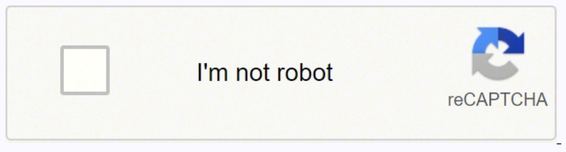
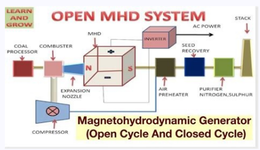


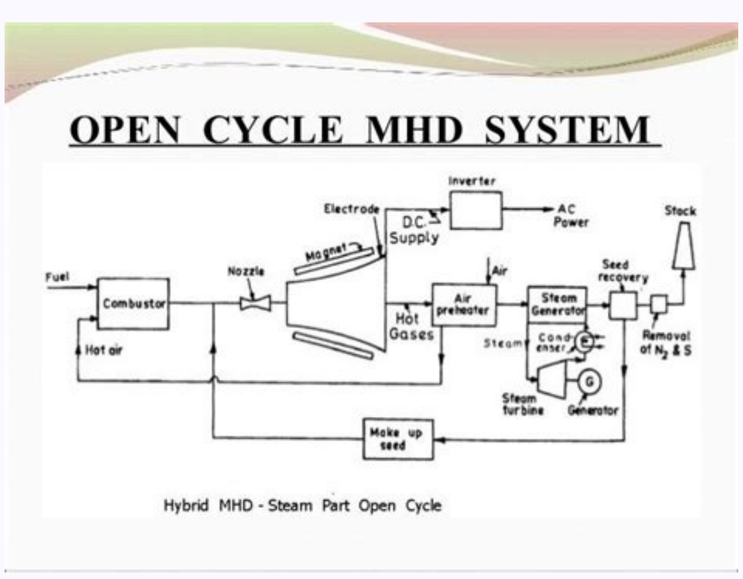

I am not robot!

# Open cycle mhd system diagram

**Types of mhd system.  Refrigeration cycle diagram explained.  Difference between open cycle and closed cycle gas turbine.  How does a bicycle pump work diagram.**




**MHD power plants provide the potential to generate electric power in large-scale with reduced environmental impact.**
**There are different types of MHD generators designed based on the type of application and fuel used. Pulsed MHD generator is used for remote sites are used to generate electrical power of large pulses. What is MHD Generator? Definition: A magnetohydrodynamic (MHD) generator is a device that generates power directly by interacting with a rapidly moving stream of fluid, usually ionized gases/plasma. MHD devices transform heat or kinetic energy into electrical energy. The typical setup of an MHD generator is that both turbine and electric power generator coalesce into a single unit and has no moving parts, thus, eliminating vibrations and noise, limiting wear and tear. MHDs have the highest thermodynamic efficiency as it operates at higher temperatures than mechanical turbines. MHD-generator MHD Generator Design The efficiency of conductive substances should be increased to increase the operational efficiency of a power generating device. The required efficiency can be achieved when a gas is heated to become plasma/fluid or adding other ionizable substances like the salts of alkali metals. To design and implement an MHD generator, several issues like economics, efficiency, contaminated hypo ducts are considered.**

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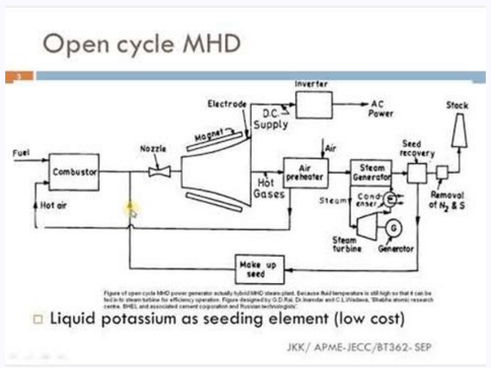
**Hall MHD Generator Design The very high output current produced through the Faraday flows along with the fluid duct and reacts with the applied magnetic field resulting in Hall Effect. In other words, the current flowing along with the fluid would lead to loss of energy. The total current produced is equal to the vector sum of the components of traverse (Faraday) and axial current.**




**The use of Magnetohydrodynamic power generators was first observed by ‘Michael Faraday’ during 1791-1867 while moving a fluid electric substance through a fixed magnetic field. MHD power plants provide the potential to generate electric power in large-scale with reduced environmental impact. There are different types of MHD generators designed based on the type of application and fuel used. Pulsed MHD generator is used for remote sites are used to generate electrical power of large pulses. What is MHD Generator? Definition: A magnetohydrodynamic (MHD) generator is a device that generates power directly by interacting with a rapidly moving stream of fluid, usually ionized gases/plasma. MHD devices transform heat or kinetic energy into electrical energy. The typical setup of an MHD generator is that both turbine and electric power generator coalesce into a single unit and has no moving parts, thus, eliminating vibrations and noise, limiting wear and tear. MHDs have the highest thermodynamic efficiency as it operates at higher temperatures than mechanical turbines. MHD-generator MHD Generator Design The efficiency of conductive substances should be increased to increase the operational efficiency of a power generating device.**
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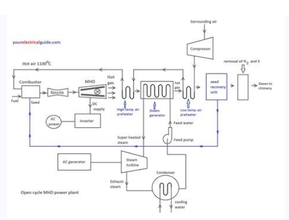


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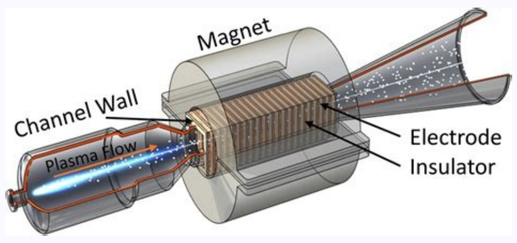


**How does a bicycle pump work diagram.**

MHD generators are devices employed to generate electric power by interacting with a moving fluid like ionized gas or plasma and magnetic field. The use of Magnetohydrodynamic power generators was first observed by ‘Michael Faraday’ during 1791-1867 while moving a fluid electric substance through a fixed magnetic field. MHD power plants provide the potential to generate electric power in large-scale with reduced environmental impact. There are different types of MHD generators designed based on the type of application and fuel used. Pulsed MHD generator is used for remote sites are used to generate electrical power of large pulses. What is MHD Generator? Definition: A magnetohydrodynamic (MHD) generator is a device that generates power directly by interacting with a rapidly moving stream of fluid, usually ionized gases/plasma.

MHD devices transform heat or kinetic energy into electrical energy. The typical setup of an MHD generator is that both turbine and electric power generator coalesce into a single unit and has no moving parts, thus, eliminating vibrations and noise, limiting wear and tear. MHDs have the highest thermodynamic efficiency as it operates at higher temperatures than mechanical turbines. MHD-generator MHD Generator Design The efficiency of conductive substances should be increased to increase the operational efficiency of a power generating device. The required efficiency can be achieved when a gas is heated to become plasma/fluid or adding other ionizable substances like the salts of alkali metals. To design and implement an MHD generator, several issues like economics, efficiency, contaminated hypo ducts are considered. Three most common designs of MHD generators are: Faraday MHD Generator Design The design of a simple Faraday generator includes a wedge-shaped pipe or tube made of a non-conductive substance. The powerful electromagnet produces a magnetic field and allows the conductive fluid to pass through it perpendicularly, inducing the voltage. The electrodes are placed at right angles to the magnetic field to extract the output electrical power. This design offers limitations such as the kind of field used and density. Eventually, the amount of power drawn using the Faraday design is directly proportional to the area of the tube and the speed of the conductive fluid. Hall MHD Generator Design The very high output current produced through the Faraday flows along with the fluid duct and reacts with the applied magnetic field resulting in Hall Effect. In other words, the current flowing along with the fluid would lead to loss of energy.

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hall-effect-generator-design Disc MHD Generator Design The Hall Effect disc MHD generator design is highly efficient and is the most commonly used design. A fluid flows at the center of the disc generator. The ducts enclose the disc and the flowing fluid. The pair of Helmholtz coils are used to generate the magnetic field above as well as below the disc. The Faraday currents flow over the boundary of the disc, while the Hall-Effect current flows between ring electrodes located at the center and the boundary of the disc. current-flow-in-disc Principle of MHD Generator MHD generator is commonly referred to as a fluid dynamo, which is compared to a mechanical dynamo – a metal conductor when passed through a magnetic field generates a current in a conductor. However, in the MHD generator, conducting fluid is used instead of a metal conductor. As the conducting fluid (conductor) moves through the magnetic field, it produces an electrical field perpendicular to the magnetic field. This process of electric power generation through MHD is based on the principle of Faraday’s law of electromagnetic induction. When the conducting fluid flows through a magnetic field, a voltage is generated across its fluid and it is perpendicular to both the fluid flow and the magnetic field as per Fleming’s Right Hand Rule. Applying Fleming’s Right-Hand Rule to the MHD generator, a conducting fluid is passed through a magnetic field ‘B’. The conducting fluid has free charge particles moving with a velocity ‘v’. The effects of a charged particle moving with a velocity ‘v’ in a constant magnetic field are given by the Lorentz Force Law. The simplest form of this description is given below by the vector equation.

F = Q (v x B) Where, ‘F’ is the force acting on the particle. ‘Q’ is the charge of the particle, ‘v’ is the velocity of the particle, and ‘B’ is the magnetic field. The vector ‘F’ is perpendicular to both ‘v’ and ‘B’ according to the right-hand rule. MHD Generator Working The MHD electricity generation diagram is shown below with possible system modules. To begin with, the MHD generator requires a gas source of high temperature, which can be either a coolant of a nuclear reactor or can be high-temperature combustion gases produced from coal. mhd-generator-working As the gas and fuel pass through the expansion nozzle, it decreases the pressure of the gas and increases the speed of fluid/plasma through the MHD duct, and increasing the overall efficiency of the power output.

The exhaust heat produced from the fluid through the duct is the DC power. It used to run the compressor to boost the fuel combustion rate. MHD Cycles and Working Fluids Fuels like coal, oil, natural gas, and other fuels that are capable of producing high temperatures can be utilized in MHD generators. Besides this, MHD generators can use nuclear energy to generate electricity. MHD generators are of two types – open cycle and closed-cycle systems. In an open cycle system, the working fluid is passed only once through the MHD duct. This produces exhaust gases after generating electrical energy, which is released to the atmosphere via a stack. The working fluid in a closed cycle system is recycled to the heat source for reusing it repeatedly. The working fluid used in an open cycle system is air, whereas helium or argon is used in a closed cycle system. Advantages The advantages of the MHD generator include the following. MHD generators convert heat or thermal energy directly into electrical energy It has no moving parts, so mechanical losses would be minimal Highly efficient Has higher operational efficiency more than conventional generators, therefore, the overall cost of an MHD plant is less compared to conventional steam plants Operational and maintenance costs are less It works on any type of fuel and has better fuel utilization Disadvantages The disadvantages of the MHD generator include the following. Aids in the high amount of losses that include fluid friction and heat transfer losses Needs large magnets, leading to higher costs in implementing MHD generators High operating temperatures in the range of 200°K to 2400°K will corrode the components sooner Applications of MHD Generator The applications are MHD generators are used for driving submarines, aircraft, hypersonic wind tunnel experiments, defense applications, and so on. They are used as an uninterrupted power supply system and as power plants in industries They can be used to generate electric power for domestic applications FAQs 1). What is a practical MHD generator? Practical MHD generators were developed for fossil fuels. However, these were overtaken by low-cost combined cycles, where the exhaust of gas turbines heats the steam to run a steam turbine. 2). What is seeding in MHD generation? Seeding is a process of injecting a seeding material like potassium carbonate or cesium into the plasma/fluid to increase the electrical conductivity. 3). What is MHD flow? The slow movement of a fluid can be described as a regular and orderly movement. Any disturbance in the flow velocity, leads to turbulence, changing the flow characteristics rapidly. 4). Which fuel is used in MHD power generation? The coolant gases like helium and carbon dioxide are used as plasma in nuclear reactors to direct MHD power generation. 5). Can plasma generate electricity? Plasma is a good conductor of electricity as it has plenty of free electrons. It becomes electrically conductive when electric and magnetic fields are applied and that influence the behavior of charged particles. This article gives a detailed description of an overview of the MHD generator, which generates electricity using metal liquid. We also discussed the MHD generator principle, designs, and working methods. Additionally, this article highlights the advantages and disadvantages and various applications of the MHD generator. Here is a question for you, what is the function of a generator?