JEFFERSON TRANSFORMERS

FOR USE WITH LUMINOUS TUBES

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JEFFERSON ELECTRIC COMPANY
Bellwood, Illinois

Bulletin 402-LT

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JEFFERSON

LUMINOUS TUBE TRANSFORMERS

Nos. 721-111 and 721-121

Nos. 721-141, 721-221 and 721-151

No. 721-161

AN especially important factor in creating the ever increasing demand for outdoor fluorescent and clear luminous tube signs and interior fluorescent and clear luminous tube lighting is their dependability, and the first requisite to dependability is transformer power of positive and adequate volume. Jefferson engineers have been identified with every step of progress and improvement—applying their specialized experience in the design and building of transformers to anticipate the ever-enlarging requirements.

During the many years of commercial use of luminous tubes great strides have been made in the improvement of various components of the Neon sign. This is particularly true of the luminous tube transformer. Improvements and refinements of great importance have been and are constantly being made in the Jefferson engineering and research laboratories and through cooperation with luminous tube sign manufacturers.

The present line of Jefferson Luminous Tube Sign Transformers incorporates the following features, which insure long life, quiet and efficient operation:

- Patented Mid-point Grounded Balanced Design.
- High insulation safety factor.
- Streamlined sturdy cases.
- Uniform maximum output.
- Heat and vacuum treated, non-aging low-loss cores.
- Double vacuum treated coils.
- Liberal spacing of pancake type windings.
- Shock-proof primary and secondary terminals.
- Gasketed case and bushings for water proofing.
- Improved compound and method of sealing.
- Oil treated multi-petticoated porcelain bushings.

Jefferson Transformers are listed by Underwriters' Laboratories, Inc. and carry the Underwriters' label.

Mid-Point Grounded Balanced Design

Jefferson engineers developed the mid-point grounded BALANCED design; protected by U. S. Patent Nos. 1,777,256 and 1,786,422; Canadian Patent Nos. 323,728 and 323,729. This design is universally recognized as the outstanding improvement in transformer design for luminous tube lighting. It definitely balances the current and limits the secondary voltage to required values — promotes longer life of tubing and all electrical parts — and insures uniform brilliancy.

Streamlined Cases

The first streamlined one-piece deep drawn case designs were introduced by Jefferson in both standard and indoor transformer types. Since that time case structure has been constantly improved to provide Jefferson Transformers of smaller, neater and more attractive lines. Heavy steel of exceptional durability treated to resist rust is used. Mounting brackets of sturdy design are provided. Standard types are finished in long wearing black crackled enamel. Indoor types are finished in an exclusively new gray, representing hammered metal, having a very harmonizing and attractive appearance.

Polarity Marking

When two or more transformers are mounted together and the secondary leads are in close proximity, it is necessary that these leads be connected to terminals of identical polarity marking. Primary connections must conform to N. E. C. practice — white wire to cadmium terminals. Unless this precaution is observed all equipment in the circuit will be subject to abnormal stress and perhaps will suffer damage.

To insure proper installation with minimum stresses and to prevent cascading, the terminals of all Jefferson cased transformers, except window types, are equipped with cadmium and brass nuts and washers on primary and secondary to indicate the polarity of the transformer windings. Cadmium marked terminals represent the "common" connections, and brass terminals the "hot wire" connections.

Ground Terminal

To comply with Underwriters' Laboratories, Inc. requirements covering the grounding of luminous tube transformers, all Jefferson units in series "721",

"722", "724" and "725" are now supplied with a separate ground terminal located at one end of the case.

Cool Operation

The liberal design throughout, the use of the best materials, and unexcelled workmanship, provide for long transformer life and cool operation.

Shock-proof primary and secondary terminals are provided to meet the requirements of the National Electrical Code and Underwriters' Laboratories, Inc.

Winding Construction

Jefferson secondary windings are of the pancake type, providing greater insulating factors, better radiation, and coolness in operation. The primary coil is layer-wound of special high temperature resistant enameled wire, with additional insulation between each layer. The secondary windings and high voltage leads are insulated from each other and the metal case with heavy mica plate, insuring against electrical breakdown. All coils are automatically machine-wound to exacting specifications and are then vacuum treated and impregnated. Secondary coils are protected against high voltage surges by having the turns of first and last layers spaced 1/16" apart and triple insulation between layers. The complete core and winding unit is given an additional vacuum treatment and is impregnated with moisture-proof compound of high dielectric strength to afford absolute protection under every climatic condition.

Insulation

Jefferson chemical and electrical engineers worked intensively for several years to develop an extremely high grade of high dielectric all-weather resisting insulating compound for both impregnation and filling of transformer cases. This compound is of the asphalt base type, subjected to a special blowing process—which thoroughly eliminates sulphur and moisture, and insures a highly refined product.

The adhesive qualities of this material are such that the compound serves as an extremely good binder, holding the various parts of the transformer unit securely, preventing hum and possibility of air or moisture seepage.

As all types of compound are extremely poor conductors of heat, special high dielectric fillers are mixed into the compound to insure low temperatures at the center of the transformer. Heat is thus uniformly distributed to the case walls and hot spots within the transformer avoided.

Chemical Laboratory

The Jefferson chemical laboratory imposes very rigid requirements covering all raw materials used, to insure only the highest quality, and especially to guard against the presence of chemicals which may later promote electrolysis. In addition chemical engineers personally supervise all vacuum impregnation, moisture proofing compounds and heat treatments.

Complete Line for Outdoor and Indoor Service

Transformers listed include types for all kinds of portable and fixed outdoor and indoor fluorescent and clear luminous tube uses. All are listed as standard by the Underwriters' Laboratories, Inc. — and the latest indoor models, series 726, 727 and 728 described on Pages 12 to 15 comply with the new National Electrical Code requirements covering concealment of the high tension secondary connections of indoor installations.

Standard Outdoor Types—One Secondary Terminal at Each End of Case

All Jefferson 6000 to 15,000 volt outdoor transformers are equipped with shock-proof porcelain secondary caps and high tension cable clamps — a feature developed and introduced by Jefferson (Pats. U. S. No. 1,983,347 — Canadian No. 352,509).

Standard models are equipped with porcelain bushings located one at each end of the case. Both primary connections are at one end of the case. These transformers are most generally used in outdoor type signs although they are suitable for indoor signs when an enclosure is used for the transformer.

Special Outdoor "X" Types—Both Secondary Terminals at One End of Case

For those who prefer transformers with secondary bushings at one end of the case 15,000, 12,000 and 9,000 volt units can be furnished. This style construction is furnished when specified as follows: No. 731-111 for 15,000 volt. No. 731-121 for 12,000 volt 30 MA, etc.

Guarantee

"The Jefferson Electric Company agrees to correct by repair or replacement, at company's option, such transformers as may fail in service within a period of one year from date of shipment, provided conditions of operation have been normal at all times and that the transformers have not been subjected to abnormal stresses from such causes as incorrect primary voltage or frequency, defective tubing, defective cables or insulators, excessive length of tubing, or in general, improper sign installation.

The Jefferson Electric Company will not be liable for any expenses incurred in installation or transportation."

No. 721-351

Nos. 731-111 and 731-121

Nos. 731-141 and 731-221

SPECIFICATIONS AND DIMENSIONS
LUMINOUS TUBE TRANSFORMERS—Series 721

• 60 Cycle 115 Volts—Binding Posts Standard (One at each end of case)

Cat. No.	Telegraphic Code	Cap. V.A.	Approx. Watts Consumption at 115 Volts 60 Cycles	Secondary Volts	Secondary M.A.	Fig.	DIMENSIONS IN INCHES A	B	C	D	E	F	G	H	J	K	Approx. Shipping Weight Lbs.
721-811	ZIPME	650	335	15000	45	2	16¼	5 7/16	7 5/16	11¼	12½	3 3/16	13½	5 7/16	7/16 x ¾	.....	55
721-111	ZACNA	450	225	15000	30	1	14¾	4¾	6 17/32	9 15/32	10⅛	3 3/16	11	5 5/16	7/16 x ⅝	.....	31
721-311	ZINUP	250	135	15000	18	1	14¾	4¾	6 17/32	9 15/32	10⅛	3 3/16	11	5 5/16	7/16 x ⅝	.....	27½
721-821	ZIPLA	500	270	12000	45	2	14¾	4¾	6 15/32	9 15/32	10¼	3 3/16	11⅛	5 7/32	7/16 x ⅝	.....	34
721-121	ZARHO	360	180	12000	30	1	14¾	4¾	6 17/32	9 15/32	10⅛	3 3/16	11	5 5/16	7/16 x ⅝	.....	30
721-221	ZAFWY	250	125	12000	24	1	13¼	4¾	3 25/32	9 15/32	10¼	3 3/16	11⅛	2¾	7/16 x ⅝	.....	19½
721-321	ZINON	200	100	12000	18	1	13¼	4¾	3 25/32	9 15/32	10¼	3 3/16	11⅛	2¾	7/16 x ⅝	.....	20
721-841	ZIOXY	375	200	9000	45	2	14¾	4¾	6 15/32	9 15/32	10¼	3 3/16	11⅛	5 7/32	7/16 x ⅝	.....	34
721-141	ZAGYT	250	125	9000	30	1	13¼	4¾	3 25/32	9 15/32	10¼	3 3/16	11⅛	2¾	7/16 x ⅝	.....	19½
721-341	ZATOK	190	80	9000	18	1	11⅝	3	4½	9⅜	9 11/16	1⅛	10¾	3½	13/64 x 13/16	.....	14
721-851	ZEVUR	330	165	7500	45	5	(Page 5 — width — dimension 'A' 4")										25
721-151	ZARUJ	225	100	7500	30	1	13¼	4¾	3 25/32	9 15/32	10¼	3 3/16	11⅛	2¾	7/16 x ⅝	.....	19
721-351	ZAHTE	150	65	7500	18	2	11⅝	3	4½	9⅜	9 11/16	1⅛	10¾	3½	13/64 x 13/16	.....	13
721-831	ZEWAN	250	125	6000	45	5	(Page 5 — width — dimension 'A' 3¼")										18¼
721-131	ZAUDT	180	75	6000	30	2	11⅝	3	4½	9⅜	9 11/16	1⅛	10¾	3½	13/64 x 13/16	.....	14
721-331	ZAUTL	140	50	6000	18	2	11⅝	2¾	4½	9⅜	9 11/16	1⅛	10¾	3½	13/64 x 13/16	.....	12
721-861	ZEWOR	235	110	5000	45	5	(Page 5 — width — dimension 'A' 3¼")										18½
721-161	ZADUT	150	70	5000	30	1	9	4¾	5	6⅛	6 7/8	2½	7 5/16	2 7/8	13/64	.....	13
721-361	ZAIRG	100	45	5000	18	2	9¼	3 15/32	4¾	6½	7 5/16	1⅛	7¾	3½	13/64 x 5/16	.....	9¾
721-871	ZEWLUS	190	80	4000	45	2	11⅝	3	4½	9⅜	9 11/16	1⅛	10¾	3½	13/64 x 13/16	.....	17
721-171	ZAUSK	140	55	4000	30	2	8⅜	3½	4¾	5¾	6 7/16	1⅛	7	3½	13/64 x 5/16	.....	9½
721-371	ZAVAH	90	35	4000	18	2	8⅜	3 15/32	4¾	5¾	6 7/16	1⅛	7	3½	13/64 x 5/16	.....	8½
721-891	ZEVSY	150	65	3000	45	1	9	4⅜	5	6⅛	6 7/8	2½	7 5/16	2 7/8	13/64	.....	13
721-191	ZAETH	100	40	3000	30	2	8¾	3 15/32	4¾	5¾	6 7/16	1⅛	7	3½	13/64 x 5/16	.....	9
721-391	ZEOJD	75	25	3000	18	2	8⅜	3 15/32	4¾	5¾	6 7/16	1⅛	7	3½	13/64 x 5/16	.....	8
721-581	ZAUCS	50	20	2000	18	2	8⅜	3 15/32	4¾	5¾	6 7/16	1⅛	7	3½	13/64 x 5/16	.....	7

• 60 Cycle 115 Volts—Binding Posts Standard (Both at one end of case)

731-111	ZIYOY	450	225	15000	30	3	12½	5⅝	5⅞	8 9/16	10⅛	3 3/16	11	4⅜	7/16 x 5/8	2½	31
731-121	ZIYTA	360	180	12000	30	3	12½	5⅝	5⅞	8 9/16	10⅛	3 3/16	11	4⅜	7/16 x 5/8	2½	30
731-221	ZIYVE	250	125	12000	24	3	13	4¾	3⅞	9 15/16	10¼	3 3/16	11⅛	2⅜	7/16 x 5/8	1 13/16	19½
731-141	ZIYUZ	250	125	9000	30	3	13	4¾	3⅞	9 15/16	10¼	3 3/16	11⅛	2⅜	7/16 x 5/8	1 13/16	19½

• 25 Cycle 115 Volts—Binding Posts Standard (One at each end of case)

721-112	ZACOR	450	225	15000	30	2	16¼	5 7/16	7 5/16	11¼	12¼	3 3/16	13½	5 7/16	7/16 x ¾	.....	53
721-122	ZARIG	360	180	12000	30	2	16¼	5 7/16	7 5/16	11¼	12½	3 3/16	13½	5 7/16	7/16 x ¾	.....	47
721-222	ZAGAR	250	125	12000	24	1	14¾	4 15/16	6 17/32	9 15/32	10⅛	3 3/16	11	5 5/16	7/16 x ⅝	.....	31
721-142	ZADAP	250	125	9000	30	1	14¾	4 15/16	6 17/32	9 15/32	10⅛	3 3/16	11	5 5/16	7/16 x ⅝	.....	34
721-162	ZADVY	150	75	5000	30	2	11 9/16	4 5/16	5 11/16	7¾	8 3/16	2½	8¾	4⅛	17/64 x 25/64	.....	21

NOTE: Transformers having primary voltages and frequencies other than indicated above can be supplied. Dimensions on application.

FIG. 1

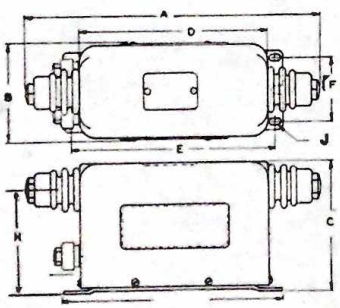


FIG. 2

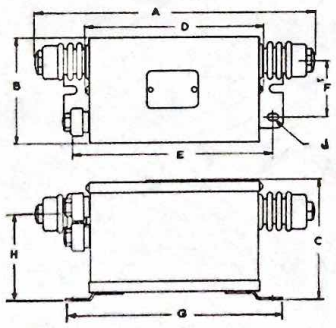


FIG. 3

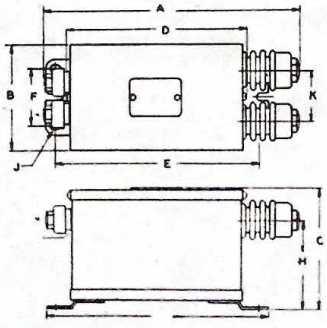
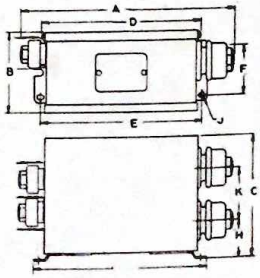


FIG. 4



JEFFERSON THIN TYPE

Luminous Tube Transformers

Series No. 725
(All Types)

Jefferson Series No. 725 Thin-Type Transformers are designed primarily for use where sign enclosures will not accommodate standard width transformers.

Transformers in this group are assembled in cases 4″ wide for the 12,000-volt, 30-MA type and 3⅝″ for the 12,000-volt, 24-MA to 7,500-volt, 30-MA. Secondary terminals are located one at each end of the case, with both primary bushings at one end of the case. Shock-proof terminals are provided to meet the requirements of many electrical inspection bureaus.

The attractive stream-lined cases used in this line are made of heavy steel of exceptional durability, treated to resist rust, and finished in long-wearing black enamel. Universal mounting brackets of sturdy design are provided.

Interior construction includes methods known to promote long life and efficient operation—high insulation safety factor—heat and vacuum-treated, non-aging low-loss cores—double vacuum treated coils—and all the many features of Jefferson guaranteed construction.

Each of these units contains the patented mid-point grounded, balanced design, developed by Jefferson Engineers. This method definitely balances the current and limits the secondary voltage to required values—promotes longer life of tubing and all electrical parts—and insures uniform brilliancy.

Like all Jefferson luminous tube transformers, this line also is listed by Underwriters' Laboratories, Inc and bears the Underwriters' label. Dimensions and electrical specifications are as follows:

SPECIFICATIONS AND DIMENSIONS (Fig. 5)

115 Volts, 60 Cycle—Binding Posts Standard (one at each end of case)

Catalog Number	Telegraphic Code	Capacity V. A.	Approx. Watts Consumption at 115 V. 60 C.	Secondary Volts	Secondary Ma	Width (A)		Approx. Wt. Lbs.
725-121	ZEEMF	360	180	12000	30	4″	See	25
725-221	ZEENG	250	125	12000	24	3¼″	Fig. 5	19
725-141	ZEEPH	250	125	9000	30	3¼″	for	18½
725-341	ZEERK	190	80	9000	18	3¼″	other	16½
725-151	ZEEWP	225	100	7500	30	3¼″	dimensions	18

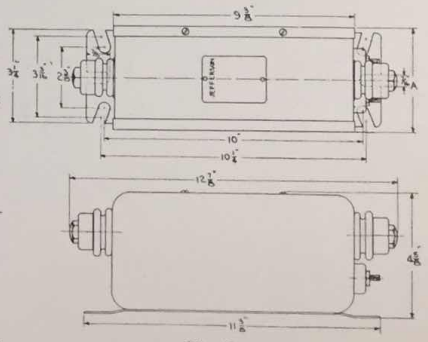


Fig. 5

HIGH INTENSITY TYPES

Luminous Tube Sign Transformers

Listed and Labeled by Underwriters' Laboratories, Inc.

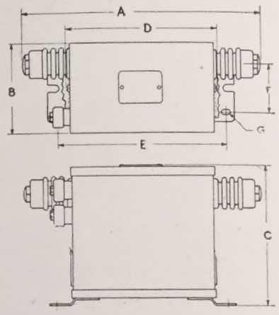
No. 721-451

No. 721-411

The rapidly increasing popularity of high intensity tubes has made necessary a full range of transformers to cover every application of this comparatively new Neon art. Cooperating closely with leading sign and electrode manufacturers, Jefferson engineers have provided a most complete line—units of 60 MA, short circuit current — 16 types in all.

Each contains the constructional features, particularly the patented mid-point grounded, balanced design, which have made Jefferson transformers so reliable, so efficient and so capable of exceptionally long and trouble-free service.

Because of their high output, transformers designed for high intensity tubing must, to insure uninterrupted and efficient performance, incorporate these fundamentals: high quality steel, liberal spacings of the high voltage coils, extra heavy insulation and correct design. The highest grade non-aging annealed silicon steel is used in both the core and shunt structures. The windings have been double vacuum treated. The entire core and coil assembly is then vacuum treated and hermetically sealed prior to installation in the rust-resisting steel case. The hermetical seal and the pre-heat treatment of core and coil and case plus a specially processed high dielectric compound insure a completed transformer which is positively sealed against every climatic condition.



The cases are finished in attractive baked black wrinkle enamel. A sturdy mounting bracket is permanently attached to the case.

SPECIFICATIONS AND DIMENSIONS

115 Volts, 60 Cycle—Binding Posts Standard (One at Each End of Case)

Catalog Number	Telegraphic Code	Capacity V. A.	Approx. Watts Consumption at 115 V.-60 Cy.	Secondary		APPROXIMATE DIMENSIONS IN INCHES							Approx. Shipping Wt. Lbs.
				Volts	MA	A	B	C	D	E	F	G	
721-411	ZASJO	825	410	15000	60	16¼	5 7/16	7 5/16	11¼	12½	3 3/16	7/16 x 3¾	60
721-421	ZATHE	720	350	12000	60	16¼	5 7/16	7 5/16	11¼	12½	3 3/16	7/16 x 3¾	56
721-441	ZASUK	500	240	9000	60	14½	5¾	6 3/8	9 3/8	9 15/16	3 3/16	7/16 x 3¾	38
*721-451	ZEWYT	450	210	7500	60	14¾	4¾	6 17/32	9 15/32	10⅛	3 3/16	7/16 x 5⅝	31
*721-431	ZEYGD	360	170	6000	60	14¾	4¾	6 17/32	9 15/32	10⅛	3 3/16	7/16 x 5⅝	30
*721-461	ZEYLJ	300	140	5000	60	14¾	4¾	6 17/32	9 15/32	10⅛	3 3/16	7/16 x 5⅝	28½
721-471	ZEYOS	250	125	4000	60	13¼	4¾	3 25/32	9½	10¼	3 3/16	7/16 x 5⅝	19¾
721-491	ZEYPA	180	90	3000	60	13¼	4¾	3 25/32	9½	10¼	3 3/16	7/16 x 5⅝	17

High Power Factor Types

724-411	ZIJUK	450	410	15000	60	16¼	5 7/16	7 5/16	11¼	12½	3 3/16	7/16 x 3¾	60
724-421	ZIKAG	400	350	12000	60	16¼	5 7/16	7 5/16	11¼	12½	3 3/16	7/16 x 3¾	59
724-441	ZIKGA	275	240	9000	60	14½	5¾	6 3/8	9 3/8	9 15/16	3 3/16	7/16 x 5⅝	37
*724-451	ZIKHE	250	210	7500	60	14¾	4¾	6 17/32	9 15/32	10⅛	3 3/16	7/16 x 5⅝	31½
*724-431	ZIHHO	200	170	6000	60	14¾	4¾	6 17/32	9 15/32	10⅛	3 3/16	7/16 x 5⅝	31
*724-461	ZIGIF	150	140	5000	60	14¾	4¾	6 17/32	9 15/32	10⅛	3 3/16	7/16 x 5⅝	32
724-471	ZIDDO	120	125	4000	60	14¼	4¾	4 3/8	9½	10¼	3 3/16	7/16 x 5⅝	19¾
724-491	ZIDZA	100	90	3000	60	14¼	4¾	4 3/8	9½	10¼	3 3/16	7/16 x 5⅝	19¾

*Stream Lined Case, see Fig. 1, Page 4.

No. 724-111 High Power Factor Transformer

HIGH POWER FACTOR

Luminous Tube Transformers

Canadian Patent Nos. 323,728 and 323,729

U. S. Patent Nos. 1,777,256, 1,786, 422 and other Patents Pending

In some sections of the country, power supply companies have incorporated power factor clauses in their contracts affecting all low power factor loads.

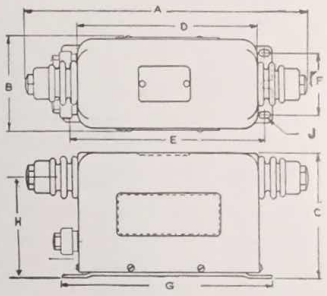
To provide luminous tube transformers suitable for use in cities operating under power factor rulings, Jefferson engineers have developed a series of transformers incorporating built-in capacitors. The inherently high reactance of standard luminous tube transformers causes low power factor. In the Jefferson series "724" transformers this reactance is partially neutralized by the incorporation of the capacitor, which is treated and immersed in a liquid insulation of recent discovery which is non-inflammable, provides a much greater insulating factor, and permits operation at higher temperatures without detrimental effects. Service records never before approached with capacitors of other types have been attained, and only after long and successful laboratory and field tests has this new capacitor been adopted. The method of installation prevents the capacitor from absorbing transformer heat, insuring operation at comparatively low temperatures.

These combination transformer and capacitor units operate at a power factor of approximately 90%, when connected to the proper tube load under normal line voltage conditions. It is important that the correct load be applied, as the power factor will be lower if the transformers are operated at lower than normal footage. However, transformers should not be overloaded in an attempt to raise the power factor.

All transformers in Jefferson series "724" are assembled in substantial black enameled, rust-resisting steel cases equipped with cadmium-plated binding posts on both primary and secondary. They are typically Jefferson in quality of materials, skilled workmanship, and precise engineering requirements, insuring long life and care-free operation.

Mid-point grounded, balanced design, patented construction is incorporated in all models.

The secondary terminals are insulated with extra large multi-petticoated, glazed porcelain bushings, and in addition are equipped with Jefferson special shock-proof porcelain caps, which provide for secure anchorage of high-tension cables. These transformers are listed as standard by the Underwriters' Laboratories, Inc. Electrical specifications, catalog numbers, and dimensions are shown below and at the bottom of page 6.



SPECIFICATIONS AND DIMENSIONS

115 Volts, 60 Cycle—Binding Posts Standard (One at Each End of Case)

Catalog Number	Telegraphic Code	Capacity V. A.	Approx. Watts Consumption at 115 V.-60 Cy.	Secondary		APPROXIMATE DIMENSIONS IN INCHES							Approx. Shipping Wt. Lbs.
				Volts	MA	A	B	C	D	E	F	G	
724-811	ZIBIZ	360	325	15000	45	16 1/4	5 7/16	7 5/16	11 1/4	12 1/2	3 3/16	7/16 x 3/4	56
724-111	ZIGAC	250	225	15000	30	14 3/4	4 3/4	6 9/16	9 1/2	10 1/8	3 3/16	7/16 x 5/8	31 1/2
724-311	ZIBOB	175	135	15000	18	14 3/4	4 3/4	6 9/16	9 1/2	10 1/8	3 3/16	7/16 x 5/8	31 1/2
724-821	ZIBUC	275	250	12000	45	14 1/2	5 3/4	6 3/8	9 3/8	9 15/16	3 3/16	7/16 x 5/8	38
724-121	ZIGGO	200	180	12000	30	14 3/4	4 3/4	6 9/16	9 1/2	10 1/8	3 3/16	7/16 x 5/8	31
724-221	ZIGUH	150	145	12000	24	13 1/4	4 3/4	4 3/8	9 1/2	10 1/4	3 3/16	7/16 x 5/8	22
724-321	ZIBWA	150	110	12000	18	13 1/4	4 3/4	4 3/8	9 1/2	10 1/4	3 3/16	7/16 x 5/8	19 3/4
724-841	ZIBYE	210	170	9000	45	13 1/4	4 3/4	6 9/16	9 1/2	10 1/8	3 3/16	7/16 x 5/8	31 1/2
724-141	ZIHEF	150	125	9000	30	13 1/4	4 3/4	4 3/8	9 1/2	10 1/4	3 3/16	7/16 x 5/8	22 1/2
724-341	ZIJYL	110	100	9000	18	13 1/4	4 3/4	4 3/8	9 1/2	10 1/4	3 3/16	7/16 x 5/8	22
724-851	ZICAY	180	150	7500	45	13 1/4	4 3/4	6 9/16	9 1/2	10 1/8	3 3/16	7/16 x 5/8	31 1/2
724-151	ZIHKY	125	110	7500	30	13 1/4	4 3/4	4 3/8	9 1/2	10 1/4	3 3/16	7/16 x 5/8	27
724-351	ZICCO	90	75	7500	18	13 1/4	4 3/4	4 3/8	9 1/2	10 1/4	3 3/16	7/16 x 5/8	18
724-831	ZICEZ	140	125	6000	45	13 1/4	4 3/4	4 3/8	9 1/2	10 1/4	3 3/16	7/16 x 5/8	19 3/4
724-131	ZIJJO	100	75	6000	30	13 1/4	4 3/4	4 3/8	9 1/2	10 1/4	3 3/16	7/16 x 5/8	22
724-331	ZICIB	75	60	6000	18	13 1/4	4 3/4	4 3/8	9 1/2	10 1/4	3 3/16	7/16 x 5/8	18
724-861	ZICUD	125	100	5000	45	13 1/4	4 3/4	4 3/8	9 1/2	10 1/4	3 3/16	7/16 x 5/8	19 3/4
724-161	ZIKIJ	90	70	5000	30	8 7/8	4 1/2	5	6 1/8	6 7/8	2 1/2	13/64	16 1/2
724-361	ZIDBE	60	45	5000	18	9 1/4	3 17/32	5 3/4	6 1/2	7 3/16	1 1/8	13/16 x 5/16	13
724-871	ZIDGY	105	75	4000	45	13 1/4	4 3/4	4 3/8	9 1/2	10 1/4	3 3/16	7/16 x 5/8	19 3/4
724-171	ZIDIC	75	55	4000	30	9 1/4	3 17/32	5 3/4	6 1/2	7 3/16	1 1/8	13/16 x 5/16	11
724-371	ZIDUF	55	40	4000	18	9 1/4	3 17/32	5 3/4	6 1/2	7 3/16	1 1/8	13/16 x 5/16	10
724-891	ZIEBY	85	60	3000	45	9 1/4	3 17/32	5 3/4	6 1/2	7 3/16	1 1/8	13/16 x 5/16	14
724-191	ZIEGD	60	40	3000	30	9 1/4	3 17/32	5 3/4	6 1/2	7 3/16	1 1/8	13/16 x 5/16	11
724-391	ZIEIJ	45	20	3000	18	9 1/4	3 17/32	5 3/4	6 1/2	7 3/16	1 1/8	13/16 x 5/16	10

JEFFERSON WEATHERPROOF

Luminous Tube Transformers

For use in outdoor signs where it is not convenient or desirable to provide enclosures for transformers, Jefferson weatherproof types are ideal. Assembled in sturdy rust-proof hot dipped galvanized cases with primary and secondary connections entirely enclosed, these transformers insure long and efficient service under every climatic condition.

The wiring compartment located at the bottom of the transformer is 6 inches square and 5 inches deep. Threaded conduit fittings (½") are provided for primary and secondary connections. Standard large petticoated secondary porcelains and primary porcelain connections are provided, all being equipped with shockproof porcelain caps.

Patented mid-point grounded balanced design is used in all units and an extra grounding terminal is incorporated for use when transformers are installed in un-grounded signs. Heavy mounting brackets are spot-welded to two sides of the case to provide quick and easy means for installation.

Thirteen different units are available in this weather-proof style, as indicated below. The same sized case is used for all models.

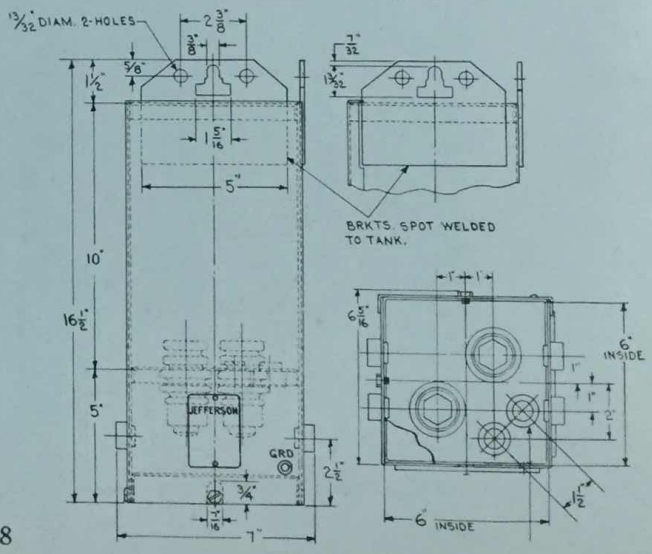
ELECTRICAL SPECIFICATIONS
115-volt, 60-cycle

Catalog Number	Telegraph Code	Capacity V. A.	Approx. Watts Consumption at 115 V. 60 C.	Approximate Weight	Secondary	
					Volts	M. A.
722-411	ZATAG	825	410	72	15000	60
722-811	ZEFOZ	650	335	68	15000	45
722-111	ZAMEZ	450	225	52½	15000	30
722-421	ZEFIX	720	350	70	12000	60
722-821	ZEFUB	500	270	68	12000	45
722-121	ZASAF	360	180	51	12000	30
722-221	ZANOD	250	125	46	12000	24
722-441	ZALOB	500	225	51	9000	60
722-841	ZEGBO	375	200	52½	9000	45
722-141	ZANAZ	250	125	48½	9000	30
722-451	ZALUC	450	200	51	7500	60
722-851	ZEGIZ	330	165	51	7500	45
722-151	ZALYE	225	100	47	7500	30

Dimensions—Case only—15" high, 6¼" wide, 6¼" deep.
Height over mounting bracket, 16½".
Width over conduit connections, 7".

LISTED AND LABELED BY UNDERWRITERS' LABORATORIES, INC.

Dimensions—All Types



CORE and COIL
(UNENCLOSED)
TRANSFORMERS

Jefferson unenclosed types are particularly adaptable for small portable signs, where space is at a premium and where small sections of tube are to be operated. Each unit is assembled in the same careful and thorough manner as are Jefferson encased types. Windings are vacuum-treated, impregnated, and the entire unit is coated with high dielectric insulating compound for moisture proofing.

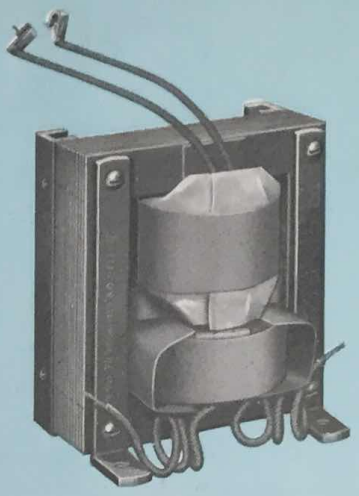
Universal mounting brackets are supplied which hold the core rigidly to reduce audible hum.

Flexible Primary and Secondary leads are 6″ long, heavily insulated and provided with connection clips.

Jefferson Unenclosed Core and Coil Type Transformers of 5000 volt secondary or less are listed as standard by the Underwriters' Laboratories, Inc. and when properly installed will insure Underwriters' approval of the completed sign. Unenclosed transformers of 6000 and 7500 volt secondaries are not approved by Underwriters' Laboratories, Inc. but Jefferson No. 720-331 and No. 720-351 of these voltages are the same units as used in Jefferson standard encased types which bear Underwriters' listing.

Care should be taken in the installation to see that there is ample clearance between secondary coils and sign enclosure. For example, there should be ⅜″ clearance when transformers of 3000 volt secondary or less are used, and ½″ clearance when transformers of 4000 volts and above are used.

Core and coil transformers have mounting holes drilled to accommodate 10-24 bolts.



Series "720" Core and Coil Type Transformers

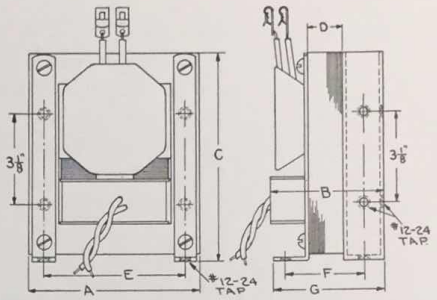


Fig. 9

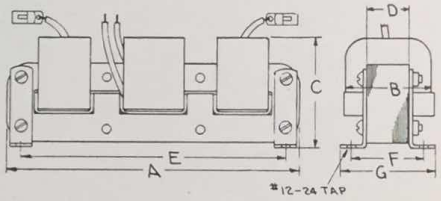


Fig. 10

SPECIFICATIONS AND DIMENSIONS

115 Volts, 60 Cycle—Unenclosed (6″ Primary and Secondary Leads)

Cat. No.	Telegraphic Code	Capacity V. A.	Approx. Watts Consumption at 115 Volts 60 Cycles	Secondary		Fig.	Approximate Dimensions in Inches							Approx. Shipping Weight Lbs.
				Volts	MA		A	B	C	D	E	F	G	
720-351	ZIVVO	150	70	7500	18	10	8¼	2 11/16	3⅛	1¼	7½	2⅛	2¾	7½
720-331	ZIVSE	140	55	6000	18	9	3¾	2 15/16	4⅝	1¼	3⅛	2¼	2 31/32	6
720-361	ZIVRA	100	40	5000	18	9	3¾	2 15/16	4⅝	1¼	3⅛	2¼	2 31/32	6
720-371	ZIVOV	90	35	4000	18	9	3¾	2 11/16	4⅝	1	3⅛	2	2 29/32	5
720-391	ZIVYX	75	25	3000	18	9	3 1/16	2½	3¾	1⅛	2½	...	2½	4
720-381	ZIVIT	50	20	2000	18	9	3 1/16	2⅛	3¾	¾	2½	...	2⅛	3

NOTE: Transformers of above types having special primary voltages and frequencies can be supplied. Dimensions on application.

INDOOR TRANSFORMERS

5,000 Volts 18 MA up to and including 12,000 Volts 24 MA

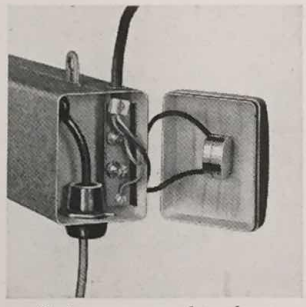
Listed and Labeled by Underwriters' Laboratories, Inc.

Series No. 728

Series No. 726

● Jefferson indoor transformers are finished in a striking, exclusively new gray hammered metal in appearance which lends a soft, harmonizing effect enhancing the beauty of the entire sign installation. The compactness of the new streamlined case and the convenient end compartments make this modern line adaptable to every type of indoor luminous sign.

Two separate and distinct groups of transformers are available in this modern case design—Series No. 728 having secondary spring contact electrode housings, and Series No. 726 with secondary cables. Transformers in either series are furnished with or without three-conductor cord and 2-prong plug with means for grounding, and primary pull switch.



End cap removed to show spacious compartment.

No Exposed High Tension Connections

These new transformers are designed to meet the latest requirements of the National Electrical Code and Underwriters' Laboratories, Inc. . . . there are no exposed live metal parts in the high tension secondary circuit—Primary connections are screw terminals, panel-mounted, inside the end compartment and no soldering is required.

Removal of end caps exposes the wiring compartments for easy and quick wiring. A combination knockout and bushing in top of case provides for primary current entry through cord and plug, or through flexible or rigid conduit. In shipping, No. 726 Transformers, the secondary cables are coiled inside the end compartments, thus resulting in a smaller and neater package.

SPECIFICATIONS AND DIMENSIONS

115 Volts, 60 Cycle Primary

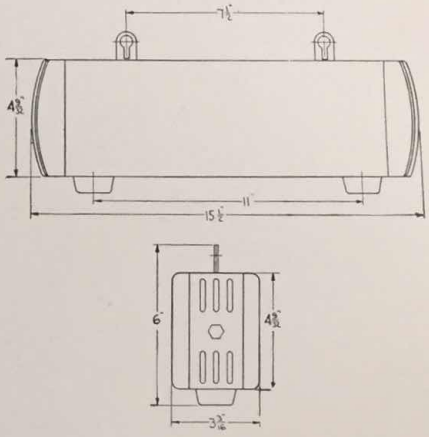
Series No. 728 Transformers — With Electrode Housings

Catalog No.	Telegraphic Code	Capacity V.A.	Approx. Watts Consumption at 115 Volts 60 Cycles	Secondary Volts	Secondary MA	Approx. Shipping Wts. Lbs.
728-221	ZAYBS	250	125	12000	24	31
728-141	ZAYAK	250	125	9000	30	31
728-341	ZAYHZ	190	80	9000	18	19
728-151	ZAYLE	225	100	7500	30	18
728-351	ZAYNO	150	65	7500	18	15
728-131	ZAYUP	180	75	6000	30	15
728-331	ZAZAL	140	50	6000	18	14
728-161	ZAZLA	150	70	5000	30	15
728-361	ZAZME	100	40	5000	18	14

Series No. 726 Transformers — With Secondary Cables

726-221	ZILIK	250	125	12000	24	20
726-141	ZIKOK	250	125	9000	30	20
726-341	ZILYN	190	80	9000	18	18
726-151	ZIMAJ	225	100	7500	30	19½
726-351	ZILLO	150	65	7500	18	17
726-131	ZIMEK	180	75	6000	30	18½
726-331	ZIMIL	140	50	6000	18	16½
726-161	ZIKUL	150	70	5000	30	16½
726-361	ZILNY	100	45	5000	18	16

Dimensions—All Types



NOTE: Series No. 728 may be used as hanging or standing type—standing brackets No. 728—001 supplied at slight additional cost. Series No. 726 is for hanging only, with eyelet supports for glass tubing.

NOTE: Transformers of above types having special primary voltages and frequencies can be supplied. Dimensions on application.

NOTE: For above units in High Power Factor Type change second digit of catalog number to "3"—example: 738-221 for 12000 V. 24 M. A electrode housing type. (Prices on application).

INDOOR TRANSFORMERS

12,000 Volts 30 MA and 15,000 Volts 30 MA Types

Listed and Labeled by Underwriters' Laboratories, Inc.

Series 726
with Hanging Bracket

Series 728
with Mounting Supports

Jefferson 12,000-volt, 30-MA and 15,000-volt, 30-MA indoor type transformers are assembled in hexagon cases as illustrated above. These units are furnished in the same exclusively new gray finish, hammered metal in appearance, as smaller indoor transformers shown on the previous page.

The 728 types are supplied with spring contact electrode housings, hanging bracket and cable clamps; and the 726 types with three-foot secondary cables and hanging bracket.

Hanging brackets, which prevent swinging movement of transformer and tubing, are furnished as standard equipment. Mounting supports for 728 types are also available when it is desired to use the transformer and tubing in standing position.

Installation is exceptionally convenient. The end caps are quickly removed by loosening one screw, opening wide the roomy wiring compartments at each end of the case. When cables are used, they are securely anchored by quickly attached clamps, which eliminate strain on the secondary cable. No splicing of secondary cable is required. Glass tubes or metal shields can be used over cables if desired. Provision is made for adjustment of electrode housings to compensate for variation in electrode centers.

Primary cord and plug (3 conductor, with 2-prong plug and ground wire) and pull switch are available at slight extra cost. Provision is also made for rigid conduit, flexible conduit, or armored cable primary connection through the wiring compartment

SPECIFICATIONS AND DIMENSIONS

115 Volts, 60 Cycle Primary

Series No. 728 Transformers — With Electrode Housings

Catalog No.	Telegraphic Code	Capacity V.A.	Approx. Watts Consumption at 115 Volts 60 Cycles	Secondary		Approx. Shipping Wts. Lbs.
				Volts	MA	
728-111	ZAWKE	450	225	15000	30	34½
728-121	ZAWMO	360	180	12000	30	33

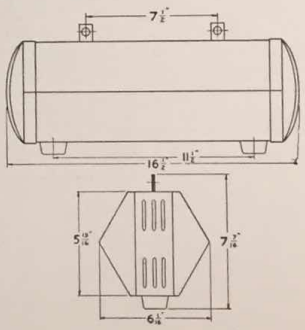
Series No. 726 Transformers — With Secondary Cables

726-111	ZIKKO	450	225	15000	30	34½
726-121	ZIKMY	360	180	12000	30	33

NOTE: Series No. 728 may be used as hanging or standing type—standing brackets No. 728—001 supplied at slight additional cost. Series No. 726 is for hanging only, with eyelet supports for glass tubing.

NOTE: For above units in High Power Factor Type change second digit of catalog number to "3" —example: 736-111 for 15000 volt 30 MA secondary cable type. (Prices on application).

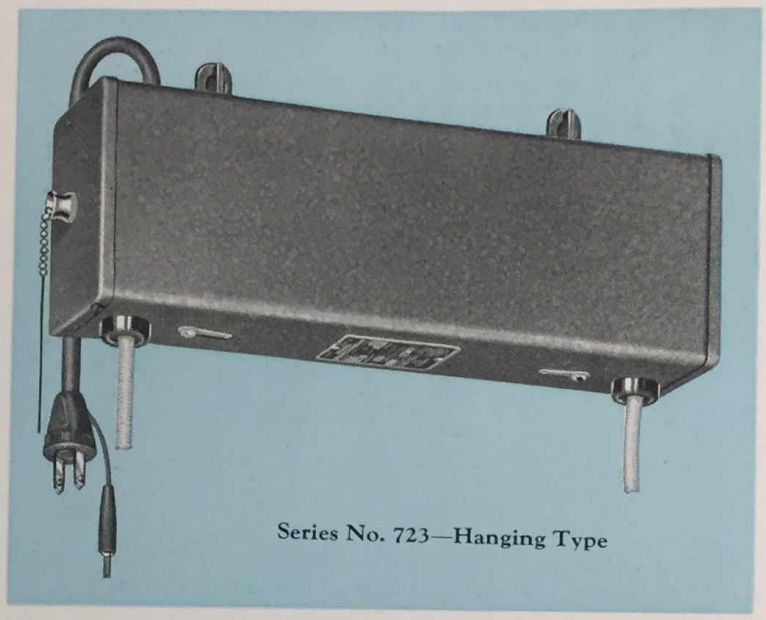
Dimensions — All Types



INDOOR TRANSFORMERS

5000 Volts 18 MA to 9000 Volts 18 MA

Listed and Labeled by Underwriters' Laboratories, Inc.



Series No. 723—Hanging Type

This new series includes four very popular sizes for indoor type hanging signs—5000, 6000, 7500 and 9000 volt secondaries, all 18 M.A.

While this group of transformers is similar in general appearance to "726" type transformers shown on page 10, they are equipped with simple shallow type end caps and only one wiring compartment. This and other economies make it possible to offer "723" styles at a substantial saving in cost.

Finished entirely in gray, these units present a very attractive appearance. Standard equipment includes, four foot secondary cables; 3-conductor primary cord with 2-prong plug and ground wire; primary pull chain switch; roomy primary wiring compartment and hanging bracket. Access to the wiring compartment is accomplished by removing the screws in the end cap. A knockout is provided in one of the compartment walls for use in the event rigid conduit, flexible conduit, or armored cable primary connection is needed.

Interior construction includes identically the same high quality materials and engineering features incorporated in all Jefferson luminous tube transformers. These features promote longer life of tubing and all electrical parts and insure uniform brilliancy.

Like all Jefferson luminous tube transformers the "723" series is listed by Underwriters' Laboratories, Inc. and bear the Underwriter's label. Dimensions and electrical specifications are shown below:

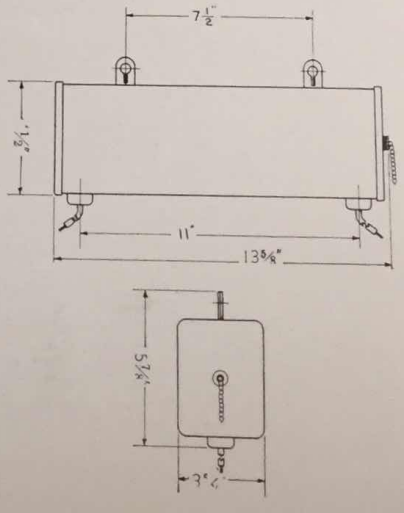
SPECIFICATIONS AND DIMENSIONS

115 Volts 60 Cycle Primary

Series No. 723 Transformers—4 foot secondary cables—3 conductor primary cord—2 prong plug—pull chain primary switch.

Catalog Number	Telegraph Code	Capacity V. A.	Secondary		Approximate Ship. Wt.
			Volts	M. A.	
723-341	ZOCHO	190	9000	18	16
723-351	ZOCIG	150	7500	18	15
723-331	ZOCKY	140	6000	18	14½
723-361	ZOCUJ	100	5000	18	14½

Dimensions—All Types



JEFFERSON Luminous Tube Footage Chart

NORMAL MAXIMUM TUBING OPERATED (BASED ON AVERAGE GRADE OF TUBING)

Secondary Voltage	Short Circuit M.A.	Capacity V.A.	Approx. Watts Consumption at 115 Volts 60 Cycles	Clear or Fluorescent Red (also recommended for neon fluorescent Gold) — TUBE SIZE, MILLIMETERS										Clear or Fluorescent Mercury Filled Tubes—All Colors—Indoor Applications* — TUBE SIZE, MILLIMETERS										Clear or Fluorescent Mercury Filled Tubes–All Colors–Outdoor Applic'ns† — TUBE SIZE, MILLIMETERS										Helium Gold — TUBE SIZE, MM					
				25	22	20	18	15	13	12	11	10	9	25	22	20	18	15	13	12	11	10	9	25	22	20	18	15	13	12	11	10	9	15	13	12	11	10	9
15000	60	825	410	102	85	78	72	60	50	45	39	33	27	120	100	90	80	72	60	54	47	40	32	90	76	69	65	54	45	40	35	30	24	30	25	22	18	16	14
	45	650	325																																				
	30	450	225																																				
	18	250	135					50	44	40	34	27	24					62	52	47	40	34	28					45	39	36	30	25	20	25	22	19	17	14	11
12000	60	720	350	79	67	61	55	45	39	35	30	25	21	95	79	70	62	55	46	42	36	30	25	71	60	55	49	40	36	31	27	22	19	23	20	17	15	13	10
	45	500	250																																				
	30	360	180																																				
	18 & 24	200&250	110 & 145					40	33	30	26	21	18					47	40	34	30	26	20					36	29	26	22	19	17	19	16	14	12	10	8
9000	60	500	240	67	57	48	40	33	29	26	22	19	15	80	67	55	45	40	33	31	26	23	18	60	51	43	36	30	26	23	20	17	13	16	14	13	11	10	7
	45	375	170																																				
	30	250	125																																				
	18	190	100					28	24	22	18	15	13					34	29	26	22	18	16					25	22	20	18	13	11	14	12	10	9	7	6
7500	60	450	210	51	41	34	28	24	22	20	16	13	11	61	48	39	31	28	27	24	19	16	12	46	37	30	25	21	20	18	15	12	10	12	11	9	8	6	5
	30	225	110																																				
	18	150	75					22	20	18	14	12	10					25	23	21	17	13	11					19	18	16	13	11	9	10	10	8	7	6	5
6000	60	360	170	40	34	28	23	19	17	16	13	11	9	48	40	32	26	23	20	18	15	12	11	36	31	25	20	17	15	14	12	10	8	9	8	7	6	5	4
	30	180	75																																				
	18	140	60					17	15	14	10	9	7					20	17	16	12	11	8					15	14	12	9	8	6	8	7	6	5	4	3
5000	60	300	140	33	28	23	19	17	15	12	10	9	7	40	33	27	22	19	16	14	12	11	8	30	25	20	17	15	14	12	9	8	6	7	7	5	5	4	3
	45	235	100																																				
	30	150	70																																				
	18	100	45					14	13	11	8	7	6					17	15	13	10	8	7					13	12	10	7	6	5	6	6	4	4	3	2
4000	45	190	75	27	23	19	16	13	11	10	8	7	6	32	27	22	18	16	13	12	10	8	7	24	20	17	15	12	11	10	7	6	..	5	5	4	4	3	2
	30	140	55																																				
	18	90	40					11	10	9	7	6	5					13	12	11	8	7	6					10	9	8	6	5	4	4	4	3	3	2	..
3000	45	150	60	17	14	12	10	10	9	8	7	6	5	22	18	16	14	12	10	10	8	7	6	14	12	11	9	9	8	7	6	5	..	4	4	3	3	2	..
	30	100	40																																				
	18	75	30					8	7	6	5	4	4					10	8	7	6	5	5					7	6	6	5	4	4	3	3	..	2	..	..
2000	18	50	23					6	5	5	4	3	3					7	7	6	5	4	4					5	4	5	4	3	3	2	2	..	2	..	..
RECOMMENDED GAS PRESSURES, MM. →				6	7	7½	8	9	10	11	12	13	15	6	7	7½	8	9	10	11	12	13	15	6	7	7½	8	9	10	11	12	13	15	From 3 to 5MM					

Note: Deduct one foot from the above figures for each pair of electrodes. †—**No. B19 or No. 20 Gas and Fluorescent Mercury.**
***—No. B10 or No. 50 Gas and Fluorescent Mercury. These footages also recommended for OUTDOOR use where temperature does not fall below 40°F.**

Note: 25 cycle transformers will operate 85% of above footages.

APPROXIMATE FOOTAGE PER WORD

BLOCK LETTERS IN SECTIONS

Ht. of Let.	Number of Letters								
	4	5	6	7	8	9	10	11	12
3″	4′	4′ 6″	5′ 6″	6′ 6″	7′ 6″	8′ 6″	9′	10′	11′
4″	5′	6′	7′	8′	9′ 6″	10′ 6″	12′	13′	14′
5″	6′	7′ 6″	9′	10′ 6″	12′	13′ 6″	15′	16′ 6″	18′
6″	7′	9′	10′ 6″	12′ 6″	14′	16′	17′ 6″	19′ 6″	21′
7″	8′	10′	12′ 6″	14′ 6″	17′	19′	21′	23′	25′8″
8″	9′6″	12′	14′	16′ 6″	19′	21′	23′ 6″	26′	28′
9″	11′	13′ 6″	16′ 6″	19′	22′	24′ 6″	27′ 6″	30′	33′
10″	12′	15′	18′	21′	24′	27′	30′	33′	36′
11″	13′	16′ 6″	19′ 6″	23′	26′	29′ 6″	32′ 6″	36′	39′
12″	14′	17′ 6″	21′	24′ 6″	28′	31′ 6″	35′	38′ 6′	42′

INDIVIDUAL BLOCK LETTERS

Ht. of Let.	Number of Letters								
	4	5	6	7	8	9	10	11	12
14″	14′	17′ 6″	21′	24′ 6″	28′	31′ 6″	35′	38′ 6″	42′
16″	16′	20′	24′	28′	32′	36′	40′	44′	48′
18″	18′	22′ 6″	27′	31′ 6″	36′	40′ 6″	45′	49′ 6″	54′
20″	20′	25′	30′	35′	40′	45′	50′	55′	60′

SCRIPT AND OUTLINE LETTERS

Ht. of Let.	Number of Letters								
	4	5	6	7	8	9	10	11	12
3″	5′	6′ 6″	7′ 6″	9′	10′	11′ 6″	12′ 6″	14′	15′
4″	7′	9′	10′ 6″	12′ 6″	14′	16′	17′ 6″	19′ 6″	21′
5″	8′ 6″	10′ 6″	12′ 6″	14′ 6″	17′	19′	21′	23′	25′
6″	10′	12′ 6″	15′	17′ 6″	20′	22′ 6″	25′	27′ 6″	30′
7″	12′	15′	18′	21′	24′	27′	30′	33′	36′
8″	13′ 6″	17′	20′	23′ 6″	27′	30′	33′ 6″	37′	40′
9″	15′	19′	23′	26′ 6″	30′ 6″	34′ 6″	38′ 6″	42′ 6″	46′
10″	17′	21′	25′	29′	33′ 6″	38′	42′	46′	50′ 6″
11″	18′ 6″	23′	27′ 6″	32′	37′	41′ 6″	46′	50′ 6″	55′
12″	20′	25′	30′	35′	40′	45′	50′	55′	60′

GENERAL INFORMATION

Conditions Detrimental to Neon Sign Operation

1. Open High-tension circuits caused by:
   (a) Broken Tubing.
   (b) Exhausted Tubing (loss of gas).
   (c) Broken High-tension Conductors.
   (d) Secondary Flashers (animators).
2. Grounded or Shorted high-tension circuits, caused by:
   (a) Soot and grime-covered tubes and insulators.
   (b) Accumulated water.
   (c) Defective or damaged cable insulation.
   (d) Insufficient spacing of conductors or electrodes.
3. Inadequate ventilation for transformers which are mounted within enclosures of indoor signs.
4. Abnormal Power Supply—high or low voltage, or incorrect frequencies. (Frequency must be exactly as stamped on transformer-voltage, plus or minus 10% of that stamped on transformer.)
5. Improper Rotary Converter Service—causing high or low frequency and voltage.
6. Improper tube footage causing high-voltage surges in both tubing and transformer.

Tube Test for Completed Signs

For nominal 115-volt service the tubing in the completed sign should be operated without flicker at 80 to 90 volts before the sign is placed in actual service. This precaution will carry the sign safely through periods of abnormal operation and will insure long life and the highest operating efficiency. If the sign operates without flicker, at decidedly below 80 volts, then a smaller transformer may be used to advantage. Jefferson Transformer No. 233-971, having a tap-changing switch to vary the secondary voltage from 55 to 125 volts in 5-volt steps, a voltmeter, cord and plug on primary, receptacle on secondary, and convenient carrying strap, is especially designed for making low-voltage tests.

Formula for Determining Letter Length

To estimate the approximate tube footage per letter, the height of single tube letters should be multiplied by 3.5. To estimate the approximate tube footage per letter in double outline and single tube script letters, multiply the height by 5. Add one foot per pair of electrodes.

Radio Interference

Care should be taken when originally laying out the tubing of a contemplated sign, and prior to forming the letters, to avoid the possibility of radio interference after the sign has been installed. All bendbacks and crossovers should be liberally spaced—not less than ¼ to ⅜ of an inch, dependent upon the amount of tubing in the crossover or bendback. Allowances should also be made for sufficient spacing between electrode housings, tubing, cables, and the body of the sign. Positive grounding of transformers and the entire sign structure is also necessary. These precautionary measures, taken while the sign is being constructed, will insure against the presence of radio interference.

Radio interference in completed signs is sometimes caused by the flickering of the tubing or by corona discharges from tubing or secondary cables. Corona discharges are usually concentrated at a sharp bend crossover or stricture. To eliminate interference from this cause, wrap the tubing at the bend or stricture with a few turns of fine bare copper wire and connect this wire to an equalizing point on the tubing. This equalizing point will be found at approximately the same distance from the second electrode as the corona discharge is from the first electrode. For example: If in a sign carrying the word "Drugs" (with one electrode at the beginning and one at the end of the word), a corona discharge is noted at the top of the letter "R," fine wire is wound around this point of the tube and connected to the equalizing point which will be found somewhere in the letter "G." If secondary cables are causing interference these should be checked very carefully for leakage to ground, etc., or poor connections. The transformer itself is never the cause of radio interference but should a combination of the foregoing causes of radio interference be difficult to suppress, the use of Jefferson condenser No. 638-001 is recommended. Two of the leads of the condenser should be connected across the primary of the transformer and the third (center) lead should be grounded.

For exceptionally stubborn cases of interference the Jefferson No. 638-005 filter, comprising a choke and condenser unit rated at 5 amperes, 115 or 230 volts, is recommended.

Hourly Cost of Operating Luminous Tube Signs

The wattage consumption of each Jefferson luminous tube sign transformer is given in the foregoing pages. The cost of hourly operation of any luminous tube sign can be determined by multiplying the wattage consumption by the kilowatt hour rate. In most communities, power charges are figured on a sliding scale which decreases with increased consumption. The operation of luminous tube signs, therefore, generally increases current charges at the lowest kilowatt hourly rate.

For example: A display incorporating one Jefferson 15,000-volt, 30-MA, transformer consumes approximately 225 watts. This is .225 of one kilowatt hour, which, at a rate of 5 cents per kilowatt hour equals 1.125 cents. When it is considered that fifty feet of 15-MM tubing can be operated with one 15,000-volt transformer at only 1.125 cents per hour, producing an advertising media unexcelled for visibility and forcefulness, the popularity and wide-spread use of luminous tube signs can readily be appreciated.

Some electrical power company rates are based on volt-ampere rather than watt consumption. As neon transformers have a volt-ampere consumption of approximately twice that of their wattage rating, the cost of operation when using standard types or low power factor transformers, in districts where rates are based on V. A. consumption, will be approximately 100% greater. To effect this saving in cost of operation, high power factor transformers should be used as these types have a volt-ampere rating approximating the wattage consumption. (See page 7 for listing of high power factor transformers).

Installation

To obtain maximum life of luminous tube sign transformers, it is recommended that they be rigidly mounted in upright positions, although it is possible to mount transformers on end or inverted, if necessary. Transformers should be located in an enclosure to provide ample spacing between terminals and grounded parts of the sign, and in such a manner that they will be protected from rain and snow. Adequate ventilation should be provided for transformers which are mounted within enclosures of indoor signs. The transformers must be wired so that they can be connected to circuits of rated voltage and frequency, and must not be wired with primaries connected in series for operation on circuits of higher than rated voltage. In large signs transformers should be wired in groups, each circuit having current capacity of 15 amperes or less. In double face signs it is recommended that each face be wired and controlled independently of the other. Transformers should be located in sign body to permit minimum length of secondary cables, and the **secondary circuits must not be interconnected.**

Fuse Protection for Luminous Tube Signs

All Neon signs should be independently fused. Maximum protection against abnormal service is obtained through the use of JEFFERSON SUPERLAG FUSES, UNION RENEWABLE FUSES, or JEFFERSON PLUG FUSES. (For complete description of Jefferson fuses see Catalogs Nos. 341-LR and 382-F.

BOMBARDING TRANSFORMERS AND CONTROLS

Cat. No. 96 -853
Bombarder

Bombarding Transformers

The great majority of sign shops purge the tubing they are preparing by internal bombardment. A heavy current at a high voltage is discharged through the partially evacuated air column causing the walls of the tube to become hot and as the process proceeds the electrodes are heated red hot. All accluded gases and impurities are freed from the glass walls and metal electrodes and drawn off through the vacuum pump. The thoroughness with which this operation is carried out is no small measure of the success in the production of guaranteed tubing.

Extra Capacity Built In

JEFFERSON Bombarding Transformers are an indispensable requisite for carrying out the process—transformers that will give real service day after day under all operating conditions. Extra capacity in the bombarder assures a higher grade tube economically and quickly produced. Extra capacity permits the tube to be bombarded at higher pressure and shortens the time required for the operation.

All Jefferson Bombarders Have *Insulated* Secondaries

A more expensive construction but well worth the extra cost because it safeguards the user from an operating hazard should one accidentally come in contact with a live terminal. (Center grounded bombarders would be exceedingly dangerous under such circumstances.)

JEFFERSON Bombarders are enclosed in metal housings which allow free circulation for cooling. Primaries are designed for operation on either 115 or 230 volts. Secondaries are liberally designed to deliver full 25,000 volts with a tap brought out at 15,000 volts. This makes it possible for the operator to select the secondary voltage he finds most useful—25,000, 15,000 or 10,000 volts. Instructions recommend erecting a three-wire trolley with appropriate leads to the pumping position. The No.969-873 bombarder is especially recommended for the preparation of high intensity tubing.

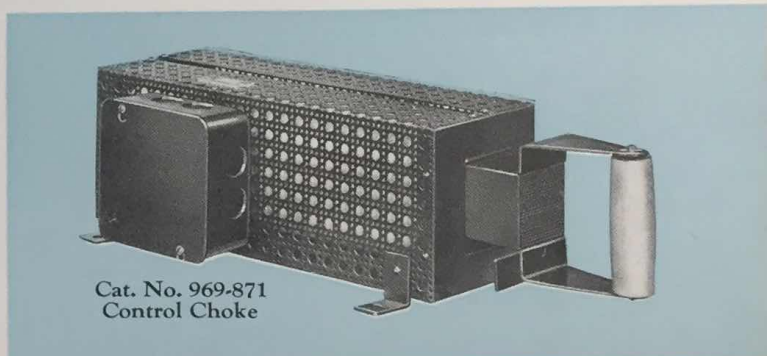
Cat. No.	Telegraphic Code	Capacity	Primary Volts	Sec. Volts	Max. Recommended Secondary Current	DIMENSIONS			Approx. Shipping Wt.
						Length	Width	Height	
969-853	ZIYEV	10 K.V.A.	115 & 230—60 cyc.*	25,000/15,000	500 MA	16¾″	16″	18¾″	280
969-873	ZOBAC	15 K.V.A.	115 & 230—60 cyc.*	25,000/15,000	750 MA	23¼″	21⅛″	23″	420

*Bombarders for other frequencies built to order.

CONTROL CHOKES

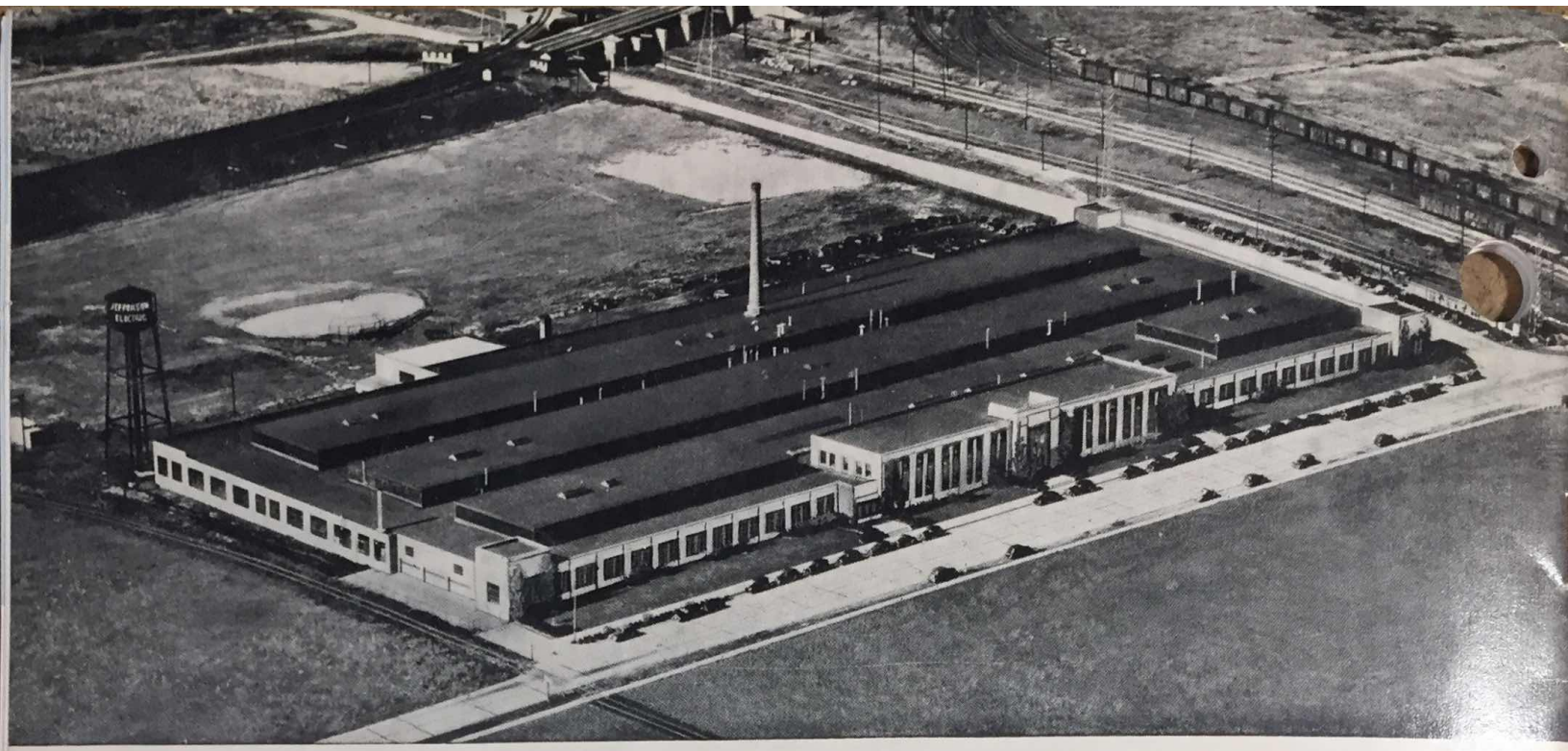
Jefferson Control Chokes

JEFFERSON sliding core Control Chokes are an asset to any sign shop. Control of the output of the bombarders secured by connecting these chokes in series with the transformer primary. As the operator withdraws the armature the transformer voltage and current is increased enabling one to maintain absolute control of temperatures during the bombarding operation. Provision is made for locking the sliding core in any position from minimum to maximum current. It is ruggedly constructed, completely protected and provided with means for fastening to a flat surface.



Cat. No. 969-871
Control Choke

Cat. No.	Telegraphic Code	For Use With Transformer No.	Capacity	DIMENSIONS			Approx. Shipping Wt.
				Length	Width	Height	
969-871	ZOBGO	969-853	10 K.V.A.	20″	4″	4″	103
969-872	ZOBDE	969-873	15 K.V.A.	20⅝″	9⅛″	5¾″	130



Transformers Manufactured Entirely in Jefferson Plant

Every Jefferson luminous tube transformer is made in its entirety in the Jefferson factory—a modern and complete plant comprising 18 acres, with 220,000 square feet of manufacturing facilities—served by C. G. W., C. A. & E. and I. H. B. Railways. During the process of manufacture, each transformer receives no less than twelve individual tests and inspections, insuring uniform excellence. All raw materials are given numerous inspections and chemical tests to insure uniform standard quality and ability to withstand the stresses to which they will be subjected in actual service. A special engineering development department is maintained to insure constant improvement in design and production.

JEFFERSON ELECTRIC COMPANY

BELLWOOD, ILLINOIS

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