FUSION ALARMS
TROUBLESHOOTING GUIDE

CURRENT LIMIT

Description: Controller is limiting the load current to the current limit set on the controller.
Alarm Type: Warning
Status LED: Flashing Orange
Display: “CURRENT LIMIT”
Alarm Reset Action: Automatically resets (disappears) when the current draw becomes less than the current limit setting due to set point or change in load.

Troubleshooting:
1. Confirm limit setting is at desired value.
2. Verify current using a True RMS clamp on current meter.
   a. Clamp on meter and controller agree: check load for faults, shorts, etc.
   b. Clamp on meter and controller do not agree: cycle power to the controller and re-check. If they still do not agree, contact the factory for assistance.

VOLTAGE LIMIT

Description: Controller is limiting the load voltage to the voltage limit set on the controller.
Alarm Type: Warning
Status LED: Flashing Orange
Display: “VOLTAGE LIMIT”
Alarm Reset Action: Automatically resets (disappears) when the load voltage becomes less than the voltage limit setting due to set point or change in load.

Troubleshooting:
1. Confirm limit setting is at desired value
2. Verify voltage using a True RMS voltage meter.
   a. Meter and controller agree – check load for imbalance.
   b. Meter and controller do not agree: cycle power to the controller and re-check. If they still do not agree, contact the factory for assistance.

CURRENT TRIP

Description: Controller has halted operation due to the load current exceeding the current trip setting.
Alarm Type: Inhibit
Status LED: Solid Red
Display: “CURRENT TRIP”
Alarm Reset Action: Requires user to acknowledge the alarm by cycling Pin 9 (Run / Reset) on the P1 connector, cycling control power, or digitally disabling and enabling the controller via SP129 Digital Command.

Synopsis: Load faults of this nature are often temporary due to conductive dust or debris that disintegrate during the fault. Additionally, thermal expansion of the elements sometimes causes shorts between the elements and grounded sidewalls. If using a transformer downstream, it is assumed that a load is connected, as an unloaded transformer will surely cause over current trips.

Troubleshooting:
1. Confirm the current trip setting is at desired value.
2. Open the furnace or oven and verify the load resistance between elements and ground. If they measure correctly, inspect the oven or furnace for arcing or burn marks as the fault may have vaporized during the event.
3. Check for loose connections between the controller and load. If using a transformer, check on both the primary and secondary side.
4. Verify current the fault using a peak capture oscilloscope and True RMS clamp on meter.
5. If you are able to confirm the fault using an oscilloscope, you will need to continue to look for problems with your load.

SHORTED SCR

Description: Controller detects a shorted SCR which may degrade performance.
Alarm Type: Warning
Status LED: Flashing Orange
Display: “SHORTED SCR”
Alarm Reset Action: Automatically resets (disappears) when the shorted SCR is detected.

Troubleshooting:
1. Disconnect the line and load.
2. Measure resistance from Line A to Load A; resistance should be greater than 10 kOhm.
3. Measure resistance from Line B to Load B; resistance should be greater than 10 kOhm.
4. Measure resistance from Line C to Load C; resistance should be greater than 10 kOhm.
5. Replace any SCR that measures less than 10 kOhm.
6. If all of the SCRs measure OK, this is a nuisance alarm. We suggest disabling the shorted SCR alarm on the System Tab of the FUSION Control Panel software.

HEATSINK TEMP WARNING

Description: Controller detects a heatsink temperature is within 5 degrees of shutdown.
Alarm Type: Warning
Status LED: Flashing Orange
Display: "WARNING HEATSINK TEMP"
Alarm Reset Action: Automatically resets (disappears) when the temperature of the heat sink is more than 5 degrees below the shutdown temperature.

Troubleshooting:
1. If the temperatures for all of the heat sinks are high
   a. Check surrounding air temperature of controller, i.e. check ventilation of electrical enclosure and correct as necessary.
   b. Check for plugging of heat sinks due to dust or debris. Remove controller and service as necessary. Install adequate filtering In electrical enclosure.
2. Check for proper fan operation by placing a small piece of paper over the exhausts.
   a. Check that there is some deflection of the paper
   b. Compare the amount of deflection is the same for units with multiple modules.
   c. If there is a fan failure – remove the cover and verify the fan wire is connected to the circuit board, replace the fan as necessary.

HEATSINK OVER-TEMP

Description: Controller has halted operation due to detecting a heatsink temperature that is over its maximum operating temperature.
Alarm Type: Inhibit
Status LED: Solid Red
Display: "INHIBIT HEATSINK TEMP"
Alarm Reset Action: Resets when the temperature of the heat sink is more than 5 degrees below the shutdown temperature and the user acknowledges the alarm by cycling Pin 9 (Run / Reset) on the P1 connector, cycling control power, or digitally disabling and enabling the controller via SP129 Digital Command.

Synopsis: For high value installations where the cost of a run far exceeds the cost of a controller, we recommend enabling Hero Mode so the controller continues to operate in the event of an over temperature condition. Note that enabling Hero Mode voids warranty as it may be fatal to the controller. The Hero Mode setting may be found on the System Tab of the FUSION Control Panel software.

Troubleshooting:
1. If the temperatures for all of the heat sinks are high
   a. Check surrounding air temperature of controller. i.e. check ventilation of electrical enclosure and correct as necessary.
   b. Check for plugging of heat sinks due to dust or debris. Remove controller and service as necessary. Install adequate filtering In electrical enclosure.

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2. Check for proper fan operation by placing a small piece of paper over the exhausts.
   a. Check that there is some deflection of the paper
   b. Compare the amount of deflection is the same for units with multiple modules.
   c. If there is a fan failure – remove the cover and verify the fan wire is connected to the circuit board, replace the fan as necessary.

FUSE BLOWN

Description: Controller has halted operation due to detecting a blown fuse.
Alarm Type: Inhibit
Status LED: Solid Red
Display: "FUSE OPEN"
Alarm Reset Action: Resets when the fuse is replaced.

Troubleshooting:
1. Disconnect the load connections.
   a. Measure resistance from Line A to Load A; resistance should be less than 800 kOhm.
   b. Measure resistance from Line B to Load B; resistance should be less than 800 kOhm.
   c. Measure resistance from Line C to Load C; resistance should be less than 800 kOhm.
2. Replace any fuse that measures greater than 800 kOhm.
3. After removing cover and gate drive to replace the fuse, check resistance directly across the fuse to verify it is open. Resistance directly across the fuse should be less than 5 Ohm.
4. Continue to replace the fuse if greater than 5 Ohm.
5. If the resistance is less than 5 Ohm (good fuse), check all connections and wiring leads to ensure they are tight and intact on that module. (includes cables, bus bar, flat flex cables, etc.)
6. Re-measure the resistance across the Line / Load. It should be less than 800 kOhm.
7. Contact the factory for assistance if the problem is not resolved.

AC LINE SYNC PLL

Description: Controller is not able to gain a phase lock with the line.
Alarm Type: Inhibit
Status LED: Red
Display: "AC LINE SYNC PLL"
Alarm Reset Action: Automatically resets (disappears) when the controller is able to sync with the line.

Troubleshooting:
1. Verify line voltage is present using a True RMS voltage meter: 3Ø voltage should be between 20.4 and 660 volts and the frequency is between 45 to 65Hz and is stable. Check all three phases.
   a. Voltage is not present, check voltage source feeding the controller.
   b. Voltage and frequency are present and within acceptable ranges, cycle power to the controller and re-check.
   c. Remove the cover and verify the voltage reference wires are connected to the gate circuit boards.
   d. Check all flat film cables are fully inserted into their connectors.
   e. Contact the factory for assistance.

LINE LOSS

Description: Controller detects a missing leg of the 3Ø input power.
Alarm Type: Inhibit
Status LED: Red
Display: “Line Loss”
Alarm Reset Action: Automatically resets (disappears) when the controller detects all three phases are present.

Troubleshooting:
1. Verify line voltage is present using a True RMS voltage meter: 3Ø voltage should be between 20.4 and 660 volts and the frequency is between 45 to 65Hz and is stable. Check all three phases.
   a. Voltage is not present, check voltage source feeding the controller.
   b. Voltage and frequency are present and within acceptable ranges, cycle power to the controller and re-check.
   c. Remove the cover and verify the voltage reference wires are connected to the gate circuit boards.
   d. Check all flat flim cables are fully inserted into their connectors.
   e. Contact the factory for assistance.

CONTROLLER IS FULLY ON

Description: Controller is abnormally firing at full conduction.
Alarm Type: None
Status LED: Green
Display: Normal Action
Alarm Reset Action: NA

Troubleshooting:
1. Using the Fusion Control Panel software verify that the following are correct
   a. Feedback type is “POWER”.
   b. Firing mode is “PHASE ANGLE”.
   c. Full scale power is the correct value.
   d. Setpoint transmitted to and setpoint read in by the controller agree.
   e. Contact the factory for assistance.

LOSS OF DIGITAL COMMUNICATION

Description: Controller is not responding to digital communication.
Alarm Type: None or Action Selected By Communication Heartbeat
Status LED: Green or Flashing Orange or Red
Display: Normal Action or “COMM ERROR”
Alarm Reset Action: Re-establish communications

Troubleshooting:
1. Verify that the IP address is correct
   a. IP address is correct - Check the cabling from the controller to the PLC.
   b. IP address is not correct- Using the Fusion Control Panel software, reset the controller’s IP address.

ADDRESS ERROR

Description: Controller detects an internal address error in the processor.
Alarm Type: Inhibit
Status LED: Red
Display: “ADDRESS ERROR XXXXXXXX”
Alarm Reset Action: Requires user to acknowledge the alarm by pressing the green button on the display or cycling control power.

Troubleshooting:
a. After resetting, the controller will continue normal operation with no further user intervention.