SURE-TRIP™ CAPACITOR TRIP UNITS
Class 9810

INTRODUCTION

SURE-TRIP™ capacitor trip units use energy stored in capacitors to supply tripping power to electrically operated mechanisms with energy requirements of 22 and 45 joules. SURE-TRIP units are designed to operate in an area with no greater than a 65°C rise in a 40°C ambient temperature. Figure 1 depicts a typical unit. See Table 1, page 2, for descriptions and catalog numbers of models available.

Load connection may be made before charging because the internal solid state switch monitors the charge in the capacitors, allowing electrical connection to the load only after the charge on the capacitors has reached 82 Vdc. This switch allows multiple tripping by cycling the output in relation to the charge on the capacitor. Charge and discharge times can be approximated from the graphs on page 3.

SURE-TRIP™ units have been extensively tested to assure reliable operation of Square D fused power circuit devices. It is the user’s responsibility to verify the same reliability in any other application.

Figure 1: SURE-TRIP Capacitor Trip Unit
<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Input</th>
<th>Energy Stored in Joules</th>
<th>Load Output</th>
<th>No Load Output</th>
<th>Min. Trip Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST200*</td>
<td>240/480 Vac</td>
<td>22</td>
<td>150/177 Vdc</td>
<td>68–95 Vdc</td>
<td>82 Vdc</td>
</tr>
<tr>
<td>ST208</td>
<td>208 Vac</td>
<td>22</td>
<td>150/177 Vdc</td>
<td>68–95 Vdc</td>
<td>82 Vdc</td>
</tr>
<tr>
<td>ST260</td>
<td>600 Vac</td>
<td>22</td>
<td>150/177 Vdc</td>
<td>68–95 Vdc</td>
<td>82 Vdc</td>
</tr>
<tr>
<td>ST400*</td>
<td>240/480 Vac</td>
<td>45</td>
<td>150/177 Vdc</td>
<td>68–95 Vdc</td>
<td>82 Vdc</td>
</tr>
<tr>
<td>ST408</td>
<td>208 Vac</td>
<td>45</td>
<td>150/177 Vdc</td>
<td>68–95 Vdc</td>
<td>82 Vdc</td>
</tr>
<tr>
<td>ST460</td>
<td>600 Vac</td>
<td>45</td>
<td>150/177 Vdc</td>
<td>68–95 Vdc</td>
<td>82 Vdc</td>
</tr>
<tr>
<td>ST520</td>
<td>120 Vac</td>
<td>22</td>
<td>150/177 Vdc</td>
<td>68–95 Vdc</td>
<td>82 Vdc</td>
</tr>
<tr>
<td>ST540</td>
<td>120 Vac</td>
<td>45</td>
<td>150/177 Vdc</td>
<td>68–95 Vdc</td>
<td>82 Vdc</td>
</tr>
</tbody>
</table>

* Shipped as 480 Vac units. For 240 Vac use, see figure 7 (page 6) or the schematic on the inside cover.
Figure 2: Charge time (in seconds) after short

Figure 3: Discharge time (in minutes) by internal resistance
DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION

- Only qualified personnel familiar with electrical circuits are to perform work described in this set of instructions. Workers must understand the hazards involved in working with or near electrical equipment. Perform such work only after reading this set of instructions in its entirety.

- For this equipment to function properly, it must be handled carefully and installed, operated, and maintained correctly. Neglecting fundamental installation and maintenance requirements may lead to personal injury, as well as damage to electrical equipment or other property.

- Capacitive charges are present for approximately 30 minutes after control power is disconnected. Always ensure capacitive charges have dissipated through short or internal resistance.

- Do not use as an auxiliary power source. This unit and all interconnected equipment will become inoperable.

- Be aware of potential hazards, wear protective equipment, and take adequate safety precautions. Consult OSHA 29 CFR, Part 1910 as well as any applicable local standards.

- Before performing visual inspections, tests, or maintenance on this device, disconnect all sources of electric power. Assume all circuits are energized until they are completely de-energized, tested, grounded, and tagged. Pay particular attention to the design of the power system. Consider all sources of power, including the possibility of backfeeding.

Failure to observe these precautions will result in death or severe personal injury.
INSTALLATION

1. Using a flat-bladed screwdriver or a 5/16 inch wrench, loosen the screws (figure 4) and remove the front cover.

![Loosen these screws](image)

**Figure 4: Removing the cover**

2. Locate the two 3/8 in (10 mm) mounting holes at the rear of the unit (figure 5). Securely mount the unit where the pilot light is visible through the enclosure opening of the end use product. Mounting hardware is not included with the SURE-TRIP unit.

Additional lights connected to this unit must be limited to no more than one pilot light Square D #44050-398-01, or one Square D catalog #9001K1L11R with lamp NE51H, or both. These may be connected at terminals (PL) and (COM). See figures 6 and 7, page 6.

![Mounting hole locations and dimensions](image)

**Figure 5: Mounting hole locations and dimensions of the SURE-TRIP capacitor trip unit**
3. Depending on whether or not the unit is equipped with a transformer, make wiring connections as follows:
   - **Without transformers.** Connect SURE-TRIP units without a transformer (ST-520 and ST-540) according to the schematic in figure 6. They have only a 120 Vac input at L1 and N. Output at (+) and (COM) is 155–170 Vdc.
   - **With transformers.** Connect SURE-TRIP units with transformers according to the schematic in figure 7. Input is at L1 and L2 and can be 208, 240, 480, or 600 Vac. Output at (+) and (COM) is 155–170 Vdc. The ST200 and ST400 SURE-TRIP units function as either 480 Vac or 240 Vac devices. They are shipped from the factory wired for 480 Vac. To accept 240 Vac on the ST200 and ST400 models, connect jumpers as shown in figure 7 or the schematic inside the cover.

4. Replace the cover, insert the screws, and tighten securely.

![Figure 6: L1 and L2 terminals connection to the terminal block](image6.png)

**NOTE:**
A capacitive charge of 82 Vdc is required before output trip voltage is available. Under normal operating conditions, the output voltage measured is 73–95 Vdc. Under tripping conditions, the output voltage instantly increases to 155–170 Vdc.

![Figure 7: Jumper connection](image7.png)

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**VERIFICATION**

When control power is supplied, the pilot light comes on within ten seconds indicating voltage in the range of 82 Vdc to 110 Vdc.

**NOTE:** Minimum trip voltage of 82 Vdc is available when the pilot light is on.

When control power is disconnected, the pilot light goes off in two to four minutes indicating that voltage has dropped from 110 Vdc to less than 82 Vdc.

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**DANGER**

**HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION**

Capacitive charges are present for approximately 30 minutes after control power is disconnected. Always ensure capacitive charges have dissipated through short or internal resistance.

**Failure to observe this precaution will result in death or severe personal injury.**

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**MAINTENANCE**

Because of the integrated design, replacement parts are not available for the SURE-TRIP unit. To replace the entire unit, specify the type imprinted on the nameplate or determine the catalog number from Table 1 (page 2) based on input and output requirements.
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