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INSTRUMENTS FOR POWER INDUSTRY

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FREQUENCY RESPONSE MEASUREMENT SYSTEM FOR CERTIFICATION OF INSTRUMENT VOLTAGE TRANSFORMERS

MarsTest-VT-PQ

Sphere of application

MarsTest-VT-PQ is a system that automates frequency response certification tests of instrument voltage transformers rated from 6 kV to 200 kV. The tests imply that voltage harmonics of order from 0.3 to 50 (15 Hz to 2.5 kHz) are applied to the transformers. The amplitude and phase angle (within 0 to 10°) measurements comply with IEC/TR 61869-103.
The system covers the needs of VT manufactures, certification labs, power distribution companies etc.

Purpose of the tests

To make a conclusion on the suitability of voltage transformers under test for power quality measurements

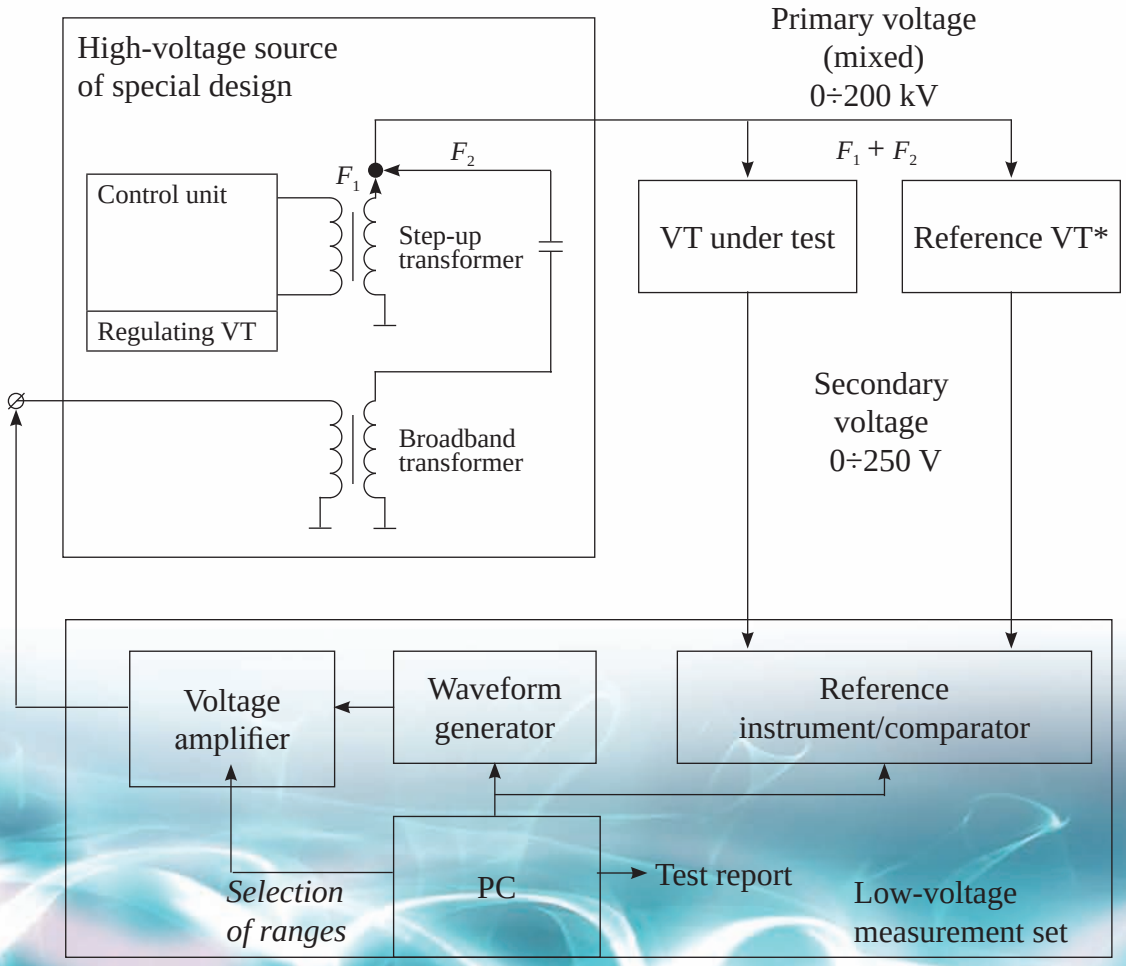
Components of the system

1. Specially designed high-voltage source and reference voltage transformer
2. Low-voltage measurement set including:
- waveform generator
- voltage amplifier
- reference instrument (comparator)
- software MarsTest-VT-PQ

Functional diagram

F_1 – fundamental harmonic 50 Hz
F_2 – other harmonic (15÷2500 Hz)

* A resistive/ capacitive divider unit or capacitive voltage transducer



Accuracy specifications for the low-voltage measurement set

Measured parameter	Measurement range	Type and limits of permissible measurement error, units of measurement	Notes
1 RMS voltage (at frequency f), V	$0.1 \cdot U_{UL}$ to U_{UL}	relative, % $\pm[0.05+0.02(U_{UL}/U - 1)]$	Frequency of the 1st voltage harmonic f=h*50, where the harmonic order number h belongs to the intervals: - 0.2 to 0.9 in steps of 0.1 - 1 to 60 (inclusive) in steps of 1
2 Frequency of AC voltage (f), Hz	15 to 2500 Hz	absolute, Hz ±0.005	$0.1\ U_{UL} < U < U_{UL}$ U_{UL} (V): as specified below the table
3 RMS voltage of the odd and even voltage harmonic components of order h, where h = 0.3...50 (15 Hz ... 2.5 kHz), V	$0.1 \cdot U_{UL}$ to U_{UL}	relative, % $\pm[0.05+0.02(U_{UL}/U - 1)]$	Frequency of the 1st voltage harmonic f: 40 to 70 Hz
4 Phase angle between the voltage waveforms of frequency f across two channels	0 to 10°	absolute,1 min absolute, 10 min	0 to 60 min 1 to 10°
5 Phase angle between the voltage harmonic components across two channels (φ_h), min	0 to 60	absolute, 1 min	h = 0.3 ... 50 at a rated fundamental voltage 50 Hz
U_{UL} – Upper limit of voltage measurement range (0.84; 1.68; 4.2; 8.4; 84; 168; 420; 840 V) U – measured voltage.			

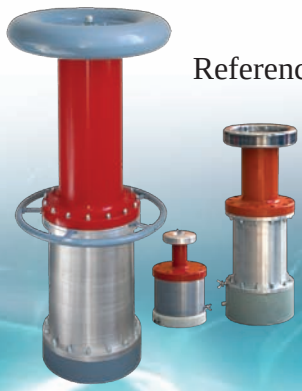
Scope of supply

Low-voltage measurement set

Components:
- SW MarsTest-VT-PQ
- Reference instrument/comparator
- Voltage amplifier
- Waveform generator
- PC

Specially designed High-voltage source

Reference VT



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