

Installation

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Introduction

Qualified Persons

WARNING

Only qualified persons who are knowledgeable in the installation, operation, and maintenance of overhead and underground electric distribution equipment, along with all associated hazards, may install, operate, and maintain the equipment covered by this publication. A qualified person is someone who is trained and competent in:

- The skills and techniques necessary to distinguish exposed live parts from nonlive parts of electrical equipment
- The skills and techniques necessary to determine the proper approach distances corresponding to the voltages to which the qualified person will be exposed
- The proper use of special precautionary techniques, personal protective equipment, insulated and shielding materials, and insulated tools for working on or near exposed energized parts of electrical equipment

These instructions are intended only for such qualified persons. They are not intended to be a substitute for adequate training and experience in safety procedures for this type of equipment.

Read this Instruction Sheet

NOTICE

Thoroughly and carefully read this instruction sheet and all materials included in the product's instruction handbook before installing or operating the Constant-Burden Battery Charger. Become familiar with the Safety Information and Safety Precautions on pages 3 and 4. The latest version of this publication is available online in PDF format at <https://www.sandc.com/en/contact-us/product-literature/>.

Retain this Instruction Sheet

This instruction sheet is a permanent part of the Type AS-1A or AS-10 Switch Operator constant burden battery charger. Designate a location where users can easily retrieve and refer to this publication.

Proper Application

WARNING

The equipment in this publication is only intended for use with AS-1A or AS-10 Switch Operators. The application must be within the ratings furnished for the equipment. For more information on ratings and application information for the AS-1A and AS-10 Switch Operators, see S&C Specification Bulletin 769-31.

Warranty

The warranty and/or obligations described in S&C's Price Sheet 150, "Standard Conditions of Sale—Immediate Purchasers in the United States," (or Price Sheet 153, "Standard Conditions of Sale—Immediate Purchasers Outside the United States"), plus any special warranty provisions, as set forth in the applicable product-line specification bulletin, are exclusive. The remedies provided in the former for breach of these warranties shall constitute the immediate purchaser's or end user's exclusive remedy and a fulfillment of the seller's entire liability. In no event shall the seller's liability to the immediate purchaser or end user exceed the price of the specific product that gives rise to the immediate purchaser's or end user's claim. All other warranties, whether express or implied or arising by operation of law, course of dealing, usage of trade or otherwise, are excluded. The only warranties are those stated in Price Sheet 150 (or Price Sheet 153), and THERE ARE NO EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ANY EXPRESS WARRANTY OR OTHER OBLIGATION PROVIDED IN PRICE SHEET 150 (OR PRICE SHEET 153) IS GRANTED ONLY TO THE IMMEDIATE PURCHASER AND END USER, AS DEFINED THEREIN. OTHER THAN AN END USER, NO REMOTE PURCHASER MAY RELY ON ANY AFFIRMATION OF FACT OR PROMISE THAT RELATES TO THE GOODS DESCRIBED HEREIN, ANY DESCRIPTION THAT RELATES TO THE GOODS, OR ANY REMEDIAL PROMISE INCLUDED IN PRICE SHEET 150 (OR PRICE SHEET 153).

Understanding Safety-Alert Messages

Several types of safety-alert messages may appear throughout this instruction sheet and on labels and tags attached to the Constant-Burden Battery Charger. Become familiar with these types of messages and the importance of these various signal words:

⚠ DANGER
“DANGER” identifies the most serious and immediate hazards that will likely result in serious personal injury or death if instructions, including recommended precautions, are not followed.


⚠ WARNING
“WARNING” identifies hazards or unsafe practices that can result in serious personal injury or death if instructions, including recommended precautions, are not followed.

⚠ CAUTION
“CAUTION” identifies hazards or unsafe practices that can result in minor personal injury if instructions, including recommended precautions, are not followed.

NOTICE
“NOTICE” identifies important procedures or requirements that can result in product or property damage if instructions are not followed.

Following Safety Instructions

If any portion of this instruction sheet is unclear and assistance is needed, contact the nearest S&C Sales Office or S&C Authorized Distributor. Their telephone numbers are listed on S&C’s website sandc.com, or call the S&C Global Support and Monitoring Center at 1-888-762-1100.

NOTICE	
Read this instruction sheet thoroughly and carefully before installing the Constant-Burden Battery Charger.	

Replacement Instructions and Labels

If additional copies of this instruction sheet are required, contact the nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

It is important that any missing, damaged, or faded labels on the equipment be replaced immediately. Replacement labels are available by contacting the nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

DANGER



Switch operators operate at high voltage. Failure to observe the precautions below will result in serious personal injury or death.

Some of these precautions may differ from company operating procedures and rules. Where a discrepancy exists, users should follow their company's operating procedures and rules.

1. **QUALIFIED PERSONS.** Access to switches and controls must be restricted only to qualified persons. See the "Qualified Persons" section on page 2.
2. **SAFETY PROCEDURES.** Always follow safe operating procedures and rules.
3. **PERSONAL PROTECTIVE EQUIPMENT.** Always use suitable protective equipment, such as rubber gloves, rubber mats, hard hats, safety glasses, and flash clothing in accordance with safe operating procedures and rules.
4. **SAFETY LABELS AND TAGS.** Do not remove or obscure any of the "DANGER," "WARNING," "CAUTION," or "NOTICE" labels and tags. Remove tags ONLY if instructed to do so.
5. **ENERGIZED COMPONENTS.** Always consider all parts live until de-energized, tested, and grounded.
6. **LOAD-INTERRUPTER SWITCH POSITION.** Always confirm the **Open/Close** position of load-interrupter switches by visually observing the position of the blades. Switches may be energized from either side and with the blades in any position.
7. **MAINTAINING PROPER CLEARANCE.** Always maintain proper clearance from energized components.
8. **OPERATION.** Circuit making and breaking is involved in the normal operation of this interrupter switch and, as a result, "partway" opening or closing is undesirable. To operate, see S&C Instruction Sheet 769-501.

The S&C Constant-Burden Battery Charger, catalog number MA-1050, is expressly designed for 12-Vdc battery-charging duty in applications where alternating current input is derived from an S&C 30-Volt-Ampere Potential Device.● This battery charger is typically used with S&C Type AS-1A and AS-10 Switch Operators when they are ordered for 12-Vdc operation.■

The battery charger presents a constant burden to its power source. Hence, the S&C Potential Device normally used to supply the battery charger can also be used for system line-to-ground voltage sensing because its output voltage is unaffected by variations in output from the battery charger. The battery charger input current is unaffected by variations in output, including those caused by changes in the state of charge of the battery and short-circuiting or open-circuiting of the battery charger output terminals.

Neither the battery charger nor its supply source can be damaged by a short circuit or an open circuit at the battery charger output terminals.

The battery charger has a regulated output, with an adjustable output voltage setting (factory-set at 13.3 Vdc). The circuitry design prevents discharge of the battery should the input voltage to the battery charger or the input voltage to the battery charger be lost or a component within the battery charger fails.

For example, if the milliammeter should “open,” a shunting diode will instantly provide an alternate path for the charging current to the battery-with no change in the charge rate or output voltage. Additionally, surge suppression is provided to prevent damage from transients on the power system.

● Although the battery charger is designed for use with the S&C 30-Volt-ampere Potential Device, other 120-Vac sources may be used.

■ S&C Type AS-1A and AS-10 Switch Operators for 12-Vdc operation are furnished with a truck battery.

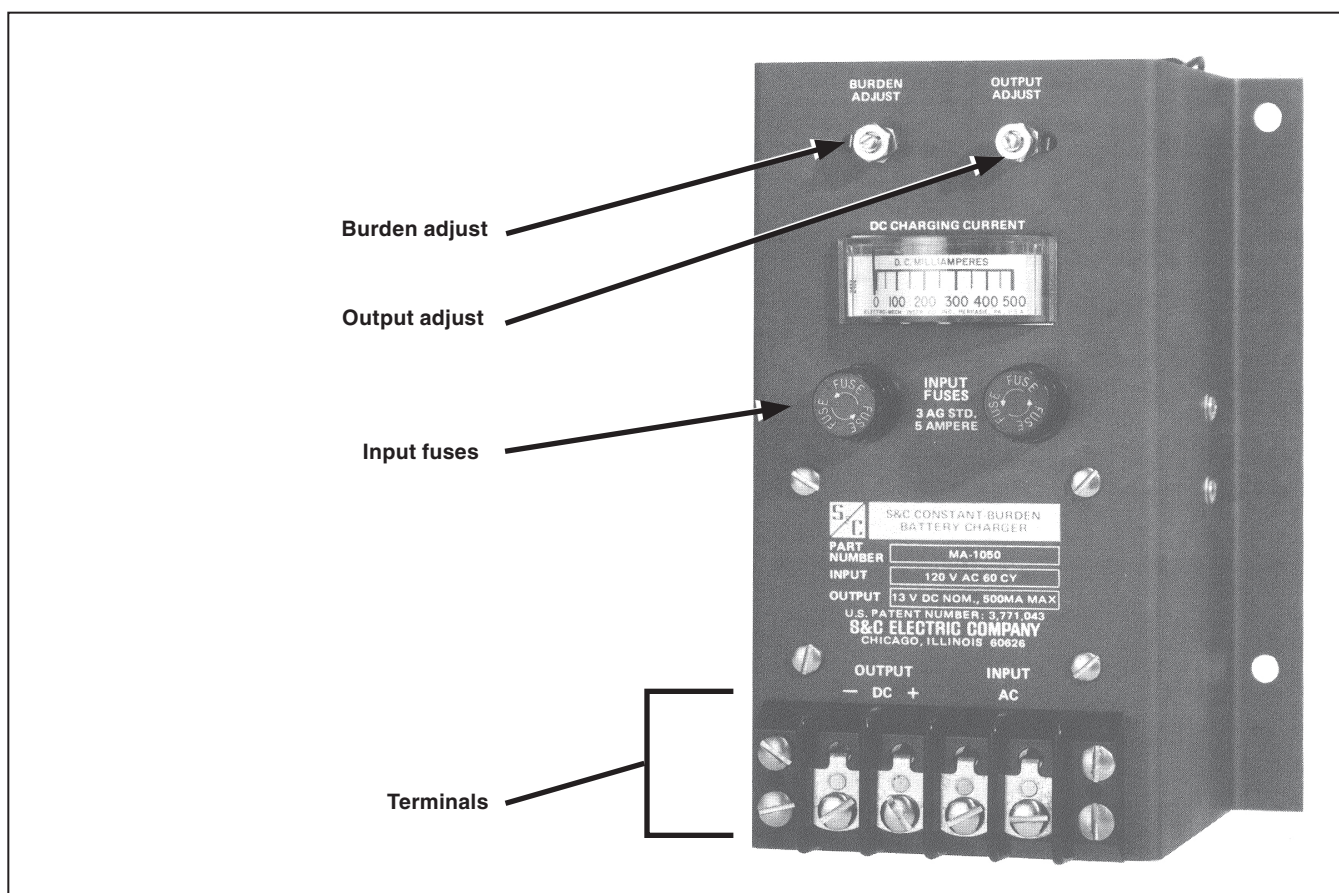


Figure 1. The Constant-Burden Battery Charger faceplate.

Installation

Test Instruments and Tools Required

When high-voltage conductors are to be connected using aluminum-alloy body connectors the following procedures should be employed:

- A voltmeter, with sensitivity of at least 5000 ohms per Volt for checking the 120-Vac input to the battery charger and the 13.3-Vdc output of the charger●
- Small and medium screwdrivers for adjusting the controls of the battery charger and for the terminal-block screws
- A 5/16-inch open-end wrench or adjustable-jaw wrench for loosening and tightening the locking nuts of the battery-charger controls

⚠ CAUTION

The Constant-Burden Battery Charger operates at 120 Vac. To avoid electric shock, follow your company's safety practices when working on 120 Vac equipment.

For Use with S&C Potential Device

Complete the following steps to set up the Constant-Burden Battery Charger for use with an S&C Potential Device:

- STEP 1.** Close the potential device grounding switch using the operating lever on the base of the device. When closed (lever in the **Down** position), the switch grounds and short-circuits the output terminals and applies a dummy burden to the secondary winding of the potential device's transformer.
- STEP 2.** If an external burden-adjusting resistor ■(in the form of an adjustable resistor connected across the output circuit of the potential device) is used, adjust it to the midsetting or midpoint of its slider adjustment.
- STEP 3.** Connect the potential-device output circuit to the input terminals of the battery charger.
- STEP 4.** Short-circuit the output terminals of the battery charger with a jumper.
- STEP 5.** Set the Burden Adjust control of the battery charger to its maximum (full clockwise) setting.
- STEP 6.** Open the potential-device grounding switch to energize the battery charger.
- STEP 7.** Adjust the external burden-adjusting resistor (see Step 1) to attain a reading of 110 Vac at the charger input terminals. (The potential device

grounding switch should be closed when incremental adjustments are made.)

- STEP 8.** Set and lock the Burden Adjust control of the battery charger to attain a reading of 200 milliamperes on the "dc charging current" meter of the battery charger.
- STEP 9.** Readjust the external burden-adjusting resistor to attain a reading of 120 Vac at the charger's input terminals. (The potential device grounding switch should be closed when incremental adjustments are made.)
- STEP 10.** Close the potential device grounding switch to de-energize the battery charger.
- STEP 11.** Remove the short-circuiting jumper from the battery charger's output terminals.

If the output voltage needs to be changed from its factory-set value of 13.3 Vdc ▲, energize the charger and use the Output Adjust control to attain the required voltmeter reading at the output terminals of the battery charger.

- STEP 12.** Make sure the potential device grounding switch is closed to de-energize the battery charger.
- STEP 13.** Connect the battery charger output terminals to the battery terminals.

NOTICE

The battery charger's positive (+) output terminal must be connected to the battery's positive (+) terminal. Similarly, the battery charger's negative (-) output terminal must be connected to the battery's negative (-) terminal.

- STEP 14.** Attach the voltmeter leads to the output terminals of the battery charger so battery voltage can be noted before the charger is energized.

● A Volt-ohm-milliammeter such as a Simpson Model 260 or Triplett Model 630 is suitable.

■ The Volt-amperes of the total connected burden must equal the 30-Volt-ampere output of the potential device See S&C Instruction Sheet 581-500.

▲ Not recommended by S&C but may be required by some users.

STEP 15. Open the potential device grounding switch and, at the same time, measure the battery charger's output voltage and observe the dc-charging current shown on the charger's milliammeter. As the output recovers to 13.3 Vdc, the charging current will taper off to a "trickle charge" level.

For example, for a fully charged, 80-ampere hour rated battery, the charging current may read as low as 20 milliamperes at -40°F (-40°C) or as high as 150 milliamperes at +160°F (+71°C) ambient temperature. For a 160-ampere-hour rated battery, corresponding current values will be twice as great as for an 80-ampere-hour rated battery.

Note: These instructions assume starting with a fully charged battery. If the battery is severely discharged, charging by other means is recommended in order to build up a useful charge within a reasonable time. Otherwise, several days may be required to recharge a severely discharged battery with this battery charger.

For Use with Other 120-Vac Power Sources

Complete the following steps to set up the Constant-Burden Battery Charger for use with an 120-Vac power source:

- STEP 1.** Connect the de-energized 120-Vac power source to the battery charger's input terminals.
- STEP 2.** Short-circuit the battery charger output terminals with a jumper.
- STEP 3.** Set the battery charge's Burden Adjust control to its maximum (full clockwise) setting.
- STEP 4.** Energize the battery charger.
- STEP 5.** Set and lock the battery charger's Burden Adjust control to attain a reading of 225 milliamperes on the battery charger's "dc charging current" meter.
- STEP 6.** De-energize the battery charger.
- STEP 7.** Remove the short-circuiting jumper from the output terminals of the battery charger. If the output voltage needs to be changed from its

factory-set value of 13.3 Vdc●, energize the charger and use the Output Adjust control to attain the required voltmeter reading at the battery charger's output terminals.

- STEP 8.** Make sure the 120-Vac source is de-energized.
- STEP 9.** Connect the battery charger output terminals to the battery terminals.

NOTICE

The battery charger's positive (+) output terminal must be connected to the battery's positive (+) terminal. Similarly, the battery charger's negative (-) output terminal must be connected to the battery's negative (-) terminal.

- STEP 10.** Make sure the 120-Vac source is de-energized.
 - STEP 11.** Attach the voltmeter leads to the battery charger's output terminals so battery voltage can be noted before the charger is energized.
 - STEP 12.** Energize the battery charger and, at the same time, measure the battery charger's output voltage and observe the dc charging current shown on the Dc Charging Current meter. As the output recovers to 13.3 Vdc, the charging current will taper off to a "trickle-charge" level. For example, for a fully charged, 80-ampere-hour rated battery, the charging current may read as low as 20 milliamperes at -40°F (-40°C) or as high as 150 milliamperes at +160°F (+71°C) ambient temperature. For a 160-ampere-hour rated battery, corresponding current values will be twice as great as for an 80-ampere-hour rated battery.
- Note:** These instructions assume starting with a fully charged battery. If the battery is severely discharged, charging by other means is recommended in order to build up a useful charge within a reasonable time. Otherwise, several days may be required to recharge a severely discharged battery with this battery charger.

● Not recommended by S&C but may be required by some users.

Product Details

Table 1. Product Details

Type	Description	Value
Input	Voltage, Nominal	125 Vac
	Frequency	50 to 60 Hertz
	Voltage, Operating Range	8 to 140 Vac
	Current Regulation	Input current varies less than 1% with output variation from open circuit to short circuit. Input current varies in direct proportion to input voltage
	Burden-Adjustment Range	4.0 Volt-amperes to 17.0 Volt-amperes
	Fuse Rating	3 AG Standard, 5 ampere
Output	Voltage, Nominal	13.3 Vdc
	Voltage, Adjustment Range	12.9 to 14.0 Vdc
	Voltage Regulation	±0.1% from 0 through 40 milliamperes
	Current	500 milliamperes maximum at 13.3 Vdc
	Metering	0 to 500 milliamperes dc; 5% full-scale accuracy
	Temperature Coefficient	-0.4 millivolts per degree Centigrade●
Physical Specifications	Construction	1/16-inch (2-mm) anodized aluminum open housing with mounting flanges
	Size	7 inches (178 mm) high × 5 inches (127 mm) wide (including mounting flange) × 4 7/16 inches (116 mm) deep
	Mounting Holes	(4) 1/4-inch (6 mm) diameter, 4 3/8 inches (111 mm) × 5 1/4 inches (133 mm) on centers
	Terminations	4-point terminal block (2 input and 2 output terminals)
	Weight	3.0 pounds (1.4 kg)
	Operating Temperature Range	-40°F to +160°F (-40°C to +71°C)

● Circuitry is specifically designed to achieve this temperature coefficient to compensate for lead-acid battery float-voltage variation with temperature.