

# METRATESTER<sup>®</sup> 4, 5, 5-F and 5-F-E Testers for DIN VDE 0701 and 0702

3-348-817-03  
5/3.01

## Applications

Electrical safety testing of electrical equipment:

per DIN VDE 0701-1: 2000 and DIN VDE 0702: 1995

by means of measurement of:

- Protective conductor resistance
- Insulation resistance
- Protective conductor current
  - equivalent leakage current method
  - residual current method (only METRATERESTER<sup>®</sup>5/5-F/5-F-E)
- Contact current

per DIN VDE 0701 Part 240 by testing of:

- absence of voltage by means of current measurement

as well as measurement of the following performance quantities:

- Line voltage
- Load current



QUALITY MANAGEMENT SYSTEM



DOS Certified per  
DIN EN ISO 9001 reg. no. 1262



## Features

### Convenient Connection

The test instrument is intended for the testing and measurement of repaired or modified devices. The device under test is connected to the measuring instrument via the integrated test socket. The quick connector safety jacks are wired in parallel to the test socket and provide for measurements at DUTs without earthing contact plugs, or at permanently connected DUTs. The DUT is connected to the integrated mains outlet at the test instrument for testing for the absence of voltage at exposed, conductive parts (per DIN VDE 0701 Part 240), as well as for load current measurement.

### Contacting Surface for Contact Finger

Protective conductor potential can be tested with the contact finger contacting surface. The PE signal lamp lights up if a potential difference of greater than 100 V occurs between the contacting surface and the earthing contact at the mains outlet.

### Rugged Design

This handy instrument is equipped with a compact plastic housing with a fold-out carrying handle. Mains and measurement cables are permanently connected. The mains cable can be wound onto a cable holder at the back of the housing, and the measurement cables can be stowed in the integrated cable compartment. The measured quantity is selected with the rotary switch.

### Safety Devices

Thermal overload protection to 253 V in all ranges (except for 16 A). The test instrument can be immediately placed back into service after the overload has been eliminated. Excessive temperatures are displayed at the LCD. The PE signal lamp indicates whether or not voltage is present at the mains protective conductor.

### Display Functions

All measurement values are read out to a large digital display for easy reading. Beyond this, in the case of the METRATERESTER<sup>®</sup>5/5-F/5-F-E, exceeded limit values per DIN VDE 0702 are signalled optically as well as acoustically in some cases.

### Residual Current Measurement with METRATERESTER<sup>®</sup>5/5-F/5-F-E

Measurement of differential current complies with regulations for periodic testing per DIN VDE 0701-1: 2000 and DIN VDE 0702: 1995.

### Radio Interface for METRATERESTER<sup>®</sup>5/5-F/5-F-E

The radio interface provides for convenient and cost-effective documentation of measured values which are transmitted to a notebook via a receiver module which is connected to the serial port. The desired measured quantity is acknowledged by pressing a key, and is then transmitted. Data can be saved, processed and read out to a printer with the help of PC.doc-win software.

# METRATESTER<sup>®</sup> 4, 5, 5-F and 5-F-E

## Testers for DIN VDE 0701 and 0702

### Applicable Regulations and Standards

IEC 61010-1 DIN EN 61 010-1/ VDE 0411-1	Safety regulations for measuring, control, regulating, and laboratory devices – general requirements
DIN VDE 0404	Devices for technical safety inspection of electrical equipment
DIN 43751	Digital measuring instruments
VDI/VDE 3540	Reliability of measuring, control and regulating equipment
DIN VDE 0470 Part 1	Testing devices and test methods – degree of protection provided by enclosures (IP code)
IEC 61326/EN 61326	Electromagnetic compatibility (EMC)

### Regulations and Standards for Use of the Test Instrument

DIN VDE 0701 Part 1 Part 240	Repair, modification and testing of electrical devices, general requirements, information technology devices
DIN VDE 0702	Periodic testing of electrical devices
BGV A2 (VBG 4)	Trade association regulations for accident prevention

### Characteristic Values

#### Measurements per VDE 0701-1:2000 and DIN VDE 0702: 1995

Measured Quantity	Measuring Range	Resolution	U <sub>NO-LOAD</sub>	R <sub>i</sub>	I <sub>k</sub>	I <sub>N</sub>
PE Resistance	0 ... 19.99 Ω	10 mΩ	< 20 V –	—	—	> 200 mA
Insulation Resistance <sup>1)</sup>	0 ... 1.999 MΩ <sup>2)</sup> 0 ... 19.99 MΩ	1 kΩ 10 kΩ	600 V – 600 V –	approx. 100 kΩ	< 10 mA	> 1 mA > 1 mA
<b>Protective Conductor Current</b>						
by Equivalent Leakage Current Meas. <sup>3)</sup>	0 ... 19,99 mA ~	10 μA	28 V ~	2 kΩ	< 20 mA	—
by Residual Current Measurement <sup>4)</sup>	0,01...19,99mA ~	10 μA	—	—	—	—
Contact Current	0 ... 1,999 mA ~	1 μA	—	2 kΩ	—	—

<sup>1)</sup> only for instruments which cannot be disconnected from all poles

<sup>2)</sup> METRATESTER<sup>®</sup>4 only

<sup>3)</sup> only if insulation resistance measurement is possible

<sup>4)</sup> METRATESTER<sup>®</sup>5/5-F/5-F-E only; necessary for instruments which can be disconnected from all poles.

#### Measurements per DIN VDE 0701 Part 240

Measured Quantity	Measuring Range	Resolution	R <sub>i</sub>
Substantiation of absence of voltage by means of <b>current measurement</b> of exposed conductive parts of the user area for instruments of Safety Class II	0 ... 1.999 mA ~	1 μA	2 kΩ

#### Field Measurements

Measured Quantity	Measuring Range	Resolution
Line Voltage	207 ... 253 V ~	1 V
Load current at mains outlet	0 ... 16.00 A ~	10 mA

Unlike the METRATESTER<sup>®</sup>5/5-F/5-F-E test instruments, the METRATESTER<sup>®</sup>4 does not provide for residual current measurements. Despite its low price, however, it can be used without restrictions for testing any device under Safety Class I which is not disconnected from all poles, as well as all devices under test under Safety Class II.

### Intrinsic Error and Service Error

Measured Quantity	Intrinsic Error	Service Error
Protective Conductor Resistance	± (2.5% rdg. + 2 d)	± (10% rdg. + 5 d)
Insulation Resistance 0 ... 1.999 MΩ <sup>1)</sup> 0 ... 19.99 MΩ	± (2.5% rdg. + 2 d) ± (2.5% rdg. + 2 d)	± (10% rdg. + 5 d) ± (10% rdg. + 5 d)
Equivalent Leakage Current	± (2.5% rdg. + 2 d)	± (10% rdg. + 5 d)
Substantiation of Absence of Voltage by means of Contact Current Measurement	± (2.5% rdg. + 2 d)	± (10% rdg. + 5 d)
Residual Current <sup>2)</sup>	± (4% rdg. + 5 d)	± (10% rdg. + 5 d)
Line Voltage	± (2.5% rdg. + 2 d)	± (10% rdg. + 5 d)
Load Current at Mains Outlet	± (5% rdg. + 2 d)	± (10% rdg. + 5 d)

<sup>1)</sup> METRATESTER<sup>®</sup>4 only

<sup>2)</sup> METRATESTER<sup>®</sup>5/5-F/5-F-E only

### Influence Quantities and Influence Error

Influence Quantity / Sphere of Influence	Measured Quantity	Influence Error ± ... % of measured value
<b>Temperature</b>	Indicated influence error valid per 10 K temperature change	
0 ... 21 °C	PE resistance	1
and 25 ... 40 °C	All other measuring ranges	0.5
<b>Frequency</b>		
49 ... 51 Hz	Equivalent leakage current	2 with capacitive load
45 ... 100 Hz	Contact current	1

### Reference Conditions

Ambient Temperature	+23 °C ±2 K
Relative Humidity	50% ±5%
Line Voltage	230 V ±1%
Measured Quantity	
Frequency	50 Hz ±0.2%
Measured Quantity	
Waveshape	sine (deviation between effective and rectified value ±0.5%)

### Ambient Conditions

Operation	-10 ... + 55 °C
Storage	-25 ... + 70 °C
Relative Humidity	max. 75%, no condensation allowed
Elevation	to 2000 m

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## METRATESTER<sup>®</sup> 4 Display and Signaling Devices

### LCD

Display Range	0 ... 1999 digits, 3½ places
Character Height	18 mm
Overflow	indicated at display with character "1" at left

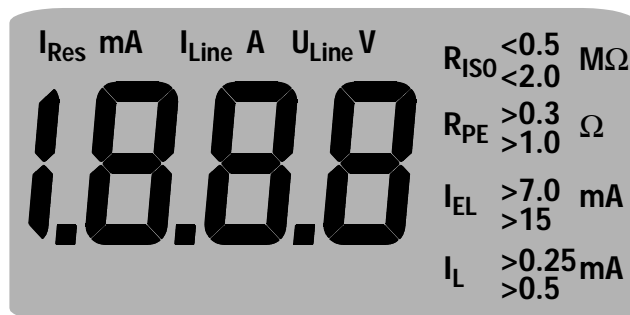
### PE Signal Lamp

Indicates whether or not voltage is present at the mains protective conductor.

## METRATESTER<sup>®</sup> 5/5-F/5-F-E Display and Signaling Devices

### LCD

Display Range	0 ... 1999 digits, 3½ places
Character Height	17 mm and special characters
Overflow	indicated at display with "OL" symbol
Excessive Temp.	for long duration short-circuit: "R <sub>ISO</sub> " and "MΩ" segments blink



Display text subject to change without notice

### PE Signal Lamp

Indicates whether or not voltage is present at the mains protective conductor.

### Error Lamp

The red error lamp indicates that limit values per VDE 0702: 1995 have been exceeded during the measurement of protective conductor or insulation resistance, equivalent leakage, contact or leakage current, as well as residual current.

### Piezoelectric Resonator

In the event that the error lamp lights up and the respectively more critical limit value is exceeded, the piezoelectric resonator sounds as well.

## Power Supply

Line Voltage	230 V / 50 Hz
Throughput Rating	max. 3700 VA, dependent upon load at mains outlet

## Overload Capacity

Load at mains outlet	1.2-fold, 5 min.
All other measured quantities	250 V continuous

## Electrical Safety

Safety Class	II
Nominal Line Voltage	230 V
Test Voltage	mains + PE (mains) + 2 mA for testing for the absence of voltage at test socket, connector jacks for phase and protective conductors and pick-off clip: 3 kV~ mains to PE (mains) + 2 mA socket: 1.5 kV~
Overvoltage Category	II
Fouling Factor	2
Safety Shutdown	if the test instrument overheats
Electromagnetic Compatibility (EMC)	IEC 61326/EN 61326

## Mechanical Design

Protection	test instrument: IP 40, terminals: IP 20 per DIN EN 60529/VDE 0470, part 1
Dimensions	W x H x D: 190 mm x 140 mm x 95 mm
Weight	1.3 kg

## METRATESTER<sup>®</sup> 5-F/5-F-E Data Interface

Type	radio transmission
Frequency	433.92 MHz
Type of Modulation	OOK (on-off keying)
Power	< 10 mW
Range	max. 30 m (in a single room), exception: panel mount version METRATESTER <sup>®</sup> 5-F-E: max. 6 m
Transmission Speed	2400 baud, each frame is sent three times
Frame Format	1 start bit, 8 data bits, 1 stop bit, no parity, no xon/xoff, no handshake
Frame Content	Device ID, measured value, measuring range and type of measurement
Receiver	
Power Supply	9 V block battery per IEC 6LR61 (alkaline-manganese). The internal battery is disconnected if power is provided by the PC.
Supply Voltage	7 ... 12 V
Dimensions	W x H x D: 65 x 100 x 24 mm
Weight	150 gr. with battery
Connector Cable	approx. 15 cm long

*Measured values can be evaluated with the help of suitable PC software, for example PC.doc-win (accessory).*

## Standard Equipment

- 1 test instrument
- 1 operating instructions

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## Accessories

### Radio Receiver FE5



### PC.doc-win

PC.doc-win is a report and database software based on MICRO-SOFT<sup>®</sup> WINWORD and ACCESS for all SECU-TEST<sup>®</sup> and METRATESTER<sup>®</sup> 5/5-F/5-F-E series test instruments. Under WINWORD, measurement results as well as data entered to the PSI module, are entered to reports per DIN VDE 0701 and device lists per DIN VDE 0702.



Complete device and system management is made possible with the help of ACCESS, as well as documentation and management of master data and test data.

- Standard forms and device lists
- Automatic initialization of WINWORD and ACCESS
- Easy preparation of customized documents
- Automatic preparation of deadline lists for periodic testing
- Management of master data for customers, work orders and devices
- Automatic allocation to the selected master data
- Search function
- Read-in PC.doc files (predecessor software in DOS)

### KS13 Cable Set



The KS 13 cable set consists of an adapter socket with 3 permanently connected cables, 3 measurement cables, 3 plug-on pick-off clips and 2 plug-on test probes. With the KS 13, the test instrument and the

device under test can be connected even if no earthing contact socket is available for the mains connection, or no earthing contact plug is present at the device under test.

## Order Information

Designation	Type	Article Number
Test Instrument	METRATESTER 4 (M 5013)	GTM 5013 000 R0001
Test instrument, panel mount version (minimum order 10 pcs.)	METRATESTER 4 E2 (M 5013 E2)	GTM 5013 000 R0012
Same as METRATESTER <sup>®</sup> 4, but with residual current measurement instead of 2 M $\Omega$ measuring range – German version	METRATESTER 5	M700D
Same as METRATESTER <sup>®</sup> 5, – French / Czech version	METRATESTER 5 F/CZ	M700F
Same as METRATESTER <sup>®</sup> 5 with additional radio interface, receiver module and PC.doc-win software – German version	METRATESTER <sup>®</sup> 5-F	M700M
Same as METRATESTER <sup>®</sup> 5-F, – French / Czech version	METRATESTER <sup>®</sup> 5-F F/CZ	M700N
Same as METRATESTER <sup>®</sup> 5-F but without receiver and software	METRATESTER <sup>®</sup> 5-F	M700V
METRATESTER <sup>®</sup> 5-F, panel mount version, without receiver and software	METRATESTER <sup>®</sup> 5-F-E	M700T
Radio receiver and software for METRATESTER <sup>®</sup> 5-F/5-F-E	FE5	M700U
Documentation and administration software for MS Winword / Access	PC.doc-win	Z710F
Cable set	KS13	GTU 3624 065 P01

Please refer to our Measuring Instruments and Testers Catalog for additional information concerning accessories.