

GRUNDFOS TECHNICAL ARTICLE: PUMP ROTATION & 3-PHASE MOTORS

Pumps operating on 3-phase motors have several advantages in our industry: high efficiency, consistent power and sometimes smaller physical size to name a few. Another tidbit of information about a 3-phase motor is that they can just as easily turn in one direction as it does the other. A 3-phase motor can generate the same amount of power turning clockwise as it does when it turns counter-clockwise.

Pumps on the other hand do care which direction they turn - they are designed to turn in only one direction. When a pump is turning in the wrong direction, it will perform and deliver water, but the performance is at best one half of what it is designed to be capable of producing. Allowing the pump to operate in the wrong direction long term can cause severe damage to the pump and motor assembly.

During the initial wiring of the incoming power to the control, or the motor leads to the starter, there is no way to determine which direction the motor will rotate. Therefore, the pump's performance needs to be checked and verified at start-up.

When on a pump installation that uses a 3-phase motor seems to be "off" at startup, you can use a simple check to confirm that the pump and motor assembly is not running in reverse.

1. Disconnect incoming power supply.
2. Reverse/interchange any 2 of the 3 INCOMING power leads going into the motor starter.
OR
3. Reverse/interchange any 2 of the 3 motor leads connected to the OUTGOING side of the motor starter.
4. Reconnect the power supply and start pump/motor assembly.
5. Recheck performance.

VFD Installations:

If you are using a Variable Frequency Drive (VFD) as part of your installation, reversing the 2 INCOMING power leads to the VFD will not change the rotation of the 3-phase motor. The VFD is receiving the incoming power and generating an outgoing 3-phase sign wave to adjust the speed of the motor. To reverse the rotation of the motor in VFD installations, the motor leads on the OUTPUT side of the drive must be reversed.