

PVmaster II – reliable large-scale inverter, on- or off-grid

KIRAN LINGAM, APPLIKATION PHOTOVOLTAIK/APPLICATION ENGINEER PHOTOVOLTAIC, LTI REENERGY GMBH

Germany based LTI Group has been a pioneer in power inverter technology since 40 years. LTI REEnergy, member of LTI Group develops and manufactures large-scale inverters for medium and large-scale photovoltaic plants. Newly innovated PVmaster II is available from a rated output of 45 kW to 305 kW and can be connected not only to a low-voltage grid or to a medium-voltage grid but also to any type of PV modules. The high-grade components and advanced control algorithms of the PVmaster II guarantee its reliability and maximum yields. High power density and innovative enclosure design in conjunction with the low number of individual components is among the most compact large-scale inverters in its class. The clear modular design enables simple and rapid exchange of individual components in the unlikely event of a failure. The integrated diagnostic facilities help to identify the assembly affected in any given case saving valuable time and reducing downtime.

The PVmaster II is a unique inverter kind which allows both conventional grid-connected in-feed mode as well as off-grid stand-alone generation and is able to switch automatically to island mode in the event of a grid outage. Modulation processes in conjunction with optimum switching frequencies make PVmaster II work efficiently in every part-load range and voltage range with high efficiency.

The power is permanently adjusted by the MPP tracker (Maximum Power Point). The current and voltage levels reached with a large-scale inverter are very high compared to string inverter. By using very high-resolution data logging systems (24-bit converter) for the MPP tracking, the high quality of the power adaptation is guaranteed with the PVmaster II, even in the lowest part-load range. With an MPP tracking efficiency > 99.9% no power reserves of the PV generator are wasted.

PVmaster II is operational between -10°C to +50°C. The rated values are maintained up to an ambient temperature of 45°C. Even at an ambient temperature of 50°C, the rated values are still maintained for a relatively long time before the temperature causes the onset of derating. All PVmaster II units have the facility to monitor the insulation resistance to earth.

The user interfaces of the PVmaster II are user-friendly and intuitive in design. This simplifies on-site start-up, parameter setting and servicing and thus saves valuable time. PVmaster has numerous interfaces like digital, analogue, CAN, RS232 with a wide range of functions. This makes it flexible, versatile and future-proof. Each individual input and output can be assigned to a wide range of functions. Inverting functions and filter functions offer a high degree of flexibility. Special events and any faults are recorded, logged and reported by the integrated data logger via the user interfaces, either by e-mail or to a mobile telephone by SMS. Local control is quick and uncomplicated with the 4.3" TFT touch display monitor (65535 colours) with LED backlighting, which is integrated in many PVmaster II versions.

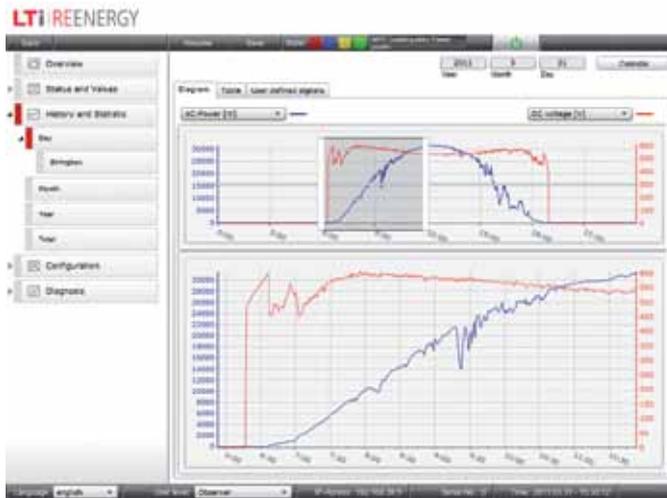
The integrated web functionality offers all the advantages of a modern online portal without any additional costs as well as additional diagnostic features. Access is gained via a local network connection or by means of an optional communication module and the convenience of a remote data connection. The integrated web functionality is based on the latest web technologies (MS Silverlight) with intuitive user interfaces and highly sophisticated and interactive graphics. The web functions

integrated as standard in the PVmaster II serve a number of purposes, such as visual display of the current status and current readings, access to the daily data history and yield data, user-friendly configuration, straightforward software update processes, and extensive diagnostic facilities and features. The integrated generator diagnostic tool allows the generator data to be plotted and logged at any time. The web interfaces can be accessed via a PC browser for ease and convenience. The basic version of the PVmaster II already has all the data acquisition and logging functions on board therefore no additional external data loggers are needed to format and send all the measurements and data which could conceivably be required. The daily data history and yield data can also be exported at any time in .csv file format and processed on a PC, as required in any individual case, thanks to the user-friendly report function.

Alternatively, the product naturally still supports the use of tried and tested online portals:

- PVmaster portal (www.pvmaster.de)
- MeteoControl
- Sunmonitor
- Further options on request

The simple and configurable export interface supports the transmission of the



On the left, visualization of day curves for selectable measured signals; in this case the total AC-power and DC-voltage are selected. On the right, visualization of produced energy for each day as a month-diagramm.

data via an integrated FTP client on any destination server.

The optional LTI control centre solution recommended for photovoltaic power stations with several PVmaster II generation units is a convenient and smart way to operate and configure all the generator units and to run their visual displays simultaneously. With its 15" TFT touch screen and the sophisticated graphical interfaces, it is also likely to catch the eye of any visi-

tor.

The advanced diagnostics included in the control centre solution even extend to a software oscilloscope, for example, also allowing simple recording and plotting of rapid signals (e.g. instantaneous voltages and currents).

The filter components and the dynamic current regulation with the compensation of low harmonic current distortion guarantee that the electricity fed into the

grid is of a high quality, exceeding the requirements of the relevant standards with a THD value of <2.5% and thus able to help improve the quality of the supply voltage. The high grid compatibility also allows PVmaster II generator units to be operated in "weak" grids. PVmaster II even has mastery of the most complex of all network support functions, the dynamic power system support function known as "fault ride-through".