MESA
POWER & COMMUNICATIONS

MESA TECHNICAL ASSOCIATES INC.
478 West Main St, Cobleskill, NY 12043
P: 866 287 6700 F: 518 234 3386

BATTERY CHARGER

USER MANUAL

Table of Contents

INTRODUCTION

Thank you for choosing this product. This battery charger/rectifier is designed to provide quality DC power for many years.

This user manual contains important technical and safety instructions. This manual must be read attentively before using the battery charger/rectifier to insure personnel safety and reliable operation of this equipment. Local and/or National safety and electrical code(s)/standard(s) must be obeyed.

Should you require any assistance, please call our service department.

IMPORTANT SAFETY INSTRUCTIONS

Keep these instructions in a safe and easily accessible place.

- Turn OFF and then disconnect AC power and DC voltage sources before servicing the charger/rectifier.
- Turn OFF DC breaker, if present, or AC power if not, prior to connecting the battery and/or the load.
- Only qualified personnel should do maintenance, attempt repairs or program the charger/rectifier.
- Use of an accessory not recommended or sold by the manufacturer may result in risk of fire, electrical shock or personal injury.
- Electrostatic sensitive components are used in this equipment. Proper ESD (electrostatic discharge) procedures must be executed to prevent any damage of the electronic components**.**
- **Batteries generate explosive gases** during their normal operation. **Never smoke** or allow an **open spark** or **flame** in the vicinity of the battery.
- Before using the charger/rectifier, read and follow the batteries' and any other involved equipment's safety, installation instructions and cautionary markings.
- Never attempt to charge a **frozen** battery.
- Do not expose charger/rectifier to rain, snow or other damps unless purchased with the appropriate NEMA/IP rating.
- Do not install or operate a dropped or otherwise damaged charger/rectifier.
- Refer to your national and/or local electrical code for the installation regulations.
- Remove watches, bracelets or anything of that nature before working on the charger/rectifier.
- Do not touch any uninsulated parts or components when the power is ON.
- Do not install the charger/rectifier over a battery or a combustible surface.
- Do not obstruct the ventilation openings or the airflow space.
- Provide and ensure the appropriate ventilation
- Do not start servicing the unit until at least five minutes have elapsed after turning it OFF and disconnecting all AC and DC supplies. Let the capacitors discharge.
- **GROUNDING** This equipment should be permanently grounded in compliance with all national and/or local codes and ordinances.

RECEIVING EQUIPMENT

Unpack and examine the charger/rectifier for completeness of the shipment according to the packing slip, and transportation damage. If your equipment arrived damaged, submit a report as a damage claim to the carrier within 24 hours.

STORAGE

If the charger/rectifier has to be stored before commissioning, it should be stored in a dry place, in the ambient temperature within –40°F to 185°F (-40°C to 85°C), not exposed to direct sunlight, on the same pallet, protected against moisture, dust, dirt and damage.
Do not use the charger/rectifier as a stocking shelf.
Remember that storing the charger/rectifier for a long time greatly deteriorates performance of the filter capacitors, which will dry out in about two years without being powered up.

HANDLING

To prevent personal injuries and/or equipment damage execute handling with care, using appropriate lifting equipment. By default, the charger/rectifier is to be lifted and moved with a forklift or jigger unless purchased with the lifting eyebolts.

INSTALLATION

FOR INSTALLATION REFER TO APPLICABLE NATIONAL AND LOCAL ELECTRICAL CODES.

LOCATION

The charger/rectifier has to be installed indoors in a well-ventilated area, where the temperature is within 32°F to +122°F (0°C to 50°C), and non-condensing humidity is not higher than 95%.

Should you require the charger/rectifier to operate outdoors or in a moist, cold, rain, under direct sunlight, etc.; the charger/rectifier must be purchased with the appropriately rated enclosure, which will provide the adequate environmental protection for your equipment.

For a more secure installation, the floor mounted units can be bolted to the floor. Four anchoring holes are provided for this purpose. The term “more secure” does not imply seismic. The charger/rectifier is not meant for seismic installations. For such installations, an appropriately designed charger/rectifier must be purchased.

If you are to install a charger/rectifier that was kept in the cold environment, let the charger/rectifier warm up for 24 hours, to avoid damaging the components and/or condensation on the live components.

If the charger/rectifier is to operate in the temperature range above the specified upper limit, the output has to be de-rated by 0.83% / °F from 122°F to 140°F (1.5% / °C from 50°C to 60°C. Also, if the charger/rectifier is to be installed above 3300ft (1000m) of the sea level, its output has to be de-rated by 7% per 3300ft (1000m).

VENTILATION AND COOLING

The rectifier/charger/rectifier is rated for the temperature range from 32°F (0°C) to 122°F (+50°C).
To calculate the required air displacement (exchange) volume use the following equation:

$$V = BTU \times e^{(0.125 \times H \times Tk/To)} / (T_r - T_k)$$

V = air flow: [cubic meter/hour]
BTU: Total dissipated heat
T_r: Maximum allowed room temperature [°K] {i.e. 50°C = 323°K]
T_k= Temperature of input cooling air
T_o= 273 °K
H = Altitude [km]

Do not place the system in direct sunlight.

In order to ensure the adequate ventilation and safe access, respect the following clearances:

- 3 in. (10 cm) on each side and the top.
- 3 feet (1 meter) in front of the unit or 1.5 charger/rectifier width, whichever is greater.

ELECTRICAL CONNECTION AND WIRING

The AC and DC ratings are provided for each charger/rectifier on the nameplate. The nameplate is located on the front panel.

The AC wire size ampacity should match the current specified on the nameplate or the current rating of the AC breaker or fuse(s), whichever is greater; unless otherwise specified by the local or national electrical code and/or standards.

The DC wire size should be chosen based on two factors – the first is the output current rating of the charger/rectifier, and the second is less than 0.5V total voltage drop at the rated current between the battery and the charger/rectifier output terminals. Keep the DC leads together and as short as possible to get the lowest impedance.

Do not lay the wires such that their bending radius is less than that required by the local electrical code or NEMA standards.

Use a branch feeder (circuit breaker or fused disconnect switch), sized to the maximum input current.
Refer to your Local or **National Electrical Code** for KNOCKOUT, WIRE GAUGE and GROUNDING instructions.

Before Connecting the battery charger/rectifier make sure that:

- The battery is not connected (if applicable)
- The circuit breakers are OFF
- All necessary relays, fuses and circuit boards are installed

- The unit is wired in accordance with the instructions (refer to the wiring connections and electrical diagram)
- Before connecting the load to the charger/rectifier, compare the load characteristics against those of the charger/rectifier (i.e. chopping voltages ripple, line-neutral voltage, positive-neutral voltage).

Correct voltage and polarity are of critical importance. If your AC supply voltage differs from the one indicated on the nameplate, do not connect the charger/rectifier. The charger/rectifier tolerance for the AC input voltage is +/- 10%. If the voltage swing is higher, consult your local power company.
Connect the AC wires and then the battery (if applicable) to the output terminals observing its polarity. Check all connections for tightness and polarity.

POWERING UP

After all wires have been connected and all connections have been verified, the unit may be powered up as follows:

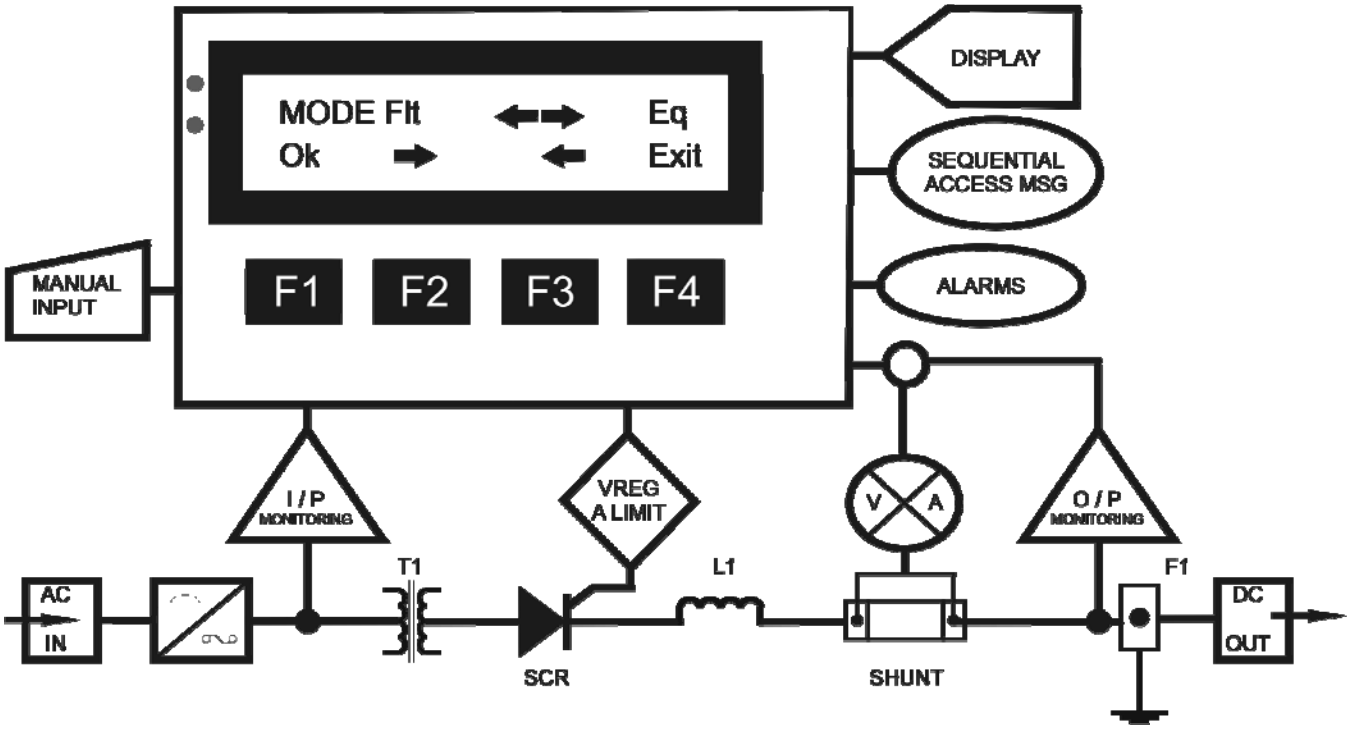
- Keep a log of adjustment readings (i.e. V_{FLOAT} and $V_{EQUALIZE}$ values entered, alarm messages, alarm and SCR blinking LEDs).
- All input and output breakers must be in **OFF** position
- Apply power to the equipment from the source
- Turn the AC breaker **ON**
- Turn the DC breaker (if supplied) **ON**
- Green LED must light up
- Wait for 5 seconds till you can read the system output voltage and status on the **LCD**
- The system uses Soft Start to slowly rise the output current and the voltage

If any additional reading or programming of the unit is necessary, refer to the **field programming** section for more information.

POWERING OFF

- Turn the charger/rectifier AC breaker **OFF**
- Turn the DC breaker (if supplied) **OFF**
- Turn the supply AC breaker **OFF**
- If a work inside the unit has to be done, wait till the filter capacitors discharge.

THEORY OF OPERATION



T1 : the AC supply is transformed and isolated.

SCR: the transformed supply voltage is rectified by an SCR bridge.

L1, C1 (optional) : the rectified voltage is smoothed out by an LC filter.

SHUNT : current and voltage measurements are sent to the control board from.

F1 : a fuse protects the SCR modules and diodes.

CONTROL BOARD

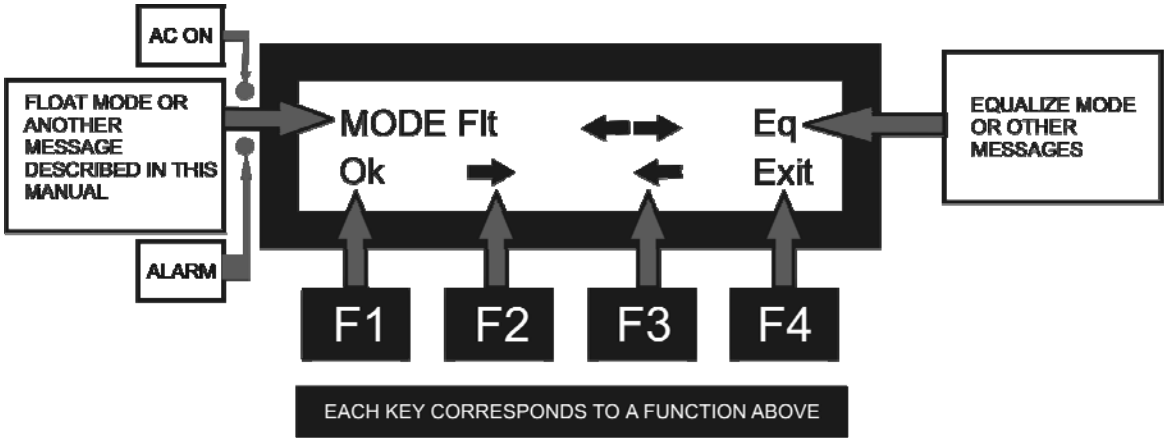
PC2x series control board provides the automatic charge control, precise voltage regulation, alarm status annunciation and display readings.

LCD DISPLAY

The charger/rectifier is supplied with a standard two-line high visibility back-lit LCD display.

KEYPAD

The keypad is used for programming the charger/rectifier, resetting the alarms, etc. Four long life membrane switches are used as the buttons F1, F2, F3 and F4.



DISPLAY UNIT

The first higher row of the LCD displays the information such as the adjustable values, number of relays, alarm ON/OFF status and voltage level. The keys' functions are displayed lower, depending of the menu context. When an alarm is activated, an exact failure message appears and the red LED starts blinking. In case of the multiple alarms, all the warning messages are shown sequentially and repeatedly.

The green LED is the AC power ON indicator.

All parameters can be saved individually.

If the keypad has been inactive for 5 minutes, the LCD power save feature shuts down backlighting of the display unit. The charger/rectifier returns to the main menu upon wake-up.

The display accuracy is $\pm$ 0.5%, $\pm$ 1 digit

KEYPAD AND CONTROL MENU

KEYPAD BUTTON FUNCTIONS

BUTTON	ACTION	Display	NOTE
F1	"Ok" or "Set"	**OK**	Enter the displayed sub-menu or Set a sub-function's value
F2	Step Down	→	Go down to next level
F3	Step Up	←	Go up to the previous selection
F4	Return	**Exit**	Return to the last selection

MAIN MENU

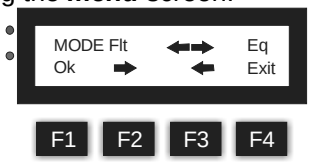
Use **F2** or **F3** keys to choose a menu or to go to/return from a sub-menu or to change a value. Use **F1** to enter a menu/sub-menu or to memorize a setting. Use **F4** to exit/return to the last selection.

ACCESSING MENU VIA KEYPAD. QUICK OVERVIEW

On powering the unit up the following reading appears on the screen (***example***):

Error! No topic specified.

At this point, pressing any key once will bring the ***menu*** screen:



Pressing F1 (Ok) gives the access to Float / Equalize menu. Pressing F4(Exit) steps back to the menu.

The other functions can be reached from the ***menu*** by pressing **F2**(→):

Error! No topic specified.

One more touch of **F2** (→) key will bring the first function "**Reset Alarm ?**" (visible only in case of an alarm):

Error! No topic specified.

Continuous pressing of **F2** (→) will make the screen to go through the following functions:

Error! No topic specified.

Error! No topic specified.

Error! No topic specified.

Error! No topic specified.

Pressing **F1 (Ok)** at any of these steps will bring up the corresponding sub-menu.

Pressing **F3** (←) makes the screen come back to the previous **menu,** one step at a time:

Error! No topic specified.

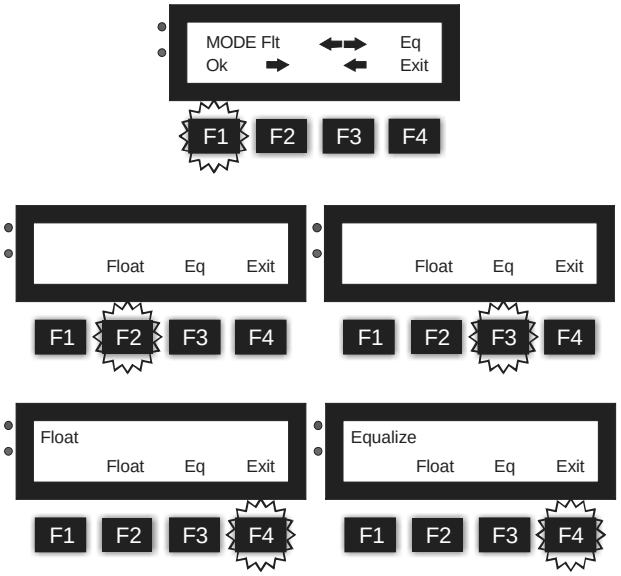
The majority of the functions have a few sub-functions. The sub-functions' tree structure is explained in the following paragraph.

MENU STRUCTURE OVERVIEW

NOTE: DEPENDING ON A PARTICULAR PER-ORDER CONFIGURATION SOME OF THE MENUS BELOW MAY NOT BE APPLICABLE.

WARNING: MODIFICATIONS OF THE FACTORY PRESETS MIGHT AFFECT THE OPERATION OF THE CHARGER/RECTIFIER, AND SHOULD BE DONE BY QUALIFIED AND TRAINED PERSONNEL ONLY, OTHERWISE THE WARRANTY IS VOID.

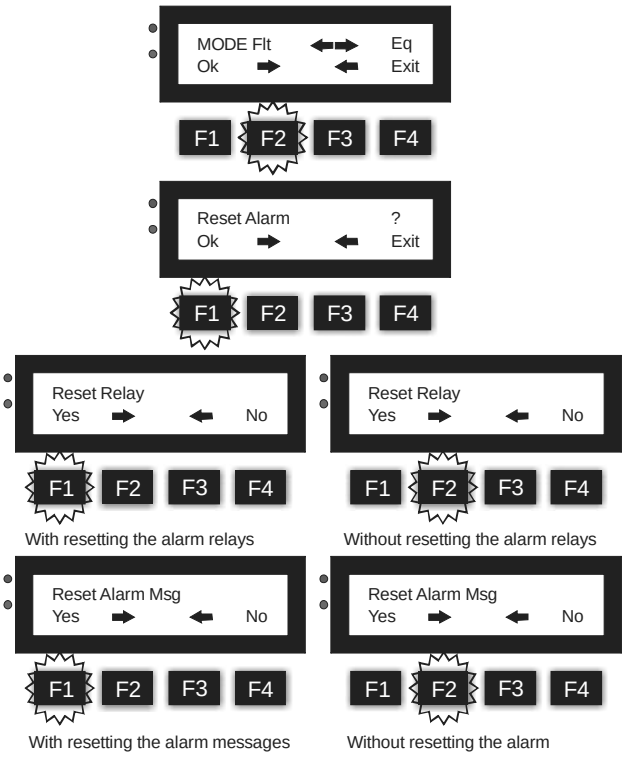
EQUALIZE



FUNCTION or ACTION	MEANING
Float	Sets Float mode
Equalize	Sets Equalize mode
Exit	Returns to the main menu

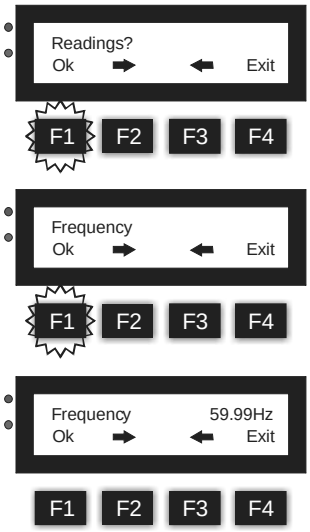
RESET ALARMS AND RELAYS

NOTE: available in case of an alarm only



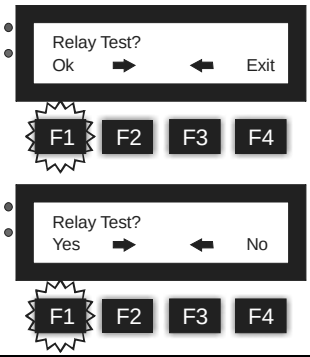
DISPLAY	FUNCTION or ACTION	MEANING
Reset relays	**Yes**	Resets all the alarm relays
	No	Goes back to **Reset alarm** menu
Reset Alarm msg	**Yes**	Clears all alarm messages
	No	Goes back to **Reset alarm** menu

READINGS



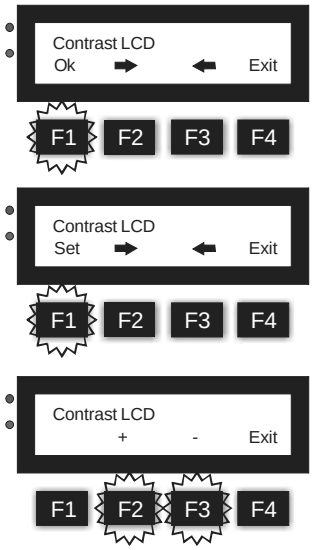
FUNCTION or ACTION	MEANING
OK	Access to display AC frequency

RELAY TEST



Relay Test	**Yes**	Tests all relays
	No	Goes back one level

LCD Contrast



FUNCTION or ACTION	MEANING
OK	Access to LCD Contrast control menu
Set	Access to LCD Contrast control
+	Increases LCD Contrast
–	Decreases LCD Contrast

TROUBLESHOOTING

Warning: only qualified personnel should attempt to service the charger/rectifier. The DC and AC sources must be disconnected and de-energized before replacing any component.

Fault	Recommendation
No output	- AC breaker open: verify that the AC breaker is closed ("ON") - AC input failure: verify that the AC supply is there and the voltage and frequency are correct - DC fuse blown: check out the DC output fuse - Bad connection: verify the output and the input connections - Control board failure: Verify the board condition, and replace if needed - SCR module burnt out: replace the thyristor module(s) - High Voltage Shutdown has happened if this option is activated: 1. Investigate the reason. 2. Turn off the AC and DC breakers for 5 minutes, and then restart
DC fuse or breaker blows/trips	- Free wheeling diode failure: check the diode for a short circuit, replace if needed - Control board failure: Verify the board condition, and replace if needed - Overload: verify the load and the batteries
AC breaker trips	- Check for short circuit(s) - SCR, Diode or Control board failure: check the components, and replace the defective ones if needed
High DC voltage	- Float, Equalize and/or High Voltage Alarm adjustments are affected. Refer to the adjustment procedures to reset - Control board failure: Verify the board condition, and replace if needed
Low volts alarm	- Charger/rectifier overload: Check if the charger/rectifier is in Current Limit mode. Check the load for problems. - Input voltage is beyond the limits: Check the input voltage. Under sizing the AC wires can be the cause - Float, Equalize and/or Low Voltage Alarm adjustments are affected. Refer to the adjustment procedures to reset - Control board failure: Verify the board condition, and replace if needed - Defective filter capacitor: disconnect the capacitor to observe if there is any change in the output voltage. If so, replace the capacitor
High ripple voltage	- AC supply voltage is too high: Read the input voltage and rectify the situation - Defective filter capacitor: disconnect the capacitor to observe if there is any change in the output voltage. If so, replace the capacitor - SCR, Diode or Control board failure: check the components, and replace the defective ones if needed
abnormal noise	- Check the thyristor(s) and magnetics - Replace control board

If a trouble persists, contact our service department, please.

REGULAR PREVENTIVE MAINTENANCE

Certain regular maintenance operations are required to insure that the charger/rectifier and the rest of the system function properly.

	Maintenance operation	Frequency
B	Measure and record the voltage across each battery cell and across the entire battery bank.	monthly
B	Verify and record the electrolyte level in each battery cell. If necessary top off with distilled water.	monthly
B	Verify and record the specific gravity of electrolyte in each battery cell	monthly
C	Verify the charger/rectifier performance.	monthly
B, C	Remove accumulated dust, especially around ventilation openings	yearly
B, C	Visually verify the conditions of all components	yearly
B, C	Verify all connections. If necessary tighten to recommended torque according to manufacturers' specifications	yearly
B	Clean and re-grease all battery connections	yearly
B	Wash batteries using distilled water only	yearly

B = battery C = charger/rectifier

For systems supplied with lead acid batteries, a partial discharge of the batteries to verify battery and charger/rectifier performance is recommended on the annual basis.

For systems supplied with nickel-cadmium batteries a complete discharge and decommissioning charge on a bi-annual basis is recommended.

CONTROL BOARD (PC) - ADJUSTMENT PROCEDURE

REQUIRED TOOLS

1. DC voltmeter, DC ammeter or multimeter.
2. DC or a dummy load.

Use the test report of the unit (included in the user's manual) to have the following data available

1. DC output float voltage Vf
2. DC output equalize voltage (if required) Ve
3. DC output maximum current $\mathbf{i_m}$

METHOD

(for your specific Ni-Cd or lead acid please use the information provided by the battery supplier)

You need

- Float voltage/cell: Vf/C
- Equalize voltage/cell: Ve/C
- Number of cells

CURRENT LIMIT

Adjust the current limit to the **test report value Imax**

A	**B**
Float voltage $\mathbf{V_f}$	Number of cells x Vf/C= Vf
Equalize voltage $\mathbf{V_e}$	Number of cells x Ve/C=Ve
Auto equalize level $\mathbf{V_{ae\ (if\ activated)}}$	$\mathbf{V_f}$ x 0,85
Maximum charging current $\mathbf{I_{max}}$	I_{max}

NOTE: All settings must be readjusted to the battery manufacturer specifications

PROCEDURE

1. Switch the AC breaker off.
2. Switch the DC breaker off (if provided).
3. Disconnect the batteries from the charger/rectifier.
4. Connect a resistive load
5. Connect a DC voltmeter across the DC output terminal (see the wiring diagram)
6. Switch the AC breaker on.

Use → or ← keys to access **Control** sub-menu. **SET** to enter menu. **EXIT** to return to previous menu

DISPLAY	**Press**	**ACTION**	**By default Value**
Float	**+ or -**	To adjust Float Voltage	**Vf (V)**
I LIM	**+ or -**	To adjust Current Limit	**Imax (A)**
Eq	**SET** **+ or -**	Toggles On/Off Equalize Voltage To adjust Equalize Voltage	**On** **Veq (V)**
T eq	**+ or -**	To adjust Equalize Time	

L VEQ	**+ or -**	To adjust Low Equalize Voltage	**Vae (V)**
TI LIM E	**+ or -**	Adjust Time/Current limit Equalize	**5 min**
AC Eq (if needed)	**SET**	Toggles AC Equalize On/Off	**On**
Tfloat (if needed)	**+ or -**	To adjust Float Timing	**28 Days**

ALARMS ADJUSTMENT PROCEDURE

REQUIRED TOOLS

1. DC voltmeter, DC ammeter or multimeter.
2. DC or a dummy load.

Use the test report of the unit (included in the user's manual) to have the following data handy:

1. DC output float voltage Vf
2. DC output equalize voltage (if required) Ve
3. DC output maximum current $\mathbf{i_m}$

DC OUT METHOD

For your specific Ni-Cd or lead acid please use the information provided by the battery supplier.

You need

- Float voltage/cell: Vf/C
- Equalize voltage/cell: Ve/C
- Number of cells

A	B
Float voltage $\mathbf{V_f}$	Number of cells x Vf/C= Vf
Equalize voltage $\mathbf{V_e}$	Number of cells x Ve/C=Ve
High volts alarm $\mathbf{V_h}$	**1.05 x Veq**
Low volts alarm $\mathbf{V_L}$	**0.8 x Vf**
Rectifier fail Vrf	**0.80 x Vf**
Ground Ignd	**5 mA**

NOTE: All settings must be readjusted as per the battery manufacturer's specifications

PROCEDURE

1. **Switch** the AC breaker off.
2. **Switch** the DC breaker off (if provided).
3. **Disconnect** the batteries from the charger/rectifier.
4. **Connect** a resistive load
5. **Connect** a DC voltmeter across the DC output terminal (see the wiring diagram)
6. **Switch** the AC breaker on.

Use → or ← keys to access **Level 2** sub-menu. **SET** to enter menu. **EXIT** to return to previous menu

DISPLAY	Press	ACTION	Default Value
Talarm	**+ or –**	To adjust Alarm Timing	**10 sec**
HVAL	**+ or –**	To adjust High Voltage Alarm level	**Vh**
	NEXT	Goes to Relays selection/toggle menu	
	NEXT, On/Off	Toggles High Voltage Alarm On/Off	**On**
	OFF, + or –	Selects relays number (1 to 7)	**No. 2**
LVAL	**+ or –**	To adjust Low Voltage alarm level (V)	**VL**
	NEXT	Goes to Relays selection/toggle menu	
	NEXT, On/Off	Toggles Low Voltage Alarm On/Off	**On**
	OFF, + or –	Selects relays number (1 to 7)	**No.3**
GNDF–	**+ or –**	To adjust Negative Ground Fault Alarm level	**5 mA**
	NEXT	Goes to Relays selection/toggle menu	**On**
	NEXT, On/Off	Toggles Negative Ground Fault	**No. 4**
	OFF, + or –	Selects relays number (1 to 7)	
GNDF+	**+ or –**	To adjust Positive Ground Fault Alarm level	**5 mA**
	NEXT	Goes to Relays selection/toggle menu	
	NEXT, On/Off	Toggles Positive Ground Fault	**On**
	OFF, + or –	Selects relays number (1 to 7)	**No. 4**
AC Fail	**+ or –**	Selects relays number (1 to 7)	
	NEXT	Goes to Relays selection/toggle menu	
	NEXT, On/Off	Toggles AC Failure Alarm On/Off	**On**
	OFF, + or –	Selects relays number (1 to 7)	**No.5**
Rectifier Fail	**+ or –**	Selects relays number (1 to 7)	**Vrf**
	NEXT	Goes to Relays selection/toggle menu	
	NEXT, On/Off	Toggles On/Off AC Failure Alarm	**On**
	OFF, + or –	Selects relays number (1 to 7)	**No.1**

TYPICAL POWER TRANSFORMER CONFIGURATION

By default, all standard chargers with a multitap power transformer are configured for 240 Vac input, unless specified otherwise at the time of purchasing. Before you wire ac power to your charger, check the wiring of the main transformer T1, to be sure it is configured for your ac input voltage.

Depending on the output power rating, the chargers can accept an input voltage of 120, 208, 230, 240 or 480 Vac. The factory wiring is for 240 Vac by default. By reconfiguring T1, the chargers can accept an input voltage of 120, 208, 230 or 240 Vac.

NOTE: The chargers built for 480 Vac input cannot be reconfigured for a lower AC input voltage, and such attempts shall not be made even if there are some other taps available for a lower AC input voltage. Such attempts void the warranty and in no way the manufacturer and/or the distributor/reseller may be held responsible for any consecutive damage(s).

The control card power supply cable is always attached to 120 Vac taps, and MUST stay always attached to them. In case, if 120 Vac taps are not available directly off the power transformer, the control card power supply cable is attached to 240 Vac taps, and the corresponding control board jumpers SW1 are reconfigured as well. If neither 120 nor 240 Vac taps are available directly off the power transformer, a small T2 control transformer (with 120 Vac secondary) is used to power up the control board and possibly some other equipment.

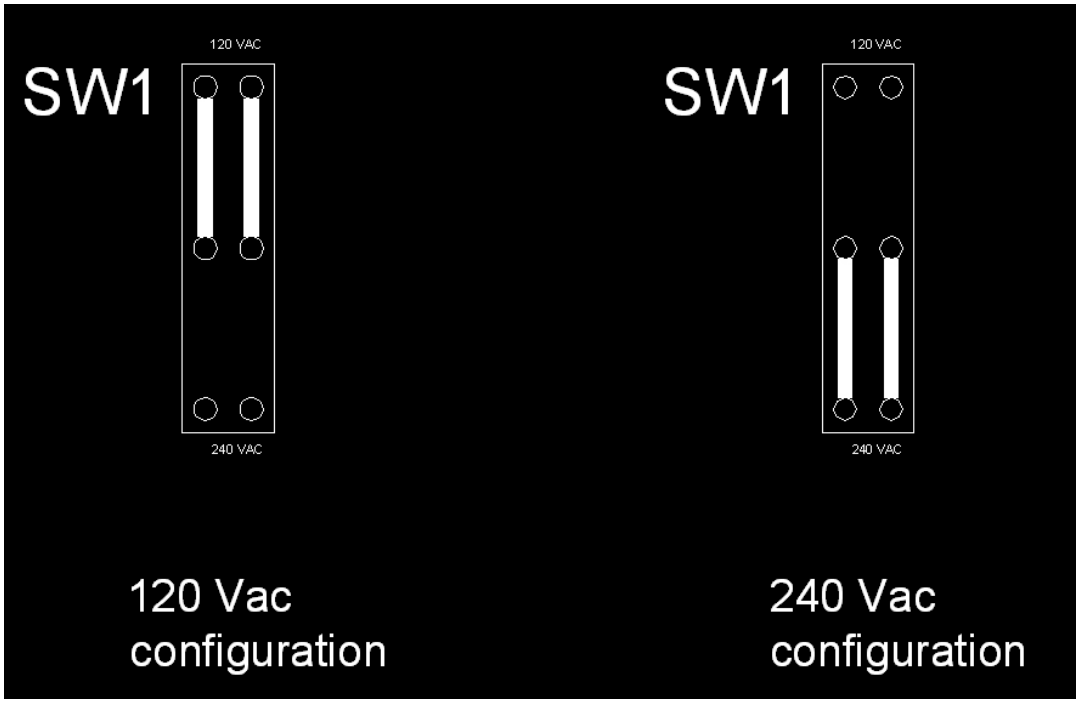


Figure 1.
Control board SW1 jumper configurations for 120/240 Vac

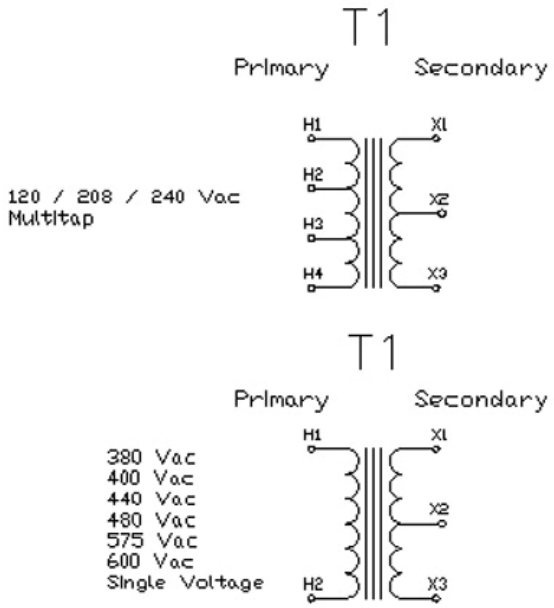
Should you require reconfiguring a charger for a different input voltage, the following instructions shall be executed:

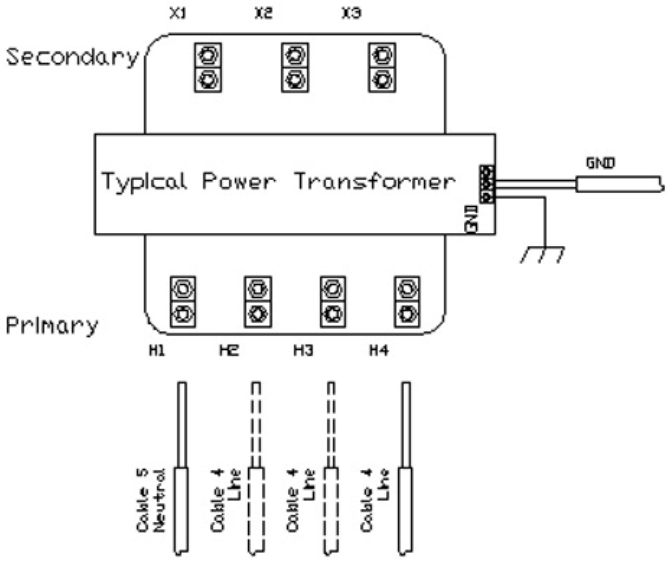
1. Comply with the “IMPORTANT SAFETY INSTRUCTIONS” on page 3 of this manual prior to starting servicing the unit.
2. Ensure that all voltages are disconnected and secured from an accidental reconnection.
3. Ensure that the terminals are well connected.
4. Ensure that the stud terminals are tight.
5. Check your work after completion.
6. See the manual appendix for additional information if needed.

Verify that no voltage is present by using a voltmeter at the input and output terminals.

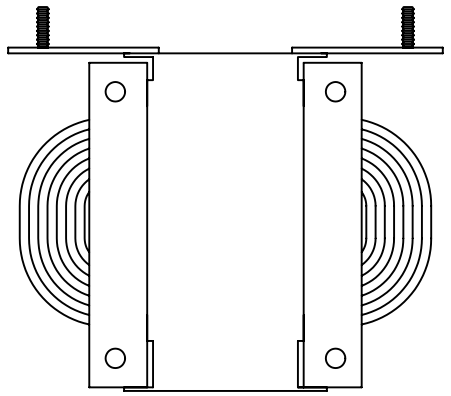
NOTE: Turning off the AC and DC circuit breakers on the charger does not eliminate live voltages inside the enclosure.

After verifying that all voltages within the enclosure are de-energized and locked out, reconfigure T1 as shown on the drawings and in the tables on the following pages. Always ensure that your control board SW1 jumper configuration corresponds to that of the power cable J5-1 attachment, after reconfiguring the charger input voltage.

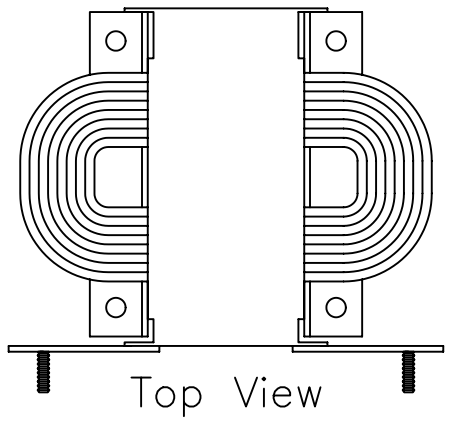




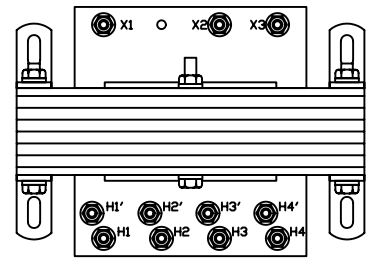
Transformer Dimension (Inch)			
Kva	A	B	C
2.75	8.75	7.5	8.75
4.0	9.5	8.0	8.5
5.5	9.5	8.0	8.5
6.5	10.5	8.75	9.25
8.0	10.5	8.75	9.25
14	12	10.5	11.5



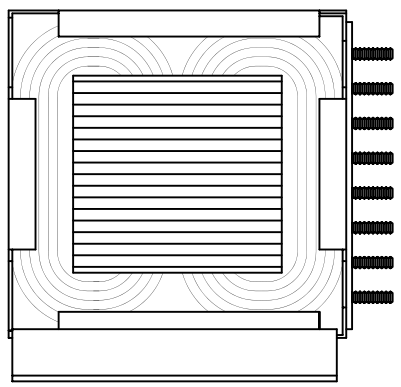
Bottom View



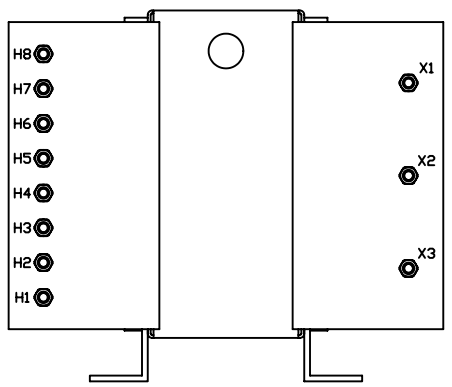
Top View



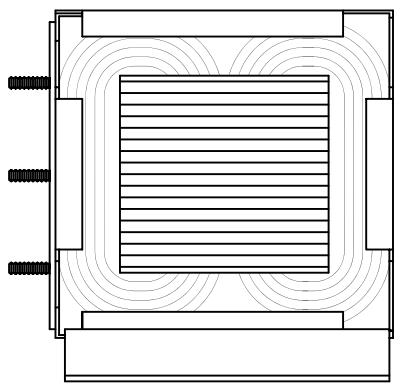
5–10A Power Transformer
Top View



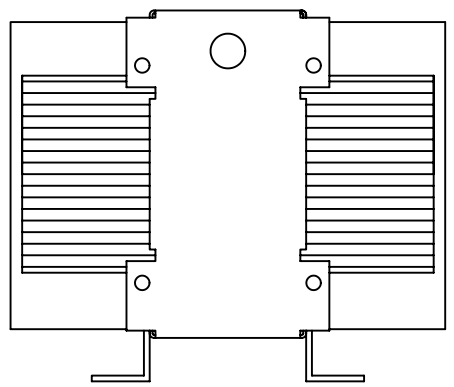
Left View



Front View



Right View



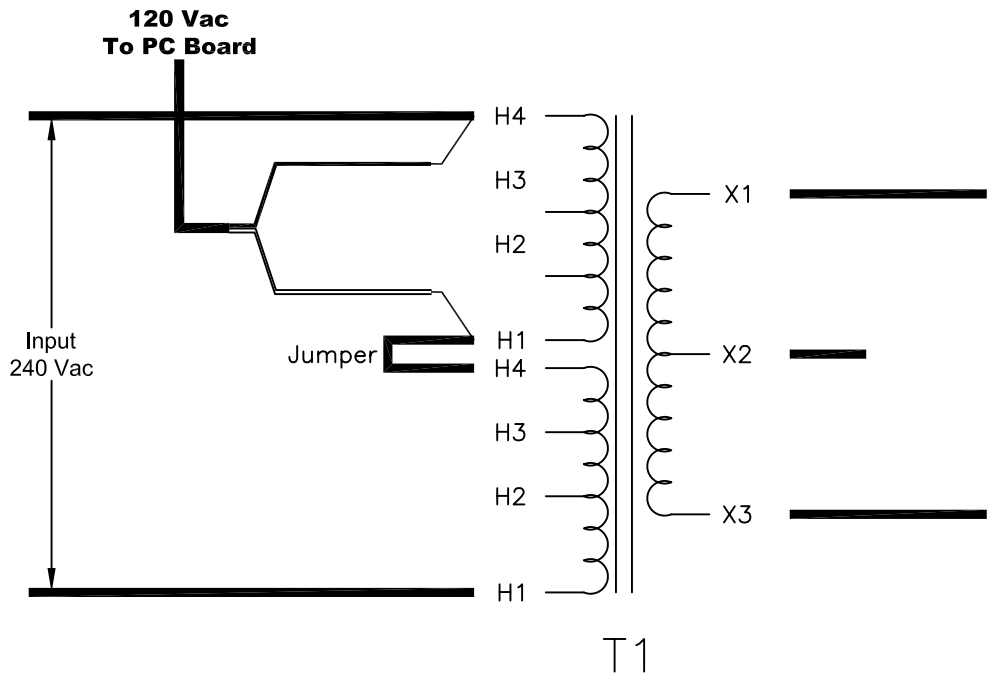
Rear View

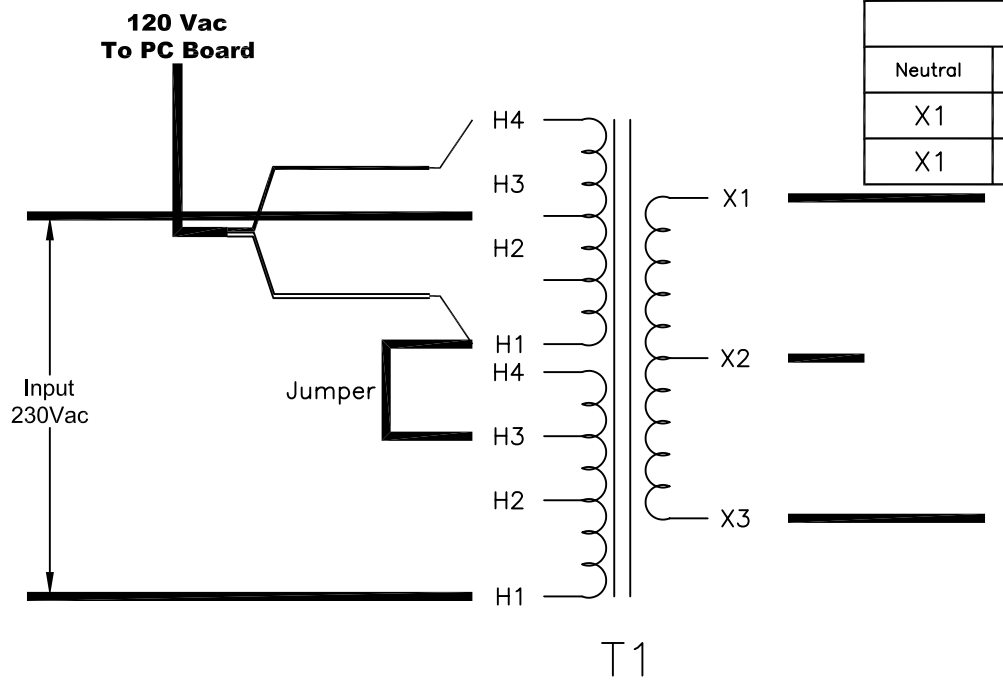
REV	BY	DESCRIPTION	DATE	APP
A	M.B.	INITIAL RELEASE	17–05–04	xx

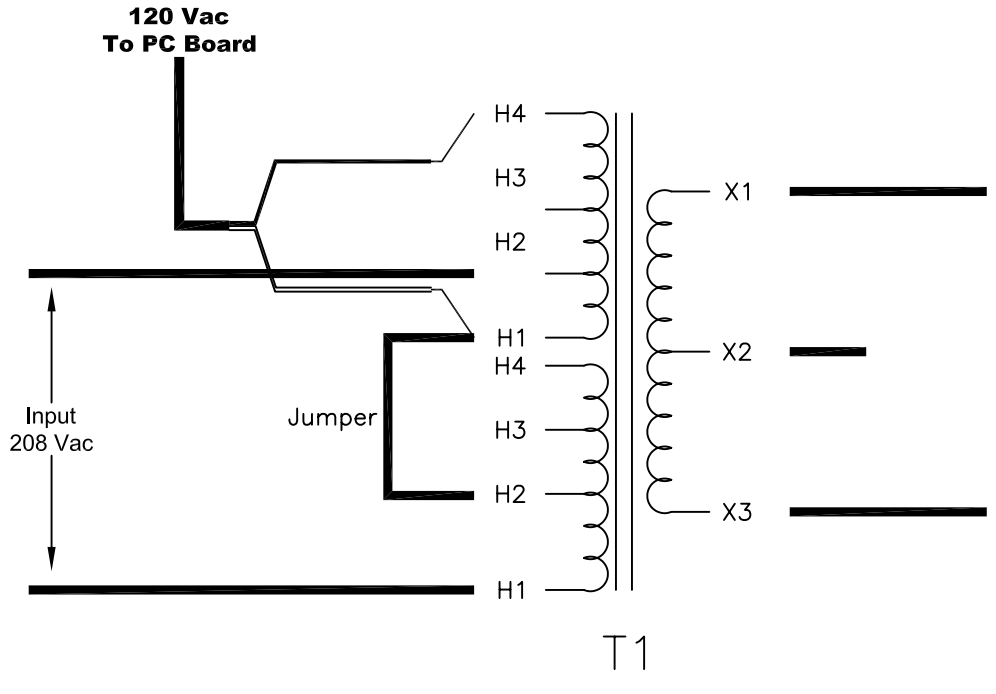
TITLE: Power Transformer General Dimension				
DRAWN BY: M.B.		DATE: 17–05–2004		SCALE n/a
SHEET: 1/4	SIZE: A	DWG NO.: 10001		REV: 01

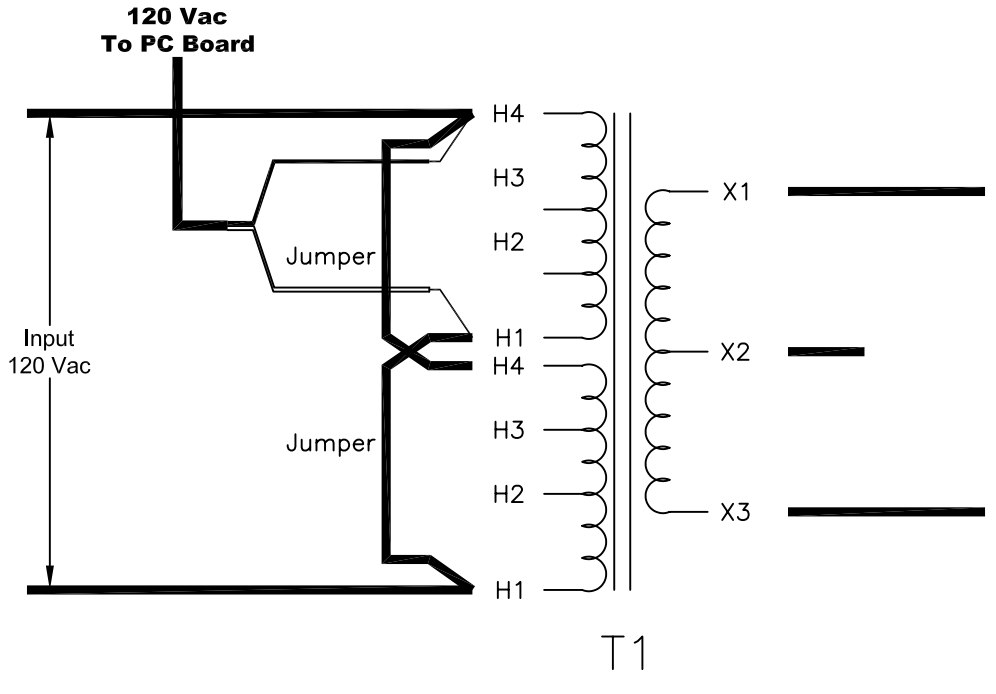
- This configuration is applicable for 125Vdc - 5 to 10 A chargers.
- Factory default setup is for 240 Vac input.
- It is a customer technical representative's responsability to reconfigure a charger for the appropriate input voltage.

Transformer 120/240 Vac			
Primary			
Connection		JUMPER	Input
H1–H1	H4–H4	Parallel	120 Vac
H1	H2	H1–H2	208 Vac
H1	H3	H1–H3	230 Vac
H1	H4	H1–H4	240 Vac
Secondary			
Neutral	Line	Output	
X1	X2		
X1	X3		







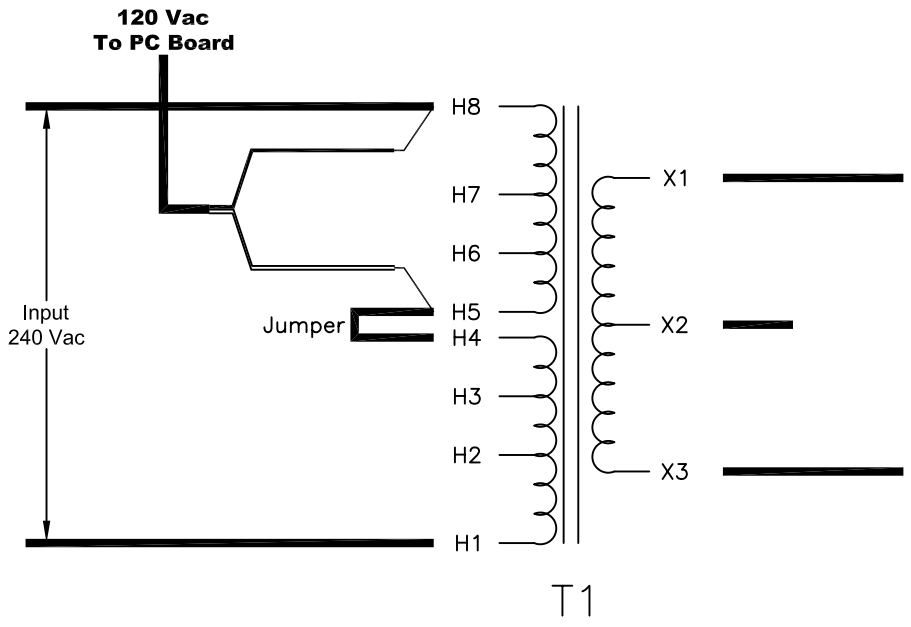


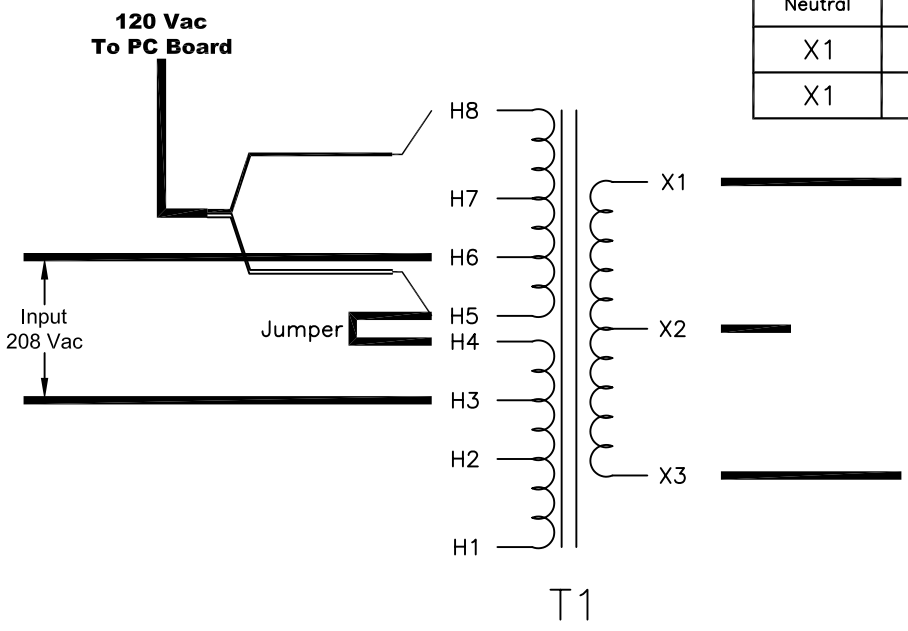
REV	BY	DESCRIPTION	DATE	APP
A	M.B.	INITIAL RELEASE	17-05-04	xx

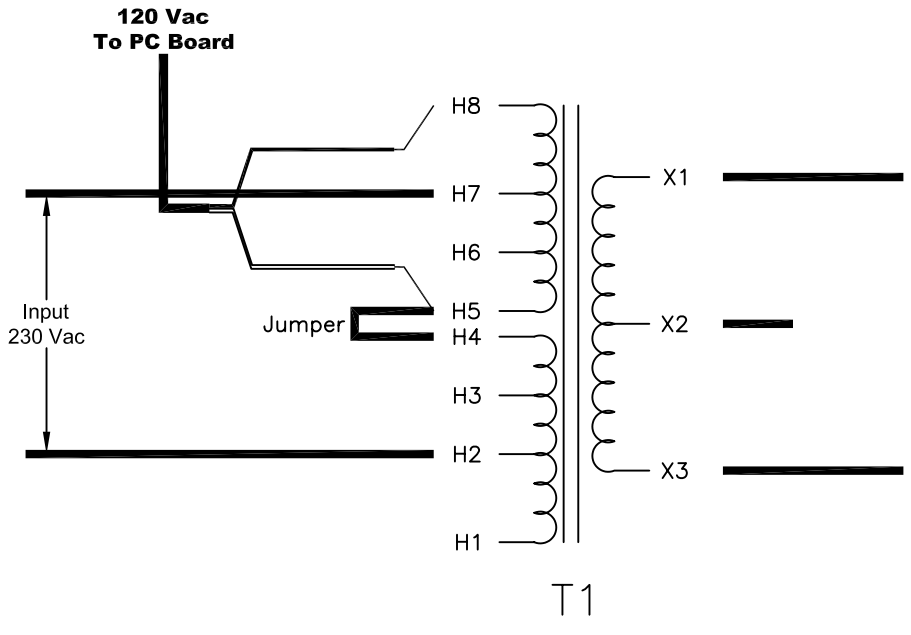
TITLE: Wire Connection Multi Input 120 / 240 Vac				
DRAWN BY: M.B.		DATE: 17–05–2004		SCALE n/a
SHEET: 2/4	SIZE: A	DWG NO.: 10001		REV: 01

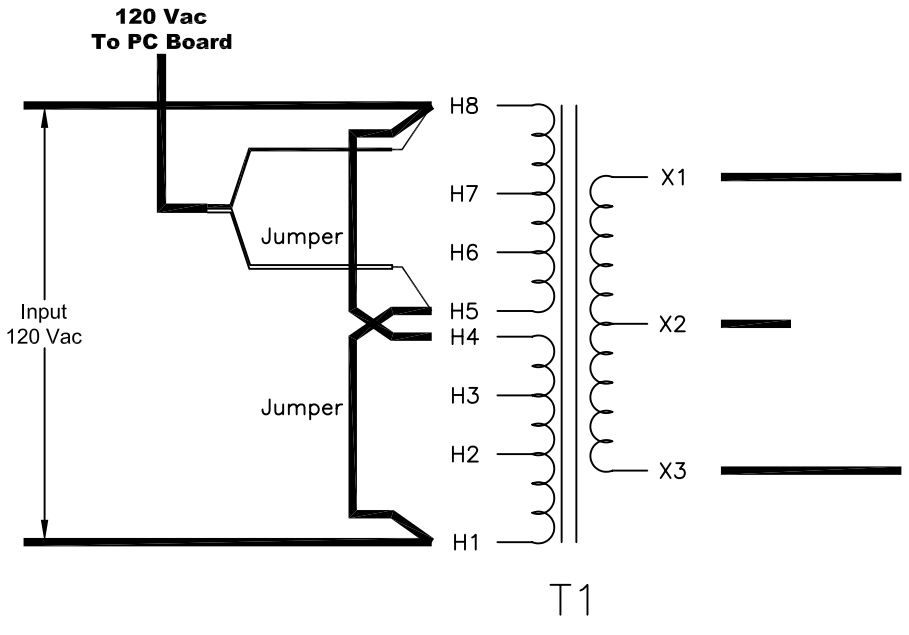
- This configuration is applicable for 125Vdc - 10 to 25 A chargers.
- Factory default setup is for 240 Vac input.
- It is a customer technical representative's responsability to reconfigure a charger for the appropriate input voltage.

Transformer 120/240 Vac			
Primary			
Connection		JUMPER	Input
H1–H5	H4–H8	Parallel	120 Vac
H3	H6	H4–H5	208 Vac
H2	H7	H4–H5	230 Vac
H1	H8	H4–H5	240 Vac
Secondary			
Neutral	Line	Output	
X1	X2		
X1	X3		







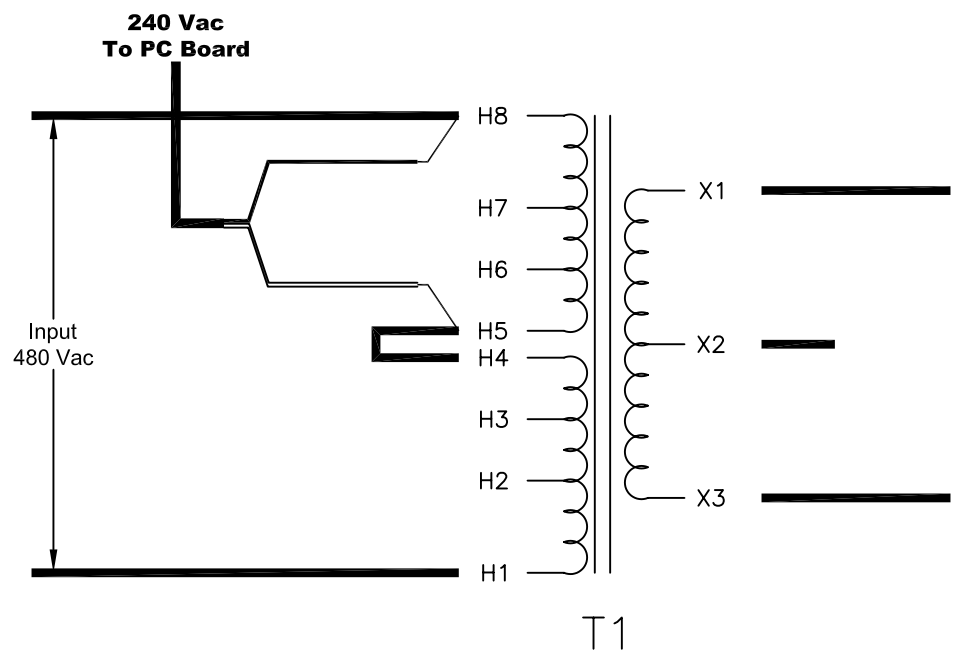


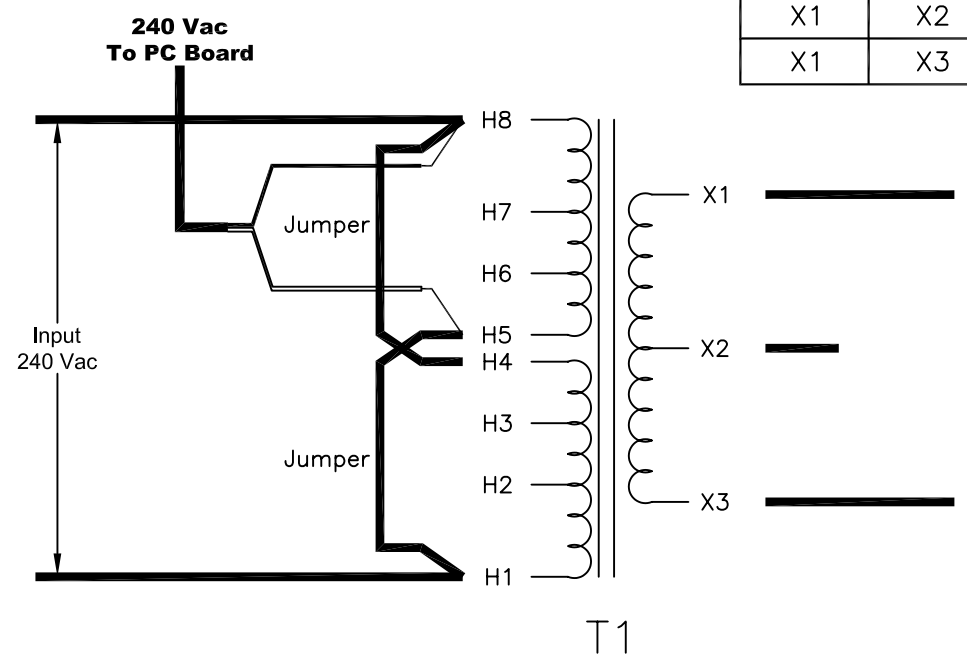
REV	BY	DESCRIPTION	DATE	APP
A	M.B.	INITIAL RELEASE	17-05-04	xx

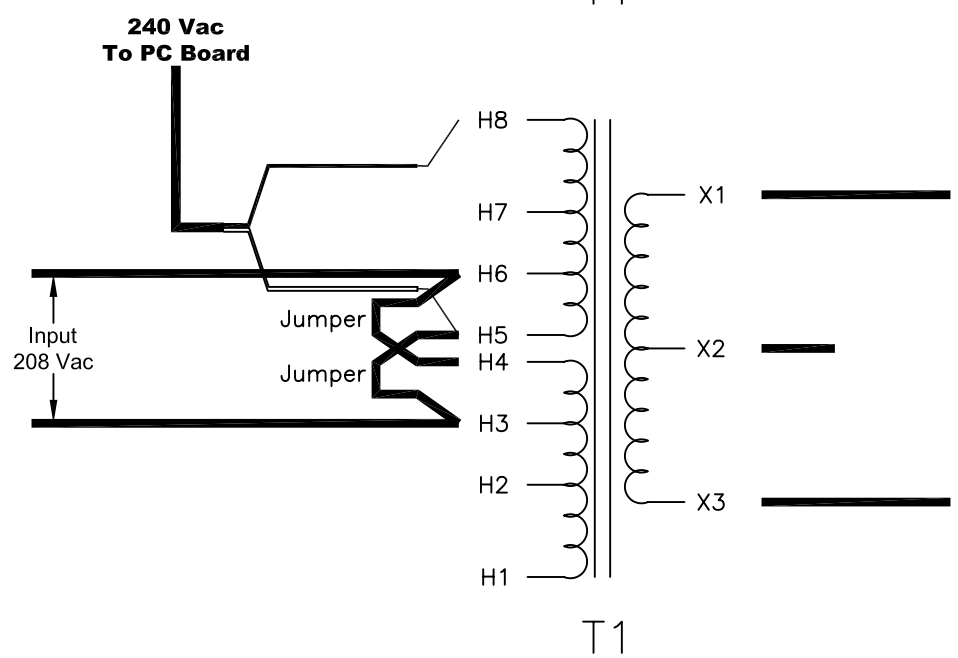
TITLE: Wire Connection Multi Input 120 / 240 Vac				
DRAWN BY: M.B.		DATE: 17–05–2004		SCALE n/a
SHEET: 3/4	SIZE: A	DWG NO.: 10001		REV: 01

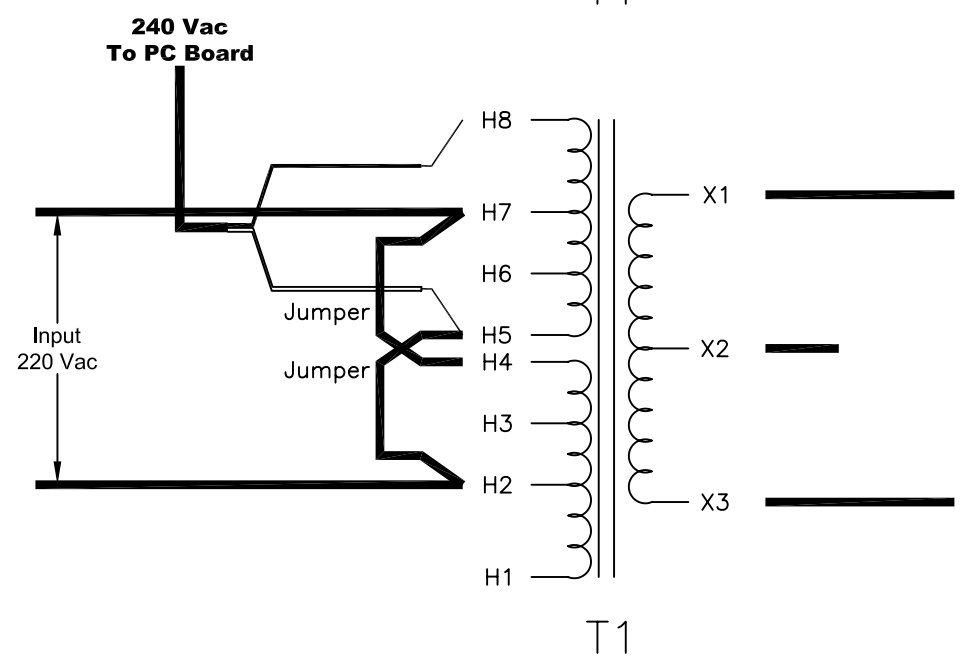
- This configuration is applicable for 125Vdc - 30-55 A chargers.
- Factory default setup is for 240 Vac input.
- It is a customer technical representative's responsability to reconfigure a charger for the appropriate input voltage.

Transformer 240/480 Vac			
Primary			
Connection		JUMPER	Input
H3–H5	H4–H6	Parallel	208 Vac
H2–H5	H4–H7	Parallel	220 Vac
H1–H5	H4–H8	Parallel	240 Vac
H1	H8	H4–H5	480 Vac
Secondary			
Neutral	Line	Output	
X1	X2		
X1	X3		









REV	BY	DESCRIPTION	DATE	APP
A	M.B.	INITIAL RELEASE	17-05-04	xx

TITLE: Wire Connection Multi Input 240 V / 480 Vac				
DRAWN BY: M.B.		DATE: 17–05–2004		SCALE n/a
SHEET: 4/4	SIZE: A	DWG NO.: I0001		REV: 01

Electrical / Electronic Products Warranty

The Manufacturer Warrants to the original user only that its equipment is free from defects in factory workmanship and materials, such warranty being conditional upon the product having been installed, commissioned, operated and maintained by qualified personnel and according to manufacturer instructions.

Our liability is limited to repairing or replacing without charge at our factory any product or component which, at user's expense, has been returned to our plant or authorized service center within 18 months from the date of shipping or 1 year from date of commissioning, whichever occurs first. The manufacturer repair or replacement of any defective product shall constitute fulfillment of his obligations.

This warranty applies to manufacturer products which are shown by the purchaser to have been originally defective and shall not apply to products which must be repaired or replaced due to normal wear, misuse, negligence, wreckage, accident, any Act Of God or to products which have been repaired or altered outside of seller's factory or one of its authorized service centers unless authorized solely by the manufacturer.

The manufacturer shall not be liable for loss, damage, or expense, consequential or otherwise from the use of its products or from any other cause.

This warranty supersedes and is given in place of all other warranties expressed or implied or conditions whether statutory or otherwise as to quality and fitness for any purpose for which the products are supplied. No person, agent or dealer is authorized to give any warranty on behalf of manufacturer or to assume for seller any other liability in connection with any of its products unless made in writing and signed by an officer of the manufacturer.

ANNEXES

Mechanical Drawings

Electric diagram

Optional features

Part list

Test report