



# AJS/Matchless Lightweight 12V conversion

A quick and easy guide to converting an AJS or Matchless 250 or 350 Lightweight to 12V electrics.

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## INTRODUCTION

The electrical system on an AJS/Matchless Lightweight leaves a bit to be desired. The charging system is primitive and the 6V electrics mean that the headlight is poor. Fortunately, the alternator has plenty of output and it's easy to convert the system to 12V operation, which will also enable you to fit an electronic ignition system.

The Wipac alternator is a two-phase, 60W affair. You can connect the three output wires straight into a three phase rectifier. This will work just fine (and has the advantage that you don't need to puzzle out which alternator wire is which...).

The only downside of this 12V conversion is that you will lose the "EMG" feature that allows you to start the engine when the battery is flat. However, the greater reliability of the electronic charging system should mean that you won't miss it.

Read on for more information...

## Step 1 — 12V conversion parts



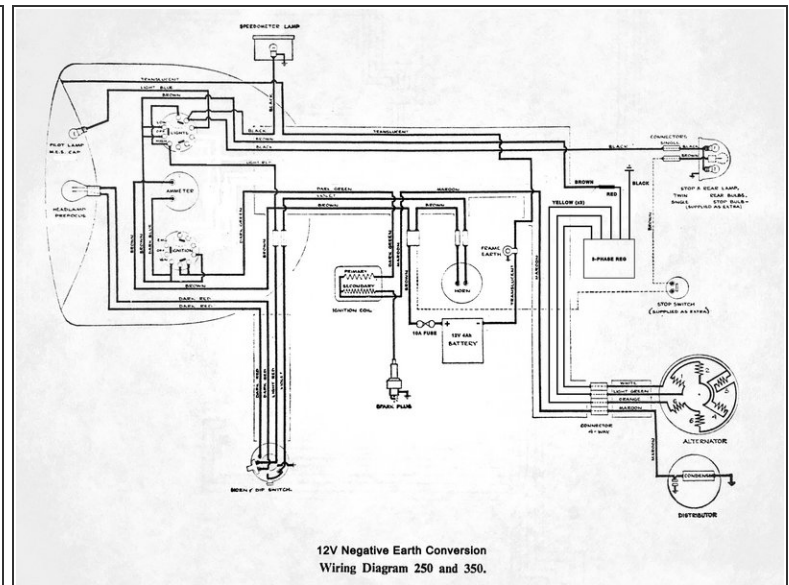
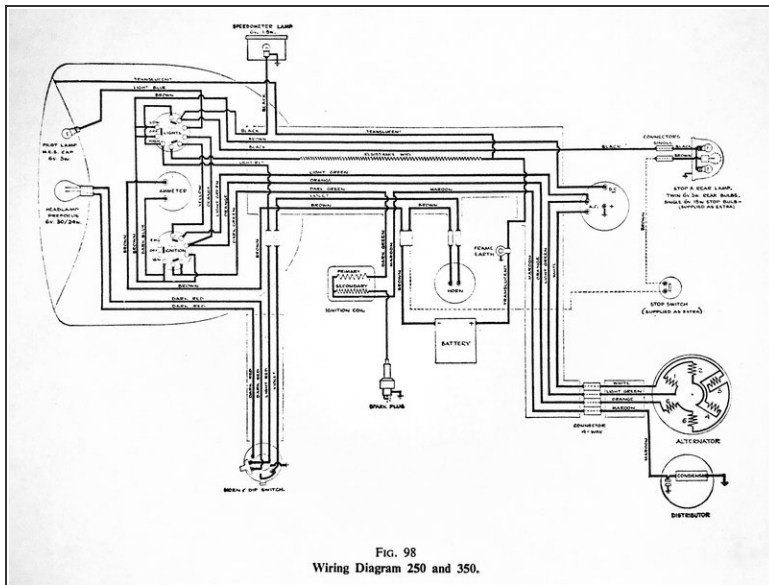
- You will need the following parts to convert your bike to 12V:
  - 12V 4Ah battery (e.g. YTX5L-BS)
  - Rubber battery strap
  - 10A in-line fuse and a selection of crimp or solder terminals
  - A single-phase (2 wire) or 3-phase (3 wire) 12V regulator rated at 150W or more. A-Reg, Wassell or Podtronics all fine)
  - 12V 4 ohm ignition coil
  - 12V bulbs
  - 12V horn (optional)

## Step 2 — Check your alternator stator



- ① The alternator stator is supposed to be insulated from earth.
- ⚠ Unfortunately, as the stator insulation degrades, the coil can become connected to earth. If this happens it *will* destroy your shiny new electronic regulator. The insulation in the picture is visibly damaged and eventually caused a short circuit...
- So, check the stator windings are free of earth with a resistance check.
- Disconnect the three alternator wires and check the resistance from any wire to earth. You should see a reading over 10k ohms.

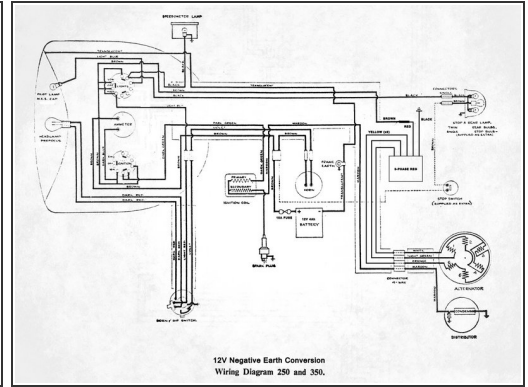
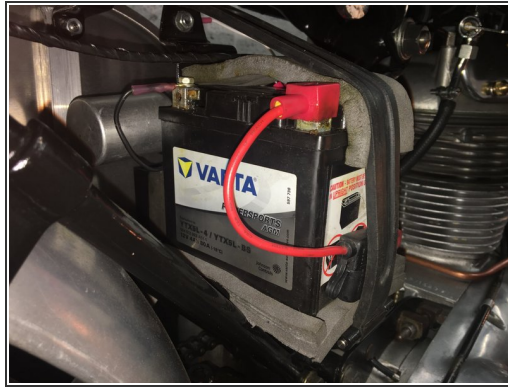
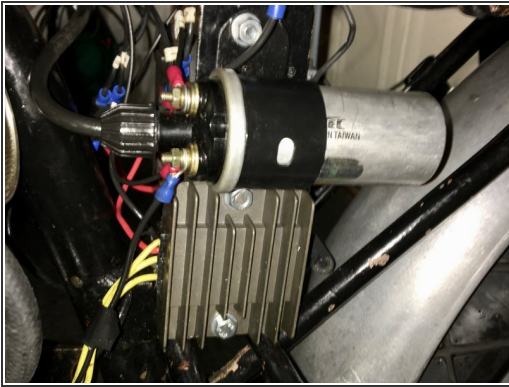
## Step 3 — Remove the 6V parts



- i The 12V system is quite a bit simpler than the Wipac system, as there's no longer a need to switch the alternator output with the headlight. It's probably easier to refer to the differences in the wiring diagram pictures to see what needs to be removed...
- i The traditional conversion uses a single phase (two wire) regulator by joining the orange & light green wires. My diagram shows a 3-phase (three wire) regulator connected to the three alternator wires, which will also work just fine.
- Disconnect and remove the 6V battery. Note the brown wire that went to the negative terminal; we'll be connecting the 12V battery positive terminal to it later (via a 10A fuse).
- Disconnect and remove the rectifier, noting the brown wire that went to the rectifier negative terminal (you'll be connecting the 12V regulator to this wire later...)
- Remove the orange, light green and white wires, as well as the resistance wire, from the main loom
- Remove the 6V ignition coil
- Remove the headlamp bulb, sidelight bulb, stop/tail bulb (and any other 6V bulbs)



## Step 4 — Fit the 12V battery & regulator



- Fit the regulator somewhere convenient (above or below the coil is a good option)
- Fit the new 12V battery. The widely-available 4Ah YTX5L-BS fits in the existing tray just fine. Use a bit of foam to isolate the battery from the engine vibration and a rubber strap to hold it in place.
- Connect a 10A inline fuse to the battery positive lead and connect the other side to the brown wire that previously went to the 6V battery negative terminal (for negative earth)
- To use a single-phase regulator, you need to **join** the orange and light green alternator wires and connect them to one of the yellow regulator wires. The white alternator wire goes to the other yellow regulator wire. To use a 3-phase regulator, connect the yellow wires to the three alternator wires. It doesn't matter which one goes to which.
- Connect the black wire from the regulator to earth (for negative earth)
- Connect the red wire from the regulator to the brown wire that previously went to the rectifier (for negative earth)
- Connect the battery negative terminal to earth (for negative earth)

## Step 5 — Fit the rest of the 12V parts



- The lights, coil and horn should all be changed for 12V items. Make sure the new coil is connected the right way round: the "-" terminal should be connected to the maroon wire that goes to the points (assuming negative earth)
- ⓘ There's no need to change the condenser if you are sticking with the Wipac points ignition.
- If you wire the system for negative earth, then you can use widely-available LED bulbs
- ⓘ I tried two different LED headlamp bulbs. They were nice and bright, but both failed after a few months due to the cooling fan breaking. I'd recommend only using fanless LED bulbs. I have since found that the alternator has enough output to power a proper 55/60W H4 halogen, so I just use one of those.
- ⚠ If you are using negative earth, then don't forget to swap the wires to the ammeter, otherwise it'll read backwards

## Step 6 — Test it



- Switch the headlight on. The ammeter should show discharge. If it shows positive charge, you need to reverse the ammeter connections.
- Switch the headlight off, put the ignition switch to "IGN" and start the engine as usual
- The ammeter should show positive charge
- Switch on the headlight. The ammeter should still show positive charge.
- Check the horn and brake lights. Everything should work as normal.

Now you can enjoy easier starting and brighter lights!