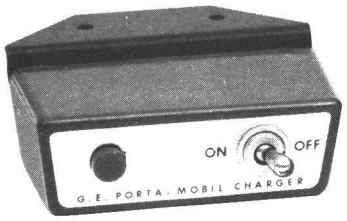
MOBILE RADIO

MAINTENANCE MANUAL

PORTA-MOBIL VEHICULAR CHARGER

(Models 4EP53A10, 11 & 12 Options 5529, 5530 & 5533)



Control Unit
(Optional)

VEHICULAR CHARGER

SPECIFICATIONS *

Dimensions (H x W x D)	3" x 6" x 3"
Input Voltage	
Model 4EP53A10	6.6 Volts ±20%
Model 4EP53A11	13.8 Volts ±20%
Model 4EP53A12	24 - 44 Volts
Temperature Range	-30°C to +65°C

*These specifications are intended primarily for the use of the serviceman. Refer to the appropriate Specification Sheet for the complete specifications.

EP-53-A

GENERAL ELECTRIC

TABLE OF CONTENTS

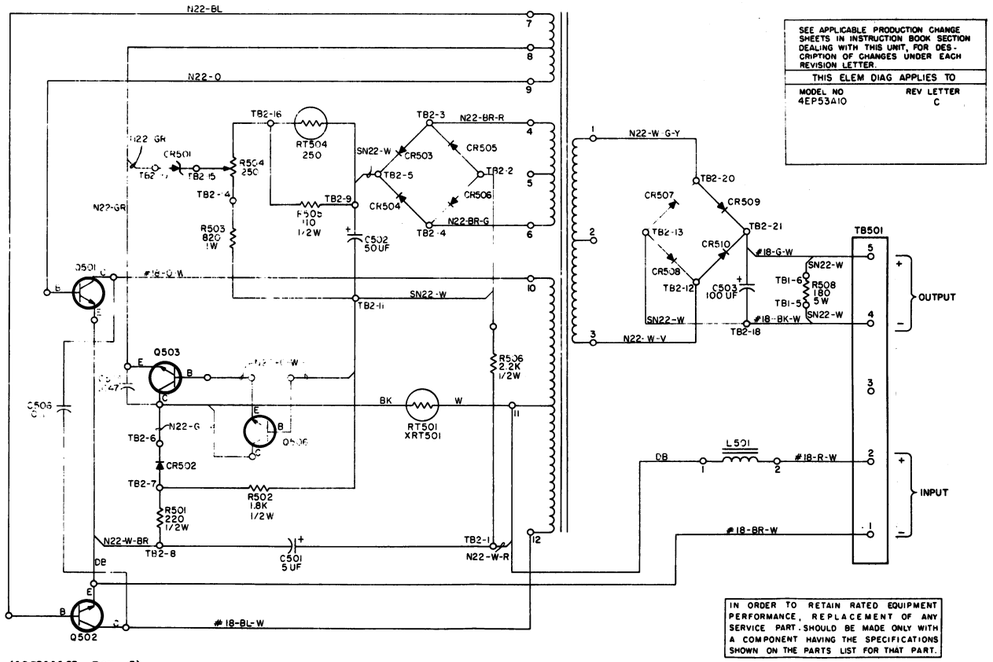
ILLUSTRATIONS

EQUIPMENT INDEX

EQUIPMENT	OPTION	IDENTIFICATION NUMBER
6-Volt Charger Charger Cable Battery Cable	5529	4EP53A10 19B205579-G1 19B205580-G1
12-Volt Charger Charger Cable Battery Cable	5530	4EP53A11 19B205579-G1 19B205580-G1
24-44 Volt Charger Charger Cable Battery Cable	5533	4EP53A12 19B205579-G1 19B205580-G1
Control Unit	5579	19B205601-G1
Cable with Cigar Lighter Plug	5580	19B205624-G1
Power Supply Modification Kit Factory Installation Field Installation	 5586 5587	 19A122614-G1 19A122614-G1

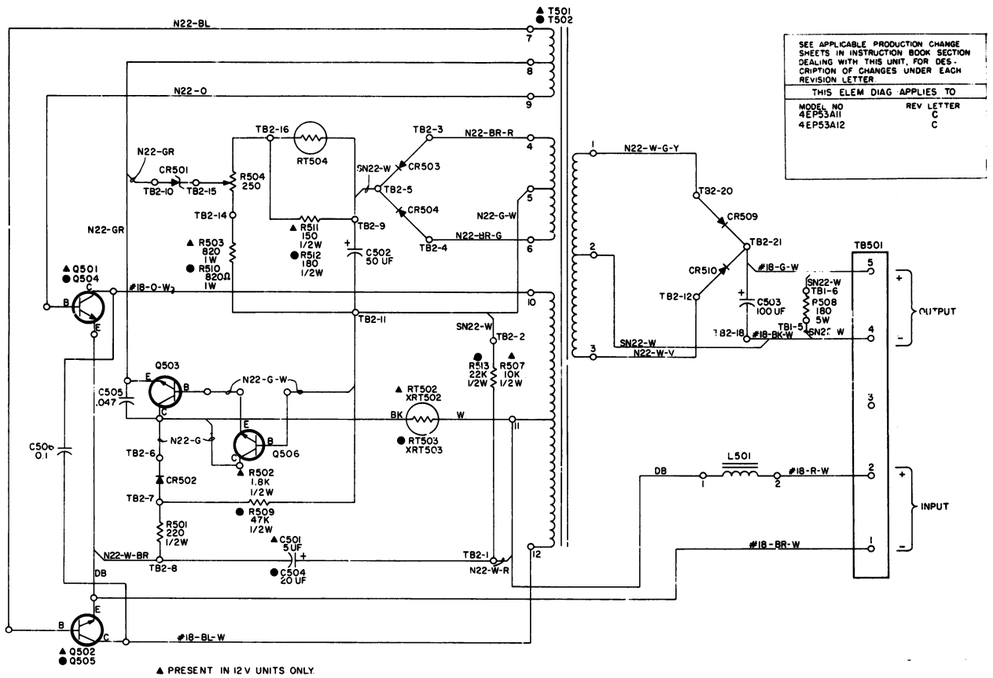
SCHEMATIC DIAGRAM

MODEL 4EP53A10



(19C311163, Rev. 5)

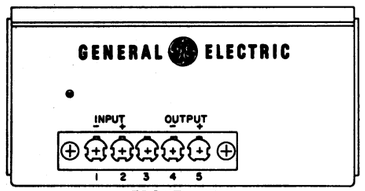
MODELS 4EP53A11 & 12



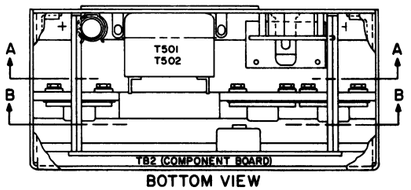
▲ PRESENT IN 12 V UNITS ONLY.
● PRESENT IN 24-44 V UNITS ONLY.

(19C311167, Rev. 6)

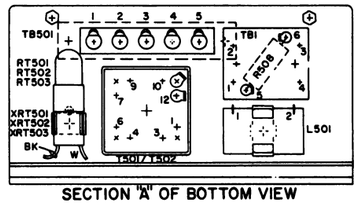
(DF-0058)



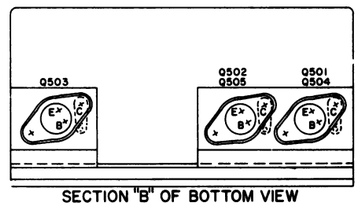
FRONT VIEW



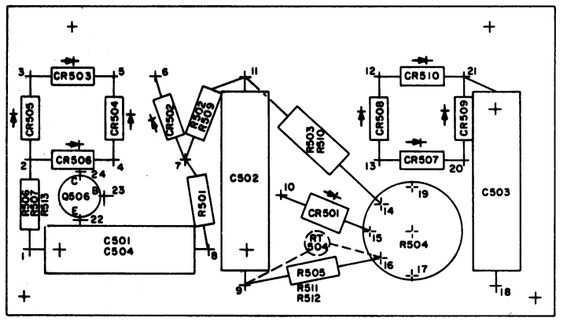
BOTTOM VIEW



SECTION "A" OF BOTTOM VIEW



SECTION "B" OF BOTTOM VIEW



TB2 (COMPONENT BOARD)

(19C311310, Rev. 1)

SCHEMATIC & OUTLINE DIAGRAMS

PORTA-MOBIL VEHICULAR CHARGER
MODELS 4EP53A10, 11 & 12

PARTS LIST

LBI-3783B

VEHICULAR CHARGER
4EP53A10 6 VDC
4EP53A11 12 VDC
4EP53A12 24-44 VDC

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - CAPACITORS - - - - - - - - -
C505*	19B209243P105	Polyester: 0.047 µf ±10%, 50 VDCW. Added by REV A.
C506*	19A116080P107	Polyester: 0.1 µf ±10%, 50 VDCW. Added to 4EP53A10, 11 by REV B. Added to 4EP53A12 by REV C.
		- - - - - - - - - - INDUCTORS - - - - - - - - -
L501	7143944P2	Choke, RF: 120 µh ±10%, .064 ohm DC res max.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
Q501 thru Q503	19A116118P3	Silicon, NPN.
Q504 and Q505	19A115622P1	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R508	5493035P7	Wirewound: 180 ohms ±5%, 5 w; sim to Tru-Ohm Type X-60.
		- - - - - - - - - THERMISTORS - - - - - - - - -
RT501	19C307037P1	Lamp, incandescent: 7.5 v; sim to GE 51.
RT502	19C307037P4	Lamp, incandescent: 14 v; sim to GE-1815.
RT503	19C307037P5	Lamp, incandescent: 28 v; sim to GE-1829.
		- - - - - - - - - TRANSFORMERS - - - - - - - - -
T501	19C311143G1	Coil.
T502	19C311143G2	Coil.
		- - - - - - - - TERMINAL BOARDS - - - - - - - -
TB1	19A122495G1	Eyelet board.
TB2		COMPONENT BOARD 19C311157G1 (Used in Model 4EP53A10) 19C311157G2 (Used in Model 4EP53A11) 19C311157G3 (Used in Model 4EP53A12)
		- - - - - - - - - CAPACITORS - - - - - - - - -
C501	19A115680P2	Electrolytic: 5 uf +150% -10%, 25 VDCW; sim to Mallory Type TT.
C502	19A115680P4	Electrolytic: 50 uf +150% -10%, 25 VDCW; sim to Mallory Type TT.
C503	19A115680P5	Electrolytic: 100 µf +150% -10%, 25 VDCW; sim to Mallory Type TT.
C504	7489483P11	Electrolytic: 5 uf +75% -10%, 6 VDCW; sim to Sprague Type 30D.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR501	19A115528P8	Silicon, Zener.
CR502 thru CR510	4037822P1	Silicon.
		- - - - - - - - - - TRANSISTORS - - - - - - - - -
Q506*	19A115300P1	Silicon, NPN; sim to Type 2N3053. Added by REV A.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R501	3R77P221K	Composition: 220 ohms ±10%, 1/2 w.
R502*	3R77P182K	Composition: 1800 ohms ±10%, 1/2 w.
		In 4EP53A10, 11 of REV B and earlier:
	3R77P112K	Composition: 1100 ohms ±10%, 1/2 w.
R503	3R78P821K	Composition: 820 ohms ±10%, 1 w.
R504	19A115681P3	Variable, Wirewound: 250 ohms ±20%, 3 w; sim to CTS Series 115.
R505	3R77P111K	Composition: 110 ohms ±10%, 1/2 w.
R506	3R77P222K	Composition: 2200 ohms ±10%, 1/2 w.
R507	3R77P103K	Composition: 10,000 ohm, ±10%, 1/2 w.
R509	3R77P473K	Composition: 47,000 ohms ±10%,1/2 w.
R510*	3R78P821K	Composition: 820 ohms ±10%, 1 w.
		In 4EP53A12 of REV A and earlier:
	3R78P102K	Composition: 1000 ohms ±10%, 1 w.
R511	3R77P151K	Composition: 150 ohms ±10%, 1/2 w.
R512	3R77P181K	Composition: 180 ohms ±10%, 1/2 w.
R513	3R77P223K	Composition: 22,000 ohms ±10%, 1/2 w.
		- - - - - - - - - THERMISTORS - - - - - - - -
RT504	19C300048P4	Disc: 100 ohms ±10%; sim to GE 2D2177.
		- - - - - - - - TERMINAL BOARDS - - - - - - - -
TB501	7117710P5	Phen: 1 terminal; sim to Cinch 1775.
		- - - - - - - - JACKS AND RECEPTACLES - - - - - -
XRT501 thru XRT503	4032220P2	Lampholder: sim to Drake N517.
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	19C311147P1	Heat sink.
	19A122484P1	Spacer.
	7118719P4	Clip, spring tension. (Used with L501).
	4032248P1	Clip, spring tension. (Used with RT501 thru RT503).
		ACCESSORIES CABLE 19B205580G1
		- - - - - - - - - - FUSES - - - - - - - - - -
F1 and F2	1R16P8	Quick blowing: 5 amps at 250 v; sim to Littelfuse 312005 or Bussman MTH-5.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XF1 and XF2	19A115776P2	Fuseholder: sim to Bussmann Type HHJ.
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	19A115067P2	Cable, 2 conductor: 600 VRMS; approx 7 feet; sim to Belden 31717.
		CABLE 19B205579G1
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	4034405P5	Plug: 5 contacts; sim to Cannon XLR-5-11C.
	19A115469P1	Cable, 4 conductor: 300 VRMS, approx 48 inches.
		CABLE 19B205624G1
		- - - - - - - - - - PLUGS - - - - - - - - - -
P1	19A115513P1	Adapter, cigarette lighter: 12 V; sim to Cole-Hersee 1624.
F1 and F2	1R16P8	- - - - - - - - - - FUSES - - - - - - - - - - Quick blowing: 5 amps at 250 v; sim to Littelfuse 312005 or Bussman MTH-5.
XF1 and XF2	19A115776P2	- - - - - - - - - - SOCKETS - - - - - - - - - - Fuseholder: sim to Bussmann Type HHJ.
	19A115067P2	- - - - - - - - - MISCELLANEOUS - - - - - - - - Cable, 2 conductor: 600 VRMS; approx 4 feet; sim to Belden 31717.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

PRODUCTION CHANGES

Changes in the equipment to improve performance or to simplify circuits are identified by a "Revision Letter", which is stamped after the model number of the unit. The revision stamped on the unit includes all previous revisions. Refer to the Parts List for descriptions of parts affected by these revisions.

REV. A - To compensate for variations in characteristics (beta vs frequency and current) between transistors from different manufacturers. Added C505 and Q506.

REV. B - (4EP53A12 only)

To compensate for component tolerances.
Changed R510.

REV. B - (4EP53A10, 11 only)
REV. C - (4EP53A12 only)

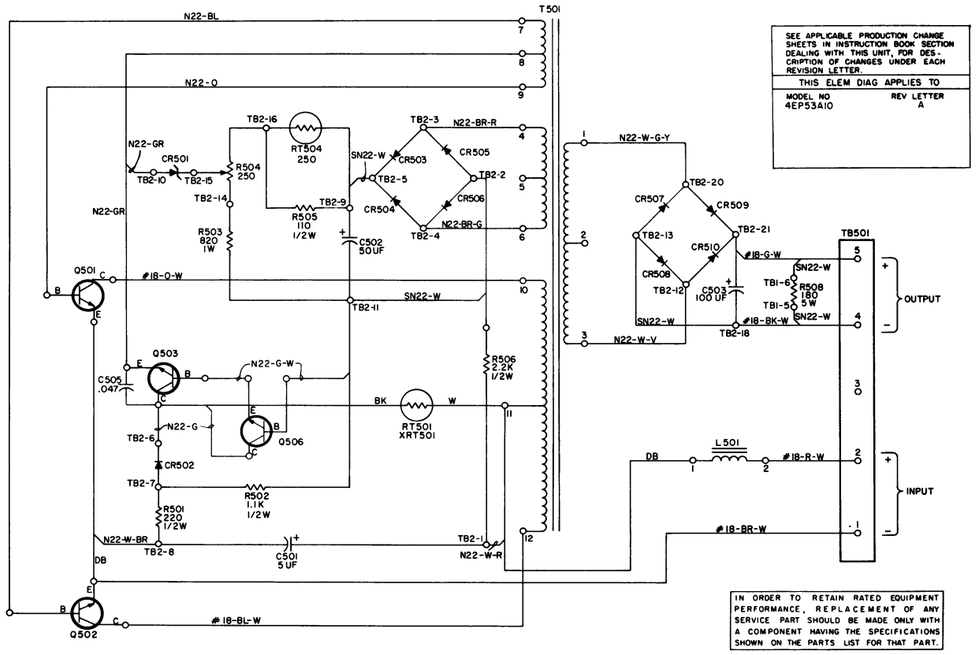
To eliminate possibility of receiver degradation caused by spurious oscillation in charger.
Added C506.

REV. C - (4EP53A10, 11 only)

To permit charger to start at low input voltages.
Changed R502.

SCHEMATIC DIAGRAM

MODEL 4EP53A10



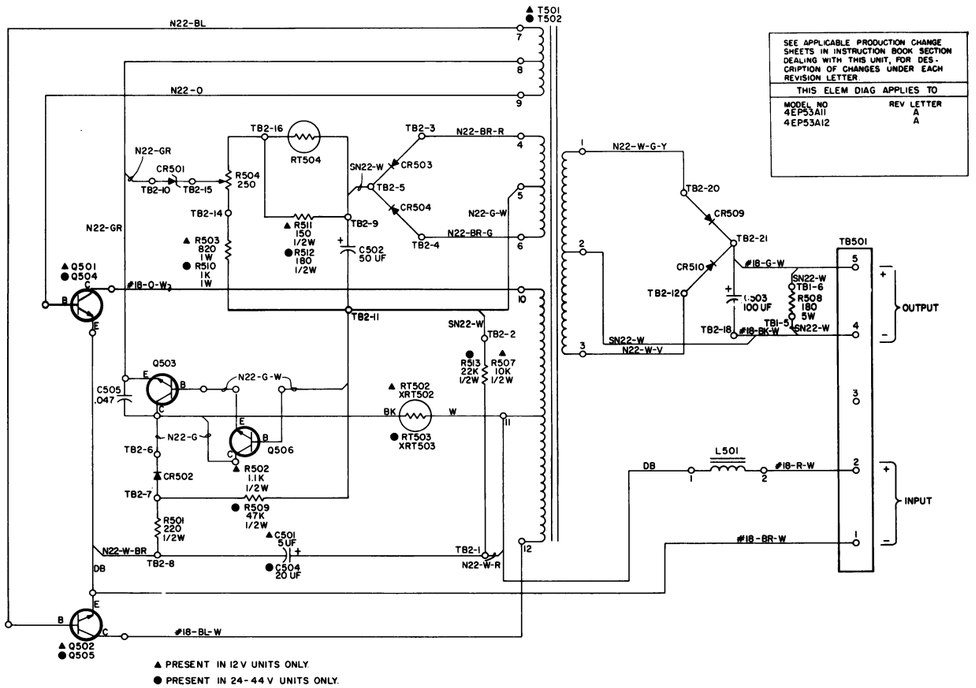
SEE APPLICABLE PRODUCTION CHANGE SHEETS IN INSTRUCTION BOOK SECTION DEALING WITH THIS UNIT, FOR DESCRIPTION OF CHANGES UNDER EACH REVISION LETTER.

THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER
4EP53A10	A

IN ORDER TO RETAIN RATED EQUIPMENT PERFORMANCE, REPLACEMENT OF ANY SERVICE PART SHOULD BE MADE ONLY WITH A COMPONENT HAVING THE SPECIFICATIONS SHOWN ON THE PARTS LIST FOR THAT PART.

(19C311163, Rev. 3)

MODELS 4EP53A11 & 12

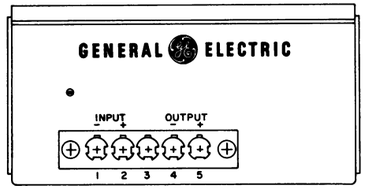


SEE APPLICABLE PRODUCTION CHANGE SHEETS IN INSTRUCTION BOOK SECTION DEALING WITH THIS UNIT, FOR DESCRIPTION OF CHANGES UNDER EACH REVISION LETTER.

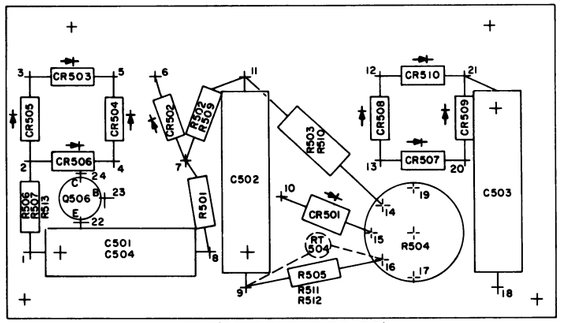
THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER
4EP53A11	A
4EP53A12	A

▲ PRESENT IN 12 V UNITS ONLY.
● PRESENT IN 24-44 V UNITS ONLY.

(19C311167, Rev. 3)

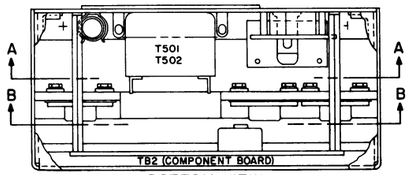


FRONT VIEW

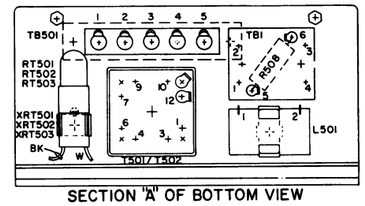


TB2 (COMPONENT BOARD)

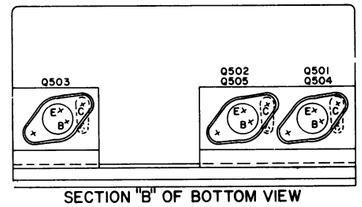
(19C311310, Rev. 1)



BOTTOM VIEW



SECTION "A" OF BOTTOM VIEW



SECTION "B" OF BOTTOM VIEW

SCHEMATIC & OUTLINE DIAGRAMS

PORTA-MOBIL VEHICULAR CHARGER
MODELS 4EP53A10, 11 & 12

PARTS LIST

LBI-3783A

VEHICULAR CHARGER
6 VDC 4EP53A10
12 VDC 4EP53A11
24-44 VDC 4EP53A12
REV A

SYMBOL	G-E PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C505*	19B209243-P105	Polyester: 0.047 µf ±10%, 50 VDCW. Added by Rev A.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L501	7143944-P2	Choke, RF: 120 µh ±10%, .064 ohm DC res max.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - - - -
Q501 thru Q503	19A115527-P1	Silicon, NPN.
Q504 and Q505	19A115622-P1	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R508	5493035-P7	Wirewound: 180 ohms ±5%, 5 w; sim to Tru-Ohm Type X-60.
		- - - - - - - - -THERMISTORS- - - - - - - - - -
RT501	19C307037-P1	Lamp, incandescent: 7.5 v; sim to GE-51.
RT502	19C307037-P4	Lamp, incandescent: 14 v; sim to GE-1815.
RT503	19C307037-P5	Lamp, incandescent: 28 v; sim to GE-1829.
		- - - - - - - - - - TRANSFORMERS - - - - - - - - - -
T501	19C311143-G1	Coil.
T502	19C311143-G2	Coil.
		- - - - - - - - - TERMINAL BOARDS - - - - - - - - -
TB1	19A122495-G1	Eyelet board.
TB2		COMPONENT BOARD 19C311157-G1 (Used in MOdel 4EP53A10) 19C311157-G2 (Used in Model 4EP53A11) 19C311157-G3 (Used in Model 4EP53A12)
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C501	19A115680-P2	Electrolytic: 5 uf +150% -10%, 25 VDCW; sim to Mallory Type TT.
C502	19A115680-P4	Electrolytic: 50 uf +150% -10%, 25 VDCW; sim to Mallory Type TT.
C503	19A115680-P5	Electrolytic: 100 µf +150% -10%,25 VDCW; sim to Mallory Type TT.
C504	7489483-P11	Electrolytic: 5 uf +75% -10%, 6 VDCW; sim to Sprague Type 30D.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - - - -
CR501	19A115528-P8	Silicon, Zener.
CR502 thru CR510	4037822-P1	Silicon.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q506*	19A115300-P1	Silicon, NPN; sim to Type 2N3053. Added by Rev A.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R501	3R77-P221K	Composition: 220 ohms ±10%, 1/2 w.
R502	3R77-P112K	Composition: 1100 ohms ±10%, 1/2 w.
R503	3R78-P821K	Composition: 820 ohms ±10%, 1 w.
R504	19A115681-P3	Variable, Wirewound: 250 ohms ±20%, 3 w; sim to CTS Series 115.
R505	3R77-P111K	Composition: 110 ohms ±10%, 1/2 w.
R506	3R77-P222K	Composition: 2200 ohms ±10%, 1/2 w.
R507	3R77-P103K	Composition: 10,000 ohm, ±10%, 1/2 w.
R509	3R77-P473K	Composition: 47,000 ohms ±10%,1/2 w.
R510	3R78-P102K	Composition: 1000 ohms ±10%, 1 w.
R511	3R77-P151K	Composition: 150 ohms ±10%, 1/2 w.
R512	3R77-P181K	Composition: 180 ohms ±10%, 1/2 w.
R513	3R77-P223K	Composition: 22,000 ohms ±10%, 1/2 w.
		- - - - - - - -THERMISTORS- - - - - - - - - - -
RT504	19C300048-P4	Disc: 100 ohms ±10%; sim to GE 2D2177.
TB501	7117710-P5	Phen: 1 terminal; sim to Cinch 1775.
		- - - - - - - - JACKS AND RECEPTACLES - - - - - - - -
XRT501 thru XRT503	4032220-P2	Lampholder: sim to Drake N517.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	19C311147-P1	Heat sink.
	19A122484-P1	Spacer.
	7118719-P4	Clip, spring tension. (Used with L501).
	4032248-P1	Clip, spring tension. (Used with RT501 thru RT503)
		ACCESSORIES CABLE 19B205580-G1
		- - - - - - - - - - - - FUSES - - - - - - - - - - - -
F1 and F2	1R16-P8	Quick blowing: 5 amps at 250 v; sim to Littelfuse 312005 or Bussman MTH-5.
		- - - - - - - - - - - - SOCKETS - - - - - - - - - - - -
XF1 and XF2	19A115776-P2	Fuseholder: sim to Bussmann Type HHJ.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	19A115067-P2	Cable, 2 conductor: 600 VRMS; approx 7 feet; sim to Belden 31717. CABLE 19B205579-G1
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	4034405-P5	Plug: 5 contacts; sim to Cannon XLR-5-11C.
	19A115469-P1	Cable, 4 conductor: 300 VRMS, approx 48 inches. CABLE 19B205624-G1
		- - - - - - - - - - - - PLUGS - - - - - - - - - - - -
P1	19A115513-P1	Adapter, cigarette lighter: 12 V; sim to Cole-Hersee 1624.
		- - - - - - - - - - - - FUSES - - - - - - - - - - - -
F1 and F2	1R16-P8	Quick blowing: 5 amps at 250 v; sim to Littelfuse 312005 or Bussman MTH-5.
		- - - - - - - - - - - - SOCKETS - - - - - - - - - - - -
XF1 and XF2	19A115776-P2	Fuseholder: sim to Bussman Type HHJ.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	19A115067-P2	Cable, 2 conductor: 600 VRMS; approx 4 feet; sim to Belden 31717.

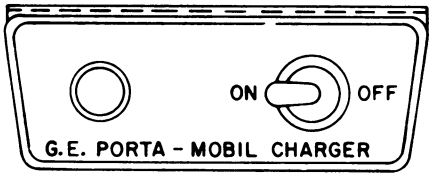
*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

PRODUCTION CHANGES

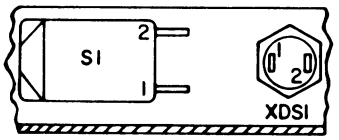
Changes in the equipment to improve performance or to simplify circuits are identified by a "Revision Letter", which is stamped after the model number of the unit. The revision stamped on the unit includes all previous revisions. Refer to the Parts List for descriptions of parts affected by these revisions.

REV. A - To compensate for variations in characteristics (beta vs frequency and current) between transistors from different manufacturers. Added C505 and Q506.

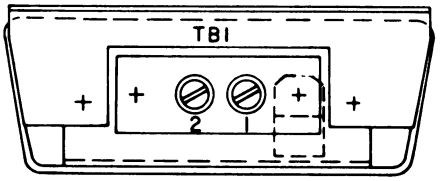
FRONT VIEW



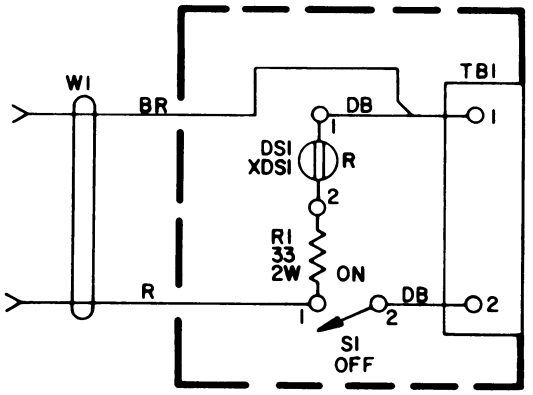
TERMINAL VIEW OF SI & XDSI



REAR VIEW



(19A122693, Rev. 1)



(19A122611, Rev. 2)

SCHEMATIC & OUTLINE DIAGRAM

CONTROL UNIT, PL-19B205601-G1

PARTS LIST

CONTROL UNIT FOR VEHICULAR CHARGER
19B205601-G1

SYMBOL	G-E PART NO.	DESCRIPTION
		- - - - - - - - - INDICATING DEVICES - - - - - - - - -
DS1	19A115825-P1	Lamp, incandescent: 28 v; sim to Drake 2840.
DS1	19B201122-P1	Lamp, indicator: 6 v; sim to GE 1768.
		- - - - - - - - - - - RESISTORS - - - - - - - - - - -
R1	3R79-P330K	Composition: 33 ohms ±10%, 2 w.
		- - - - - - - - - - - SWITCHES - - - - - - - - - - -
S1	5491899-P3	Toggle: SPST, 6 amps at 125 VAC/VDC; sim to Cutter-Hammer 8383K3.
		- - - - - - - - - TERMINAL BOARDS - - - - - - - - -
TB1	7117710-P2	Phen: 2 terminals; sim to Cinch 1781.
		- - - - - - - - - - - CABLES - - - - - - - - - - -
W1	19A115067-P2	Cable, 2 conductor: 600 VRMS; approx 4 feet; sim to Belden 31717.
		- - - - - - - - - - - SOCKETS - - - - - - - - - - -
XDS1	19B201122-P2	Lamp: sim to Drake Series 121.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19B201122-P4	Cap, lens: red translucent nylon.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

ORDERING SERVICE PARTS

Each component appearing on the schematic diagram is identified by a symbol number, to simplify locating it in the parts list. Each component is listed by symbol number, followed by its description and GE Part Number.

Service parts may be obtained from Authorized GE Communication Equipment Service Stations or through any GE Radio Communication Equipment Sales Office. When ordering a part, be sure to give:

1. GE Part Number for component
2. Description of part
3. Model Number of equipment
4. Revision letter stamped on unit

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installtion, operation or maintenance.

Should further information be desired, or should particular problems arise which are not covered sufficiently for the purchaser's purposes, contact the nearest Radio Communication Equipment Sales Office of the General Electric Company.

MAINTENANCE MANUAL

LBI-3792

DF-0058

Progress Is Our Most Important Product

GENERAL ELECTRIC

MOBILE RADIO DEPARTMENT LYNCHBURG, VIRGINIA 24502

(In Canada, Canadian General Electric Company, Ltd., 100 Wingold Ave., Toronto 19, Ontario)

PRINTED IN U.S.A.

DESCRIPTION

The General Electric PORTA-MOBIL Vehicular Charger Models 4EP53A10 (6-Volt), 4EP53A11 (12-Volt) and 4EP53A12 (24-44 Volt) provide an automatically regulated charge current to PORTA-MOBIL rechargeable batteries. All models are capable of delivering 100% recharge to the battery. When the battery is fully charged, the charge current automatically drops to a value within the manufacturers recommended overcharge rate.

The charger is designed for use in vehicles with either positive or negative grounded electrical systems, or with ungrounded systems. All external connections are made to a 5-point terminal board on the front of the charger.

Connections between the charger and the power supply are provided by a 4-foot charger cable containing four color coded wires. This cable is terminated on one end by a connector which mates with the power supply charge jack. The other end is terminated with ring terminals for connecting to the charger. For 12- and 24—44 volt chargers, battery input power is automatically disconnected when the charger cable is removed from the power supply charge jack.

Input power connections are provided by a two-wire battery cable which connects between the charger input terminals and the vehicle ignition switch or fuse plate.

Two optional input power connections (Options 5579 and 5580) are available. Option 5579 provides a control unit with power switch and indicator lamp. Option 5580 provides a two-wire cable terminated with a standard cigar plug on one end and ring terminals on the other end. All input power leads have in-line fuses to provide maximum circuit protection.

NOTE

The PORTA-MOBIL Vehicular Charger is compatible with power supply Models 4EP44A11 (Rev. C & later), 4EP44B10 (Rev. B & later), 4EP65A10 and 4EP65B10. The charger may be used with earlier revisions of Models 4EP44A10 and 4EP44B10 (or Model 4EP44A10, Rev. C), if the power supplies are equipped with factory installed option 5586 or field installed option 5587.

INSTALLATION

PORTA-MOBIL VEHICULAR CHARGER

The charger is provided complete with mounting hardware. Mount the charger and make connections as follows:

1. Choose a mounting place beneath the vehicle instrument panel, against firewall, on back of the PORTA-MOBIL mounting frame, or some other convenient location within cable length (4 feet) of the charger jack on the PORTA-MOBIL power supply. (If mounting frame location is chosen, two holes on the back of the mounting frame line up with holes in the charger case, making drilling unnecessary).

2. Remove the two hex-head screws in the front panel and slide off the back cover (Figure 1).

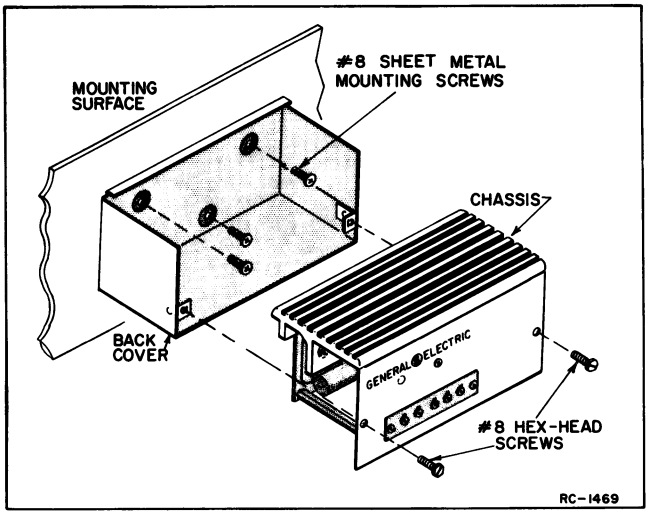


Figure 1 - Mounting the Charger

3. Use the cover as a template and drill 3 holes with a #32 (1/8-inch) drill.

4. Mount the back cover with the three #8 sheet metal screws provided and reassemble the charger.

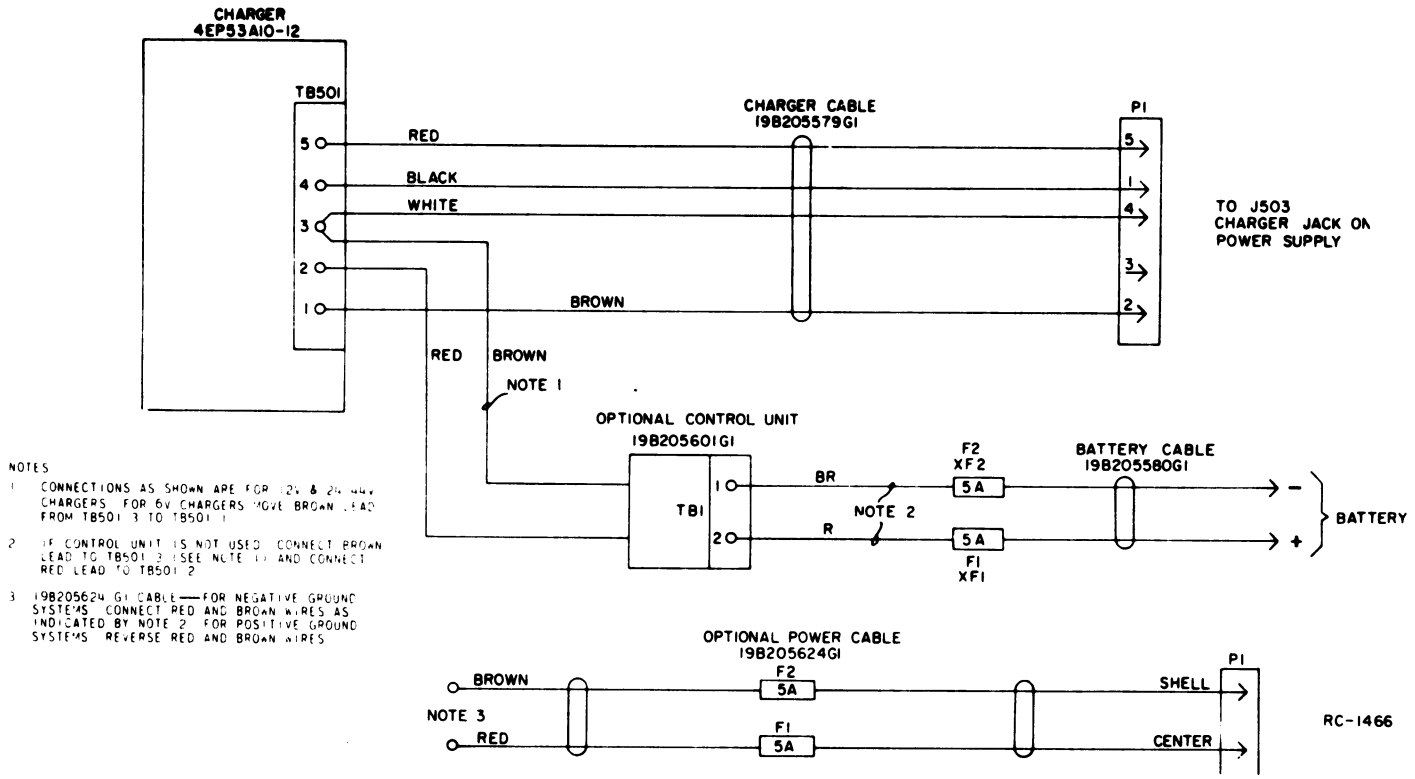


Figure 2 - Equipment Connection Diagram

5. Make input and output connections to TB501 on the charger as indicated by Figure 2 and the markings on the charger case.

NOTE

The 6-volt charger does not have the automatic disconnect feature and should be connected to power through the vehicle ignition switch or the optional control unit (Option 5579).

CONTROL UNIT 19B205601-G1 (Optional)

The control unit is provided complete with mounting bracket and associated hardware. Install unit and make connections as follows:

1. Choose the mounting location beneath the vehicle instrument panel or another location that is convenient to the operator.

2. Use the control unit mounting bracket as a template and drill 2 holes with a #32 (1/8-inch) drill. Attach the control unit to the mounting surface with two #8 self-tapping screws provided.

NOTE

The mounting bracket can be rotated 180° if necessary to facilitate installation.

3. The lamp furnished in the control unit is for use with 12- or 24-44-volt chargers. If a 6-volt charger is used, replace the lamp with the 6-volt lamp supplied separately.

4. Make connections as indicated by Figure 2.

OPERATION

Operation of the charger is fully automatic. All chargers will fully charge the PORTA-MOBIL Rechargeable Battery in 16 hours or less when connected to the specified input voltage. If the charger is connected to a fully charged battery, it will keep the battery at full charge while transmitting and receiving on a 10% (Trans), 10% (Rec) 80% (Standby) duty cycle.

When connected to a fully discharged battery, the charger permits the transmitter to deliver 80% of RF power immediately. In this case, if a 10% (Trans),

10% (Rec) 80% (Standby) duty cycle is maintained, the battery will reach full charge in approximately 24 hours.

The Optional Control Unit provides a Power OFF-ON switch for selecting charger operation. An indicator lamp lights when the switch is ON.

CIRCUIT ANALYSIS

The Vehicular Charger contains multivibrator, regulator, rectifier and filter circuits required to supply proper charge current to PORTA-MOBIL rechargeable batteries.

MULTIVIBRATOR CIRCUIT

Two transistors (Q501/Q504 and Q502/Q505) are used in the inductively-coupled multivibrator circuit. The transistors act as switches, with one conducting while the other is off.

The base bias divider network consists of an incandescant lamp (RT501/RT502/RT503), a diode (CR502) and a resistor (R501). When power is applied to the circuit, the cold filament of the lamp presents a very low resistance. This establishes a heavy forward bias for cold starting. Immediately upon starting, the lamp filament warms up and increases in resistance to provide normal running bias for the transistors. Due to inherent differences in the transistors, one will start conducting before the other and will draw a heavier current through one half of the primary windings of T501.

Assume that Q501/Q504 starts to conduct first, causing a current to flow through one half of the primary winding. This current flow induces a voltage in all windings of the transformer. A positive voltage is induced in the feedback winding, providing more forward bias to Q501/Q504, and causing it to conduct more heavily. The negative voltage appearing at one end of the feedback winding acts to cut off Q502/Q505.

The current through the primary winding rapidly saturates the core of the transformer, which stops the magnetic field (flux) from changing. With no change in the magnetic field, no voltages are induced in the windings. The magnetic field starts to collapse, sending a current through the transformer in the opposite direction. This reverses the polarity of the induced voltage in the windings, which cuts off Q501/Q504 and provides a forward bias to Q502/Q505, causing it to conduct. The two transistors continue to conduct alternately as long as input power is applied.

REGULATOR CIRCUIT

The charger output is controlled by Q503 & Q506 and associated components in the feedback circuit. Q506 is controlled by CR501 and the output from a control winding of T501. CR501, R503, R509, R511, RT504 and the control winding are properly chosen to maintain the charge current for the PORTA-MOBIL rechargeable battery within safe limits for all conditions of temperature (-30°C to +65°C) and state of charge of the battery. Potentiometer R504 determines the maximum and minimum charge current limits. This potentiometer is properly adjusted and locked at the factory and should not be readjusted in the field.

MAINTENANCE

To gain access to the inside of the charger, remove the two hex head screws from the charger front and pull the charger case apart. Troubleshooting and servicing procedures are outlined in the following TROUBLESHOOTING PROCEDURE Chart.

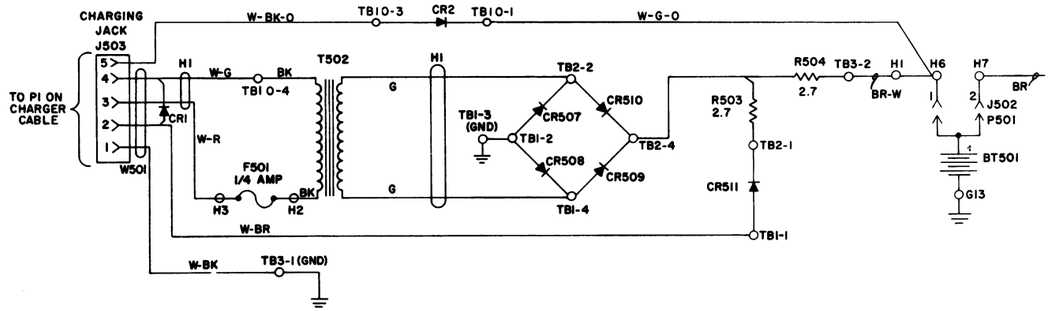
NOTE

The setting of R504 is critical and should not be changed. If adjustment is required for any reason, the charger should be returned to the factory.

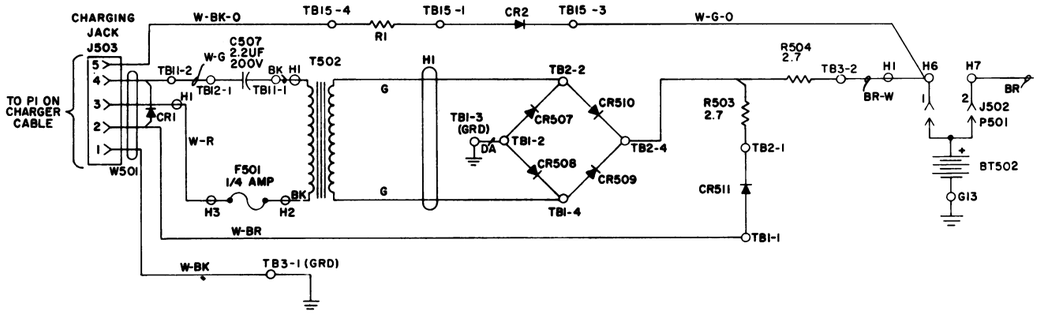
TROUBLESHOOTING PROCEDURE

SYMPTOM	PROCEDURE
CHARGER DOES NOT START	CHECK THE FOLLOWING: a. All fuses. b. All transistors for collector-to-emitter shorts. c. Input voltage to charger (TB501-1 and -2). d. Q501/Q504 and Q502/Q505 collector-to-emitter voltage. Readings should be approximately equal to supply voltage. e. Resistors for opens and shorts. f. Capacitors and diodes for shorts. g. Continuity of transformer primary windings and secondary windings. h. Transformer for shorted turns or shorts between windings (disconnect loads from secondary windings before checking).
NICKEL-CADMIUM BATTERY DOES NOT MAINTAIN CHARGE	Disconnect Nickel-Cadmium Battery and check for 14 volts (or more) at TB501-4 and -5 of charger. a. If voltage exceeds 14 volts, the battery is probably defective. b. If voltage is below 14 volts, check the following: 1. Secondary of T501 for shorts or opens. 2. Diodes in secondary of T501 for shorts or opens. 3. C503 for short.

4EP44AIO (REV C) OR 4EP44AII WITH OPTION 5586
(CHARGING CIRCUIT)



4EP44BIO WITH OPTION 5586
(CHARGING CIRCUIT)



RC-1507

SCHEMATIC DIAGRAM

RECHARGEABLE POWER SUPPLY
WITH OPTION 5586

PARTS LIST

POWER SUPPLY MODIFICATION
Option 5586

SYMBOL	G-E PART NO.	DESCRIPTION
		----------RECTIFIERS----------
CR1 and CR2	19A115823-P1	Silicon.
		----------RESISTOR----------
R1	19B209022-P15	Wirewound, phen: 1 ohms ±5%, 2 w; sim to IRC Type BWH.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.