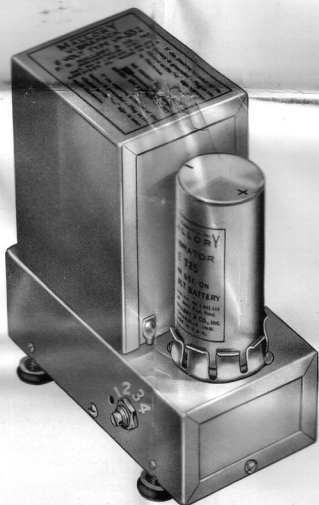


P. R. MALLORY & CO., INC.
MALLORY

Vibrapack

(TRADE MARK REG. U. S. PAT. OFFICE)

THE DEPENDABLE SOURCE OF PLATE POWER WHEN ... AND
WHERE ... COMMERCIAL ELECTRIC POWER IS NOT AVAILABLE



P. R. MALLORY & CO., INC., INDIANAPOLIS 6, INDIANA

Vibrapack

(TRADE MARK REG. U. S. PAT. OFFICE)

A conversion device for changing low voltage direct current to high voltage direct current for operating Electronic Apparatus

● Vibrapacks are the ideal vibrator power supplies for operating radio receivers, transmitters, public address amplifiers, direction finders and other electronic apparatus on police cars, airplanes, automobiles, farms, boats, QRR emergency, Military, Naval, Forestry and Lighthouse Service, where a source of commercial alternating current is not available.

Vibrapacks provide a most dependable and low cost method of obtaining high voltage direct current from a low voltage storage battery. They are time tried and proved dependable by thousands of installations . . . many in the gruelling service of police communication equipment. Some of these installations were made as far back as 1937. Units are available in various types and sizes, with outputs up to 60 watts at 300 and 400 volts.

OUTSTANDING ADVANTAGES

1. High efficiency—lower battery drain.
2. Dependable—trouble free—time-tested in thousands of installations.
3. Low cost—low maintenance.
4. Compact—light in weight.
5. Ease of installation.
6. Flexibility. Single Unit Vibrapacks can be adjusted to give 4 output voltage ranges each. The dual units are designed for a single voltage range.

In addition to applications in original equipment, Vibrapacks are also employed for the easy conversion for battery operation of radio receivers, amplifiers, etc., originally designed for A.C. operation.

Previous to the introduction of the Mallory Vibrapack it was necessary that vibrator power supplies be specifically engineered for each application. This was required so that there would be an exact match between the vibrator, transformer, buffer condensers, and load; otherwise, operating conditions might be such that low efficiency and short vibrator life would result. This handicap has been entirely overcome. The Vibrapack is truly flexible. It is adaptable to all applications within its power ratings. Any radio engineer, amateur, serviceman or experimenter who can connect and apply a common A.C. power supply can apply and use a Vibrapack with complete satisfaction.

APPLICATIONS

POLICE RADIO APPLICATION—Vibrapacks excel in original installations and assist Police Radio Departments in modernizing their equipment, reducing their operating cost, and increasing the reliability of their radio receivers. Now, easier installation is assured with the new Vibrapack VP-540, designed especially for the exacting requirements of police automobile radio receiver service. Police radio engineers have found Mallory Dual Vibrapacks, Types VP-555 and VP-557 to be ideal for powering the transmitters of "two-way" installations. Special engineering assistance is available without cost to Police Departments. Recommendations on equipment, technical information, advice and actual testimony and experience of nationally-known experts in the police field may be had by addressing the Application Engineering Section, Wholesale Division, P. R. Mallory & Co., Inc., Indianapolis, Indiana.

PORTABLE, MOBILE AND EMERGENCY TRANSMITTERS AND RECEIVERS may be constructed to operate from a storage battery by the use of a Vibrapack to furnish the plate current. The proper selection of tube complement should be made which will limit the total plate current drain to a voltage and current within the capabilities of the selected Vibrapack.

CUSTOM-BUILT AUTOMOBILE RADIO—Builders of custom-built automobile radio receivers will find the Vibrapack ideally adapted to this purpose. The many advantages of the Vibrapack will be instantly recognized.

MOBILE PUBLIC ADDRESS EQUIPMENT—Vibrapacks may be used in the construction of mobile or portable public address equipment of reasonably high power output (approximately 20 watts with Vibrapack types VP-555 and VP-557). They may also be used for the conversion of existing 110-volt A.C. operated public address systems to low voltage D.C. operation. In the conversion of a 110-volt amplifier it is recommended that the low frequency filter system be revised to eliminate the speaker field as a filter choke by using a standard filter choke having a resistance of from 90 to 200

ohms and an inductance of 4 to 15 henries. This change in the filter system will permit the use of permanent magnet speakers which will result in a large decrease in the consumption of battery output.

CONVERSION OF A.C. RECEIVERS—Vibrapacks may be used to convert standard 110-volt A.C. receivers for battery operation. For 6-volt operation, it is essential that all of the tubes in the radio receiver be of the 6.3-volt type with filaments connected in parallel and heated directly from the 6-volt battery. Practically all of the recent models of radio receivers use 6.3-volt tubes exclusively, which makes the proper connection of these tubes exceedingly simple. It is only necessary to connect one side of the heater line to the radio set chassis or ground and the other side, through a switch, to the storage battery. One side of the storage battery is to be grounded to the radio set chassis. In radio receivers using tubes having 2 or 3 different filament voltages, it is possible to select 6.3-volt tubes that are equivalent. Current consumption of the battery is usually an important item when operating a receiver from a 6-volt storage battery. While it is not essential that any change in the speaker or filter system be made, it is advisable that the speaker be replaced with a permanent magnet

speaker and that the filter be revised to standard single stage filter construction. This permits the lowest possible drain from the storage battery.

TWO-VOLT BATTERY RECEIVERS—Two-volt battery receivers may be converted to 6-volt storage battery operation by connecting the filaments of the 2-volt tubes to one cell of the 6-volt battery and connecting the Vibrapack across the entire 6 volts of the battery. In these receivers, it is usually necessary to install complete low frequency filtering and filament filtering to eliminate objectionable hum in the receiver. See paragraphs on page 10 captioned "Filter Requirements" for data on suitable high voltage filter.

Because 2-volt filament type tubes are highly sensitive to small ripple voltages, created by the Vibrapack through the battery, it is necessary to employ effective filament filtering. This may be accomplished by using a small iron core low resistance choke, such as the voice coil winding of a speaker transformer. The filament choke employed should be connected in series with one of the leads from the battery to the filaments.

Separate leads should be used for the Vibrapack and for the filament supply. These two independent circuits should be broken through a two circuit switch.

MALLORY VIBRAPACKS—TYPE VP

Catalog Number	Nominal Operating Voltage	Nominal Output Voltage	Maximum Output Current	Type	Approx. Net Weight Lbs.
VP-540.....	6	250	60 ma.	Self-Rectifying	7½
VP-551.....	6	125-150-175-200	100 ma.	Self-Rectifying	4½
VP-552*.....	6	225-250-275-300	100 ma.	Self-Rectifying	5½
VP-553.....	6	125-150-175-200	100 ma.	Tube Rectifier	4¾
VP-554*.....	6	225-250-275-300	100 ma.	Tube Rectifier	6¼
VP-555*.....	6	300	200 ma.	Tube Rectifier	12¾
VP-557*.....	6	400	150 ma.	Tube Rectifier	12¾
VP-G556.....	12	225-250-275-300	100 ma.	Self-Rectifying	5¾
VP-F558.....	32	225-250-275-300	100 ma.	Tube Rectifier	5¾

Output voltages indicated are nominal. Actual average output voltages at various loads will be found in the graphs. Figures 22 through 28, when operated at rated terminal voltage.

Tube rectifier types permit "B—" to be isolated from ground if desired.

Vibrapacks are supplied complete with hermetically sealed vibrator tubes are included in the intertuber types.

*Maximum ratings are for mobile transmitter service. For continuous duty with radio receivers where longer vibrator life is essential, reduce maximum output watt ratings to 75% of listed values.

Vibrapack Type VP-540

DESCRIPTION

Vibrapack VP-540 is designed for use as a complete "B" power unit for automobile, airplane, and marine service, and may be used to operate broad-cast band, and short wave receivers, or any electronic device within its load capabilities. All components have been designed for continuous operation and the power supply is thus ideally suited for operating police and sheriff's receivers. Rigid anchorage of components permits satisfactory operation under conditions of considerable vibration. Vibrapack type VP-540 is of the synchronous, or self-rectifying, type and does not require a separate rectifier tube. As is typical with all self-rectifying vibrator power supplies, "B—" is common with the grounded terminal of the storage battery.

The VP-540 is completely filtered for both RF and audio so that the hum and hash level is extremely low.

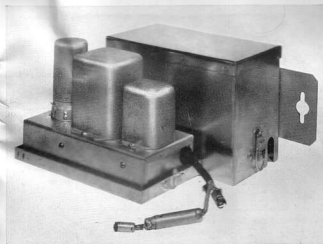


Figure 1. Vibrapack VP-540

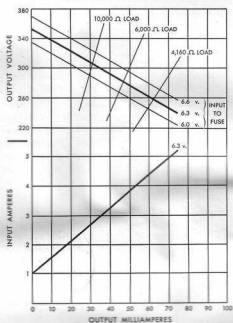


Figure 2. Operating characteristics of VP-540

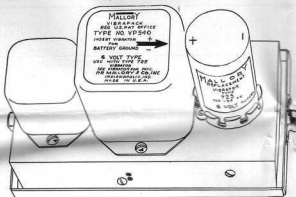


Figure 3. Showing Vibrator installed for operation when the positive (+) terminal of storage battery is grounded.

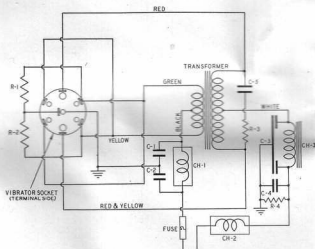


Figure 4. Schematic diagram and parts list No. VP-540.

MOUNTING: Universal, any position, with horizontal (either normal, as shown, or inverted) preferred. The Vibrapack chassis can be inserted in the housing in two positions to provide either right-hand or left-hand lead positions as desired.

WEIGHT: 7 lbs. 14 oz.

SIZE: 7 1/2" x 3 15/16" x 5 1/8" high exclusive of mounting brackets and leads, but including case fasteners and screws.

RATING: Nominal Output: 250 volts, 60 ma. Nominal Input: 6.3 volts.

NOTE: Figure 2 gives rated output voltages for various D.C. loads, and with input voltages of 6.0, 6.3, and 6.6 volts. Output characteristics for other input voltages can be obtained with reasonable accuracy by extrapolation or interpolation. Maximum permissible input voltage 8.0; minimum recommended input voltage 5.7.

INSTALLATION: Vibrapack is suspended by universal key-hole slots in the mounting brackets with 9/16" mounting centers. For replacement applications Vibrapacks may be installed in present hangers used by some power supplies; for new installations use 1/4" bolts.

CAUTION: Be sure that the battery voltage is turned off before installing or replacing the fuse in the primary cable fuse holder. The correct fuse is type SFE 9 ampere.

CONNECTIONS: "A" hot of the storage battery connects to the Vibrapack lead having the fuse. "A" ground connection is made automatically in an automobile installation by the mounting bolts. When the pack is installed on an insulated bulk-head, run one of the "A" leads to one of the mounting bolts. "B+" connects to the other cable, and "B—" connects to the ground, or the cable shielding.

POLARITY: Adjustment of the output polarity is obtained by the manner in which the vibrator is plugged in its socket. See Figure 3. If the negative (—) terminal of the storage battery is grounded, or connected to the Vibrapack case the vibrator should be inserted in its socket so that the (—) sign on the vibrator container is adjacent to the arrow stamped on the transformer housing. If the positive (+) terminal of the storage battery is grounded, the vibrator should be inserted in its socket so that the (+) sign on the container is adjacent to the arrow on the transformer housing.

CAUTION: On initial installation check output polarity. If a negative potential is delivered at the output cable, shut off the Vibrapack at once. Lift the vibrator from its socket, rotate it through 180 degrees and reinsert. Damage to the internal filter condenser may result from operating the Vibrapack with reversed output polarity. Six-volt connections should be made with No. 12 wire or larger.

LEGEND	VP-540
TRANSFORMER	B-44562-1
R-1	A-40389-6
R-2	A-40389-6
R-3	A-40389-3
R-4	A-40389-9
C-1	RF-481
C-2	RF-481
C-3	A-101650-1
C-4	A-42080-2
C-5	A-40980-8
VIB SOCKET	A-40921-1
CH-1	RF-582
CH-2	A-42334-1
CH-3	B-44565-1
FUSE	SFE 9-AMP
VIBRATOR	725C

Vibrapack Types VP-551, VP-552 and VP-G556

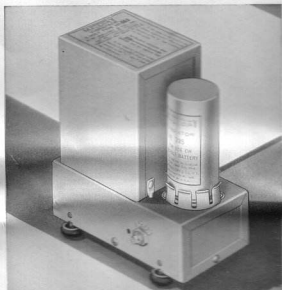


Figure 5—Vibrapacks Nos. VP-552 and VP-G556

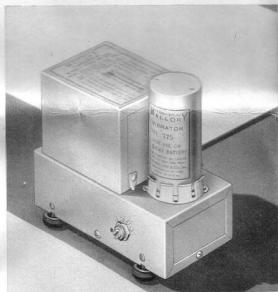


Figure 6. Vibrapack No. VP-551

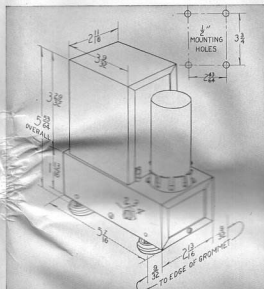


Figure 7. Dimensions Nos. VP-552 and VP-G556

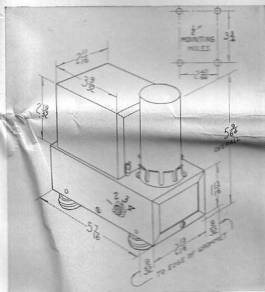


Figure 8. Dimensions No. VP-551

DESCRIPTION

INPUT VOLTAGE: VP-551, VP-552 . . . 6.3 volts, nominal
VP-G556 12.6 volts, nominal

OUTPUT VOLTAGES: See graphs, (Figures 22, 23 and 27).
4-point switch provides output voltage adjustment in approximate 25-volt steps.

FILTERING: Efficient R.F. filtering for vibrator hash only. Audio hum filtering requirements similar to those of equivalent output A.C. operated power supplies. See section on "Filter Requirements," Page 10.

RECTIFICATION: Mallory HEAVY DUTY Self-Rectifying Vibrator employed—eliminates need of rectifier tube. The vibrators (6-volt 725C; 12-volt G-725C) have a special 5-pin base providing two plainly-

labeled positions of insertion to give correct polarity of Vibrapack output regardless of which pole of the storage battery may be grounded.

FUSE: External fuse must be used—see paragraph captioned "Fuses," Page 10.

SPECIAL NOTE: It is characteristic of all synchronous or self-rectifying vibrator power supplies (such as the VP-551, VP-552, VP-G556) that B— is at ground potential and is common with the grounded pole of the storage battery.

In most circuits B— connects to the apparatus chassis so that this characteristic is unobjectionable; however, if the circuit requires B— to be "off-ground" for bias resistors, filter chokes or speaker field, a tube rectifier type Vibrapack must be employed.

INSTALLATION: See general installation instructions, page 9.

Vibrapack Types VP-553, VP-554 and VP-F558

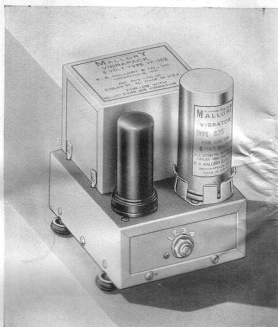


Figure 9. Vibrapack No. VP-553

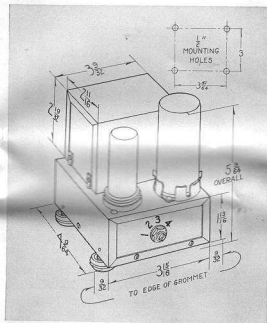


Figure 11. Dimensions No. VP-553

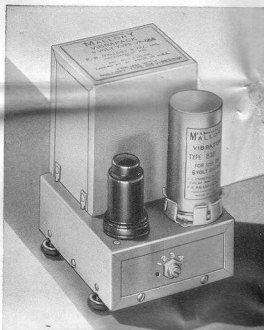


Figure 10. Vibrapacks Nos. VP-554 and VP-F558

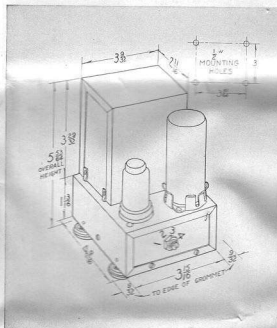


Figure 12. Dimensions Nos. VP-554 and VP-F558

DESCRIPTION

INPUT VOLTAGE: VP-553, VP-554 . . . 6.3 volts, nominal
VP-F558 32 volts, nominal

OUTPUT VOLTAGES: See graphs, (Figures 24, 25 and 28).
4-point switch provides output voltage adjustment in
approximate 25-volt steps.

FILTERING: Efficient R.F. filtering for vibrator hash
only. Audio hum filtering requirements similar to
those of equivalent output A.C. operated power sup-

plies. See paragraph captioned "Filter Requirements,"
Page 10.

RECTIFICATION: Vibrapack Type VP-553 is supplied
with 6X5 rectifier tube. For light loads of less than
40 ma. customer may substitute 6ZY5G rectifier tube
to save 0.3 ampere battery drain.

Vibrapack Types VP-554 and VP-F558 are provided
with 0Z4A rectifier tubes, the most efficient type tube
for loads from 30 milliamperes minimum to the maxi-

mum output of the Vibrapacks. When using the VP-554 to operate apparatus requiring less than 30 milliamperes, or for radio-telegraph transmitters having a light load when in the "key-up" condition, a 6W5 or 6X5 tube should be installed. No circuit change is required.

Since substitution of rectifier tubes is not practical in Vibrapack VP-F558 the minimum load requirement must be met by incorporating an appropriate load in the circuit design, such as by using a bleeder resistor of the correct size, etc.

OUTPUT POLARITY: Correctly supplied without adjustment.

"B MINUS": Independent of chassis and battery—may be grounded if desired.

FUSE: External fuse required—see paragraph captioned "Fuses," Page 10.

INSTALLATION: See general installation instructions, page 9.

Heavy-Duty Dual Vibrapacks Types VP-555 and VP-557



Figure 13. Vibrapack VP-557. (VP-555 similar in appearance except for use of F.P. Capacitor.)

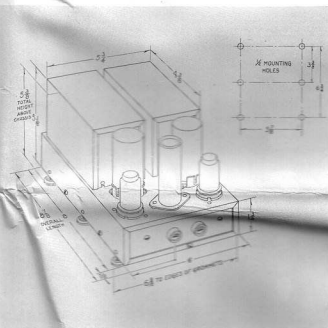


Figure 14. Dimension No. VP-555. (VP-557 similar except for use of bathtub type filter capacitor.)

DESCRIPTION

INPUT VOLTAGE: VP-555, VP-557... 6.3 volts, nominal

OUTPUT VOLTAGE: VP-555, 300 volts, 200 ma. nominal*

VP-557, 400 volts, 150 ma. nominal*

*For mobile transmitter service. For continuous duty with radio receivers where longer vibrator life is essential, reduce maximum output watts ratings to 75% of listed values.

Refer to graph, Figure 26 for specific data.

FILTERING: VP-555 is completely filtered for both audio and R.F. vibrator hash. Ripple approx. 1 1/2% at maximum load.

VP-557 has efficient R.F. filter for vibrator hash.

Input filter condenser only built on chassis. Requires filter choke and output condenser (not supplied) in most applications. See page 11 under caption "Filter Design Requirements."

FUSES: Both VP-555 and VP-557 have built-in fuses so that external fusing is unnecessary. Use type 3AG-12 ampere for replacement.

VIBRAPACK TYPE VP-555 employs two vibrators and two rectifier tubes. Matched components, plus a special balancing circuit, insure equal division of load, resulting in dependable, consistent performance. Special attention has been paid to the anchorage of components to permit operation in mobile equipment (automobiles,

airplanes, and boats) where heavy vibration may be encountered. This Vibrapack is supplied with high efficiency 0Z4A rectifier tubes which do not require separate power for cathode heating, and thus provide the lowest possible storage battery drain. For special circuit requirements, 6X5 or 6W5 rectifier tubes may be employed.

A separate heater circuit with an independent terminal is provided so that when heater type rectifier tubes are employed, instant power is available for "break-in" radio-phone operation and similar applications. When so used, the rectifier heaters are connected to the battery through a separate lead, permitting the rectifier cathodes to remain heated during the stand-by periods.

The special load balancing circuit also functions as an efficient low frequency hum filtering system so that additional filtering should be required only in high gain circuits. A three-section Mallory FP Condenser is employed. The VP-555 is particularly adapted to police "two-way" radio service and mobile public address systems.

The two circuit sections of this Vibrapack are individually fused, providing complete protection to all component parts.

RECTIFIER TUBES: The 0Z4A rectifier tubes furnished with this Vibrapack require a total *minimum* starting output load current of 140 milliamperes; the load current may drop to as low as 75 milliamperes thereafter. If the circuit is such that this minimum load requirement cannot be maintained, 6W5 or 6X5 rectifier tubes may be employed without altering the Vibrapack. 6X5 rectifier tubes may be used for all loads to 150 milliamperes. For loads to 200 milliamperes use 6W5 rectifier tubes. Heater type rectifier tubes are recommended for C.W. transmitter service.

VIBRAPACK TYPE VP-557: Especially designed for radio transmitter service and is provided with heater type tubes which permit satisfactory operation in radio-telegraph circuits where the load may vary through wide limits. The VP-557 may also be used for public address amplifiers where high voltage tubes are employed. A separate heater circuit with an independent terminal is provided so that the rectifier tubes may be kept heated during the entire period of service, and instant power is available for "break-in" operation.

All components of the VP-557 are securely anchored to permit operation in installations where heavy vibration is encountered, as in airplane, automobile and marine service.

A high-voltage input filter condenser only is supplied with this pack and is of the high-surge type. The completion of the smoothing filter requires only the addition of a conventional filter choke and an output condenser of 600 working volts rating. Mallory HS condensers are recommended. See last paragraph, page 13.

The two circuit sections of this Vibrapack are individually fused, providing complete protection to all component parts.

RECTIFIER TUBES: Vibrapack type VP-557 is provided with two 6X5 rectifier tubes which will be satisfactory for all applications. The substitution of other types of rectifier tubes is unnecessary and is not recommended. A minimum load of 25 milliamperes must be maintained at all times to limit the output voltage of this Vibrapack and protect the rectifier tubes and filter condenser.

INSTALLATION: See general installation instructions, page 9. Dimensions and mounting data shown on page 7.

General Information on All Vibrapacks

SELECTION OF PROPER VIBRAPACK

There are four factors to be considered in selecting the correct Vibrapack type:

1. Input voltage—the low voltage D.C. source. Six, 12, and 32 volt Vibrapack types are available as listed.

2. Output voltage—the table on page 3 gives the nominal output voltage ratings for the various models. The actual voltage depends upon the load and Figures 22 through 28 give the average voltages (subject to commercial tolerances) at various loads, with 6.3, 12.6, or 32 volts respectively applied to the Vibrapack terminals. Allowance should be made for voltage drop in external filter chokes, if required.

3. Output current—maximum and minimum. The load current should not exceed the rated output of the Vibrapack. For example, if an amplifier requires 125

milliamperes, a dual Vibrapack (type VP-555 or VP-557) should be selected, rather than attempting to operate a single unit Vibrapack beyond its rated capacity.

In some applications the load current is not constant, but varies over wide limits. Such a condition will occur in a Class B audio amplifier or in radio-telegraph transmitters. Vibrapacks using 0Z4A rectifier tubes (types VP-554, VP-555, and VP-F558) have a minimum load requirement, as set forth in the description of each unit. If the minimum load is not sufficient to meet the requirements of the specific Vibrapack, then a bleeder resistor must be added to the power supply, or a heater type rectifier tube substituted.

In the case of the high-voltage dual Vibrapack Type VP-557, a minimum load of 25 milliamperes must be maintained to limit the output voltage to a safe value for the rectifier tubes and filter condenser.

4. Self-rectifying or tube rectifying type? If "B—" is to be connected to the ground or one of the storage battery leads, a self-rectifying Vibrapack may be used.

If the "B—" circuit incorporates resistors, chokes, or speaker field so that the voltage drop may be used for bias, a tube rectifier type Vibrapack must be used. A tube rectifier type Vibrapack can be used with "B—" grounded, if desired.

Where circuit conditions permit their use, the Self-Rectifying Vibrapacks are exceptionally satisfactory and are to be recommended.

INSTALLATION INSTRUCTIONS

The Vibrapack can be easily installed and will give long life and satisfactory performance if the following installation and operation instructions are carefully observed.

MOUNTING: All Vibrapacks except the VP-540 have been designed to mount directly on the chassis of a receiver, transmitter, amplifier or other equipment without transmission of objectionable hum, or introduction of circulating "ground currents" which would produce "hash interference." Mounting in this manner is accomplished by drilling four $\frac{1}{8}$ " holes (six holes for dual Vibrapacks) which line up with spade bolts attached to chassis of the Vibrapack. The rubber grommets furnished are inserted in these holes and the Vibrapack mounted thereon, with the cup washers placed on both sides of the grommets for distribution of the load before the nut is placed on the spade bolt. This insulates the Vibrapack from the chassis both electrically and mechanically. It is important that the Vibrapack be mounted in this manner if "vibrator hash" is to be reduced to a minimum.

Grounding of the Vibrapack chassis is best accomplished by soldering a heavy strip of stranded braid on the chassis and grounding the other end to the Vibrapack chassis at the screw located directly under the terminal board, or between the terminal boards on the dual units. The length of this lead must be kept at a minimum for best results. Ground Vibrapack chassis only at this one point.

HOW TO CONNECT THE VIBRAPACK: The connections made to the Vibrapack are "A Hot," "A Ground," "B+," and "B—."

Vibrapack types VP-555 and VP-557 have a separate terminal (marked "FIL") for supplying power to the rectifier tube heaters; the other "A Hot" terminal (marked "VIB") supplies power to the vibrator circuit. When the VP-555 is used with 0Z4A tubes the "FIL" terminal may be left unconnected. The 0Z4A tubes provide practically instantaneous output on the application of power.

With 6X5 and 6W5 rectifier tubes, a time delay of 5 to 15 seconds occurs while the rectifiers are heating. This is unobjectionable in most applications, and in such cases the "FIL" terminal is connected to "VIB" with a short length of No. 18 wire. For "break-in" and radio-telephone service where instant power output is required, the "FIL" terminal should be connected to the "Hot" terminal of the storage battery with a separate lead. The "FIL" terminal may be connected with the "Hot" filament leads of the transmitter so that a common switch can be used to turn on all tubes of the transmitter. Transmission is accomplished by closing the switch in the circuit between the "VIB" terminal of the Vibrapack and the ungrounded terminal of the storage battery, but keying, or similar effects must not be attempted in this circuit.

Provision is made for correct operation of all types of Vibrapacks on battery grounds of either positive or negative polarity. Special Mallory synchronous vibrators on Types VP-551, VP-552, and VP-G556 are reversible. By determining the polarity of the grounded side of the battery and following label directions, the "B" voltage will be properly polarized. Special Mallory Vibrators on tube-rectifier type Vibrapacks do not require polarization of output. On types VP-551, VP-552, and VP-G556, "A" ground and "B—" must be connected to the chassis itself, as they are common and at ground potential. On tube rectifier type Vibrapacks, only "A" ground must be connected to the chassis, as "B—" may float if desired on these types.

INPUT CIRCUIT REQUIREMENTS

LOW VOLTAGE VIBRAPACK LEADS: The leads from the battery to the set and the Vibrapack must be as short and as large in cross section as is conveniently possible, as the output secured is directly affected by the voltage drop in these connecting leads. Because a Vibrapack is a conversion device—similar in characteristics to an A.C. transformer—the input and output potentials will vary proportionately.

Input wiring losses can be kept to a minimum by observing three conditions:

1. Keeping the battery leads as short as possible.
2. Making certain that the switch or relay used to control the circuit has low resistance.
3. Using wire of sufficient size to properly carry the current.

The use of short direct leads is as good a rule for the battery leads as for the general wiring of the transmitter or receiver. If control is required from any location that is not in direct line of the wiring between the battery and the Vibrapack do not run long leads to the switch. Insert a relay in the circuit. The coil of the relay can be energized through leads of any reasonable length.

It has been found that the Delco-Remy Automobile Horn Relay, Part 1116775, is satisfactory and is quite inexpensive. This relay may be purchased from any U.M.S. or Oldsmobile agency. The current drain of the coil is approximately 1.4 amperes at 6.3 volts; and with 17.5 amperes passing through the relay, the drop across the contacts averaged 40 millivolts on several samples tested. Other makes of relays may be used, but care should be taken in selecting units with contacts sufficiently large to handle the required current without sticking, and with a total drop of less than 50 millivolts through the controlled circuit at maximum load.

SELECTION OF CORRECT SIZE WIRE

The following graph (Figure 15) will enable the Vibrapak user to determine the correct wire size for the battery leads, to keep the voltage drop of the connecting wire within the desired limits. The graph is based on a maximum voltage drop in the leads of 1/10 volt; if it is not essential that maximum efficiency be obtained, somewhat smaller wire can be used. The graph gives the total length of the leads—thus if the battery is 10 feet from the Vibrapak, the total lead length will be at least 20 feet.

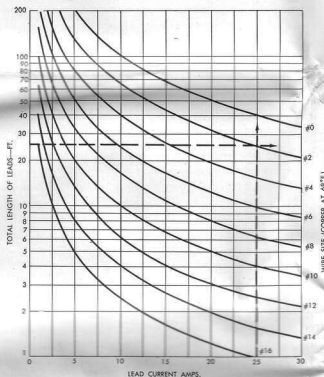


Figure 15. Wire Size Table

USE OF TABLE: The following example will illustrate the use of the graph (Figure 15). Suppose that a heavy-duty police transmitter is mounted in the rear trunk compartment of an automobile. Assume that the battery is located in the engine compartment so that a total of 26 feet of wire is required for the 6-volt connections; also assume that 25 amperes current is required for the Vibrapak, tube filaments, etc. It will be noted on the graph (as shown by the heavy-dashed lines) that No. 2 wire would be required to limit the cable loss to 1/10 volt. No. 2 flexible welding cable would be excellent for this installation.

In all heavy-duty automotive installations it is recommended that the "A Ground" circuit be carried by copper wire, rather than by the frame of the vehicle.

FUSES

DUAL VIBRAPACK TYPES VP-555 and VP-557 are protected by two 3AG 12-ampere fuses, mounted in compression type low resistance bakelite holders, and external fusing is unnecessary.

VIBRAPACK BP-540 is protected by one SFE9, 9-ampere fuse mounted in the primary cable fuse holder. It is essential that all other types of single unit Vibrapacks be protected by an external fuse. The following sizes are recommended:

VP-551, VP-553—5 to 7½ amp.

VP-552, VP-554—10 to 15 amp.

VP-G556—5 to 7½ amp.

VP-F558—3 to 5 amp.

Either screw-type household fuses or automotive radio type fuses may be used. Automotive fuses should be mounted in bayonet-locking, compression type holders to prevent excessive voltage drop.

FILTER REQUIREMENTS

With the exception of the Dual Vibrapak types VP-555, VP-557, and the new single unit VP-540, low frequency or audio hum filtering must be added externally to the Vibrapak. The omission of the low frequency hum filter is an advantage since it permits the components to be selected by the purchaser to meet the particular requirements of the installation.

For those who wish to purchase a factory-made filter the Mallory Filter Unit Type VF-223 is recommended.

Mallory VF-223 Filter Unit



VF-223
FILTER

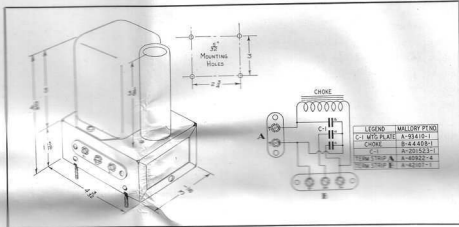


Figure 16. The VF-223 Filter Unit with Dimensional and Schematic diagrams.

DESCRIPTION

The Mallory VF-223 Filter Unit is a complete audio filter system for use with all single-unit Vibrapacks. The VF-223 is designed to give maximum suppression of hum with minimum voltage drop and it is especially recommended for applications which are sensitive to hum, or where voltage regulation is important as in Class "B" audio amplifiers. The D.C. resistance of the $4\frac{1}{2}$ henry choke is only approximately 90 ohms.

The filter condenser is a three section Mallory of 15-15-10 mfd. 450 working volt capacity. The two 15 mfd. sections are used with the choke to form a conventional pi-section filter while the third 10 mfd. section connects to a separate terminal so that if desired a filtered intermediate output voltage can be obtained.

The VF-223 Filter Unit is mounted on a heavy cadmium plated metal chassis $4\frac{1}{16}$ " long x $3\frac{1}{8}$ " wide x $1\frac{13}{16}$ " high. The overall height of the VF-223, excluding the mounting bolts, is $4\frac{7}{8}$ ". The general construction is such that when mounted with any standard single unit Vibrapack the combination provides a pleasing business-like appearance.

CONNECTIONS: The VF-223 is provided with two terminal boards. The terminal board with two connections is the input. "B+" of the VF-223 input is connected to

"B+" of the Vibrapack. "B—" of the VF-223 input is connected to "B—" of a tube type Vibrapack, or to the metal chassis of a self-rectifying Vibrapack. Output is obtained from the "B— and B+" terminals of the triple terminal board.

If an intermediate voltage is not required, connect "B+" and "BM" together with a short wire jumper, which will increase the capacity of the output section of the filter to 25 mfd.

INTERMEDIATE VOLTAGE: In some applications an intermediate voltage may be required. This intermediate voltage can be obtained by using a series dropping resistor connected between the "B+" and "BM" terminals of the VF-223, or by using a voltage divider resistor connected between the "B+" and "B—" output terminals with the tap of the resistor connected to the "BM" terminal. For most applications where only limited dissipation is required, 10 watt resistors may be used and mounted inside the VF-223 chassis.

The values of the required resistors can easily be calculated by Ohm's law. Recommendations for specific applications will be gladly made on receipt of complete information as to operating conditions, including the model of Vibrapack used, the voltage and current load on the high voltage tap and the voltage and current desired on the intermediate voltage tap.

Filter Design Requirements on All Vibrapacks

For those who wish to install the filter as an integral part of apparatus being constructed, or to employ the filter existing in A.C. operated equipment being converted for battery operation with a Vibrapack, the following design data will be helpful in securing hum-free operation and satisfactory vibrator life.

The filter must be of the capacitor input type and have about 8 mfd. in the first condenser. The capacity

of the second condenser may vary, depending upon the filtering desired, ranging from 4 to 25 mfd. with a 4 to 15 henry choke. The D.C. resistance of this choke should be as low as practical to secure maximum output voltage from the Vibrapack. For Types VP-552, VP-554, VP-G556 and VP-F558, 100 to 200 ohms is suggested. For Types VP-551 and VP-553, not over 400 ohms

(Continued on page 14)

Service Schematics and Parts List

LEGEND	VP-551	VP-552
TRANSFORMER	B-44617-1	B-44617-2
C-1	RF-481	RF-481
C-2	A-40389-10	A-40389-4
C-3	A-40389-3	A-40389-2
CH-1	RF-582	RF-583
CH-2	A-40389-1	A-40389-1
B-1	A-40389-9	A-40389-3
VIBRATOR	25C	25C
VIB SOCKET	A-40921-1	A-40921-1
TERM STRIP	A-40922-1	A-40922-1
SWITCH	B-11102-1	B-11102-1
B-1	A-40389-8	A-40389-6

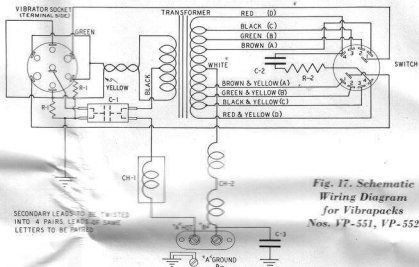


Fig. 17. Schematic
Wiring Diagram
for Vibrapacks
Nos. VP-551, VP-552

LEGEND	VP-G556	VP-G56
TRANSFORMER	B-44617-1	B-44617-2
C-1	RF-481	RF-481
C-2	A-40389-1	A-40389-1
C-3	TF-481	TF-481
C-5	A-40297-1	A-40297-1
CH-1	RF-583	RF-583
CH-2	A-40389-1	A-40389-1
B-1	A-40389-3	A-40389-3
VIBRATOR	25C	25C
VIB SOCKET	A-40921-1	A-40921-1
TERM STRIP	A-40922-1	A-40922-1
SWITCH	B-11102-1	B-11102-1

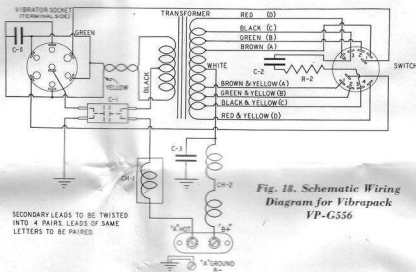


Fig. 18. Schematic Wiring
Diagram for Vibrapack
VP-G556

LEGEND	VP-553	VP-554
TRANSFORMER	B-44617-1	B-44617-2
C-1	RF-481	RF-481
C-2	A-40389-1	A-40389-1
C-3	A-40389-3	A-40389-3
C-4	TF-481	TF-481
CH-1	RF-583	RF-583
CH-2	A-40389-1	A-40389-1
B-1	A-40389-3	A-40389-3
RECTIFIER	TYPE 6X5	TYPE 6X5
VIBRATOR	TYPE 825C	TYPE 825C
VIB SOCKET	A-1521-1	A-1521-1
TERM STRIP	A-40922-1	A-40922-1
SWITCH	B-11102-1	B-11102-1
B-1	A-40389-8	A-40389-6

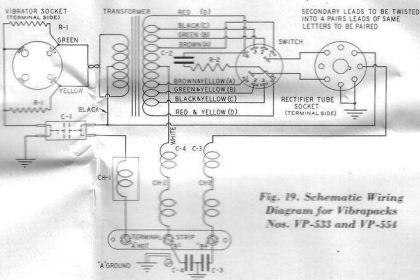


Fig. 19. Schematic Wiring
Diagram for Vibrapacks
Nos. VP-553 and VP-554

Service Schematics and Parts List

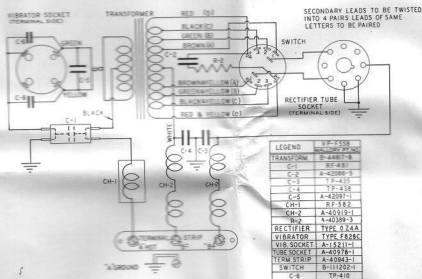


Fig. 20 Schematic Wiring Diagram for Vibrapack VP-F558

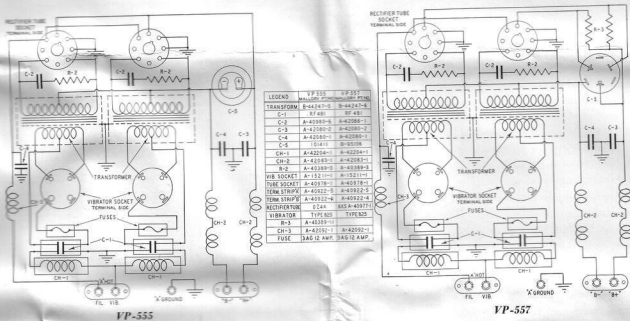


Fig. 21. Schematic Wiring Diagram for Vibrapacks

(Continued from page 11)

should be used, depending upon the load current.

Use Mallory Dry Electrolytic Capacitors having a rating of 450 working volts with Vibrapack Types VP-552, VP-554, VP-G556, or VP-F558, or having a rating of 250 volts or more with Vibrapack Types VP-551 and VP-553.

Sensitive radio receivers may require the use of a .5 or 1.0 mfd. R.F. condenser (Mallory Condenser Types RF481 or RF482) connected from "A HOT" to ground in the radio receiver. It may also be necessary to use a .1 mfd. Mallory Condenser TP-418 connected between "B+" and Ground in the radio receiver. On installations using Vibrapack VP-553 and VP-554, it may be necessary to use a .25 mfd. Mallory Condenser Type TP440 connected between "B—" and Ground in the radio receiver. These by-pass condensers are required to eliminate any remaining traces of RF (hash) interference that is subject to pick-up by receivers of unusual sensitivity.

Vibrapack Type VP-555 is equipped with an efficient filter which also serves as a load distribution circuit. Additional filtering will rarely be required except for high gain stages, where individual resistance-capacity filters may be incorporated for the various stages. Such filters are generally found in commercial amplifiers for de-coupling purposes, so that when converting A.C. amplifiers for battery operation, changes in the amplifier circuit are seldom required. Information on specific applications will be furnished promptly and without charge on receipt of schematic diagram and information on proposed installation.

Vibrapack VP-551 is provided with the input filter condenser only. The filter is completed by the addition of a filter choke and output condenser. The filter choke should have a rating of 150 ma. 4 henries or larger, and would be identical with the filter choke selected for an equivalent A.C. power supply. The output filter condenser should have a rating of 600 working volts or greater. Mallory (HS) High Surge 600 working volt rating condensers are recom-

PERFORMANCE

The output voltage at various load levels, and with various input potentials can be predicted with reasonable exactitude by referring to the following graphs. These graphs also show the primary input current for various loads. Values not shown may be obtained with reasonable accuracy by interpolation or extrapolation.

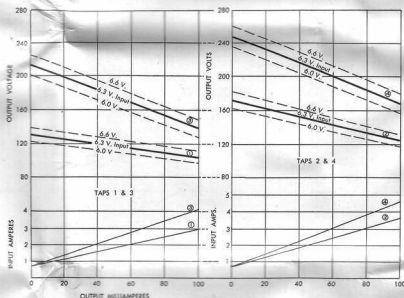


Figure 22. Operating characteristics of VP-551

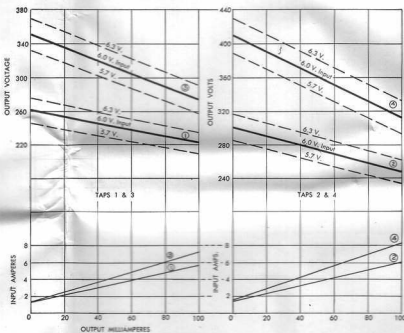


Figure 23. Operating characteristics of VP-552

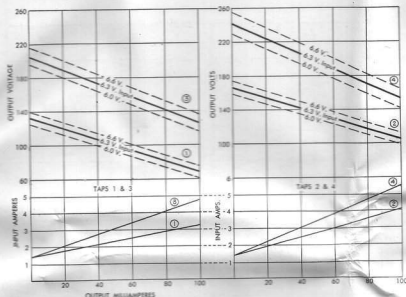


Figure 24. Operating characteristics of VP-553

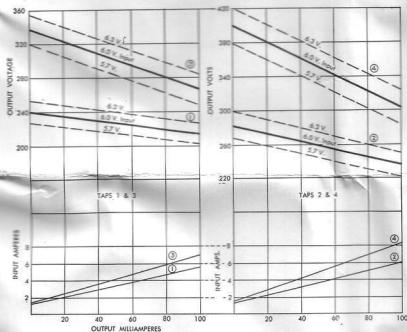


Figure 25. Operating characteristics of VP-554

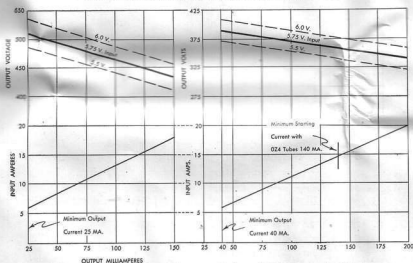


Figure 26. Operating characteristics of VP-557 and VP-555

mended, although paper dielectric condensers of 600 working volt rating or greater can be used. Note that a minimum load of 25 milliamperes must be maintained on the VP-557 to limit the output voltage. See remarks under the description of this unit.

Adjusting Output

It is advisable that the Vibrapack be turned off when any adjustment is made on the voltage control switch. The lowest output is obtained at position No. 1 and the voltage increased over the range in steps of 25 volts each to the highest output at position No. 4. Referring to the accompanying charts, it can be seen that the Output Voltage is plotted against the Output Current and also Input Current against Output Current. The Output Voltage shown applies ahead of the filter choke.

Operating Voltage Limits

Six-volt single unit Vibrapacks may be operated satisfactorily through a range of applied voltage from 5.5 to 7.5 volts. The VP-555 and VP-557 should *not* be operated at higher than 6.5 volts, to secure the greatest life and performance of the components. These ranges normally occur in a 6-volt, 3-cell storage battery during the cycles of charge and discharge, under the loads of the Vibrapacks specified.

The maximum recommended input potential for the VP-G556 is 15 volts; the minimum recommended input potential is 10 volts. The maximum recommended input potential for the VP-F558 is 38 volts; the minimum recommended input potential is 24 volts.

It must be remembered that the maximum life from the vibrator, tube and other components will be secured when the input voltage is near the rated value.

Microphone Current

Most radio engineers and public address operators use and prefer the modern crystal, dynamic or velocity micro-

phones which do not require external power.

For the benefit of those who wish to use the older type single and double button carbon microphones, the following precaution should be noted. Microphone current should be obtained from a separate battery (which may consist of flash-light cells) and *not* from the storage battery used to operate the Vibrapak. It is only practical to obtain microphone current from the storage battery if the microphone supply lead is filtered with an iron core choke and high-capacity condenser.

Replacement Vibrators

Use only genuine Mallory Vibrators of the recommended types for replacement to insure satisfactory service from your Vibrapak.

Vibrapak Type	Correct Mallory Replacement Vibrator
VP-540.....	725C
VP-551—VP-552.....	725C
VP-553—VP-554.....	825C
VP-G556.....	G725C
VP-555—VP-557.....	825C*
VP-F558.....	F826C

*Two Vibrators required.

Tube Substitution

The right is reserved to supply Vibrapacks with the glass equivalents of the metal rectifier tubes specified herein, when the latter are unavailable.

Special Precautions

Do not overload your Vibrapak.

Do not use Vibrapacks to supply power for household electric appliances or electric motors without the specific approval of the Mallory Engineering Department. Unauthorized use in such applications will void the guarantee.

Do not substitute any components for the original equipment as they have been selected and designed for perfect matching.

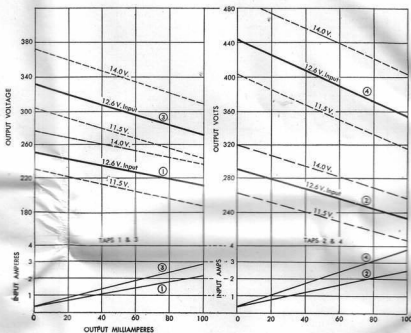


Figure 27. Operating characteristics of VP-G556

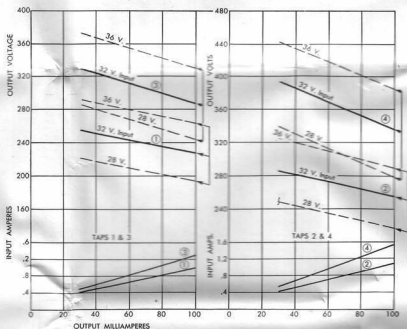


Figure 28. Operating characteristics of VP-F558

Purchasers are urged to discuss special applications and uses of Mallory Vibrapacks with our Engineering and Development Laboratories. Address communications to Application Engineering Section—Wholesale Division, P. R. Mallory & Co., Inc., Indianapolis 6, Indiana

Manufactured and sold under one or more of the following United States Letters Patent Nos.:

1,943,183 1,944,940 2,032,424 2,049,310 2,186,638 2,190,685 2,197,967 2,223,536 DES. PAT. 365,825
1,943,240 1,961,841 2,039,957 2,167,084 2,187,950 2,194,288 2,207,306 2,223,573 Other Patents Pending

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