

MAY TECH TIP

Common Repairs for the ZW – Part 3 Whistle Diode & Circuit Breaker Replacement

By Jim Weatherford



The February Tech Tip addressed how to replace the ZW power cord and in April we showed you how to replace the carbon rollers (four each) and loose or missing binding posts (eight each). This Tech Tip will address replacing the whistle rectifier and the power circuit breaker.

REPLACING THE WHISTLE RECTIFIER

There are two whistle rectifier disks in the ZW transformer; unlike the KW. The copper oxide rectifiers used in all the Postwar Lionel transformers is old technology and is most often no longer performing its diode duties; namely activating the horn or whistle relay in our diesel or steam locomotives.

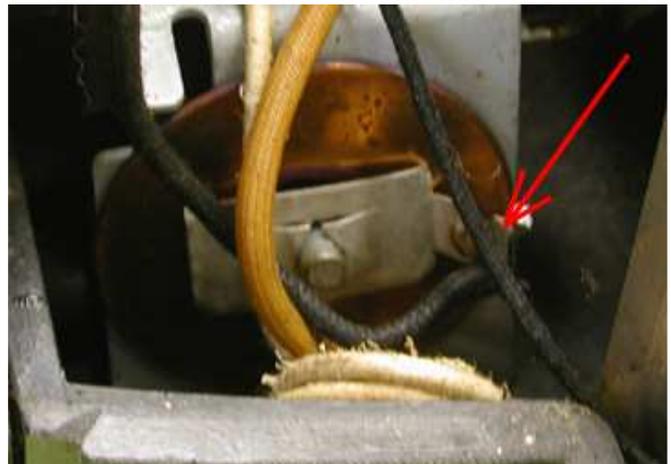
I don't recommend using an original rectifier disk or even the new replacement disks since they don't produce a direct current pulse with square sides. Further, the old rectifiers usually are not very efficient and output voltage to the track will be affected. Lastly, many of the new solid

state sound systems will not work well with the oxide rectifiers.

Consequently, I like to use the modern solid state stud rectifier when replacing the whistle diodes. I use to use 50 volt peak to peak 15 ampere rectifiers and they worked well. Recently, I have started using stud rectifiers, cathode to the case rated at 40 amps; they have less voltage drop and are sturdier. Present prices are around \$4.50 each.



Now to the easy part. Once you've unsoldered the wire from the speed nut, you can secure the loose end of the wire to the stud



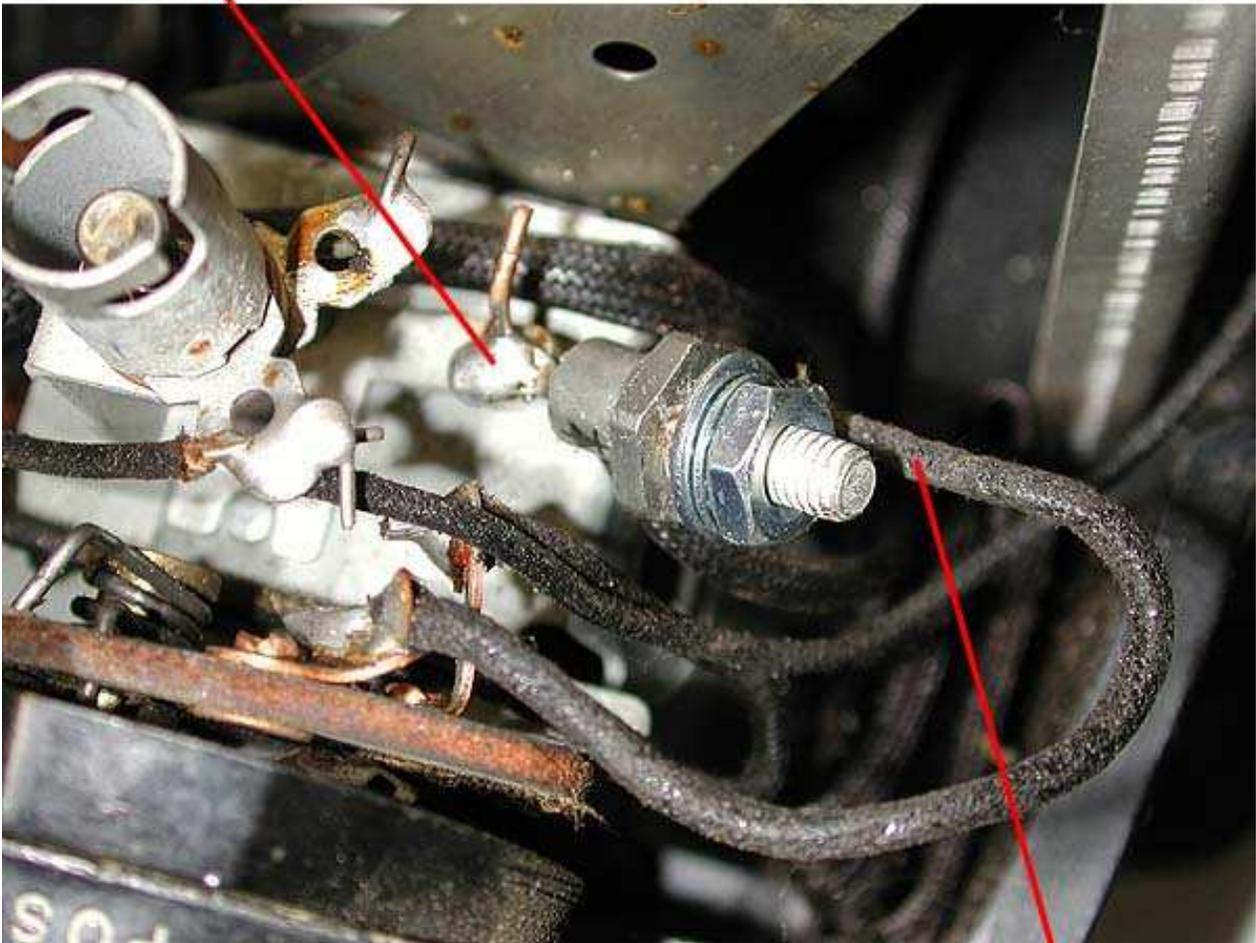
of the rectifier by slipping it under the nut and tightening it. **Note:** Just leave the old copper oxide rectifier in place; it won't interfere with the whistle control circuitry once we install the new stud rectifier.

Then solder the terminal end of the stud rectifier directly to the tab on the direction/whistle control assembly. This has the additional benefit of allowing more air to circulate around the rectifier.

The ZW circuit breaker is typically very sturdy and seldom needs replacing. A defective breaker usually does one of the following: it doesn't activate when there's a short on the track and you burn hookup wires; it activates under a load not anywhere near maximum, or the contacts are open and you get no output.

Unplug the power cord and remove the case top. ZW's of the early type have the breaker installed in the case bottom near the left hand

Solder Stud Rectifier Terminal to bracket



Wire Under Stud Rectifier Washer

You have electrically reversed the polarity of the diode using this method.

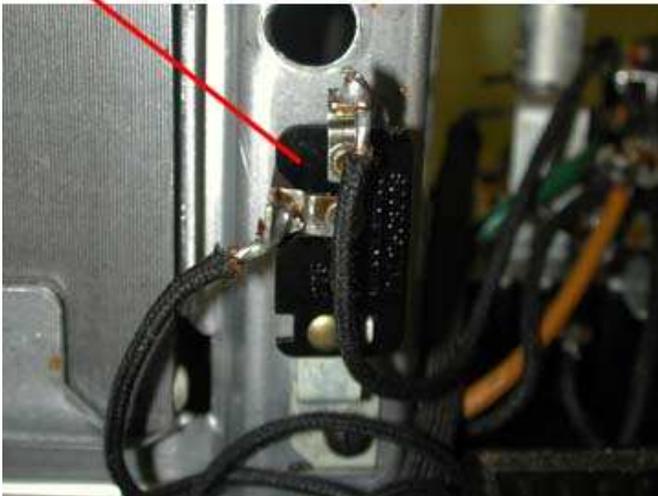
One word of caution regarding the use of modern electronic whistles and sound activation when replacing whistle diodes, always use the same technique so each side is identical. You won't cause problems when switching from one isolated track to another when you activate the whistle or sound effects.

controls and the output terminals. It's a plastic piece about 1 1/2 inches on a side held to the case bottom with one 1/2 inch long # 4 screw. The type 'R' ZW has its circuit breaker mounted on the support bracket near the output terminals. It's a metal bracket-like piece about 2 inches by 3/4 inches attached to the coil support bracket with one 1/4 inch long # 6 screw. You can further identify the breaker by noting there are two heavy gauge wires soldered to it; one goes to the "U" terminal bus and the other to the left lamp (red

REPLACING THE CIRCUIT BREAKER

lens) bracket assembly.

Circuit Breaker



Replacing a bad breaker, fortunately, is very straight forward. If yours is the 'R' type, simply unsolder both wires and remove the mounting screw. Install the new breaker and solder the old wires back on to the terminals.



The older type with the breaker (# Z-22) in the case bottom is also easy. Remove the mounting screw and lift it up with the wires attached. Unsolder the two wires, resolder them to the new breaker and reinstall it back in the same spot.

By the way, the replacement type 'R' circuit breaker that mounts on the core bracket may be difficult to find. You can, however, use the more available older type breaker since the mounting hole is still cast in the case bottom. It may be

necessary to replace one of the wires if it's not long enough.

After installation, put the case top back on, plug in the power cord, and test for proper operation by advancing the right hand voltage control about half way and shorting the "A" and "U" together with a screw driver. The circuit breaker should activate in about 3 seconds and the left light (red lens) will illuminate. I haven't oversimplified this repair, it really is this easy.



Something you might experience; the circuit breaker activates but the light doesn't illuminate. You've checked the #51 6 volt bulb and it's ok. What could be the matter?

Most likely, it's the resistor wire that goes from the "U" common terminal to the indicator light bracket. Test if the resistor is bad by replacing the #51 6 volt bulb with a #1445 18 volt bayonet bulb and then install a jumper wire from the "U" terminal to the light bracket. Short the output again to activate the circuit breaker and see if the light illuminates. If it does, the voltage reducing resistor wire is defective. You have the choice of finding a new resistor or just removing the resistor, installing a regular wire in its place, and using an 18 volt bulb. That's what they did on the ZW Type R transformer made in 1952.