

**Project Name:** Gulran-BHC Solar water supply system

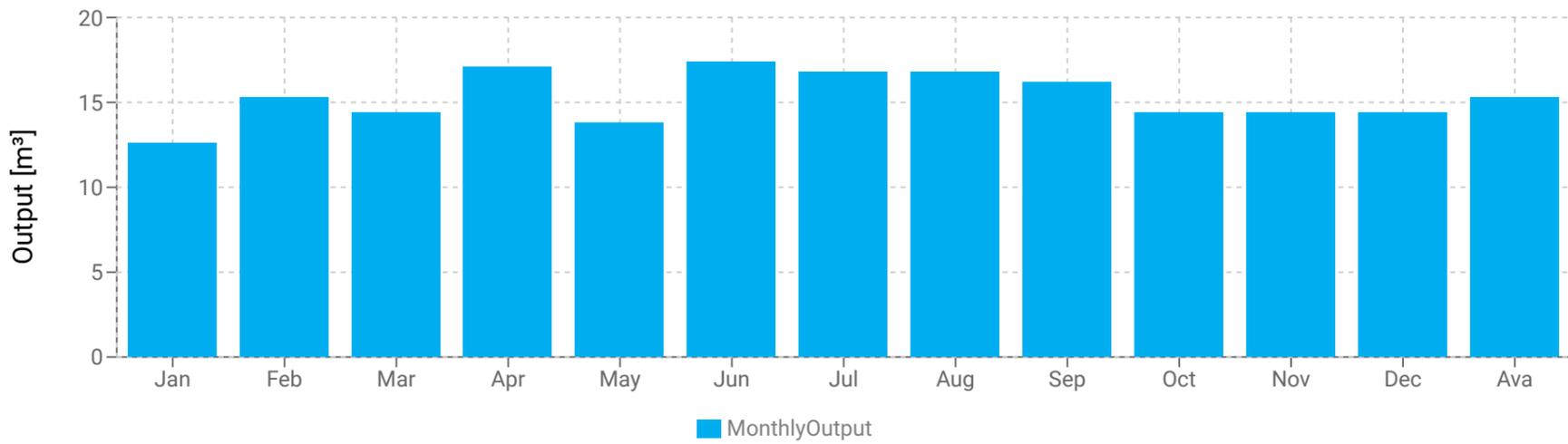
**Input Summary**

Tuesday, 13, August, 2024

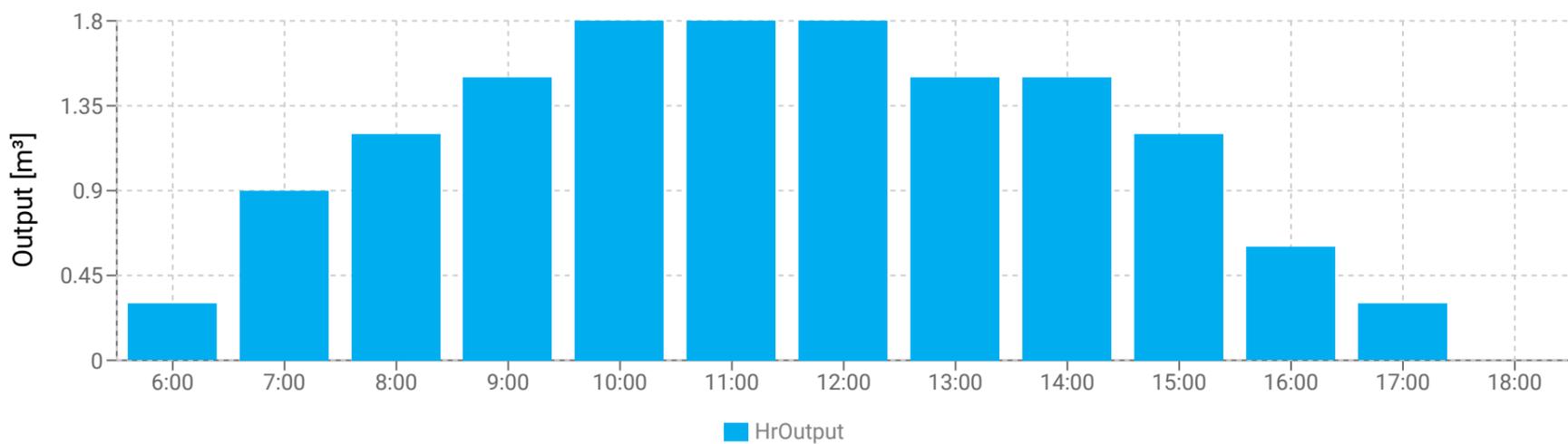
Location:	Afghanistan, Herat(34°, 62°)
GPS:	35.098016°, 61.68512°
Designer:	Farid Ahmad Qaderi
Water Demand:	1.2(m <sup>3</sup> /h)
Avg. Water Production:	10.8(m <sup>3</sup> /d) According to 6 hours pump operation during sunny days at STC (1000 w/m <sup>2</sup> ) irradiation at 25C°
Head (SWL+DD):	45(m)
Pipe Friction losses:	6m (5%)
Total Dynamic Head:	51 (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	90
Solar Cable	2*6mm <sup>2</sup>	m	15
Pipeline	PE 0.5 Inch/16mm (PE100, PN16)	m	110
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	50
Safety rope	Plastic	m	80
Well probe sensors	Electronic	set	1
Cable splice kit	IP68	set	1
Earthing Cable	1*16mm <sup>2</sup>	m	30
Cable 2*1.5mm <sup>2</sup>	For sensors	m	90
Pump fittings	Poly ethylene	set	1

Daily Average output/month



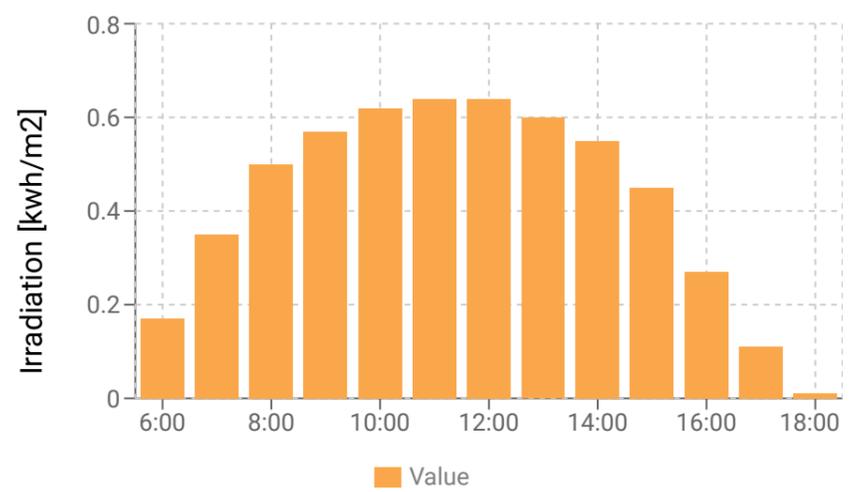
Hourly Output



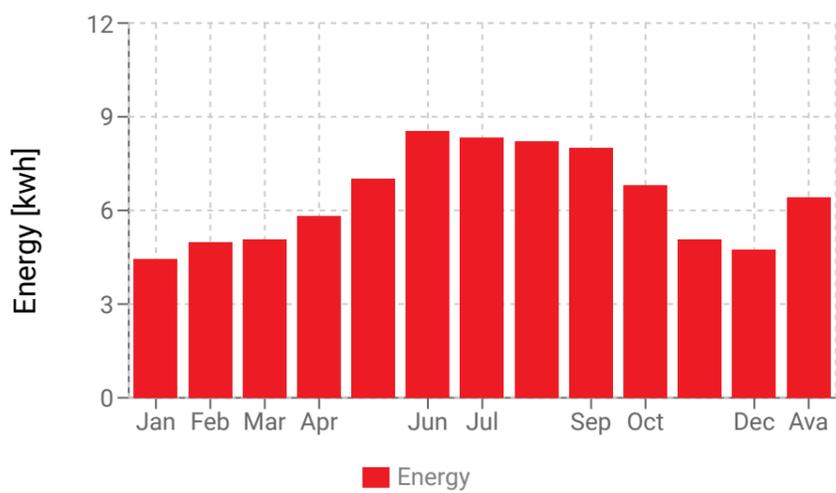
Irradiation value in deferent months of year



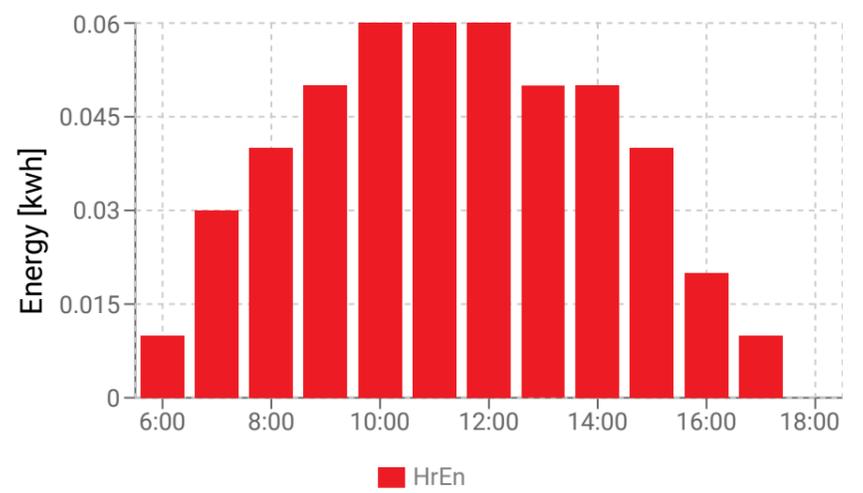
Hourly Values



Energy value in deferent months of year



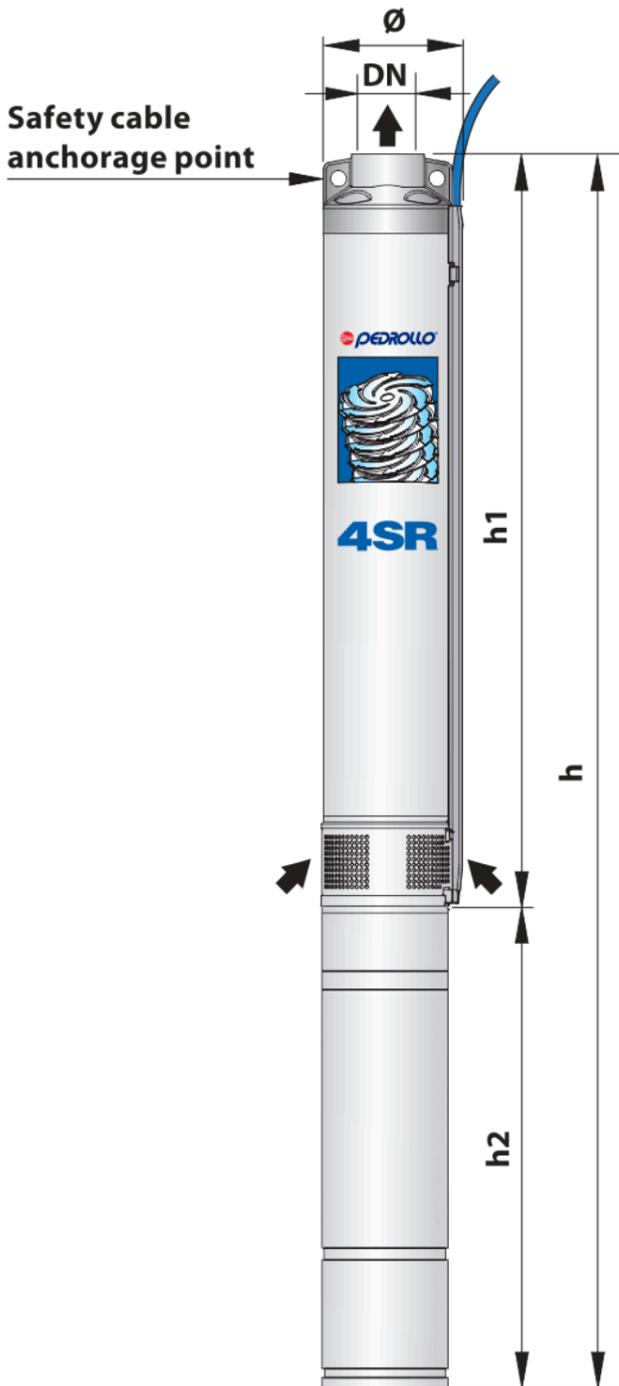
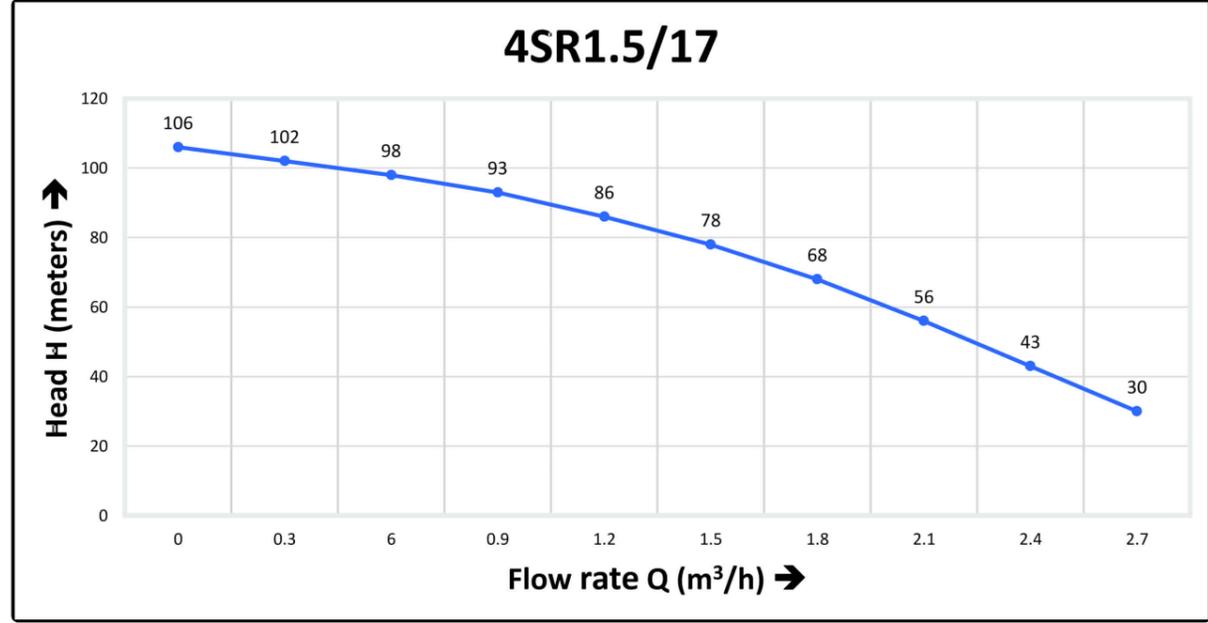
Hourly Values



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**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

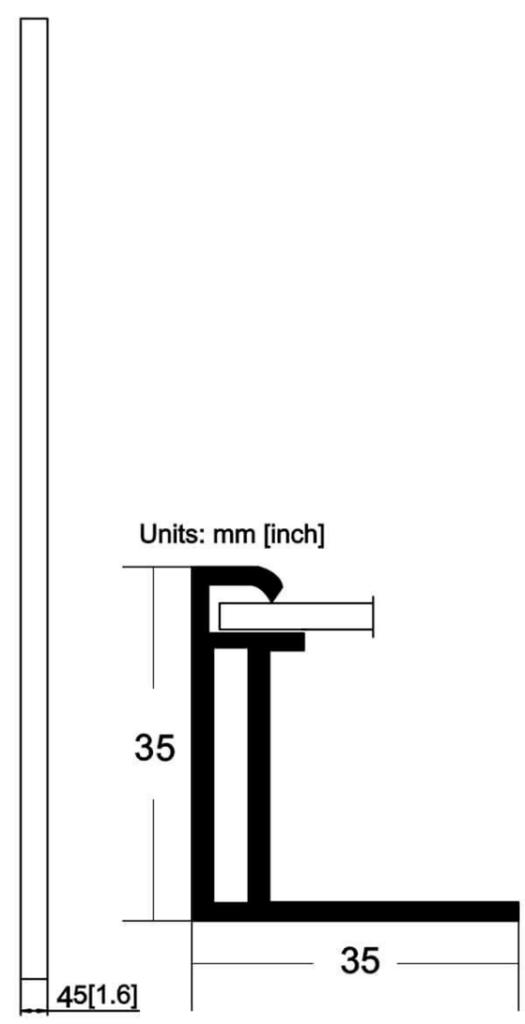
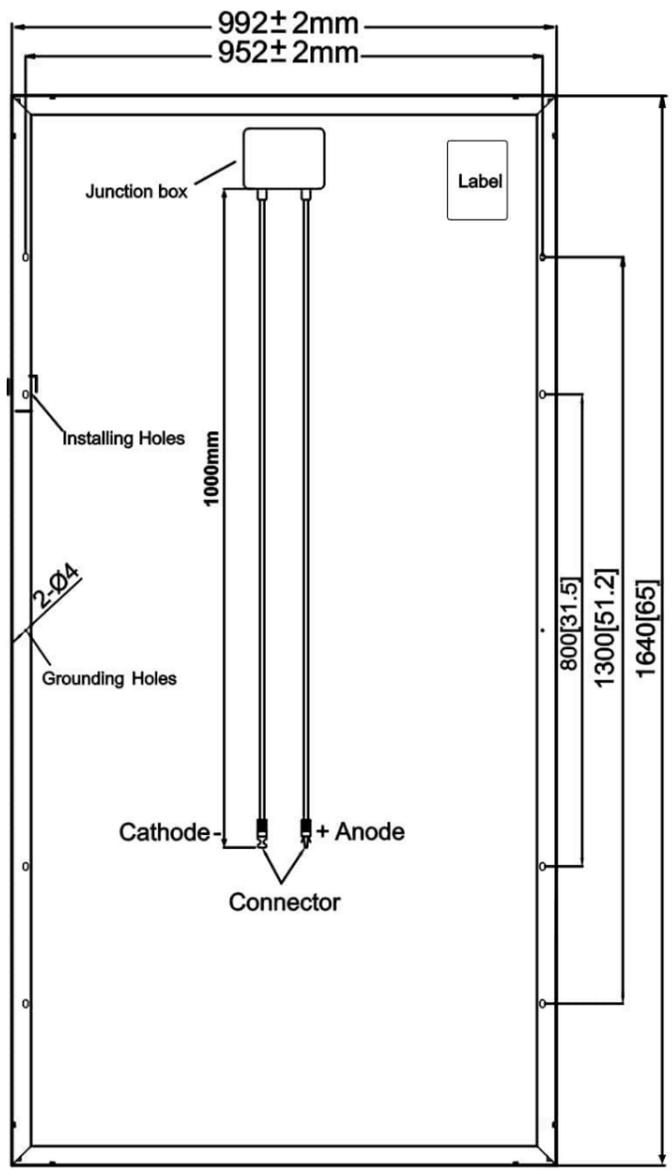
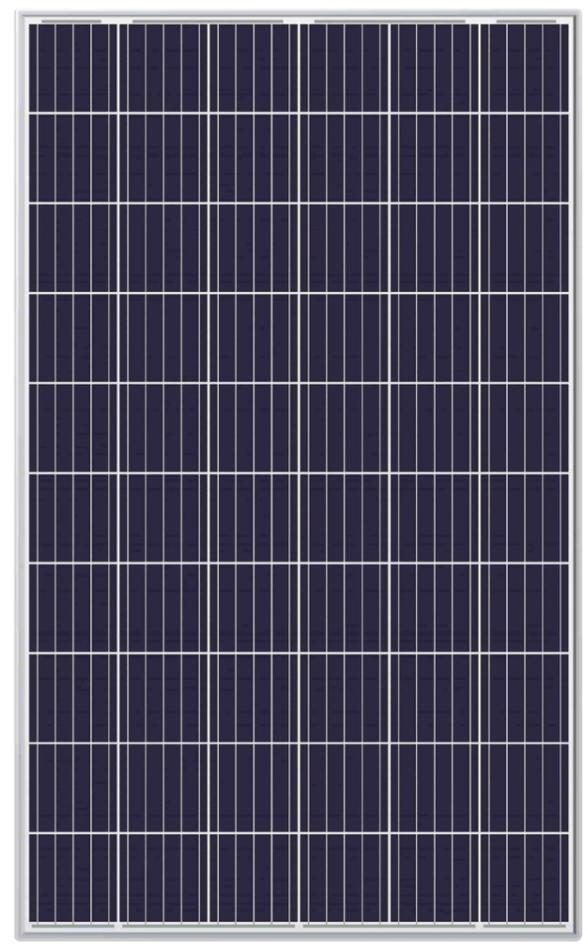


**Dimensions and weight**

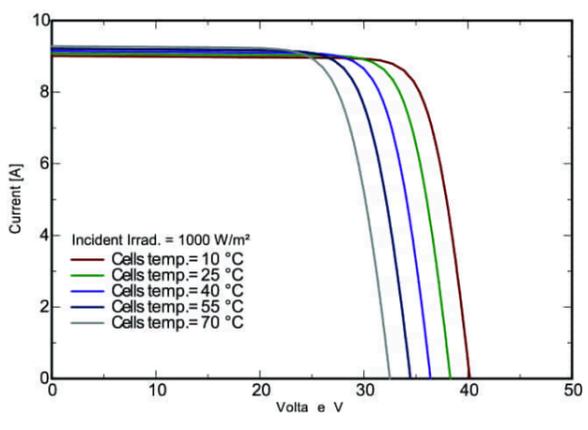
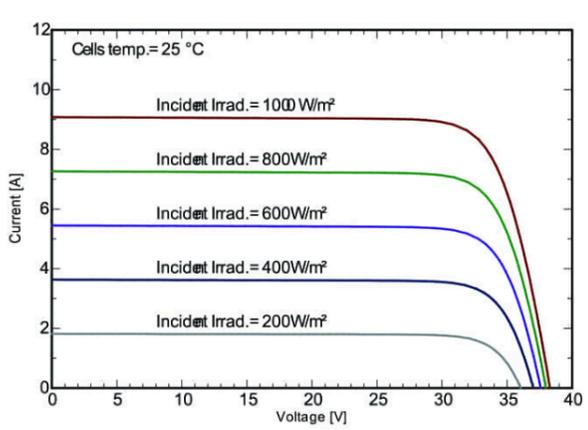
MODEL	PORT	DIMENSIONS mm				kg
		Ø	h1	h2	h	
Three-phase	DN					3~
<b>4SR1.5/17 - PD</b>	<b>1¼"</b>	<b>98</b>	<b>499</b>	<b>356</b>	<b>855</b>	<b>14.2</b>

**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

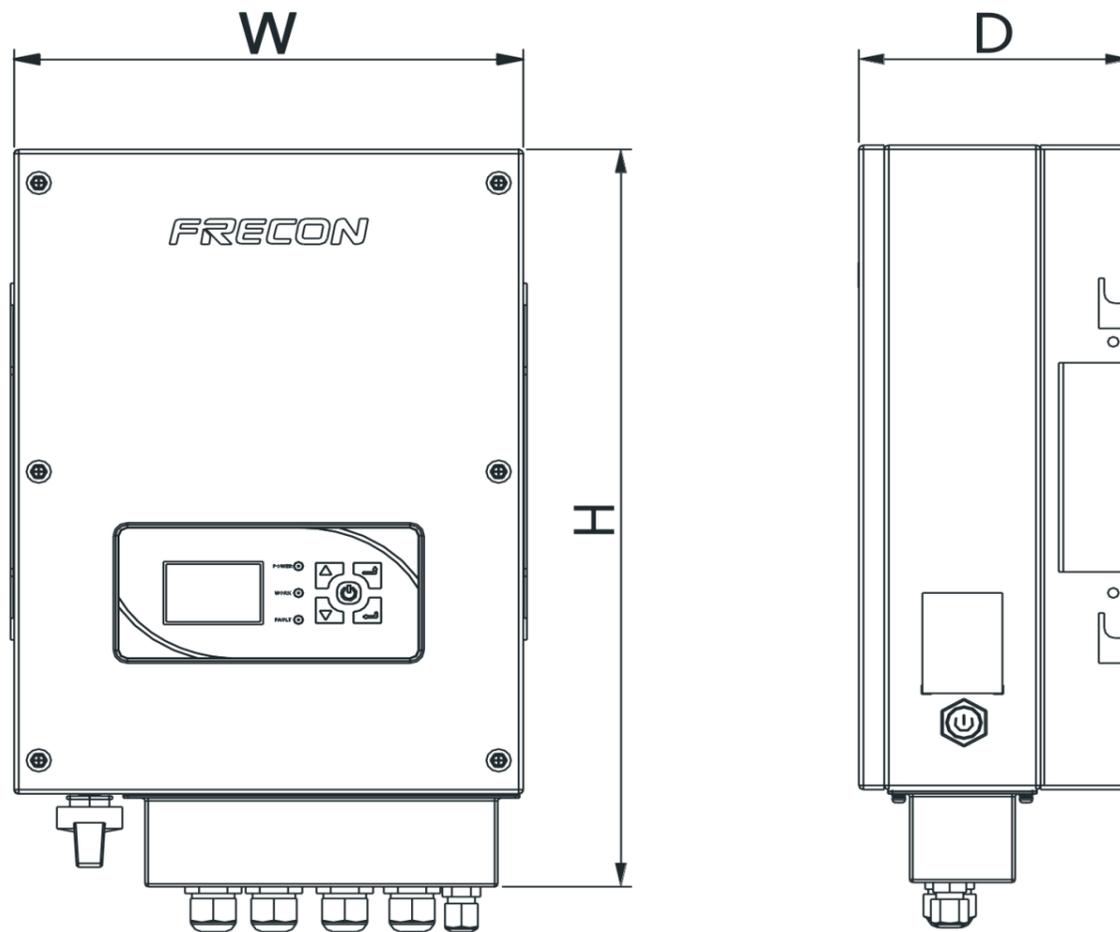


**I-V CURVE**



**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:**

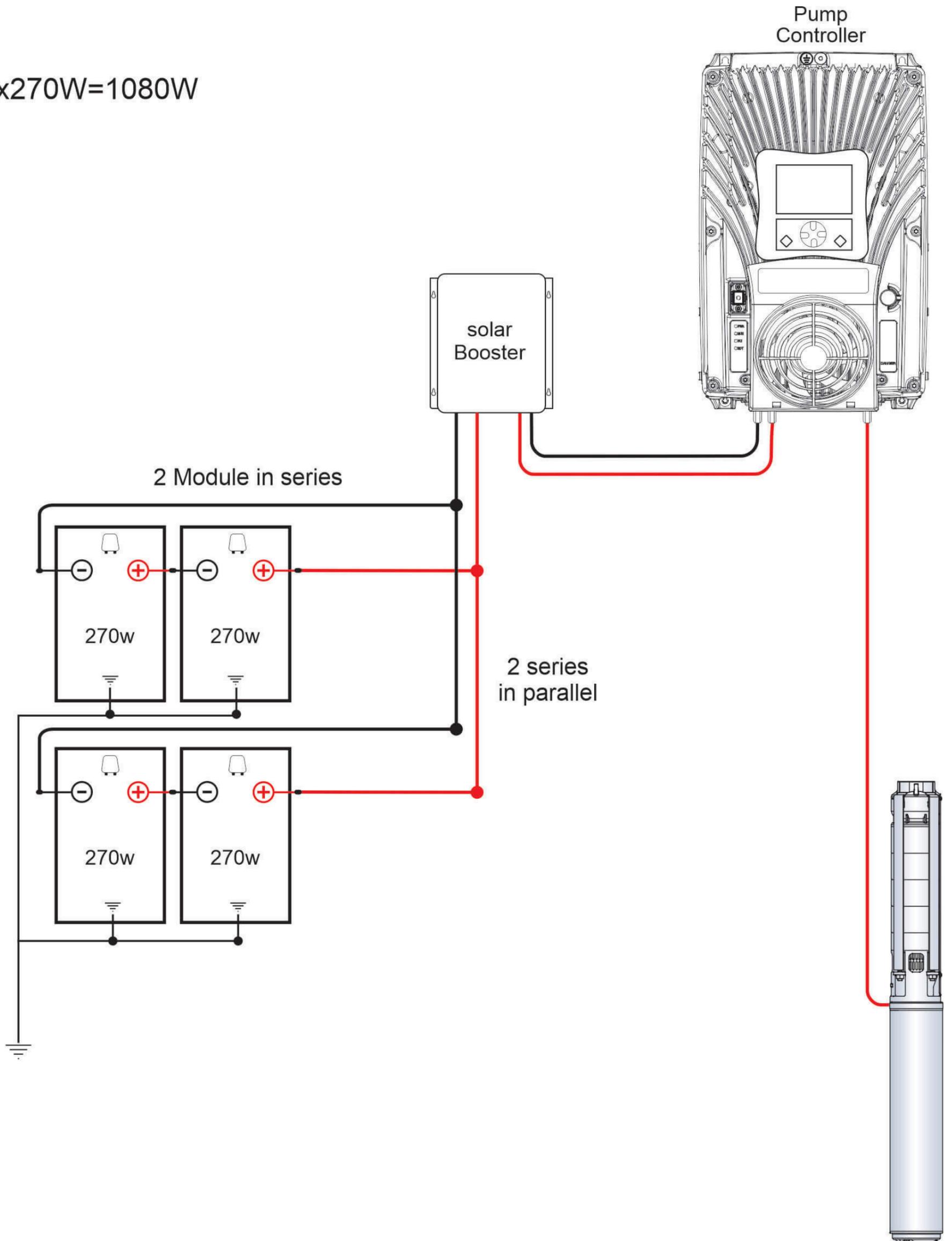
Brand: No  
Model: Fixed Structure  
Capacity: 4/6/8/10/12 panels



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

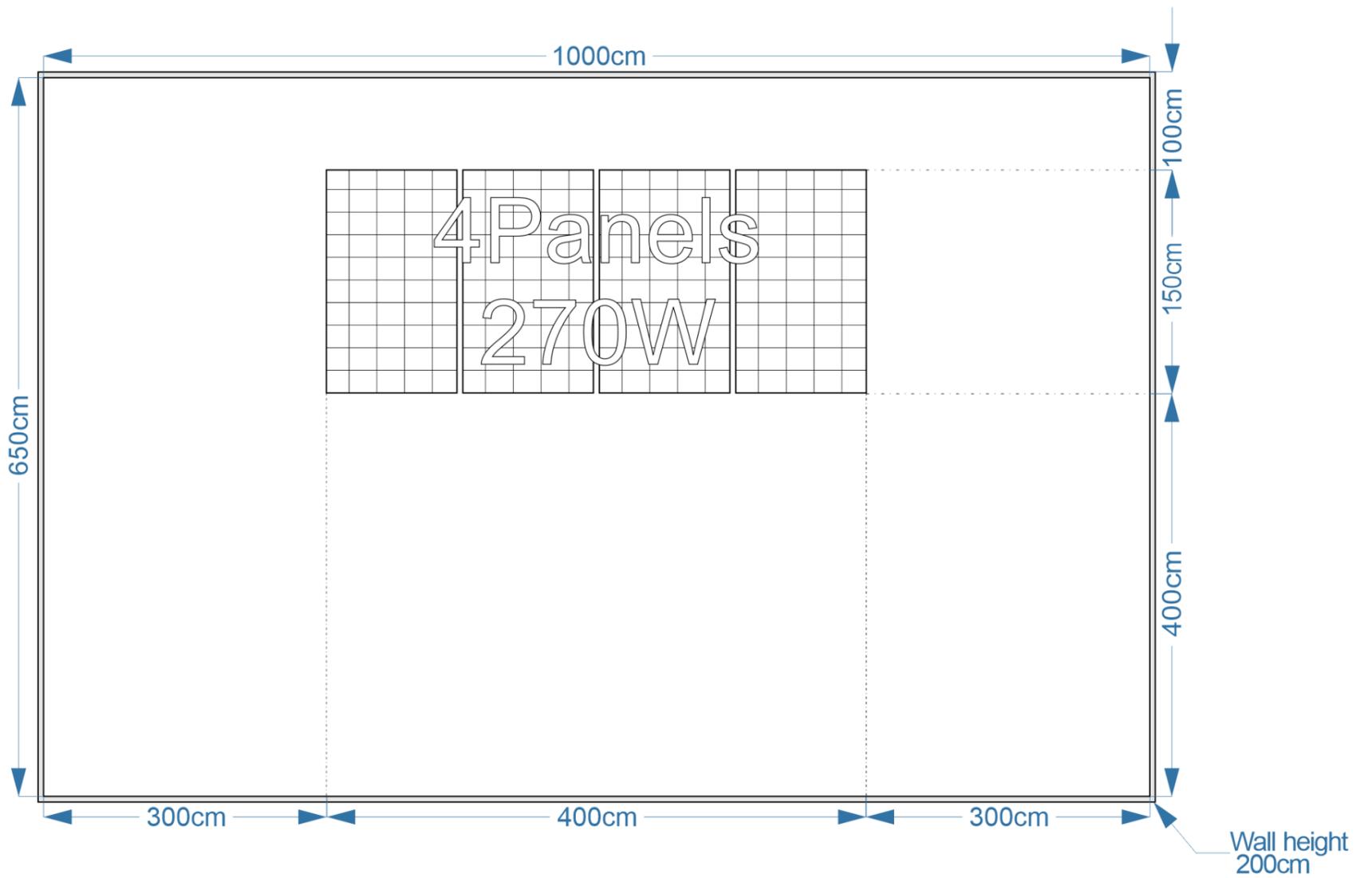
Wiring Diagram

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



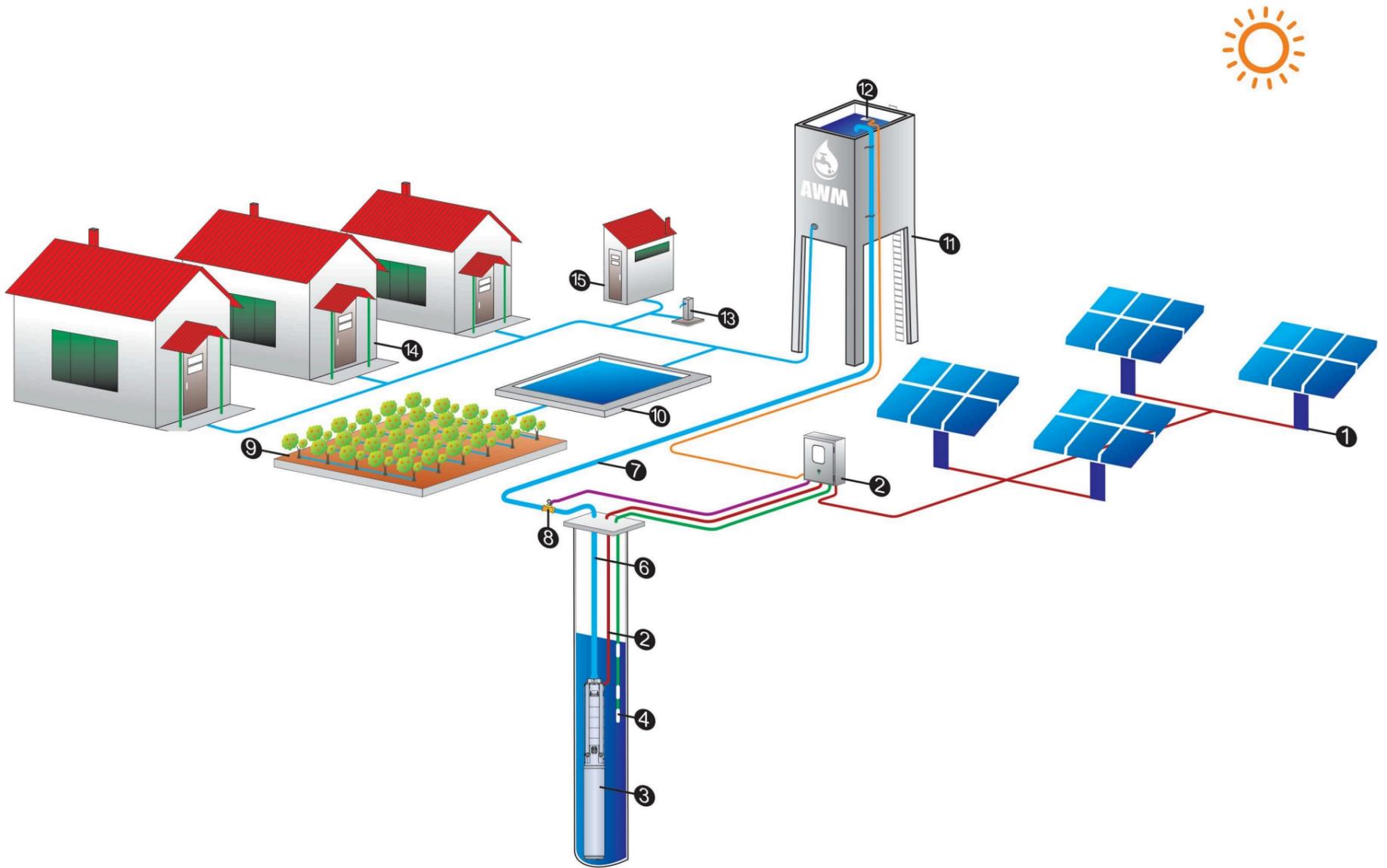
Area Diagram

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



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

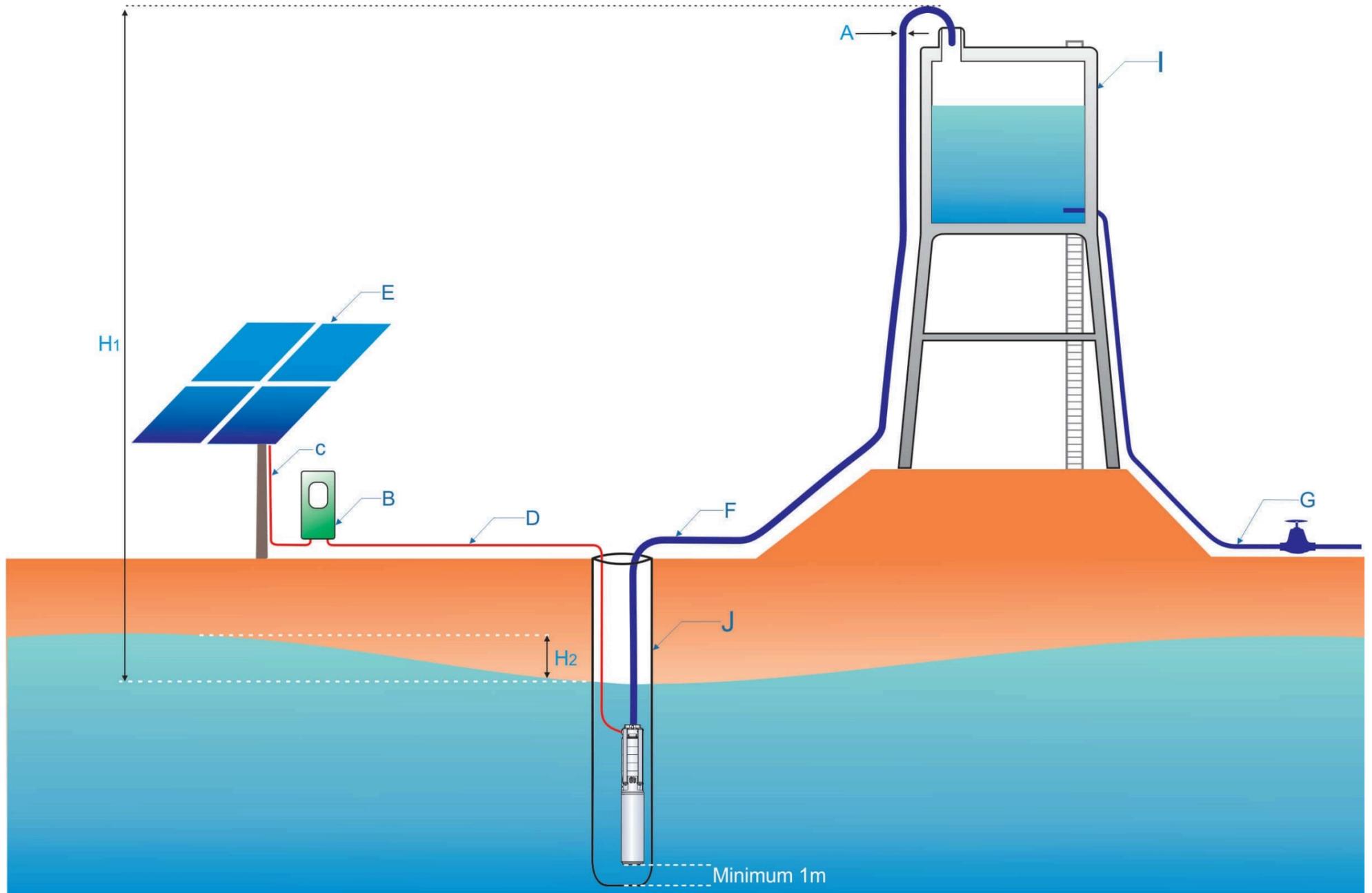
System General layout



- 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.