

SOLAR POWER GENERATION SYSTEM

General Description

The db-tech, DB-519ST Solar Power Generation System has been designed considering the solar technology applications in harnessing electricity from Sun. It's a eco friendly way to generate the energy from the Sun. This system will enable students to learn the basic as well as advanced concepts of Solar Photovoltaic energy generation.



Specification

Features

- A unique Solar system for electricity generation.
- Provided with meters for analysis of parameters
- Provided with all safety protections
- Connector Sheathed Shock proof type
- DC Voltmeter & DC Ammeter
- Multi Function Meter
- MPPT type charge controller with LCD indication for monitoring the battery charging status.
- MPPT Charge controller having protection against short circuit , output over voltage and also self- protection against excessive temperature of heat sink.
- MPPT based charging process with four stage control, along with ATC (automatic Temperature Compensation)

Scope of Learning

The Geography behind Solar PV installation

- Site assessment and planning before Solar PV installation
- Understanding the Sun position and tilting of Solar PV module
- Analysis of voltage and current at different tilt angles
- Effect of shadow on Solar PV system

Measurement and Analysis of Different parameters of Solar PV Module

- Open circuit voltage (Voc) of Solar PV module
- Short circuit current (Isc) of Solar PV module
- Parameters measurement with parallel Solar PV modules
- Parameters measurement with series Solar PV modules
- I-V characteristics of PV Module
- P-V characteristics of PV Module
- Vmp, Imp, MPP & Fill Factor Measurement of Solar PV module

MPPT Charge Controller

PV Module Input Voltage :	24–50V
Max Current	: 25A
Battery voltage	: 24V
Technology	: MPPT
Display type	: LCD
Charging Stage	: Bulk, Absorptions and Float
Battery	
Make	: Exide Solar Tubular
Capacity	: 100Ah
Type	: C10
Quantity	: 2 Nos.
Meters	

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Estimating Solar PV system

- Load Estimation and calculation

Charge controller

- Basics of MPPT
- Efficiency calculation of Charge Controller

Inverter & Batteries

- Testing of Inverter
- Testing of battery using gravity hydrometer

Analysis of the effect of dust on Solar PV module

Analysis of the effect of temperature on Solar PV module

Safety and Precaution for installation of Solar PV System

Technical Specifications

Solar Panel

Make	: Waaree
Cell Type	: Poly (multi) crystalline
No. of Cells	: 72
Pm	: 250Wp
Voc	: 43V
Isc	: 7.75A
Vmp	: 35V
Imp	: 7.14A
Quantity	: 2Nos.
Inverter	
Capacity	: 500VA
DC Input voltage	: 24V
Input Voltage	: 190~260V AC
Output Voltage on Mains mode	: Same as input
Output Voltage on UPS mode	: 210~245V
Output Frequency on UPS mode	: 50Hz ±0.1Hz
Output waveform on Mains mode	: Same as input
Output waveform on UPS mode	: Modified Sine wave
Battery Charging Current	: 12A
Battery Charging Mode	: Solar and Grid
Efficiency at full load	: >80%
UPS Overload / UPS Short circuit	: Yes
Technology	: Microcontroller Based Design
LED Indication	: Mains ON, UPS ON, Low Battery, Charging & Over load

DC Voltmeter	: 0-300V, 2 Nos.
DC Ammeter	: 0-20A, 3 Nos.
AC Multi Function Meter	: Voltage-10-230V
	: Current-100mA-5A
	: Watt-10-1200W
	: Frequency-50Hz

Structure for Solar Panel

Material	: MS
Tracking Type	: Manual, Dual Axis Seasonal and day wise
Assembly	: Detachable and easy to install
Quantity	: 2 sets.

Safety and Protection

MCB (DC)	: 16Amp. for solar panels and 25 Amp. for battery, 2 Nos.
MCB (AC)	: 6 Amp. AC output load protection & Grid Charging, 2Nos.
Fuse	: 10 Amp. for Individual protection of solar panel and battery, 4Nos
Banana Terminals	: 10 Amp. & 20 Amp. (shock proof connections)

List of Accessories

Patch Cards	: 20Amp. & 10 Amp.
Mains Card	: 2 Nos.
Wires	: 2.5 Square mm havells
	: Red – 30 meters
	: Black – 30 meters
Gravity Hydrometer	: 1 No.
BNC to BNC cable	: 1 No.
Glass Fuse 10Amp.	: 10 Nos.

Optional Accessories

Sun Path Finder	: 1 No.
Rheostat 100Ω/8Amp	: 1 No.