







Check for correct polarity in the input strings and absence of any leakage to ground in the PV generator. When exposed to sunlight, the PV panels supply DC direct voltage to the inverter. The inside of the inverter may only be accessed after the equipment has been disconnected from the grid and from the photovoltaic generator.



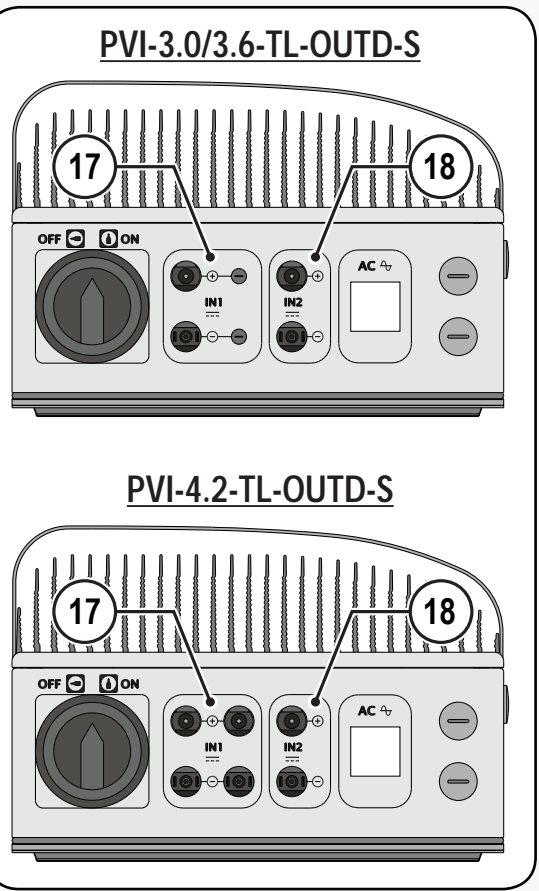
**Warning! The inverters to which this document relates to are WITHOUT ISOLATION TRANSFORMER (transformer-less). This type involves the use of insulated photovoltaic panels (IEC61730 Class A Rating) and the need to maintain the photovoltaic generator floating with respect to earth: no pole of the generator must be connected to earth.**

For the string connections it is necessary to use the quick fit connectors (multicontact or weidmüller) located on the bottom of the mechanic 17 18.

The number of quick fit connectors changes based on the model of inverter.

	PVI-3.0-TL-OUTD	PVI-3.6-TL-OUTD	PVI-4.2-TL-OUTD
No. of input channels	2		2
No. of quick fit connectors		4 (2 pairs)	4 + 2 (2 pairs per MPPT1 17 and 1 pairs per MPPT2 18)

- Crimp the Multicontact/Weidmüller MC4/WM4 quick fit connector counterparts (supplied) to the string cables or to the cables wired to the DC disconnect switches (external)
- Connect all the strings included in the design of the system and always check the tightness of the connectors
- If some of the string inputs should not be used you must proceed to verify the presence of covers on DC input connectors and then install them should they be absent: this operation is necessary for the tightness of the inverter and to avoid damaging the free connector that could be used at a later date.



**Load protection breaker (AC disconnect switch) and line cable sizing**

To protect the AC connection line of the inverter, we recommend installing a device for protection against over current and leakage with the following characteristics:

	PVI-3.0-TL-OUTD	PVI-3.6-TL-OUTD	PVI-4.2-TL-OUTD
Type	Automatic circuit breaker with differential thermal magnetic protection		
Nominal Voltage	19 m	16 m	14 m
Nominal Current		20 A	25 A
Magnetic protection characteristic		B/C	
Number of poles		2	
Type of differential protection		A/AC	
Differential sensitivity		300 mA	

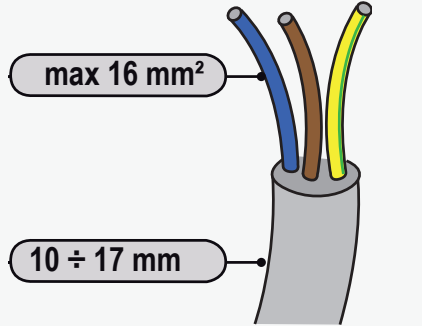
Power-One Italy S.p.A. declares that the Power-One AURORA transformerless inverters, in terms of their construction, do not inject continuous ground fault currents and therefore there is no requirement that the differential protection installed downstream of the inverter be type B in accordance with IEC 60755 / A.2.

**Characteristics and sizing of the line cable**

Three-pole cable required. The cross-section of the AC line conductor must be sized in order to prevent unwanted disconnections of the inverter from the grid due to high impedance of the line that connects the inverter to the power supply point.

Cross-section of the line conductor (mm²)	Maximum length of the line conductor (mt)		
	PVI-3.0-TL-OUTD	PVI-3.6-TL-OUTD	PVI-4.2-TL-OUTD
4 mm²	19 m	16 m	14 m
6 mm²	29 m	24 m	21 m
10 mm²	48 m	41 m	35 m
16 mm²	77 m	65 m	56 m

The values are calculated in nominal power conditions, taking into account:  
1. a power loss of not more than 1% along the line. 2. copper cable, with HEPR rubber insulation, laid in free air



**Warning! Before performing any of the operations described below, ensure the AC line downstream the inverter has been correctly disconnected**

- Remove the protective film located on the hole to be used for the AC cables 19
- Insert the M25 cable gland in the hole and secure it using the special M25 lock nut (supplied)



**Warning! To ensure environmental protection IP65 it is necessary to fix the cable gland to the inverter chassis with a minimum tightening torque of 7.5 Nm**

- Strip 10 mm of sheathing from the AC grid connection cables
- Plug the AC line cable into the inverter, passing it through the previously installed cable gland
- Connect the protective earth (yellow-green) cable to the contact labelled with the symbol on the terminal block 10



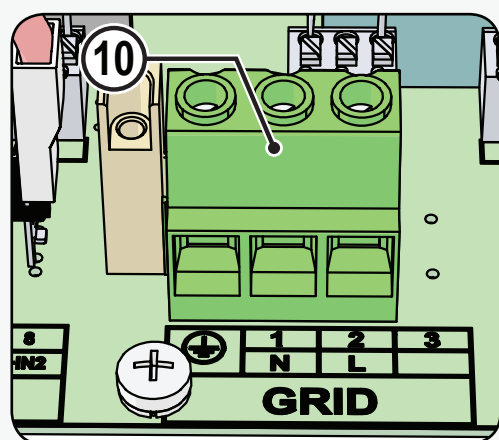
**Warning! Aurora inverters should be earthed (PE) via the terminal with the protective earth label , using a cable with an appropriate cross-section of the conductor for the maximum ground fault current that the generating system might experience**

- Connect the neutral cable (normally blue) to the terminal labelled with the letter N
- Connect the phase cable to the terminal labelled with the letter L

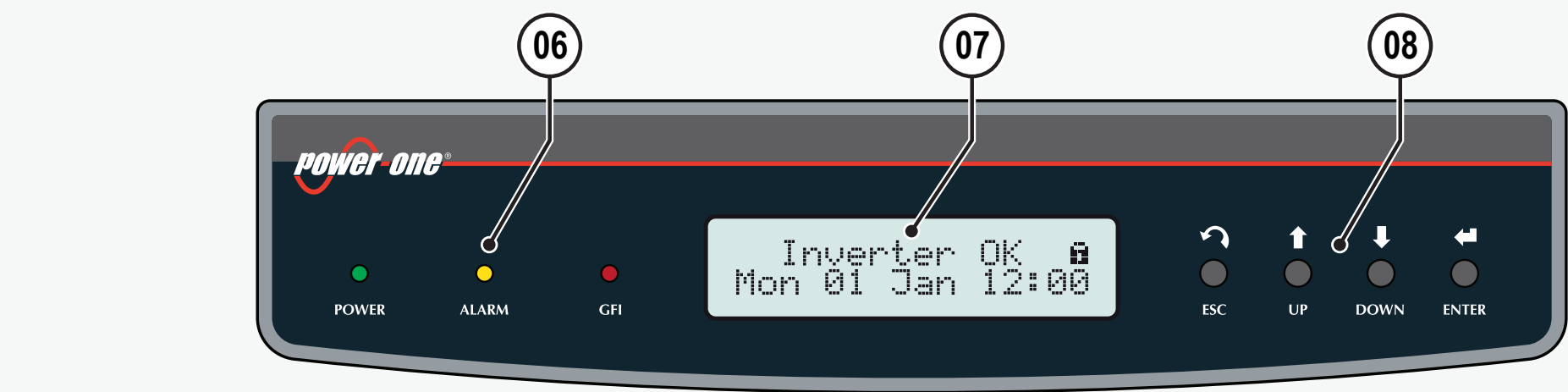


**Warning! The AC cables must be tightened on the terminal block with a minimum torque of 1.5 Nm**

Once the connection to the terminal board 10 is complete, screw in the cable gland firmly (tightening torque 5.0Nm) and check the tightness.



LEDs and BUTTONS, in various combinations, can be used to view the status or carry out complex actions that are described more fully in the manual.



<b>LED POWER</b>	<b>GREEN</b> On if the inverter is working correctly. Flashes when checking the grid or if there is insufficient sunlight.
<b>LED ALARM</b>	<b>YELLOW</b> The inverter has detected an anomaly. The anomaly is shown on the display.
<b>LED GFI</b>	<b>RED</b> Ground fault on the DC side of the PV generator. The error is shown on the display.

<b>ESC</b>	It is used to access the main menu, to go back to the previous menu or to go back to the previous digit to be edited
<b>UP</b>	It is used to scroll up the menu options or to shift the numerical scale in ascending order
<b>DOWN</b>	It is used to scroll down the menu options or to shift the numerical scale in descending order
<b>ENTER</b>	It can be used to confirm an action, to access the submenu for the selected option (indicated by the > symbol) or to switch to the next digit to be edited

AURORA inverters are equipped with a graphic Display 20, consisting of 2 lines of 16 characters each, which can be used to:

- Display the operating state of the inverter and the statistical data
- Display the service messages for the operator
- Display the alarm and fault messages for the operator
- Changing the settings of the inverter

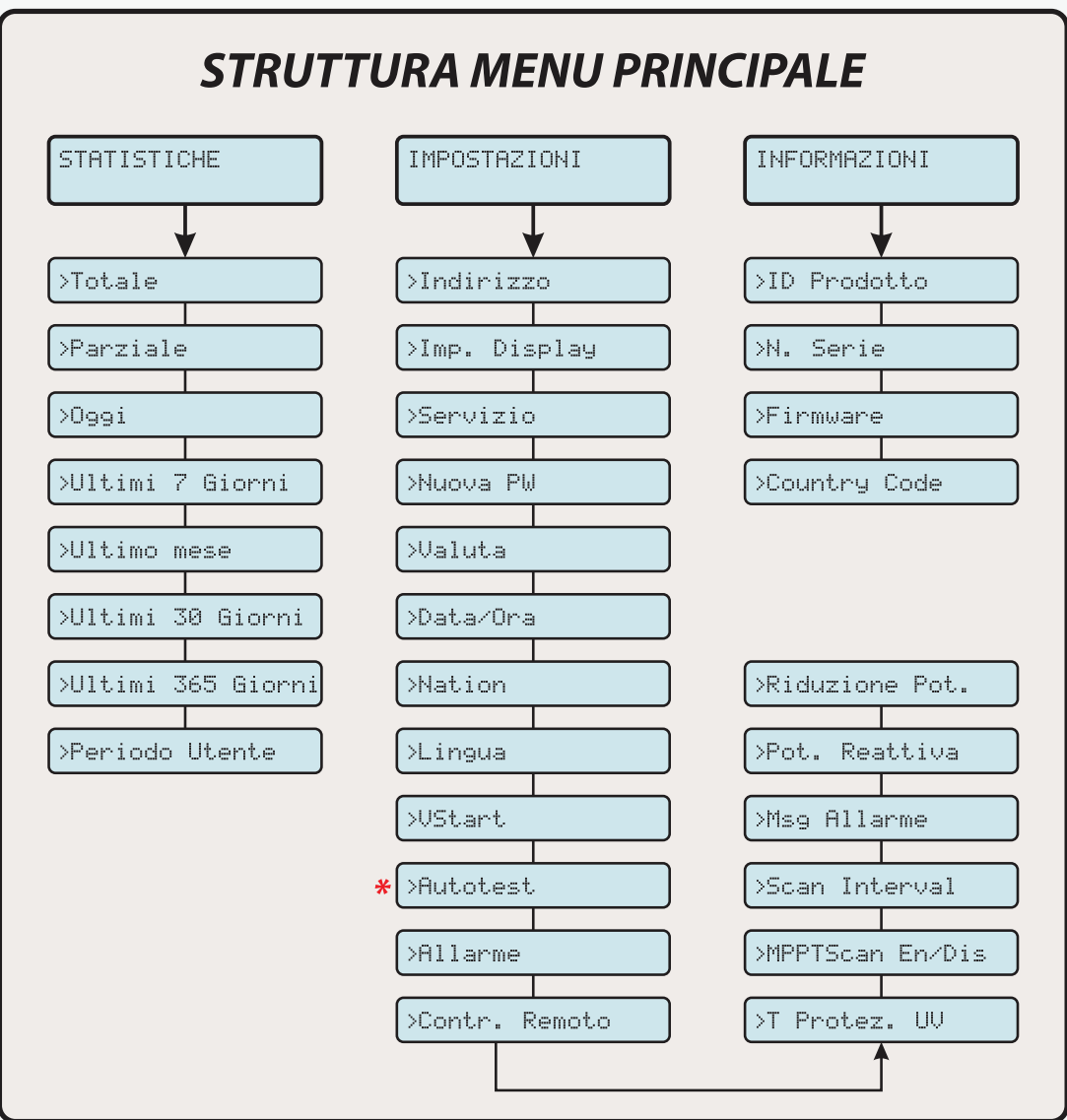
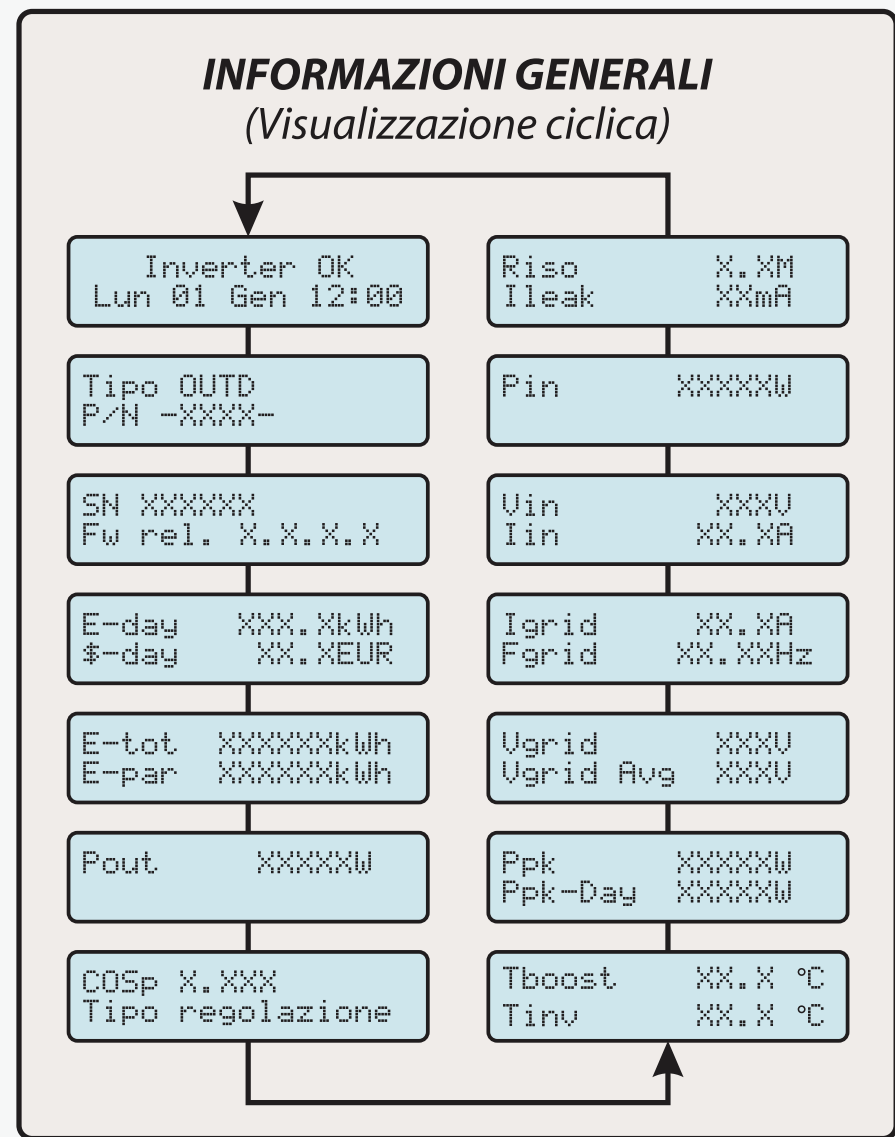
During the normal operation of the inverter the display cycles through the **GENERAL INFORMATION**. This information relates to the input and output parameters and the inverter identification parameters. By pressing **ENTER** it is possible to lock scrolling on a screen to be constantly displayed.

Press **ESC** to access the three main menus, which have the following functions:

- **STATISTICS:** Displays the statistics
- **SETTINGS:** Modify the settings of the inverter
- **INFO:** View service messages for the operator



Refer to the manual for details regarding use and functions available in the menu



\* Disponibile solo per standard di rete CEI021 INT e CEI021 EXT

Each cable which must be connected to the connectors of the communication and control signals must pass through one of the two service cable glands 20. An M20 cable gland (that takes cables from 7 mm to 13 mm in diameter) and a gasket with two holes to insert into the cable gland which enables two separate cables of a maximum diameter of 5 mm to be accommodated, are available.



**Warning! To ensure environmental protection IP65 it is necessary to fix the cable glands to the inverter chassis with a minimum tightening torque of 7 Nm**

**Connection to the RS485 communication line**

The RS485 communication port is the inverter's communication port. The AU-RORA inverters use an RS485 HALF-DUPLEX communication line made up of two transmission and reception cables (+T/R and -T/R) and a communication reference cable (RTN): all three cables must be connected in daisy-chain configuration. The chain connection can be made without distinction by using the RJ45 connector couples 14 (one for in and one for out) or the terminal block 13. The last inverter in the daisy chain must be "terminated" or the 120 Ohm communication line termination resistance must be activated by switching the dip-switch 15.

**Using the alarm terminal block**

Terminal block 13 connecting to the configurable relay that allows connection of external devices which, according to the mode selected in the menu "SETTINGS > Alarm" can, for example, signal malfunctions. The operating modes that can be set are: Production and Alarm.



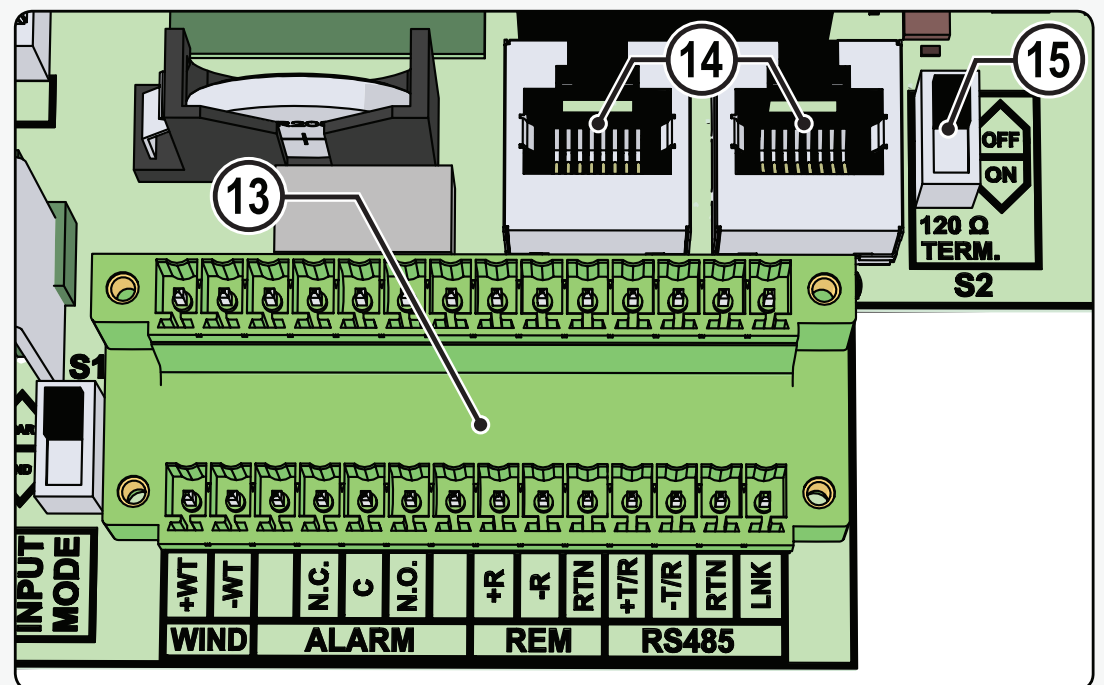
**The ALARM contact can be used only with systems that ensure a safety isolating additional at least (supplementary insulation in relation to the DC input voltage)**

**Using the REM terminal block**

The REM terminal block 13, if suitably configured, allows the "Remote ON/OFF" function to be used: this function allows remote disconnection of the inverter from the grid



For further information regarding the configuration and use of the communication and control signals terminal block, please see the manual



The inverter commissioning procedure is as follows:

- Switch the integrated switch 16 (version -S) to the ON position or close the external switches: If the input voltage applied to one of the two input channels is greater than the minimum starting voltage, the inverter will start up.

- When the inverter is turned on for the first time you will be asked to select the "Nation" of installation. This selection allows the inverter to automatically configure its parameters to ensure that compliance with local standards; the default language corresponding to the selected "Nation" will also be set.



**Warning! After the grid standard was set you have 24 hours to make any changes to the grid standard value; 24 hours later the "Nation Select" functionality will be blocked, and any subsequent changes can only be made using a password provided on request by Power-One**

- After you have set the "Nation" value, the message "Initializing...Please Wait" is displayed. Depending on the input voltage value, the inverter will show various messages on the display and change the behaviour of the three LED 20:

INPUT VOLTAGE	DISPLAY MESSAGE	LED STATUS	DESCRIPTION
Vin < Vstart	Waiting Sun	Green = FLASHING Yellow = OFF Red = OFF	The input voltage is not sufficient to permit connection to the grid.
Vin > Vstart	Missing Grid	Green = FLASHING Yellow = ON Red = OFF	There is sufficient input voltage to permit connection to the grid: the inverter waits until there is grid voltage to carry out the parallel connection.

**The inverter is powered ONLY by the voltage coming from the photovoltaic generator: presence of grid voltage alone IS NOT SUFFICIENT to permit the inverter to start up.**

- With the inverter in "Missing Grid" status, close the AC switch downstream the inverter so as to supply the grid voltage to the inverter: the inverter performs the grid voltage check, measures the photovoltaic generator insulation resistance against earth and carries out other self-diagnosis checks. During the checks before the parallel with the grid, the green LED keeps flashing, the others are off.

**During the grid voltage check and measurement of the insulation resistance, the values for the grid voltage and frequency and the insulation resistance measured by the inverter are shown on the display. The inverter completes parallel connection with the grid SOLELY if the grid parameters meet the ranges provided for by the regulations in force and if the insulation resistance is greater than 1Mohm.**

- If the preliminary checks for parallel connection to the grid are successful, the inverter connects to the grid and begins to export power to the grid. At this stage, the display shows the inverter's parameters in cycles. The green LED stays lit whereas the others are off.

	PVI-3.0-TL-OUTD	PVI-3.6-TL-OUTD	PVI-4.2-TL-OUTD
<b>Table: Technical Data</b>			
<b>Input</b>			
Absolute Maximum Input Voltage (V <sub>maxabs</sub> )	600 V		
Input Activation Voltage (V <sub>act</sub> )	200 V (adj. 120...350 V)		
Input Operating Range (V <sub>min...Vmax</sub> )	0.7 x Vstart...580 V		
Rated DC Input Power (P <sub>dc</sub> )	3120 Wp	3750 Wp	4375 Wp
Number of Independent MPPTs	2		
Maximum Input Power for each MPPT (P <sub>mppt-max</sub> )	2000 W	3000 W	3000 W
MPPT Input DC Voltage Range (V <sub>mppt-min</sub> ... V <sub>mppt-max</sub> ) at P <sub>dc</sub>	160...530 V	120...530 V	140...530 V
Maximum DC Input Current (I <sub>dc-max</sub> ) / for each MPPT (I <sub>mppt-max</sub> )	20.0 A / 10.0 A	32.0 A / 16.0 A	32.0 A / 16.0 A
Maximum Input Short Circuit Current for each MPPT	12.5 A	20.0 A	20.0 A
Maximum Backfeed current (from AC to DC side)		Negligible	
Number of DC Inputs Pairs for each MPPT	1		2 for MPPT1 and 1 for MPPT2
<b>DC Connection Type</b>			
DC Connection Type		Tool Free PV Connector WM / MC4	
<b>Input protection</b>			
Reverse Polarity Protection		Yes, from limited current source	
Input Overvoltage Protection for each MPPT - Varistor		2	
Photovoltaic Array Isolation Control		According to local standard	
DC Switch Rating (-S Version)		Max. 25.0 A / 600 V	
<b>Output</b>			
AC Grid Connection Type		Monophase	
Rated AC Power (P <sub>ac</sub> )	3000 W	3600 W	4200 W
Maximum AC Output Power (P <sub>ac-max</sub> )	3300 W <sup>(1)</sup>	4000 W <sup>(2)</sup>	4600 W <sup>(3)</sup>
Rated AC Grid Voltage (V <sub>ac</sub> )		230 V	
AC Voltage Range		180...264 Vac <sup>(4)</sup>	
Maximum AC Output Current (I <sub>ac-max</sub> )	14.5 A	17.2 A <sup>(5)</sup>	20.0 A
Inrush Current		Negligible	
Maximum Output Fault Current		<25 A rms (100ms)	
Rated Output Frequency (f <sub>o</sub> )		50 Hz / 60 Hz	
Output Frequency Range (f <sub>min...fmax</sub> )		47...53 / 57...63 Hz <sup>(6)</sup>	
Nominal Power Factor (Cosφ <sub>ac</sub> )	>0.995 adj. ± 0.9 with Pacr= 3.0 kW	>0.995 adj. ± 0.9 with Pacr= 3.6 kW	>0.995 adj. ± 0.9 with Pacr= 4.2 kW
Total Harmonic Distortion of Current		< 3.5%	
AC Connection Type		Screw terminal block	
<b>Output protection</b>			
Anti-Islanding Protection		According to local standard	
Maximum AC Overcurrent Protection	16.0 A	19.0 A	22.0 A
Output Overvoltage Protection - Varistor		2 (L - N / L - PE)	
<b>Operating performance</b>			
Maximum Efficiency (η <sub>max</sub> )		96.8%	
Weighted Efficiency (EURO/CEC)		96% / -	
Power Input Threshold		10.0 W	
Stand-by Consumption		< 8.0 W	
<b>Communication</b>			
Wired Local Monitoring		PVI-USB-RS232_485 (opt.), PVI-DESKTOP (opt.)	
Remote Monitoring		PVI-AEC-EVO (opt.), AURORA-LOGGER (opt.)	
Wireless Local Monitoring		PVI-DESKTOP (opt.) with PVI-RADIOMODULE (opt.)	
User Interface		LCD Display with 16 characters x 2 line	
<b>Environmental</b>			
Ambient Temperature Range	-25...+60°C / -13...140°F with derating above 50°C/122°F	-25...+60°C / -13...140°F with derating above 55°C/131°F	-25...+60°C / -13...140°F with derating above 50°C/122°F
Storage Temperature		-40...80°C (-40...+176°F)	
Relative Humidity		0...100% condensing	
Environmental pollution classification for external environment		3	
Noise Emission		< 50 dB(A) @ 1 m	
Maximum Operating Altitude without Derating		2000 m / 6560 ft	
Environmental Category		External	
<b>Physical</b>			
Environmental Protection Rating		IP 65	
Cooling		Natural	
Dimension (H x W x D)		618 x 325 x 222 mm / 24.3 x 12.8 x 8.7 inch	
Weight		17.5 kg / 38.6 lb	
Mounting System		Wall bracket	
Overvoltage Category in accordance with IEC 62109-1		II (DC input) III (AC output)	
<b>Safety</b>			
Isolation Level		Transformerless (TL)	
Safety Class		I	
Marking		CE	
1. Limited to 3000 W for Germany 2. Limited to 3600 W for Germany 3. Limited to 4200 W for Germany 4. The AC voltage range may vary depending on specific country grid standard 5. Restricted to 16 A (up to the maximum output power of 3680 W) for the standard UK G83/1. 6. The Frequency range may vary depending on specific country grid standard			
<b>Remark. Features not specifically listed in the present data sheet are not included in the product</b>			

**Service- Contact Details:**

Australia	+61 2 9735 3111	service.au@power-one.com
Benelux	+32 2 206 0338	service.bx@power-one.com
China	+8675529885888	service.cn@power-one.com
Eastern Europe	+49 7641 95520 32	service.ee@power-one.com
France	00 800 00 28 76 72	service.fr@power-one.com
Germany	0800 2200211	service.de@power-one.com
Greece	00 800 00 28 76 72	service.gr@power-one.com
India	+65 6896 3363	service.in@power-one.com
Italy	00 800 00 28 76 72	service.it@power-one.com
Middle East	00 800 00 28 76 72	
Singapore	+65 6896 3363	service.sg@power-one.com
Spain	00 800 00 28 76 72	service.es@power-one.com
South east Asia		service.se@power-one.com
UK	0800 0232341	service.uk@power-one.com
USA	+1 877-261-1374	service.us@power-one.com



<b>Italy Facility</b> Via S. Giorgio, 642 52028 Terranuova B.r. Italy +39 055 9195 1	<b>Phoenix Facility</b> 3201 East Harbour Drive Phoenix, Arizona, 85034 United States 480-643-1700	<b>Camarillo Facility</b> 740 Calle Plano Camarillo, California, 93012 United States 805-987-8741
--	--	---

Copyright © 2013 Power-One, Inc. All rights reserved. No part of this document may be reproduced in any form without the prior written permission of Power-One. Power-One makes no representations or warranties, express or implied, with respect to the contents of this document. Power-One reserves the right to make changes to this document without notice and shall not be responsible for any damages caused by reliance on the content presented. All trademarks, logos, trade names, service marks and copyrighted materials used in this document are the property of their respective owners. The Power-One name and logo are registered trademarks of Power-One, Inc. in the U.S.A. and other countries.

<http://www.power-one.com>