

M100

Comparator



Comparator M100 is a high-precision instrument designed for calibration and testing of current and voltage transformers. Developed for metrology laboratories, transformer manufacturers, and power utility companies, the M100 combines measurement accuracy, reliability, and advanced digital signal processing technologies.

The instrument provides highly accurate measurement of ratio errors and phase displacement in accordance with international standards

FEATURES AND BENEFITS

- ▲ Fully automatic measurement and digital display of current/voltage ratio errors, phase displacement, test current and voltage, resistance, conductance and power of burden
- ▲ A single instrument for performing both current (CT) and voltage transformer (VT) measurements
- ▲ High measurement accuracy (CT and VT testing)
- ▲ Compatibility with fully automated calibration systems
- ▲ Excellent noise immunity and long-term stability
- ▲ Fast measurement process with minimized operator influence
- ▲ Automatic test reports generation using basic or user-created templates
- ▲ Specifications conform to the standards/recommendations of IEC 60044 and IEC 61869
- ▲ VT testing requires the use of test and standard transformers with equal rated ratios
- ▲ CT testing requires the use of test and standard transformers with equal rated ratios and 5:1 of secondary currents ratio

VERSIONS

Comparator **M100** is available in two versions:

- ▲ **M100.1** allows CT calibration in secondary current range from 1 to 120 % of rated current
- ▲ **M100.2** allows CT calibration in secondary current range from 1 to 200 % of rated current

COMPLETE MEASUREMENT SYSTEM

OLTEST LLC also supplies PC-controlled CT and VT calibration facilities for specific customer requirements, including:

- ▲ **M100** Comparator
- ▲ **M402** Electronic Current Burden
- ▲ **M410** Electronic Voltage Burden
- ▲ **M500** Programmable Standard Current Transformer
- ▲ **S100** Automatic Current Source

APPLICATIONS

Comparator **M100** is used by:

- ▲ Current and Voltage Transformers manufacturers
- ▲ On-site testing Current and Voltage Transformers
- ▲ Calibration laboratories
- ▲ Metrology institutes

TECHNICAL SPECIFICATIONS

Value	Range	Accuracy	Condition	
Voltage error, ε_U	-15...15 %	$\pm (0,005 \cdot \varepsilon_U + 1 \cdot 10^{-4} + 10^{-4} \cdot \Delta\varphi_U)$ %	$20 \text{ V} \leq U_s \leq 240 \text{ V}$	
		$\pm (0,005 \cdot \varepsilon_U + 1 \cdot 10^{-3} + 10^{-4} \cdot \Delta\varphi_U)$ %	$6 \text{ V} \leq U_s < 20 \text{ V}$	
Phase displacement, $\Delta\varphi_U$	-300...300 min	$\pm (0,005 \cdot \Delta\varphi_U + 0,05 + 5 \cdot 10^{-2} \cdot \varepsilon_U)$ min	$20 \text{ V} \leq U_s \leq 240 \text{ V}$	
		$\pm (0,005 \cdot \Delta\varphi_U + 0,1 + 5 \cdot 10^{-2} \cdot \varepsilon_U)$ min	$6 \text{ V} \leq U_s < 20 \text{ V}$	
Current error, ε_I	-15...15 %	$\pm (0,005 \cdot \varepsilon_I + 2 \cdot 10^{-4} + 10^{-4} \cdot \Delta\varphi_I)$ %	$1 \text{ A} \leq I_s \leq 7,5 \text{ A}$	
		$\pm (0,005 \cdot \varepsilon_I + 3 \cdot 10^{-3} + 10^{-4} \cdot \Delta\varphi_I)$ %	$0,05 \text{ A} \leq I_s < 1 \text{ A}$	
		$\pm (0,005 \cdot \varepsilon_I + 1,5 \cdot 10^{-2} + 10^{-4} \cdot \Delta\varphi_I)$ %	$0,01 \text{ A} \leq I_s < 0,05 \text{ A}$	
Phase displacement, $\Delta\varphi_I$	-300...300 min	$\pm (0,005 \cdot \Delta\varphi_I + 0,03 + 5 \cdot 10^{-2} \cdot \varepsilon_I)$ min	$0,25 \text{ A} \leq I_s \leq 7,5 \text{ A}$	
		$\pm (0,005 \cdot \Delta\varphi_I + 0,5 + 5 \cdot 10^{-2} \cdot \varepsilon_I)$ min	$0,01 \text{ A} \leq I_s < 0,25 \text{ A}$	
Active (reactive) VT burden power, $P (Q)$	0...500 W (VA)	$\pm [0,005 \cdot \sqrt{(P^2 + Q^2)} + U_{Sr}^2 \cdot 10^{-7}]$ W (VA)	$50 \text{ V} \leq U_s \leq 240 \text{ V}$	
		$\pm [0,005 \cdot \sqrt{(P^2 + Q^2)} + U_{Sr}^2 \cdot 2 \cdot 10^{-7}]$ W (VA)	$30 \text{ V} \leq U_s < 50 \text{ V}$	
		$\pm [0,005 \cdot \sqrt{(P^2 + Q^2)} + U_{Sr}^2 \cdot 10^{-6}]$ W (VA)	$6 \text{ V} \leq U_s < 30 \text{ V}$	
Active (reactive) CT burden power, $P (Q)$	0...500 W (VA)	$\pm [0,005 \cdot \sqrt{(P^2 + Q^2)} + I_{Sr}^2 \cdot 3 \cdot 10^{-4}]$ W (VA)	$0,01 \text{ A} \leq I_s \leq 7,5 \text{ A}$	
Active (reactive) VT burden conductivity $G (B)$	0...0,05 S	$\pm [0,005 \cdot \sqrt{(G^2 + B^2)} + 1 \cdot 10^{-7}]$ S	$50 \text{ V} \leq U_s \leq 240 \text{ V}$	
		$\pm [0,005 \cdot \sqrt{(G^2 + B^2)} + 2 \cdot 10^{-7}]$ S	$30 \text{ V} \leq U_s < 50 \text{ V}$	
		$\pm [0,005 \cdot \sqrt{(G^2 + B^2)} + 1 \cdot 10^{-6}]$ S	$6 \text{ V} \leq U_s < 30 \text{ V}$	
Active (reactive) CT burden resistance $R (X)$	0...200 Ω	$\pm [0,005 \cdot \sqrt{(R^2 + X^2)} + 3 \cdot 10^{-4}]$ Ω	$0,01 \text{ A} \leq I_s \leq 7,5 \text{ A}$	
Rated secondary current	1...5 A	-	-	
Current range	M100.1	1...120 %	$\pm 0,5 \%$	-
	M100.2	1...200 %		
Rated secondary voltage	100/3...110 V	-	-	
Voltage range	20...120 %	$\pm 0,5 \%$	-	

ε_U – VT voltage error, %
 $\Delta\varphi_U$ – VT phase displacement, min
 ε_I – CT current error, %
 $\Delta\varphi_I$ – CT phase displacement, min
 U_{Sr} – rated value of the secondary voltage of tested VT, V
 P – value of active power measurement result, W
 Q – value of reactive power measurement result, VA

I_{Sr} – rated value of the secondary current of tested CT, A
 I_s – secondary current
 U_s – secondary voltage
 G – value of conductance measurement result, S
 B – value of susceptance measurement result, S
 R – value of burden resistance measurement result, Ω
 X – value of burden reactance measurement result, Ω

Power mains

Rated voltage 220/230 V
 Rated frequency 50/60 Hz

Operating temperature 0...40 °C

Relative humidity up to 80 % non-condensing

Size (W × H × D) 250 × 150 × 350 mm

Weight (Main unit) 5 kg











Standards

Safety EN 61010-1:2010
 EMC EN 61326-1:2013

ORDERING INFORMATION

Scope of supply

The following items are supplied with the **standard M100 modification**:

No	Item	Part no.	
1	Main Unit M100.1* M100.2	411439.017 411439.017-01	
2	IC(U) Instrument cable (U); 1,5 m	685611.008	
3	IC (I) Instrument cable (I); 1,5 m	685611.009	
4	Mains cable 10 A EU (CEE 7/XVII - C13)	—	
5	FE cable; 3 m	685611.304-02	
6	Jumper with U-shaped lugs	685611.012	
7	U-shape lug, ø8 mm (10 pcs.)	—	
8	Bag	323382.046	
9	USB Cable (CBL-USB2 AMBM-6 USB)	685612.107	
10	USB flash drive	408111.003	
11	Operating manual. Part 1. Operation and maintenance	411439.019 OM	
12	Operating manual. Part 2. Comparator's PC software manual	411439.019 OM1	
13	Passport	411640.019 P	

* Version is determined when ordering.

OLTEST LLC (UKRAINE)

Development and production
of measurement devices

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