

Active Cooling System (ACS)

For High-Watt LEDs

Cooling System Concept

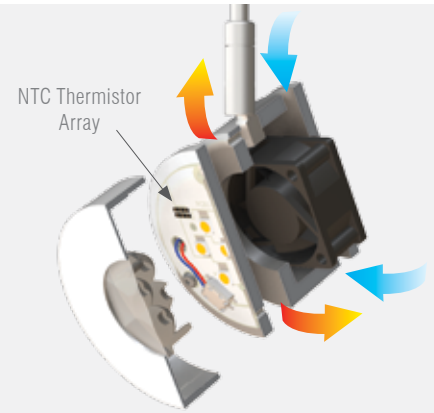
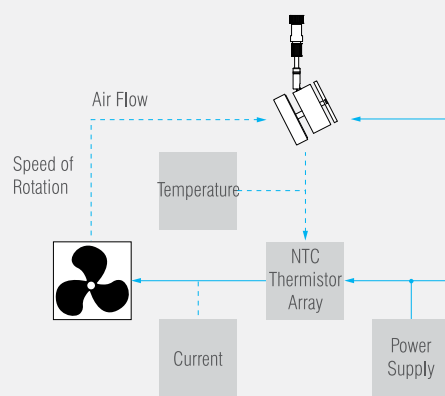
LED fixtures that run at an optimal operating temperature are more likely to maintain product efficiency and performance. In high-watt LEDs, additional cooling methods are often used to help dissipate the excess thermal energy generated by the fixture. If LEDs overheat, the fixture and hardware can be damaged, resulting in a loss of efficiency, output, and color.

The solution is MP Lighting's patented¹ Active Cooling System (ACS) which uses a thermal sensor, known as an NTC Thermistor Array, to detect changes in temperature and control speeds of a cooling fan. The system helps to regulate airflow through the fixture, ensuring that it will run at an optimal operating temperature. The addition of cool air increases a fixture's efficiency by up to 30%.

¹ Patent # (US): 8070324; Patent Application # (Germany): 11 2009 001 839, (Japan): 2011-520291

How it works

The NTC Thermistor Array is thermally attached to the heat sink and will detect changes in temperature. As the temperature of the heat sink increases or decreases, the resistance of the NTC Thermistor Array will adjust accordingly. The speed of the cooling fan will increase or decrease based on this resistance as the array is connected to the power line of the fan. As a result, the fan will compensate for changes in the fixture's temperature, drawing cool air in and forcing hot air out, until it has reached a stable temperature.



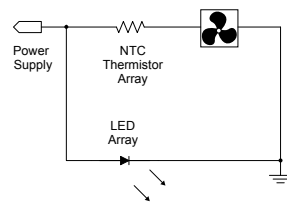
The new L223, an 18W LED spot light, is the first MP Lighting fixture to use the Active Cooling System. (≈1200lm)

MP Lighting ACS vs. Conventional Cooling System

In MP Lighting's Active Cooling System, the NTC Thermistor Array and cooling fan function as a control loop. The simple design and technology of the system allows the NTC Thermistor Array to directly control the speed of the cooling fan based on the negative feedback from the NTC Thermistor Array. The ACS requires no additional electronic parts or power supply to operate.

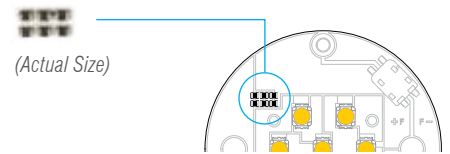
✓ MP Lighting ACS Circuit Diagram:

- NTC Thermistor Array
- Rheostat (optional)



MP Lighting Fan Control Circuit:

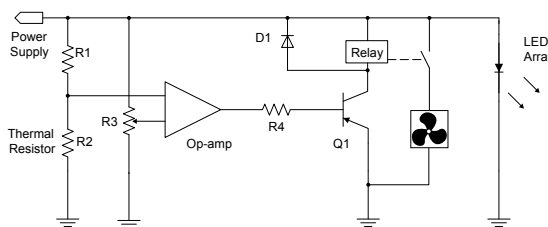
- The NTC Thermistor Array directly fits on the LED circuit board.



In contrast, conventional cooling systems require an additional power supply and electronic parts to control the speed of the fan. This increases the number of parts in the system, the cost of manufacturing, and the risk that the fixture will malfunction.

✗ Traditional Circuit Diagram:

- Resistor
- Thermal Resistor
- Rheostat
- Operational Amplifier
- Relay
- Diode
- Bipolar Junction Transistor
- Capacitors



Traditional Fan Control Circuit:

- The Traditional Circuit requires an additional or larger circuit board.



(Actual Size)