War Department Technical Manual
TM 11-275

This Manual supersedes TM 11-275, 5 April 1943, TM 11-275-A, 22 June 1943, and TM 11-275, 25 August 1943 and Section III of War Department Training Circular No. 3, 1943.

PE-104-A
Applicable Pages
RADIO SET
SCR-284-A

k4che

War Department

24 January 1944

Revised 5 April 1945

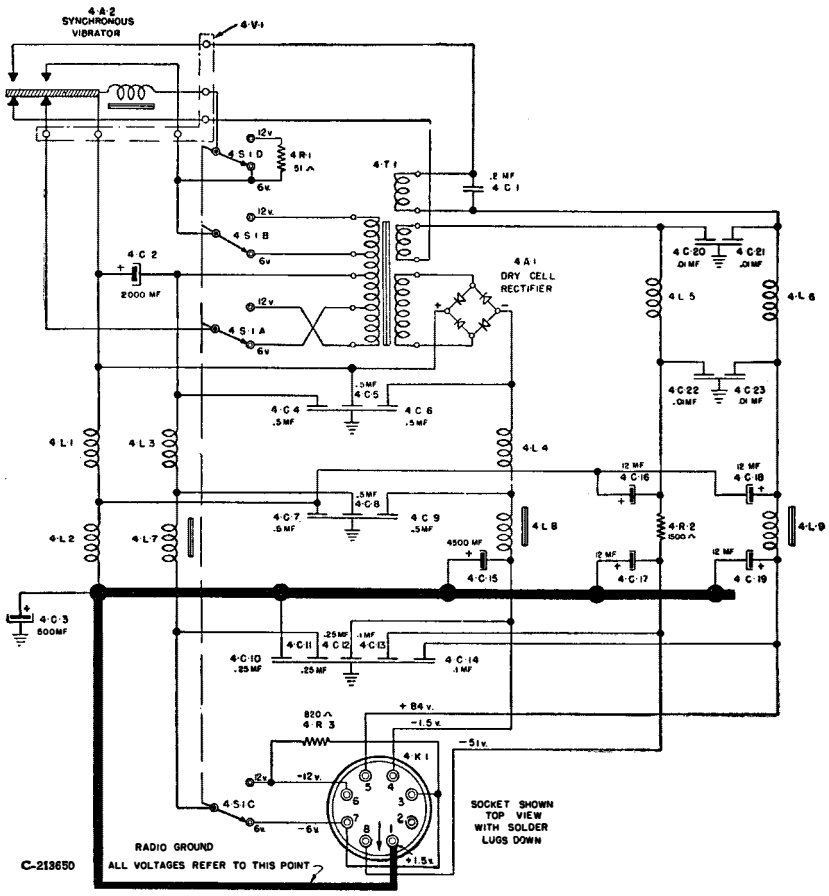

FIG. 20. POWER CONVERTER PE-104-A, SCHEMATIC DIAGRAM

Used on Sets 1-12000. For Sets above 12000, see Fig. 48-A.

17. Power Converter PE-104-A (FIGS. 20 & 21)

Power Converter PE-104-A may be used as an alternate source of power with Battery BA-43, being equivalent in both physical size and voltage. It is flexible in that it can be adjusted from 6-volt to 12-volt input by switch 4-S-1, with a slotted shaft for screwdriver adjustment, located on the top cover near the name plate. Adjustment from 6-volt to 12-volt is accomplished through the primary of the power transformer (4-T-1). Power Converter PE-104-A, operating in conjunction with the 6- or 12-volt storage battery, or Generator GN-45-(*), supplies plate and filament voltages to the receiver, and bias and filament voltages to the transmitter.

*NOTE: AN **ALTERNATE** POWER CONVERTER PE-104-A IS USED IN A NUMBER OF RADIO SETS SCR-284-A.*

*THE FUNCTIONING OF THE **ALTERNATE** POWER CONVERTER PE-104-A IS IDENTICAL WITH POWER CONVERTER PE-104-A. **FOR REFERENCE TO ALTERNATE SCHEMATIC AND CONNECTION DIAGRAMS, (FIGURES 48-A AND 48-B.)***

a. Primary voltage enters connector 4-K-1 at point No. 1 to No. 6, or point No. 1 to No. 7 (as selected), Figure 20, and terminates at the center tap of the primary of Power Transformer (4-T-1). It is filtered by iron core choke (4-L-7), air core choke (4-L-3), and capacitors (4-C-11, 4-C-8, 4-C-4, and 4-C-2). The positive side of the vibrator is connected from the return bus and filtered to the vibrator by capacitors (4-C-3, 4-C-5, and 4-C-7) and air core chokes (4-L-1 and 4-L-2).

b. The synchronous vibrator (4-A-2) interrupts the direct current in the primary of Transformer (4-T-1), changing direct current into alternating, or pulsating current. The transformer then steps up this voltage. This is rectified by the other set of points on vibrator (4-A-2), and is filtered by chokes (4-L-6 and 4-L-9), and capacitors (4-C-21, 4-C-23, 4-C-18, and 4-C-19). Capacitor (4-C-1) is connected across the high voltage secondary serving as a buffer, absorbing surges which occur on breaking current at the vibrator points. Current at this point is d-c and terminates at pin No. 5 on socket (4-K-1). The negative return connects between the high voltage secondary and pin No. 8 on socket (4-K-1), filtered by capacitors (4-C-20, 4-C-22, 4-C-16, and 4-C-17),

NOTE: POWER CONVERTER PE-104-A, PROCURED ON ORDER No. 29069-PHILA-45-10, IS SIMILAR TO THE POWER CONVERTER PE-104-A AS SHOWN IN FIGURE 20 WITH THE ADDITION OF BALLAST RECTIFIER 4-A-3 IN THE FILAMENT CIRCUIT AND WITH THE ELIMINATION OF CAPACITORS 4-C-20, 4-C-21, 4-C-22, 4-C-23, CHOKES 4-L-1, 4-L-3, 4-L-4, AND 4-L-5. IT IS ALSO IDENTICAL WITH ***ALTERNATE*** *POWER CONVERTER PE-104-A SHOWN IN FIGURES 48-A AND 48-B WITH THE ADDITION OF BALLAST RECTIFIER 4-A-3 TO THE FILAMENT CIRCUIT.*

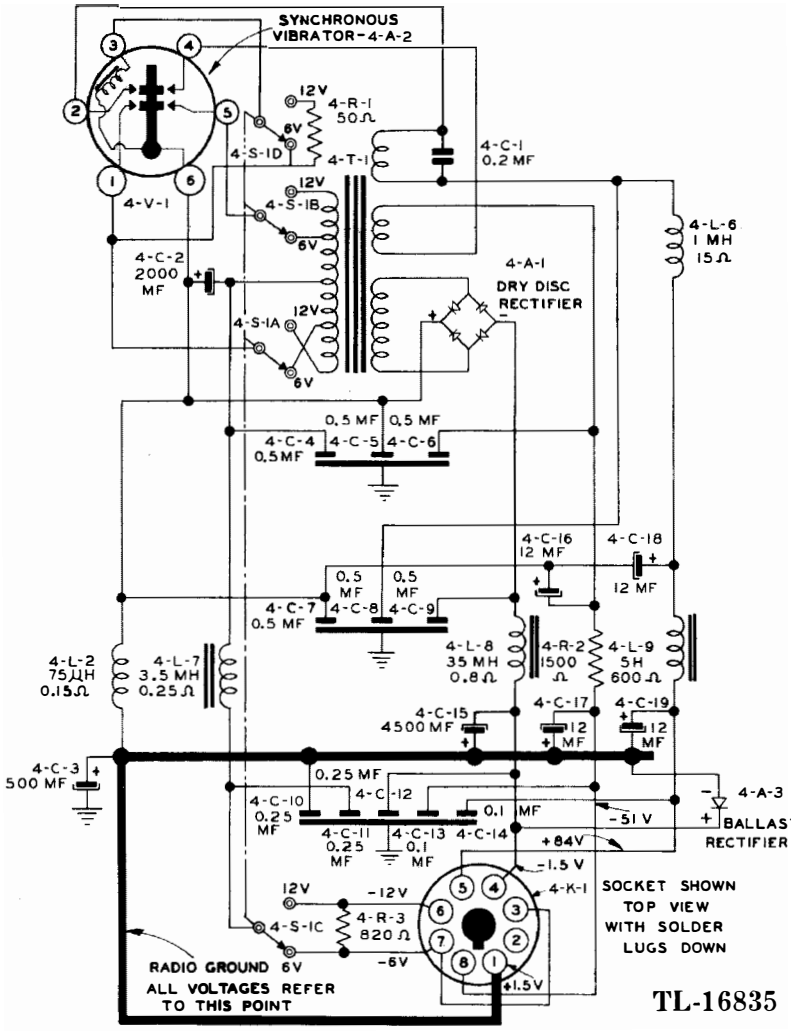

FIG. 20.1. POWER CONVERTER PE-104-A, SCHEMATIC DIAGRAM (SECOND REVISION)

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air choke (4-L-5), and bias resistor (4-R-2), across which is developed the 51-volts bias.

c. Another secondary on transformer (4-T-1) is connected to the input arms of rectifier (4-A-1). Pulsating d.c. coming out of the other two arms is filtered on the positive side by capacitors (4-C-5, 4-C-2, 4-C-7, and 4-C-3), and chokes (4-L-1 and 4-L-2). On the negative side it is filtered by capacitors (4-C-6, 4-C-9, 4-C-12, and 4-C-15), aircore choke (4-L-4) and iron core choke (4-L-8), and then connects to pin No. 4 on socket 4-K-1.

d. Air core chokes (4-L-1, 4-L-2, 4-L-3, and 4-L-4) serve to eliminate "hash" which may otherwise back up through the filaments causing undesirable noises. The air core chokes also reduce some of the pulsation and noise caused by the breaking of the points of the vibrator.

Iron core chokes (4-L-8 and 4-L-9), smooth pulsation so that direct current flows smoothly.

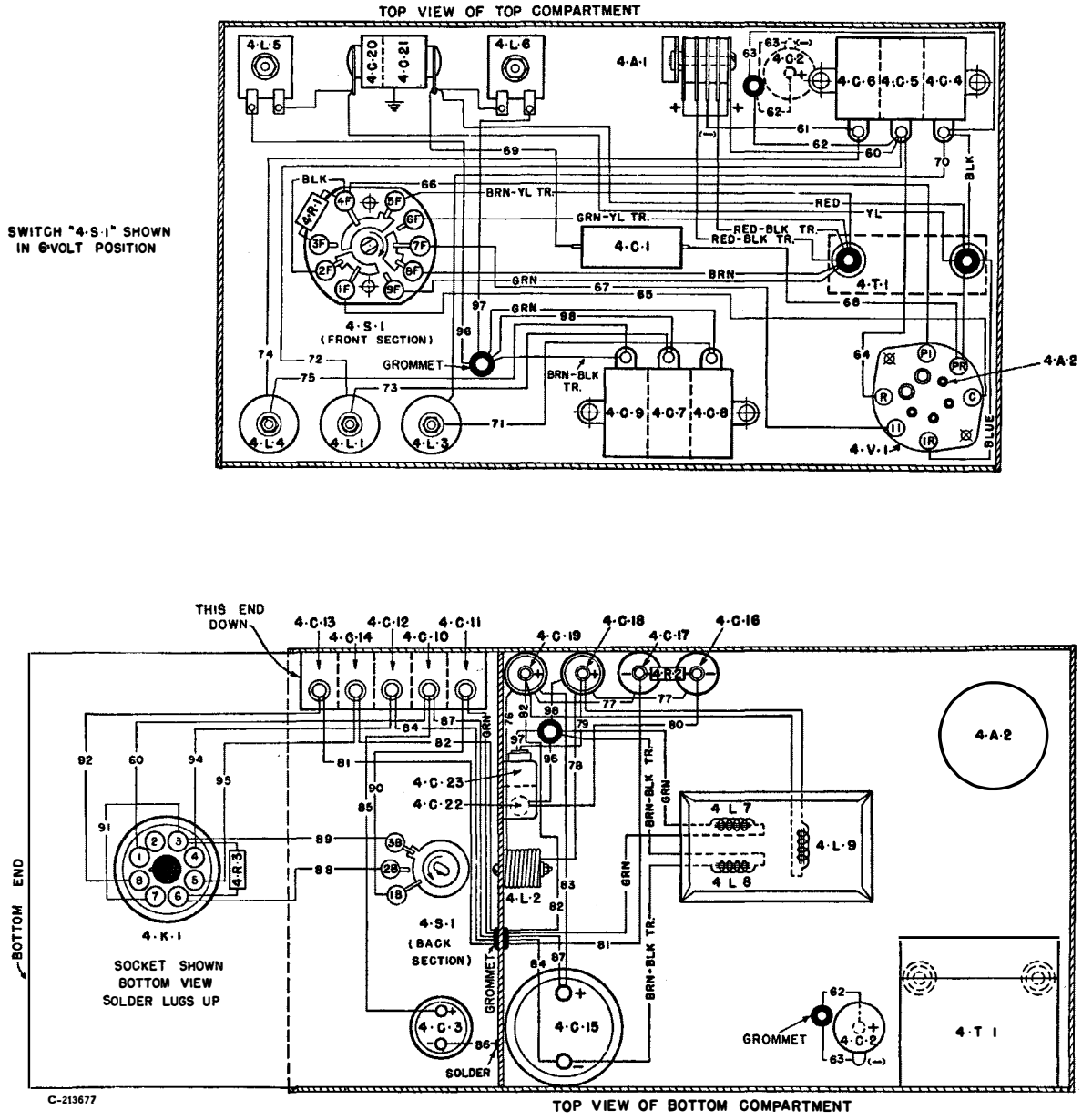


FIG. 21. POWER CONVERTER PE-104-A, CONNECTION DIAGRAM

Used on Sets 1-12000. For Sets above 12000, see Fig. 48-B.

becomes evident, lower the baking temperature, adding one hour to the baking time for each 10° F. drop.

(3) After the baking operation remove from heating apparatus and apply varnish to all parts and exposed metal with a paint brush or spray. Follow instructions provided with the kit.

(4) After varnish has been applied, replace the component in the heating apparatus and allow to remain there for approximately one-half hour—until varnish has dried.

(5) Remove from heating apparatus and repeat the application of varnish.

(6) Replace in heating apparatus. Shut off heat and allow to cool for approximately twelve hours.

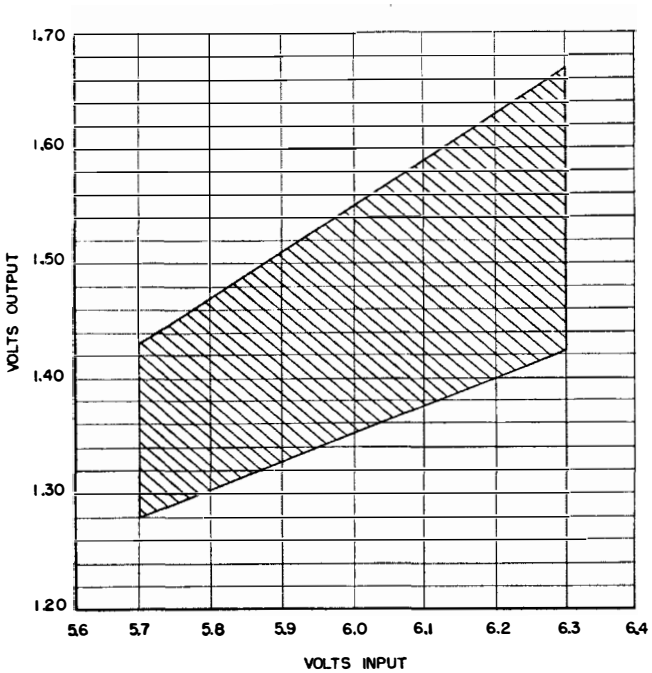
(7) When component has returned to normal ambient temperature, and varnish is absolutely dry (not tacky), remove all masking tape.

(8) Clean off any excess varnish on those portions where it will impede electrical continuity or mechanical action.

(9) Extreme caution should be taken when varnishing around moving parts. Varnish, when dry, will impede the mechanical motion.

35. Power Converter PE-104-A

a. In some power converter units transformer 4-T-1 has a dropping resistor, covered with black insulated sleeving, connected in series with one lead to rectifier 4-A-1. If 4-T-1 is replaced, remove the series resistor. It is a part of the old transformer and should not be used with the replacement unit.



Sketch (d)

PE-104-A VOLTAGE CHART

If a resistor is necessary, it will be issued as a part of the replacement transformer.

b. It is possible for the vibrator used in the Power Converter PE-104-A to control the output voltages over a considerable range. Therefore, it is important to check the output voltages when the vibrator is replaced. The most important of these checks is that on the filament supply voltage, nominally 1.4 volts. If this supply is too high, very short tube life will result, and if it is too low, the receiver performance will suffer.

These voltages may be checked by applying a source of approximately 6 volts d-c from a storage battery to terminals 1 and 7 on power plug 4-K-1. (See Figure 48-A.) Connect a 3.5 ohm resistor, which is rated at 1 watt or greater, between terminals 1 and 4. Use a voltmeter of 1000 ohms per volt or greater, and carefully measure the input voltage between terminals 1 and 7, and the output voltage between terminals 1 and 4. If the output voltage does not fall within the shaded area of Sketch (d), use another vibrator. For example, if 6.1 volts is measured on the input, the output voltage should be between 1.375 and 1.590 volts. Any vibrators which do not come within the limits shown on Sketch (d), may be usable for replacement in another power converter.

c. In the later models of Power Converter PE-104-A, bakelite has been substituted in place of fibre and fishpaper for insulating parts. All bakelite parts have been processed to make them fungi- and moisture-resistant.

On all power converters with serial Nos. 10,001 and higher, chokes 4-L-7, 4-L-8, and 4-L-9 in a metal container, and transformer 4-T-1 also in a metal container are hermetically sealed.

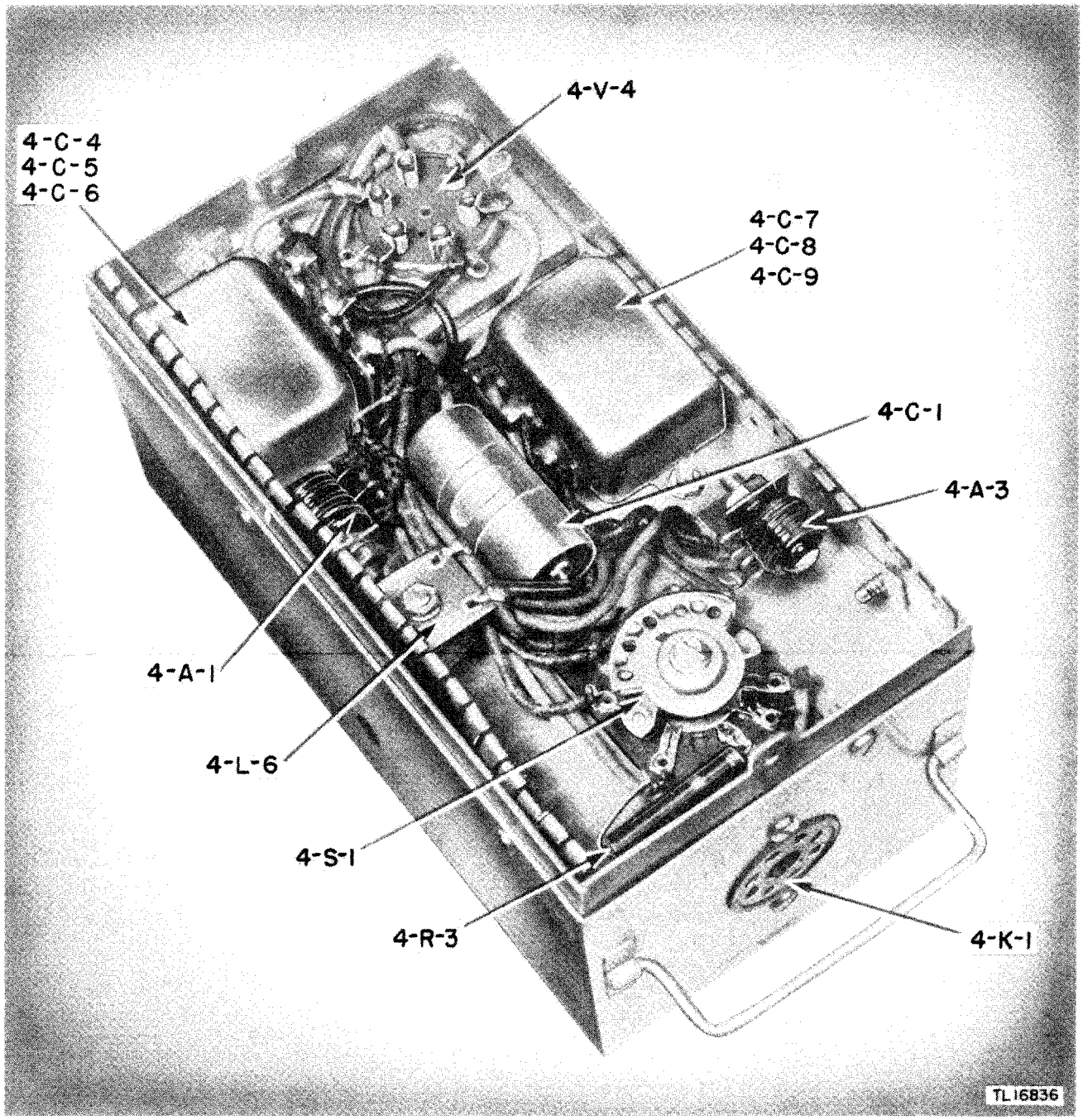


FIG. 36.1. POWER CONVERTER PE-104-A (SECOND REVISION) TOP COVER REMOVED

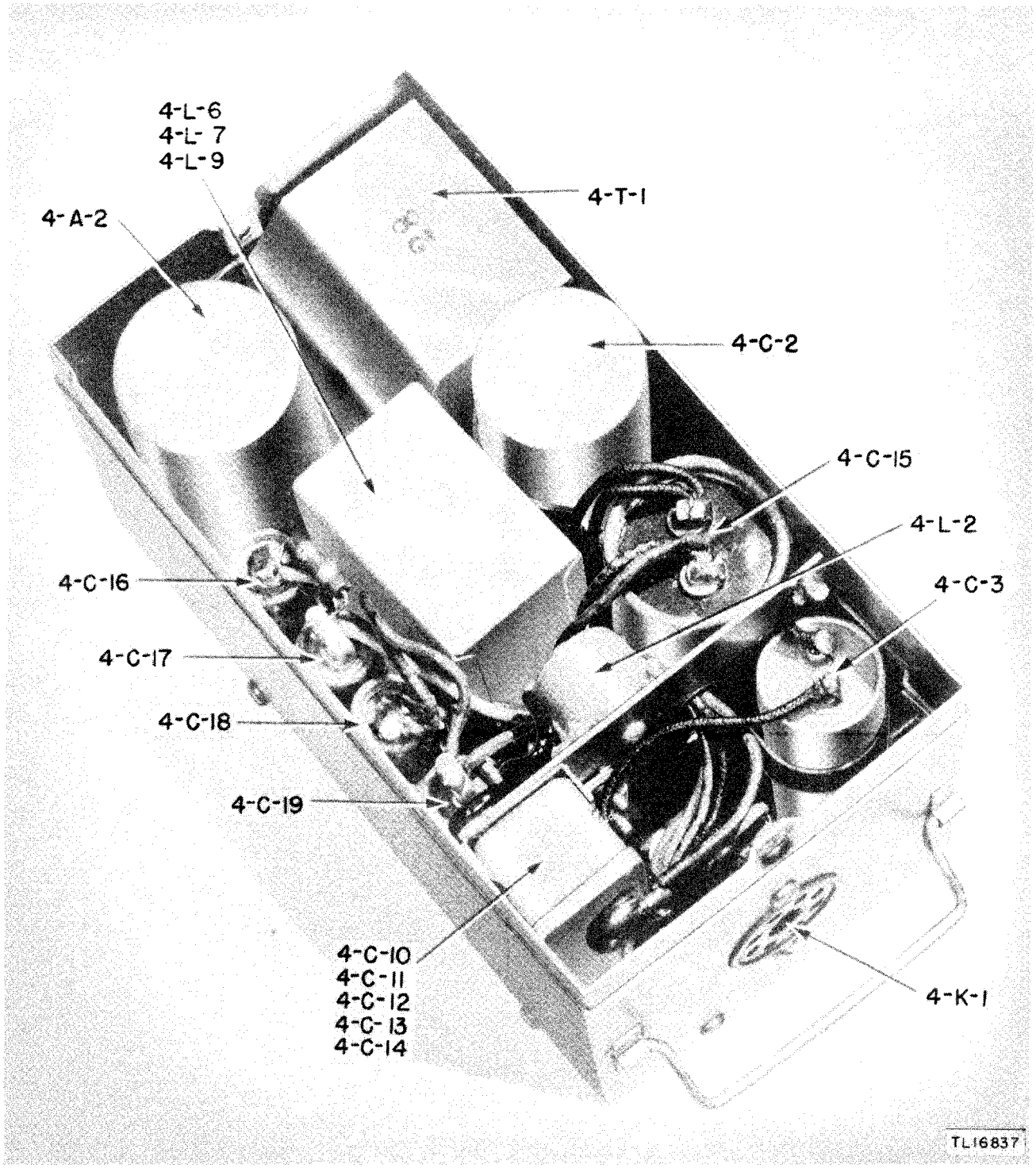


FIG. 36.2. POWER CONVERTER PE-104-A (SECOND REVISION) BOTTOM COVER REMOVED

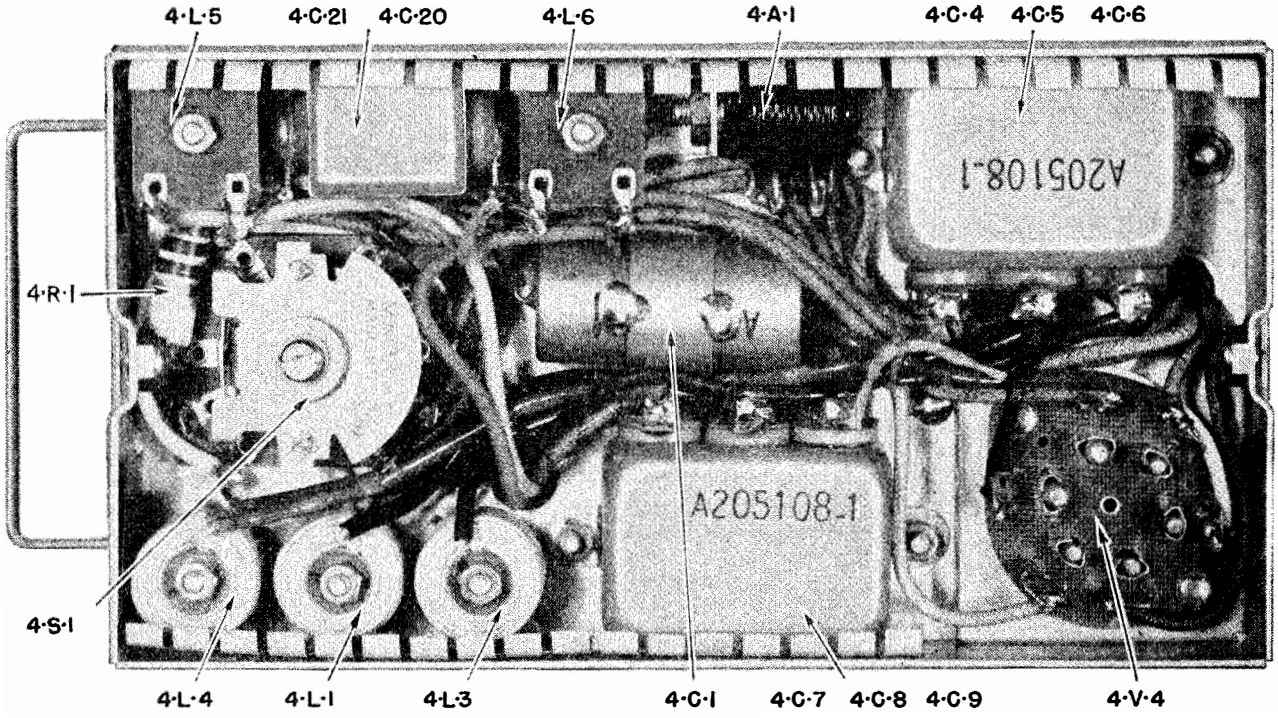


FIG. 40. POWER CONVERTER PE-104-A (BOTTOM COVER REMOVED)

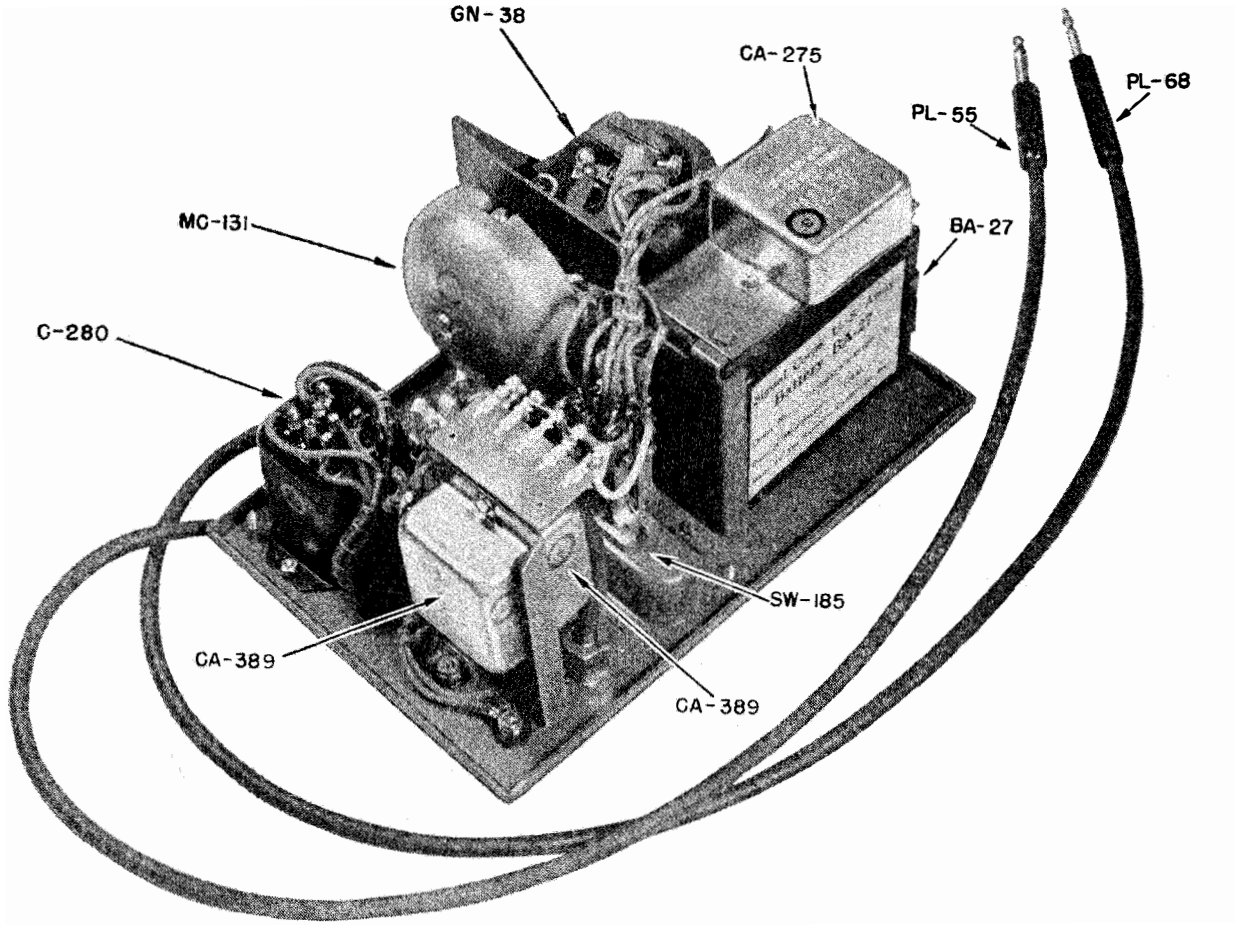


FIG. 41. REMOTE CONTROL UNIT RM-29-A (CASE REMOVED)

45. REPLACEABLE PARTS FOR POWER CONVERTER PE-104-A

ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	*Symbol*	*Stock No.*	*Name of Part and Description*	*Function*
			CAPACITORS (Fixed)	
1	4-C-1	3DA200-6	Fixed (Special), .2 μf ±10%, 100 v.a.c., case, brass tube ¾" dia. x 1⅝". Wire leads.	Buffer across high voltage
1	4-C-2	3DB2000-4	Fixed (Standard), electrolytic, 2000 μf +100% —20%, 15 v.d.c., solder lug terminals. Positive terminal marked red. Approx. size 1⅜" dia. x 3", metal can.	A supply filter, 6-12 volts
1	4-C-3	3DB500-6	Fixed (Standard), electrolytic, 500 μf +100% —20%, solder lug connection. Positive terminal marked red. Approx. size 1" dia. x 2 13/16", metal can.	A supply filter
1	4-C-4 4-C-5 4-C-6	3DA500-87	Fixed (Special), paper dielectric, triple section, .5 μf ±15%, 100 v.d.c., solder lug terminals. Sealed metal case ¾" x 1¼" x 2⅛", (2) 3/16" dia. mtg. holes spaced 2⅛".	Hash filter
1	4-C-7 4-C-8 4-C-9	3DA500-87	Fixed (Special), paper dielectric, triple section, .5 μf ±15%, 100 v.d.c., solder lug terminals. Sealed metal case ¾" x 1¼" x 2⅛". (2) 3/16" dia. mtg. holes spaced 2⅛".	Hash filter
1	4-C-10 4-C-11 4-C-12 4-C-13 4-C-14	3DE250	Fixed (Special), paper dielectric, 5-section, three .25 μf. 35 v.d.c., two .1 μf, 100 v.d.c., +50% —10%, solder lug terminals. Sealed metal case, approx. size 1 7/32" x 1" x 2¾".	By-pass
1	4-C-15	3DB4500	Fixed (Special), 4500 μf +100% —20%, 2 v.d.c., tubular fibre case, wax impregnated, size 1 7/16" dia. x 3". Solder lug terminal. Positive terminal marked red.	Filter for 1½-volt supply
1	4-C-16	3DB12-15	Fixed (Standard), electrolytic, 12 μf +100% —20%, tubular fibre case, wax impregnated, size ¾" dia. x 2 11/16". Solder lug terminals.	C filter
1	4-C-17	3DB12-15	Fixed (Standard), electrolytic, 12 μf +100% —20%, tubular fibre case, wax impregnated, size ¾" dia. x 2 11/16". Solder lug terminals.	C filter
1	4-C-18	3DB12-15	Fixed (Standard), electrolytic, 12 μf +100% —20%, fibre case, wax impregnated, approx. overall size ¾" dia. x 2 11/16". Solder lug terminals.	B filter

REPLACEABLE PARTS FOR POWER CONVERTER PE-104-A (Continued)

ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	*Symbol*	*Stock No.*	*Name of Part and Description*	*Function*
			CAPACITORS (Fixed) Continued	
1	4-C-19	3DB12-15	Fixed (Standard), electrolytic, 12 μf +100% —20%, fibre case, wax impregnated, size $\frac{3}{4}$" dia. x $2\frac{11}{16}$". Solder lug terminals.	B filter
1	4-C-20 4-C-21		Fixed (Special), dual .01 μf +50% —10%, 200 v.d.c., solder lug terminals. Approx. size $\frac{3}{4}$" x $\frac{3}{4}$" x $2\frac{11}{16}$". Mtg. holes $\frac{11}{64}$" dia. spaced $2\frac{5}{16}$".	By-pass —51 and +84 volt supply (Used only in packs with serial numbers below 12001)
1	4-C-22 4-C-23		Fixed (Special), dual .01 μf +50% —10%, 200 v.d.c., solder lug terminals. Approx. size $\frac{3}{4}$" x 1" x $1\frac{13}{32}$". Mtg. holes .156" dia. spaced $\frac{1}{2}$".	By-pass —51 and +84 volt supply (Used only in packs with serial numbers below 12001)
			CHOKES	
1	4-L-1	3C337-1	(Special), iron core, min. inductance 75 μh, max. coil resistance .15 ohms. Approx. size $\frac{13}{16}$" dia. x $\frac{11}{16}$". Leads 6" long.	Filter in +1.5 volt lead (Used only in packs with serial numbers below 12001)
1	4-L-2	3C337-1	(Special), iron core, min. inductance 75 μh, max. coil resistance .15 ohms. Approx. size $\frac{13}{16}$" dia. x $\frac{11}{16}$". Leads 6" long.	Filter in +1.5 volt lead
1	4-L-3	3C337-1	(Special), iron core, min. inductance 75 μh, max. coil resistance .15 ohms. Approx. size $\frac{13}{16}$" dia. x $\frac{11}{16}$". Leads 6" long.	Filter in input voltage lead (Used only in packs with serial numbers below 12001)
1	4-L-4	3C337-1	(Special), iron core, min. inductance 75 μh, max. coil resistance .15 ohms. Approx. size $\frac{13}{16}$" dia. x $\frac{11}{16}$". Leads 6" long.	Filter in —A $1\frac{1}{2}$ volt lead (Used only in packs with serial numbers below 12001)
1	4-L-5	3C337	(Special), inductance 1 mh, coil resistance 15 ohms ±20%. Approx. size $\frac{13}{16}$" dia. x $\frac{3}{8}$". Leads 1" long.	Filter in —51 volt lead (Used only in packs with serial numbers below 12001)
1	4-L-6	3C337	(Special), inductance 1 mh, coil resistance 15 ohms ±20%. Approx. size $\frac{13}{16}$" dia. x $\frac{3}{8}$". Leads 1" long.	Filter in +84 volt lead
1	4-L-7 4-L-8 4-L-9	3C337-2	(Special), iron core, three chokes in metal container, 4-L-7 inductance 3.5 mh, and max. coil resistance .25 ohms. 4-L-8 inductance 35 mh, and max. coil resistance .8 ohm. 4-L-9 inductance 5.0 henries and max. coil resistance 600 ohms. Approx. size $1\frac{5}{16}$" x 2" x $2\frac{7}{8}$". Wire leads.	4-L-7 filter in negative input voltage lead 4-L-8 filter in negative 1.5 volt 'A' lead 4-L-9 filter in positive 84 volt lead

REPLACEABLE PARTS FOR POWER CONVERTER PE-104-A (Continued)

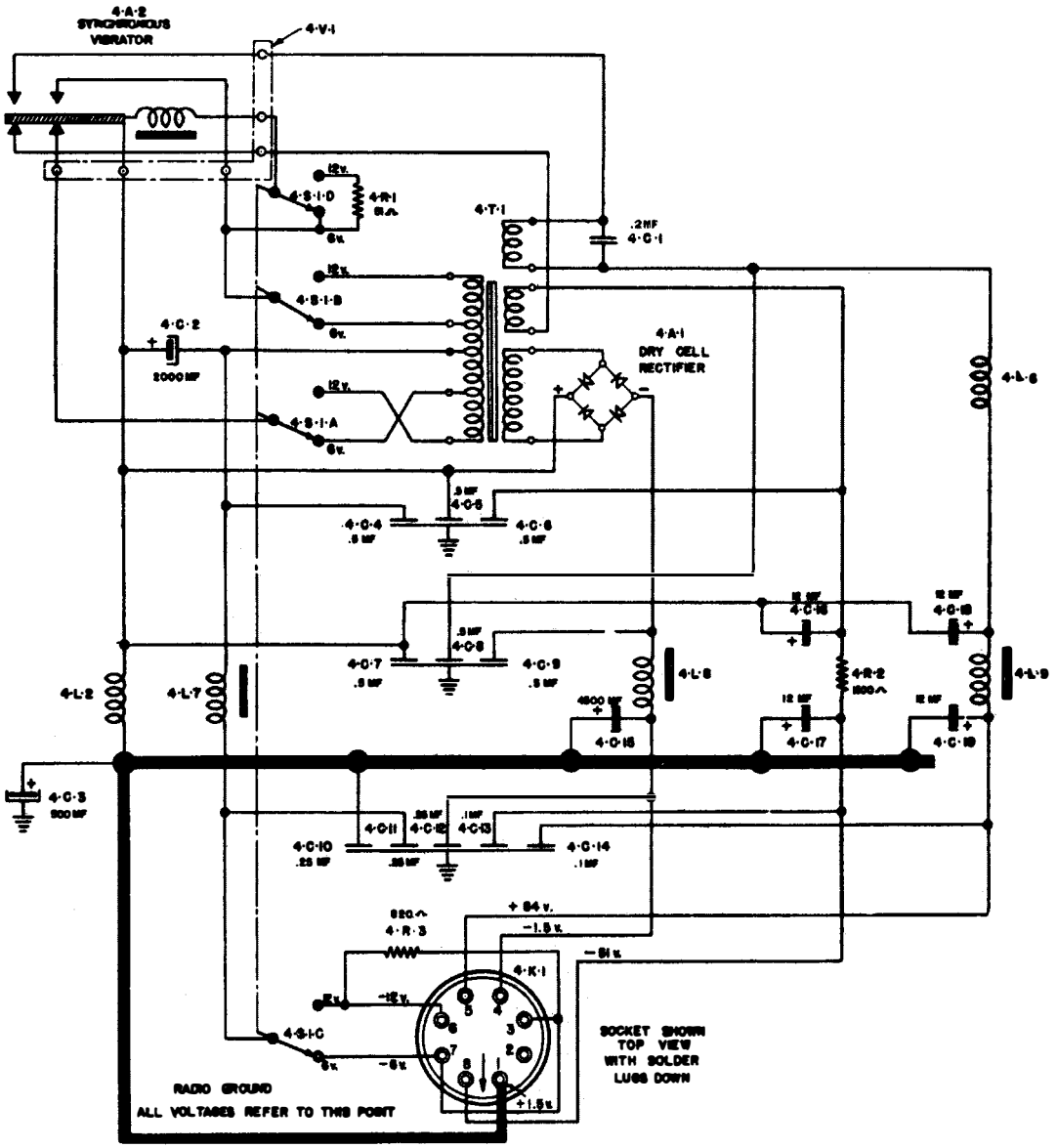
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	*Symbol*	*Stock No.*	*Name of Part and Description*	*Function*
			COVER ASSEMBLIES	
2		2Z3401.9	Bottom (Special), .042″ c.r.s. 3¾″ x 7″, connection diagram inside; .010″ paper base bakelite insulator 3½″ x 6⅝″.	Bottom cover PE-104-A
2		2Z3401.7	Top (Special), .042″ c.r.s. 3¾″ x 7″, ⅜″ i.d. adjustment hole in cover; .010″ paper base bakelite insulator 3½″ x 6⅝″.	Top cover PE-104-A
			GROUND STRIP ASSEMBLIES	
2		2Z3003.3	(Special), (long), .010″ phosphor bronze 1″ x 6¾″, 24 teeth, riveted to .010″ fish paper ¾″ x 5½″.	Ground top cover to case
2		2Z3003.1	(Special), (short), .010″ phosphor bronze 1″ x 4¾″, 17 teeth, riveted to fish paper .010″, ¾″ x 3¾″.	Ground top cover to case
			PLUG BUTTON	
2		2Z1480-1	(Standard), 6-section snap cover, 13/32″ dia.	Cover hole in case of PE-104-A
			POWER CONVERTER PE-104-A	
1		3H4600-104A	(Standard), Signal Corps PE-104-A 3⅞″ x 4″ x 7″, octal socket in front.	Alternate source of power for receiver A and B voltages and transmitter bias
			RECTIFIER	
1	4-A-1	3H4845-3	(Special), MG-CU-Sulphide, max. output voltage 1.8 volts d.c. Solder lug terminals. Approx. size ⅝″ dia. x 1⅛″. Mtg. screw No. 10-32.	Rectify 'A' supply
			RESISTORS	
1	4-R-1	3Z6005A1-3	(Standard), composition, 50 ohms ±5%, 1 watt, ¼″ dia. x ¾″. Wire leads.	Reduce 12 to 6 volts
1	4-R-2	3Z6150-48	(Standard), composition, 1500 ohms ±10%, ½ watt, ¼″ dia. x 7/16″. Wire leads.	Bias
1	4-R-3	3Z6082	(Standard), composition, 820 ohms ±5%, ½ watt, ¼″ dia. x ⅝″. Wire leads.	Reduce 12 to 6 volts for vibrator coil
			SOCKETS	
1	4-K-1	2Z8678.6	(Special), bakelite octal socket.	Output voltage connector
1	4-V-1	2Z8676	Socket (Standard), 6 contacts, bakelite, 5/32″ dia. mtg. holes spaced 1½″.	Vibrator socket

REPLACEABLE PARTS FOR POWER CONVERTER PE-104-A (Continued)

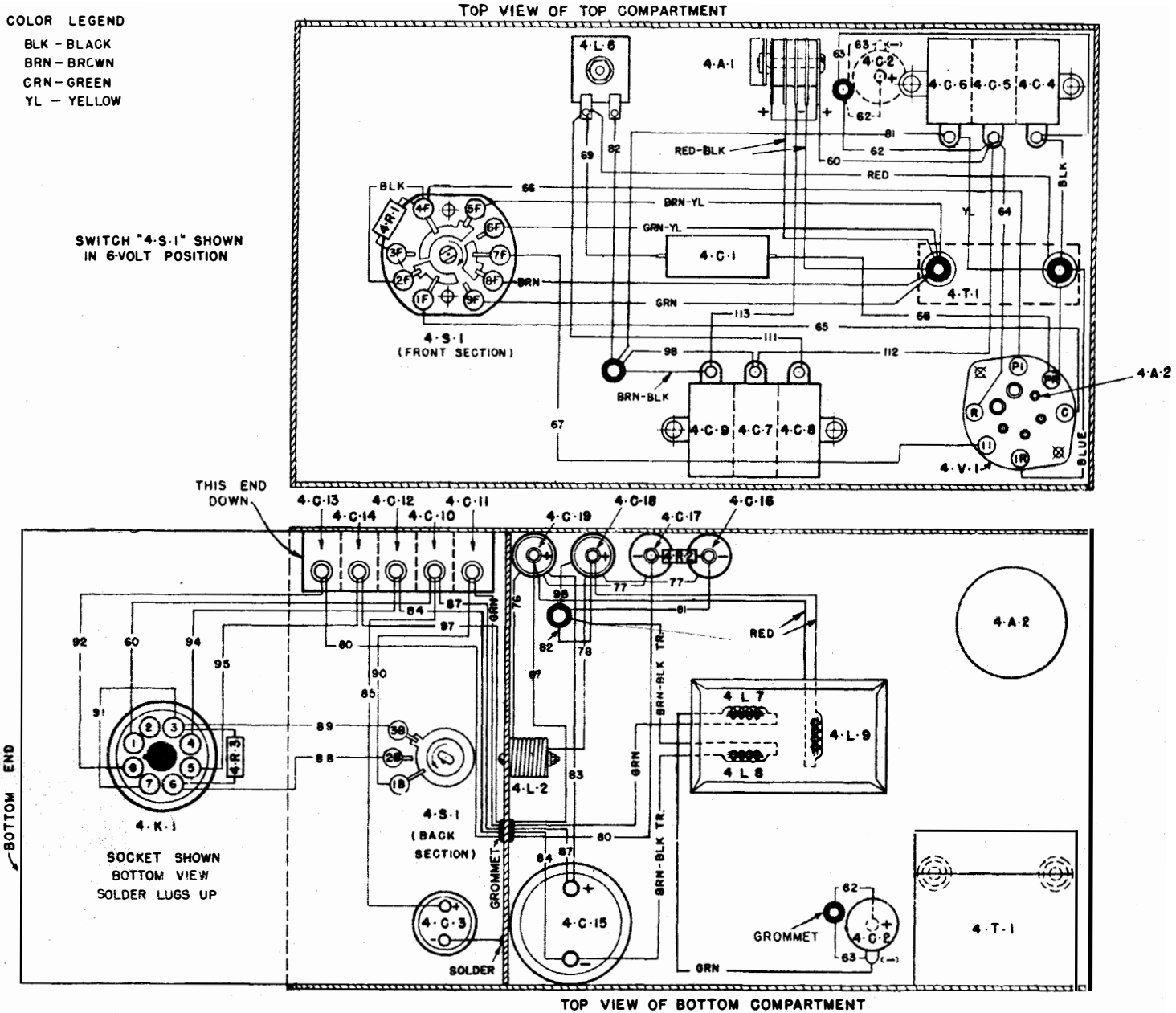
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	*Symbol*	*Stock No.*	*Name of Part and Description*	*Function*
			SWITCHES	
1	Part of 4-S-1	3Z9825-63.7	(Special), half-section, wafer, paper base bakelite, impregnated. Lugs and rotor contacts silver or silver alloy. Contacts, non-shortening type. Mtg. holes .130″ to .145″ dia., spaced 1.031″. Approx. size of wafer 1 13/64″ x 1 3/8″.	Part of 4-S-1 voltage change switch
1	Part of 4-S-1		(Special), full-section, wafer, paper base bakelite, impregnated. Lugs and rotor contacts silver or silver alloy. Contacts, non-shortening type. Mtg. holes .130″ x .145″ dia., spaced 1.031″. Approx. overall size of wafer 1 5/8″ x 1 3/8″.	Part of 4-S-1 voltage change switch
1	Part of 4-S-1		Index (Special), two position. Shaft slotted on one end. Approx. overall size 1 1/4″ x 1 3/8″ x 1 7/32″.	Part of 4-S-1 voltage change switch
			TERMINAL BOARD ASSEMBLY	
2		2Z9402.11	(Special), 2 eyelets mounted in laminated phenolic 1/16″ x 3/4″ x 13/16″.	Junction block for plate voltage choke
			TRANSFORMER	
1	4-T-1	2Z9625-1	(Special), 6 and 12-volt primary, 3 secondaries furnish approx. 84, 51 and 1 1/2 volts d.c. when rectified. Wire leads. Approx. overall size 1 7/8″ x 2 3/32″ x 2 9/16″.	Power transformer
			VIBRATOR	
1	4-A-2	3H6690	(Standard), 6-prong synchronous, enclosed in metal can. Fits standard 6-contact socket. Approx. size 1 1/2″ dia. x 3 5/8″.	Convert d.c. to a.c.



(USED ON SETS WITH SERIAL NOS. ABOVE 12,000. FOR SETS 1-12,000, SEE FIG. 20)

FIG. 48-A POWER CONVERTER PE-104-A (ALTERNATE) SCHEMATIC DIAGRAM



(USED ON SETS WITH SERIAL NOS. ABOVE 12,000. FOR SETS 1-12,000, SEE FIG. 21)

FIG. 48-B POWER CONVERTER PE-104-A (ALTERNATE) CONNECTION DIAGRAM