LANGLOIS

RENEWABLE ENERGY

2025

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Technical datasheets on our website

WIND TURBINE SIMULATOR - NETWORK INJECTION

EDUCATIONAL OBJECTIVES

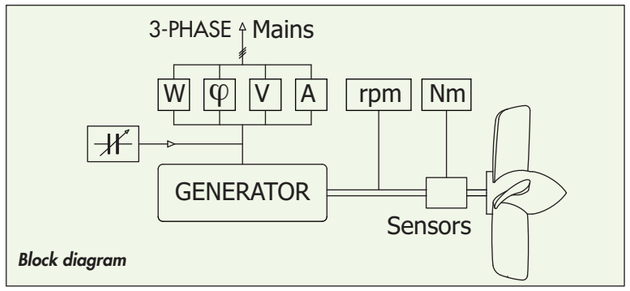
- Understanding the mechanical & electrical principles of a wind turbine.
- Studying the hypo-synchronous and hyper-synchronous operating modes of an asynchronous motor.
- Studying the synchronization of the electrical network.
- Calculating the efficiency of the energy production system.
- Using a clamp-on Ammeter.

Practical Works

- Reminders on the wind turbine functioning.
- Synchronization procedure on the electrical network.
- Raising the power factor by a capacitors bank and study the results.
- Plotting the electrical characteristics of the energy production system.
- Calculating the overall efficiency.
- Studying of the functioning in an isolated site.

ref. EOLYP2 | TEACHING RESSOURCES STUDENTS / TEACHER

ref. EOLYP2-ECO *without sensor and display unit*



Block diagram

THREE-PHASE WIND TURBINE 400W

EDUCATIONAL OBJECTIVES

- Understanding the different elements of a wind turbine.
- Make the measurements of electrical parameters (3-phase and continuous).
- Analyzing and interpreting results.
- Studying the efficiency and impacts related to the wind force.
- Studying the chain of wind energy (production, storage, consumption, energetic behavior).
- Control and set a speed variator from a PC.

ref. EOLYS-500 | USER'S MANUAL WITH PRACTICAL WORKS

SoMove **Supplied with SoMove**

THREE-PHASE WIND TURBINE UNITS 400W

EDUCATIONAL OBJECTIVES

- Understanding the different parts of a wind turbine.
- Make the measurements of electrical parameters.
- Analyzing and interpreting results.
- Studying the efficiency and impacts related to the wind force.
- Study the chain of wind energy (production, storage, consumption, energetic behavior).
- Wiring of a wind turbine installation.
- Set up a Bluetooth connection

Practical Works

- Studying and reading of the electrical features of the wind turbine.
- Calculate the system's efficiency.
- Realization of the diagram and wiring for the energy injection on the electrical network.
- Realization of a diagram & wiring for the energy use in an isolated site.
- Download and setup of the Bluetooth application

Reference EOL-1

Bluetooth®

Smartphone not supplied

Each reference includes:
1 turbine (Ref. EOLYS-500) + 1 specific electrical cabinet + 1 link cable

Réf	Communicating	Features
EOL1	YES (Bluetooth®)	Operation with partial and total resale + at isolated site
EOL2	No	Partial or total resale operation only
EOL3	YES (Bluetooth®)	Operation at isolated site only

TEACHING RESSOURCES STUDENTS / TEACHER

STUDYING THE CONVERSION OF RENEWABLE ENERGY

EDUCATIONAL OBJECTIVES

- Study of the conversion of the electrical energy from 3-phase to single-phase.
- Make some measurements with a clamp-on ammeter.

Proposed Practical Works

- Understanding of the wiring diagram.
- Sizing of the electrical components related to the voltage and the power.
- Reading of currents and voltage in different points of the circuit.
- Calculation of powers.
- Calculation of electrical efficiencies.

ref. CONVERTYS | **ref. CHARGEOL**

SOLAR CENTRAL UNITS WITH LOADING PANELS

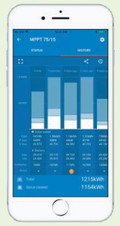
SOLAR CENTRAL UNIT + LOADING PANEL NETWORK INJECTION & ISOLATED SITE

ref. SOL-1 **Bluetooth®**
Electrical cabinet + 2 Solar panels + 1 Link cable

ref. HABITAT-1
Dedicating loading panel

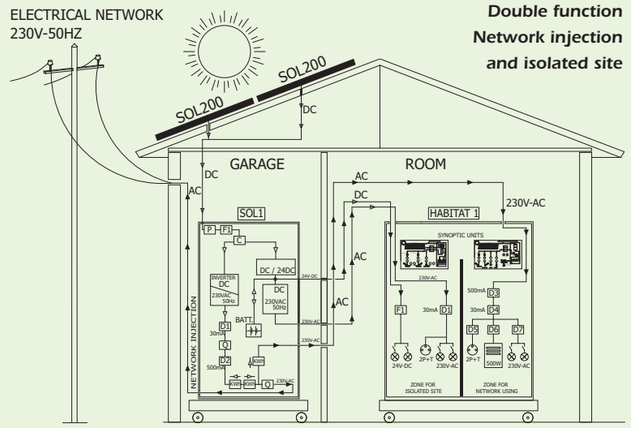
TEACHING RESSOURCES STUDENTS / TEACHER

x 2



Bluetooth®

Technical datasheets on our website



Double function
Network injection and isolated site

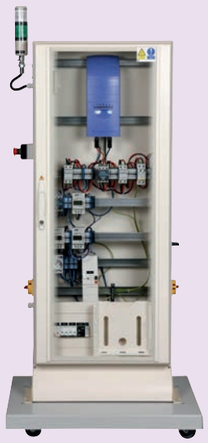
USING SOLAR ENERGY WITH PUBLIC NETWORK INJECTION AND ISOLATED SITE CHOOSE SOL-1 + HABITAT-1

SOLAR CENTRAL UNIT + LOADING PANEL NETWORK INJECTION ONLY

ref. SOL-2
Electrical cabinet + 2 Solar panels + 1 Link cable

ref. HABITAT-2
Dedicating loading panel

TEACHING RESSOURCES STUDENTS / TEACHER



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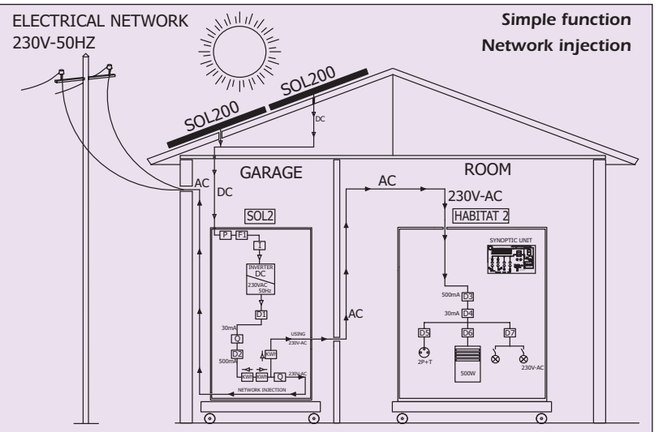
Technical datasheets on our website



Simple function
Network injection

USING SOLAR ENERGY WITH PUBLIC NETWORK INJECTION OLY CHOOSE SOL-2 + HABITAT-2

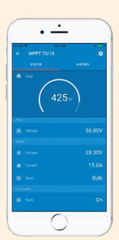
SOLAR CENTRAL UNIT + LOADING PANEL ISOLATED SITE ONLY

ref. SOL-3 **Bluetooth®**
Electrical cabinet + 2 Solar panels + 1 Link cable

ref. HABITAT-3
Dedicating loading panel

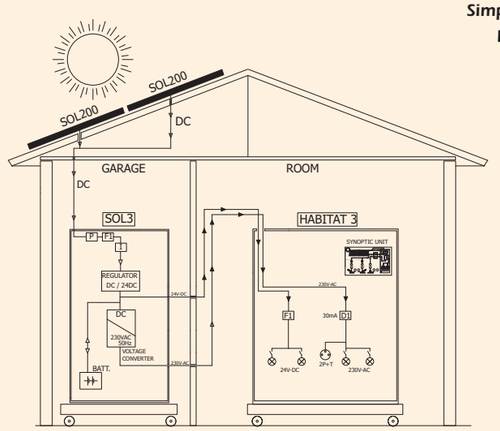
TEACHING RESSOURCES STUDENTS / TEACHER

x 2



Bluetooth®

Technical datasheets on our website



Simple function
Isolated site

USING SOLAR ENERGY ON AN ISOLATED SITE ONLY CHOOSE SOL-3 + HABITAT-3

EDUCATIONAL OBJECTIVES

- Understanding the different elements of a photovoltaic system.
- Understanding the safety components involved in the system.
- Electrical measurements of different parameters.
- Analyzing and interpreting results.
- Studying the efficiency and impacts related to the positioning of the solar panels.
- Studying of the chain of solar energy (production, storage, consumption, resale, energetic behavior).
- Wiring of a photovoltaic system.

PARTIAL OR TOTAL RESALE OPERATION

In the cabinet a DC/AC inverter converts the DC from the photovoltaic panels to AC 220VAC 50Hz, and injects its power in synchronism into the electrical grid. This inverter is protected against any polarity reversal and any overload on the DC or AC side. When the panels are not lit, the inverter consumes no current.

Technical characteristic for the inverter coupled to the electrical grid.

INVERTER	Voltage	Max current	Power
INPUT	65~125VDC	8A	
OUTPUT	230VAC-50Hz	2,25A	500W

LOADING ZONE FOR USE ON SITE WITH ELECTRICITY NETWORK (PRESENT ON HABITAT 1 AND HABITAT 2)

- 1 standard box with standard protections
- 1 differential circuit-breaker 16A/30mA
- 3 thermal-magnetic circuit breakers
- 2 light fittings 100W-230VAC with switches
- 1 500W convector
- 1 230VAC 50Hz 2P+E socket
- 1 mimic unit with safety terminals for I and U measurements in different circuits.

OPERATION IN ISOLATED SITE WITH NO RESALE

The photovoltaic current charges two 12V sealed batteries cabled in series through a charge controller.
This DC voltage is either available on safety terminals at the rear of the cabinet or converted to 250VAC 50Hz by a 200W voltage converter.

Technical characteristics of converter for isolated site

VOLTAGE CONVERTER	Voltage	Max Current	Power
INPUT	20~32 VDC	11A	
OUTPUT	230VAC 50Hz	1,5A	300VA

LOADING ZONE FOR ISOLATED SITE USE (PRESENT ON HABITAT 1 AND HABITAT3)

- 1 differential circuit-breaker 16A/30mA
- 1 two-pole fuse holder with fuse cartridges gPV 10x38 1000V
- 2 24V DC low energy consumption light fittings with switches
- 2 light fittings 230VAC with switches
- 1 230VAC 50Hz 2P+E socket
- 1 mimic unit with safety terminals for I and U measurements in different circuits.

PORTABLE SOLAR POWER UNIT TYPE RESTITUTION NETWORK

Dims of the panel:
1600 x 800 x 100mm

Technical datasheets on our website

ref. SOL-RES2

TEACHING RESSOURCES STUDENTS / TEACHER

The SOL-RES2 solar power plant includes:
1 technical case.
2 photovoltaic panels on tilting frames of approximately 200Wp each.
1 solar cable 30 m to connect the panels to the case.
2 portholes to observe consumption.
1 set of safety cords.
1 power cord.

EDUCATIONAL OBJECTIVES

- Discover the different elements of a photovoltaic installation network restitution.
- Apprehend and understand the security elements present.
- Perform electrical measurements of the various quantities.
- Analyze & interpret the results.
- Study the performance and the effects related to the positioning of the panels
- Study the energy chain (production, use, resale, energy behavior).
- Wiring a photovoltaic installation with grid restitution.

PORTABLE SOLAR CENTRAL UNIT FOR ISOLATED SITE WITH ARTIFICIAL LIGHT SOURCE

Technical datasheets on our website

EDUCATIONAL OBJECTIVES

- Understand a photovoltaic installation of isolated site type.
- Understand the security features of the system.
- Perform wiring of a photovoltaic system.
- Perform electrical measurements of different quantities.
- Analyze & interpret the results.
- Study the performance and impact of solar panels positioning
- Study the energy chain (production, storage, use of a solar charge controller for battery).

The SOL-PRO solar unit includes:
1 technical briefcase.
2 portable and folding photovoltaic panels.
1 artificial light source (3 spotlights).
2 cables to connect the panels to the case.
1 set of safety leads 4mm.

ref. SOL-PRO TEACHING RESSOURCES STUDENTS / TEACHER

SOLAR ANALYSER

ref. VA200

- Current/voltage graph drawing (characteristic of the solar panel)
- Autoscan search of the solar panel maximum power – Pmax (60V – 6A)
- Maximal voltage Vmaxp at Pmax power
- Maximal voltage Imaxp at Pmax power
- Opened circuit voltage Vopen
- Short-circuit opened Ishort
- I = f(V) graph with a cursor
- Efficiency calculation in %
- Power by area unit (in W/m2)
- Manual test for a particular point
- Range 10V / accuracy 0.001V
  Range 60V / accuracy 0.01V
  Range 1A / accuracy 0.1mA
  Range 6A / accuracy 1mA
  Accuracy 1% + 18dgt

PYRANOMETER

ref. PYR1307

Measures the power of solar radiation in watts per m2: W/m2

- Ratings: 199.9 W/m2 and 1,999 W/m2
- Measuring error: < 10W/m2 or 5% of the reading
- Display: 2,000 pixel LCD
- Captures min. and max. values
- "Hold" key allows one to freeze the display
- Backlighting
- Supplied with a carry case
- Dimensions: 162 x 63 x 28mm
- Weight: 250g

LEADS FOR SOLAR PANEL

1 meter cable to connect your solar panels to all security Ø4mm terminals solution up to 20A.

Female solar connector of M type, polarity « - »,
black cable with safety plug Ø 4mm.

ref. RSN-100

Male solar connector of M type, polarity « + »,
red cable with safety plug Ø 4mm.

ref. RSR-100

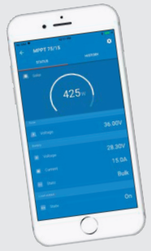
Technical datasheets
on our website

WORKSITE TRAFFIC LIGHTS
LED TECHNOLOGY – SELF-CONTAINED

EDUCATIONAL OBJECTIVES

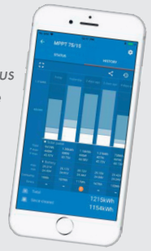
- Study and putting into service of solar energy worksite traffic lights.
- Reminder on the different solar panel technologies.
- Wiring of the components of a photovoltaic installation at an isolated site.
- Reading the different electrical values of the production system of solar energy.
- Calculation of the efficiency of the installation.
- Programming a controller (PLC).
- Setting up a Bluetooth® connection

ref. FEU-LED TEACHING RESSOURCES STUDENTS / TEACHER Bluetooth®



Bluetooth®

Tous ces produits nécessitent le téléchargement sous Play store ou Apple store de l'application gratuite Victron Energy. Permet de relever sur tablette ou smartphone :
- *Tension- Intensité panneau / Puissance (W)*
- *Tension - Intensité batterie / Intensité charge*
- *Etat On-Off charge*



SOLAR LED STREET LAMP

EDUCATIONAL OBJECTIVES

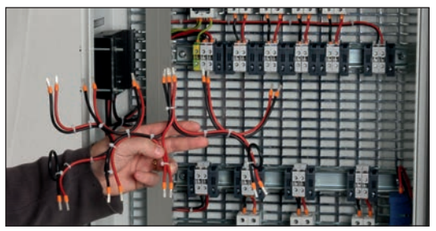
- Study street lighting with LED street lamp and solar energy.
- Commission a solar system.
- Demonstrate the ecological functioning of LED technology.
- Discover the different technologies of solar panels.
- Wire photovoltaic components, mechanically install a public lighting.
- Perform electrical and mechanical maintenance on the street lamp.
- Use hand tools.
- Identify the different electrical quantities of a solar energy production line.
- Calculate the performance of the installation.
- Set up a Bluetooth network communication.
- Set up a photovoltaic system from a tablet or a smartphone.

ref. MAQ-DEL TEACHING RESSOURCES STUDENTS / TEACHER Bluetooth®

SOLAR PUMPING STATION

EDUCATIONAL OBJECTIVES

- Apprehend a photovoltaic system dedicated to the power supply of a water pump.
- Perfom measurements of electrical parameters.
- Analyze and interpreting results.
- Perform wiring tests with commissioning and operation validation.
- Studying the efficiency and impacts of solar panels positioning
- Studying a solar charge regulator.



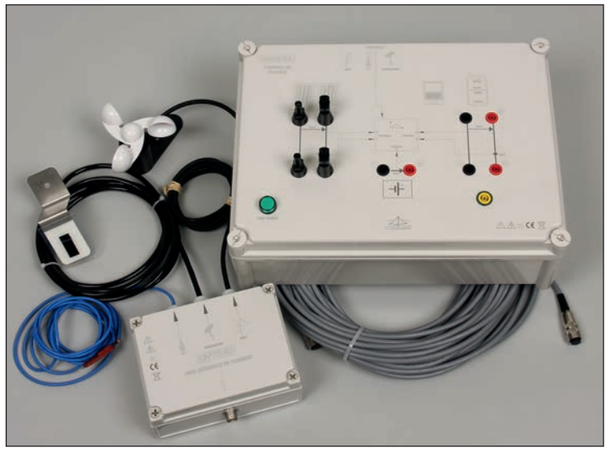
It is enough for you to remove the strand to ask to students of do the wiring.

Educational solar pumping station simulating the water supply of a population in a desert area.

ref. SOLPUITS TEACHING RESSOURCES STUDENTS / TEACHER

Bluetooth®

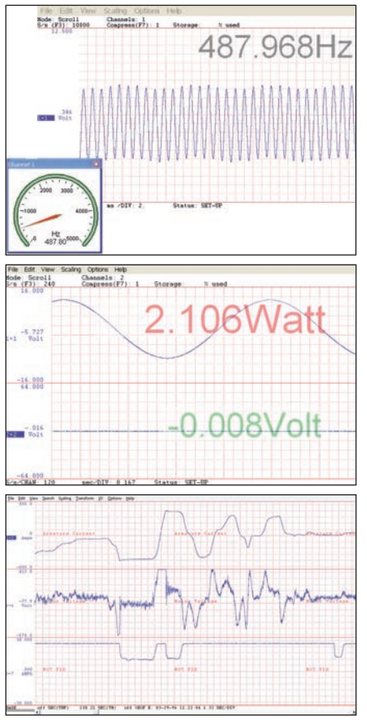
SOLAR DATA ACQUISITION



Set of sensors, interfaces and software for the real time data monitoring of a photovoltaic installation.

ref. ACQUI-SOL2

This system allows the acquisition of data on any LANGLOIS solar models, in "isolated site" or "grid injection" mode.
Record the following physical quantities in real time: temperature of the solar panel surface, the wind speed, the solar radiation, the voltage and current produced by the solar panels, the battery charging voltage and current ("isolated site" mode only), the voltage and current injected to the grid ("grid injection" mode only), the load consuming current



Technical datasheets on our website

DUAL ENERGY ELECTRIC GATES, SOLAR OR MAINS 230VAC

POA-1 - facing street side

POA-1 - facing house side

The gates POA-1 and POA-2 are supplied with an autonomous wheeled frame comprising a solar panel 30W-24VDC and two spotlights simulating the sun

ref. POA-1 **double leaf** | **ref. POA-2** **sliding** | TEACHING RESSOURCES STUDENTS / TEACHER

EDUCATIONAL OBJECTIVES

- To observe and understand the operation of electric gate automation.
- Reminder about the different solar panel technologies.
- To study the operation of an assembly of solar panel, battery, charge regulator.
- To take measurements of electrical values.
- To study the operation of photo-electric cells.
- To learn how to program gate automation according to several operating criteria.
- To perform industrial maintenance operations.

STUDY OF THE FEEDING OF PHOTOVOLTAIC ENERGY NATIONAL NETWORK

EDUCATIONAL OBJECTIVES

- Learn about a photovoltaic installation with energy feeding to the grid.
- Study the types of energy feeding to the grid, e.g. total or partial.
- Learn about and understand the photovoltaic elements present.
- Create the wiring of a photovoltaic installation.
- Take the electrical measurements of the different values.
- Study the efficiency and incidences related to the positioning of the solar panels.
- Study the use of a grid inverter and energy meter.

ref. QUICK-MPLUS | TEACHING RESSOURCES STUDENTS / TEACHER

Set of photovoltaic modules (H-250mm) and solar panels for studying a solar installation with energy feeding to the 230V AC grid.

STUDY OF FAULT DIAGNOSTICS ON A SOLAR INSTALLATION

EDUCATIONAL OBJECTIVES

- To learn and understand the operation of a photovoltaic installation.
- To diagnose faults on a photovoltaic installation in isolated site.
- To take the measurements of the different electrical values.
- Analysing and interpreting the results.
- To study the efficiency of the solar panels.
- To study the energy system (production, storage, use, energy performance).

Model + Solar source (panel and spotlights) for indoor operation

ref. SOL-DIAG | TEACHING RESSOURCES STUDENTS / TEACHER

STUDY OF PHOTOVOLTAIC ENERGY ON AN ISOLATED SITE

EDUCATIONAL OBJECTIVES

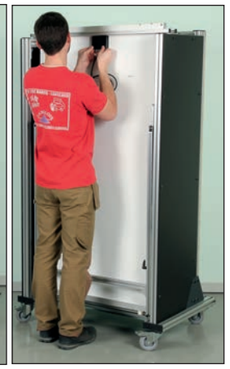
- Understand a photovoltaic installation such as an isolated site.
- Understand and understand the photovoltaic elements present.
- Carry out the wiring of a photovoltaic installation.
- Carry out electrical measurements of the different values.
- Study the efficiency and the impacts related to the positioning of the panels.
- Study the energy chain (production, storage, charge, discharge).
- Study the use of a solar charge regulator for battery.
- Configure a Bluetooth® connection

ref. QUICK-NPLUS | TEACHING RESSOURCES STUDENTS / TEACHER

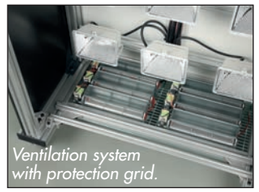
Set of photovoltaic modules (H-250mm) and solar panels for studying a solar installation on an isolated site.

ARTIFICIAL SOLAR SOURCE






REF	Photovoltaic panel delivered installed	Side protection against the direct access to the lamps	Forced ventilation to simulate the wind	Poles and chains for zone boundary
SOL-ARTI2	Yes	Yes	Yes	No
SOL-ARTI2-N	No	Yes	Yes	No
SOL-ECO2	Yes	No	No	Yes
SOL-ECO2-N	No	No	No	Yes


Ventilation system with protection grid.

Special characteristics for SOL-ARTI2 et SOL-ARTI2-N
Two opaque side panels prevent the accidental blinding of a student. With the solar panel and spotlight support they also make a closed duct for evacuating heat by an air current going from bottom to top. Centrifugal fans, located in the bottom part, inject fresh air that runs up the panel.
Grids in the bottom and top parts let the air flow pass evacuating the heat, and prevent accidental contact by hand with a burning spotlight or with the fan blades.

The versions SOL-ECO2 and SOL-ECO2-N have no lateral protection, no forced ventilation. Versions delivered with 4 poles and 2 chains for the delimitation of a safety zone around the system.


Protection by bounded safety zone

ARTIFICIAL SOLAR SOURCE COMMUNICATING VERSION

ref. SOL-COM2

Version identical to SOL-ARTI but with these additional features:
- 1 Schneider programmable PLC with its Ethernet interface
- 2 analog card I/O for PLC
- 1 electronic interface to retrieve the voltage/current parameters of the photovoltaic panel.
- 1 RJ45 connector for the connection to a PC.

Technical datasheets on our website

PHOTOVOLTAIC SOLAR PANELS 200WC ON TILTING FRAME

FEATURES OF THE PANEL
- Open circuit voltage: 46VDC
- Short-circuit current: 6.3A
- Optimum operating voltage: 37VDC
- Optimum operating current: 5.7A
- Maximum power: 215Wc (variation of ± 10% depending on the series)
- Sealed connections IP65 – 1000V on the rear of the panel.
- Type of cells: Monocrystalline silicon

FEATURES OF THE FRAME
- Aluminum chassis with adjustable tilt from 5° to 70°
- Protractor allowing the measurement of the tilt angle
- Several SOL-200 can be electrically coupled to increase the power
- Lightweight and easily movable
  Dim.: in folded position: 1600 x 700 x 100mm

ref. SOL-200

- Aluminium frame on wheels with 2 brakes
- Solar panel 30W-24VDC on frame with casters (2 with brakes)
- 2 projectors for simulating the sun's rays
- 2 photovoltaic cables 3 metres for linking the panel to the wiring frame
- Dimensions of the panel frame: H 1300 x 900 x 620mm

ref. SOL-100

PHOTOVOLTAIC SOLAR PANEL 30 WC FOR INDOOR OPERATION

SIMULATION OF A SOLAR PANEL

Given that photovoltaic panels do not produce significant power in cloudy conditions, it is not possible to complete the related tutorials. DC10 is a source which, by replacing the solar panels, overcomes unpredictable sunshine.

ref. DC10

Supplied with cable (1m) for connection to the management system of photovoltaic panels.

Suitable for indoor operation with our products.

SOLAR TRACKER WITH BATTERY

EDUCATIONAL OBJECTIVES
- Study and commissioning of a solar tracker.
- Understanding the operation of solar cells.
- Mastering the wiring of components in an off-grid photovoltaic system.
- Visualizing the system's electrical parameters via Bluetooth®.
- Comparing the performance of a photovoltaic system with and without a solar tracker.

ref. TRACSOL2

TEACHING RESSOURCES STUDENTS / TEACHER

Bluetooth®

ROOFTOP SOLAR PANELS

Discover our training system specially designed for hands-on learning of solar panel installation on a tiled roof!
This system simulates the complete installation of solar panels on a roof section, itself mounted on a mobile frame equipped with braked casters for easy and safe handling.
Ideal for training centers, technical schools, and professionals seeking advanced training, this system offers a realistic and interactive experience.
Thanks to its mobility, it can be easily moved and positioned according to your needs, facilitating demonstrations and practical exercises.
Master all the essential steps of photovoltaic installation in a safe and controlled environment.

A platform located under the roof allows for the storage of tiles and system equipment. The chassis is mounted on large diameter wheels, allowing the model to be used outdoors in dry weather.

SYSTEM COMPOSITION
- 1 anodized aluminum frame mounted on 4 braked casters
- 15 tiles, including 1 cat flap tile and spare tiles
- 6 tile hooks
- 6 rubber tile protectors
- 2 solar panel support rails
- 4 termination brackets
- 4 universal brackets
- 3 24VDC monocrystalline solar panels – 50Wp minimum
- 2 microinverters
- 1 kit for secure 230VAC microinverter connection

Dimensions: H x W x D – 1200 x 1600 x 1200mm
Weight: 230kg (without options) – 250kg (with options)

ref. SOL-COUV-600

STUDENT/TEACHER EDUCATIONAL FILE

EDUCATIONAL OBJECTIVES

- ***Install solar panels on a roof***
- ***Handle solar panels***
- ***Observe and understand how a solar panel works***
- ***Test the wiring (with COF-COUV option)***
- ***Measure electrical quantities (with COF-COUV option)***
- ***Connect and understand the importance of equipotential bonding***
- ***Understand the role of each component***
- ***Discover the different solar panel technologies***

Practical Work
- Mounting solar panels on a tiled roof
- Routing cables through a tiled roof vent
- Creating and reading a wiring diagram
- Wiring the solar section using MC4 connectors
- Wiring the 230VAC section using secure connectors
- Wiring an AC photovoltaic panel (COF-COUV option)
- Studying microinverters
- Studying series/parallel connection of panels

Side view of system no. SOL-COUV-600 with options Ref. COF-COUV and Ref. ECL-COUV

SINGLE-PHASE AC ELECTRICAL BOX OPTION + DC PHOTOVOLTAIC MEASUREMENT INTERFACE

ref. COF-COUV

Part 1: Measurement Interface
Interface for precise voltage and current measurement on each solar panel (measuring devices not included). It is integrated into a box equipped with Ø4mm safety terminals. This box, located at the front of the SOL-COUV-600 system, is easily attached and removed using a support pole attached to the frame. Connection to the solar panels is made via 2-meter cables equipped with MC4 solar connectors for simple and secure installation.

Part 2: Distribution Panel
AC distribution panel installed at the rear of the SOL-COUV-600 system. Designed for optimal integration, it receives the alternating current generated by the solar inverters via a junction box. It then redistributes it to your electrical network.
Connection to the grid is easily made using a 2P+E socket.
This panel is easily installed and removed from its housing. This allows you to complete the wiring at a traditional wiring station before commissioning the model.
A safety module equipped with an emergency stop, a power indicator, and a key switch allows you to disconnect power to the main distribution box at any time.

The waterproof main distribution box includes a surge protector, a set of circuit breakers, and residual current device (RCD) to optimally protect the solar inverter against damage or power surges. In addition, an integrated meter allows you to precisely monitor the energy injected into or returned to the grid, ensuring efficient management of your installation.

OPTIONAL INCLUDES
- 1 connection cable to the junction box
- 2 slides for installing the panel with the enclosures
- 1 main panel with the enclosures
- 1 measurement interface
- 2 cable support handles

ARTIFICIAL LIGHTING OPTION FOR INDOOR USE

This artificial light source, whose spectrum closes that of natural sunlight, offers a reliable solution to overcome the vagaries of sunlight. It provides sufficient light intensity to allow the solar panels to produce approximately one-third of their peak power (Wp).
Each solar panel is illuminated by two artificial light sources, all electrically connected via a power strip equipped with an on/off switch and an integrated protection system, ensuring safety and ease of use.
The lighting poles can be easily handled (installed or removed) without tools thanks to tightening knobs, simplifying installation and maintenance.

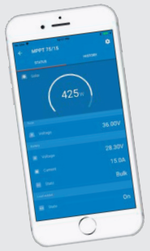
OPTIONAL INCLUDES
- 3 lighting poles each equipped with 2 halogen bulbs
- 3 pole supports
- 1 power strip

ref. ECL-COUV

These 4 didactic solutions 4 allow to understand, in a context of sustainable development, the main autonomous elements present in an eco-district.
Autonomous and entirely in low voltage 12VDC, these sets operate on solar energy.
Adjustable solar panel for indoor use (halogens fixed on the frame) or outdoor with the sun.

8 COMMON EDUCATIONAL OBJECTIVES

- Commission a solar system.
- Discover the different solar panel technologies.
- Wire photovoltaic components.
- Perform electrical and mechanical maintenance on the street lamp.
- Record the different electrical quantities of a solar energy production chain.
- Calculate the efficiency of the installation.
- Configure communication on a Bluetooth network.
- Configure a photovoltaic installation from a tablet or smartphone.



Bluetooth

Requires download from Play store or Apple store of the free Victron Energy app.
Allows reading on tablet or smartphone:
- Voltage - Panel current / Power (W)
- Voltage - Battery current / Load current
- State On-Off charge

Technical datasheets on our website

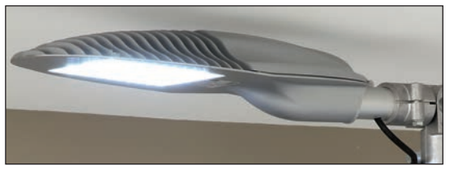
ECO-DISTRIC : AUTONOMOUS SOLAR LED LIGHTING

3 SPECIFIC EDUCATIONAL OBJECTIVES

- Study street lighting with solar-powered LED street lamps.
- Demonstrate the ecological operation of LED technology.
- Mechanically install public lighting.

ref. SOL-EQ1

DELIVERED WIRED AND CONFIGURED | TEACHING RESSOURCES STUDENTS / TEACHER



Ultra powerful LEDs with high light output

Controller screen attached to the side of the cabinet

ECO-DISTRIC: SPEED SIGNALING AND SOLAR VIDEO SURVEILLANCE

4 SPECIFIC EDUCATIONAL OBJECTIVES

- Study a solar-powered flashing traffic sign.
- Study solar-powered urban video surveillance.
- Configure communication on a Wifi network (camera).
- Configure an Ethernet IP network between the camera and the Wifi Switch.

ref. SOL-EQ3

DELIVERED WIRED AND CONFIGURED | TEACHING RESSOURCES STUDENTS / TEACHER | AUTONOMOUS WIFI NETWORK

Interior view of the electrical cabinet

ECO-DISTRIC: PEDESTRIAN SIGNALS AND SOLAR VIDEO SURVEILLANCE

5 SPECIFIC EDUCATIONAL OBJECTIVES

- Study a solar-powered LED flashing traffic sign.
- Study solar-powered urban video surveillance.
- Demonstrate the ecological operation of LED technology.
- Configure communication on a Wifi network (camera).
- Configure an Ethernet IP network between the camera and the Wifi Switch.

ref. SOL-EQ2

DELIVERED WIRED AND CONFIGURED | TEACHING RESSOURCES STUDENTS / TEACHER | AUTONOMOUS WIFI NETWORK

LED panel

Controller screen attached to the side of the cabinet

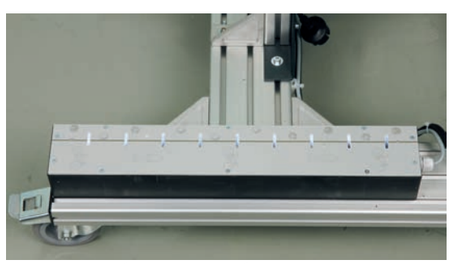
ECO-DISTRICT: SOLAR LIGHTING FOR GREEN AREAS AND CYCLE LANES

2 SPECIFIC EDUCATIONAL OBJECTIVES

- Study solar-powered ground lighting
- Study the energy savings generated by the different sensors

ref. SOL-EQ4

DELIVERED WIRED AND CONFIGURED | TEACHING RESSOURCES STUDENTS / TEACHER

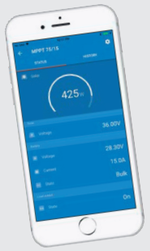


Simulation box for the lighting of a cycle lane

These 4 didactic solutions 4 allow to understand, in a context of sustainable development, the main autonomous elements present in an eco-district.
Autonomous and entirely in low voltage 12VDC, these sets operate on solar energy.
Adjustable solar panel for indoor use (halogens fixed on the frame) or outdoor with the sun.

8 COMMON EDUCATIONAL OBJECTIVES

- Commission a solar system.
- Discover the different solar panel technologies.
- Wire photovoltaic components.
- Perform electrical and mechanical maintenance on the street lamp.
- Record the different electrical quantities of a solar energy production chain.
- Calculate the efficiency of the installation.
- Configure communication on a Bluetooth network.
- Configure a photovoltaic installation from a tablet or smartphone.



Bluetooth®

Requires download from Play store or Apple store of the free Victron Energy app.
Allows reading on tablet or smartphone:
- Voltage - Panel current / Power (W)
- Voltage - Battery current / Load current
- State On-Off charge

PDF Technical datasheets on our website

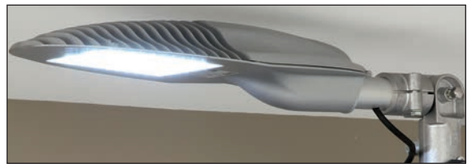
ECO-DISTRICT: PEDESTRIAN SIGNAL, VIDEO SURVEILLANCE AND SOLAR STREET LIGHTING

7 SPECIFIC EDUCATIONAL OBJECTIVES

- Study street lighting with solar-powered LED street lamp
- Study a flashing solar-powered LED traffic sign
- Study urban video surveillance powered by solar energy
- Demonstrate the ecological operation of LED technology
- Configure communication on a Wifi network (camera)
- Configure an Ethernet IP network between the camera and the Wifi Switch
- Study the energy savings generated by the different sensors

ref. SOL-EQ5

DELIVERED WIRED AND CONFIGURED | TEACHING RESSOURCES STUDENTS / TEACHER | AUTONOMOUS WIFI NETWORK



Ultra powerful LEDs with high light output

LED panel

Controller screen attached to the side of the cabinet

ECO-DISTRICT: AUTONOMOUS SOLAR VIDEO SURVEILLANCE

3 SPECIFIC EDUCATIONAL OBJECTIVES

- Study urban video surveillance powered by solar energy
- Configure communication on a wifi network (camera)
- Configure an ethernet IP network between the camera and the Wifi Switch

ref. SOL-EQ7

DELIVERED WIRED AND CONFIGURED | TEACHING RESSOURCES STUDENTS / TEACHER | AUTONOMOUS WIFI NETWORK

Interior view of the electrical cabinet

ECO-DISTRICT: ELECTRIC VEHICLE CHARGING STATION WITH SOLAR LIGHTING

8 SPECIFIC EDUCATIONAL OBJECTIVES

- Study a charging station and solar energy lighting
- Demonstrate the ecological operation of a hybrid terminal
- Configure a Wifi communication (charging station)
- Configure an Ethernet IP network, between the terminal & the Wifi Switch
- Study the energy savings generated by the different sensors
- Study the different types of charging sockets for electric vehicles
- Test an electric vehicle charging station.
- Study an access control by code keypad and RFID badge

ref. SOL-EQ6

DELIVERED WIRED AND CONFIGURED | TEACHING RESSOURCES STUDENTS / TEACHER | AUTONOMOUS WIFI NETWORK

Delivered with a tester charging station

ECO-DISTRICT: AUTONOMOUS SOLAR VIDEO SURVEILLANCE WITH ASSISTED VIDEO PROTECTION

5 SPECIFIC EDUCATIONAL OBJECTIVES

- Study urban video surveillance powered by solar energy
- Configure Wifi communication (camera)
- Configure an Ethernet IP network, between the camera & the Wifi Switch
- Configure the dome camera
- Configure the recording settings

ref. SOL-EQ8

DELIVERED WIRED AND CONFIGURED | TEACHING RESSOURCES STUDENTS / TEACHER | AUTONOMOUS WIFI NETWORK

Interior view of the electrical cabinet

Supplied with an 18 "HD LED recorder and monitor representing the security post.

Equipped with 2 adjustable cameras and a dome camera..

Technical datasheets on our website

SOLAR AND WIND TURBINE HYBRID STATIONS

These hybrid stations include:
1 electrical cabinet + 1 three-phase wind turbine 400W
2 photovoltaic panels + 1 connection cable

TEACHING RESSOURCES STUDENTS / TEACHER

EDUCATIONAL OBJECTIVES

- Discover the different components involved in a wind / solar Hybrid installation.
- Perform electrical measurements of different quantities.
- Analyze & interpret the results.
- Study the efficiency and impacts related to wind strength and sunlight.
- Study the energy chain (production, storage, use, energy behavior).
- Wire a hybrid wind / solar installation.

NETWORK INJECTION AND ISOLATED SITE
ref. SOLEOL-1 **Bluetooth®**

NETWORK INJECTION
ref. SOLEOL-2

ISOLATED SITE
ref. SOLEOL-3 **Bluetooth®**

Practical works

- Record and study of the electrical characteristics of the wind turbine.
- Record and study of the electrical characteristics of solar panels.
- Calculating the efficiency of the wind / solar hybrid system.
- Realization of the diagram and wiring for restitution of the energy on the electrical grid (except SOLEOL-3).
- Realization of the diagram and cabling for use of the energy in isolated site (except SOLEOL-2).

Bluetooth®

Smartphone not supplied

PARTIAL OR TOTAL RESALE OPERATION

In the cabinet a DC/AC inverter converts the DC from the photovoltaic panels and/or the wind turbine to AC 220VAC 50Hz, and injects its power in synchronism into the electrical grid. This inverter is protected against any polarity reversal and any overload on the DC or AC side. When the panels are not lit, the inverter consumes no current.

Technical characteristic for the inverter coupled to the electrical grid.

INVERTER	Voltage	Max current	Power
INPUT	65~125VDC	8A	
OUTPUT	230VAC-50Hz	2,25A	500W

OPERATION IN ISOLATED SITE WITH NO RESALE

The photovoltaic and/or wind turbine current charges two 12V sealed batteries cabled in series through a charge controller. This DC voltage is either available on safety terminals at the rear of the cabinet or converted to 250VAC 50Hz by a 200W voltage converter.

Technical characteristics of converter for isolated site.

VOLTAGE CONVERTER	Voltage	Max Current	Power
INPUT	20~32 VDC	11A	210W
OUTPUT	230VAC 50Hz	1,5A	300VA

HYBRID SOLUTIONS

EDUCATIONAL OBJECTIVES

- Discover the various elements of a photovoltaic or wind turbine system.
- Learn and understand the safety elements present.
- Perform activities at different electrical dimensions.
- Analyze & interpret the results.
- Study the yield and incidence related to the panel positioning.
- Study the energy chain (production, storage, utilization, energy behavior).
- Wire a photovoltaic or wind facility
- Set up a Bluetooth® connection (TAE-ISOL only)

ISOLATED SITE

ref. TAE-ISOL **Bluetooth®**

TEACHING RESSOURCES STUDENTS / TEACHER

This teaching panel must be connected to a PV or wind voltage source.
It is compatible with our SOL-200 solar panels and our EOLYS-500 wind power.
Input voltage between 24Vdc and 48Vdc maximum.

Smartphone not supplied

Bluetooth®

Requires download from Play store or Apple store of the free Victron Energy app.
Allows reading on tablet or smartphone:
- Voltage - Panel current / Power (W)
- Voltage - Battery current / Load current
- State On-Off charge

NETWORK INJECTION

ref. TAE-RES

TEACHING RESSOURCES STUDENTS / TEACHER

This worktable must be connected to a PV or wind voltage source
It is compatible with our SOL-200 solar panels and our EOLYS-500 wind power. Entry voltagecomprises between 75VCC and 150Vcc.

You can choose between two types of operation: total return of energy produced or restitution of energy not consumed only.
TAE-RES is put on a table. It is equipped with 2 unfolding mobile arms which can move 70° and provide great stability.
Dimensions: 770 x 600 x 360mm (unfolded arms).
Delivered with a group of 4mm safety cords.

COMPLETE SOLUTION FOR THE STUDY OF SOLAR, WIND AND HYBRID ENERGY

ref. PACK-SOLEOL-1 (included A + B + C + D + E)

SUPPLIED WITH TEACHING RESOURCES STUDENT & TEACHER

Bluetooth®

PDF

Technical datasheets on our website

FULL DESCRIPTION OF ALL ITEMS INCLUDED IN PACK-SOLEOL-1, SEE TECHNICAL DATASHEETS.

ITEM A
ELECTRICAL CABINET

ITEM B
PHOTOVOLTAIC SOLAR PANELS + PYRANOMETER

OPERATION IN PARTIAL OR TOTAL RESALE AND ON ISOLATED SITE

ITEM C
3-PHASE WIND TURBINE 400W

ITEM D
LOADING ZONE

ITEM E
CONVERSION OF RENEWABLE ENERGY AND RHEOSTAT

4 COMPLETE STUDIES POSSIBLE DEPENDING ON THE COMBINATION OF ITEMS SUPPLIED

STUDY N°1
ITEMS A + B +D
SOLAR CENTRAL UNIT WITH NETWORK INJECTION & ISOLATED SITE

STUDY N°2
ITEMS A + C + D
WIND TURBINE CENTRAL UNIT WITH NETWORK INJECTION & ISOLATED SITE

STUDY N°3
ITEMS A + B + C + D
HYBRID CENTRAL UNIT WITH NETWORK INJECTION & ISOLATED SITE

STUDY N°4
ITEMS C + E
RENEWABLE ENERGY CONVERSION

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