

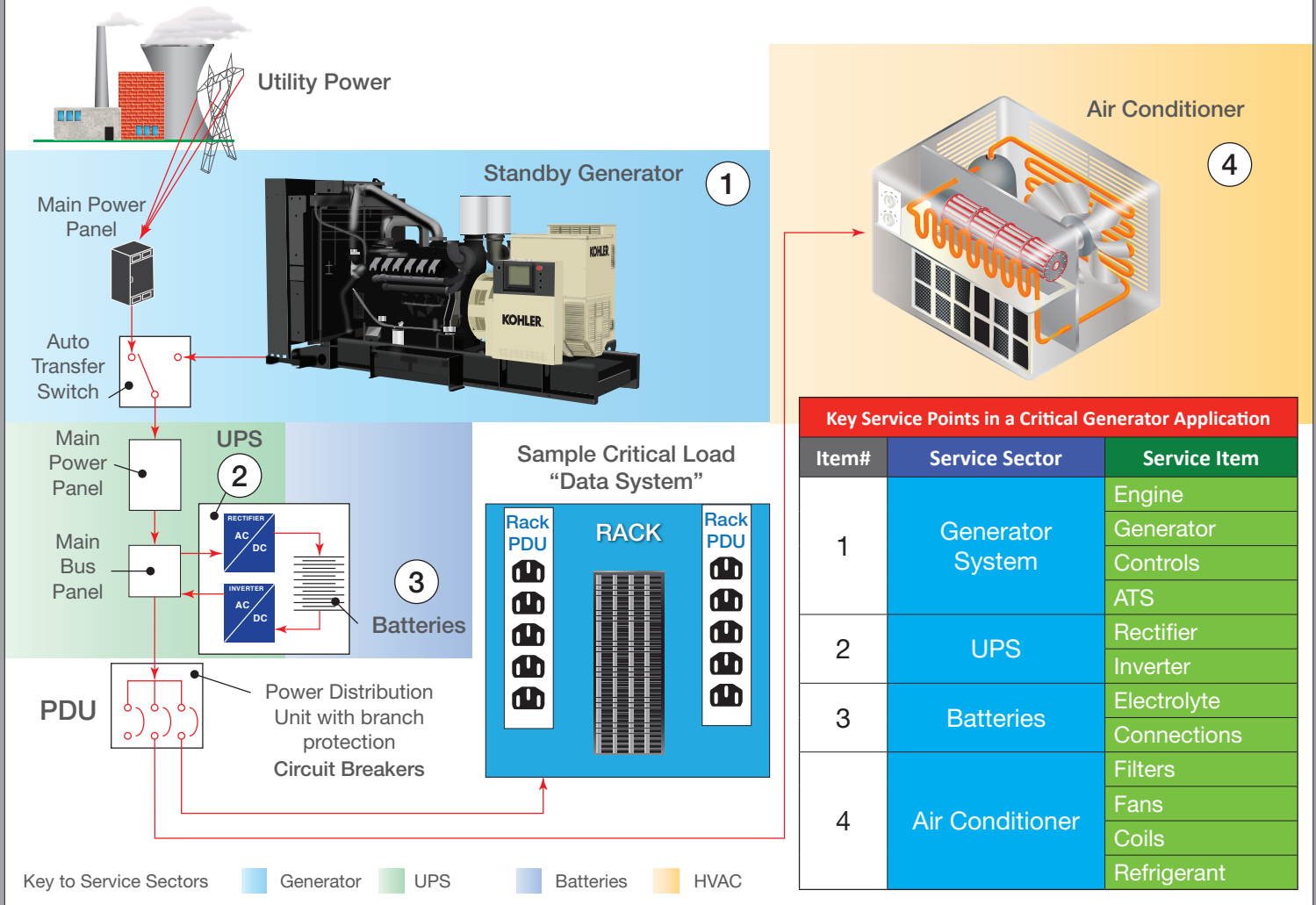


A generator system is a complex combination of many mechanical and electrical components that require regular planned maintenance (PM) to ensure the system is ready to operate when required. In many critical power applications, such as healthcare and data centers, power is fed to other vital systems to ensure the essential connected load can operate without interruption and within the required ambient conditions. Therefore, in addition to the primary load, such as a data-center rack, there will be Uninterrupted Power System (UPS), Batteries and HVAC (Heating, Ventilation, and Air Conditioning). These connected items also must be part of routine PM service programs to ensure total application reliability. This information discusses why many generator service providers are now offering their clients PM service programs that not only cover the generator system, but also the UPS, Battery, and HVAC systems. As such an application received total service from a single supplier.

1.0 THE ADVANTAGES OF TOTAL GENERATOR SYSTEM MAINTENANCE:

Society's reliance on a reliable source of power has never been as high as it is today. As most industries and services increase their dependence on cloud-based services and data via the internet, any disconnect to these services results in a major interruption to their business, with the potential for life and economizing critical events. Traditionally generator service providers have been relied upon to provide generator service to a standard dictated by codes from the National Fire Protection Association (NFPA) and Underwriters Laboratory (UL). A high percentage of service is undertaken in accordance with Planned Maintenance (PM) programs to ensure the equipment in standby mode is ready to run when the primary power goes offline.

Figure 1 Key Service Sectors Within a Critical Power Generator Application



The installation information provided in this information sheet is informational in nature only, and should not be considered the advice of a properly licensed and qualified electrician or used in place of a detailed review of the applicable National Electric Codes and local codes. Specific questions about how this information may affect any particular situation should be addressed to a licensed and qualified electrician.

1.0 THE ADVANTAGES OF TOTAL GENERATOR SYSTEM MAINTENANCE (CONTINUED):

Many generator users are businesses that have a network of locations over several areas, some nationwide. It could be a healthcare company, communication company with cell towers across the country, or a data base company with key centers in many states.

The trend over the last two decades has been to utilize generator service from a company specializing in generator system maintenance. Using a single source generator service provider for PM and emergency service provides:

- 1.1 CONSISTENCY** – in cost, level of service, and reporting.
- 1.2 RELIABILITY** – Coordinating with one service provider is more reliable than coordinating with many services specializing in only certain pieces of interconnected systems.
- 1.3 EFFICIENCY** – One service provider is trained and equipped to service the complete generator system. They can identify any potential issues before they become unscheduled shutdowns.

2.0 THE ADVANTAGES OF TOTAL GENERATOR APPLICATION MAINTENANCE:

As businesses with a network of generator systems experience the advantages of single point service for all their generator systems, they start to request if the generator network service providers can also manage the service and maintenance requirements of other key components of their application, see *Figure 1*. If it makes sense to roll all generator system service under one provider, it's also makes sense to utilize a single source service provider to also manage service of the other key connected loads within the application.

In applications where reliable power, for example, healthcare and database systems, the system is only as strong as its weakest link, as such service to other key connected loads is just as vital as generator service. Key connected loads frequently include:

- 2.1 HVAC** – Sensitive equipment frequently must be maintained within a certain ambience. As demonstrated in several winter power outages, cold can extend power outages because of other connected loads, and a lot of electronic equipment must be operated in a cool ambient.
- 2.2 UPS** – Database and telecommunication systems employ a UPS to ensure there is no power interruption while power is switched from the primary to the secondary source. In Microgrid systems, there can be several power sources.
- 2.3 BATTERIES** – are used to provide uninterrupted power as the load is switched from one source to another.

Total support for all connected loads that require PM service, particularly those subject to NFPA and UL, are driving single source network servicing companies to expand their service offering.

3.0 SERVICE REQUIREMENTS OF THE GENERATOR SYSTEM AND ALL THE CONNECTED AUXILIARY LOADS:

The paper covers the total service from a single service provider for generator and other connected auxiliary loads as detailed in *Figure 1*. In most applications the primary equipment load will be serviced by the manufacturer, user, or manufacture's authorized representative. As already stated, routine service is through planned PM service programs.

The following details the service requirements of the four segments within a typical critical power installation with a standby generator system giving backup power to the utility:

- 3.1 GENERATOR SYSTEM** – The generator system is a complex connection of many mechanical and electrical components, all highly dependent on each other. A generator PM service normally includes:
 - 3.1.1 LOAD TESTING** – This test is carried out in full PM service as recommended in NFPA and UL codes.
 - 3.1.2 FUEL MAINTENANCE** – Diesel powered systems must ensure diesel stored does not deteriorate over time.
 - 3.1.3 ENGINE** – The engine coolant system is checked, and coolant changed as required. All other engine components electrical and mechanical are inspected, as is the starter battery electrolyte.
 - 3.1.4 GENERATOR** – The generator is inspected including the AVR and general condition.
 - 3.1.5 CONTROLS AND ATS** – Controls are checked and during a load bank test the ATS operation is verified.
- 3.2 UPS SYSTEM** – A UPS system comprises a rectifier and inverter. Checks will be made as recommended to ensure the UPS operates to give uninterrupted power between the primary power dropping out and the secondary taking over.
- 3.3 BATTERIES** – A generator application can utilize batteries in several areas. For total connected load service requirements, the user is usually referring to starter batteries and the batteries used in electronic UPS systems. Items to be checked are:
 - 3.3.1 CELL VOLTAGE** – Cell voltage is a good indicator of battery condition.
 - 3.3.2 ELECTROLYTE** – Concentration and condition is checked and measured.
 - 3.3.3 CONNECTIONS** – A visual and mechanical check of all connections is made.
- 3.4 HVAC** – Critical applications such as databases and transmission controls frequently must be cooled as do the facilities in applications such as healthcare:
 - 3.4.1 AIR CONDITIONER** – Filters are changed as recommended and by visual examination. Refrigerate pressure read and coils examined. Mechanical items including fans examined.
 - 3.4.2 HEATING** – Check the power supply and operation and change humidifiers filters as required.

4.0 OTHER INFORMATION:

Your authorized distributor can provide further information as to Total System Maintenance.

To fulfill our commitment to be the leading supplier in the power generation industry, the Buckeye Power Sales 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.



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