TEST & MEASUREMENT DEVICES

Development and production of measurement devices

M120

Voltage Transformer Test Set

The Voltage Transformer Test Set M120 measures voltage transformer (VT) errors by comparing the primary voltage, which is scaled by the primary voltage converter, and the secondary voltage of the VT under test. The primary voltage converter is a component of the M120 and can be implemented on the basis of a capacitive divider or a reference voltage transformer.

The capacitive divider consists of the High Voltage Gas-filled Capacitor (included in the set) and the Low-Voltage part (built into the Measuring Unit). The primary voltage measurement range (up to 520 kV) is determined when ordering, depending on the characteristics of the high voltage capacitor.

A Reference Voltage Transformer can be used as a primary voltage converter, while the primary voltage range and other technical specifications are configured according to customer requirements

FEATURES AND BENEFITS

- Test for accuracy:
  - inductive VT
  - capacitive VT
  - low-power VT (LPVT)
  - voltage sensor
- VT testing according to:
  IEC 61869-3, IEC 61869-5, IEC 61869-11,
  IEEE C57.13, IEC 60044-2, IEC 60044-5, IEC 60044-7
- VT testing with any ratio
- Short measurement time
- Measurement of primary and secondary voltages, THD measurement
- Integrated 7" capacitive touch screen
- PC control via RS232 serial port
- Test voltage up to 520 kV
- Optional inclusion two high voltage capacitors for different maximum voltages in the set (determined when ordering)
- Easy handling
- Small size and low weight

APPLICATIONS

M120 is used by:

- Voltage Transformers manufacturers
- On-site testing of Voltage Transformers
- Calibration laboratories

COST-EFFECTIVE SOLUTION

The Voltage Transformer Test Set M120 is available in two versions depending on customer requirements:

M120.1 – for Inductive VT, Capacitor VT;

M120.2 – for Inductive VT, Capacitor VT, Low-power VT (LPVT), Voltage sensor.

The M120 is equipped with an appropriate High Voltage Capacitor depending on the required maximum primary voltage and operating conditions (in-door or outdoor).

The ability to include in the M120 set two High Voltage Capacitors for different maximum voltages allows to realize two measurement schemes without moving heavy high-voltage equipment.

The M120 version M120.2 set includes an LPVT adapter. The connection type and input impedance can be agreed with the customer when ordering.

TEST ARRANGEMENT

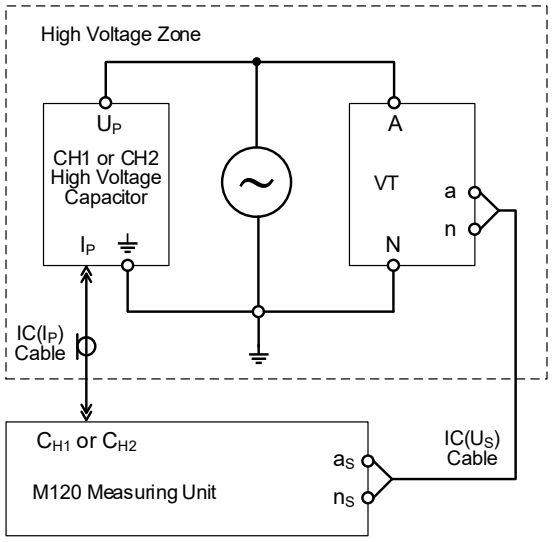


Fig.1 Inductive VT, Capacitive VT testing

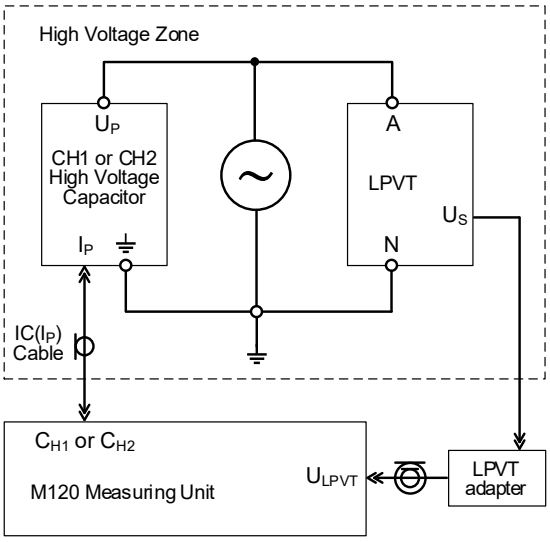
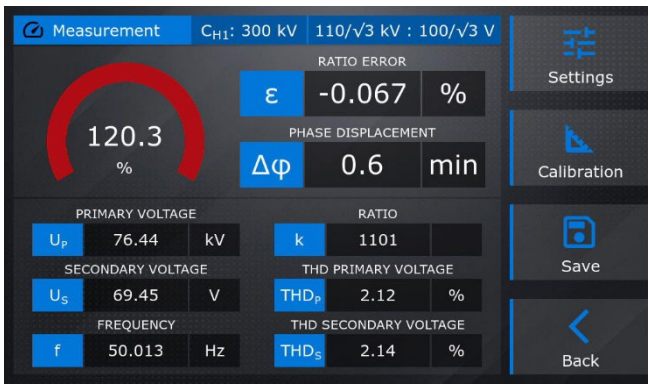


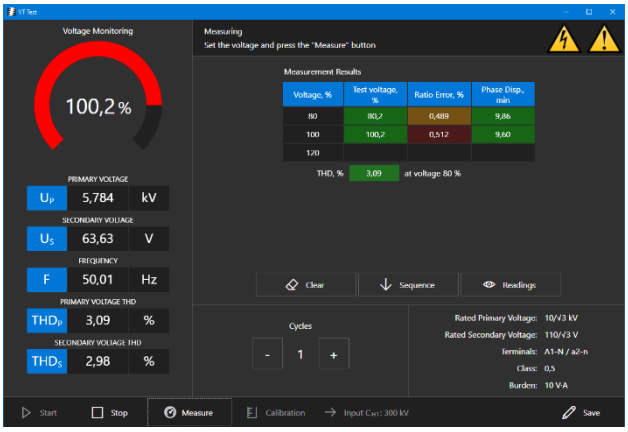
Fig.2 Low-power VT (LPVT), Voltage sensor testing (for M120.2 only)

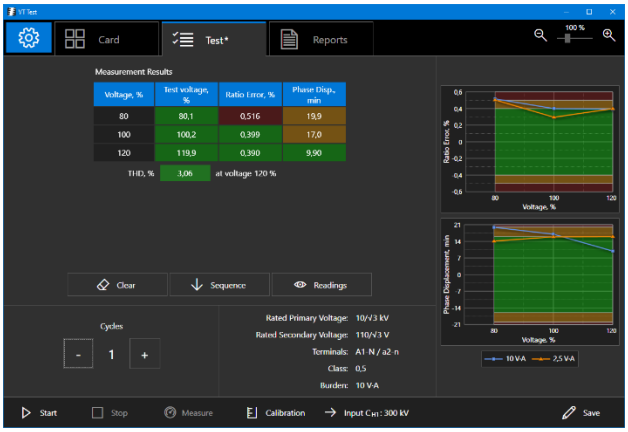
EASY OPERATION

CONTROL FROM THE BUILT-IN SCREEN

On the front panel there is a 7" capacitive touch screen, as well as duplicate control buttons and an encoder. The interface is intuitive and easy to use. Measurement results are stored in memory and can be copied to a USB flash drive.







PC CONTROL

Specialized software "VT Test" is designed to automate the VT testing process.

VT Test software features:

- Generation of transformer test cards, which include information about the transformer type, its characteristics and the test program;
- Control of the transformer test process;
- Analysis of the measurement results for compliance with the specified accuracy class;
- Output results in tabular and graphical form;
- Saving and viewing measurement results in the database in the form of reports;
- Exporting reports from the database to Microsoft Word and Microsoft Excel files;
- Creation of custom report templates

Full automation of the testing process is achieved when using OLTEST equipment:

- Electronic Voltage Burden M410 or M411;
- Voltage Regulator R100 or R200;
- Test Voltage Transformers G740, G770.

TECHNICAL SPECIFICATIONS

Measurement ranges and absolute error limits of VT Test Set M120 with capacitive divider

Value	Range	Resolution	Accuracy*	Additional conditions
Ratio error ε	−100…100 %	0,001 %	± 0,04 %	100 V ≤ U_P ≤ U_{Pmax}** 5 V ≤ U_S ≤ 500 V 0,1 V ≤ U_{LPVT} ≤ 10 V***
		0,01 %	± 0,1 %	10 V ≤ U_P < 100 V 0,5 V ≤ U_S < 5 V 0,01 V ≤ U_{LPVT} ≤ 0,1 V
Phase displacement $\Delta\varphi$	−300…300 min	0,1 min	± 2 min	100 V ≤ U_P ≤ U_{Pmax}** 5 V ≤ U_S ≤ 500 V 0,1 V ≤ U_{LPVT} ≤ 10 V***
		0,1 min	± 5 min	10 V ≤ U_P < 100 V 0,5 V ≤ U_S < 5 V 0,01 V ≤ U_{LPVT} < 0,1 V***
Primary voltage U_P	0…U_{Pmax}	10 mV	± (0,5 % rdg + 50 mV)	–
Secondary voltage U_S	0…500 V	0,1 mV	± (0,5 % rdg + 0,5 mV)	–
Secondary voltage U_{LPVT}***	0…10 V	0,01 mV	± (0,5 % rdg + 0,02 mV)	–
Frequency f	48…62 Hz	0,001 Hz	± 0,02 Hz	0,5 V ≤ U_S ≤ 500 V 0,01 V ≤ U_{LPVT} ≤ 10 V***
Total harmonic distortions THD_P, THD_S	0…20 %	0,01 %	± (0,5 % rdg + 0,1 %)	10 V ≤ U_P ≤ U_{Pmax}** 0,5 V ≤ U_S ≤ 500 V 0,01 V ≤ U_{LPVT} ≤ 10 V***

* Specified error limits are valid for the ambient temperature range from 0 to 40 °C. For the temperature range below 0 °C within the operating temperature range the error limits are doubled.

** U_{Pmax} is the maximum value of the primary voltage determined by the maximum voltage of the High Voltage Capacitor CH1 or CH2 used in the circuit.

*** For M120.2 only.

Power mains	
Rated Voltage	100…240 V
Rated Frequency	50 or 60 Hz
Operating conditions	
Temperature	−15...40 °C
Relative humidity	up to 80 % non-condensing
Technical parameters	
Size (Measuring unit) (W × H × D)	460 × 150 × 370 mm
Weight (Measuring unit)	8 kg
Standards	
Safety	EN 61010-1:2010/A1:2019/AC:2019-04
EMC	EN IEC 61326-1:2021

ORDERING INFORMATION

Scope of supply

No	Item	Part no.	
1	Measuring Unit*		
	M120.1 with Capacitive Divider	M120.100-01	
	M120.2 with Capacitive Divider	M120.100-02	
	M120.1 with Reference Voltage Transformer	M120.110-01	
	M120.2 with Reference Voltage Transformer	M120.110-01	
2	IC(I_P) Instrument Cable*	M120.701	
3	IC(U_S) Instrument Cable*	M120.702	
4	Measuring Cable* (Banana plug 4 mm)	M120.703	
5	Mains Cable 10 A EU (CEE7/XVII – C13)	–	
6	RS232 Cable (Null Modem)	–	
7	LPVT Adapter – BNC*** 2 MΩ II 50 pF	M120.301	
8	LPVT adapter – RJ45*** 2 MΩ II 50 pF	M120.302	
9	Set of tips	M120.751	
10	Bag	S3U19	
11	USB flash drive	408111.003	
12	High Voltage Capacitor 50 kV indoor***	HVC50.1	

No	Item	Part no.	
13	High Voltage Capacitor 100 kV indoor***	HVC100.1	
14	High Voltage Capacitor 100 kV outdoor***	HVC100.2	
15	High Voltage Capacitor 300 kV indoor***	HVC300.1	
16	High Voltage Capacitor 300 kV outdoor***	HVC300.2	
17	Reference Voltage Transformer***	M630	
18	Operating manual	M120 OM	
19	Passport	M120 P	

*Version is selected when ordering.
**Length is determined when ordering.
***Availability is determined when ordering.

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Development and production
of measurement devices

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