



Your Reliable Guide for Power Solutions

To fulfill our commitment to be the leading supplier in the power generation industry, the Total Energy Systems, LLC. team ensures they are always up-to-date with the current power industry standards as well as industry trends. As a service, our **Information Sheets** are circulated on a regular basis to existing and potential power customers to maintain their awareness of changes and developments in standards, codes and technology within the power industry.

Ignition System Maintenance on Gaseous Generator Systems

1.0 Introduction:

Generator systems, when arranged as an engine connected to an AC alternator to generate electrical power, have a variety of engine types to choose from. One engine frequently found in generator systems is a spark ignition engine. Spark ignition engines utilize a variety of fuels for their combustion cycle, with the most common fuel on medium to heavy duty being Natural Gas and Liquid Petroleum. Smaller units are frequently gasoline powered. Whatever the fuel, all spark ignition engines work on the same principle of combustion and have unique components for ignition. Should these components not be maintained in proper running order, emergency power, when required, will be reduced, or even lost.

This information sheet discusses the ignition components within a generator system equipped with a spark ignition engine, and how they should be part of an Ignition System Maintenance (ISM) program to ensure the system remains fully operational and reliable.

ISM Components to Replace During Service	
Item	Service Description
1	Spark Plug - Renew and set gap to OEM specification
2	Rotor - Replace due to electrical arc erosion
3	Cables - Replace all cables and boots
4	Condenser - Replace on older engines when in distributor, but inspect on newer engines when separately mounted
5	Distributor Cap - Replace

Distributor - Top View

Distributor Cap - Side View

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2.0 Key Components Within a Spark Ignition Engine:

Gaseous generator sets are a very reliable power supply for prime and standby power applications, but as for any prime mover, or reciprocating engine, they have components within their ignition system that have to be maintained to ensure trouble free operation. (See Diagram 1)

The principal components within a spark ignition engine are:

- 2.1 Spark Plug** – Most EPA compliant gaseous/gasoline powered reciprocating engines operate on the 4-stroke Otto-Cycle. To ignite the fuel on the combustion cycle, they use a spark plug. There is one spark plug per cylinder, for example a Vee eight-cylinder engine will have 8-spark plugs, and a straight 6-cylinder engine will have 6-spark plugs.
- 2.2 Condenser** – To provide a good spark across the spark plug gap to ensure efficient combustion of the fuel, a condenser is used to generate a high-tension DC voltage to the spark plug.
- 2.3 Distributor** – A distributor, usually mechanically driven by the engine, turns a rotor that controls which spark plug is fed with high tension voltage to provide the spark that ignites the fuel on the combustion cycle.
- 2.4 Distributor Cap** – Inside the distributor cap are several contacts each for one of the cylinders, hence an 8-cylinder engine has 8 contact points in the distributor cap.
- 2.5 Rotor** – Mounted in the center of the distributor cap connected to the engine driven shaft, is a rotor. The rotor completes the high-tension voltage between the rotor conducting arm and the distributor contact point feeding its assigned spark plug.
- 2.6 High Tension Connecting Cables** – The electrical components within a spark ignition system are connected by high-tension cables, with the condenser cable wired to the distributor cap, and the individual spark plug cables connected to their individual contacts on the distributor cap.

3.0 Wear Items Occurring in a Spark Ignition System:

An engine is a working piece of equipment and over time, various parts of the system can deteriorate due to wear and elements around the system. The following changes in a spark ignition system have to be monitored to ensure an engine performs to its designed requirements:

- 3.1 Spark Plug** – The gap from which each spark is generated can become corroded to a level that the spark is too weak to ignite the fuel during the combustion cycle.
- 3.2 Condenser** – In some older engines, there is a condenser in the distributor cap that has contacts that can erode.
- 3.3 Distributor & Cap** – There are two wear items in the distributor. The contact points in the distributor cap can become eroded or carbonized due to the electrical arcing between the rotor arm and the contact point. Without maintenance, the engine will begin to miss-fire because there is insufficient electrical flow from the rotor to the contact point feeding the individual spark plug.
The distributor cap, due to fatigue, heat and vibration, can also crack and mechanically fail.
The other maintenance item is the contact point between the rotor and distributor feed from the condenser becoming worn.
- 3.4 Rotor** – While the engine is running, the rotor is continuously turning. Over time, the rotor conductive arm will be eroded by electrical arcing. The rotor can also crack from fatigue leading to mechanical failure.
- 3.5 High Tension Connecting Cables** – Over time, the cables lose their conductivity, either within the cable or the connecting boot. Cables also mechanically fail due to heat and vibration if not maintained correctly.

4.0 Ignition System Maintenance (ISM) Program:

Your authorized generator system distributor is fully trained on the spark ignition systems. As such, they will ensure your generator system is maintained in a fully operational state. ISM service can also be integrated into a total system maintenance program. Full ISM service for a generator system installed in standby applications should be undertaken every 5-years. In a prime power application, service should follow the hourly rate recommended by the manufacturer.

The following is undertaken during an ISM service program:

- 4.1 Spark Plug** – Each spark plug is replaced. Before replacement, the spark plug gap is set per manufacturer's specification. The old spark plugs will be checked to see if there are other issues causing excessive deterioration. Before inserting the new spark plug, a dielectric grease is applied to the thread and cap.
- 4.2 Distributor & Cap** – The distributor is examined for any cracks and mechanical issues. The cap will be replaced with an original OEM part from the manufacturer. Visual checks are made of the points to check if other issues are present.
- 4.3 Rotor** – The rotor will be replaced and checked for excessive wear.
- 4.4 Condenser** – In older models where a condenser is within the distributor it will be replaced. Older models will also require the timing to be reset. Where an external condenser is present, it will be checked for any electrical and mechanical defects.
- 4.5 High-Tension Connecting Cables** – All the cables from the spark plugs to the distributor cap and the condenser to the distributor cap are replaced. The caps on all connections where the connection boot is placed are coated with a small amount of dielectric grease.

5.0 Engine Built to Latest EPA Emission Standards:

ISM service is particularly important on the latest EPA approved spark ignition engines. It is essential for clean combustion and to maintain emission standards. Poor ignition leads to inefficient combustion and increased pollutants.



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