Instructions for SELTRONIC™ Breakers Types PC/PCF/PCC/ PCCF/PCA/PCFA/PCCA/PCCFA

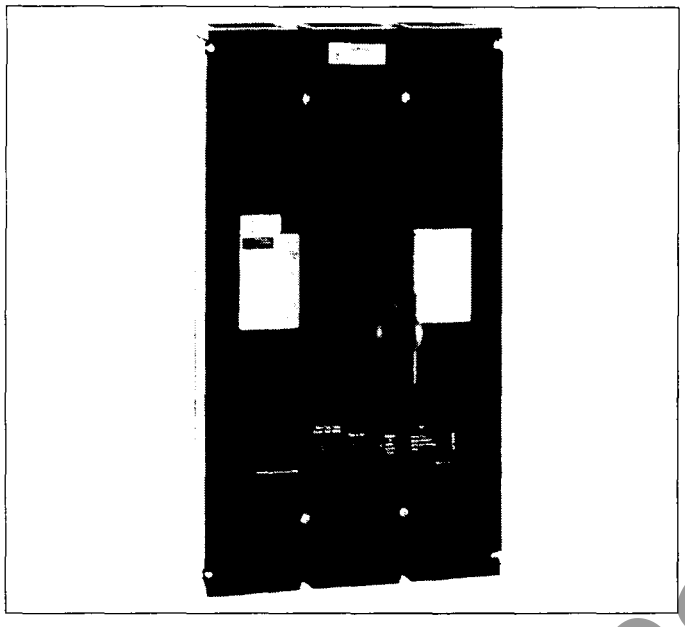


Fig. 1 PC SELTRONIC Breaker

⚠ 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.

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) as well as De-ion arc chambers. The De-ion chambers interrupt short circuit fault currents without outward disturbances.

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. Enclosed breakers are limited to 80% of their assigned rating per Section 220-10(b) of the National Electrical Code.

PCCA and PCCFA SELTRONIC breakers are rated for application at 100% of their rating when used in enclosures having minimum physical sizes and ventilation patterns as defined in Fig. 13. All 100% listed breakers are identified for 100% application with a supplementary label attached to the face of the breaker similar to the one illustrated in Fig. 14. Rating plugs will permit small overcurrent loads to continue for short periods of time but will cause the breaker to trip on sustained overcurrents of 125% of the plug rating within two hours and in less time at higher overloads.

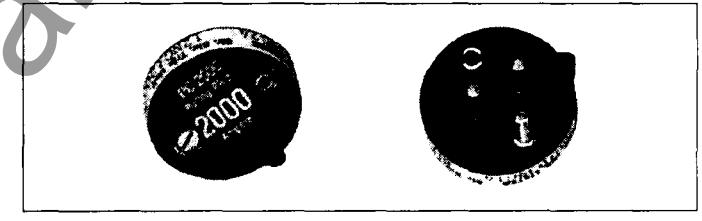


Fig. 2 SELTRONIC Rating Plugs

Optional Adjustable Rating Plugs

Adjustable rating plugs can be continuously adjusted. See Figs. 3 and 9. Conductors for SELTRONIC breakers employing adjustable rating plugs must be applied on the basis of the 100% rating of the plug.

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

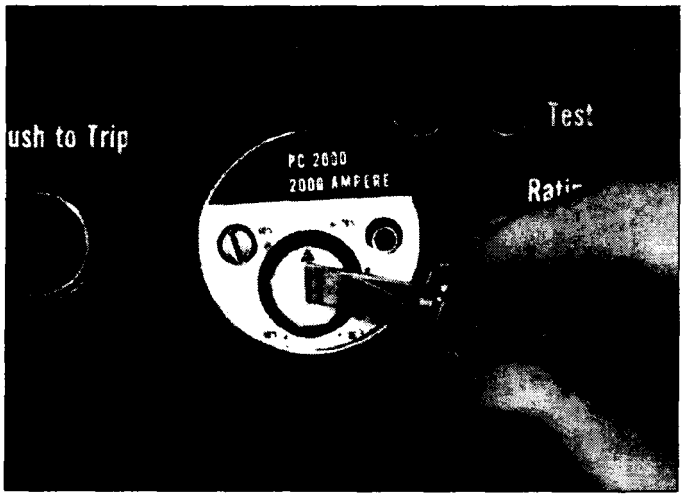


Fig. 3 Adjustable Rating Plug

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 pre-set to maximum. Install desired rating plug (Fig. 4) and reset all adjustments to meet application requirements before closing breaker.

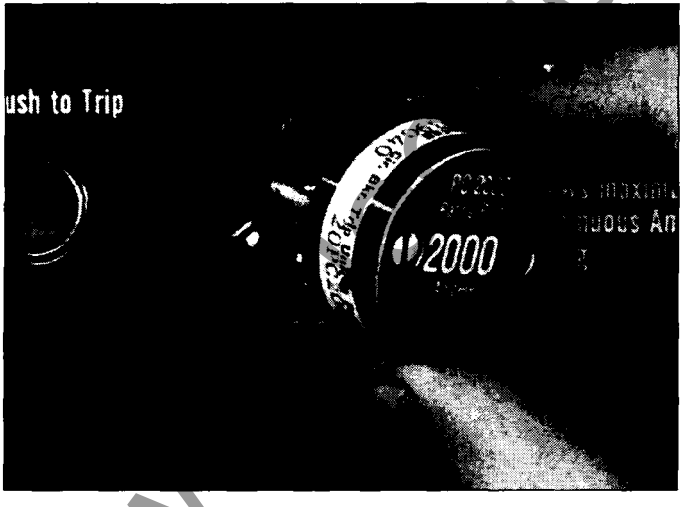


Fig. 4 Installation of PC Rating Plug

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

PC/PCA/PCC/PCCA SELTRONIC breakers may be mounted in a variety of methods including fixed and draw-out, Outline and installation dimensional details are shown in Figs. 6 and 7 for the fixed mounted rear connected breakers. The drawout frame is shown in Fig. 8. PCFA and PCCF SELTRONIC breakers have extended line and load side connectors as shown in Fig. 5. These breakers -available in 2000 and 2500A ratings only - are intended for fixed front mounting only. Rear "T" connectors and drawout frames are accessories and must be ordered separately.

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. PC rating plugs are not interchangeable with rating plugs of other frame size SELTRONIC breakers.

Electrical Ratings

Type	Frame Rating Amps	Cont. Ampere Rating	No. Poles	Volts AC	Interrupting Capacity RMS Symmetrical Amps AC Rating		
					240	480	600
PC/PCC/PCA/PCCA PCF/PCCF/PCFA/PCCFA	2000	1000-2000	2-3	600	125,000	100,000	100,000
PC/PCC/PCA/PCCA PCF/PCCF/PCFA/PCCFA	2500	1400-2500	2-3	600	125,000	100,000	100,000
PC/PCC/PCA/PCCA	3000	1600-3000	2-3	600	125,000	100,000	100,000

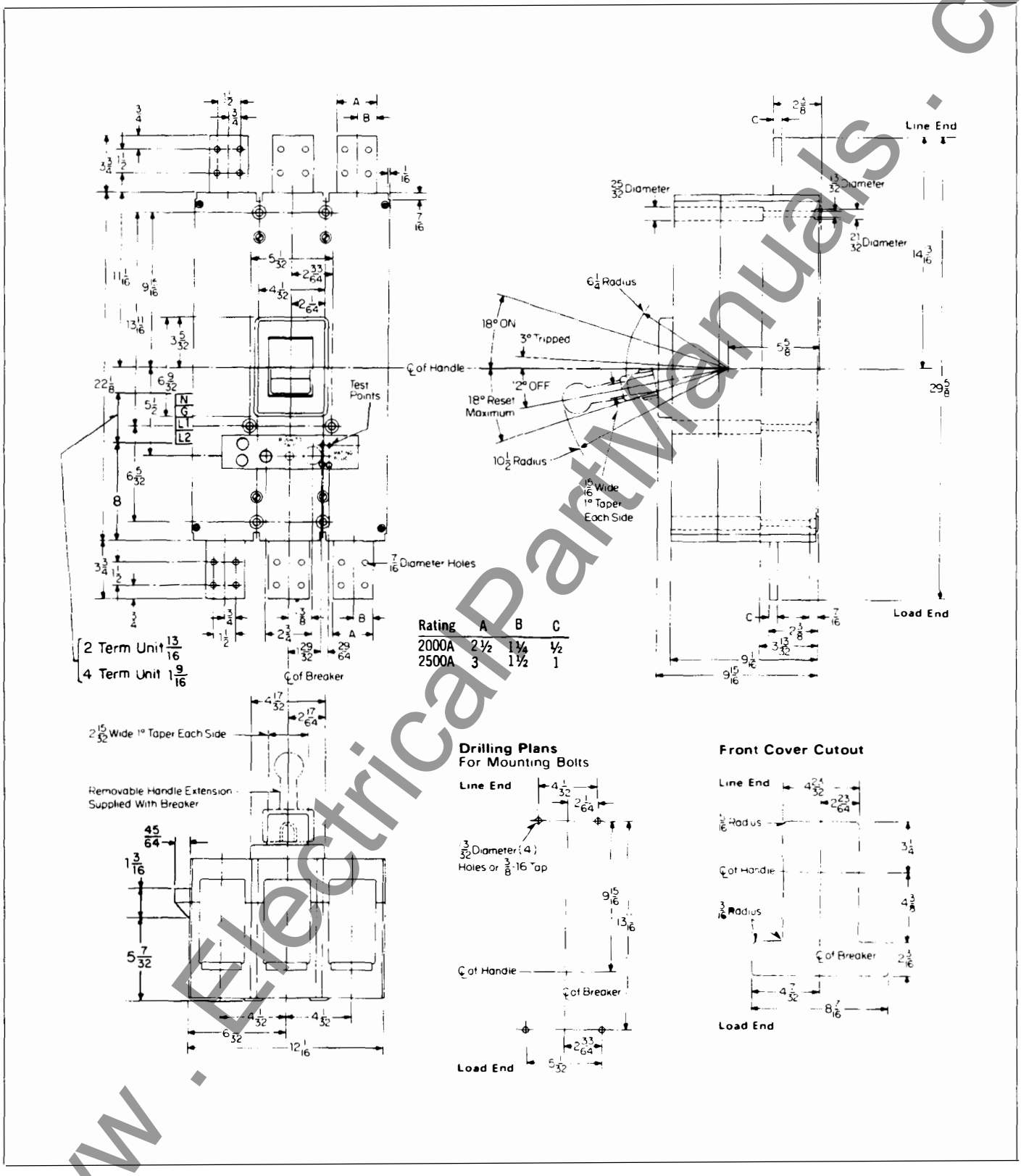


Fig. 5 Outline Dimensions for Fixed Mounted, Front Connected PCF-2000 and PCF-2500 SELTRONIC Breakers

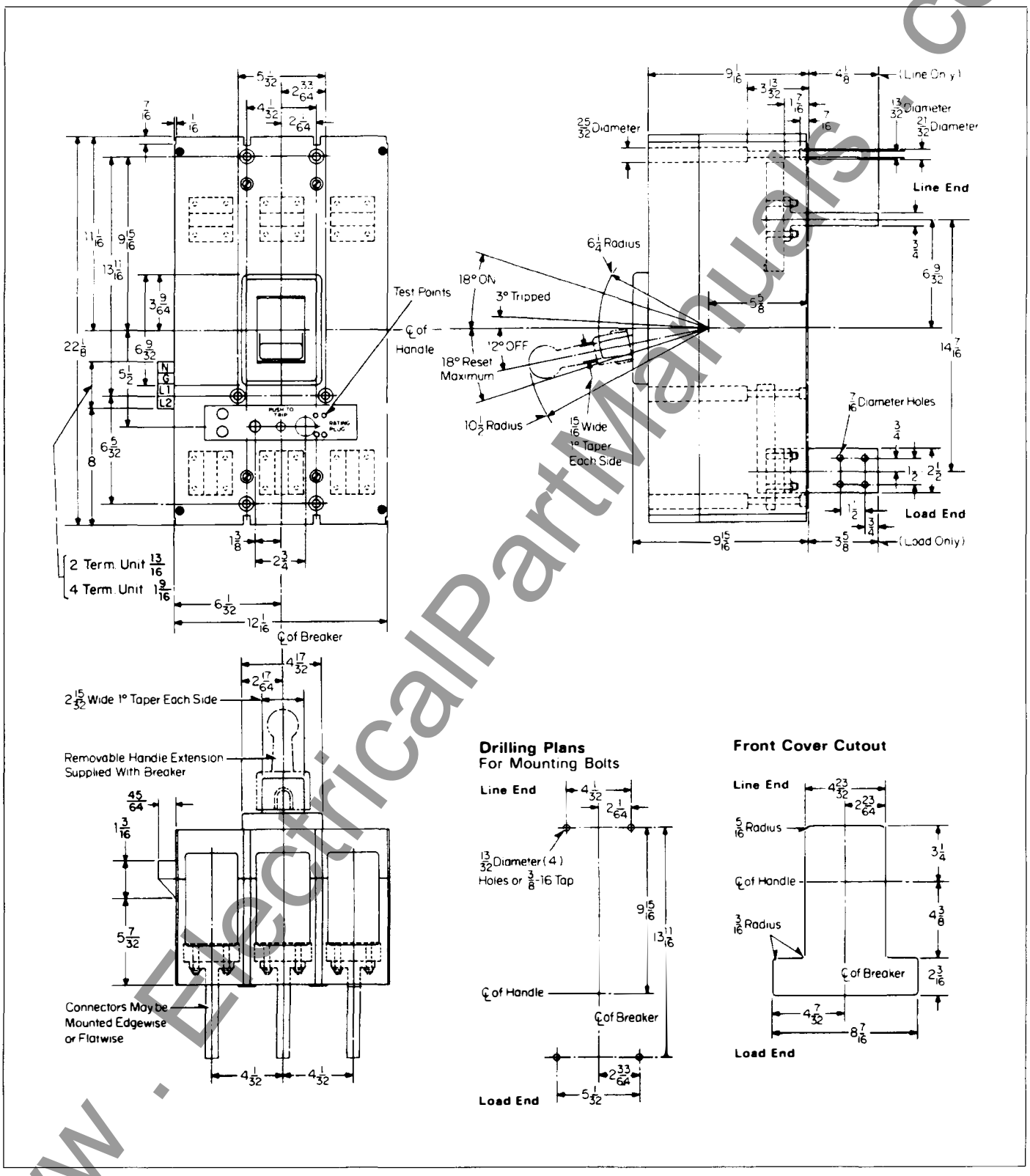


Fig. 6 Outline Dimensions for Fixed Mounted, Rear Connected PC and PCA 2000 and 2500 SELTRONIC Breakers

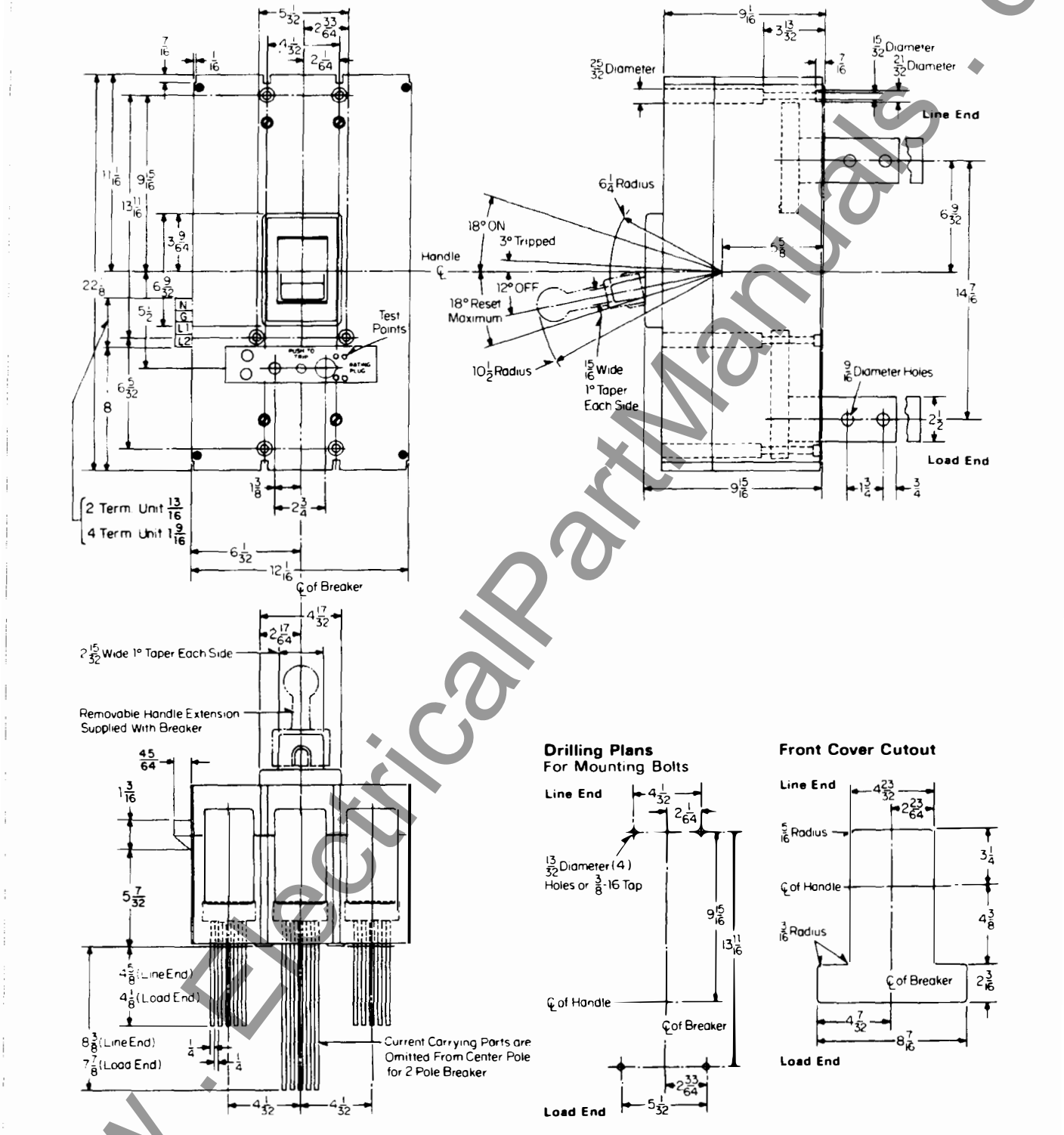


Fig. 7 Outline Dimensions for Fixed Mounted. Rear Connected PC and PCA 3000 SELTRONIC Breaker

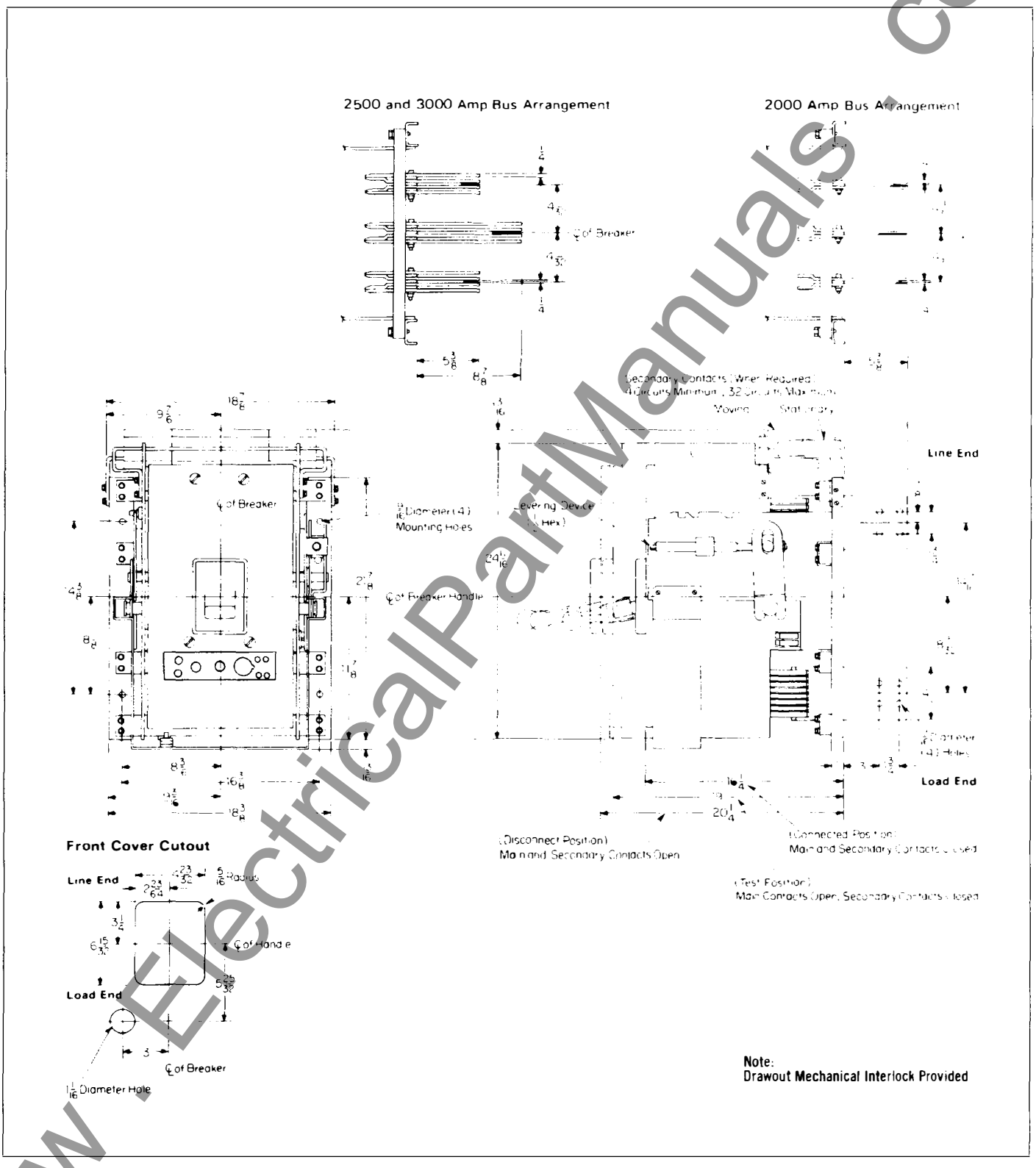
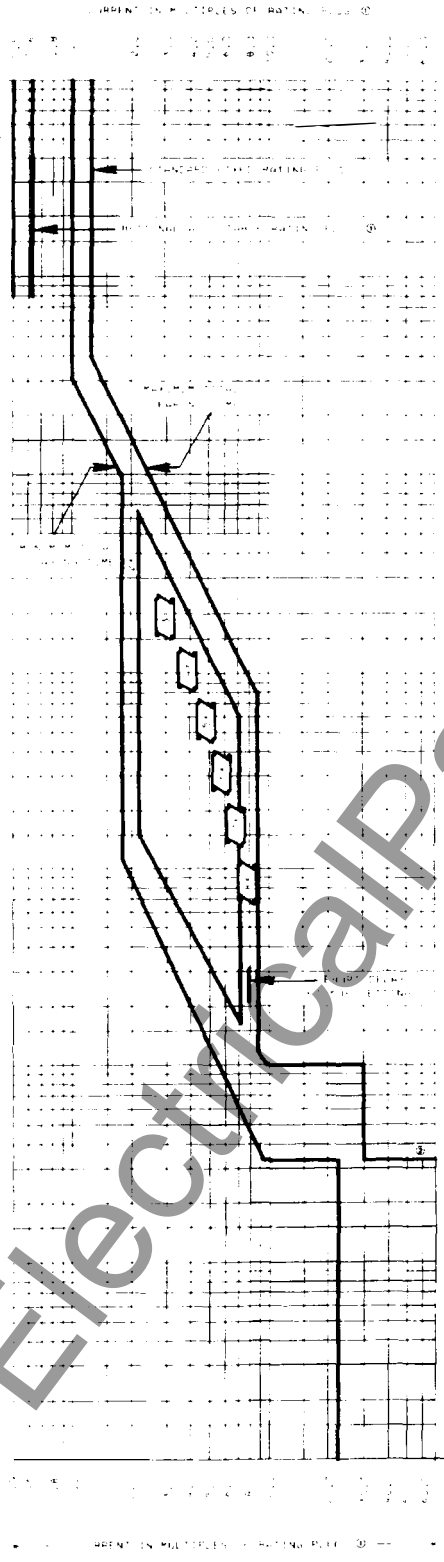


Fig. 8 Outline Dimensions for Drawout Frame PC and PCA 2000-2500-3000



Typical Time/Current Curves for Types PC, PCC, PCF, PCCF, PCA, PCCA, PCFA, PCCFA Two and Three Pole Breakers

For curves for specific frame ratings, refer to the following curve numbers:

PC 2000: SC 3607-81	PCA 2000: SC 3621-81
PC 2500: SC 3608-81	PCA 2500: SC 3622-81
PC 3000: SC 3609-81	PCA 3000: SC 3623-81

Curve accuracy applies from -20°C to +55°C ambient. For possible continuous ampere derating for ambient above 40°C, refer to Westinghouse.

Breaker Ratings

600 Volts, 50/60 Hz, Maximum

Continuous Amperes		Short Delay Pick-up Settings
1000-2000	PC 2000	2X to 8X Rating Plug Value With
1400-2500	PC 2500	Calibration Settings As Shown On
1600-3000	PC 3000	Curve (Tolerance ±10%)

Interrupting Ratings (UL/CSA Listed)

Breaker Frame	Symmetrical RMS Amperes		
	240 Volts	480 Volts	600 Volts
All Above	125,000	100,000	100,000

Rating Plugs Available

Continuous Amperes		Range of Adjustment
2000	**PC 2000**	Fixed 100%
2000		50-100%①
1800		Fixed 100%
1800		70-100%①
1600		Fixed 100%
1600		70-100%①
1400		Fixed 100%
1200		Fixed 100%
1000		Fixed 100%
2500	**PC 2500**	Fixed 100%
2500		50-100%①
2000		Fixed 100%
2000		70-100%①
1800		Fixed 100%
1800		70-100%①
1600		Fixed 100%
1400		Fixed 100%
3000	**PC 3000**	Fixed 100%
3000		50-100%①
2500		Fixed 100%
2500		70-100%①
2000		Fixed 100%
1800		Fixed 100%
1600		Fixed 100%

① When adjustable rating plugs are used, short delay pick-up settings track the selected position of the adjustable rating plug. For example, with an adjustable 2000 ampere rating plug set at 50%, and the short delay pick-up set at 4X, the short delay pick-up is 2000 X 50% X 4 = 4000 Amperes.

② The end of the curve is determined by the interrupting rating and/or the specific application.

Fig. 9 SELTRONIC Trip Curve

Accessories

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

ADJUSTMENTS

Short Time Pick-Up/Short Time Delay

The Short Time Pick-Up adjustment (Fig. 9) has an adjustment range of 2 to 8x the ampere rating of the installed rating plug.

The Short Time Delay adjustment on the PCA has an adjustment range of .08 to .28 seconds at 6x the ampere rating of the installed rating plug.

For more precise trip curve information, refer to table, Fig. 9, for curve numbers.

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 and the Ground Fault Protection System is operational. 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

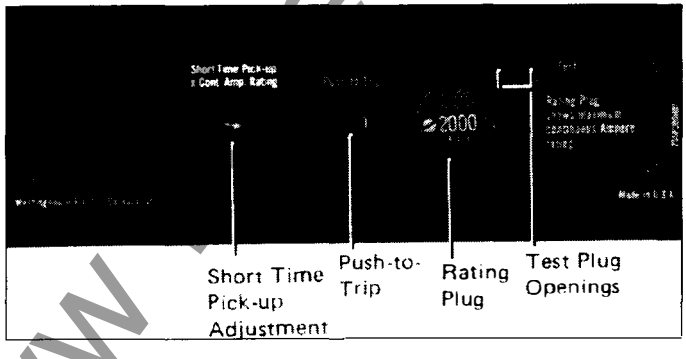


Fig. 10 Solid-State Trip Unit Without Short Time Delay Adjustment

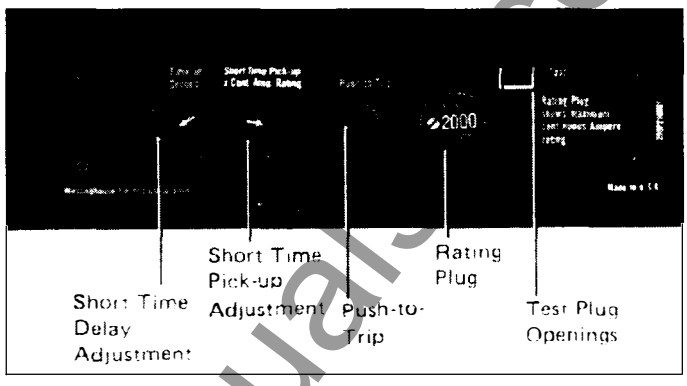


Fig. 11 Solid-State Trip Unit With Short Time Delay Adjustment

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 PCA/PCCA/PCFA/PCCFA SELTRONIC breaker is equipped with two test receptacles (Fig. 10). These 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 jumpers, testing instructions and operates on 120 volt, 60 hertz, control power. While the

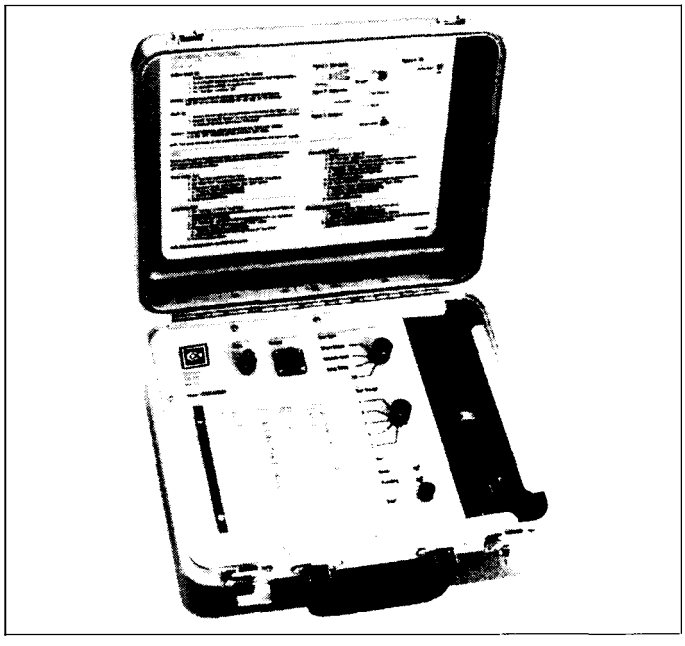
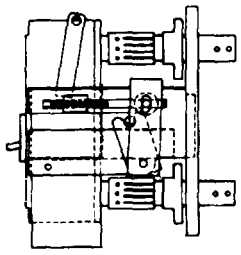
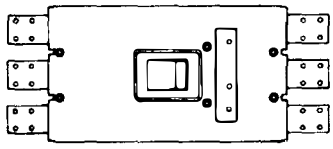
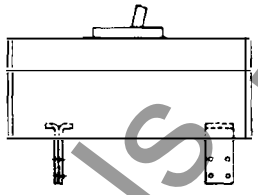


Fig. 12 SELTRONIC Test Kit Style # 1232C50G01

MINIMUM ENCLOSURE SIZE A—28 HIGH x 22 x 23 B—34 HIGH x 22 x 26 C—45 HIGH x 38 x 20 * 71 71 TOP/BOT FRONT 144 144 TOP BOT ONE SIDE	 DRAWOUT See Fig. 7	 FIXED FRONT CONNECTED See Fig. 4	 FIXED REAR CONNECTED See Fig. 5 or 6

BREAKER TYPE	RATING 100%	RATING 80%	AVAILABLE	ENCLOSURE SIZE INCHES	VENT PATTERN SQ. IN./SQ. IN. TOP/BOT	RATING 100%	RATING 80%	AVAILABLE	ENCLOSURE SIZE INCHES	VENT PATTERN SQ. IN./SQ. IN. TOP/BOT	RATING 100%	RATING 80%	AVAILABLE	ENCLOSURE SIZE INCHES	VENT PATTERN SQ. IN./SQ. IN. TOP/BOT	TYPE CONNECTOR
① PC/PCC 3000	PCC X		YES	PCC B	PCC 120/120						PCC X	PC X	YES	PCC C	PCC 102/102	
① PC/PCC 2500	PCC X		YES	PCC B	PCC 120/120	PCC X	PC X	YES	PCC C	PCC *	PCC X	PC X	YES	PCC C	PCC 68/68	
① PC/PCC 2000	PCC X		YES	PCC A	PCC 15/15	PCC X	PC X	YES	PCC C	PCC 68/68	PCC X	PC X	YES	PCC C	PCC 68/68	

① Details apply to Standard Seltronic Breakers (PC/PCC) as Well as PCG/PCCG/PCFG/PCCFG.

Fig. 13 Enclosure Dimensions Required for 100% Rating Application

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.

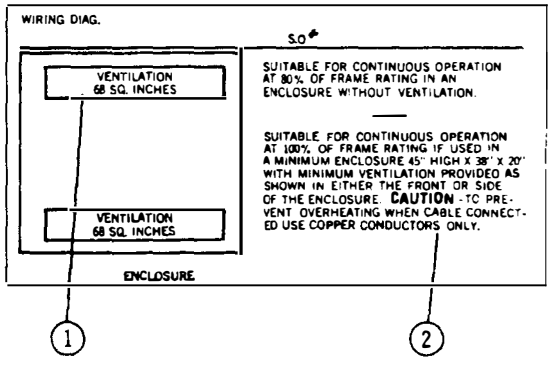
2. Moderate phase overload with the breaker tripping within a prescribed time period.

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.

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

CAUTION

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.



① Ventilation Size Refers to Specific Enclosure Size taken from Fig. 15. For Application Other Than One Shown, Obtain Details From Fig. 15. Ventilation is Required Only for 100% Application.

② Generally, Bus Bar Extensions are Connected Directly to the Breaker in Switchboard Applications. In this Case, aluminum Cables May Be Used.

Fig. 14 Typical Nameplate Required on 100% UL listed Breakers