ENERGYDOCK LEVEL 03

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	ACLEVEL3	24/1600/40/16

SPECIALIZED SOLAR SYSTEMS®

SPECIALIZED **SOLAR** SYSTEMS®
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Refer to https://specializedsolarsystems.co.za/associated-partners/ for distributor listing and further information

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1. GENERAL OVERVIEW OF THE LEVEL 3 ENERGY SYSTEM

The primary use of this energy system is for an uninterrupted AC power (UPS) function. In the event of grid failure, the inverter within the Victron Energy MultiPlus Inverter/Charger 1600VA is automatically activated and takes over the energy supply to the connected loads. This happens very quickly (20 milliseconds), enabling a computer and most sensitive electronic equipment to safely continue to operate efficiently from the unit's internal battery without any electricity disruptions.

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 transferring up to 16A of 230 VAC through the system from mains supply.

With an intelligent battery charger, the system always maintains its modern LiFePO4 battery at the correct voltage values ensuring long-life and zero battery maintenance for many years.

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.

ENERGYDOCK LEVEL 03

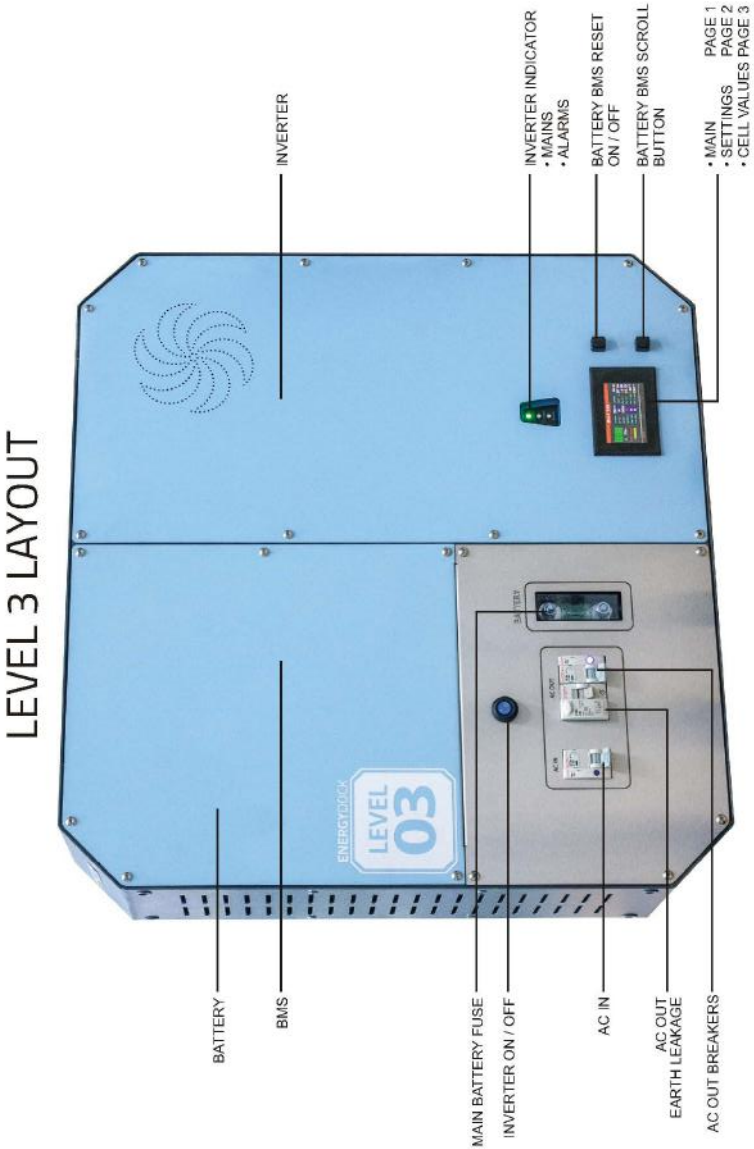
2. INVERTER TECHNICAL SPECIFICATIONS

2.1 VICTRON ENERGY - MultiPlus Inverter/Charger 1600VA	
24 VOLT 24/1600/40	
PowerControl	Yes
PowerAssist	Yes
Three Phase and parallel operation	Yes
Transfer switch	16A
2.2 INVERTER	
Input voltage range	19 – 33V
Output Output voltage	230VAC ± 2%
Output Frequency:	50Hz ± 0,1% (1)
Cont. output power at 25°C (3)	1600VA
Cont. output power at 25°C	1300W
Cont. output power at 40°C	1100W
Cont. output power at 65°C	800W
Peak power	2800W
Maximum efficiency	94 %
Zero-load power	9 W
Zero-load power in search mode	3 W
2.3 CHARGER CONFIGURATION	
AC Input	Input voltage range: 187-265 VAC Input frequency: 45 – 65 Hz
Charge voltage 'absorption'	27,6V
Charge voltage 'float'	27.00 V
Charge current house battery	40 A
2.4 INVERTER ENCLOSURE	
Common Characteristics	Material & Colour: Steel/ABS (blue RAL 5012)
	Protection category: IP 21
Battery-connection	35mm^2
230V AC-connection	G-ST18i connector
Weight	10,2 kg
Dimensions (h x w x d)	470 x 265 x 120 mm

2. INVERTER TECHNICAL SPECIFICATIONS

2.4 GENERAL	
Programmable relay (5)	Yes
Protection (2)	a – g
VE.Bus communication port	For parallel and three phase operation, monitor-
Remote on-off	On/off
DIP switches	Yes (7)
Internal DC fuse	125A
Common Characteristics	Operating temp. range: -40 to +65°C (fan
	Humidity (non-condensing): max 95%
2.6 STANDARDS	
Safety	EN-IEC 60335-1, EN-IEC 60335-2-29, EN 62109-1
Emission / Immunity	EN 55014-1, EN 55014-2, EN-IEC 61000-3-2, EN-
	IEC 61000-6-1, IEC 61000-6-2, IEC 61000-6-3
Road vehicles	ECE R10-5
1) Can be adjusted to 60Hz and to 240V 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 generator start/stop signal function AC rating: 230V/4A DC rating: 4A up to 35VDC, 1A up to 60VDC 6) Remote / Battery charge voltage / Inverter frequency / search mode 7) Battery charge voltage / search mode
2.7 ENERGY SYSTEM SPECIFICATIONS	
Enclosure material	Alluminuim; 409 Stainless steel
Weight	46 Kg
Dimensions	580(H) X 660(W) X 155(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.

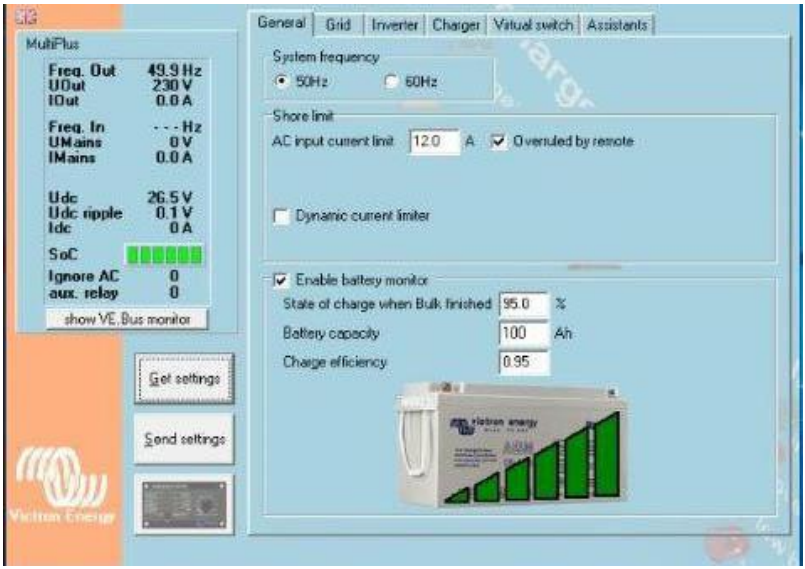
3. LEVEL 3 UNIT LAYOUT



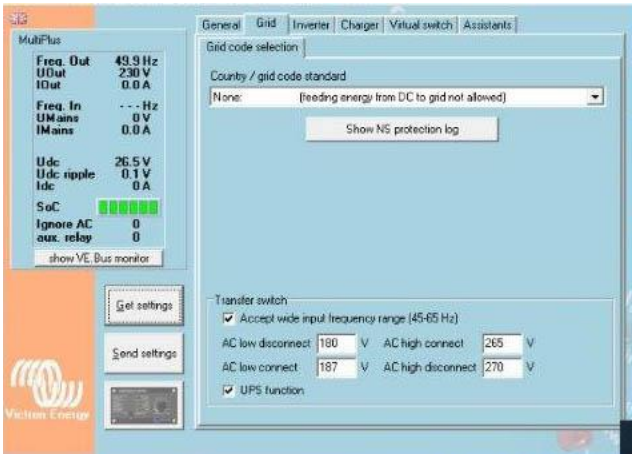
4. DEFAULT CONFIGURATION SETTINGS

The EnergyDock Level 3 unit is supplied with the following default settings. Please note that these settings are primarily for the use of the UPS function. Should solar input or the power assist function will be used, please inquire at Specialized Solar Systems for the details of these settings.

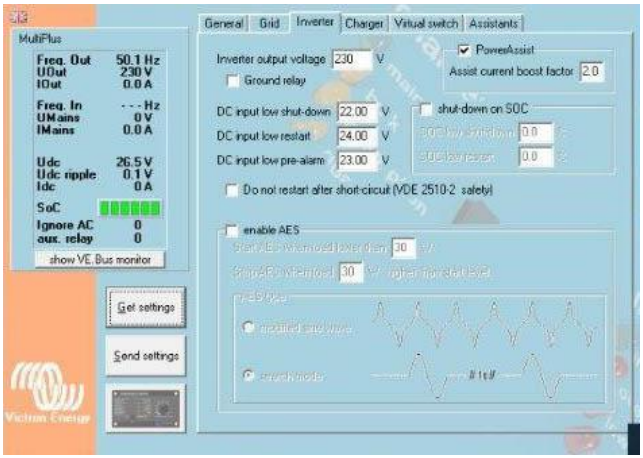
Inverter Setup



4. DEFAULT CONFIGURATION SETTINGS

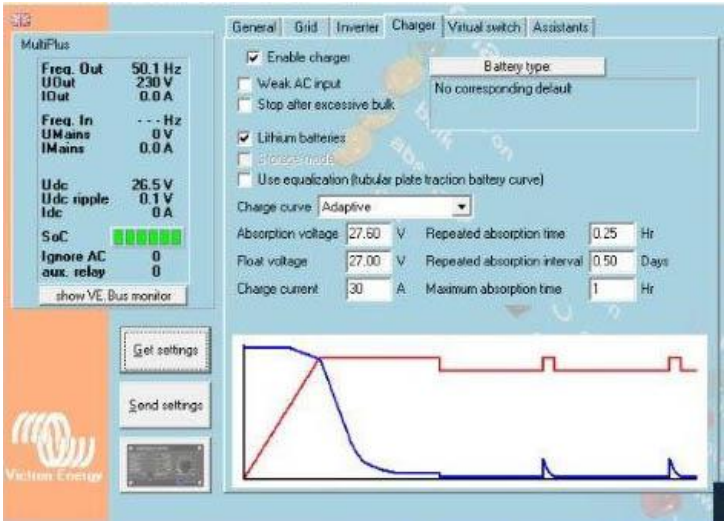


In UPS mode, no feedback will be allowed.

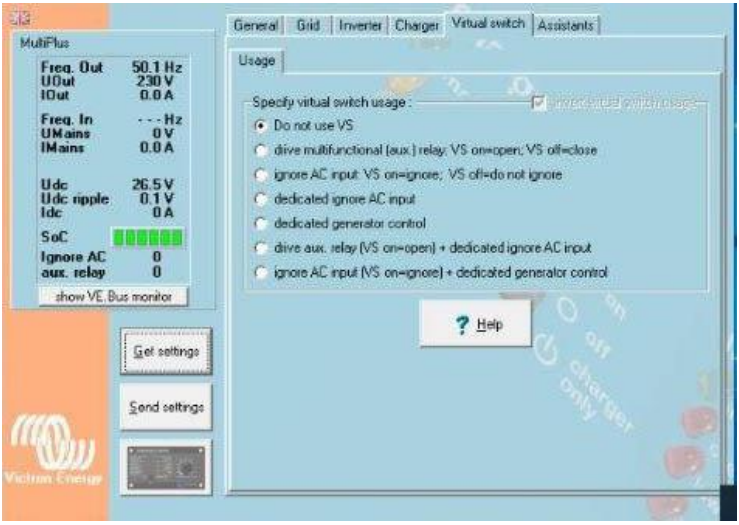


In UPS mode, the DC low shut down value has been set at 22V. This setting has been based on a low ampere draw and should be considered by the installer. At 22V the battery will be depleted between 0 – 5% state of charge (SOC). With a higher constant load, this should be increased to 24V.

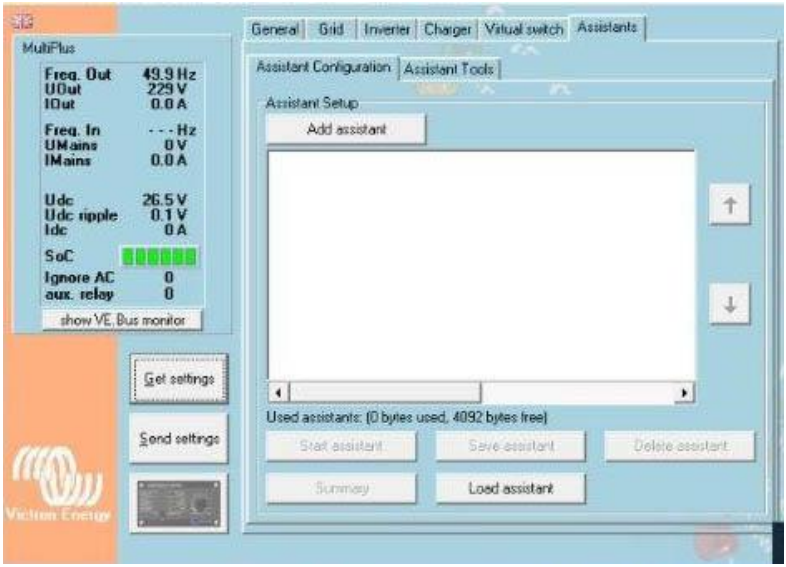
4. DEFAULT CONFIGURATION SETTINGS

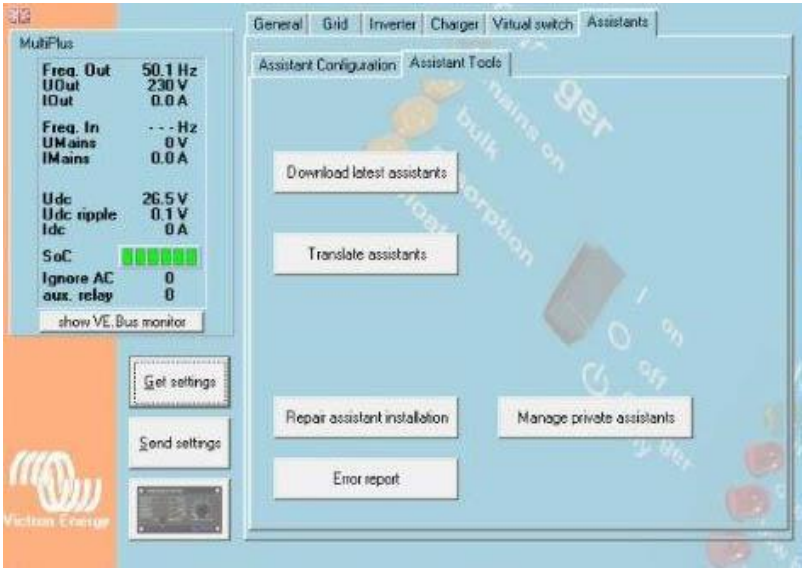


Please note that we have set the charger to 30A. Please maintain this setting. Please also take note of the "repeated times" -these have been set specifically for UPS mode.



4. DEFAULT CONFIGURATION SETTINGS



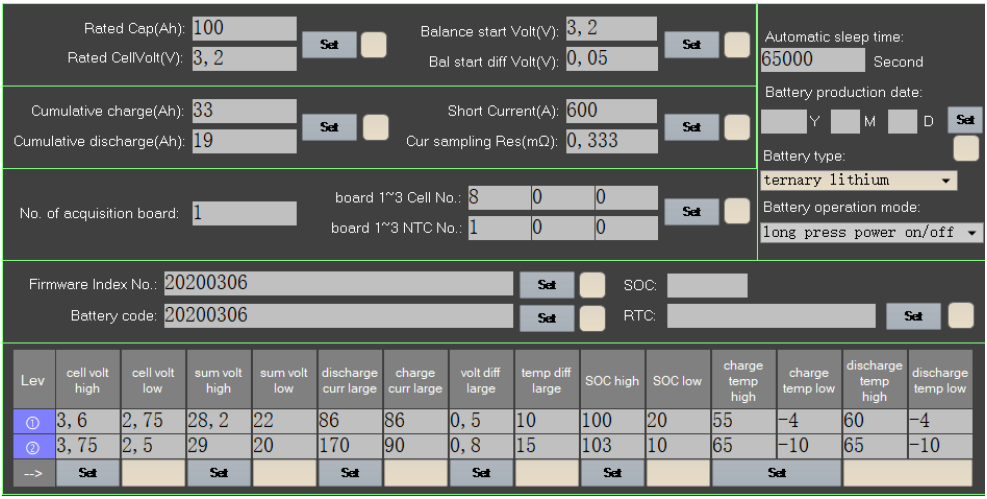


4. DEFAULT CONFIGURATION SETTINGS

The level 3 unit has a smart BMS with the following values:

- 8S 24/60A
- Max Discharge 60A (1536 W)
- Max Charge 30A (768 W)

The following program settings within the BMS will apply:



To access these settings, please enquire about the software program, cables and interphases available.

SHORT SUMMARY OF SETUP

The BMS has two levels of action:

Level 1 = Warning
Level 2 = Protective

When "Level 1" (warning) is activated (indication on screen), the unit will indicate this working value. If "Level 2" is reached, the BMS will deactivate the charge or discharging switch automatically to protect the battery. It will reactivate the switch when the fault condition is restored.

The BMS is activated by current movement. The unit is set to go into sleep mode if no current is sensed in an 18 hour period. When you receive the unit, please press the "BMS reset" button and the screen will come on. One can now press the scroll button to see the different values in the BMS.

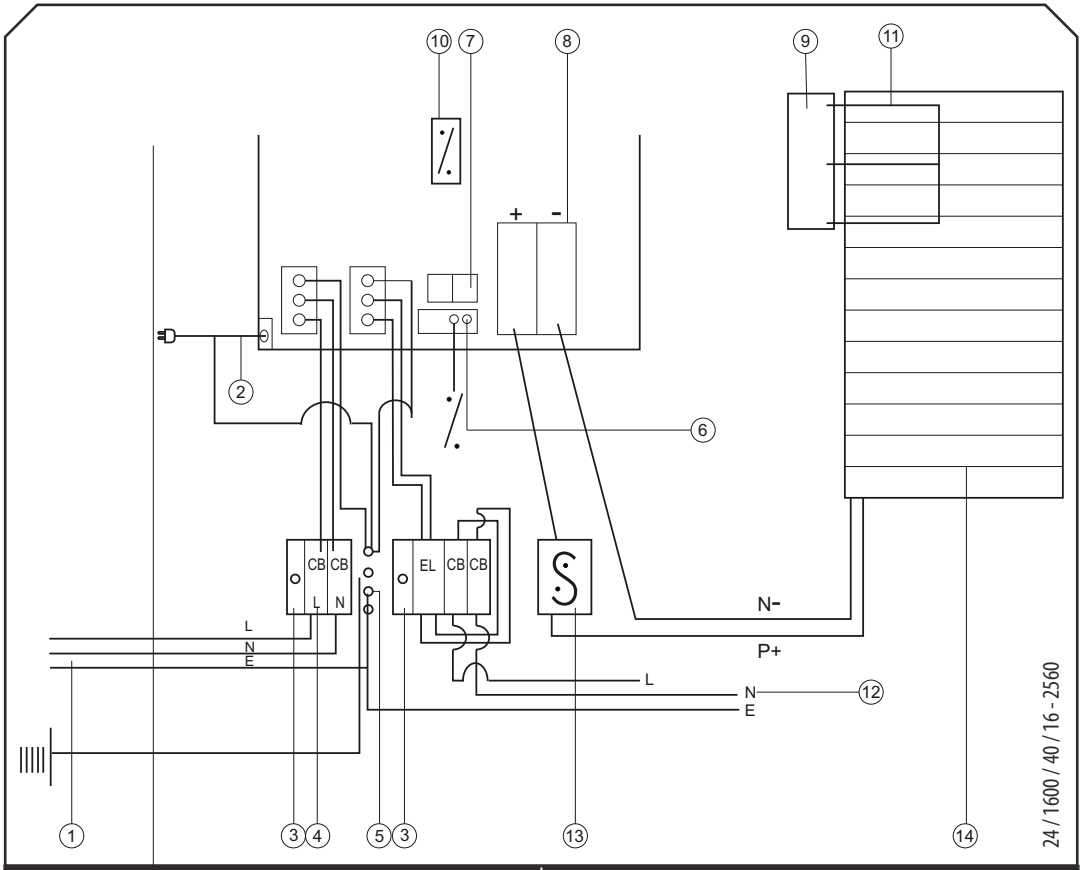
DC ATTACHMENT

Please confirm settings prior to connecting the DC Attachment unit.

EARTH LEAKAGE

Please note that the internal "Ground relay" in the inverter settings has been disconnected. This has been done with the assumption that the installed earth leakage will be used. If the installed earth leakage is bypassed, please inquire about the Ground Relay settings.

5. WIRING SCHEMATIC LEVEL 3 (24V)



1. AC input from grid.
2. Grounding connection.
3. Indicator lights.
4. Double pole circuit breaker.
5. Common earth bar.
6. Remote on/off switch.
7. Remote monitoring.
8. Battery connection.
9. Internal BMS.
10. Manual on/off switch.
11. Cell monitor cable.
12. AC output to load.
13. Main DC fuse.
14. LiFePh04 battery.

6. INTERNAL STORAGE

6.1 BATTERY SPECIFICATIONS	
Battery type:	$LiFePO_4$ (Lithium iron phosphate)
Nominal Voltage:	25.6 VDC
Amp Hours:	100
Wh capacity at 100%:	2560 Wh
Max Charge (A):	30
Max Discharge (A):	60
Battery Voltage Shutdown:	23 VDC
Battery Voltage Restart:	25 VDC
Expected Cycle Life:	Greater than 3000 @ 0.2C discharge & 90 % SOC
Max Charge Voltage:	27.9 VDC

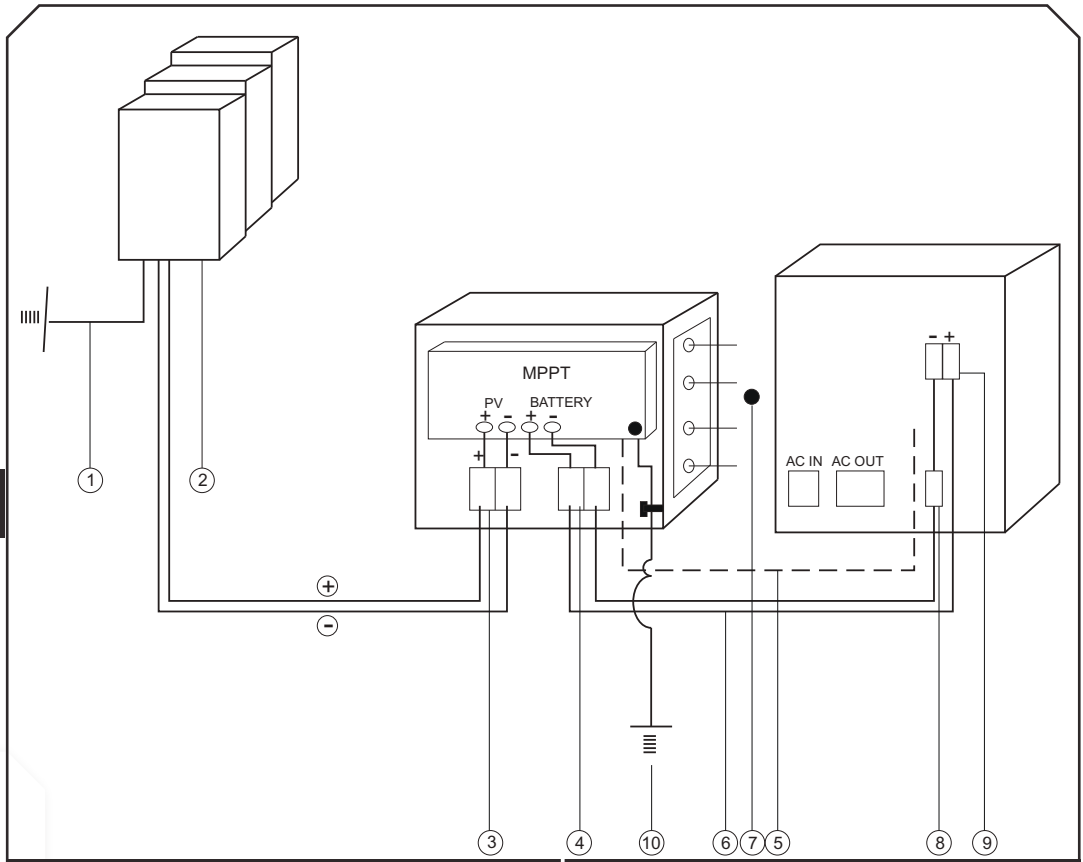
7. SOLAR PANEL (PV) INTEGRATION

By purchasing the "DC- Attachment Unit" (100 -150 / 30 / 720 – 24) , 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:

100 -150 / 30 / 720 – 24 DC Attachment unit

7.1 PV SPECIFICATIONS LEVEL 3	
Max Input Voltage from solar panels:	100 VDC
Max (A) supplied by solar and grid:	30A
Max Wp of solar panels:	720 Wp
Programming of MPPT for effective charge:	
Bulk and absorb voltage:	27.6 VDC
Float voltage:	27.0 VDC
Max charge:	60A

8. WIRING SCHEMATIC LEVEL 3 (24V)



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. Optional remote monitoring cable.
6. Battery cable connection MPPT with fuses.
7. Bolt on method between units.
8. Connect MPPT battery breaker to fuse.
9. Connect MPPT battery breaker directly to inverter input.
10. Bonded earth to AC.

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 batter y 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 4mm^2.
- 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) Unauthored 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.

LEVEL 03

ENERGYDOCK

LEVEL 03

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:**	

PASS	COMPONENTS	QUALITY CONTROLLER INSPECTION	COMMENTS
	Multiplus Inverter 1.6 kVA		
	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		
	BMS main on/off		
SIGN-OFF:		**DATE:**	

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 700w 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:	

ENERGYDOCK
LEVEL 03

SPECIALIZED SOLAR SYSTEMS®
The National Alternative Energy Company
www.specializedsolarsystems.co.za