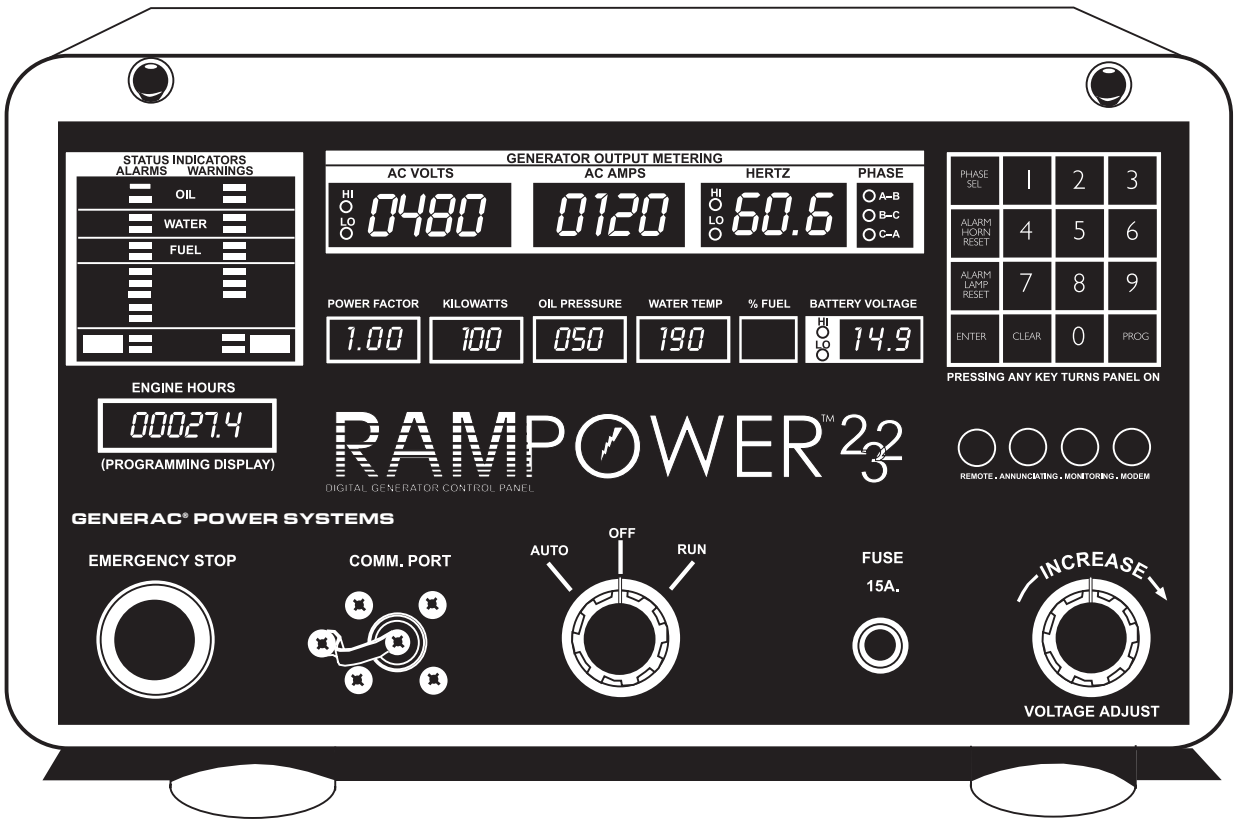
GENERAC®

POWER SYSTEMS, INC.

Operator's Manual

"D" Option Control Panel



SAVE THESE INSTRUCTIONS – The manufacturer suggests that these rules for safe operation be copied and posted in potential hazard areas. Safety should be stressed to all operators and potential operators of this equipment.

Study these SAFETY RULES carefully before installing, operating or servicing this equipment. Become familiar with this manual and all literature pertaining to your generator set and related equipment. This equipment can operate safely, efficiently and reliably only if it is properly installed, operated and maintained. Many accidents are caused by failing to follow simple and fundamental rules or precautions.

Generac cannot possibly anticipate every possible circumstance that might involve a hazard. The warnings in this manual, and on tags and decals affixed to your equipment are, therefore, not all-inclusive. If you use a procedure, work method or operating technique Generac does not specifically recommend, you must satisfy yourself that it is safe for you and others. You also must make sure the procedure, work method or operating technique that you choose does not render the equipment unsafe.

GENERAL HAZARDS

- For safety reasons, Generac recommends that this equipment be installed and serviced by a Generac Authorized Service Dealer or other competent, qualified electrician or installation technician who is familiar with applicable codes, standards and regulations. The operator also must comply with all such codes, standards and regulations.
- When working on this equipment, remain alert at all times. Never work on the equipment when physically or mentally fatigued.
- Inspect the equipment regularly, and promptly repair or replace all worn, damaged or defective parts using only factory-approved parts.
- Before performing any maintenance on the generator or any related equipment, disconnect the generator's battery cables to prevent accidental start-up. Disconnect the cable from the battery post indicated by a NEGATIVE, NEG or (–) first. Reconnect that cable last.

ELECTRICAL HAZARDS

- Generators produce dangerous electrical voltages and can cause fatal electrical shock. Avoid contact with bare wires, terminals, connections, etc., while the generator and related equipment are running. Ensure all appropriate covers, guards and barriers are in place before operating the equipment. If work must be done around an operating unit, stand on an insulated, dry surface to reduce shock hazard.
- Do not handle any kind of electrical device while standing in water, while barefoot, or while hands or feet are wet. DANGEROUS ELECTRICAL SHOCK MAY RESULT.
- If people must stand on metal or concrete while installing, operating, servicing, adjusting or repairing this equipment, place insulative mats over a dry wooden platform. Work on the equipment only while standing on such insulative mats.
- Wire gauge sizes of electrical wiring, cables and cord sets must be adequate to handle the maximum electrical current (amperage) to which they will be subjected.
- Before installing or servicing this equipment, make sure that all power voltage supplies are positively TURNED OFF at their source. Failure to do so will result in hazardous and possibly fatal electrical shock.
- When installed with an automatic transfer switch, the generator may crank and start anytime without warning. To prevent injuries cause by sudden start-up, disable the generator's automatic start circuit before working on or around the unit. Then, place a "Do Not Operate" tag on the generator control panel and on the transfer switch.
- In case of accident caused by electric shock, immediately shut down the source of electrical power. If this is not possible, attempt to free the victim from the live conductor. AVOID DIRECT CONTACT WITH THE VICTIM. Use a nonconducting implement, such as a rope or board, to free the victim from the live conductor. If the victim is unconscious, apply first aid and get immediate medical help.
- Never wear jewelry when working on this equipment. Jewelry can conduct electricity resulting in electric shock, or may get caught in moving components causing injury.

FIRE HAZARDS

- For fire safety, the generator and related equipment must be installed and maintained properly. Installation always must comply with applicable codes, standards, laws and regulations. Adhere strictly to local, state and national electrical and building codes. Comply with regulations the Occupational Safety and Health Administration (OSHA) has established. Also, ensure that the equipment is installed in accordance with the manufacturer's instructions and recommendations. Following proper installation, do nothing that might alter a safe installation and render the unit in noncompliance with the aforementioned codes, standards, laws and regulations.

AUTHORIZED SERVICE DEALER LOCATION

To locate the nearest GENERAC AUTHORIZED SERVICE DEALER, please call this number:

1-800-333-1322

DEALER LOCATION INFORMATION CAN BE OBTAINED AT THIS NUMBER.

OVERVIEW

The "D" option control panel is a microprocessor-based generator set control panel designed for Generac's range of standby generators. It has a fully digital user interface and comprehensive communication capabilities.

The panel is housed in a steel sheet metal enclosure that meets NEMA 1 specifications. The front face of the panel consists of a number of light-emitting diodes (LED) display windows showing generator operating conditions, a tactile keypad, alarm and status LED indicators, a main fuse, an "Emergency Stop" switch and other generator set controls.

CONTROL PANEL CIRCUIT BOARDS

The control panel contains three main printed-circuit boards (PCB), the automatic voltage regulator (AVR), and terminal blocks for external connections.

To find the location of the circuit boards, refer to Appendix 3 for the control panel exploded views. The three main PCBs have the following defined functions:

◆ PCB 1 – MAIN CENTRAL PROCESSOR UNIT (CPU) BOARD

(Part # 0A1053) This board houses the microprocessor, its memory, input and output (I/O) stages and all communication hardware (including optional modem for telephone system communications).

◆ PCB 2 – DISPLAY BOARD

(Part # 0A1056) This board houses all the LED displays and annunciators, and their respective driver circuitry.

◆ PCB 3 – INTERFACE BOARD

(Part # 0A1054) This board houses all the components necessary to interface the CPU board to the generator. This board receives high voltage and current signals from the generator output. All control relays are mounted on this board. Connections to this board are by screw terminals.

◆ LOCATIONS OF CIRCUIT BOARDS

PCBs 1 and 2 are mounted together on the back of the hinged front wall of the panel, and PCB 3 is mounted on the left wall of the panel as viewed from the front.

The right wall houses the AVR and the optional electronic governor controller. Both of these controls, which are mounted on a chassis, are accessible externally from the right side of the panel via removable covers that allow for adjustment.

⚠ WARNING ⚠

⚠ Remove the 15-amp fuse from the front of the panel during all engine maintenance to guard against accidental or remote start-up.

OPTIONAL EQUIPMENT

◆ GENLINK™

GenLink is a communications software that allows the generator to be started and monitored from a remote PC via a modem. The generator can dial out automatically and inform the PC if it has an active alarm condition.

◆ MODEM

A modem (Part # 0A3557) can be connected to the D panel to allow the generator to communicate with a remote PC.

◆ REMOTE ANNUNCIATOR PANEL

When connected to the generator via a simple shielded two-wire link (plus two wires for power), this 20-light remote indicator panel will display the generator's status.

◆ REMOTE RELAY PANEL

This panel is similar to the remote annunciator, but instead of indicator lights, it provides relay contact closures for status (e.g., alarms).

DIGITAL DISPLAYS (FIGURE 1.1, PAGE 3)

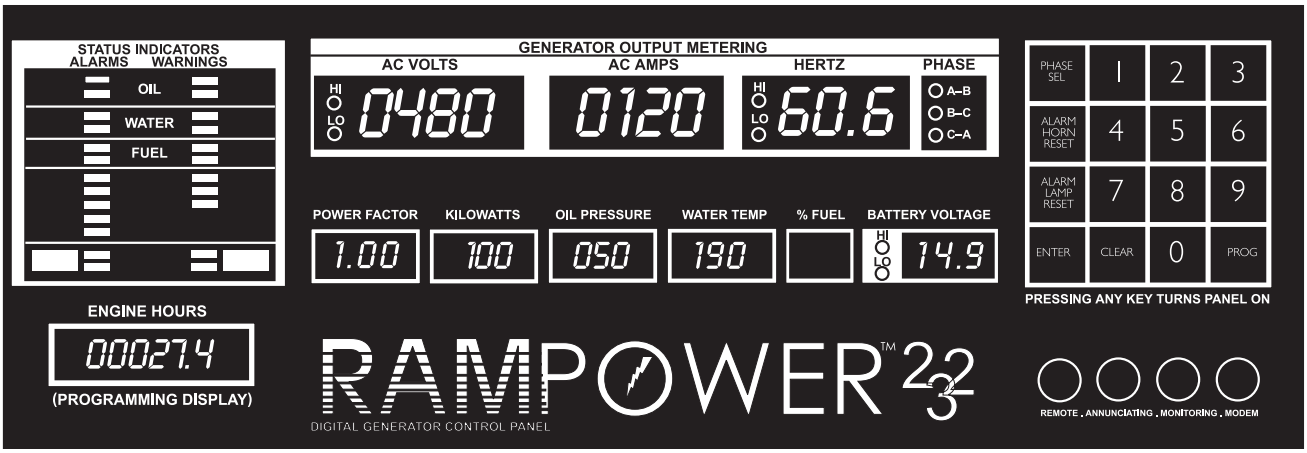
◆ BATTERY SAVER ("SLEEP MODE")

In order to conserve battery power, the display panel will power down after five minutes when it is not being used. It will reactivate if any of the following occurs:

- A key is pressed.
- The engine is started.
- Remote communications occur.

During the power down period, the alarms are checked for 30 seconds every five minutes; any alarm that occurs is permanently illuminated.

Figure 1.1 – Digital Displays on D Option Control Panel



◆ AC VOLTAGE DISPLAY (AC VOLTS)

This is a four-digit LED display for monitoring the voltage of the selected phase. A keypad command ("PHASE SEL") is used to select which phase is displayed. LEDs indicate the phase that is currently active. The range is 0 to1,023 volts AC.

When the unit is monitoring a three-phase generator, the displayed voltage will coincide with one of the following phase selections. A lit LED on the phase indicator will show the active phase.

❍ A-B

❍ B-C

❍ C-A

When the unit is monitoring a single-phase generator, the displayed voltage will coincide with one of the following phase selections. A lit LED on the phase indicator will show the active phase.

❍ A-Neutral (A - B)

❍ C-Neutral (B - C)

❍ C-A

Selection of single or three phase monitoring is done through the panel's programmable options (see "Programmable Options," Page 11).

◆ AC VOLTAGE INDICATORS (HI, LO)

A pair of LEDs (included in "AC VOLTS" display) is used to indicate whether the generator's AC output voltage is low or high. The set points are user programmable. These alarms are latched and cause the alarm relay to latch.

Either alarm condition will shut down the generator and cause a modem callout if enabled. This alarm is enabled after the programmable alarm hold off timer expires.

Voltage alarm checking is done on all phases. In the case of single-phase (i.e., 110 volts AC), the C-A phase selection should coincide with an AC voltage display of 220 volts AC. The alarm checking is taken care of by the software, thus the alarm trigger points only need to be set around the A-N or C-N reading (i.e., 110 volts AC).

Half a second of bad readings is required before the alarm will be raised.

◆ AC CURRENT DISPLAY (AC AMPS)

This is a four-digit LED display for monitoring the current in the selected phase. The range is 0 to 5,000 amps, depending on the selected current transformer and the setting of the programmable full-scale current range.

◆ FREQUENCY DISPLAY (HERTZ)

This is a three-digit LED display for monitoring the frequency of the generator output. The range of this display is 40 to 70 Hertz. Phase "A" is used for this measurement.

◆ FREQUENCY INDICATORS (HI, LO)

A pair of LEDs (included in "HERTZ" display)is used to indicate whether the generator's frequency output is low or high. The set points are user programmable. These alarms are latched and cause the alarm relay to latch.

◆ POWER FACTOR

This is a three-digit LED display for monitoring the power factor of the selected phase. The range is 0 to 1.00.

◆ POWER OUTPUT (KILOWATTS/MEGAWATTS)

This is a three-digit LED display for monitoring the total power output of the generator. The power output is the sum of all three phases, taking power factor into account.

For powers greater than 1 megawatt, the display will show a decimal point after the MW unit, e.g., 900 = 900 kW; 1.10 = 1.1 MW.

◆ OIL PRESSURE

This is a three-digit display used to monitor engine oil pressure. The range is 0 to 100 psi or 0 to 7.03 kg/cm. If the sensor is short circuited, "-S-" will display. If the sensor is open circuited, "-0-" will display.

◆ WATER TEMPERATURE

This is a three-digit display used to monitor the engine water temperature. The range is 0° to 300° F or -18° to 149° C. If the sensor is short circuited, "-S-" will display. If the sensor is open circuited, "-0-" (or 000) will display. The alarm relay is latched.

If no block heater is fitted to the generator, there can be a problem in cold climates where temperatures of less than 25° F (-4° C), can cause the sensor to think it is open circuited. If this happens, either "-0-" (or 000) will display.

To avoid this situation, the open circuit detection can be overridden. To do this, it is necessary to set the low temperature alarm set point to 1° F or 1° C.

◆ % FUEL

This is a two-digit display that allows users the option of monitoring the quantity of fuel remaining. If the display is active, the range is 0 to 99 percent. Fuel level senders are optional. If a fuel level sender has not been installed, the % fuel display should be disabled (See Programmable Options on page 13 and High Fuel Alarm on page 5).

◆ BATTERY VOLTAGE DISPLAY

This is a three-digit LED display for monitoring battery voltage. The range is 0 to 51.1 volts DC.

◆ BATTERY VOLTAGE INDICATORS (HI, LO)

A pair of LEDs (included in "Battery Voltage" display) is used to indicate a low or high battery voltage condition. The set points are user programmable. These alarms are latched and cause the alarm relay to latch. They do not shut down the generator, but do cause a modem callout if enabled. The low battery indicator will be activated after six minutes of a low battery condition. This allows it to be used as a battery charger monitor.

◆ ENGINE HOURS

This is a six-digit LED display used to show engine running time in hours. This display is also used when entering the password and changing the programmable options (see "Operation of Digital Generator Control Panel," Page 11).

STATUS INDICATORS – ALARMS AND WARNINGS (SEE FIGURE 1.2)

◆ OIL

▶ Low Oil Pressure Alarm (LO PRES)

A red LED is used to indicate a low oil pressure condition. The set point is user programmable. The alarm is latched and causes the alarm relay to latch. It shuts down the generator and causes a modem callout if enabled. This alarm is enabled after the programmable alarm hold off timer expires.

▶ High Oil Temperature Alarm (HIGH TEMP)

A red LED is used to indicate a high oil temperature switch has been closed. This alarm is latched and causes the alarm relay to latch. It shuts down the generator and causes the modem to callout if enabled. This alarm is enabled at all times.

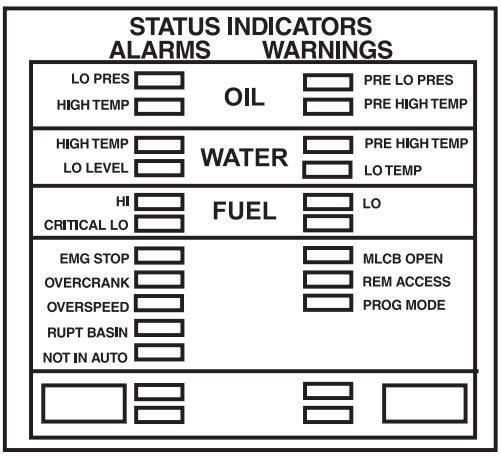
▶ Pre Low Oil Pressure Warning (PRE LO PRES)

A yellow LED is used to indicate a warning that a low oil pressure condition exists. The set point is user programmable. The alarm relay is latched.

▶ Pre High Oil Temperature Warning (PRE HIGH TEMP)

A yellow LED is used to indicate a warning that a pre high oil temperature condition exists. The alarm relay is latched.

Figure 1.2 – Status Indicators



◆ WATER

▶ High Water Temperature Alarm (HIGH TEMP)

A red LED is used to indicate a high water temperature condition. The set point is user programmable. The alarm is latched and causes the alarm relay to latch. The alarm shuts down the generator and causes a modem callout if enabled. The alarm is enabled after the programmable alarm hold off timer expires.

▶ Low Level Water Alarm (LO LEVEL)

A red LED is used to indicate the radiator water level is low. The alarm is latched and causes the alarm relay to latch. The alarm shuts down the generator and causes a modem callout if enabled. This alarm is enabled after the programmable alarm hold off timer expires.

▶ Pre High Water Temperature Warning (PRE HIGH TEMP)

A yellow LED is used to indicate a warning that a high water temperature condition exists. The set point is user programmable. The alarm relay is latched.

▶ Low Water Temperature Warning (LO TEMP)

A yellow LED is used to indicate a warning that a low water temperature exists. The set point is user programmable. The alarm relay is latched.

◆ FUEL

▶ High Fuel Alarm (HI)

A red LED is used to indicate a high fuel level. The indicator can be activated in one of two ways:

1. Percent input
2. Switch input on J7-5

If the fuel percent measurement is used, an analog sensor MUST BE installed and selected via programmable option #2. This allows for percentages to be programmed for critical low fuel, low fuel and high fuel. If the percentages are exceeded for high fuel, the alarm relay will latch, but the generator will continue to run. The modem will callout if enabled. (The switch input will light the LED only.)

NOTE:

The two switch inputs – LO Fuel Level J7-4 and HI Fuel Level J7-5 – work only if the percentage input is turned off via programmable option #2.

When the % Fuel measurement is not used, the display is turned off.

▶ Critical Low Fuel Alarm (CRITICAL LO)

A red LED is used to indicate critical low fuel. This feature is available only with an analog sender. The alarm is latched. It does shut down the generator and causes a modem callout if enabled.

▶ Low Fuel Warning (LO)

A yellow LED used to indicate a low fuel level. The indicator can be activated in one of two ways:

1. Percent input from analog sender
2. Switch input on J7-4

If the fuel percent measurement is used, an analog sensor MUST BE installed and selected via programmable option #2. This allows for percentages to be programmed for critical low fuel, low fuel and high fuel. The alarm relay is latched, but the generator will continue to run. The modem will callout if enabled. (The switch input will light the LED only.)

NOTE:

The two switch inputs – Lo Fuel Level J7-4 and Hi Fuel Level J7-5 – work only if the percentage input is turned off via programmable option #2.

When the % Fuel measurement is not used, the display is turned off.

◆ ADDITIONAL ALARMS AND WARNINGS

▶ Emergency Stop Alarm (EMG STOP)

A red LED is used to indicate that the emergency stop switch has been activated. This alarm is latched and causes the alarm relay to latch. It shuts down the generator and causes a modem callout if enabled. This alarm is enabled at all times.

▶ Overcrank Alarm (OVERCRANK)

A red LED is used to indicate that the engine did not start after eight starting attempts. The starting cycle consists of a programmable number of seconds of cranking followed by five seconds of OFF time. This alarm is latched and causes the alarm relay to latch. It shuts down the generator and causes a modem callout if enabled.

▶ General Overspeed Alarm (OVERSPEED)

A red LED used to indicate an overspeed condition. The set point is user programmable. The alarm is latched and causes the alarm relay to latch. The alarm shuts down the generator and causes a modem callout if enabled. The alarm is enabled after the engine starts. If the speed sensor fails, then the bottom right (unmarked) yellow LED will light and the alarm relay will latch. The alarm shuts down the generator and causes a modem callout if enabled.

▶ Ruptured Basin Alarm (RUPT BASIN)

A red LED is used to indicate the double wall fuel tank has ruptured. A float switch in the outer tank closes when a rupture occurs. The alarm latches and causes the alarm relay to latch. It causes the modem to callout if enabled, but it does not shut down the generator. This alarm is enabled at all times.

▶ Not in Auto Alarm (NOT IN AUTO)

A red LED is used to indicate the panel switch is not set to the Auto start mode.

▶ Main Line Circuit Breaker Warning (MLCB OPEN)

A yellow LED is used to indicate a main line circuit breaker is open. This is an optional switch input.

▶ Remote Access Warning (REM ACCESS)

A yellow LED is used to indicate that modem communication is currently active.

▶ Program Mode Warning (PROG MODE)

A yellow LED is used to indicate that the panel is in the program mode.

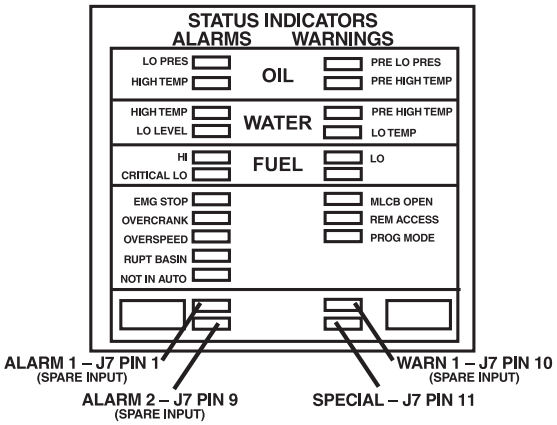
◆ SPARE LEDs

There are four unmarked LEDs on the front panel; two red and two yellow. These indicators have different functions depending on whether or not a Remote Annunciator or Remote Relay Panel is connected to the D-panel.

▶ No Remote Annunciator/Remote Relay Panel Connected

Without a Remote Annunciator/Remote Relay Panel connected to the D panel (Figure 1.3), the functions are as follows:

Figure 1.3 – Spare Indicators (Without Remote Annunciator/Remote Relay Panel Connected)



ALARMS 1, 2 and the SPECIAL pin can occur only after the programmable hold off time. When the pin is shorted to ground, the LED lights, the engine shuts down, and the alarms relay is latched. The modem will call out if it is enabled.

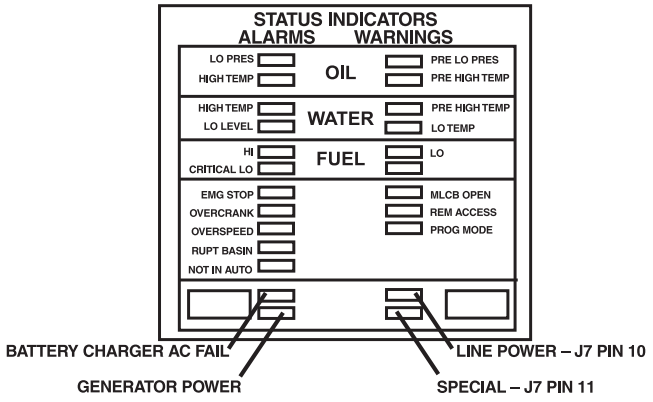
The SPECIAL LED also can light and cause an alarm if there is a speed sensor (tach) loss.

The WARN1 LED will light when its pin is shorted to ground. The alarm relay will latch, and the modem will call out if it is enabled.

▶ Remote Annunciator/Remote Relay Panel Connected

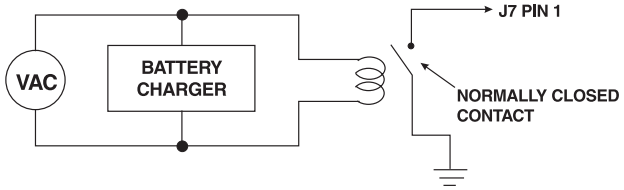
With a Remote Annunciator/Remote Relay Panel fitted to the D panel (Figure 1.4), the LEDs function as follows:

Figure 1.4 – Spare Indicators (With Remote Annunciator/Remote Relay Panel)



The BATTERY CHARGER AC FAIL pin is intended to show that the AC supply to the battery charger has failed by shorting the pin to ground via an external, customer supplied relay (Figure 1.5).

Figure 1.5 – Battery Charger AC Fail



The LED will light and latch. The generator will not shut down, the alarm relay will not operate, and the modem will not call out. The status will be sent to the remote annunciator and displayed on its front panel.

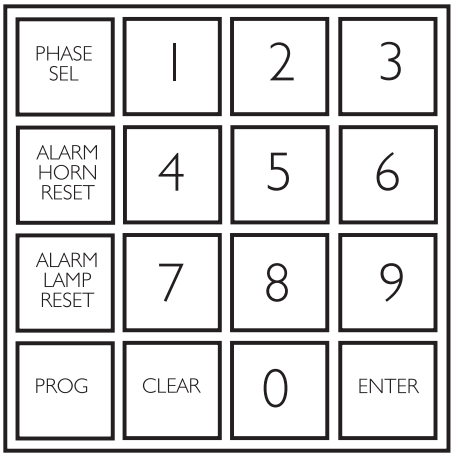
GENERATOR POWER will cause the LED to act as an indicator only. No alarms or shutdowns will occur. The state of the input will be displayed on the remote annunciator. It is intended to be connected to an auxiliary contact on a transfer switch to indicate when all loads are running on generator power. The LED lights when J7 pin 9 is shorted to ground.

LINE POWER – J7 pin 10 acts as above.

SPECIAL – J7 pin 11 acts as previously described.

KEYPAD

Figure 1.6 – Keypad Features



PRESSING ANY KEY TURNS PANEL ON

◆ NUMERIC KEYS 0-9

Decimal numbers are included on a keypad for entry of passwords and setting of programmable values.

◆ ENTER AND CLEAR KEYS

The ENTER key will be used to accept data input from the numeric keys. The CLEAR key will be used to remove erroneous entries during programming.

◆ PROGRAM KEY (PROG)

This key is used to enter the local programming mode. After pressing this key, the programming display will show the word "ACCESS," prompting the user for the password. The password is a six-digit number that is entered on the numeric keys and is displayed on the hourmeter/programming display. The default factory password is always 000000.

◆ ALARM HORN RESET KEY

This key is used to reset the alarm relay contacts.

◆ ALARM LAMP RESET KEY

This key is used to reset alarms that have been latched.

◆ PHASE SELECT KEY (PHASE SEL)

This key is used to select which of three phases is to be shown in the "AC Volts" and "AC Amps" displays.

CONTROLS (FIGURE 1.7, PAGE 8)

◆ EMERGENCY STOP SWITCH

This switch (colored RED) is a normally closed, single-action, latching push button that, when activated, will immediately cause the generator to shut downand alarm relay to latch.

◆ RS-232 LOCAL COMMUNICATIONS PORT (COMM. PORT)

This connector allows connection of a local computer to the panel for easy programming and diagnostic checking. The computer needs to have a copy of GenLink™ loaded on it to enable communication with the D panel. A serial cable (part # 0A4042) also is required to connect to the unit.

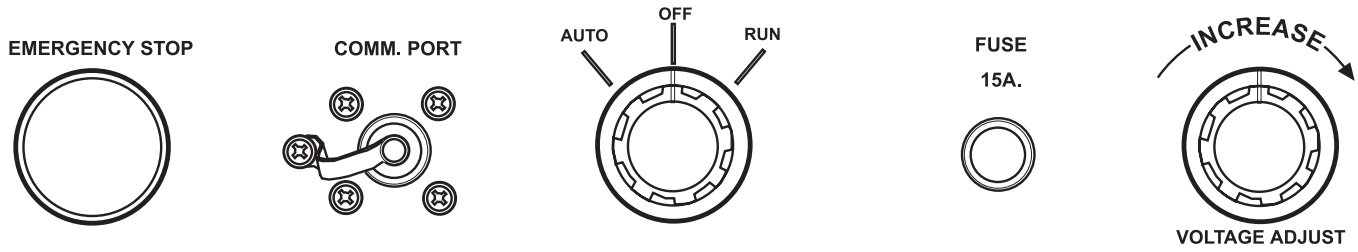
◆ AUTO-OFF-RUN SWITCH

A three-position rotary switch is provided for generator control. In AUTO the generator will wait for a signal, such as from an automatic transfer switch. When it receives the remote start signal, it will automatically initiate the generator start sequence. This only occurs assuming no shutdown alarm condition exists.

When in the OFF position, the generator is inhibited from starting.

When the switch is in the RUN position, the generator will instantly be commanded to start assuming that no shutdown alarm condition exists.

Figure 1.7 – Control Switches and Knobs on D Option Control Panel



◆ MAIN DC FUSE (FUSE 15A)

This fuse is rated at 15 amps and is of the 1.25-inches x 0.25-inch glass type (part # 022676). Removal of this fuse inhibits all control panel functions and is recommended during all maintenance operations.

◆ VOLTAGE TRIM POTENTIOMETER (VOLTAGE ADJUST) (IF EQUIPPED)

This control allows adjustment of the generator output voltage in the range +/- 5 percent, if set to the midpoint.

INPUTS

◆ AC VOLTAGE

Four terminals (PCB3: J2-1, J2-2, J2-3, J2-4) are provided for voltage measurement. Maximum input voltage is 1000 volts AC.

NOTE

Correct phasing for these terminals is essential for correct operation (see Appendix 1 – Electrical Data for phase schematics).

◆ AC CURRENT

Four terminals (PCB3: J2-7, J2-9, J2-11, J2-10) are provided for current measurement. The inputs will interface with current transformers having a five-amp secondary winding at their rated current.

NOTE

Correct phasing for these terminals is essential for correct operation (see Appendix 1 – Electrical Data for phase schematics).

◆ FUEL LEVEL (PCB1: J10-1)

An optional analog input is provided for fuel level measurement. This is a 0 to 5 VDC input. An input signal of 0 volts is equivalent to 0 percent remaining fuel and 5 volts is equivalent to 99 percent remaining fuel. The relationship between input voltage and fuel level is linear.

◆ OIL PRESSURE (PCB1: J10-2)

An analog input is provided for oil pressure measurement. This input will interface to the standard Generac sender unit (part # 053666). It is also used for warning and shutdown situations.

◆ WATER TEMPERATURE (PCB1: J10-3)

An analog input is provided for coolant temperature measurement. This input will interface to the standard Generac thermistor sensor (part # 053667). It is also used for warning and shutdown situations.

◆ ENGINE SPEED SENSOR (PCB1: J10-5)

An input is provided for sensing engine speed by counting teeth on the flywheel via a magnetic proximity probe. The input interfaces to the Generac standard magnetic pickup (part # 082130D).

◆ COOLANT LEVEL SENSOR (PCB1: J10-4)

A dedicated analog input is provided for sensing low coolant level. The input will interface to the Generac coolant level sensor (part # 057522).

◆ EMERGENCY STOP CONTACT (PCB3: TB2-1, TB2-3)

An input is provided for an emergency stop switch(es). The switch contact is normally closed.

◆ TRANSFER SWITCH/REMOTE START (PCB1: J7-12)

When the AUTO-OFF-RUN switch is set to AUTO and this input is grounded, the generator will begin its start sequence. When the utility voltage drops, the transfer switch/remote start system will close a contact to ground this input.

◆ PRE HIGH OIL TEMPERATURE (PCB1: J7-7)

An optional input is provided for a pre high oil temperature warning switch. (Switch to ground to alarm.)

◆ HIGH OIL TEMPERATURE (PCB1: J7-6)

An optional input is provided for a high oil temperature alarm switch. (Switch to ground to alarm.)

◆ HIGH FUEL LEVEL (PCB1: J7-5)

An input is provided for a high fuel level switch. (Switch to ground to alarm.) It cannot be used to display fuel percentage.

◆ LOW FUEL LEVEL (PCB1: J7-4)

An input is provided for a low fuel level switch. (Switch to ground to alarm.) It cannot be used to display fuel percentage.

◆ MAIN LINE CIRCUIT BREAKER (PCB1: J7-2)

An input is provided for a circuit breaker auxiliary contact to indicate that the main line circuit breaker is open. (Switch to ground to alarm.)

◆ RUPTURED BASIN (PCB1: J7-3)

An input is provided for a level switch indicating the fuel tank is ruptured. (Double wall fuel tanks only.) (Switch to ground to alarm.)

◆ SPARE ALARMS (PCB1: J7-1, J7-9)

Two inputs are provided for spare alarms. (Switch to ground to alarm.) See “Spare LEDs,” Page 6.

◆ SPARE WARNINGS (PCB1: J7-10, J7-11)

Two inputs are provided for spare warning conditions. (Switch to ground to alarm.) See “Spare LEDs,” Page 6.

OUTPUTS

◆ STARTER SOLENOID (PCB3: TB1-12, TB1-13)

A relay contact output is provided to activate the starter solenoid. This form A relay is rated at 10 amps at 28 volts DC.

◆ ALARM (PCB3: TB1-4(NC), TB1-5(COM), TB1-6(NO)

A relay contact output is provided that will activate on an alarm condition. This form C relay is rated at 10 amps at 28 volts DC.

◆ LOAD CONTROL (PCB3: TB1-7(NC), TB1-8(COM), TB1-9(NO)

A relay contact output is provided for load control. This contact will not energize unless the generator is running. It is a form C relay rated at 10 amps at 28 volts DC.

◆ AUXILIARY (PCB3: TB1-1(NC), TB1-2(COM), TB1-3(NO)

A relay contact output is provided for optional use. This form C relay is rated 10 amps at 28 volts DC.

◆ PREHEATER (PCB3: TB1-9, TB1-10)

A relay contact output is provided to activate a diesel preheater. This form A relay is rated at 10 amps at 28 volts DC.

◆ FUEL CONTROL RELAY (PCB3: TB1-14, TB1-15)

A relay contact output is provided to control the fuel solenoid/valve. This form A relay is rated at 10 amps at 28 volts DC.

COMMUNICATIONS

◆ FRONT PANEL COMMUNICATIONS PORT

The front panel includes a connector for RS-232 serial communication. See “RS-232 Local Communications Port,” Page 7.

◆ MODEM

The unit can optionally be provided with a modem with “AT” command set which is FCC part 68 approved. The modem will allow an operator to perform the functions of the front panel at a remote site. However, the modem functions will not allow remote control of the engine if the front panel AUTO-OFF-RUN switch is in OFF or RUN mode (part # 0A3557).

◆ REMOTE COMMUNICATIONS PORT (UP TO 1,200 FEET)

The D panel is provided with an RS-485 communications port. This is designed to be connected to Generac’s remote annunciators or remote relay panels (The Time Multiplexed Annunciator CANNOT be used with a D panel.). Up to one annunciator and four remote relay panels can be connected together on this port via a shielded two wire communications cable (plus two wires for power).

▶ Monitored Parameters

The remote annunciator panel (RAP) and remote relay panel (RRP) provide remote monitoring of the following engine parameters. Remote monitoring is by illuminated LEDs on the annunciator and relay contact closures on the relay panel.

1. Generator Run
2. Battery Charger AC Failure
3. Low Battery Voltage
4. High Battery Voltage
5. RPM Sensor Loss
6. Overcrank
7. Overspeed
8. Generator Power
9. Pre Low Oil Pressure
10. Pre High Coolant Temperature
11. Low Coolant Temperature
12. Low Fuel
13. Low Oil Pressure
14. High Coolant Temperature
15. Emergency Stop
16. Not in Auto
17. Line Power
18. Spare

Connection details and a connection harness (excluding the communications cable) are supplied with the optional panels.

◆ DIAL OUT OPTION (MODEM MUST BE FITTED)

The dial out feature allows the panel to call out to a PC (computer) running GenLink™ software when any alarm (red LEDs) occurs. Once this feature has been implemented, the GenLink™ software is placed in standby mode and waits for calls from any generator programmed for dial out. The program will then display the alarm responsible for dial out.

INSTALLATION NOTES

The D option control panel is designed to enhance the current range of Generac control panels. As such, this panel can accommodate most Generac standby generators.

The anti-vibration mountings, fixing centers and overall dimensions are compatible with existing panels, as are the lower panel connections and most of the engine electrical connections. All engine temperature and oil pressure alarms and pre-alarms are derived from the analog signals from engine senders, so the existing alarm and shutdown switches become redundant; these should be disconnected or removed from the engine.

Lower panel connections are identical, and the panel plugs into the existing lower panel connector. The only additional lower panel wiring is a separate neutral wire that should be wired from the lower panel neutral bar to the bullet connector marked “00” (not used in a delta configuration) which is part of the lower panel connection harness protruding from the bottom of the D panel.

Refer to the schematics and wiring diagrams in “Appendix 1 – Electrical Data” for more installation information.

OPERATION OF DIGITAL GENERATOR CONTROL PANEL

◆ USING THE KEYPAD

The use of most keys is self-explanatory, but the operation of some keys requires a brief explanation. (For additional information, see "Keypad" on Page 7.)

Pressing ALARM HORN RESET turns off only the alarm relay. Alarm conditions continue to be displayed. Pressing ALARM LAMP RESET clears all alarm LEDs that are not current.

Pressing the PROG (Program) key will cause the programming digits to display "ACCESS." At this time, the password must be entered (see Programmable Option 28 – "Set User Password"). If an invalid password is entered, the program will do nothing. Additional characters may be entered in an attempt to log on (only the last six digits are recognized). If a valid password is not entered and/or no keypad activity has occurred for two minutes, the program will revert to running time display.

If the correct password is entered, the display will change to "00." At this time, the program is waiting for an option (see "Programmable Options") to be entered. Twenty-eight options may be displayed and changed, if desired. The current setting remains unchanged if ENTER is pressed, or it can be changed by entering a new number followed by ENTER. Exit the keypad routine by pressing ENTER again anytime the display shows "00."

Program options can be modified in the AUTO, OFF or RUN mode. However, it is recommended that the options be changed while the panel is in the OFF mode.

◆ PROGRAMMABLE OPTIONS

For information on programmable options, refer to the following text, as well as the chart on Page 13.

▶ 1. – Select English or Metric Units

Units of measurement will be changed on the panel for oil pressure and water temperature.

▶ 2. – Fuel Display On/Off

The fuel display should be turned off when an analog fuel sensor is not being used. Alarm and warning LEDs for fuel are activated by either the low and high fuel switches or the programmed values used with the analog sensor.

▶ 3. – Pre Low Oil Pressure

See "Status Indicators – Alarms and Warnings," Page 4.

▶ 4. – Low Oil Pressure

See "Status Indicators – Alarms and Warnings," Page 4.

▶ 5. – Low Water Temperature

See "Status Indicators – Alarms and Warnings," Page 4.

▶ 6. – Pre High Water Temperature

See "Status Indicators – Alarms and Warnings," Page 4.

▶ 7. – High Water Temperature

See "Status Indicators – Alarms and Warnings," Page 4.

▶ 8. – Critical Low Fuel

This is used with an analog sensor to turn on a red alarm LED. See "Status Indicators – Alarms and Warnings," Page 4.

▶ 9. – Low Fuel

This is used with an analog sensor to turn on a yellow warning LED. See "Status Indicators – Alarms and Warnings," Page 4.

▶ 10. – High Fuel

This is used with an analog sensor to turn on a red alarm LED. See "Status Indicators – Alarms and Warnings," Page 4.

▶ 11. – Low AC Voltage

A red LED next to the "AC Volts" display is used to indicate this alarm. If the generator's AC voltage drops below this set value for more than 0.5 seconds, an alarm occurs and the engine shuts down. The alarm is latched and causes the alarm relay to latch and produce a modem callout if enabled. This alarm is activated after the alarm hold off time is complete.

▶ 12. – High AC Voltage

A red LED next to the "AC Volts" display is used to indicate this alarm. If the generator's AC voltage goes above this set value for more than 0.5 seconds, an alarm occurs and the engine shuts down. The alarm is latched and causes the alarm relay to latch and produce a modem callout if enabled. This alarm is activated after the alarm hold off time is complete.

▶ 13. – Low Battery Voltage

A red LED next to the "Battery Voltage" display is used to warn that battery voltage is below programmed limits. No shutdown occurs with this warning.

▶ 14. – High Battery Voltage

A red LED next to the "Battery Voltage" display is used to warn that battery voltage is above programmed limits. No shutdown occurs with this warning.

▶ 15. – Low Frequency Limit

A red LED next to the "Hertz" display is used to indicate this alarm. If the generator's frequency drops below this set value for more than 1.5 seconds, an alarm occurs and the engine shuts down. The alarm is latched and causes the alarm relay to latch and produce a modem callout if enabled. This alarm is activated after the alarm hold off time is complete. Frequency is measured on phase "A."

▶ 16. – High Frequency Limit

A red LED next to the "Hertz" display is used to indicate this alarm. If the generator's frequency goes above this set value for more than 1.5 seconds an alarm occurs and the engine shuts down. The alarm is latched and causes the alarm relay to latch and produce a modem callout if enabled. This alarm is activated after the alarm hold off time is complete. Frequency is measured on phase "A."

▶ 17. – Starting Speed

This is the speed at which the engine becomes self-sustaining and causes the starter to disengage. The alarm hold off timer is started when this rpm has been reached.

▶ 18. – Overspeed

See "Status Indicators – Alarms and Warnings," Page 4.

▶ 19. – Alarm Hold Off Time

Most alarms are ignored during alarm hold off time. If an alarm still persists after the hold off time, it will become active. See "Status Indicators – Alarms and Warnings," Page 4, for more information.

▶ 20. – Crank Cycle On Time

This is the length of time that the starter stays engaged when given a command to start. There will be a five second off time after each on time. After eight unsuccessful tries (each try consisting of one cycle crank on time and one off time), the overcrank alarm will latch the engine off, and the alarm LED will turn on.

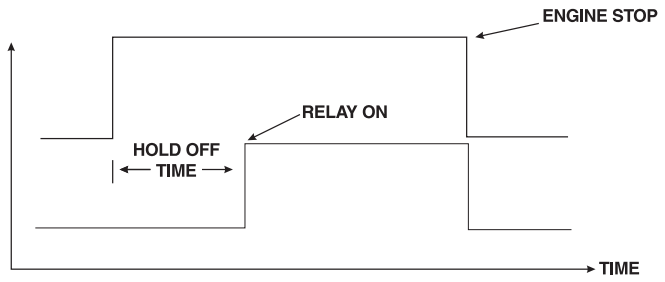
▶ 21. – Flywheel Teeth

This value is preset at the factory. This is the number of teeth on the flywheel ring gear.

▶ 22. – Load Control

This load control relay output has NO/NC contacts that can be used to connect the generator to the load once the generator's output voltage and frequency climb above the preprogrammed low AC voltage and low frequency limits. This relay can be controlled from the front panel or through GenLink™ software via a modem or RS-232. It is possible to use this output as a generator running signal, but it will be delayed by the hold off timer. (e.g., Program the output to be ON, see Figure 2.1). See "Outputs" on Page 9.

Figure 2.1 – Load Control as Generator Running Signal



▶ 23. – Set/Reset Auxiliary Output 1

This auxiliary relay output has NO/NC contacts that can be used as general purpose relay under front panel control. This relay also can be controlled from the front panel or through GenLink™ software via a modem or RS-232. By selecting Option 3, the relay is programmed to operate on engine shutdown only. See "Outputs" on Page 9.

▶ 24. – Set CT Primary Current

This is the current rating for the primary side of the CT with the secondary side being five amps. D panels are set up to use five amp secondaries.

▶ 25. – Preheat Time On

This is the length of time that the preheat device on a diesel engine is energized.

▶ 26. – Preheat While Cranking

This allows the preheater to be energized while the engine is cranking.

▶ 27. – Select Phasing

There are three possible generator configurations. They are single-phase, three-phase wye and three-phase delta.

▶ 28. – Set User Password

This allows the user to change the default password. All D panels ship from the factory with the default password set to zero (000000). If the modified user password is lost or misplaced, it is possible for a technician to access the panel through remote software to determine the password. However, in order for the technician to access the panel and password, the panel must be capable of remote communication via a modem.

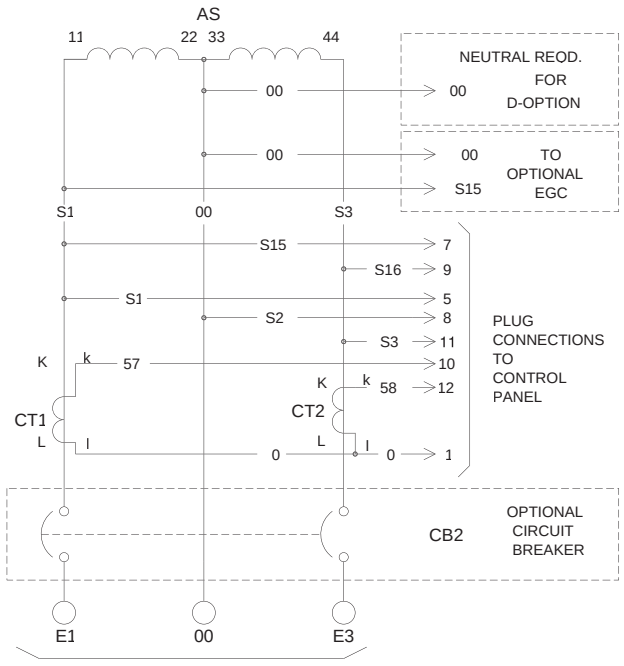
PROGRAMMABLE OPTIONS

OPTION	DEFAULT	RANGE or ALT	YOUR SETTING
1. Select English or Metric Units	1=English	2=Metric	
2. Fuel Display On/Off	1=OFF	2=ON	
3. Pre Low Oil Pressure	15 psi/1.02 bar.	0-100 psi/0-6.8 bar.	
4. Low Oil Pressure	10 psi/0.68 bar.	0-100 psi/0-6.8 bar.	
5. Low Water Temp.	90° F/32° C	0-300° F/-18-149° C	
6. Pre High Water Temp.	220° F/104° C	0-300° F/-18-149° C	
7. High Water Temp.	250° F/121.2° C	0-300° F/-18-149° C	
8. Critical Low Fuel	5%	0-99%	
9. Low Fuel	10%	0-99%	
10. High Fuel	95%	0-99%	
11. Low AC Voltage	90 VAC	0-1023 VAC	
12. High AC Voltage	230 VAC	0-1023 VAC	
13. Low Battery Voltage	12.2 VDC	0-51.1 VDC	
14. High Battery Voltage	15.0 VDC	0-51.1 VDC	
15. Low Frequency Limit	57 Hz	40-70 Hz	
16. High frequency limit	63 Hz	40-70 Hz	
17. Starting Speed	500 RPM	0-3600 RPM	
18. Overspeed	2100 RPM	0-3600 RPM	
19. Alarm Hold Off Time	10 SEC	0-60 SEC	
20. Crank Cycle On Time	5 SEC	5-15 SEC	
21. Flywheel Teeth	168	75-200	
22. Load Control	1=OFF	2=ON	
23. Set/Reset Aux. Output 1	1=OFF	2=ON/3=Operate on Shutdown	
24. Set CT Primary Current	150A	50-5000A	
25. Preheat Time On	0 SEC	0-30 SEC	
26. Preheat While Cranking	2=ON	1=OFF	
27. Select Phasing	2=WYE	1=SINGLE	
		2=WYE	
		3=DELTA	
28. Set User Password	000000	000000-999999	

Appendix 1 — Electrical Data

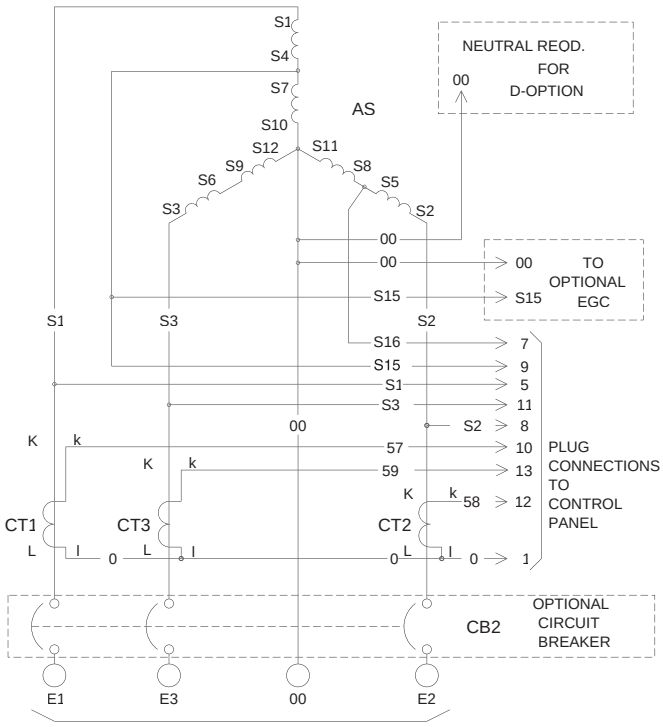
D Option Control Panel
Phase Schematics – Drawing No. 099389-B

VOLTAGE CODE - A + M
SERIES 4-WIRE



CUSTOMER CONNECTION
120/240V 1-PHASE 60Hz
110/220V 1-PHASE 50Hz

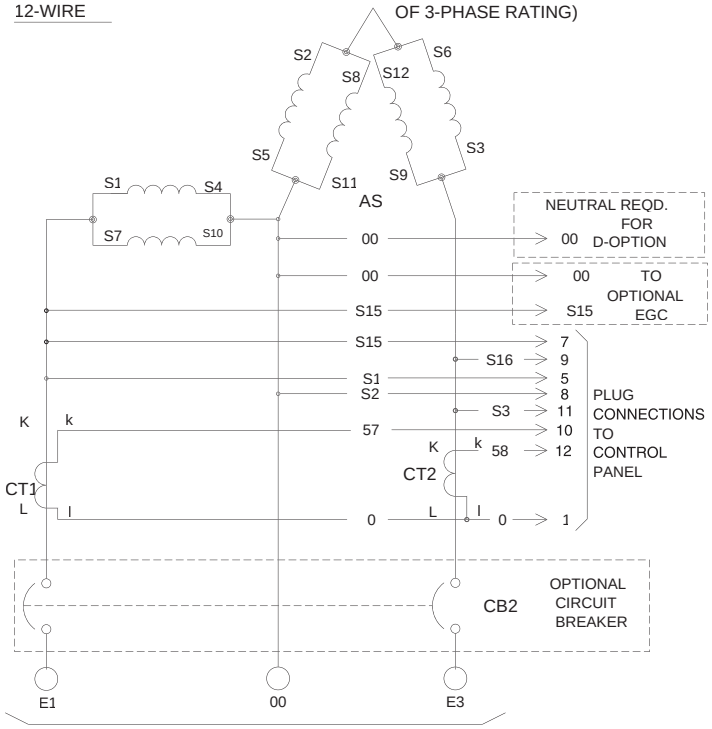
VOLTAGE CODE - K + R
SERIES WYE 12-WIRE



CUSTOMER CONNECTION
277/480V 3-PHASE 60Hz
240/415V 3-PHASE 50/60Hz

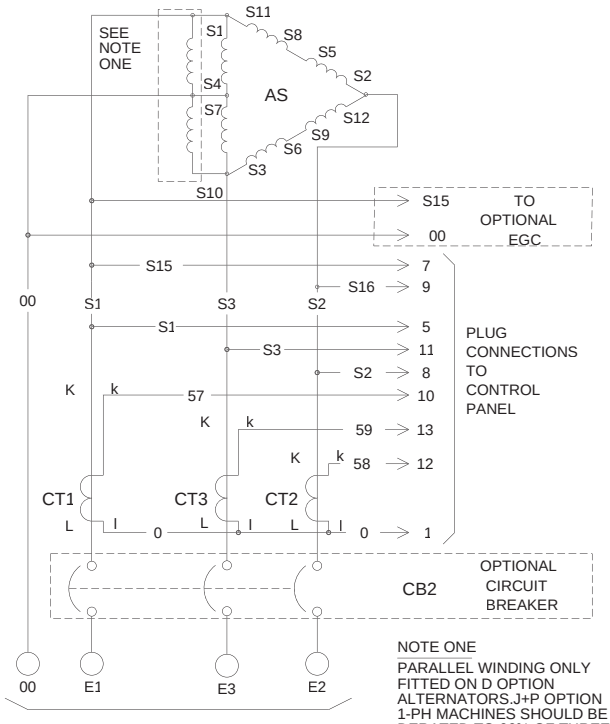
VOLTAGE CODE - A + M
PARALLEL ZIG-ZAG
12-WIRE

(ONLY USED ON 125kW AND ABOVE, OUTPUT IS 66% OF 3-PHASE RATING)



CUSTOMER CONNECTION
120/240V 1-PHASE 60Hz
110/220V 1-PHASE 50Hz

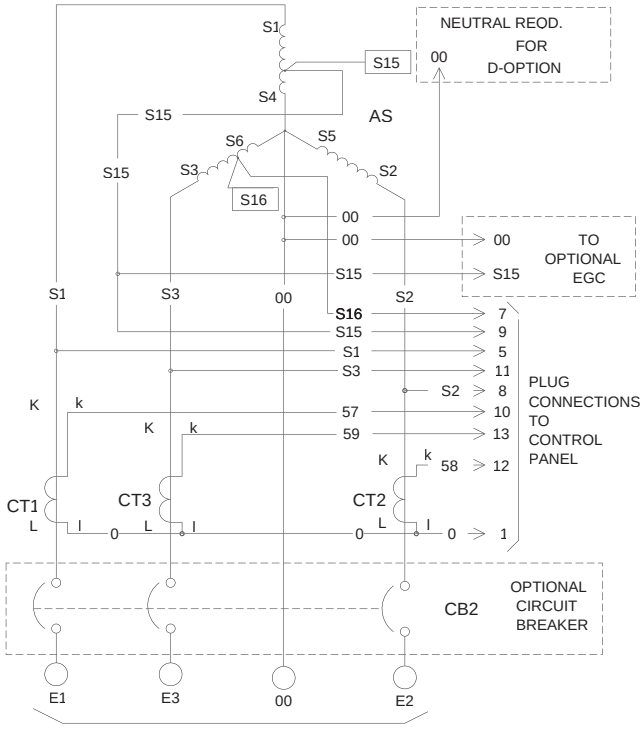
VOLTAGE CODE - D,J + P
SERIES DELTA 12-WIRE



CUSTOMER CONNECTION
120/240V 3-PHASE 60Hz
100/200V 3-PHASE 50Hz

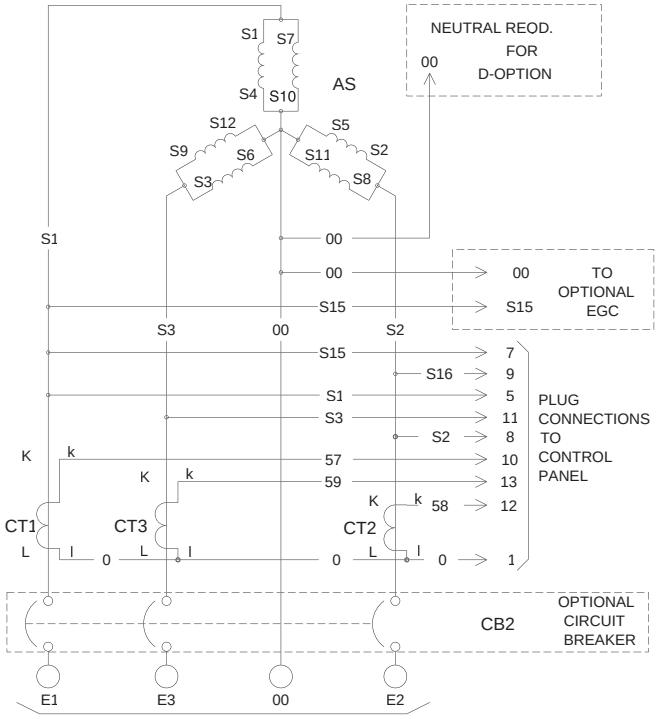
NOTE ONE
PARALLEL WINDING ONLY FITTED ON D OPTION ALTERNATORS.J+P OPTION 1-PH MACHINES SHOULD BE DERATED TO 66% OF THREE PHASE RATING.

VOLTAGE CODE - L + S
6-WIRE WYE



CUSTOMER CONNECTION
346/600V 3-PHASE 60Hz
277/480V 3-PHASE 50Hz

VOLTAGE CODE - G + N
PARALLEL WYE 12-WIRE

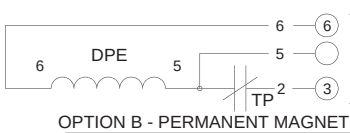


CUSTOMER CONNECTION
120/208V 3-PHASE 60Hz 139/240V 3-PHASE 60Hz
115/200V 3-PHASE 50Hz

EXCITATION POWER OPTIONS

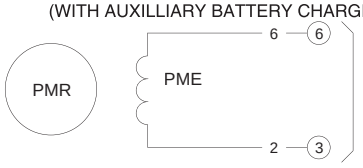
(USE EITHER OPTION A OR OPTION B ONLY)

OPTION A - DISPLACED PHASE WINDING

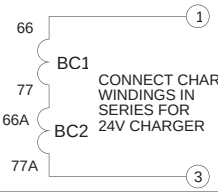


CONNECT 6 WIRE TO PIN 6 AND 2 WIRE TO PIN 3 IN CONTROL PANEL PLUG. IN CASE OF TP FAILURE BYPASS TP BY CONNECTING 5 WIRE TO PIN 3.

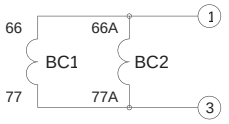
OPTION B - PERMANENT MAGNET GENERATOR
(WITH AUXILLIARY BATTERY CHARGE WINDINGS)



CONNECT 6 WIRE TO PIN 6 AND 2 WIRE TO PIN 3 IN CONTROL PANEL PLUG.



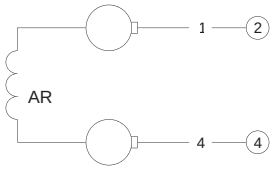
CONNECT CHARGE WINDINGS IN SERIES FOR 24V CHARGER



CONNECT CHARGE WINDINGS IN PARALLEL FOR 12V CHARGER

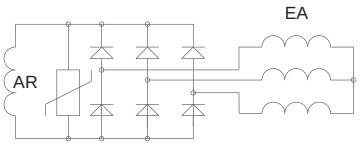
EXCITER FIELD OPTIONS

OPTION A - UNITS WITH BRUSHES



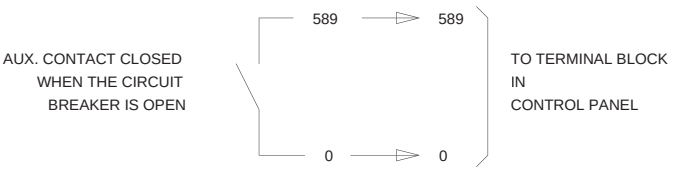
CONNECT 1 WIRE FROM BRUSHES TO PIN 2 AND 4 WIRE FROM BRUSHES TO PIN 4 IN THE CONTROL PANEL PLUG.

OPTION B - BRUSHLESS UNITS



CONNECT 1 WIRE TO PIN 2 AND 4 WIRE TO PIN 4 IN THE CONTROL PANEL PLUG.

OPTIONAL CIRCUIT BREAKER STATUS AUXILLIARY CONTACT



LEGEND

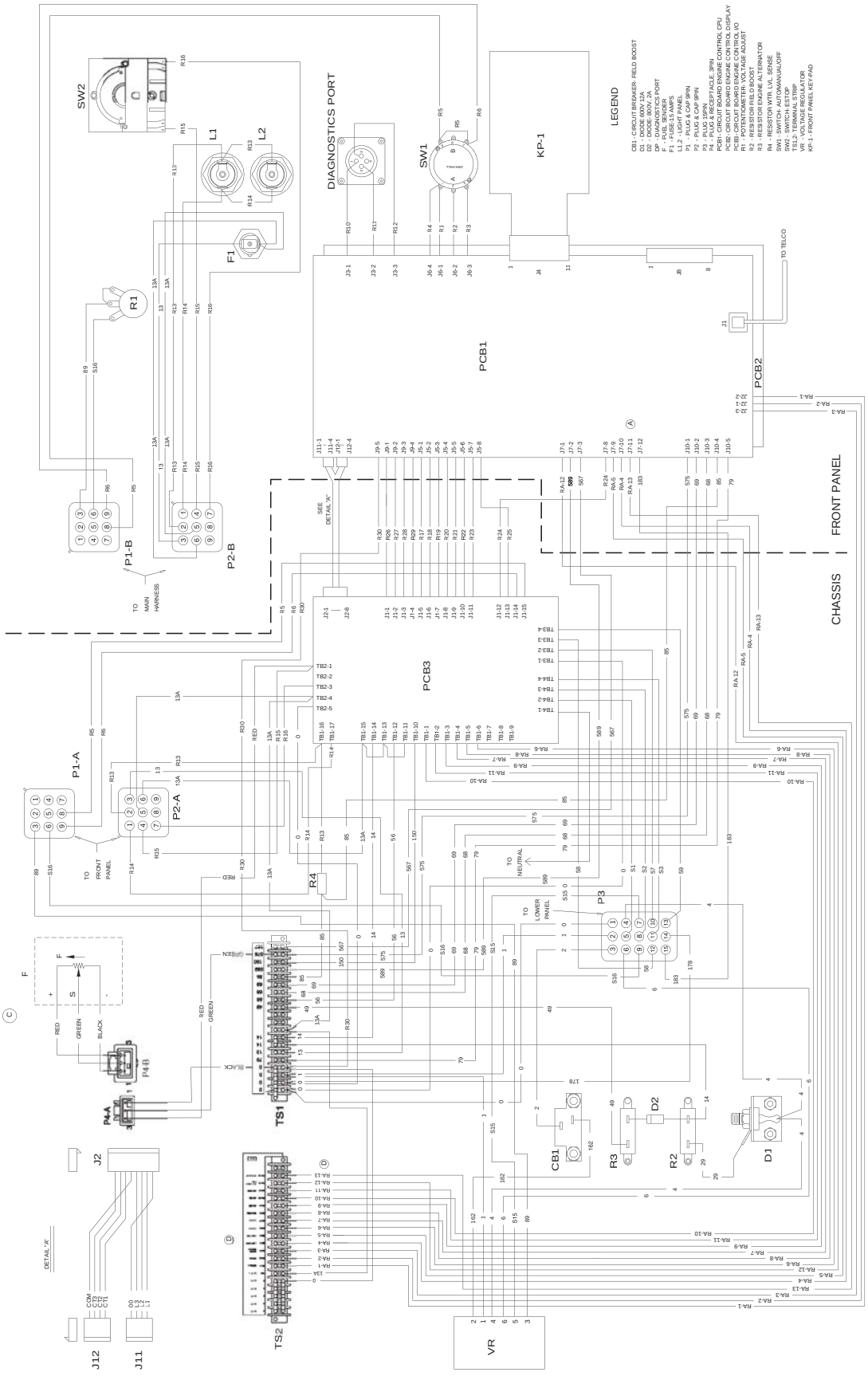
AR	ALTERNATOR ROTOR
AS	ALTERNATOR STATOR
BC	BATTERY CHARGE WINDING
CB2	MAIN CIRCUIT BREAKER (OPTIONAL)
CT	CURRENT TRANSFORMER
DPE	DISPLACED PHASE EXCITATION WINDING
EA	BRUSHLESS EXCITER ARMATURE
EF	BRUSHLESS EXCITER FIELD
EGC	ELECTRONIC GOVERNOR CONTROL
PMR	PERMANENT MAGNET ROTOR
PME	PERMANENT MAGNET EXCITATION WINDING
TP	THERMAL PROTECTOR (AUTO-RESET)

READ THIS DRAWING IN CONJUNCTION WITH
WIRING DIAGRAMS Nos. 099336 & 099491

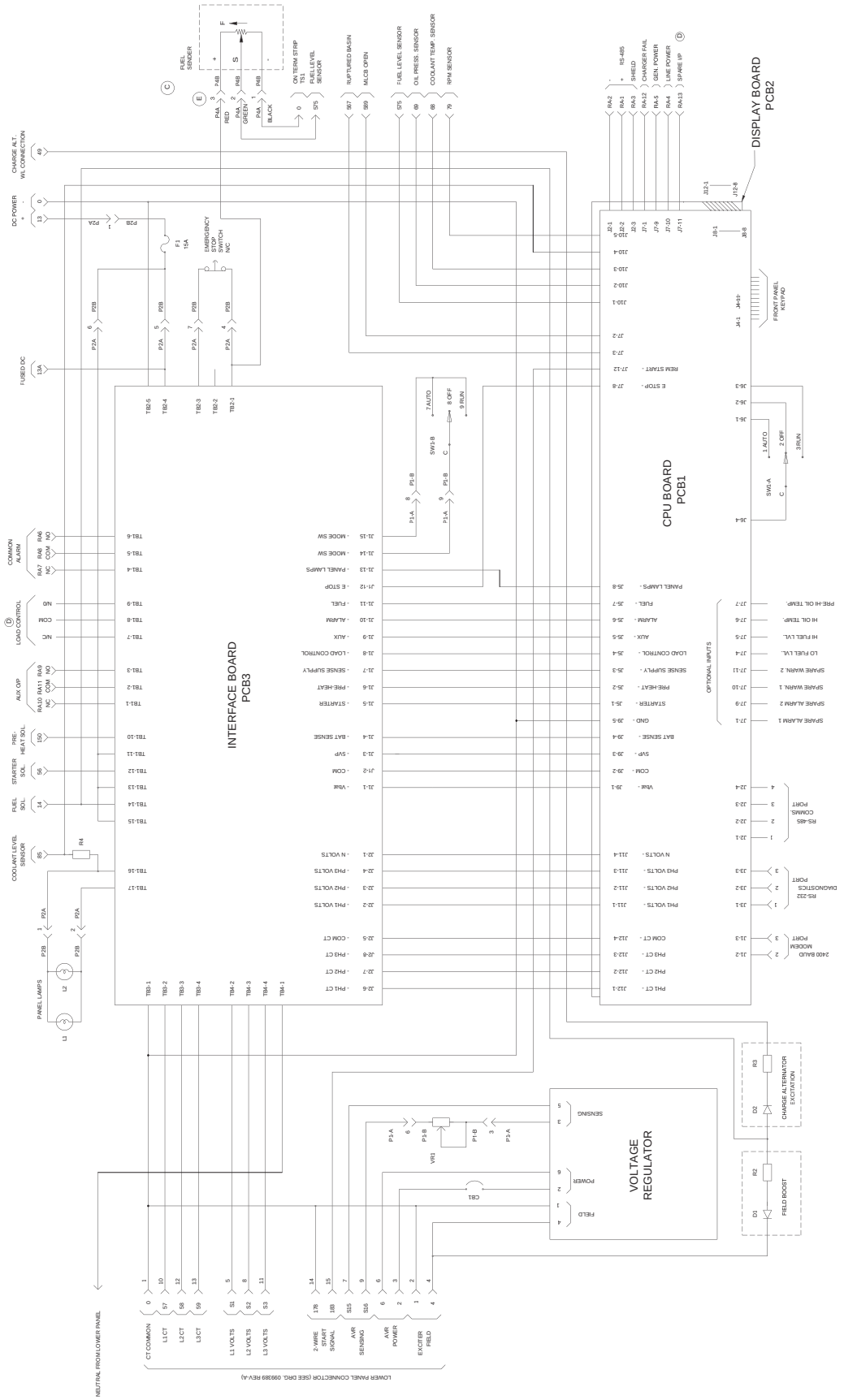
Appendix 1 — Electrical Data

D Option Control Panel

Control Panel Wiring Diagram (For Use With Generac Alternator) – Drawing No. 021773-E



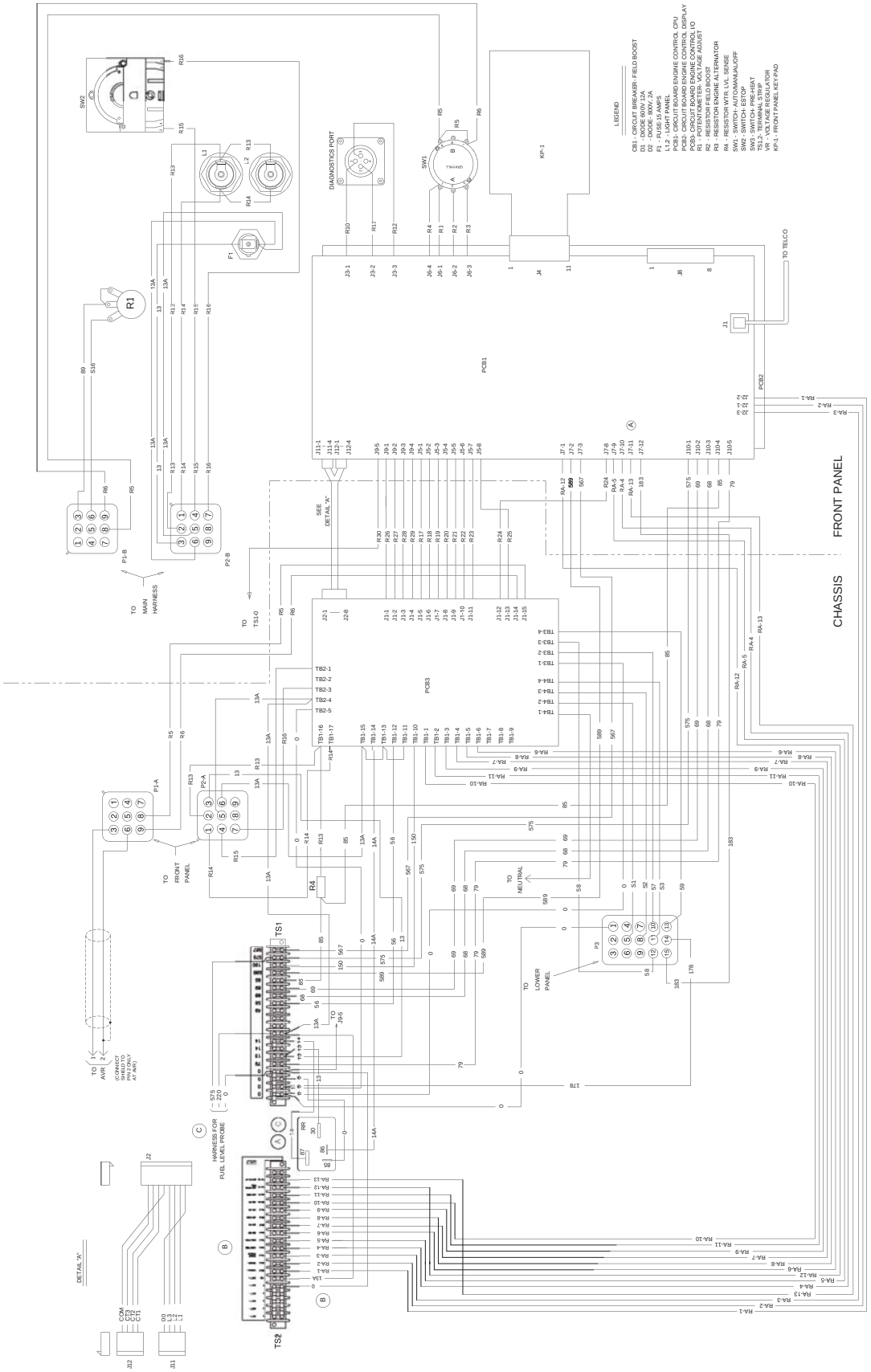
Control Panel Schematic Diagram (For Use With Generac Alternator) – Drawing No. 021736-E



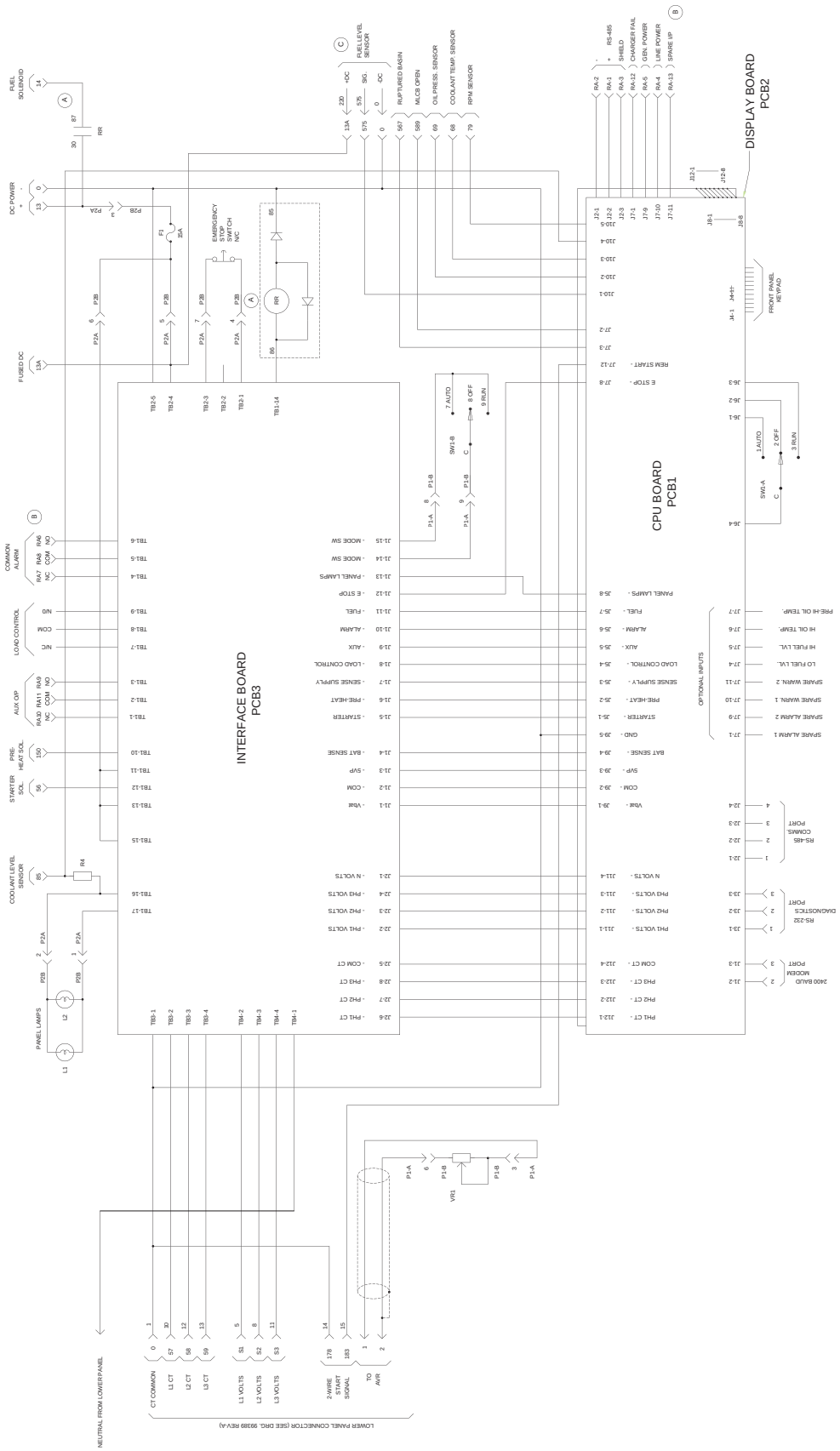
Appendix 1 — Electrical Data

D Option Control Panel

Control Panel Wiring Diagram (For Use With Marathon Alternator) – Drawing No. 0A5798-C

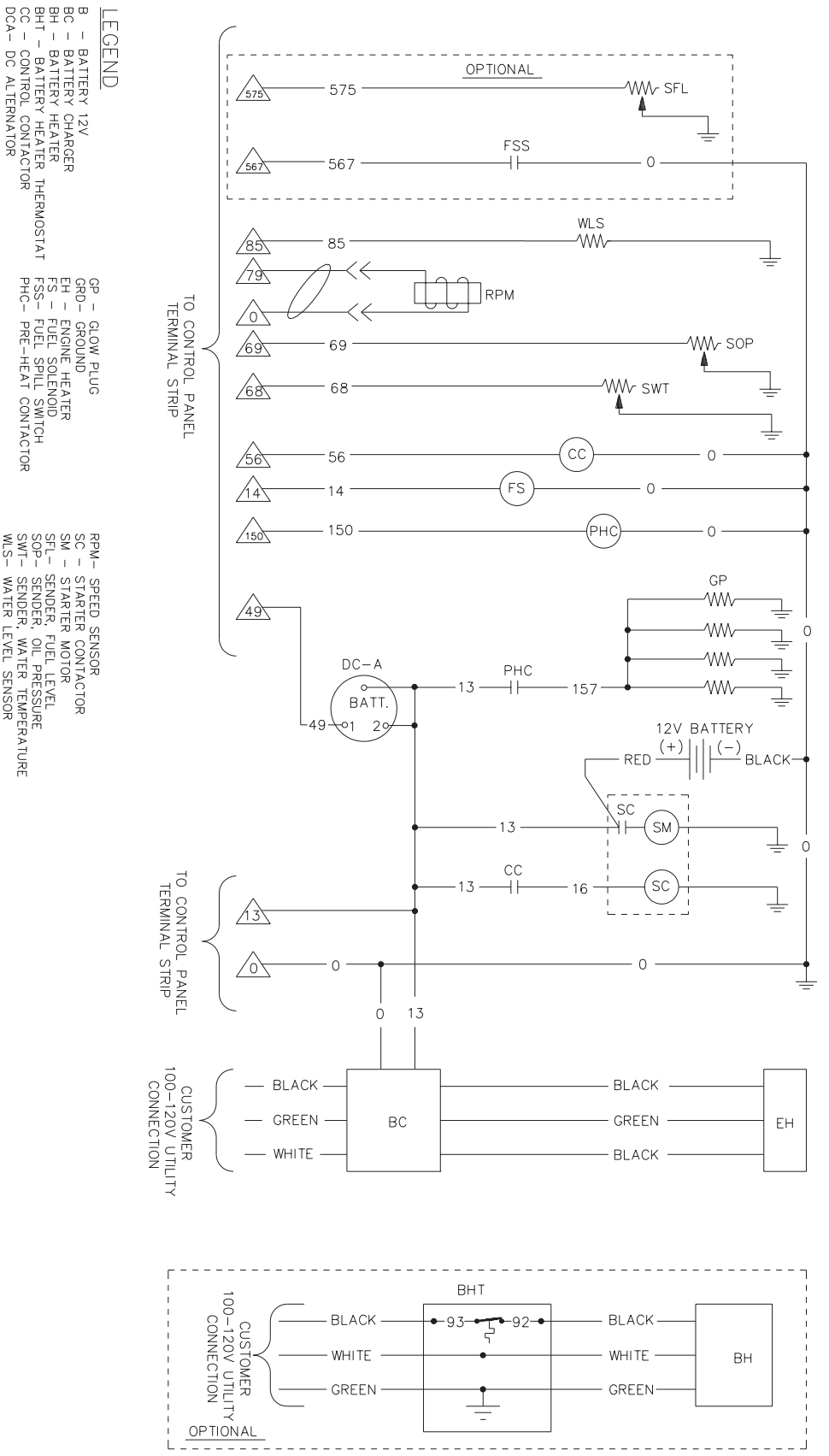


Control Panel Schematic Diagram (For Use With Marathon Alternator) – Drawing No. 0A5799-C



Appendix 1 — Electrical Data

D Option Control Panel
Typical Engine Schematic Diagram – Drawing No. 021737



NOTES

D Option Control Panel
Control Panel (Units Less Than 400 kW) – Drawing No. 0A3103-H

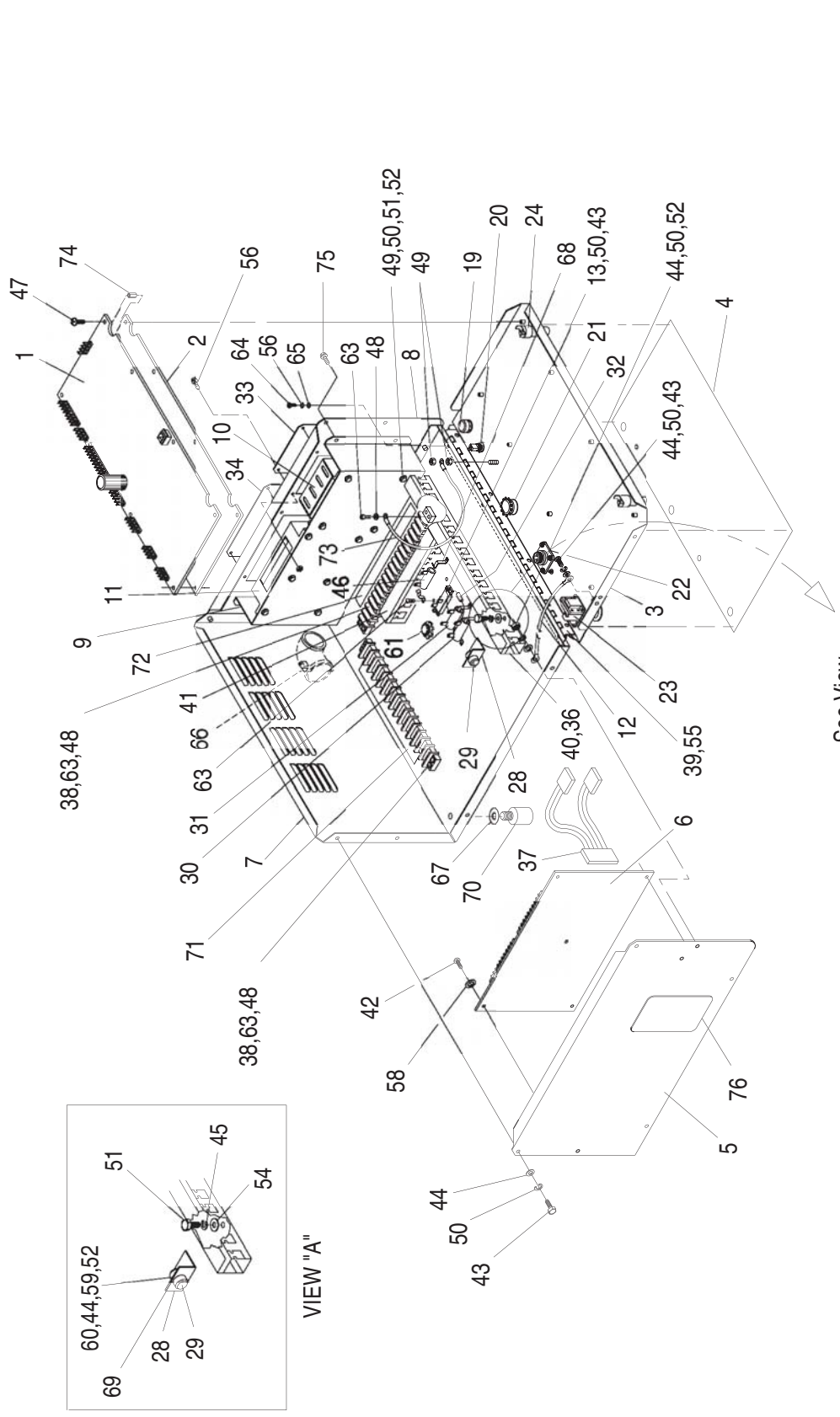


TABLE A-FIELD BOOST RESISTER DATA

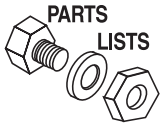
ALL DIRECTLY EXCITED MACHINES	5 OHM 25W	
UP TO 100KW WITH 12 OR 24V DC SYSTEMS	P/N-48352	
ALL BRUSHLESS MACHINES	25 OHM 25W	
UP TO 100KW WITH 12V DC SYSTEMS	P/N-57405	
ALL BRUSHLESS MACHINES	50 OHM 25W	
UP TO 100KW WITH 24V DC SYSTEMS	P/N-83364	
ALL BRUSHLESS MACHINES	75 OHM 25W	
OVER 100KW WITH 12 OR 24V DC SYSTEMS	P/N-86266	

TABLE B-AVR POWER (DPE) CIRCUIT BREAKER DATA

ALL DIRECTLY EXCITED MACHINES	7A	
19 TO 45KW	P/N-48467	
ALL BRUSHLESS MACHINES	5.5A	
19 TO 25KW	P/N-54450	
ALL BRUSHLESS MACHINES	6.0A	
29 TO 41KW	P/N-48505	
ALL BRUSHLESS MACHINES	4.5A	
45 TO 100KW	P/N-48476	
ALL MACHINES	4.5A	
OVER 100KW	P/N-48476	

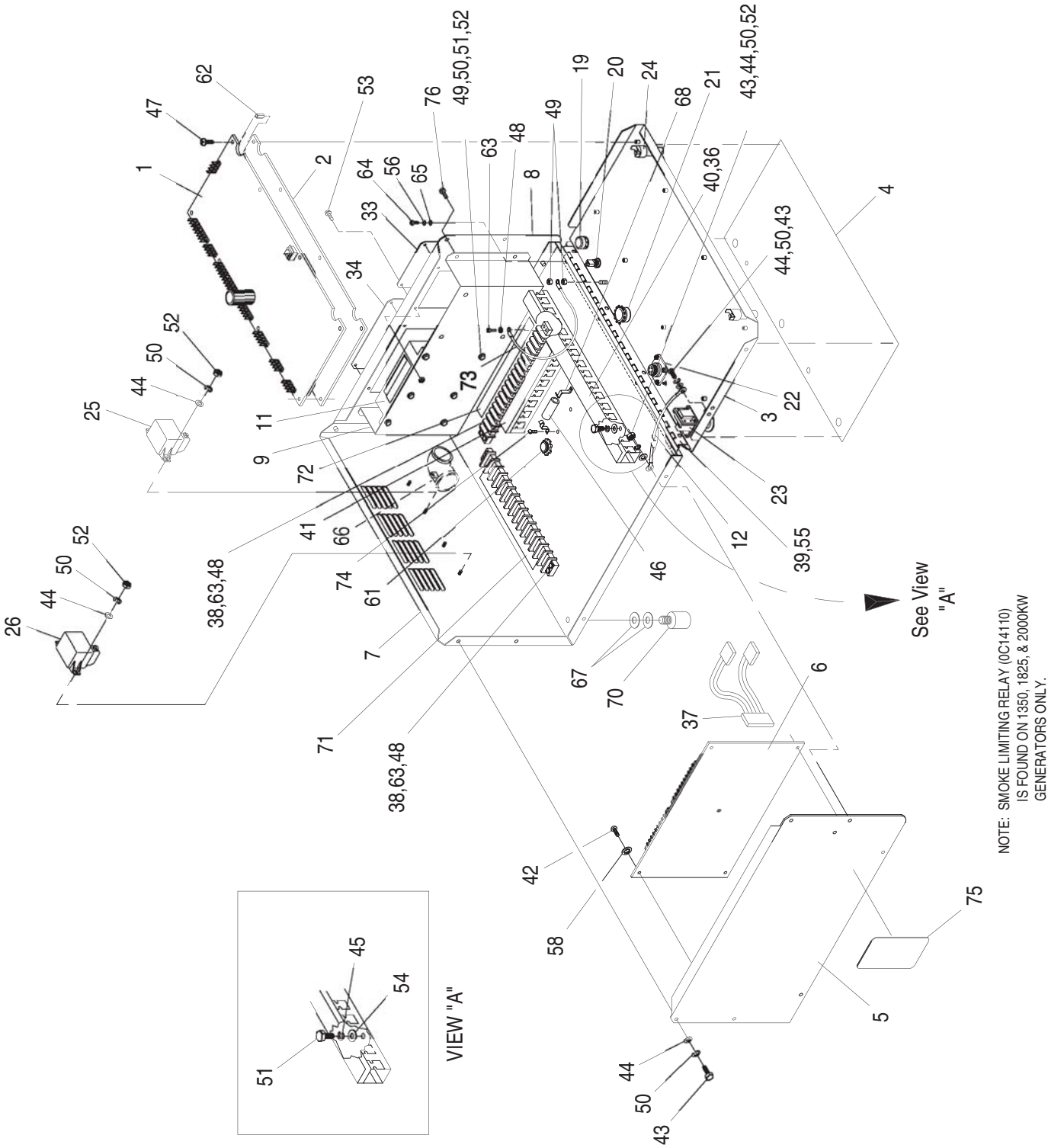
TABLE C-AVR/ELECTRONIC GOVERNOR CONTROLLER DATA

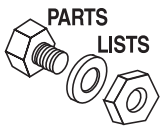
ALL 60HZ MACHINES WITH GENERAC	
ALTERNATORS USE VOLTAGE REGULATOR	P/N-67680
ALL 50HZ MACHINES WITH GENERAC	
ALTERNATORS USE VOLTAGE REGULATOR	P/N-92952
BARBER COLMAN 12V 2500-5000HZ	
ELECTRONIC GOVERNOR CONTROLLER	P/N-67709
BARBER COLMAN 24V 2500-5000HZ	
ELECTRONIC GOVERNOR CONTROLLER	P/N-67710
BARBER COLMAN 12V 5000-9500HZ	
ELECTRONIC GOVERNOR CONTROLLER	P/N-67711



ITEM	PART NO.	QTY.	DESCRIPTION
1	0A1053	1	SCH ASSEMBLY "D-PANEL" CPU
2	0A1056	1	PCB ASSEMBLY "D" DISPLAY
3	0A2274	1	FRONT PANEL RAM
4	0A1057A	1	OVERLAY 'D' OPT PANEL
5	0A2277	1	RAM PANEL LEFT SIDE
6	0A1054	1	INTERFACE BOARD
7	0A1436	1	D PANEL BOTTOM-LG GENS
8	0A1438	1	RAM PANEL RIGHT SIDE
9	0A1440	1	CHASSIS AVR & E-GOV
10	SEE TABLE C	-	AVR ASSEMBLY
11	SEE TABLE C	-	ELECTRONIC GOVERNOR
12	0A2275	1	DOOR-STOP RAM PANEL
13	-----	-	SEE TABLE B
19	071361	1	POTENTIOMETER PNL 5K +/-10% 2.25W
20	032300	1	FUSE HOLDER
	022676	1	FUSE 15A X AGC15 (NOT SHOWN)
21	0A3033	1	SWITCH AUTO/OFF/MAN
22	0A3034	1	CONNECTOR RS-232
23	098426A	1	SWITCH EMERG PB HEAD
	098426C	1	SWITCH EMERG PB N.C. (NOT SHOWN)
24	0A3035	2	LAMP PANEL ILLUM.
28	055444	1	HEATSINK (DIODE)
29	049939	1	RECTIFIER MSC 12A 600V 1N1206R
30	SEE TABLE A	1	FIELD BOOST RESISTOR
31	044213	1	RESISTOR 10R 5% 12W
32	025192	1	RECTIFIER MSC 2A 600V 1N5062
33	0A1441B	1	COVER PLATE AVR
34	0A1441A	1	COVER PLATE E-GOVERNOR
35	0A1666	1	HARNESS 'D' PANEL FRONT (NOT SHOWN)
36	0A1667	1	HARNESS 'D' PANEL MAIN
37	0A2566A	1	HARNESS D INTERCONNECTING
38	057335	2	BLOCK TERM 20A 20 X 6 X 1100V
39	0A2273	1	HINGE, RAM PANEL
40	0A2400	1	TRUNKING 320MM
41	0A2400A	1	TRUNKING 180MM
42	020752	5	SCREW PPM 4-40 X 1/4 ZINC
43	033121	16	SCREW HHC #10-32 X 1/2
44	023897	17	WASHER FLAT #10 ZINC
45	022097	4	WASHER LOCK M6-1/4
46	057405	1	RESISTOR 25R 5% 25W
47	084543A	9	SCREW PHM M3-0.5 X 12MM
48	022155	14	WASHER LOCK #6
49	022188	4	NUT HEX #6-32 STEEL
50	022152	16	WASHER LOCK #10
51	022287	4	SCREW HHC 1/4-20 X 3/4 G5
52	022158	2	NUT HEX #10-32 STEEL
54	022473	4	WASHER FLAT 1/4 ZINC
55	036261	4	RIVET POP .125 X .129-.133/#30
56	0C6225	4	SCREW HHTT #6-32 X 1/4 CZ
58	023364	8	WASHER SHAKEPROOF INT #6
59	023762	1	WASHER SHAKEPROOF EXT #10 STL
60	030468	1	WASHER STEP NYLON .20
61	034616	1	FITTING STRAIGHT 3/4
63	036909	6	SCREW PPHM #6-32 X 1-3/8
64	036918	4	SCREW PPHM #8-32 X 1/2
65	038150	4	WASHER FLAT #8 ZINC
66	039271	1	FITTING 90D 3/4
67	047246	8	FLAT WASHER SPECIAL 1/4
68	064733	4	RESISTOR MOUNTING BRACKET
69	070370	2	WASHER MICA .203
70	040479	4	VIB MOUNT 1.0 X 1.0 X 1/4-20
71	0C8474	1	DECAL 20 LITE AN CON
72	0A3392	1	DECAL TERMINAL BLOCK
73	0441140156	1	WIRE ASSY 18AWG #0
74	0A5062F	9	PCB EDGEHOLD MOUNT
75	0A2284	4	SCREW SWAGE 8-32 X 1/2 Z/YC
76	0C1229	1	DECAL CUST CONN BOX

D Option Control Panel
Control Panel (Units 400 kW and Larger) – Drawing No. 0A5793-E





ITEM	PART NO.	QTY.	DESCRIPTION
1	0A1053	1	SCH ASSEMBLY "D-PANEL" CPU
2	0A1056	1	PCB ASSEMBLY "D" DISPLAY
3	0A2274	1	FRONT PANEL RAM
4	0A1057A	1	OVERLAY 'D' OPT PANEL
5	0A2277	1	RAM PANEL LEFT SIDE
6	0A1054A	1	INTERFACE BOARD
7	0A9294	1	D PANEL BOTTOM-LG GENS
8	0A1438	1	RAM PANEL RIGHT SIDE
9	0A1440	1	CHASSIS AVR & E-GOV
11	067710	1	CONTROLLER GOVERNOR 24V 1800
12	0A2275	1	DOOR-STOP RAM PANEL
19	071361	1	POTENTIOMETER PNL 5K +/-10% 2.25W
20	032300	1	FUSE HOLDER
	022676	1	FUSE 15A X AGC15 (NOT SHOWN)
21	0A3033	1	SWITCH AUTO/OFF/MAN
22	0A3034	1	CONNECTOR RS-232
23	098426A	1	SWITCH EMERG PB HEAD
	098426C	1	SWITCH EMERG PB N.C. (NOT SHOWN)
24	0A3035	2	LAMP PANEL ILLUM.
25	0C4110	1	RELAY 24V 50A W/DIODE
26	SEE NOTE:	1	RELAY SMOKE LIMITING 24V
33	0A1441B	1	COVER PLATE AVR
34	0A1441A	1	COVER PLATE E-GOV
35	0A1666	1	HARNESS 'D' PANEL FRONT (NOT SHOWN)
36	0A5800	1	WIRING HARNESS D PANEL
37	0A2566A	1	HARNESS D INTERCONNECTING
38	057335	2	BLOCK TERM 20A 20 X 6 X 1100V
39	0A2273	1	HINGE RAM PANEL
40	0A2400	1	TRUNKING 320MM
41	0A2400A	1	TRUNKING 180MM
42	020752	5	SCREW PPM 4-40 X 1/4 ZINC
43	033121	6	SCREW HHC #10-32 X 1/2
44	023897	3	WASHER FLAT #10 ZINC
45	022097	4	WASHER LOCK M6-1/4
46	057405	1	RESISTOR 25R 5% 25W
47	084543A	9	SCREW PHM M3-0.5 X 12MM
48	022155	12	WASHER LOCK #6
49	022188	2	NUT HEX #6-32 STEEL
50	022152	3	WASHER LOCK #10
51	022507	4	SCREW HHC 1/4-20 X 1/2 G5
52	022158	4	NUT HEX #10-32 STEEL
53	0C6225	4	SCREW HHTT #6-32 X 1/4 CZ
54	022473	4	WASHER FLAT M6-1/4 ZINC
55	036261	4	RIVET POP .125 X .129-.133/#30
56	022264	4	WASHER LOCK M4
58	023364	5	WASHER SHAKEPROOF INT #6
61	034616	1	FITTING STRAIGHT 3/4
62	0A5062F	9	PCB EDGEHOLD MOUNT
63	036909	6	SCREW PPHM #6-32 X 1-3/8
64	036918	4	SCREW PPHM #8-32 X 5/8
65	038150	4	WASHER FLAT #8 ZINC
66	0A9234	1	GEDNEY CONN 1IN 90
67	047246	8	FLAT WASHER SPECIAL 1/4
68	064733	2	RESISTOR MTG BRACKET
70	040479	4	VIB MNT 1.0 X 1.0 X 1/4-20
71	0C8474	1	DECAL 20 LITE AN CON
72	0A3392	1	DECAL TERMINAL BLOCK
73	0441140156	1	WIRE ASSEMBLY 18AWG #0
74	036906	2	SCREW PPHM #6-32 X 1
75	0C1229	1	DECAL CUST CONN BOX
76	0A2284	4	SCREW SWAGE 8-32 X 1/2 Z/YC

GENERAC® POWER SYSTEMS, INC.
P.O. BOX 8
WAUKESHA, WI 53187

Part No. A3303 **Revision C (11/25/02)** **Printed in U.S.A.**