

MINI-GRID NDEGO SECTOR-KAYONZA DISTRICT IN RWANDA (EASTERN PART OF AFRICA)



**Project Design, Engineering & Project
Management by SunPower &
Consultants Pvt Ltd, India
www.sunpowerconsultant.com**



1. Background of the Project

SOLEKTRA is a leading provider of clean renewable energy solutions such as Solar Home Systems, Solar Street Lights, Solar Mini Grids, Smart Solar Irrigation, Water Solutions and other groundbreaking technological solutions.

After careful evaluation and deeply researching on electricity access in Ndego Sector, it has been noticed that most parts of Ndego and residents as well don't have electricity either on grid or off grid connections. It is in that regard in May 2019, **SOLEKTRA** launched the Solar Mini Grid in Ndego Sector-Kayonza District to improve the livelihood of people through productive use of energy enterprises development.

This Mini Grid was initiated to help people for commercial needs. Here people can connect Radios, TVs, Shavers, Fridges, Computers, Printing machines, photocopy and Internet café etc. It provides electricity to the 40 households including shops etc.



2. Village Mapping of all 40 House Holds



3. Project Profile

- Village – Ndego Sector-Kayonza district- Rwanda
- No. of House Holds Connected – 40 HHs
- Total No. of House in the village – 1000 Houses
- Distribution system used: underground
- PV – 275Wp*8nos
- Technology used: Power Bloxs
- Inverter size–200W*8
- Battery storage:1.2Kwh*8
- Power Cable used to supply meter hubs 2*4sqmm(cu)
- Service Cable used at the end users HH 2*2.5sqmm (Cu)

4. Trenching works of the power supply to the meter hubs



5. Mounting of the solar panels



Eight solar panels have been fixed above the Power hub with the capacity of 275 wp each . It was used to supply to the eight Power Blox which have the capacity of 1.2 Kwh storage each.



6. Installed PV Module Technical Data Sheet



AstroNova™
Profitable for Decades

255W~275W
5BB-Polycrystalline PV Module

CHSM6610P Series
CHSM6610P/HV Series

CHSM6610P max system voltage 1000V standard
CHSM6610P/HV max system voltage 1500V standard

Tier 1
Bloomberg

No. 1
PHOTON

MunichRe
Insured

DNV GL
TOP TIER

10-year Warranty for Materials and Processing
25-year Warranty for Extra Linear Power Output
(1st year ±2.5%, 2nd-25th years ±0.7% / year)



97.50%
80.70%

KEY FEATURES

- +5W OUTPUT POSITIVE TOLERANCE**
Guaranteed 0~+5W positive tolerance ensures power output reliability.
- INNOVATIONAL 5-BUSBAR CELLS**
Reduces the cell series resistance and internal stress, decreases the risk of micro-crack and improves the module output.
- Anti-PID**
Excellent PID resistance at 96 hours (@85°C/85%) test, and also can be improved to meet higher standards for the particularly harsh environment.
- EXCELLENT MECHANICAL LOAD CAPABILITY**
Certified to withstand: snow load (6000 Pa) and wind load (3600 Pa).
- HIGHER RELIABILITY AND DURABILITY**
Effectively deals with harsh environments, such as sand, salt mist and ammonia resistance.

COMPREHENSIVE CERTIFICATES

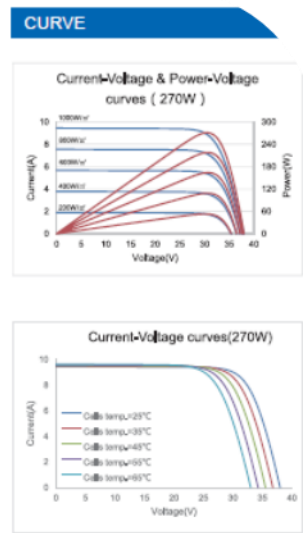


ELECTRICAL SPECIFICATIONS					
Rated output (P _{mp})*	255 Wp	260 Wp	265 Wp	270 Wp	275 Wp
Rated voltage (V _{mp}) at STC	30.86 V	30.88 V	30.92 V	31.08 V	31.12 V
Rated current (I _{mp}) at STC	8.33 A	8.43 A	8.58 A	8.70 A	8.85 A
Open circuit voltage (V _{oc}) at STC	37.48 V	37.72 V	37.87 V	38.00 V	38.45 V
Short circuit current (I _{sc}) at STC	8.85 A	8.95 A	9.18 A	9.45 A	9.52 A
Module efficiency	15.6%	15.9%	16.2%	16.5%	16.9%
Rated output (P _{mp}) at NOCT	191.3 Wp	195.0 Wp	198.8 Wp	202.5 Wp	206.3 Wp
Rated voltage (V _{mp}) at NOCT	27.73 V	27.94 V	27.98 V	28.12 V	28.15 V
Rated current (I _{mp}) at NOCT	6.90 A	6.98 A	7.10 A	7.20 A	7.33 A
Open circuit voltage (V _{oc}) at NOCT	34.24 V	34.46 V	34.60 V	34.71 V	35.13 V
Short circuit current (I _{sc}) at NOCT	7.45 A	7.54 A	7.73 A	7.96 A	8.02 A
Temperature coefficient (P _{mp})	- 0.407%/°C				
Temperature coefficient (I _{sc})	+0.049%/°C				
Temperature coefficient (V _{oc})	- 0.310%/°C				
Normal operating cell temperature (NOCT)	43±2°C				
Maximum system voltage (IEC/UL)	1000V _{DC} or 1500V _{DC}				
Number of diodes	3				
Junction box IP rating	IP 67				
Maximum series fuse rating	15 A				

* Measurement tolerance ±1-3%
STC: Irradiance 1000W/m², Cell Temperature 25°C, AM=1.5
NOCT: Irradiance 800W/m², Ambient Temperature 20°C, AM=1.5, Wind Speed 1m/s

MECHANICAL SPECIFICATIONS	
Outer dimensions (L x W x H)	1648 x 990 x 35 mm 64.88 x 38.98 x 1.38 in
Frame technology	Aluminum, silver / black anodized
Module composition	Glass / EVA / Backsheet (white)
Front glass thickness	3.2 mm / 0.13 in
① Cable length (IEC/UL)	900 mm / 35.43 in
Cable diameter (IEC/UL)	4 mm ² / 12 AWG
② Maximum mechanical test load	6000 Pa
Tire performance (IEC/UL)	Class C (IEC) or Type 1 (UL)
③ Connector type (IEC/UL)	MC4 compatible

① 900(+)/600(-) mm or 1000 mm for defined projects in advance.
② Ironing Crystalline Silicon PV Module Installation Manual or contact technical department.
③ Mechanical Test Load=1.5X Maximum Mechanical Design Load.



PACKING SPECIFICATIONS	
① Weight (module only)	18.3 kg / 40.34 lbs
② Packing unit	31 pcs / box
Weight of packing unit (for 40'HQ container)	606 kg / 1336 lbs
Number of modules per 40'HQ container	868 pcs

① Tolerance ±1.0kg
② Subject to sales contract

7. Installed Power Blox



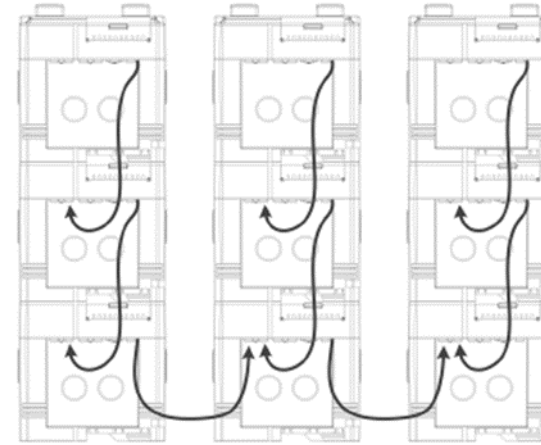
The figure below shows how two Power-Blox can be coupled together.

Before the two units are coupled, switch off both units.

The transfer cable (9) of the upper unit is now passed through the cable guide channel (10) and connected to one of the two transfer sockets (6) of the lower unit. It does not matter which of the two transfer sockets (6) is used.

After switching on the two Power-Blox both Power-Blox synchronize and form a "swarm net".

Up to three Power-Blox can be connected to a tower and several towers can be coupled to each other.



PBX-200 PB (230 V, 200 W, 1.2 kWh AGM Battery)
PBX-200 Li (230 V, 200 W, 1.2 kWh Li-ion Battery)

8. Technical data of installed PBXs (Power Bloxs)

Inverter	PBX-200 Pb	PBX-200 Li
Rated grid voltage	230 V	
Rated frequency	50 Hz	
Phases	1 Phase	
Harmonic distortion	<4%	
Continuous power at 25°	200 W	
Power for 5 sec. at 25°	230 W	
Power for 3 sec. at 25°	370 W	
Maximum load	Up do short-circuit	
Cos φ	0.1 bis 1	
Grid / generator input		
Input voltage	230 V ±15%	
Frequency range	47 - 64 Hz	
Grid charger current	5 A	
Charging characteristics	IUoU ¹	Li BMS ¹
Resettable fuse	10 A	
Transfer connectors		
Transfer voltage	230 V ±15%	
Frequency range	47 - 64 Hz	
Resettable fuse	10 A	

Solar input		
Solar charger type	MPP ²	
Input voltage range	30 - 45 V	
PV current	8 A	
Maximum PV power	250 W	
Recommended PV power	200 W	
Charging characteristics	IUoU ¹ , temperature regulated	Li BMS ¹ , temperature regulated
Battery		
Included batteries	2 x Hoppecke sun power VR M 12 V 58	2 x SmartBattery 12 V 50 AH
Battery technology	Lead acid / AGM ³	LiFePO ⁴
Internal battery voltage	24V	
Cycle stability	2500 cycles	5000 cycles
Expected lifetime	3 - 5 Jahre	> 10 Jahre
DC Output		
Cigarette lighter socket	12 V, 3 A	
USB socket	2 x 5 V, 2 A	

9. Installed meter hubs





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