

# Vibration Switch Selection Guide

## FOR MARLEY COOLING TOWERS

### Mechanical Vibration Switch

The mechanical vibration switch is the most basic option for cooling tower vibration management. It is also less accurate and reliable than other vibration management tools. The mechanical switch comprises an inertia-sensitive mechanism that activates a snap-action switch if vibration exceeds a specified set point. The switch, when “tripped,” can simultaneously trigger an alert and shut down the equipment. Because these switches do not collect data, they are able only to react to a vibration event as it is occurring. In many cases this is too late to prevent a failure; the only thing the mechanical switch prevents is further damage to the tower.



### Electronic Vibration Switch

The electronic vibration switch for cooling tower vibration management has several advantages over a mechanical switch. The electronic switch utilizes a solid-state piezoelectric crystal to provide a 4-20mA electrical output when deformed by vibration forces. Vibration that exceeds a preset limit triggers an alarm, alerting operators to inspect the cooling tower and shut it down before failure occurs. If vibration exceeds a second preset limit before operators manually shut down the tower, the switch triggers a solid-state relay for automatic shutdown. Both the mechanical and electronic switches typically are mounted on structural support

beams. Alternately, the electronic switch offers an external accelerometer option which provides superior vibration measurement accuracy when mounted on the casing of the gearbox.

### “Smart” Vibration Switch

The “smart” vibration switch for cooling tower vibration management offers many of the advantages of an electronic vibration switch. The smart switch measures vibration with an imbedded piezoelectric accelerometer. Its small footprint and hermetically sealed casing allow installation directly onto the gearbox or bearing housing and does not require an additional external accelerometer. Smart switches offered by SPX feature factory-programmed set points, start-up delays, and alarm delay timers specifically optimized for cooling tower vibration protection.

For a more detailed explanation of vibration monitoring and protection systems, please read the [Vibration Management for Cooling Tower Components](#) white paper at [spxcooling.com](#).



## Vibration Management Options for Cooling Towers

Options	IMI 685A mechanical switch	Metrix 5550 mechanical switch	IMI 686B smart electronic switch	IMI 640B transmitter	IMI 685B electronic switch plus transmitter	Metrix 440/450 electronic switch plus transmitter
Relative Cost	\$	\$	\$\$	\$\$	\$\$\$\$	\$\$\$\$
Level of Protection	basic (recommended)	basic	better (recommended)	better	best (recommended)	best
Vibration / Amplitude Range	0–7g pk	0–16g pk	0.25–5.0 in/s	0–1.0 in/s	0.1–1.5 in/s	0.1–1.5 in/s
Frequency Range	0–100 Hz (0–6,000 CPM)	0–60 Hz (0–3,600 CPM)	2–1,000 Hz (420–60,000 CPM)	3–1,000 Hz	2–1,000 Hz (120–60,000 CPM)	2–1,000 Hz (120–60,000 CPM)
Set Point	1–2g (recommended)	1–2g (recommended)	0.7 in/s (shutdown) (SPX factory setting)	none	0.6 in/s (alarm) 0.7 in/s (shutdown)	0.6 in/s (alarm) 0.7 in/s (shutdown)
Output Signal	none	none	none	4–20 ma transmitter	4–20 mA	4–20 mA (option)
Power Input	none	none	24–240 VAC/DC	12–30 VDC	85–245 VAC 24 VDC	115 VAC 24 VDC
Relay Contact Options	2 x SPDT (DPDT) form C	SPDT, silver DPDT, gold (option)	SPST MOSFET form A, or form B	none	2 x SPDT form C	(1 or 2) x SPDT form C
Relay Contact State	open or closed	open or closed	normally closed (SPX factory setting)	none	open or closed	open or closed
Wiring Entries	3/4"–14 NPT	3/4" NPT or M20 x 1.5	30 ft integral cable	30 ft integral cable	cord grips or 1/2" NPT	1 x 3/4" NPT 2 x 3/4" NPT
Reset Options	external push-button standard, remote reset option	external push-button standard, remote reset option	cycle power for reset	none	internal push-button standard, remote reset option	external push-button or remote reset, auto reset configurable
Tower Startup Time Delay	none	20–30 sec (requires remote reset)	5 sec (SPX factory setting)	none	20 sec	20 sec
Alert/Alarm Time Delay	none	none	3 sec (SPX factory setting)	none	0–45 sec	3 sec factory setting 2–15 adjustable
Housing Material	aluminum alloy with epoxy	copper-free cast aluminum	hermetically sealed stainless steel	hermetically sealed stainless steel	aluminum alloy	copper-free aluminum, zinc chromate and epoxy
Environmental Rating	NEMA 4X (IP66)	NEMA 4 (IP66), NEMA 4X option	NEMA 4X (IP66)	NEMA 4X (IP66)	NEMA 4X (IP66)	440 NEMA 4X (IP66) 460 NEMA 4X EXP
Website	<a href="http://pcb.com">pcb.com</a>	<a href="http://metrixvibration.com">metrixvibration.com</a>	<a href="http://pcb.com">pcb.com</a>	<a href="http://pcb.com">pcb.com</a>	<a href="http://pcb.com">pcb.com</a>	<a href="http://metrixvibration.com">metrixvibration.com</a>

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