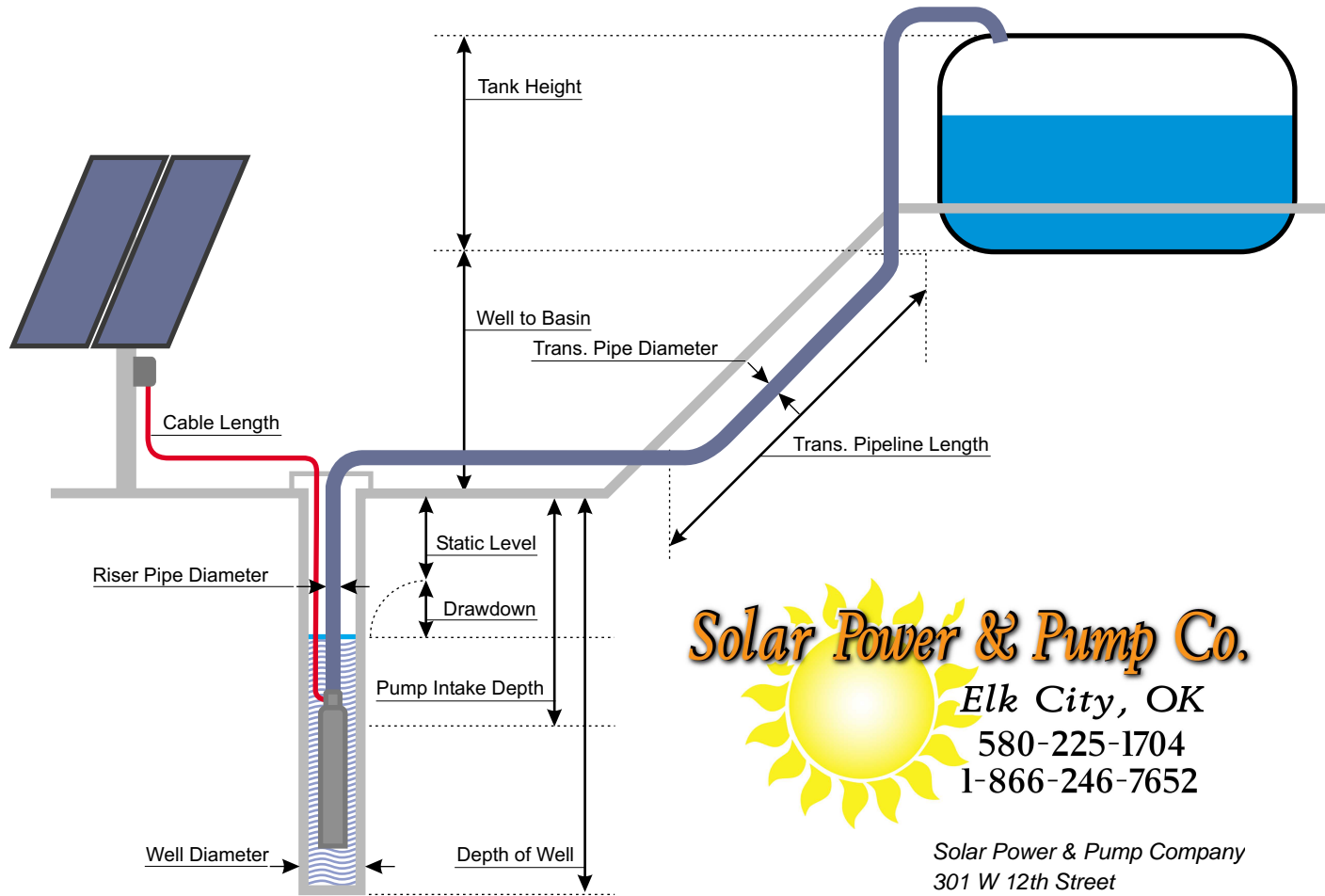
### Data:

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 96V, max system Voltage  $U_{max} = 200V$   
**Systems above 1200Wp require 8 panels wired in series for nom 96V**





**Solar Power & Pump Co.**  
Elk City, OK  
580-225-1704  
1-866-246-7652

Solar Power & Pump Company  
301 W 12th Street  
Elk City, OK 73644  
Website: [www.togosolar.com](http://www.togosolar.com)  
E-mail: [sales@togosolar.com](mailto:sales@togosolar.com)