Solar Pump Controller Fault

Causes, Fixes & Troubleshooting Guide

Pumps Africa Technical Support PDF

Solar Pump Controller Fault? Here’s What You Need to Know

A solar pump controller is responsible for managing the entire pumping system. Therefore, when the controller develops a fault, the pump may stop working completely, operate intermittently, or trigger repeated alarm codes.

In many cases, the controller is not actually damaged. Instead, it may simply be detecting another system problem such as:

- Low voltage
- Dry running
- Overheating
- Poor solar input
- Electrical faults
- Incorrect settings

Fortunately, most solar pump controller faults can be diagnosed systematically without replacing the entire system.

This guide explains:

- Common solar pump controller faults
- Why controller alarms occur
- How to troubleshoot controller problems
- Possible repair solutions
- When to replace the controller

Whether you use a solar borehole pump, irrigation system, or off-grid water supply, these troubleshooting steps can help identify the issue quickly.

Because modern controllers are essentially tiny electronic supervisors that panic immediately when anything in the system behaves suspiciously.

Common Signs of a Solar Pump Controller Fault

Your system may:

- Display alarm codes
- Fail to start the pump

- Shut down unexpectedly
- Restart repeatedly
- Show low voltage warnings
- Display dry-run protection faults
- Trip overload protection
- Run intermittently

Additionally, some controllers may appear completely dead even though solar panels are generating power normally.

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1. Low Voltage Fault

Low voltage alarms are one of the most common solar controller problems.

If solar panel voltage drops below the controller’s operating range, the system may:

- Shut down
- Refuse to start
- Reduce pump speed
- Display warning messages

Common Causes

- Cloudy weather
- Dirty solar panels
- Shading
- Damaged panels
- Undersized solar arrays

Solution

- Clean solar panels
- Inspect panel wiring
- Check voltage readings
- Remove shading
- Verify proper solar array sizing

Low voltage problems are especially common during winter and cloudy conditions.

Solar controllers are deeply committed to announcing low voltage at the exact moment somebody desperately needs water pressure.

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2. Dry-Run Protection Alarm

Most solar controllers include dry-run protection to prevent pump damage when water levels become too low.

If the borehole cannot supply enough water:

- The controller shuts down the pump
- Alarms may appear repeatedly
- The system may cycle on and off

Common Causes

- Low borehole water level
- Poor recovery rate
- Excessive pumping demand
- Faulty level sensors

Solution

- Check water levels
- Reduce pumping demand
- Inspect dry-run sensors
- Allow borehole recovery time

Dry-run protection should never be bypassed permanently, as it protects the pump from serious damage.

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3. Overload Fault

An overload alarm usually means the motor is drawing excessive current.

This may happen due to:

- Seized pump bearings
- Blocked impellers
- Low voltage
- Incorrect controller settings
- Damaged motors

Common Symptoms

- Controller trips repeatedly
- Pump starts briefly then stops
- Motor overheating
- Reduced water flow

Solution

- Inspect the pump mechanically
- Check motor condition
- Verify electrical supply
- Inspect for blockages

4. Overheating Controller

Solar controllers generate heat during operation. However, poor ventilation can cause overheating problems.

This is common when controllers are installed:

- In direct sunlight
- Inside sealed enclosures
- Near heat sources
- In dusty environments

Common Symptoms

- Random shutdowns
- Heat warnings
- Intermittent operation
- Burnt smell near controller

Solution

- Improve ventilation
- Relocate controller if necessary
- Clean cooling vents
- Check ambient temperatures

Controllers appreciate airflow far more than many installers seem willing to provide.

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5. Loose or Corroded Electrical Connections

Outdoor solar installations are exposed to:

- Moisture
- Dust
- Insects
- Heat
- Corrosion

Over time, electrical connections may loosen or deteriorate.

Common Symptoms

- Intermittent faults
- Voltage fluctuations
- Burnt terminals
- Random restarts

Solution

- Tighten terminals
- Replace damaged connectors
- Clean corrosion
- Inspect all wiring

Even a single loose terminal can cause major system instability.

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6. Faulty Float Switch or Water Level Sensor

Many solar systems use:

- Float switches
- Tank sensors
- Borehole probes

To automate operation.

If these sensors fail, the controller may prevent startup or trigger alarm conditions.

Solution

- Inspect sensor wiring
- Test float switches
- Verify controller inputs
- Replace faulty sensors

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7. Incorrect Controller Settings

Incorrect programming can cause:

- Startup problems
- Low flow
- Pressure instability
- Repeated alarms

This commonly occurs after:

- Power interruptions
- System upgrades
- Accidental resets
- Incorrect commissioning

Solution

Verify:

- Voltage settings
- Dry-run parameters
- Operating schedules
- Pressure limits
- Motor settings

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8. Lightning or Surge Damage

Power surges and lightning strikes can damage:

- Controller boards
- Internal components
- Communication systems

This is particularly common in rural installations and agricultural areas.

Common Symptoms

- Controller completely dead
- Burn marks
- No display
- Fault codes that will not clear

Solution

- Inspect for visible damage
- Test incoming power
- Replace damaged controllers if necessary
- Install surge protection

South African thunderstorms continue maintaining full employment for electrical technicians nationwide.

How to Troubleshoot a Solar Pump Controller Fault

Step 1 – Check Solar Input Voltage

Inspect:

- Panel voltage

- Shading
- Dirt buildup
- Damaged wiring

Step 2 – Read Fault Codes

Most controllers display:

- Alarm codes
- Warning lights
- Fault messages

Consult the controller manual for specific fault meanings.

Step 3 – Inspect Electrical Connections

Check:

- Loose terminals
- Corrosion
- Damaged cables
- Burnt connectors

Step 4 – Verify Water Supply

Ensure:

- Adequate borehole recovery
- Stable water levels
- No dry-run conditions

Step 5 – Reset the Controller

Some faults can be cleared by:

- Restarting the system
- Resetting alarms
- Restoring correct settings

Can a Faulty Controller Damage a Solar Pump?

Yes.

If controller faults continue:

- Motors may overheat
- Dry running can occur
- Electrical damage may develop
- Pump lifespan may decrease

Therefore, repeated controller alarms should always be investigated promptly.

When to Contact a Solar Pump Specialist

You should contact a technician if:

- Fault codes continue repeatedly
- The controller overheats
- The system shuts down constantly
- Voltage problems persist
- The pump still does not operate
- The controller shows visible damage

Solar Pump Troubleshooting & Repairs in South Africa

At Pumps Africa, we assist customers across South Africa with:

- Solar controller faults
- Solar pump troubleshooting
- Borehole pump repairs
- Irrigation system support
- Dry-run protection problems
- Electrical fault diagnosis
- Solar water pumping systems

We supply:

- Solar pump controllers
- Solar borehole pumps
- Pressure systems
- Irrigation pumping systems
- Water storage solutions
- Agricultural pumping equipment

Related Pump Troubleshooting Guides

You may also find these guides useful:

- Solar Pump Not Starting
- Solar Pump Low Flow Rate
- Pump Overheating
- Pump Losing Prime
- Borehole Pump Running Dry
- Low Water Pressure Problems

Need Help With a Solar Pump Controller Fault?

If your solar pump controller is showing alarms, fault codes, or startup problems, contact Pumps Africa for expert troubleshooting support and repair assistance across South Africa.

Our technical team can help diagnose:

- Low voltage faults
- Dry-run alarms
- Overload problems
- Controller overheating
- Electrical failures
- System configuration issues

Website: https://pumpsafrica.co.za

Because solar controllers have an extraordinary ability to display mysterious warning codes exactly when somebody says: “The system has been working perfectly for months.”