Section 8. Electrical System

GENERAL

Installing the genset electrical system includes installing line circuit breakers and connecting the load, installing the remote start control (if used), and connecting the battery. The battery must always be connected last to avoid accidental genset starting during the installation.

⚠WARNING ***Accidental starting of the generator set during installation creates a hazard of serious personal injury or death. Do not connect the starting battery until instructed to.***

All wiring must meet Coast Guard, NFPA, and all other applicable codes. Have all wiring installed by a qualified electrician. Wiring diagrams do not include customer-added components.

Be sure to seal all openings made for wiring so exhaust or fuel vapors cannot enter the living quarters. If flexible-metal conduit is used, it must be sealed internally at the end where it terminates within the junction box or panelboard. Flexible-metal conduit is not vapor-tight along its length due to its unique construction.

⚠WARNING ***Inhalation of exhaust gas or ignition of fuel vapor can cause severe personal injury or death. Be sure to vapor-seal flexible metal conduit, and all openings made during installation of the generator set, with a silicone/rubber-based sealant.***

⚠WARNING ***Faulty electrical equipment can cause shock and severe personal injury or death. Use only approved power supply assemblies, and never remove the grounding pin from the power cord. No ground, or an incorrect ground, can cause the vessel to become electrically "hot".***

LOAD CONNECTIONS

While at dock, most boats have a dockside connection for use of commercial power. These installations must have a transfer switch to isolate the genset and the commercial power. The two power sources must never be connected together. A single-phase, manual shoreline-transfer switch is available from Onan for this function. See Figure 8-1.

Use a section of flexible conduit at the genset to absorb movement and vibration. Flexible, multi-strand wire must be used throughout to reduce the danger of breakage due to boat movement or vibration. Grounding must comply with wiring codes.

Non-Reconnectable Generators

The single-phase 120, 120/240-volt (115, 115/230-volt), two- and three-wire connections are shown on the AC wiring and schematic diagrams, Figures 8-2 and 8-3. These generators are transformer regulated as shown. The load leads are connected to the circuit breakers in the control box (supplied on 60 hertz gensets).

When output is taken from two generator windings (such as 120/240 volts), the load must be balanced across the windings. Taking full load from one winding can cause poor voltage regulation and damage to the equipment or generator. A 220-, 230- or 240-volt load is connected across both windings. The AC output breaker (not furnished on 50 hertz gensets) must be sized according to the AC output current.

International 50 hertz or 60 hertz generators can be connected for 2-wire, single-phase, 220- or 240-volt output. This is done by grounding lead L2, and lifting and insulating (by electrical tape or isolation terminal) lead L0 on transformer-regulated generators. In these connections, only the hot lead L1 is connected through the breaker trip; and lead L2 is connected directly to ground (not through the breaker trip).

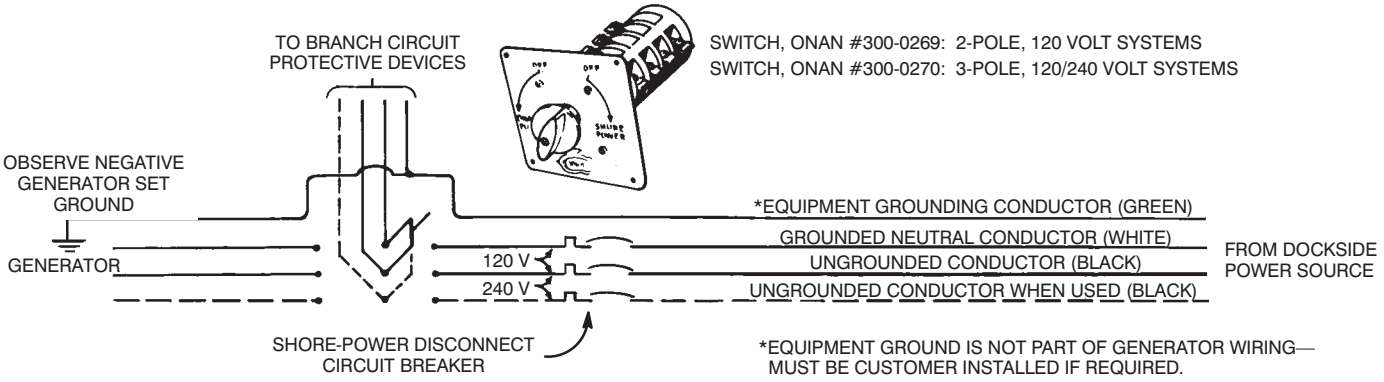


FIGURE 8-1. TYPICAL SINGLE-PHASE MANUAL SHORELINE-TRANSFER SWITCH CIRCUIT

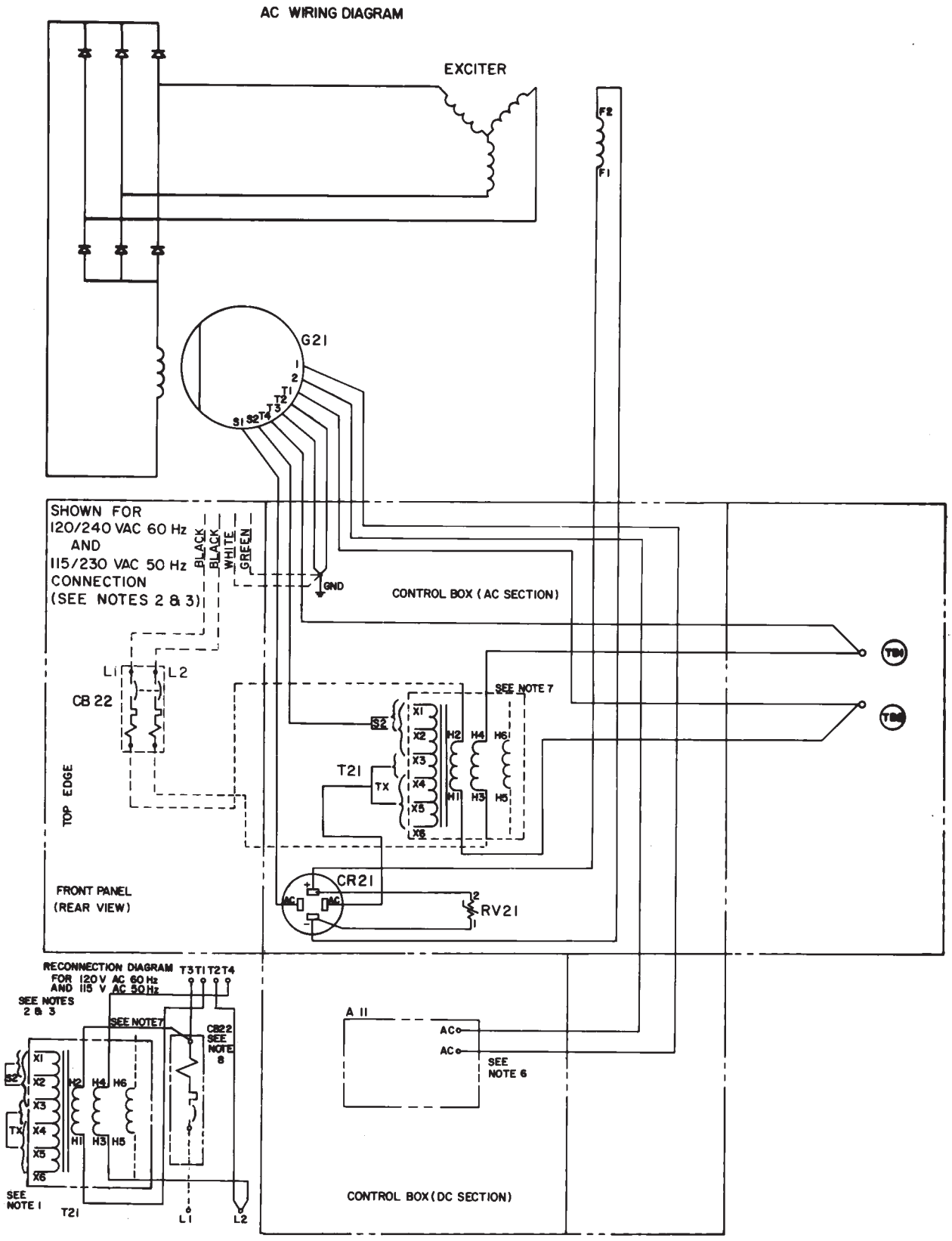
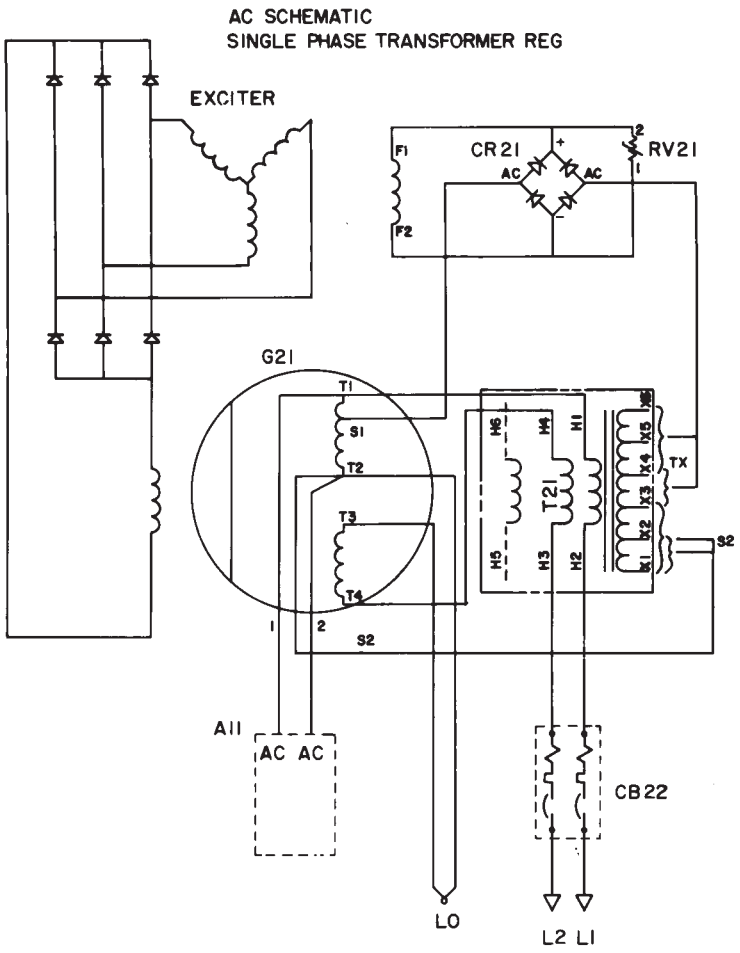


FIGURE 8-2. AC WIRING DIAGRAM, SINGLE-PHASE, TRANSFORMER REGULATION (PG. 1 OF 2)



COMPONENT IDENTIFICATION

REF DES	DESCRIPTION
A11	PCB Ass'y, Engine Monitor
CB22	Circuit Breaker, Load
CR21	Bridge Rectifier
G21	Generator, Ac
RV21	Suppressor Ass'y
TB1, 2	Standoff Insulator
T21	Transformer, Regulation

	OUTPUT VOLTAGE ADJUSTMENT	60 Hz (-01) 120, 120/240V TAP POSITION S2	60 Hz (-01) 120, 120/240V TAP POSITION TX	50 Hz (-02) 110, 110/220V TAP POSITION S2	50 Hz (-02) 110, 110/220V TAP POSITION TX	50 Hz (-02) 115, 115/230V TAP POSITION S2	50 Hz (-02) 115, 115/230V TAP POSITION TX	50 Hz (-02) 120, 120/240V TAP POSITION S2	50 Hz (-02) 120, 120/240V TAP POSITION TX
DKC MDKC	INCREASE	X2	X3	X3	X6	X3	X5	X3	X4
	STD	X1	X3	X2	X6	X2	X5	X2	X4
	DECREASE	X2 X1	X4 X4	X1	X6	X1	X5	X1	X4

	OUTPUT VOLTAGE ADJUSTMENT	60Hz (-03) 120, 120/240V TAP POSITION S2	60Hz (-03) 120, 120/240V TAP POSITION TX	50Hz (-04) 110, 110/220V TAP POSITION S2	50Hz (-04) 110, 110/220V TAP POSITION TX	50Hz (-04) 115, 115/230V TAP POSITION S2	50Hz (-04) 115, 115/230V TAP POSITION TX	50Hz (-04) 120, 120/240V TAP POSITION S2	50Hz (-04) 120, 120/240V TAP POSITION TX
DKD MDKD	INCREASE	X2 X1	X3 X3	X3	X6	X3	X5	X3	X4
	STD	X2	X4	X2	X6	X2	X5	X2	X4
	DECREASE	X1	X4	X1	X6	X1	X5	X1	X4

NOTES:
1. TO ADJUST OUTPUT VOLTAGE, MOVE TAPS ON T21 ACCORDING TO TABLES.
   IN ALL VOLTAGE CONNECTIONS (50 AND 60 Hz), LEAVE T1 AND T4 CONNECTED TO H1 AND H4 RESPECTIVELY.
2. FOR 60Hz: USE S2 LEAD (FROM GEN) ON TAPS X1-2 (4 TAPS) USE TX LEAD ON TAPS X3-4.
3. FOR 50Hz: USE S2 LEAD (FROM GEN) ON TAPS X1-3 (6 TAPS) USE TX LEAD ON TAPS X4-6
   a. FOR 110/220V AND 110V CONNECT H2 TO H6. FOR 110V CONNECT H5 TO T3 (L1) AND H3 TO T2 (L2). FOR 110/220V USE H5 FOR L1 AND H3 FOR L2 (T2 AND T3 ARE GRD)
   b. FOR 115/230V AND 115 V INSULATE H5 AND H6 (NOT USED)
   c. FOR 120/240V AND 120V CONNECT H2 TO H5. FOR 120V CONNECT H6 TO T3 (L1) H3 TO T2 (L2). FOR 120/240V USE H6 FOR L1 AND H3 FOR L2 (T2 AND T3 ARE GRD)
4. UNLESS OTHER NOTED, ALL COMPONENTS ARE SHOWN IN THE DE-ENERGISED POSITION.
5. DASHED LINES INDICATE WHEN USED.
6. A11 CONNECTION ON -3CR, -53CR MODELS ONLY. INSULATE LEADS ON -3CE, -53CE MODELS.
7. H5 AND H6 LEADS ARE USED ONLY ON 50Hz 110V, 110/220V AND 50Hz 120V, 120/240V CONNECTIONS.
8. IF CB 22 IS NOT USED CONNECT LEADS DIRECTLY TO THE LOAD
9. INSULATE ALL UNUSED OR INTERCONNECTED GENERATOR & TRANSFORMER LEADS WITH 898-0606 AND SECURE WITH 332-1794

FIGURE 8-3. AC SCHEMATIC DIAGRAM, SINGLE-PHASE, TRANSFORMER REGULATION (PG. 2 OF 2)