

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

D-5 Signal Repeater Circuit

Approved February 1985

**Definition:** A circuit designed to repeat red, yellow or green positions of the searchlight signal mechanism or aspects of colorlight signals.

**Symbol:** None.

**Description:** A signal repeater circuit provides a reliable check on the position of the signal mechanism of a searchlight signal or aspects of colorlight signals and may be used to provide an indication of the aspect of wayside signals or for controlling other signal circuits.

**Purpose and Application:** A signal repeater circuit is used to repeat the aspect of wayside signals. It may be used in centralized traffic control, automatic block, absolute permissive block or interlocking systems.

**General:** The circuits shown in this Training Bulletin are typical circuits only, and are shown in this manner for descriptive purposes. Equipment, nomenclature and application should be in accordance with individual railroad requirements.

**Detailed Operation:** Searchlight Signal Mechanism Repeater Circuits are covered in Figures 1 through 4. Searchlight signal contact configuration and numbering are shown for "H" or "H-2" type searchlight signal heads and "SA" and "SA-1" signal heads. Similar circuits may be applied to the independent front and back contacts of the "H-5" searchlight signal unit.

The following refers to Figure 1 for the "H" or "H-2" head: When the searchlight signal mechanism is in the (red) Stop position, battery is applied through the signal mechanism contact 6 to 4, through connection from 4 to 3 through contact 3 to 2 through the coils of the (RPR) red repeater relay to negative battery energizing the red repeater relay. Simi-

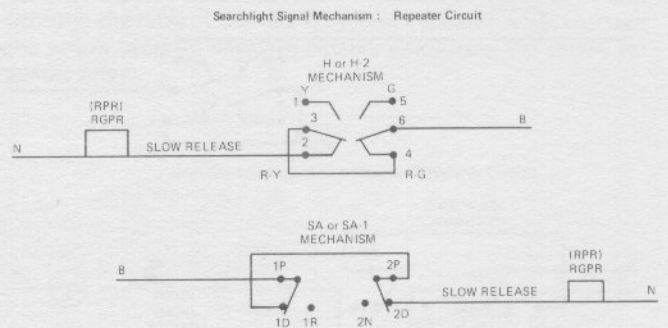


Figure 1: Repeats mechanism at Stop.

larly for the "SA" or "SA-1" mechanism, battery energy is applied through contact 1P to 1D through 1D to contact 2P to 2D through 2D through the coils of the red repeater relay to negative battery again energizing the red repeater relay.

As for Figure 2 for the "H" or "H-2" head: When the searchlight signal mechanism is in the (yellow) Approach position, battery is applied through the signal mechanism

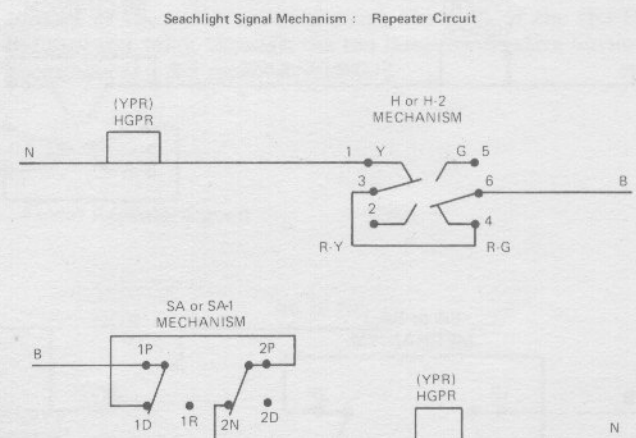


Figure 2: Repeats mechanism at Approach.

contact 6 to 4 through connection from 4 to 3, through contact 3 to 1, through the coils of the (YPR) yellow repeater relay to negative battery energizing the yellow repeater relay. For the "SA" or "SA-1" mechanism in the (yellow) Approach position, battery is applied through signal mechanism contact 1P to 1D through the connection from 1D to 2P, through contact 2P to 2N through the coils of the YPR to negative battery energizing the yellow repeater relay.

When the searchlight signal mechanism is in the (green) Proceed position (refer to Figure 3), battery is applied through contact 6 to 5 or 1P to 1R, through the coils of the (GPR) green repeater relay to negative battery energizing the green repeater relay.

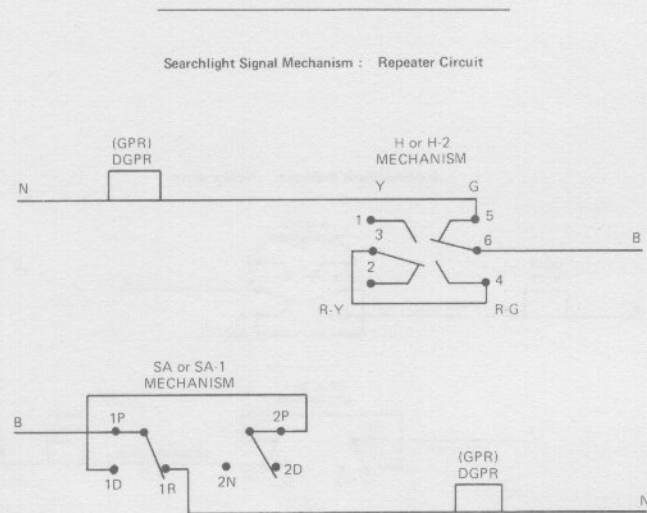


Figure 3: Repeats mechanism at Proceed.

Regarding Figure 4: When the "H" or "H-2" searchlight signal mechanism is in either the (green) Proceed, or the (yellow) Approach position, battery is applied through the signal mechanism contact 6 to 5, through connection from 5 to 1, through the coils of the (GYPR) green-yellow repeater relay to negative battery, or through contact 6 to 4, through connection 4 to 3, through contact 3 to 1, through

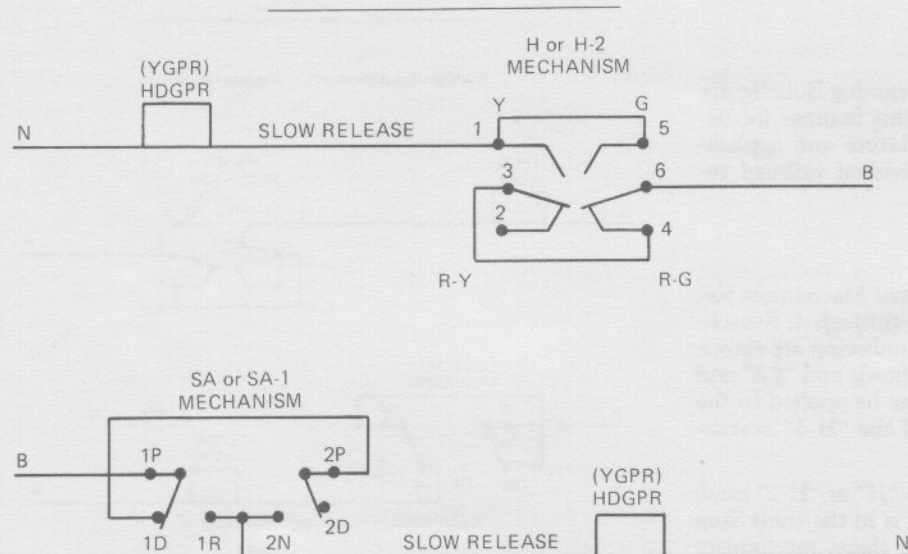


Figure 4: Repeats mechanism at Approach or Proceed.

the coil of the (GYPR) green-yellow repeater relay to negative battery energizing the green-yellow repeater relay. When the "SA" or "SA-1" signal mechanism is in the (green) Proceed position battery is applied through SA contact 1P to 1R and then to the coil of the YGPR relay energizing same. When these mechanisms are in the (yellow) Approach position the YGPR is energized by means of a circuit from battery plus to mechanism contact 1P to 1D through connection 1D to 2P and from 2P to 2N to the coils of the YGPR and then to negative battery.

Colorlight Signal Repeater Circuits are covered in Figures 5 through 10. When necessary to repeat the green, yellow or red aspect of a colorlight signal, a relay with very low resistance coils in series with the lamp circuit may be used. The coils should have a rectifier in parallel with them to allow for ac operation. There are specially designed relays that can be used for this purpose.

Colorlight Signal Repeater Circuits Using "H" and "D" Signal Control System: When the "H" and "D" relays are both energized (See Figure 5), ac or dc voltage is applied

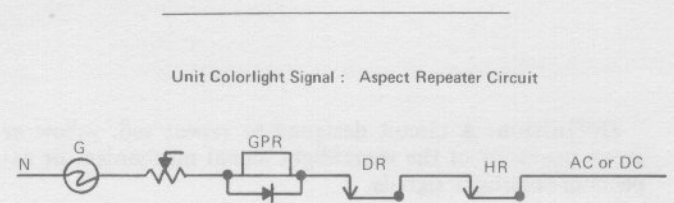


Figure 5: "H" and "D" relays energized.

through a heel and back contact in the approach relay (if appropriate), a heel and front contact of the "H" relay, through a heel and front contact of the "D" relay, through the (GPR) green repeater coils, through the green lamp to negative battery. This causes the green repeater relay to become energized.

When the "H" relay is energized and the "D" relay is de-energized (See Figure 6), ac or dc voltage is applied through a heel and back contact of the approach relay (if appropriate) through a heel and front contact of the "H" relay, through a heel and back contact of the "D" relay, through the coils of the (YPR) yellow repeater relay, through the yellow lamp to negative battery energizing the yellow repeater relay.

Unit Colorlight Signal : Aspect Repeater Circuit

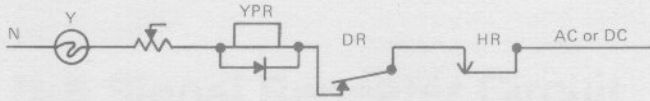


Figure 6: "H" relay energized.

When the "H" relay is de-energized (See Figure 7), ac or dc voltage is applied through a heel and back contact of the approach relay (if used), through a heel and back contact of the "H" relay, through the coils of the (RPR) red repeater relay, through the red lamp to negative battery energizing the red repeater relay.

Unit Colorlight Signal : Aspect Repeater Circuit

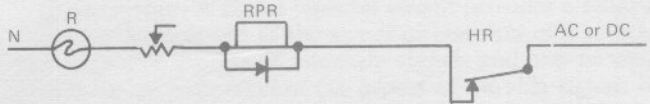


Figure 7: "H" relay de-energized.

Colorlight Signal Repeater Circuits Using "HD" Signal Control System: When the "HD" relay is energized (Refer to Figure 8) with normal polarity on its coils ac or dc voltage is applied through a heel and back contact of the approach relay (if used), through a neutral heel and front contact of the "HD" relay, through a polar heel and normal contact of the "HD" relay, through the coils of the (GPR) green repeater relay, through the green lamp to negative battery energizing the green repeater relay.

Unit Colorlight Signal : Aspect Repeater Circuit

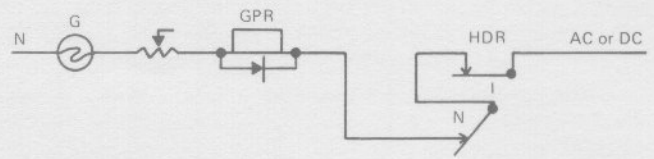


Figure 8: "HD" relay energized/normal polarity.

When the "HD" relay is energized with reverse polarity on its coils (See Figure 9) ac or dc voltage is applied through a heel and back contact of the approach relay (if appropriate), through a neutral heel and front contact of the "HD" relay, through a polar heel and reverse contact of the "HD" relay, through the coils of the (YPR) yellow repeater relay, through the yellow lamp to negative battery energizing the yellow repeater relay.

Unit Colorlight Signal : Aspect Repeater Circuit

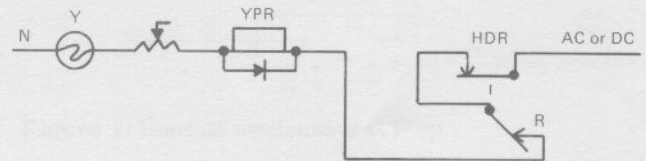


Figure 9: "HD" relay energized/reverse polarity.

When the "HD" relay is de-energized (See Figure 10) ac or dc voltage is applied through a heel and back contact of the approach relay (if used), through a neutral heel and back contact of the "HD" relay, through the coils of the (RPR) red repeater relay, through the red lamp to negative battery energizing the red repeater relay.

Unit Colorlight Signal : Aspect Repeater Circuit

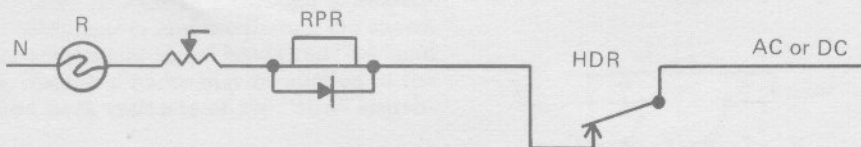


Figure 10: "HD" relay de-energized.

**Note:** This Bulletin is for general information only. For specific applications consult the rules, standards and instructions published by your railroad.