INSTRUCTIONS

GEK-7315

Cable Type Rackout Mechanism For AKD-5 Powermaster Low Voltage Drawout Switchgear

(Refer to GEI-90890 for other Powermaster features)

BREAKER COMPARTMENT

The breaker is supported within its compartment by a roll-out track which is part of the drawout mechanism attached to the sides of the compartment, Fig. 2. The drawout mechanism is shown in an exploded view, Fig. 6, and its operation is explained in detail later in the manual under OPERATION.

All AK-2A power air circuit breakers of the same type and rating, which have duplicate wiring, may be interchanged.

Each breaker compartment has four positions: CONNECTED or fully engaged, TEST, and DISCONNECT or fully disengaged and fully WITHDRAWN where breaker is ready for removal. The doors on the breaker compartments do not have to be opened to move the breakers in or out. Each door panel is provided with a double latch, operated by a vertical slide lift handle. Although the breaker compartment door panel may be opened in any position, it is recommended that the door only be opened with the breaker in the fully disengaged position. Never open the breaker door when the breaker is energized.

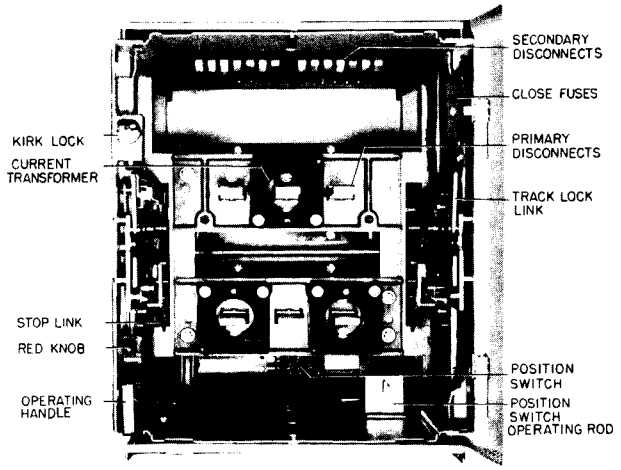

Fig. 1 (8914414) AK-25 Compartment

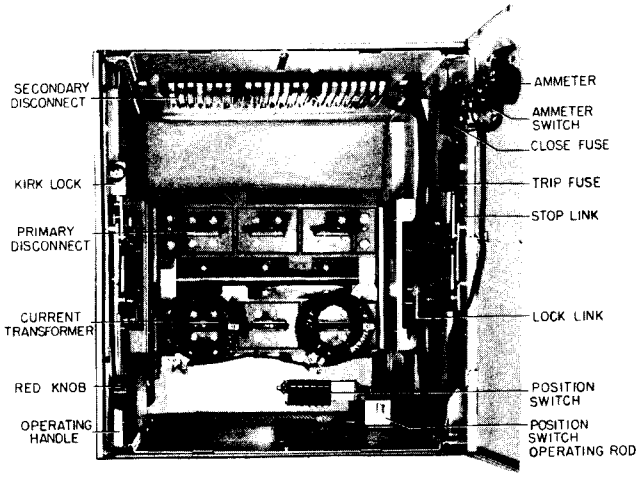

Fig. 2 (8914415) AK-50 Compartment

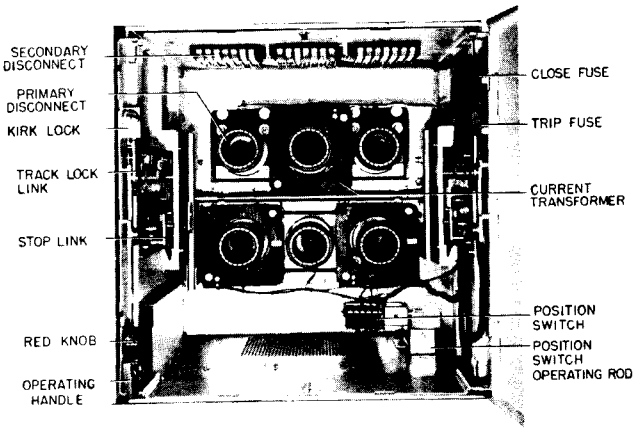

Fig. 3 (8914416) AK-75 Compartment

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the General Electric Company.

INTERLOCKS

Several interlocks are available as accessories. They are described in the following paragraphs.

Kirk Key Interlock

The Kirk Key Interlock is mounted with two 1/4-20 one-way screws, and external tooth lockwashers to the left side of the inner house.

The interlock is designed so the key may be removed from the lock only if the bolt is extended, and if the drawout mechanism is in the disconnected position. See Fig. 4.

Check the operation of the interlock as follows:

1. Operate the drawout mechanism to the disconnected position. The interlock key may be turned and removed, inserting the interlock bolt into a semicircular slot in the mechanism pushrod. The red knob can not be operated. See Fig. 4.

2. Insert the key and turn to withdraw the bolt from the slot in the mechanism push rod.

3. Operate the mechanism to the connected position. Turn the interlock key. The push rod must interfere so the bolt cannot be extended far enough to allow the key to be withdrawn. See Fig. 5.

Door Interlock

A door interlock, which prevents opening of the compartment door when the breaker is closed, can be provided as an optional accessory. See Figs. 6 & 7.

The door interlock consists of a link 74-26 which is mounted on the inner house side sheet of the breaker compartment. A combination torsion-compression spring 74-33 is mounted on the link pivot pin and biases the link in a forward and counter clockwise direction. One end of the link engages with a slot in the door latch 147-04, the other end engages with the draw out mechanism push rod.

When the breaker is operated to the connected position, the push rod moves forward. This forward motion of the push rod creates interference between the end of the push rod and the interlock link and blocks the raising of the door latch.

As long as the breaker remains closed, the push rod cannot be retracted and the door interlock will be operative. To open the door, the breaker must be tripped and the push rod retracted. The interlock link is then free to rotate about its pivot pin and the door latch bar can be lifted.

If required the interlock can be defeated. A small hole is provided in the door in front of the interlock link. By inserting a tool such as a screwdriver through this hole, the interlock link can be pushed back until it is free of the latch. With the interlock link held back in this manner, the door latch can be raised and the door opened.

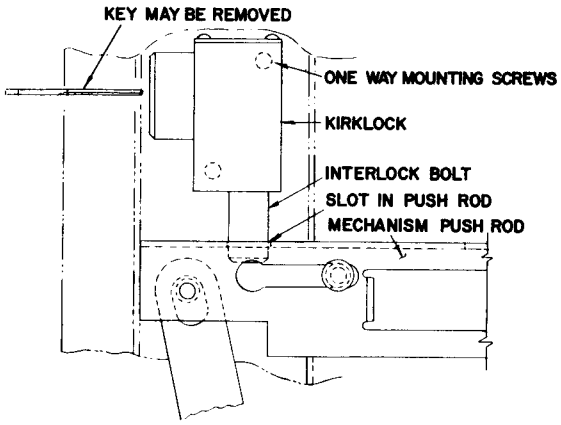

Fig. 4 (0116B5047-0) Side View of Kirk Lock With Drawout Mechanism in the Disconnected Position

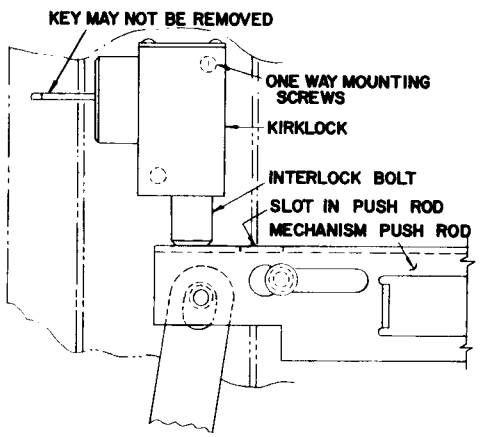

Fig. 5 (0116B5047-0) Side View of Kirk Lock With Drawout Mechanism in the Connected Position

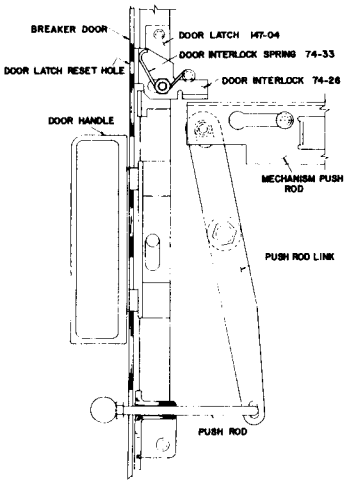

Fig. 6 (0102C5208-0) Door Interlock With Red Knob In

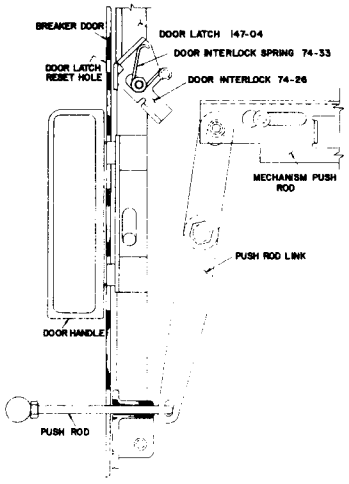

Fig. 7 (0102C5208) Door Interlock With Red Knob Out

Mechanism Padlock Device

An accessory is available to padlock ıe drawout mechanism. When installed the mechanism is inoperative. See Figs. 8 & 9.

The device may be used to padlock the mechanism in the connected, test, or the disconnected position.

A 1/4-20 bolt is inserted in the device for shipment. This bolt should be removed and discarded.

In operation, part 218-30 is placed around the rod 145-26 so the pin 218-33 is inserted in a hole in the compartment side sheet. Part 218-31 is then raised to clamp rod 145-26 so it cannot be pulled. Up to three padlocks can then be inserted in the matching holes between 218-31 and 218-30. The padlock is not furnished with the device.

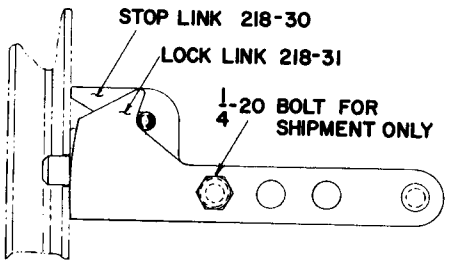

Fig. 8 (0116B5046-0) Front View of Drawout Mechanism Padlock Device

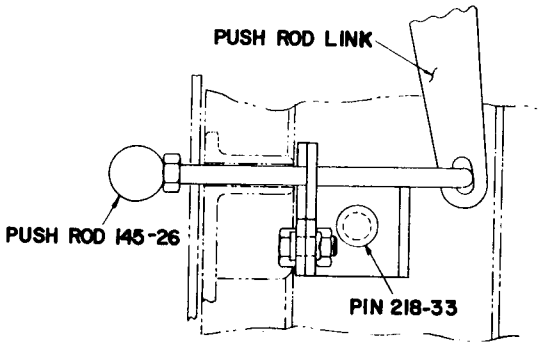

Fig. 9 (0116B5046-0) Side View of Drawout Mechanism Padlock Device

DRAWOUT OPERATION

The drawout mechanism, consists of a roll-out 2-section track that is mechanically operated by a cable, ratchet gear, and cam assembly with various mechanical interlocks. The mechanism tracks and ratchet gear are mounted to the side of the breaker compartment and are connected together by a shaft that runs between the two ratchet gears. It includes an operating handle, cable, pulleys, reset push rod and ·ever linkage, over-center toggle linkage ıd kick-off pawl release link. The left nand side of the racking mechanism is shown exploded in Fig. 6. A description of how the mechanism is assembled, and of how it works is provided in the following paragraphs. Refer to the part designation numbers displayed in Fig. 10.

The mounting plate (73) is riveted directly to the side of the breaker cubicle wall or to channels in conbination compartments. Four wheels (64) are mounted on this plate by means of riveted pins with screw inserts. Track (89) is held by these rollers so that it can roll back and forth between the rollers. Six similar rollers are fixed to this track (89). Track (94) is held between these rollers. The breaker is held by pins which fit into the slots shown in the top of track (94). A lock-link (97) is fixed in track (89) and bears against the front breaker pin, locking the breaker to the track (94) and also locking the tracks (89) and (94) together.

There are three positions of the drawout mechanism - CONNECT - TEST - DISCONNECT. The mechanism as shown in Fig. 10 is in the fully withdrawn position. If the breaker should be withdrawn from the cubicles when the tracks are in either the TEST or the CONNECTED positions, a stop link (76) which is mounted to the mounting plate (73) so that is free to pivot, will drop down to prevent the breaker from being pushed back into contact with the primary disconnects.

This stop link, 76, is moved out of its blocking position by pin, 101, on track, 94, when the tracks are moved to the DISCONNECT position by the drawout mechanism.

To move the breaker out to this fully connected position as shown in the exploded view, the operation would be as follows:

The reset push-rod knob, 160, must first be pulled forward. This causes the push-rod, 51, through lever, 118, to be moved to the rear. As the push-rod, 51, moves toward the rear, a cam groove in the reset push-rod, 51, moves pin, 122 and 123 of the pawl kicker link, 120, out of the detent, permitting the pawl, 42, to engage a tooth of the ratchet gear, 38. Until the reset knob is pulled, the pushrod is held in the retracted position by the overcenter spring toggle linkage consisting of links, 50, and 62, and spring, 151. Link, 50, is fixed to track, 89 by pin, 53, so that it may pivot. Pin, 57, is fixed at one end to the reset push rod, 50. Pin, 52, rides in a cam slot in mounting plate, 73, while pin, 56, is fixed in track, 89. As the reset push-rod, 51, is moved to the rear, pin 52, is raised out of the notch in the mounting plate, 73, which causes spring 151, to compress and rotate link, 50. Since link, 62, is notched and is positioned between pins, 53 and 56, spring, 151, pushes link, 50, until pin, 52, is stopped by the top of the cam slot in plate, 73. This also sets the over-center spring toggle, the other side of center, ready for the next operation.

The operating handle, 29, can now be operated to pull the cable, 116. This cable is wrapped around pulley, 104, and causes pulley, 104 to rotate clockwise until the pin, 110, is engaged by slot. Since this pin is fixed in pulley, 105, further rotation of pulley, 104, will now cause pulley, 105, to be rotated also. Pulley, 105, is a double pulley with two different diameters. Cable, 115, is fixed to this pulley in such a way that as the pulley is rotated clockwise, the cable will be wrapped onto the larger diameter and off the smaller diameter. This difference in rates at which the cable moves from one diameter to the other, causes the cable which passes over pulley, 103, to be shortened. Shortening of this loop causes lever, 40, to which the small pulley, 103, is fixed, to rotate about shaft, 109. Since pawl, 42, is also attached to link, 40, rotation of link 40 causes ratchet gear, 38, to be rotated by the pawl hook that is engaged in one of the gear teeth.

A cam roller, 41 attached gear, 38, engages a cam groove in track, 89. As the gear is rotated, the track is forced to move by the movement of the cam roller, 41, riding in the cam groove. A stop, 49, in the cover plate, 82, engages a slot in pulley, 105, and limits its travel to 330 degrees. After the pulley, 105, reaches the end of its rotation, springs 149 and 150 will return the pulleys to the positions required for the next stroke as the operating handle is allowed to return to its normal position. Lever, 40, is also returned by spring, 148, and pawl, 42, will now engage the next tooth in the ratchet gear. The operation is then repeated for three additional strokes of the handle.

At the end of the fourth stroke the kicker link, 120, will be pulled into a notch in the push-rod, 51, by the action of spring, 152. Pin 52 of the over-center spring toggle linkage at the same time will drop into a slot in the mounting plate, 73. The movement of track, 89, relative to the mounting plate, 73, has previously cammed link, 50, to a position such that when the stop notch is reached, the push-rod, 51, will be pushed forward by the action of the over-center spring, 151. This motion also retracts reset knob 160, and indicates that the mechanism has reached another stopped position (in this case the TEST position). To move the breaker and drawout mechanism further, the reset knob, 160, must be pulled again. After the reset knob has been operated, two additional strokes of the operating handle, 29, will carry the breaker to the fully disconnected (DISCONNECT) position. At this point the reset handle will be retracted as before and further motion of the operating handle will be without effect until the reset knob has again been operated. This action is applicable in any of the three stop positions of the mechanism.

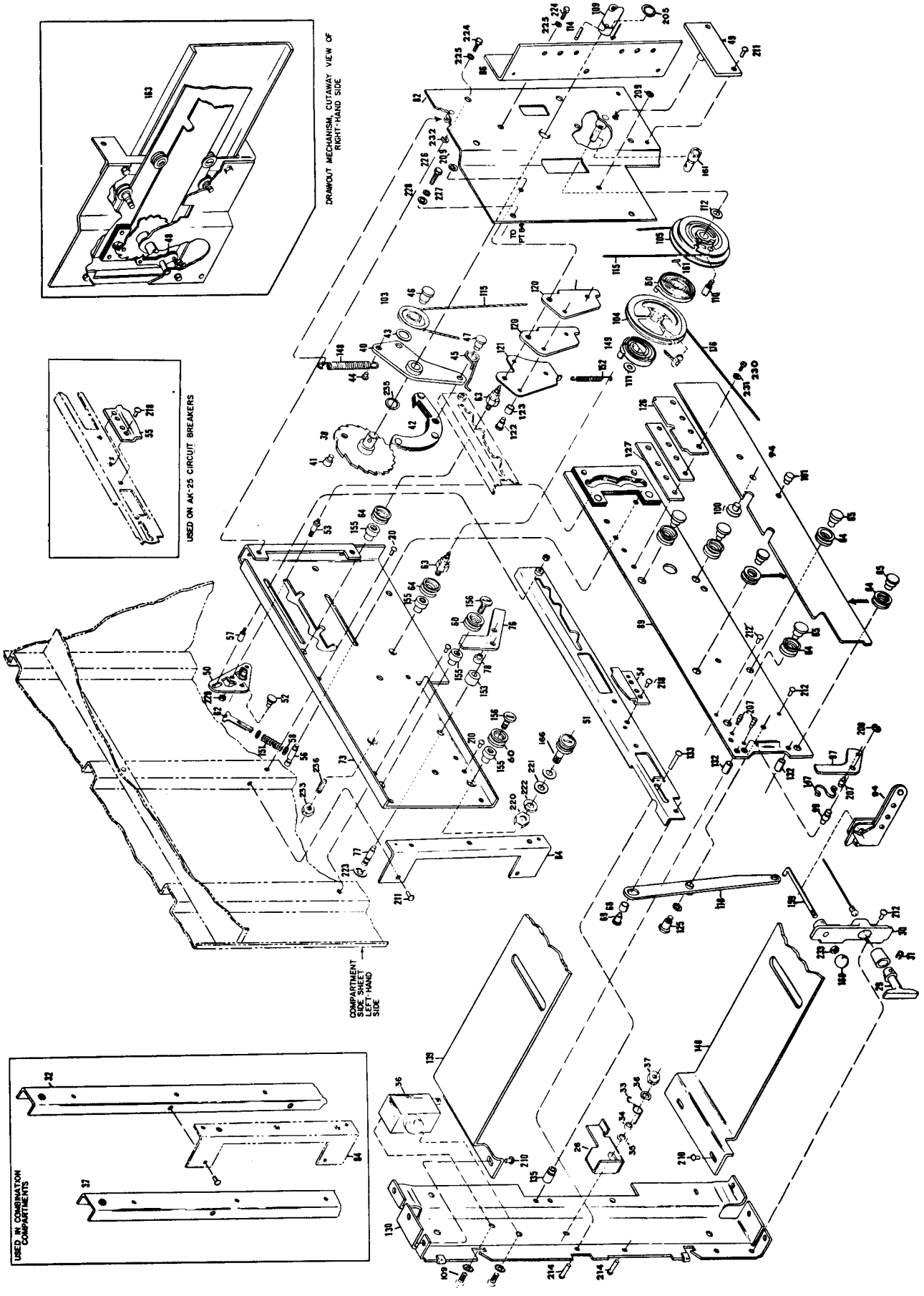

Fig. 10 Drawout Mechanism