

INSTALLATION INSTRUCTIONS

Original Issue Date: 2/94

Model: 6-2000 kW

Market: Industrial

Subject: **Flush- or Surface-Mount Remote Annunciator Kits**
PA-293991 and PA-293991-SD

The remote annunciator monitors the condition of the generator set from a location remote of the generator set. If a generator alarm condition occurs, the remote annunciator alerts the operator through visual and audible signals. The remote annunciator kit includes a 14-relay dry contact box to isolate the annunciator from the controller and protect the controller from voltage surges and stray voltage. If a generator alarm condition occurs, the appropriate relay contacts close to activate the horn and corresponding lamp on the remote annunciator. The following paragraphs describe specific features of the remote annunciator.

Determine which accessory connection wiring diagram to use by identifying the type of generator set controller by the circuit board part number on the controller circuit board. The alphacharacter in the circuit board part number may be different from the one shown. See Figure 1.

Circuit Board Part Number	Terminal Strip Qty.	Wiring Diagram
A-328003 (6-18 kW)	TB1	Figure 9
A-328003	TB1	Figure 10
A-336415	TB1 and TB2	Figure 11
A-352160	TB1, TB2, TB3, and TB4	Figure 12

Figure 1. Generator Set Controller Identification

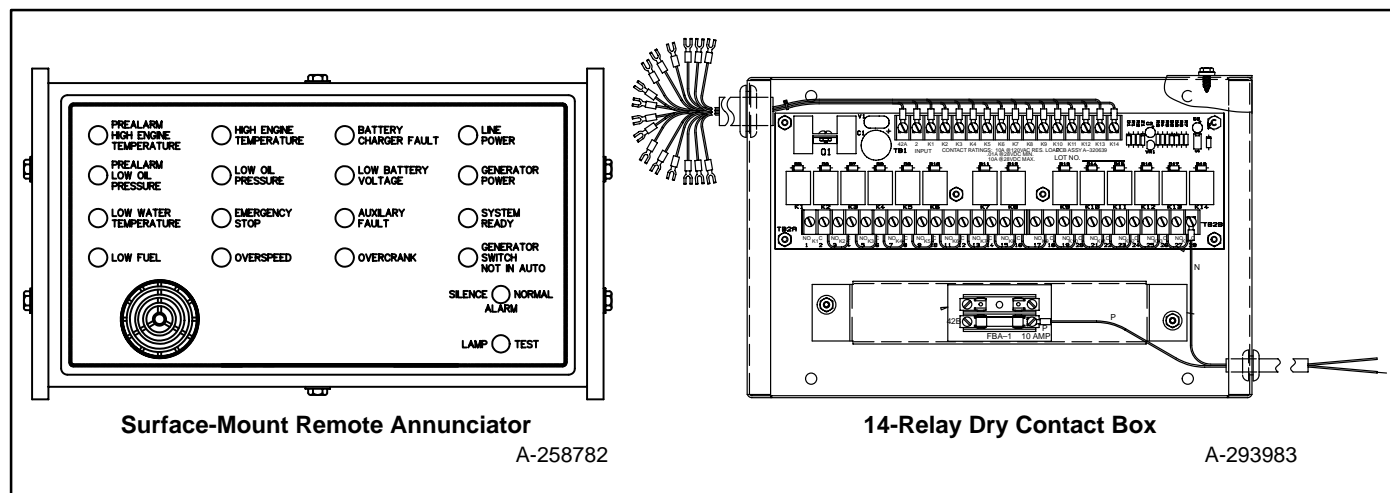


Figure 2. Remote Annunciator Kit Components

Features

Horn

Alarm Horn. Horn sounds if any fault or prealarm condition exists, except emergency stop, battery charger fault, or low battery volts. Silence the alarm horn with the generator master switch in the AUTO position. See Resetting section following.

Lamps

Auxiliary Fault. Lamp flashes or remains on to indicate a fault occurred. Auxiliary fault does not apply to 20-2000 kW generator set controllers with TB1, TB2, TB3, and TB4.

Flashing Lamp Condition:

- The auxiliary lamp flashes immediately when the controller senses no AC output while the unit is running, except during first 10 seconds after start-up. When AC output is sensed, the lamp stops flashing and turns off. No manual reset is required.
- The auxiliary lamp flashes when battery power is reconnected or low and then regains full power while the generator master switch is in the RUN or AUTO position. A temporary low battery condition may result from a weak or undersized battery for the application. Place the generator master switch in OFF/RESET position to clear this condition.

Continuous On Lamp Condition:

- The auxiliary lamp illuminates when the optional emergency stop switch is reset while the generator master switch is in the AUTO or RUN position. Place the generator master switch in OFF/RESET position to clear this condition.
- The auxiliary lamp illuminates and engine shuts down 5 seconds after high oil temperature (P1-13), low coolant level (P1-14), or auxiliary delay shutdown (P1-15) faults occur, if so equipped. These conditions are inhibited during first 30 seconds after crank disconnect.
- The auxiliary lamp illuminates and engine shuts down immediately when an overvoltage condition occurs, if equipped with voltage shutdown kit.
- The auxiliary lamp illuminates and engine shuts down immediately when activated by any customer-supplied sensing device connected to the auxiliary immediate shutdown ports (P1-17 and P1-18).

Battery Charger Fault, if Battery Charger equipped.

Lamp illuminates when the generator set battery charger malfunctions.

Emergency Stop. Lamp illuminates when generator stops by local or optional emergency stop switch, if equipped.

Generator Power. Lamp illuminates when the generator set supplies the power.

Generator Switch Not In Auto. Lamp illuminates when the generator set master switch is not in the AUTO position.

High Engine Temperature. Lamp illuminates when generator set shuts down from high engine coolant temperature.

Line Power. Lamp illuminates when a power supply other than the generator set supplies the power. When the lamp illuminates, the SYSTEM READY lamp also illuminates.

Low Battery Voltage, if Battery Charger equipped.

Lamp illuminates when battery or charging voltage drops below a preset level on charger. Lamp also illuminates when undervoltage condition occurs from a battery or charger malfunction while the generator set is running.

Low Fuel. Lamp illuminates when fuel tank level approaches empty. Requires fuel tank low fuel sensor for lamp to function.

Low Oil Pressure. Lamp illuminates when generator shuts down because of low engine oil pressure.

Low Water Temperature. Lamp illuminates when optional engine block heater malfunctions and/or temperature is too low (below 70° F, 21° C) for ten second start-up. Requires optional prealarm sender kit for lamp to function.

Overcrank. Lamp illuminates and cranking stops when unit does not start within the defined cranking period.

Overspeed. Lamp illuminates when generator set shuts down from an overspeed condition (above 70 Hz).

Prealarm High Engine Temperature. Lamp illuminates when engine coolant temperature approaches shutdown range. Requires optional prealarm sender kit for lamp to function.

Prealarm Low Oil Pressure. Lamp illuminates when engine oil pressure approaches shutdown range. Requires optional prealarm sender kit for lamp to function.

System Ready. Lamp illuminates when generator master switch is in AUTO position and the system has no fault conditions.

Mounting

Flush- or Surface-Mounting Capability. This instruction includes installation information for both flush- and surface-mount models.

Switches

Alarm Silence. Switch disconnects alarm during servicing. Place the generator master switch in the AUTO position to reset. See Resetting section following.

Lamp Test. Switch tests the remote annunciator indicator lamps.

Installation



Accidental starting. Can cause severe injury or death.

Disconnect battery cables before working on generator set (disconnect negative lead first and reconnect it last).

Disabling generator set. Accidental starting can cause severe injury or death. Turn generator set master switch to OFF position, disconnect power to battery charger, and remove battery cables (remove negative lead first and reconnect it last) to disable generator set before working on the generator set or connected equipment. The generator set can be started by an automatic transfer switch or remote start/stop switch unless these precautions are followed.

NOTE

Connect any combination of remote annunciators and audio-visual alarms totaling three to the controller.

NOTE

Use a controller connection kit between the generator set controller and the 14-relay dry contact box to provide easy access to controller terminal connections.

NOTE

Observe all applicable national, state, and local electrical codes during remote annunciator installation.

14-Relay Dry Contact Box Installation

1. Place the generator set master switch in the OFF/RESET position.
2. Disconnect the generator set engine starting battery(ies), negative (–) lead first. Disconnect power to battery charger, if equipped.
3. Determine a mounting location for the 14-relay dry contact box. Consider the length of the supplied wiring harness when choosing a mounting location. If the most suitable location requires a longer harness, fabricate a new harness using the supplied harness as a guide.

NOTE

The supplied wiring harness allows a maximum distance of approximately 5 ft. (1.5 m) between the

14-relay dry contact box and the generator set controller or controller connection kit, if used.

Choose one of the following mounting locations for the 14-relay dry contact box, in order of acceptability:

- Inside the junction box. Limited by other installed accessories.
- On top of the junction box. Limited by the size of the controller and the size of the junction box.
- On top of the generator skid. Limited by the clearance and housing options.
- In an area as near to the generator set controller as practical.

Mount 14-relay dry contact box in location selected using customer-supplied mounting hardware.

4. Connect the 14-relay dry contact box to the controller terminal strip or controller connection kit, if used. Use a controller connection box to allow easy connection and disconnection of generator accessories. See Figure 8 for 14-relay dry contact/remote annunciator connections.

To determine which accessory connection wiring diagram to use identify the type of generator set controller by the circuit board part number on the controller circuit board. The alphacharacter in the circuit board part number may be different from the one shown. See Figure 1.

Circuit Board Part Number	Terminal Strip Qty.	Wiring Diagram
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Figure 3. Generator Set Controller Identification

5. Connect lead P of wiring harness from 14-relay dry contact box to battery positive at starter solenoid. Lead N of wiring harness connects to battery negative (–) at engine ground. Do not use terminals 42A and 2 of 14-relay dry contact box terminal strip to supply voltage to relay contacts. Use separate leads directly from the battery for lead P and N.

If additional load, lights or alarms are connected to the 14-relay dry contact box, resize leads P and N accordingly.

Connect controller terminals 2 (ground) and 42A (battery voltage) to the 14-relay dry contact box terminal strip to provide an electrical source to operate the K1-K14 relays. When a generator fault condition occurs, the 14-relay dry contact box relay

(K1-K14) tied to that function energizes and the corresponding lamp on the remote annunciator illuminates.

6. Select a visible location to mount the remote annunciator. Install the remote annunciator panel, either surface- or flush-mounted, in a location easily observed by operating personnel at their work station.
7. Prepare mounting site. Drill pilot holes for anchors, if used. Create opening for surface mounting, if used. See Figure 4 for remote annunciator dimensions and mounting hole dimensions.
8. Proceed to Surface-Mount or Flush-Mount Annunciator Installation section following.

Surface-Mount Annunciator Installation

1. Disassemble annunciator box. Remove the side panels and separate front and back annunciator panels.

NOTE

Retain side panels and drill screws for reassembling.

2. Proceed to Annunciator Wiring section following. Return to this section after wiring annunciator.
3. After wiring 14-relay dry contact box to annunciator panel, mount back panel of annunciator to wall. See Figure 4 for mounting hole dimensions. Protect annunciator from dust and debris when drilling holes.

NOTE

The annunciator kit mounts to a standard 4 in. (10 cm.) square electrical box installed in the wall. Mount back plate to box in wall and reassemble box.

4. Reassemble front and back panels of annunciator box with drill screws removed in step 1 above.
5. Reattach the side panels.
6. Reconnect generator set engine starting battery, negative (–) lead last.
7. Move generator set master switch to AUTO for start-up by remote transfer switch or remote start/stop switch. Move remote annunciator alarm horn switch to NORMAL. If the horn sounds or lamp(s) illuminate, see Resetting following.

Flush-Mount Annunciator Installation

1. Disassemble annunciator box. Remove the side panels and separate front and back annunciator panels. Side panels will not be reused. Retain drill screws (X-794-2) for reassembly. See Figure 5 for additional flush-mount instructions.
2. Proceed to Remote Annunciator Wiring section following. Return to this section after wiring remote annunciator.
3. After wiring 14-relay dry contact box to annunciator panel, reassemble front panel to back panel using existing drill screws. See Figure 5.
4. Loosely attach L-shaped side mounting brackets (293993) to back panel using existing drill screws. See Figure 5.
5. Loosely attach front adapter panel studs to L-shaped side mounting brackets using #6-32 hex. nuts (X-71-2). See Figure 5.
6. Center remote annunciator in adapter panel and tighten hardware.
7. Mount assembly in opening. Protect remote annunciator from dust and debris when drilling holes.

NOTE

Mount the annunciator inside a standard Hoffmann 12 x 8 x 4 in. (30 x 20 x 10 cm.) pull box installed in the wall. Mount kit inside pull box using black #10-32 screws supplied.

NOTE

Use mounting hardware suitable for wall composition and thickness.

8. Reconnect generator set engine starting battery, negative (–) lead last.
9. Move generator set master switch to AUTO for start-up by remote transfer switch or remote start/stop switch. Move remote annunciator alarm horn switch to NORMAL. If the horn sounds or lamp(s) illuminates, see Resetting following.

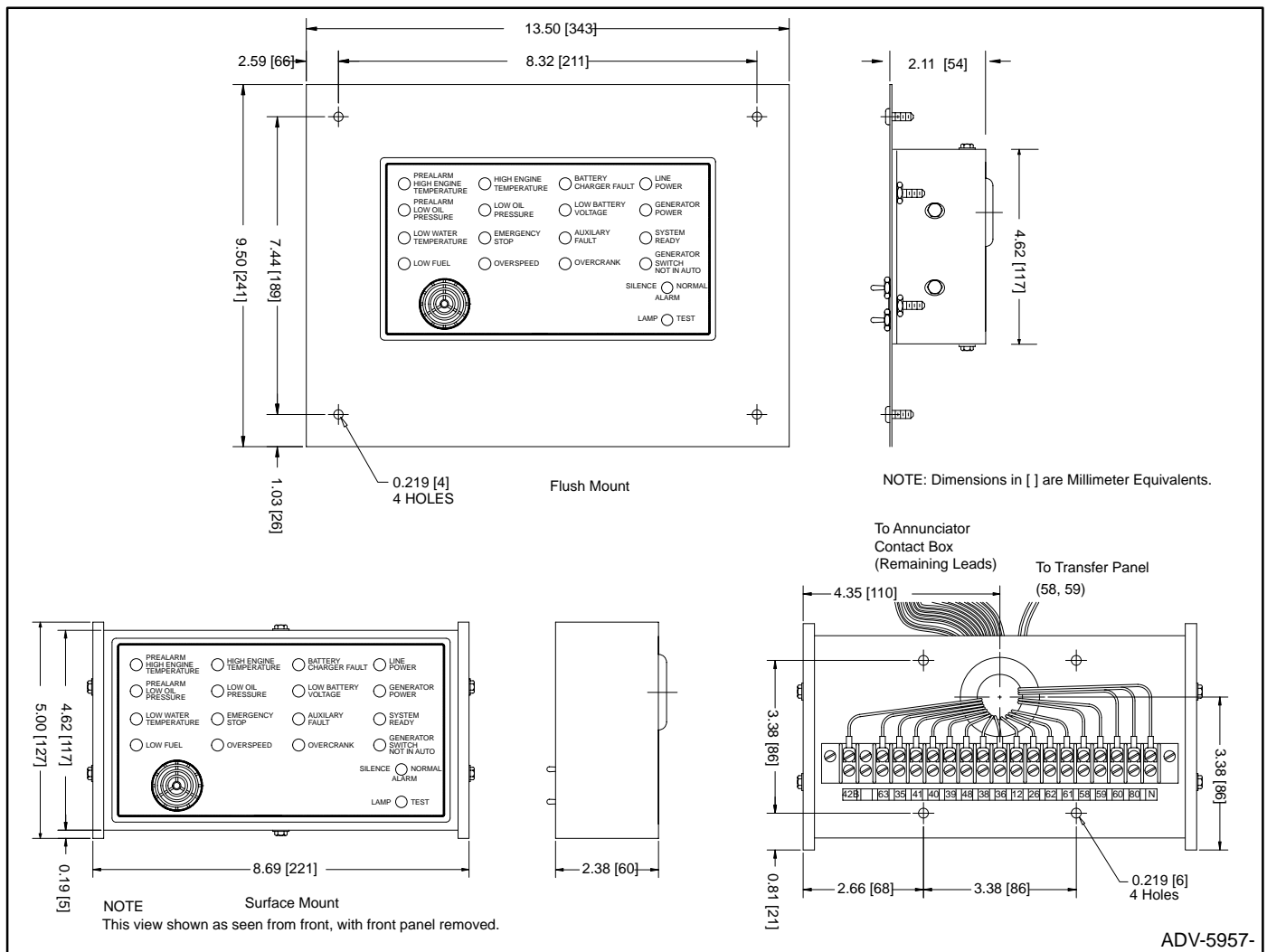


Figure 4. Component Dimensions

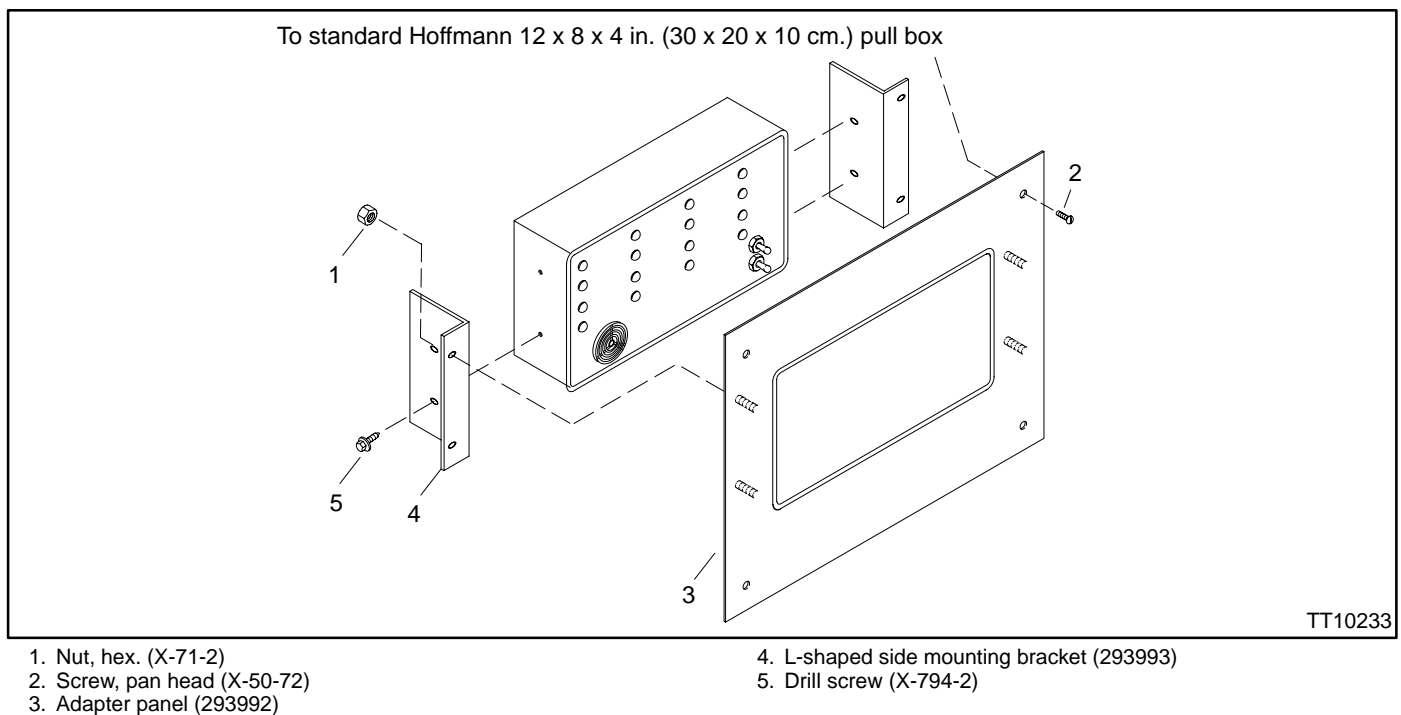


Figure 5. Flush-Mount Annunciator Installation

Remote Annunciator Wiring

1. The customer must supply all leads between the 14-relay dry contact box and the remote annunciator. Leads must be isolated from all other voltages. Observe the following guidelines during installation:

- Always use separate conduit for remote annunciator leads.
- Use grounded metallic conduit for leads or use shielded cable in nonmetallic conduit.
- Use dry contact kits located at the generator set for all signal leads and a separate power source for the remote annunciator.

To determine what gauge wire, stranded or solid, to use for leads N and 42B, determine the distance between the 14-relay dry contact box and the remote annunciator. For example, if the distance between the remote annunciator and the 14-relay dry-contact box is 400 ft (122 m), then the total wire length for each conductor is 400 ft (122 m). According to the chart in Figure 6, this example requires 14-gauge wire for leads N and 42B only.

Leads	Length	Wire Gauge
N, 42B	0-100 ft. (0-21 m)	18-20
	100-500 ft. (31-152 m)	14
	500-1000 ft. (152-305 m)	10
39, 12, 36, etc.	0-1000 ft. (305 m)	18-20

Figure 6. Wire Specifications Between Remote Annunciator and Dry Contact Box

Use stranded or solid 18- or 20-gauge wire for signal leads (39, 12, 36, etc.) at lengths up to 1000 ft. (305 m). Never mount the remote annunciator more than 1000 ft. (305 m) from the 14-relay dry contact box.

2. Attach wiring of proper length and gauge to 14-relay dry contact box.
3. Route wiring from 14-relay dry contact box through opening in back of annunciator panel.
4. Attach leads to terminal strip. Be sure to connect the 14-relay dry contact box leads to the corresponding terminals in the remote annunciator. See Figure 7. See Figure 8, Figure 9, Figure 10, or Figure 11 for more connection information.
5. Connect transfer switch terminals 10, 12, and 13 to remote annunciator terminals 59, N, and 58 respectively, if transfer switch equipped.
6. Return to Surface-Mount or Flush-Mount Installation section to complete annunciator installation.

Dry Contact Box Terminal	Connects To:	Remote Annunciator Terminal
42B		42B
K1, C terminal		N
K1, NO terminal		39
K2, NO terminal		12
K3, NO terminal		36
K4, NO terminal		38
K5, NO terminal		26*
K6, NO terminal		60
K7, NO terminal		80
K8, NO terminal		41
K9, NO terminal		48
K10, NO terminal		61
K11, NO terminal		62
K12, NO terminal		63
K13, NO terminal		35
K14, NO terminal		40
Controller Terminal	Connects To:	Dry Contact Box Terminal
42		42A
2		2
TB1-39		K1 Input
TB1-12		K2 Input
TB1-36		K3 Input
TB1-38		K4 Input
TB1-26*		K5 Input
TB1-60		K6 Input
TB1-80		K7 Input
TB1-41		K8 Input
TB1-48		K9 Input
TB1-61		K10 Input
TB1-62		K11 Input
TB1-63		K12 Input
TB1-35		K13 Input
TB1-40		K14 Input
Connect dry contact box N terminal to battery negative (–) on engine and P terminal to battery positive (+) on engine.		
*Does not apply to 20-2000 kW controller with TB1, TB2, and TB3.		

Figure 7. Remote Annunciator Kit Wiring Connections

Resetting the Controller and Remote Annunciator

Use the following procedure to reset the controller and remote annunciator after a fault alarm.

1. Move controller alarm horn switch to the SILENCE position. Move remote annunciator alarm switch to SILENCE to stop alarm horn. Remote annunciator lamp remains lit.
2. Disconnect generator set from load with line circuit breaker or automatic transfer switch.

3. Correct cause of fault alarm. See generator service manual.
4. Move generator master switch to OFF/RESET and then to the RUN position for start-up. Remote annunciator alarm horn sounds and lamp darkens.
5. Correct cause of alarm.
6. Reconnect generator to load via line circuit breaker or automatic transfer switch.
7. Move generator master switch to AUTO position for start-up by remote transfer switch or remote start/stop switch. Move remote annunciator alarm switch to NORMAL.
8. Move controller alarm horn switch to NORMAL.

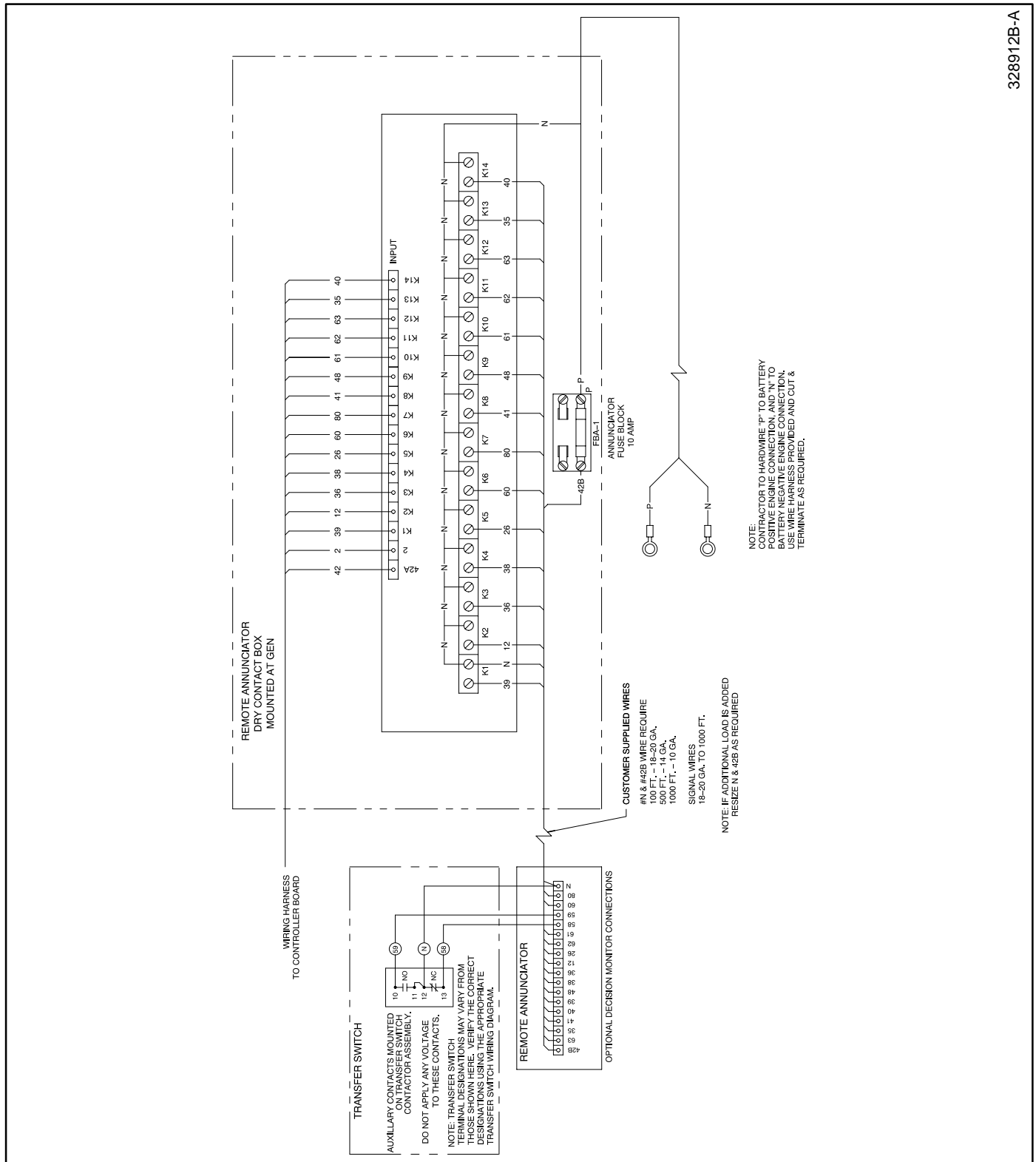


Figure 8. 14-Relay Dry Contact /Remote Annunciator Connection

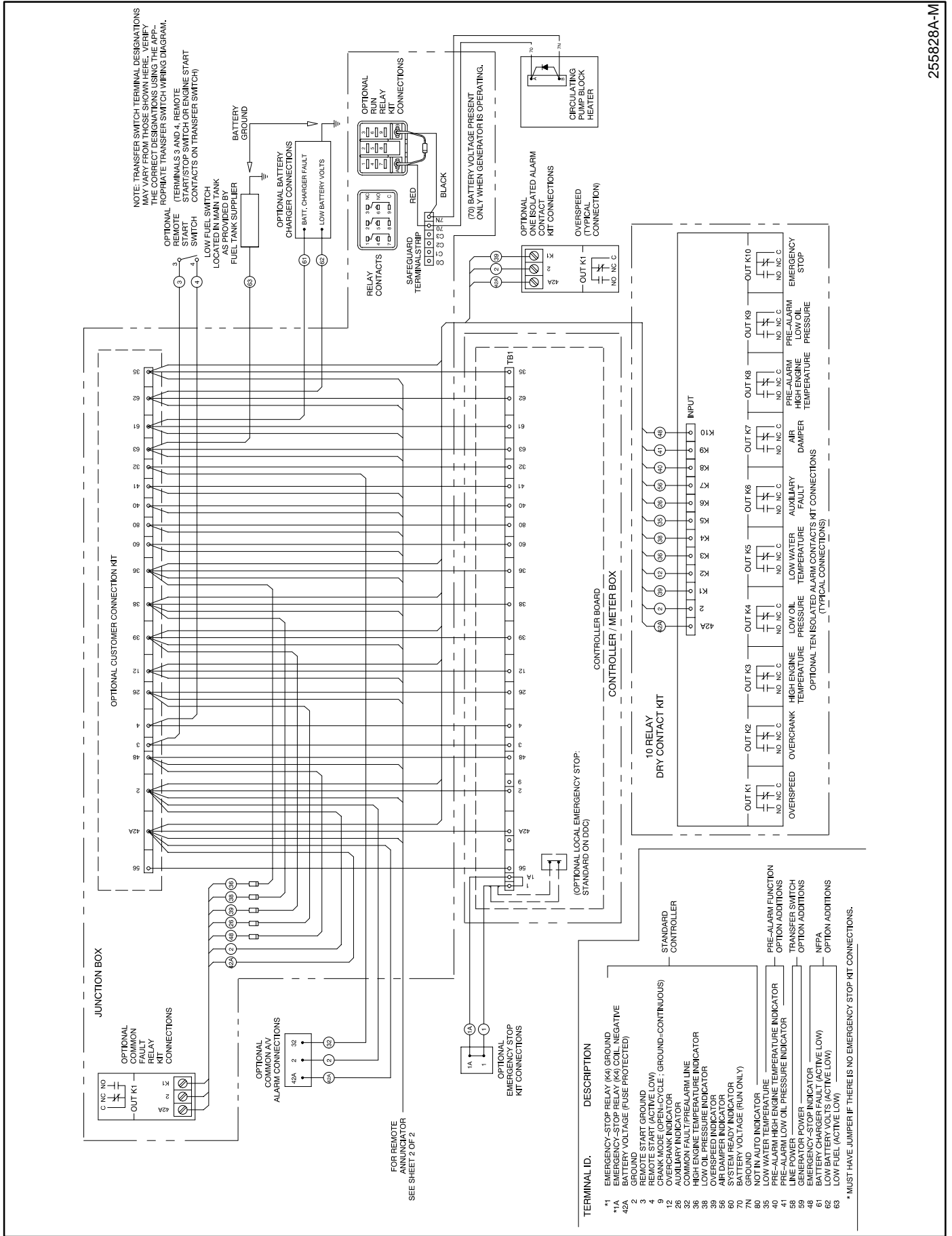


Figure 10. 20-2000 kW Controller With TB1 Terminal Strip Accessory Connections



Figure 12. 20-2000 kW Controller With TB1 , TB2, and TB3 Terminal Strips Accessory Connections

Remote Annunciator Kits

Parts List				
Kits: PA-293991 and PA-293991-SD			Unique Parts	
Qty.	Description	Common Parts	PA-293991	PA-293991-SD
1	Panel Assembly, annunciator (*includes)		A-258782	A-258782-SD
1	*Circuit Board Assy., 16-light	A-292885		
1	*Grommet	X-284-3		
2	*Screw, 6-32 x 0.50 in.	X-49-26		
4	*Screw, hex 8-32 x 0.375 in.	X-67-43		
6	*Screw, drill 8-18 x 0.50 in.	X-794-2		
1	*Bracket, wall mount		253346-BLK	253346-SD
1	*Panel, front		253350-BLK	253350-SD
1	*Decal, marker	258832		
1	*Nameplate		258834	325376
1	*Harness, wiring	258890		
1	*Block, terminal	258891		
2	*Panel, side	287798		
1	Assembly, dry contact box		A-293983	A-293983-SD
1	*Circuit Board Assy, 14-relay dry contact	A-320639		
13	*Lead	LW-1803		
1	*Grommet	X-284-7		
2	*Tie, cable	X-468-5		
2	*Screw, 6-32 x 0.50 in.	X-49-26		
4	*Screw, 10-24 x 0.50 in.	X-6216-1		
6	*Nut, hex, 8-32	X-70-12		
6	*Spacer	X-712-9		
1	*Fuse, 10-amp	223316		
1	*Bracket, fuse holder	226675		
1	*Box, dry contact		226676-KCB	226676-SD
1	*Grommet	243488		
1	*Block, fuse	256493		
1	*Marker, strip	256494		
1	*Harness, annunciator	256495		
1	*Cover, dry contact		256880-KCB	256880-SD
1	*Harness, wiring	293982		
1	Terminal, 16-14 wire	X-283-32		
1	Terminal	X-283-4		
1	Terminal	X-283-5		
4	Screw, pan head	X-50-72		
4	Nut, hex	X-71-2		
1	Panel, front annunciator		293992-BLK	293992-SD
2	Bracket, mounting	293993		