Modified Meter Finds Leaky Bonds

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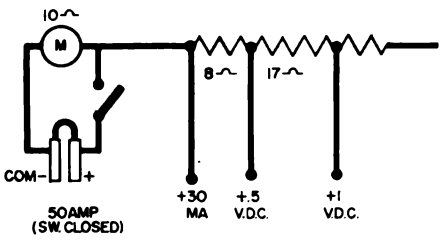
One of the big problems I have run up against is leaking bonds in track circuits when there are, for example, 20 or more circuits in a 12-mile block.

We are well acquainted with the old story of getting a call to a block which is red for train No. so-and-so. Upon arrival at the block, train No. so-and-so has gone through and jarred the rail so that contraction or expansion of the rail has cleared the leak and all checks fine—another gray hair on the old head!

A lot of times, though, they don't clear all the way up and may be still leaking a few mils [milliamperes]. The 3-volt scale on the Weston 280 is very good, but when a joint is leaking just a few mils the drop doesn't show up



readily. With a smile on your face, confident that you'll find the trouble in the next circuit, you walk right over it.

In a fit of frustration to overcome the difficulty, I took an old Weston 50-amp panel meter and clipped the positive lead halfway between the "horseshoe" shunt and the movement, and inserted a toggle switch. I took an old wire wound resistor from the box of radio parts and calibrated the meter, using the Weston 280 as a standard. The meter movement figured about 10 ohms with 30-mil full-scale deflection. With about 8 ohms in series with the movement, this gave me a 0.5-volt scale over about 5 in. (already on the scale as 50 amps), and the least drop in track voltage will readily show.

When the least drop in voltage shows, the 30-mil scale will readily show as little as a 1-mil leak when placed across the joint. If the needle moves at all on a rail head bond—change out the bond.

The 1-volt scale is used to read on the battery side of the sensitivity resistance and the 50-amp scale is good to read load on the M22 switch machine and others.

The meter is about 35 ohms per volt but it is fine for a low voltage, high current circuit. It would be easy to add shunts to the meter to multiply the current range, but the 280 will cover most any other ranges needed.

Loss of Shunt at Automatic Interlockings

By A Signal Inspector
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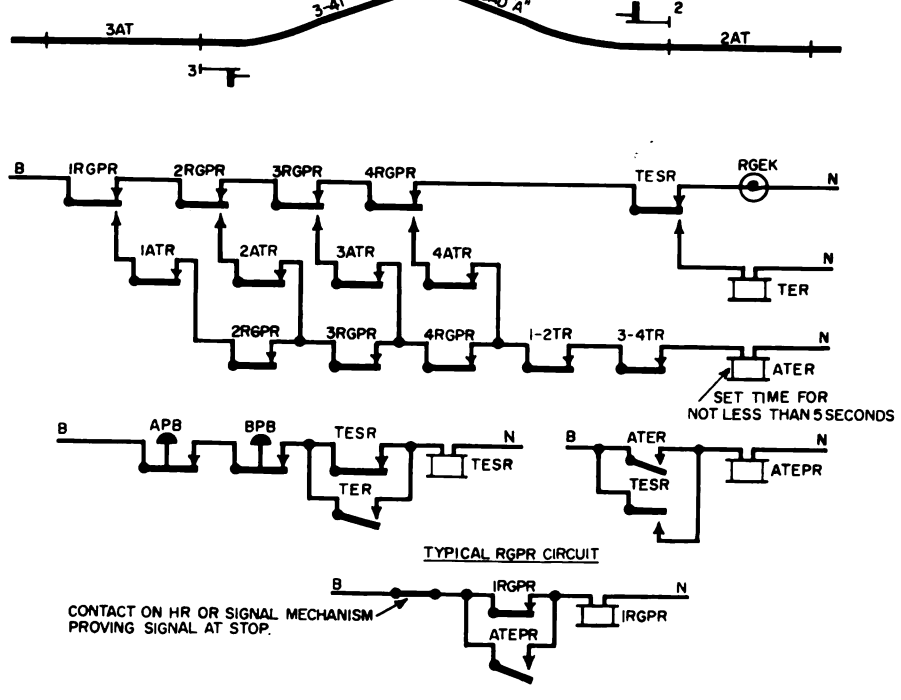
A few years ago I came up with some simplified circuits for automatic interlockings. My interest in automatic interlockings is the result of finding so many different schemes in service at various locations. Some are much more complicated and require many more relays than others. In some cases as many as five thermal relays are used, each with a repeater, to provide loss of shunt protection as required under ICC rule 136.309. After extensive study and experimenting with various circuits, I came up with the scheme shown. Since there are still automatic interlockings to be installed, and some so obsolete that it might be economical to rewire them completely, I thought others in the signaling field would be interested in them.



Only two additional relays, the ATER and the ATEPR, are required to provide the loss of shunt protection at the crossing of two single-track lines, provided the relays repeating the stop indication of the home signals (RGP relays) are wired as shown.

Note that if either one of the home signals has cleared on one road, all conflicting home signals are checked at stop, the track circuits between home signals must be energized, and the approach circuit for the signal that cleared has to remain energized for a predetermined time interval before the RGP relay picks up. Thus one timing relay, the ATER, and its repeater, the ATEPR, provide protection for all routes. The front contact of the TES relay may be used to indicate (RGKE that all signals are at stop as shown, but it is an optional feature.