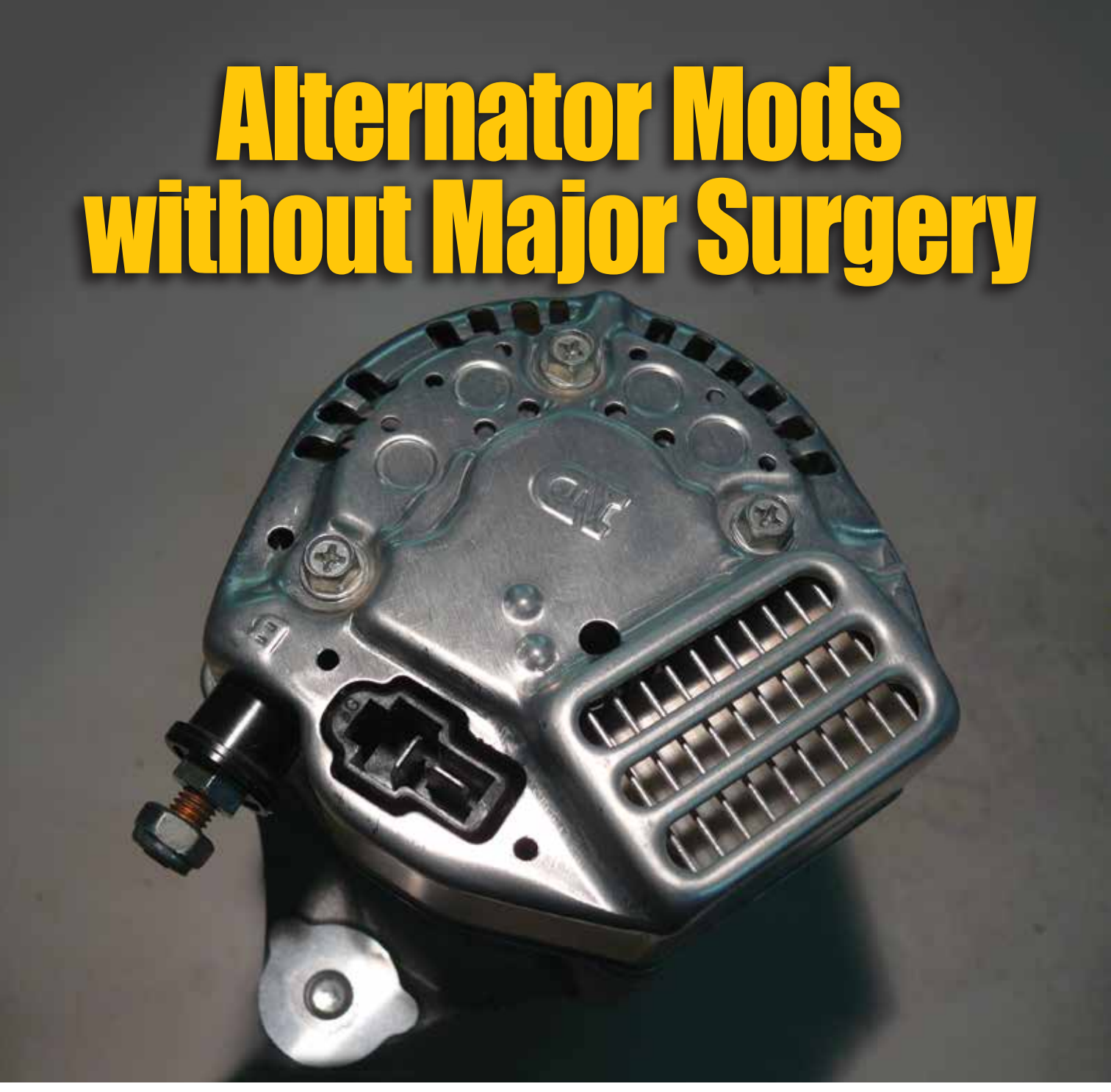
Alternator Mods without Major Surgery



Another way to modify a Nippondenso alternator for use with an external voltage regulator.

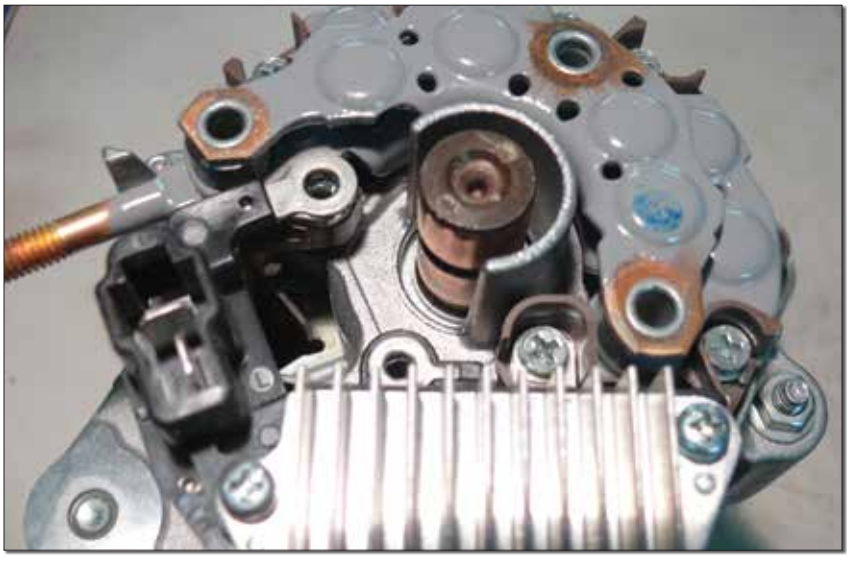
BY GRAEME COATES

After seeing Ted Miller's article, "How to Rewire a Nippondenso Alternator for External Regulation," in the March 2019 issue of KITPLANES®, I decided there had to be a simpler way to modify an ND alternator. This alternate method requires no major surgery. There's one minor modification, enlarging a brush-holder mounting hole, but this does not prevent the alternator from being returned to its standard configuration.

Starting with the standard alternator, remove the terminal shroud and end cover to expose the brush holder and regulator. Next, remove two screws to release the brush holder, then remove three screws to release the regulator. The two long screws will be reused, but the third screw is not used again.

The only (tiny) modification to the alternator is to ream out the left-hand

Remove the terminal shroud (left) to expose the brush holder and internal regulator.



(Left) The brush holder is held in place with two screws. (Right) The alternator after removing the brush holder.

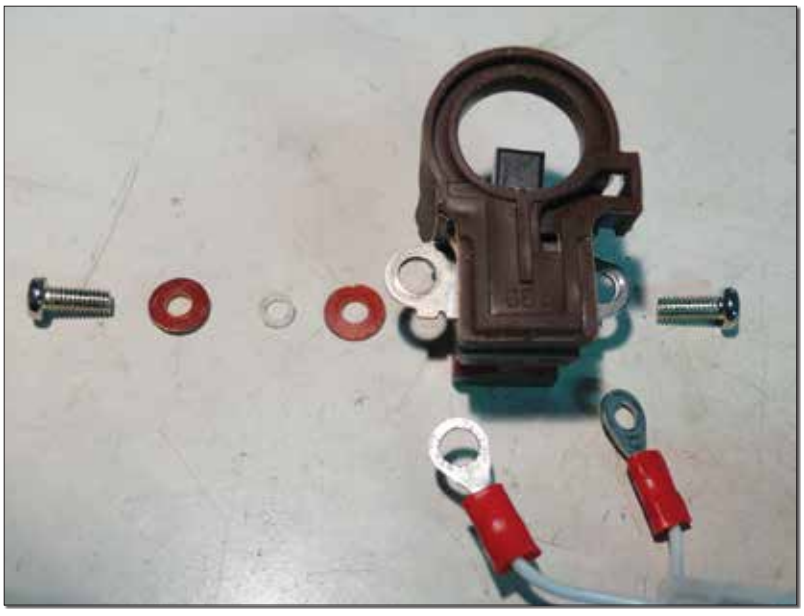
mounting hole of the brush holder to 5 mm. As mentioned earlier, this will not prevent the alternator from being restored to standard. This minor mod is necessary as the wire to this terminal on the brush holder must *not* contact the frame or output terminal of the alternator, or the magic smoke will escape!

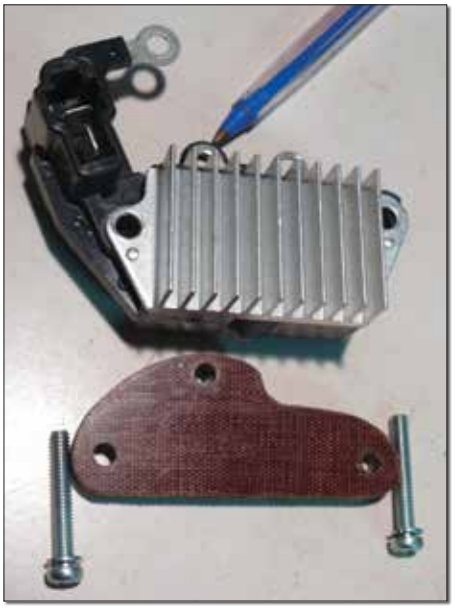
The new components are two M4x10-mm screws; two fiber washers with 4-mm holes; one small piece of nylon tube (or equivalent), OD 5 mm, ID 4 mm, and a length of 1.5 mm; and two 18-gauge terminated wires.

A mounting block (phenolic, canvas Bakelite, etc.) replaces the regulator with three holes: two for the original mounting screws and one with a captive nut to become the right-hand mounting point for the brush holder. This block is ¼-inch thick and precisely replaces the regulator after being cut to

To release the regulator, remove three screws.

Photos: Graeme Coates





(Left) Brush holder and new components: two M4x10-mm screws, two fiber washers with 4-mm holes, one small piece of nylon tube (OD 5 mm, ID 4 mm, 1.5 mm long), and two terminated 18-gauge wires. (Right) The regulator is replaced by a mounting block with three holes: two for the original mounting screws and one with a captive nut that aligns with the hole in the regulator pointed to by the pen. This becomes the right-hand mounting point for the brush holder.

shape. I used two ⅛-inch thick pieces epoxied together and holding the nut. Alternatively, use a ¼-inch block, drill a 3.3-mm hole, and tap for M4. Mount this on the alternator, and put one fiber washer where the left-hand brush holder terminal was attached.

Assemble one fiber washer and the nylon tube on an M4x10-mm screw, then add a new wire terminal with a 5-mm hole, and fit the screw into the now 5-mm hole in the brush holder. Mount the brush holder on the alternator with the right-hand new wire under the brush-holder lug. This keeps the brush holder precisely level and only a tiny fraction higher than the original position.

Conduct a test to ensure that neither wire is in contact with the alternator frame or the output terminal. These two wires go to the external regulator; one will get grounded or connected to 12 volts depending on regulator type, but do this at the regulator. I used a B&C LR3C-14 regulator, and thus one wire is connected to ground at the regulator.

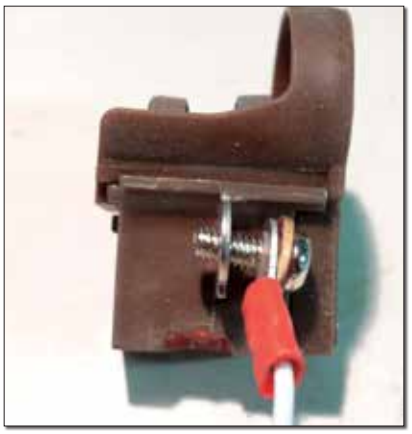
Fit a rubber grommet to the opening on the alternator rear cover, thread the

(Left) The mounting block is ¼-inch thick and replaces the regulator after being cut to shape. It's made from two ⅛-inch thick pieces of canvas Bakelite, epoxied together and holding the nut. (Right) The mounting block attached to the alternator. Put one fiber washer where the left-hand brush-holder terminal was attached.

wires through, and refit the screws and terminal shroud that were previously removed. Be sure to protect and terminate the two wires as necessary. An alternative to having wires coming out of the cover is to mount a Molex-style terminal in the cover, and attach it with two pop-rivets.

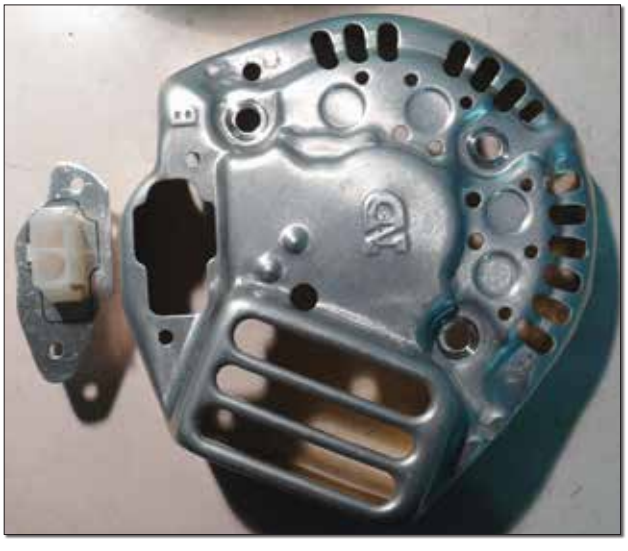
Done! And remember that the alternator can be returned to the standard configuration at any time. ✚

Graeme Coates is an Australian electrical engineer who is building a tri-gear Europa (slowly!).



Assemble one fiber washer and the nylon tube on an M4x10-mm screw (left), then add a new wire terminal with a 5-mm hole, and fit the screw into the now 5-mm hole in the brush holder.

(Left) The brush holder mounted on the alternator with the right-hand new wire under the brush-holder lug. This keeps the brush holder precisely level and only a tiny fraction higher than the original position. (Right) Alternator with terminal shroud reinstalled and wires threaded through a rubber grommet fitted to the rear cover.



An alternative to having wires coming out of the cover is to mount a Molex-style terminal to the cover and attach it with two pop-rivets.