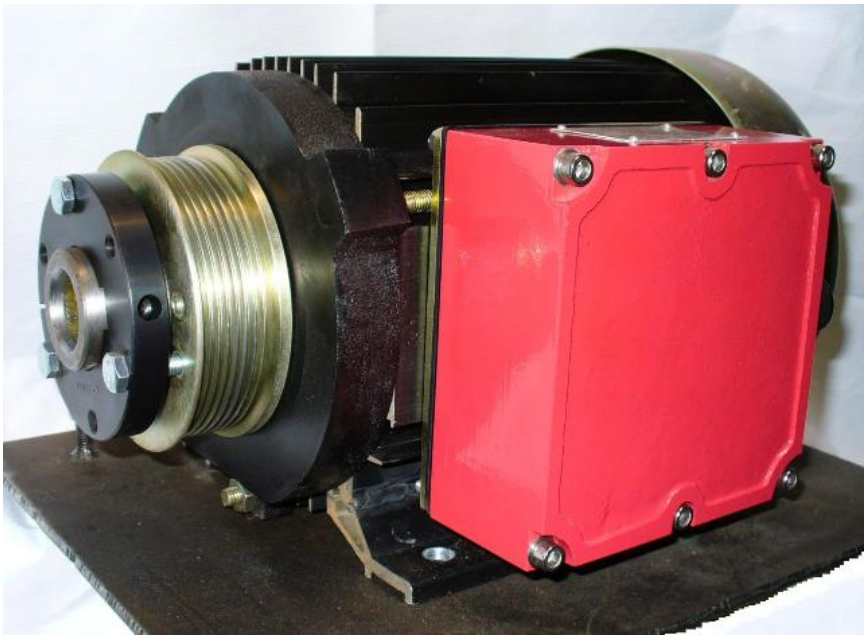
UtterPower.com
Alternative Energy Solutions

PMG

Attention: Due to a number of situations beyond my control, PMGs will no longer be offered for sale through Utterpower. I'm working to delete or modify pages that suggest you should write for information. I will leave the PMG pages up for customer reference and your reading pleasure. If I find a way to deliver a quality PMG at a cost effective price in the future, I will make an announcement.

UTTERPOWER Mission Critical Alternator



Utterpower 3KW PMG

American Quality Control
In stock and ready to ship! This 3kw continuous duty unit is $699.95 with the drive pulley, bushing, bolts, Quality Marine Grade. Five Years in the Field providing the only source of power at one full time family residence test site. See below for actual screen shots of this unit under load.
120/240 AC 60HZ 3KW Continuous Duty
Above Picture: Note the anodized cases, quality plated marine grade pulley and fittings, the connection box is heavy, has a seal, and the fasteners are stainless. This is NOT designed to compete in price alone! If you're looking for cheap, keep looking..
Mission Critical, Highly Reliable AC Generator, unit can start large inductive loads, scroll down for technical info.
Solar Storms? http://eclipptv.com/viewVideo.php?video_id=9745 The PMG will survive! Small diesels have no electronics, they will survive too!
This would be Mad Max's choice for an off Gird Generator. See the results of our 10,000 hour 'destructive test' below. This alternator can handle everything the Lister CS can deliver and more. It's done so for 10 straight 24 hour days in one test. Note the advanced patented cooling system, simply a must in a high power rare earth PMG. It's EMP proof! (see foot note) If the unthinkable happens the diesel powered PMG will have total immunity. Yes we have experienced an unthinkable event recently. Some of our Government Officials readily admit, "they don't know what to do". Some think they have allowed the barn to burn down and now they are all working on putting the Cow back in! What will they totally mismanage next? Maybe there is something to be said about the Boy Scout Motto? Many are awakening to the fact that you can't count on the Government, those that demand to be taken care of may be very disappointed in the months, years to come.

The development of the PMG has everything to do with why conventional generators FAIL. I have spent years studying these failures, and I'm sure that some people would be dumbfounded to learn that some of the 'so called' advanced features found on their generators actually caused them to fail. Furthermore, the repair is often more expensive than buying the generator over again! I found this out with a Honda Construction Generator I once owned, and so have a lot of other people with a range of brands.

The Utterpower PMG

No Brushes.

- No rectifiers.
- No electronics.
- Totally sealed to run in harsh environments, dust and grit, BUT with a (must have) patented cooling system.
- Meets important ANSI standard C84.1 from no load to full load, and runs cool while doing it.
- Potentially higher efficiency to assure that your ever higher fuel costs are lowest possible for a kilowatt hour of energy produced.
- 3kw Continuous 120, 120/240, or 240 VAC (all selectable by you) 60hz AC model, this unit has started and ran two 17,000 BTU air conditioners at the same time!
- Broad International Patents, and a team with the means and motivation to protect these patents.
- North American Repair Facility

Overview

I consider myself very fortunate to be in communication with people around the world who live off the grid, some are in the jungles of South America, some in harsh environments in Africa, and still others are living in climates where -20F is not considered all that cold. My friend Mamad in Iran has probably been to some of the harshest environments anyone could imagine where he made repairs to equipment he specializes in. Mamad for one knows what it takes for machines to survive in these hostile places, it's often all about "SSR" Simple_Rugged_Reliable design (KISS engineering).

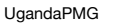
It just doesn't seem to matter where the generator is or how it's used, 99% of all reported failures of Generators (Alternators) occur in certain components. If the Generator has a voltage regulator, this is the device that often fails, and it is also reported as the most expensive item to replace. Fact is; some people report that buying another generator was cheaper than the estimated replacement or repair of their voltage regulator. Some are shocked to learn that it was the voltage regulator they paid extra for that damaged the field or other components by boosting the current as their generator ran out of fuel. Other items responsible for failures are rectifiers that supply the DC current to the field winding, brushes or brush holders, worn out slip rings, broken or damaged wiring associated with the brush rigging, and defects in the field winding on the rotor.

In the case of the Brushless Alternator designs, there are still components on the rotor that fail, diodes and capacitors are often used, and they fail. Some Brushless Alternators have an access door that will allow you to replace these components without taking the generator apart, in other generators; you're in for some work, or you'll pay a high labor charge to have someone else disassemble the machine and fix it. If you know Murphy as

well as I do , these components ALWAYS fail when you need the generator most.
Prior to developing this unit, the only acceptable high power PMGs I could find were either Military pieces, or expensive aircraft alternators.
About 4 years ago, I placed an utterpower built 6/1_PMG listgen in an off gird location in the North Western Cascade Mountains in Washington State. This unit usually runs eight hours a day, seven days a week. The test site is rather perfect, fewer mechanical skills in the house hold and until last month the family had no idea they were running one of the more powerful 60HZ 120VAC PMGs I've ever seen. This family will readily admit that this 60hz generator set has not received the best of care, the family has learned what not to do, and all troubles have been related to the prime mover, zero troubles in PMG or drive.
Just to note, total harmonic distortion on this machine was measured at 3.6% or less and this 3KW (conservatively rated) unit has carried 4000 watts plus for some hours without over heating in the LAB and again in the field. That's well beyond what most off grid families ever need, and there's more surge capability left. One of the strong points of this design is it's ability to start larger induction motors like those found in 1.5HP 240Volt well pumps. In a lot of locations, if you can't start the pump, you haven't found the right solution. In my opinion, there is a reason to utilize the AC generator for charging batteries, in many cases, it's just too easy to select an Inverter with a built in battery charger and AC transfer switch, AND take advantage of the convenience. If you have a 48 volt battery bank, the PMG works great as a battery charger, simply run the prime mover at lower RPM, and feed the output into a quality high power rectifier and onto your batteries, this offers a great 'back up' should the built in charger in your inverter ever fail.
In 2007, the PMG was further refined, with units in the jungles and harsh saltwater marine environments.
So you ask... if they're so good, why doesn't Sears and Roebuck have them?
I think part of the answer is the EXTREME effort it involves to properly engineer a PMG for a specific use, unlike the Synchronous Generator; you can't tweak the field current to make it right, you need design it exactly right and you find that the PMG is not exactly scalable. There are certainly more challenges beyond that, you don't go to "HappyMagnets", and stick any old thing to the rotor , each magnet is custom machined, then charged and >certified< to have the proper flux density; this is a time consuming process, but it is the only way you can get what we are after from no load to full load, and again, we can't cheat by increasing the current in the field. We also need to note that the PMG rotor is currently far more expensive than a few turns of wire, and the other components used in the more common designs. Both the rotor and the cooling system are patented, this work came about after studying another effort that failed miserably as per voltage droop and other criteria, but that doesn't stop people from marketing it!
Other problems with the PMG design involve air flow and properly cooling the Generator while keeping dust and dirt out that erode the protective coatings of the magnets and stator windings. The Utterpower design cools the rotor directly, but it's a sealed unit, so no dust or dirt is blown thru the stator windings or past the magnets to contaminate the inside of the unit. Open framed PMGs can prematurely fail as we soon learn that there is a lot of ferrous materials in soils and in and around the typical operating environment of a generator set. We must remember just how strong these magnets are. The Utterpower PMG makes use of patented technology to keep the unit cool and to provide a superior voltage droop. Do not buy a PMG without knowing and understanding it's voltage droop, research the ANSI standard and learn why it's important to have a generator that can meet ANSI voltage droop specs like this one does!
There are several test sites where the Lister 6/1 and PMG are the source of power feeding (AC IN) to inverters that are known to be a little particular as to the Frequency and voltage of the generators, since this PMG makes a nice clean sine wave and the expected peak voltage, these finicky Inverters connect to the PMG when they reject other

Generators, some of them have respected names.
The model 1003 120/240 60hz unit is a perfect match for the mighty 6/1, and it can make all the current that the massive flywheels can help deliver for starting heavy loads like well pumps.
One of the major advantages of the PMG is it can be sent via UPS, or FEDEX. This is a major savings over other generators all by itself, and as we know, the cost of fuel continues to increase the cost of truck shipping.
The voltage droop in the utterpower PMG will allow you to operate at 60hz and meet ANSI C84.1 from no load to full rated load, and if we look at the ANSI utilization chart, if your distribution system is short or heavy gauge; you can place a 48% overload on the PMG and still meet the standard in many cases.

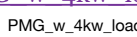
UgandaPMG



UgandaPMG

Above: A veggie burning test site in Africa. 50HZ 220VAC Utterpower PMG. Note the exhaust system, there's a condensate trap, and the exhaust exits away from the work site. That looks like a grain grinder to the right? Also notice the pre heater for the SVO fuel. Notice how clean they keep the platform. See other test sites below.
6/2010 Add…BEFORE YOU BUY AN ALTERNATOR, find out what you are buying!
We all know there's stuff out there that is rated at what the alternator can do in the first few minutes, our 3KW can run all day in moderate ambient temperatures at much higher output. In our research, we found one alternator that literally started smoking and failed when it was ran at it's advertised rating for two hours! Following is actual screen shots of a 3KW PMG on the Variable Frequency Drive Test Bench. We are plenty happy with the power analyzer we own, and I guess FLUKE like it to, because they now own the company who made it…

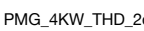
PMG_w_4kw_load_KW



PMG_w_4kw_load_KW

Above: 4000 Watt (4KW) load
Above: Utterpower PMG provides an excellent voltage even when it is operating well above it's continuous rating. I would have put more load on the unit, but it wasn't handy at the moment.

PMG_4KW_THD_2dot9



PMG_4KW_THD_2dot9

Above: Notice how low the total harmonic distortion is with this 4000 watt load, 2.9 THD is not something you'll likely see in an ST generator or many other generators.
Before you compare the Utterpower PMG with another alternator, find out what the other one promises, what kind of voltage does it put out at rated capacity? How long have their units been in service?
One of the first Utterpower PMGs was placed in an off grid year around house hold in our Northern Cascade Mountains. Due to the location in densely wooded terrain with a steep mountain slope to the south, there is little chance of using solar. Average run time is 8 hours a day, and now that we have suffered far cooler temperatures in this area, average run times are around 10 hours a day. This is year 5 for the PMG with no maintenance! during on customer visit, we did put the PMG on the test bench to measure voltages and THD under load, we could find no changes. This unit is still running on the original drive belt!
There's other things to think about when you buy an alternator for mission critical applications like storm or Hurricane duty. What kind of "hands on" knowledge and experience does the Dealer or Seller have? One I hear all the time is "The salesmen was a really nice guy".

Facebook

31 Responses to *PMG*

_Jim *says:*
August 19, 2010 at 4:08 pm

Hi guys. I'm wondering why the small images above don't show up … clicking on the link the big ones appear okay, but the small ones just show the image file name …

Regards, _Jim

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Reply

George B. *says:*
August 19, 2010 at 5:09 pm

Jim, I'll look into this, I have so much to learn, one of the more informed has just got her Mac back, so hopefully I'll have some help fixing and migrating pages
from old site to new. I greatly appreciate your input.

Reply

david o *says:*
August 20, 2010 at 11:08 am

Looks good George!
Did I miss the specifications…..at what RPM does the PMG operate for 60 hz power?

Thanks!

Reply

George B. *says:*
August 20, 2010 at 4:07 pm

David, Thanks for your question… Answer: 60hz=3600, 50hz= 3000
This design has a well balanced small diameter rotor, it spins at twice the RPMs, but sees half the torque (half the radial load on bearing) at any given power output.
Lead off grid field tester runs 8 hours or more a day, (under a tree canopy, and up against mountains that block solar a good part of the day). This is fifth year of running, zero maintenance, zero changes in power quality from pre install tests. Bearings are generous in size, and the rear bearing is identical to the front bearing. Off grid sites like this one are high value to our community, we learn what works and what doesn't. Reminds me of Guam, another proving ground, there were piles of small failed generators at the salvage yard after their last large typhoon swept through, those scrapped consumer generators didn't make it two months.

Reply

Chuck Cunningham *says:*
August 27, 2010 at 6:19 pm

Hello,
Can this gen be adapted to an 8′ good volume water wheel?
Thanks

Chuck

Reply

George B. *says:*
August 27, 2010 at 7:24 pm

Chuck, it's all about the design and what you expect out... please see my post about the hydrovolt, just enter this is the search window in the right hand corner.. the calculations to figure out what you have is easier than it was to get out of 8th grade, no excuse not to do your own math. We know it's all about volume, velocity, and head. The PMG is capable of making 4KW no problem, you'll need some torque and a drive system, and you'll need a target output you want to reach.

Reply

Chuck Cunningham *says:*
August 28, 2010 at 1:09 am

Thanks George. Doing my own math is no problem but did need to know where to start. I found a site earlier and learned how to figure out head, rpm, speed of flow, hp, etc. Just didn't know what type of generator to use. Sorry, just real green at all this but I can take it from here.

Reply

George B. *says:*
August 28, 2010 at 2:26 am

Chuck, we are all green when we step a foot left our right of what we study everyday. What I was meaning to communicate is the formula is basic and starting with the potenial of the hydro site is key. At least you'll know the energy potential. if you don't have much velocity, you may not be looking at a generator this large. For personal use, even 50 watts 24 hours a day adds up. As for hydro itself, I'm as green as the next when it comes to wheels of this size, and I'd study the site closely to see if there is any potential to create head "within your buget". I hope you will share more about your site, as we have too few people here discussing hydro, if you got it... how great it is...

Reply

_Jim *says:*
August 31, 2010 at 4:11 am

Quick question – from whence does the harmonic distortion hail?

Ostensibly the movement of a wire through a magnetic field in a circular manner _should_ result in perfect sine wave ... were one of your loads perhaps non-linear? Maybe an incandescent lamp/or lights? Can't imagine you used anything like an HP or Agilent DC power supply (or a computer SMPS) plugged into the PMG's output for part of the 'load' ...

Reply

George B. *says:*
August 31, 2010 at 5:23 am

Hi Jim,
As noted in the THD figures I shared, we compared our findings against the ST3 generator using the same load at exactly the same frequency.. the PMG and load produced half or better the distortion firgures of the ST3 with the same load. The ST3 I cherry picked, the best one ever to go thru my shop, I keep it for a comparative to other generators. Generators are all about magnetic fields and coils of wire, and sooo much more . If I read you right, you think THD has everything to do with load? Since gen manufacturers use the THD figures in their advertisements they

disagree. Since we've documented that the PMG is a bunch better than other generators as per THD, we think you need to do some bench testing yourself. Make sure you get a good power analyzer, you want to be able to trust the numbers you share. There's at least two EEs in and out of my shop that will take me to task whenever they think I need it.. and of course.. I do need it once in a while. And Jim, I will be glad to sell you a PMG so you can do some testing. Greatly appreciate your question, there's a lot of EEs that walk around the THD topic..

Reply

Dave Heine *says:*
November 22, 2010 at 7:53 am

Can the 3 KW PMGs be run mounted vertically? I see some reference to a 6KW PMG on your site. Do you have an idea as to when these will be available for purchase?

Thanks,

Great site!

Reply

George B. *says:*
November 22, 2010 at 4:46 pm

Dave, the bearing are rated to take a side load that should easily cover what the small mass of the rotor would generate. I think there are two generators running this way, but it is VERY difficult to find someone running enough hours to report on. No news is usually good news when it comes to our community. As for availability of more product? I have learned not to pass along promises, and my apologies for leaving a page up this long with no product in stock.

Reply

John Stefoni *says:*
December 19, 2010 at 6:34 pm

I want to purchase one of your alternators. I was looking for on line purchase page but could not find. Please provide purchase info. I have an original lister 6/1 want to put it to work and get off the grid. John Stefoni

Reply

George B. *says:*
December 23, 2010 at 5:03 pm

It's my hope that we get PMGs stocked soon and catch up with demand. Till then, the only fair thing I can think of to do is make a list of names and dates and go back down that list in order and make offers. Providign more info on how to order a product that is sold out may not be the best idea.

Reply

Simon Welch *says:*
February 15, 2011 at 9:38 pm

Why much for a PMG, I need to upgrade my old Metro 6/1s that came with a crap Indian generator.

Regards

Simon

Reply

Terry Barrett *says:*
April 1, 2011 at 11:27 pm

George,
I sent an email yesterday before exploring your entire site. I found the info on the PMG. I was just given a 1980 Lister BS649, counter rotation with a twin disc clutch on it. It is low time (approx 1,000 hr). I have not started it yet but I am confident that it runs. It has a 3 vbelt flywheel on it and in order to use the PMG i will need a flat flywheel. Can you sourse one and what is the approx price? Can't waite to get the project together.

Regards,

Terry

Reply

George B. *says:*
April 25, 2011 at 4:58 am

Sorry, there's are no PMGs in the pipe at this time 😕 I'm no help in locatign a new flywheel..

Reply

Dale Chlumsky *says:*
April 25, 2011 at 1:46 am

George,

Why wont you be able to sell the pmg?? I was interested in having one of those.

Best regards,
Dale

Reply

George B. *says:*
April 25, 2011 at 4:53 am

Dale, there's several reasons, one of the basic ones is magnets of the quality required are way too expensive at the moment. A pure PMG can be viable, but when the price is far higher than a traditional generator, one needs to rethink the investment.

Reply

Cornelius Pienaar *says:*
May 10, 2011 at 5:59 am

Hi George you are so right about the bs out there.Everyone wants his 15m on a soap box. The lister 5/1 and 6/1 has become my goal for living again but getting one is proving trying, but I WILL GET ONE.

Ihave been looking at genset for a long time now and everyone promises there's is the best " 5kw for $500 but worth $6900″ what a lot of bs. and people are caught everyday.

I will be going offgridd in the near future via solar, pelton turbine and a lister6/1 with one of your PMG's if possible. I live in sunny Western Australia and we have no shortage of sunshine here (damn it's hot) Am I able to purchase one of your 3kw PMG's?

Keep up the good work and take as long as you like on that soap box

Kindest Regards
Cornelius

Reply

George B. *says:*
May 10, 2011 at 2:03 pm

Cornelius,

One of the most important things a person off grid can do is learn his equipment inside and out. Most generators are fairly simple to learn, but few learn how to troubleshoot a problem and fix it prior to an outage. History tells us that commodities change in price drastically, this has affected the price of 2 bearing generators quite a bit. don't expect commodities to stay high forever, they'll dip sooner or later. After studying small power for years, I think a 2 bearing generator set up where the engine can be quickly changed, or the generator can be removed quickly and set up on the work bench for repair is a good idea.

Reply

Doug *says:*
May 13, 2011 at 1:09 am

Do you know of any good PMG's that are out there? I know they may not be as strong as the ones you sold but I am just looking for a dependable 2K -4K unit. I currently have a ST head that does 6.5K-ish but I would like a more rugged backup then my ST head.

I am planning no trying to build a 90% off grid house here in a 24 months and I am trying to line up some good parts.

thanks

Doug

Reply

George B. *says:*
May 13, 2011 at 1:55 am

I don't know where to send you. At the current price point, I'd suggest you look at a top quality conventional gen head.. but I'm still no far of voltage regulators for small power. I'd rather spend the money on the governor and keep the voltage inside the ANSI standard with the governor.

Reply

steve P *says:*
May 19, 2011 at 6:19 pm

Waiting for the price of rare earths to drop is like waiting for the price of gold to go back below $1000 an ounce anytime soon.

China now has control of 85% of the rare earth minerals to be found around the world.

So to stop production of magnets because of these prices just means that the PMG will never never be manufactured again.. Period

Reply

George B. *says:*
May 19, 2011 at 6:59 pm

Steve,
I attempt to offer products that will provide some kind of return on investment. I know that opinions vary, but at these high prices I believe the expense is far greater than the return on investment, there are other quality more conventional generators. I'll leave it to others to sort out the many problems that normally ride along with a very steep price increase.. namely all the losers that would cheat you on magnet quality in order to profit. Sooner or later I might receive less than a dozen 3KW PMGs. I'll have to bench test every one of them at full load and verify all is good, and then I'll likely sell them as is. I can't afford to buy at these prices, and I refuse to sit on other people's money who might still want to buy at these prices.. so it's game over for me at this time. Commodities go up and down, rare earth is not rare, but it is costly to refine, and the EPA could make it even more costly... we'll see what the free world (growing smaller every day) is willing to do in order to support the hybrid auto market and many other uses. A Friend just bought some junk silver coins. Teh price he paid was based on face value. When he weighed up his purchase, he found it weighed 22% less than the new coins woud have weighed. Then a day later, silver dropped 9% in value. At the end of the day, who knows where commodities will go.. I'm just not a buyer at these prices.. I may be the biggest loser.. time will tell..

Reply

James W *says:*
August 31, 2011 at 2:03 pm

George,

If they want to bite the high price bullet for the magnets, the folks at otherpower.com can show folks how to build their own PMG. Their designs focus on off-grid battery charging, rather than 110vac, so it may not be a good fit for some. It's just an option.

James

Reply

George B. *says:*
August 31, 2011 at 2:37 pm

James, Otherpower is a fun site to visit.. I have written articles on Dan F and Dan B. This is where tyou go to learn how to do wind right..DIY...their PMGs are designed for a far different purpose for sure..

Reply

George B. *says:*
December 23, 2010 at 8:21 am

You have been added to the notify list, we are hoping to get units in Jan 2011, and hopefully a steady supply from here on out.. we'll go down the list in order WHEN they are in the warehouse.

Reply

William Bablitz *says:*

April 2, 2011 at 12:07 am

Would it be possible to still be added to the list for a PMG when/if available? As well I purchased your CD approx 3 years ago, has the content changed or been edited much since?

Thanks in advance

Bud WA Bablitz

Reply

George B. *says:*
April 25, 2011 at 4:56 am

There's little chance I'll get to the end of the current waiting list. Remember. Metals are a lot like gasoline, they go up and down in price, if things change, we may decide to offer more IF we can manufacture with the quality we demand.

Reply

George B. *says:*
April 25, 2011 at 4:59 am

no more PMGs are coming till the market on rare earth changes in price.

Reply