Guidance when ordering summation current transformers

Summation current transformers are suitable for the summation of several synchronized alternating currents with similar phases but with differing load phase shifts. It is also possible to have the summation of currents with varied nominal voltages of similar phase positions. These measurements cannot be used for tariff applications, as the existing voltage differences are recorded as errors.

With the counter connection of the main transformer to the summation current transformer, it is possible to receive secondary currents which are proportional to the differences of the primary input currents.

The built-in technical know-how enables the summation current transformers to add secondary currents of varying nominal transmissions from the main transformer.

The secondary connections of each main transformer are connected to the allocated primary inputs of the summation current transformers.

The number of windings of individual partially wound primary circuits of the summation current transformer is proportionally aligned to the ratio of the primary nominal current of the corresponding main transformer, and to the sum of the nominal currents of all the summation current transformers being connected to the main transformer.

For the visual display of the current, a measuring unit can be used with a measuring range similar to the secondary nominal current of the summation current transformers.

It is irrelevant for the main transformers with similar nominal transmission ratios, to which primary circuit of the summation current transformer the connection is made.

With main transformers of different nominal transmission ratios, care must be taken to adhere to the assigned connection to the terminals of the summation current transformers.
Is the current flow in the main transformer interrupted, the secondary circuit of the main transformer must neither be short-circuited nor be connected to the summation current transformer, or to the main transformer.

Summation current transformers with unallocated primary circuits must remain open for a later connection to an additional main transformer. The secondary output current of the summation current transformer is in this instance lower than the secondary nominal current of the summation current transformer by a quantity equal to the ratio of the primary nominal current of this ”missing“ main transformer and the sum of all the primary nominal currents of the main transformer.

The nominal secondary current of a main transformer must be equal to the nominal primary current of the input allocation of the summation current transformer.

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Please find below an example for the correct selection of measuring components for summation current transformers.

Example:

Actual situation:	3 transmission ratios	1000 / 5 VA
		800 / 5 VA
		600 / 5 VA
	Overall current	2400 / 5 VA
Burden:	– 1 current meter – 1 power recorder	
Looking for:	1 summation current transformer and the VA power of an individual main transformer	

Required active performance of the summation current transformer:

Current meter	1.5 VA
Performance recorder	7.0 VA
Measurement conductor loss	1.5 VA
consumption P_o summation ct	4.0 VA
Interim result	14.0 VA

The individual transformer must provide it's VA share from this 14.0 VA corresponding to its ratio to the "total transmission".

Consideration must also be given to the respective power loss between the main transformer and the summation transformer plus other possible losses.

1. Main transformer 1000 / 5A $\frac{1000}{2400}$ x 14.0 = 5.83 VA + additional possible losses

2. Main transformer 800 / 5A $\frac{800}{2400}$ x 14.0 = 4.67 VA + additional possible losses

3. Main transformer 600 / 5A $\frac{600}{2400}$ x 14.0 = 3.50 VA + additional possible losses

The VA values of the main transformers are to be rounded up to the corresponding VA values in our charts.

The ratio of the primary current of a main transformer to the sum of the primary currents of all main current transformers the ratio must not exceed 1:8.

Important indication to the power measuring

Too many rising deviation can prevent the measuring transformer acting as a current transformer from fulfilling its protective function with regard to the connected measuring units, as in normal operation its functions is well below its saturation limit, and in the event of over currents, the saturation limit is reached considerably later and takes the function almost as a protection current transformer.

If there is too much of a decrease, the measuring transformer, as a result of the continuous excess demands will reach the saturation limit too soon and indirectly function as a switch, rendering a measuring impossible.