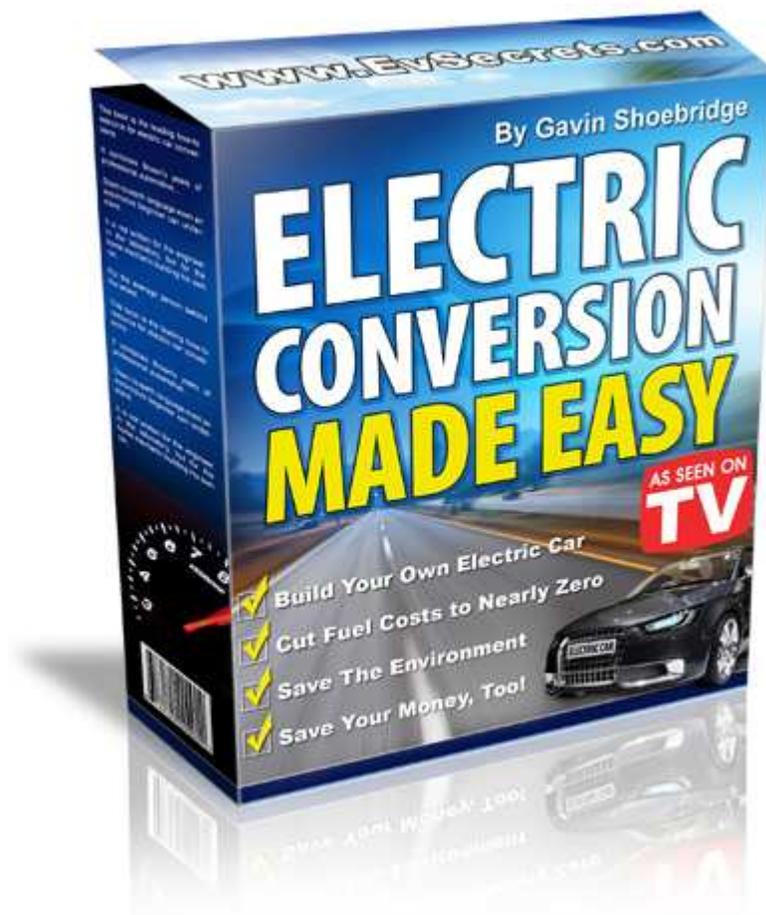


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# Electric Conversion Made Easy

- Insider Secrets Revealed -



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# Introduction



Hi, my name is **Gavin Shoebridge** and with the help of this ebook you'll be driving gas-free in just a few months.

First of all, I want to thank you for taking a sneak peak of my” [Electric Conversion Made Easy](#)” ebook. You've already taken the first step towards being independent from gasoline from your general daily driving.

Take a moment to imagine driving past the gas station on your way to the mall or on the way to work, keeping that money in your pocket instead of handing it over for gas.



**It's a satisfying feeling.** I know this because I've already converted a car to run on electricity. I also know that you already have the necessary skills to convert a car because I was a complete novice when I started; I could only just change my own motor oil! Yup, a couple of years ago I decided to break my own oil addiction. I wanted to reduce the carbon I was creating by burning 20 gallons of gas each week. I also wanted to slash my transport costs right down.

I had 2 choices: I could either ride a bicycle everywhere come rain or shine, or I could take an existing gas car and convert it to electricity. If you're anything like me you enjoy riding a bike, but you just can't beat a car for convenience, especially when it's raining. ☺

## Why Did I Write This Ebook?

You may be wondering what motivated me to write this ebook.

**I actually have a couple of reasons:**

- Everyone I've met who has converted their car to run on electricity wants to tell you about their conversion and show you their work. I'm no different; I want to tell you my story as well.
- However, I *also* want to show you exactly *how* it's done in a step-by-step fashion so that you can do it too.

I want to show you *how easy it is to convert a car to run on electricity*. A car that will achieve highway speeds if you desire. A car that can go for 100 miles if you so wish. A car that looks *normal*. Not only is it possible - it's actually very easy to do!



The picture above is the car I converted. It's what I'd consider an **"average electric car"**.

## How Does An Electric Car Work?

[An electric car](#) uses electricity stored in batteries to turn an electric motor which turns the wheels. This is similar in concept to using gas stored in a tank to turn an engine. What are the main parts in an electric car? Not a lot to be honest.

### The 3 main parts your EV needs to run are:

- #1** An electric motor which powers the wheels,
- #2** Batteries which store the electricity, and,
- #3** A controller which acts as a floodgate between the batteries and the motor and is attached to your accelerator.

There are a few other bits such as fuses, a circuit-breaker in case of emergency, a contactor to "start" the car's main circuit, a vacuum pump to keep your brake system working (covered in Chapter #7), and some relays to keep items such as your heater and your Controller's key-ignition switch operating.

## Differences Between An Electric Car And A Gas Powered Car

**a) Firstly**, there's much less noise and vibration because there's no engine running. People that aren't used to electric cars get a surprise when you pull up at the lights. Stopping in an electric car is a bit like going to rap concert: you know you're *there* but you just don't really feel or hear anything. Unless you *like* rap music of course in which case I apologize!

**b) Secondly**, there's almost zero maintenance in an electric car, which means no maintenance costs! You may find yourself topping up the water in your batteries every couple of months (depending on what batteries you use), but otherwise there's no oil changes, no filter replacements, no servicing, no spark plugs, no radiator repairs, no exhaust repairs, no belts, pulleys and fluids to change and best of all - no more gas! In fact the only time you'll have to go to a gas station is to put air in your tires. *Sounds good, huh?*

## [Are There Other Benefits Of Driving An EV?](#)

There certainly are. Sure, it's quieter and more reliable than a gas-powered car but there are still more important reasons to "**go electric**":



[Energy independence](#) is one enormous reason. An electric car is not at the mercy of oil supplies and oil prices originating from the Middle East. Every mile you drive is powered by locally produced electricity from your own country.



[Pollution reduction](#) is another huge reason. Even if your electric car is charging from coal-fired electricity, the Co2 emissions per mile are approximately 70% cleaner (based on several studies) than that of a gas-powered car. If your electricity comes from natural gas, solar, geothermal, hydro or even nuclear then it's even cleaner still. Electric cars also emit no smog or fumes from an exhaust. Just imagine sitting in a traffic jam and breathing only fresh air!



[Electric cars save you money](#). One electric vehicle manufacturer said recently that if you're paying more than \$1 per gallon then it works out cheaper to drive an electric car! It costs literally pennies per mile. This is due to the high efficiency of electric motors: \$1 worth of electricity will move you much further than \$1 worth of gas.



[Electric cars have the benefit of high reliability](#) due to a lack of things to go wrong. You'll never have to repair your exhaust or replace a radiator. You'll never need servicing or spark plugs replaced. No more belts or pulleys, no more air filters or fuel filters, no more fuel injection problems or oil changes – the list goes on and on. It all adds up to less expenses which means more money to spend on yourself instead.



You also have the benefit of [recharging your car at home](#). If you're anything like me, having to work the gas station into your journey every time your car gets thirsty is a real pain in the neck. Then there's the waiting for an available pump, then the queue at the cashier. With an electric car however you can charge your car at home so it's always "full" and ready to go as soon as you jump in.

Don't be scared off by misinformed claims that electric cars have a limited range or top speed – the only thing limiting you from owning an electric racing car is your budget & needs which is what we'll discuss in chapter #1.

- ⊘ No fuel injection computers.
- ⊘ No exhaust gas detectors.
- ⊘ No ignition timing computers.
- ⊘ No more oily hands and waste engine oil.

*"The simplicity of electric car is simply fantastic!"*

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## Here's what you'll learn in the Complete Version of the [Electric Conversion Made Easy](#) ebook

### A Breakdown Of Each Major Section Of The Ebook

#### The Main Components Of An Electric Car

If you are planning to convert your gas-guzzling car to an electric car, you need to know the key components in an EV, what they do, and where they go. This section provides information on each key component before you hit the garage.



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#### Deciding Your Electric Car Needs & Budget

- ➡ **How to get the maximum range** - When most EV owners talk about range, they mean the distance from fully charged to absolutely flat. There's much more to it than that however. This section offers information on calculating your range requirements.
- ➡ **How to achieve your desired speed** - A high top speed can be achieved without too much extra cost – depending on your car's system. I explain how it relates to your car's voltage, with real world examples.
- ➡ **The main things that could affect your overall costs** - There are many choices

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to make, and these will affect your overall performance & range, but also your budget. I run through the main issues in cost cutting versus performance.

➡ **5 Critical Questions that you must ask yourself when deciding your Range Needs**

This section answers range related questions such as:

- *How do I calculate my range requirements?*
- *What battery pack voltage should I use?*
- *What system will provide the best speed?*
- *What batteries will provide the best range?*
- *What about hilly driving?*

➡ **Deciding Speed And Voltage Requirements** - This section removes the mystery of system voltages with popular real-world examples with top speeds and relative performance.

➡ **Deciding Your Budget** - Sounds terrifying doesn't it? Relax - it doesn't have to be! This section clears the air on what can be achieved with a typical electric car on a low budget – and what you can achieve when you invest a little more!

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### **3 Common Voltage Conversions - Real Examples**

➡ **48 Volt System** - Information on how to get the most out of a cheap, low voltage system.

➡ **96 Volt System** - What can you get from a 96 volt system in the real world? Easy! Read this to find out!

➡ **144 Volt System** - Now we're getting into high performance – but it can still be cheap! This section reveals the benefits of a high voltage system.

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### Early Cost Reduction Options

- ➡ **Save money by choosing an in-between voltage such as a 72 volt system or a 120 volt system** - How to make your own decisions on voltages *to suit your needs*.
  
- ➡ **How to save on individual shipping costs.** - There are so many options, so what about shipping costs and import taxes? What are my options?
  
- ➡ **How to find bargains on the internet or in your local wreckers yard** - It's a potential goldmine out there!
  
- ➡ **How to save money on voltmeters and ammeters** - How do you slash your instrumentation costs down by 80% without losing any accuracy or convenience? No problem!
  
- ➡ **How to save \$150 by using computer power supplies instead of DC to DC Converters.** - Now we're talking about some real savings – included are full instructions on how to convert a computer power supply into a working DC to DC converter to run your headlights & wipers, saving hundreds.
  
- ➡ **Cut costs even more:** I'll show you how to eliminate costs by welding battery racks yourself, crimping the ends of the main cables yourself or fabricating your own motor mounts and adapter plate – it's not scary or difficult and you could easily keep \$1000 in your pocket.

## Selecting a Donor Car

- ➡ **Simple & effective tips to help you choose an ideal "donor car"** - You have a world full of car makes and models to choose from! So what makes a good donor car? I reveal simple strategies anyone can use to choose the best car for your own specific needs.
- ➡ **How to choose a donor car based on aerodynamics** - This can play a large part in your final range. Having good aerodynamics can improve your car's range by up to 30% more in some cases. So what do you look for?
- ➡ **Essential Donor Car Checklist** - If you've found a potential donor car for your conversion, you need to check a few essentials. You will learn exactly what to look for – and what to avoid.(this checklist alone could save you hundreds of dollars). It's important to make sure you choose a car that you want to convert! It's all very well converting the perfect vehicle to electric, but it should be a car you like the look of and want to be seen in!
- ➡ **Where to buy Seized Cars – Up to 95% OFF - for your donor car** - Included in this section is information on seized, used vehicles and where to track one down in your area for next to nothing.

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## Selecting The Batteries

- ➡ **How to make sure you choose the right batteries for your electric car** - To help you make the right decision I present many different kinds of batteries with the pro & cons of each. I cover everything from good old *Flooded Lead Acid batteries*, right through to *Sealed Lead Acid (SLA) & Advanced Glass Mat (AGM)* batteries. I also cover the more uncommon *Nickel Cadmium (Ni-Cd)*, *Nickel Metal Hydride (NiMH)*, and the now-popular *Lithium Iron Phosphate (LiFePO4)* batteries. All of which is translated into simple English for you to understand.

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- ➡ **How to save money on batteries** - Don't panic! If you're financially challenged then there are solutions to cut battery costs. I explain a very economical technique called Battery Rejuvenation which helps even the most cash-strapped converters get their cars on the road.
  
- ➡ **How to get creative if money's getting in your way** - There are many ways to raise money - even from the junk parts in your donor car. Some websites & local papers even advertise for free! Some other ideas are company sponsorship (electric cars are free marketing!). In this chapter I cover more options than you may think of...
  
- ➡ **A precise method to figure out exactly what size batteries do you need** - Revealed is a no-nonsense way to accurately estimate just how many batteries you'll need for your particular driving & performance requirements, and how to work out battery capacity - regardless of voltage. Fret no more, it's all in here!

### Selecting The Controller

- ➡ **How to find a decent yet affordable controller** - Nowadays you're in luck as there are options galore! This section helps you ensure your controller is just right for your car with brand recommendations.
  
- ➡ **How to choose a controller that has a very low failure rate** - Found a controller you like? It may be a hidden gem or a disaster waiting to happen. Explained is how to find out which one it could be.
  
- ➡ **Want to cut costs again?** - I explain where to go to find second hand controllers that are proven reliable and strong - yet just as good as new ones.
  
- ➡ **Where to find the controllers that other EV converters use** - Listed are all the major EV component sellers in the world, including the second hand suppliers

## Selecting The Motor

The motor is one of the most important parts of your EV. Selecting the right one is as important as selecting the right batteries. It has to be able to push the load of the car without straining and overheating.

- ➡ **What to choose: DC or AC motors?** - There are big differences in these motors and their associated components – I explain the costs versus the benefits.
  
- ➡ **The most common DC motors available - how to choose the right one** - I explain the differences between each DC motor type and which ones are suitable for electric cars as well as controllers.
  
- ➡ **How to find a Cheap Electric Motor** - There are thousands of electric motors for sale out there right now! The ebook provides the info you need to select a good one and where to look.
  
- ➡ **4 things to look for before you buy a motor(most EV converters get this wrong)** - Should you buy a shunt wound, series wound or compound wound motor... And what does that mean in English? All is revealed in this chapter!
  
- ➡ **How to choose a second hand motor** - Many converters stumble across second hand motors that look worn out - but could actually be hidden gems – I demonstrate how to tell what's good and what's scrap.
  
- ➡ **Can you use a forklift motor in an Electric Car?** - You bet. You can even run them well over their rated voltage - but you have to know what to look for. Size, weight and condition are all vital – so they're all explained in this section.

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**EV Checklist (use it before you buy the components)**

You can use this list to price hunt as it includes all the main components of an EV. This is a great time saver, and takes the mystery out of hunting for EV parts.



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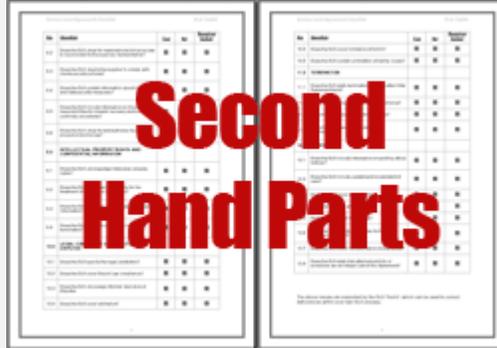
**Exclusive Parts Suppliers List (For New Parts)**

I'll give you a complete list of components you'll need from both online and local shops, whatever's easier for you. Plus, if you don't have time to build it yourself, I'll show you where to buy complete EV Kits – just bolt them in and drive away!



### **Exclusive Parts Suppliers List(Second Hand Parts)**

You can save hundreds (if not thousands) of dollars with buying second hand parts. The good news is that the parts you need are all out there in various discussion boards and forums. But where do you start? Where are all these places? I list all the current “hot sites” for pre-owned EV parts buying & trading.



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### **Dismantling the Donor Car**

Don't just rip everything out! I'll explain in detail what you can do during dismantling to ensure the important things go back in easily and efficiently, as well as being eco-friendly.

- ➡ **How to make sure that the dismantling process will take just a couple of hours – not a couple of weeks** - Believe it or not there are ways to get things done quickly, yet in detail. They're often simple things that you'd only think of after the dismantling process. Don't worry though, I've listed them all in this section to save your valuable time.
  
- ➡ **The tools needed to dismantle your donor car** - You'll learn the differences between each one, which ones are handy, and which ones you actually don't need!

- ➡ **How to make sure the Dismantling process doesn't turn into a chaos** - After I finished the dismantling I immediately knew how to do things better next time. I explain how to dismantle your car more efficiently with the right tools.
  
- ➡ **Vital Steps needed to be taken to ensure success** - How do you know which wire goes where? Included are some useful tips to help the re-installation of the gearbox and reused components.
  
- ➡ **How to drain fluids** - This section includes tips on what to do first and what to do with the oil & coolant from your engine.
  
- ➡ **Separating The Engine From The Gearbox(the easy way)** - If your donor car is front wheel drive, you may want to remove the gearbox before you haul out the engine – find out why right here.
  
- ➡ **How to Remove The Gas Tank, Safely and Easily** - Included are things to remember, and great ideas to reuse the fuel afterwards for your EV.
  
- ➡ **How to Remove The Gearbox** - Included are handy instructions for a quick & painless removal.
  
- ➡ **How to sell Those Old Parts and make some profit - reduce your conversion cost by up to 10%** - Some EV converters can get several hundred dollars back just by placing a small advertisement on the Internet or local paper. I reveal some great tips to get the most out of your old parts and which ones are valuable and worth something to someone!

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## Electric Conversion Master Plan

The best conversion is made up to a plan. There's an old (but true) phrase: "If you fail to plan, you plan to fail". I'll bet when you think of planning, you probably imagine boring evenings sitting at a table writing & drawing diagrams - but relax, it doesn't have to be like that. With the simple, plain English ebook & videos it'll barely take an hour to calculate what you'll need for your own Electric Vehicle conversion.

- ➡ **How to make sure your conversion will be a success even *before* you start assembling all the parts together.**
  
- ➡ **How to save a lot of time and effort** by using cardboard mock-up batteries (based on your chosen battery's dimensions).
  
- ➡ **How to make sure that your batteries will fit exactly into your chosen donor car.** - This is also covered in the ebook – the last thing you want is for your batteries not to fit!
  
- ➡ **How to ensure your car doesn't get “overweight”** - Your donor car will have weight limits set by the manufacturer – I explain how they work and what to take into consideration to keep your car within it's weight limits – and what to do when your car gets too heavy.

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## Installing the Motor

Installing the motor onto your gearbox is often the most challenging part - so I'll make sure you get it right the first time.

- ➡ **Clear explanation of the basic assembly of a gearbox to motor adapter** - I can't stress enough just how important it is to have this assembly perfectly straight. Even just 1 millimeter of imbalance will create a noticeable vibration while driving and your coupler will eventually break. I explain the most

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important part to get right for trouble-free motoring.

- ➡ **How to make your own gearbox coupler (a big money saver)** - Don't pay an engineer to join your gearbox to your motor – make it yourself! There are several ways to do it – but the Lovejoy Coupler method is the cheapest and easiest. I explain in detail just how to use it for your own conversion, saving up to \$1000 in engineering costs.
  
- ➡ **How do you install your motor mounts?** - These are key components in the installation of your motor. Poor design will cause breakages – welding is best but drilling & bolting works too. But what makes a good mount? How do you mount your motor to the car? How many mounts does a motor need? All is explained in simple, plain English with real examples.

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### **Installing the Controller**

Your controller has ventilation and moisture-resistance needs – be sure to follow the instructions carefully in this chapter.

- ➡ **The 2 most important things to take into consideration when positioning your controller** (many people don't take this into consideration and they risk component failure & limited controller life)
  
- ➡ **The best places to install the controller.** . Can you mount it on it's side? Should it be behind the front grille for airflow? What if you need to take it out in the future? These are important questions which are carefully answered.
  
- ➡ **Using a second hand or forklift controller?** - Make sure you take many photos of your controller in it's previous form with close ups of the terminals. You'll need these later.

## Putting it all together

I know the importance of installing things tidily. When people are standing in front of your "engine" bay, taking photos of your work while asking you a dozen curious questions, you'll want your EV to look good. Tidy wiring and thought-out connections are covered in this chapter.

- ➡ **How to make sure you connect the Potbox the right way** - For a lot of technically inclined people this may seem obvious but I've seen a lot of converters get this totally wrong. The ebook and videos help out quite a lot here.
  
- ➡ **How to install the Voltmeter and Ammeter** - This is another key component that you have to take care of, and make sure it's done tidily. You'll also need to know where to install a "Shunt" for your ammeter – don't worry, this part is covered in detail.
  
- ➡ **How to prevent short-circuits from destroying your batteries** - Simply by installing fuses and a circuit breaker you've chopped out the risk of battery & component damage! I cover just where to put them and what amperage is suitable.
  
- ➡ **Circuit Breaker Installation** - there are a couple of legal requirements for this important item. Did you know that the driver must be able to switch it off – but the driver's not allowed to touch the off switch! Sounds a bit cryptic but it's not: All you need is a pull-cable installed in the right location.
  
- ➡ **Inertia Switch Connection & Installation** - I'll let you in on a little secret where you can often find FREE inertia switches and save at least \$80. Sounds pretty good huh?
  
- ➡ **Complete schematics of building Your Own DC To DC Converter** - a DC to DC Converter keeps your normal car battery and basic electrics working, preventing the headlights, turn signals, radio etc to go flat. I will show you exactly how to turn an existing computer power supply into a usable converter - saving \$100 US! (this cost-cutting option is explained in detail, with full photos in Chapter #7)

- ➡ **How to keep the brake system working 100% of the time** by installing a Vacuum Pump
  
- ➡ **How to install Power Steering** in order to keep your electric car perfectly legal(in every country or state)
  
- ➡ **3 easy options to keep your Air Conditioning working** in your EV for those hot summers. Just because you're going electric, doesn't mean you have to sweat!

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### **Installing a Heater**

Unless you live in the tropics, you're going need a heater in your EV at some point. In fact in some countries having a heater is actually a legal requirement in order to defog the inside of your windscreen.

- ➡ **The simplest & cheapest method to install a heater** - explained in detail in both the videos and in the ebook, you can modify your car's existing heater core to provide instant heat – electrically – saving over a hundred dollars.
  
- ➡ **How to use my K.I.S.S rule of thumb** to create your own 110 volt in-dash heater without paying an EV parts supplier for a kit. It's not hard at all!
  
- ➡ **Wiring the heater - detailed schematics**

## Installing the Batteries

There's a fair amount to consider here. Obviously you have to make sure your batteries will fit into your electric car, but keep in mind the weight – and what that will do to your car's handling and legal limitations.

- ➡ **Legal requirements** - As mentioned, all cars have weight limits – make sure your batteries don't exceed yours.
  
- ➡ **Where to find the best and most inexpensive metal used for battery racks** - A cheap & convenient metal to use is angle-iron. I explain what it is, and how to use it. This is something you can do yourself too!
  
- ➡ **Safety Tips** - I pass on some important safety tips from a qualified seatbelt technician regarding mounting your battery racks securely so they won't tear through your car's metal in an accident.
  
- ➡ **How to choose the best welding cable as your main battery cable** - Using a cable too small will not only increase the resistance of your circuit (choking your performance) but it can increase the risk of fire as your cables overheat under load.
  
- ➡ **How to make sure the batteries will fit perfectly even before you start** -A simple technique I used with great success that enabled me to save tens of hours of hard work and guessing, and running back & forth to the garage – it's all in the measuring!

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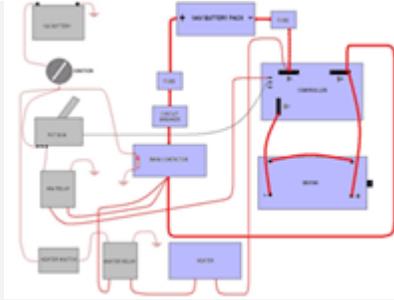
## Powering Up Your Electric Vehicle

This is the essential part of the "Electric Conversion Made Easy" ebook: Time to get your car running on pure electrons which means it's time to wire up all those EV gadgets!

**Remember:** I've simplified all schematics and made them very basic for non technical people to make sense of.

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- ➡ **What to do first** - With a box of components ready to be installed you'll probably be scratching your head – don't panic. Let's tape-up & prepare your tools for safety.
- ➡ **Real Life Examples** - from my own EV conversion
- ➡ **How NOT to get electrocuted** - electrocution isn't fun but you can convert a car without getting zapped if you do it carefully - I'm proof of that.
- ➡ **Before you power it up** - all your parts are installed? Are you ready to turn the key? I run you through a detailed checklist to run through before you turn that key. This part is essential reading!
- ➡ **If your gearbox rotates differently to your motor** - Relax. It's not complicated to change the direction of most motors - if you know how. I translate this mysterious, hard to find "techno-speak" into simple, plain English. No longer is the issue of motor rotation & motor timing adjustment a confusing holy grail.

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## Installing The Charging System

The fourth most vital part to any electric car is its charging system. I'll present you 2 main options to choose from. I've tried both methods so I can explain the pros & cons of each so you can decide which suits your needs & budget.

- ➡ **Mains Powered Pack Charger Method** - simplest and most flexible method – but not always the cheapest. Or is it? You could be able to find a second hand one, use a recycled charger from a forklift. A good "single pack charger" could save you money in the long run by looking after your batteries thoroughly.
  
- ➡ **One-Charger-Per-Battery Method** it's a much cheaper version. By using this method I saved approximately \$800 USD. I'll let you know exactly how to do it – while also explaining issues such as "voltage drop" to make sure it works properly.
  
- ➡ **Vital Safety measures:** Ensuring you connect the correct terminals onto the plug/socket setup in place of your gas filler (this is vital).
  
- ➡ **Other Cost saving solutions:** - cheap and reliable methods of having a mains pack charger: Ever heard of a “bad-boy” charger? While not for the faint hearted, it could save you over a thousand bucks on a factory designed charging system.
  
- ➡ **Mounting the charger into the car** - It's the ultimate in convenience, but you may require special electrical requirements for car to be legal. Have you considered mounting the charger outside the car (in your garage). There are pros & cons to each covered in detail in this chapter.

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## **Preparing Your Electric Car For The Road**

Congratulations! The hard work's been done! Now it's time to get your EV inspected and legal.

- ➡ **How to make sure that your EV pass the inspection** - To give you an idea what the rulebooks look like I provide the strict New Zealand Rulebook in 3 PDF files as a reliable guidance.
  
- ➡ **How To Get Your electric car insured** - Your new EV needs to be insured. This can be a tricky area and it'll really test your insurance company's promised flexibility. I'll show you a handful of proven steps to get your car insured in your area (I've used these myself).

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To Your Success,

*Gavin Shoebidge*