Manual: Aanganwari HLS (Generally Conforming to HAREDA/DSND Specs)

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SOLAR PHOTOVOLTAIC PRINCIPAL

Sun light is converted into DC Electricity when it falls on the top surface of the solar cells inside the SPV module by means of direct Photovoltaic conversion process. The generated electricity can either be directly used during the sunshine hours or may be stored in storage batteries to be used later. Solar Home Lighting system essentially comprises a solar PV module / battery, electronic charge controller, luminaire with built in high frequency inverter, Fan, TV etc.

RSPL offers a wide range of Solar PV Home Lighting Systems with standard and custom-built versions. The standard models generally conform to MNRE specifications.

150W SOLAR BASED LED HOME LIGHT SYSTEM (MANOHAR JYOTI)

GENERAL SPECIFICATIONS

1) System Voltage: 12 Volts DC
2) Solar PV module of 150Wp: 1 No.
3) Battery Lifepo4 12.8V/100AH: 1 No
4) 22W BLDC Ceiling Fan (48inch/1200mm): 2 No
5) LED Luminaire/Bulb 6W max: 3 No's
6) MPPT Solar Charge Controller with inbuilt battery space: 1 No
7) Module Mounting Frame suitable for grouting: 1 No
8) Nuts/Bolts/Hardware/Cable: 1 Set
9) USB ports for mobile charging (5V, 1A): 1 No

CONSTRUCTION FEATURES AND PROVISIONS

SPV MODULE

1) 36/72 Nos. mono/poly crystalline solar cells in 12 V Configuration.
2) Laminated in EVA
3) High Transmission toughened glass as superstate
4) Anodized Aluminum Frames.
5) Terminal box with terminals.
6) Pmax minimum 150Wp

BATTERY

1) Type. of battery: 12.8V LiFePO4 Battery Pack
2) Capacity: 100AH
3) Terminals: Two Wires

LED BATTEN & LUMINAIRE (6W Max)

1) Aluminum/Plastic cabinets with adequate heat dissipation
2) Lens are used for LEDS.

3) LED driver dc to dc buck converter (constant current)
4) Adequate protection against open circuit, short circuit and reverse polarity.

MPPT SOLAR CHARGE CONTROLLER

1) MPPT Solar charge controller with inbuilt battery.
2) MS Powder coated CRCA / plastic housing cabinet.
3) Overload /short circuit protection provided.
4) Blade fuse is used for short circuit.
5) System ON/OFF switch provided.
6) Connection /points for module, battery, fan and bulbs / luminaires
7) Solder free installation.
8) No Load, Short circuit, battery deep discharge, battery overcharge and reverse polarity protections.
9) Reverse flow of current from battery to module is protected.
10) Very-low idle power consumption.
11) LCD indication for

a. Battery deep discharge (Load Disconnect).
b. Charging in progress
c. Overload /short circuit

LCD DISPLAY

1) Battery voltage, PV voltage, PV current, battery chg. Current
2) Battery low, overload/short circuit, load current, battery status in %.

MODULE MOUNTING FRAME

1) Comprises of 6 members made from 32x32x3mm angle iron or as required.
2) Two Nos. MS Flat strips.
3) Four Nos. Foundation Bolts.
4) Necessary Nut/Blots hardware.
5) Please note that size of the members of mounting frame can very from place to place and inclination is achieved by lowering or raising the rear legs.

CABLE

1) $4mm^2$ twin core wire or any other size as per requirement.
2) Length as per requirement.
3) Insulated PVC cable.

ELECTRICIAL SPECIFICATION

MPPT SOLAR CHARGE CONTROLLER

1) Max. charging current:15A
2) Max. Load current: 15A
3) Load disconnect battery voltage: 11.3 + 0.2 volts or as required.
4) Load reconnect battery voltage: >12.5 volts or as required.
5) Constant Charging voltage: 14.5 + 0.2 volts or as required.

6) Idle current consumption: Less than 40 mA
7) PV charging efficiency: >90%
8) Overload/short circuit protection: Provided

This measurement is done under following conditions i.e. PV is off, Load Off. The current drawn from the battery is the idle current. Some charge controllers are of variable duty cycle or variable frequency type as per requirements of the customer. Some are provided with overload electronic cut-off (Electronic Fuse) through reset switch.

DC TO DC CONVERTER

1) Led driver: Buck (constant current) driver.
2) Overall efficiency: >85%.

LIGHT OUTPUT

1) > 32 Lux for each luminaire when measured from a height of 2.5 meter in an area of 2.5-meter diameter
2) The light is glaze free and not have any shadow band.

WORKING

As soon as the sun rises in the morning, photovoltaic cells start generating electric power. This electric power is stored in the battery through charge controller. As the sun sets in the evening, the photovoltaic cells stop power generation. The electric power stored in the battery is used for lighting the lamp/Fan/TV during night. Fan can also be operated during daytime.

Electronic charge controller and LED (bulb/batten) luminaires have electronic circuits. Electronic charge controller protects the battery from overcharge and deep discharge. It also has the facility to protect from reverse polarity, if battery connections are made by mistake in the reverse manner. Constant voltage charging strategy is adopted in the charge controller (some charge controllers are of PWM/VF type) which protects the battery from being over charged and keeps the battery in good health. If battery is deep discharged then Red LED marked “LOW” will start glowing, the loads, luminaires etc. will be disconnected and it will not be possible to switch “ON” the lights & fan. The glowing of green “LED” indicates battery charging.
The LED (Bulb/Batten) Luminaire have inbuilt constant current led driver circuit. When DC voltage from the battery is given to the (bulb/batten) It is starts glowing. A bed switch etc. is provided with each luminaire for switching ON and OFF of the lights.

INSTRUCTIONS FOR USE

INSTALLATION

The Solar module/modules is/are to be installed on the roof of the house or at any other place where shade free sun is available throughout the day. The solar PV modules is/are fixed in such a direction that it faces south at appropriate inclination. If inclination angle is not known, it can be kept in horizontal position, and it should face sun. The solar PV

modules can be installed as per fig. 3 & 4 which is self-explanatory. The legs of the frame can be grouted with four number foundation rods provided.

The PV modules, charge controller with inbuilt battery and LED (Bulb/Batten) luminaires, fan connections are made. The appropriate cable size should be used for making these connections. For a distance of 10 meters, from the charge controller to the luminaires 1.5 Sq.mm two core cable shall be sufficient. Wiring has to be as per requirements.

REPLACEMENTS

FUSE
The blade fuse is provided in the charge controller. The fuse can be easily replaced by new one if it is burnt. In LED luminaires resettable fuse is used.

BATTERY
The battery can be replaced by removing wires from PCB mounting terminals.

PRINTED CIRCUIT BOARD
In case of faults in the PCB's of Charge controller and the (bulb/batten) luminaires, these can be easily replaced by removing the connectors and unscrewing the mounting screws.

PRECAUTIONS

DO'S

1) Ensure that Solar PV modules are installed in the shade free sun in a proper direction.
2) The PV modules connections should be made in the last
3) The solar PV modules are to be cleaned regularly to remove dust.
4) In case red LED marked "LOW" glows, charge the battery for 1-2 days before use.
5) If overload / short circuit LED (RED) glows reduce load and press reset switch
6) In case the system is not in use, ensure that the battery is regularly charged so that it is in full charged condition.

DONT's

1) Do not clean solar PV modules with Acid/Chemicals/Detergent etc.
2) Don't tamper with settings of charge controller.

TROUBLE SHOOTING:

If the system does not work, please ensure:

1) That the module, charge controller, battery, fans and the luminaires are connected in proper polarity. Make correct connection if found wrong.
2) That the fuses is intact in the charge controller If fuse is blown out, replace by new one.

3) If charge controller does not show any indication during day time see that the battery is connected in proper polarity.
4) If Red LED makes "LOW" glows, allow the battery to charge for a few days before use.
5) Ensure that the lamp is OK.
6) Even then if the system does not work, call the technician to check up the PCB etc. for component level trouble shooting.

P.S.

In case of any problem please contact the source from where you have procured the system.

In case of any problem with the battery or SPV modules please write to the manufacturer with copy to us and the source from where you have procured the system. Battery and SPV modules carry the warranty of respective manufacturers also.

Please note that the light output of lamp is dependent on temperature, direction of lamp. The Luminaries should be preferably used with lamp in horizontal position.

If the system does not behave properly, kindly contact the source from where you have procured/nearest dealer or us at the following address:

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