

ENERGY SYSTEM DATA SHEET

Read this data sheet carefully and ensure you have fully understood its contents before operating this device for the first time



PRODUCT	PRODUCT CODE	SPEC: SHORT
AC Energy System	ACLEVEL4	48 / 3000/ 35-32-5000



SPECIALIZED SOLAR SYSTEMS®
The National Alternative Energy Supply Company®™

43 Ossie Urban Street, Tamsui Industria,
George, 6529, South Africa
+27(0) 44 878 1126
info@specializedsolarsystems.co.za
www.specializedsolarsystems.co.za

Refer to <https://specializedsolarsystems.co.za/associated-partners/> for distributor listing and further information



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1. GENERAL OVERVIEW OF THE LEVEL 4 ENERGY SYSTEM

This Energy System utilizes the Victron Multiplus II inverter range. This NERSA approved unit is an inverter/charger with device networking built in. The Multiplus II communicates with the solar charger, batteries and other devices to control a grid-connected system, off-grid system or a remote power installation capable of parallel operations, for increased power output or battery charge rates. The Multiplus II can also be configured for three phase energy supply. A host of advanced features – such as uninterrupted power supply, setting load limits and supplementing limited grid power availability with battery power – can also be controlled directly from your cell phone or smart device, making remote monitoring also possible.

The Level 4 energy system has a 3000 VA inverter and a 5 kWh LiFePO₄ battery with full integrated remote management for all components.

By purchasing the “DC-Attachment Unit”, this Level 4 Energy System can be integrated with up to 3.240 kWp (9 x 360 Wp) of installed solar panels. Now your energy system becomes a fully DC- coupled network integrated unit, saving on your monthly energy bill and/or becoming a fully remote managed “off-grid” solution. This unit is not only a UPS. It has the capability to become an integral part of your electrical network, facilitating the input of solar energy into this network and transferring up to 32A of 230 VAC through the system. With its intelligent battery charger, it maintains the LiFePO₄ battery at the correct value, ensuring long life with no maintenance. This unit has a 35A charger.

Ask your service agent about any of the following system functions:

- Integration of solar panels.
- Transfer capacity and advantages.
- Parallel connection and growth of system.
- 1Ø - 3Ø phase connection capability.
- Remote monitoring and evaluation of the energy system.
- System setting and programming functions.

2. TECHNICAL SPECIFICATIONS

2.1 VICTRON ENERGY - MultiPlus II Inverter/Charger 3000VA

48 VOLT 48 / 3000 / 35-32

PowerControl	Yes
PowerAssist	Yes
Transfer switch	32A
Maximum AC input current	32A
Auxiliary output	Yes (32A)

2.2 INVERTER

DC Input voltage range	38 – 66V
Output	Output voltage: 230 VAC \pm 2% Frequency: 50 Hz \pm 0,1% (1)
Cont. output power at 25°C (3)	3000VA
Cont. output power at 25°C	2400W
Cont. output power at 40°C	2200W
Cont. output power at 65°C	1700W
Maximum apparent feed-in power	2500VA
Peak power	5500W
Maximum efficiency	95%
Zero-load power	11W
Zero load power in AES mode	7W

2.3 CHARGER CONFIGURATION

AC Input	Input voltage range: 187-265 VAC, Input frequency: 45 – 65 Hz
Charge voltage 'absorption'	55,2V
Charge voltage 'float'	54V
Maximum battery charge current	35A 0.2C DVCC

2.4 INVERTER ENCLOSURE

Material & Colour	Steel, blue RAL 5012
Protection category	IP22
Battery-connection	M8 bolts
230V AC-connection	Screw terminals 13 mm ² (6 AWG)
Weight	19 kg
Dimensions (h x w x d) mm	506 x 275 x 147

2. TECHNICAL SPECIFICATIONS

2.5 GENERAL

Interfaces	VE.Can, USB, Ethernet, VE.Direct, Wi-Fi
External AC current sensor (optional)	50A
Programmable relay (5)	Yes
Protection (2)	a – g
VE.Bus communication port	For parallel and three phase operation, remote monitoring and system integration
General purpose com. port	Yes, 2x
Remote on-off	Yes
Operating temperature range	-40 to +65°C (fan assisted cooling)
Humidity (non-condensing)	Max 95%

2.6 STANDARDS

Safety	EN-IEC 60335-1, EN-IEC 60335-2-29, EN-IEC 62109-1, EN-IEC 62109-2
Emission / Immunity	EN 55014-1, EN 55014-2, EN-IEC 61000-3-2, EN-IEC 61000-3-3 EC 61000-6-1, IEC 61000-6-2, IEC 61000-6-3
Uninterrupted power supply	IEC 62040-1
Anti-islanding	Please consult the certificates on our website.
1) Can be adjusted to 60Hz 2) Protection: a. Output short circuit. b. Overload c. Battery voltage too high. d. Battery voltage too low. e. Temperature too high. f. 230VAC on inverter output.	g. Input voltage ripple too high. 3) Non-linear load, crest factor 3:1 4) At 25°C ambient 5) Programmable relay which can be set for general alarm, DC under voltage or genset start/stop function. AC rating: 230V / 4A, DC rating: 4A up to 35VDC and 1A up to 60VDC.

2.7 ENERGY SYSTEM SPECIFICATIONS

Enclosure material	Alluminum; 409 Stainless steel
Weight	83 Kg
Dimensions	880(H) X 800(W) X 180(D) mm
Ventilation distance	150mm clear on all sides with no obstructions
Installation	Indoors/inside only
Programming/settings	Optimally factory preprogrammed. Changing any settings will render warranty void.

3. DEFAULT CONFIGURATION SETTINGS

Default configuration settings below:


General | Grid | Inverter | **Charger** | Virtual switch | Assistants

System frequency
 50Hz 60Hz

Shore limit
AC input current limit A Overruled by remote

Dynamic current limiter
 External current sensor connected (see manual)

Enable battery monitor
State of charge when Bulk finished %
Battery capacity Ah
Charge efficiency



General | **Grid** | Inverter | Charger | Virtual switch | Assistants

Grid code selection

Country / grid code standard

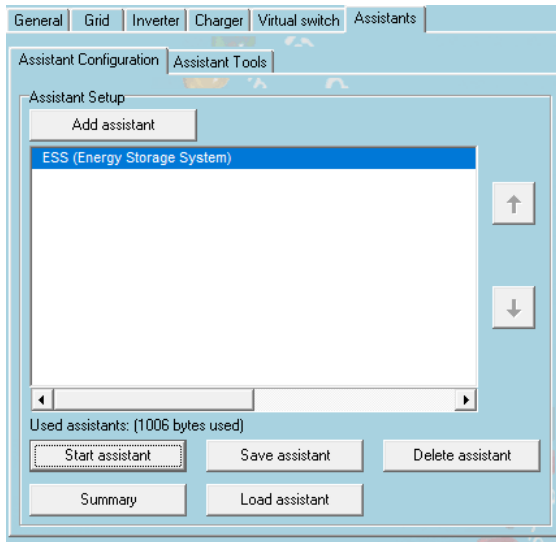
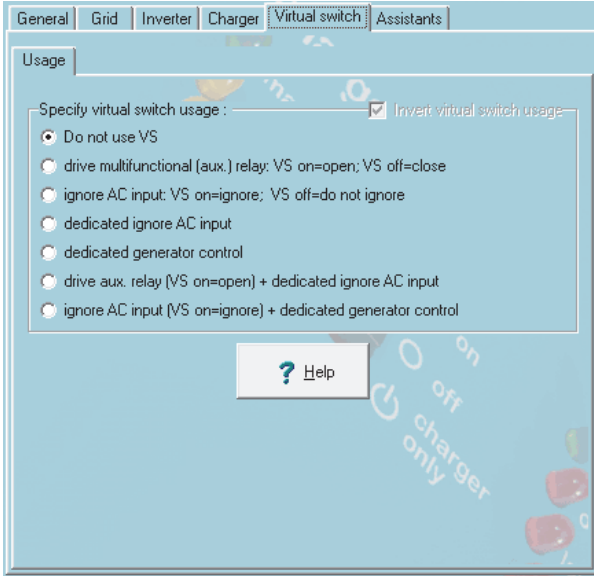
Loss Of Mains (LOM) detection
LOM detection AC input 1

Note: Click [here](#) for more info on LOM.

3. DEFAULT CONFIGURATION SETTINGS

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Default configuration settings below:



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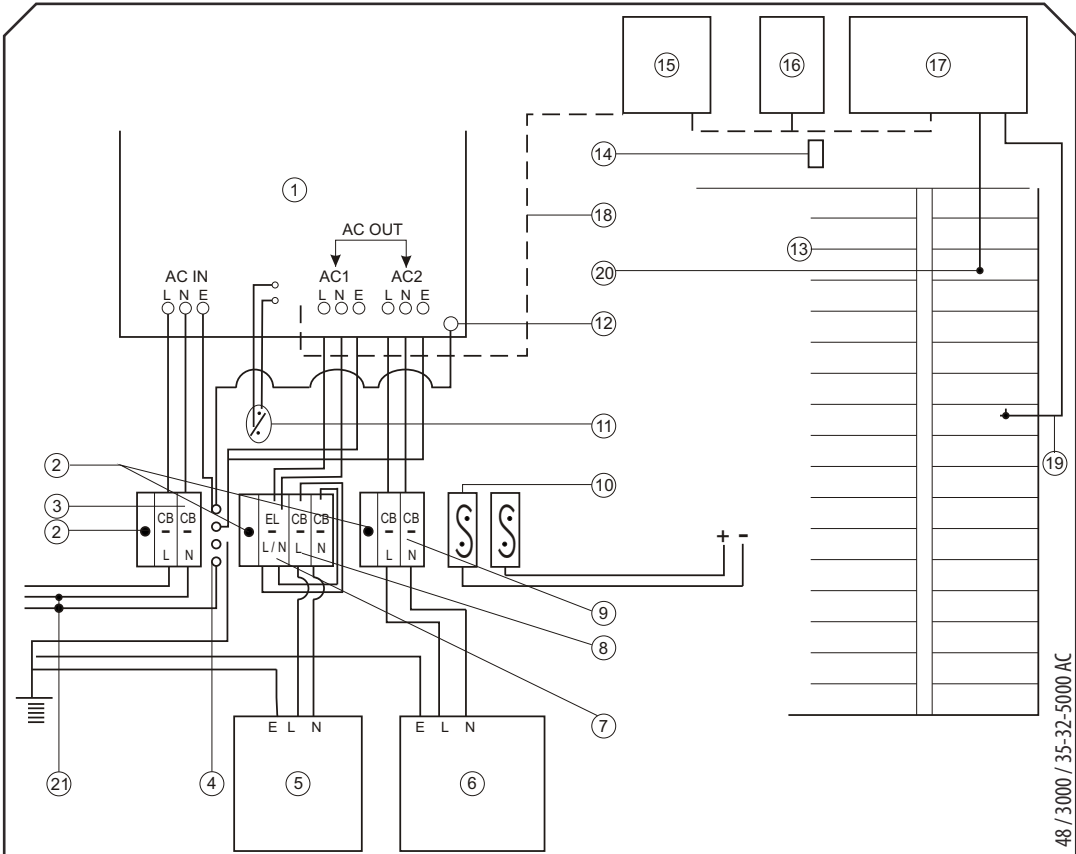
File Information

ESS (Energy Storage System) (size:947)

- *) System uses LiFePo4 with other type BMS
(This can be either a BMS connected via CAN bus or a BMS system in which the batteries are protected from high/low cell voltages by external equipment.)
- *) The battery capacity of the system is 200 Ah.
- *) Sustain voltage 50.00 V.
- *) Cut off voltage for a discharge current of:
 - 0.005 C= 49.00 V
 - 0.25 C= 48.50 V
 - 0.7 C= 48.00 V
 - 2 C= 47.50 V
- *) Inverting is allowed again when voltage rises 1.20 V above cut-off(0).
- *) Relevant VEConfigure settings:
 - Battery capacity 200 Ah.
 - PowerAssist unchecked
 - Lithium batteries checked
 - Dynamic current limiter unchecked
 - Storage mode unchecked

Total size of all assistants including the required
(hidden) system assistants is: 1006

OK



1. Multplus II inverter 3 kVA.
2. Indicator lights.
3. Double pole circuit breakers.
4. Common earth bar.
5. AC1 output - essential leads only.
6. AC2 output - high loads only.
7. AC1 earth leakage.
8. AC1 double pole circuit breakers.
9. AC2 double pole circuit breakers.
10. LiFePhO4 main fuse.
11. Inverter on/off switch.

12. Ground to earth.
13. LiFePhO4 battery sensor.
14. BMS main on/off switch.
15. Colour control GX.
16. Translator board can-buss.
17. Battery BMS.
18. Inverter cable.
19. Battery temperature sensor.
20. Battery cell monitor.
21. Neutral / earth link

5.1 BATTERY SPECIFICATIONS

Battery type:	LiFePO ₄ (Lithium iron phosphate)
Rated voltage:	51.2 VDC
Nominal capacity:	100 Ah
Standard charge current:	70A
Wh capacity at 100%:	5120 Wh
Max charge current:	100A
Max charge voltage:	56 VDC
Cycle life:	Greater than 3000 @ 0.2C discharge & 90 %
Standard discharge current:	50A
Max discharge current:	100A
Discharge cut-off voltage:	48V at 30A - 50A
Operating temperature:	
Charge:	0 to 45° C
Discharge :	-10 to 55° C

The following algorithm has been programmed into the energy system battery:

- » Cell over-discharge protection.
- » Battery over-discharge protection.
- » Cell over-current protection.
- » Battery discharge over-current protection.
- » Short circuit protection.
- » Over / under temperature protection.

The battery software is integrated into the inverter and the possibly attached MPPT. All alarm triggers will be presented in the battery information LED screen and/or in the VRM Management Portal. The battery is programmed to protect itself if it is used outside the allowed settings.

6. SOLAR PANEL (PV) INTEGRATION

By purchasing the "DC- Attachment Unit" (150 - 250 / 70 - 48 DC) , this energy system can become a full off-grid energy supply system for 1Ø or 3Ø phase energy supply.

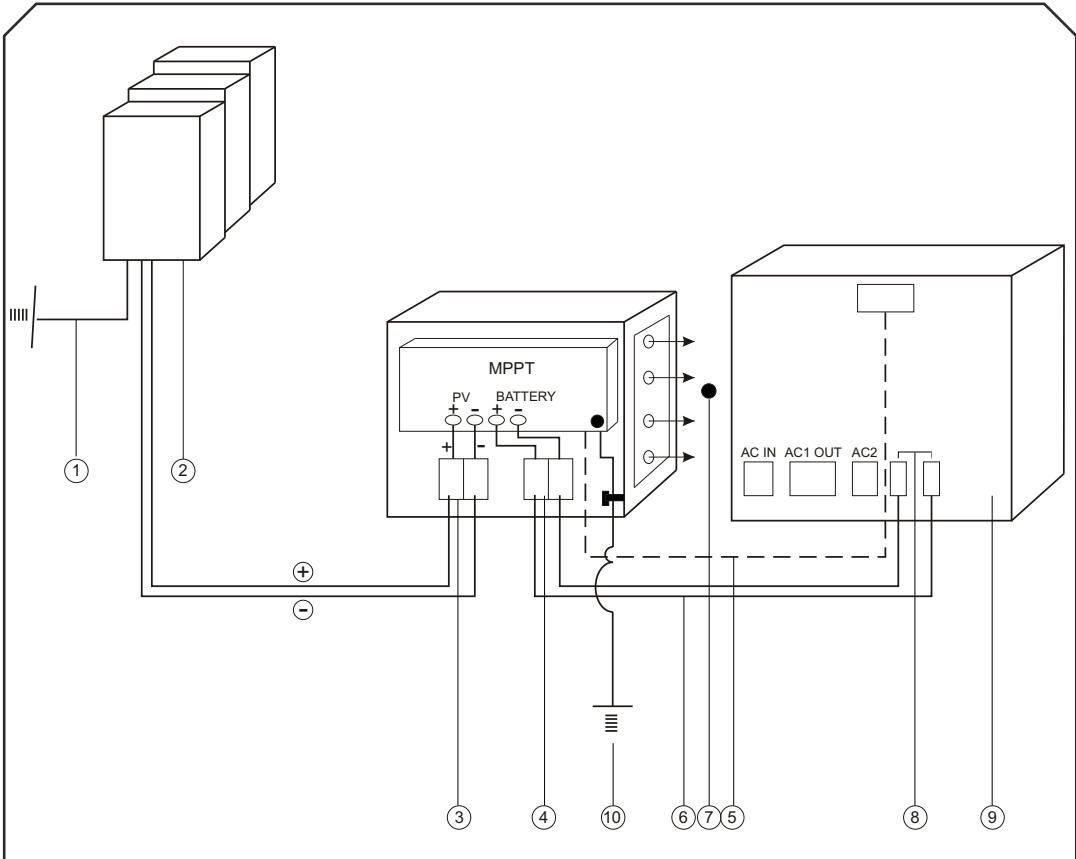
The following technical specifications would apply to this energy system:

6.1 PV SPECIFICATIONS LEVEL 4

Max input voltage from solar panels: (please confirm clusters from solar panels to system)	150 /250 VDC
Max (A) supplied by solar and grid simultaneously:	100A
Recommended (A) supplied by solar & grid simultaneously:	70A
Max solar array:	3240 Wp
Programming of MPPT for effective charge:	Please see battery values



7. DC-COUPLED MPPT UNIT LINE DIAGRAM TO LEVEL 4 ENERGY SYSTEM



1. DC-PV earth not bonded to AC earth.
2. Configured solar panel installation.
3. Double pole DC breaker for PV.
4. Double pole DC breaker for battery.
5. VE direct or can-buss.

6. Battery cable connection MPPT with fuses.
7. Bolt on method between units.
8. Main fuses for battery.
9. Level energy system.
10. Bonded earth to AC.

8. PROGRAMMING FEATURES

To achieve optimal performance from your energy system, you will need to have it programmed effectively. This program, be it UPS mode, virtual switch or ESS method of operation, must be done by a qualified service technician. With remote monitoring connected, our monitoring division will be able to support and confirm these settings on behalf of this approved installer, if so required.

9. SAFETY INSTRUCTIONS

General safety instructions:

Please read all documentation supplied with this product first so that you are familiar with the safety indicators and instructions before using this product. This equipment should be used for the designated application only.

WARNING: Danger and electrical shock

- This product is used in combination with a permanent energy source (battery). Even if the equipment is switched off, a dangerous electrical voltage can occur at the input or output terminals. Always switch the AC power OFF and disconnect the battery before any maintenance is carried out.
- Never use the product at sites where a gas or a dust explosion could occur. The product is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities, or with a lack of experience or knowledge.
- An approved service agent must take responsibility of the installation of this product.

9.1 Transport and storage safety instructions:

- When transporting or storing the product, ensure that the main supply and the battery leads are disconnected.
- Transport the product in the original packaging only.
- Store all products in a dry environment in a temperature range of 0 to 45°C.

WARNING: Do not lift heavy objects without assistance.

10. INSTALLATION

- For electrical work, follow the National Wiring Standards and Regulations of South Africa.
- This product is a Safety Class 1 device. The AC input and/or output terminals must be provided with an uninterrupted grounding for safety purposes. The additional grounding point located inside the unit should have a ground conduction of at least 4mm².
- Never replace a protective device with a component of a different kind.
- Before switching the energy system on, first check that the input voltage is correct.
- Ensure that the equipment is used in the correct operating conditions.
- Never operate in wet or dusty conditions.
- Ensure that there is sufficient free space for ventilation around the installed equipment.
- Install the product in a heat proof environment.
- Ensure that there are no chemicals, plastic pots or curtains in the immediate vicinity of the installation.
- Always ensure that you follow the correct installation video/manual procedures when attempting to install this unit.

SPECIALIZED SOLAR SYSTEMS (PTY) LTD. (SSS) – WARRANTY CONDITIONS

This Limited Warranty applies to the Products and Systems sold and/or installed by Specialized Solar Systems (SSS) or an affiliated company. SSS warrants the quality of such Systems and specifies the scope of such Warranty.

1. 1 (one) Year Limited Warranty
SSS warrants the equipment installed and workmanship to be free from defects and/or failures specified below for a period not exceeding 1 (one) year from the date of installation of such equipment:
 - i) Defects and/or failures due to manufactured items;
 - ii) Defects and/or failures due to materials.
 - iii) Defects and/or failures due to faulty workmanship.
 - iv) Batteries are subjected to a power usage factor of 0.2C over 3000 cycles or 5 years (whichever comes first), at a temperature that is less than 45°C.
 - v) Programming: Energy systems are optimally setup in factory production. Changing any of these settings will void the energy systems warranty.

In the event of any of the above defects and/or failures, SSS will arrange for the repair/replacement of such systems/components at its sole discretion. This may include the repair/replacement of the system/components with new/replacement components.

2. Warranty Exclusions
 - i) No claim based on this Limited Warranty may be brought after the applicable Warranty period;
 - ii) Any repair/replacement of systems/components shall not extend the original terms of this Warranty.
 - iii) The customer is responsible for ensuring a valid electrical Certificate of Compliance is obtained for a specific site/premises, prior to SSS conducting any installation of systems on that specific site/premises. Failure of the customer to comply with this requirement will invalidate this warranty.
3. This Limited Warranty shall not cover defects and/or failures of systems/components from the following causes, even though such defects and/or failures are discovered within the applicable Warranty period:
 - i) Defects and/or failures caused by devices and/or parts other than the systems/components supplied/installed by SSS;
 - ii) Defects and/or failures caused by defective wiring, installation, or handling by parties other than SSS;
 - iii) Defects and/or failures caused by installations not in conformance with SSS system/component specifications, installation manuals or operation manuals;

- iv) Defects and/or failures caused by unauthorized maintenance, operation or modification;
 - v) Defects and/or failures caused by removal from the original place of installation;
 - vi) Defects and/or failures caused by repairs not in accordance with SSS instructions;
 - vii) Defects and/or failures caused by inappropriate handling during transportation and storage;
 - viii) Defects and/or failures caused by external accidents such as fire and explosion;
 - ix) Defects and/or failures caused by natural forces, acts of God, or force majeure events and other unforeseen circumstances or causes beyond SSS' reasonable control, including but not limited to, earthquakes, hurricanes, typhoons, tornadoes, floods, lightning, storm damage, snow damage, etc.;
 - x) Defects and/or failures caused by smoke and/or other pollution, salt damage, acid, rain, etc.;
 - xi) Unauthorized tampering with any part of the system/components.
4. This Limited Warranty does not cover the transportation cost for reshipment of any repaired or replaced system/components to the applicable location, and does not cover the transportation cost for the return of the system/components to SSS or SSS' authorized agents and costs associated with installation, removal or re-installation of the system/components, where such system/components are not installed by SSS or an authorized SSS agent.
 5. This Limited Warranty is transferrable to a new owner of a location where the system/components were originally installed provided that the system/components remain installed at the location where originally installed.
 6. Warranty Limitations
The Limited Warranty set forth herein is expressly in lieu of and excludes all other express or implied warranties including, but not limited to, warranties of merchantability and fitness for a particular purpose and all other obligations or liabilities on the part of SSS, unless such other warranties, obligations or liabilities are expressly agreed to in writing by SSS. SSS shall have no responsibility or liability whatsoever for damages or injury to persons or property, or for other loss or injury resulting from any cause whatsoever arising out of or relating to the systems/components including, without limitation, any defects and/or failures in the systems/components or from use or installation.
Beyond this SSS shall not be liable under any circumstances for any incidental, indirect, consequential or special damages howsoever caused. In no event shall SSS' aggregate liability exceed the value of the system/component which is the subject of a claim or dispute.
This Limited Warranty shall be valid until a new revision is issued by Specialized Solar Systems.

ENERGYDOCK

LEVEL
04



SPECIALIZED SOLAR SYSTEMS® QUALITY CONTROL

COMPONENT NAME:		ASSEMBLER NAME:	
COMPONENT SERIAL NO:		QUALITY CONTROLLER NAME:	

- CHECKLIST -

PASS	FIT & FINISH	QUALITY CONTROLLER INSPECTION	COMMENTS
	Main assembly (paint finish, structure, rivots)		
	Battery compartment lid		
	Inverter compartment lid		
	Multiplus Inverter fit		
	Circuit Breakers DIN Rail & SSS cover		
	LifePO ₄ battery mount		
	Alignments		

SIGN-OFF:		DATE:	
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PASS	COMPONENTS	QUALITY CONTROLLER INSPECTION	COMMENTS
	Multiplus Inverter 500 VA		
	Indicator lights		
	Double pole circuit breaker - 20A		
	Common earth bar		
	AC out in earth leakage - 25A		
	AC out breaker - 20A		
	LiFePO ₄ main fuse		
	Inverter on/off switch		
	Ground to earth		
	Battery BMS		
	BMS remote display		
	Battery cell monitor		
	Neutral / earth link		

SIGN-OFF:		DATE:	
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SPECIALIZED SOLAR SYSTEMS® QUALITY CONTROL

PASS	PROGRAMMING & COMMISSIONING Memory, setup & connectivity	QUALITY CONTROLLER INSPECTION	COMMENTS
	BMS on/off		
	Inverter on/off		
	VE Config upload		
SIGN-OFF:		DATE:	
PASS	PERFORMANCE - DISCHARGE & CHARGE	QUALITY CONTROLLER INSPECTION	COMMENTS
	UPS mode - AC disconnected		
	Resistive load 400w discharge to LVD		
	Discharge time		
	Discharge voltage LVD		
	Re-charge to 50% SOC		
SIGN-OFF:		DATE:	
PASS	SAFETY & LEGAL	QUALITY CONTROLLER INSPECTION	COMMENTS
	Earth leakage test		
	Breaker test		
	Labels - AC, PV DC (if applicable & align)		
	QR code		
	Earth relay test (inverter)		
SIGN-OFF:		DATE:	
PASS	SAFETY & LEGAL	QUALITY CONTROLLER INSPECTION	COMMENTS
	Packaging Material & mount		
	Shipping list :		
	Manual - Multiplus		
	Product Specification brochure		
	Hanger bracket kit		
	QC label		
	Spare fuse		
SIGN-OFF:		DATE:	

SPECIALIZED SOLAR SYSTEMS® QUALITY CONTROL

FINAL SIGN-OFF AND APPROVAL

NAME OF COMMISSIONER:

DATE:

SIGN-OFF:

