

## KS-21413

### PROTECTOR

#### DESCRIPTION, REQUIREMENTS, AND TESTING

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#### 1. GENERAL

1.01 This section covers the KS-21413 protector (circuit breaker) and associated parts used to protect the frame aisle feeders in battery distribution circuits.

1.02 Whenever this section is reissued, the reason for reissue will be listed in this paragraph. This issue affects the Equipment Test List.

1.03 Reference shall be made to Section 020-010-711 covering General Requirements and Definitions for additional information necessary for the proper application of the requirements listed herein.

#### 2. DESCRIPTION

2.01 The KS-21413 protector unit (Fig. 1) consists of two circuit breakers equipped with single-pole snap-action switches, assembled in a housing arranged for attachment to a steel plate designed for mounting to the end guard of a frame aisle lineup. Mounting plates are available to mount one, four, or six units. Some codes of the protector are provided with a series resistor/lamp combination, which, when energized by the associated alarm switches, will illuminate the lamps. The alarm switches will operate when either of the circuit breakers trip due to overload. The protector units are also available with different current ratings and common or independent line termination.

2.02 The line, load, and alarm terminals are of the plug-in type. Crimp-type female connectors (List 110) are provided for attachment of line and load leads. Alarm leads (List 111) are supplied with the protector units which are equipped with alarm lamps. Protector units, without the alarm lamp network, are supplied with List 112 and 113 alarm jumpers for externally paralleling the alarm switches.

2.03 The resistor-lamp combination consists of the following:

- (1) Resistor assembly 003-10336 (\*) (or equivalent) consisting of a 5-watt, 200-ohm, and a 5-watt, 500-ohm resistor.
- (2) Lamp assembly 045-76066 (\*) (or equivalent) consisting of a lamp holder and two 24-volt, 0.040-ampere lamp (\*\*).

#### NOTICE

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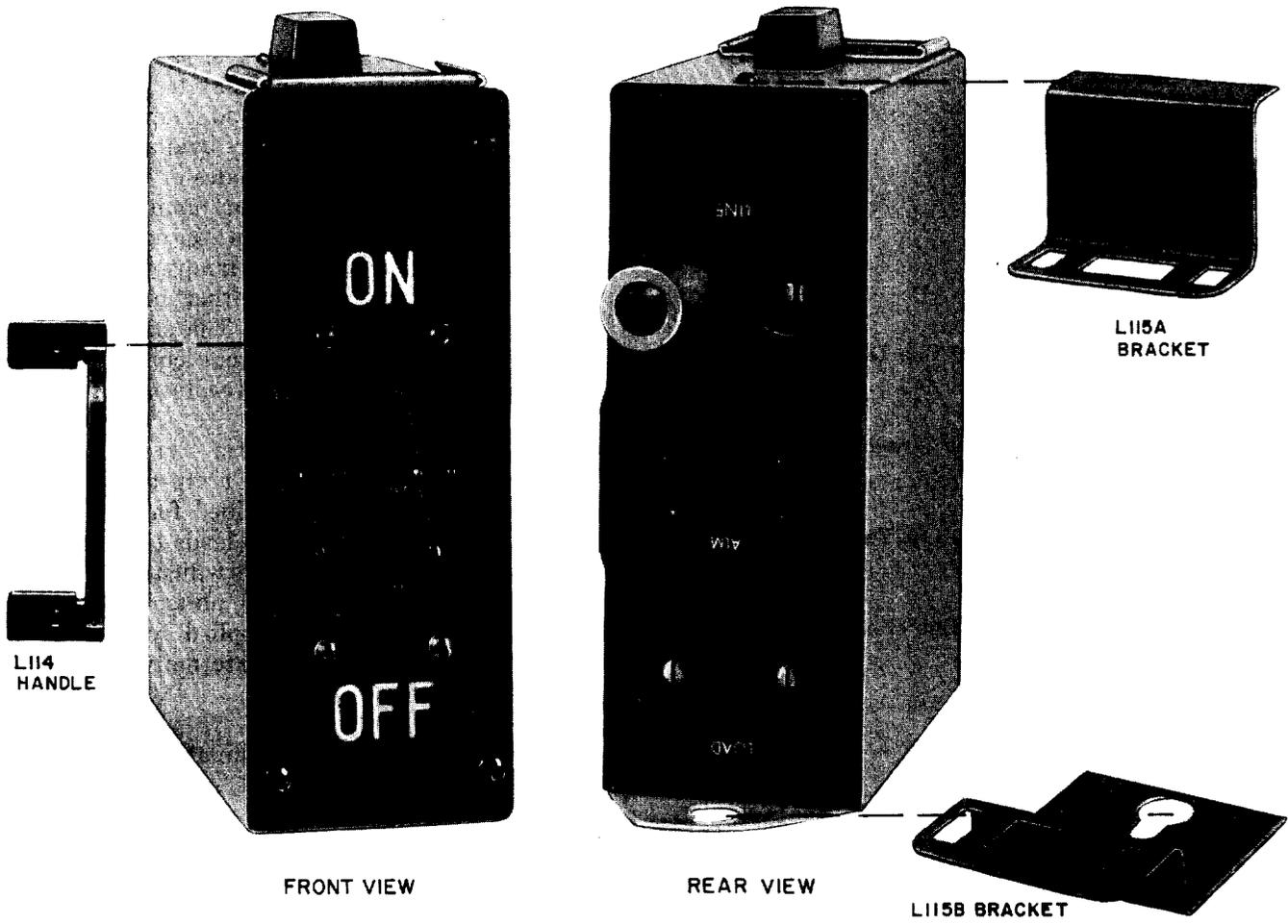


Fig. 1—KS-21413 Protector

(\*) Heineman Electric Company, Trenton, New Jersey  
 (\*\*) Lamps may be purchased from Industrial Devices, Inc., Edgewater, N. J. as Model 3132/3141-24ESB

**2.04** The associated parts for use with the protector are as follows. (Orders for protector units and/or associated parts shall specify name of Part and List number.)

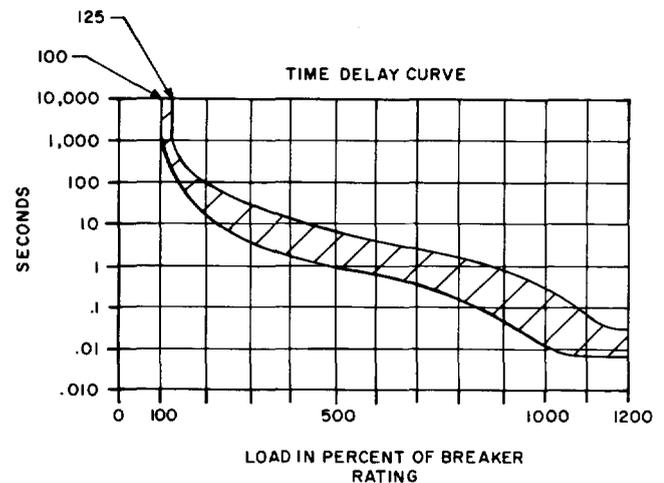
- KS-21413, L101 Mounting Plate (One Protector Unit)
- KS-21413, L102 Mounting Plate (Four Protector Units)
- KS-21413, L103 Mounting Plate (Six Protector Units)
- KS-21413, L110 (\*) Connector for 2/0 AWG External Wiring
- KS-21413, L111 Alarm Lead, Wire 20 AWG with one female terminal
- KS-21413, L112 Alarm Jumper, Wire 20 AWG with two male terminals
- KS-21413, L113 Alarm Jumper, Wire 20 AWG with two female terminals
- KS-21413, L114 Handle Guard
- KS-21413, L115A Cable Retainer
- KS-21413, L115B Cable Retainer

(\*) The connectors are designed for crimping to a 2/0 cable by the KS-19964, L102, tool with either the L112 or L212 die, or with the L202 tool with the L112 die. When L212 die is used, the compressed length of the barrel measured from the wire side should not exceed 3/4 of an inch or be less than 5/8 of an inch. When an L112 die is used, 1 crimp shall be made. After crimping, the external metal area of the connector should be insulated by tape or other equivalent means.

**3. REQUIREMENTS**

**3.01 Electrical:** The breakers are inverse time—delay type designed to carry the rated current continuously and will trip on overcurrents in accordance with the performance curve shown in Figure 2.

**3.02 Mechanical:** The breaker lever has three positions; ON, OFF, and TRIP. In the ON position the line terminal is connected to the load



**Fig. 2—Time Delay Curve Table A**

terminal through the breaker contacts and the alarm switch contacts are open. In the OFF position both breaker contacts and alarm switch contacts are open. The breaker lever will move to the TRIP position when the breaker is operated by an overload. At this position the alarm switch contacts will close, connecting the breaker line terminal through the resistor-lamp circuit to the alarm terminal. From the TRIP position the breaker lever must be operated manually to the OFF position before the breaker lever can operate the main contacts to the ON position. Operating the breaker lever to the OFF position will open alarm switch contacts and also reset the trip mechanism.

**4. TESTING**

**4.01 List of Tools, Gauges, and Test Apparatus**

CODE OR SPEC. NO. TOOLS	DESCRIPTION
KS-6854	Screwdriver
R-2512	Adjustable wrench
—	3-inch D Screwdriver
—	4-inch E Screwdriver

SECTION 026-316-701

GAUGES

- Pocket watch or clock

TEST APPARATUS

- Ammeter, dc, ranges as required
- Battery, storage
- Rheostats (size to be determined by the current rating of protector being tested)
- Switch, SPDT

**4.02 Electrical Operation:** To check a dc time-delay circuit breaker, proceed as follows: Check each pole separately as shown by options 1 and 2.

- (1) Disconnect the circuit breaker from its circuit, and set up the proper test circuit as indicated by the illustration referenced in Table A. Select

the correct rheostats and ammeter depending on the current to be used. Use wire and switch capable of carrying the current without undue heating.

- (2) With the breaker closed and switch A in position 1, adjust rheostat A for current equal to rated current.
- (3) With switch A in position 2, adjust rheostat B until the same value of current is obtained.
- (4) Readjust rheostat A until the current is 1.50 percent of the rated current .
- (5) Throw switch A to position 1, and note that the pole trips within the required time.
- (6) Verify that alarm leads are activated and alarm lamp lights, if applicable
- (7) Reset circuit breaker to OFF, and verify that the alarm lamp is off and alarm leads are open.

TABLE A

KS-21413 PROTECTOR REQUIREMENTS

LIST NO.	BREAKER RATING (AMPS)	COMMON LINE TERMINALS	ALARM LAMP	LIST 111 LEAD (QTY)	LIST 110 CONNECTOR (QTY) (A)	LIST 112 JUMPER (QTY)	LIST 113 JUMPER (QTY)	TEST FIG. NO.
1	100		X	1	2			3
2	100	X	X	1	2			4
3	90		X	1	2			3
4	60		X	1	2			3
5	30		X	1	2			3
6	100				2	1	1	5
7	100	X			2	1	1	6
8	90				2	1	1	5
9	60				2	1	1	5
10	30				2	1	1	5
11	45		X	1	2			3
12	15		X	1	2			3
13	45				2	1	1	5
14	15				2	1	1	5

(A) When both circuit breakers of a protector are to be used, two additional List 110 connectors for L1 and L6 and one additional List 110 Connector for L2 through L5 and L7 through L14 must be ordered.

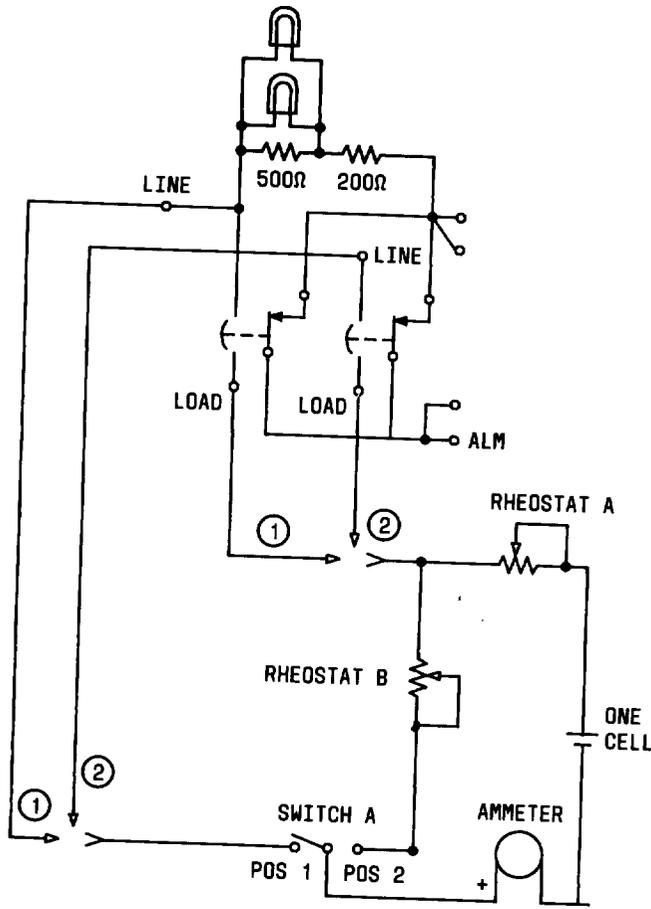


Fig. 3—Test Circuit—Independent Line Termination—With Lamp Assembly

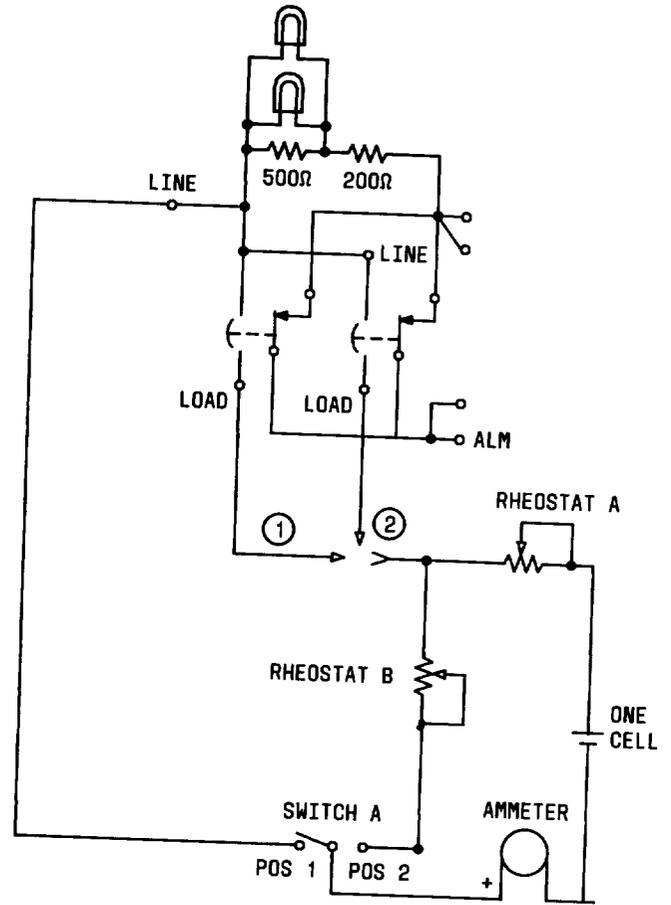


Fig. 4—Test Circuit—Common Line Termination—With Lamp Assembly

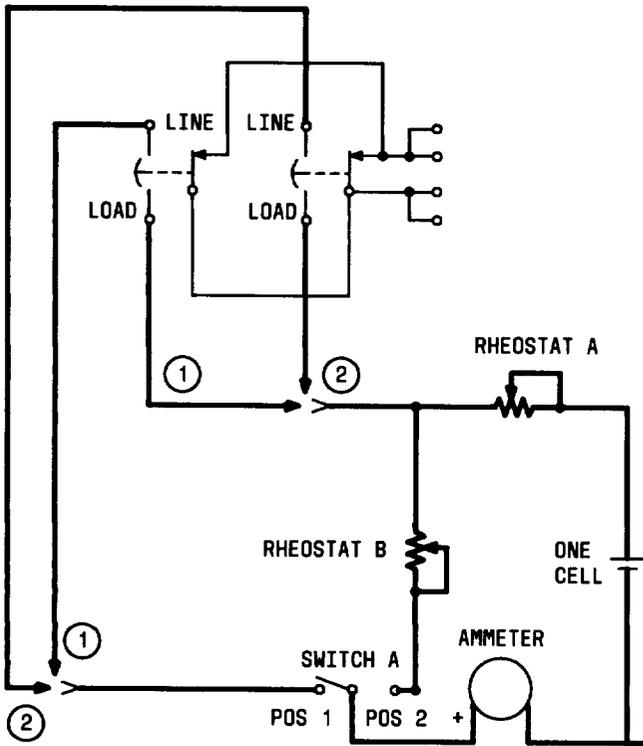


Fig. 5—Test Circuit—Independent Line Termination—Without Lamp Assembly

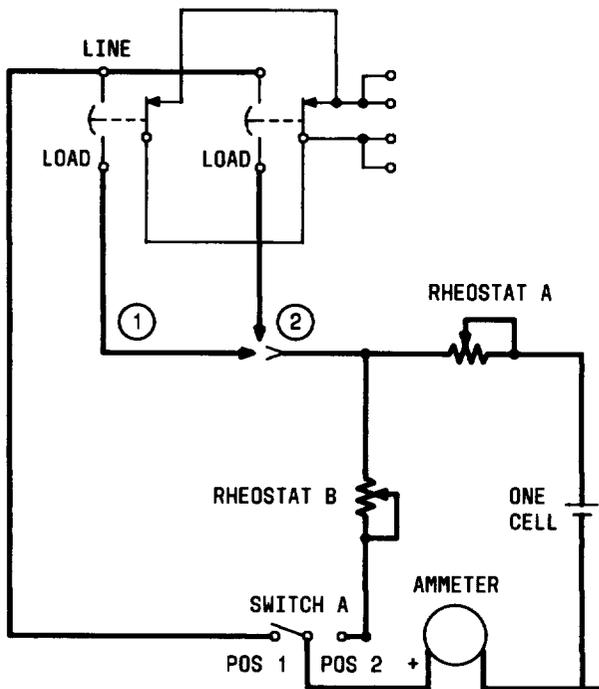


Fig. 6—Test Circuit—Common Line Termination—Without Lamp Assembly