

FREED

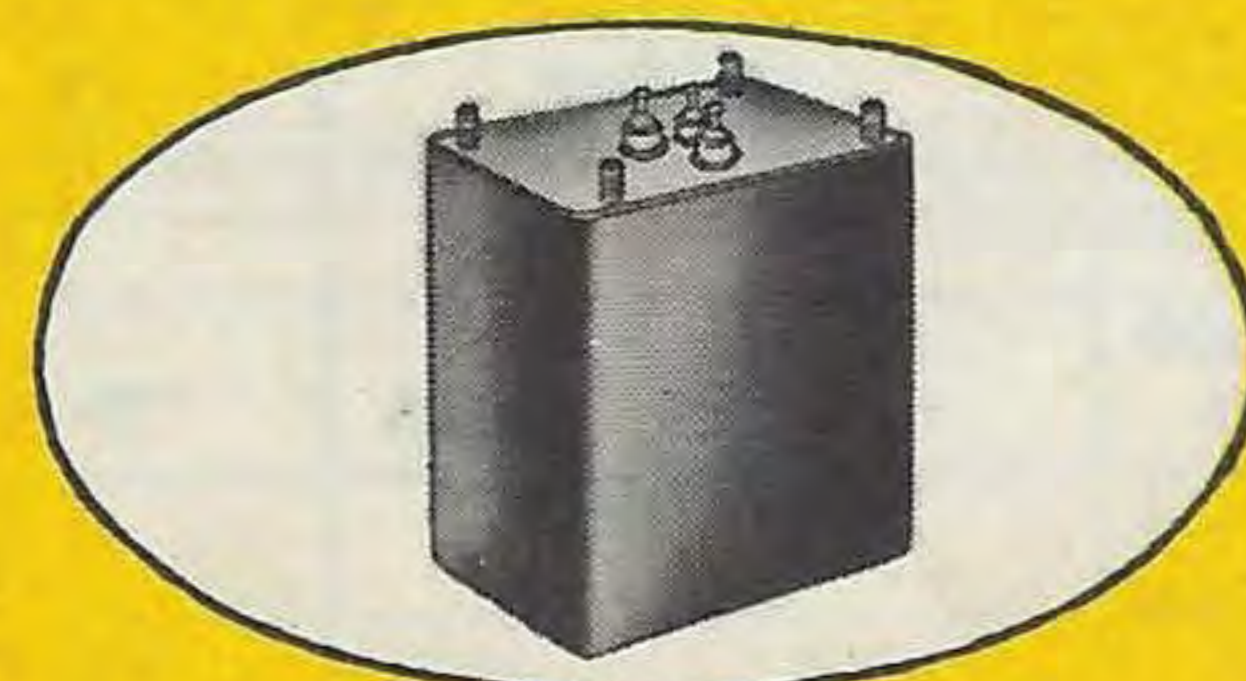
CATALOG

631

AUDIO TRANSFORMERS



DISCRIMINATORS



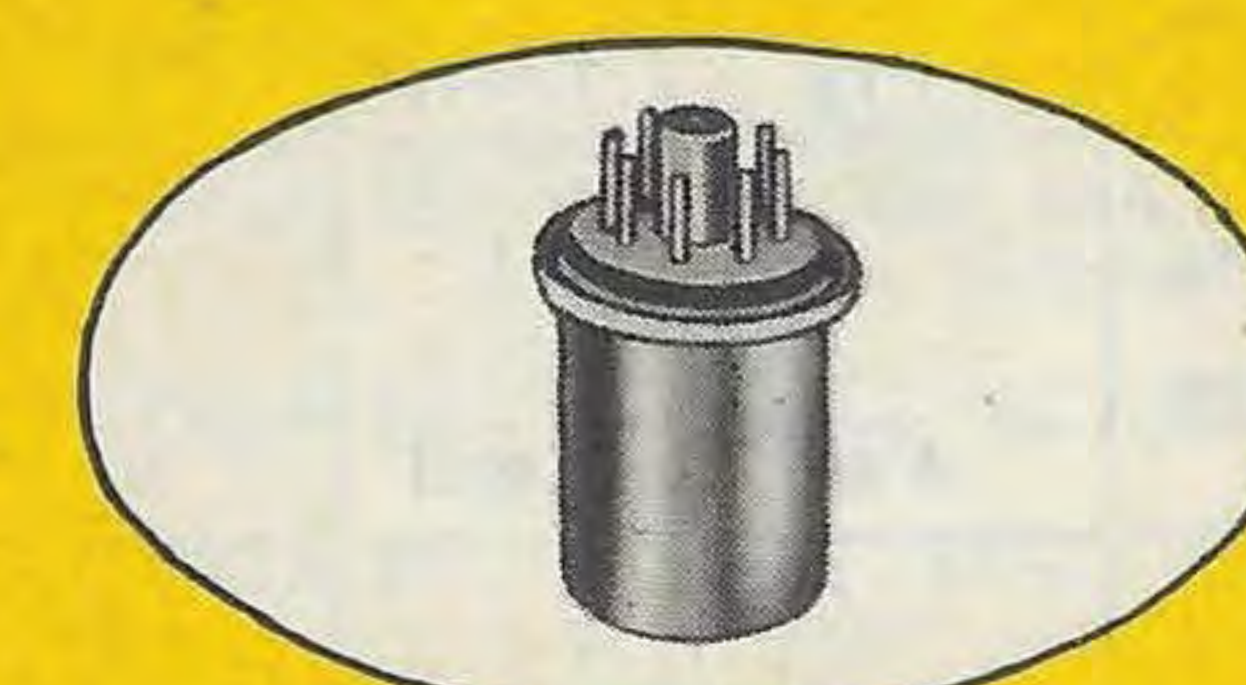
FILTERS

HIGH Q REACTORS



MAGNETIC AMPLIFIERS

POWER COMPONENTS



PULSE TRANSFORMERS

ULTRASONIC COMPONENTS



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Products of extensive research

- QUALITY
- ACCURACY
- DEPENDABILITY

FREED

TRANSFORMER CO., INC.

MAIN OFFICE AND FACTORY:

1718-1736 Weirfield Street

Brooklyn (Ridgewood) 27, New York

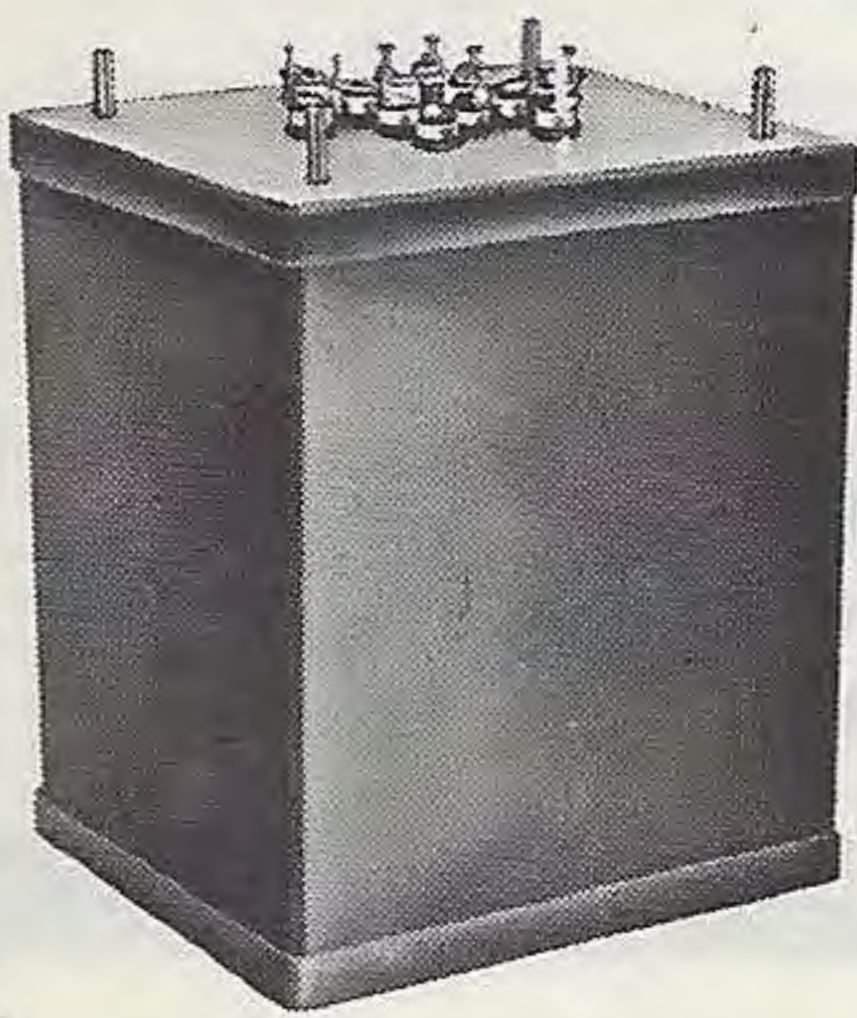
BROADCAST QUALITY COMPONENTS

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.

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

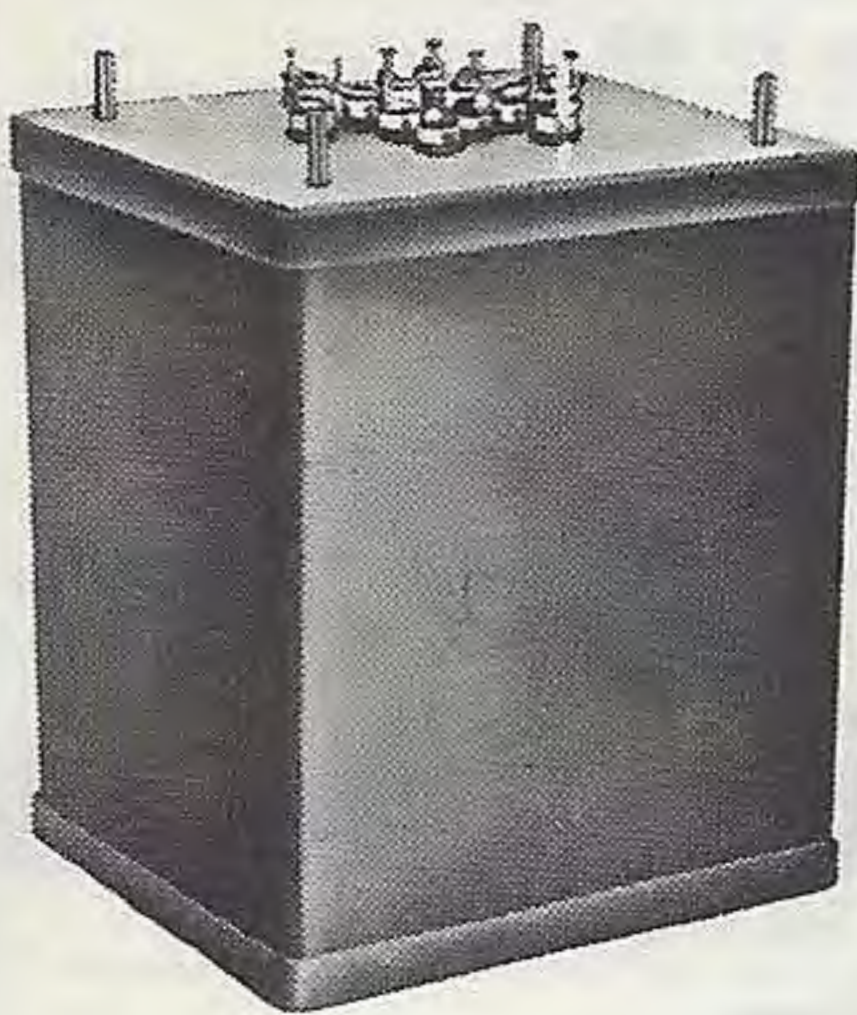
U-60 IMPEDANCES IN OHMS:
2.5, 5, 10, 15, 20, 30, 40, 60

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

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 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 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.

DC-4B CASE

Same as 4A — 4" high

DC-5B CASE

Height: 4 1/2"
Width: 4 1/8"
Depth: 3 1/2"
Mtg. Cen.: 3"x2 5/8"
Studs: 4 10-32
Knockout: 3" dia.

DC-6A CASE

Height: 4 7/8"
Width: 5"
Depth: 4 1/8"
Mtg. Cen.: 3 3/4"x3"
Studs: 4 10-32
Knockout: 3" dia.

DC-6B CASE

Height: 6"
Width: 5"
Depth: 4 1/8"
Mtg. Cen.: 3 3/4"x3"
Studs: 4 10-32
Knockout: 3" dia.

DC-7 CASE

Height: 5 3/8"
Width: 5 1/2"
Depth: 5"
Mtg. Cen.: 4 3/8"x3 3/4"
Studs: 4 1 1/4"-20
Knockout: 3 7/8" 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.: 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, 12-40, 4/125A.	5,000 C.T.	+40	3.1:1	50	5	DC-4B

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	6550 AB1 or 6146 AB2 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.

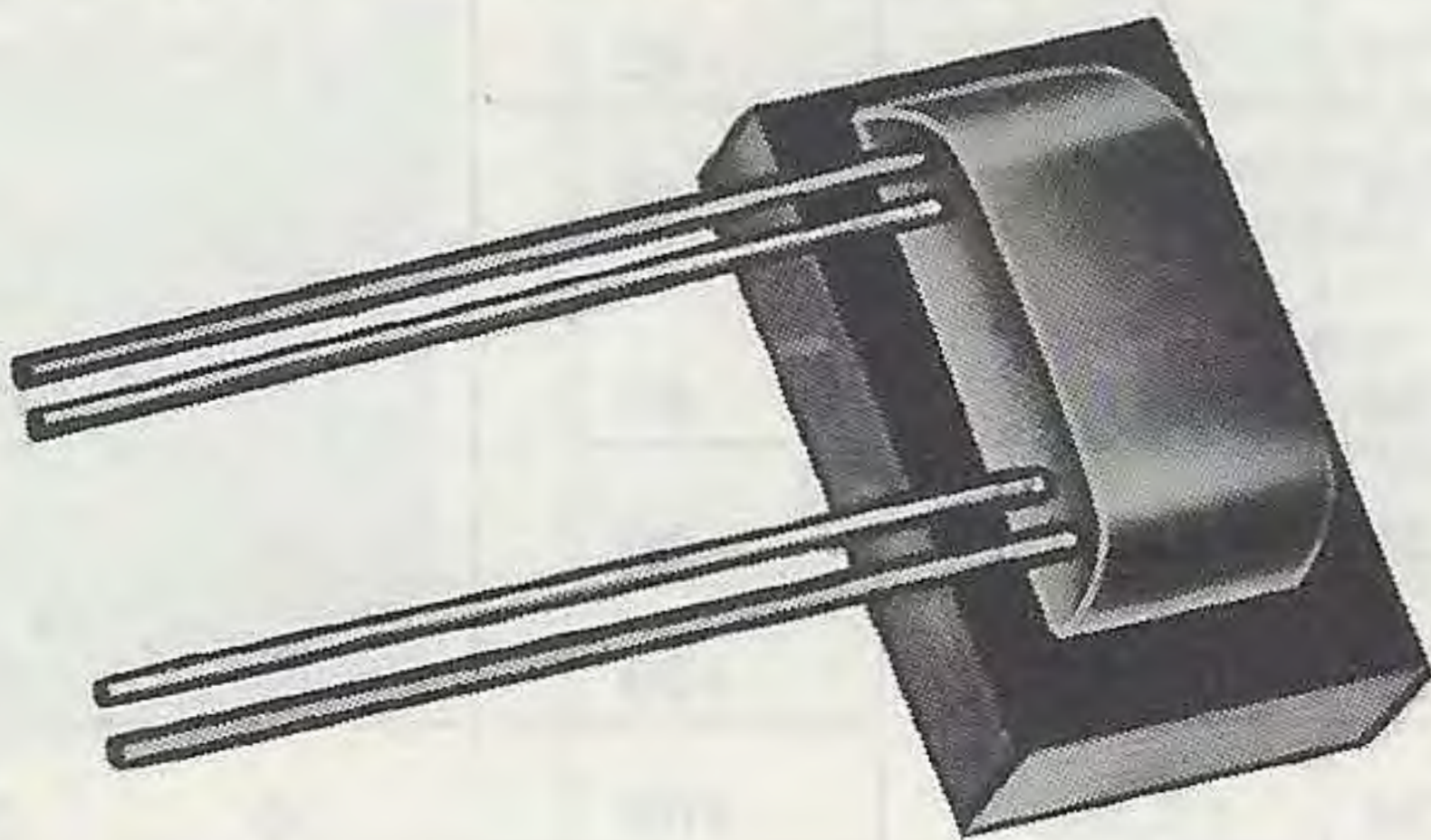
125 and 500 ohms can be used for 150 and 600 ohms.

CONDENSED LISTING

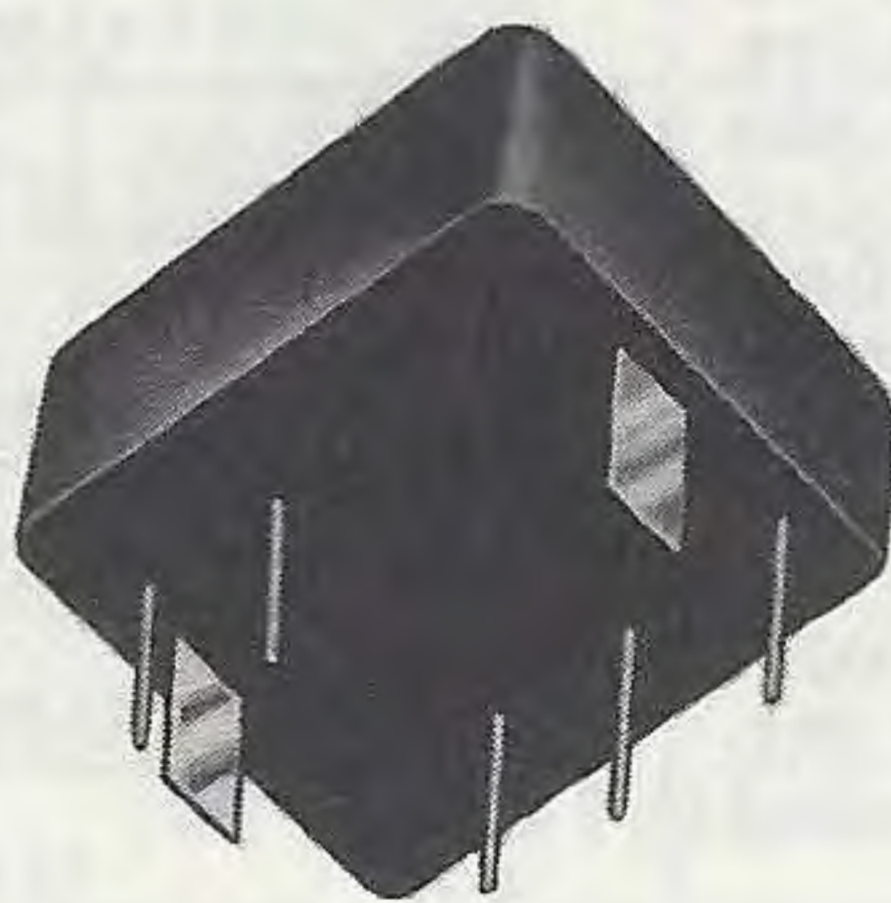
MINIATURE TRANSISTOR AUDIO TRANSFORMERS

TYPE			TUA			TSA			TNA			TPA			TTA			
MAX. POWER			500 MW			500 MW			1 W			3 W			5 W			
FREQ. RESPONSE			.4 — 15 KC ± 2 DB			.3 — 15 KC ± 2 DB			.2 — 15 KC ± 2 DB			.15 — 15 KC ± 2 DB			.15 — 15 KC ± 2 DB			
SIZE	UNCASED		11/32 D. x 7/16 H			7/16 D., 15/32 H.			9/16 D. x 21/32 H.			7/16 x 19/32 x 3/4			11/16 x 13/16 x 13/16			
	CASED MIL-T-27A-4RX											15/16 D. x 11/16 H.			15/16 D. x 1 9/16 H.			
	MOLDED MIL-T-27A-5RX					1/2 D. x 1/2 H.			19/32 x 17/32 x 17/32			7/8 x 25/32 x 17/32			1 5/32 x 1 x 31/32			
MATCHING IMP.			Turns Ratio	Cat. No. TUA	Pri.	Sec.	Cat. No. TSA	Pri.	Sec.	Cat. No. TNA	Pri.	Sec.	Cat. No. TPA	Pri.	Sec.	Cat. No. TTA	Pri.	Sec.
Pri.	Sec.																	
150/37.5	3.2	6.85/1	16	CT		28	CT		28	CT		30	CT		15	CT		
150/37.5	12	3.54/1	17	CT		29	CT		29	CT		31	CT		17	CT		
150/37.5	50	1.73/1	21	CT		30	CT		30	CT		32	CT		18	CT		
300/75	3.2	9.68/1	20	CT		31	CT		31	CT		33	CT		20	CT		
300/75	12	5/1	19	CT		32	CT		32	CT		34	CT		21	CT		
300/75	50	2.45/1	22	CT		33	CT		33	CT		35	CT		22	CT		
500/125	500	1/1	23	CT		34	CT		34	CT		36	CT		1	CT		
600/150	3.2	13.7/1	1	CT		1	SP		1	SP		1	SP		23	SP		
600/150	12	7.07/1	2	CT		2	SP		2	SP		2	SP		24	SP		
600/150	50	3.47/1	13	CT		35	SP		35	SP		3	SP		25	SP		
600/150	600-150	1/1	3	CT		3	SP	SP	3	SP	SP	4	SP	SP	26	SP	SP	
600/150	1.2K-300	1/1.41	24	CT		22	SP	CT	22	SP	CT	37	SP	CT	7	SP	CT	
1K/250	3.2	17.7/1	4	CT		36	CT		36	CT		38	CT		19	CT		
1K/250	12	9.13/1	25	CT		37	CT		37	CT		39	CT		27	CT		
1K/250	50	4.47/1	14	CT		26	CT		26	CT		40	CT		13	CT		
1.2K/300	3.2	19.3/1	26	CT		4	SP		4	SP		5	SP		28	SP		
1.2K/300	12	10/1	5	CT		5	SP		5	SP		6	SP		29	SP		
1.2K/300	50	4.9/1	27	CT		38	SP		38	SP		7	SP		30	SP		
1.2K/300	600-150	1.41/1	6	CT		6	SP	SP	6	SP	SP	8	SP	SP	31	SP	SP	
2K/500	3.2	25/1	28	CT		7	SP		7	SP		9	SP		10	SP		
2K/500	12	12.9/1	29	CT		8	SP		8	SP		10	SP		32	SP		
2K/500	600	1.83/1	30	CT		9	SP	SP	9	SP	SP	11	SP	SP	33	SP	SP	
4K/1000	3.2	35.4/1	8	CT		10	SP		10	SP		12	SP		11	SP		
4K/1000	12	18.2/1	9	CT		11	SP		11	SP		13	SP		34	SP		
4K/1000	600-150	2.58/1	10	CT		12	SP	SP	12	SP	SP	14	SP	SP	9	SP	SP	
10K/2.5K	3.2	56/1	7	CT		13	SP		13	SP		15	SP		35	SP		
10K/2.5K	12	29/1	11	CT		14	SP		14	SP		16	SP		36	SP		
10K/2.5K	50	14.1/1	12	CT		39	CT		39	CT		17	CT		37	CT		
10K/2.5K	600-150	4.1/1	15	CT		15	SP	SP	15	SP	SP	18	SP	SP	38	SP	SP	
10K/2.5K	1K	3.17/1	18	CT		40			40			19			39			
10K	10K-2.5K	1/1	31		CT	16		SP	16		SP	20		SP	40		SP	
20K/5K	50	20/1	32	CT		25	CT		25	CT		21	CT		12	CT		
20K/5K	600/150	5.78/1	33	CT	CT	41	CT	CT	41	CT	CT	22	CT	CT	16	CT	CT	
25K/6.2K	600/150	6.45/1	34	CT	CT	23	CT	CT	23	CT	CT	23	CT	CT	8	CT	CT	
25K/6.2K	1.2K/300	4.55/1	35	CT	CT	21	CT	CT	21	CT	CT	24	CT	CT	5	CT	CT	
50K/12.5K	6/1.5	91.5/1	36	CT	CT	18	CT	CT	18	CT	CT	25	CT	CT	3	CT	CT	
50K/12.5K	500/125	10/1	37	CT	CT	17	CT	CT	17	CT	CT	26	CT	CT	2	CT	CT	
50K/12.5K	1.2K/300	6.45/1	38	CT	CT	20	CT	CT	20	CT	CT	27	CT	CT	6	CT	CT	
100K/25K	1K/250	10/1				27	CT	CT	27	CT	CT	28	CT	CT	14	CT	CT	
100K/25K	1.2K/300	9.15/1				19	CT	CT	19	CT	CT	29	CT	CT	4	CT	CT	

CT—Center Tap SP—Split Winding



TTA, TPA UNCASED



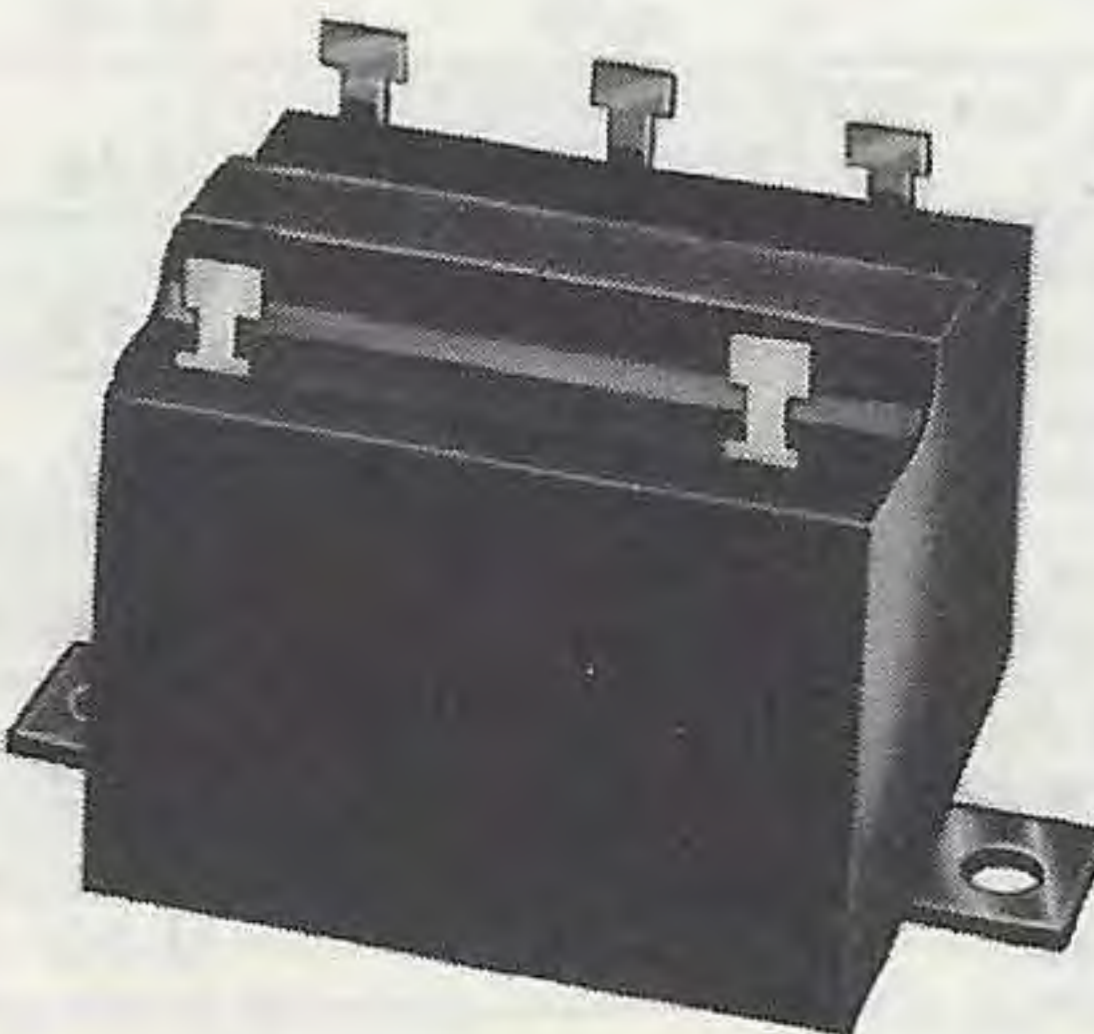
TPA MOLDED



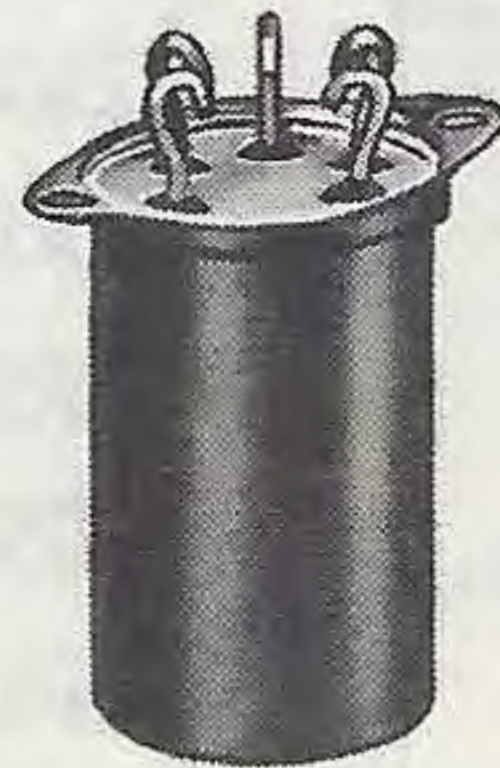
TUA, TSA, TNA CASED
TSA MOLDED



TNA MOLDED



TTA MOLDED



TTA, TPA CASED

MINIATURE TRANSISTOR AUDIO TRANSFORMERS

These high quality miniature transformers are high efficiency audio components featuring hermetic 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.

TYPE		TSA			TNA			TPA			TTA		
MAX. POWER		500 MW			1 W			3 W			5 W		
FREQ. RESPONSE		.3 — 15 KC ± 2 DB			.2 — 15 KC ± 2 DB			.15 — 15 KC ± 2 DB			.15 — 15 KC ± 2 DB		
SIZE	UNCASED							$\frac{7}{16} \times \frac{19}{32} \times \frac{3}{4}$			$1\frac{7}{16} \times 1\frac{13}{16} \times 1\frac{13}{16}$		
	CASED MIL-T-27A-4RX	$\frac{7}{16}$ D., $1\frac{15}{32}$ H.			$\frac{9}{16}$ D. x $2\frac{1}{32}$ H.			$1\frac{15}{16}$ D. x $1\frac{1}{16}$ H.			$1\frac{15}{16}$ D. x $1\frac{1}{16}$ H.		
	MOLDED MIL-T-27A-5RX	$\frac{1}{2}$ D. x $\frac{1}{2}$ H.			$1\frac{19}{32} \times 1\frac{17}{32} \times 1\frac{17}{32}$			$\frac{7}{8} \times 2\frac{25}{32} \times 1\frac{17}{32}$			$1\frac{15}{32} \times 1 \times 1\frac{31}{32}$		
MATCHING IMP.		Cat. No.	Max. I (MA) Total Pri.	Max. I dc (MA) Unbal. $\frac{1}{2}$ Pri.	Cat. No.	Max. I (MA) Total Pri.	Max. I dc (MA) Unbal. $\frac{1}{2}$ Pri.	Cat. No.	Max. I (MA) Total Pri.	Max. I dc (MA) Unbal. $\frac{1}{2}$ Pri.	Cat. No.	Max. I (MA) Total Pri.	Max. I dc (MA) Unbal. $\frac{1}{2}$ Pri.
Pri.	Sec.												
150 (CT)	3.2	28	35	12	28	40	16	30	45	20	15	130	50
150 (CT)	12	29	35	12	29	40	16	31	45	20	17	130	50
150 (CT)	50	30	35	12	30	40	16	32	45	20	18	130	50
300 (CT)	3.2	31	30	8	31	32	14	33	35	16	20	100	35
300 (CT)	12	32	30	8	32	32	14	34	35	16	21	100	35
300 (CT)	50	33	30	8	33	32	14	35	35	16	22	100	35
500 (CT)	500	34	20	6	34	22	10	36	25	12	1	80	25
600 (SP)	3.2	1	16	6	1	18	8	1	20	10	23	65	25
600 (SP)	12	2	16	6	2	18	8	2	20	10	24	65	25
600 (SP)	50	35	16	6	35	18	8	3	20	10	25	65	25
600 (SP)	600 (SP)	3	16	6	3	18	8	4	20	10	26	65	25
600 (SP)	1.2K (CT)	22	16	6	22	18	8	37	20	10	7	65	25
1K (CT)	3.2	36	14	4	36	15	6	38	16	8	19	50	20
1K (CT)	12	37	14	4	37	15	6	39	16	8	27	50	20
1K (CT)	50	26	14	4	26	15	6	40	16	8	13	50	20
1.2K (SP)	3.2	4	12	4	4	14	6	5	16	8	28	40	15
1.2K (SP)	12	5	12	4	5	14	6	6	16	8	29	40	15
1.2K (SP)	50	38	12	4	38	14	6	7	16	8	30	40	15
1.2K (SP)	600 (SP)	6	12	4	6	14	6	8	16	8	31	40	15
2K (SP)	3.2	7	9	3	7	10	5	9	14	6	10	25	12
2K (SP)	12	8	9	3	8	10	5	10	14	6	32	25	12
2K (SP)	600 (SP)	9	9	3	9	10	5	11	14	6	33	25	12
4K (SP)	3.2	10	6.5	2	10	8	3	12	9	4	11	20	10
4K (SP)	12	11	6.5	2	11	8	3	13	9	4	34	20	10
4K (SP)	600 (SP)	12	6.5	2	12	8	3	14	9	4	9	20	10
10K (SP)	3.2	13	5	1	13	6	2	15	7	3	35	15	9
10K (SP)	12	14	5	1	14	6	2	16	7	3	36	15	9
10K (CT)	50	39	5	1	39	6	2	17	7	3	37	15	9
10K (SP)	600 (SP)	15	5	1	15	6	2	18	7	3	38	15	9
10K	1K	40	5	1	40	6	1.5	19	7	1.8	39	15	5
10K	10K (SP)	16	5	1	16	6	1.5	20	7	1.8	40	15	5
20K (CT)	50	25	2.5	.8	25	3	1	21	5	2	12	8	6
20K (CT)	600 (CT)	41	2.5	.8	41	3	1	22	5	2	16	8	6
25K (CT)	600 (CT)	23	2.5	.8	23	3	1	23	5	2	8	6	4
25K (CT)	1.2K (CT)	21	2.5	.8	21	3	1	24	5	2	5	6	4
50K (CT)	6 (CT)	18	2	.6	18	2.5	1	25	3.5	1	3	5	3
50K (CT)	500 (CT)	17	2	.6	17	2.5	1	26	3.5	1	2	5	3
50K (CT)	1.2K (CT)	20	2	.6	20	2.5	1	27	3.5	1	6	5	3
100K (CT)	1K (CT)	27	2	.4	27	2	.8	28	2	1	14	4	2
100K (CT)	1.2K (CT)	19	2	.4	19	2	.8	29	2	1	4	4	2

		TYPE		TUA					
		MAX. POWER		500 MW					
		FREQ. RESPONSE		.4 — 15 KC ± 2 DB					
		SIZE	UNCASED	—					
			CASED MIL-T-27A-4RX	11 ¹¹ / ₃₂ D. x 1 ¹ / ₂ H.					
		MOLDED	—						
MATCHING IMP.		Cat. No.	Max. I (MA) Total Pri.	Max. I dc (MA) Unbal. 1 ¹ / ₂ Pri.	MATCHING IMP.		Cat. No.	Max. I (MA) Total Pri.	Max. I dc (MA) Unbal. 1 ¹ / ₂ Pri.
Pri.	Sec.				Pri.	Sec.			
150 (CT)	3.2	16	15	10	2K (CT)	3.2	28	3.5	2.5
150 (CT)	12	17	15	10	2K (CT)	12	29	3.5	2.5
150 (CT)	50	21	15	10	2K (CT)	600	30	3.5	2.5
300 (CT)	3.2	20	9	7	4K (CT)	3.2	8	3.5	1.5
300 (CT)	12	19	9	7	4K (CT)	12	9	3.5	1.5
300 (CT)	50	22	9	7	4K (CT)	600	10	3.5	1.5
500 (CT)	500	23	7	5	10K (CT)	3.2	7	2	1
600 (CT)	3.2	1	7	5	10K (CT)	12	11	2	1
600 (CT)	12	2	7	5	10K (CT)	50	12	2	1
600 (CT)	50	13	7	5	10K (CT)	600	15	2	1
600 (CT)	600	3	7	5	10K (CT)	1K	18	2	1
600 (CT)	1.2K	24	7	5	10K (CT)	10K (CT)	31	2	1
1K (CT)	3.2	4	6	3.5	20K (CT)	50	32	2	.8
1K (CT)	12	25	6	3.5	20K (CT)	600 (CT)	33	2	.8
1K (CT)	50	14	6	3.5	25K (CT)	600 (CT)	34	2	.8
1.2K (CT)	3.2	26	6	3.5	25K (CT)	1.2K (CT)	35	2	.8
1.2K (CT)	12	5	6	3.5	50K (CT)	6 (CT)	36	2	.6
1.2K (CT)	50	27	6	3.5	50K (CT)	500 (CT)	37	2	.5
1.2K (CT)	600	6	6	3.5	50K (CT)	1.2K (CT)	38	2	.5

CT = Center Tap. SP = Split Winding.

CASE DIMENSIONS

DM-20 CASE



Height: 1 9/16"
Dia.: 15/16"
Mtg. Cen.: 1 1/8" to 1 7/32"
Mtg. 2 holes: 166 x .120
Flange Lgth.: 1 13/32"
Flange D.: .975"

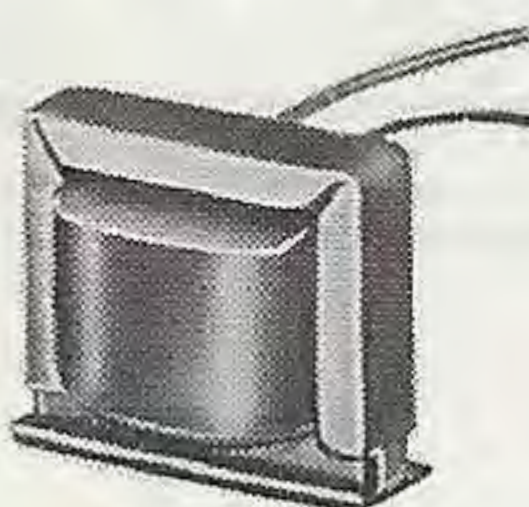
CASE DIMENSIONS

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: 13/16"
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: 13/16"

TMO-19

Height: 13/16"
Width: 1 15/32"
Depth: 1 1/4"
Mtg. Cen.: 1 3/4"
2 Mtg. Holes: 3/16" dia.
Flange Lgth.: 2 1/16"

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.

Catalog No.	Application	MIL Type	Impedance Level Ohms		Max. Power Level DBM	Ratio	Equiv- alent Shield- ing D.B.	Max. Pri. D.C. per Side Ma.	D.C. Un- bal- ance 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.	TF4RX10YY	15,000	60,000 C.T.	+8	1:2		0	0	DM-20
PMA5*	Single triode plate to push-pull grids.	TF4RX12YY	15,000	60,000 C.T.	+8	1:2		2	2	DM-20
PMA 6	Single triode plate to multiple line.	TF4RX16YY	15,000	50/200/500	+8	5.48:1		0	0	DM-20
PMA 7*	Single triode plate to multiple line.	TF4RX12YY	15,000	50/200/500	+8	5.48:1		2	2	DM-20
PMA 8	Push-pull triode plates to multiple line.	TF4RX12YY	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.	TF4RX16YY	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
PMA 12	Microphone or line to grid.	TF4RX10YY	50/200/500 C.T.	60,000 C.T.	+5	1:11		0	0	DM-20
PMA 13	Mixing and matching.	TF4RX16YY	150/600	600 C.T.	+8	1:1		0	0	DM-20
PMA 14	Single triode plate to push-pull grids.	TF4RX15YY	15,000	95,000 Split	+5	1:2.5		0	0	DM-20
PMA 15*	Single triode plate to push-pull grids.	TF4RX15YY	15,000	95,000 Split	15	1:2.5		4	4	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*	TF4RX12YY	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*	TF4RX12YY	100K		1.2K	✓	3	300 to 15,000	1	2,790	95	100	DM-20
TMA 5*	TF4RX12YY	25K		1.2K	✓	2	200 to 15,000	3	1,740	110	250	DM-20
TMA 6*	TF4RX12YY	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*	TF4RX12YY	25K		600		2	200 to 15,000	3	1,740	61	250	DM-20
TMA 9*	TF4RX12YY	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.

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 Ohms		Maximum Power Level DBM	Ratio	Equiva- lent Shield- ing D.B.	Max. Pri. D.C. per Side Ma.	D.C. Un- bal- ance Ma.	Case Number
		Primary	Secondary						
PGA 1	Universal 500 ohm line to single grid.	U-500	50,000	+12	1:10	50	0	0	DM-01
PGA 2	Universal 500 ohm line to push-pull grids.	U-500	60,000 split	+12	1:11	50	0	0	DM-01
PGA 3	Universal 500 ohm line to push-pull grids.	U-500	100,000 split	+12	1:14.1	50	0	0	DM-01
PGA 4	Bridging line to single grid.	10,000	60,000	+12	1:2.45	50	0	0	DM-01
PGA 5	Bridging line to push-pull grids.	10,000	60,000 center tap	+12	1:2.45	50	0	0	DM-01
PGA 6	Low level line matching.	U-500	U-500	+18	1:1	50	0	0	DM-01

CASE DIMENSIONS



DM-01 CASE

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

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

DC-2A CASE

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

LOW LEVEL OUTPUT AND MIXING TRANSFORMERS
Frequency Response 30-15,000 C.P.S. ± 1.0 DB

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

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.

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

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.

PROFESSIONAL GRADE COMPONENTS

HIGH LEVEL OUTPUT TRANSFORMERS

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

CASE DIMENSIONS



DC-1A CASE

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

DC-2A CASE

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

DC-2B CASE

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

DC-4A CASE

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

DC-5A CASE

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

DC-6A CASE

Height: $4\frac{7}{8}$ "
Width: 5"
Depth: $4\frac{1}{8}$ "
Mtg. Cen.: $3\frac{3}{4}$ "x3"
Studs: 4 10-32
Knockout: 3"x $2\frac{1}{2}$ "

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	60	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	160	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

* Available with taps to apply screen feedback.

U-16 IMPEDANCES IN OHMS:

2, 4, 8, 12, 16

U-500 IMPEDANCES IN OHMS:

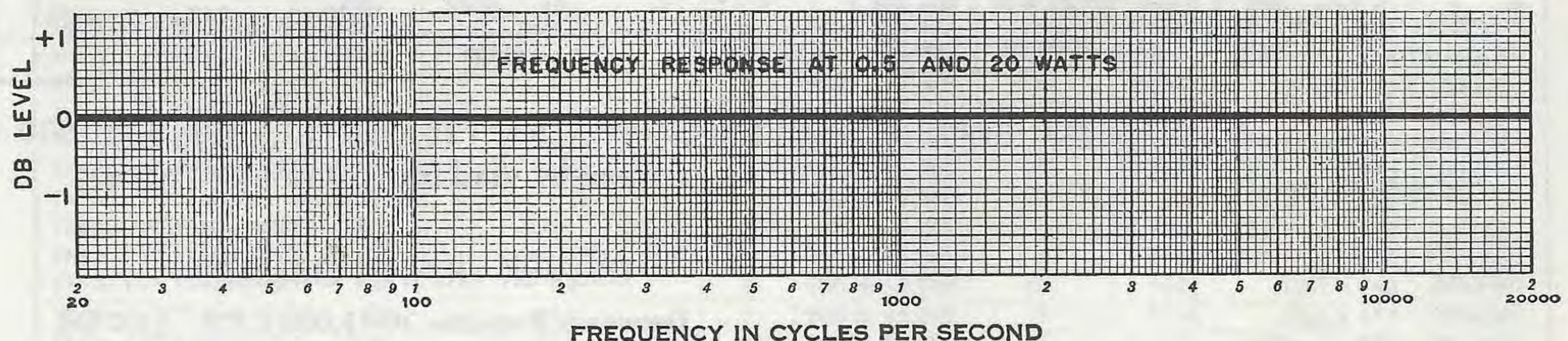
50, 125, 200 C.T., 250, 330, 500 C.T., 125 and 500 ohms can be used for 150 and 600 ohms.

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

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

NEW CIRCUIT REVISES WILLIAMSON HI-FIDELITY AMPLIFIER FOR IMPROVED PERFORMANCE



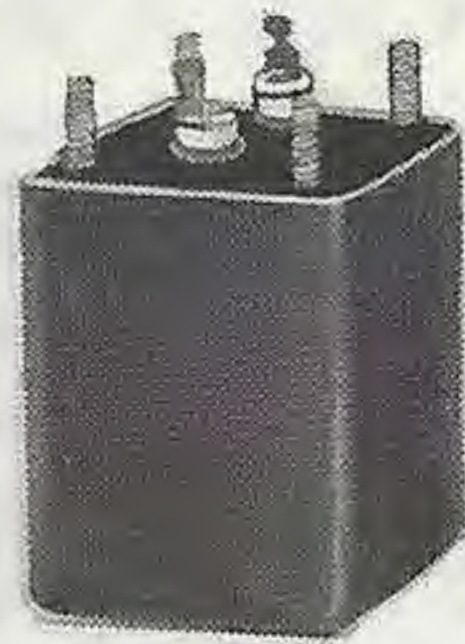
FREED supplies the following parts from stock.

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

- 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.

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

DC CASE STYLE



DC-1 A

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

DC-2 A

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

DC-2 B

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

DC-4 A

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

DC-5 A 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

DC-5 B

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

DC-6 A CASE

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

DC-7 B CASE

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

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-1 A
PGC 3	8	50	300	1000	DC-1 A
PGC 4	20	50	425	2500	DC-2 A
PGC 5	10	70	250	2500	DC-2 A
PGC 6	6	100	160	2500	DC-2 A
PGC 7	6	150	115	2500	DC-2 B
PGC 8	10	150	160	2500	DC-4 A
PGC 9	5.5	200	95	2500	DC-4 A
PGC 10	10	200	150	2500	DC-4 A
PGC 11	10	250	135	2500	DC-5 B
PGC 12	8	300	95	2500	DC-5 B
PGC 13	7	400	60	2500	DC-5 B
PARALLEL FEED			AUDIO CHOKES		
PGC 14	100	10	3500	1000	DM-01
PGC 15	30	50	650	1500	DC-2 A
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-4 A
PGC 18	5-20	250	135	1500	DC-5 B
PGC 19	3-15	300	95	1500	DC-5 B
PGC 20	3-15	400	60	1500	DC-5 B

* 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

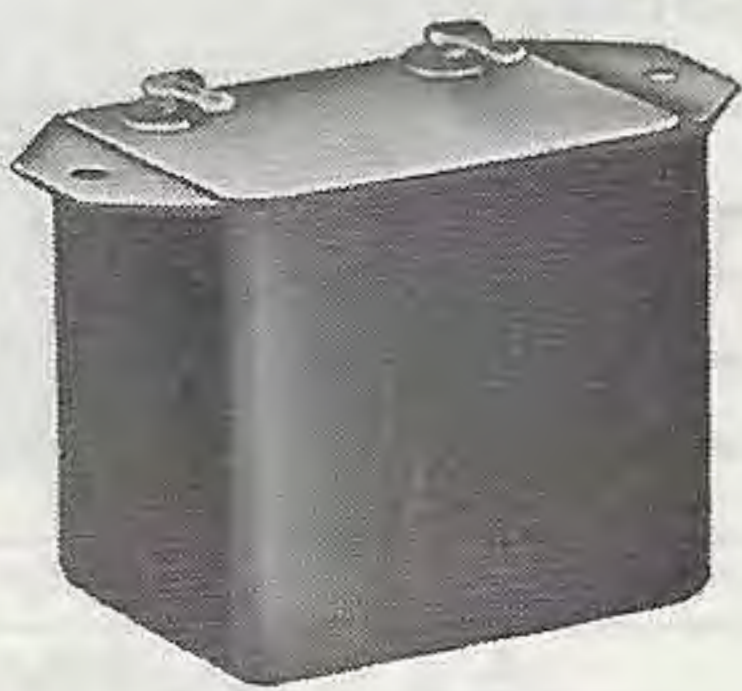
All units supplied with leads.

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

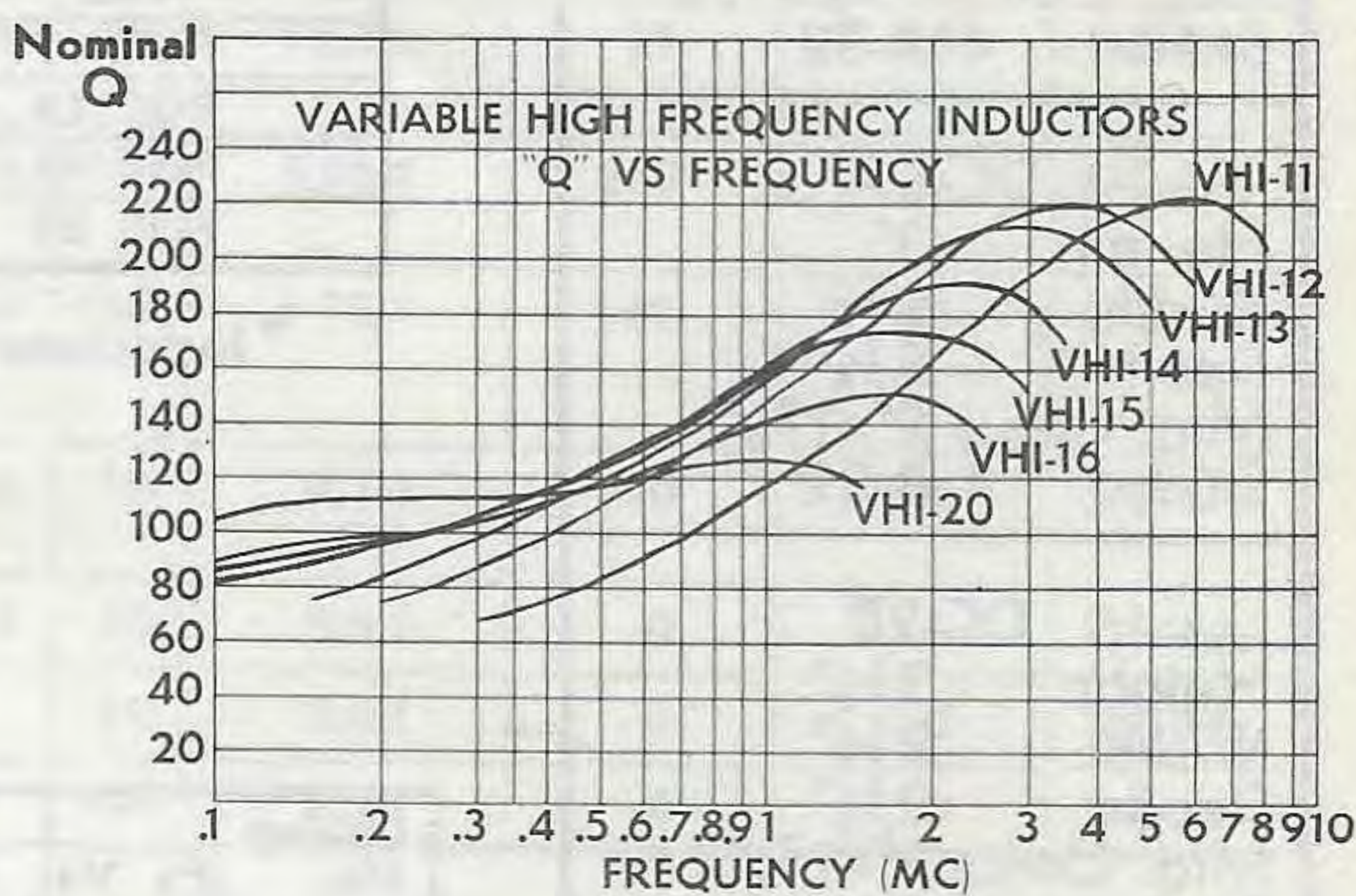
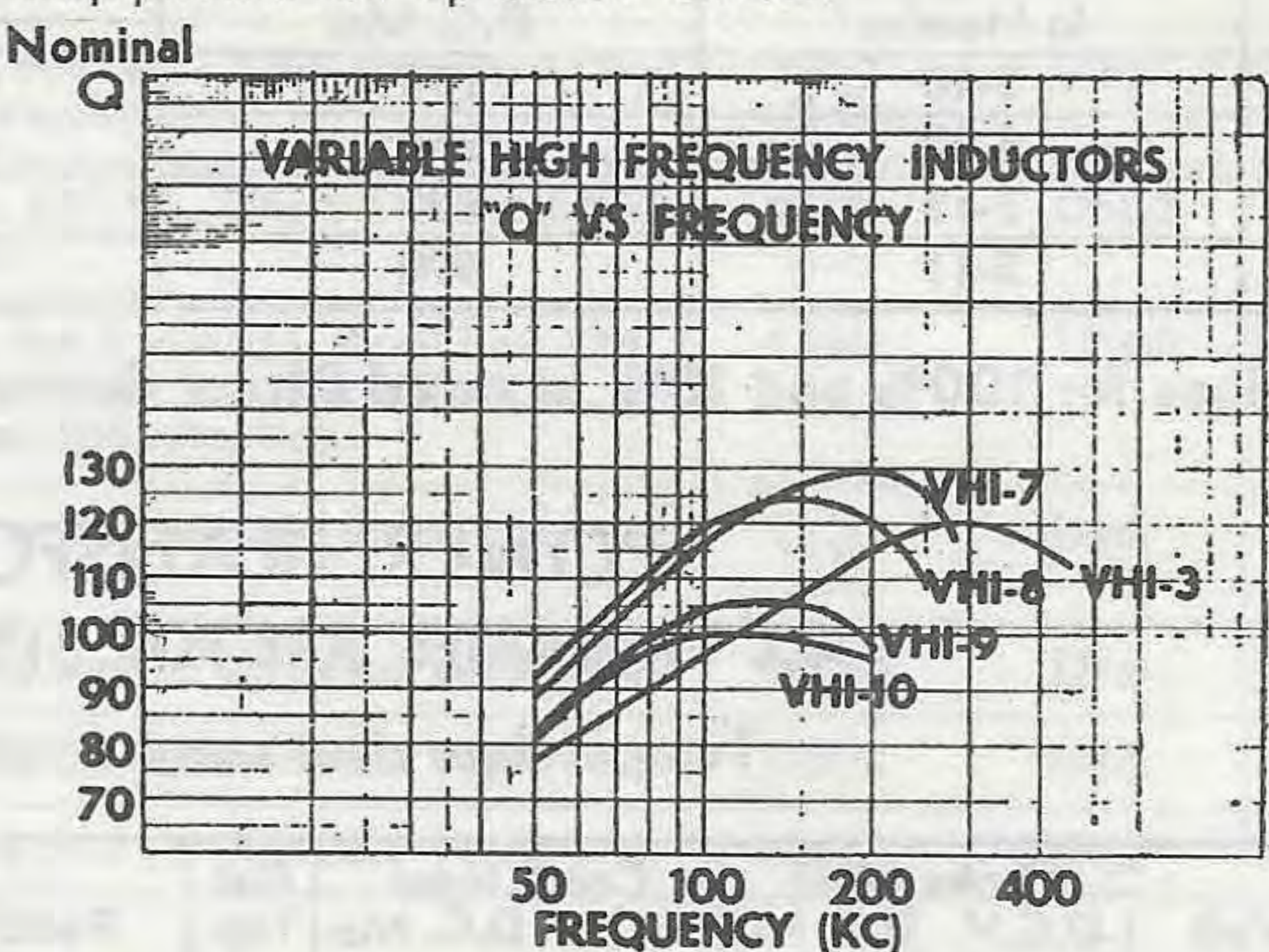
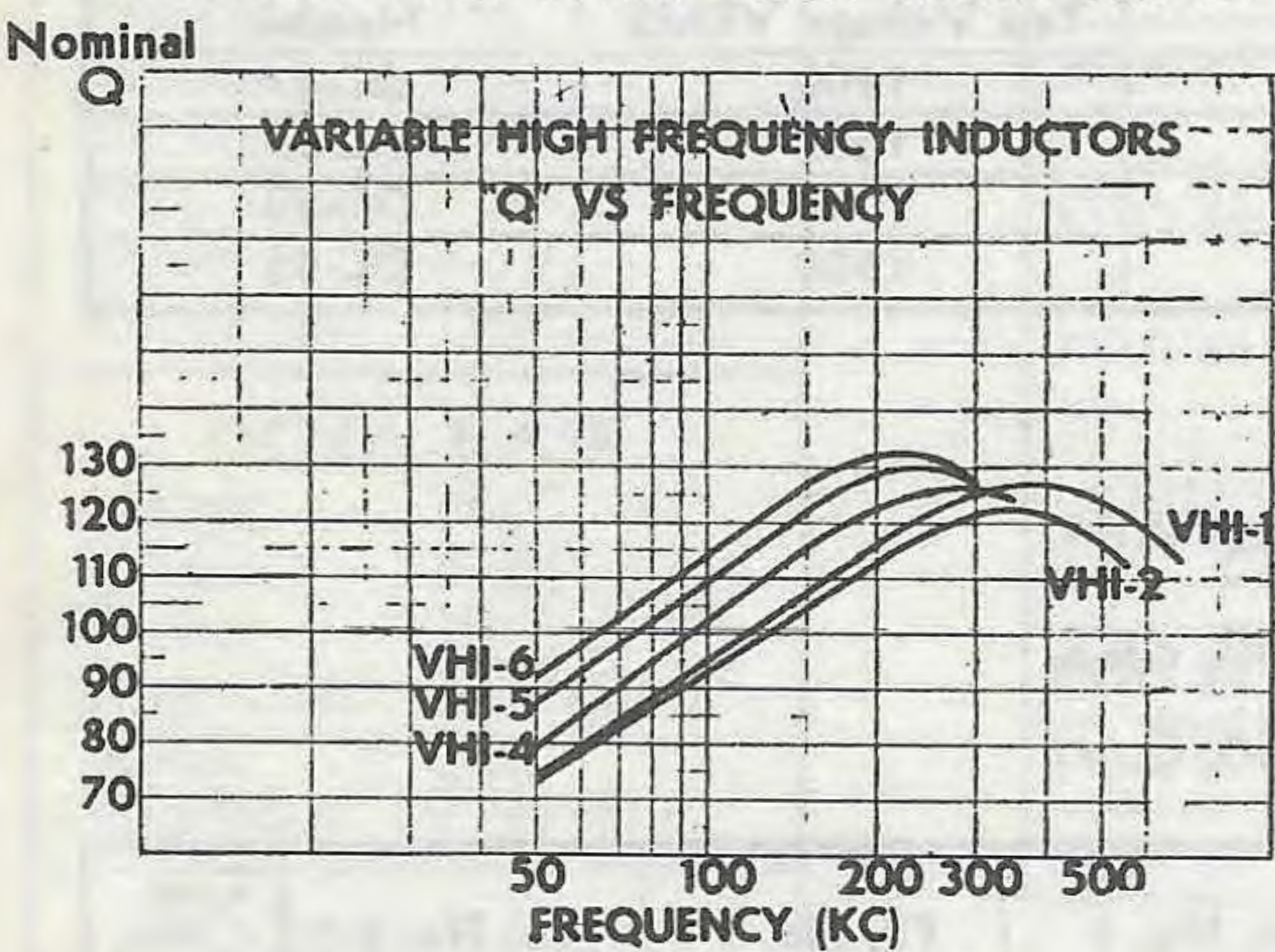


Height: 1 21/32"
Width: 1 21/32"
Depth: 1 13/32"
Flange L: 2 3/8"
Mtg. Cen.: 2"

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

- Continuous variation of inductance
- Q practically constant over whole range of variation
- Hermetically sealed
- Inductances other than those listed can be supplied to special order



CASE DIMENSIONS

VI-1



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

Catalog No.	Test Freq. (MC)	Inductance		Variations of Q		RDC (Ω) Nominal	Self Res. Freq. (MC) @ L Max.	Max. Non Destruct Current (MA)	Case Size
		Min.	Max.	@ L Min.	@ L Max.				
VHI-1	.1	1.1 MH	1.75 MH	93.5	100.5	.75	2.2	250	VI-1
VHI-2	.1	1.7 MH	2.5 MH	94.5	96.5	1.1	1.9	200	VI-1
VHI-3	.1	2.3 MH	3.7 MH	94.5	97.2	1.4	1.6	200	VI-1
VHI-4	.1	3. MH	4.5 MH	100.7	101.7	1.9	1.4	160	VI-1
VHI-5	.1	4. MH	5.7 MH	107.	108.	2.2	1.3	160	VI-1
VHI-6	.1	5.5 MH	7.5 MH	112.	119.	3.1	1.	130	VI-1
VHI-7	.1	7. MH	10.5 MH	116.	120.5	4.5	.9	100	VI-1
VHI-8	.1	10. MH	15. MH	106.	109.	6.6	.85	80	VI-1
VHI-9	.1	14.5 MH	20.5 MH	101.	101.5	9.2	.6	60	VI-1
VHI-10	.1	20. MH	30. MH	105.	115.	13.7	.55	50	VI-1
VHI-11	1.	9.50 μH	11.0 μH	104.	114.	.24	>10	150	VI-1
VHI-12	1.	14.0 μH	15.6 μH	113.	127.	.29	>10	150	VI-1
VHI-13	1.	24.5 μH	28.0 μH	145.	156.	.37	>10	150	VI-1
VHI-14	1.	47.0 μH	52.0 μH	178.	195.	.46	>10	150	VI-1
VHI-15	.5	71.0 μH	79.5 μH	152.	168.	.56	>10	150	VI-1
VHI-16	.5	94.0 μH	105.0 μH	165.	173.	.64	>10	150	VI-1
VHI-17	.5	145.0 μH	165.0 μH	200.	222.	.75	9.7	150	VI-1
VHI-18	.5	191.0 μH	218.0 μH	204.	229.	.9	9.4	150	VI-1
VHI-19	.5	234.0 μH	265.0 μH	216.	238.	1.0	8.3	150	VI-1
VHI-20	.5	279.0 μH	318.0 μH	219.	236.	1.1	7.	150	VI-1
VHI-21	.5	380.0 μH	416.0 μH	216.	230.	1.3	6.5	150	VI-1
VHI-22	.5	480.0 μH	545.0 μH	220.	237.	1.5	7.	150	VI-1

HIGH "Q" REACTORS

QGC — are hermetically sealed, MIL-T-27A, Grade 4, Class R, High Q Reactors for low audio frequency application with an excellent inductance stability with variations of A.C. and D.C. currents, frequencies and temperatures.

SPECIAL REACTORS:

- (1) with a center tap
- (2) with a split winding
- (3) with inductances other than those listed can be supplied.

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"

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 7/32"
2 Slots: .166" x .120"
Knockouts: .875"

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

DM - 30 CASE



Height: 2 9/32"
Diameter: 1 5/16"
Flange L: 1 13/32"
Flange D: 0.975"
Mtg. Cen.: 1 1/8" to 1 7/32"
2 Slots: .166" x .120"
Knockouts: .875"

AH CASE



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

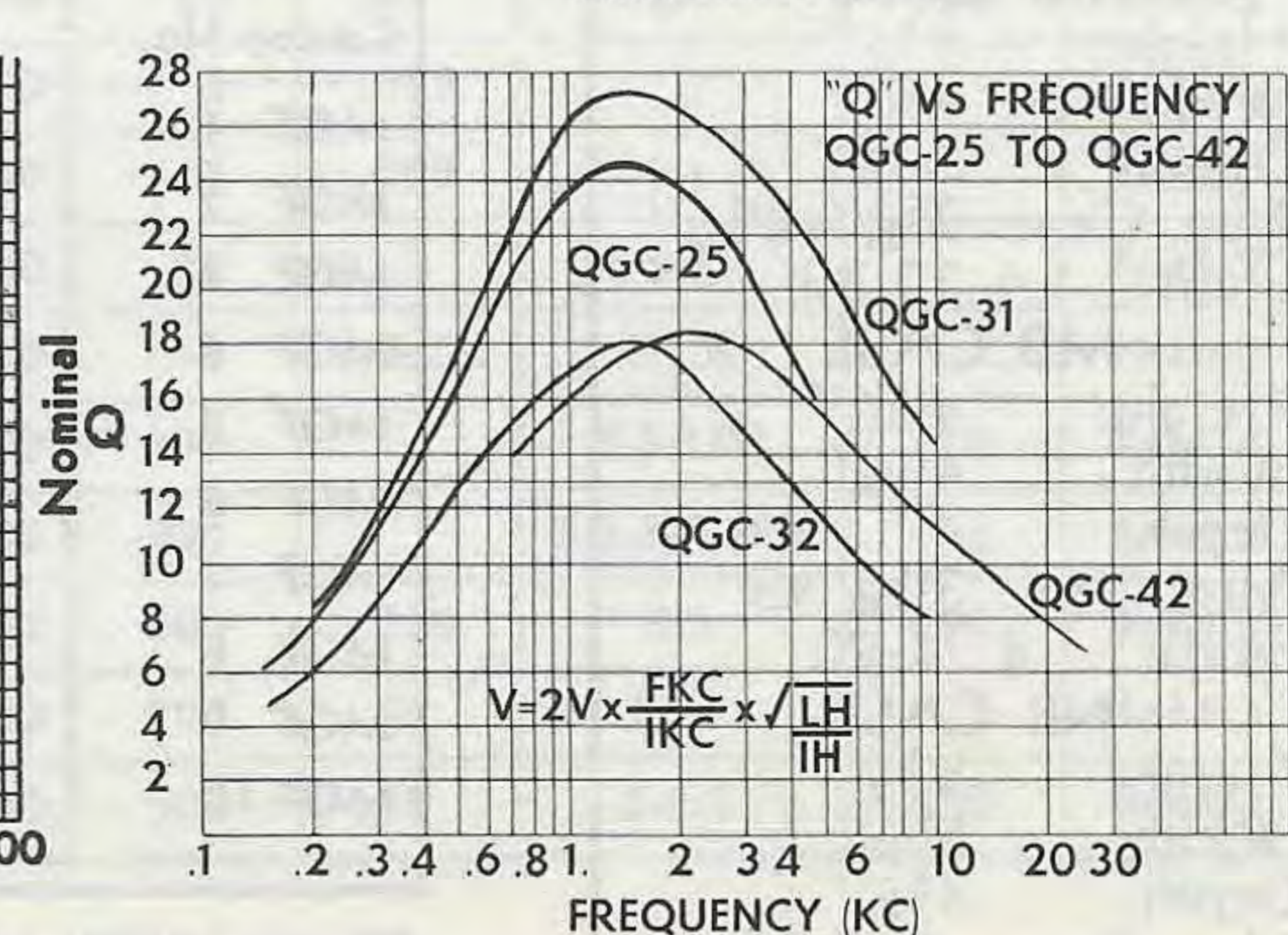
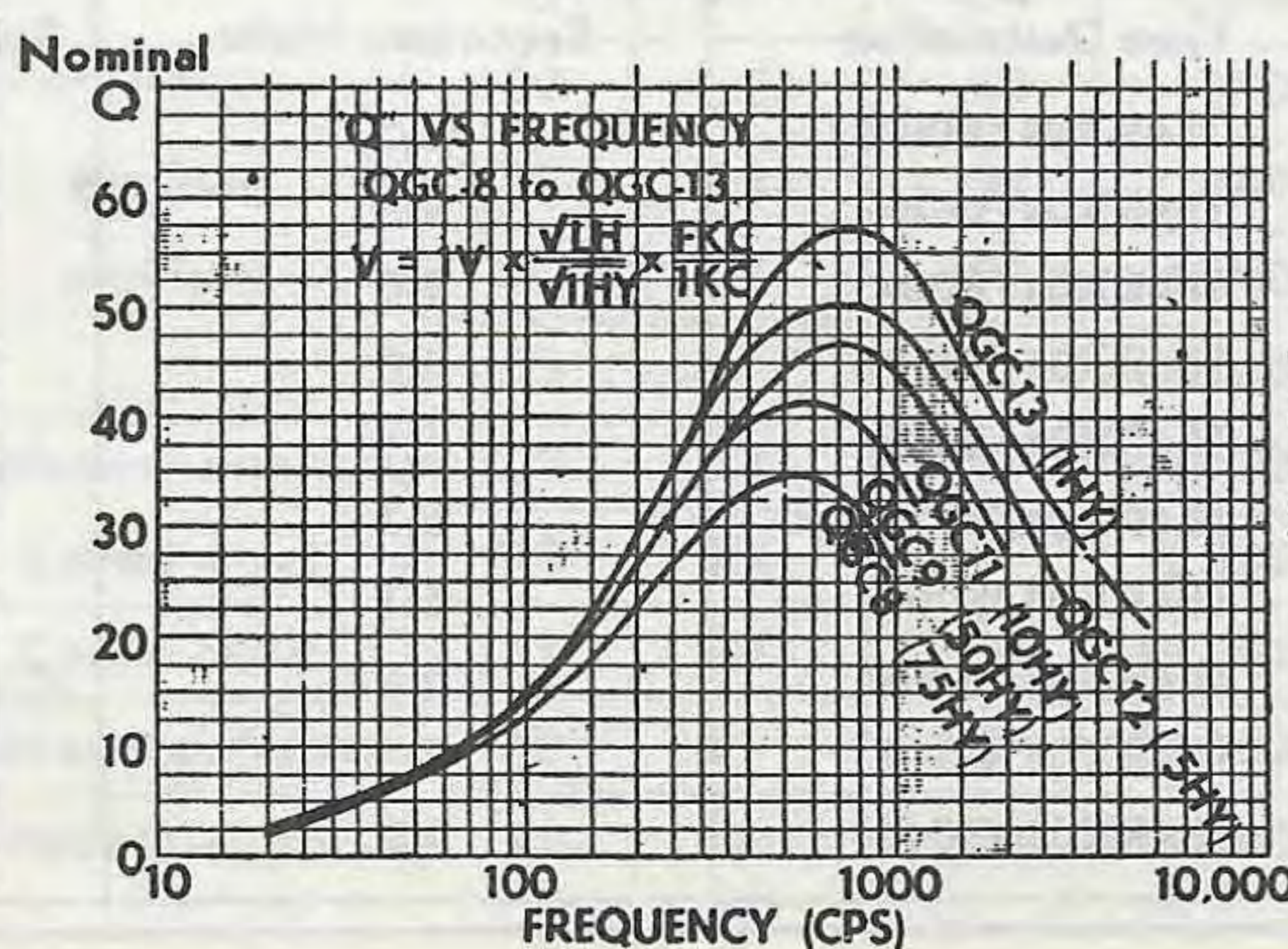
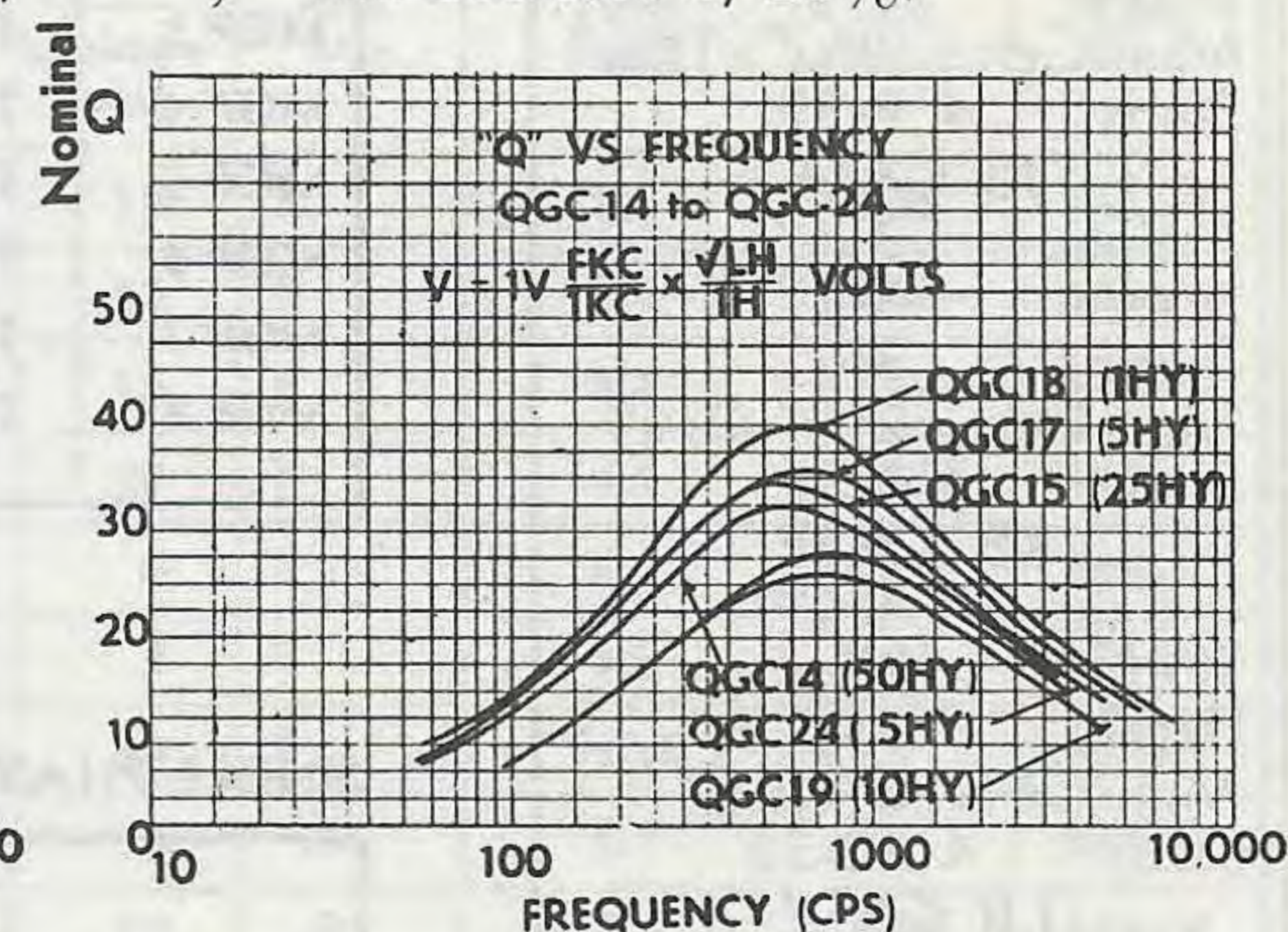
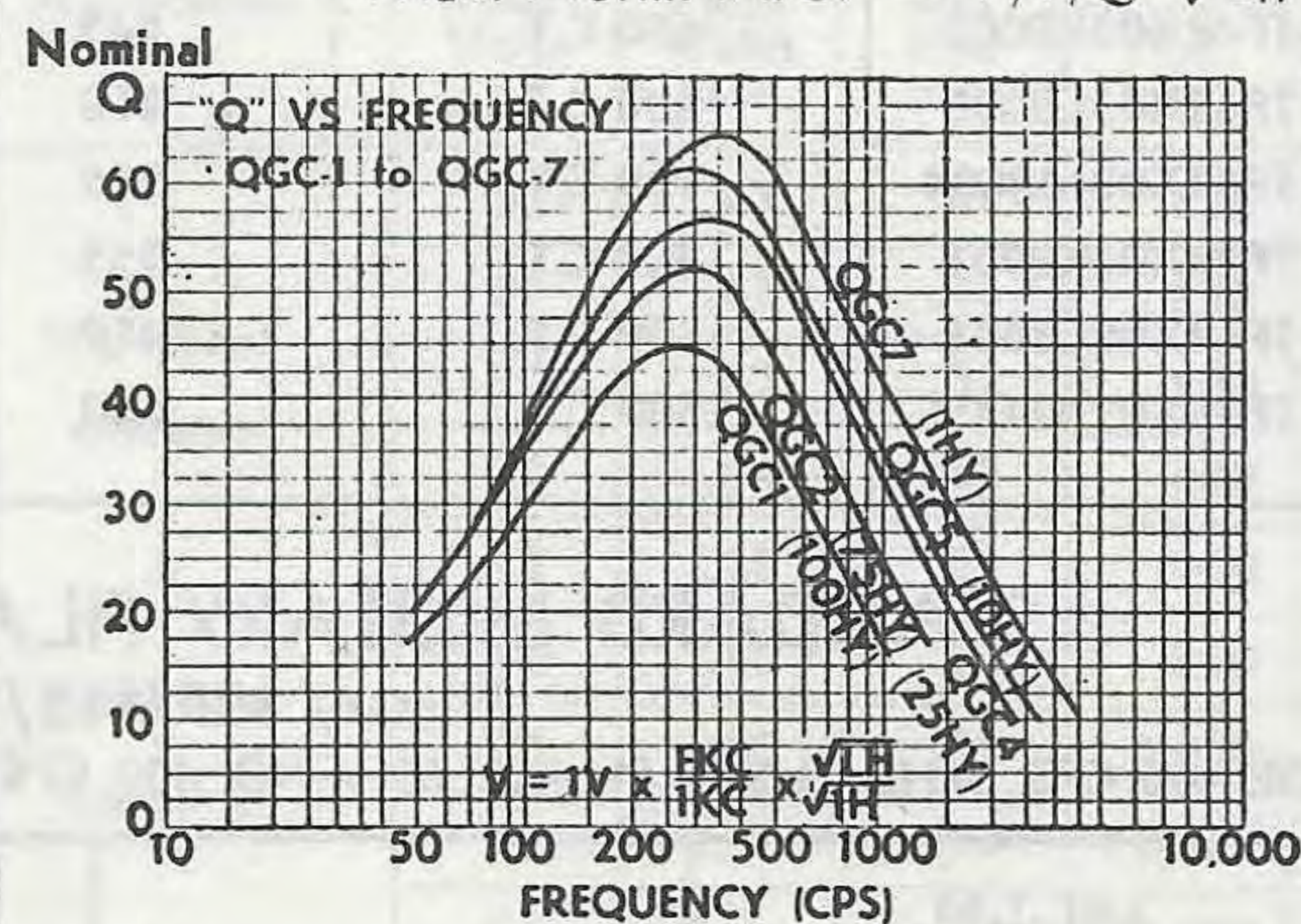
DM - 40 CASE



Height: 2 1/32"
Diameter: 9/16"
Pig Tails

Catalog No.	Ind. H (±2%)	Ω/H Max.	Max. Norm DC*	Max. Norm AC**	Self Res. Freq. ±25%	Case
QGC-1	100					
QGC-2	75					
QGC-3	50					
QGC-4	25	20	85	0.58	$F_o = 22/\sqrt{L_H}$	DC-2A
QGC-5	10					
QGC-6	5					
QGC-7	1					
QGC-8	75					
QGC-9	50					
QGC-10	25					
QGC-11	10	55	60	0.5	$F_o = 7.2/\sqrt{L_H}$	AJ
QGC-12	5					
QGC-13	1					
QGC-14	50					
QGC-15	25					
QGC-16	10	70	40	0.25	$F_o = 35/\sqrt{L_H}$	AH
QGC-17	5					
QGC-18	1					
QGC-19	10					
QGC-20	7.5	110				
QGC-21	5		15	0.15	$F_o = 34/\sqrt{L_H}$	DM-20
QGC-22	2.5					
QGC-23	1					
QGC-24	.5					
QGC-25	5					
QGC-26	2.5					
QGC-27	1					
QGC-28	.75		13	0.11	$F_o = 35/\sqrt{L_H}$	DM-30
QGC-29	.5					
QGC-30	.2	250				
QGC-31	.1					
QGC-32	2					
QGC-33	1.5					
QGC-34	1					
QGC-35	.75					
QGC-36	.5					
QGC-37	.25	500	10	0.04	$F_o = 45/\sqrt{L_H}$	DM-40
QGC-38	.1					
QGC-39	.075					
QGC-40	.05					
QGC-41	.025					
QGC-42	.01					

*Max. Norm D.C. = I D.C. (MA) $\sqrt{L_H}$
**Max. Norm. A.C. = $V/F \sim \sqrt{L_H}$ at which the inductance will decrease by 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: $1\frac{5}{16}$ "
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 $1\frac{7}{16}$ "
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 " 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	TF4RX03HA001	200/100/0/100/200	185	.070	5/6. 3V @ 2A	6. 3V @ 3A	HA
MGP 2	TF4RX03JB002	650 C.T.	260	.070	5/6. 3V @ 2A	6. 3V @ 4A	JB
MGP 3	TF4RX03KB006	650 C.T.	245	.150	6. 3V @ 5A	5V @ 3A	KB
MGP 4	TF4RX03LB003	800 C.T.	318	.175	5V @ 3A	6. 3V @ 8A	LB
MGP 5	TF4RX03MB004	900 C.T.	345	.250	5V @ 3A	6. 3V @ 8A	MB
MGP 6	TF4RX02KB001	700 C.T.	255	.250			KB
MGP 7	TF4RX02LB002	1100 C.T.	419	.250			LB
MGP 8	TF4RX02NB003	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	TF4RX01EB002	2.5	3.0	2,500	EB
MGF 2	TF4RX01GB003	2.5	10.0	2,500	GB
MGF 3	TF4RX01FB004	5.0	3.0	2,500	FB
MGF 4	TF4RX01HB005	5.0	10.0	2,500	HB
MGF 5	TF4RX01FB006	6.3	2.0	2,500	FB
MGF 6	TF4RX01GB007	6.3	5.0	2,500	GB
MGF 7	TF4RX01JB008	6.3	10.0	2,500	JB
MGF 8	TF4RX01KB009	6.3	20.0	2,500	KB
MGF 9	TF4RX01JB012	2.5	10.0	10,000	JB
MGF 10	TF4RX01KB013	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 3/8"
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 1/16"
Flange L.: 1 13/32"
Flange D.: 0.975"
Mtg. Cen.: 1 1/8" to 1 7/32"
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: 1 1/16"
Thickness: 29/64"

MMO-2

Diameter: 1 3/16"
Thickness: 1 9/32"

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	TFR4X35YY	✓	✓		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

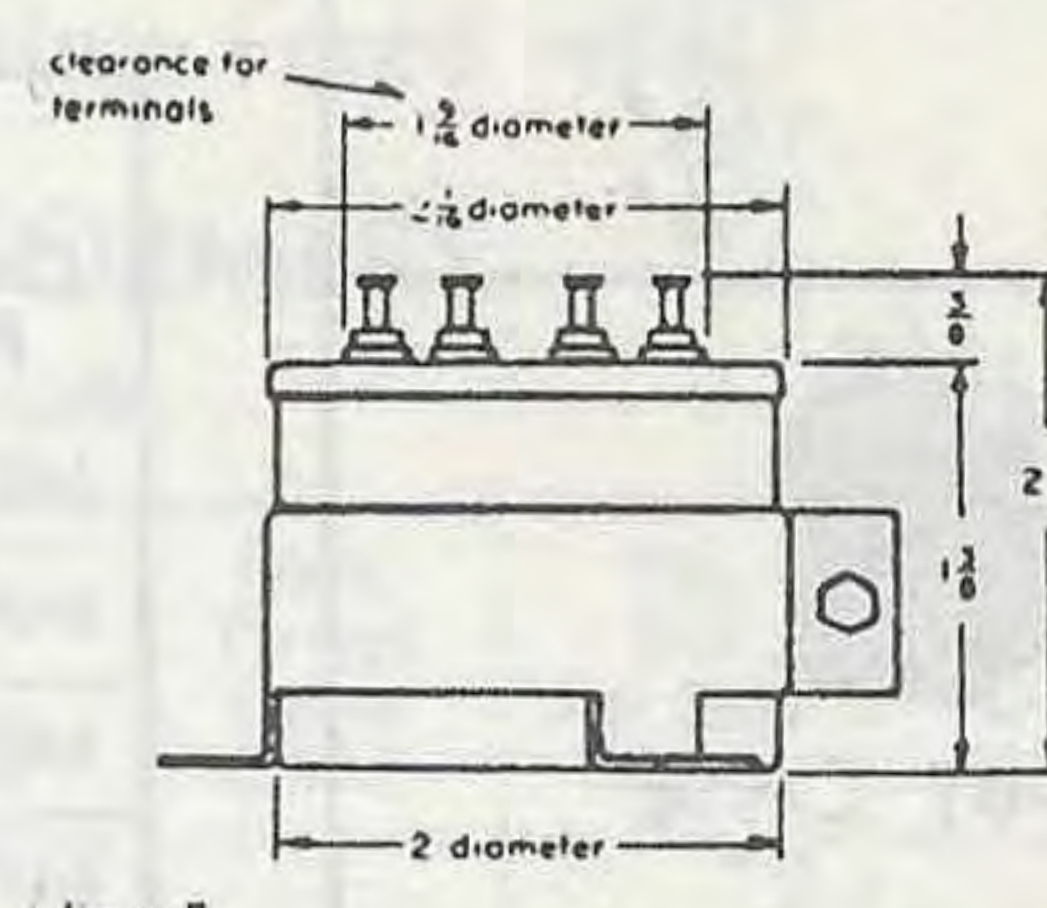
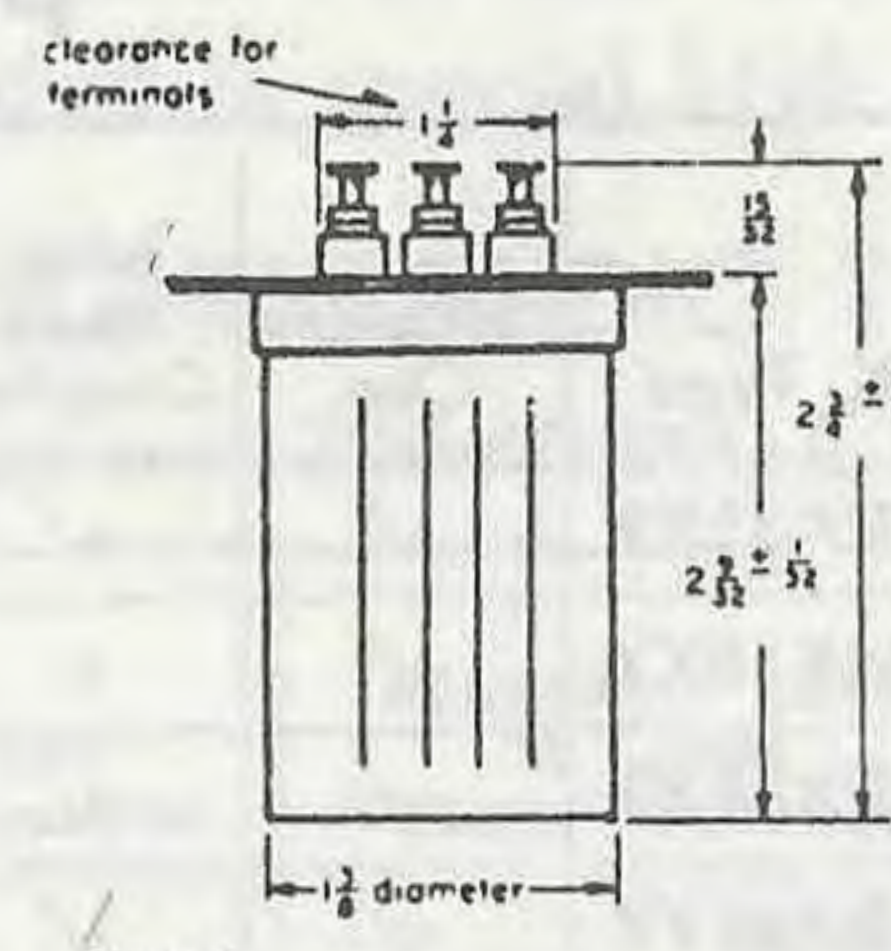
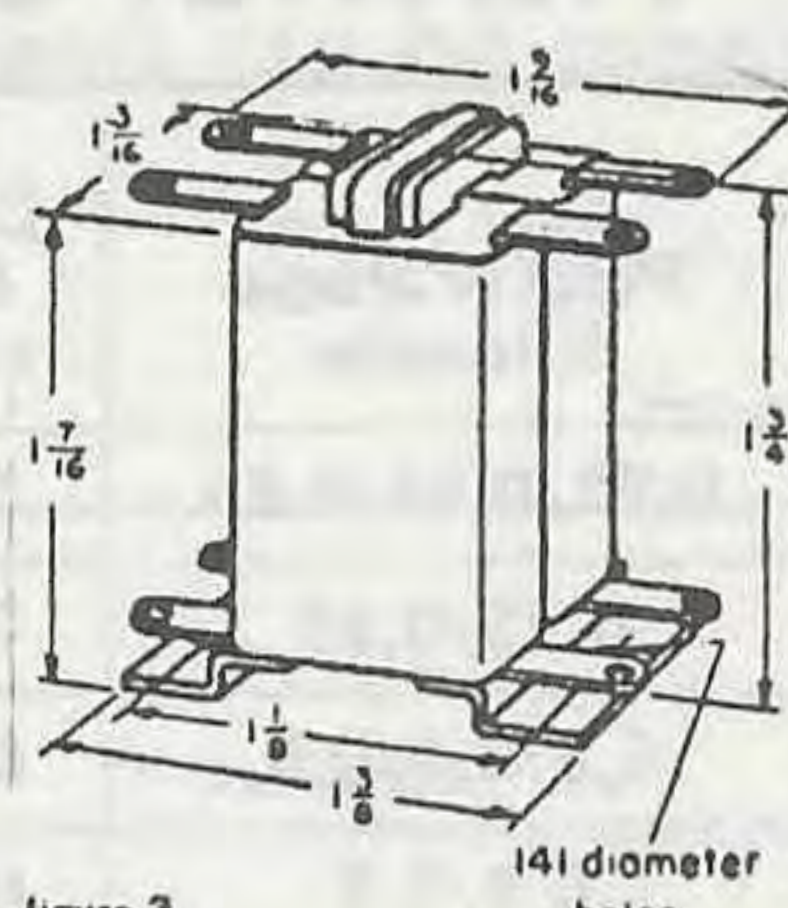
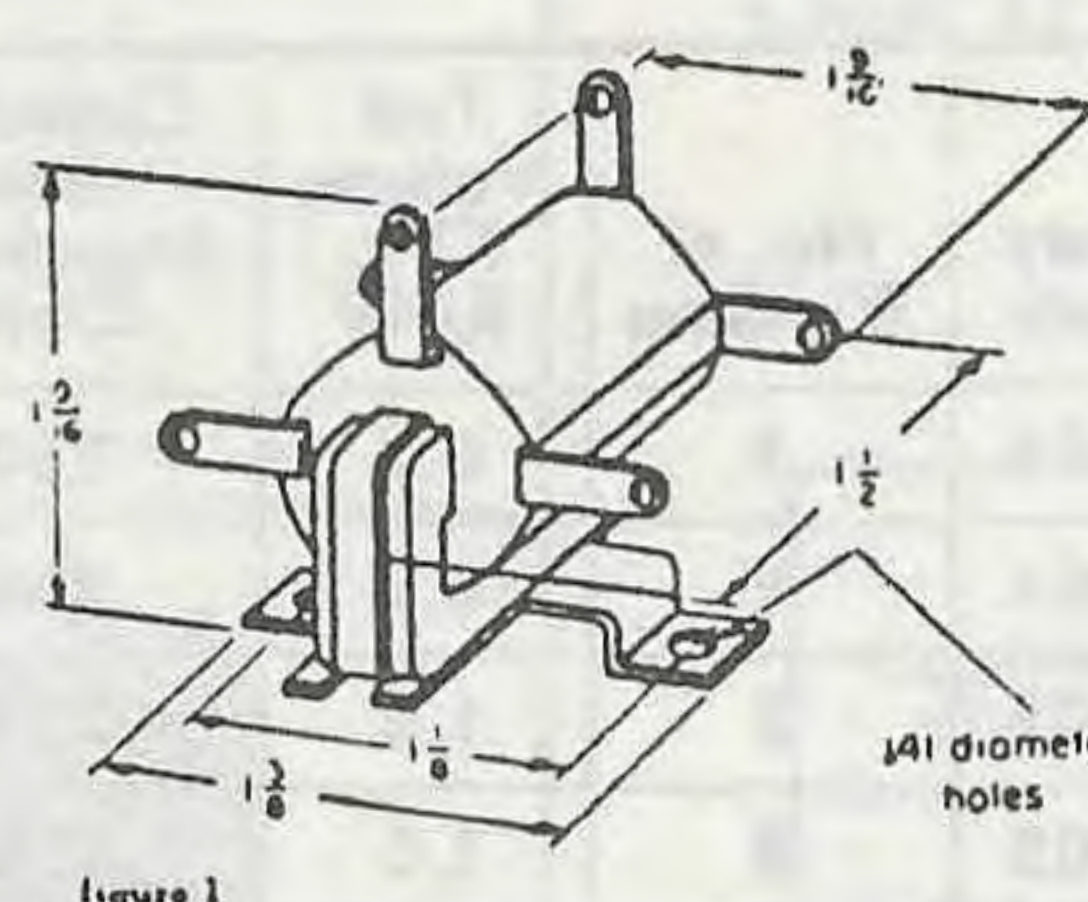
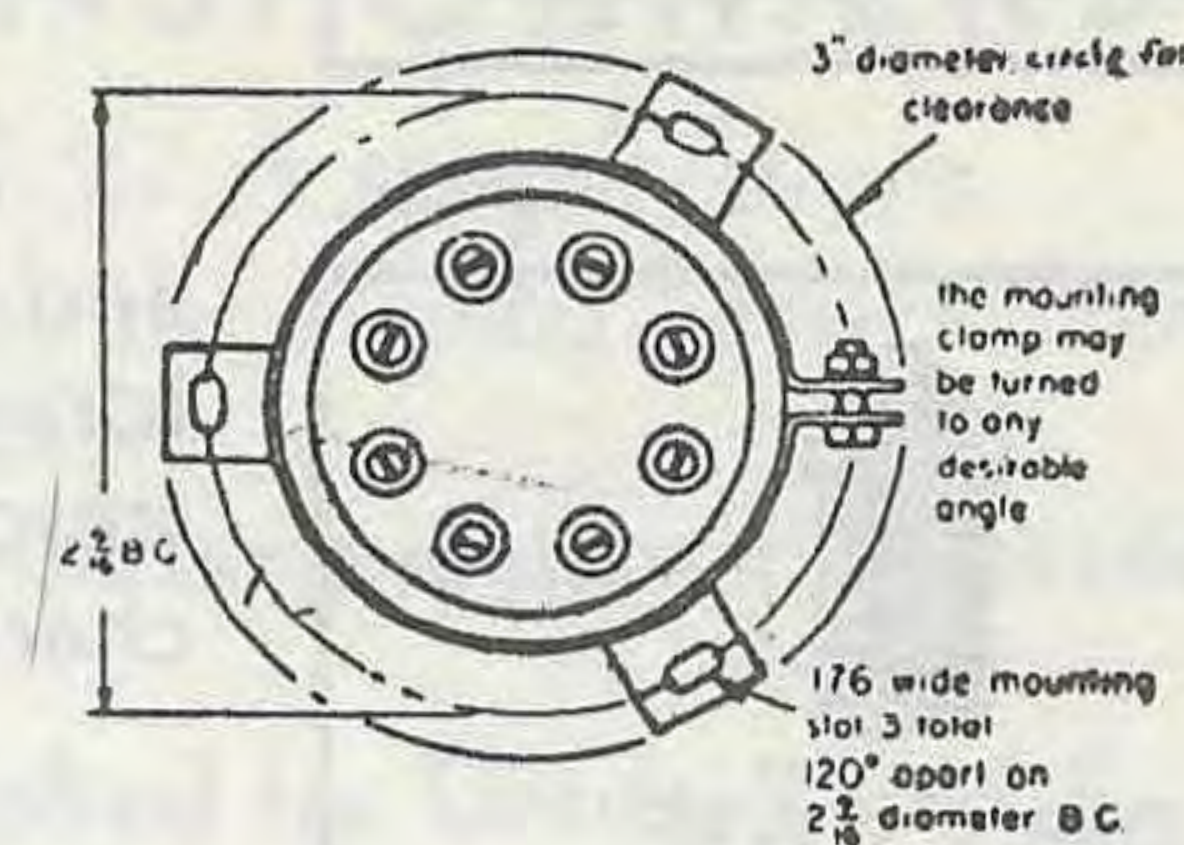
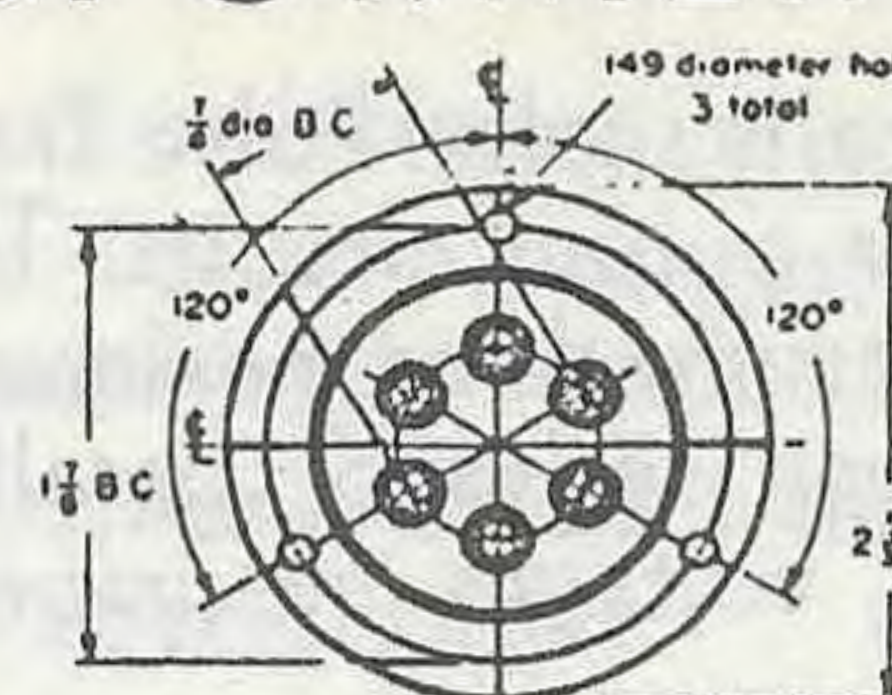
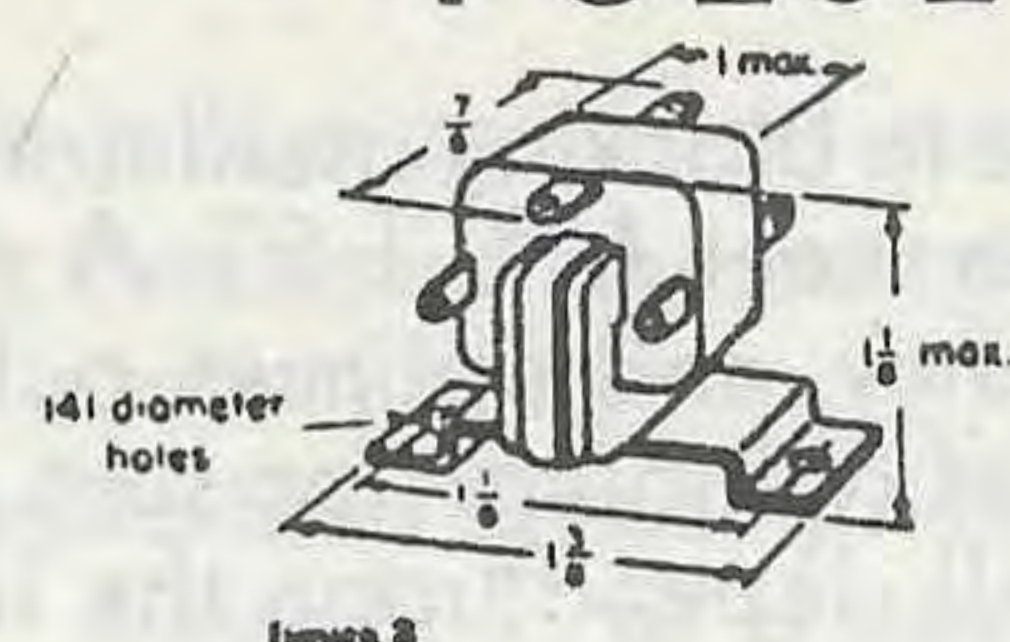


MMO-1
MMO-2

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		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	Blocking oscillator	10	5	.04	7,500	22	.01	3:1	100	MM-2
EPT-11	TF4RX35YY		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	Memory core & Current driver	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	Current driver	21	1-4	.22	18,000	800	.250	6:1	200	MM-3
EPT-18	TF4RX32YY	Current transformer	10	6	.2	90,000	200	.05	11:1	75	MM-3
EPT-19	TF4RX36YY	Pulse inversion	22	1-7	.25	55,000	300	.05	6:1:1	400	MM-3

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

PULSE TRANSFORMERS



Freed No.	Radiation Laboratory No.	Westinghouse No.	Dimension Figure	GUIDANCE VALUES				Test Voltage (60 Cycle RMS)
				Pulse Voltage (KV)	Pulse Duration (Microseconds)	Maximum Duty Ratio	Load Impedance (Ohms)	
BLOCKING OSCILLATOR, REGENERATIVE DRIVER OR COUPLING TRANSFORMERS								
MPT-13C	132AW2	1P1	1	1.0/1.0/1.0	0.3 to 1.5	0.002	250	1000
MPT-13M	132AW2F	7P1	1					
MPT-13H	132AW2P	4P101	4					
MPT-14C	132BW2	1P2	1	0.5/0.5/0.5/0.15	0.3 to 1.5	0.002	200	1000
MPT-14M	132BW2F	7P2	1					
MPT-14H	132BW2P	4P102	5					
MPT-15C	132DW2	1P3	1	0.5/0.5/0.5	0.1 to 0.5	0.002	300	1000
MPT-15M	132DW2F	7P3	1					
MPT-15H	132DW2P	4P103	4					
MPT-16C	134BW2	1P4	3	2.5/2.5, 2.5/1.25 1.5/1.5, 1.5/0.75	1 to 2.5 1 to 5	0.002 0.002	1500 1500	1500
MPT-16M	134BW2F	7P4	3					
MPT-16H	134BW2P	4P104	5					
MPT-17C	134CW2	1P5	1	2.0/2.0/1.0 1.5/1.5/0.75	1 to 2.5 1 to 5	0.002 0.002	1200 1200	1000
MPT-17M	134CW2F	7P5	1					
MPT-17H	134CW2P	4P105	4					
MPT-18C	134EW2	1P6	2	2.0/2.0/1.0 1.5/1.4/0.75	0.3 to 1 0.3 to 1.5	0.002 0.002	800 800	750
MPT-18M	134EW2F	7P6	2					
MPT-19C	145CW2	1P7	1					
MPT-19M	145CW2F	7P7	1	0.5/0.5/0.5	1.0 to 5	0.002	500	1000
MPT-19H	145CW2P	4P107	4					
MPT-20C	145EW2	1P8	1					
MPT-20M	145EW2F	7P8	1	1.0/1.0/1.0	1.0 to 5	0.002	800	1000
MPT-20H	145EW2P	4P108	4					
MPT-21C	166AW2	1P9	1					
MPT-21M	166AW2F	7P9	1	1.0/0.67/0.67	1.0 to 5	0.002	800	1000
MPT-21H	166AW2P	4P109	4					
MPT-22C	176AW2	1P10	1					
MPT-22M	176AW2F	7P10	1	2.0/1.0/1.0 1.5/0.75/0.75	1 to 2.5	0.002 0.002	1000 1000	1000
MPT-22H	176AW2P	4P110	4					
MPT-23C	187AW2	1P11	1					
MPT-23M	187AW2F	7P11	1	1.0/0.5/0.5	0.5 to 2	0.002	400	1000
MPT-23H	187AW2P	4P111	4					
MPT-24C	224AW2	1P12	2					
MPT-24M	224AW2F	7P12	2	1.0/1.0/1.0/0.3	0.1 to 0.5	0.002	1000	750
PULSE TRIGGERING OR CURRENT TRANSFORMERS								
MPT-25C	139DW2	1P13	1		0.25 to 5	0.002		1000
MPT-25M	139DW2F	7P13	1					
MPT-25H	139DW2P	4P113	4					
PULSE OUTPUT TRANSFORMERS								
MPT-26C	148CW2	1P14	3	0.2/2.0	0.6 to 3	0.002	1600	1500
MPT-26M	148CW2F	7P14	3	0.4/2.0	0.25 to 1.25	0.002	1000	
MPT-26H	148CW2P	4P114	5	0.4/2.0	0.5 to 2.5	0.002	2000	
MPT-27C	148DW2	1P15	3	0.29/2.0	0.5 to 2.5	0.002	1200	1500
MPT-27M	148DW2F	7P15	3	0.57/2.0	0.2 to 1.0	0.002	800	
MPT-27H	148DW2P	4P115	5	0.57/2.0	0.4 to 2.0	0.002	1500	

C Indicates — varnish impregnated commercial construction.

M Indicates — encapsulated or molded construction to MIL-T-27A Grade 5 Class R.

H Indicates — hermetically sealed to MIL-T-27A Grade 4 Class R.

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 ¹¹ / 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 ¹ / ₁₆	4 6-32
GA	3 ¹³ / ₁₆	2 ³ / ₈	2 ³ / ₄	2 ¹ / ₈ x 1 ³ / ₄	4 6-32
HB	3 ¹ / ₂	3 ¹ / ₁₆	2 ⁵ / ₈	2 ¹⁹ / ₆₄ x 1 ⁵⁵ / ₆₄	4 8-32
JA	3 ⁹ / 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 ¹¹ / ₁₆	3 x 2 ⁷ / ₁₆	4 10-32
LA	5 ⁹ / 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 ¹¹ / ₁₆	4	4 ¹¹ / ₁₆	3 ¹¹ / ₁₆ x 3	4 ¹ / ₄ -20



MC-10 CASE

Height: 1⁵/₁₆"
Width: 1¹/₄"
Depth: 1⁵/₁₆"
Mtg. Cen.: ⁹/₁₆" x ⁷/₈"
Mtg.: 2 4-40 threaded inserts

Catalog No.	MIL Type	Inductance Henry	Rat. Current DC Ma.	DC Res. Ohms	Test Volt Kilovolts	Case No.
MGC 1	TF4RX04AJ	100	10	3,500	1.	AJ
MGC 2	TF4RX04AJ	4	50	230	1.	AJ
MGC 3	TF4RX04EB	10	50	325	1.	EB
MGC 4	TF4RX04FA	20	50	475	1.5	FA
MGC 5	TF4RX04FA	30	50	650	1.5	FA
MGC 6	TF4RX04AJ	3	75	175	1.	AJ
MGC 7	TF4RX04EB	6	75	235	1.5	EB
MGC 8	TF4RX04FA	12	75	265	1.5	FA
MGC 9	TF4RX04EB	3.5	100	145	1.	EB
MGC 10	TF4RX04FA	8	100	180	1.5	FA
MGC 11	TF4RX04GA	12	100	190	2.	GA
MGC 12	TF4RX04EB	2	150	92	1.5	EB
MGC 13	TF4RX04FA	4	150	115	1.5	FA
MGC 14	TF4RX04GA	8	150	125	2.	GA
MGC 15	TF4RX04JB	11	150	120	2.5	JB
MGC 16	TF4RX04FA	2.5	200	70	1.5	FA
MGC 17	TF4RX04GA	4	200	80	2.	GA
MGC 18	TF4RX04HB	7	200	135	2.	HB
MGC 19	TF4RX04JA	10	200	125	2.5	JA
MGC 20	TF4RX04GA	2.5	300	50	2.	GA
MGC 21*	TF4RX04HB	4	300	62	2.5	HB
MGC 22	TF4RX04JB	6	300	85	2.5	JB
MGC 23*	TF4RX04KB	8	300	65	2.5	KB
MGC 24	TF4RX04LA	10	300	100	2.5	LA
MGC 25*	TF4RX04HB	2	400	37	2.5	HB
MGC 26	TF4RX04KB	6	400	60	2.5	KB
MGC 27*	TF4RX04JA	2	500	35	2.5	JA
MGC 28	TF4RX04KB	4	500	45	2.5	KB
MGC 29*	TF4RX04MB	7	500	50	2.5	MB
MGC 30*	TF4RX04LB	2	700	20	2.5	LB
MGC 31*	TF4RX04MB	1.75	1,000	12.5	2.5	MB

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

HERMETICALLY SEALED, MIL-T-27A, GRADE 5, CLASS S FILTER REACTORS

These reactors have a split winding for series or parallel connections.

Catalog No.	Min. Inductance @ Idc (Series Connection)				Max. Rdc	Test Voltage	Case No.
MGC-32	3.2 H @ Odc	2.1 H @ 25 MA	1.70 H @ 35 MA	1.4 H @ 45 MA	220 Ohms	1000 V	MC-10
MGC-33	1.3 H @ Odc	1.1 H @ 50 MA	0.8 H @ 70 MA	0.5 H @ 90 MA	100 Ohms	1000 V	MC-10
MGC-34	400 MH @ Odc	300 MH @ 100 MA	240 MH @ 130 MA	190 MH @ 160 MA	35 Ohms	1000 V	MC-10
MGC-35	105 MH @ Odc	100 MH @ 200 MA	80 MH @ 250 MA	50 MH @ 300 MA	10 Ohms	1000 V	MC-10
MGC-36	25 MH @ Odc	23.5 MH @ 400 MA	15 MH @ 500 MA	11 MH @ 600 MA	2 Ohms	1000 V	MC-10
MGC-37	5.7 MH @ Odc	4.5 MH @ 0.8 A	3.9 MH @ 1 A	3 MH @ 1.2 A	0.5 Ohms	1000 V	MC-10

When using two sections in parallel, double the Idc. Both inductance and resistance are divided by 4.

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 on the degree of temperature stabilization the cores have different temperature coefficients. The degree of stabilization is denoted by a two-letter code.

- SF Non-stabilized cores, $\pm 2\frac{1}{2}\%$ inductance variations from -55°C to $+85^{\circ}\text{C}$.
- SN Non-stabilized cores, $\pm 2\%$ inductance variations from -55°C to $+85^{\circ}\text{C}$.
- SE Temperature stabilized cores, $+0.1\%$ to -0.4% inductance variations from -1.5°C to $+54^{\circ}\text{C}$.
- SB Temperature stabilized cores, $\pm 0.1\%$ inductance variations from $+13^{\circ}\text{C}$ to $+35^{\circ}\text{C}$.
- SD Temperature stabilized cores, $\pm 0.1\%$ inductance variations from -1.5°C to $+54^{\circ}\text{C}$.
- SW Temperature stabilized cores, $\pm 0.25\%$ inductance variations from -54°C to $+85^{\circ}\text{C}$.
- SP Temperature stable carbonyl iron cores, $\pm 0.3\%$ inductance variations 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. Under some unfavorable working conditions the temperature coefficient of inductance corresponding to a given stability characteristic may be exceeded.

2. Nominal and Apparent Inductance:

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

$$L_{\text{app}} = \frac{L}{1 - \left(\frac{F}{F_0}\right)^2} = \frac{L}{1 - \frac{C_d}{C_0}}$$

where L = Nominal inductance

C_d = Distributed capacity

$$C_0 = \frac{1}{(2\pi F_0)^2 L}$$

3. Variation of Inductance vs. Normalized A.C. Voltage and Normalized A.C. and D.C. Currents:

$$\text{Normalized } V_{AC} = \frac{V}{F} \frac{1}{\sqrt{L_H}}$$

$$\text{Normalized } I_{AC} = I_{AC} \sqrt{L_H}$$

$$\text{Normalized } I_{DC} = I_{DC} \sqrt{L_H}$$

where F — operating frequency in cycles

L_H — inductance in henries

I_{AC} — A.C. current in MA

I_{DC} — D.C. current in MA

V — A.C. voltage across the core

These normalized expressions for a 20% decrease in inductance are listed on "Q" charts and on page 17.

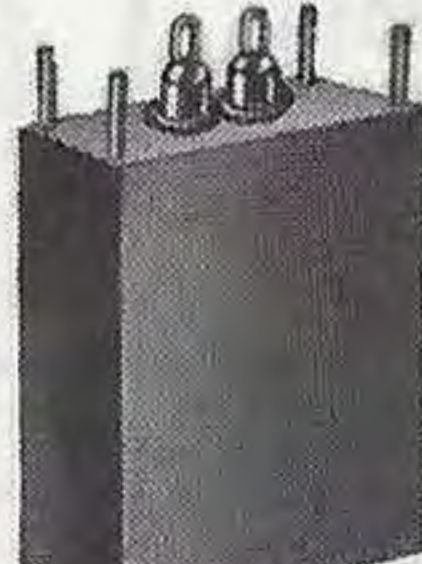
Toroids with special requirements such as tapped toroids, toroidal transformers, molded and cased units with dimensions other than standard sizes and high temperature toroids can be supplied on request. Our engineering and laboratory facilities are available for consultation, research and development.

TORODIAL INDUCTORS

Type	Ω/H	Max. Norm. Idc	Max. Norm. Iac	Max. Norm. Vac	Type	Ω/H	Max. Norm. Idc	Max. Norm. Iac	Max. Norm. Vac
TI- 1	70	55	73.5	0.46	TI-19	4,500	25	29	0.18
TI- 1A	68	75	90.5	0.57	TI-20	2,750	100	*	*
TI- 2	160	90	135	0.85	TI-21	1,200	350	*	*
TI- 3	600	100	67	0.42	TI-22	5,600	210	*	*
TI- 3A	310	150	240	1.5	TI-23	7,000	250	*	*
TI- 4	110	55	67	0.42	TI-24	330	15	18	0.11
TI- 5	260	28	35	0.22	TI-25	200	20	24	0.15
TI- 6	230	75	125	0.80	TI-26	150	25	32	0.20
TI- 7	480	40	53	0.33	TI-27	76.5	50	62	0.39
TI- 8	1,500	50	80	0.5	TI-28	48.5	50	64	0.40
TI- 9	150	200	240	1.5	TI-29	33.5	70	88	0.55
TI-10	430	125	270	1.7	TI-30	28	100	135	0.84
TI-11	30	120	190	1.2	TI-31	19.5	100	136	0.85
TI-12	45	100	160	1	TI-32	48.5	6	14.5	0.09
TI-13	55	140	175	1.1	TI-33	2,150	8	13	0.08
TI-14	580	150	—	—	TI-34	1,700	8	9.5	0.06
TI-15	900	100	—	—	TI-35	4,100	10	18	0.11
TI-16	600	16	21	0.13	TI-36	3,950	10	11	0.07
TI-17	1,200	20	29	0.18	TI-37	23.5	10	32	0.20
TI-18	2,600	30	40	0.25	TI-38	100	4	9.5	0.06

*TI-20 through TI-23 have a very low voltage coefficient and inductance will change very little with voltage. Because of high frequency application, the maximum voltage is limited rather by breakdown than by saturation.

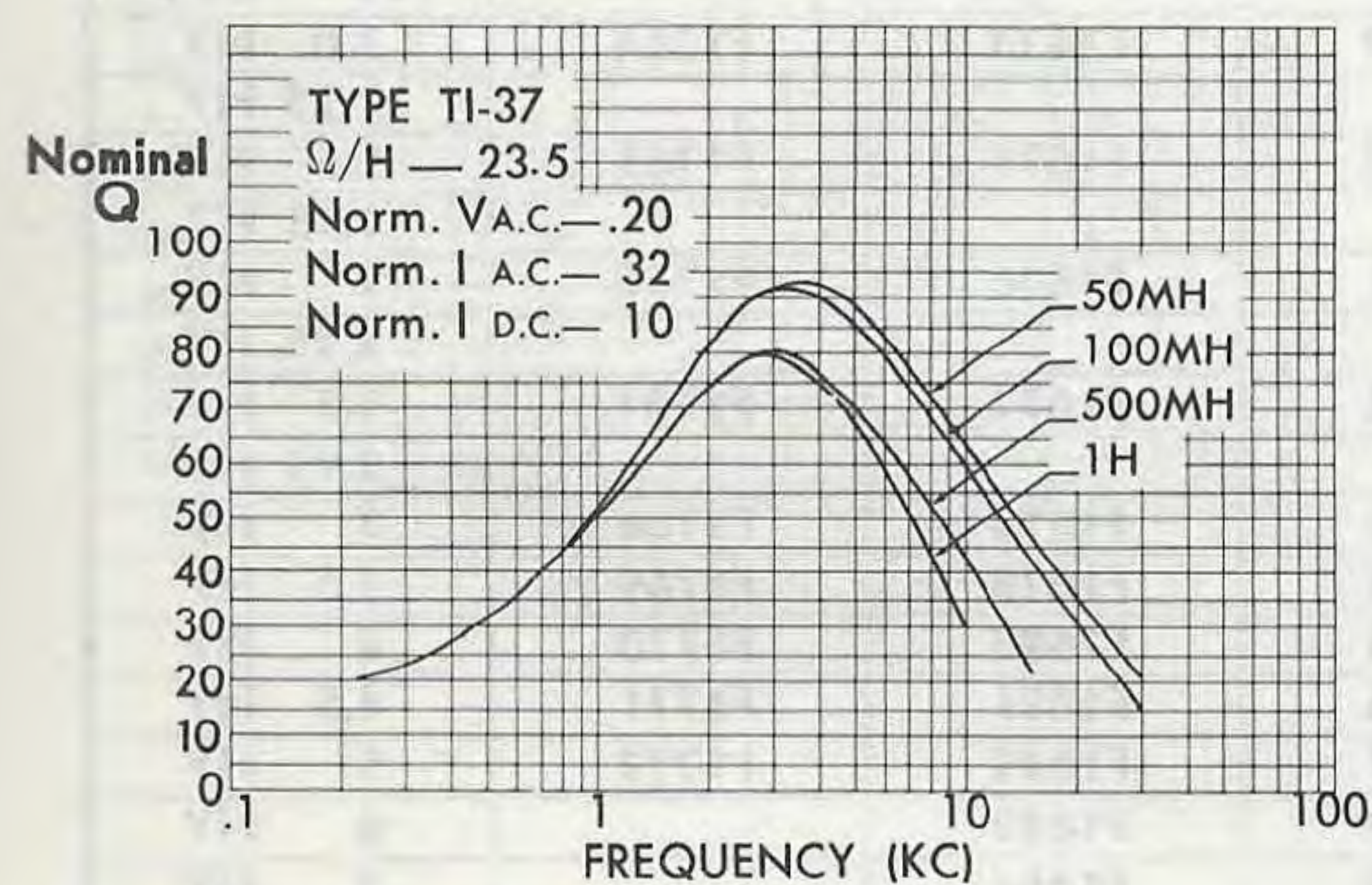
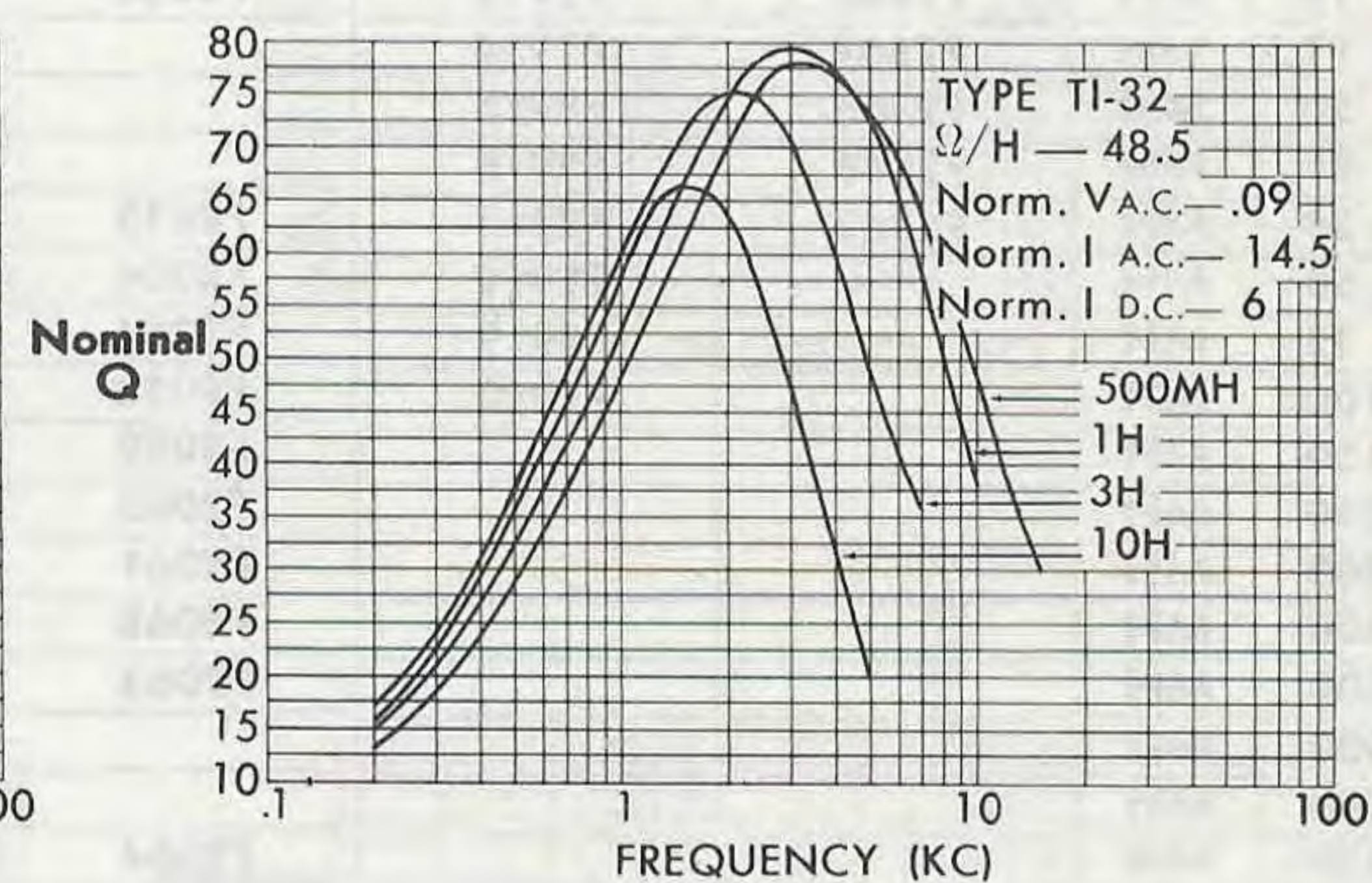
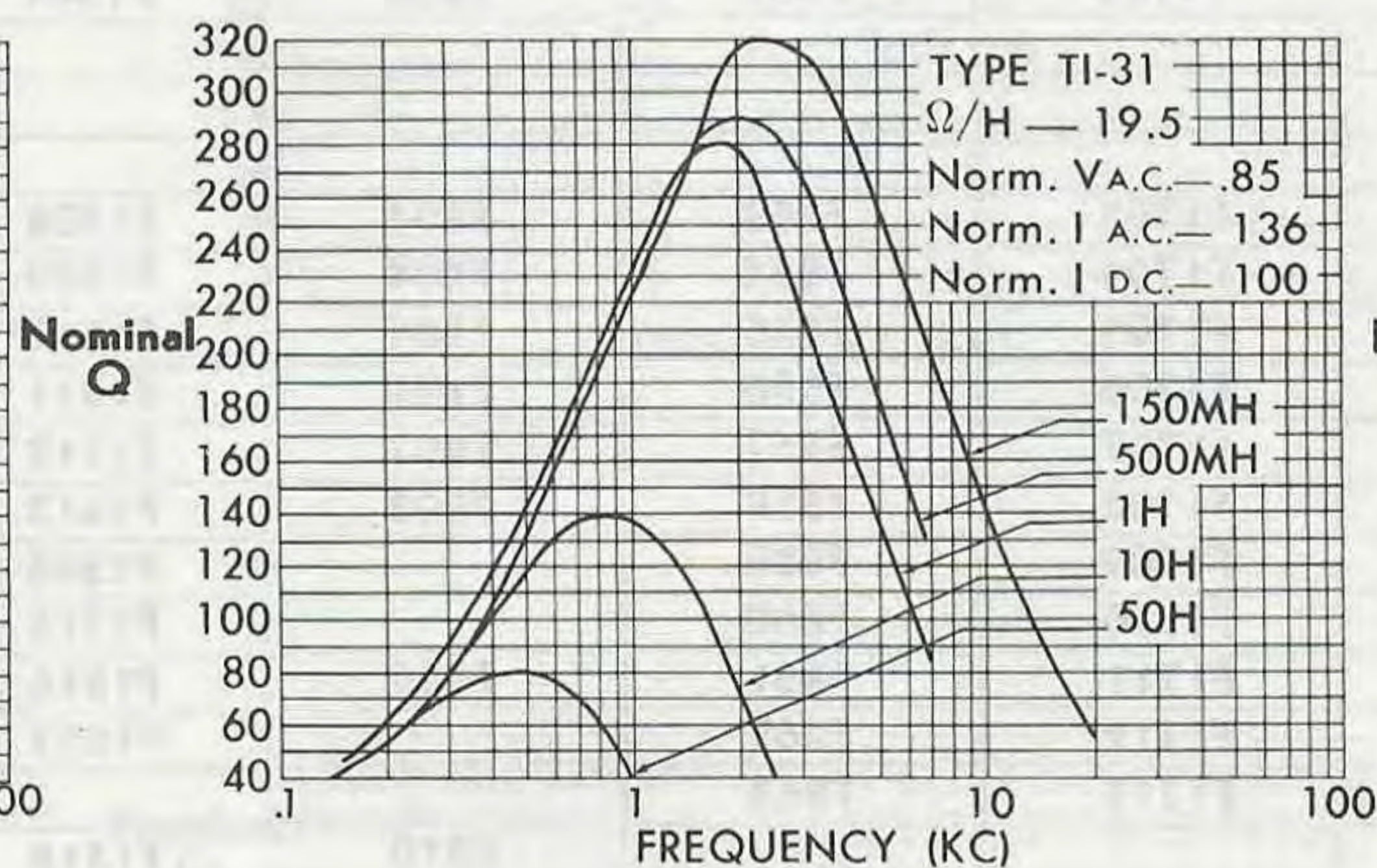
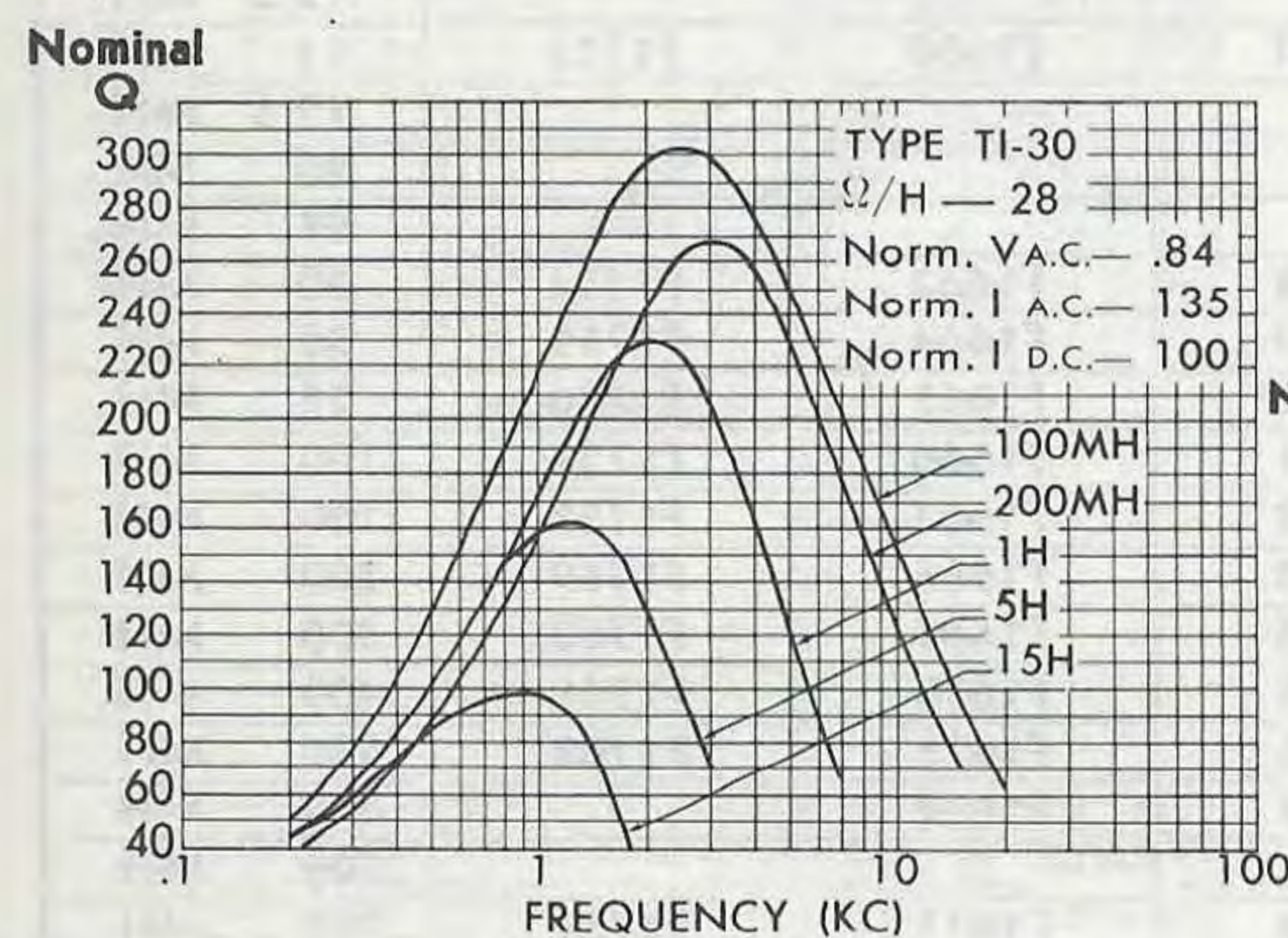
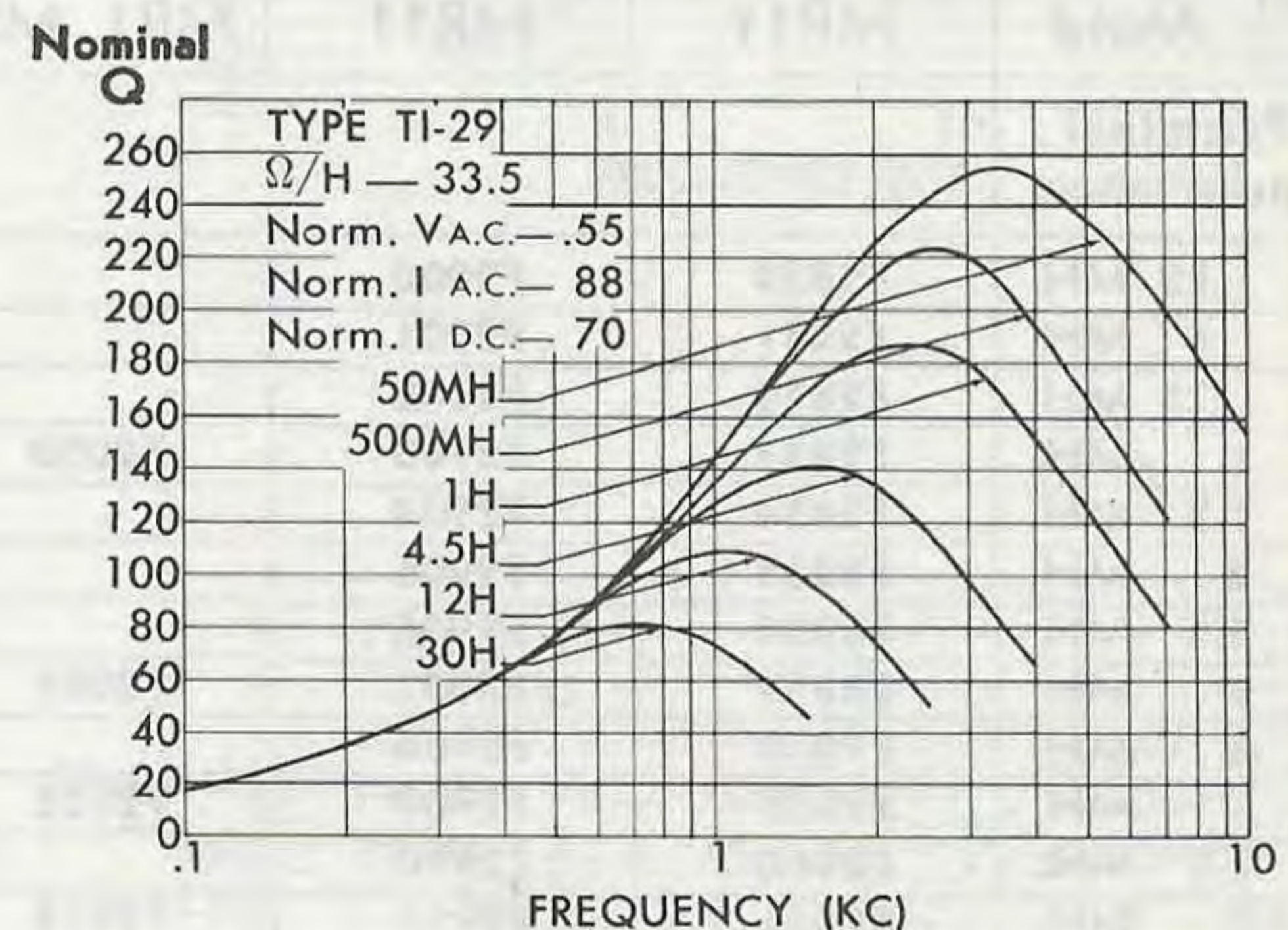
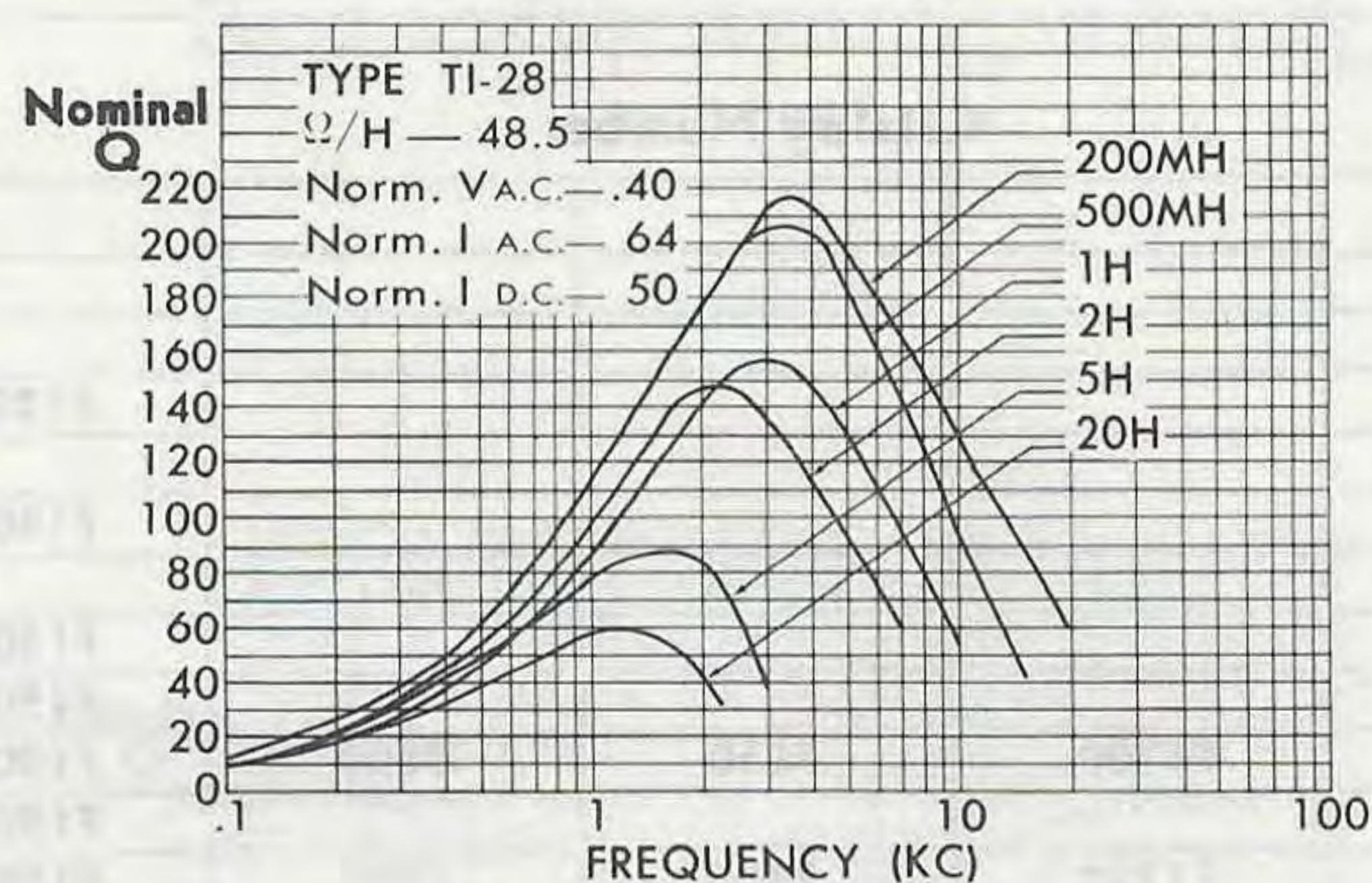
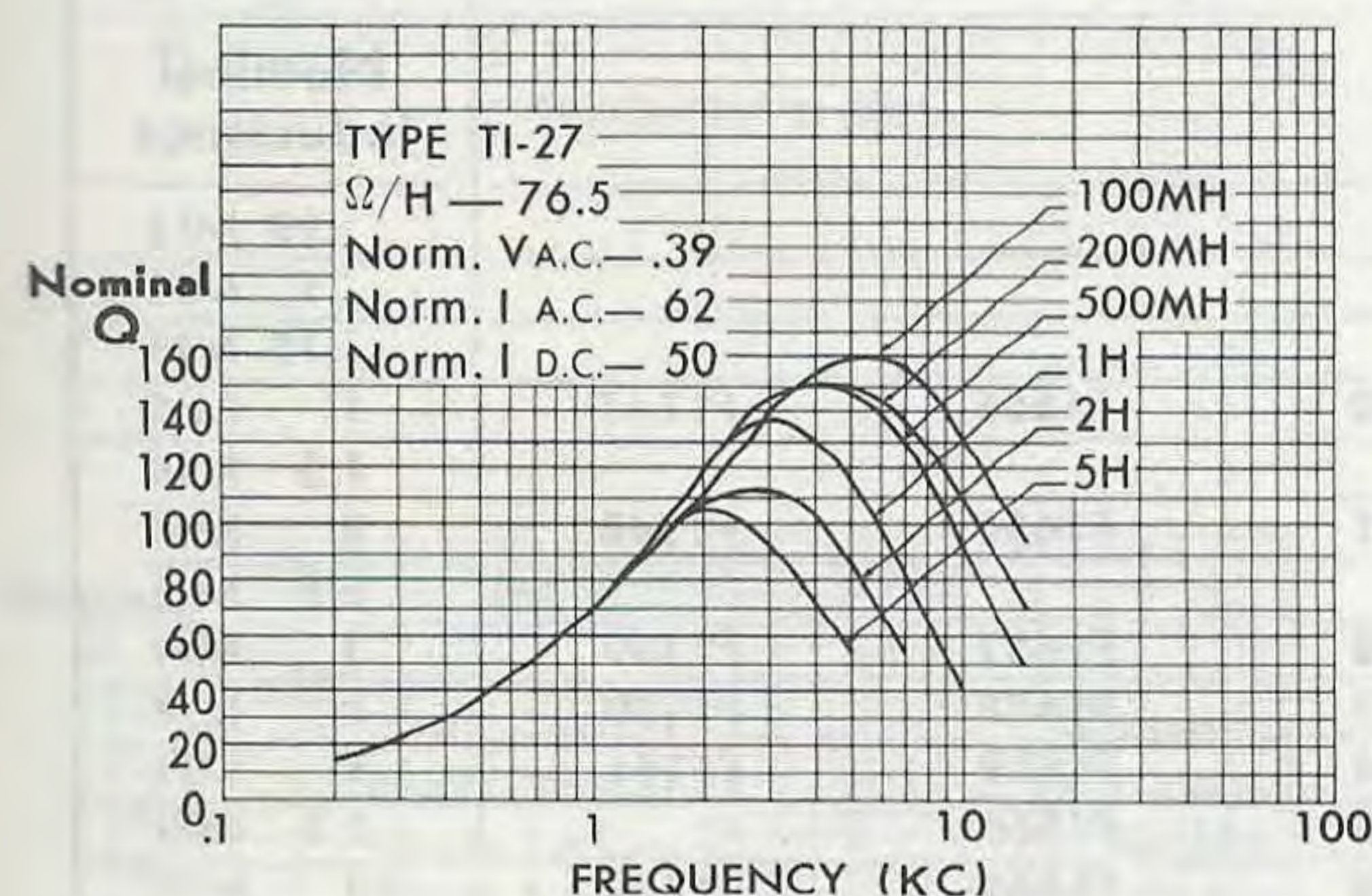
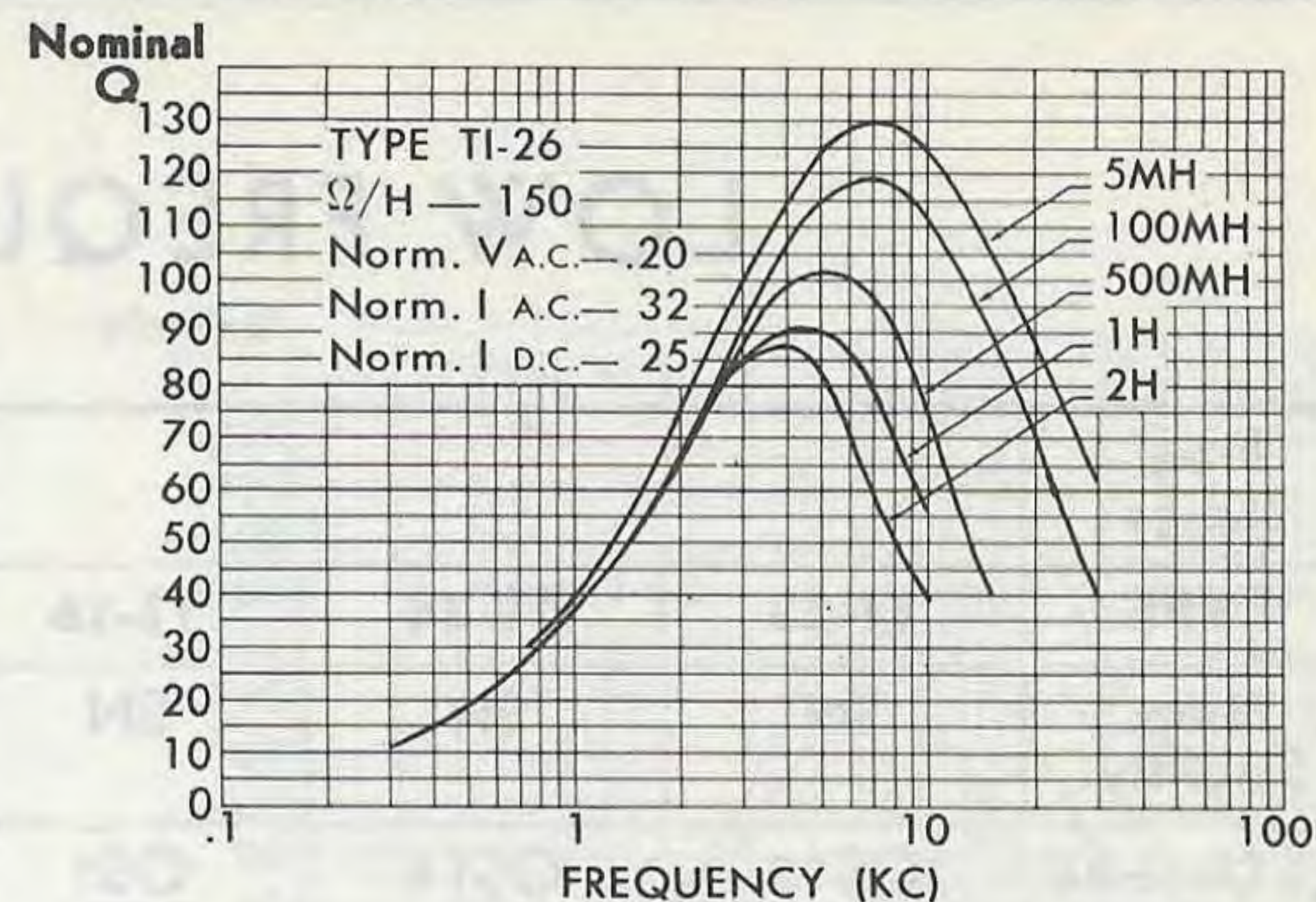
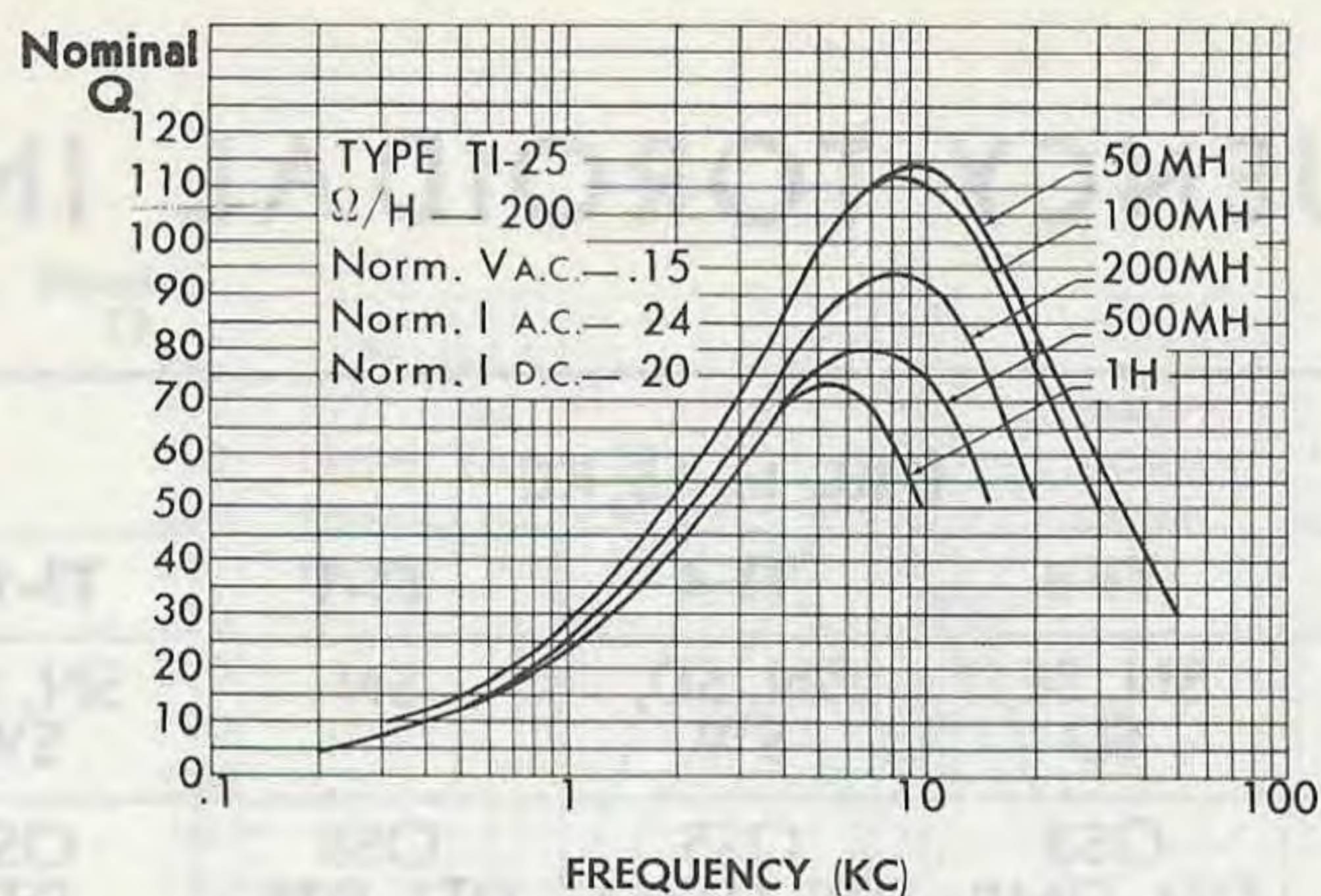
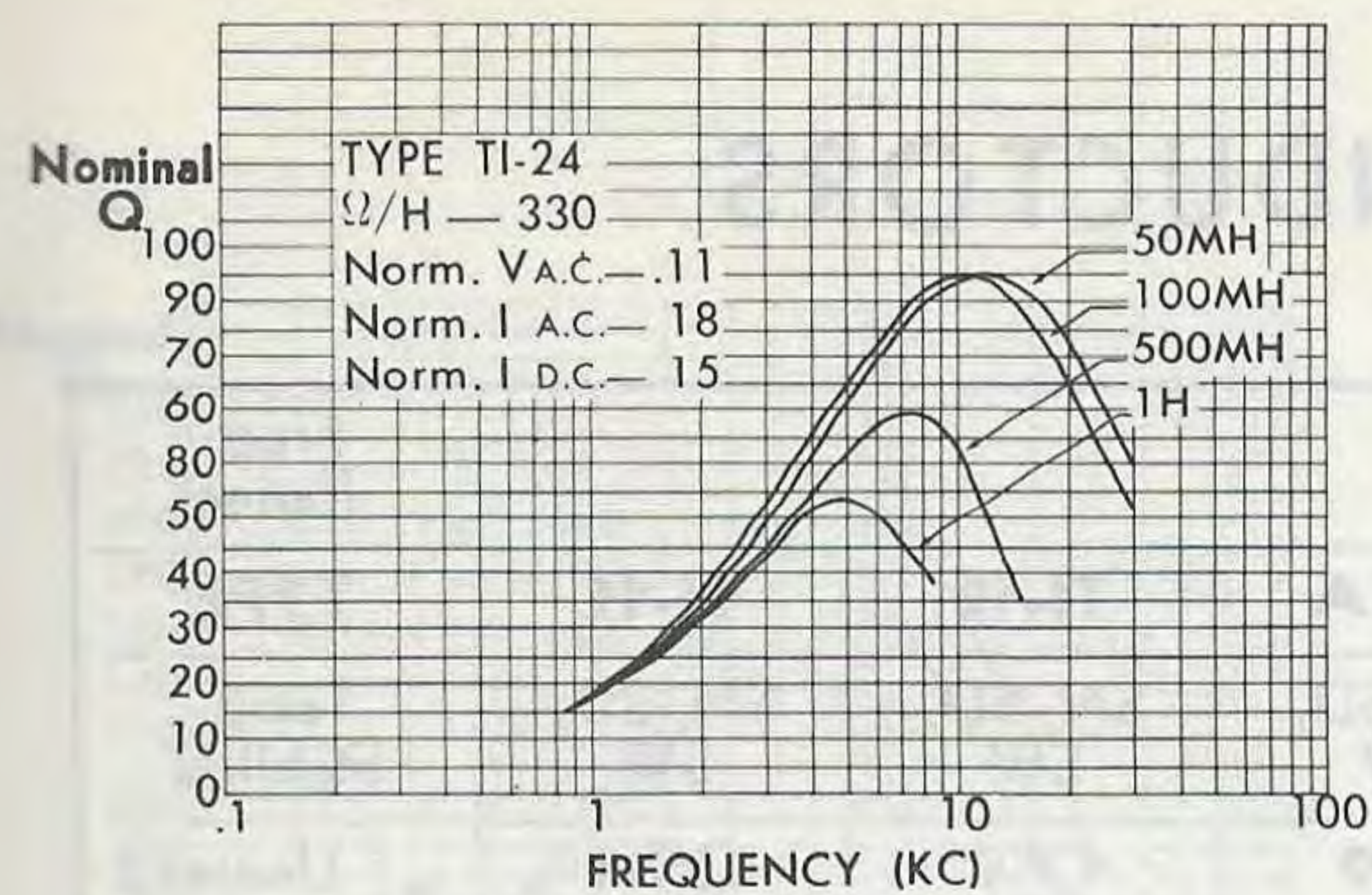
CASED, UNCASED AND MOLDED UNITS

DT-1 CASE 	DT-2 CASE 	DT-3 CASE 	DT-4 CASE 	DT-5 CASE 
DT-6 CASE 	DST-1 CASE 	DM-2 CASE 	DM-11 CASE 	
MR-1 	MR-2 to MR-10 	MS-1 	OS-1 to OS-11 	

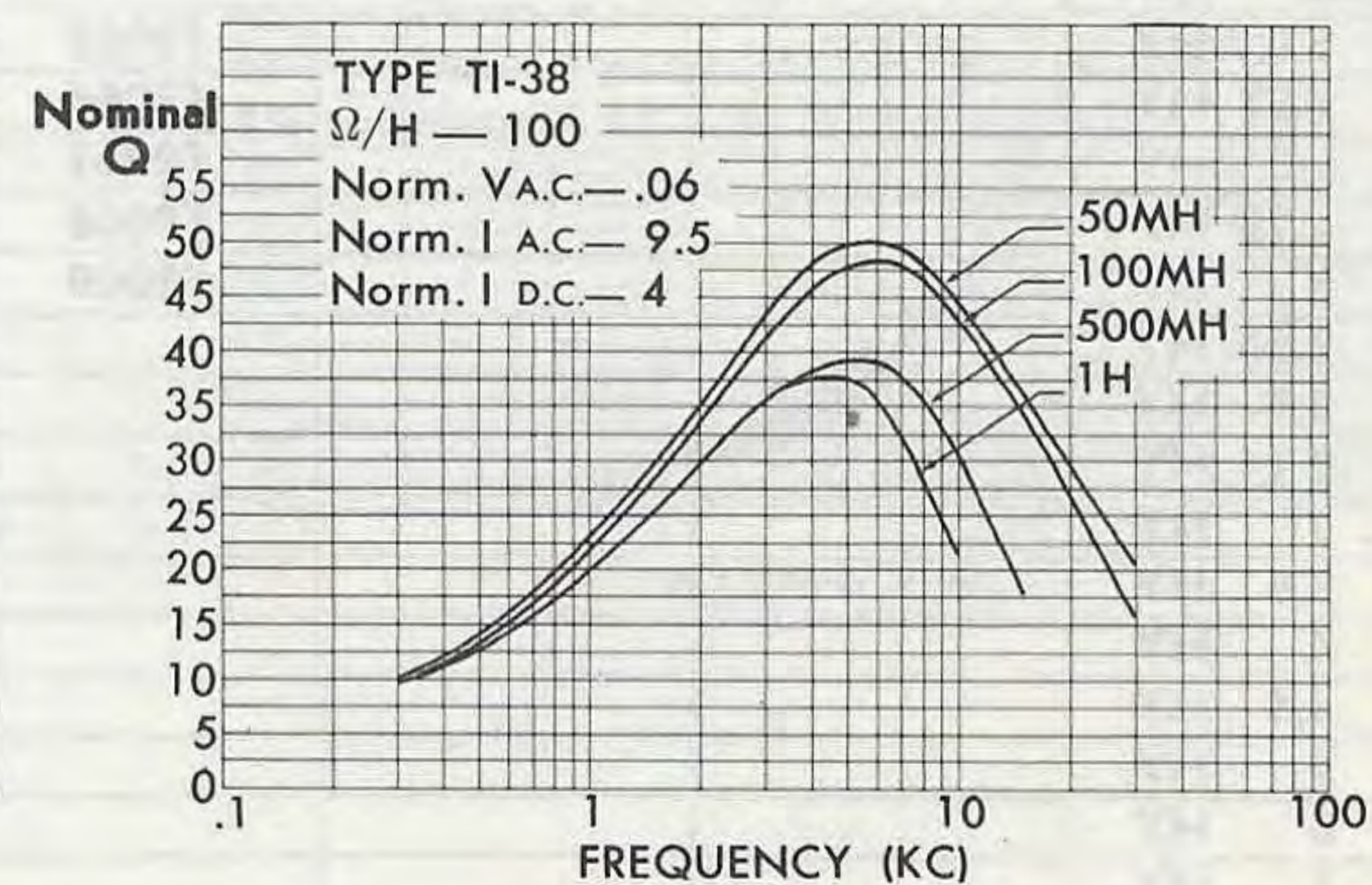
LOW FREQUENCY TOROIDAL INDUCTORS

Freq. Range		100 ~ to 10 KC			200 ~ to 12 KC							Freq. Range		
TYPE		TI-38	TI-32	TI-37	TI-24	TI-25	TI-26	TI-27	TI-28	TI-29	TI-30	TI-31	TYPE	
Temp. Stability		SF	SF	SF	SN	SN	SN	SN	SN	SN	SN	SN	Temp. Stability	
Size	Uncased Case Mold	OS1 DST1 MR1, MS1	OS3 DT1, DM2 MR3	OS5 DT2, DM11 MR4	OS1 DST1 MR1, MS1	OS12 DT1 MR2	OS3 DT1, DM2 MR3	OS5 DT2, DM11 MR4	OS8 DT3, DT5 MR6	OS9 DT4 MR7	OS9 DT4 MR8	OS11 DT4 MR10	Size	Uncased Case Mold
	Nominal Inductance	Catalog Number												Nominal Inductance
1	MH				F2400	F2450	F2500	F2550	F2600	F2650	F2700	F2750	1	MH
2	MH				F2401	F2451	F2501	F2551	F2601	F2651	F2701	F2751	2	MH
3	MH				F2402	F2452	F2502	F2552	F2602	F2652	F2702	F2752	3	MH
5	MH	F3550			F2403	F2453	F2503	F2553	F2603	F2653	F2703	F2753	5	MH
7.5	MH	F3551			F2404	F2454	F2504	F2554	F2604	F2654	F2704	F2754	7.5	MH
10	MH	F3552			F2405	F2455	F2505	F2555	F2605	F2655	F2705	F2755	10	MH
15	MH	F3553			F2406	F2456	F2506	F2556	F2606	F2656	F2706	F2756	15	MH
20	MH	F3554			F2407	F2457	F2507	F2557	F2607	F2657	F2707	F2757	20	MH
30	MH	F3555			F2408	F2458	F2508	F2558	F2608	F2658	F2708	F2758	30	MH
50	MH	F3556	F2800	F4000	F2409	F2459	F2509	F2559	F2609	F2659	F2709	F2759	50	MH
75	MH	F3557	F2801	F4001	F2410	F2460	F2510	F2560	F2610	F2660	F2710	F2760	75	MH
100	MH	F3558	F2802	F4002	F2411	F2461	F2511	F2561	F2611	F2661	F2711	F2761	100	MH
150	MH	F3559	F2803	F4003	F2412	F2462	F2512	F2562	F2612	F2662	F2712	F2762	150	MH
200	MH	F3560	F2804	F4004	F2413	F2463	F2513	F2563	F2613	F2663	F2713	F2763	200	MH
300	MH	F3561	F2805	F4005	F2414	F2464	F2514	F2564	F2614	F2664	F2714	F2764	300	MH
400	MH	F3562	F2806	F4006	F2415	F2465	F2515	F2565	F2615	F2665	F2715	F2765	400	MH
500	MH	F3563	F2807	F4007	F2416	F2466	F2516	F2566	F2616	F2666	F2716	F2766	500	MH
750	MH	F3564	F2808	F4008	F2417	F2467	F2517	F2567	F2617	F2667	F2717	F2767	750	MH
1	H	F3565	F2809	F4009	F2418	F2468	F2518	F2568	F2618	F2668	F2718	F2768	1	H
1.25	H	F3566	F2810	F4010	F2419	F2469	F2519	F2569	F2619	F2669	F2719	F2769	1.25	H
1.5	H	F3567	F2811	F4011	F2420	F2470	F2520	F2570	F2620	F2670	F2720	F2770	1.5	H
1.75	H	F3568	F2812	F4012	F2421	F2471	F2521	F2571	F2621	F2671	F2721	F2771	1.75	H
2	H	F3569	F2813	F4013	F2422	F2472	F2522	F2572	F2622	F2672	F2722	F2772	2	H
2.25	H	F3570	F2814	F4014		F2473	F2523	F2573	F2623	F2673	F2723	F2773	2.25	H
2.5	H	F3571	F2815	F4015		F2474	F2524	F2574	F2624	F2674	F2724	F2774	2.5	H
3	H	F3572	F2816	F4016		F2475	F2525	F2575	F2625	F2675	F2725	F2775	3	H
3.5	H	F3573	F2817	F4017		F2476	F2526	F2576	F2626	F2676	F2726	F2776	3.5	H
4	H	F3574	F2818	F4018		F2477	F2527	F2577	F2627	F2677	F2727	F2777	4	H
4.5	H	F3575	F2819	F4019		F2478	F2528	F2578	F2628	F2678	F2728	F2778	4.5	H
5	H	F3576	F2820	F4020		F2479	F2529	F2579	F2629	F2679	F2729	F2779	5	H
7.5	H	F3577	F2821	F4021		F2480	F2530	F2580	F2630	F2680	F2730	F2780	7.5	H
10	H	F3578	F2822	F4022		F2481	F2531	F2581	F2631	F2681	F2731	F2781	10	H
15	H		F2823	F4023			F2532	F2582	F2632	F2682	F2732	F2782	15	H
20	H		F2824	F4024			F2533	F2583	F2633	F2683	F2733	F2783	20	H
25	H			F4025									25	H
30	H									F2684	F2734	F2784	30	H
40	H									F2685	F2735	F2785	40	H
50	H									F2686	F2736	F2786	50	H
75	H											F2787	75	H
100	H											F2788	100	H

FREED TRANSFORMER COMPANY, INC.



UNCASED		
Type	O.D.	Hi.
OS-1	$\frac{5}{8}$ "	$\frac{5}{16}$ "
OS-3	1"	$\frac{3}{8}$ "
OS-5	$1\frac{5}{16}$ "	$\frac{5}{8}$ "
OS-8	$1\frac{7}{8}$ "	$1\frac{1}{16}$ "
OS-9	$2\frac{1}{4}$ "	$1\frac{1}{8}$ "
OS-11	$2\frac{5}{8}$ "	$1\frac{1}{8}$ "
OS-12	$1\frac{3}{16}$ "	$\frac{3}{8}$ "



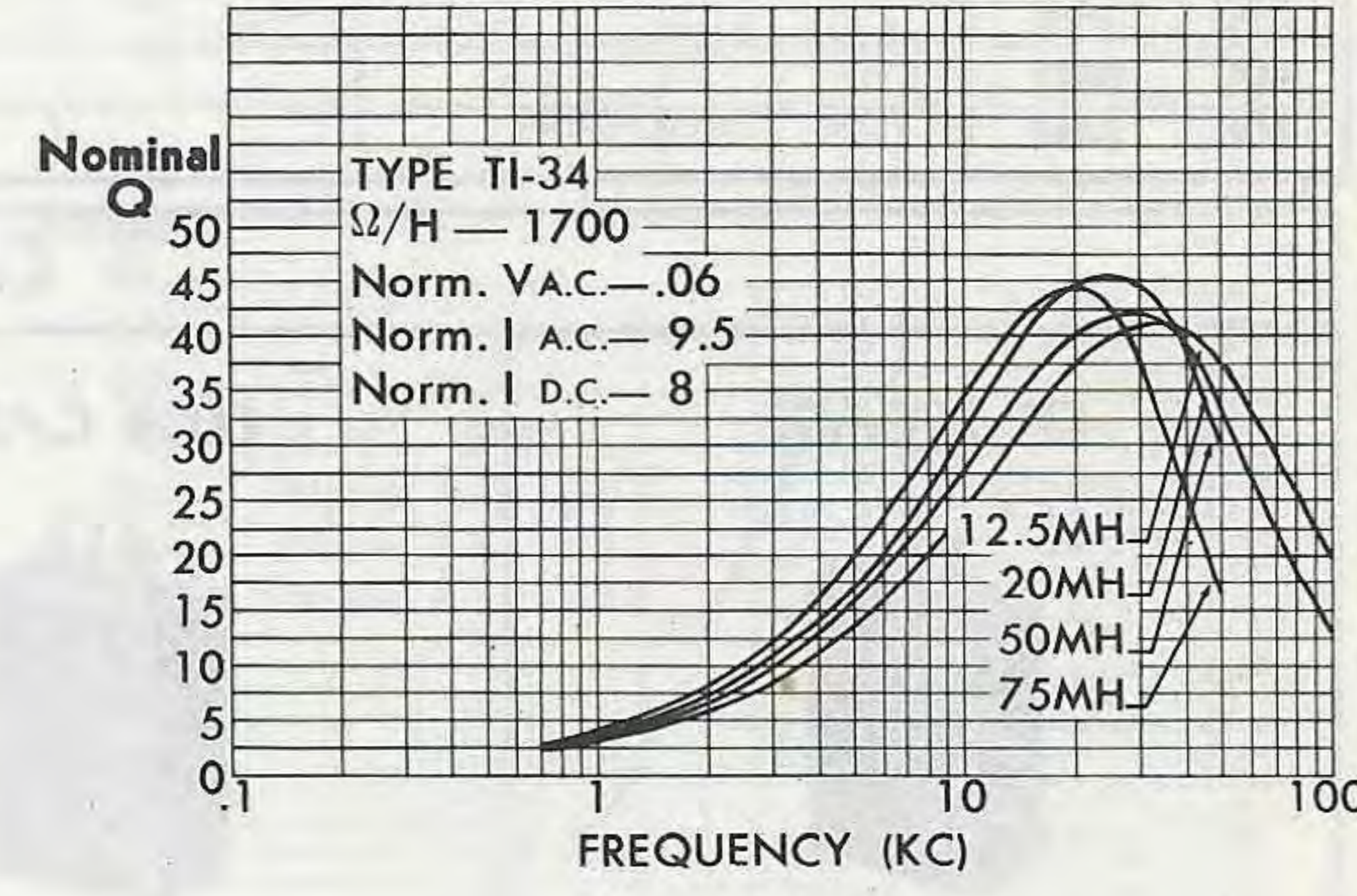
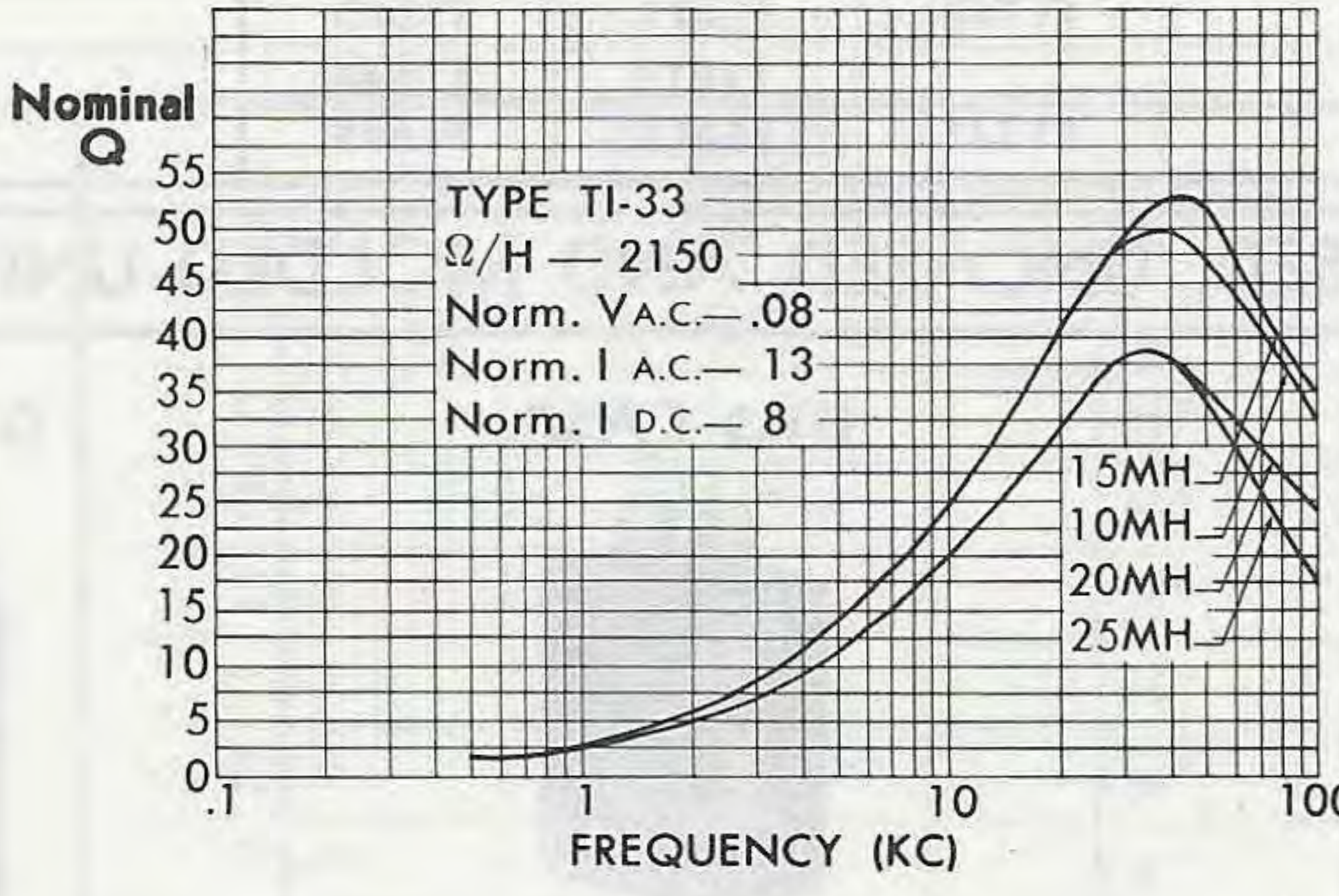
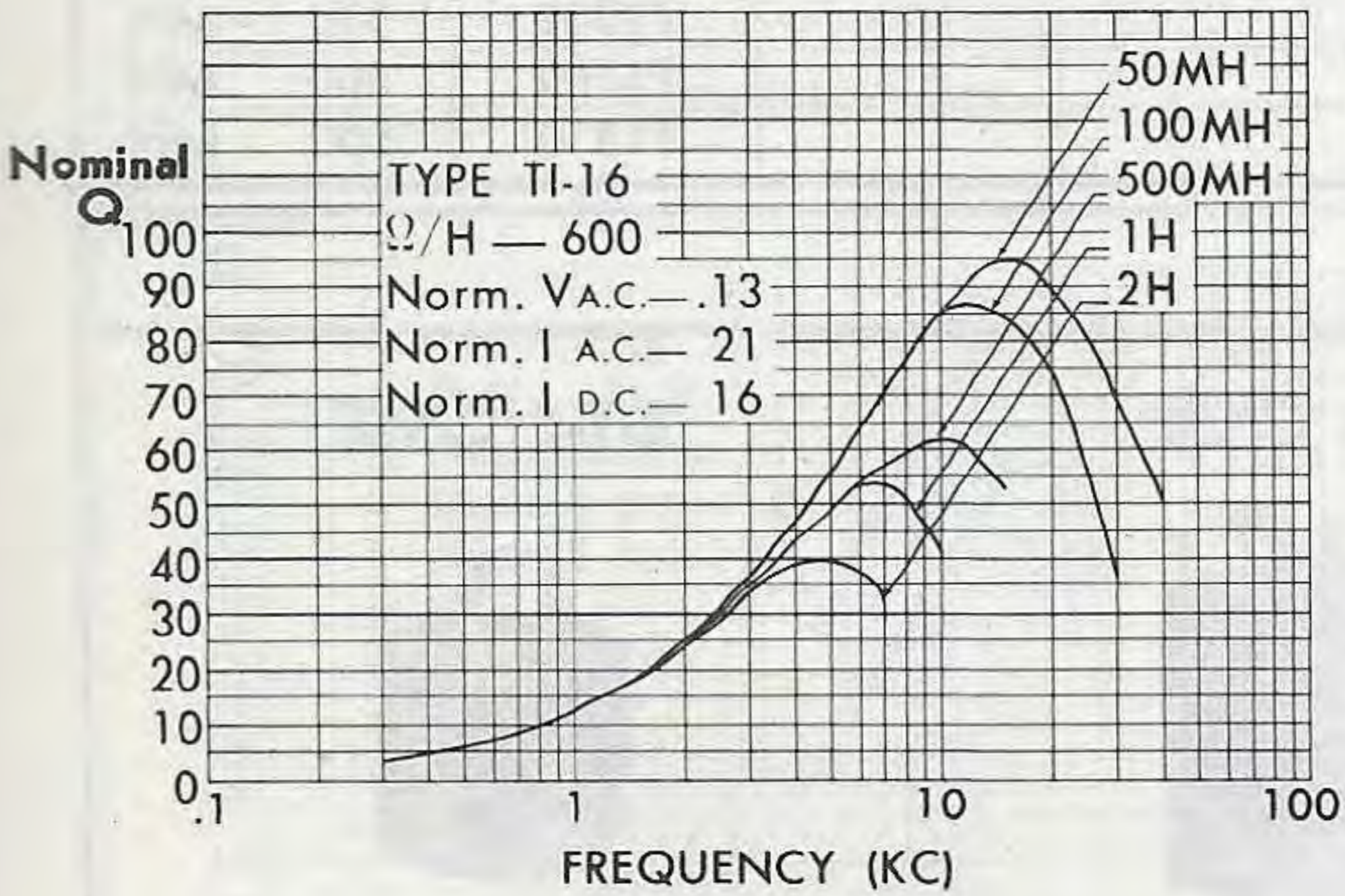
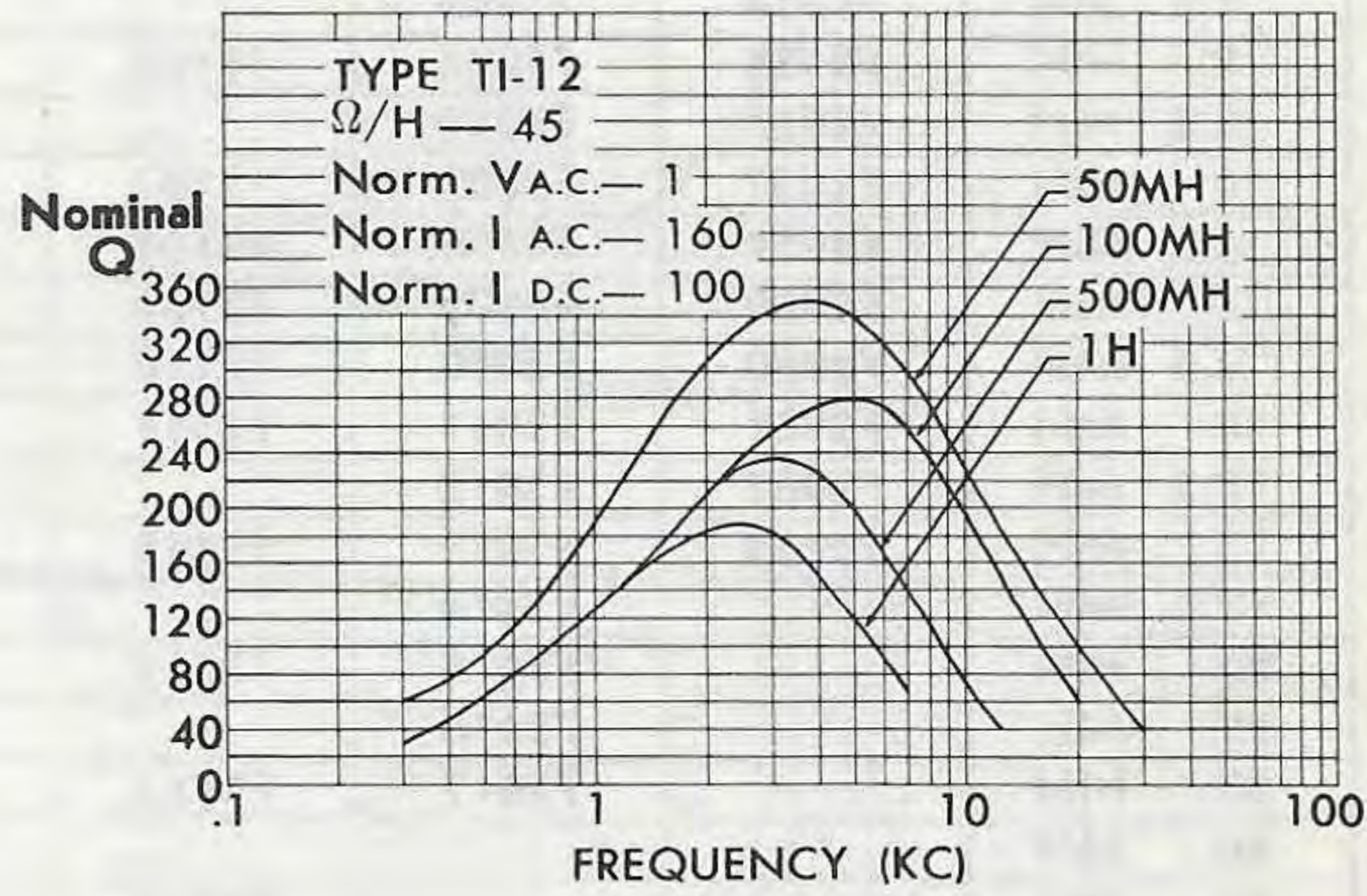
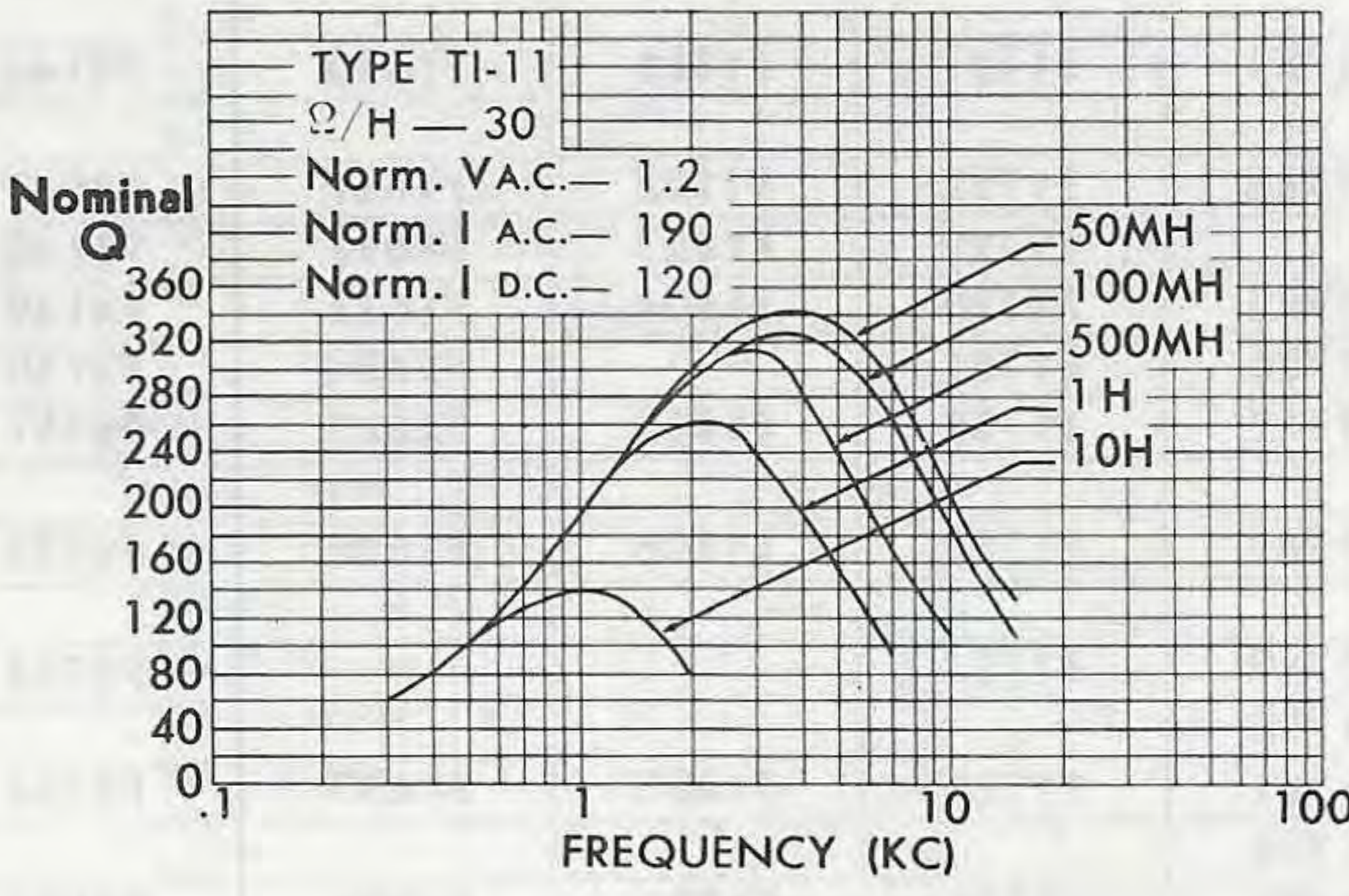
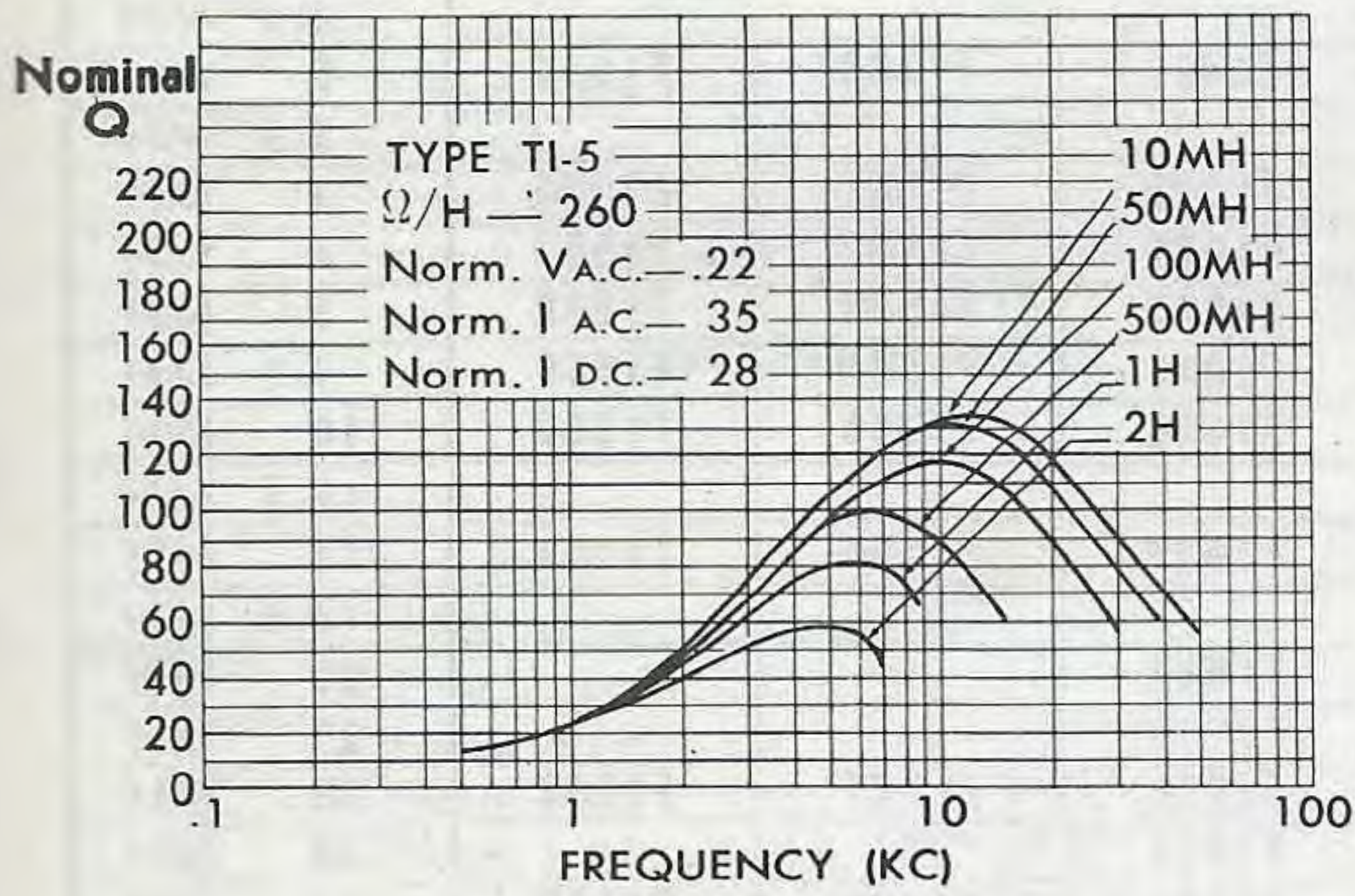
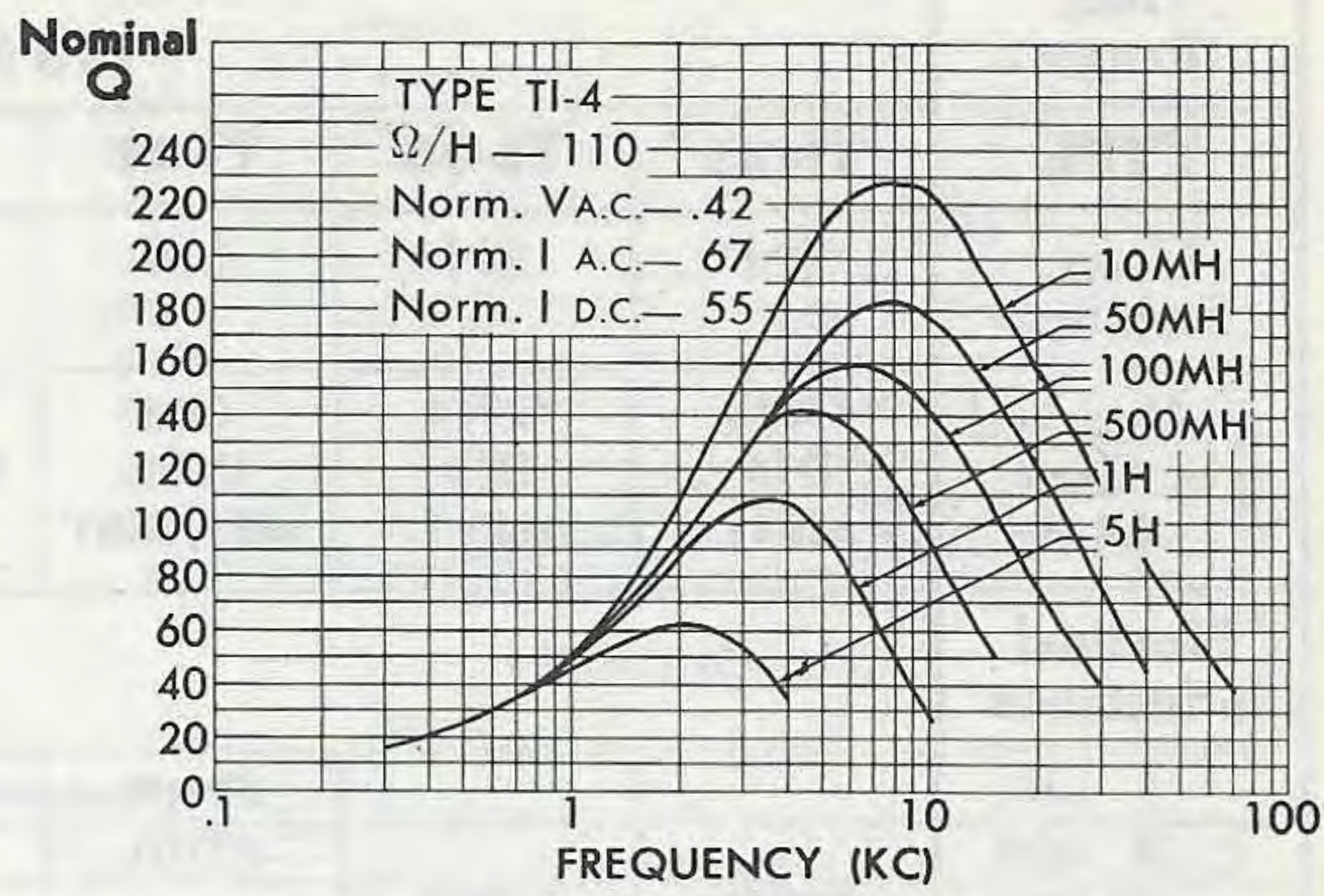
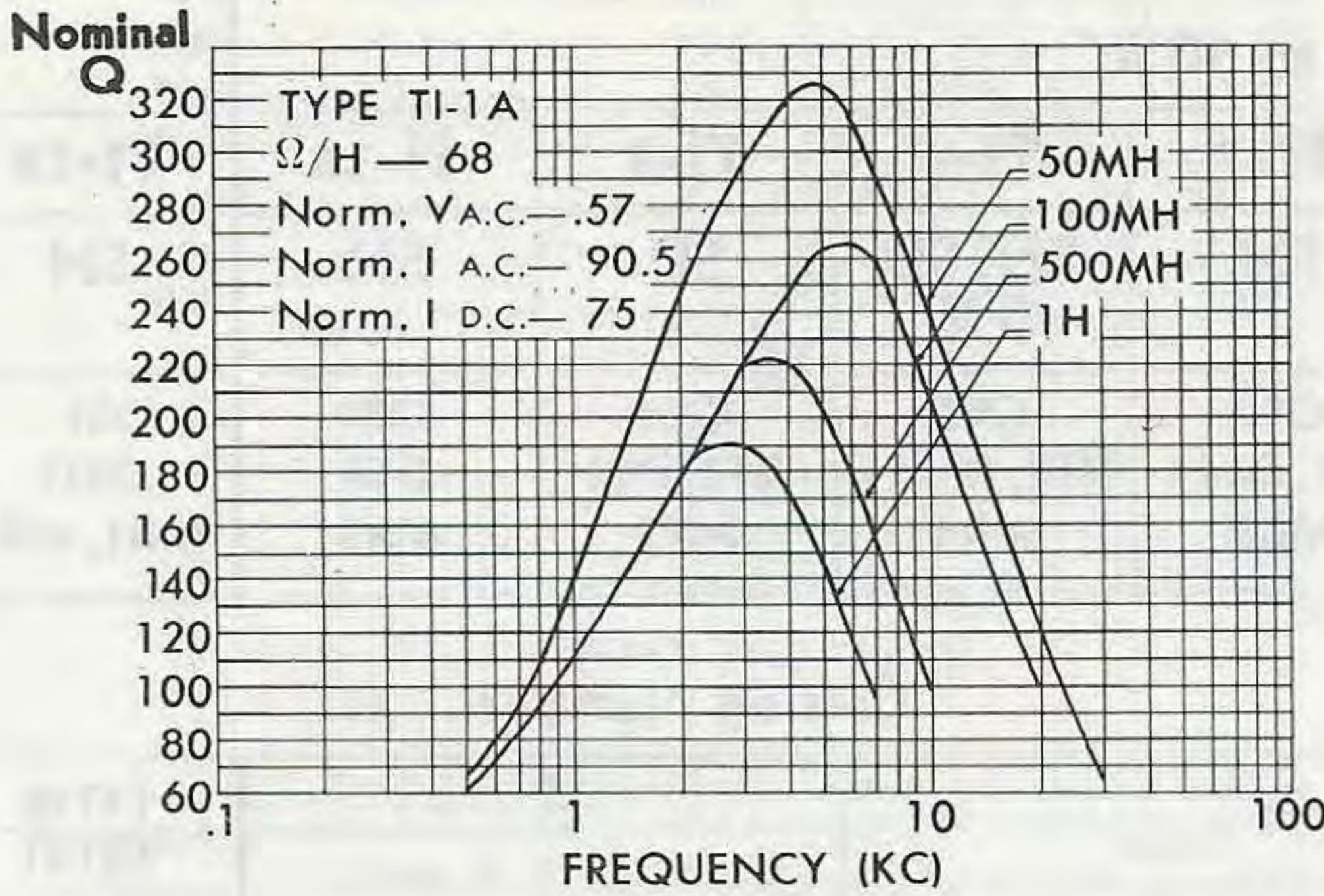
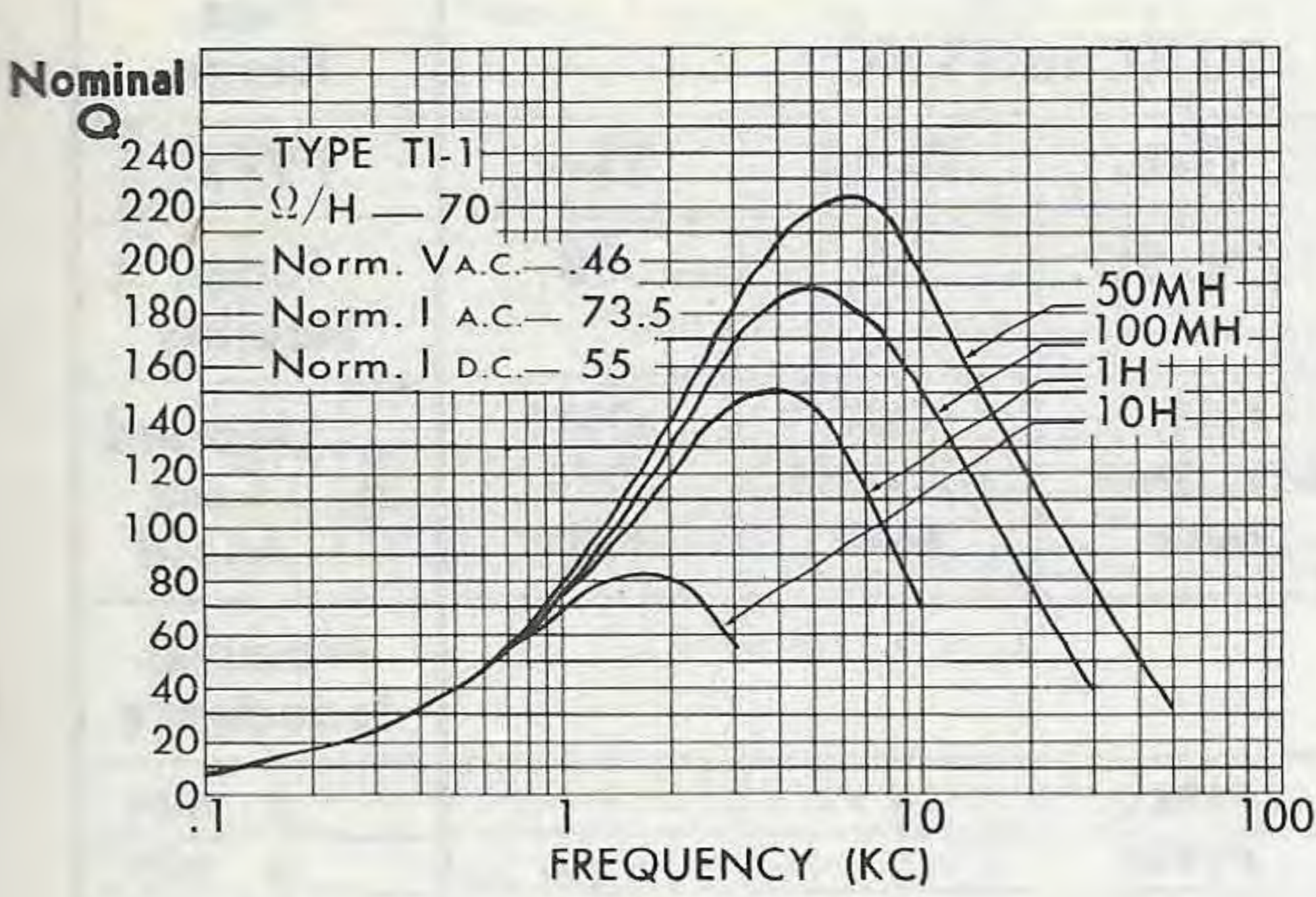
CASE							
Type	Hi.	Dia.	Length	Width	Mtg.	Mtg. Cen.	Cutout
DT-1	$1\frac{7}{32}$ "		$1\frac{1}{16}$ "	$\frac{1}{2}$ "	2 4-40 inserts	$\frac{3}{4}$ "	$\frac{5}{16}$ " x $\frac{1}{2}$ "
DT-2	$1\frac{3}{4}$ "		$1\frac{7}{16}$ "	$1\frac{3}{16}$ "	2 6-32 studs	$\frac{7}{8}$ " x $\frac{9}{32}$ "	$\frac{3}{8}$ " x $1\frac{1}{16}$ "
DT-3	2"		$1\frac{25}{32}$ "	$\frac{7}{8}$ "	2 6-32 studs	$1\frac{1}{4}$ " x $\frac{3}{8}$ "	$\frac{3}{8}$ " x $\frac{3}{4}$ "
DT-4	$3\frac{1}{8}$ "		$2\frac{3}{4}$ "	$1\frac{5}{16}$ "	4 8-32 studs	$2\frac{1}{16}$ " x $1\frac{1}{16}$ "	$\frac{3}{4}$ " x $\frac{3}{8}$ "
DT-5	$1\frac{3}{16}$ "	$1\frac{13}{16}$ "			2 6-32 inserts	$1\frac{1}{8}$ "	$\frac{3}{8}$ " x 1"
DM-2	1"	$1\frac{1}{8}$ "			2 4-40 inserts	$\frac{5}{8}$ "	$\frac{3}{8}$ " x $\frac{7}{8}$ "
DM-11	$1\frac{1}{2}$ "	$1\frac{3}{8}$ "			2 6-32 inserts	$\frac{7}{8}$ "	$\frac{3}{8}$ " x $\frac{7}{8}$ "
DST-1	$2\frac{5}{32}$ "		$\frac{3}{4}$ "	$1\frac{11}{32}$ "	$\frac{1}{4}$ " long pins	To fit $\frac{1}{2}$ " crystal socket	

MOLD			
Type	O.D.	Hi.	Clearance Hole Mounting
MR-1	$\frac{7}{8}$ "	$1\frac{3}{32}$ "	Pig Tails
MR-2	$1\frac{1}{16}$ "	$\frac{1}{2}$ "	No. 4
MR-3	$1\frac{3}{16}$ "	$\frac{1}{2}$ "	No. 6
MR-4	$1\frac{1}{2}$ "	$\frac{3}{4}$ "	No. 8
MR-6	$2\frac{1}{8}$ "	$\frac{7}{8}$ "	No. 8
MR-7	$2\frac{3}{8}$ "	$1\frac{5}{16}$ "	No. 10
MR-8	$2\frac{1}{2}$ "	$1\frac{3}{8}$ "	No. 10
MR-10	$2\frac{7}{8}$ "	$1\frac{3}{8}$ "	No. 10
MS-1	$2\frac{5}{32}$ " x $2\frac{5}{32}$ "	$1\frac{3}{32}$ "	Pig Tails

LOW FREQUENCY TOROIDAL INDUCTORS

Freq. Range		1 KC to 15 KC									Freq. Range	
TYPE		TI-33	TI-34	TI-16	TI-5	TI-4	TI-1	TI-1A	TI-12	TI-11	TYPE	
Temp. Stability		SN	SN	SN	SN, SE, SD	SN, SD, SW	SN	SN, SD, SW	SN, SD, SW	SN, SD, SW	Temp. Stability	
Size	Uncased Case Mold	OS13 DT6 MR11	OS14 DT6 MR11	OS1 DST1 MR1, MS1	OS3 DT1, DM2, MR3	OS5 DT2, DM11, MR4	OS8 DT3, DT5, MR6	OS9 DT4 MR7	OS9 DT4 MR8	OS11 DT4 MR10	Size	Uncased Case Mold
Nominal Inductance		Catalog Number									Nominal Inductance	
.25 MH		F2850	F2900								.25 MH	
.5 MH		F2851	F2901								.5 MH	
.75 MH		F2852	F2902								.75 MH	
1 MH		F2853	F2903	F2050				F1500	F1655	F1747	1 MH	
1.5 MH		F2854	F2904								1.5 MH	
2 MH		F2855	F2905					F1501	F1656	F1748	2 MH	
2.5 MH		F2856	F2906								2.5 MH	
3 MH		F2857	F2907	F2051				F1502	F1657	F1749	3 MH	
4 MH		F2858	F2908					F1503	F1658	F1750	4 MH	
5 MH		F2859	F2909	F2052	F1700	F850	F800	F1504	F1659	F1751	5 MH	
7.5 MH		F2860	F2910					F1505	F1660		7.5 MH	
10 MH		F2861	F2911	F2053	F1701	F851	F801	F1506	F1661	F1752	10 MH	
12.5 MH		F2862	F2912								12.5 MH	
15 MH		F2863	F2913	F2054	F1702	F852	F802	F1507	F1662	F1753	15 MH	
17.5 MH		F2864	F2914								17.5 MH	
20 MH		F2865	F2915								20 MH	
25 MH		F2866	F2916								25 MH	
30 MH		F2867	F2917	F2055	F1703	F853	F803	F1508	F1663	F1754	30 MH	
50 MH			F2918	F2056	F1704	F854	F804	F1509	F1664	F1755	50 MH	
75 MH			F2919	F2057	F1705	F855	F805	F1510	F1665	F1756	75 MH	
100 MH			F2920	F2058	F1706	F856	F806	F1511	F1666	F1757	100 MH	
150 MH				F2059	F1707	F857	F807	F1512	F1667	F1758	150 MH	
200 MH				F2060	F1708	F858	F808	F1513	F1668	F1759	200 MH	
300 MH				F2061	F1709	F859		F1514	F1669	F1760	300 MH	
400 MH				F2062	F1710	F860		F1515	F1670	F1761	400 MH	
500 MH				F2063	F1711	F861	F809	F1516	F1671	F1762	500 MH	
600 MH					F1712	F862		F1517	F1672		600 MH	
700 MH					F1713	F863					700 MH	
750 MH				F2064			F810	F1518	F1673	F1763	750 MH	
800 MH					F1714	F864					800 MH	
900 MH					F1715	F865					900 MH	
1.0 HY				F2065	F1716	F866	F811	F1519	F1674	F1764	1.0 HY	
1.25 HY				F2066	F1717	F867	F812				1.25 HY	
1.5 HY				F2067	F1718	F868	F813	F1520	F1675	F1765	1.5 HY	
1.75 HY				F2068	F1719	F869	F814				1.75 HY	
2 HY				F2069	F1720	F870	F815	F1521	F1676	F1766	2 HY	
2.25 HY						F871	F816				2.25 HY	
2.5 HY						F872	F817	F1522	F1677	F1767	2.5 HY	
2.75 HY						F873	F818				2.75 HY	
3 HY						F874	F819	F1523	F1678	F1768	3 HY	
3.5 HY						F875	F820	F1524	F1679	F1769	3.5 HY	
4 HY						F876	F821	F1525	F1680	F1770	4 HY	
4.5 HY						F877	F822	F1526	F1681	F1771	4.5 HY	
5 HY						F878	F823	F1527	F1682	F1772	5 HY	
6 HY							F824	F1528	F1683		6 HY	
7 HY							F825	F1529	F1684		7 HY	
7.5 HY										F1773	7.5 HY	
8 HY							F826	F1530	F1685		8 HY	
9 HY							F827	F1531	F1686		9 HY	
10 HY							F828	F1532	F1687	F1774	10 HY	
12 HY								F1533	F1688		12 HY	
15 HY							F829	F1534	F1689	F1775	15 HY	
17 HY								F1535	F1690		17 HY	
20 HY							F830	F1536	F1691	F1776	20 HY	
25 HY								F1537	F1692	F1777	25 HY	
30 HY								F1538	F1693	F1778	30 HY	
40 HY										F1779	40 HY	
50 HY										F1780	50 HY	

FREED TRANSFORMER COMPANY, INC.



UNCASED		
Type	O.D.	Hi.
OS-1	$\frac{5}{8}$ "	$\frac{5}{16}$ "
OS-3	1"	$\frac{3}{8}$ "
OS-5	$1\frac{5}{16}$ "	$\frac{5}{8}$ "
OS-8	$1\frac{1}{8}$ "	$1\frac{1}{16}$ "
OS-9	$2\frac{1}{4}$ "	$1\frac{1}{8}$ "
OS-11	$2\frac{5}{8}$ "	$1\frac{1}{8}$ "
OS-13	$\frac{3}{8}$ "	$\frac{1}{4}$ "
OS-14	$\frac{7}{16}$ "	$\frac{7}{32}$ "

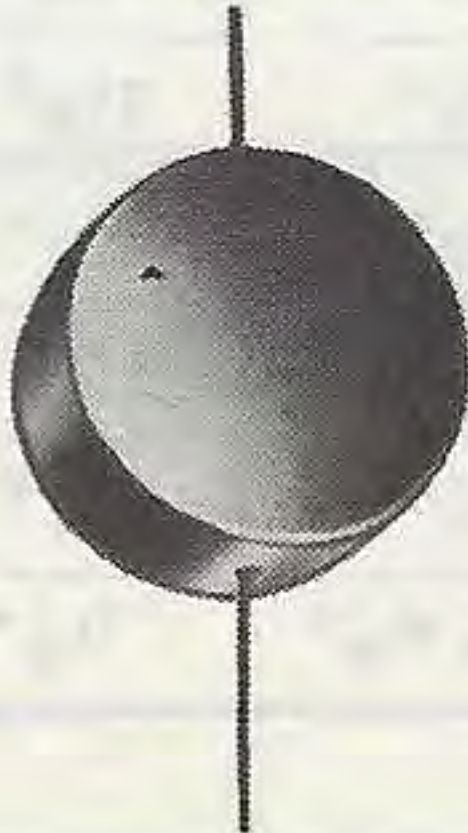
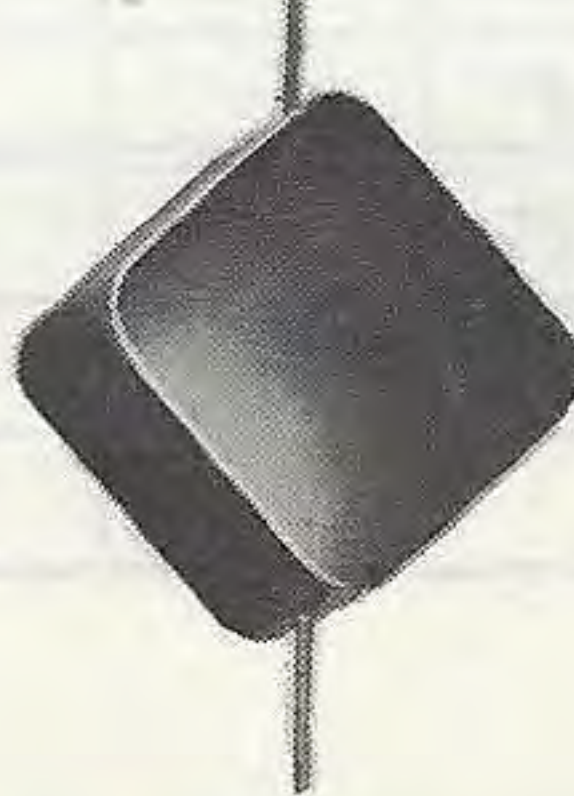
CASE							
Type	Hi.	Dia.	Length	Width	Mtg.	Mtg. Cen.	Cutout
DT-1	$1\frac{7}{32}$ "		$1\frac{1}{16}$ "	$\frac{1}{2}$ "	2 4-40 inserts	$\frac{3}{4}$ "	$\frac{5}{16}$ " x $\frac{1}{2}$ "
DT-2	$1\frac{3}{4}$ "		$1\frac{7}{16}$ "	$\frac{13}{16}$ "	2 6-32 studs	$\frac{7}{8}$ " x $\frac{9}{32}$ "	$\frac{3}{8}$ " x $1\frac{1}{16}$ "
DT-3	2"		$1\frac{25}{32}$ "	$\frac{7}{8}$ "	2 6-32 studs	$1\frac{1}{4}$ " x $\frac{3}{8}$ "	$\frac{3}{8}$ " x $\frac{3}{4}$ "
DT-4	$3\frac{1}{8}$ "		$2\frac{3}{4}$ "	$1\frac{5}{16}$ "	4 8-32 studs	$2\frac{1}{16}$ " x $1\frac{1}{16}$ "	$\frac{3}{4}$ " x $\frac{3}{8}$ "
DT-5	$1\frac{3}{16}$ "	$1\frac{13}{16}$ "			2 6-32 inserts	$1\frac{1}{8}$ "	$\frac{3}{8}$ " x 1"
DT-6	$\frac{5}{8}$ "	$\frac{1}{2}$ "			Pig Tails		
DM-2	1"	$1\frac{1}{8}$ "			2 4-40 inserts	$\frac{5}{8}$ "	$\frac{3}{8}$ " x $\frac{7}{8}$ "
DM-11	$1\frac{1}{2}$ "	$1\frac{3}{8}$ "			2 6-32 inserts	$\frac{7}{8}$ "	$\frac{3}{8}$ " x $\frac{7}{8}$ "
DST-1	$\frac{25}{32}$ "		$\frac{3}{4}$ "	$1\frac{1}{32}$ "	$\frac{1}{4}$ " long pins	To fit $\frac{1}{2}$ " crystal socket	

MOLD			
Type	O.D.	Hi.	Clearance Hole Mounting
MR-1	$\frac{7}{8}$ "	$1\frac{13}{32}$ "	Pig Tails
MR-3	$1\frac{3}{16}$ "	$\frac{1}{2}$ "	No. 6
MR-4	$1\frac{1}{2}$ "	$\frac{3}{4}$ "	No. 8
MR-6	$2\frac{1}{8}$ "	$\frac{7}{8}$ "	No. 8
MR-7	$2\frac{3}{8}$ "	$1\frac{5}{16}$ "	No. 10
MR-8	$2\frac{1}{2}$ "	$1\frac{3}{8}$ "	No. 10
MR-10	$2\frac{7}{8}$ "	$1\frac{3}{8}$ "	No. 10
MR-11	$\frac{7}{16}$ "	$\frac{1}{4}$ "	Pig Tails
MS-1	$\frac{25}{32}$ " x $\frac{25}{32}$ "	$1\frac{13}{32}$ "	Pig Tails

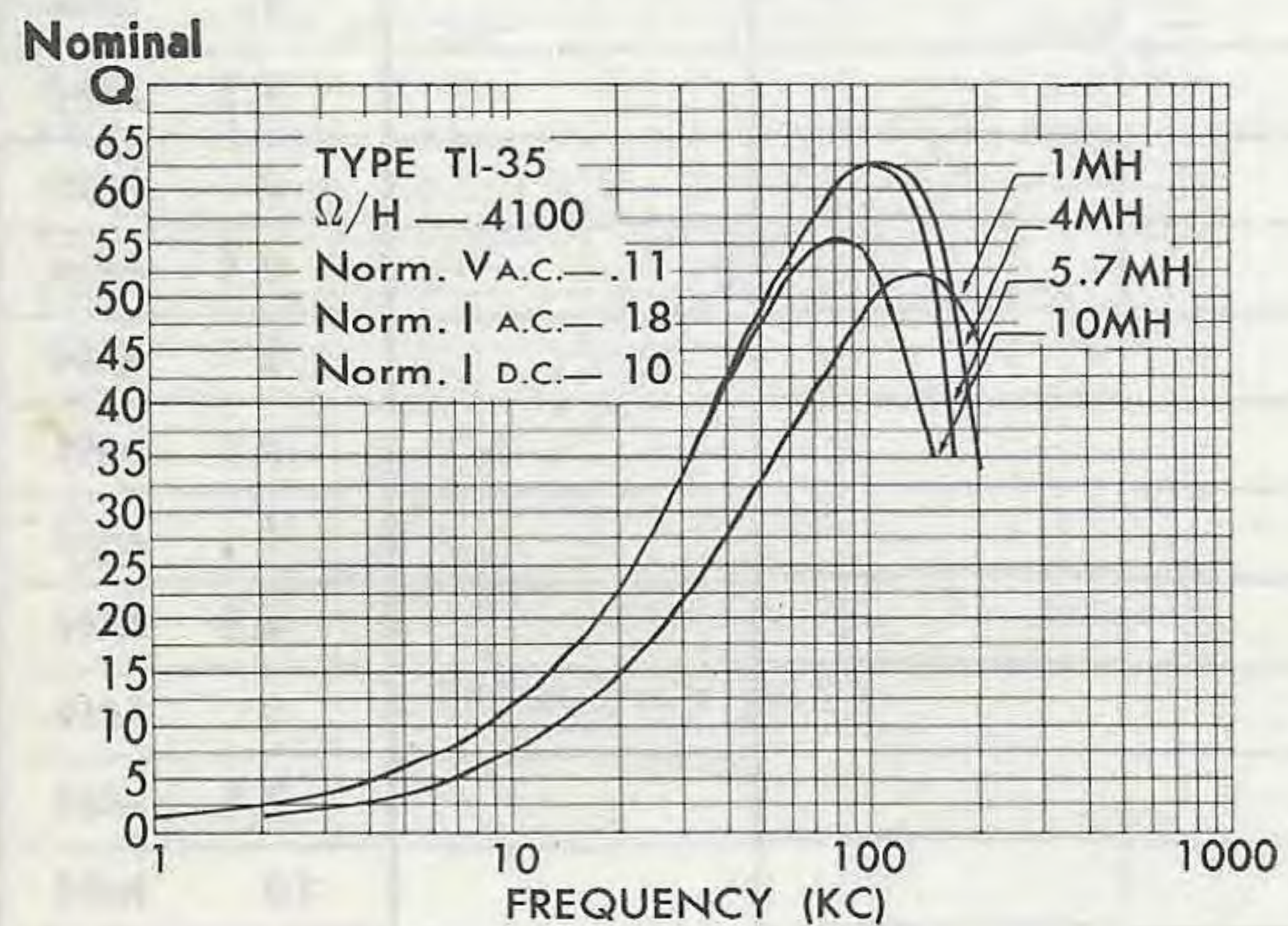
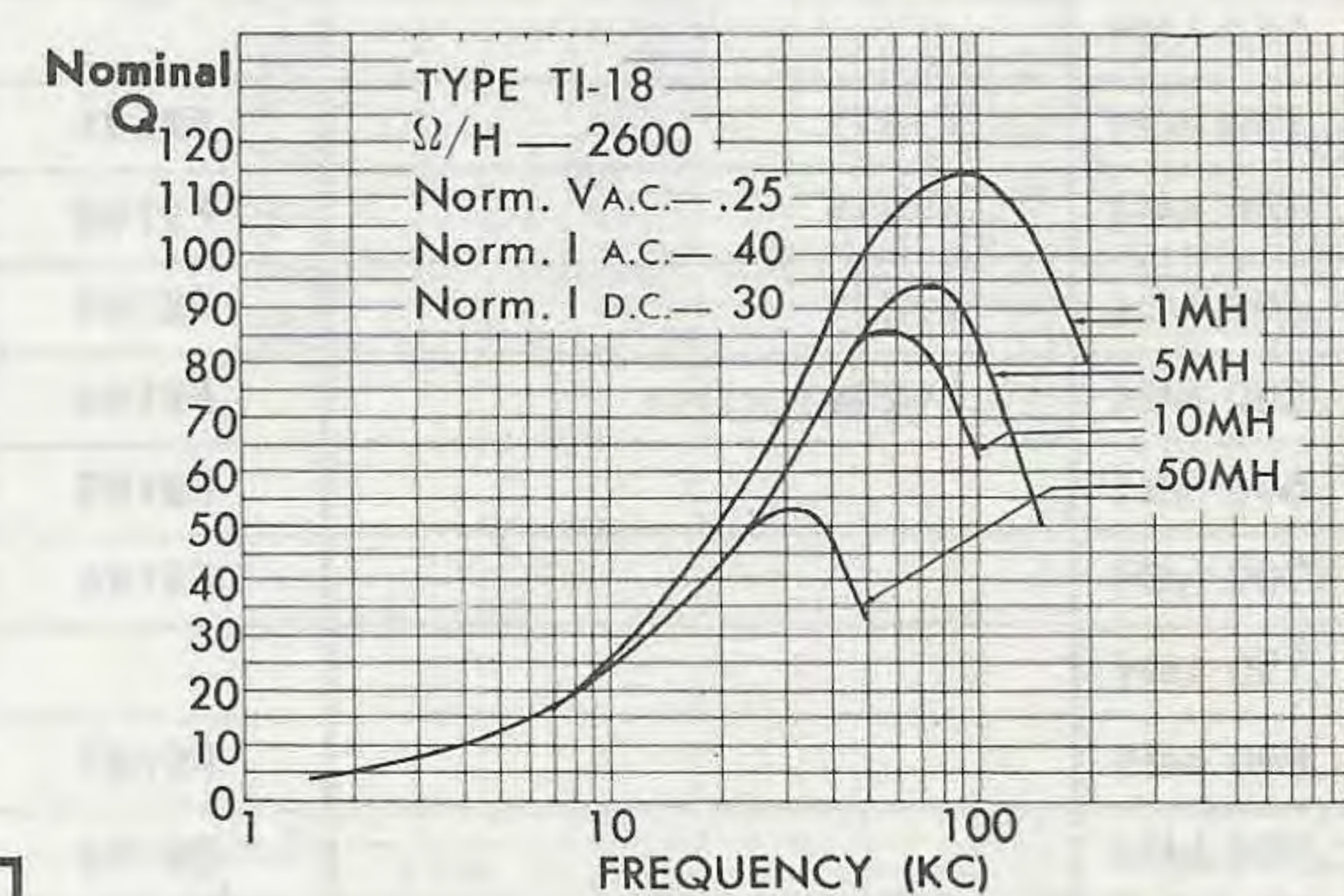
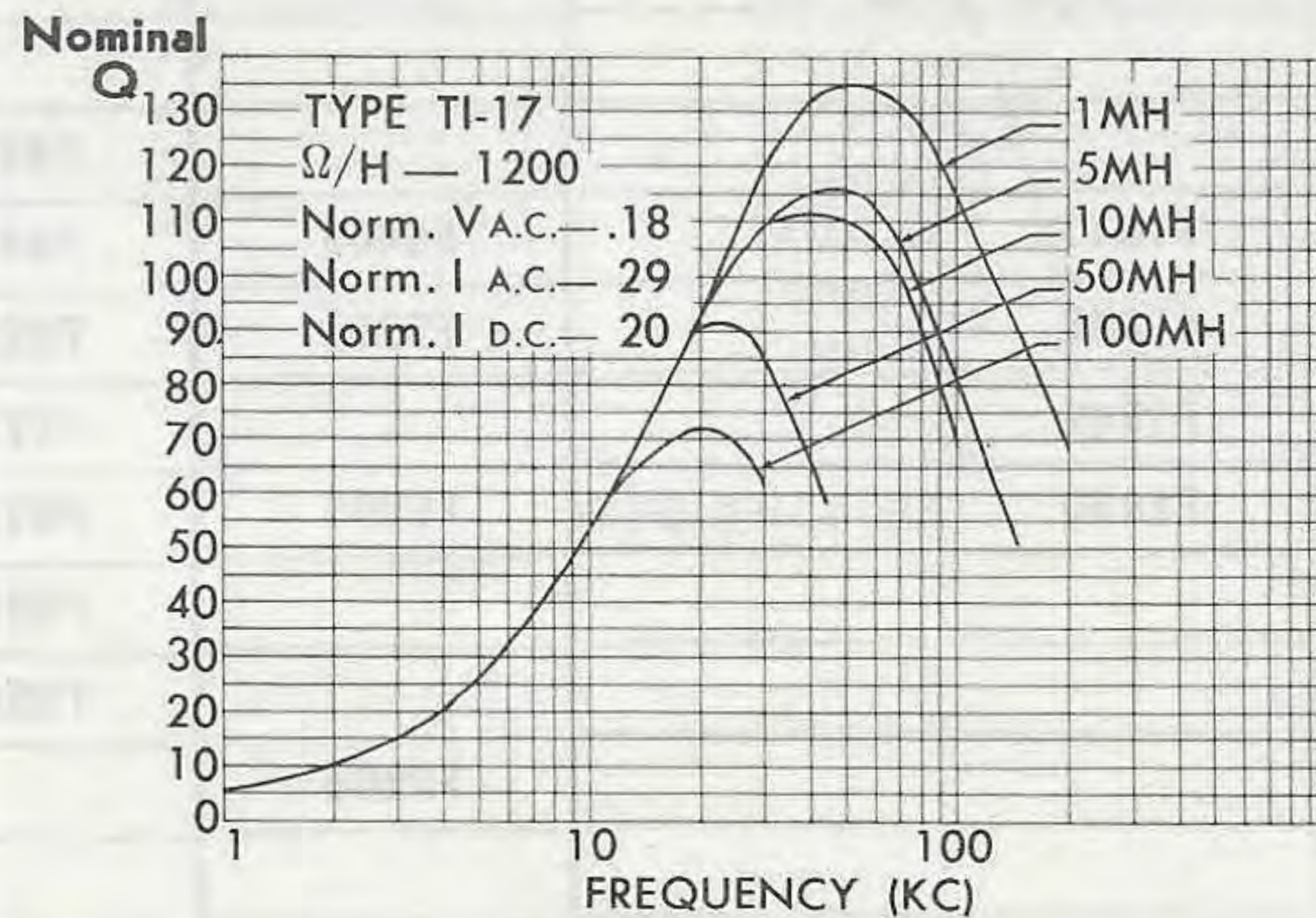
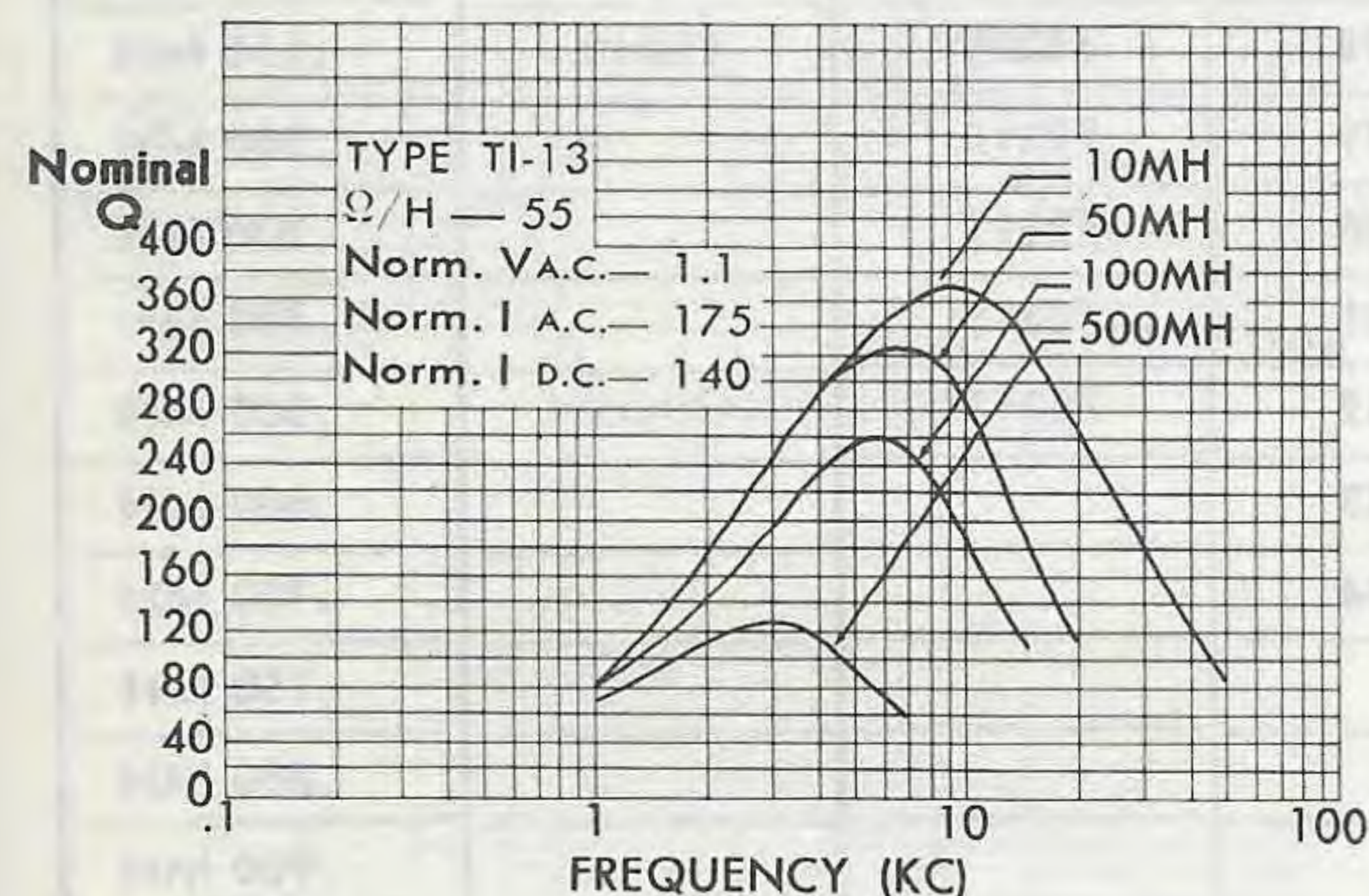
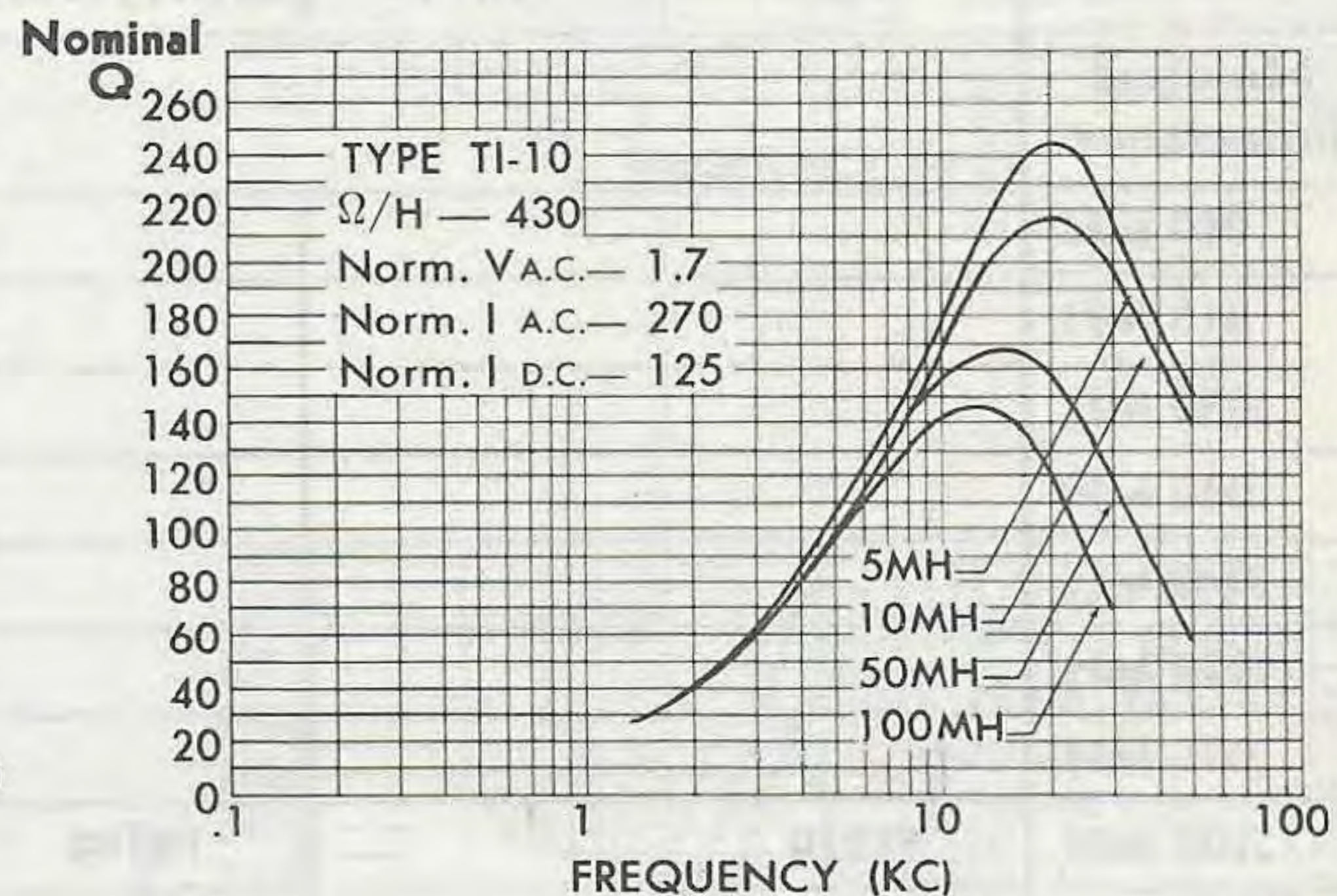
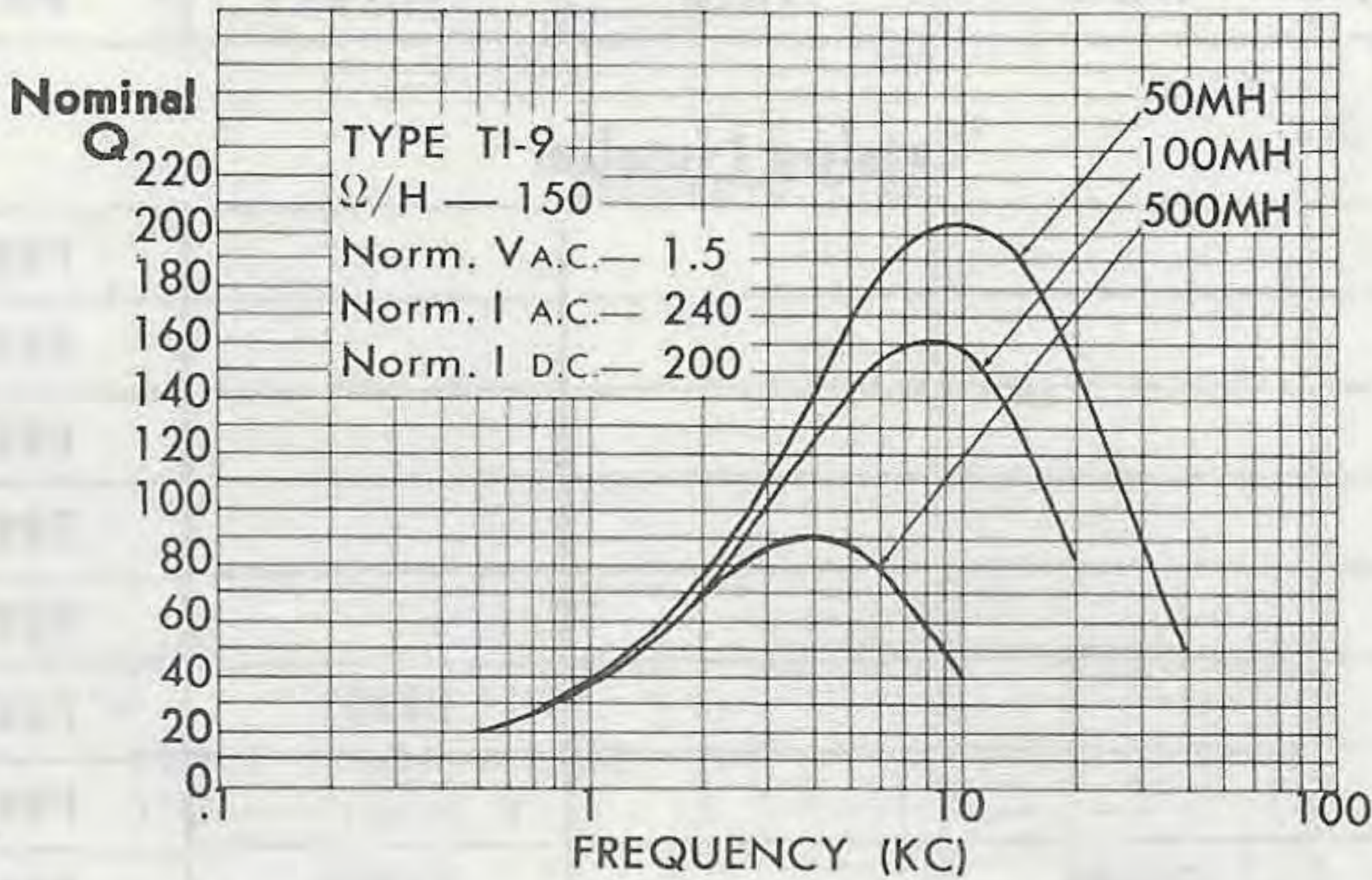
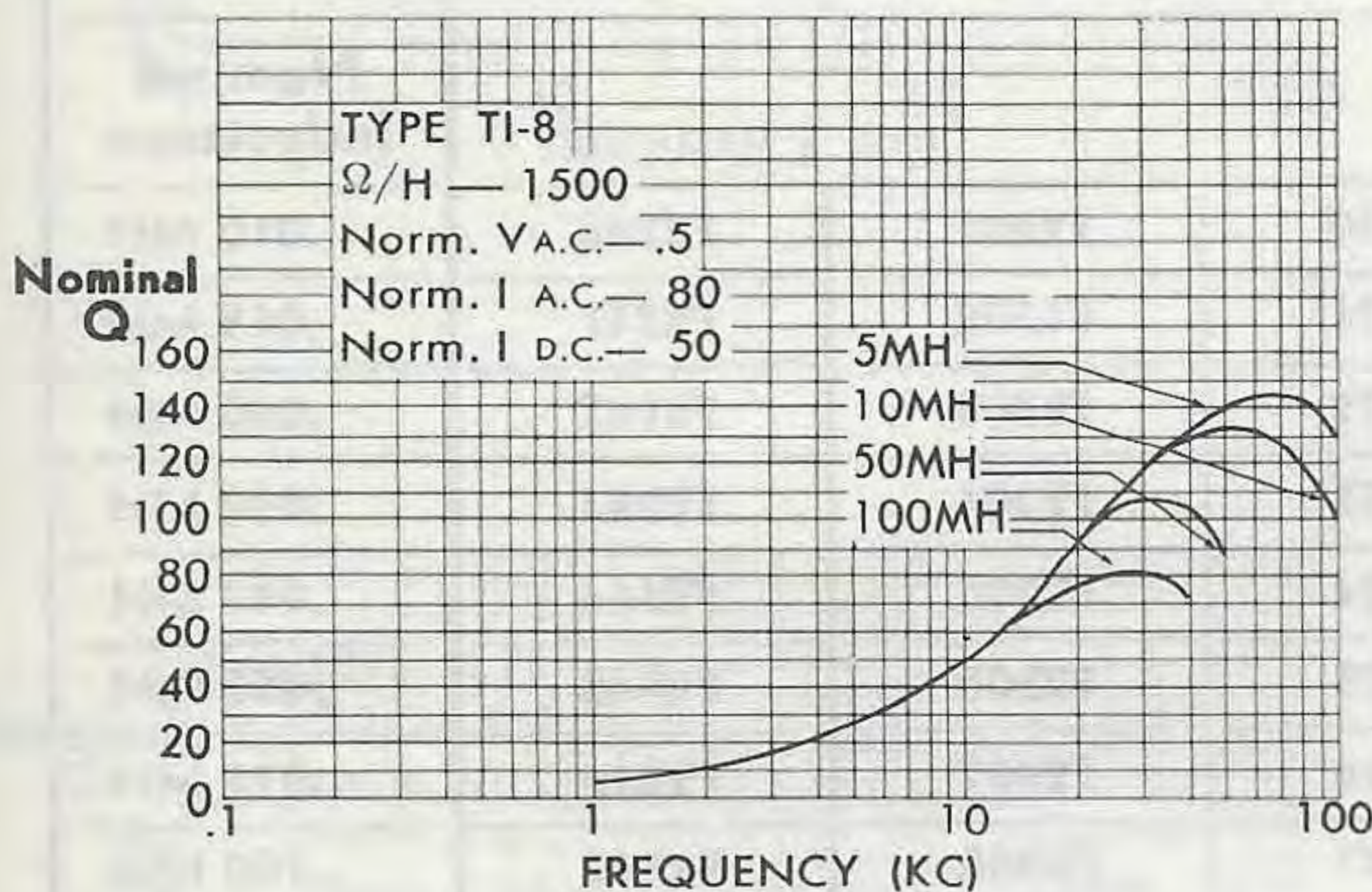
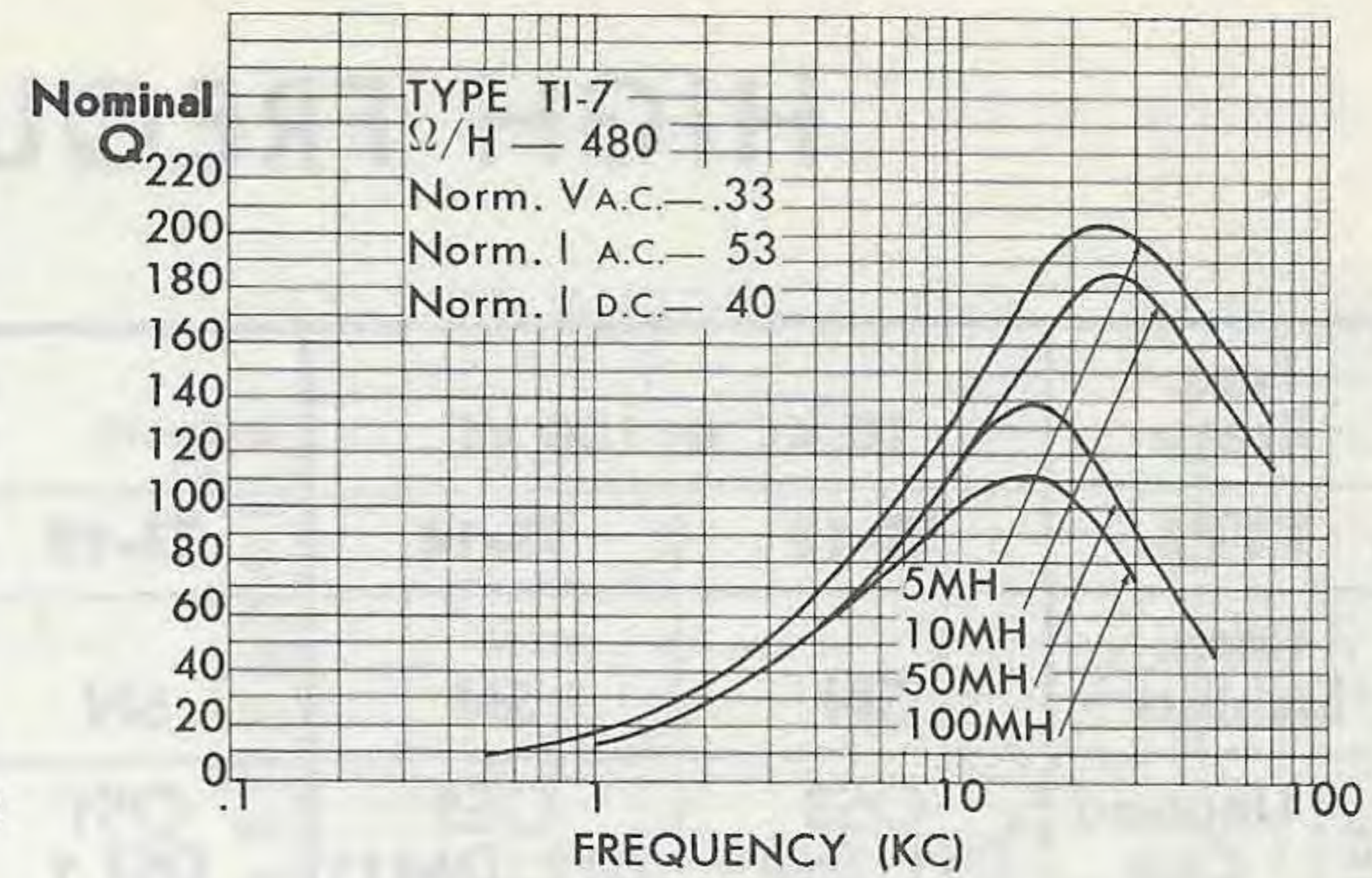
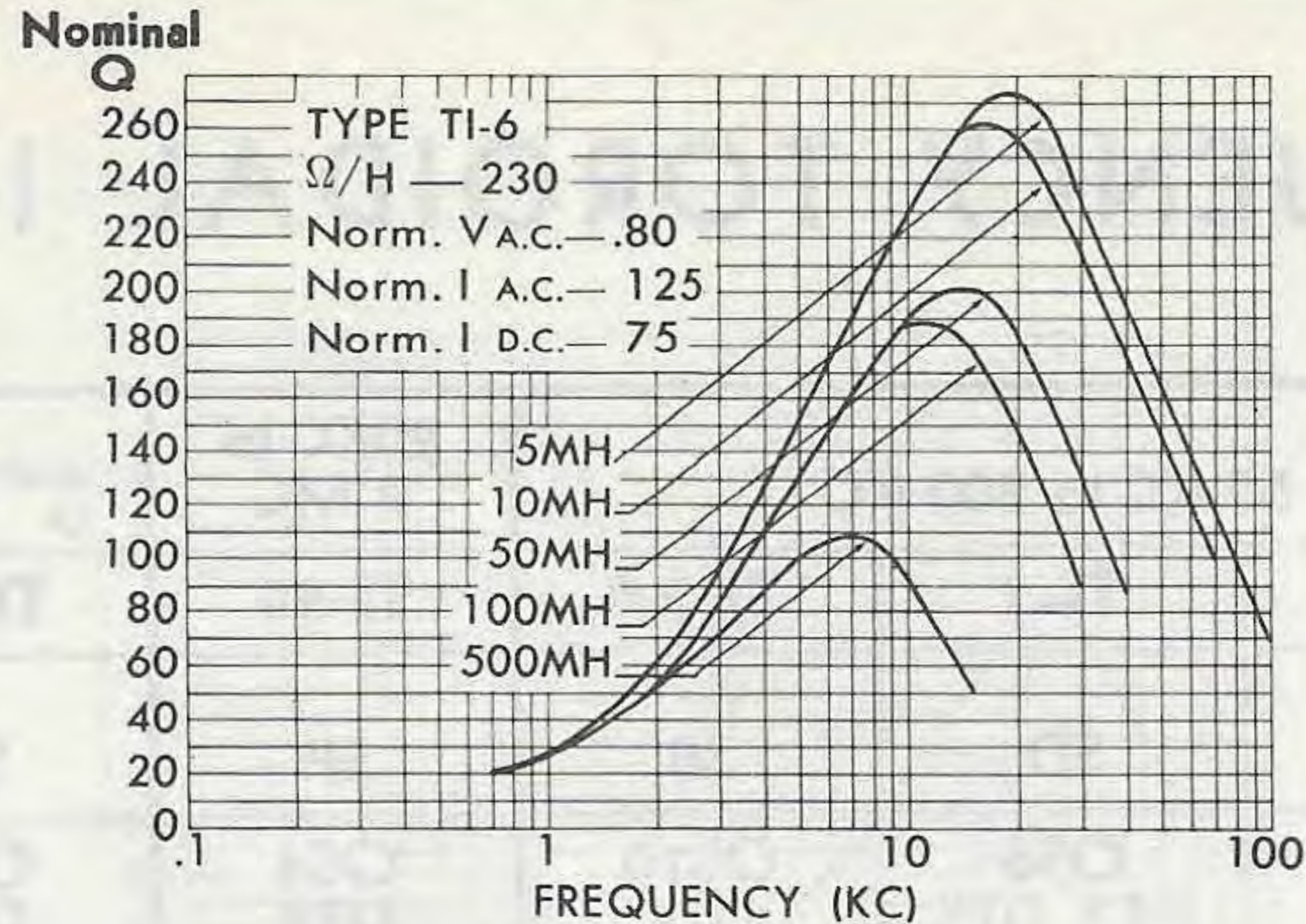
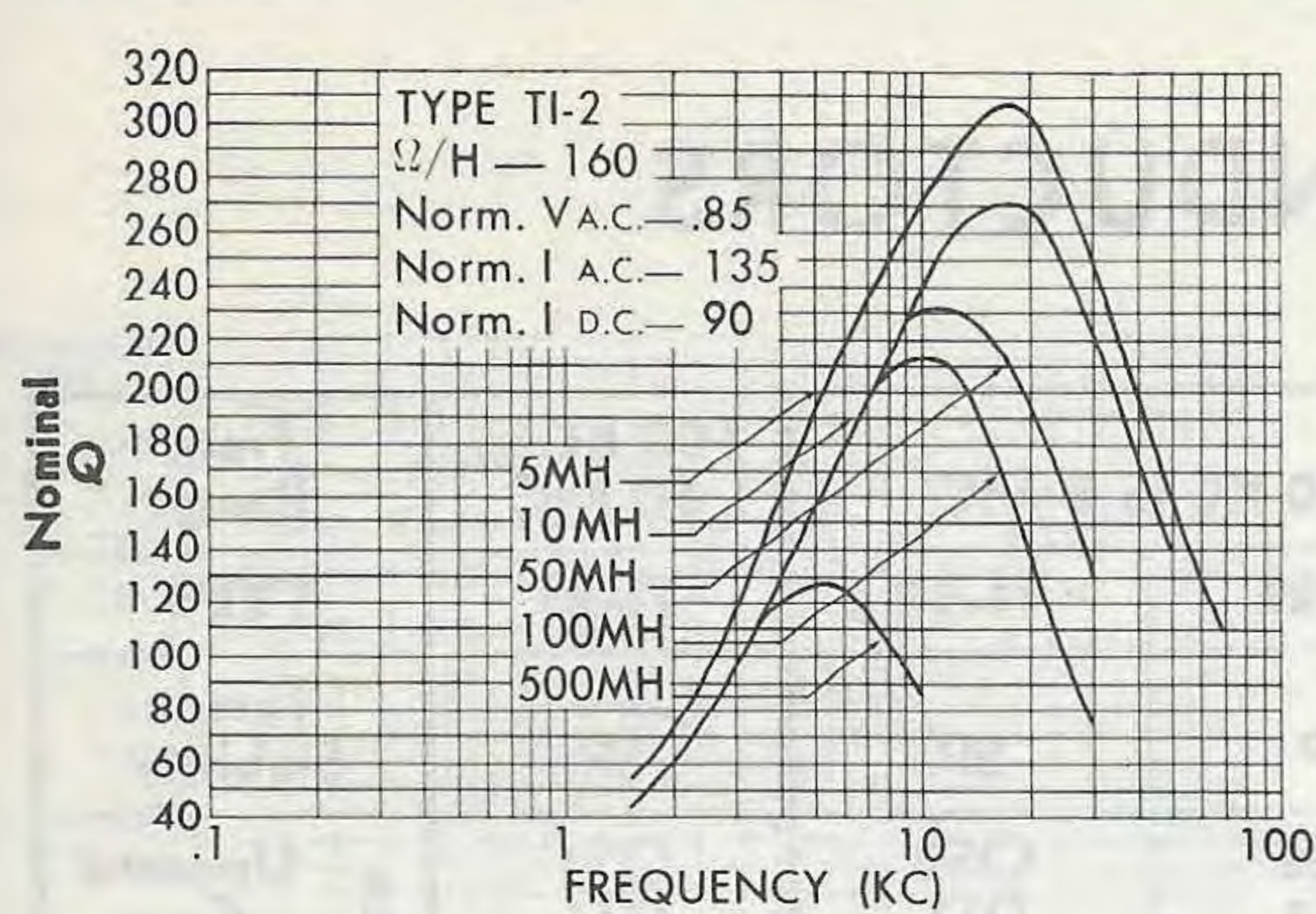
MEDIUM FREQUENCY TOROIDAL INDUCTORS

Freq. Range		10 KC to 50 KC							30 KC to 75 KC				Freq. Range
TYPE		TI-35	TI-36	TI-17	TI-7	TI-6	TI-2	TI-13	TI-18	TI-8	TI-10	TI-9	TYPE
Temp. Stability		SN	SN	SN	SN	SN, SD SW	SD	SN	SN	SN, SD	SB	SB	Temp. Stability
Size	Uncased Case Mold	OS13 DT6 MR11	OS14 DT6 MR11	OS1 DST1 MR1, MS1	OS3 DT1, DM2 MR3	OS5 DT2, DM11 MR4	OS6 DT3, DT5 MR5	OS9 DT4 MR8	OS1 DST1 MR1, MS1	OS3 DT1, DM2 MR3	OS7 DT3, DT5 MR5	OS10 DT4 MR9	Size Uncased Case Mold
Nominal Inductance		Catalog Number											Nominal Inductance
.1 MH				F2100					F2140	F1821			.1 MH
.2 MH				F2101					F2141	F1822			.2 MH
.25 MH	F2950	F3000											.25 MH
.3 MH				F2102					F2142	F1823			.3 MH
.4 MH				F2103					F2143	F1824			.4 MH
.5 MH	F2951	F3001		F2104	F1781				F2144	F1825			.5 MH
.75 MH	F2952	F3002											.75 MH
1 MH	F2953	F3003		F2105	F1782	F1726	F1800	F1629	F2145	F1826	F1579	F1554	1 MH
1.5 MH	F2954	F3004											1.5 MH
2 MH	F2955	F3005		F2106	F1783	F1727	F1801	F1630	F2146	F1827	F1580	F1555	2 MH
2.5 MH	F2956	F3006											2.5 MH
3 MH	F2957	F3007		F2107	F1784	F1728	F1802	F1631	F2147	F1828	F1581	F1556	3 MH
4 MH	F2958	F3008		F2108		F1729	F1803	F1632	F2148	F1829	F1582	F1557	4 MH
5 MH	F2959	F3009		F2109	F1785	F1730	F1804	F1633	F2149	F1830	F1583	F1558	5 MH
7.5 MH	F2960	F3010		F2110	F1786	F1731		F1634	F2150	F1831	F1584	F1559	7.5 MH
10 MH	F2961	F3011		F2111	F1787	F1732	F1805	F1635	F2151	F1832	F1585	F1560	10 MH
12.5 MH	F2962	F3012											12.5 MH
15 MH	F2963	F3013		F2112	F1788	F1733	F1806	F1636	F2152	F1833	F1586	F1561	15 MH
17.5 MH		F3014											17.5 MH
20 MH		F3015		F2113	F1789	F1734			F2153	F1834			20 MH
25 MH		F3016			F1790					F1835			25 MH
30 MH		F3017		F2114	F1791	F1735	F1807	F1637	F2154	F1836	F1587	F1562	30 MH
40 MH					F1792					F1837			40 MH
50 MH				F2115	F1793	F1736	F1808	F1638	F2155	F1838	F1588	F1563	50 MH
75 MH				F2116	F1794	F1737	F1809	F1639	F2156	F1839	F1589	F1564	75 MH
100 MH				F2117	F1795	F1738	F1810	F1640	F2157	F1840	F1590	F1565	100 MH
150 MH					F1796	F1739	F1811	F1641			F1591	F1566	150 MH
200 MH					F1797	F1740	F1812	F1642			F1592	F1567	200 MH
250 MH						F1741							250 MH
300 MH						F1742	F1813	F1643				F1568	300 MH
400 MH							F1814	F1644				F1569	400 MH
500 MH						F1743	F1815	F1645				F1570	500 MH

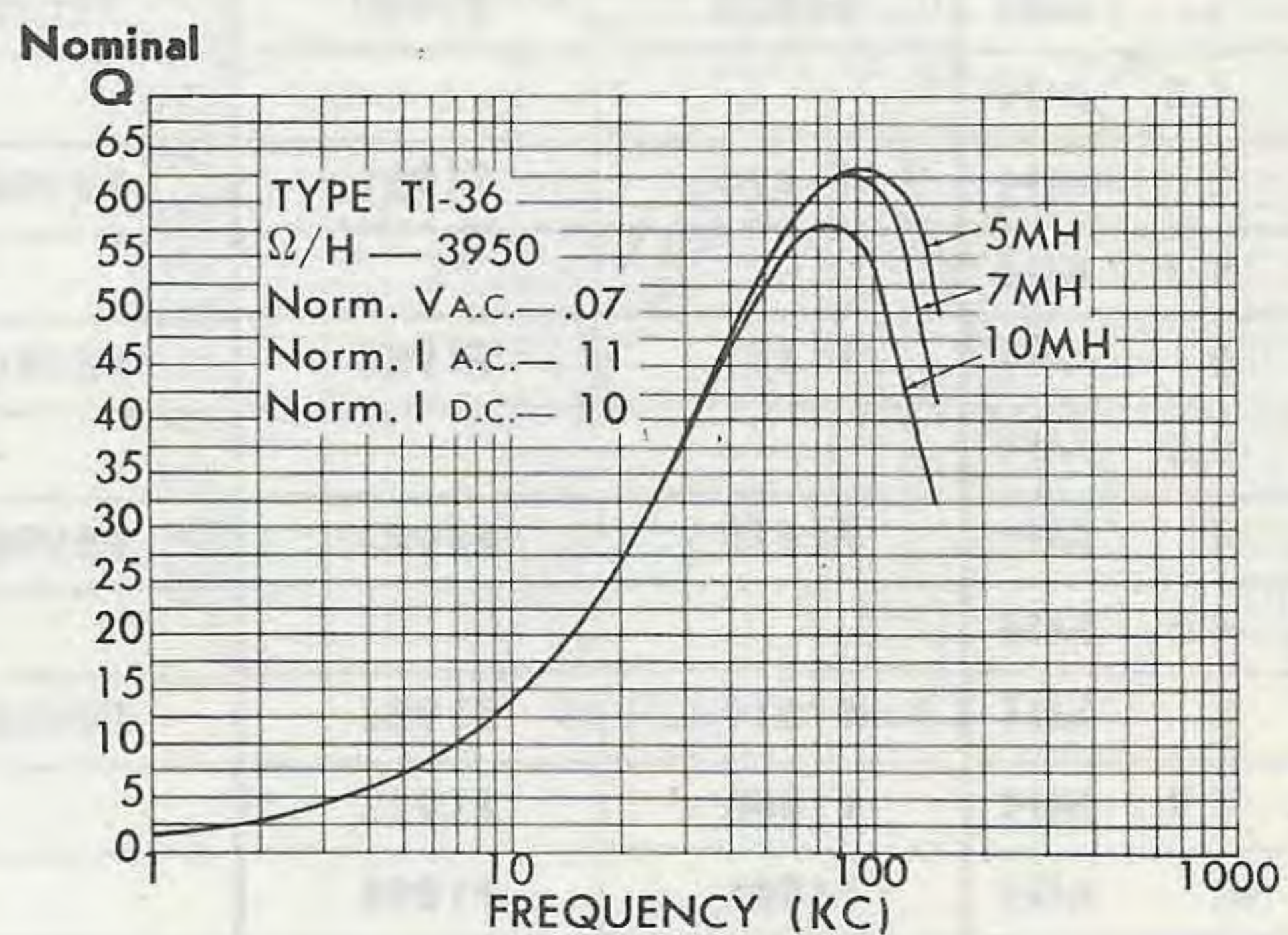
CASED, UNCASD AND MOLDED UNITS

DT-1 CASE 	DT-2 CASE 	DT-3 CASE 	DT-4 CASE 	DT-5 CASE 
DT-6 CASE 	DST-1 CASE 	DM-2 CASE 	DM-11 CASE 	
MR-1 	MR-2 to MR-10 	MS-1 	OS-1 to OS-11 	

FREED TRANSFORMER COMPANY, INC.



UNCASED		
Type	OD	HI
OS-1	5/8"	5/16"
OS-3	1"	3/8"
OS-5	1 5/16"	5/8"
OS-6	1 5/8"	7/8"
OS-7	1 11/16"	5/8"
OS-9	2 1/4"	1 1/8"
OS-10	2 3/8"	1 1/4"
OS-13	3/8"	1/4"
OS-14	7/16"	7/32"



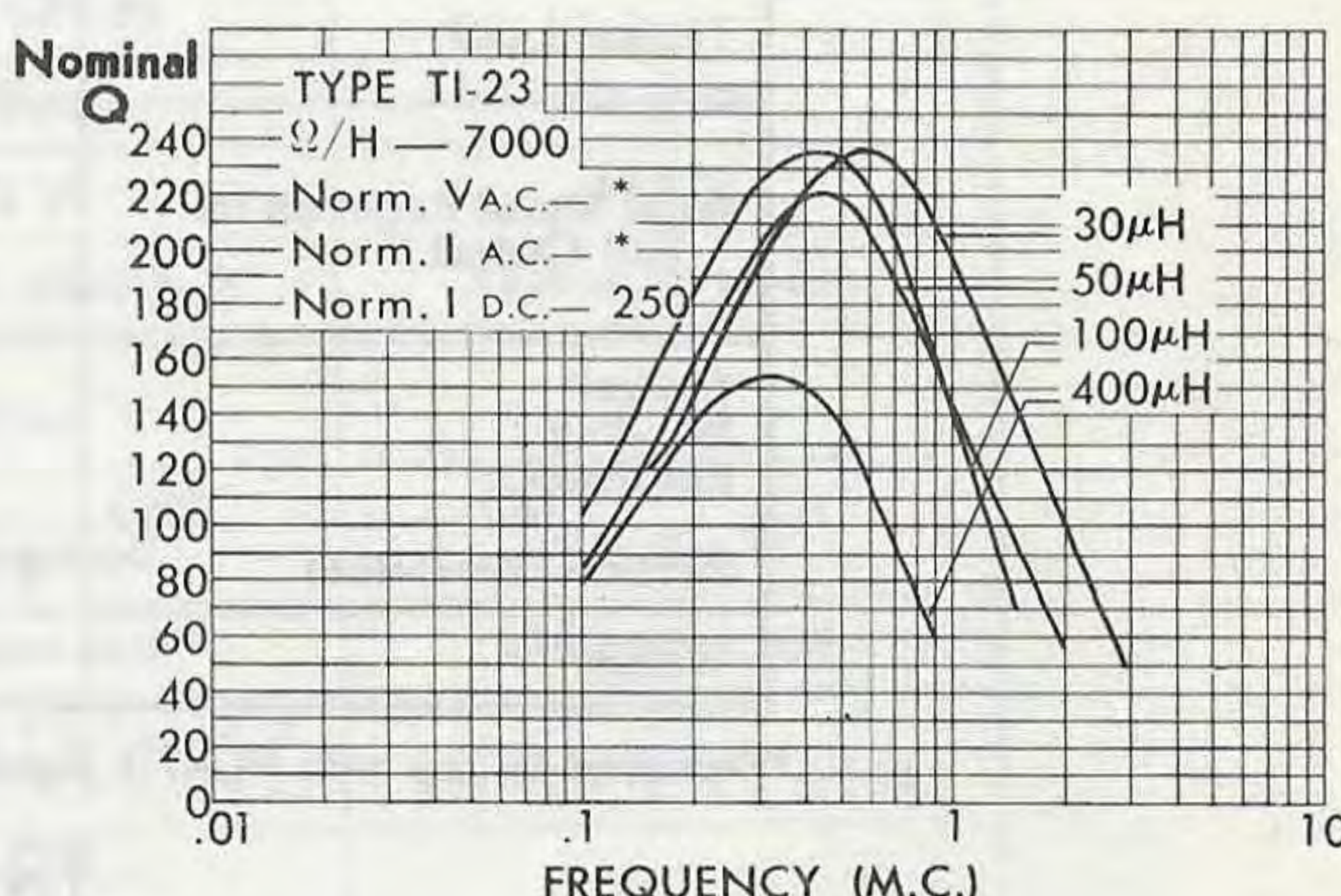
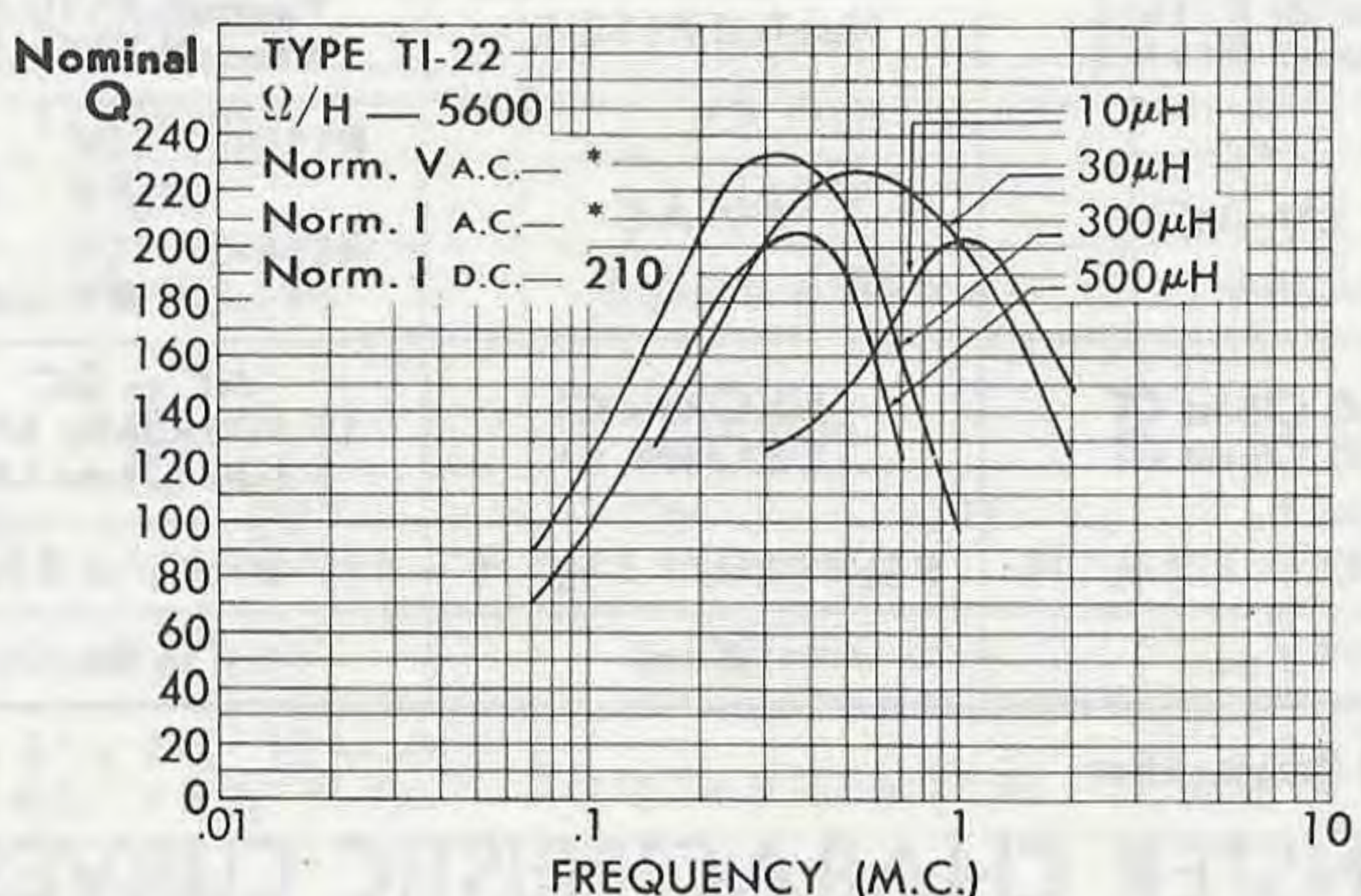
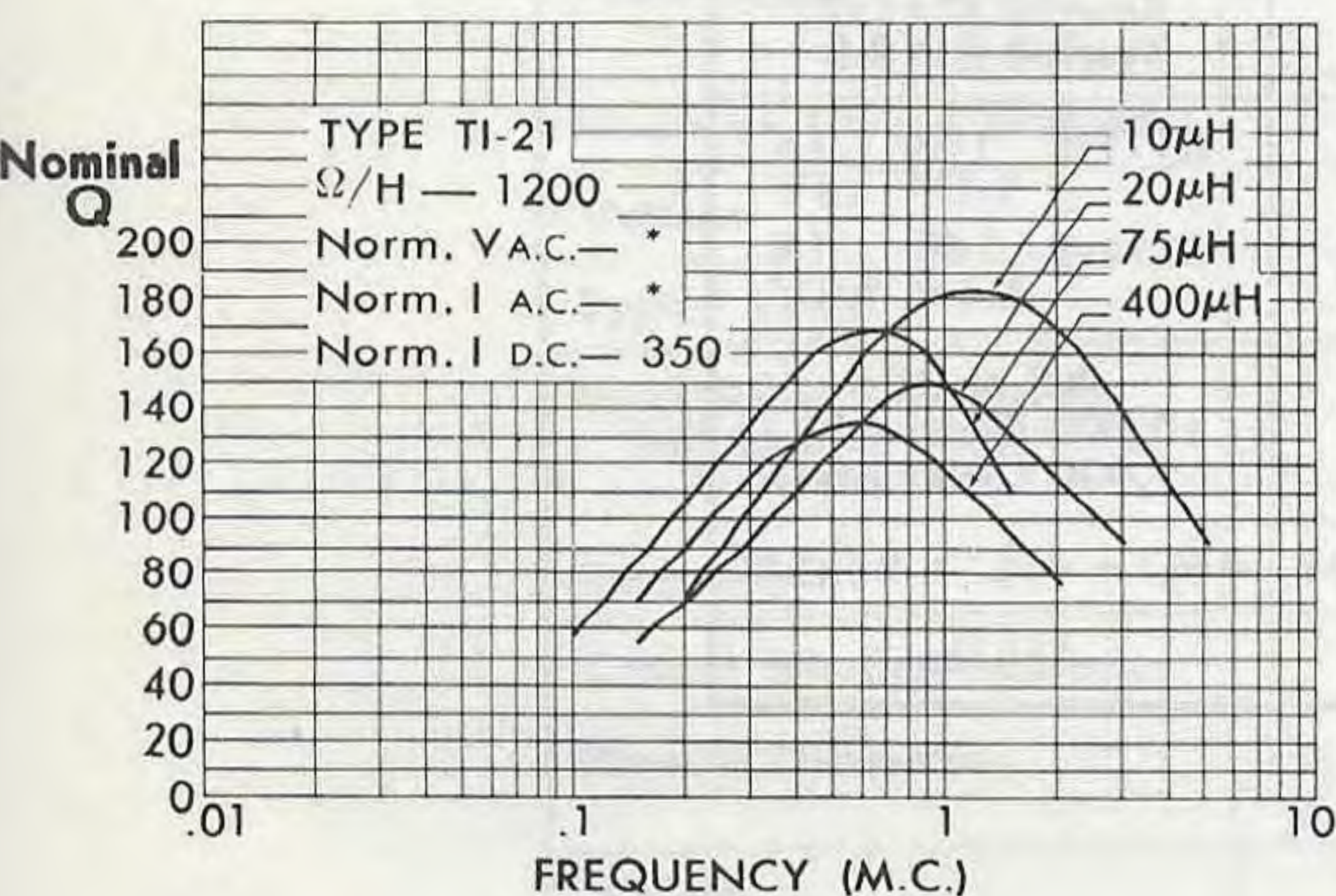
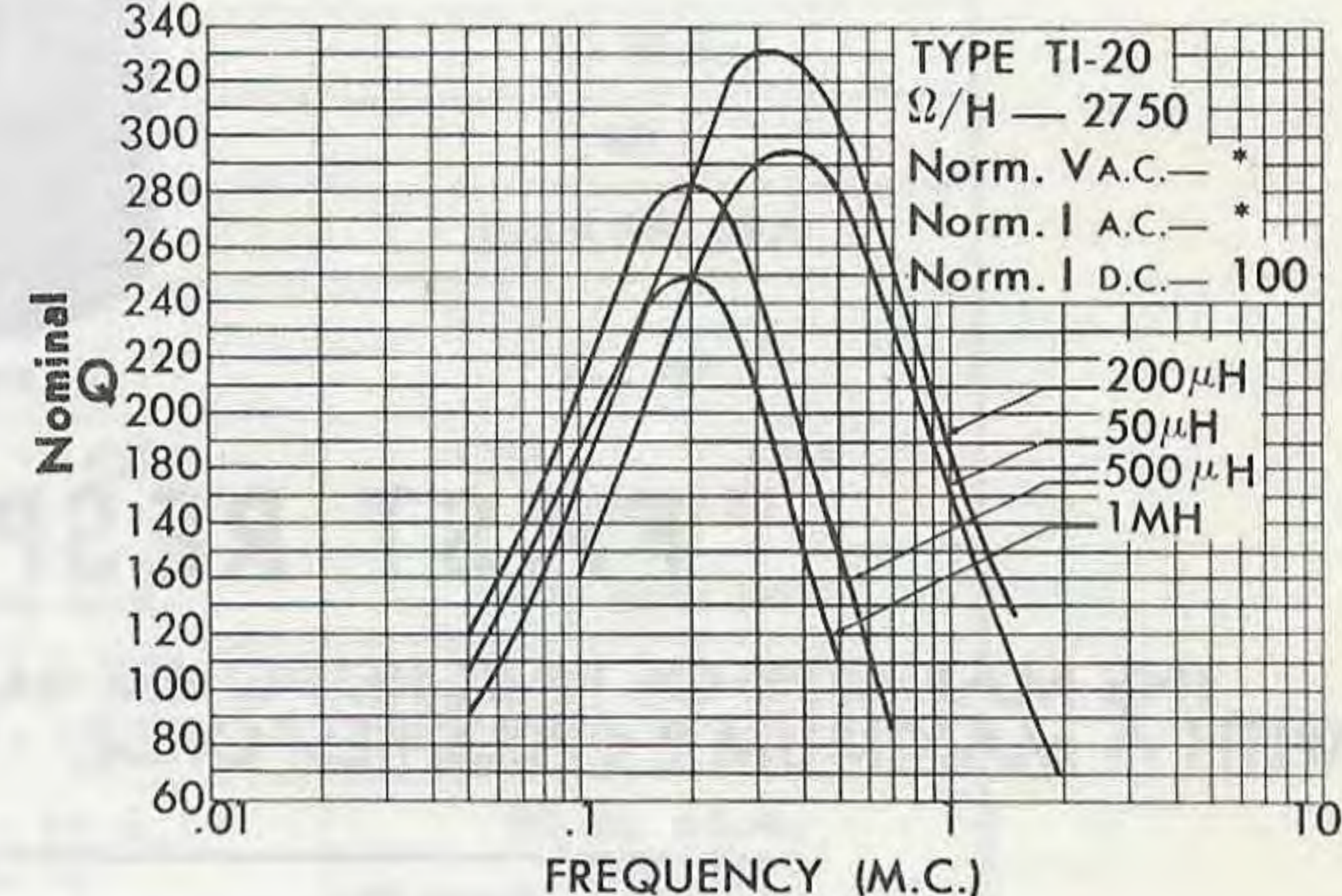
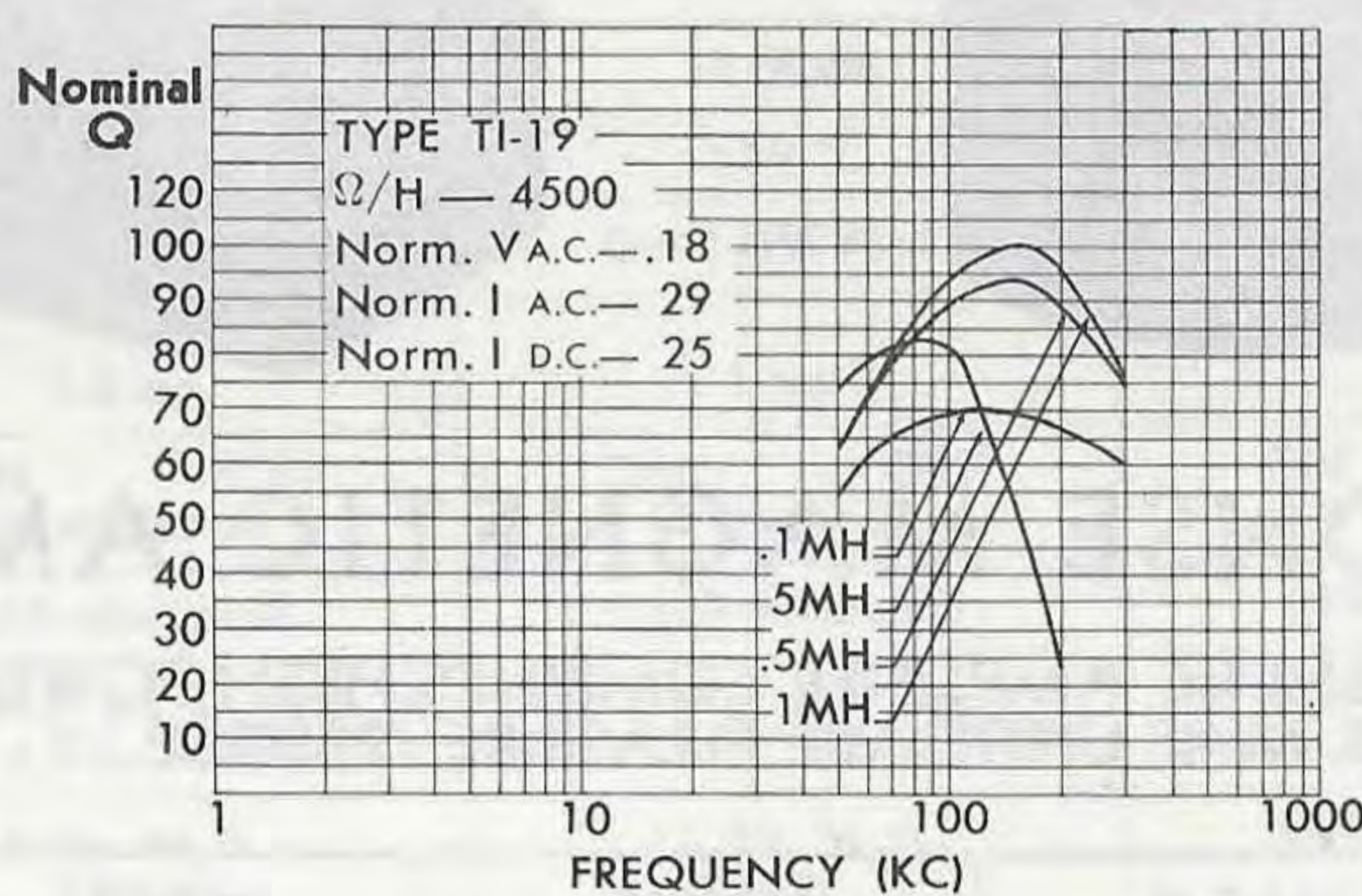
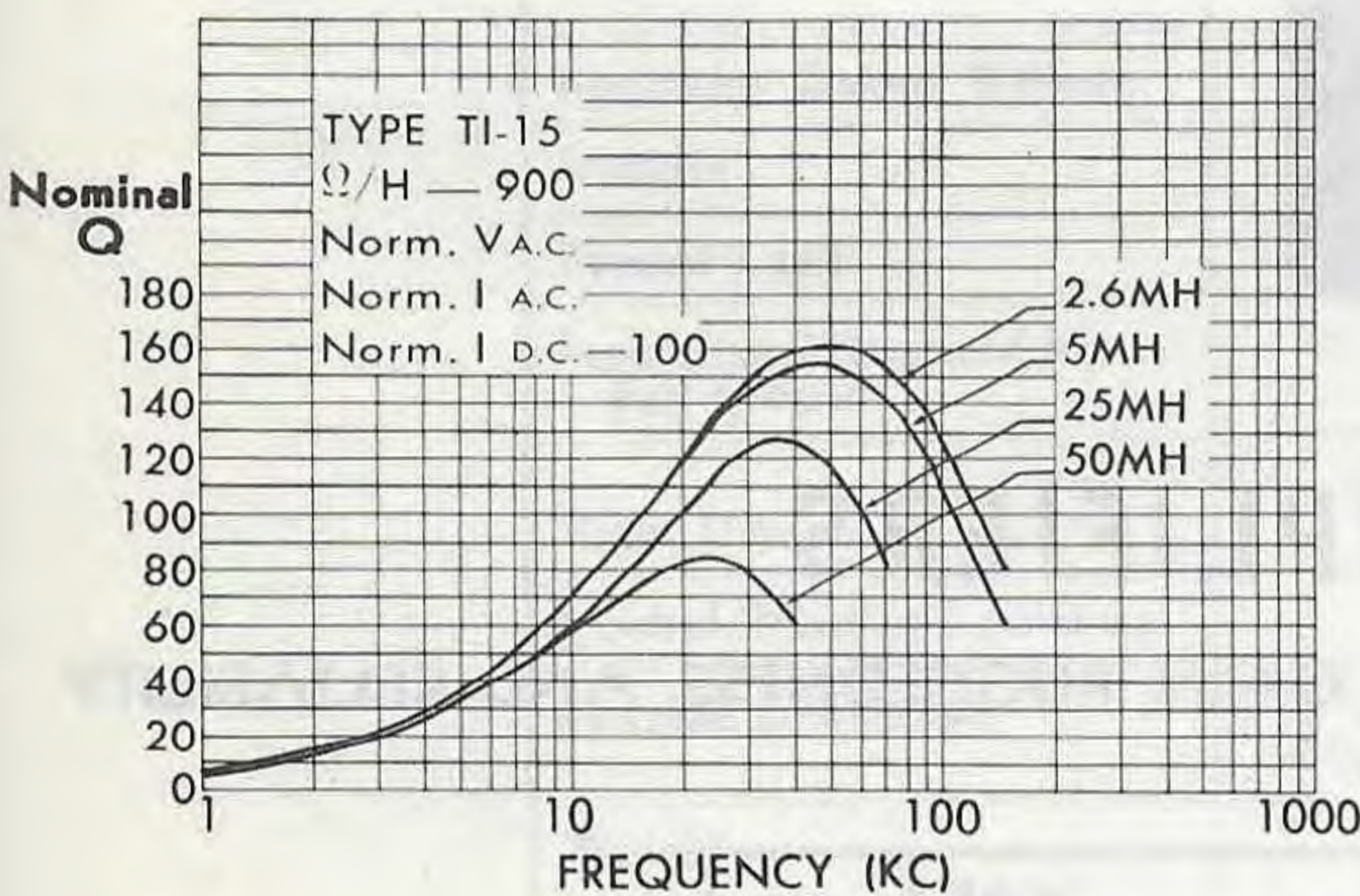
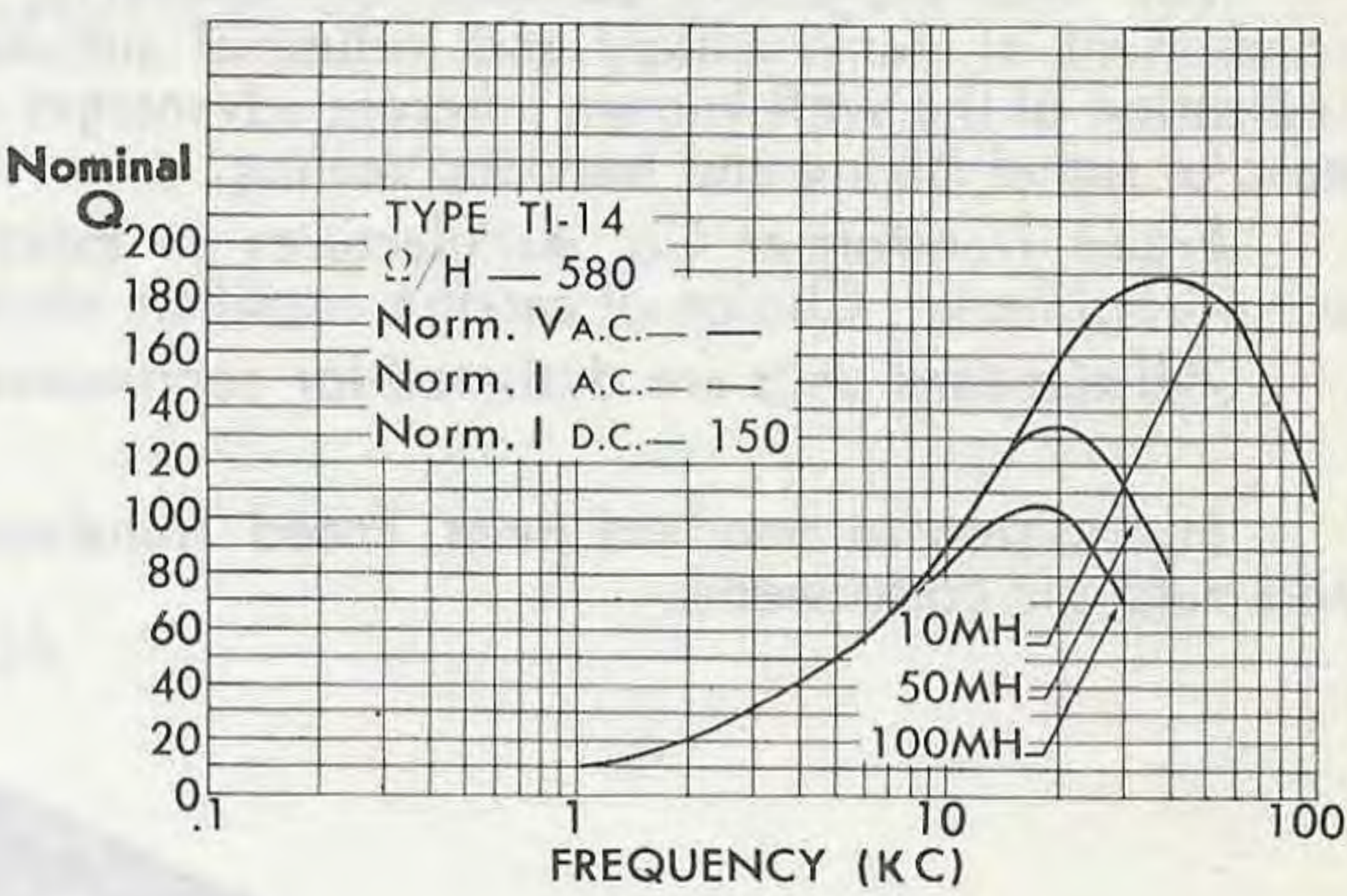
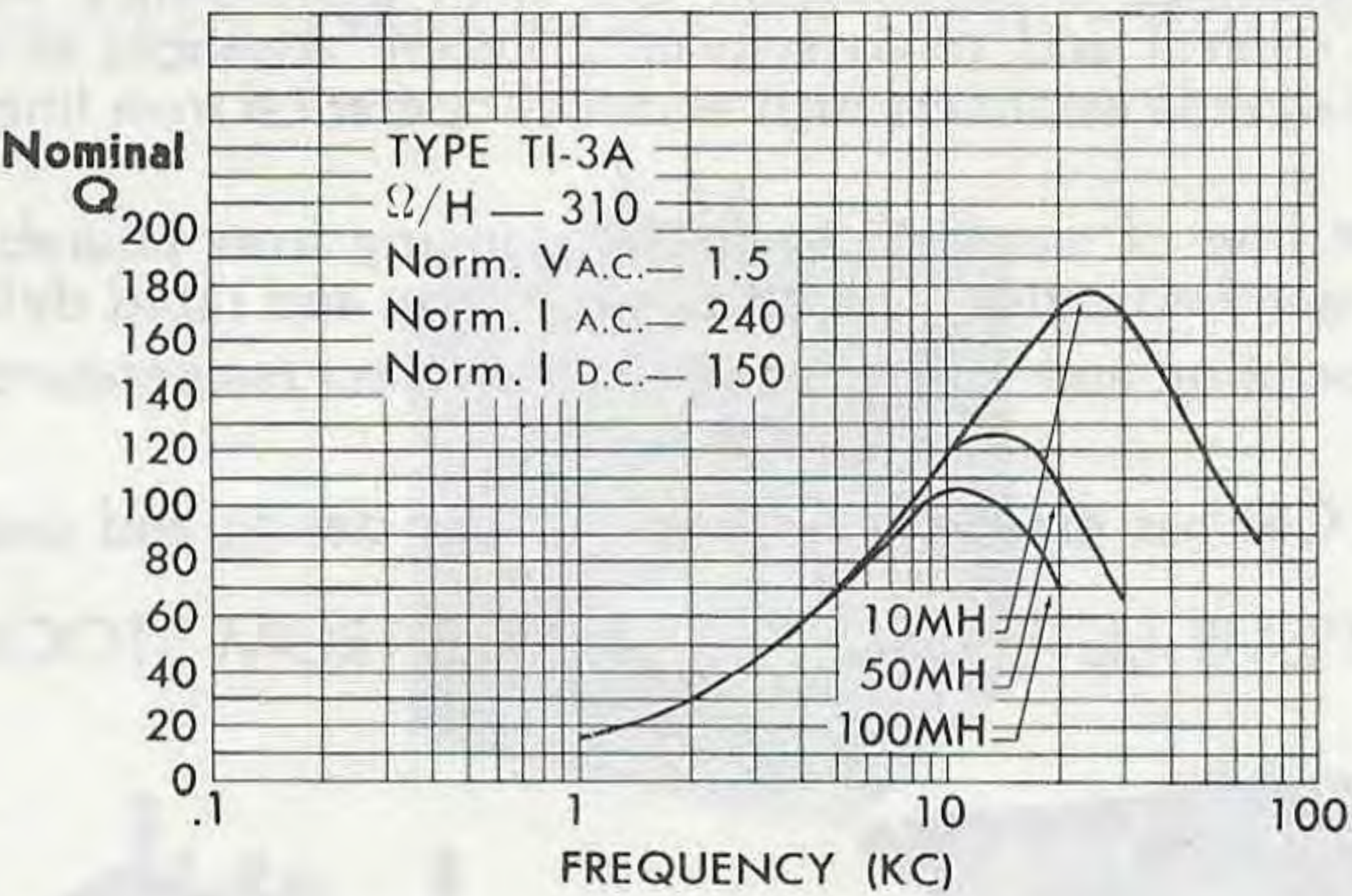
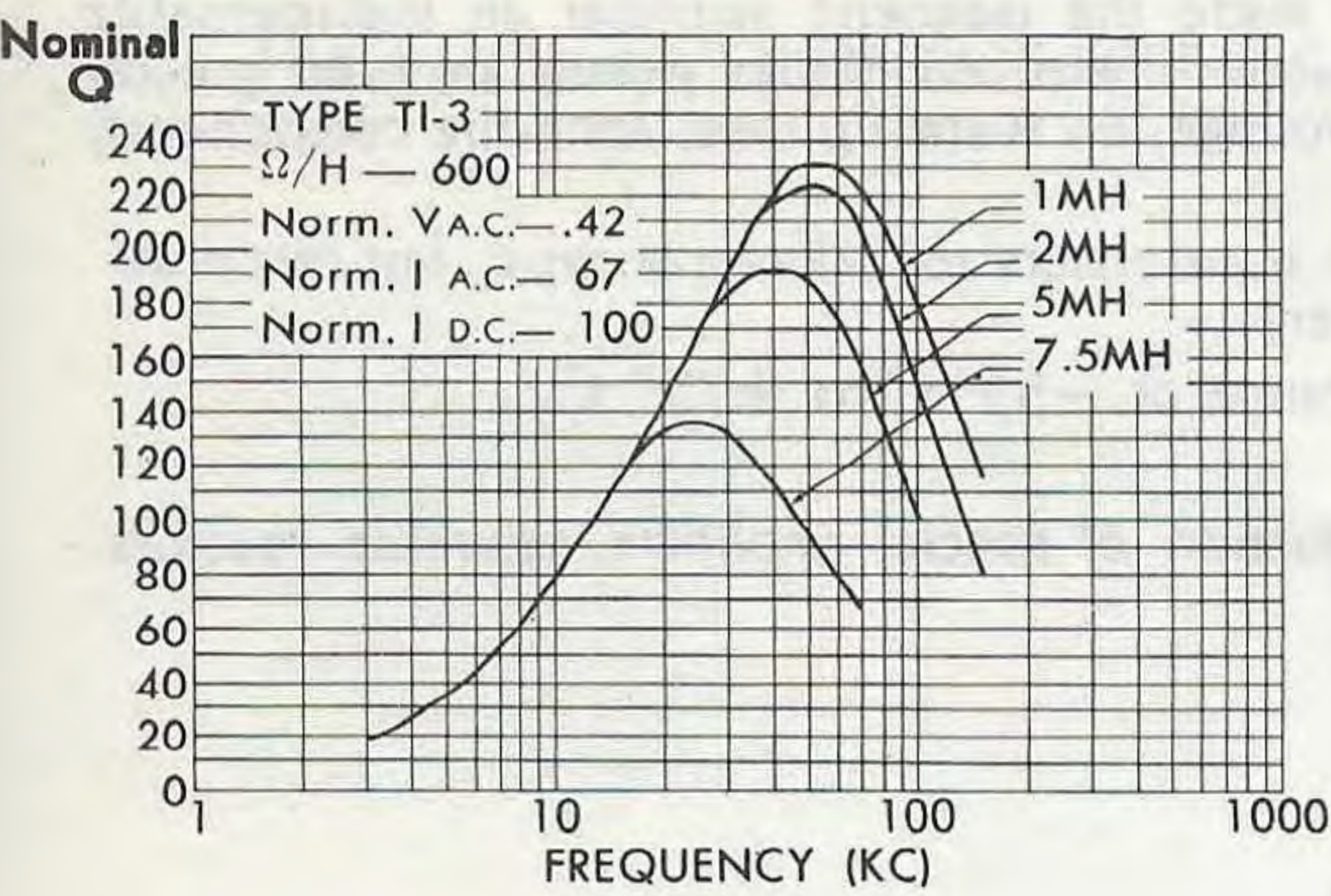
CASE							
Type	Hi.	Dia.	Length	Width	Mtg.	Mtg. Cen.	Cutout
DT-1	1 7/32"		1 1/16"	1/2"	2 4-40 inserts	3/4"	5/16" x 1/2"
DT-2	1 3/4"		1 7/16"	13/16"	2 6-32 studs	7/8" x 9/32"	3/8" x 11/16"
DT-3	2"		1 25/32"	7/8"	2 6-32 studs	1 1/4" x 3/8"	3/8" x 3/4"
DT-4	3 1/8"		2 3/4"	1 5/16"	4 8-32 studs	2 1/16" x 11/16"	3/4" x 3/8"
DT-5	1 3/16"	1 13/16"			2 6-32 inserts	1 1/8"	3/8" x 1"
DT-6	5/8"	1/2"			Pig Tails		
DM-2	1"	1 1/8"			2 4-40 inserts	5/8"	3/8" x 7/8"
DM-11	1 1/2"	1 3/8"			2 6-32 inserts	7/8"	3/8" x 7/8"
DST-1	25/32"		3/4"	1 1/32"	1/4" long pins	To fit 1/2" crystal socket	

MOLD			
Type	O.D.	Hi.	Clearance Hole Mounting
MR-1	7/8"	13/32"	Pig Tails
MR-3	1 1/16"	1/2"	No. 6
MR-3A	1 3/16"	11/16"	No. 6
MR-4	1 1/2"	3/4"	No. 8
MR-5	1 7/8"	1"	No. 8
MR-8	2 1/2"	1 3/8"	No. 10
MR-9	2 5/8"	1 7/16"	No. 10
MR-11	7/16"	1/4"	Pig Tails
MS-1	25/32 x 25/64"	13/64"	Pig Tails

HIGH FREQUENCY TOROIDAL INDUCTORS

Freq. Range		10 KC to 100 KC		50 KC to 200 KC			20KC to 2 MC	50 KC to 5 MC		100 KC to 10 MC	Freq. Range		
TYPE		TI-15	TI-14	TI-19	TI-3	TI-3A	TI-20	TI-22	TI-23	TI-21	TYPE		
Temp. Stability		SN	SN	SN	SD	SB	SP	SP	SP	SP	Temp. Stability		
Size	Uncased Case Mold	OS3 DT1, DM2 MR3	OS5 DT2, DM11 MR4	OS1 DST 1 MR1, MS1	OS6 DT3, DT5 MR5	OS10 DT4 MR8	OS4 DT2 MR3A	OS2 DT1 MR2	OS2 DT1 MR2	OS1 DT1 MR1, MS1	Size	Uncased Case Mold	
	Catalog Number												
Nominal Inductance												Nominal Inductance	
.010 MH								F2270	F2301	F2240	.010 MH		
.015 MH								F2271	F2302	F2241	.015 MH		
.020 MH								F2272	F2303	F2242	.020 MH		
.030 MH								F2273	F2304	F2243	.030 MH		
.040 MH								F2274	F2305	F2244	.040 MH		
.050 MH							F2201	F2275	F2306	F2245	.050 MH		
.075 MH								F2276	F2307	F2246	.075 MH		
.100 MH		F1870		F2180	F1846		F2202	F2277	F2308	F2247	.100 MH		
.125 MH										F2248	.125 MH		
.150 MH								F2278	F2309	F2249	.150 MH		
.200 MH		F1871		F2181	F1847		F2203	F2279	F2310		.200 MH		
.300 MH		F1872		F2182	F1848		F2204	F2280	F2311		.300 MH		
.400 MH		F1873		F2183	F1849			F2281	F2312		.400 MH		
.500 MH		F1874		F2184	F1850		F2205	F2282	F2313		.500 MH		
.600 MH				F2185				F2283			.600 MH		
.700 MH				F2186				F2284			.700 MH		
.750 MH							F2206				.750 MH		
.800 MH				F2187							.800 MH		
.900 MH				F2188							.900 MH		
1 MH		F1875	F1920	F2189	F1851		F2207				1 MH		
1.5 MH							F2208				1.5 MH		
2 MH		F1876	F1921	F2190	F1852		F2209				2 MH		
2.5 MH							F2210				2.5 MH		
3 MH		F1877	F1922	F2191	F1853		F2211				3 MH		
3.5 MH							F2212				3.5 MH		
4 MH		F1878	F1923	F2192	F1854		F2213				4 MH		
4.5 MH							F2214				4.5 MH		
5 MH		F1879	F1924	F2193	F1855		F2215				5 MH		
7.5 MH		F1880	F1925		F1845						7.5 MH		
10 MH		F1881	F1926		F1844	F1856					10 MH		
15 MH		F1882	F1927			F1857					15 MH		
20 MH		F1883	F1928			F1858					20 MH		
25 MH		F1884									25 MH		
30 MH		F1885	F1929			F1859					30 MH		
40 MH		F1886				F1860					40 MH		
50 MH		F1887	F1930			F1861					50 MH		
75 MH		F1888	F1931			F1862					75 MH		
100 MH		F1889	F1932			F1863					100 MH		
150 MH			F1933								150 MH		
200 MH			F1934								200 MH		
250 MH			F1935								250 MH		
300 MH			F1936								300 MH		

FREED TRANSFORMER COMPANY, INC.



UNCASED		
Type	O.D.	Hi.
OS-1	5/8"	5/16"
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-10	2 3/8"	1 1/4"

CASE							
Type	Hi.	Dia.	Length	Width	Mtg.	Mtg. Cen.	Cutout
DT-1	1 ¹⁷ / ₃₂ "		1 ¹¹ / ₁₆ "	1 ¹ / ₂ "	2 4-40 inserts	3 ³ / ₄ "	5 ⁵ / ₁₆ " x 1 ¹ / ₂ "
DT-2	1 ³ / ₄ "		1 ¹⁷ / ₁₆ "	1 ¹³ / ₁₆ "	2 6-32 studs	7 ⁷ / ₈ " x 9 ⁹ / ₃₂ "	3 ³ / ₈ " x 1 ¹¹ / ₁₆ "
DT-3	2"		1 ²⁵ / ₃₂ "	7 ⁷ / ₈ "	2 6-32 studs	1 ¹ / ₄ " x 3 ³ / ₈ "	3 ³ / ₈ " x 3 ³ / ₄ "
DT-4	3 ¹ / ₈ "		2 ³ / ₄ "	1 ⁵ / ₁₆ "	4 8-32 studs	2 ¹ / ₁₆ " x 1 ¹¹ / ₁₆ "	3 ³ / ₄ " x 3 ³ / ₈ "
DT-5	1 ³ / ₁₆ "	1 ¹³ / ₁₆ "			2 6-32 inserts	1 ¹ / ₈ "	3 ³ / ₈ " x 1"
DT-6		1 ¹ / ₂ "	5 ⁵ / ₈ "		Pig Tails		
DM-2	1"	1 ¹ / ₈ "			2 4-40 inserts	5 ⁵ / ₈ "	3 ³ / ₈ " x 7 ⁷ / ₈ "
DM-11	1 ¹ / ₂ "	1 ³ / ₈ "			2 6-32 inserts	7 ⁷ / ₈ "	3 ³ / ₈ " x 7 ⁷ / ₈ "
DST-1	2 ²⁵ / ₃₂ "		3 ³ / ₄ "	1 ¹¹ / ₃₂ "	1 ¹ / ₄ " long pins	To fit 1 ¹ / ₂ " crystal socket	

MOLD			
Type	Dia.	Hi.	Clearance Hole Mounting
MR-1	7/8"	13/32"	Pig Tails
MR-2	1 1/16"	1/2"	No. 4
MR-3	1 3/16"	1/2"	No. 6
MR-3A	1 3/16"	11/16"	No. 6
MR-4	1 1/2"	3/4"	No. 8
MR-5	1 7/8"	1"	No. 8
MR-8	2 1/2"	1 3/8"	No. 10
MS-1	25/32" x 25/32"	13/32"	Pig Tails

MAGNETIC AMPLIFIERS AND SATURABLE TRANSFORMERS

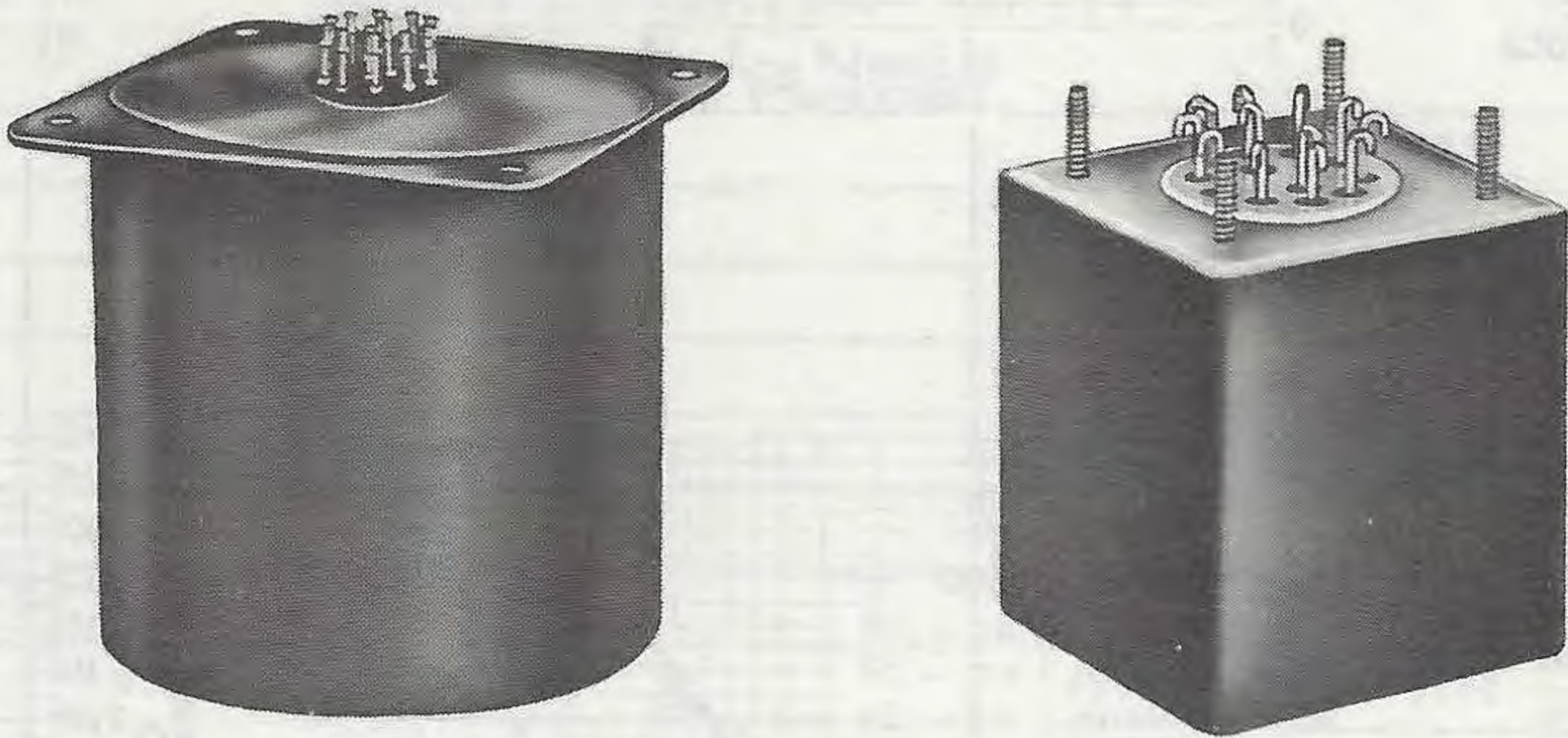
The ever increasing demand for reliability, ruggedness, miniaturization and high performance has made the magnetic amplifier an indispensable component of many military and industrial automatic control and servo systems. Recent advances in materials and techniques permit an even greater utilization of 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 rapid delivery.

All standard units are designed for continuous operation and will operate in an ambient temperature range of -55° C to +75° C.

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

ALL ITEMS LISTED ARE AVAILABLE FROM STOCK.



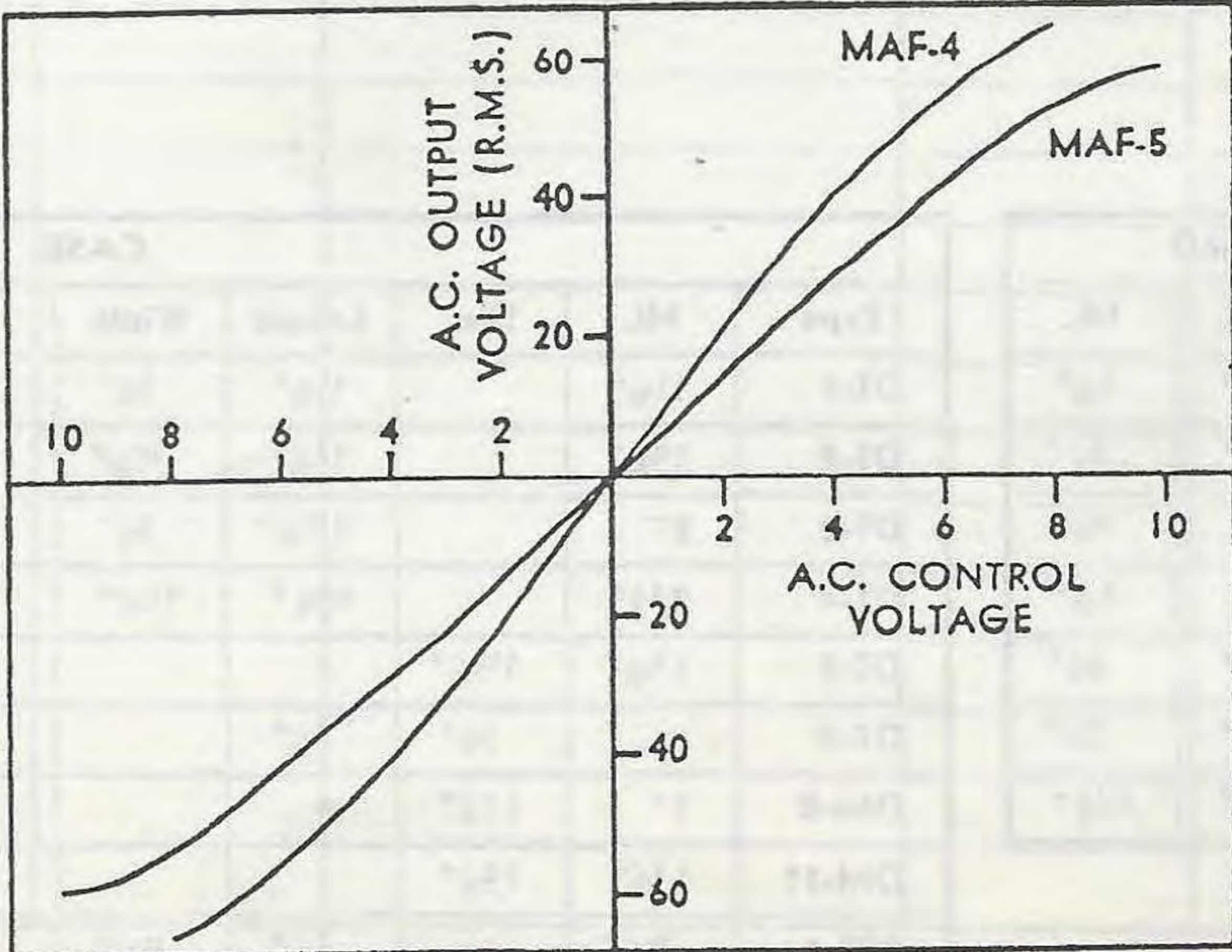
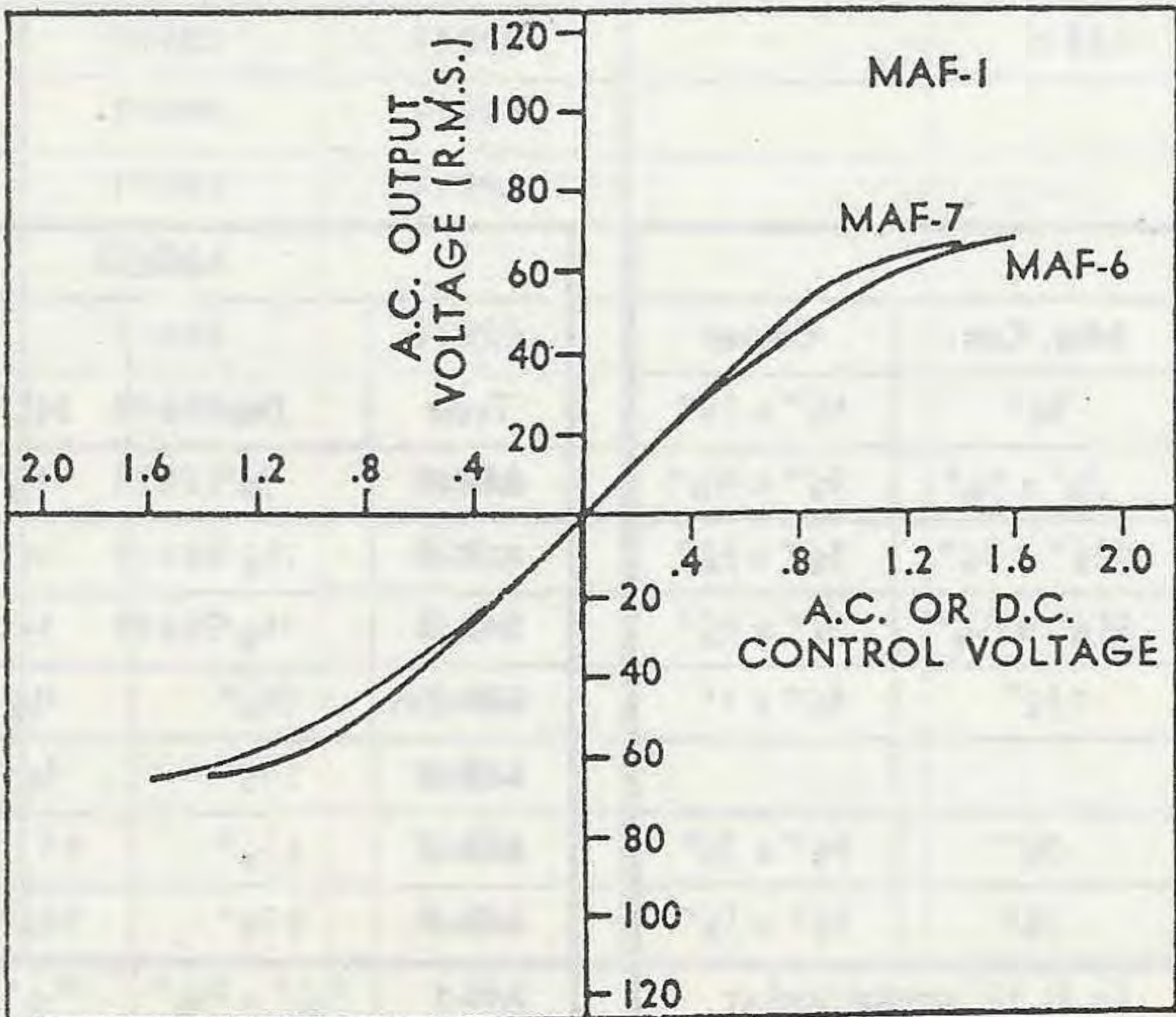
FAST RESPONSE MAGNETIC AMPLIFIERS

THE MAF TYPE OF FAST RESPONSE MAGNETIC AMPLIFIER COMBINES HIGH POWER GAIN, RUGGEDNESS, AND RELIABILITY WITH A MAXIMUM 2 CYCLE RESPONSE. ALL MAF UNITS ARE PHASE-REVERSIBLE.

Freed No.	MAF-4*	MAF-5*	MAF-6	MAF-7
Power Supply	115V 400 cps	115V 400 cps	115V 400 cps	115V 400 cps
Maximum Output Wattage	10	15	10	15
Output Voltage	57.5V RMS	57.5V RMS	57.5V RMS	57.5V RMS
Typical Load	Kearfott R110-2 Kearfott R111-2	Kearfott R112-2	Kearfott R110-2 Kearfott R111-2	Kearfott R111-2 Kearfott R112-2
Input Signal Required for Full Output	8V AC	8V AC	R110-2 10K 1K 1.2V .4V R111-2 10K 1K 1.6V .6V	R111-2 10K 1K 1.2V .6V R112-2 10K 1K 2.5V 1.0V
Control Winding Resistance	60 Ohms CT 150 Ohms CT	60 Ohms CT 150 Ohms CT	AC or DC 10,000 Ohms Min. 1,000 Ohms Min.	AC or DC 10,000 Ohms Min. 1,000 Ohms Min.
Physical Dimensions	2 3/16" O.D. x 2 3/8" H	2 1/2" O.D. x 2 1/2" H	4 3/8" x 4 1/4" x 2 7/8" H	4 3/8" x 4 1/4" x 2 7/8" H
Weight	13 oz.	18 oz.	4 1/2 lbs.	4 1/2 lbs.

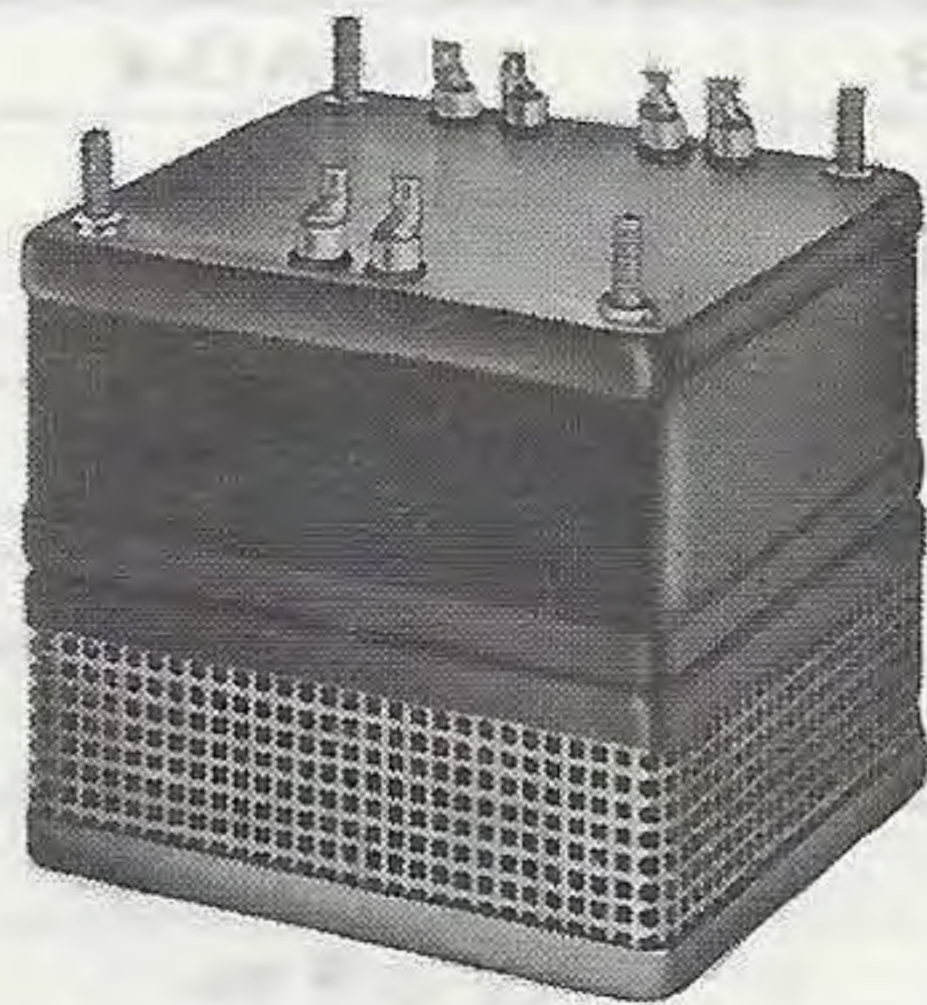
*Designed for use with MAT-1 Transistor Preamplifier

TRANSFER CHARACTERISTIC CURVES



PUSH-PULL MAGNETIC AMPLIFIERS

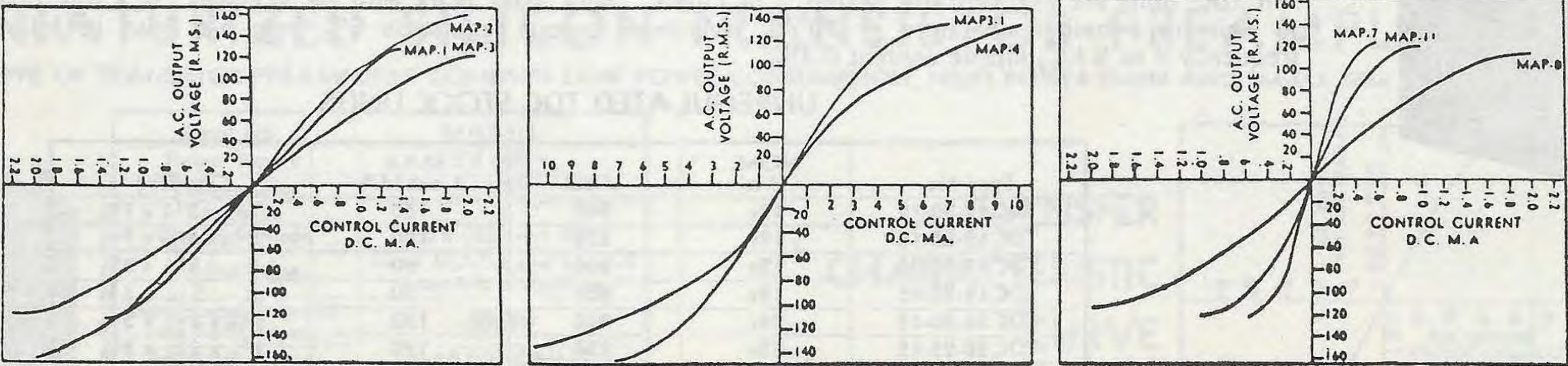
The map line of push-pull magnetic amplifiers features high gain, polarity-sensitive amplification and a phase-reversible output.



Freed No.	MAP-1	MAP-2	MAP-3	MAP-301
Power Supply	115 V.A.C. 60 Cycles (To MAPT-1)	115 V.A.C. 60 Cycles (To MAPT-2)	115 V.A.C. 60 Cycles (To MAPT-3)	115 V.A.C. 60 Cycles (To MAPT-301)
Maximum Output Wattage	2.8 Watts	15 Watts	50 Watts	50 Watts
Voltage	140 V	150 V	120 V	140 V
Typical Load	Kollsman 951-0160	Diehl FPE 25-11	Diehl FPF 49-9	Diehl FPF 49-9
Input Signal Required for Full Output	1.2 ma.	1 ma.	2 ma.	4.5 ma.
Resp. Time	ON OFF 15 cycles 60	ON OFF 5 cycles 38	ON OFF 3 cycles 15	ON OFF 5 cycles 20
Control Winding Resistance	620 ohms each	1230 ohms each	250 ohms each	1700 ohms each
Physical Dimensions	3 3/8" x 3 1/4" x 5 7/8" H M.A. 2 5/8" x 2 1/4" x 3" H T.	3 7/8" x 4 5/8" x 7" H M.A. 2 5/16" x 2 3/4" x 3 3/4" H T.	5 1/8" x 6 7/8" x 8" H M.A. 3 5/16" x 3 7/8" x 4 1/4" H T.	5 1/2" x 5" x 8" H M.A. 3 5/8" x 4 1/4" x 3 3/8" H T.
Weight	6 lbs. M.A. 3 lbs. T.	11 lbs. M.A. 3 1/2 lbs. T.	26 1/2 lbs. M.A. 8 lbs. T.	20 lbs. M.A. 8 lbs. T.

Freed No.	MAP-4	MAP-7	MAP-8	MAP-11
Power Supply	115 V.A.C. 60 Cycles (To MAPT-4)	115 V.A.C. 400 Cycles	115 V.A.C. 400 Cycles (To MAPT-8)	115 V.A.C. 400 Cycles
Maximum Output Wattage	175 Watts	15 Watts	50 Watts	10 Watts
Voltage	130 V	125 V	115 V	115 V
Typical Load	Diehl FPF 85-18-1	Kearfott R112-2A	Bendix CK-3000-1-A	Kearfott R111-2A
Input Signal Required for Full Output	8 ma.	.5 ma.	1.8 ma.	.9 ma.
Resp. Time	ON OFF 17 cycles 66	ON OFF 5 cycles 15	ON OFF 45 cycles 60	ON OFF 4 cycles 75
Control Winding Resistance	3000 ohms each	4,400 ohms each	320 ohms each	3300 ohms each
Physical Dimensions	7 1/4" x 5" x 7 7/8" H M.A. 4" x 4 3/4" x 5 5/8" H T.	3 1/4" x 3 5/8" x 7" H	3 7/8" x 3 7/8" x 7 7/8" H M.A. 2 15/16" x 2 3/4" x 3 3/4" H T.	4 1/8" x 3 1/2" x 5 1/4" H
Weight	35 lbs. M.A. 12 lbs. T.	7 lbs.	7 1/2 lbs. M.A. 4 lbs. T.	5 lbs.

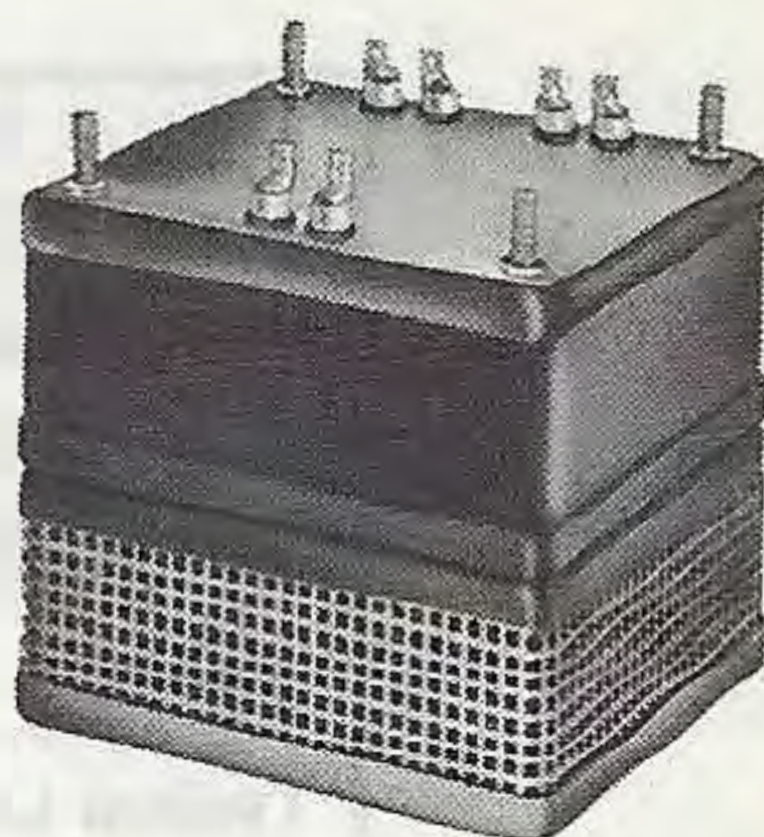
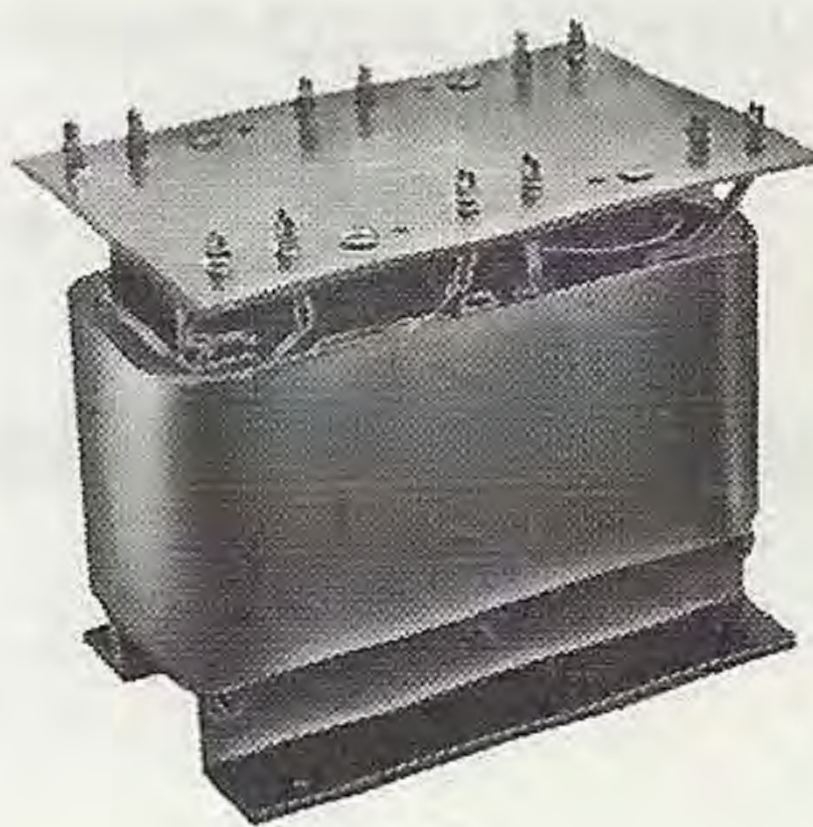
TRANSFER CHARACTERISTIC CURVES



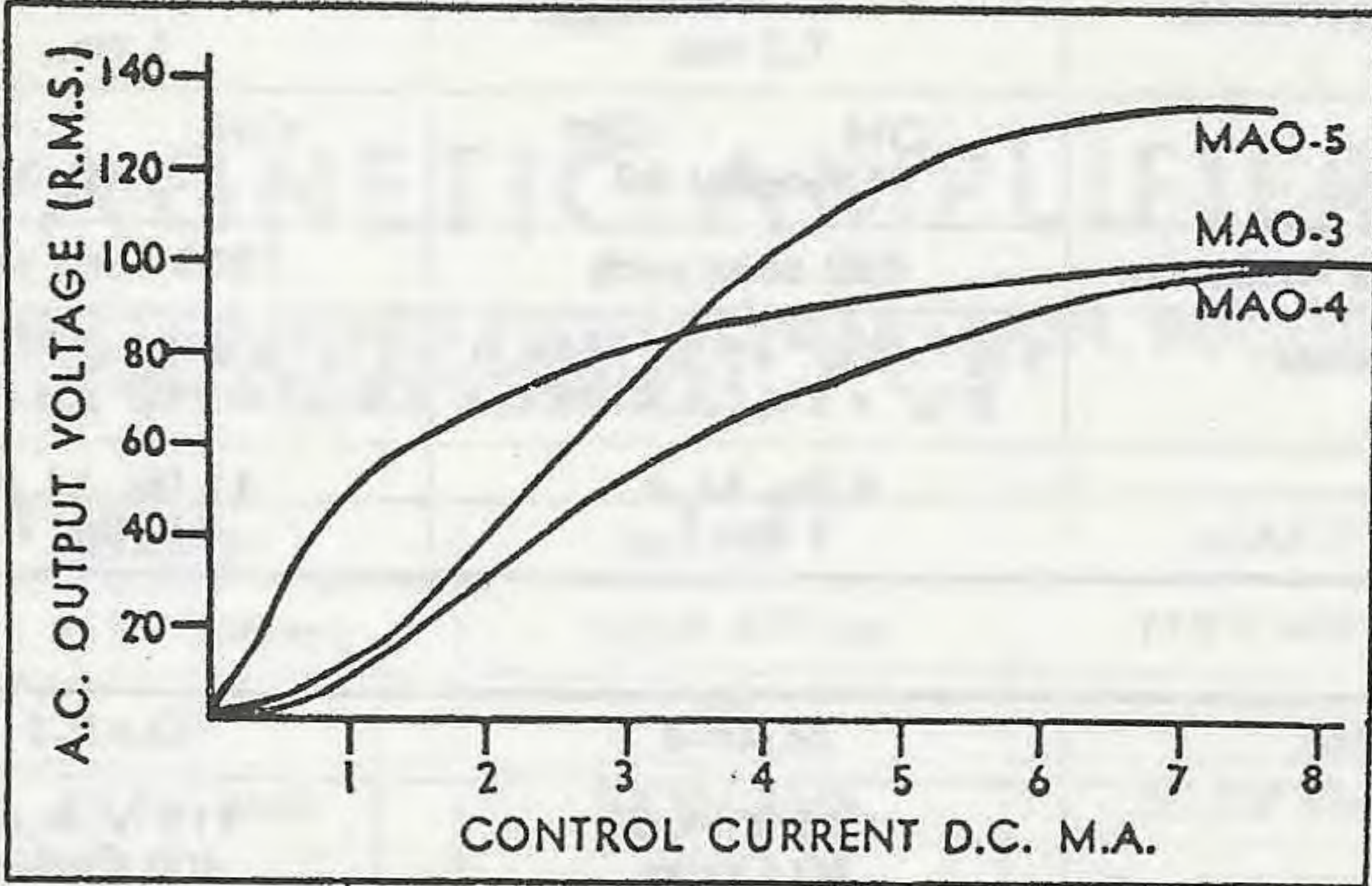
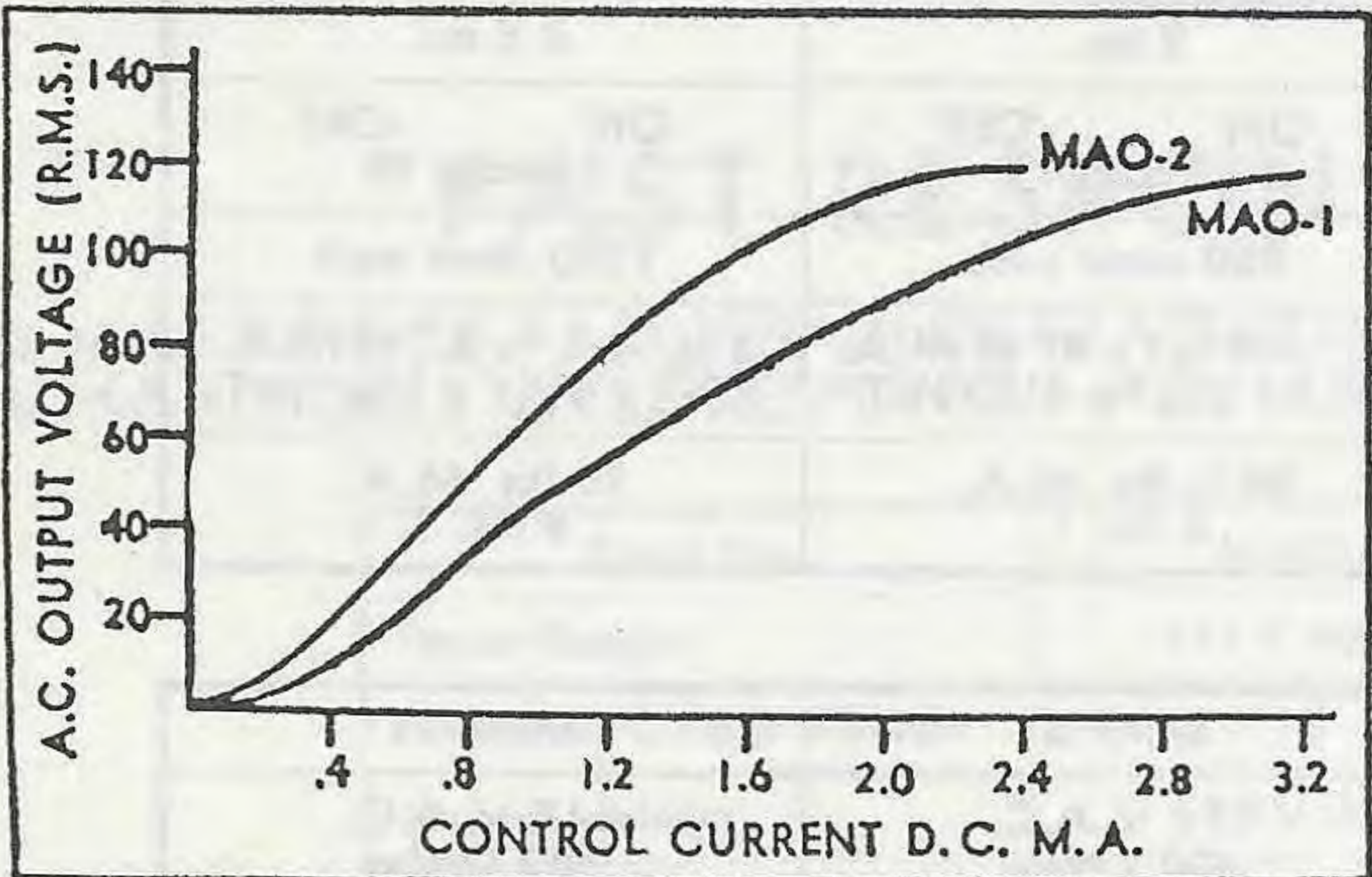
SINGLE ENDED MAGNETIC AMPLIFIERS

THE MAO LINE OF SINGLE-ENDED MAGNETIC AMPLIFIERS PROVIDES A SINGLE STAGE OF DC CONTROLLED AMPLIFICATION, UTILIZING POSITIVE FEEDBACK TO OBTAIN MUCH HIGHER GAIN THAN THAT OF A SATURABLE REACTOR.

Freed No.	MAO-1	MAO-2	MAO-3	MAO-4	MAO-5
Power Supply	115 V.A.C. 60 Cycles	115 V.A.C. 60 Cycles	115 V.A.C. 60 Cycles	115 V.A.C. 60 Cycles	115 V.A.C. to the MAO-T-5 Transformer 60 Cycles
Maximum Output Wattage	4 watts	20 watts	100 watts	400 watts	575 watts
Voltage	120V	120V	100V	100V	135V
Typical Load	4000 ohms	700 ohms	100 ohms	25 ohms	25 ohms
Input Signal Req. for Full Output	3 ma.	1.8 ma.	9 ma.	9 ma.	6 ma.
Control Winding Resistance	300 ohms each	700 ohms each	5600 ohms each	4500 ohms each	4,500 ohms
Physical Dimensions	3 3/4" x 4" x 3 1/2" H	4 1/4" x 3 5/8" x 6 3/8" H	3 1/4" x 5 1/2" x 4 13/16" H	5" x 7 1/2" x 6" H	5" x 7 1/2" x 6" H Transf. 3 7/8" x 3 7/8" x 3 3/4" H
Weight	4 lbs.	7 lbs.	8 1/2 lbs.	21 lbs.	21 lbs. Trans. 7 1/4 lbs.



TRANSFER CHARACTERISTIC CURVES



TRANSISTOR CONVERTERS

THE FREED LINE OF DC TO AC AND DC TO DC TRANSISTOR CONVERTERS PROVIDE A HIGH EFFICIENCY VOLTAGE CONVERSION FROM BATTERY SOURCES TO AN AC LINE VOLTAGE OR HIGH DC VOLTAGE WITHOUT THE USE OF MOVING PARTS.

Freed Transformer Co. maintains a stock 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.

The MAC Line of Static DC to AC Converters provide a highly efficient voltage conversion from battery sources to AC voltage without the use of moving parts.

The output voltage and/or frequency is directly proportional to source voltage variation.

Special regulators can be supplied to compensate for this variation.

- RUGGED, QUIET, MAINTENANCE FREE, LONG LIFE OPERATION.
- HIGH POWER TO WEIGHT RATIO, ARC-FREE OPERATION.

DC TO DC CONVERTERS

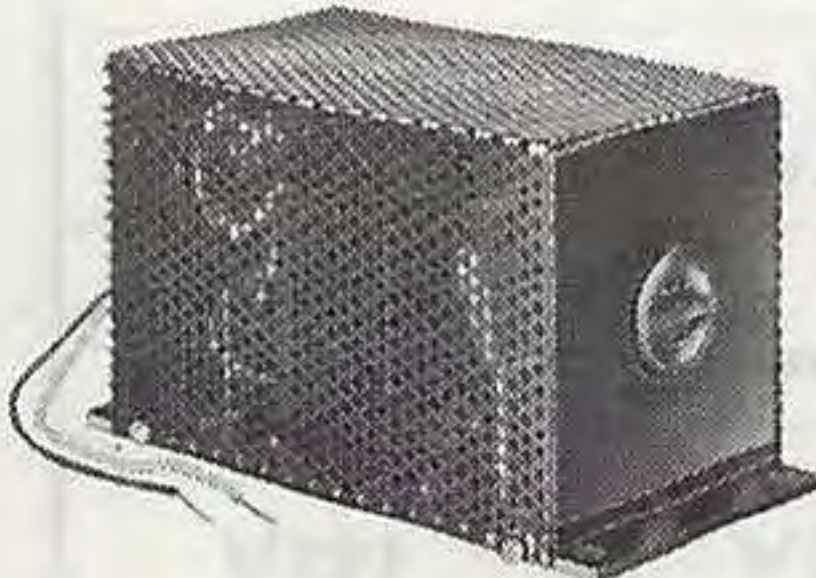
All TDC units are Hermetically Sealed, Oil Filled. Mtg. base plate must be mounted on a sink of sufficient area to maintain a base temperature of 70° C. Maximum output regulation 5% from half load to full load. Ripple frequency 4 to 5 KC; Ripple content 0.1%.

UNREGULATED TDC STOCK UNITS

Type No.	NOM. V in	V out	MAX 1 out MA	Case Size
TDC 12-30-15	12v	300	150	2 5/8 x 2 1/4 x 3 1/2
TDC 12-25-12	12v	250	120	2 5/8 x 2 1/4 x 3 1/2
TDC 12-30-05	12v	300	50	2 x 2 1/4 x 3 1/2
TDC 12-20-05	12v	200	50	2 x 2 1/4 x 3 1/8
TDC 28-30-15	28v	300	150	2 5/8 x 2 1/4 x 3 1/2
TDC 28-25-12	28v	250	120	2 5/8 x 2 1/4 x 3 1/2
TDC 28-30-05	28v	300	50	2 x 2 1/4 x 3 1/8
TDC 28-20-05	28v	200	50	2 x 2 1/4 x 3 1/8

DC TO AC TRANSISTOR CONVERTERS

Input Voltage — 12 VDC
Output Frequency — 60 CPS.— Square Wave



OPEN CASE

Freed No.	Output Voltage	Power	Type of Case	Dimensions
MAC 12-3-60	115 VRMS	30 VA	Cased	7¼" x 3⅛" x 4⅜"
MAC 12-10-1	115 VRMS	100 VA	Cased	7¼" x 4" x 5"
MAC 12-10-2	115 VRMS	100 VA	Herm. Sealed	7¼" x 4⅛" x 4⅜"
MAC 12-20-1	115 VRMS	180 VA	Cased	6" x 4⅛" x 6"
MAC 12-20-2	115 VRMS	180 VA	Herm. Sealed	6" x 4⅛" x 6"
MAC 12-30-1	115 VRMS	250 VA	Cased	5⅞" x 6⅛" x 7⅛"
MAC 12-30-2	115 VRMS	250 VA	Herm. Sealed	5⅞" x 6⅛" x 7⅛"



SEALED CASE

DC TO AC TRANSISTOR CONVERTER

- Output Waveform — Square Wave
- Output Frequency — 60 cps (Adjustment Control)
- Frequency Stability ± 3%
- Hermetically Sealed
- Maximum Ambient Temperature 50° C
- Temperature of Base Mounting Plate must not exceed 70° C
- Output Voltage Variation — Varies Directly with Input Voltage



	Nominal Input V.D.C.	Output @ 115 V VA	Unregulated
TAC-12-50	12	50	4⅛" x 3½" x 4½" H
TAC-12-90	12	90	4⅛" x 3½" x 4⅞" H
TAC-12-175	12	175	5" x 4⅛" x 6" H
TAC-28-50	28	50	4⅛" x 3½" x 4½" H
TAC-28-100	28	100	4⅛" x 3½" x 4⅞" H
TAC-28-175	28	175	5" x 4⅛" x 6" H
TAC-28-250	28	250	5½" x 5" x 6¾" H

DC TO AC INVERTERS WITH SINE WAVE OUTPUTS
ARE AVAILABLE IN TYPES LISTED BELOW

Input Voltage — 5 Volts
Output Voltage — 5 Volts ± 5%
(NOM)



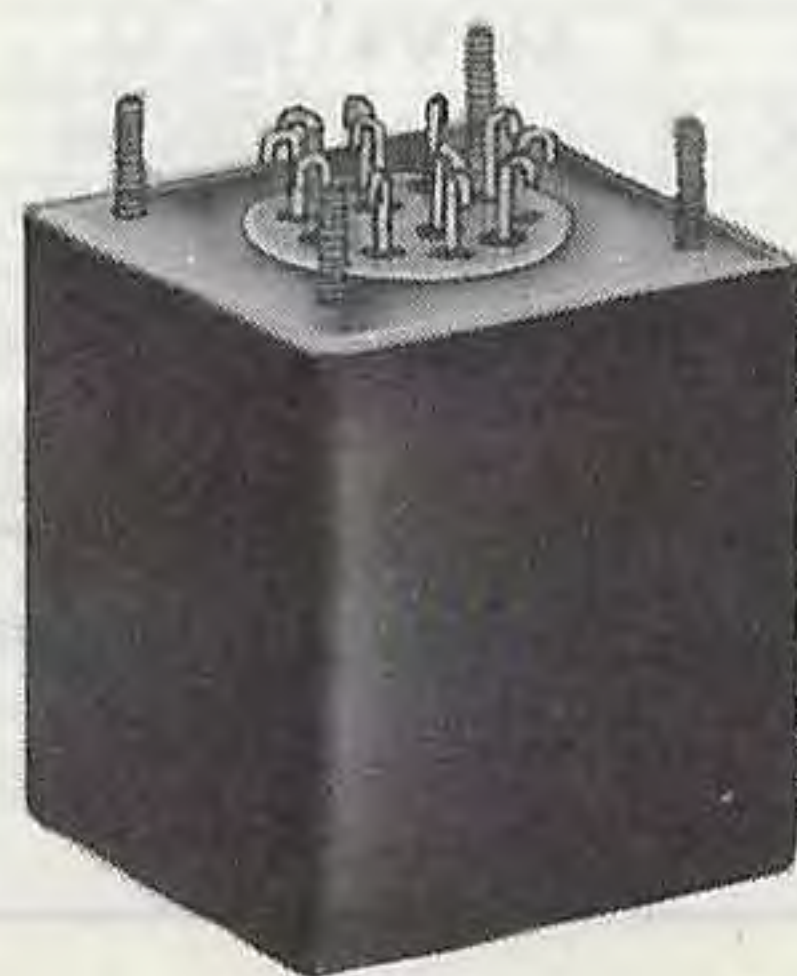
Freed No.	Frequency	Distortion	Power
MAC 5-2-F-1	600 cps.	4% Max.	.5 VA
MAC 5-1-F-2	1200 cps.	4% Max.	.5 VA
MAC 5-3-F-2	2400 cps.	4% Max.	.5 VA
MAC 5-4-F	4800 cps.	4% Max.	.5 VA

These units will operate in an ambient of 20 degrees C to 50 degrees C with the nominal output voltage constant within ±.15% over the temperature range. All units cased — commercial grade.

Case size is 1⅞" x 2" x 5" high. Connections are brought out to an octal plug.

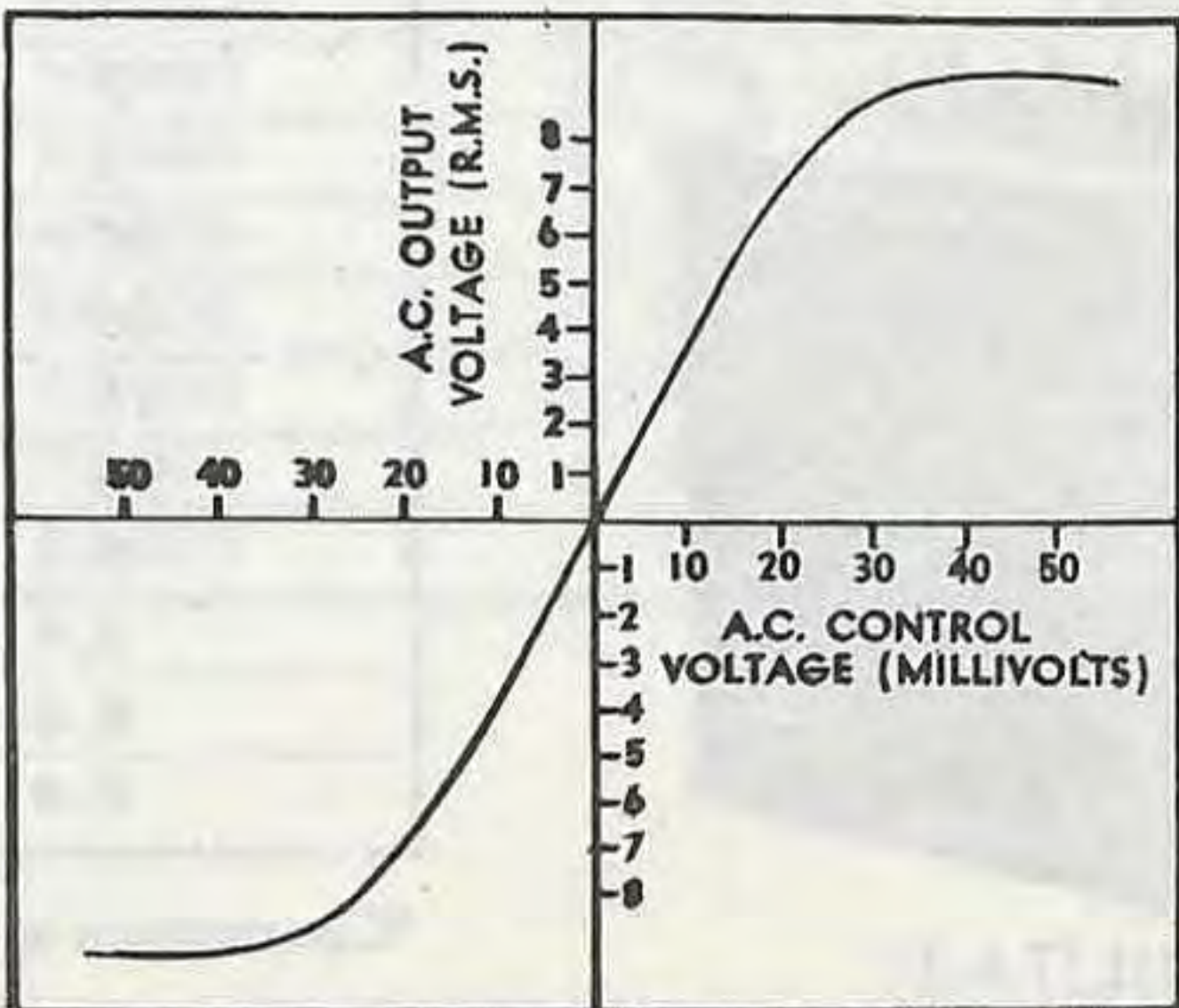
MINIATURIZED SILICON TRANSISTOR PREAMPLIFIER

THE MAT TYPE OF TRANSISTOR PREAMPLIFIER COMBINES LOW POWER CONSUMPTION, HIGH POWER GAIN AND SMALL SIZE AND WEIGHT.



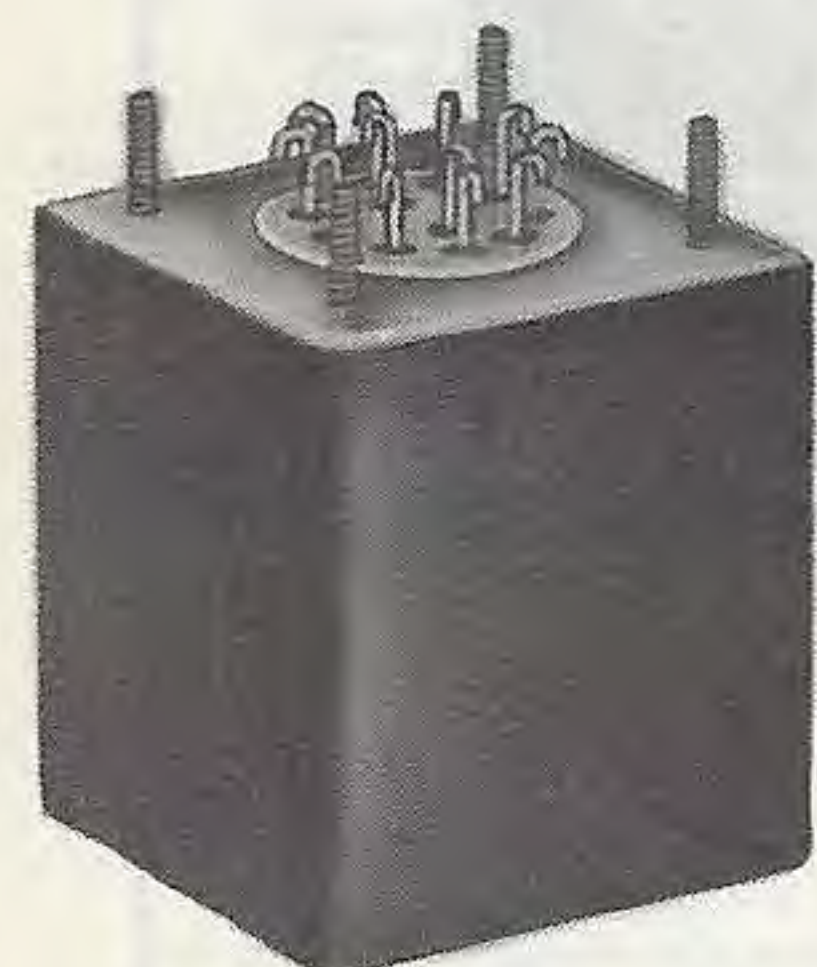
Freed No.	MAT-1-1
Power Supply	115V 400~
Voltage Gain	400
Maximum Output Voltage	10V (RL = 1.5K)
Typical Load	Freed MAF-4 and MAF-5 Magnetic Amplifiers
Input Signal Required for Full Output	50MV
Input Impedance	>10,000 OHMS
Physical Dimensions	1¾" x 1⅞" x 2⅝" H
Weight	10 oz.

TRANSFER
CHARACTERISTIC
CURVE



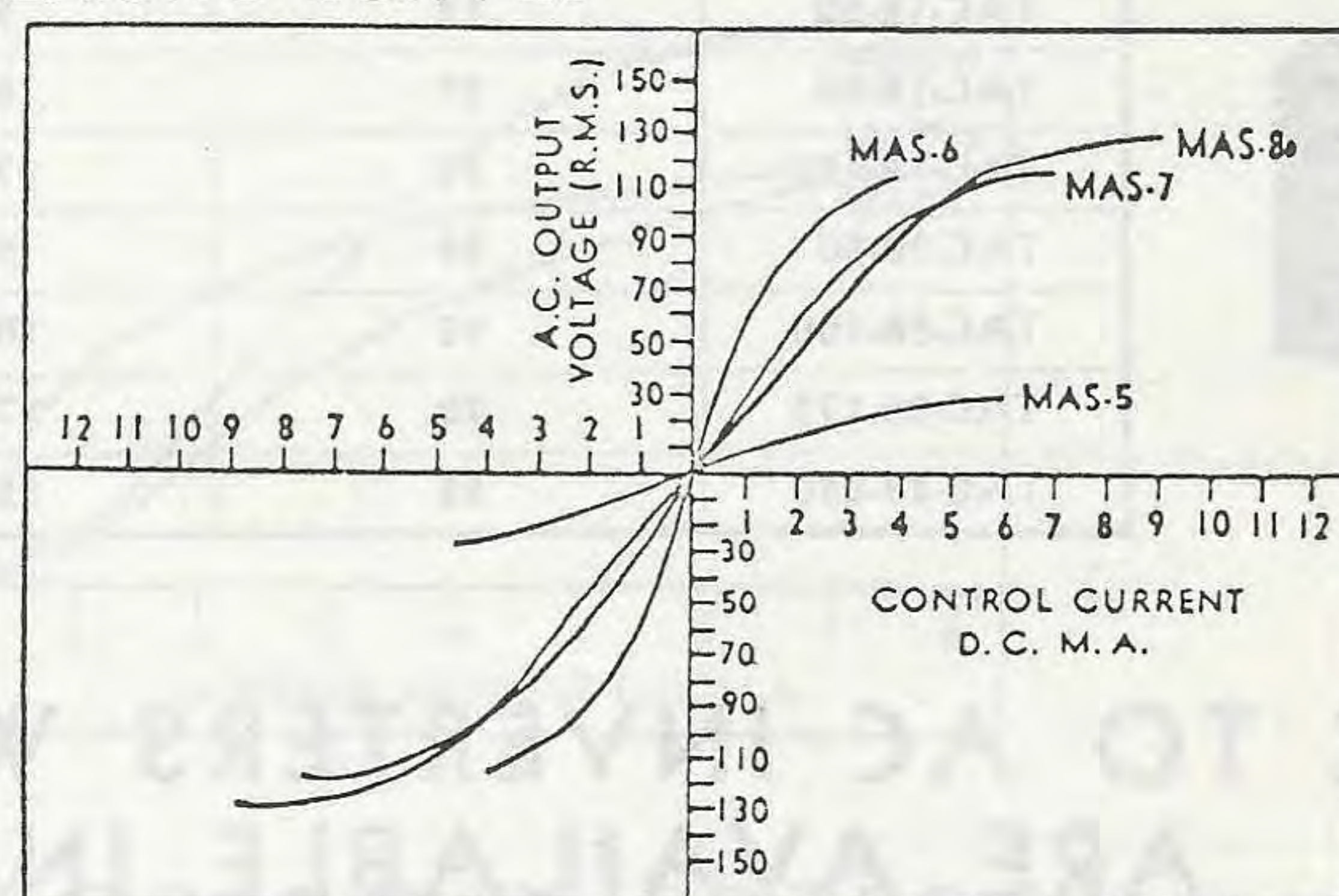
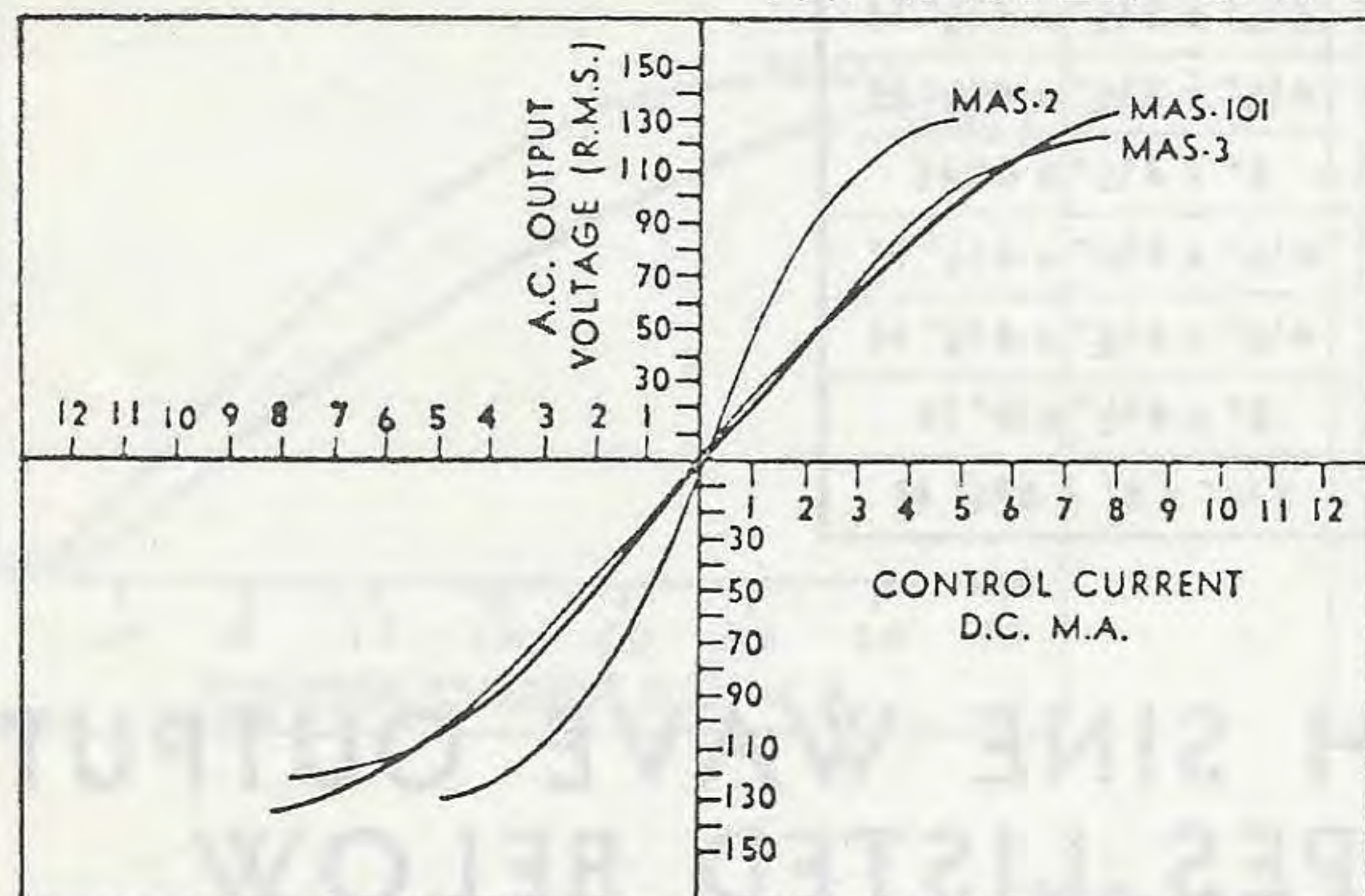
FREED SATURABLE TRANSFORMERS DC CONTROLLED

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



Freed No.	MAS-1	MAS-101	MAS-2	MAS-3	MAS-4	MAS-5	MAS-6	MAS-7	MAS-8
Power Supply	115 V.A.C. 60 Cycles	115 V.A.C. 60 Cycles	115 V.A.C. 400 Cycles	115 V.A.C. 60 Cycles	115 V.A.C. 60 Cycles	115 V.A.C. 400 Cycles	115 V.A.C. 400 Cycles	115 V.A.C. 400 Cycles	115 V.A.C. 400 Cycles
Maximum Output	15 watts	15 watts	6 watts	30 watts	60 watts	2.7 watts	30 watts	40 watts	10 watts
Wattage Voltage	130V	120V	120V	120V	120V	26V	120V	115V	125V
Typical Load	Diehl FPE 25-11	Diehl FPE 25-11	Kearfott R-110	Diehl FPE 49-7	250 ohms	Kearfott R-118	Diehl FPE 49-13-1	Bendix CK-3000-1A	Kearfott R-110, R-111
Input Signal Required for Full Output	6 ma.	9 ma.	3 ma.	8 ma.	20 ma.	4 ma.	4 ma.	6 ma.	11 ma.
Resp. Time	ON OFF 2 cycles 5	ON OFF 3 cycles 6	ON OFF 3 cycles 6	ON OFF 3 cycles 30	ON OFF 5 cycles 35	ON OFF 10 cycles 35	ON OFF 12 cycles 9	ON OFF 12 cycles 9	ON OFF 6 cycles 3
Control Winding Resistance	14 K ohms each	3200 ohms each	2000 ohms each	6800 ohms each	2000 ohms each	1500 ohms each	4000 ohms each	4000 ohms each	7000 ohms each
Physical Dimensions	3 1/2" x 4 1/8" x 5 1/2" H	3 1/2" x 4 1/8" x 5 1/2" H	1 3/4" x 2 9/16" x 2 13/16" H	4 3/4" x 5 7/8" x 5 1/2" H	7" x 5 1/4" x 7" H	2 1/4" x 2 1/8" x 2 1/4" H	3 3/4" x 3 1/4" x 4" H	3 13/16" x 3 1/4" x 4" H	1 5/8" x 2 3/8" x 3 1/8" H
Weight	9 lbs.	9.75 lbs.	2 lbs.	18.5 lbs.	29 lbs.	1.25 lbs.	6 lbs.	6 lbs.	21 oz.

TRANSFER CHARACTERISTIC CURVES

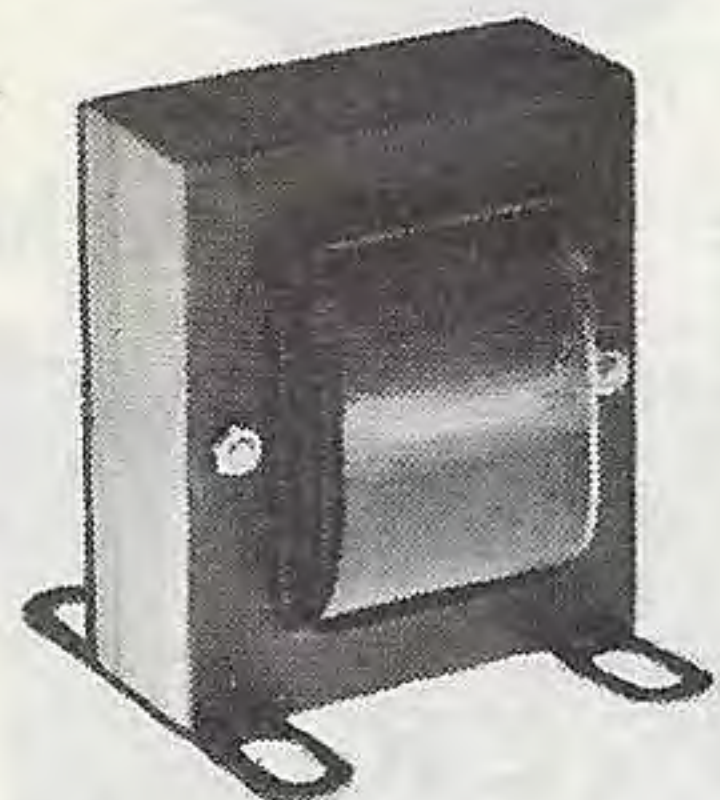


CONSTANT VOLTAGE TRANSFORMERS

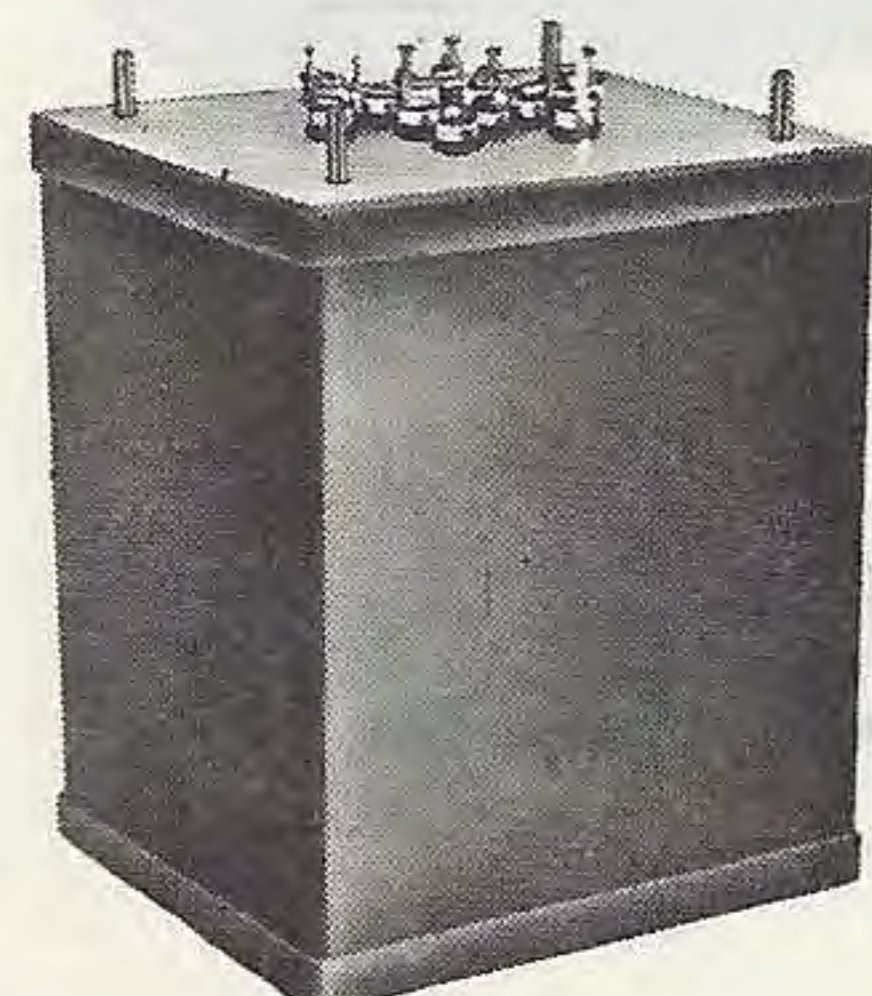
The MCV line of constant voltage transformers provides accurate regulation against line and/or load variations, without the use of tubes or moving parts.

- MILITARY SPECIFICATIONS
- COMMERCIAL
- ACCURATE REGULATIONS
- FULLY AUTOMATIC
- NO TUBES
- NO MOVING PARTS
- FAST RESPONSE

Rated output within $\pm 2\%$ of nominal value. Regulation automatically maintained within $\pm 1\%$. Regulation from 25% to full load $\pm 2\%$.



COMMERCIAL



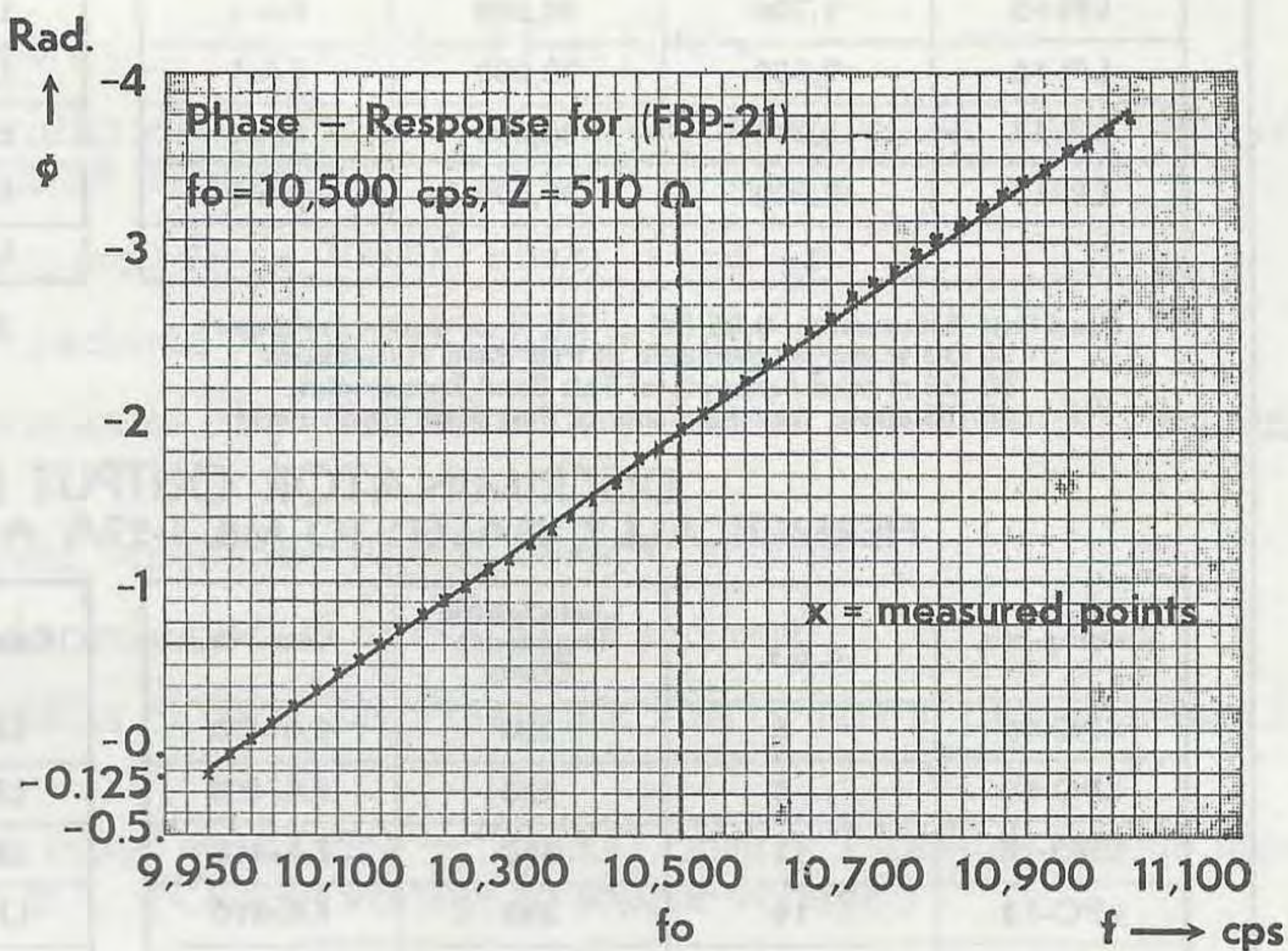
MILITARY

Reg. Output in R.M.S. Volts	Input Range in R.M.S. Volts	Output in V.A. P.F-1	CATALOG NUMBERS			
			60 Cycles		400 Cycles	
			Comm.	Military*	Comm.*	Military*
115	95-130	5	MCV65LC	MCV65LM	MCV45LC	MCV45LM
115	95-130	25	MCV625LC	MCV625LM	MCV425LC	MCV425LM
115	95-130	75	MCV675LC	MCV675LM	MCV475LC	MCV475LM
115	95-130	125	MCV6125LC	MCV6125LM	MCV4125LC	MCV4125LM
115	95-130	175	MCV6175LC	MCV6175LM	MCV4175LC	MCV4175LM
115	95-130	250	MCV6250LC	MCV6250LM	MCV4250LC	MCV4250LM
115	95-130	375	MCV6375LC	MCV6375LM	MCV4375LC	MCV4375LM
115	95-130	500	MCV6500LC	MCV6500LM	MCV4500LC	MCV4500LM
115	95-130	750	MCV6750LC	MCV6750LM	MCV4750LC	MCV4750LM
115	95-130	1000	MCV61000LC	MCV61000LM	MCV41000LC	MCV41000LM
26	95-130	5	MCV6 5 4FC	MCV6 5 4FM	MCV454FC	MCV454FM
26	95-130	25	MCV6254FC	MCV6254FM	MCV4254FC	MCV4254FM
26	95-130	75	MCV6754FC	MCV6754FM	MCV4754FC	MCV4754FM
26	95-130	125	MCV61254FC	MCV61254FM	MCV41254FC	MCV41254FM
6.4	95-130	5	MCV6 5FC	MCV6 5FM	MCV45FC	MCV45FM
6.4	95-130	25	MCV625FC	MCV625FM	MCV425FC	MCV425FM
6.4	95-130	75	MCV675FC	MCV675FM	MCV475FC	MCV475FM
6.4	95-130	125	MCV6125FC	MCV6125FM	MCV4125FC	MCV4125FM

*Condensers are not provided with units. Where condensers are provided they are external to units.

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.



CASE DIMENSIONS

FA-5 CASE



Height: 4 1/2"
Width: 3 1/2"
Depth: 2 1/8"
Mtg. Cen.: 2 1/16" x 1 9/16"
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.: 1 11/16" x 1 9/16"
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.: 1 11/16" x 1 9/16"
Studs: 4-8-32 x 1/2"
Knockout: 1 1/2" dia.

TELEMETERING BAND PASS FILTERS

Hermetically sealed to MIL-T-27A and MIL-F-18327

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.

Characteristic Impedance 500 Ω			
Catalog No.	Center Frequency c.p.s.	3 DB Band Width % of C.F.	Case No.
FBP-10	400	$\pm 9\frac{3}{4}$	FA-10
FBP-11	560	$\pm 9\frac{3}{4}$	FA-10
FBP-12	730	$\pm 9\frac{3}{4}$	FA-10
FBP-13	960	$\pm 9\frac{3}{4}$	FA-10
FBP-14	1,300	$\pm 9\frac{3}{4}$	FA-10
FBP-15	1,700	$\pm 9\frac{3}{4}$	FA-10
FBP-16	2,300	$\pm 9\frac{3}{4}$	FA-10
FBP-17	3,000	$\pm 9\frac{3}{4}$	FA-15
FBP-18	3,900	$\pm 9\frac{3}{4}$	FA-15
FBP-19	5,400	$\pm 9\frac{3}{4}$	FA-15
FBP-20	7,350	$\pm 9\frac{3}{4}$	FA-15
FBP-21	10,500	$\pm 9\frac{3}{4}$	FA-15
FBP-22	12,300	$\pm 9\frac{3}{4}$	FA-15
FBP-23	14,500	$\pm 9\frac{3}{4}$	FA-15
FBP-24	22,000	$\pm 9\frac{3}{4}$	FA-15
FBP-25	22,000	$\pm 19\frac{1}{2}$	FA-15
FBP-26	30,000	$\pm 9\frac{3}{4}$	FA-15
FBP-27	30,000	$\pm 19\frac{1}{2}$	FA-15
FBP-28	40,000	$\pm 9\frac{3}{4}$	FA-15
FBP-29	40,000	$\pm 19\frac{1}{2}$	FA-15
FBP-30	52,500	$\pm 9\frac{3}{4}$	FA-15
FBP-31	52,500	$\pm 19\frac{1}{2}$	FA-15
FBP-32	70,000	$\pm 9\frac{3}{4}$	FA-15
FBP-33	70,000	$\pm 19\frac{1}{2}$	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	$\pm 9\frac{3}{4}$	FA-5
FBP-35	560	$\pm 9\frac{3}{4}$	FA-5
FBP-36	730	$\pm 9\frac{3}{4}$	FA-5
FBP-37	960	$\pm 9\frac{3}{4}$	FA-5
FBP-38	1,300	$\pm 9\frac{3}{4}$	FA-5
FBP-39	1,700	$\pm 9\frac{3}{4}$	FA-5
FBP-40	2,300	$\pm 9\frac{3}{4}$	FA-5
FBP-41	3,000	$\pm 9\frac{3}{4}$	FA-5
FBP-42	3,900	$\pm 9\frac{3}{4}$	FA-5
FBP-43	5,400	$\pm 9\frac{3}{4}$	FA-5
FBP-44	7,350	$\pm 9\frac{3}{4}$	FA-5
FBP-45	10,500	$\pm 9\frac{3}{4}$	FA-5
FBP-46	12,300	$\pm 9\frac{3}{4}$	FA-5
FBP-47	14,500	$\pm 9\frac{3}{4}$	FA-5
FBP-48	22,000	$\pm 9\frac{3}{4}$	FA-5
FBP-49	22,000	$\pm 19\frac{1}{2}$	FA-5
FBP-50	30,000	$\pm 9\frac{3}{4}$	FA-5
FBP-51	30,000	$\pm 19\frac{1}{2}$	FA-5
FBP-52	40,000	$\pm 9\frac{3}{4}$	FA-5
FBP-53	40,000	$\pm 19\frac{1}{2}$	FA-5
FBP-54	52,500	$\pm 9\frac{3}{4}$	FA-5
FBP-55	52,500	$\pm 19\frac{1}{2}$	FA-5
FBP-56	70,000	$\pm 9\frac{3}{4}$	FA-5
FBP-57	70,000	$\pm 19\frac{1}{2}$	FA-5

FREED TRANSFORMER COMPANY, INC.

DISCRIMINATOR INPUT LOW PASS FILTER
HERMETICALLY SEALED TO MIL-T-27A AND MIL-F-18327 SPECIFICATIONS

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



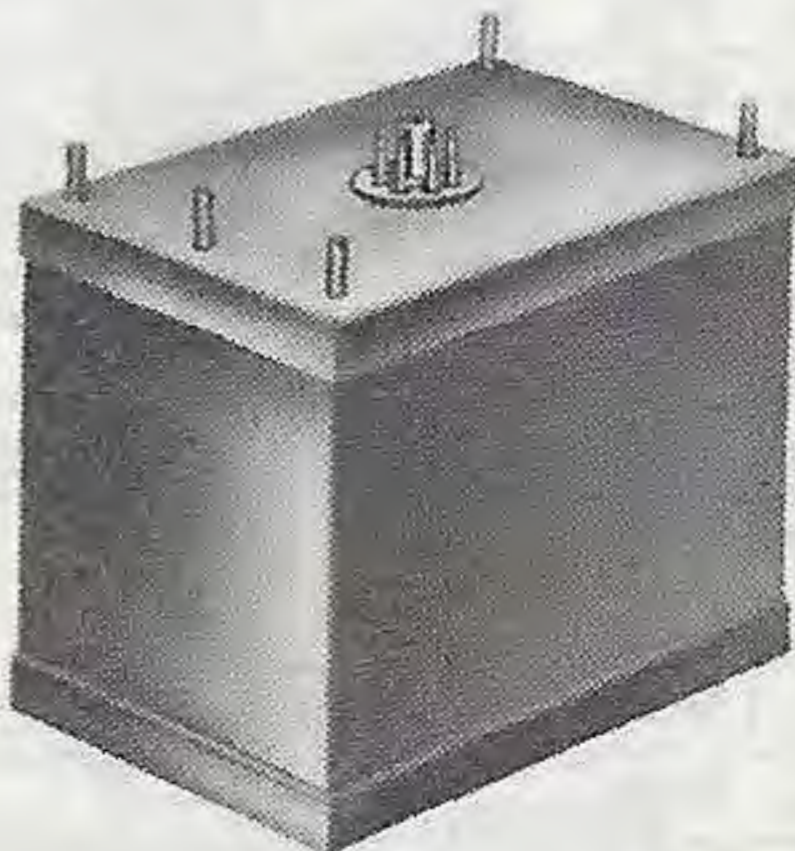
Height: 4 1/2"
Width: 1 7/8"
Depth: 1 5/8"
Mtg. Cen.: 1 15/64" x 1 1/16"
4 Inserts: 6-32
Knockout: 1 1/2"

FA-190 CASE



Height: 4 1/2"
Width: 2 1/4"
Depth: 1 5/8"
Mtg. Cen.: 1 7/32" 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

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

Band Pass Attenuation: 0.05 DB $\pm$ 9 3/4% of Center Frequency
30 DB at second harmonic of Pass Band Frequencies
50 DB at third harmonic of Pass Band Frequencies
40 DB above third harmonic of Pass Band Frequencies

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

Band Pass Attenuation: 0.05 DB $\pm$ 15% of Center Frequency
30 DB at second harmonic of Pass Band Frequencies
50 DB at third harmonic of Pass Band Frequencies
40 DB above third harmonic of Pass Band Frequencies

DISCRIMINATOR OUTPUT LOW PASS FILTER
HERMETICALLY SEALED TO MIL-T-27A AND MIL-F-18327 SPECIFICATIONS

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	± 15	$\pm 1.0\%$	26.0	FA-190
DST-30	30.0	± 15	$\pm 1.0\%$	26.0	FA-190
DST-31	40.0	± 15	$\pm 1.0\%$	26.0	FA-190
DST-32	52.5	± 15	$\pm 1.0\%$	26.0	FA-190
DST-33	70.0	± 15	$\pm 1.0\%$	26.0	FA-190

FIXED DISCRIMINATORS
HERMETICALLY SEALED TO MIL-T-27A AND MIL-F-18327 SPECIFICATIONS

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

FREED FILTERS

To MIL-T-27A and MIL-F-18327

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.

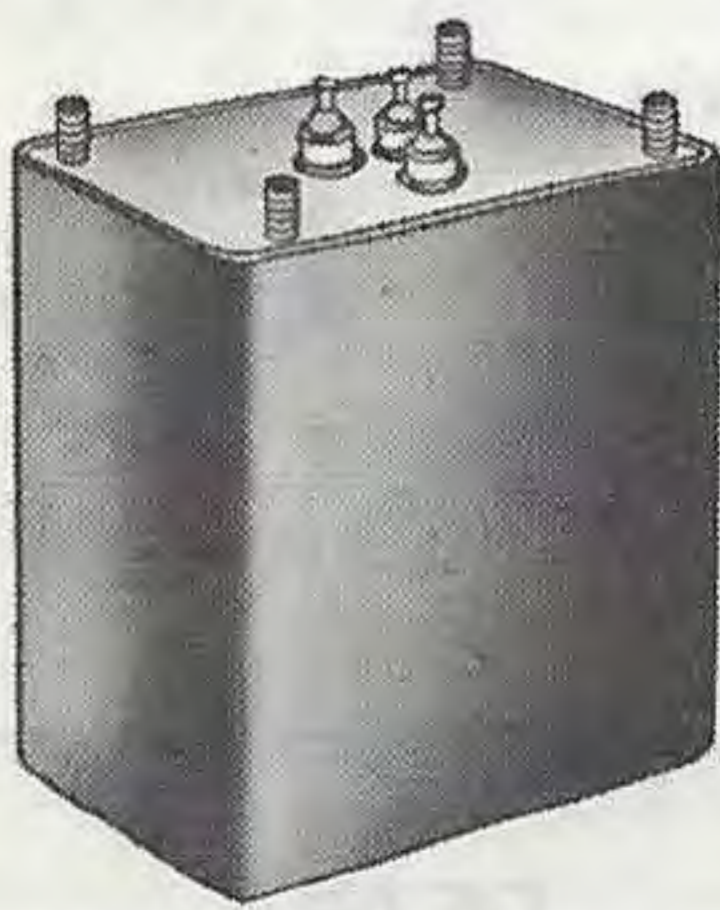
Band Pass Filters: The attenuation characteristics of Band Pass Filters are 2db or less at plus or minus 3% of center frequency 40db or more at 0.5 and 2 center frequency.

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.)

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—6-32 x 3/8"
Knockout: 7/8" dia.

Special filters in all six types
are available for any frequency
from 100 to 20,000 cycles

Catalog No.	Cut-off Frequency c.p.s.
ILP- 100	100
ILP- 200	200
ILP- 300	300
ILP- 500	500
ILP- 750	750
ILP- 1,000	1,000
ILP- 1,500	1,500
ILP- 2,000	2,000
ILP- 2,500	2,500
ILP- 3,000	3,000
ILP- 5,000	5,000
ILP- 7,000	7,000
ILP- 10,000	10,000
ILP- 15,000	15,000
ILP- 20,000	20,000
ILP- 23,000	23,000
ILP- 25,000	25,000
ILP- 32,000	32,000
ILP-130,000	130,000
ILP-150,000	150,000

Catalog No.	Cut-off Frequency c.p.s.
LLP- 500	500
LLP- 1,000	1,000
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
LLP-16,000	16,000
LLP-20,000	20,000
LLP-70,000	70,000
LLP-80,000	80,000
IHP- 200	200
IHP- 250	250
IHP- 300	300
IHP- 400	400
IHP- 500	500
IHP- 1,000	1,000
IHP- 2,000	2,000
IHP- 3,000	3,000
IHP-10,000	10,000
IHP-15,000	15,000
LHP- 200	200
LHP- 300	300
LHP- 400	400
LHP- 500	500
LHP- 800	800
LHP- 1,000	1,000
LHP- 2,000	2,000
LHP- 6,000	6,000
LHP-10,000	10,000

Catalog No.	Cut-off Frequency c.p.s.
IBP - 100	100
IBP - 200	200
IBP - 250	250
IBP - 400	400
IBP - 500	500
IBP - 700	700
IBP - 800	800
IBP - 900	900
IBP - 1,000	1,000
IBP - 1,500	1,500
IBP - 2,000	2,000
IBP - 3,000	3,000
IBP - 5,000	5,000
IBP - 7,200	7,200
IBP -10,000	10,000
IBP -12,000	12,000
IBP -15,000	15,000
IBP -30,000	30,000
IBP -57,600	57,600
LBP- 100	100
LBP- 300	300
LBP- 400	400
LBP- 600	600
LBP- 800	800
LBP- 1,000	1,000
LBP- 1,500	1,500
LBP- 2,000	2,000
LBP- 3,000	3,000
LBP- 7,200	7,200
LBP-10,000	10,000
LBP-14,400	14,400
LBP-20,000	20,000
LBP-28,800	28,800

HERMETICALLY SEALED SUB-MINIATURE 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, 30db or more at 1.5 cut-off frequency and 40 db or more at 2 cut-off frequency.

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

LLM Line Low Pass Filter. Characteristic Impedance 500 to 600 ohms, in and out.

High Pass Filters: The attenuation characteristics of High Pass Filters are 6db or less at cut-off frequency, 30db and 40db or more at 0.67 and 0.5 cut-off frequency.

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

LHM Line High Pass Filter. Characteristic Impedance 500 to 600 ohms, 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 35db or more at 0.5 and 2 center frequency.

IBM 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.)

LBM 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 5:1. (Output voltage to source voltage.)

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

Catalog No.	Cut-off Freq. c.p.s.	Case No.
IBM - 400	400	DF-02
IBM - 500	500	DF-02
IBM - 700	700	DF-02
IBM - 800	800	DF-02
IBM - 900	900	DF-02
IBM - 1,000	1,000	DF-02
IBM - 1,500	1,500	DF-02
IBM - 2,000	2,000	DF-01
IBM - 3,000	3,000	DF-01
IBM - 5,000	5,000	DF-01
IBM - 7,200	7,200	DF-01
IBM - 10,000	10,000	DF-01
IBM - 12,000	12,000	DF-01
IBM - 15,000	15,000	DF-01
IBM - 30,000	30,000	DF-01
IBM - 57,600	57,600	DF-01
IHM - 300	300	DF-01
IHM - 400	400	DF-01
IHM - 500	500	DF-01
IHM - 1,000	1,000	DF-01
IHM - 2,000	2,000	DF-01
IHM - 3,000	3,000	DF-01
IHM - 10,000	10,000	DF-01
IHM - 15,000	15,000	DF-01

Catalog No.	Cut-off Freq. c.p.s.	Case No.
ILM- 300	300	DF-01
ILM- 500	500	DF-01
ILM- 750	750	DF-01
ILM- 1,000	1,000	DF-01
ILM- 1,500	1,500	DF-01
ILM- 2,000	2,000	DF-01
ILM- 2,500	2,500	DF-01
ILM- 3,000	3,000	DF-01
ILM- 5,000	5,000	DF-01
ILM- 7,000	7,000	DF-01
ILM- 10,000	10,000	DF-01
ILM- 15,000	15,000	DF-01
ILM- 20,000	20,000	DF-01
ILM- 23,000	23,000	DF-01
ILM- 25,000	25,000	DF-01
ILM- 32,000	32,000	DF-01
ILM-130,000	130,000	DF-01
ILM-150,000	150,000	DF-01
LHM- 300	300	DF-03
LHM- 400	400	DF-03
LHM- 500	500	DF-03
LHM- 800	800	DF-03
LHM- 1,000	1,000	DF-02
LHM- 2,000	2,000	DF-02
LHM- 6,000	6,000	DF-02
LHM-10,000	10,000	DF-02

Catalog No.	Cut-off Freq. c.p.s.	Case No.
LBM - 300	300	DF-02
LBM - 400	400	DF-02
LBM - 600	600	DF-02
LBM - 800	800	DF-02
LBM - 1,000	1,000	DF-01
LBM - 1,500	1,500	DF-01
LBM - 2,000	2,000	DF-01
LBM - 3,000	3,000	DF-01
LBM - 7,200	7,200	DF-01
LBM -10,000	10,000	DF-01
LBM -14,400	14,400	DF-01
LBM -20,000	20,000	DF-01
LBM -28,800	28,800	DF-01
LLM - 500	500	DF-03
LLM - 1,000	1,000	DF-03
LLM - 1,500	1,500	DF-02
LLM - 1,600	1,600	DF-02
LLM - 2,000	2,000	DF-02
LLM - 2,500	2,500	DF-02
LLM - 3,000	3,000	DF-02
LLM -16,000	16,000	DF-02
LLM -20,000	20,000	DF-02
LLM -70,000	70,000	DF-02
LLM -80,000	80,000	DF-02

CASE DIMENSIONS



DF CASE STYLE

DF-01

Height: 1 3/8"

Width: 3/4"

Depth: 3/4"

Mtg. Cen.: 9/16" Diag.

Studs: 2 ÷ 4-40

DF-02

Height: 1 3/8"

Width: 1"

Depth: 1"

Mtg. Cen.: 3/4" Diag.

Studs: 2 ÷ 4-40

DF-03

Height: 1 3/4"

Width: 1"

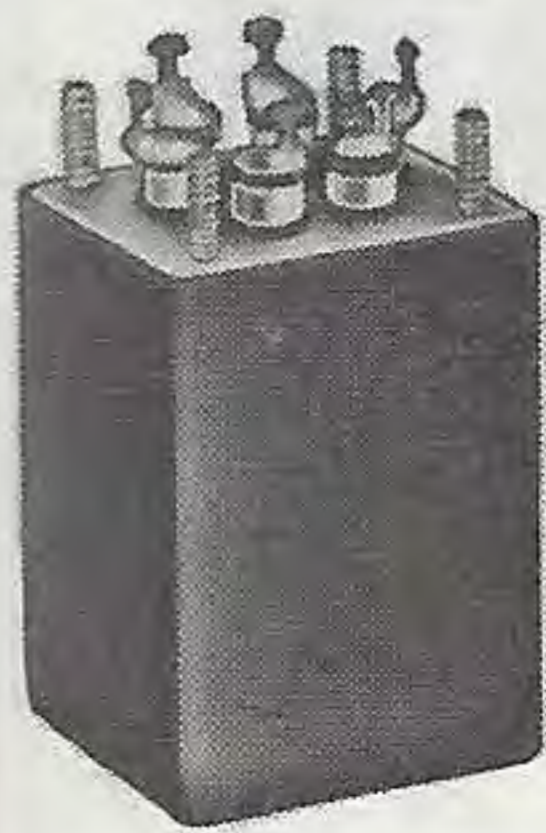
Depth: 1"

Mtg. Cen.: 3/4"

Studs: 2 ÷ 4-40

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.

Catalog No.	Frequency
NTF- 30	30 cps
NTF- 60	60 cps
NTF-120	120 cps

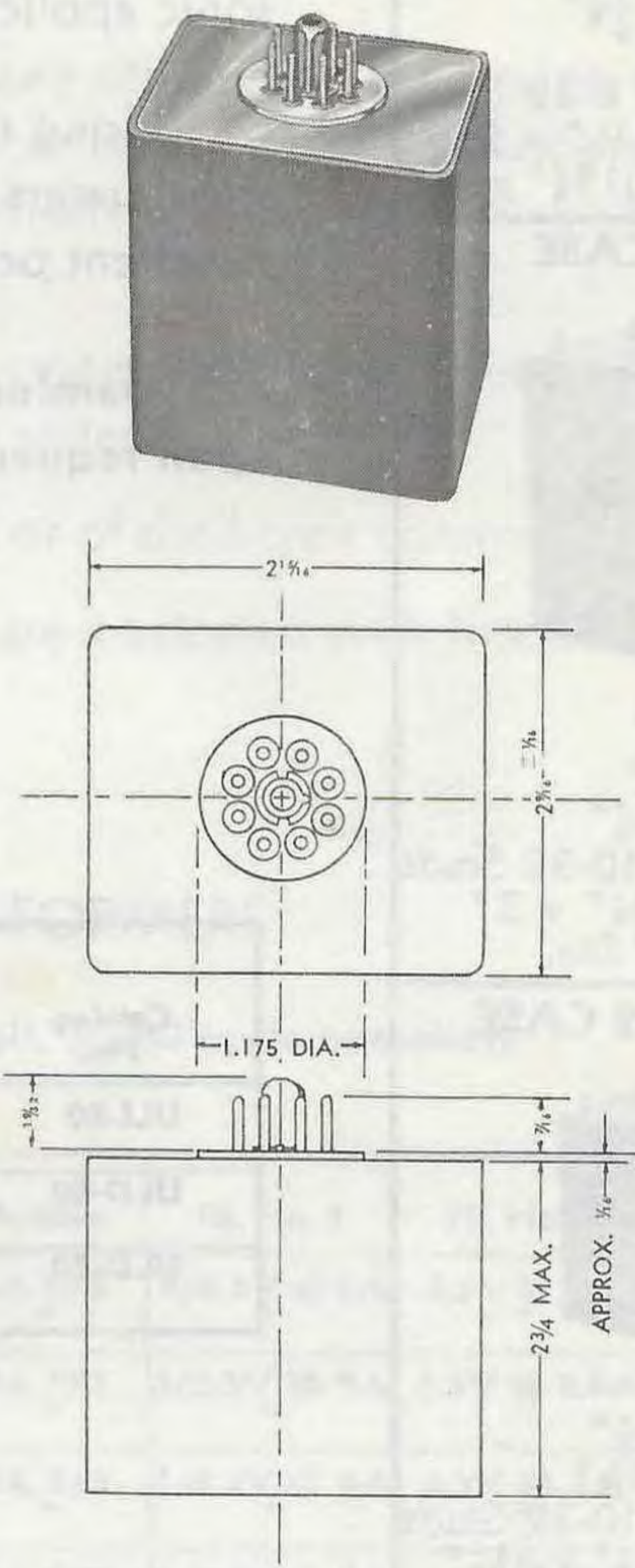
TELEGRAPH TONE CHANNEL FILTERS
HERMETICALLY SEALED TO MIL-T-27A AND MIL-F-18327 SPECIFICATIONS

Freed Band Pass Filters are extensively used in multiplex frequency shift transmitting and receiving. Stock filters cover all narrow and wide band channels. All units are built with a standard octal socket.

FBT Transmitting Filters are built for a 600 ohm in and out characteristic impedance. Filter configuration allows paralleling of channel outputs. 10db adjacent channel crossover attenuation.

TRANSMITTING FILTERS

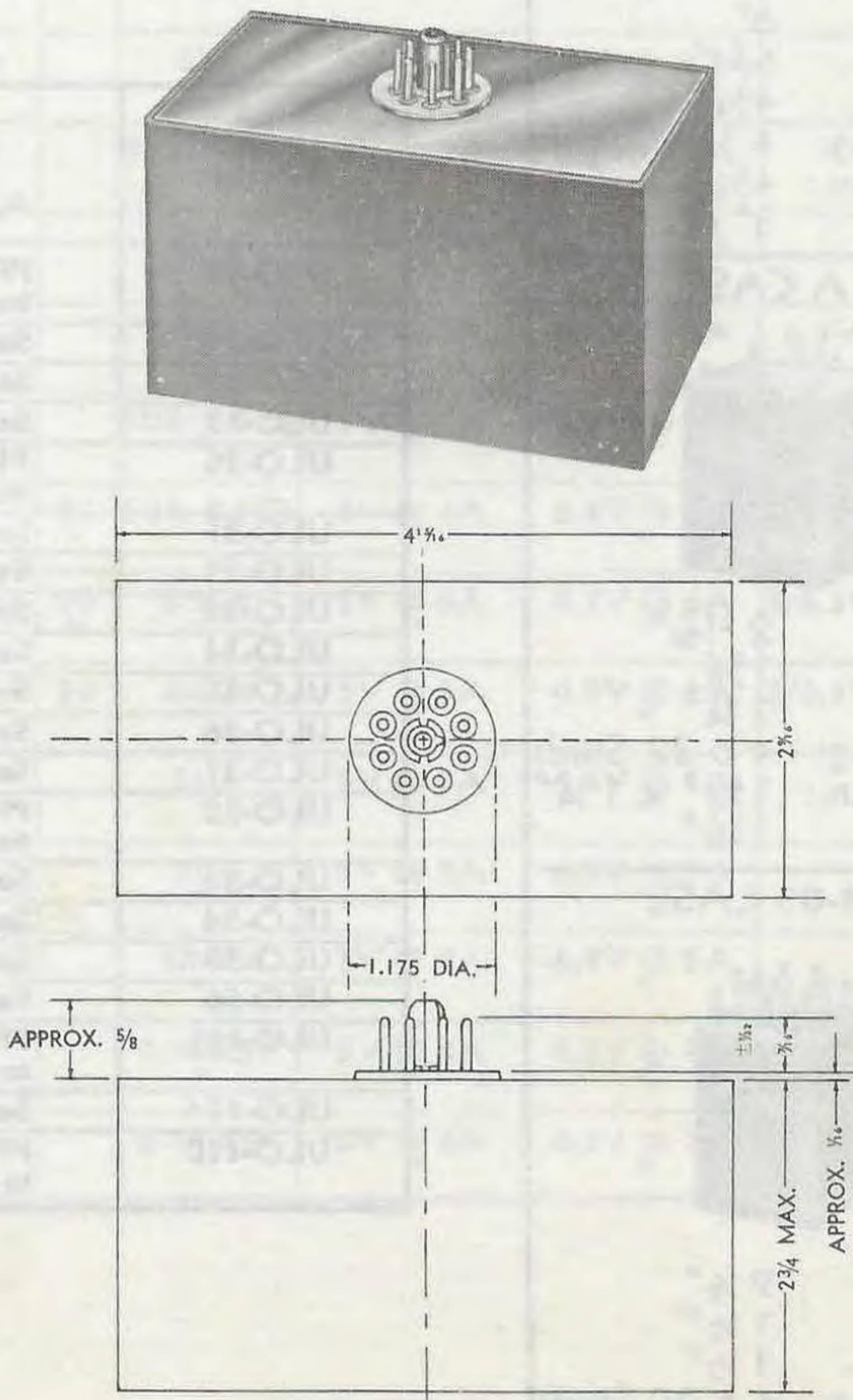
Catalog No. Case FA-955	Center Frequency (c.p.s.) Insertion Loss 5db	Pass Band (c.p.s.) Attenuation 2db	Stop Band (c.p.s.) Attenuation 20db
FBT-10	425	±42.5	±130
FBT-11	595	±42.5	±130
FBT-12	765	±42.5	±130
FBT-13	935	±42.5	±130
FBT-14	1,105	±42.5	±130
FBT-15	1,275	±42.5	±130
FBT-16	1,445	±42.5	±130
FBT-17	1,615	±42.5	±130
FBT-18	1,785	±42.5	±130
FBT-19	1,955	±42.5	±130
FBT-20	2,125	±42.5	±130
FBT-21	2,295	±42.5	±130
FBT-22	2,465	±42.5	±130
FBT-23	2,635	±42.5	±130
FBT-24	2,805	±42.5	±130
FBT-25	2,975	±42.5	±130
FBT-26	1,955	±85	±260
FBT-27	2,380	±85	±260
FBT-28	2,805	±85	±260
FBT-29	3,230	±85	±260



FBR Receiving Filters are designed for a characteristic impedance of 600 ohms in and out. Filter configuration permits paralleling of channel inputs. 20db adjacent channel crossover attenuation.

RECEIVING FILTERS

Catalog No. Case FA-950	Center Frequency (c.p.s.) Insertion loss 6db	Pass Band (c.p.s.) Attenuation 2db	Stop Band (c.p.s.) Attenuation 33db
FBR-10	425	±42.5	±130
FBR-11	595	±42.5	±130
FBR-12	765	±42.5	±130
FBR-13	935	±42.5	±130
FBR-14	1,105	±42.5	±130
FBR-15	1,275	±42.5	±130
FBR-16	1,445	±42.5	±130
FBR-17	1,615	±42.5	±130
FBR-18	1,785	±42.5	±130
FBR-19	1,955	±42.5	±130
FBR-20	2,125	±42.5	±130
FBR-21	2,295	±42.5	±130
FBR-22	2,465	±42.5	±130
FBR-23	2,635	±42.5	±130
FBR-24	2,805	±42.5	±130
FBR-25	2,975	±42.5	±130
FBR-26	1,955	±85	±260
FBR-27	2,380	±85	±260
FBR-28	2,805	±85	±260
FBR-29	3,230	±85	±260



CASE DIMENSIONS

DC-4B CASE



Height: 4 3/4"
Width: 3 1/8"
Length: 3"
Mounting: 4 8-32 Studs
Mtg. Cen.: 2 1/2" x 2 1/2"
Cutout: (2) 1 3/8" x 5/8"

DC-6B CASE



Height: 6"
Width: 5"
Length: 4 1/8"
Mounting: 4 10-32 Studs
Mtg. Cen.: 3 3/4" x 3"
Cutout: 3" Dia.

MA-2 CASE



Height: 4"
Width: 4 5/8"
Length: 3 15/16"
Mounting: 4 10-32 Studs
Mtg. Cen.: 2 1/2" x 3 3/4"
Cutout: (2) 2 3/4" x 3/4"

OL-112-1 CASE

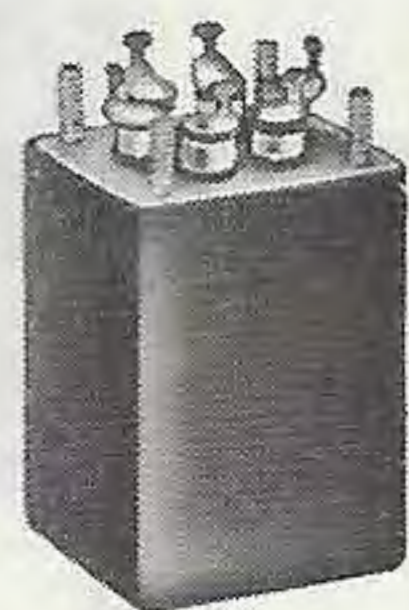
Height: 6"
Width: 5 7/8"
Length: 4 3/4"
Mounting: 4 1/4-20 Studs
Mtg. Cen.: 4 3/4" x 3 5/8"
Cutout: 3" dia.

EA CASE



Height: 2 11/16"
Width: 1 7/8"
Length: 1 3/4"
Mounting: 4 6-32 Studs
Mtg. Cen.: 1 3/8" x 1 1/4"
Cutout: 1 3/16"

DM-03 CASE



Height: 2 1/2"
Width: 1 1/2"
Length: 1 1/2"
Mounting: 4 6-32 Studs
Mtg. Cen.: 1 1/16" x 1 1/16"
Cutout: 1 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.

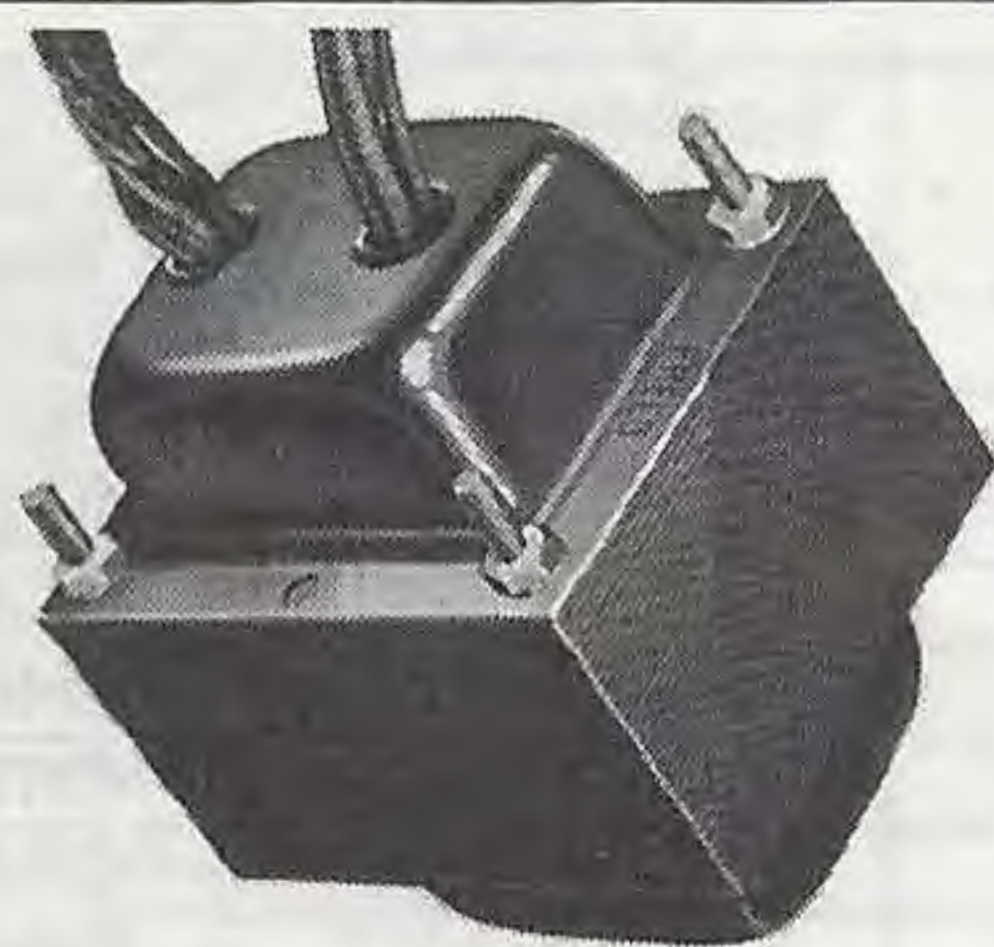
Catalog No.	Application	Primary Impedance Ohms	Ratio	Maximum Power Watts	Maximum Primary D.C. per Side Ma.	Case Size
ULI-20	Transducer to PP 811A	1, 2, 4	1:17.3	5		DM-03
ULD-20	PP 6CM6 to PP 811A	10,000	4.4:1	5	50	DM-03
ULD-50	PP 5881 to PP 8000	7,200	1.7:1	25	90	EA

ULTRASONIC OUTPUT TRANSFORMERS

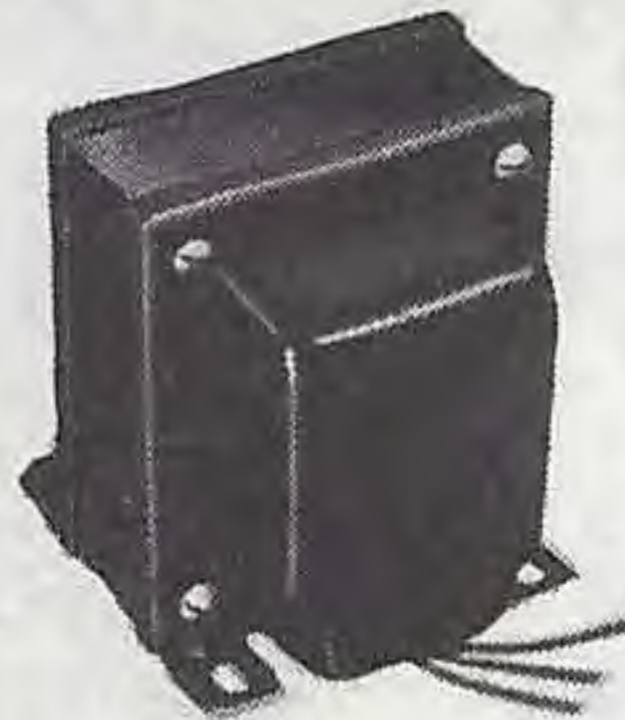
Frequency response: ± 1 DB 20 KC to 60 KC.

Catalog No.	Application	Impedance in Ohms		Maximum Power Watts	Maximum Primary D.C. per Side Ma.	Case Size
		Primary	Secondary			
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	MA-2
ULO-53	Same	10,800	7.5/30	500	230	MA-2
ULO-54	Same	10,800	25/100	500	230	MA-2
ULO-55	Same	10,800	125/500	500	320	MA-2
ULO-56	Same	10,800	250/1000	500	230	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 CZ No.	Height	Width	Depth	Mtg. Centers	Mtg. Studs
HS300	2 ⁵ / ₈	3	2 ¹ / ₂	2 ¹ / ₂ x 2	(4) 1 ¹ / ₈ x 3/8
HS303	2 ⁵ / ₈	3	2 ¹ / ₂	2 ¹ / ₂ x 2	(4) "
HS306	3 ¹ / ₄	3	2 ¹ / ₂	2 ¹ / ₂ x 2	(4) "
HS307	3 ⁵ / ₈	3	2 ¹ / ₂	2 ¹ / ₂ x 2	(4) "
HS503	3 ¹ / ₂	3 ³ / ₄	3 ¹ / ₈	3 ¹ / ₈ x 2 ¹ / ₂	(4) "
HS505	3 ³ / ₄	3 ³ / ₄	3 ¹ / ₈	3 ¹ / ₈ x 2 ¹ / ₂	(4) "
HS603	3 ³ / ₄	4 ¹ / ₂	3 ³ / ₄	3 ³ / ₄ x 3	(4) "
HS605	4	4 ¹ / ₂	3 ³ / ₄	3 ³ / ₄ x 3	(4) "
HS606	4 ⁵ / ₁₆	4 ¹ / ₂	3 ³ / ₄	3 ³ / ₄ x 3	(4) "
HS610	4 ⁵ / ₈	4 ¹ / ₂	3 ³ / ₄	3 ³ / ₄ x 3	(4) "
HS612	4 ⁷ / ₈	4 ¹ / ₂	3 ³ / ₄	3 ³ / ₄ x 3	(4) "
HS708	5 ⁷ / ₈	5 ¹ / ₄	4 ³ / ₈	4 ³ / ₈ x 3 ¹ / ₂	(4) 9/32 x 2 ¹ / ₂
HS709	6	5 ¹ / ₄	4 ³ / ₈	4 ³ / ₈ x 3 ¹ / ₂	(4) "



Case CZ No.	Height	Width	Depth	Mtg. Centers	Mtg. Holes
VS300	3 ⁵ / ₁₆	2 ⁵ / ₈	2 ³ / ₄	2 x 1 ¹ / ₁₆	(4) 1 ¹ / ₈ x 3/8
VS303	3 ⁵ / ₁₆	2 ⁵ / ₈	3	2 x 1 ¹ / ₁₆	(4) "
VS304	3 ²⁹ / ₃₂	4 ¹ / ₄	3 ¹ / ₄	2 ¹ / ₂ x 3	(4) "
VS306	3 ⁵ / ₁₆	2 ⁵ / ₈	3 ³ / ₈	2 x 2 ¹ / ₁₆	(4) "
VS307	3 ⁵ / ₁₆	2 ⁵ / ₈	3 ¹ / ₂	2 x 2 ¹ / ₁₆	(4) "
VS503	3 ²⁹ / ₃₂	3 ¹ / ₄	3 ⁵ / ₈	2 ¹ / ₂ x 2 ⁵ / ₁₆	(4) "
VS505	3 ²⁹ / ₃₂	3 ¹ / ₄	3 ⁷ / ₈	2 ¹ / ₂ x 2 ⁵ / ₈	(4) "
VS506	3 ²⁹ / ₃₂	3 ¹ / ₄	4 ¹ / ₄	2 ¹ / ₄ x 3	3/16 x 3/8
VS508	3 ⁵ / ₈	2 ⁵ / ₈	3 ¹ / ₈	2 x 2 ¹ / ₈	(4) "
VS603	4 ²¹ / ₃₂	3 ⁷ / ₈	3 ⁷ / ₈	3 x 2 ¹ / ₁₆	(4) "
VS605	4 ²¹ / ₃₂	3 ⁷ / ₈	4 ¹ / ₈	3 x 2 ¹ / ₁₆	(4) "
VS606	4 ²¹ / ₃₂	3 ⁷ / ₈	4 ¹ / ₄	3 x 3 ¹ / ₈	(4) "
VS610	4 ²¹ / ₃₂	3 ⁷ / ₈	4 ³ / ₄	3 x 3 ¹ / ₁₆	(4) "
VS612	4 ²¹ / ₃₂	3 ⁷ / ₈	5	3 x 3 ¹ / ₁₆	(4) "
VS708	5 ⁷ / ₁₆	4 ⁹ / ₁₆	5 ³ / ₄	3 ¹ / ₂ x 4	(4) 9/32 x 2 ¹ / ₂
VS709	5 ⁷ / ₁₆	4 ⁹ / ₁₆	5 ⁷ / ₈	3 ¹ / ₂ x 4 ¹ / ₈	(4) "

COMMERCIAL 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.

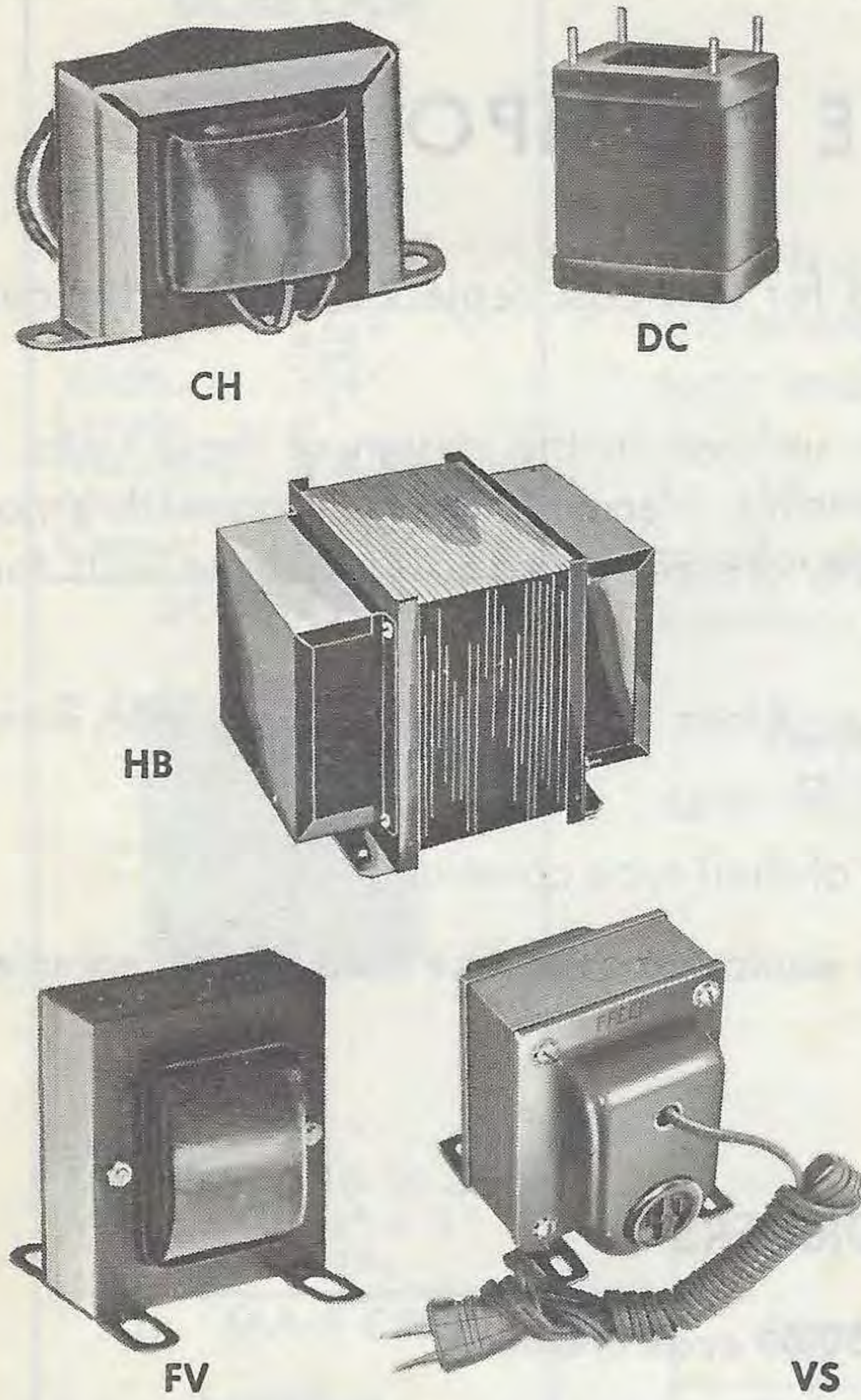
POWER TRANSFORMERS

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



COMMERCIAL 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 & 18 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.

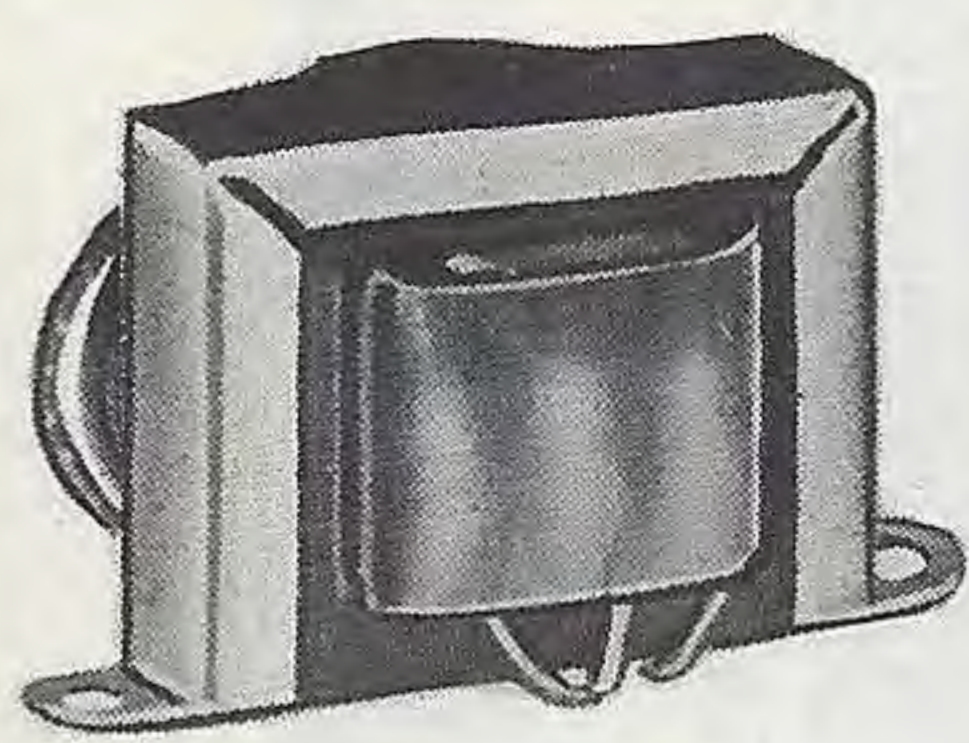
Catalog Number	Primary Voltage	Secondary Voltage	VA Rating	Case Size
LB-1	90-110	1.1 x input	350	VS-300
LB-2	90-110	1.1 x input	2000	VS-611

Case No.	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 1/8 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 11/16	2 13/16	1 3/4	2 3/8	(2) 3/8
CH60	2	3 1/4	1 3/4	2 13/16	(2) 3/8
CH62	2	3 1/4	2 1/8	2 13/16	(2) 3/8
CH70	2 5/16	3 11/16	2 1/4	3 1/8	(2) 3/8
CH80	2 5/8	4	2 5/8	3 9/16	(2) 3/8
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 11/16	(4) 3/16 x 3/8
VS612	4 21/32	3 7/8	5	3 x 3 13/16	(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) 3/16 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

COMMERCIAL GRADE COMPONENTS

AUDIO TRANSFORMERS

CASE DIMENSIONS



CH-40 CASE

Height: 1 1/16"
Width: 2 3/8"
Depth: 1 3/16"
Mtg. Cen.: 2"

CH-50 CASE

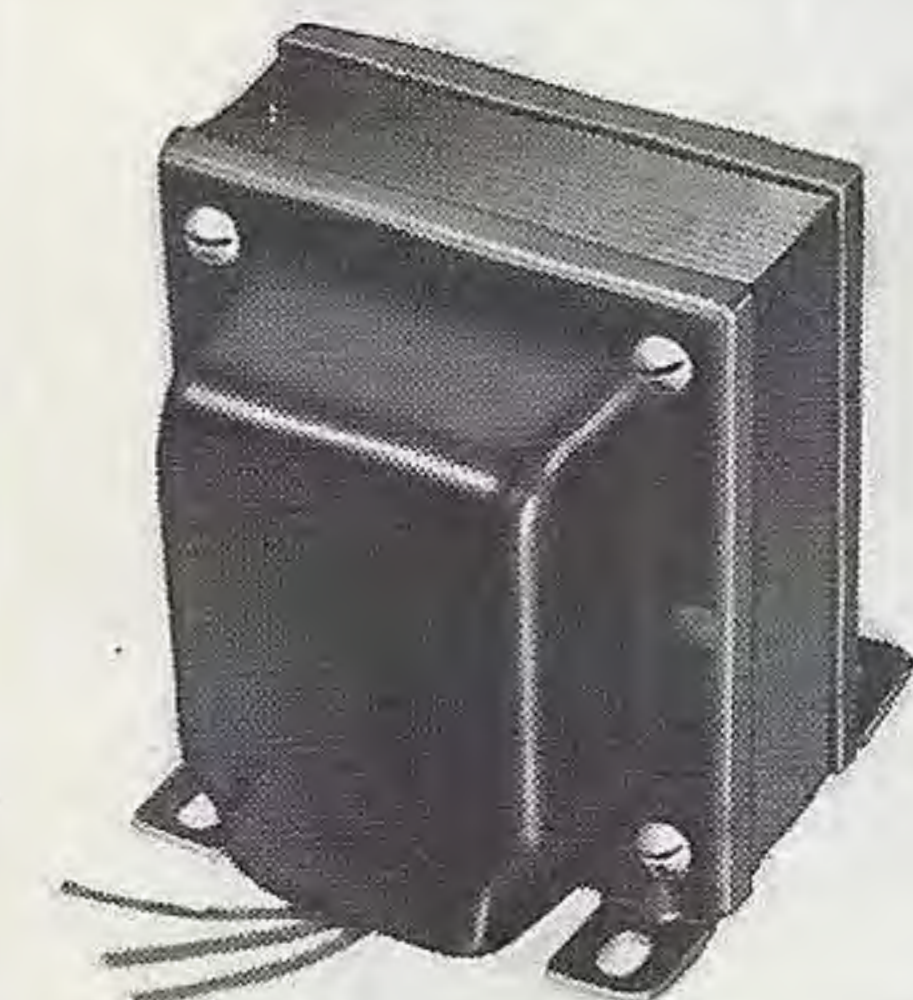
Height: 1 11/16"
Width: 2 13/16"
Depth: 1 3/4"
Mtg. Cen.: 2 3/8"

CH-60 CASE

Height: 2"
Width: 3 1/4"
Depth: 1 3/4"
Mtg. Cen.: 2 13/16"

CH-80 CASE

Height: 2 5/8"
Width: 4"
Depth: 2 5/8"
Mtg. Cen.: 3 9/16"



VS-100 CASE

Height: 2 11/32"
Width: 1 7/8"
Depth: 2 1/4"
Mtg. Cen.: 1 1/2" x 1 1/16"

VS-300 CASE

Height: 3 3/32"
Width: 2 5/8"
Depth: 2 3/4"
Mtg. Cen.: 2" x 1 11/16"

VS-303 CASE

Height: 3 5/32"
Width: 2 5/8"
Depth: 3"
Mtg. Cen.: 2 x 1 15/16"
Mtg. Hole: (4) 3/16 x 3/8

VS-306 CASE

Height: 3 5/32"
Width: 2 5/8"
Depth: 3 3/8"
Mtg. Cen.: 2 x 2 5/16"
Mtg. Hole: (4) 3/16 x 3/8

VS-308 CASE

Height: 3 33/64"
Width: 2 27/32"
Depth: 3 3/8"
Mtg. Cen.: 2" x 2 9/16"

Catalog No.	Application	Impedance Level		Max. Power Level DBM or Power in Watts	Ratio	Max. Pri. D.C. per Side Ma.	D.C. Unbalance 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	±2DB 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		±2DB 200-5000	CH-40
RGA 3	Input; voice coil to grid. Intercom	3.2	100,000	+20	1:179			±2DB 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			±2DB 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		±2DB 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		±2DB 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	±2DB 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		±3DB 200-10000	CH-40
RGA 9	Output; plate to V.C. 6V6, 6AQ5, 6AS5, 7C5.	5000	3.2	5W		50		±3DB 200-10000	CH-40
RGA 10	Output; plate to V.C. 6AR5, 6K6, 6V6, 7B5, 14A5, 3S4, 3U4, 3Q4, 3Q5, 3C5, 3A4.	10,000 or 7500	3.2	5W		30		±3DB 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	±2DB 200-8000	CH-60
RGA 12	Output; TP to V.C. 6V6, 6AQ5, 7C5, C1AB.	10,000CT	3.2	10W	5.6:1	40	4	±3DB 200-10000	CH-60

COMMERCIAL 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

PRICE LIST

FREED TRANSFORMER COMPANY, Inc., 1718 Weirfield St., Brooklyn (Ridgewood) 27, N. Y.

FREED TRANSFORMER COMPANY, INC.

Catalog No.	Net Price	Catalog No.	Net Price	Catalog No.	Net Price	Catalog No.	Net Price	Catalog No.	Net Price
TSA-6	7.00	ULO-10	25.00	DST-31	60.00	LPO-19	62.80	F-1519	8.35
TSA-7	6.50	ULO-11	25.00	DST-32	60.00	LPO-20	61.15	F-1520	8.35
TSA-8	6.50	ULO-12	25.00	DST-33	60.00	LPO-21	55.60	F-1521	8.55
TSA-9	7.50	ULO-13	25.00	FBP-10	86.00	LPO-22	55.60	F-1522	8.55
TSA-10	7.00	ULO-30	32.50	FBP-11	86.00	LPO-23	48.20	F-1523	8.75
TSA-11	7.00	ULO-31	32.50	FBP-12	86.00	LPO-24	47.10	F-1524	8.75
TSA-12	7.50	ULO-32	32.50	FBP-13	86.00	LPO-25	47.10	F-1525	9.05
TSA-13	7.50	ULO-33	32.50	FBP-14	70.80	LPO-26	47.10	F-1526	9.05
TSA-14	7.50	ULO-34	32.50	FBP-15	70.80	LPO-27	48.20	F-1527	9.25
TSA-15	8.00	ULO-35	32.50	FBP-16	70.80	LPO-28	47.10	F-1528	9.75
TSA-16	7.00	ULO-36	32.50	FBP-17	70.80	LPO-29	47.10	F-1529	10.10
TSA-17	7.00	ULO-37	32.50	FBP-18	70.80	LPO-30	47.10	F-1530	10.10
TSA-18	7.00	ULO-52	75.00	FBP-19	70.80	LPO-31	48.20	F-1531	10.35
TSA-19	7.50	ULO-53	75.00	FBP-20	70.80	LPO-32	47.10	F-1532	10.75
TSA-20	7.00	ULO-54	75.00	FBP-21	70.80	LPO-33	47.10	F-1533	11.25
TSA-21	6.50	ULO-55	75.00	FBP-22	70.80	LPO-34	47.10	F-1534	11.75
TSA-22	6.75	ULO-56	75.00	FBP-23	70.80	LPO-35	47.10	F-1535	11.75
TSA-23	6.50	ULO-101	145.00	FBP-24	86.00	NTF-30	25.00	F-1536	12.75
TSA-25	6.50	ULO-104	145.00	FBP-25	70.80	NTF-60	25.00	F-1537	13.10
TSA-26	6.00	ULO-110	145.00	FBP-26	86.00	NTF-120	25.00	F-1538	13.60
TSA-27	7.50			FBP-27	86.00				
TSA-28	6.00	VHI-1	9.50	FBP-28	86.00				
TSA-29	6.00	VHI-2	9.50	FBP-29	86.00				
TSA-30	6.30	VHI-3	9.50	FBP-30	86.00				
TSA-31	6.00	VHI-4	9.50	FBP-31	86.00				
TSA-32	6.00	VHI-5	9.50	FBP-32	86.00				
TSA-33	6.30	VHI-6	9.50	FBP-33	86.00				
TSA-34	6.50	VHI-7	9.50	FBP-34	73.00				
TSA-35	6.50	VHI-8	9.50	FBP-35	73.00				
TSA-36	6.00	VHI-9	9.50	FBP-36	73.00				
TSA-37	6.00	VHI-10	9.50	FBP-37	73.00				
TSA-38	6.50	VHI-11	9.50	FBP-38	73.00				
TSA-39	7.00	VHI-12	9.50	FBP-39	80.00				
TSA-40	6.50	VHI-13	9.50	FBP-40	88.00				
TSA-41	6.75	VHI-14	9.50	FBP-41	88.00				
		VHI-15	9.50	FBP-42	88.00				
TTA-1	8.10	VHI-16	9.50	FBP-43	88.00				
TTA-2	6.60	VHI-17	9.50	FBP-44	88.00				
TTA-3	8.60	VHI-18	9.50	FBP-45	88.00				
TTA-4	9.10	VHI-19	9.50	FBP-46	88.00				
TTA-5	8.60	VHI-20	9.50	FBP-47	88.00				
TTA-6	6.60	VHI-21	9.50	FBP-48	88.00				
TTA-7	8.75	VHI-22	9.50	FBP-49	88.00				
TTA-8	8.60			FBP-50	88.00				
TTA-9	8.90			FBP-51	88.00				
TTA-10	8.45			FBP-52	88.00				
TTA-11	8.45			FBP-53	88.00				
TTA-12	8.50			FBP-54	88.00				
TTA-13	8.10			FBP-55	88.00				
TTA-14	9.10			FBP-56	88.00				
TTA-15	8.10			FBP-57	88.00				
TTA-16	8.60			FBR-10	89.50				
TTA-17	8.10			FBR-11	89.50				
TTA-18	8.10			FBR-12	89.50				
TTA-19	8.10			FBR-13	89.50				
TTA-20	8.10			FBR-14	89.50				
TTA-21	8.10			FBR-15	89.50				
TTA-22	8.10			FBR-16	89.50				
TTA-23	8.45			FBR-17	89.50				
TTA-24	8.45			FBR-18	89.50				
TTA-25	8.45			FBR-19	89.50				
TTA-26	8.90			FBR-20	89.50				
TTA-27	8.10			FBR-21	89.50				
TTA-28	8.45			FBR-22	89.50				
TTA-29	8.45			FBR-23	89.50				
TTA-30	8.45			FBR-24	89.50				
TTA-31	8.90			FBR-25	89.50				
TTA-32	8.45			FBR-26	89.50				
TTA-33	8.90			FBR-27	89.50				
TTA-34	8.45			FBR-28	89.50				
TTA-35	8.60			FBR-29	89.50				
TTA-36	8.60			FBT-10	42.50				
TTA-37	8.50			FBT-11	42.50				
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TTA-39	8.35			FBT-13	42.50				
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				LPO-17	62.50				
				LPO-18	61.60				
ULD-20	10.00	DSF-10	39.50	DSF-11	39.50	DSF-12	39.50	DSF-13	39.50
ULD-50	15.65	DSF-14	39.50	DSF-15	39.50	DSF-16	39.50	DSF-17	39.50
ULI-20	10.00	DSF-18	39.50	DSF-19	39.50	DSF-20	39.50	DSF-21	39.50
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		DSF-26	39.50	DSF-27	39.50	DSF-28	39.50	DSF-29	39.50
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		DST-22	50.00	DST-23	50.00	DST-24	50.00	DST-25	50.00
		DST-26	50.00	DST-27	50.00	DST-28	50.00	DST-29	50.00
		DST-30	60.00						

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Catalog No.	Net Price	Catalog No.	Net Price	Catalog No.	Net Price	Catalog No.	Net Price	Catalog No.	Net Price		
F-1793	8.65	F-2054	5.85	Type TI - 23s		F2555	8.10	F2712	13.75	F2902	5.60
F-1794	8.65	F-2055	6.30	F-2301	6.25	F2556	8.10	F2713	14.10	F2903	5.60
F-1795	9.00	F-2056	6.80	F-2302	6.25	F2557	8.20	F2714	14.20	F2904	5.60
F-1796	9.45	F-2057	7.05	F-2303	6.25	F2558	8.40	F2715	14.30	F2905	5.80
F-1797	10.00	F-2058	7.25	F-2304	6.25	F2559	8.20	F2716	14.50	F2906	5.80
Type TI - 2s		F-2059	7.35	F-2305	6.25	F2560	8.30	F2717	14.70	F2907	6.00
F-1800	14.20	F-2060	7.70	F-2306	6.25	F2561	8.50	F2718	15.10	F2908	6.00
F-1801	14.20	F-2061	8.00	F-2307	6.75	F2562	8.60	F2719	15.20	F2909	6.00
F-1802	14.20	F-2062	8.20	F-2308	6.75	F2563	8.80	F2720	15.30	F2910	6.30
F-1803	14.20	F-2063	8.45	F-2309	6.75	F2564	8.95	F2721	15.50	F2911	6.60
F-1804	14.20	F-2064	9.75	F-2310	6.75	F2565	9.10	F2722	15.70	F2912	6.60
F-1805	14.65	F-2065	10.80	F-2311	7.50	F2566	9.30	F2723	15.80	F2913	7.30
F-1806	14.65	F-2066	11.00	F-2312	7.50	F2567	9.50	F2724	15.95	F2914	8.30
F-1807	14.65	F-2067	11.40	F-2313	7.50	F2568	9.90	F2725	16.05	F2915	8.30
F-1808	14.65	F-2068	11.65	TYPE TI-24		F2569	10.50	F2726	16.20	F2916	8.40
F-1809	14.65	F-2069	12.00	F2400	5.90	F2570	10.70	F2727	16.50	F2917	8.60
Type TI - 17		F-2100	7.90	F2401	5.90	F2571	10.90	F2728	16.70	F2918	8.80
F-1810	14.65	F-2101	7.90	F2402	5.90	F2572	11.40	F2729	17.00	F2919	8.80
F-1811	14.90	F-2102	7.90	F2403	5.90	F2573	11.60	F2730	17.50	F2920	8.90
F-1812	14.90	F-2103	7.90	F2404	6.05	F2574	12.10	F2731	17.95	TYPE TI-35	
F-1813	14.90	F-2104	7.90	F2405	6.05	F2575	12.40	F2732	18.90	F2950	6.60
F-1814	14.90	F-2105	7.90	F2406	6.05	F2576	12.90	F2733	19.45	F2951	6.90
F-1815	14.90	F-2106	7.90	F2407	6.05	F2577	13.40	F2734	20.40	F2952	7.20
Type TI - 8 and 8s		F-2107	7.90	F2408	6.30	F2578	13.70	F2735	21.85	F2953	7.40
F-1821	8.65	F-2108	7.90	F2409	6.30	F2579	13.90	F2736	22.50	F2954	7.60
F-1822	8.65	F-2109	7.90	F2410	6.80	F2580	14.20	TYPE TI-31		F2955	7.80
F-1823	8.65	F-2110	7.90	F2411	7.05	F2581	14.20	F2750	14.40	F2956	8.00
F-1824	8.65	F-2111	8.05	F2412	7.25	F2582	14.50	F2751	14.80	F2957	8.10
F-1825	8.65	F-2112	8.05	F2413	7.35	F2583	14.50	F2752	14.90	F2958	8.30
F-1826	8.65	F-2113	8.25	F2414	7.70	TYPE TI-28		F2753	14.90	F2959	8.50
F-1827	8.65	F-2114	8.25	F2415	8.00	F2600	6.75	F2754	14.90	F2960	8.70
F-1828	8.65	F-2115	8.65	F2416	8.20	F2601	6.85	F2755	14.90	F2961	8.90
F-1829	8.65	F-2116	8.65	F2417	8.45	F2602	6.90	F2756	14.90	F2962	9.05
F-1830	8.65	F-2117	9.05	F2418	9.75	F2603	6.95	F2757	14.90	F2963	9.20
F-1831	8.65	Type TI - 18		F2419	10.50	F2604	7.05	F2758	15.05	TYPE TI-36	
F-1832	8.75	F-2140	8.65	F2420	10.80	F2605	7.10	F2759	15.10	F3000	5.90
F-1833	8.85	F-2141	8.65	F2421	11.00	F2606	7.30	F2760	15.20	F3001	5.90
F-1834	9.00	F-2142	8.65	F2422	11.40	F2607	7.40	F2761	15.20	F3002	5.90
F-1835	9.00	Type TI - 19		TYPE TI-25		F2608	7.60	F2762	14.50	F3003	6.00
F-1836	9.00	F-2143	8.65	F2450	7.90	F2609	7.80	F2763	14.80	F3004	6.00
F-1837	9.10	F-2144	8.65	F2451	7.90	F2610	7.20	F2764	15.10	F3005	6.15
F-1838	9.40	F-2145	8.65	F2452	7.90	F2611	7.60	F2765	15.50	F3006	6.30
F-1839	9.50	F-2146	8.65	F2453	7.90	F2612	8.40	F2766	15.80	F3007	6.30
F-1840	9.90	F-2147	8.65	F2454	7.70	F2613	8.50	F2767	16.05	F3008	6.60
Type TI - 3s		F-2148	8.65	F2455	7.70	F2614	8.70	F2768	16.10	F3009	6.60
F-1844	14.25	F-2149	8.65	F2456	7.50	F2615	9.20	F2769	16.20	F3010	6.80
F-1845	14.25	F-2150	8.65	F2457	7.50	F2616	9.40	F2770	16.40	F3011	7.20
F-1846	14.25	F-2151	8.75	F2458	7.30	F2617	9.55	F2771	16.60	F3012	7.40
F-1847	14.25	F-2152	8.85	F2459	7.30	F2618	9.70	F2772	16.80	F3013	7.70
F-1848	14.25	F-2153	9.00	F2460	7.20	F2619	9.90	F2773	17.00	F3014	8.20
F-1849	14.25	F-2154	9.00	F2461	7.10	F2620	10.05	F2774	17.10	F3015	8.50
F-1850	14.25	F-2155	9.20	F2462	7.10	F2621	10.10	F2775	17.40	F3016	8.80
F-1851	14.25	F-2156	9.50	F2463	7.05	F2622	10.20	F2776	17.60	F3017	8.90
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F-1853	14.25	Type TI - 20s		F2465	7.00	F2624	10.50	F2778	18.05	F3550	7.50
F-1854	14.25	F-2180	7.90	F2466	7.05	F2625	10.80	F2779	18.45	F3551	7.50
F-1855	14.25	F-2181	7.90	F2467	7.10	F2626	11.80	F2780	19.00	F3552	7.50
Type TI - 3As		F-2182	7.90	F2468	7.20	F2627	12.20	F2781	19.50	F3553	7.45
F-1856	20.00	F-2183	7.90	F2469	7.20	F2628	12.35	F2782	19.95	F3554	7.40
F-1857	20.50	F-2184	7.90	F2470	7.40	F2629	12.65	F2783	20.90	F3555	7.35
F-1858	20.50	F-2185	7.90	F2471	7.40	F2630	13.30	F2784	21.80	F3556	7.30
F-1859	22.30	F-2186	7.90	F2472	7.60	F2631	14.65	F2785	22.80	F3557	7.25
F-1860	22.80	F-2187	7.90	F2473	7.80	F2632	15.20	F2786	23.80	F3558	7.75
F-1861	22.80	F-2188	7.90	F2474	8.00	F2633	16.15	F2787	24.70	F3559	8.00
F-1862	23.30	F-2189	7.90	F2475	8.40	TYPE TI-29		F2788	27.50	F3560	8.25
F-1863	23.30	F-2190	7.90	F2476	8.80	F2650	8.05	TYPE TI-32		F3561	8.50
Type TI - 15		F-2191	7.90	F2477	9.50	F2651	8.10	F2800	7.40	F3562	8.65
F-1870	7.25	F-2192	7.90	F2478	9.80	F2652	8.20	F2801	7.60	F3563	8.85
F-1871	7.25	F-2193	7.90	F2479	9.95	F2653	8.20	F2802	7.80	F3564	9.00
F-1872	7.25	Type TI - 21s		F2480	10.20	F2654	8.20	F2803	8.40	F3565	9.10
F-1873	7.25	F-2201	6.40	F2481	10.50	F2655	8.20	F2804	8.60	F3566	9.30
F-1874	7.25	F-2202	6.40								

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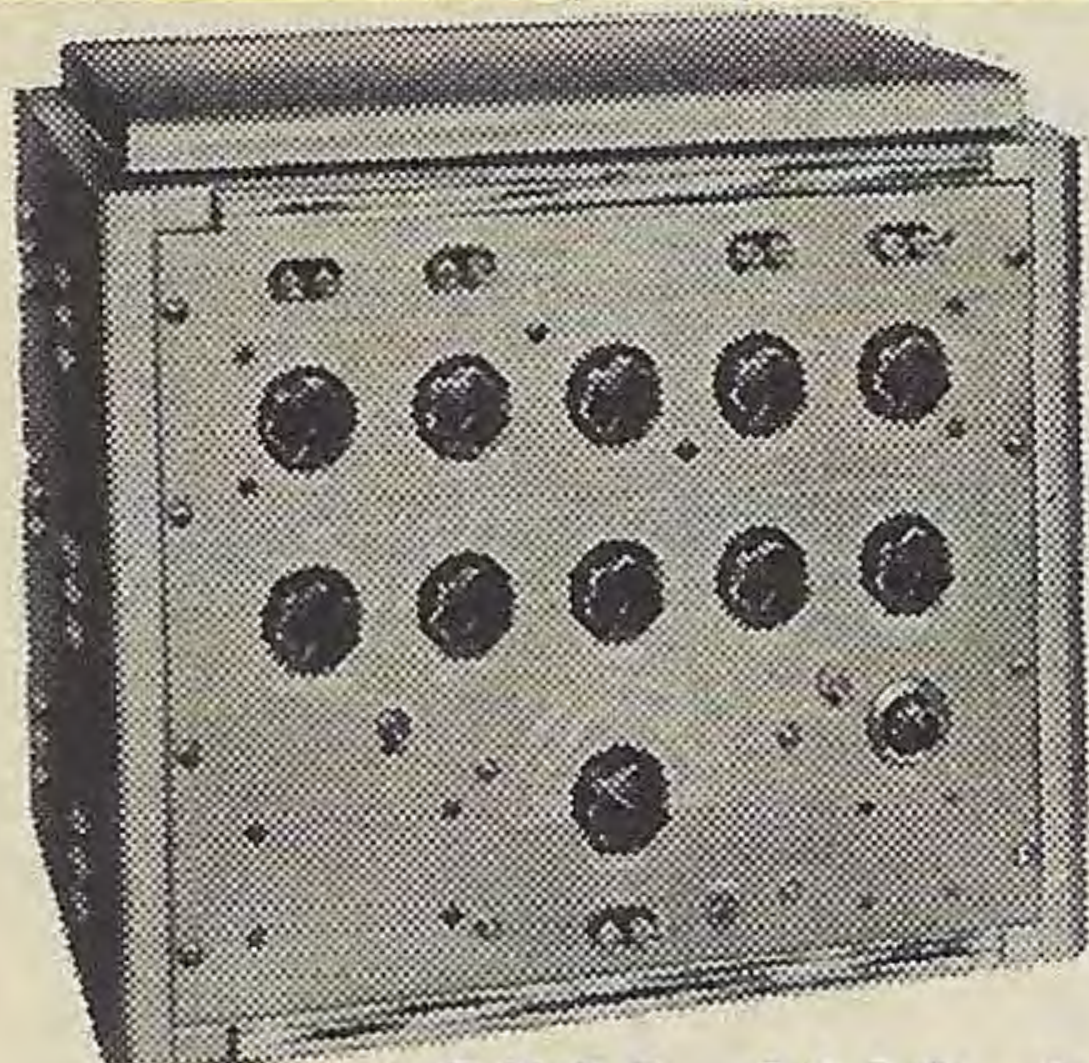
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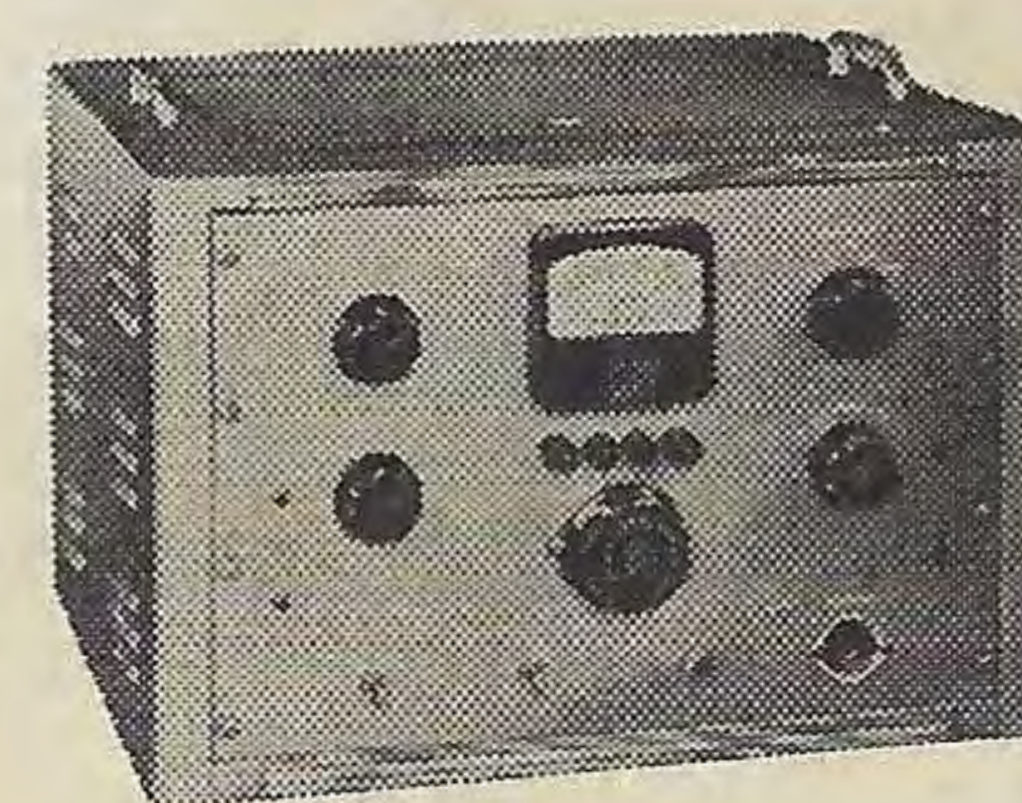
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INCREMENTAL INDUCTANCE BRIDGE



TYPE 1140-A
NULL DETECTOR AMPLIFIER



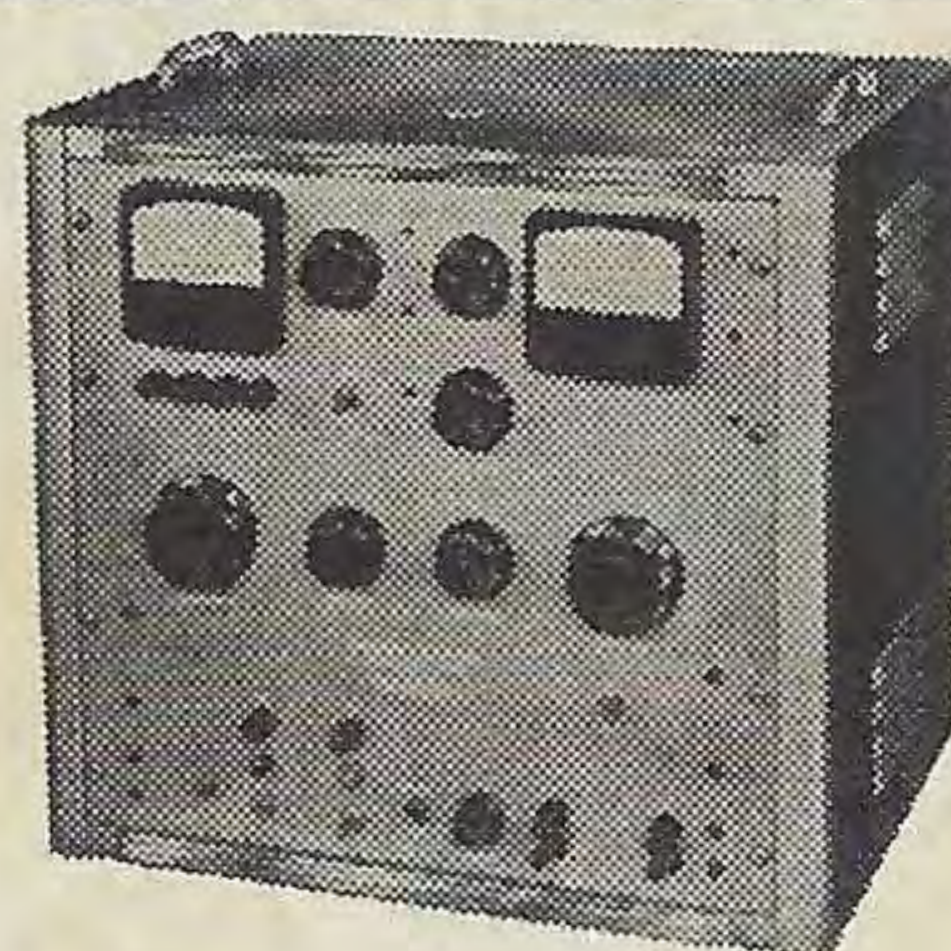
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A.C. SUPPLY



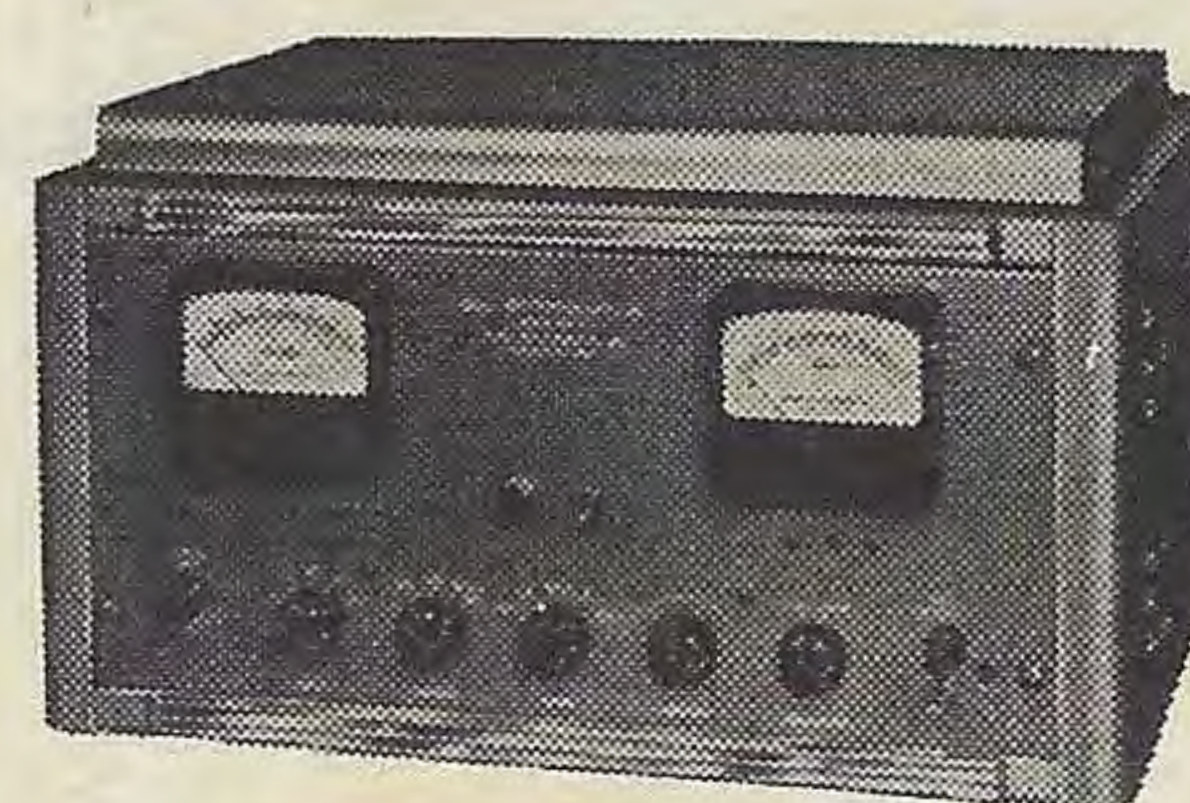
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D.C. SUPPLY



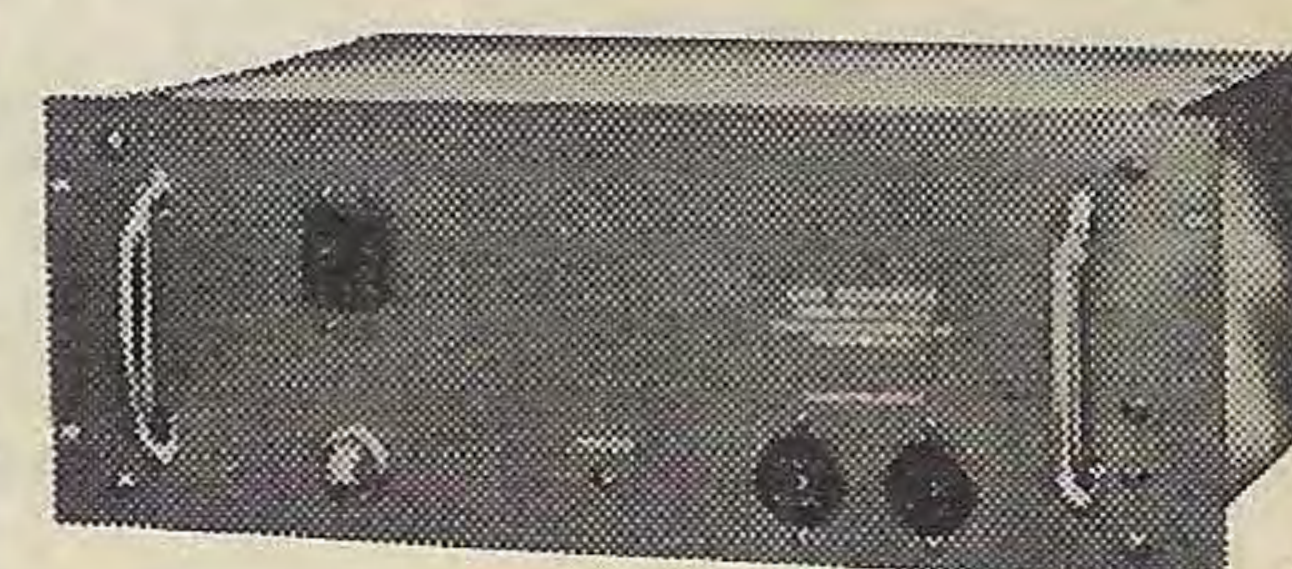
TYPE 1150-A
UNIVERSAL BRIDGE



TYPE 1870 INCREMENTAL
INDUCTANCE COMPARISON BRIDGE



TYPE 1210-A
NULL DETECTOR AND
VACUUM TUBE VOLTMETER



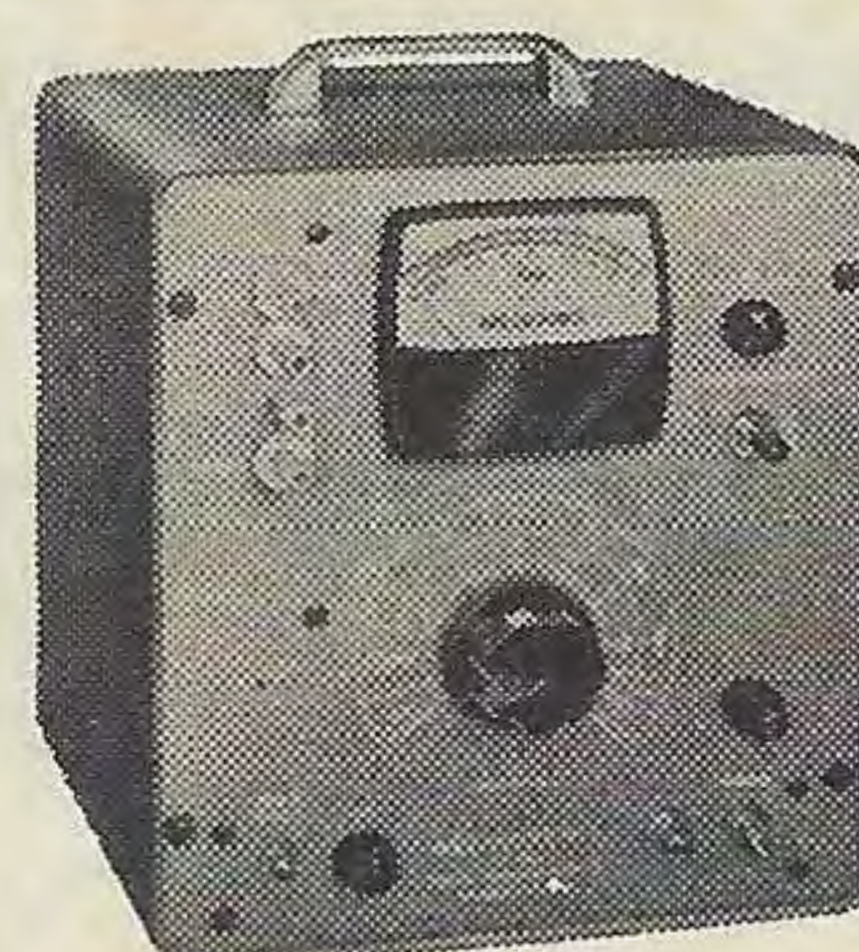
RAC-1.5/3
AC LINE VOLTAGE REGULATOR



TYPE 2030
BATTERY OPERATED
PORTABLE MEGOHMMETER



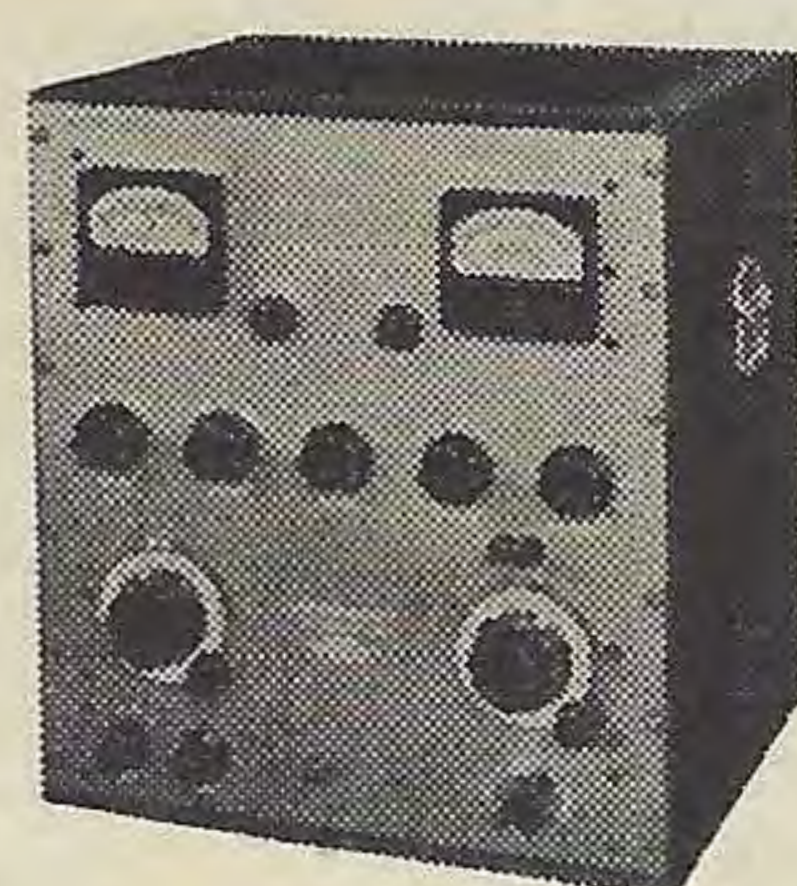
TYPE 1620
VARIABLE TEST
VOLTAGE MEGOHMMETER



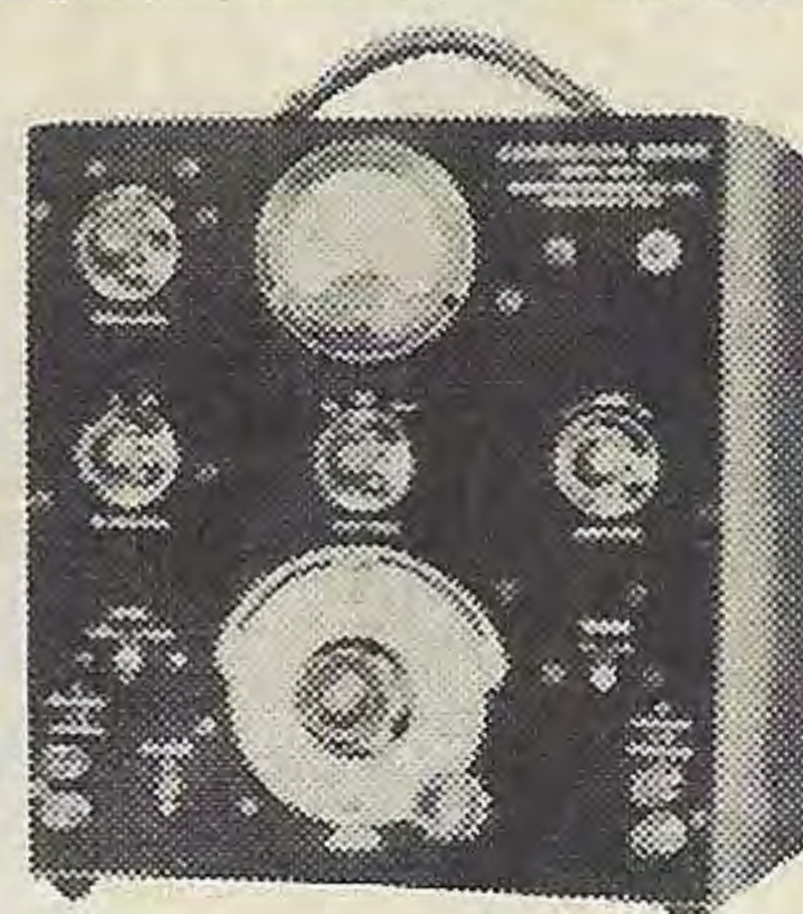
TYPE 1020-C
MEGOHMMETER



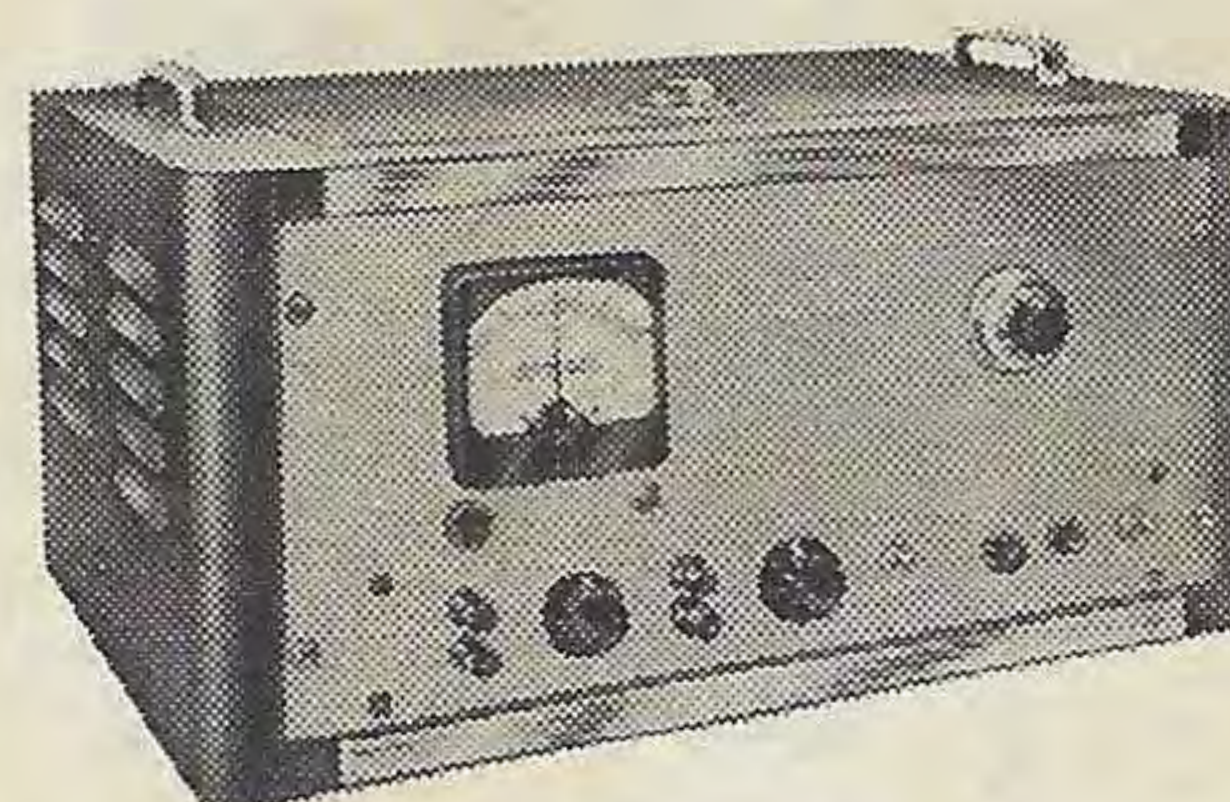
TYPE 2050
NULL DETECTOR (ALL TRANSISTOR)



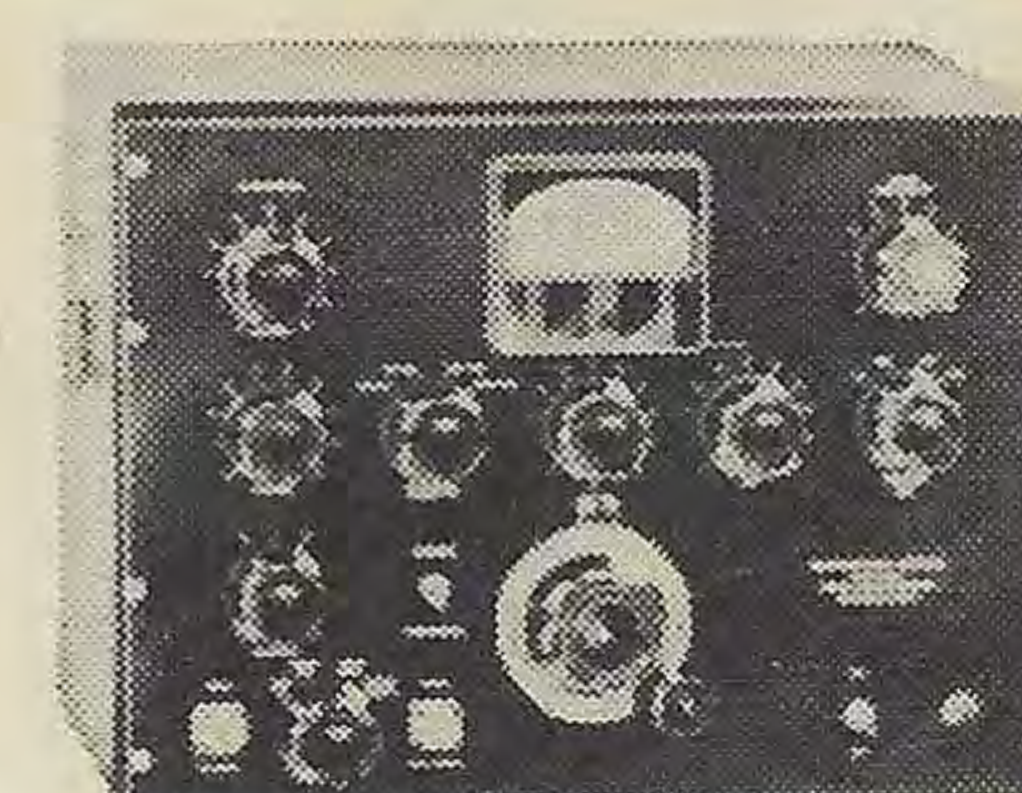
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LOW FREQUENCY "Q" INDICATOR



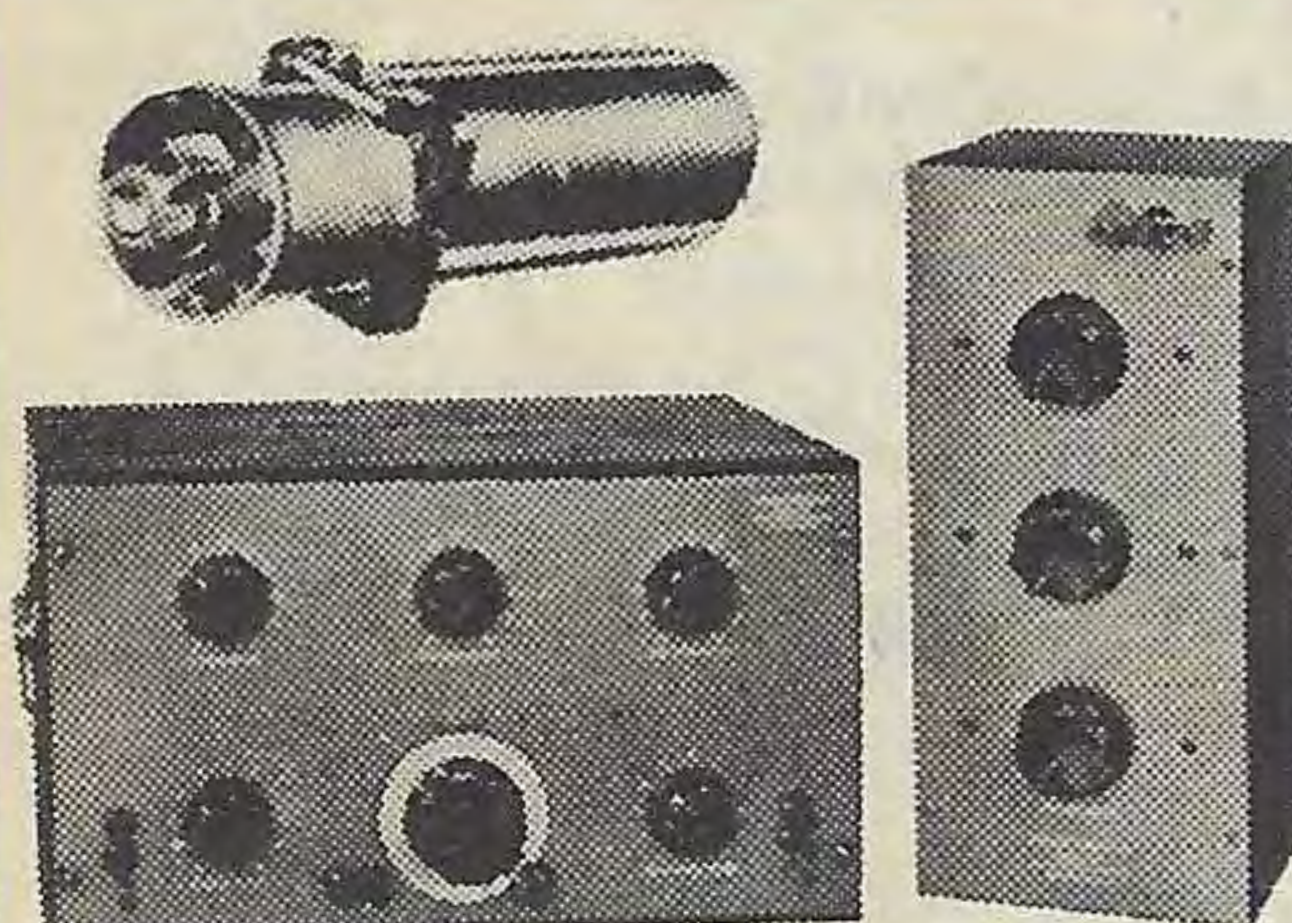
TYPE 1010-A
COMPARISON LIMIT BRIDGE



TYPE 1560
A.C. DIFFERENTIAL VOLTMETER



TYPE 1410
WIDE BAND AND CARRIER
FREQUENCY DISTORTION METER



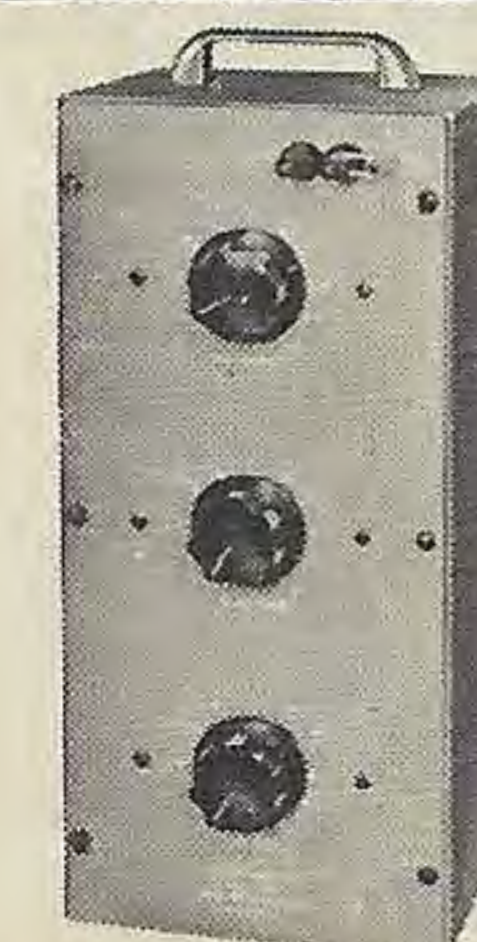
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TYPE 2020
INDUSTRIAL ELECTRONIC COUNTERS



TYPE 2075
NULL DETECTOR



TYPE 1220-1280
DECADE INDUCTORS

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