

Signal Training Bulletin



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

A10A Switch Machines General

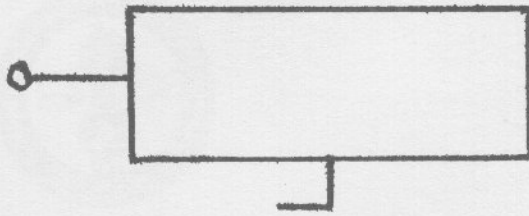
Approved September 1986

Note:

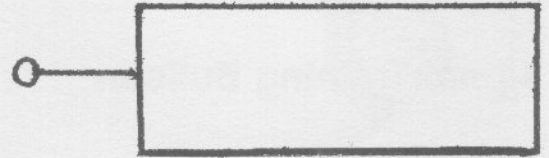
**Destroy October Signal Training
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Symbol:



Dual Control



Non-Dual Control

Purpose: The purpose of switch machines is to move the position of the switch points by power from normal to reverse or reverse to normal thereby providing desired route for trains or engines.

Types: Pneumatic (Air) Type — Air pressure is developed by compressors at or near the switch(es) and is admitted to the driving cylinder(s) through an arrangement of piping and valves controlled electrically. This type of switch is most often found in hump or classification yards or in large interlockings. To prevent air line freezing in winter weather, alcohol is injected into the air supply as it is developed. The air supply is piped to the switch(es) usually through 1 in. pipe from the larger feeder line, all of which is underground. These switches operate extremely fast.

Hydraulic Type — This type of power switch combines the spring return feature of a spring switch with electrically driven hydraulic pressure for the prime mover. This is accomplished by hydraulic pressure moving the points sufficient distance for the spring compression to force them to the desired position. Usually this type of switch is found around yards where train and engine movements are at low speeds.

Electric — Electrically operated switches are the most commonly used and are found in both yard and main line service. They employ electric motors to drive the switch points to the desired position through an arrangement of gears. Electricity may be either ac or dc with the latter being the most common. They are operated in a dc voltage range of 20 to 110 volts. Some are 110 volts ac. The 110-volt machines are commonly known as high voltage, and all others are considered low voltage.

Power switches may or may not be equipped with levers* for auxiliary throwing in the event the prime mover fails, i.e., air, hydraulic and electric. Switches so equipped are known as dual control switches. Main line switches usually have switch and lock movements that lock the switch points in the desired position mechanically and also have switch point activated circuit controllers to prove switches are in the desired position. The route must, therefore, be properly lined and locked before the governing signal can clear.

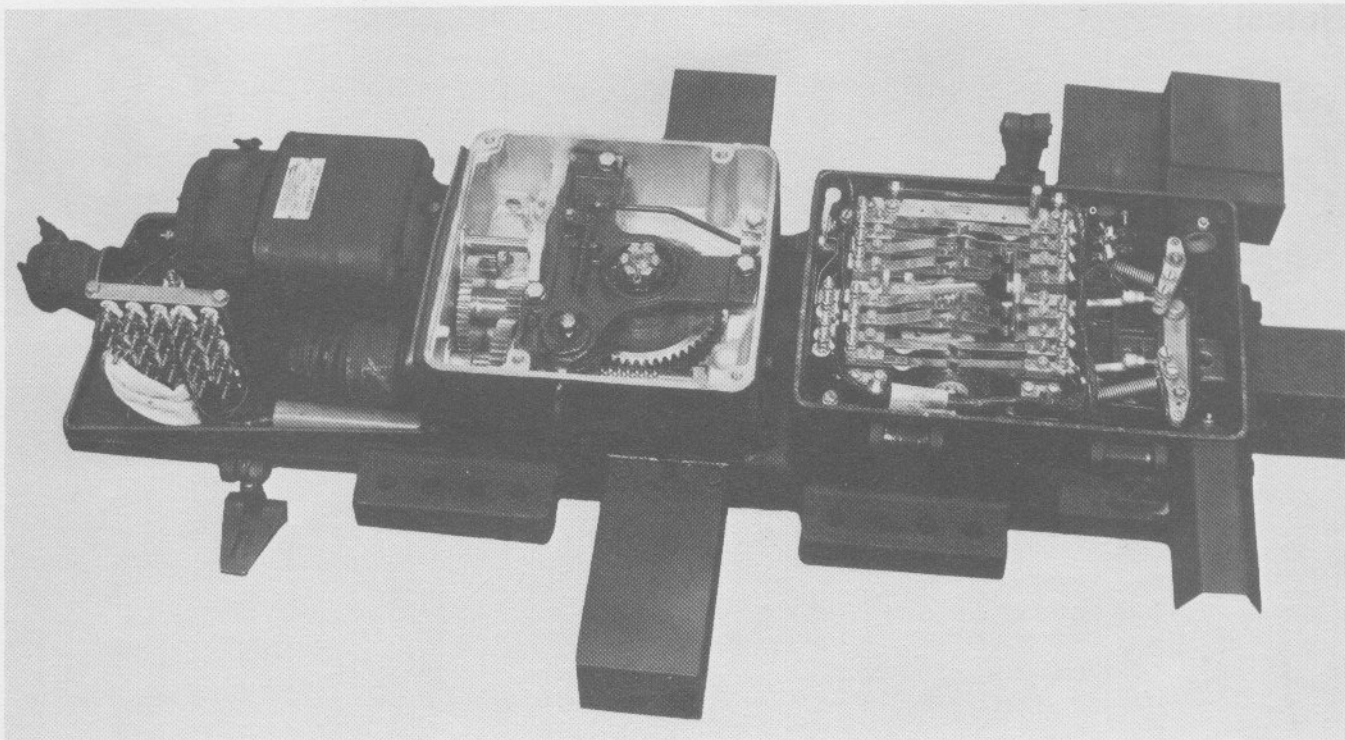
*When switch machines are changed from power operation to hand, the power is disengaged from the operating mechanism. Yard switches are usually trailable in that they may be trailed through inadvertently without damage internally, whereas main line switches are not trailable and must be in proper position for each movement.

Installation & Maintenance: For proper installation and maintenance, one should refer to the individual railroad standards and specifications for the type being utilized. Usually these are based on individual manufacturer's recommendations contained in their manuals and prints or drawings. Prints will contain all pertinent measurements such as distance from rail, crosstie spacing and fastening requirements. It is imperative that switches be properly installed for trouble-free operation and economical maintenance. Maintenance consists of periodic inspections and tests, lubrication, tightening of all nuts and bolts and elimination of any slack in rods or fittings due to wear or shifting. Switches play an extremely vital role in railroad operation, and their proper installation, testing and maintenance is critical.

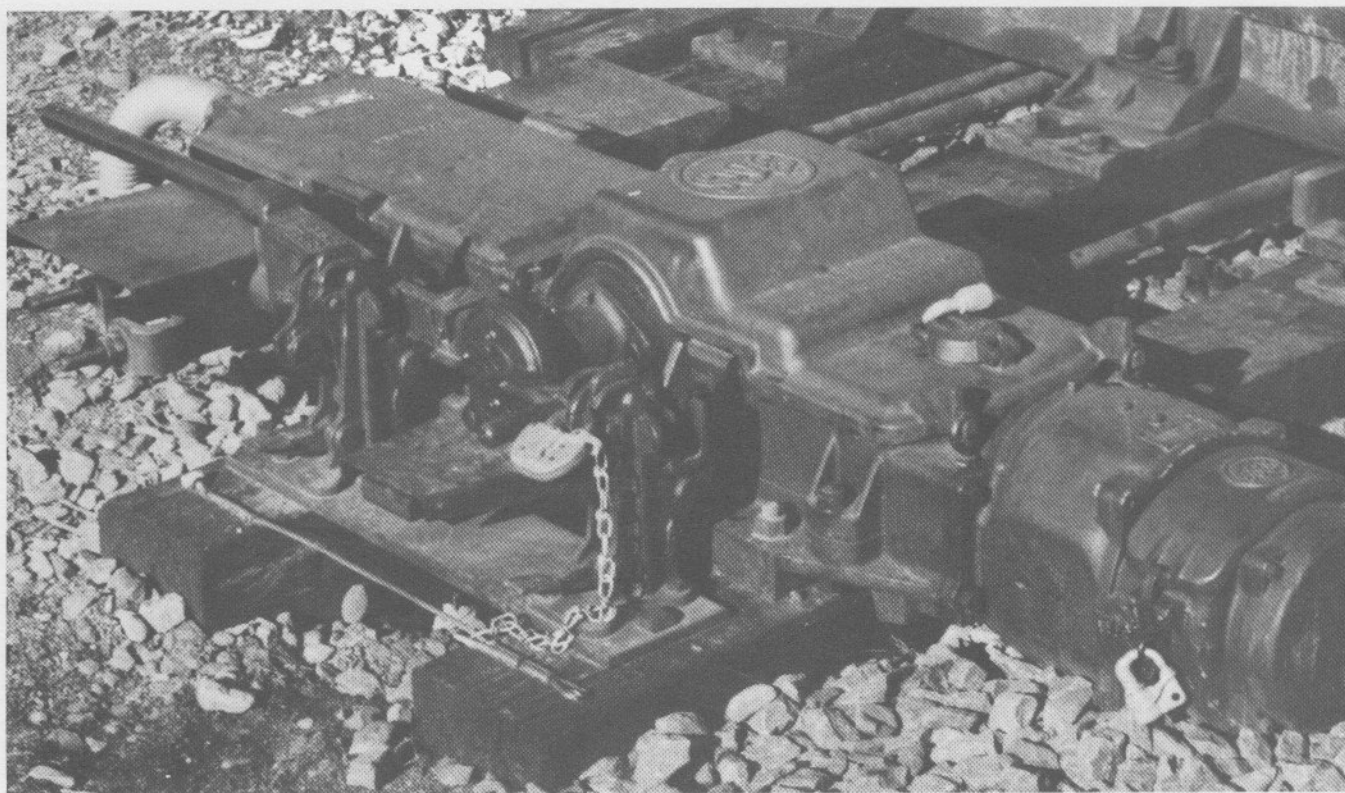
General: Power switches may be operated by air pressure, hydraulic pressure and electricity, with the latter being the most popular.

Control: All power switches may be controlled locally or from remote locations.

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



Non-Dual Control Switch Machine



Dual Control Switch Machine