Battery Solenoids, Original and the Replacement

The Original Solenoid:

Features of a solenoid taken apart and repaired, about real size.

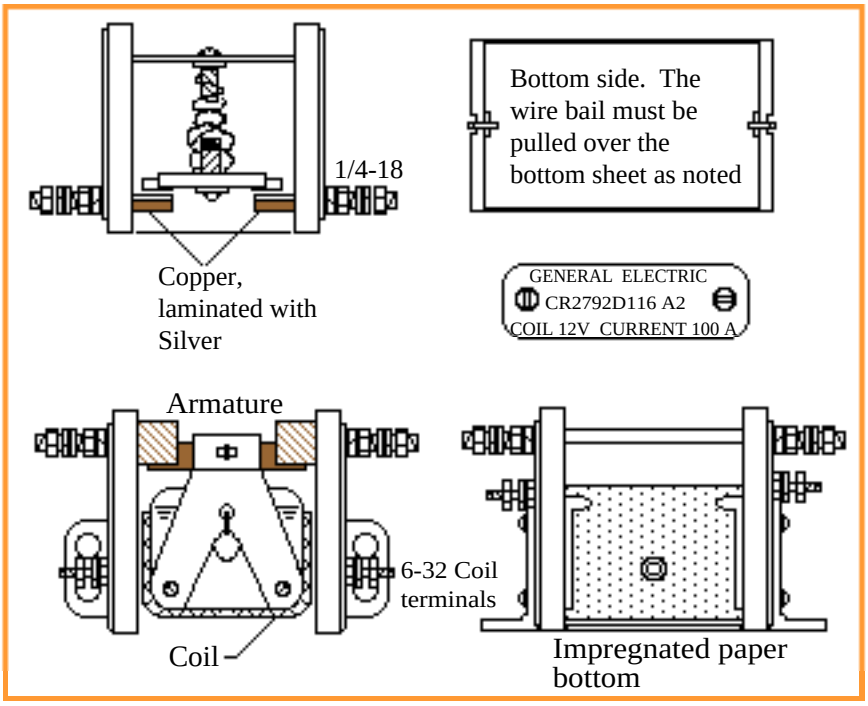
Contacts show incredibly little erosion for handling so much current.

Contacts are laminated with silver on copper

True part number: GE CR2791D116 A2

Rating is: 12 V 100 Amps

Big studs are 1/4-28 copper



Small studs are 6-32 brass screws with a square-shaped head on the inside, so as to not rotate when the outside nuts are manipulated.

The inside end of the original was made square so as to fit in a square recess in the case. I made one, using a new (Orchard aircraft supply) brass screw 5/8ths long and milled the head of it square. Lucked out the first one, having tried another using the sander. I got a very good fit. The square head guarantees that the stud does not rotate given that the bottom nut of the stack is never loosened.

Inside, the wire from the coil to the replacement stud are securely soldered to the head of the new stud, the same as for the original.

Replaced the non-original, too-thick 1/4-28 nuts so as to give more stud depth for the battery cable terminals. The plastic cover is not shown (held in place with the bail).

The first time you remove the wires from the small studs (to clean the terminals and the stud, something that should be done every few years), make sure you have a thin open end wrench to hold the bottom nut on the stud (the nut next to the case) still while the outer nut is loosened. If you have a loose inner nut, then removing the outer nut will likely allow the stud to spin, breaking the wire to the coil.

The terminals on the cables and the studs themselves should be cleaned of the usual sulfide coating which accrues with time. It appears as a brown/black coating and it is not a good conductor.

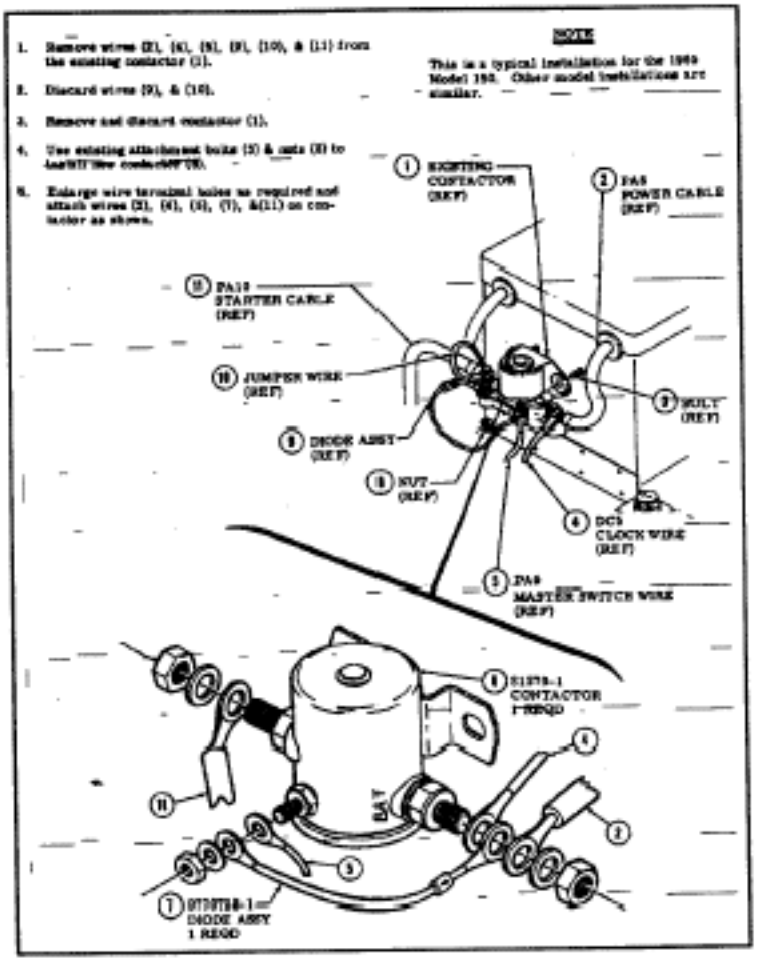
Service Bulletin 65-89 Allows Inexpensive Contactor Replacement For Pre-1966 Singles

$350 Battery Contactor is legally replaced by $21.90 unit

By Steve Ells

Battery contactors are seldom thought about, rarely tested, and seldom fail. In an article titled, Solenoids, Contactors, Relays: What Do They Do and When Should They Be Replaced? that appeared in the April 1996 issue of the Cessna Pilots Association magszine, CPA suggested that the starter contactor be changed at 2,000 hours time-in-service due to the relative low cost of the contactor and the potential for expensive component damage if the contactor "welded" shut during a start.

Recently CPA received a phone call from Joe Rothrock, Cessna Pilots Association member number 8673, saying that he was looking for a battery contactor for his 1958 172. I checked the parts manual and found that the part number for this contactor was 0712603-2. List price from Cessna is $358. Mr. Rothrock said he knew the list price and wondered if there was any alternative. I didn't know but said I'd try to find out. After a few hours of studying drawings it was obvious that Cessna switched from the $358 contactor to a $21.90 contactor (part number S1579-1; superceded by S1579-A2) beginning in 1966 for 150s, 172s, 180s, 182s, 185s, 205s, P206s, U206s, and 210s. The parts books for all these single engine Cessnas still specifies the high cost contactor.

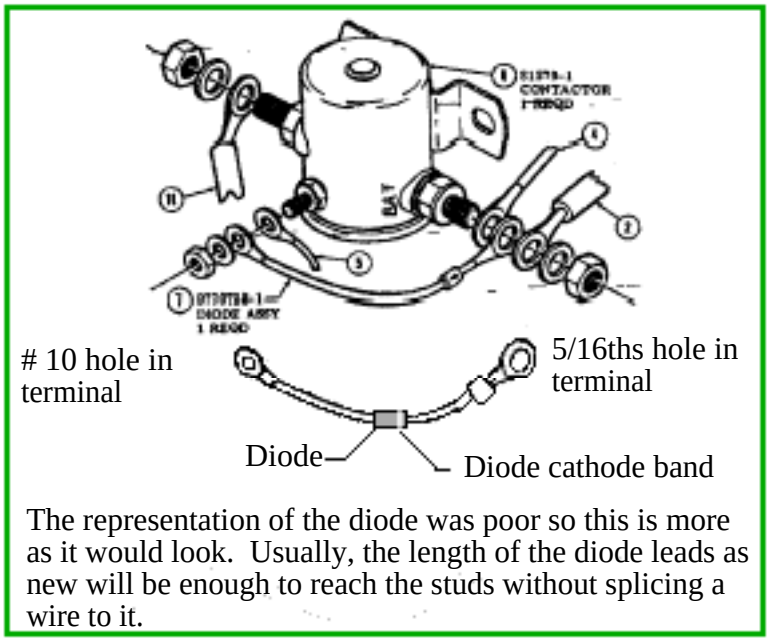


Cessna SB 65-89

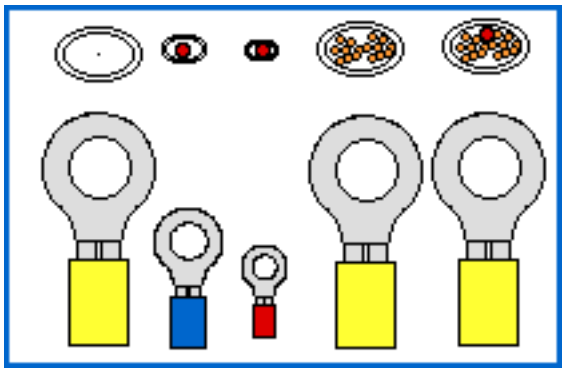
Cessna Service Bulletin 65-89 announced, "An approved design heavy duty battery contactor..." had been installed on the single engine models during the 1966 model year. The bulletin goes on to say that the new contactor can be added to earlier model Cessnas and provided the information on how to do this by providing a drawing to aid in installation of the new contactor. This drawing has been reproduced for the benefit of our members that own pre-1966 Cessnas.

I know this image is too wide, but it is a limitation of the software which does not permit reduction without losing clarity of the text. To be able to read the fine print, use the 120 percent or 150 percent of the Adobe Reader.

As one of the members found, his original style solenoid had been replaced with the Cessna-sanctioned part noted above. Note that, instead of the four studs as on the original, the wire from the large Bat terminal to the "top" of the coil has been run internally, so there are three studs, not four. As usual, Cessna neglected to tell anyone what the sizes of the studs are so this sketch makes up for that and shows the diode as they should have You need to know the sizes of the holes in the terminals before you start.



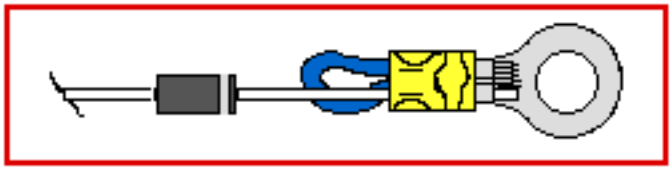
The representation of the diode was poor so this is more as it would look. Usually, the length of the diode leads as new will be enough to reach the studs without splicing a wire to it.



We found that Red or Blue terminals with the necessary 5/16ths hole are rare but even Radio Shack has yellow with 5/16ths hole as part of a package of various sizes. What is not well known is that you can use terminals which are grossly oversize for holding just the diode lead, shown as the red circle, if you fill up the excess opening in the yellow with more wire.

Starting from the left, the upper row of figures are to depict the crimpable cross section of the various sized terminals. Note that the size diode we used, for 3 amps, would crimp well in the red if you could get one with the 5/16ths hole but the blue would be too large to crimp on only the diode lead.

However, with a yellow terminal having a 5/16ths hole, we can successfully crimp the diode lead as long as we add two size 16 wire stubs to make up the necessary size for the yellow.



The blue wire is the filler, formed as a loop to allow confirmation of a correct crimp and for a pull check after the crimp.

Note: Aircraft Spruce lists both a battey solenoid and a starter solenoid. They look the same but their actions differ. The starter solenoid is meant for only short duration usage whereas the battery solenoid is meant to be enabled and stay on without getting hot. The starter solenoid, if left enabled, will get very! hot. Unfortunately, Spruce does not list the item as a Cessna part though it may be.

For additional information about pulses, see the article “Diodes and Pulses....”.

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