



**Diesel Generator Sales, Hire,  
Service, Refurbishment,  
Spares & Maintenance**



Certificate No: FM 36735

## Generators for Domestic & Commercial Applications

### Introduction

We all take electricity for granted, but it is clear that supplies are not going to be as reliable in the future as they have been in the past. Independent observers of the electricity supply industry all agree that demand is predicted to outgrow supply, at a time when many power stations are reaching the end of their useful lives. Furthermore, increasingly unpredictable weather patterns mean that power cuts as a result of inclement weather can happen without warning and usually at the most inconvenient moment!

The solution as many people are finding is to buy a diesel generator for standby use. Generator prices have halved in real terms over the past ten years, and so are now accessible to many.

The following section describes what you need to do if you're going to buy a generator.

### What do I need to do?

- 1) Ascertain your power requirements. A simple generator sizing tool is available on our website [www.yorpower.com](http://www.yorpower.com). It is of course possible to buy a generator large enough to enable you to operate all of your electrical appliances simultaneously. However, most buyers choose a smaller generator which will look after basic needs such as heating, lighting, cooking and freezers. In this situation you simply need to recognise that you do not have unlimited electrical supply and act accordingly.

Typical sizes of generators we supply to domestic applications are as follows:

3-4 bedroom house	15-23KVA
Large house with some outbuildings	23-40KVA
Mansion	30KVA upwards

- 2) Choose a location for your generator. Some factors to consider are:
  - a) Proximity to incoming mains supply (meter cupboard). The closer the better since cable runs will be shorter
  - b) Aesthetics and noise. Our generators are all soundproofed so noise levels are minimised. The canopies they are supplied in are also weatherproof and usually painted in a cream colour
- 3) Switch requirements. You will need to have a switch installed (usually in the meter cupboard). This can be a manual switch, so you start the generator yourself, or an automatic switch which starts the generator automatically in the event of a power cut.

And that's it! The following sections go into more detail on generators and terminology, but are only provided for the interested reader.

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## **Terminology and Other Information**

Installation requires expert assistance and a strict adherence to current codes and regulations. We recommend that Yorpower or your own contractor perform your installation.

### **STAND-BY OR PRIME**

The first determination you will need to make is whether you will require stand-by or prime power. Simply stated, prime power is required when you have no other source of power. A stand-by set is a backup to normal mains supply.

### **GENERATOR TYPES & FEATURES**

Generator sets produce either single or three phase power. Choose a single phase set if you do not have any motors above five horsepower. Three-phase power is better for motor starting and running. Most homeowners will require single phase whereas industrial or commercial applications usually require three phase power. Three phase generators are set up to produce 120/208 or 277/480 volts. Single-phase sets are 120 or 120/240. Use the low voltage to run domestic appliances and the high voltage for your motors, heaters, stoves and dryers.

### **GAS OR DIESEL**

We recommend diesels due to their longevity and lower operating costs. Today's modern diesels are quiet and require much less maintenance than comparably sized gas (natural gas or propane) units. Fuel costs per kW produced with diesels is normally thirty to fifty percent less than gas units.

1500 rpm water cooled diesel units operate on average 12-30,000 hours before major maintenance is required. 1500 rpm water cooled gas units normally operate 6-10,000 hours because they are built on a lighter duty gasoline engine block.

3000 rpm air-cooled gas units are normally replaced – not overhauled at 500 to 1500 hours.

Because the gas units burn hotter (higher btu of the fuel) you will see significantly shorter lives than for diesel units.

### **OPERATING SPEED**

Electric equipment is designed to use power with a fixed frequency: 50 Hertz (Hz) in the UK, Europe and Australia, 60 Hertz (Hz) in the United States and Canada. The frequency output of a generator depends on a fixed engine speed. To produce 50 Hz electricity, most engines operate at 1500 or 3000 RPM. Each has its advantages and drawbacks. 1500 RPM, four pole sets are the most common and least expensive. They offer the best balance of noise, efficiency, cost and engine life. 3000 RPM, two pole sets are smaller and lightweight, best suited for portable, light-duty applications.

### **FEATURES & BENEFITS TO LOOK FOR**

#### **ENGINE**

- Engine block. For long life and quiet operation we recommend four cycle, liquid cooled, industrial duty diesel engines.

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- Air or liquid cooling. Air-cooled engines require a tremendous amount of air and may require ducting. They're noisy too. Liquid cooling offers quieter operation and more even temperature control.
- Intake and exhaust. Time and money savers include a large, integral air cleaner with replaceable filter element and a residential muffler, which is built into the exhaust manifold. This saves the need for an additional muffler.
- The lubrication system should have a full flow, spin-on oil filter with bypass.
- DC electrical system. Standard 12 volt system should include:
  - Starter motor and battery charging alternator with a solid state voltage regulator
  - Diesel units should come with a pre-heat switch and start/stop switch
  - Safety shutdown system to protect the engine in case of oil pressure loss, generator overspeed or overcrank and high water temperature
  - DC system circuit breaker.

### **ALTERNATOR**

The AC generator should have a 4-pole revolving field. An automatic voltage regulator will provide "clean" power. Normal utility power is +/- 5% voltage regulation; our 1500-rpm models are even better +/- 2%! All of our models offer AVR – Automatic Voltage Regulation.

Lifetime lubricated bearing - All Yorpower units are provided with industrial quality lifetime lubricated bearings

### **ENGINE ACCESSORIES AND CONTROLS**

Upon determining the generator size you will need, make a list of optional and installation equipment you require. For noise abatement, we recommend a residential (not industrial grade) muffler. A good primary fuel filter/water separator is a must to protect your engine's fuel system. Stand-by sets may require a block heater to keep the coolant/water mix at an adequate temperature for easier starting.

### **AC SWITCHGEAR AND CONTROLS**

Switchgear can be as simple or complex as you want or can afford. Of course, as complexity increases, so does cost. Balance and a good electrical advisor are the keys here. All generator systems require a circuit breaker and a distribution panel. The circuit breaker protects the generator set from short circuit and unbalanced electrical loads. The distribution panel divides and routes the connected loads and includes circuit breakers to protect these loads. Stand-by systems also require a main circuit breaker between the utility source and the transfer panel. The transfer panel switches power from the utility to the gen-set and back so that both aren't on at the same time. Auto-start, auto-transfer systems are available but are costly. Your supplier or contractor can help you determine what you will need.

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**Question** : I have bought a generator, and would like to connect it to my house in case of mains failure. What do I need to do?

**Answer** : When using a generator as an alternative supply to the mains, there are several precautions that must be observed. It is vital that the generator is completely isolated from the mains supply. This ensures that the generator is not attempting to power up the whole street, and also ensures that it does not electrocute a utility worker trying to restore the mains supply.

To achieve this, a double-pole, break-before-make, changeover switch must be installed by a qualified electrician.

- This should be fitted between the electricity meter and the building consumer unit. The switch connects the building to either the mains supply or to a lead which can be plugged into the generator.
- Most buildings now have a Residual Current Device (RCD) built into the consumer unit. This is configured to operate from the mains supply with an earthed neutral, and not from a generator with a floating earth. To utilise this protection device, it is necessary to modify the generator so that it is configured in the same way as the mains supply.
- This is a simple modification for a qualified electrician, involving adding a link wire from the neutral terminal to the earth terminal. It is recommended to make this connection in the plug that is to be used to connect to the generator. This ensures that the generator is unmodified when it is disconnected from the house, and therefore remains safe.
- The plug should be labelled "Do not connect to mains: Neutral-Earth link fitted". The lead between the generator and the transfer switch is not protected by the RCD, it is therefore recommended to use a steel armoured cable for this connection. Finally a local low-impedance earth spike needs to be installed

**Contact Yorpower for all your Generator Requirements!**

**Return to [Yorpower Diesel Generators](#)**

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