

3.4 Protection Circuitry Operation

The inverter is protected against fault conditions and in normal usage it will be rare to see any. However, if a condition occurs that is outside the inverter's normal operating parameters, then it will shut down and attempt to protect itself, the battery bank, and your AC loads. If the inverter shuts down, it may be due to one of the following conditions (also refer to the Troubleshooting section to help diagnose and clear the fault condition).

- **Low Battery** – The inverter will shut off whenever the battery voltage falls to the **LBCO** (Low Battery Cut Out) level to protect the batteries from being over-discharged. After the inverter has reached the LBCO level and has turned off, it will automatically restart after one of the following conditions:

1. AC power is applied and the inverter begins operating as a battery charger.
2. Battery voltage rises to the **LBCI** (Low Battery Cut In) level.

The inverter's status LED turns off when a low battery fault condition occurs. Refer to Table 3-1 to determine the LBCO and LBCI levels for your inverter model.

- **High Battery** – In the event the battery voltage approaches the **HBCO** (High Battery Cut Out) level, the inverter will automatically shut down to prevent it from supplying unregulated AC output voltage. The inverter's status LED turns off when a high battery fault condition occurs. The inverter will automatically restart once the battery falls to the **HBCI** (High Battery Cut In) level. Refer to Table 3-1 to determine the HBCO and HBCI levels for your inverter model.



Info: High battery voltage may be caused by excessive or unregulated voltage from the solar panels or other external charging sources.

- **Overload** – During Inverter and Standby mode operation, the inverter monitors the DC and AC current levels. In the event of a short-circuit or overload condition, the inverter will shut down. The inverter needs to be reset to begin operating again (refer to Section 6.1 for information on resetting the inverter).
- **Over-temperature** – If internal power components begin to exceed their safe operating temperature level, the inverter will shut down to protect itself from damage. The inverter's status LED turns OFF to indicate the over-temperature fault condition. The inverter will automatically restart once the unit cools down.
- **Internal Fault** – The inverter continually monitors several internal components and processor communications. If a condition occurs that does not allow proper internal operation, the inverter will shut down to protect itself and the connected loads. The inverter needs to be reset to begin operating again (refer to Section 6.1 for information on resetting the inverter).

Table 3-1, Inverter Battery Turn On/Off Levels

Inverter Battery turn on/ off Levels	MS-PAE Inverter/Chargers	
	24 VDC Models	48 VDC Models
HBCO	34.0 VDC	>67.6 VDC
HBCI	<33.4 VDC	<66.7 VDC
LBCI	25.0 VDC	50.0 VDC
LBCO (one minute delay)	20.0 VDC (18.0 to 24.4 VDC)*	40.0 VDC (36.0 to 48.8 VDC)*
LBCO (no delay)	17.0 VDC	34.0 VDC

* adjustable with remote control