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EMERGENCY PREPAREDNESS
Tip o'da Week

Convert a Lawn Mower into a Generator

The material presented on this page is intended to start you thinking about what you can do today that might someday save your life. If nothing else, our "Tip o' da Week" might just make your life a bit easier when a disaster strikes. We do not present topics that cost a lot of money (like structure reinforcement.) These are "do it yourself" projects and are relatively inexpensive.

Converting a Lawn Mower into a Gernator

This Tip of the Week outlines the construction of a generator from a lawnmower engine.

Many of our visitors and customers have read our Tip O'Da Week episodes discussing the homemade generator made from a horizontal shaft engine and a

car alternator. Now build a generator with a lawn mower engine!

As you might remember, our first generator was built using a horizontal shaft engine. After many attempts, we have successfully completed the construction of a generator using a common lawn mower engine, the type that is sitting in your back yard right now.

About the parts needed:

1.  **The motor:**

The generator project will require a vertical shaft gas engine from a lawn mower. The typical lawn mower engine will be 3 to 5 horse power and will have a 7/8" shaft, with a 3/16" key way and a threaded hole in the bottom of the shaft. Most of these engines have either 3 or 4 bolts holding them down to the existing lawn mower base.

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2.  **The Alternator:**

A GM 10si style automotive alternator.
The alternator will fall into one of three categories.

- A) External voltage regulator type.
  - This type of alternator does not have an internal regulator and must have one connected externally to control the alternator field intensity and thus the output voltage and current of the alternator. The disadvantage in using this type of alternator is that connection is a bit more complicated and the regulator is an added component that must be mounted and connected properly. This type of alternator is typically less expensive than the other options shown below, but like the model with an internal regulator, it too requires an external on / off switch or the alternator and regulator pair can discharge batteries when it is not charging and the switch is left on.
- B) Single wire connection type with internal regulator.
  - The single wire connection type alternator automatically starts producing output power when the RPM of the input shaft reaches a minimum speed. And, when the RPM drops below a preset speed the output stops. A big advantage is that it does not require a switch to isolate the alternator from the battery source to keep the alternator from draining the battery when not in use. The disadvantage in using this type of alternator is that the alternator will start to charge the batteries as soon as the minimum speed is reached, and will place a load on the engine as soon as the minimum RPM is achieved. In some cases, you might need to throttle through this minimum RPM range to insure that the motor does not bog down at low RPM when the alternator begins to produce power. Another disadvantage is that these alternators are more expensive than other options, but it provides a very simple connection method.
- C) Internal regulator type with external control switch.
  - Another option is to use the type we used on our last project. This alternator has an internal voltage regulator but requires an external switch to start or stop power production. The advantage in using this model is that the alternator can be switched off while the motor is still running and power output stops. This aids in connecting and disconnecting batteries or other loads.

One note in the Single wire connection type with internal regulator:

We found that the single wire configuration is not ideal for this application. Because the lawn mower engine mentioned above doesn't have much throttle adjustment, if a single wire configuration is used with a 2 1/2 inch pulley on the motor the alternator doesn't kick in without manually moving the throttle butterfly to a higher setting and then releasing. This problem might be eliminated by using a 3" pulley. However, a single wire configuration can be used on our last project using a horizontal shaft engine. The problem we have right now, is that

we don't have all the answers yet for this configuration. Feel free to experiment, but with the motor we used and the pulley we used, it wasn't convent in that you had to reach under the carburetor to throttle up manually to start generation.

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3.  **Electrical wires:**

A positive and a negative car battery cable is needed, as well as an alternator connector and associated wires. The alternator wires are not needed if a single wire alternator with built in regulator is used.

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4.  **An "A" style industrial V Belt**

This V-Belt transfers power from the pulley (which will be mounted) on the motor to the pulley on the alternator. Various belt lengths can be used if your mounting system provides for several inches of belt length adjustment. Keep in mind that the belt length should be kept to a minimum to reduce belt slap and associated wear.

We have found that the Automotive V-belt used on a standard alternator is not compatible with the industrial "A" size belt that mates with all pulleys you will find for the motor. However, if you use an industrial "A" style V-belt, it will provide an exact fit for the motor and an "OK" fit for the alternator. Replacing the pulley on the alternator to match the pulley on the motor is an option (a more expensive option) but would be the ideal solution.

Since the motor is the source of the toque, and after looking at the wear pattern of both automotive and "A" belts used in this configuration, we feel the "A" belt (which matches the motor pulley) is the better choice, and modifying the alternator by replacing the pulley is not required for most applications.

Remember that an automotive belt will work in a pinch if you can't find an "A" belt for this project. Just plan to buy the most expensive V belt you can find. Price matters! An inexpensive automotive belt usually doesn't have any nylon cords in the center, only on the outside of edge of the belt, and since the angle of the belt (mainly the inside area) doesn't match the "A" size pulley on the motor, excessive wear of the belt can result. Be sure to keep a spare around after you determine the correct size.

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5.  **A cast iron pulley**

The motor pulley needs to be high quality cast iron. The mass of a cast iron pulley tends to act as a flywheel, taking the place of the mass of the lawn mower blade. Remember that most lawn mower engines have a very light aluminum fly wheel and use the steel blade as part of the effective fly wheel mass. The added weight of the cast iron pulley (compared to the mass of an aluminum pulley) helps the engine idle smoothly and helps keep belt slap to a minimum.

Full discussion of the pulley can be found below.

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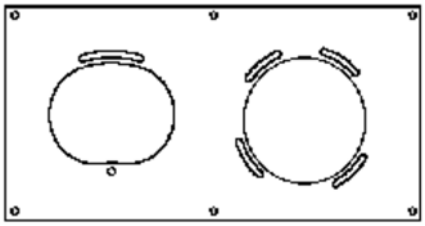
6.  **The mounting bracket**

The mounting bracket is the most complicated part of the project. We custom designed and manufactured one out of 1/8" steel and they are available for purchase at a very cost effective price! With this bracket the project comes together in a snap, and eliminates many hours of frustration.

The great thing about this bracket is that it's Universal in design and allows use of a wide variety of engine manufacturers and engine models. Our first prototype (shown above) was made with a 3.5 HP Briggs and Stratton engine, but we have since built one with a 3.75 HP Tecumseh, and another version with a 5 HP Tecumseh .

It not only eliminates hours of time figuring out the bolt pattern of your motor, but also eliminates the trial and error guess work in finding a belt length that will work once the motor and alternator are mounted. Additionally, this bracket can be bolted down to a simple base of your own design and the rest of the work is done!

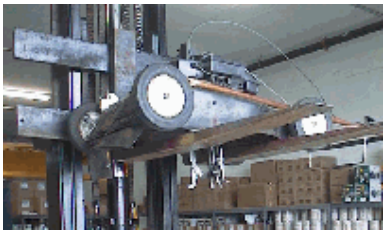
Further discussion of the mounting bracket can be found below.

Putting it all together:

The first step is to remove the motor from the lawn mower base. Typically, there are 3 or 4 bolts holding the motor to the base, but before you remove them, you will need to remove the mower blade and the shaft coupler that holds the blade on the motor shaft. Getting the blade and the coupling off is a bit of a pain. Removing the blade is not nearly as difficult, but still requires a bit of ingenuity to figure out a way to "jam" the blade so it won't rotate while you remove the bolt which holds it in place on the motor shaft.

We found that we had to use a "pulley puller", to remove the shaft coupler after the mower blade was removed. A "pulley puller" which can be rented or purchased at most auto parts stores. Removing the coupler is difficult to impossible without use of this tool.

You will also find that it's a bit of a pain to work under the mower to remove the blade, especially if there is still oil in the motor or gas in the tank. We found that some oil leaked when we tipped the motor over and the mower smoked like crazy for a few minutes when we started it. The ideal way to approach motor and blade removal is to elevate the mower on some type of platform and not to tip the motor at all. We ended up using a fork lift to hold the mower up in the air for the blade removal as shown in this photo.



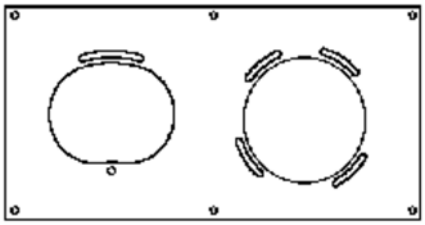
The next hassle will be in finding the required pulley. Our research indicated that nearly all the motors used in vertical shaft lawn mowers have a 7/8" shaft, and a 3/16" or 1/4" key way. However, horizontal shaft motors under about 7 HP use a 3/4" shaft. The 3/4" pulleys can be found at most hardware stores, but the 7/8" pulleys are impossible to find. What we had to do was to set up an account with a company that supplies Heating and Air Conditioning Systems, Motors, Blowers and Components to be able to order the correct pulleys. We will be making the correct pulleys available for purchase to folks who can't find them locally.

Another catch is that a 3/16" key way is not standard on cast iron pulleys. What we found was that a 1/4" key way is the norm because most high horse power AC motors use a 1/4" size key way. A pulley with a 3/16" key way is not typically available in a 7/8" shaft diameter configuration. It is possible to use a pulley with a 1/4" key way on a motor that has a 3/16" key way provided that the set screw is on top of the key on the motor shaft and NOT on the shaft itself. If close attention is paid to this detail the pulley will stay in place without vibrating or loosening.

As expected, the biggest problem is figuring out how to bolt everything together. In our first attempts, we tried to figure out an easy way to reuse the lawn mower base, and somehow build something that could be attached simply to the base (so that a belt could be run to the pulley on the alternator). That proved to be an impossible task for various reasons. All the bases we looked at on the most common mowers were constructed a bit differently, so whatever would work on one mower would not fit the base for another brand of mower. In some cases, (especially with side discharge mowers) a pulley could actually be run out the

discharge shoot. Some mowers did not have the required clearance, or had extra sheet metal that directed the cut grass in such a way that the metal would need to be cut in order to be able to run the belt out from under the mower.

So, what we ended up concentrating on was coming up with a universal base that just about any motor could fit on. Yes, there were some complications there, too. Some motors have the head on one side and the tank on the other and some have them set 90 degrees apart. So, our base had to allow for rotating the motor by about 30 degrees, and allow positioning the motor in any of the 90 degree quadrants. That allowed the motor to be in any position with clearance for the alternator and a method for hooking up the belt. We also wanted to allow the alternator position to be adjusted allowing for several belt sizes to be used. The bracket also has an integral belt adjustment slot which allows the alternator position to be adjusted, which also serves to tension the belt.



Now, lets talk a bit about lawn mower engines.

The lawn mower we used had a 3.5 Horse power Briggs and Stratton 4 stroke gas engine. That particular model motor has a safety shut off lever on the lawn mower handle which has a cable attached to the motor, and the attached cable must be activated to disengage the motor shut off break and to allow spark to reach the spark plug. What we decided to do was to cut the cable off and deactivate the motor shut off feature. If your motor has this feature, you will need to spend some time looking at the cable and the levers on the motor to figure out a way to deactivate or preserve the feature. In either case the motor will not start unless something is done about the cable and levers.

We found that there was a small hole in one of the lever plates on the side of the engine, and after pulling the cable, a small nail can be inserted into the lever to keep the mechanism from retracting and shutting off the motor. Like I said, it will take a bit of time to figure out how your motor shut off mechanism works (if there is one installed on your motor).

Most of the lawn mower engines you will find have a 7/8" shaft and a 3/16" key way cut into the shaft. They also have a threaded hole in the bottom of the shaft.

The big issue. Pulley size and type:

The vertical shaft motor from this lawn mower would not throttle as high as the same horse power motor we used in the horizontal shaft generator project. That motor was from a lawn edger, and could be set to a higher maximum speed. After talking with some lawn mower experts, we were told that the throttle mechanism on the lawn mower has the maximum throttle set to be about 75% of the maximum butter fly valve position of the carburetor. We were told that the lawn mower manufacturers set the throttle mechanism that way so there is extra throttle capability for when the mower hits some heavy or wet grass. The motor could then self throttle to a higher setting if necessary, then throttle back to the pre set throttle setting.

The reason we mention all this is that the pulley size we used on the horizontal shaft motor project would not work on this project. In testing this motor with the throttle set as high as possible without modifying the carburetor, and using a 4 3/4" pulley on the motor (similar size to the one on our other project), the motor would bog down and die with a 39 Amp load on the alternator. Without modifying the carburetor, we couldn't keep the thing running when the load was switched in with the large size pulley.

What size pulley works without modifying the carburetor or throttle linkage?

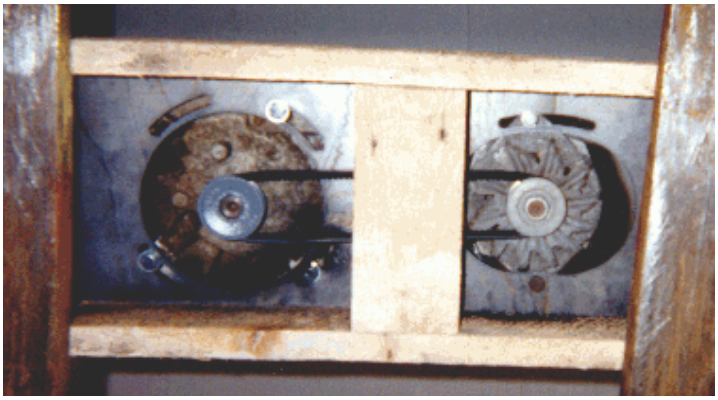
We had excellent results with a 2 ½" pulley. It allowed the alternator to output voltage at even half or lower throttle settings at a slightly lower output current. So, with less than full demand, the motor speed could be reduced without killing the motor, and providing fuel savings.

Testing notes:

The largest load we had available during testing drew 39 Amps with the alternator output of 14.4 volts or about 560 Watts. Testing was conducted with an ambient outside temperature of 82 Degrees. We ran the load for 2 hours and the case temperature of the alternator only reached 148 degrees.

Another thing to note: Lawn mower engines have a rather small gas tank. We found that we could only run the generator for about an hour at a time with the standard gas tank without re-filling in use (which is not a good idea). We plan to continue using the standard tank, but other folks out there might want to figure out a way to attach a larger tank, or select a lawnmower with a large tank.

Mounting the motor, and alternator made easy:



Shown here is a bottom view of the bracket, motor, alternator and 2x4 base.

Mounting all this stuff is the tricky part of this project. But like last time, we designed and manufactured a bracket to make the task simple!

The bracket is made from 1/8" steel and has provisions for mounting the motor and alternator, and additional holes for mounting the plate to a base of your own design.

What we did for the base was cut two 2x4's the length of the bracket, and another 2x4 as a cross brace to be installed under the bracket at the bottom of the long 2x4's. Imagine the base as being an H. The two long pieces were installed so that the base was 4 inches in height, and the cross brace was installed on the two length wise 2x4's at the bottom, and on it's side so that it stood 2" in height. That provided the necessary clearance for the belt and provided stabilization of the two side pieces. A further improvement would be to install two more short 2x4 at each end of the assembly to completely box in the rotating pulleys (for added safety).

As in the last project, we elected to mount the alternator in such a manor that it actually runs backwards. This simplifies the hook up and it still works. Many astute readers questioned the alternators rotation direction and what affect would be seen if the alternator fan (which is attached to the alternator input shaft) also runs backwards. Well, the fan still functions, but instead of pulling air through the back and exhausting through the front, the air flow direction is reversed. Also, the fan blades are not as efficient when running backwards so air flow is reduced slightly. But, remember that like in the other project, the alternator is mounted to a steel plate which also serves as a large heat sink. And from the two hour test run at 39 Amp output, the alternator case temperature was only 148 degrees (ambient temperature was 80 degrees). So, I guess what I'm saying is that it really doesn't matter. These alternators normally spend most of their lives under the hood of cars stuck in traffic jams on hot days, and see temperatures much higher than this.

Now, getting back to the mounting issues: The lawn mower engine has a longer shaft than the alternator, and if the pulley is installed in the ideal location on the motor shaft the two pulleys do not align. So, what we found on our project was that the alternator needs to be mounted flush on top of the bracket but the motor needs to be spaced 1" above the mounting plate. This is easily carried out by using 1" longer bolts, and 1" long spacer tubes. Then the alignment of the pulleys is correct.

Take a look at the photo of the generator in operation charging a bank of three deep cycle marine batteries. A spacer tube is visible at the bottom of the motor, and provides the necessary height adjustment to keep the pulleys aligned. The pulley is also visible beneath the mounting plate. This motor had three mounting bolts, so three extension tubes were needed.

So what can this thing be used for?

In it's simplest form this is a high current DC charging system. With

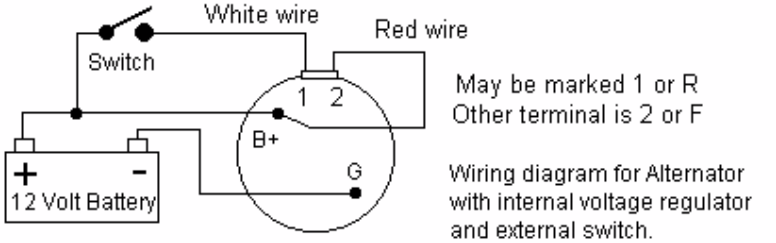
the addition of a DC to AC power converter, it also becomes an AC generator system with battery back up.

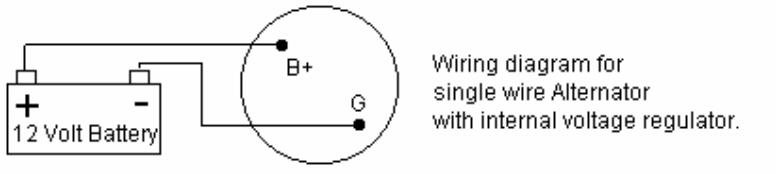
This charging system can be used to recharge a battery bank which can be used later to power a DC to AC inverter for your household AC power needs like the 21" TV as shown. Imagine being able to charge your batteries during the day, and then to be able to silently extract power at night for entertainment, lighting or cooking needs without disturbing your neighbors! This system can also be used in conjunction with other alternative energy system components like solar panels or wind generators as back up power for when the sun isn't shining or the wind isn't blowing!

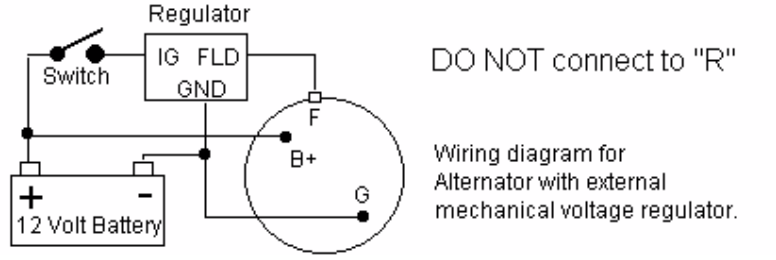
The addition of a DC to AC power converter allows 120 Volt AC devices (like the television above) to be powered either from the lawn mower DC generator or by the batteries the system can charge. These converters are available in sizes from 140 Watts to 3,000 watts from our power related page.

DC to AC power converters are available through these pages: POWER DC to AC

Wiring it up:







The wiring depends on which alternator you choose. All three alternator types are shown.

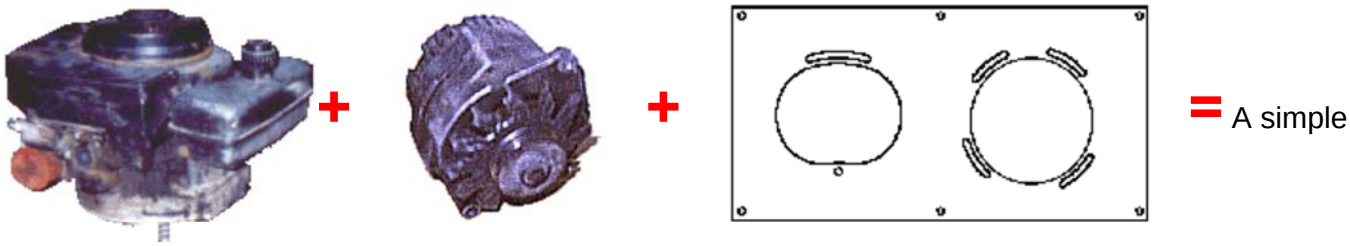
Do not wire the alternator unless you are sure about what type you are using. If you make a mistake in the selection of the alternator or wiring diagram you run a very high risk of damaging your battery, electronic devices, or worse yet causing personal injury! Consult a parts professional for additional information!

This Tip o'da Week is intended for educational purposes only. No guarantees are expressed or implied as to the accuracy of information presented here! Consult with an automotive wiring expert before attempting to carry out any wiring.

One final note:

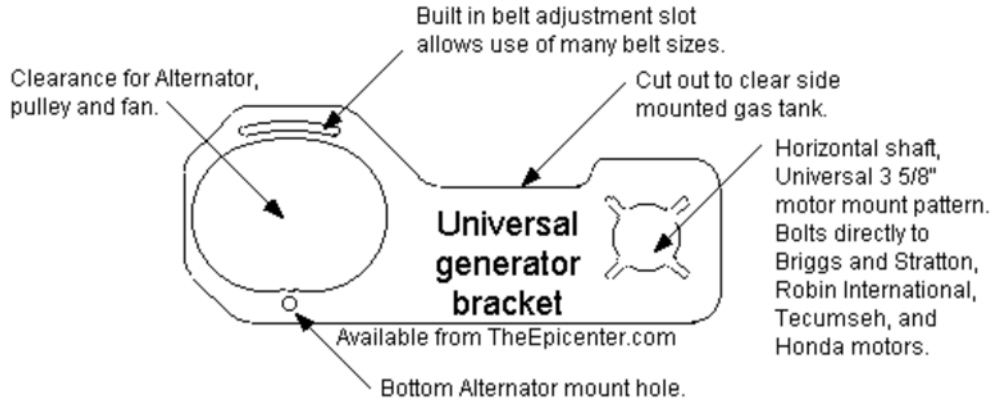
If you are using an alternator that requires an external switch, you will need to turn off the switch prior to attempting to start the generator. If the switch is on, the generator will try to output voltage while you are pulling the starting cord on the motor. You will find that it will be nearly impossible to pull the cord! If the switch is off, then there is little to no resistance from the alternator. Once the motor is running, the switch can be set to the on position.

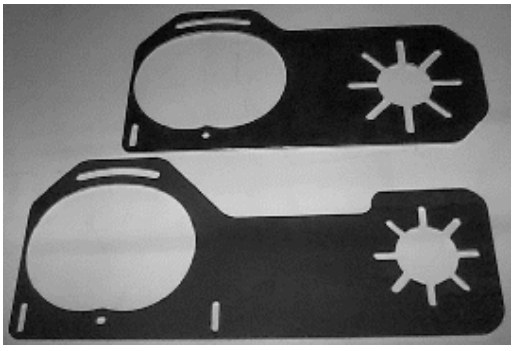
To recap:



= A simple method has been shown for building a generator from a lawn mower engine and a car alternator!

The following related items are also available from Epicenter:





Universal Horizontal Shaft Generator Bracket

Now several versions of our famous Universal Generator Bracket.

You can now build your own AC / DC generator!

A unique bracket that mounts a GM 10si alternator to a horizontal shaft gas engine. The simple way to build your own generator! Add a DC to AC power converter, and you have a super high output DC charging system, as well as an AC generator. Be aware, you must have a battery hooked up to the alternator, or you will damage the internal voltage regulator.

We have designed and manufactured a simple, one piece universal mounting bracket specifically for this task! This bracket bolts to the motor (using a universal bolt pattern), and allows the alternator to bolt directly to the bracket. The bracket also has an integral belt adjustment slot which allows the alternator position to be adjusted, which serves to tension the belt.

We now have 2 versions of our bracket. The long one is the one we have been selling for years. The short version is a new one that is intended for applications when you want a more compact system, and have an engine with no obstructions on one side.These brackets are

designed for the small footprint GM 10SI Alternator. Larger alternators will not fit!

Dimensions for Long version:

- 19.5" long x 8" tall.
- 13" from center of motor shaft to center of alternator shaft with belt adjusted in center.
- 6.6" between standard 2 bolt mounting bolts for GM 10si alternator
- Made from 10 gauge Steel or Stainless Steel (0.135" thick)

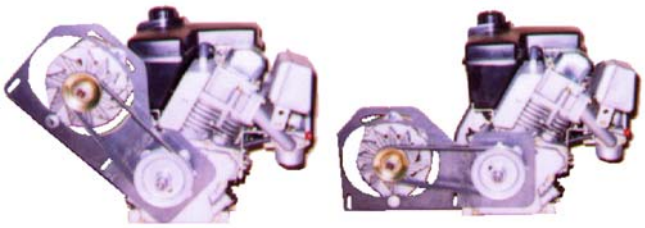
Dimensions for Short version:

- 16.5" long x 8" tall.
- 9" from center of motor shaft to center of alternator shaft with belt adjusted in center.
- 6.6" between standard 2 bolt mounting bolts for GM 10si alternator
- Made from 10 gauge Steel or Stainless Steel (0.135" thick)

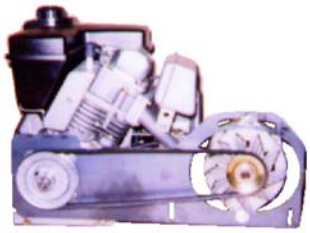
See our "Tip O'da Week" on the subject.

Example Mounting for Horizontal Shaft Bracket

Short version mounted on a Tecumsineeh OHV engine.



Long version mounted on a Tecumsineeh OHV engine.



☐ **Bare Steel Universal Horizontal Shaft Generator Bracket, Short version. Price: $24.95**

☐ **Black Powder Coated Universal Horizontal Shaft Generator Bracket, Short version. Price: $29.95** *New item!*

☐ **Stainless Steel Universal Horizontal Shaft Generator Bracket, Short version. Price: $39.95** *New item!*

☐ **28" belt (for the SHORT version of the bracket). Price: $9**
(Use with our 4" pulley on motor and standard 2.5" alternator pulley

☐ **4" pulley for 3/4" engine shaft. Price: $14.85**

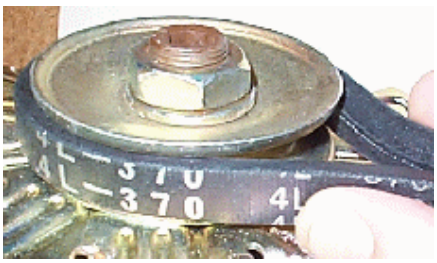
☐ **Bare Steel Universal Horizontal Shaft Generator Bracket, Long version. Price: $24.95**

☐ **Black Powder Coated Universal Horizontal Shaft Generator Bracket, Long version. Price: $29.95** *New item!*

☐ **Stainless Steel Universal Horizontal Shaft Generator Bracket, Long version. Price: $42.95** *New item!*

☐ **37" belt (for the LONG version of the bracket). Price: $9**

☐ **4" pulley for 3/4" engine shaft. Price: $14.85**



A Note about Alternator pulleys and belts.

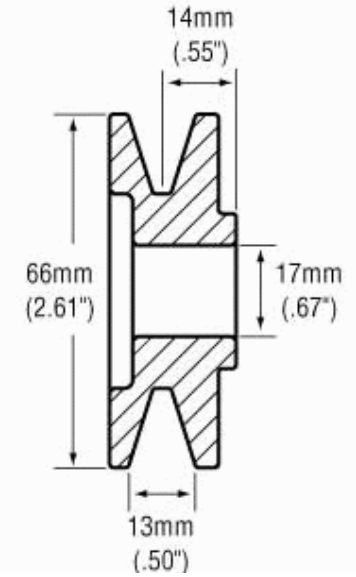
The normal 2.5" pulley (shown here) on a GM 10si alternator is a 3/8" automotive pitch belt.

You will not be able to find a 3/8" automotive pitch pulley to go on your engine. The only commonly available pulleys available in standard engine shaft diameters that have key ways are Industrial "A" style models. These require Industrial "A" style belts.

The pulleys and belts we sell to go on the engine are industrial "A" style, 1/2 inch wide. Although the combination of automotive and Industrial "A" style belts is not the ideal solution, it works well for most customers and is the least expensive option. The belt rides a little higher in the alternator pulley, and at the correct depth on the engine pulley. Extreme power users may experience some belt wear,

especially if the belt is not tight, or if the pulleys are misaligned even to a slight degree because of the reduced contact area between the alternator pulley and belt side.

There is a better solution.



Special Industrial "A" belt pulley for GM 10si alternator.

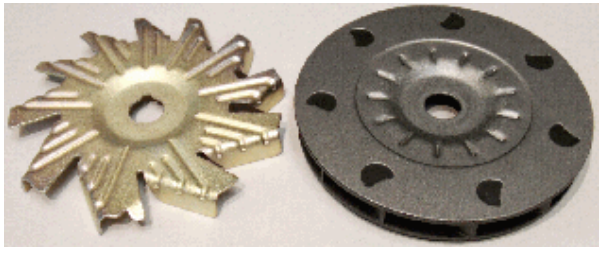
We are now offering a special 2.5" Industrial "A" style pulley that fits the GM 10si alternator. These will fit any of the alternators we sell, and we will even install it for you at no cost by request. Shown here is the same belt as it would fit our new special alternator pulley. So, for people who plan to run their systems near capacity for extended periods of time, we recommend replacing the standard pulley on the alternator with one of ours. If you already have your own alternator, or did not buy it from us, we can not guarantee this will fit your alternator. Please look very closly at the diagram for measurements. You may return it if it doesn't work out, but you will be responsable for shipping costs BOTH ways which may be more then the cost of the pulley.

Special Industrial "A" belt pulley for the GM 10si alternator.

☐ **Special pulley for Alternator, 2.5 inch, "A" style industrial. Price: $19.95** *New item!*

☐ **Install this pulley to any alternator purchased on this order** (No Installation Charge For This Option)

Notes about alternator direction and fans:



Stock fans for 10si (left) and 12si alternators (right).

Above are the stock fans for the 10SI alternators (like the 63 amp model), and the 12SI alternator (to the right).

Most asked questions:

Q: Doesn't the alternator run backwards?

A: Yes, in several of these projects the alternator turns in the opposite direction. An alternator will

function in either direction.

Q: Is cooling an issue when the fan runs in the wrong direction?

A: In most situations, no. The fan still functions but at reduced efficiency. The alternators in our projects are bolted to a metal mounting plate which acts as a large heat sink. We do offer a special bi-directional fan that can be used in place of the stock fan. This fan is as efficient when rotated in either direction.

Q: Where can I find a reverse fan?

A: A bi-directional fan is available from us. For a true reverse direction fan you will find them used on '65-'69 Corvairs. But the Corvair fans have an integral pulley which can not be removed and is not the ideal diameter.

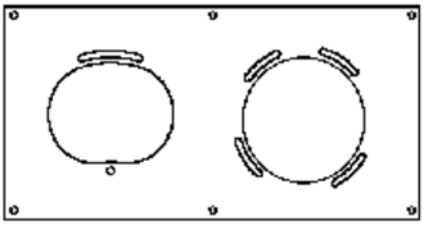
Bi-directional fans for use with our alternators

(back face on left, front face on right).

These fans fit the 10SI and 12SI alternators we sell. If you already have an alternator, we can not guarantee these will fit. They will only fit if the existing fan has a dish in the center, and the dish points toward the alternator. See the above pictures.

☐ **Bi-directional fan for GM 10SI or GM 12SI alternator. Price: $24.75** *New item!*

☐ **Install this fan to any alternator purchased on this order** (No Installation Charge For This Option)

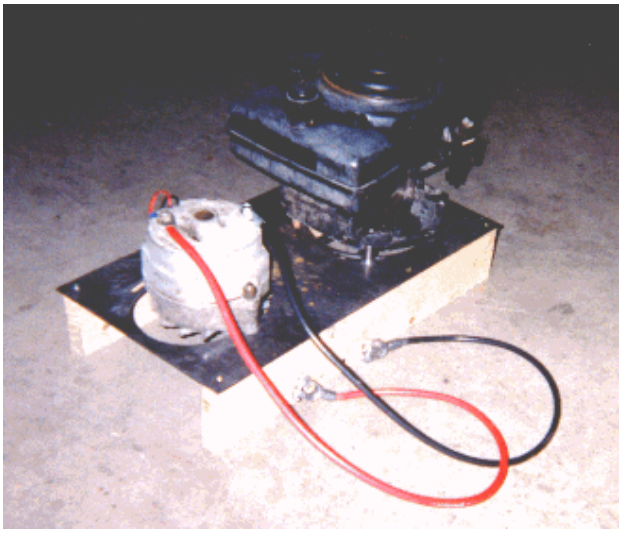


Vertical Shaft Generator Bracket

Now build a generator from a common-style lawn mower engine with our new Vertical Shaft Generator Bracket!

Universal mounting pattern fits all lawn mower engines. Same integral belt adjustment slot and alternator mounting provisions as our horizontal design.

(Bracket allows you to mount alternator as in the photo below):



See our "Tip O'da Week" on the subject.

Dimensions for Vertical Bracket:

- 24" long x 12" wide.
- 11" from center of motor shaft to center of alternator shaft with belt adjusted in center.
- 6.6" between standard 2 bolt mounting bolts for GM 10si alternator.
- Made from 10 gauge steel or Stainless Steel (0.135" thick).

☐ **Bare Steel Vertical Shaft Mounting Bracket. Price $29.95**
☐ **Black Powder Coated Vertical Shaft Mounting Bracket. Price $34.95** *New item!*
☐ **Stainless Steel Vertical Shaft Mounting Bracket. Price $43.95** *New item!*
☐ **Pulley for engine, 2 1/2" cast iron, 3/16" key way, 7/8" shaft, "A" style industrial. Price: $19.95**
☐ **30" Belt for vertical shaft bracket and pulley above, "A" style industrial. Price $9.00**

Alternators and Regulators

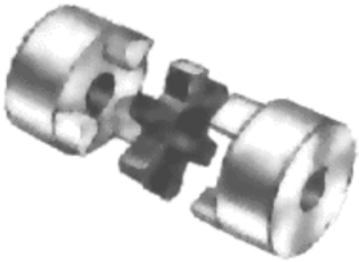
For use with any of our generator projects.

Sold outright! No core charge!
All alternators are remanufactured with new brushes and bearings, right here in Eugene, OR.
If you plan to run your system near capacity for extended periods of time, we recommend replacing the standard pulley on the alternator with one of our special Industrial "A" belt alternator pulleys above.
Be aware, you must have a battery hooked up to an alternator or you will damage the internal voltage regulator if you try to rotate it at normal RPMs.

☐ **Model 7122, 63 Amp - External regulator type. Price $49.00**
☐ **Model 11710, External voltage regulator for 7122 alternators. Price $27.50**
☐ **Wiring Plug for 7122 (you provide switch). Price $5.50**

☐ **Model 7127, 63 Amp - Internal regulator type, 12 volt. External switch required. Price $69.95 (RECOMMENDED MODEL) (Also see wiring plug below)**
☐ **Model 7294, 94 Amp - Internal regulator type, 12 volt. External switch required. Price $102.00**
☐ **Wiring plug for 7127, 7294 alternators (you provide switch). Price $5.50**

☐ **Model 7127X, 63 amp - Single wire, internal regulator type, 12 volt. Price $75.00**
☐ **Model 7294X, 94 Amp - Single wire, internal regulator type, 12 volt. Price $118.00**



Direct Drives

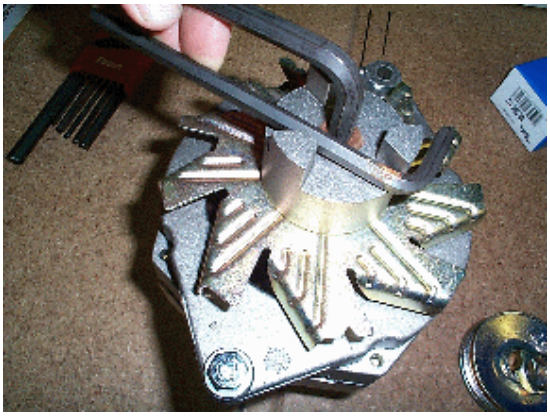
Q: How do you direct drive a generator head with an engine?

A: Direct drive shaft coupler assembly.

To connect the output shaft of an engine to a generator head input shaft (or anything else for that matter), a special shaft coupler is required. Basically, three pieces are needed.

Select a coupler half that is the correct size to fit the engine shaft (or driving shaft size), then select a coupler half that is the correct size for the generator head (or driven shaft size). Then the two shaft couplers are joined using what is called a spider. Notice that the shaft couplers each have 3 fingers and the spider has 6 slots. The three fingers from the engine side fit into three of the spider slots, and the three fingers from the generator side coupler fit into the other three slots on the spider. This coupler assembly allows for several degrees of misalignment between the two shafts and protect the bearings from seeing side loads that would result from misalignment.

These couplers are available in several sizes, but we have marked the ones that are needed for our projects:



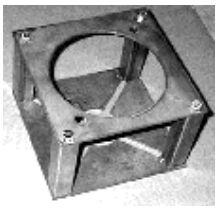
Special direct drive alternator coupler

This coupler is custom machined to replace the nut, lock washer and pulley on a standard GM 10si alternator.With this, and our direct drive bracket set you can build an untra compact and reliable charging system with no belts to wear out.

Installing our custom direct drive alternator coupler.

We have had a few customers ask for the easy way is to install our custom direct drive alternator coupler. First you have to remove the nut, lock washer and pulley from the alternator. The only practical way is to block the fan on top of a piece of wood, and use an air impact wrench on the nut. If you don't have one, take your alternator to any shop and pay them a few dollars to do it for you.

Now, to install our alternator coupler you will need an allen wrench to fit the end of your alternator shaft, and a second one goes across 2 of the ears. Hold the shaft in position with the center allen wrench, and turn the coupler with the other wrench as shown. Again we will install this for you on request.



Direct drive alternator mounting assembly.

The next thing need is a way to mount the direct drive system to the engine. Shown here is the complete assembly. Note that we do not sell completed assemblies, just the two plates. The engine plate has mounting slots such that it can fit all engines with bolt circles smaller or equal to 7.5 inches. This covers everything from 3 HP to 20 HP. The plate with the large hole is where the alternator mounts.

Notice from the picture that there are spacers and bolts connecting the two plates. We do not provide the bolts or spacer tubes. The engine plate comes with nuts pre-welded to the side of the plate that faces away from the engine. This is done so that the surface of the plate that touches the motor is free of obstructions. The spacer tubes need to be large enough in diameter that they can sit over the nuts (the nuts sit inside the tubes). In the example shown, we used square tube for the spacers but we have also used 3/4 electrical conduit for the spacers. The length of the bolts and the length of the spacers must be determined at the time of assembly and are not provided.

At this time we only offer these direct drive bracket sets in Bare Steel, unpainted. We are looking at doing them in powder coat, and stainlesssteel if enough people are interested in those options. Call if interested.

- [ ] **Bare Steel Direct drive bracket set - Price: $34.95**
- [ ] **Black Powder Coated Direct drive bracket set - Price: $55.95**
- [ ] **Stainless Steel Direct drive bracket set - Price: $65.95**
- [ ] **1/2" Direct Drive Coupler. Price $18.50**
- [ ] **5/8" Direct Drive Coupler. Price $18.50**
- [ ] **3/4" Direct Drive Coupler** (most 5 HP and smaller horizontal shaft motors). **Price $18.50**
- [ ] **7/8" Direct Drive Coupler** (use with most vertical shaft motors). **Price $18.50**

☐ **1" Direct Drive Coupler (**use with 8 HP horizontal motors and others). **Price $18.50**

☐ **Special-threaded and counter bored for GM alternators**. Custom made to direct drive GM alternators with gas engine **Price $32.50**

☐ **Spider for all couplers**. **Price $7.85** **ONE SPIDER REQUIRED FOR EACH PAIR OF DRIVE COUPLERS.**

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