PV Port & Store

PV Port & Store is a standardized, portable, mass produced 2 kWp PV system with electrical storage for residential applications.

Capacity and components (all available off the shelf except the Rotomoulded bench)

- 6 x Glass Glass PV modules with frame (325 x 6 = 1950 Wp), resisting wind pressure up to 4000 N/m² *[Glass Glass can be replaced by regular Glass-foil for upscaling]*
- 2 x 48V 50 Ah Lithium Iron Phosphate batteries (2 x 48 x 50 = 4.8 kWh), DOD 90-100%, 10 year design life at 0°C to 50°C operating temperature
- 1 x 48/3000/35-32 230V inverter (1700 - 6000 Wp)
- 1 x MPPT 150/35
- 1 x Zigbee current sensor
- 1 x intelligent controller, Zigbee receiver
- Cables, plugs, DC cables, MC4 connectors
- Galvanized steel pipe 60 mm x 3.65, Hot Dip
- TÜV certified Tubeclamps
- PV module rails, PV module bended cross bars, rain drain, screws
- Sprinkler system, with pump Rotomoulded Bench, UV stabilized plastics

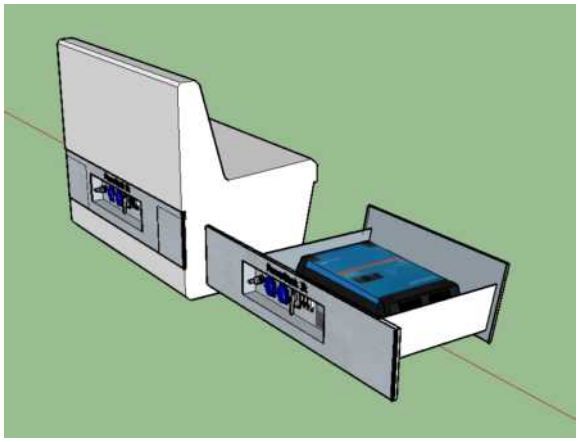
Mechanical structure

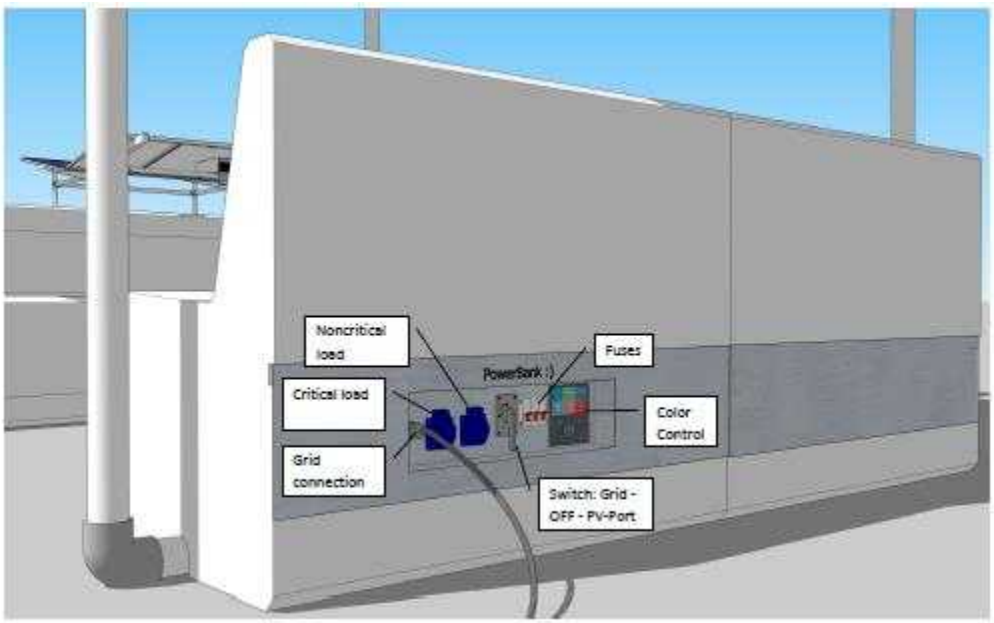
- Self - ballasting structure; No puncture in the roof
- Based on CFD and solar yield simulations, the optimized east-west orientation of the modules modules has enabled the design to resists wind load conditions defined by Indian Standard Codal requirements (IS875 Part 3) for basic wind speed of 50m/s considering flat terrain for installation on top of buildings with up to 12m height (4 stories). The design also resists to the load at wind speeds of 55m/s including Venturi effects at 1 m from the terrace edge. (*Certificate available*)

Rotomoulded Bench

One of the two benches contains all the electronics, inverter, batteries in a cavity which is surrounded by water. This bench comes pre-assembled with all the electronics from the factory. The other bench cavities offer room for the installation of batteries with potential future capacity increase. The water in both the benches is filled on site, allowing easy transport. The advantages of the water filled benches are two folds:

1. The weight of the bench is substantially increased with water and thus acts as counter-weight to all the uplift force which may be caused due to wind
2. The water surrounding the electronics acts as a fluid cooled heat sink and thermal buffer which improves efficiency and keeps batteries within the permitted temperature range for their 10 year warranty conditions.





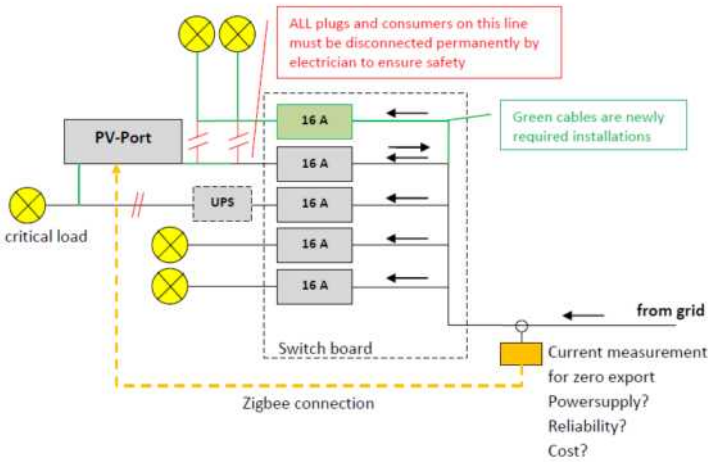
Functionalities

PV Port & store is a hybrid system that provides the following functionalities

1. **In parallel to the grid:** All loads are supplied from the PV Port & Store. In case load is more than PV output, the electricity is imported from the grid.
2. **During power outage:** The PV Port & Store supplies electricity from the PV modules and the batteries to the critical load during grid outages (similar to a conventional UPS system).
3. **No export to the Grid:** PV Port & Store shall not export anything to the grid after the Discom meter. There is no need to change the existing meter.
4. **Peak shaving:** A user can participate in the Time of Day tariff, demand side management schemes of the distribution companies to support them in peak shaving and taking the benefits of the schemes.

Connection to the house

PV Port & Store has two outputs a) for supplying to the non-critical load and b) for supplying to the critical load. There are several ways to connect PV Port & Store in the house however the recommended connection is to use a dedicated 16 A MCB at the distribution box. This eliminates any chances of MCB blinding and thus is safe to be used. For the zero export functionality, a current sensor is placed at the incoming to the distribution box and which is communicating to the inverter using a wireless zigbee connection. In case zigbee signals are not reliable, an alternative wired communication cable can also be used.



Connection at the distribution box using dedicated MCB

Sprinkler system

PV Port & Store comes with a sprinkler system which can be used to sprinkler water. It can be with both automatic / manual modes. The system can also provide alarms to the user every week or so to clean the system.

Monitoring and Communication

Monitoring is done via the inverter and a cheap communication method is being worked out. An APP is currently being developed which will enable the user to download the data from the inverter using the smartphone as a hotspot (no wifi, no GSM is required) and using the network of the mobile phone, the data is communicated to a central server which is populating the data on a web portal (PV Port Portal). This method is eliminating the reoccurring cost of any dedicated GSM connection for the

inverter and lack of wifi signals on the roof. Where good Wifi connection is available, it will be used for constant monitoring.

PV Port Portal

A web portal is currently under development which allows user to do the following things:

1. Qualify themselves to be eligible for a PV Port & Store (space requirements, electrical requirements, accessibility to the roof etc)
2. It contains all the information about PV Port & Store which a consumer would like to know before buying the system (Specifications, marketing material etc)
3. It allows the consumer to place an order and track it's shipment
4. The consumer can access all user manuals, installation videos, invoicing etc on the portal itself.
5. It can register the PV Port & Store on the portal and communicate the data from the inverter using point to point communication.

Timelines

1. 2 PV Port & Store systems will be ready in Germany by 11 March 2019
2. 1 system will remain in Germany to be available for display at Intersolar Munich at ISA or SECI booths
3. 1 system will be shipped to India to be installed at a designated location in Delhi
4. PV Port Portal and PV Port APP shall be ready by April 2019 to be put to use.
5. 15-20 similar systems will be available in June 2019 in India to be installed at various locations in the discom network.

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Disclaimer

The concept of PV Port & Store is developed under the Indo-German Technical Cooperation projects aimed at promotion of solar energy and is implemented jointly by Ministry of New and Renewable Energy and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.
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