

Thursday, July 11, 2024

Lifeline-Gedo

## Gawiido

### Solar pumping project

#### Parameter

|                        |                                     |                    |       |              |         |
|------------------------|-------------------------------------|--------------------|-------|--------------|---------|
| Location:              | Somalia, Dolow (4° North; 42° East) | Water temperature: | 25 °C |              |         |
| Required daily output: | 80 m³; Sizing for average month     | Dirt loss:         | 5.0 % | Motor cable: | 50 m    |
| Pipe type:             | custom 1: 0.100 mm                  | Static head:       | 50 m  | Pipe length: | 2,000 m |

#### Products

#### Quantity Details

|                   |  |
|-------------------|--|
| PS2-4000 C-SJ8-15 | 1 pc. Submersible pump system including a controller with Data Module, motor, and pump end |
| LC450-P36         | 12 pc. 5,400 Wp; 4x 3 modules; 15 ° tilted   |
| Motor cable       | 50 m 4 mm² 3-phase cable for power and 1-phase cable for ground                            |
| Pipeline          | 2,000 m 80 mm (inner diameter) Pipeline  |
| Accessories       | 1 set Well Probe V2, PV Disconnect 440-40-3, Surge Protector2                              |

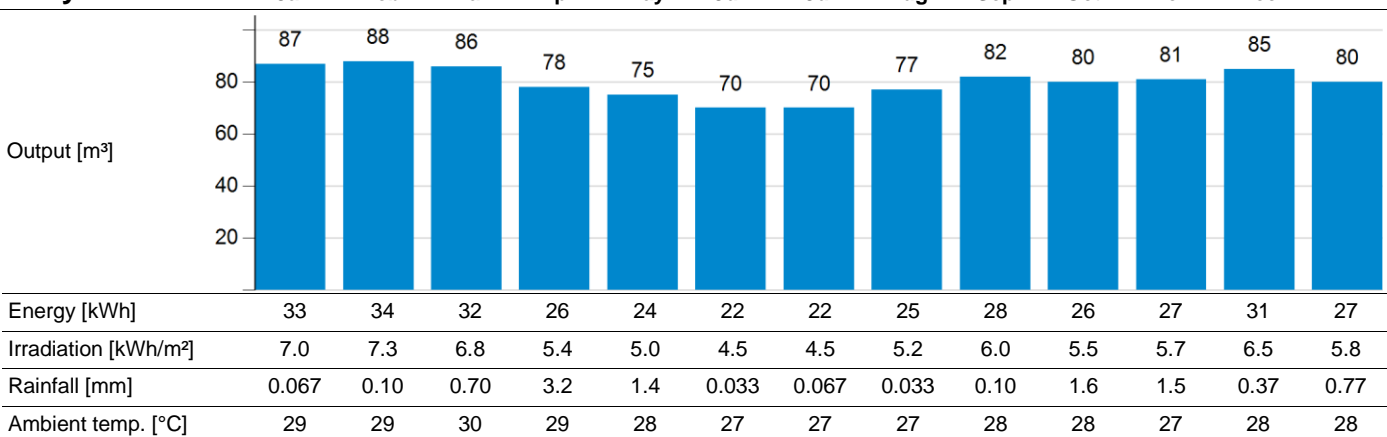
#### Sun Sensor setting in Pump Scanner

min. 100 W/m²

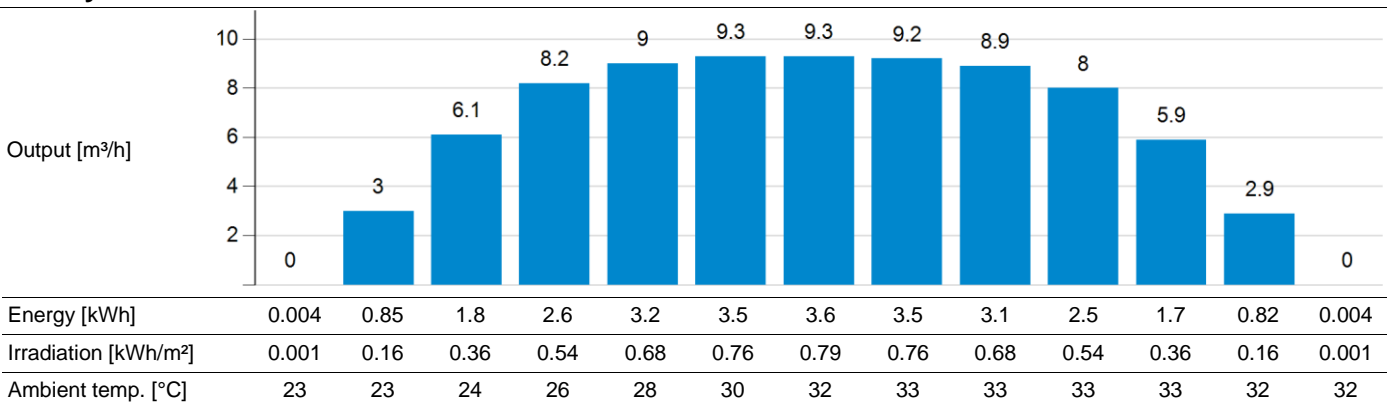
#### Daily output in average month

80 m³

#### Daily values



#### Hourly values



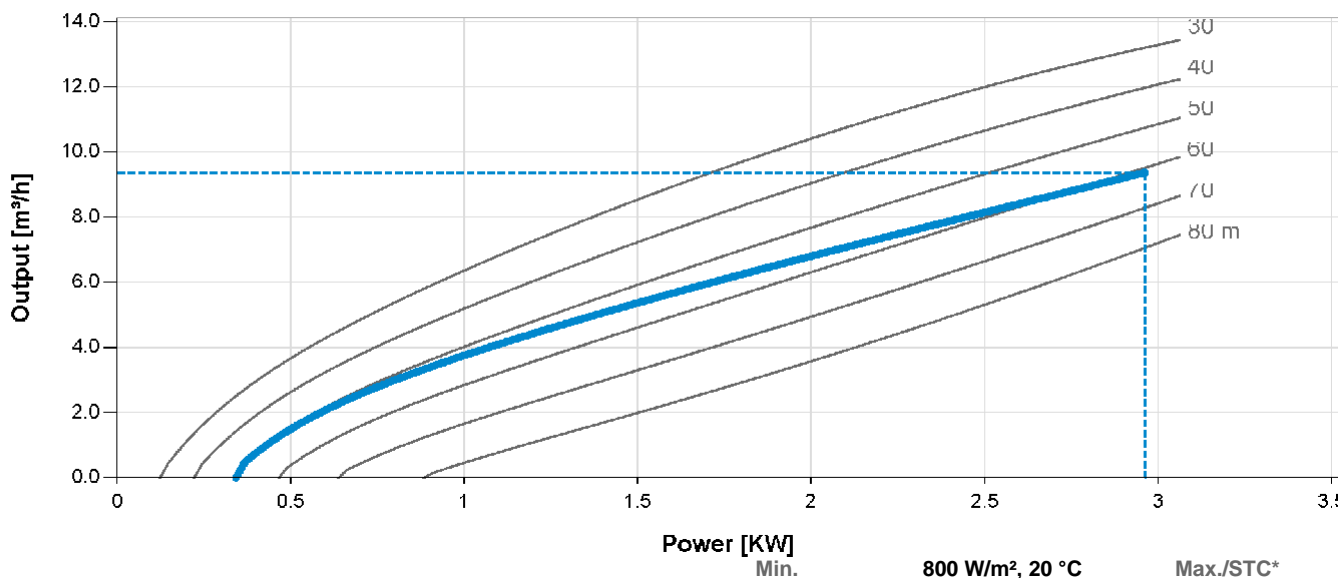
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## System characteristic



|                     |                  |        | Min.  | 800 W/m², 20 °C | Max./STC* |
|---------------------|------------------|--------|-------|-----------------|-----------|
| <b>PV generator</b> | Cell temperature | [°C]   |       | 46              | 25        |
|                     | Temperature loss | [%]    |       | 8.8             | -         |
|                     | Dirt loss        | [%]    |       | 5.0             | -         |
|                     | Pmax             | [Wp]   |       | 3,865           | 5,580     |
|                     | Vmp              | [V]    |       | 211             | 232       |
|                     | Imp              | [A]    |       | 18              | 24        |
|                     | Voc              | [V]    |       | 258             | 283       |
|                     | Isc              | [A]    |       | 20              | 26        |
|                     | Pout             | [W]    |       | 3,075           | -         |
|                     | Vout             | [V]    |       | 237             | -         |
|                     | Iout             | [A]    |       | 13              | -         |
| <b>Motor cable</b>  | Power loss       | [%]    | 0.92  | 2.9             | 2.9       |
| <b>Pump systems</b> | Motor power      | [W]    | 342   | 2,965           | 2,965     |
|                     | Motor voltage    | [V EC] | 128   | 213             | 213       |
|                     | Motor current    | [A]    | 2.7   | 14              | 14        |
|                     | Motor speed      | [rpm]  | 2,215 | 3,015           | 3,015     |
|                     | Flow rate        | [m³/h] | 0     | 9.4             | 9.4       |
|                     | Efficiency       | [%]    | 0     | 51              | 53        |
| <b>Pipeline</b>     | Flow speed       | [m/s]  | 0     | 0.52            | 0.52      |
|                     | Friction loss    | [m]    | 0.021 | 11              | 11        |

\*STC: Standard test conditions for photovoltaic modules, 1000 W/m² solar irradiance, 25 °C cell temperature

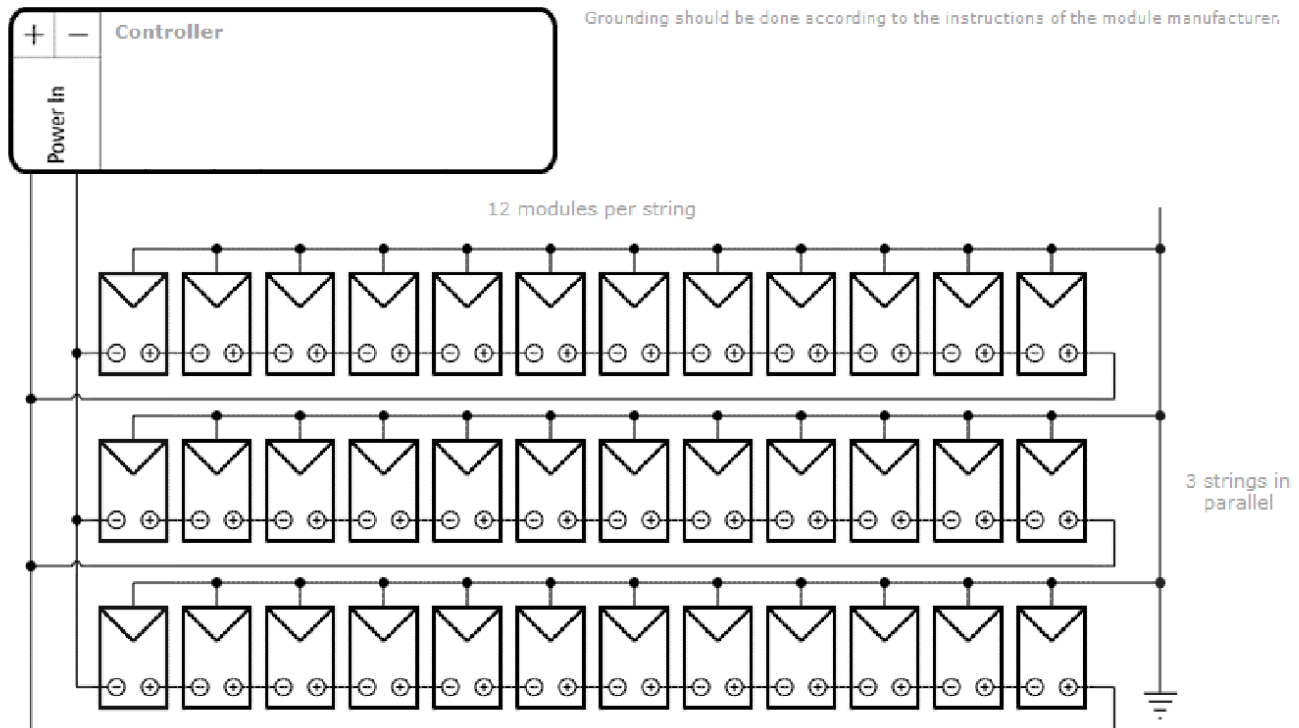
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## Wiring diagram



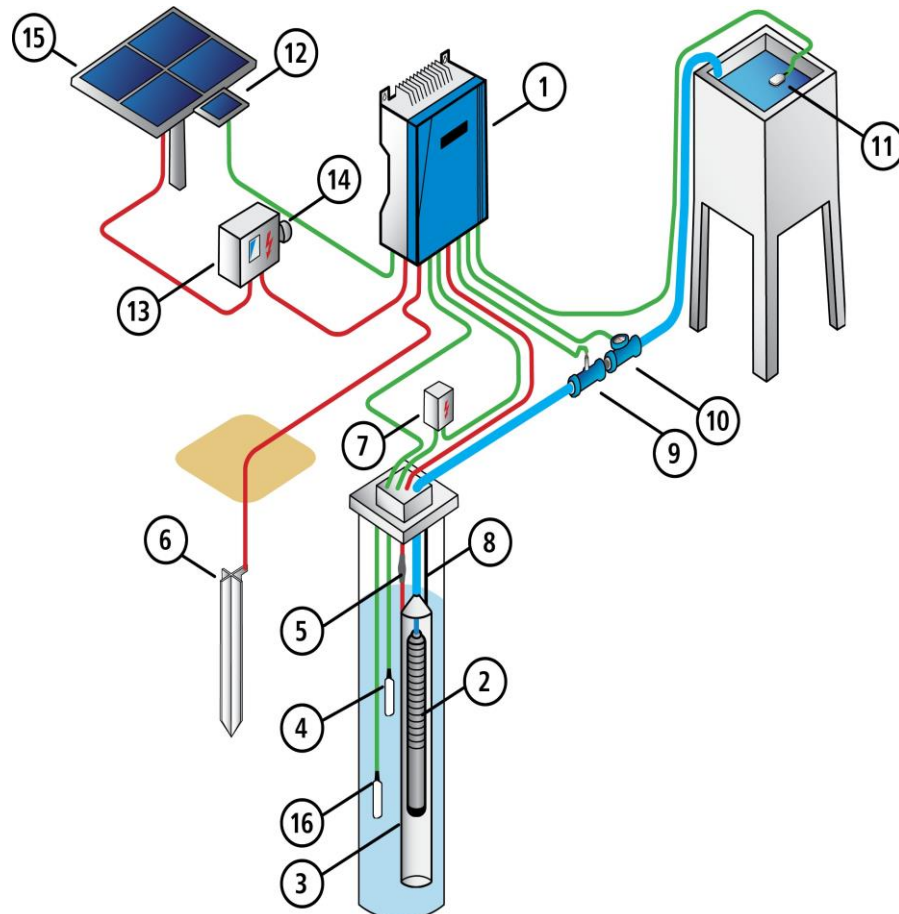
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## System Layout



1: PS2 Controller

2: Submersible Pump

3: Flow Sleeve

4: Well Probe

5: Cable Splice Kit

6: Grounding Rod

7: Surge Protector\*

8: Safety Rope

9: Water Meter

10: Pressure Sensor

11: Float Switch

12: Sun Switch

13: PV Disconnect

14: Lightning Surge Protector

15: PV Generator

\*It is recommended to install a Surge Protector at each controller sensor input.

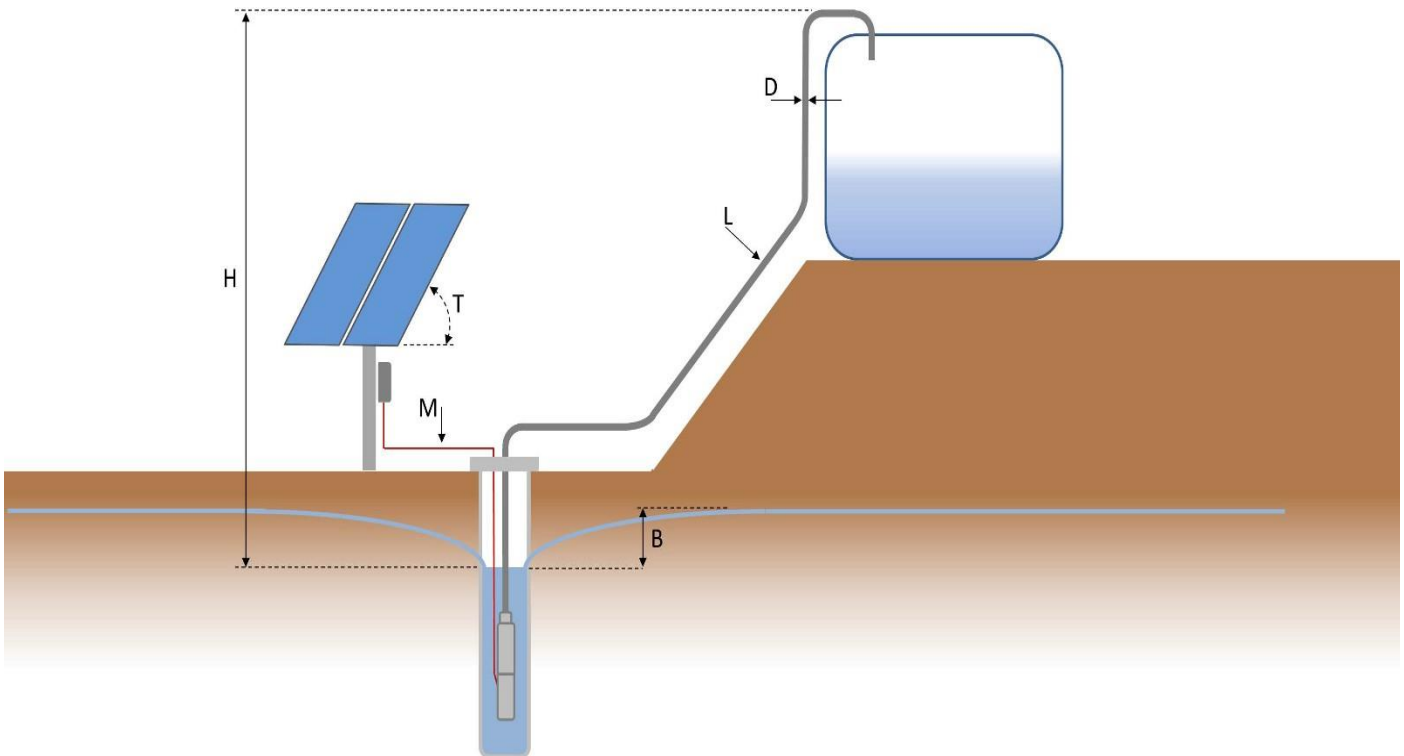
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## Sizing Layout



|                                    |   |
|------------------------------------|---|
| <b>H (Static head):</b>            | Vertical height from the dynamic water level to the highest point of delivery.  |
| <b>B (Drawdown):</b>               | Lowering of water level depending on flow rate and recovery rate of the well.   |
| <b>D (Pipeline inner diameter)</b> |   |
| <b>L (Pipe length):</b>            | Entire pipeline from the pump outlet to the point of delivery. Ellbows and armatures must be added as an equivalent length of pipeline. |
| <b>M (Motor cable):</b>            | The cable between controller and pump unit.   |
| <b>T (Tilt angle):</b>             | Angle of the PV generator surface from the horizontal plane.  |

# PS2-4000 C-SJ8-15

Solar Submersible Pump System for 4" wells

## System Overview

|           |              |
|-----------|--------------|
| Head      | max. 80 m    |
| Flow rate | max. 13 m³/h |

## Technical Data

### Controller PS2-4000

- Controlling and monitoring
- Control inputs for dry running protection, remote control etc.
- Protected against reverse polarity, overload and overtemperature
- Integrated MPPT (Maximum Power Point Tracking)
- Integrated Sun Sensor

|                 |             |
|-----------------|-------------|
| Power           | max. 4.0 kW |
| Input voltage   | max. 375 V  |
| Optimum Vmp**   | > 238 V     |
| Motor current   | max. 14 A   |
| Efficiency      | max. 98 %   |
| Ambient temp.   | -40...50 °C |
| Enclosure class | IP68        |

### Motor ECDRIVE 4000-C

- Maintenance-free brushless DC motor
- Water filled
- Premium materials, stainless steel: AISI 304/316
- No electronics in the motor

|                  |                 |
|------------------|-----------------|
| Rated power      | 4.0 kW          |
| Efficiency       | max. 92 %       |
| Motor speed      | 900...3,300 rpm |
| Insulation class | F               |
| Enclosure class  | IP68            |
| Submersion       | max. 150 m      |

### Pump End PE C-SJ8-15

- Non-return valve
- Premium materials, stainless steel: AISI 304
- Centrifugal pump

|            |           |
|------------|-----------|
| Efficiency | max. 68 % |
|------------|-----------|



### Pump Unit PU4000 C-SJ8-15 (Motor, Pump End)

|                   |             |
|-------------------|-------------|
| Borehole diameter | min. 4,0 in |
| Water temperature | max. 50 °C  |

## Standards



2006/42/EC, 2004/108/EC, 2006/95/EC

IEC/EN 61702:1995, IEC/EN 62253 Ed.1

The logos shown reflect the approvals that have been granted for this product family. Products are ordered and supplied with the approvals specific to the market requirements.

\*\*Vmp: MPP-voltage under Standard Test Conditions (STC): 1000 W/m² solar irradiance, 25 °C cell temperature

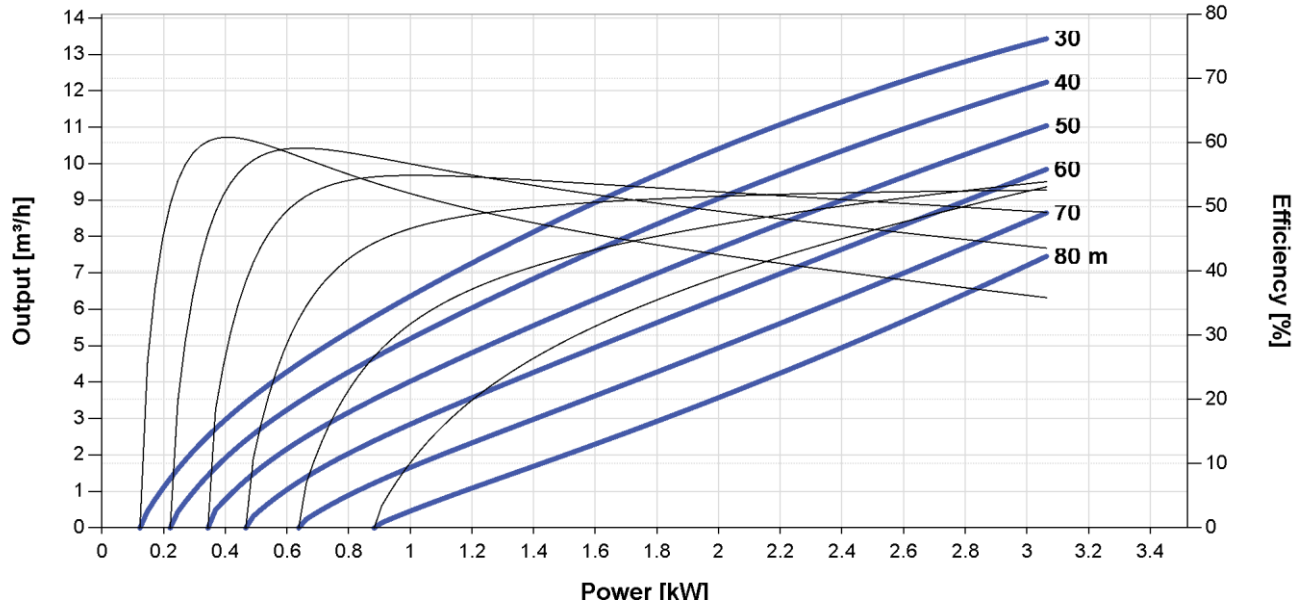


# PS2-4000 C-SJ8-15

Solar Submersible Pump System for 4" wells

## Pump Chart

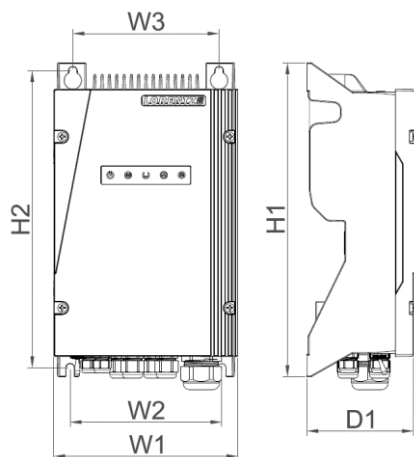
V<sub>mp</sub>\* > 238 V



## Dimensions and Weights

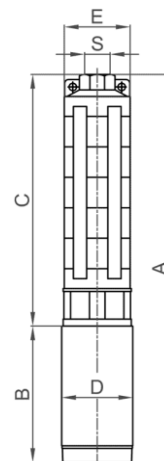
### Controller

H1 = 352 mm  
H2 = 333 mm  
W1 = 207 mm  
W2 = 170 mm  
W3 = 164 mm  
D1 = 124 mm



### Pump Unit

A = 1,118 mm  
B = 245 mm  
C = 873 mm  
D = 96 mm  
E = 98 mm  
S = 2 in



|            | Net weight |
|------------|------------|
| Controller | 6.1 kg     |
| Pump Unit  | 21 kg      |
| Motor      | 10 kg      |
| Pump End   | 11 kg      |

\*V<sub>mp</sub>: MPP-voltage under Standard Test Conditions (STC): 1000 W/m² solar irradiance, 25 °C cell temperature

