A. **Purpose**

This Manual Part recommends vital circuit guidelines for pushbutton cut-out applications for manually terminating or restarting grade crossing warning devices.

B. **General**

1. A manual pushbutton cut-out may be required to eliminate excessive crossing warning device operation when a portion of a crossing approach is occupied by a facing train movement which stops or conducts switching moves.
2. Where this application is used with wayside signals the PBSR should be checked in the wayside train control circuits.
3. Where this application is used without wayside signals, operational consideration must be given to the possibility that shortened warning time may result from operation of the PBSR.
4. The vital circuit design guidelines provided in this manual part shall also apply to equivalent vital electronic and/or software applications.
5. The vital circuit design guidelines provided in this manual part represent one method of design for pushbutton cut-out applications. Some aspects of the circuit design may vary, depending on the design practices of the individual railroad.

C. **Operation**

An example of a pushbutton cut-out circuit is shown in Figure 16309-1. The spring returned STOP pushbutton is momentarily depressed energizing the slow release pushbutton relay (PBR). Energy is then applied through the pushbutton, east approach track relay (ETR), island track relay (XTR) and finally the PBR to energize the pushbutton stick relay (PBSR). A stick circuit is then established, bypassing the PBR.

The PBSR bypasses the ETR in the XR control circuit to energize the XR and deactivate the crossing warning devices.

The crossing warning devices may be reactivated by de-energizing the PBSR relay with use of the START pushbutton.
Figure 16309-1