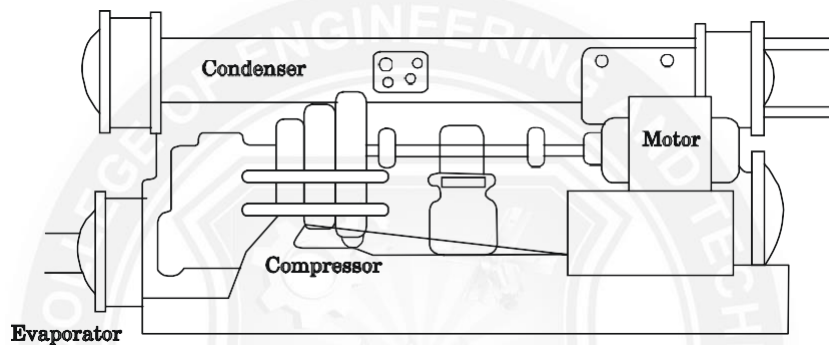


## 2.2.a) CHILLED WATER PLANT

**Chilled water is extensively used as a secondary refrigerant in larger commercial, institutional and industrial premises to make cooling available over a large area.**

The refrigeration machine that produces chilled water is generally referred to as *chiller*.



*Fig. 1.6.1 Sectional details of a packaged chiller*

It consists of the compressor(s), evaporator and condenser packaged as a single unit.

The condensing medium may be water or outdoor air. Air-cooled chillers are typically designed for outdoor installation and have large fans to force outdoor air over the condenser coil for heat rejection.

Water-cooled chillers are designed for indoor installation and are supplied with a source of water for condenser heat rejection. The evaporator consists of a shell-and-tube heat exchanger with refrigerant in the shell and water in the tubes.

## b) FAN COIL UNITS

A fan coil unit consists of a heat exchanger in which water is circulated and a fan assembly, incorporating a filter and simple controls, designed for wall perimeter units. The ceiling

units mounted within ceiling voids. The ceiling units can be configured as a cassette, drawing air into the centre and discharging at the periphery. Heating elements, electric, hot water or steam can be included.

The chilled water is fed to a number of air-handling units, each sized for a suitable zone, where the conditions

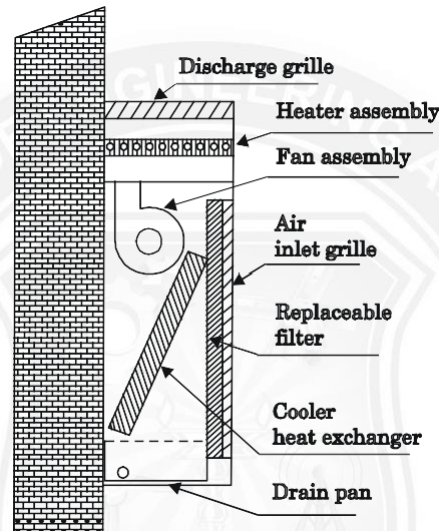
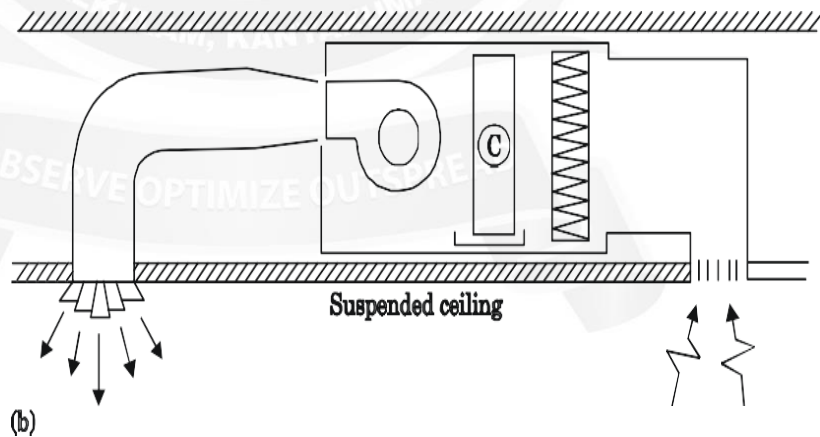


Fig1.6.b.1- Fan coil units- Wall mounted

throughout the zone can be satisfied by the outlet air



from the unit.

Fig1.6.b.2- Fan coil units- Ceiling mounted

This offers a wide range of comfort conditions within the space, with units serving a single rooms, or part of a room.

The coil is normally operated with a fin temperature below room dew point, so that some latent heat is removed by the coil, which requires a condensate drain. Multi-speed fans are usual, so that the noise level can be reduced at times of light load.

**Advantages of this type of system**

- Individual control for zone or office, including heating in some zones and cooling in others
- Relatively low cost of standard units
- Simple control system
- Built in standby capacity where several units are located in one zone.

**Disadvantages**

- Limited flexibility with standard units - all operating parameters fixed by the manufacturer.
- Normally only simple dry bulb control is provided, although some specialist units incorporate electronic control systems and humidifiers.
- Limited control of fresh air input, if any, so that advantage of free cooling cannot be taken.
- Limited ability to control air distribution.
- Visibility of the units and connecting chilled water services may be an issue.