

# SARGENT 3540-3550-3570 SERIES POWER SUPPLIES OPERATION AND INSTALLATION INSTRUCTIONS

**MODELS: 3540, 3550, 3570 (24 VOLT); 3541, 3551, 3571 (12 VOLT);  
and 737-12 VOLT and 738-24 VOLT BATTERY BACKUP KITS**



## 1. DESCRIPTION

These instructions cover 6 different models:

Table 1 3500 Series Models

Model #	Amps	Volts	Output Circuits
3540	2 Amps	24 Volts	CCS-4
3550	4 Amps	24 Volts	CCS-8
3570	6 Amps	24 Volts	CCS-8
3541	3 Amps	12 Volts	CCS-4
3551	4.5 Amps	12 Volts	CCS-4
3571	6 Amps	12 Volts	CCS-8

The SARGENT 3500 Series power supplies consist of a power module and CCS (Central Control System) control board to which all connections are made. The board provides terminals for line voltage input and DC outputs on separate circuits so that a number of devices can be powered. Models 3540, 3541 and 3551 are furnished with the CCS-4 control board with four separate output circuits. The 3550, 3570 and 3571 are furnished with the CCS-8 control board with eight separate output circuits. Each output circuit has an on/off slide switch and an LED that displays its status. The CCS control board also provides an LED indication showing that the power supply is on, emergency release terminals; line voltage, DC fuses and sealed lead acid-gel cell battery charging are functional. All power supplies in the 3500 Series are Class 2 rated when installed following these instructions. Always check with your local building department to make sure you are complying with applicable wiring codes before installing these units.

## 2. SAFETY

Line voltage input and the battery output present a high voltage shock hazard. If shorted, the battery output can generate sufficient heat to ignite some materials. Whenever the unit is powered, either by line voltage or batteries, the cover LED is lit. The supply must only be opened by trained service personnel when the cover LED is on.

Note: Power supplies are shipped without batteries.

## 3. OPERATING CHARACTERISTICS

### 3.1 LINE VOLTAGE INPUT

110-120 VAC hot, neutral and earth ground are connected to terminals “H”, “N”, “G” (Fig. 3). This is fed to the input of the power module through factory made connections.

### 3.2 DC OUTPUT AND VOLTAGE ADJUSTMENT

3500 Series Power Supplies have adjustable output capable of charging backup batteries. The power supplies are factory set at 12 volts or 24 volts, respectively. When the battery pack option is used, the power supply output must be set to 13.5 volts for 12 volt supplies and 27 volts for 24 volt supplies. If the voltage is to be changed, use the potentiometer on the power module marked “V ADJ” (Fig. 1 and 3). The current rating addresses the possibility of the supplies operating at 12.5% over voltage. Therefore, any supply which is operated at its nominal voltage (12 V or 24 V) can supply about 20% more than its current rating. Despite this, SARGENT recommends that power supplies be operated at no more than two thirds of their maximum amperage capacity for optimum reliability. Operating power supplies at their maximum amperage greatly increases the possibility of heat induced failure.

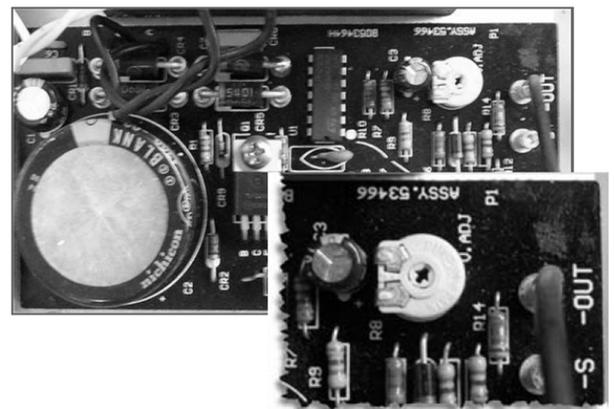


Fig. 1 Power Supply Adjustments

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### 3.3 BATTERY CHARGING CAPABILITY

The power supply incorporates a battery charging circuit appropriate for standby rated sealed lead acid or gel cell batteries. Battery backup is available by ordering a 737-12 Volt or 738-24 Volt Battery Backup Kit.

A resistor and diode are present on CCS boards which, together with the power supply, constitute a battery charging circuit appropriate for standby rated sealed lead acid or gel cell batteries. Dry cell or NICAD batteries must not be used. Batteries are an option. The power supply can be used with or without them.

**IMPORTANT:** The battery pack of the appropriate voltage is connected to the red and black flying leads following correct polarity.

In the event of an AC power failure, the batteries will automatically provide current to output loads. However, if the emergency release terminals F1 and F2 are opened (Fig. 2), battery power will be blocked.

The components utilized on the CCS board for battery charging function for battery packs up to 20 amp hours in capacity with either 12 or 24 volts. Larger battery packs can be accommodated (Table 2). Calculate the correct battery pack based on desired backup time and the current draw by the load (Table 2). For proper battery charging, the power supply must be set at 13.5 volts for a 12 for volt system and 27 volts for a 24 volt system. SARGENT power supplies are factory set at 12 volts or 24 volts respectively and must be adjusted or batteries will not hold their full capacity and could be damaged.

Table 2 Battery Pack Selection (Chart to Determine Size of Battery Back Backup Time Desired)

		Minimum Hours of Battery Life Required									
CURRENT DRAIN		MIN	1 HR	2 HR	4 HR	UL STD	8 HR	16 HR	24 HR	48 HR	72 HR
	150 mA	4 Ah	4 Ah	4 Ah	4 Ah	4 Ah	4 Ah	4 Ah	8 Ah	8 Ah	<i>12 Ah</i>
	300 mA	4 Ah	4 Ah	4 Ah	4 Ah	4 Ah	4 Ah	8 Ah	12 Ah	16 Ah	<i>24 Ah</i>
	500 mA	4 Ah	4 Ah	4 Ah	4 Ah	4 Ah	8 Ah	12 Ah	16 Ah	<i>24 Ah</i>	<i>36 Ah</i>
	1 A	4 Ah	4 Ah	8 Ah	12 Ah	12 Ah	20 Ah	24 Ah	<i>48 Ah</i>	<i>72 Ah</i>	
	2 A	4 Ah	8 Ah	12 Ah	20 Ah	20 Ah	<i>36 Ah</i>	<i>48 Ah</i>	<i>100 Ah</i>	<i>150 Ah</i>	
	3 A	4 Ah	8 Ah	16 Ah	24 Ah	28 Ah	<i>52 Ah</i>	<i>72 Ah</i>	<i>150 Ah</i>	<i>240 Ah</i>	
	4 A	4 Ah	8 Ah	16 Ah	24 Ah	32 Ah	<i>36 Ah</i>	<i>72 Ah</i>	<i>100 Ah</i>	<i>200 Ah</i>	<i>300 Ah</i>
	5 A	4 Ah	12 Ah	16 Ah	24 Ah	40 Ah	<i>44 Ah</i>	<i>84 Ah</i>	<i>120 Ah</i>	<i>240 Ah</i>	<i>360 Ah</i>
	7.5 A	4 Ah	16 Ah	20 Ah	36 Ah	60 Ah	<i>72 Ah</i>	<i>130 Ah</i>	<i>180 Ah</i>	<i>360 Ah</i>	<i>480 Ah</i>
10 A	4 Ah	20 Ah	28 Ah	48 Ah	72 Ah	<i>100 Ah</i>	<i>180 Ah</i>	<i>240 Ah</i>	<i>480 Ah</i>	<i>720 Ah</i>	

Notes:

- 1) "Min" time refers to facilities using an emergency generator where the batteries are only required to operate the system for under 3 minutes until the generator takes over. Ah refers to ampere hour.
- 2) UL Standard require 4 hours of battery operation followed by a 24 hour recharge period and then a second four hours of operation.
- 3) Standard Sargent power supplies can only charge up to a 20 Ah pack.  
If a larger pack is called for, the factory must be alerted to supply modified equipment. Larger packs are shown in italics in the chart.
- 3) Batteries must be sealed lead acid or gel cell type. Dry cells will not recharge and will be damaged.
- 4) The chart above is valid when batteries are operating at room temperature; in a cold environments, capacity is reduced.
- 5) Batteries should be replaced after 5 years of use.

### 3.4 EMERGENCY RELEASE TERMINALS

The LED illuminates when the power module or batteries are operating. +V is terminated at terminal F1, a connection is then made between terminals F1 and F2 before +V is routed to the "P" terminals (Fig. 2 and 3). Terminals F1 and F2 constitute an emergency release point. Note: An NC contact, controlled by the user's fire alarm system, can be connected across terminals F1 and F2 so the connection between these terminals will be broken in the event of a fire. UL listed auxiliary latching normally closed contacts\* must not be used. This will automatically release all the power to devices being driven by the unit. If the emergency release terminals are not to be used in this way, a jumper should be placed between F1 and F2, so the board's output terminals will function. Ensure that the switching capability of any switch or relay contacts placed across F1 and F2 can handle the full output load of the power supply.



Fig. 2 Emergency Release

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## 3.5 OUTPUT TERMINALS

The CCS board has three types of output terminals. “P” terminals are on individual circuit breakers carrying +12 or +24 volts (when the emergency release terminals are closed). The “H” terminal carries the full +V output of the supply on a single terminal (when F1 and F2 are closed). Use the “H” terminal for applications where the powered device requires more than 2 Amps of current. The Polyswitch circuit breakers cannot reliably supply more than 2 Amps of current without tripping. Never wire multiple “P” terminals in parallel to supply increased current. This bypasses the safety role of the Polyswitch breakers and defeats the purpose of this circuit protection. When two “P” terminals are wired in parallel, current carrying capacity is not doubled. The current conducted through the two terminals will not be identical, so one switch will trip and then immediately the second will trip. When “P” terminals are correctly used as isolated outputs, each is inherently current limited to Class 2 standards. Finally, the “R” terminals are for 0 volt DC negative return and are common.

\* A trouble contact is a contact closure that comes from the fire panel. A trouble contact is energized when a fire panel experiences an integrity issue either internal to the panel or wiring to the panel.

## 3.6 FUSING AND CIRCUIT POLYSWITCHES

The board includes: an AC fuse, DC fuse and four (CCS-4) or eight (CCS-8) polyswitches (Fig. 3). The AC fuse is on the hot 120 VAC input and protects against an internal short in the power supply transformer. Abnormal or overload conditions presented on the CCS-4 or CCS-8 output(s) will not be protected by the AC Fuse. The DC fuse protects the full DC output of the supply before it is divided through the Polyswitches, providing a special type of automatic circuit breaker to the individual “P” outputs. If one of the Polyswitches receives an overload, it will rapidly cut the current down to a small leakage current (about 100mA) allowing the rest of the installation to continue to operate.

Note: Each “P” output includes a slide switch and LED. The slide switch cuts DC power to its respective output and the LED monitors when the output is powered. When a Polyswitch trips, the associated LED will also go out. If all the LED’s go out, one of the fuses has tripped or the power supply has gone into automatic shut off (discussed later). Always replace any blown fuse with the same rated fuse.

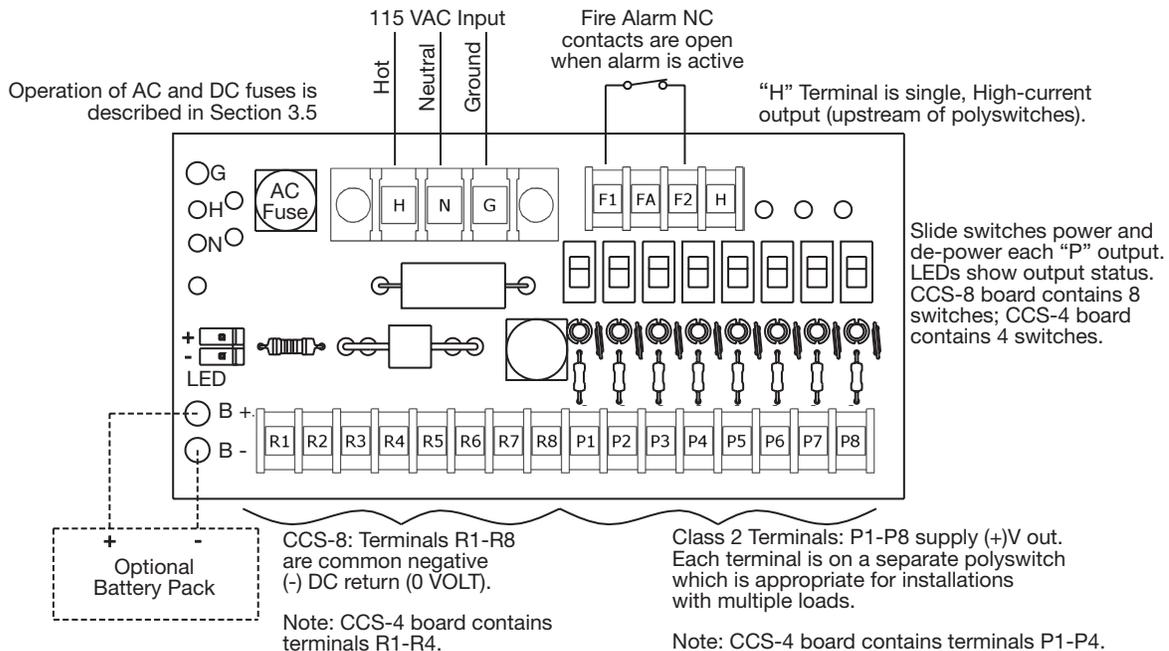


Fig. 3 Power Supply Wiring With CCS-8 Board

The DC fuse should only trip if there is a short circuit in the supply itself (downstream short circuits or overloads will trip individual Polyswitches). This could occur if the F1-H terminal block somehow contacts DC negative. Alternately, if you are not using the “P” terminals for downstream wiring but are using the “H” terminal to operate an individual, high current, downstream load, a short circuit or overload could trip the DC fuse.

SARGENT’s power supply family contains an additional safety feature which is automatic shut off in the event of a DC short circuit or overload. This is often called a “crowbar” circuit. When you are using the power supply without batteries, a DC short circuit will usually cause the power supply to shut itself off rather than tripping any fuse or Polyswitch. If batteries are implemented, however, they will attempt to drive into the load as soon as the short circuit or overload occurs and the fuses and/or Polyswitches will trip to maintain safety.

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If this happens, there is a reset procedure. First, correct the overload condition. Next, remove all current from the Polyswitch for a period of 10 seconds by moving the associated slide switch to the “off” position. Wait 10 seconds, return the slide switch to “on”; operation will return to normal. Without correction to the overload, the Polyswitch will trip again; de-power and re-power the Polyswitch to reset. Table 3 provides summary information on how the operation of the power supply safety features are used with and without batteries.

The DC fuse should only trip if there is a short circuit in the supply itself (downstream short circuits or overloads will trip individual Polyswitches). This could occur if the F1-H terminal block somehow contacts DC negative. Alternately, if you are not using the “P” terminals for downstream wiring but are using the “H” terminal to operate an individual, high current, downstream load, a short circuit or overload could trip the DC fuse.

Table 3 Safety Features

	AC FUSE	DC FUSE	POLYSWITCH	AUTO SHUTOFF
Without Batteries	Will trip only if internal transformer shorts (all LED's will be out).	Generally will not trip. Supply will go into auto shut-off in case of overload (all LED's will be out).	Generally will not trip. Supply will go into auto shut-off in case of overload* (all LED's will be out).	Will generally occur in the case of any short or overload (all LED's will be out).
With Batteries	Will trip only if internal transformer shorts (all LED's will be out).	Will trip if terminal F1, F2 or H shorts to negative or in case of overload when terminal H is used as single output (all LED's will be out).	Will trip in event of individual zone short or overload (individual zone LED will be out).	Batteries drive into short or overload which trips another safety feature unless overload current is less than fuse or Polyswitch rating.

Note: Polyswitches can individually trip in overload condition without batteries or in special case where overload current is greater than polyswitch trip current (2.5 Amps) but less than power supply output capacity. This is unusual. A pure short circuit is more common and this will put the supply into auto shut-off.

### 3.7 ADDING BATTERIES TO A 3500 SERIES POWER SUPPLY

To connect batteries, follow these directions:

1. Install batteries as shown (Fig. 4).
2. The voltage adjustment potentiometer V.ADJ (Fig. 1) must be set without the batteries connected. The voltage should be read at the flying leads of the battery connection.
3. Set the voltage output by rotating the V. ADJ potentiometer on the power supply module to 13.5 volts for 12 volt supplies; and 27 volts for 24 volt supplies (Fig. 1).

**IMPORTANT:** Cutting and removing the WARNING label is necessary to make connection and indicates understanding and acceptance of the conditions and settings necessary for proper operation.

4. Connect the black flying lead to battery negative (-) and the red flying lead to battery positive (+) (Fig. 3).



Fig. 4 Power Supply With Batteries Installed

### 3.8 CODE APPROVED WIRING METHODS

These units are Class 2 rated. This means that the individual DC outputs of the supplies (on “P” terminals) are current limited and can pose neither a high voltage nor high energy hazard outside of the enclosure. Electrical building codes in most jurisdictions permit Class 2 wiring to be done “in the open” rather than in conduit. To maintain the Class 2 ratings on the “P” terminal outputs, never connect them together to obtain higher capacity. If you require higher capacity, use the “H” terminal. The “H” terminal is high current (not Class 2) and generally must be in conduit. The line voltage wiring coming into the unit must generally be in conduit as it poses a high voltage hazard. Be sure to check with your local building department to make sure you are complying with applicable wiring codes before installing these units.

## 4. APPROVALS

All SARGENT power supplies are tested by various agencies. Consult the label inside the supply to be advised of current approval status.