Pyranometer

Model - STEM 5005

Make - STEMROBO

FEATURES

- ❑ Handheld Device.
- ❑ 32-bit ARM Cortex-M3 based measurement.
- ❑ Low power consumption.
- ❑ Water and dust proof sensor casing.
- ❑ Protective dome given for safety of sensor.
- ❑ Wi-fi communication
- ❑ Mobile friendly App to monitor the data remotely

SPECIFICATIONS	
Detection range	0 to 2000W/m^2
Operating voltage	+5V
Display	16x2 LCD Display
Sensor connector	DIN type
Cable length	1 meter

Indicative Product Image

Weather Monitoring Station

Make - STEMROBO

Model - STEM 5014

FEATURES & SPECIFICATIONS

- Epoxy coated tower type structure for robust and aesthetic look and Detachable Assembly.
- Application Dashboard for remote monitoring and analysis.
- The system is based on the microcontroller, a high-performance, low-power 8-bit AVR RISC microcontroller. It features 128KB Flash, 4KB SRAM, 4KB EEPROM, multiple I/O interfaces, and operates at up to 16 MHz with advanced communication and control capabilities.
- The temperature sensor operates within a range of - 10°C to 90°C, ensuring reliable performance across varying environmental conditions. It provides a measurement resolution of 1°C for accurate temperature monitoring.
- The relative humidity sensor measures across a full range of 0 to 100%. It offers a resolution of 5% for effective atmospheric humidity assessment.
- The wind speed sensor supports measurement from 0 to 20 m/s. It delivers readings with a resolution of 1 m/s for consistent wind velocity analysis.
- The wind direction sensor detects primary and intermediate directions including North, East, West, South, and intercardinal points. It enables comprehensive monitoring of wind patterns.
- The rainfall sensor utilizes a tipping bucket mechanism with an unlimited operating range. It provides ±2% accuracy at 1.5 inches per hour and a resolution of 0.1 mm.
- The solar radiation sensor operates within a range of 10 to 2000 W/m². It ensures ±5% accuracy with a resolution of 10 W/m² for precise solar intensity measurement.
- The air quality sensor measures particulate concentration from 0 to 12,500 µg/m³. It provides ±5% accuracy with a resolution of 40 µg/m³ for reliable air quality monitoring. The atmospheric pressure sensor operates within a range of 15 to 115 kPa. It delivers ±1.5% accuracy with a resolution of 0.12 kPa for precise pressure measurement.
- The UV index sensor measures radiation from 0 to 15 mW/cm² at 365 nm wavelength. It offers ±2.5% accuracy, 1 mW/cm² resolution, and sensitivity to both UV-A and UV-B.
- The system includes a 75W solar panel with an open-circuit voltage of 21V and short-circuit current of 4.76A.
- The power system incorporates a 12V, 42Ah battery for reliable energy storage. It is supported by a 10A charge controller for efficient power management.

Indicative Product Image

Solar cell - based sunlight radiation meter

Model - STEM 5015

Make - STEMROBO

FEATURES

- ❑ Mobile app to monitor the data,
- ❑ Low power consumption and 5V operating voltage
- ❑ Water and dust proof sensor casing
- ❑ 1meter long cable
- ❑ Handheld device with LCD display.
- ❑ 32-bit ARM Cortex-M3 based measurement

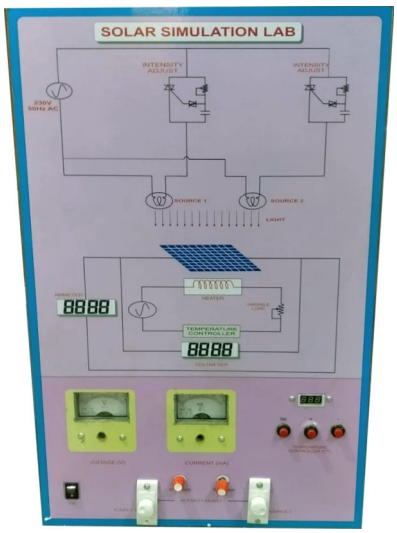
SPECIFICATIONS	
Detection Range	0 to 2000 w/m^2
Operating voltage	5V
Display	16x2 LCD output
Sensor connector	DIN type

Indicative Product Image

Solar simulator for solar cell characteristic study

Make - STEMROBO

Model - STEM 5016



FEATURES

- ❑ Complete system to study the fundamentals of Solar Simulation
- ❑ Digital Display for voltage and current measurement Quartz Halogen Lamp as a Light source
- ❑ Programmable Temperature Controller Heater for heating test of solar cell
- ❑ Variable Intensity available for testing

SPECIFICATIONS	
Supply Voltage	220V AC, 50Hz
Solar Cell	
Open Circuit Voltage (Voc)	1.8 to 2V DC (approx.)
Short Circuit Current (Isc)	min 150mA (approx.)
Quartz Halogen lamp	220V, 50Watt
Voltmeter	0-20V
Ammeter	0-2000mA
Intensity Control	Variable (In five steps)
Temperature Controller	up to 99°C
Heater	25 Watt
Load Resistance	0-100 Ohm10 turn 0-10 Ohm 1 turn
Fuse	1Amp

Indicative Product Image

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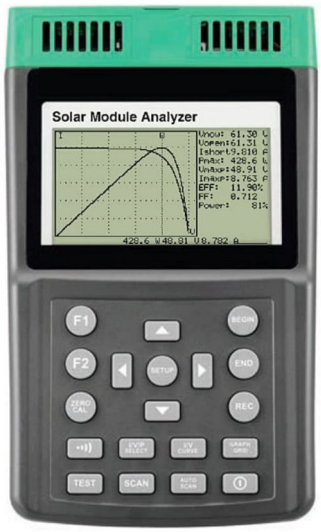
IV Curve Tester

Model - STEM 5017

Make - STEMROBO



FEATURES

- ❑ Micro-controller-based display of 16X2 LCD
- ❑ PC Interface with a dashboard software
- ❑ Mains operated at 220Volt
- ❑ To measure Open Circuit Voltage and Short Circuit Current
- ❑ To measure Maximum Voltage and Current
- ❑ Facility in dashboard software to see mathematical value used to locate data points on a common reference frame

SPECIFICATIONS	
Power Supply	+5V DC
DC Voltage Range	0-50V
DC Current Range	10A

Indicative Product Image

Solar Energy Trainer with Grouping of Solar Cells

Make - STEMROBO

Model - STEM 5019

FEATURES & SPECIFICATIONS

Solar PV Modules

- Modules Wattage: 5W
- Quantity: 4 Nos.
- Open Circuit Voltage (Voc): 10V
- Short Circuit Current (Isc): 0.60A
- Maximum Power Voltage (Vmp): 8.80V
- Maximum Power Current (Imp): 0.57A
- Converter: Buck & Boost
- Sensing: Dusk to Dawn Batteries
- Voltage 6V Capacity: 4 Ah
- Quantity: 4 Nos.
- LCD
- Voltmeter: 0-40V Ammeter: 0-3A
- Dual channel V, I measurement system with PC interface using USB.
- Microcontroller Used: STM32
- Number of Voltage and Current Measurement Channels: 2 channels
- Voltage Measurement Range: 0–36 V DC
- Current Measurement Range: 0–2.5 A
- Supply Voltage: +5 V DC

Dashboard graphical user interface to be provided to see the VI curve by using Solar PV e- learning module Software.

EXPERIMENTS:

- Study of series combination of Solar PV Modules.
- Study of parallel combination of Solar PV Modules.
- Study of series-parallel combination of Solar PV Modules.
- Study of VI Characteristics of Solar PV Module.
- Study of blocking diode and its working in Solar PV Module.
- Study of bypass diode and its working in Solar PV Module.
- Study of the effect of inclination angle of Solar PV Module.
- Study of different charging techniques.
- Study of Buck converter. Study of Boost converter.
- Study of the effect of change in solar radiation on Solar PV Module.
- Computer Interface with a dashboard software for VI Characteristics Interfaced with Solar PV e-learning software using animations for training for this experiment
- To measure Open Circuit Voltage and Short Circuit Current
- To measure Maximum Voltage and Current

Indicative Product Image

Solar Tracker Demonstrator Kit

Make - STEMROBO

Model - STEM 5020

EXPERIMENTS

- ❑ Complete training system to study the fundamentals of Solar Tracking
- ❑ Single-axis and Dual-axis Tracking Manual, Time and Auto Modes of operation in Single Axis Solar Tracking Manual mode of operation in Dual- axis Solar Tracking Master Reset Switch for recovery of System
- ❑ Atmega32 based design with Rheostat 1.6A, 100ohm
- ❑ Halogen Lamp of 500Watt with Tripod Emergency Motor Stop Switches
- ❑ Tilt Sensors for sensing angle of panel with respect to horizontal plane.
- ❑ Facility for charging battery using Solar energy as well as DC supply

SPECIFICATIONS	
Supply Voltage	12V DC.
Solar Panel	
Maximum Output	18W Power (Pm)
Open Circuit	21V DC Voltage (Voc)
Short Circuit	1.07A Current (Isc)
Max. Output	17V Voltage (Vmp)
Max. Current (Im)	1.06A
DC Motor	12V
Rechargeable Battery	12V, 7Ah
Display	20 x 4 LCD
Light Sensor	Phototransistor
Acceleration/Vibration	+5V @ 1ma current/Tilt Sensor – 3 Axis
Fuse	1Amp (3 Nos.)
DC Adaptor	12V @ 1Amp
Microcontroller	8-bit AVR microcontroller running up to 20 MHz with an operating voltage of 1.8–5.5 V Memory 32 KB Flash, 2 KB SRAM, and 1 KB EEPROM for program and data storage.

Indicative Product Image

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DC Table Fan

Make - STEMROBO

Model - STEM 5030

SPECIFICATIONS

- ❑ Operated at 12 V DC ,
- ❑ It is energy-efficient performance, making it suitable for long hours of use.
- ❑ High Speed Motor for strong air flow
- ❑ Adjustable Speed control knob

Indicative Product Image

PWM Controller

Make - STEMROBO

Model - STEM 5048

FEATURES & SPECIFICATIONS

- Control Panel to understand working of PWM Controller: Enclosure consists of any high-grade insulating material for better user safety and in compliance with IS302-1/IEC60335- 1, tested from any Govt approved lab. Connectors: BS 10 terminals and patch cords to be provided to protect from danger. BS10 safety terminals are in compliance with IS302- 1/IEC60335-1, tested from any Govt approved Lab.
- Required Switches to be provided
- Solar PV Module: Poly Crystalline Technology
- Wattage: 40 watts
- Charge controller: PWM type with reverse polarity protection for battery as well as load.
- An embedded DPM to be provided for voltage & Current measurement at both i.e. Input and output sides.
- Battery:12V,7.5Ah
- Load: DC lamp
- PWM controller (in range of 5 A) in loose form provided (1 no) to enable students to independently build and understand the circuit.

Indicative Product Image

MPPT Charge Controller

Make - STEMROBO

Model - STEM 5049

FEATURES & SPECIFICATIONS

- Control Panel to understand working of MPPT Charge Controller: Enclosure consists of any high-grade insulating material for better user safety and in compliance with IS302- 1/IEC60335-1, tested from any Govt approved lab.
- Required Switches to be provided
- Connectors: BS10 Safety Terminals
- Solar PV module: Poly crystalline Technology
- Wattage-40 watts
- Charge controller: MPPT – type with reverse polarity protection for battery as well as load.
- Connectors: BS 10 terminals and patch cords to be provided to protect from danger. BS10 safety terminals are in compliance with IS302- 1/IEC60335-1, tested from any Govt approved Lab.
- An embedded DPM to be provided for voltage & Current measurement at both i.e. Input and output sides
- Battery:12V,7.5Ah
- Load: DC lamp
- MPPT Charge Controller (in range of 5 A) in loose form are provided (1 no) to enable students to independently build and understand the circuit.

Indicative Product Image

Solar PCU

Make - STEMROBO

Model - STEM 5051

FEATURES & SPECIFICATIONS

- ❑ Solar PCU (Working System)
- ❑ It is manage the flow of electricity between solar panels, batteries, and the load (appliances) to ensuring stable and efficient power supply. A Hybrid Solar PCU is advanced type of solar inverter that is work with multiple power sources at the same time—typically solar panels, batteries, and the grid (or even a generator).
- ❑ Hybrid Solar Home System consist of hybrid inverter as the central component of the system. It has dual input source to charge the battery and can simultaneously charge the battery from solar panels as well as conventional grid. Solar panels connected in series and parallel is generate power during the day. In the event of grid failure / absence of grid, the hybrid inverter charges the battery from solar panel and DC power from battery is used to power AC appliances.
- ❑ For understanding of its working the system is supplied loose with a self-standing 3 sided perforated mesh structure, along with the solar panels, the panel mounting structure, the inverters, batteries, so as to allow the students to learn the installation of the wall chargers, the associated power switchgears. The learner is able to install the solar panels, wire a residential installation, install the inverter, and make connections with the solar inverter and thereby run the installation on the solar power and test the complete functionality of the solar inverter.

It is designed to achieve learning objectives:

- ❑ Understand the concept, working principle and overall functionality of the system
- ❑ Understand sizing of the system based on customer requirement
- ❑ Install, operate, and maintain the system
- ❑ Diagnose and troubleshoot the problems during and after the installation
- ❑ Learn battery maintenance and perform maintenance of solar lead acid battery
- ❑ Detailed Product description: Solar Panel, 12 V,170 Wp – 4 Nos
- ❑ Module Mounting Structure – 2 Set
- ❑ Solar Hybrid Inverter, 850 VA,12 V – 1 Nos
- ❑ AC Loads - CFL Lamp, 230 V, 11 W – 1 Nos
- ❑ AC Loads - LED Bulb, 230 V, 9 W – 1 Nos
- ❑ AC Loads - AC LED Television, 230 V, 55 W–1No
- ❑ AC DB with MCB, 230 V,
- ❑ 16 A, AC 2-Pole, C-Curve – 1 Nos
- ❑ Switchboard, 3-Module, 16 A – 1 Nos
- ❑ Switchboard, 6-Module, 6 A – 1 Nos
- ❑ AC Plug top, 3 Pin, 6A – 1 Nos
- ❑ Connecting wires – 1 Set

Accessories –

- ❑ PVC Pipe Fitting-1set
- ❑ Nuts, bolts, etc. – 1 Set
- ❑ Rubber mat – 1 set
- ❑ Metal perforated trolley – 1 Nos

Electrical Characteristics:

- ❑ Voltage: 230 V Frequency: 50/60 Hz ± 5%

Mechanical Parameters:

- ❑ Minimum Dimensions: 1500W x 865D x 1600H mm Self-standing structure

The system is supplied with relevant technical and practical manuals.

Indicative Product Image

Solar Grid Tied Inverter Demonstrator Training Kit.

Make - STEMROBO

Model - STEM 5052

SPECIFICATIONS	
Solar panel Power	1000Wp Type-Polycrystalline
Single phase grid tied inverter-inbuilt	
Rated output power	1kW
Max DC input voltage	450V Max
DC input current	10A
Rating grid voltage	230 Vac
Grid voltage range	180Vac-230Vac
Grid rating output current	4.3A Rating grid frequency: 50Hz
Topology	Transformer less
Protection	DC reverse polarity, AC short circuit, etc.
Digital Meters:	
DC Voltmeter	300V (1no.)
DC Ammeter	20A (1no.)
AC Voltmeter	450 V (1no.)
AC Ammeter	10A (1no.)
Bidirectional energy meter	1no.
Multi function meter	1no.
Terminals	BS 10 safety type with Patch cords Protection devices
DCDB (DC distribution)	1no.
ACDB (AC distribution)	1no.
Structure for Solar Panel Material	GI
Assembly	Detachable and easy to install
Load	AC/DC Resistive (Lamp Load)
Load range	0 - 1.2 kW, in steps of 100W, it has onboard 10A ammeter.

Indicative Product Image

Solar Street Light

Make - STEMROBO

Model - STEM 5053

FEATURES & SPECIFICATIONS

- The system is able to perform Real time Remote Monitoring of parameters like – Temperature, humidity, air quality, motion data through sensors On/OFF Status of light pole on console,
- Processor: 64bit cortex A53 ARMv8 Quad core processor 1.4GHz
- Connectivity: 802.11 b/g/n Wireless LAN, Bluetooth 4.1, ZigBee, USB & Ethernet RAM: 1GB LPDD2 Memory: 32GB OS: Linux
- Ethernet: 10/100 base T Ethernet socket
- Video output: HDMI and composite RCA USB port: 4 nos.
- BS 10 terminals and specially designed patch cords to be provided to protect from danger.
- BS10 safety terminals are in compliance with IS302- 1/IEC60335-1, tested from any Govt approved Lab.
- Control Panel is consist of any high-grade insulating material for better safety and in compliance with IS302- 1/IEC60335-1, tested from any Govt approved Lab.
- Smart pole and node Microcontroller: ATMega2560
- Sensors and actuator connector: 10 nos.
- Digital input/output pins: 34 nos.
- Analog input pins: 16 nos. UART: 2 nos.
- I2C: 1 no.
- Switch faults: 30 nos. Test points: 30 nos.
- Power Supplies: 5V and 3.3V Variable Potentiometer: 1 no (10K) Switches: 3 nos.
- Digital voltmeter and ammeter: 0 - 25V/10A Buzzer and LED: 1 no. each Color

Indicative Product Image

Solar Street Light

Make - STEMROBO

Model - STEM 5053

- LCD: 1.77 inch (approx) USB: 2.0
- Wi-Fi module: 1no. (2.4GHz)
- ZigBee transceiver: 1no. (2.4GHz/63mW)
- Flash memory: 256 kb (of which 8 KB used by boot loader)
- SRAM: 8 KB
- EEPROM: 4 KB
- Clock speed: 16 MHz
- PIR sensor: TTL
- Temperature sensor: 0 - 100° C
- Humidity sensor: 0 – 100 %RH
- Air quality sensor: PM, PM2.5,
- PM10 Ambient light sensor: Analog output
- Solar panel: 40W
- Battery: 12V, 26 Ah
- Charge controller: 12V, 0.7A
- LED light: 10W
- Rheostat: 100 Ohm, 3A
- MCB: 16A
- DC ammeter: 5A
- DC voltmeter: 100V
- Battery level indicator display: 8-70V
- Power Supply: 110V - 260V AC, 50Hz
- Rheostat - 100 Ohm, 3A (01 no),
- 4mm BS-10 Banana Patch cords (25 nos.),
- Keyboard & mouse, structure for Solar Panel

Indicative Product Image

Solar, Wind and Hybrid Power Plant

Make - STEMROBO

Model - STEM 5054

FEATURES & SPECIFICATIONS

- ❑ Hybrid Control panel has both Solar and Wind turbine inputs.

Solar PV

- ❑ Modules Wattage:1 KWatt
- ❑ Battery: 75 Ah – 2 nos.
- ❑ Wind Turbine: 300 watts
- ❑ Charging Current: minimum 300mA approx.
- ❑ Actual Output Power: minimum 10watt (generated at wind speed of 4- 6 m/sec while indoor testing)
- ❑ Solar Structure – GI type
- ❑ AC voltmeter & AC ammeter, DC volt AC multifunction meter
- ❑ Blower for wind turbine – Wind speed upto 5m/s
- ❑ Charge controller - Hybrid type
- ❑ Inverter Capacity: 1KVA
- ❑ Output voltage: between 200- 240V
- ❑ BS 10 terminals and specially designed patch cords to be provided to protect from danger.
- ❑ BS10 safety terminals are in compliance with IS302- 1/IEC60335-1, tested from any Govt approved Lab.
- ❑ Control Panel is consist of any high-grade insulating material for better safety and in compliance with IS302- 1/IEC60335-1, tested from any Govt approved Lab.

Indicative Product Image

SolarTraffic Light

Model - STEM 5055

Make - STEMROBO

FEATURES & SPECIFICATIONS

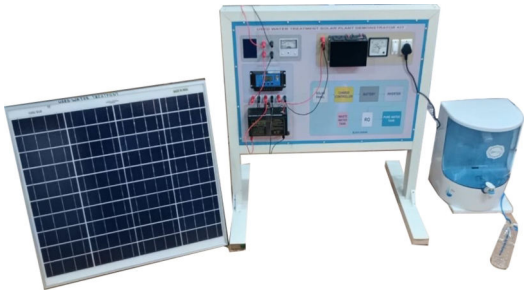
- ❑ 12V, 16Ah battery, 75 Wp solar panel
- ❑ GI structure for solar panel with halogen lamp mounted on a stand for performing Inside Lab experiment, 12V, 10A dusk to dawn charge controller,
- ❑ 15W LED light and 5 Feet height pole (for inside Lab operation)
- ❑ All above things to be provided for lab purposes so that students can use it to learn wiring.
- ❑ Terminals – BS10 type, BS 10 terminals and specially designed patch cords to be provided to protect from danger.
- ❑ Bs10 safety terminals are in compliance with IS302-1/IEC60335- 1, tested from any Govt approved Lab

Indicative Product Image

Used Water Treatment Solar Plant Demonstrator Kit

Make - STEMROBO

Model - STEM 5056



FEATURES

- ❑ Microcontroller based Constant Current Power Supply with LCD
- ❑ Transparent Tank for better visibility of process
- ❑ Discharge outlet for easy removal of sludge
- ❑ Aluminum and Stainless-Steel Electrodes for comparative study

SPECIFICATIONS	
Electro coagulation Tank Volume	1L
Material	Acrylic
Settlement Tank Volume	500ml
Material	Acrylic
Filters	Sand and Charcoal Electrodes
Material	Aluminum and Stainless-Steel Rod
Dimensions (mm)	8 x 310
Solar Panel Power	75 Watt
CC Power supply	3A
Meters	PH meter, TDS meter (handy is provided for measurements)

Indicative Product Image

Solar DC pump

Make - STEMROBO

Model - STEM 5057

SPECIFICATIONS	
Solar panel	1000Wp-capacity Solar Panel
Structure	GI with C-clamps Water Pump
Pump type	Surface Pump
Operation	Solar
Capacity of Pump	1HP
Mechanical Structure included	
Source Tank	1No.
Overhead Tank	1No.
Material of Tank	SS grade 304 Solar controller
Technology	MPPT
Power Rating	1HP.
Digital Meters	
DC voltmeter	300V (1 Nos.)
DC Ammeter	20A (1 Nos.)
MCB	1No.
Terminals	BS10 type for safety, BS 10 terminals and specially designed patch cords to be provided to protect from danger BS10 safety terminals

Indicative Product Image

Demonstration Kit for Wind Generation (Wind Turbine with Blower)

Make - STEMROBO

Model - STEM 5058

FEATURES

- ❑ Control panel is provided with measuring instruments for voltage and current.
- ❑ BS 10 terminals and specially designed patch cords to be provided to protect from danger.
- ❑ BS10 safety terminals are in compliance with IS302-1/IEC60335-1, tested from any Govt approved Lab.
- ❑ Control Panel is consist of any high-grade insulating material for better safety and in compliance with IS302- 1/IEC60335-1, tested from any Govt approved Lab.

SPECIFICATIONS	
Wind Turbine	300 watt
Charging Current	minimum 300mA approx.
Actual Output Power	10watt or more (generated at wind speed of 4-6 m/sec while indoor testing)
Appropriate Voltmeters & Ammeters to be provided.	
Blower for wind turbine	Wind speed upto 5m/s
Charge controller	For Wind Turbine
Battery Capacity	26AH – 2 nos.,
Inverter Capacity	750VA minimum
Output voltage	200- 240 volt
AC Load	Lamp type – 10 watt

Indicative Product Image