Alternative energy solutions

Frequently asked questions

What size generator would I need for my home or small business?

The size of the generator needed is based on the type of appliances, equipment, pumps, air-conditioners and other electrical devices that require power. Your service panel is normally rated at 60 amps @ 240 volts and the average home uses approximately 30 to 60 amps of 220 volts power to operate everything simultaneously. Appliances will typically use 220 volts power.

Consider the following calculation to determine how many amps and watts you need. For example, if you want to operate your refrigerator (15 amps x 220 volts = 3 300 watts), freezer (15 amps x 220 volts = 3 300 watts) and electric hot water heater (12 amps x 220 volts = 2 460 watts) at the same time, you will need approximately 9 240 watts to meet the breaker requirements for these appliances.

Note that the breakers are typically oversized by 10 to 15% for safety purposes, and all of the appliances mentioned will probably not operate at peak at the same time. Thus, the above load can be handled with a 12 000 watt (12kW) generator.

The major appliances, pumps or other motor-driven devices that you plan to operate with your generator system need to be considered when calculating the minimum size of a generator.

Take the following power requirements into consideration to help you establish a minimum size generator system:

- Borehole pumps usually require three times the running watts to start the pump.
- Air-conditioner systems and electric motors use three times the running watts to start up.
- Hot water heaters normally use between 12 amps (2 640 watts) and 18 amps (3 960 watts), depending on the heater's size and efficiency.
- Electric kitchen stoves are usually on 40 amp breakers and use a large amount of power. If you want to run this appliance from your generator, it will significantly increase the size of the generator you require.

What is the advantage of buying a Turner Morris generator with a facility from FNB?

Turner Morris supplies world-class generator products at competitive prices. The Turner Morris factory-direct programme removes the middle man and saves you money by offering discounts on the standard retail price.

In addition, Turner Morris has branches countrywide that provide service, maintenance and spare parts directly to their customers.

What to consider when applying for a facility with FNB:*

- The price of the generator/UPS.
- The inclusion of installation costs in your facility amount.
- Whether you can afford the facility.

**Subject to the size of the generator/UPS purchased.*

FNB
First National Bank

how can we help you?

Turner Morris provides:

- Competent and knowledgeable salespeople who will analyse your requirements and advise on the energy solution best suited to your specific needs.
- Excellent customer service, including parts and warranty assistance on all products purchased from Turner Morris.
- Troubleshooting and technical support via their 14 branches countrywide.
- Workshop facilities and onsite service.
- Best-in-class, cost-effective products of the highest quality.
- Installation of generators and control panels nationally, as per your requirements.

What is the difference between single and three phase?

Single phase consists of only one phase, using two wires with an earth and three phase consists of three phases, using three or four wires. Generally, homes are single phase and businesses are three phase. Your main breaker panel will indicate if you have a single or three-phase service where single phase is 220V and three phase is 380V. There are other voltages that exist, but these are the most common. If you are unsure whether you have a single or three-phase system, call an electrician or your utility company, which will be able to provide you with this information.

Is a single or three-phase generator suitable for the average homeowner or small business?

Almost all houses and household appliances in South Africa run on a 220V (single phase) system. If you plan to use an extension cord to run your appliances, you will need a 220V generator.

If you want to install a generator on your distribution board, it is important to verify whether the incoming line from the municipal supply is single phase (three wires enter the main breaker) or three phase (four or five wires enter the main breaker).

It is best to install a three-phase generator if your incoming supply is three phase. It is not advisable to install a small generator on your distribution board, as the installation may not be cost-effective. Consider installing generators that are 15kVa and larger to ensure cost-effectiveness.

What is the function of the control panel on a standby generator?

Most of the engine/generator controllers used today are digital and are designed to provide control of the generator set.
The controller system monitors the operation of the engine and generator functions. Safety items include low oil pressure, high temperature, engine start over-crank, over/under frequency (speed), low coolant level, etc.

Modern digital controllers for residential or small business applications are simplified indicators: a start/stop button with or without auto-start. If the generator has auto-start, the controller can be used to interface with an automatic transfer switch or inverter battery system to start and stop automatically.

Usually, manual controls are provided on all generators including those with auto-start. Advanced controllers provide real-time monitoring of volts, hertz and amperage in addition to the basic engine/generator safeties and auto-start functions. Complex controllers (installed on larger generator systems) provide engine safeties and shutdowns for low oil pressure, high temperature, engine start over-crank, over/under-speed, and low coolant level. These complex controllers also indicate low fuel levels, kVa output, kW output, power factor, engine and generator gauges in real time. Larger generators often have a communication capability for remote monitoring and starting.

Can I use a portable generator for an automatic starting system?

No, most portable generators do not have the capability to auto-start. The generator must have an electric starter, electric choke (for gasoline units), start/stop controls and safety sensors to be able to start and stop automatically. The cost of auto-start and safety equipment generally increases the price of portable equipment to such an extent that consumers do not purchase them, therefore they are not as frequently manufactured.

Should I purchase a petrol or diesel generator?

There are a number of factors to consider in evaluating the differences between a petrol-powered and diesel-powered engine:

- Small diesel-driven generators are normally 30 to 40% more expensive in price than the equivalent petrol unit.
- Petrol-powered engines are cheaper to maintain than diesel-powered engines.
- Diesel is cheaper than petrol.

Can a generator supply power to a computer system in my home or business?

Most generators sold by Turner Morris are designed to power computers. The majority of Turner Morris generators use Automatic Voltage Regulated (AVR) generator systems that provide from 1 to 2% voltage regulation, which meets or exceeds the local utility power specifications.

Some portable generators with capacitor regulation (voltage control from 5 to 10% without AVR) can present a problem for some computer systems if the computer is plugged directly into the electrical circuit and does not use a battery-regulated power supply or UPS.

What does the term "glazing" mean in a diesel engine?

Diesel engines are designed to operate with a load. When a diesel engine operates considerably below the rated output level, the engine can start to over-fuel or "glaze".

Diesel engines perform most efficiently in the 70 to 80% range of rated output. When an engine operates for a prolonged period of time below 40% of the rated output, it begins to over-fuel, similar to driving a car in traffic at slow speed for a long period.

Glazing occurs when the injection tips begin to carbonize and disrupt the fuel-spray pattern. Commercial generator systems often have widely varying loads with low output conditions, which can often lead to glazing, and owners artificially load the generator with an automatic load bank.

A load bank will place a "false" load on the generator system to keep the diesel engine properly loaded. Once a diesel engine begins to glaze, the only way to correct the problem is to load the engine for a couple of hours to burn off the excess fuel and clean up the engine. This is seldom necessary in a residential or commercial application.

Generally, electronically controlled engines and engines with advanced emission systems are less likely to glaze. It is for this reason that proper sizing and design is important. Turner Morris can help you make the right choice, keeping your sizing and design considerations in mind.

What kind of maintenance will my diesel generator need?

Diesel engines require routine maintenance for long-life service. Standard maintenance requirements are similar to owning a diesel-powered vehicle (oil, oil filter, air filter and fuel filter).

In tropical and cold climates it is advisable to have a water-fuel separation filter system installed, as moisture can damage a diesel engine because the water properties create advanced ignition and accelerated detonation.

Maintaining your diesel generator:

- The engine will need an oil change every 200 hours (depending on dust conditions), or annually in the case of standby generators.
- Change the oil filter when you change the oil.
- Check air filters whenever you inspect the generator or change the oil. Air filters need to be changed when they appear dirty.
- Fuel filters are normally changed every 200 hours depending on how clean the fuel is.
- Inspect fuel filters when you fill the tanks, during oil changes and any time you inspect the generator.
- If the generator has a service schedule, follow it.

The generator end (AC alternator) will not require any service unless you live in a dusty environment. Dirt and heavy dust particles can cause shorts in the internal wiring coatings, so it is recommended that you use a high-pressure (50 PSI) air hose to occasionally blow out the dust from the generator system.

Will the generator have adequate operating instructions and service manuals?

Every generator system sold by Turner Morris comes complete with an operator manual for the engine, generator and controller (if applicable). We will include any special instructions for added options or features, if available. Some manufacturers offer factory service, parts and manual kits as an option.

What is a transfer switch and how does it work?

A transfer switch is a box that only allows power to be supplied to the distribution panel from the utility or the generator system but not both at the same time.

Manually operated panels
These types of panels are used primarily for portable generators.

When the power goes off, you need to follow these steps:

1. Leave the transfer switch in the utility position.
2. Start the generator and allow it to properly warm up. The generator breaker should be in and stay in one position.
3. Once the generator engine is warmed up, move the transfer switch to the generator position.

When the power returns, the sequence of events is reversed:

1. Move the transfer switch to the utility position.
2. After the generator engine has run with no load and has cooled down for approximately five minutes, shut down the generator engine.

Automatic transfer switches

Automatic transfer switches monitor utility and generator power, and regulate the switch-over from utility to generator power and back, automatically.

When utility power fails or is unsatisfactory, the transfer switch control starts the generator set, checks the generator speed and voltage output, and transfers the load to the generator set. When utility power is restored, the transfer switch automatically transfers back to utility power. The generator is allowed to cool down for a short period and then shuts down. The system instantly resets itself and is ready for the next power interruption, without any action required by the user.

Automatic systems exercise the generator every month to circulate oil and charge the batteries.

Three-phase systems should always use automatic transfer switches, as they include in-phase monitoring controls that prevent power transfers when the transfer will damage out-of-phase equipment. As most small businesses have a three-phase system, installation is definitely needed, and installation costs will become imperative.

Can I install a transfer switch myself?

Turner Morris recommends that transfer switches be installed by a licensed and registered electrician. This is a requirement to activate your warranty, as you will need a Certificate of Compliance for insurance purposes.

What size transfer switch do I need?

The transfer switch is sized to match the service or sub-panel on the building. The transfer switch must also be the same size in amps (or larger) than the maximum output of the generator you select.

Can I save money by buying a manual transfer switch?

No, most modern automatic transfer switches have a manual mode, so they do not switch until you change the switch position to transfer or automatic. New switches are electrically operated – when they change position, they use power from the utility or generator to move. They do not have handles on the side like older switches. You may save a small amount on a manual switch, but you cannot retrofit the switch later to make it automatic. For portable generators, purchase a manual switch from Turner Morris' full line of automatic and manual switches.

What is the difference between standby/emergency/maximum and prime/ continuous duty applications?

Most products have a "maximum" rating, also called standby and emergency rating. This value is the highest that a generator can produce under normal conditions, although it may have some peak reserve for surges.

The prime or continuous rating is the rating that the equipment should not exceed under normal running on a continuous basis. Even though small portables have both ratings, this does not mean that they are designed for continuous use. A prime power generator must be 1 800 RPM and liquid cooled. Any air-cooled or 3 600 RPM generator is a standby generator.

Most residential generators are standby rated. You should use a prime-rated, 1 800 RPM, liquid-cooled generator when the number of hours per year will exceed 500 and usage occurs on a regular basis. If you start the generator many times a year for short periods, you may need a prime power-rated generator.

You should use a prime power-rated generator when the generator is used 24 hours per day, seven days per week. If you use a standby generator in a prime power situation, the generator's life expectancy could be shortened considerably and the potential for premature failure increases dramatically.

Buying a generator system rated for standby duty and using it for prime or prime continuous application is not advisable and will usually void your factory warranty as well. Your generator system should be considered a long-term investment, and should be sized and selected properly.

Why do well pumps, air-conditioners and other electrical motor-driven appliances require special consideration when sizing a generator?

Appliances and equipment with electric motors, especially compressors and well pumps, have a much higher start-up amperage than the running amps shown on most nameplates.

As a general rule of thumb, a minimum of at least three times the amperage to start a device is required to run it. However, some devices can require up to six or seven times the amperage. If you have water wells, large air-conditioners, pumps or other heavy-duty motor applications, you need to find out what is the start-up amperage of the largest piece of equipment.

Turner Morris can assist you with all of your heavy-duty motor-starting calculations and can supply you with generator systems designed to provide the best performance.

How are decibel levels calculated on generators?

Most generator manufacturers calculate decibel (dB) levels at full-load operation. The South African standard is based on the sound level at seven metres (European standard) and the American standard is based on the sound level at 22 feet, but it is close enough to compare.

The calculation of dB levels involves a complicated mathematical formula, and is best compared in relation to human conversation, which measures at 65dB.

What are the most important things to consider when purchasing a standby emergency generator system?

Consider the following:

- A generator is a major purchase and can last 10 to 20 years if properly taken care of. For most residential applications, a quality generator will last a lifetime if used for standby/emergency backup. For this reason, Turner Morris recommends the purchase of a quality generator with suitable features for your application, as it is ultimately a long-term investment.
- If your backup requirements are infrequent and you only need limited power during an outage, a more cost-effective generator system will most likely meet your needs (ie, air cooled, 3 000 RPM, petrol driven or diesel driven).
- The alternator is usually the last thing to fail with heavy use.
- Controllers are a vital part of most generator systems. The controller monitors the generator engine speed for hertz, oil pressure and water temperature, as well as other engine and generator functions. It shuts down the engine if one of the threshold settings for these controls fails. It also provides the auto-start function for the automatic transfer switch or inverter, if one is used. Ensure that you buy a unit with adequate controls.

- A generator is a mechanical and electrical device, and will need maintenance or parts in time. Ensure that you purchase a generator system from a supplier that will provide you with the services and support that you require. Consider Turner Morris, which has a track record of almost 80 years in South Africa.
- Know what you intend to run with your generator and make sure the generator you purchase can handle the load. Turner Morris can help you with design and motor-starting considerations, as well as load calculations.

Does Turner Morris sell parts?

Yes, Turner Morris keeps a full range of spare parts available from all of their branches nationwide.

What fuel should I use in my generator?

Petrol units use the highest octane unleaded fuel. Diesel units use the lowest PPM diesel fuel available.

How much fuel does a generator use?

All standby and prime-power diesel generators are fitted with a fuel tank that will run for eight hours.

Do I need a fuel tank?

Industrial diesel generators are fitted with a built-in tank. Turner Morris can also offer you long-running fuel tanks if needed. Note that portable generators already have tanks installed and are not expandable.

How do I find an electrician?

Turner Morris may supply a qualified and registered electrician if requested. Correct installation and proper advice is imperative, as you will need a Certificate of Compliance for your insurance company.

How do I install my generator?

Two options are available to you when installing your generator:

- Plug in when the power is off (no installation needed).
- Get a certified electrician to install your device (subject to installation costs payable by you).