

GRAPHICAL DETERMINATION OF INPUT IMPEDANCE OF
REPEATING COIL WITH ANY TERMINATING IMPEDANCE

9 $\frac{1}{2}$ E COIL

1. GENERAL

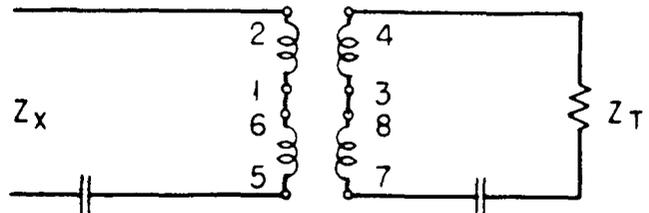
1.01 This section contains transmission characteristics of 9 $\frac{1}{2}$ E repeating coils, and charts for graphically adding the effect of a 9 $\frac{1}{2}$ E coil to, or subtracting it from, any given positive impedance.

1.02 The method of using these charts is given in detail in Section 304-200-100.

1.03 Since capacitors are usually associated with repeating coils, a table of reactances of 1 mf and $\frac{1}{4}$ mf at various frequencies is given below for convenience. The actual values of commercial capacitors may be 8 to 10 per cent higher.

Freq. cps	1 mf	$\frac{1}{4}$ mf
200	-j 796	-j 199
300	-j 531	-j 133
500	-j 318	-j 80
1000	-j 159	-j 40
2000	-j 80	-j 20
3000	-j 53	-j 13

2. COIL CONNECTIONS



2.01 The 9 $\frac{1}{2}$ E is a unity ratio coil; therefore, the charts are also valid for the case in which windings (2-1) (6-5) are interchanged with windings (4-3) (8-7). The capacitors shown in each side are electrically equivalent to and correspond to the units usually furnished at the midpoints of the windings in standard circuits.

3. LIST OF CHARTS

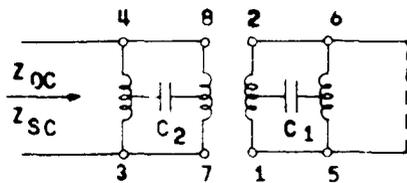
	Chart
200 Cycles per Second	1
300 " " "	2
500 " " "	3
1000 " " "	4
2000 " " "	5
3000 " " "	6

TRANSMISSION CHARACTERISTICS OF 94E REPEATING COILS

MISCELLANEOUS DATA

INNER WINDINGS (2-1) AND (6-5), PARALLEL WOUND, EACH 725 TURNS #30EC, $20\Omega \pm 15\%$
 OUTER WINDINGS (4-3) AND (8-7), PARALLEL WOUND, EACH 725 TURNS #29EC, $20\Omega \pm 15\%$
 SILICON STEEL CORE WITH 30 MIL EQUIVALENT SERIES AIR GAP.
 IMPEDANCE RATIO (4-3) (8-7) TO (2-1) (6-5) = 1:1 ($\pm 4\%$).
 INDUCTANCE UNBALANCE: (2-1) AND (6-5) = 0.3% MAX.; (4-3) AND (8-7) = 0.3% MAX.

BASIC IMPEDANCE MEASUREMENTS



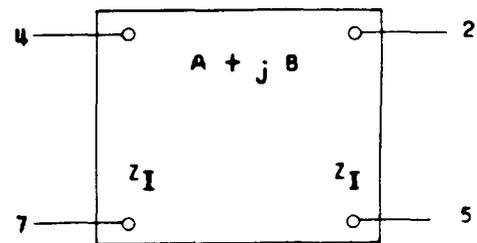
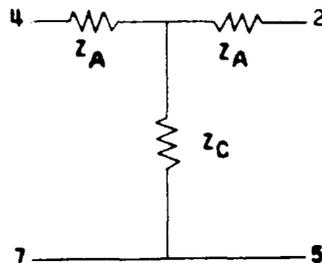
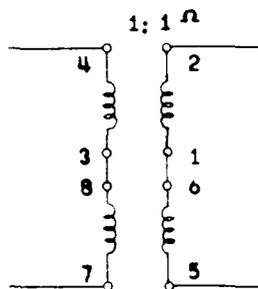
Z_{OC} = OPEN CIRCUIT IMPEDANCE
 Z_{SC} = SHORT CIRCUIT IMPEDANCE
 = $21 + j\omega 0.00295$
 $C_1 = .0056 \mu F$
 $C_2 = .0104 \mu F$

FREQ. CPS	Z_{OC}
	(0.375V. A-C, 0-400 MA D-C)
200	23 + j 217
300	31 + j 316
500	42 + j 463
1000	69 + j 817
1500	106 + j 1168
2000	150 + j 1530
2500	200 + j 1887
3000	262 + j 2240

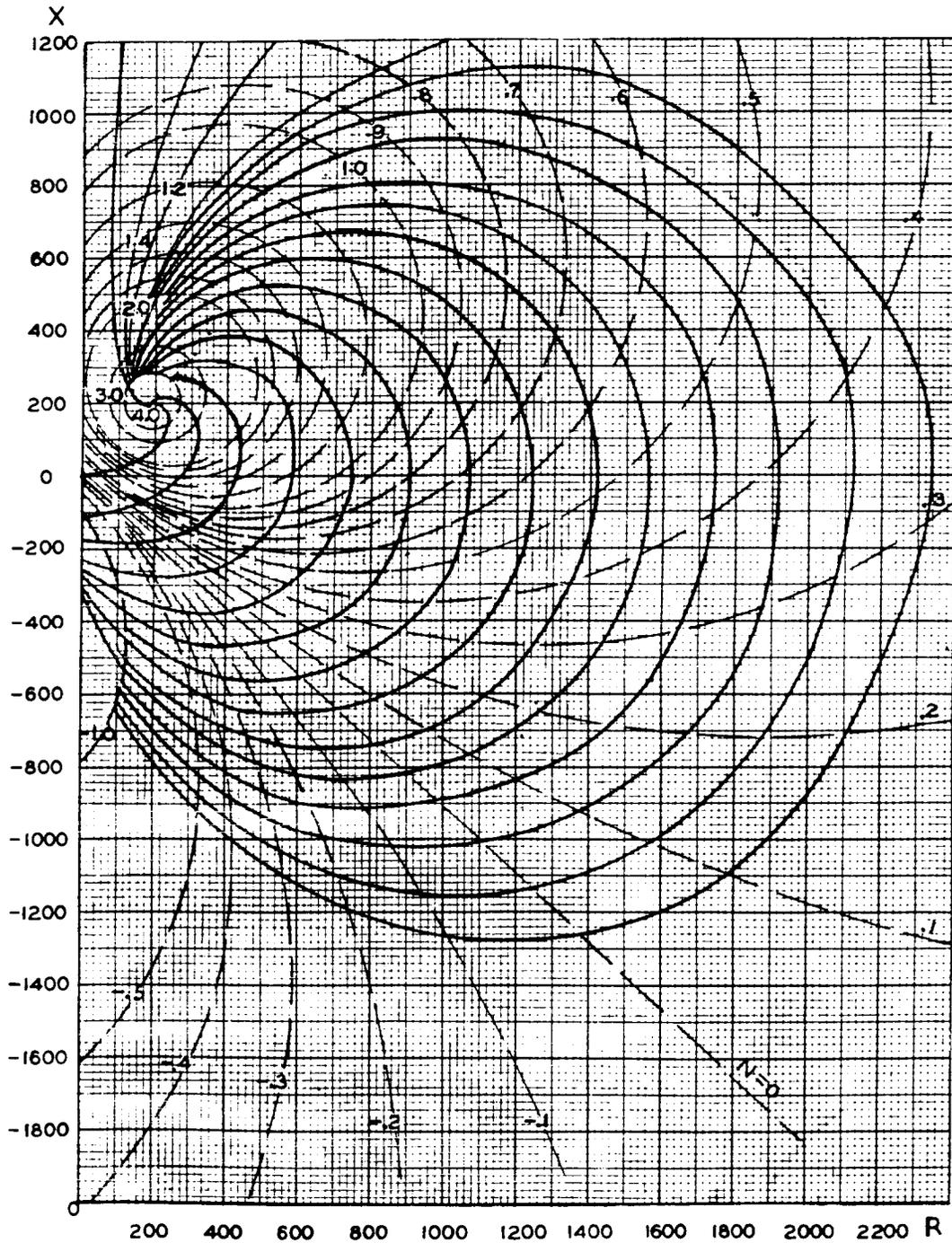
IMAGE PARAMETERS *

FREQ. CPS	EQUIVALENT T NETWORK		TRANSFER CONSTANT			IMAGE IMPEDANCE Z_I
	Z_A	Z_C^*	$A + j B$		A	
			NEP.	RAD.	DB	
200	42 + j 7	50 + j 864	.246 -j .195		2.14	184 + j 200
300	42 + j 11	82 + j 1260	.213 -j .153		1.85	213 + j 254
500	42 + j 19	128 + j 1880	.190 -j .113		1.65	240 + j 342
1000	42 + j 37	277 + j 3500	.165 -j .0668		1.43	283 + j 562
1500	42 + j 56	566 + j 5570	.152 -j .0422		1.32	324 + j 826
2000	42 + j 74	1150 + j 8660	.137 -j .0266		1.19	390 + j 1158
2500	42 + j 92	2650 + j 13700	.119 -j .0142		1.03	514 + j 1603
3000	42 + j 111	8610 + j 24600	.0954 -j .0012		0.83	852 + j 2340

* 0.75V. A-C, 0-200 MA. D-C ON (4-3) (8-7)

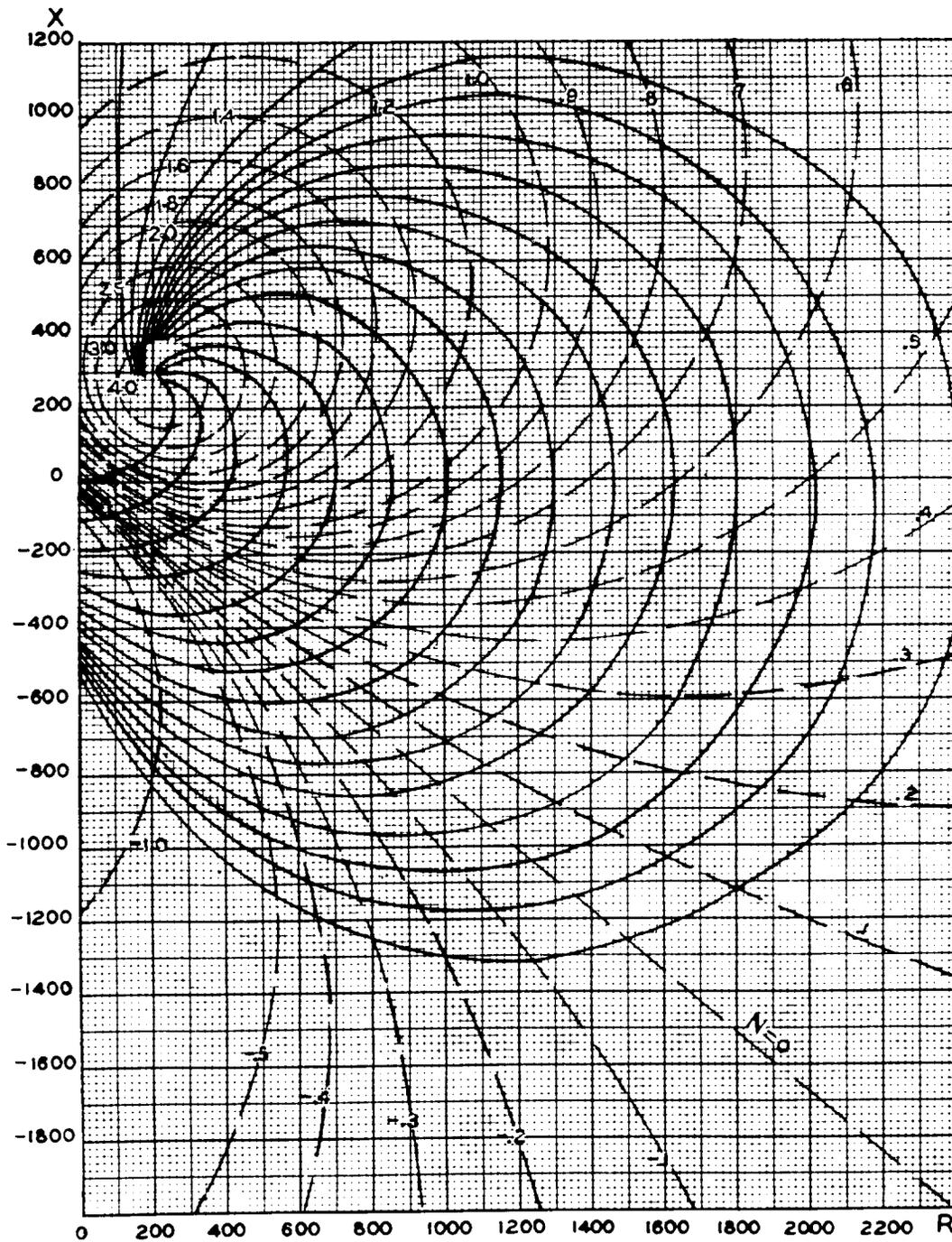


INPUT IMPEDANCE OF 94E REPEATING COIL Chart 1 WITH ANY TERMINATION 200 CPS



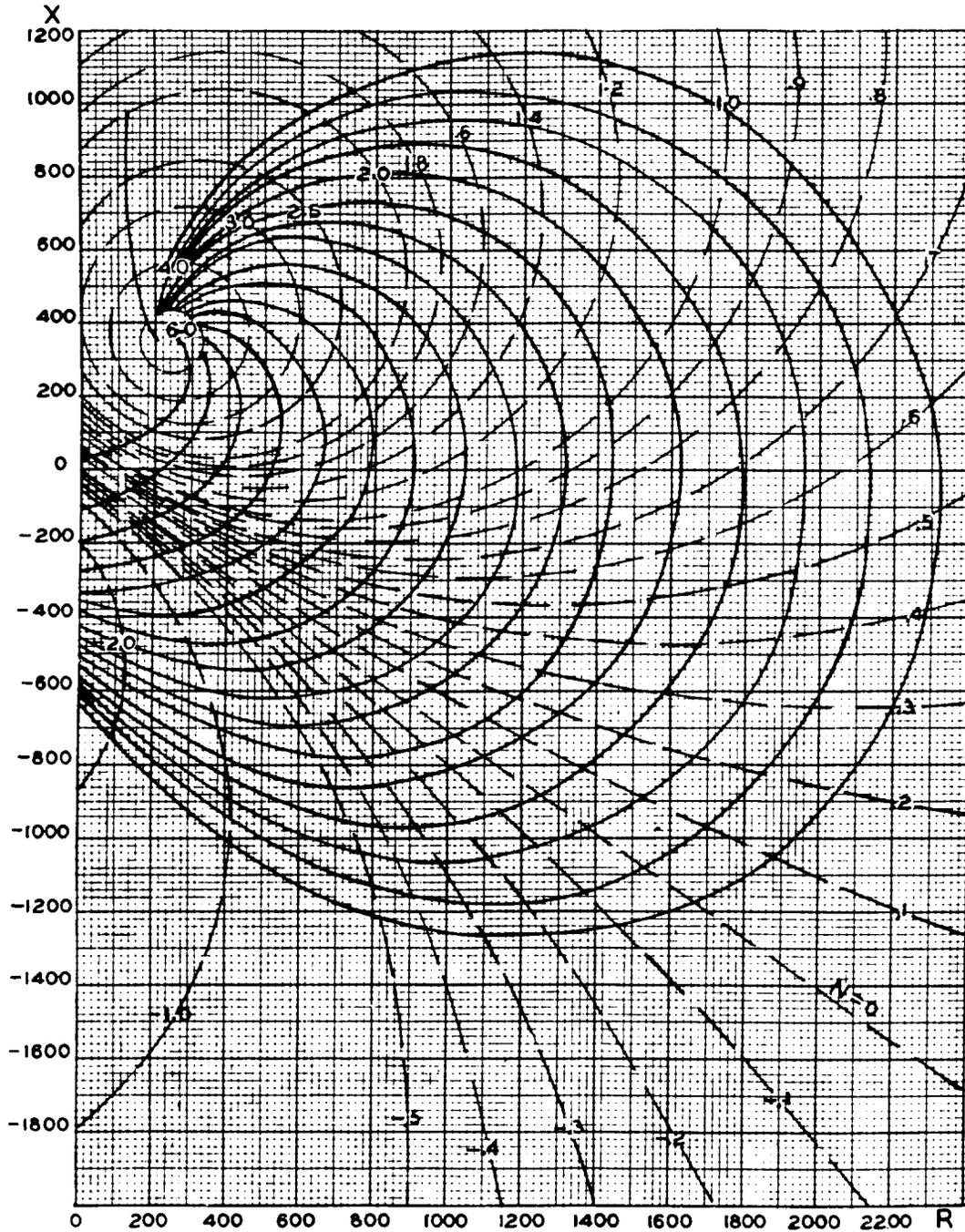
FOR EXPLANATION OF USE OF CHARTS SEE SECTION 304-200-100

INPUT IMPEDANCE OF 94E REPEATING COIL
WITH ANY TERMINATION
300 CPS



FOR EXPLANATION OF USE OF CHARTS SEE SECTION 304-200-100

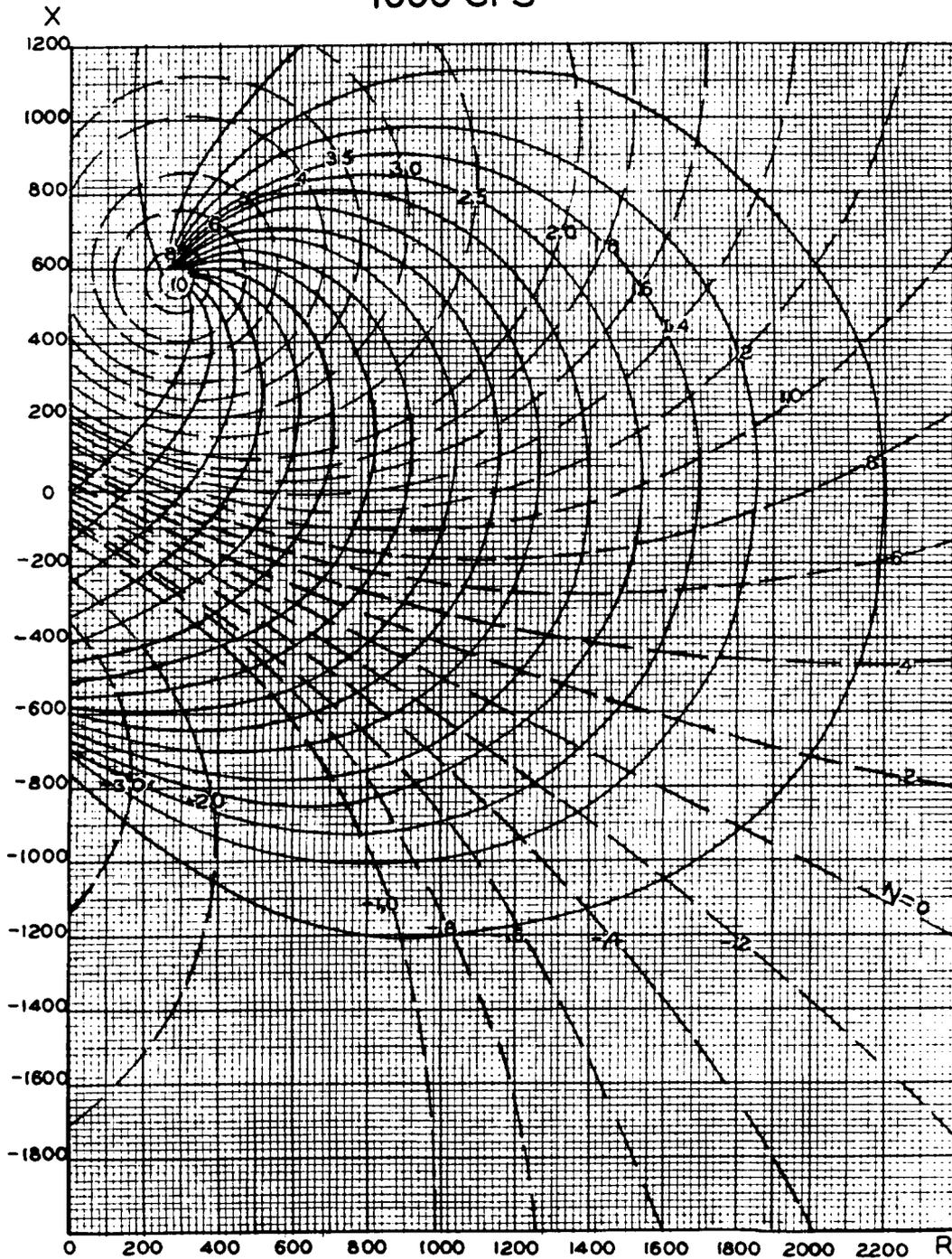
INPUT IMPEDANCE OF 94E REPEATING COIL
WITH ANY TERMINATION
500 CPS



FOR EXPLANATION OF USE OF CHARTS SEE SECTION 304-200-100

Chart 4

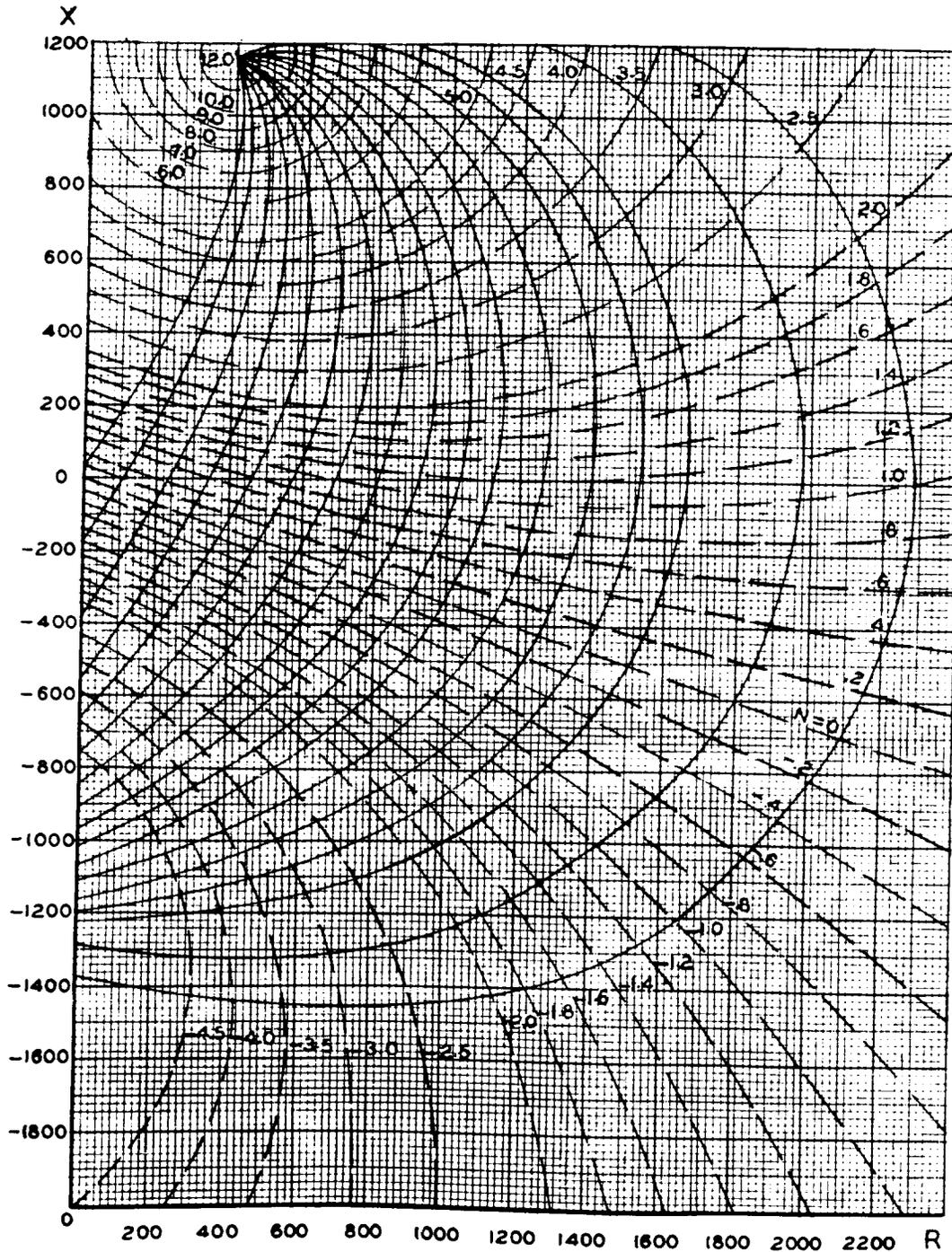
INPUT IMPEDANCE OF 94E REPEATING COIL WITH ANY TERMINATION 1000 CPS



FOR EXPLANATION OF USE OF CHARTS SEE SECTION 304-200-100

INPUT IMPEDANCE OF 94E REPEATING COIL WITH ANY TERMINATION 2000 CPS

Chart 5

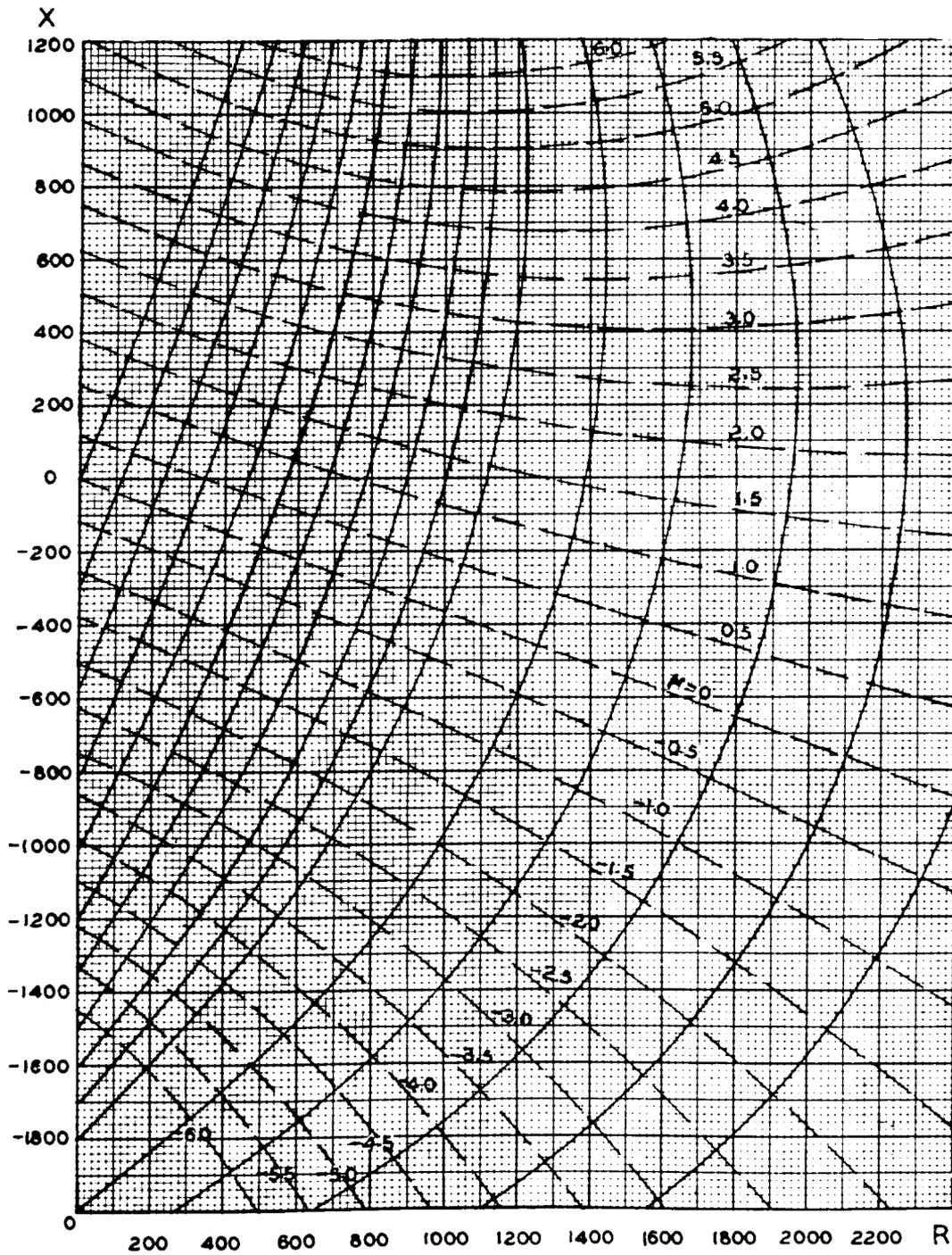


FOR EXPLANATION OF USE OF CHARTS SEE SECTION 304-200-100

INPUT IMPEDANCE OF 94E REPEATING COIL WITH ANY TERMINATION

Chart 6

3000 CPS



FOR EXPLANATION OF USE OF CHARTS SEE SECTION 304-200-100