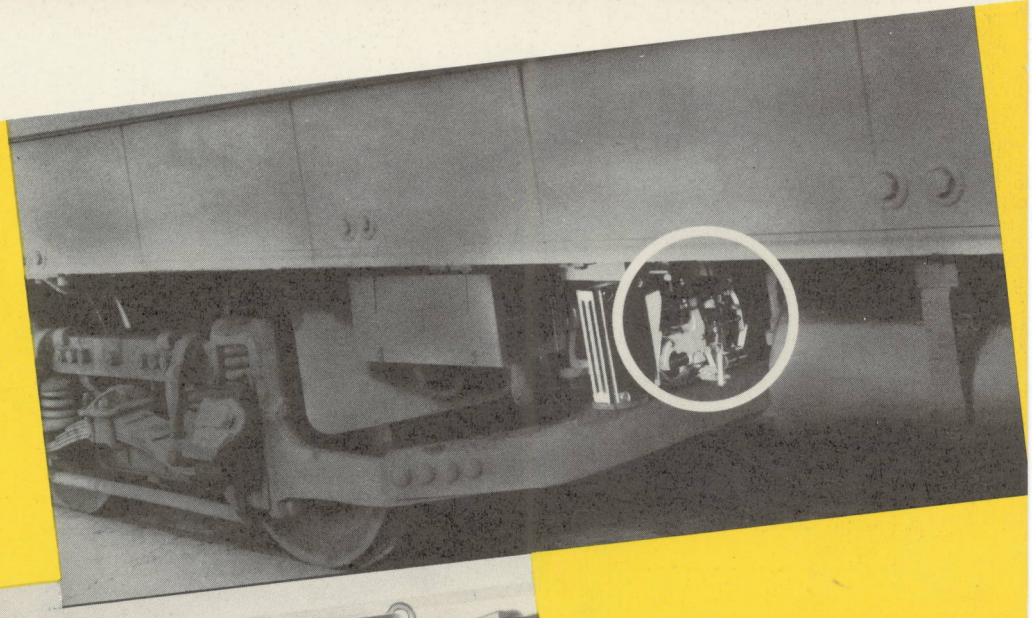
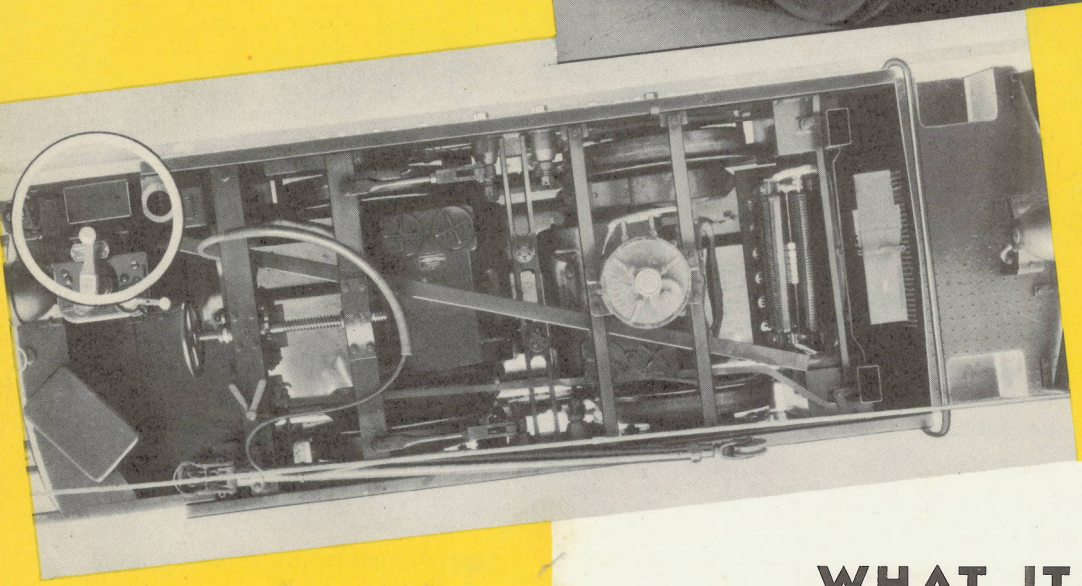
MODERN LINE-BREAKER EQUIPMENT

FOR ELECTRIC RAILWAY CARS





FOR MINE LOCOMOTIVES

ADVANTAGES

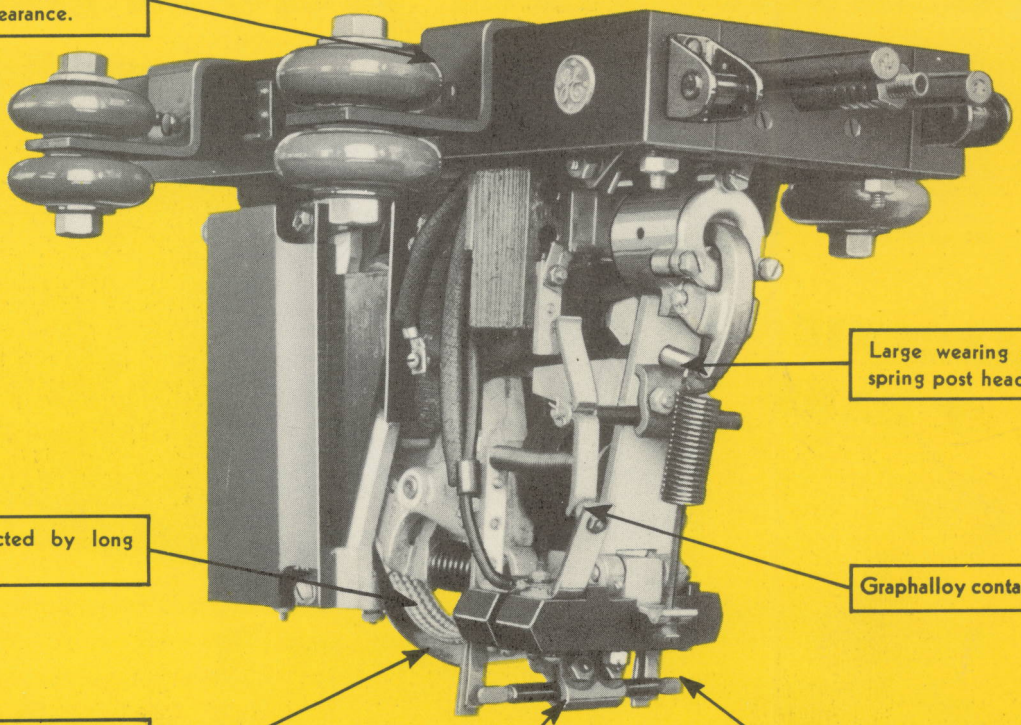
- Prevents Jerky Starting
- Reduces Accidents
- Minimizes Short-circuit Damage
- Eliminates Breaker Flash
- Reduces Maintenance Costs

WHAT IT DOES

This modern line breaker replaces the conventional hand-operated circuit breaker. Besides protecting the equipment from overloads and short circuits, it effects a valuable improvement in car and locomotive operation by eliminating practically all of the arcing in the drum controller. The line breaker accomplishes this by automatically opening and closing according to the direction of movement of the controller handle. Thus, when the controller handle is moved toward the "off" position from any position of accelerating or running, the breaker instantly opens and cuts off the power before the main controller drum is moved.

GENERAL ELECTRIC

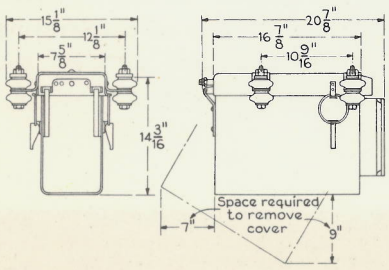
FOR ELECTRIC RAILWAY CARS



TYPES AND APPLICATION

There are two standard types of breaker for electric railway cars: the Type DB-986A for cars not having safety air features, and Type DB-987A for cars with safety air features. The types are identical except that the Type DB-987A is equipped with an air cylinder to trip the breaker when emergency application of the brakes is made.

The breaker is compactly designed, is contained in an easily removed sheet-metal case, and weighs only 72 lb. Its small dimensions permit installation in the limited space available on small cars.



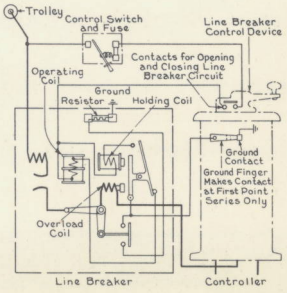
At left:
Dimensions of DB-986 and DB-987 line breakers

HOW IT IS INSTALLED

Steel supports welded to the breaker facilitate installation. Porcelain bolt insulators insulate the case from the supporting straps attached to the car body.

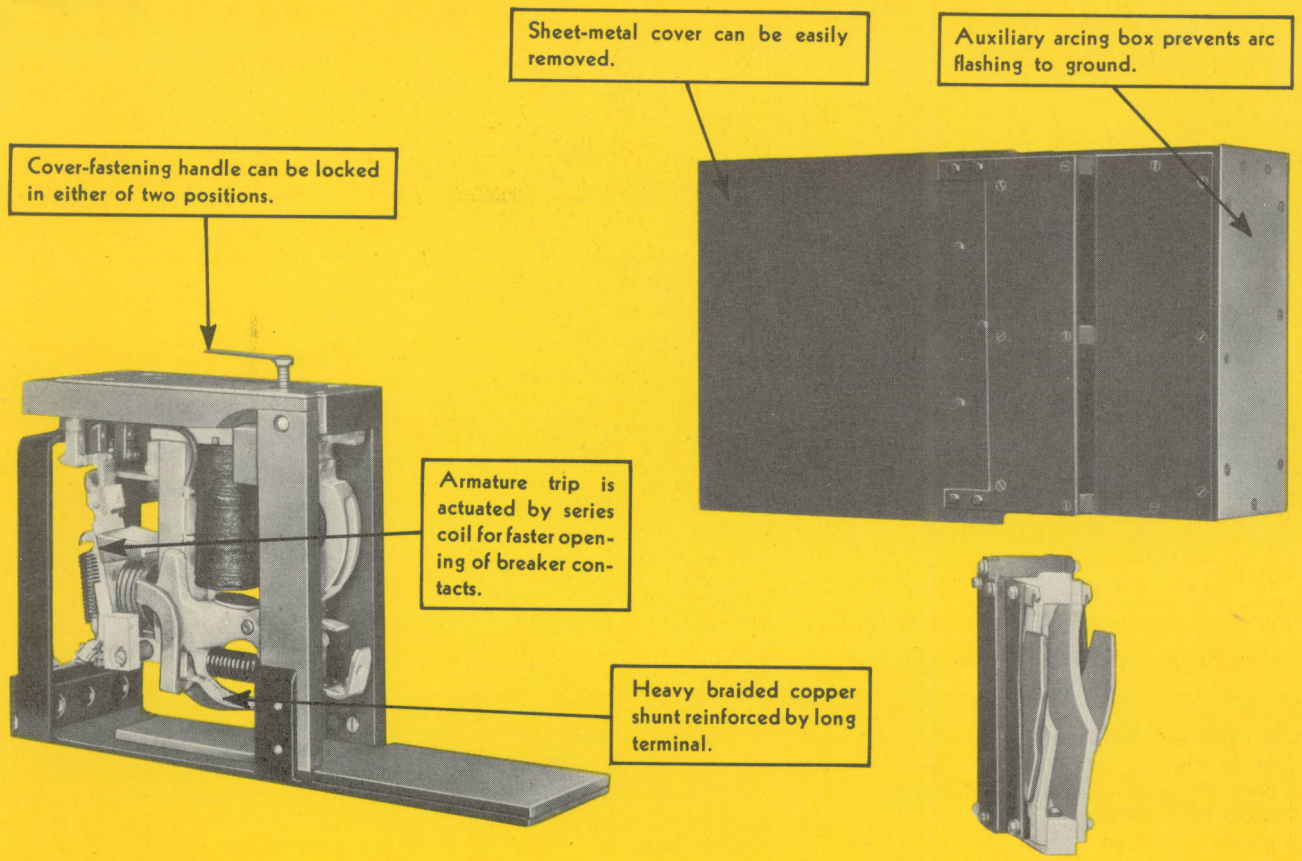
The control device on the controller is easily installed. Some standard controllers are already drilled and tapped to receive it.

The diagram below shows the combined control switch and fuse furnished. It should be installed in the cab within easy reach of the motorman. Connections should conform to arrangements shown.



At right:
Connection diagram for control device and DB-986 line breaker

FOR MINE LOCOMOTIVES



TYPES AND APPLICATION

The line breaker 17JM2 for mine locomotives is available for both 250- and 500-volt service. It has a maximum capacity of 300 amperes continuous, or 425 amperes hourly.

The breaker is compactly designed, is contained in an easily removed sheet-metal case, and weighs only 77 lb. Its small dimensions are consistent with the small available space on mine locomotives.

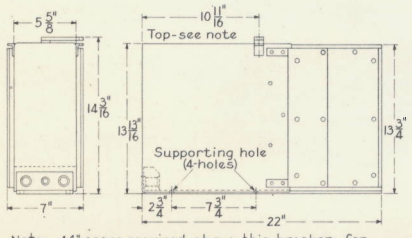
When ordering line breakers for mine use, specify serial number of locomotive, trolley voltage, weight of locomotive, type of controller, number and horsepower of motors.

HOW IT IS INSTALLED

This line breaker can be installed in the locomotive without regard for grounded parts, since it is equipped with an auxiliary arcing box which makes it impossible for arcs to flash to the ground.

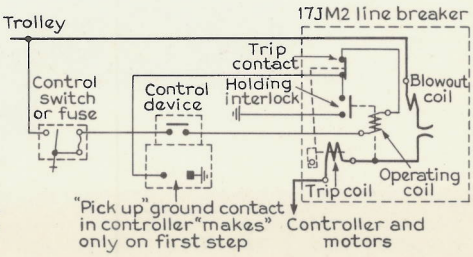
The line-breaker control device is easily installed. Some standard controllers are already drilled and tapped to receive it.

The diagram below shows the combined control switch and fuse furnished. It should be installed within easy reach of the locomotive operator. Connections should conform to arrangements shown.



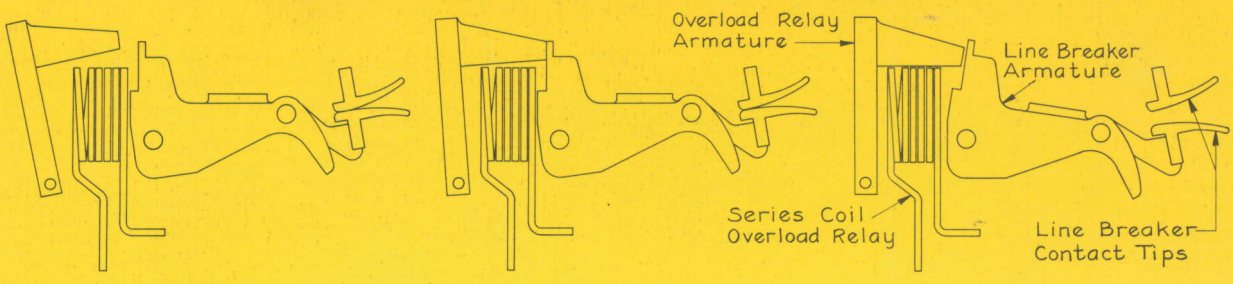
Note: 14" space required above this breaker for removal of cover
The supports of this apparatus may be grounded

At left:
Dimensions for 17JM2 line breaker



At right:
Connection diagram for control device and 17JM2 line breaker

THE HIGH SPEED OF THE G-E LINE BREAKER AND WHAT IT MEANS IN EXTRA PROTECTION



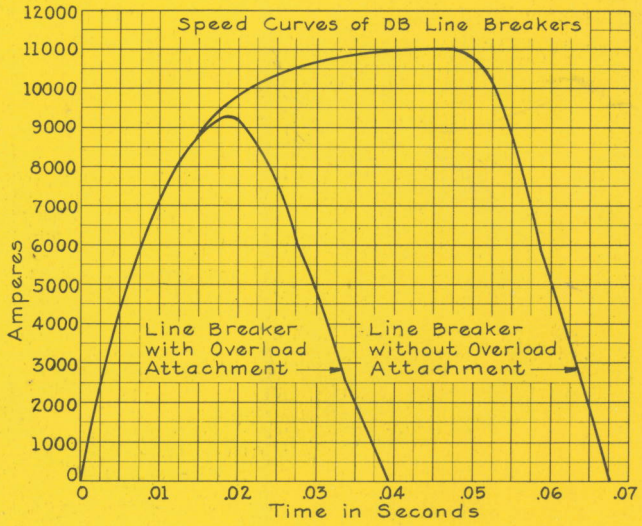
Line breaker closed

Action of overload relay on line-breaker armature

Line breaker open

The *sketches* above show how the energy of the overload or short circuit is actually utilized by the G-E line breaker to increase the speed of opening. The instant a heavy overload or short circuit comes on, the overload-relay series coil picks up the overload-relay armature which kicks open the breaker.

The *curves* give a comparison of the time required for the line breaker to open with and without this attachment. What this means in extra protection is indicated by the great decrease in energy (ampere-seconds) which is imposed on equipment before the circuit is broken.

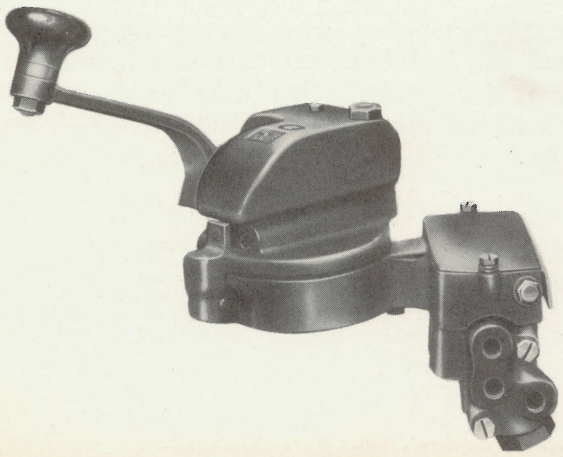


SAFETY AIR FEATURES

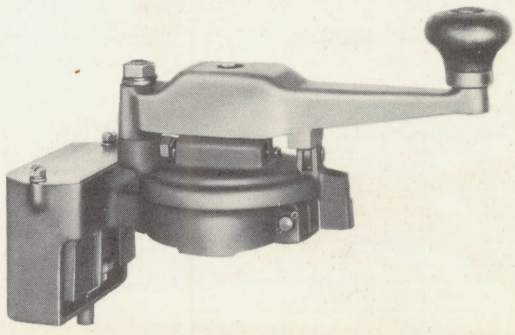
Use of safety air features on electric railway cars is made possible through the Type LB-4 control device and by combining an air-actuated knockout cylinder with line breaker Type DB-987A. A small pilot valve on the control device actuates the safety features.

RHEOSTATIC BRAKING CONTROL

G-E line breakers for both railway and mine use can be used with rheostatic braking controllers. The control device is slightly modified, and the line breaker protects the motors only in accelerating and running. It becomes inoperative when the motors are used for braking.



Type LB-4 control device for cars equipped with safety air features



Type LB-2 control device for cars not equipped with safety air features

GENERAL ELECTRIC COMPANY, SCHENECTADY, NEW YORK

6-38 (4M)
Filing No. 9200