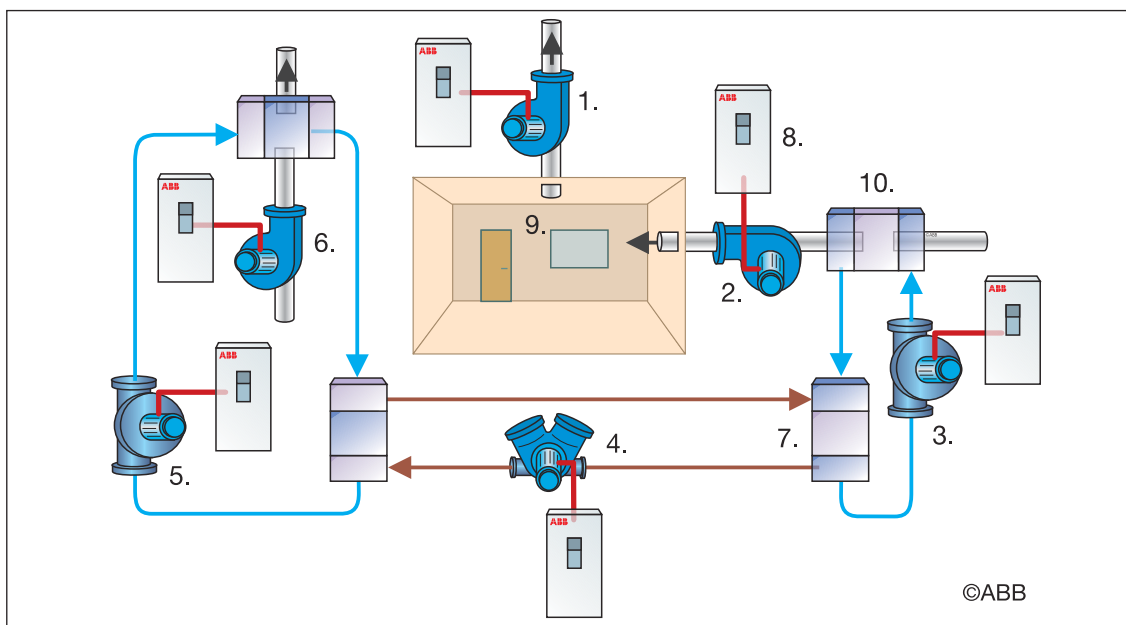


HVAC system controlled by AC drives



Air conditioning system with variable speed drives.

Application principle

This principal drawing introduces a space air-conditioning system with some main HVAC (Heating Ventilation and Air Conditioning) applications where variable speed AC drives can be used. This simplified diagram is for space cooling, but the cooling can be replaced by space heating instead. Variable speed AC drives are not always used in all these applications but in modern buildings at least some of these applications are usually controlled by AC drives. The purpose of the air conditioning system is to maintain the air quality for working and living in the room or space.

These "Comfort Zone" requirements are:

- Temperature 22 - 26°C.
- Relative humidity 30 - 70%.
- Air change 35 m³/hour/person.
- Air speed 0.15 - 0.25m/s.
- CO₂ content less than 0.1%.

Detailed description

This system for space cooling of the room (9) has an exhaust fan (1.) and a supply fan (2.). The air volume is controlled with AC drives (8.) according to the temperature and pressure requirements to keep the comfort in the room. The supply air flows through a heat exchanger (10.), which is cooled with water circulated by the chilled water pump (3.). The chilled water flow is controlled by an AC drive. The chilled water is cooled in the heat exchanger (7.) and the primary side of the heat exchanger is the evaporator of the chiller compressor (4.). The chiller compressor capacity is controlled by an AC drive and the water circulated by the cooling tower pump (5.) cools its condenser. Pump flow is controlled by an AC drive. The cooling tower fan (6.) cools the cooling water and the fan capacity is controlled by an AC drive.



Performance in creating the Comfort Zone

The use of variable speed AC drives improves the controllability of the whole heating, cooling and air conditioning system, making it easy to maintain the Comfort Zone. The use of variable speed drives usually increases the initial investment costs, but the electrical energy savings for the motors and VSDs alone mean that an investment in VSD has a pay-back time of 0.2 - 3 years.

In addition to savings in electrical energy, VSD provide several important customer benefits:

- Fast control for maintaining Comfort Zone conditions.
- Accurate control to keep the desired air quality.
- Reduced consumption of heating and cooling energy.
- Reduced consumption of electrical energy.
- Easy to maintain low noise levels.



Air conditioning is an important element in high rise office buildings (Guangzhou, China).



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