

FREED

CATALOG

591

AUDIO TRANSFORMERS



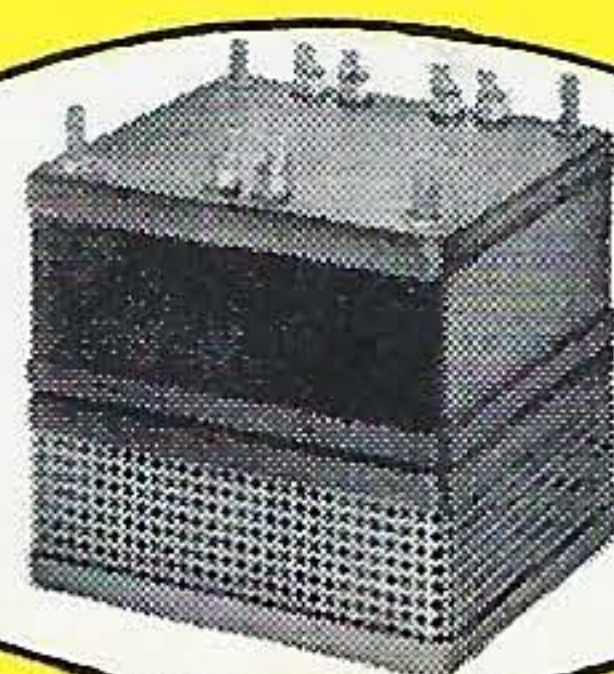
DISCRIMINATORS



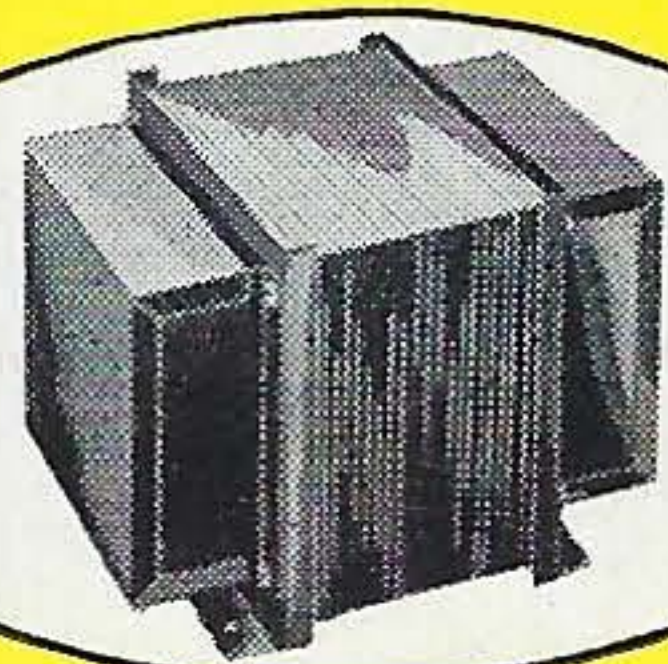
FILTERS



HIGH Q REACTORS



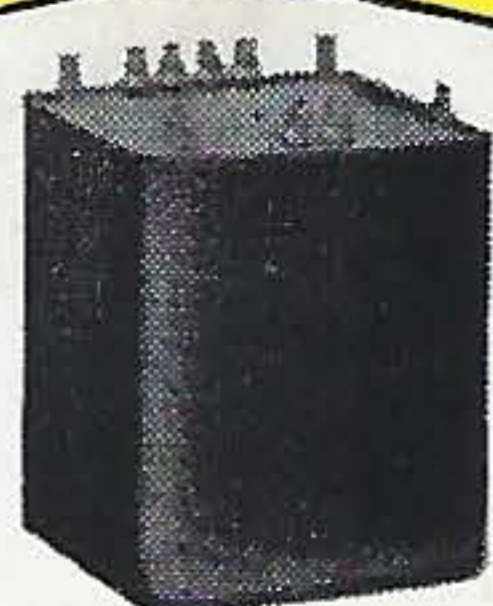
MAGNETIC AMPLIFIERS



POWER COMPONENTS



PULSE TRANSFORMERS



ULTRASONIC COMPONENTS

Products of extensive research

- QUALITY
- ACCURACY
- DEPENDABILITY

FREED

TRANSFORMER CO., INC.

MAIN OFFICE AND FACTORY:

1718-1736 Weirfield Street

Brooklyn (Ridgewood) 27, New York

TABLE OF CONTENTS

HERMETICALLY SEALED		ENCAPSULATED		UNCASED OR SHELL		MIL-T-27A		MINIATURE		BROADCAST QUALITY		PROFESSIONAL GRADE		REPLACEMENT GRADE		KITS		TABLE OF CONTENTS	
AUDIO TRANSFORMERS																			
3										3	6							Driver	
			26													26		High Fidelity	
2										2								Hybrid	
2, 4, 10			30	4, 10	4	2	5	30										Input	
3, 4, 10			30	4, 10	4	2	5	30										Interstage	
3, 4, 5, 10			30	4, 5, 10	4	3	5, 6	30										Matching	
3, 4			30	4	4	3	5	30										Mixing	
3, 10			30	10		3	6	30										Output, High Level	
3, 4				4	4	3	5											Output, Low Level	
2						2												Repeat Coil	
4	4	4	4	4	4													Transistor	
CONSTANT VOLTAGE TRANSFORMERS																			
23																			
DISCRIMINATORS																			
25						25												Fixed and Slug Tuned	
FILTERS																			
25						25												Discriminator, Input and Output	
26					26	26												Miniature	
26					26	26												Band Pass	
26					26	26												High Pass	
26					26	26												Low Pass	
24						24												Telemetering	
12																		Null T Network	
HIGH Q REACTORS																			
							8											Professional Grade	
						8, 9												Quality Grade	
13-21	13-21	13-21	13-21	13-21	13-21													Toroidal Inductors	
15	15	15	15	15	15													400 CPS to 15 KC	
16	16	16	16	16	16													10 KC to 50 KC	
16	16	16	16	16	16													10 KC to 100 KC	
17	17	17	17	17	17													20 KC to 2 MC	
16	16	16	16	16	16													30 KC to 75 KC	
16	16	16	16	16	16													50 KC to 200 KC	
17	17	17	17	17	17													50 KC to 5 MC	
17	17	17	17	17	17													100 KC to 10 MC	
8							8											Variable	
MAGNETIC AMPLIFIERS																			
22		22																Fast Response	
22																		Pre-Amplifier	
22		22																Push Pull	
21																		Saturable Transformers	
		22																Single Ended	
POWER COMPONENTS																			
10		29	10					29										Filament Transformers	
12		26, 30	12					7	30									Filter Reactors	
		29							29									Isolation Transformers	
		29							29									Line Booster Transformers	
10			10															Plate Transformers	
10		26, 28	10					7, 26	29									Power Transformers	
		29							29									Step-Down Transformers	
								7										Swinging Chokes	
PULSE TRANSFORMERS																			
11	11		11	11														Blocking Oscillators	
11	11		11	11														Current Transformers	
11	11		11	11														Driver Transformers	
11	11		11	11														Interstage Transformers	
11	11		11	11														Matching Transformers	
11	11		11	11														Memory Core	
11	11		11	11														Pulse Inversion	
11	11		11	11														Output, Low Level	
TRANSISTOR CONVERTERS																			
23																		DC to AC Converters	
23																		DC to DC Converters	
ULTRASONIC COMPONENTS																			
27																		Driver Transformers	
27																		Input Transformers	
27																		Output Transformers	

FREED TRANSFORMER CO., INC.

New York City (Metropolitan Area) Sales Office and Factory
1718-1736 WEIRFIELD ST., BROOKLYN (Ridgewood) 27, N. Y.

Phone — EVergreen 6-1300

SALES REPRESENTATIVES

• **CALIFORNIA**

ROBERT G. MOYE COMPANY
116 South Stoneman Ave.
P.O. Box 224
Alhambra, Calif.
Tel. CUMberland 3-1669
F. W. MOULTHROP CO.
575 Tenth Street
San Francisco 3, Calif.
Tel. MArket 1-0722

• **GEORGIA**

FLOYD FAUSETT AND CO.
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Atlanta 10, Ga.
Tel. PLaza 5-5781

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482 Sheridan Road
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NE-7-6405

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SCOTT AND STEFFEN, INC.
1836 Euclid Ave.
Cleveland 15, Ohio
Tel. TOWer 1-2626

• **WESTERN PENNSYLVANIA**

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120 West Second Street
Dayton 2, Ohio
Tel. ADams 2652

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145 No. Narbeth Ave.
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1104 Mondawmin
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AUTOMATIC GENERAL SALES
Richard F. Kimball
3824 Mockingbird Lane
Dallas 5, Texas
Tel. LAKeside 1-7876

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222 First Ave. North
Seattle 9, Wash.
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• **Distributors only—No. N. J.**

JACK WEBER ASSOCIATES
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Old Bridge, N. J.
Tel. SOuth River 6-5900

• **Distributors only—So. N.J., E. Penn., Del., Md., Wash., D. C.**

DAVID S. LINZ
238 Shelmire Street
Philadelphia 11, Penn.
Tel. ESsex 9-0734

• **EXPORT DIVISION**

458 Broadway
New York 13, N. Y.

BROADCAST QUALITY COMPONENTS

Modern high fidelity broadcasting and transcription equipment requires the use of "Audio" — transformers of utmost quality and reliability in performance. Freed broadcast quality components have been designed to meet these requirements. They are wide band, high fidelity components with low distortion throughout the audio range and beyond. Frequency response for most units is in the order of ± 1 DB from 20 to 20,000 cps and for high level output transformers in the order of ± 0.5 DB from 20 to 30,000 cps.

These units feature astatic construction, longitudinal balance, high efficiency, uniform response, and constant impedance match throughout the audio frequency spectrum. Maximum neutralization of stray fields is accomplished through the use of hum balanced coil structures and multiple alloy shielding. Equal high fidelity response is assured on every tap of any universal impedance winding without line reflection of transverse coupling.

All broadcast quality components are thoroughly impregnated in a special non-hygroscopic varnish and fully encapsulated with a moisture proof, high melting compound.

All broadcast quality components are **hermetically sealed**.

All units are tested in accordance with and meet "EIA" standards.

Almost all units are designed with universal impedance windings to insure greatest versatility.

A full line of high Q reactors complements this series of audio transformers.

FREED TRANSFORMER COMPANY, INC.

PRICE LIST

Catalog No.	Pg. in Cat.	List Price	Catalog No.	Pg. in Cat.	Net Price	Catalog No.	Pg. in Cat.	List Price	Catalog No.	Pg. in Cat.	Net Price	Catalog No.	Pg. in Cat.	List Price	Catalog No.	Pg. in Cat.	Net Price
EPT-1	11	7.50	MGC-8	12	7.00	PGC-12	7	14.50	QGC-7	9	22.50	TF-1	29	4.40	DST-15	25	50.00
EPT-2	11	7.50	MGC-9	12	6.50	PGC-13	7	17.50	QGC-8	9	15.00	TF-2	29	5.00	DST-16	25	60.00
EPT-3	11	7.50	MGC-10	12	7.00	PGC-14	7	11.00	QGC-9	9	15.00	TF-3	29	15.00	DST-17	25	50.00
EPT-4	11	7.50	MGC-11	12	8.75	PGC-15	7	12.00	QGC-10	9	15.00	TF-4	29	18.50	DST-18	25	50.00
EPT-5	11	7.50	MGC-12	12	6.50	PGC-16	7	11.50	QGC-11	9	15.00	TF-5	29	4.40	DST-19	25	50.00
EPT-6	11	7.50	MGC-13	12	7.00	PGC-17	7	10.00	QGC-12	9	15.00	TF-6	29	6.00	DST-20	25	50.00
EPT-7	11	7.50	MGC-14	12	8.75	PGC-18	7	11.50	QGC-13	9	15.00	TF-7	29	6.60	DST-21	25	50.00
EPT-8	11	9.50	MGC-15	12	9.50	PGC-19	7	14.50	QGC-14	9	13.50	TF-8	29	7.00	DST-22	25	50.00
EPT-9	11	9.50	MGC-16	12	7.00	PGC-20	7	17.50	QGC-15	9	13.50	TF-9	29	11.50	DST-23	25	50.00
EPT-11	11	7.50	MGC-17	12	8.75				QGC-16	9	13.50	TF-10	29	24.00	DST-24	25	60.00
EPT-12	11	7.50	MGC-18	12	10.00				QGC-17	9	13.50	TF-11	29	3.00	DST-25	25	60.00
EPT-13	11	9.50	MGC-19	12	12.50	Catalog No.	Pg. in Cat.	List Price	QGC-18	9	13.50	TF-12	29	4.40	DST-26	25	60.00
EPT-14	11	9.50	MGC-20	12	8.75	PGP-1	7	14.00	QGC-19	9	11.50	TF-13	29	6.00	DST-27	25	50.00
EPT-15	11	12.50	MGC-21	12	*	PGP-2	7	20.50	QGC-20	9	11.50	TF-14	29	7.25	DST-28	25	60.00
EPT-16	11	12.50	MGC-22	12	9.50	PGP-3	7	10.00	QGC-21	9	11.50	TF-15	29	7.75	DST-29	25	60.00
EPT-17	11	11.50	MGC-23	12	*	PGP-4	7	10.50	QGC-22	9	11.50	TF-16	29	6.60	DST-30	25	60.00
EPT-18	11	11.50	MGC-24	12	18.00	PGP-5	7	11.00	QGC-23	9	11.50	TF-17	29	7.00	DST-31	25	60.00
EPT-19	11	11.50	MGC-25	12	*	PGP-6	7	12.00	QGC-24	9	11.50	TF-18	29	24.00	DST-32	25	60.00
Note—Molded Units \$1.00 additional.			MGC-26	12	16.00	PGP-7	7	14.00				TF-19	29	5.00	DST-33	25	60.00
			MGC-27	12	*	PGP-8	7	13.00	Catalog No.	Pg. in Cat.	List Price				FBP-10	24	86.00
			MGC-28	12	16.00	PGP-9	7	14.00	RGA-1	30	5.50				FBP-11	24	86.00
			MGC-29	12	*	PGP-10	7	15.50	RGA-2	30	4.40	Catalog No.	Pg. in Cat.	List Price	FBP-12	24	86.00
			MGC-30	12	*	PGP-11	7	21.00	RGA-3	30	4.40	TMA-1	4	12.50	FBP-13	24	86.00
			MGC-31	12	*	PGP-12	7	25.00	RGA-4	30	7.75	TMA-2	4	16.00	FBP-14	24	70.80
			*Not stocked, available on short delivery. Prices on request.			PGP-13	7	27.50	RGA-5	30	4.40	TMA-3	4	13.00	FBP-15	24	70.80
						PGP-14	7	33.00	RGA-6	30	5.25	TMA-4	4	16.50	FBP-16	24	70.80
						PGP-15	7	38.50	RGA-7	30	5.50	TMA-5	4	16.50	FBP-17	24	70.80
						PGP-16	7	17.50	RGA-8	30	2.50	TMA-6	4	16.50	FBP-18	24	70.80
						PGP-17	7	20.50	RGA-9	30	2.50	TMA-7	4	13.50	FBP-19	24	70.80
						PGP-18	7	27.50	RGA-10	30	3.00	TMA-8	4	16.00	FBP-20	24	70.80
						PGP-19	7	33.00	RGA-11	30	5.50	TMA-9	4	13.00	FBP-21	24	70.80
						PGP-20	7	41.00	RGA-12	30	4.40	TMA-10	4	12.50	FBP-22	24	70.80
												TMA-11	4	13.00	FBP-23	24	70.80
												TMA-12	4	16.50	FBP-24	24	86.00
												TMA-13	4	12.50	FBP-25	24	70.80
												TMA-14	4	16.50	FBP-26	24	86.00
												TMO-15	4	6.50	FBP-27	24	86.00
												TMO-16	4	6.50	FBP-28	24	86.00
												TMO-17	4	5.50	FBP-29	24	86.00
												TMO-18	4	6.50	FBP-30	24	86.00
												TMA-19	4	12.50	FBP-31	24	86.00
														FBP-32	24	86.00	
														FBP-33	24	86.00	
														FBP-34	24	73.00	
														FBP-35	24	73.00	
														FBP-36	24	73.00	
														FBP-37	24	73.00	
														FBP-38	24	73.00	
														FBP-39	24	80.00	
														FBP-40	24	88.00	
														FBP-41	24	88.00	
														FBP-42	24	88.00	
														FBP-43	24	88.00	
														FBP-44	24	88.00	
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														FBP-48	24	88.00	
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														FBP-54	24	88.00	
														FBP-55	24	88.00	
														FBP-56	24	88.00	
														FBP-57	24	88.00	
														LPI-10	25	43.25	
														LPI-11	25	43.25	
														LPI-12	25	43.25	
														LPI-13	25	43.25	
														LPI-14	25	43.25	
														LPI-15	25	43.25	
														LPI-16	25	43.25	
														LPI-17	25	43.25	
														LPI-18	25	43.25	
														LPI-19	25	43.25	
														LPI-20	25	43.25	
														LPI-21	25	43.25	
														LPI-22	25	43.25	
														LPI-23	25	43.25	
														LPI-24	25	43.25	
														LPI-25	25	43.25	
														LPI-26	25	43.25	
														LPI-27	25	43.25	
														LPI-28	25	43.25	
														LPO-10	25	93.300	

FREED TRANSFORMER COMPANY, INC.

PRICE LIST (CONT.)

Toroidal Inductors

Prices shown are Net for Hermetically Sealed. Deduct \$1.50 from Net for Uncased units. Add \$1.00 to Net for Encapsulated units.

Type TI - 1

Catalog No.	Pg. in Cat.	Net Price
F-800	15	6.65
F-801	15	6.65
F-802	15	6.65
F-803	15	7.10
F-804	15	6.60
F-805	15	6.60
F-806	15	8.50
F-807	15	8.50
F-808	15	8.50
F-809	15	9.50
F-810	15	9.50
F-811	15	10.50
F-812	15	10.50
F-813	15	10.50
F-814	15	10.50
F-815	15	10.50
F-816	15	11.00
F-817	15	11.50
F-818	15	12.00
F-819	15	12.35
F-820	15	12.65
F-821	15	12.75
F-822	15	13.00
F-823	15	13.30
F-824	15	13.75
F-825	15	14.25
F-826	15	14.50
F-827	15	14.80
F-828	15	15.20
F-829	15	16.15
F-830	15	17.10

Type TI - 4 and 4s

Catalog No.	Pg. in Cat.	Net Price
F-850	15	7.90
F-851	15	7.90
F-852	15	7.90
F-853	15	7.90
F-854	15	7.90
F-855	15	7.90
F-856	15	8.25
F-857	15	8.60
F-858	15	8.80
F-859	15	8.95
F-860	15	9.05
F-861	15	9.20
F-862	15	9.35
F-863	15	9.50
F-864	15	9.80
F-865	15	10.35
F-866	15	10.65
F-867	15	10.65
F-868	15	10.65
F-869	15	11.15
F-870	15	11.15
F-871	15	11.15
F-872	15	11.50
F-873	15	11.50
F-874	15	12.00
F-875	15	12.45
F-876	15	12.90
F-877	15	13.40
F-878	15	13.90

Type TI - 1A and As

Catalog No.	Pg. in Cat.	Net Price
F-1500	15	7.50
F-1501	15	7.50
F-1502	15	7.50
F-1503	15	7.50
F-1504	15	7.50
F-1505	15	7.50
F-1506	15	7.50
F-1507	15	7.75
F-1508	15	7.75
F-1509	15	7.75
F-1510	15	7.75
F-1511	15	7.75
F-1512	15	7.75
F-1513	15	7.90
F-1514	15	7.90
F-1515	15	7.90
F-1516	15	8.10
F-1517	15	8.10
F-1518	15	8.10
F-1519	15	8.35
F-1520	15	8.35
F-1521	15	8.55
F-1522	15	8.55
F-1523	15	8.75

Catalog No.	Pg. in Cat.	Net Price
F-1524	15	8.75
F-1525	15	9.05
F-1526	15	9.05
F-1527	15	9.25
F-1528	15	9.75
F-1529	15	10.10
F-1530	15	10.10
F-1531	15	10.35
F-1532	15	10.75
F-1533	15	11.25
F-1534	15	11.75
F-1535	15	11.75
F-1536	15	12.75
F-1537	15	13.10
F-1538	15	13.60

Type TI - 9s

Catalog No.	Pg. in Cat.	Net Price
F-1554	16	16.60
F-1555	16	16.80
F-1556	16	17.00
F-1557	16	17.30
F-1558	16	17.40
F-1559	16	17.50
F-1560	16	17.60
F-1561	16	17.80
F-1562	16	18.05
F-1563	16	18.30
F-1564	16	18.50
F-1565	16	18.50
F-1566	16	19.00
F-1567	16	19.50
F-1568	16	19.95
F-1569	16	20.40
F-1570	16	21.40

Type TI - 10s

Catalog No.	Pg. in Cat.	Net Price
F-1579	16	14.15
F-1580	16	14.15
F-1581	16	14.35
F-1582	16	14.45
F-1583	16	14.50
F-1584	16	14.60
F-1585	16	14.70
F-1586	16	14.80
F-1587	16	14.90
F-1588	16	15.00
F-1589	16	15.10
F-1590	16	15.30
F-1591	16	15.40
F-1592	16	15.60

Type TI - 13

Catalog No.	Pg. in Cat.	Net Price
F-1629	16	16.60
F-1630	16	16.80
F-1631	16	17.00
F-1632	16	17.30
F-1633	16	17.40
F-1634	16	17.50
F-1635	16	17.60
F-1636	16	17.80
F-1637	16	18.05
F-1638	16	18.30
F-1639	16	18.50
F-1640	16	18.50
F-1641	16	19.00
F-1642	16	19.50
F-1643	16	19.95
F-1644	16	20.40
F-1645	16	21.40

Type TI - 12 and 12s

Catalog No.	Pg. in Cat.	Net Price
F-1655	15	13.60
F-1656	15	13.60
F-1657	15	13.60
F-1658	15	14.05
F-1659	15	14.05
F-1660	15	14.05
F-1661	15	14.65
F-1662	15	14.65
F-1663	15	15.10
F-1664	15	15.10
F-1665	15	13.75
F-1666	15	13.75
F-1667	15	14.15
F-1668	15	14.15
F-1669	15	14.65
F-1670	15	14.65
F-1671	15	14.65
F-1672	15	15.10
F-1673	15	15.60
F-1674	15	16.05
F-1675	15	16.05
F-1676	15	16.50
F-1677	15	16.50

Catalog No.	Pg. in Cat.	Net Price
F-1678	15	17.00
F-1679	15	17.00
F-1680	15	17.50
F-1681	15	17.50
F-1682	15	17.50
F-1683	15	17.95
F-1684	15	17.95
F-1685	15	17.95
F-1686	15	18.45
F-1687	15	18.90
F-1688	15	19.50
F-1689	15	19.95
F-1690	15	20.40
F-1691	15	20.90
F-1692	15	21.40
F-1693	15	21.85

Type TI - 5

Catalog No.	Pg. in Cat.	Net Price
F-1700	15	5.70
F-1701	15	5.70
F-1702	15	5.70
F-1703	15	6.20
F-1704	15	6.65
F-1705	15	6.90
F-1706	15	7.10
F-1707	15	7.35
F-1708	15	7.60
F-1709	15	7.85
F-1710	15	8.05
F-1711	15	8.30
F-1712	15	9.00
F-1713	15	9.60
F-1714	15	9.80
F-1715	15	10.25
F-1716	15	10.60
F-1717	15	10.95
F-1718	15	11.20
F-1719	15	11.50
F-1720	15	11.90

Type TI - 5s

Catalog No.	Pg. in Cat.	Net Price
F-1700s	15	7.90
F-1701s	15	7.90
F-1702s	15	7.90
F-1703s	15	7.90
F-1704s	15	7.90
F-1705s	15	8.15
F-1706s	15	8.25
F-1707s	15	8.50
F-1708s	15	8.80
F-1709s	15	8.95
F-1710s	15	9.05
F-1711s	15	9.20
F-1712s	15	9.30
F-1713s	15	9.60
F-1714s	15	9.80
F-1715s	15	10.25
F-1716s	15	10.65
F-1717s	15	10.85
F-1718s	15	11.20
F-1719s	15	11.50
F-1720s	15	11.90

Type TI - 6 and 6s

Catalog No.	Pg. in Cat.	Net Price
F-1726	16	8.15
F-1727	16	8.15
F-1728	16	8.15
F-1729	16	8.15
F-1730	16	8.15
F-1731	16	8.15
F-1732	16	8.45
F-1733	16	8.45
F-1734	16	8.55
F-1735	16	8.55
F-1736	16	8.55
F-1737	16	9.00
F-1738	16	10.00
F-1739	16	10.00
F-1740	16	10.00
F-1741	16	10.00
F-1742	16	10.45
F-1743	16	11.90

Type TI - 11s

Catalog No.	Pg. in Cat.	Net Price
F-1747	15	14.20
F-1748	15	14.20
F-1749	15	14.20
F-1750	15	14.20
F-1751	15	14.20
F-1752	15	15.20
F-1753	15	15.20
F-1754	15	15.20
F-1755	15	15.20
F-1756	15	15.20
F-1757	15	14.20

Catalog No.	Pg. in Cat.	Net Price
F-1758	15	14.20
F-1759	15	14.65
F-1760	15	14.65
F-1761	15	15.20
F-1762	15	15.85
F-1763	15	16.15
F-1764	15	16.65
F-1765	15	17.10
F-1766	15	17.60
F-1767	15	17.80
F-1768	15	18.05
F-1769	15	18.45
F-1770	15	18.45
F-1771	15	18.45
F-1772	15	19.00
F-1773	15	19.50
F-1774	15	19.95
F-1775	15	20.40
F-1776	15	20.90
F-1777	15	21.85
F-1778	15	22.80
F-1779	15	23.75
F-1780	15	24.70

Type TI - 7

Catalog No.	Pg. in Cat.	Net Price
F-1781	16	7.90
F-1782	16	7.90
F-1783	16	7.90
F-1784	16	7.90
F-1785	16	7.90
F-1786	16	7.90
F-1787	16	8.05
F-1788	16	8.05
F-1789	16	8.25
F-1790	16	8.25
F-1791	16	8.45
F-1792	16	8.65
F-1793	16	8.65
F-1794	16	8.65
F-1795	16	9.00
F-1796	16	9.45
F-1797	16	10.00

Type TI - 2s

Catalog No.	Pg. in Cat.	Net Price
F-1800	16	14.20
F-1801	16	14.20
F-1802	16	14.20
F-1803	16	14.20
F-1804	16	14.20
F-1805	16	14.65
F-1806	16	14.65
F-1807	16	14.65
F-1808	16	14.65
F-1809	16	14.65
F-1810	16	14.65
F-1811	16	14.90
F-1812	16	14.90
F-1813	16	14.90
F-1814	16	14.90
F-1815	16	14.90

Type TI - 8 and 8s

Catalog No.	Pg. in Cat.	Net Price
F-1821	16	8.65
F-1822	16	8.65
F-1823	16	8.65
F-1824	16	8.65
F-1825	16	8.65
F-1826	16	8.65
F-1827	16	8.65
F-1828	16	8.65
F-1829	16	8.65
F-1830	16	8.65
F-1831	16	8.65
F-1832	16	8.75
F-1833	16	8.85
F-1834	16	9.00
F-1835	16	9.00
F-1836	16	9.00
F-1837	16	9.10</

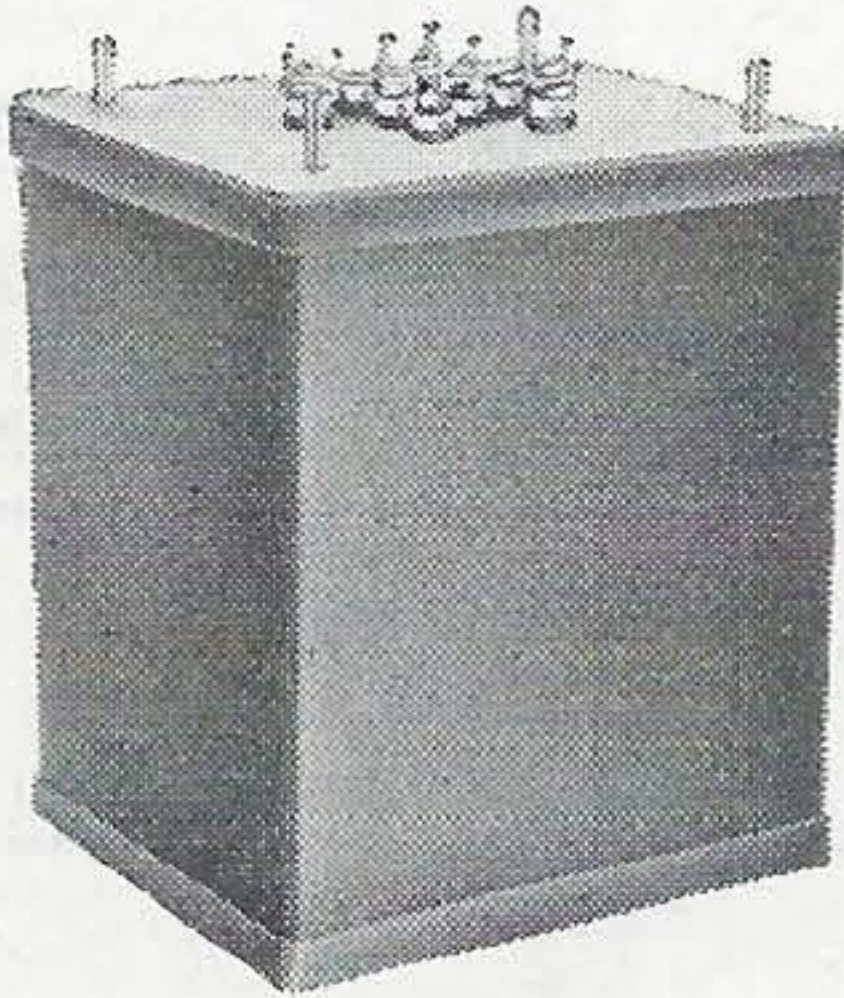
BROADCAST QUALITY COMPONENTS

INPUT TRANSFORMERS

Frequency Response 20-20,000 C.P.S. ±1.0 DB

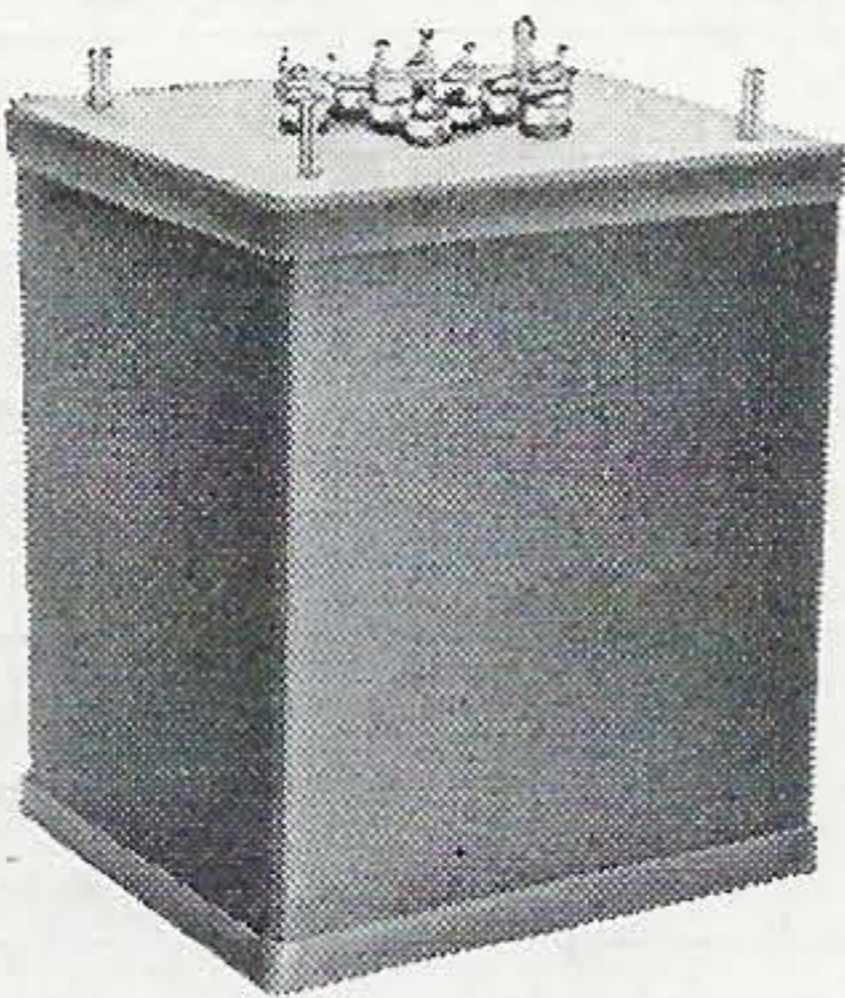
CASE DIMENSIONS

DC-2B CASE



Height: 3 1/2"
Width: 2 5/8"
Depth: 2 1/4"
Mtg. Cen.: 2"x1 3/4"
Studs: 4 8-32
Knockout: 1 1/2" dia.

DC-4A CASE



Height: 3 3/4"
Width: 3 1/8"
Depth: 3"
Mtg. Cen.: 2 1/2"x2 1/2"
Studs: 4 8-32
Knockout: 2" dia.

Catalog No.	Application	Impedance Level Ohms		Maximum Power Level DBM	Ratio	Equivalent Shielding D.B.	Maximum Pri. D.C. per Side Ma.	D.C. Unbalance Ma.	Case Number
		Primary	Secondary						
QGA 1	Universal 500 ohm line to push-pull grids	U-500	100,000 split	+10	1:14.1	70	0	0	DC-2B
QGA 2	Universal 500 ohm line to push-pull grids	U-500	100,000 split	+10	1:14.1	90	0	0	DC-2B
QGA 3	Universal 500 ohm line to single or push-pull grids	U-500	60,000 split	+10	1:11	70	0	0	DC-2B
QGA 4	Universal 500 ohm line to single or push-pull grids	U-500	60,000 split	+10	1:11	90	0	0	DC-2B
QGA 5	Universal low impedance microphone, pickup or line to single or push-pull grids	U-60	60,000 split	+10	1:31.6	70	0	0	DC-2B
QGA 6	Universal low impedance microphone, pickup or line to single or push-pull grids	U-60	60,000 split	+10	1:31.6	90	0	0	DC-2B

U-60 IMPEDANCES IN OHMS:
2.5, 5, 10, 15, 20, 30, 40, 60

U-500 IMPEDANCES IN OHMS:
50, 125, 200 CT, 250, 330, 500 CT.
125 and 500 ohms can be used for 150 and 600 ohms.

HYBRID AND REPEAT COILS

Frequency Response 20-20,000 C.P.S. ±1.0 DB

Catalog No.	Application	Impedance Level Ohms		Maximum Power Level D.B.M.	Ratio	Equivalent Shielding D.B.	Maximum Pri. D.C. per Side Ma.	D.C. Unbalance Ma.	Case Number
		Primary	Secondary						
QGA 7	Hybrid. Unbalanced 500/600 ohm lines to 600 ohms.	Total Pri 1200/1000 split 300/250 300/250	600/150 or 500/125 split	+10	1.41:1	70	0	0	DC-2B
QGA 8	Hybrid. Balanced 500/600 ohm lines to 600 ohms. Longitudinal balance 70 DB	Total Pri 1200/1000 split 300/250 C.T. 300/250 C.T.	600/150 or 500/125 split	+10	1.41:1	70	0	0	DC-2B
QGA 9	Hybrid. Unbalanced 500/600 ohm lines to triode plate. No. D.C. in secondary.	Total Pri 1200/1000 split 300/250 300/250	15,000 or 12,500	+10	1:3.54	70	0	0	DC-2B
QGA 10	Hybrid. Balanced 500/600 ohm lines to triode plate. No. D.C. in secondary. Longitudinal balance 70 DB.	Total Pri 1200/1000 split 300/250 C.T. 300/250 C.T.	15,000 or 12,500	+10	1:3.54	70	0	0	DC-2B
QGA 11	Repeat coil for low frequency ringing. Longitudinal balance 70 DB.	600/500 split	600/500 split Balanced		1:1	90	0	0	DC-4A

INTERSTAGE TRANSFORMERS

Frequency Response 20-20,000 C.P.S. ±1.0 D.B.
*50-20,000 C.P.S. ±1.0 D.B.

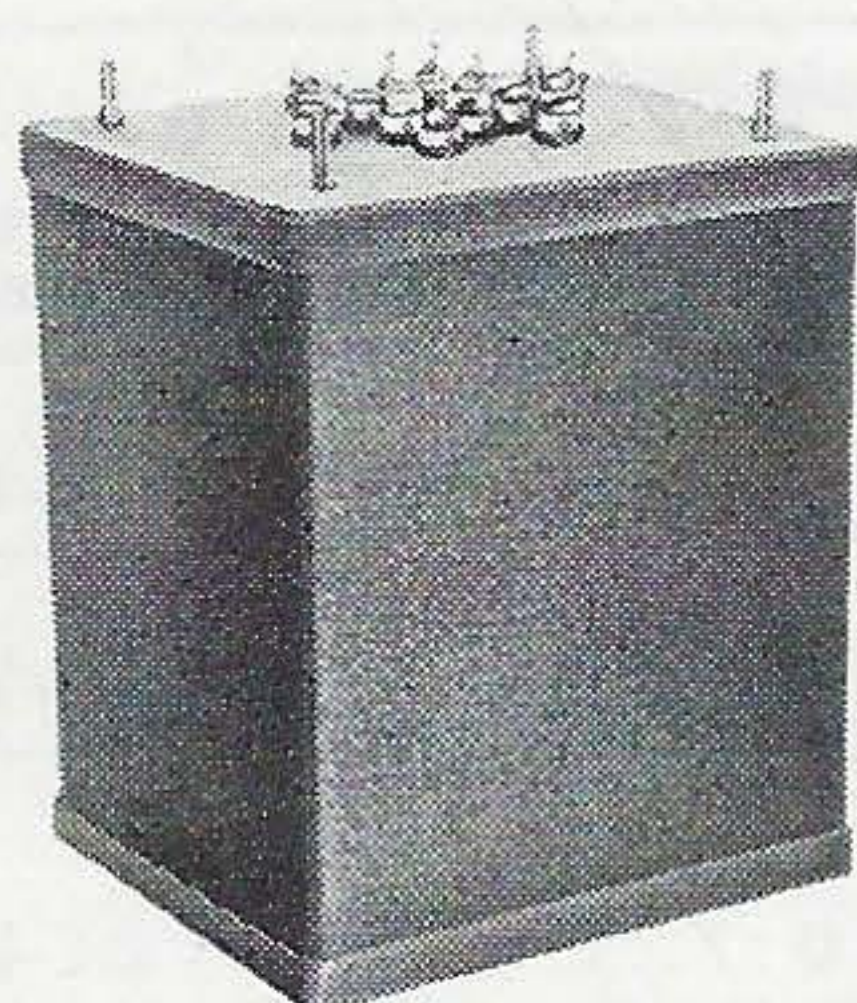
Catalog No.	Application	Impedance Level Ohms		Maximum Power Level D.B.M.	Ratio	Equivalent Shielding D.B.	Maximum Pri. D.C. per Side Ma.	D.C. Unbalance Ma.	Case Number
		Primary	Secondary						
QGA 12	Bridging line to single or push-pull grids.	10,000	60,000 split	+10	1:2.45	70	0	0	DC-2B
QGA 13	Single 6C4, 6J5, 1/2 6SN7 triode to push-pull grids. Shunt feed.	15,000	60,000 split	+18	1:2	45	0	0	DC-2B
QGA 14*	Single 6C4, 6J5, 1/2 6SN7 triode to push-pull grids.	15,000	60,000 split	+18	1:2	45	8	8	DC-2B
QGA 15	Push-pull triode plates to push-pull class A grids.	20,000 split	45,000 split	+25	1:1.5	30	8	0.5	DC-4A

BROADCAST QUALITY COMPONENTS

LOW LEVEL OUTPUT, MIXING, MATCHING TRANSFORMERS

Frequency Response 20-20,000 C.P.S. ± 1.0 DB
*50-20,000 C.P.S. ± 1.0 DB

CASE DIMENSIONS



DC-2B CASE

Height: $3\frac{1}{2}$ "
Width: $2\frac{5}{8}$ "
Depth: $2\frac{1}{4}$ "
Mtg. Cen.: $2'' \times 1\frac{3}{4}''$
Studs: 4 8-32
Knockout: $1\frac{1}{2}$ " dia.

DC-4A CASE

Height: $3\frac{3}{4}$ "
Width: $3\frac{1}{8}$ "
Depth: 3"
Mtg. Cen.: $2\frac{1}{2}'' \times 2\frac{1}{2}''$
Studs: 4 8-32
Knockout: 2" dia.

DC-5B CASE

Height: $4\frac{1}{2}$ "
Width: $4\frac{1}{8}$ "
Depth: $3\frac{1}{2}$ "
Mtg. Cen.: $3\frac{1}{8}'' \times 2\frac{5}{8}''$
Studs: 4 10-32
Knockout: $2\frac{1}{2}$ " dia.

DC-6A CASE

Height: $4\frac{7}{8}$ "
Width: $5\frac{1}{8}$ "
Depth: $4\frac{1}{8}$ "
Mtg. Cen.: $3\frac{3}{4}'' \times 3''$
Studs: 4 10-32
Knockout: 3" dia.

DC-6B CASE

Height: 6"
Width: 5"
Depth: $4\frac{1}{8}$ "
Mtg. Cen.: $3\frac{3}{4}'' \times 3''$
Studs: 4 10-32
Knockout: 3" dia.

DC-7 CASE

Height: $5\frac{3}{8}$ "
Width: $5\frac{1}{2}$ "
Depth: 5"
Mtg. Cen.: $4\frac{3}{8}'' \times 3\frac{3}{4}''$
Studs: 4 $1\frac{1}{4}$ "-20
Knockout: 3" dia.

Catalog No.	Application	Impedance Level Ohms		Maximum Power Level D.B.M.	Ratio	Equivalent Shielding D.B.	Max. Pri. D.C. per Side Ma.	D.C. Unbalance Ma.	Case Number
		Primary	Secondary						
QGA 16	Single plate or bridging line to Universal 500 ohm line. Shunt feed.	15,000	U-500	+18	5.5:1	70	0	0	DC-2B
QGA 17*	Single plate to Universal 500 ohm line.	15,000	U-500	+18	5.5:1	70	8	8	DC-2B
QGA 18	Push-pull triode plates to Universal 500 ohm line.	20,000 C.T.	U-500	+25	6.3:1	70	8	0.5	DC-2B
QGA 19	Mixing, low impedance microphone or line to Universal 500 ohm line.	U-500	U-500	+12	1:1	70	0	0	DC-2B
QGA 20	Line level mixing and matching.	U-500	U-500	+30	1:1	70	0	0	DC-2B
QGA 21	High mu triode photo-cell to Universal 500 ohm line.	100,000	U-500	+12	14.1:1	70	0	0	DC-2B

DRIVER TRANSFORMERS

Frequency Response 20-20,000 C.P.S. ± 1.0 DB

Catalog No.	Application	Primary Impedance Ohms	Maximum Power Level D.B.M.	Turn Ratio Pri.: $\frac{1}{2}$ Sec.	Max. Pri. D.C. per Side Ma.	D.C. Unbalance Ma.	Case Number
QGA 22	Universal 500 ohm line to Class B grids.	U-500	+40	1:1	0	0	DC-4A
QGA 23	Push-pull 6J5, etc. to push-pull 2A3's, 6L6's, etc.	20,000 C.T.	+30	3.2:1	8	0.5	DC-2B
QGA 24	Push-pull 2A3, 6B4 to push-pull 809, T2-40, 4/125A.	5,000 C.T.	+40	3.1:1	50	5	DC-4A

HIGH LEVEL OUTPUT TRANSFORMERS

Frequency Response 20-30,000 C.P.S. ± 0.5 DB

Catalog No.	Application	Impedance Level Ohms		Maximum Power Level DBM Watts		Ratio	Max. D.C. per Side Ma.	D.C. Unbalance Ma.	Case Number
		Primary	Secondary	DBM	Watts				
QGA 25	PP 5881, 6B4, 6L6, 300A, 275A to Universal 500 ohm line.	5,000 split	U-500	+42	15	3.16:1	70	7	DC-5B
QGA 26	As above to Universal voice coil.	5,000 split	U-16	+42	15	17.7:1	70	7	DC-5B
QGA 27	Push-pull 6V6, 6AQ5, 7C5, 6N7 to Universal 500 ohm line.	8,000 split	U-500	+42	15	4:1	50	5	DC-5B
QGA 28	As above to Universal voice coil.	8,000 split	U-16	+42	15	22.4:1	50	5	DC-5B
QGA 29	P.P. 6F6, 6V6, 6AQ5, 7C5, 7B5, 6AR5, 6K6, 6L6 to Universal 500 ohm line.	10,000 split	U-500	+42	15	4.47:1	40	4	DC-5B
QGA 30	As above to Universal voice coil.	10,000 split	U-16	+42	15	25:1	40	4	DC-5B
QGA 31	PP. 807, 1614, KT-66, (Williamson Amplifier) to Universal 500 ohm line.	10,000 split	U-500	+45.5	36	4.47:1	60	6	DC-6A
QGA 32	As above to Universal voice coil.	10,000 split	U-16	+45.5	36	25:1	60	6	DC-6A
QGA 33	P.P. Parallel, 6A5G, 300A to Universal 500 ohm line.	2,500 split	U-500	+45.5	36	2.24:1	100	10	DC-6A
QGA 34	As above to Universal voice coil.	2,500 split	U-16	+45.5	36	12.5:1	100	10	DC-6A
QGA 35	P.P. 6L6 or P.P. Parallel 6L6 to Universal 500 ohm line.	3,800 split	U-500	+47	50	2.75:1	140	14	DC-6B
QGA 36	As above to Universal voice coil.	3,800 split	U-16	+47	50	15.4:1	140	14	DC-6B
QGA 37	High level multiple line to Universal voice coil.	U-500	U-16	+42	15	5.6:1	0	0	DC-5B
QGA 38	High level multiple line to Universal voice coil.	U-500	U-16	+47	50	5.6:1	0	0	DC-6B
QGA 39*	5881 or 6146 Class AB1 to Universal 500 ohm line.	6,600 split	U-500	+45.5	36	3.64:1	70	7	DC-6A
QGA 40*	5881 or 6146 Class AB1 to Universal voice coil.	6,600 split	U-16	+45.5	36	20:1	70	7	DC-6A
QGA 41	6550 AB1 or 6146 AB2 to Universal 500 ohm line.	5,000 split	U-500	+50	100	3.16:1	140	14	DC-7
QGA 42	6550AB1 or 6146AB2 to Universal voice coil.	5,000 split	U-16	+50	100	17.7:1	140	14	DC-7

*These units supplied with taps for applying screen feedback.

U-16 IMPEDANCES IN OHMS: 2, 4, 8, 12, 16.

U-500 IMPEDANCES IN OHMS. 50, 125, 200 C.T., 250, 330, 500 C.T.
125 and 500 ohms can be used for 150 and 600 ohms.

MINIATURE AUDIO TRANSFORMERS

These high quality, miniature transformers feature hermetically sealing for maximum protection from moisture penetration with subsequent electrolysis and corrosion of fine wires. While primarily intended for non-military equipment, these units are constructed in accordance with MIL-T-27A Specifications.

Frequency response: ± 2DB 30-20,000 CPS.
* ± 2DB 200-10,000 CPS.

CASE DIMENSIONS

DM-20 CASE



Height: 1 9/16"
Dia.: 1 5/16"
Mtg. Cen.: 1 1/8" to 1 7/32"
Mtg. 2 holes: .166 x .120
Flange Lgth.: 1 13/32"
Flange D.: .975"

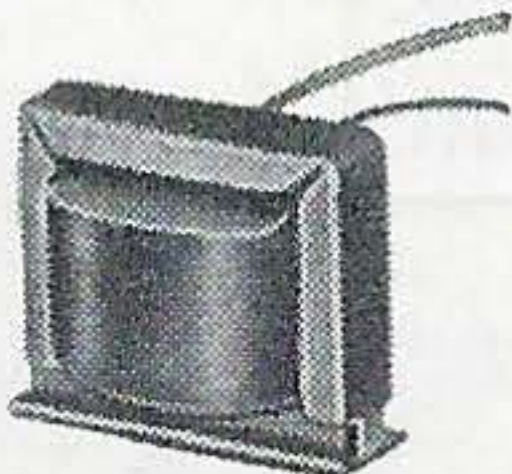
CASE DIMENSIONS

DM-O1 CASE

Height: 2"
Width: 1 1/2"
Depth: 1 1/2"
Mtg. Cen.: 1 1/16" x 1 1/16"
Studs: 4 6-32
Knockout: 1 3/8" dia.

UNCASED DIMENSIONS

TMO 1 TO 14



Height: 1 3/16"
Width: 1 1/16"
Depth: 2 1/32"
Mtg. Cen.: 1 3/8"
2 Mtg. Holes: .120 dia.
Flange Lght.: 1 5/8"

TMO 15 TO 18

Height: 2 1/32"
Width: 9/16"
Depth: 1 3/16"

TMO-19

Height: 1 3/16"
Width: 1 15/32"
Depth: 1 1/4"
Mtg. Cen.: 1 3/4"
2 Mtg. Holes: 3/16" dia.
Flange Lgth.: 2 1/16"

Catalog No.	Application	MIL Type	Impedance Level Ohms		Max. Power Level DBM	Ratio	Equiva-lent Shield-ing D.B.	Max. Pri. D.C. per Side Ma.	D.C. Un-balance Ma.	Case Number
			Primary	Secondary						
PMA 1	Line or microphone to single or push-pull grids.	TF4RX10YY	50/200/500	60,000 C.T.	+8	1:11		0	0	DM-20
PMA 2	Dynamic microphone or speaker voice coil to single or P.P. grid.	TF4RX10YY	4/8	60,000 C.T.	+8	1:86.6		0	0	DM-20
PMA 3	Line or microphone to single or push-pull grids. Magneti-cally shielded.	TF4RX10YY	50/200/500	60,000 C.T.	+8	1:11	30	0	0	DM-20
PMA 4	Single triode plate to single or push-pull grids.	TF4RX15YY	15,000	60,000 C.T.	+8	1:2		0	0	DM-20
PMA 5*	Single triode plate to push-pull grids.	TF4RX15YY	15,000	60,000 C.T.	+8	1:2		2	2	DM-20
PMA 6	Single triode plate to multiple line.	TF4RX13YY	15,000	50/200/500	+8	5.48:1		0	0	DM-20
PMA 7*	Single triode plate to multiple line.	TF4RX13YY	15,000	50/200/500	+8	5.48:1		2	2	DM-20
PMA 8	Push-pull triode plates to multiple line.	TF4RX13YY	30,000 C.T.	50/200/500	+8	7.75:1		2	0.25	DM-20
PMA 9	Crystal mike or pickup to multiple line.	TF4RX13YY	60,000 C.T.	50/200/500	+8	11:1		0	0	DM-20
PMA 10	Mixing or matching.	TF4RX16YY	50/200	50/200/500	+8	1:1.50		0	0	DM-20
PMA 11	Parallel Feed Reactor.	TF4RX20YY	40 hy, 3 ma dc, 3500 ohms d. c. resistance.							DM-20

MINIATURE TRANSISTOR TRANSFORMERS

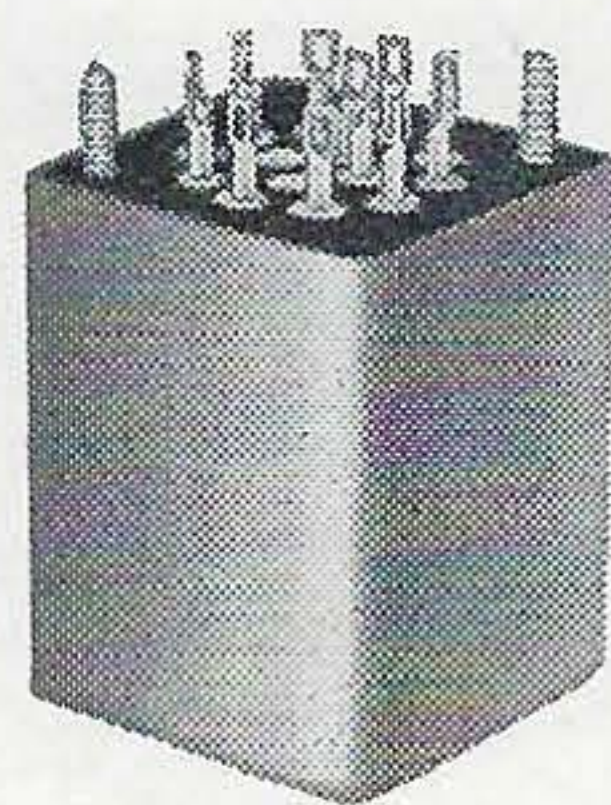
These high quality miniature transformers are high efficiency audio components featuring her-metically sealing for maximum protection against electrolysis and subsequent corrosion of fine wires caused by moisture penetration. The units are constructed in accordance with MIL-T-27A Specifications. Transistor Transformers can also be supplied in an open or encapsulated type of construction.

Catalog No.	MIL Type	Impedance Ohms				Frequency Response		Unbalanced Primary Current M.A./D.C.	D.C. Resistance Ohms		Max. Power Output M.W.	Case No.
		Pri.	Ct.	Sec.	Ct.	±D.B.	C.P.S.		Pri.	Sec.		
TMA 1*	TF4RX16YY	500		500		1	200 to 15,000	0	18	24	250	DM-20
TMA 2*	TF4RX13YY	50K		500		2	300 to 15,000	3	2,200	49	250	DM-20
TMA 3*	TF4RX13YY	50K		6		2	300 to 15,000	3	2,200	.55	250	DM-20
TMA 4*	TF4RX13YY	100K		1.2K	✓	3	300 to 15,000	1	2,790	95	100	DM-20
TMA 5*	TF4RX13YY	25K		1.2K	✓	2	200 to 15,000	3	1,740	110	250	DM-20
TMA 6*	TF4RX13YY	50K		1.2K	✓	2	300 to 15,000	3	2,200	106	250	DM-20
TMA 7*	TF4RX17YY	600/150		1.2K	✓	1	200 to 15,000	4	30	95	250	DM-20
TMA 8*	TF4RX13YY	25K		600		2	200 to 15,000	3	1,740	61	250	DM-20
TMA 9*	TF4RX13YY	4K	✓	600/150	✓	1	200 to 15,000	1	274	43	250	DM-20
TMA 10*	TF4RX13YY	2K		3.2		2	200 to 15,000	10	160	.28	250	DM-20
TMA 11*	TF4RX13YY	4K	✓	3.2		1	200 to 15,000	1	274	.26	250	DM-20
TMA 12*	TF4RX13YY	20K		50		2	300 to 15,000	4	1,340	2.9	250	DM-20
TMA 13*	TF4RX17YY	1K		50		2	300 to 15,000	8	42.6	2.5	250	DM-20
TMA 14*	TF4RX16YY	100K		1K		2	300 to 15,000	0	1,550	16.8	100	DM-20
TMO 15		20K		50		2	300 to 15,000	1	2,215	7.25	40	open
TMO 16		20K		600		2	300 to 15,000	1	2,215	102	40	open
TMO 17		1K		50		2	300 to 15,000	3	93	5.6	60	open
TMO 18		100K		1K		2	300 to 15,000	0	3,000	57.5	100	open
TMA 19*	TF4RX13YY	1K		3.2		2	200 to 15,000	20	38	.19	1000	DM-01

*When ordering open units specify TMO — when ordering encapsulated units specify TMC.

CASE DIMENSIONS

DM-01C CASE



Height: 2"
Width: 1½"
Depth: 1½"
Mtg. Cen.: 1½" diag.
Studs: 2 6-32
Knockout: 1¼" dia.

PROFESSIONAL GRADE COMPONENTS

This group of components has been designed for use in high fidelity and professional equipment and for public address service. Freed has developed this series of units employing the latest design techniques and the best commercially available materials. Except for units carrying unbalanced direct current the frequency response is ± 1 DB from 30 to 15,000 cps. All units feature excellent performance characteristics combined with minimum size and weight.

All units are vacuum varnished and then potted in compound to insure long life and trouble free performance.

Professional Grade components are supplied cased. Upon request these units can be supplied open or in shell type construction.

All cased Professional Grade Components supplied with terminals meet "EIA" standards.

Transformers PGA 1 through PGA 10 are supplied in hermetically sealed cases.

INPUT TRANSFORMERS

Frequency Response 30-15,000 C.P.S. ± 1.0 DB

Catalog No.	Application	Impedance Level Primary Secondary Ohms	Maximum Power Level DBM	Ratio	Equivalent Shielding D.B.	Max. Pri. D.C. per Side Ma.	D.C. Unbalance Ma.	Case Number
PGA 1	Universal 500 ohm line to single grid.	U-500 50,000	+12	1:10	50	0	0	DM-01C
PGA 2	Universal 500 ohm line to push-pull grids.	U-500 60,000 split	+12	1:11	50	0	0	DM-01C
PGA 3	Universal 500 ohm line to push-pull grids.	U-500 100,000 split	+12	1:14.1	50	0	0	DM-01C
PGA 4	Bridging line to single grid.	10,000 60,000	+12	1:2.45	50	0	0	DM-01C
PGA 5	Bridging line to push-pull grids.	10,000 60,000 center tap	+12	1:2.45	50	0	0	DM-01C
PGA 6	Low level line matching.	U-500 U-500	+18	1:1	50	0	0	DM-01C

LOW LEVEL OUTPUT AND MIXING TRANSFORMERS

Frequency Response 30-15,000 C.P.S. ± 1.0 DB

Catalog No.	Application	Impedance Level Primary Secondary Ohms	Maximum Power Level DBM	Ratio	Max. Pri. D.C. Per Side Ma.	D.C. Unbalance Ma.	Case Number
PGA 7	Single triode plate to Universal 500 ohm line. Shunt feed.	15,000 U500	+18	5.48:1	0	0	DM-01C
PGA 8	Single triode plate to Universal 500 ohm line.	15,000 U500	+18	5.48:1	8	8	DM-01C
PGA 9	Push-pull triode plates to Universal 500 ohm	20,000 CT U500	+30	6.32:1	8	0.5	DM-01C
PGA 10	Low level line matching.	U500 U500	+18	1:1	0	0	DM-01C

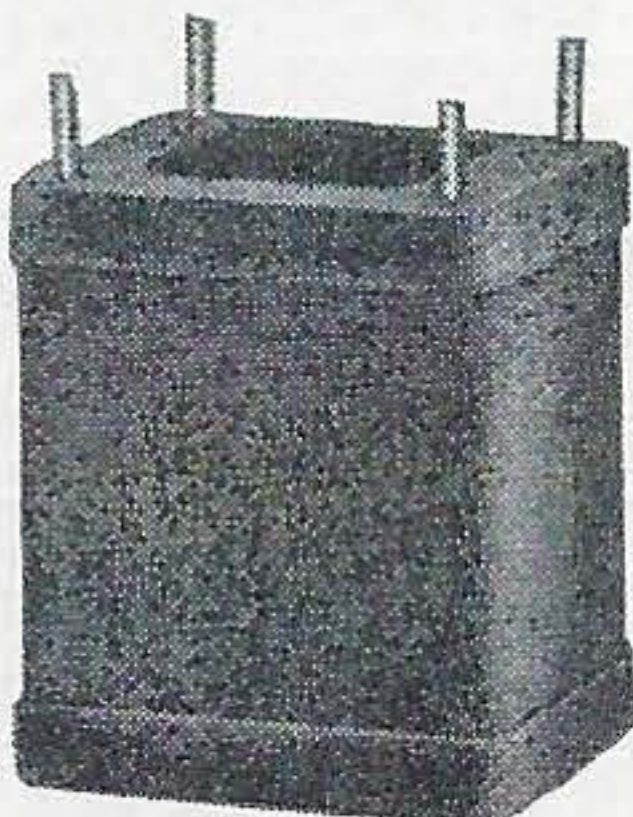
U-500 IMPEDANCES IN OHMS: 50, 125, 200 CT, 250, 330, 500 CT. 125 and 500 ohms can be used for 150 and 600 ohms.

PROFESSIONAL GRADE COMPONENTS

DRIVER TRANSFORMERS

Frequency Response 30-15,000 C.P.S. ±1.0 DB

CASE DIMENSIONS



DC-1A CASE

Height: 2 1/2"
Width: 2 1/16"
Depth: 1 13/16"
Mtg. Cen.: 1 1/2" x 1 1/4"
Studs: 4 8-32
Knockout: 1 1/4" dia.

DC-2A CASE

Height: 3"
Width: 2 5/8"
Depth: 2 1/4"
Mtg. Cen.: 2" x 1 3/4"
Studs: 4 8-32
Knockout: 1 1/2" x 1 3/8"

DC-2B CASE

Height: 3 1/2"
Width: 2 5/8"
Depth: 2 1/4"
Mtg. Cen.: 2" x 1 3/4"
Studs: 4 8-32
Knockout: 1 1/2" x 1 3/8"

DC-4A CASE

Height: 3 3/4"
Width: 3 1/8"
Depth: 3"
Mtg. Cen.: 2 1/2" x 2 1/2"
Studs: 4 8-32
Knockout: 2" x 1 3/4"

DC-5A CASE

Height: 3 7/8"
Width: 4 1/8"
Depth: 3 1/2"
Mtg. Cen.: 3 1/8" x 2 5/8"
Studs: 4 10-32
Knockout: 2 1/2" x 2"

DC-6A CASE

Height: 4 7/8"
Width: 5"
Depth: 4 1/8"
Mtg. Cen.: 3 3/4" x 3"
Studs: 4 10-32
Knockout: 3" x 2 1/2"

Catalog No.	Application	Primary Impedance Ohms	Turn Ratio Pri: 1/2 Sec.	Max. Level DBM	Max. Pri. D.C. Per Side Ma.	Max. D.C. Unbalance Ma.	Case Number
PGA 11	Universal 500 ohm line to push-pull grids.	U500	1:1	+40	0	0	DC-2A
PGA 12	Push-pull 6C4, 6SN7 triodes to push-pull 2A3, 6L6 grids.	20,000 C.T.	3.0:1	+30	10	1	DC-1A
PGA 13	Push-pull 2A3, 6B4, 6A5G to push-pull 809, TZ-40, 4/125A	5,000 C.T.	3.2:1	+40	50	5	DC-2A

All units supplied with leads.

HIGH LEVEL OUTPUT TRANSFORMERS

Frequency Response 30-15,000 C.P.S. ±1.0 DB

Catalog No.	Application	Impedance Level Ohms		Maximum Power Level DBM Watts		Ratio	Max. Pri. D.C. Per Side Ma	DC Unbalance Ma	Case Number
		Primary	Secondary						
PGA 14	P.P. 6K6, 6AR5, 7B5 Class A to Universal voice coil.	12,000 C.T.	U16	+40	10	27.4:1	40	4	DC-2B
PGA 15	P.P. 6F6 Cl. AB ₂ , P.P. 6V6, 6AQ5, 7C5, Cl. AB ₁ , 6L6 or 5881 Triode to Universal voice coil.	10,000 C.T.	U16	+43	20	25:1	50	5	DC-4A
PGA 16	P.P. 6L6 Cl. AB ₂ , self bias to Universal 500 ohm line.	9,000	U500	+44.8	30	4.23:1	50	5	DC-4A
PGA 17	As above to Universal voice coil.	9,000	U16	+44.8	30	23.7:1	50	5	DC-4A
PGA 18	P.P. 6N7 Cl. B, P.P. 6V6, 6AQ5, 7C5, Cl. AB ₁ to Universal voice coil.	8,000 C.T.	U16	+41.8	15	22.3:1	45	5	DC-4A
PGA 19	P.P. 6L6, fixed bias, Cl. AB ₁ , to Universal 500 ohm line.	6,600 C.T.	U500	+44.8	30	3.63:1	70	7	DC-4A
PGA 20	As above to Universal voice coil.	6,600 C.T.	U16	+44.8	30	20.3:1	70	7	DC-4A
PGA 21	P.P. 6L6 Cl. A, P.P. 2A3, 6A5G, 6B4 self bias P.P. Par. 6V6 Cl. AB ₁ to Universal voice coil.	5,000 C.T.	U16	+43	20	17.7:1	80	8	DC-4A
PGA 22	P.P. Par 6L6 Cl. AB ₁ , self bias P. P. 6L6 Cl. AB ₂ fixed bias PP807 Cl. AB ₂ to Universal 500 ohm line.	4000 C.T.	U500	+47	50	2.83:1	100	10	DC-5A
PGA 23	As above to Universal voice coil.	4000 C.T.	U16	+47	50	15.8:1	100	10	DC-5A
PGA 24	P.P. 6A5G, 6B4, 2A3, fixed bias Universal voice coil.	3000 C.T.	U16	+41.8	15	13.7:1	75	7.5	DC-4A
PGA 25	P.P. Par. 807 Cl. AB ₂ to Universal 500 ohm line.	2100 C.T.	U500	+51.8	150	2.05:1	240	12	DC-6A
PGA 26	P.P. Par 2A3, 6A5G, fixed bias 6B4, 300A Cl. AB ₁ , P.P. Par 6L6 Cl. A to Universal 500 ohm line.	1500 C.T.	U500	+44.8	30	1.73:1	180	15	DC-4A
PGA 27	As above to Universal voice coil.	1500 C.T.	U16	+44.8	30	9.7:1	150	15	DC-4A
PGA 28	Matching line to Universal voice coil.	U500	U16	+44.8	30	5.6:1	0	0	DC-4A
PGA 29	Matching line to Universal voice coil.	U500	U16	+47	50	5.6:1	0	0	DC-5A
PGA 30	Matching line to Universal voice coil.	U500	U16	+50	100	5.6:1	0	0	DC-6A

U-16 IMPEDANCES IN OHMS:

2, 4, 8, 12, 16

U-500 IMPEDANCES IN OHMS:

50, 125, 200 C.T., 250, 330, 500 C.T., 125 and 500 ohms can be used for 150 and 600 ohms.

A 70 volts level can be obtained for the following impedances:

500 ohms — 10 watts + 40 DBM
330 ohms — 15 watts + 42 DBM
250 ohms — 20 watts + 43 DBM
200 ohms — 25 watts + 44 DBM
125 ohms — 40 watts + 46 DBM
50 ohms — 100 watts + 50 DBM

*PGA 28, 29 & 30 supplied with terminals, all other units with leads.

CASE DIMENSIONS

DM-01 CASE



Height: 2"
Width: 1 1/2"
Depth: 1 1/2"
Mtg. Cen.: 1 1/16" x 1 1/16"
Studs: 4 6-32
Knockout: 1 1/4" dia.

DC CASE STYLE



DC-1A

Height: 2 1/2"
Width: 2 1/16"
Depth: 1 13/16"
Mtg. Cen.: 1 1/2" x 1 1/4"
Studs: 4 8-32
Knockout: 1 1/4" dia.

DC-2A

Height: 3"
Width: 2 5/8"
Depth: 2 1/4"
Mtg. Cen.: 2" x 1 3/4"
Studs: 4 8-32
Knockout: 1 1/2" x 1 3/8"

DC-2B

Height: 3 1/2"
Width: 2 5/8"
Depth: 2 1/4"
Mtg. Cen.: 2" x 1 3/4"
Studs: 4 8-32
Knockout: 1 1/2" x 1 3/8"

DC-4A

Height: 3 3/4"
Width: 3 1/8"
Depth: 3"
Mtg. Cen.: 2 1/2" x 2 1/2"
Studs: 4 8-32
Knockout: 2" x 1 3/8"

DC-5A CASE

Height: 3 7/8"
Width: 4 1/8"
Depth: 3 1/2"
Mtg. Cen.: 3 1/8" x 2 5/8"
Studs: 4 10-32
Knockout: 2 1/2" x 2"

DC-5B

Height: 4 1/2"
Width: 4 1/8"
Depth: 3 1/2"
Mtg. Cen.: 3 1/8" x 2 5/8"
Studs: 4 10-32
Knockout: 2 1/2" dia.

DC-6A CASE

Height: 4 7/8"
Width: 5"
Depth: 4 1/8"
Mtg. Cen.: 3 3/4" x 3"
Studs: 4 10-32
Knockout: 3" dia.

DC-7B CASE

Height: 6 3/4"
Width: 5 1/2"
Depth: 5"
Mtg. Cen.: 4 3/8" x 3 3/4"
Studs: 4 1/4-20
Knockout: 3" x 2 1/2"

PROFESSIONAL GRADE COMPONENTS
FILTER REACTORS

Inductance measured at 50V, 60 cycles with rated direct current in the winding.

Catalog No.	Inductance in Henries	Rated Current D.C. Ma.	D.C. Resistance Ohms	Dielectric Test Voltage VRMS	Case Number
PGC 1	40	15	2000	1000	DM-01
PGC 2	12	40	400	1000	DC-1A
PGC 3	8	50	300	1000	DC-1A
PGC 4	20	50	425	2500	DC-2A
PGC 5	10	70	250	2500	DC-2A
PGC 6	6	100	160	2500	DC-2A
PGC 7	6	150	115	2500	DC-2B
PGC 8	10	150	160	2500	DC-4A
PGC 9	5.5	200	95	2500	DC-4A
PGC 10	10	200	150	2500	DC-4A
PGC 11	10	250	135	2500	DC-5B
PGC 12	8	300	95	2500	DC-5B
PGC 13	7	400	60	2500	DC-5B
PARALLEL FEED			AUDIO CHOKES		
PGC 14	100	10	3500	1000	DM-01
PGC 15	30	50	650	1500	DC-2A
PGC 16	400	1	6000	1000	DM-01

SWINGING INPUT REACTORS

Catalog No.	Inductance in Henries *	Rated Current D.C. Ma.	D.C. Resistance Ohms	Dielectric Test Voltage VRMS	Case Number
PGC 17	5-20	150	160	1500	DC-4A
PGC 18	5-20	250	135	1500	DC-5B
PGC 19	3-15	300	95	1500	DC-5B
PGC 20	3-15	400	60	1500	DC-5B

* Inductance values for 100% and 10% of rated Direct Current.

POWER TRANSFORMERS

ALL PRIMARIES ARE FOR 115V., 50/60 c.p.s.

Temperature rises range from 45° to 50°C.

Catalog No.	Py Va	Hi Volt	Choke Input D.C.V. D.C. Ma	Cond. Input D.C.V. D.C. Ma.	Bias Tap.	Rectifier	Fil. No. 1	Fil. No. 2	Fil. No. 3	Case No.
PGP 1	15	440V C.T.	Low flux density, hum-bucking. For Preamplifier service.	270 15		6X4	6.3VCT@0.6A	6.3V @ 0.3A		DC-2B
PGP 2	30	550V C.T.	Low flux density, hum-bucking. For Preamplifier service.	310 35		6X4	6.3VCT@0.6A	6.3VCT@0.9A		DC-4A
PGP 3	45	500V C.T.		270 40		6X4, 5Y3	5/6.3V @ 2A	6.3V @ 2A		DC-4A
PGP 4	57	600V C.T.		330 50		6X4, 5Y3	5/6.3V @ 2A	6.3V @ 2.5A		DC-4A
PGP 5	64	650V C.T.		370 50		6X4, 5Y3	5/6.3V @ 2A	6.3V @ 3A		DC-4A
PGP 6	73	600V C.T.		320 70		6X4, 5Y3	5/6.3V @ 2A	6.3V @ 3A		DC-4A
PGP 7	110	650V C.T.	225 140	330 100		5Y3, 5U4	5V @ 3A	6.3V @ 5A		DC-5B
PGP 8	76	700V C.T.	260 100	385 70		5Y3	5V @ 2A	6.3V @ 2.5A		DC-5A
PGP 9	108	700V C.T.	250 125	370 90		5Y3, 5U4	5V @ 3A	6.3V @ 5A		DC-5B
PGP 10	127	700V C.T.	260 170	350 120		5U4	5V @ 3A	6.3V @ 5A		DC-5B
PGP 11	146	700V C.T.	260 210	350 150		5U4	5V @ 3A	6.3V @ 5A	6.3V @ 1A	DC-6A
PGP 12	207	800V C.T.	295 280	400 200		5U4, 2-5Y3	5V @ 4A	6.3V @ 6A		DC-6A
PGP 13	225	800V C.T.	295 280	400 200	80	5U4, 2-5Y3	5V @ 4A	6.3V @ 6A	5/6.3V @ 2A	DC-6A
PGP 14	268	840V C.T.	330 350	450 250	80	2-5U4	5V @ 6A	6.3V @ 6A	5/6.3V @ 2A	DC-6A
PGP 15	320	900V C.T.	340 420	490 300	80	2-5U4	5V @ 6A	6.3V @ 6A	5/6.3V @ 2A	DC-7B
PGP 16	127	900V C.T.	360 150			5U4	5V @ 3A	6.3V @ 5A		DC-6A
PGP 17	150	900V C.T.	350 200			5U4	5V @ 3A	6.3V @ 5A		DC-6A
PGP 18	203	1100V C.T.	400 250			5R4GY	5V @ 3A	6.3V @ 5A		DC-6A
PGP 19	248	1100V C.T.	420 300			2-5R4GY	5V @ 4A	6.3V @ 7A		DC-6A
PGP 20	310	1280V C.T.	480 350			2-5R4GY	5V @ 4A	6.3V @ 7A		DC-7B

All units supplied with leads.

PQC HIGH Q REACTORS

PQC-Reactors are low-priced High Q components designed for use in selective circuits such as wave filters, wave traps, and noise suppressors.

CASE DIMENSIONS

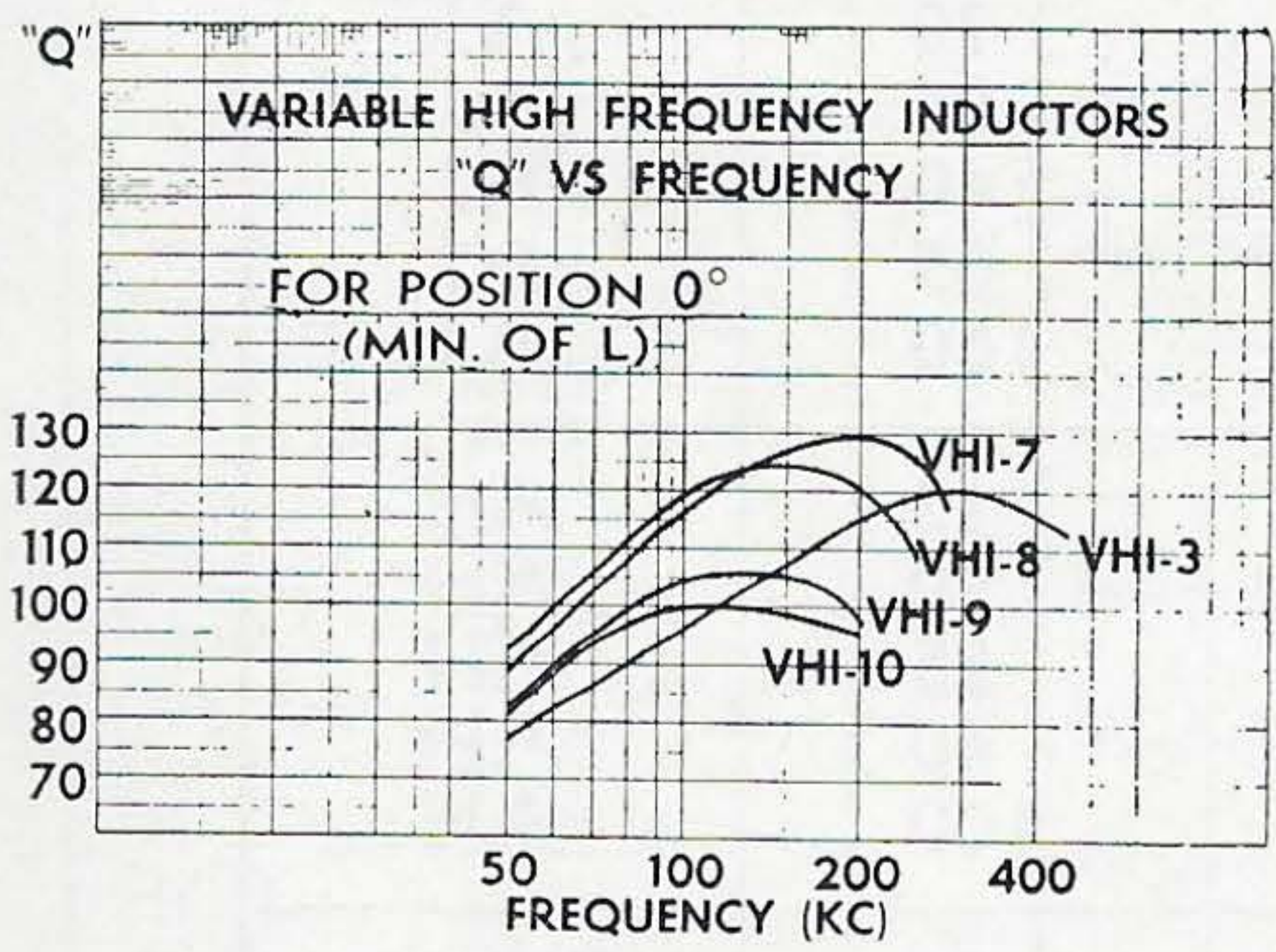
DM-02 CASE



Height: 1 21/32"
Width: 1 21/32"
Depth: 1 13/32"
Flange L: 2 3/8"
Mtg. Cen.: 2"

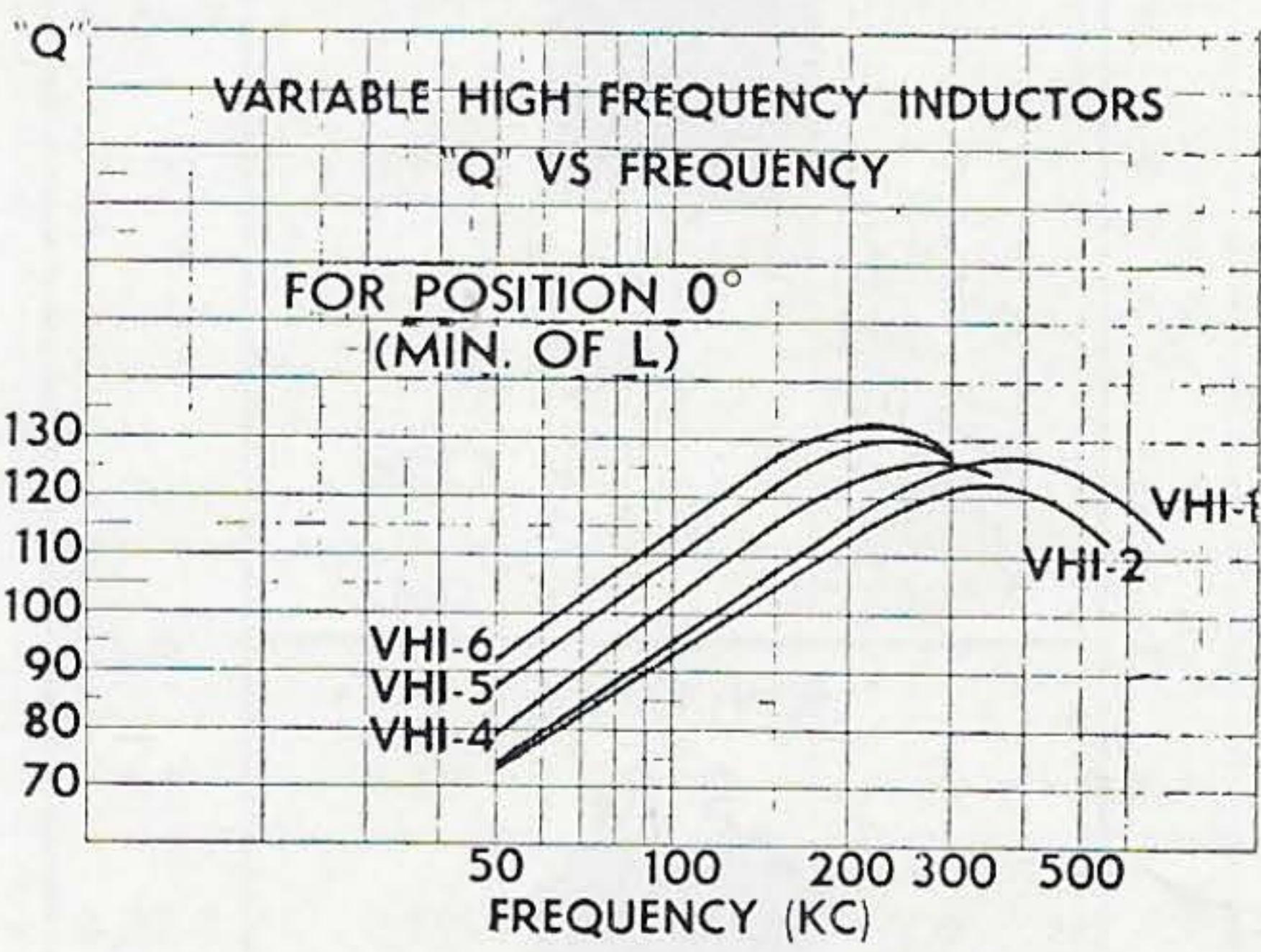
Catalog No.	Application	Rated Ind. in Henries	Q	Tuning Capacitor (Mf)	Case Size
PQC 1	60 cps resonant trap	14.00	10	.5	DM-02
PQC 2	400 cps resonant trap	1.58	15	.1	DM-02
PQC 3	1000 cps resonant trap	1.00	20	.025	DM-02
PQC 4	Dynamic noise suppression inductor	2.40	20 @ 4 KC		DM-02
PQC 5	Dynamic noise suppression inductor	2.00	15 @ 4 KC		DM-02
PQC 6	Dynamic noise suppression inductor	1.30	15 @ 4 KC		DM-02
PQC 7	Dynamic noise suppression inductor	.80	15 @ 4 KC		DM-02
PQC 8	Dynamic noise suppression inductor	.60	15 @ 4 KC		DM-02
PQC 9	Dynamic noise suppression inductor	.40	15 @ 4 KC		DM-02

MINIATURE VARIABLE HIGH FREQUENCY INDUCTORS



- VARIABLE for ± 20% of its nominal inductance.
- FREQUENCY RANGE: 20 to 500 Kilocycles.
- Q practically constant over whole range of inductance variation.
- Miniature size.
- Hermetically sealed.

Variable high frequency inductors with any inductance from 1 to 50 mhy with a variation of appr. ± 20% can be made on special order.



CASE DIMENSIONS

VI-1



Height: 1 3/16"
Diameter: 3/4"
2 Studs: 4-40
Mtg. Cen.: 3/8"

Catalog No.	Nominal Inductance* MHY @ 100 KC		Variation of Q @ 100 KC		RDC ohms ±15%	Max. Non-destructive Current MA	Self-resonant Freq. MC	Case Des.
	Min.	Max.	Min.	Max.				
VHI-1	1.1	1.75	93.5	100.5	.75	250	2.2	VI-1
VHI-2	1.7	2.5	94.5	96.2	1.1	200	1.9	VI-1
VHI-3	2.3	3.7	94.5	97.2	1.4	200	1.6	VI-1
VHI-4	3.	4.5	100.75	101.75	1.9	160	1.4	VI-1
VHI-5	4.	5.7	107.	108.	2.2	160	1.3	VI-1
VHI-6	5.5	7.5	112.	119.	3.1	130	1.	VI-1
VHI-7	7.	10.5	116.	120.5	4.5	100	.9	VI-1
VHI-8	10.	15.	106.	109.	6.6	80	.85	VI-1
VHI-9	14.5	20.5	101.	101.5	9.2	60	.6	VI-1
VHI-10	20.	30.	105.	115.	13.7	50	.55	VI-1

QGC HIGH Q REACTORS

QGC-Reactors are designed for low audio frequency application requiring very high Q and inductance stability. These units are impregnated with a special compound and mounted in **hermetically sealed** cases. A hum reducing lamination structure used in these reactors results in an extremely low pickup of extraneous stray fields. A very low temperature coefficient is achieved by a specially developed impregnation and assembly process. All QGC High Q Reactors have an extremely low voltage coefficient.

All Resistance values are nominal and can vary by ±20%.

Inductance values are given within ±2%.

Closer Tolerances and Inductances other than the standard Catalog items can be supplied on special orders.

Inductance Values up to 400 Henries can be supplied.

The graphs showing the coil characteristics make use of the following formulas:

1. "Q" versus frequency was measured with voltages given by the expression:

$$V = K \sqrt{\frac{LH}{1H}} \times \frac{FKC}{1KC}$$

K—a constant listed in every chart
LH—inductance in Henries
FKC—frequency in kilocycles at which the measurements were made.
2. Variation of inductance versus normalized Direct Current.
The normalized DC is given by

$$I_n = I_{dc} \sqrt{LH}$$

where I_{dc} is the dc current in MA and LH the inductance in Henries.
3. Variation of Inductance versus normalized AC voltage.
The normalized AC voltage is given by

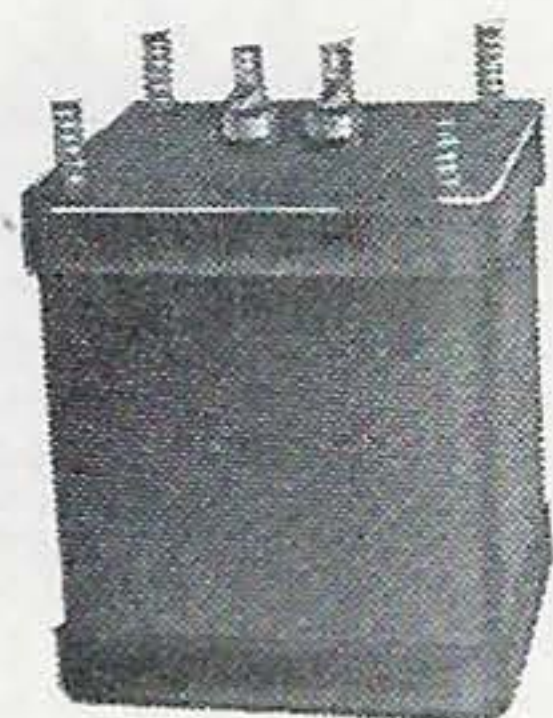
$$V_n = \frac{V}{\sqrt{LH}} \times \frac{60 \text{ cps}}{F_{cps}}$$

V_n —normalized AC voltage
 V —voltage across the coil
LH—inductance in Henries
F—frequency of measurement in cps

* ± 5%

CASE DIMENSIONS

DC-2A CASE



Height: 3"
Width: 2 5/8"
Depth: 2 1/4"
Mtg. Cen.: 2" x 1 3/4"
Studs: 4 8-32
Knockout: 1" dia.

AJ CASE



Height: 2 3/8"
Width: 1 5/8"
Depth: 1 5/8"
Mtg. Cen.: 1 3/16" x 1 3/16"
Studs: 4 6-32
Knockout: 1 1/8" dia.

AH CASE



Height: 1 3/4"
Width: 1 5/16"
Depth: 1 5/16"
Mtg. Cen.: 1 1/4" diag.
Studs: 2 6-32
Knockout: 7/8" dia.

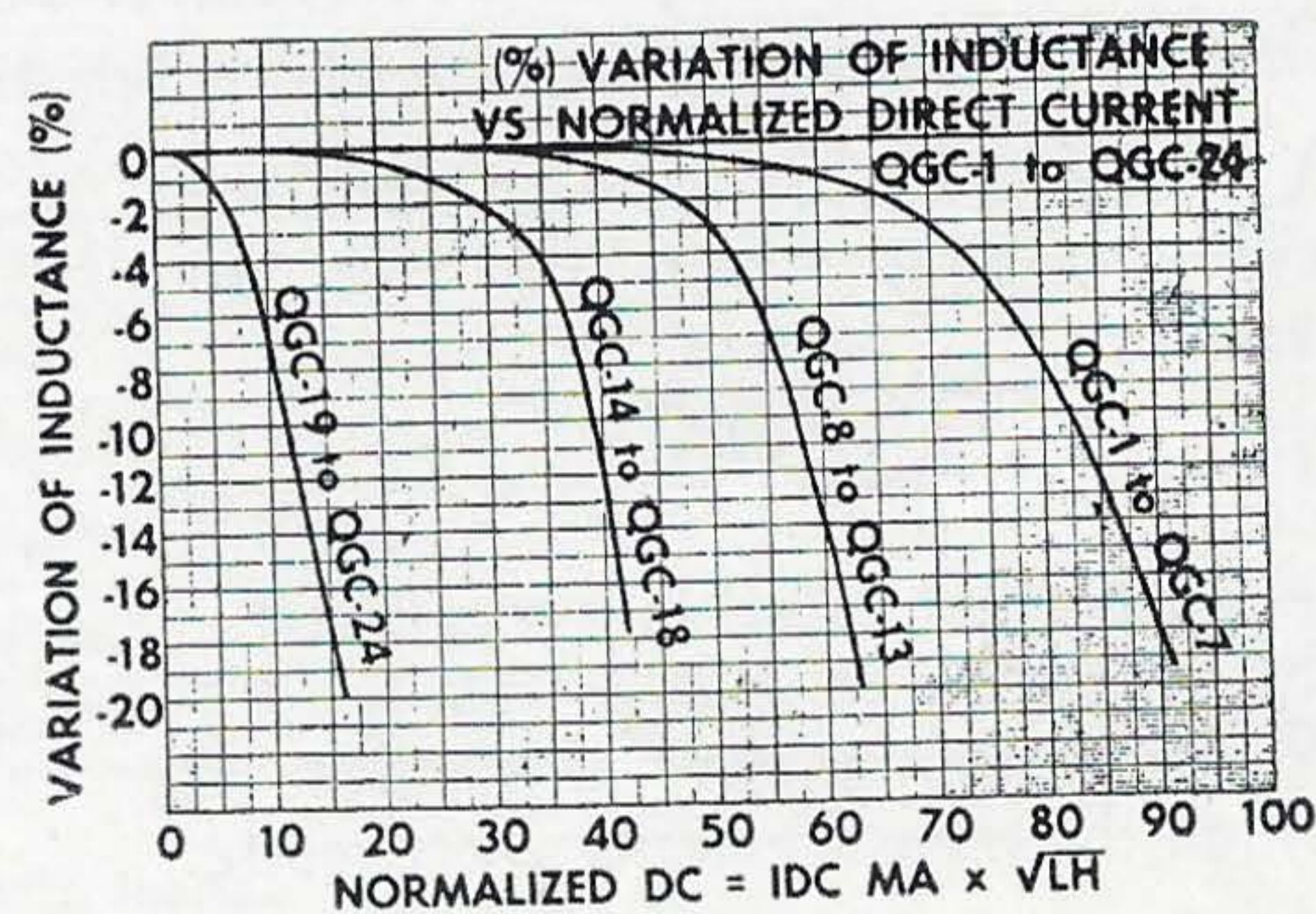
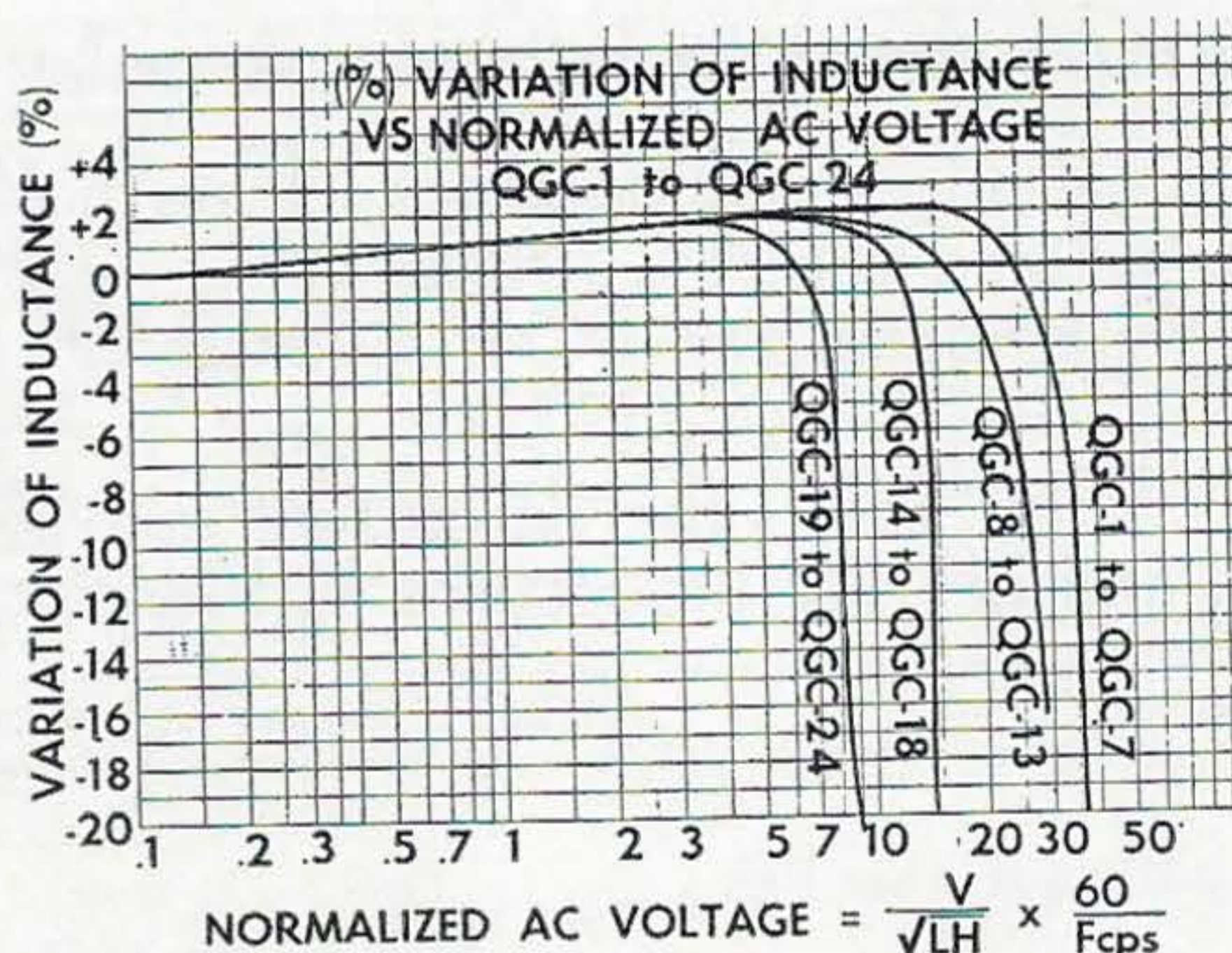
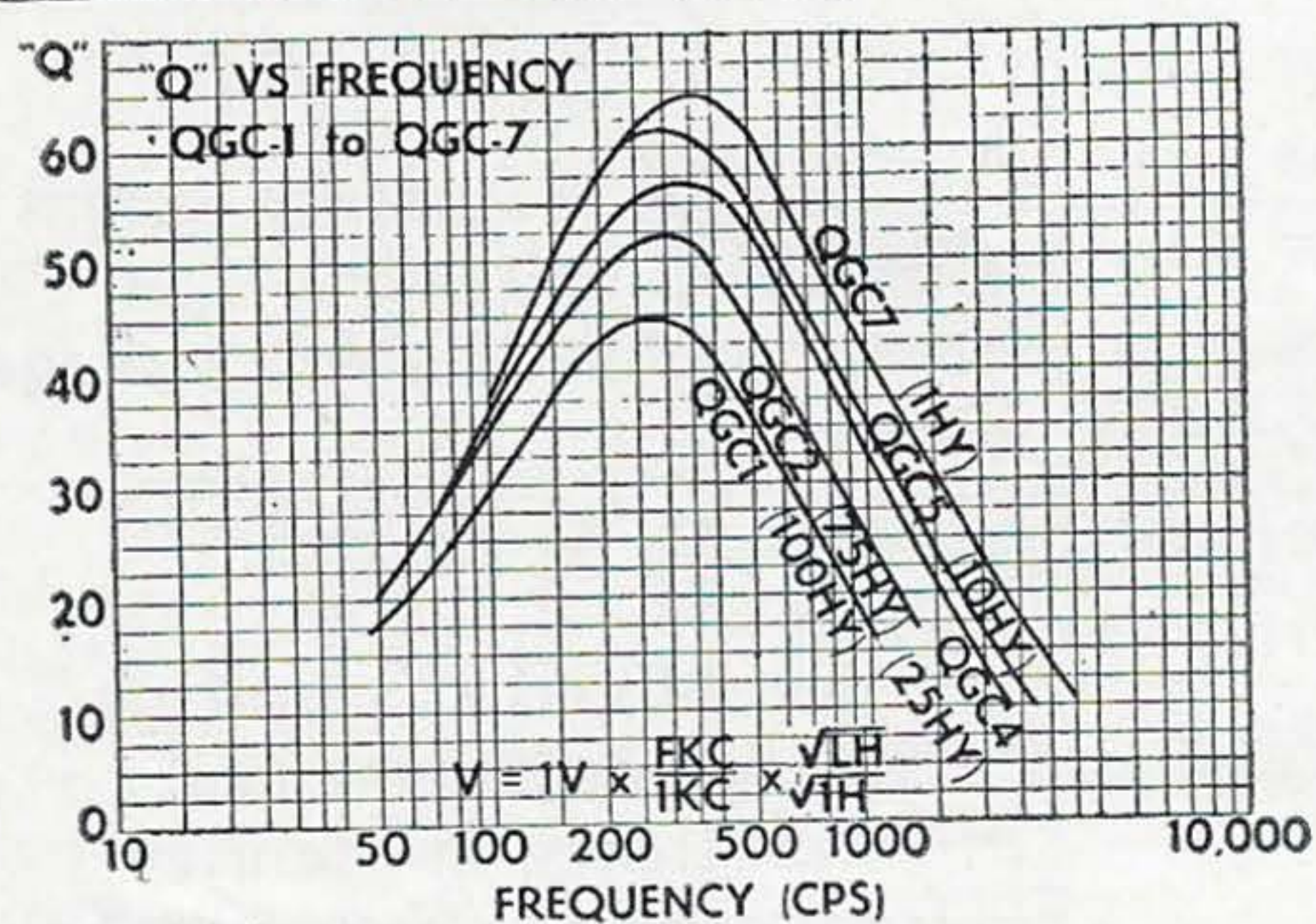
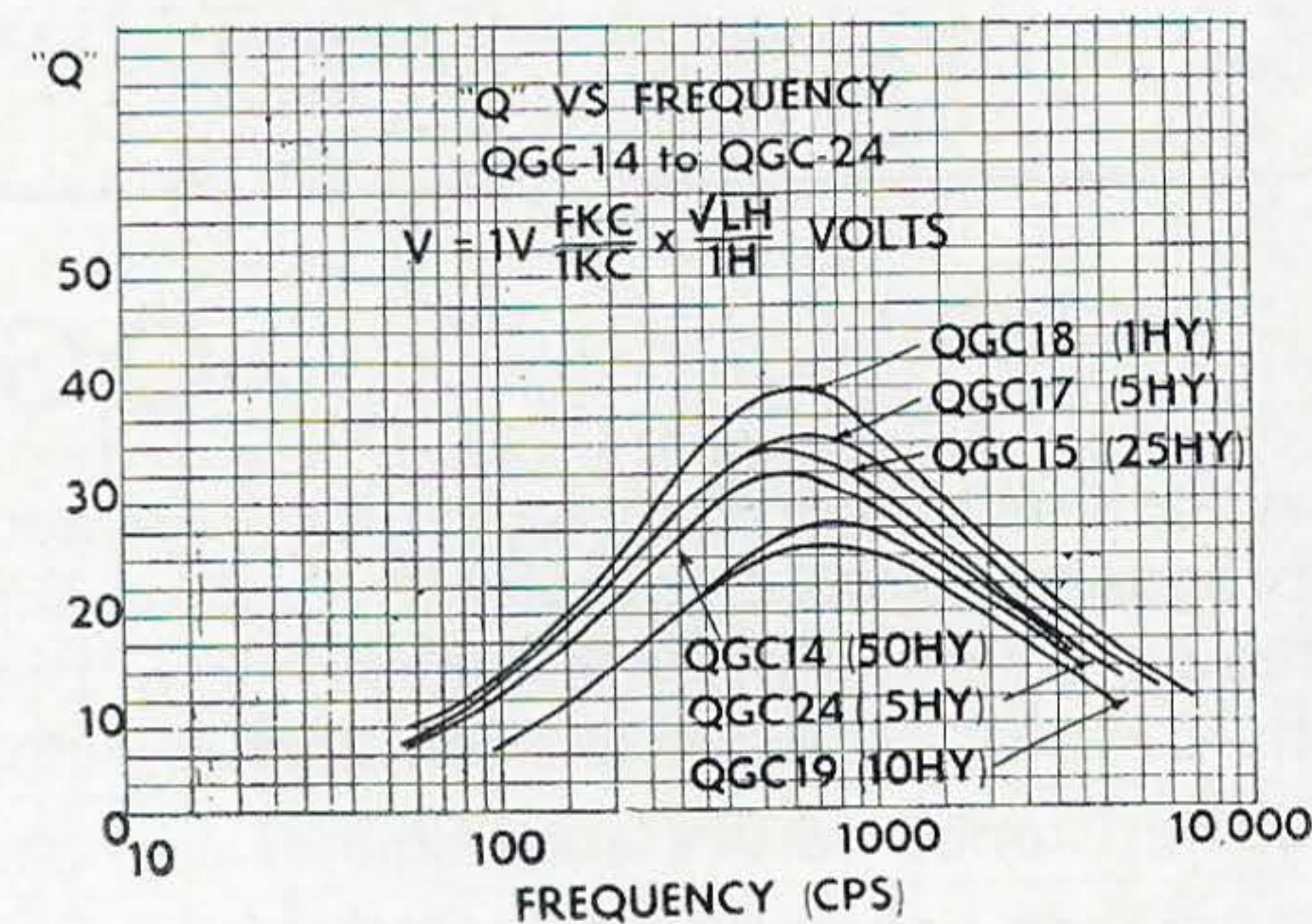
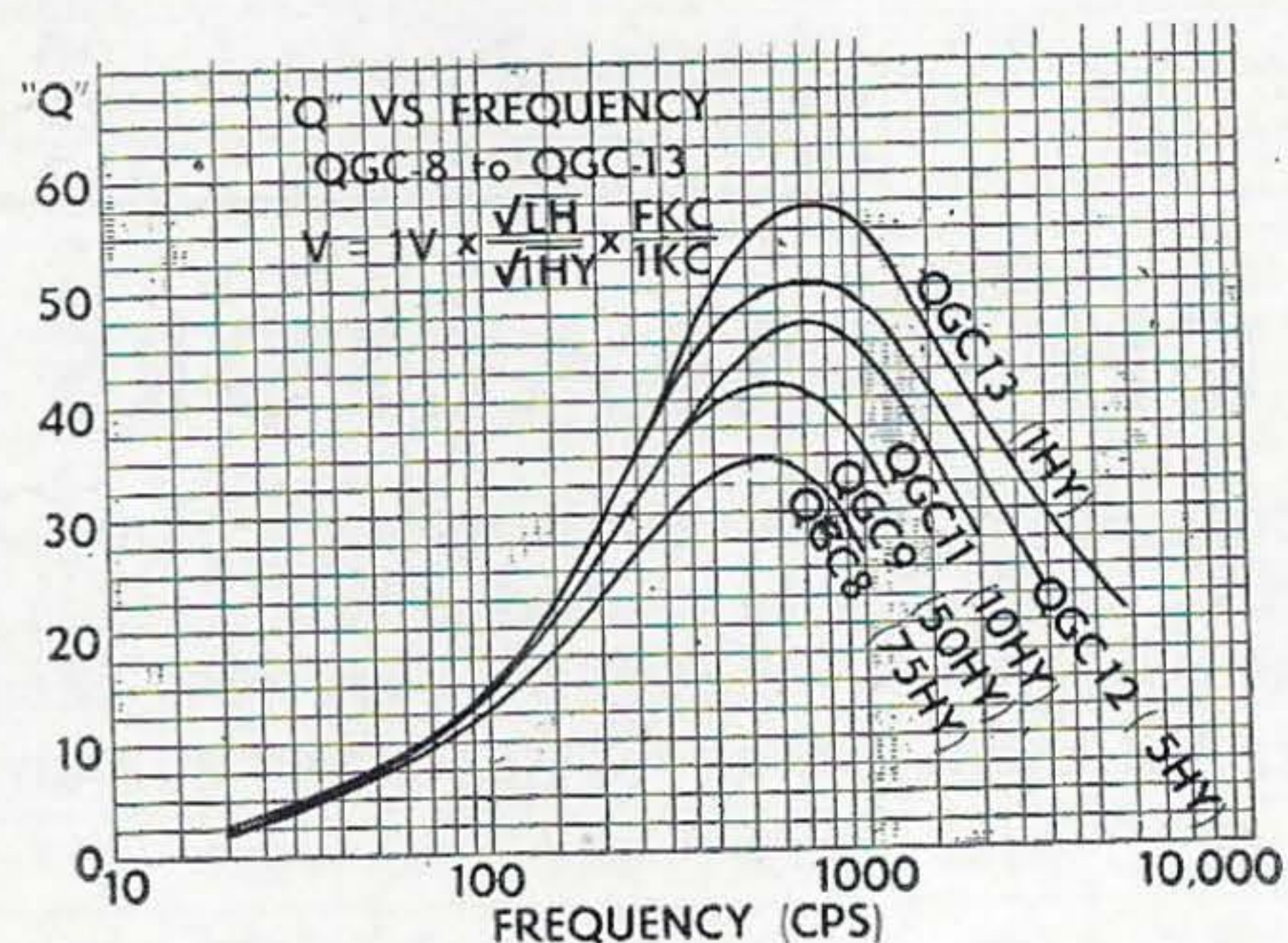
DM-20 CASE



Height: 1 9/16"
Dia.: 1 5/16"
Flange L.: 1 13/32"
Flange D.: 0.975"
Mtg. Cen.: 1 1/8" to 1 7/32"
2 Holes: 0.147 wide
Knockout: 0.875 dia.

QUALITY GRADE HIGH Q REACTORS

Catalog No.	Inductance Hy.	RDC Ohms Tolerance ± 20%	Self-resonant Frequency KC	Current Capacity MA	Case No.
QGC-1	100	1,611	2.2	40	DC-2A
QGC-2	75	1,054	2.6	50	DC-2A
QGC-3	50	878	3.2	50	DC-2A
QGC-4	25	378	4.5	80	DC-2A
QGC-5	10	117	7.2	160	DC-2A
QGC-6	5	78	10.2	160	DC-2A
QGC-7	1	15	22.6	400	DC-2A
QGC-8	75	3,400	.82	16	AJ
QGC-9	50	2,050	1.00	20	AJ
QGC-10	25	1,250	1.41	25	AJ
QGC-11	10	460	2.25	40	AJ
QGC-12	5	210	3.20	65	AJ
QGC-13	1	40	7.20	160	AJ
QGC-14	50	2,900	4.60	13	AH
QGC-15	25	1,300	6.60	20	AH
QGC-16	10	570	10.70	25	AH
QGC-17	5	280	15.20	40	AH
QGC-18	1	50	35.00	100	AH
QGC-19	10	760	10.70	20	DM-20
QGC-20	7.5	700	12.20	20	DM-20
QGC-21	5	450	15.20	25	DM-20
QGC-22	2.5	235	22.00	32	DM-20
QGC-23	1	90	35.00	63	DM-20
QGC-24	0.5	45	51.00	80	DM-20



CASE DIMENSIONS



AJ CASE

Height: $2\frac{3}{8}$ "
Width: $1\frac{5}{8}$ "
Depth: $1\frac{5}{8}$ "
Mtg. Cen.: $1\frac{3}{16}$ " x $1\frac{3}{16}$ "
Studs: 4 6-32
Cut Out: $1\frac{1}{8}$ " D



EB CASE

Height: $2\frac{7}{16}$ "
Width: $1\frac{15}{16}$ "
Depth: $1\frac{13}{16}$ "
Mtg. Cen.: $1\frac{3}{8}$ " x $1\frac{1}{4}$ "
Studs: 4 6-32

FB CASE

Height: $2\frac{1}{2}$ "
Width: $2\frac{5}{16}$ "
Depth: $2\frac{1}{16}$ "
Mtg. Cen.: $1\frac{11}{16}$ " x $1\frac{1}{16}$ "
Studs: 4 6-32

GB CASE

Height: $2\frac{13}{16}$ "
Width: $2\frac{3}{4}$ "
Depth: $2\frac{3}{8}$ "
Mtg. Cen.: $2\frac{1}{8}$ " x $1\frac{3}{4}$ "
Studs: 4 6-32

HA CASE

Height: $4\frac{1}{4}$ "
Width: $3\frac{1}{16}$ "
Depth: $2\frac{5}{8}$ "
Mtg. Cen.: $2\frac{19}{64}$ " x $1\frac{55}{64}$ "
Studs: 4 8-32

HB CASE

Height: $3\frac{3}{16}$ "
Width: $3\frac{1}{16}$ "
Depth: $2\frac{5}{8}$ "
Mtg. Cen.: $2\frac{19}{64}$ " x $1\frac{55}{64}$ "
Studs: 4 8-32

JB CASE

Height: $3\frac{7}{8}$ "
Width: $3\frac{9}{16}$ "
Depth: $3\frac{1}{16}$ "
Mtg. Cen.: $2\frac{5}{8}$ " x $2\frac{1}{8}$ "
Studs: 4 8-32

KB CASE

Height: $4\frac{5}{16}$ "
Width: $3\frac{15}{16}$ "
Depth: $3\frac{3}{8}$ "
Mtg. Cen.: $3\frac{1}{16}$ " x $2\frac{7}{16}$ "
Studs: 4 10-32

LB CASE

Height: $4\frac{1}{2}$ "
Width: $4\frac{5}{16}$ "
Depth: $3\frac{11}{16}$ "
Mtg. Cen.: $3\frac{5}{16}$ " x $2\frac{11}{16}$ "
Studs: 4 10-32

MB CASE

Height: $4\frac{15}{16}$ "
Width: $4\frac{11}{16}$ "
Depth: 4"
Mtg. Cen.: $3\frac{11}{16}$ " x 3"
Studs: 4 $\frac{1}{4}$ -20

NB CASE

Height: $5\frac{1}{2}$ "
Width: $5\frac{1}{16}$ "
Depth: $4\frac{5}{16}$ "
Mtg. Cen.: $4\frac{1}{16}$ " x $3\frac{5}{16}$ "
Studs: 4 $\frac{1}{4}$ -20

STANDARD MILITARY TRANSFORMERS

This group comprises audio and power units designed to meet MIL-T-27 A specifications. The functional characteristics of these transformers were established by the Armed Service Standardization Program. These units are supplied in standard MIL cases.

Transformers meeting MIL-T-27A specifications Grade 1 through 6 with temperature characteristics of Class S, T, or U can be supplied on special order.

Encapsulated units using either Epoxy-Resins or Fosterite can be supplied for Grade 2 and 5. Class U components can be supplied molded in special high temperature Freed resin.

STANDARD MILITARY AUDIO TRANSFORMERS

Frequency Response 300-10,000 C.P.S. ± 2 DB

Catalog No.	Application	Type Designation	Impedance Level in Ohms Primary Secondary	Ratio	Max. Power Level DBM	Pri. D.C. Per Side in Ma	Max. D.C. unbalance	Case
MGA 1	Transformer, interstage, single or P.P. plates to single or P.P. grids.	TF4RX15AJ	10,000 C.T. 90,000 split and C.T.	1:3 overall	+15	10	10	AJ
MGA 2	Transformer, matching 600 ohm line to voice coil.	TF4RX16AJ	600 split 4, 8, 16	6.12:1 overall	+33	0	0	AJ
MGA 3	Transformer, input, 600 ohm line to single or P.P. grids.	TF4RX10AJ	600 split 135,000 C.T.	1:15	+15	0	0	AJ
MGA 4	Transformer, matching, 600 ohm line to 600 ohm line.	TF4RX16AJ	600 split 600 split	1:1	+15	0	0	AJ
MGA 5	Transformer, output, single plate 7,600 ohm, 4,800 ohm to 600 ohm line.	TF4RX13AJ	7,600 tap @ 4,800 600 split	3.56:1	+33	40	40	AJ
MGA 6	Transformer, output, single plate 7,600 ohm, 4,800 ohm to voice coil.	TF4RX13AJ	7,600 tap @ 4,800 4, 8, 16	21.8:1	+33	40	40	AJ
MGA 7	Transformer, output, single or P.P. plates to 600 ohm line.	TF4RX13AJ	15,000 C.T. 600 split	5:1	+33	10	10	AJ
MGA 8	Transformer, output, P.P. plates to 600 ohm line.	TF4RX13AJ	24,000 C.T. 600 split	6.32:1	+30	10	1	AJ
MGA 9	Transformer, output, P.P. plates to 600 ohm line.	TF4RX13AJ	60,000 C.T. 600 split	10:1	+27	10	1	AJ

STANDARD MILITARY POWER TRANSFORMERS

Primary 105/115/125V 60~

SINGLE PHASE 400 CPS, AND THREE PHASE 60 AND 400 CPS TRANSFORMERS CAN BE SUPPLIED ON SPECIAL ORDER.

Catalog No.	MIL-T-27 Type Designation	Hi Volt.	D.C. Volts	D.C. Amps.	Fil. No. 1	Fil. No. 2	Case
MGP 1	TF1RX03HA001	200/100/0/100/200	185	.070	5/6. 3V @ 2A	6. 3V @ 3A	HA
MGP 2	TF1RX03JB002	650 C.T.	260	.070	5/6. 3V @ 2A	6. 3V @ 4A	JB
MGP 3	TF1RX03KB006	650 C.T.	245	.150	6. 3V @ 5A	5V @ 3A	KB
MGP 4	TF1RX03LB003	800 C.T.	318	.175	5V @ 3A	6. 3V @ 8A	LB
MGP 5	TF1RX03MB004	900 C.T.	345	.250	5V @ 3A	6. 3V @ 8A	MB
MGP 6	TF1RX02KB001	700 C.T.	255	.250			KB
MGP 7	TF1RX02LB002	1100 C.T.	419	.250			LB
MGP 8	TF1RX02NB003	1600 C.T.	640	.250			NB

STANDARD MILITARY FILAMENT TRANSFORMERS

Primary 105/115/125V 60~

SINGLE PHASE 400 CPS, AND THREE PHASE 60 AND 400 CPS TRANSFORMERS CAN BE SUPPLIED ON SPECIAL ORDER

Catalog No.	MIL-T-27 Type Designation	Secondary Volts	Secondary Current Amps	Secondary Test Volts RMS	Case
MGF 1	TF1RX01EB002	2.5	3.0	2,500	EB
MGF 2	TF1RX01GB003	2.5	10.0	2,500	GB
MGF 3	TF1RX01FB004	5.0	3.0	2,500	FB
MGF 4	TF1RX01HB005	5.0	10.0	2,500	HB
MGF 5	TF1RX01FB006	6.3	2.0	2,500	FB
MGF 6	TF1RX01GB007	6.3	5.0	2,500	GB
MGF 7	TF1RX01JB008	6.3	10.0	2,500	JB
MGF 8	TF1RX01KB009	6.3	20.0	2,500	KB
MGF 9	TF1RX01JB012	2.5	10.0	10,000	JB
MGF 10	TF1RX01KB013	5.0	10.0	10,000	KB

*Standard Military Filament and Power Transformers are also available in Grade 4.

CASE DIMENSIONS



DM-8 CASE

Height: 1 1/2"
Width: 1 3/32"
Flange D.: 1 1/4"



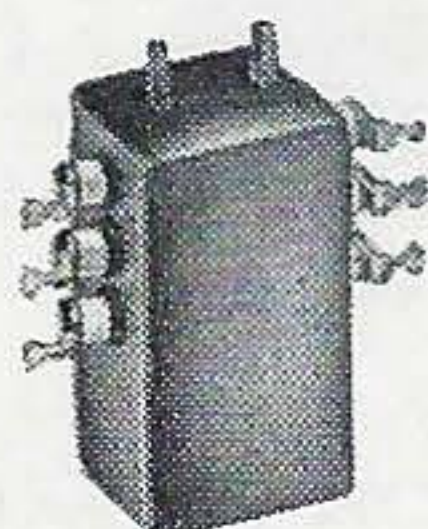
DM-01 CASE

Height: 2"
Width: 1 1/2"
Depth: 1 1/2"
Mtg. Cen.: 1 1/16" x 1 1/16"
Studs: 4 6-32
Knockout: 1 1/4" dia.



DM-20 CASE

Height: 1 9/16"
Diameter: 1 5/16"
Flange L.: 1 13/32"
Flange D.: 0.975"
Mtg. Cen.: 1 1/8" to 1 7/8"
2 Holes: .147 wide
Knockout: .875



DM-18 CASE

Height: 1"
Width: 2 1/4"
Depth: 1 1/8"
Mtg. Cen.: 9/16"
Studs: 2 6-32

MM-1

Length: 3/4"
Diameter: 1/2"

MM-2

Length: 23/32"
Width: 23/32"
Height: 1/2"

MM-3

Length: 1 1/4"
Width: 1 1/4"
Height: 1/2"
Mtg. Cen.: 1 1/2"
Mtg. Flange: 1 11/16"

MM-4

Length: 1 13/16"
Depth: 1 1/4"
Height: 1/2"
Mtg. Cen.: 2 1/8"
Mtg. Flange: 2 1/2"

MOLDED DIMENSIONS

MMO-1

Diameter: 11/16"
Thickness: 29/64"

MMO-2

Diameter: 13/16"
Thickness: 19/32"

HERMETICALLY SEALED PULSE TRANSFORMERS

Hermetically sealed Pulse Transformers for use in blocking oscillator, low level interstage coupling, and modulator output circuits. These components meet MIL-T-27 A specifications. The pulse transformers are designed for maximum power, efficiency, and optimum pulse performance. Balanced coil structures permit series or parallel connection of windings for turn ratios other than unity. Pulse characteristics, voltages and impedance levels will depend upon the interconnections made.

PULSE TRANSFORMERS

Catalog No.	MIL Type	Blocking Osc.	Inter-stage Coupling	Low Power Output	Pulse Voltage Kilovolts	Pulse Duration Micro-seconds	Duty Rate	No. of Windings	Test Voltage KV., RMS	Characteristic Impedance Ohms	Case No.
MPT-1	TF4RX35YY	✓	✓		0.25/0.25/0.25	0.2-1.0	.004	3	0.7	250	DM-20
MPT-2	TF4RX35YY	✓	✓		0.25/0.25	0.2-1.0	.004	2	0.7	250	DM-20
MPT-3	TF4RX35YY	✓	✓		0.5/0.5/0.5	0.2-1.5	.002	3	1.0	250	DM-18
MPT-4	TF4RX35YY	✓	✓		0.5/0.5	0.2-1.5	.002	2	1.0	250	DM-18
MPT-5	TF4RX35YY	✓	✓		0.5/0.5/0.5	0.5-2.0	.002	3	1.0	500	DM-20
MPT-6	TF4RX35YY	✓	✓		0.5/0.5	0.5-2.0	.002	2	1.0	500	DM-20
MPT-7	TF4RX35YY	✓	✓	✓	0.7/0.7/0.7	0.5-1.5	.002	3	1.5	200	DM-18
MPT-8	TF4RX35YY	✓	✓	✓	0.7/0.7	0.5-1.5	.002	2	1.5	200	DM-18
MPT-9	TF4RX35YY	✓	✓	✓	1.0/1.0/1.0	0.7-3.5	.002	3	2.0	200	DM-18
MPT-10	TF4RX35YY	✓	✓	✓	1.0/1.0	0.7-3.5	.002	2	2.0	200	DM-18
MPT-11	TF4RX35YY	✓	✓	✓	1.0/1.0/1.0	1.0-5.0	.002	3	2.0	500	DM-01
MPT-12	TF4RX35YY	✓	✓	✓	0.15/0.15/0.3/0.3	0.2-1.0	.004	4	0.7	700	DM-8

ULTRA MINIATURE PULSE TRANSFORMERS

- Meet all requirements of MIL-T-27 A.
- Negligible weight.
- Exceedingly small size.
- Encapsulated or hermetically sealed.



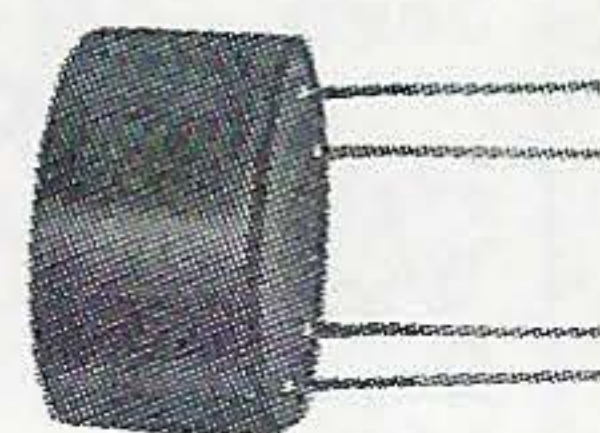
MM-1



MM-2



MM-3
MM-4



MMO-1
MMO-2

Catalog No.	MIL Type	Application	Pulse Vclts	Pulse Width usec	Rise time usec	Inductance		PPS, Mcs	Turns Ratio	Zo ohms	Case Des.
						Prin. uhy	Leakage uhy				
EPT-1	TF4RX31YY	Impedance matching & Interstage coupling	20	.07	.03	125	12	2	1:1	200	MM-1
EPT-2	TF4RX31YY		20	.07	.03	150	15	2	2:1	200	MM-1
EPT-3	TF4RX31YY		20	.07	.03	160	15	2	3:1	100	MM-1
EPT-4	TF4RX31YY		20	.07	.03	200	20	2	4:1	100	MM-1
EPT-5	TF4RX31YY		17	.10	.04	200	6	2	4:1	100	MM-1
EPT-6	TF4RX31YY		15	.10	.04	200	5	2	5:1	100	MM-1
EPT-7	TF4RX31YY	Blocking oscillator	25	.50	.05	1,200	20	1	7:1:1		MM-1
EPT-8	TF4RX31YY		10	10	.04	12,000	70	.01	5:1		MM-2
EPT-9	TF4RX31YY		10	5	.04	7,500	22	.01	3:1	100	MM-2
EPT-11	TF4RX35YY	Memory core & Current driver	100	.25	.02	200	2	.012	1:1		MM-1
EPT-12	TF4RX35YY		50	.33	.07	240	2	.002	1:1		MM-1
EPT-13	TF4RX35YY		40	.5	.07	6,000	15		2:1		MM-2
EPT-14	TF4RX35YY	Current transformer	15	6	.1	16,000	15	.0004	1:1.4		MM-2
EPT-15	TF4RX36YY		5	1.5	.25	4,000	300		5:5:1PP	10	MM-4
EPT-16	TF4RX36YY		2.5	2.4	.2	2,800	200		3.3:3.3:1PP	6	MM-4
EPT-17	TF4RX32YY	Pulse inversion	21	1-4	.22	18,000	800	.250	6:1	200	MM-3
EPT-18	TF4RX32YY		10	6	.2	90,000	200	.05	11:1	75	MM-3
EPT-19	TF4RX36YY		22	1-7	.25	55,000	300	.05	6:1:1	400	MM-3

When ordering encapsulated units add "M" to the catalog number.

HERMETICALLY SEALED FILTER REACTORS

MEET MIL-T-27A SPECIFICATIONS



Case	Height	Depth	Width	Mtg. Centers	Studs
AJ	2 ³ / ₈	1 ⁵ / ₈	1 ⁵ / ₈	1 ³ / ₁₆ x 1 ³ / ₁₆	4 6-32
EB	2 ⁷ / ₁₆	1 ¹³ / ₁₆	1 ¹⁵ / ₁₆	1 ³ / ₈ x 1 ¹ / ₄	4 6-32
FA	3 ¹ / ₈	2 ¹ / ₁₆	2 ⁵ / ₁₆	1 ¹¹ / ₁₆ x 1 ⁷ / ₁₆	4 6-32
GA	3 ¹⁵ / ₁₆	2 ³ / ₈	2 ³ / ₄	2 ¹ / ₈ x 1 ³ / ₄	4 6-32
HB	3 ³ / ₁₆	3 ¹ / ₁₆	2 ⁵ / ₈	2 ¹⁹ / ₆₄ x 1 ⁵⁵ / ₆₄	4 8-32
JA	3 ³ / ₁₆	3 ¹ / ₁₆	4 ⁷ / ₈	2 ⁵ / ₈ x 2 ¹ / ₈	4 8-32
JB	3 ⁷ / ₈	3 ¹ / ₁₆	3 ⁹ / ₁₆	2 ⁵ / ₈ x 2 ¹ / ₈	4 8-32
KB	4 ⁵ / ₁₆	3 ³ / ₈	3 ¹⁵ / ₁₆	3 x 2 ⁷ / ₁₆	4 10-32
LA	5 ⁵ / ₁₆	3 ¹¹ / ₁₆	4 ⁵ / ₁₆	3 ⁵ / ₁₆ x 2 ¹¹ / ₁₆	4 10-32
LB	4 ¹ / ₂	3 ¹¹ / ₁₆	4 ⁵ / ₁₆	3 ⁵ / ₁₆ x 2 ¹¹ / ₁₆	4 10-32
MB	4 ¹⁵ / ₁₆	4	4 ¹¹ / ₁₆	3 ¹¹ / ₁₆ x 3	4 ¹ / ₄ -20

Catalog No.	MIL Type	Inductance Henry	Rat. Current DC Ma.	DC Res. Ohms	Test Volt Kilovolts	Case No.
MGC 1	TF1RX04AJ	100	10	3,500	1.	AJ
MGC 2	TF1RX04AJ	4	50	230	1.	AJ
MGC 3	TF1RX04EB	10	50	325	1.	EB
MGC 4	TF1RX04FA	20	50	475	1.5	FA
MGC 5	TF1RX04FA	30	50	650	1.5	FA
MGC 6	TF1RX04AJ	3	75	175	1.	AJ
MGC 7	TF1RX04EB	6	75	235	1.5	EB
MGC 8	TF1RX04FA	12	75	265	1.5	FA
MGC 9	TF1RX04EB	3.5	100	145	1.	EB
MGC 10	TF1RX04FA	8	100	180	1.5	FA
MGC 11	TF1RX04GA	12	100	190	2.	GA
MGC 12	TF1RX04EB	2	150	92	1.5	EB
MGC 13	TF1RX04FA	4	150	115	1.5	FA
MGC 14	TF1RX04GA	8	150	125	2.	GA
MGC 15	TF1RX04JB	11	150	120	2.5	JB
MGC 16	TF1RX04FA	2.5	200	70	1.5	FA
MGC 17	TF1RX04GA	4	200	80	2.	GA
MGC 18	TF1RX04HB	7	200	135	2.	HB
MGC 19	TF1RX04JA	10	200	125	2.5	JA
MGC 20	TF1RX04GA	2.5	300	50	2.	GA
MGC 21*	TF1RX04HB	4	300	62	2.5	HB
MGC 22	TF1RX04JB	6	300	85	2.5	JB
MGC 23*	TF1RX04KB	8	300	65	2.5	KB
MGC 24	TF1RX04LA	10	300	100	2.5	LA
MGC 25*	TF1RX04HB	2	400	37	2.5	HB
MGC 26	TF1RX04KB	6	400	60	2.5	KB
MGC 27*	TF1RX04JA	2	500	35	2.5	JA
MGC 28	TF1RX04KB	4	500	45	2.5	KB
MGC 29*	TF1RX04MB	7	500	50	2.5	MB
MGC 30*	TF1RX04LB	2	700	20	2.5	LB
MGC 31*	TF1RX04MB	1.75	1,000	12.5	2.5	MB

*Not stocked, available on short delivery.
Above units available in Grade 4.

SERIES 1950 NULL "T" FILTERS

The Freed Series 1950 Null T networks consist of two resistance capacitance networks, whose outputs completely cancel each other at the balance frequency. They may be used as rejection networks particularly at low frequencies where LC filters become excessively large and unstable.

Standard models are available for 30, 60 and 120 cycles in a wide range of impedances. Each network will give a minimum of 50 db attenuation at the null frequency.

The null frequency is adjusted to a tolerance of ±2%.

All Null T Filters are hermetically sealed.

Prices on request.



TOROIDAL INDUCTORS

Using the latest developments in the field of magnetic materials and new impregnation and molding techniques the Freed Transformer Co. makes available to the industry the most extensive line of toroidal inductors.

Freed toroids are available in three types of constructions. Open units coated with a special high temperature extremely low loss compound, hermetically sealed in metal cases or molded in special **Freed Epoxy Resin**. Both hermetically sealed and molded units meet the latest military specification MIL-T-27A (graded 1 or 4 and 2 or 5 respectively). Freed toroidal inductors are supplied with either molypermalloy or carbonyl iron powder cores.

1. Temperature Stabilization:

The molypermalloy and carbonyl iron powder cores have a temperature coefficient of inductance. Depending upon the degree of temperature stabilization the cores have different temperature coefficients. The degree of stabilization is denoted by a two-letter code.

- SN Non-stabilized cores, maximum inductance variations $\pm 2\%$ from -55°C to $+85^{\circ}\text{C}$
- SE Temperature-stabilized cores, maximum inductance variations $\pm .1\%$ from -1.5°C to $+54^{\circ}\text{C}$
- SB Temperature-stabilized cores, maximum inductance variations $\pm .1\%$ from $+13^{\circ}\text{C}$ to $+35^{\circ}\text{C}$
- SD Temperature-stabilized cores, maximum inductance variations $\pm .1\%$ from -1.5°C to $+54^{\circ}\text{C}$
- SW Temperature-stabilized cores, maximum inductance variations $\pm 25\%$ from -54°C to $+85^{\circ}\text{C}$
- SP Temperature stable carbonyl iron cores, maximum inductance variations $\pm .3\%$ from -55°C to $+85^{\circ}\text{C}$

The temperature (stabilization) coefficient of an inductor will depend upon the nominal inductance value, operating frequency and A.C. voltage across the coil. Therefore some coils may have a lower temperature coefficient than the one corresponding to the core stability characteristic. Under some unfavorable working conditions the temperature coefficient of inductance corresponding to a given stability characteristic may be exceeded.

2. Self Resonant Frequency F_0 :

This frequency is defined as the resonant frequency of L — Inductance and C_d — distributed capacity of the winding.

3. Adjustment Accuracy $\pm 1\%$ or 1 Turn Whichever Is Greater:

All toroidal inductors are adjusted at a frequency well below the self resonant frequency " F_0 ." Since all toroids have a voltage coefficient of inductance they are adjusted with a low A.C. voltage in the region of the initial permeability of the core material.

The apparent inductance at any frequency F is given by the expression

$$L_{app} = \frac{L}{1 - \left(\frac{f}{f_0}\right)^2}$$

Where L is the nominal inductance. For frequencies " F " well below the self resonant frequency " F_0 " the fractional increase of inductance due to the self resonant frequency is

$$\frac{\Delta L}{L} = \left(\frac{f}{f_0}\right)^2 = \omega^2 LC_d$$

4. "Q":

The "Q" or quality factor of the coil is shown for every toroid type. Since the "Q" depends both upon the frequency and the A.C. voltage across the coil, the "Q" vs. frequency graphs show the "Q" variations for a given voltage applied across the coil. This voltage is defined by the expression,

$$V = K_q \sqrt{L_H} \times \frac{F_{KC}}{1_{KC}}$$

Where K_q is a voltage constant, L_h — inductance in henries F KC — frequency in kilocycles (or megacycles where indicated) at which the measurements were made. When the "Q" of the coil is measured by a standard "Q" meter method at a frequency close to the self resonant frequency of the coil,

$$Q_{\text{effective}} = Q_{\text{apparent}} \left(1 + \frac{C_d}{C_o} \right)$$

$$= Q_{\text{apparent}} \left[1 + \left(\frac{F}{F_o} \right)^2 \right]$$

Where "Q" apparent is the "Q" measured on the "Q" meter, C_d — distributed capacity of the coil, C_o — tuning capacity of the "Q" meter. F and F_o are respectively the measurement frequency and self resonant frequency.

5. Variations of Inductance vs Normalized A.C. Voltage:

All toroidal inductors have an A.C. voltage coefficient. The variations of inductance vs applied A.C. voltage can be computed from the Charts Nos. 1 and 2 on page 17. The normalized voltage is given by the expression

$$V_{\text{norm.}} = \frac{V}{\sqrt{L_H}} \times \frac{60 \text{ cps.}}{F \text{ cps.}} \times K_v$$

V — A.C. voltage across the coil.

L_H — Inductance in henries.

F — Measurement frequency in cycles.

K_v — is the voltage coefficient (a variable parameter for different coils) listed in the graph. For high frequency toroids the expression for normalized voltage is changed to,

$$V_{\text{norm.}} = \frac{V}{\sqrt{L_H}} \times \frac{1Kc}{F_{KC}} \times K_v$$

6. Variations of Inductance vs Normalized D.C. Current:

The incremental permeability of the coil and consequently the inductance depends upon the magnetizing D.C. ampere turns. The variations of inductance vs D.C. current can be computed from the Charts Nos. 3 and 4 on page 17. The normalized Direct Current is given by the expression

$$I_{\text{norm.}} = I_{dc} \sqrt{L_H} \times K_i$$

Where I_{dc} — current in M.A. thru the coil.

L_H — inductance in henries.

K_i — current coefficient (a variable parameter for different coils) listed in the graph.

7. Maximum Current:

This is the maximum non-destructive current that a coil can tolerate without overheating and consequent failure. It is defined as

$$I_{\text{max}} = \sqrt{I_{\text{RMS}}^2 + I_{\text{dc}}^2}$$

The maximum current is listed for each type of toroidal inductors and is computed by dividing the parameter of the numerator by the square root of the inductance in millihenries. This current will affect the inductance value and may partially or completely saturate the inductor. The inductances variations due to I_{dc} and V_{ac} must be computed from the expressions of paragraphs 5 and 6.

Toroids with special requirements such as tapped toroids, toroidal transformers, molded and cased units with dimensions other than standard sizes and high temperature toroids can be supplied upon request. Our engineering and laboratory facilities are available for consultation, research and development.

TOROIDAL INDUCTORS

FREQUENCY RANGE: UP to 15 Kc

TYPE	TI-16		TI-5		TI-4		TI-1		TI-1A		TI-12		TI-11	
Temp. Stab.	SN		SN, SE, SD		SN, SD, SW		SN, SD, SW		SN, SD, SW		SN, SD, SW		SN, SD, SW	
$\Omega/1H$ ($\pm 20\%$)	650		260		110		70		68		45		29	
I Max. (Amp.)	0.32/ $\sqrt{LMH}$		0.85/ $\sqrt{LMH}$		2/ $\sqrt{LMH}$		4.5/ $\sqrt{LMH}$		4/ $\sqrt{LMH}$		8/ $\sqrt{LMH}$		13 $\sqrt{LMH}$	
Nominal Inductance	Catalog No.	Fo Kc	Catalog No.	Fo Kc	Catalog No.	Fo Kc	Catalog No.	Fo Kc	Catalog No.	Fo Kc	Catalog No.	Fo Kc	Catalog No.	Fo Kc
1 MH	F2050	650							F1500	320	F1655	560	F1747	1100
2 MH									F1501	230	F1656	380	F1748	740
3 MH	F2051	410							F1502	190	F1657	300	F1749	560
4 MH									F1503	160	F1658	250	F1750	470
5 MH	F2052	330	F1700	420	F850	170	F800	270	F1504	150	F1659	220	F1751	410
7.5MH									F1505	120	F1660	180		
10 MH	F2053	240	F1701	270	F851	130	F801	192	F1506	100	F1661	150	F1752	260
15 MH	F2054	200	F1702	215	F852	110	F802	155	F1507	85	F1662	120	F1753	200
30 MH	F2055	150	F1703	140	F853	83	F803	109	F1508	60	F1663	80	F1754	130
50 MH	F2056	122	F1704	105	F854	67	F804	82	F1509	47	F1664	60	F1755	95
75 MH	F2057	105	F1705	81	F855	57	F805	66	F1510	40	F1665	47	F1756	75
100 MH	F2058	90	F1706	68	F856	51	F806	56	F1511	33	F1666	40	F1757	62
150 MH	F2059	80	F1707	54	F857	43	F807	45	F1512	29	F1667	31	F1758	48
200 MH	F2060	70	F1708	40	F858	38	F808	39	F1513	23	F1668	27	F1759	40
300 MH	F2061	60	F1709	35	F859	32			F1514	20	F1669	21	F1760	31
400 MH	F2062	52	F1710	29	F860	28			F1515	18	F1670	18	F1761	26
500 MH	F2063	48	F1711	26	F861	26.5	F809	24	F1516	16	F1671	16	F1762	22
600 MH			F1712	22	F862	24			F1517	14	F1672	14		
700 MH			F1713	21	F863	23								
750 MH	F2064	40					F810	19	F1518	12	F1673	12.5	F1763	17.5
800 MH			F1714	19	F864	22								
900 MH			F1715	17.5	F865	21								
1 Hy	F2065	36	F1716	16.5	F866	20	F811	16.5	F1519	10	F1674	10.6	F1764	14.5
1.25 Hy	F2066	33	F1717	15	F867	18.5	F812	15						
1.5 Hy	F2067	30	F1718	13.5	F868	17	F813	13	F1520	9	F1675	8.5	F1765	11.5
1.75 Hy	F2068	28	F1719	12.2	F869	16	F814	12.2						
2 Hy	F2069	27	F1720	11	F870	15.5	F815	11	F1521	8	F1676	8.2	F1766	9.6
2.25 Hy					F871	14.5	F816	10.5						
2.5 Hy					F872	14	F817	10.3	F1522	7	F1677	6.3	F1767	8.2
2.75 Hy					F873	13.5	F818	9.8						
3 Hy					F874	12.5	F819	9.2	F1523	6.2	F1678	5.7	F1768	7.4
3.5 Hy					F875	12	F820	8.5	F1524	5.8	F1679	5.2	F1769	6.6
4 Hy					F876	11.5	F821	8	F1525	5.5	F1680	4.8	F1770	6.1
4.5 Hy					F877	11	F822	7.5	F1526	5.1	F1681	4.5	F1771	5.7
5 Hy							F823	7	F1527	4.9	F1682	4.2	F1772	5.3
6 Hy							F824	6.4	F1528	4.5	F1683	3.8		
7 Hy							F825	5.9	F1529	4.1	F1684	3.5		
7.5 Hy													F1773	4.1
8 Hy							F826	5.5	F1530	3.9	F1685	3.25		
9 Hy							F827	5	F1531	3.7	F1686	3		
10 Hy														
12 Hy							F828	4.8	F1532	3.4	F1687	2.9	F1774	3.4
15 Hy									F1533	3.1	F1688	2.6		
17 Hy							F829	3.9	F1534	2.8	F1689	2.3	F1775	2.6
20 Hy									F1535	2.6	F1690	2.1		
25 Hy							F830	3.4	F1536	2.4	F1691	1.95	F1776	2.2
30 Hy									F1537	2.2	F1692	1.75	F1777	1.9
40 Hy									F1538	2	F1693	1.5	F1778	1.7
50 Hy													F1779	1.4
													F1780	1.25

FOR CASE DIMENSIONS SEE PAGE 20.

FREED TRANSFORMER COMPANY, INC.

FREQUENCY RANGE: 10 Kc to 50 Kc || 10 Kc to 100 Kc

TYPE	TI-17		TI-7		TI-6		TI-2		TI-13		TI-15		TI-14	
Temp. Stab.	SN		SN		SN, SD, SW		SD		SN		SN		SN	
$\Omega/1$ MH ($\pm 20\%$)	1.2		.48		.23		.16		.055		1.0		0.3	
I Max. (Amp.)	0.25/ $\sqrt{\text{LMH}}$		0.7/ $\sqrt{\text{LMH}}$		2/ $\sqrt{\text{LMH}}$		2.5/ $\sqrt{\text{LMH}}$		5.8/ $\sqrt{\text{LMH}}$		0.5/ $\sqrt{\text{LMH}}$		1.3 $\sqrt{\text{LMH}}$	
Nominal Inductance	Catalog No.	Fo Kc	Catalog No.	Fo Kc	Catalog No.	Fo Kc	Catalog No.	Fo Kc	Catalog No.	Fo Kc	Catalog No.	Fo Kc	Catalog No.	Fo Kc
(MH)														
.100	F2100	4300									F1870	1800		
.200	F2101	2800									F1871	1300		
.300	F2102	2200									F1872	1100		
.400	F2103	1800									F1873	940		
.500	F2104	1600	F1781	1300							F1874	850		
1	F2105	1000	F1782	880	F1726	820	F1800	550	F1629	400	F1875	620	F1920	560
2	F2106	670	F1783	600	F1727	550	F1801	400	F1630	280	F1876	450	F1921	390
3	F2107	520	F1784	470	F1728	450	F1802	320	F1631	230	F1877	370	F1922	310
4	F2108	440			F1729	380	F1803	280	F1632	200	F1878	320	F1923	270
5	F2109	380	F1785	350	F1730	330	F1804	250	F1633	180	F1879	290	F1924	240
7.5	F2110	290	F1786	280	F1731	260			F1634	145	F1880	240	F1925	200
10	F2111	250	F1787	240	F1732	220	F1805	170	F1635	130	F1881	210	F1926	170
15	F2112	190	F1788	190	F1733	180	F1806	140	F1636	105	F1882	175	F1927	140
20	F2113	160	F1789	165	F1734	150					F1883	150	F1928	120
25			F1790	145							F1884	140		
30	F2114	120	F1791	135	F1735	115	F1807	100	F1637	73	F1885	125	F1929	96
40			F1792	110							F1886	110		
50	F2115	90	F1793	100	F1736	86	F1808	76	F1638	57	F1887	100	F1930	74
75	F2116	70	F1794	80	F1737	68	F1809	62	F1639	47	F1888	.082	F1931	60
100	F2117	58	F1795	68	F1738	58	F1810	53	F1640	40	F1889	.072	F1932	52
150			F1796	55	F1739	46	F1811	43	F1641	33			F1933	42
200			F1797	47	F1740	40	F1812	37	F1642	28			F1934	36
250					F1741	35							F1935	32
300					F1742	31	F1813	30	F1643	23			F1936	30
400							F1814	26	F1644	20				
500					F1743	23.5	F1815	23	F1645	18				

FREQUENCY RANGE: 30 Kc to 75 Kc || 50 Kc to 200 Kc

TYPE	TI-18		TI-8		TI-10		TI-9		TI-19		TI-3		TI-3A	
Temp. Stab.	SN		SN, SD		SB		SB		SN		SD		SB	
$\Omega/1$ MH ($\pm 20\%$)	2.6		1.5		0.43		0.15		4.5		0.6		0.31	
I Max. (Amp.)	0.15/ $\sqrt{\text{LMH}}$		0.4/ $\sqrt{\text{LMH}}$		2/ $\sqrt{\text{LMH}}$		5/ $\sqrt{\text{LMH}}$		0.12/ $\sqrt{\text{LMH}}$		1.3/ $\sqrt{\text{LMH}}$		2.5/ $\sqrt{\text{LMH}}$	
Nominal Inductance	Catalog No.	Fo Kc	Catalog No.	Fo Kc	Catalog No.	Fo Kc	Catalog No.	Fo Kc	Catalog No.	Fo Kc	Catalog No.	Fo Kc	Catalog No.	Fo Kc
(MH)														
.1	F2140	2500	F1821	5600					F2180	4000	F1846	2150		
.2	F2141	1700	F1822	3600					F2181	2500	F1847	1500		
.3	F2142	1400	F1823	2800					F2182	1900	F1848	1250		
.4	F2143	1200	F1824	2300					F2183	1550	F1849	1070		
.5	F2144	1050	F1825	2000					F2184	1350	F1850	960		
.6									F2185	1200				
.7									F2186	1070				
.8									F2187	1000				
.9									F2188	900				
1	F2145	700	F1826	1250	F1579	500	F1554	500	F2189	850	F1851	680		
2	F2146	500	F1827	800	F1580	350	F1555	350	F2190	540	F1852	480		
3	F2147	400	F1828	600	F1581	300	F1556	290	F2191	400	F1853	390		
4	F2148	340	F1829	500	F1582	260	F1557	250	F2192	340	F1854	330		
5	F2149	300	F1830	440	F1583	240	F1558	220	F2193	290	F1855	300		
7.5	F2150	240	F1831	330	F1584	200	F1559	175			F1845	250		
10	F2151	200	F1832	280	F1585	170	F1560	150			F1844	210	F1856	190
15	F2152	160	F1833	210	F1586	140	F1561	120					F1857	150
20	F2153	140	F1834	175									F1858	125
25			F1835	150										
30	F2154	110	F1836	135	F1587	105	F1562	82					F1859	96
40			F1837	110									F1860	80
50	F2155	85	F1838	95	F1588	82	F1563	62					F1861	70
75	F2156	65	F1839	75	F1589	68	F1564	50					F1862	54
100	F2157	58	F1840	60	F1590	60	F1565	42					F1863	45
150					F1591	50	F1566	34						
200					F1592	43	F1567	29						
250														
300							F1568	23.5						
400							F1569	20						
500							F1570	18						

FOR CASE DIMENSIONS SEE PAGE 20.

TOROIDAL INDUCTORS

FREQUENCY RANGE:

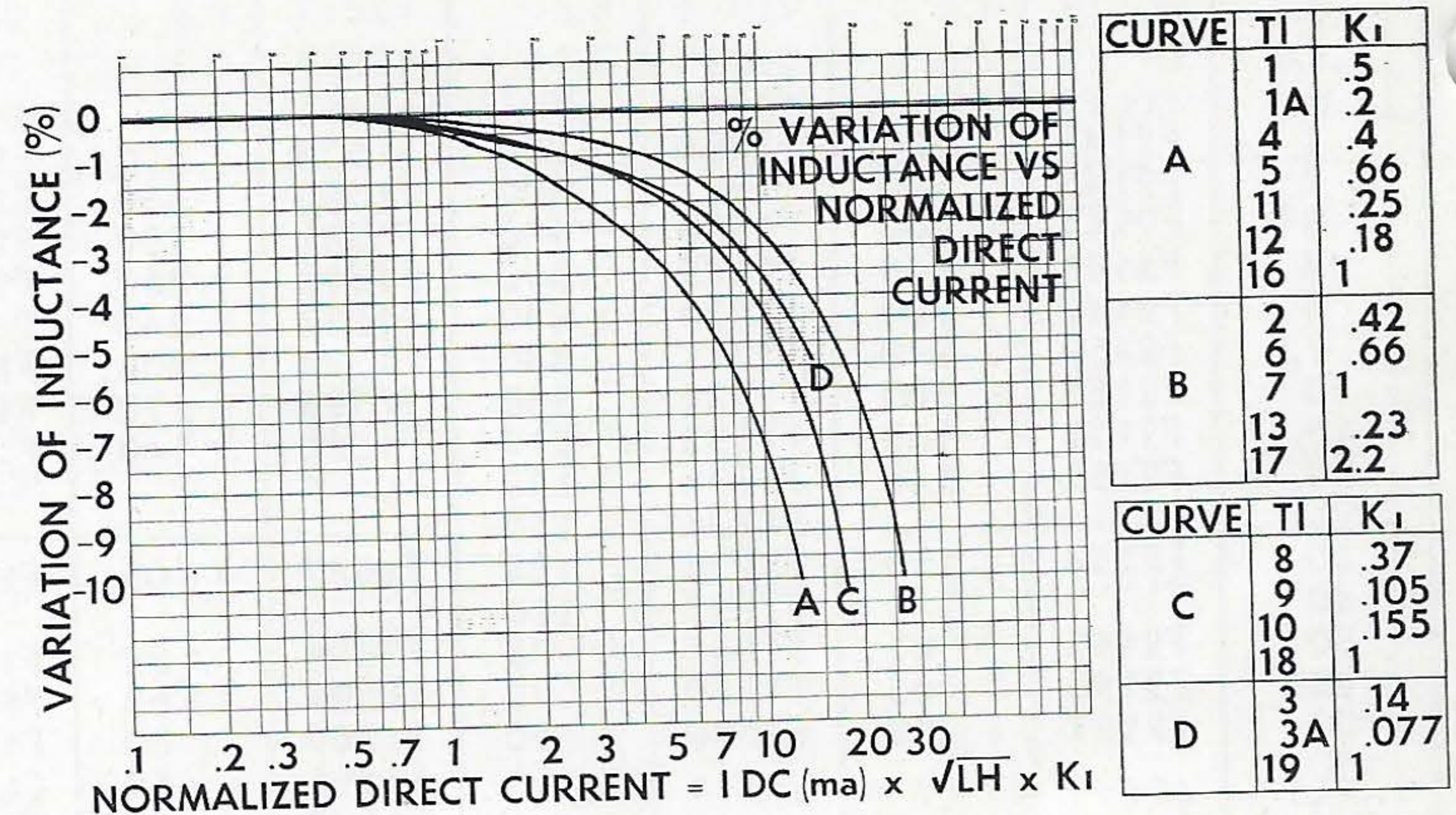
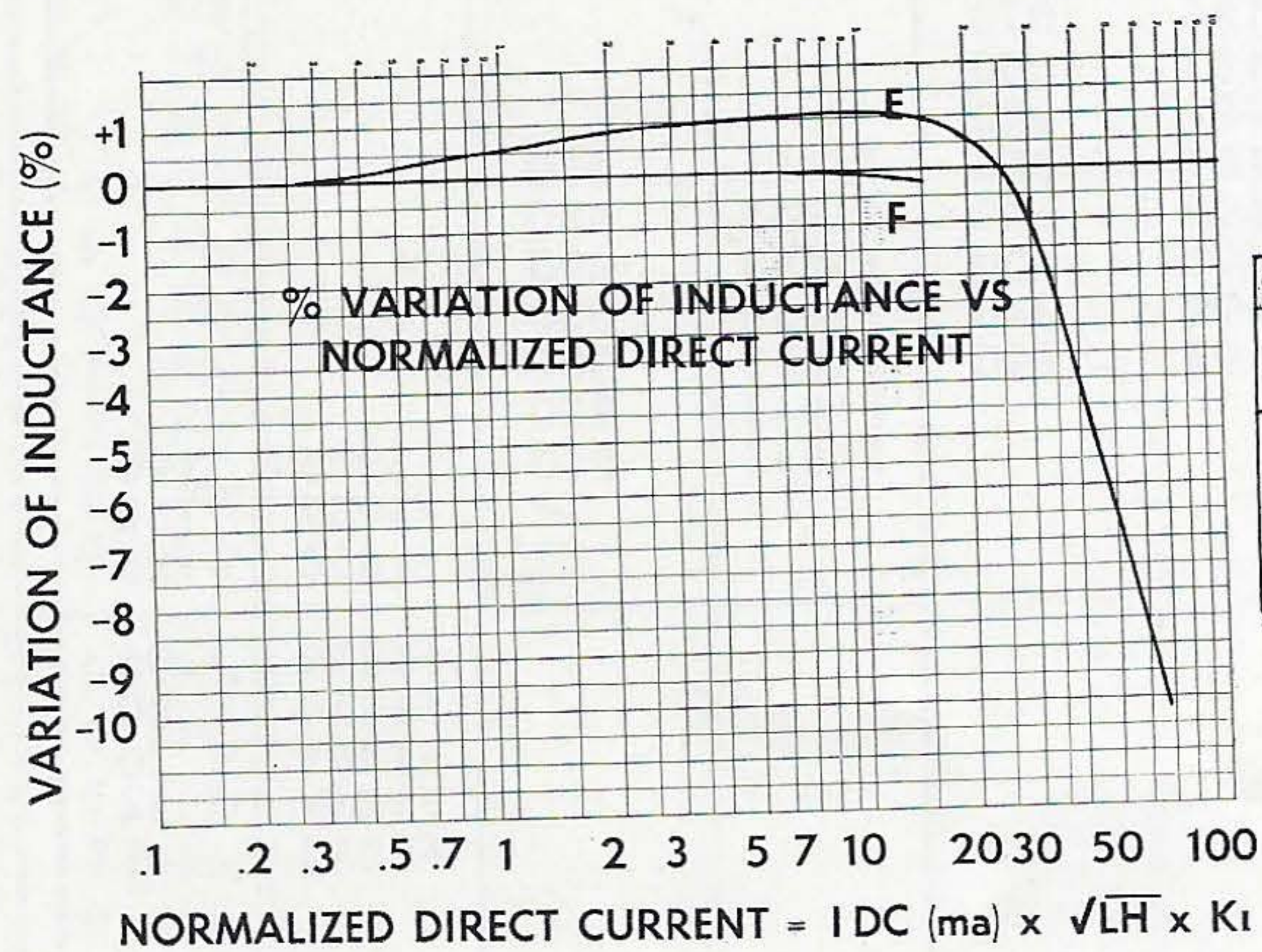
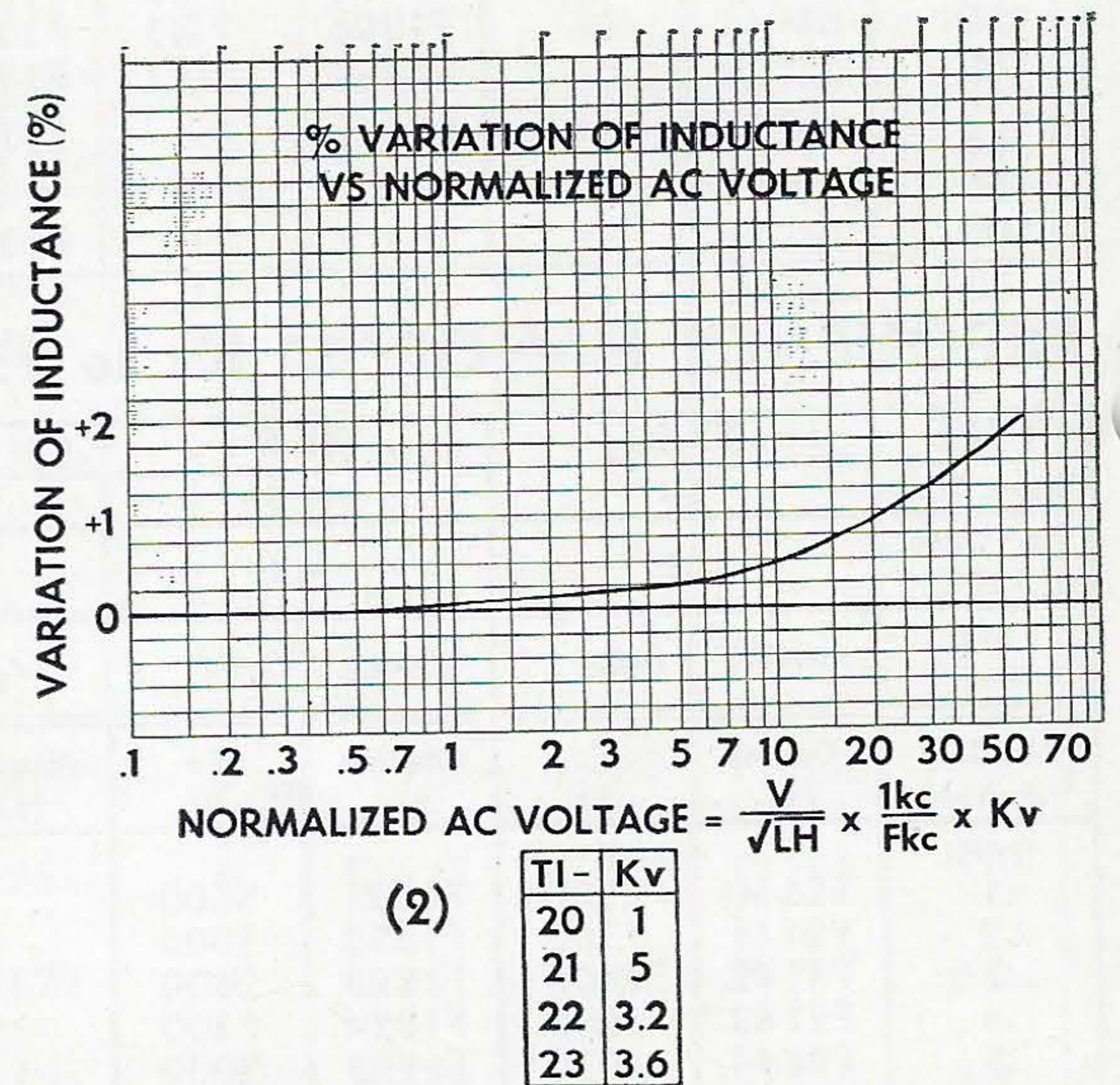
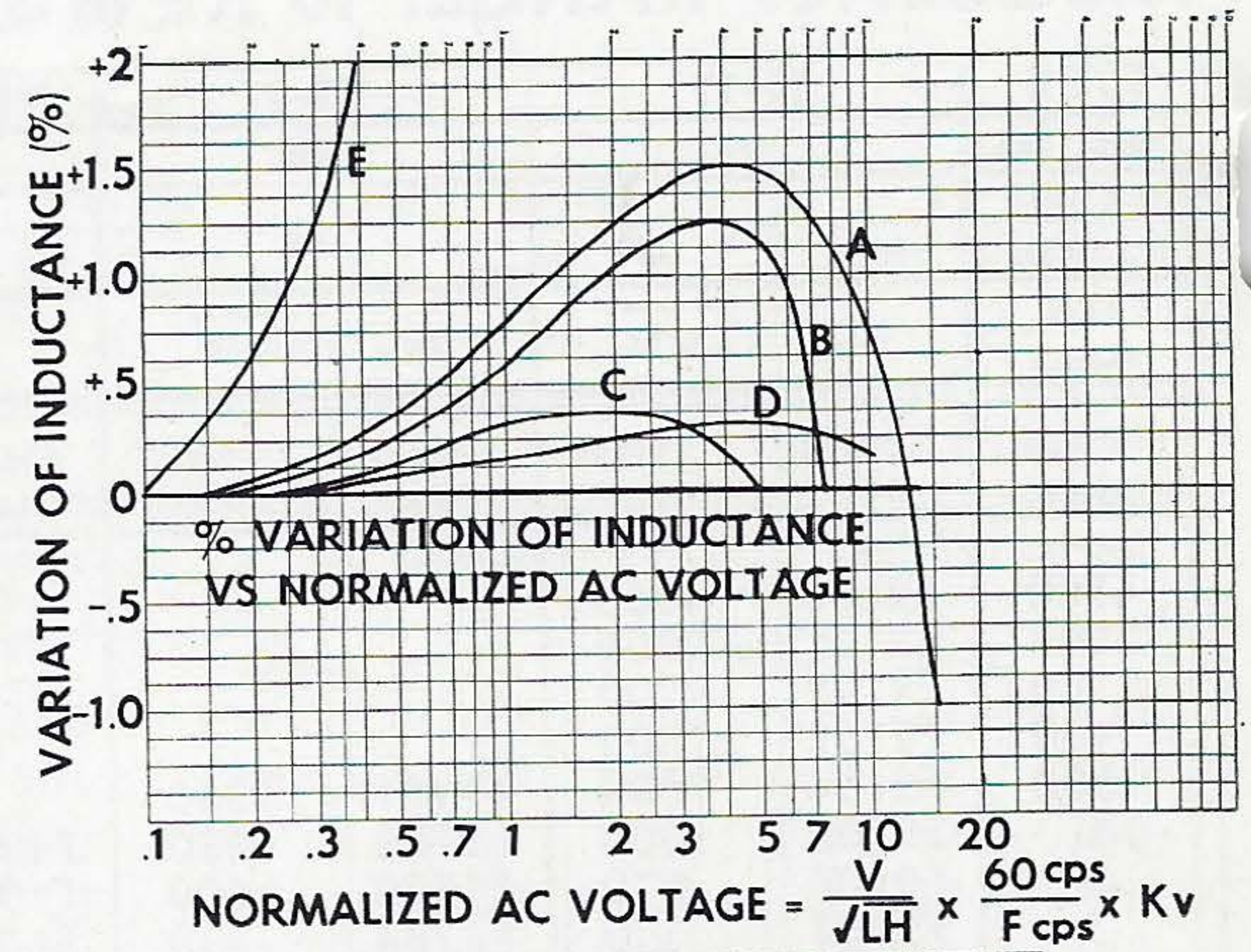
20 Kc to
2 Mc

50 Kc to
5 Mc

50 Kc to
5 Mc

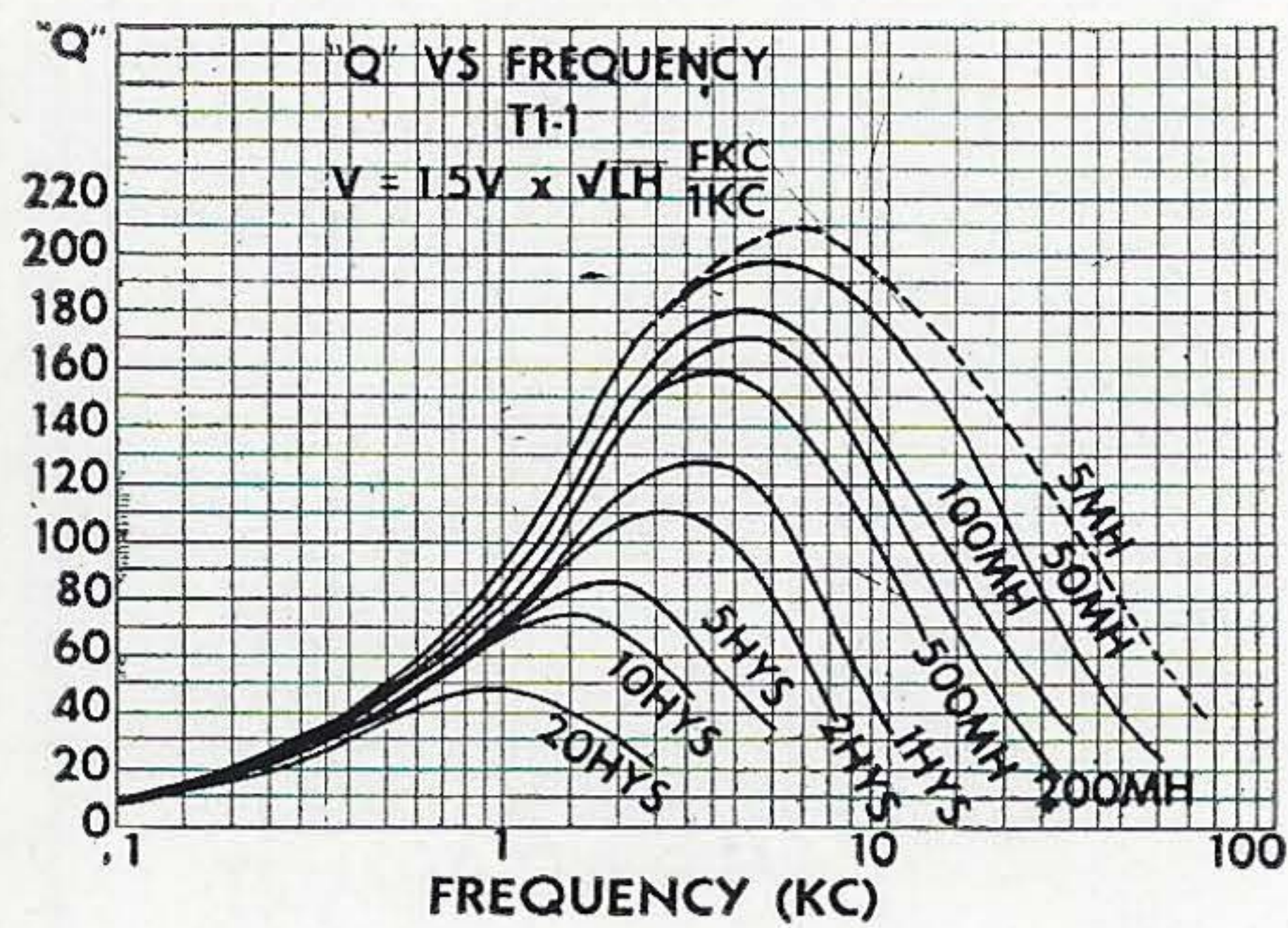
100 Kc
to 10 Mc

TYPE	TI-20		TI-22		TI-23		TI-21	
Temp. Stab.	SP		SP		SP		SP	
$\Omega/1$ MH ($\pm 20\%$)	2.75		5.6		7		12	
I Max. (Amp.)	$0.2/\sqrt{LMH}$		$0.11/\sqrt{LMH}$		$0.11/\sqrt{LMH}$		$0.05/\sqrt{LMH}$	
Nominal Inductance	Catalog No.	Fo Mc	Catalog No.	Fo Mc	Catalog No.	Fo Mc	Catalog No.	Fo Mc
(MH)								
.010			F2270	13.5	F2301	11.5	F2240	17.0
.015			F2271	10.5	F2302	9.2	F2241	13.5
.020			F2272	9.0	F2303	8.0	F2242	11.5
.030			F2273	7.0	F2304	6.3	F2243	8.8
.040			F2274	6.0	F2305	5.4	F2244	7.4
.050	F2201	4.3	F2275	5.3	F2306	4.8	F2245	6.5
.075			F2276	4.1	F2307	3.8	F2246	5.0
.100	F2202	3.0	F2277	3.5	F2308	3.2	F2247	4.2
.125							F2248	3.6
.150			F2278	2.8	F2309	2.7	F2249	3.2
.200	F2203	2.1	F2279	2.4	F2310	2.3		
.300	F2204	1.7	F2280	1.9	F2311	1.8		
.400			F2281	1.6	F2312	1.5		
.500	F2205	1.3	F2282	1.4	F2313	1.4		
.600			F2283	1.25				
.700			F2284	1.1				
.750	F2206	1.1						
1	F2207	.9						
1.5	F2208	.75						
2	F2209	.65						
2.5	F2210	.55						
3	F2211	.52						
3.5	F2212	.48						
4	F2213	.45						
4.5	F2214	.42						
5	F2215	.4						

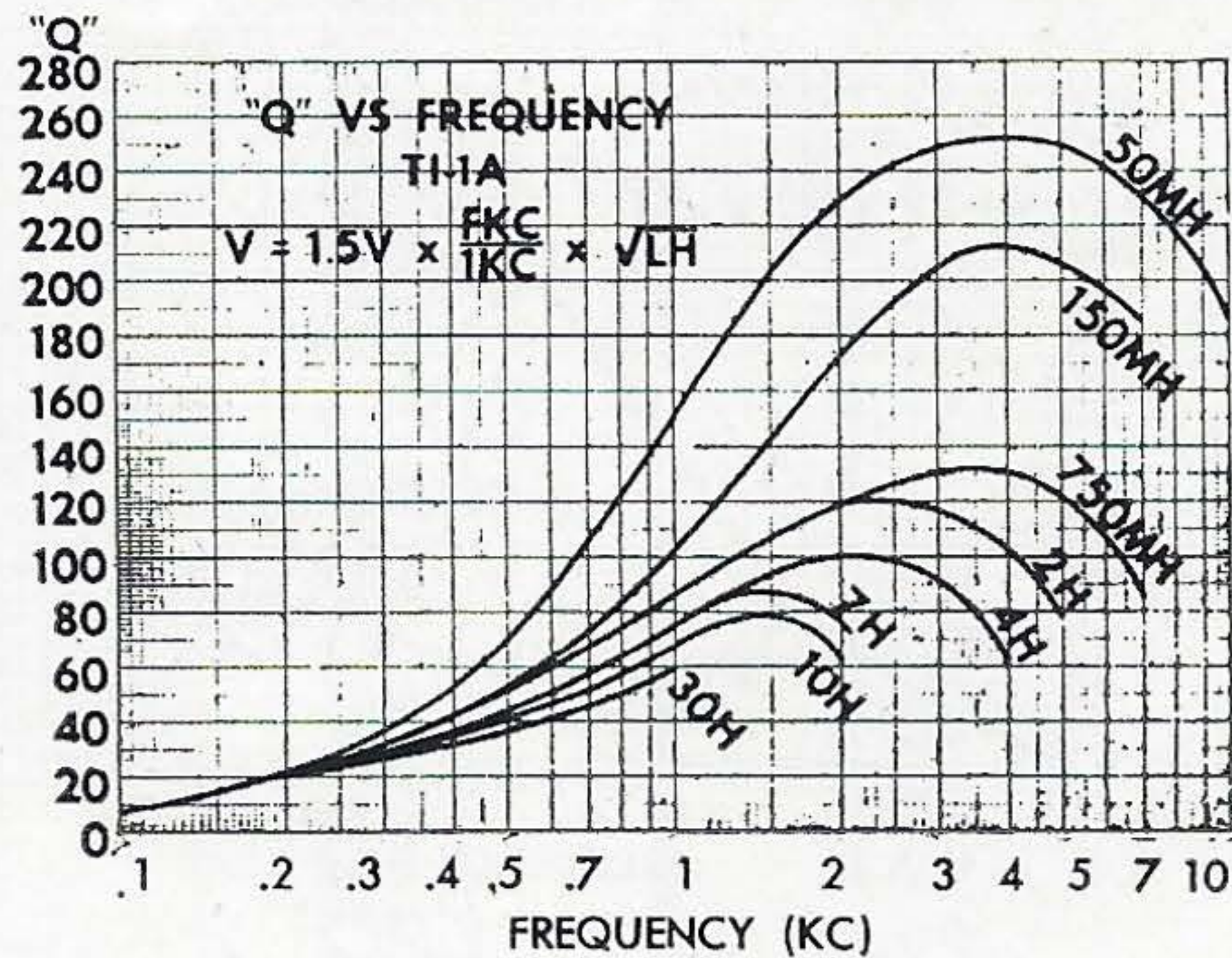


FREED TOROIDAL INDUCTORS

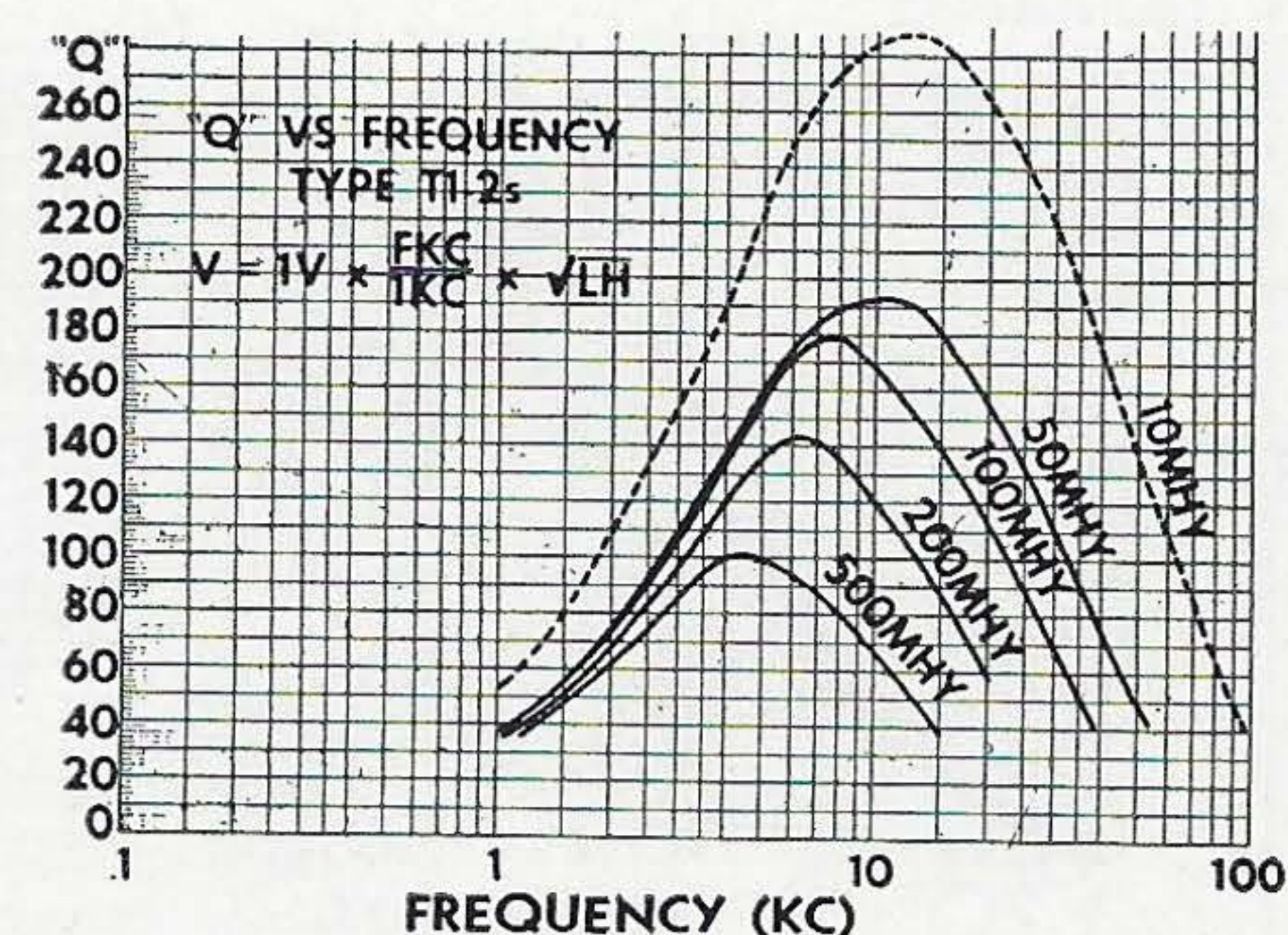
Q VS FREQUENCY GRAPHS



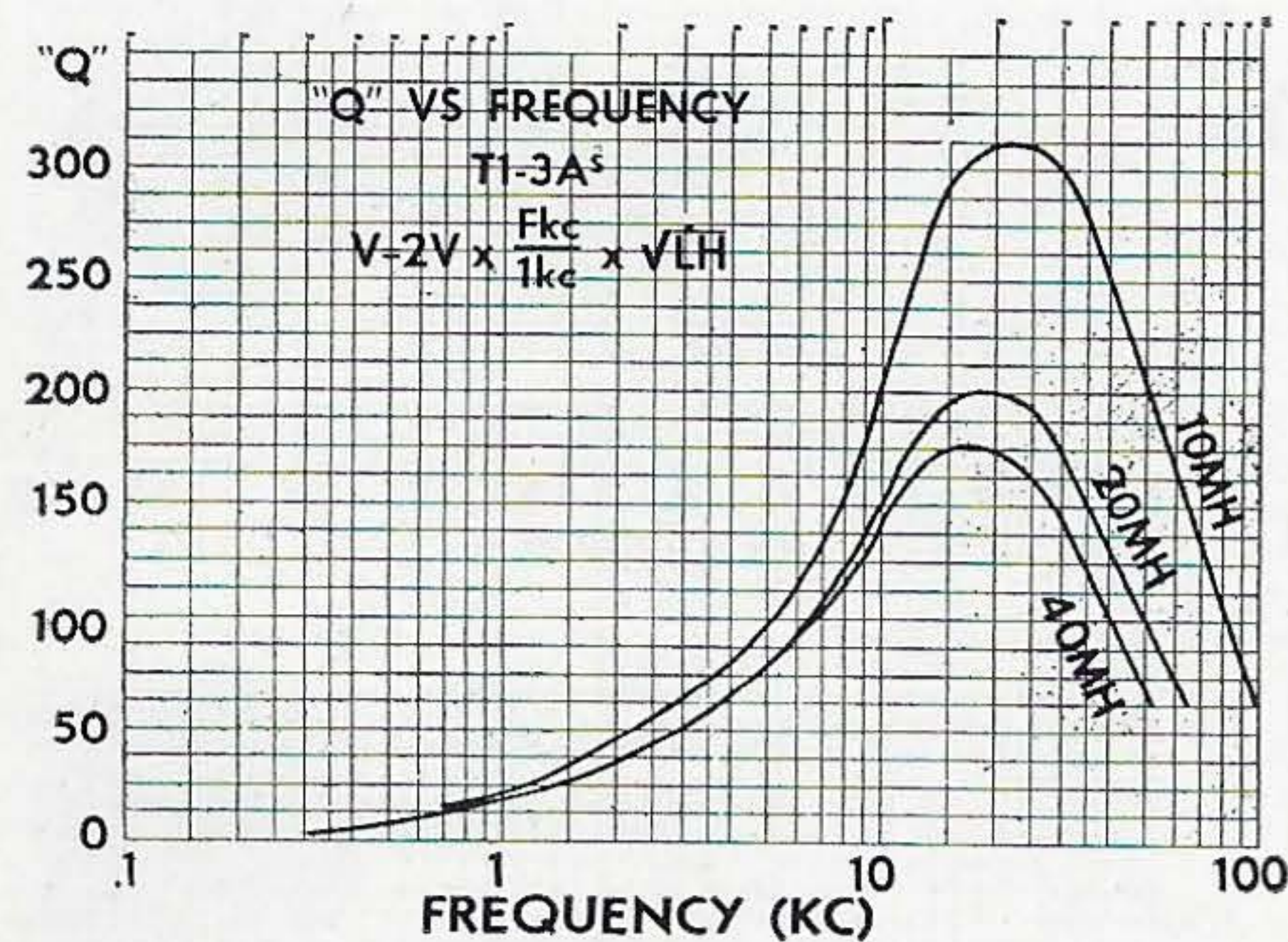
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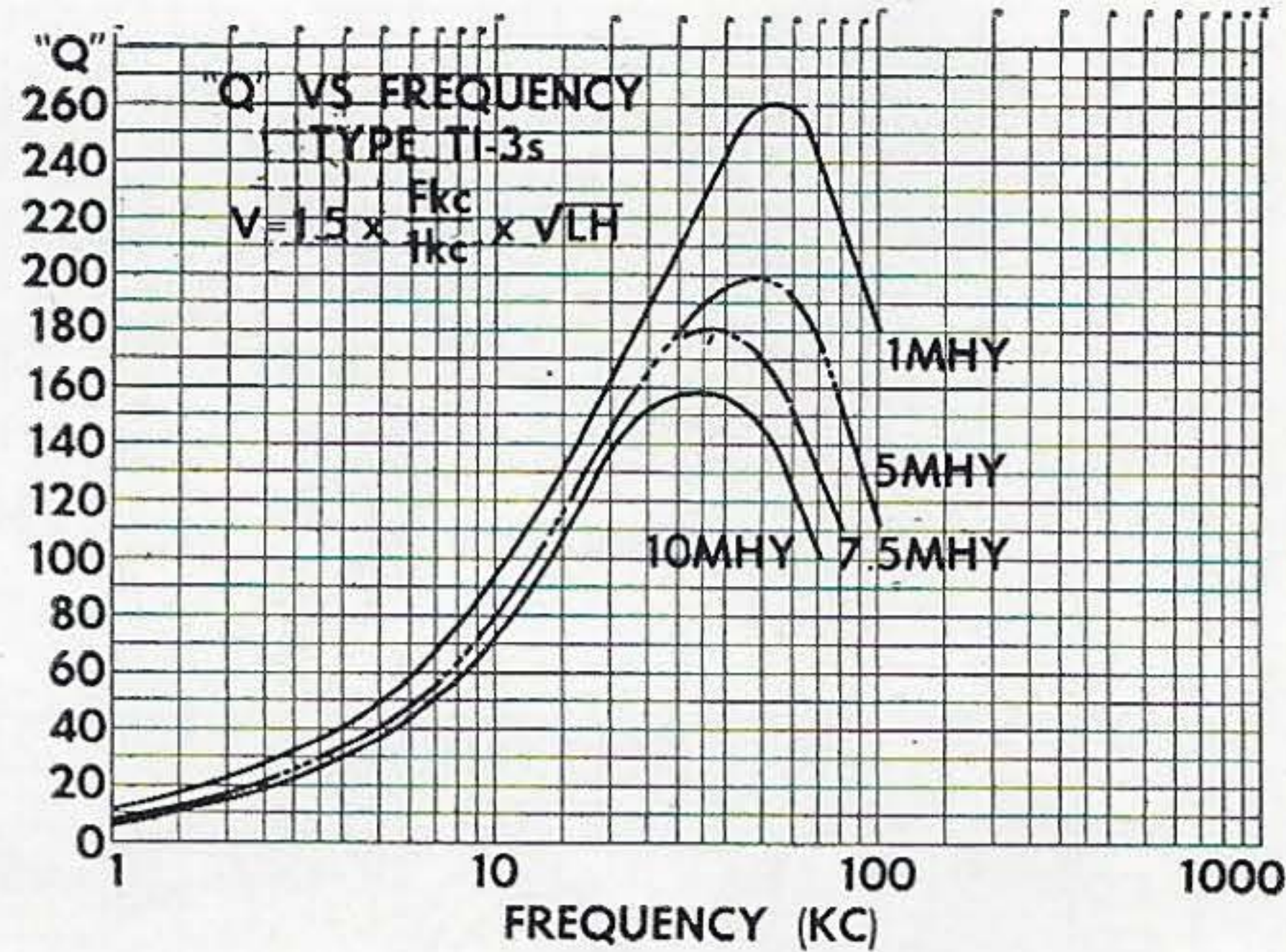
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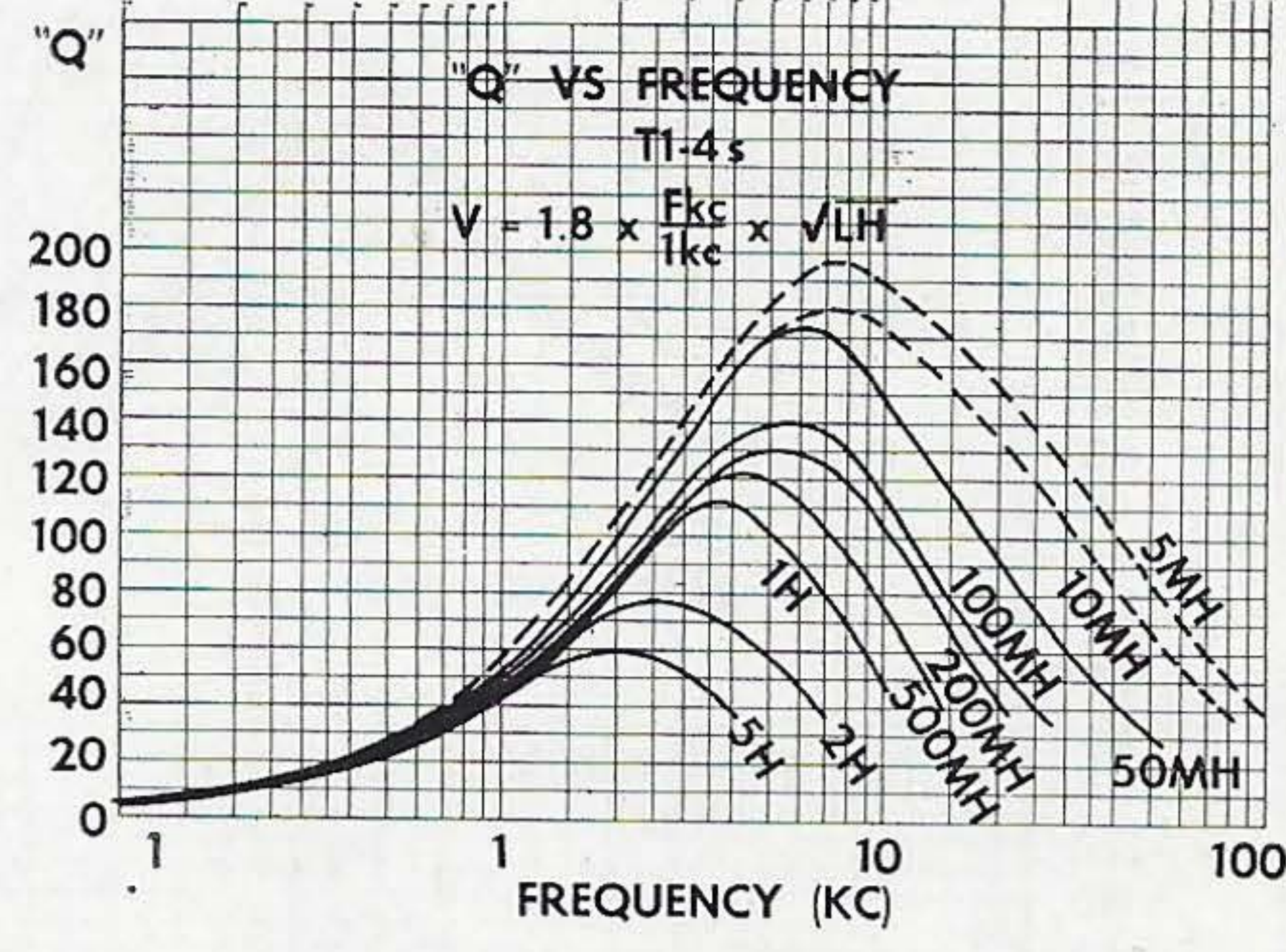
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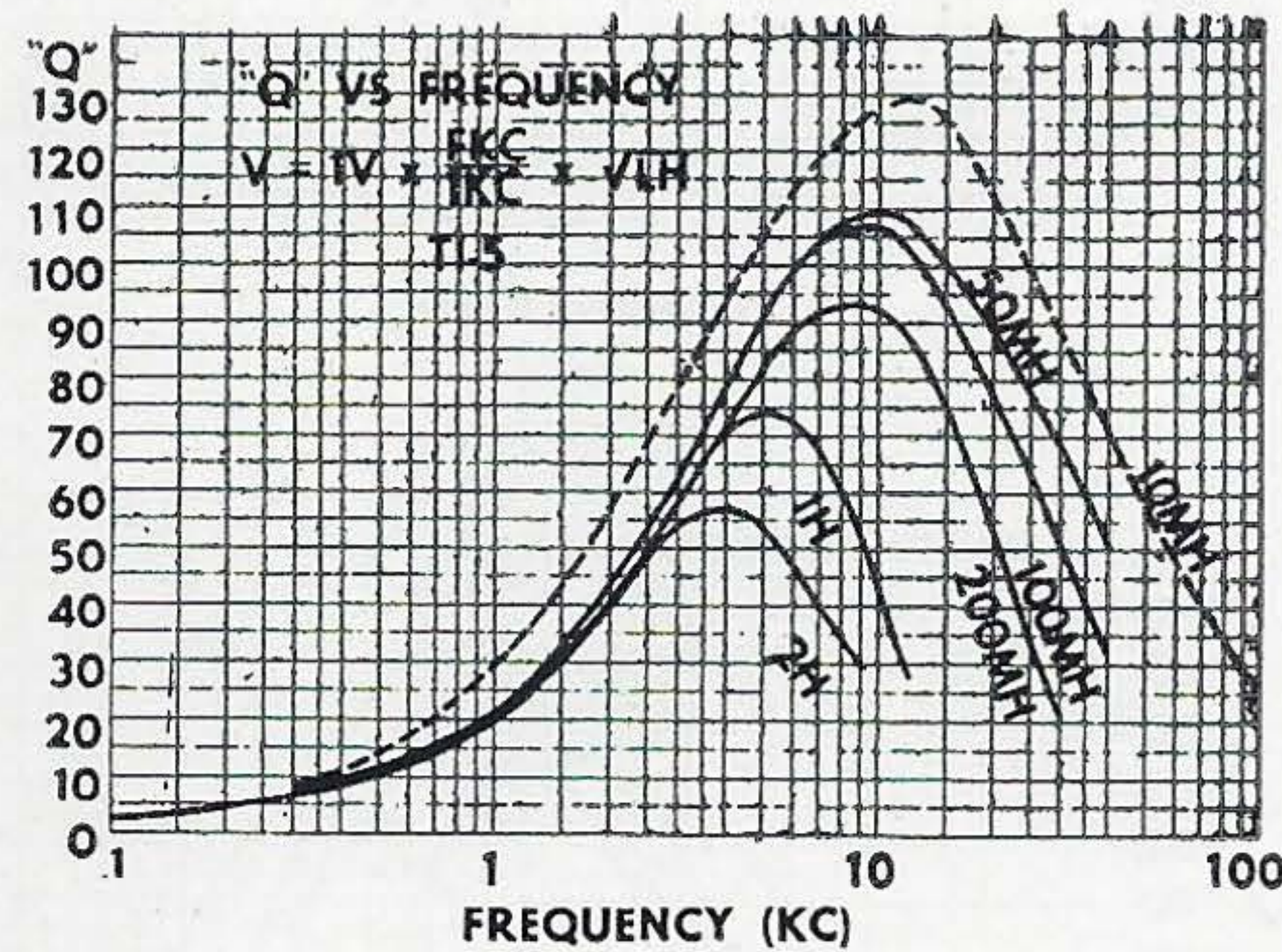
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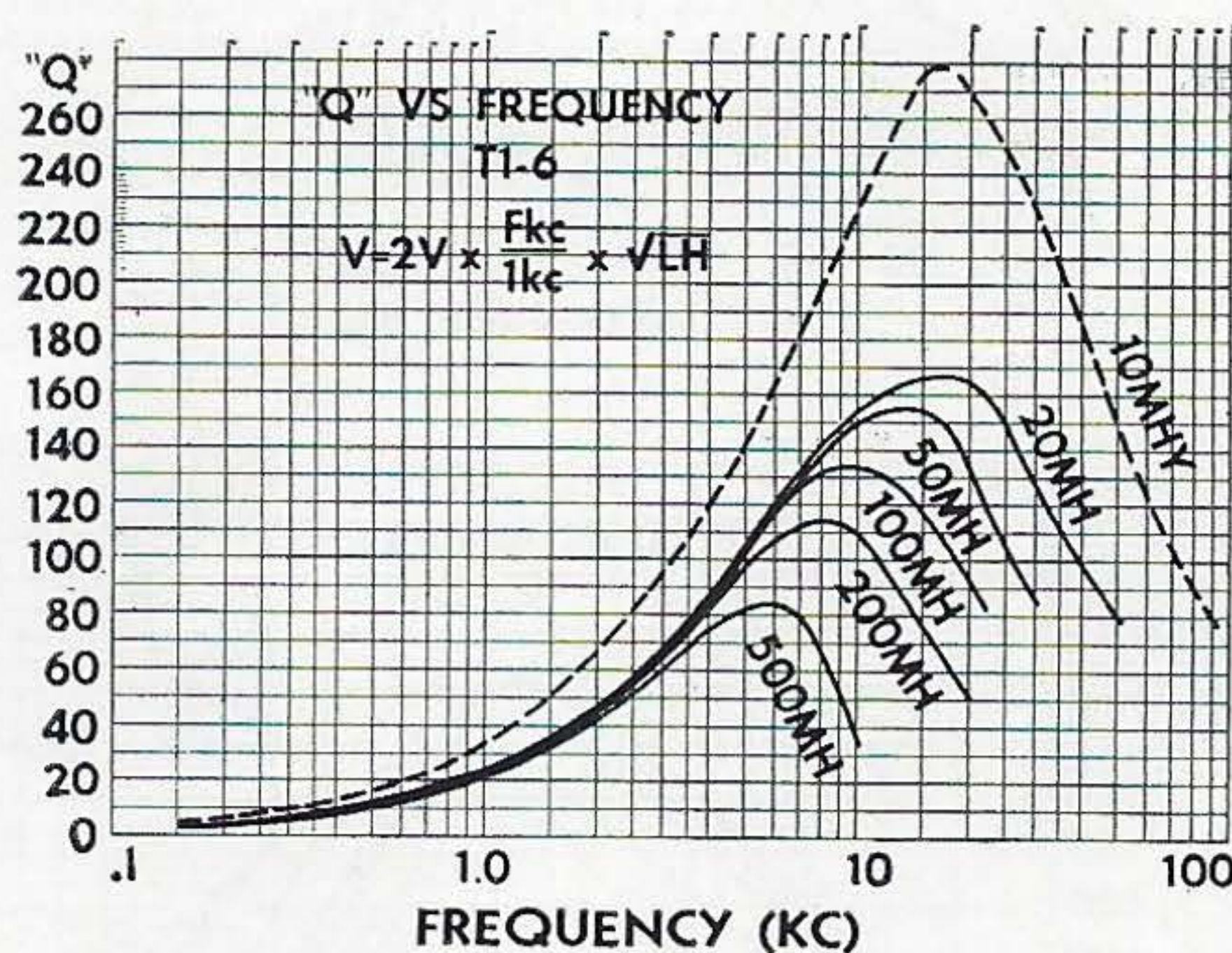
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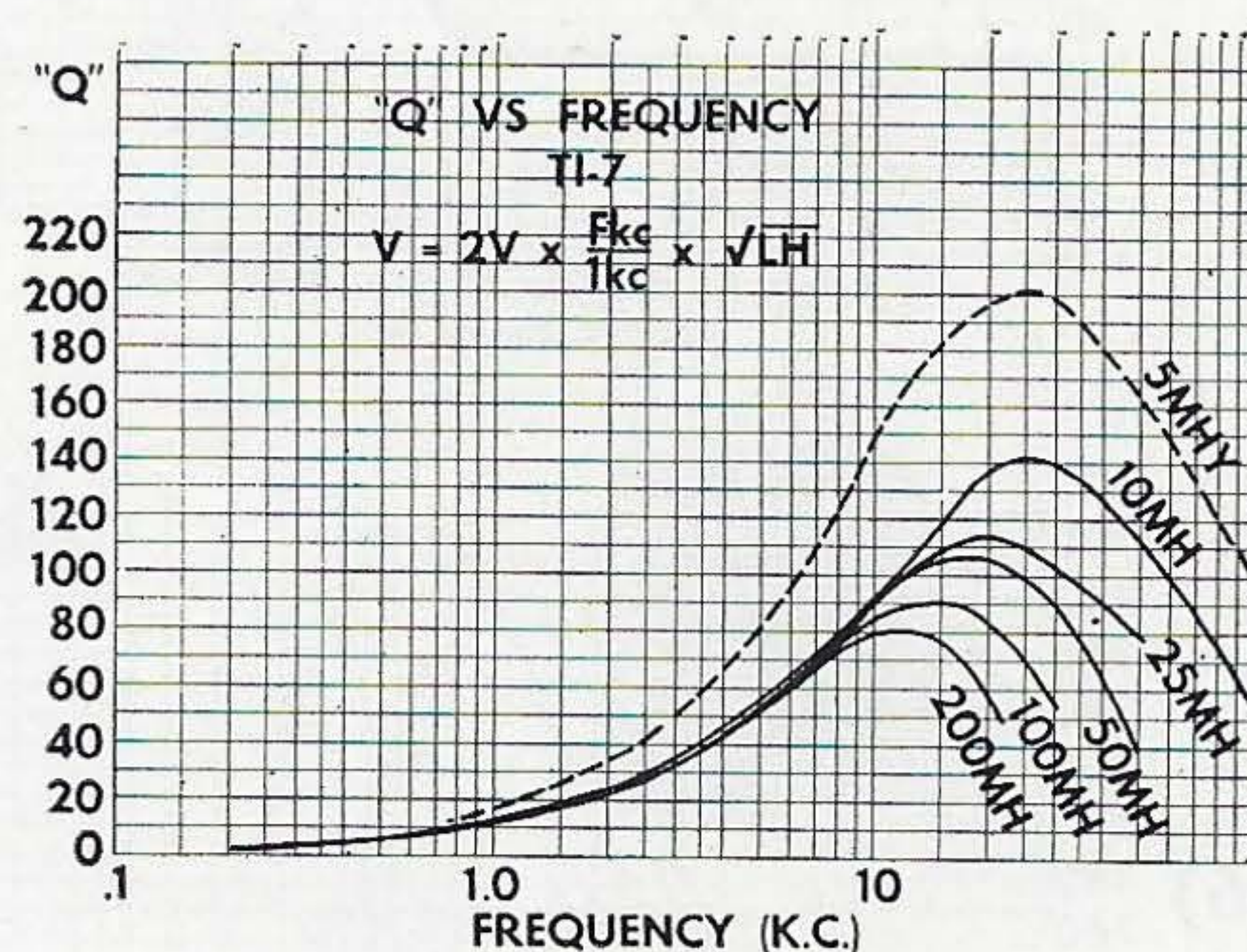
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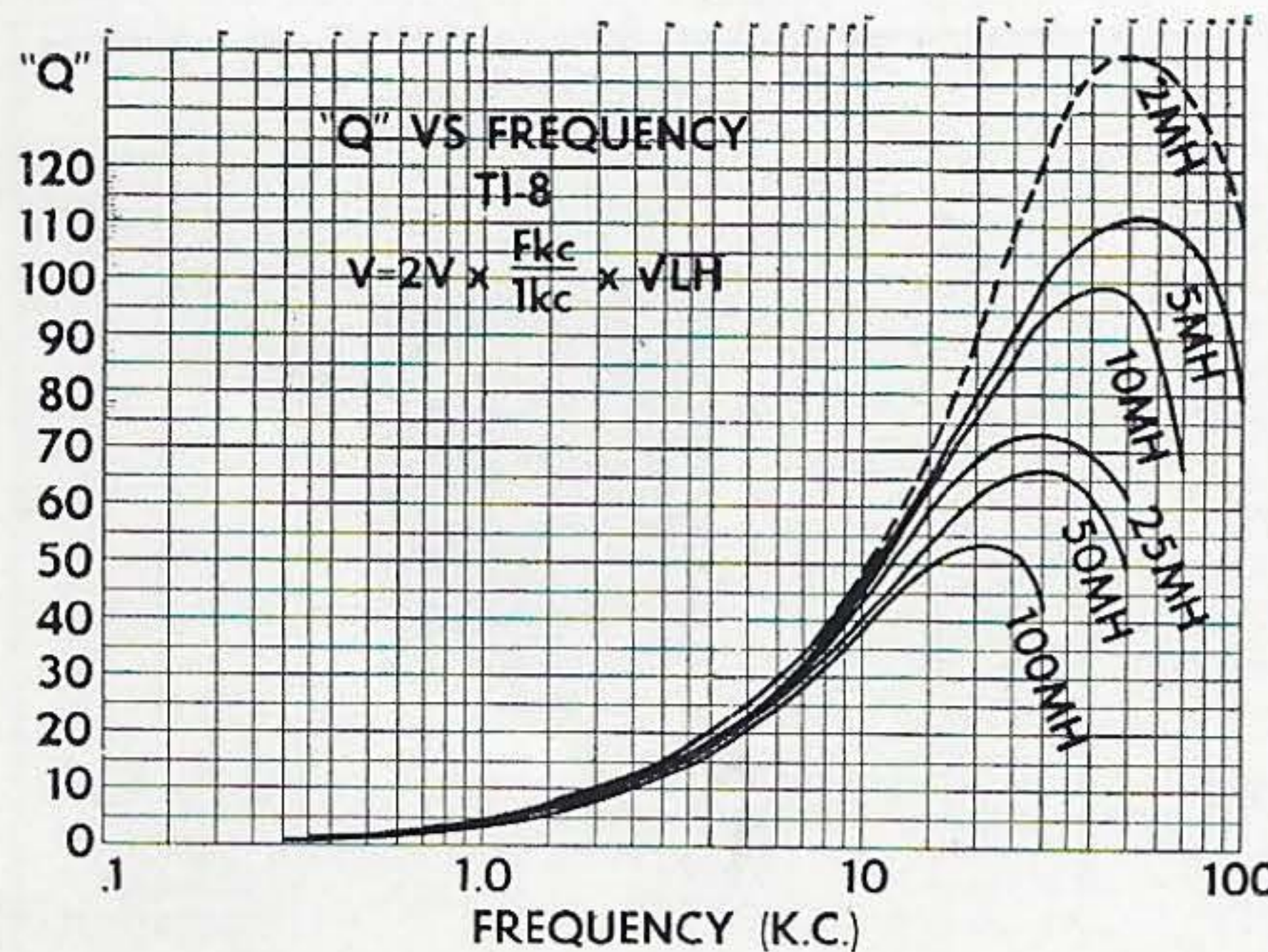
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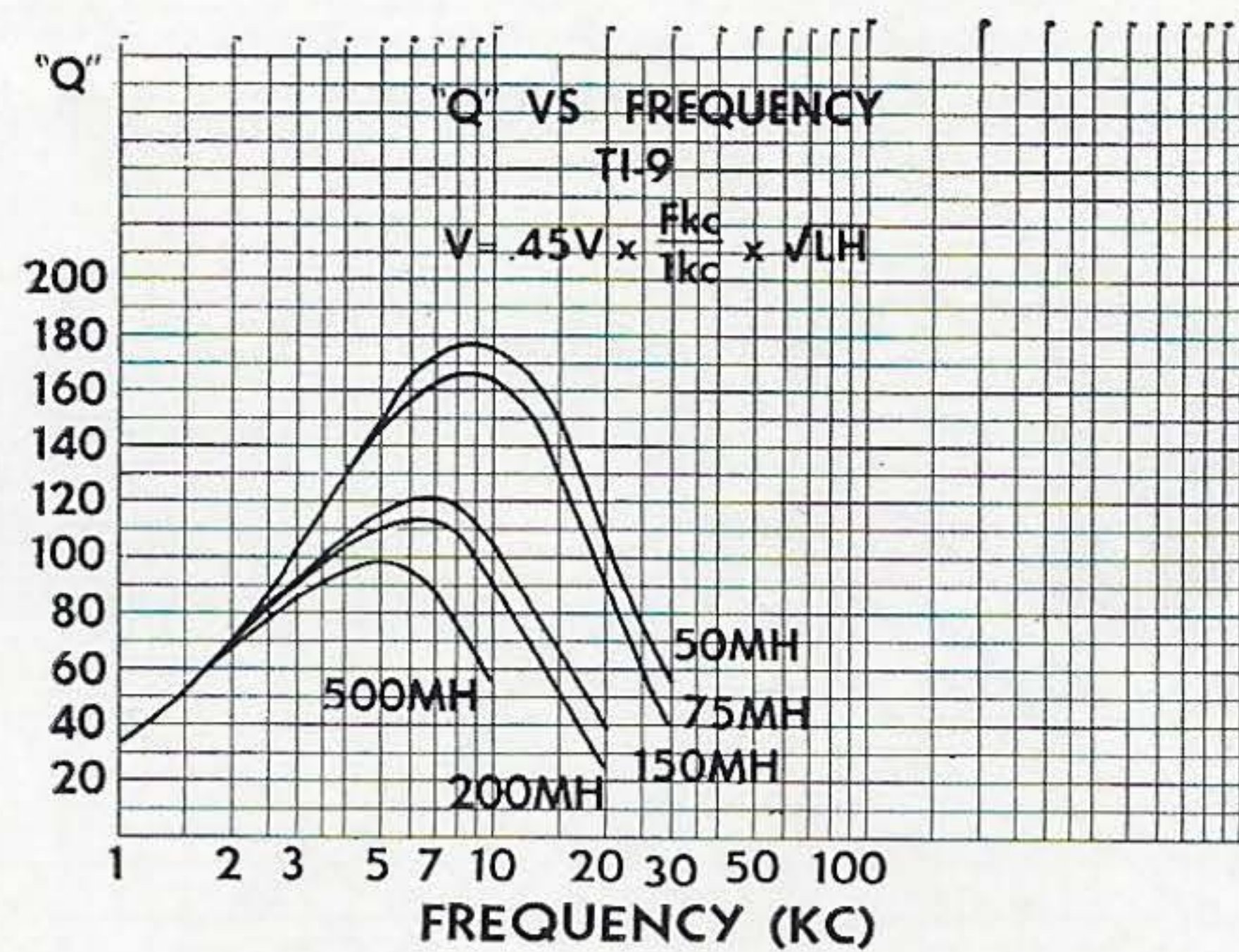
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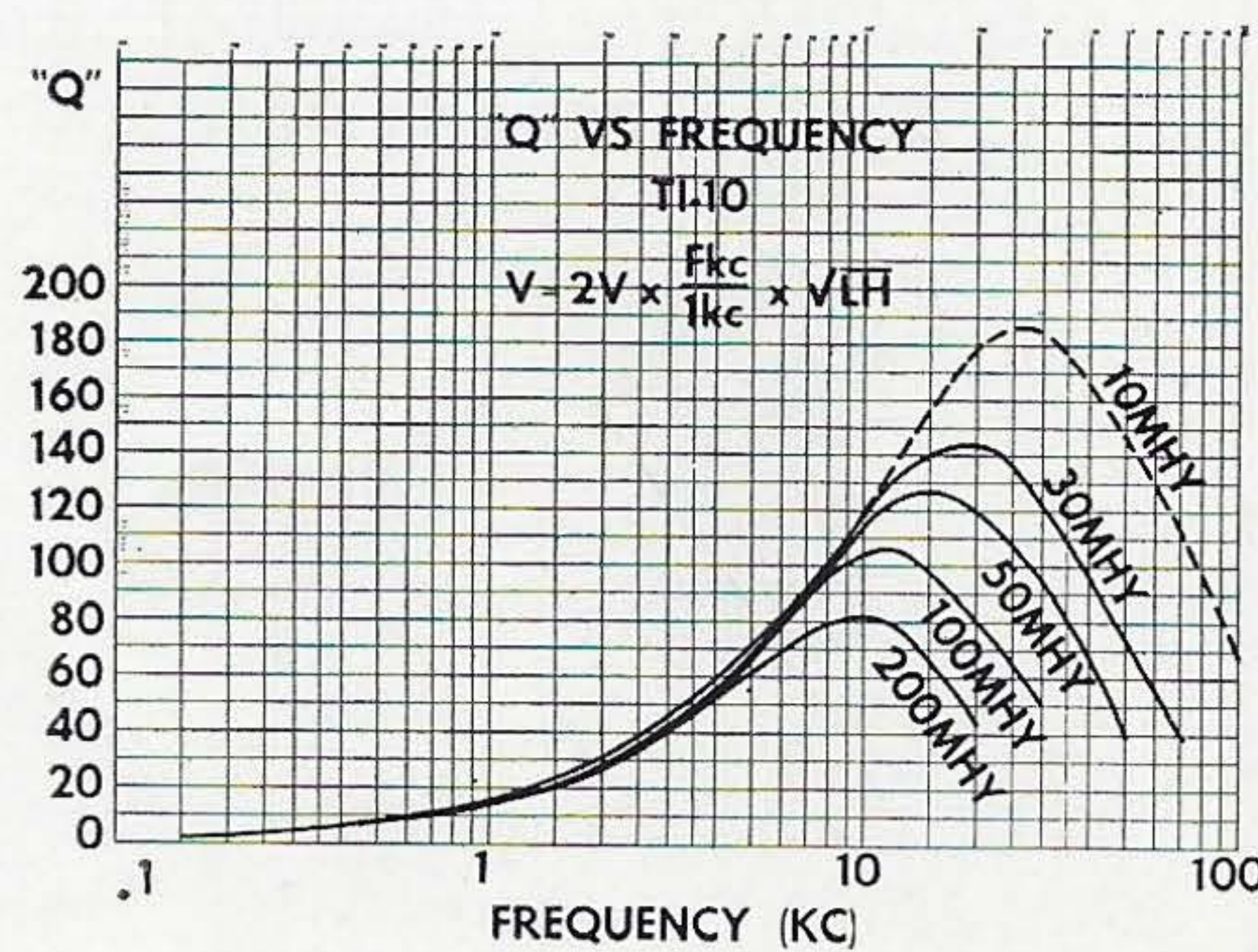
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(14)

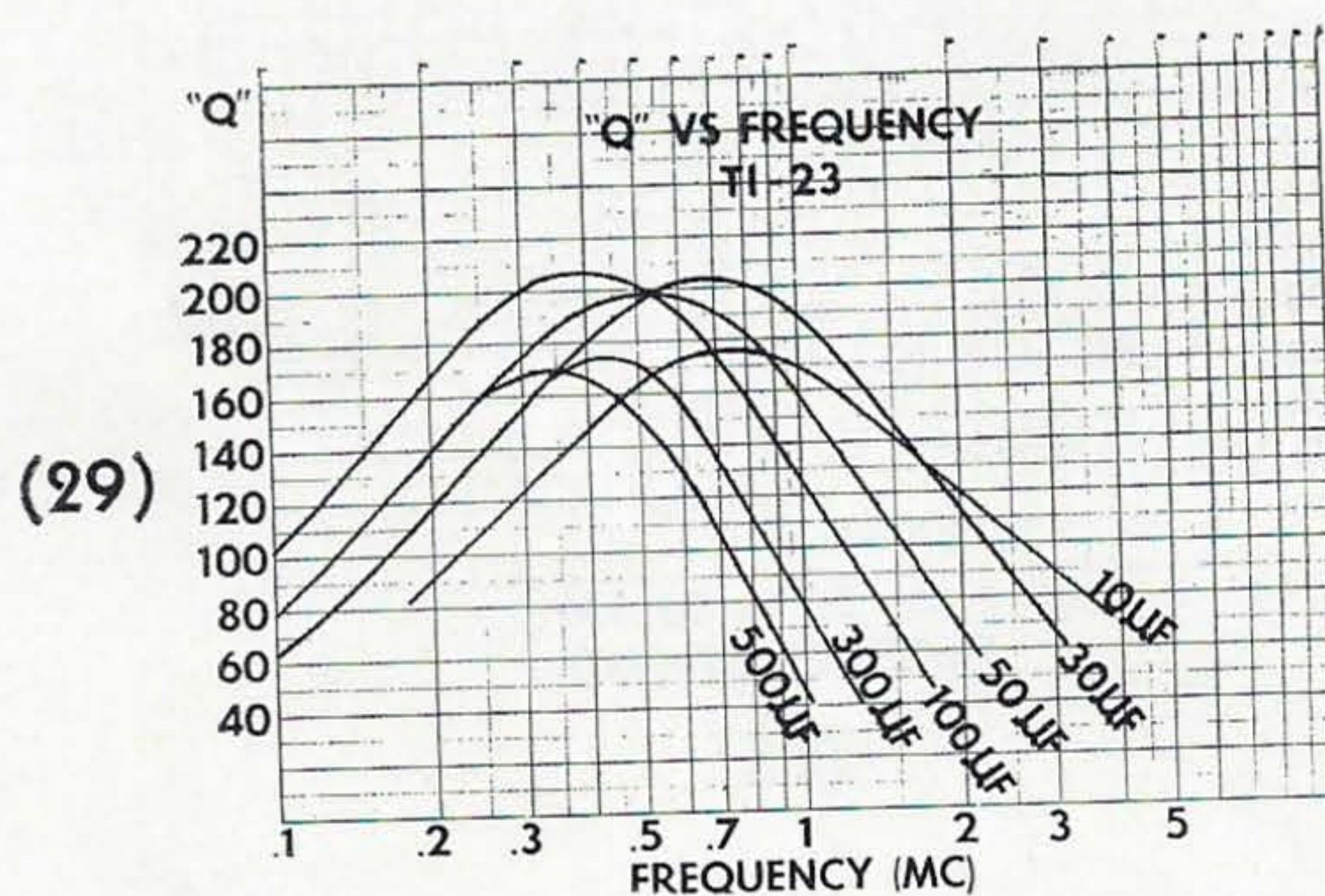
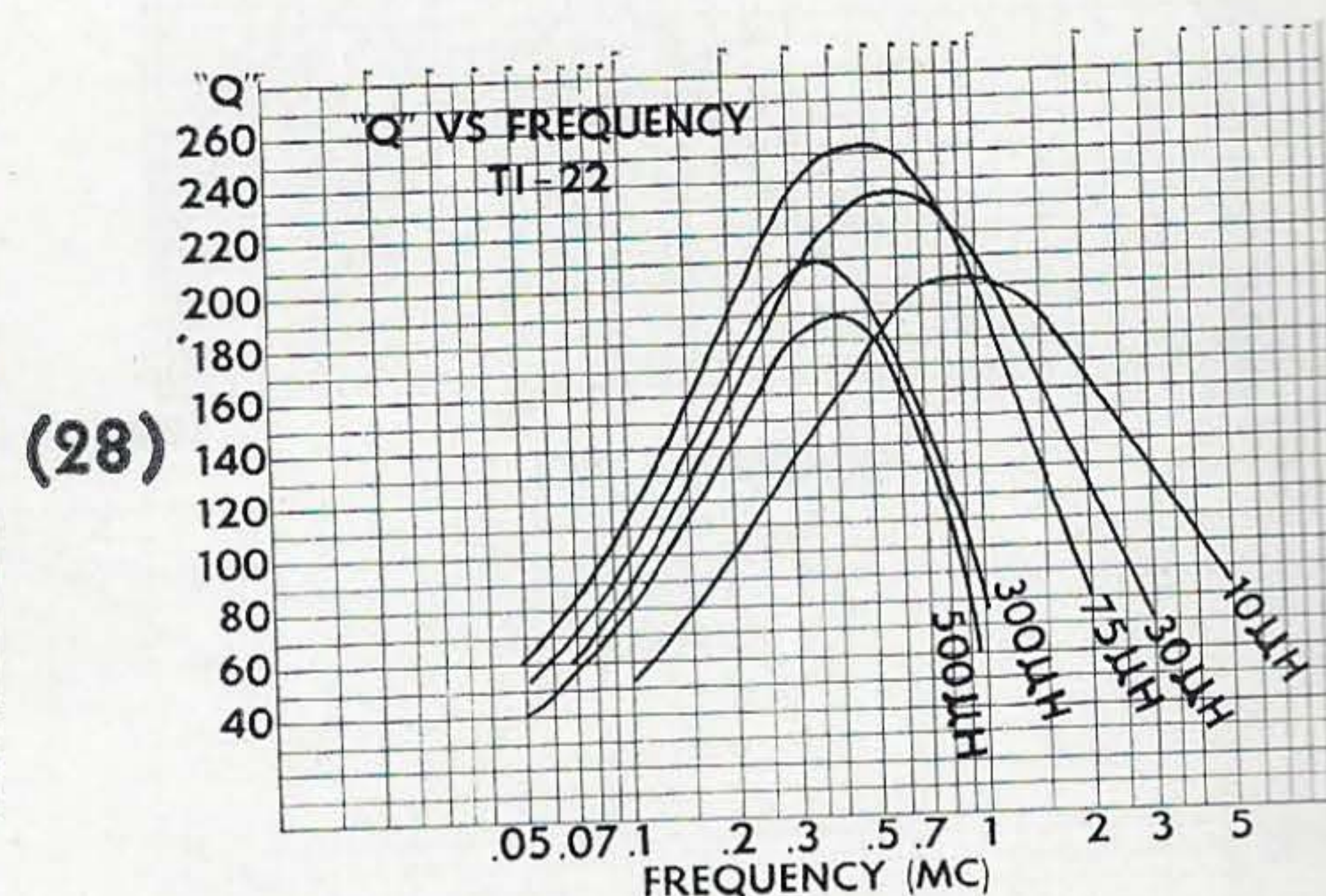
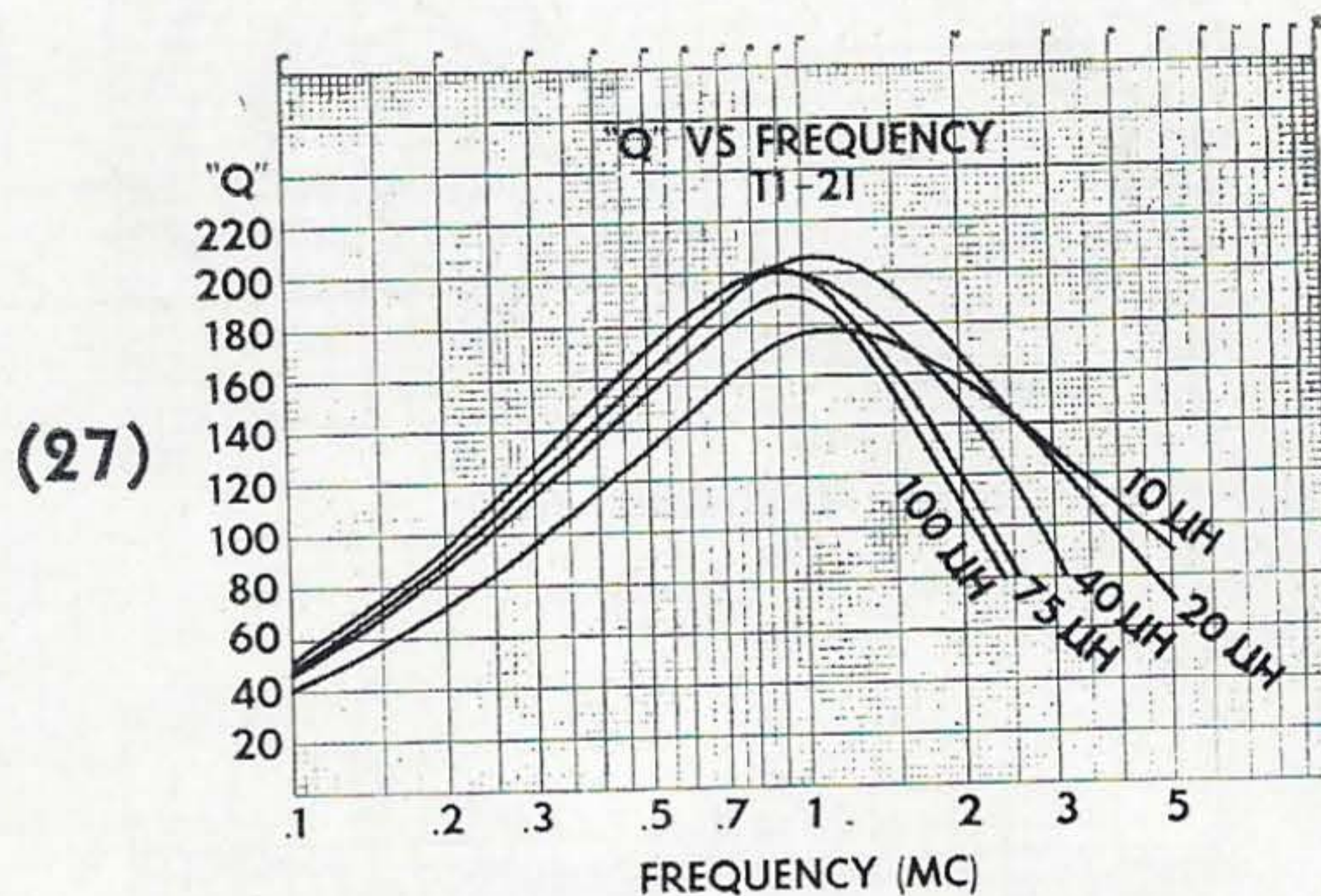
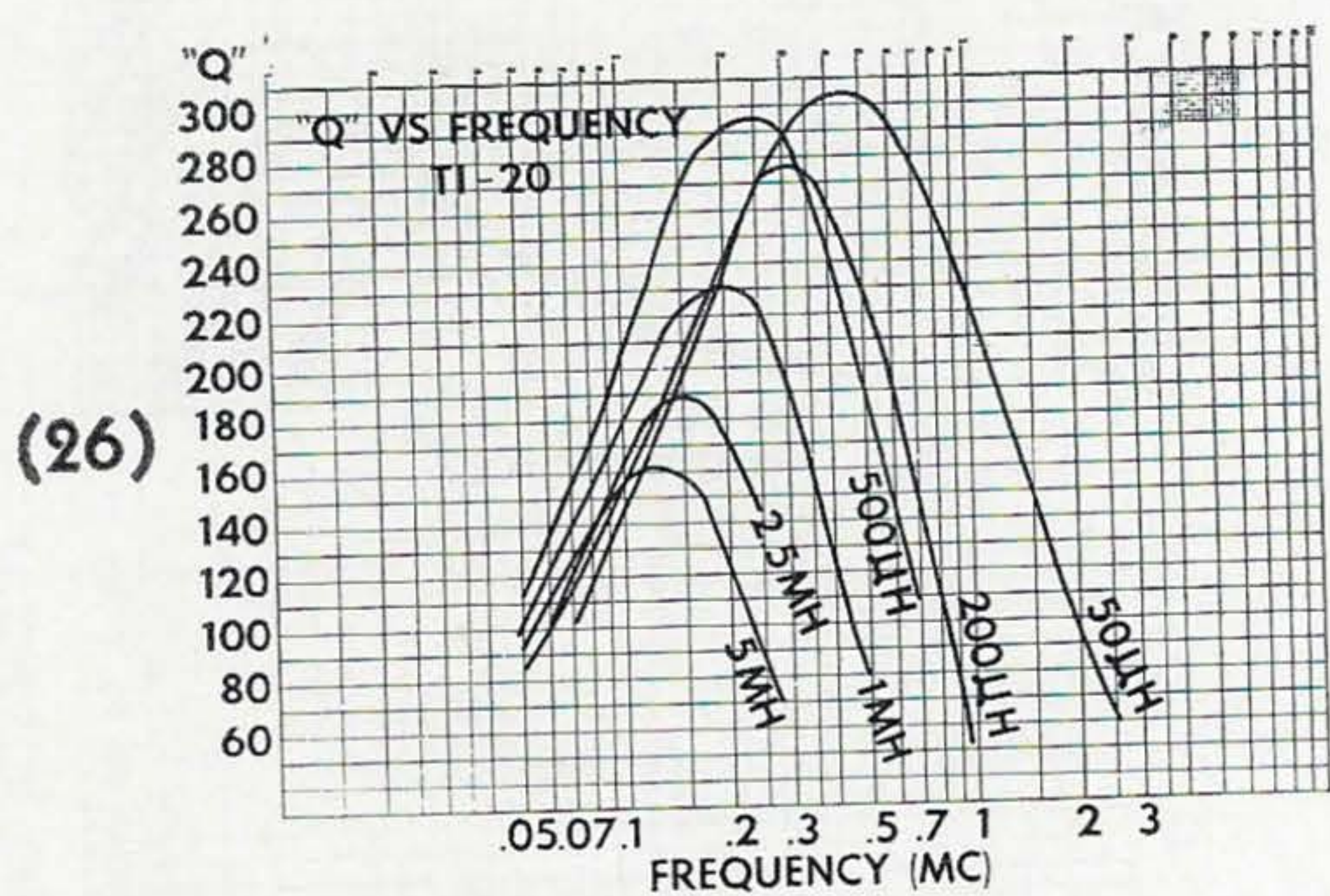
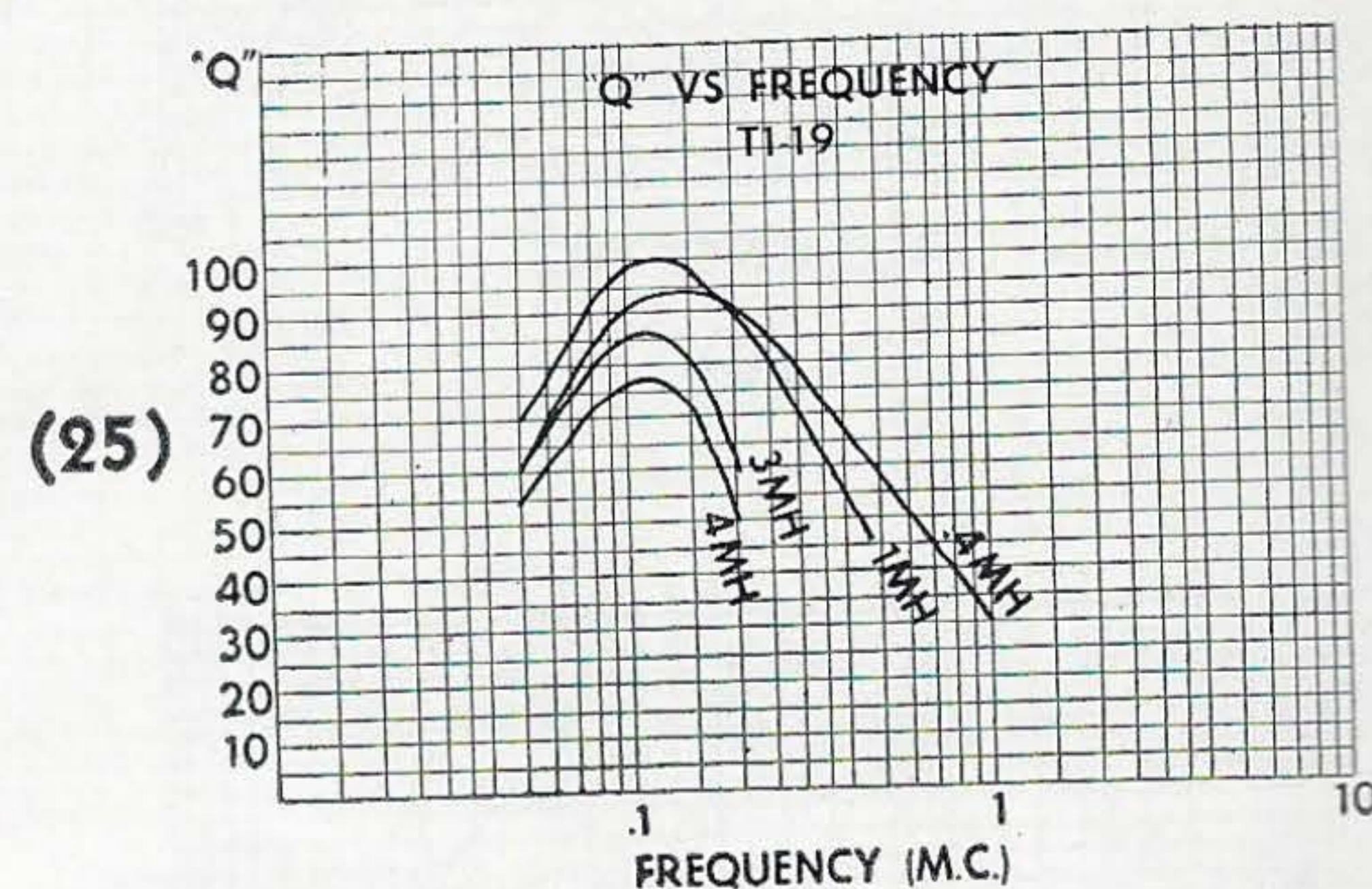
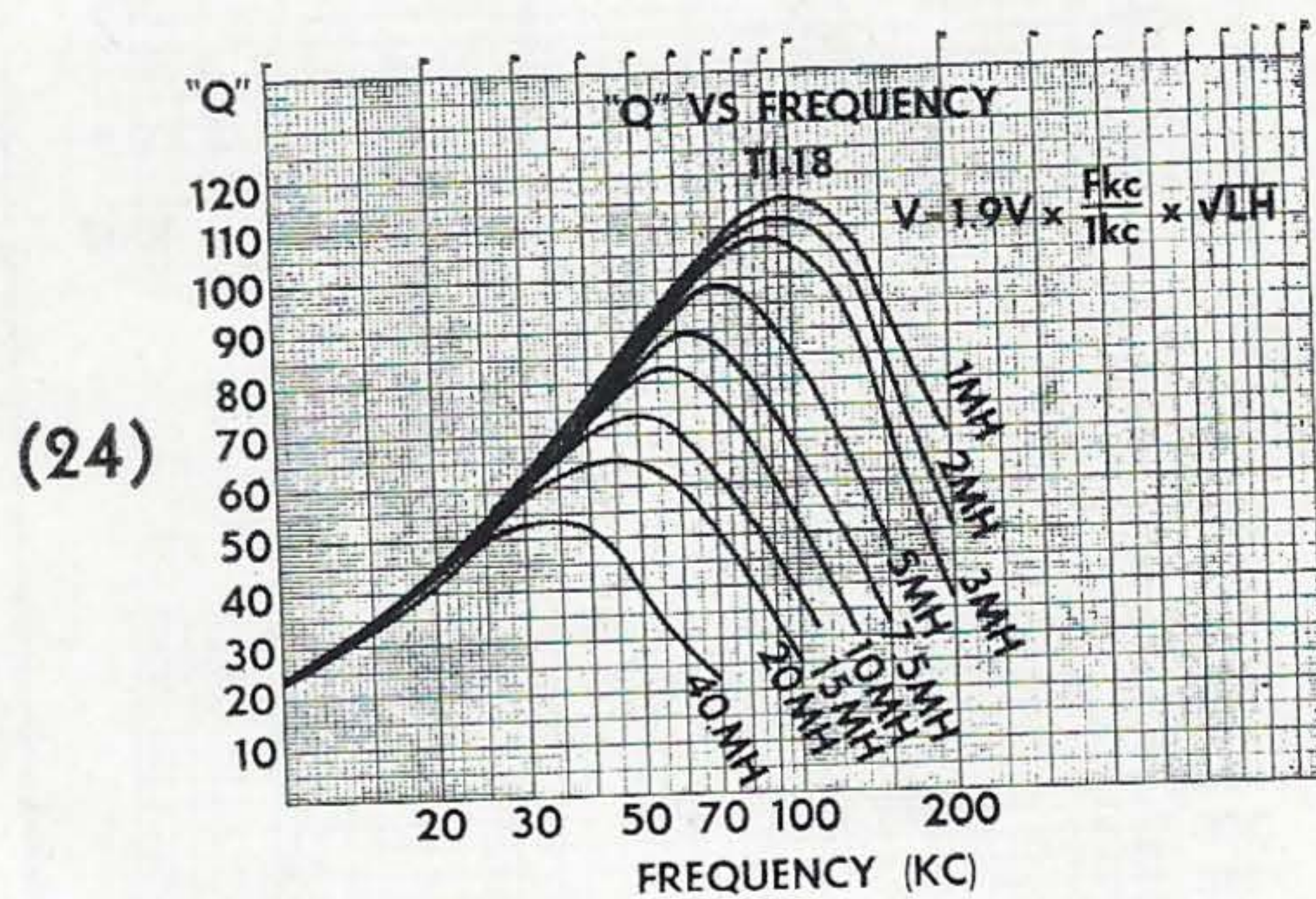
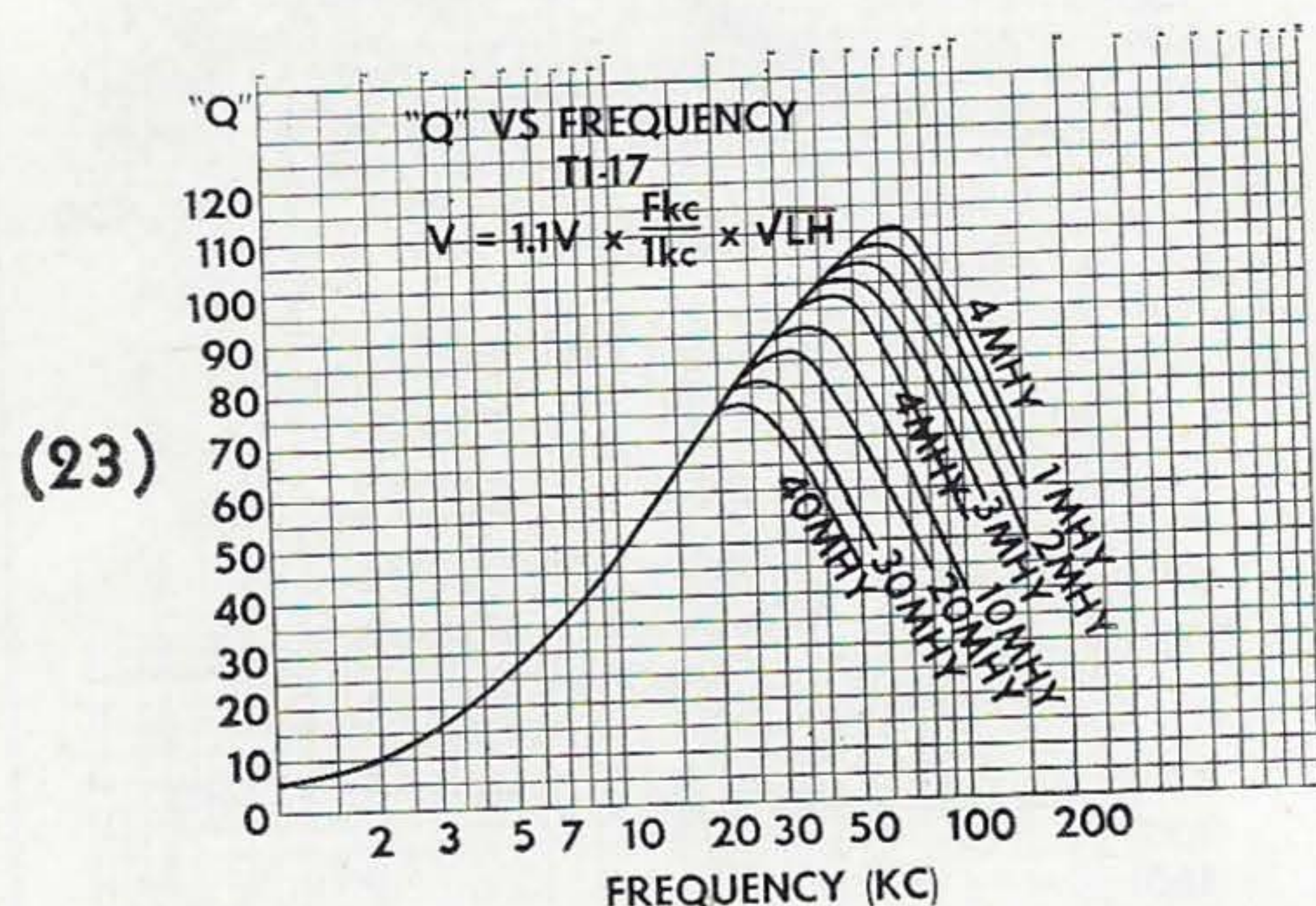
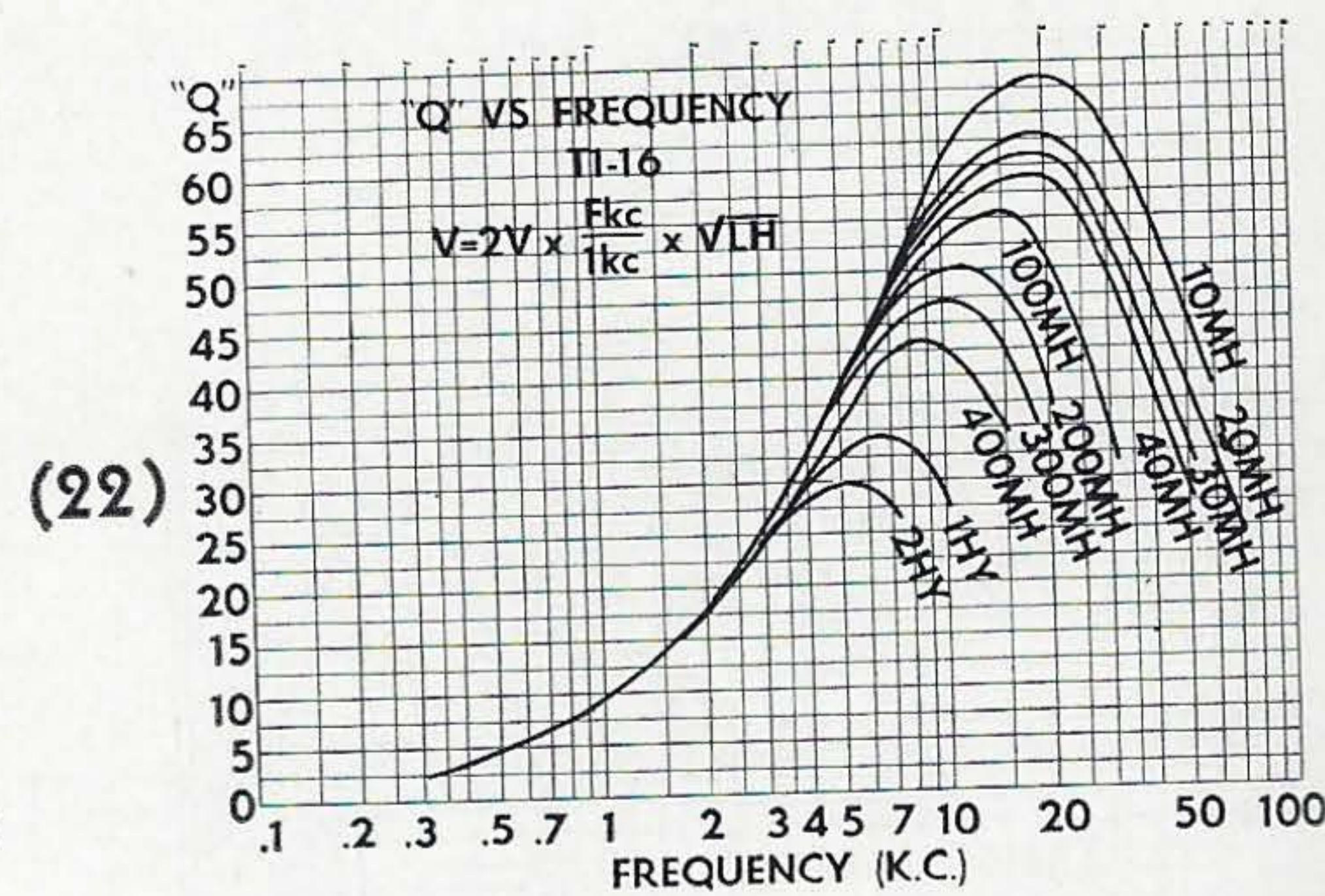
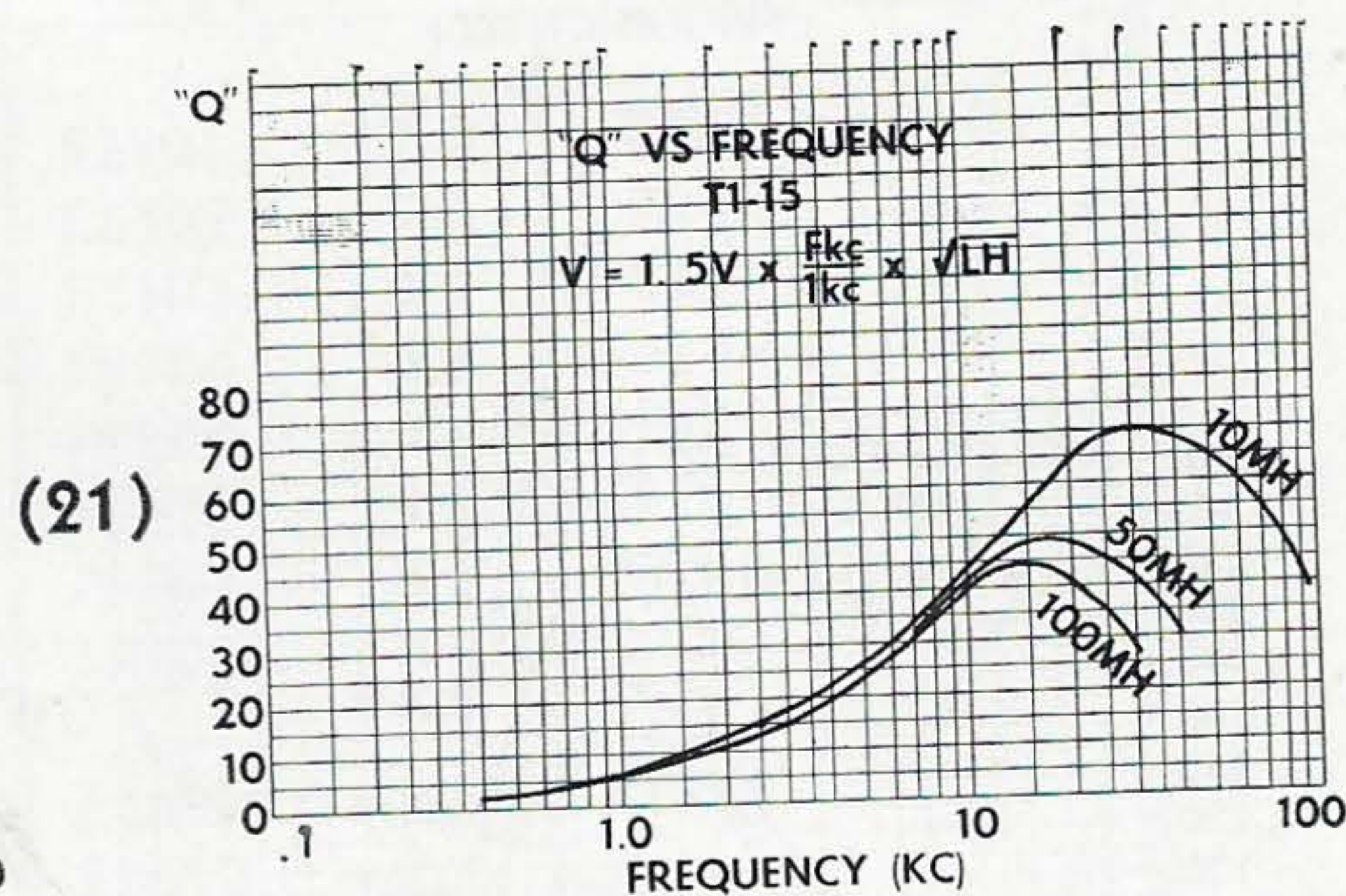
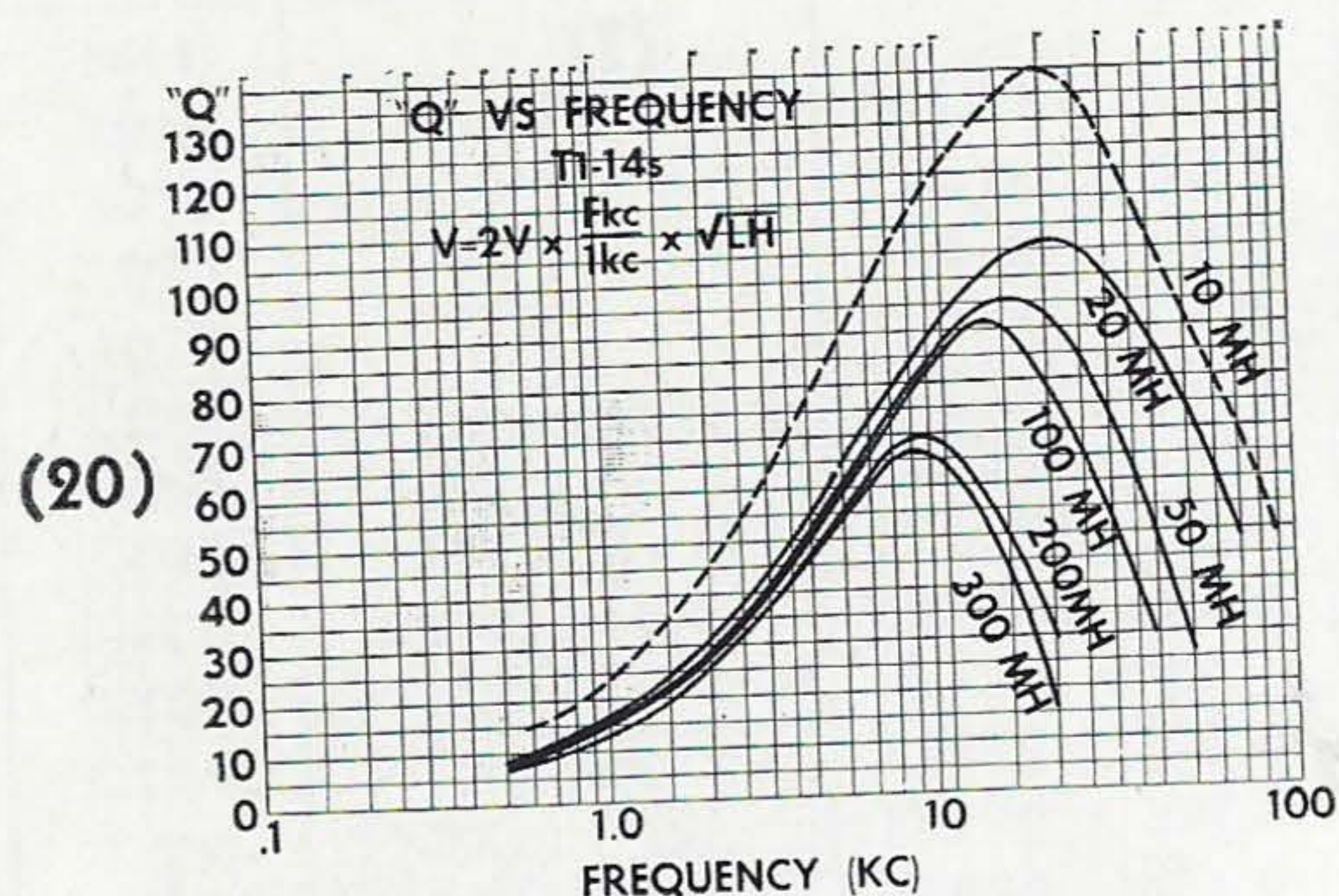
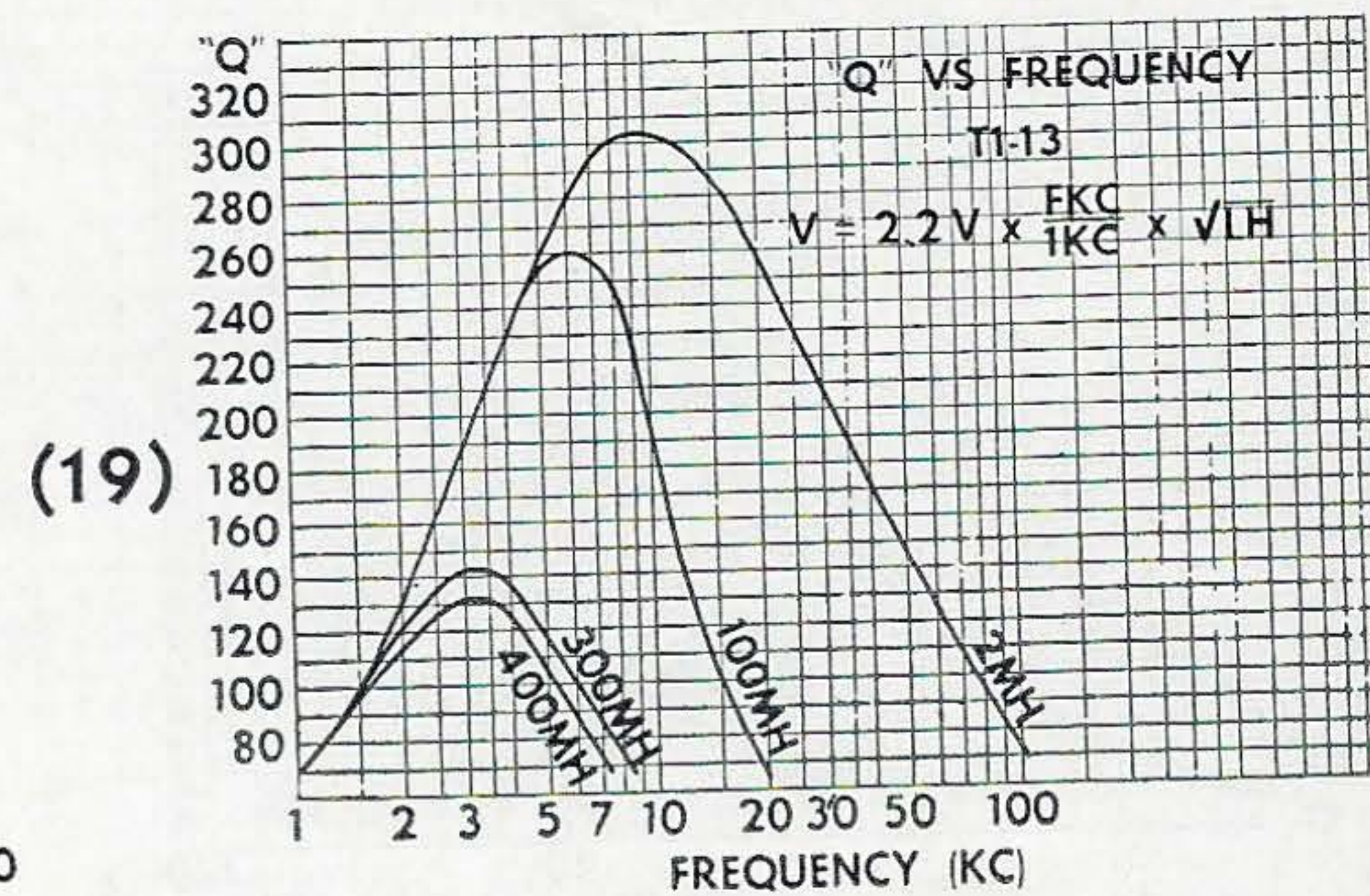
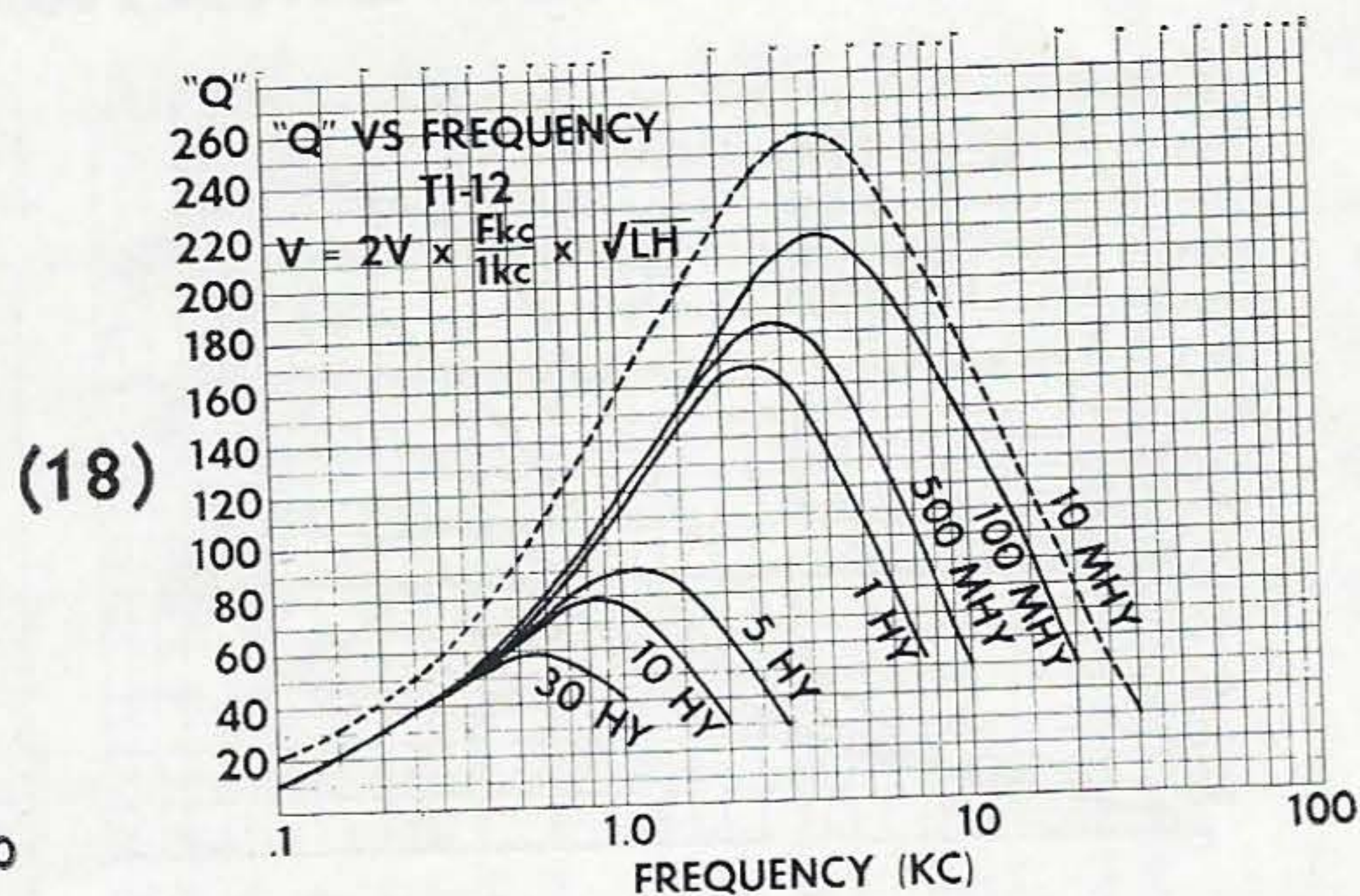
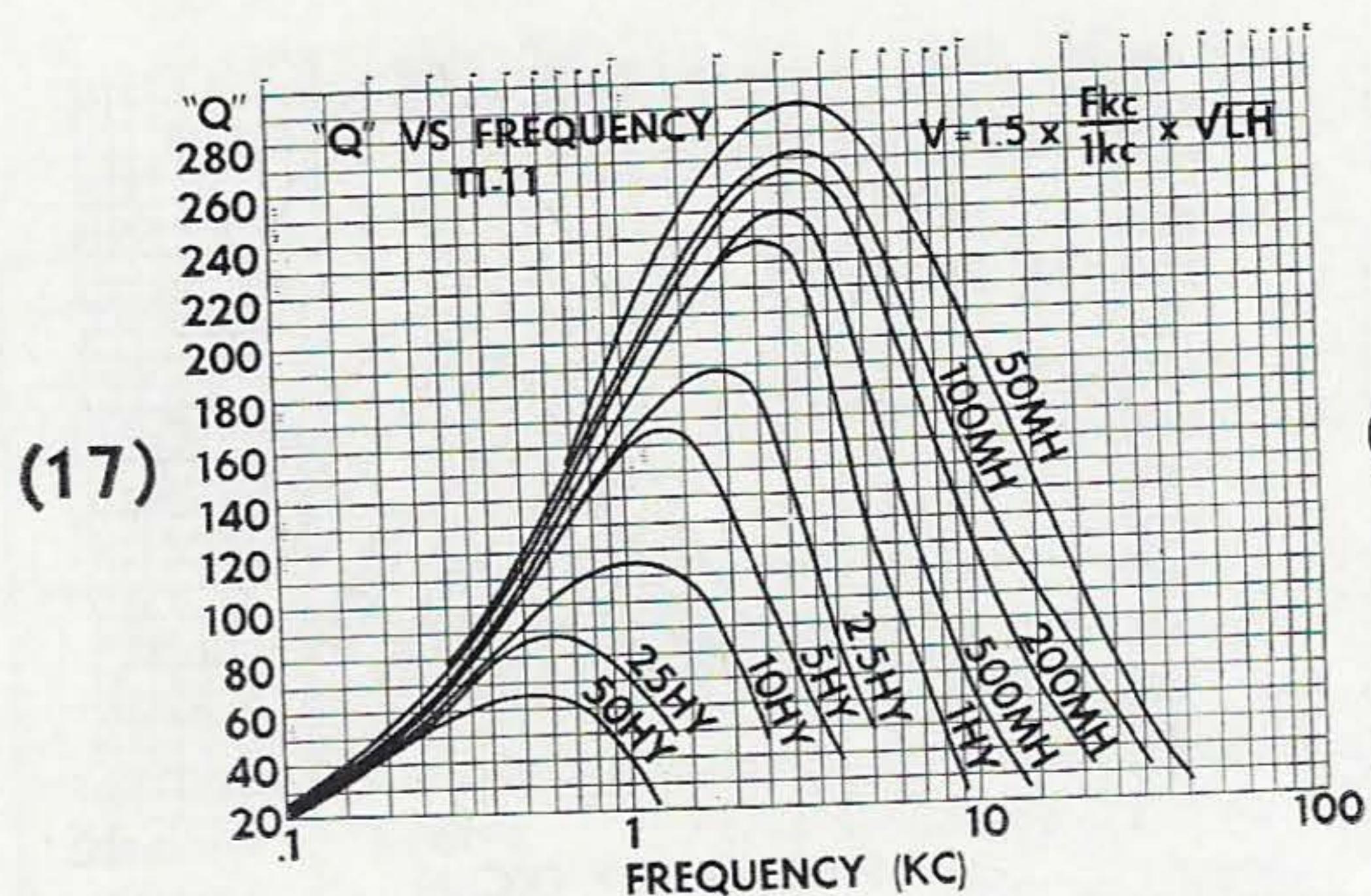


(15)



(16)

FREED TOROIDAL INDUCTORS Q VS FREQUENCY GRAPHS

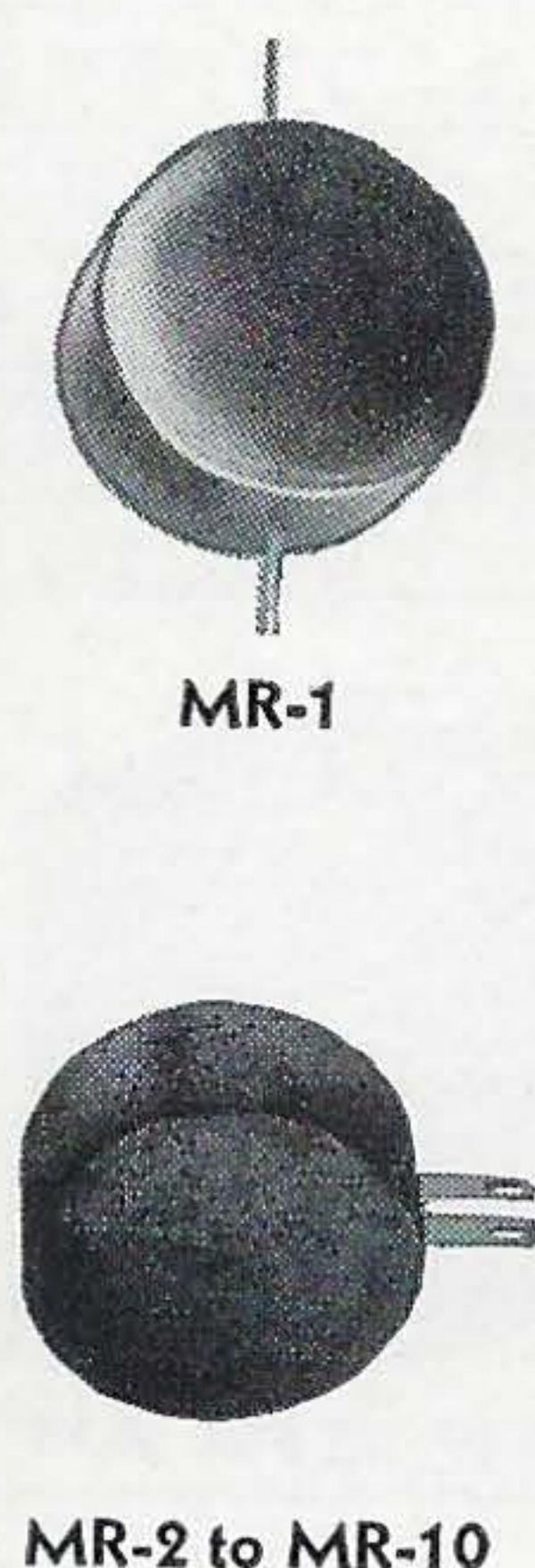


FREED TRANSFORMER COMPANY, INC.

CROSS REFERENCE GUIDE TO CASED, UNCASED AND MOLDED UNITS, SEE CHARTS A, B AND C.

Toroid Type	Case	Mold	Uncased Dimensions	Toroid Type	Case	Mold	Uncased Dimensions
TI-1	DT-3, DT-5	MR-6	OS-8	TI-12	DT-4	MR-8	OS-9
TI-1A	DT-4	MR-7	OS-9	TI-13	DT-4	MR-8	OS-9
TI-2	DT-3, DT-5	MR-5	OS-6	TI-14	DT-2, DM-11	MR-4	OS-5
TI-3	DT-3, DT-5	MR-5	OS-6	TI-15	DT-1, DM-2	MR-3	OS-3
TI-3A	DT-4	MR-8	OS-10	TI-16	DST-1	MR-1, MS-1	OS-1
TI-4	DT-2, DM-11	MR-4	OS-5	TI-17	DST-1	MR-1, MS-1	OS-1
TI-5	DT-1, DM-2	MR-3	OS-3	TI-18	DST-1	MR-1, MS-1	OS-1
TI-6	DT-2, DM-11	MR-4	OS-5	TI-19	DST-1	MR-1, MS-1	OS-1
TI-7	DT-1, DM-2	MR-3	OS-3	TI-20	DT-2	MR-4	OS-4
TI-8	DT-1, DM-2	MR-3	OS-3	TI-21	DT-1	MR-1, MS-1	OS-1
TI-9	DT-4	MR-9	OS-10	TI-22	DT-1	MR-2	OS-2
TI-10	DT-3, DT-5	MR-5	OS-7	TI-23	DT-1	MR-2	OS-2
TI-11	DT-4	MR-10	OS-11				

[A] DIMENSIONS OF MOLDED UNITS



Molded Coil Code No.	OD"	H"	Clearance Hole H-Mounting
MR-1	7/8	13/32	Pig tails
MR-2	1 1/16	1/2	4-40
MR-3	1 3/16	1 1/16	6-32
MR-4	1 1/2	3/4	8-32
MR-5	1 7/8	1	8-32
MR-6	2 1/8	7/8	8-32
MR-7	2 3/8	1 5/16	10-32
MR-8	2 1/2	1 3/8	10-32
MR-9	2 5/8	1 7/16	10-32
MR-10	2 7/8	1 3/8	10-32
MS-1	2 5/32 x 2 5/32	1 3/32	Pig tails



[B] DIMENSIONS OF UNCASED UNITS

Open Coil Code No.	OD"	H"	
OS-1	5/8	5/16	All OS Units supplied with 4" long leads
OS-2	7/8	3/8	
OS-3	1	3/8	
OS-4	1	9/16	
OS-5	1 5/16	5/8	
OS-6	1 5/8	7/8	
OS-7	1 11/16	5/8	
OS-8	1 7/8	1 1/16	
OS-9	2 1/4	1 1/8	
OS-10	2 3/8	1 1/4	
OS-11	2 5/8	1 1/8	

[C] CASE DIMENSIONS

DT-1 CASE Height: 1 7/32" Width: 1 1/2" Length: 1 1/16" Mounting: 2 4-40 inserts Mtg. Centers: 3/4" Cutout: 5/16" x 1/2"	DT-2 CASE Height: 1 3/4" Width: 1 3/16" Length: 1 7/16" Mounting: 2 6-32 studs Mtg. Centers: 7/8" x 9/32" Cutout: 3/8" x 1 1/16"	DT-3 CASE Height: 2" Width: 7/8" Length: 1 25/32" Mounting: 2 6-32 studs Mtg. Centers: 1 1/4" x 3/8" Cutout: 3/8" x 3/4"	DT-4 CASE Height: 3 1/8" Width: 1 5/16" Length: 2 3/4" Mounting: 4 8-32 studs Mtg. Centers: 2 1/16" x 1 1/16" Cutout: 3/4" x 3/8"
DST-1 CASE Height: 2 5/32" Width: 1 1/32" Length: 3/4" Pins: 1/4" long To fit: 1/2" crystal socket	DT-5 CASE Height: 1 3/16" Diameter: 1 13/16" Mounting: 2 6-32 inserts Mtg. Centers: 1 1/8" Cutout: 3/8" x 1"	DM-2 CASE Height: 1" Diameter: 1 1/8" Mounting: 2 4-40 inserts Mtg. Centers: 5/8" Cutout: 3/8" x 7/8"	DM-11 CASE Height: 1 1/2" Diameter: 1 3/8" Mounting: 2 6-32 inserts Mtg. Centers: 7/8" Cutout: 3/8" x 7/8"

MAGNETIC AMPLIFIERS AND SATURABLE TRANSFORMERS

The ever increasing demand for reliability, ruggedness, miniaturization and high performance has made the magnetic amplifier an indispensable component of many military and industrial automatic control and servo systems. Recent advances in materials and techniques permit an even greater utilization of the well-known inherent advantages of magnetic amplifiers such as direct operation from line voltage, no warm-up time, long-life components, ease of signal mixing, and hermetic sealing.

Freed Transformer Co. manufactures an extensive line of magnetic amplifiers, ranging from saturable transformers to half-wave type, fast-response servo amplifiers. Choice of catalog amplifiers assures standardization, lowest possible cost and delivery from stock.

The MAO line of single-ended magnetic amplifiers provides a single stage of DC controlled amplification, utilizing positive feedback to obtain a gain much higher than that of a saturable reactor.

The MAP line of push-pull magnetic amplifiers features high gain, polarity-sensitive amplification, and a phase-reversible output.

The MAF type of fast response magnetic amplifiers combines high power gain, ruggedness, and reliability with a maximum 2 cycle response. All MAF units are phase-reversible.

The MAS line of saturable transformers, commonly controlled by dual-triodes or transistors, emphasises low cost, small size, extreme reliability (no rectifiers), and phase-reversible output.

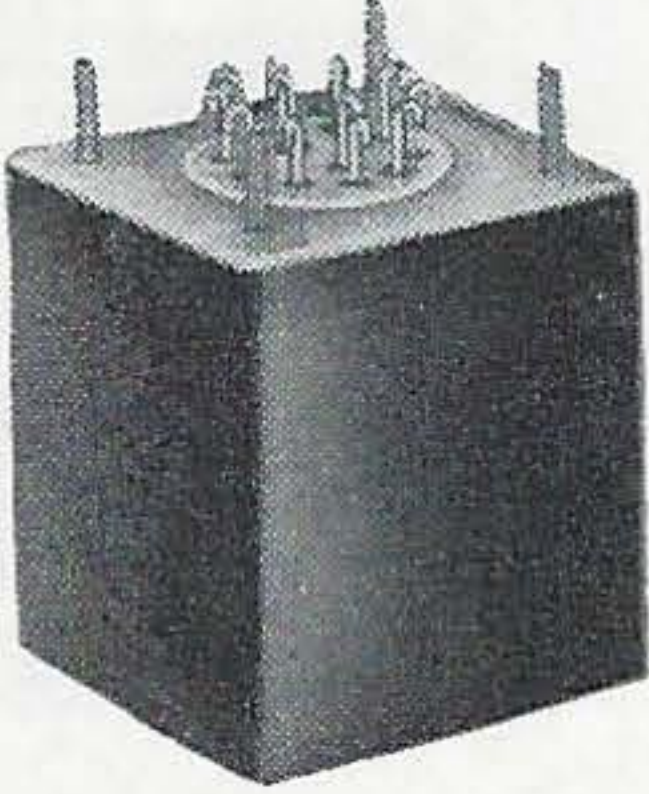
All standard units are designed for continuous operation and will operate in an ambient temperature range of -55°C to $+75^{\circ}\text{C}$.

Vacuum tube and transistor preamplifiers can be supplied if very high impedance inputs are required.

In addition to standard items, Freed Transformer Co. has extensive facilities for the design and production of special amplifiers, saturable reactors, and magnetic components.

Complete, comprehensive Engineering Data for Magnetic Amplifiers, Saturable Transformers and Transverters, including most recent developments is available on request. Send for catalog.

SATURABLE TRANSFORMERS designed for 115V-AC operation

CASE DIMENSIONS						
						
Case No.	Height	Width	Depth	Mtg. Centers	Mounting Studs	Knockout
MA 202	5 1/2"	4 1/8"	3 1/2"	3 1/4" x 2 1/2"	(4) 10:32	(2) 2 1/4" x 3/4"
MA 203	2 7/8"	2 9/16"	1 3/4"	2 1/8" x 1 5/8"	(4) 6:32	1 1/2" D
MA 204	2 1/4"	2 1/4"	2 1/8"	1 5/8" x 1 3/8"	(4) 6:32	1 1/2" D
MA 205	4"	3 7/8"	3 3/8"	3 1/4" x 3 5/8"	(4) 8:32	1 1/2" D
MA 206	3 1/8"	1 5/8"	2 3/8"	1 1/8" x 1 7/8"	(4) 6:32	1" D

Catalog No.	Supply Frequency C.P.S.	Rated Power Output—W.	Rated Voltage Output—V-AC	†Signal Req'd for Full Output MA-DC	Total Res. of Control Wdgs. K Ω	‡Response Time		Typical Motor Load	Case No.
						On	Off		
MAS-1	60	15	115	6.0	27	2	5	Diehl FPE 25-11	MA 202
MAS-2	400	6	115	4.0	4	3	6	Kearfott R 110-2	MA 203
MAS-5	400	2.7	26	4.0	3.3	8	2	Kearfott R 118	MA 204
MAS-6	400	30.0	115	4.0	8	11	9	Diehl FPE 49-13-1	MA 205
MAS-7	400	40.0	115	5.5	8	12	9	Bendix CK 3000-1-A	MA 205
MAS-8	400	5	130	9	14	20	13	Kearfott R 110-2 Kearfott R 111-2	MA 206
	400	10	125	11	14	20	13		MA 206

†Coils connected in series.

‡Response time measured in cycles supply frequency necessary to obtain 63% (On) or 37% (Off) of steady state output in response to a DC step input.

NOTE: ALL SATURABLE TRANSFORMERS ARE HERMETICALLY SEALED.

TRANSISTOR CONVERTERS

Freed Transformer Co. now makes available from stock a line of reliable, highly efficient static DC to DC and DC to AC converters.

DC to DC converters in hermetically sealed cans. RF filters included inside case.

- Rugged, quiet, maintenance free, long life operation.
- High power to weight ratio, arc-free operation.

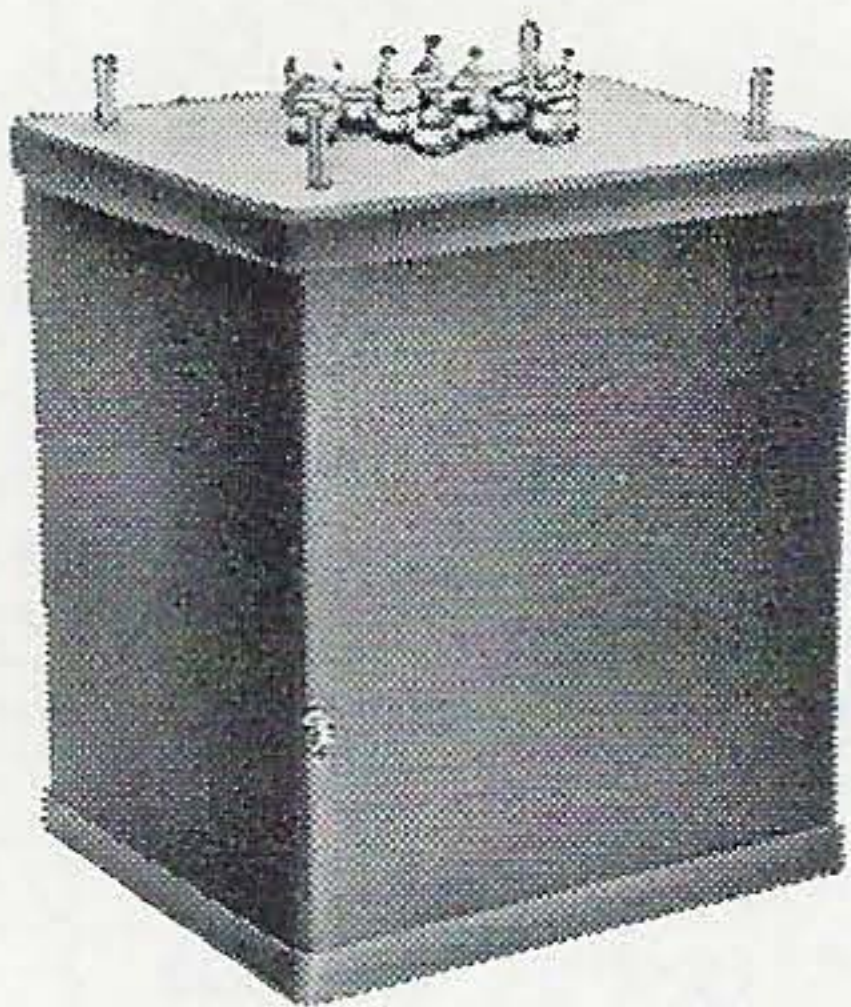
DC to DC CONVERTERS

Freed No.	Input VDC	Output		Size
		VDC	IDC	
MAC- 6.2.1	6.3	150	.049	2 5/8 W x 2 1/4 D x 3 1/2 H = DC2B 3 7/8 H x 3 3/16 x 3 1/16 = JB
MAC- 6.3.1	6.3	195	.080	
MAC-12.2.1	12.6	300	.043	DC2B
MAC-12.2.2	12.6	180	.072	DC2B
MAC-12.4.1	12.6	390	.100	JB
MAC-12.4.2	12.6	245	.170	JB
MAC-12.4.3	12.6	350	.120	JB
MAC-12.4.4	12.6	225	.218	JB
MAC-26.2.1	26	250	.100	DC2B
MAC-26.2.2	26	600	.043	DC2B
MAC-26.2.3	26	360	.072	DC2B
MAC-26.4.1	26	600	.140	JB
MAC-26.4.2	26	450	.190	JB
MAC-26.4.3	26	450†	.190	JB

†Tap at 225 Volts.

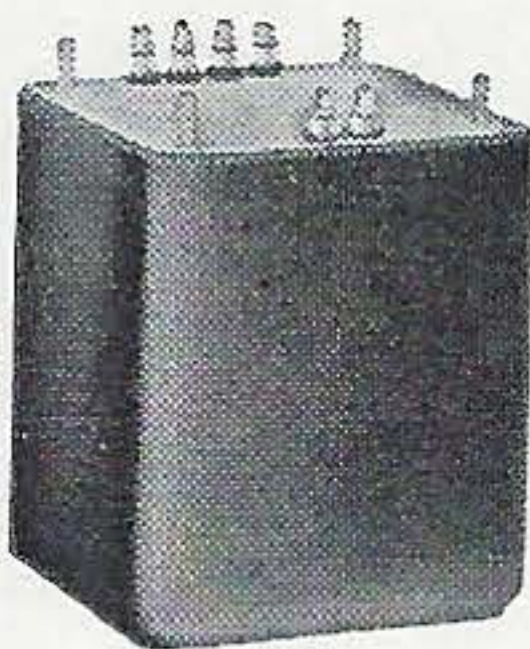
Also available for AC Square wave output at slightly higher ratings.

DC-2B CASE



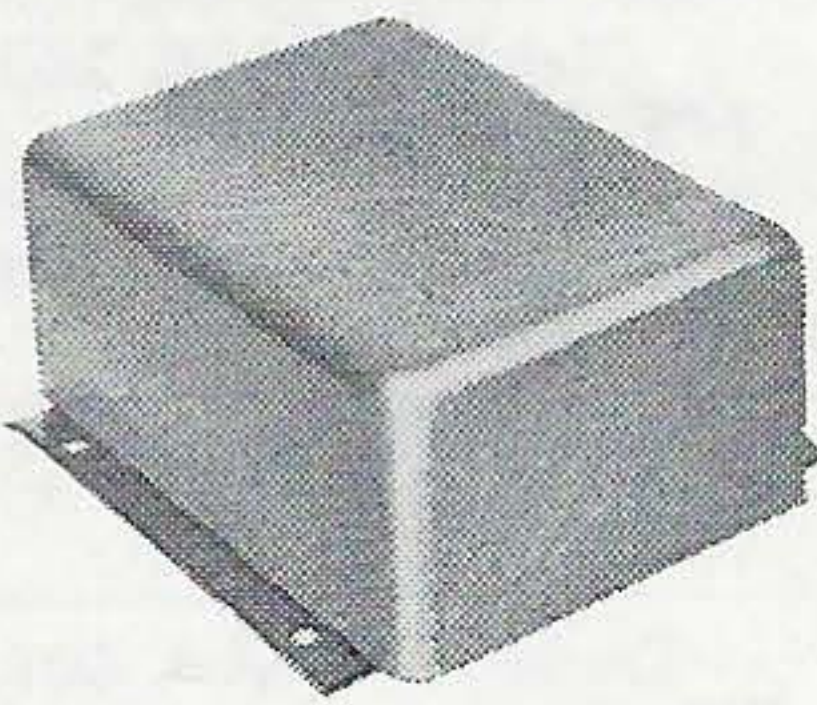
Height: 3 1/2"
Width: 2 5/8"
Depth: 2 1/4"
Mtg. Cen.: 2" x 1 3/4"
Studs: 4 8-32
Knockout: 1 1/2" dia.

JB CASE



Height: 3 7/8"
Width: 3 9/16"
Depth: 3 1/16"
Mtg. Cen.: 2 5/8" x 2 1/8"
Studs: 4 8-32

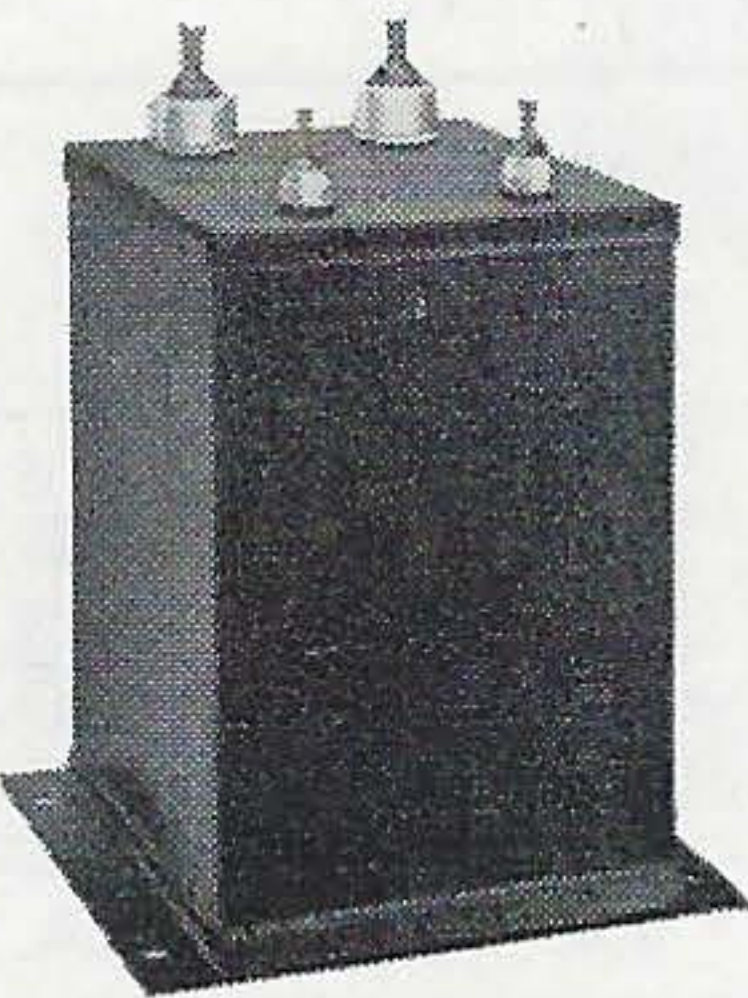
MAC-6-30-1 CASE



Height: 3"
Width: 5 1/2"
Depth: 8"

MAC-12-20-1 CASE

Height: 3"
Width: 5 1/2"
Depth: 8"



MAC-12-30-2 CASE

Height: 7"
Width: 4 3/4"
Depth: 5 7/8"

DC to AC CONVERTERS

Freed No.	Input Voltage	Output VA	Output Voltage and Frequency	Output Regulation	Weight
MAC-6-30-1**	6 volt battery	150 watts maximum Fixed Load	115 volts* 60 cycles	—	7 lbs.
MAC-12-20-1**	12 volt battery	170 watts Fixed Load	115 volts* 60 cycles	—	7 lbs.
MAC-12-30-2**	12 volt battery	250 watts maximum	115 volts* 60 cycles	10%	16 lbs.

*Output voltage varies directly with input voltage.

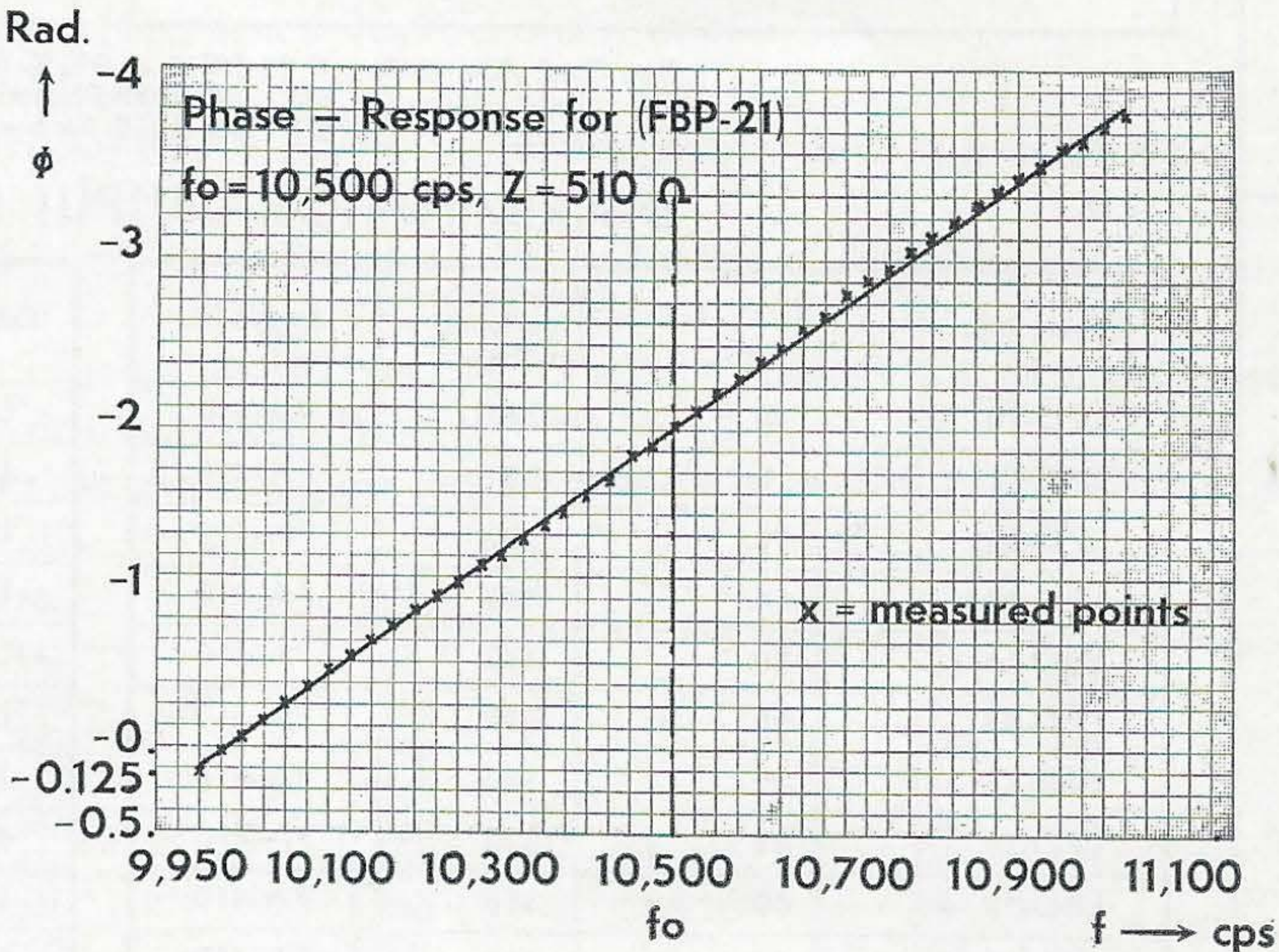
**Hermetically sealed.

A COMPLETE LINE OF CONSTANT VOLTAGE TRANSFORMERS IS NOW AVAILABLE—WRITE FOR COMPLETE INFORMATION.

TELEMETERING COMPONENTS

A complete line of Band Pass Filters, Low Pass Filters and Discriminators is available for multi-channel telemetering applications. These components cover the frequency range from 400 cps to 70,000 cps. The filters feature **exceptional phase linearity**, excellent selectivity characteristics and plug-in construction. The Discriminators, either fixed or slug tuned, have exceptional linearity, high amplification, and utmost stability.

PHASE LINEARITY GRAPH FOR
FREED TELEMETERING FILTERS
FBP-10 THROUGH FBP-57



TELEMETERING BAND PASS FILTERS

These filters cover the frequencies from 400 c.p.s. to 70KC. Narrow frequency B.P.F. have a band width of $\pm 9\frac{3}{4}\%$ of center frequency and 45 DB (minimum) points at $\pm 7\frac{1}{2}\%$ of center frequency of higher or lower adjacent channels. Wide frequency B.P.F. have a band width of $\pm 19\frac{1}{2}\%$ of center frequency and 50 D.B. points at $\pm 15\%$ of center frequencies of higher or lower second adjacent channels.

CASE DIMENSIONS

FA-5 CASE



Height: 4 1/2"
Width: 3 1/2"
Depth: 2 1/8"
Mtg. Cen.: 27/16" x 19/16"
Studs: 5-8-32 x 1/2"
Octal Header

FA-10 CASE



Height: 4 1/2"
Width: 3 1/2"
Depth: 2 1/8"
Mtg. Cen.: 11 1/16" x 19/16"
Studs: 4-8-32 x 1/2"
Knockout: 1 1/2" dia.

FA-15 CASE

Height: 4 1/2"
Width: 2 7/8"
Depth: 2 1/8"
Mtg. Cen.: 11 1/16" x 19/16"
Studs: 4-8-32 x 1/2"
Knockout: 1 1/2" dia.

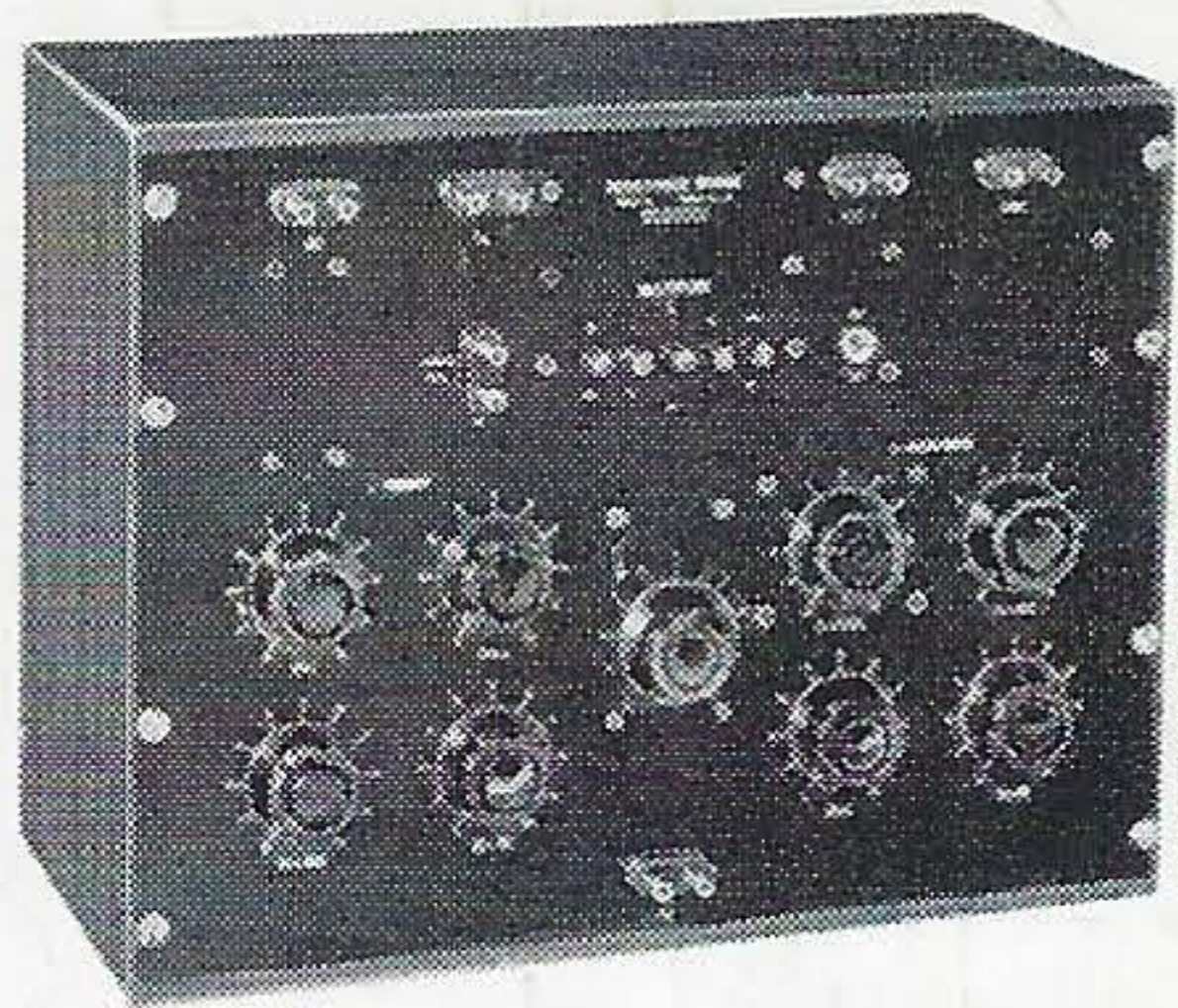
Characteristic Impedance 500 Ω			
Catalog No.	Center Frequency c.p.s.	3 DB Band Width % of C.F.	Case No.
FBP-10	400	± 9 3/4	FA-10
FBP-11	560	± 9 3/4	FA-10
FBP-12	730	± 9 3/4	FA-10
FBP-13	960	± 9 3/4	FA-10
FBP-14	1,300	± 9 3/4	FA-10
FBP-15	1,700	± 9 3/4	FA-10
FBP-16	2,300	± 9 3/4	FA-10
FBP-17	3,000	± 9 3/4	FA-15
FBP-18	3,900	± 9 3/4	FA-15
FBP-19	5,400	± 9 3/4	FA-15
FBP-20	7,350	± 9 3/4	FA-15
FBP-21	10,500	± 9 3/4	FA-15
FBP-22	12,300	± 9 3/4	FA-15
FBP-23	14,500	± 9 3/4	FA-15
FBP-24	22,000	± 9 3/4	FA-15
FBP-25	22,000	± 19 1/2	FA-15
FBP-26	30,000	± 9 3/4	FA-15
FBP-27	30,000	± 19 1/2	FA-15
FBP-28	40,000	± 9 3/4	FA-15
FBP-29	40,000	± 19 1/2	FA-15
FBP-30	52,500	± 9 3/4	FA-15
FBP-31	52,500	± 19 1/2	FA-15
FBP-32	70,000	± 9 3/4	FA-15
FBP-33	70,000	± 19 1/2	FA-15

Characteristic Impedance 2,500 Ω			
Catalog No.	Center Frequency c.p.s.	3 DB Band Width % of C.F.	Case No.
FBP-34	400	± 9 3/4	FA-5
FBP-35	560	± 9 3/4	FA-5
FBP-36	730	± 9 3/4	FA-5
FBP-37	960	± 9 3/4	FA-5
FBP-38	1,300	± 9 3/4	FA-5
FBP-39	1,700	± 9 3/4	FA-5
FBP-40	2,300	± 9 3/4	FA-5
FBP-41	3,000	± 9 3/4	FA-5
FBP-42	3,900	± 9 3/4	FA-5
FBP-43	5,400	± 9 3/4	FA-5
FBP-44	7,350	± 9 3/4	FA-5
FBP-45	10,500	± 9 3/4	FA-5
FBP-46	12,300	± 9 3/4	FA-5
FBP-47	14,500	± 9 3/4	FA-5
FBP-48	22,000	± 9 3/4	FA-5
FBP-49	22,000	± 19 1/2	FA-5
FBP-50	30,000	± 9 3/4	FA-5
FBP-51	30,000	± 19 1/2	FA-5
FBP-52	40,000	± 9 3/4	FA-5
FBP-53	40,000	± 19 1/2	FA-5
FBP-54	52,500	± 9 3/4	FA-5
FBP-55	52,500	± 19 1/2	FA-5
FBP-56	70,000	± 9 3/4	FA-5
FBP-57	70,000	± 19 1/2	FA-5

FREED

LABORATORY TEST INSTRUMENTS

Set a new standard for
performance, accuracy and dependability



TYPE 1110-AB
INCREMENTAL INDUCTANCE BRIDGE



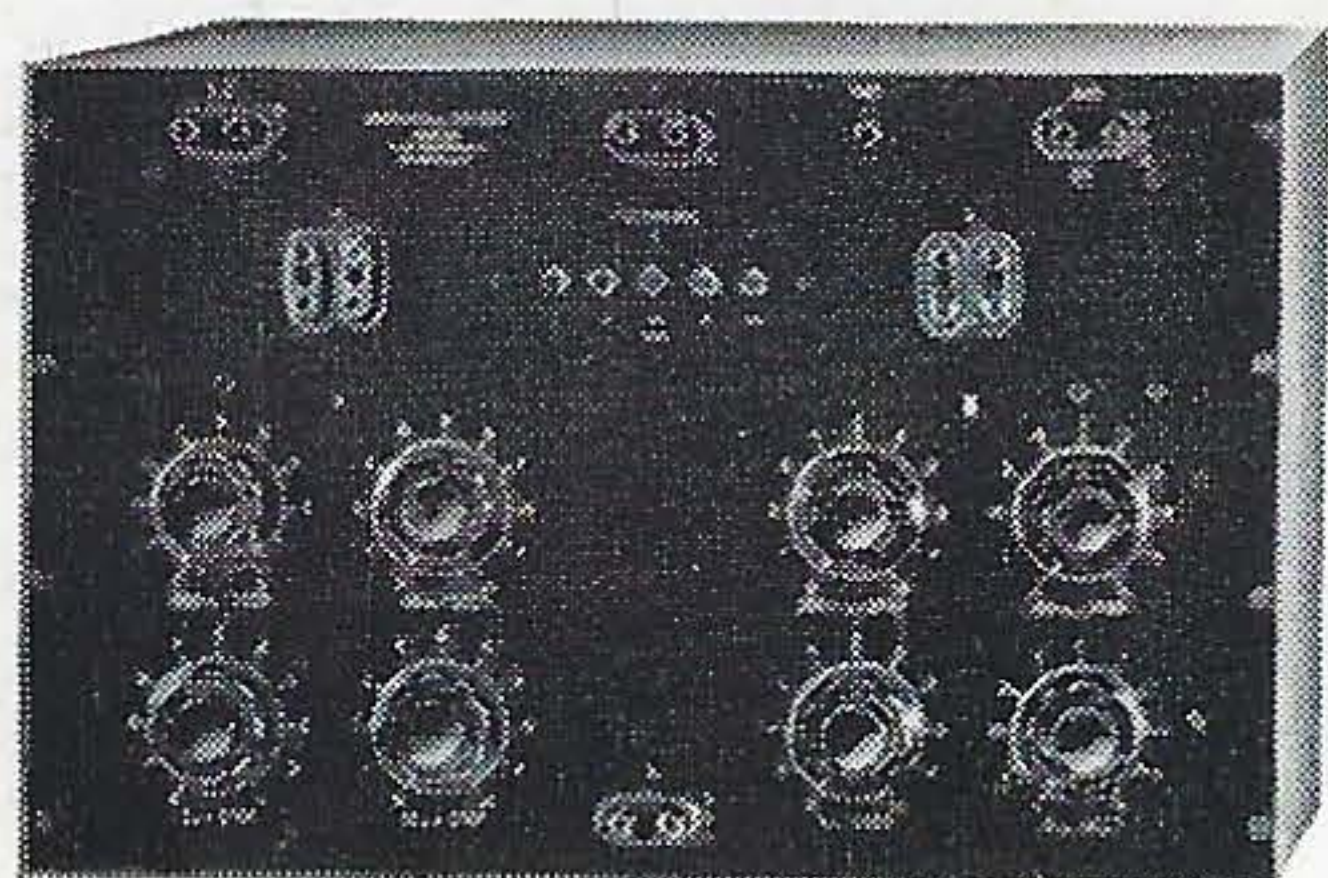
TYPE 1140-A
NULL DETECTOR AMPLIFIER



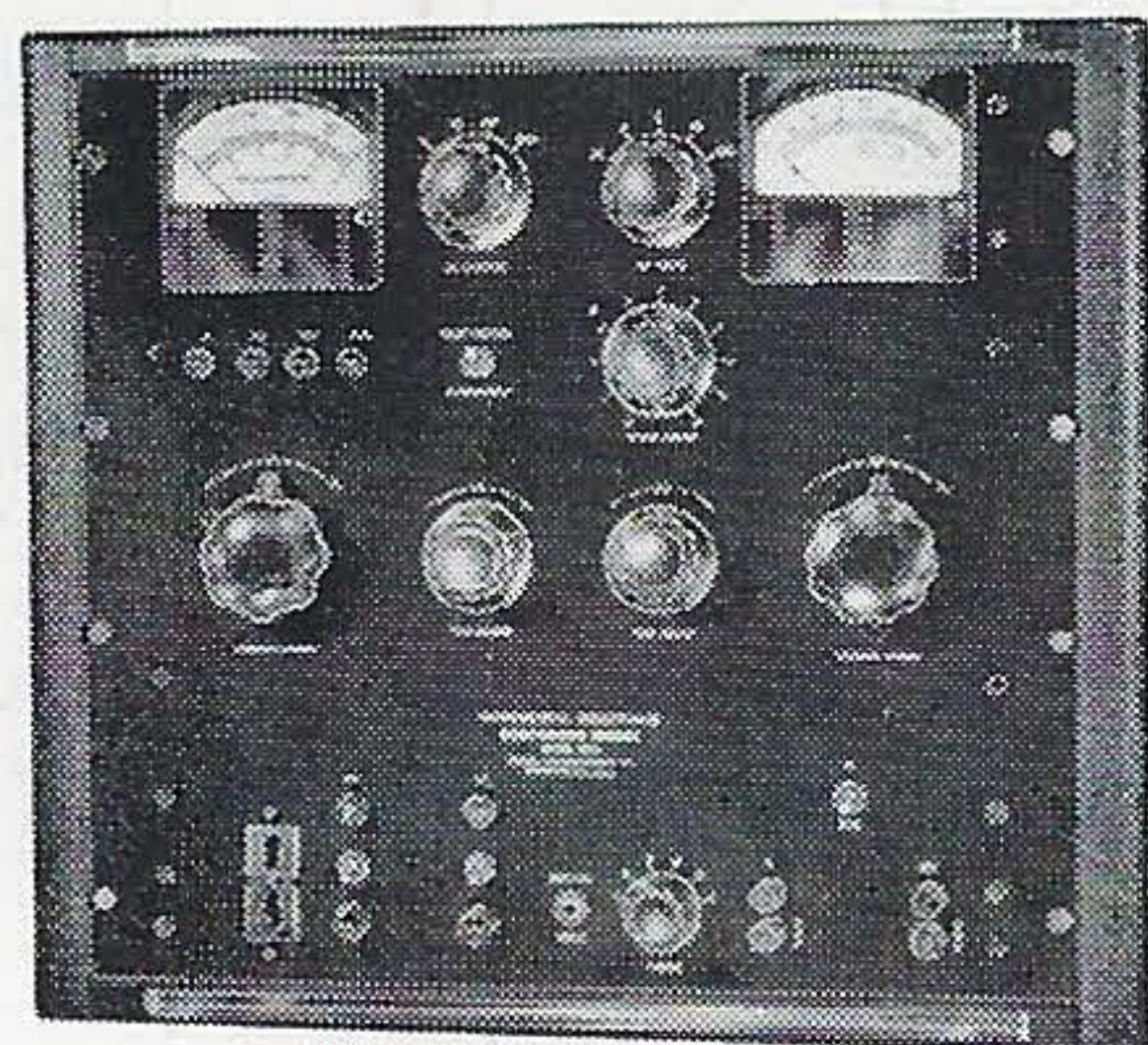
TYPE 1180
A.C. SUPPLY



TYPE 1170
D.C. SUPPLY



TYPE 1150
UNIVERSAL BRIDGE



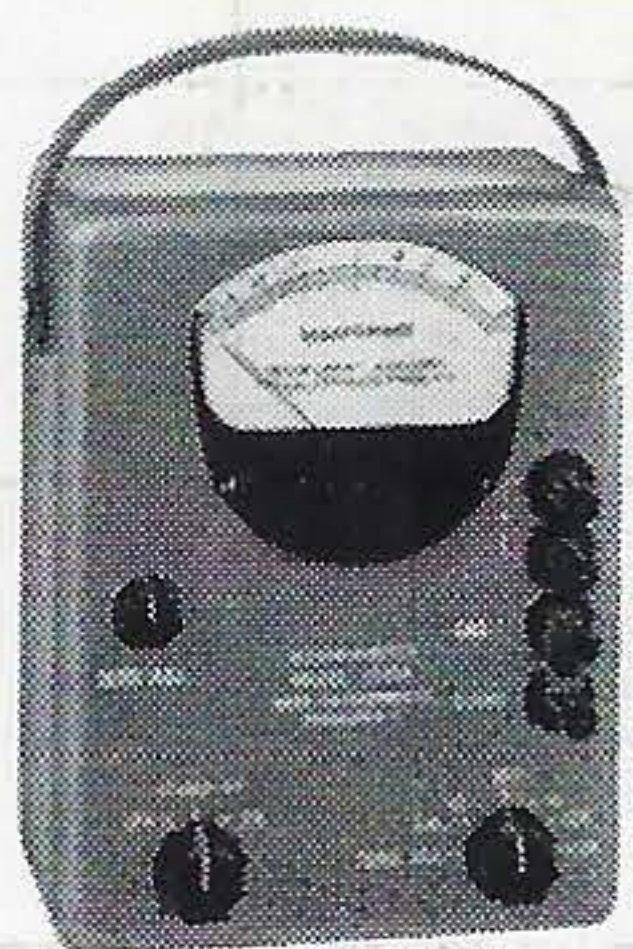
TYPE 1870 INCREMENTAL
INDUCTANCE COMPARISON BRIDGE



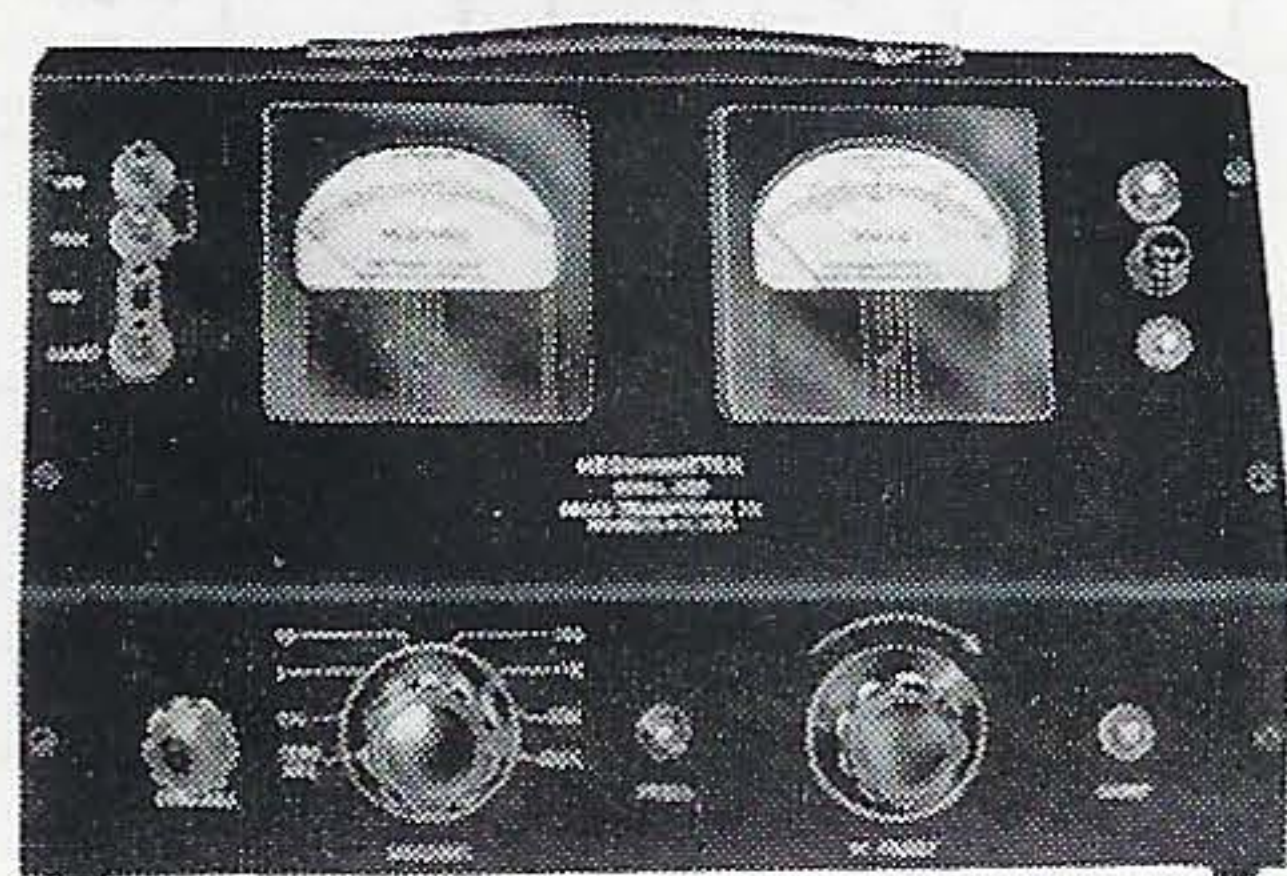
TYPE 1210-A
NULL DETECTOR AND
VACUUM TUBE VOLTMETER



TYPE 1940
INTERSTAGE FILTER



TYPE 2030
BATTERY OPERATED
PORTABLE MEGOHMMETER



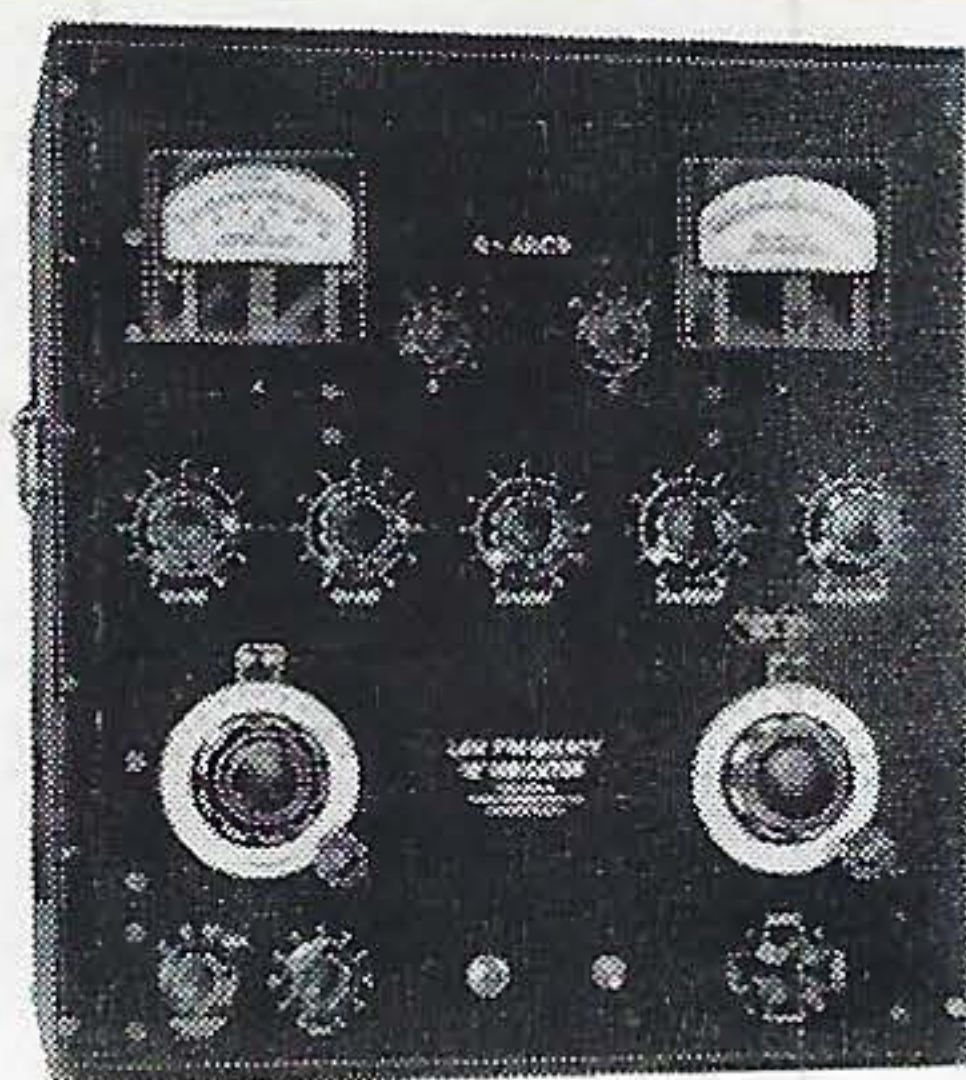
TYPE 1620
VARIABLE TEST
VOLTAGE MEGOHMMETER



TYPE 1020-B
MEGOHMMETER



TYPE 2050
NULL DETECTOR (ALL TRANSISTOR)



TYPE 1030-A
LOW FREQUENCY "Q" INDICATOR



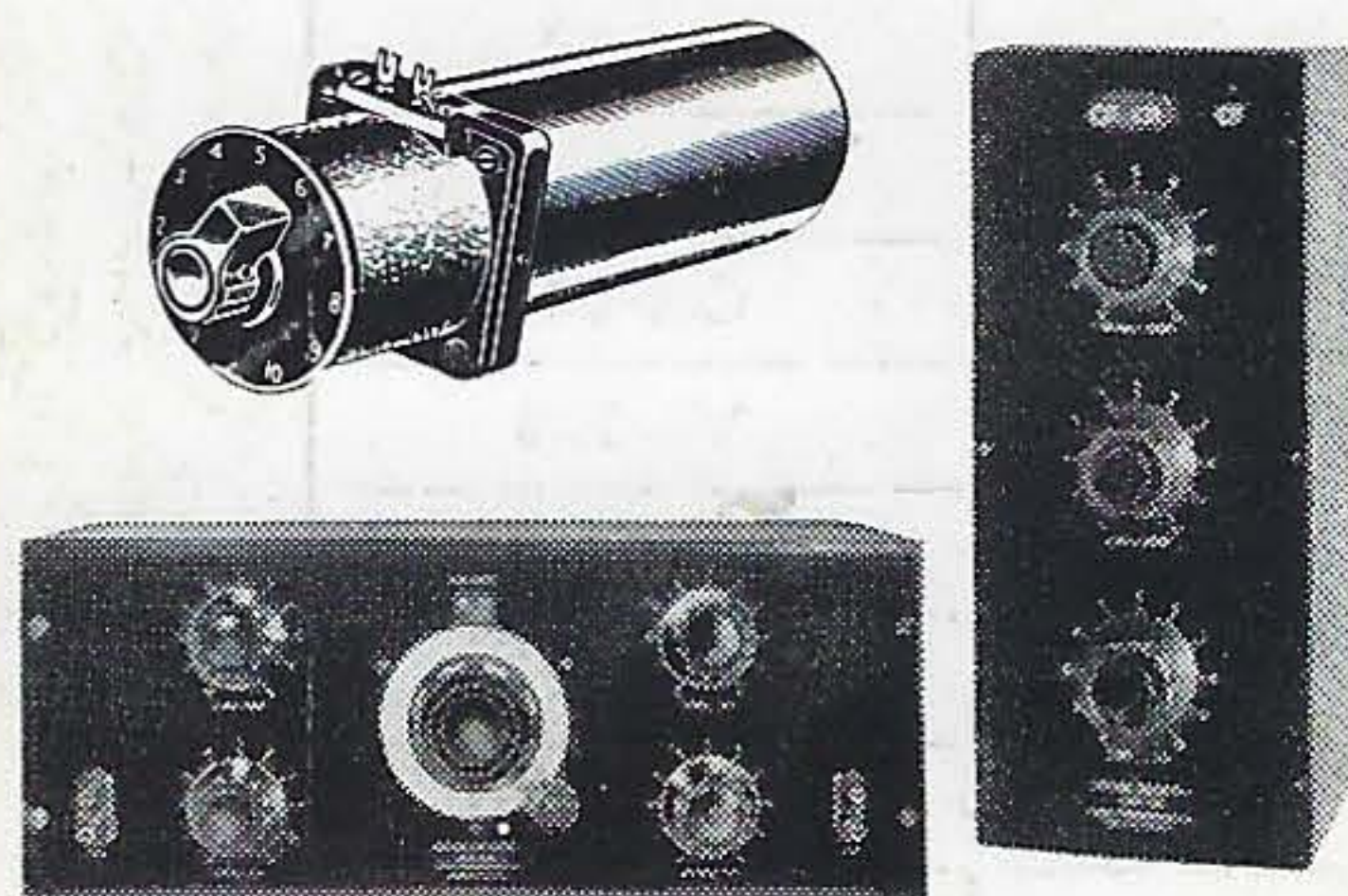
TYPE 1010-A
COMPARISON LIMIT BRIDGE



TYPE 1560
A.C. DIFFERENTIAL VOLTMETER



TYPE 1410
WIDE BAND AND CARRIER
FREQUENCY DISTORTION METER



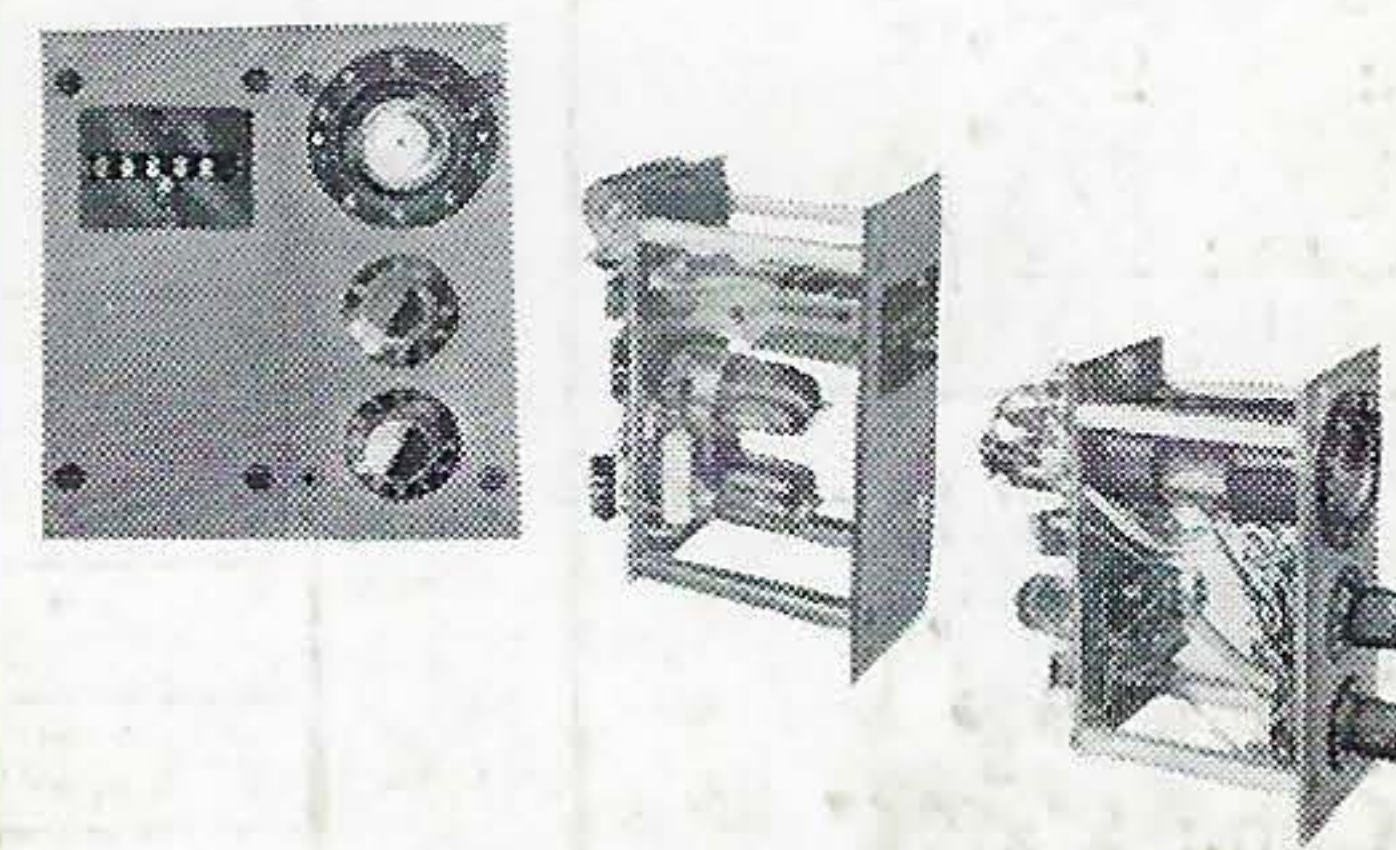
DECADE CAPACITORS
AND INDUCTORS



TYPE 2020
INDUSTRIAL ELECTRONIC COUNTERS



TYPE 2022
ELECTRONIC COUNTER



3000 SERIES
MODULAR COUNTERS

FREED TRANSFORMER CO., INC.

1718 WEIRFIELD ST., BROOKLYN (Ridgewood) 27, N.Y.

PRINTED IN U.S.A.

CASE DIMENSIONS

FA-1 CASE



Height: 4 1/2"
Width: 1 1/2"
Depth: 1 1/2"
Mtg. Cen.: 31/32 sq.
4 Inserts: 6-32
Knockout: 1"

FA-185 CASE



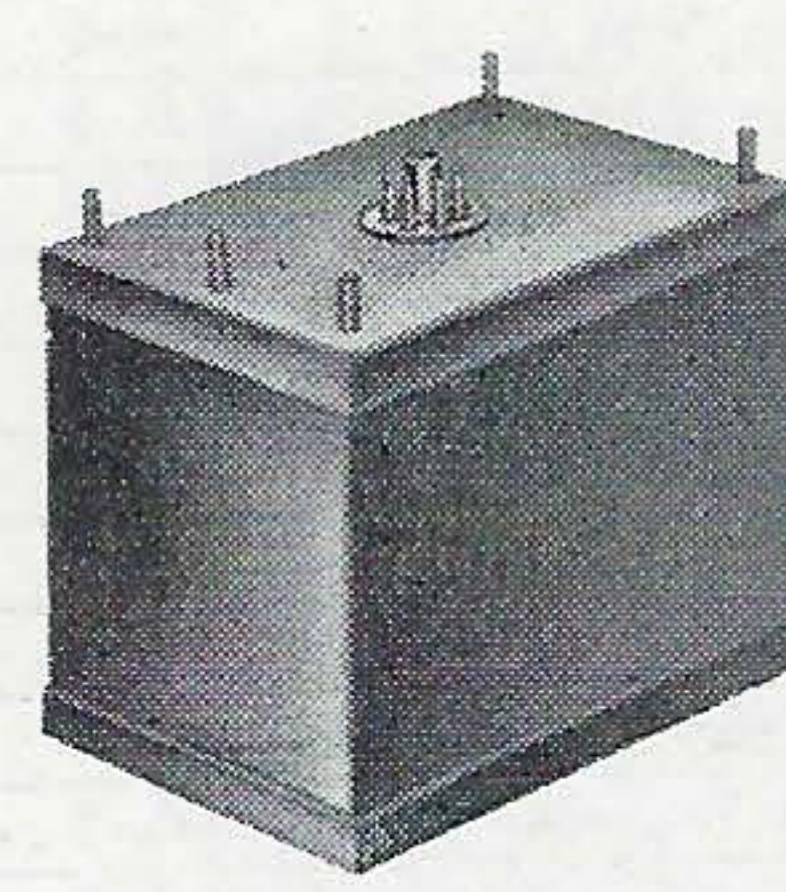
Height: 4 1/2"
Width: 1 7/8"
Depth: 1 5/8"
Mtg. Cen.: 1 15/64" x 1 1/16"
4 Inserts: 6-32
Knockout: 1 1/2"

FA-190 CASE



Height: 4 1/2"
Width: 2 1/4"
Depth: 1 5/8"
Mtg. Cen.: 1 17/32" x 1 1/16"
4 Inserts: 6-32
Knockout: 1 1/2"

FA-410 CASE



Height: 4 1/2"
Width: 6"
Depth: 4"
Mtg. Cen.: 5 1/4" x 3 1/4"
5 Studs: 10-32
Octal Header

DISCRIMINATOR INPUT LOW PASS FILTER

Catalog No.	Fo Center Freq. in c.p.s.	Characteristic Impedance Ohms	Case No.
LPI-10	400	30,000	FA-1
LPI-11	560	30,000	FA-1
LPI-12	730	30,000	FA-1
LPI-13	960	30,000	FA-1
LPI-14	1,300	30,000	FA-1
LPI-15	1,700	30,000	FA-1
LPI-16	2,300	30,000	FA-1
LPI-17	3,000	30,000	FA-1
LPI-18	3,900	30,000	FA-1

Catalog No.	Fo Center Freq. in c.p.s.	Characteristic Impedance Ohms	Case No.
LPI-19	5,400	30,000	FA-1
LPI-20	7,350	30,000	FA-1
LPI-21	10,500	30,000	FA-1
LPI-22	12,300	30,000	FA-1
LPI-23	14,500	30,000	FA-1
LPI-24	22,000	5,100	FA-1
LPI-25	30,000	5,100	FA-1
LPI-26	40,000	5,100	FA-1
LPI-27	52,500	5,100	FA-1
LPI-28	70,000	5,100	FA-1

Pass Band Attenuation: 0.05 DB at $\pm 9\frac{3}{4}\%$ of center frequency
30 DB at third harmonic of Pass Band Frequencies
50 DB at fifth harmonic of Pass Band Frequencies

DISCRIMINATOR OUTPUT LOW PASS FILTER

Catalog No.	Fo c. p. s.	Characteristic Impedance Ohms	Case No.
LPO-10	6	330	FA-410
LPO-11	8	330	FA-410
LPO-12	11	330	FA-410
LPO-13	14	330	FA-410
LPO-14	20	330	FA-410
LPO-15	25	330	FA-410
LPO-16	35	330	FA-410
LPO-17	45	330	FA-410
LPO-18	60	330	FA-410
LPO-19	81	330	FA-410
LPO-20	110	330	FA-410
LPO-21	160	330	FA-410
LPO-22	185	330	FA-410

Catalog No.	Fo c. p. s.	Characteristic Impedance Ohms	Case No.
LPO-23	220	330	FA-410
LPO-24	330	330	FA-410
LPO-25	450	330	FA-410
LPO-26	600	330	FA-410
LPO-27	660	330	FA-410
LPO-28	790	330	FA-410
LPO-29	900	330	FA-410
LPO-30	1,050	330	FA-410
LPO-31	1,200	330	FA-410
LPO-32	1,600	330	FA-410
LPO-33	2,100	330	FA-410
LPO-34	7,200	330	FA-410
LPO-35	10,000	330	FA-410

Attenuation: < 0.2 DB up to 0.5 times Fo
< 0.7 DB from 0.5 to 1. times Fo
> 20 DB at 2 Fo to 2.5 Fo
> 30 DB from 2.5 times Fo to 100 Kc.

SLUG TUNED DISCRIMINATORS

Catalog No.	Center Frequency (Kc.)	% Deviation of Fo	Linearity	D.C. Output Volts	Case No.
DST-17	3.0	$\pm 8\frac{1}{2}\%$	$\pm 0.5\%$	32.5	FA-190
DST-18	3.9	$\pm 8\frac{1}{2}\%$	$\pm 0.5\%$	32.5	FA-190
DST-19	5.4	$\pm 8\frac{1}{2}\%$	$\pm 0.5\%$	32.5	FA-190
DST-20	7.35	$\pm 8\frac{1}{2}\%$	$\pm 0.5\%$	32.5	FA-190
DST-21	10.5	$\pm 8\frac{1}{2}\%$	$\pm 0.5\%$	32.5	FA-190
DST-22	12.3	$\pm 8\frac{1}{2}\%$	$\pm 0.5\%$	32.5	FA-190
DST-23	14.5	$\pm 8\frac{1}{2}\%$	$\pm 0.5\%$	32.5	FA-190
DST-24	22.0	$\pm 8\frac{1}{2}\%$	$\pm 0.5\%$	32.5	FA-190
DST-25	30.0	$\pm 8\frac{1}{2}\%$	$\pm 0.5\%$	32.5	FA-190

Catalog No.	Center Frequency (Kc.)	% Deviation of Fo	Linearity	D.C. Output Volts	Case No.
DST-26	40.0	$\pm 8\frac{1}{2}\%$	$\pm 0.5\%$	32.5	FA-190
DST-27	52.5	$\pm 8\frac{1}{2}\%$	$\pm 0.5\%$	32.5	FA-190
DST-28	70.0	$\pm 8\frac{1}{2}\%$	$\pm 0.5\%$	32.5	FA-190
DST-29	22.0	$\pm 15\%$	$\pm 1.0\%$	26.0	FA-190
DST-30	30.0	$\pm 15\%$	$\pm 1.0\%$	26.0	FA-190
DST-31	40.0	$\pm 15\%$	$\pm 1.0\%$	26.0	FA-190
DST-32	52.5	$\pm 15\%$	$\pm 1.0\%$	26.0	FA-190
DST-33	70.0	$\pm 15\%$	$\pm 1.0\%$	26.0	FA-190

FIXED DISCRIMINATORS

Catalog No.	Center Frequency (cps)	% Deviation of Fo	Linearity	D.C. Output Volts	Case No.
DST-10	400	$\pm 8\frac{1}{2}\%$	$\pm 0.5\%$	32.5	FA-185
DST-11	560	$\pm 8\frac{1}{2}\%$	$\pm 0.5\%$	32.5	FA-185
DST-12	730	$\pm 8\frac{1}{2}\%$	$\pm 0.5\%$	32.5	FA-185
DST-13	960	$\pm 8\frac{1}{2}\%$	$\pm 0.5\%$	32.5	FA-185

Catalog No.	Center Frequency (cps)	% Deviation of Fo	Linearity	D.C. Output Volts	Case No.
DST-14	1,300	$\pm 8\frac{1}{2}\%$	$\pm 0.5\%$	32.5	FA-185
DST-15	1,700	$\pm 8\frac{1}{2}\%$	$\pm 0.5\%$	32.5	FA-185
DST-16	2,300	$\pm 8\frac{1}{2}\%$	$\pm 0.5\%$	32.5	FA-185

WRITE FOR COMPLETE TELEMETERING TECHNICAL DATA—CATALOG NO. 592

FREED TRANSFORMER COMPANY, INC.

FREED FILTERS

Freed Standard Filters are **Hermetically Sealed Miniature** high performance components designed for both production and laboratory applications in the Communications and Electronic industry. In order to achieve attenuation requirements not obtainable with one single filter, one can combine several standard filters of different transmission characteristics. Wide Band Pass characteristics are obtainable by combining low and high Pass Units. The astatic construction of inductive components together with special shielding reduces the hum pick-up of the standard filters.

The standard filters are available in Low Pass, High Pass and Band Pass Filters.

Low Pass Filters: The attenuation characteristics of Low Pass Filters are 6db or less at cut-off frequency, 35db or more at 1.5 cut-off frequency and 40 db or more at 2 cut-off frequency.

ILP Interstage Low Pass Filter. Characteristic impedance 10,000 ohms, in and out.

LLP Line Low Pass Filter. Characteristic Impedance 500 to 600 Ω, in and out.

High Pass Filters: The attenuation characteristics of High Pass Filters are 6db or less at cut-off frequency, 35db and 40db or more at 0.67 and 0.5 cut-off frequency.

IHP Interstage High Pass Filter. Characteristic Impedance 10,000 ohms, in and out.

LHP Line High Pass Filter. Characteristic Impedance 500 to 600 Ω, in and out.

Band Pass Filters: The attenuation characteristics of Band Pass Filters are 2db or less at plus or minus 3% of center frequency 40db or more at 0.5 and 2 center frequency.

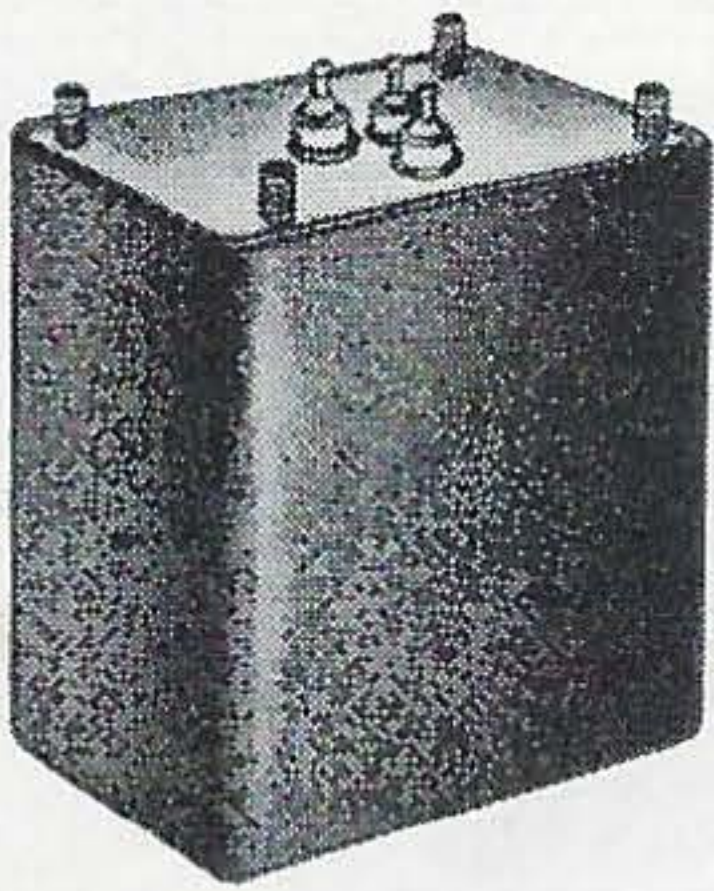
IBP Interstage Band Pass Filter. Nominal input impedance — 10,000 ohms. Nominal output impedance 5 megohms or grid of vacuum tube. Effective voltage step-up 2:1. (Output voltage to source voltage.)

LBP Line Band Pass Filter. Nominal input impedance 500 to 600 ohms. Nominal output impedance 5 megohms or grid of vacuum tube. Effective voltage step-up 9:1. (Output voltage to source voltage).

Special filters in all six types are available for any frequency from 200 to 20,000 cycles.

CASE DIMENSIONS

DF-1 CASE

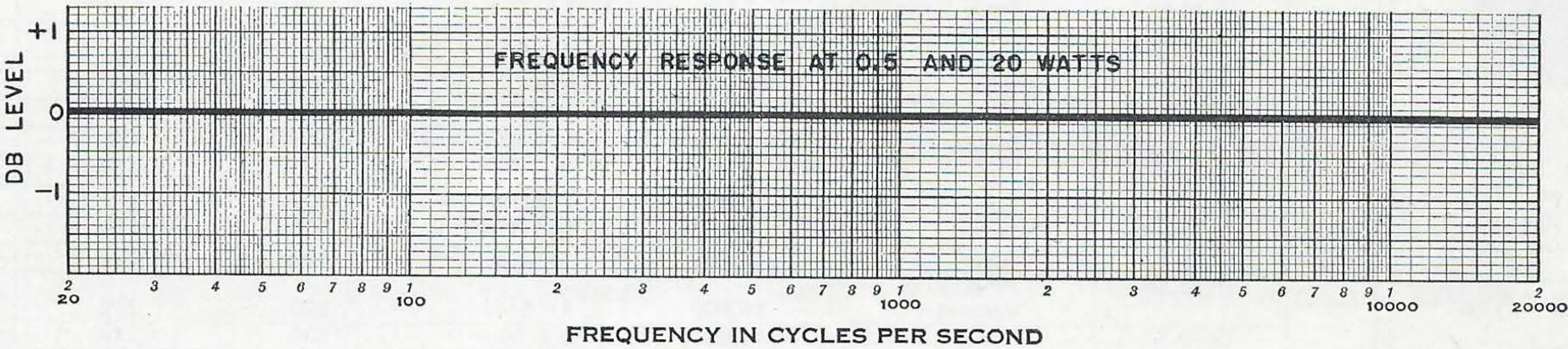


Height: 2 1/2"
Width: 1 11/16"
Depth: 1 3/16"
Mtg. Cen.: 1 1/4" x 3/4"
Studs: 4—6-32x3/8"
Knockout: 7/8" dia.

Catalog No.	Cut-off Frequency c.p.s.
ILP- 500	500
ILP- 750	750
ILP- 1,500	1,500
ILP- 1,600	1,600
ILP- 2,000	2,000
ILP- 2,500	2,500
ILP- 3,000	3,000
ILP- 7,000	7,000
ILP- 15,000	15,000
ILP- 20,000	20,000
LLP- 1,500	1,500
LLP- 1,600	1,600
LLP- 2,000	2,000
LLP- 2,500	2,500
LLP- 3,000	3,000
IHP- 300	300
IHP- 400	400
IHP- 1,000	1,000
IHP- 2,000	2,000
LHP- 300	300
LHP- 400	400
LHP- 1,000	1,000

Catalog No.	Center Frequency
IBP - 200	200
IBP - 250	250
IBP - 400	400
IBP - 800	800
IBP - 1,000	1,000
IBP - 1,500	1,500
IBP - 2,000	2,000
IBP - 3,000	3,000
IBP - 5,600	5,600
IBP -10,000	10,000
IBP -15,000	15,000
LBP- 300	300
LBP- 400	400
LBP- 600	600
LBP- 1,000	1,000
LBP- 1,500	1,500
LBP- 2,000	2,000
LBP- 3,000	3,000
LBP-10,000	10,000
LBP-20,000	20,000

NEW CIRCUIT REVISES WILLIAMSON HI-FIDELITY AMPLIFIER FOR IMPROVED PERFORMANCE.



FREED supplies the following parts from stock.

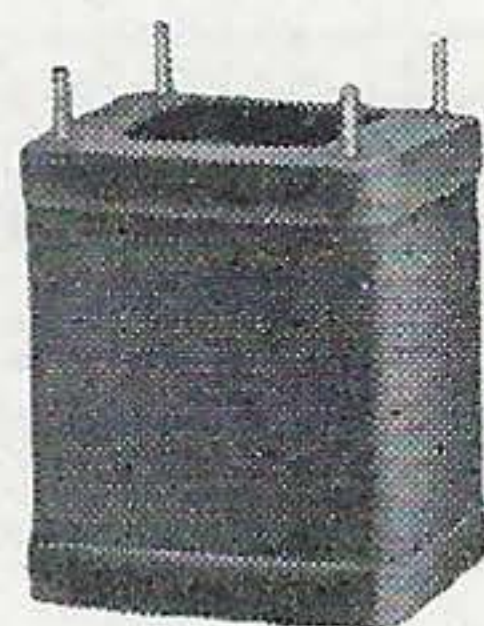
- Frequency response: .1DB from 20 to 30,000 cps. at 20W.
- Harmonic distortion: 0.4% from 20 to 30,000 cps. at 20W.
- Two section L-C filter for improved stable performance.
- 20 Watt output connected as Williamson amplifier.
- 10 Watt output connected as ultra linear amplifier.

For case dimensions VS-304, VS-506, VS-606 see page 29, and CH-40 see page 30.

Catalog No.	Application	Rating	Case No.
KA-10	output transf.	Prim: 10,000 Ω ct. Sec. 16/8 Ω	VS-506
KC-10	filter reactor	12Hy at 165MA, RDC 180 Ω	VS-304
KC-11	filter reactor	20Hy at 30MA, RDC 1,250 Ω	CH-40
KP-10	power transf.	Pri: 115V 60cps; Sec. 1: 1100 Vct at 150MA; Sec. 2:6.3Vct at 4A; Sec. 3: 5V at 3A.	VS-606
PCB-10		Printed circuit board	6"x9"

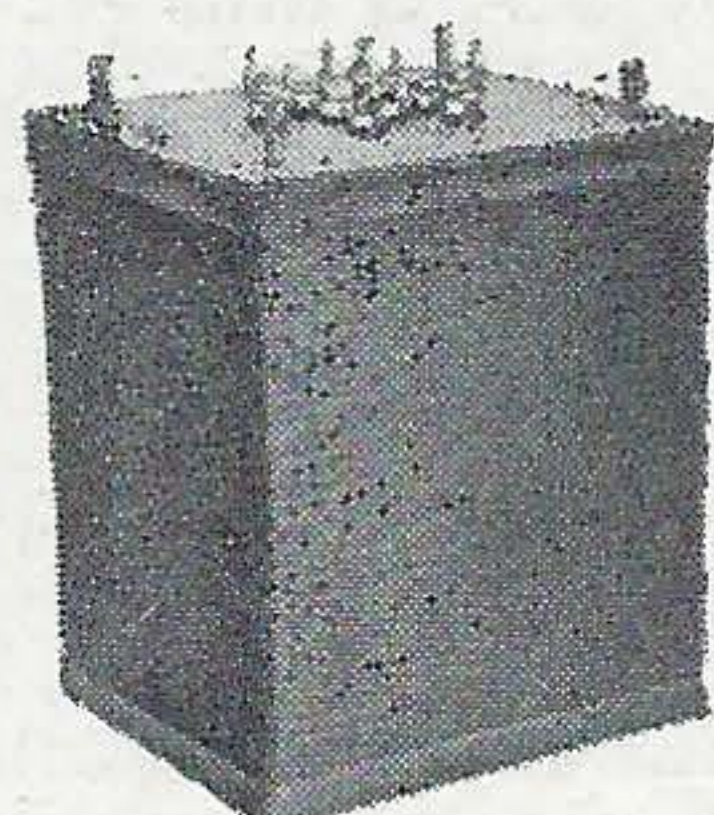
CASE DIMENSIONS

DC-4 CASE



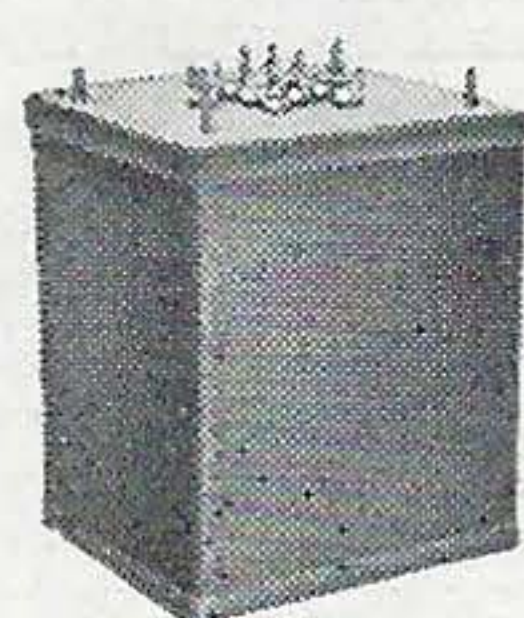
Height: $4\frac{3}{4}$ "
 Width: $3\frac{1}{8}$ "
 Length: 3"
 Mounting: 4 8-32 Studs
 Mtg. Cen.: $2\frac{1}{2}$ " x $2\frac{1}{2}$ "
 Cutout: (2) $1\frac{3}{8}$ " x $\frac{5}{8}$ "

DC-6B CASE



Height: 6"
 Width: 5"
 Length: $4\frac{1}{8}$ "
 Mounting: 4 10-32 Sds.
 Mtg. Cen.: $3\frac{3}{4}$ " x 3"
 Cutout: 3" Dia.

OL-MA-2 CASE



Height: 4"
 Width: $4\frac{5}{8}$ "
 Length: $3\frac{15}{16}$ "
 Mounting: 4 10-32 Sds.
 Mtg. Cen.: $2\frac{1}{2}$ " x $3\frac{3}{4}$ "
 Cutout: (2) $2\frac{3}{4}$ " x $\frac{3}{4}$ "

OL-112-1 CASE

Height: 6"
 Width: $5\frac{7}{8}$ "
 Length: $4\frac{3}{4}$ "
 Mounting: 4 $\frac{1}{4}$ -20 Sds.
 Mtg. Cen.: $4\frac{3}{4}$ " x $3\frac{5}{8}$ "
 Cutout: 3" dia.

EA CASE



Height: $2\frac{11}{16}$ "
 Width: $1\frac{7}{8}$ "
 Length: $1\frac{3}{4}$ "
 Mounting: 4 6-32 Studs
 Mtg. Cen.: $1\frac{3}{8}$ " x $1\frac{1}{4}$ "
 Cutout: $1\frac{3}{16}$ "

DM-03 CASE



Height: $2\frac{1}{2}$ "
 Width: $1\frac{1}{2}$ "
 Length: $1\frac{1}{2}$ "
 Mounting: 4 6-32 Studs
 Mtg. Cen.: $1\frac{1}{16}$ " x $1\frac{1}{16}$ "
 Cutout: $1\frac{1}{4}$ " Dia.

ULTRASONICS

New developments and applications of ultrasonics for industrial cleaning, soldering, welding, and mixing have created a demand for generators and components specifically designed for ultrasonic applications.

Using the latest developments in the field of special magnetic materials the FREED ultrasonic transformers are designed for greatest efficiency and maximum reliability. They feature small size, excellent performance and long life under continuous duty operation.

Transformers with an extended frequency range (frequencies up to 2 MC) can be supplied upon request.

ULTRASONIC DRIVER AND INPUT TRANSFORMERS

Frequency response: ± 1 DB 10 KC to 60 KC.

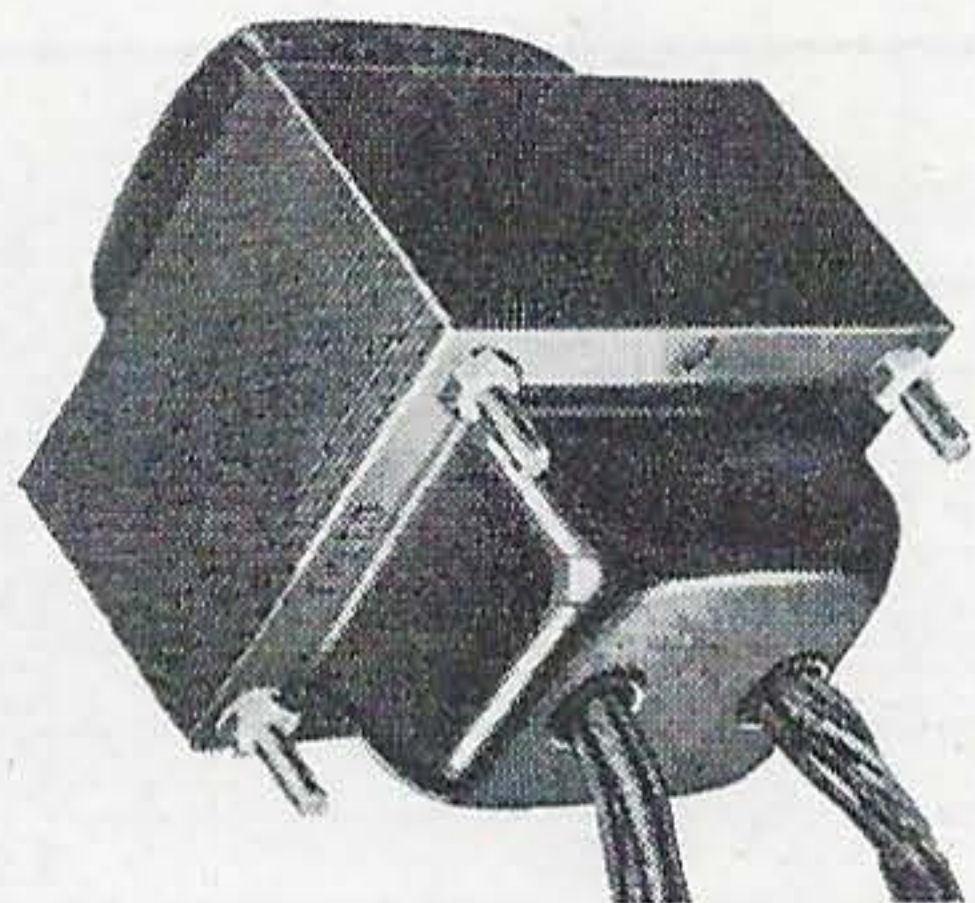
Catalog No.	Application	Primary Impedance Ohms	Ratio	Maximum Power Watts	Maximum Primary D.C. per Side Ma.	Case Size
ULI-20	Transducer to PP 811A	1, 2, 4	1:17.3	5		DM-03
ULD-20	PP 6CM6 to PP 811A	10,000	4.4:1	5	50	DM-03
ULD-50	PP 5881 to PP 8000	7,200	1.7:1	25	90	FH-EA

ULTRASONIC OUTPUT TRANSFORMERS

Frequency response: ± 1 DB 20 KC to 60 KC.

Catalog No.	Application	Impedance in Ohms Primary	Secondary	Maximum Power Watts	Maximum Primary D.C. per Side Ma.	Case Size
ULO-10	PP 6083 to transducer	7,600	1/4	100	120	DC-4B
ULO-11	Same	7,600	2/8	100	120	DC-4B
ULO-12	Same	7,600	4/16	100	120	DC-4B
ULO-13	Same	7,600	7.5/30	100	120	DC-4B
ULO-30	PP 811A to transducer	12,400	1/4	300	170	DC-4B
ULO-31	Same	12,400	2/8	300	170	DC-4B
ULO-32	Same	12,400	4/16	300	170	DC-4B
ULO-33	Same	12,400	7.5/30	300	170	DC-4B
ULO-34	Same	12,400	25	300	170	DC-4B
ULO-35	Same	12,400	125/500	300	170	DC-4B
ULO-36	Same	12,400	250/1000	300	170	DC-4B
ULO-37	Same	12,400	75/300	300	170	DC-4B
ULO-52	PP 8000 to transducer	10,800	4/16	500	230	OL-MA-2
ULO-53	Same	10,800	7.5/30	500	230	OL-MA-2
ULO-54	Same	10,800	25/100	500	230	OL-MA-2
ULO-55	Same	10,800	125/500	500	320	OL-MA-2
ULO-56	Same	10,800	250/1000	500	230	OL-MA-2
ULO-101	PP. Par. 8000 to transducer	5,400	25/100	1000	430	DC-6B
ULO-104	Same	5,400	75/300	1000	430	DC-6B
ULO-110	PP 4-250A to transducer	10,900	18.8/75/300	800	250	OL-112-1

CASE DIMENSIONS



Case No.	Height	Width	Depth	Mtg. Centers	Mtg. Studs
HS300	2 $\frac{5}{8}$	3	2 $\frac{1}{2}$	2 $\frac{1}{2}$ x2	(4) $\frac{1}{16}$ x $\frac{3}{8}$
HS303	2 $\frac{7}{8}$	3	2 $\frac{1}{2}$	2 $\frac{1}{2}$ x2	(4) "
HS306	3 $\frac{1}{4}$	3	2 $\frac{1}{2}$	2 $\frac{1}{2}$ x2	(4) "
HS307	3 $\frac{3}{8}$	3	2 $\frac{1}{2}$	2 $\frac{1}{2}$ x2	(4) "
HS503	3 $\frac{1}{2}$	3 $\frac{3}{4}$	3 $\frac{1}{8}$	3 $\frac{1}{8}$ x2 $\frac{1}{2}$	(4) "
HS505	3 $\frac{3}{4}$	3 $\frac{3}{4}$	3 $\frac{1}{8}$	3 $\frac{1}{8}$ x2 $\frac{1}{2}$	(4) "
HS603	3 $\frac{3}{4}$	4 $\frac{1}{2}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$ x3	(4) "
HS605	4	4 $\frac{1}{2}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$ x3	(4) "
HS606	4 $\frac{5}{16}$	4 $\frac{1}{2}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$ x3	(4) "
HS610	4 $\frac{5}{8}$	4 $\frac{1}{2}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$ x3	(4) "
HS612	4 $\frac{7}{8}$	4 $\frac{1}{2}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$ x3	(4) "
HS708	5 $\frac{7}{8}$	5 $\frac{1}{4}$	4 $\frac{3}{8}$	4 $\frac{3}{8}$ x3 $\frac{1}{2}$	(4) $\frac{9}{32}$ x2 $\frac{1}{32}$
HS709	6	5 $\frac{1}{4}$	4 $\frac{3}{8}$	4 $\frac{3}{8}$ x3 $\frac{1}{2}$	(4) "



Case No.	Height	Width	Depth	Mtg. Centers	Mtg. Holes
VS300	3 $\frac{5}{32}$	2 $\frac{5}{8}$	2 $\frac{3}{4}$	2x1 $\frac{1}{16}$	(4) $\frac{3}{16}$ x $\frac{3}{8}$
VS303	3 $\frac{5}{32}$	2 $\frac{5}{8}$	3	2x1 $\frac{1}{16}$	(4) "
VS304	3 $\frac{29}{32}$	4 $\frac{1}{4}$	3 $\frac{1}{4}$	2 $\frac{1}{2}$ x3	(4) "
VS306	3 $\frac{5}{32}$	2 $\frac{5}{8}$	3 $\frac{3}{8}$	2x2 $\frac{1}{16}$	(4) "
VS307	3 $\frac{5}{32}$	2 $\frac{5}{8}$	3 $\frac{1}{2}$	2x2 $\frac{1}{16}$	(4) "
VS503	3 $\frac{29}{32}$	3 $\frac{1}{4}$	3 $\frac{5}{8}$	2 $\frac{1}{2}$ x2 $\frac{5}{16}$	(4) "
VS505	3 $\frac{29}{32}$	3 $\frac{1}{4}$	3 $\frac{7}{8}$	2 $\frac{1}{2}$ x2 $\frac{5}{8}$	(4) "
VS506	3 $\frac{29}{32}$	3 $\frac{1}{4}$	4 $\frac{1}{4}$	2 $\frac{1}{4}$ x3	$\frac{3}{16}$ x $\frac{3}{8}$
VS508	3 $\frac{5}{8}$	2 $\frac{5}{8}$	3 $\frac{1}{8}$	2x2 $\frac{1}{8}$	(4) "
VS603	4 $\frac{21}{32}$	3 $\frac{7}{8}$	3 $\frac{7}{8}$	3x2 $\frac{1}{16}$	(4) "
VS605	4 $\frac{21}{32}$	3 $\frac{7}{8}$	4 $\frac{1}{8}$	3x2 $\frac{1}{16}$	(4) "
VS606	4 $\frac{21}{32}$	3 $\frac{7}{8}$	4 $\frac{1}{4}$	3x3 $\frac{1}{8}$	(4) "
VS610	4 $\frac{21}{32}$	3 $\frac{7}{8}$	4 $\frac{3}{4}$	3x3 $\frac{9}{16}$	(4) "
VS612	4 $\frac{21}{32}$	3 $\frac{7}{8}$	5	3x3 $\frac{15}{16}$	(4) "
VS708	5 $\frac{7}{16}$	4 $\frac{9}{16}$	5 $\frac{3}{4}$	3 $\frac{1}{2}$ x4	(4) $\frac{9}{32}$ x2 $\frac{1}{32}$
VS709	5 $\frac{7}{16}$	4 $\frac{9}{16}$	5 $\frac{7}{8}$	3 $\frac{1}{2}$ x4 $\frac{1}{8}$	(4) "

REPLACEMENT GRADE COMPONENTS

These components are designed to meet the demand for low-cost replacement parts for commercial electronic equipment.

The best commercially available materials have been utilized in the design of these units, to insure reliability and excellent performance characteristics. Vacuum impregnation with a non-hygroscopic varnish to prevent penetration of humidity are employed to give these units long life and trouble-free performance.

230-115 V, 50-60 C. P. S. Stepdown Transformers rated from 25 V A up to 5,000 V A Rating and line booster transformers are included in this series.

All units, with only a few exceptions, are uncased or of shell-type construction.

Isolation transformers and Stepdown transformers are equipped with line cord and receptacle.

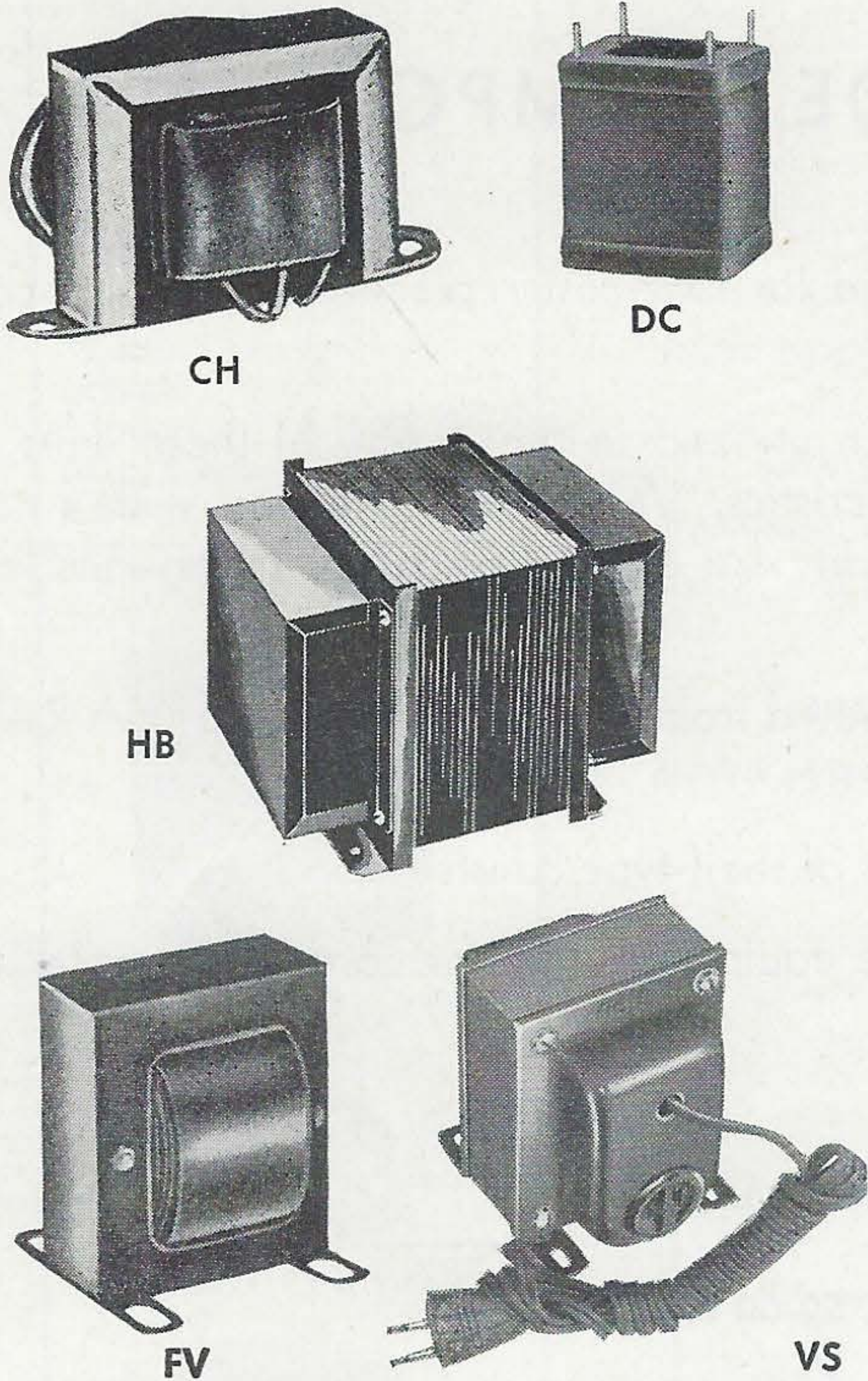
POWER TRANSFORMERS

All primaries designed for 115-volt, 50-60 cycle operation.

Catalog No.	Py Va	Hi Volt	Choke Input D.C.V. D.C.Ma.	Cond. Input D.C.V. D.C.Ma.	Bias Tap	Rectifier	Fil. No. 1	Fil. No. 2	Fil. No. 3	Case No.
RGP 1 RGP 2	45 "	500V CT		270 40		6X4, 5Y3	5/6.3V @ 2A	6.3V @ 2A		VS300 HS300
RGP 3 RGP 4	57 "	600V CT		330 50		6X4, 5Y3	5/6.3V @ 2A	6.3V @ 2.5A		VS303 HS303
RGP 5 RGP 6	64 "	650V CT		370 50		6X4, 5Y3	5/6.3V @ 2A	6.3V @ 3A		VS303 HS303
RGP 7 RGP 8	73 "	600V CT		320 70		6X4, 5Y3	5/6.3V @ 2A	6.3V @ 3A		VS306 HS306
RGP 9 RGP 10	110 "	650V CT	225 140	330 100		5Y3, 5U4	5V @ 3A	6.3V @ 5A		VS503 HS503
RGP 11 RGP 12	76 "	700V CT	260 100	385 70		5Y3	5V @ 2A	6.3V @ 2.5A		VS307 HS307
RGP 13 RGP 14	108 "	700V CT	250 125	370 90		5Y3, 5U4	5V @ 3A	6.3V @ 5A		VS503 HS503
RGP 15 RGP 16	127 "	700V CT	260 170	350 120		5U4	5V @ 3A	6.3V @ 5A		VS505 HS505
RGP 17 RGP 18	146 "	700V CT	260 210	350 150		5U4	5V @ 3A	6.3V @ 5A	6.3V @ 1A	VS603 HS603
RGP 19 RGP 20	207 "	800V CT	295 280	400 200		5U4, 2-5Y3	5V @ 4A	6.3V @ 6A		VS606 HS606
RGP 21 RGP 22	225 "	800V CT	295 280	400 200	80	5U4, 2-5Y3	5V @ 4A	6.3V @ 6A	5/6.3V @ 2A	VS606 HS606
RGP 23 RGP 24	268 "	840V CT	330 350	450 250	80	2-5U4	5V @ 6A	6.3V @ 6A	5/6.3V @ 2A	VS612 HS612
RGP 25 RGP 26	320 "	900V CT	340 420	490 300	80	2-5U4	5V @ 6A	6.3V @ 6A	5/6.3V @ 2A	VS708 HS708
RGP 27 RGP 28	127 "	900V CT	360 150			5U4	5V @ 3A	6.3V @ 5A		VS603 HS603
RGP 29 RGP 30	150 "	900V CT	350 200			5U4	5V @ 3A	6.3V @ 5A		VS605 HS605
RGP 31 RGP 32	203 "	1100V CT	400 250			5R4GY	5V @ 3A	6.3V @ 5A		VS610 HS610
RGP 33 RGP 34	248 "	1100V CT	420 300			2-5R4GY	5V @ 4A	6.3V @ 7A		VS612 HS612
RGP 35 RGP 36	310 "	1280V CT	480 350			2-5R4GY	5V @ 4A	6.3V @ 7A		VS709 HS709

FREED TRANSFORMER COMPANY, INC.

CASE DIMENSIONS



REPLACEMENT GRADE COMPONENTS

FILAMENT TRANSFORMERS

All primaries are for 115V, 50/60 c.p.s.

Catalog No.	Secondary Voltage	Secondary Current Amps.	Secondary Test Voltage RMS	Case Size
TF 1	2.5 (C.T.)	7.5	1500	CH60
TF 2	2.5 (C.T.)	10	1500	CH70
TF 3	2.5 (C.T.)	5	7500	DC2B
TF 4	2.5 (C.T.)	10	7500	DC4A
TF 5	5.0 (C.T.)	4	1500	CH60
TF 6	5.0 (C.T.)	6	1500	CH70
TF 7	5.0 (C.T.)	10	1500	CH80
TF 8	5.0 (C.T.)	10	1500	FV10
TF 9	5.0 (C.T.)	20	2500	FV30
TF 10	5.0 (C.T.)	20	10,000	DC6A
TF 11	6.3 (C.T.)	1.35	1500	CH50
TF 12	6.3 (C.T.)	3	1500	CH60
TF 13	6.3 (C.T.)	5	1500	CH70
TF 14	6.3 (C.T.)	7	1500	FV12
TF 15	6.3 (C.T.)	10	1500	FV22
TF 16	10 (C.T.)	5	2500	CH80
TF 17	10 (C.T.)	5	2500	FV10
TF 18	10 (C.T.) or 11 (C.T.) (tapped primary)	12 or 11	7500	DC-5C
TF 19	12.6 (C.T.)	2	1500	CH62

TF 3, 4 & 10 supplied with terminals. All others with leads.

AUTO TRANSFORMERS

To be used as step-down transformer. Equipped with standard receptacle and line cord.

Catalog No.	Transformation	VA Rating	Weight (lbs.)	Case Size
SDT 1*	230/115 V. 50/60 c.p.s.	25	1	CH-60
SDT 2*	230/115 V. 50/60 c.p.s.	50	1 1/4	CH-62
SDT 3	230/115 V. 50/60 c.p.s.	50	2 1/2	VS-300
SDT 4	230/115 V. 50/60 c.p.s.	100	3	VS-401
SDT 5	230/115 V. 50/60 c.p.s.	200	5	VS-501
SDT 6	230/115 V. 50/60 c.p.s.	300	6 1/2	VS-601
SDT 7	230/115 V. 50/60 c.p.s.	400	8	VS-604
SDT 8	230/115 V. 50/60 c.p.s.	500	11	VS-611
SDT 9	230/115 V. 50/60 c.p.s.	750	15	VS-706
SDT 10	230/115 V. 50/60 c.p.s.	1000	23	VS-718
SDT 11	230/115 V. 50/60 c.p.s.	1500	29 1/2	VS-728
SDT 12*	230/115 V. 50/60 c.p.s.	2000	37	HB-718
SDT 13*	230/115 V. 50/60 c.p.s.	2500	47	HB-728
SDT 14*	230/115 V. 50/60 c.p.s.	3000	58	HB-828
SDT 15*	230/115 V. 50/60 c.p.s.	5000	72	HB-920

*Supplied with leads without line cord and receptacle.

ISOLATION TRANSFORMERS

Electrostatic shield between primary and secondary. Equipped with standard receptacle and line cord.

Catalog Number	Primary Voltage 50/60 c.p.s.	Secondary Voltage	VA Rating	Case Size
IT 1	115	115	50	VS-401
IT 2	115	115	100	VS-503
IT 3	115	115	300	VS-700
IT 4	115	115	500	VS-714
IT 5*	220/440	110/220	250	VS-612
IT 6*	220/440	110/220	500	VS-714

*Supplied with leads without line cords and receptacle.

LINE BOOSTER TRANSFORMERS

Operates from 90 to 110 volts input to provide 10% step-up.

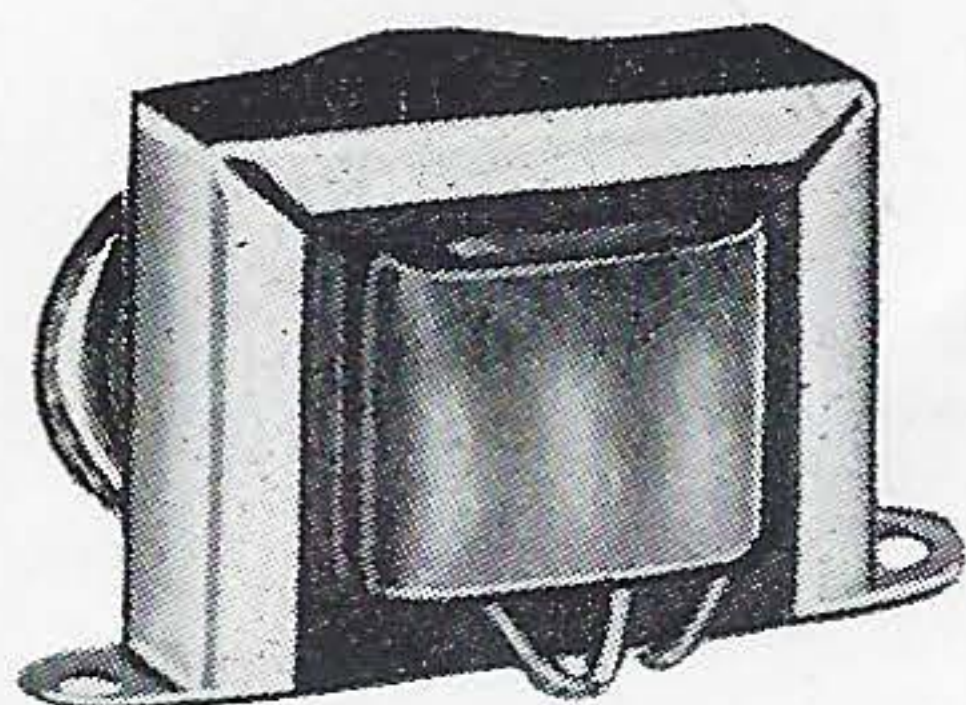
Catalog Number	Primary Voltage	Secondary Voltage	VA Rating	Case Size
LB-1	90-110	1.1 x input	350	VS-300
LB-2	90-110	1.1 x input	2000	VS-611

Case Co.	Height	Width	Depth	Mtg. Centers	Mtg. Studs
DC2B	3 1/2	2 5/8	2 1/4	2 x 1 3/4	(4) 8-32
DC4A	3 3/4	3 1/8	3	2 1/2 x 2 1/2	(4) 8-32
DC5C	4 7/8	4 1/8	3 1/2	3 3/8 x 2 5/8	(4) 10-32
DC6A	4 7/8	5	4 1/8	3 3/4 x 3	(4) 10-32
CH50	1 1/16	2 1/16	1 3/4	2 3/8	(2) 1/8
CH60	2	3 1/4	2	2 1/16	(2) 1/8
CH62	2	3 1/4	2 1/8	2 1/16	(2) 1/8
CH70	2 5/16	3 11/16	2 1/4	3 1/8	(2) 1/8
CH80	2 5/8	4	2 5/8	3 9/16	(2) 1/8
FV10	3 1/16	2 1/2	2 9/16	2 x 2	(4) 13/64 x 21/64
FV12	3 1/16	2 1/2	2 11/16	2 x 2 1/8	(4) 13/64 x 21/64
FV22	3 7/16	2 13/16	2 7/8	2 1/4 x 2 1/4	(4) 3/16 x 3/8
FV30	4 1/32	3 1/8	3	2 1/2 x 2 1/4	(4) 13/64 x 21/64
HB718	6 1/4	6 1/2	8 1/2	4 3/4 x 4 1/2	(4) 9/32 x 21/32
HB728	6 1/4	6 1/2	9 3/4	4 3/4 x 5 3/4	(4) 9/32 x 21/32
HB828	6 5/8	7 5/16	9 7/8	5 5/8 x 5 3/4	(4) 9/32 x 21/32
HB920	6 5/8	7 7/8	10 1/4	6 1/2 x 7 5/16	(4) 9/32 x 21/32
VS300	3 5/32	2 5/8	3	2 x 2	(4) 3/16 x 3/8
VS401	3 9/16	2 15/16	3 1/4	2 1/4 x 1 15/16	(4) 3/16 x 3/8
VS501	3 29/32	3 1/4	3 3/8	2 1/2 x 2 1/16	(4) 3/16 x 3/8
VS503	3 29/32	3 1/4	3 5/8	2 1/2 x 2 5/16	(4) 3/16 x 3/8
VS601	4 21/32	3 7/8	3 5/8	3 x 2 7/16	(4) 3/16 x 3/8
VS604	4 21/32	3 7/8	4	3 x 2 7/8	(4) 3/16 x 3/8
VS611	4 21/32	3 7/8	4 7/8	3 x 3 1/16	(4) 3/16 x 3/8
VS612	4 21/32	3 7/8	5	3 x 3 3/16	(4) 3/16 x 3/8
VS700	5 7/16	3 7/8	5	3 1/2 x 3 1/4	(4) 3/16 x 3/8
VS706	5 7/16	4 9/16	5 1/2	3 1/2 x 3 3/4	(4) 3/16 x 3/8
VS714	5 7/16	4 9/16	6 1/2	3 1/2 x 4 3/4	(4) 3/16 x 3/8
VS718	5 7/16	4 9/16	7	3 1/2 x 5 1/4	(4) 9/32 x 21/32
VS728	5 7/16	4 9/16	8 1/4	3 1/2 x 6 1/2	(4) 3/16 x 3/8

REPLACEMENT GRADE COMPONENTS

AUDIO TRANSFORMERS

CASE DIMENSIONS



CH-40 CASE

Height: $1\frac{1}{16}$ "
Width: $2\frac{3}{8}$ "
Depth: $1\frac{5}{8}$ "
Mtg. Cen.: $2\frac{1}{8}$ "

CH-50 CASE

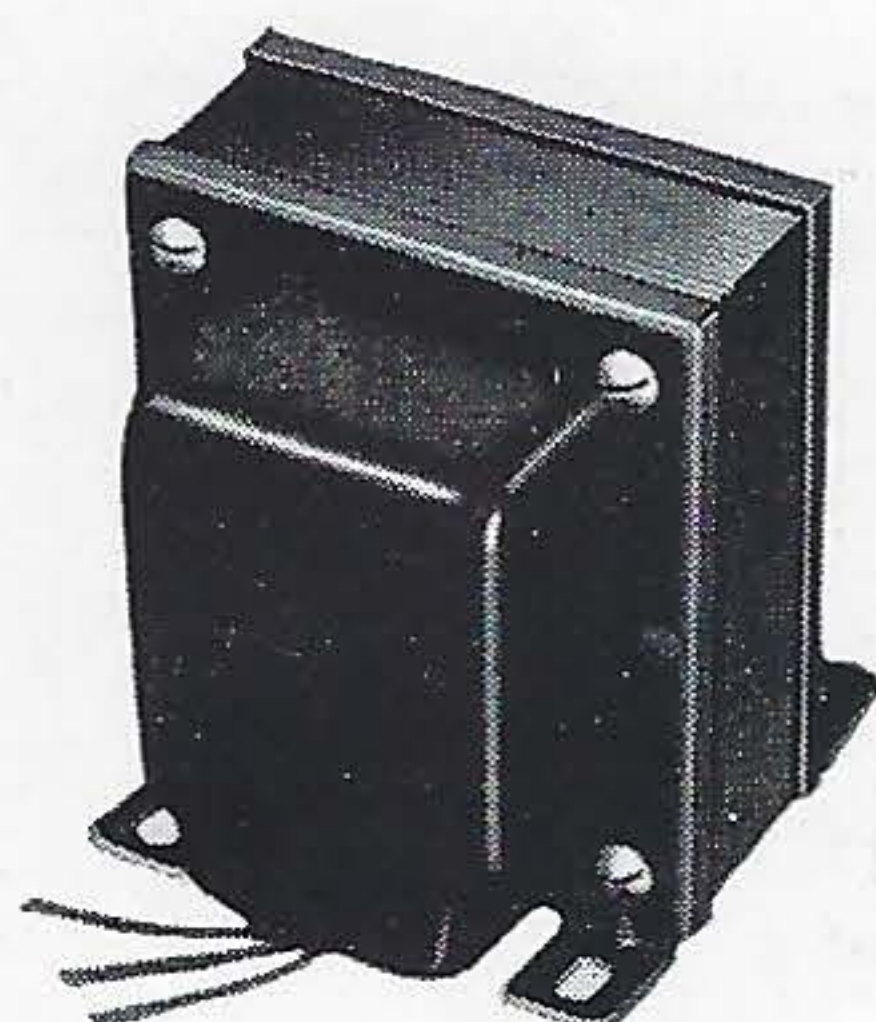
Height: $1\frac{1}{16}$ "
Width: $2\frac{13}{16}$ "
Depth: $1\frac{3}{4}$ "
Mtg. Cen.: $2\frac{3}{8}$ "

CH-60 CASE

Height: $2\frac{1}{8}$ "
Width: $3\frac{1}{4}$ "
Depth: $2\frac{1}{8}$ "
Mtg. Cen.: $2\frac{13}{16}$ "

CH-80 CASE

Height: $2\frac{5}{8}$ "
Width: $4\frac{1}{8}$ "
Depth: $2\frac{5}{8}$ "
Mtg. Cen.: $3\frac{9}{16}$ "



VS-100 CASE

Height: $2\frac{11}{32}$ "
Width: $1\frac{7}{8}$ "
Depth: $2\frac{1}{4}$ "
Mtg. Cen.: $1\frac{1}{2}$ "x $1\frac{1}{16}$ "

VS-300 CASE

Height: $3\frac{3}{32}$ "
Width: $2\frac{5}{8}$ "
Depth: $2\frac{3}{4}$ "
Mtg. Cen.: $2\frac{1}{8}$ "x $1\frac{11}{16}$ "

VS-303 CASE

Height: $3\frac{5}{8}$ "
Width: $2\frac{5}{8}$ "
Depth: $3\frac{1}{8}$ "
Mtg. Cen.: $2\frac{1}{2}$ "x $1\frac{15}{16}$ "
Mtg. Hole: (4) $\frac{3}{16}$ "x $\frac{3}{8}$ "

VS-306 CASE

Height: $3\frac{5}{8}$ "
Width: $2\frac{5}{8}$ "
Depth: $3\frac{3}{8}$ "
Mtg. Cen.: $2\frac{1}{2}$ "x $2\frac{5}{16}$ "
Mtg. Hole: (4) $\frac{3}{16}$ "x $\frac{3}{8}$ "

VS-308 CASE

Height: $3\frac{33}{64}$ "
Width: $2\frac{27}{32}$ "
Depth: $3\frac{3}{8}$ "
Mtg. Cen.: $2\frac{1}{2}$ "x $2\frac{9}{16}$ "

Catalog No.	Application	Impedance Level Ohms		Max. Power Level DBM or Power in Watts	Ratio	Max. Pri. D.C. per Side Ma.	D.C. Un-balance Ma.	Freq. Response C.P.S.	Case No.
		Primary	Secondary						
RGA 1	Input; multiple line or double button mike to single or push-pull grids.	500 CT 200 CT	100,000 CT	+20	1:14.1	50	5	± 2 DB 200-5000	CH-40
RGA 2	Input; single button mike to single or push-pull grids.	100	100,000 CT	+20	1:31.6	50		± 2 DB 200-5000	CH-40
RGA 3	Input; voice coil to grid. Intercom	3.2	100,000	+20	1:179			± 2 DB 200-5000	CH-40
RGA 4	Mixing and matching line to line.	600 CT 500 CT 200 CT 150/125/50	600 CT 500 CT 200 CT 150/125/50	+20	1:1			± 2 DB 100-5000	CH-40
RGA 5	Interstage; single triode plate to single or P.P. grids.	10,000	90,000 CT	+30	1:3	10		± 2 DB 200-5000	CH-40
RGA 6	Output; single plate to line or mixer.	10,000	600 CT 500 CT 200 CT 150/125/50	+30	4.8:1	10		± 2 DB 200-5000	CH-40
RGA 7	Output; Push-pull plate to line or mixer.	20,000 CT	600 CT 500 CT 200 CT 150/125/50	+30	6.32:1	10	1	± 2 DB 200-5000	CH-40
RGA 8	Output; plate to V.C. 6AL6, 6L6, 6Y6, 25B6, 25C6, 35A5, 35B5, 35C5, 50B5, 50C5, 50C6, 50L6, 117N7.	2500	3.2	5W		70		± 3 DB 200-10000	CH-40
RGA 9	Output; plate to V.C. 6V6, 6AQ5, 6AS5, 7C5.	5000	3.2	5W		50		± 3 DB 200-10000	CH-40
RGA 10	Output; plate to V.C. 6AR5, 6K6, 6V6, 7B5, 14A5, 35A, 3U4, 3Q4, 3Q5, 3C5, 3A4.	10,000 or 7500	3.2	5W		30		± 3 DB 200-10000	CH-40
RGA 11	Output; P.P. plates to V.C. P.P. 6V6, PP6K6.	12,000 CT or 8000 CT	3.2	15W		50	5	± 2 DB 200-8000	CH-60
RGA 12	Output; TP to V.C. 6V6, 6AQ5, 7C5, C1AB.	10,000 CT	3.2	10W	5.6:1	40	4	± 3 DB 200-10000	CH-60

REPLACEMENT GRADE CHOKES

Catalog No.	Inductance in Henries	Rated Current D.C. Ma.	D.C. Resistance	Dielectric Test Voltage	Case Number
RGC 17	40	15	2000	1000	CH-40
RGC 1	4	40	200	1000	CH-40
RGC 2	9	40	400	1000	CH-40
RGC 3	6	50	400	1000	CH-40
RGC 18	20	50	425	1500	CH-60
RGC 4	10	55	400	1500	CH-50
RGC 19	3	75	200	1500	CH-40
RGC 5	10	75	250	1500	CH-60
RGC 6	10	75	250	1500	VS-100
RGC 7	6	100	150	1500	CH-60
RGC 8	6	100	150	1500	VS-100
RGC 9	3.5	150	100	1500	CH-60
RGC 10	3.5	150	100	1500	VS-100
RGC 20	12	160	180	2500	VS-306
RGC 11	2	200	60	1500	CH-60
RGC 12	2	200	60	1500	VS-100
RGC 13	3.7	200	65	1500	CH-80
RGC 21	7	200	100	2500	VS-303
RGC 14	3.7	200	65	1500	VS-300
RGC 15	2.8	300	65	1500	CH-80
RGC 16	2.8	300	65	1500	VS-300
RGC 22	5	300	65	2500	VS-308