



1660 S.W. 196th Avenue • Aloha, Oregon 97006

## MODEL AT-100/AT-100AE INSTALLATION INSTRUCTIONS

The Model AT-100/AT-100AE AUTO-TROL® Battery Charger Control extends battery life, reduces maintenance and saves power by replacing existing timers on all makes of battery chargers so that the battery always becomes fully charged, without being overcharged, each recharge cycle.

The Model AT-100/AT-100AE includes other desirable control features:

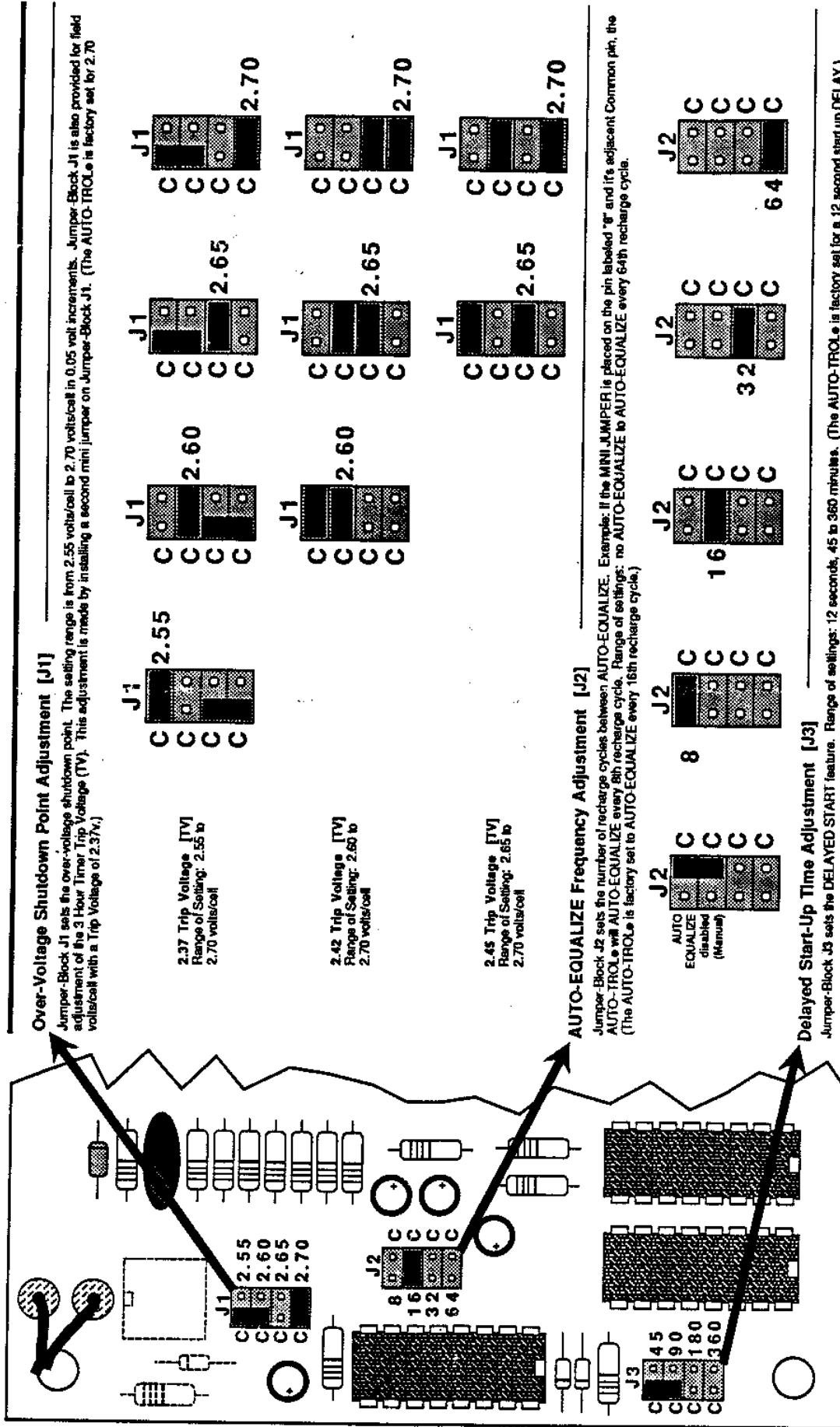
1. **Delayed Start (DS):** You will often save on your power cost (peak demand charges) if the beginning of the battery charging cycle is delayed until the plant power demand is lower; i.e. 9 P.M. The delayed start feature is adjustable from 12 seconds to 6 hours after the battery is connected to the charger. (See attached AT-100/AT-100AE Special Features Adjustment Sheet.)
2. **Overvoltage Shutdown (OVS):** Prevents overcharging due to charger malfunction. The OVS feature shuts off the charger immediately if the preset voltage level is reached at any time during the recharge cycle so the battery is not damaged.
3. **Timer Trip Voltage Adjustment (TV):** This feature allows the control to be matched to differing battery/charger combinations. (See attached AT-100/AT-100AE Special Features Adjustment Sheet.)
4. **Backup Timer:** Again prevents overcharging if, for any reason, the charging cycle continues up to 14 hours.
5. **Equalize Charging at any time by pressing the EQUALIZE button with LED indication of selected function.**
6. **Auto-Equalize (Model AT-100AE only):** The Model AT-100AE has an Auto-Equalize feature. The battery manufacturer recommends that the battery be "equalized" after every so many recharge cycles. The Auto-Equalize feature automatically accomplishes the equalize task on a regular basis and is adjustable (see attached AT-100/AT-100AE Special Features Adjustment Sheet).
7. **Spike Charge Limiting:** This feature limits the charging of a fully charged battery to 25 minutes or less. (This feature is bypassed during the equalize mode.)
8. **Time Retention Latch (TRL) option:** This option is primarily used when power management systems are present. The feature retains elapsed charge time if AC power is removed during the charging process.

### EXPRESS WARRANTY

This product is warranted to be free of defects in material and workmanship under normal use for a period of one year. If defective product is encountered, return it for replacement free of charge. This express warranty is in lieu of any other warranty, express, implied or statutory, including without limitation, any warranty of fitness or merchantability. The sole liability of the manufacturer under this warranty is limited to replacing the defective product. This warranty shall not apply to any product which has been damaged by the improper usage, accident, neglect, alteration or abuse. The liability of the manufacturer is limited solely to replacing the defective product. In no event shall the manufacturer be liable for special or consequential damages to any buyer, user or other person.

# AUTO-TROL® AT-100AE SPECIAL FEATURE ADJUSTMENT

BEFORE installing the AUTO-TROL, refer to the following settings for the MINI JUMPERS provided to configure the Jumper-Blocks as shown below.



## Over-Voltage Shutdown Point Adjustment [J1]

Jumper-Block J1 sets the over-voltage shutdown point. The setting range is from 2.55 volts/cell to 2.70 volts/cell in 0.05 volt increments. Jumper-Block J1 is also provided for field adjustment of the 3 Hour Timer Trip Voltage (TV). This adjustment is made by installing a second mini jumper on Jumper-Block J1. (The AUTO-TROL is factory set for 2.70 volts/cell with a Trip Voltage of 2.37V.)

<p><b>J1</b></p> <p>2.55</p>	<p><b>J1</b></p> <p>2.60</p>	<p><b>J1</b></p> <p>2.65</p>	<p><b>J1</b></p> <p>2.70</p>
<p><b>2.37 Trip Voltage [TV]</b> Range of Setting: 2.55 to 2.70 volts/cell</p>			
<p><b>J1</b></p> <p>2.60</p>	<p><b>J1</b></p> <p>2.65</p>	<p><b>J1</b></p> <p>2.70</p>	<p><b>J1</b></p> <p>2.70</p>
<p><b>2.42 Trip Voltage [TV]</b> Range of Setting: 2.60 to 2.70 volts/cell</p>			
<p><b>J1</b></p> <p>2.65</p>	<p><b>J1</b></p> <p>2.70</p>	<p><b>J1</b></p> <p>2.70</p>	<p><b>J1</b></p> <p>2.70</p>
<p><b>2.48 Trip Voltage [TV]</b> Range of Setting: 2.65 to 2.70 volts/cell</p>			

## AUTO-EQUALIZE Frequency Adjustment [J2]

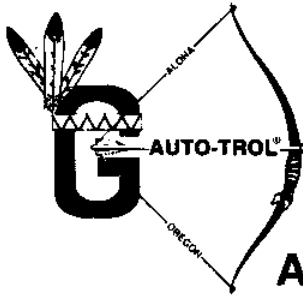
Jumper-Block J2 sets the number of recharge cycles between AUTO-EQUALIZE. Examples: If the MINI JUMPER is placed on the pin labeled "8" and it's adjacent Common pin, the AUTO-TROL will AUTO-EQUALIZE every 8th recharge cycle. Range of settings: no AUTO-EQUALIZE to AUTO-EQUALIZE every 64th recharge cycle. (The AUTO-TROL is factory set to AUTO-EQUALIZE every 16th recharge cycle.)

<p><b>J2</b></p> <p>AUTO EQUALIZE disabled (Manual)</p>	<p><b>J2</b></p> <p>8</p>	<p><b>J2</b></p> <p>16</p>	<p><b>J2</b></p> <p>32</p>	<p><b>J2</b></p> <p>64</p>
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## Delayed Start-Up Time Adjustment [J3]

Jumper-Block J3 sets the DELAYED START feature. Range of settings: 12 seconds, 45 to 360 minutes. (The AUTO-TROL is factory set for a 12 second start up DELAY.)

<p><b>J3</b></p> <p>12 second start up delay</p>	<p><b>J3</b></p> <p>45</p>	<p><b>J3</b></p> <p>90</p>	<p><b>J3</b></p> <p>180</p>	<p><b>J3</b></p> <p>360</p>
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## AUTO-TROL® MODEL AT-100/AT-100AE DESCRIPTION OF OPERATION

Upon connection to a battery, the STOP LED lights (If the **Delayed Start** option is activated, see \*Note below). After approximately twelve seconds, the red STOP LED extinguishes and the green ON CHARGE LED lights, indicated the start of the charging process.

As the charging process nears completion, the green ON CHARGE LED will begin to pulse at approximately twelve second cycles.

At anytime during the charging process, pressing the EQUALIZE button places the AUTO-TROL® into the equalize charging mode for that charge cycle. The yellow EQUALIZE LED will light during either manual or automatic initiation of the Equalize Mode.

When charging is complete, the AUTO-TROL® returns to the "STOP" charging mode (green ON CHARGE LED extinguishes, red STOP LED lights). The green ON CHARGE LED will continue to pulse dimly at a twelve second cycle.

\*Note for AUTO-TROL® units with **Delayed Start** activated: Pulsing of the green ON CHARGE LED also occurs during delayed start mode.

Pressing the STOP button terminates the charging process regardless of equalize mode.

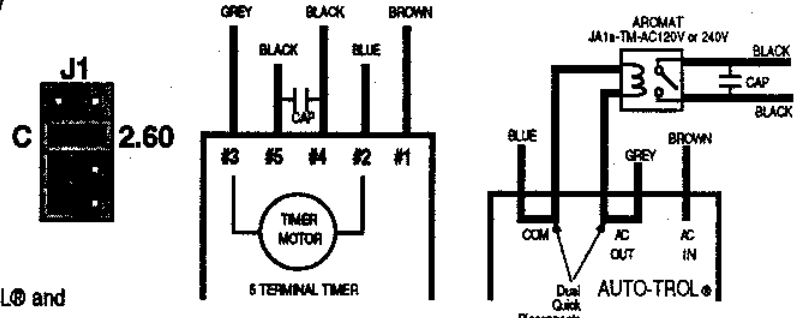
## AUTO-TROL® MODEL AT-100/AT-100AE INSTALLATION INSTRUCTIONS

1. Disconnect or turn off AC power to battery charger.
2. Verify that the charger has an AC power contactor. If it does not have one, an AC power contactor (P&B model #PRD7AYO-XXX or equivalent) must be installed.
3. Remove existing timer.
4. Use **TEMPLATE** to locate and drill 5 holes, then mount the AUTO-TROL®.

### LA MARCHE A45 SERIES (5 terminal type)

5. Configure J1 for 2.60 volts per cell:
6. Connect wires as follows:

TIMER TERMINAL	WIRE COLOR	AUTO-TROL® TERMINAL
#1	BROWN	AC IN
#2	BLUE	COM
#3	GREY	AC OUT
#4 & 5	BLACK	auxiliary contactor with orange capacitor

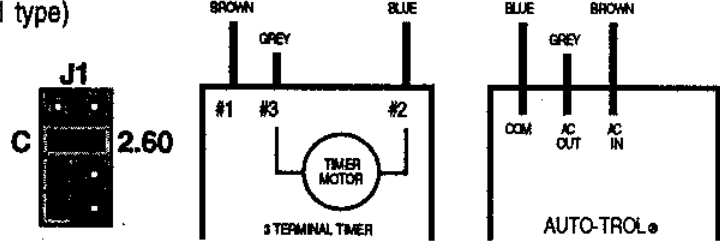


7. Install the auxiliary contactor above the AUTO-TROL® and connect the wires as illustrated.
8. Connect wires from the AUTO-TROL® to DC output: RED to POSITIVE (+), BLACK to NEGATIVE (-).

### LA MARCHE A7 & A45 SERIES (3 terminal type)

5. Configure J1 for 2.60 volts per cell:
6. Connect wires as follows:

TIMER TERMINAL	WIRE COLOR	AUTO-TROL® TERMINAL
#1	BROWN	AC IN
#2	BLUE	COM
#3	GREY	AC OUT



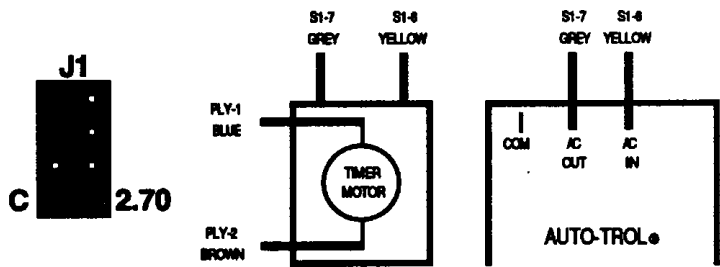
7. Connect wires from the AUTO-TROL® to DC output: RED to POSITIVE (+), BLACK to NEGATIVE (-).

### GBC/HERTNER Model TF/3TF

5. Configure J1 for 2.70 volts per cell:

6. Connect wires as follows:

- Disconnect and tape off wires PLY-1 (Blue) and PLY-2 (Brown) going to the timer motor.
- Connect wire S1-6 (Yellow) from AC Line (L3) to AC IN.
- Connect wire S1-7 (Grey) from contactor coil to AC OUT.



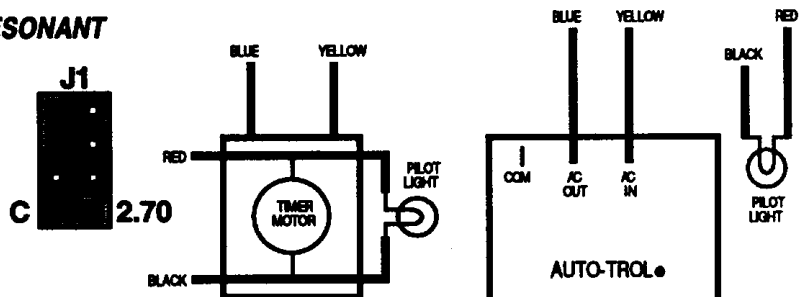
7. Connect leads from the AUTO-TROL® to DC output terminals: RED to POSITIVE (+), BLACK to NEGATIVE (-).

### HOBART, GOULD, HESTER, FERRO - RESONANT

5. Configure J1 for 2.70 volts per cell:

6. Connect wires as follows:

- YELLOW wire (from AC Line) to AC IN.
- BLUE wire (from contactor) to AC OUT.
- Connect RED wire from charger and PILOT LIGHT together and insulate.
- Connect BLACK wire from charger and PILOT LIGHT together and insulate.



7. Connect wires from the AUTO-TROL® to DC output: RED to POSITIVE (+), BLACK to NEGATIVE (-).

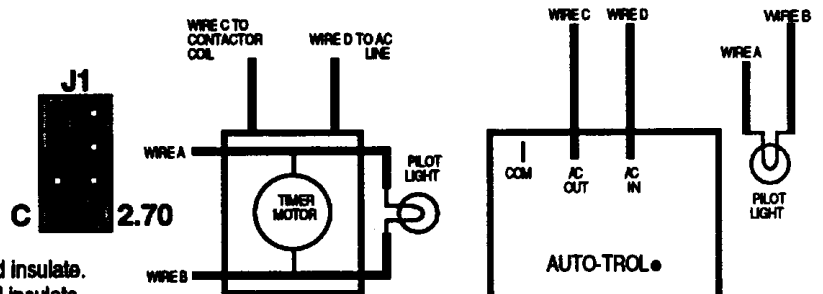
### CHLORIDE, CRUSADER, FERRO - RESONANT (EXIDE & PACIFIC FERROMATE similar)

**NOTE: Wire numbers may vary unit to unit.**

5. Configure J1 for 2.70 volts per cell:

6. Connect wires as follows:

- Wire D (from AC Line) to AUX (next to right edge).
- Wire C (from contactor) to AC OUT.
- Make JUMPER wire from AC IN to AUX.
- Connect wire A and PILOT LIGHT together and insulate.
- Connect wire B and PILOT LIGHT together and insulate.



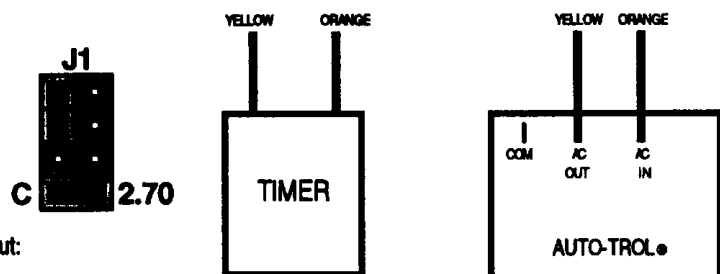
7. Connect wires from the AUTO-TROL® to DC output: RED to POSITIVE (+), BLACK to NEGATIVE (-).

### C&D AUTO-REG

5. Configure J1 for 2.70 volts per cell:

6. Connect wires as follows:

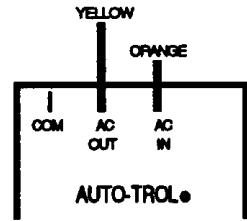
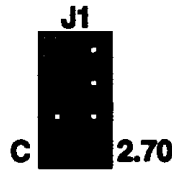
- YELLOW wire (from contactor coil) to AC OUT.
- ORANGE wire (from AC Line) to AC IN.



7. Connect wires from the AUTO-TROL® to DC output: RED to POSITIVE (+), BLACK to NEGATIVE (-).

**C&D AUTO-REG FR SERIES (with 24vac control)**

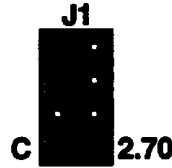
5. Configure J1 for 2.70 volts per cell:
6. Connect wires as follows:
  - a) YELLOW wire (from contactor coil) to AC OUT.
  - b) ORANGE wire (from control transformer) to AC IN.



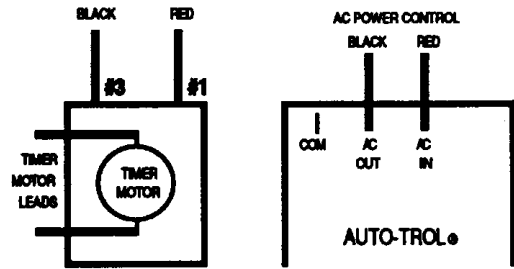
7. Connect wires from the AUTO-TROL® to DC output: RED to POSITIVE (+), BLACK to NEGATIVE (-).

**IBE CVC SERIES**

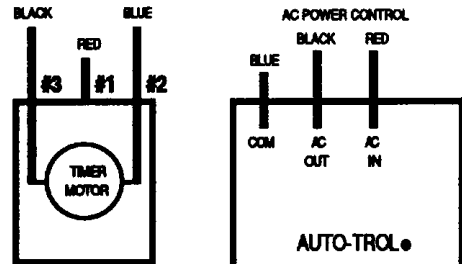
5. Configure J1 for 2.70 volts per cell:
6. The charger **MUST** have an AC contactor or magnetic switch (some models do not). If the charger does **NOT** have one, then a contactor must be installed to handle the main AC power.
7. Connect wires from the AUTO-TROL® to DC output terminals: RED to POSITIVE (+), BLACK to NEGATIVE (-).



**Timer Motor separate from AC Control circuit**

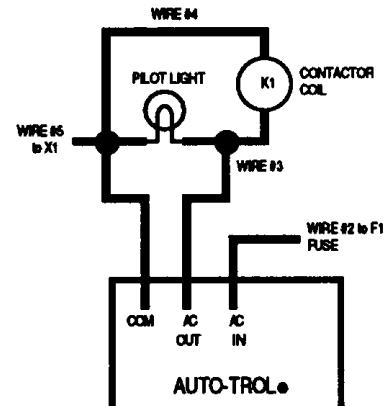
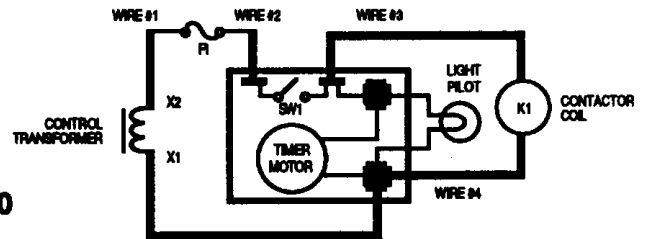
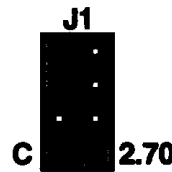


**Timer Motor common to AC Control circuit**



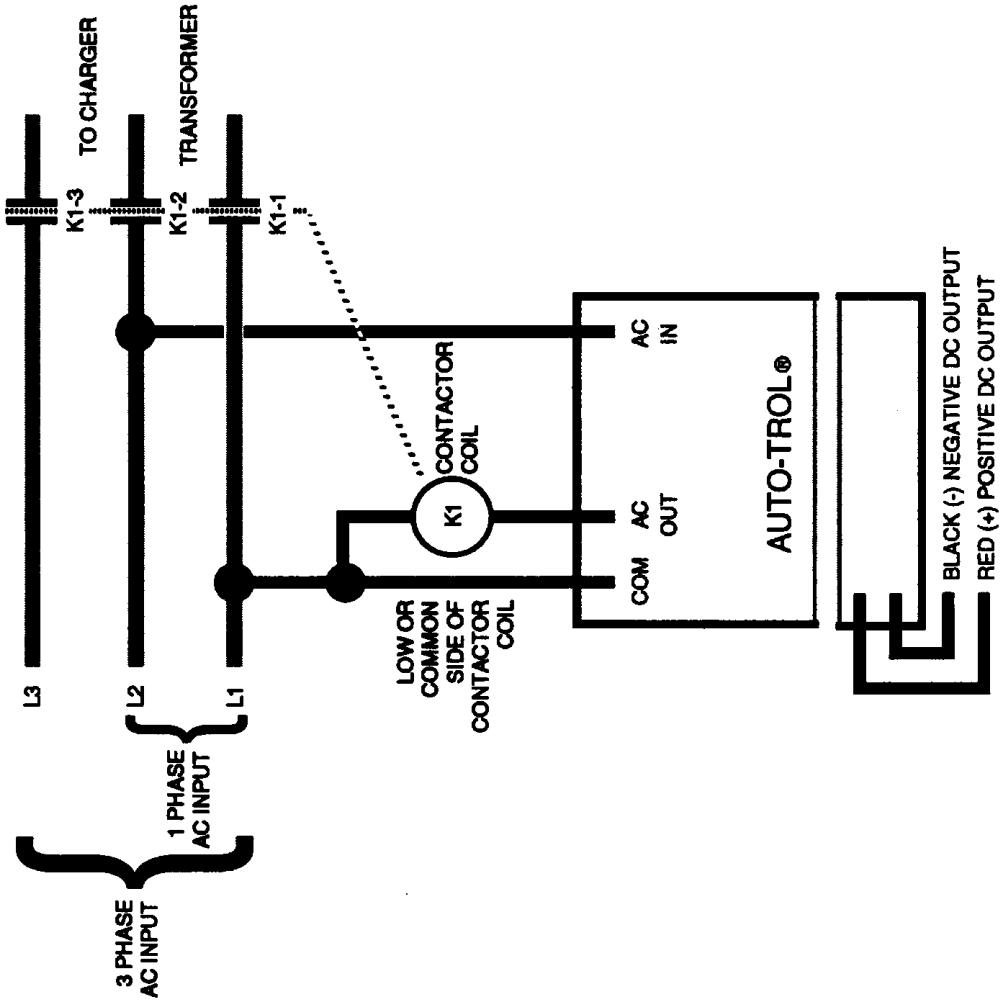
**MOTOR APPLIANCE CORP. (MAC) Chargers**

5. Configure J1 for 2.70 volts per cell:
6. Connect wires as follows:
  - a) WIRE #2 (from fused side of CONTROL TRANSFORMER X2) to AC IN.
  - b) Splice WIRE #3 (from CONTACTOR COIL K1) and PILOT LIGHT lead together and connect to AC OUT.
  - c) Splice WIRE #4 (from CONTACTOR COIL K1), PILOT LIGHT lead, and WIRE #5 (from CONTROL TRANSFORMER X1) together and connect to COM.
7. Connect wires from the AUTO-TROL® to DC output terminals: RED to POSITIVE (+), BLACK to NEGATIVE (-).

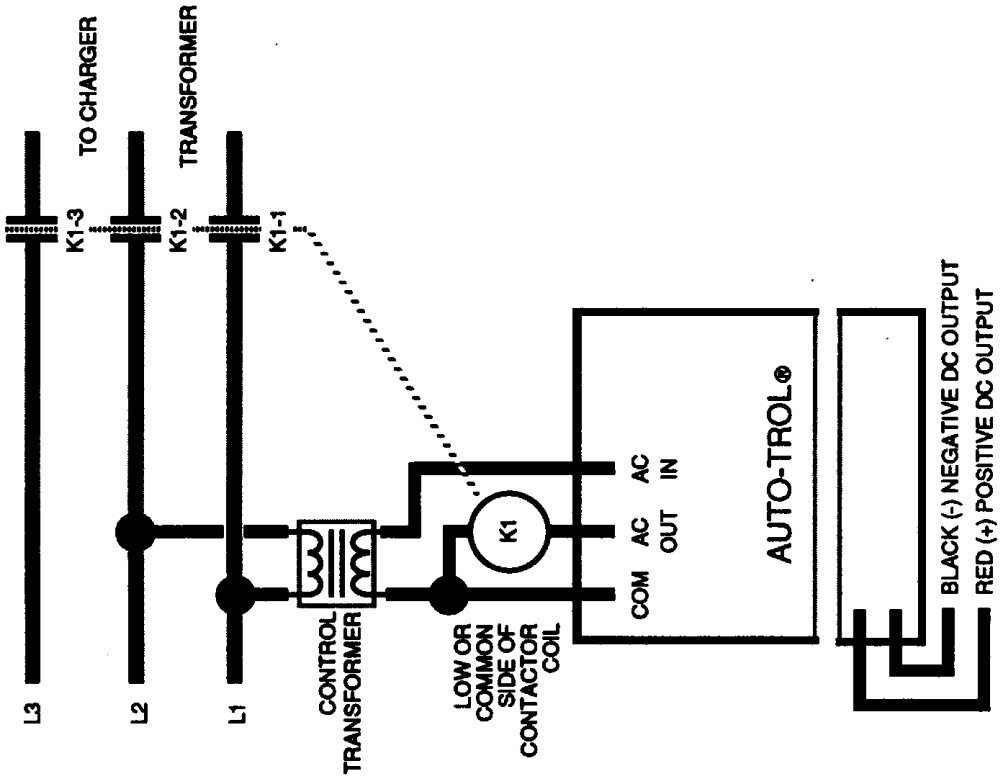


# TYPICAL SCHEMATIC INSTALLATION

## WITHOUT A CONTROL TRANSFORMER

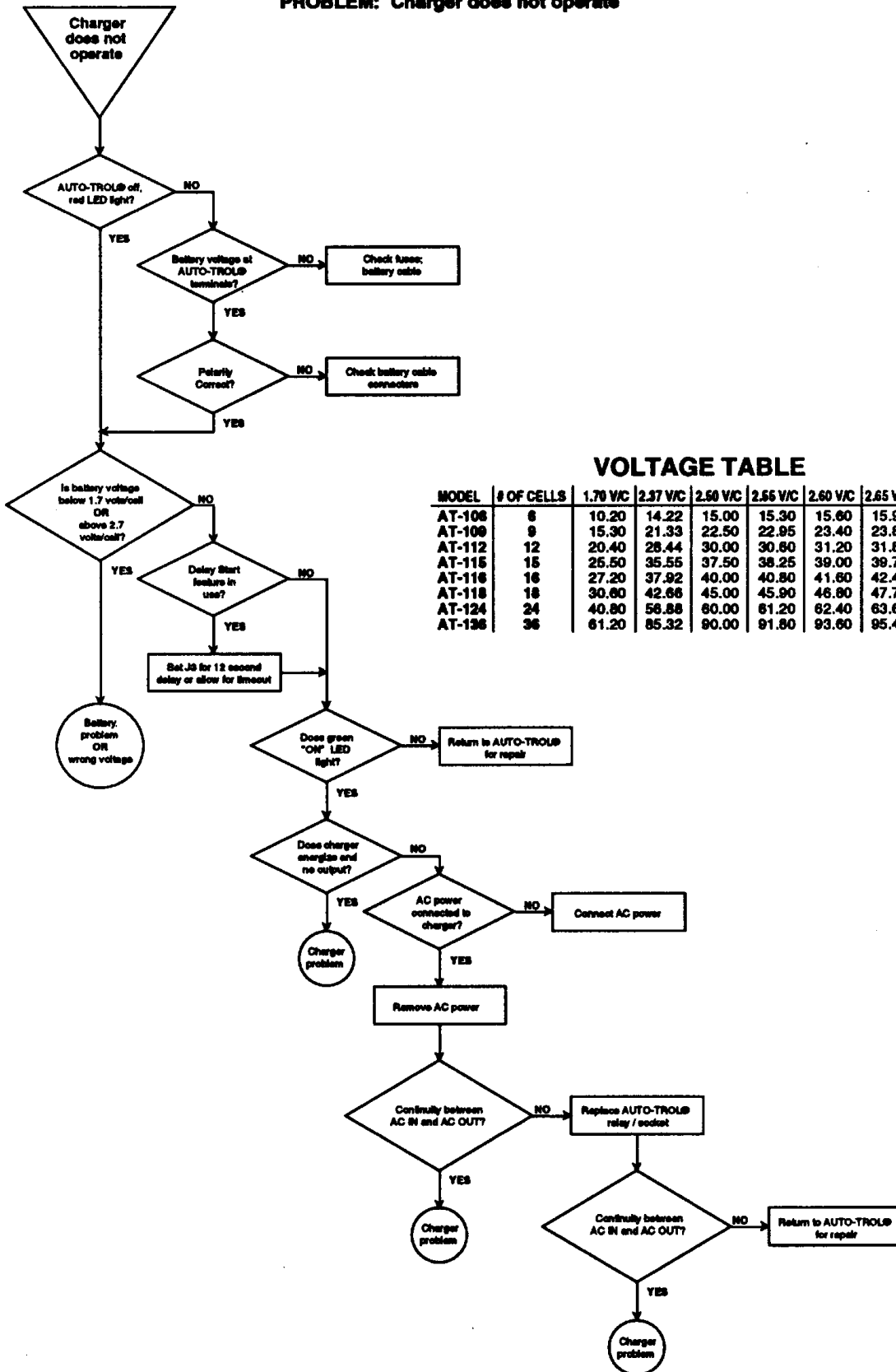


## WITH A CONTROL TRANSFORMER



# AUTO-TROL® AT-100/AT-100AE TESTING INSTRUCTIONS

**PROBLEM: Charger does not operate**



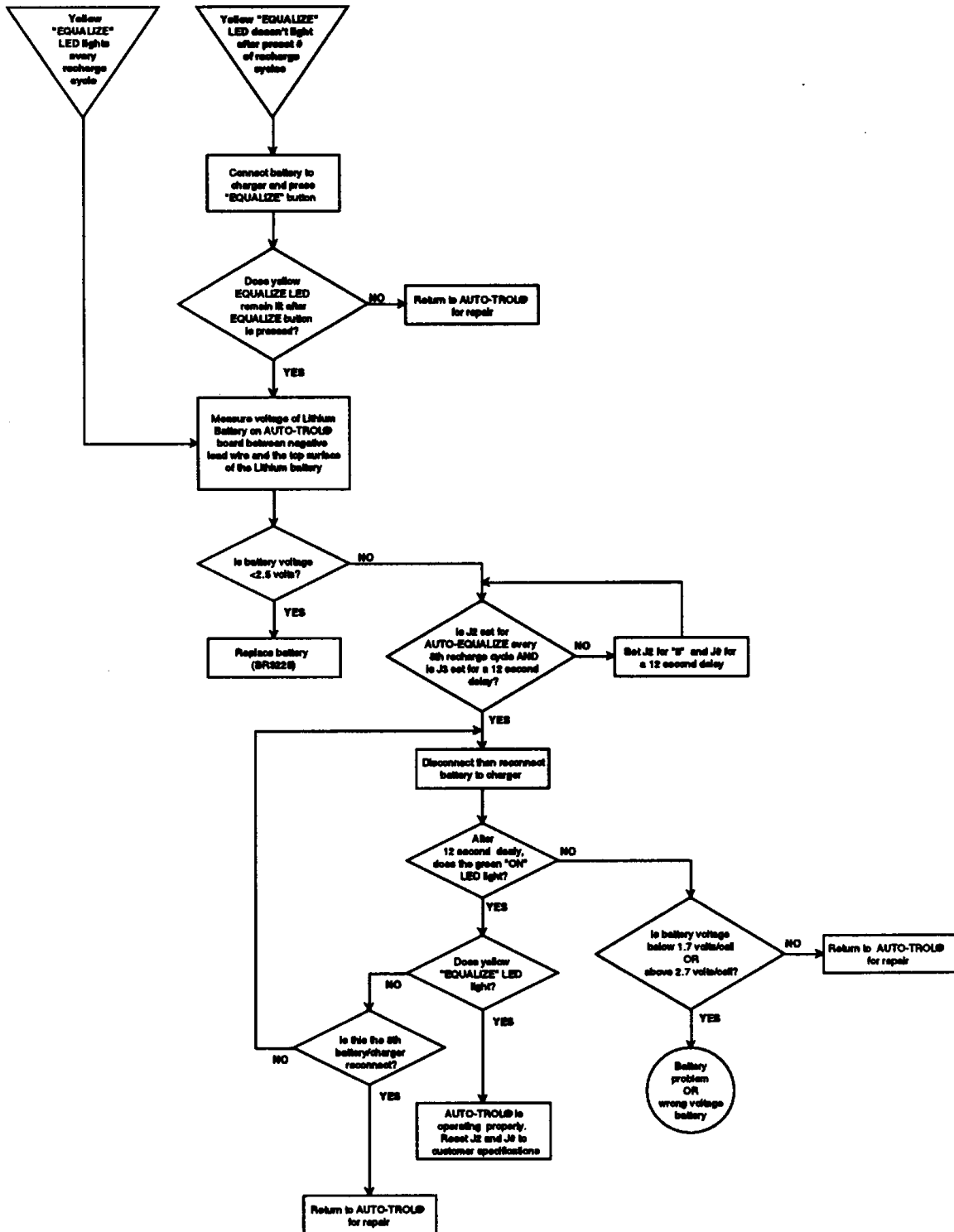
**VOLTAGE TABLE**

MODEL	# OF CELLS	1.70 V/C	2.37 V/C	2.50 V/C	2.56 V/C	2.60 V/C	2.65 V/C	2.70 V/C
AT-106	6	10.20	14.22	15.00	15.30	15.60	15.90	16.20
AT-109	9	15.30	21.33	22.50	22.95	23.40	23.85	24.30
AT-112	12	20.40	28.44	30.00	30.60	31.20	31.80	32.40
AT-115	15	25.50	35.55	37.50	38.25	39.00	39.75	40.50
AT-116	16	27.20	37.92	40.00	40.80	41.60	42.40	43.20
AT-118	18	30.60	42.86	45.00	45.90	46.80	47.70	48.60
AT-124	24	40.80	56.88	60.00	61.20	62.40	63.60	64.80
AT-136	36	61.20	85.32	90.00	91.80	93.60	95.40	97.20

# AUTO-TROL® AT-100/AT-100AE TESTING INSTRUCTIONS

PAGE 2

PROBLEM: Equalize LED always/never lights



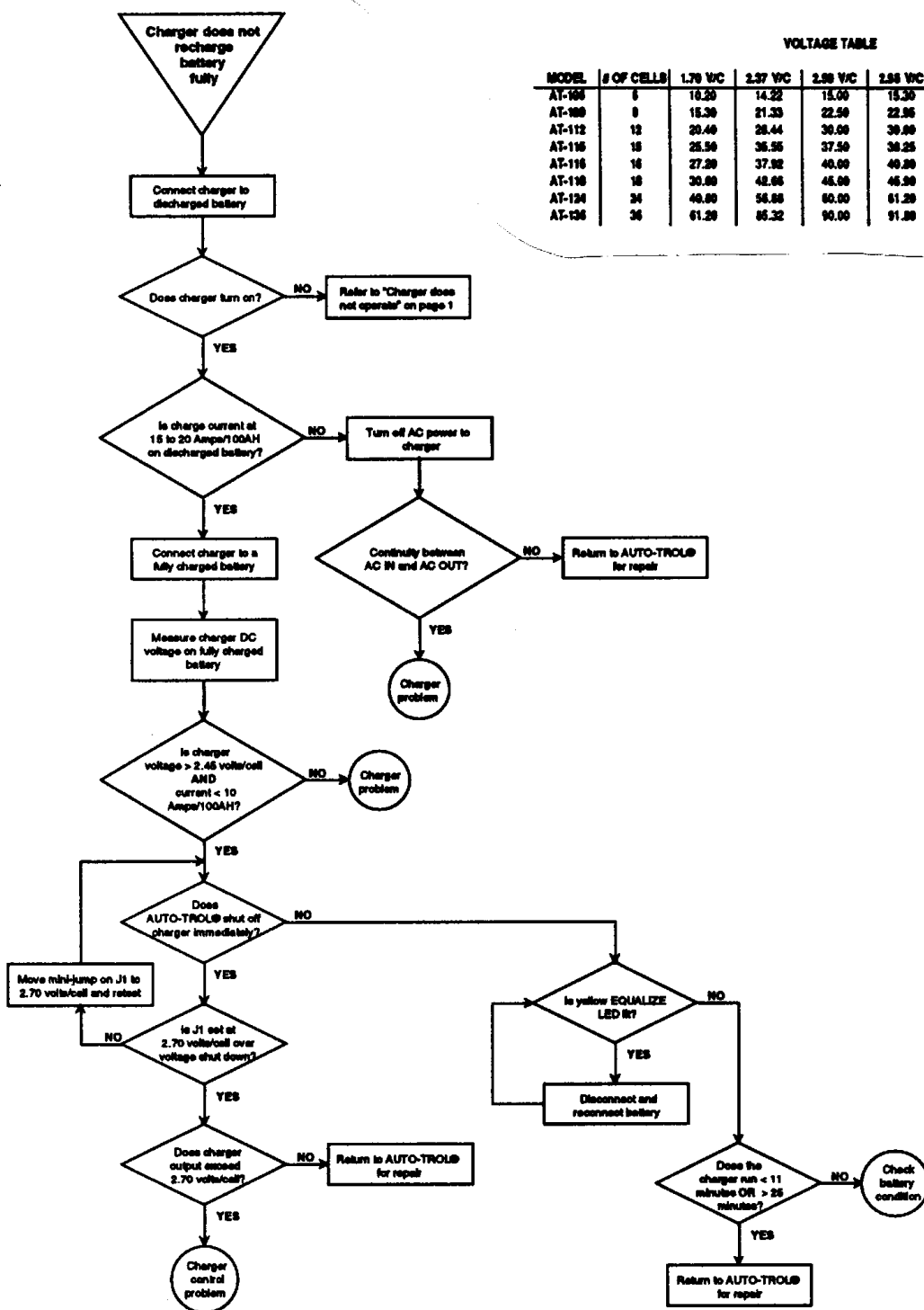


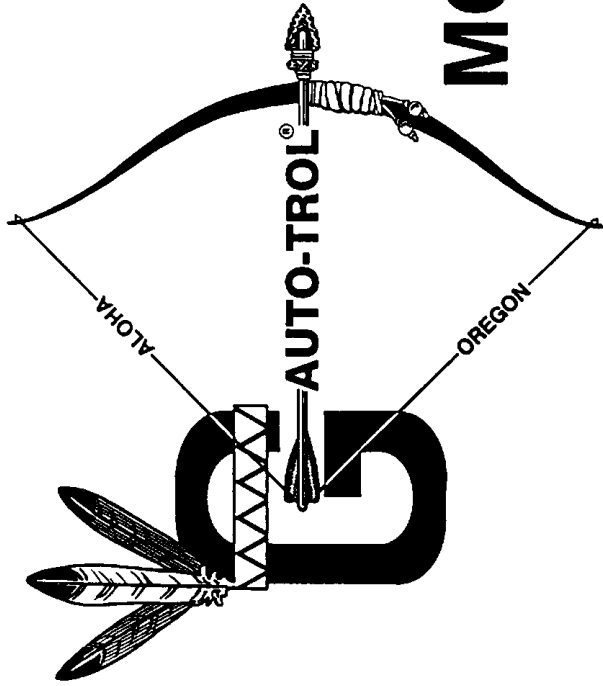
# AUTO-TROL® AT-100/AT-100AE TESTING INSTRUCTIONS

## PROBLEM: Charger does not recharge battery fully

VOLTAGE TABLE

MODEL	# OF CELLS	1.76 V/C	2.37 V/C	2.98 V/C	2.58 V/C	2.98 V/C	2.98 V/C	2.70 V/C
AT-100	8	14.08	18.96	23.84	20.64	23.84	23.84	21.60
AT-100	8	15.36	20.16	25.44	22.56	25.44	25.44	23.40
AT-112	12	20.40	27.24	34.56	30.72	34.56	34.56	31.80
AT-116	16	26.56	35.36	44.64	39.84	44.64	44.64	40.80
AT-116	16	27.20	36.16	45.68	40.32	45.68	45.68	41.40
AT-116	16	28.00	37.12	46.72	41.12	46.72	46.72	42.40
AT-124	24	36.00	47.52	60.00	52.80	60.00	60.00	55.20
AT-124	24	36.80	48.48	61.12	53.76	61.12	61.12	56.40
AT-136	36	50.40	66.72	84.00	73.92	84.00	84.00	77.40





# AUTO-TROL LIMITED

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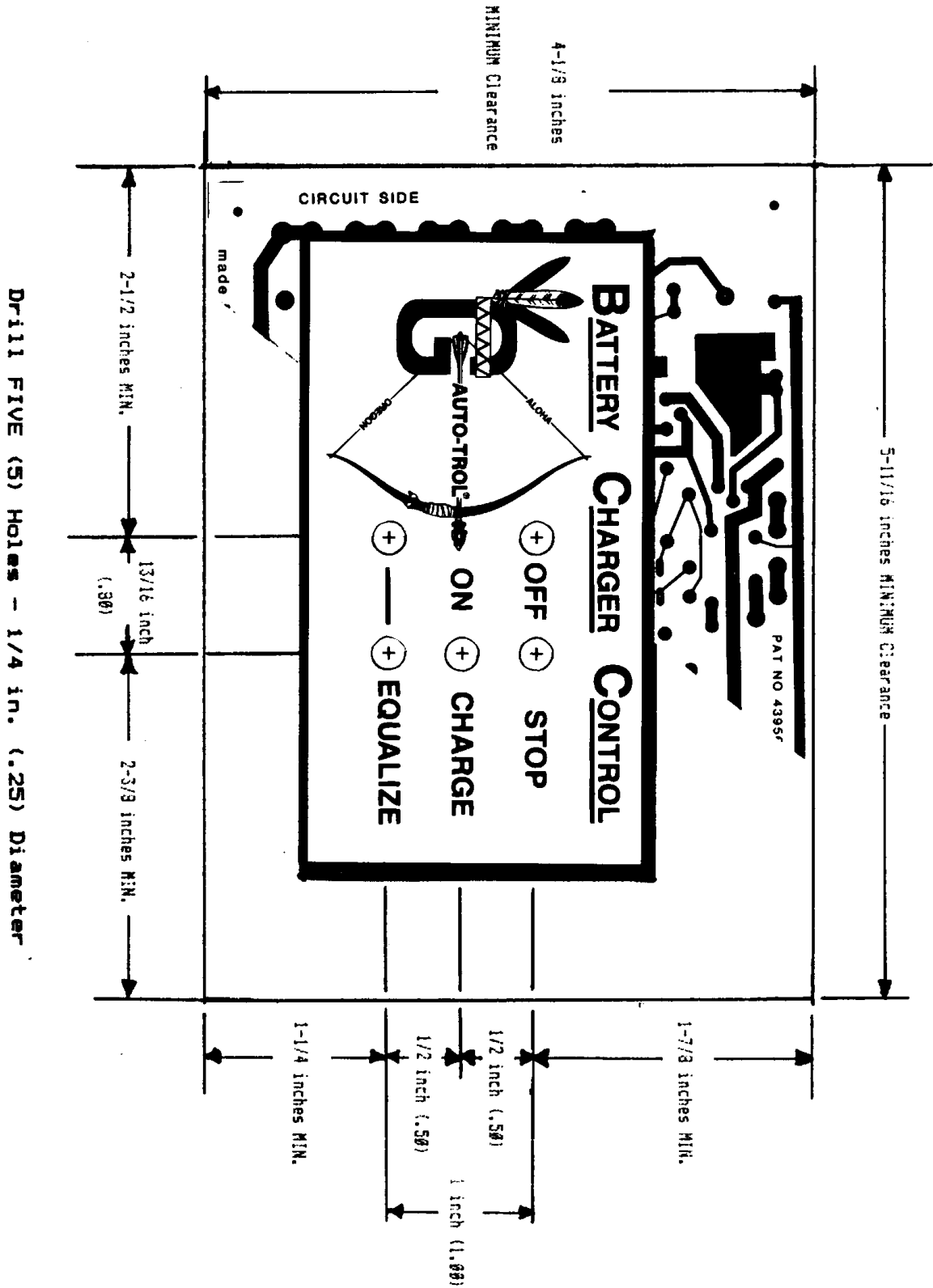
## MODEL AT-100/AT-100AE

### LED

### CHARGER STATUS

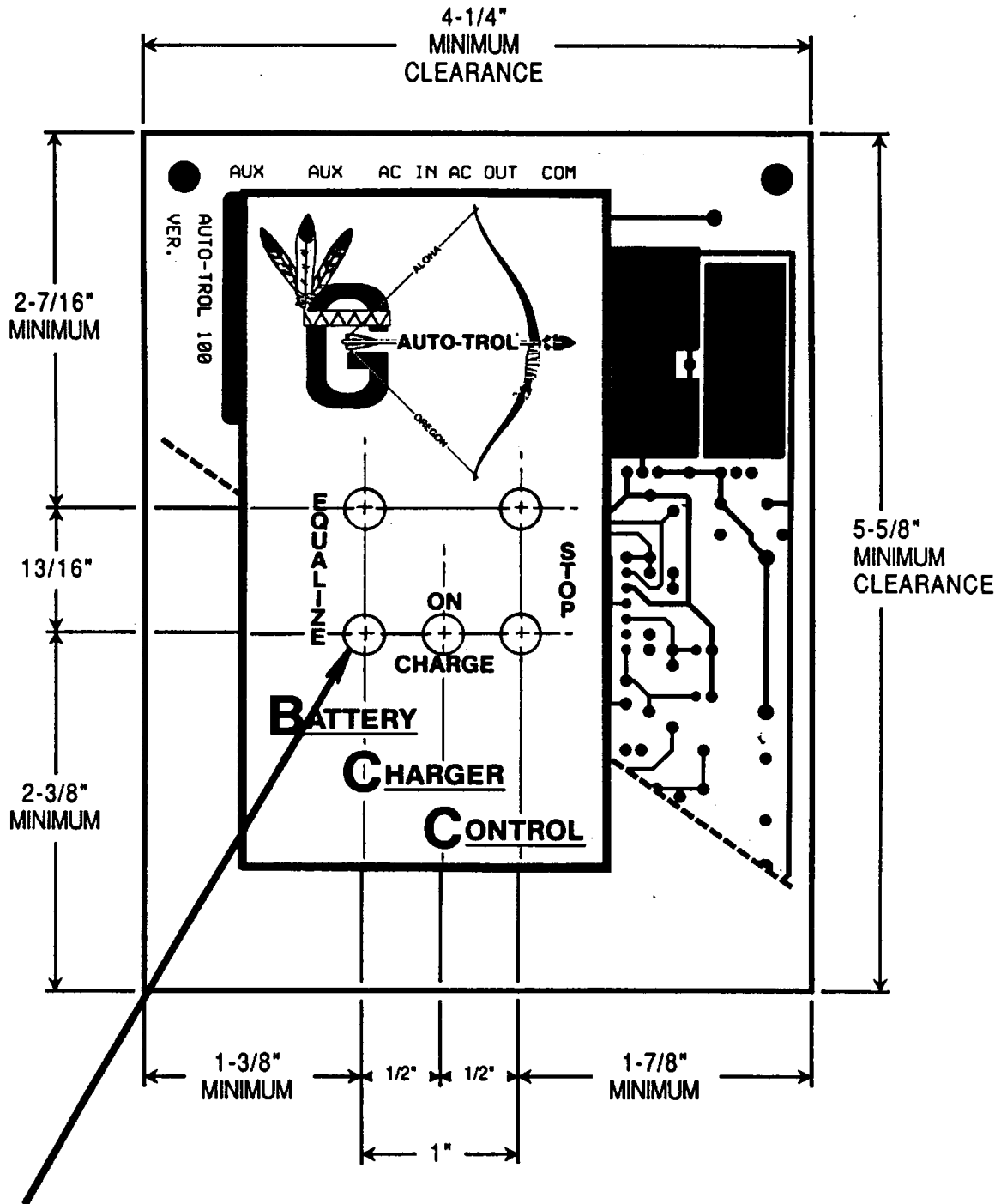
<b>RED</b>	- ON	<b>CHARGE COMPLETED</b>
<b>GREEN</b>	- DIM/OFF PULSING	(OR DELAYED START ACTIVATED)
<b>GREEN</b>	- ON	<b>CHARGING</b> [BATTERY < 80%]
<b>GREEN</b>	- ON/DIM PULSING	<b>FINAL CHARGE</b> [BATTERY > 80%]
<b>YELLOW</b>	- ON	<b>EQUALIZE MODE</b>

# AUTO-TROL® MODEL AT-100 FRONT PANEL MOUNTING TEMPLATE



FRONT PANEL MOUNTING TEMPLATE

# AUTO-TROL® MODEL AT-100 FRONT PANEL MOUNTING TEMPLATE



Drill five (5) holes - 1/4" (.25") diameter