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.
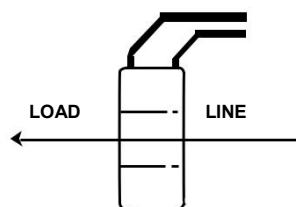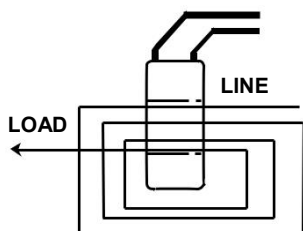

1 Primary Turn

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
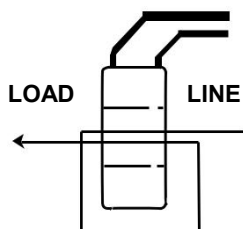
2 Primary Turns

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: A300:5 Current Transformer
$$\frac{300p}{5s} = \frac{60s}{1p}$$

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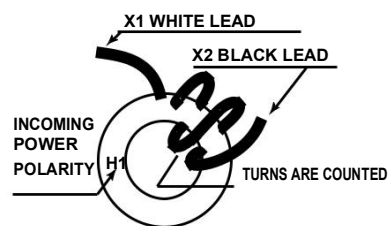$$\frac{325p}{5s} = \frac{65s}{1p}$$

Deducting 5 secondary turns will only require 275 amps on the primary to maintain the 5 amp secondary output or:
$$\frac{275p}{5s} = \frac{55s}{1p}$$

The above ratio modifications are achieved in the following manner:

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

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