



Generator manufacturers offer various engine-driven generator systems ranging from a few kilowatts (kW) to several megawatts (MW). The generators offered are grouped in power nodes; these nodes represent a specific range of kW's provided by the manufacturer, with the power range highly dictated by the engine's horsepower (hp) output. Most manufacturers offer sizing calculators for system designers to input the various loads the generator will be connected to, including phase, voltage, and frequency. However, determining a generator's electrical output size is the first part of generator selection. Generator systems are applied to many applications, and the final specification will have to consider the accessories and options over and above the standard product offering to ensure the specification fits the application. This information sheet discusses the base specifications of a generator system and the range of accessories and options available to ensure the final complete specification fits the application's purpose.

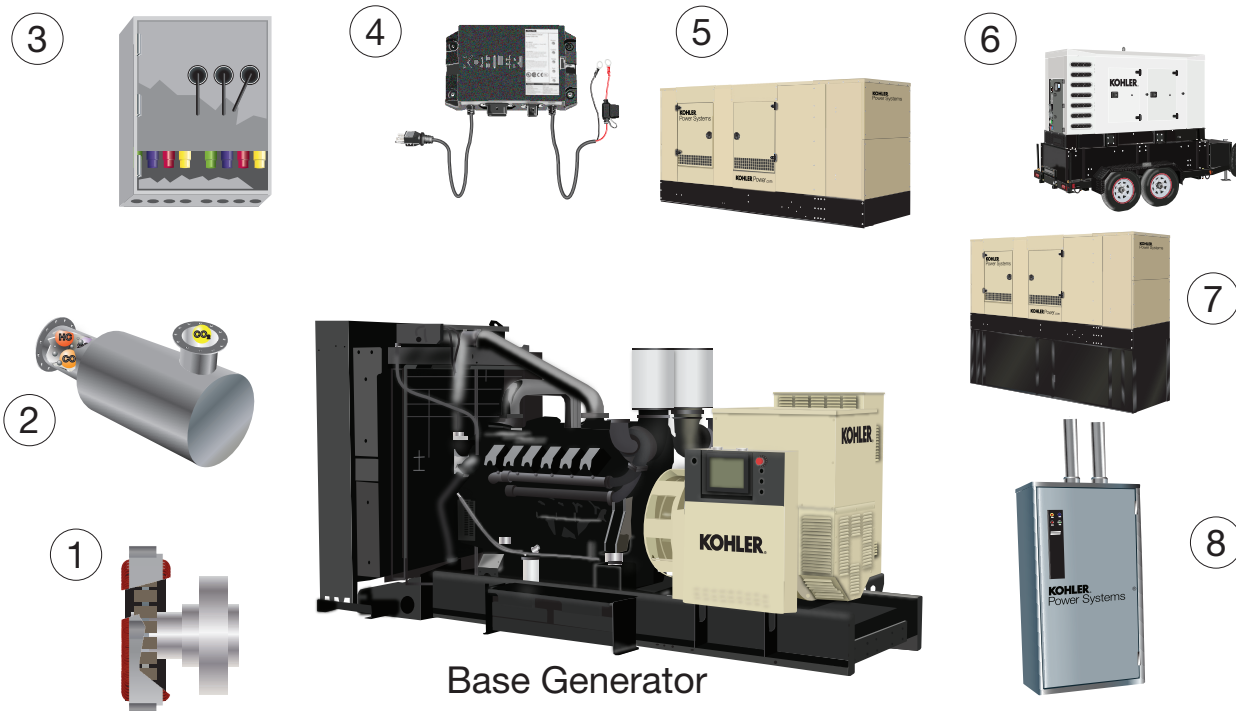
1.0 BASE SPECIFICATION:

The industry, generally, has established a base specification. A base specification is determined in the initial sizing process, and from this, an additional package of accessories can be selected to meet a specific application. The base specification includes:

- 1. Application** - Prime or standby power; any derates for altitude and ambient conditions.
- 2. Engine Type** - Diesel, gaseous (NG/LPG), and gasoline. EPA compliance is required for application and engine horsepower.
- 3. Generator Type** - kW/kVA, single or three phase, voltage output, frequency, and power factor (PF).
- 4. Standard Configuration** - Open or enclosed; stationary or mobile.
- 5. Standard Options** - These usually include a generator-mounted radiator, fuel, air, and oil filters, a standard control panel, a charging alternator, battery mounts and cables, and generator protection for temperature and oil pressure, among other things.

Figure 1

Accessories Offered for Engine Driven Generator Systems



A Sample of Accessories Offered for a Base Generator *

1	Permanent Magnet Generator AVR	5	Weather Protected Enclosure
2	Exhaust Aftertreatment Solutions	6	Trailers to DOT Standards
3	Docking Station	7	Base Mounted UL Fuel Tanks
4	Automatic Battery Charger	8	Automatic Transfer Switches

* See over for other accessories. For a complete list, contact your authorized distributor.

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.

2.0 SELECTING ACCESSORIES AND OPTIONS TO MEET APPLICATION:

Having determined the base specification, which primarily ensures the generator system will meet the site load demands, the system designer must select various options and accessories to ensure the generator complies with any existing specification, proposed location, and application requirements. Accessories are offered to cover a variety of mechanical and electrical options. In many cases, a proposal will include a submittal package listing all the options added to the base specification. These accessories are available from the manufacturer but, in some cases, from their authorized distributor.

The following breaks down accessories by category:

2.1 SWITCHGEAR:

Controls are available for following methods of starting and stopping the generator:

1. **Push Button Start** - A mobile set or rental unit may only require the standard start and stop.
2. **Automatic Start** - For standby power applications, a variety of automatic transfer switches (ATS) are offered. *The types of ATS available are the subject of other information sheets.*
3. **Paralleling Switchgear** - The application may require two or more generators to be paralleled together to meet the total connected load power requirements. *See the information sheet on Paralleling.*
4. **By-pass Isolator Switches** - An application may specify by-pass isolator switches for various reasons, such as maintenance and/or load isolation. The size, amperage, and configuration will depend on the application.
5. **Docking Stations** - This option is used when an outside source of power and/or load bank is used for maintenance, testing, or emergency power. *See the information sheet on Docking Stations.*
6. **Remote Annunciation** - Frequently, applications specify remote annunciation of generator performance covering an array of sensors. Many generators are remote and are monitored from another location.
7. **AVRs** - Some applications have a high percentage of motor loads, and the standard AVR is complimented by the addition of a Permanent Magnet Generator (PMG) AVR. *See information sheet on PMG AVRs.*

2.2 ENCLOSURES AND RELATED EQUIPMENT:

Generators are available from the factory in an open configuration for installation in a covered location. But many are installed outside, requiring a variety of enclosure options:

1. **Weather Protective Enclosure** - Sheet metal housing suitable for outside installation. See **Figure 1**.
2. **Sound Attenuation** - Generators installed in areas sensitive to noise pollution are installed in sound-attenuated enclosures. The degree of attenuation depends on the application but is usually less than 80 dBA.
3. **Motorized Louvers** - Motorized louvers will be specified where extra airflow is required (remote-mounted radiators) or in very cool ambients where in-flow air has to be restricted to prevent overcooling.
4. **Remote Radiators** - Sometimes, a location does not permit adequate air flow for cooling air both into and outside the installed area. For these applications, a remote radiator option is available. *See information on Remote Radiators.*

2.3 FUEL DELIVERY:

Whether at a fixed location or mobile, the generator needs an independent fuel source, either diesel or gas. Various codes, such as UL, specify the standard fuel containers to which they should be built. Typical options are:

1. **UL Double-Wall Base-Mounted Diesel Tanks**—The base generator is designed to be fitted on top of a variety of UL-approved double-walled fuel tanks for both mobile and stationary applications.
2. **Tanks Resistant to Projectiles** - UL 2080 (see information sheet) are available for remote areas subject to random gunfire and vehicle collisions.

2.4 12V AND 24V STARTING CIRCUITS:

Generator sets are fitted with 12 or 24-volt starter motors. These are supplied as standard with an engine-mounted charging alternator, but frequently, these additional options are specified:

1. **Automatic Battery Charger** - One of the number one reasons standby generators do not start when required is a discharged battery. Many applications specify an additional automatic charger powered from the primary source when the generator is stationary.
2. **Alternative Batteries** - The standard battery is Lead Acid, but some applications specify other batteries, such as Alkaline or Nickel-Cadmium. *See the information sheet on battery options.*

2.5 SILENCERS AND EXHAUST AFTERTREATMENT:

EPA emission compliance varies between applications such as standby, prime, or mobile power with these options:

1. **Exhaust Aftertreatment** - Factory-assembled versions are available for required EPA Tier emissions. These assemblies include the complete equipment, including DEF tanks.
2. **Loose Exhaust Assemblies** - Through the factory or their authorized distributor, loose exhaust fittings and various grades of silencers are used for on-site installation.

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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