

DIY Prius Generation 3 (2010-2016) Battery Reconditioner **Grid Charger/Discharger (~\$150)**



This is a high voltage project - be careful and use proper precautions when installing the harness for the car, building the charger and using it!



This DIY charger/discharger will help with the high voltage traction battery reconditioning process. It requires a harness to be hooked to the traction battery and a separate harness connected to the fan which cools the battery. The harnesses can be attached and left in place when not using the charger/discharger. Cap the exposed traction battery harness end for safety when not in use. If you google “2010 prius car harness installation high voltage” you’ll find instructions for connecting a harness. The battery fan harness can be spliced into the factory wires at the fan and a connector attached at the other end which connects to the charger/discharger. The total parts cost for this project is about \$150.

Charging and discharging profiles, procedures and precautions can be found on the internet. I’m not going into those detail in this paper.

This project is designed for 120VAC (US) input for the Gen3 Prius NiMH battery. It should also work for the Gen2 Prius battery since the Gen2 battery is the same chemistry/voltage/design.

The project is housed in a ~20” x 4” x 4” PVC/Vinyl post sleeve with end caps. The sleeve was sliced open along its length about ¾” from the bottom.

The “Light bulb discharger” is two standard screw in bulb fixtures wired in series attached to a scrap piece of wood to be used with two 120V incandescent bulbs.

This is a moderate difficulty build, and requires soldering, drilling, mounting, cutting, filing, and some creative thinking when building. Crimping connectors, cutting/stripping skills are also needed. It is VERY important to properly insulate wiring and components!

Although I took care in putting this guide together, you are ultimately responsible for exercising appropriate care and caution in evaluating the design, selecting components, assembly, use, and operation. If you are not familiar with DIY electrical projects, don't attempt this!

Features:

- Voltage and charging current display, gentle constant current (350mA) charging
- Variable speed control for the battery cooling fan
- Connectors and sockets for easy connection/disconnection
- Uses easy to source parts

This is a modified version of <http://projekt.com/locouki/Website/insight/V2-grid-charger-discharger.html>. Also, thanks to the helpful [priuschat](#) members, too!

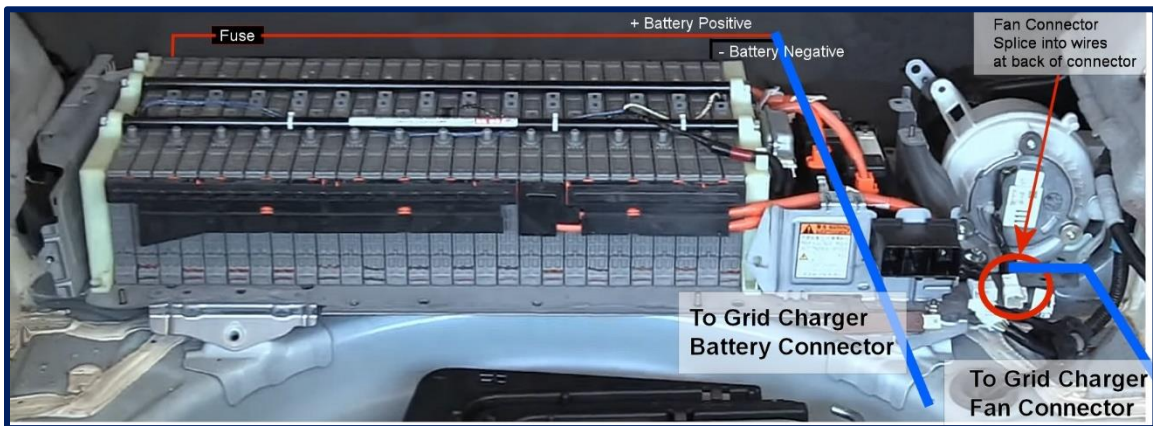
Hope you find this interesting and useful!

tgtech on priuschat.com

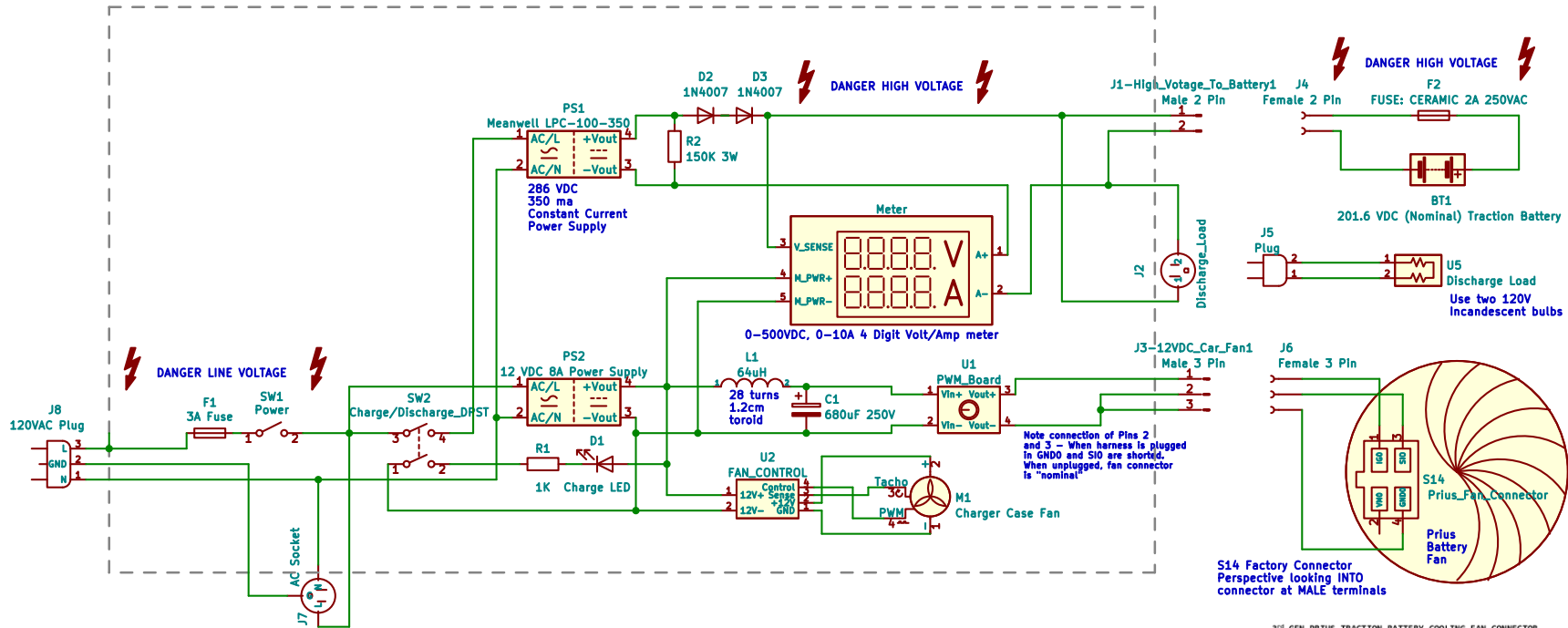
tgtech's DIY Prius Battery Reconditioner – Grid Charger/Discharger



tgtech's DIY Prius Battery Reconditioner – Grid Charger/Discharger



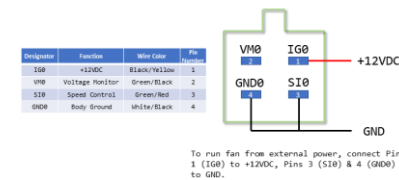
Prius Gen 3 Traction Battery Reconditioner – Grid Charger/Discharger – NiMH – V1.0



IMPORTANT: Car must be in OFF state during the reconditioning process!

1. Fuse F2 for the Traction Battery should be mounted as close to the battery positive terminal as practical
2. Ensure cabling/insulation is rated at 250V DC or greater
3. Harnesses to the Traction battery and the Fan are needed to connect the reconditioner to the battery and fan
4. Be careful with conductors carrying AC (Line) voltages and charger/traction battery voltages
5. Before powering the car ON, turn off the reconditioner and unplug the harnesses
6. AC Socket U1 is for convenience

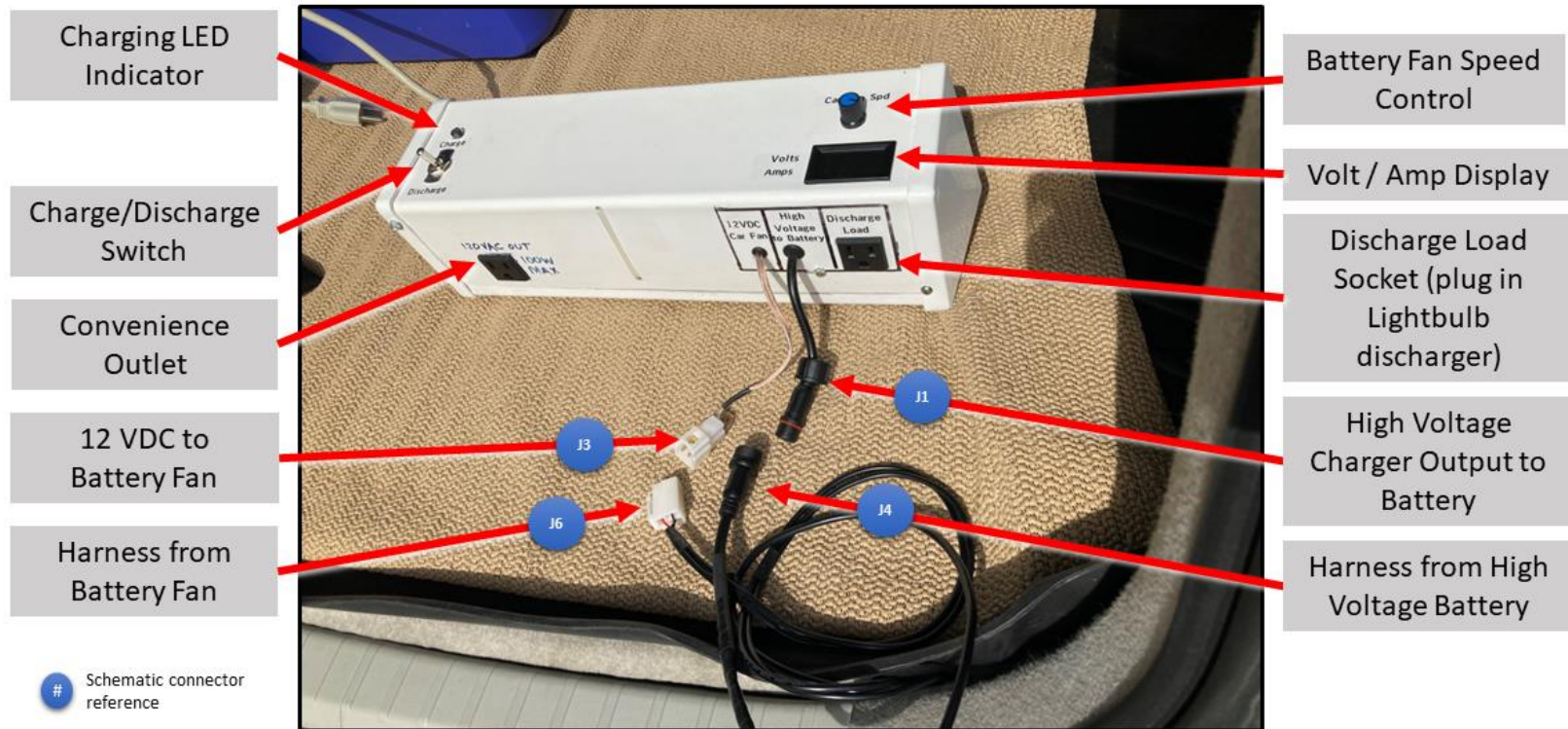
3rd GEN PRIUS TRACTION BATTERY COOLING FAN CONNECTOR
S14 Connector attached to fan, Perspective Looking into the connector at the Male terminals



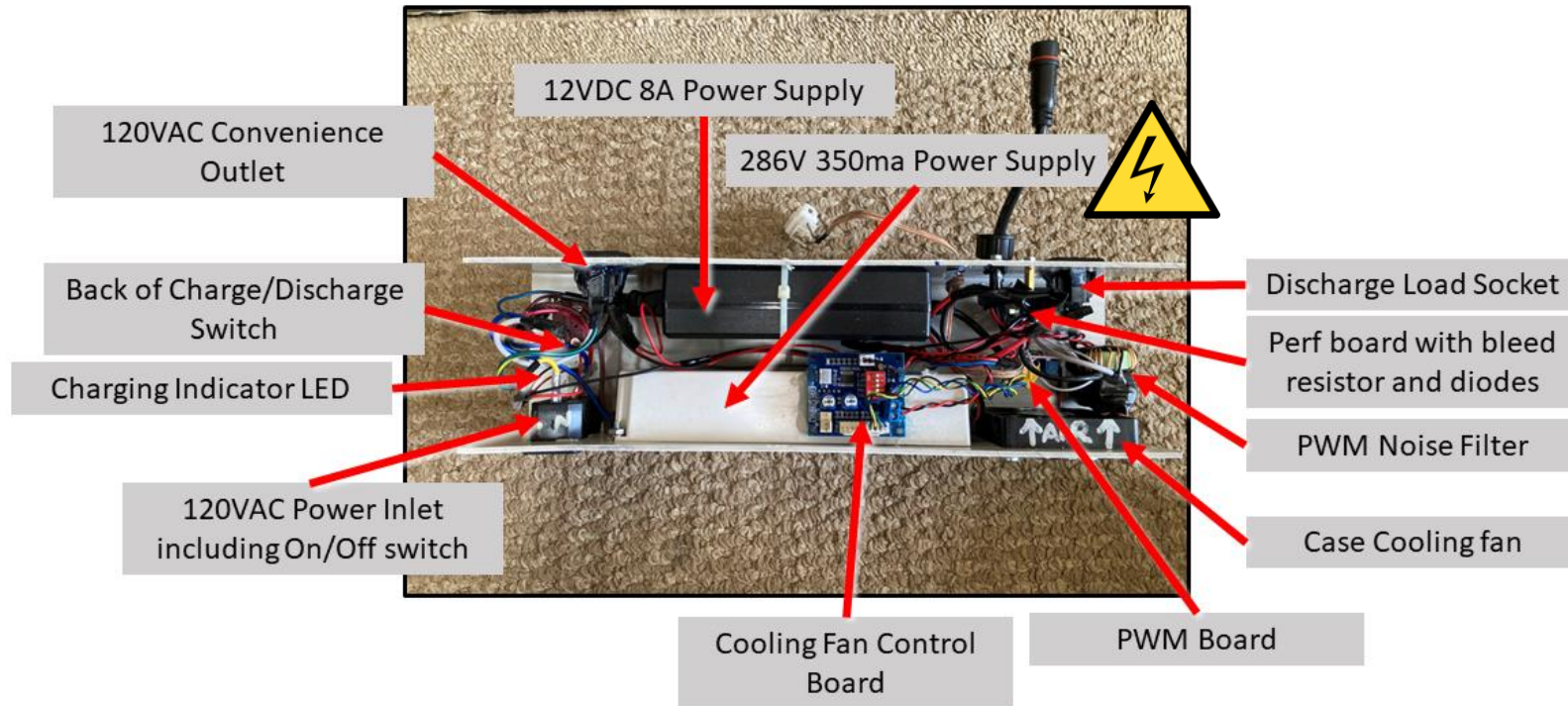
To run fan from external power, connect Pin 1 (GND) to +12VDC, Pins 3 (S10) & 4 (GND) to GND.

| | | | | | |
|------------------------------------|----------------------------|-------|--|---------|--|
| Sheet: / | | Date: | | Rev: | |
| File: PriusHVGridCharger.kicad_sch | | | | | |
| Title: | | | | | |
| Size: A4 | KiCad E.D.A. kicad (6.0.6) | | | id: 1/2 | |

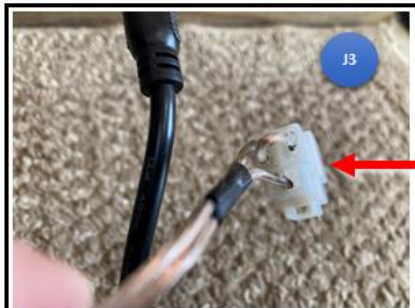
Prius Gen3 Battery Reconditioner - Grid Charger/Discharger *Overview*



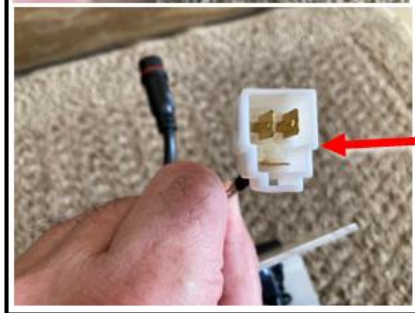
Prius Gen3 Battery Reconditioner - Grid Charger/Discharger *Interior*



Prius Gen3 Battery Reconditioner - Grid Charger/Discharger *Connectors*



Rear of Male connector –
12VDC to Battery Fan
Note jumper between
two pins



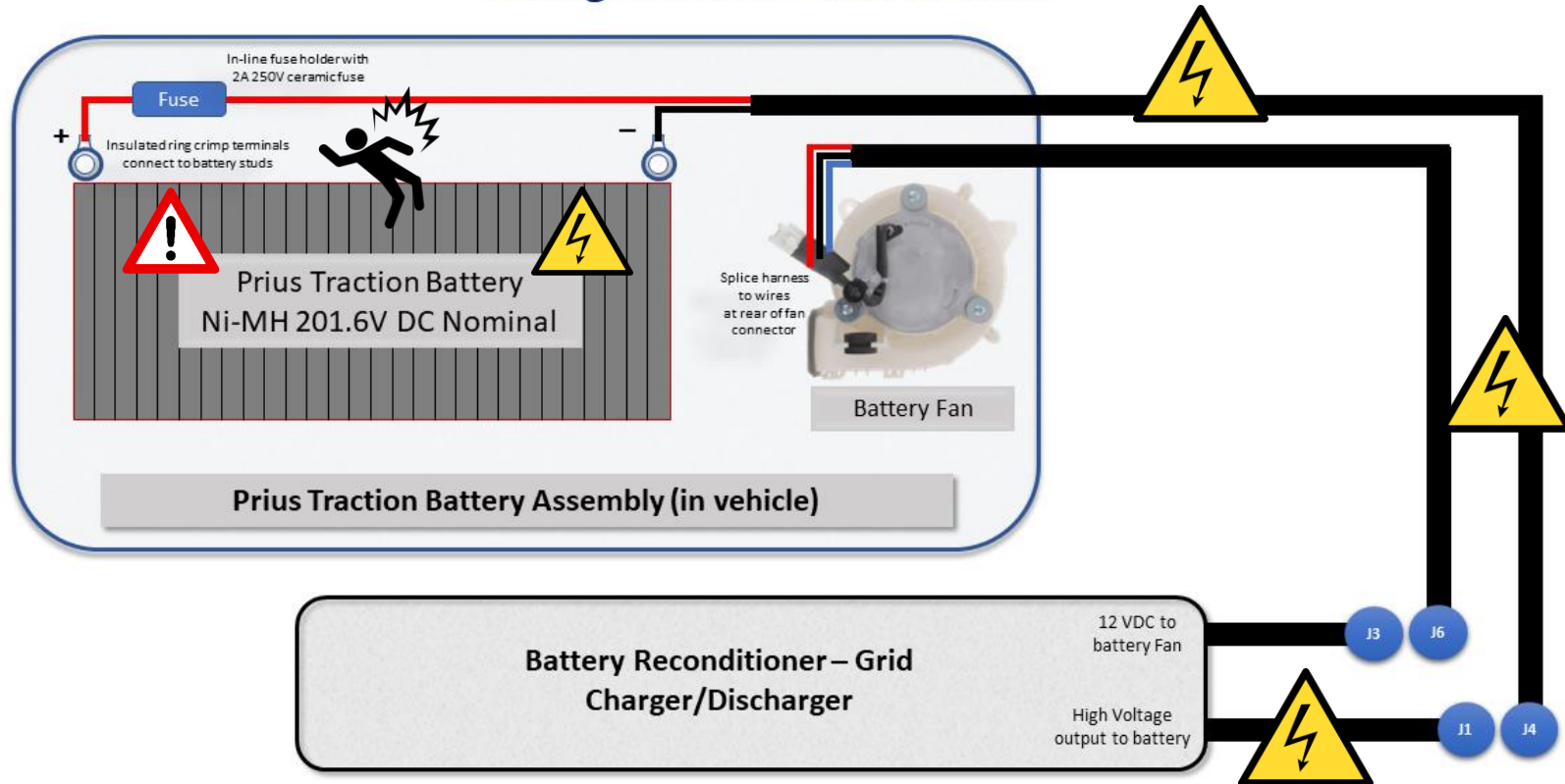
Front of Male
connector – 12VDC to
Battery Fan



Male Connector
for High Voltage
Charger Output to
Battery



Prius Gen3 Battery Reconditioner - Grid Charger/Discharger *Wiring Harness Connections*




REMOVE THE SERVICE PLUG BEFORE WORKING ON OR IN BATTERY!! EXERCISE PROPER PRECAUTIONS WHEN WORKING ON HIGH VOLTAGE DEVICES!!



For help removing the service plug, watch the [2010 - 2015 Prius Service Plug](#) video

Parts:

Volt/Amp meter – need 1:



Condition: **New**

Bulk savings: Buy 1 \$4.99/ea, Buy 2 \$4.84/ea, Buy 3 \$4.79/ea

Quantity: 4 or more for \$4.74/ea
More than 10 available / **2 sold**

Price: **US \$4.99/ea**

Buttons: Buy another, Add to cart, Make Offer, Add to Watchlist

DC0-500V 0-10A 4 Bit Voltmeter Voltage And Current Adjustable Voltage Meter

Shop with confidence
eBay Money Back Guarantee
Get the item you ordered or get your money back.
[Learn more](#)

Seller information
szb6721960 (30,6153)
99.4% Positive feedback

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[Visit store](#)
[See other items](#)

A seller you've bought from Returns accepted

Power Inlet (includes fuse) – need 1:



Anrader 6pcs Inlet Module Plug Male Power Socket with 5A Fuse Switch 10A 250V 3 Pin IEC320 C14

204 ratings | 14 answered questions

Amazon's Choice for "c14 plug"

\$9.99


prime & FREE Returns

You can get up to 5% off on Amazon Business — and this past year, you would have saved \$93.02. Sign up, it's free. More details

| Product Specifications | |
|------------------------|----------------------------|
| Specification Met | |
| Style | Power Socket w Switch Fuse |
| UNSPSC Code | 39000000 |

Specification for this product family (See all 3 products)

Load and Aux sockets – need 2:



Roll over image to zoom in

VIDEO

weideer 3Pcs 3 Pins US Power Socket Plug Panel 15A 125V AC Panel Mount Outlet Industrial Plug Female Connectors Adapter With 18AWG Connection line K-019-X

52 ratings

\$8.99

prime One-Day & FREE Returns

You can get up to 3% off on Amazon Business — and this past year, you would have saved \$93.02. Sign up, it's free. More details

Get a \$200 Gift Card: Pay \$0.00 \$8.99 upon approval for the Amazon Prime Rewards Visa Card. No annual fee.

Eligible for amazon smile donation.

Size: **With wire**

| | |
|-------------------------------------|---------------------------------|
| With wire \$8.99 prime | Without wire \$7.99 prime |
|-------------------------------------|---------------------------------|

• Socket Total Size:30.5x26.5x34mm/1.2"x1.0"x1.3";Mounting holes:21.5x25mm/0.84"x0.9";Top Square Face Size:26.5 x26.5mm / 1.0" x 1.0"

Charge/Discharge Switch – need 1:



Baomain Toggle Switch DPST ON/Off 2 Position 250VAC 15A 125VAC 20A 1/2" mounting Hole Screw Terminal

Visit the Baomain Store
★★★★☆ 210 ratings

\$6²⁹

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You can get up to 10% off on Amazon Business — and this past year, you would have saved \$93⁰². Sign up, it's free. More details
Eligible for amazon smile donation.

| | |
|---------------|----------------|
| Mounting Type | Screw Terminal |
| Contact Type | Dpst |
| Brand | Baomain |
| Material | Metal |
| Terminal | Dpst |

About this item

- Rating: 250VAC 15A, 125VAC 20A
- Contact: Double pole single throw(DPST)

12V DC power supply – need 1:



12V 1A 2A 3A 5A 6A 8A 10A Power Supply AC to DC Adapter for 5050 LED Strip Light

Condition: New

Sale ends in: 08h 05m 02s

Model: 8A

Quantity: 1 More than 10 available
817 sold / See feedback

Price: **US \$13.57**

~~US \$14.59~~ Save 7%

Buy It Now

Add to cart

Add to Watchlist

A seller you've bought from Free shipping and returns 817 sold

Shipping: FREE Standard Shipping | See details
Located in: Saint Albans, New York, United States

Case cooling fan controller – need 1:



HiLetgo DC 12V 5A PWM PC CPU Fan Temperature Control Speed Controller Board Speed Controller Temperature Probe Buzzer

Visit the HiLetgo Store
★★★★☆ 34 ratings | 7 answered questions

\$7⁹⁹

✓prime One-Day & FREE Returns

| | |
|----------|----------|
| Brand | HiLetgo |
| Voltage | 12 Volts |
| Material | FR4 |

About this item

- Circuit load capacity: maximum current per output 5A, the bus currents up 9A
- Output Range: The first channel 20% -100%, or 40% -100% (TFL = ON)
- Working voltage: DC12V
- Stall alarm minimum speed: 700-800 rpm
- Temperature probe parameters: 50K B = 3950

Compare with similar items

Report incorrect product information.

Roll over image to zoom in

Case cooling fan – need 1:



GDSTIME 80mm PWM Fan, High Speed 12V 4PIN
80mm x 25mm CPU Cooler Fan Cooling

Visit the GDSTIME Store
★★★★★ 97 ratings | 3 answered questions
Amazon's Choice in Computer Case Fans by GDSTIME

-16% \$15⁹⁹

List Price: \$18.99

✓prime One-Day

& FREE Returns

Coupon: ✓ 5% coupon applied at checkout. Terms

You can get up to 14% off on Amazon Business — and this past year, you would have saved \$93⁰². Sign up, it's free. More details

Size: 80x80x25mm

| | | | |
|---------------------------------|---------------------------------|---------------------------------|-----------------------------------|
| 80x80x25mm \$15.99 ✓prime | 80x80x38mm \$14.99 ✓prime | 92x92x38mm \$15.99 ✓prime | 120x120x38mm \$20.99 ✓prime |
|---------------------------------|---------------------------------|---------------------------------|-----------------------------------|

Cooling fan finger guard – need 1:



Bgears 2 Pieces Pack Cooling Fan Grill
80mm

Brand: Bgears
★★★★★ 77 ratings

\$2⁹⁹

✓prime One-Day

& FREE Returns

Thank you for being a Prime Member. Get \$125 off: Pay \$0.00 \$2.99 upon approval for the Amazon Business Prime Card. Terms apply.

Size: 80mm

| | |
|--------------------------|--------------------------|
| 80mm \$2.99 ✓prime | 90mm \$7.27 ✓prime |
|--------------------------|--------------------------|

- Steel Chrome Finished
- Prevent external object from touching the Fan blades
- 80mm x 80mm x 2mm

High voltage power supply – need 1:



[PowerNex] Mean Well LPC-100-350 286V 350mA 100W Single Output LED Power Supply

Brand: MEAN WELL

\$30⁹⁴

Get a \$200 Gift Card: Pay \$0.00 \$30.94 upon approval for the Amazon Prime Rewards Visa Card. No annual fee.

- Constant current mode
- High efficiency up to 90%
- Fully encapsulated with IP67 level
- Isolation class II, no F.G.
- 2 years warranty

Specifications for this item

| | |
|--------------|---------------|
| Brand Name | MEAN WELL |
| Ean | 6083351366432 |
| Item Weight | 1.34 pounds |
| Model Number | LPC-100-350 |

Cabling/connectors – need 2 pairs:



BTF-LIGHTING 3 Pin Electrical Connector 18AWG IP65 Male Female Connector 7.87in/20cm Extension Cable for Car,Truck,Boat,Indoor/Outdoor LED Strip Lights/String 22mm Nut Big Size 5 Pairs

Visit the BTF-LIGHTING Store

★★★★★ 751 ratings | 77 answered questions

\$12.99 (\$2.60 / Count)

prime One-Day

& FREE Returns

You can get up to 9% off on Amazon Business — and this past year, you would have saved \$93.02. Sign up, it's free. More details

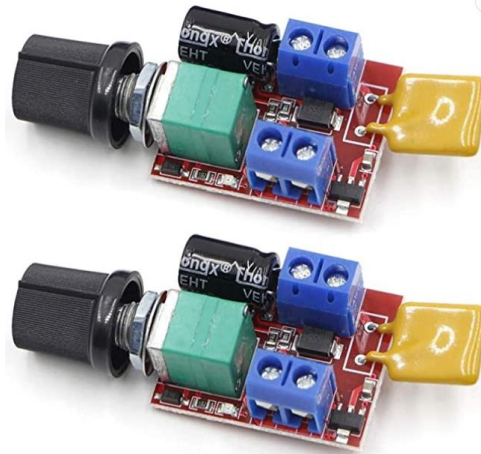
May be available at a lower price from other sellers, potentially without free Prime shipping.

Extra Savings Promotion Available. 1 Applicable Promotion

Size: 3 pin

| | | |
|---|---|---|
| 2 pin \$11.99 (\$2.40 / Count) prime | 3 pin \$12.99 (\$2.60 / Count) prime | 4 pin \$12.99 (\$2.60 / Count) prime |
|---|---|---|

Fan motor speed control – need 1:



Riorand DC 3V 6V 12V 24V 35V 5A Motor Speed Controller PWM Speed Control Ultra Small LED Dimmer (2PCS)

Brand: Riorand

★★★★★ 111 ratings | 8 answered questions

\$8.99

prime

& FREE Returns

You can get up to 5% off on Amazon Business — and this past year, you would have saved \$93.02. Sign up, it's free. More details

- Speed Control Switch Low Voltage DC 3V 5V 6V 12V 5A;Control Power: 90W;Duty Cycle adjustable: 1%~100%
- Motor Speed Controller with a self-recovery fuse 5A and a Power-On LED light
- Provide a continuous current of 5A to your DC brush motor or other DC load
- This mini controller will be disconnected automatically if the current is too large and the fuse will recover automatically after cooling
- Please just contact me by email if there are any issue and I will solve it within 24 hours

See more product details

Report incorrect product information.

Wiring for harness – need about 30 feet for Traction battery harness and fan harness:



18 Gauge 2 Conductor Electrical Wire 18AWG Electrical Wire Stranded PVC Cord Oxygen-free copper Cable 65.6FT/20M Flexible Low Voltage LED Cable for LED Strips Lamps Lighting Automotive(18/2AWG-65.6FT)

Brand: TZMOIK

★★★★★ 647 ratings

\$24.99

prime

& FREE Returns

You can get up to 4% off on Amazon Business — and this past year, you would have saved \$93.02. Sign up, it's free. More details

Get a \$200 Gift Card: Pay \$0.00 \$24.99 upon approval for the Amazon Prime Rewards Visa Card. No annual fee.

Eligible for amazon smile donation.

Color: 18AWG-2C/65.6FT



Inline fuse holder for harness – need 1:



Philmore 507 GMA (5mm x 20mm) Inline Fuse Holder ~ 10A @ 250V Maximum

Condition: **New**
 Quantity: 0 available / 2 sold

Price: **US \$1.99** [Add to Watchlist](#)

Shipping: **US \$3.79** Standard Shipping | [See details](#)
 Located in: Costa Mesa, California, United States

Delivery: Estimated between **Sat, Jul 30** and **Mon, Aug 1** to 20736 | [See details](#)

Returns: 30 day returns | Buyer pays for return shipping | [See details](#)

Payments:

PayPal CREDIT
 Special financing available. | [See terms and apply now](#)

Earn up to 5x points when you use your eBay Mastercard®. [Learn more](#)

Fuse for high voltage harness – need 1:

Digi-Key ELECTRONICS | All Products | F4609-ND

Product Index > Circuit Protection > Fuses > Littelfuse Inc. 0215002.MXP

0215002.MXP

Digi-Key Part Number: F4609-ND
 Manufacturer: [Littelfuse Inc.](#)
 Manufacturer Product Number: 0215002.MXP
 Description: FUSE CERAMIC 2A 250VAC 5X20MM
 Manufacturer Standard Lead Time: 27 Weeks

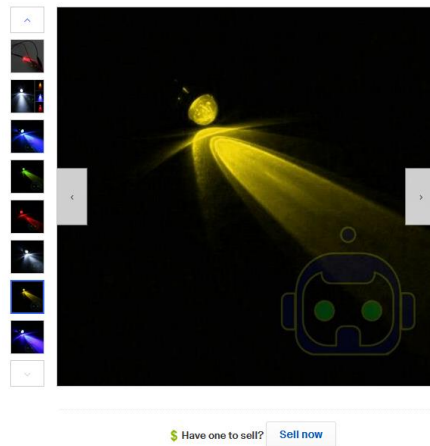
Detailed Description: 2 A 250 V AC DC Fuse Cartridge, Ceramic Holder 5mm x 20mm

Customer Reference:

cms-datasheet [cms-datasheet](#)

Image shown is a representation only. Exact specifications should be obtained from the product data sheet.

LED for charging indicator – need 1:



3mm 5mm 8mm 10mm Pre Wired LED + Holder DC9-12V Color Lights Emitting Diodes

Condition: **New**
 LED Size:
 Qty.:
 Color:
 Quantity: More than 10 available
 2,453 sold / [See feedback](#)

Price: **US \$5.95** [Buy It Now](#)
[Add to cart](#)
[Add to Watchlist](#)

A seller you've bought from: 2,453 sold | Returns accepted

Shipping: **FREE** Standard Shipping | [See details](#)
 Located in: Duluth, Georgia, United States

Delivery: Estimated between **Mon, Aug 1** and **Thu, Aug 4** to 20736 | [See details](#)

Returns: 30 day returns | Buyer pays for return shipping | [See details](#)

Payments:

PayPal CREDIT
 Special financing available. | [See terms and apply now](#)

[\\$ Have one to sell? Sell now](#)

Generic connector kit (use one 3-pin male/female pair for the Traction Battery Fan):



Glarks 400Pcs 6.3mm 1 2 3 4 6 8 9 Pin Electrical Automotive Wire Connector Male Female Socket Plug and Pin Header Crimp Wire Terminals Kit for Motorcycle, Bike, Car, Boats

Brand: Glarks
★★★★★ 544 ratings | 4 answered questions

\$18⁹⁹

✓prime One-Day & FREE Returns

Thank you for being a Prime Member. Get \$125 off: Pay \$0.00 \$18.99 upon approval for the Amazon Business Prime Card. Terms apply.

Size: 400Pcs 1 2 3 4 6 8 9 Pin

| | |
|-------------------------------------|------------------------------------|
| 10Set 6.3mm 8P \$10.93 ✓prime | 10Set 6.3mm 9P \$9.99 ✓prime |
| 20Set 6.3mm 6P \$12.95 ✓prime | 30Set 6.3mm 1P \$7.99 ✓prime |

Roll over image to zoom in

Electronic components (reference the schematic for part references):

- 1K Ω ¼ W resistor (R1) to drop the current for proper LED operation.
- 150K Ω 3 watt resistor (R2) for bleeding down voltage when power is removed.
- Two 1N4007 diodes (D2, D3) to prevent backflow from the battery into the charger.
- Inductor (L1) to reduce electrical noise from the PWM control. *Inductor L1's value is not terribly critical, I wound 28 turns of magnet wire around a 1.2cm radius ferrite toroid (see pic below):*



- 680 μ F 24V (or greater) electrolytic capacitor (C1) to reduce electrical noise from the PWM control. *Capacitor C1's value is also not terribly critical, anything from 250 μ F to 750 μ F would probably work fine. It does have to be rated at 24V or higher. Pay attention to polarity when wiring:*



Other miscellaneous parts:

- 4" x 4" PVC/Vinyl post sleeve and end caps. One end cap needs to be drilled to allow air flow (see pics)
- 3 pin PC power cord for powering the unit (if using the recommended power inlet connector)
- Crimp fittings to make the harnesses to the traction battery
- Heat shrink insulation
- Zip ties
- Nuts, bolts, screws, standoffs
- Perfboard for mounting electronic components
- Hookup wire
- Grommets
- Old extension cord to use for light bulb discharger cord
- Two light bulb sockets for discharger, scrap wood for base