

INTERVIEWS:

Data center cooling technologies and why are they important



R Narayanan

Interview with R Narayanan, Group Senior Vice President & Head of Motion Business, Asia, ABB

Q: Why is data center cooling important?

A: Data center cooling is crucial because it ensures the continuous and efficient operation of massive amounts

of IT equipment, which tends to generate heat. Modern data centers handle a wide range of traffic, enabling everything from the digitalisation of industries to online shopping. However, the rapid expansion of data centers is intensifying concerns over their impact on the planet, particularly regarding how to cool these facilities in an environmentally sustainable manner.

With technologies like AI and the growing need for storage and processing data, the number of data centers will grow by 160 percent by the end of this decade, reaching 3-4 percent of the total energy consumption. Currently, the world's roughly 8,000 data centers account for about 1 percent of global greenhouse gas emissions, comparable to sectors like chemicals and aviation. It's clear that their role in the energy transition becomes crucial.

Compounding this challenge further are the high temperatures produced by advanced computing technologies, which place even greater demands on data center cooling infrastructure. According to reports, on average, the cooling system accounts for 40 percent of the energy consumed by a data center. Our solutions enhance power availability and reliability while tapping into renewable energy and optimizing efficiency. By working alongside our customers, we enable sustainable designs that maximise efficiency and minimise resource use.

Q: What are the most common data center cooling systems?

A: The cooling system for a data center varies based on factors like the data center's size, location, and workload demands, for example. However, the key consideration is to ensure that the systems are efficient, reliable, and sustainable. ABB offers high-efficiency motors and variable speed drives (VSDs) in key applications such as central chillers, pumps, fans and compressors.

Q: What cooling technologies do you offer?

A: Cooling efficiency is a critical requirement for data center stability. We offer an optimum pairing of high-efficiency motors and VSDs to help data center cooling systems maintain the targeted temperature and humidity levels.



A data center image. Photo source: Adobe stock image



ULH HVAC drive family.
Photo credit: ABB

Synchronous Reluctance Motors (SynRM) are the best choice for motors. They operate quietly, making them ideal for noise-sensitive environments. With the highest IE5 efficiency rating, SynRM motors convert electrical energy into mechanical power with unparalleled efficiency. Running at cooler temperatures, they offer additional benefits like operating performance optimization and reduced maintenance needs. Another notable feature is their magnet-free design, which eliminates the need for rare earth magnets, making them an eco-friendly choice. The SynRM motors which come with a compatible drive create the ultimate combination of efficiency and performance.

VSDs replace throttling or bypass valves for better flow control, resulting, on average, in 20 to 60 percent energy savings for the air conditioning system.

Reliable control of fans, pumps, and compressors even in communication loss situations is vital. Likewise ensuring that cooling continues even during equipment redundancy.

Ultra-low harmonic (ULH) drives offer even greater gains. ULH drives bring improvements to the wider electrical network, providing the lowest harmonic disturbance. Harmonics can disrupt operations immediately, if not addressed. They can cause damage to sensitive electronics, interfere with communication equipment, and provide false readings on measurement devices. They can also trip circuit breakers, blow fuses, and cause capacitor failures. The effects also include overheating of transformers, cables, motors, generators, and capacitors.



A fan wall in a data center. Photo source: Adobe stock image



Air-cooled chillers on a rooftop of a data center. Photo source: Adobe stock image

In the worst cases, harmonics cause unnecessary and unwanted process interruptions.

Q: What is the future of cooling technologies as data centers become modern and sustainable?

A: Like businesses in other industries, data center operators are striving to balance growth with their commitments to sustainability and carbon neutrality. While improving energy efficiency presents numerous challenges, it also offers exciting opportunities to tackle cooling issues in data centers.

With new technologies emerging, operators can achieve a win-win outcome that benefits both their business and the planet.

Q: Do you have any case studies of data center cooling? (preferably from Southeast Asia / Asia Pacific)?

A: Several of the biggest data centers in the region specified our equipment for their cooling systems because of our proven technology which helps data center operators maximise efficiency in their day-to-day operations while reducing their impact on the environment. In addition to our global experience and expertise, our local presence also allows data center operators to rely on us for prompt and personalised assistance, ensuring that their operations run smoothly, without costly interruptions.