

Averaging Transformer type FAVT & Summation Current Transformer

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1. INTRODUCTION

The output voltage of power transformers with dual secondary windings and a single primary connected tap changer is dependent on the load connected to each secondary winding. When the tap changer is operated the voltage on both secondary windings is altered. If a voltage control relay is used to control the voltage levels a decision must be made regarding the best reference to use for voltage control purposes.

For maximum flexibility and overall accuracy the AVERAGE of the secondary voltage levels gives the best operational value for the control voltage.

2. AVERAGING VOLTAGE TRANSFORMER

The SuperTAPP controls power system voltage and protects the connected customers against abnormal voltage levels resulting from incorrect tap change operation.

In the case of dual secondary windings an average measuring voltage is derived from a voltage transformer on each secondary winding connected into an interposing transformer arrangement, the single output from which is connected to the measuring input of a SuperTAPP relay.

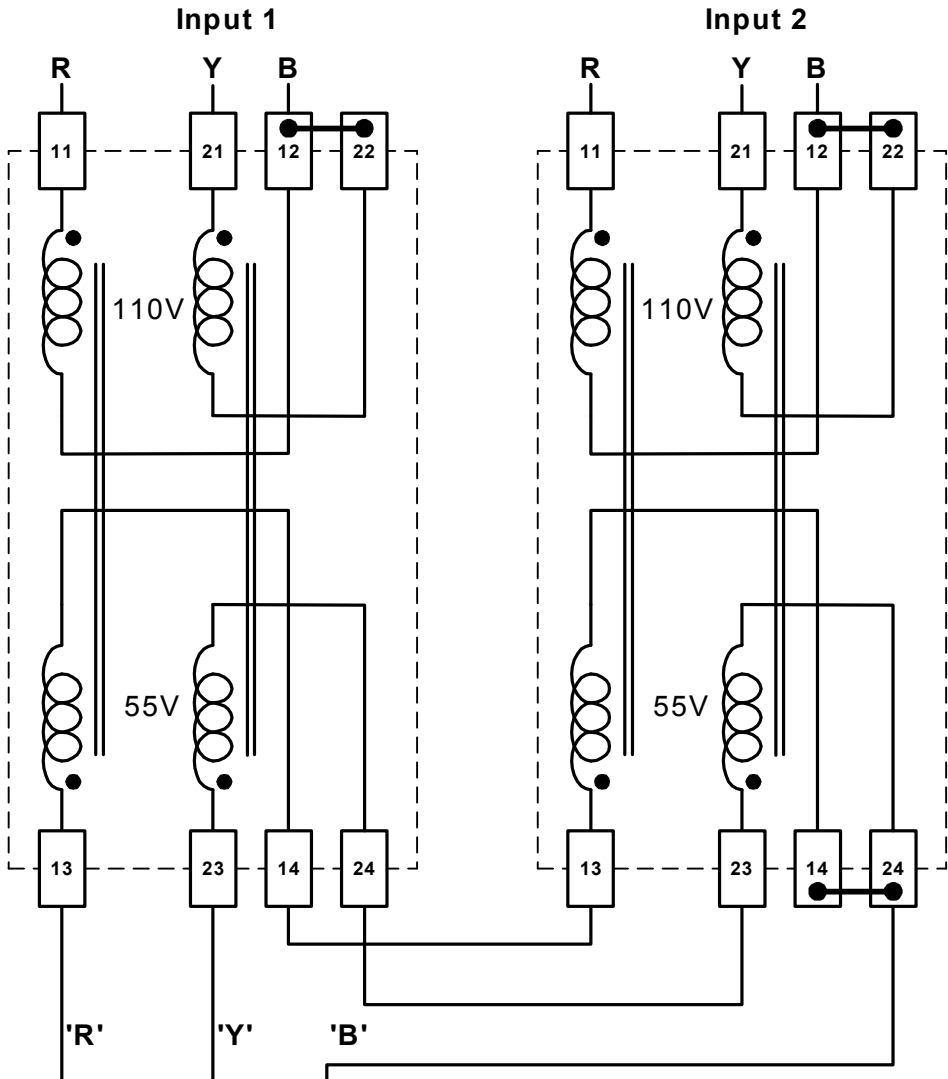
The averaging arrangement consists of two FAVT modules connected in an open delta configuration as shown below in figure 1.

The specification for each averaging voltage transformer module is:

Primary Voltage	110V nominal but with an upper continuous rating of 140V
Secondary Voltage	With 110V at primary the secondary design output is 55V $\pm 1.0\%$ with a 3VA load. All units produced have comparable outputs at this burden, each within $\pm 0.25\%$ of any other unit
Full Load Rating	50VA
Temperature Range	-40°C to +70°C
Connections	32/0.2mm (1.0mm ²) black flexible leads 300mm length

The operational burden of the RVM/5m with the RTMU/1m is 6VA.

When one of the two secondary windings are taken off load the averaging module connections should be re-arranged such that both inputs to the averaging transformer are selected to the winding that remains on load.



3 phase voltage average output to SuperTAPP or MicroTAPP

Figure 1

If single phase VTs are to be used for voltage measurement a single FAVT averaging module can be re-configured, as shown below in figure 2 to give an average single phase voltage output from the two single phase VTs.

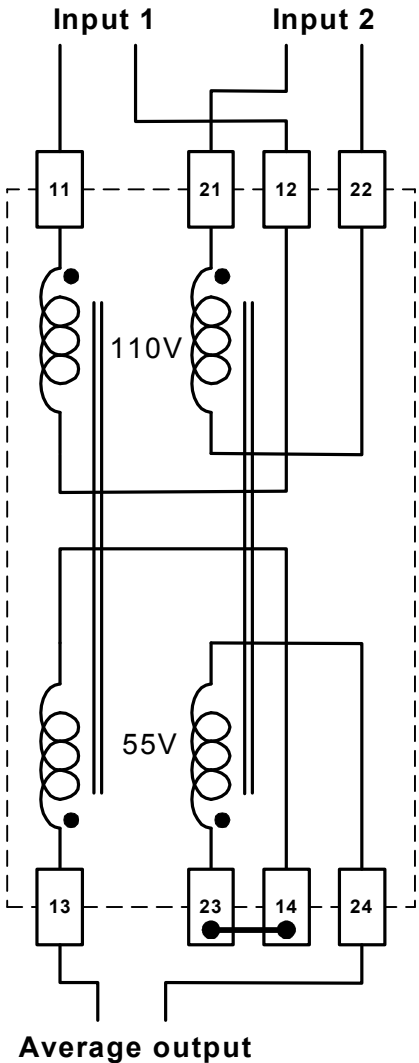


Figure 2

3. CURRENT SUMMATION TRANSFORMER

Depending on the CT ratios and secondary output an interposing current transformer may be required.

CT secondary	Summation Transformer
0.5 Amp	None, the CTs are paralleled and connected to the 1 Amp input of the SuperTAPP relay
1 Amp	1+1=1 summation transformer (Type A)
5 Amp	5+5=1 summation transformer (Type B)

The specification for each summation transformer is:

Type A for use with 1A Current Transformers

Input 1	1A
Input 2	1A
Output	1A with 1A applied to each input
Load Rating	10VA Continuous at 2A on each input 10A on each input for 3 seconds
Temperature Range	-40°C to +70°C
Connections	50/0.25mm (2.5mm ²) black flexible leads 300mm length

Type B for use with 5A Current Transformers

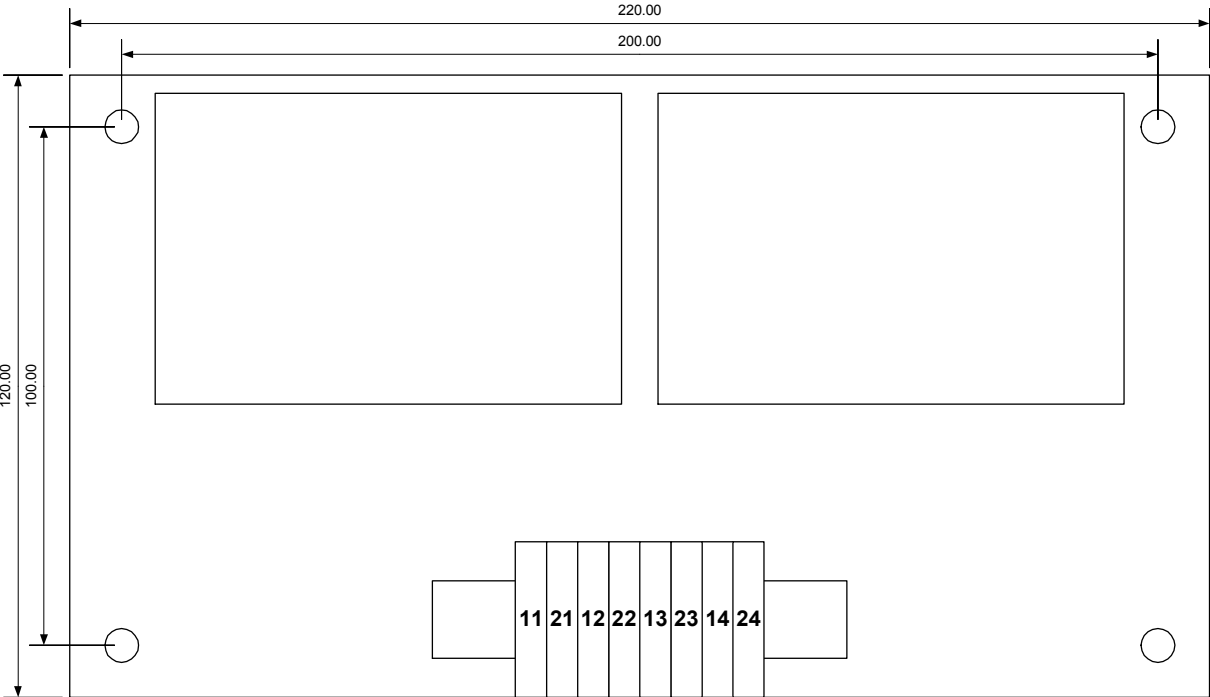
Input 1	5A
Input 2	5A
Output	1A with 1A applied to each input
Load Rating	10VA Continuous at 10A on each input 50A on each input for 3 seconds
Temperature Range	-40°C to +70°C
Connections	50/0.25mm (2.5mm ²) black flexible leads 300mm length

Each voltage control system requires four averaging voltage transformers and possibly one current summation transformer if CTs with 1Amp or 5Amp LDC secondary outputs are used.

4. MECHANICAL

The averaging VT arrangement is to be mounted on a single board and pre-wired to a 'klippon' type connector strip. The approximate dimensions of each unit will be 220mm x 120mm x 80mm (W x H x D).

Averaging VT & Summation CT



Height above baseplate is 75mm