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**Recommended Vital Circuit Design Guidelines for Following Move Stick Circuits at Interlockings and Controlled Points**

Revised 2025 (3 Pages)

**A. Purpose**

This Manual Part recommends vital circuit design guidelines for following move stick circuits at interlockings and controlled points.

**B. General**

1. The vital circuit design guidelines provided in this Manual Part shall also apply to equivalent vital software applications.
2. The vital circuit design guidelines provided in this Manual Part represent one type of design for following move stick circuits at interlockings and controlled points. Some aspects of the circuit design may vary depending on the design practices of the individual railroads.

**C. Design**

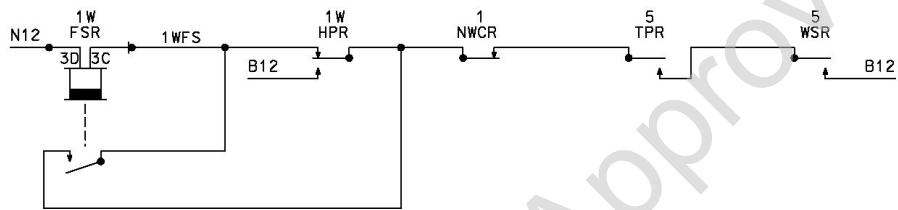
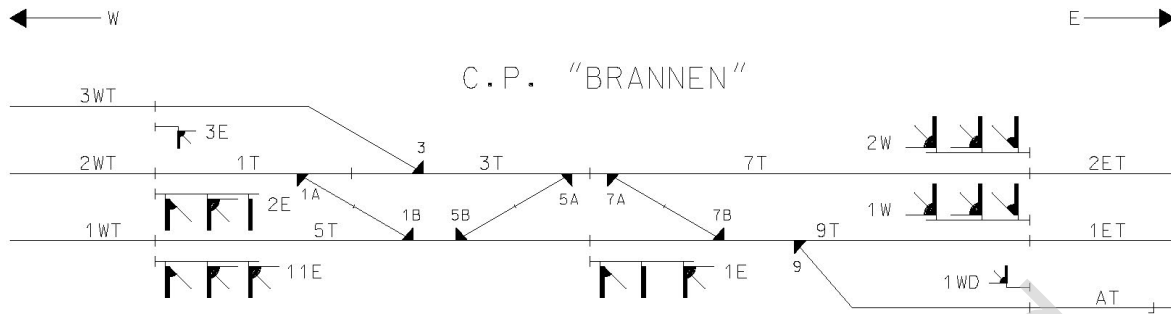
1. The following move stick circuits at interlockings and controlled points will allow restricting signals to be displayed for a train following another train into an occupied track. This is usually provided on the main tracks and controlled sidings at interlockings and controlled points in TCS territory.
2. Circuit design shall ensure that a restricting signal can be displayed into a track occupied by a preceding train movement traveling in the same direction. Refer to Figure 16420-1.
  - a. This is accomplished by energizing the west follow stick relay (1WFSR) over contacts of the last route locking stick relay (5WSR), the track repeater relay of the last track circuit in the route (5TPR), the normal switch correspondence relay (1NWCR), and the line repeater relay (1WHPR).

After the train enters the block 1WHPR de-energizes, keeping 1WFSR energized over its own contact to allow the following move for as long as the block remains occupied.

- b. To prevent the following move stick relay from being energized for an unintended block, a switch correspondence contact shall be inserted in the pick path. As can be seen in Figure 16420-1, if the contact of 1NWCR was not inserted in the pick path of 1WFSR and a train traversed from 1W to 2E, the 1WFSR would energize unintentionally.

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- c. To allow a restricting aspect, the contact of 1WFSR in parallel with the contact of 1WHPR will enable the signal control relay to energize when the block west of CP Brannen on Track No.1 is occupied by a westbound train movement through the interlocking. Refer to Manual Part 16.4.5 Recommended Vital Circuit Design Guidelines for Home Networks at Interlockings and Controlled Points and route check relay Manual Part 16.4.4 Recommended Vital Circuit Design Guidelines for Route Check Networks at Interlockings and Controlled Points.
  3. Whenever the front contacts of a stick relay are used to bypass the line "H" relay, back contacts of the same relay shall be inserted in the line circuit to verify that the relay has become de-energized after the train movement is completed.

This is accomplished by the back contacts of 1WFSR in the eastward line circuit for Track No.1. This prevents an opposing signal from being cleared at CP McKnight (next interlocking west) if 1WFSR fails to de-energize at CP Brannen, after 1W block becomes unoccupied.
  4. Examples of a Boolean equivalent expression and a ladder logic diagram for the 1WFSR relay circuit are shown in Figure 16420-1.



BOOLEAN EQUIVALENT

$$1WFSR = (.N.5WSR * .N.5TPR * 1NWCR * 1WHPR + .N.1WHPR * 1WFSR)$$

LADDER LOGIC EQUIVALENT

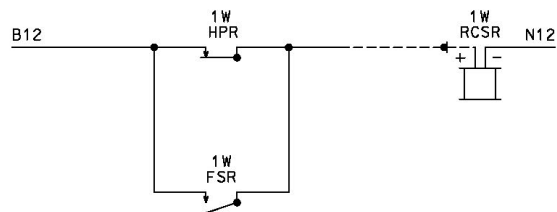
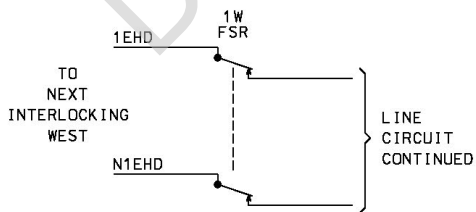
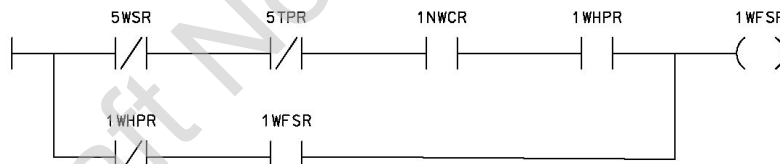


Figure 16420-1: Example of Following Move Stick Circuit