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## INSTALLATION INSTRUCTIONS

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Original Issue Date: **6/93**

Model: **20-150 kW**

Market: **Industrial**

Subject: **Safeguard Circuit Breaker Kits With Current Transformers  
(Used with Controllers without Meters)**

### Introduction

The safeguard circuit breaker kit protects the generator set in the event of an overload or short circuit. It is different than conventional circuit breakers in that it has a trip curve matched to the generator characteristics. When an overload or short circuit occurs, the safeguard circuit breaker opens the battery supply voltage to the voltage regulator.

PA-255132	PA-255132-SD
PA-255133	PA-255133-SD
PA-255136	PA-255136-SD
PA-255137	PA-255137-SD
PA-255138	PA-255138-SD
PA-255139	PA-255139-SD
PA-255140	PA-255140-SD
PA-255141	PA-255141-SD
PA-255142	PA-255142-SD
PA-255143	PA-255143-SD
PA-255144	PA-255144-SD
PA-255145	PA-255145-SD
PA-255146	PA-255146-SD
PA-255147	PA-255147-SD
PA-255149	PA-255149-SD
PA-255153	PA-255153-SD
PA-255155	PA-255155-SD
PA-255157	PA-255157-SD
PA-255159	PA-255159-SD
PA-255163	PA-255163-SD

**Note:** See Generator Price List for availability and selection of safeguard circuit breakers.

### Safety Precautions

Observe the following safety precautions while installing the kit.

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#### ⚠ WARNING



**Accidental starting.  
Can cause severe injury or death.**

Disconnect the battery cables before working on the generator set. Remove the negative (-) lead first when disconnecting the battery. Reconnect the negative (-) lead last when reconnecting the battery.

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**Disabling the generator set. Accidental starting can cause severe injury or death.** Before working on the generator set or connected equipment, disable the generator set as follows: (1) Move the generator set master switch to the OFF position. (2) Disconnect the power to the battery charger. (3) Remove the battery cables, negative (-) lead first. Reconnect the negative (-) lead last when reconnecting the battery. Follow these precautions to prevent starting of the generator set by an automatic transfer switch, remote start/stop switch, or engine start command from a remote computer.

## Mounting and Connection

1. Place the generator set master switch in the OFF position.
2. Disconnect the power to the battery charger, if equipped.
3. Disconnect the generator set engine starting battery(ies), negative (-) lead first.
4. Remove right-side panel of junction box by removing six screws.
5. Locate and remove safeguard circuit breaker knockout. See Figure 1 for location. To remove, place wood block behind plate and strike with hammer. Remove burrs.
6. Mount breaker to junction box with four screws and flat washers. ON/OFF markings must be right side up.
7. Attach terminals (X-283-3) to each lead of current transformers.
8. Place generator output leads through current transformers as shown in Figure 4.

**Note:** Place all current transformers with dot or HI markings toward the generator set (see Figure 2).

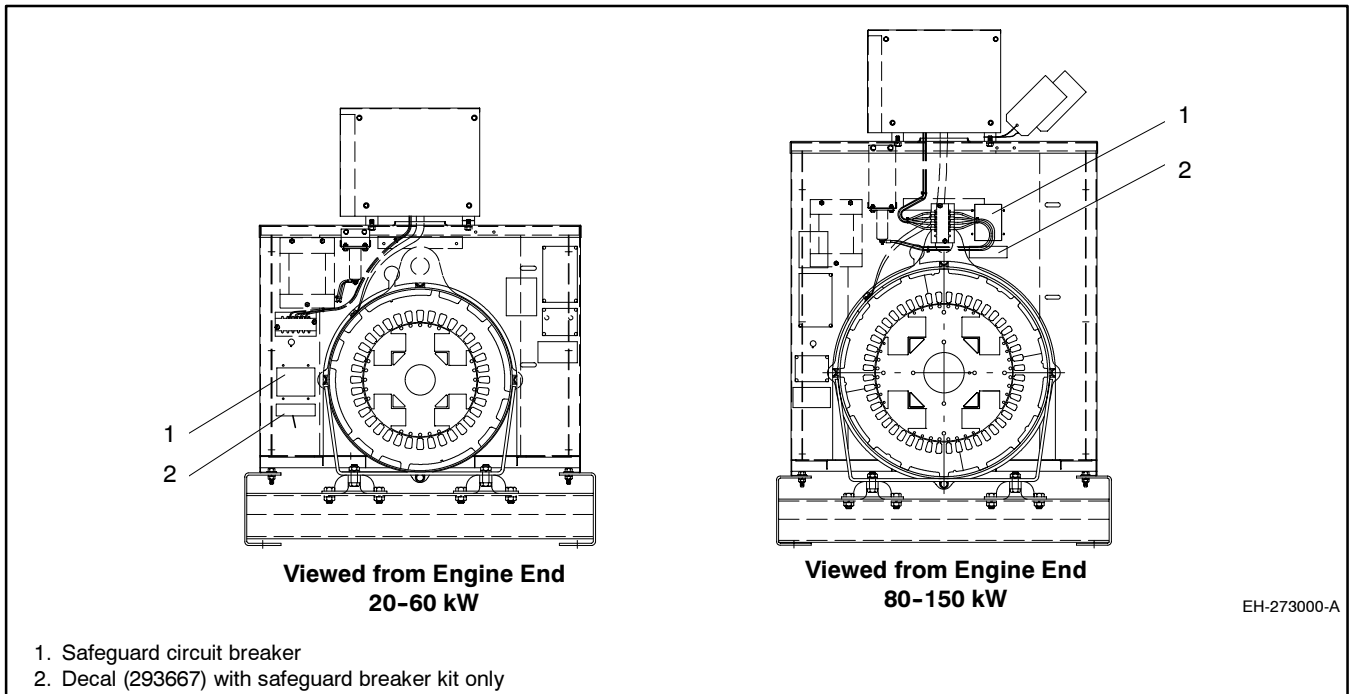
9. Loosen upper screws on safeguard terminal strip with leads marked C0, C1, C2, and C3. Place jumper strip under terminals and tighten screws.
10. Connect safeguard circuit breaker as follows. See Figure 3 for wiring diagram.

**Note:** Safeguard terminal strip may have wires connected in a different sequence than shown in Figure 4. Leads connected to top terminals have identification marked. Base connections on terminal identification (not position).

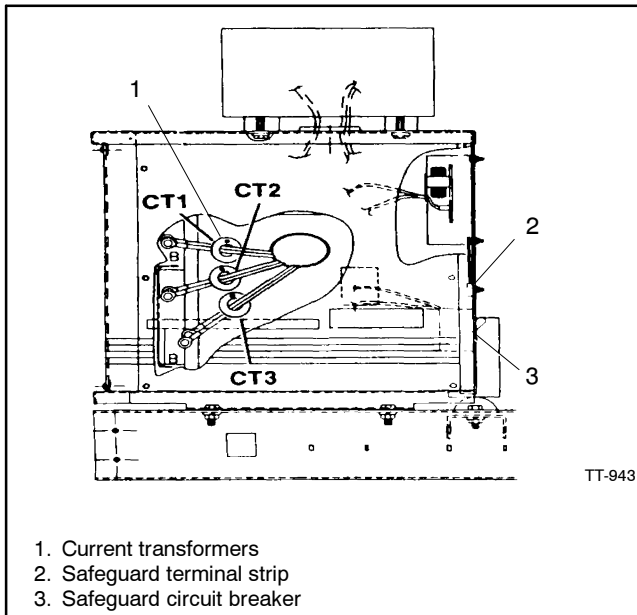
- a. Connect black leads of current transformers to C0 on terminal strip.

**Note:** Due to screw length, it may be necessary to place one CT lead on upper screw of terminal strip.

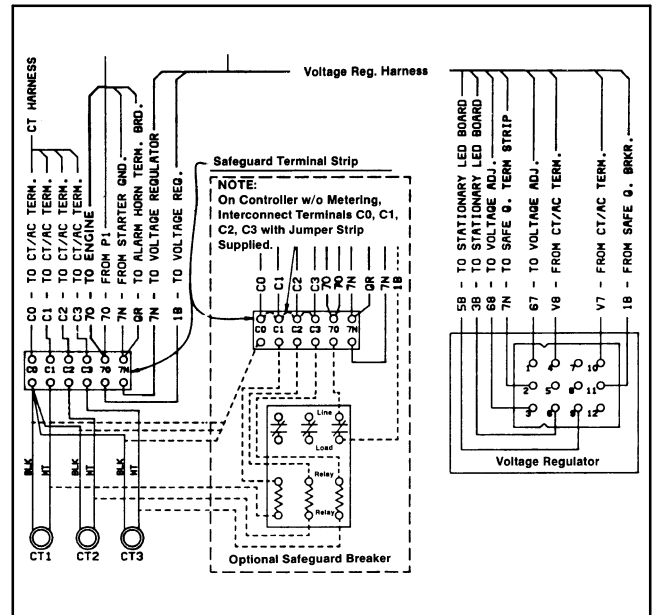
- b. Disconnect white lead of CT1 from terminal strip and connect to lower relay on first pole of breaker. Connect jumper lead from upper relay terminal on first pole of breaker to C1 on terminal strip.
- c. Disconnect white lead of CT2 from terminal strip and connect to lower relay terminal of second pole of breaker. Connect jumper lead from upper relay terminal on second pole of breaker to C2 on terminal strip.
- d. Disconnect white lead of CT3 from terminal strip and connect to lower relay terminal on third pole of breaker. Connect jumper lead from upper terminal on third pole of breaker to C3 on terminal strip.
- e. Disconnect 1B from terminal strip and connect to load terminal on third pole of breaker. Connect jumper lead from line terminal on third pole of breaker to terminal 70 on terminal strip.
11. Replace right-side panel of junction box using six screws.
12. Check the surface of the junction box directly beneath the safeguard circuit breaker. With surface clean and dry, apply safeguard circuit breaker decal (kits with decal only).
13. Check that the generator set master switch is in the OFF position.
14. Reconnect the generator set engine starting battery, negative (-) lead last.
15. Reconnect power to the battery charger, if equipped.



**Figure 1** Safeguard Circuit Breaker Locations



**Figure 2** Safeguard Circuit Breaker Kit Installation

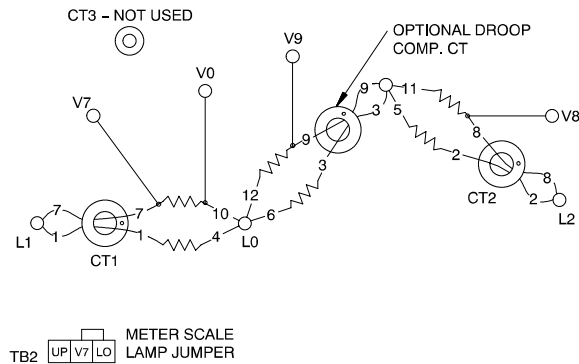


**Figure 3** Wiring Diagram

### 12 LEAD ALTERNATOR, 3 WIRE, SINGLE PHASE

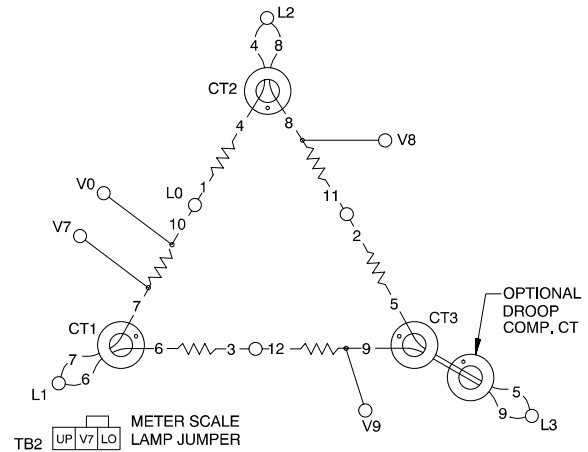
60 HZ: 100/200V  
60 HZ: 120/240V  
50 HZ: 100/200V  
50 HZ: 110/220V

SOME SETS NOT RATED FOR  
SINGLE PHASE - SEE MANUALS



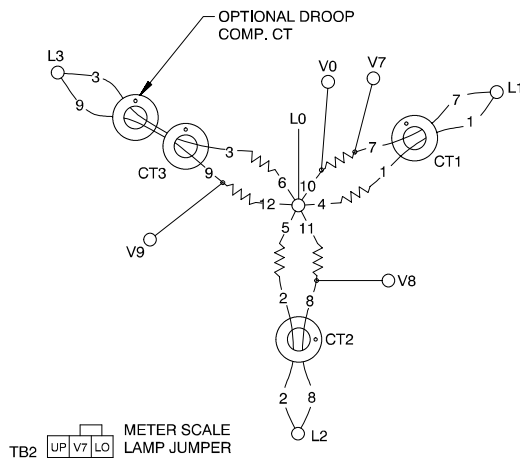
### 12 LEAD ALTERNATOR, 4 WIRE, DELTA

60 HZ: 120/240V  
50 HZ: 110/220V



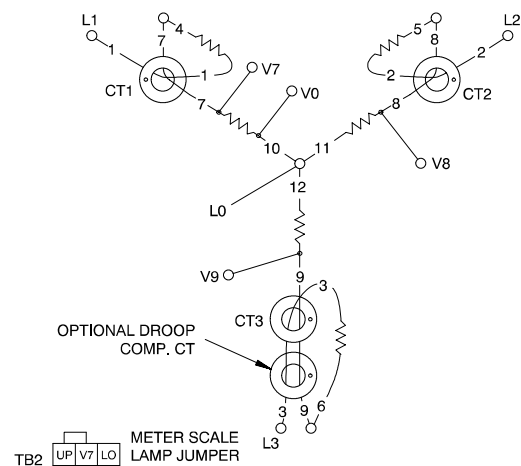
### 12 LEAD ALTERNATOR, 4 WIRE, LOW WYE

60 HZ: 120/208V  
60 HZ: 127/220V  
60 HZ: 139/240V  
50 HZ: 110/190V  
50 HZ: 115/200V  
50 HZ: 120/208V



### 12 LEAD ALTERNATOR, 4 WIRE, HI WYE

60 HZ: 220/380V  
60 HZ: 240/416V  
60 HZ: 277/480V  
50 HZ: 220/380V  
50 HZ: 230/400V  
50 HZ: 240/416V



**Note:** Position current transformers CT1, CT2, and CT3 with the dot or HI side CT marking toward the generator set.

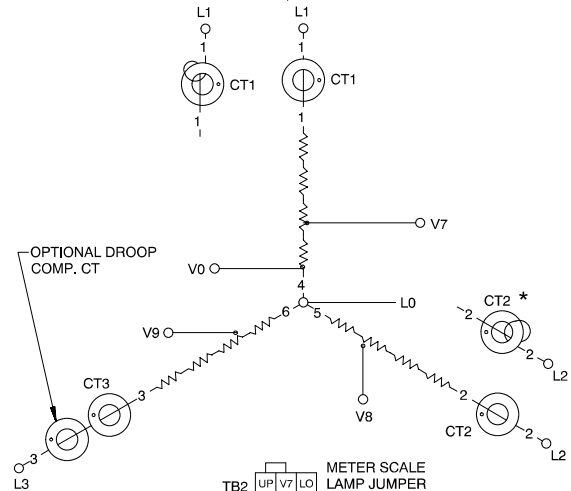
**Note:** Phase Rotation: A = L1, B = L2, and C = L3.

**Note:** All 12-lead generator sets are reconnectable. The 6-lead, 600-volt generator set is not reconnectable. Some specially wound stators are made for a single voltage and are also not reconnectable.

**Note:** (600-volt models only) Use 1 turn of the output lead through the current transformer on current-production 6-lead, 600-volt stators. Some early stators may have two turns of the output lead through the current transformer. Continue using the original factory current transformer wiring system.

### 6 LEAD ALTERNATOR, 4 WIRE, WYE

60 HZ: 347/600V



5750-6

**Figure 4** Current Transformer Connections

## Parts List

Qty.	Description	Common Parts	Unique Parts				
			PA-255132	PA-255133	PA-255136	PA-255137	PA-255138
4	Washer, flat, #6, 0.158 x 0.375 x 0.049 in.	X-25-9					
4	Screw, 6-32 x 3/8 in.	X-49-2					
1	Lead, short jumper	LW-1604-1414					
3	Lead, jumper	LW-1604-1414					
6	Terminal, spade	X-283-3					
1	Strip, jumper	X-6076-2					
1	Breaker, circuit		X-796-1	X-796-1	X-796-2	X-796-1	X-796-2
3	Transformer, current		246887	246886	246886	246875	246885
Qty.	Description	Common Parts	Unique Parts				
			PA-255139	PA-255140	PA-255141	PA-255142	PA-255143
4	Washer, flat, #6, 0.158 x 0.375 x 0.049 in.	X-25-9					
4	Screw, 6-32 x 3/8 in.	X-49-2					
1	Lead, short jumper	LW-1604-1414					
3	Lead, jumper	LW-1604-1414					
6	Terminal, spade	X-283-3					
1	Strip, jumper	X-6076-2					
1	Breaker, circuit		X-796-2	X-796-3	X-796-6	X-796-3	X-796-2
3	Transformer, current		246886	246885	246887	246889	246887
Qty.	Description	Common Parts	Unique Parts				
			PA-255144	PA-255145	PA-255146	PA-255147	PA-255149
4	Washer, flat, #6, 0.158 x 0.375 x 0.049 in.	X-25-9					
4	Screw, 6-32 x 3/8 in.	X-49-2					
1	Lead, short jumper	LW-1604-1414					
3	Lead, jumper	LW-1604-1414					
6	Terminal, spade	X-283-3					
1	Strip, jumper	X-6076-2					
1	Breaker, circuit		X-796-4	X-796-6	X-796-6	X-796-1	X-796-1
3	Transformer, current		246885	246885	246886	246885	246889
Qty.	Description	Common Parts	Unique Parts				
			PA-255153	PA-255155	PA-255157	PA-255159	PA-255163
4	Washer, flat, #6, 0.158 x 0.375 x 0.049 in.	X-25-9					
4	Screw, 6-32 x 3/8 in.	X-49-2					
1	Lead, short jumper	LW-1604-1414					
3	Lead, jumper	LW-1604-1414					
6	Terminal, spade	X-283-3					
1	Strip, jumper	X-6076-2					
1	Breaker, circuit		X-796-6	X-796-2	X-796-6	X-796-2	X-796-2
3	Transformer, current		246889	246889	248874	248874	248875