

# PVMaster III L

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Your global inverter solution.





» Optimal operation  
of your photovoltaic  
plant at any time  
and worldwide. «



# Innovative technology.

As a specialist in large-scale solar parks LTI ReEnergy provides reliable technology and optimized solutions individually fitted to local conditions and standards. The PVMaster III L incorporates various benefits and services geared to meet the differing needs of customers all over the world – whether it be compliance with local standards and regulations, coping with harsh environments or handling tough logistical challenges. The high-performance components determine the total return of a photovoltaic system and how quickly investments made in a power plant pay for themselves.

## **Early riser and late to bed**

Power units switch-on and off demand oriented. PVMaster III L producing power in the early and late hours of the day or under bad weather conditions.

## **Modular system design**

Makes routine maintenance and servicing very quickly and ensures maximum uptime.

## **Local requirements**

Our PVMaster III L central inverter solution is completely compliant with new draft CEA regulations and fulfills the required grid support functions.

## **Established service**

Fully equipped service center including component level repair facility in India for over 6 years.

## **Local content benefit**

Care-free servicing through worldwide available components and significant reduction of maintenance costs because of international standard components.

## **Remote control**

Various interfaces and VPN for remote control offers our global partner secured communication possibilities.

## **Reliability and robustness**

Reliability and robustness derived from the extensive experience of LTI ReEnergy's leading pitch systems in the wind business for more than 15 years.

# PVMaster III L

## PVML.1050 and PVML.1400

- Central inverter system for direct connection to a medium voltage transformer
- Compact and modular design with high power density
- Complete grid support: LVRT, HVRT, ZVRT
- Simple and fast installation and commissioning
- MPP voltage range 590 V to 920 V
- Applicable with all common module types
- Maximum efficiency > 98.8 %<sup>6)</sup>



### Technical Data

Designation	PVML.1050	PVML.1400
<b>Generator connection (DC)</b>		
Min./max. input voltage ( $V_{dc, min} / V_{dc, max}$ )	590 V / 1000 V	
MPP voltage range ( $V_{mpp, min}$ to $V_{mpp, max}$ )	590 V to 920 V	
Number of inputs	optional 9, 10 or 12 fused inputs (+/-)	optional 12 or 16 fused inputs (+/-)
MPP-Tracker	1	
Max. input current ( $I_{dc, max}$ )	1800 A	2400 A
Rated input voltage ( $V_{dc, r}$ )	640 V	
Start voltage supply ( $V_{dc, start}$ )	660 V	
Termination technique flat terminal (L+, L-)	each input M12 (max. 300 mm <sup>2</sup> )	
<b>Mains power connection (AC)</b>		
Max. output power ( $S_{ac, r}$ ) at $V_{ac, r}$	1050 kVA	1400 kVA
Rated power ( $P_{ac, r}$ ) at $\cos \varphi = 1$ <sup>1)</sup>	1050 kW	1400 kW
Rated voltage ( $V_{ac, r}$ ) <sup>2)</sup>	390 V	
Min./max. output voltage ( $V_{ac, min} / V_{ac, max}$ )	in accordance with country-specific requirements, adjustable	
Rated frequency (f)	50 Hz / 60 Hz	
Frequency range ( $f_{min}$ to $f_{max}$ )	in accordance with country-specific requirements	
Max. output current ( $I_{ac, max}$ )	1560 A	2080 A
System form	IT (3~)	
Power factor $\cos \varphi$ <sup>3)</sup>	adjustable 0.8 ind. to 0.8 cap.	
Distortion factor (THD) at $P_{ac, r}$	< 2.5 %	
Termination technique flat terminal (L1, L2, L3)	each input M12 (max. 300 mm <sup>2</sup> )	
<b>Efficiency<sup>4)</sup></b>		
Max. efficiency	> 98.8 %	
European efficiency	> 98.6 %	
CEC efficiency	> 98.6 %	
<b>Dimensions</b>		
Height (including 200 mm plinth)	1800 mm	1800 mm
Width	3600 mm	4200 mm
Depth	600 mm	600 mm
Weight (approx.)	1650 kg	2000 kg
<b>General data</b>		
Immediate vicinity	indoor installation	
Ambient temperature <sup>5)</sup>	-10°C to +50°C	
Relative humidity <sup>5)</sup>	15 % to 85 % <sup>6)</sup> , condensation not permitted	
Max. altitude (above sea level) <sup>7)</sup>	3000 m	
Pollution severity (EN 60664-1)	2	
Cooling method	regulated air/liquid cooling	
Fresh air requirement	2100 m <sup>3</sup> /h	2500 m <sup>3</sup> /h

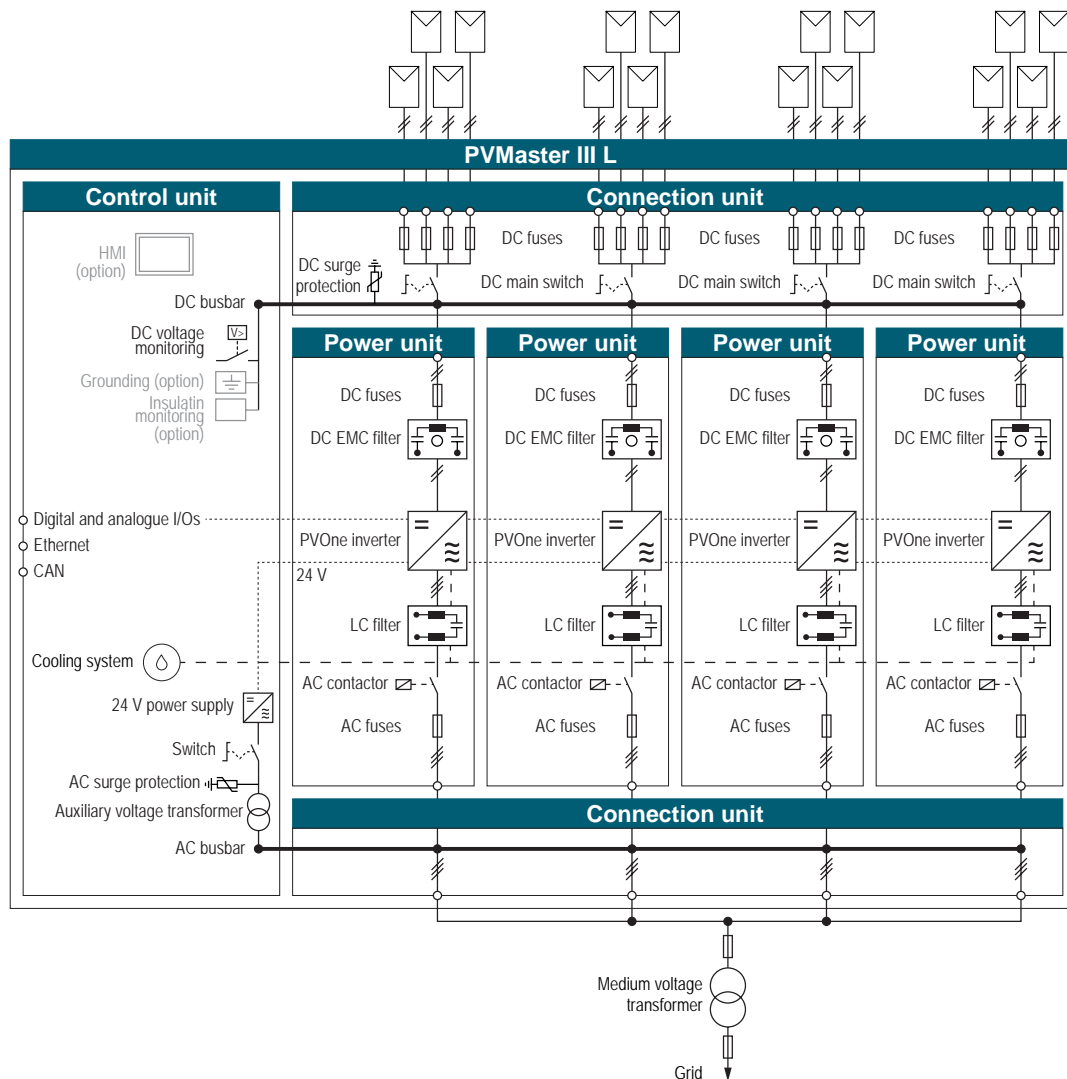
- 1) At  $\cos \varphi = 1$  the maximum apparent power ( $S_{ac, r}$ ) of the unit is available as active power at the rated grid voltage ( $V_{ac, r}$ ). The maximum active power will be reduced accordingly with decreasing grid voltage and/or decreasing power factor  $\cos \varphi$ .
- 2) Line-to-line voltage; tolerance  $\pm 15$  %; other rated system voltages on request
- 3) Engineering notes regarding module design at reactive power from 0.9 ind. or 0.9 cap.
- 4) Data referred to inverter excluding medium voltage transformer
- 5) If frosting occurs or at high humidity the option cabinet heater may be required
- 6) 15 % to 95 % available upon request
- 7) Power derating at altitudes >2000 m required, higher altitude values on request

## Technical Data

Designation	PVML.1050	PVML.1400
<b>Liquid cooling</b>		
Coolant	water-glycol mixture	
<b>Power consumption</b>		
Intrinsic consumption in active mode (approx.)	800 W	
Standby power consumption <sup>8)</sup> / night	< 100 W / 1.5 W	
Auxiliary voltage supply	internal	
<b>Safety / Protective equipment</b>		
Protection class (IEC 62103)	1	
Overvoltage category DC / AC	2 / 3	
Protection type (IEC 60529)	IP 54	
Insulation monitoring of PV generator	yes	
AC/DC surge voltage protector	yes	
Temperature monitoring	temperature-dependent derating, shutdown at impermissible temperatures	
Overload response	current limitation, operating point shift	
PV generator/mains decoupling	electrical isolation by low frequency transformer	
Disconnection option	yes	
<b>Standards</b>		
General	<ul style="list-style-type: none"> <li>- CE conformity</li> <li>- Conforming to EEG 2014</li> <li>- IEC 62109-1:2010: Safety of power converters for use in photovoltaic power systems – Part 1: General requirements</li> <li>- IEC 62109-2:2011: Safety of power converters for use in photovoltaic power systems – Part 2: Particular requirements for inverters</li> <li>- IEC 61000-6-2:2005: Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments</li> <li>- IEC 61000-6-4:2006 + A1:2010: Electromagnetic compatibility (EMC) – Part 6-4: Generic standards - Emission standard for industrial environments</li> </ul>	
Grid monitoring	- In accordance with country-specific requirements	
<b>Interfaces / Features / Options</b>		
Interfaces	<ul style="list-style-type: none"> <li>- Ethernet (RJ45)</li> <li>- microSD card</li> <li>- 7 x digital outputs as floating contacts (24 V to 230 V, AC/DC, changeover contact)</li> <li>- 8 x digital inputs with extended-range actuation coils (24 V or 230 V, AC/DC)</li> <li>- 2 x S0 pulse inputs or digital inputs with extended-range actuation coils (24 V or 230 V, AC/DC)</li> <li>- 2 x analog inputs (0 V to +10 V / -10 V to +10 V / 0 mA to 20 mA / 4 mA to 20 mA)</li> <li>- 2 x PT100 input</li> <li>- 1 x CAN (e.g. for string monitoring)</li> </ul>	
Features	<ul style="list-style-type: none"> <li>- DC surge protector type 2</li> <li>- AC surge protector type 2 (auxiliary supply AC voltage)</li> <li>- DC main switch</li> <li>- AC short-circuit proofing</li> <li>- Extensive power factor control functions for static and dynamic grid stabilisation</li> <li>- Integrated data logger</li> <li>- Support for various online portals</li> <li>- Air/liquid heat exchanger</li> </ul>	
Options	<ul style="list-style-type: none"> <li>- Insulation monitoring of PV generator</li> <li>- Positive or negative grounding of PV generator</li> <li>- DC contactor</li> <li>- Advanced LVRT options (buffer, test terminals, ...)</li> <li>- Cabinet heater</li> <li>- HMI device</li> <li>- Network switch with optical interface</li> <li>- VPN modem (GSM, DSL) for remote data access and transmission</li> <li>- Control unit with extensive functionality</li> <li>- Trouble reports issued by e-mail</li> <li>- Zone monitoring at DC side</li> <li>- Park controller</li> </ul>	

8) Without fan in passive mode

# Schematic Diagram.



## All in one inverter

The PVMaster III L is one of the most functional large-scale inverters in its class, thanks to its compact and turnkey design.

All major components like cooling system, DC fuses, auxiliary transformer and AC-DC-connections are integrated into the PVMaster III L. Commissioning time and costs are decreased by these advantages.

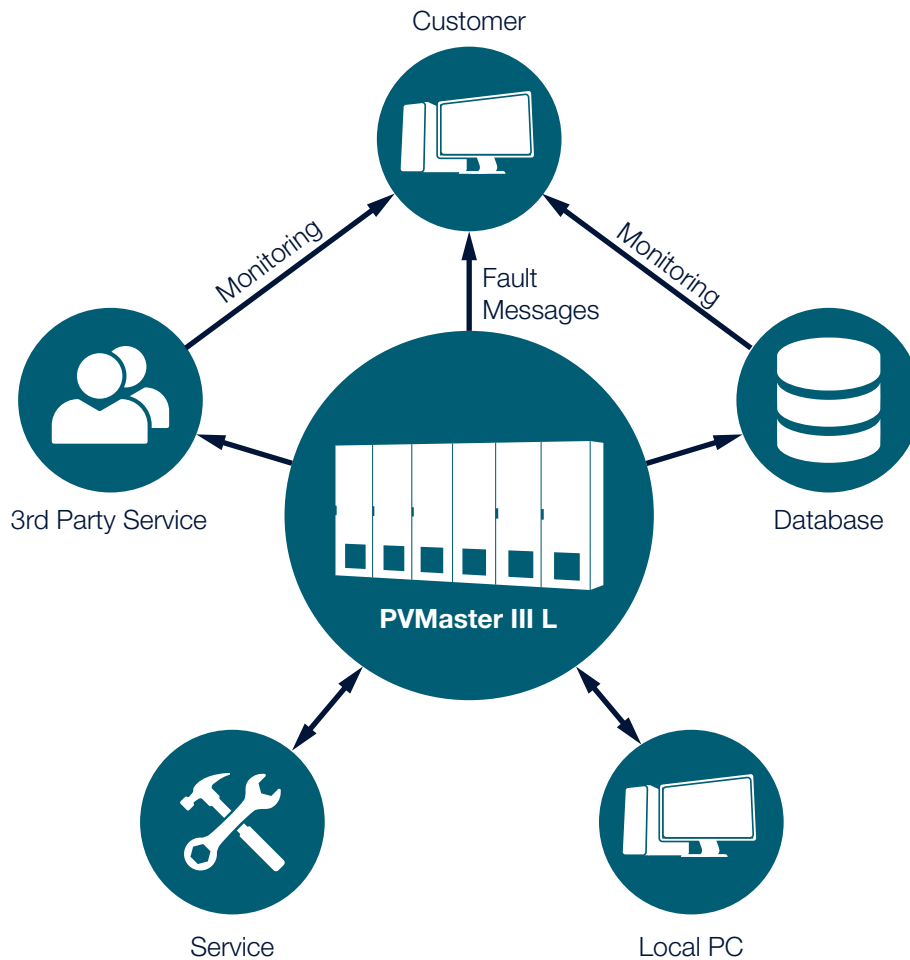
Despite its compact design, the modular PVOne unit permits quick and easy exchange of components. The integrated diagnostics also help to identify the component concerned quickly and easily, saving valuable time and cutting downtimes. The use of high-grade components ensures the unit's reliability and makes it virtually maintenance-free.

## Liquid cooling concept

In addition to the before mentioned benefits, a reduction of losses directly from the source is secured and lower emissions are led into the cabinet. Moreover, less dust gets in the cabinet through closed this liquid cooling system which ensures a long lifetime by this features. The reliability is increased substantially by the use of components from the heavy industry with 24/7 operation. In addition to that, the self-consumption is reduced compared to the conventional air cooling.

# Monitoring Solutions.

Worldwide connectivity.



## Customized direct access worldwide

PVMaster III L solutions provide all internal values. This convenience, including the facility to monitor the power fed-in from each string in a PV park online, means that investors and operators are always well informed – especially when it comes to ensuring high availability.

Thanks to several communication options our international service partners are able to access the PVMaster III L remotely via VPN. Software updates and parameter settings can be easily adjusted within a short time from any place in the world. Our English-speaking hotline offers assistance in identifying and eliminating errors and malfunctions.

