OWNER'S MANUAL 193111-082

Revised June 30, 2010

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

POWER STAR

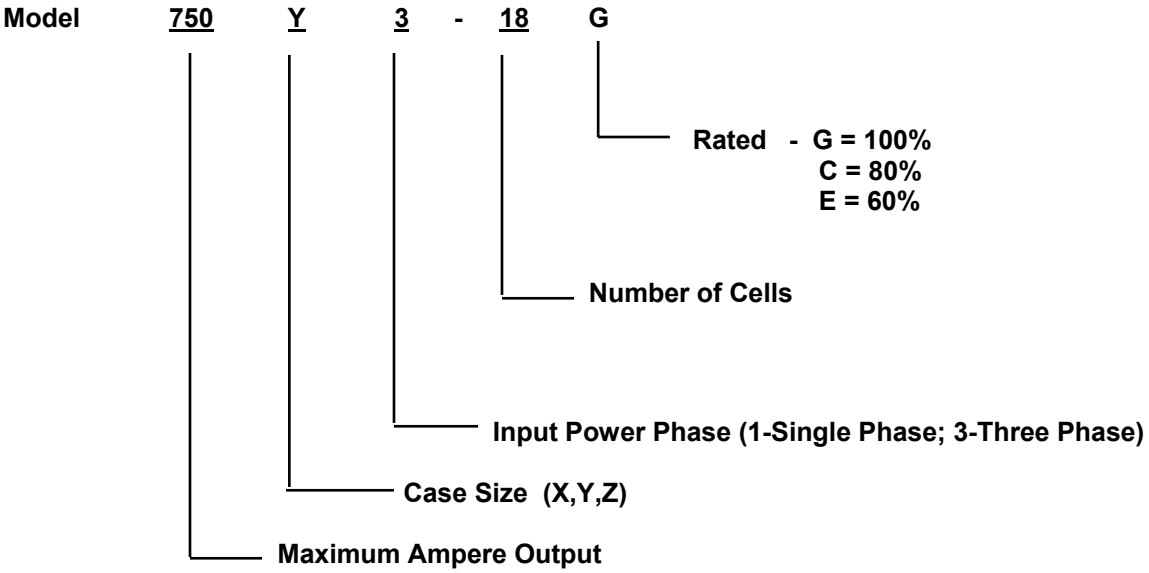
SCR – Controlled Output Type Battery Charger

DO NOT DESTROY

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

NOTE: Information regarding obtaining additional copies of this manual is located in the Introduction chapter of this manual.

A battery charger is identified by model number. Incorporated into the model number is the ampere-hour capacity, case size, input power phase, and number of cells in battery for which charger is intended. The following example explains the basic model numbering arrangement.



NOTE: This information is required for ordering certain replacement/service parts.

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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 as instructed in the Maintenance chapter of this manual. Replace any precautionary or instruction label that cannot be easily read.

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.

SAFETY INSTRUCTIONS AND WARNINGS

FOR OPERATION OF BATTERY CHARGING EQUIPMENT

IMPORTANT – READ AND UNDERSTAND THESE INSTRUCTIONS. DO NOT LOSE THEM. ALSO READ OPERATING/INSTRUCTION MANUAL BEFORE INSTALLING, OPERATING, OR SERVICING THIS 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.

   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.

DESCRIPTION OF EQUIPMENT

Charger

The basic charging circuit is the silicon controlled rectifier (SCR)-type with isolating transformer (s). This design regulates charging current by allowing the battery to determine its own charge cycle rate in accordance with its state of discharge. It provides an I-E-I charge curve that eliminates the possibility of overcharging, even with line voltage variations of ± 10%. The charger is internally protected from overload and short circuits.

The charger is designed to properly charge batteries of 3 different ampere-hour ratings, which are listed on the charger nameplate. One of the three ratings can be chosen through the "charge grade" control setting. Charge times are dependent on the charge grade setting as shown below.

Batteries of smaller or larger ampere-hour capacities can also be charged, but will require shorter or longer charging, respectively.

Charge Grade	BCI Code	Discharge Level	Charge Time
0	100D6C8	100%	8 Hrs.
B (1)	80D6C8	80%	8 Hrs.
E (2)	80D6C10	80%	10 Hrs,

Charge Control

NOTE: The charger is designed to accept different Prestolite controls for greater flexibility. For charge controls for other than the SCR1000, see the charge control owner's manual supplied with the charger.

The SCR1000 Control is provided as the standard charger control. It utilizes either a voltage/time (VT) charge termination or a patented dV/dT charge termination technique which eliminates excessive gassing returning approximately 107% of the amp-hours removed from the battery. Features of the SCR1000 Control include auto start/stop, manual equalize, manual stop, back-up timer protection, two charge termination methods, manual or automatic (with optional BID module) battery temperature compensation, high and low battery voltage discrimination, AC power fail recovery, selectable output profiles, and charge cycle data archiving.

The SCR1000 is "matched" to the output voltage of the charger by means of a printed circuit board mounted DIP switch. It will operate on a 6, 9, 12, 18, 24 and "optional" cell batteries. The optional setting is provided to accommodate batteries between 6 and 24 cells that are not listed above. A second SCR1000 Control version is available that accommodates 12, 18, 24, 36, 40 and "optional" cell batteries.

The four LEDs on the front panel indicate the status of a normal charge cycle. The "80% Charged" LED will light when the battery current is reduced to approximately 8.2 amps per 100 AH of battery rating. The battery voltage at the 80% charged point will vary with charge profile setting and/or manual or automatic temperature settings. The "Charge Complete" LED will light only if the battery has completed the charge cycle and is ready for use. All four LEDs will flash if the charger terminates a charge prematurely. See the Troubleshooting chapter of this manual to determine the cause of the fault. The "Equalized" LED will light solid when an equalize charge is requested by pressing the equalize push button. The "Equalize" LED will flash when the charger is equalizing the battery.

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.

INSTALLATION

Location

For best operating characteristics and longest unit life, take care in selecting an installation site. Avoid locations exposed to high humidity, dust, high ambient temperature, or corrosive fumes. Moisture can condense on electrical components, causing corrosion or shorting of circuits (especially when dirt is also present).

Adequate air circulation is needed at all times in order to assure proper operation. Provide a minimum of 6 inches of free air space at rear and sides of the unit. Make sure that ventilation openings are not obstructed.

Always remove the charger shipping skid from the unit before installation. The charger must be installed over a noncombustible surface such as concrete or metal. Keep the charging area clear of all combustible material such as wood, paper, and cloth. When moving the charger after the packing skid and box have been removed, make sure that lifting forks do not damage the charger panels or cables.

WARNING: SPARKS OR MOLTEN METAL falling through open bottom can cause fire or explosion.

- **Install over noncombustible material such as concrete or metal.**
- **Keep charging area clear of combustible material.**

Environmental Characteristics

Operating Characteristics	0°C to 40°C (32°F to 104°F)
Operating Altitude	To 2000 Meters (6562 Feet)
Operating Humidity	80% up to 31°c, decreasing to 50% at 40°C, non-condensing 80% up to 88°F decreasing to 50% at 104°F, non-condensing

Grounding

The frame of the power source must be grounded for personnel safety. Where grounding is mandatory under state or local codes, it is the responsibility of the user to comply with all applicable rules and regulations. Where no state or local codes exist, it is recommended that the National Electrical Code be followed.

In addition to the usual function of protecting personnel against the hazard of electrical shock due to fault in the equipment, grounding serves to discharge the static electrical charges which tend to build up on the surfaces of equipment. These static charges can cause painful shock to personnel, and can lead to the erroneous conclusion that an electrical fault exists in the equipment.

If a charger is to be connected to the AC power supply with a flexible jacketed cable, one having a separate grounding conductor should be used. When included in cable assembly, grounding conductor will be green, green with a yellow stripe, or bare. When connecting input power to charger (as instructed in Line Connection to Battery Charger section of this manual), connect grounding conductor to equipment grounding terminal (stud with a green nut and a cup washer and identified by symbol ⏚), taking care to make a good electrical connection. Connect other end of grounding conductor to the system ground.

If, for any reason, an input cable which does not include a grounding conductor is used, the equipment must be grounded with separate conductor. Minimum size and color coding requirements must be in accordance with any applicable state or local code, or the National Electrical Code.

If metallic armored cable or conduit is used, the metal sheathing or conduit must be effectively grounded as required by state or local code, or the National Electrical Code.

If a system ground is not available, the charger frame must be connected to a driven ground rod (at least 8 ft [2438 mm] long), or to a water pipe that enters the ground not more than 10 ft (3048 mm) from the charger. A grounding conductor must be connected to the rod or pipe in a manner that will assure a permanent and effective ground. The conductor must be sized in accordance with any applicable state or local code, or by the National Electrical Code. If in doubt, use the same size conductor as is used for the conductors supplying power to the charger.

WARNING: ELECTRIC SHOCK HAZARD – Under no circumstance should you use a grounding conductor with a current carrying capacity less than the ampere rating shown in Table 4-1.

LINE AMPS	DISCONNECT SWITCH *	BRANCH FUSE SIZE (AMPERES)	COPPER CABLE SIZE AWG * *	
			POWER	GROUND
0-2.5	30A	5	No. 14	No. 14
2.6-4.5	30A	7	No. 14	No. 14
4.6-7.5	30A	10	No. 14	No. 14
7.6-12	30A	15	No. 14	No. 14
12.1-16	30A	20	No. 12	No. 12
16.1-18	30A	25	No. 10	No. 10
18.1-22	30A	30	No. 10	No. 10
22.1-24.5	60A	35	No. 8	No. 10
24.6-32.5	60A	40	No. 8	No. 10
32.6-40	60A	50	No. 8	No. 10
40.1-45	60A	60	No. 6	No. 10
45.1-57.5	100A	80	No. 4	No. 8
57.6-78	100A	100	No. 2	No. 8
78.1-102.5	200A	125	No. 2	No. 6
102.6-135	200A	150	No. 1/0	No. 6

Table 4-1 Recommended AC Input and Branch Fusing

The above table (Table 4-1) is based on 75°C (167°F) rated conductors and 40°C (104°F) ambient temperatures. Refer to National Electrical Code (2008) Tables 310-16 corrected to 40°C (104°F).

* For 115, 208, and 230-volt lines, use 250-volt disconnect switch.
For 440-480, 575-volt lines, use 600-volt disconnect switch.

* * Two conductors and ground conductor required for single phase.
Three conductors and ground conductor required for three phase.

Recommended minimum size of grounding conductors (based on National Electrical Code 2008– Table 250-95).

Line Voltage Changeover Instructions

1. Determine if the charger is connected for available line voltage. A label located near AC input terminals is marked with the AC voltage for which the charger is factory connected.

2. If charger is not connected correctly, check serial nameplate to determine that charger is equipped to be connected for available line voltage. If charger is suitably equipped, make voltage changeover connections by following instructions on AC INPUT label inside charger.

3. If charger is reconnected, check input fuse (s) ratings with ratings specified on label and replace if necessary.

   CAUTION: INCORRECT CONNECTIONS AND INCORRECT FUSE SIZE can damage this equipment. Follow voltage changeover instructions carefully.

Line Connections to Battery Charger

Follow local code requirements if different than instructions in this manual.

1. Turn charger OFF.

2. Be sure charger is connected correctly for available line voltage as instructed above.

3. On charger nameplate, note the AC input amperes corresponding to the line voltage to which charger is to be connected. Use that ampere value to select the proper disconnect switch, fuse, and power cable sizes from Table 4-1. A “WARNING” label inside charger also lists fuse sizes for each line voltage (circled fuse rating is required for internal line voltage connections made at factory).

4. Route AC power input cable in through knock-out provided in side panel of charger cabinet. Securely fasten cable wires to a power input terminal inside charger. Refer to Grounding section of this manual for proper connection of grounding conductor. (Charger cabinet top or side panel, or both, may have to be removed to provide access to terminal block.)

5. With disconnect switch (on AC input power line) in "OPEN" or "OFF" position, connect power cable coming from charger, to the switch. Install fuses in switch.

Charging Cable Connectors

If connectors are already attached to charging cables, make sure that they're attached so that positive charger polarity will connect to positive battery terminal.

If connectors must be attached to charging cables, follow instructions supplied with connectors.

CAUTION: Make sure connectors are securely attached to cables (good solder joint or well tightened set screws, whichever is applicable). Be certain that positive charger cable will connect to positive battery terminal. If necessary, trace cables into charger and use supplied connection diagram to determine polarity. The use of a DC voltmeter may show polarity. Improper connections will "blow" output fuse and may cause other damage.

Note: If this charger is equipped with certain optional features, the connector attaching procedure may be modified. Refer to OPTIONS chapter of this manual for details.

Pre-operation Checks

1. Inspect charger thoroughly for damage; loose screws, nuts, or electrical connections.

WARNING: ELECTRICAL SHOCK HAZARD – Before inspecting or cleaning inside cabinet, turn OFF and remove fuses of disconnect switch (supplying AC power to charger) and disconnect battery.

2. Remove all special tags that are tied to charger. Keep tags with this manual for future reference. Leave all precautionary and instruction labels in place on charger. Carefully read and follow instructions on all tags and labels. Make sure all labels remain visible to anyone operating charger.

3. Make sure all charger cabinet panels are fastened in place, to assure proper flow of ventilating air through cabinet.

OPERATION

NOTE: The operating procedure given here explains the operation of a charger equipped with the SCR1000 Control. For charge controls other than the SCR1000 Control, see the charge control owner's manual supplied with the charger for the operating procedure.

NOTE: If this charger is equipped with certain optional features, the operating procedure may be modified.

Preliminary

1. Make sure that charger is installed and grounded as instructed in this manual.

2. Make sure the charge control is set to the proper cell size via the charge control DIP switch cell selector.

3. Turn on main fused disconnect switch that supplies AC power to charger.

4. Maintain electrolyte level in batteries to be charged, as instructed by battery manufacturer. The volume of electrolyte will expand during the charge. Therefore, to avoid overfilling, do not add water until the battery has received at least an 80% charge. This will usually be reached at the time gassing starts.

Normal or Daily 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 the charger. (Number of cells and ampere-hour capacity are within charger nameplate rating.)

2. Securely engage the battery and charger connectors. The four LEDs will light.

3. After a 5 second delay, the LEDs will go out and 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 and display "OFF" when the charge has finished. The light will remain on until the battery is disconnected from the charger.

   NOTE: To disconnect battery from charger before charge is complete, first press the STOP push button, then disconnect the battery from the charger.

   NOTE: While not normally required, the charging rate may be adjusted to compensate for unusual ambient temperature, age of battery, etc. Refer to appropriate control "Owners' Manual".

Normally, the required size charger for a given battery is chosen by matching closely the ampere-hour capacity of the battery to the nameplate rating of the charger. A smaller charger can be used to recharge batteries up to 1-1/2 times the charger rating. Charging time will be longer than 8 hours. A higher capacity charger may be used for recharging in less than 8 hours, but care must be taken that the battery temperature does not exceed its manufacturer's recommended limits.

Equalize or Weekend Charge

Batteries may need periodic equalizing to correct for inequalities between cells that result from daily or frequent cycling. An equalizing charge should be given if any of the following conditions exist:

1. The specific gravity of any cell at the end of charge is 20 points less than the average.
2. The on-charge voltage of any cell at the end of charge is 20 mV less than the average.
3. The battery has been stored for 30 days.
4. A large volume of water has been added.

To issue an 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. The four LEDs will light.
3. After a 5 second delay, the LEDs will go out and the charger will turn on. The ammeter will indicate charging current.
4. Press the EQUALIZE push button. The "Equalize" LED will light solid. Press the push-button 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 level.
6. The battery reaches the normal charge 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" LEDs will light and display "OFF" when the equalize charge has finished. The LEDs will remain on until the battery is disconnected from the charger.

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 Discrimination

The SCR1000 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 2.30 volts/cell, the charger will not start and all four LEDs will flash and the display will read "Hb". If the battery voltage eventually falls below 2.30 volts/cell, the control will automatically begin a normal charge sequence.

If the battery connected to the charger has an average terminal voltage of less than 1.75 volts/cell, the charger will not start and all four LEDs will flash and display will read "Lb". If the battery voltage eventually rises above 1.75 volts/cell, the control will automatically start a normal charge sequence.

If the battery connected to the charger has a terminal voltage of less than 1.75 volts/cell and the operator wishes to start the charge regardless of this low battery voltage, the charge cycle will start if the STOP pushbutton is pushed.

AC Power Fail

During an AC power failure, the SCR1000 Control stores key information about the charge cycle. The information is retained. This causes the control to resume the charge where it left off when the AC power is returned, virtually unaffecting timers and equalize requests.

WARNING: ELECTRICAL SHOCK HAZARD — Before checking electrical components, turn off and remove fuses of disconnect switch (supplying AC power to charger) and disconnect battery.

Abnormal Shutdowns

1. Manual Stop

To turn the charger off during any part of a charge cycle, press the STOP pushbutton. All four LEDS will light and the display will read “SrOP“. To restart the charger, disconnect and reconnect the battery. A new charge cycle will begin.

2. Backup Timer Shutdown

A backup timer will shut down the charger and all four LEDs will flash and the display will read “0-80” if the battery on charge does not reach the 80% voltage during the first 9 hours of charging. Likewise, if the SCR1000 Control is set to terminate via the dV/dT methodology and the charger does not reach the termination point within 5 hours after reaching the 80% charged level, the charger will shut down and all four LEDS will flash. The display will read “80-E”.

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.

3. 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.

4. Low Current Shutdown

If the charger output current falls below a predetermined level, a low current shutdown will occur. All four LEDs will flash and the display will read “LCSD“.

NOTE: This feature is disabled for the first 30 seconds of charge.

5. Curve Error

If the charger output becomes uncontrolled and falls above or below the proper level for a predetermined period of time, the charger will shutdown to protect the battery. All four LEDs will flash and the display will read “CUEr”.

6. Unbalanced Input Current

If the charger input current becomes unbalanced for a predetermined period of time, the charger will shut down to protect the charger from damage. All four LEDs will flash and the display will read “UbLn”.

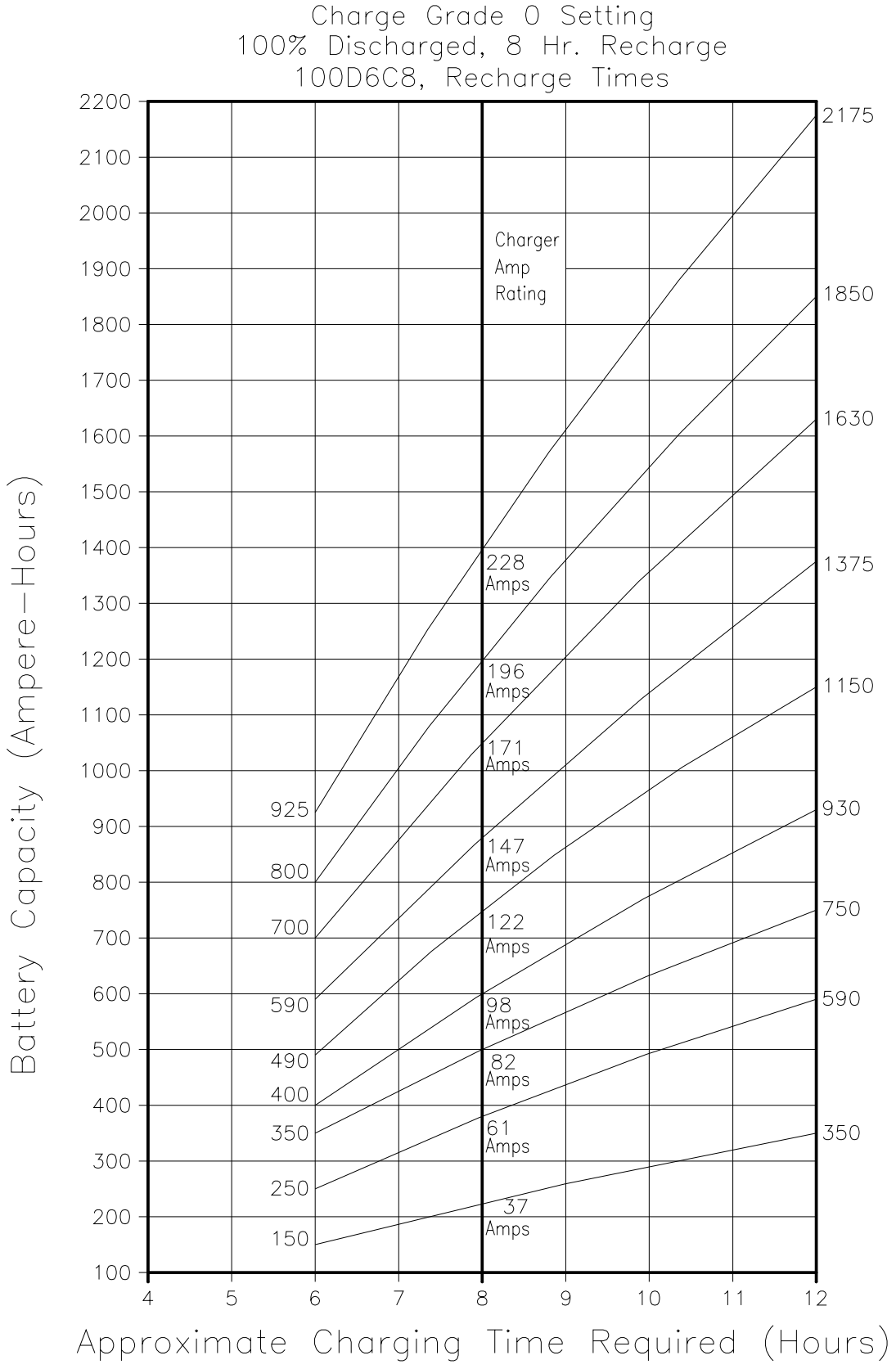
Charge Grade 0 Setting
100% Discharged, 8 Hr. Recharge
100D6C8, Recharge Times
Battery Capacity (Ampere-Hours)
Approximate Charging Time Required (Hours)
Charger Amp Rating
2175
1850
1630
1375
1150
930
750
590
350
228 Amps
196 Amps
171 Amps
147 Amps
122 Amps
98 Amps
82 Amps
61 Amps
37 Amps
925
800
700
590
490
400
350
250
150
2200
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
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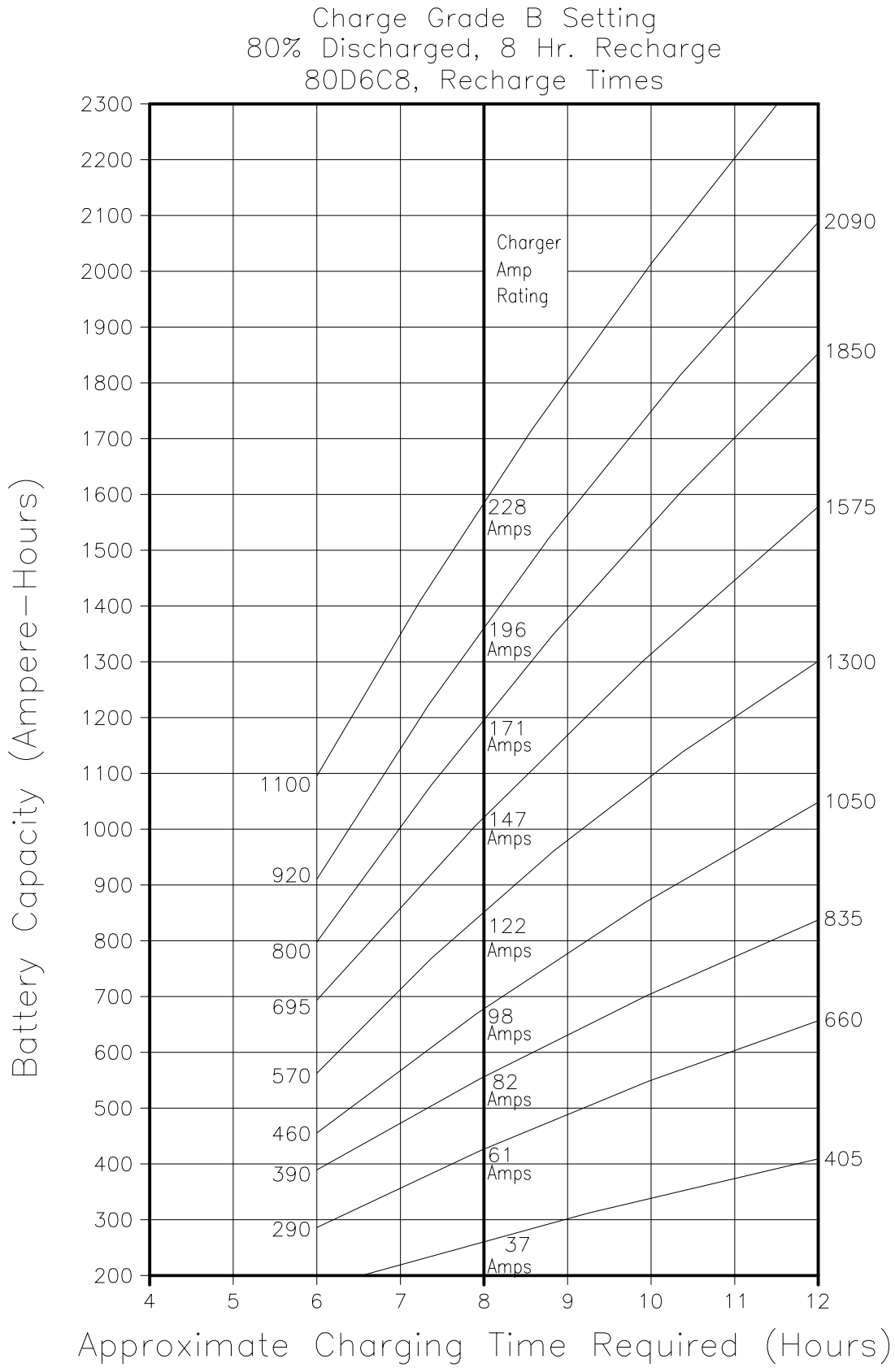
Figure 5-1


Charge Grade B Setting
80% Discharged, 8 Hr. Recharge
80D6C8, Recharge Times
Battery Capacity (Ampere-Hours)
Approximate Charging Time Required (Hours)
Charger Amp Rating
2090
1850
1575
1300
1050
835
660
405
228 Amps
196 Amps
171 Amps
147 Amps
122 Amps
98 Amps
82 Amps
61 Amps
37 Amps
1100
920
800
695
570
460
390
290
2300
2200
2100
2000
1900
1800
1700
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1300
1200
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12

Figure 5-2

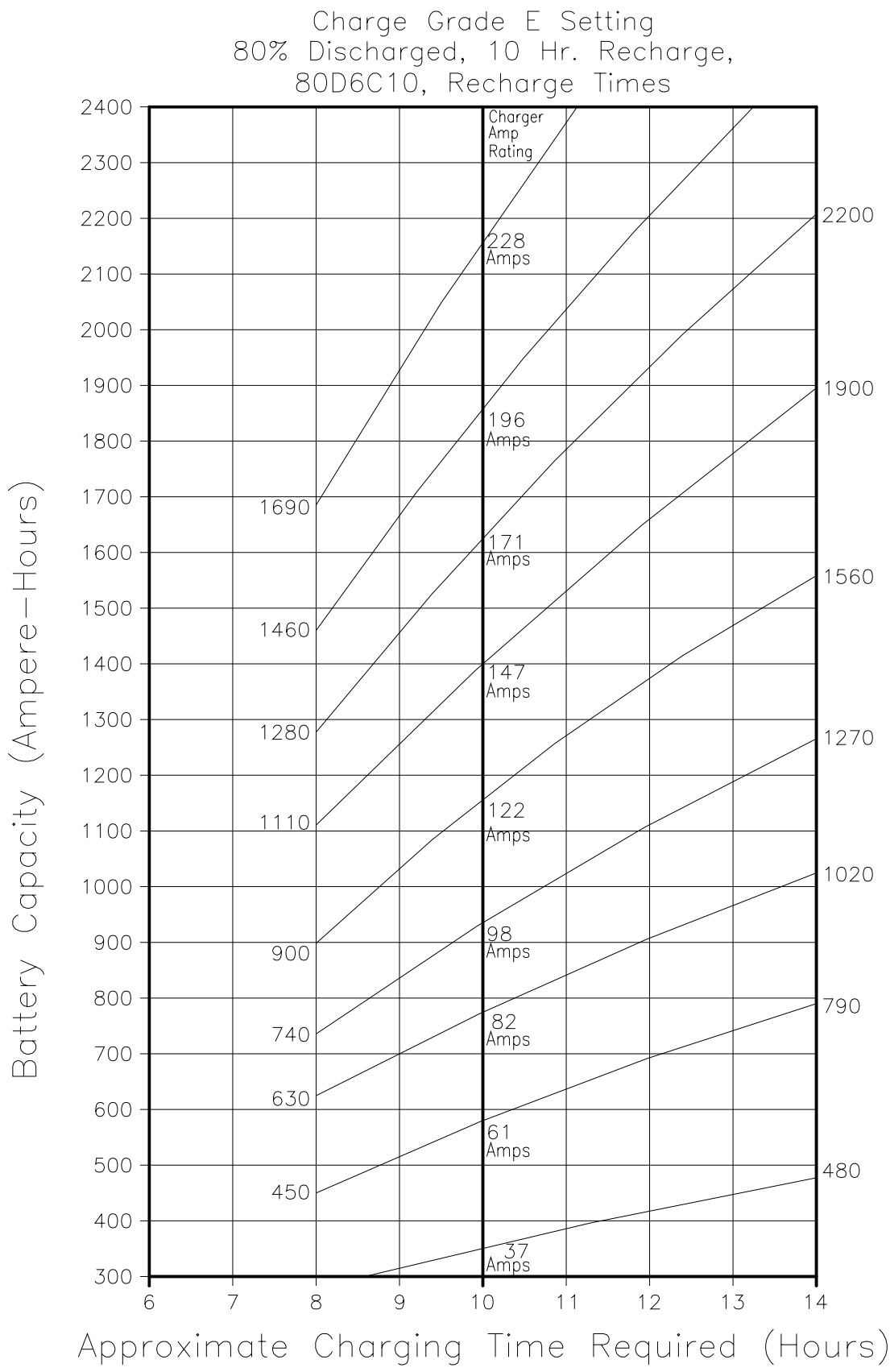

Charge Grade E Setting
80% Discharged, 10 Hr. Recharge,
80D6C10, Recharge Times
Battery Capacity (Ampere-Hours)
Approximate Charging Time Required (Hours)
Charger Amp Rating
228 Amps
196 Amps
171 Amps
147 Amps
122 Amps
98 Amps
82 Amps
61 Amps
37 Amps
2400
2300
2200
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
6
7
8
9
10
11
12
13
14
1690
1460
1280
1110
900
740
630
450
2200
1900
1560
1270
1020
790
480

Figure 5-3

MAINTENANCE

WARNING: ELECTRICAL SHOCK HAZARD — Before inspecting or cleaning inside cabinet, turn OFF and remove fuses of disconnect switch (supplying AC power to charger) and disconnect battery.

Inspection And Cleaning

For uninterrupted, satisfactory service from this charger, it's necessary to keep unit clean, dry, and well ventilated. At least every three months, or more often as necessary, wipe and blow out all dirt from unit's interior components, with clean, dry air of not over 25 psi (172 kPa) pressure. Use a hand bellows if compressed air isn't available.

Check and tighten all electrical connections as necessary to eliminate unnecessary losses and to avoid subsequent trouble from overheating or open circuits. Check for broken wiring or damaged Insulation on wiring.

WARNING: ELECTRICAL SHOCK HAZARD — Failure to keep internal parts clean and dry may allow transformer (s) to short out, causing secondary circuits to carry dangerously high voltage.

Be sure to replace all charger cabinet panels after any servicing, to assure proper flow of cooling air through unit and to protect internal components.

WARNING: ELECTRICAL SHOCK HAZARD — All cabinet panels must be replaced to protect personnel from contact with hazardous voltages.

Lubrication

None required.

Fuse Replacement

The SCRs and silicon diodes in this charger are protected by a “fast-clearing” type fuse.

CAUTION: The use of any other type fuse besides the “fast-clearing” type may cause damage to silicon diodes.

TROUBLESHOOTING

Troubleshooting Table

SYMPTOM	PROBABLE CAUSES	ACTION	
		PARAGRAPH	PAGE
No Display And No LED's	(1) No AC Voltage To Charger	7.01	7-8
	(2) Input Fuse (s) Blown	7.02	7-8
	(3) Control Trans. Breaker Tripped	7.03	7-8
	(4) Control Trans. Bad	7.04	7-8
	(5) Wrong Control Trans. Connection	7.05	7-8
	(6) Bad Harness/Connection – Loose or Incorrect	7.06	7-8
	(7) Bad Control Board	7.07	7-8
Display Illegible	(1) Noisy Environment	7.08	7-8
	(2) Low Input Voltage	7.09	7-8
	(3) Bad Control Board	7.07	7-8
Charger Doesn't Respond To Battery Being Connected	(1) Output Fuse Bad	7.10	7-8
	(2) Bad Harness/Connections – Loose Or Incorrect	7.06	7-8
	(3) Bad Control Board	7.07	7-8
	(4) Output Cables Reversed	7.11	7-9
	(5) Bad Output Connector	7.12	7-9
Control Not Responding (Locked Up)	(1) Noisy Environment	7.08	7-8
	(2) Bad Suppressor Core	7.13	7-9
	(3) Low Input Voltage	7.09	7-8
	(4) Power Interruption	7.08	7-8

SYMPTOM	PROBABLE CAUSES	ACTION	
		PARAGRAPH	PAGE
Unit Smells Hot	(1) Inadequate Ventilation	7.14	7-9
	(2) Ambient Too Hot	7.15	7-9
	(3) Lack of Maintenance	7.16	7-9
	(4) Bad Transformer	7.17	7-9
	(5) Bad Control Transformer	7.04	7-8
	(6) Bad Internal Power Connection	7.19	7-9
	(7) Bad Control Board	7.07	7-8
	(8) Wrong Amp/Hour Jumper	7.20	7-9
	(9) Bad Expansion Board	7.21	7-9
Battery has Low S. G.'s	(1) Reading Not Temperature Corrected	7.22	7-9
	(2) Bad Battery	7.23	7-9
	(3) Bad Equalize Schedule	7.24	7-10
	(4) Charge Curve Incorrect	7.25	7-10
	(5) Rates Set Incorrectly	7.26	7-10
	(6) Too Cold	7.27	7-10
	(7) Bad BID	7.28	7-10
Battery Doesn't Last Full Shift	(1) Faulty > Lift Interrupt	7.29	7-10
	(2) Manual Disconnect	7.30	7-10
	(3) A.H. Required > Battery Nameplate	7.31	7-10
	(4) Battery Not Providing Nameplate Rating	7.23	7-9
	(5) Equalize Schedule	7.24	7-10
	(6) Charge Curve Incorrect	7.25	7-10
	(7) Rates Set Incorrectly	7.26	7-10
	(8) Bad BID	7.28	7-10
	(9) Charger Too Small For Battery	7.33	7-10
Battery Water Usage Is Too High	(1) Rates Set Incorrectly	7.26	7-10
	(2) Charge Curve Incorrect	7.25	7-10
	(3) Equalize Schedule	7.24	7-10
	(4) Control On Forming Cycles	7.32	7-10
	(5) Control On Voltage/Time	7.34	7-10
	(6) Bad BID	7.28	7-10

SYMPTOM	PROBABLE CAUSES	ACTION	
		PARAGRAPH	PAGE
Low Number Of A.H.'s Returned To Battery	(1) Faulty Lift Interrupt	7.29	7-10
	(2) Battery Not Fully Discharged	7.35	7-10
	(3) Manual Disconnect	7.30	7-10
	(4) Rates Set Incorrectly	7.26	7-10
	(5) Charge Curve Incorrect	7.25	7-10
	(6) Battery Not Providing Nameplate Rating	7.23	7-9
	(7) Bad Control Board	7.07	7-8
	(8) Bad BID	7.28	7-10
Battery Temperature Too High	(1) Insufficient Cool Down Before And/Or After Charging	7.36	7-10
	(2) Battery Power Demand Too Great	7.37	7-10
	(3) Rates Set Incorrectly	7.26	7-10
	(4) Charge Curve Incorrect	7.25	7-10
	(5) Equalize Schedule	7.24	7-10
	(6) Control Set For Voltage/Time	7.34	7-10
	(7) Control Set For Cell Forming	7.32	7-10
	(8) Bad BID	7.28	7-10
Incorrect Charge Rate	(1) Rates Set Incorrectly	7.26	7-10
	(2) Charge Curve Incorrect	7.25	7-10
	(3) Battery A.H. Not Equal To Charger A.H.	7.29	7-10
	(4) Battery Has Incorrect Size BID	7.28	7-10
	(5) Bad Control Board	7.07	7-8

SYMPTOM	PROBABLE CAUSES	ACTION	
		PARAGRAPH	PAGE
Doesn't Shutdown When Battery Is Disconnected	(1) Control Set For Forming Cycles	7.32	7-10
	(2) Bad Control Board	7.07	7-8
Noisy Unit	(1) Loose Sheet Metal	7.38	7-10
	(2) Bad Contactor	7.39	7-11
	(3) Loose Transformer Mounting	7.40	7-11
	(4) Noisy Transformer	7.41	7-11
	(5) Placed On Rack That Makes Noise	7.42	7-11
Erratic Operation	(1) Bad Control Board	7.07	7-8
	(2) Bad SCR	7.43	7-11
	(3) Bad SCR Gate Connection	7.18	7-9
	(4) Bad Harness/Connection – Loose Or Incorrect	7.06	7-8
	(5) Bad Power Connection	7.19	7-9
	(6) Bad Output Cable Connector	7.12	7-9
	(7) Moisture Inside Cabinet	7.44	7-11
	(8) Lack of Maintenance	7.16	7-9
	(9) High Ambient Temperature	7.15	7-9
Meter Reading Wrong (V/C)	(1) Bad Output Connection	7.12	7-9
	(2) Bad Harness/Connections – Loose Or Incorrect	7.06	7-8
	(3) Internal Power Connection	7.19	7-9
	(4) Bad Control Board	7.07	7-8
Meter Reading Wrong (Amps)	(1) Bad Output Connection	7.12	7-9
	(2) Bad Harness/Connections – Loose Or Incorrect	7.06	7-8
	(3) Internal Power Connection	7.19	7-9
	(4) Bad Control Board	7.07	7-8
	(5) Bad/Incorrect Shunt	7.45	7-11

SYMPTOM	PROBABLE CAUSES	ACTION	
		PARAGRAPH	PAGE
Unbalanced Input Current Display Reads "UbLn" or "UNBAL LN"	(1) Incorrect Wiring To Primary Of Transformer	7.46	7-11
	(2) Incorrect Cabling To Transformer Secondary	7.47	7-11
	(3) Bad Harness/Connections – Loose Or Incorrect	7.06	7-8
	(4) Bad SCR	7.43	7-11
	(5) Bad Diode	7.48	7-11
	(6) Bad Control Board	7.07	7-8
	(7) Bad SCR Gate Connection	7.18	7-9
	(8) AC Supply	7.01	7-8
	(9) Bad Transformer	7.17	7-9
High Input Current	(1) Incorrect Wiring To Primary Of Transformer	7.46	7-11
	(2) Incorrect Cabling To Transformer Secondary	7.47	7-11
	(3) Incorrect AC Input Jumper Setting	7.49	7-11
	(4) Bad Harness/Connections – Loose Or Incorrect	7.06	7-8
	(5) Bad SCR	7.43	7-11
	(6) Bad Diode	7.48	7-11
	(7) Bad SCR Gate Connection	7.18	7-9
	(8) AC Supply	7.01	7-8
	(9) Bad Transformer	7.17	7-9

SYMPTOM	PROBABLE CAUSES	ACTION	
		PARAGRAPH	PAGE
Display Reads "CUEr" or "CURVE"	(1) Bad Harness/Connections – Loose Or Incorrect	7.06	7-8
	(2) Bad SCR	7.43	7-11
	(3) Bad Diode	7.48	7-11
	(4) Bad Control Board	7.07	7-8
	(5) Incorrect Wiring To Primary Of Transformer	7.46	7-11
	(6) Bad/Incorrect Shunt	7.45	7-11
Display Reads "0-80","80-E", BACKUP09 or BACKUP05	(1) Battery A.H. > Charger A.H.	7.29	7-10
	(2) Bad Output Cable Connector	7.12	7-9
	(3) Incorrect Charge Curve Setting	7.25	7-10
	(4) Bad Battery	7.02	7-8
	(5) Bad BID	7.28	7-10
Display Reads "Srop" or "MAN Stop"	(1) Someone Pressed Manual Stop Button	7.30	7-10
	(2) Bad Control Board	7.07	7-8
Display Reads "LCsd" or "LOW CURR"	(1) Bad Harness/Connections – Loose Or Incorrect	7.06	7-8
	(2) Battery Not Fully Formed	7.50	7-11
	(3) Bad Battery	7.23	7-9
	(4) Bad A.H. > Charger A.H.	7.51	7-11
	(5) Bad Internal Power Connection	7.19	7-9
	(6) AC Supply	7.01	7-8
	(7) Bad AC Fuse	7.02	7-8
	(8) Output Fuse Bad	7.10	7-8
	(9) Bad Control Board	7.07	7-8
	(10) Bad Transformer	7.17	7-9
	(11) Bad Or Wrong Size Shunt	7.45	7-11

SYMPTOM	PROBABLE CAUSES	ACTION	
		PARAGRAPH	PAGE
Display Reads "Lb" or "LOW BATT"	(1) Bad Harness/Connections – Loose Or Incorrect	7.06	7-8
	(2) Bad Battery	7.23	7-9
	(3) Bad Control Board	7.07	7-8
	(4) Bad Output Cables/Connector	7.12	7-9
Display Reads "Hb" or "HI BATT"	(1) Bad Battery	7.23	7-9
	(2) Bad Control Board	7.07	7-8
Display Reads "ACF" or "AC FAIL"	(1) Intermittent AC Fail (Supply)	7.01	7-8
	(2) Control Transformer Connection	7.05	7-8
	(3) Bad Harness/Connection – Loose Or Incorrect	7.06	7-8
	(4) Bad Control Transformer	7.04	7-8
	(5) Bad Control Board	7.07	7-8
Display Reads "rES","COP","Lul", "RST XX","COP", "LV1 InH" or (Reset Memory)	(1) Noise (Supply)	7.08	7-8
	(2) Bad Control Board	7.07	7-8
	(3) Bad Suppressor Core	7.13	7-9

Action

7.01 Reference the INSTALLATION chapter (pg. 4-1).

7.02 Disconnect AC power and replace the bad AC fuse. Reapply AC power to the charger. If the fuse (s) blows instantly, check the connections on the input side of the contactor to make sure there are no shorts between any of the input wires . If that's okay, then check the input wiring from the contactor to the main transformer (s). Refer to the DIAGRAM chapter and locate the diagram for your charger to confirm that the charger is wired correctly. Also check the wires going up to the terminal block on the transformer, the wires will have numbers that correspond to the number on the terminal block. If they are incorrect, change them and start over. If it still blows fuse (s), the transformer will have to be replaced.

7.03 Reset the breaker. Disconnect the control and reapply AC power to the charger. Measure to see if 24VAC is on the output side of the control transformer. If there is, the control has failed. If there isn't 24VAC, then replace the control transformer. It is still possible that the control has failed; so once the control transformer is replaced, measure to see if the 24VAC drops once the control is connected.

7.04 Check and see if any input fuses are blown. Visually inspect the control transformer for discoloration on the casing of the input side of the control transformer. Disconnect the control before applying AC power. Once AC power is reapplied, measure the input voltage to the control transformer, it should be the AC supply voltage (208/240/480). If not, check the control transformer input wiring. If you did read the supply voltage, then measure the output side and you should read 24VAC. If not, replace the control transformer.

7.05 Look at the casing of the control transformer on the input side. Reference the DIAGRAM chapter to determine the input. There will be four pins and each one will be labeled as follows: COM (common), 208 (208VAC), 240 (240VAC), and 480 (480VAC). There should always be a wire on the common pin no matter what voltage is applied to the charger, and the second wire will go to the pin labeled as the voltage that is applied to operate the charger. Measure the voltage on the output side of the control transformer, it should read approximately 24VAC.

7.06 A bad harness/connection can cause many different problems. The best way to confirm a bad harness/connection problem is to take measurements where the harness is connected to the charger and then follow the wire (s) up the harness to the PC board and measure there also. The measurement should match what was measured at the charger connection. If it doesn't, check the following: Check the connectors at the square plugs where the control harness connects to the charger harness, the connectors could be pressed out of the plugs. Make sure the connectors look okay inside the edge mount connector at the PC board). Make sure the harness connections are tight where they connect to the charger. Make sure the wires are crimped to the terminals tightly and also check to make sure that they are crimped to the bare wire and not to the insulation only.

7.07 To check the Control Board for proper operation, first check the DIP Switch settings of S1. Make sure the shunt size setting matches the shunt in the charger (100A ON = 100A shunt, 400A ON = 400A, 100A and 400A OFF = 200A). If the charger operates normally except there is no alphanumeric display, the check the connection from the display to the Control Board. Replace the Control Board if the connection is correct.

If the charger still does not work properly even though the above settings and voltages are correct, the Control Board may need replaced. However, this is unlikely and all other possibilities should be checked before taking this step.

7.08 Temporarily shut down any equipment on the same voltage supply line and see if the charger starts to respond normally. If the charger does, then check all grounds going to the equipment that is shut down. If the problems still exist, then return power to all the other equipment and call your local PRESTOLITE POWER Representative.

7.09 Measure the AC supply voltage coming into the charger to confirm that it matches the charger input tap settings.

7.10 Use an Ohmmeter and measure directly across the DC Fuse. A good fuse will measure almost (0) Ohms and a bad one will measure a very high resistance, in the megohm range or greater. If for some reason a DC Fuse measures somewhere in between, replace the DC Fuse and send it in to your local PRESTOLITE POWER Representative.

7.11 Refer to the DIAGRAM chapter in the owners manual and locate the diagram for your charger to determine where the output cables connect to the charger. The black (Negative) output cable goes into the charger and connects to a bus bar on the end of the DC Fuse which is located on the left portion of the interior panel. The red (Positive) output cable goes into the charger and connects to the leads of the inductor that is located on the right-front corner of the charger base. The output connector will have a (+) and (-) symbol on it. The (+) terminal should have the red output cable connected to it, and the (-) should have the black output cable connected to it.

7.12 Make sure the output connector does not have any cracks on its casing that could result in a short. Make sure the output cable lugs are making a good connection with the battery connector. You will see traces of pitting on the lug surface from arcing if there isn't a good connection. This could be the result of a weak retainer clip in the connector or lugs that were soldered on incorrectly. If the lugs had too much heat applied to them when the cables were soldered on, the solder will wick up the cable and make it very stiff. When they are inserted into the connector, the stiff cable forces the retainer clip down and creates poor connection between the battery connector and the charger connector.

7.13 Make sure the suppressor core is attached to the control wire harness with the green wire outside the core, and that it is not missing. Visually inspect the suppressor core for missing pieces or cracks. If so, replace the suppressor core.

7.14 Refer to the INSTALLATION chapter and go to the paragraph labeled "LOCATION". This will define the guide lines. If a charger has inadequate ventilation, many different problems can occur. If a charger runs under extreme temperatures, any component inside the charger could fail prematurely.

7.15 An extremely high ambient temperature can cause many different problems. If a charger runs under extreme temperatures, any component inside the charger could fail prematurely.

7.16 Refer to the MAINTENANCE chapter in the manual. Electrical parts tend to attract dust and dirt after a long period of time, which can cause parts to fail prematurely.

7.17 AC fuses are most likely to have failed. Visually inspect the transformer. If a winding has failed, the winding will appear to be burnt or look black. The varnish might be flaking off. Refer to the DIAGRAM chapter in the manual and locate the diagram for your charger. On the diagram there will be a winding configuration of the transformer. Disconnect the SCRs and diodes from the transformer and reapply AC to the charger. Measure the transformer secondary voltage, if less than 25VAC is present, replace the transformer.

7.18 Visually inspect for loose connections or components on the heat sink that appear to be bad. There are suppressors on the heat sink that are designed to absorb energy surges. If the surge is too high the component will fail. It will be very dark in color or cracked.

7.19 Do a continuity or resistance test. Check for connection points that visually appear to have been exposed to extreme heat. Any connections that appear loose or overheated must be re-lugged and rechecked.

7.20 If the AH jumper is incorrect for the charger, it will cause the unit to charge at rates either higher or lower than name-plate rating.

7.21 To check the expansion board for proper operation, first make sure there is a good connection to the SCR2000 control board. The connection is in the lower left of the expansion PC board. Check for the proper Charger I.D. number if the problem is long CDAC approval delays. Also check the CDAC cables for proper insertion or damage.

If the expansion board still does not work after these checks, replace the expansion PC board.

7.22 Specific Gravity readings vary with the temperature of the electrolyte. To temperature correct the Specific Gravity readings to match the nameplate ratings of the battery, use the following rule of thumb; + 1 S.G. point per 3 degrees F that the electrolyte temperature exceeds 77 degrees F.

7.23 Take Specific Gravity readings and measure Cell Voltages. If acid has been spilled or the battery has been extremely heated, it is possible that a battery's capacity could be greatly reduced, and the acid is not capable of increasing to the battery nameplate rating.

7.24 The proper equalize schedule is one that is tailored to the specific battery and charger operation. The Control Auto Equalize feature can be used to automate the equalize schedule (See the Control Owner's manual).

Excess equalizing causes increased water usage. Too little or no equalizing can lead to battery sulfation and/or decrease battery shift run times. Adjusting the auto equalize number of cycles can improve the equalize performance. Some operations may also benefit from day of week equalizing. This can be programmed by the Auto EQ type function to the SCR2000 Control .

7.25 Using the Review feature of the control (See the Control Owner's manual), check the charge curve setting of the charger. If it does not match the Battery Type (Standard, SLA, Custom), reprogram the control to the proper curve. (Refer to the Programming chapter of the Control Owner's manual).

7.26 Using the Review feature of the control (See the Control Owner's manual), check the Fixed AH setting of the charger. If it does not match the battery nameplate rating of the battery (it should be within 20% of the battery nameplate rating), reprogram the control to the proper Fixed AH rating (Refer to the Programming chapter of the Control Owner's manual). If this is not possible due to the maximum rating of the charger, a larger charger should be used.

7.27 If battery electrolyte temperatures are well below 32 degrees F, the Power Star will not be able to adequately charge the battery. Battery insulation or heaters would be required to keep the battery electrolyte temperatures close to 32 degrees F or above.

7.28 The BID module communicates battery temperature, cell size, voltage, ampere hour size, BID no. And type to the charger. A nonfunctioning or incorrectly programmed BID can cause charging and /or battery problems. Using the Control Review Features (See the Control Owner's manual), check the review items listed above. Replace a non-functioning or incorrectly programmed module with a new one.

7.29 A faulty lift interrupt on a lift truck can cause the battery to be over or under discharged. Check the interrupt voltage of the interrupt following the procedures found in your truck and/or lift interrupt operator's manual (s).

7.30 Repeated manual disconnecting of the battery from the charger before charge complete can cause long term battery damage and lead to inefficient truck/battery/charger operations. When it is necessary to stop the charge cycle before charge complete *always terminate the charge cycle by pressing the STOP key before disconnecting the battery from the charger.*

7.31 If the application requires a larger AH battery than is presently in use, the only long term solution is to replace the battery with one of the proper AH rating.

7.32 If the control is set to perform forming cycles , DV/DT termination is disabled, and the low current shutdown is disabled. To return to normal operation, program the control to "00" Forming Cycles (See the Programming chapter of the Control Owner's manual).

7.33 The Power Star is capable of charging batteries of somewhat larger AH capacities than it's nameplate rating, if increased time is allowed (See chart on page 5-3). When charging oversize batteries, be sure to allow the battery to reach charge complete.

7.34 Program the control to DV/DT charge termination (See the Programming chapter of the Control Owner's manual).

7.35 If fully discharged batteries are desired for efficient operations, lift interrupts can be installed on the trucks to allow the operators to recognize a fully discharged battery.

7.36 A cool down can be programmed into the Control to add a specified cool down time between charge termination and the signaling of charge complete (See the Programming chapter of the Control Owner's manual). A delayed start can be programmed into the Control to add a specified delay time between battery connection and the start on the charge (See the Programming chapter of the Control Owner's manual).

7.37 Battery is being discharged at too high (fast) of a rate. Consult the battery manufacturer or distributor for applications assistance.

7.38 Check and tighten all sheet metal fasteners (screws and bolts).

7.39 Check the voltage across the contactor coil. If the voltage is 24VAC +/- 10%, replace contactor with a properly functioning part.

7.40 Check and tighten all transformer mounting screws.

7.41 Check transformer for visible damage. Coat the transformer coil with a Prestolite approved (contact Ametek/Prestolite Power Service) air dry varnish. If that fails to reduce the noise level, drive a shim of the proper material (contact Ametek/Prestolite Power Service) between coil and core.

7.42 Check for and tighten any loose fasteners on the rack. Remove any lightweight loose objects that are on the rack near the charger.

7.43 Check the SCR as described below. If it tests faulty, replace with an SCR of the proper type.

Connect a VOM set on the 1k Ohms scale; positive to SCR anode (stud), negative to SCR cathode (heavy red lead). The VOM should read a very high impedance (near open circuit). Touch and hold the SCR gate lead (small white lead) to the SCR anode. The VOM should read a low impedance (near short circuit). If the SCR reads shorted before the gate is touched to the anode, the SCR is bad. If the SCR reads open when the gate is touched to the anode, the SCR is bad (A DVM may be used if it is set to the Diode scale). A high impedance will be indicated by an over range indication (usually OL), a low impedance will be indicated by a low reading.

7.44 Disconnect the charger from the battery and the input AC. Blow out the charger with compressed air, and allow the unit to set unused for 1 to 2 weeks in a warm dry environment (as hot as possible, up to 104 degrees F) and dry as possible.

7.45 Replace damaged and/or incorrect shunt with one of correct size.

7.46 Reconnect transformer primary wiring to match the schematic included in this manual.

7.47 Reconnect transformer secondary wiring to match the schematic included in this manual.

7.48 Using a VOM or DVM, check the diode for proper operation as stated below.

Set the VOM to the 1k Ohms scale. Connect the positive VOM lead to the anode (cable lead) and the negative VOM lead to the cathode (stud). The VOM should read a low impedance (near short circuit). Reverse the VOM leads. The VOM should read high impedance (near open circuit). Replace any diodes that fail with the proper part.

7.49 Reconnect the input primary jumpers to match the input voltage, see the installation chapter of this manual. *Be sure to connect the control transformer primary properly*.

7.50 Program the forming cycles feature of the Control to the number of cycles required to properly form the battery. See the Programming chapter of the Control Owner's manual.

7.51 Reprogram the fixed AH setting of the SCR2000 Control to match the battery nameplate AH rating. See the Programming chapter of the SCR2000 Control manual.

OPTIONS

The options listed in the following table of contents are those most commonly available. Special options not listed here will be covered by enclosed “addendum” sheets.

OPTION NUMBER	OPTION DESCRIPTION	PAGE
002	Parallel Charging	8-1
003	Series Charging	8-1
500	Fused Disconnect Switch and 24V Control Circuit	8-2

Parallel Charging – Option 002

This option provides cables allowing two batteries to be charged at the same time (batteries connected in parallel to charger).

To prevent premature charger turn on, this option requires the use of a battery connector with auxiliary contacts (Anderson “SBX” or equivalent). The same type connector must be specified on the battery and vehicle. The connector on the battery must have the auxiliary contacts jumpered together.

NOTE: The safety interlock circuit is protected by an in-line 1 Amp AGC Fuse inside the battery charger.

When charging two batteries, each must be of the same voltage (or number of cells). The total rated ampere-hour capacity of both batteries plus the voltage (number of cells of only one of the batteries) must be within the range of the charger. Refer to charger nameplate for ratings. For example: two 12-volt (6 cell), 225 ampere-hour batteries would make a 12-volt (6 cell), 450 ampere-hour load.

Operate this charger as instructed in the Operation chapter of this manual except that batteries are to be connected as shown in Figure 8-1, plus the total ampere-hour capacity must be used to calculate charging time.

CAUTION: Make sure all connections are made positive to positive and negative to negative as shown.

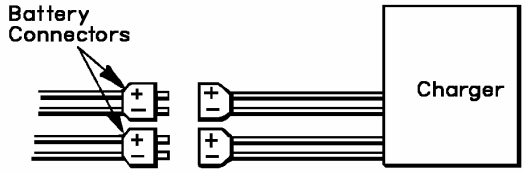


Figure 8-1 Parallel Charging Connections

Series Charging – Option 003

This option provides a cable allowing two batteries to be charged at the same time (batteries connected in series to charger).

CAUTION: With the batteries required to be connected in series, this charger cannot be used to charge one battery only.

Both batteries must be of the same ampere-hour rating. The total rated voltage (or number of cells) of both batteries (add the two), plus the ampere-hour capacity of only one battery, must be within the charger nameplate range ratings. For example: two 12-volt (6-cell), 450 ampere-hour batteries would make a 24-volt (12-cell), 450 ampere-hour load.

For series charging, both batteries must be at identical depths of discharge (DOD); ie, they are used in series in the vehicle. A mismatch in DOD of the two batteries will result in severe overcharge of the lightly discharged battery and severe undercharge of a deeply, discharged battery.

Operate this charger as instructed in the Operation chapter of this manual, except that charger must be connected to both batteries instead of just one. Refer to Figure 8-2.

CAUTION: Make sure all connections are made positive to positive and negative to negative as shown.

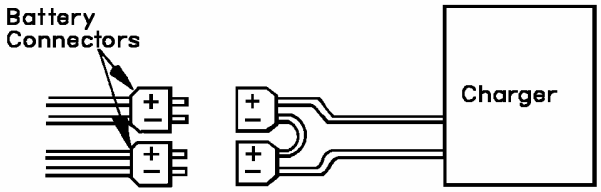


Figure 8-2 Series Charging Connections

Fused Disconnect Switch – Option 500 (Refer to Figure 8-3)

This option is provided to meet certain "JIC" requirements. The switch must be in the open (OFF) position to disconnect all AC power into charger and to allow front door to be opened. With switch in open position, door can be opened by turning slotted latch screw to the left.

Disconnect switch is for *emergency* or *service use* only.

Charge cycle should continue until automatically shut off. If cycle must be interrupted, turn timer to "OFF" or push "STOP" button.

A control circuit operating on 24 volts is also provided to help assure operator safety.

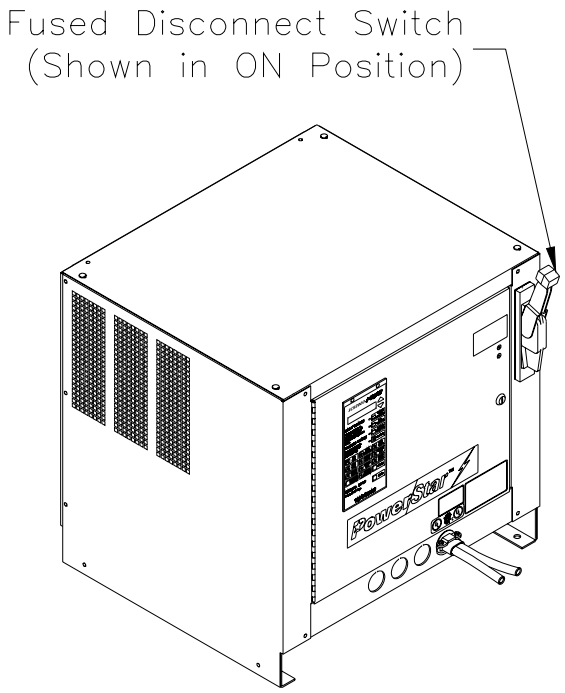


Figure 8-3 Fused Disconnect Switch

CDAC Expansion Kit

Power Star CDAC Expansion Kit……..193360-001

This option is required for communications with the Host Computer of a Prestolite CDAC (Charger Data Acquisition and Control) System.

Remote Display Kit

Power Star Remote Display Kit..……...192356-001

A remote display kit is available for applications where the charger display is inaccessible or not visible. It allows remote control of Manual Stop and Equalize functions, as well as LED Status indicators.

This remote control box must be connected to charger as instructed on label provided with remote charge control. Operate the charger as instructed in the Operation chapter of this manual and as instructed under any applicable option descriptions.

Archive Downloading Kit

Prestolite Data Link Kit...……..…....193026

This kit is available to allow the user to download Power Star archive data to a laptop PC via the PC's Serial Port. Data is stored in a "text" file format that can be imported into most popular spreadsheet programs.

Wall Mounting Bracket

Wall Mounting Bracket……..……..390850-2

Facilitates wall mounting of Y and Z Case Chargers.

PARTS LIST

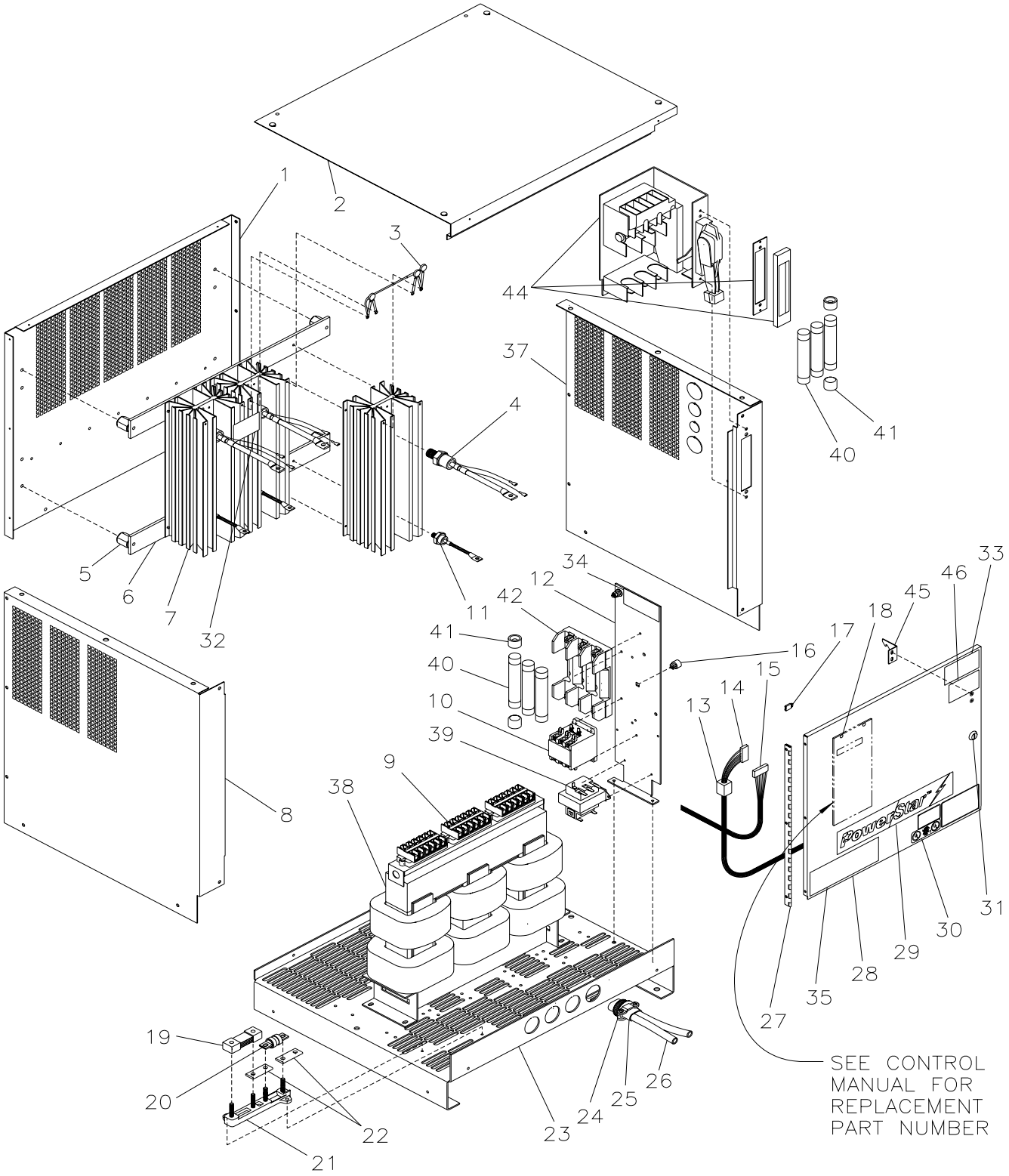


Figure 9-1

Part Numbers Common to all Dash Numbers									
		500488-XXX	500489-XXX	500490-XXX	500491-XXX	500492-XXX	500493-XXX	500494-XXX	500495-XXX
Item No.	Item Description	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
1	Panel, Rear	194454	194454	194454	194454	194454	194454	194454	194454
2	Panel, Top	194457	194457	194457	194457	194457	194457	194457	194457
3	Capacitor Assy.	194708	194708	194708	194708	194708	194708	194708	194708
4	SCR	192112-1	192112-1	192112-1	192113-1	192113-1	192112-1	192112-1	192112-1
5	Insulator, Heat sink	404033	404033	404033	404033	404033	404033	404033	404033
6	Insulator, Heat sink	194717	194717	194717	194717	194717	194717	194717	194717
7	Heat sink, Extruded	194392	194392	194392	194391	194391	194392	194392	194392
8	Panel, Side, Left	194455	194455	194455	194455	194455	194455	194455	194455
9	Block, Terminal	192273	192273	192273	192273	192273	192273	192273	192273
10	Contactor	406243-1	406243-1	406243-1	406243-1	406243-1	406243-1	406243-1	406243-1
11	Diode	402832-3	402832-3	402832-3	402832-3	402832-3	402832-3	402832-3	402832-3
12	Panel, Interior	194447	194447	194447	194447	194447	194447	194447	194447
13	Suppressor, Harness	192266-1	192266-1	192266-1	192266-1	192266-1	192266-1	192266-1	192266-1
14	Harness, Interior Panel	194810	194810	194810	194810	194810	194810	194810	194810
15	Harness, Rectifier	194808	194808	194808	194808	194808	194808	194808	194808
16	Grommet, Mounting	194827-1	194827-1	194827-1	194827-1	194827-1	194827-1	194827-1	194827-1
17	Connector, Amp-Hour	194840-1	194840-2	194840-4	194840-5	194840-1	194840-1	194840-2	194840-4
18	Rivet, Snap	193101-1	193101-1	193101-1	193101-1	193101-1	193101-1	193101-1	193101-1
19	Shunt, Current	193125-2	193125-2	193125-2	193125-2	193125-3	193125-2	193125-2	193125-2
20	Fuse, DC Output	Y1890-4	Y1890-4	Y1890-5	Y1890-5	Y1890-6	Y1890-4	Y1890-4	Y1890-5
21	Insulator, Shunt	193114	193114	193114	193114	193114	193114	193114	193114
22	Bus Bar	392458	392458	392458	392458	392458	392458	392458	392458
23	Base	194453	194453	194453	194453	194453	194453	194453	194453
24	Connector, Strain Relief	W10080-5	W10080-5	W10080-5	W10080-5	W10080-5	W10080-5	W10080-5	W10080-5
25	Cover, Neoprene	378234-13	378234-13	378234-13	378234-13	378234-13	378234-13	378234-13	378234-13
26	Cable, Output Charging	396263-80	396263-80	396263-81	396263-81	396263-81	396263-80	396263-80	396263-81
27	Hinge, Door	194377	194377	194377	194377	194377	194377	194377	194377
28	Door	194458	194458	194458	194458	194458	194458	194458	194458
29	Label, Power Star	194841	194841	194841	194841	194841	194841	194841	194841
30	Label, UL and CUL	404079	404079	404079	404079	404079	404079	404079	404079
31	Latch, Door	194530	194530	194530	194530	194530	194530	194530	194530
32	Label, Warning	406518	406518	406518	406518	406518	406518	406518	406518
33	Label, Danger	404099	404099	404099	404099	404099	404099	404099	404099
34	Label, Input	196182	196182	196182	196182	196182	196182	196182	196182
35	Label, Prestolite Power	196036	196036	196036	196036	196036	196036	196036	196036
36	Label, Warning & Info **	196183	196183	196183	196183	196183	196183	196183	196183
** Not Shown (Located inside door)									

Part Numbers for Specific Dash Numbers (60 Hz., 208/240/480 V.)									
		500488-2X0	500489-2X0	500490-2X0	500491-2X0	500492-2X0	500493-2X0	500494-2X0	500495-2X0
Item No.	Item Description	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
37	Panel, Side, Right	194565	194565	194565	194565	194565	194565	194565	194565
38	Transformer Assy.	194894	194895	194872	194896	194891	194897	194875	194862
39	Transformer, Control	406247-2	406247-2	406247-2	406247-2	406247-2	406247-2	406247-2	406247-2
40	Fuse (208 VAC)	196030-8	196030-10	196030-12	196030-15	196030-15	196030-15	196030-15	196030-25
	Fuse (240 VAC)	196030-8	196030-8	196030-10	196030-12	196030-15	196030-12	196030-15	196030-20
	Fuse (480 VAC)	196030-4	196030-4	196030-5	196030-6	196030-6	196030-6	196030-8	196030-10
41	Reducer, Fuse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
42	Block, Fuse	404605-4	404605-4	404605-4	404605-4	404605-4	404605-4	404605-4	404605-4
43	Label, AC Input **	406461	406461	406461	406461	406461	406461	406461	406461
** Not Shown (Located inside door)									

Part Numbers for Specific Dash Numbers (60 Hz., 208/240/480 V. with JIC)									
		500488-2X1	500489-2X1	500490-2X1	500491-2X1	500492-2X1	500493-2X1	500494-2X1	500495-2X1
Item No.	Item Description	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
37	Panel, Side, Right	194456	194456	194456	194456	194456	194456	194456	194456
38	Transformer Assy.	194894	194895	194872	194896	194891	194897	194875	194862
39	Transformer, Control	406247-2	406247-2	406247-2	406247-2	406247-2	406247-2	406247-2	406247-2
40	Fuse (208 VAC)	196030-8	196030-10	196030-12	196030-15	196030-15	196030-15	196030-15	196030-25
	Fuse (240 VAC)	196030-8	196030-8	196030-10	196030-12	196030-15	196030-12	196030-15	196030-20
	Fuse (480 VAC)	196030-4	196030-4	196030-5	196030-6	196030-6	196030-6	196030-8	196030-10
41	Reducer, Fuse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
43	Label, AC Input **	406461	406461	406461	406461	406461	406461	406461	406461
44	Switch, Disconnect	403956-1	403956-1	403956-1	403956-1	403956-1	403956-1	403956-1	403956-1
45	Latch, Door, Disconnect	194379	194379	194379	194379	194379	194379	194379	194379
46	Label, Disconnect Sw.	407250	407250	407250	407250	407250	407250	407250	407250
** Not Shown (Located inside door)									

Part Numbers for Specific Dash Numbers (60 Hz., 240/480/575 V.)									
		500488-2X2	500489-2X2	500490-2X2	500491-2X2	500492-2X2	500493-2X2	500494-2X2	500495-2X2
Item No.	Item Description	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
37	Panel, Side, Right	194565	194565	194565	194565	194565	194565	194565	194565
38	Transformer Assy.	194902	194903	194904	194905	194906	194907	194908	194909
39	Transformer, Control	406247-4	406247-4	406247-4	406247-4	406247-4	406247-4	406247-4	406247-4
40	Fuse (240 VAC)	196030-8	196030-8	196030-10	196030-12	196030-15	196030-12	196030-15	196030-20
	Fuse (480 VAC)	196030-4	196030-4	196030-5	196030-6	196030-8	196030-6	196030-8	196030-10
	Fuse (575 VAC)	196030-3	196030-4	196030-4	196030-5	196030-6	196030-5	196030-6	196030-8
41	Reducer, Fuse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
42	Block, Fuse	404605-4	404605-4	404605-4	404605-4	404605-4	404605-4	404605-4	404605-4
43	Label, AC Input **	194140	194140	194140	194140	194140	194140	194140	194140
** Not Shown (Located inside door)									

Part Numbers for Specific Dash Numbers (60 Hz., 240/480/575V. with JIC)									
								500494-2X5	
Item No.	Item Description	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
37	Panel, Side, Right							194456	
38	Transformer Assy.							194908	
39	Transformer, Control							406247-4	
40	Fuse (240 VAC)							196030-15	
	Fuse (480 VAC)							196030-8	
	Fuse (575 VAC)							196030-6	
41	Reducer, Fuse							N/A	
43	Label, AC Input **							194140	
44	Switch, Disconnect							403956-1	
45	Latch, Door, Disconnect							194379	
46	Label, Disconnect Sw.							407250	
** Not Shown (Located inside door)									

Part Numbers Common to all Dash Numbers									
		500496-XXX	500497-XXX	500498-XXX	500499-XXX	500500-XXX	500501-XXX	500502-XXX	500503-XXX
Item No.	Item Description	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
1	Panel, Rear	194454	194454	194373	194373	194454	194454	194454	194454
2	Panel, Top	194457	194457	194376	194376	194457	194457	194457	194457
3	Capacitor Assy.	194708	194708	194708	194708	194708	194708	194708	194708
4	SCR	192113-1	192113-1	192113-1	192113-1	192112-1	192112-1	192112-1	192113-1
5	Insulator, Heat sink	404033	404033	404033	404033	404033	404033	404033	404033
6	Insulator, Heat sink	194717	194717	194727	194727	194717	194717	194717	194717
7	Heat sink, Extruded	194391	194391	194391	194391	194392	194392	194392	194391
8	Panel, Side, Left	194455	194455	194374	194374	194455	194455	194455	194455
9	Block, Terminal	192273	192273	192273	192273	192273	192273	192273	192273
10	Contactor	406243-1	406243-1	406243-1	406243-1	406243-1	406243-1	406243-1	406243-1
11	Diode	402832-3	402832-3	402832-3	402832-3	402832-3	402832-3	402832-3	402832-3
12	Panel, Interior	194447	194447	194447	194447	194447	194447	194447	194447
13	Suppressor, Harness	192266-1	192266-1	192266-1	192266-1	192266-1	192266-1	192266-1	192266-1
14	Harness, Interior Panel	194810	194810	194810	194810	194810	194810	194810	194810
15	Harness, Rectifier	194808	194808	194808	194808	194808	194808	194808	194808
16	Grommet, Mounting	194827-1	194827-1	194827-1	194827-1	194827-1	194827-1	194827-1	194827-1
17	Connector, Amp-Hour	194840-5	194840-1	194840-2	194840-3	194840-1	194840-2	194840-4	194840-5
18	Rivet, Snap	193101-1	193101-1	193101-1	193101-1	193101-1	193101-1	193101-1	193101-1
19	Shunt, Current	193125-2	193125-3	193125-3	193125-3	193125-2	193125-2	193125-2	193125-2
20	Fuse, DC Output	Y1890-5	Y1890-6	Y1890-7	Y1890-8	Y1890-4	Y1890-4	Y1890-5	Y1890-5
21	Insulator, Shunt	193114	193114	193114	193114	193114	193114	193114	193114
22	Bus Bar	392458	392458	392458	392458	392458	392458	392458	392458
23	Base	194453	194453	194372	194372	194453	194453	194453	194453
24	Connector, Strain Relief	W10080-5	W10080-5	W10080-5	W10080-5	W10080-5	W10080-5	W10080-5	W10080-5
25	Cover, Neoprene	378234-13	378234-13	378234-13	378234-13	378234-13	378234-13	378234-13	378234-13
26	Cable, Output Charging	396263-81	396263-81	396263-82	396263-82	396263-80	396263-80	396263-81	396263-81
27	Hinge, Door	194377	194377	194377	194377	194377	194377	194377	194377
28	Door	194458	194458	194378	194378	194458	194458	194458	194458
29	Label, Power Star	194841	194841	194841	194841	194841	194841	194841	194841
30	Label, UL and CUL	404079	404079	404079	404079	404079	404079	404079	404079
31	Latch, Door	194530	194530	194530	194530	194530	194530	194530	194530
32	Label, Warning	406518	406518	406518	406518	406518	406518	406518	406518
33	Label, Danger	404099	404099	404099	404099	404099	404099	404099	404099
34	Label, Input	196182	196182	196182	196182	196182	196182	196182	196182
35	Label, Prestolite Power	196036	196036	196038	196038	196036	196036	196036	196036
36	Label, Warning & Info **	196183	196183	196183	196183	196183	196183	196183	196183

** Not Shown (Located inside door)

Part Numbers for Specific Dash Numbers (60 Hz., 208/240/480 V.)									
		500496-2X0	500497-2X0	500498-2X0	500499-2X0	500500-2X0	500501-2X0	500502-2X0	500503-2X0
Item No.	Item Description	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
37	Panel, Side, Right	194565	194565	194521	194521	194565	194565	194565	194565
38	Transformer Assy.	194765	194774	194777	194888	194898	194878	194805	194768
39	Transformer, Control	406247-2	406247-2	406247-2	406247-2	406247-2	406247-2	406247-2	406247-2
40	Fuse (208 VAC)	196030-25	196030-30	196030-30	196030-45	196030-20	196030-25	196030-30	196030-40
	Fuse (240 VAC)	196030-20	196030-25	196030-30	196030-40	196030-20	196030-20	196030-25	196030-35
	Fuse (480 VAC)	196030-12	196030-12	196030-15	196030-20 *	196030-10	196030-10	196030-15	196030-15 *
41	Reducer, Fuse	N/A	N/A	N/A	196017	N/A	N/A	N/A	196017
42	Block, Fuse	404605-4	404605-4	404605-4	404605-5	404605-4	404605-4	404605-4	404605-5
43	Label, AC Input **	406461	406461	406461	406461	406461	406461	406461	406461

* Requires Item #41, 1 pair per fuse.
** Not Shown (Located inside door)

Part Numbers for Specific Dash Numbers (60 Hz., 208/240/480 V. with JIC)									
		500496-2X1	500497-2X1	500498-2X1	500499-2X1	500500-2X1	500501-2X1	500502-2X1	500503-2X1
Item No.	Item Description	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
37	Panel, Side, Right	194456	194456	194375	194375	194456	194456	194456	194456
38	Transformer Assy.	194765	194774	194777	194888	194898	194878	194805	194768
39	Transformer, Control	406247-2	406247-2	406247-2	406247-2	406247-2	406247-2	406247-2	406247-2
40	Fuse (208 VAC)	196030-25	196030-30	196030-30	196030-45	196030-20	196030-25	196030-30	196030-40
	Fuse (240 VAC)	196030-20	196030-25	196030-30	196030-40	196030-20	196030-20	196030-25	196030-35
	Fuse (480 VAC)	196030-12	196030-12	196030-15	196030-20 *	196030-10	196030-10	196030-15	196030-15 *
41	Reducer, Fuse	N/A	N/A	N/A	196017	N/A	N/A	N/A	196017
43	Label, AC Input **	406461	406461	406461	406461	406461	406461	406461	406461
44	Switch, Disconnect	403956-1	403956-1	403956-1	403956-2	403956-1	403956-1	403956-1	403956-2
45	Latch, Door, Disconnect	194379	194379	194379	194379	194379	194379	194379	194379
46	Label, Disconnect Sw.	407250	407250	407250	407250	407250	407250	407250	407250

* Requires Item #41, 1 pair per fuse.
** Not Shown (Located inside door)

Part Numbers for Specific Dash Numbers (60 Hz., 240/480/575 V.)									
		500496-2X2	500497-2X2	500498-2X2	500499-2X2	500500-2X2	500501-2X2	500502-2X2	500503-2X2
Item No.	Item Description	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
37	Panel, Side, Right	194565	194565	194521	194521	194565	194565	194565	194565
38	Transformer Assy.	194910	194911	194912	194913	194914	194915	194916	194917
39	Transformer, Control	406247-4	406247-4	406247-4	406247-4	406247-4	406247-4	406247-4	406247-4
40	Fuse (240 VAC)	196030-20	196030-25	196030-30	196030-40	196030-20	196030-20	196030-25	196030-35
	Fuse (480 VAC)	196030-12	196030-12	196030-15	196030-20 *	196030-10	196030-10	196030-15	196030-20 *
	Fuse (575 VAC)	196030-10	196030-10	196030-12	196030-15 *	196030-8	196030-8	196030-12	196030-15 *
41	Reducer, Fuse	N/A	N/A	N/A	196017	N/A	N/A	N/A	196017
42	Block, Fuse	404605-4	404605-4	404605-4	404605-5	404605-4	404605-4	404605-4	404605-5
43	Label, AC Input **	194140	194140	194140	194140	194140	194140	194140	194140

* Requires Item #41, 1 pair per fuse.
** Not Shown (Located inside door)

Part Numbers for Specific Dash Numbers (60 Hz., 240/480/575 V. With JIC)									
								500502-2X5	
Item No.	Item Description	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
37	Panel, Side, Right							194456	
38	Transformer Assy.							194916	
39	Transformer, Control							406247-4	
40	Fuse (240 VAC)							196030-25	
	Fuse (480 VAC)							196030-15	
	Fuse (575 VAC)							196030-12	
41	Reducer, Fuse							N/A	
43	Label, AC Input **							194140	
44	Switch, Disconnect							403956-1	
45	Latch, Door, Disconnect							194379	
46	Label, Disconnect Sw.							407250	

* Requires Item #41, 1 pair per fuse.
** Not Shown (Located inside door)

Part Numbers Common to all Dash Numbers									
		500504-XXX	500505-XXX	500506-XXX	500507-XXX	500508-XXX	500509-XXX	500510-XXX	500511-XXX
Item No.	Item Description	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
1	Panel, Rear	194373	194373	194373	194454	194454	194454	194373	194373
2	Panel, Top	194376	194376	194376	194457	194457	194457	194376	194376
3	Capacitor Assy.	194708	194708	194708	194708	194708	194708	194708	194708
4	SCR	192113-1	192113-1	192113-1	192112-1	192112-1	192112-1	192113-1	192113-1
5	Insulator, Heat sink	404033	404033	404033	404033	404033	404033	404033	404033
6	Insulator, Heat sink	194727	194727	194727	194717	194717	194717	194727	194727
7	Heat sink, Extruded	194391	194391	194391	194392	194392	194392	194391	194391
8	Panel, Side, Left	194374	194374	194374	194455	194455	194455	194374	194374
9	Block, Terminal	192273	192273	192273	192273	192273	192273	192273	192273
10	Contactor	406243-1	406243-1	406244-1	406243-1	406243-1	406243-1	406243-1	406243-1
11	Diode	402832-3	402832-3	402832-3	402832-3	402832-3	402832-3	402832-3	402832-3
12	Panel, Interior	194447	194447	194447	194447	194447	194447	194447	194447
13	Suppressor, Harness	192266-1	192266-1	192266-1	192266-1	192266-1	192266-1	192266-1	192266-1
14	Harness, Interior Panel	194810	194810	194810	194810	194810	194810	194810	194810
15	Harness, Rectifier	194808	194808	194808	194808	194808	194808	194808	194808
16	Grommet, Mounting	194827-1	194827-1	194827-1	194827-1	194827-1	194827-1	194827-1	194827-1
17	Connector, Amp-Hour	194840-1	194840-2	194840-3	194840-1	194840-2	194840-4	194840-5	194840-1
18	Rivet, Snap	193101-1	193101-1	193101-1	193101-1	193101-1	193101-1	193101-1	193101-1
19	Shunt, Current	193125-3	193125-3	193125-3	193125-2	193125-2	193125-2	193125-2	193125-3
20	Fuse, DC Output	Y1890-6	Y1890-7	Y1890-8	Y1890-4	Y1890-4	Y1890-5	Y1890-5	Y1890-6
21	Insulator, Shunt	193114	193114	193114	193114	193114	193114	193114	193114
22	Bus Bar	392458	392458	392458	392458	392458	392458	392458	392458
23	Base	194372	194372	194372	194453	194453	194453	194372	194372
24	Connector, Strain Relief	W10080-5	W10080-5	W10080-5	W10080-5	W10080-5	W10080-5	W10080-5	W10080-5
25	Cover, Neoprene	378234-13	378234-13	378234-13	378234-13	378234-13	378234-13	378234-13	378234-13
26	Cable, Output Charging	396263-81	396263-82	396263-82	396263-80	396263-80	396263-81	396263-81	396263-81
27	Hinge, Door	194377	194377	194377	194377	194377	194377	194377	194377
28	Door	194378	194378	194378	194458	194458	194458	194378	194378
29	Label, Power Star	194841	194841	194841	194841	194841	194841	194841	194841
30	Label, UL and CUL	404079	404079	404079	404079	404079	404079	404079	404079
31	Latch, Door	194530	194530	194530	194530	194530	194530	194530	194530
32	Label, Warning	406518	406518	406518	406518	406518	406518	406518	406518
33	Label, Danger	404099	404099	404099	404099	404099	404099	404099	404099
34	Label, Input	196182	196182	196182	196182	196182	196182	196182	196182
35	Label, Prestolite Power	196038	196038	196038	196036	196036	196036	196038	196038
36	Label, Warning & Info **	196183	196183	196183	196183	196183	196183	196183	196183

** Not Shown (Located inside door)

Part Numbers for Specific Dash Numbers (60 Hz., 208/240/480 V.)									
		500504-2X0	500505-2X0	500506-2X0	500507-2X0	500508-2X0	500509-2X0	500510-2X0	500511-2X0
Item No.	Item Description	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
37	Panel, Side, Right	194521	194521	194521	194565	194565	194565	194521	194521
38	Transformer Assy.	194780	194783	194865	194899	194885	194771	194786	194788
39	Transformer, Control	406247-2	406247-2	406247-2	406247-2	406247-2	406247-2	406247-2	406247-2
40	Fuse (208 VAC)	196030-45	196030-50	196030-60	196030-25	196030-30	196030-40	196030-50	196030-50
	Fuse (240 VAC)	196030-40	196030-45	196030-50	196030-25	196030-30	196030-35	196030-45	196030-50
	Fuse (480 VAC)	196030-20 *	196030-20 *	196030-25 *	196030-12	196030-15	196030-20 *	196030-20 *	196030-25 *
41	Reducer, Fuse	196017	196017	196017	N/A	N/A	196017	196017	196017
42	Block, Fuse	404605-5	404605-5	404605-5	404605-4	404605-4	404605-5	404605-5	404605-5
43	Label, AC Input **	406461	406461	406461	406461	406461	406461	406461	406461

* Requires Item #41, 1 pair per fuse.
** Not Shown (Located inside door)

Part Numbers for Specific Dash Numbers (60 Hz., 208/240/480 V. with JIC)									
		500504-2X1	**500505-2X1**	**500506-2X1**	**500507-2X1**	**500508-2X1**	**500509-2X1**	**500510-2X1**	**500511-2X1**
Item No.	**Item Description**	**Part No.**	**Part No.**	**Part No.**	**Part No.**	**Part No.**	**Part No.**	**Part No.**	**Part No.**
37	Panel, Side, Right	194375	194375	194375	194456	194456	194456	194375	194375
38	Transformer Assy.	194780	194783	194865	194899	194885	194771	194786	194788
39	Transformer, Control	406247-2	406247-2	406247-1	406247-2	406247-2	406247-2	406247-2	406247-2
40	Fuse (208 VAC)	196030-45	196030-50	196030-60	196030-25	196030-30	196030-40	196030-50	196030-50
	Fuse (240 VAC)	196030-40	196030-45	196030-50	196030-25	196030-30	196030-35	196030-45	196030-50
	Fuse (480 VAC)	196030-20 *	196030-20 *	196030-25 *	196030-12	196030-15	196030-20 *	196030-20 *	196030-25 *
41	Reducer, Fuse	196017	196017	196017	N/A	N/A	196017	196017	196017
43	Label, AC Input **	406461	406461	406461	406461	406461	406461	406461	406461
44	Switch, Disconnect	403956-2	403956-2	403956-2	403956-1	403956-1	403956-2	403956-2	403956-2
45	Latch, Door, Disconnect	194379	194379	194379	194379	194379	194379	194379	194379
46	Label, Disconnect Sw.	407250	407250	407250	407250	407250	407250	407250	407250

* Requires Item #41, 1 pair per fuse.
** Not Shown (Located inside door)

Part Numbers for Specific Dash Numbers (60 Hz., 240/480/575 V.)									
		500504-2X2	**500505-2X2**	**500506-2X2**	**500507-2X2**	**500508-2X2**	**500509-2X2**	**500510-2X2**	**500511-2X2**
Item No.	**Item Description**	**Part No.**	**Part No.**	**Part No.**	**Part No.**	**Part No.**	**Part No.**	**Part No.**	**Part No.**
37	Panel, Side, Right	194521	194521	194521	194565	194565	194565	194521	194521
38	Transformer Assy.	194918	194919	194920	194921	194922	194923	194924	194842
39	Transformer, Control	406247-4	406247-4	406247-4	406247-4	406247-4	406247-4	406247-4	406247-4
40	Fuse (240 VAC)	196030-40	196030-45	196030-50	196030-25	196030-30	196030-35	196030-45	196030-50
	Fuse (480 VAC)	196030-20 *	196030-20 *	196030-25 *	196030-12	196030-15	196030-20 *	196030-20 *	196030-25 *
	Fuse (575 VAC)	196030-15 *	196030-20 *	196030-20 *	196030-10	196030-12	196030-15 *	196030-20 *	196030-20 *
41	Reducer, Fuse	196017	196017	196017	N/A	N/A	196017	196017	196017
42	Block, Fuse	404605-5	404605-5	404605-5	404605-4	404605-4	404605-5	404605-5	404605-5
43	Label, AC Input **	194140	194140	194140	194140	194140	194140	194140	194140

* Requires Item #41, 1 pair per fuse.
** Not Shown (Located inside door)

Part Numbers for Specific Dash Numbers (60 Hz., 240/480/575 V. with JIC)									
			500505-2X5						
Item No.	**Item Description**	**Part No.**	**Part No.**	**Part No.**	**Part No.**	**Part No.**	**Part No.**	**Part No.**	**Part No.**
37	Panel, Side, Right		194375						
38	Transformer Assy.		194919						
39	Transformer, Control		406247-4						
40	Fuse (240 VAC)		196030-45						
	Fuse (480 VAC)		196030-20 *						
	Fuse (575 VAC)		196030-20 *						
41	Reducer, Fuse		196017						
43	Label, AC Input **		194140						
44	Switch, Disconnect		403956-2						
45	Latch, Door, Disconnect		194379						
46	Label, Disconnect Sw.		407250						

* Requires Item #41, 1 pair per fuse.
** Not Shown (Located inside door)

Part Numbers Common to all Dash Numbers									
		500512-XXX	500513-XXX	500514-XXX	500515-XXX	500516-XXX			
Item No.	Item Description	Part No.	Part No.	Part No.	Part No.	Part No.			
1	Panel, Rear	194373	194373	194373	194373	194373			
2	Panel, Top	194376	194376	194376	194376	194376			
3	Capacitor Assy.	194708	194708	194708	194708	194708			
4	SCR	192113-1	192112-1	192113-1	192112-1	192113-1			
5	Insulator, Heat sink	404033	404033	404033	404033	404033			
6	Insulator, Heat sink	194727	194727	194727	194727	194727			
7	Heat sink, Extruded	194391	194392	194391	194392	194391			
8	Panel, Side, Left	194374	194374	194374	194374	194374			
9	Block, Terminal	192273	192273	192273	192273	192273			
10	Contactor	406244-1	406243-1	406243-1	406243-1	406243-1			
11	Diode	402832-3	402832-3	402832-3	402832-3	402832-3			
12	Panel, Interior	194447	194447	194447	194447	194447			
13	Suppressor, Harness	192266-1	192266-1	192266-1	192266-1	192266-1			
14	Harness, Interior Panel	194810	194810	194810	194810	194810			
15	Harness, Rectifier	194808	194808	194808	194808	194808			
16	Grommet, Mounting	194827-1	194827-1	194827-1	194827-1	194827-1			
17	Connector, Amp-Hour	194840-2	194840-2	194840-6	194840-2	194840-6			
18	Rivet, Snap	193101-1	193101-1	193101-1	193101-1	193101-1			
19	Shunt, Current	193125-3	193125-2	193125-2	193125-2	193125-2			
20	Fuse, DC Output	Y1890-7	Y1890-4	Y1890-5	Y1890-4	Y1890-5			
21	Insulator, Shunt	193114	193114	193114	193114	193114			
22	Bus Bar	392458	392458	392458	392458	392458			
23	Base	194372	194372	194372	194372	194372			
24	Connector, Strain Relief	W10080-5	W10080-5	W10080-5	W10080-5	W10080-5			
25	Cover, Neoprene	378234-13	378234-13	378234-13	378234-13	378234-13			
26	Cable, Output Charging	396263-82	396263-80	396263-81	396263-80	396263-81			
27	Hinge, Door	194377	194377	194377	194377	194377			
28	Door	194378	194378	194378	194378	194378			
29	Label, Power Star	194841	194841	194841	194841	194841			
30	Label, UL and CUL	404079	404079	404079	404079	404079			
31	Latch, Door	194530	194530	194530	194530	194530			
32	Label, Warning	406518	406518	406518	406518	406518			
33	Label, Danger	404099	404099	404099	404099	404099			
34	Label, Input	196182	196182	196182	196182	196182			
35	Label, Prestolite Power	196038	196038	196038	196038	196038			
36	Label, Warning & Info **	196183	196183	196183	196183	196183			
	** Not Shown (Located inside door)								

Part Numbers for Specific Dash Numbers (60 Hz., 208/240/480 V.)									
		500512-2X0	500513-2X0		500515-2X0				
Item No.	Item Description	Part No.	Part No.		Part No.				
37	Panel, Side, Right	194521	194521		194521				
38	Transformer Assy.	194791	194883		194881				
39	Transformer, Control	406247-2	406247-2		406247-2				
40	Fuse (208 VAC)	196030-60	196030-50		196030-50				
	Fuse (240 VAC)	196030-60	196030-45		196030-50				
	Fuse (480 VAC)	196030-30 *	196030-20 *		196030-25 *				
41	Reducer, Fuse	196017	196017		196017				
42	Block, Fuse	404605-5	404605-5		404605-5				
43	Label, AC Input **	406461	406461		406461				
	* Requires Item #41, 1 pair per fuse. ** Not Shown (Located inside door)								

Part Numbers for Specific Dash Numbers (60 Hz., 208/240/480 V. with JIC)									
		500512-2X1	**500513-2X1**		**500515-2X1**				
Item No.	**Item Description**	**Part No.**	**Part No.**		**Part No.**				
37	Panel, Side, Right	194375	194375		194375				
38	Transformer Assy.	194791	194883		194881				
39	Transformer, Control	406247-2	406247-2		406247-2				
40	Fuse (208 VAC)	196030-60	196030-50		196030-50				
	Fuse (240 VAC)	196030-60	196030-45		196030-50				
	Fuse (480 VAC)	196030-30 *	196030-20 *		196030-25 *				
41	Reducer, Fuse	196017	196017		196017				
43	Label, AC Input **	406461	406461		406461				
44	Switch, Disconnect	403956-2	403956-2		403956-2				
45	Latch, Door, Disconnect	194379	194379		194379				
46	Label, Disconnect Sw.	407250	407250		407250				
	* Requires Item #41, 1 pair per fuse.								
	** Not Shown (Located inside door)								

Part Numbers for Specific Dash Numbers (60 Hz., 240/480/575 V.)									
		500512-2X2	**500513-2X2**	**500514-2X2**	**500515-2X2**	**500516-2X2**			
Item No.	**Item Description**	**Part No.**	**Part No.**	**Part No.**	**Part No.**	**Part No.**			
37	Panel, Side, Right	194521	194521	194521	194521	194521			
38	Transformer Assy.	194925	194926	194927	194928	194929			
39	Transformer, Control	406247-4	406247-4	406247-4	406247-4	406247-4			
40	Fuse (240 VAC)	196030-60	196030-45	196030-60	196030-50	196030-60			
	Fuse (480 VAC)	196030-30 *	196030-20 *	196030-30 *	196030-25 *	196030-30 *			
	Fuse (575 VAC)	196030-25 *	196030-20 *	196030-25 *	196030-20 *	196030-25 *			
41	Reducer, Fuse	196017	196017	196017	196017	196017			
42	Block, Fuse	404605-5	404605-5	404605-5	404605-5	404605-5			
43	Label, AC Input **	194140	194140	194140	194140	194140			
	* Requires Item #41, 1 pair per fuse.								
	** Not Shown (Located inside door)								

Part Numbers for Specific Dash Numbers (60 Hz., 240/480/575 V. with JIC)									
						500516-2X5			
Item No.	**Item Description**	**Part No.**	**Part No.**		**Part No.**	**Part No.**			
37	Panel, Side, Right					194375			
38	Transformer Assy.					194929			
39	Transformer, Control					406247-4			
40	Fuse (240 VAC)					196030-60			
	Fuse (480 VAC)					196030-30 *			
	Fuse (575 VAC)					196030-25 *			
41	Reducer, Fuse					196017			
43	Label, AC Input **					194140			
44	Switch, Disconnect					403956-2			
45	Latch, Door, Disconnect					194379			
46	Label, Disconnect Sw.					407250			
	* Requires Item #41, 1 pair per fuse.								
	** Not Shown (Located inside door)								

		Part Numbers Common to all Dash Numbers							
		500630A-XXX	500631A-XXX	500695-XXX	500632A-XXX	500633A-XXX	500634A-XXX	500635-XXX	500638-XXX
Item No.	Item Description	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
1	Panel, Rear	197157	197157	194454	197157	197157	197157	194454	194454
2	Panel, Top	197163	197163	194457	197163	197163	197163	194457	194457
3	Capacitor Assy.	193223-2	193223-2	193223-2	193223-2	193223-2	193223-2	193223-2	193223-2
4	SCR	192112-1	192112-1	192112-1	192112-1	192112-1	192112-1	192112-1	192112-1
5	Insulator, Heat sink	404033	404033	404033	404033	404033	404033	404033	404033
6	Insulator, Heat sink	404033	404033	194717	404033	404033	404033	194717	194717
7	Heat sink	195242	195242	192224	195242	195242	195242	192224	192224
8	Panel, Side, Left	197158	197158	194455	197158	197158	197158	194455	194455
9	Block, Terminal	192273	192273	192273	192273	192273	192273	192273	192273
10	Contactor	406240-1	406240-1	406240-1	406240-1	406240-1	406240-1	406240-1	406240-1
11	Diode	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
12	Panel, Interior	N/A	N/A	194447	N/A	N/A	N/A	194447	194447
13	Suppressor, Harness	192266-1	192266-1	192266-1	192266-1	192266-1	192266-1	192266-1	192266-1
14	Harness, Interior Panel	197290	197290	194810	197290	197290	197290	194810	194810
15	Harness, Rectifier	195941	195941	196013	195941	195941	195941	196013	196013
16	Grommet, Mounting	N/A	N/A	194827-1	N/A	N/A	N/A	194827-1	194827-1
17	Connector, Amp-Hour	194840-1	194840-2	194840-1	194840-4	194840-5	194840-1	194840-1	194840-2
18	Rivet, Snap	193101-1	193101-1	193101-1	193101-1	193101-1	193101-1	193101-1	193101-1
19	Shunt, Current	193125-2	193125-2	193125-2	193125-2	193125-2	193125-3	193125-2	193125-2
20	Fuse, DC Output	Y1890-4	Y1890-4	Y1890-4	Y1890-5	Y1890-5	Y1890-6	Y1890-4	Y1890-4
21	Insulator, Shunt	193114	193114	193114	193114	193114	193114	193114	193114
22	Bus Bar	392458	392458	392458	392458	392458	392458	392458	392458
23	Base	197324	197324	194453	197324	197324	197324	194453	194453
24	Connector, Strain Relief	W10080-5	W10080-5	W10080-5	W10080-5	W10080-5	W10080-5	W10080-5	W10080-5
25	Cover, Neoprene	378234-13	378234-13	378234-13	378234-13	378234-13	378234-13	378234-13	378234-13
26	Cable, Output Charging	396263-80	396263-80	396263-80	396263-81	396263-81	396263-81	396263-80	396263-80
27	Hinge, Door	197165	197165	194377	197165	197165	197165	194377	194377
28	Door	197164	197164	194458	197164	197164	197164	194458	194458
29	Label, Power Star	194841	194841	194841	194841	194841	194841	194841	194841
30	Label, UL and CUL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
31	Latch, Door	194530	194530	194530	194530	194530	194530	194530	194530
32	Label, Input Voltage **	194335	194335	194335	194335	194335	194335	194335	194335
33	Label, Danger **	404099	404099	404099	404099	404099	404099	404099	404099
34	Label, Warning, Rain **	191892	191892	191892	191892	191892	191892	191892	191892
35	Label, Warning **	406434	406434	406434	406434	406434	406434	406434	406434
36	Label, DC Fuse **	405026	405026	405026	405026	405026	405026	405026	405026
47	Label, Frame Ground **	405548	405548	N/A	405548	405548	405548	N/A	N/A
48	Label, L1 **	400092	400092	N/A	400092	400092	400092	N/A	N/A
49	Label, L2 **	400097	400097	N/A	400097	400097	400097	N/A	N/A

** Not Shown

		Part Numbers for Specific Dash Numbers (60 Hz., 208/240/480 V.)							
		500630A-2X0	500631A-2X0	500695-2X0	500632A-2X0	500633A-2X0	500634A-2X0	500635-2X0	500638-2X0
Item No.	Item Description	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
37	Panel, Side, Right	197159	197159	194565	197159	197159	197159	194565	194565
38	Transformer Assy.	195972	195977	196536	195982	195987	195990	195993	196002
39	Transformer, Control	406247-2	406247-2	406247-2	406247-2	406247-2	406247-2	406247-2	406247-2
40	Fuse (208 VAC)	196030-12	196030-12	196030-20	196030-10	196030-20	196030-20	196030-30	196030-30
	Fuse (240 VAC)	196030-10	196030-10	196030-20	196030-10	196030-15	196030-20	196030-25	196030-25
	Fuse (480 VAC)	196030-5	196030-6	196030-10	196030-5	196030-8	196030-10	196030-12	196030-12
41	Reducer, Fuse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
42	Block, Fuse	406207-1	406207-1	406207-1	406207-1	406207-1	406207-1	406207-1	406207-1
43	Label, AC Input **	406461	406461	406461	406461	406461	406461	406461	406461

** Not Shown

		Part Numbers for Specific Dash Numbers (60 Hz., 208/240/480 V. with JIC)							
				500695-2X1				**500635-2X1**	**500638-2X1**
Item No.	**Item Description**			**Part No.**				**Part No.**	**Part No.**
37	Panel, Side, Right			194565				194565	194565
38	Transformer Assy.			196536				195993	196002
39	Transformer, Control			406247-2				406247-2	406247-2
40	Fuse (208 VAC)			196030-20				196030-30	196030-30
	Fuse (240 VAC)			196030-20				196030-25	196030-25
	Fuse (480 VAC)			196030-10				196030-12	196030-12
41	Reducer, Fuse			N/A				N/A	N/A
43	Label, AC Input **			406461				406461	406461
44	Switch, Disconnect			403956-1				403956-1	403956-1
45	Latch, Door, Disconnect			194379				194379	194379
46	Label, Disconnect Sw.			407250				407250	407250

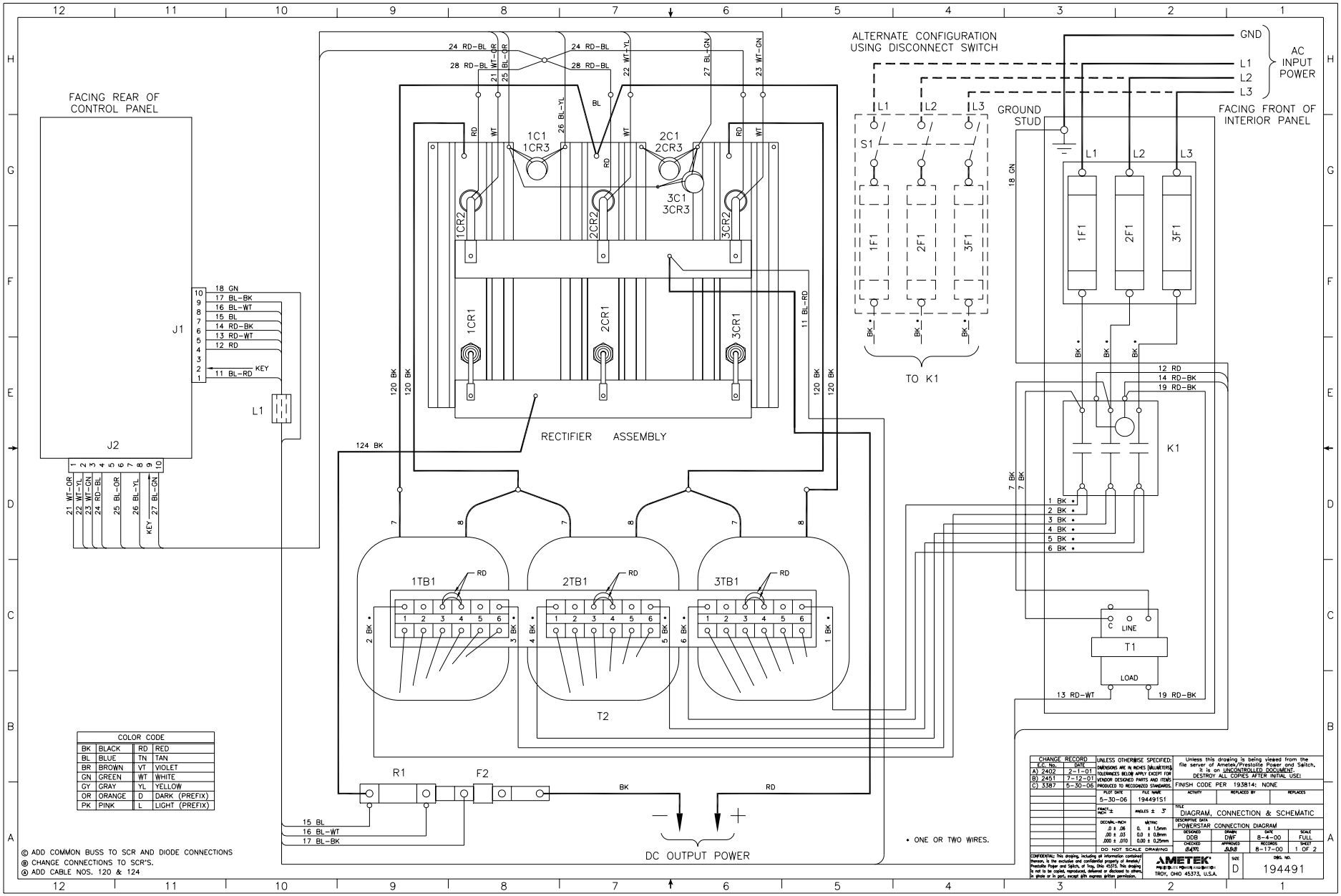
** Not Shown

		Part Numbers for Specific Dash Numbers (60 Hz., 120/208/240 V.)							
		500630A-2X4	**500631A-2X4**		**500632A-2X4**				
Item No.	**Item Description**	**Part No.**	**Part No.**		**Part No.**				
37	Panel, Side, Right	197159	197159		197159				
38	Transformer Assy.	195975	195980		195985				
39	Transformer, Control	406247-1	406247-1		406247-1				
40	Fuse (120 VAC)	W10085-6	W10085-6		W10085-6				
	Fuse (208 VAC)	W10085-38	W10085-38		W10085-4				
	Fuse (240 VAC)	W10085-4	W10085-4		W10085-4				
41	Reducer, Fuse	N/A	N/A		N/A				
42	Block, Fuse	405357-1	405357-1		405357-1				
43	Label, AC Input **	406465	406465		406465				
50	Label, 120 Volt Input **	406748	406748		406748				
51	Label, N **	193949	193949		193949				
52	Insulator, Terminal, N **	404033	404033		404033				

** Not Shown

DIAGRAMS

Model no. Information		DIAGRAM OUTPUT SCHEMATIC	OUTLINE DIMENSION
CASE SIZE	PHASE		
X	1	195249	197203
Y	1	195250	194449
Y	3	194491	194449
Z	3	194491	194449
See model number description inside front cover.			



CHANGE RECORD	
E.C. No.	DATE
A) 2402	2-1-01
B) 2451	7-12-01
C) 3387	5-30-06

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [MILLIMETERS] TOLERANCES BELOW APPLY EXCEPT FOR VENDOR DESIGNED PARTS AND ITEMS PRODUCED TO RECOGNIZED STANDARDS.

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FINISH CODE PER 193814: NONE

PLOT DATE	FILE NAME	ACTIVITY	REPLACED BY	REPLACES
5-30-06	194491S1			

FRACT. ± 1/32 ANGLES ± 3°

DECIMAL-INCH: .0 ± .06, .00 ± .03, .000 ± .010
METRIC: 0. ± 1.5mm, .00 ± 0.8mm, .000 ± 0.25mm

DO NOT SCALE DRAWING

TITLE: DIAGRAM, CONNECTION & SCHEMATIC
DESCRIPTIVE DATA: POWERSTAR CONNECTION DIAGRAM

DESIGNED	DRAWN	DATE	SCALE
DDB	DWF	8-4-00	FULL
CHECKED	APPROVED	RECORDS	SHEET
[illegible]	JLDB	8-17-00	1 OF 2

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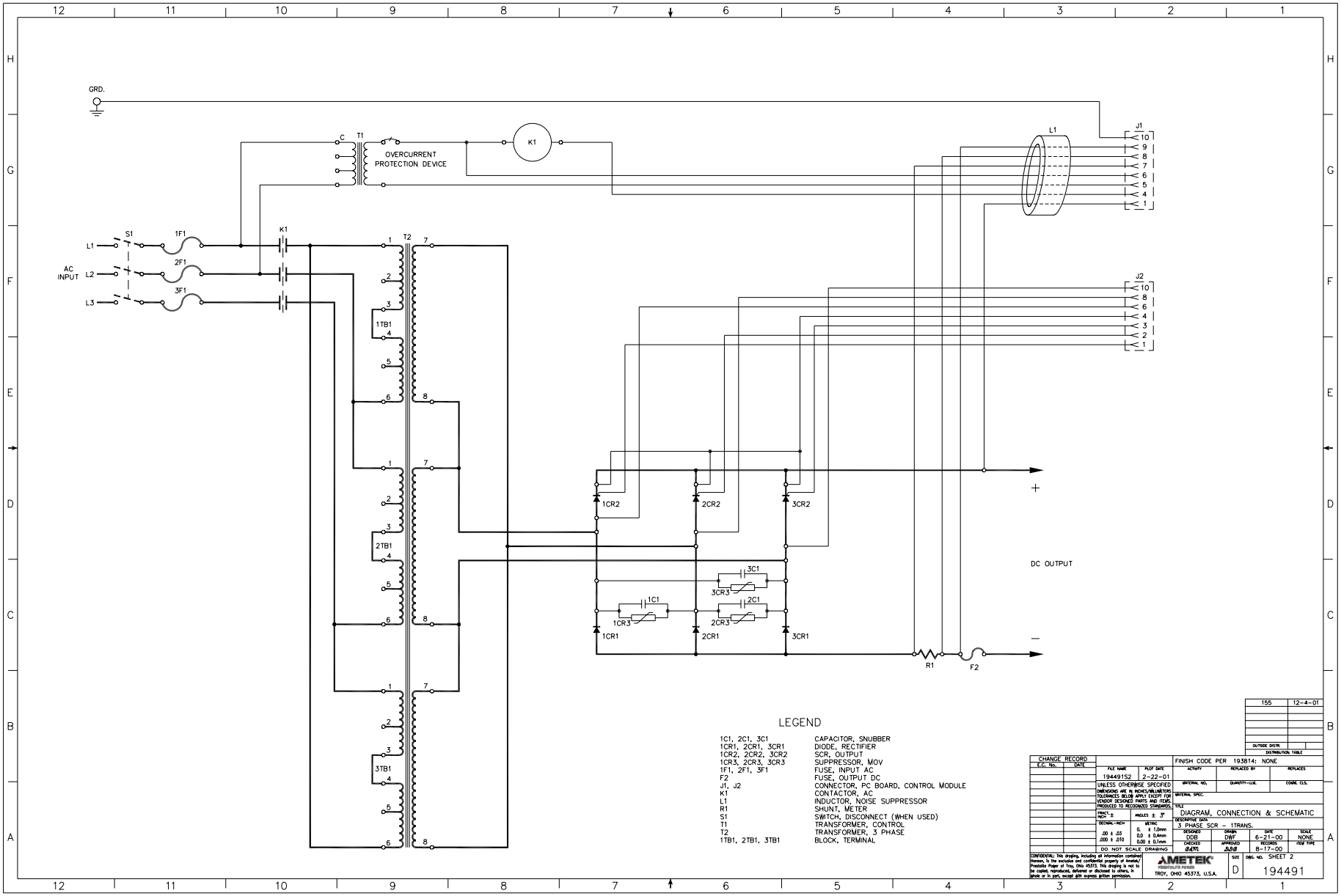
AMETEK
TROY, OHIO 45373, U.S.A.

SIZE D | DWG. NO. 194491



LEGEND

1C1, 2C1, 3C1	CAPACITOR, SNUBBER
1CR1, 2CR1, 3CR1	DIODE, RECTIFIER
1CR2, 2CR2, 3CR2	SCR, OUTPUT
1CR3, 2CR3, 3CR3	SUPPRESSOR, MOV
1F1, 2F1, 3F1	FUSE, INPUT AC
F2	FUSE, OUTPUT DC
J1, J2	CONNECTOR, PC BOARD, CONTROL MODULE
K1	CONTACTOR, AC
L1	INDUCTOR, NOISE SUPPRESSOR
R1	SHUNT, METER
S1	SWITCH, DISCONNECT (WHEN USED)
T1	TRANSFORMER, CONTROL
T2	TRANSFORMER, 3 PHASE
1TB1, 2TB1, 3TB1	BLOCK, TERMINAL

155	12-4-01
OUTSIDE DISTR.	
DISTRIBUTION TABLE	

CHANGE RECORD

E.C. No.	DATE

FINISH CODE PER 193814: NONE

FILE NAME	PLOT DATE
194491S2	2-22-01

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES/MILLIMETERS TOLERANCES BELOW APPLY EXCEPT FOR VENDOR DESIGNED PARTS AND ITEMS. PRODUCED TO RECOGNIZED STANDARDS.

ACTIVITY	REPLACED BY	REPLACES
MATERIAL NO.	QUANTITY-U.M.	COMM. CLS.
MATERIAL SPEC.		

FRACT. INCH ± | ANGLES ± 3°

DECIMAL-INCH	METRIC
.00 ± .03	0. ± 1.0mm
.000 ± .010	0.0 ± 0.4mm
	0.00 ± 0.1mm

DO NOT SCALE DRAWING

TITLE: DIAGRAM, CONNECTION & SCHEMATIC

DESCRIPTIVE DATA: 3 PHASE SCR – 1TRANS.

DESIGNED	DRAWN	DATE	SCALE
DDB	DWF	6-21-00	NONE
CHECKED	APPROVED	RECORDS	ITEM TYPE
0.4TR	0.5JB	8-17-00	

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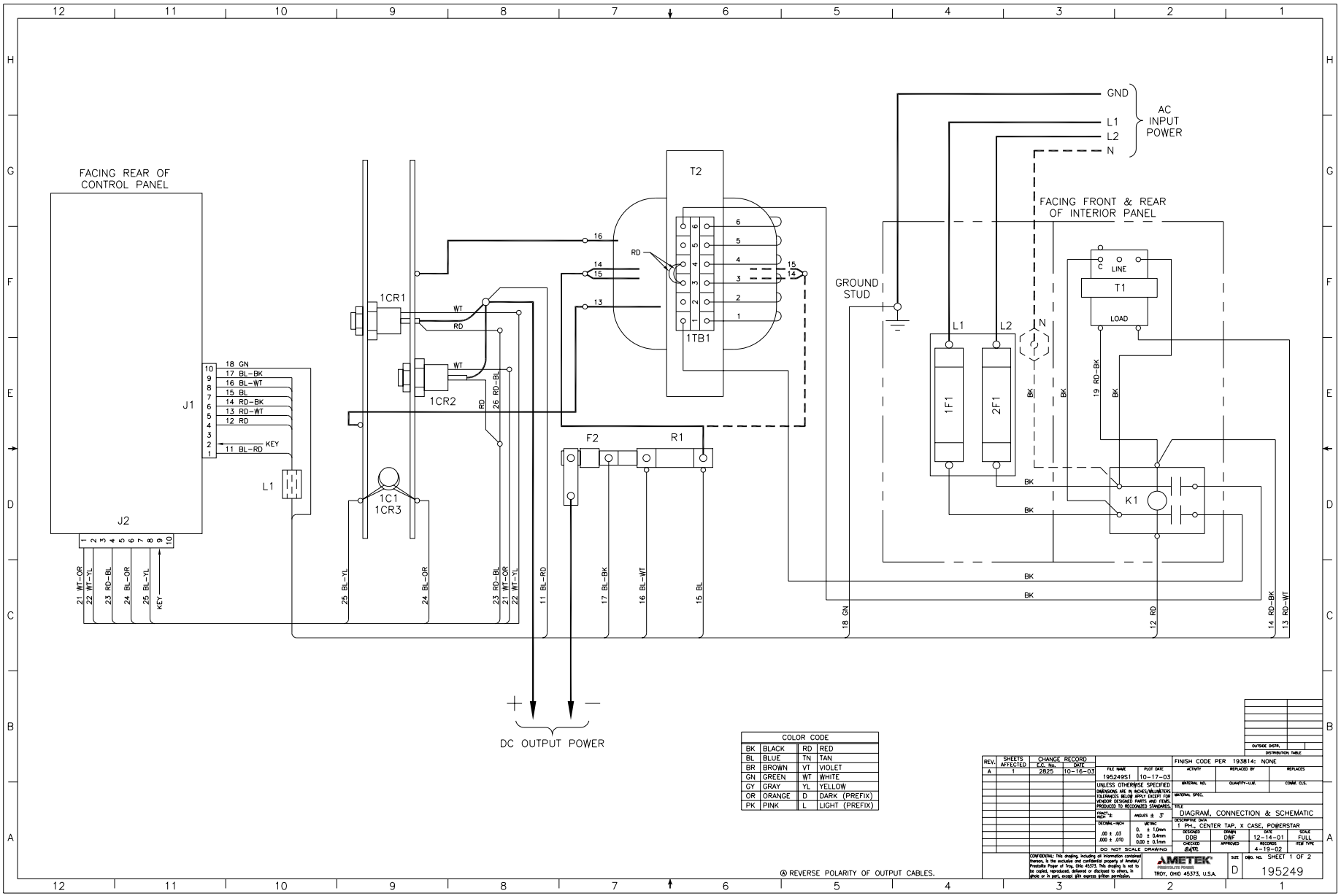
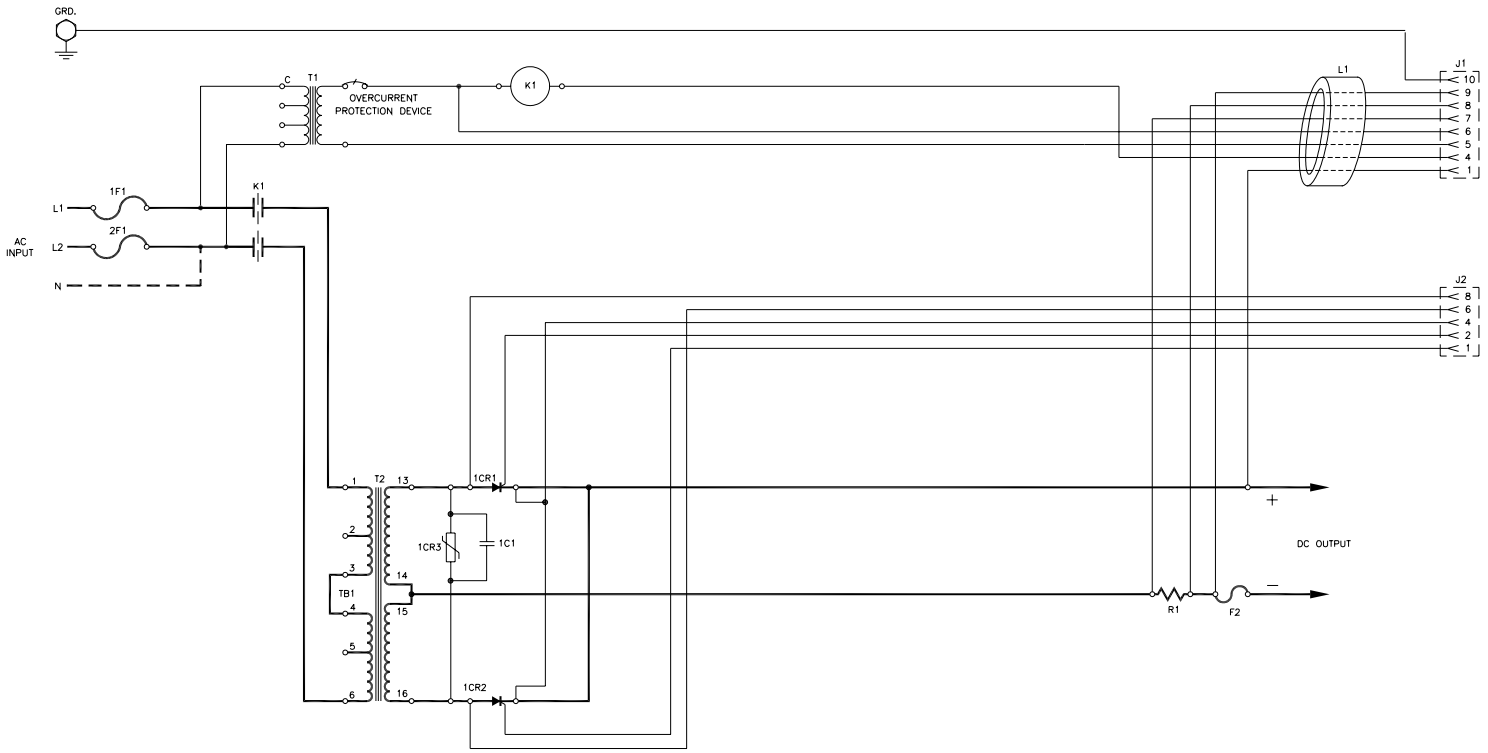
AMETEK® PRESTOLITE POWER
TROY, OHIO 45373, U.S.A.

SIZE D | DWG. NO. SHEET 2 | 194491



COLOR CODE			
BK	BLACK	RD	RED
BL	BLUE	TN	TAN
BR	BROWN	VT	VIOLET
GN	GREEN	WT	WHITE
GY	GRAY	YL	YELLOW
OR	ORANGE	D	DARK (PREFIX)
PK	PINK	L	LIGHT (PREFIX)



LEGEND

1C1	CAPACITOR, SNUBBER
1CR1, 1CR2	SCR, OUTPUT
1CR3	SUPPRESSOR, MOV
1F1, 2F1	FUSE, INPUT AC
F2	FUSE, OUTPUT DC
J1,J2	CONNECTOR, PC BOARD, CONTROL MODULE
K1	CONTACTOR, AC
L1	INDUCTOR, NOISE SUPPRESSOR
R1	SHUNT, METER
T1	TRANSFORMER, CONTROL
T2	TRANSFORMER
TB1	BLOCK, TERMINAL

CHANGE RECORD
E.C. No. | DATE

FILE NAME: 19524952 | PLOT DATE: 12-21-01

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES/MILLIMETERS
TOLERANCES BELOW APPLY EXCEPT FOR VENDOR DESIGNED PARTS AND ITEMS PRODUCED TO RECOGNIZED STANDARDS.

FRACT ± | ANGLES ± 3°
DECIMAL-INCH: .00 ± .01; .000 ± .010
METRIC: 0. ± 1.0mm; 0.0 ± 0.4mm; 0.00 ± 0.1mm

DO NOT SCALE DRAWING

FINISH CODE PER 193814: NONE

ACTIVITY	REPLACED BY	REPLACES

MATERIAL NO.	QUANTITY-U.M.	COMM. CLS.

MATERIAL SPEC.

TITLE: DIAGRAM, CONNECTION & SCHEMATIC

DESCRIPTIVE DATA: 1 PH, CENTER TAP, x CASE, POWERSTAR

DESIGNED	DRAWN	DATE	SCALE
DDB	DDB	06-04-01	FULL
CHECKED	APPROVED	RECORDS	ITEM TYPE
		4-19-02	

OUTSIDE DISTR.
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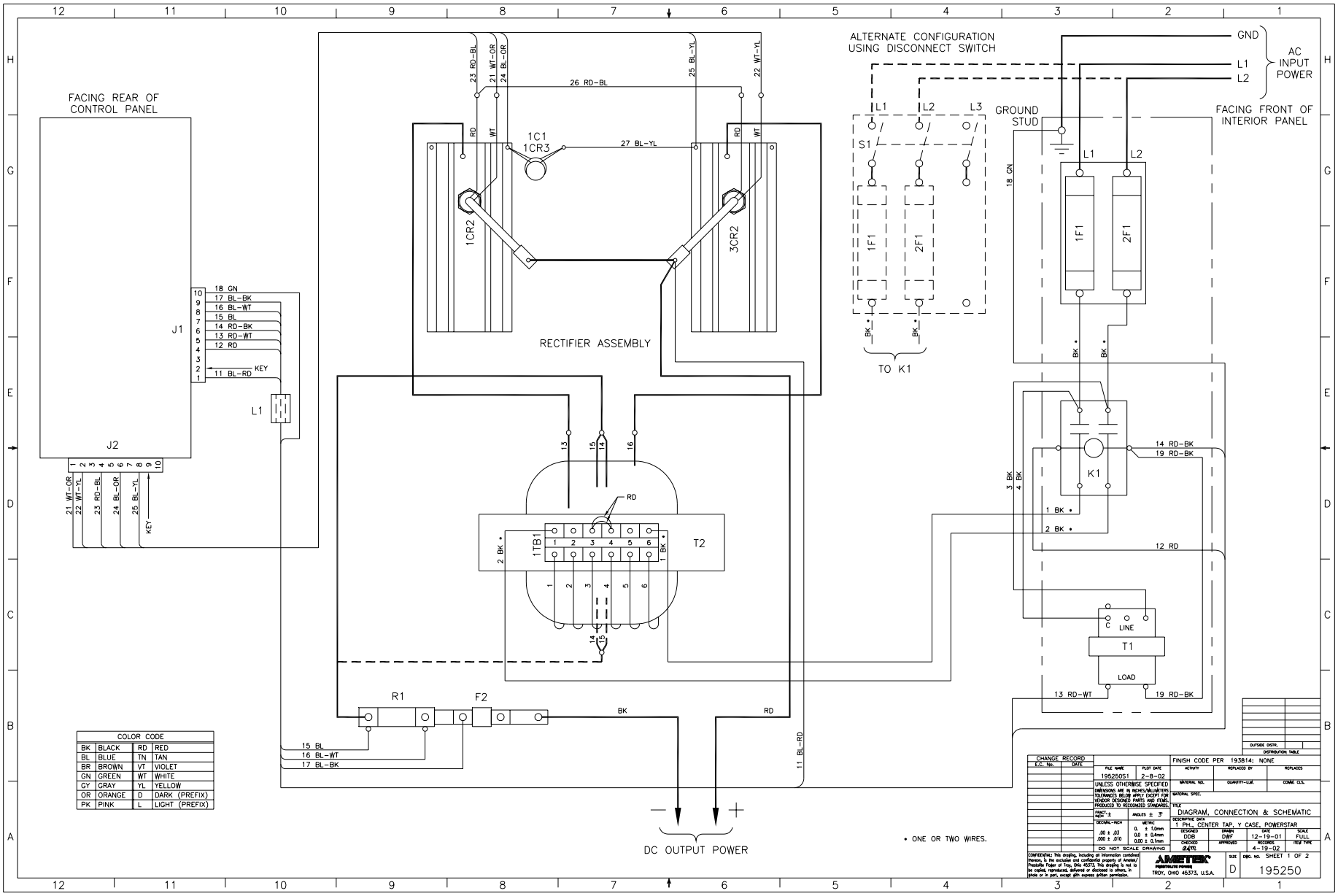
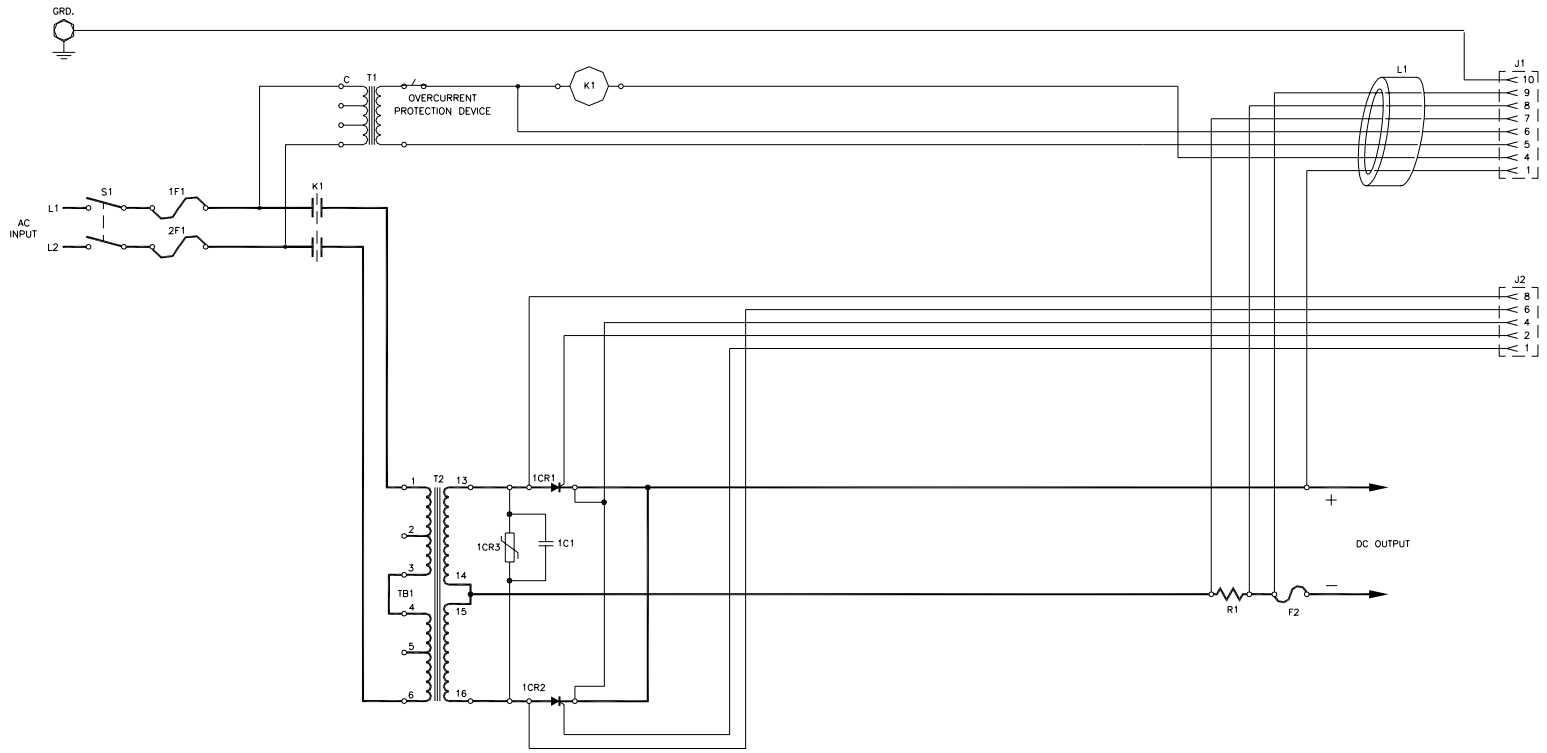
AMETEK
PRESTOLITE POWER
TROY, OHIO 45373, U.S.A.

SIZE: D | DRG. NO. 195249 | SHEET 2


FACING REAR OF CONTROL PANEL
J1
J2
18 GN
17 BL-BK
16 BL-WT
15 BL
14 RD-BK
13 RD-WT
12 RD
11 BL-RD
KEY
L1
21 WT-OR
22 WT-YL
23 RD-BL
24 BL-OR
25 BL-YL
RECTIFIER ASSEMBLY
1C1
1CR3
1CR2
3CR2
26 RD-BL
27 BL-YL
1TB1
T2
R1
F2
BK
RD
DC OUTPUT POWER
ALTERNATE CONFIGURATION USING DISCONNECT SWITCH
S1
1F1
2F1
TO K1
GROUND STUD
GND
L1
L2
AC INPUT POWER
FACING FRONT OF INTERIOR PANEL
K1
T1
LINE
LOAD
14 RD-BK
19 RD-BK
12 RD
13 RD-WT
19 RD-BK
• ONE OR TWO WIRES.
COLOR CODE
BK BLACK
BL BLUE
BR BROWN
GN GREEN
GY GRAY
OR ORANGE
PK PINK
RD RED
TN TAN
VT VIOLET
WT WHITE
YL YELLOW
D DARK (PREFIX)
L LIGHT (PREFIX)
CHANGE RECORD
FINISH CODE PER 193814: NONE
195250S1
2-8-02
UNLESS OTHERWISE SPECIFIED
DIAGRAM, CONNECTION & SCHEMATIC
1 PH., CENTER TAP, Y CASE, POWERSTAR
DDB
DWF
12-19-01
FULL
4-19-02
DO NOT SCALE DRAWING
AMETEK
TROY, OHIO 45373, U.S.A.
D
SHEET 1 OF 2
195250



LEGEND

1C1	CAPACITOR, SNUBBER
1CR1, 1CR2	SCR, OUTPUT
1CR3	SUPPRESSOR, MOV
1F1, 2F1	FUSE, INPUT AC
F2	FUSE, OUTPUT DC
J1,J2	CONNECTOR, PC BOARD, CONTROL MODULE
K1	CONTACTOR, AC
L1	INDUCTOR, NOISE SUPPRESSOR
R1	SHUNT, METER
S1	SWITCH, DISCONNECT (OPTIONAL)
T1	TRANSFORMER, CONTROL
T2	TRANSFORMER
TB1	BLOCK, TERMINAL

CHANGE RECORD
E.C. No. | DATE

FILE NAME: 19525052 | PLOT DATE: 2-8-02

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES/MILLIMETERS
TOLERANCES BELOW APPLY EXCEPT FOR VENDOR DESIGNED PARTS AND ITEMS PRODUCED TO RECOGNIZED STANDARDS.
FRACT ± | ANGLES ± 3°
DECIMAL-INCH: .00 ± .03; .000 ± .010
METRIC: 0. ± 1.0mm; 0.0 ± 0.4mm; 0.00 ± 0.1mm
DO NOT SCALE DRAWING

FINISH CODE PER 193814: NONE
ACTIVITY | REPLACED BY | REPLACES
MATERIAL NO. | QUANTITY-U.M. | COMM. CLS.
MATERIAL SPEC.
TITLE: DIAGRAM, CONNECTION & SCHEMATIC
DESCRIPTIVE DATA: 1 PH, CENTER TAP, Y CASE, POWERSTAR
DESIGNED: DDB | DRAWN: DDB | DATE: 06-04-01 | SCALE: FULL
CHECKED | APPROVED | RELEASED: 4-19-02 | ITEM TYPE

OUTSIDE DISTR.
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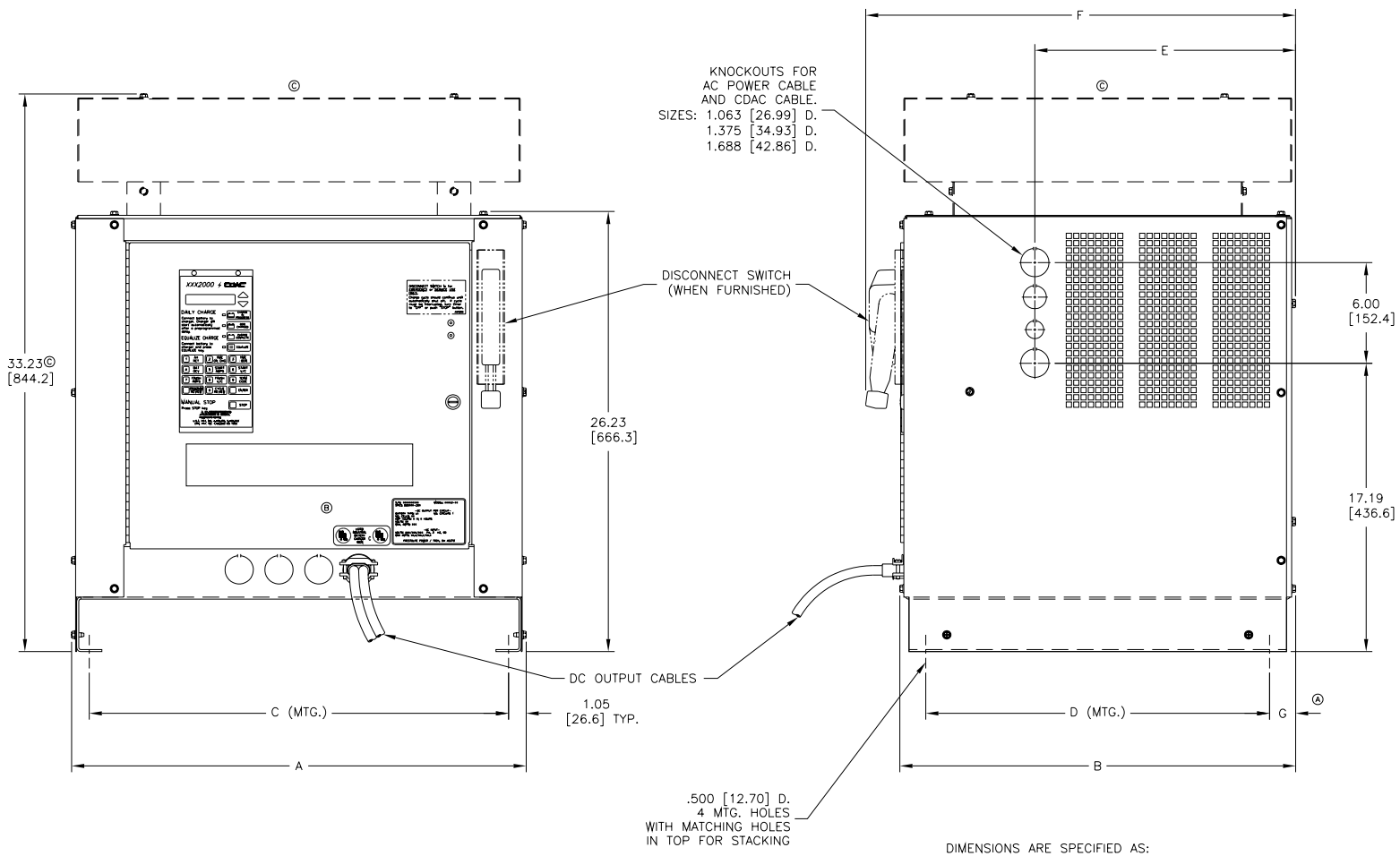
AMETEK
PRESTOLITE POWER
TROY, OHIO 45373, U.S.A.

SIZE: D | DRG. NO. 195250 | SHEET 2



DIMENSIONS ARE SPECIFIED AS:
INCHES
[MILLIMETERS]

CABINET DESIGNATION (CASE)	DIMENSIONS							REMARKS
	A (WIDTH)	B (DEPTH)	C (MTG.)	D (MTG.)	E (KO'S)	F (DISC. SW.)	G (MTG.)	
B, H, S & Y	21.47 [545.3]	20.47 [519.9]	19.38 [492.1]	17.75 [450.9]	12.54 [318.5]	22.50 [571.5]	1.36 [34.5]	
C, T & Z	27.09 [688.2]	23.59 [599.3]	25.00 [635.0]	20.50 [520.7]	15.54 [394.7]	25.63 [650.9]	1.55 [39.4]	C & Z CASE SHOWN

Ⓐ Ⓐ

CHANGE RECORD	
E.C. No.	DATE
A) 2363	11-3-00
B) 2607	9-19-02
C) 2622	10-10-02

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES [MILLIMETERS].
TOLERANCES BELOW APPLY EXCEPT FOR VENDOR DESIGNED PARTS AND ITEMS PRODUCED TO RECOGNIZED STANDARDS.

PLOT DATE 8-23-04 | FILE NAME 194449

FRACT: ± | ANGLES ± 3°

DECIMAL-INCH: .00 ± .03, .000 ± .010 | METRIC: 0. ± 1.0mm, 0.0 ± 0.4mm, 0.00 ± 0.1mm

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FINISH CODE PER 193814: NONE

ACTIVITY	REPLACED BY	REPLACES

TITLE: OUTLINE, DIMENSIONAL Ⓑ

DESCRIPTIVE DATA: B, C, H, Y & Z CASE Ⓑ

DESIGNED	DRAWN	DATE	SCALE
DDB	DWF	8-22-00	QUARTER
CHECKED	APPROVED	RECORDS	SHEET
BAM		8-23-00	1 OF 1

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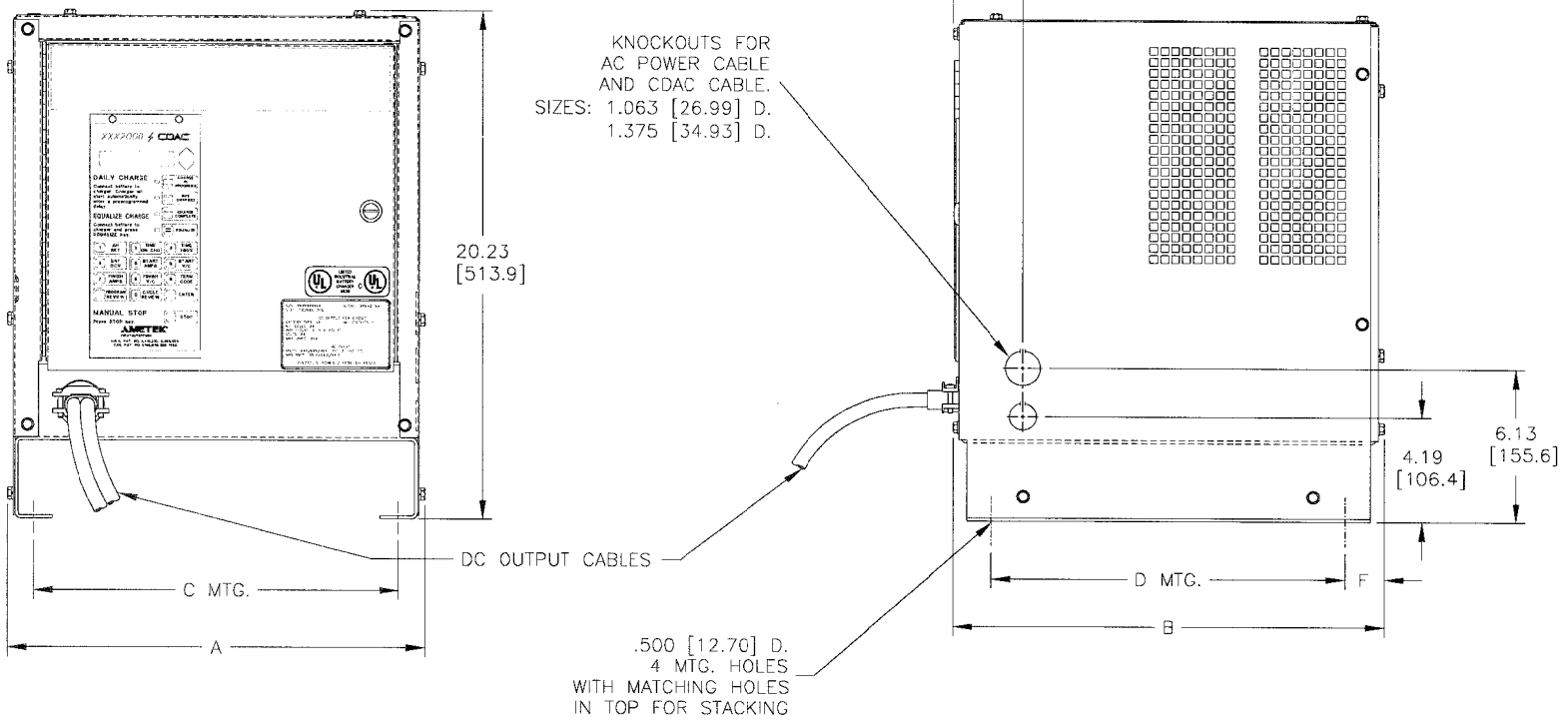
AMETEK PRESTOLITE POWER AND SWITCH
TROY, OHIO 45373, U.S.A.

SIZE C | DWG. NO. 194449



DIMENSIONS ARE SPECIFIED AS:
INCHES
[MILLIMETERS]

CABINET DESIGNATION (CASE)	DIMENSIONS					
	A (WIDTH)	B (DEPTH)	C (MTG.)	D (MTG.)	E (KO'S)	F (MTG.)
A, M, X	16.58 [421.1]	17.09 [434.2]	14.50 [368.3]	14.00 [355.6]	2.78 [70.7]	1.55 [39.4]

CHANGE RECORD		UNLESS OTHERWISE SPECIFIED:	Unless this drawing is being viewed from the file server of Ametek/Prestolite Power and Switch, it is an UNCONTROLLED DOCUMENT. DESTROY ALL COPIES AFTER INITIAL USE!			
E.C. No.	DATE	DIMENSIONS ARE IN INCHES [MILLIMETERS]				
		TOLERANCES BELOW APPLY EXCEPT FOR VENDOR DESIGNED PARTS AND ITEMS PRODUCED TO RECOGNIZED STANDARDS.	FINISH CODE PER 193814: NONE			
		PLOT DATE: 1-10-08	FILE NAME: 197203	ACTIVITY	REPLACED BY	REPLACES
		FRACT ± INCH	ANGLES ± 3°	TITLE: OUTLINE, DIMENSIONAL		
		DECIMAL—INCH: .0 ± .06; .00 ± .03; .000 ± .010	METRIC: 0. ± 1.5mm; 0.0 ± 0.8mm; 0.00 ± 0.25mm	DESCRIPTIVE DATA: A, M, X CASE		
		DO NOT SCALE DRAWING		DESIGNED: BAM	DRAWN: BAM	DATE: 6-28-06
				CHECKED: BWS	APPROVED	RECORDS: 2-2-07
						SCALE: THIRD
						SHEET: 1 OF 1

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AMETEK
PRESTOLITE POWER AND SWITCH
TROY, OHIO 45373, U.S.A.

SIZE: C

DWG. NO.: 197203

WARRANTY

AMETEK/PRESTOLITE POWER "SCR" 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. **PRODUCT AND PARTS WARRANTED.** Subject to the exceptions listed below each Industrial Battery Charger is warranted for a specific period of time commencing from the date of it's 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) Terms and conditions for warranty coverage:

SCR PRODUCTS	ULTRA MAXX	ULTRA CHARGE	POWER STAR	POWERSTAR PLUS
FULL COVERAGE - LABOR, TRAVEL, MILEAGE & PART REPLACEMENT	1-year	1-year	1-year	1-year
PRINTED CIRCUIT BOARD (REPLACEMENT ONLY)	2-years additional	2-years additional	2-years additional	2-years additional
TRANSFORMER, INDUCTOR, SCR & DIODE (REPLACEMENT ONLY)	9-years additional	9-years additional	9-years additional	9-years additional
TOTAL WARRANTY TERM (YEARS)	10-years	10-years	10-years	10-years

   b) Warranty Expense Limitation: The maximum warranty expense Prestolite will incur for any Battery Charger will be limited to the original purchase price of the Battery Charger.

   c) 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.** Prestolite extends this warranty 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.

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.

THIS WARRANTY IS GIVEN AND ACCEPTED IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABLILITY OR FITNESS FOR A PARTICULAR PURPOSE, OTHER THAN AS EXPRESSLY SET FORTH HEREIN. IN NO EVENT SHALL PRESTOLITE BE LIABLE FOR ANY ANTICIPATED OR LOST PROFITS, SPECIAL, DIRECT, INDIRECT OR INCIDENTAL DAMAGES, CONSEQUENTIAL DAMAGES, TIME CHARGES OR OTHER COMMERCIAL EXPENSES OR LOSSES, AND BUYER ASSUMES ALL RISK AND LIABILITY RESULTING FROM USE OF THE GOODS. PRESTOLITE DOES NOT AUTHORIZE ANY REPRESENTATIVE OR OTHER PERSON TO ASSUME ON BEHALF OF PRESTOLITE 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

Data Sheet: 1148
Index: 060110
Replaces: 030105