



SNS COLLEGE OF TECHNOLOGY

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Department of Mechanical Engineering

Gas Power Plant

In a gas turbine plant air is used as a working fluid. The air compressed by compressor is fed to the combustion chamber where heat is added to the air.

Heat is added to the compressed air either by burning fuel in the chamber or by the use of air heaters.

The hot and high pressure air from the combustion chamber is then passed to the gas turbine, where it expands and does the mechanical work. The gas turbine drives the alternator which converts the mechanical energy into electrical energy.

The schematic arrangement of gas turbine power plant is shown in figure. The main components of the plant are 1.Low pressure compressor 2.Inter cooler 3.High pressure compressor 4.Regenerator 5. Combustion chamber 6.High pressure turbine 7.Alternator 8.Starting motor.

1.Low pressure compressor:

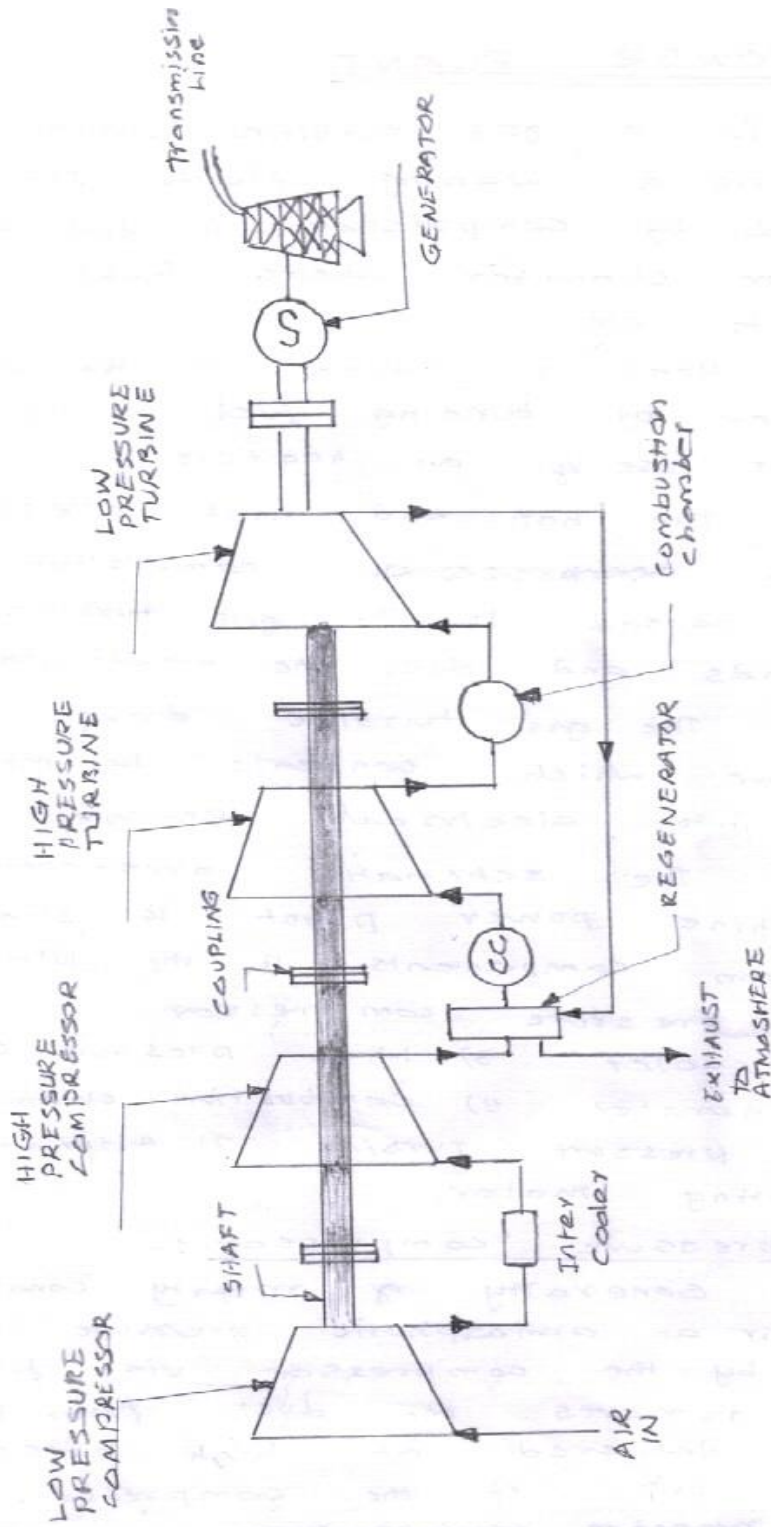
Generally of rotary compressor, the air at atmospheric pressure is which removes the dust from the air. Air is delivered at high pressure at the output of the compressor

2.Intercoolers:

The air is passed through the intercooler after compression in Low pressure compressor since it is hot. It is used to reduce the work of the compressor and increase the efficiency.

3.High pressure compressor:

The air from the intercooler enters into the high pressure compressor where it is further compressed to a high pressure. The high pressure air is then passed to the regenerator.



LAYOUT OF GAS TURBINE PLANT

4.Regenerator:

It is a device which recovers heat from the exhaust gas of the turbine. The exhaust gas is passed through the regenerator before being released into the atmosphere. The compressed air from the compressor passes through the tubes on its way to the combustion chamber.

5.Combustion chamber:

The air at high pressure from the compressor is led to the combustion chamber via regenerator. In combustion chamber heat is added to the air by burning oil.

6.Gas turbine:

The products of combustion consisting of mixture of gases at high temperature and pressure are passed to the gas turbine. These gases in passing over the low pressure turbine and expanded and thus do the mechanical work.

7.Alternator:

The gas turbine is coupled to the alternator. The alternator converts the mechanical energy of the turbine into electrical energy.

8.Starting motor:

Before starting the turbine, compressor has to be started. For starting the compressor an electric motor is mounted on the same shaft. These motors are energized by batteries.

ADVANTAGES GAS TURBINE PLANTS:

- 1.Simple design compared to steam power plant and no boiler is required.
- 2.Initial and operating costs are less.
- 3.It can be started quickly from cold conditions.
- 4.Maintenance is less and thereby the maintenance cost is low.
- 5.Any quality of fuel can be used.
- 6.Smaller is size and weight.

DISADVANTAGES OF GAS TURBINE PLANTS:

- 1.External power is required to start the compressor.
- 2.The net output is low.
- 3.Overall efficiency is less.