



## FINAL ACCEPTANCE AND COMPLIANCE TESTS SOLAR PV SYSTEMS NAMIBIA S4H GP 600497

<b>Site Name or ID:</b> Klein Aub Clinic	<b>Inspection date:</b> 10.01.2017
<b>GSOL Representative:</b> Mr. Heinrich Steuber	<b>Note:</b> <b>Grid connected System (public power)</b>

### **FAC Test Description:**

- The main objective of the Final Acceptance Test is to assure the purchaser that all the components of the System are installed in right quantity, and the System met the relevant requirements.
- The Final Acceptance Test is successfully performed when the FAC requirements for a system included in the relevant purchase order are met, the FAC are performed successfully and no severity level 1 (service affecting) or no severity level 2 (non-service affecting) defects remain in the system.
- The punch list shall list all defects ranked as severity level 1 or 2 defects identified during the respective final acceptance test, if any. All level 1 defects shall be remedied by contractor prior to final acceptance. All level 2 defects can be remedied by contractor during 4 weeks after signing FAC.

### **Severity Level 1 Defects:**

Severity Level 1 defects or service affecting defects are all defects that can contribute to FAC failure.

### **Severity Level 2 Defects:**

Severity Level 2 defects or non-service affecting defects are all defects that cannot contribute to FAC failure and should be marked on the document for clearance after the FAC visit. After FAC all severity level 2 defects should be cleared during 4 weeks. The same punch/snag list should be used to verify that all snags identified at FAC are cleared.

### **Severity Level 1 Defects List:**

- Power System not operational (system not supplying power to equipment)
- Power System functioning but not functioning in battery mode.
- Solar chargers not functioning (not supplying DC to the battery or some modules not operational)
- Inverters not functioning (not supplying AC load or some modules not operational)
- Mains mode not functional (not supplying AC load when mains is available, PV panels disconnected and battery discharged)
- Batteries not functional.
- PV panels not functional.
- Delivery not complete.

### **Severity Level 2 Defects List:**

- All other snags identified on site as per the table on page 3.



BILL OF QUANTITY / COMPONENT	PART NUMBER	QUANTITY	CHECKED (GSOL)	APPROVED (CUSTOMER)
Victron Quattro 48/8k/110-100/100	QUA488020000	1	✓	✓
Victron SmartSolar MPPT 250//100-TR	SCC125110210	1	✓	✓
Victron Lynx Distributor	LYN060102000	1	✓	✓
Victron Lynx Power In	LYN020102000	1	✓	✓
Victron Lynx Shunt VE.Can	LYN040102100	1	✓	✓
Victron Color Control GX	BPP000300100R	1	✓	✓
BAE Cell 6 PVV 900 PPOL horizontal batteries	2089017	24	✓	✓
EGing Solar 250Watt Poly, Alu panel	02250P05	24	✓	✓
Circuit breaker B 16A 1 pole	2622758039	2	✓	✓
Circuit breaker C 32A 1 pole	2122721414	2	✓	✓
Outdoor cabinet for batteries and inverter w/cooling	SBC-DK	1	✓	✓



<b>SEVERITY LEVEL 1 SNAGS – SERVICE AFFECTING SNAGS:</b>	<b>PASS</b>	<b>FAIL</b>	<b>CLEARED</b>
Power System operational? Supplying power to equipment	X		✓
Power System tested in hybrid mode, stable in all modes: generator/mains, solar and battery (not related to generator issues)	X		✓
All Solar chargers functional? Charging batteries when solar energy available.	X		✓
All Inverters functional? Supplying load to AC equipment.	X		✓
All Solar panels functional?	X		✓
Battery operation to be verified?	X		✓
Delivery complete?	X		✓
<b>SEVERITY LEVEL 2 SNAGS –NON - SERVICE AFFECTING SNAGS:</b>	<b>PASS</b>	<b>FAIL</b>	<b>CLEARED</b>
Installation is as per agreed layout design.	X		✓
The visual inspection of equipment is free from any damage.	X		✓
All connections ( <b>cabling and coopers</b> ) correct gauge and securely terminated.	X		✓
Solar structure properly mounted on the roof or ground.	X		✓
All solar panels firmly fixed on roof or ground structure.	X		✓
All equipment labeled.	X		✓
No alarms present on power system.	X		✓
System log files to be verified.	X		✓
System Voltage Calibration and readings to be checked & verified.	X		✓
Load & Battery Current Calibration to be checked & verified	X		✓
Battery Breaker to be tested & verified.	X		✓
Load Breakers to be tested & verified.	X		✓
Battery rack properly installed	X		✓
Batteries free from damages and acid leakages properly installed on rack.	X		✓
Check earth connections to Power system and Solar panels	X		✓
Staff training performed.	X		✓



DESCRIPTION	VALUE	COMMENTS
Min. AC Load during FAC visit:	0,03 kW	
Max. AC Load during FAC visit:	1,25 kW	Clinic A/C unit and cabinet cooling active
Current from Solar chargers:	62 A	Can go from 0 to 100A
Battery voltage:	57V	
Generator Rating:	N/A	No genset present
Equipment Room Temperature at FAC visit:	30 °C	Cabinet set to 26 °C
Battery voltage to switch on Mains:	49 V	
AC Current available from mains:	32 A	Limited by programming and breaker

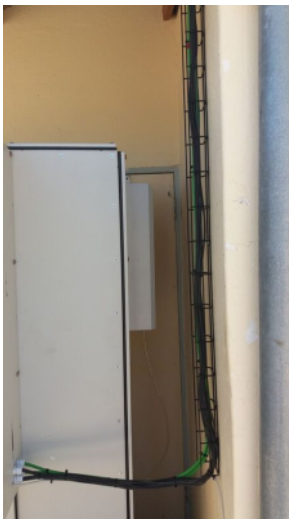
SNAGS LIST – TO BE CLEARED	RESPONSIBLE	CLEARED
Installation Complete – no pending installation related action.		

**FAC Summary:**

FAC APPROVED BY:	Name:	Signature:
Site Representative		
GSOL Representative	Heinrich Steuber	
UNDP Representative		
UNDP/PSU Representative		



Annexes





### System Test Report

#### 1. General Data

Project Nr.: 10263  
 Customer: UNDP (GP600497 Namibia)  
 System ID: 2017MP100064  
 Q.C. Passed  Yes  No  
 Signature: *Alih Os.*

GSOL ENERGY GLOBAL A/S  
  
 2017MP100064  
 www.gsolenenergy.com

#### 2. System information

Inverter No. of Inverters: 1 Inverter type & size: V. Quattro 8kVA  
 Voltage (L-N): 230 VAC  1-phase or  3-phase  
 DC Cable dimension: 25 mm2 DC fuse: 200 A  
 AC-Out Cable dim.: 2x6 mm2 AC relay/junction Amp:  
 AC-In Cable dim.: 2x6 mm2  
 Max DC Amp: 210 Max AC Amp /phase: 34  
 Firmware version: 2653-413  AC OVP - out  
 Charger No. of chargers: 1 Charger type: MPPT 250/100-TR  
 DC Cable dimension: 25 mm2 DC fuse: 125A  DC OVP DENHguard  
 Firmware version: 2.04  
 DC Coupling  Distributor  Power-In  Lynx Ve.Can Max DC Amp:  
 AC Coupling  Type GEG AC Amp size: 32A  
 Type Multicluster Clusters: 1  
 Battery Battery bank voltage: 48 V Ah per cluster: 729 C10  
 PV Inverter No. of PV-Inverters:  
 AC Cable dimension:  
 Grid Feedback allowed  Yes  No  
 Firmware version:  
 Grounding  New Grounding rod  Existing Grounding rod Cable dim. 6 mm2  
 Monitoring  Battery monitor  Color Monitor  Other 2.11 Monitor ID: f45eab69d112

#### 3. System testing - Installation

Fixation  All elements firmly installed  Bolts used at: INVERTER  
 Cabling  Cables laid with respect to bending radius (max 5 x diameter) and orientation  
 Cable fixators at every 30 cm max  
 Marking Cable polarity marked:  Red/Black  Cable marking system  
 AC-in / AC-out marked LABEL  
 Battery connection marked RED / BLACK

#### 4. System testing - Function

Inverter  All lights showing Normal operation AC test level: 2000 W  
 Listed system voltage and phase verified  
 Inverter Program  UPS / Prioritise Grid Voltage (L-N): 230 VAC  
 Custom trigger for cyclic operation  
 AC-In Power trigger lvl: W Battery trigger lvl: Udc  
 AC-In Power block lvl: W Battery block lvl: Udc  
 Trigger parameters verified  
 PV inverter Frequency shifting  
 Grid Feedback activated?  No  Yes from Chargers  Yes from PV inverters  
 NOTES: System tested with 500Wp per charger  
 System charging  By Chargers  By Grid/Genset  By PV inverter  
 Safety Battery Breaker functional  Yes  No  
 System Grounding  Grounding ok  
 Monitor Color Monitor:  All devises showing  Activated on Web-portal  
 Two-way com enabled  
 Battery Monitor:  Battery Ah set

#### 5. Comments / Written notes