260vdc Float Battery Charger

Single-Phase Input
Three-Phase Input

Applications for:
Utility & General Industry
- Switchgear
- Engine starting
- Emergency lighting
- Alarm systems
- Railroad service
- UPS

Communications & Telecommunications
- Radio
- Telemetering
- Microwave
- Telephone

Computers & Control Systems
- Uninterruptible power systems
The Sbs SCR/SCRF Series of industrial float chargers is designed to automatically control charging rates for a wide variety of battery types and to simultaneously provide full-rated output for both continuous and intermittent dc loads.

The chargers are constant voltage devices with automatic current limiting. Voltage regulation and current limiting are controlled by solid-state integrated circuitry to assure maximum performance in minimum space.

The SCR/SCRF Series is ideally suited to utility, communications and other stationary charger applications.

**DESIGN FEATURES**

**Component Selection**
- Electronic and electrical components are substantially derated to assure long life and reliability. Typical MTBF is 100,000 hours minimum. Components are selected or designed to provide a system life expectancy in excess of 30 years.

**Modular Construction**
- Control circuits, alarm circuits and electrical sub-assemblies are printed circuit board wired or modularized with plug and socket connections for easy serviceability.

**Standard Sub-assemblies**
- Control modules and many electrical sub-assemblies are standardized across the entire range of charger sizes. This minimizes spare parts inventory and simplifies maintenance.

**Durable**
- Front panels are recessed to prevent accidental damage to meters and controls. Standard cabinets are NEMA-1 enclosures of heavy-gauge phosphatized steel with an attractive, long-lasting acrylic enamel finish.

**Easy Troubleshooting**
- A complete service manual, color-coded wiring, test-point identification and circuit-symbol labeling of internal components make troubleshooting easy.

**Ease of Adjustment**
- Tap adjustments are not required. Output float voltage, equalize voltage, current limit and alarm levels are potentiometer adjustable.

**Ease of Access**
- Internal components and connections are easily accessible and/or removable through a hinged front door that opens approximately 180 degrees for easy serviceability.

**Ease of Installation**
- Cabinets are floor, wall or rack mountable and equipped with knockouts for cable or conduit entrance. Input, output and remote alarm connections are wired to easily accessible, internal terminal blocks.

**ENVIRONMENTAL SPECIFICATIONS**

**Operating Ambient Temperature**
- 32°F to 122°F (0°C to 50°C) without derating

**Storage Temperature**
- -40°F to 185°F (-40°C to 85°C)

**Operating Altitude**
- 3300 feet (1000 meters) above sea level without derating

**Relative Humidity**
- 5% to 95% (without condensation)

**Audible Noise**
- Less than 65dBA at any point 5 feet from any vertical surface of enclosure. Typical values measure 55 to 60dBA at 100% load.

**Ventilation**
- Units rated 300Acdc output or less are convection cooled via NEMA-1 vent openings in cabinet.
ELECTRICAL SPECIFICATIONS

AC Input
- Standard transformers are available with taps for nominal voltages as listed below.

Single-Phase Voltages:
- 120/220 – 240V 47 – 63Hz
- 480V 57 – 63Hz
- 120/208 – 240V 47 – 63Hz (optional)

Three-Phase Voltages:
- 208 – 240V 57 – 63Hz
- 380 – 416V 47 – 63Hz
- 480V 57 – 63Hz

Chargers are wired and circuit protected for one nominal input voltage and frequency to be specified at time of order.

Output Regulation
- ±0.5% of DC voltage setting maintained with input line variations of -12%, +10% voltage and/or ±5% frequency
- ±0.5% of DC voltage setting maintained with load variations from no load to full load
- ±1.0% of DC voltage setting maintained against the combined variations of line, load and temperature

Output Transient Response & Recovery
- ±5.0% max. of DC voltage setting maintained with step load changes from 20% to 100% load
- Recovery to ±2.0% of DC voltage setting typically 200msec
- Recovery to steady state DC voltage setting typically 500msec
- Overshoot of DC voltage setting is not present at turn-on due to “soft-start” feature.

Output Current Limit
- The electronic current limiting circuitry is factory set at 110% of rated output. It is continuously adjustable from 90% to 120% of rated load.

Output Ripple and Electrical Noise*
- Unfiltered (SCR Series): Output ripple voltage is less than 10% RMS for single-phase input SCR units. Output ripple voltage is less than 3% RMS for three-phase input SCR units.
- Filtered (SCRF Series): Output ripple voltage is 30mVrms or less for all SCR units. Electrical voice band noise is less than 32dBmC using C-message weighting network.
*Measured when connected to a battery with an 8-hour Amp-Hour rating of 4 times the full load current rating of the charger.

Battery Eliminator Operation
- SCR/SCRF Series Chargers will operate as DC power supplies without batteries. Addition of the Filtered Battery Eliminator option will reduce ripple, when used as a battery eliminator, to the greater of 0.06% or 30mV.

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## SCR/SCRF Battery Charger DC Output Table

<table>
<thead>
<tr>
<th>VDC Nominal</th>
<th>Float Adjustment Range (VDC)</th>
<th>Equalize Adjustment Range (VDC)</th>
<th>ADC Size Cell Available (1)</th>
<th>Lead-Acid Cell Capability (3) (No. of Cells)</th>
<th>Ni-Cd Cell Capability (3) (No. of Cells)</th>
</tr>
</thead>
<tbody>
<tr>
<td>260</td>
<td>230 - 280</td>
<td>245 - 300</td>
<td>6 to 25</td>
<td>110 - 124</td>
<td>172 - 188</td>
</tr>
<tr>
<td>300</td>
<td>270 - 320</td>
<td>305 - 360</td>
<td>16 to 300</td>
<td>126</td>
<td>196</td>
</tr>
</tbody>
</table>

(1) The discrete Adc sizes offered within the ranges listed above are: 6, 16, 25, 35, 50, 75, 100, 150, 300 Adc. All sizes are rated at 100% load. Some current ratings are not available on certain chargers. Consult factory or current price list for exact offerings.
(2) Based on Lead-Acid Float of 2.15 to 2.25V/cell and equalize of 2.25 to 2.4V/cell.
(3) Based on Ni-Cd Float of 1.55 to 1.45V/cell and Equalize of 1.50 to 1.60V/cell.
**SCR/SCRF Battery Charger Standard Accessories**

**AC On Indicating Light**
- Green front panel indicator

**AC Input Circuit Breaker**
- **Single-Phase Input:**
  - Two-pole, 7500 AIC, UL Listed 100A-Frame
- **Three-Phase Input:**
  - Three-pole, 7500 AIC, UL Recognized 100A-Frame
  - Three-pole, 25000 AIC, UL Listed 225A-Frame
  - Three-pole, 30000 AIC, UL Listed 400A and 600A-Frame

**DC Output Fuses**
- Two-pole, fast-acting, current-limiting rectifier type

**AC and DC Surge Suppressors**
- **MOV Type**
  - **AC Withstand:**
    - 240Vac or less: 1500Vpk - 1.2x20 µsec pulse
    - Over 240Vac: 3000Vpk - 1.2x20 µsec pulse
  - **DC Withstand:**
    - All DC outputs: 4000Vpk - 2x10 µsec pulse

**DC Output Ammeter and Voltmeter**
- Front panel, 2% accuracy, 3.5-inch case

**Manual Float/Equalize Switch**
- Front panel toggle switch

**Float and Equalize Adjustment Potentiometers**
- Two front panel mounted, lockable adjustment potentiometers

**Current Limit Adjustment Potentiometer**
- Internally mounted, with easily accessible adjustment

**DC Output Blocking Diode**
- Standard SCR/SCRF Series feature prevents battery from discharging back through the filter and rectifier when charger is “off” due to AC power failure or charger malfunction.

**DC Output Protection Diode**
- Prevents damage to charger and battery due to reversed polarity connections

**Color-Coded Internal Wiring**
- 600 Volt, color-coded, polyvinylchloride (PVC) wiring is standard.

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![Typical SCR/SCRF Series Internal Construction Detail](image-url)
**Typical SCR/SCRF Performance Curves**

- **Output Regulation – Ni-Cd Batteries**

- **Conversion Efficiency – Single-Phase Charger**

- **Conversion Efficiency – Three-Phase Charger**

**One-Line Circuit Diagram**

- Remote Alarm Signals
- Remote Alarm Signal
- Remote Alarm Signal
- Remote Alarm Signal
- Current Sense
- Float/Equalize Selection (Timer is optional)
- Voltage Sense & Adjustment
- Hi-Low Voltage Alarms (optional)*
- Charger Failure Alarm (optional)*
- Ground Detection Alarm (optional)*
- Common or Summary Alarm (optional)*
- Internal Alarm Signal(s)
- Regulated DC Output

*These alarm options are available together as a single circuit board. See combined alarm-status charger monitor on optional accessories page.
SCR/SCRF BATTERY CHARGER OPTIONAL ACCESSORIES

Alarm Relays for Remote Indication*  
Available with or without front panel alarm indicating lights

• AC Power Failure Alarm  
Provides alarm state when AC power fails or AC breaker is open

• DC Ground Detection Alarms  
Provides alarm state when a ground fault has occurred at either the + or – output terminal

• High-Low DC Voltage Alarms  
Provides high alarm state when battery is being overcharged and low alarm state when battery is near end of discharge

• Charger Failure Alarm (No DC Current)  
Provides alarm state when charger output current is less than 2% of rated output for 30 seconds or more. Will also activate with AC power failure and/or DC breaker or fuse open.

• Battery Discharging Alarm  
Provides alarm state when battery discharge current exceeds the charger recharge current

• End of Discharge Alarm  
Provides alarm state when battery has discharged to lowest system voltage limit

• DC Current Limit Alarm  
Provides alarm state when charger output current reaches the current limit setting

• Common (Summary) Alarm  
Provides a single alarm state when any one or all monitored alarm conditions exist on charger

*Alarm contacts provide one (1) set of dry form “C” contacts (SPDT) wired to a terminal strip for customer termination. Alarm contacts provide (2) sets of dry form “C” contacts (DPDT) available without indicating lights.

Cabinet heater strips
Special high-interrupting capacity
Drip-proof cabinet shields
Fungus proofing (tropicalization)
Optional higher AIC circuit breakers are available.

Forced Load Sharing  
Chargers operating in parallel share load to within 2% of output current of each charger.

High DC Voltage Charger Shutdown  
A contact closure from a high DC voltage alarm activates the shutdown circuit and charger output current goes to zero.

Filtered Battery Eliminator  
Output ripple voltage is 30mVrms or 0.06% of nominal output voltage, whichever is higher, without battery connected.

Input Lightning Arrestors  
Provides additional input protection against lightning-induced transients, ANSI 37.90A

Surge Withstand Capability  
Additional surge protection to meet performance requirements of IEEE-472 SWC specification

AC Input Voltmeter and/or Ammeter  
Front-panel, 2% accuracy, 3.5-inch case, 1% 3.5-inch case, 1% 4.5-inch case, switchboard or digital

Additional Optional Accessories  
Special input voltages and frequencies
Device nameplates
Special paint
Special high-interrupting capacity
NEMA-4 or NEMA-12 cabinets
AIC circuit breakers
Drip-proof cabinet shields
Special hypalon internal wiring, switchboard type
1% accuracy panel or switchboard meters
Alarm buzzer
Cabinet heater strips
Export packing

AC Fuse  
• Two-pole AC fuse for single-phase, 3-pole AC fuse for 3-phase

DC Circuit Breaker  
Two-pole DC breaker is installed with one-pole standard fuse:
• 5000 AIC, UL Listed 100A-Frame
• 10000 AIC, UL Listed 250 & 400A-Frame
• 14000 AIC, UL Listed 600 & 800A-Frame

Additional timers:
• 0-72hr. Manual Equalize Timer
w/ or w/float Equalize Indicating Lights
Replaces float/equalize switch. Charger automatically switches from “equalize” to “float” at end of set time interval.

• 0-72hr. Line Failure Auto-Equalize Timer w/Float Equalize Indicating Lights
Charger is switched to equalize for a set time interval after power is interrupted for 10 seconds or more. Equipped with “float reset” and “equalize” override switches.

• 0-72hr. Current Limit Auto-Equalize Timer w/Float Equalize Indicating Lights
Charger is switched to equalize for a set time interval after charger is in current limit for 10 seconds or more. Equipped with “float reset” and “equalize” override switches.

DC Ground Detection for Local Indication  
• Ground Detection Switch for Front Panel DC Voltmeter Indication
Measures voltage from + or – output terminals to common ground

• Ground Detection Indicating Lights with Ground Test & Lamp Test Switch
Front panel lamps indicate + or – output ground fault with switch in “ground test” position. In “lamp test” position both lights are verified as operational.

High DC Voltage Alarm Relay  
With indicating light, 15-second time delay on alarm, auto reset

Low DC Voltage Alarm Relay  
With indicating light, 15-second time delay on alarm, auto reset

Ground Detection Alarm Relay  
With (+) ground detection indicating light and (−) ground detection indicating light, 15-second time delay on alarm, auto reset

Charger Failure Alarm Relay  
With indicating light, 30-second time delay on alarm, auto reset

Common Alarm Relay  
Summary alarm relay for any one or all alarms on this board.

*Alarm contacts are rated for 0.5A @ 120V AC or DC. Indicating lights are red LEDs. Front panel mounted. A “lamp test” switch is provided for verifying operation of indicating lights. Customer terminal strip is rated 15A @ 120VAC or DC to accommodate #14AWG maximum wire. This option may be ordered without ground detection for DC systems that are referenced to ground.

Additional surge protection to meet performance requirements of IEEE-472 SWC specification

AC Input Voltmeter and/or Ammeter  
Front-panel, 2% accuracy, 3.5-inch case, 1% 3.5-inch case, 1% 4.5-inch case, switchboard or digital

Additional Optional Accessories  
Special input voltages and frequencies
Device nameplates
Special paint
Special high-interrupting capacity
Fungus proofing (tropicalization)
NEMA-4 or NEMA-12 cabinets
AIC circuit breakers
Drip-proof cabinet shields
Special hypalon internal wiring, switchboard type
1% accuracy panel or switchboard meters
Alarm buzzer
Cabinet heater strips
Export packing

Additional surge protection to meet performance requirements of IEEE-472 SWC specification

AC Input Voltmeter and/or Ammeter  
Front-panel, 2% accuracy, 3.5-inch case, 1% 3.5-inch case, 1% 4.5-inch case, switchboard or digital

Additional Optional Accessories  
Special input voltages and frequencies
Device nameplates
Special paint
Special high-interrupting capacity
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1% accuracy panel or switchboard meters
Alarm buzzer
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Export packing

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Special hypalon internal wiring, switchboard type
1% accuracy panel or switchboard meters
Alarm buzzer
Cabinet heater strips
Export packing
1. DC AMMETER
2. DC VOLTMETER
3. AC POWER “ON” LIGHT
4. EQUALIZE ADJUST LIGHT
5. FLOAT ADJUST POT
6. EQUALIZE TIMER (optional)
   FLOAT EQUALIZE SWITCH (standard)
7. DC CIRCUIT BREAKER (optional)
8. DC FUSE(S)
9. AC CIRCUIT BREAKER
10. DC SURGE SUPPRESSOR
11. STATUS INDICATING LIGHTS & SWITCHES (optional)
12. POWER ISOLATION TRANSFORMER w/AC RECONNECTION T.B.
13. AC SURGE SUPPRESSORS
14. SCR RECTIFIER/HEAT SINK ASSEMBLY
15. POLARITY & BLOCKING DIODE ASSEMBLIES
16. FILTER CHOKE(S)
17. BLEEDER RESISTOR
18. FILTER CAPACITORS
19. ALARM RELAY(S) (optional)
20. ALARM CONTROL MODULES (optional)
21. CONTROL MODULE
22. CURRENT LIMIT ADJUST POT
23. INPUT LINE & GROUND TERMINALS (TB1)
24. OUTPUT TERMINALS (TB2)
25. REMOTE ALARM TERMINALS (TB3)
## SCR/SCRF Battery Charger Heat Loss, Size, & Weight Data Table

### 260Vdc

<table>
<thead>
<tr>
<th>Ampere Rating*</th>
<th>Heat Loss BTU/hr.*</th>
<th>Cabinet Style</th>
<th>Shipping Weight (approx.) lbs. (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Single-Phase Input</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>670</td>
<td>2</td>
<td>230 (104)</td>
</tr>
<tr>
<td>12</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>16</td>
<td>1790</td>
<td>2</td>
<td>320 (145)</td>
</tr>
<tr>
<td>20</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>25</td>
<td>2790</td>
<td>3</td>
<td>490 (222)</td>
</tr>
</tbody>
</table>

| **Three-Phase Input** | | | |
| 16 | 1260 | 2 | 350 (159) |
| 20 | -    | - | -        |
| 25 | 1960 | 3 | 510 (231)|
| 30 | -    | - | -        |
| 35 | 2750 | 3 | 560 (254)|

*Heat loss in BTU/hr. is stated for nominal number of cells at float voltage and 100% dc load current. **Consult factory for ampere and voltage ratings up to 100A and 600V.

### Ordering Information

Specify:

- Charger model number:
  - “1” or “3” phase input
  - “260” nominal Vdc output
  - “006” to “300” rated Adc output
- Nominal input (Vdc) and frequency (Hz)
- Number and type of battery cells
- All optional accessories required on charger

Consult factory for higher dc voltage output and dc current outputs. Specifications and performance data subject to change without notice.

### Cabinet Dimensions

<table>
<thead>
<tr>
<th>CABINET STYLE</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE MOUNTING</td>
<td>Floor***</td>
<td>Floor</td>
<td>Floor</td>
<td>Floor</td>
</tr>
<tr>
<td>Dimensions (inches)</td>
<td>H</td>
<td>W</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>37%</td>
<td>49</td>
<td>62</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>20%</td>
<td>32</td>
<td>42</td>
<td>58</td>
<td></td>
</tr>
<tr>
<td>14%</td>
<td>24</td>
<td>24</td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

***Rack-mounting cabinet is optional for these styles.