**PS-MPPT**

| Bit | | Array Fault | LED Indication: Charging Status | LED Indication: Battery Status | Description | Causes | Solutions |
|---|---|---|---|---|---|---|---|
| 0 | 1 | Overcurrent | Solid R | | The charge current exceeds the controller's rating | PV Array is too large | Consult the documentation for maximum current ratings |
| 1 | 2 | FETs shorted | Solid R | | MOSFET(s) damaged - short circuited | The current sense circuitry is malfunctioning<br>A power MOSFET is damaged (short circuited)<br>An external short has occurred | Contact distributor for service<br>Contact distributor for service<br>Be sure the positive power terminals are not wired together externally |
| 2 | 3 | Software bug | Solid R | | A software error has occurred in the processor | This is an internal software problem | Update to latest firmware from the Morningstar website |
| 3 | 4 | Battery HVD | Blink R | | Battery voltage exceeds high voltage disconnect threshold - halt in charging | Another charging source in the system is over-charging the battery | Remove the other charging source, check its operation and charging voltage. Keep the charging voltage at or below the SSMPPT charging voltage. |
| 4 | 5 | Array HVD | Blink R | | PV input voltage above safe operating limit | Power MOSFETs may be shorted<br>Array input voltage exceeds operational ratings | Contact distributor for service<br>Consult documentation for maximum array voltage. Keep array voltage below maximum rating. Be sure to take into account temperature effects on the array Voc. |
| 5 | 6 | EEPROM setting edit (reset required) | Solid R | R - Y - G | EEPROM settings edited while running | A set point was changed via custom programing | Restart/power cycle to reset. MSView Coil Reset command may also be used. |
| 6 | 7 | RTS shorted | Solid R | R/Y - G/Y | Short circuit detected in Remote Temp Sensor | The RTS cable has been pinched or otherwise shorted<br>The RTS terminal connections have collected dust/moisture and are causing an erroneous reading | Inspect RTS cable and connection<br>Inspect RTS terminals for dust/dirt/moisture and clean with alcohol if necessary |
| 7 | 8 | RTS disconnected | Solid R | R/Y - G/Y | Remote Temp Sensor has been disconnected (was properly connected) | The RTS is no longer detected. Previously a valid RTS signal was present. | Inspect the RTS connection for loose wires. Inspect the RTS cable for breaks. |
| 8 | 9 | Local Temp. Sensor Failed | Solid R | | Damaged local (ambient) temp sensor | Local Temp. Sensor has been damaged | Contact distributor for service |
| 9 | 10 | Battery LVD | Solid R | | Battery voltage below minimum operating range, possible halt to charging possible | Battery Voltage below controller's minimum operating voltage | Consult documentation for minimum battery operating voltage. Resize system as necessary to prevent batteries drained below this minimum level. |
| 10 | 11 | Slave Control Timeout | Blink R | | Slave mode charging control has timed-out | Loss of communications with controller<br>Controller has not received a slave command in over 60 seconds | Check physical communications connection to controller, check master device is still powered and sending commands<br>Check to make sure master device is configured to send slave commands at least once every 60 seconds |
| 11 | 12 | DIP Switch Changed (excl. DIP 8) | Blink R | R - Y - G | DIP switch changed while running | User changed a DIP switch during operation<br>DIP switch(s) not fully in on/off position<br>Dirt/Debris/Condensation | Return the DIP switches to original position or reset the PSMPPT so that the new changes take effect.<br>Check all DIP switches to ensure they are in full 'on' or 'off' position<br>Inspect the PCB around the DIP switches for moisture, corrosion, |
| | | **Load Fault** | | | | | |
| 0 | 17 | External Short Circuit | | R/G - Y | External wiring short circuit | A short occurred on a power cable<br>A system miswire | Inspect the system wiring for shorts, damaged insulation, etc.<br>Be sure the positive power terminals are not wired together externally |
| 1 | 18 | Load Over-current | | R/Y - G | Load current draw exceeds the controllers rating | Damaged load causing excessive current draw<br>Load draws more than SSMPPT rated current | Inspect and test load for proper operation<br>Reduce loads connected to SSMPPT load terminals. Connect these loads directly to battery instead. |
| 2 | 19 | Load MOSFETs damaged | | R - Y - G | Load MOSFETs shorted | Damaged load causing excessive current draw<br>Voltage on the Load terminals<br>An external short has occurred<br>A power MOSFET is damaged (short circuited) | Inspect and test load for proper operation<br>Verify there are no other power sources connected to the load output circuit<br>Be sure the positive power terminals are not wired together externally<br>Contact distributor for service |
| 3 | 20 | Software bug | | R - Y - G | A software error has occurred in the processor | This is an internal software problem | Update to latest firmware from the Morningstar website |
| 4 | 21 | Load HVD | | R - G | Battery voltage exceeds load high voltage disconnect threshold | Another charging source in the system is over-charging the battery | Remove the other charging source, check its operation and charging voltage. Keep the charging voltage at or below the SSMPPT charging voltage. |
| 5 | 22 | Heatsink Over-Temperature | | R - Y | Heatsink temperature exceeds safe operating limits - load disconnected | Poor airflow around controller<br>Excessive ambient temperature | Ensure controller is mounted in a position with enough clearance on all sides. See manual for more information.<br>Check ambient temperature at the controller location. Ensure temperature is below maximum temp rating of SSMPPT. See manual for more information. |

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| 6 | 23 | DIP Switch Changed (excl. DIP 8) | Blink R | R - Y - G | DIP switch changed while running | User changed a DIP switch during operation | Return the DIP switches to original position or reset the PSMPPT so that the new changes take effect. |
| | | | | | | DIP switch(s) not fully in on/off position | Check all DIP switches to ensure they are in full 'on' or 'off position |
| | | | | | | Dirt/Debris/Condensation | Inspect the PCB around the DIP switches for moisture, corrosion, debris |
| 7 | 24 | EEPROM setting edit (reset required) | Solid R | R - Y - G | EEPROM settings edited while running | A set point was changed via custom programing | Restart/power cycle to reset. MSView Coil Reset command may also be used. |
| **Bit** | | **Alarm** | | | | | |
| 0 | 1 | RTS open | | | Remote Temp Sensor Disconnected (always set if no RTS connected) | RTS not connected | RTS not required for operation, RTS can be connected if desired for more accurate temperature compensated charging |
| 1 | 2 | RTS shorted | | R/Y - G/Y | Short circuit detected in Remote Temp Sensor | See **Array Fault: RTS shorted** above. | See **Array Fault: RTS shorted** above. |
| 2 | 3 | RTS disconnected | | R/Y - G/Y | Remote Temp Sensor has been disconnected (was properly connected) | See **Array Fault: RTS disconnected** above. | See **Array Fault: RTS disconnected** above. |
| 3 | 4 | Ths open | | | Heatsink temp. sensor open circuit | Damage to heatsink temperature sensor | Without accurate temperature sensor, controller cannot prevent the heatsink temperature from exceeding safe levels. Contact distributor for service. |
| 4 | 5 | Ths shorted | | | Heatsink temp. sensor short circuit | Damage to heatsink temperature sensor | Without accurate temperature sensor, controller cannot prevent the heatsink temperature from exceeding safe levels. Contact distributor for service. |
| 5 | 6 | Heatsink Hot (active temp limiting) | | | Heatsink High Temperature Warning, reduction of charging current | Poor airflow around controller | Ensure controller is mounted in a position with enough clearance on all sides. See manual for more information. |
| | | | | | | Excessive ambient temperature | Check ambient temperature at the controller location. Ensure temperature is below maximum temp rating of SSMPPT. See manual for more information. |
| 6 | 7 | Tind (inductor temp sensor) Open | | | Inductor temp. sensor open circuit | Damage to one or more inductor temperature sensors | Without accurate temperature sensor, controller cannot prevent the inductor temperature from exceeding safe levels. Contact distributor for service. |
| 7 | 8 | Tind (inductor temp sensor) Short | | | Inductor temp. sensor short circuit | Damage to one or more inductor temperature sensors | Without accurate temperature sensor, controller cannot prevent the inductor temperature from exceeding safe levels. Contact distributor for service. |
| 8 | 9 | Tind Hot (active temp limiting) | | | Inductor high temp. warning, reduction of charging current | Poor airflow around controller | Ensure controller is mounted in a position with enough clearance on all sides. See manual for more information. |
| | | | | | | Excessive ambient temperature | Check ambient temperature at the controller location. Ensure temperature is below maximum temp rating of SSMPPT. See manual for more information. |
| 9 | 10 | Current limit | | | Active limiting of charging current | Input power exceeds controller rating | No action required, controller will operate at full rated output. |
| 10 | 11 | Current offset | | | Erroneous current reading when there should be zero current, could lead to inaccurate load and/or array current measurements | Failed current offset routine | Reboot controller and allow sweep of array input. Check if Alarm returns |
| | | | | | | Damage to current measurement circuit | Contact distributor for service |
| 11 | 12 | Battery Sense Out of Range | | R/Y - G/Y | Battery sense voltage out of acceptable range | Disconnected wire on the Battery Sense | Inspect Battery Sense connection |
| | | | | | | Greater than 5V difference between Sense and Battery Voltage | Inspect Battery sense wires and connection. Inspect Battery power cables and connection. |
| 12 | 13 | Battery Sense Disconnected | | R/Y - G/Y | Battery sense was working, now out of range | Disconnected wire on the Battery Sense | Inspect Battery Sense connection |
| | | | | | | Greater than 5V difference between Sense and Battery Voltage | Inspect Battery sense wires and connection. Inspect Battery power cables and connection. |
| 13 | 14 | Uncalibrated | | | Factory calibration was not performed, inaccurate current and/or voltage readings may result | Calibration of measurement circuits not performed at factory | Contact distributor for service. |
| 14 | 15 | Tb 5V (RTS miswire) | | R/Y - G/Y | Remote Temp Sensor wired incorrectly | Battery Sense and/or RTS wired incorrectly | Ensure Battery Sense and RTS wired to correct terminals with correct polarity |
| 15 | 16 | FP10 Supply Out of Range | | | Floating 10V internal power supply out-of-range. Unit may still operate correctly, but this is an indication of a potential hardware failure. | Internal hardware problem | Contact distributor for service |
| 16 | 17 | unused | | | | | |
| 17 | 18 | FET open | | | MOSFET(s) damaged - open circuit | Hardware failure | Contact distributor for service |

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|---|---|---|---|---|---|---|---|
| 18 | 19 | IA Offset | | | Erroneous current reading when there should be zero current, could lead to inaccurate array current measurement | Failed current offset routine | Reboot controller and allow sweep of array input. Check if Alarm returns |
| 19 | 20 | IL Offset | | | Erroneous current reading when there should be zero current, could lead to inaccurate load current measurement | Damage to current measurement circuit<br>Failed current offset routine | Contact distributor for service<br>Reboot controller and allow sweep of array input. Check if Alarm returns |
| 20 | 21 | 3V Supply Out of Range | | | P3 Internal power supply out-of-range. Unit should still operate correctly, but this is an indication of a potential hardware failure. | Damage to current measurement circuit<br>Internal hardware problem | Contact distributor for service<br>Contact distributor for service |
| 21 | 22 | 12V Supply Out of Range | | | P12 Internal power supply out-of-range. Unit should still operate correctly, but this is an indication of a potential hardware failure. | Internal hardware problem | Contact distributor for service |
| 22 | 23 | high Va current limit | | | PV input voltage too high, current limiting to protect hardware | Array input voltage too high for safe operation | Consult documentation for maximum array voltage. Keep array voltage below maximum rating. Be sure to take into account temperature effects on the array Voc. |
| 23 | 24 | Power on Reset | | | A power down reset has occurred | Controller has lost power | None required |
| 24 | 25 | LVD | | | Low Voltage Disconnect (load) condition has occurred and the load was disconnected | Battery voltage has dropped below the load low voltage disconnect threshold | None required – condition will recover when battery bank charges up to a higher level |
| 25 | 26 | Log Timeout | | | 24hrs since last log entry write | Controller has not detected a complete sunrise/sunset cycle in the last 24hrs. | Could indicate excessively low array voltage, high ambient light conditions at night, or miswiring of the solar array. Check all of these factors. |
| 26 | 27 | EEPROM Access Failure | | | Log data and/or custom charging settings load failure | Hardware failure, no access to log data or custom settings memory | Reboot controller (power cycle on/off) and check if Alarm returns. If yes, contact distributor for service. |