

**Project Name:** Chaproad SHC Water power solar system

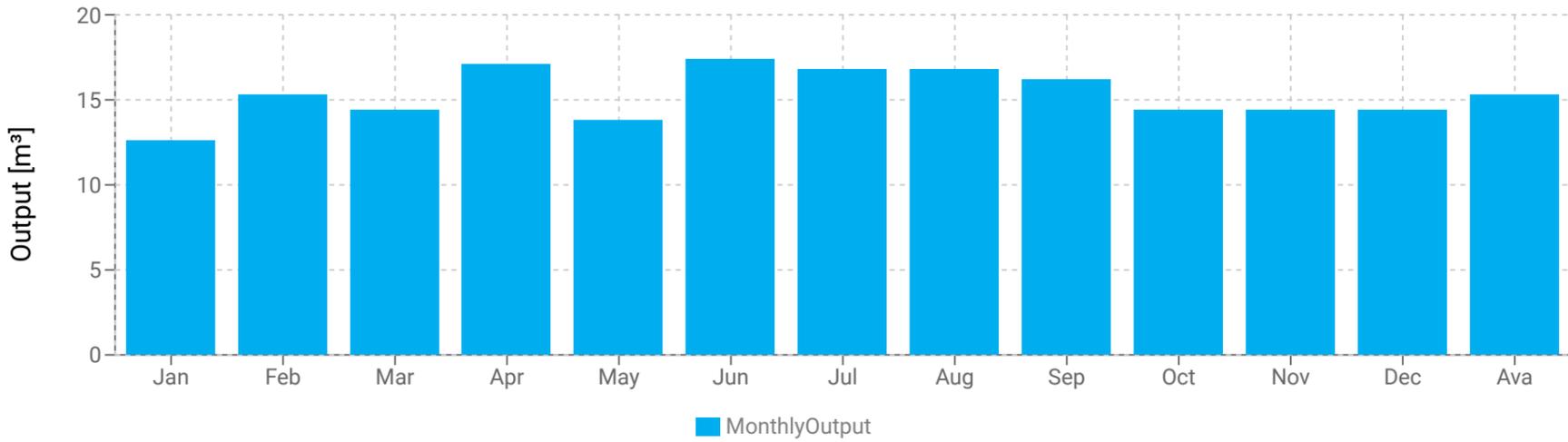
**Input Summary**

Thursday, 15, August, 2024

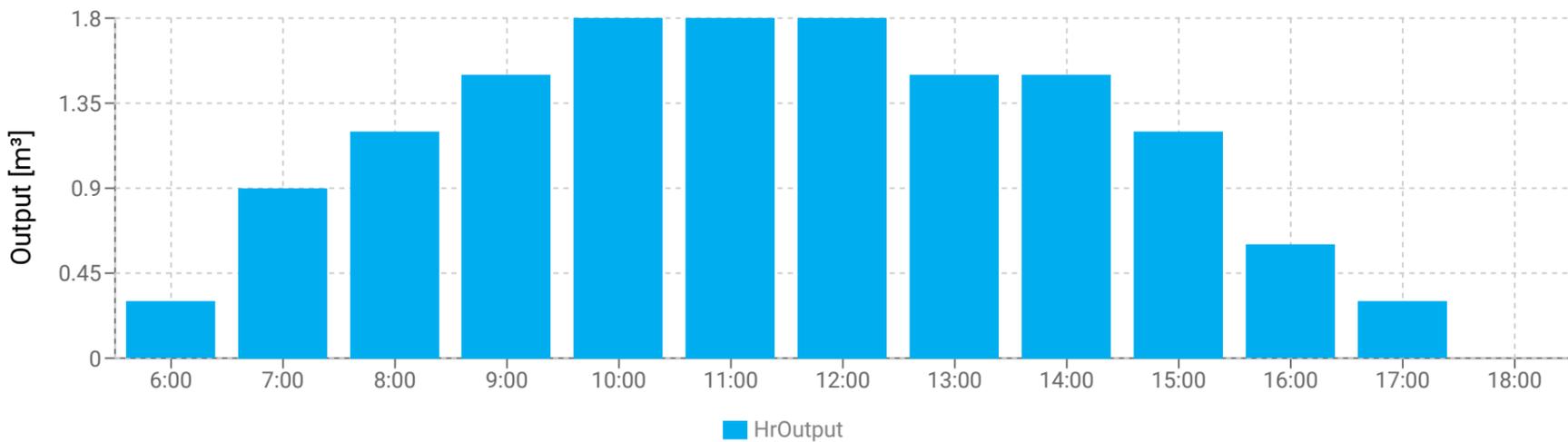
|                        |   |
|------------------------|---|
| Location:              | Afghanistan, Herat(34°, 62°)  |
| GPS:                   | 33.93658087°, 63.43497022°  |
| Designer:              | Farid Ahmad Qaderi  |
| Water Demand:          | 1.1(m <sup>3</sup> /h)  |
| Avg. Water Production: | 10.8(m <sup>3</sup> /d) According to 6 hours pump operation during sunny days at STC (1000 w/m <sup>2</sup> ) irradiation at 25C° |
| Head (SWL+DD):         | 50(m)   |
| Pipe Friction losses:  | 3m (4%)   |
| Total Dynamic Head:    | 53 (m)  |

| Main Products              | Description                                 | Unite  | Quantity |
|----------------------------|---|--------|----------|
| Solar                      | PROPSOLAR 270W Poly crystalline 37.9V 9.22A | panels | 4        |
| Pump                       | PEDROLLO 4SR1.5/17 1HP 0.75Kw 220V          | pc     | 1        |
| Controller                 | FRECON IP65 1.5kw 220V                      | pc     | 1        |
| Structure                  | Fixed Structure                             | set    | 1        |
| Motor Cable                | 4*2.5mm <sup>2</sup>                        | m      | 65       |
| Solar Cable                | 2*6mm <sup>2</sup>                          | m      | 15       |
| Pipeline                   | PE 0.5 Inch/16mm (PE100, PN10)              | m      | 75       |
| Accessories                | Description                                 | Unite  | Quantity |
| Float switch               | Mechanical                                  | pcs    | 1        |
| PV disconnect switch       | IP54  | pcs    | 1        |
| Inverter box               | IP20  | Box    | 1        |
| Grounding rod              | Copper                                      | set    | 1        |
| Flexible Conduct pipe      | Flexible                                    | m      | 30       |
| Cable splice kit           | IP68  | set    | 1        |
| Safety rope                | Plastic                                     | m      | 90       |
| Well probe sensors         | Electronic                                  | set    | 1        |
| Earthing Cable             | 1*16mm <sup>2</sup>                         | m      | 30       |
| Cable 2*1.5mm <sup>2</sup> | For sensors                                 | m      | 70       |
| Pump fittings              | Poly ethylene                               | set    | 1        |

Daily Average output/month



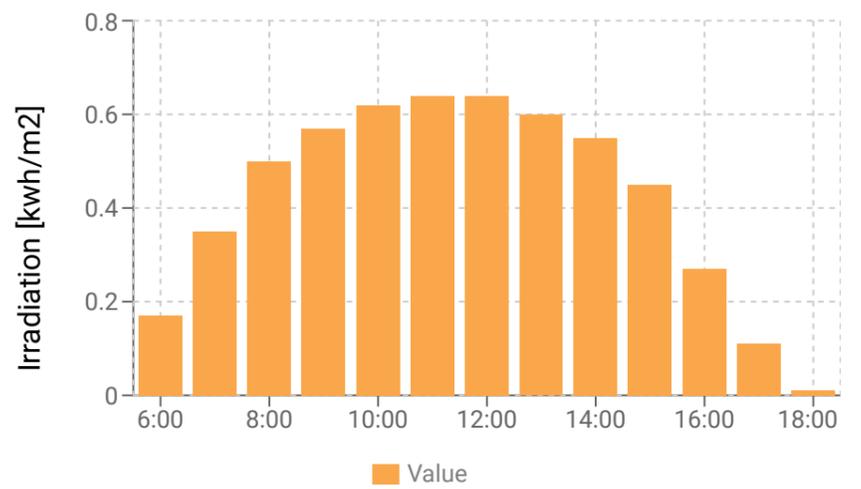
Hourly Output



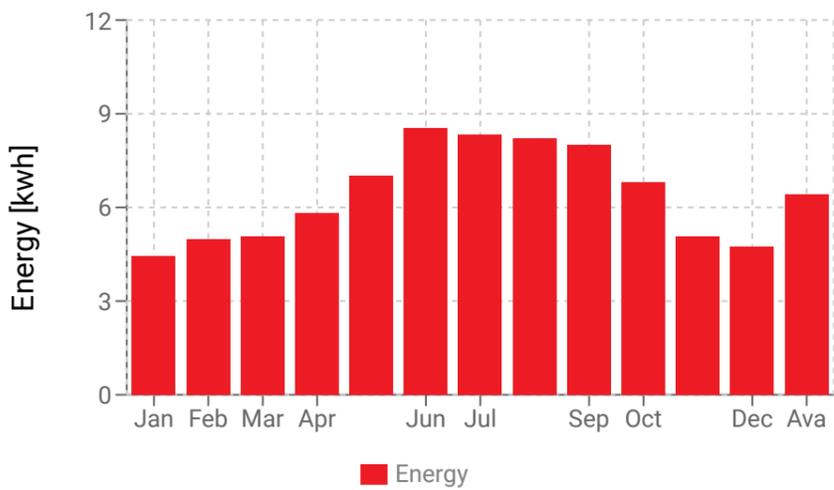
Irradiation value in deferent months of year



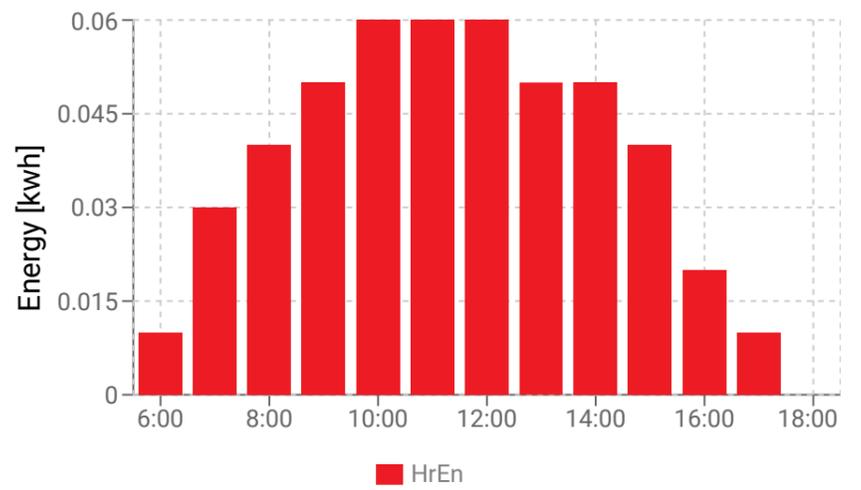
Hourly Values



Energy value in deferent months of year

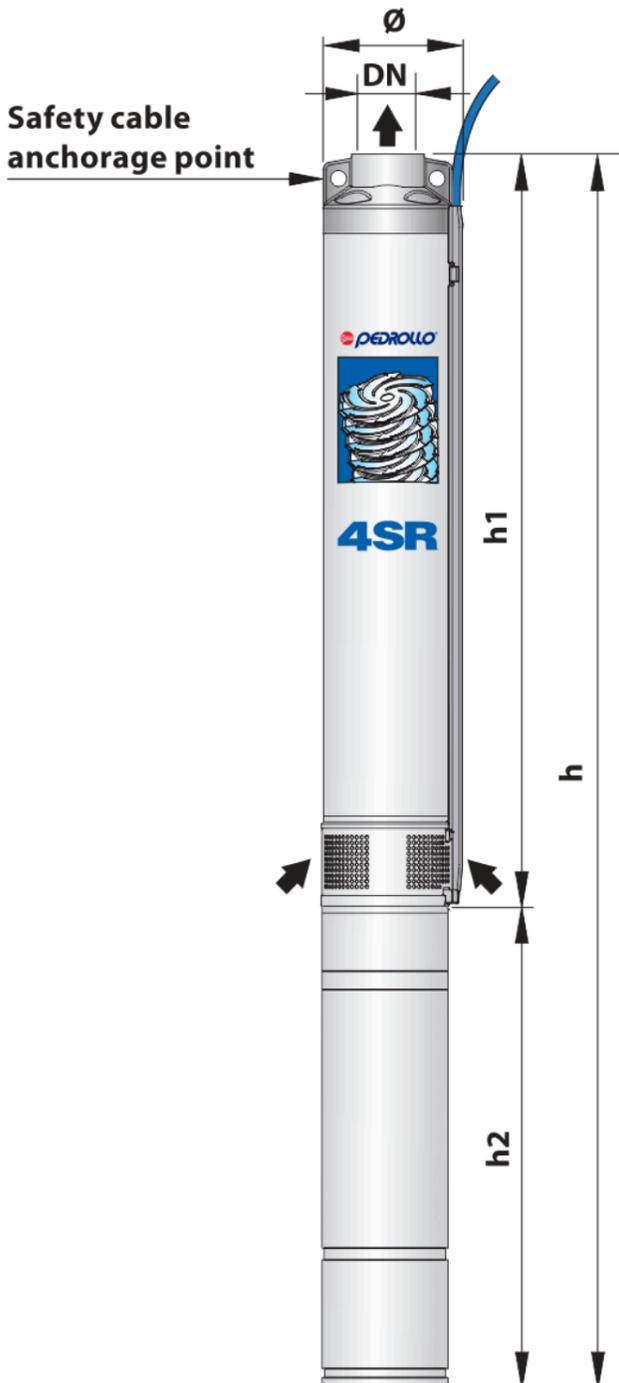
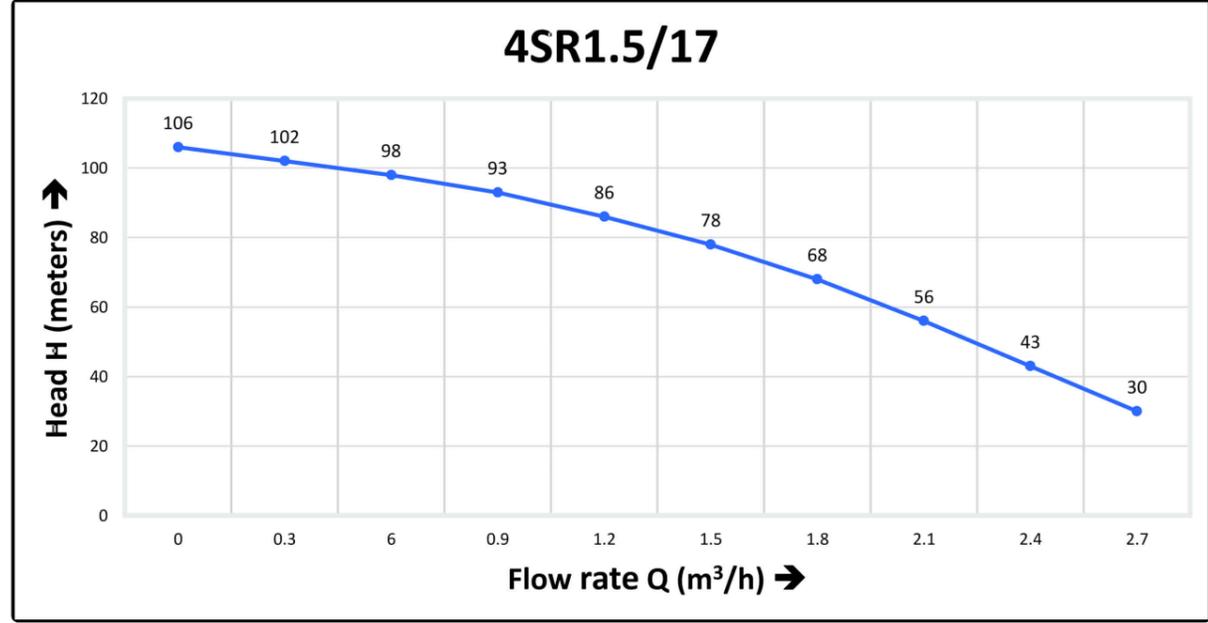


Hourly Values



**Submersible pump specification:**

Brand: PEDROLLO  
 Model: 4SR1.5/17  
 Power: 0.75Kw  
 Hours power: 1HP  
 Current: 8.6A  
 OutLet: 0.5Inch  
 Voltage: 220V  
 Phase: 3Phase  
 Diameter: 4inch  
 Weight: 14.3kg  
 Made in: Italy

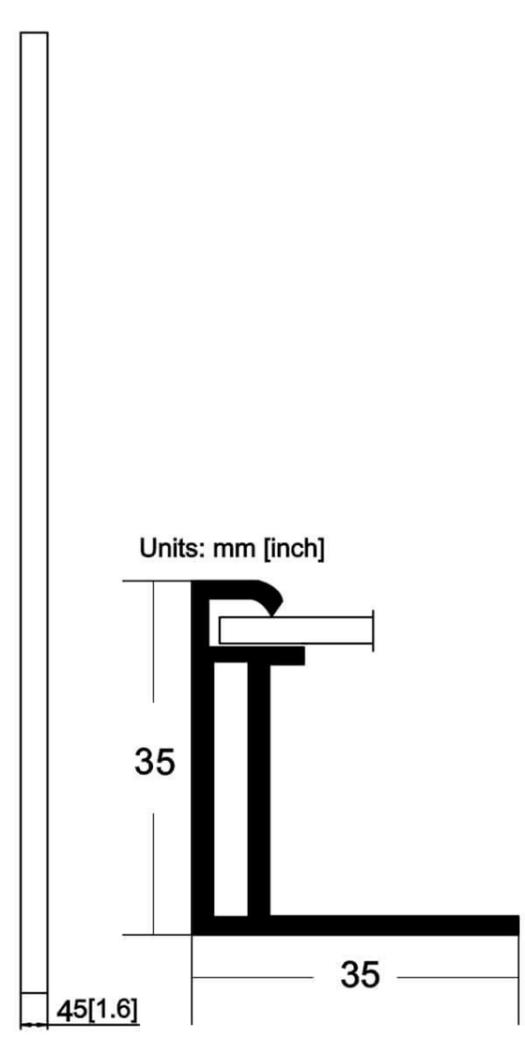
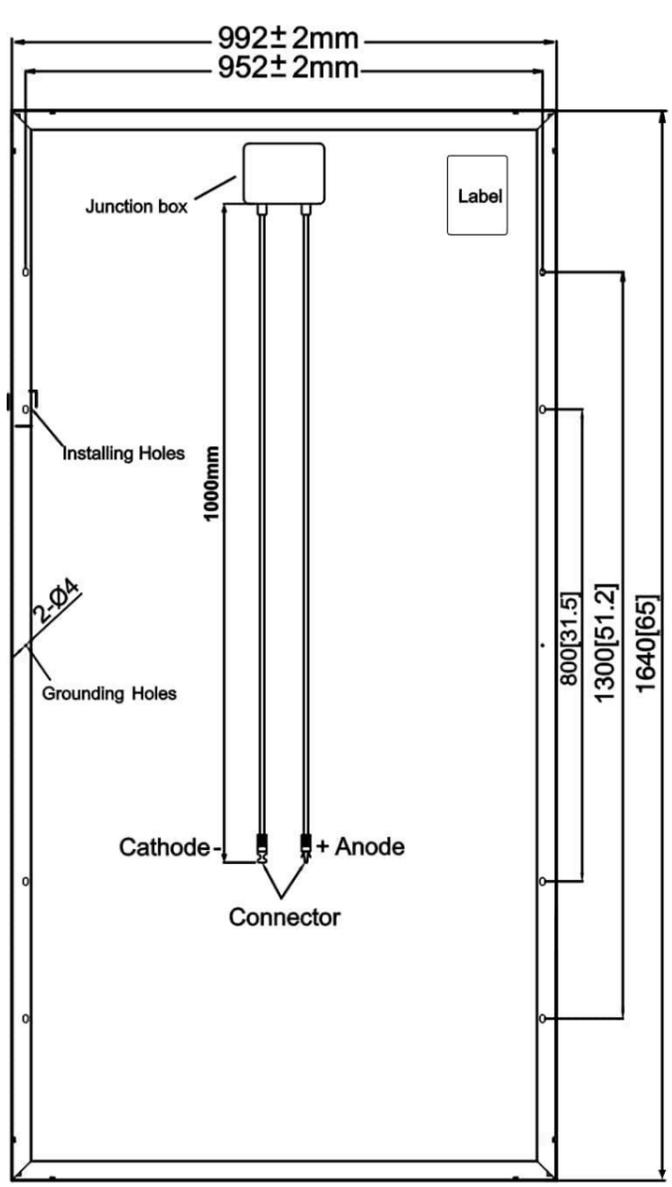
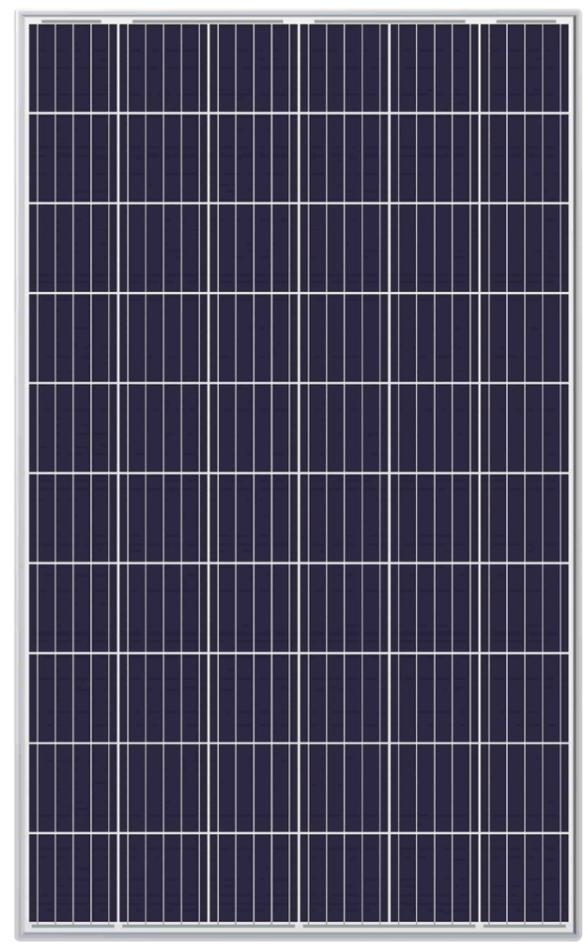


**Dimensions and weight**

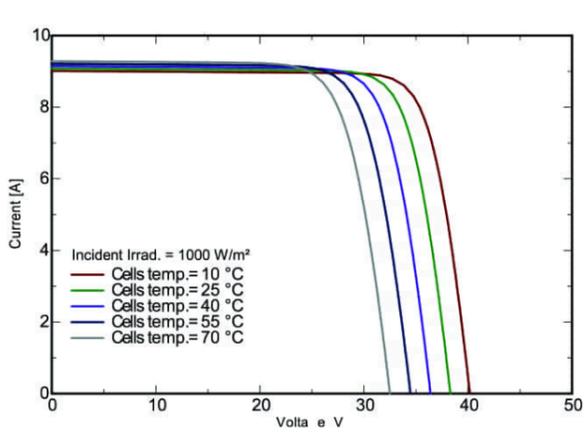
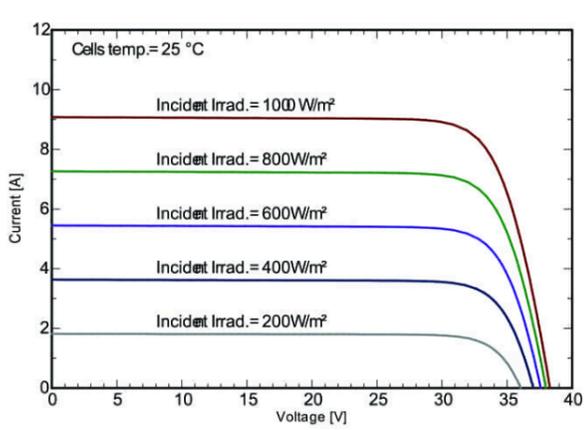
| MODEL                 | PORT<br>DN | DIMENSIONS mm |            |            |            | kg          |
|-----------------------|------------|---------------|------------|------------|------------|-------------|
|                       |            | Ø             | h1         | h2         | h          |             |
| Three-phase           | DN         |               |            |            |            | 3~          |
| <b>4SR1.5/17 - PD</b> | <b>1¼"</b> | <b>98</b>     | <b>499</b> | <b>356</b> | <b>855</b> | <b>14.2</b> |

**Solar specification:**

|                                |                  |
|--------------------------------|------------------|
| Brand:                         | PROPSOLAR        |
| Model:                         | PS-660           |
| Cell Technology:               | Poly crystalline |
| Rated Maximum power (Pmax):    | 270 Wp           |
| Voltage at Maximum power(Vmp): | 30.9 V           |
| Current at Maximum power(Imp): | 8.73A            |
| Open Circuit Voltage(Voc):     | 37.9V            |
| Short Circuit Current (Isc):   | 9.22A            |
| Mazimum System Voltage:        | 1000V            |
| Weight:                        | 18 kg            |
| Made in:                       | China            |

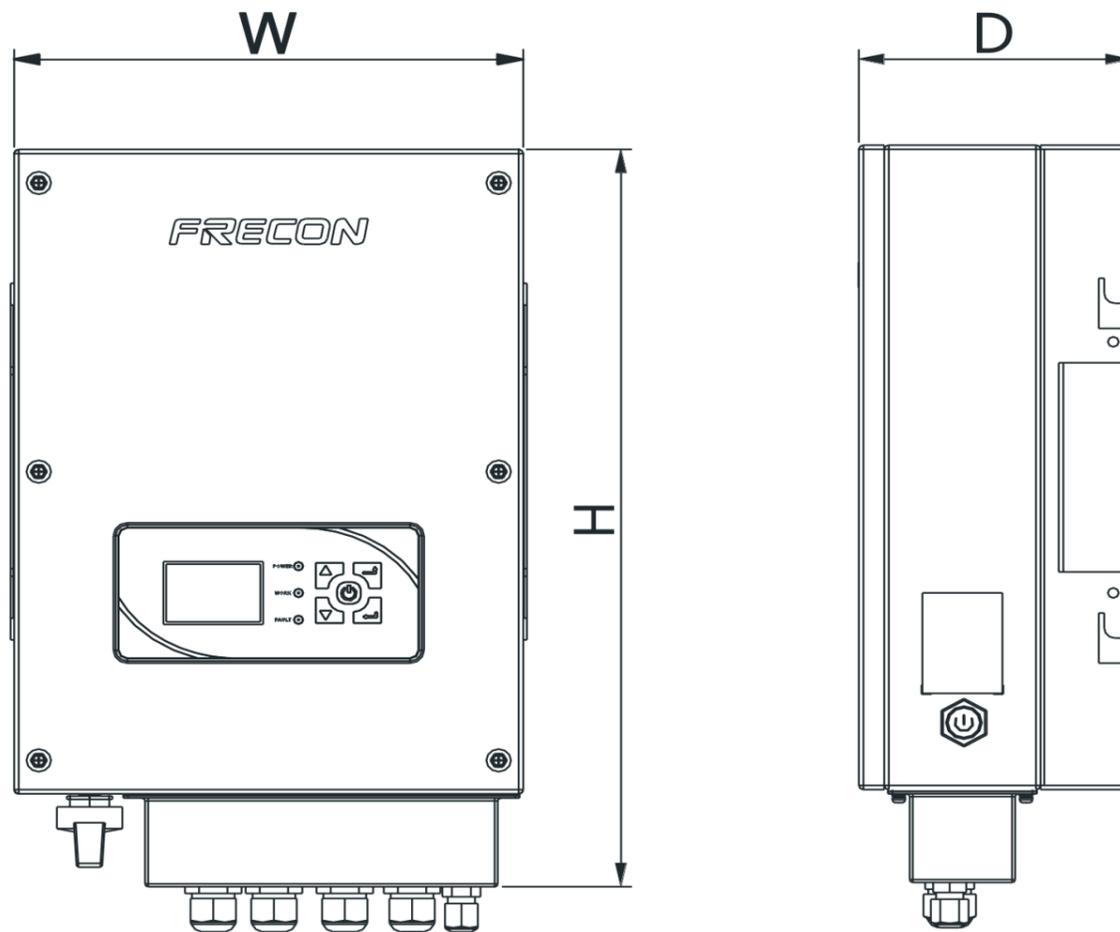


**I-V CURVE**



**Controller specification:**

Brand: FRECON IP65  
 Model: PV580-2S-1.5  
 Power: 1.5 Kw  
 Hours power: 2 HP  
 Current: 10.5 A  
 Voltage(AC): 220 V  
 Voltage(DC): 200-260V  
 Weight: 11.4 kg  
 Made in: China



| Model         | External and installation dimensions (mm) |     |     | N.W (kg) |
|---------------|---|-----|-----|----------|
|               | W   | H   | D   |          |
| PV580-2S-1.5B | 280                                       | 440 | 150 | 11.4     |

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**Structer specification:**

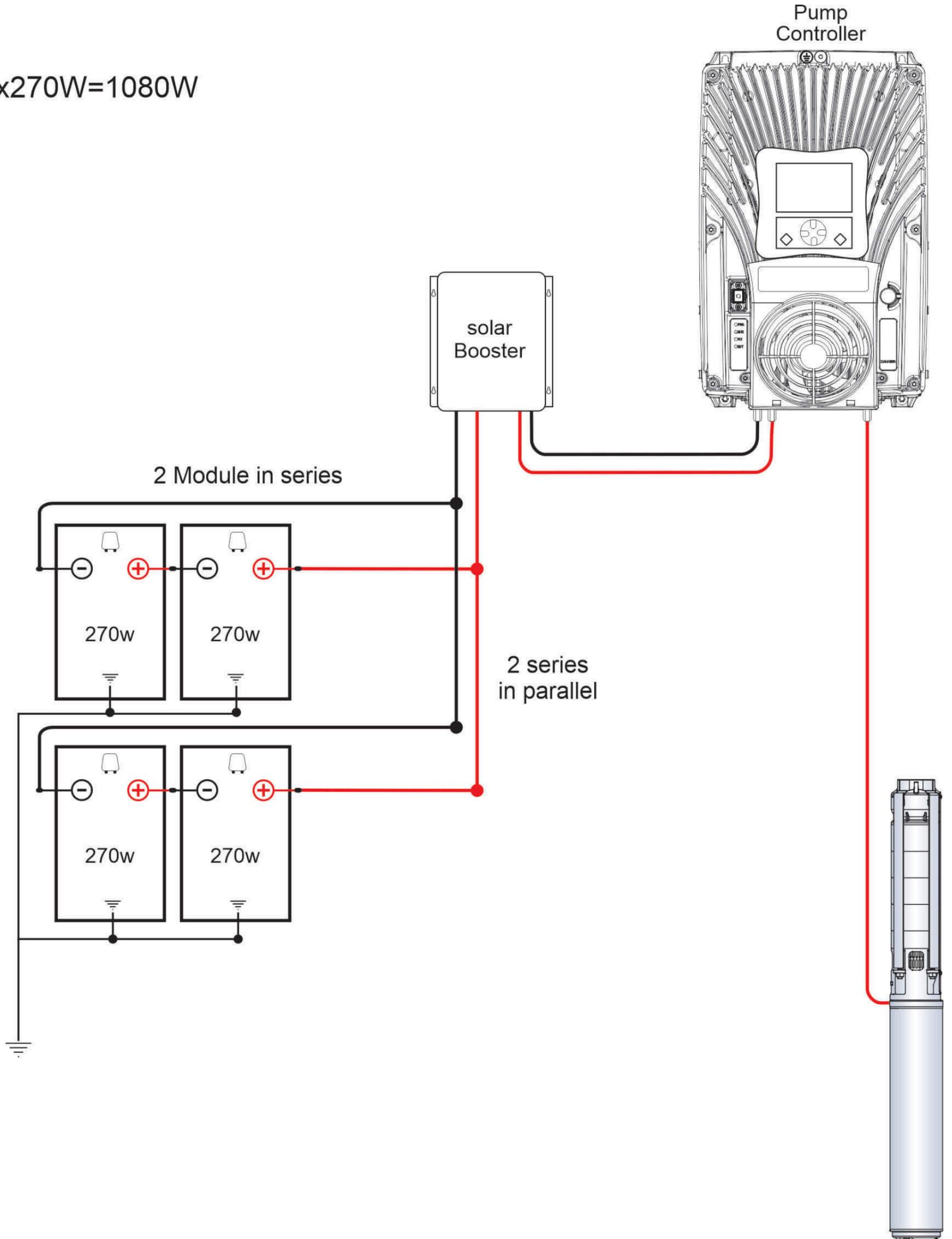
Brand: No  
Model: Fixed Structure  
Capacity: 4/6/8/10/12 panels



Note: Image may be deferent with actual product as this is a graphic design.

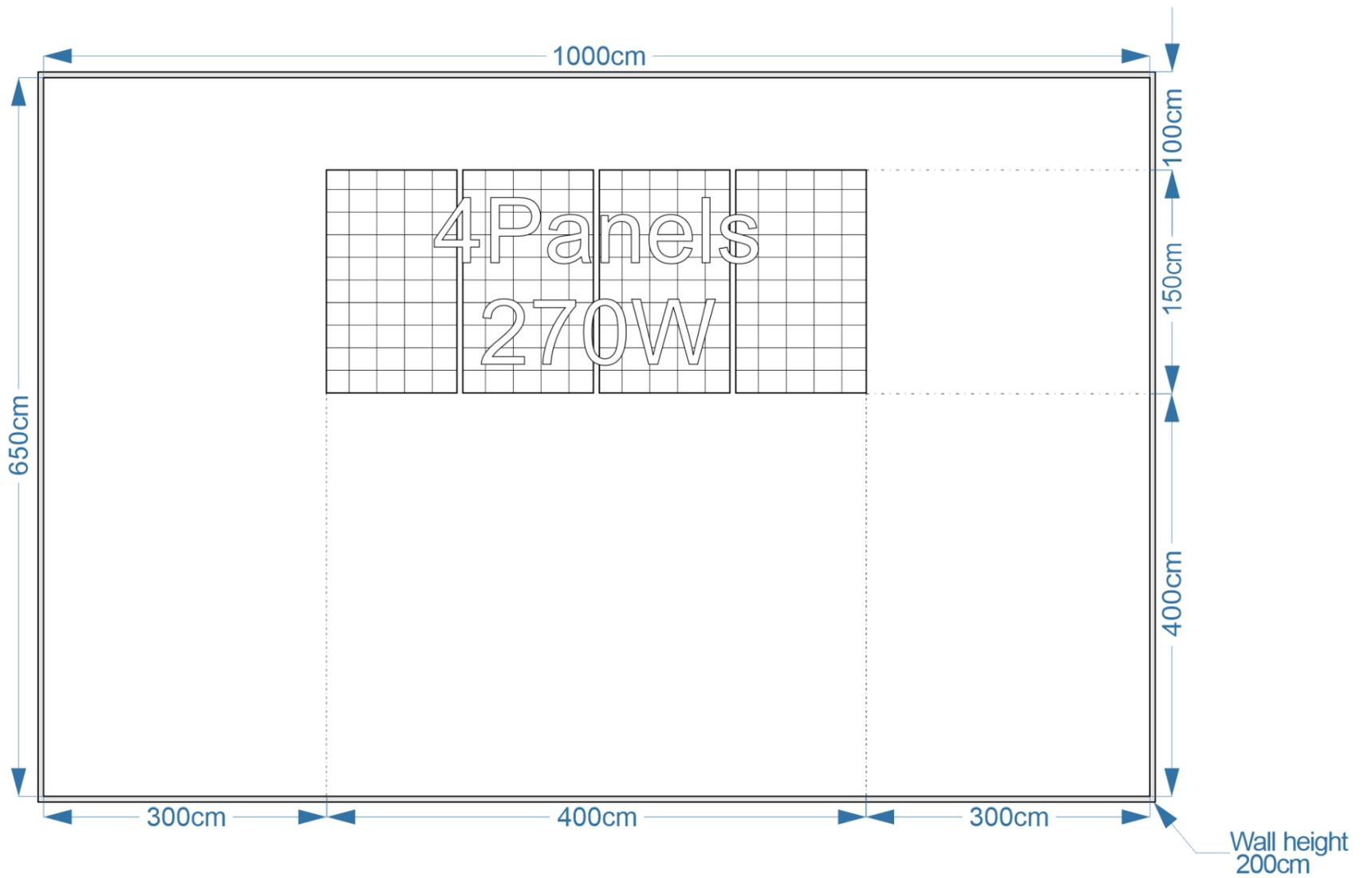
Wiring Diagram

$$2^S \times 2^P = 4^D \times 270W = 1080W$$



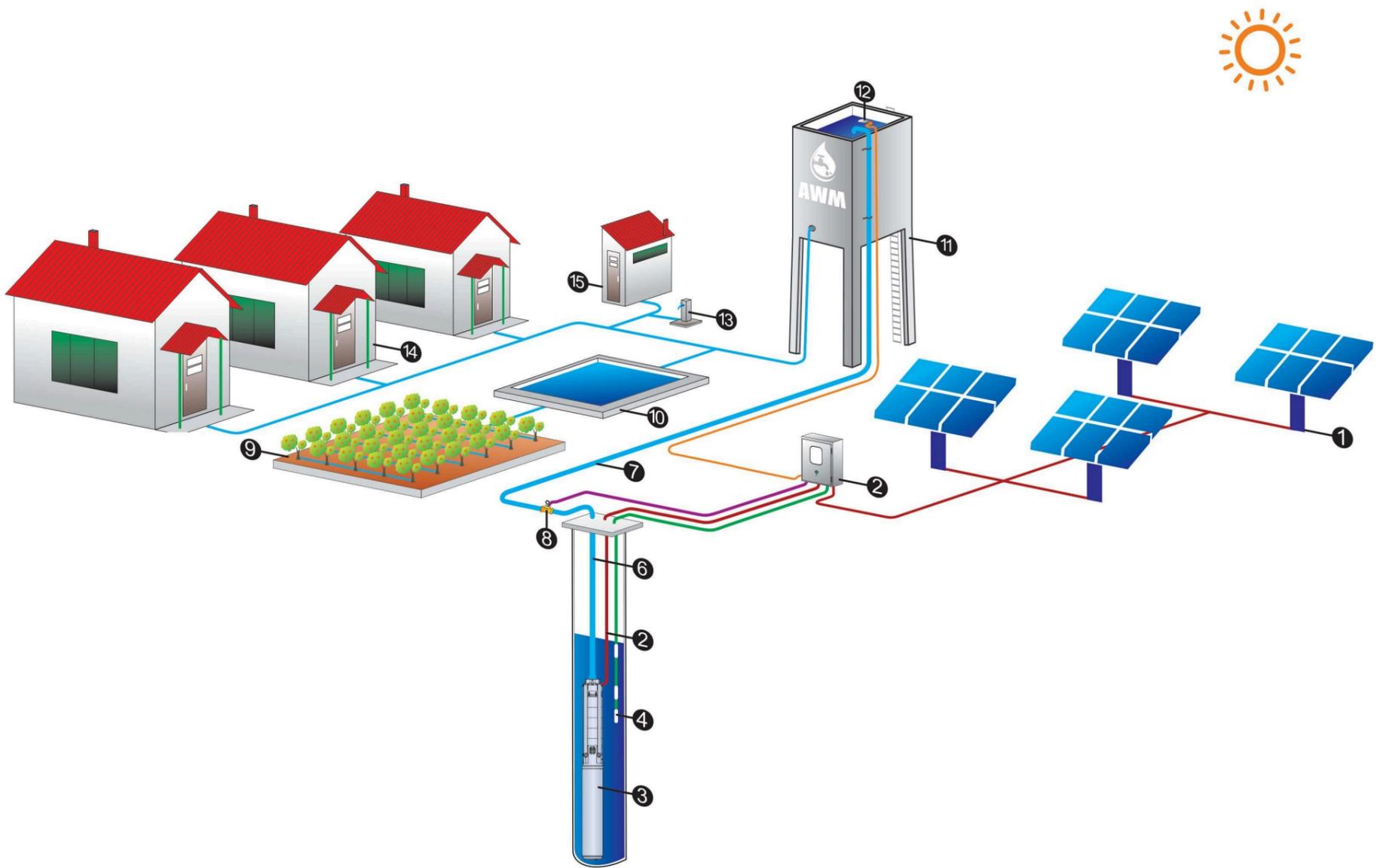
Area Diagram

Required Area for this project:  
Minimum 65m<sup>2</sup>



Note: The area which the panels will install must be south face.

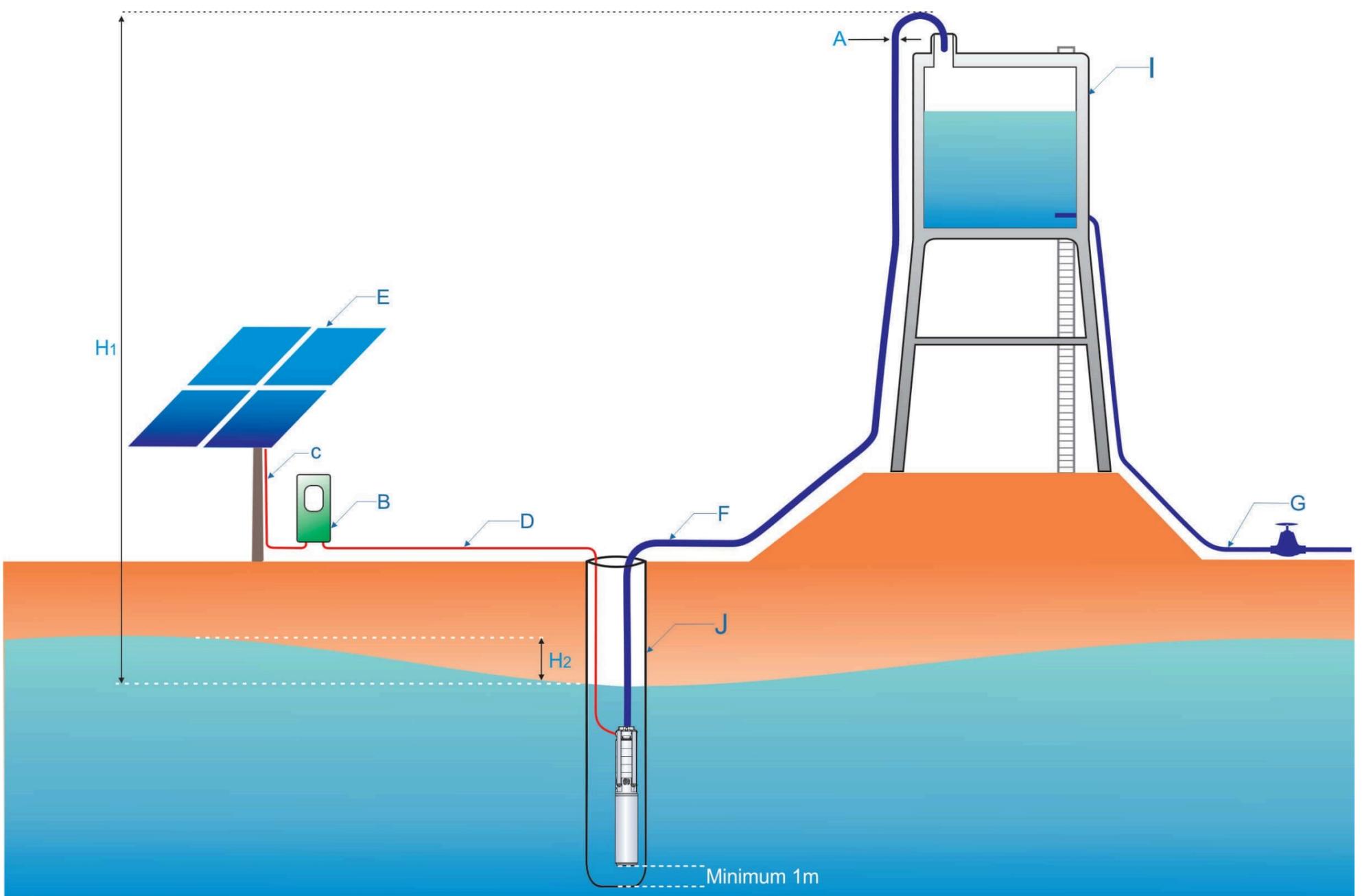
System General layout



- 1- Solar panels
- 2- Pump controller
- 3- Submersible
- 4- well probe sensors
- 5- Pump electrical cable
- 6- Non return valve
- 7- Pressure Gauge
- 8- Water meter

- 9- Garden
- 10- Swimming pool
- 11- Water reservoir
- 12- Flaut switch
- 13- Flaut switch Ele. cable
- 14- Residential Houses
- 15- Toilet

Sizing layout



A (pipe diameter) pipeline inner diameter.

B (controller) solar pump controller to drive the pump.

C (cable) the electrical cable between solar and controller.

D (cable) the electrical cable between controller and pump.

E (solar) solar panels stand.

F (pipeline) pipeline from the pump outlet to the reservoir.

G (pipeline) water tank outlet.

H<sub>1</sub> (static head) vertical height from the lowest level to the highest point of delivery.

H<sub>2</sub> (draw down) the dynamic water level of the well depending on the pump operation.