FEDERAL SIGNAL
Safety and Security Systems / Industrial

# Model PS600 SelecTone® Standby Battery Backup/Power Supply


## *Installation and Maintenance Instructions*

*255314D*
*Rev. D1 0315*
*Printed in U.S.A.*


**Warranty** – Seller warrants all goods for five years on parts and 2-1/2 years on labor, under the following conditions and exceptions: Seller warrants that all goods of Seller's manufacture will conform to any descriptions thereof for specifications which are expressly made a part of this sales contract and at the time of sale by Seller such goods shall be commercially free from defects in material or workmanship. Seller reserves the right at the Seller's discretion to "Repair and Return" or "Replace" any item deemed defective during the warranty period. This warranty does not cover travel expenses, the cost of specialized equipment for gaining access to the product, or labor charges for removal and reinstallation of the product. This warranty shall be ineffective and shall not apply to goods that have been subjected to misuse, neglect, accident, damage, improper maintenance, or to goods altered or repaired by anyone other than Seller or its authorized representative, or if five years have elapsed from the date of shipment of the goods by Seller with the following exceptions: lamps and strobe tubes are not covered under this warranty. Outdoor warning sirens and controllers manufactured by Federal Warning Systems are warranteed for two years on parts and one year on labor. No agent, employee, representative or distributor of Seller has any authority to bind the Seller to any representation, affirmation, or warranty concerning the goods and any such representation, affirmation or warranty shall not be deemed to have become a part of the basics of the sales contract and shall be unenforceable. THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OR MERCHANTABILITY, FITNESS FOR PURPOSE AND OF ANY OTHER TYPE, WHETHER EXPRESS OR IMPLIED. These warranties shall not apply unless Seller shall be given reasonable opportunity to investigate all claims for allegedly defective goods. Upon Seller's instruction a sample only of allegedly defective goods shall be returned to Seller for its inspection and approval. The basis of all claims for alleged defects in the goods not discoverable upon reasonable inspection thereof pursuant to paragraph 8 hereof must be fully explained in writing and received by Seller within thirty days after Buyer learns of the defect or such claim shall be deemed waived.

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**⚠ WARNING**

It is important to follow all instructions shipped with this product. This device is to be installed by a trained electrician who is thoroughly familiar with the National Electrical Code and/or Canadian Electrical Code and will follow the NEC and/or CEC Guidelines as well as all local codes.

The selection of the mounting location for the PS600, its controls and the routing of the wiring are to be accomplished under the direction of the facilities engineer and the safety engineer. In addition, listed below are some other important safety instructions and precautions you should follow:

- Read and understand all instructions before installing or operating this equipment.
- The nameplate should NOT be obscured, as it contains cautionary and/or other information of importance to maintenance personnel. Ensure the nameplate remains readable if the housing exterior is painted.
- Do not connect this unit to the system when power is on.
- After installation, ensure that all bolts and threaded joints are tightened.
- Establish a procedure to routinely check the power supply for proper activation and operation.
- Provide a copy of these instructions to the Safety Engineer, operator(s) and maintenance personnel.
- File these instructions in a safe place and refer to them when maintaining and/or reinstalling the device.

Failure to follow all safety precautions and instructions may result in property damage, serious injury, or death.

## An Overview of the Model PS600

The Model PS600 Power Supply is a nominal 12 Vdc or 24 Vdc supervised power supply that provides primary power and/or standby power to various devices in a SelecTone system while maintaining the charge level of an integral 24 volt battery package. The battery package automatically supplies power during power outages. When power is restored, the supply recharges the batteries.

The PS600 is housed in an enclosure designed for permanent mounting on a wall or another substantial vertical surface. An optional key-lock door is supplied for the front door of the cabinet, the lock is provided to discourage unauthorized access. The unit is intended for indoor use only.

### Certifications

This power supply is intended for use in applications requiring UL certification for fire protection signaling and access control. The power supply must be installed in accordance with National Electric Codes and in accordance with NFPA 72 (protective signaling systems).

The PS600 meets these additional certifications:

UL certifications 1481 and 294, suited for UL certified fire alarms and control systems

NYC Department of Buildings Approved (MEA)

California State Fire Marshall Approved (CSFM)

CSA Approved (Canada)

### PS600 Circuitry

The power supply converts 120 Vac at 50/60 Hz or 240 Vac at 50/60 Hz into a fully regulated 12 Vdc or 24 Vdc output. The unit has a 6 A capacity, and the output is protected by a poly switch (PTC). The battery is also protected by a 10 A fuse. The PS600 is equipped with thermal and short-circuit protection with auto reset.

The power-supply printed circuit board contains circuitry that provides dc operating voltage to units in a SelecTone system and maintains a charge level on the batteries when ac power is available. It also includes logic circuitry that controls the ac power LED, dc power LED and transfer of battery connection to the output during an ac power outage. The power supply has green and red LED indicators mounted on the printed circuit board inside the PS600.

The circuitry is divided into two sections: the dc output circuits and the charger/logic circuits. The output circuits supply dc operating voltage to the load when ac voltage is available. The charger/logic circuits control the charging of the battery package and the red dc power and green ac power LED indicators. See Table 1.

**Table 1** Power supply circuit board LED indicators

| Red (dc) | Green (ac) | Description |
|---|---|---|
| ON | ON | Normal function |
| ON | OFF | Battery backup is powering output |
| OFF | ON | No dc output |
| OFF | OFF | System off, no battery |

## Charger/Logic Circuits Diagnostics

The charger/logic circuits consist of battery charging circuitry. This part of the circuit also illuminates the green and red LEDs which indicate the presence of ac and dc voltage, respectively.

Furthermore, the power-sense circuit causes the green LED to turn off if the battery backup is powering the output, or if the system is off and there is no battery. This circuit also causes the red LED turn off if there is no dc output, or if the system is off and there is no battery.

The battery terminals provide a convenient location for checking the battery voltage with a dc voltmeter. To check the battery voltage, connect the negative voltmeter lead to the

negative (–) terminal and the positive meter lead to the positive (+) terminal.

For more information on system maintenance, see "Maintaining the PS600" on page 20.

**NOTE:** With no ac present and the battery wires connected, the dc output circuits read approximately 1 volt lower than the actual battery voltage.

## Related Signaling Devices

The PS600 is used with these UL listed, 24 Vdc models:

- 50GC SelecTone Audible Signaling Device
- 300GC SelecTone Audible Signaling Device
- 300GCX SelecTone Hazardous Location Audible Signaling Device
- 300X SelecTone Explosion Proof Audible Signaling Device
- 302GC SelecTone Audible Signaling Device
- 302GCX SelecTone Hazardous Location Audible Signaling Device
- 302X SelecTone Explosion Proof Audible Signaling Device

## Product Specifications

| | |
|---|---|
| Operating Voltage | 120 Vac, 50/60 Hz<br>240 Vac, 50/60 Hz |
| Current Requirement | 120 Vac, 1.90 A<br>240 Vac, 0.95 A |
| dc Output (Non-Power-Limited, Supervised) | |
| ac Power Applied | |
| Voltage | 24.8 Vdc no load<br>23.1 Vdc full load |
| Current | 6 A maximum |
| Ripple | 0.5 Vrms maximum |

| | |
|---|---|
| During Power Failure | |
| Voltage: | 26.4 Vdc no load<br>24 Vdc nominal |
| Current: | 6 A maximum<br>(25° C)*(see note) |
| Output Circuits (Non-Power-Limited) | 6 A at 24 Vdc resistive |
| Dry Contact Closure of Trouble Out Relay | Connect to power limited circuits |
| ac Fail Relay | 2 A, 120 Vac/28 Vdc |
| Battery Trouble Relay | 2 A, 120 Vac/28 Vdc |
| Battery Package | |
| Number of Batteries | 2 connected in series |
| Battery Voltage | 12 V each (24 V total) |
| Capacity | 12 Ah |
| Type | Sealed, lead-acid gelled electrolyte |
| Recharge Time | 48 hours (after complete discharge) |
| Charging Current | 1.25 A maximum |
| Physical | |
| Dimensions (HWD) | 15.50 in x 12.50 in x 4.50 in |
| Weight | 13 lb (without batteries) |
| Operating Temp. Range | 0° C to + 49° C |

*Battery current capacity changes throughout the operating temperature range.

## Unpacking the PS600

After unpacking the PS600, examine it for damage that may have occurred in transit. If the unit has been damaged, do not attempt to install or operate it. File a claim immediately with the carrier, stating the extent of the damage. Carefully check all envelopes, shipping labels, and tags before removing or discarding them. Disposal of all shipping materials must be carried out in accordance with national and local codes and standards. If any parts are missing, please call Federal Signal Customer Support at 708-534-4756 or 877-289-3246.

## Mounting the PS600

The steel enclosure of the Model PS600 power supply is designed for mounting on a wall or other substantial vertical surface. The PS600 is shipped without the batteries installed. The batteries must be installed after the unit is mounted.

When installing the PS600, do NOT use electrical conduit to support the unit because the device weighs 13 lb fully assembled without the batteries. When mounting the unit, be sure the mounting surface can sustain the weight of the PS600. The method of mounting the unit must also withstand external mechanical stresses that may be applied to the cabinet. The cabinet has three holes located in the rear to accommodate #10 mounting screws.

To mount the PS600:

1. Before installing the batteries, use the power supply enclosure as a template to mark the location of the three mounting holes on the mounting surface.
2. Mount the cabinet with the appropriate hardware. Make sure that the unit is firmly secured to the mounting surface.
3. Terminate the conduit for the 120 Vac or 240 Vac power at one of the two knockouts located at the upper right side of the cabinet. These knockouts are located above and to the right of the two transformers.
4. Terminate the conduit for the 24 Vdc or 12 Vdc output at one of the knockouts located at top or the middle left side of the cabinet.

## Installing the Batteries and Wiring the PS600

**⚠ WARNING**

***SHOCK HAZARD: To avoid electrical shock hazards, do not connect or disconnect wires while power is applied.***

***NOTICE***

***CHARGE BATTERIES BEFORE USE: Batteries are shipped partially charged. Allow at least 48 hours of charging time before operating from batteries.***

**NOTE:** For access control applications, batteries are optional. When batteries are not used, the loss of ac will result in the loss of output voltage.

The PS600 should be installed with the National Electrical Code NFPA 72 and in accordance with any local regulations. Use only 18 AWG wire for all power connections (battery, dc output). Use 22 AWG to 18 AWG wire for signaling outputs (ac and low battery supervision).

**NOTE:** In accordance with NFPA72, the wires to the batteries do not have to be supervised provided that they are in conduit or equivalent to prevent mechanical injury.

**For 120 Vac or 240 Vac power Class I conductors:**
Use one of the two knockouts located at the upper right side of the cabinet near the two transformers.

**For the non-power limited 24 Vdc or 12 Vdc output conductors:**
Use one of the two knockouts in the top, either the middle or the left side of the cabinet or the knockout in the middle of the left side. Make sure that all power-limited fire protective signaling conductors are segregated from electric light, power, Class I, or non-power limited fire protective signaling conductors by more than 0.25 inch inside the power supply cabinet.

## Determining the Total Ampere-Hour Capacity

The PS600 battery consists of two 12-volt, sealed lead-acid batteries connected in series. These batteries supply emergency power to units in a SelecTone system or other devices during electrical power failures. The power supply includes a built-in charger for the batteries.

The length of time that the batteries can supply power depends upon the amount of current drawn by the loads. In normal fire alarm systems, the two time frames are used: twenty-four hours on standby, followed by five minutes of alarm, or sixty hours on standby, followed by five minutes of alarm.

The power supply must have enough capacity to properly operate the external equipment. Calculate the standby current and the twenty-four discharge rate on standby or the standby current and the sixty hour discharge rate on standby. Determine the total ampere-hour capacity necessary as described in the following example:

| | |
|---|---|
| Discharge Rate: | 24 hours |
| Standby current: | 0.200 A, 24 Vdc |
| Five minutes Alarm Current: | 6 A, 24 Vdc |
| Useful Battery Capacity: | 85 percent |

Capacity needed = (discharge rate [hours] x standby current [amps]) + (alarm hours [hours] x alarm current [amperage])/useful battery capacity

Capacity Required: ([24 x 0.200] + [5/60 x 6])/0.85
= ( 4.80 + 0.5)/0.85
= 5.30/0.85
= 6.23 Ah

In this example, a 24 Vdc, 6 A power supply with 24 V, 12 Ah battery can operate the signaling device.

## Determining the Maximum Load Discharge

Determining the maximum load discharge current from a specific battery size over a specific amount of time can be tricky. Batteries are rated at maximum efficiency over a 20 hour discharge period. Therefore, a 20 Ah battery will provide 1 A over a 20 hour period.

However, calculating discharge time for other discharge currents is not as easy as division or multiplication. A 20 Ah battery will supply 1 A for 20 hours. However, it will not provide 2 A for 10 hours, but rather 1.8 A for 10 hours, which is equivalent to 18 Ah.

**EXAMPLE:**

See Figure 1. Your system has a 12 Ah battery and you need 4 hours of backup time. Simply locate the 12 Ah diagonal line and the 4-hour horizontal discharge timeline. Find the intersection (as circled). Follow this intersection point vertically down to find the maximum discharge current. In this case, 2 A is the maximum discharge current.

**Figure 1** Discharge time as a function of discharge current

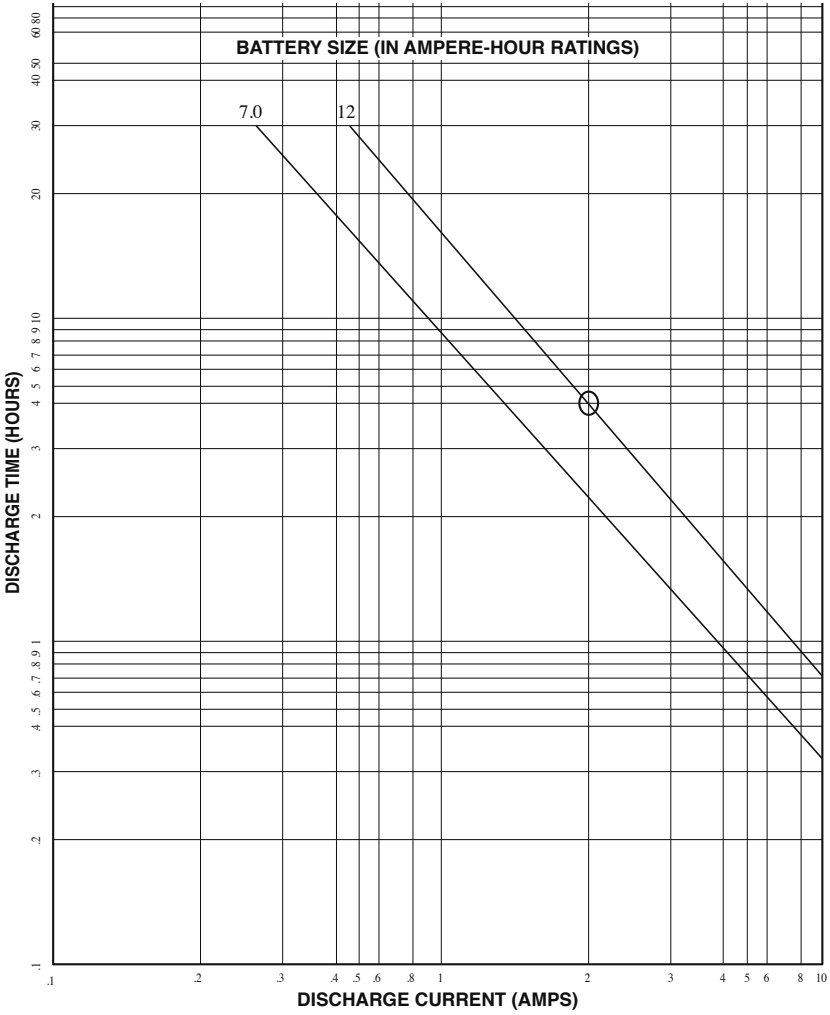
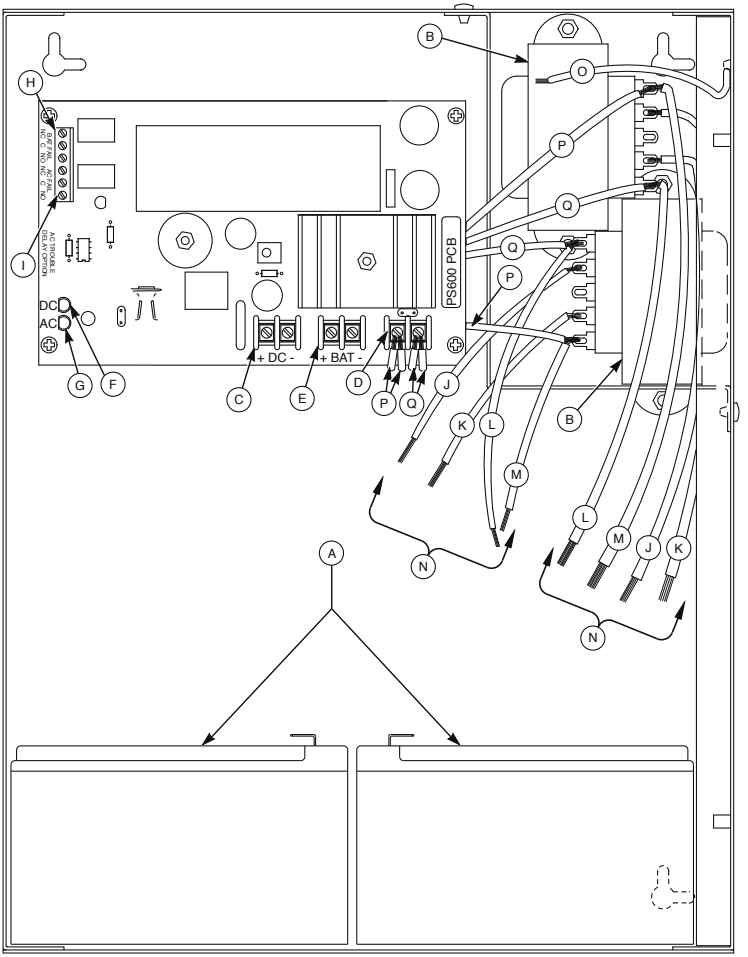


**Figure 2** Interior of PS600 cabinet




**A** 12 V, 12 Ah battery
**B** Transformers
**C** dc Terminal blocks
**D** ac-Terminal blocks
**E** Battery terminal blocks
**F** dc- (red) LED
**G** ac- (green) LED
**H** Battery fail terminal blocks
**I** ac fail terminal blocks
**J.** Green
**K.** Red
**L.** Black
**M.** White
**N.** To 120/240 Vac
**O.** Ground (Green)
**P.** Yellow
**Q.** Blue

To wire the PS600 to your system:

**1.** See Figure 2 on page 14. Install the electrical wiring for the input and output circuits. Use only 18 AWG wire for all power connections (battery, dc output). Use 22 AWG to 18 AWG wire for signaling outputs (ac and low battery supervision).

Be sure to keep power-limited wiring (supervised ac and low battery signaling) separate from non-power-limited wiring (120 Vac at 50/60 Hz or 240 Vac at 50/60 Hz input, battery wires and dc output).

**2.** For the transformer connections, see Figure 3 on page 16. Strip no more than 0.25 inch of wire insulation from the ends of the power leads. Insert the stripped ends of the wire into the connector as far as they can travel.

**3.** Make sure the lead insulation is flush with the connector. If you are using stranded wire, be sure that there are no loose strands outside of the connector plug that could touch the adjacent lead and cause a short circuit.

**4.** Connect the 12 Vdc or 24 Vdc (output) circuits of the device to be powered to the two-position terminal block labeled **-DC+** in the upper left side of the power supply PC board. Observe the correct polarity. A wiring terminal screw can accommodate up to two wires provided the wires sit under the terminal clamp on opposite sides of the terminal screw.

**5.** Set the batteries next to one another at the bottom of the power supply cabinet.

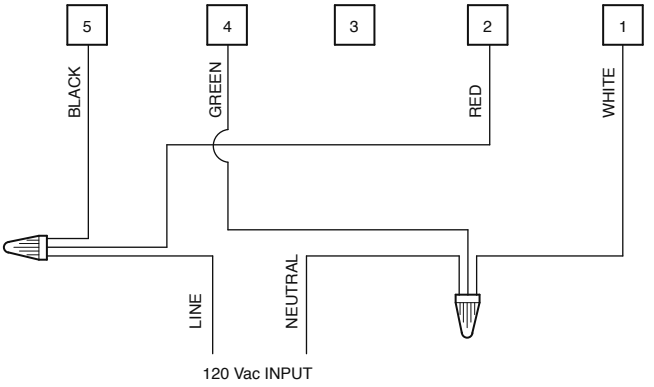
**6.** See Figure 2 on page 14 and Figure 4 on page 17. Connect the provided short yellow jumper wire between the positive (RED) terminal of the first battery and the negative (BLACK) terminal of the second battery.

**7.** Connect the two provided battery wires to the two-position terminal block located at the lower left side of the power supply PC board and labeled **-BAT+**. Observe the correct polarity.

**8.** Connect the black (negative) wire of the battery terminal block to the black (negative) terminal of the first battery.

**9.** Connect the red (positive) wire of the battery terminal block to the red (positive) terminal of the second battery and close the cabinet door.

**Figure 3** Transformer connections



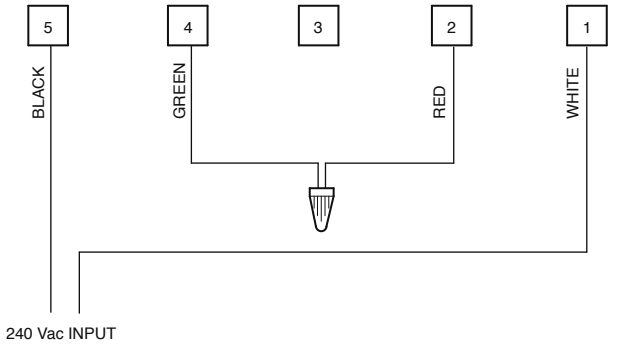
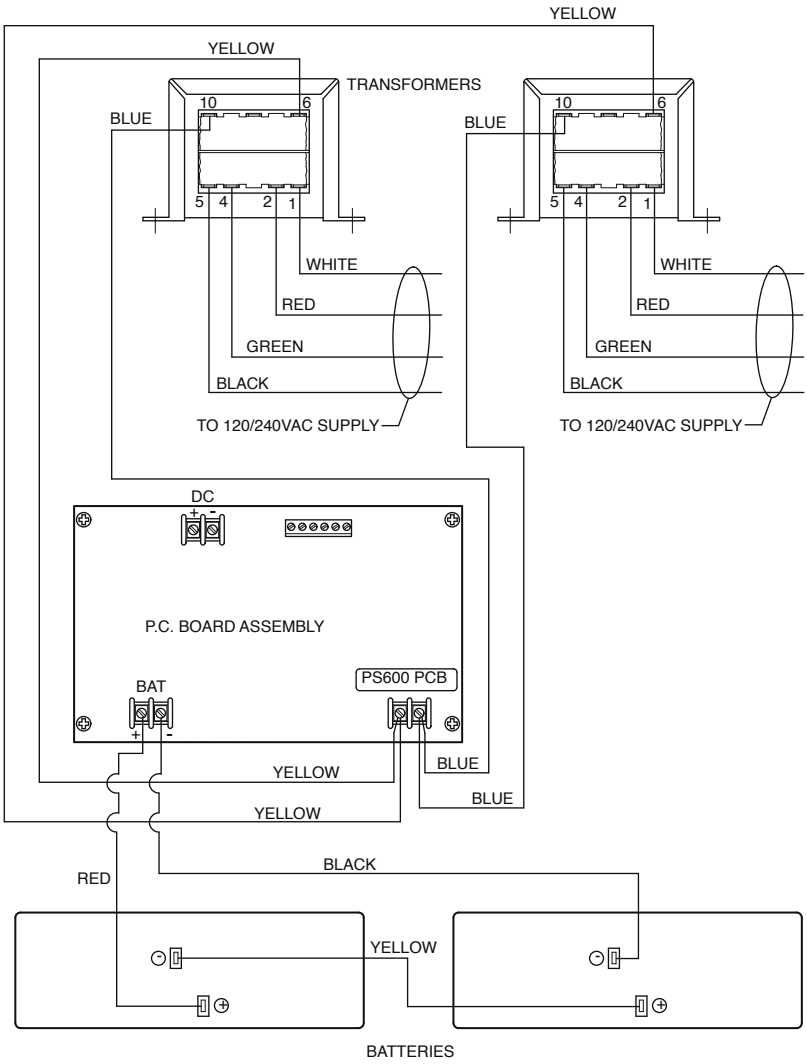



**Figure 4** PS600 Wiring schematic



## Setting Up the PS600 for Your System

The PS600 can be configured as battery backup for your system or as a supervised power supply

### For Battery Backup

To set up the PS600 as a battery backup for your system:

1. Set the voltage. See Table 2.

**Table 2** Switch 1 output voltage settings

| Voltage | SWITCH 1 |
|---|---|
| 12 Vdc | ON -12V |
| 24 Vdc | OFF - 24V |

2. Connect the battery to battery terminals (**BAT**). Carefully observe polarity and match the battery voltage to the output set voltage.

3. Make sure the red and green LEDs turn on. Red indicates the presence of dc power and the green indicates the presence of ac power.

### For a Supervised Power Supply

To set up the PS600 for a supervised power supply:

1. Set the voltage. See Table 2.

2. For battery backup, connect the battery to the battery terminals (**BAT**). Carefully observe polarity and match the battery voltage to the set output voltage.

3. Make sure the red and green LEDs turn on. Red indicates the presence of dc power and the green indicates the presence of ac power.

4. Use the **AC FAIL** (1 Form C dry contact) terminal to report loss of ac. ac fail is indicated in approximately 5 minutes. The ac fail relay is 2 A at 120 Vac/28 Vdc.

5. Use **BAT FAIL** (1 Form C dry contact) terminal to report LOW or NO battery condition. Battery fail is indicated in approximately 20 seconds. The battery trouble relay is 2 A at 120 Vac/28 Vdc.

## Getting Repair Service or Technical Assistance

Products returned for repair require a Return Authorization form from your local distributor or from Federal Signal. To obtain repair service or technical assistance from Federal Signal, call 708-534-4756 or 877-289-3246. For instruction manuals and information on related products, visit:

http://www.federalsignal-indust.com

## Safety Message to Maintenance Personnel

**⚠ WARNING**

Listed below are some important safety instructions and precautions you should follow:

- Read and understand all instructions before operating this system.
- Any maintenance to the system must be done with power turned off.
- Any maintenance to the system must be performed by a trained electrician who is thoroughly familiar with all applicable national and local codes in the country of use.
- Do not connect this unit to the system when power is on.
- Never alter the unit in any manner. Safety may be compromised if additional openings or other alterations are made to the internal components or housing.
- The nameplate should NOT be obscured, as it contains cautionary and/or other information of importance to maintenance personnel. Ensure the nameplate remains readable if the housing exterior is painted.

- After performing any maintenance, test the system to ensure that it is operating properly.

Failure to follow all safety precautions and instructions may result in property damage, serious injury, or death.

## Maintaining the PS600

Other than cleaning, no regularly scheduled maintenance is required. To ensure unit is operating properly, it should be tested at regularly scheduled intervals.

The PS600 should be tested at least once a year to insure proper operation as follows:

### Testing the Output Voltage

Under normal load conditions, the dc output voltage should be checked for proper voltage level.

### Testing the Battery

Under normal load conditions, check that the battery is fully charged. Check specific voltages at both the battery terminals and at the board terminals marked **-BAT+**.

Battery life is five years. However, changing batteries in four years or less is recommended.

## Ordering Replacement Parts

Typical spare parts are listed in Table 3. To order accessories and replacement parts, please call Federal Signal Customer Support at 708-534-4756 or 877-289-3246.

**Table 3** Replacement parts

| Description | Part Number |
|---|---|
| 12 V, 12 Ah Battery | K155190 |
| PS600 PC Board | K2001312 |
| 120/240 Vac Transformer | K120819 |

## Returning the Product for Credit

Product returns for credit require a return authorization from your local distributor prior to returning the product to Federal Signal. Please contact your distributor for assistance.

A product is qualified to be returned for credit when the following conditions are met:

- Product is resalable and in the original cartons
- Product has not been previously installed
- Product is the current revision
- Product has not been previously repaired
- Product is a standard product
- Product is not a service part

All returns are subject to a re-stock fee.

Defective products that are returned within the warranty period will be repaired or replaced at Federal Signal's sole discretion. Defective products do not include those products with lamp failure.

Circumstances other than those listed above will be addressed on a case-by-case basis.

| NOTES |
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