



VEBKO ONLINE HELP

Transducer Test

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1 Imported Content

To perform a transducer test, AMT Transducer & Meter room can be used. This room consists of two main windows of "Test View" and "Transducer Characteristic". In this section, it is possible to test single-phase and three-phase transducers with symmetric performance characteristics (such as active and reactive power characteristics) or asymmetrical ones.

To begin the test, the user needs to double-click on „Transducer“ option after completing the data in „Device“ section in „General Test Object“ window.

On "Transducer Properties" page, it is possible to view a set of "Functions". For a transducer test, the user can select from among functions such as active power, reactive power, apparent power, frequency, current, voltage, power factor, load factor, phase (in degrees), mean current, DC current, DC voltage, DC power and line to line voltage. Some of these parameters can be measured in single-phase state, some in three-phase state while some can be measured in both states. In accordance with the transducer type and its manufacturer company, this equipment can have different inputs and even in some cases, several inputs simultaneously. Finally, these inputs will be converted into analog signals. On the other side, the transducers can also have binary outputs which are activated as soon as the specified characteristic goes past a certain limit. In some other cases, it is possible to use the output binary signals as a counter that produces a pulse based on the measured energy.

The type of output received from the transducer is specified in "Output" section. To test transducers and in accordance with their output, it is possible to take their output current and DC voltage to the inputs of the device for measurement by selecting "Current" or "Voltage" option. Otherwise, "Pulse" option can be selected so that the number of pulses are recorded. "Open Loop" option makes it possible to record the values in transducers that only display the output on the screen that is located in front of the user. So a window asking the user to enter the values manually appears.

The connection related to the current transformers is specified in "CT Starpoint Connection" section. Since normally active power flows from the busbar toward the line, "Toward Line" option is selected. Selecting "Toward Line" is in accordance with the injection of active power from the device into the equipment. If "Toward Busbar" is selected, 180 degrees are added to the current angle.

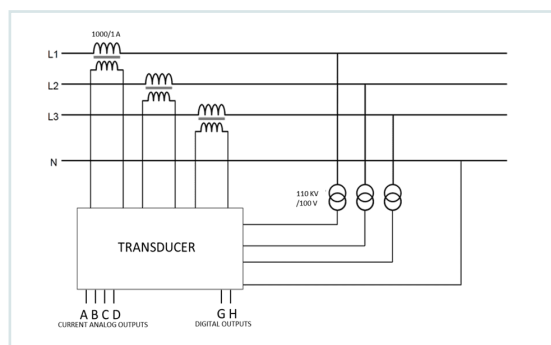


Figure 1

Connection of a sample transducer to CT and PT

In "Full scale error reference" section, it is possible to specify the reference for recording the error which is specified as a range from zero to maximum or from negative to positive maximum. If the characteristic is asymmetrical, the range is from zero to maximum and if it is symmetric, both options can be selected for error calculation. Before this, in the video related to offload test of the meter a complete explanation about error calculation has been provided.

In "Tolerance" section, the error value can be entered in form of an absolute or a relative value and the default values are 1 millipulse and 0/25 percent. In the end, a comparison is made between these two values and the greater value is selected as the allowed error value.

About transducers, before anything, the accuracy class for different characteristics of power, current, voltage to frequency must be specified. This factor is obtained using the calculations and relations that are available in the manual of the transducer.

In „Number of phases“ section, it is specified whether the transducer is single-phase or three-phase.

The test characteristic is specified in „Characteristic Definition“ section. Since the transducer characteristic can be either linear or non-linear, symmetric and asymmetric options are available for „Characteristic Type“. Moreover, it is possible to select the appropriate option in accordance with the features of the transducer from „Linear“, „Compound“, and „Quadratic“.

To specify energy "Import" and "Export" values, "Symmetrical" option can be checked so that a different characteristic from both sides is available. The minimum value for the input and output of the transducer is specified in "Minimum Value" field. If the compound performance characteristic option is selected, Knee Point needs to be specified as well. In fact, this point divides the characteristic into two parts with different ranges. The maximum value for the input and output of the transducer is specified in "Maximum Value" field. Also, the range of the performance characteristic is specified in "Saturation Range" field.

It should be noted that by using „Primary“ and „Secondary“ options at the top of the page, it is possible to enter the values in form of primary or secondary in accordance with the type of the meter which should be done considering the CT and PT turns ratio. „Relative“ and „Absolute“ options are used to display the relative or absolute value of the elements. After entering the values, „OK“ is selected to continue with the test.

"After completing the information in "Transducer Properties" section, "Hardware Configuration" needs to be examined. By opening this window, the user can see that the current and voltage outputs are adjusted by default. Also, in "Binary/Analog Input" tab it can be seen that binary #9 is considered for measuring the output milliampere by default. However, if necessary, it is possible to use any other

binaries of the device. After applying the changes, by clicking on “Ok”, the changes are saved. To perform the test, the user only needs to specify the intended binary inputs and then begin the process of measuring the voltage and current elements in order to compare them with the transducer characteristic.

Here we are going to perform the sample test on a transducer. The transducer is of the S3-WRD series which is a sample for reactive/active power measurement or watt/var. This transducer has a 0.2 percent accuracy for the output rate. The S3-WRD series is available in three different models of S3-WRD-1, S3-WRD-3 and S3-WRD-3A. Their difference is in how they are used in single-phase and three-phase systems as well as three-wire and four-wire systems..

Also, it is possible to use these transducers with 1 and 5 amps input currents as well as a vast variety of voltage inputs. The model we are analyzing is S3-WRD-3 and a picture of its wiring can be seen in the following.

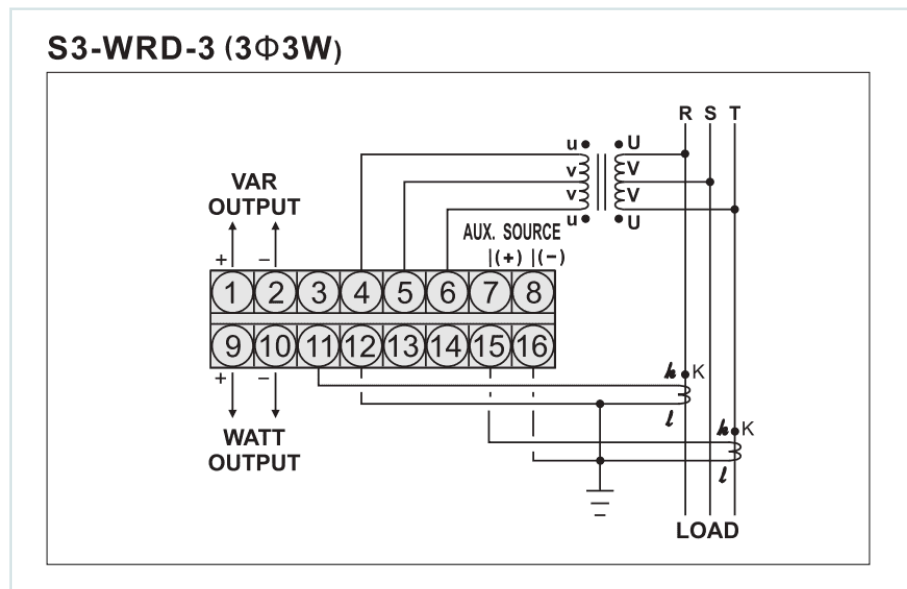


Figure 2

For example, for a 230 watt (var) output, this transducer gives a 4 milliamper output with 1 amp of input current and 132 volts of input voltage. If the output power is zero we will have 12 milliamperes and if it is 230 watts, we will have 20 milliamperes in the output. Considering these values and the linear characteristic of the transducer, it is time to test this equipment.

In the first step, by running the AMPro software, we enter the AMT Transducer & Meter environment. Before anything, by clicking on “Test Object Parameters”, the information related to the transducer is entered in “Device” section. This information includes the title/explanation for the transducer, the manufacturer company, type of the device, installation location of the equipment and the serial number. In “Nominal Values” section, values related to CT secondary and PT are entered in accordance with how the test is performed.

Now, after accepting these items, by double-clicking on "Transducer", the user enters the "Transducer Properties" window. By selecting the intended function which here is active power, the output is set at Current. By enabling the "Symmetrical" option, it is made possible to also evaluate the negative values.

In "Minimum Value" section, 230 watts is entered as the input value and its corresponding output which equals 4 milliamperes is entered. In "Maximum Value" section, 230 watts is entered in secondary form as the value and the corresponding current for this output is specified to be 20 milliamperes.

After accepting these, it is time to add the points on the characteristic and perform the test. A simple approach is to click on "Sequence" and specify the upper and lower limits of power and the number of test points so that the points are added in certain distances. By performing the test, it can be observed that the output values are recorded in accordance with the applied input.

By enabling the display of Actual Value for binary #9, it is possible to view the waveform of the measured values in "Signal View" window in the software. After the test is finished, the intended elements are selected and the report is prepared.

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