Operating Instructions

GOSSEN METRAWATT

# MINITEST | MASTER | PRO | BASE

## Testers per DIN VDE 0701-0702

3-349-358-15
6/1.11


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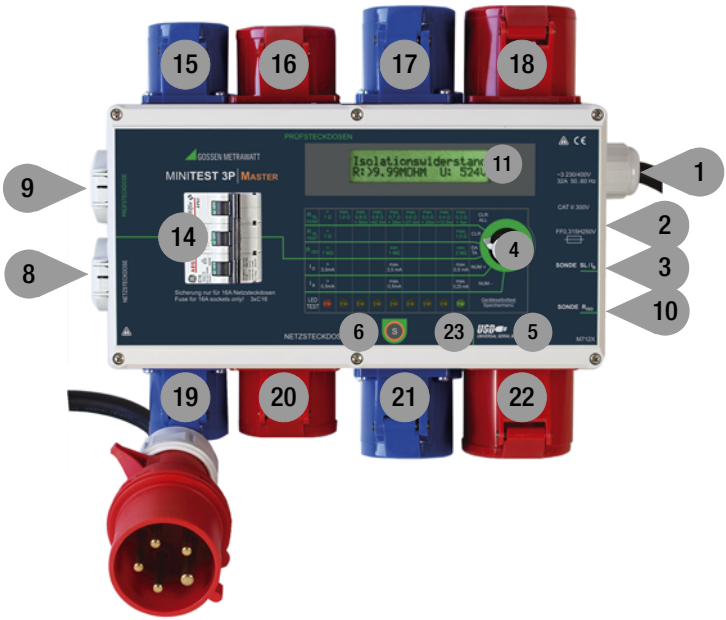
TEST BEFORE USE
MINITEST MASTER
230V 16A
CAT II 300V
FF0,315H250V
M712U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MINITEST 3P MASTER

1 Mains power cable
2 Fuse (for protecting the probe (3))
3 Probe connector socket for measuring protective conductor current (PE) or contact current ($I_C$)
4 Rotary switch for selecting the desired measuring function
5 USB port *
6 Send key * for data transmission or storage
7 LEDs for indicating adherence to, or violation of limit values
8 Earthing contact mains outlet
9 Earthing contact test socket
10 Probe connector socket for insulation resistance measurement (only necessary for Safety Class II)
11 LCD *
12 POWER ON key *
13 RCCB test/POWER OFF key *
14 Fuse for 16 A mains outlets and mains switch
15 CEE test socket 1P+N+PE 16 A-6h
16 CEE test socket 3P+N+PE 16 A-6h
17 CEE test socket 1P+N+PE 32 A-6h
18 CEE mains socket 3P+N+PE 32 A-6h
19 CEE mains socket 1P+N+PE 16 A-6h
20 CEE mains socket 3P+N+PE 16 A-6h
21 CEE mains socket 1P+N+PE 32 A-6h
22 CEE mains socket 3P+N+PE 32 A-6h
23 Barcode scanner connection (9-pin, subminiature plug) **
24 Probe cable

* not for **MINITEST | BASE**
** **MINITEST | MASTER** and **MINITEST 3P | MASTER** only

| **Features of MINITEST | ... series** | **MINITEST 3P \| MASTER** | **MINITEST \| MASTER** | **MINITEST \| PRO** | **MINITEST \| BASE** |
|---|---|---|---|---|
| **Connection types** | | | | |
| Tests on monophase DUTs | ✘ | ✘ | ✘ | ✘ |
| Tests on 3-phase DUTs via additional test sockets CEE 16A / CEE 32A | ✘ | – | – | – |
| **Fusing devices** | | | | |
| Fuse for probe connection | ✘ | ✘ | ✘ | ✘ |
| RCCB in mains plug | – | ✘ | ✘ | – |
| Miniature circuit breaker | ✘ | – | – | – |
| **Report functions** | | | | |
| Illuminated two-line LCD * | ✘ | ✘ | ✘ | – |
| Memory for 2,000 tests (10 measured values per test) | ✘ | ✘ | – | – |
| Key for transmission of measured values | ✘ | ✘ | ✘ | – |
| Key for storing measured values | ✘ | ✘ | – | – |
| Data interface (USB port) | ✘ | ✘ | ✘ | – |
| Barcode scanner connection (9 pin, subminiature plug) | ✘ | ✘ | – | – |

* as from series launched in March 2007

| **Standard equipment accessories of MINITEST | ... series** | **MINITEST 3P \| MASTER** | **MINITEST \| MASTER** | **MINITEST \| PRO** | **MINITEST \| BASE** |
|---|---|---|---|---|
| Probe cable with test probe | ✘ | ✘ | ✘ | ✘ |
| Adapter for earthing contact plug to CEE coupling 3P+N+PE 32 A-6h | ✘ | – | – | – |
| Adapter for plug 1P+N+PE 16 A to CEE coupling 3P+N+PE 32 A-6h | ✘ | – | – | – |
| Adapter for plug 3P+N+PE 16 A to CEE coupling 3P+N+PE 32 A-6h | ✘ | – | – | – |
| Adapter for plug 1P+N+PE 32 A to CEE coupling 3P+N+PE 32 A-6h | ✘ | – | – | – |
| USB connector cable | ✘ | ✘ | ✘ | – |
| Operating instructions | ✘ | ✘ | ✘ | ✘ |

Table of Contents



## 1 Applications

The test instrument is used to test the electrical safety of monophase and 3-phase electrical devices. The test instrument allows for the measurement of protective conductor resistance, insulation resistance and differential current and/or contact current in accordance with DIN VDE 0404.

## 2 Safety Features and Precautions

The test instrument has been manufactured and tested in accordance with the following safety regulations:

IEC 61010-1 / DIN EN 61010-1 / VDE 0411-1, DIN VDE 0413 parts 2 and 4.

When used for its intended purpose, the safety of the user, the test instrument and the device under test (electrical equipment or electrical medical device) is assured.

**Read the operating instructions carefully and completely before placing your test instrument into service. Follow all instructions contained therein. Make sure that the operating instructions are available to all users of the instrument.**

Tests may only be performed by a qualified electrician, or under the supervision and direction of a qualified electrician. The user must be instructed by a qualified electrician in the execution and evaluation of tests.

### Safety Precautions for MINITEST 3P | MASTER

The instrument is intended for connection with a 3-phase system up to 32 A.

**MINITEST 3P** | MASTER can also be connected to all customary CEE and earthing contact outlets via the adapters included in the standard equipment.

**Attention!**
The instrument may only be connected to the mains via the adapters included in the standard equipment.

**Attention!**
All mains sockets and/or test sockets are connected in parallel:
Only one DUT at a time may therefore be connected to a socket.

**Observe the following safety precautions:**

- **MINITEST** | **MASTER** | **PRO** | **BASE**:
  The instrument may only be connected to electrical systems with a maximum of 230 V which are protected with a fuse or circuit breaker with a maximum rating of 16 A.
- Measurements within electrical systems are prohibited.
- Be prepared for the occurrence of unexpected voltages at devices under test (for example, capacitors may be dangerously charged).
- Make certain that the measurement cables are in flawless condition, e.g. no damage to insulation, no cracks in cables or plugs etc.
- **Insulation Resistance Measurement $R_{ISO}$**
  Testing is conducted with up to 500 V. Current limiting is utilized ($I < 3.5$ mA), but if the terminals (L or N) are touched, electrical shock may occur which could result in consequential accidents.
- **Differential Current Measurement $I_D$ / Contact Current Measurement $I_C$**
  It is absolutely essential to assure that the device under test is operated with line voltage during performance of the differential current and/or contact current measurement. Exposed conductive parts may conduct dangerous contact voltage during testing, and may not under any circumstances be touched (**MINITEST** | **MASTER** | **PRO**:
  mains power is disconnected if leakage current exceeds approx. 15 mA).
- The function test may only be performed after the device under test has successfully passed the safety test while connected to the test socket!

**The measuring and test instrument may not be used:**

- if it demonstrates visible damage
- with damaged connector cables and measuring cables
- if it no longer functions properly
- after extraordinary stresses due to transport
- **MINITEST 3P** | **MASTER**: with other adapters than those included in the standard equipment.

In such cases, the instrument must be removed from operation and secured against unintentional use.

**Meanings of Symbols on the Instrument**

The symbols on the instrument have the following meanings:

Warning concerning a point of danger (attention: observe documentation!)

Indicates EC conformity

The device may not be disposed of with the trash. Further information regarding the WEEE mark can be accessed on the Internet at www.gossenmetrawatt.com by entering the search term WEEE.

## 3 Initial Start-Up

### Connection

Connect the test instrument's mains plug to the mains power outlet.

**MINITEST 3P | MASTER:**

The instrument can be connected to all customary CEE sockets by means of the mains connection adapter (standard equipment).

### Switching the MINITEST 3P | MASTER On:

The instrument is switched on via the 3-pole miniature circuit breaker (m.c.b.).

### Switching the MINITEST | MASTER | PRO | BASE On

The test instrument can be switched on with the green power-on switch located on the integrated residual current protective device. It can be switched back off again with the blue test key.

### Switching the MINITEST | BASE On

The test instrument is switched on and off with the help of the mains plug.

## 4 Test Sequence

Testing for electrical safety always begins with a visual inspection. The measurements are then conducted in the order in which they appear next to the selector switch on the test instrument, from top to bottom.

For each type of measurement, the test instrument evaluates the measured values and indicates whether or not limit values in accordance with DIN VDE 0701-0702 have been adhered to by means of an LED array.

| Indication | Meaning |
|---|---|
| **Green LED** | The measured value is better than the strictest limit value. |
| **Red LED** | The measured value is worse than the most lenient limit value. |
| **Yellow LED** | The limit value is in-between the strictest and the most lenient limit values. Whether or not the DUT passes testing depends upon the device's classification. Evaluation should be conducted by a qualified electrician. |

The number and type of required measurements are determined according to the classification of the device under test:

| Device Under Test | | | Connect DUT to the test socket. | | | | Connect DUT to mains outlet. – Switch the DUT on. | |
|---|---|---|---|---|---|---|---|---|
| | | | **Protective conductor resistance** Probe socket PE/ $I_C$ | **Protective conductor resistance** Permanent, probe socket PE/ $I_C$ | **Insulation resistance** No probe required | **Insulation resistance** Probe socket $R_{ISO}$ | **Differential current** No probe required | **Contact current** Probe socket PE/ $I_C$ |
| Safety class I | Earth contact plug | All exposed parts are connected with PE | ✘ | | ✘ | | ✘ Test with the mains plug poled in both directions. | |
| | | With exposed parts which are not connected with PE | | | | ✘ | ✘ Test with the mains plug poled in both directions. | ✘ Test with the mains plug poled in both directions. |
| | CEE plug * | All exposed parts are connected with PE | ✘ | | ✘ | | ✘ | |
| | | With exposed parts which are not connected with PE | ✘ | | | ✘ | ✘ | ✘ |
| | Permanently connected DUT | | | ✘ | | | | ✘ |
| Safety class II | With European earth contact plug | | | | | ✘ | | ✘ Test with the mains plug poled in both directions. |

* **MINITEST 3P** | **MASTER** only

| Use of mains outlet number depending on the mains terminal (all test sockets as well as mains outlets No. 8 and 19 can always be used regardless of which mains adapters are used) | Mains outlet number | | |
|---|---|---|---|
| | 20 | 21 | 22 |
| Mains connection with mains plug 3P+N+PE 32 A | ✘ | ✘ | ✘ |
| Connection with earthing contact plug adapter to CEE coupling 3P+N+PE 32 A-6h | – | ✘ max. 16 A | – |
| Connection with adapter for plug 1P+N+PE 16 A to CEE coupling 3P+N+PE 32 A-6h | – | ✘ max. 16 A | – |
| Connection with adapter for plug 3P+N+PE 16 A to CEE coupling 3P+N+PE 32 A-6h | ✘ | ✘ max. 16 A | ✘ max. 16 A |
| Connection with adapter for plug 1P+N+PE 32 A to CEE coupling 3P+N+PE 32 A-6h | – | ✘ | – |

# 5 Descriptions of Individual Measurements

## 5.1 Measurements at the Test Outlet(s)

### Protective Conductor Resistance, $R_{PE}$ SOCKET

The probe must be plugged into the **PROBE PE/$I_C$** socket for the measurement of protective conductor resistance. Measurement is performed between the protective conductor terminal at the test outlet and the **PROBE PE/$I_C$** socket.

### Protective Conductor Resistance, $R_{PE}$ FIX

This measurement is used for testing the protective conductor at permanently connected devices. The test instrument must be connected to the same supply circuit as the device under test during measurement.

**Attention!**
Good test results may be obtained with parallel ground connections, although the protective conductor is interrupted.

The probe must be plugged into the **PROBE PE/$I_C$** socket for the measurement of protective conductor resistance. Measurement is performed between the protective conductor terminal at the mains connection and the **PROBE PE/$I_C$** socket.

Testing is performed up through a resistance value of approximately 1.3 Ω with automatic polarity reversal.

The earthing contact resistance and the test current are indicated on the LCD (not for **MINITEST** | **BASE**).

### Checking the Zero Point and the Fuse

The zero point and the internal fuse can be checked by inserting the plug attached to the test probe cable into the **PROBE $R_{ISO}$** socket and the tip of the test probe into the **PROBE PE/$I_C$** socket with the selector switch in the **$R_{PE}$ SOCKET** or **$R_{PE}$ FIX** setting. The displayed value should not exceed 100 mΩ.

**Note:** If a current of 0 mA is indicated, the fuse is usually defective. Test and replace it, if required.

**Attention!**
It is absolutely essential to insert the tip of the test probe into the **PROBE PE/$I_C$** socket for this test!

**Attention!**
Use only the probe cable which is included with the test instrument. If a different probe cable is used:
– The measured value may be distorted.
– The test instrument may be damaged.
– Malfunctioning may occur.

### Insulation Resistance, $R_{ISO}$

Various test types are provided for the measurement of insulation resistance.

The test type is selected automatically when the test probe is plugged into the probe connector socket (10).

The original test probe cable must be used in order to take advantage of this function. Test type switching cannot be assured if other test probe cables are used.

- For safety class I DUTs without exposed conductive parts:
  Test insulation between L/N and PE at the test outlet.
  **The test probe cable may not be plugged into the PROBE $R_{ISO}$ socket for this test!**
- For safety class II DUTs, or for safety class I DUTs with exposed conductive parts which are not connected to the protective conductor:
  Test between L/N at the test outlet and the **PROBE $R_{ISO}$** socket.
  **The test probe must be plugged into the PROBE $R_{ISO}$ socket for this test!**

The insulation resistance and the test voltage are indicated on the LCD (not for **MINITEST** | **BASE**).

### Discharging the Device Under Test

The device under test is automatically discharged when the insulation test is switched off (turn switch to $R_{PE}$ or $I_D$).

The LEDs light up rapidly, one after the other from left to right, during discharging.

Furthermore, residual voltage appears at the display (not for **MINITEST** | **BASE**).

Leave the DUT connected to the test instrument during the discharging sequence.

## 5.2 Measurements at the Mains Outlet(s)

Differential current and/or contact current measurements are performed at the mains outlet(s). The DUT must be unplugged, and plugged back in again. **In the case of mains plugs which are not polarity protected, testing must be conducted with the mains plug poled in both directions.**

**Attention!**
The mains outlet(s) always conduct(s) voltage as soon as the test instrument has been switched on.

**Note!**
Make sure that the device under test is switched off before plugging it into the mains outlet.

### The device under test must be switched on during testing.

The device under test must be switched back off before it is unplugged from the mains outlet.

### Differential Current Measurement, $I_D$

Total current from all phase conductors is measured during differential current measurement. For safety class I devices, this corresponds to the amount of current which is conducted by the protective conductor.

Differential current is displayed in mA at the LCD (not for **MINITEST** | **BASE**).

### Evaluating the Measured Values

Measured values of less than 0.5 mA are indicated by means of a green LED.

Measured values of greater than 3.5 mA are indicated by means of a red LED. These devices may be dangerous, **however, for example for 3-phase current devices, there may be higher admissible limit values of e.g. 1 mA per kW up to 10 mA, depending on the manufacturer's specifications. These cases are all indicated with the red LED.** Evaluation must be conducted by a qualified electrician in this case.

Measured values of between 0.5 and 3.5 mA are indicated by means of a yellow LED. An evaluation of electrical safety should be conducted by a qualified electrician in this case.

### Contact Current Measurement, $I_C$

When measuring contact current, current is measured which is conducted via the probe at the **PROBE PE/$I_C$** socket to the protective conductor terminal at the device under test.

### Evaluating the Measured Values

Measured values of less than 0.25 mA are indicated by means of a green LED. There is no danger in touching these parts.

Measured values of greater than 0.5 mA are indicated by means of a red LED. Devices which demonstrate these values are dangerous because persons who touch them are startled, which may result in consequential accidents.

These devices may not be placed back into service.

Measured values of between 0.25 and 0.5 mA are indicated by means of a yellow LED. Current within this range is not dangerous, but the threshold of perception is approximately 0.1 mA depending upon sensitivity, which causes mild tingling. This is unpleasant for some people, for which reason devices of this sort should be examined.

### Self-Test

A device self-test is conducted when the selector switch is turned to the LED Test position.

Testing is indicated by the LEDs which light up one after the other from left to right.

# 6 Report Functions

Depending on the selected operating mode, the measured values and the result of each test can be transmitted to a PC via USB port for onward processing or stored to the internal device memory. The transmission or storage process of measured values is indicated by all LEDs lighting briefly up from right to left.

| Operating mode selected at the test instrument | MINITEST 3P \| MASTER | MINITEST \| MASTER | MINITEST \| PRO |
|---|---|---|---|
| **Transmission mode** (Transmission of individual measured values) | ✘ | ✘ | ✘ |
| **Permanent transmission** (Continuous transmission of measured values) | ✘ | ✘ | ✘ |
| **Memory mode** (Internal measured value memory) | ✘ | ✘ | — |

### Selection of Operating Mode

The corresponding PC analysis software programs have to be installed and started for the three different operating modes in order to receive data, see table above.

Press key „S“ (6) when switching on the instrument to set the requested operating mode. The following operating modes are shown in subsequent order:

- „Transmission mode“, siehe chapter 6.1
- „Permanent transmission“, see chapter 6.2
- „Memory mode“, see chapter 6.3

The operating mode which is indicated when releasing key „S“ (6) is selected. This setting remains active even after switching off the instrument.

## 6.1 Transmission Mode

To transmit the current measured value, key „S“ must be pressed in operating mode „Transmission mode“.

## 6.2 Permanent Transmission

If operating mode „Permanent transmission“ is activated, each measured value is transmitted via the USB port.

## 6.3 Memory Mode

In the test instruments **MINITEST** | MASTER or **MINITEST 3P** | MASTER a maximum of 2,047 DUTs with 10 measured values per DUT can be stored. If an attempt is made to store more than 10 measured values for one DUT, the additional values are ignored and the red LED lights up briefly.

### 6.3.1 Activate Memory Menu

After selecting memory mode (see above) you have to set the rotary switch to position Geräteselbsttest/Speichermenü *(Self-test/Memory Menu)*. Activate the memory menu by pressing key „S“ (6). The following is shown on the LCD:

**** MEMORY MENU ** SELECTION -> SWITCH**.

You may now select the requested memory function via the rotary switch.

### 6.3.2 Selecting Memory Function

➪ **Key NUM – > Menu DUT NUM –**

The number of the current memory location is reduced by one each time key „S“ (6) is pressed. The lowest possible value is „1“. The letter „D“ in front of the number signifies that data are already available for this memory location.

➪ **Key NUM + > Menu DUT NUM+**

The number of the current memory location is increased by one each time key „S“ (6) is pressed. The highest possible value is „2,047“, i.e. a maximum of 2,047 DUTs can be tested. The letter „D“ in front of the number signifies that data are already available for this memory location.

➪ **Key DATA > Menu MEASURED VALUE NO.**

In this switch position all measured values of a DUT are shown in a consecutive, numerical sequence in the order of their recording.

➪ **Key CLR > Menu DUT DEL ?**

Pressing key „S“ (6) deletes the current memory location, i.e. all data for the selected DUT. As a preventive measure against accidental deletion you have to keep key „S“ (6) pressed for about half a second before the deletion process is started. The red LED lights up during the deletion.

➪ **Key CLR ALL > Menu DELETE MEMORY ?**

Pressing key „S“ (6) deletes the entire device memory. As a preventive measure against accidental deletion you have to keep key „S“ (6) pressed for about 1 to 2 seconds before the deletion process is started. The red LED lights up during the deletion.

### 6.3.3 Exiting the Memory Menu

Set the rotary switch to position Geräteselbsttest/Speichermenü *(Self-test/Memory Menu)* and press key „S“ (6) to exit the memory menu.

In operating mode „Memory mode“ the last measured value indicated after a measurement is shown when pressing key „S“ (6). The storage operation - as well as transmision of the values via USB port - is indicated by a flickering of the LEDs. If more than 10 values are stored for one DUT, the red LED lights up additionally for approx. half a second, thus signalling that it was not possible to store the measured values.

### 6.3.4 Reading out Stored Measured Values at the PC

Prerequisite: The test instrument may not be set to Geräteselbsttest/Speichermenü *(Memory Menu or Self-test)*.

The stored measured values can be transmitted from the test instrument to a PC via the analysis software and the USB port where they can be evaluated and documented.

### 6.3.5 Barcode Scanner Function

Connect the barcode scanner to jack 23. Only barcode scanners by GMC-I Messtechnik GmbH may be used, e. g. type B3261.

Barcode scanners with USB port are not suitable.

In function „NUM+“ and „NUM-“ a text comprising a maximum of 24 characters which has been scanned with the barcode scanner is recorded as a description of the DUT. The text is shown in the second line of the LCD and stored.

### 6.3.6 Switching Off Safely

You have to exit the memory menu before switching off the test instrument or disconnecting it from the mains. Set the rotary switch (4) to position Geräteselbsttest/Speichermenü *(Self-test/Memory Menu)* and press key „S“ (6) for approx. half a second.

# 7 Technical Data

| Measured Quantity | Measuring Range | Reso-lution | $U_{no\text{-}load}$ | $R_i$ | $I_K$ | $I_N$ |
|---|---|---|---|---|---|---|
| Protective conductor resistance | 0 … 1.30 Ω<br>1.0 … 99.9 Ω | 10 mΩ<br>100 mΩ | < 5 V –<br>< 5 V – | | | > 200 mA * |
| Insulation resistance | 0 … 9.99 MΩ | 10 kΩ | 520 V – | approx. 50 kΩ | < 3.5 mA | > 1 mA |
| Contact current measurement (verification of absence of voltage) | 0 … 9.99 mA ~ | 10 µA | | 1 kΩ | | |
| Differential current **MINITEST** \| MASTER \| PRO \| BASE | 0.1 . . . 9.99 mA~ | 10 µA | | | | |
| Differential current **MINITEST 3P** \| MASTER | 0.2 . . . 9.99 mA~ | 10 µA | | | | |

* With automatic polarity reversal

## Intrinsic Error and Measuring Error

| Measured Quantity | Intrinsic Uncertainty | Measuring Uncertainty |
|---|---|---|
| Protective conductor resistance | ± (5% rdg. + 4 d) | ± (10% rdg. + 6 d) |
| Insulation resistance | ± (7% rdg. + 2 d) | ± (10% rdg. + 5 d) |
| Contact current measurement (verification of absence of voltage) | ± (5% rdg. + 4 d) | ± (10% rdg. + 5 d) |
| Differential current **MINITEST** \| MASTER \| PRO \| BASE | ± (5% rdg. + 6 d) | ± (10% rdg. + 6 d) |
| Differential current **MINITEST 3P** \| MASTER | ± (5 % rdg. + 10 d) | ± (10 % rdg. + 10 d) |

## Influencing Quantities and Influence Error

| Influencing Quantity / Sphere of Influence | Designation per DIN VDE 0404 | Influence Error ± … % of Measured Value |
|---|---|---|
| **Change of position** | E1 | — |
| **Change to test equipment supply voltage** | E2 | 2.5 |
| **Temperature fluctuation**<br>0 … 21° C and 25 … 40° C | E3 | Specified influence error valid starting with temperature changes as of 10 K:<br>1 for protective conductor resistance<br>0.5 for all other measuring ranges |
| **Amount of current at DUT** | E4 | 2.5 |
| **Low frequency magnetic fields** | E5 | 2.5 |
| **DUT impedance** | E6 | 2.5 |
| **Capacitance during insulation measurement** | E7 | 2.5 |
| **Waveshape of measured current** | E8 | |
| 49 … 51 Hz | | 2 with capacitive load (for equivalent leakage current) |
| 45 … 60 Hz | | 1 (for contact current) |
| | | 2.5 for all other measuring ranges |

### Reference Conditions

| | |
|---|---|
| Ambient temperature | +23 °C ±2 K |
| Relative humidity | 40 ... 60% |
| Line voltage | |
| **MINITEST** \| MASTER \| PRO \| BASE: | 230 V ±1% |
| **MINITEST 3P** \| MASTER: | 230 V/400 V ±1% |
| Measured quantity frequency | 50 Hz ±0.2% |
| Measured quantity waveshape | Sine (deviation between RMS and rectified value: ±0.5%) |

### Ambient Conditions

| | |
|---|---|
| Operating temp. | 0 to + 40 °C |
| Storage temp. range | –20 to +70 °C |
| Humidity | Max.75%, no condensation allowed |
| Elevation | to 2000 m |

### Power Supply

Line voltage

| | |
|---|---|
| **MINITEST** \| MASTER \| PRO \| BASE: | 230 V 50 Hz |
| **MINITEST 3P** \| MASTER: | 230 V/400 V50 Hz |

Throughput rating

| | |
|---|---|
| **MINITEST** \| MASTER \| PRO \| BASE: | max. 3700 VA |
| **MINITEST 3P** \| MASTER: | max. 38.4 kVA |

depending upon load at the mains outlet

### Electrical Safety

| | |
|---|---|
| Safety class | I |
| Nominal line voltage | 230 V |
| Test voltage | Mains + PE (mains) to test outlet, probe socket PE/$I_C$ or $R_{ISO}$ : 1.5 kV~ Mains to PE (mains): 3 kV~ |
| Measuring category | 300 V CAT II |
| Contamination degree | 2 |
| Fuse | FF0,315H1000V or FF0,315H500V or FF0,315H250V **MINITEST 3P** \| MASTER only: 3 x C16A |
| Residual current protective device (**MINITEST** \| MASTER \| PRO) | 30 mA with undervoltage trigger and inhibiting of automatic restart |

### Display and Indicating Devices

#### LCD (not for MINITEST | BASE)

Dot matrix display, two lines of 20 characters each

#### LEDs

9 LEDs for indicating compliance with or violation of limit values:
1 red, 7 yellow and 1 green

### Mechanical Design

Dimensions/weight

**MINITEST** | MASTER | PRO | BASE:
W x H x D: 200 mm x 1mm x 77 mm (without integrated outlets, grommets and rotary switch)

| | |
|---|---|
| Weight | approx. 1.5 kg |

**MINITEST 3P** | MASTER
W x H x D: 350 mm x 160 mm x 125 mm (without surface-type outlets, grommets, circuit breaker and rotary switch)
(overall dimensions without cables)

| | |
|---|---|
| Weight | approx. 3.3 kg |
| Protection | housing IP 44, terminals IP 20 |

Table excerpt regarding significance of the IP codes

| IP XY (1st digit X) | Protection against foreign object entry | IP XY (2nd digit Y) | Protection against the penetration of water |
|---|---|---|---|
| 2 | ≥ 12.5 mm dia. | 0 | not protected |
| 4 | ≥ 1.0 mm dia. | 4 | splashing water |

### Electromagnetic Compatibility (EMC)

| | |
|---|---|
| Interference emission | EN 61326-1:2006 class B |
| Interference immunity | EN 61326-1:2006 |

# 8 Maintenance

## 8.1 Housing

No special maintenance is required for the housing. Keep outside surfaces clean. Use a slightly dampened cloth for cleaning. Avoid the use of cleansers, abrasives or solvents.

## 8.2 Replacing the Fuse

Instructions on checking the zero point and fuse are given in chapter 5.1.

**Attention!**
Disconnect the instrument from the measuring circuit before removing the fuse for replacement!

Eliminate the cause of the overload after the fuse has blown before putting the instrument back into service!

The fuse holder is situated between the mains power cable and the probe connector socket. The characteristic value of the fuse is indicated on the front plate or in chapter 7.

**Attention!**
Please make absolutely sure that only the specified fuse is inserted! If fuses with other blowing characteristics, other current ratings or other breaking capacities are used, the operator is placed in danger, and protective diodes, resistors and other components may be damaged.

The use of mended fuses or short-circuiting the fuse holder is prohibited.

The defective fuse can be disposed of with the trash.

## 8.3 Recalibration

The respective measuring task and the stress to which your measuring instrument is subjected affect the ageing of the components and may result in deviations from the guaranteed accuracy.

If high measuring accuracy is required and the instrument is frequently used in field applications, combined with transport stress and great temperature fluctuations, we recommend a relatively short calibration interval of 1 year. If your measuring instrument is mainly used in the laboratory and indoors without being exposed to any major climatic or mechanical stress, a calibration interval of 2-3 years is usually sufficient.

During recalibration* in an accredited calibration laboratory (DIN EN ISO/IEC 17025) the deviations of your instrument in relation to traceable standards are measured and documented. The deviations determined in the process are used for correction of the readings during subsequent application.

We are pleased to perform DKD or factory calibrations for you in our calibration laboratory. Please visit our website at www.gossenmetrawatt.com (→ Services → DKD Calibration Center *or* → FAQs → Calibration questions and answers).

By having your measuring instrument calibrated regularly, you fulfill the requirements of a quality management system per DIN EN ISO 9001.

Standards DIN VDE 0701-0702 and IEC 63353 (VDE 0751) stipulate that only measuring instruments which are regularly tested and calibrated may be used for testing.

* Verification of specifications or adjustment services are not part of the calibration. For products from our factory, however, any necessary adjustment is frequently performed and the observance of the relevant specification is confirmed.

Note:
These tests can be performed on-site with the SECU-cal 10 calibration adapter accessory.

### 8.4 Return and Environmentally Sound Disposal

The test instrument is a category 9 product (monitoring and control instrument) in accordance with ElektroG (German electrical and electronic device law). This device is not subject to the RoHS directive.

We identify our electrical and electronic devices (as of August 2005) in accordance with WEEE 2002/96/EC and ElektroG with the symbol shown to the right per DIN EN 50419.

These devices may not be disposed of with the trash.

Please contact our service department regarding the return of old devices (see chapter 10).

## 9 Accessories

### 9.1 Standard Equipment

Please refer to page 3 for the standard equipment accessories.

### 9.2 Order Information for Available Accessories

The accessories available for your measuring instrument are regularly examined for compliance with the currently applicable safety standards and are extended to include new application fields, if necessary. The suitable, up-to-date accessories for your measuring instrument are shown on our website www.gossenmetrawatt.com with the associated photo, order number, description and, depending on the scope of the accessories, datasheet and operating instructions.

| Description | Type | Article number |
|---|---|---|
| Probe for measuring protective conductor resistance, e.g. at rotating devices under test | Brush probe | Z745G |
| Calibration adapter for test instruments per DIN VDE 0701-0702/IEC 63353 (VDE 0751) (max. 200 mA) | SECU-cal 10 | Z715A |
| Test adapter for electrical devices and extension cables with CEE plug-and-socket devices | VL2 E | Z745W |
| | | |
| Barcode scanner, printer and RFID scanner see separate datasheet ID systems | | |
| **PC Analysis Software** | | |
| For further information on software, please refer to our website<br><br>http://www.gossenmetrawatt.com<br>(→ Products → Electrical Testing → Testing of Electr. Appliances → MINITEST)<br><br>or<br><br>http://www.gossenmetrawatt.com<br>(→ Products → Software → Software for Testers) | | |
| **Case / carrying pouches** | | |
| Case for **MINITEST** \| MASTER, **MINITEST** \| PRO and **MINITEST** \| BASE | Case | Z740B |
| Universal carrying pouch for **MINITEST** \| MASTER, **MINITEST** \| PRO and **MINITEST** \| BASE | F2000 | Z700D |
| Universal carrying pouch big for **MINITEST 3P** \| MASTER | F2010 | Z700F |

## 10 Repair and Replacement Parts Service Calibration Center* and Rental Instrument Service

If required please contact:

GMC-I Messtechnik GmbH
**Service Center**
Thomas-Mann-Str. 20
90471 Nürnberg · Germany
Phone: +49 911 817718-0
Fax: +49 911 817718-253
E-mail service@gossenmetrawatt.com
www.gmci-service.com

This address is only valid in Germany.
Please contact our representatives or subsidiaries for service in other countries.

* **DKD** Calibration Laboratory for Measured Electrical Quantities: DKD – K – 19701, accredited per DIN EN ISO/IEC 17025: 2005

Accredited quantities: direct voltage, direct current value, direct current resistance, alternating voltage, alternating current value, AC active power, AC apparent power, DC power, capacitance, frequency and temperature

**Competent Partner**

GMC-I Messtechnik GmbH is certified in accordance with DIN EN ISO 9001:2008.

Our calibration laboratory is accredited per DIN EN ISO/IEC 17025:2005 by the Deutscher Kalibrierdienst (German Calibration Service) under registration number DKD–K–19701.

We offer a complete range of expertise in the field of metrology: from **test reports** and **factory calibration certificates**, right on up to **DKD calibration certificates**.

Our spectrum of offerings is rounded out with free test equipment management.

Our service department includes an **on-site DKD calibration bench**. If errors are discovered during calibration, our specialized personnel are capable of completing repairs using original replacement parts.

As a full service calibration lab, we can calibrate instruments from other manufacturers as well.

## 11 Product Support

If required please contact:

GMC-I Messtechnik GmbH
**Product Support Hotline**
Phone: +49 911 8602-0
Fax: +49 911 8602-709
E-mail support@gossenmetrawatt.com

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