

Vibration Troubleshooting

Excessive cooling tower vibration is a problem to be avoided. At the very least, vibration can cause excessive noise. At the other end of the spectrum, depending on the source of the vibration, it can result in serious damage to the cooling tower itself. Early detection and inspection of the cooling tower to find the source of the vibration (shaft misalignment, broken gear teeth, imbalances etc.) are key to avoiding downtime and more serious structural damage.

Things to check:

- **Fan:** Check fan blades to be sure they are installed properly and hardware correctly tightened to spec. Make sure all of the blades are pitched at the same angle. Check fan tip clearance within cylinder.
- **Geareducer® Drive:** Check that oil level is correct, hardware is tight and alignment pins are properly installed.
- **Close Coupling / Driveshaft:** Check that all hardware including set screws are tight. Verify alignment measurements are within spec (see component's user manual for instructions).
- **Motor:** Check that all mounting hardware is tight. Confirm any greaseable bearings have been recently serviced. If equipped with a space heater, check installation and operation. Confirm drain plugs are correctly installed.
- **Structure:** If the casing panels are vibrating, make sure casing stiffeners are installed properly.
- **Fan Cylinder:** If the fan cylinder has stiffener rings check to be sure they are installed correctly.
- **Belt Drive:** Check belt alignment and tension. See *Belt Drive Troubleshooting SB-25* for additional information.
- **Tower Resonance:** If the vibration only occurs at an intermediate speed and then goes down as the tower gets up to full speed, this is a resonance. Any resonant speeds should be locked out in the VFD. A typical lockout range is 2-5Hz. Anytime the vibration exceeds 0.5 in/s that speed should be locked out to prevent operating in a resonant speed.

- **Vibration Level:** If the vibration is above 0.5 in/s at full fan speed, contact SPX Cooling engineering.

- **Vibration Switch:** Check that the vibration switch is installed and functioning correctly. Confirm no water is in the switch housing and connections aren't damaged.

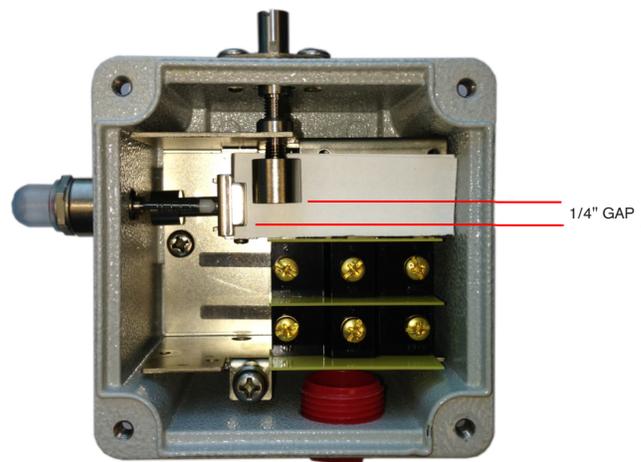
Vibration Switch Troubleshooting

IMI685A Mechanical Switch

The primary function of a mechanical switch is to shut down the tower in the event of a catastrophic failure. If the previous checks are all good, raise the setpoint of the mechanical switch until it no longer trips during operation.

Make sure the switch is set per "Factory Setting" before making any adjustments.

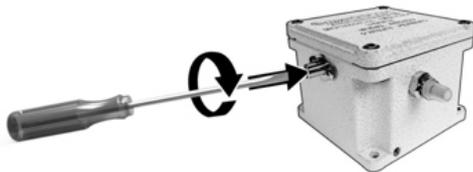
To confirm factory setting remove the cover and measure the gap distance between the edges of the cylinder and the square magnet. If the gap setting is not 1/4" rotate the adjustment screw clockwise or counter clockwise until a 1/4" gap is obtained.



IMI685A Mechanical Switch

Operate the fan motor as follows:

- Start the fan motor (full voltage or DOL start). If the switch trips rotate the adjustment screw clockwise 1/4 turn, reset the switch and restart the motor.



VFD operation:

- If the VFD has a bypass motor starter follow the above procedure first using the bypass motor starter.
- Using the VFD speed control, slowly ramp up the motor speed to full speed allowing 5 seconds for every 2 hertz of speed change. If the switch trips during the ramp up procedure, consider performing a vibration analysis on the tower operation.

Rotating the adjustment screw clockwise increases the trip point. Turning counterclockwise decreases the trip point.

IMI686B Smart Switch

The 686B is preset to 0.7in/s. If the tower checks out but switch is tripping, shut down the tower and conduct a vibration analysis to determine cause of problem.

IMI685B Electronic Switch

The 685B Series electronic vibration switch is designed to monitor vibration levels and trip an alert when a specified limit is exceeded.

The 685B should be set to 0.6in/s alarm and 0.7in/s shutdown. Verify it is set properly.

Alarm (shutdown) at
.7 in/s with
3 sec time delay

Alert (notification)
at .6 in/s with 45
sec time delay

