

PEERLESS

Transformers



division of



PEERLESS ELECTRICAL PRODUCTS

ALTEC
LANSING CORPORATION



In the field of transformer design and production Peerless Electrical Products, division of Altec Lansing Corporation, holds a unique position. The Peerless engineering staff specializes in the development of audio transformers of unusual quality for high fidelity amplifiers, public address systems, broadcast and recording applications, and in the design of custom transformers with specialized applications in all types of complex electronic devices.

Peerless production quality is maintained through the careful selection and continual testing of the finest raw materials and the intelligent combination of mass production techniques and hand-craftsmanship.

In many electronic applications there is no margin of error. A fault in a guided missile cannot be corrected. For this reason, Peerless transformers are tested through all stages of production in a manner which exceeds the highest accepted quality control standards and guarantees the absolute reliability of every unit shipped from the Peerless plant.









Transformers engineered and built by Peerless include units from 1/8 of a cubic inch to more than 8 cubic feet; from fractional voltages to 50,000; from less than one cycle to a half megacycle, and in one, two, and three phase or phase changing configurations. Construction categories cover the entire range from open frame construction to potted, hermetically sealed and vacuum impregnated units. Peerless transformers can be varnish treated, fosterited, epoxy or silastic impregnated and encapsulated. Hermetically sealed units can be compound, resin, mineral or silicone oil filled.

All Peerless transformers, whether for commercial audio applications or for such stringent military specifications as MIL-T-27-A and JAN-T-27, are fully representative of the engineering, production, and testing integrity which has made Peerless famous. This catalog contains all of the audio transformers regularly manufactured by Peerless and a description of six custom units which are typical of the Peerless production and engineering facility.

Whatever your transformer needs, Peerless engineers can design to any given military or commercial specification within the broad ranges described, and manufacture in any quantity.

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The transformers in this catalog represent the most advanced developments in the science of audio transformer design. In this outstanding group, the audio designer and builder will find the transformers required for the design of any high fidelity amplifier. The matched units, through their wide scope of applications and performance characteristics, contribute to the finest and most advanced quality circuits.

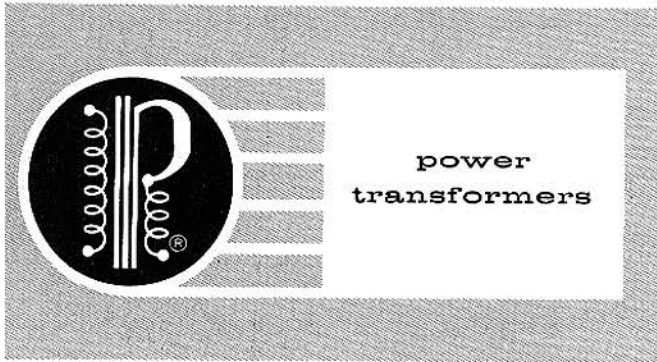
- They are grouped by general type:
- Power Transformers.....Pages 2-3
 - Input Transformers.....Pages 4-5
 - Output Transformers.....Pages 6-7
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The three latter groups contain two classes of transformers—the Standard and 20-20 Plus. The Standard transformers are ideally suited for application within audible frequency ranges and are guaranteed to meet or exceed their specified power rating. The 20-20 Plus transformers should be applied when exceptionally wide frequency response is desired. These transformers have frequency ranges

greater than 20-20,000 cps, some having ranges of 10-100,000 cps, and are guaranteed to meet or exceed their published frequency range.

In addition to complete specifications on every transformer, this catalog contains performance analyses of representative transformers of each group. In each case, the indicated analysis may be considered typical of the performance characteristics of the group as a whole.

A special Peerless "user counseling" service is available, for complete assurance of maximum performance of each unit. Address correspondence about performance and applications of Peerless transformers to: Design Assistance Service, Peerless Electrical Products, 9356 Santa Monica Boulevard, Beverly Hills, California. If your requirements preclude the use of commercially available transformers, consult this service for information on custom design and manufacture. Peerless research and engineering facilities permit efficient development, design, and manufacture of custom, specialty transformers for any individual need, regardless of quantity or application.



Combination Plate and Filament Transformers

These power transformers, with the exception of R-800-A, are fully encased and finished in Peerless gray enamel to harmonize with the Peerless audio transformers. They are potted with a specially formulated compound which provides high thermal conductivity between the transformer and the case for most efficient heat dissipation.

Low winding resistances insure good regulation of output voltage under varying loads. Filament winding capacity is provided in excess of requirements to permit the addition of auxiliary loads such as separate potential for grid bias supplies. The primary winding is isolated by an electrostatic shield consisting of an over-lapped, insulated turn of sheet copper used because of its higher conductivity and lower impedance, especially with radio frequencies. The insulated overlap prevents fringe leakage between the separated windings.

Each transformer in this group, with the exception of R-800-A and R-815-S, has a laminated core of grain oriented silicon steel.

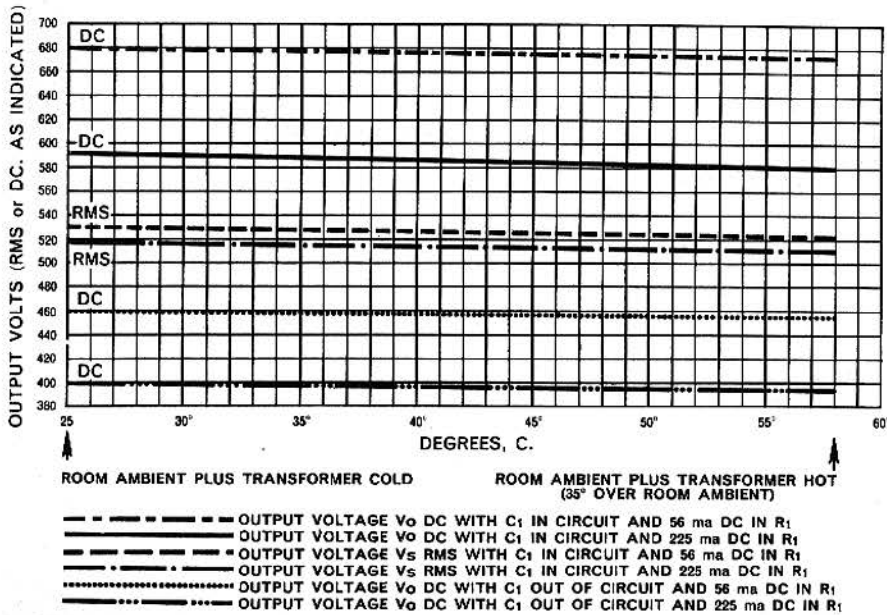
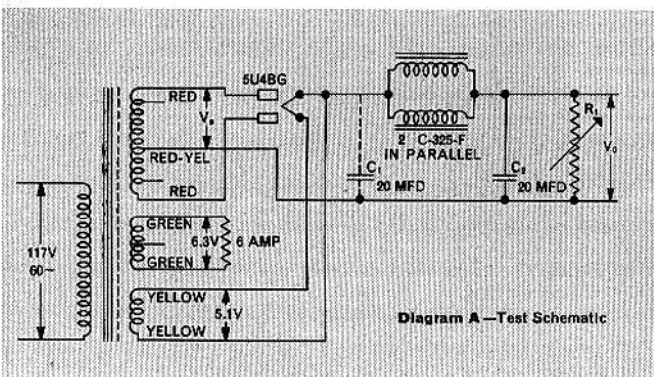


Diagram A

The diagram and chart illustrate the performance of the R-631-F Transformer. The full plate winding of the R-631-F was connected to a load through a Type 5U4BG Rectifier Tube and a filter network. The six volt filament winding was loaded to six amperes. The filter system consisted of two C-325-F filter chokes connected in parallel and two 20 mfd filter capacitors. Two sets of measurements were made, one with and the other without the input capacitor identified as C_1 and shown in dotted lines on the diagram. In both sets of measurements, the high potential output current was first adjusted to one-fourth of rated current (56 ma) and then full rated current (225 ma). The voltage measurements are indicated on the voltage scale. The temperature scale shows the two extremes of measurement temperatures. At the left can be seen the DC output voltages for four conditions of test and the corresponding rms winding potentials, at an ambient temperature of 25°C. and with the transformer "cold." At the right of the scale will be found the corresponding voltages with the transformer operating in an ambient temperature of 58°C. and with its ultimate temperature rise of an additional 35°C. Thus, under normal operating conditions, such as those encountered in a relatively closed cabinet, a practically constant regulation of the transformer and the filter chokes is indicated.



Filament Transformers

These transformers provide additional filament current capacity. They may be used back-to-back with any Peerless plate and filament transformer to furnish isolated AC up to 115 volts.

Frequently this potential is used by powering a low current rectifier to supply the DC bias voltage for an amplifier power stage. Variations in bias voltage are obtained by connecting the 6.3 volt winding of the F-012-X to the 6.3 volt winding on the power transformer for an approximate 115 volts, 5 volt winding for approximately 90 volts, or one side of the 6.3 volt winding and the center tap for approximately 60 volts.

Smoothing Chokes

The casings of these smoothing or filter chokes are of the same general style and construction as those of the power transformers.

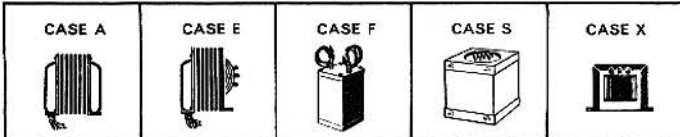
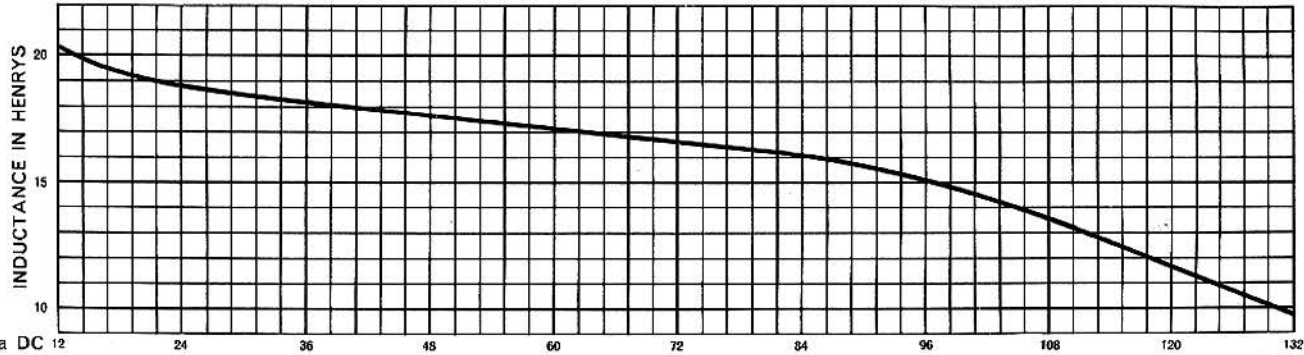
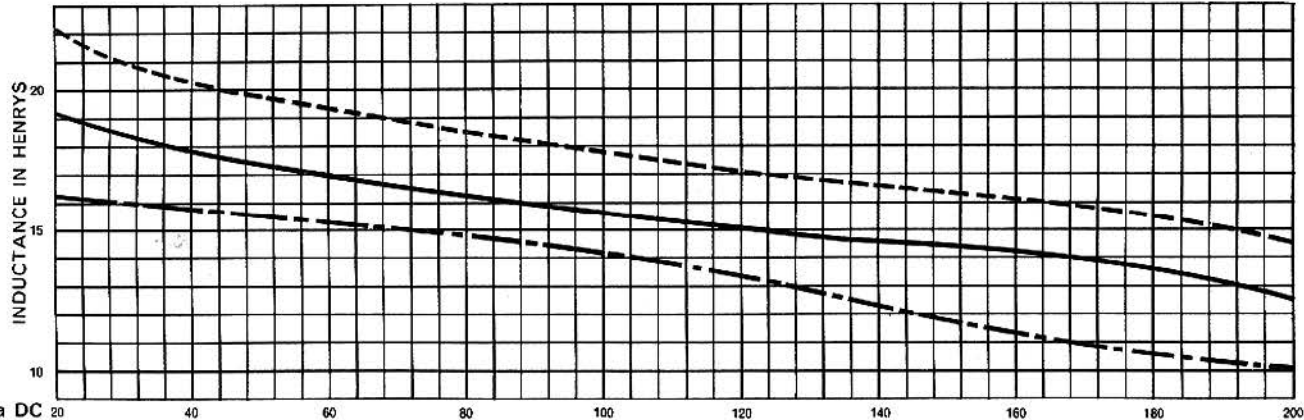
These units provide varied application. Two C-325-F chokes in parallel will operate at 5 henrys with 240 ma of DC, developing only 120 ohms of DC resistance. Similarly, a pair of C-390-F chokes will operate at 5 henrys with 400 ma of DC, developing only 75 ohms of DC resistance.

Diagrams B and C

Two inductance-current curves extending over a current range of 10:1 illustrate current flow capacity of Peerless smoothing chokes.

Superimposed AC=
@ 60 CPS

117.5v ————
82.5v ————
10. v ————



Superimposed AC=
82.5 V @ 60 CPS

**All primaries are 117 V, 60 cycle.
†All transformers in this group are supplied with electro-static shield.
▼Maximum operating level, 1 mw reference.

•Impedance is total of two separate windings.
*These units may also be used as bridging transformers. Complete application data in each packing box.

COMBINATION PLATE AND FILAMENT TRANSFORMERS**†

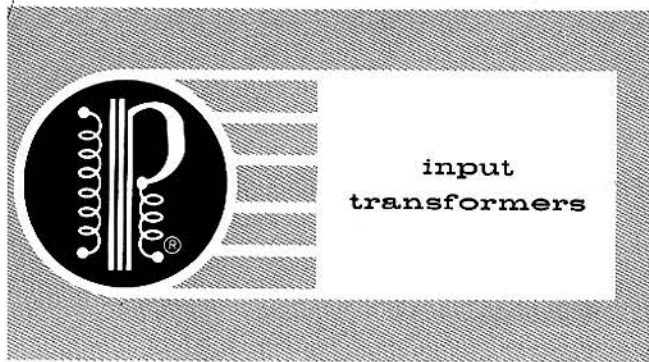
| Type Number | High Voltage Secondary | | Filament 5 V. | Current, Amperes 6.3 V.C.T. | Dimensions, Inches | | | Weight Lbs. | List Price |
|-------------|---|--|---------------|-----------------------------|--------------------|---------|---------|-------------|------------|
| | AC Volts | DC MA. | | | Height | Depth | Width | | |
| R-340-F | 325-0-325 | 100 | 3. | 5. | 4-3/8 | 3-1/16 | 2-3/4 | 4 | \$28.00 |
| R-490-F | 350-0-350 | 200 | 3. | 6. | 5-5/16 | 3-15/16 | 3-3/8 | 8 | \$35.00 |
| R-562-F | 400-0-400 | 220 | 3. | 6. | 5-5/16 | 3-15/16 | 3-3/8 | 9 | \$45.00 |
| R-631-F | 500-435-0-435-500 (Has 100 V tap for C bias) | 225 (Replaces the R-630-F in a larger case) | 3. | 6. | 6 | 4-3/4 | 4-1/16 | 11-1/2 | \$55.00 |
| R-800-A | 400-0-400 | 300 | 4. | 4.-5. | 4-3/4 | 5-1/8 | 3-15/16 | 12 | \$34.00 |
| R-815-S | 550-275-0-275-550 | 280 from 550-0-550 40 from 275-0-275 | 6. | 4.-4.2-.9 | 6-3/8 | 5-1/8 | 5-1/8 | 18 | \$72.00 |

FILAMENT TRANSFORMERS

| Type Number | Secondary Current, Amperes 6.3V. C.T. | Test Volts R.M.S. | Primary Volts 60 Cycle | Dimensions, Inches | | | Weight Lbs. | List Price |
|-------------|---------------------------------------|-------------------|------------------------|--------------------|-------|-------|-------------|------------|
| | | | | Height | Depth | Width | | |
| F-012-X | 1. | 2000 | 117 | 1-5/8 | 2-7/8 | 1-5/8 | 1/2 | \$8.75 |
| F-139-E | 8 | 2000 | 117 | 3-1/2 | 3-1/8 | 2-7/8 | 3-1/4 | \$14.00 |

SMOOTHING CHOKES

| Type Number | Current D.C. MA. | Inductance Henrys | Resistance Ohms | Test Volts R.M.S. | Dimensions, Inches | | | Weight Lbs. | List Price |
|-------------|------------------|-------------------|-----------------|-------------------|--------------------|---------|--------|-------------|------------|
| | | | | | Height | Depth | Width | | |
| C-325-F | 120 | 10 | 240 | 1500 | 3-7/8 | 2-13/16 | 2-7/16 | 3 | \$13.00 |
| C-380-F | 200 | 10 | 150 | 1500 | 4-15/16 | 3-9/16 | 3-3/16 | 6 | \$23.50 |



These units have high maximum operating levels and low insertion loss. They are encased in Peerless gray enamel casings. The K-308-D, a Standard quality transformer, is magnetically shielded to 60 db.

The K-241-D is a 20-20 Plus transformer of comparatively small size in relation to its performance characteristics. Its primary balance places it in a class with repeating coils (See Chart H). It is magnetically shielded to 90 db.

The S-217-D is a 20-20 Plus line level output transformer. It may be used as a high level input transformer by connecting to either single or push-pull grids. The precisely balanced low impedance winding provides excellent line termination.

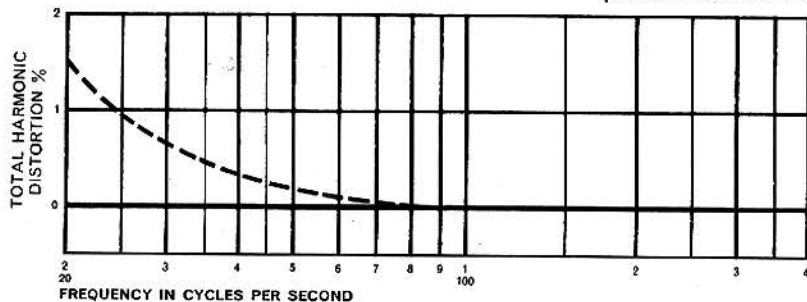


Diagram D
Distortion characteristics of the K-308-D operating at maximum rated level between matching impedances.

--- 0 dbm INPUT, SECONDARY TERMINATED
— OSCILLATOR RESIDUAL DISTORTION

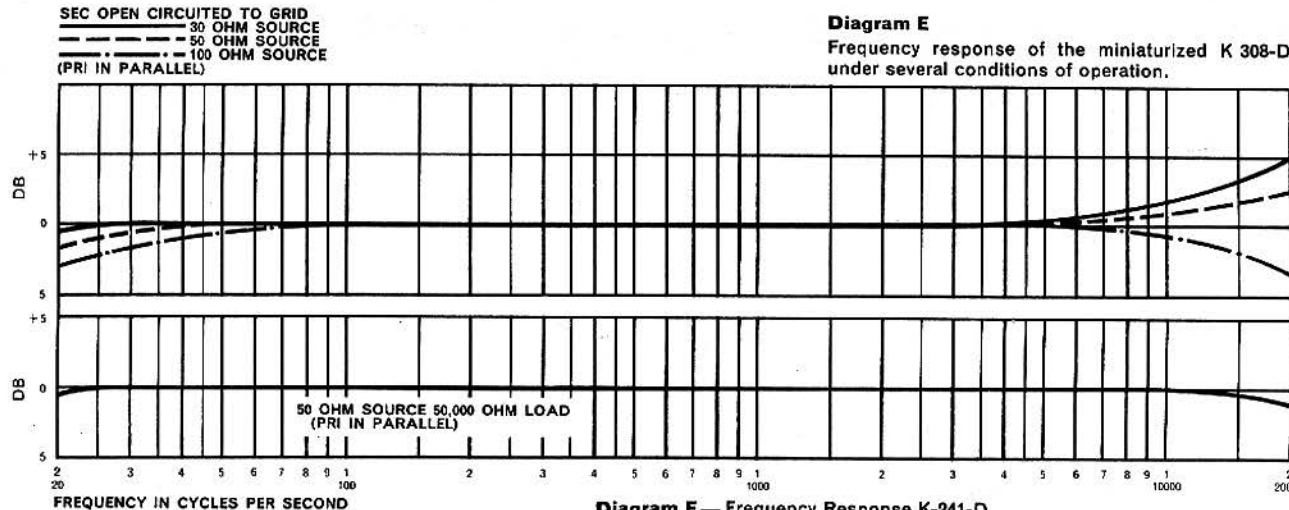


Diagram E
Frequency response of the miniaturized K 308-D under several conditions of operation.

Diagram F — Frequency Response K-241-D
Frequency response curves of four operating conditions, divided into two parts. The first shows response at maximum rated power level both with the transformer terminated resistively and unterminated. The same conditions of operation are shown in the second part excepting the -60 dbm level which is representative of microphone output. Extreme performance stability is illustrated by the frequency responses taken at widely different power levels and under two extremes of operations; that is, with open circuited secondary and with fully loaded secondary. Performances between these extremes are within the illustrated limiting curves.

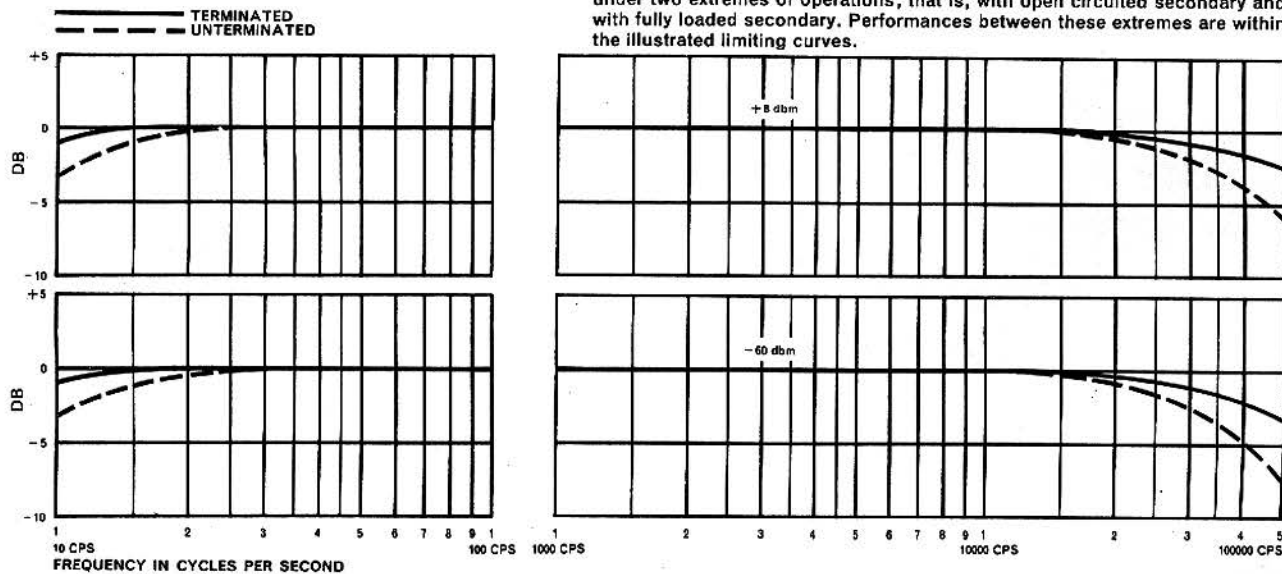
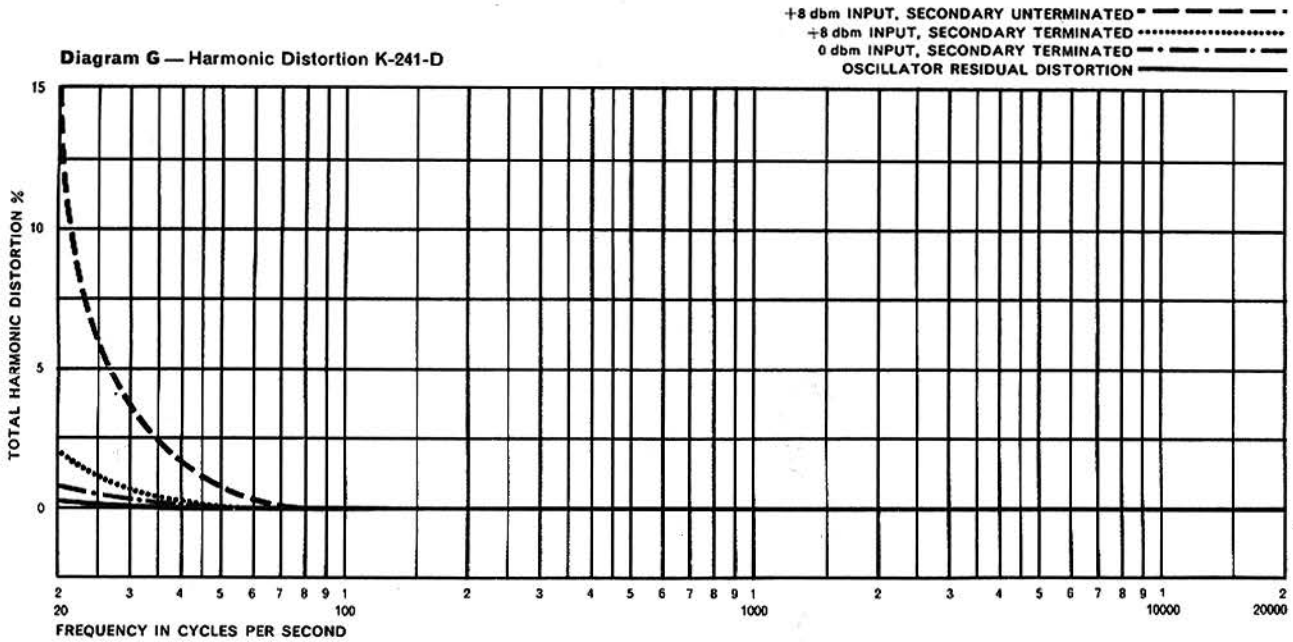


Diagram G — Harmonic Distortion K-241-D



Distortion characteristics are shown under three conditions.

- Full rated input with an open secondary.
- Full rated input with properly terminated secondary.
- Input at 0 dbm with properly terminated secondary.

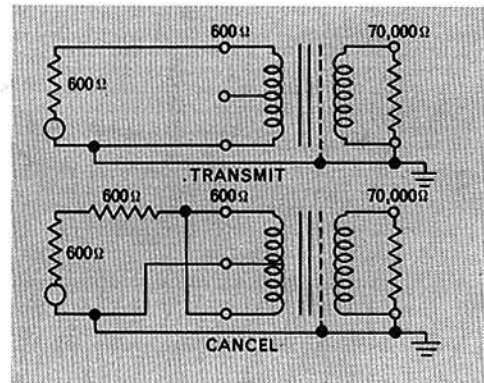
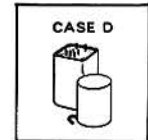
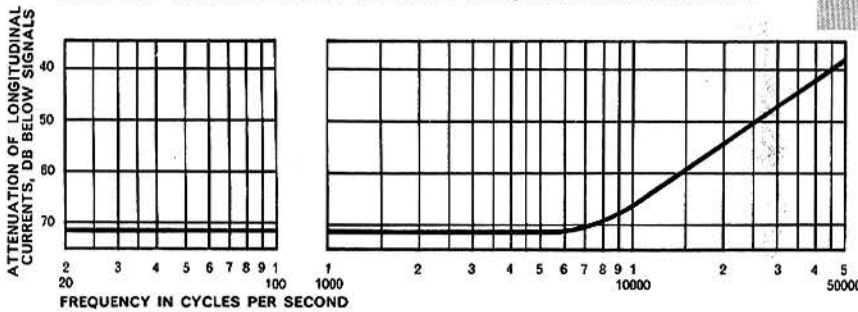


Diagram H — Longitudinal Current Cancelling Characteristics K-241-D

The attenuation of longitudinal currents, measured on the 600 ohm input connection, is shown in db below the relative steady-state transmission level.



Frequency response is guaranteed on all 20-20 plus transformers

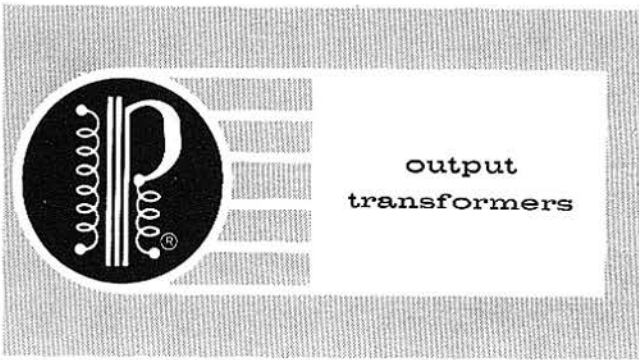
INPUT TRANSFORMERS (20-20 PLUS)

| Type Number | Descriptive Data | Max. Level | Impedance, Ohms Primary Secondary | Primary DC MA. Max. Unbal. | Height | Dimensions, Inches Depth Width | Weight Lbs. | List Price |
|-------------|--|------------|--|-------------------------------|--------|-----------------------------------|-------------|------------|
| K-241-D* | Frequency response, ± 1 db: 10-25,000 cps. Primary balanced to attenuate longitudinal currents in excess of 50 db. Sec. may be used single ended or in P-P. Has 2 sec. windings with bal. cap. to grd. Electrostatic shield is provided between pri. and sec. Has 90 db electromagnetic shielding. Insertion loss 1-1/4 db. Transformer will operate into open circuit or resistive load. Frequency resp. down less than 1 db at 15 KC, when operated into resistive load shunted with 120 MMFD, cap. High power rating makes transf. suitable for use as output transf. | +8 dbm | 500-280- 125-31 70,000 • or 600-340- 150-37.5 84,000 • | 0 | — | 2-3/4 1-1/2 2 | 1 | \$42.00 |

STANDARD INPUT TRANSFORMERS

| Type Number | Descriptive Data | Impedance, Ohms Primary Secondary | Freq. Range ± 1 db | Dimensions, Inches Height Depth Width | Weight Lbs. | List Price |
|-------------|---|--------------------------------------|---------------------------|--|-------------|------------|
| K-308-D | Line, Mixer or Microphone to Sgle. Grid. Max. Level: 0 dbm ∇ . 60 db magnetic shielding. | 250 C.T. 50,000 | 30-20,000 when terminated | 1-1/2 1-1/16 round | 1/4 | \$15.00 |

**All primaries are 117 V, 60 cycle. †All transformers in this group are supplied with electro-static shield. ∇ Maximum operating level, 1 mw reference.
 •Impedance is total of two separate windings. *These units may also be used as bridging transformers. Complete application data in each packing box.



High Level Transformers

The five 20-20 Plus output transformers, developed within a uniform performance standard and having common design requirements, are an outstanding series. The maximum rated operating level for the group applies to the frequency range of 20-20,000 cps. These transformers handle one-half of rated power at 15 cycles and one-quarter at 10.

The full power (60 cps) primary open circuit inductance is approximately 100 hy for each 1000 ohms of primary impedance. Leakage inductance referred to the total primary is approximately 1 mh for each 1000 ohms of primary impedance. Leakage inductance between the two halves of the primary equals the total primary leakage inductance. This represents a quality factor of approximately 100,000.

Resonant frequency of the transformers occurs in the 75,000—100,000 cps range because of the very low values of the distributed, stray, and shunt capacitances. Reactive values are so proportioned that the high frequency droop of the transformer is a smooth slope of approximately 8 db per octave. This characteristic is especially desirable when the transformers are included in feedback circuits.

These transformers can be operated between a wide range of impedances because of the numerically large quality factor; nominal power ratings of the transformers change since they are determined by signal voltages across the windings as well as currents through the windings. When this series of transformers is operated between impedances which are half the rated value, the power ratings can be doubled. On the opposite extreme, the power rating must be halved when the transformers are operated between impedances which are double the rated impedance. Under these conditions, the insertion losses are also doubled or halved; this should be considered in application planning.

The secondaries of the transformers are bifilar wound and are fully balanced. They may be operated in balanced circuits or with either end grounded. The excellent performance characteristics of this group are illustrated by curves a-d, diagram 1.

The competitively priced Standard transformers are adequate for nearly all power and impedance applications within their respective ratings.

The line level transformers feature nickel alloy cores, lending to miniaturization and two coil construction for balanced windings and approximately 30 db of hum bucking.

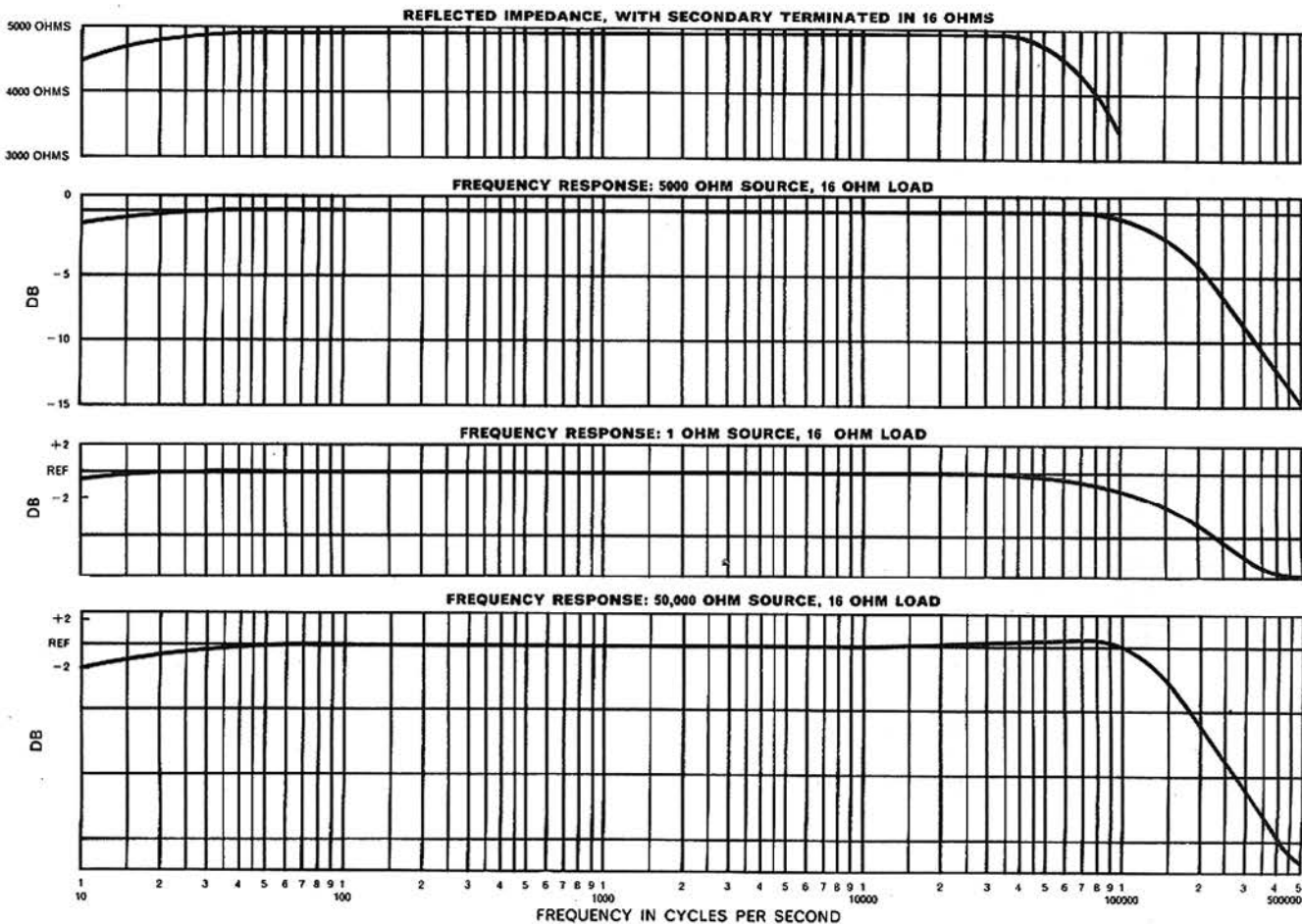
Diagram 1.—Performance Curves of S-271-S

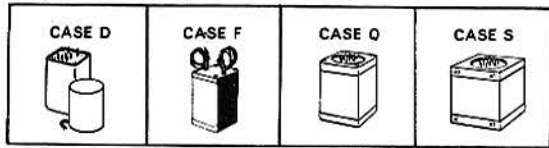
These performance curves of the S-271-S are representative of the entire group of 20-20 Plus high level output transformers.

Curve a. Reflected Primary impedance with the 16 ohm secondary terminated resistively in 16 ohms. The reflected impedance is uniformly 5000 ohms within 10% on a continuum from 10 cps to 65,000 cps.

Curve b. Frequency response between matching impedances (5000 ohm source and 16 ohm load) is shown to be flat within ± 1 db over the published frequency range. Above 100,000 cps, the response goes into a smooth slope of approximately 8 db per octave, an especially desirable characteristic when the transformer is used in circuits having a large amount of inverse feed-back.

Curves c & d. The effects of extreme source impedance are shown. Their similarity to the "standard condition" (Curve b) emphasizes the adaptability of the transformer to modern, wide range amplifiers.





**All primaries are 117 V, 60 cycle.
 †All transformers in this group are supplied with electro-static shield.
 ▼Maximum operating level, 1 mw reference.

◆Impedance is total of two separate windings.
 °These units may also be used as bridging transformers. Complete application data in each packing box.

STANDARD OUTPUT TRANSFORMERS

| Type Number | Descriptive Data | Freq. Range ±1 db | Impedance, Ohms | | Pri. DC MA | | Audio Watts | Dimensions, inches | | | Weight Lbs. | List Price |
|-------------|---|----------------------|---|--|------------|--------|-------------|--------------------|--------|--------|-------------|------------|
| | | | Primary | Secondary | Max. | Unbal. | | Height | Depth | Width | | |
| S-448-Q | Single or P-P plates to line. 30 db hum bucking. | 20-20,000 | 20,000 C.T. 12,500 C.T. 5000-3125 | 500 C.T. 200 C.T.-333 250-125-50 | 15 | 2 | +18 dbm▼ | 3-1/2 | 2-3/8 | 2-1/2 | 1-3/4 | \$32.00 |
| S-510-F | P-P plates to speaker. | 20-30,000 | 10,000 C.T. 8000 C.T. | 16-8 | 40 | 4 | 10 | 2-7/8 | 2-3/4 | 2-1/2 | 2 | \$23.00 |
| S-526-F | P-P plates to speaker. | 20-30,000 | 6600 C.T. 5000 C.T. | 16-8-4 | 60 | 6 | 20 | 4-3/8 | 3-1/16 | 2-3/4 | 3-3/4 | \$27.00 |
| S-542-F | P-P plates to speaker. | 20-30,000 | 5000 C.T. 4000 C.T. | 16-8-4 | 140 | 14 | 40 | 5-5/16 | 3-9/16 | 3-1/16 | 6 | \$32.00 |

OUTPUT TRANSFORMERS (20-20 PLUS)

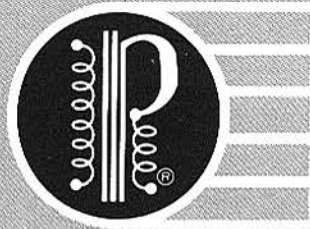
| Type Number | Descriptive Data | Max. Level▼ | Impedance, Ohms | | Primary DC MA | | Dimensions, inches | Weight Lbs. | List Price | | |
|------------------------|--|-------------|-----------------|-------------------|---------------|--------|--------------------|-------------|------------|--------|---------|
| | | | Primary | Secondary | Max. | Unbal. | | | | Height | Depth |
| S-217-D* Line Level | Frequency response: ±1 db: 5-65,000 cps. Pri. may be used single ended or P-P. Sec. windings have bal. cap. to ground. Has C.T. tertiary of 24.5 ohms which may be used for feedback or grounded for electrostatic shield. Parallel feed is required. Astatic balance and electro-magnetic shield provide approx. 50 db of shielding. Insertion loss 0.5 db. Transf. may be used as excellent input transf. to either single or P-P grids. When used this way balanced low impedance winding provides excellent line termination. | +20 dbm | 12,500 3125 | 600-300 150-75 | 25 | 0 | 3-1/4 | 1-1/2 | 2 | 1-1/4 | \$64.00 |

HIGH LEVEL OUTPUT TRANSFORMERS (20-20 PLUS)

| Type Number | Descriptive Data | Impedance, Ohms | Pri. DC MA Per Winding | Max. Level▼ | Dimensions, inches | Weight Lbs. | List Price | | | | |
|-------------|--|--------------------------|------------------------|-------------|--------------------|-----------------------------------|------------|---------|-----------|-------|---------|
| | | | | | | | | Primary | Secondary | Max. | Unbal. |
| S-232-Q | Frequency response, ±1 db: 10-100,000 cps. Insertion loss 0.6 db. (See descriptive data below) | 6600 C.T. 1650 C.T. | 16, 8, 4, 1. | 70 140 | 7 14 | +43 dbm (20 watts) See Data | 4-1/8 | 3-3/16 | 3-1/16 | 3-1/4 | \$44.00 |
| S-238-Q | Frequency response, ±1 db: 10-75,000 cps. Insertion loss 0.6 db. (See descriptive data below) | 10,000 C.T. 2500 C.T. | 16, 8, 4, 1. | 50 100 | 5 10 | +43 dbm (20 watts) See Data | 4-1/8 | 3-3/16 | 3-1/16 | 3-1/4 | \$44.00 |
| S-258-Q | Frequency response, ±1 db: 10-100,000 cps. Insertion loss 0.4 db. (See descriptive data below) | 5000 C.T. 1250 C.T. | 16, 8, 4, 1. | 120 240 | 12 24 | +46 dbm (40 watts) See Data | 4-5/8 | 3-5/8 | 3-1/2 | 6-1/2 | \$60.00 |
| S-271-S | Frequency response, ±1 db: 10-100,000 cps. Insertion loss 0.3 db. (See descriptive data below) | 5000 C.T. 1250 C.T. | 16, 8, 4, 1. | 200 400 | 20 40 | +49 dbm (80 watts) See Data | 6-3/8 | 5-1/8 | 5-1/8 | 18 | \$90.00 |
| S-273-S | Frequency response, ±1 db: 10-80,000 cps. Insertion loss 0.3 db. (See descriptive data below) | 8000 C.T. 2000 C.T. | 16, 8, 4, 1. | 125 250 | 12 25 | +49 dbm (80 watts) See Data | 6-3/8 | 5-1/8 | 5-1/8 | 18 | \$90.00 |

DESCRIPTIVE DATA, GENERAL

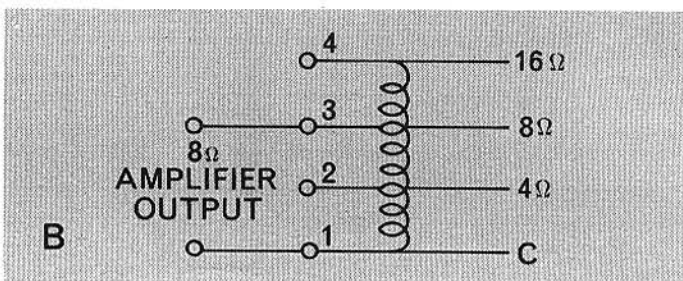
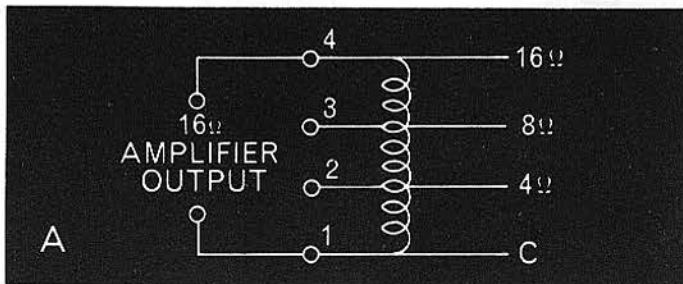
Maximum rated operating level ▼ applies to frequency range 20-20,000 cps. Power rating is 1/2 at 15 cps, 1/4 at 10 cps. Full power (60 cps) primary open circuit inductance is approximately 100 Henrys for each 1000 ohms of primary impedance. Leakage inductance, secondary referred to total primary, is approximately 1 mh per 1000 ohms of primary impedance. Leakage inductance, half primary to half primary is approximately 1 mh per 1000 ohms of primary impedance. Can be used between half and double of rated impedances. For halved impedances, power ratings are doubled. For doubled impedances, power ratings are halved. Secondary may be operated with either end, or C.T. grounded.



impedance
matching
transformers

High Level Auto

Used for impedance matching between amplifiers and loudspeakers at any power rating up to 70 volts across the entire winding. Diagram J shows some applications of the A-262-E transformer's step up and step down matching connections. An amplifier with a single 8 ohm output can be coupled to either a 16 ohm or a 4 ohm loudspeaker when the A-262-E is used.



- **All primaries are 117 V, 60 cycle.
- †All transformers in this group are supplied with electro-static shield.
- ▼ Maximum operating level, 1 mw reference.
- Impedance is total of two separate windings.
- *These units may also be used as bridging transformers. Complete, application data in each packing box.

Line Matching

These are repeating coil type transformers. The E-204-D is the superb 20-20 Plus unit so precisely balanced to be used, when desired, as a hybrid transformer. In the conventional two transformer hybrid arrangement attenuations in excess of 70 db can be achieved. It is exceptionally useful in applications involving transmission lines where performance requirements are severe.

The E-372-Q repeating coil is suitable for applications requiring ground isolation and/or impedance matching between 50 and 500 ohms.

STANDARD IMPEDANCE MATCHING TRANSFORMERS

| Type Number | Descriptive Data | Audio Watts Max. 70 V Line | Impedance, Ohms Primary | Impedance, Ohms Secondary | Freq. Range ± 1 db | Dimensions, Inches Height | Dimensions, Inches Depth | Dimensions, Inches Width | Weight Lbs. | List Price |
|---------------------|--|----------------------------|--|--|------------------------|---------------------------|--------------------------|--------------------------|-------------|------------|
| E-372-Q Repeat Coil | Electro-static Shield, 60 db Magnetic Shield. | +18 dbm▼ | 500 C.T.-333 250-200 C.T. 125-50 | 500 C.T.-333 250-200 C.T. 125-50 | 20 20,000 | 3-1/2 | 2-3/8 | 2-1/2 | 1-1/2 | \$35.00 |

MATCHING TRANSFORMERS (20-20 PLUS)

| Type Number | Descriptive Data | Max. Level▼ | Impedance, Ohms Primary | Impedance, Ohms Secondary | Primary DC MA. Max. | DC MA. Unbal. | Dimensions, Inches Height | Dimensions, Inches Depth | Dimensions, Inches Width | Weight Lbs. | List Price |
|-------------------------|--|-------------|-------------------------|---------------------------|---------------------|---------------|---------------------------|--------------------------|--------------------------|--------------------------|-------------|
| E-204-D Repeat Coil | Frequency response: ± 1 db: 5-80,000 cps. Electrostatic shield. Astatic balance and electro-magnetic shield provide approx. 50 db magnetic shielding. Attenuates longitudinal currents 80 db in bal. circuit in freq. range up to 70,000 cps. Insertion loss 0.4 db. | +23 dbm | 500 C.T. 125 C.T. | 500 C.T. 125 C.T. | 100 | 0 | 3-1/4 | 1-1/2 | 2 | 1-1/4 | \$67.00 |
| As a Hybrid Transformer | This precise matching transf. is an excellent hybrid unit for operation from two 250/300 ohm sources. Balancing resistor of approx. 125/150 ohms required in pri. circuit. For max. attenuation between sources the exact value of resistor should be determined from measurements made in circuit where transf. is used. Correct value will yield average attenuation of 27 to 30 db with a max. attenuation of approx. 50 db at some point between 500 cps and 1000 cps. | | | | Total Pri. | | Impedances, Ohms Pri. 1 | Impedances, Ohms Pri. 2 | | Sec. | Max. Level▼ |
| | | | | | 500 or 600 | | 250 or 300 | 250 or 300 | | 500-125 or 600-150 | +23 dbm |

IMPEDANCE MATCHING AUTO TRANSFORMER (20-20 PLUS)

| Type Number | Descriptive Data | Impedance, Ohms | Insertion Loss | Max. Level▼ | Dimensions, Inches Height | Dimensions, Inches Depth | Dimensions, Inches Width | Weight Lbs. | List Price |
|-------------|---|---------------------------|-------------------------|--|---------------------------|--------------------------|--------------------------|-------------|------------|
| A-262-E | Frequency response, ± 1 db: 10-100,000 cps. May be used in any combination of rated impedances, step-up or step-down. | 16, 8, 4 or 8, 4, 2 | .5 db. or 1.0 db. | 48.7 dbm (75 watts) or 44.7 dbm (30 watts) | 4-3/16 | 3-1/16 | 3-7/16 | 5-3/4 | \$31.00 |



Typical Peerless solutions to meet difficult transformer specifications

problem

1

Design a charging reactor with an inductance of 4.85 henrys ($\pm 7\%$) at 150 ma, DC, and an inductance linearity of 20%. It should operate at 8000 volts DC, be tested at 14,000 RMS volts, and continuously useable in the frequency range up to 2000 cps. It should have a maximum temperature rise of 125°C in a standard ambient, also a maximum effective capacitance of only 60 micromicrofarads when measured in the frequency range between 20 and 25 megacycles. Other prime factors are minimum weight and dimension. Construction to be in strict accordance with the applicable requirements of MIL-T-27.

solution

Inductance: 4.85 henrys $\pm 5\%$ @ 150 ma, DC • Linearity: 10% • Operating-Voltage: DC=8000 • Test Voltage RMS: 16,000 • Useable at F up to: 2000 cps • Maximum Temp. Rise: 100°C • Ambient Temperature: 25°C • Max. Effective Cap.: 51 micromicrofarads (measured at 20-25 megacycles) • Weight: 2-3/4 lbs. • Dimensions, nominal: H—3-1/2" +3/8" terminal, W—2-7/8", L—3-13/16".

problem

2

Design a miniaturized 400 cycle filament transformer for airborne operation. Transformer to operate in an ambient temperature ranging from -55°C to +100°C. The maximum allowable temperature rise to be 60° over ambient. Dimensions cannot exceed 2-7/8" high, by 2-7/16" wide, by 2-1/2" long; nor can the weight exceed 2 pounds. The primary source to be 115V, with primary insulation for 500V RMS hipot. An electrostatic shield is required between the primary and secondary. The secondary is required to deliver 10 amperes at 5V (C.T.) $\pm 3\%$, have a total maximum capacitance of 60 micromicrofarads to other windings, shield, and core, and be able to stand a high potential test of 21,000V, RMS, @ 60 cycles. Construction to be in accordance with applicable parts of MIL-T-27, grade 2, Class B. The above are given as maximum dimension and minimum performance requirements, greatest possible improvement in size, weight and performance requested.

solution

Filament transformer, Fosterite Impregnated • Primary: 115V, 380 to 1600 cps. Hipot at 1000V, RMS, 60 cps Electrostatic shield grounded to core. • Secondary: 5V, C.T. $\pm 1/4\%$ @ 10 amp. Hipot at 25,000V, RMS, 60 cps. for one minute. Distributed capacitance to other winding, shield and core: 50 micromicrofarads. • Temperature Rise: 30°C • Ambient temperature range: -55°C to +100°C • Weight: 12 ounces • Dimensions: H—2-1/4" +3/8" terminal, W—2-3/16", L—2-1/2".

problem

3

Design a miniaturized 400 cycle power transformer for airborne operation, with a three phase primary and three secondaries: three phase, two phase and single phase. Transformer to operate in an ambient temperature ranging from -55°C to +85°C. The maximum allowable temperature rise to be 40°C over ambient. Transformer to operate at altitudes up to 50,000 feet. Dimensions cannot exceed 5" high, by 2-1/4" wide, by 2-1/2" long, nor can the weight exceed 2-1/2 pounds. The primary source to be 115V, 400 cps, three phase. The three secondary loads to be (a) 30V, three phase, at 1.8A with .5 lagging power factor, (b) 30V, single phase, at .4A with .7 lagging power factor, and (c) 115V single phase, in quadrature with (b) $\pm 5^\circ$, at .47A with .7 lagging power factor. Secondaries (a) and (b) to be loaded continuously with (c) loaded intermittently. All secondary windings to be ended in four terminals. Construction to be in accordance with applicable parts of MIL-T-27, Grade 1, Class A. The above are given as maximum dimensions and minimum performance requirements, greatest possible improvement in size, weight and performance requested.

solution

Power transformer, three phase, 400 cps to one phase, two phase, and three phase. Construction: Grade 1, Class A, to MIL-T-27 • Ambient Temperature range: -55°C to +85°C • Temperature Rise: 35°C • Primary: Three terminal, three phase, 115V, 380-420 cps, per phase • Secondaries: Total of four terminals (a) 30V, three phase at 1.8A and .5 lagging power factor. Continuous duty. (b) 30V, single phase at .4A and .7 lagging power factor. Continuous duty. (c) 115V, single phase, at .47A, .7 lagging power factor and in quadrature with (b) within $\pm 1^\circ$. Weight: Two pounds • Dimensions: H—4-1/32" + 1/2" seven terminal header; W—2-1/32"; L—2-9/32".

problem

4

Design a miniature audio input transformer for airborne operation. Transformer to operate in an ambient temperature of +85°C, and to conform to the applicable parts of MIL-E-5400 and MIL-T-27. Duty cycle to be continuous with a minimum life of 1000 hours. Transformer to couple a 300 ohm source to a tube grid. Step-up turns ratio to be 1:17 minimum, with the maximum possible desired. Frequency response to be flat within 0.75 db from 20 cps to 7,000 cps, and flat within 1.2 db from 15 cps to 10,000 cps. Maximum signal level to be 500 mv @ 20 cps in 300 ohm primary. Electrostatic shield required between primary and secondary. Electromagnetic shielding to be 40 db minimum. Size to be kept minimum but must not exceed 1-1/8" x 7/8" x 1-3/8" high.

solution

Audio Transformer, low level input, miniaturized. • Construction: Grade 1, Class A, MIL-T-27 • Duty Cycle: Continuous • Life: Greater than 1,000 hours. • Ambient temperature: +85°C max. • Primary: Three terminal, center-tapped winding, 300 ohms nominal impedance. • Secondary: Two terminal winding, 125,000 ohms nominal impedance. • Turns ratio: 1:20-1/2 • Electrostatic Shield: Between primary and secondary. • Electromagnetic Shield: 45db • Frequency response: 20 cps—7,500 cps, flat within 0.5 db and 10 cps—10,000 cps, flat within 1.0 db with 125,000 ohm load. • Maximum input voltage: 500 mv at 20 cps. • Dimensions: 1" x 11/16" x 1" high + 1/8" terminal.

problem

5

Design an hermetically sealed, miniaturized, power supply to provide 6600V, DC, at 100 microamperes load, when connected to a source of 115V, 400 cps. Power supply to operate in an ambient temperature range between -55°C and +85°C. Minimum life to be 5000 hours at full load. Full load input current must not exceed 0.05A. Output voltage regulation, no load to full load, to be 400 volts DC maximum. Maximum ripple voltage at full load to be 250 volts, peak to peak. Casing to be in accordance with the applicable requirements of MIL-T-27. Power supply to have low external magnetic field. Preferred maximum dimensions to be 3-3/4" x 3-3/4" x 1-3/4" thick.

solution

Power supply: Hermetically sealed, AC to DC. • Construction: Oil filled metal casing in accordance with applicable requirements of MIL-T-27. • Duty cycle: Continuous • Life: Greater than 10,000 hours (measured). • Ambient temperature: +85°C maximum, -55°C minimum. • Input: Two terminals, 115V, 380 cps to 420 cps. • Input Current: .045A at full load. • Output: One terminal and case, 6600V DC at 100 microamperes. • Regulation: 350V, no load to full load. • Ripple voltage: 200V peak to peak. • External field: Nil. • Dimensions: 1-17/32" x 3-17/32" x 3-19/32" +1-1/16" over terminals.

problem

6

Design an hermetically sealed 400 cps output transformer for use in a servo amplifier with a high degree of feedback ($\mu\beta > 100$). Frequency response to be linear within 3 db from 200 cps to 170,000 cps, with no dips or peaks. Primary impedance to be 6,000 ohms, center-tapped, with a maximum DC resistance of 60 ohms. Primary OCL to be 4 henrys minimum when measured at 30V, 400 cps, and with 7.5 ma of DC flowing through the total winding. Secondary impedance to be 500 ohms, center-tapped, with a maximum DC resistance of 6 ohms. Secondary rated output to be 140V @ 400 cps into a 500 ohm load. Transformer efficiency to be 95% minimum. Ambient temperature range to be from -55°C to +105°C. Maximum altitude to be 70,000 feet. Casing to be in accordance with the applicable requirements of MIL-T-27, with preferred dimension limits to be 2-1/2" x 2-3/4" x 2-3/16".

solution

Output Transformer: 400 cps, high level, hermetically sealed. • Construction: Grade 1, Class B, MIL-T-27. Maximum Altitude: 70,000 feet. • Duty Cycle: Continuous. • Life: Greater than 10,000 hours. • Ambient Temperature: -55°C to +105°C. • Primary: Three terminal, center-tapped winding, 6000 ohms nominal impedance. Primary Resistance: 45 ohms. • Primary OCL: 5 henrys, measured at 30V, 400 cps, with a 7.5 ma, DC, through winding. • Secondary: Three terminal, center-tapped winding, 500 ohms nominal impedance. • Secondary Resistance: 5 ohms. • Rated Operating Level: 140V, 400 cps across 500 ohm secondary load. • Efficiency: 96%. Frequency Response: 200 cps—300,000 cps, flat within 1.0 db, and 200 cps—550,000 cps, flat within 3.0 db. Smooth response, no discontinuities. • Dimensions: 1-1/2" x 2-3/4" x 2-3/16" high +5/8" terminals.



ALTEC
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