

WM3000U | WM3000I

Measuring Bridges for Voltage Transformers and Current Transformers



Testing of Conventional, Electronical and
Non-conventional, Digital Measuring Transformers

Multifunctional Measuring Bridge WM3000U WM3000I

The current/voltage measuring bridges WM3000U and WM3000I are high-precision comparator units for comparing secondary signal from transformer under test (or digital information of non-conventional transformers) with a reference signal supplied by a standard device.

The resulting error value will be displayed as ratio error and phase displacement on the screen.

In general the operation of the measuring bridges will be performed via integrated 10.1" capacitive touch screen. Optionally control and read-out of the measuring values can be performed via integrated interfaces and PC.

- Conventional voltage transformers (VT)
- Electronical voltage transformers (EVT, LPVT)
- Non-conventional, digital voltage transformers

Tests according to IEC61869-1/3 (old: IEC60044-2), IEC61869-7 (old: IEC60044-7), IEC61869-11, IEC61850-9-2, ANSI/IEEE C57.13, IEC61869-15 (DC function available as option)

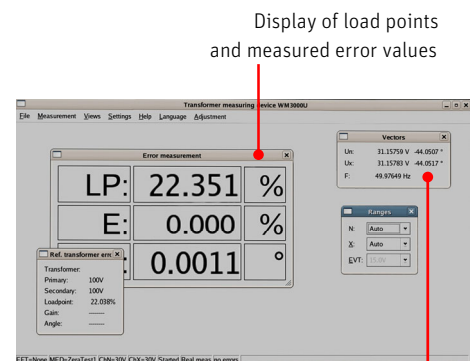
- Conventional current transformers (CT) according
- Electronical current transformers (ECT, LPCT)
- Non-conventional, digital current transformers

Tests according to IEC61869-1/2, (old: IEC60044-1), IEC61869-8 (old: IEC60044-8), IEC61869-10 IEC61850-9-2, ANSI/IEEE C57.13, IEC61869-14 (DC function available as option)

- Voltage inputs for PT and EVT with high impedance direct input (WM3000U)
- Current inputs for CT and ECT with high impedance direct input (WM3000I)
- Inputs for non-conventional, digital transformer (100Base-Tx full duplex RJ45)
- User friendly operation via touch screen with integrated graphical user interface
- A/D conversion of measuring value by 24 Bit converter
- Measurement of different currents and



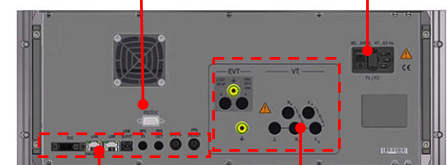
Measuring bridge WM3000U



VTs WM3000U

CTs WM3000I

RS232 interface Mains connection/main switch

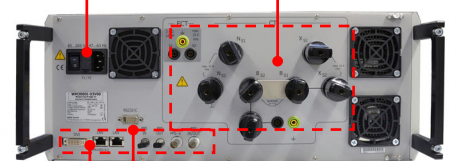


Rear side WM3000U

DVI-, LAN-, USB- and PPS- connection terminal

DUT connection

Mains connection/main switch



Rear side WM3000I

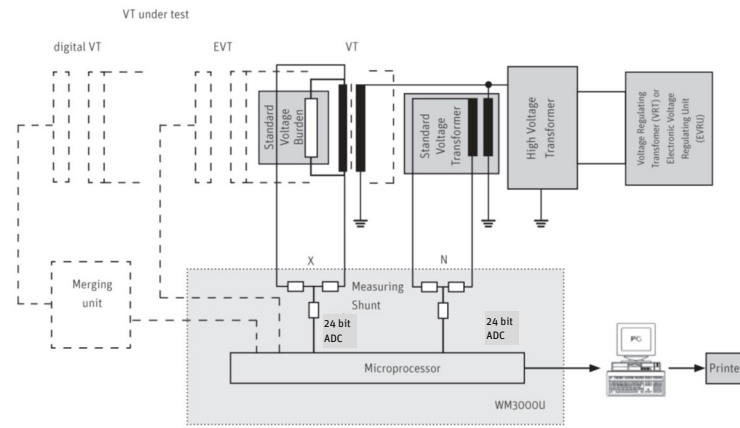
RS232 interface

DVI-, LAN-, USB- and PPS- connection terminal

Principle Diagramm

Accuracy Test

Voltage transformer testing



Technical Data

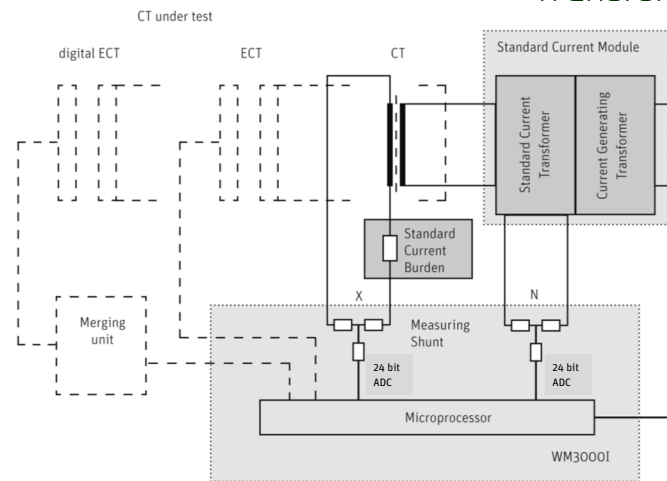
WM3000U

Voltage Transformer Measuring Bridge WM3000U

General	
Power supply	85 ... 265 V, 47 ... 63 Hz
Power consumption	55 VA
Temperature range, operation	5° ... +40° C
Relative humidity (not condensing)	max. 95 %
Dimensions (LxWxH)	450 x 483 x 177 mm
Weight	~ 8.5 kg
Fundamental frequency	15 ... 65 Hz
Safety	
IP class according to DIN EN 60529	IP30
Declaration of conformity	CE conform
Protection class according to DIN EN 61140	I
Voltage transformer measurement	
Voltage input N-channel	
Voltage measurement	2 V ... 500 V
Voltage channels input impedance (@ range)	380 KΩ / 500 pF @ 3.75 V ... 480 V
Voltage measurement accuracy 3)	< 100 x 10 E-6 @ 10 V ... 500 V < 200 x 10 E-6 @ 2 V ... < 10 V
Voltage measurement accuracy 4) 10)	< 200 x 10 E-6 @ 10 V ... 500 V < 300 x 10 E-6 @ 2 V ... < 10 V
Maximum of voltage	500 V
Voltage input X-channel	
Voltage measurement	2 V ... 500 V
Voltage channels input impedance (@ range)	380 KΩ / 500 pF @ 3.75 V ... 480 V
Voltage measurement accuracy 3)	< 100 x 10 E-6 @ 10 V ... 500 V < 200 x 10 E-6 @ 2 V ... < 10 V
Voltage measurement accuracy 4) 10)	< 200 x 10 E-6 @ 10 V ... 500 V < 300 x 10 E-6 @ 2 V ... < 10 V
Maximum of voltage	500 V
Voltage input EVT-channel	
Voltage measurement	0.1 mV ... 18 V
EVT input impedance	2 GΩ / 10 pF
Voltage measurement accuracy 3)	< 300 x 10 E-6 @ 200 mV ... 15 V < 500 x 10 E-6 @ 20 mV ... < 200 mV
Voltage measurement accuracy 3) 10)	< 900 x 10 E-6 @ 200 μV ... < 20 mV
Voltage measurement accuracy 4) 10)	< 400 x 10 E-6 @ 200 mV ... 15 V < 600 x 10 E-6 @ 20 mV ... < 200 mV
Maximum of voltage	18 V
Conventional voltage transformers	
Ratio error indication 1) 3) 5)	TV 0.9 ... 1: < 50 x 10 E-6 @ 10 V ... 500 V < 100 x 10 E-6 @ 2 V ... < 10 V TV 0.5 ... < 0.9: < 100 x 10 E-6 @ 10 V ... 500 V < 150 x 10 E-6 @ 2 V ... < 10 V TV < 0.5: < 200 x 10 E-6 @ 10 V ... 500 V < 250 x 10 E-6 @ 2 V ... < 10 V
Ratio error indication 4) 5) 10)	TV 0.9 ... 1: < 150 x 10 E-6 @ 10 V ... 500 V < 200 x 10 E-6 @ 2 V ... < 10 V TV 0.5 ... < 0.9: < 200 x 10 E-6 @ 10 V ... 500 V < 250 x 10 E-6 @ 2 V ... < 10 V TV < 0.5: < 300 x 10 E-6 @ 10 V ... 500 V < 350 x 10 E-6 @ 2 V ... < 10 V
Phase displacement indication 1) 3) 5)	TV 0.9 ... 1: < 0.2 min @ 10 V ... 500 V < 0.5 min @ 2 V ... < 10 V TV 0.5 ... < 0.9: < 0.4 min @ 10 V ... 500 V < 0.7 min @ 2 V ... < 10 V TV < 0.5: < 0.6 min @ 10 V ... 500 V < 0.9 min @ 2 V ... < 10 V
Non-conventional, digital voltage transformers acc. to EN61850	
Ratio error indication 2) 3) 5)	< 100 x 10 E-6 @ 10 V ... 500 V < 200 x 10 E-6 @ 2 V ... < 10 V
Ratio error indication 4) 5) 10)	< 200 x 10 E-6 @ 10 V ... 500 V < 300 x 10 E-6 @ 2 V ... < 10 V
Phase displacement indication 5)	< 1.1 min @ 10 V ... 500 V < 1.5 min @ 2 V ... < 10 V
Electronical voltage transformers	
Ratio error indication 2) 3) 5)	< 400 x 10 E-6 @ 200 mV ... 18 V < 600 x 10 E-6 @ 20 mV ... < 200 mV
Ratio error indication 2) 3) 5) 10)	< 1000 x 10 E-6 @ 200 μV ... < 20 mV
Ratio error indication 4) 5) 10)	< 500 x 10 E-6 @ 200 mV ... 18 V < 700 x 10 E-6 @ 20 mV ... < 200 mV
Phase displacement indication 2) 3) 5)	< 0.6 min @ 200 mV ... 15 V < 1.1 min @ 20 mV ... < 200 mV
Phase displacement indication 2) 3) 5) 10)	< 1.5 min @ 200 μV ... < 20 mV

1: With TV = divider ratio (input voltage X / input voltage N) or (input voltage N / input voltage X)
 2: In N-channel @ 10 V ... 500 V
 3: From 45 ... 65 Hz
 4: Only DC
 5: Differential error, the accuracy of the single channels should not be added
 6: With adapter CA500: 1 GΩhm, 2 MΩhm, 10 pF, 100 pF selectable
 10: Option

Principle Diagramm Accuracy Test Current transformer testing



Technical Data WM3000I

Current Transformer Measuring Bridge WM3000I

General	
Power supply	85 ... 265 V, 47 ... 63 Hz
Power consumption	max. 280 VA
Temperature range, operation	5° ... + 40° C
Temperature range, storage	-15° ... + 65° C
Relative humidity (not condensing)	max. 95 %
Dimensions (LxWxH)	450 x 483 x 177 mm
Weight	~ 11 kg
Fundamental frequency	15 ... 65 Hz
Safety	
IP class according to DIN EN 60529	IP30
Declaration of conformity	CE conform
Protection class according to DIN EN 61140	I
Current transformer measurement	
Current input N-channel	
Current measurement	1 mA ... 15 A
Current channels input impedance (@ range)	< 5 mΩ
Current measurement accuracy 3)	< 100 x 10 E-6 @ 15A ... 50 mA < 200 x 10 E-6 @ < 50 mA ... 5 mA
Current measurement accuracy 4) 10)	< 200 x 10 E-6 @ 15A ... 50 mA < 300 x 10 E-6 @ < 50 mA ... 5 mA
Maximum current	15 A
Current input X-channel	
Current measurement	1 mA ... 15 A
Current channels input impedance (@ range)	< 5 mΩ @ 5 mA ... 15 A
Current measurement accuracy 3)	< 100 x 10 E-6 @ 15A ... 50 mA < 200 x 10 E-6 @ < 50 mA ... 5 mA
Current measurement accuracy 4) 10)	< 200 x 10 E-6 @ 15A ... 50 mA < 300 x 10 E-6 @ < 50 mA ... 5 mA
Maximum current	15 A
Voltage input ECT-channel	
Voltage measurement	0.1 mV ... 18 V
Voltage range(s)	15 V, 10 V, 5 V, 2.5 V, 1 V, 500 mV, 250 mV, 100 mV, 50 mV, 25 mV
ECT input impedance 6)	2 GΩ / 10 pF
Voltage measurement accuracy 3)	< 300 x 10 E-6 @ 200 mV ... 15 V < 500 x 10 E-6 @ 20 mV ... < 200 mV
Voltage measurement accuracy 3) 10)	< 900 x 10 E-6 @ 200 μV ... < 20 mV
Voltage measurement accuracy 4) 10)	< 400 x 10 E-6 @ 200 mV ... 15 V < 600 x 10 E-6 @ 20 mV ... < 200 mV
Voltage measurement linearity	< 150 x 10 E-6 @ 200 mV ... 15 V
Maximum of voltage	18 V
Conventional current transformers	
Ratio error indication 1) 3) 5)	TV 0.9 ... 1: < 50 x 10 E-6 @ 50 mA ... 15 A < 150 x 10 E-6 @ 5 mA ... < 50 mA TV 0.5 ... < 0.9 : < 100 x 10 E-6 @ 50 mA ... 15 A < 200 x 10 E-6 @ 5 mA ... < 50 mA TV < 0.5 : < 200 x 10 E-6 @ 50 mA ... 15 A < 300 x 10 E-6 @ 5 mA ... < 50 mA
Ratio error indication 1) 4) 5) 10)	TV 0.9 ... 1: < 150 x 10 E-6 @ 50 mA ... 15 A < 250 x 10 E-6 @ 5 mA ... < 50 mA TV 0.5 ... < 0.9 : < 200 x 10 E-6 @ 50 mA ... 15 A < 300 x 10 E-6 @ 5 mA ... < 50 mA TV < 0.5 : < 300 x 10 E-6 @ 50 mA ... 15 A < 400 x 10 E-6 @ 5 mA ... < 50 mA
Phase displacement indication 1) 3) 5)	TV 0.9 ... 1: < 0.2 min @ 50 mA ... 15 A < 0.5 min @ 5 mA ... < 50 mA TV 0.5 ... < 0.9 : < 0.4 min @ 50 mA ... 15 A < 0.7 min @ 5 mA ... < 50 mA TV < 0.5 : < 0.6 min @ 50 mA ... 15 A < 0.9 min @ 5 mA ... < 50 mA
Non-conventional, digital current transformers acc. to EN61850-9-2	
Ratio error indication 2) 3) 5)	< 100 x 10 E-6 @ 15A ... 50 mA < 200 x 10 E-6 @ < 50 mA ... 5 mA
Ratio error indication 4) 5) 10)	< 200 x 10 E-6 @ 15A ... 50 mA < 300 x 10 E-6 @ < 50 mA ... 5 mA
Phase displacement indication 5)	< 1.1 min @ 15A ... 50 mA < 1.5 min @ < 50 mA ... 5 mA
Electronical current transformers	
Ratio error indication 2) 3) 5)	< 400 x 10 E-6 @ 200 mV ... 15 V < 600 x 10 E-6 @ 20 mV ... < 200 mV
Ratio error indication 2) 3) 5) 10)	< 1000 x 10 E-6 @ 200 μV ... < 20 mV
Ratio error indication 4) 5) 10)	< 500 x 10 E-6 @ 200 mV ... 15 V < 700 x 10 E-6 @ 20 mV ... < 200 mV
Phase displacement indication 2) 3) 5)	< 0.6 min @ 200 mV ... 15 V < 1.1 min @ 20 mV ... < 200 mV
Phase displacement indication 10)	< 1.5 min @ 200 μV ... < 20 mV

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1: With TV = divider ratio (input current X / input current N) or (input current N / input current X)
 2: In N-channel @ 50 mA ... 15 A
 3: From 15 ... 65 Hz
 4: Only DC
 5: Differential error, the accuracy of the single channels should not be added
 6: With adapter CA500: 1 GΩhm, 2 MΩhm, 10 pF, 100 pF selectable
 10: Option
 Subjects to alteration.

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