

## BMW /5 charging system upgrade

**A**s good as BMW's classic /5 series is, there's always room for improvement. One thing old /5s — and just about every airhead from 1970-1994 — can really benefit from is a charging system upgrade. While the stock system basically works fine, it can come up short in voltage delivery, especially in low-rpm urban situations where the engine doesn't spin at high enough revolutions to maintain the necessary voltage to keep the battery up.

Euro MotoElectrics in Denver, Colorado ([euromotoelectrics.com](http://euromotoelectrics.com)), specializes in electric system upgrades for BMW, Moto Guzzi and Ducati. Over the years, they've developed numerous starting and charging kits for vintage and contemporary BMWs, including the EnDuraLast III kit for 1970-1977 airheads.

The comprehensive kit includes a new 4-wire stator plus a new rotor, diode board, diode board mounts, alternator brushes, an adjustable voltage regulator and wiring. The major benefits of the system are increased output (240 watts versus 180 watts stock), with charging voltage coming on at significantly lower rpms than the stock system.

For our install on a 1973 R75/5 we also had Euro MotoElectrics send us a new front crankshaft oil seal (easy to do while you're there) along with a rotor removal bolt and an optional resistor lead for the charging light. The charging light excites the system, but if the light fails the system won't charge. This simple modification is just a safeguard in the unlikely event the charge light does fail.

This is a high-quality, well-thought-out upgrade and everything goes together exactly as it should. That said, we suggest making this a weekend project to give yourself plenty of time, as it is fairly involved for the average weekend warrior. Required tools include a good soldering iron and solder/flux, a torque wrench, and, if you replace the crankshaft seal, a seal puller.

Depending on the exact year of your bike, you may or may not have to install an insulated Y-post connection for the upgraded 4-wire stator. The extra wire — added starting in 1974 — increases the efficiency of the AC to DC conversion. We forgot to order the available kit and came up with our own Y-post, a 4mm bolt with mylar for insulation. Simple enough, but the optional Y-bolt kit from Euro is only \$2.75 and worth getting. That brings us to cost, which we consider very reasonable given the improvements gained (more on that in a second). The complete kit goes for \$350, with the rotor tool adding \$8.25, the seal \$7.95 and the charging light circuit mod another \$20, for an all-in of \$388.95 if you also get the Y-post kit. By comparison, a replacement BMW rotor and stator alone will set you back almost \$500.

As for performance, our system went from barely producing 13 volts at 4,000rpm to kicking out 14.25 volts as low as 1,500rpm. That's an impressive improvement, ensuring full charging even if all you do is lope around town. As ever, we suggest having a good manual on hand for parts identification and proper torque specs.



The upgrade kit includes a new 4-wire stator, rotor, diode board and mounts, regulator, brushes and wiring. The seal is optional.

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# MOTORCYCLE CLASSICS HOW-TO



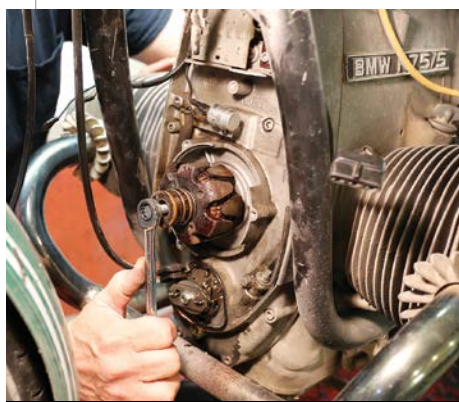
**1** First and most importantly, disconnect the battery by removing the ground cable. The alternator is under the front engine cover. Remove the three Allen-head bolts securing the front cover to the engine and remove the cover.



**2** Next, disconnect the electrical connections at the alternator (five spades on our R75), then remove the three Allen-head bolts securing the alternator cover and stator to the engine.



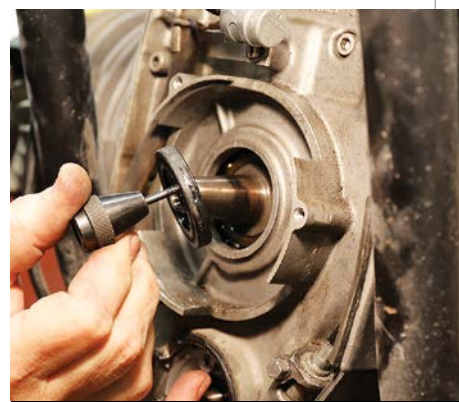
**3** With the Allen-head bolts removed the alternator cover and stator should remove easily as a unit to reveal the alternator rotor. The stator is pinned to the cover with a roll pin at the factory. The new stator is not.



**4** Remove the Allen bolt securing the alternator rotor to the crankshaft. Install the long removal bolt. It threads into the rotor only, pushing against the inside of the crank to pull the rotor free.



**5** Tighten the bolt, then tap the rotor with a brass or rubber mallet. It will usually pop off its taper. Be careful not to overtighten the bolt; it could break.



**6** With the rotor off, we elected to replace the front crank seal. It wasn't leaking, but it's easy enough to do. After drilling a small pilot hole, we used a seal puller and it popped right out.



**7** Installing the new seal is a simple matter of positioning it and pushing it evenly around its circumference with hand pressure to start, followed by seating with a flat driver such as a socket or small block of wood, working evenly around until it's flush with the case.



**8** Using a soldering iron, melt the solder securing the three wires from the stator to the junction block on the alternator cover and remove them from the block. The blue device is a "solder sucker" — a handy vacuum that sucks up the solder and gets it out of the way while you're working.



**9** With the three alternator wires pulled free from the junction block, remove the two screws securing the block to the cover and remove the block.



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**10** Next, place the cover on the jaws of a vice with the stator clear and gently drive the stator out of the cover, working back and forth from one side to another. It usually comes out quite easily.



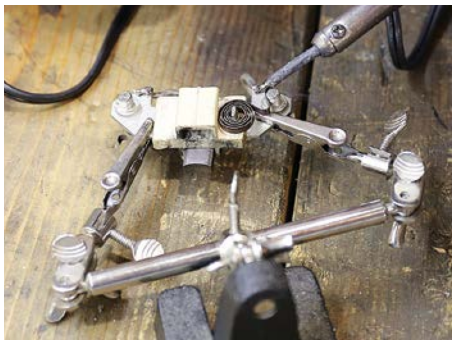
**11** With the stator removed, flip the cover over and remove the two nuts securing the brush holder to the alternator cover, followed by the brush holder itself. Note the insulating collar on one of the locating posts.



**12** With the brush holder removed, use a soldering iron to melt the solder at the brush lead connections and remove the brushes from the holder.



**13** The kit comes with new brushes. The insulation on the leads from our old brushes was in good shape so we transferred it to the new brushes after first lightly soldering the wire ends to keep them closed.



**14** Next, install and solder the new brushes to the holder, making sure that once installed the brush wires will be under the holder and the solder joint at the top for proper clearance to the cover. Reinstall the brush holder, noting the insulating collar on one locating post.



**15** Our early alternator required adding a Y post for the new 4-wire stator. We drilled a 5mm hole in the position shown, then used a mylar insulating collar and mylar washers to isolate a fixed mounting post made from a 4mm bolt with one nut fixing it to the cover and another to fix the fourth wire and the spade terminal connection.



**16** Next, install the new stator in the alternator cover, making sure it's clocked so the stator wires freely pass through the cover as shown. This photo shows the new stator's fourth wire secured to the Y post we installed.



**17** Install the junction block for the stator wires and solder the wires in place. It doesn't matter which goes where. If necessary, ream out the holes for the wires using a small drill bit. Clip the excess off the wires when done.



**18** We next swapped out the original diode board, a simple matter of removing the four Allen screws securing it to the engine. Some engines had rubber mounts for the diode board. Ours did not.



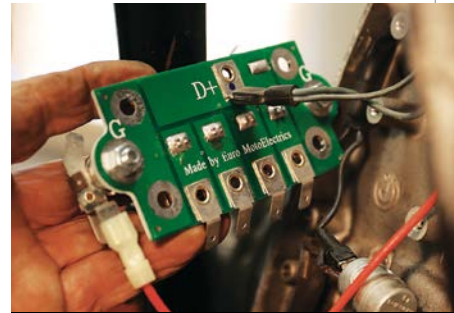
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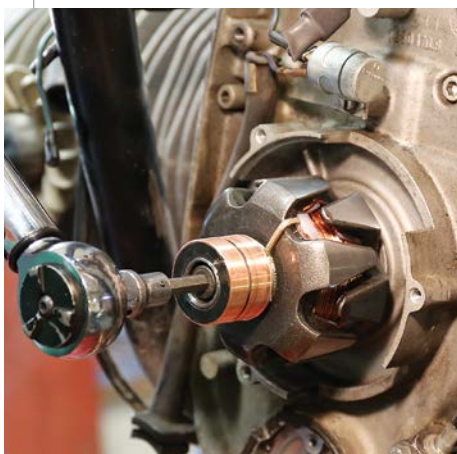
**19** Before installing the new diode board we wired in a new power lead to the main terminal on the starter. This is to ensure a solid voltage path.



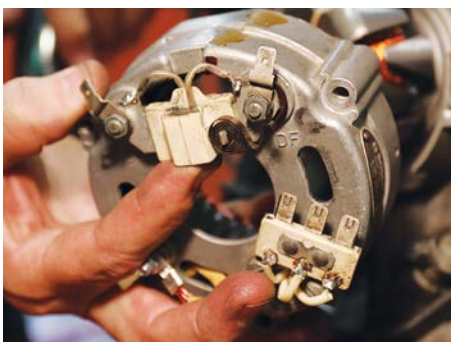
**20** The original power lead from the wiring harness was redundant. To keep it available but isolated, we insulated the connecting spade terminal with shrink wrap tubing.



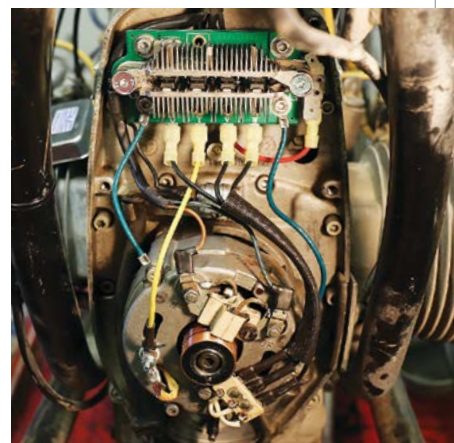
**21** Connect the wiring to the D+ terminal on the back of the new board (the new wire from the starter is also shown connected). Note: Our early bike required shortening the original diode board mounting screws 0.25 inch each to mount the new diode board.



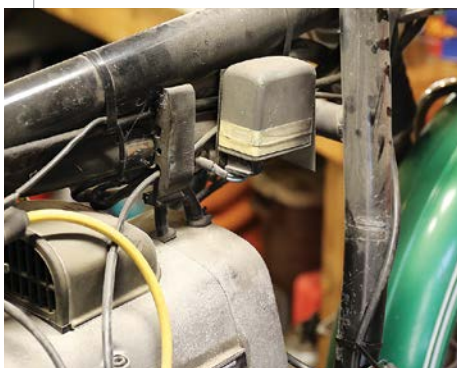
**22** Next, we installed the new rotor, using the supplied new bolt and lock washer and torquing it to 14ft/lb.



**23** Install the alternator cover and stator. To keep the brushes clear of the rotor slip rings, carefully pull the brush springs back, cocking them on the brush holder mounting posts. Snug the bolts down to roughly 6ft/lb. Do not overtighten. Reseat the brush springs.



**24** With the alternator installed, connect all the wiring as shown. The blue wires are additional grounds.



**25** Our final step (we could have done this at any time) was to replace the original voltage regulator and install the optional charging light energizing circuit. The fuel tank must first be removed to gain access to the voltage regulator.



**26** Replacing the regulator is a simple matter of disconnecting the regulator harness before removing two bolts, transferring the harness to the new regulator and bolting it to the frame. The optional charging light circuit attaches to one of the regulator D+ wires using a Posi-Lock tap connector.



**27** The other end of the circuit connects to the right ignition coil on the spare blade for the switched battery circuit to the coil, which is a green/blue wire. Finally, we reinstalled the front cover before reconnecting the battery.