

ABSTRACT

This document contains a list of the most common causes of motor overheating. It is not comprehensive, but only meant as a guideline. Please consult the factory with any additional questions.

Common Causes

- Unbalanced three phase power supply - Generally, any voltage imbalance in excess of 1%, or measured current unbalance in excess of 5% will cause excessive heat within motor. See NEMA MG-1 Standard for details.
- Operating voltage too high or too low. Any operating voltage above or below 15% of nominal voltage should be considered a problem, and will cause excessive heat within motor.
- Impeller is locked or dragging, causing overload. Material caught in impeller or between wear ring and impeller may overload motor, yet not sufficiently to trip overload protection. Heavy sludge or sand/silt conditions in sump may also cause this condition.
- Operation of pump with motor partially or totally unsubmerged. Heat is produced during the operation of an electric motor, and this heat must be dissipated to prevent damage. In a submersible pump, the motor is designed to transfer heat through the motor housing and into the liquid in which the motor is submerged. For proper heat transfer to occur, over 50% of the motor housing (or 75% of the whole pump) must be continuously submerged. If the motor housing is only in contact with air, heat is not transferred at an adequate rate, with the result of excessive heat buildup within the motor.
- Improper float switch setting. If low level (pump off) float is set too low, pump will operate without proper cooling for a period of its duty cycle. We recommend that pump - off level be set so the entire pump is always submerged. However, the low level should never be set below the middle of the motor housing.

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- Continuous operation of pump. Typical HOMA pumps are designed for a 50% duty cycle. This means that the pump should operate for no more than 30 minutes per hour without special sizing considerations. The rest time permits full cooling for the motor, and assures the longest life and efficiency of the motor. However, several conditions may occur that could cause the pumps to operate continuously, as described below:
 1. Float switch(s) obstructed. Pump does not shut off at low water level.
 2. Check valve not functioning properly. Permits water column in discharge to backflow when pump shuts down. Depending on the discharge line capacity, and the sump volume, this may cause the pump to restart immediately, or very shortly after it shutoff. (We recommend a maximum of 10 starts per hour to permit adequate cooling of the motor windings.) In very severe cases, the pump may even restart while spinning in reverse due to the backflow. Tremendous loads are applied in this situation, and broken shafts, impeller hubs, or worse often occur. As a minimum, noticeable contact between impeller and wear ring is evident, since the severe loading will deflect the pump shaft.
 3. Inflow rate exactly matches pump capacity. This causes the pump to operate for extended periods of time without shutting down. This can be a particular problem if the float switches are set low, resulting in an unsubmerged motor.