

MODEL 410D

Auto-Charged Capacitor Trip Device

- Self-contained standby power source
- Maintains full operating voltage for a minimum of two days
- Discharge manually or with an external control device
- Engineered and Built in the U.S.A.

DESCRIPTION

The model 410D Auto-Charged Capacitor Trip Device is a micro-controller based high speed capacitor type circuit breaker tripping unit. It differs from standard CTD's in that it has a separate charging circuit and is isolated from the mains. In addition, the 410D can maintain a full charge for 48 hours.

This device is primarily for use with circuit breakers which require some form of AC power for their closing operation; i.e. circuit breakers having either a stored energy closing mechanism with an AC-operated release coil, or an AC solenoid-operated closing mechanism. There are no field adjustments required.

Pushing the red button marked DISPLAY will cycle between capacitor voltage, capacitor energy, or battery voltage on the 3-digit 7-segment LED display. LEDs below that will indicate JOULES or VOLTAGE for the capacitor status, or BATTERY VOLTAGE. The 410D will remain on the preferred parameter to be displayed. Additional individual status LEDs will indicate loss of AC power, low battery, and battery status.

An internal battery management and charging circuit maintains full charge on the batteries.

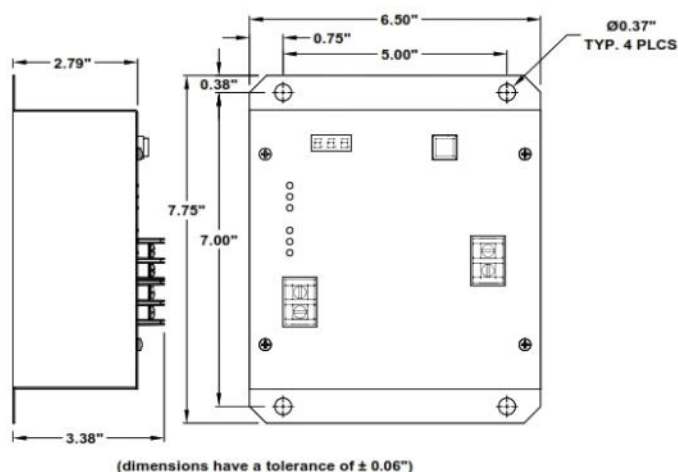
When primary power is lost, the charge on the capacitor is maintained by internal Li-Ion batteries. The LOSS OF AC LED blinks and the 3-digit display will turn off to conserve battery life. Pushing the DISPLAY button will allow a 10 second viewing of the parameters. When the battery voltage drops below 6.4V, the charging circuit shuts off and the LOW BATTERY LED blinks. BATTERY STATUS LED is described in next section (see **LED Indicators**)



SPECIFICATIONS

Model	410D
Nominal AC voltage, input	85 – 264 VAC, 47 - 440 Hz
Nominal DC voltage, input	120 – 370 VDC
Battery (user replaceable)	2X 18650 2500mAh 3.6V Li-Ion
Low Battery Threshold	6.4V
Output voltage	380VDC minimum
Stored Energy	40.4 J at 380 V
Operating temperature	-20° to +131° F
Humidity tolerance	0 - 97% w/o condensation
Case material	20 gauge CRS
Mounting	Surface
Weight	3.2 lbs

DIMENSIONS



Telephone: Main - (918) 438-1220
Sales - (800) 862-2875
Fax: (918) 437-7584

E-mail: sales@time-mark.com
Internet: http://www.time-mark.com



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Tulsa, Oklahoma 74116

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READ ALL INSTRUCTIONS BEFORE INSTALLING, OPERATING OR SERVICING THIS DEVICE.
KEEP THIS DATA SHEET FOR FUTURE REFERENCE.

GENERAL SAFETY

POTENTIALLY HAZARDOUS VOLTAGES ARE PRESENT AT THE TERMINALS OF THE MODEL 410D.
ALL ELECTRICAL POWER SHOULD BE REMOVED WHEN CONNECTING OR DISCONNECTING WIRING.
THIS DEVICE SHOULD BE INSTALLED AND SERVICED BY QUALIFIED PERSONNEL.

Installation Instructions

FUNCTION - MODEL 410D

3-Digit Display

Displays Cap Voltage, Energy Stored, or battery voltage.

DISPLAY button

For selecting between cap voltage, stored energy, or battery voltage to be displayed on 3-digit display. Display remains on preferred selection.

LED Indicators

VOLTAGE, when on displayed value is cap voltage
JOULES (W sec), when on displayed value is nominal energy stored
BATTERY VOLTAGE, when on displayed value is battery voltage

LOSS OF AC

OFF = powered by primary voltage source
BLINKING = loss of ac power, operating on battery back-up

LOW BATTERY

SLOW BLINK (10 Sec. Rate) = battery voltage is low
FAST BLINK (1 Sec. Rate) = batteries not detected (checked on power up)

BATTERY STATUS

ON = charging
OFF = charge complete, standby, or shutdown
BLINKING = Battery failed to charge

Loss of AC Power

LOSS OF AC LED blinks. 3-digit display is off. Pushbutton can wake display and toggle between cap voltage, stored energy, and battery voltage. Display will turn off after 10 sec timer elapses.

PRE-INSTALLATION CHECK

Before putting the Model 410D into service, it should be examined carefully to make certain that the unit has not been damaged during shipment.

INSTALLATION

Mount the Model 410D in the desired location.

Verify that the supply voltage is of the proper value and frequency (see **Specifications table**).

Connect the operating power source to the L1 and L2 terminals (polarity is irrelevant for DC source) and connect output tripping circuit to the Vout and GND terminals (refer to **Typical Application examples**).

DO NOT APPLY POWER.

Place a 1K Ohm 5W bleed resistor across the Vout and GND terminals.

Install batteries as follows:

1. Remove screws holding down front cover.
2. Install batteries with correct polarity.
3. As soon as the batteries are installed correctly the 410-D will perform a self-test of the display and LED indicators after which the 410-D will execute a 5 sec delay. When the 5 sec delay expires and if battery voltage is 6.4V or more the 410-D will then commence to charge the capacitor, but will be held to a low voltage due to the bleed resistor.
4. Screw down front cover.

Remove bleed resistor.

NOW APPLY POWER

CAUTION

The Model 410D does NOT have a cover actuated safety switch to disconnect the primary power source and discharge the capacitor through an internal bleed resistor, unlike it's predecessor, the Model 410.

When servicing, safely place a 1K Ohm 5W bleed resistor across the Vout and GND terminals.

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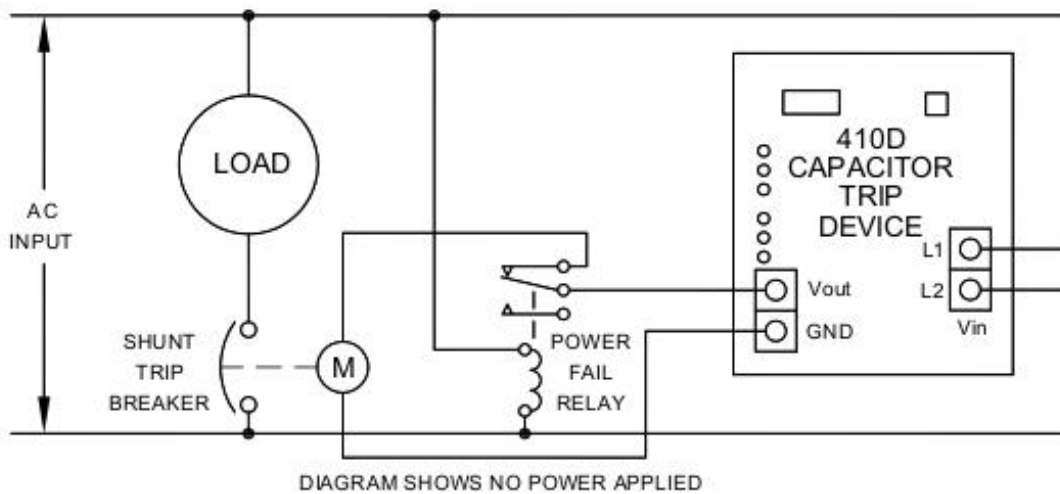
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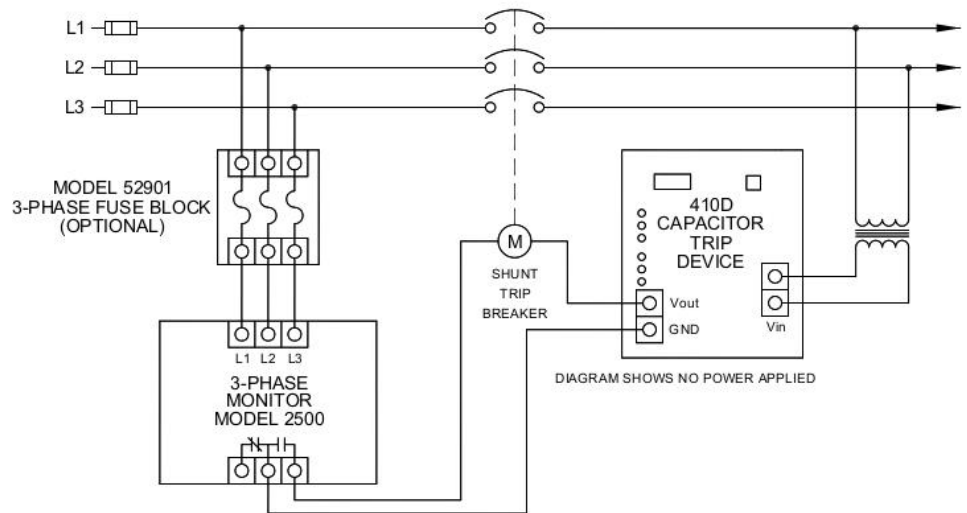
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TYPICAL APPLICATIONS

SHUNT BREAKER & POWER FAIL RELAY WITH CAP TRIP DEVICE



SHUNT BREAKER WITH CAP TRIP DEVICE



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Installation Instructions

OPERATION AND MAINTENANCE

The operation of the Model 410D is completely automatic, requiring only an occasional check to determine if the unit is functioning properly.

Check the battery status periodically. If it is blinking, replace old batteries with fresh ones. See BATTERY REPLACEMENT.

FIELD SERVICE AND ADJUSTMENT

The Model 410D has been completely checked and adjusted at the factory. It is advisable not to disturb these adjustments. If for any reason the unit fails to operate properly, it should be returned to the factory for repair, or re-calibration.

REPAIRS

The **Model 410D** is not field repairable. Should this unit require repairs, call Time Mark Corporation at 800-862-2875 (8 a.m. to 5 p.m. CST) for instructions on returning it to the factory for service.

WARRANTY

This product is warranted to be free from defects in materials and workmanship for one year. Should this device fail to operate, we will repair it for one year from the date of manufacture. For complete warranty details, see the *Terms and Conditions of Sales* page in the front section of the Time Mark catalog or contact Time Mark at 1-800-862-2875.

BATTERY REPLACEMENT

1. Remove input power

WARNING - The capacitor is still charged to dangerously high voltage

2. Safely place a 1K Ohm 5W bleed resistor across the Vout and GND terminals
3. Monitor the voltage across the resistor and wait for the capacitor voltage to drop to 0V
4. Remove screws holding down front cover
5. Remove old batteries
6. Install new batteries with correct polarity
7. As soon as the batteries are installed correctly, the 410D will perform a self-test of the display and LED indicators. After a 5 second delay, the 410D will commence charging the capacitor if the battery voltage is 6.4V or more (Note: capacitor voltage will remain low due to the resistor placed in step 2)
8. Replace cover and screws
9. Remove bleed resistor
10. Apply operating voltage

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