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INSTALLATION, OPERATION AND MAINTENANCE MANUAL
AMERICAN BATTERY CHARGING LLC.

Series ABC11B-120-XX

INDUSTRIAL BATTERY CHARGERS

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1.0 GENERAL DESCRIPTION

1.1 Description

The American Battery Charging rectifiers described in this manual are designed to supply a constant voltage output for any load within their ratings. Beyond approximately 110% of the rated load the output voltage will drop rapidly, thereby protecting the rectifier and the system to which it is connected, this makes the ABC rectifier ideal for use as a battery charger since it supplies a constant current to a discharged battery.

ABC11B chargers are two rate float battery chargers for charging standby and on-line batteries.

1.2 Specifications

1.2.1 Input

AC Input Voltage: Models are provided with taps for specific ranges of AC input The **bold type** indicates the voltage setting for a particular model when shipped. The Table below lists the particular models, AC input voltages and the recommended external AC line protection. Caution: To reduce the risk of fire, use only on circuits with branch circuit protection in accordance with the National Electric Code, NFPA 70.

Model	Solar P/N	AC input range Tolerance +/- 10%	External protection
ABC11B-120-10	1060367-100	100/110/**120**VAC	40A
ABC11B-120-15	1060367-200	100/110/**120**VAC	60A
ABC11B-120-20	1060367-300	100/110/**120**VAC	70A
ABC11B-120-25	1060367-400	100/110/**120**VAC	90A
ABC11B-120-10	1060367-500	208/220/230/**240**VAC	20A
ABC11B-120-15	1060367-600	208/220/230/**240**VAC	25A
ABC11B-120-20	1060367-700	208/220/230/**240**VAC	40A
ABC11B-120-25	1060367-800	208/220/230/**240**VAC	50A
ABC11B-120-10	1060367-900	**380**/400/415VAC	15A
ABC11B-120-15	1060367-1000	**380**/400/415VAC	15A
ABC11B-120-20	1060367-1100	**380**/400/415VAC	20A
ABC11B-120-25	1060367-1200	**380**/400/415VAC	25A
ABC11B-120-10	1060367-1300	440/460/**480**VAC	15A
ABC11B-120-15	1060367-1400	440/460/**480**VAC	15A
ABC11B-120-20	1060367-1500	440/460/**480**VAC	15A
ABC11B-120-25	1060367-1600	440/460/**480**VAC	20A

AC Input Frequency: 50 Hertz Models: 47-63 HZ

If the available nominal AC voltage matches another one of the taps provided, the main transformer T1 must be rewired to the appropriate tap. The taps are located on the left side of the main transformer T1. T1 is located at the top of the charger cabinet and the taps are labeled with the particular voltage. Disconnect wire #3 from the standard tap connection and reconnect to the alternate tap if required. See Figure 1.2.1.

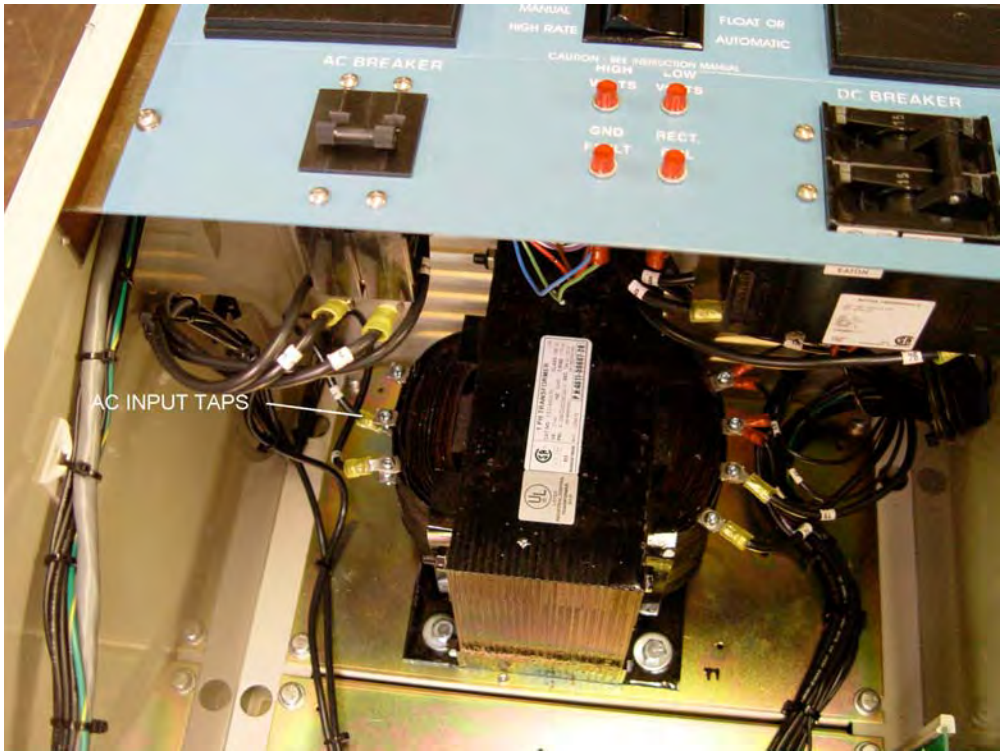


FIGURE 1.2.1: MAIN TRANSFORMER T1, AC INPUT TAPS

1.2.2 Output

Output voltage suitable for charging valve regulated or flooded lead-acid or nickel-cadmium batteries. Maximum output voltage is 145VDC.

Voltage Stability: +/- 1/2" from no-load to full load with an AC input voltage variation of +/- 10% and an AC input frequency variation of +/- 5% with battery connected.

Current: Models of 10, 15, 20 and 25 amps. Limited to approximately 110% overload capacity.

1.2.3 Controls

"Float - High Rate" Manual Switch (Located on the front panel)

"Float" Voltage Potentiometer (Located on E1 control board)
"High-Rate" Voltage Potentiometer (Located on E1 control board)

1.2.4 Meters and Indicators

Ammeter: Moving-Coil, 3 1/2" scale, 2% accuracy
Voltmeter: Moving-Coil, 3 1/2" scale, 2% accuracy
"AC ON" LED Indicator
"High-Rate" LED Indicator

1.2.5 Operating Environment

Natural convection cooled
Operating Temperature range: -10 degree C (+14 degrees F) to +50 degrees C (+122 degrees F)
Maximum humidity: 95%
Maximum altitude: 4100 feet (1250 M) above sea level
Derated models available for higher temperatures or altitudes.

1.2.6 Protection

AC Input 2-pole circuit breaker
DC Output 2-pole circuit breaker
AC and DC Surge Suppressors
Soft Start Circuit

1.2.7 Wiring

Insulation: 600 Volts All wires tagged for identification
Ratings per NEC, NFPA No. 70

1.2.8 Enclosures

Type: NEMA 1 - Ventilated
Color: RAL 7032 Polyester powder coat

1.2.9 Testing Tested in accordance with NEMA PE-5

2.0 INSTALLATION

CBC Battery Chargers are suitable for indoor use only, and supplied in cabinets for floor mounting.

Warning: This product is intended for installation in a restricted area only.

2.1 Location

Locate the battery charger in the desired location (refer to dimensional drawing in last section of manual). Avoid locations near heat generating equipment, or subject to extremes of dirt or moisture.

2.2 Wall Cabinets

Install the wall-mounted unit with suitable bolts, according to unit weight, wall material and structure. Use eight 1/4" diameter bolts. With bolts in place, install the unit over the bolts with keyslot mounting holes. Open the cabinet door for access to the bolts for tightening.

2.3 Cable Routing

Cable entry to the cabinet is normally from the bottom. Conduit may be connected through the top, back or sides as required if bottom entry is impractical or undesirable. Refer to the dimensional drawing in the last section of the manual and Figure 2.3.

Figure 2.3: Cable entry for AC input at P1 and charger output at TB521

2.4 Ventilation

The design of the cabinet provides satisfactory for convection cooling. Allow a minimum of 3 inches (75mm) clearance on each side, and 6 inches (150mm) on top for ventilation.

2.5 Connecting Battery to Charger

Connect the charger and load to the battery using separate cables. The charger output terminals are at TB521. The DC load terminals are at TB522. Use two sets of cables to connect these to the battery. The charger to battery cables will carry the charger output current. The DC load cables will carry the maximum DC loads.

Connect the TB521 positive to the battery positive terminal.
Connect the TB521 negative to the battery negative terminal.
Connect the TB522 positive to the battery positive terminal.
Connect the TB522 negative to the battery negative terminal.

NOTE: If correct polarity is not observed at TB521, the charger will not operate.

2.6 Connecting Charger to AC Supply Mains

Locate the input/output terminal strip (P1). Check the AC line for input voltage, frequency and phase to match the specifications as listed on the battery charger's nameplate, located on the cabinet front. The AC line must be sized to allow for the maximum current capacity as indicated by the rating of the input fuse or breaker. Connect the AC line to the terminals indicated. Connect ground to proper terminal: GND.

2.7 Energizing

Energize the charger DC BREAKER. The battery should be connected to the chargers DC output and the breaker energized, before the AC power is energized.

Energize the AC line then energize the charger AC BREAKER. The "AC ON" lamp should light, and the charger should be operating.

3.0 Output Adjustments

ABC11B-series battery chargers have been adjusted at the factory. See Figure 3.0 for voltage and current limit adjustment potentiometers. For charging batteries, "Float" and "High Rate" voltages have been set according to the following table. Alternate voltage settings are indicated for other battery types. The charging voltage may be adjusted if needed according to the following instructions. The selection of "Float" or "High Rate" is controlled by the "High Rate" switch (S1), or the automatic charge control circuit.

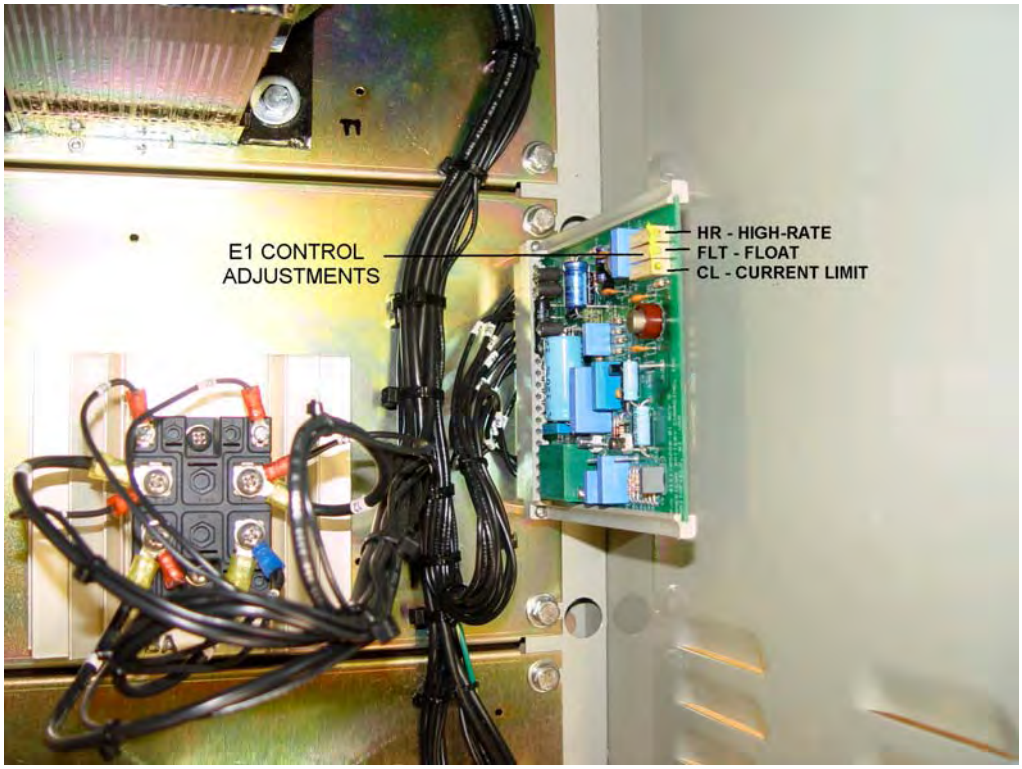


Figure 3.0: E1 control adjustment potentiometers

The "Float" voltage is adjusted to a specific voltage in order to maintain a fully charged battery in a fully charged condition. The "High Rate" voltage is adjusted to a specific voltage higher than "Float". This voltage should be set to force-charge the battery. A battery should be "High Rate" charged whenever discharged.

CAUTION: The "Float/High Rate" switch (S1) controls the "High Rate" charge. Never leave the switch in the "High Rate" position for long periods of time (consult the battery manual). Excessive "High Rate" charging will cause cells to gas (through electrolysis) and dissociate the water in the electrolyte into hydrogen and oxygen. Never let the electrolyte level drop below the minimum level line.

It is recommended that all settings be checked before putting the charger into service. The following procedure should also be followed if the voltages require resetting in the future or when a new control card, E1, is installed.

3.1 "Float" Voltage Adjustment

3.1.1 Precision Voltmeter

Attach a precision voltmeter of the correct range in parallel with the rectifier's voltmeter. (Accuracy should be better than +/- 0.5%)

3.1.2 Switch to "Float"

Switch the charger's switch (S1) to "Float". The "High Rate" lamp should be out. If the charger's high-rate LED is lit, the automatic timer has initiated a high-rate charge cycle. Allow the charger to "High Rate" charge until the "High Rate" lamp goes out. This may take from 4 to 30 hours. When the lamp goes out, proceed to Paragraph 3.1.3.

3.1.3 Checking "Float" Voltage

The current should be considerably lower than the output current listed on the rectifier nameplate. The "High Rate" lamp should be out. Check that the voltage is at the desire level. Consult the battery manufacturers recommendations. If the voltage is incorrect, adjust as per Paragraph 3.1.4.

3.1.4 Adjusting "Float" Voltage

If the voltage is incorrect, adjust potentiometer (FLT) located on the printed circuit card (E1), using a small screwdriver. Turn the adjusting screw counter-clockwise to reduce voltage. Adjust in small increments, allowing voltage to stabilize after each adjustment. When properly set, proceed to 3.2.1.

3.2 "High Rate" Voltage Adjustment

CAUTION: Set "Float" voltage per paragraph 3.1 before adjusting "High Rate" voltage.

3.2.1 Checking "High Rate" Voltage

Switch the charger to the "High Rate" mode with switch (S1). The "High Rate" LED should be lit. Allow the "High Rate" voltage and current to stabilize. The DC output current must be less than the maximum value as shown on the nameplate. If it is not, wait until the level drops. Check that the voltage is at the desired level. Consult the battery manufacturers recommendations. If the

voltage is incorrect, adjust per Paragraph 3.2.2

3.2.2 Adjusting "High Rate"

If the voltage is incorrect, adjust the potentiometer (HR), located on the printed circuit card (E1), using a small screwdriver. The potentiometer is labeled "High Rate". Turn the adjusting screw clockwise to increase voltage, and counter-clockwise to reduce voltage. Adjust in small increments, allowing voltage to stabilize after each adjustment. When properly set, return the switch (S1) to "Float".

3.3 "Current Limit" Adjustment

The "Current Limit" potentiometer (CL), is located on the printed circuit card (E1). It is factory set normally at 110% of rated output.

CAUTION: The "Current Limit" potentiometer (P3), is set at the factory and sealed. Do not change this adjustment. An improper setting may damage the rectifier.

If it is desired to adjust the current limit to a lower value, or to adjust a new control card (E1), the following procedure may be used.

3.3.1 Adjusting "Current Limit"

Turn the "Current Limit" potentiometer (CL), fully counter-clockwise. Energize the AC line. Slowly adjust potentiometer (CL) clockwise until the ammeter reading is equal to the DC current rating on the nameplate. Adjust current limit only with rectifier under full load. CAUTION: Under no circumstances should the rectifier current exceed the nameplate value. Damage may occur if miss-adjusted.

4.0 DESCRIPTION OF OPERATION

4.1 Rectifier circuit

4.1 When the rectifier is connected to an appropriate AC voltage source, the voltage is connected to the input transformer, (T1). The transformer steps the voltage up or down, as required for the specific DC output voltage. The transformer also isolates the commercial AC line from the battery circuit. The main secondary, X1-X2, of the transformer is connected to the full wave bridge rectifier.

The bridge is the heart of the power circuit. This assembly is a standard full-wave silicon bridge, incorporating three diodes and two SCR's (silicon controlled

rectifiers) which are capable of being made conductive for any part of each half cycle. This is accomplished by the application of positive pulses to the gate terminals of the SCR's at the desired time. Before the pulses are applied, the SCR is open, and no current flows in the circuit. However, as soon as the SCR is fired, it operates as a standard silicon rectifier until the forward current is reduced to almost zero. Charger output control can therefore be accomplished by changing the point in time the SCR's are fired.

The firing angle determines the output of the bridge. When large, the SCR conducts for only a short time and the bridge output power is low. When is small, the SCR conducts for nearly the complete half cycle, and the bridge output power is high.

Following the bridge is a snubber circuit, (E2), consisting of varistors, and RC-suppressors. These act to suppress AC and DC line surges and thereby protect the bridge rectifiers and other equipment connected.

4.2 Control Card

A printed circuit card (E1) is used for charger control. This solid state card, which utilizes integrated circuits, provides the charger with voltage regulation and automatic current limiting by controlling the SCR conduction angle.

4.3 Sequence of Operation

A theoretical sequence of operation is as follows: The output voltage tends to decrease, due to an increasing load or decreasing AC main voltage. As the output voltage drops, the control module (E1) senses a difference between actual and desired voltage, and generates an error signal. This error signal is fed to the pulse generator of (E1), which starts the firing pulses earlier in the half-cycle of AC voltage.

Since the SCR's are now conducting for a longer period of time, the average output voltage is increased by an amount, which will reduce the error to zero. Thus, the rectifier maintains the output voltage at an essentially constant value, despite changes in input voltage or load condition.

The current limiting circuit of (E1) will override the voltage regulation circuit and begin to reduce the output voltage to (zero if necessary) as the output current begins to exceed the adjusted value (normally 110% of rated load).

4.4 Accessory device – EMI/RFI filter

Charger models 1060637-500, 600, 700 and –800 have an EMI/RFI filter (X1) provided at the AC input. The filter reduces high-frequency noise emissions.

4.5 Accessory device – Multi-alarm with Auto-Charge

This battery charger is equipped with a Multi-alarm board (E3), part number 4111-95046-01. The E3 board is located on the inside of the charger door. The circuit board is supplied with DC voltage from the battery. The board is connected to the charger by plug P2. See Figure 4.5

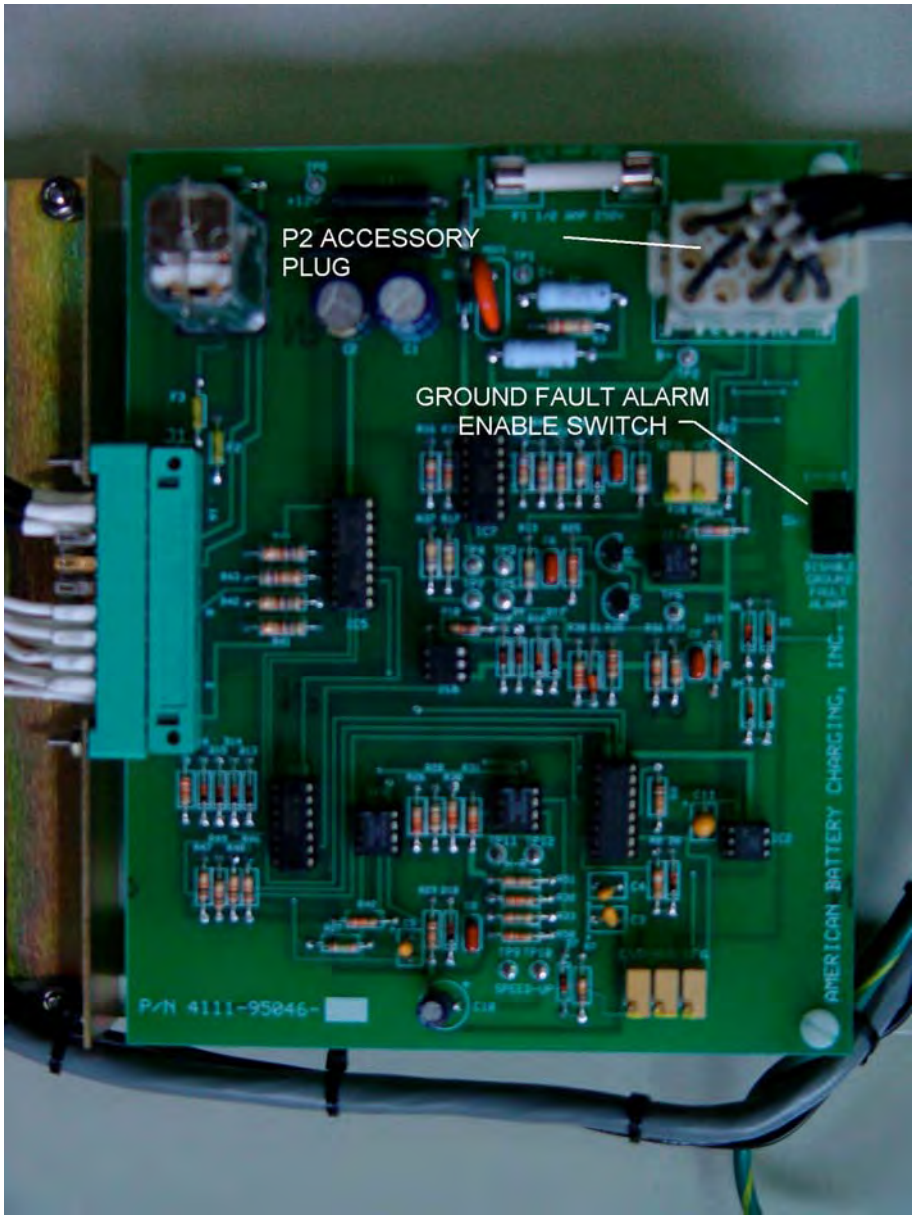


Figure 4.5: E3 Multi-alarm accessory circuit

The Multi-alarm board includes the following circuits:

AUTOMATIC CHARGE CONTROL

This circuit is used to automatically switch the charger's output from float charging to high rate charging. The automatic charging circuit senses a signal from the main control card (E1) that indicates when the rectifier is operating in current limit. If this condition remains longer than a set period of time, normally about 3 minutes, the charger is switched to high rate charge.

When the charger leaves current limit and changes over to voltage control, the charger will be kept in high rate for a specific charging time, normally 8 to 12 hours. After the set charging time has elapsed, the charger is switched back to float charging. Should the charger return to current limit and remain longer than the 36 second set period, the high rate timer is reset and started again when the rectifier leaves current limit.

LOW VOLTAGE ALARM WITH LIGHT (LED)

The supervised DC voltage is sensed via a voltage divider in which a potentiometer (LVA) is included to allow setting of the required trigger voltage. This set point is adjusted with a 25-turn potentiometer, which results in good resolution. The sensed voltage is compared with a temperature stabilized voltage reference in a voltage comparator circuit with built-in hysterisis and time delay. A front panel-mounted light (LED) displays the LOW VOLTS alarm condition.

Hysterisis: Approximately 5%
Time delay: 10 msec maximum
Accuracy: +/- 1%
Adjustment: Rotate LVA clockwise to raise the alarm level

HIGH VOLTAGE ALARM WITH LIGHT (LED)

The supervised DC voltage is sensed via a voltage divider in which a potentiometer (HVA) is included to allow setting of the required trigger voltage. This set point is adjusted with a 25-turn potentiometer, which results in good resolution. The sensed voltage is compared with a temperature stabilized voltage reference in a voltage comparator circuit with built-in hysterisis and time delay. A panel-mounted light (LED) displays the HIGH VOLTS alarm condition.

Hysterisis: Approximately 5%
Time delay: 10 msec maximum
Accuracy: +/- 1%
Adjustment: Rotate HVA clockwise to raise the alarm level

RECTIFIER FAILURE ALARM WITH LIGHT (LED)

This circuit is used to indicate an abnormal interruption of the charging circuit, caused by a malfunction of the charger or blown fuses. Alarm indication is also given at AC line failure or disconnection. The alarm circuit senses two signals from the main control card (E1). Signals from the outputs of the voltage regulator and current regulator are fed to separate comparators. When the charger is not working properly, both signals are either high or zero. Either of these conditions initiates an alarm condition which displays on the front panel mounted RECT FAIL light (LED).

Adjustment: Potentiometer (RFA) factory preset

GROUND FAULT ALARM WITH LIGHT (LED)

This circuit utilizes advanced integrated circuitry to indicate if the fault current to ground from the DC system positive or negative becomes too high. Upon ground fault, when the impedance between the charger output and ground becomes too low, a ground fault current will result. This current is converted to a voltage in a current-voltage converter. The ground fault current to be indicated is set via a 25-turn potentiometer (GFA), connected after the converter. The voltage from the potentiometer (GFA) is fed to a comparator circuit with a preset trigger level. Indication is given via a front panel mounted GND FAULT light (LED).

The ground fault alarm circuit may be de-activated if desired, via switch SW1. See Figure 4.5. Moving switch SW1 to the lower position will disable the ground fault alarm function.

Fault current range: 1 ma to direct grounding
Adjustment: Rotate potentiometer GFA clockwise to lower alarm level

SUMMARY ALARM RELAY (INDIVIDUAL ALARM RELAYS OPTIONAL)

All alarms are connected to a summary (group) alarm relay, included on the E3 board. This circuit will initiate an alarm signal for any of the provided alarms: LOW VOLTS, HIGH VOLTS, RECT FAILURE, or GND FAULT (if enabled). Contacts for remote indication are provided at terminal block P3.

E3 board maximum current draw: 160ma.
Ambient temperature: -10 to +70C
Temperature stability: 50ppm per degree C

5.0 MAINTENANCE AND TROUBLESHOOTING PROCEDURES

5.1 Maintenance

The ABC11B-series chargers do not employ any moving parts, other than the adjusting potentiometers and a relay. Other than blowing dust off the rectifier, no maintenance should be required during the life of the charger.

All magnetic components, resistors, capacitors and semiconductors are conservatively rated for long life. Silicon rectifiers with non-aging characteristics are used throughout, so that no adjustments for aging of rectifiers will be necessary.

Screw fastened connectors are used in wiring to reduce to a minimum the number of soldered connections. Most small components are mounted directly to the chassis with screws, and can be removed and replaced without major disassembly.

5.2 Troubleshooting Procedure

Table 1, in conjunction with the Troubleshooting Diagnostics (Figures 1,2,3, and 4) has been prepared to aid in fault isolation in the event of charger failure.

In cases of malfunction, first check the following:

1. All inter-cell and inter-tray battery connections. These connections are positive to negative (in series), and must be securely tightened.

2. Connections between battery and charger. These connections are positive to positive, negative to negative (in parallel), and must be securely tightened.

3. Individual cell voltages. Consult the battery manufacturer's recommendations for individual cell voltages and differences.

4. AC input voltage and frequency. Must match design input of the charger's as shown on the nameplate.

If all external connections are correct, cell voltages are within tolerance, and AC input voltage and frequency match the nameplate, then using Table 1, locate the applicable symptom and perform the corrective action as indicated. In some cases it will be necessary to use the diagnostics of Figures 1,2,3, and 4. To use these diagnostics, perform the steps in each box and proceed to the step indicated by your result. Refer to Figure 5.2 for key component locations.

NOTE: Care must be exercised at all times to avoid contact with live circuits.

Figure 5.2: Key component locations

Code	Component description
BA	Bridge module
CB521-525	DC distribution breakers
E1	Main control board (Firing board)
E2	Suppressor board
E3	Multi-alarm board
L1	Output filter inductor
T1	Main transformer
TB522	DC input terminal block for CB521-525
X1	EMI/RFI filter (For –500, 600, 700 & 800 only)

STEP	OBSERVATION	SYMPTOM	CORRECTIVE ACTION
1. CONNECT BATTERY TO CHARGER	NORMAL BATTERY VOLTAGE ON VOLTMETER	DC BREAKER OPENS IMMEDIATELY	REFER TO DIAGNOSTIC FIGURE 1
2. APPLY CORRECT AC VOLTAGE TO CHARGER	NORMAL VOLTAGE AND CURRENT ON VOLTMETER AND AMMETER	AC BREAKER OPENS IMMEDIATELY	REFER TO DIAGNOSTIC FIGURE 2
		DC BREAKER OPENS AS OUTPUT CURRENT EXCEEDS 110% OF RATED OUTPUT	REDUCE CURRENT LIMIT SETTING BY ADJUSTING POTENTIOMETER CL ON CONTROL BOARD E1 COUNTERCLOCKWISE IF NO EFFECT IS OBSERVED REPLACE CONTROL E1 SEE 3.3
		NO OUTPUT	REFER TO DIAGNOSTIC FIGURE 3
		VOLTAGE AND CURRENT NOT STABLE	REPLACE CONTROL BOARD E1
		CHARGER OPERATES CONTINUOUSLY AT CURRENT LIMIT	REFER TO DIAGNOSTIC FIGURE 4A
		"FLOAT" OR "HIGH-RATE" VOLTAGE INCORRECT	REFER TO DIAGNOSTIC FIGURE 4B

TABLE 1

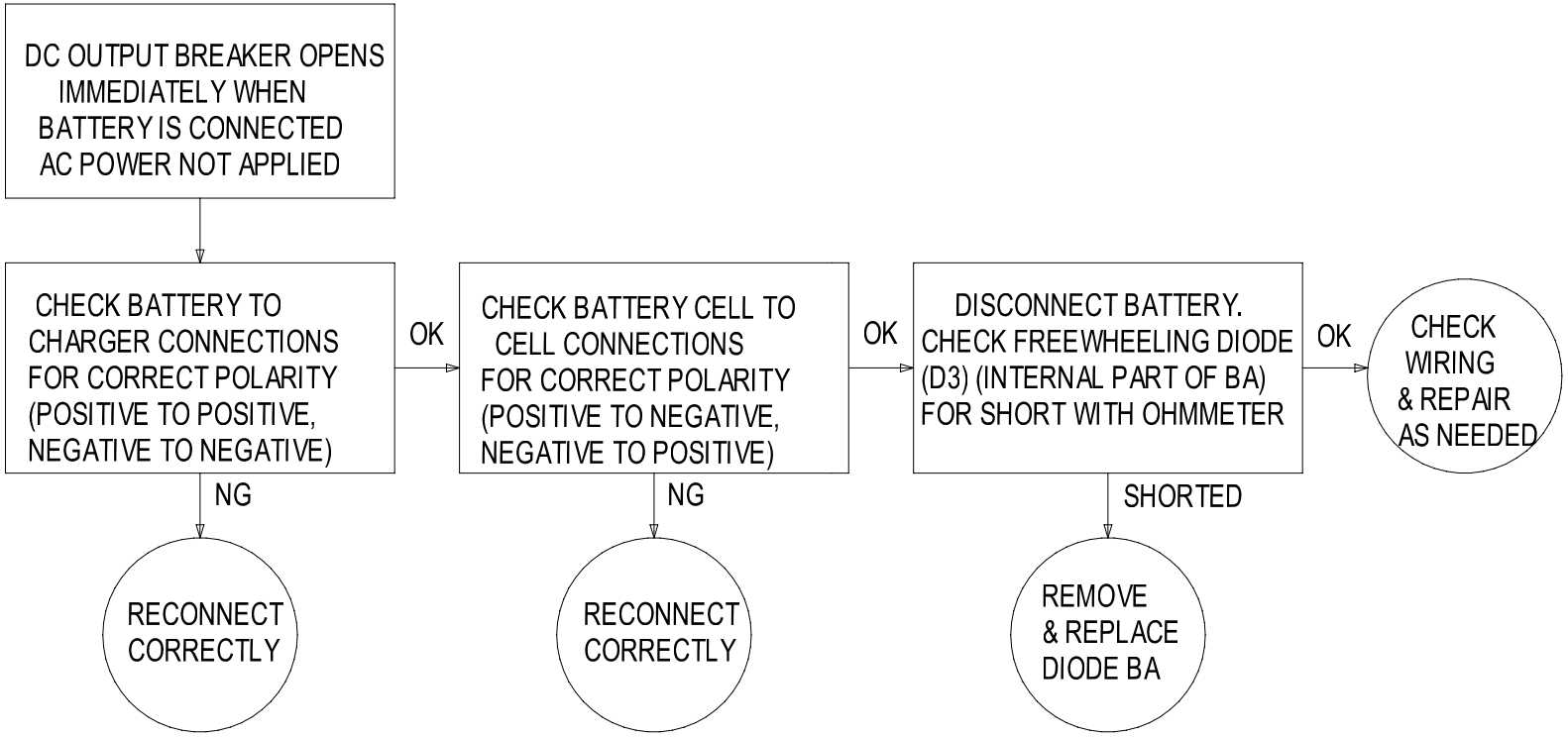


FIGURE 1 Troubleshooting Diagnostic

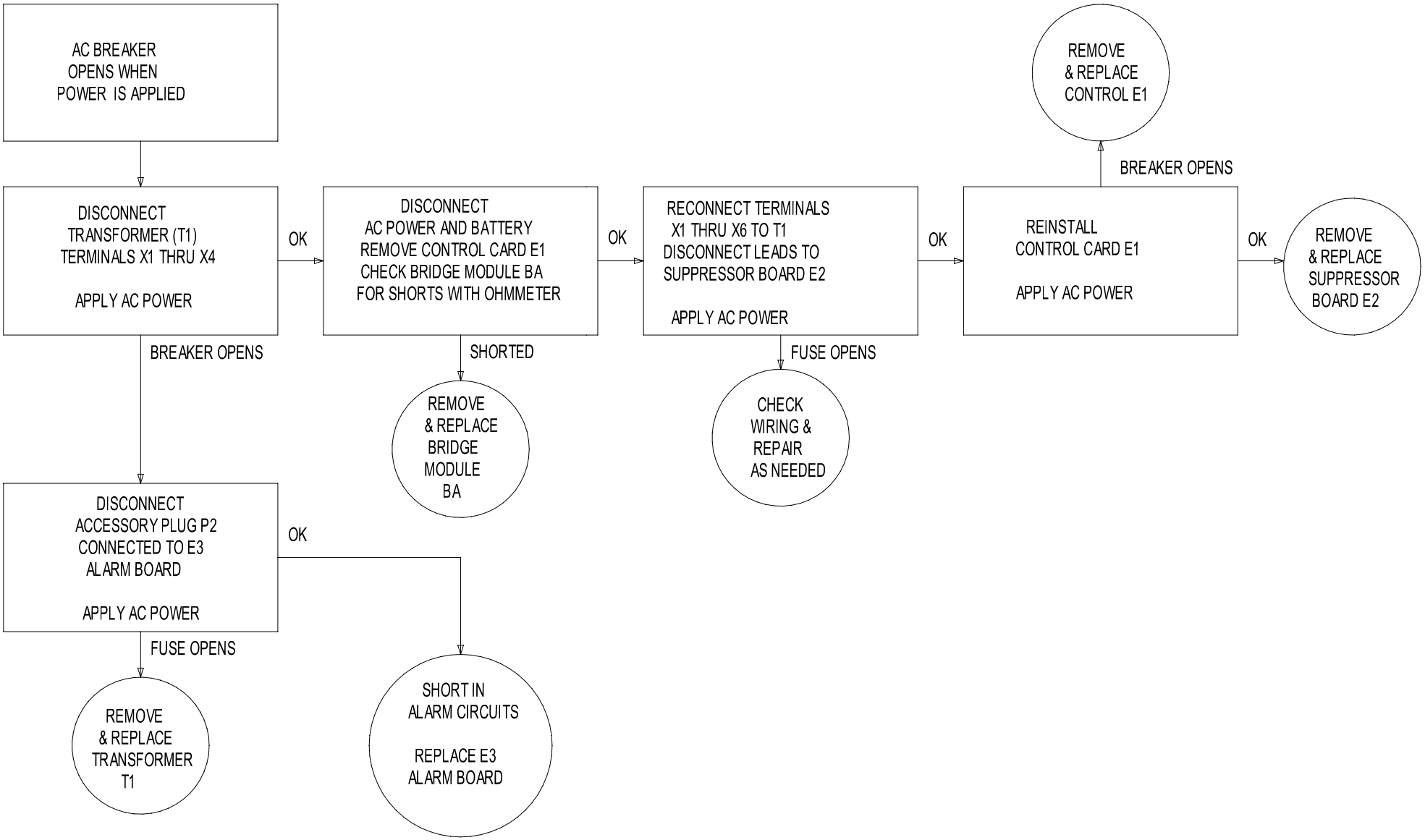


FIGURE 2 Troubleshooting Diagnostic

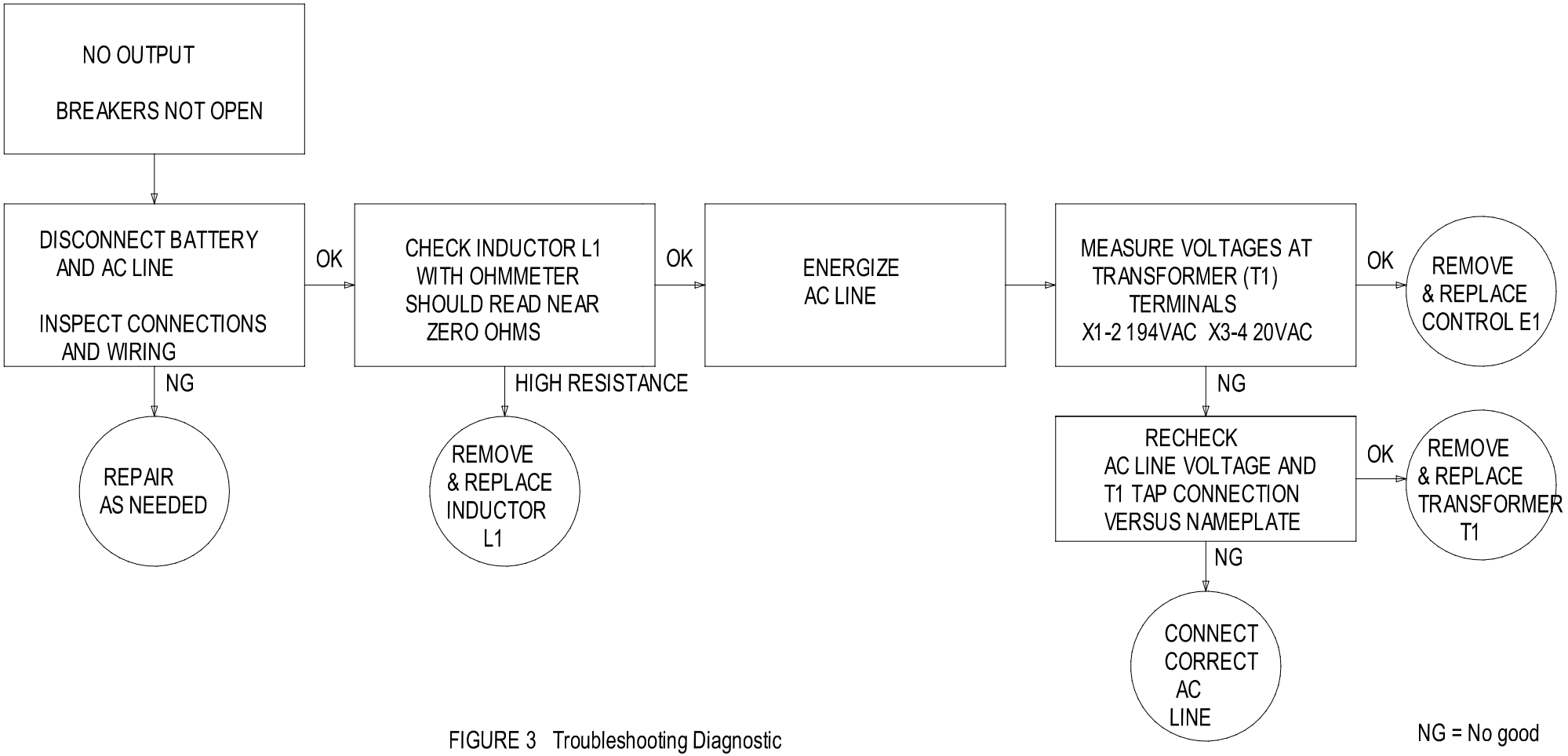
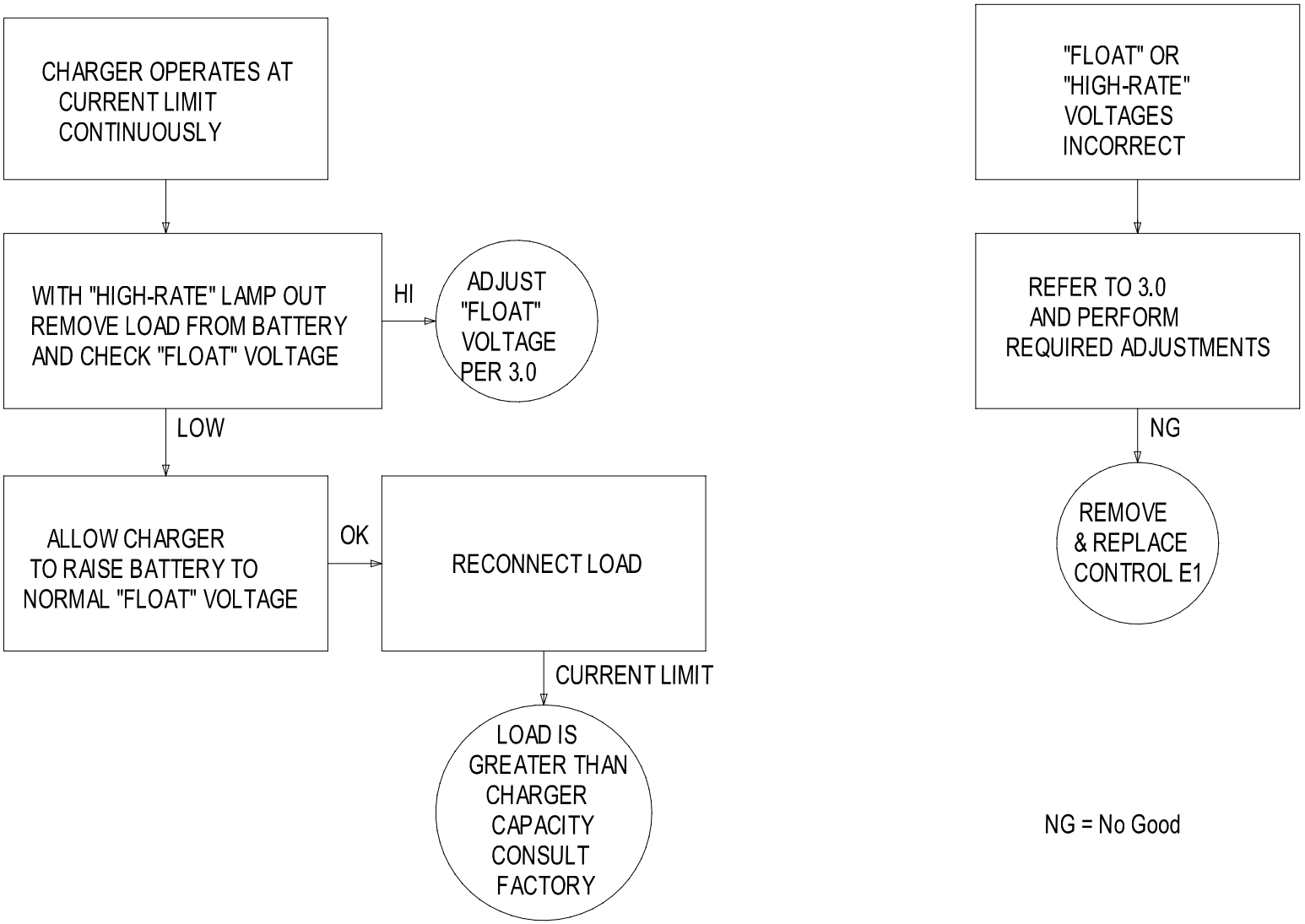


FIGURE 3 Troubleshooting Diagnostic

NG = No good



A

FIGURE 4 Troubleshooting Diagnostic

B

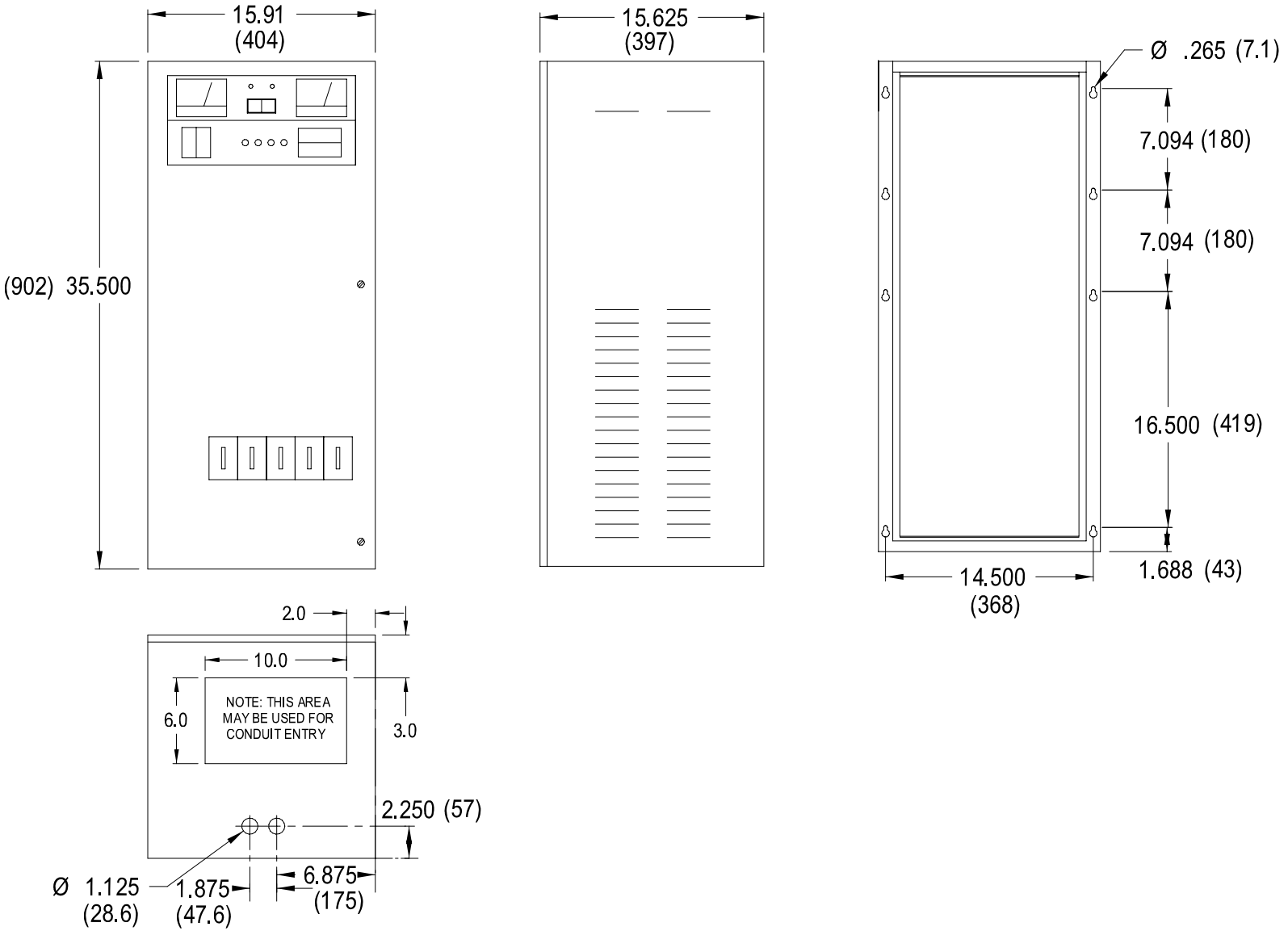
AMERICAN BATTERY CHARGING, INC.

SPARE PARTS LIST - MODEL ABC11B-120-XX

SOLAR MODEL 1060367 SERIES -100 TO -1600

CODE	QTY	DESCRIPTION	ABC INC PART NUMBER	X INDICATES ITEM USED ON SOLAR 1060367 DASH NUMBER														
				100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
A	1	AMMETER 0-15A 2%	4152-05000-03	X				X				X				X			
A	1	AMMETER 0-30A 2%	4152-05000-06		X	X			X	X			X	X			X	X	
A	1	AMMETER 0-50A 2%	4152-05000-07				X				X				X				X
CB521/525	2	DC BREAKER CF2 20AMP	3292-50621-03	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
CB522	1	DC BREAKER CF2 40AMP	3292-50621-07	X	X	X		X	X	X		X	X	X		X	X	X	
CB522	1	DC BREAKER CD2 100AMP	3292-50621-13				X				X				X				X
CB523/524	2	DC BREAKER CD2 60AMP	3292-50621-09	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BA	1	BRIDGE MODULE	3541-50458-02	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
E1	1	CONTROL BOARD	4111-95047-01	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
E2	1	SNUBBER BOARD 120V CE	4111-95048-01	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
E3	1	MULTI-ALARM BOARD 120V	4111-95046-01	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
ACB	1	AC BREAKER AM2 40AMP	3292-11879-28	X															
ACB	1	AC BREAKER AM2 60AMP	3292-11879-31		X														
ACB	1	AC BREAKER AM2 70AMP	3292-11879-32			X													
ACB	1	AC BREAKER AM2 90AMP	3292-11879-35				X												
ACB	1	AC BREAKER AM2 20AMP	3292-11879-24					X											
ACB	1	AC BREAKER AM2 25AMP	3292-11879-25						X										
ACB	1	AC BREAKER AM2 40AMP	3292-11879-28							X									
ACB	1	AC BREAKER AM2 50AMP	3292-11879-30								X								
ACB	1	AC BREAKER CD2 10AMP	3292-06996-51									X							
ACB	1	AC BREAKER CD2 15AMP	3292-06996-52										X						
ACB	1	AC BREAKER CD2 20AMP	3292-06996-53											X					
ACB	1	AC BREAKER CD2 25AMP	3292-06996-54												X				
ACB	1	AC BREAKER CD2 10AMP	3292-06996-51													X			
ACB	1	AC BREAKER CD2 10AMP	3292-06996-51														X		
ACB	1	AC BREAKER CD2 15AMP	3292-06996-52															X	
ACB	1	AC BREAKER CD2 20AMP	3292-06996-53																X
DCB	1	DC BREAKER CD2 15AMP	3292-50620-15	X				X				X				X			
DCB	1	DC BREAKER CD2 25AMP	3292-50620-25		X				X				X				X		
DCB	1	DC BREAKER CD2 30AMP	3292-50620-30			X				X				X				X	
DCB	1	DC BREAKER CD2 40AMP	3292-50620-40				X				X				X				X
LED3-6	4	LED -RED (ALARM)	4211-13332-01	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
LED1	1	LED - GREEN (AC-ON)	4219-14986-05	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
LED2	1	LED-AMBER (HIGH-RATE	4219-14986-04	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
L1	1	INDUCTOR	4641-50608-02	X				X				X				X			
L1	1	INDUCTOR	4641-50610-02		X				X				X				X		
L1	1	INDUCTOR	4641-50612-02			X				X				X				X	
L1	1	INDUCTOR	4641-50614-02				X				X				X				X
S1	1	SWITCH - FLOAT/HIGH-RATE	3221-06269-01	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
T1	1	TRANSFORMER	4611-50607-01	X															
T1	1	TRANSFORMER	4611-50609-01		X														
T1	1	TRANSFORMER	4611-50611-01			X													
T1	1	TRANSFORMER	4611-50613-01				X												
T1	1	TRANSFORMER	4611-50607-25									X							
T1	1	TRANSFORMER	4611-50609-25										X						
T1	1	TRANSFORMER	4611-50611-25											X					
T1	1	TRANSFORMER	4611-50613-25												X				
T1	1	TRANSFORMER	4611-50607-28					X											
T1	1	TRANSFORMER	4611-50609-28						X										
T1	1	TRANSFORMER	4611-50611-28							X									
T1	1	TRANSFORMER	4611-50613-28								X								
T1	1	TRANSFORMER	4611-50607-29													X			
T1	1	TRANSFORMER	4611-50609-29														X		
T1	1	TRANSFORMER	4611-50611-29															X	
T1	1	TRANSFORMER	4611-50613-29																X
V	1	VOLTMETER 0-200V 2%	4151-05001-13	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
X1	1	RFI/EMI FILTER 20SKV6	3359-13795-13					X											
X1	1	RFI/EMI FILTER 30SKV6	3359-13795-14						X										
X1	1	RFI/EMI FILTER 40SKV6	3359-13795-15							X	X								

				100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
				X INDICATES ITEM USED ON SOLAR 1060367 DASH NUMBER															



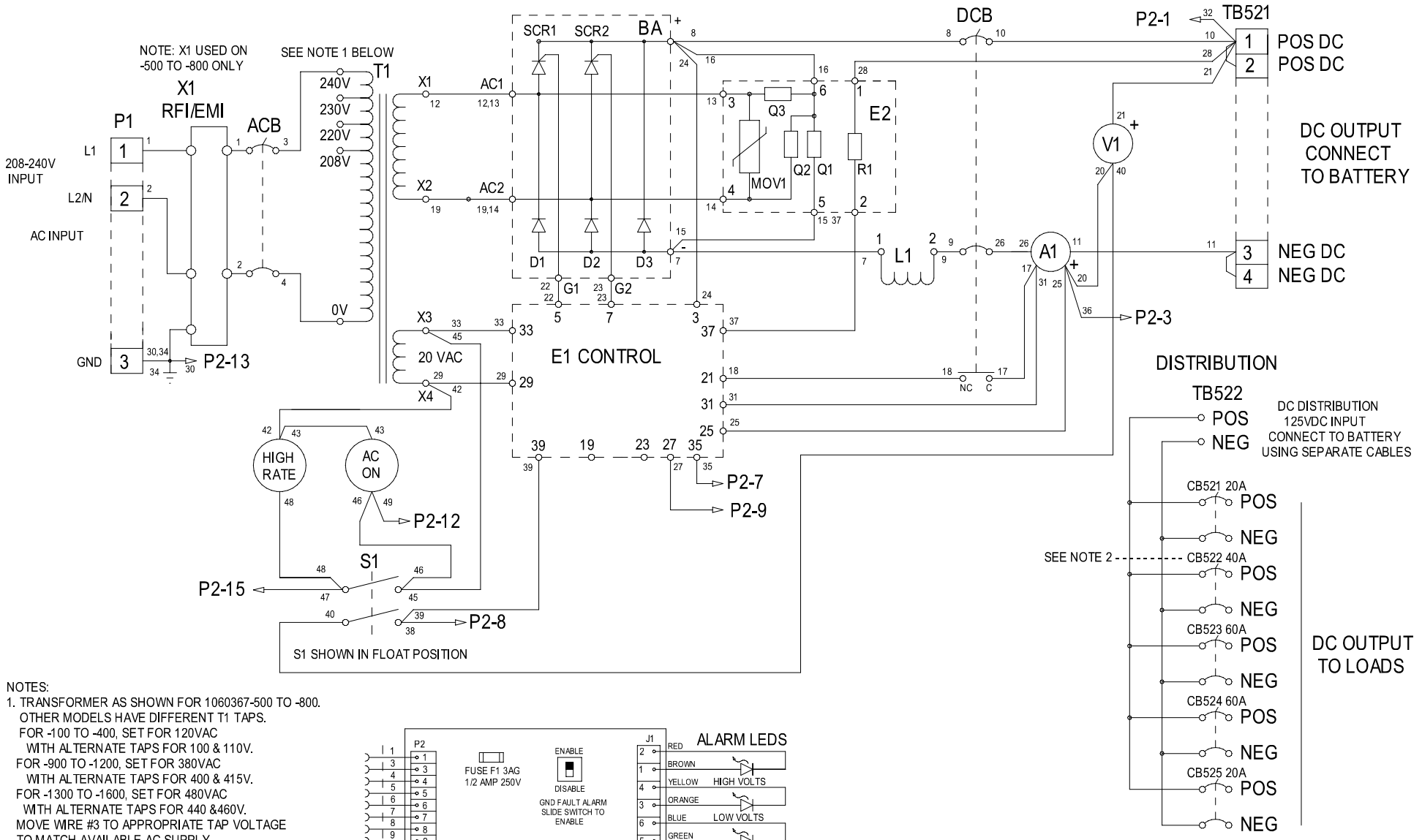
1. INSTALL WITH EIGHT 1/4" (6MM) DIA. BOLTS. ACCESS TO KEYHOLE SLOTS VIA DOOR.
2. DOOR OPENS ON LEFT SIDE HINGES, APPROX. 180 DEGREES.
3. ALL INPUT/OUTPUT CONNECTIONS LOCATED NEAR BOTTOM CONDUIT ENTRY HOLES.
4. ALL COMPONENTS AND/OR CHASSIS REMOVEABLE FROM CABINET FRONT.
5. CHASSIS MATERIAL: 14GA. CRS. ENCLOSURE MATERIAL: 18GA. CRS.
   FINISH: RAL7032 POLYESTER UNLESS NOTED OTHERWISE.
6. ALL DIMENSIONS IN INCHES (MILLIMETERS).

AMERICAN BATTERY CHARGING, INC.

SCALE: NONE	APPROVAL:	DATE: 11/28/05
DRAWN BY:		REV: 1

OUTLINE DIMENSIONAL DRAWING
WALL MOUNT CABINET - W4A

GROUP: 4725		DRAWING NO. 71202



NOTES:
1. TRANSFORMER AS SHOWN FOR 1060367-500 TO -800.
   OTHER MODELS HAVE DIFFERENT T1 TAPS.
   FOR -100 TO -400, SET FOR 120VAC
   WITH ALTERNATE TAPS FOR 100 & 110V.
   FOR -900 TO -1200, SET FOR 380VAC
   WITH ALTERNATE TAPS FOR 400 & 415V.
   FOR -1300 TO -1600, SET FOR 480VAC
   WITH ALTERNATE TAPS FOR 440 &460V.
   MOVE WIRE #3 TO APPROPRIATE TAP VOLTAGE
   TO MATCH AVAILABLE AC SUPPLY.
2. CB522 RATING 40A EXCEPT FOR MODELS
   -400, -800, -1200 & -16OO, RATING IS 100A.

AMERICAN BATTERY CHARGING, INC.
SMITHFIELD RI 02917

SCALE: NONE	APPROVAL:	DATE: 08/14/06
DRAWN BY:		REV: 0

MAIN CHARGER SCHEMATIC/WIRING DIAGRAM
MODEL ABC11B-120-XX CE SOLAR 1060367 SERIES

GROUP: 4725		DRAWING NO. 71250