SOLAR STIK®

TROUBLESHOOTING GUIDE FOR THE PRO-VERTER 5000-220 AFF1 DARI GATE SYSTEMS

Item # 20-XXXXXX

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TROUBLESHOOTING PROCEDURES

Clearing PRO-Verter Faults

If any fault occurs, the user interface will display the fault message and the red “Fault” LED will be lighted. Remove cause of the fault. The unit will remain in Fault mode until the fault is cleared.
A short press (0.1 seconds) of the On/Off button will clear the fault message and the PRO-Verter will return to the operational status (if the reason for the fault condition has been corrected). Refer to the section on “Fault Messages”.

System Recovery with Overdischarged Batteries

If batteries are discharged to a “critical-low” level, the System may cease to function. There are two (2) methods to restore a System with overdischarged batteries:

1. Connect an active 230 VAC power source to the PRO-Verter “Generator Input” connector. Turn on the 230 VAC generator input breaker on the Faceplate. When the LED over the System Recovery switch illuminates, toggle the recovery switch while pressing the user interface On/Off button. After the user interface powers up, release the System Recovery switch and the user interface On/Off button. The System will begin charging the batteries within two (2) minutes

2. Connect an active PV array (exposed to sun) to the PRO-Verter (or Power Hub 3500). Turn on the PRO-Verter user interface. Charging will begin when the PV input voltage is 5.0 VDC higher than the battery voltage.

PRO-Verter Fault Messages and Troubleshooting Guides

Table 1. Fault Messages Symptoms and Troubleshooting

Fault Messages and Troubleshooting Guide	
Fault Message	**Symptoms and Troubleshooting**
Battery low voltage!	PRO-Verter is in Fault mode because the battery voltage has dropped to the set lower threshold of Batt Low Voltage. • When the battery voltage drops to the set lower threshold of Batt Low Voltage, activation of this fault protection is initiated. The red Fault LED will flash once per second and the alarm in PRO-Verter will beep once per second. The inverter will continue to operate normally and the blue Status LED will continue to be on steady. (**Note:** Fault message "Battery low voltage!" will not be displayed during this time.) • If the battery voltage stays at or below the threshold setting for a duration equal to the set LV Detect Time, only the inverter will be switched off and fault message "Battery low voltage!" will be displayed. The red Fault LED will now change to steady on, the blue Status LED will switch off and the alarm in PRO-Verter will now beep steady. If the "Battery low voltage!" fault condition is not reset within the LV Cut Off Time, the PRO-Verter will shut down completely after the LV Cut Off Time (LCD screen/LED/Alarm will be off) has expired. • If the batteries are being charged by the PV array and the battery voltage recovers to the set Reset Voltage before LV Cut Off Time time expires while in "Battery low voltage!" fault condition, the inverter will restart and "Battery low voltage!" fault condition will be cleared. • While in "Battery low voltage!" fault condition, if AC input is made available before the expiration of LV Cut Off Time, the "Battery low voltage!" fault condition will be cleared. The PRO-Verter will restart in Invert mode, synchronize with the AC input, and then transfer to the AC input at zero crossing. It will now operate in Charge mode.
Battery ultra low voltage!	The PRO-Verter is in Fault mode because the battery voltage has dropped to 18 V or lower. **(Note: A voltage this low will not be encountered when using $LiFePO_4$ batteries because the battery's own BMS will disconnect the output terminals before the voltage drops that low.)**

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Fault Messages and Troubleshooting Guide	
Fault Message	**Symptoms and Troubleshooting**
Battery over voltage!	The PRO-Verter is in Fault mode because the battery voltage has risen to the programmed upper threshold of Batt Over Voltage. **(a) AC input is not available and PRO-Verter is operating in Invert mode:** • There will be no AC output because the Inverter will be switched off. The blue Status LED will be switched Off and the red Fault LED will be steady on. The alarm will beep steady. • The fault will be cleared automatically when the battery voltage drops to 0.5 V below the set upper threshold of Batt Over Volt. **(b) AC input is available and PRO-Verter is operating in Charge mode:** • There will be no AC output or charging. • The fault will be cleared automatically when the battery voltage drops to 0.5 V below the set upper threshold of Batt Over Volt. The PRO-Verter will restart in Invert mode, synchronize with the AC input, and then the transfer relay will be energized to transfer to AC input at zero crossing. The PRO-Verter will, thus, resume operation in Charge mode.
Input over current!	The PRO-Verter is in Fault mode because the input current being drawn from the AC input source (Input Current = Charging Current + Pass-through Current to the load) is 1 A more than the set threshold of Grid Max Current/Gen Max Current for 5 seconds (current is sampled every 33.3 µs). • There will be no AC output because the transfer relay will be de-energized and charging will be stopped. The blue Status LED will be switched off and the red Fault LED will be steady on. The alarm in PRO-Verter will beep steady. • The PRO-Verter will be turned off and will require manual reset by turning off the main breaker, waiting for 1 minute, and then turning on the main breaker. • The set threshold of Grid Max Current/Gen Max Current should match the breaker capacity of the AC input source/AC input branch circuit. If AC input current capacity cannot be increased, reduce the AC load/bulk current accordingly.
Output over current!	The PRO-Verter is in Fault mode because the instantaneous output current being drawn from the PRO-Verter inverter by the AC load is 330% of the rated value of the PRO-Verter for 2 samples (current is sampled every 33.3 µs). • There will be no AC output because the PRO-Verter inverter will be switched off. The blue Status LED will be switched off and the red Fault LED will be steady on. The alarm will beep steady. • The PRO-Verter will be off and will require manual reset by powering off, waiting for 1 minute, and then powering on again. • Ensure the maximum, instantaneous surge current of the load is NOT more than 300% (30 A) of the rated current (10 A) of the inverter for more than 1 millisecond.

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Fault Messages and Troubleshooting Guide	
Fault Message	**Symptoms and Troubleshooting**
Output over load!	The PRO-Verter is in Fault mode because of overload to the inverter: • There will be no AC output because the inverter will be switched off. The blue Status LED will be switched off and the red Fault LED will be steady on. The alarm in PRO-Verter will beep steady. • PRO-Verter will shut down and will require manual reset by turning off the main power switch, waiting for 1 minute, and then turning on the main power switch. Output voltage is less than 96 V_{rms} for 300 cycles (5 seconds at 60 Hz).
Output over load 1!	Output power demand is over the rated output by 110% for 30 min.
Output over load 2!	Output power demand is 230% of rated output for 10 min.
Output over load 3!	Output power demand is 140% of rated output for 1 min.
Output over load 4!	Output power demand is 150% of rated output for 30 sec.
Output short circuit!	The PRO-Verter is in Fault mode because there is a short circuit on the output side in Invert mode. Short circuit protection is activated when: Output voltage < 15 V_{rms} for 6 cycles and output current is more than the rated output current of 10.00 A_{rms}. • There is no AC output because the inverter has been switched off. The blue Status LED will be switched off and the red Fault LED will be steady on. The alarm will beep steady. • The PRO-Verter will be turned off and will require manual reset by powering off, waiting for 1 minute, and then powering on again. **Note:** If there is short circuit condition in Charge mode, i.e., when AC input is available, short circuit condition on the output side will trip the AC input breaker. The load will be transferred to the inverter and the inverter will then see short circuit condition and will shut down as described above.
Output failure!	The PRO-Verter is in Fault mode because AC input from grid/generator has been connected to the AC output terminals by mistake. A value of 10 VAC or above detected at the AC output terminals when the PRO-Verter boots up will activate this protection. • The blue Status LED will be switched off and the red Fault LED will be steady on. The alarm in will beep steady. • The PRO-Verter will be turned off and will require manual reset by powering off, waiting for 1 minute, and then powering on again. Check the connection. If there is 10 VAC or over at the output terminal, remove the connection and connect to the input terminals.
Transformer over heat!	The PRO-Verter is in Fault mode because the bidirectional transformer in the PRO-Verter has overheated ≥ 302 °F (150 °C). • The blue Status LED will be switched off and the red Fault LED will be steady on. The alarm will beep steady. • If in Invert mode, inverter will be switched off. If in Charge mode, the transfer relay will be de-energized and the inverter will be switched off. • Ensure the fans are working properly, there is no blockage of air flow, there is adequate airflow, and the ambient temperature is within the limits. Reduce the load/bulk current. • The fault will clear when the transformer has cooled down to ≤176 °C (80 °C).

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Fault Messages and Troubleshooting Guide	
Fault Message	**Symptoms and Troubleshooting**
Heat sink over heat!	The PRO-Verter is in Fault mode because the internal heat sink for the MOSFETS in the PRO-Verter has overheated to ≥158 ºF (70 °C). • The blue Status LED will be switched off and the red Fault LED will be steady on. The alarm will beep steady. • If in Invert mode, the inverter will be switched off. If in Charge mode, the transfer relay will be de-energized and the inverter will be switched off. • Check that the fans are working properly, there is no blockage of air suction and discharge vents, adequate cool replacement air is available, and the ambient temperature is within the limits. Reduce the load and bulk current. • The fault will be cleared when the heat sink has cooled down to 104 ºF (40 °C).
SD card unusable!	• Data logging will not start. • Verify the format is FAT16/FAT32. • Verify the capacity is less than 16 GB. • Reformat the card.
SD card read error!	• Data logging stops. • Remove and reinsert the card.
SD card write error!	• Data logging stops. • Remove and reinsert the card.
SD card full!	• Data logging stops. • Move or delete files or reformat the card.
Write failure!	The entered value of programmable parameter could not be written.
Out of range!	The entered value of programmable parameter is out of the programmable range. Change parameter value to within the specified range.