Pacific Gas and Electric Company

A Self-Checklist to Solve Power Problems for Sensitive Equipment

Have you experienced any of the following problems?

- Equipment failure
- Loss of Circuit Boards
- Power Supply Problems
- System Lockout
- Automatic Resets
- Loss of Memory
- Data Errors

These could be hardware or software failures but they could also be due to power related problems.

How can you tell?

Here is a checklist that will help you take the initial steps to identify and resolve some of the more common power problems.

KEEP A TROUBLE LOG

Record Changes

Has any electrical equipment been added or changed?

Has any work been done on the electrical system recently?

Record times

When was the equipment installed?

When did the problem arise?

What time did the problem happen?

Does the problem occur on a regular basis?

Record Other Activities

What else was going on at the time of the problem?

- Was other equipment operating?
- Were large loads coming on?
- Were lights flickering?
- Were there any power outages?

Record Other Equipment Affected

What other equipment experienced the same problem?

- Is it similar?
- Is it made by the same manufacturer?
- Is it on the same circuit?

THINGS TO LOOK FOR

Do a Visual Check

- Could nearby equipment on the same circuit be the source of the disturbances?
- Do you see circuit breaker tripping, or overheated circuit breakers and transformers?
- Do you see any charred insulation or burnt areas caused by arcing?

The following investigations may require the assistance of a licensed electrician. Check for:

- A neutral-ground bond. There should be only one at the main service entrance;
- Proper low resistance grounding;
- Loose, improper or missing connections.

Do a Measurement Check

- Use a true RMS voltmeter to see if voltage is within the manufacturer's specifications. Most equipment should operate between +6% to 13% of nominal voltage. This is a national standard.

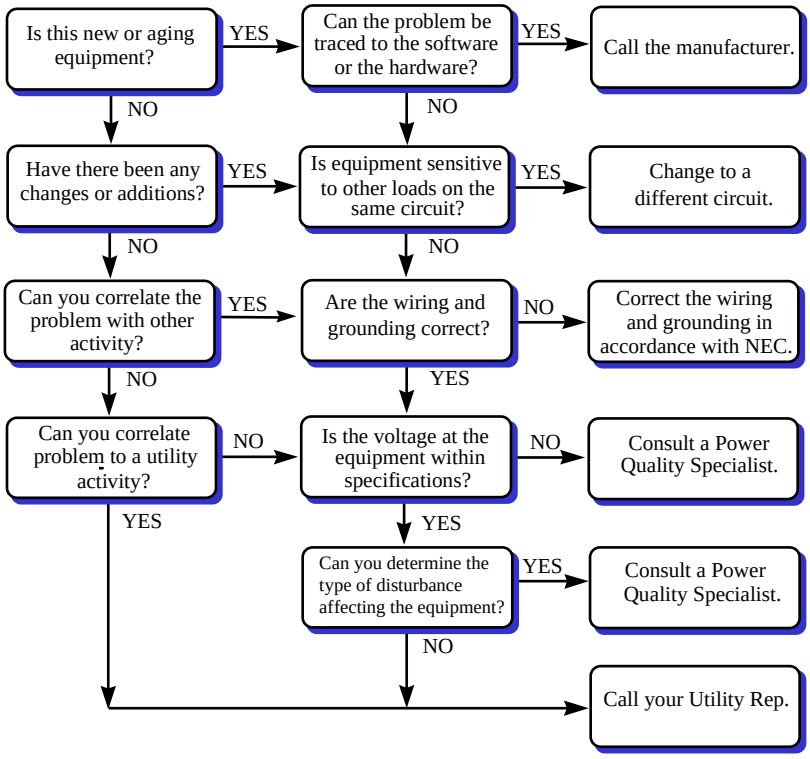
- Check for currents on the neutral and ground conductors. Current on the ground may indicate a wiring and ground problem.

- Check the neutral to ground voltage using a true RMS voltmeter. Neutral to ground voltage above 5 volts has been identified as a possible source of disturbances.

POSSIBLE SOLUTIONS

1. If the problem is hardware or software related, contact the vendor or manufacturer.
2. If the disturbance is caused by other equipment on the same circuit, isolate or move sensitive equipment to another circuit.
3. If noise or other high frequency interference is causing a problem, move equipment to a different location.
4. If there are any suspected faulty electrical components, replace them.
5. If voltage serving the equipment is not within the manufacturer's specifications, consult a power quality specialist.
6. If current measurements indicate an unbalanced situation beyond the tolerance of the equipment, balance the load.
7. If there is more than one grounding system, have a licensed electrician correct the situation in accordance with the National Electrical Code (NEC).
8. If noise in the ground system is unacceptable, install an isolated ground system, according to NEC.
9. If the problem still persists, contact a power conditioning specialist.

A FLOWCHART TO ANALYZE YOUR POWER PROBLEM



It is normal for the voltage of your electric service to vary constantly. These fluctuations can result from the normal operation of a utility's electric transmission and distribution system, among other reasons. Usually, these voltage changes will not cause problems for your equipment or facilities. But for certain electronic equipment, some fluctuations may cause damage or poor operation.

YOU are responsible for providing any devices needed to protect your sensitive equipment that cannot operate within the voltage variations of PG&E's normal electrical service. These variations are specified in PG&E's Electric Rule 2 (http://www.pge.com/tariffs/pdf/ER2.pdf), on file with the California Public Utilities Commission (http://www.cpuc.ca.gov/). PG&E is not liable for damage to your equipment or any other damage from variations in service voltage that are allowable under this rule. A copy of Electric Rule 2 (http://www.pge.com/tariffs/pdf/ER2.pdf) is available upon request.