

M100

Comparator



Comparator **M100** is a precision test set for measurement of quantities used during the calibration and verification of Current and Voltage Transformers

FEATURES AND BENEFITS

- Measurement of CT and VT errors, phase displacement, test current and voltage, resistance, conductance and power of burden
- High measurement accuracy (CT and VT testing): up to $\pm 0,005\%$ and $\pm 0,05$ min
- 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 or 5:1 of secondary currents ratio
- Possibility of using with automated CT and VT calibration system
- Automatic test reports generation using basic or user-created templates

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 150 % of rated current

APPLICATIONS

M100 is used by:

- Manufacturer of Current and Voltage Transformers
- On-site testing Current and Voltage Transformers
- Calibration laboratories
- Metrology Institutes

TECHNICAL SPECIFICATIONS

Value	Range	Limit of errors	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	$\pm (0,005 \cdot \Delta\varphi_U + 0,05 + 5 \cdot 10^{-2} \cdot \varepsilon_U) \text{ min}$	$20 \text{ V} \leq U_s \leq 240 \text{ V}$
		$\pm (0,005 \cdot \Delta\varphi_U + 0,1 + 5 \cdot 10^{-2} \cdot \varepsilon_U) \text{ min}$	$6 \text{ V} \leq U_s < 20 \text{ V}$
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	$\pm (0,005 \cdot \Delta\varphi_I + 0,03 + 5 \cdot 10^{-2} \cdot \varepsilon_I) \text{ min}$	$0,25 \text{ A} \leq I_s \leq 7,5 \text{ A}$
		$\pm (0,005 \cdot \Delta\varphi_I + 0,5 + 5 \cdot 10^{-2} \cdot \varepsilon_I) \text{ min}$	$0,01 \text{ A} \leq I_s < 0,25 \text{ A}$
Active (reactive) VT burden power, P (Q)	0...500 W (V·A)	$\pm [0,005 \cdot \sqrt{(P^2+Q^2)} + U_{Sr}^2 \cdot 10^{-7}] \%$	$50 \text{ V} \leq U_s \leq 240 \text{ V}$
		$\pm [0,005 \cdot \sqrt{(P^2+Q^2)} + U_{Sr}^2 \cdot 2 \cdot 10^{-7}] \%$	$30 \text{ V} \leq U_s < 50 \text{ V}$
		$\pm [0,005 \cdot \sqrt{(P^2+Q^2)} + U_{Sr}^2 \cdot 10^{-6}] \%$	$6 \text{ V} \leq U_s < 30 \text{ V}$
Active (reactive) CT burden power, P (Q)	0...500 W (V·A)	$\pm [0,005 \cdot \sqrt{(P^2+Q^2)} + I_{Sr}^2 \cdot 3 \cdot 10^{-4}] \%$	$0,01 \text{ A} \leq I_s \leq 7,5 \text{ A}$
Active (reactive) VT burden conductivity G (B)	0...0,05 S	$\pm [0,005 \cdot \sqrt{(G^2+B^2)} + 1 \cdot 10^{-7}] \%$	$50 \text{ V} \leq U_s \leq 240 \text{ V}$
		$\pm [0,005 \cdot \sqrt{(G^2+B^2)} + 2 \cdot 10^{-7}] \%$	$30 \text{ V} \leq U_s < 50 \text{ V}$
		$\pm [0,005 \cdot \sqrt{(G^2+B^2)} + 1 \cdot 10^{-6}] \%$	$6 \text{ V} \leq U_s < 30 \text{ V}$
Active (reactive) CT burden resistance R (X)	0...200 Ω	$\pm [0,005 \cdot \sqrt{(R^2+X^2)} + 3 \cdot 10^{-4}] \%$	$0,01 \text{ A} \leq I_s \leq 7,5 \text{ A}$
Standard CT relative current	M100.1	1...120 %	-
	M100.2	1...150 %	
Standard VT secondary voltage	6...240 V	$\pm 0,5 \%$	

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, V·A
 I_{Sr} – rated value of the secondary current of tested CT, A
 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 Hz
Operating temperature	0...40 °C
Relative humidity	up to 80 % non-condensing
Size	235 × 148 × 250 mm
Weight	5 kg
Standards	
Safety	EN 61010-1:2010
EMC	EN 61326-1:2013
Calibration interval	2 years recommended

ORDERING INFORMATION

Scope of supply

The following items are supplied with the standard M100 modification:

No	Item Name	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	Power cord		
5	Jumper with U-shaped lugs	685611.012	
6	U-shape lug, ø8 mm (10 pcs.)		
7	Bag	323382.007	
8	Operating manual Part 1. Operation and maintenance	411439.019 OM	
9	Operating manual Part 2. Comparator's PC software manual	411439.019 OM1	
10	Passport	411640.019 P	
11	USB Cable (CBL-USB2 AMBM-6 USB)	685612.107	
12	Software M100 (installation disk)	411439.019 K	

* Please specify modification when ordering

OLTEST ENERGO Sp z o.o.

Development and production of
measurement devices

POSTAL ADDRESS

Oltest Energo Sp z o.o.,
Warsaw, 00-680,
Zurawia str., 43, 109

TEL and E-MAIL

(+48 22) 60-22-998
market@oltest.pl