



BATTERY CHARGER

Installation, Operating, and Maintenance
Instruction

DEPENDABLE POWER SYSTEMS WARRANTY

Dependable Power Systems warrants that the power system delivered will be of the kind and quality described in the order or contract. In connection with the power system sold, Dependable Power Systems agrees to correct any defect(s) in workmanship or normal use (excluding the batteries, which are warranted by the manufacturer) during the period of one year from date of shipment, by repair or replacement of defective part(s). Such correction shall constitute a fulfillment of all Dependable Power Systems liabilities in respect to the power system sold. In no event shall Dependable Power Systems be liable for consequential damage.

DANGER!

HAZARDOUS VOLTAGES MAY EXIST INSIDE THIS UNIT EVEN WHEN UNIT IS NOT CONNECTED. Do not use uninsulated tools or touch uninsulated wires. Check for voltage on terminals before handling, and disconnect the AC input and DC output at the service panel before making any connections.

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10/30/06

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Section 1 INTRODUCTION

1-1. GENERAL

The Dependable Power Systems Battery Charger is a solid-state, constant voltage, current limited rectifier/charger unit that provides clean, isolated DC power.

1-2. OPERATION

The rectifier/charger consists of the input isolation transformer (T1), rectifier/charger control board (PC1), three SCR's (SCR1 to SCR3), three diodes (D1 to D3), two fuses (FU1 to FU2), and an inductor (L1), connected in a 3 phase full wave bridge. On filtered units an additional inductor (L2) and capacitors (C7 & C8) are provided.

The input transformer isolates the battery from the AC input line and provides the correct voltage, via FU1 and FU2 to feed the full wave bridge (SCR1 to SCR3 & D1 to D3). The control windings on T1 supply the power and phase information to the rectifier/charger control board.

The full wave bridge (SCR1 to SCR3 & D1 to D3) converts the AC from T1 to DC which powers the any DC loads and charges the batteries. The DC loads run on the rectifier output as long as it remains higher then the batteries. As the AC input goes lower then -10%, the batteries first share in powering the loads, then takes over completely. The inductor is used to limit the surge current and smooth the ripple.

The rectifier/charger control board regulates the output voltage and limits the output current of the rectifier/charger by varying the phase angle at which the SCR's are turned on. Besides controlling the regulation and current limit, the control board provides a walk-on feature, which slowly raises the voltage and current when the AC input is first applied. The rectifier/charger control board also includes a separate overvoltage regulator that limits the output voltage independent of the primary regulator and provides an overvoltage indication. Fuse blown (FU1 to FU2) indicators are also included on the control board.

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Section 2 INSTALLATION

2-1. INSPECTION, HANDLING, AND ASSEMBLY

The Battery Charger should be checked for shipping damage immediately upon receipt, and all damage reported to the carrier. Internal damage must also be reported to Dependable Power Systems.

Units must be stored in an upright position, in a dry location (0 to 50 degrees C, at 0 to 95% humidity). The storage location must not be exposed to the outside elements. Because of possible battery deterioration, the batteries, if provided, should not be stored longer than 6 months without charging.

Although the charger is a large, ruggedly constructed unit, it must be handled with reasonable care to avoid damage. Severe bumps and jolts must be avoided. Only personnel experienced in the installation of equipment of this size and weight should be used. The unit's size and weight can be found on the Outline and Interconnect drawing.

On all but the very large systems, no assembly is required. With the large units, two or more modules may have to be bolted together and interconnected. On these units, refer to the Outline and Interconnect drawing for details. To facilitate moving a unit equipped with fans, the entire top fan panel may be removed. However, great care must be taken to avoid damaging the fan assembly.

The unpacked unit may be moved on its wheels, when provided, or by a forklift or pallet jack. Because of the weight of the unit, ramps or sloping floors should be avoided when using the wheels or pallet jack.

CAUTION

The balance points of the Battery Charger are typically not centered. The heavy side of the unit is noted on the outside of the packing material.

2-2. ENVIRONMENTAL CONSIDERATIONS

As with all electrical wiring, long runs of the AC wires or the battery wires, if required, should be avoided to reduce noise pickup and line drops. If batteries are mounted outside the unit, long runs can reduce battery run time.

The charger generates some heat and therefore, should be in a well ventilated or cooled area. The temperature range for the standard charger is 0 to 40 degrees C.

The primary ventilation is through the top and bottom of the UPS. Restricting the air flow by placing objects near, on top of, or under the unit could reduce the operating life of the unit. Access is obtained by the front door(s).

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2-3. ELECTRICAL REQUIREMENTS

Refer to the Outline and Interconnect drawing for the required electrical connections and the current requirements. All connections to the Battery Charger, including an adequate earth ground connection, are to conform to local codes. If there is a conflict between the local electrical code and wiring diagrams provided, contact the Dependable Power Systems service department.

Areas are provided in the floor and at the top rear of the unit for cable and/or conduit entry. Connections are made to terminal strips located inside the front door (panel). See Outline and Interconnect drawing for exact location.

Section 3

CONTROLS AND INDICATIONS

3-1. GENERAL

A thorough understanding of all the controls and indicators will assure the proper operation of the Battery Charger. This section discusses the front panel indicators and controls.

3-2. RECTIFIER/CHARGER

AC ON: This LED (light emitting diode) indicates that the primary AC power is available to the rectifier/charger.

EQUALIZE TIMER: This timer allows the charger to operate at the equalize level for the preset time, then switch back the "FLOAT" level.

FLOAT ADJUST: This potentiometer adjusts the float level.

EQUALIZE ADJUST: This potentiometer adjusts the equalize level.

AC INPUT: This breaker supplies and protects the AC input line. This device also acts as the unit on off switch.

AC FAILURE: If this led is on, the input AC voltage has failed and the charger will not be able to supply output voltage and current.

HIGH DC: The output of the charger is above the overvoltage level. Shut down one charger at a time to determine which is causing the problem.

LOW DC: If these contacts and/or LED operated, this indicates that the batteries are nearly discharged.

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POSITIVE GROUND DETECT: This LED indicates that there is a ground fault on the positive DC bus.

NEGATIVE GROUND DETECT: This LED indicates that there is a ground fault on the negative DC bus.

HIGH AC: If this LED is on the input AC voltage is high. The charger should be shut down to prevent damage.

DC OUTPUT: This breaker supplies and protects the DC output line.

METERS: The meters include Output DC volts and amps.

Section 4

STARTUP AND VERIFICATION OF OPERATION

4-1. GENERAL

Once the Charger is in position and all connections have been made per the Outline and Interconnect drawing, you are ready to proceed to the startup and test stages.

4-2. POWER VERIFICATION

At your power panel, switch on the AC power feeding the Charger. With a voltmeter, check the voltage level present at the AC input terminals and verify that they are the same as shown on the Outline and Interconnect drawing. If the levels are different shut down the power and contact Dependable Power Systems. NOTE: Rotation is not critical as this unit is self correcting.

Connect batteries to unit and close the external battery breaker if available. With a voltmeter, check the voltage and polarity at the battery input terminals and verify that they are the same as shown on the Outline and Interconnect Drawing. If the polarity is wrong, reverse the input battery cabling and recheck with a voltmeter. If the voltage levels are different, shut down the power and contact Dependable Power Systems. NOTE: The positive battery must connect to input terminal #22 and the negative connects to #21.

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4-3. STARTUP

Close the AC INPUT breaker and the DC OUTPUT breaker, the unit will start, with the voltage and current walking up. The front panel meters should be functioning. Check the charger voltage and current. If the batteries are new or have set for a long time the charger may go into current limit. The output voltage will then be lower than the set point until the batteries demand for current is lower than the current limit level. If the output voltage is excessively lower than normal check batteries for bad or reversed cell(s) or an external short.

4-4. POWER FAILURE, RECTIFIER/CHARGER FAILURE SIMULATION

If either the AC input power is lost or the rectifier/charger fails, the rectifier/charger output will be lost and the external loads will operate off of the batteries. To simulate either of these failures, simply open the AC input circuit breaker (CB1). Notice the "AC ON" LED will not be illuminate. In the event of an actual power failure, this is exactly what you would see. In the unlikely event the system does not perform as specified, open the input and output breakers and contact the Dependable Power Systems service department.

Section 5

INTERNAL INDICATORS, ADJUSTMENTS, AND CONTROLS

The following items are located on the circuit boards inside the unit. These controls should only be adjusted under the direction of Dependable Power Systems service department by qualified personnel.

1. Fuse blown indicators for FU1 & FU2 (PC1).
2. Charger current limit adjustment (PC1).
3. Charger overvoltage limit (PC1).
4. DC undervoltage set point (PC2-SW2).
5. DC overvoltage trip set point (PC2-SW1).

Section 6

MAINTENANCE

The maintenance schedule is as follows:

1. Once a year, more often in extremely dusty areas, blow out the unit to remove any dust and dirt from the circuit boards, heat sinks, and transformers. The fans should be checked for proper operation.
2. Every ten years the DC electrolytic capacitors should be replaced.