Features

Automatic Blocking Sockets (ABS) *
Automatic blocking sockets prevent incorrect connection of measurement cables and inadvertent selection of the wrong measured quantity. This significantly reduces danger to the user, the instrument and the system under test, and eliminates it entirely in many cases.

Automatic / Manual Measuring Range Selection
Measured quantities are selected with the rotary switch. The measuring range is automatically matched to measured values. The measuring range can be selected manually as well with the help of the AUTO/MAN key.

Display of Negative Values at the Analog Scale
Negative values are also displayed at the analog scale for zero-frequency quantities, allowing for observation of measured quantity fluctuation around the zero-point.

Storage of Measured Values
By pressing the HOLD/MIN/MAX key, the currently displayed measurement value can be „frozen“ in the display. The minimum and maximum values which were present at the input of the measuring instrument after activation of the MIN/MAX mode can be selectively "retained" with the MIN/ MAX function. The most important application is the determination of the minimum or maximum value during long-term observation of measurement quantities. MIN/MAX has no effect on the analog display; it continues to display the current measurement value.

Continuity Test
Allows for the detection of short-circuits and interrupted conductors. In addition to displaying test results, an acoustic signal can also be generated if desired.

Power Saving Circuit
The device is switched off automatically if the measured value remains unchanged for a period of approximately 15 minutes, and if none of the controls are activated during this time. Automatic shutdown can be deactivated.

Protective Cover for Harsh Conditions (Option)
The instrument is protected against damage in the event of impacts or dropping by means of a soft rubber cover with tilt stand. The rubber material also assures that the instrument does not wander if it is set up on a vibrating surface.

Duty Cycle Measurement – Measurement of Square-Wave Signals
This function makes it possible to test circuits and transmission cables by measuring the frequency and the duty cycle of pulses with amplitudes of 2 to 14 V and frequencies of 100 Hz to 10 kHz.

Voluntary Manufacturer’s Guarantee
36 months for material and workmanship
1 ... 3 years for calibration (depending on application)

* Patented (patent no. EP 1801 598, US 7,439,725)
### Characteristic Values

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>V</td>
<td>600 mV</td>
<td>100 μV</td>
<td>10 MΩ / &lt; 400 pF</td>
<td>±2% rdg. + ... d</td>
<td>5.0 + 5</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>6 V</td>
<td>1 mV</td>
<td>5.2 MΩ / &lt; 400 pF</td>
<td>±2% rdg. + ... d</td>
<td>5.0 + 5</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>60 V</td>
<td>10 mV</td>
<td>5 MΩ / &lt; 400 pF</td>
<td>±2% rdg. + ... d</td>
<td>5.0 + 5</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>600 V</td>
<td>100 mV</td>
<td>5 MΩ / &lt; 400 pF</td>
<td>±2% rdg. + ... d</td>
<td>5.0 + 5</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>1000 V</td>
<td>1 V</td>
<td>5 MΩ / &lt; 400 pF</td>
<td>±2% rdg. + ... d</td>
<td>5.0 + 5</td>
<td>V</td>
</tr>
</tbody>
</table>

| A              | 60 mA           | 10 μA    | 100 mV          | ±2% rdg. + ... d | 5.0 + 5          | A              |
|                | 600 mA          | 100 μA   | 700 mV          | ±2% rdg. + ... d | 5.0 + 5          | A              |
|                | 6 A             | 1 mA    | 200 mV          | ±2% rdg. + ... d | 5.0 + 5          | A              |
|                | 10 A            | 10 mA   | 300 mV          | ±2% rdg. + ... d | 5.0 + 5          | A              |

| Ω              | 600 Ω           | 0.1 Ω    | 250 μA          | ±2% rdg. + ... d | 5.0 + 5          | Ω              |

| °C             | 100 kHz         | 0.1 Hz   | ±2% v. MUL + 8 D | 1000 V          | max. 10 s       | °C             |
|                | 1 kHz           | 1 Hz     | ±2% v. MUL + 8 D | 1000 V          | max. 10 s       | °C             |

| Hz             | 10 ... 100 Hz   | 0.1 Hz   | ±2% v. MUL + 8 D | 1000 V          | max. 10 s       | Hz             |
|                | 1000 Hz         | 1 Hz     | ±2% v. MUL + 8 D | 1000 V          | max. 10 s       | Hz             |

| Hz             | 1000 Hz         | 1 kHz    | ±2% v. MUL + 8 D | 1000 V          | max. 10 s       | Hz             |

| Hz             | 1 kHz           | 10 kHz   | ±2% v. MUL + 8 D | 1000 V          | max. 10 s       | Hz             |

### Reference Conditions
- Ambient temperature: +23 °C ± 2 K
- Relative humidity: 40 ... 60%
- Measured quantity frequency: 45 ... 65 Hz
- Measured quantity waveshape: Sinusoidal
- Battery voltage: 3 V ± 0.1 V

**Key**
- rdg. = reading (measured value)
- d = digit
- MUL = upper range limit
- MR = measuring range
Influencing Quantities and Influence Error

<table>
<thead>
<tr>
<th>Influencing Quantity</th>
<th>Sphere of Influence</th>
<th>Measured Quantity / Measuring Range</th>
<th>Influence Error 1) ±( rdg. + ... digits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>0 °C ... +21 °C and +25 °C ... +40 °C</td>
<td>600 mV to 600 V</td>
<td>1.0 + 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1000 V</td>
<td>0.2 + 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V</td>
<td>0.4 + 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 Ω</td>
<td>0.15 + 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 MEΩ</td>
<td>0.25 + 2</td>
</tr>
<tr>
<td></td>
<td>&gt; 30 Hz ... 45 Hz</td>
<td>A</td>
<td>2.0 + 10</td>
</tr>
<tr>
<td></td>
<td>&gt; 65 Hz ... 1 kHz</td>
<td>60 / 600 mA / 6 A</td>
<td>1.5 + 10</td>
</tr>
<tr>
<td></td>
<td>&gt; 30 Hz ... 45 Hz</td>
<td>10 A</td>
<td>2 + 10</td>
</tr>
<tr>
<td></td>
<td>&gt; 65 Hz ... 500 Hz</td>
<td>600 mV</td>
<td>3 + 10</td>
</tr>
<tr>
<td></td>
<td>&gt; 65 Hz ... 800 Hz</td>
<td>600 V</td>
<td>35 + 20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1000 V</td>
<td>35 + 20</td>
</tr>
</tbody>
</table>

Crestfactor CF

Test signal: Rectangle 55 Hz, no DC component

\[ CF = \frac{U_1}{U_{eff}} = \frac{1}{1 + \frac{T_1}{T}} \]

<table>
<thead>
<tr>
<th>Crest factor CF</th>
<th>Measured Quantity / Measuring Range</th>
<th>Influence Error ±( rdg. + ... digits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5 &lt; CF ≤ 2</td>
<td>6 V, 60 V, 600 V, 1000 V</td>
<td>±1 % rdg.</td>
</tr>
<tr>
<td>2 &lt; CF ≤ 4</td>
<td></td>
<td>±5 % rdg.</td>
</tr>
</tbody>
</table>

The admissible crest factor CF of the alternating quantity to be measured depends on the display value. Crest factor 4 at the end of range, it is increased accordingly when the range is reduced. However, due to input protection, voltage is limited to 1000 V, therefore the admissible crest factor in the 600 V ranges is half as high.

Power limiting: voltage x frequency max. 3 x 10^6 V x Hz.

Response Time (after manual range selection)

<table>
<thead>
<tr>
<th>Measured Quantity / Measuring Range</th>
<th>Response Time</th>
<th>Measured Quantity / Measuring Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td></td>
<td>Voltage</td>
</tr>
<tr>
<td>0.7 s</td>
<td>1.5 s</td>
<td>from 0 to 80% of the upper range limit</td>
</tr>
<tr>
<td>1.5 s</td>
<td>2 s</td>
<td>from 80% to 50% of the upper range limit</td>
</tr>
<tr>
<td>4 s</td>
<td>5 s</td>
<td></td>
</tr>
<tr>
<td>6 s</td>
<td>7 s</td>
<td></td>
</tr>
<tr>
<td>8 s</td>
<td>9 s</td>
<td></td>
</tr>
</tbody>
</table>

Display

LCD panel (65 mm x 30 mm) with analog and digital display including unit of measure, type of current and various special functions

Analog:
Display: LCD scale with pointer
Scale length: 55 mm in all ranges
Scaling: 0 ... 60 with 61 scale divisions in all ranges
Polarity display: With automatic switching
Overflow display: Triangle
Measuring rate: 30 measurements per second

Digital:
Display / char. height: 7-segment characters / 15 mm
Number of places: 36/7-place, 6000 steps
Overflow display: “–” sign is displayed if plus pole is connected to –
Measuring rate: 3 measurements per second

Electromagnetic Compatibility (EMC)

Interference emission: EN 61326-1: 2006 class B
Interference immunity: EN 61326-1: 2006
EN 61326-2-1: 2006
International TRMS Multimeter

Power Supply

- Battery: 2 x 1.5 V AA size batteries, alkaline manganese per IEC LR6 or equivalent rechargeable NiCd battery
- Service life: With alkaline manganese: approx. 750 hours for V, A; approx. 200 hours for V, A
- Battery test: If battery voltage drops to below approximately 2.1 V, the minus sign is displayed automatically.

Electrical Safety

- Safety class: II per IEC 61010-1:2010/EN 61010-1:2011
- Measuring category: 1000 V CAT III, 600 V CAT IV
- Nominal voltage: 1000 IV
- Pollution degree: 2
- Test voltage: 6.7 kV~ per IEC 61010-1/EN 61010-1

Fuses

- Fuses for all ranges up to 600 mA: FF 1.6 A/1000 V, 6.3 mm x 32 mm, switching capacity: 10 kA at 1000 V with ohmic load, protects all current measuring ranges up to 600 mA in combination with power diodes
- Fuses for all ranges up to 10 A: FF 10 A/1000 V, 10 mm x 38 mm, switching capacity: 30 kA at 1000 V with ohmic load, protects 6A and 10 A ranges to 1000 V

Data Interface

- Type: Optical via infrared light through the housing
- Data transmission: Serial, bidirectional (not IrDa compatible)
- Protocol: Device specific
- Baud rate: 9600 baud

The USB plug-in interface adapter (see accessories) is used for adaptation to the PC’s USB port.

Ambient Conditions

- Accuracy range: 0 °C ... + 40 °C
- Operating temp.: −10 °C ... + 50 °C
- Storage temperature: −25 °C ... + 70 °C without batteries
- Relative humidity: 45 ... 75%, no condensation allowed
- Elevation: to 2000 m

Mechanical Design

- Protection: IP 40, IP 20 at the connector jacks per DIN VDE 0470, part 1 / EN 60529
- Dimensions: 84 mm x 195 mm x 35 mm
- Weight: Approx. 350 gr. with battery

Applicable Regulations and Standards

- IEC 61010-1/EN 61010-1/VDE 0411-1: Safety requirements for electrical equipment for measurement, control and laboratory use
- EN 60529 VDE 0470, Part 1: Test instruments and test procedures
- DIN EN 61326-2-1 VDE 0843-2-2-1: Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 2-1: Particular requirements for sensitive test and measurement equipment

Standard Equipment

1. TRMS-digital multimeter
2. 2 x 1.5 V AA size batteries
1. set of measurement cables KS17-2
1. short-form operating instructions

Detailed operating instructions are available on our website www.gossenmetrawatt.com.

Order Information

- Description
- Type
- Article Number

**Analog-digital multimeter with IR interface, standard equipment as above**

**METRALINE DMM16**

**M196A**

**Accessories**

- Protective rubber holster with carrying strap
- DAkkS calibration certificate for METRALINE DMM16
- Fast reacting surface temperature sensor, type K (NiCr-Ni) –50 ... +400 °C
- Clip-on current transformer, 30 mA ... 150 A~, 1000:1, ±2.5 %, 1 mA/A
- Clip-on current sensor 60 / 600 A , 40 / 400 A , 10 mV / A or 1 mV / A
- Carrying pouch
- Imitation leather carrying pouch for one METRALINE Hit and accessories
- Imitation leather carrying pouch for two METRALINE Hit and accessories
- Hard case for 1 METRALINE Hit and accessories
- Hard case for two METRALINE Hit, adapter and accessories
- Fuses (pack of 10)
- Fuses (pack of 10)

For additional information on accessories, please refer to:

- our „Measuring Instruments and Testers“ catalogue
- our website www.gossenmetrawatt.com

Prepared in Germany • Subject to change without notice • A pdf version is available on the Internet