

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.
- UL Recognized in the U.S. and Canada

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. The Model 410D is UL Recognized in the U.S. and Canada.

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.

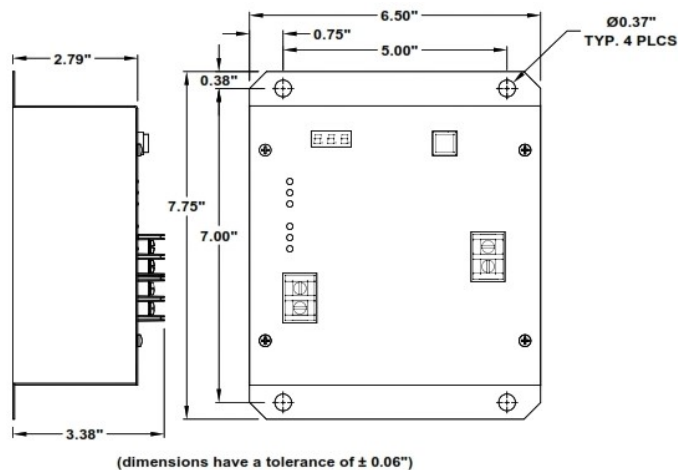
When primary power is lost, the charge on the capacitor is maintained by internal Li-Ion batteries. The LOSS OF AC LED blinks and the 3-digit display will turn off to conserve battery life. Pushing the DISPLAY button will allow a 10 second viewing of the parameters. When the battery voltage drops below 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-40J | 410D-80J |
|---|---|----------------|
| Nominal AC Voltage, Input | 85 – 277 VAC, 47 - 440 Hz | |
| Nominal DC Voltage, Input | 120 – 430 VDC | |
| Battery (user replaceable) | 2X 18650 2500mAh 3.6V Li-Ion | |
| Low Battery Threshold | 6.4V | |
| Output Voltage | 380VDC minimum | |
| Stored Energy | 40.4J at 380 V | 80.8J at 380 V |
| Fuse - Primary Voltage (V _{IN}) | 4A 600VAC, 5x20mm, internal, replaceable | |
| Fuse - Battery | 1.5A 63VDC, internal, factory replaceable | |
| Operating Temperature | -20° to +131° F | |
| Humidity Tolerance | 0 - 97% w/o condensation | |
| Case Material | 20 gauge CRS | |
| Mounting | Surface | |
| Weight | 3.2 lbs | |
| Agency Approvals | UL Recognized (U.S. and Canada) | |

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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MODEL 410D

Auto-Charged Capacitor Trip Device

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.
PROTECT THIS UNIT WITH PROPERLY RATED FUSES.
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.

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 its predecessor, the Model 410.

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

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Installation Instructions

INSTALLATION (Cont'd)

Note: The 410D is shipped with batteries installed and a jumper placed on only one pin of a 2-pin header marked "BATT". (See figure below). The tape on the batteries is for shipping purposes only and may be removed.

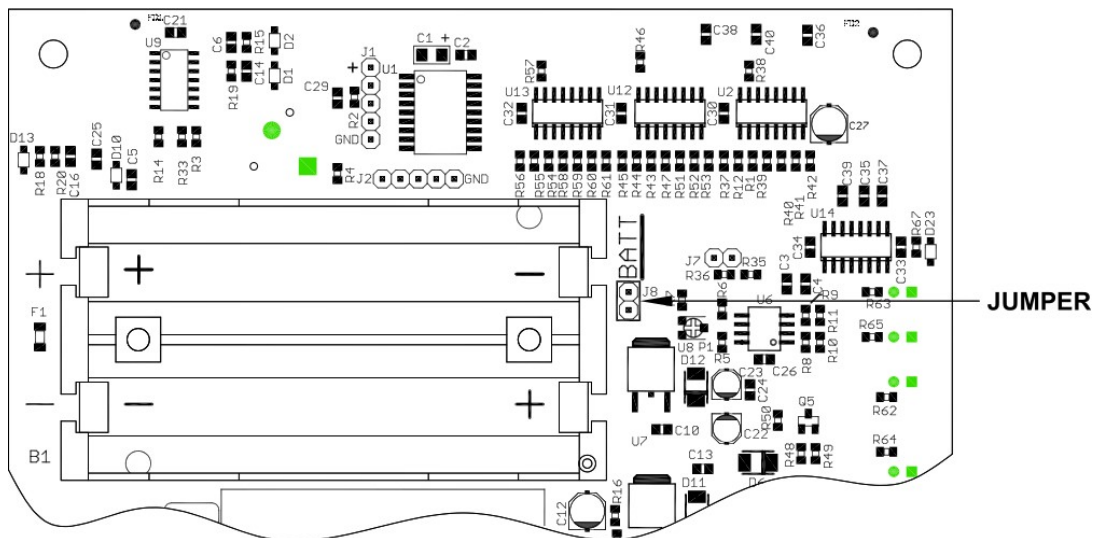
Install battery jumper as follows:

1. Remove screws holding down front case cover.
2. Place shunt on the two pins marked "BATT" (see figure below). The 410D will perform a self-test of the display and LED indicators after which the 410D will execute a 5 sec delay. When the 5 sec delay expires and if battery voltage is 6.4V or more the 410D will then commence to charge the capacitor, but will be held to a low voltage due to the bleed resistor.
3. Screw down front cover.

Remove bleed resistor.

NOW APPLY POWER

FIGURE 1: LOCATION OF BATTERY JUMPER



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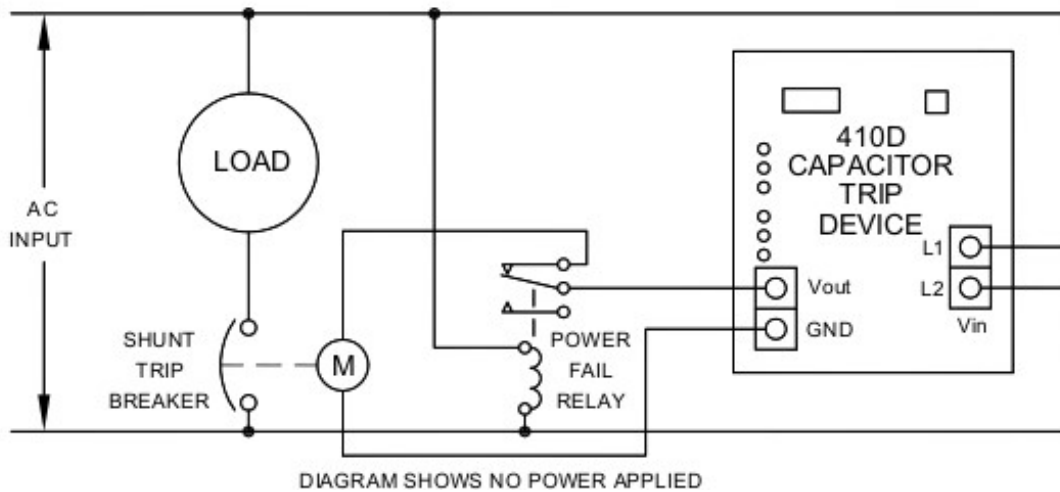
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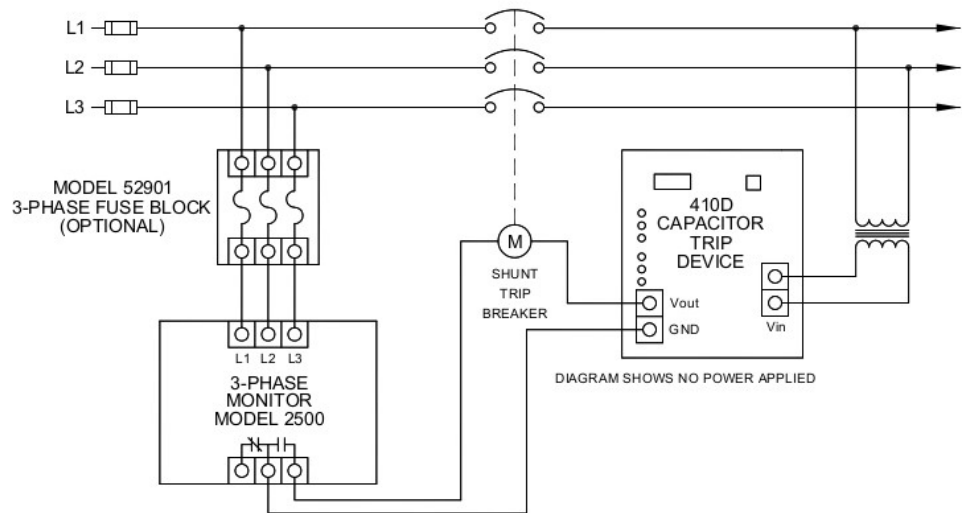
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TYPICAL APPLICATIONS

SHUNT BREAKER & POWER FAIL RELAY WITH CAP TRIP DEVICE



SHUNT BREAKER WITH CAP TRIP DEVICE



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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/TROUBLESHOOTING

The Model 410D is not field repairable. Should the unit not operate properly verify that the proper supply voltage is applied and check all fuses and verify shunt is on battery jumper pins. If everything is correct, and the device still fails to operate, contact the factory at 1-800-862-2875 (Mon-Fri; 8 a.m. to 5 p.m. CST) for instructions on returning it for repair.

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 its predecessor, the Model 410.

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

BATTERY REPLACEMENT

WARNING - The capacitor is still charged to dangerously high voltage

1. Remove input power
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 shunt on the two pins marked "BATT". Remove old batteries.
6. Install 2 Li-Ion batteries 18650 with correct polarity.
7. Place shunt on the two pins marked "BATT". 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

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.

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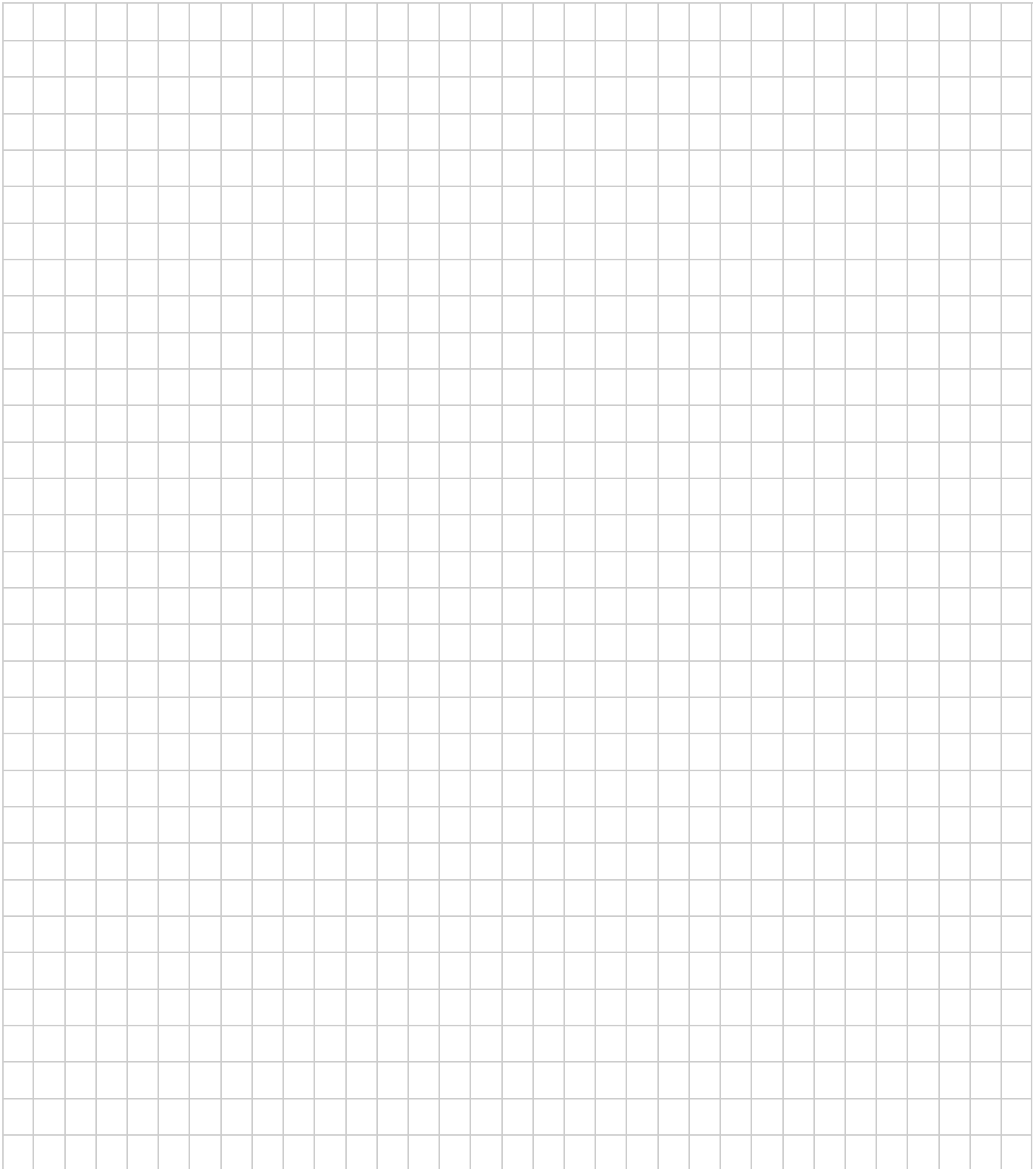


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Have Questions? Call us at (800) 862-2875 Mon-Fri 8am-5pm CST.



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