

**Safety has priority
with our**

 **GOSSEN METRAWATT**

PROFITEST[®] 204 **For testing the safety of electrical machinery equipment**

- Testing and measurement per EN 60204:
quickly, reliably and conveniently
- Test reports with built-in printer or at PC
- International application



QUALITY MANAGEMENT SYSTEM



DQS certified per
DIN EN ISO 9001 Reg. No.1262

PROFITEST 204 / MetraMachine 204 – The system for testing the safety of electrical machine equipment per EN 60204 ...

A complete mobile system with many advantages for the user

Quick tests through the use of signal lamps and acoustic signals

Lamps at the instrument, as well as on the remote control, signal that testing is in progress (yellow), or the successful (green) or unsuccessful (red) completion of the test. An acoustic signaling device can be switched on for OK/Failed status indication. Both types of signals provide for quick assessment of the device under test without reading the measurement values.

Remote control with control panel built into the test prod handle

Two 4 meter long, permanently fixed measurement cables connect the test prods to the instrument. With the three buttons in the handle of the test prod with integrated controls, protective conductor and insulation resistance testing can be started, and measurement values can be stored.

Four wire measurement method guarantees high level measurement accuracy

The four wire measurement method is used for testing, by means of which current and voltage paths are directed separately right up to the test prods via the 4 meter long connection cables, which guarantees the prescribed accuracy, even for small measurement values. The usually elaborate and time-consuming compensation of measurement cable resistances is thus made unnecessary. With a 12 meter extension cable the working range can be increased to 20 meters.

Electronically adjustable limit values for adaptation to various regulations

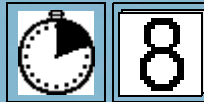
Limit values can be preset for every measurement, to allow for adapting the tests to current regulations or individual, local circumstances.

High-voltage module for various applications

Two high-voltage modules are available for voltage testing. The PROFITEST 204 HP is suited for testing up to 2.5 kV per EN 60204, and the PROFITEST 204 HV for testing up to 5.4 kV per, for example, EN 60439. The module is docked to the basic unit, from which it is operated.

Stopwatch (timer) for accurate testing in accordance with regulations

The test duration for protective conductor testing, as well as the discharge time in the measurement of residual voltage can be preset as parameters. The time can be set according to individual needs, or precisely in accordance with regulations. Elapsed time can be monitored during measurement with the analog or the digital display.



Large illuminated display for trouble-free reading

Menus, instructional texts, measurement results, help texts and error messages are plainly displayed in clear text at a large dot matrix LCD. The display is illuminated and provides for trouble-free reading, even under poor lighting conditions.

Operator instructions in dialog with the user

The instrument is very easy to operate with its function selector switch and five keys, in connection with the clear text display. The steps required for all adjustments and measurements are carried out in dialog with the user.

Help texts for all functions and adjustments

Help texts can be viewed at the display for all measurement and test functions, current menu items and almost all adjustments.

Measurement value memory stores a great number of measurements

Up to 2800 measurements for a maximum of 254 systems can be stored in the instrument's memory. Numbering of measurements according to type is performed automatically.

Test reports with PSI Module, printer or via PC

Test reports can be prepared on site with the PSI module installed, or with a connectable printer. Data can be transferred via RS232 interface for test report preparation at the PC.

Can also be used for testing portable appliances in accordance with additional regulations (e.g. DIN VDE 0701/0702)

Tests made possible with the PROFITEST 204 not only fulfill requirements per EN 60204. In part, they are also required by additional regulations such as DIN VDE 0701, DIN VDE 0702 (for portable appliances) as well as others, e.g. for cables, etc.

International application – text display in various languages

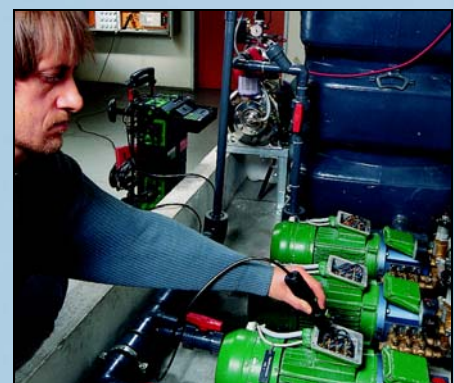
Text display at the LCD is possible in various languages. A given language can be loaded to the instrument from a floppy disc.



Protective conductor test



High-voltage test



Remote control

... with flexible test report preparation

Three modes for test report printing

On-site printing of test reports with the SECUTEST PSI printer module

The easiest way to prepare test reports is to print measurement values with the SECUTEST PSI. The printer module is installed into the lid of the PROFITEST 204 and connected to the RS232 interface port. Texts including the description of the equipment to be tested and the individual measurements can be entered with the

alphanumeric keyboard. These are automatically stored to the appropriate data set. When tested equipment is selected, the texts are displayed at the LCD and are printed on site onto the chart strips along with measurement values, as well as date and time.

On-site printing of test reports with commercially available printers

Test report data are made available at the "PRINTER" port for on-site print-out of test reports with commercially available printers. Any printer with a parallel CENTRONICS interface can be used.

The layout of the test report can be selected, or even created, by the user.

Three different test report templates are available within the device memory. After the template has been selected and the printer started, the stored measurement values are loaded to the selected template and printed out along with a test report number, equipment description, date, time etc. Texts for the description of equipment can be entered previously with the keys at the PROFITEST 204.

Test report templates can be designed, prepared and changed by the user with any PC editor. Thus foreign language test reports are easily made possible. They can be transferred to the test instrument via the serial interface, where a maximum of three templates can be stored.

The header, the text between the measurement data lines and the end of the test report can be set up as desired for the individualized layout of test reports. Positioning of measurement values can also be determined by the user, and the worst value can be added for improved clarity. Date, time, test instrument used etc., can be entered into the test report at any desired position. However, the listings sequence is predetermined and cannot be changed.

Data for Unit No:	: 001
Machine	00021
Test completed on	: 27.01.1997, 17:28
Test instrument used	: PROFITEST204, M 1234 5678
Protective conductor test No.	: 001
Voltage drop	: 0.17 V
Resistance	: 17.2mΩ
Limit value	: 1.00 V
Protective conductor test No.	: 002
Voltage drop	: 0.19 V
Resistance	: 19.8mΩ
Limit value	: 1.00 V
Insulation test No.	: 001
Insulation resistance	: >3.00GΩ
Nominal voltage	: 1.00kV
Limit value	: 10.0MΩ

Measurement values printed onto chart strips on site with the SECUTEST PSI

GOSSEN-METRAWATT GmbH Electrical Measuring Instruments and Testers Thomas-Mann-Straße 16-20, 90471 Nürnberg				
ENC. 2: Verification the insulation resistance				
-Insulation resist. were measured between the PE terminal and the phase terminals of the machine not connected to the line.				
-Limits and test voltages are recorded with each test result.				
-Test duration was extended to ensure stable readings where necessary.				
Total number of tests carried out: 002				
Tests with insufficient results:				
Number of test	Insulation resistance	Nom. test voltage	Limit value	Note

GOSSEN-METRAWATT GmbH Electrical Measuring Instruments and Testers Thomas-Mann-Straße 16-20, 90471 Nürnberg				
ENC. 1: Verification of continuity of the protective bonding circuit				
-The continuity of the prot. bonding circuit to all accessible parts of the machine has been proved by visual inspection and test.				
-Tests were made between the PE terminal and relevant points that are part of the protective bonding circuit.				
-Tests were made with AC at line frequency and a current of at least 10 Amps at a voltage not exceeding 24 V rms. The duration of the test and the maximum acceptable voltage drop across the protective circuit are recorded with each test result.				
Total number of tests carried out: 002				
List of test points:				
GOSSEN-METRAWATT GmbH Electrical Measuring Instruments and Testers Thomas-Mann-Straße 16-20, 90471 Nürnberg				
CERTIFICATE FOR PROOF OF COMPLIANCE FOR INDUSTRIAL MACHINES				
Verification of safety for the electrical equipment of industrial machines according to DIN VDE 0113 / EN 60204-1 / IEC 204-1				
1. Common data of machine under test				
Description / Number	:	Machine 00021		
Number of protocol	:	001		
Equipment used for tests	:	PROFITEST 204 , M 1234 5678		
Date of tests	:	27.01.1997		
Responsible person	:	R. Schweiger		
The following protocol confirms that all tests for proof of electrical safety of the described machine according to the standards mentioned above have been carried out with great care.				
The tests have been carried out by skilled persons according to DIN VDE 0105 Part 1 / 5.7S, Subclause 3.2.1.				
The machine under test - meets - does not meet - the requirements of DIN VDE 0113 / EN 60204-1 / IEC 204-1				

System test report printed with external printer

Software Program	PS3	PC.doc-WORD™	PC.doc-ACCESS™	WinProfi
PROFITEST®204	●	●	●	●
SECUTEST®PSI	●	●	●	●

Accessories

Designation	Type
RS232, USB interface cable	Adapter cable Z501L
Signal lamp set for high-voltage testing in accordance with DIN VDE 0104	Signal 204
Plug-on cable lug for secure attachment of the test probe to the terminals	Kabelschuh 204
12 m extension cable for use with the measurement cable and test probe with integrated measuring circuit fuse	Leadex 204
Universal carrying pouch	F2000
Transport caddy for the basic unit + high-voltage module set, including rubber straps and protective cover	Caddy 204
EMERGENCE STOP switch	STOP 204
Kit for securing sites against unauthorized presence during high-voltage tests	Claim 204
Interface adapter for PC keyboards	PROFI-MFI
Control programming software in 3 languages for remote control from the PC	Remote 204
Pack of 10 rolls recording chart for PSI module (1 roll = approx. 6.7 m)	PS-10P
Pack of 10 ink ribbon cartridges for PSI module	Z3210

High-voltage module with separate signal lamps



Signal lamp set



Caddy with protective cover and side pockets for printer and accessories



Interface port

Connection to a PC can be established via one of the two RS232 interface ports.

Large, illuminated dot matrix display

Menus, instructional texts, measurement results, help texts and error messages are plainly displayed at the LCD in clear text. The selected language can be loaded to the instrument from a floppy disc.

Signal lamps for OK/Failed status indication

One signal lamp at the instrument and another at the handle of the test prod indicate successful test completion in green, and failure in red. A quick evaluation of the test is thus possible without reading the measurement values.

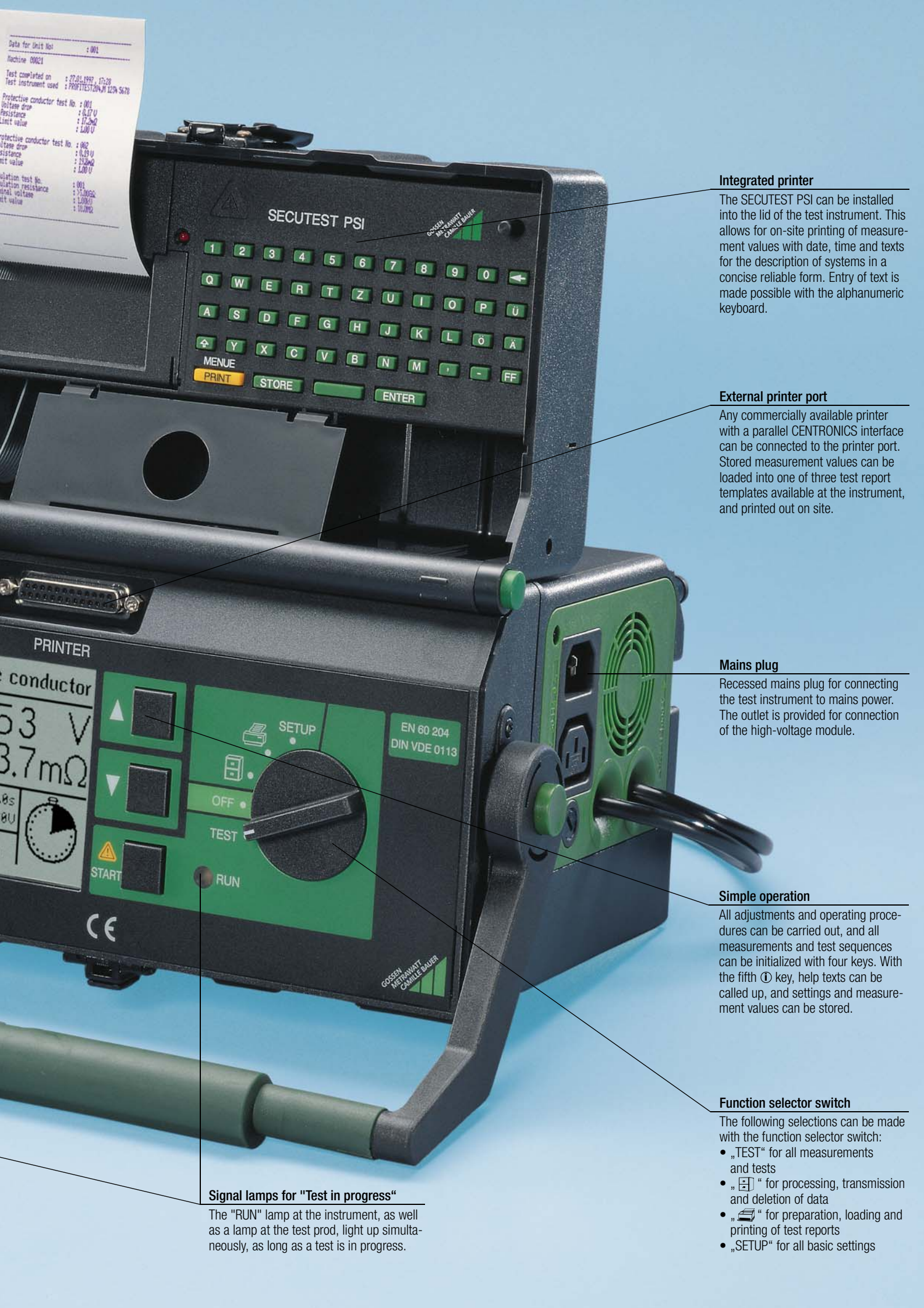
Remote control buttons

Protective conductor and insulation resistance tests can be started, and measurement values can be stored with the three buttons in the handle of the test prod.

Test prods

One test prod is equipped with buttons/signal lamps for remote control of the instrument, whereas the replaceable measuring circuit fuse (T16 A/1000 V slow-blow) is located in the other.





Integrated printer

The SECUTEST PSI can be installed into the lid of the test instrument. This allows for on-site printing of measurement values with date, time and texts for the description of systems in a concise reliable form. Entry of text is made possible with the alphanumeric keyboard.

External printer port

Any commercially available printer with a parallel CENTRONICS interface can be connected to the printer port. Stored measurement values can be loaded into one of three test report templates available at the instrument, and printed out on site.

Mains plug



Recessed mains plug for connecting the test instrument to mains power. The outlet is provided for connection of the high-voltage module.

Simple operation

All adjustments and operating procedures can be carried out, and all measurements and test sequences can be initialized with four keys. With the fifth key, help texts can be called up, and settings and measurement values can be stored.

Function selector switch

The following selections can be made with the function selector switch:

- „TEST“ for all measurements and tests
- „“ for processing, transmission and deletion of data
- „“ for preparation, loading and printing of test reports
- „SETUP“ for all basic settings

Signal lamps for "Test in progress"

The "RUN" lamp at the instrument, as well as a lamp at the test prod, light up simultaneously, as long as a test is in progress.

PROFITEST 204:

All measurements in accordance with EN 60204 (DIN VDE 0113) quickly, simply, reliably and conveniently

Standards

Tests for special machine types are laid down in the relevant standards. If such standards do not exist, the measurements to be performed may include one or several of the measurements described below, however, they always must include the testing of conductivity of the protective conductor.

The measurement with 10 A may be considered to be a reference measurement as it must be conducted in voltage-free condition, i.e. before switching on the device. If the loop impedance measurement becomes necessary, however, we recommend the additional use of our PROFITEST C.

Measurement and test functions

The required tests can be performed quickly, easily, reliably and conveniently with the new PROFITEST 204. The tests include continuity testing of protective conductor connections with at least 10 A, testing of insulation resistance, voltage testing and testing for residual voltage.

Leakage current tests, voltage measurements and frequency measurements are also possible with this instrument.



► Protective conductor test

A continuity test of the protective conductor system is required, in which a current of at least 10 A at 50 Hz from a PELV power supply is applied for at least 10 sec. Testing must occur between the PE terminal and various points of the protective conductor system. The maximum allowable voltage drop is dependent upon the cross section of the protective conductor. It ranges from 1.0 to 3.3 V.

The PROFITEST 204 allows for adjustment of test duration and the voltage drop limit value. Thus the test parameters can be adapted to actual on-site conditions.

The four-wire measurement method is used for testing, which guarantees the prescribed accuracy, even for small measurement values, and makes elaborate compensation of measurement cable resistances unnecessary.

VDE 0660 Teil 500
EN 60204
EN 60439
VDE 0113

<p>PROFITEST 204</p> <p>Protective conductor Insulation resistance Leakage current Voltage measurement High Voltage test</p>

<p>Protective conductor</p> <p>ΔU 0.53 V R_{SL} 53.7 mΩ</p> <p>Duration : 10.0s Limit : 1.00V</p> <p>Testing ... </p>
--

<p>Prot. conductor</p> <p>The continuity of the protective conductor system is tested with a 10A 50Hz PELV source for a duration of 10s.</p> <p>MENU Exit HELP START Start test</p>
--

<p>Protective conductor</p> <p>Setting the test parameters</p> <p>Duration : 10.0s Limit value: 1.00V Diameter of conductor $\varnothing > 6.0 \text{ mm}^2$</p> <p>MENU Cont. Change val. START Start test HELP</p>

► Insulation resistance test

The regulation requires:

Insulation resistance, which is measured at 500 V DC between all electrical circuit conductors and the protective conductor system, may not be less than 1 M Ω .

Nominal voltage ranges of 100 V, 250 V, 500 V and 1000 V are available with the PROFITEST 204 for these measurements. Like the allowable limit value for insulation resistance testing, these can be adjusted as test parameters.

In addition to the measured insulation resistance, the voltage at the DUT is also displayed at the LCD. Capacitive test components are, of course, discharged after measurement.

EN 60439
VDE 0113
VDE 0660 Teil 500
EN 60204

<p>PROFITEST 204</p> <p>Protective conductor ► Insulation resistance Leakage current Voltage measurement High Voltage test</p>

<p>Insulation resistance</p> <p>R_{INS} 1.28 GΩ U_{INS} 1.05 kV</p> <p>Nom. volt.: 1.00 kV Limit : 1.00 MΩ</p> <p>Testing ... $U > 25V$</p>

<p>Insul. resistance</p> <p>The insulation resistance is measured at 500V DC between power circuits and protective earth conductor. It must exceed 1MΩ.</p> <p>MENU Exit HELP START Start test</p>

<p>Insulation resistance</p> <p>Setting test parameters</p> <p>Nom volt. : 1.00 kV Limit : 1.00 MΩ</p> <p>MENU Cont. Change val. START Start test HELP</p>

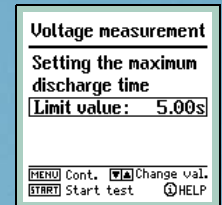
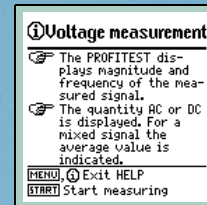
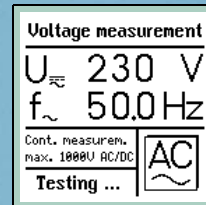
➤ Voltage measurement (Protection against residual voltages)

The regulation requires that at every exposed, active part of a machine, to which a voltage of more than 60 V is applied during operation, residual voltage must be reduced to a value of 60 V or less within 5 sec. after supply power has been switched off.

Testing for the absence of voltage with the PROFITEST 204 is performed with a voltage measurement, with which discharge time is measured. The time which expires after supply power has been switched off until the limit value of 60 V has been reached, is continuously displayed at the LCD during discharge.

In addition to voltage type (AC, DC or AC+DC), the corresponding frequency is also measured and displayed.

EN 60204 VDE 0113 EN 60439 VDE 0660 Teil 500



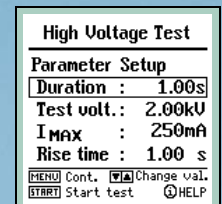
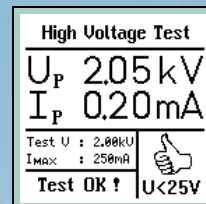
➤ Voltage test

The electrical equipment of a machine must withstand the application of a test voltage for at least 1 sec. between the conductors of all electrical circuits and the protective conductor system, which is equal to 2 times the voltage rating for the equipment, or at least 1000 V_~. The test voltage must have a frequency of 50 Hz, and must be generated by a transformer with a minimum power rating of 500 VA.

For this test the PROFITEST 204 must first be supplemented by the PROFITEST 204 HP high-voltage module (to 2 kV), or the PROFITEST 204 HV (to 5 kV).

The following test parameters can be selected: test duration, test voltage, maximum allowable current in the event of arc-over, and the time during which the test voltage should climb to the selected value.

EN 60439 VDE 0113 VDE 0660 Teil 500 EN 60204

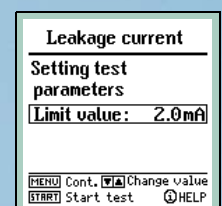
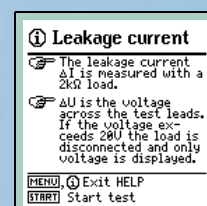
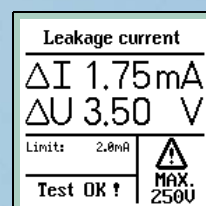


➤ Leakage current test

Although leakage current measurement does not belong to those tests which are required for the safety of electrical machine equipment, it offers the opportunity to test devices, machines and electrical equipment for the absence of voltage via current measurement. This measurement is required for data processing equipment and office machinery in accordance with DIN VDE 0701, Part 240, and is also recommended by specialists for safety inspection of other devices.

The leakage current limit value can be entered as a parameter. Leakage current, and the voltage drop which is generated by this current at a 2 kΩ resistor are measured and displayed.

VDE 0660 Teil 500 EN 60204 EN 60439 VDE 0113



➤ Do not forget the functions tests!

Characteristic values

Measured Quantity	Measuring Range	Nominal Range of Use	Resolution	Nominal Voltage U_N	Open Circuit Voltage U_0	Nominal Current I_N	Short-circuit Current I_K	Internal Resist. R_I	Operating Error	Intrinsic Error	Overload	
											Value	Duration
Protective Conductor Resistance R_{PC}	0 ... 85 m Ω	10 ... 330 m Ω	100 $\mu\Omega$	—	12 V ~	10 A ¹⁾	12 A	—	$\pm(8.6\% \text{ rdg.} + 6 \text{ digits})$	$\pm(3\% \text{ rdg.} + 5 \text{ digits})$	Fuse: 16 A/1000 V Breaking capacity: 5 kA	
	85 ... 999 m Ω		1 m Ω									
	1.00 ... 9.99 Ω	10 m Ω										
	10.0 ... 25.0 Ω	100 m Ω										
ΔU ²⁾	0 ... 9.99 V*	—	0.01 V	—	12 V ~	10 A	12 A	—	—	$\pm(2\% \text{ rdg.} + 3 \text{ digits})$		
	10.0 ... 12.0 V		0.1 V		12 V ~	—	—	$\pm(10\% \text{ rdg.} + 3 \text{ digits})$				
Insulation Resistance R_{INS}	0 ... 999 k Ω	0.050 ... 50 M Ω	1 k Ω	100/250/500/1000 V	max. $1.3 \cdot U_N$	1 mA	max. 1.6 mA	—	$\pm(5.5\% \text{ rdg.} + 4 \text{ digits})$ from 0.05 M Ω ... 50 M Ω	$\pm(3\% \text{ rdg.} + 2 \text{ digits})$	1200 V	contin- ous
	1.00 ... 9.99 M Ω		10 k Ω									
	10.0 ... 99.9 M Ω		100 k Ω									
	100 ... 499 M Ω	1 M Ω	250/500/1000 V						—	$\pm(5\% \text{ rdg.} + 2 \text{ digits})$		
	500 ... 999 M Ω	1 M Ω	500/1000V									
	1 ... 3 G Ω	10 M Ω	1000 V									
Leakage Current ΔI	0.00 ... 9.99 mA	0.2 ... 9.9 mA	0.01 mA	—	—	—	—	2 k Ω	$\pm(8.6\% \text{ rdg.} + 9 \text{ digits})$	$\pm(5\% \text{ rdg.} + 5 \text{ digits})$	250 V	contin- ous
Voltage U DC/AC	0.0 ... 99.9 V	1.0 ... 1000 V	0.1 V	—	—	—	—	20 M Ω	$\pm(8.6\% \text{ rdg.} + 9 \text{ digits})$	$\pm(5\% \text{ rdg.} + 5 \text{ digits})$	1200 V	contin- ous
	100 ... 999 V		1 V									
	1.00 ... 1.2 kV		0.01 kV									
Frequency $f \sim$	8.0 ... 99.9 Hz	10 ... 1000 Hz	0.1 Hz	—	—	—	—	20 M Ω	$\pm(8.6\% \text{ rdg.} + 2 \text{ digits})$	$\pm(2\% \text{ rdg.} + 1 \text{ digits})$		
	100 ... 999 Hz		1 Hz									

¹⁾ up to a maximum of 330 m Ω

²⁾ with reference to 10 A nominal current

PROFITEST 204HP/2.5 kV high-voltage module

Measured Quantity	Nominal Range of Use	Resolution	Operating Error	Intrinsic Error
Test voltage U AC	250 V ... 2.50 kV	1 V 10 V	$\pm(5\% \text{ rdg.} + 5 \text{ digits})$	$\pm(2.5\% \text{ rdg.} + 5 \text{ digits})$
Current I AC	10.0 ... 200 mA	0.1 mA 1 mA	$\pm(5\% \text{ rdg.} + 5 \text{ digits})$	$\pm(2.5\% \text{ rdg.} + 5 \text{ digits})$

Nominal Ranges of Use

Line Voltage	207 V ... 253 V
Line Frequency	45 Hz ... 65 Hz
Line Voltage Waveshape	sine
Temperature Range	0 °C ... + 40 °C

Temperature Ranges

Storage Temperature	- 20 °C ... + 60 °C
Operating Temperature	- 5 °C ... + 40 °C

Power Supply

Line Voltage	207 V ... 253 V
Line Frequency	45 Hz ... 65 Hz
Power Consumption	204: approx. 180 VA w/o accessories 204HP: max. 700 VA 204HV: max. 100 VA

Max. Leakage Current

	0.5 mA basic unit and 204HP/HV
--	-----------------------------------

Power Consumption

	max 6 A basic unit and 204HP/HV
--	------------------------------------

Interface

Type	RS232C, serial, per DIN 19241
Format	9600, N, 8, 1
Port	9-pin sub-miniature socket

Electrical Safety

Safety Class	204: II 204HP/HV: II per IEC 61010-1 / EN 61010-1/
VDE 0411-1	
Nominal Voltage	230 V
Test Voltage 204	5.55 kV 50 Hz
Test Voltage 204 HP/HV	Mains / PE / key switch/ external signal lamps to high-voltage measuring terminals: 204HP: 5 kV AC 50 Hz 204HV: 8 kV AC 50 Hz
Measuring Category	II
Contamination Degree	2
Safety Shutdown	if transformer overheats
Fuses	204 Mains: T1.6 / 250 Test probe: T16 / 1000 204HP/HV Mains: F3.15/250

Mechanical Design

Protection Type	Housing IP 40 per DIN VDE 0470 part 1/ EN 60529
Dimensions	292 x 130 x 243 mm
Weight 204:	approx. 5.1 kg
204HP/HV:	approx. 8 kg

Standard Equipment

PROFITEST 204 test instrument with RS232 interface and CENTRONICS port for external printer, 2 test prods permanently affixed with 4 meter measurement cables, 1 plug-on cable

lug, mains power cable with earthing contact plug, floppy disc with download program for test report templates and other languages, inspection certificate, operating instructions.

Printed in Germany · Subject to change without notice · 1/8.05 · Order No. 3-337-030-03

PROFITEST 204HV/5.4 kV high-voltage module

Measured Quantity	Nominal Range of Use	Resolution	Operating Error	Intrinsic Error
Test Voltage U AC	650 V ... 5.40 kV	1 V 10 V	$\pm(5\% \text{ rdg.} + 5 \text{ digits})$	$\pm(2.5\% \text{ rdg.} + 5 \text{ digits})$
Current I AC	1.0 ... 10.0 mA	0.01 mA 0.1 mA	$\pm(5\% \text{ rdg.} + 5 \text{ digits})$	$\pm(2.5\% \text{ rdg.} + 5 \text{ digits})$

Order Information

Designation	Type
EN 60204 / DIN VDE 0113 test instrument as described under „Standard Equipment“, with German as pre-installed user language and download program for test report templates + user language selection	PROFITEST 204
Same test instrument as PROFITEST 204, however, with firmly connected 12 m measuring cable with START/MEMORY mode in the test plug	PROFITEST 204L
Complete system including PROFITEST 204, PROFITEST 204HP, Signal 204, Leadex 204, Caddy 204, test report	MetraMachine 204/2.5
Complete system including PROFITEST 204, PROFITEST 204HP, Caddy 204, test report	MetraMachine 204-I/2.5
Complete system for tests according to EN 60439 / DIN VDE 0660, consisting of PROFITEST 204, PROFITEST 204HV, Signal 204, Leadex 204, Caddy 204, test report	MetraMachine 439/5.4
Extensions	
High-voltage module, 2.5 kV / 500 VA	PROFITEST 204HP-2.5 kV
High-voltage module, 5.4 kV / 10 mA	PROFITEST 204HV-5.4 kV
PSI module including 2 rolls of recording chart, ink ribbon cartridge, batteries and operating instructions	SECUTEST PSI

Your Authorized Distributor:

GOSSEN METRAWATT GMBH
Thomas-Mann-Straße 16 – 20
90471 Nürnberg · Germany
Phone (09 11) 86 02 – 111
Fax (09 11) 86 02 – 777
E-Mail info@gossenmetrawatt.com
www.gossenmetrawatt.com

 **GOSSEN METRAWATT**