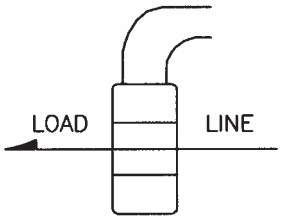
APPLICATION GUIDE

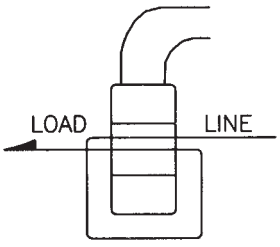
Primary Turn Ratio Modification

The nameplate of the current transformer is based on the condition that the primary conductor will be passed once through the transformer opening. The rating can be reduced in even multiples by looping this conductor two or more times through the opening. A transformer having a rating of 200 to 5 amperes will be changed to 50 to 5 amperes if four loops or turns are made with the primary cable as illustrated.



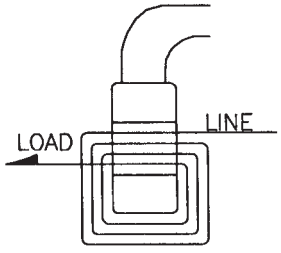
1 Primary Turn

NAMEPLATE RATIO	ACTUAL RATIO
100:5	100:5
150:5	150:5
200:5	200:5
300:5	300:5
400:5	400:5
500:5	500:5
600:5	600:5
800:5	800:5



2 Primary Turns

NAMEPLATE RATIO	ACTUAL RATIO
100:5	50:5
150:5	75:5
200:5	100:5
300:5	150:5
400:5	200:5
500:5	250:5
600:5	300:5
800:5	400:5



4 Primary Turns

NAMEPLATE RATIO	ACTUAL RATIO
100:5	25:5
150:5	37.5:5
200:5	50:5
300:5	75:5
400:5	100:5
500:5	125:5
600:5	150:5
800:5	200:5

Secondary Turn Ratio Modification

Formula: $\frac{Ip}{Is} = \frac{Ns}{Np}$

Where:
Ip – Primary Amperage
Is – Secondary Amperage
Np – Number of Primary Turns
Ns – Number of Secondary Turns

Example: A 300:5 Current Transformer –

$$\frac{300\ p}{5\ s} = \frac{60\ s}{1\ p}$$

(In practicality one turn is dropped from the secondary as a ratio correction factor).

The ratio of the current transformer can be modified by altering the number of secondary turns by forward or backwinding the secondary lead through the window of the current transformer.

By adding secondary turns the same primary amperage will result in a decrease in secondary output. By subtracting secondary turns the same primary amperage will result in greater secondary output.

Again using the 300:5 example adding five secondary turns will require 325 amps on the primary to maintain the 5 amp secondary output or

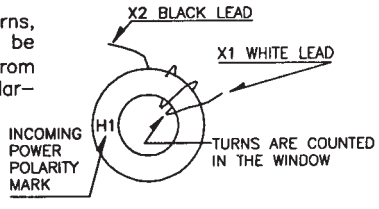
$$\frac{325\ p}{5\ s} = \frac{65 s}{1\ p}$$

Deducting 5 secondary turns will only require 275 amps on the primary to maintain the 5 amp secondary output or

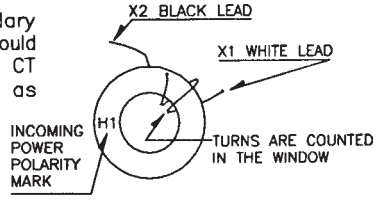
$$\frac{275\ p}{5\ s} = \frac{55 s}{1\ p}$$

The above ratio modifications are achieved in the following manner:

To add secondary turns, the white lead should be wound through the CT from the side opposite the polarity mark.



To subtract secondary turns the white lead should be wound through the CT from the same side as the polarity mark.



TECHNICAL DATA

CURRENT TRANSFORMERS RATIO MODIFICATION

Relatively large changes in ratio may be acheived through the use of primary turns, For example:

TABLE 6

CT RATIO	NUMBER OF PRIMARY TURNS	MODIFIED RATIO
100:5A	2	50:5A
200:5A	2	100:5A
300:5A	2	150:5A
100:5A	3	33.3:5A
200:5A	3	66.6:5A
300:5A	3	100:5A
100:5A	4	25:5A
200:5A	4	50:5A
300:5A	4	75:5A

A primary turn is the number of times the primary conductor passes through the CT's window. The main advantage of this ratio modification is you maintain the accuracy and burden capabilities of the higher ratio. The higher the primary rating the better the accuracy and burden rating.

You can make smaller ratio modification adjustments by using additive or subtractive secondary turns. For example if you have a CT with a ratio of 100:5A.. By adding one additive secondary turn the ratio modification is 105:5A, by adding on subtractive secondary turn the ratio modification is 95:5A. Subtractive secondary turns are acheived by placing the "X1" lead through the window from the H1 side and out the H2 side. Additive secondary turns are acheieved by placing the "X1" lead through the window from the H2 and out the H1 side. So, when there is only one primary turn each secondary turn modifies the primary rating by 5 amperes. If there is more than one primary turn each secondary turn value is changed (i.e. 5A divided by 2 primary turns = 2.5A). The following table illustrates the effects of different combinations of primary and secondary turns:

TABLE 7

CT RATIO 100:5A

PRIMARY TURNS	SECONDARY TURNS	RATIO ADJUSTMENT
1	−0−	100:5A
1	1+	105:5A
1	1−	95:5A
2	−0−	50:5A
2	1+	52.5:5A
2	2−	45.0:5A
3	−0−	33.3:5A
3	1+	34.97:5A
3	1−	31.63:5A