INSTRUCTIONS

ACCURACY STANDARDS FOR POTENTIAL TRANSFORMERS*

ACCURACY CLASSES FOR METERING SERVICE

The accuracy classification of potential transformers for metering service includes a correlation between ratio correction factor and phase angle so as to show the overall effect on watthour meter registration. The classification is based on the requirement that the transformer correction factor (the correction for overall error due to both ratio error and phase angle) be within the limits specified in Table 3. For any particular accuracy class the ratio correction factor and phase angle must fall within the parallelograms of Figure 1 to keep the transformer correction factor within the limits specified in Table 3. These limits apply over the voltage range of ± 10% of the rated voltage at rated frequency.

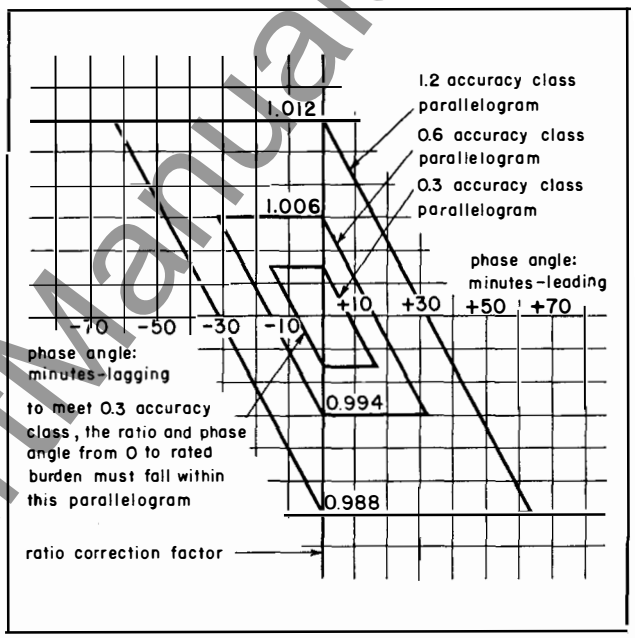
Table 1

METERING ACCURACY CLASSIFICATION

The line numbers are ASA standard accuracy classes (60 cycles).

LINE NUMBER	ACCURACY AT BURDEN				
	W	X	Y	Z	ZZ
1	0.3	0.3	0.3	0.3	0.3
2	0.3	0.3	0.3	0.3	0.6
3	0.3	0.3	0.3	0.3	1.2
4	0.3	0.3	0.3	0.3	...
5	0.3	0.3	0.3	0.6	1.2
6	0.3	0.3	0.3	0.6	...
7	0.3	0.3	0.3	1.2	...
8	0.3	0.3	0.6	1.2	...
9	0.3	0.3	0.6	...	...
10	0.3	0.3	1.2	...	...
11	0.3	0.3	...	...	...
12	0.3	0.6	0.6	1.2	...
13	0.3	0.6	1.2	...	...
14	0.3	0.6	...	...	...
15	0.3	1.2	...	...	...
16	0.3	...	...	...	...
17	0.6	0.6	1.2	...	...
18	0.6	1.2	...	...	...
19	0.6	...	...	...	...
20	1.2	...	...	...	...

NOTE: A single line in this table defines the accuracy classes at five burdens.



Ratio correction factor and phase angle of potential transformer are limited, as shown in parallelograms above, by transformer correction factor limits listed in Table 3. Limits apply from 10% below to 10% above rated primary voltage at rated frequency and from zero burden on the transformers to the rated burden on 120-volt basis.

FIG. 1. Parallelograms

For example, the overall correction will never exceed .3% for a transformer in the 0.3 accuracy class. If the ratio correction factor is 1.003 the maximum allowable phase angle, from Figure 1, is —15.6 minutes. The transformer correction factor is:

$$TCF = RCF + \frac{\gamma}{2600}$$

$$= 1.003 + \frac{-15.6}{2600}$$

$$= .997$$

The corresponding ratio correction factor and phase angle for any point inside the 0.3 class parallelogram will always give a transformer correction factor between .997 and 1.003.

*Reference—Parallelogram Fig. 13.037 of A.S.A. Standards C-57.

OPERATION IN WYE AT UNDERVOLTAGE

Transformers of line-to-line voltage rating (Group 2 Table 13.016 ASA C57.13) are commonly connected in wye and operate continuously at $1/\sqrt{3}$ times their rated primary voltage. The accuracy volt-ampere rating based on this lower voltage rating will be only ⅓ of normal value.

If one line becomes grounded the transformer will be operating at full voltage. The transformer can be operated at full voltage without excessive heating if the nameplate thermal burden rating is not exceeded. This means that the volt-ampere burden at the reduced voltage must be kept to ⅓ the original thermal rating, if the nameplate rating is not to be exceeded under line fault conditions. The insulation is, however, stressed $\sqrt{3}$ times normal, and operation under line fault conditions must be on an emergency basis. (See Technical Data 44-060, Page 35.)

NAMEPLATE MARKING

According to ASA Standard C57.13, Par. 13.075 the manufacturer shall specify on the nameplate a reference to a data sheet or instruction book which will give such information as accuracy classification, application data or any other information of general use in the application of potential transformers. Therefore, on the transformer nameplate a line number from Table 1 specifies the accuracy classes at five burdens.

Example: Designation on nameplate
Rating Leaflet No. I.L. 44-060-2-1.

Table 2

STANDARD BURDENS

BURDEN DESIGNATION	SECONDARY VOLT-AMPERES+	BURDEN POWER FACTOR
W	12.5	0.10
X	25	0.70
Y	75	0.85
Z	200	0.85
ZZ	400	0.85

+At 120 volts for secondary winding or 69.3 volts for tertiary winding.

Table 3

LIMITS OF TRANSFORMER CORRECTION FACTOR (TCF)

ACCURACY CLASS	MINIMUM	MAXIMUM	LIMITS OF POWER FACTOR OF METERED LOAD—LAGGING	
			MINIMUM	MAXIMUM
1.2	0.988	1.012	0.6	1.0
0.6	0.994	1.006	0.6	1.0
0.3	0.997	1.003	0.6	1.0

WESTINGHOUSE ELECTRIC CORPORATION
SHARON PLANT • TRANSFORMER DIVISION • SHARON, PA.
Printed in U.S.A.

Instructions for Accuracy Standards for Potential Transformers *

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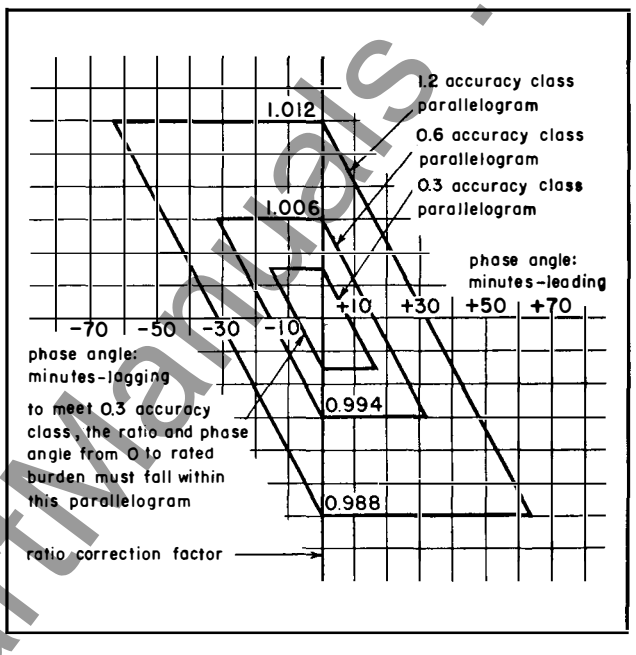

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METERING ACCURACY CLASS FROM TABLE 1

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Westinghouse Electric Corporation
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