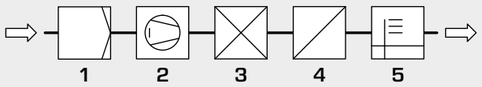
Basic knowledge

Setup of an air conditioning system

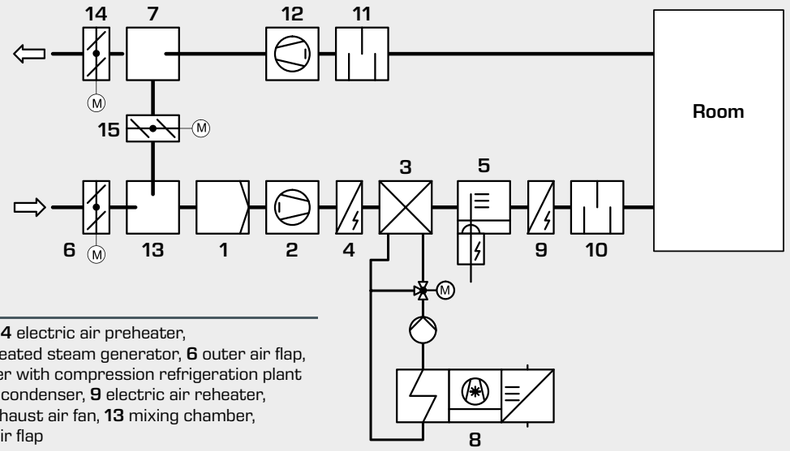
Simple full air conditioning system



A full air conditioning system consists in its most simple form of the following components:

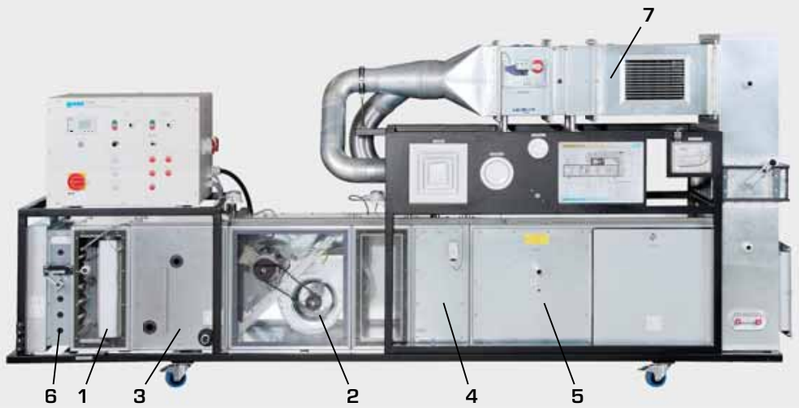
1 air filter: removes dust and dirt from the air
2 fan: aspirates the air and transports it through the system
3 air cooler: cools and dehumidifies the air
4 air heater: heats the air and compensates for the temperature loss during humidification and dehumidification
5 air humidifier: adds humidity to the air

Real air conditioning systems are usually more complex in design. To save energy, the waste air from the room can be returned to the room after processing. This is called recirculating operation. The ratio of recirculating air and outer air is controlled by throttle valves or flaps. In the diagram shown below the air cooler is supplied with cold water from a water chiller. Steam humidifier and air heater are heated electrically.



Complex air conditioning system with recirculating operation

1 air filter, **2** air inlet fan, **3** air cooler, **4** electric air preheater, **5** steam humidifier with electrically heated steam generator, **6** outer air flap, **7** distribution chamber, **8** water chiller with compression refrigeration plant in block construction with air-cooled condenser, **9** electric air reheater, **10** inlet air silencer, **11** silencer, **12** exhaust air fan, **13** mixing chamber, **14** exhaust air flap, **15** recirculating air flap



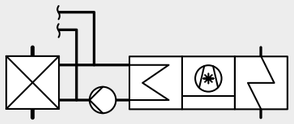
ET 620 Air conditioning and ventilation system

1 air filter,
2 fan,
3 air cooler,
4 air heater,
5 humidification chamber,
6 ventilation flap,
7 distribution system with flaps and outlets

Air cooler

- **direct evaporator of a compression refrigeration system**

  Advantage:
  simple and cheapdesign



- **cold water circuit with compression refrigeration system**

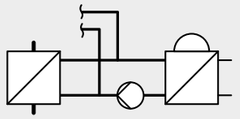
  Advantage:
  several coolers can be operated via one refrigeration system

Direct evaporator as air cooler

Air heater

- **electric air heater**

  Advantage:
  simple design, easy to control



- **hot water circuit with boiler**

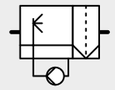
  Advantage:
  all fuels and heat sources possible, several air heaters can be connected to one heat source

Electric air heater

Air humidifier

- **steam humidifier**

  Advantage:
  no cooling by condensation, hygienic



- **spray humidifier with mist collector**

  Advantage:
  can also operate as air cooler

Steam humidifier

An example from practice: industrial air conditioning system with comprehensive filters for clean room production