

[illegible]

| SYM.  | STOCK# | AM'T. | DESCRIPTION                                     | STOCK# | AM'T. | DESCRIPTION                   |
|-------|--------|-------|-------------------------------------------------|--------|-------|-------------------------------|
| C1    | 25002  | 1     | capacitor, dual, 5000mfd                        | 41090  | 4     | screw, #4-40 x 5/16           |
| CR1,2 | 93010  | 1     | rectifier, dual                                 | 42000  | 1     | washer, lock, 3/8             |
| F1    | 91001  | 1     | fuse, 5A                                        | 42001  | 1     | flat washer, 3/8              |
| II    | 97715  | 1     | neon indicator                                  | 42002  | 9     | washer, lock, #6              |
| J1,J2 | 52004  | 2     | binding post                                    | 42004  | 6     | washer, lock, #10             |
| K1    | 39000  | 1     | relay, overload                                 | 42005  | 4     | washer, flat, #6              |
| L1    | 34002  | 1     | choke, 5MH                                      | 42007  | 4     | washer, lock, #4              |
| M1    | 74012  | 1     | meter, dual range amps                          | 42011  | 2     | washer, flat, #10             |
| M2    | 74013  | 1     | meter, volts                                    | 42029  | 1     | washer, rubber, 1/2           |
| R1    | 10020  | 1     | resistor, 33K, 1/2W, 20% (orange,orange,orange) | 42511  | 1     | spring clip                   |
| S1    | 61003  | 1     | switch, toggle, DPDT                            | 43002  | 3     | lug, #10                      |
| S2    | 61000  | 1     | switch, toggle, SPST                            | 43014  | 4     | lug, meter, flag type         |
| T1    | 30025  | 1     | transformer, power                              | 46013  | 4     | foot, rubber                  |
| TB1   | 54003  | 1     | terminal strip, 2 Post                          | 53036  | 1     | knob                          |
| XF1   | 97804  | 1     | fusoholder                                      | 57003  | 1     | line cord                     |
|       | 40000  | 10    | nut, hex, #6-32                                 | 59507  | 1     | bracket, capacitor mounting   |
|       | 40001  | 1     | nut, hex, 1/8                                   | 80079  | 1     | panel                         |
|       | 40002  | 2     | nut, hex, 15/32                                 | 81247  | 1     | chassis                       |
|       | 40003  | 2     | nut, ring, 15/32                                | 81248  | 1     | bracket, rectifier mounting   |
|       | 40007  | 4     | nut, hex, #4-40                                 | 81933  | 1     | shield, meters                |
|       | 40012  | 8     | nut, hex, #10-32                                | 82102  | 1     | strain relief                 |
|       | 40016  | 1     | nut, hex, 1/2-24                                | 86006  | 1     | frame (bezel)                 |
|       | 41007  | 1     | screw, #6-32 x 3/4                              | 87006  | 1     | handle with rings             |
|       | 41015  | 4     | screw, #6-32 x 3/8, flat head                   | 88075  | 1     | cabinet                       |
|       | 41044  | 4     | screw, #10-32 x 3/8                             | 89001  | 1     | rotor assembly                |
|       | 41047  | 2     | screw, #8 P.K. (self tapping)                   | 89244  | 1     | nomenclature label            |
|       | 41063  | 4     | screw, #6-32 x 1/4, flat head                   | 89649  | 2     | bracket, handle mounting      |
|       | 41086  | 5     | screw, #6-32 x 5/16                             | 96354  | 1     | manual of instruction (kit)   |
|       | 41089  | 10    | screw, #6-32 x 3/16, round head                 | 96101  | 1     | manual of instruction (wired) |



## BATTERY ELIMINATOR AND CHARGER

1064-1

### LOW-RIPPLE

The EICO Model 1064 Low-Ripple Battery Eliminator and Charger provides two continuously variable ranges of well-filtered low DC voltage at high current. A pi-type LC filter has been incorporated to permit satisfactory operation and testing of transistor radios and other transistor equipment. The 0-8 volt range is used mainly for charging 6 volt automobile batteries or for bench-testing automobile radios that are normally powered by a 6 volt battery. The 0-16 volt range is used mainly for charging 12 volt automobile or boat batteries, or for operating automobile radios or marine equipment that is internally powered by a 12 volt battery. The heavy-duty filter choke provided is adequately rated for continuous use in any application within the ratings of the unit.

Other applications for the Model 1064, which increase its usefulness to the purchaser, are the following: operating or servicing of battery operated transmitters and amplifiers; servicing automobile ignition and lighting systems; operation of electrical toys; light electroplating; relay operation; testing pinball machines; and laboratory testing.

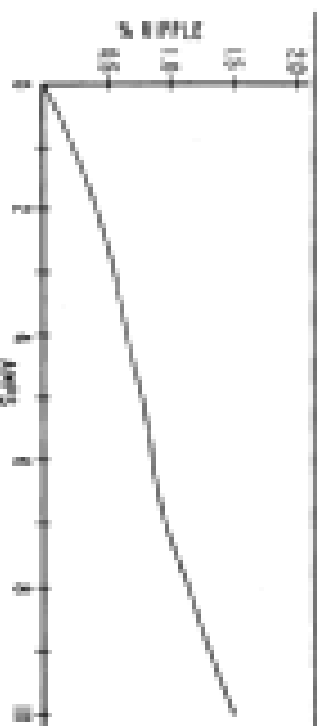
The Model 1064 operates on 105-125 volts AC 60 cycles (drawing 150 watts) which it converts to either of the two DC ranges mentioned above by means of a continuously variable step-down transformer and a full wave selenium rectifier. The step-down transformer has two separate and identical secondary windings, each of which can deliver half the maximum output voltage of the instrument when rectified. There is a movable tap on each winding, and both taps are moved together by the VOLTAGE (output voltage) control to allow continuous control of the output voltage.

When the 6V range is selected, the two secondary windings are thrown in parallel to provide 0-8 volts DC at a maximum of 10 amperes continuously, and 20 amperes intermittently, after rectification. When the 12 volt range is selected, the two secondary windings are thrown in series to provide 0-16 volts DC at a

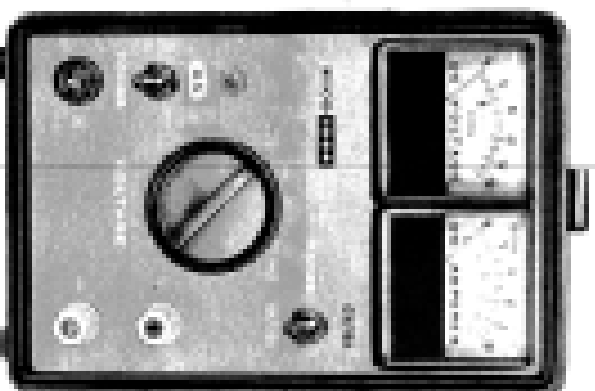
maximum of 8 amperes continuously, and 10 amperes intermittently, after rectification. Another function of the range selector is the automatic selection of the proper ammeter range. At the 6V position, the ammeter range is 0-20 amps; at the 12V position, the ammeter range is 0-10 amps.

For the utmost in convenience to the user, both a voltmeter and an ammeter are incorporated in the output circuit to allow simultaneous observation of the output voltage and the output current with no need for switching. Furthermore, this instrument provides double protection against damage due to overheating. An automatic reset overload relay, in the secondary of the step-down transformer, opens the secondary circuit when the current exceeds 20 amperes, and automatically resets itself when the overload is removed. The primary of the step-down transformer is protected by a 5 ampere fuse, which is easily replaceable from the front panel.

For transistor equipment operation, the Model 1064 will normally be set to the 12 volt range. The ripple in the output, with the voltage constant at 12 volts, is shown in the accompanying graph.



The Model 1064 is rugged and designed for hard use. It is housed in an epoxy paint finished perforated steel cabinet providing excellent ventilation. A cast metal panel frame gives the unit added rigidity. The overall dimensions are 10 1/2" x 7 3/4" x 8 3/4" and weight is 16 pounds. The appearance is outstandingly attractive.



### OPERATION AND FUNCTION OF CONTROLS

#### GENERAL INSTRUCTIONS

**LINE VOLTAGE:** This instrument operates only from the 105-125 volt, 60 cycle AC line. It will not operate from any should it be connected to a DC line.

**VENTILATION:** Adequate ventilation is necessary for proper operation of the instrument and to assure long life and dependable performance. The rectifiers require constant air circulation to keep them from overheating. For this reason, do not place this unit in an enclosed test panel or rack. Poor or inadequate ventilation might also cause the automatic reset overload relay to operate prematurely and so prevent continuous operation of the unit at the maximum rating. Please note that it is normal for the cabinet to become very warm during operation. This should not be cause for alarm.

**LEADS:** Insulated wire leads must be used to connect the Model 1064 to the equipment or battery to be supplied with DC power. The leads must be of adequate current-carrying capacity and should not be excessively long. Otherwise the voltage drop between the output terminals of the Model 1064 and the equipment or battery being supplied with DC power will be excessive. This will result in a lower voltage actually supplied than is read on the voltmeter. In addition, the leads should be color-coded as follows: red-colored lead for the positive (+) connection; black-colored lead for the negative (-) connection.

#### OPERATION

A. Battery Eliminator for Automobile Radios or Marine Equipment (8 or 12 volts).

1. Connect the line cord of the Model 1064 to the 105-125 volt, 60 cycle AC line.
2. Throw the power toggle switch to ON.
3. Rotate the VOLTAGE control to its maximum counter-clockwise position (0 volts).
4. Set the RANGE toggle switch at either 6V or 12V as required.

3. With the radio receiver turned off, connect a lead from the receiver's positive input terminal to the positive binding post of the Model 1064. Connect another lead from the receiver's negative input terminal to the negative binding post of the Model 1064.

6. Turn the VOLTAGE control clockwise (increasing the voltage) until the voltmeter reads either 4.3 volts or 12.6 volts as required.

1. Turn the radio receiver on and readjust the VOLTAGE to obtain the same voltage as before.

B. Automobile or Marine Battery Charger (8 or 12 volts).

Note on when to recharge a battery: Read the following instructions carefully before using the Model 1064 as a battery charger: Check the S.G. (specific gravity) of the electrolyte in each cell with a hydrometer. If the electrolyte level is too low to get a hydrometer reading, add distilled water until the level reaches the point stated by the manufacturer (or 1/2 inch or more above top of the plates). (Note 1: Never check the electrolyte level with an open flame as the fumes are combustible. Note 2: The S.G. may be temporarily lowered if the water is added shortly before the hydrometer test). Correct the hydrometer reading for temperature by adding 4 points (.004) for every ten degrees above 80 degrees F and subtract 4 points for every ten degrees below 80 degrees F. If the S.G. of the electrolyte has fallen lower than the minimum safe value stated by the battery manufacturer (approximately 1.200-1.225), the battery should be recharged. (Note: If the S.G. of the electrolyte in any cell differs by more than 50 points from the S.G. of the electrolyte in the other cells of the battery, that cell is probably defective).

1. Connect the line cord of the Model 1064 to the 105-125 volt, 60 cycle AC line.
2. Rotate the VOLTAGE control to its maximum counter-clockwise position (0 volts).
1. Set the RANGE toggle switch at either 6V or

12V depending on whether you are charging a 6V or a 12V battery.

4. With the Model 1004 turned off, connect a lead from the positive terminal of the battery to the positive binding post of the Model 1004. Connect another lead from the negative terminal of the battery to the negative binding post of the Model 1004. To check whether the connections are correct, observe the voltmeter. If it reads positive, the connections are correct. If it reads negative, reverse the leads to the battery.

5. Throw the POWER toggle switch to ON.

6. Rotate the VOLTAGE control clockwise (increasing the voltage) until the charging current as read on the ammeter reaches the normal rate of 8 amperes for a 6 volt battery and 5 amperes for a 12 volt battery. The voltage should be between 6 and 8 volts for a 6 volt battery and between 12 and 16 volts for a 12 volt battery. Proceed with the charging, checking the S.G. and the charging current at two-hour intervals. The charging should be continued until the S.G. reaches at least 1.250, at which value it can properly be replaced in the automobile with safety. It is preferable, however, to continue the charging until there is no further increase in S.G. In three successive checks spaced an hour apart, or a value of S.G. is reached that is close to that stated by the manufacturer as being the S.G. at full charge (between 1.260 and 1.280 depending upon the particular battery). Notice that the charging current tapers off as the charging proceeds due to the increasing and opposing e.m.f. of the battery.

NOTE: CHARGE IN A WELL-VENTILATED ROOM AS THE FUMES LIBERATED DURING THE CHARGING PROCESS ARE TOXIC AND CORROSIBLE. Loosen or remove the battery caps while the battery is being charged, so that the fumes may escape.

**VOLTAGE TESTING:** An alternative method of checking battery condition is by no-load voltage measurement. A method that is better still, is voltage measurement under load. While no-load voltage measurement is not considered completely reliable, it has been found to be an effective and quick way of determining how nearly charged the battery is. Table 1 below gives no-load voltage per cell, the corresponding hydrometer reading, and the estimated battery condition from full charge to complete discharge. The load test, which is a more reliable indicator of future battery failure, is performed in the following manner: with the ignition off, and the starter motor turning the warm engine over, take rapid voltage readings across each cell. Do not perform this test unless the S.G. of the battery is 1.250 or higher. Furthermore, do not run the starter more than 15 seconds or you may damage it. Table 2 below gives the voltage reading per cell and the estimated battery condition. Table 3 shows how to evaluate the no-load voltage per cell or the S.G. of the electrolyte with regard to the temperature at which the electrolyte will freeze. Note: The voltage readings must be made with an accurate, low-voltage voltmeter.

All of the above information applies only to lead-acid batteries which are almost universally used in automobiles. Occasionally, the technician may encounter a different type of battery known as the Edison

battery which employs nickel plates and an electrolyte which is a water solution of potassium hydroxide. Hydrometer testing can not be used with this battery because the S.G. of the electrolyte does not vary perceptibly from full charge to discharge. The individual cell discharge voltage is approximately 1.2 volts per cell and may vary between 1.4 volts and 1.0 volts.

**TABLE 1. HYDROMETER OR NO-LOAD**

| Specific Gravity<br>(at 70°F) | Voltage<br>Per Cell<br>(No Load) | Battery Condition |
|-------------------------------|----------------------------------|-------------------|
| 1.280                         | 2.12                             | GOOD              |
| 1.260                         | 2.10                             |                   |
| 1.210                         | 2.05                             | FAIR              |
| 1.180                         | 2.03                             |                   |
| 1.150                         | 2.00                             | POOR              |

**TABLE 2. STARTER-LOAD VOLTAGE**

| Voltage per Cell<br>(Starter Load) | Battery Condition |
|------------------------------------|-------------------|
| 1.95-1.40                          | GOOD              |
| 1.45-1.35                          | FAIR              |
| Below 1.35                         | POOR              |

**TABLE 3. ELECTROLYTE FREEZING POINTS**

| If Specific Gravity Is | Or Cell Voltage Is | Battery Will Freeze At |
|------------------------|--------------------|------------------------|
| 1.141                  | 1.89               | 10 Deg. F              |
| 1.182                  | 2.03               | 9 Deg.                 |
| 1.214                  | 2.05               | -20 Deg.               |
| 1.232                  | 2.08               | -40 Deg.               |
| 1.246                  | 2.10               | -60 Deg.               |
| 1.260                  | 2.11               | -75 Deg.               |

**SERVICE CONSULTATION**

If you are experiencing trouble that you cannot diagnose yourself, you are invited to avail yourself of the RICCO Service Consultation Department. The consultant handling your inquiry will make every effort to diagnose the cause of your particular difficulty based on the information that you provide. Please be as thorough as possible. Include the following information about your unit:

- Have you made a thorough check of the wiring, checking also for cold solder joints, or accidental shorting between parts, or to chassis? (Check to see whether a bare wire or lead extends far enough to be shorted when the bottom plate is put on).
- Have you checked that the proper tube or transformer is in each socket, and also making proper contact in the socket? Are all shields firmly in place?
- Does the trouble occur at one time or one operating situation, but not at another time or operating situation? Be as specific as possible in this respect.

- d) If the unit is of the type that involves alignment or calibration, be as specific as possible as to what you have done or not done with regard to these requirements. If the unit incorporates tuned circuits stated to be factory pre-aligned, did you change any settings? If so, what alignment procedure did you use?
- e) Have you observed any peculiarity about a part? If a part appears charred or otherwise damaged by excessive heat, please say so. If you think you have damaged a particular part in the assembly or wiring, please say so. In conjunction with the symptoms, the consultant may be able to determine whether such a part is likely to be defective.
- f) Have you gone through any trouble-shooting procedure that may be provided? If your manual includes a table of contacts made at each switch position, have you checked out the switches accordingly (if the trouble is such that doing this would be appropriate)? Have you been able to make checks of the operating voltages and/or resistances, if this is appropriate, and your manual provides a table of voltages and resistances? What are the results of these checks? Also, have you taken any other trouble-shooting approaches? What have been the results?

g) If this is high fidelity equipment, please state the type (magnetic, ceramic, crystal) of phono cartridge you are using and/or the make and model number. State the make and model of your record changer, or turntable and tone arm. Are the speakers in the same cabinet with your electronic equipment? If so, describe the cabinet and the placement of the components. Please state the make and model of your speakers.

In addition, list any code numbers in red under the words **INSTRUCTION MANUAL**, on the cover of the book provided with your unit. If there are no red code numbers, state this specifically. If the unit bears a serial number, it is essential that you include this also.

## PARTS REPLACEMENT

If it appears that a component is defective, and you desire a replacement from EICO, address your correspondence to our Customer Service Department.

If you are claiming the right to a no-charge replacement under the terms and conditions of the warranty, it is required that you shall have sent in the registration card within 18 days of the date of purchase, and that you send back the defective part transportation prepaid. EICO will make the necessary replacement at no charge for parts eligible under the terms and conditions of the warranty. In returning tubes, pack them very carefully to avoid breakage in shipment. Broken tubes will not be replaced. Please read the warranty on the subject of parts eligible for replacement.

Further information required on a part returned to the factory for a no-charge replacement under the terms and conditions of the warranty is as follows:

a) Model number and serial number, if any, of unit. Also any code numbers in red under the words **INSTRUCTION MANUAL** on the cover of the book supplied with the unit.

b) Stock number and description of part as given on the parts list. If the part is not listed (of itself) in the parts list, it means that the part is integral with a sub-assembly. If the sub-assembly is not sealed, and the defective part is definitely identified and easily replaceable (not more than two connections), you may request replacement for the particular part. If the sub-assembly is sealed, or if the defective part is not definitely identified or is not easily replaceable (more than two connections), then remove the sub-assembly and return it to EICO (less any tubes) for repair or replacement, if your unit is in warranty. If your unit is out of warranty, you are generally advised to order a replacement sub-assembly.

c) Describe as completely as possible the nature of the defect, or your reason for requesting replacement.

## FACTORY REPAIR SERVICE

EICO maintains a Factory Repair Service Department for in-warranty or out-of-warranty repair of EICO equipment. It is intended to serve those customers who are not adequately familiar with electronics to make use of the EICO Service Consultation facilities, or whose difficulties cannot be solved by correspondence.

For all out-of-warranty units, there is a minimum labor and handling fee. For the Model No. 1064, this fee is \$5.00. Charges for components replaced are additional to the minimum fee.

For in-warranty completed kit units, there is a minimum labor and handling fee. For the Model No. 1064, this fee is \$5.00. There is no charge for a replaced defective part provided that the terms and conditions of the warranty for no charge replacement are not violated in the judgment of EICO.

For in-warranty factory-wired units, there is no labor and handling fee if the unit complies with the terms and conditions of the warranty in the judgment of EICO. However, if the terms and conditions of the warranty are violated, then there will be charged to customer a minimum labor and handling fee plus the cost of parts replaced.

In all cases, the unit must be sent to the factory transportation prepaid, and the unit will be returned to the customer transportation collect.

The services rendered for the minimum labor and handling fee are the correction of any minor wiring errors (not extensive corrections or re-wiring), the

labor involved in replacing defective parts, and any adjustments, alignment, or calibration procedures that would normally be performed on a factory-wired unit. Units not wired according to instructions, or modified in any way, or showing evidence of the use of acid core solder, will not be serviced and will be returned to the customer forthwith.

Units requiring extensive corrections or re-wiring will incur an additional labor charge which will be set by EICO. The customer will be informed of this situation and written authorization from the customer will be required before the work is done.

Please note: minimum labor and handling fees are subject to revision at any time.

## LOCAL REPAIR FACILITIES

Out-of-warranty repair work may also be performed by authorized service stations as well as the EICO factory. A list of authorized service stations is provided with this manual. The roster of stations may change from time to time, and if considerable time has elapsed since you purchased your unit, you are advised to contact the station you choose before sending the unit to them for repair. Use of a local service station will often result in faster service, and, usually, lower transportation costs.

It is necessary that you comply with the Shipping Instructions that follow when sending in a unit for service.

## SHIPPING INSTRUCTIONS

You are strongly advised to retain the original shipping carton and inserts in the case that re-shipment is required for service or any other purpose. The carton may be collapsed, for storage in as small a space as possible. In many cases, the same carton is used for kit and factory-wired units so that the kit carton will serve for re-shipment of the completed kit.

To submit a unit for service, either to the factory or an authorized service station\*, fill out completely the Service Work Order form provided with the manual. Pack the unit very carefully, preferably in the original shipping carton with the original inserts.

If this is not possible, use a strong oversize carton, preferably wood, allowing at least 3 inches of resilient packing material such as shredded paper or excelsior, to be inserted between all sides of the unit and the carton. Seal the carton with strong gummed paper tape or strong twine, or both. Include the Service Work Order in the carton and in addition, attach a tag to the instrument on which is printed your name and address and brief reference to the trouble experienced. Affix "FRAGILE" or "HANDLE WITH CARE" labels to at least four sides of the carton, or print these words

large and clear with a bright color crayon. Ship by prepaid Railway Express or parcel post to:

Electronic Instrument Co., Inc.  
13-00 Northern Blvd.  
Long Island City 1, New York  
Attention: Service Department

Include your name and address on the outside of the carton. Return shipment will be made transportation charges collect. Note that a carrier cannot be held liable for damages in transit, if packing, IN HIS OPINION, is inefficient.

\*Authorized service stations are for out-of-warranty units only, unless the station is specifically noted on the List of Authorized Service Stations to be authorized for other work.

**EICO**

THE EICO WARRANTY

**EICO**

The Electronic Instrument Company, Inc., hereafter referred to as EICO, warrants that, for a period of 90 days from the date of purchase, any EICO kit will be free of defects in parts, and that any EICO factory-wired unit will be free of defects in parts and workmanship. For an EICO kit, EICO's obligation is limited to those parts which are returned transportation prepaid to the factory without further damage, and in the judgement of EICO are either originally defective or have become defective in normal use. For an EICO factory-wired unit, EICO's obligation is limited to those parts, sections, or the entire unit which is returned transportation prepaid to the factory without further damage, and in the judgement of EICO are either originally defective or have become defective in normal use.

The warranty does not apply to any parts damaged in the course of handling, assembling, or wiring by the customer, or damaged due to abnormal usage or in violation of instructions or reasonable practice, or further damaged to a consequential degree in return shipment. Furthermore, the foregoing warranty is made only to the original customer, and is and shall be in lieu of all other warranties, whether expressed or implied, and of all other obligations or liabilities on the part of EICO, and no event shall EICO be liable for any anticipated profits, consequential damages, loss of time, or other losses incurred by the customer in connection with the purchase or operation of EICO products or components thereof.

The registration card, which accompanies each EICO kit or factory-wired unit, must be filled in and returned to the company within 10 days after the date of purchase. This warranty applies only to registered units.