Pump Overheating

Causes, Fixes & Troubleshooting Guide

Pumps Africa Technical Support PDF

Pump Overheating? Here’s What You Need to Know

If your pump is overheating, becoming excessively hot, or repeatedly shutting down, there is usually an electrical, mechanical, or installation problem causing the motor to work harder than it should.

Pump overheating is one of the most common problems affecting:

- Borehole pumps
- Pressure pumps
- Irrigation pumps
- Centrifugal pumps
- Booster pumps
- Industrial water pumps

An overheating pump should never be ignored. Excessive heat can damage:

- Motor windings
- Bearings
- Capacitors
- Mechanical seals
- Impellers

If left unresolved, overheating can eventually lead to complete pump failure.

This troubleshooting guide explains:

- Why pumps overheat
- Common causes of pump motor overheating
- How to troubleshoot the problem
- Repair solutions
- When to repair or replace the pump

Whether you have a domestic water pump, industrial pumping system, or borehole installation, this guide can help identify the issue quickly.

Common Signs of an Overheating Pump

Your pump may:

- Feel extremely hot to the touch
- Shut down unexpectedly
- Trip overload protection
- Produce a burning smell
- Run noisily
- Lose water pressure
- Hum loudly
- Start and stop repeatedly

In severe cases, the motor may stop working completely.

Because eventually every overworked pump enters its “I cannot continue under these conditions” phase. A deeply relatable engineering experience.

---

1. Low Water Flow or Dry Running

One of the most common causes of pump overheating is dry running.

Pumps rely on water for:

- Cooling
- Lubrication
- Stable operation

If the pump runs without sufficient water flow, heat builds up rapidly inside the motor and pump housing.

Common Causes

- Low borehole water level
- Closed valves
- Blocked suction lines
- Airlocks
- Suction leaks

Solution

- Check water supply
- Inspect suction lines
- Remove airlocks
- Install dry-run protection

Dry running can permanently damage pump seals and motor components.

---

2. Blocked Impeller or Pipework

A blocked impeller forces the motor to work harder, increasing heat and electrical load.

Common blockages include:

- Sand
- Dirt
- Rust particles
- Debris
- Scale buildup

This is common in:

- Borehole systems
- Irrigation applications
- Dirty water pumps

Solution

- Isolate electrical power
- Open pump housing
- Inspect impeller
- Remove debris
- Check pipework for restrictions

---

3. Incorrect Voltage Supply

Low or unstable voltage can cause the motor to overheat.

When voltage is too low:

- Current increases
- The motor struggles to operate efficiently
- Excess heat develops

Common Electrical Problems

- Long cable runs
- Undersized wiring
- Poor electrical connections
- Generator instability
- Overloaded circuits

Symptoms

- Pump running slowly

- Motor humming loudly
- Breaker tripping
- Lights dimming during startup

Solution

- Test incoming voltage
- Inspect cable sizing
- Check generator output
- Ensure proper electrical protection

Low voltage is a common problem in agricultural and rural installations across South Africa.

---

4. Worn or Seized Bearings

Damaged bearings create friction inside the motor, causing overheating.

Over time, bearings may:

- Wear out
- Seize
- Become contaminated
- Lose lubrication

Common Symptoms

- Grinding noises
- Excessive vibration
- Hot motor housing
- Difficult shaft rotation

Solution

- Inspect bearings
- Replace worn bearings
- Check shaft alignment

Ignoring worn bearings can eventually destroy the motor completely.

---

5. Overloaded Pump Motor

If the pump is incorrectly sized or operating outside its design limits, the motor may overheat continuously.

This often happens when:

- Pump head is incorrect

- Pipe sizing is wrong
- System pressure is too high
- Pump operates beyond its duty point

Solution

- Verify pump sizing
- Check system design
- Confirm flow and pressure requirements

This is extremely common in incorrectly designed irrigation and booster systems.

---

6. Failed Cooling Fan

Many electric motors use cooling fans to remove heat.

If the fan is:

- Damaged
- Blocked
- Missing
- Rotating incorrectly

The motor can overheat quickly.

Solution

Inspect:

- Fan blades
- Ventilation openings
- Airflow around the motor

Clean dust and debris buildup regularly.

---

7. Faulty Capacitor

A damaged capacitor can cause the motor to draw excessive current, leading to overheating.

Common Signs

- Pump humming
- Hard starting
- Motor getting hot quickly
- Intermittent startup problems

Solution

Replace the capacitor using the correct:

- Voltage rating
- Microfarad (µF) specification

---

8. Continuous Operation Without Rest

Some domestic pumps are not designed for constant operation.

If the pump runs continuously for long periods:

- Heat builds up
- Motor insulation deteriorates
- Lifespan reduces significantly

Common Causes

- Water leaks
- Faulty pressure switches
- Incorrect pressure tank settings
- Excessive system demand

Solution

- Check pressure switch settings
- Repair leaks
- Install correct pressure tank
- Upgrade pump if required

How to Troubleshoot an Overheating Pump

Step 1 – Switch Off Power Safely

Always isolate electrical supply before inspecting the pump.

Step 2 – Check Water Supply

Ensure:

- Adequate water flow
- No dry running
- Valves are open

- Suction line is clear

Step 3 – Inspect Electrical Supply

Use a multimeter to verify:

- Correct voltage
- Stable electrical supply
- Proper phase balance on three-phase pumps

Step 4 – Inspect Bearings & Shaft

Check whether:

- The shaft rotates freely
- Bearings are noisy
- Vibration is excessive

Step 5 – Check Cooling & Ventilation

Inspect:

- Cooling fan
- Airflow
- Ventilation openings

Dust buildup can trap heat inside the motor.

Can an Overheating Pump Damage the Motor?

Yes.

If overheating continues:

- Motor windings can burn out
- Seals may fail
- Bearings can seize
- Electrical components may be damaged

Overheating dramatically shortens pump lifespan.

When to Contact a Pump Specialist

You should contact a pump technician if:

- The motor smells burnt
- Breakers trip repeatedly
- The pump overheats continuously
- Bearings are noisy
- Voltage problems persist
- The pump loses pressure
- The motor stops completely

Pump Troubleshooting & Pump Repairs in South Africa

Pumps Africa assists customers across South Africa with:

- Borehole pump problems
- Pump overheating issues
- Pressure pump repairs
- Irrigation pump troubleshooting
- Pump motor replacements
- Electrical fault diagnosis
- Industrial pump support
- Solar pumping systems

We supply:

- Borehole pumps
- Centrifugal pumps
- Pressure pumps
- Booster pumps
- Solar water pumps
- Industrial pumping systems

Related Pump Troubleshooting Guides

You may also find these guides useful:

- Pump Humming But Not Starting
- Pump Losing Prime
- Pump Keeps Tripping Breaker
- Borehole Pump Running Dry
- Low Water Pressure Problems
- Pump Vibrating Excessively

Need Help With an Overheating Pump?

If your pump motor is overheating or shutting down repeatedly, contact Pumps Africa for expert troubleshooting support and pump repair assistance across South Africa.

Our technical team can assist with:

- Electrical faults
- Overheating motors
- Pump sizing issues
- Dry running problems
- Voltage issues
- Replacement pump recommendations

Website: https://pumpsafrica.co.za

Because pumps rarely overheat during convenient moments. They prefer peak irrigation season, load shedding chaos, or exactly five minutes before guests arrive. Engineering has a dark sense of humor.