

| BIDIRECTIONAL CONVERTER                         |                                                                                                                                                                                                                            |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GridAssist function                             | In case of overload the ECOMulti will import power from the grid to prevent system shutdown.                                                                                                                               |
| Maximum AC current feed-through                 | 50 A                                                                                                                                                                                                                       |
| AC voltage                                      | 230 V 50 Hz single phase                                                                                                                                                                                                   |
| Cont. output power at 25 °C                     | 3000 VA                                                                                                                                                                                                                    |
| Cont. output power at 25 °C                     | 2500 W                                                                                                                                                                                                                     |
| Cont. output power at 40 °C                     | 2200 W                                                                                                                                                                                                                     |
| Peak power                                      | 6000 W                                                                                                                                                                                                                     |
| Maximum efficiency                              | 94%                                                                                                                                                                                                                        |
| Power factor range (when connected to the grid) | 0,7 inductive to 0,7 capacitive (programmable)                                                                                                                                                                             |
| Zero-load power (W)                             | 15 W                                                                                                                                                                                                                       |
| Zero load power in AES mode                     | 10 W<br>(island mode operation with AC output lowered to 200 V when load < 50 Watt)                                                                                                                                        |
| Charge voltage 'absorption'                     | 28,2 V                                                                                                                                                                                                                     |
| Charge voltage 'float'                          | 26,7 V                                                                                                                                                                                                                     |
| Maximum charge current                          | 70 A                                                                                                                                                                                                                       |
| Maximum battery depth of discharge (DoD)        | 80%                                                                                                                                                                                                                        |
| Auxiliary output                                | To connect additional loads once the battery has been fully charged: 16 A relay                                                                                                                                            |
| Programmable relay                              | For monitoring, alarm or other purposes                                                                                                                                                                                    |
| VE.Bus communication port                       | For parallel and three phase operation, remote monitoring, remote control and system integration                                                                                                                           |
| General purpose communication port              | Yes                                                                                                                                                                                                                        |
| Remote on-off                                   | Yes                                                                                                                                                                                                                        |
| BATTERY                                         |                                                                                                                                                                                                                            |
| Technology                                      | Lithium Iron Phosphate                                                                                                                                                                                                     |
| Nominal voltage                                 | 25,6 V                                                                                                                                                                                                                     |
| Nominal energy at 25°C                          | 2,3 kWh                                                                                                                                                                                                                    |
| Nominal capacity at 25°C                        | 90 Ah                                                                                                                                                                                                                      |
| Nominal capacity at 0°C                         | 72 Ah                                                                                                                                                                                                                      |
| Nominal capacity at -20°C                       | 45 Ah                                                                                                                                                                                                                      |
| Battery Management System                       | Cell balancing, and system shutdown in case of cell over voltage, cell under voltage and over temperature                                                                                                                  |
| Cycle life, 80% DoD                             | 2000 cycles                                                                                                                                                                                                                |
| Cycle life, 70% DoD                             | 3000 cycles                                                                                                                                                                                                                |
| Cycle life, 50% DoD                             | 5000 cycles                                                                                                                                                                                                                |
| Max storage time at 25 °C                       | 1 year                                                                                                                                                                                                                     |
| OTHER                                           |                                                                                                                                                                                                                            |
| Display                                         | Graphical display<br>Graphical User Interface (GUI)<br>Ethernet (standard) and Wifi (optional) for remote monitoring and control<br>Data storage and graphical display on vrm.victronenergy.com<br>Android and iPhone apps |
| Operating temperature                           | -20 to + 40°C                                                                                                                                                                                                              |
| Storage temperature                             | -40 to + 50°C                                                                                                                                                                                                              |
| Protection category                             | IP22                                                                                                                                                                                                                       |
| Humidity                                        | 95% non condensing                                                                                                                                                                                                         |
| Warranty                                        | System: 5 years<br>Battery: 3 years full warranty plus 7 years prorated warranty                                                                                                                                           |
| ENCLOSURE                                       |                                                                                                                                                                                                                            |
| Colour                                          | Blue RAL 5012                                                                                                                                                                                                              |
| Weight                                          | Without battery: 28 kg      With battery: 60 kg                                                                                                                                                                            |
| Dimensions (hwxwd)                              | 475 x 575 x 360 mm                                                                                                                                                                                                         |
| STANDARDS                                       |                                                                                                                                                                                                                            |
| Safety                                          | EN 60335-1, EN 60335-2-29, VDE-AR-N 4105                                                                                                                                                                                   |
| Emission, Immunity                              | EN55014-1, EN 55014-2, EN 61000-3-3                                                                                                                                                                                        |
| Anti-islanding                                  | VDE-AR-N 4105, C10/11, G59/3-2, G83/2, RD 1699/2011, RD 413/2014, UTE C15-712-1                                                                                                                                            |



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# ECOMulti

A simple wall mounted energy storage solution



**Nighttime**  
During the night the ECOMulti is disconnected from the grid. The home is powered by energy stored in the battery. The ECOMulti will reconnect the grid when the battery is discharged.



**Battery charging**  
The next day, when the PV array produces sufficient power to supply the loads and to start charging the battery, the ECOMulti will regulate charge current to absorb nearly 100% of the surplus PV power.



**Discharging during the day**  
When PV output is reduced by clouds or when a power hungry load is switched on, resulting in no surplus PV power available, battery charging will stop. Insufficient PV power will be supplemented by power from the ECOMulti. In case of overload power will be imported from the grid to supplement power from the ECOMulti (GridAssist function), and system shut down due to overload will be prevented.



**Battery fully charged**  
Once the battery is fully charged, additional loads (for example the water heater) can be switched on, or surplus power will be exported to the grid.

**End of the day**  
The ECOMulti disconnects from the grid about 10 minutes after PV power has become insufficient to provide any charge current. In order to prevent false disconnections due to lack of sun during the day, the inverter/charger also uses an internal timer to predict the end of the day.

**UPS function**  
When the grid fails, the ECOMulti will continue to power the home.

# ECOmulti

A simple wall mounted energy storage solution

[www.victronenergy.com](http://www.victronenergy.com)

## Sizing the PV array

Sufficient energy must be harvested to recharge the battery and to power the home, even on a reasonably clear winter day.

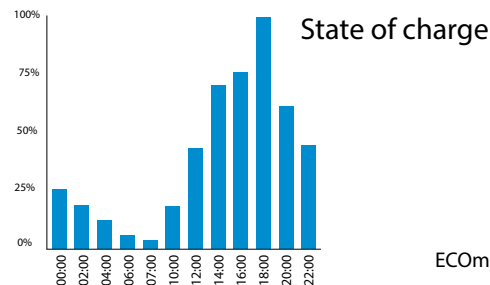
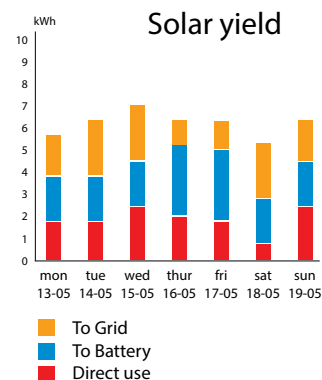
At roughly 50 degrees latitude (Seattle, London, Amsterdam, Berlin, München) the two person energy conscious household will need a 2,5 kWp array. A four person household would need a 5 kWp array.

At roughly 30 to 40 degrees latitude (Los Angeles, Marseille, Sevilla) a 1 kWp resp. 2 kWp array will do.

A larger PV array will increase feedback into the grid, but not substantially increase battery utilization and self sufficiency.

## Increasing storage capacity

More battery storage capacity will reduce feedback into the grid and increase self sufficiency, especially during the summer season. To increase self sufficiency during wintertime both the battery and the PV array have to be enlarged.



ECOmulti app



## Why 2,3 kWh?

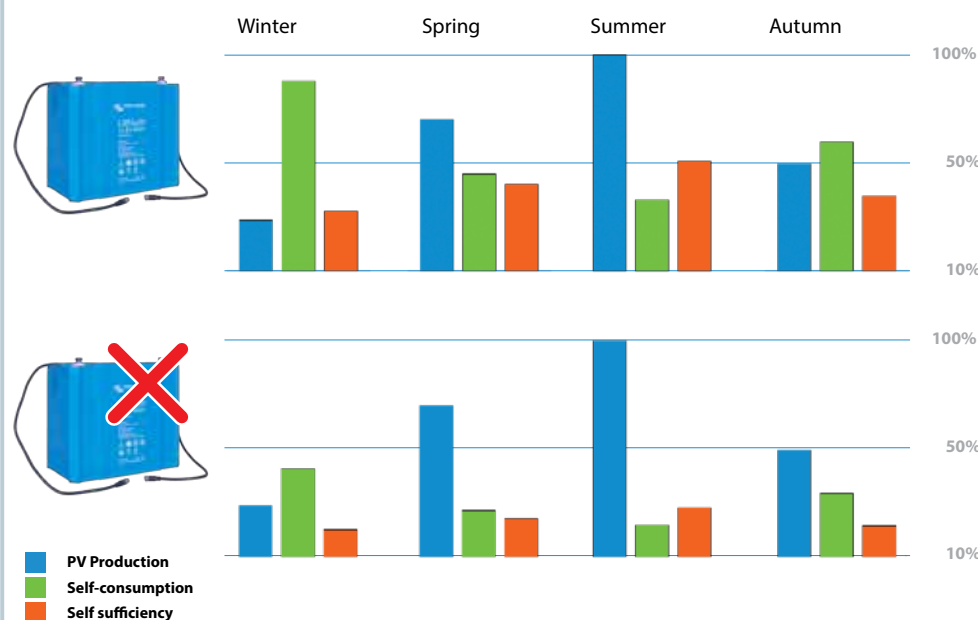
Whenever PV output exceeds consumption, storing excess output for later use will increase self-consumption.

## However

- PV harvest will fluctuate from season to season, from day to day and also within the day.
- Electricity consumption is likewise fluctuating: working days, weekends and holiday periods will all result in different consumption patterns.

A 2,3 kWh Li-ion battery is an efficient solution for a two person energy conscious household. Energy consumption from dusk to dawn will be 2 kWh or more, even when no energy hungry appliances like a dishwasher or clothes dryer are used. A fully charged 2,3 kWh battery will therefore be discharged before the sun starts shining again.

The average household with two children would fully utilize a 4,6 kWh Li-ion battery; one additional battery module.



Typical seasonal variations at roughly 50 degrees latitude ~ Seattle, London, Amsterdam, Berlin, München ~ with battery and without battery.

**Two person energy conscious household**  
Consumption: 2500 kWh per year  
PV array: 2,5 kWp  
Battery: 2,3 kWh Li-ion

**Two person energy conscious household**  
Consumption: 4500 kWh per year  
PV array: 5 kWp  
Battery: 4,6 kWh Li-ion

## A simple wall mounted energy storage solution

The **ECOmulti** can be wall mounted, is easy to install, easy to program and easy to operate.

## Extremely flexible

- Energy storage can be increased by adding battery modules.
- AC power can be increased by paralleling **ECOmulti** modules.
- Three **ECOmulti** modules can be configured for three phase operation.

## More self-consumption, more independence

With 2,3 kWh Li-ion storage capacity and a 3 kVA bidirectional inverter, the **ECOmulti** reduces dependence on power from the grid.

The growing interest in self-consumption is driven by increasing retail electricity prices and simultaneously decreasing feed in tariffs. Feed in tariffs are decreasing a. o. because it becomes increasingly difficult, and expensive, to ensure stability of the grid as more solar and wind power comes on line. Simultaneously, the retail price of electricity is increasing, to cover these same costs plus the cost to keep conventional power plants in hot standby to back-up renewable power generation in case the sun is not shining and/or the wind is not blowing.

The **ECOmulti** meets the German interconnection standard VDE-AR-N 4105 and the Incentive Program for Solar Energy Storage Systems *Marktanzreizprogramm für Batteriespeicher*.

With Intelligent Battery and Load Management the **ECOmulti** can limit power export to the grid to at most 60% of the installed Wp capacity; *KfW-Programm Erneuerbare Energien "Speicher"*.

According to the Fraunhofer-Institut für Solare Energiesysteme (ISE), a household that consumes 4500 kWh per year can reduce energy import from the grid by 60% when installing a 5 kWp solar array combined with 4 kWh usable energy storage.

For more information please download our white paper *Self-consumption or grid independence* from [www.victronenergy.com](http://www.victronenergy.com).

