



TYPE LFR4 ISOLATING SWITCH

HIGH VOLTAGE

NEMA CLASS E2

DESCRIPTION

APPLICATION

The Type LFR4 Isolating Switch is primarily used in an Ampgard Starter along with an LF25H430 or LF50H430 Contactor and motor starting current limiting fuses. THIS ISOLATING SWITCH IS A NON-LOAD BREAK DEVICE. IT MUST NEVER CLOSE OR INTERRUPT A POWER LOAD. However, it does have a very limited capacity for interrupting the single phase control transformer exciting current or a load which does not exceed 750 VA up thru 2500 V or 600 VA from 2501 to 5000 volts.

Ampgard starters manufactured prior to 1976 used a LFM Isolating Switch. This LFR4 cannot be used in such starters without modification. Do not attempt this without obtaining instructions from the factory.

This industrial type control is designed to be installed, operated, and maintained by adequately trained workmen. These instructions do not cover all details, variations, or combinations of the equipment, its storage, delivery, installation, check-out, safe operation, or maintenance. Care must be exercised to comply with local, state, and national regulations, as well as safety practices, for this class of equipment.

INSTALLATION

The assembled Type LFR4 Isolating Switch slides into the starter structure on two rails. The isolating switch should be positioned so that all doors close properly, the mounting holes line up, and the mechanical interlock to the contactor is in the proper location. The switch is to be bolted in place using two 5/16-18 X 1.00 long socket head cap screws.

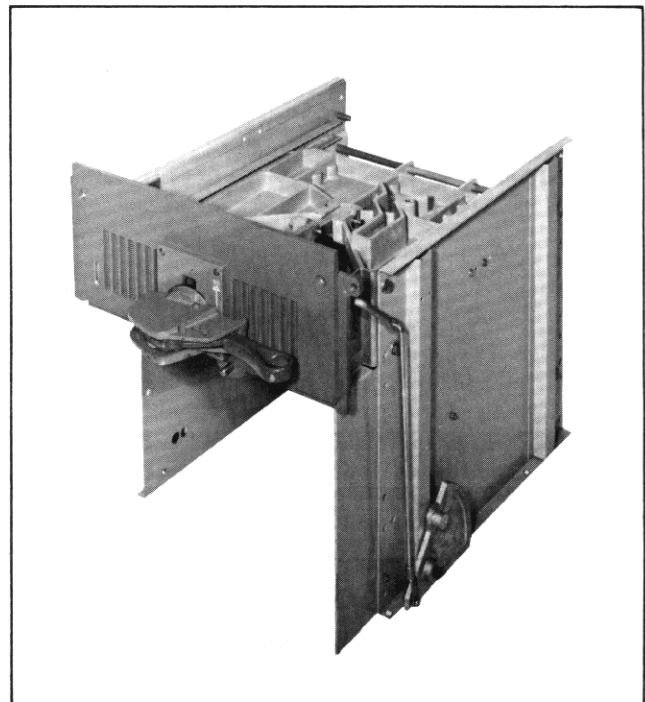
RATING

360 Amps continuous (enclosed)
5000 Volts maximum

GENERAL

The Type LFR4 Isolating Switch is a high voltage, three pole manually operated device. It consists of an operating mechanism and sliding tray mounted between two steel endplates. The sliding tray is molded insulating material and carries three sets of fuse jaw finger assemblies. One end of the fuse jaw finger assembly grips the upper ferrule of the power fuse while the other end engages the line stab connector which is mounted in the Ampgard Starter. In the open position, the three fuse jaw fingers are grounded.

Arc resistant and flame retarding insulating barriers are mounted between phases and also between the two outside poles and the Isolating Switch end plates.



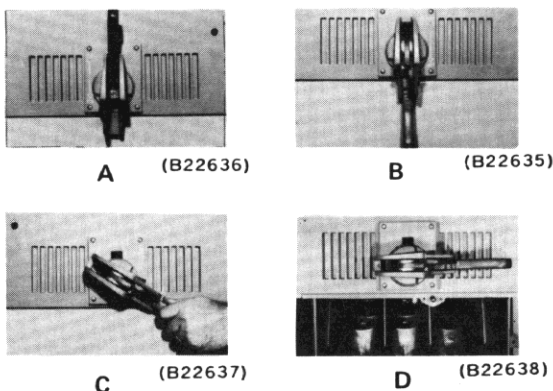
(Photo 75-0158)

Fig. 1. Type LFR4 Isolating Switch

Isolating Switch Handle (Fig. 2). The starter is shipped with the isolating switch in the ON position. The isolating switch handle is operated by moving it through a vertical arc from the ON to the OFF position. From the OFF position, it can be rotated 90° counterclockwise to the HORIZONTAL position, the door open position.

In both the ON and OFF positions, a portion of the handle housing extends over the high voltage door preventing the high voltage door from being opened. To open this door, the handle must be moved to the HORIZONTAL position.

With the handle in the OFF position, up to three padlocks can be used to lock the switch, preventing the handle from being moved to either the ON or the HORIZONTAL position. This prevents both unauthorized entry into the high voltage compartment and accidental closing of the isolating switch while maintenance work is being done. From the HORIZONTAL position, the handle cannot be moved to the ON position, without first moving to the OFF position.



The operating handle has three distinct positions. In the ON position (A), the isolating switch is closed, the high voltage door is interlocked shut, and the starter may be energized.

In the OFF position (B), the isolating switch is open, the high voltage door is interlocked shut and the starter is de-energized and grounded.

With the handle rotated 90° counterclockwise (C) to the HORIZONTAL position (D), the isolating switch is open, the starter is de-energized, grounded, and the high voltage door may be opened.

Fig. 2. Isolating Switch Handle Operation

MECHANICAL INTERLOCKS

Before putting the isolating switch into service, it is recommended that the user be familiar with the mechanical interlocks.

Door Interlock. With the isolating switch handle in the HORIZONTAL position, the high voltage door can be opened. As soon as the door opens, a mechanical interlock becomes effective. It is designed to prevent the user from accidentally operating the isolating switch handle and closing the starter on to the line with the high voltage door open.

This interlock is a spring loaded plunger located just below the handle housing (Fig. 2). This prevents the handle from being accidentally returned to the OFF position. This interlock may be deliberately cheated by depressing the plunger with a screwdriver so that the handle can be moved to the OFF position to observe the operation of the isolating switch during installation or maintenance. To do this, it is necessary to deliberately cheat the interlock. The handle must be returned to the HORIZONTAL position by again depressing the interlock plunger before the high voltage door can be closed. The operator must be aware of what he is doing and take appropriate safety precautions.

Contactor to Isolating Switch Mechanical Interlock (Fig. 3). The Type LFR4 Isolating Switch functions only as a disconnect; it must never close, or interrupt a power load. To prevent this, the interference lever roller (30), on the contactor is engaged by a cam (24) on the isolating switch. If the contactor is closed, the isolating switch cannot

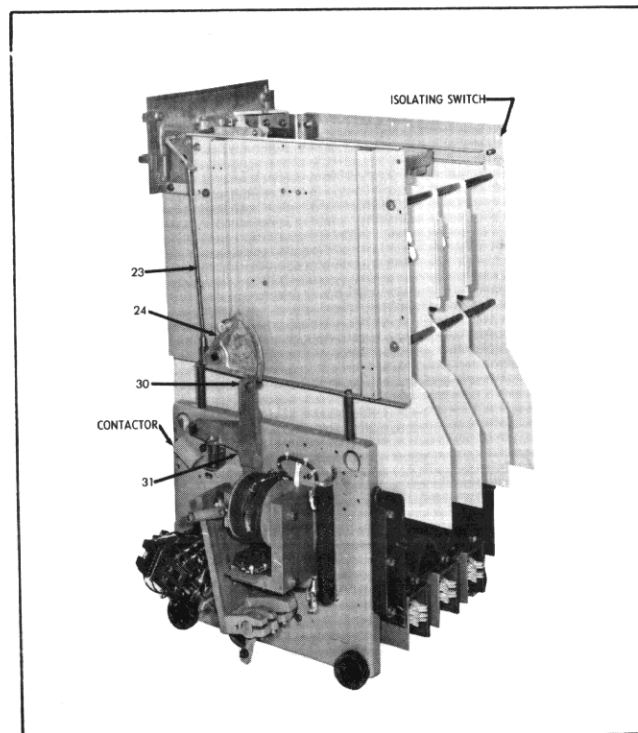


Fig. 3. Type LFR4 Isolating Switch and Type LF50H430 Contactor

(Photo 75-0157)

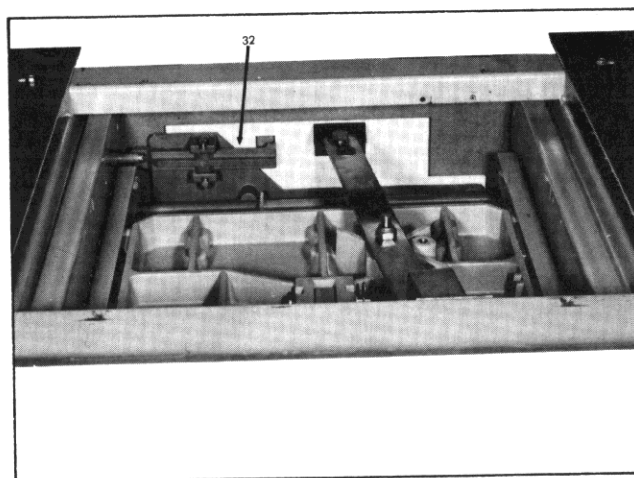
be moved either from the OFF to the ON, or from the ON to the OFF positions. This is a positive interlock, it cannot be cheated without disassembly of the interlocking parts.

Line Stab Insulating Shutter. Both the shutter and the rear line stab barrier are mounted in the starter structure and are intended to prevent accidental access to the line bus. As the isolating switch is opened, the molded cam surface of the sliding tray mechanically drives the insulating shutter closed across the three line stab openings in the rear barrier. As the shutter closes the openings, green and white striped labels are uncovered to visually indicate that the shutter is closed. With the isolating switch in the fully open position, the fuse jaw finger assemblies and the line side of the main fuses are connected to the ground bar.

As a final precaution before touching any of the electrical parts of the starter, visually check to make certain that the shutter is closed, the green and white striped labels are visible, the grounding fingers are in contact with the ground bar, and the tips of the fuse fingers are visible.

When the isolating switch is removed from the starter structure, a latch lever (32, Fig. 4) on the shutter assembly is activated. It is designed to hold the insulating shutter closed. This latch may be deliberately cheated and the shutter moved to the open position. CAUTION should be observed since the exposed line terminal stabs of the starter may be energized at line potential.

When the Isolating Switch is replaced in the structure, the latch member is automatically released to allow the shutter to operate normally.



(Photo 75-0160)

Fig. 4. Shutter Operating Mechanism

AUXILIARY SWITCH

An electrical interlock can be provided on the isolating switch which is designed to operate before the fuse jaws open as the handle is moved from the ON position. This electrical interlock is mounted behind the front plate and is actuated by a spring finger that is moved by the clevis (27, Fig. 5). The contacts of this interlock are normally used to disconnect the load of a control circuit transformer, space heaters, or auxiliary circuits when the load is in excess of 750 VA up thru 2500 V or 600 VA from 2501 to 5000 V. Both contacts must be the same polarity.

Max. Aux. Switch Rating

AC Volts	Amperes	
	Cont. and Interrupt	Inrush
115	15	40
230	10	20

MAINTENANCE AND REPAIR

GENERAL

This industrial type control is designed to be installed, operated, and maintained by adequately trained workmen. These instructions do not cover all details, variations, or combinations of the equipment, its storage, delivery, installation, check-out, safe operations, or maintenance. Care must be exercised to comply with local, state, and national regulations, as well as safety practices, for this class of equipment.

A maintenance program should be established as soon as the isolating switch has been installed and put into operation. After the isolating switch has been inspected a number of times at monthly intervals and the conditions noted, the frequency of inspection can be increased or decreased to suit the conditions found, since this will depend upon the severity of the duty.

Examination. With the isolating switch on a table or bench and the cam (24) overhanging the edge check the following points:

- 1) Move the operating handle through its full range of operation from the HORIZONTAL position, through OFF to ON (door interlock has to be cheated manually). The handle should move freely, without binding, and the top insulating tray should glide smoothly in the guides.
- 2) With the handle in the ON position, the ends of the fuse jaws will project beyond the endplates. Move these jaws by hand. They should be loose and pivot freely up and down.
- 3) When the cam (24, Fig. 3) is blocked approximately .12 inches below the flange, the mechanical interlock will lock the handle mechanism and prevent the fuse jaws from being moved from either the ON to OFF position or from the OFF to ON position.

Adjustment (See Figs. 3 and 5). Normally, the isolating switch will not require any adjustment; however, if for any reason parts are removed or replaced, it will be necessary to adjust the top insulating tray (20), rocker linkage (22), cam adjustment rod (23) and cam (24).

The adjustment procedure is as follows:

- 1) With the handle in the OFF position, adjust the tray position by removing the tray pin (25) and turning the rod end (26) into or out of the clevis (27) until the tray is 5.50 inches from the back of the end plates. Replace tray pin (25).
- 2) Adjust the rocker (28) so that when the handle is moved from the OFF to the ON position a clearance of .03 to .06 inches is obtained between the edge of the rocker and the edge of the clevis (27). Make this adjustment by tightening or loosening the adjustment clevis (29).
- 3) When installed in the controller, adjust the interlock cam (24) so that it will just touch the roller (30) on the contactor. Make this adjustment by tightening or loosening the cam adjustment rod (23). As a final check, install fuses, and with the feeder bus deenergized see if the isolating switch can be opened or closed with contactor either held closed mechani-

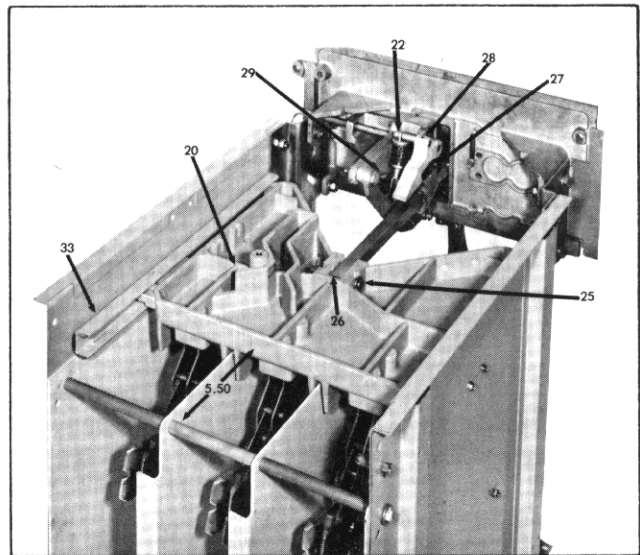


Fig. 5. Type LFR4 Isolating Switch
Mechanical Interlock Adjustment

cally or energized from a separate control supply. The rocker (28) must engage the clevis (27) a minimum of .12 inches for proper mechanical locking. If it does not, readjust per Par. 2.

LUBRICATION

Periodically, apply a light coating of Dow Corning DC-4 high temperature silicone grease (or equivalent) to the tips of the fuse jaw fingers where they engage the line terminal stabs. Also clean and lubricate the tray guide rails (33, Fig. 5) and the rollers above and below the clevis (27, Fig. 5).

Opening the High Voltage Door Under Abnormal Conditions. In the unlikely event that either the isolating switch fuse jaws or the contactor contacts should weld closed, or if an event should occur so that the isolating switch handle cannot be moved from the ON to the OFF position, provision has been made so that the high voltage door can be opened in an emergency. The door can be opened by using the following procedure:

- 1) MAKE SURE THAT THE MAIN INCOMING POWER LINE IS DEENERGIZED, to avoid a hazardous situation when the high voltage door is opened.
- 2) Remove the four screws holding the rectangular handle housing of the isolating switch to the front casting.
- 3) The complete handle housing can now be pushed up far enough to provide clearance for opening the door and any maintenance carried out.

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