Signal Training Bulletin

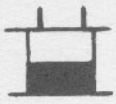
COMMITTEE G: Education & Training
Communication & Signal Division, AAR

C-9 Neutral Slow-Release Relay

Approved November 1978

Definition: A relay which, when the controlling circuit is opened or completely shunted, will release slower than a regular neutral relay.

Symbol:



Description: One type of slow release relay has similar physical characteristics to a neutral relay, except that the coils are wound over a heavy section of copper tubing or a portion of the winding is replaced by heavy copper slugs. The name plate or the label affixed inside the relay usually indicates that the relay has been designed for slow release operation. Figure 1 shows slow release relays of this type.

Purpose and Application: The purpose of the slow release relay is to provide a small delay between the time that energy is removed from the relay coils and the time the armature drops away opening the front contacts.

One application of this relay is to permit an uninterrupted circuit through the front contacts while the control circuit is open during contact transfer time of a controlling relay. Another application is in gate-type crossing warning systems.

The slow release feature is used to delay the release of the gate arm until the flashing lights have operated for at least three seconds.

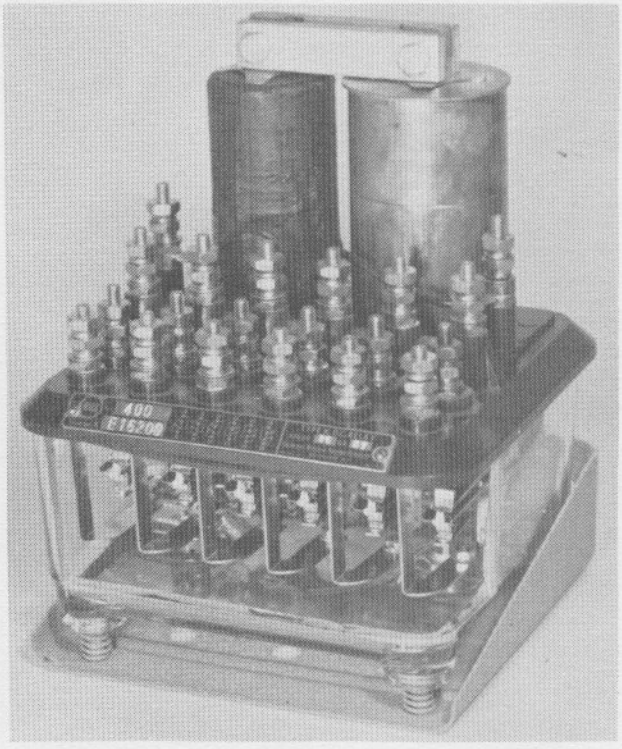


Figure 1 (a)

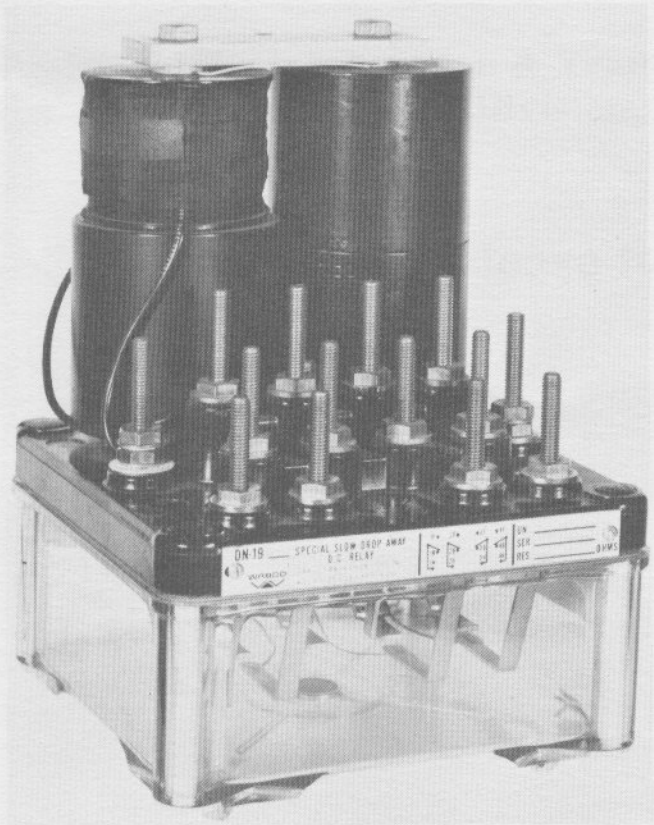


Figure 1 (b)

General Information: Many railroads have instructions outlining the installation, field maintenance and inspection procedures of relays, and maintenance personnel should become familiar with their company's instructions.

An ordinary acting relay may be made slow release by connecting a capacitor, resistor, diode, or half-wave rectifier in multiple with the coils. The release time depends on the value of the capacitor, resistor, diode or rectifier.

Detailed Operation: Slow release relay operation obtained by insertion of copper tubes or slugs in the magnetic circuit is the result of inductive action retarding the decreasing flux in the magnetic circuit. The coil resistance of these slow release relays is generally about half that of an ordinary neutral relay of the same working voltage, in order that twice the amount of current will flow through the coils thereby increasing the flux in the magnetic circuit towards the saturation point. This additional amount of flux obtained by the larger current flow will take longer to decrease when the coils are de-energized. Additional drop-away delay may be achieved by reducing the air gap between the armature and pole pieces. Reducing the air gap allows the residual magnetism of the cores to exert a stronger retaining effect on the armature after the coils are de-energized. It is essential that the working voltage be maintained to obtain the required retardation. A slight decrease in voltage will cause a reduction in the slow release effect of the relay.