



Signal Training Bulletin

**COMMITTEE G: Education & Training
Communication & Signal Division, AAR**

D-6 Switch Repeater Circuits

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The Signalman's Journal

Definition: A means by which the position of a switch, movable point frog, or derail is reflected in a signal control circuit; whereby proceed indications of a signal cannot be displayed over a switch unless the switch points and the controlling lever, or equivalent device are in correspondence.

Symbol: None

Purpose and Application: To provide a safe passage of trains over track switches, movable point frogs, or derails. Applied to all track switches, movable point frogs, and derails in signaled territory.

General Information: A two-wire polarized circuit is universally used to operate switch repeater relays through which signal control circuits are checked.

Correspondence between the position of a power switch and the route called for is enforced by inserting a contact of the switch control relay or lever in the switch repeater circuit.

Some of the older switch repeater circuits may be designated as "SS" or "KR" circuits. Those of more modern design are called "WP" or "WC" circuits.

The position of the control device and the polarity of the circuit are combined to control a neutral polar relay or select the energizing of biased neutral normal and reverse switch repeater relays. The two biased neutral relays are connected in the circuit with the biasing features opposite so that only one of the relays may be energized in response to either polarity.

Switch repeater relays are also used on hand-throw switches in automatic block signal systems in place of track shunting arrangements. These may be either two wire neutral control of a normal switch repeater relay for normal switch indication only, or two wire polarized control of a neutral polar switch repeater relay where both normal and reverse switch point indication are desired.

Detailed Operation: Energy for the switch repeater relays for a power switch is applied through the switch circuit controller, which is of the over and locked type, which means the switch points must be within a specified distance of the stock rail and mechanically locked in that position before the normal or reverse contacts of the controller are closed.

See Figures 1, 2, 1a and 2a for various circuits.

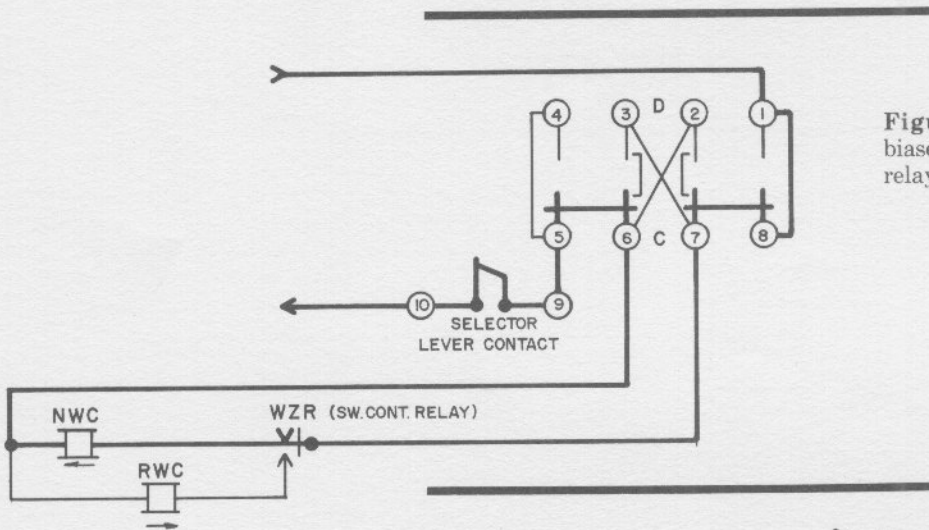
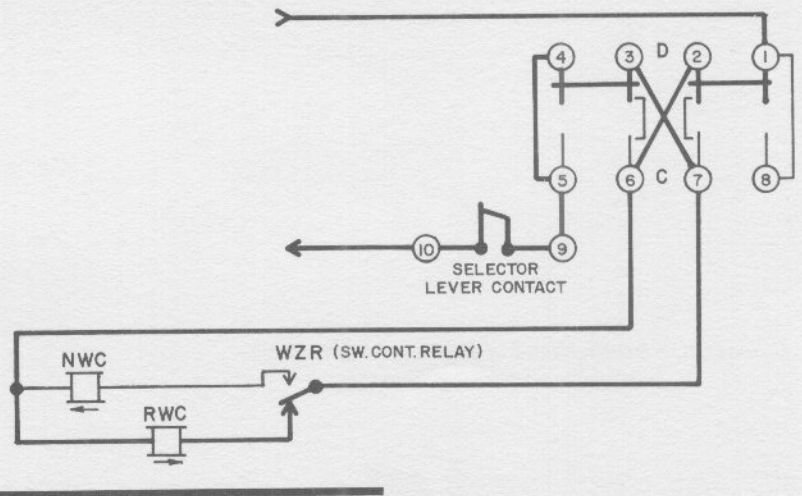


Figure 1—(L) Shows current for a biased neutral normal switch repeater relay.

Figure 2—(R) Shows current for a biased neutral reverse switch repeater relay.



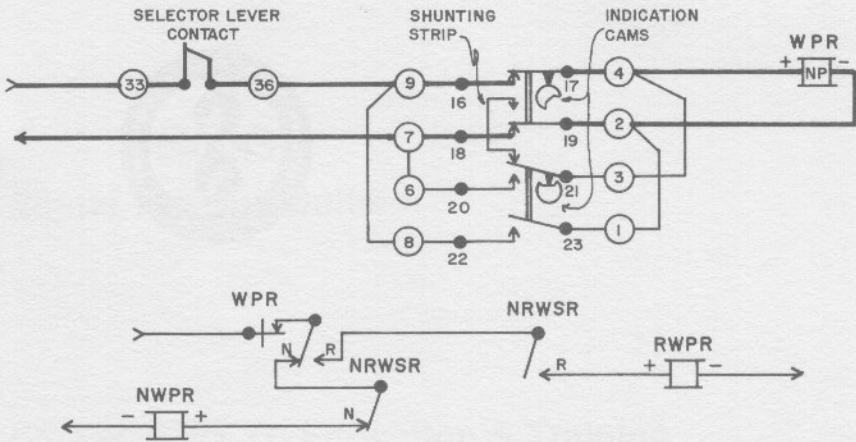


Figure 1a—(L) Shows current for normal control of a neutral polar switch repeater relay and normal switch repeater relay.

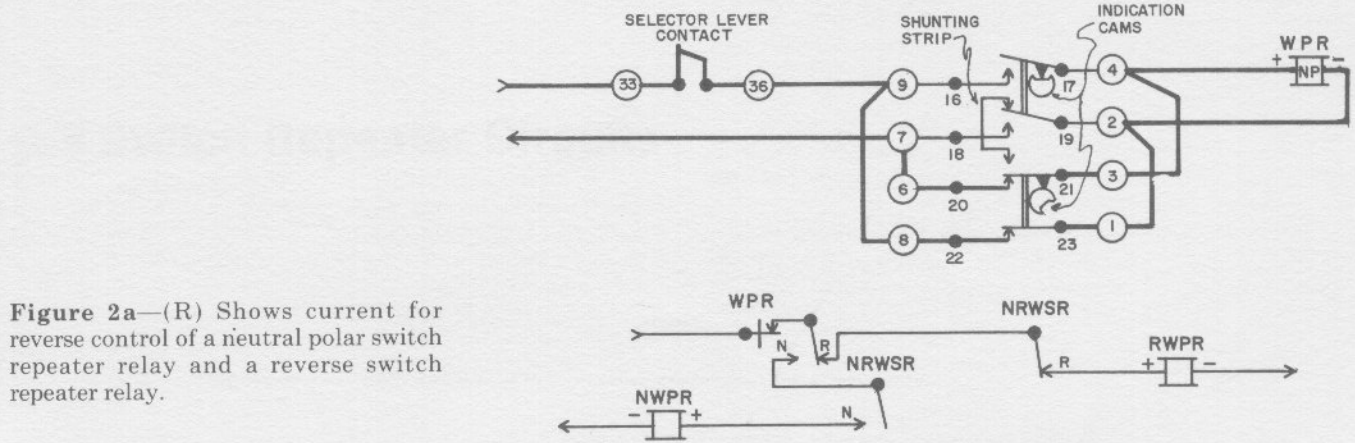


Figure 2a—(R) Shows current for reverse control of a neutral polar switch repeater relay and a reverse switch repeater relay.

Note: The shunt contacts or shunt strip in the switch circuit controller section shunt the coils of the switch repeater relays when the switch is in transit, improperly closed or unlocked. The method and circuitry for shunting switch repeater relays varies with manufacturer and model. Manufacturers' manuals should be referred to for details of shunting arrangements.

The circuits shown utilize a magnetic stick relay for a switch control device through which the normal and reverse switch repeater circuits are checked.

Normal switch repeater indication of a hand-throw switch may be obtained by use of a switch circuit controller and a neutral relay as a normal switch repeater relay. See Figure 3.

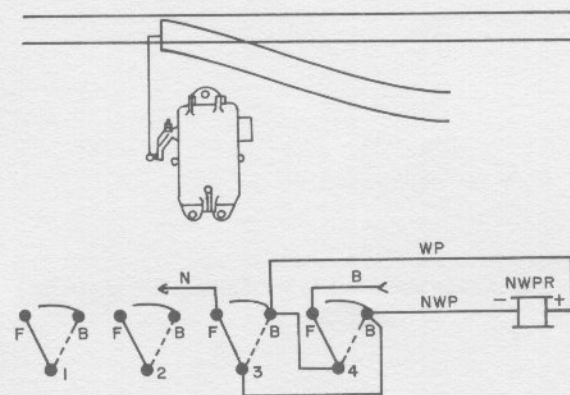


Figure 3—Shows a normal switch repeater circuit.

Normal and reverse position of a hand-throw switch may be indicated by use of a switch circuit controller and neutral polar relay as shown in Figure 4 (normal position), Figure 4a (reverse position).

The switch repeater relays are prevented from becoming energized from other power sources while in transit or improperly closed by means of a back contact shunt wired in the switch circuit controller jumpers 3H to 4B and 4H to 3B in Figure 3. In Figure 4, the jumpers are 1B to 2F, 2F to 3B and 3B to 4F.

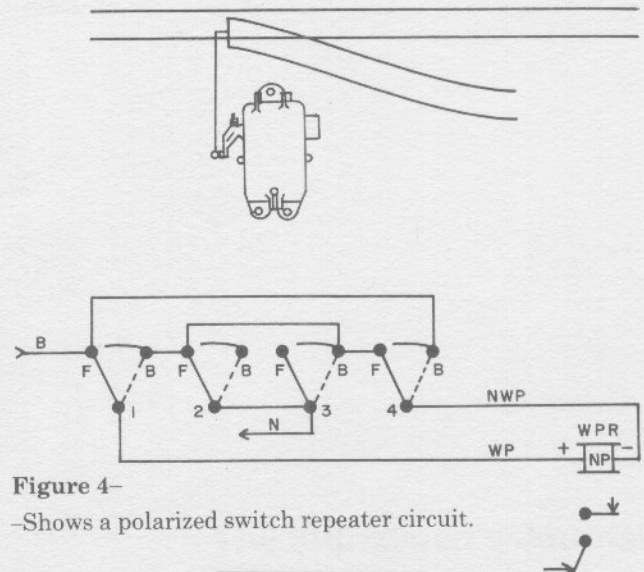


Figure 4—Shows a polarized switch repeater circuit.