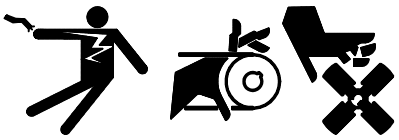
INSTALLATION INSTRUCTIONS

Reactive Droop Compensator Kits For 20-300 kW Standby Generator Sets

Kit No.	kW
PA-256496 & PA-256496-SD	20-30
PA-256497 & PA-256497-SD	31-40
PA-256498 & PA-256498-SD	41-65
PA-256499 & PA-256499-SD	66-110
PA-256500 & PA-256500-SD	111-175
PA-256505 & PA-256505-SD	176-270
PA-256506 & PA-256506-SD	271-300

The reactive droop compensator is used to distribute the load evenly when two generator sets are used in parallel. These kits should be installed only by a qualified electrician or technician.



⚠ WARNING

Accidental starting.
Can cause severe injury or death.
Disconnect battery cables before working on generator set (negative lead first and reconnect it last).

Accidental starting can cause severe injury or death. Disconnect battery cables (remove negative lead first and reconnect it last) to disable generator set before working on any equipment connected to generator. The generator set can be started by remote start/stop switch unless this precaution is followed.

⚠ WARNING

Hazardous voltage.

Moving rotor.

Can cause severe injury or death.

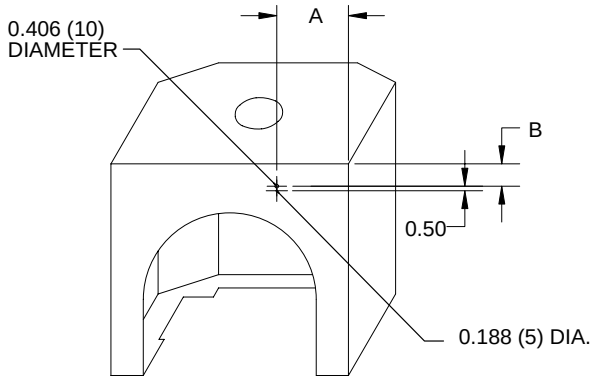
Do not operate generator set without all guards and electrical enclosures in place.

Hazardous voltage can cause severe injury or death. Perform electrical service only as prescribed in equipment manual. Be sure that generator is properly grounded. Never touch electrical leads or appliances with wet hands, when standing in water, or on wet ground as the chance of electrocution is especially prevalent under such conditions. Wiring should be inspected at the interval recommended in the service schedule—replace leads that are frayed or in poor condition. The function of a generator set is to produce electricity and wherever electricity is present, there is the hazard of electrocution.

INSTALLATION

1. Move generator master switch to OFF position. Disconnect generator set battery cables, negative lead first.

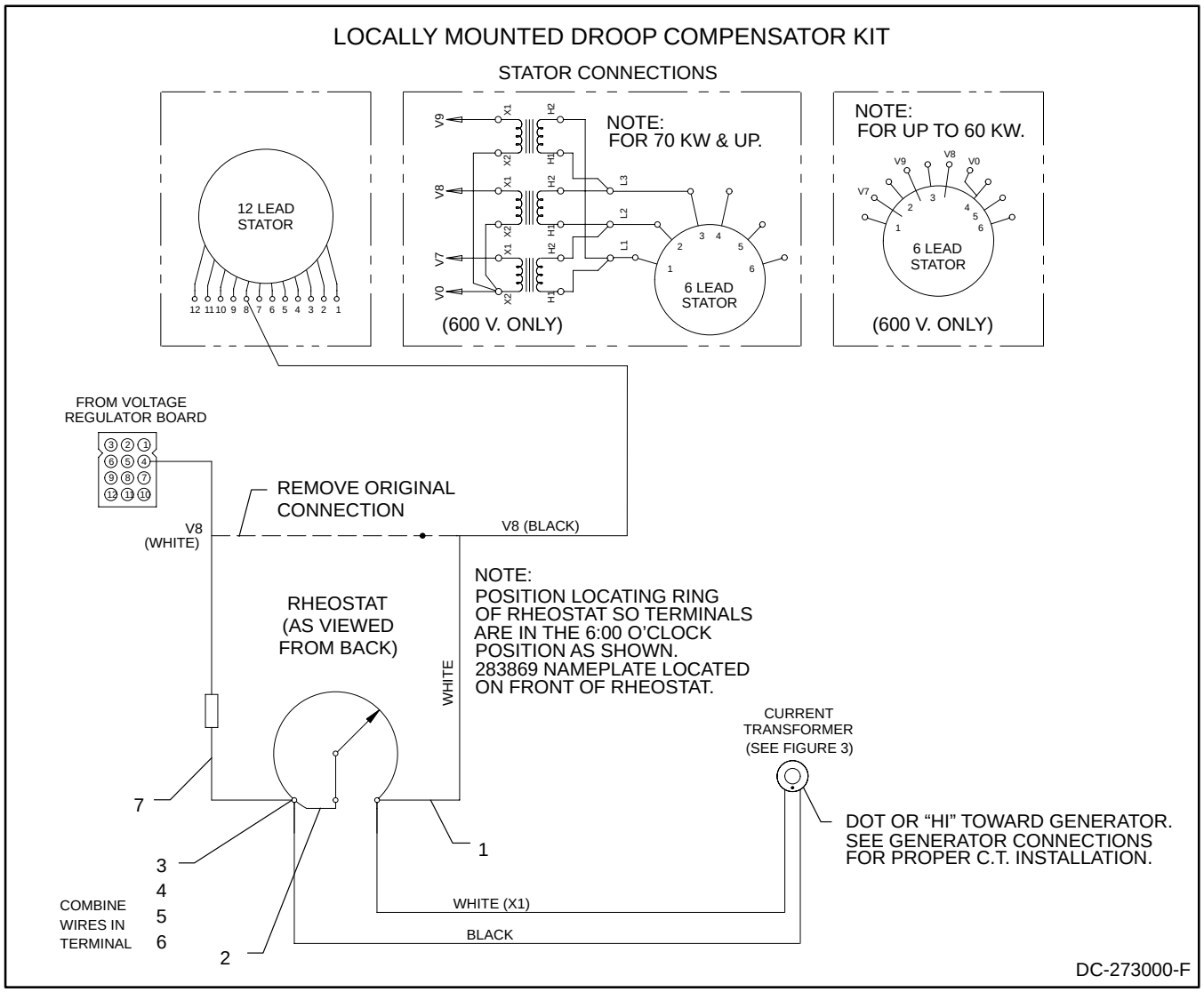
2. Drill mounting holes in junction box as shown in Figure 1.



GENERATOR RATING	A	B
20-65 kW	7.50 in. (190 mm)	2.50 in. (64 mm)
66-110 kW	17.00 in. (432 mm)	2.50 in. (64 mm)
111-175 kW	7.43 in. (189 mm)	6.09 in. (155 mm)
176 kW and Above	10.00 in. (254 mm)	2.50 in. (64 mm)

DC-273000-F

Figure 1. Drilling Instructions



1. Lead (LW-1636-400)
2. Lead (LW-1603-1313)
3. Terminal (X-283-11) qty. 2
4. Plain Washer (X-25-48) qty. 3
5. Whiz Nut (X-6210-4) qty. 3
6. R.H.M. Screw (X-51-5) qty. 3
7. Lead (LW-1606-400)

Figure 2. Wiring Diagram

3. Install rheostat (X-467-4) through mounting hole and align tab with smaller hole. Install nameplate (283869), lock washer, and nut. Attach knob. See Figures 1 and 2.

NOTE

Lock washer, nut, and knob are supplied with rheostat.

4. Install stator leads through reactive droop compensator current transformer according to application as shown in Figure 3.

NOTE

Dot or "HI" mark on current transformer must be toward generator set.

NOTE

Generator sets up to 240 volts require one turn of output leads through current transformer. Generator sets above 240 volts require two turns of output leads through current transformer.

5. Attach lead (LW-1603-1313) to center position of rheostat with one 8-32 x 0.438-in. r.h.m. screw (X-51-5), 0.188 x 0.438-in. plain washer (X-25-48), and 8-32 whiz nut (X-6210-4).

6. Disconnect the V8 connection between the voltage regulator and stator. Connect lead (LW-1606-400) to voltage regulator V8 (white) lead.

7. Combine lead (LW-1606-400) and black lead from current transformer with terminal (X-283-11).

8. Attach terminal (X-283-10) and lead (LW-1603-1313) from rheostat center position to rheostat as shown in Figure 2 with one 8-32 x 0.438-in. r.h.m. screw (X-51-5), 0.188 x 0.438 x 0.049-in. plain washer (X-25-48), and 8-32 whiz nut (X-6210-4).

9. Connect lead (LW-1636-400) to V8 (black) lead from stator. Combine V8 from stator lead to white (X1) lead from current transformer with terminal (X-283-11).

10. Attach terminal to rheostat with one 8-32 x 0.438-in. r.h.m. screw (X-51-5), 0.188 x 0.438 x 0.049-in. plain washer (X-25-48), and 8-32 whiz nut (X-6210-4).

TESTING

To test and adjust the reactive droop compensator, proceed as follows. Read entire procedure before beginning.

1. With the cross current rheostat set at minimum (full counterclockwise position [ccw]), record the RPM or frequency and voltage at 1/4 load steps to full load on unit #1. Repeat Step 1 for unit #2.

2. Compare the readings and make final adjustments so that the voltage is within 1 volt at each load step and the speed is within three RPM or the frequency is within 0.1 Hz for each unit. Adjust voltage using local or remote voltage adjusting potentiometer. Adjust speed at governor or at remote speed adjusting potentiometer.

3. Check droop compensation on each unit as follows:

   a. With unit #1 operating at the correct speed and voltage, apply a lagging power factor load. This load should preferably be 1/2 to full load and must be inductive, as resistance loads cannot be used.

   b. Observe the voltmeter on unit #1 with the cross current rheostat set at minimum. As the rheostat is turned clockwise (cw) the voltmeter should show a decrease in voltage. If a larger voltage is obtained when cross current rheostat is turned cw, shut down the system and reverse the direction of the generator load line through current transformer, or reverse transformer leads. Recheck droop.

   c. Set the cross current rheostat to a value at approximately 4% below rated voltage at full load. As an example, the voltage will droop (decrease) 19.2 volts on a 480-volt system at full load or 9.6 volts at one-half load. To determine voltage droop at other than full load, use the following formula:

      Rated Voltage x 0.04 x Actual Load (expressed as a % of full load) = Voltage Droop

      NOTE

      With full load 0.8 power factor, a droop of 3-5% should be adequate for paralleling.

   d. Repeat Steps 3 a, b, and c for unit #2 and be certain the amount of voltage droop is equal at the same load point as on unit #1.

   e. With this procedure, the two units will share reactive currents proportionately.

4. In addition to Steps 1-3, it is desirable to use the following procedure to check that the units are sharing the reactive load correctly.

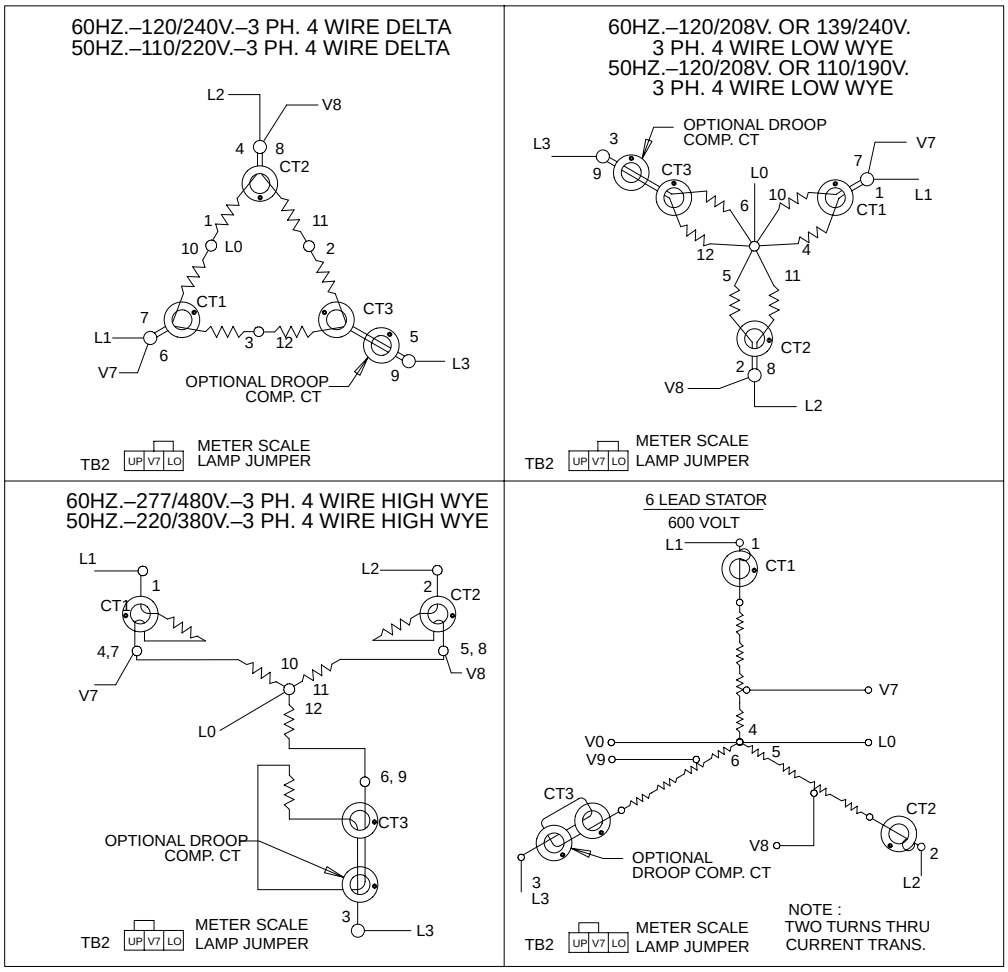
   a. Parallel the units at one-half to full load. Check the wattmeters to determine that each unit is carrying equal kW load or a load proportional to its capacity. If the loads are incorrect, adjust and recheck the governor throttle control to correctly balance loading. Engine speed will determine load sharing ability.

   b. With the load balanced, check the ammeters to see that equal current is being produced or the current is proportional according to capacity. If the currents are incorrect, adjust the cross current rheostat to reduce the current of the unit that has the highest reading. The current should be reduced to an equal division or be proportional.

   c. As a result of performing Steps 4 a and b, the governors have been adjusted to balance load and the cross current rheostat has been adjusted to balance current. These settings would be optimum for parallel operation.

      NOTE

      Voltage must droop on lagging power factor loads (inductive loads). A little change in voltage is acceptable on unity power factor loads (resistance loads).



PHASE ROTATION

A B C

L1 L2 L3

NOTE: CURRENT TRANSFORMER DOT OR “HI” TOWARD GENERATOR.

NOTE: 380-VOLT, 480-VOLT AND 600-VOLT GENERATOR SETS REQUIRE TWO (2) TURNS OF OUTPUT LEADS THROUGH CURRENT TRANSFORMER.
ALL OTHERS REQUIRE ONE (1) TURN OF OUTPUT LEADS THROUGH CURRENT TRANSFORMER.

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Figure 3. Generator Connections

Parts List

Kits: PA-256496, PA-256496-SD, PA-256497, PA-256497-SD, PA-256498, PA-256498-SD, PA-256499, PA-256499-SD, PA-256500, PA-256500-SD, PA-256505, PA-256505-SD, PA-256506, and PA-256506-SD

Description	Qty.	Part Number
Lead	1	LW-1603-1313
Lead	1	LW-1606-400
Lead	1	LW-1636-400
Washer, 0.188 x 0.438 x 0.049 in. plain	3	X-25-48
Terminal	2	X-283-11
Rheostat, 16 ohm 2.50 amp	1	X-467-4
Screw, 8-32 x 0.438 in. r.h.m.	3	X-51-5
Nut, 8-32 whiz	3	X-6210-4
Wire, 16-gauge PVCUL1015 white	6 ft.	—
Nameplate	1	283869
Transformer, current (Kits PA-256496 and PA-256496-SD)	1	233951
Transformer, current (Kits PA-256497 and PA-256497-SD)	1	233952
Transformer, current (Kits PA-256498 and PA-256498-SD)	1	233953
Transformer, current (Kits PA-256499 and PA-256499-SD)	1	233954
Transformer, current (Kits PA-256500 and PA-256500-SD)	1	233957
Transformer, current (Kits PA-256505 and PA-256505-SD)	1	233955
Transformer, current (Kits PA-256506 and PA-256506-SD)	1	233958