WM3000U | WM3000I
Measuring Bridges for Voltage Transformers and Current Transformers

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

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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 8.9” touch screen. Optionally control and read-out of the measuring values can be performed via integrated interfaces and PC.

- Conventional voltage transformers (PT) according to IEC60044-2
- Electronical voltage transformers (EVT) according to IEC60044-7
- Non-conventional, digital voltage transformers according to IEC61850-9-2

- Conventional current transformers (CT) according to IEC60044-1
- Electronical current transformers (ECT) according to IEC60044-8
- Non-conventional, digital current transformers according to IEC61850-9-2

- 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 voltages via absolute control of all ranges PC interface via Ethernet
### Technical Data 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 (DxWxH)**: 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

<table>
<thead>
<tr>
<th>Voltage input N-channel</th>
<th>Voltage measurement</th>
<th>Voltage measurement accuracy 1)</th>
<th>Maximum of voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage channels input impedance (@ range)</td>
<td>380 KΩ / 500 pF @ 3.75 V ... 480 V</td>
<td>&lt; 100 x 10⁻⁶ @ 10 V ... 500 V</td>
<td>500 V</td>
</tr>
<tr>
<td>&lt; 200 x 10⁻⁶ @ 2 V ... &lt; 10 V</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Voltage input X-channel</th>
<th>Voltage measurement</th>
<th>Voltage measurement accuracy 1)</th>
<th>Maximum of voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage channels input impedance (@ range)</td>
<td>380 KΩ / 500 pF @ 3.75 V ... 480 V</td>
<td>&lt; 100 x 10⁻⁶ @ 10 V ... 500 V</td>
<td>500 V</td>
</tr>
<tr>
<td>&lt; 200 x 10⁻⁶ @ 2 V ... &lt; 10 V</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Voltage input EVT-channel</th>
<th>Voltage measurement</th>
<th>EVT input impedance</th>
<th>Voltage measurement accuracy 1)</th>
<th>Maximum of voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVT input impedance</td>
<td>&gt; 1 GΩ / 70 pF</td>
<td>&gt; 300 x 10⁻⁶ @ 200 mV ... 18 V</td>
<td>&lt; 500 x 10⁻⁶ @ 20 mV ... &lt; 200 mV</td>
<td>20 V</td>
</tr>
</tbody>
</table>

#### Conventional voltage transformers

<table>
<thead>
<tr>
<th>Ratio error indication 1)</th>
<th>TV 0.9 ... 1:</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 50 x 10⁻⁶ @ 10 V ... 500 V</td>
<td></td>
</tr>
<tr>
<td>&lt; 100 x 10⁻⁶ @ 2 V ... &lt; 10 V</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Phase displacement indication 1)</th>
<th>TV 0.9 ... 1:</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.2 min @ 10 V ... 500 V</td>
<td></td>
</tr>
<tr>
<td>&lt; 0.5 min @ 2 V ... &lt; 10 V</td>
<td></td>
</tr>
</tbody>
</table>

#### Non-conventional, digital voltage transformers acc. to EN61850

<table>
<thead>
<tr>
<th>Ratio error indication</th>
<th>&lt; 100 x 10⁻⁶ @ 10 V ... 500 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 200 x 10⁻⁶ @ 2 V ... &lt; 10 V</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Phase displacement indication</th>
<th>&lt; 1.1 min @ 10 V ... 500 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1.5 min @ 2 V ... &lt; 10 V</td>
<td></td>
</tr>
</tbody>
</table>

#### Electronical voltage transformers

<table>
<thead>
<tr>
<th>Ratio error indication 2)</th>
<th>&lt; 400 x 10⁻⁶ @ 200 mV ... 18 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 600 x 10⁻⁶ @ 20 mV ... &lt; 200 mV</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Phase displacement indication 2)</th>
<th>&lt; 0.6 min @ 200 mV ... 15 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1.1 min @ 20 mV ... &lt; 200 mV</td>
<td></td>
</tr>
</tbody>
</table>

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1: With TV = divider ratio (input voltage N / input voltage X) or (input voltage X / input voltage N)
2: In N-channel (@ 10 V ... 500 V)
3: From 45 ... 65 Hz

Subjects to alteration.

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19.10.2015
Transformer Measuring Equipment

Technical Data

WM30001

Current Transformer Measuring Bridge WM30001

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 (DueWh): 450 x 483 x 177 mm
- Weight: ~ 11 kg
- Max. height above sea level: 2000 m
- 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 accuracy 3) < 100 x 10^-6 @ 15A .. 50 mA
  - < 200 x 10^-6 @ < 50 mA ... 5 mA
  - Maximum current: 15 A
- Current input X-channel:
  - Current measurement accuracy 3) < 100 x 10^-6 @ 15A .. 50 mA
  - < 200 x 10^-6 @ < 50 mA ... 5 mA
  - Maximum current: 15 A
- Voltage input ECT-channel:
  - Voltage measurement: 2.5 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: > 1 GΩ / 70 pF
  - Voltage measurement accuracy 3) < 300 x 10^-6 @ 200 mV ... 15 V
  - < 500 x 10^-6 @ 20 mV ... < 200 mV
  - Voltage measurement linearity: < 150 x 10^-6 @ 200 mV ... 15 V
  - Maximum of voltage: 20 V

Conventional current transformers
- Ratio error indication 1) 3):
  - TV 0.9 ... 1:
    - < 50 x 10^-6 @ 50 mA ... 15 A
    - < 100 x 10^-6 @ 10 mA ... 15 A
    - < 200 x 10^-6 @ 5 mA ... 50 mA
    - TV < 0.9:
      - < 200 x 10^-6 @ 5 mA ... 50 mA
    - < 300 x 10^-6 @ 5 mA... 50 mA
- Phase displacement indication 1) 3):
  - TV 0.9 ... 1:
    - < 0.2 min @ 50 mA ... 15 A
    - < 0.5 min @ 5 mA ... 50 mA
    - TV < 0.9:
      - < 0.4 min @ 5 mA ... 15 A
      - < 0.7 min @ 5 mA ... 50 mA
      - TV < 0.5:
        - < 0.6 min @ 5 mA ... 15 A
        - < 0.9 min @ 5 mA ... 50 mA

Non-conventional, digital current transformers acc. to EN61850-9-2
- Ratio error indication:
  - < 100 x 10^-6 @ 15A ... 50 mA
  - < 200 x 10^-6 @ < 50 mA ... 5 mA
- Phase displacement indication:
  - < 1.1 min @ 15A ... 50 mA
  - < 1.5 min @ < 50 mA ... 5 mA

Electronic current transformers
- Ratio error indication 2) 3):
  - < 400 x 10^-6 @ 200 mV ... 15 V
  - < 600 x 10^-6 @ 20 mV ... 200 mV
- Phase displacement indication 2) 3):
  - < 0.6 min @ 200 mV ... 15 V
  - < 1.3 min @ 20 mV ... 200 mV

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

Subjects to alteration.