FROD # 14859

Cutler-Hammer

Instructions for SELTRONIC™ Breakers Types NC/NCA, HNC/HNCA and NCY/NCYA

WARNING

DO NOT ATTEMPT TO INSTALL OR PERFORM MAINTENANCE ON EQUIPMENT WHILE IT IS ENERGIZED. DEATH, SEVERE PERSONAL INJURY, OR SUBSTANTIAL PROPERTY DAMAGE CAN RESULT FROM CONTACT WITH ENERGIZED EQUIPMENT. ALWAYS VERIFY THAT NO VOLTAGE IS PRESENT BEFORE PROCEEDING WITH THE TASK, AND ALWAYS FOLLOW GENERALLY ACCEPTED SAFETY PROCEDURES.

CUTLER-HAMMER IS NOT LIABLE FOR THE MISAPPLICATION OR MISINSTALLATION OF ITS PRODUCTS.

The user is cautioned to observe all recommendations, warnings, and cautions relating to the safety of personnel and equipment as well as all general and local health and safety laws, codes, and procedures.

The recommendations and information contained herein are based on Cutler-Hammer experience and judgement, but should not be considered to be all-inclusive or covering every application or circumstance which may arise. If any questions arise, contact Cutler-Hammer for further information or instructions.

DESCRIPTION

General

AB De-ion® SELTRONIC Circuit Breakers. (Fig. 1) are designed and tested in accordance with Underwriters' Laboratories, Inc., Standard UL489 for Molded Case Circuit Breakers. Each breaker is equipped with a solid state trip unit with provisions for interchangeable rating plugs (Fig. 2).

Rating Plugs

Each rating plug (Fig. 2) will permit the breaker to carry 100% of the assigned ampere rating indicated on the plug in open air continuously without exceeding UL specified temperature rise limitations. Overcurrent protective devices are limited to 80% of their assigned rating per Section 220-10(b) of the National Electrical Code. Rating plugs will permit small overloads to continue for short periods of time but will cause the breaker to trip on sustained overloads of 135% of the plug rating within two hours and in less time at higher overloads.

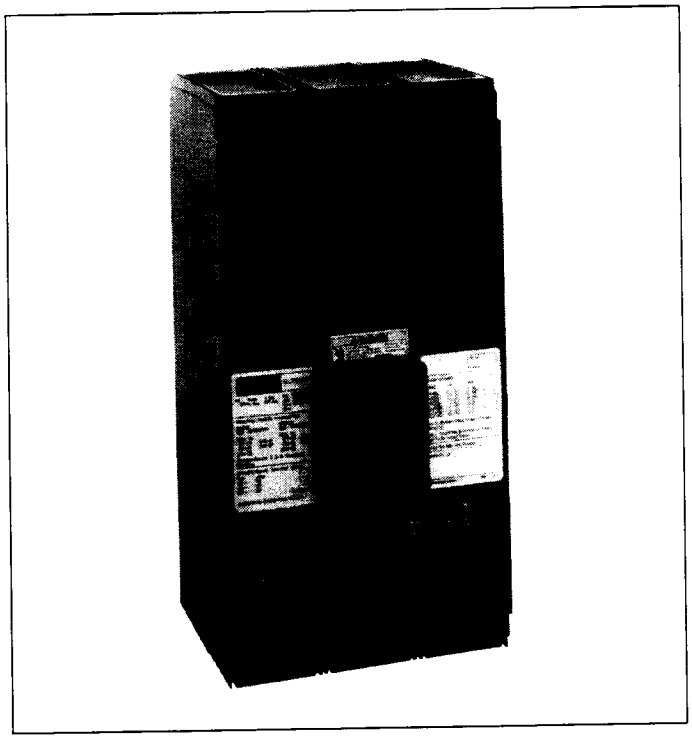


Fig. 1 NC SELTRONIC Breaker

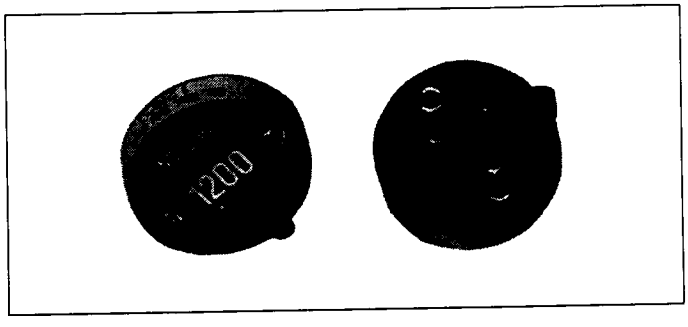


Fig. 2 SELTRONIC Rating Plugs

Optional Adjustable Rating Plug

Adjustable rating plugs can be adjusted over a continuous range. See Fig. 3. Conductors for SELTRONIC Breakers employing adjustable rating plugs must be applied on the basis of the 100% rating of the plug.

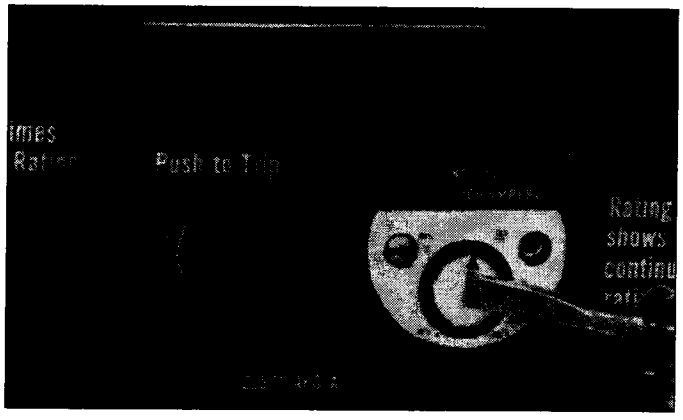


Fig. 3 Adjustable Rating Plug

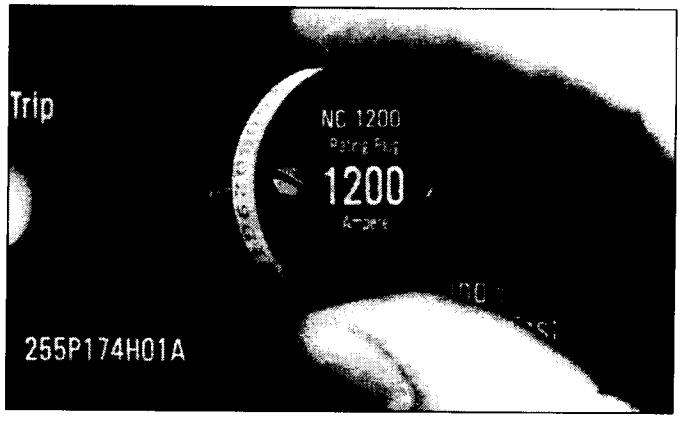


Fig. 4 Installation of NC Rating Plug

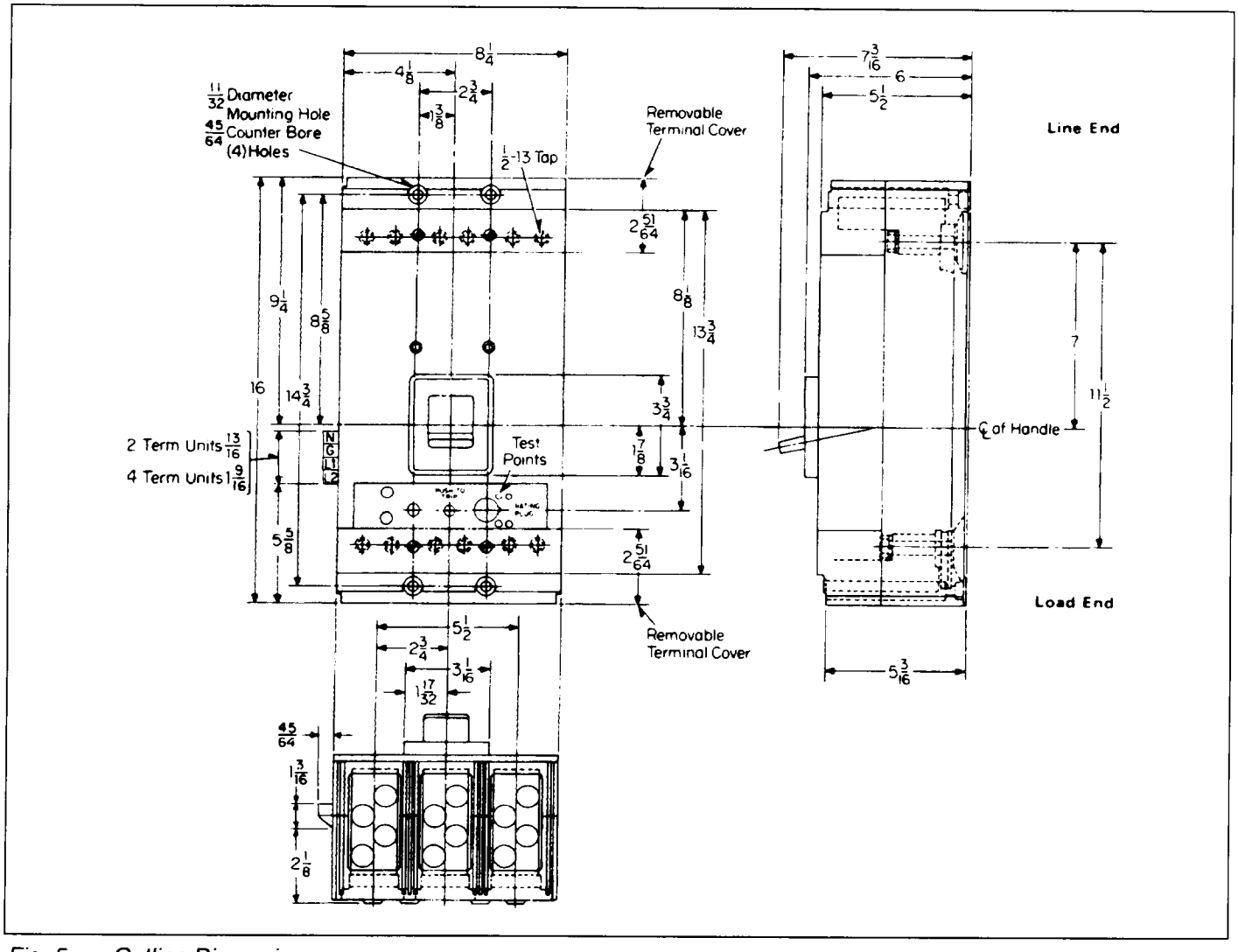


Fig. 5 Outline Dimensions

Breaker Position Indication

When the breaker is open, the handle is in either the MID or OFF position. If in MID position, the breaker has been tripped and the latch must be reset by moving the handle to the extreme OFF position before attempting to reclose the breaker. To close the breaker after resetting the latch, move the handle to the ON position.

NOTE: The breaker cannot be latched until the rating plug is installed and properly tightened.

FACTORY TESTS

This breaker has been completely factory inspected and tested. The short time pick-up has been preset to maximum. Install desired rating plug (Fig. 4) and reset all adjustments to meet application requirements before closing the breaker.

Electrical Ratings						
Type	Cont. Ampere Rating	No. Poles	Volts AC	Interrupting Capacity RMS Symmetrical Amps AC Rating		
				240 V.	480 V.	600 V.
NC/NCA	600-1200	2-3	600	42,000	30,000	22,000
HNC/HNCA	600-1200	2-3	600	65,000	50,000	25,000
NCY/NCYA	600-1200	2-3	240	100,000	- - -	- - -

BREAKER INSTALLATION

Mounting Arrangement

SELTRONIC breakers are suitable for mounting in either the normal vertical or horizontal position. SELTRONIC breakers without internal attachments and with field installed attachments are suitable for reverse feed application.

Mounting Method

These 1200 Amp Frame SELTRONIC breakers may be mounted in a variety of methods including fixed and drawout. Outline and drilling plans for mounting the breaker using front connected terminals are shown in Figs. 5 and Fig. 6. Fig. 6 illustrates the front cover cut-out normally required for breakers individually mounted in switchboard enclosures. Figs. 7 and 8 illustrate two alternate mounting means including: rear studs and panelboard connecting straps. All items are accessories that must be ordered separately and are not supplied with the breaker. Fig. 9 illustrates the standard drawout frame available as an alternate mounting arrangement.

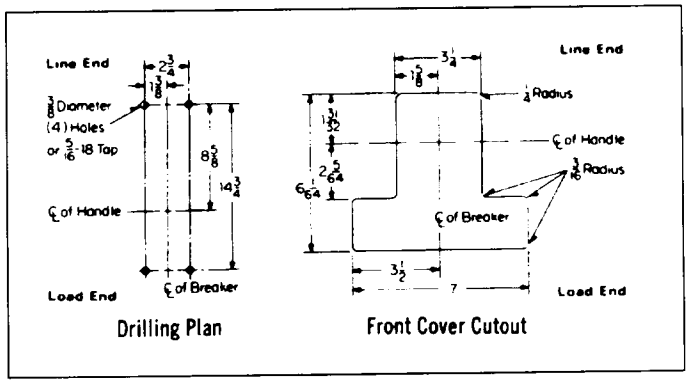
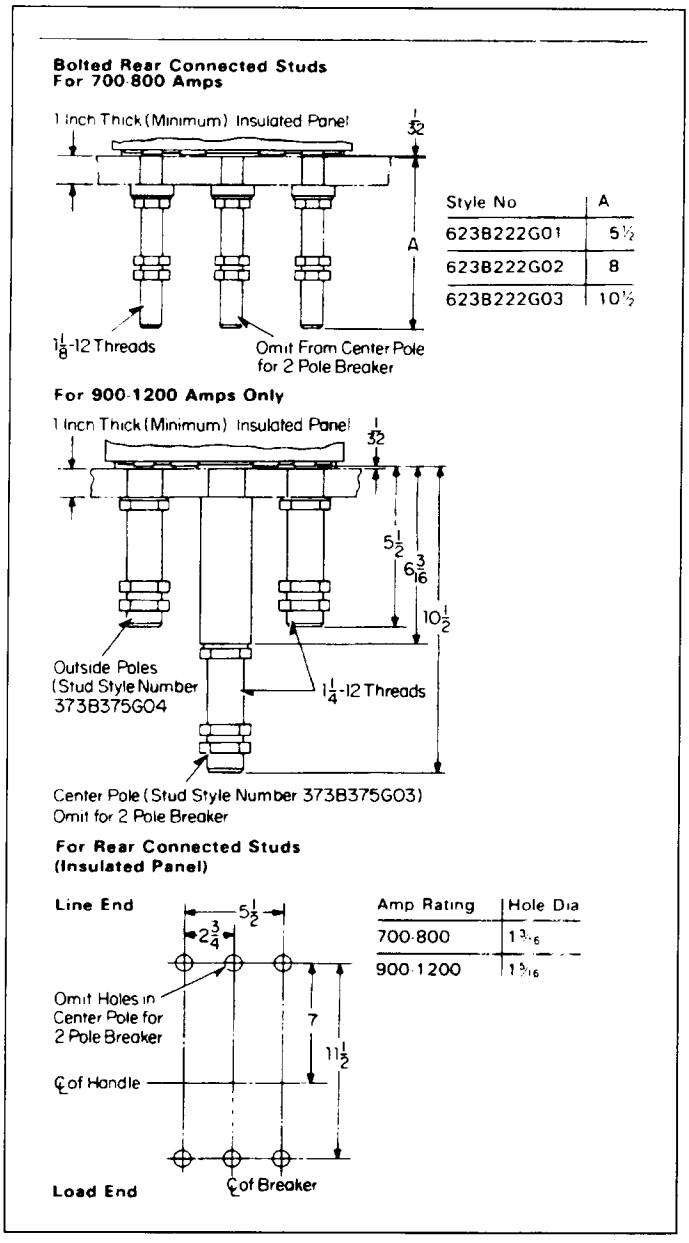


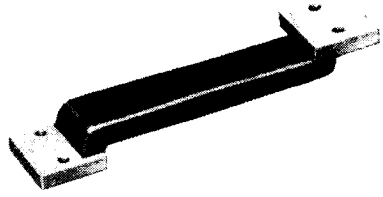
Fig. 6 Drilling Plans for Mounting Bolts (Front Connected Terminals) and Front Cover Cutout



Style No	A
623B222G01	5½
623B222G02	8
623B222G03	10½

Amp Rating	Hole Dia
700-800	1 3/16
900-1200	1 5/16

Fig. 7 Rear Connected Studs



Ampere Rating	Type Connector	Connector Style Number
1200	Short	505C606G04
1200	Medium	505C606G05
1200	Long	505C606G06
Mtg. Bracket	(4 Reg.)	315C270H01

Bus Spacing 3-1/2 In.

Fig. 8 Panelboard Connecting Straps

Rating Plug Installation and Removal

The SELTRONIC breaker is shipped with the rating plug opening covered with a vinyl nameplate. Remove the shipping nameplate and align the rating plug with opening key way and push-in (Fig. 4). With a small screwdriver, tighten the rating plug screw securely until the plug is pulled flush with the face of the breaker. The screw serves a dual purpose: plug retention and interlock. Should an attempt be made to remove the rating plug with the breaker in the "On" position, the breaker will trip automatically. **The breaker cannot be closed with the rating plug removed.**

To remove the rating plug, place the breaker in the "Off" position, loosen the interlocking screw and remove the plug. NC rating plugs are not interchangeable with rating plugs of other frame size SELTRONIC breakers.

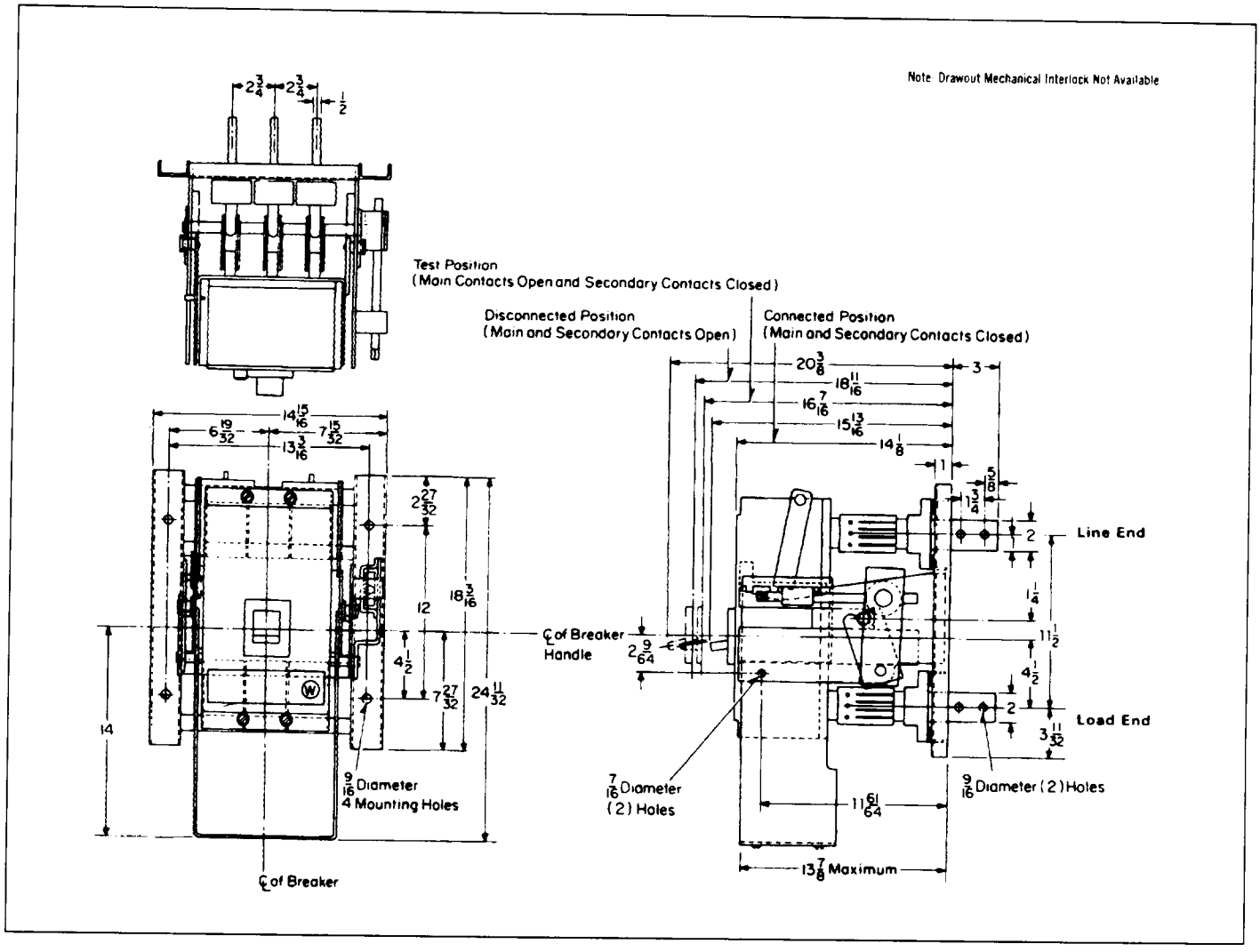


Fig. 9 Drawout Frame

Wire Terminals

A full range of wire terminals is available for either copper or alum/copper application. Catalog numbers and wire ranges are shown on the breaker nameplate. Pictorial identification and installation instructions are given in I.L. 13080.

Terminal Types

Terminal Cat. No.	Wire Range, Type No. of Cables	Torque Lb. In.
Al/Cu Pressure Terminals		
TA1000NB1①	(3) 3/0-400 MCM, Al/Cu	375
TA1200NB1①	(4) 4/0-500 MCM, Al/Cu	375
TA1201NB1②	(3) 500-750 MCM, Al/Cu	450
Copper Only Pressure Terminals		
T1000NB1	(3) 3/0-500 MCM, Cu Only	300
T1200NB1	(4) 3/0-400 MCM, Cu Only	275

① Type AL9CU Aluminum Terminal.
② Type AL7CU Aluminum Terminal.

Accessories

A variety of accessories are available for either factory or field installation. Consult the nearest Cutler-Hammer distributor for details and availability.

WARNING

INTERNAL ENERGIZED CONDUCTORS OR METAL PARTS CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. DISCONNECT ALL POWER BEFORE REMOVING COVER TO INSTALL OR REMOVE ACCESSORIES.

ADJUSTMENTS

Short Time Pick-up/Short Time Delay

The Short Time Pick-up Adjustment (Fig. 10) has an adjustment range from 2 to 8x the ampere rating of the installed rating plug.

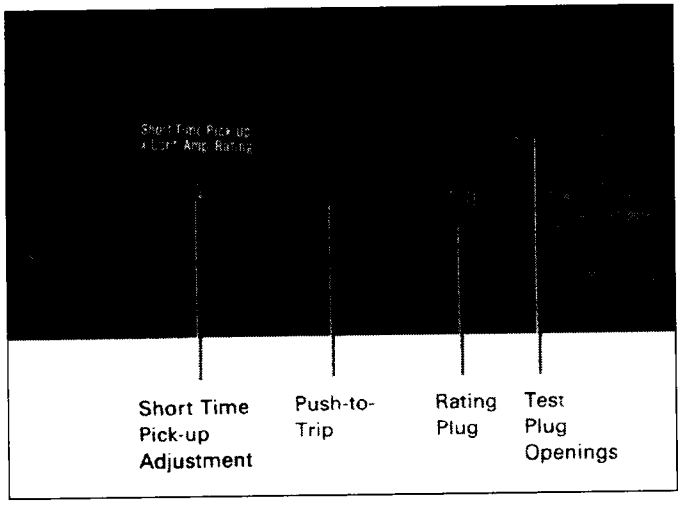


Fig. 10 Sold-State Trip Unit Without Short Time Delay Adjustment

The short time delay setting is fixed on the standard NC, NCY and HNC versions. The actual time delay is a function of the fault current as shown in Application Data 29-162 Page 8.

The short time delay settings are optional and supplied only on the NCA, NCYA and HNCA versions. Refer to Application Data 29-162, Page 19 for available time delay adjustments.

FIELD TESTING

Mechanical

A push-to-trip pushbutton is provided on the breaker (Fig. 10) to mechanically trip the breaker. This pushbutton can be used under both normal and emergency tripping procedures as well as to periodically exercise the operating mechanism of the SELTRONIC breaker.

Electrical

Electrical field testing should be limited to only those tests that are necessary to determine that the installation is correct. Because of the many variables involved, field testing cannot be considered as an accurate check of the calibration of any sensing system. The quality of current test sources and the accuracy of available meters and timing devices generally preclude accurate results. Field testing should be more of a functional type test which confirms the serviceability of the system involved.

Test Kit

Each SELTRONIC breaker is equipped with two test receptacles (Fig. 10). These two receptacles are designed to be used with a separate portable test kit (Fig. 12) for functionally testing the solid-state circuitry and tripping mechanism in the breaker. The test kit includes two test cords. One test cord for testing SELTRONIC breakers, and one for testing Series C breakers with electronic trip units. The test kit operates on 120 volt 60 hz control power, and testing instructions are included with every kit. While the breaker is in service and without removing either the line or load conductors, the following tests may be performed and the tripping functions observed:

1. High level phase fault with instantaneous tripping of the breaker.

2. Moderate phase overload with the breaker tripping within a prescribed time period.

Downtime of the breaker is limited to the time required to reset and reclose the breaker. All tests performed above are functional operation tests only and are not intended as a check of the actual calibration of the breaker. Calibration can best be done at the factory with precise calibration equipment.

If a fault occurs during testing the breaker will override any test fault simulation and trip on the actual circuit overcurrent.

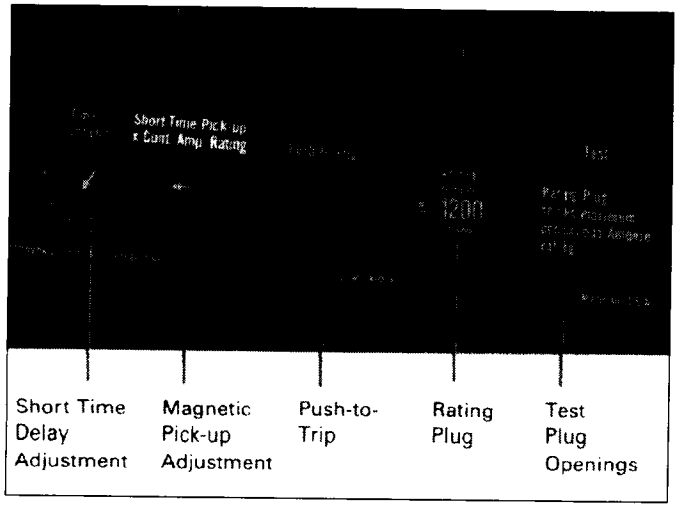


Fig. 11 Solid-State Trip Unit With Short Time Delay Adjustment

One style test kit (S#1232C50G01) can be used for testing all ratings and frame sizes of SELTRONIC breakers.

NOTE: Style #1232C50G02 is available to operate from 240 volt AC control power.

CAUTION

WHILE THE SELTRONIC BREAKER CAN BE TESTED UNDER VARYING LOAD CONDITIONS WHILE IN SERVICE, GOOD MAINTENANCE PRACTICES WILL DICTATE THAT FUNCTIONAL OPERATION TESTS BE LIMITED TO SCHEDULED MAINTENANCE SHUTDOWN PERIODS WITH MINIMUM LOAD CURRENT INTERRUPTIONS.

Type NCY breakers are suitable for applications at 240 volts AC, 100,000 amps I.C. provided the cables are additionally braced in accordance with Fig. 13.

CAUTION

UNSUPPORTED CABLES CAN CAUSE MINOR PERSONAL INJURY OR EQUIPMENT DAMAGE UNDER SHORT CIRCUIT CONDITIONS.

WRAP BREAKER CABLES WITH 3/8-INCH NYLON OR EQUIVALENT ROPE AS SHOWN IN FIG. 13 HAVING A MINIMUM TENSILE STRENGTH OF 2000 POUNDS, AT 6 INCHES FROM TERMINALS AND EVERY ADDITIONAL 6 INCHES WITH FIVE WRAPS OR EVERY ADDITIONAL 1 INCH WITH ONE WRAP.

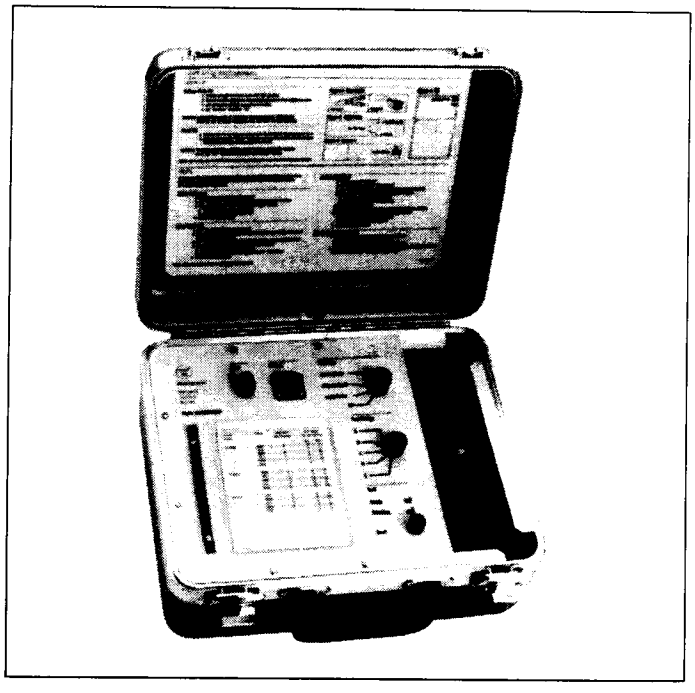


Fig. 12 Electronic Trip Unit Test Kit S#1232C50G01

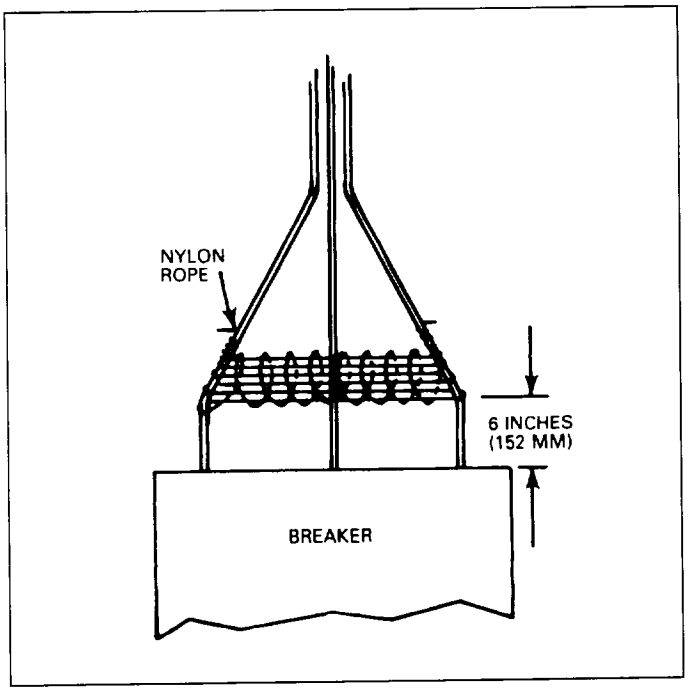


Fig. 13 Securement of Cable (See Caution Note for Bracing Instructions)