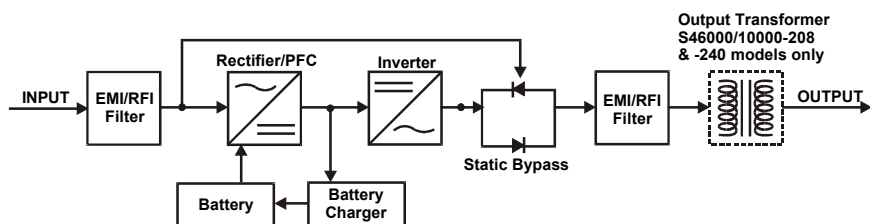


# MAJOR COMPONENTS



## EMI /RFI FILTERS

These UPS components provide surge protection, and filter both electromagnetic interference (EMI) and radio frequency interference (RFI). They minimize any surges or interference present in the utility line and keep the sensitive equipment protected.

## RECTIFIER/POWER FACTOR CORRECTION (PFC) CIRCUIT

In normal operation, the rectifier/power factor correction (PFC) circuit converts utility AC power to regulated DC power for use by the inverter, while ensuring that the wave shape of the input current used by the UPS is near ideal. Extracting this sinewave input current achieves two objectives: the utility power is used as efficiently as possible by the UPS, and the amount of distortion reflected on the utility is reduced. This results in cleaner power being available to other devices in the building not being protected by the Series 4000.

## INVERTER

In normal operation, the inverter utilizes the DC output of the power factor correction circuit and “inverts” it into precise, regulated sinewave AC power. Upon a utility power failure, the inverter receives its required energy from the battery through the Rectifier / PFC. In both modes of the operation, the UPS inverter is on-line and continuously generating clean, precise, regulated AC output power.

## BATTERY CHARGER

The battery charger utilizes energy from the Rectifier / PFC and precisely regulates it to continuously “float” charge the battery system. The battery system charges whenever the Series 4000 is connected to utility power.

## BATTERY

The Series 4000 employs valve regulated, nonspillable, lead acid batteries. At a typical room temperature (70° F) and with the UPS float charging, the battery system will last many years. Optional external battery cabinets are available to provide extended run times.

## **STATIC BYPASS**

The Series 4000 provides an alternate path for utility power to the connected load, in the unlikely event of a UPS malfunction. Should the UPS have an overload, over temperature, or UPS failure condition, the UPS automatically transfers the connected load to **BYPASS** providing the bypass voltage is within specification. **BYPASS** operation is indicated by an alarm and an illuminated **BYPASS** LED (other LED's may be illuminated to indicate any diagnosed problem). The load may also be transferred to BYPASS using the control panel.

**NOTE:** The **BYPASS** power path does NOT protect the connected equipment from disturbances on the utility supply and its range of operation is limited to +/- 17% of the nominal input supply voltage.

## **AUTO RE-START**

Upon restoration of the utility AC power after a utility power outage and complete battery discharge, the UPS will automatically restart and supply power to the critical load and the battery charger will automatically recharge the battery.

# INSTALLATION

These instructions are for use by competent personnel only.

## INSTALLATION CONSIDERATIONS

Detailed instructions to help you install the UPS are provided in the following pages; however, you should give some consideration to the proposed environment in which the UPS is to be installed, and carry out some preparatory work.

## UNPACKING AND INSPECTION

Follow unloading instructions printed on the carton. Do not discard any packaging until installation is complete, check that you have removed to a safe place the user manual, stabilizing brackets, and any other items shipped with the unit to be used in its installation.

**CAUTION:** S46000 UPS weighs up to 173kg (381lbs) and the S410000 UPS weighs up to 287kg (633lbs). Use adequate handling aids when moving or installing the UPS. The UPS is fitted with castor wheels for easy movement. Take care when the UPS is removed from its packing and being wheeled across an uneven floor without the stabilizers fitted, that it does not tip over.

Before you install the UPS, give it a thorough visual examination to ensure it has not been subjected to shipping damage. If it is not in perfect condition, you should advise both the shipper and the supplier immediately. **DO NOT ATTEMPT TO INSTALL A DAMAGED UPS.**

**IMPORTANT** - Check the UPS rating plate that the UPS is suitable for operation on your UTILITY voltage and load voltage requirements before installing.

## LOCATION

Locate the Series 4000 indoors in a controlled environment, where it cannot be accidentally disconnected. Locate it in an area with unrestricted airflow, away from water, flammable liquids, gases, corrosives, or conductive contaminants.

Air vents are located at the front and the rear of the UPS. Do not position the UPS in an enclosed space where airflow is restricted. Allow at least 150mm (6 inches) free space around the UPS, with a minimum of 300mm (12 inches) at the back to enable easy operator access to the rear panel mounted input/output/battery circuit breakers.

Electrical maintenance/servicing requires access to all four sides of the UPS, provide the necessary free space or use a flexible wiring system to allow the UPS to be pulled forward.

Maintain an ambient temperature range of 0 - +40° centigrade (32-104° F)

**NOTE-** UPS operation in temperatures above 25°C (77°F) reduces battery life.

Model	AIRFLOW		DISSIPATION*		OUTPUT RATING**	
	Cfm	m <sup>3</sup> /h	Watts	K Btu/hr	VA	Watts
S46000	130	221	504	1.7	6000	4200
S410000	270	459	840	2.8	10000	7000

\* Increase dissipation 25% for -208 and -240 transformer models.

\*\* Decrease output rating 10% for the S46000/10000 & -208 models.

## ELECTRICAL INSTALLATION CONSIDERATIONS

This UPS must be installed by competent electrical personnel and wired in accordance with local/national electrical codes.

The following information is provided for your guidance.

On start-up, the UPS will take a half cycle inrush current of up to 3 times the rated current. This must be taken into account when selecting the overload protection device at the input Utility supply distribution point. To avoid random tripping on start-up, we recommend that the input Utility supply be protected with an MCB capable of withstanding this initial inrush.

The utility input supply cable must be connected to the UPS via a wall mounted double pole circuit breaker, rated to carry the input current and be capable of breaking the maximum prospective short circuit current of this branch circuit. The breaker is to be mounted within six feet of the UPS and be readily accessible to the operator.

## ELECTRICAL CONNECTIONS

The UPS is supplied with an input/output/battery terminal block assembly on the rear of the UPS within a cable box. (see outline drawing) The cable box (gland plate) can be removed to enable knockouts to be removed, or new holes drilled, to secure the cables.

The cable sizes and distribution methods used during installation are subject to local/national electrical codes of practice, and therefore are not detailed here. The following tables detail the standard current ratings. The UPS rating plate gives details of the current ratings for alternative output voltages.

The terminals will accept wire sizes up to the values below:

S46000 = 8 AWG                      Recommended for all S46000 wiring.

S410000 = 6 AWG                    Recommended for all S410000 wiring.

(75°C copper wire)

Terminal tightening torque is 35 in-lb.

**Connecting the UPS Power cables**

Power cables connect to screw terminals on a terminal block that is located behind the rear mounted cable box (see figure). Permanent wiring must be routed to the cable box using appropriate materials as required by local codes.

**Connection of optional remote battery cabinets**

Full installation instructions are provided with these cabinets. Safety/EMC certification limits the use of these terminals to Sola supplied options.

**Properly grounded (earthed) equipment provide multiple benefits**

High quality ground (earth) connections are required for the equipment ground conductors (protective earth) and grounding electrode conductor (power system earth connection) to reduce electrical noise and provide for safe operation of the UPS and connected loads. Conduit used alone without a grounding conductor wire is not an acceptable connection. Size ground (protective earth) conductors equal to circuit conductors.

# S46000 / S410000 UPS ONLY

The S46000/10000 models are NOT fitted with an isolating output transformer and are NOT separately derived sources under the NEC. The output L1 terminal is connected to the input L1 terminal and must not be connected to ground at the UPS (see NEC 250-5d, 250-26, 250.91, 250.92).

## S46000 CONNECTIONS

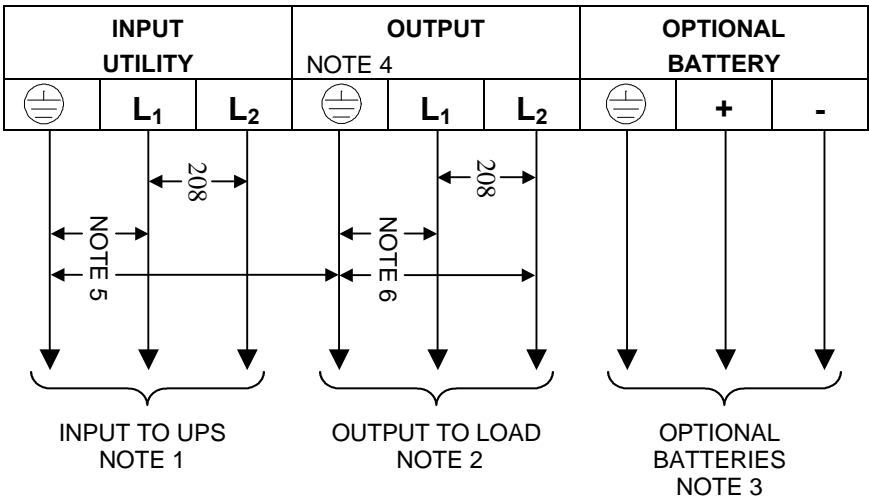
CONNECTION	CURRENT RATING	Recommended Wire Size	Recommended External Overcurrent Protection
INPUT	28 AMPS	8 AWG (10 mm <sup>2</sup> )	40 AMPS
OUTPUT	26 AMPS	8 AWG (10 mm <sup>2</sup> )	
BATTERY	23 AMPS	8 AWG (10 mm <sup>2</sup> )	

SIZE GROUNDING (PROTECTIVE EARTH) CONDUCTORS EQUAL TO CIRCUIT CONDUCTORS

## S410000 CONNECTIONS

CONNECTION	CURRENT RATING	Recommended Wire Size	Recommended External Overcurrent Protection
INPUT	45 AMPS	6AWG (16 mm <sup>2</sup> )	60 AMPS
OUTPUT	43 AMPS	6AWG (16 mm <sup>2</sup> )	
BATTERY	37 AMPS	6AWG (16 mm <sup>2</sup> )	

SIZE GROUNDING (PROTECTIVE EARTH) CONDUCTORS EQUAL TO CIRCUIT CONDUCTORS



## **NOTES FOR S46000 / S410000 UPS ONLY**

1. The installer must provide circuit breaker protection according to local codes. The UTILITY disconnect must be within sight of the UPS. Maintain service space around the UPS or use flexible conduit.
2. The installer must provide output distribution panels and circuit breaker protection according to local codes. Output circuits must not share a common conduit with input circuits or any other wiring.
3. Refer to the manual provided with any optional battery cabinets.
4. This unit does NOT contain an isolating transformer. It is NOT a separately derived source. System grounding is provided at the UTILITY. Do not connect any output circuit conductor to ground at the UPS.
5. The UTILITY may be derived from a single-phase or three-phase source. The line to ground voltages are dependant upon the grounding of the UTILITY. Do not use a floating AC source.
6. Output L1 is connected directly to the Input L1. The line-ground voltages will match the input line-ground voltages.

# S46000-208 / S410000-208 UPS ONLY

Models whose part number ends with a “208” are fitted with a single-phase isolating output transformer and are separately derived sources. The output neutral is already bonded to ground on the output terminals with a Bonding Jumper (see NEC 250-5d, 250-26, 250.91, 250.92). The output L1 and L2 terminals are not connected to the input L1 and L2.

## S46000-208 CONNECTIONS

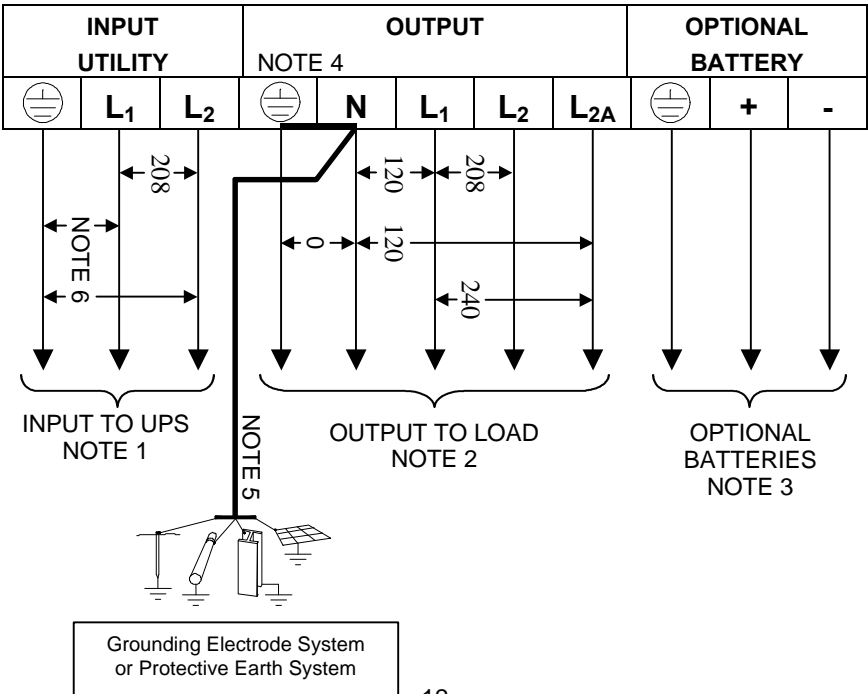
CONNECTION	CURRENT RATING	Recommended Wire Size	Recommended External Overcurrent Protection
INPUT	28 AMPS	8 AWG (10 mm <sup>2</sup> )	40 AMPS
OUTPUT @ 208V	26 AMPS	8 AWG (10 mm <sup>2</sup> )	
OUTPUT @ 120V	22.5 AMPS	8 AWG (10 mm <sup>2</sup> )	
BATTERY	33 AMPS	8 AWG (10 mm <sup>2</sup> )	

SIZE GROUNDING (PROTECTIVE EARTH) CONDUCTORS EQUAL TO CIRCUIT CONDUCTORS

## S410000-208 CONNECTIONS

CONNECTION	CURRENT RATING	Recommended Wire Size	Recommended External Overcurrent Protection
INPUT	45 AMPS	6AWG (16 mm <sup>2</sup> )	60 AMPS
OUTPUT @ 208V	43 AMPS	6AWG (16 mm <sup>2</sup> )	
OUTPUT @ 120V	37.5 AMPS	6AWG (16 mm <sup>2</sup> )	
BATTERY	39 AMPS	6AWG (16 mm <sup>2</sup> )	

SIZE GROUNDING (PROTECTIVE EARTH) CONDUCTORS EQUAL TO CIRCUIT CONDUCTORS





## **NOTES FOR S46000-208 / S410000-208 UPS ONLY**

1. The installer must provide circuit breaker protection according to local codes. The utility disconnect must be within sight of the UPS. Maintain service space around the UPS or use flexible conduit.
2. The installer must provide output distribution panels, circuit breaker protection, or emergency disconnect switches according to local codes. Output circuits must not share a common conduit with input circuits or any other wiring. **IMPORTANT** - Distribute any 120VAC loads evenly between L1 AND L2A. Do not connect loads between the output terminals L2-N or L2-L2A. These are not standard voltages.
3. Refer to the manual provided with any optional battery cabinets.
4. The single-phase isolating output transformer is a separately derived source. The output neutral is already bonded to ground on the output terminals with a Bonding Jumper. No other bonding wire is needed. (see NEC 250-5d, 250-26, 250.91, 250.92)
5. Install an 8 AWG (10 mm<sup>2</sup>) (75° C copper wire) (minimum size, see NEC 250-5d, 250-81, 250-83, table 250-94) grounding electrode conductor between the grounded circuit conductor (neutral) and the nearest effectively grounded metal structural member, nearest effectively grounded metal water pipe, or other grounding electrode in the grounding electrode system. If the grounding electrode conductor must be protected, non-metal conduit is recommended. If metal conduit must be used, bond both ends of the conduit to the grounding electrode conductor. Conduit is not an acceptable grounding electrode conductor.
6. The utility may be derived from a single-phase or three-phase source. The line to ground voltages are dependant upon the grounding of the utility and do not affect the output voltages. Do not use a floating AC source.

## S46000-240 / S410000-240 ONLY

Models whose part number ends with a “240” are fitted with a single-phase isolating output transformer and are separately derived sources. The output neutral is already bonded to ground on the output terminals with a Bonding Jumper (see NEC 250-5d, 250-26, 250.91, 250.92). The output L1 and L2 terminals are not connected to the input L1 and L2.

### S46000-240 CONNECTIONS

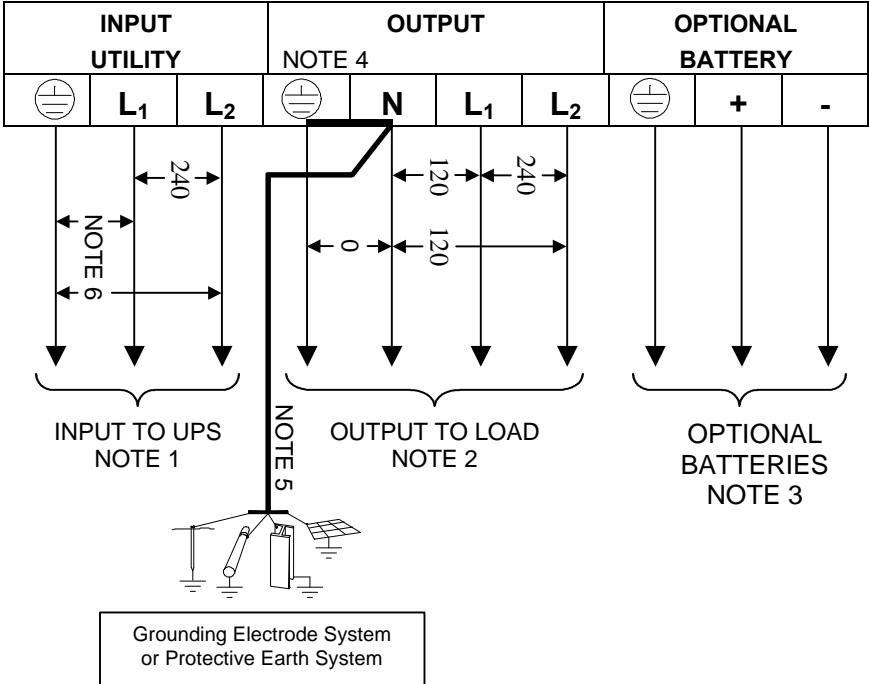
CONNECTION	CURRENT RATING	Recommended Wire Size	Recommended External Overcurrent Protection
INPUT	27 AMPS	8 AWG (10 mm <sup>2</sup> )	40 AMPS
OUTPUT @ 230V	25 AMPS	8 AWG (10 mm <sup>2</sup> )	
OUTPUT @ 120V	25 AMPS	8 AWG (10 mm <sup>2</sup> )	
BATTERY	27 AMPS	8 AWG (10 mm <sup>2</sup> )	

SIZE GROUNDING (PROTECTIVE EARTH) CONDUCTORS EQUAL TO CIRCUIT CONDUCTORS

### S410000-240 CONNECTIONS

CONNECTION	CURRENT RATING	Recommended Wire Size	Recommended External Overcurrent Protection
INPUT	44 AMPS	6AWG (16 mm <sup>2</sup> )	60 AMPS
OUTPUT @ 230V	42 AMPS	6AWG (16 mm <sup>2</sup> )	
OUTPUT @ 120V	41.5 AMPS	6AWG (16 mm <sup>2</sup> )	
BATTERY	44 AMPS	6AWG (16 mm <sup>2</sup> )	

SIZE GROUNDING (PROTECTIVE EARTH) CONDUCTORS EQUAL TO CIRCUIT CONDUCTORS



## **NOTES FOR S46000-240 / S410000-240 ONLY**

1. The installer must provide circuit breaker protection according to local codes. Maintain service space around the UPS or use flexible conduit.
2. The installer must provide output distribution panels, circuit breaker protection, or emergency disconnect switches according to local codes. Output circuits must not share a common conduit with input circuits or any other wiring. **IMPORTANT** - Distribute any 120VAC loads evenly between L1 AND L2.
3. Refer to the manual provided with any optional battery cabinets.
4. The single-phase isolating output transformer is a separately derived source. The output neutral is already bonded to ground on the output terminals with a Bonding Jumper. (see NEC 250-5d, 250-26, 250.91, 250.92)
5. Install an 8 AWG (10 mm<sup>2</sup>) (75° C copper wire) (minimum size, see NEC 250-5d, 250-81, 250-83, table 250-94) grounding electrode conductor between the grounded circuit conductor (neutral) and the nearest effectively grounded metal structural member, nearest effectively grounded metal water pipe, or other grounding electrode in the grounding electrode system. If the grounding electrode conductor must be protected, non-metal conduit is recommended. If metal conduit must be used, bond both ends of the conduit to the grounding electrode conductor. Conduit is not an acceptable grounding electrode conductor.
6. The utility may be derived from a single-phase or three-phase source. The line to ground voltages are dependant upon the grounding of the utility and do not affect the output voltages. Do not use a floating AC source.