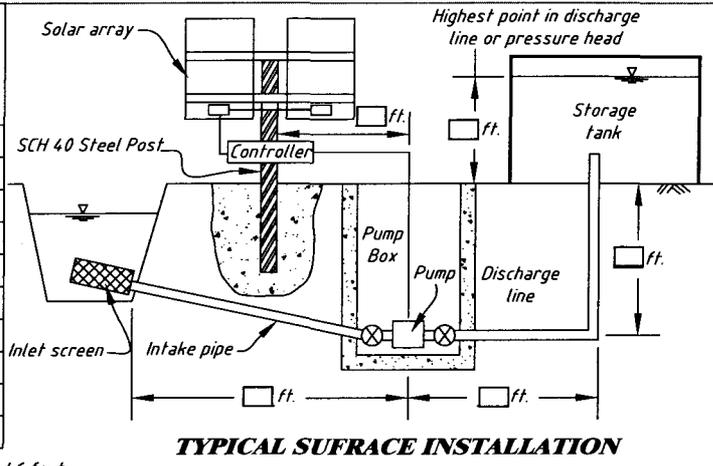


**TYPICAL WELL INSTALLATION**

Note: If the actual layout varies significantly from the details shown, provide accurate details on a new drawing.

| Solar Panel Module Area (sq. ft.) | Hole Dia. (in.) | Post Embed Depth (in.) | Concrete Volume (cu.ft.) |
|-----------------------------------|-----------------|------------------------|--------------------------|
| 10                                | 12              | 30                     | 2                        |
| 15                                | 15              | 40                     | 4                        |
| 30                                | 18              | 45                     | 7                        |
| 40                                | 18              | 54                     | 8                        |
| 50                                | 18              | 56                     | 10                       |
| 60                                | 24              | 46                     | 12                       |
| 70                                | 24              | 54                     | 14                       |
| 80                                | 24              | 60                     | 16                       |
| 90                                | 24              | 68                     | 18                       |
| 100                               | 24              | 76                     | 20                       |

Note: Pole height above ground shall not exceed 6 feet.



**TYPICAL SURFACE INSTALLATION**

- Water Quality at Source**
- Very Good: Water contains no abrasive particles, and/or TDS < 50 ppm.
  - Good: Water may contain small amounts of silt, and/or TDS < 100 ppm.
  - Fair: Water may contain small amounts of silt, sand, or rust, and/or TDS < 200 ppm.
  - Poor: Water may contain moderate amounts of silt, sand, or rust, and/or TDS = 200-800 ppm.
  - Very Poor: Water regularly contains silt, sand, or rust, and/or TDS > 800 ppm.

Comments: \_\_\_\_\_

**Water Storage Data**

Volume Required = Maximum Daily Requirement ( ) (gal/day) x ( ) days = ( ) gallons.

Volume Available (gallons):

| Open Tank        | Pres. Tank | In Line | Other | Total |
|------------------|------------|---------|-------|-------|
| _____            | _____      | _____   | _____ | _____ |
| New or Existing: | _____      | _____   | _____ | _____ |

**Water Pumping Data**

Static Water Depth: \_\_\_\_\_ ft. (Distance from ground to water surface when not pumping).

Drawdown Level: \_\_\_\_\_ ft., at \_\_\_\_\_ GPM. (Depth water drops when pumping).

Discharge Head: \_\_\_\_\_ ft. (Dist. from ground surface to highest water surface in discharge line) (Use either Discharge Level or Pressure Head, but not both)

Pressure Head: \_\_\_\_\_ ft. (Tank pressure in psi. x 2.31)

Losses: \_\_\_\_\_ ft. (Minor and friction losses in discharge line)

Total Dynamic Head: \_\_\_\_\_ ft. (Sum of values above).

**Water Source Information**

| Subsurface               |                           | Surface                     |       |       |
|--------------------------|---------------------------|-----------------------------|-------|-------|
| Well                     | Spring                    | Stream                      | Canal | Pond  |
| Depth (ft.) _____        | Yield (gpm) _____         | Flow Rate _____             | _____ | _____ |
| Max. Yield (gpm) _____   | Collection Box Data _____ | Seasonal or Perennial _____ | _____ | _____ |
| Casing I.D. (in.) _____  | Depth (ft.) _____         | Depth _____                 | _____ | _____ |
| Well Test (Y or N) _____ | Volume (gal.) _____       | _____                       | _____ | _____ |
| Date of Test _____       | Covered (Y or N) _____    | _____                       | _____ | _____ |

**Water Use Information**

| Type of Use       | Seasonal Water Requirement (Gal./Day) |       |        |        | Comments (# or type of animals, type of irrigation, etc.) |
|-------------------|---------------------------------------|-------|--------|--------|---|
|                   | Summer                                | Fall  | Winter | Spring |   |
| Livestock         | _____                                 | _____ | _____  | _____  | _____   |
| Wildlife          | _____                                 | _____ | _____  | _____  | _____   |
| Irrigation        | _____                                 | _____ | _____  | _____  | _____   |
| Domestic/Potable  | _____                                 | _____ | _____  | _____  | _____   |
| Other             | _____                                 | _____ | _____  | _____  | _____   |
| Total Requirement | _____                                 | _____ | _____  | _____  | _____   |

DATE \_\_\_\_\_

Designed \_\_\_\_\_

Drawn \_\_\_\_\_

Checked \_\_\_\_\_

Approved \_\_\_\_\_

Cooperator: \_\_\_\_\_

Solar Panel Well and Surface Installation

County Conservation District \_\_\_\_\_ County, Wyoming

USDA NRCS Natural Resources Conservation Service

File No. \_\_\_\_\_

Drawing No. 533-01

Sheet \_\_\_\_\_ of \_\_\_\_\_

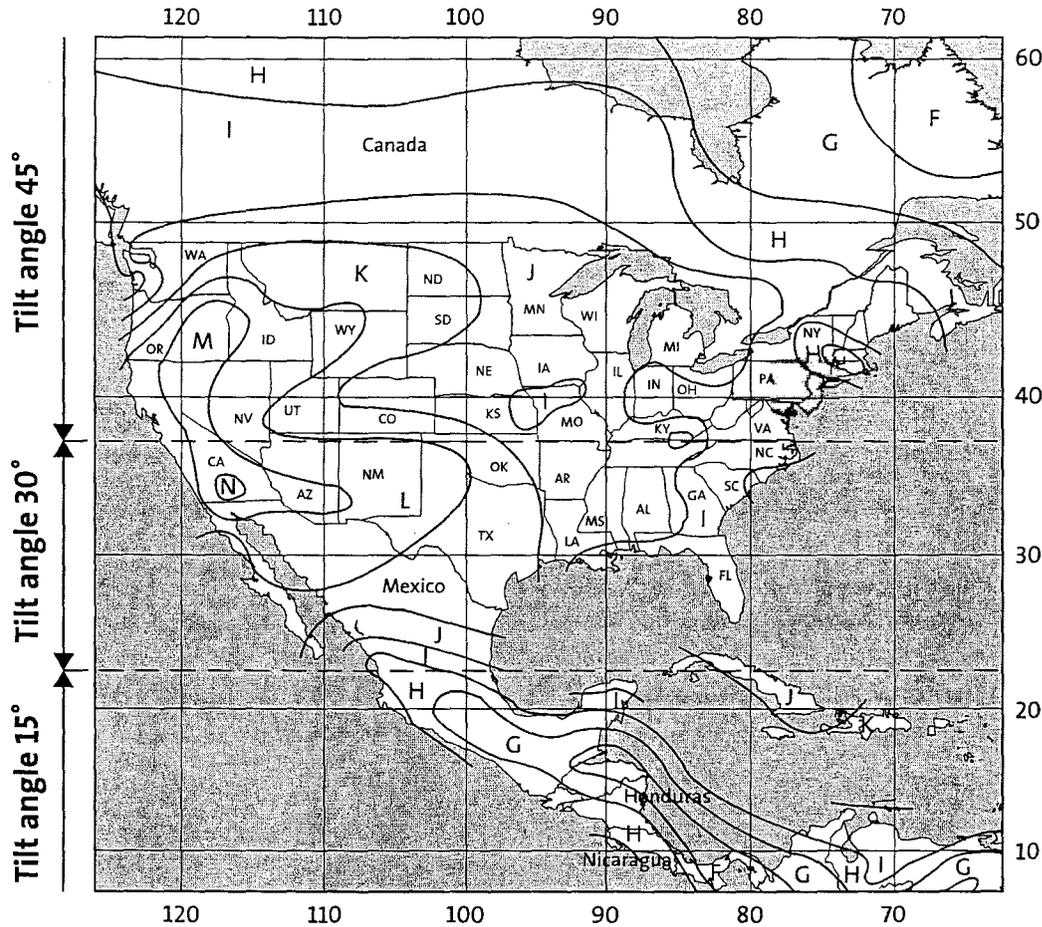
## SOLAR PUMPING TABLE OF QUANTITIES

| Item No. | Item   |
|----------|--|
| 1        | _____ Pump   |
| 2        | _____ Switch Box<br><br>OR<br>_____ Controller   |
| 3        | _____ Watt Array - ____ - ____ Volts DC<br><br>_____ Watt Panels<br>_____ Watt Panels<br>_____ Watt Panels |
| 4        | _____ Post and Rack for Mounting Panels<br><br>OR<br>_____ Trailer Mounted Panels                          |
| 5        | _____ Submersible Pump Cable   |
| 6        | _____ Safety Rope  |
|          | Other Accessories and/or Optional Items  |
| 7        | _____  |
| 8        | _____  |
| 9        | _____  |
| 10       | _____  |

**Grundfos SQ Flex and  
Lorentz PS200/600/1200  
Sizing and Data Sheets**

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## North-America (July)



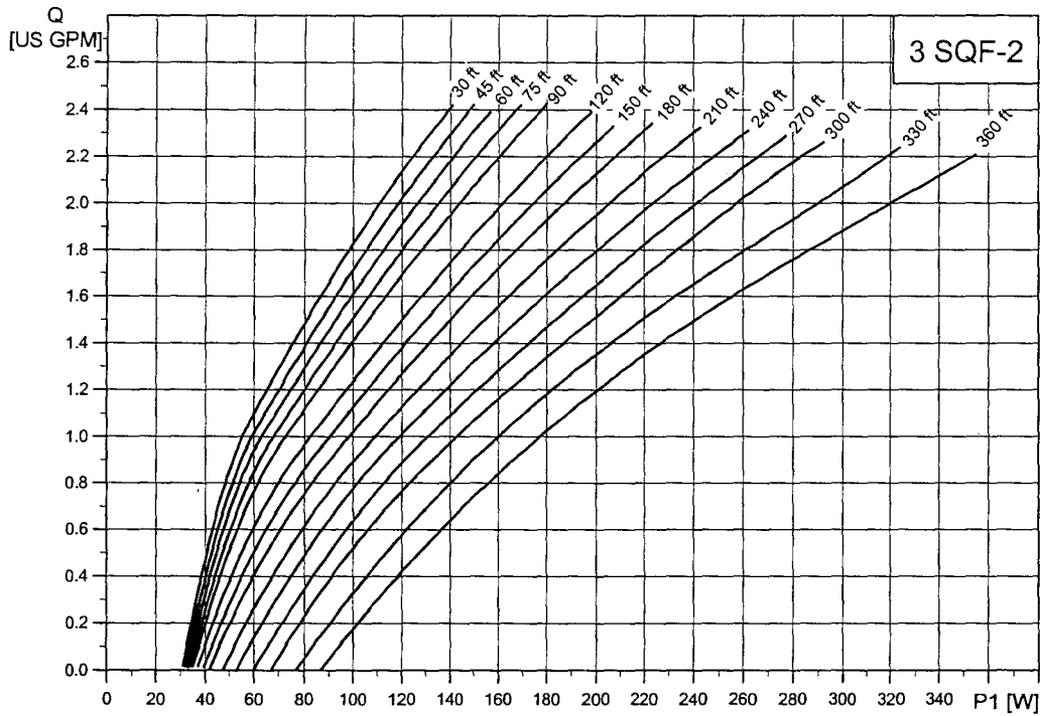
TM02 8743 0804

## Sizing table

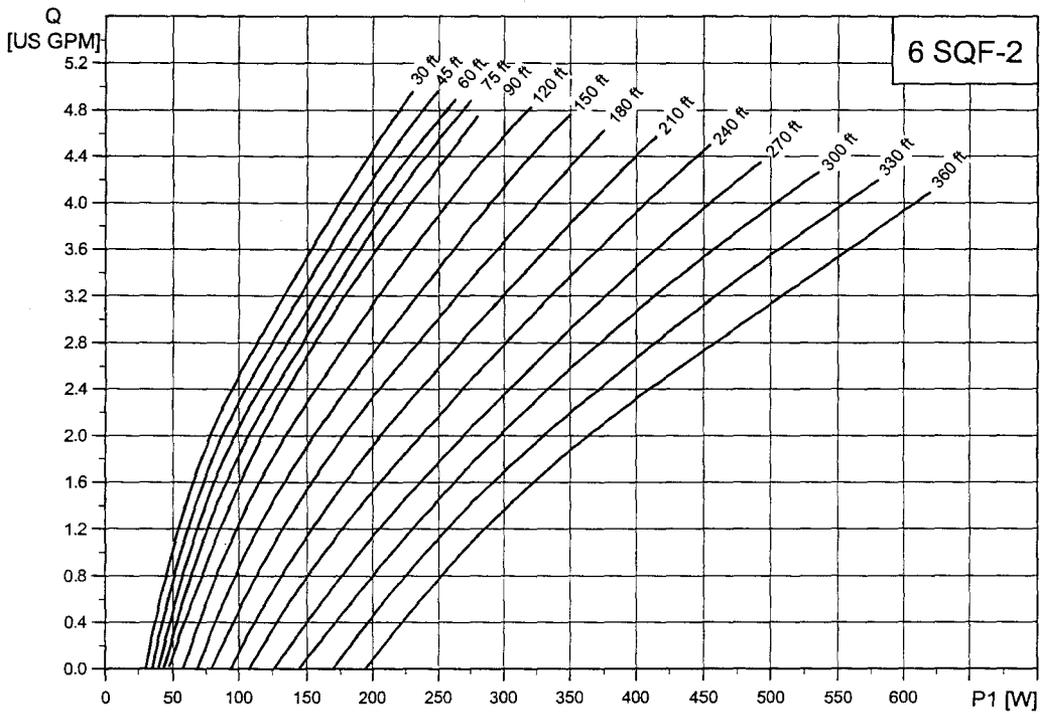
| Zone                    | Solar radiation                | Required head [ft]      |          |          |          |         |             |         |          |         |      |      |      | No. of 50 Wp modules | Power [Wp] |      |
|-------------------------|--------------------------------|-------------------------|----------|----------|----------|---------|-------------|---------|----------|---------|------|------|------|----------------------|------------|------|
|                         |                                | 20                      | 40       | 60       | 90       | 120     | 160         | 180     | 220 (A)  | 260     | 300  | 340  | 360  |                      |            | 390  |
| Zone K - tilt angle 30° | 7.3 kWh/m <sup>2</sup> per day | Required flow [gal/day] |          |          |          |         |             |         |          |         |      |      |      | 4                    | 200        |      |
|                         |                                | 5810                    | 3380     | 2770     | 1740     | 1060    | 819         | 766     | 687      | 608     | 502  | 423  | 370  |                      |            | 291  |
|                         |                                | 25 SQF-3                | 11 SQF-2 |          |          | 6 SQF-2 | 3 SQF-2     |         |          |         |      |      |      |                      |            |      |
|                         |                                | 13600                   | 6340     | 5150     | 4020     | 2990    | 2060        | 1820    | 1530 (B) | 1240    | 1080 | 1000 | 951  |                      |            | 872  |
|                         |                                | 75 SQF-3                | 25 SQF-3 | 11 SQF-2 |          |         | 6 SQF-2 (C) |         |          | 3 SQF-2 |      |      |      |                      |            |      |
|                         |                                | 20400                   | 9670     | 6970     | 5230     | 4490    | 3490        | 3060    | 2190     | 1960    | 1720 | 1510 | 1370 |                      |            | 1190 |
|                         |                                | 75 SQF-3                | 25 SQF-6 |          | 11 SQF-2 |         |             |         |          | 6 SQF-2 |      |      |      |                      |            |      |
|                         |                                | 25900                   | 14100    | 9700     | 5890     | 5150    | 4440        | 4070    | 3280     | 2460    | 2090 | 1900 | 1850 |                      |            | 1690 |
|                         |                                | 75 SQF-3                | 25 SQF-6 |          | 3 SQF-2  |         |             |         |          | 6 SQF-2 |      |      |      |                      |            |      |
| 30400                   | 18400                          | 12100                   | 7980     | 5550     | 4940     | 4620    | 3910        | 3280    | 2480     | 2170    | 2090 | 1930 |      |                      |            |      |
| 75 SQF-3                | 25 SQF-6                       |                         | 11 SQF-2 |          |          |         |             | 6 SQF-2 |          |         |      |      |      |                      |            |      |
|                         |                                |                         |          |          |          |         |             |         |          |         |      |      | 20   | 1000                 |            |      |

# Performance curves

SQFlex



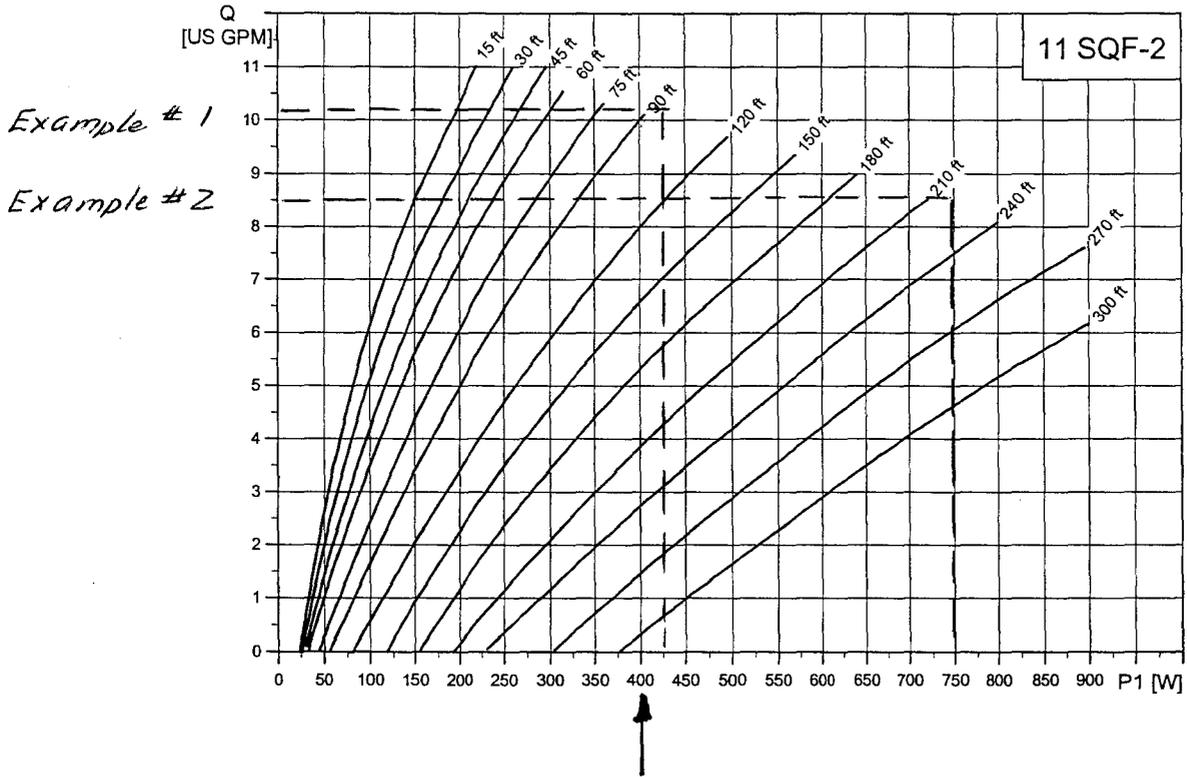
TM02 2426 4201



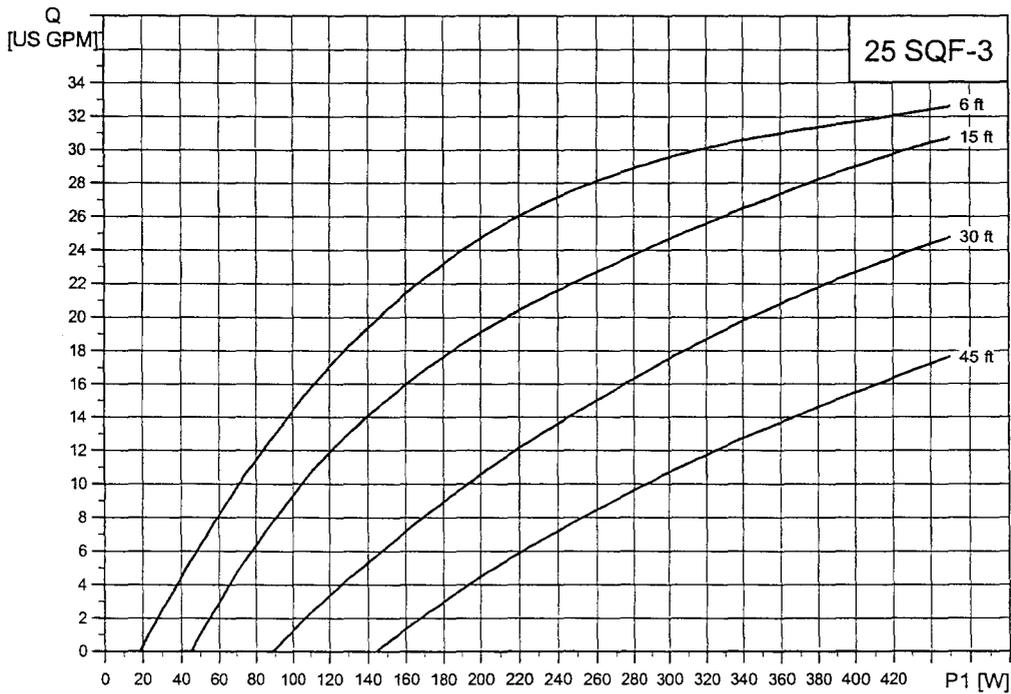
TM02 2427 4201

# Performance curves

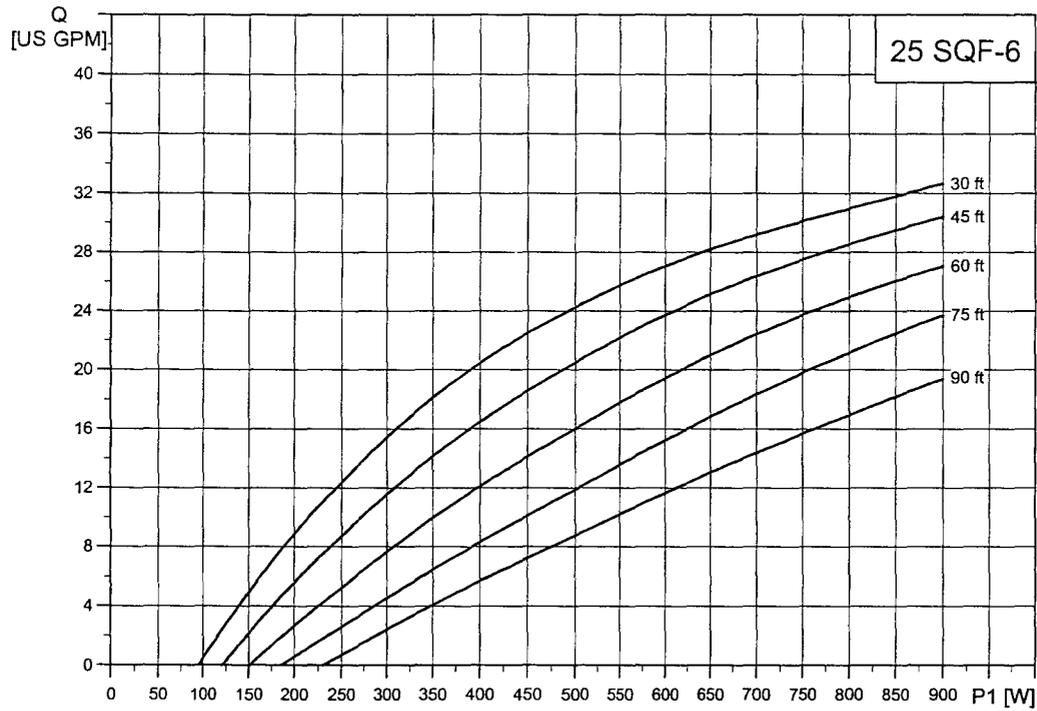
SQFlex



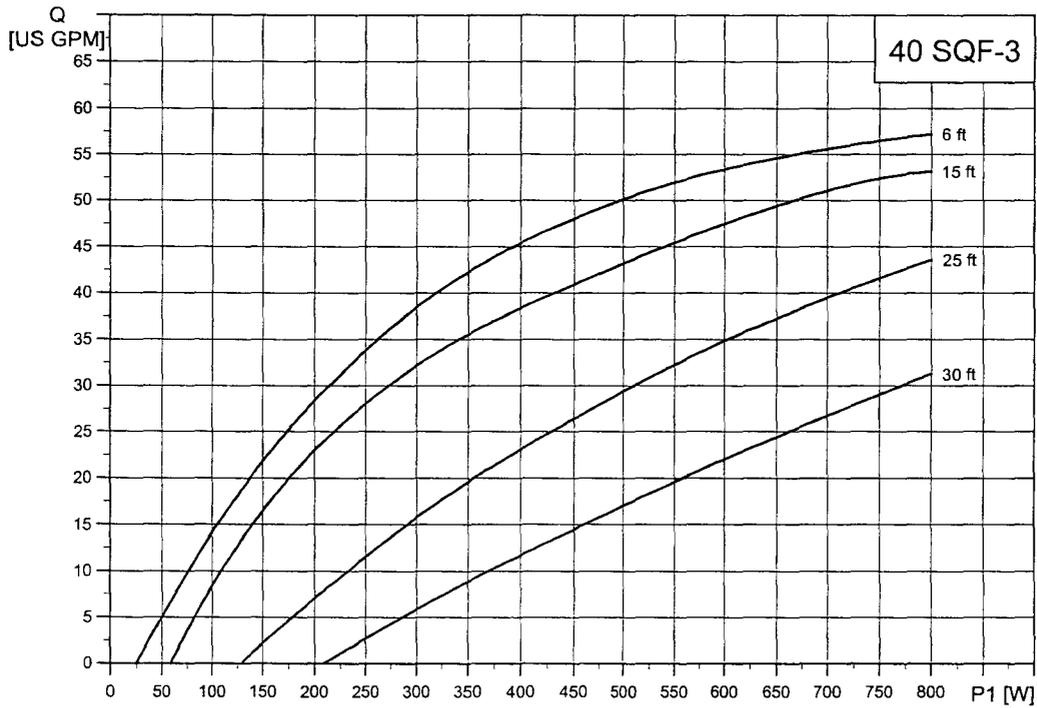
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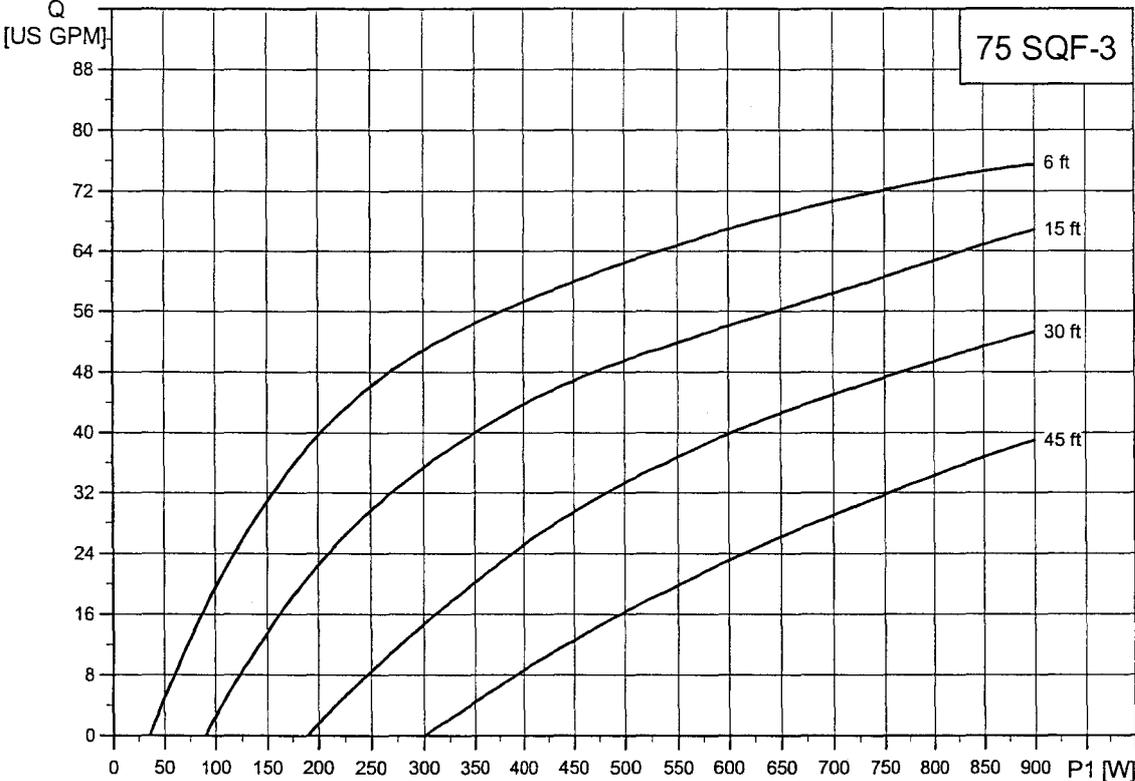
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TM02 2430 4201

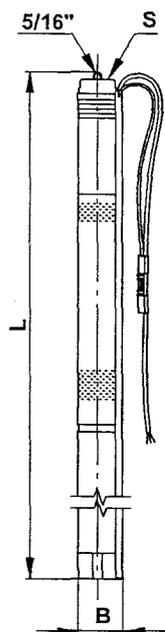


TM02 2431 4201



TM02 2432 4201

## Dimensions and weights



| Pump type | Dimensions [in] |     |         | Net weight [lb]★ | Shipping weight [lb]★ | Shipping volume [ft³]★ |
|-----------|-----------------|-----|---------|------------------|-----------------------|------------------------|
|           | L               | B   | S       |                  |                       |                        |
| 3 SQF-2   | 47              | 2.9 | 1" NPT  | 17               | 21                    | 0.75                   |
| 6 SQF-2   | 48              | 2.9 | 1" NPT  | 17.5             | 21.5                  | 0.75                   |
| 11 SQF-2  | 49              | 2.9 | 1¼" NPT | 18               | 22                    | 0.75                   |
| 25 SQF-3  | 32              | 3.9 | 1½" NPT | 18               | 21                    | 0.56                   |
| 25 SQF-6  | 35              | 3.9 | 1½" NPT | 19.5             | 23                    | 0.56                   |
| 40 SQF-3  | 36              | 3.9 | 2" NPT  | 21               | 24.5                  | 0.56                   |
| 75 SQF-3  | 39              | 3.9 | 2" NPT  | 24               | 27.5                  | 0.56                   |

★ Pump complete

## Electrical data

30 - 300 VDC or 1 x 90 - 240 VAC, 50/60 Hz

| Pump type | Motor type | Max. power input P <sub>1</sub> [W] | Max. current [A] |
|-----------|------------|-------------------------------------|------------------|
| 3 SQF-2   | MSF 3      | 900                                 | 7                |
| 6 SQF-2   | MSF 3      | 900                                 | 7                |
| 11 SQF-2  | MSF 3      | 900                                 | 7                |
| 25 SQF-3  | MSF 3      | 900                                 | 7                |
| 25 SQF-6  | MSF 3      | 900                                 | 7                |
| 40 SQF-3  | MSF 3      | 900                                 | 7                |
| 75 SQF-3  | MSF 3      | 900                                 | 7                |

## SQF pump

|                                      |  |
|--------------------------------------|--|
| <b>Supply to pump</b>                | 1 x 90 - 240 V -10%/+6%, 50/60 Hz.<br>30 - 300 VDC.  |
| <b>Run-up time</b>                   | Depending on power source.   |
| <b>Start/stop</b>                    | No limitation to the number of starts/stops per hour.  |
| <b>Enclosure class</b>               | IP 68.   |
| <b>Motor protection</b>              | Built into the pump.<br>Protection against:<br>- Dry running by means of a water level electrode.<br>- Overvoltage and undervoltage.<br>- Overload.<br>- Overtemperature.  |
| <b>Conductivity</b>                  | ≥ 70 µs/cm (micro siemens).  |
| <b>Sound pressure level</b>          | The sound pressure level is lower than the limiting values stated in the EEC Machinery Directive.  |
| <b>Radio noise</b>                   | SQF comply with EMC Directive 89/336/EEC.<br>Approved according to EN 50081-1 and 50082-2.   |
| <b>Reset function</b>                | SQF can be reset via CU 200 or by disconnecting the power from the power supply in 1 minute.   |
| <b>Power factor</b>                  | PF = 1.  |
| <b>Operation via generator</b>       | Voltage: 115 VAC, -10%/+6%.<br>The generator output must be a minimum of 1000 Watts.   |
| <b>Earth leakage circuit breaker</b> | If the pump is connected to an electrical installation where an earth-leakage circuit breaker (ELCB) is used as an additional protection, this circuit breaker must trip out when earth fault currents with DC content (pulsating DC) occur. |
| <b>Borehole diameter</b>             | 3 SQF-2, 6 SQF-2, 11 SQF-2: Minimum: 3 inch.<br>25 SQF-3, 25 SQF-6, 40 SQF-3, 75 SQF-3: Minimum: 4 inch.   |
| <b>Installation depth</b>            | Min.: The pump must be totally submerged in the pumped liquid.<br>Max.: 500 ft below the static water table (220 psi).   |
| <b>Suction strainer</b>              | Holes of the suction strainer:<br>3 SQF-2, 6 SQF-2, 11 SQF-2: 0.090 inch.<br>25 SQF-3, 25 SQF-6: 0.10 inch.<br>40 SQF-3, 75 SQF-3: 0.16 inch x 0.79 inch.  |
| <b>Pumped liquids</b>                | pH 5 to 9.<br>Sand content up to 50 ppm.   |
| <b>Marking</b>                       | CE   |

## IO 100 switch box

|                            |   |
|----------------------------|---|
| <b>Voltage</b>             | Max. 225 VDC, 7 A.<br>Max. 265 VAC, 7 A.                        |
| <b>Enclosure class</b>     | IP 55 / NEMA 3R.  |
| <b>Ambient temperature</b> | In operation: -22°F to +122°F; during storage: -22°F to +140°F. |
| <b>Marking</b>             | CE  |

## IO 101 switch box

|                            |   |
|----------------------------|---|
| <b>Voltage</b>             | 115 VAC -15%/+10%, 50/60 Hz (internal relay).<br>Max. 225 VDC, 7 A<br>Max. 265 VAC, 7 A |
| <b>Enclosure class</b>     | IP 55 / NEMA 3R.  |
| <b>Ambient temperature</b> | In operation: -22°F to +122°F; during storage: -22°F to +140°F.                         |
| <b>Marking</b>             | CE  |

## IO 102 breaker box

|                            |   |
|----------------------------|---|
| <b>Voltage</b>             | Max. 225 VDC, 7 A.<br>Max. 265 VAC, 7 A.                        |
| <b>Enclosure class</b>     | IP 55 / NEMA 3R.  |
| <b>Ambient temperature</b> | In operation: -22°C to +122°F; during storage: -22°C to +140°F. |
| <b>Marking</b>             | CE  |

## CU 200 control unit

|                              |   |
|------------------------------|---|
| <b>Voltage</b>               | 30 - 300 VDC<br>90 - 240 VAC -10%/+6%, 50/60, PE.   |
| <b>Power consumption</b>     | 5 W.  |
| <b>Current consumption</b>   | Max. 130 mA.  |
| <b>Enclosure class</b>       | IP 55 / NEMA 3R.  |
| <b>Ambient temperature</b>   | In operation: -22°C to +140°F; during storage: -22°C to +140°F.   |
| <b>Relative air humidity</b> | 95%.  |
| <b>Pump cable</b>            | Max. length between CU 200 and pump: 660 feet.<br>Max. length between CU 200 and level switch: 1640 feet.     |
| <b>Back-up fuse</b>          | Max.: 10 A.   |
| <b>Radio noise</b>           | The CU 200 complies with EMC Directive 89/336/EEC.<br>Approved according to standards EN 55 014 and 55 014-2. |
| <b>Marking</b>               | CE.   |
| <b>Weight</b>                | 4.5 lb  |

# Lorentz PS1200



CONERGY

## Characteristics

- | Lift up to 760 feet (240 m)
- | Flow rate up to 45 gpm (11.0 m<sup>3</sup>/h)
- | Simple installation
- | Maintenance-free
- | High reliability and life expectancy
- | Cost-effective pumping solution

## Application

- | Drinking water supply
- | Livestock watering
- | Pond management
- | Irrigation

## PS1200 Controller

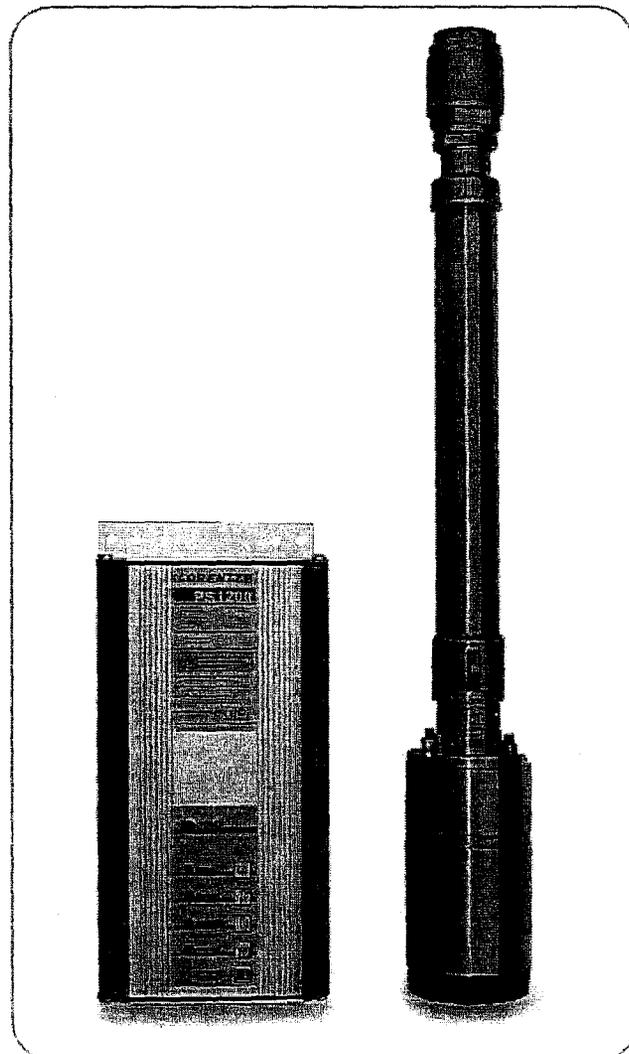
- | One controller for array direct or battery powered operation, with system status indication
- | Mounted above ground (no submerged electronic parts)
- | Two control inputs for well probe (dry run protection) and remote control (float or pressure switch)
- | Automatic reset 20 minutes after low water protection engages
- | Protected against reverse polarity, overload and high temperature
- | Speed control, maximum pump speed adjustable to reduce flow rate to approximately 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)

## Pump End (PE)

- | High life expectancy
- | Non-return check valve
- | Dry running protection (optional)
- | Material: stainless steel (AISI 316), rubber

## For HR Pumps only

- | Helical rotor pump (positive displacement pump)
- | Two main parts only: stator and rotor, field serviceable
- | Stator: geometry made of abrasion resistant rubber
- | Rotor: stainless steel, hard chrome plated, abrasion resistant
- | More resistant to damage by sand than other pump types
- | Self-cleaning



## Motor ECDRIVE 1200 HR/C

- | Brushless DC motor
- | No electronics inside motor
- | Water filled
- | IP 68, pressure balanced, max. submersion unlimited
- | Dynamic slide bearings, material: carbon/ceramic
- | Wetted material: stainless steel (AISI 316), POM, rubber, cable drinking water approved

# Lorentz PS1200

## 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 |     |     |
| <b>US Gallons x 1000 / day</b> |                    |             |             |         |             |         |             |         |              |         |              |         |              |         |              |         |              |         |     |     |
| 350 Wp                         | 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 |
|                                | hours/day          | 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 |
|                                | hours/day          | 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 |
| CM                             |                    | C-BF-04     |             | HR-14   |             |         |             |         |              | HR-04   |              |         |              |         |              |         |              |         |     |     |
| Wire size / max length         |                    | 21.0        |             | 12.3    |             | 10.6    |             | 9.5     |              | 7.9     |              | 3.5     |              | 3.3     |              | 2.9     |              | 2.6     |     |     |
|                                |                    | #12 / 200ft |             |         |             |         |             |         |              |         |              |         |              |         |              |         |              |         |     |     |
| 420 Wp                         | 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 |
|                                | hours/day          | 6.0         | 11.0        | 15.5    | 5.8         | 7.1     | 5.2         | 7.7     | 4.5          | 6.3     | 3.2          | 4.5     | 2.0          | 2.8     | 1.6          | 2.1     | 1.4          | 1.9     | 1.3 | 1.7 |
|                                | hours/day          | 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 |
| CM                             |                    | C-BF-04     |             | HR-14   |             |         |             |         |              | HR-07   |              | HR-04   |              |         |              |         |              |         |     |     |
| Wire size / max length         |                    | 23.0        |             | 11.4    |             | 11.0    |             | 10.0    |              | 9.0     |              | 5.3     |              | 3.4     |              | 3.0     |              | 2.7     |     |     |
|                                |                    | #12 / 150ft |             |         |             |         |             |         |              |         |              |         |              |         |              |         |              |         |     |     |
| 480 Wp                         | 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 |
|                                | hours/day          | 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 |
|                                | hours/day          | 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 |
| CM                             |                    | C-BF-04     |             | HR-20   |             |         |             | HR-14   |              |         |              | HR-07   |              |         |              |         |              |         |     |     |
| Wire size / max length         |                    | 25.0        |             | 15.0    |             | 14.5    |             | 11.1    |              | 9.5     |              | 7.4     |              | 5.3     |              | 5.0     |              | 4.4     |     |     |
|                                |                    | #12 / 150ft |             |         |             |         |             |         |              |         |              |         |              |         |              |         |              |         |     |     |
| 560 Wp                         | 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 |
|                                | hours/day          | 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 |
|                                | hours/day          | 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 |
| CM                             |                    | 30.0        |             | 28.0    |             | 15.0    |             | 11.4    |              | 11.0    |              | 10.5    |              | 10.0    |              | 5.3     |              | 5.2     |     |     |
| Wire size / max length         |                    | #12 / 150ft |             |         |             |         |             |         |              |         |              |         |              |         |              |         |              |         |     |     |
| 660 Wp                         | 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 |
|                                | hours/day          | 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 |
|                                | hours/day          | 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 |
| CM                             |                    | 31.0        |             | 29.0    |             | 25.0    |             | 14.3    |              | 14.0    |              | 11.4    |              | 10.2    |              | 5.4     |              | 5.3     |     |     |
| Wire size / max length         |                    | #10 / 250ft |             |         |             |         |             |         |              |         |              |         |              |         |              |         |              |         |     |     |
| 720 Wp                         | 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 |
|                                | hours/day          | 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 |
|                                | hours/day          | 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 |
| CM                             |                    | 43.0        |             | 32.0    |             | 29.5    |             | 14.5    |              | 14.2    |              | 11.4    |              | 10.3    |              | 5.4     |              | 5.3     |     |     |
| Wire size / max length         |                    | #10 / 250ft |             |         |             |         |             |         |              |         |              |         |              |         |              |         |              |         |     |     |
| 840 Wp                         | 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 |
|                                | hours/day          | 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 |
|                                | hours/day          | 4.5         | 18.8        | 25.4    | 12.4        | 17.2    | 9.5         | 13.0    | 7.9          | 10.8    | 6.8          | 8.7     | 4.8          | 6.3     | 4.0          | 5.3     | 3.0          | 4.2     | 2.6 | 3.6 |
| CM                             |                    | 45.0        |             | 42.0    |             | 30.0    |             | 27.0    |              | 14.3    |              | 13.8    |              | 10.4    |              | 10.0    |              | 5.3     |     |     |
| Wire size / max length         |                    | #10 / 250ft |             |         |             |         |             |         |              |         |              |         |              |         |              |         |              |         |     |     |
| 1000 Wp                        | 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 |
|                                | hours/day          | 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 |
|                                | hours/day          | 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 |
| CM                             |                    | 45.0        |             | 42.0    |             | 31.0    |             | 28.0    |              | 14.3    |              | 13.8    |              | 10.4    |              | 10.0    |              | 5.3     |     |     |
| Wire size / max length         |                    | #10 / 300ft |             |         |             |         |             |         |              |         |              |         |              |         |              |         |              |         |     |     |

M O R E W A T E R

BERNT LORENTZ GmbH & Co.KG  
Hamburg, Germany  
www.Lorentz.de

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LORENTZ

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>2</sup> |
|-----|-----------------|
| #18 | 1               |
| #12 | 4               |
| #10 | 6               |
| #8  | 10              |
| #6  | 16              |



CONERGY

# PS1200 SIZING TABLE for Solar Direct Systems

Ver: 05/01/13

Fixed and single axis tracked Systems

| 265 Feet<br>80m |         | 300 Feet<br>90m |         | 330 Feet<br>100m |         | 400 Feet<br>120m |         | 460 Feet<br>140m |         | 530 Feet<br>160m |         | 600 Feet<br>180m |         | 660 Feet<br>200m |         | 760 Feet<br>230m |         | VERTICAL<br>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-03H      |      | HR-03       |      | HR-03H      |      |
| 2:2         |      | 2:0         |      | 1:9         |      | 1:8         |      | 1:7         |      |
| #10 / 400ft |      | #10 / 500ft |      |

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

|                        |     |
|------------------------|-----|
| PEAK SUN               | 7.5 |
| hours/day              | 6.0 |
| hours/day              | 4.5 |
| 350 Wp                 |     |
| GPM                    |     |
| Wire size / max length |     |

|             |      |             |      |             |      |             |      |             |      |            |      |            |      |
|-------------|------|-------------|------|-------------|------|-------------|------|-------------|------|------------|------|------------|------|
| 1:24        | 1:42 | 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-03H      |      | HR-03       |      | HR-03H      |      | HR-03      |      | HR-03H     |      |
| 2:5         |      | 2:7         |      | 2:0         |      | 1:9         |      | 1:8         |      | 1:6        |      | 1:4        |      |
| #10 / 400ft |      | #10 / 500ft |      | #8 / 750ft |      | #8 / 750ft |      |

|                        |     |
|------------------------|-----|
| PEAK SUN               | 7.5 |
| hours/day              | 6.0 |
| hours/day              | 4.5 |
| 420 Wp                 |     |
| GPM                    |     |
| Wire size / max length |     |

|             |      |             |      |             |      |             |      |             |      |            |      |            |      |            |      |            |      |
|-------------|------|-------------|------|-------------|------|-------------|------|-------------|------|------------|------|------------|------|------------|------|------------|------|
| 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-03H      |      | HR-03       |      | HR-03H      |      | HR-03      |      | HR-03H     |      | HR-03      |      | HR-03H     |      |
| 3:2         |      | 3:0         |      | 2:7         |      | 2:5         |      | 1:9         |      | 1:7        |      | 1:6        |      | 1:5        |      | 1:5        |      |
| #10 / 450ft |      | #10 / 500ft |      | #8 / 750ft |      |

|                        |     |
|------------------------|-----|
| PEAK SUN               | 7.5 |
| hours/day              | 6.0 |
| hours/day              | 4.5 |
| 480 Wp                 |     |
| GPM                    |     |
| Wire size / max length |     |

|             |      |             |      |             |      |             |      |             |      |            |      |            |      |            |      |            |      |
|-------------|------|-------------|------|-------------|------|-------------|------|-------------|------|------------|------|------------|------|------------|------|------------|------|
| 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-03H      |      | HR-03       |      | HR-03H      |      | HR-03      |      | HR-03H     |      | HR-03      |      | 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 / 500ft |      | #10 / 500ft |      | #10 / 500ft |      | #8 / 750ft |      |

|                        |     |
|------------------------|-----|
| PEAK SUN               | 7.5 |
| hours/day              | 6.0 |
| hours/day              | 4.5 |
| 660 Wp                 |     |
| GPM                    |     |
| Wire size / max length |     |

|             |     |             |     |             |      |             |      |             |      |            |      |            |      |            |      |            |      |
|-------------|-----|-------------|-----|-------------|------|-------------|------|-------------|------|------------|------|------------|------|------------|------|------------|------|
| 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       | 1:5  | 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       | 0:74 |
| HR-07       |     | HR-04H      |     | HR-03H      |      | HR-03       |      | HR-03H      |      | HR-03      |      | HR-03H     |      | HR-03      |      | 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 |      | #10 / 500ft |      | #10 / 500ft |      | #8 / 750ft |      |

|                        |     |
|------------------------|-----|
| PEAK SUN               | 7.5 |
| hours/day              | 6.0 |
| hours/day              | 4.5 |
| 720 Wp                 |     |
| GPM                    |     |
| Wire size / max length |     |

|             |     |             |     |             |     |             |     |             |      |            |      |            |      |            |      |            |      |
|-------------|-----|-------------|-----|-------------|-----|-------------|-----|-------------|------|------------|------|------------|------|------------|------|------------|------|
| 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 | 1:59        | 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-03H      |     | HR-03       |     | HR-03H      |      | HR-03      |      | HR-03H     |      | HR-03      |      | HR-03H     |      |
| 5:2         |     | 5:0         |     | 4:8         |     | 4:6         |     | 3:2         |      | 1:8        |      | 1:8        |      | 1:8        |      | 1:7        |      |
| #10 / 400ft |     | #10 / 500ft |      | #8 / 750ft |      |

|                        |     |
|------------------------|-----|
| PEAK SUN               | 7.5 |
| hours/day              | 6.0 |
| hours/day              | 4.5 |
| 840 Wp                 |     |
| GPM                    |     |
| Wire size / max length |     |

|             |     |             |     |             |     |             |     |             |      |
|-------------|-----|-------------|-----|-------------|-----|-------------|-----|-------------|------|
| 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        | 1:98 |
| 2:4         | 3:2 | 2:1         | 2:9 | 1:49        | 2:5 | 1:8         | 2:4 | 1:32        | 1:80 |
| HR-07       |     | HR-04H      |     | HR-03H      |     | HR-03       |     | HR-03H      |      |
| 5:2         |     | 5:0         |     | 4:8         |     | 4:6         |     | 3:2         |      |
| #10 / 300ft |     | #10 / 400ft |     | #10 / 500ft |     | #10 / 500ft |     | #10 / 500ft |      |

(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)

|                        |     |
|------------------------|-----|
| PEAK SUN               | 7.5 |
| hours/day              | 6.0 |
| hours/day              | 4.5 |
| 1000 Wp                |     |
| GPM                    |     |
| Wire size / max length |     |

|                        |     |
|------------------------|-----|
| PEAK SUN               | 7.5 |
| hours/day              | 6.0 |
| hours/day              | 4.5 |
| 1200 Wp                |     |
| GPM                    |     |
| Wire size / max length |     |

MORE WATER

**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

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

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

# Lorentz PS1200



**CONERGY**

### Sand and Silt Tolerance

- | The pump (HR) has a higher resistance to wear from sand and clay than any other pump type. In properly constructed wells the amount of sand and clay is within the tolerance of the pump.
- | 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.

### Pump Cable and Splice

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

### Drop Pipe

- | 1/4", 1/2" or 2" NPT pump 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.

### Temperature Limits

- | Pump: Specify temperature class on order
  - Class 1      46 °F to 72 °F (8 °C to 22 °C)
  - Class 2      64 °F to 90 °F (18 °C to 32 °C)
  - Class 3      82 °F to 108 °F (28 °C to 42 °C)
- | Controller: ambient temperature -22 to +131 °F (-30 to +55 °C)

### Warranty

- | 2 years manufacturer's warranty against defects in material and workmanship

## Technical data Lorentz PS1200:

|                             | HR-03  | HR-03H  | HR-04   | HR-04H    | HR-07     | HR-14     | HR-20     | C-BF-04   | C-DF-03   |
|-----------------------------|--|---------|---------|-----------|-----------|-----------|-----------|-----------|-----------|
| <b>Lift [ft]</b>            | 265-460  | 530-760 | 133-230 | 265-460   | 133-400   | 0-200     | 0-133     | 0-65      | 0-33      |
| <b>Max. Flow Rate [gpm]</b> | 2.2  | 1.8     | 3.5     | 3.4       | 1.2       | 12.3      | 15        | 32        | 45        |
| <b>Max. Efficiency [%]</b>  | 60   | 64      | 60      | 65        | 64        | 65        | 64        | 40        | 40        |
| <b>Solar Operation</b>      | nominal voltage 72-96 V DC<br>open circuit voltage max. 200 V DC |         |         |           |           |           |           |           |           |
| <b>Solar Generator [Wp]</b> | 350-480  | 420-900 | 350-420 | 420-1,200 | 420-1,200 | 350-1,200 | 480-1,200 | 350-1,200 | 840-1,200 |
| <b>Battery Operation</b>    | nominal voltage 72-96 V DC                                       |         |         |           |           |           |           |           |           |
| <b>Pump &amp; Motor</b>     |  |         |         |           |           |           |           |           |           |
| <b>Diameter</b>             | 3.78" (96 mm)  |         |         |           |           |           |           |           |           |
| <b>Height</b>               | 20" - 32" (500-800 mm) depending on model                        |         |         |           |           |           |           |           |           |
| <b>Weight</b>               | 25 lbs (11.5 kg) or less, depending on model                     |         |         |           |           |           |           |           |           |
| <b>Controller</b>           |  |         |         |           |           |           |           |           |           |
| <b>Dimension</b>            | 17" x 7" x 6" (425 x 175 x 150 mm)                               |         |         |           |           |           |           |           |           |
| <b>3 Conduit Holes</b>      | 1/2", 3/4" and 1 1/4" KO   |         |         |           |           |           |           |           |           |
| <b>Weight</b>               | 11 lbs (4.8 kg)  |         |         |           |           |           |           |           |           |

Available from:



## Lorentz PS600

CONERGY

### Characteristics

- | Lift up to 600 feet (180 m)
- | Flow rate up to 43 gpm (11.0 m<sup>3</sup>/h)
- | Simple installation
- | Maintenance-free
- | High reliability and life expectancy
- | Cost-effective pumping solution

### Application

- | Drinking water supply
- | Livestock watering
- | Pond management
- | Irrigation

### PS600 Controller

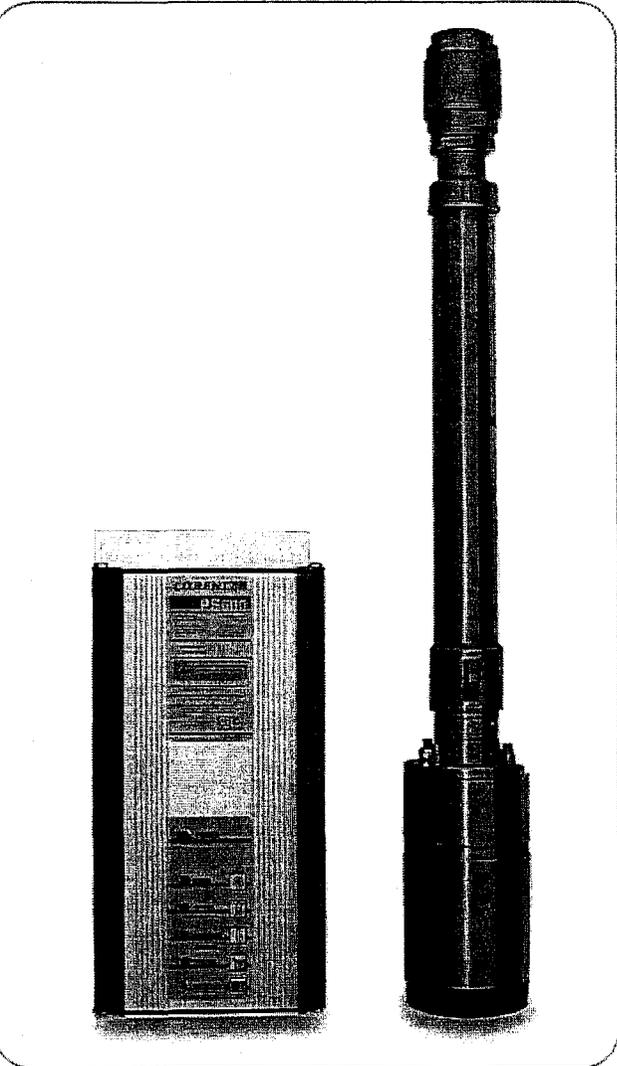
- | One controller for array direct or battery powered operation, with system status indication
- | Mounted above ground (no submerged electronic parts)
- | Two control inputs for well probe (dry run protection) and remote control (float or pressure switch)
- | Automatic reset 20 minutes after low water protection engages
- | Protected against reverse polarity, overload and high temperature
- | Speed control, maximum pump speed adjustable to reduce flow rate to approximately 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)

### Pump End (PE)

- | High life expectancy
- | Non-return check valve
- | Dry running protection (optional)
- | Material: stainless steel (AISI 316), rubber

### For HR Pumps only

- | Helical rotor pump (positive displacement pump)
- | Two main parts only: stator and rotor, field serviceable
- | Stator: geometry made of abrasion resistant rubber
- | Rotor: stainless steel, hard chrome plated, abrasion resistant
- | More resistant to damage by sand than other pump types
- | Self-cleaning



### Motor ECDRIVE 600 H/C

- | Brushless DC motor
- | No electronics inside motor
- | Water filled
- | IP 68, pressure balanced, max. submersion unlimited
- | Dynamic slide bearings, material: carbon/ceramic
- | Wetted material: stainless steel (AISI 316), POM, rubber, cable drinking water approved

# Lorentz PS600

## PS600 SIZING TABLE for Solar Direct Systems

Ver: 05/01/10

Fixed and single axis tracked Systems

| VERTICAL LIFT                  | 16 Feet<br>5m |         | 33 Feet<br>10m |         | 50 Feet<br>15m |         | 65 Feet<br>20m |         | 100 Feet<br>30m |         | 133 Feet<br>40m |         | 165 Feet<br>50m |         | 200 Feet<br>60m |         | 230 Feet<br>70m |         |
|--------------------------------|---------------|---------|----------------|---------|----------------|---------|----------------|---------|-----------------|---------|-----------------|---------|-----------------|---------|-----------------|---------|-----------------|---------|
|                                | Fixed         | Tracked | Fixed          | Tracked | Fixed          | Tracked | Fixed          | Tracked | Fixed           | Tracked | Fixed           | Tracked | Fixed           | Tracked | Fixed           | Tracked | Fixed           | Tracked |
| <b>US Gallons x 1000 / day</b> |               |         |                |         |                |         |                |         |                 |         |                 |         |                 |         |                 |         |                 |         |
| PEAK SUN                       | 9.25          | 13.21   | 5.00           | 7.13    | 5.00           | 6.87    | 3.96           | 5.71    | 1.98            | 2.51    | 1.64            | 2.30    | 1.59            | 2.09    | 1.24            | 1.80    | 1.00            | 1.40    |
| hours/day                      | 7.93          | 11.10   | 4.09           | 5.71    | 3.95           | 5.41    | 2.91           | 4.11    | 1.65            | 2.16    | 1.42            | 1.95    | 1.26            | 1.67    | 1.09            | 1.40    | 0.80            | 1.10    |
| 300 Wp                         | 6.60          | 8.98    | 3.17           | 4.28    | 2.90           | 3.94    | 1.85           | 2.50    | 1.32            | 1.80    | 1.19            | 1.59    | 0.92            | 1.24    | 0.74            | 1.00    | 0.60            | 0.80    |
| CPM                            | C-BF-04       |         | HR-14          |         |                |         | HR-04          |         |                 |         | HR-03           |         |                 |         |                 |         |                 |         |
| Wire size / max length         | #10 / 150ft   |         | #10 / 150ft    |         |                |         | #10 / 250ft    |         |                 |         | #10 / 250ft     |         |                 |         |                 |         |                 |         |
| PEAK SUN                       | 11.11         | 16.11   | 35.8           | 7.9     | 6.0            | 7.77    | 4.37           | 6.9     | 3.77            | 5.3     | 2.8             | 2.3     | 1.6             | 2.2     | 1.55            | 2.1     | 1.3             | 1.8     |
| hours/day                      | 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     |
| 350 Wp                         | 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     |
| CPM                            | C-BF-04       |         | HR-14          |         |                |         | HR-04          |         |                 |         | HR-04           |         |                 |         |                 |         |                 |         |
| Wire size / max length         | #10 / 150ft   |         | #10 / 150ft    |         |                |         | #10 / 250ft    |         |                 |         | #10 / 250ft     |         |                 |         |                 |         |                 |         |
| PEAK SUN                       | 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     |
| hours/day                      | 9.8           | 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     |
| 420 Wp                         | 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     |
| CPM                            | C-BF-04       |         | HR-14          |         |                |         | HR-07          |         | HR-04           |         |                 |         |                 |         |                 |         |                 |         |
| Wire size / max length         | #10 / 150ft   |         | #10 / 150ft    |         |                |         | #10 / 300ft    |         | #10 / 300ft     |         |                 |         |                 |         |                 |         |                 |         |
| PEAK SUN                       | 13.7          | 20.0    | 7.9            | 10.0    | 7.1            | 9.2     | 5.8            | 8.0     | 4.8             | 6.9     | 3.7             | 4.2     | 2.9             | 4.1     | 2.3             | 3.3     | 1.6             | 2.3     |
| hours/day                      | 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     |
| 480 Wp                         | 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     |
| CPM                            | C-BF-04       |         | HR-20          |         | HR-14          |         | HR-07          |         | HR-04           |         |                 |         |                 |         |                 |         |                 |         |
| Wire size / max length         | #10 / 130ft   |         | #8 / 230ft     |         | #8 / 230ft     |         | #8 / 230ft     |         | #8 / 300ft      |         |                 |         |                 |         |                 |         |                 |         |
| PEAK SUN                       | 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     |
| hours/day                      | 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     |
| 660 Wp                         | 12.7          | 17.4    | 7.4            | 10.0    | 5.8            | 7.9     | 5.0            | 6.6     | 3.7             | 5.0     | 2.6             | 3.6     | 2.3             | 2.6     | 1.9             | 2.5     | 1.6             | 2.3     |
| CPM                            | C-BF-04       |         | HR-20          |         | HR-14          |         | HR-07          |         | HR-04           |         |                 |         |                 |         |                 |         |                 |         |
| Wire size / max length         | #10 / 85ft    |         | #10 / 130ft    |         | #8 / 230ft     |         | #8 / 230ft     |         | #8 / 230ft      |         |                 |         |                 |         |                 |         |                 |         |
| PEAK SUN                       | 18.5          | 26.4    | 13.2           | 18.8    | 9.5            | 13.5    | 7.7            | 10.6    | 6.3             | 8.0     | 5.3             | 7.7     | 4.7             | 6.8     | 2.9             | 3.8     | 2.7             | 3.8     |
| hours/day                      | 16.4          | 23.3    | 11.4           | 15.6    | 7.4            | 10.6    | 6.9            | 9.5     | 5.4             | 7.0     | 4.8             | 6.6     | 3.7             | 5.0     | 2.6             | 3.7     | 2.4             | 3.4     |
| 720 Wp                         | 14.0          | 20.0    | 9.3            | 12.4    | 5.3            | 7.4     | 6.1            | 8.5     | 4.5             | 6.0     | 4.3             | 5.6     | 2.4             | 3.2     | 2.4             | 3.3     | 2.1             | 2.9     |
| CPM                            | C-BF-04       |         | HR-20          |         | HR-14          |         | HR-07          |         | HR-04           |         |                 |         |                 |         |                 |         |                 |         |
| Wire size / max length         | #10 / 85ft    |         | #10 / 130ft    |         | #8 / 230ft     |         | #8 / 230ft     |         | #8 / 230ft      |         |                 |         |                 |         |                 |         |                 |         |
| PEAK SUN                       | 20.3          | 29.3    | 14.5           | 21.1    | 10.8           | 15.8    | 8.4            | 10.6    | 7.1             | 10.0    | 5.9             | 8.0     | 5.0             | 7.1     | 2.9             | 3.8     | 2.7             | 3.9     |
| hours/day                      | 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     |
| 880 Wp                         | 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     |
| CPM                            | C-BF-04       |         | HR-20          |         | HR-14          |         | HR-07          |         | HR-04           |         |                 |         |                 |         |                 |         |                 |         |
| Wire size / max length         | #10 / 85ft    |         | #10 / 130ft    |         | #8 / 230ft     |         | #8 / 230ft     |         | #8 / 230ft      |         |                 |         |                 |         |                 |         |                 |         |

M O R E  
W A T E R

BERNT LORENTZ GmbH & Co.KG  
Hamburg, Germany  
www.Lorentz.de

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DANKOFF SOLAR &  
LORENTZ

System Voltage: 48 -72V  
nominal, e.g. 4 to 6 standard  
12V modules wired in series.  
Voc 150Vmax.  
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>2</sup> |
|-----|-----------------|
| #18 | 1               |
| #12 | 4               |
| #10 | 6               |
| #8  | 10              |
| #6  | 16              |



CONERGY

### PS600 SIZING TABLE for Solar Direct Systems

Ver: 05/01/10

Fixed and single axis tracked Systems

| 265 Feet<br>80m |         | 300 Feet<br>90m |         | 330 Feet<br>100m |         | 400 Feet<br>120m |         | 460 Feet<br>140m |         | 530 Feet<br>160m |         | 600 Feet<br>180m |         | 660 Feet<br>200m |         | 760 Feet<br>230m |         | VERTICAL<br>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

|      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|
| 0.85 | 1.25 | 0.70 | 1.10 | 0.65 | 1.00 | 0.60 | 0.90 | 0.50 | 0.72 |
| 0.68 | 0.97 | 0.55 | 0.83 | 0.48 | 0.71 | 0.43 | 0.62 | 0.34 | 0.49 |
| 0.50 | 0.68 | 0.40 | 0.55 | 0.30 | 0.41 | 0.25 | 0.34 | 0.18 | 0.25 |

HR-03

|             |     |            |     |     |
|-------------|-----|------------|-----|-----|
| 1.7         | 1.6 | 1.5        | 1.4 | 1.3 |
| #10 / 330ft |     | #8 / 450ft |     |     |

|      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|
| 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-03

|             |     |            |     |     |
|-------------|-----|------------|-----|-----|
| 2.2         | 2.0 | 1.9        | 1.8 | 1.7 |
| #10 / 330ft |     | #8 / 450ft |     |     |

|      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 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-03H

|             |     |            |     |     |            |     |
|-------------|-----|------------|-----|-----|------------|-----|
| 2.5         | 2.1 | 2.0        | 1.9 | 1.8 | 1.6        | 1.4 |
| #10 / 330ft |     | #8 / 450ft |     |     | #6 / 600ft |     |

|      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 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 |
| 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 |
| 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 |

HR-04H

HR-03

HR-03H

|            |     |            |     |     |            |     |
|------------|-----|------------|-----|-----|------------|-----|
| 3.2        | 3.0 | 2.7        | 2.5 | 1.9 | 1.7        | 1.5 |
| #6 / 420ft |     | #8 / 450ft |     |     | #6 / 600ft |     |

|      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|
| 2.11 | 3.04 | 1.72 | 2.30 | 1.45 | 2.06 | 1.35 | 1.96 | 1.19 | 1.69 |
| 1.72 | 2.44 | 1.45 | 1.96 | 1.29 | 1.76 | 1.07 | 1.53 | 0.92 | 1.31 |
| 1.32 | 1.85 | 1.19 | 1.59 | 1.14 | 1.45 | 0.79 | 1.11 | 0.66 | 0.92 |

HR-07

HR-04H

|            |     |            |     |     |
|------------|-----|------------|-----|-----|
| 5.0        | 3.4 | 3.3        | 3.2 | 3.1 |
| #8 / 265ft |     | #6 / 420ft |     |     |

|     |     |     |     |      |      |      |      |      |      |
|-----|-----|-----|-----|------|------|------|------|------|------|
| 2.5 | 3.6 | 2.3 | 3.3 | 1.59 | 2.30 | 1.51 | 2.17 | 1.40 | 1.85 |
| 2.2 | 3.0 | 2.0 | 2.8 | 1.53 | 2.11 | 1.32 | 1.80 | 1.16 | 1.59 |
| 1.9 | 2.5 | 1.6 | 2.1 | 1.45 | 1.96 | 1.06 | 1.43 | 0.92 | 1.24 |

HR-07

HR-04H

|            |     |            |     |     |
|------------|-----|------------|-----|-----|
| 5.2        | 5.0 | 3.3        | 3.3 | 3.2 |
| #8 / 300ft |     | #6 / 500ft |     |     |

|     |     |     |     |     |     |     |     |      |      |
|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| 2.6 | 3.7 | 2.5 | 3.6 | 1.8 | 2.0 | 1.7 | 2.0 | 1.59 | 1.98 |
| 2.4 | 3.2 | 2.2 | 3.1 | 1.6 | 1.8 | 1.5 | 1.7 | 1.37 | 1.85 |
| 2.1 | 2.8 | 1.9 | 2.6 | 1.4 | 1.7 | 1.3 | 1.6 | 1.16 | 1.59 |

HR-07

HR-04H

|            |     |            |     |     |
|------------|-----|------------|-----|-----|
| 5.2        | 5.0 | 3.3        | 3.3 | 3.2 |
| #8 / 300ft |     | #6 / 500ft |     |     |

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

**Attention: WIRE SIZING \$\$\$**  
Especially for Lifts greater 100m / 330ft compare wire sizes with PS1200 system. Due to higher system voltage lots of \$ can be saved on the pump wire

**More Lift ?**  
Choose PS1200 System for greater lift applications and lower cable cost

(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.

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

Daily solar radiation:  
7.5 = moderately dry summer weather

|                         |     |     |     |
|-------------------------|-----|-----|-----|
| PEAK SUN Hours/Day      | 7.5 | 6.0 | 4.5 |
| Wp                      | 300 | 300 | 300 |
| GPM                     |     |     |     |
| Wire size / max. length |     |     |     |

|                         |     |     |     |
|-------------------------|-----|-----|-----|
| PEAK SUN Hours/Day      | 7.5 | 6.0 | 4.5 |
| Wp                      | 350 | 350 | 350 |
| GPM                     |     |     |     |
| Wire size / max. length |     |     |     |

|                         |     |     |     |
|-------------------------|-----|-----|-----|
| PEAK SUN Hours/Day      | 7.5 | 6.0 | 4.5 |
| Wp                      | 420 | 420 | 420 |
| GPM                     |     |     |     |
| Wire size / max. length |     |     |     |

|                         |     |     |     |
|-------------------------|-----|-----|-----|
| PEAK SUN Hours/Day      | 7.5 | 6.0 | 4.5 |
| Wp                      | 480 | 480 | 480 |
| GPM                     |     |     |     |
| Wire size / max. length |     |     |     |

|                         |     |     |     |
|-------------------------|-----|-----|-----|
| PEAK SUN Hours/Day      | 7.5 | 6.0 | 4.5 |
| Wp                      | 660 | 660 | 660 |
| GPM                     |     |     |     |
| Wire size / max. length |     |     |     |

|                         |     |     |     |
|-------------------------|-----|-----|-----|
| PEAK SUN Hours/Day      | 7.5 | 6.0 | 4.5 |
| Wp                      | 720 | 720 | 720 |
| GPM                     |     |     |     |
| Wire size / max. length |     |     |     |

|                         |     |     |     |
|-------------------------|-----|-----|-----|
| PEAK SUN Hours/Day      | 7.5 | 6.0 | 4.5 |
| Wp                      | 840 | 840 | 840 |
| GPM                     |     |     |     |
| Wire size / max. length |     |     |     |

M O R E W A T E R

**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 5% power loss. Select PS1200 system to save \$ on cable !  
 PUMP CABLE, EXAMPLE: #10 / 250ft = 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

**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               | 2"     |
| C-DF-03               | 2"     |

# Lorentz PS600



**CONERGY**

### Sand and Silt Tolerance

- | The pump (HR) has a higher resistance to wear from sand and clay than any other pump type. In properly constructed wells the amount of sand and clay is within the tolerance of the pump.
- | 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.

### Pump Cable and Splice

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

### Drop Pipe

- | 1/4", 1/2" or 2" NPT pump 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.

### Temperature Limits

- | Pump: Specify temperature class on order
  - Class 1      46 °F to 72 °F (8 °C to 22 °C)
  - Class 2      64 °F to 90 °F (18 °C to 32 °C)
  - Class 3      82 °F to 108 °F (28 °C to 42 °C)
- | Controller: ambient temperature -22 to +131 °F (-30 to +55 °C)

### Warranty

- | 2 years manufacturer's warranty against defects in material and workmanship

## Technical data Lorentz PS600:

|                             | HR-03  | HR-03H  | HR-04   | HR-04H  | HR-07   | HR-14   | HR-20   | C-BF-04 | C-DF-03 |
|-----------------------------|--|---------|---------|---------|---------|---------|---------|---------|---------|
| <b>Lift [ft]</b>            | 230-460  | 530-600 | 100-230 | 265-460 | 133-300 | 0-165   | 100     | 50      | 16      |
| <b>Max. Flow Rate [gpm]</b> | 2.2  | 1.7     | 3.6     | 3.4     | 7.4     | 12.3    | 15      | 32      | 43      |
| <b>Max. Efficiency [%]</b>  | 60   | 64      | 60      | 65      | 64      | 65      | 64      | 40      | 40      |
| <b>Solar Operation</b>      | nominal voltage 48-72 V DC<br>open circuit voltage max. 150 V DC |         |         |         |         |         |         |         |         |
| <b>Solar Generator [Wp]</b> | 300-480  | 420-900 | 300-480 | 420-900 | 420-900 | 300-900 | 420-900 | 300-900 | 720-900 |
| <b>Battery Operation</b>    | nominal voltage 48 V DC  |         |         |         |         |         |         |         |         |
| <b>Pump &amp; Motor</b>     |  |         |         |         |         |         |         |         |         |
| <b>Diameter</b>             | 3.78" (96 mm)  |         |         |         |         |         |         |         |         |
| <b>Height</b>               | 20"-32" (500-800 mm) depending on model                          |         |         |         |         |         |         |         |         |
| <b>Weight</b>               | 25 lbs (11.5 kg) or less, depending on model                     |         |         |         |         |         |         |         |         |
| <b>Controller</b>           |  |         |         |         |         |         |         |         |         |
| <b>Dimension</b>            | 17" x 7" x 6" (425 x 175 x 150 mm)                               |         |         |         |         |         |         |         |         |
| <b>3 Conduit Holes</b>      | 1/2", 3/4" and 1 1/4" KO   |         |         |         |         |         |         |         |         |
| <b>Weight</b>               | 11 lbs (4.8 kg)  |         |         |         |         |         |         |         |         |

Available from:

# Lorentz PS200



CONERGY

## Characteristics

- | Lift up to 165 feet (50 m)
- | Flow rate up to 9.5 gpm (2.7 m<sup>3</sup>/h)
- | Simple installation
- | Maintenance-free
- | High reliability and life expectancy
- | Cost-effective pumping solution

## Application

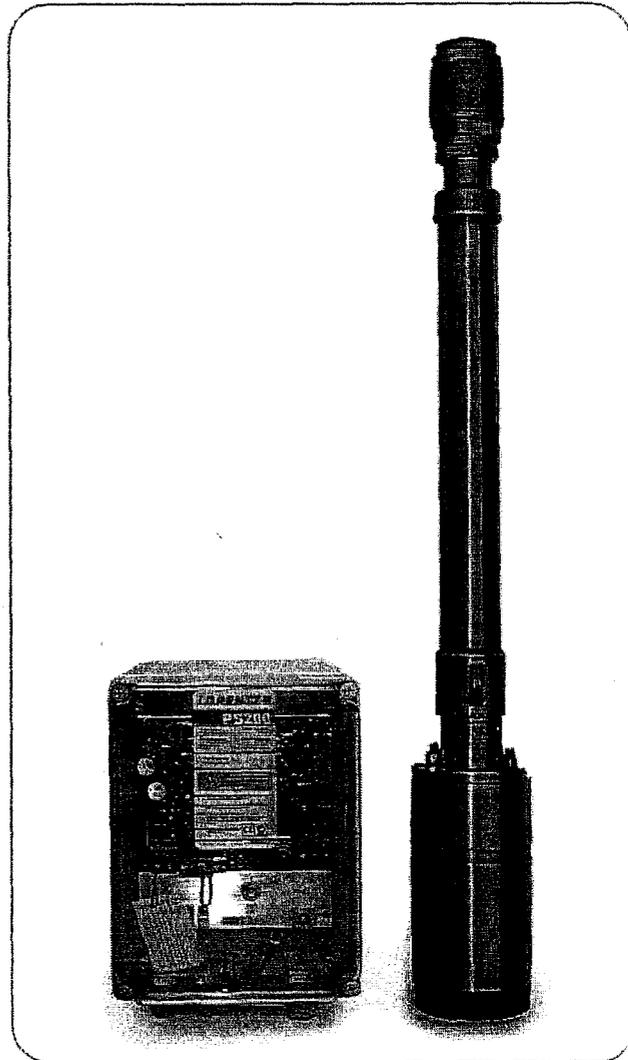
- | Drinking water supply
- | Livestock watering
- | Pond management
- | Irrigation

## PS200 Controller

- | One controller for array direct or battery powered operation, with system status indication
- | Mounted above ground (no submerged electronic parts)
- | Two control inputs for well probe (dry run protection) and remote control (float or pressure switch)
- | Automatic reset 20 minutes after low water protection engages
- | Protected against reverse polarity, overload and high temperature
- | Speed control, maximum pump speed adjustable to reduce flow rate to approximately 30 %
- | Solar operation: integrated MPPT (Maximum Power Point Tracking)
- | Battery operation: low voltage disconnect and restart after battery has recovered
- | Max. efficiency 88 % (motor + controller)
- | Enclosure: IP 54 (sealed, weatherproof)

## Pump End (PE)

- | Helical rotor pump (positive displacement pump)
- | Two main parts only: stator and rotor, field serviceable
- | Stator: geometry made of abrasion resistant rubber
- | Rotor: stainless steel, hard chrome plated, abrasion resistant
- | More resistant to damage by sand than other pump types
- | Self-cleaning



## Motor ECDRIVE 600 HR

- | Brushless DC motor
- | No electronics inside motor
- | Water filled
- | IP 68, pressure balanced, max. submersion unlimited
- | Dynamic slide bearings, material: carbon/ceramic
- | Wetted material: stainless steel (AISI 316), POM, rubber, cable drinking water approved

# Lorentz PS200

## Technical data Lorentz PS200:

### PS200 for 24 V Solar-Direct

6 kWh/m<sup>2</sup>/day solar radiation on tilted surface

| total lift |     | Pump Model | peak GPM | PV Watts / [G/day] |       |       | cable size AWG |
|------------|-----|------------|----------|--------------------|-------|-------|----------------|
| [ft]       | [m] |            |          | 80                 | 120   | 150   |                |
| 16         | 5   | HR-04      | 1.9      | 840                | 915   | 960   | 12             |
|            |     | HR-07      | 3.4      | 960                | 1,440 | 1,680 |                |
| 33         | 10  | HR-04      | 1.7      | 790                | 865   | 960   | 12             |
|            |     | HR-07      | 3.4      | 935                | 1,245 | 1,295 |                |
| 50         | 15  | HR-04      | 1.6      | 695                | 840   | 960   | 12             |
|            |     | HR-07      | 3.2      | 840                | 1,200 | 1,245 |                |
| 65         | 20  | HR-04      | 1.5      | 600                | 790   | 935   | 12             |
|            |     | HR-07      | 3.2      | 575                | 915   | 1,175 |                |
| 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 36-48 V table  |       |       | 10             |

### PS200 for 36-48V Solar-Direct

6 kWh/m<sup>2</sup>/day solar radiation on tilted surface

| total lift |     | Pump Model | peak GPM | PV Watts / [G/day] |       |       | cable size AWG |
|------------|-----|------------|----------|--------------------|-------|-------|----------------|
| [ft]       | [m] |            |          | 150                | 200   | 250   |                |
| 16         | 5   | HR-04      | 3.2      | 1,660              | 1,740 | 1,925 | 12             |
|            |     | HR-07      | 5.2      | 2,245              | 2,510 | 2,770 |                |
|            |     | HR-14      | 9.5      | 2,905              | 3,960 | 4,755 |                |
| 33         | 10  | HR-04      | 3.1      | 1,585              | 1,715 | 1,845 | 12             |
|            |     | HR-07      | 5.0      | 2,110              | 2,375 | 2,640 |                |
|            |     | HR-14      | 9.0      | 2,375              | 3,435 | 4,225 |                |
| 50         | 15  | HR-04      | 3.0      | 1,450              | 1,585 | 1,795 | 12             |
|            |     | HR-07      | 4.9      | 1,845              | 2,190 | 2,510 |                |
|            |     | HR-14      | 8.7      | 2,110              | 2,905 | 3,695 |                |
| 65         | 20  | HR-04      | 3.0      | 1,450              | 1,635 | 1,740 | 12             |
|            |     | HR-07      | 4.8      | 1,585              | 1,980 | 2,375 |                |
| 82         | 25  | HR-04      | 3.0      | 1,320              | 1,480 | 1,635 | 12             |
|            |     | HR-07      | 4.6      | 1,320              | 1,715 | 2,110 |                |
| 100        | 30  | HR-04      | 2.9      | 1,135              | 1,295 | 1,530 | 12             |
| 130        | 40  | HR-04      | 2.9      | 790                | 1,055 | 1,320 | 10             |
| 165        | 50  | HR-04      | 2.8      | 525                | 790   | 1,110 | 10             |



CONERGY

**Technical data Lorentz PS200:**

|   |     | PS200 for 24 V Solar-Direct |      |                      |     |       | PS200 for 36-48 V Solar-Direct |                      |       |       |            |
|---|-----|-----------------------------|------|----------------------|-----|-------|--------------------------------|----------------------|-------|-------|------------|
| 4 kWh/m <sup>2</sup> /day solar radiation on tilted surface |     |                             |      |                      |     |       |                                |                      |       |       |            |
| total lift  |     | Pump                        | peak | PV Watts / [G / day] |     |       | peak                           | PV Watts / [G / day] |       |       | cable size |
| [ft]  | [m] | Model                       | GPM  | 80                   | 120 | 150   | GPM                            | 150                  | 200   | 250   | AWG        |
| 16  | 5   | HR-04                       | 1.9  | 525                  | 600 | 670   | 3.2                            | 1,265                | 1,425 | 1,690 | 12         |
|   |     | HR-07                       | 3.4  | 480                  | 840 | 1,125 | 5.2                            | 1,240                | 1,845 | 2,245 |            |
| 33  | 10  | HR-04                       | 1.7  | 480                  | 550 | 620   | 3.1                            | 1,185                | 1,320 | 1,585 | 12         |
|   |     | HR-07                       | 3.4  | 405                  | 720 | 1,005 | 5.0                            | 1,110                | 1,585 | 1,980 |            |
| 50  | 15  | HR-04                       | 1.6  | 430                  | 480 | 575   | 3.0                            | 1,055                | 1,215 | 1,505 | 12         |
|   |     | HR-07                       | 3.2  | 360                  | 670 | 935   | 4.9                            | 1,030                | 1,585 | 1,955 |            |
| 65  | 20  | HR-04                       | 1.5  | 335                  | 380 | 525   | 3.0                            | 925                  | 1,110 | 1,425 | 12         |
|   |     | HR-07                       | 3.2  | 260                  | 600 | 885   | 4.8                            | 870                  | 1,450 | 1,845 |            |
| 82  | 25  | HR-04                       | 1.5  | 260                  | 360 | 500   | 3.0                            | 685                  | 950   | 1,345 | 12         |
|   |     | HR-07                       |      |                      |     |       | 4.6                            |                      | 660   | 1,055 |            |
| 100   | 30  | HR-04                       | 1.5  | 190                  | 285 | 480   | 2.9                            | 525                  | 790   | 1,265 | 12         |
| 130   | 40  | HR-04                       | 1.3  |                      | 240 | 430   | 2.9                            | 445                  | 630   | 925   | 10         |
| 165   | 50  | HR-04                       | 1.3  | see 36-48V table     |     |       | 2.8                            | 340                  | 525   | 790   | 10         |

**PS200 for 24 V Battery**

| total lift |     | Pump  | GPM | Watts | Wire size |
|------------|-----|-------|-----|-------|-----------|
| [ft]       | [m] | Model |     |       | AWG       |
| 16         | 5   | HR-04 | 1.5 | 24    |           |
|            |     | HR-07 | 2.0 | 37    | #12       |
|            |     | HR-14 | 4.6 | 40    |           |
| 33         | 10  | HR-04 | 1.4 | 29    |           |
|            |     | HR-07 | 2.0 | 42    | #12       |
|            |     | HR-14 | 4.4 | 55    |           |
| 50         | 15  | HR-04 | 1.3 | 34    |           |
|            |     | HR-07 | 1.8 | 50    | #12       |
|            |     | HR-14 | 4.0 | 74    |           |
| 65         | 20  | HR-04 | 1.2 | 38    |           |
|            |     | HR-07 | 1.7 | 60    | #12       |
|            |     | 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 48 V Battery**

| total lift |     | Pump  | GPM  | Watts | Wire size |
|------------|-----|-------|------|-------|-----------|
| [ft]       | [m] | Model |      |       | AWG       |
| 16         | 5   | HR-04 | 2.9  | 55    |           |
|            |     | HR-07 | 4.5  | 90    | #12       |
|            |     | HR-14 | 10.1 | 130   |           |
| 33         | 10  | HR-04 | 2.7  | 70    |           |
|            |     | HR-07 | 4.4  | 100   | #12       |
|            |     | HR-14 | 9.5  | 165   |           |
| 50         | 15  | HR-04 | 2.7  | 80    |           |
|            |     | HR-07 | 4.2  | 115   | #12       |
|            |     | 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       |

# Lorentz PS200



### Sand and Silt Tolerance

- | The pump (HR) has a higher resistance to wear from sand and clay than any other pump type. In properly constructed wells the amount of sand and clay is within the tolerance of the pump.
- | 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.

### Pump Cable and Splice

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

### Drop Pipe

- | 1/4", 1/2" or 2" NPT pump 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.

### Temperature Limits

- | Pump end, motor: water temperature up to +104 °F (+40 °C)
- | Specify temperature range on order
- | Controller: ambient temperature -22 to +131 °F (-30 to +55 °C)

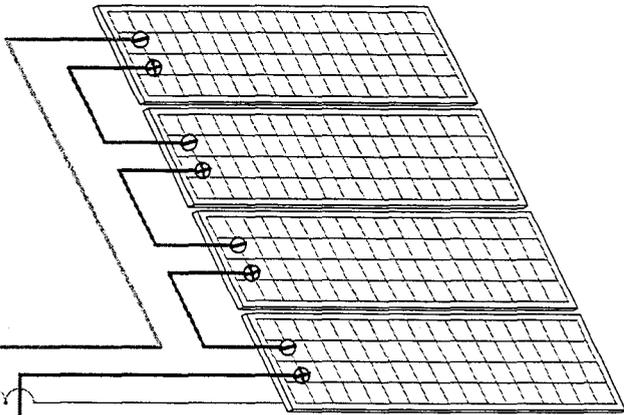
### Warranty

- | 2 years manufacturer's warranty against defects in material and workmanship

## Technical data Lorentz PS200:

|   | HR-04  | HR-07  | HR-14  |
|---|--|--------|--------|
| <b>Lift [m]</b>                         | 0-50   | 0-30   | 0-20   |
| <b>Max. Flow Rate [m<sup>3</sup>/h]</b> | 0.8  | 1.2    | 2.7    |
| <b>Max. Efficiency [%]</b>              | 60   | 61     | 62     |
| <b>Solar Operation</b>                  | nominal voltage 24-48 V DC<br>open circuit voltage max. 100 V DC |        |        |
| <b>Solar Generator [Wp]</b>             | 80-300   | 80-300 | 80-300 |
| <b>Battery Operation</b>                | nominal voltage 24-48 V DC                                       |        |        |
| <b>Pump &amp; Motor</b>                 |  |        |        |
| <b>Diameter</b>                         | 3.78" (96 mm)  |        |        |
| <b>Height</b>                           | 20"-32" (500-800 mm) depending on model                          |        |        |
| <b>Weight</b>                           | 25 lbs (11.5 kg) or less, depending on model                     |        |        |
| <b>Controller</b>                       |  |        |        |
| <b>Dimension</b>                        | 9 3/4" x 7 3/8" x 4" (248 x 188 x 100 mm)                        |        |        |
| <b>3 Conduit Holes</b>                  | Cord grip fittings included                                      |        |        |
| <b>Weight</b>                           | 2.2 lbs (1.2 kg)   |        |        |

Available from:



PV Modules (Solar Panels)

Before connecting the array to your controller, measure the open-circuit voltage and confirm it matches the range for your system!

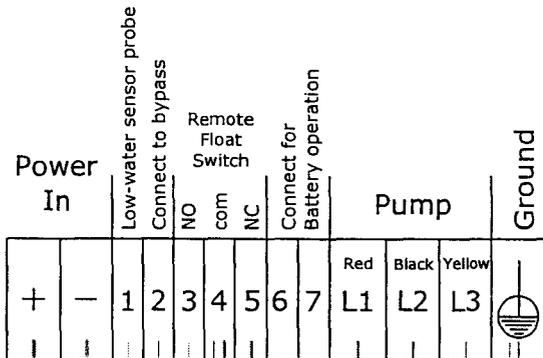
PS200 for 24-48v systems: 2-4 12v modules in series  
38-84 VDC expected open circuit voltage  
100 VDC maximum open circuit voltage

PS600, for 48-72v systems: 4-6 12v modules in series  
76-126 VDC expected open circuit voltage  
150 VDC maximum open circuit voltage

PS1200 for 72-96v systems: 6-8 12v modules in series  
114-168 VDC expected open circuit voltage  
200 VDC maximum open circuit voltage

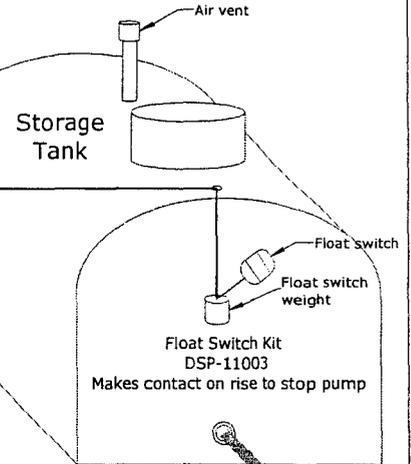
### PS Controller

L1/L2/L3 must match the numbers on pump leads.  
*Other combinations may cause reverse rotation!!*  
For wire size, refer to ETAPUMP Sizing Table.



If not using Low Water Probe, Jumper Terminals 1 and 2

Float Switch Cable  
For best results, use Shielded, Twisted Pair



Pitless adapter

Well casing

Drop pipe

Low Water Probe LOR-03002

Submersible Splice Kit DSP-02501

Grounding Electrode System

Lorentz pump



Sample Installation Diagram  
Lorentz PS Submersible Pump  
for PS200, PS600 and PS1200

**Conergy, Inc.**

1730 Camino Carlos Rey, Santa Fe, NM 87507  
www.conergy.us



## Products

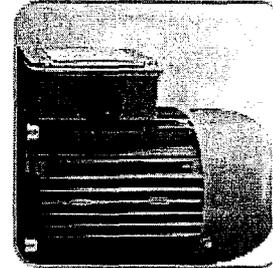
- | **Solar Water Pumps**
  - : Surface Pumps
  - Submersible Pumps
  - : Questionnaire
- | **Photovoltaics**
- | **Balance of Systems**
- | **Solar Thermal**

SEARCH

## Surface Pumps

The most economical DC water pumps are surface (non-submersible) pumps. They can reduce pumping energy consumption by half or more, compared to conventional AC pumps.

Surface pumps can pull the water up to 20 feet (suction capacity) and lift or push up to 900 feet. Our Conergy pumps have a wide range of application and can provide as little as 0.5 gallons per minute and up to 70 gallons per minute. Surface pumps must be protected from weather and freezing.



### Solaram surface pump

The Conergy Solaram Surface Pump draws water from a shallow well, spring, pond, river or tank. It can push water uphill and over long distances for home, village, irrigation or livestock uses. It can use power directly from a photovoltaic array to fill a storage tank.

[» Details](#)



### Flowlight Booster Pump

The Flowlight Booster Pump provides city water pressure, anywhere. It has been a standard in home renewable energy systems since 1986. It is economical for domestic water supply, drip irrigation, and water purification.

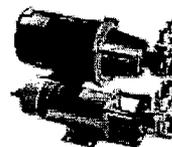
[» Details](#)



### Solar Slowpump

Solar Slowpump was the world's first commercially available low power solar pump. It was developed by Windy Dankoff in 1983, in response to those who said "that's impossible".

[» Details](#)



### SunCentric

The SunCentric™ uses solar-electric power to pump as much as 50,000 gallons (200 cu. m.) per day from shallow water sources. Applications include irrigation, livestock, domestic water, pond management, water treatment, solar water heating, hydronic space heating, fire protection, and more.

[» Details](#)



## Download

Data Sheet DC Hot Water Circulating Pumps  
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