

OWNER'S MANUAL 430429-285

Revised February 14, 2001

IMPORTANT: Read these instructions before installing, operating, or servicing this system.

250CII

CHARGE CONTROL

DO NOT DESTROY

AMETEK/PRESTOLITE POWER , TROY, OHIO 45373-1099, U.S.A.

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INTRODUCTION

How To Use This Manual

IMPORTANT: It is especially important that all charger internal components be kept clean and dry, and all electrical connections tightened. Replace any precautionary or instruction label that cannot be easily read.

To ensure safe operation, read the entire manual, including the chapter on Safety Instructions and Warnings.

Throughout this manual, the words **WARNING**, **CAUTION**, and **NOTE** may appear. Pay particular attention to the information provided under these headings. These special annotations are easily recognized as follows:

WARNING gives information regarding possible personal injury. Warnings will be enclosed in a box such as this.

CAUTION refers to possible equipment

damage. Cautions will be shown in bold type.

NOTE offers helpful information concerning certain operating procedures. Notes will be shown in italics.

Equipment Identification

The unit's identification number (specification, model, serial number) usually appears on a nameplate attached to the front panel.

Receipt Of Equipment

When you receive the equipment, check it against the invoice to make sure it is complete and inspect the equipment for possible damage due to shipping. If there is any damage, notify the carrier immediately to file a claim. Furnish complete information concerning damage claims or shipping errors to the company shown on the cover of this manual. Include all equipment identification numbers and group part numbers (if any) as described above along with a full description of the parts in error.

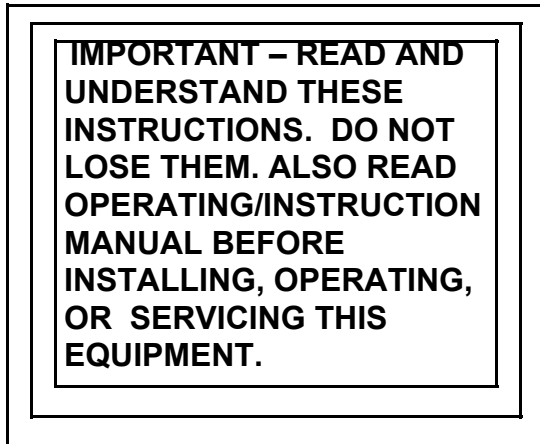
Move the equipment to the site of installation before uncrating. Use care to avoid damaging the equipment when using bars, hammers, etc., to uncrate the unit.

Additional copies of this manual may be purchased by contacting the company shown on the cover of this manual. Include the Owner's Manual number and equipment identification numbers.

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SAFETY INSTRUCTIONS AND WARNINGS

FOR OPERATION OF BATTERY CHARGING EQUIPMENT



A. General

Battery charging products can cause serious injury or death, or damage to other equipment or property, if the operator does not strictly observe all safety rules and take precautionary actions.

Safe practices have developed from past experience in the use of charging equipment. These practices must be learned through study and training before using this equipment. Anyone not having extensive training in battery charging practices should be taught by experienced operators.

Only qualified personnel should install, use, or service this equipment.

B. Shock Prevention

Bare conductors, or terminals in the output circuit, or ungrounded, electrically-live equipment can fatally shock a person. To protect against shock, have competent electrician verify that the equipment is adequately grounded and learn what terminals and parts are electrically HOT.

The body's electrical resistance is decreased when wet, permitting dangerous current to flow through the body. Do not work in damp area without being extremely careful. Stand on dry rubber mat or dry wood and use insulating gloves when dampness or sweat cannot be avoided. Keep clothing dry.

1. Installation and Grounding of Electrically Powered Equipment – Electrical equipment must be installed

and maintained in accordance with the National Electrical Code, NFPA 70, and local codes. A power disconnect switch must be located at the equipment. Check nameplate for voltage and phase requirements. If only 3-phase power is available, connect *single-phase* equipment to only two wires of the 3-phase line. DO NOT CONNECT the equipment grounding conductor (lead) to the third live wire of the 3-phase line as this makes the equipment frame electrically HOT, which can cause a fatal shock.

If a grounding lead (conductor) is part of the power supply cable, be sure to connect it to a properly grounded switch box or building ground. If not part of the supply cable, use a separate grounding lead (conductor). Do not remove a ground prong from any plug. Use correct mating receptacles. Check ground for electrical continuity before using equipment.

The grounding conductor must be of a size equal to or larger than the size recommended by Code or in this manual.

2. Charging Leads – Inspect leads often for damage to the insulation. Replace or repair cracked or worn leads immediately. Use leads having sufficient capacity to carry the operating current without overheating.
3. Battery Terminals – Do not touch battery terminals while equipment is operating.
4. Service and Maintenance – Shut OFF all power at the disconnect switch or line breaker *before* inspecting, adjusting, or servicing the equipment. Lock switch OPEN (or remove line fuses) so that the power cannot be turned ON accidentally. Disconnect power to equipment if it is to be left unattended or out of service.

Disconnect battery from charger. Measure voltage on capacitors and discharge through an insulated screwdriver if there is any voltage reading.

Keep inside parts clean and dry. Dirt and/or moisture can cause insulation failure. This failure can result in high voltage at the charger output.

C. Burn and Bodily Injury Prevention

The battery produces very high currents when short circuited, and will burn the skin severely if in contact with any metal conductor that is carrying this current. Do not permit rings on fingers to come in contact with battery terminals or the cell connectors on top of the battery.

Battery acid is very corrosive. Always wear correct eye and body protection when near batteries.

D. Fire and Explosion Prevention

Batteries give off explosive flammable gases which easily ignite when coming in contact with an open flame or spark. Do not smoke, cause sparking, or use open flame near batteries. Charge batteries only in locations which are clean, dry, and well ventilated. Do not lay tools or anything that is metallic on top of any battery. All repairs to a battery must be made only by experienced and qualified personnel.

E. Arcing and Burning of Connector

To prevent arcing and burning of the connector contacts, be sure the charger is OFF before connecting or disconnecting the battery. (If the charger is equipped with an ammeter, the ammeter should not indicate current flow.) Always connect battery before turning charger ON.

F. Medical and First Aid Treatment

First aid facilities and a qualified first aid person should be available for each shift for immediate treatment of electrical shock victims.

EMERGENCY FIRST AID: Call physician and ambulance immediately. Use First Aid techniques recommended by the American Red Cross.

DANGER: ELECTRICAL SHOCK CAN BE FATAL. If person is unconscious and electric shock is suspected, do not touch person if he or she is in contact with charging leads, charging equipment, or other live electrical parts. Disconnect (open) power at wall switch and then use First Aid. Dry wood, wooden broom, and other insulating material can be used to move cables, if necessary, away from person. IF BREATHING IS DIFFICULT, give oxygen. IF NOT BREATHING, BEGIN ARTIFICIAL BREATHING, such as mouth-to-mouth. IF PULSE IS ABSENT, BEGIN ARTIFICIAL CIRCULATION, such as external heart massage.

IN CASE OF ACID IN THE EYES, flush very well with clean water and obtain professional medical attention immediately.

G. Equipment Warning Labels

Inspect all precautionary labels on the equipment. Order and replace all labels that cannot be easily read.

GENERAL INFORMATION

Description of Equipment

The 250CII Control uses a single chip microcontroller to both monitor and control the battery charging process of the charge cycle by the analog ammeter and the four LEDs on the front panel of the control (see Figure 7-1). The 250CII Control utilizes either a Voltage/Time (VT) charge termination or a patented dV/dT charge termination technique which eliminates excessive gassing by returning approximately 107% of the amp-hours removed from the battery. All front panel information (including operating instructions) is back printed on a clear Lexan polycarbonate overlay

which is resistant to damage from oils, gasoline, and frequent operator handling. The 250CII Control is “matched” to the output voltage of the charger by means of a printed circuit board mounted DIP switch (See Figure 7-2). Features of the 250CII Control include auto start/stop, manual equalize, manual stop, backup timer protection, two charge termination methods, 80% voltage point adjustment, high and low battery voltage discrimination, and AC power fail recovery.

Application of Equipment

The 250CII Control is “universal” in design such that it will operate on 6, 12, 18, 24, 36 and “optional” cell batteries. Battery size is switch-selectable on the control. “Optional” is provided to accommodate batteries between 6 and 36 cells that are not listed above.

The 250CII Control may be applied to any Prestolite Charger that is equipped with a 24 VAC control voltage source and an ammeter shunt in the negative output lead. Retrofit and/or adapter kits may be required – consult factory before ordering.

Installation

WARNING: DO NOT connect a battery to this charger if any LED is lit. Do not disconnect a battery from this charger while a charge is in progress; otherwise, arcing and burning of connector parts or a battery explosion may result. Batteries produce explosive gases. Keep sparks, flame and cigarettes away. Ventilate when charging in an enclosed area. Always shield eyes when working near batteries.

If a 250CII Control is ordered with a Prestolite Charger, no installation is required. The control is preset at the factory to operate with the charger it is

installed into. If the 250CII Control is a replacement, see the Set-Up chapter of this manual.

Charge Cycle Status Display

The status of a normal charge cycle is indicated by the four LEDs on the front panel. The "80% Charged" LED will light when the battery voltage reaches the 80% charged voltage. This voltage may be 2.37 volts/cell or 2.45 volts/cell nominal, depending on the status of DIP switch S1-7. See the Set-Up chapter of this manual. The "Charge Complete" LED will light only if the battery has completed the charge cycle and is ready for use.

The "Abnormal Shutdown" LED will light if the charger terminates a charge prematurely. See the Troubleshooting chapter of this manual to determine the cause of the fault. The "Equalize" LED will light solid when an equalize charge is requested by the user who pushes the EQUALIZE pushbutton. The "Equalize" LED will flash when the charger is equalizing the battery.

Charge Termination

The 250CII Control uses one of two termination methods during a charge cycle:

1. **Voltage/Time (VT) Termination:** Charge ends 3 hours after battery reaches the 80% charged point.
2. **dV/dT Termination:** Charge ends according to the rate of voltage change over time.

The termination method is selected using DIP switch S1-8. The 250CII Control leaves the factory in the dV/dT mode.

To use the Voltage/Time termination method, open DIP switch S1-8. See the Set-Up chapter of this manual.

NOTE: If voltage/time termination is selected and the battery reaches the 80% charged point in less than 3 minutes, the charge will terminate unless an equalized charge was requested. In that case, the charge terminates 3 hours later.

OPERATION

Normal Charge

WARNING: DO NOT connect a battery to this charger if any LED is lit. Do not disconnect a battery from this charger while a charge is in progress; otherwise, arcing and burning of connector parts or a battery explosion may result. Batteries produce explosive gases. Keep sparks, flame, and cigarettes away. Ventilate when charging in an enclosed area. Always shield eyes when working near batteries.

1. Insure that battery size matches charger (Number of cells and ampere hour capacity are within nameplate information).
2. Securely engage the battery and charger connectors.
3. After a five second delay (all LED's will be lit), the charger will turn on. The ammeter will indicate charging current.
4. The "80% Charged" LED will light when the battery on charge reaches the 80% charged voltage.
5. The charger will automatically turn off and the "Charge Complete" LED will light when the charge has finished. The light will remain on until the battery is disconnected from the charger.

NOTE: If the control is in the voltage/time termination mode (switch S1-8 open) and the battery voltage reaches the 80% charged point in 3 minutes or less, the charge will be terminated immediately and "Charge Complete" LED will light.

NOTE: To disconnect battery from charger

before charge is complete, first press the stop pushbutton, then disconnect the battery from the charger.

Equalize Charge

1. Insure that battery size matches the charger. (Number of cells and ampere-hour capacity are within charger nameplate rating.)
2. Securely engage the battery and charger connectors.
3. After a 5 second delay (all LED's will be lit), the charger will turn on. The ammeter will indicate charging current.
4. Press the EQUALIZE pushbutton. The "Equalize" LED will light solid. Press the pushbutton again to cancel the equalize charge.

NOTE: The equalize charge cannot be cancelled once the battery reaches the equalize charging period. Press the STOP pushbutton to terminate the charge.

5. The "80% Charged" LED will light when the battery on charge reaches the 80% charged voltage.
6. The battery reaches the normal termination point (dV/dT or VT). However, the battery is charged another 3 hours. The "Equalize" LED will flash during this equalize period.
7. The charger will automatically turn off, and the "Charge Complete" and the "Equalize" LED will light when the equalized charge has finished. The LED's will remain on until the battery is disconnected from the charger.

NOTE: If the control is set for voltage/time termination (DIP switch S1-8 open) and the battery voltage reaches the 80% charged point in 3 minutes or less, the equalize charge will still occur.

WARNING: DO NOT connect a battery to this charger if any LED is lit. Do not disconnect a battery from this charger while a charge is in progress; otherwise, arcing and burning of connector parts or a battery explosion may result. Batteries produce explosive gases. Keep sparks, flame, and cigarettes away. Ventilate when charging in an enclosed area. Always shield eyes when working near batteries.

Manual Stop

1. To turn the charger off during any part of a charge cycle, press the STOP pushbutton. The "Abnormal Shutdown" LED will light.
2. To restart the charger, disconnect and reconnect the battery. A new charge cycle will begin.

Battery Discrimination

The 250CII Control has the ability to reject batteries with cell sizes that do not match the cell size that the control is set up for (via DIP switch S1-1 through S1-6). If the battery connected to the charger has an average terminal voltage of greater than 2.40 volts/cell, the charger will not start and the "Equalize", "Abnormal Shutdown", and "Charge Complete" LEDs will flash (high battery fault indication). If the battery voltage eventually falls below 2.40 volts/cell, the control will begin a normal charge sequence.

If the battery connected to the charger has an average terminal voltage of less than 1.85 volts/cell, the charger will not start and the "Equalize" and "Abnormal" LEDs will flash (low battery fault indication). If the battery voltage eventually rises above 1.85 volts/cell, the control will start a normal charge sequence. If the battery connected to the charger has a terminal voltage of less than 1.85 volts/cell and the operator wishes to start the charge regardless of this low battery voltage, the charge cycle will start if both the EQUALIZE and the STOP pushbuttons are held pushed in until all LEDs go out (approximately 5 seconds). Release the keys at this time.

Backup Timer Shutdown

A backup timer will shut down the charger and flash the "Abnormal Shutdown" LED if the battery on charge does not reach the 80% voltage during the first 10 hours and 15 minutes of charging. All other LEDs will be off.

Likewise, if the 250CII Control is set to terminate via the dV/dT methodology (DIP switch S1-8 closed) and the charger does not reach the termination point within 5 hours after reaching the 80% charged voltage, the charger will shut down and the "Abnormal Shutdown" LED will flash. The "80% Charged" LED will remain lit.

WARNING: DO NOT connect a battery to this charger if any LED is lit. Do not disconnect a battery from this charger while a charge is in progress. Otherwise, arcing and burning of connector parts or a battery explosion may result. Batteries produce explosive gases. Keep sparks, flame, and cigarettes away. Ventilate when charging in an enclosed area. Always shield eyes when working near batteries.

Battery Disconnect Shutdown

If the battery is disconnected from the charger during a charge cycle, the charger will be shut down. All LEDs will be off.

Low Current Shutdown

If the charger output current falls below a predetermined level, a low current shutdown will occur. The "Charge Complete" LED will turn on and the "Abnormal Shutdown" LED will flash.

NOTE: This feature is disabled for the first 30 seconds of charge (or until 80% charged is reached).

AC Power Failure

During an AC power failure, the 250CII Control stores key information about the charge cycle. The information is retained by powering some of the control's key components with a battery derived power supply. This causes the control to resume the charge where it left off when the AC power is returned, virtually unaffected timers and equalize requests.

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SET-UP

Cell Size Selection (See Figure 7-2)

The 250CII Control may be set up to operate on 6, 12, 18, 24, 36, and "optional" cell size batteries. The Appropriate switch (and only one DIP switch S1-1 through S1-6) that matches the cell size stated on the charger nameplate must be "on" or "closed". Contact the factory for cell sizes other than those listed above. On the charger nameplate, observe the cell rating. Move the appropriate switch to the "on" or "closed" position (a ball-point pen is a helpful tool to accomplish this).

Note: Be sure that only one of the DIP switch positions S1-1 through S1-6 is "closed".

Ammeter

The ammeter full scale value must agree with the charger DC output current rating as shown in Table 5-1. If they are not in agreement, the control should not be installed and the proper control or replacement meter should be obtained. Reference Table 5-1.

<u>CHARGER DC OUTPUT CURRENT RATING (amps)</u>	<u>CONTROL AMMETER FULL SCALE VALUE (amps)</u>
0 to 76	100
77 to 171	200
172 to 320	400

Table 5-1 Ammeter Application Chart

Termination Type Selection

The 250CII Control may be set for either a Voltage/Time (VT) termination or a dV/dT termination.

Voltage/Time (VT) Termination: Charge ends 3 hours after battery reaches the 80% charged point.

dV/dT Termination: Charge ends according to the rate of voltage changeover time.

The control leaves the factory in the dV/dT termination mode. To use the voltage/time termination method, open DIP switch S1-8. Reference Table 5-2.

80% Voltage Point Selection

The 250CII Control may be set for an average 80% voltage point of 2.37 volts/cell or 2.45 volts/cell. The control leaves the factory with the 2.37 volts/cell setting.

In order to change the 80% voltage point to 2.45 volts/cell, close DIP switch S1-7. Reference Table 5-2.

<u>POSITION (S1)</u>	<u>LABEL</u>	<u>FUNCTION</u>
1	6	6 cell
2	12	12 cell
3	18	18 cell
4	24	24 cell
5	36	36 cell
6	OPT	Optional cell size
7	80%	80% voltage select, closed = 2.45 volts/cell
8	TERM	termination type select, closed = dV/dT
9		not used
10		not used

Table 5-2 DIP Switch S1

TROUBLESHOOTING

If a problem is suspected with the 250CII Control, always check that the cell selection switch on the side of the control is set correctly (see Figure 7-2). An improperly set cell selection switch could cause the charge to end prematurely or to run too long resulting in an abnormal shutdown. Also, an improperly connected or faulty control wire harness could cause erratic operation.

Inspect the control wire harness connections for proper mating and that all wires/terminals are fully installed in the connector housing (s). For detailed charger troubleshooting procedures, see the Charger Manual.

WARNING: ELECTRICAL SHOCK HAZARD – Before checking electrical components, turn off and remove fuses of disconnect switch (supplying AC power to charger), disconnect battery and check for voltage on capacitors. Discharge through insulated screwdriver if there is any reading.

	HI BATT	LO BATT	LO CURR	9 HOUR TIMER	5 HOUR TIMER	MANUAL STOP
80% LED					solid	
CHARGE COMPLETE LED	flash		solid			
ABNORMAL SHUTDOWN LED	flash	flash	flash	flash	flash	solid
EQUALIZE LED	flash	flash				

Table 6-1 250CII LEDs

Troubleshooting Procedures

Solid Red “Abnormal Shutdown” LED

Manual Stop Shutdown Indication

Cause #1: Charge cycle deliberately terminated by pressing STOP button.

CAUTION: BATTERY IS NOT FULLY RECHARGED.

Action: Disconnect battery from charger. Reconnect battery to charger to begin new charge cycle.

Cause #2: Reason for abnormal shutdown is unknown.

Action: Check specific gravities to determine need for additional charge. Disconnect and reconnect battery to charger to begin new charge cycle.

Flashing Green “Charge Complete” LED
Flashing Red “Abnormal Shutdown” LED
Flashing Yellow “Equalize” LED

High Battery Voltage Indication

Cause #1: Battery number of cells is greater than rated charger number of cells.

Action: Disconnect the battery from the charger and connect to a charger with the same number of cells as the battery.

Cause #2: Battery was just removed from a charger and has an open circuit terminal voltage greater than the high voltage discrimination setting (2.40 volts/cell).

Action: Confirm that the battery matches the rating of the charger and that none of the battery cells are defective. The charge cycle will begin automatically when the battery voltage falls below 2.40 volts/cell.

Cause #3: DIP switch S1 settings on the 250CII Control are incorrect.

Action: Set the DIP switch S1 according to the Set-Up chapter in this manual.

Flashing Red “Abnormal Shutdown” LED
Flashing Yellow “Equalize” LED

Low Battery Voltage Indication

Cause #1: Battery number of cells is less than rated charger number of cells.

Action: Disconnect the battery from the charger and connect to a charger with the same number of cells as the battery.

Cause #2: Battery is over-discharged and has an open circuit terminal voltage less than the low voltage discrimination setting (1.85 volts/cell).

Action: Confirm that the battery matches the rating of the charger and that none of the battery cells are defective. If it is desired to start the charge cycle on this low volt-

age

battery, then press both buttons for about 5 seconds. The control will ignore the low battery indication and start the charge cycle.

Cause #3: DIP switch S1 settings on the 250CII Control are incorrect.

Action: Set the DIP switch S1 according to the Setup chapter in this manual.

Solid Green “Charge Complete” LED Flashing Red “Abnormal Shutdown” LED

Low Current Shutdown Indication

Cause: Low charger output current possibly caused by one of the following:

1. *Battery # cells greater than charger cell rating*
2. *Battery amp-hour rating much less than charger amp-hour rating*
3. *High resistance in charge circuit*
 - a. *Cable*
 - b. *Connector*
 - c. *Inter-cell connectors*
 - d. *Internal cell open*
4. *Sulfated battery*
5. *Low acid level*
6. *Rate incorrectly set*
7. *Blown input fuses*
8. *Incorrect line voltage/connections*
9. *Open rectifier diode*
10. *Defective power transformer*
11. *Blown output fuse*
12. *Wiring between control and the charger*

Solid Yellow “80% Charged” LED Solid Green “Charge Complete” LED Solid Red “Abnormal Shutdown” LED Solid Yellow “Equalize” LED

NOTE: All four LEDs will be lit solid for about 5 seconds anytime a battery is connected to the control. However, if the LEDs remain lit (probably dimmer than normal), and the charger does not turn on after the 5 second delay, there is a problem.

Improper AC Voltage Input To Control Indication

Cause #1: AC input to charger is incorrect.

Action: Refer to charger owner’s manual.

Cause #2: Connections to and/or from the control transformer are incorrect.

Action: Refer to charger owner’s manual.

Flashing Red “Abnormal Shutdown” LED

10.25 Hour Backup Timer Shutdown Indication

Cause: Battery did not reach the 80% voltage point within 10 hours and 15 minutes. Check for one of the following:

1. *One or more low voltage cells*
2. *Low charger output*
 - a. *Incorrect line voltage/connection*
 - b. *Blown input fuse*
 - c. *Charge rate set too low*
 - d. *Defective power transformer*
 - e. *Battery has incorrect number of cells for charger/control*
 - f. *High impedance in cable or connector*
 - g. *Open rectifier diode*

Solid Yellow “80% Charged” LED Flashing Red “Abnormal Shutdown” LED

5 Hour Backup Timer Shutdown Indication

Cause: Battery did not reach the dV/dT charge termination within 5 hours after the 80% trip point was reached. Check for one of the following:

1. *Abnormally high battery counter EMF*
 - a. *Sulfation on plates*
 - b. *Loose/corroded inter-cell connectors*
 - c. *Battery # of cells not matched to charger*
2. *Incorrect cell switch setting on the control*

PARTS LIST

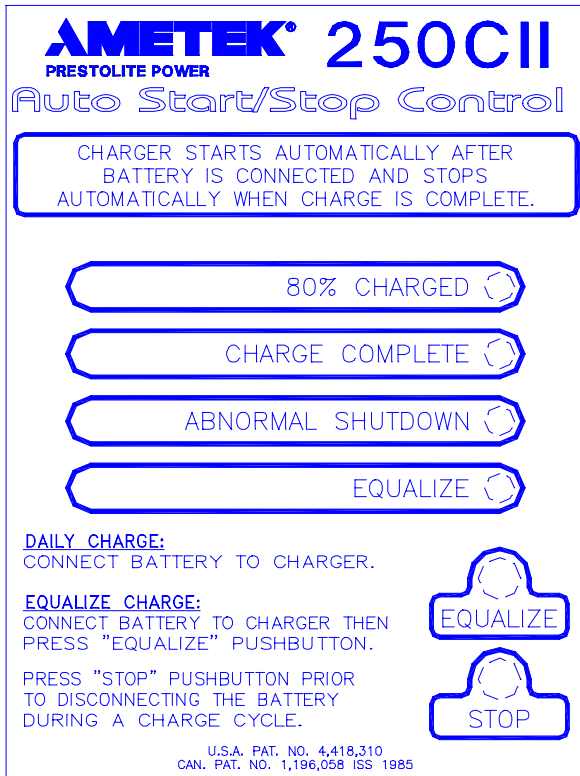


Figure 7-1

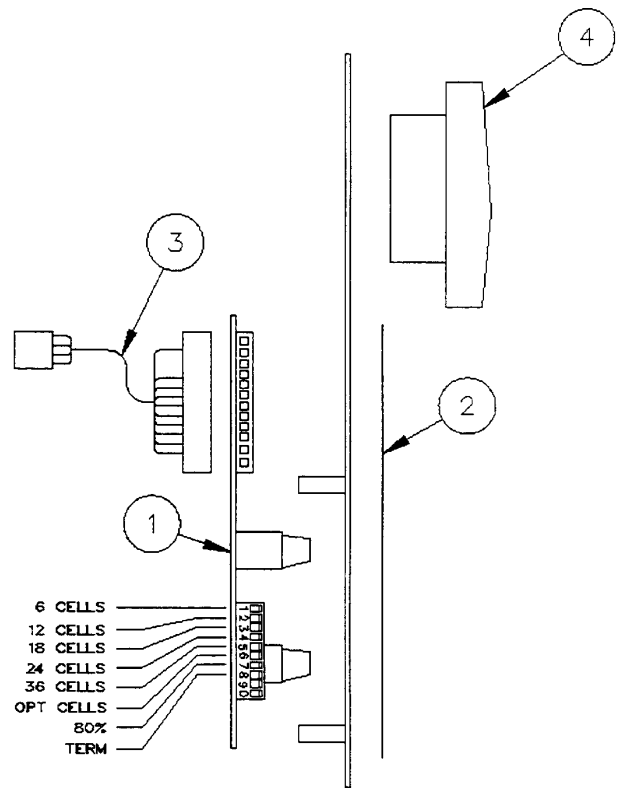


Figure 7-2

PARTS LIST FOR FIGURE 7-1 AND FIGURE 7-2

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>PART NO.</u>
1	PC BOARD ASSEMBLY, 250CII CONTROL	192617-XXX (See back of board)
2	OVERLAY	192624
3	WIRE HARNESS	399434
4	METER	400707-006 (100A) 400707-002 (200A) 400707-003 (400A)

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ELECTRONIC PRINTED CIRCUIT BOARD EXCHANGE SERVICE POLICY

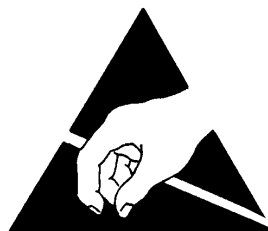
Because of the definite superiority of certain solid-state control components over conventional electromechanical relays and regulators, the company product lines now incorporate solid-state controls for applications in which they may be used to advantage. To facilitate testing and servicing, these control components and circuits have been assembled as modules on printed circuit boards, mounted in such a manner as to be quickly and easily removed. Electrical connections to other components of the unit are by means of plug-in, screw type, or "Faston" connectors.

In recognition of the fact that most users of this equipment lack the facilities and specially trained personnel necessary to service and repair electronic equipment, the company has established an electronic printed circuit board exchange service plan.

Under the Printed Circuit Board Exchange Plan, the owner of the equipment may exchange the printed circuit board (s) in which fault has developed for a replacement.

A standard exchange price has been established for each printed circuit board without regard to the amount of repair required to the original turned in, which is applied against the cost of the replacement. Exchange prices for a specific printed circuit board may be determined by contacting an authorized company distributor or by writing to the factory, giving the SPECIFICATION or ASSEMBLY, MODEL, and SERIAL numbers of the unit in which the printed circuit board is installed.

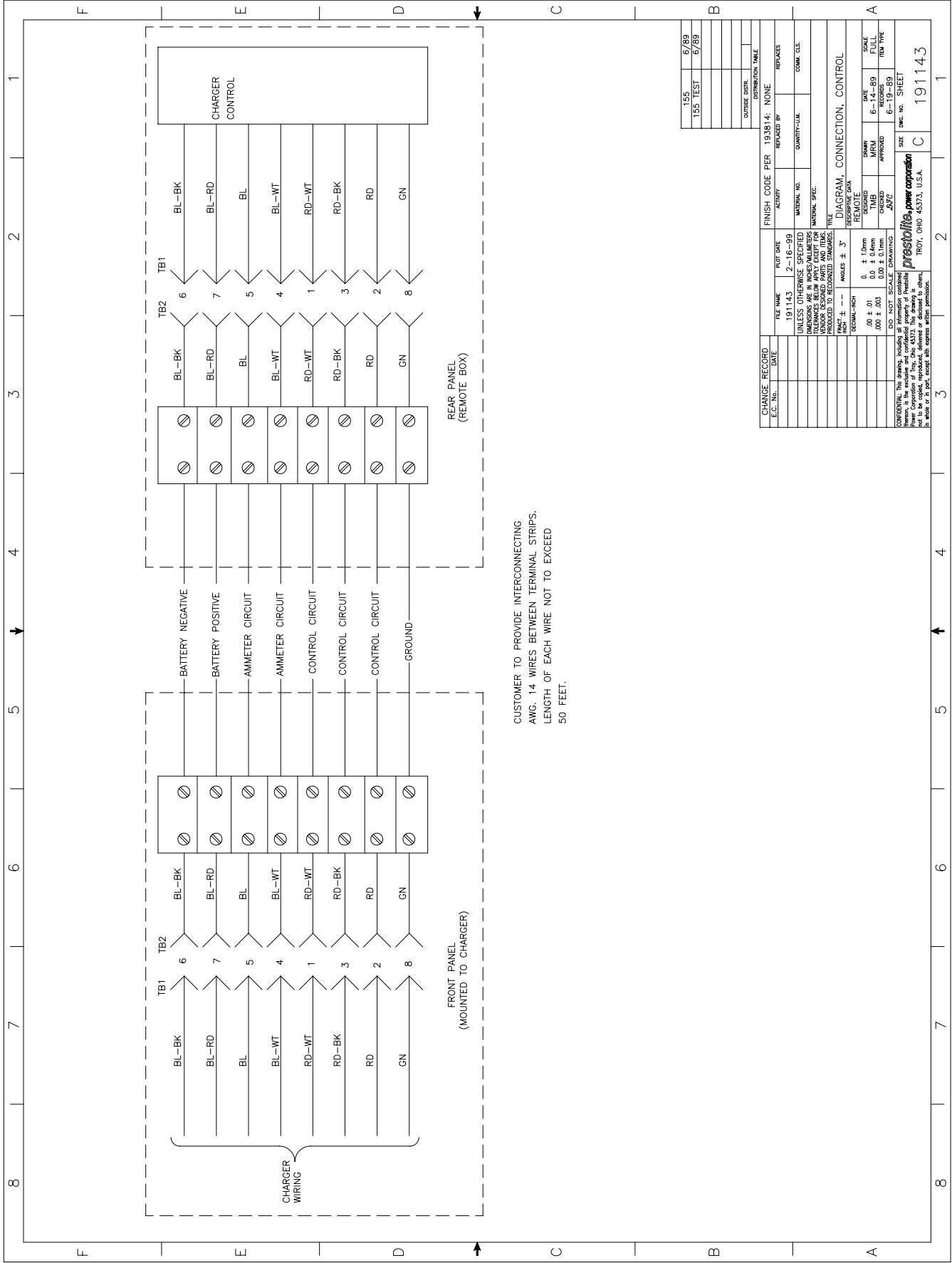
This Exchange Plan applies only to the specified solid-state control components circuitry which have failed due to electrical fault or normal deterioration resulting from use and age. The plan does not cover parts which have been physically damaged through accident or abuse, or to which unauthorized repairs have been made or attempted.



CAUTION: Printed circuits and other devices may be affected by static electricity. Handling precautions required.

DIAGRAMS

<u>DESCRIPTION</u>	<u>PART NUMBER</u>
STANDARD WIRING DIAGRAM	192637 SHEET 3
REMOTE CONTROL WIRING DIAGRAM	191143



CUSTOMER TO PROVIDE INTERCONNECTING
AWG. 14 WIRES BETWEEN TERMINAL STRIPS.
LENGTH OF EACH WIRE NOT TO EXCEED
50 FEET.

CHANGE RECORD	DATE	FILE NAME	REF. DATE	FINISH CODE PER 193B14: NONE	REWORKED BY	REVISION TABLE
E.C. No.		191143	2-16-99		REWORKED BY	
		UNLESS OTHERWISE SPECIFIED			QUANTITY-LIN.	CONN. CLS.
		DIMENSIONS BELOW APPLY EXCEPT FOR		MATERIAL NO.		
		DIMENSIONS ARE IN INCHES/MILLIMETERS		MATERIAL SPEC.		
		TOLERANCES BELOW APPLY EXCEPT FOR		TITLE		
		DIMENSIONS ARE IN INCHES/MILLIMETERS		DIAGRAM, CONNECTION, CONTROL		
		PRODUCED TO RECOGNIZED STANDARDS.		REVISION DATA		
		UNIT #	ANGLES ± 3'	REVISION NO.	DATE	SCALE
		FRACTIONAL-INCH		PREPARED	6-14-89	FULL
		DECIMAL-INCH	0. ± 1.0mm	TMB	6-10-89	REL. TYPE
		MILLIMETERS	0.0 ± 0.4mm	APPROVED		
			± .003			
			± .005			
		DO NOT SCALE DIMENSIONS				
CONFIDENTIAL: This drawing, including all information contained hereon, is the property of PrestoStuffs, Inc. and is not to be copied, reproduced, altered or disclosed to others, in whole or in part, except with express written permission.		Dwg. No. C 191143		SHEET		
PrestoStuffs, Inc.				TROY, OHIO 45373, U.S.A.		

155 TEST	6/89
155 TEST	6/89
OUTSIDE DATE	

WARRANTY

AMETEK/PRESTOLITE POWER INDUSTRIAL BATTERY CHARGERS

Ametek/Prestolite Power (hereinafter called "Prestolite") warrants that each new and unused Industrial Battery Charger manufactured and supplied by it is of good workmanship and is free from any inherent mechanical defects, provided that (1) the product is installed and operated in accordance with generally accepted industrial standards and in accordance with the printed instructions of Prestolite, (2) the product is used under normal conditions for which designed, (3) the product is not subjected to misuse, negligence or accident, and (4) the product receives proper care, protection and maintenance under supervision of competent personnel. This warranty is subject to the following provisions:

1. **PRODUCTS AND PARTS WARRANTED.** Subject to the exceptions listed below each Industrial Battery Charger is warranted for a period of one (1) year from the date of its shipment by Prestolite, provided the charger is used in accordance with Prestolite's published performance rating for the unit involved. The exceptions to this warranty are as follows:
 - a) Power transformers and silicon diodes on unit (s) shipped after January 1, 1997 are warranted for ten (10) years after Prestolite's shipment of the unit(s) of which they are a part, provided however that during the last nine (9) years of this 10 year period the warranty covers parts replacement only – no labor or other services are provided by Prestolite, nor shall Prestolite be obligated to reimburse the owner or any other person for any work performed.
 - b) Primary switch contacts, fuses, bulbs, and filters are not warranted unless found to be defective prior to use.
2. **COMMENCEMENT OF WARRANTY TIME PERIODS.** The warranty periods indicated in the Warranty Schedule shall commence on the date of shipment by Prestolite.
3. **PERSONS COVERED BY WARRANTY.** This warranty is extended by Prestolite only to the purchaser of new equipment from Prestolite or one of its authorized distributors. The products purchased under this agreement shall be used exclusively by the buyer and its employees and by no other persons; and therefore there shall be no third party beneficiary to this warranty.
4. **LIMITATION OF REMEDY.** The existence of claimed defects in any product covered by this warranty is subject to Prestolite's factory inspection and judgement. Prestolite's liability is limited to repair of any defects found by Prestolite to exist or, at Prestolite's option, the replacement of the defective product. F.O.B. factory after the defective product has been returned by the purchaser at its expense to Prestolite's shipping place. Replacement and exchange parts will be warranted for the remainder of the original Industrial Battery Charger Warranty or for a period of ninety (90) days, whichever is greater.

Prestolite and its authorized distributors or dealers shall not be liable for direct or indirect, special or consequential damages in excess of such repair or replacement. In no event shall the purchaser be entitled to recover for contingent expenses resulting from, but not limited to, telephone calls, telegrams, travel expenses, lodging, duties and taxes, labor, rental or replacement equipment, loss of business or profits or other commercial losses.
5. **USE OF DEFECTIVE PRODUCT.** Continued use of an Industrial Battery Charger after discovery of a defect VOIDS ALL WARRANTIES.
6. **ALTERED EQUIPMENT.** Except as authorized in writing, the warranty specified does not cover any equipment that has been altered by any party other than Prestolite.

EXCEPT AS STATED ABOVE, ALL OTHER WARRANTIES AND CONDITIONS, EITHER EXPRESSED OR IMPLIED, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE EXCLUDED AND BUYER ASSUMES ALL RISK AND LIABILITY RESULTING FROM USE OF THE GOODS. AMETEK/PRESTOLITE POWER NEITHER ASSUMES NOR AUTHORIZES ANY PERSONS TO ASSUME FOR AMETEK/PRESTOLITE POWER ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OR USE OF THE GOODS SOLD, AND THERE ARE NO ORAL AGREEMENTS OR WARRANTIES COLLATERAL TO OR AFFECTING THIS WRITTEN WARRANTY.

WARNING

At all times, safety must be considered an important factor in the installation, servicing, and operation of the product, and skilled, qualified technical assistance should be utilized.

AMETEK/PRESTOLITE POWER
TROY, OHIO USA

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