

# Knowledge base No. 002

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Current transformer special applications

# Knowledge base information

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02			
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## 1 Description

This document provides some information for the application of the external current transformers (CT's) which are used to measure the load- or line-side currents.

Please read the general description of using CT's in the Installation and Operation manual first.

## 2 Use of 1A current transformers (instead of 5A)

The recommended secondary CT output-current is 5 Amps. This is the measurement-range of the AHF-internal data acquisition.

It is possible to use CT's with 1 Amp secondary output. Note, however, that the measurement accuracy in that case is 1/5 of what it would be using a 5A CT.

In most applications, however, one may not be able to detect a difference in performance between utilization of a 5A and 1A CT.

If you use a 1A CT please

- Use a CT with a ratio suitable for the application and corresponding to the maximum current. The CT-ratio should not be higher than absolutely necessary.
- Make sure to set the correct ratio for parameter P310, because the ratio in P310 is based on CT's with a **5A** secondary current.

**Table 1: Examples for parameter setting using a 1A CT**

Used 1A CT	Correct value for P310
500 : 1A	2500 : 5A
1000 : 1A	5000 : 5A

### 3 CT setting for the case of using a step-up transformer

If an AHF is used with a step-up transformer, and the CT's are placed on the high-voltage side the ratio of CT's has to be adapted to the step-up transformer-ratio. The following figure gives an example:

#### Note

Please note the permissible rated ECOsine<sup>®</sup> Active voltages and line frequencies when designing this type of compensation system.

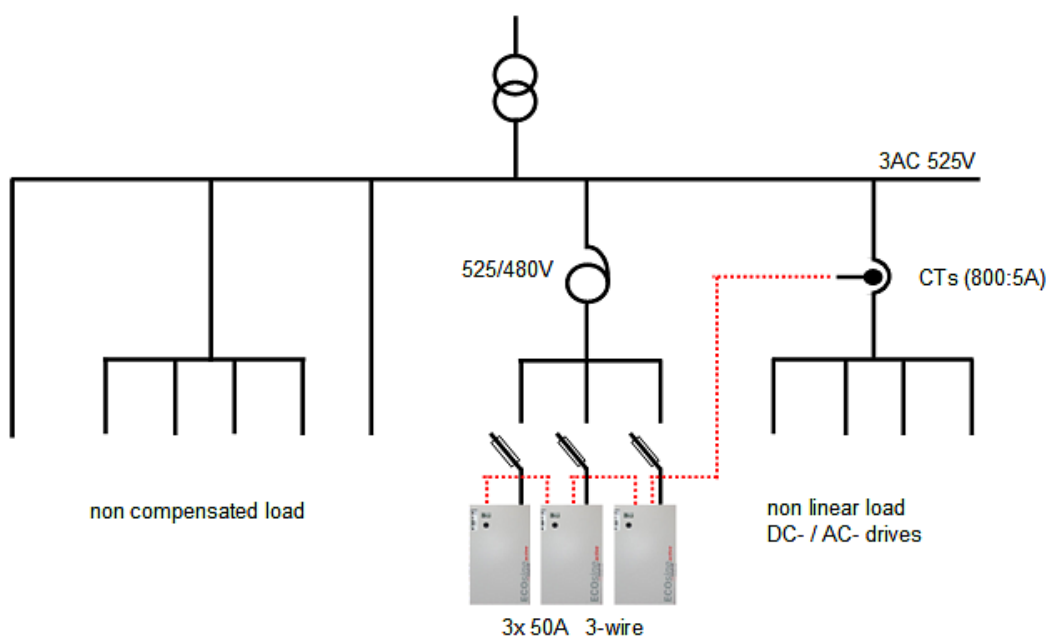


Fig. 1: Application example for using of output transformer

Table 2: Parameter setting for application example

Parameter no.	Value	Note
P300	loadside	position of CT
<b>P310</b>	<b>875 : 5A</b>	<b>adapted ratio of CT (800*525V/480V)</b>
P320	150A	parallel current (3*50A)

## 4 Parallel operation of AHF units with CT's placed on the AC-line side

### 4.1 Supply with one feeding transformer

In case of parallel operation of more than 1 AHF and the CT's placed on the AC-line side it is necessary to provide additional cancellation CT's and summation CT's to form the equivalent of the load-side current. **The ratios of the summation CT's must be adapted to the ratio of the AC-line side CT's and the ratio of the cancellation CT's as you may have chosen different current-ratios for both.** The following figure gives an example. Other CT ratios are possible.

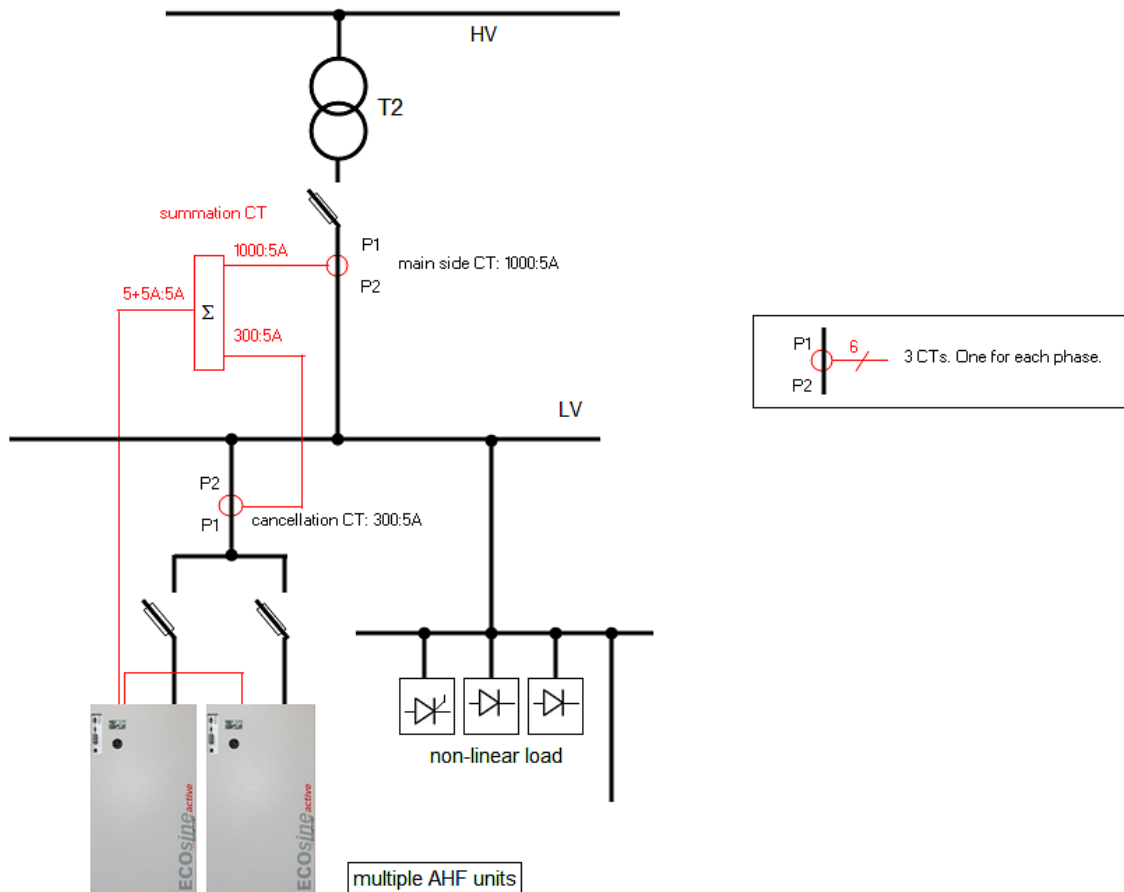
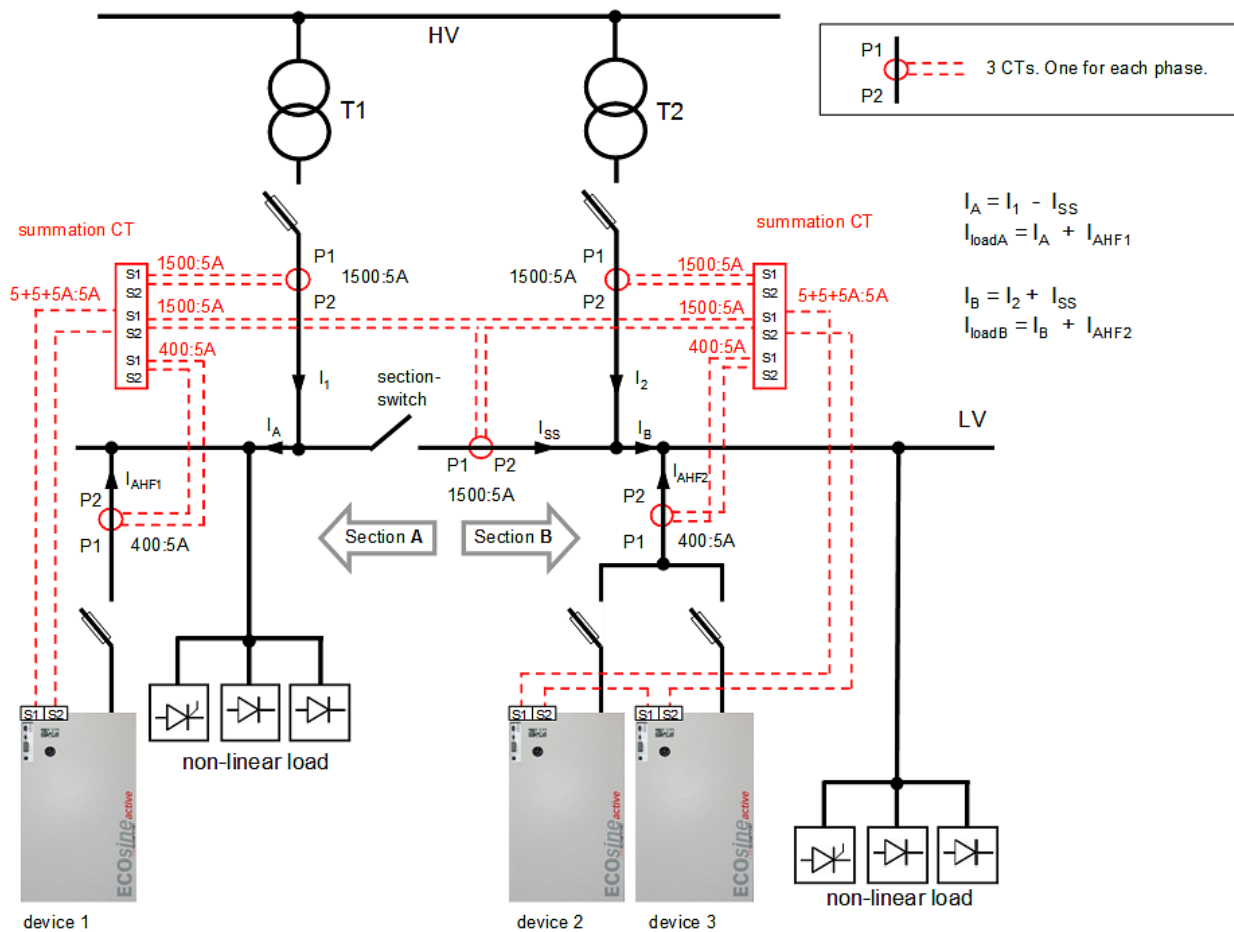


Fig. 2: Application example for parallel operation of 2 AHF (50A) with CT's on the AC-line side

**Table 3: Parameter setting for application example parallel operation**

Parameter no.	Value	Note
P300	loadside	position of CT (load current is calculated by summation of current signals)  <b>Please note the correct direction of the cancellation CT's (from AHF P1 to load P2!)</b>
P310	1300 : 5A	adapted ratio of CT (1000A+300A)
P320	100A	parallel current (2*50A)

#### 4.2 Supply with two independent feeding transformers



**Fig. 3: Application example for parallel operation of 2+1 AHF (each 50A) with CT's placed on the AC-line side and two independent transformers**

**Table 4: Parameter setting for application example parallel operation**

Parameter no.	Value	Note
P300	loadside	position of CT (load current is calculated by summation of current signals)  <b>Please note the correct direction of the cancellation CT (from AHF P1 to load P2!)</b>
<b>P310</b>	<b>3400 : 5A</b>	<b>adapted ratio of CT (1500A+1500A+400A)</b>
P320	50A (set in device 1) 100A (set in device 2 and 3)	parallel current

## 5 Combination of AHF and PFC units with main CT's placed on the AC-line side

If there is no possibility to place CTs somewhere downstream (neither for AHF nor for PFC) the following CT wiring can be a solution.

### 5.1 PFC in combination with one AHF unit

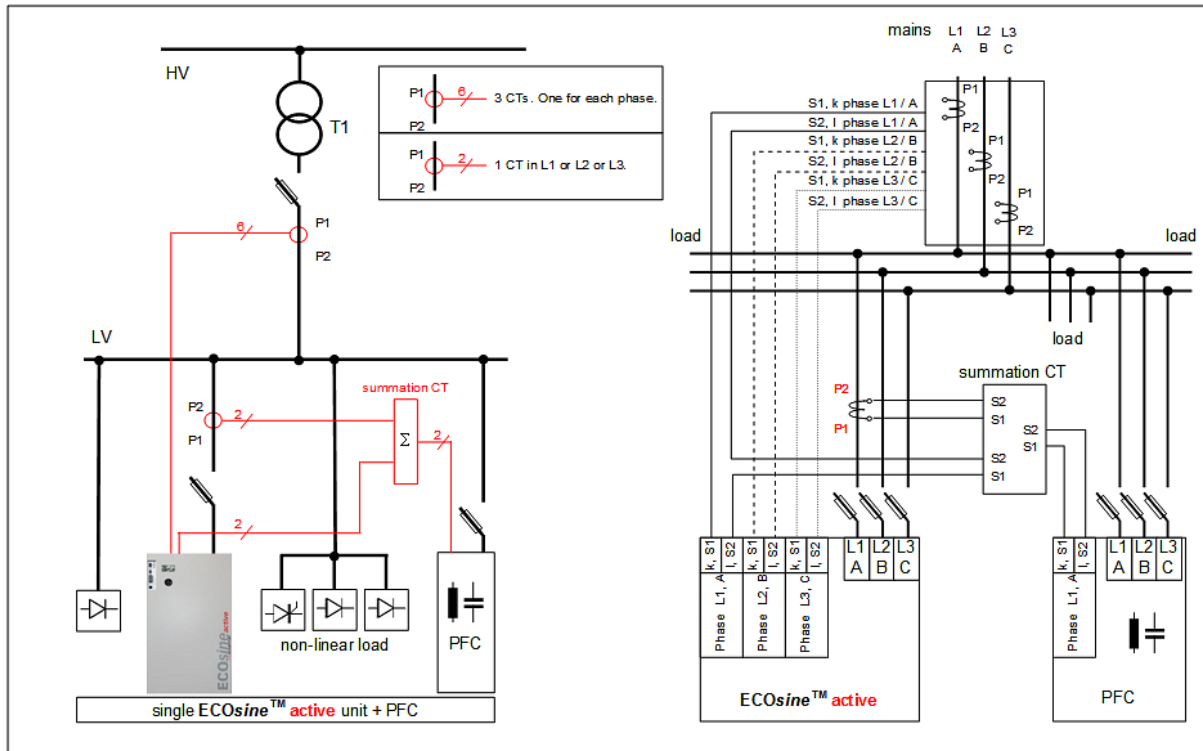
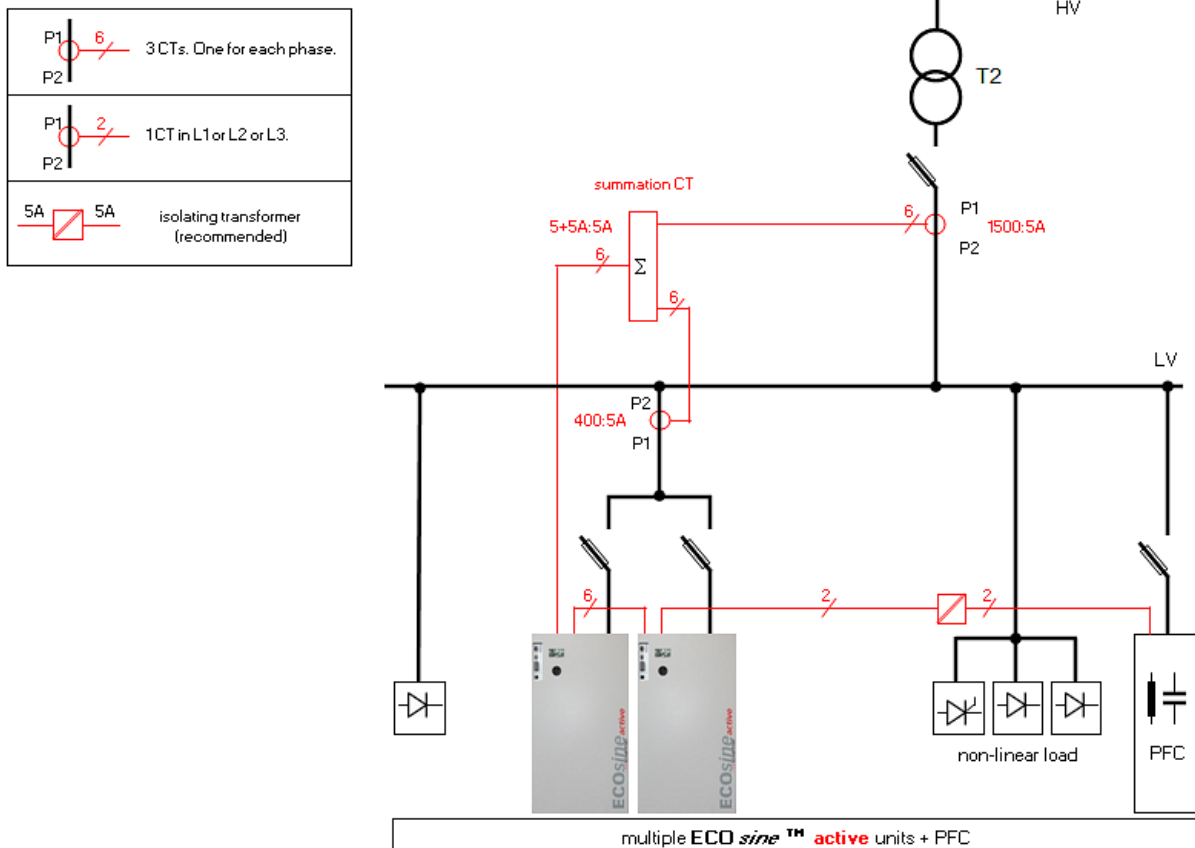


Fig. 4: Application example for one AHF with CT's placed on the AC-line side and PFC system



## 5.2 PFC in combination with multiple AHF units

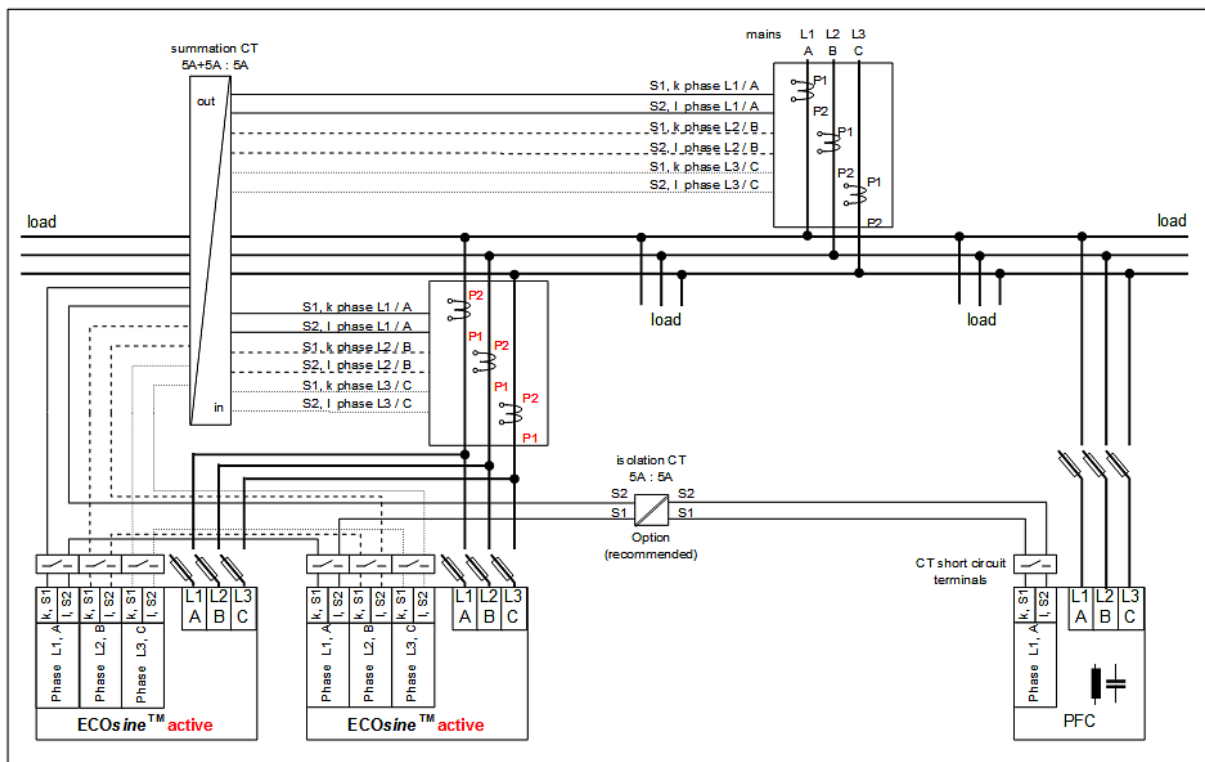
In case of parallel operation of more than 1 AHF and the CT's placed on the AC-line side it is necessary to provide additional cancellation CT's and summation CT's to form the equivalent of the load-side current. **The ratios of the summation CT's must be adapted to the ratio of the AC-line side CT's and the ratio of the cancellation CT's as you may have chosen different current-ratios for both.** The following figure gives an example. Other CT ratios are possible.



**Fig. 5: Application example for parallel operation of 2 AHF (each 50A) with main CT's placed on the AC-line side and PFC system**

**Table 5: Parameter setting for application example PFC in combination with multiple AHF units**

Parameter no.	Value	Note
P300	loadside	position of CT (load current is calculated by summation of current signals)  <b>Please note the correct direction of the cancellation CT (from AHF P1 to load P2!)</b>
P310	1900 : 5A	adapted ratio of CT (1500A+400A)
P320	100A (set in each device)	parallel current



**Fig. 6: Wiring diagram for Application example running 2 AHF in parallel operation (each 50A) with main CT's placed on the AC-line side and PFC system**