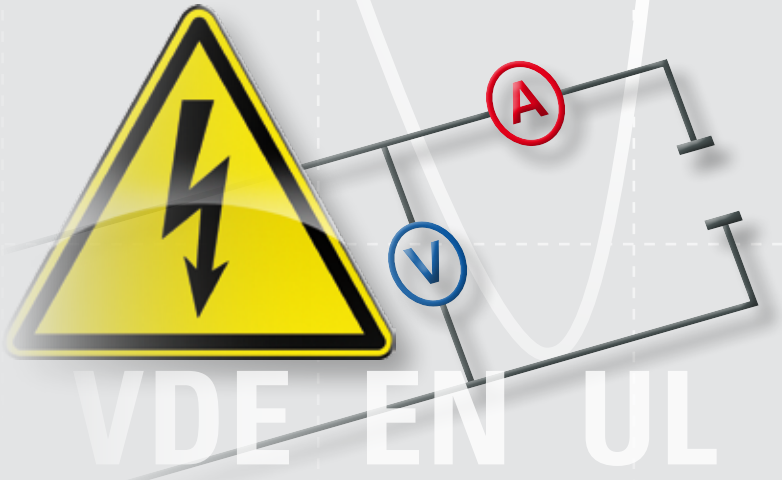
SCHLEICH
Advanced Test Technologies

Innovative Testing and Measurement Technology

for the electrical safety and functional test



VDE EN UL

5

SCHLEICH-Publications

Catalog | 5
Testing and Measurement Technology
for the electrical safety and functional test

- Handheld-Class
- GLP1-Class
- GLP2-Class
- GLP3-Class
- Accessories

scope: 164 pages
languages: German and English

Catalog
Testing and Measurement Technology
for electrical windings, safety and functional tests
at winding materials of all kinds

- MotorAnalyzer-Class | All-Purpose Electric Motor Tester
- MTC2-Class | All-Purpose Winding Tester
- GLP1-e and GLP2-ce High-Voltage Tester
- MTC3-Class | All-Purpose Winding Tester for Stators and Armatures
- All-Purpose Windows® Motor Testers
- Winding Systems
- Bonding Systems
- Software and Accessories

scope: 70 pages
languages: German and English

Leaflet
Testing and Measurement Technology
for the electrical safety tests at
hybrid and electro vehicles

- GLP1-e and Handheld
  PE and Insulation Resistance Testers

scope: 8 pages
languages: German and English

You can inform yourself on our large, well-coordinated product range of testers and test systems for almost every electric test task. We would be pleased to send you our publications regarding winding tests and safety tests at hybrid and electric cars.

Just scan the corresponding QR-code with your mobile (the reader software has to be installed) and send us the e-mail.

You can also send us an e-mail in the classical way, call us, or download the leaflets as pdf-file from our websites.

phone	+49 (0) 23 72-94 98-0
e-mail	sales@schleich.com
internet	www.schleich.com
download	German version www.schleich.com/de/download.php english version www.schleich.com/en/download.php

Safety and Functional Tester

Solutions made by SCHLEICH

The Handheld-Class
Handy, Practical, Good

The Handheld testers are small and robust all-purpose testers for standard-compliant safety tests in workshops, production and for the mobile use at repairs, installations, services and so on.

The tester's test technology is installed within a solid Aluminum enclosure for the rough mobile use. Via intelligent interfaces test values can be transferred to the PC and processed there.

The Handheld-Class
compels by its intuitive and clear operation

Test methods

- PE resistance
- insulation resistance
- high-voltage DC
- function 1-phase
- substitute leakage current

Range of applications

- tester maintenance
- small electrical appliances
- communication technology
- luminaires
- medical technology
- cabinets
- service
- wind power plants

The GLP1-Class
Small and Strong

The GLP1 testers are very compact testers to test the electrical safety and the function of electrical products according to variable national and international regulations. Whether manually operated, automatically run or integrated in a production line – these testers do an excellent job.

They are designed as single testers with only one test method and as combination testers for typical standard test processes. All necessary safety tests and even the functional test can be combined in these compact testers.

The GLP1-Class
the most compact tester in its market segment

Test methods

- high-voltage AC
- arc-detection
- high-voltage DC
- insulation resistance
- PE resistance
- residual voltage
- short-circuit
- function 1-phase

Range of applications

- automatic production lines
- electrical tools
- small electrical appliances
- EN 60204
- laboratory and test institutes
- luminaires
- medical technology
- OEM-applications
- test facility
- cabinets
- transformers
- and many others

The GLP2-Class
Outstanding Performance

The GLP2-testers are the result of more than 20 years' experience in "customer based technology" manufacturing. The testers set standards with precise, intelligent test processes regarding ease of use, modularity, functionality, test accuracy and performance.

Despite the compact design based on the SCHLEICH-MODULAR-CONCEPT the testers offer many possibilities to combine and integrate various safety and functional test methods. Whether only one test method or a number of methods – you determine the configuration!

The GLP2-Class
customized testers for every test task

Test methods

- high-voltage AC
- arc-detection
- high-voltage DC
- insulation resistance
- polarization
- PE resistance
- leakage current
- substitute leakage current
- residual voltage
- short-circuit
- function 1-phase
- function 3-phase
- resistance
- sense of rotation
- special tests
- mechanical tests
- visual test
- turn-to-turn fault

Range of applications

- automatic production lines
- electrical tools
- small electrical appliances
- household appliances
- cables and leads
- laboratories and test institutes
- LED-luminaires
- PCBs
- luminaires
- material tests
- medical technology
- motors
- test fields
- transformers
- wirings

The GLP3-Class
Test technology without any limit

The GLP3 testers are SCHLEICH's high-end-testers for complex test tasks at various products. They are for example used to test electrical motors, electronic assemblies, household appliances and so on.

The GLP3 tester's performance is the combination of all its strengths: ease of use, software, hardware, data base concepts – based on trendsetting technologies everything is perfectly matched.

The tester's lifelong update ability guarantees that you are always on the latest state-of-the-art technology.

The GLP3-Class
progressive test technology for highest demands

Test methods

- high-voltage AC
- arc-Detection
- high-voltage DC
- insulation resistance
- polarization
- PE resistance
- leakage current
- residual voltage
- short-circuit
- function 1-phase
- function 3-phase
- resistance
- capacity
- inductivity
- surge voltage
- partial discharge
- sense of rotation
- special tests
- mechanical tests
- visual test
- turn-to-turn fault

Range of applications

- components
- assemblies
- large electrical appliances
- small electrical appliances
- electrical products of all kinds
- electrical tools
- frequency converter
- household appliances
- cables and leads
- harnesses
- lamp replacement
- luminaire heat
- PCBs
- luminaires / LED
- medical technology
- motors
- transformers
- wirings

Contents


INNOVATION
Escape
Preset

Company

SCHLEICH – Experience, Competence and Passion.

Founded in 1952 as repair service for electric machines SCHLEICH has emerged as an internationally well-known manufacturer of coil winding machines for electrical engineering and for the electric motor industry within the following decades.

Already in 1987 we supplied the first PC-controlled surge testers for testing coils. This was a milestone within the company's history and the basis for the decision to specialize in developing testers. Owing to consequent service and continuous further development we are one of the internationally leading manufacturers of electronic testers for winding and motor testing today.

Every day each and every one of our 80 employees passionately works on guaranteeing and optimizing the high standard of our testers. Customers, the sales department and our manufacturing staff contribute new ideas and improvements. Thus they are all part of the innovation process that leads us into technology leadership regarding safety and functional test technology.

Besides innovation, SCHLEICH also stands for reliability. High quality requirements which are individually defined for each company sector, guarantee that you can rely on our products at any time. We are certified according to DIN EN ISO 9001 since 1998.

Made in Germany

Martin Lahrmann
Wolfgang Böhm
Karl-Dieter Schleich
Jan-Philipp Lahrmann

Tailor-Made Perfection.
Perfection in Series Production.
Made by SCHLEICH.

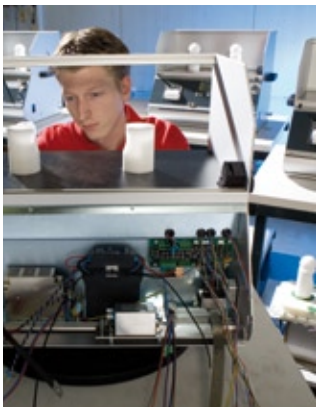
All under one roof – made by SCHLEICH

Extensive production facilities guarantee that all testers' components are designed and manufactured for you at our site in Hemer.

We manufacture measuring and electronic cards in highly reliable and modern In-Line-SMD-assembly technology which guarantees a stable quality of our final products. In our testers modern high-end processors perform your test task fast, precisely and reliably.

We also manufacture diverse accessory components such as test covers, contactings, production lines, tool supports with test object holders, and or robotic gripping with our CNC machines.

To ensure that you can use your SCHLEICH tester reliably for a long time, our engineers continue to maintain and develop the software. Regular updates make sure that you can always use the latest test software.



No limits for large-scale projects

SCHLEICH has the necessary technology, the PPS-controlled project handling, the manpower and the appropriate logistic infrastructure to realize large-scale projects.

Large-scale projects often require a lot of space due to their size and/or quantity of connected testers. For this we have continuously extended our production space to 4500 m² within the last years. This gives us the necessary space to completely install the entire testers including transfer lines as well as various working stations. We can also commission your complete project at our site for testing reasons.

Bosch®-transfer systems, Siemens®-data carriers on the product carriers and persistent SCHLEICH contacting technology usually care for the material flow within the systems. The information flow is guaranteed by the well-established SCHLEICH test technology connected with linked SCHLEICH line controls.

In total we project and manufacture your complete package as a turn-key solution under one roof for you.

You are our focus

The most important thing for us is to take optimum care of you during the complete process – right from the first contact up to the delivery of the completed tester.

Our internal ERP-system with integrated project management module guarantees that we can complete any tester according to your required schedule. Precise product planning as well as a thorough controlling allow an on-schedule control of the production process.

In addition we are able to inform you on the respective production phase of your tester at any time.

Consequent detailed documentation

Upon receipt of your order we start the complete documentation of your testers. Any drawing prepared by our designers joins a consequent documentation of the production progress. Even after delivery, we keep the records of any service intervention of your tester – from the calibration to service intervention.

Training and service

In our training rooms our engineers impart all knowledge to you in especially tailored training units so that you are able to tap the functionality of our testers as good as even possible.

It is very important for us that you are completely satisfied with our tester at any time. In case you have any queries or need support you can either call our service hotline or one of our of many service-engineers is of course available at any time.

Our comprehensive warranty assures you – in the event of a failure – that problems that might possibly occur can be solved by our engineers fast and reliably- either directly at your or at our site.

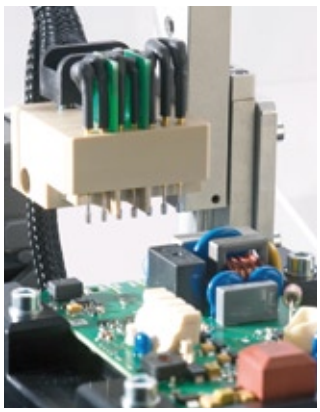
Individual solutions for diverse test tasks

With our wide, well-coordinated product range, we offer you test systems for almost every electrical test task – no matter which industry you are in.

SCHLEICH testers support you to only delivery products to your customers which correspond to valid standards and meet your high quality requirements at the same time.

The competence that has grown over the past decades through the close cooperation with our customers and innumerable projects makes us the problem solver of your tasks. We supply innovative test solutions which completely meet you individual requirements – whether single testers, combination testers or "all under one roof" system solutions.

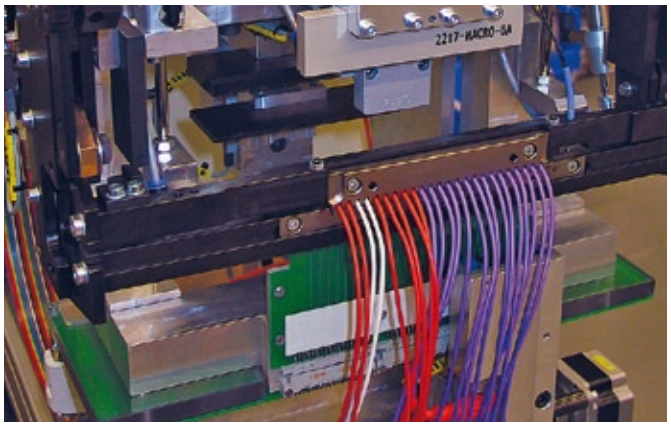
- individually designed testers
- individually designed test object fixtures
- specially designed contactings
- test work stations adapted to your application
- production lines with transfer systems
- large-scale projects with different testers



A comprehensive consultation in advance and the planning of your tester according to your requirements lead to a special design of hardware and software as well as the mechanics. At SCHLEICH we are proud that you receive “all under one roof”.

The division of our product range into different tester classes as well as the SCHLEICH-MODULAR-CONCEPT design guarantees that we design and manufacture your individual solution as cost-efficient as possible. This always takes place without any compromises regarding technology.

S·M·C
SCHLEICH MODULAR CONCEPT



- electrical industry
- medical technology
- automotive industry
- aerospace technology
- wind power technology
- solar technology
- mechanical engineering
- electric motor industry
- consumption electronics
- luminaire industry
- communication technology

Green Energy.
Test technology for the entire energy cycle – from the generation to the consumption

Today everybody talks about Green Energy. At the moment two sectors of "green" energy generation are becoming apparent: wind power and solar energy.

At the end of the "green" energy cycle there is also the green energy consumer. Besides energy efficient electric devices the electric car becomes increasingly important in the future.

We offer the adequate tailored configured test technology for all kinds of energy generation and all kinds of electrical consumers. This applies for the production as well as for the maintenance.

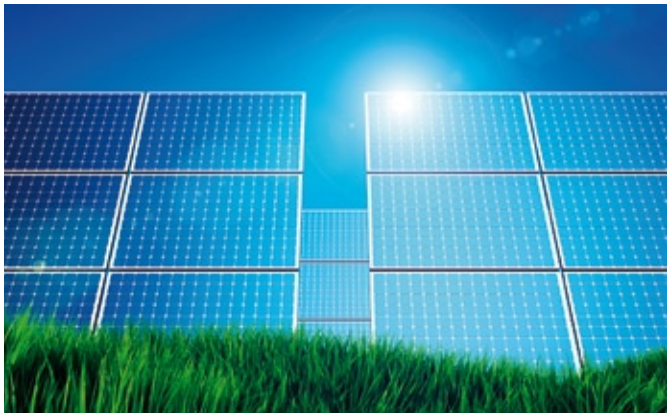
Wind power

To test generators and generator components we supply you with thousand fold proven test technology. Whether winding, safety or functional test technology we offer the adequate solution.

With manual or automatic test systems we guarantee that your winding system works properly also in the rough use of a wind power plant. Portable winding testers enable engineers to perform maintenance tests with automatic evaluation at the generator directly within the nacelle. No special know-how is necessary for this test. With our compact Handheld tester you can perform lightning arrestor tests from the rotor blade down to the bottom.

Range of applications

- lightning arrestor
- electrical safety
- generator
- partial discharge
- power inverter
- winding



Solar energy

In the production and installation of solar panels we support you with reliable safety and functional test technology. We supply fully automatic test systems for the production to thoroughly test your solar panels. Manual testers support you during the acceptance test or troubleshooting at the installation site.

Let us know your test task – and we will assemble the adequate tailor-made tester for you based on our comprehensive tester and test method tool box.

Range of applications

- battery test
- lightning protection
- electrical function
- electrical safety
- power inverter
- efficiency

Electric cars

The automotive industry relies on SCHLEICH's innovative test technology as well. Many well-known automotive manufacturers trust in SCHLEICH's winding testers when testing electric drives, hybrid engines, alternators or different electric auxiliary drives in modern cars.

Besides the electric drive in electric cars the energy storage based on most modern battery technology is very important. SCHLEICH testers analyze all electrically relevant parameters within the storages. Whether safety and/or functional tester we offer the optimum tailored tester.

At the end of the production there is the completed electric car. A check regarding safety and function goes without saying. Stationary or portable SCHLEICH testers support you with it.

In all our production steps we set a high value on the traceability of all installed components. In addition to the precise SCHLEICH test technology also the data base concept of our tester can trump. The testers save several series numbers and additional production relevant information in addition to the test results. Thus the traceability is guaranteed in all steps of the production.

Within an electric car's lifetime maintenances are consistently necessary. High-performance testers of SCHLEICH support the service staff in workshops. Also complex test tasks are performed user-friendly, fully automatically and in a comfortable way.

Range of applications

- actuators
- battery test
- electric safety
- e-motors
- auxiliary drives
- high-voltage batteries
- hybrid engines
- charging cables
- charging stations
- sensor technology
- wiring

Calibration, Online Calibration and Online Service

Calibration

The monitoring of testing equipment is very important for every company. The regular calibration of your testing equipment is an important precondition for assured quality. Therefore, we calibrate the testing equipment for our customers according to the standards.

We offer three possibilities for the calibration:

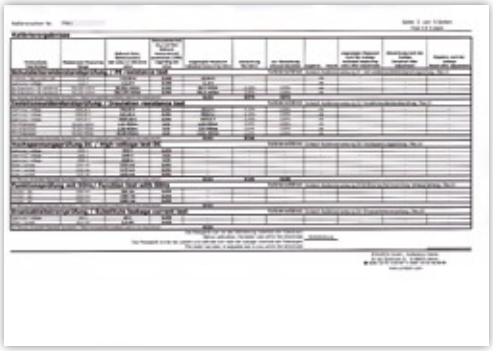
- "in-house calibration" means we calibrate at your site
- "at SCHLEICH calibration" means we calibrate at our site
- "online calibration" means we support the calibration via remote maintenance at your site

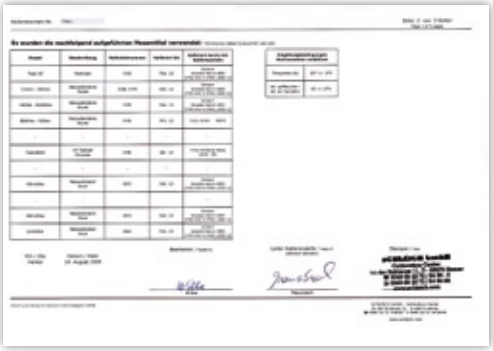
For the calibration at our site we plan a short door-to-door time. If you have a standard tester we can, upon request, place a loan tester at your disposal to fill the calibration time. If required we are also able to calibrate devices of other manufacturers.

In case unacceptable deviations in test values are detected during the calibration we of course adjust the tester as part of our calibration service. The test values before and after the adjustment are documented in the calibration certificate.

Our calibration standards are traceable back to national standards. Our DIN EN ISO 9001 certified calibration center also works of course according to further standards for example DIN EN ISO 10012, the regulation of requirements for measurement processes and measuring equipment.

If required the calibration is performed according to DAkkS/DKD-standard. (DAkkS = German Accreditation Body / DKD = German Calibration Service).





calibration@schleich.com

Online service

All testers have to be calibrated within the product cycle. The occurring costs consist of calibration and travel costs.

In case the tester's location is far away from SCHLEICH the travel costs might possibly be higher than the calibration costs. To keep your costs as low as possible we combine the trips to several customers or use the online calibration service if possible. For this you do not need any SCHLEICH service engineer at your site. One of your staff members can reliably perform the calibration himself according to our online instruction and control.

Regarding online connections: safety and data protection are of course important especially when using the internet; it has to be set a high value on the fact that data are not transferred into the wrong hands. Therefore, we use validated and reliably proven remote control software of a well-known German software producer for the online connection.

Only for the time of the service a safe connection is established between your tester and the service PC. During the service we can see the same screen content on our service PC that is also displayed on your tester. If you allow it we are able to enter data in your tester via our keyboard and mouse and to navigate through the menus.

In addition it is possible to communicate via a chat window. This is important to ask you questions or to give you instructions. Alternatively this can also be done via phone.

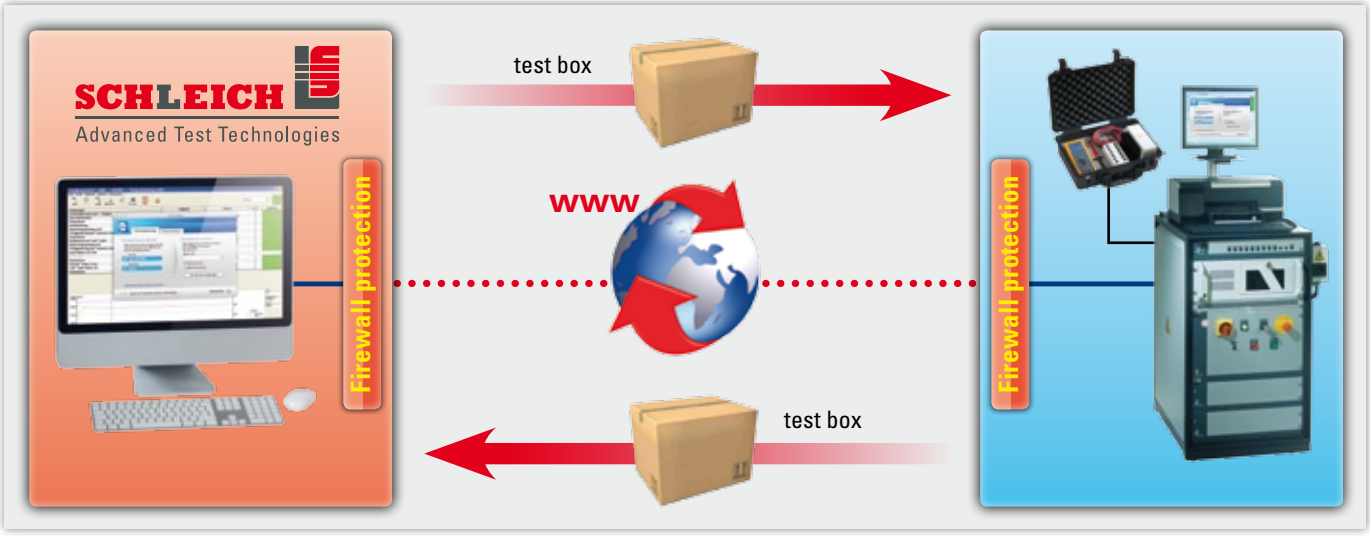
The online service can be performed directly from our head office as well as through a local SCHLEICH sales representative. In addition our online service can also be used for software maintenance tasks.

Remote calibration

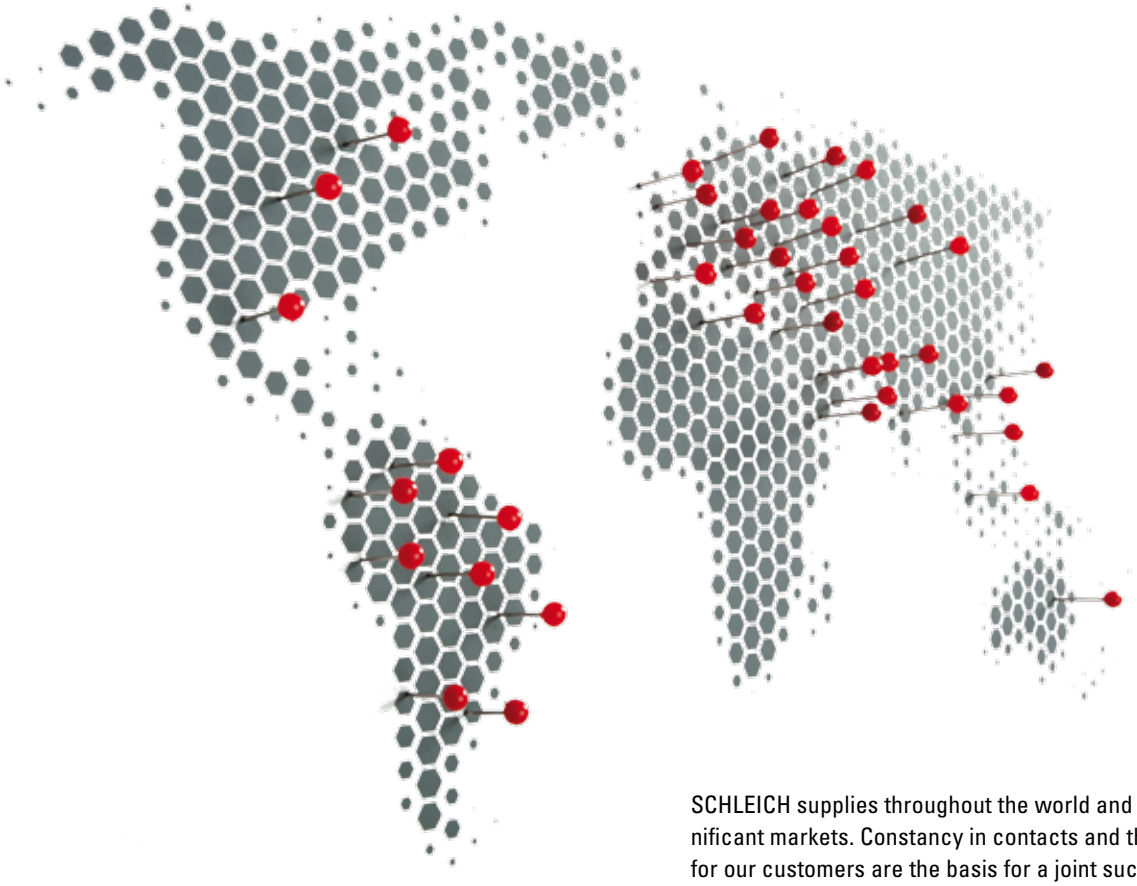
For the remote calibration we send you a test box with calibrated measuring resistances and a calibrated tester.

When starting the remote calibration online, a connection via internet is established at first. After having established the connection you can perform the single test steps under the online supervision of our service engineer. We can see the values measured by the tester also on our screen. Our engineer can control whether the measured values are ok. In case of deviations our service engineer can directly adjust the measuring value online.

After the calibration, the test box is sent back to us again. We prepare the calibration certificate and e-mail it to you.



Service without limits. Regardless where you work we are at your disposal.



SCHLEICH supplies throughout the world and is present on all significant markets. Constancy in contacts and the first-class support for our customers are the basis for a joint success for us.

We find the answer for all your questions. Together with our representatives in more than 50 countries we develop fast and competent solutions for all your tasks.

e-mail:	welcome@schleich.com
sales department:	+49 (0) 23 72-94 98-0
	sales@schleich.com
sales partner:	www.schleich.com/de/vertrieb.php
	www.schleich.com/en/vertrieb.php
calibration:	calibration@schleich.com

Renowned customers all around the globe trust in our products.

We would be pleased to convince you as well of our know-how regarding electric safety, functional and quality testers. Whether single tester, combination tester or a comprehensive system solution – we are the right partner for you.

ABB
AEG
Airbus Industries
Alcatel
Alstom
AMK
Ansorg
Arcelik
ATB
Audi
BAG
Becker Antriebstechnik
Bernal Tore
BJB
BMW
Boing
Bosch
Braun
BSHG
CERN
Continental
Daimler
Danfoss
DAL
Dematic Cranes
Deutsche Bahn
DOM
Dometic
E.G.O.
Electrolux
ELIN
ELNOR
Embraco
EMU
Enercon
Engel
ERCO
Evobus
Fagor
Fein
Festool
Flygt
Franklin Electric
Gildemeister
Grohe
Grundfos
Hanning
Heidelberger Druck
Heidolph
HILTI
Hirschmann
Hoffmeister-Leuchten
IFM
Ihne + Tesch
Imperial
Indramat-Rexroth
Jumo
Juno
Jungheinrich
KaVo
Kärcher
Kress
KSB
Leica
Lenze Antriebstechnik
LEONI
Liebherr Aerospace
Lufthansa
Meiko
MAN
Mennekes
Mercedes
Miele
Motory International SRO
Murr Elektronik
Nettelhof
Nilfisk
Novoferm Tore
Oase Pumpen
Ocean
Opel
Osram
Papst
Philips
Philips medical
Phoenix Contact
Preh Automation
Premiere
Rademacher
Rexroth
Rittal
Rotomatika
Salmson
Saeco
Salzgitter AG
Schabmüller
Schulte E-Technik
Severin
SEW
Siemens
Siemens Wind Power
Stahl
Staff
Stöber
TCM
Tecumseh
TEE
Temic
Trilux
TÜV
UPS
USK
Vaillant
Vestas
VDE
Vossloh
VW
WAP-ALTO
WDR
Weidmüller
WEG
WILA-Leuchten
WILO
Zanussi
Zeiss
ZF
Zumtobel
…


Handheld
PE
Start
Stop
Display
Mode
Test
Methods
set limits
Test socket
fail
test
pass
Erase
memory
PE
ISO
Leak
Fun

Die Handheld-Class

Handy, Practical, Good

Handheld | Mobile All-Purpose Tester

USB
RS232
PC
I/O

Highlights

- small and portable
- integrated test socket
- easy and clear operation
- start button on both sides for left and right-handed operators
- PE resistance test with 10A AC in four-wire-technology: evaluation regarding resistance or voltage drop
- insulation resistance test: evaluation regarding resistance or current
- high-voltage test DC up to 2500V DC
- interface for printer or result query
- integrated result storage for a subsequent transfer via RS232 or USB interface
- storage and print of test results via PrintCom

The testers of the Handheld class are all-purpose testers for the electric safety test, for the PE test as well as for the test regarding insulation faults. They can be supplied as single as well as combination testers.

The main application field of these compact Handheld testers is at the customer's site. For this the test technology is installed within a sturdy Aluminum strand casting box. Comprehensive accessories like transport box and straps to carry the tester facilitate the engineer's work.

Besides the high-voltage test AC the testers can also be used for EN 60204 tests. When doing without the high-voltage test all necessary tests can be performed according to the machine regulation. Owing to the integrated storage the test results do not have to be written down manually.

In addition it is also possible to increase the test voltage at the insulation resistance test to max. 2500V DC at the Handheld testers. Thus there is an interesting alternative to the high-voltage test with AC. 1800V ACeff corresponds to approx. 2500V DC.

For connecting the test object a test socket is often used. Tests can be performed by the test probe against this socket. As an alternative the tester can also be connected via a connecting cable with the enclosure (PE feed-in point) of the test object. Then the tests are performed against this PE point.

The test of lightning arrestors at wind power plants is a special application. For this the PE minimum current monitoring can be switched off in order to be also able to test currents less than 10A. At a reduced test current and a test line in four-wire-technology of 50m length resistances of up to 15Ω can be measured.

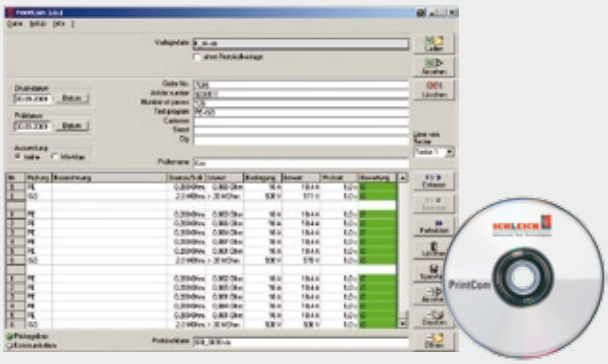
insulation resistance

PE resistance

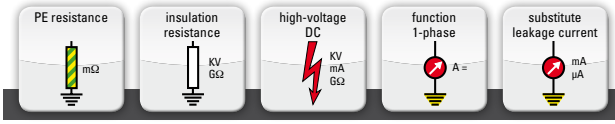
test value display

PrintCom – archive and print test results in Excel®:

With PrintCom you are able to protocol and save your test results fast and comfortably:
- import test results
- save test results in Excel® format
- print test results



You will find more details on page 44.



Handheld | Single and combination testers

Model	403046	403001	40309000	403012	40309001	403018
PE resistance test 10A AC	–	●	●	●	●	●
insulation resistance test 100…1000V DC	●	●	●	●	●	●
high-voltage test 100…2500V DC	–	–	–	●	●	–
substitute leakage test	–	–	●	–	●	–
functional test 2A	–	–	–	–	–	●
battery operation	●	–	–	–	–	–

● standard | ○ option | – not available


10:35 | Preset :
1900 VACeff
1200 2400 3600 4800
25.3 mAeff
20 40 60 80
0.2 0.4 0.6
Test
VORSICHT / HOCHSPANNUNG - LEBENSGEFAHR
CAUTION / HIGH VOLTAGE - DANGER OF LIFE
3200 VACeff
23.7 mA eff
Menu
Escape
Preset
50
100
%

The GLP1-Class
Small and Strong

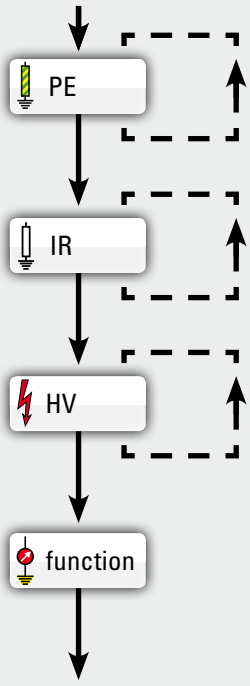
GLP1-g | Safety and Functional Tester

USB
RS232
Ethernet
PC
LabView®
PLC
I/O
Analog
Print

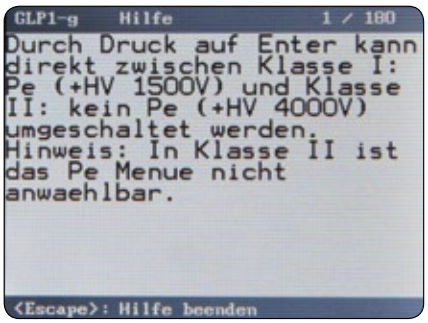
Highlights

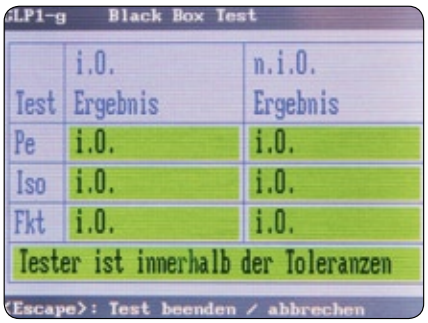
- very well readable color graphic display
- innovative handy entry via rotary button
- structured menu and practical functioning buttons
- multilingual user software
- large result storage for a subsequent data transfer
- PE resistance test in four-wire-technology
- insulation resistance test
- high-voltage test – safety current restricted
- short circuit test before the functional test
- functional test with current and output measurement
- self-test via black box according to VDE regulations
- electronic PE test current control
- electronic high-voltage setting
- high-voltage with ramp up/down time
- electronic voltage setting of 10…260V AC
- integrated isolating transformer
- worldwide voltage supply 110V…250V / 47…63Hz
- start upon touching the test object with the test probe
- acoustical and visual status messages
- password protection
- digital I/O interface and analog actual value outputs
- interfaces for printer, remote control or result query
- integration into production lines with PLC / PC remote control
- two-circuit safety inputs
- safety circuits with restraint-guided safety relays
- PrintCom-software to save and print test results on a PC
- designs: tabletop unit, box unit, 19”-installation
- optimum OEM-preconditions

GLP1-g single or combination testers are designed for testing the electrical safety and functioning of electric products according to the standards. Owing to the structured menus test routines can be set very easily and saved as different setups.



Tests are consecutively performed step by step. For this the tester automatically switches the individual test methods on the test object. If several points of one method are to be tested within one test method, e.g. multiple measurement at the PE test the operator scans these test points one after another with the test probe. This test probe with integrated start button and three-color LED of our product range realizes a comfortable way of working. Afterwards the rest of the process is again performed completely automatically.



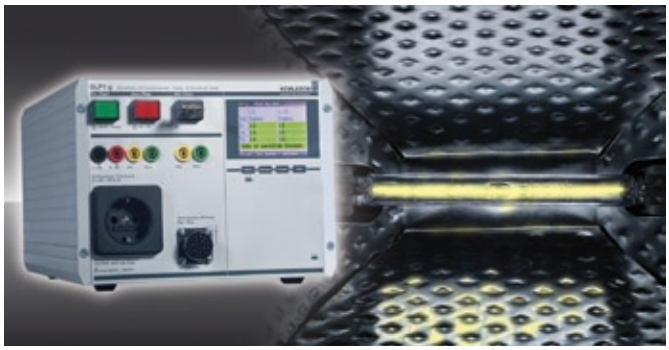


After the safety tests the GLP1 automatically checks whether there is a short circuit between L and N. If everything is ok the functional test follows. For this test the mains voltage that is electronically set within the tester is switched to the test object. The test can be performed either with or without evaluating the current or the output respectively.

Thanks to the integrated monitoring function also untrained persons are able to perform the tests reliably and safely.

The integrated interfaces allow printing test results. With our Windows® software PrintCom you can save results on a PC or continue to process them.

Alternatively the interfaces also allow a remote control of the tester via a PC, a PLC or LabView®. Digital I/O channels are also available. The testers can be easily integrated in automatic production lines.



For general technical data of the testers as well as of standard single and combination testers please look on page 134

GLP1-g 60204 | Safety Tester EN 60204-VDE 0113

EN 60204 VDE 0113

USB
RS232
Ethernet
PC
LabView®
PLC
I/O
Analog
Print

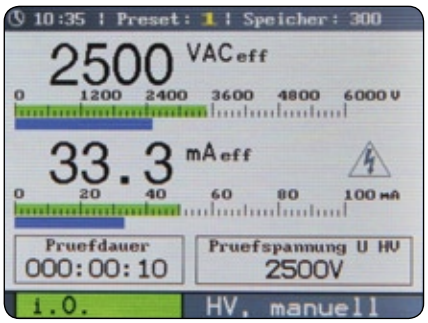
Highlights

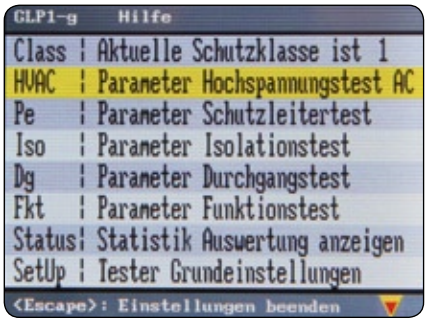
- very well readable color graphic display
- innovative handy entry via illuminated rotary button
- structured menu and practical functioning buttons
- multilingual user software
- large result storage for a subsequent data transfer
- PE resistance test in four-wire-technology
- insulation resistance test
- high-voltage test incl. burning function
- illuminated ring at the rotary button to show the high-voltage level
- residual voltage test
- self-test via black box according to VDE regulations
- electronic PE test current control
- PE test with resistance or voltage drop display
- electronic high-voltage setting
- high-voltage with ramp up/down time
- three HV modes: manual, automatic with time lapse and burning
- worldwide voltage supply 110V…250V / 47…63Hz
- start upon touching the test object with the PE test probe
- acoustical and visual status messages
- password protection
- digital I/O interface and analog actual value outputs
- interfaces for printer, remote control or result query
- integration into production lines with PLC / PC remote control
- two-circuit safety inputs
- safety circuits with restraint-guided safety relays
- PrintCom-software to save and print test results on a PC
- designs: tabletop unit, box unit, mobile caddy, 19”-installation
- optimum OEM-preconditions

GLP1-g 60204 testers are designed for testing the electrical safety at machines and devices according to the machinery directive EN 60204 and VDE 0113 respectively. The measuring values for the individual measurements are optimally displayed for the operator.

GLP1-g 60204 testers are perfectly suited for a fast, uncomplicated test in workshops as well as on site, e.g. on the installation site. You can perform PE and insulation resistance tests as well as high-voltage and residual voltage tests.

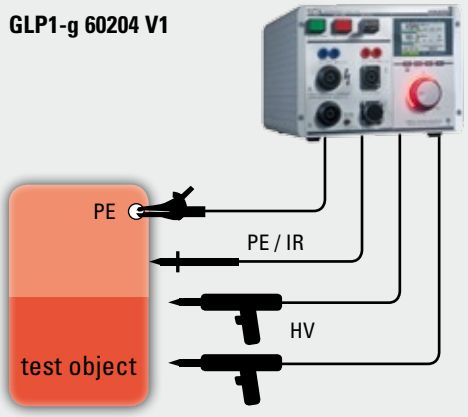
The integrated interfaces allow printing the test results. In case a PC is available, you can directly save and process the results by using our Windows® software PrintCom.



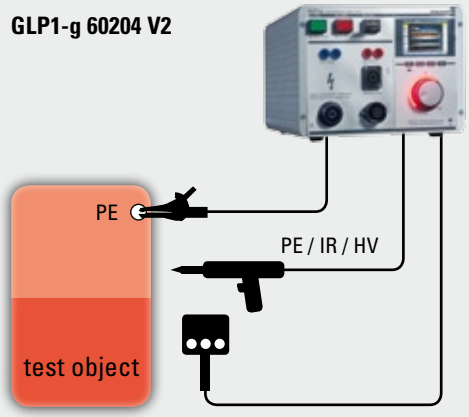


Two different models are available which only vary in the way of contacting the test object

GLP1-g 60204 V1



GLP1-g 60204 V2



At the model V1 the PE and insulation resistance tests are performed at first by means of a test probe with an integrated control unit. Afterwards the high-voltage test is done with two safety test pistols. The test pistols are available with or without integrated start button as well as in variable cable connecting lengths.

At the model V2 the test object is contacted at ground (central PE point). All three tests can be performed against this single ground point with the same test pistol. By activating the selection switches at the control panel that is seen as the control unit, it can be switched between the test methods. For the operator's safety the high-voltage button in the control panel has to be continuously activated during the high-voltage test. A test pistol with pressure dependent start button is used. To start the test, the test tip only has to be pressed against the test object and the test step starts.

For general technical data of the testers as well as of standard single and combination testers please look on page 134

GLP1-g HV | High-Voltage Tester AC/DC up to 50KV

- USB
- RS232
- Ethernet
- PC
- LabView®
- PLC
- I/O
- Analog
- Print

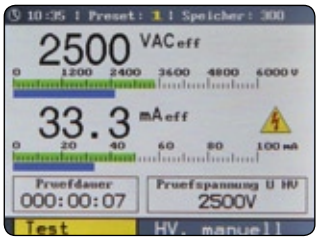
Highlights

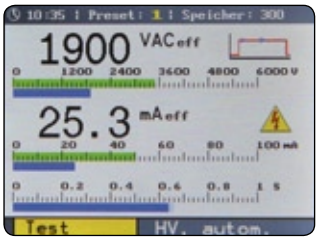
- very well readable color graphic display
- innovative handy entry via rotary button
- structured menu and practical functioning buttons
- multilingual user software
- large result storage for a subsequent data transfer
- high-voltage test up to 50KV AC
- high-voltage test up to 6KV DC with lowest residual ripple
- electronic high-voltage setting
- high-voltage with ramp up/down time
- three HV modes: manual, automatic with time lapse and burning
- voltage check and cable break monitoring (4-wire-technology)
- manual high-voltage setting via rotary button
- illuminated ring at the rotary button shows the voltage level
- worldwide voltage supply 110V…250V / 47…63Hz
- acoustical and visual status messages
- password protection
- digital I/O interface and analog actual value outputs
- interfaces for printer, remote control or result query
- integration into production lines with PLC / PC remote control
- switch-on sequence according to VDE 0104
- two-circuit safety inputs, two-hand start
- safety circuits with restraint-guided safety relays
- PrintCom-software to save and print test results on a PC
- designs: tabletop unit, box unit, mobile caddy, 19”-installation
- optimum OEM-preconditions

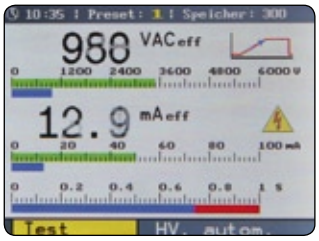
GLP1-g HV testers are designed for testing the electrical insulating property and electric strength (clearances and leakage paths) at electrical parts and components.

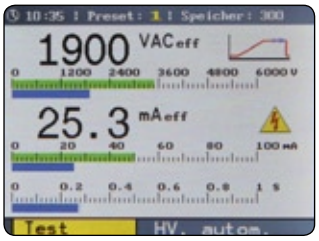
These testers are perfectly suited for a fast, uncomplicated test during the production. This can either be done manually with safety pistols or automatically. The testers allow programmed time processes, several other monitoring functions or locating insulation faults due to “burning”.

The high-voltage is generated electronically. The manual voltage setting is done via the rotary button at the front. The automatic voltage setting with ramp profiles is done electronically.







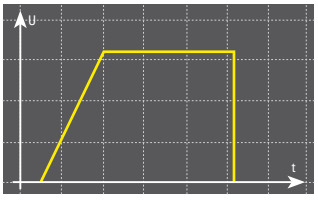


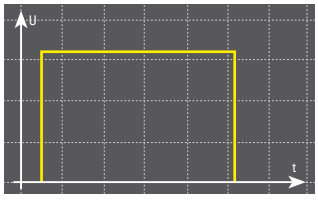
These testers are not only designed for a standard test voltage for routine tests but also provide a sufficient level of test voltage for type tests and material analysis.

Matching your applications we offer a great variety of different test pistols. For the tester's use in automatic production lines or test setups we also offer the corresponding high-voltage cables and contactings, of course.

The integrated interfaces allow printing test results. With our Windows® software PrintCom you can save results on a PC or continue to process them.

Alternatively the interfaces also allow a remote control of the tester via a PC, a PLC or LabView®. Digital I/O channels are also available. Thus the testers can be easily integrated in automatic production lines.





Test with or without voltage ramp profile

For general technical data of the testers as well as of standard single and combination testers please look on page 134

≤ 50KV

GLP1-g HV with 12KV AC

GLP1-g HV with 15KV AC

GLP1-g HV with 20KV AC

GLP1-g HV with 50KV AC

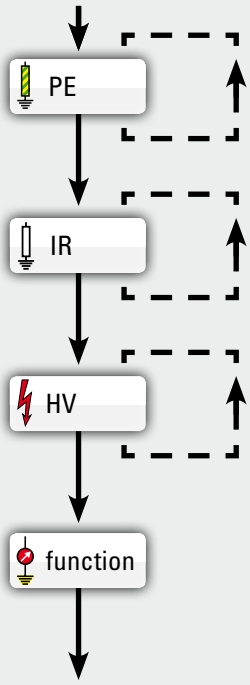
GLP1-e | Safety and Functional Tester

- USB
- RS232
- PC
- LabView®
- PLC
- I/O
- Analog
- Print

Highlights

- PE resistance test in four-wire-technology
- insulation resistance test
- high-voltage test with fixed voltage
- short circuit test before the functional test
- functional test with current measurement
- self-test via black box according to VDE regulations
- electronic PE test current control
- integrated isolating transformer
- integrated result storage for a subsequent data transfer
- start upon touching the test object with the test probe
- acoustical and visual status messages
- connections for warning and result light
- digital I/O interface and analog actual value outputs
- interfaces for printer, remote control or result query
- integration in production lines with PLC / PC remote control
- designs: tabletop unit, box unit, 19" installation
- optimum OEM preconditions
- PrintCom software to save and print test results on a PC

GLP1-e single and combination testers are designed for testing the electric safety and functioning of electric products according to the standards. Owing to the few adjustable parameters the GLP1-e testers are particularly suited for standardized test processes.



Tests are consecutively performed step by step. For this the tester automatically switches the individual test methods on the test object. If several points of one method are to be tested within one test method, e.g. multiple measurement at the PE test the operator scans these test points one after another with the test probe. This test probe with integrated start button and three-color LED of our product range realizes a comfortable way of working. Afterwards the rest of the process is again performed completely automatically.

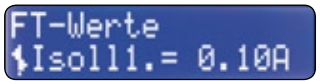
After the safety tests the GLP1-e automatically checks whether there is a short circuit between L and N. If everything is ok the functional test follows. For this test the mains voltage is switched to the test object. The test can be performed either with or without current evaluation.

Thanks to the monitoring function that can be activated, untrained persons are also able to perform the tests reliably and safely.

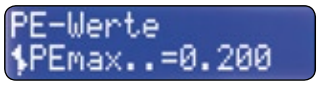
The integrated RS232 or USB interface allows printing test results directly. With our Windows® software PrintCom you can save results on a PC or continue to process them.

Alternatively the interface also allows a remote control of the tester via a PC, a PLC or LabView®. Digital I/O channels are available in addition. Thus the testers can be easily integrated in automatic production lines.

display at the end of the test



entry of a test parameter



entry of a test parameter

single tester PE

combination tester PE | IR | HV | function

tester with up to 1500V DC

test of an electric grill: PE | IR | function according to EN 60335

luminaire test: PE | IR | function according to EN 60598

For general technical data of the testers as well as of standard single and combination testers please look on page 140

GLP1-e 60204 | Safety Tester EN 60204-VDE 0113

EN 60204 VDE 0113

USB
RS232
PC
LabView®
PLC
I/O
Analog
Print

Highlights

- PE resistance test in four-wire-technology
- insulation resistance test
- high-voltage test incl. burning function
- residual voltage test
- self-test via black box according to VDE regulations
- electronic PE test current control
- PE test with resistance or voltage drop display
- manual high-voltage setting
- three HV modes: manual, automatic with time lapse and burning
- integrated result storage for a subsequent data transfer
- start upon touching the test object with the PE test probe
- acoustical and visual status messages
- digital I/O interface and analog actual value outputs
- interfaces for printer, remote control or result query
- designs: tabletop unit, box unit, mobile caddy, 19”-installation
- optimum OEM-preconditions
- PrintCom software to save and print test results on a PC

GLP1-e 60204 testers are designed for testing the electrical safety at machines and devices according to the machinery directive EN 60204 and VDE 0113 respectively.

GLP1-e 60204 testers are perfectly suited for a fast, uncomplicated test in workshops as well as on site, e.g. on the installation site. You can perform PE and insulation resistance tests as well as high-voltage and residual voltage tests.

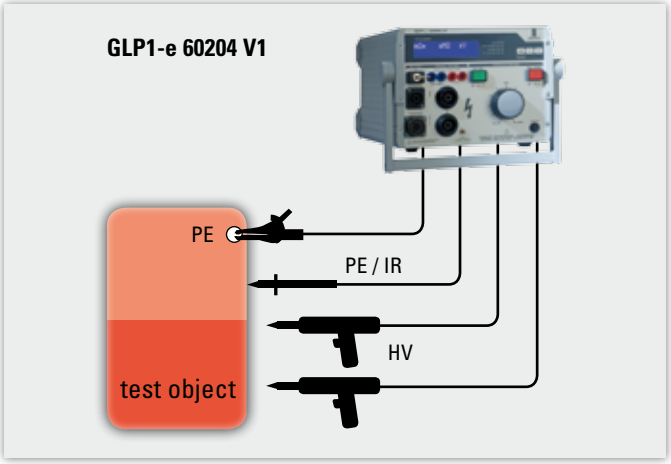
The integrated RS232 interface allows printing the test results directly. In case a PC is available you can directly save and process the results by using our Windows® software PrintCom and continue to process them.

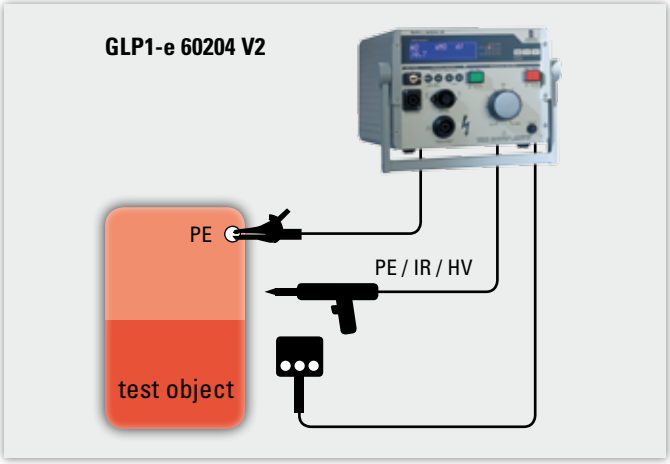
PE resistance

insulation resistance

high-voltage

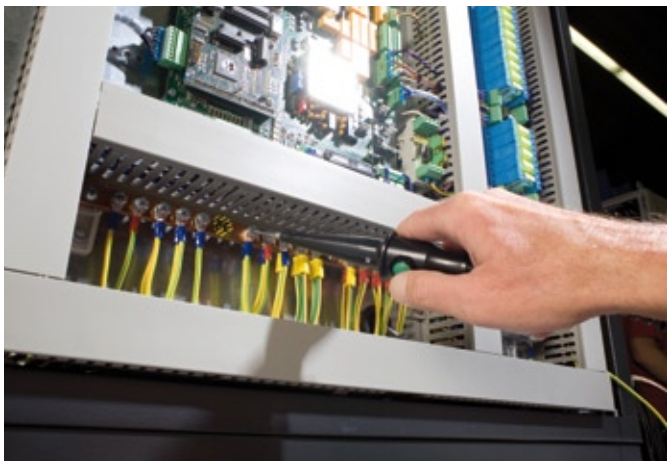
Two different models are available which only vary in the way of contacting the test object





At the model V1 the PE and insulation resistance tests are performed at first by means of a test probe with integrated control unit. Afterwards the high-voltage test is done with two safety test pistols. The test pistols are available with or without integrated start button as well as in variable cable connecting lengths.

At the model V2 the test object is contacted at ground (central PE point). All three tests can be performed against this single ground point with the same test pistol. By activating the selection buttons at the control panel that is seen as the control unit it can be switched between the test methods. For the operator's safety the high-voltage button in the control panel has to be continuously activated during the high-voltage test. A test pistol with pressure dependent start button is used. To start the test the test tip only has to be pressed against the test object and the test step starts



For general technical data of the testers as well as of standard single and combination testers please look on page 140

GLP1-e HV | High-Voltage Tester AC/DC up to 50KV

USB
RS232
PC
LabView®
PLC
I/O
Analog
Print

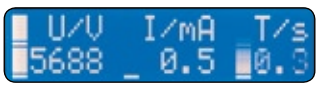
Highlights

- high-voltage test up to 50 KV AC
- high-voltage test up to 6KV DC with lowest residual ripple
- three HV modes: manual, automatic with time lapse and burning
- voltage check and cable break monitoring (4-wire-technology)
- manual high-voltage setting via rotary button
- automatic high-voltage setting with ramp-up time
- acoustical and visual status messages
- VDE 0104 compliant switch-on sequence
- digital I/O interface, two-hand start and analog actual value outputs
- interfaces for printer, remote control or result query
- safety circuits with restraint-guided safety relays
- integration into production lines with PLC / PC remote control
- designs: tabletop unit, box unit, mobile caddy, 19”-installation
- optimum OEM-preconditions
- PrintCom-software to save and print test results on a PC

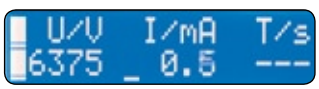
GLP1-e HV testers are designed for testing the electrical insulating property and electric strength (clearances and leakage paths) at electrical parts and components.

These testers are perfectly suited for a fast, uncomplicated test during the production. This can either be done manually with safety pistols or automatically. The testers allow programmed time processes, several other monitoring functions or locating insulation faults due to “burning”.

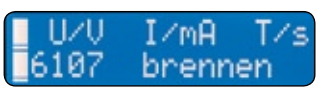
The high-voltage is generated either manually or automatically. These testers are not only designed for a standard test voltage for routine tests but also provide a sufficient level of test voltage for type tests and material analysis.



automatic mode



manual mode



burning mode

GLP1-e HV with 12KV AC

≤ 50KV

GLP1-e HV with 15KV AC

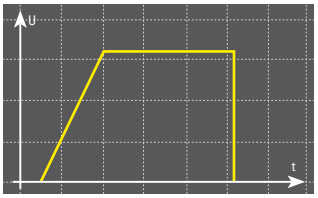
GLP1-e HV with 20KV AC

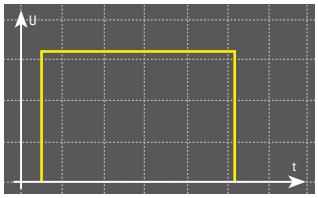
GLP1-e HV with 50KV AC

Tests are often performed with two safety pistols. Matching your applications we offer a great variety of different test pistols. For the tester's use in automatic production lines or test setups we also offer the corresponding high-voltage cables and contactings, of course.

The integrated RS232 interface allows printing test results directly. With our Windows® software PrintCom you can save results on a PC or continue to process them.

Alternatively the interface also allows a remote control of the tester via a PC, a PLC or LabView®. Digital I/O channels are also available. Thus the testers can be easily integrated in automatic production lines.





Test with or without voltage ramp profile

For general technical data of the testers as well as of standard single and combination testers please look on page 140

The GLP1-Class

Enclosure Versions

Rock-solid test technology and an appealing design should not contradict but complement each other. Thus we install the innovative technology of the GLP1-Class into a rock-solid but nevertheless light weighted and very appealing enclosure.

At the front panel there are the displays, the controls, and the test connections. Everything is arranged very clearly and in an ergonomic way. The standard marking is in German and English. Additional languages are of course available as an option.

At the rear panel there are the mains socket, the interfaces, and the optional test connections. In this way the test lead to the test object can also be connected at the rear instead at the front. This is advantageous for OEM applications at which the GLP1 is often integrated in the cabinet.

GLP1 tabletop enclosure

The light weighted but nevertheless dimensionally stable Aluminum enclosure is designed according to the current standard EMV-requirements. It perfectly includes the electronics as well as the high-performance high-voltage transformer.

width	236 mm (42DU)
height	178 mm
length	320 mm

GLP1 with carrying handle

A carrying handle can be installed in addition. It serves for the easy transport or for the diagonal setup of the tester.

width	236 mm (42DU)
height	178 mm without handle
length	320 mm

GLP1 tabletop enclosure 19"

In case more space for the technology is needed the GLP1 can also be installed in a 19" enclosure with standard width.

width	448 mm
height	178 mm
length	320 mm

GLP1 with 19" fixing plate

Automation specialists, special purpose machine manufacturers, and OEM often integrate testers of the GLP1-class into a 19" cabinet. The testers offer the perfect precondition for this. The 19" assembly kit is available for the installation as option.

width	448 mm
height	178 mm
length	320 mm

GLP1 in a mobile caddy

For extremely mobile applications we integrate your GLP1 into a caddy. The caddy is very sturdy and also appropriate for the outdoor use. To get from one measuring place to the other you can roll the caddy comfortably behind yourself.

In the additional storage space within the caddy you can additionally store the test leads. Thus you always have everything "on board".

width	500 mm
height	406 mm
length	350 mm

GLP1 in a transport box

Instead of a caddy you can also comfortably integrate the GLP1 in a portable transport box. This box is ideal for applications in the railway, automotive, service, and outdoor use.

In the additional storage space within the transport box you can additionally store the test leads and test probes.

width	470 mm
height	180 mm
length	360 mm

PortaTest | Insulating Oil and Insulating Material Tester

RS232

PC

Print

Highlights

- fully automatic insulating oil tester
- test voltages 60KV, 80KV and 100KV
- test of insulating materials
- variable test voltage and variable test voltage rise
- integrated test sequence according to national and international standards
- storage potential for ten user-defined test sequences
- filament formation is avoided by a short switch-off time with current switch-off < 1ms
- average value display and display of single disruptive breakdown values
- magnetic stirrer
- integrated normal paper protocol printer
- different test electrodes
- graphic display with background light
- clear user navigation via four functional buttons
- entry of the sample number and temperature
- PC-software PrintCom to save and print test results

PortaTest testers determine the disruptive breakdown of insulating oils and materials fully automatically. Due to their compact structure, the PortaTest testers can be used on site as well as in laboratories. Owing to their large swiveling protection cover, the test vessel can be comfortably and safely placed on the high-voltage electrodes in the test chamber.

Our oil testers are characterized by high user-friendliness. The operator can select the respective test program by means of the test standard and the tester directly shows which test electrode and which electrode distance is to be selected for this test. A setting gauge facilitates to adjust the distance of the electrodes. The process of the test sequences is performed fully automatically.

Owing to the graphic display the operation is very comfortable. With the four function buttons below the display you can select a test standard, enter data and configure your own test sequences or the tester itself.

When you receive the tester it already includes test sequences that correspond to all current national and international standards and test specifications. In addition, you can define up to ten further test sequences and save them in the tester.

Integrated test processes

- 16 standard test sequences consistent with the international test standards
- 10 freely programmable test sequences
- short test program for a quick status evaluation (5min test period)
- overload test, single disruptive breakdown test
- withstand voltage test (1min - 24h) with programmable rise speed
- step test (1 - 10 steps)

PortaTest testers can label the oil samples automatically with a consecutive number. However, the operator is also able to use his own number identification.

A detailed test protocol is printed on the integrated printer after each test. Besides the used test standard this protocol also includes information regarding date, time, sample number, single disruptive breakdown values as well as an average value and the standard deviation.

If needed the test results can also be transferred from the tester to the PC via our PrintCom software saved or be combined in test protocols. In order to be able to process the data in an optimal way PrinCom saves all data in an Excel® format.

PortaTest standard testers

article number	4018300	4018301	4018302
test voltage	60KV	80KV	100KV
voltage measurement TRMS (true r.m.s. measurement)	●		
voltage rise	0.1…10KV/s		
test standard: IEC 156/95, VDE 370/96, BS 5874/80, UTE C27-221/74, UNE 21309/89, NEN 10156, SEV 3141/69, CEI 10-I/73, ASTM-D 1816/90, ASTM-D 877/90, ASTM-D 149/97 JIS 2101-82, JIS Si 2101/82, JIS C 2123, IS 6855/92, EN 60243-1	●		
standard test sequences	16		
freely programmable test sequences	10		
withstand voltage measurement	●		
step voltage measurement	●		
switch-off time at disruptive breakdown	<1ms		
magnetic stirrer (can be switched on / off) incl. draft angle for stirring staff	●		
matrix printer 40 characters/line	●		
test vessel made of glass (0.4l) with 1 pair electrodes upon request	●		
setting gauge	●		
integrated clock with date and battery buffer	●		
mains voltage supply	230V - 240V | 50Hz - 60 Hz		
special voltage supply 110V | 60Hz	○		
work and storage temperature	0°…50°C | -20°…50°C		
dimensions (w x l x h mm)	580 x 370 x 400		

● standard | ○ option

PortaTest accessories

article number	
4018303	test vessel with 1 pair spherical electrodes (ball electrode) | 0.4 liter
4018305	test vessel with 1 pair cylindrical electrodes (ball electrode) | 0.4 liter
4018306	test vessel with 1 pair cylindrical electrodes (ball electrode) | 0.4 liter

PrintCom | GLP1-Software

RS232
Ethernet
USB
Print

Highlights

- importing test results during the test and out of the intermediate storage of the tester
- storage of test results in the Excel® format during the production
- print of test results in Excel® via protocol samples
- several ready-made protocol samples included in the delivery extent
- freely configurable Excel® protocol samples to print test results
- different storage modes (single or collection results)
- OpenOffice®-/MS Excel® compatible software
- Windows 7® compliant

Archive and print test results in Excel®

PrintCom – the quickest and most comfortable way to protocol and save the test results of GLP1 testers.

Importing

The software lists imported test results well-arranged on your computer screen.

Storing

The test results are user-friendly saved in the Excel® format. The basis are Excel® protocol samples preconfigured by us.

PrintCom offers you to adapt the protocol to you requirements by adding additional information or by means of an individual protocol layout, for example with your logo. In the delivery extent you will already find a large variety of easily adaptable samples. Of course, you can also create completely new protocols.

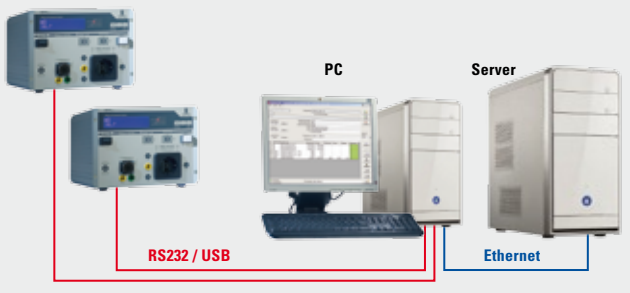
Printing

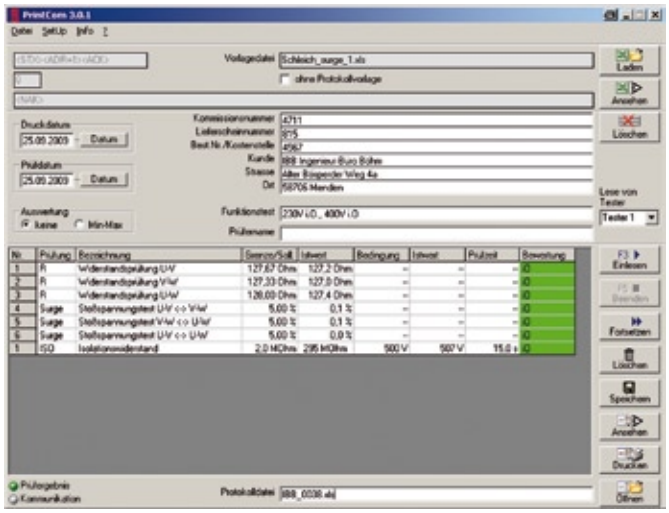
Owing to the integration of the test results in an Excel® file you are able to print your test results directly. Thus you can impressively document the tested quality to your customer.

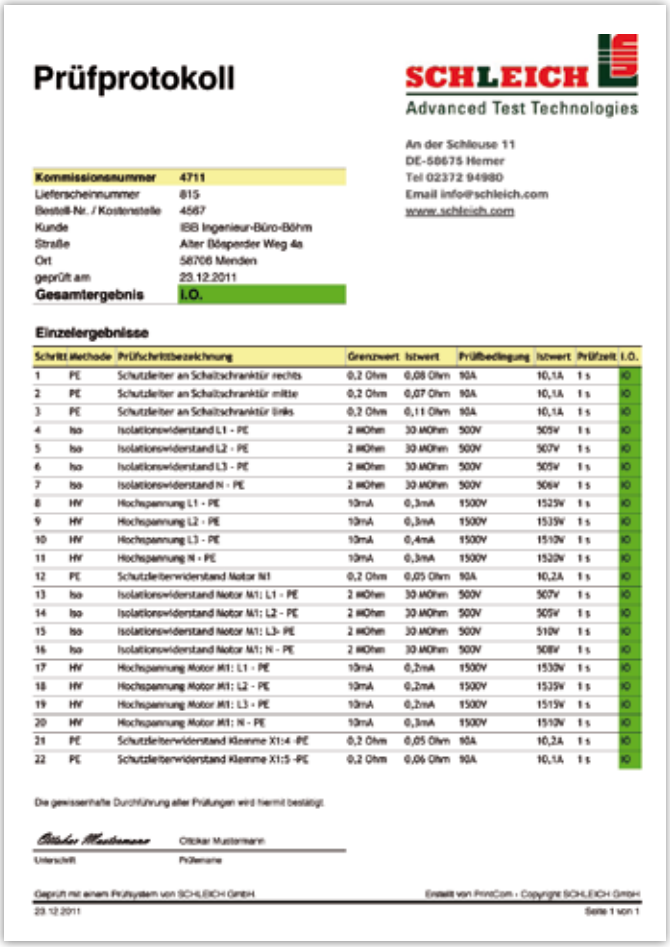
Connection Options

GLP1-g

GLP1-e







Prüfprotokoll

SCHLEICH
Advanced Test Technologies

An der Schleuse 11
DE-58675 Hemer
Tel 02372 94980
Email info@schleich.com
www.schleich.com

Kommissionsnummer	**4711**
Lieferscheinnummer	815
Bestell-Nr. / Kostenstelle	4567
Kunde	ISB Ingenieur-Büro-Böhm
Straße	Alter Bösperder Weg 4a
Ort	58706 Menden
geprüft am	23.12.2011
Gesamtergebnis	**I.O.**

Einzelergebnisse

Schritt	Methode	Prüfschrittbezeichnung	Grenzwert	Istwert	Prüfbedingung	Istwert	Prüfzeit	I.O.
1	PE	Schutzleiter an Schaltschranktür rechts	0,2 Ohm	0,08 Ohm	10A	10,1A	1 s	IO
2	PE	Schutzleiter an Schaltschranktür mitte	0,2 Ohm	0,07 Ohm	10A	10,1A	1 s	IO
3	PE	Schutzleiter an Schaltschranktür links	0,2 Ohm	0,11 Ohm	10A	10,1A	1 s	IO
4	Iso	Isolationswiderstand L1 - PE	2 MOhm	30 MOhm	500V	505V	1 s	IO
5	Iso	Isolationswiderstand L2 - PE	2 MOhm	30 MOhm	500V	507V	1 s	IO
6	Iso	Isolationswiderstand L3 - PE	2 MOhm	30 MOhm	500V	505V	1 s	IO
7	Iso	Isolationswiderstand N - PE	2 MOhm	30 MOhm	500V	506V	1 s	IO
8	HV	Hochspannung L1 - PE	10mA	0,3mA	1500V	1525V	1 s	IO
9	HV	Hochspannung L2 - PE	10mA	0,3mA	1500V	1535V	1 s	IO
10	HV	Hochspannung L3 - PE	10mA	0,4mA	1500V	1510V	1 s	IO
11	HV	Hochspannung N - PE	10mA	0,3mA	1500V	1520V	1 s	IO
12	PE	Schutzleiterwiderstand Motor M1	0,2 Ohm	0,05 Ohm	10A	10,2A	1 s	IO
13	Iso	Isolationswiderstand Motor M1: L1 - PE	2 MOhm	30 MOhm	500V	507V	1 s	IO
14	Iso	Isolationswiderstand Motor M1: L2 - PE	2 MOhm	30 MOhm	500V	505V	1 s	IO
15	Iso	Isolationswiderstand Motor M1: L3- PE	2 MOhm	30 MOhm	500V	510V	1 s	IO
16	Iso	Isolationswiderstand Motor M1: N - PE	2 MOhm	30 MOhm	500V	508V	1 s	IO
17	HV	Hochspannung Motor M1: L1 - PE	10mA	0,2mA	1500V	1530V	1 s	IO
18	HV	Hochspannung Motor M1: L2 - PE	10mA	0,2mA	1500V	1535V	1 s	IO
19	HV	Hochspannung Motor M1: L3 - PE	10mA	0,2mA	1500V	1515V	1 s	IO
20	HV	Hochspannung Motor M1: N - PE	10mA	0,3mA	1500V	1510V	1 s	IO
21	PE	Schutzleiterwiderstand Klemme X1:4 -PE	0,2 Ohm	0,05 Ohm	10A	10,2A	1 s	IO
22	PE	Schutzleiterwiderstand Klemme X1:5 -PE	0,2 Ohm	0,06 Ohm	10A	10,1A	1 s	IO

Die gewissenhafte Durchführung aller Prüfungen wird hiermit bestätigt.

Otticker Mustermann
Unterschrift Prüfername

Geprüft mit einem Prüfsystem von SCHLEICH GmbH — Erstellt von PrintCom - Copyright SCHLEICH GmbH
23.12.2011 — Seite 1 von 1


GLP2-ce
Sicherheits- und Funktionstester | Safety and Functional Analyzer
Touch Control Interface
STOP
Beding./Istwert
10A
500V
10.7A
508V
Nr.
Bezeichnung
1
Schutzleiter
2
Isolation
Betriebsbereit, warte auf Prüfstart
23T69W1
Prüfplan laden
Absicherung | Fuse
PE-Prüfsonde | PE-P
Netz | Power
Restspannung
V
Polarisation
Arc-Detection
Hochspannung AC
KV
mA
A
Mehrfach-station
Matrix
Durchgang
Ω
Widerstand
Ω
Ableitstrom 3-phasig
mA
µA
Ableitstrom 1-phasig
mA
µA
Schutzleiter-widerstand
mΩ
Funktion 1-/3-phasig AC
A ~

The GLP2-Class
Outstanding Performance

The GLP2-Class

GLP2-ce | Basic Model

RS232
CAN
Ethernet
USB
LabView®
Profibus
PC
PLC
I/O
Analog
Print

Highlights

- tester for all safety tests
- automatic switchover between high- and low-voltage tests
- one- and three-phase functional test with apparent and active power measurement
- test methods can be combined according to the SCHLEICH-MODULAR-CONCEPT
- single test with a large display of the measuring values
- pictures can be displayed for a visual test
- central picture storage in a network
- additional analog inputs and outputs
- additional digital inputs and outputs
- freely programmable additional processes for digital inputs and outputs
- high-resolution color display with a resolution of 800 x 480 pixel and touch functionality
- integrated 1GB memory for test program data and 3GB for test results
- data storage on USB-flash-drive
- already integrated statistical evaluation
- thermo transfer print for labels
- connection of several different label printers is possible
- central storage of label layouts in a network
- connection for USB-mouse, USB-keyboard and bar code reader
- network-compatible via Ethernet LAN or WLAN
- network with additional testers and central storage
- optimum OEM preconditions
- remote maintenance and remote calibration compatible
- can be remote calibrated and remote controlled

Based on the GLP2-e testers the GLP2-ce class with its Windows CE® operating system offers the best opportunities for the use as single and combination testers. Despite consequently improved measuring and control technology the GLP2-ce testers still have their accustomed compact and handy structure.

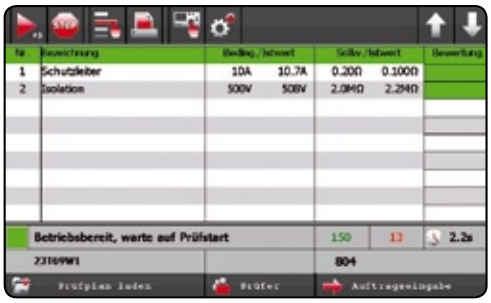
GLP2-ce testers include an integrated automatic switchover between all low- and high-voltage tests. Thus, the test object can be automatically tested in one test process without any re-clamping of the test connections. They can be ideally used in the series production, regardless if test results are to be documented or not.

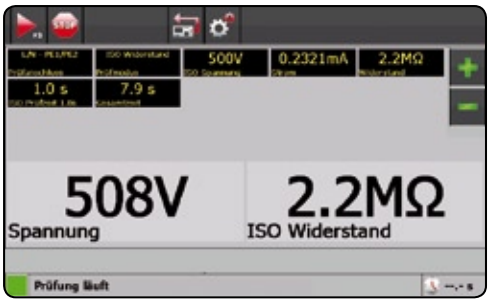
The testers can of course also be used in laboratories for type and material tests.

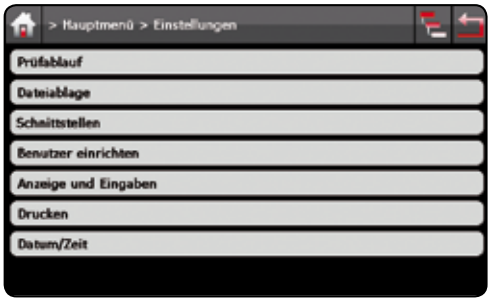
The integrated 4GB storage of the GLP2-ce testers is also able to save countless test results beside several thousand test programs. This guarantees you to save test results of several years within the tester. You can of course save the test results also on another PC via an USB flash drive or the integrated network interface.

In order to furnish your products with type plates directly after the test, the GLP2-ce is able to trigger a thermo transfer printer.

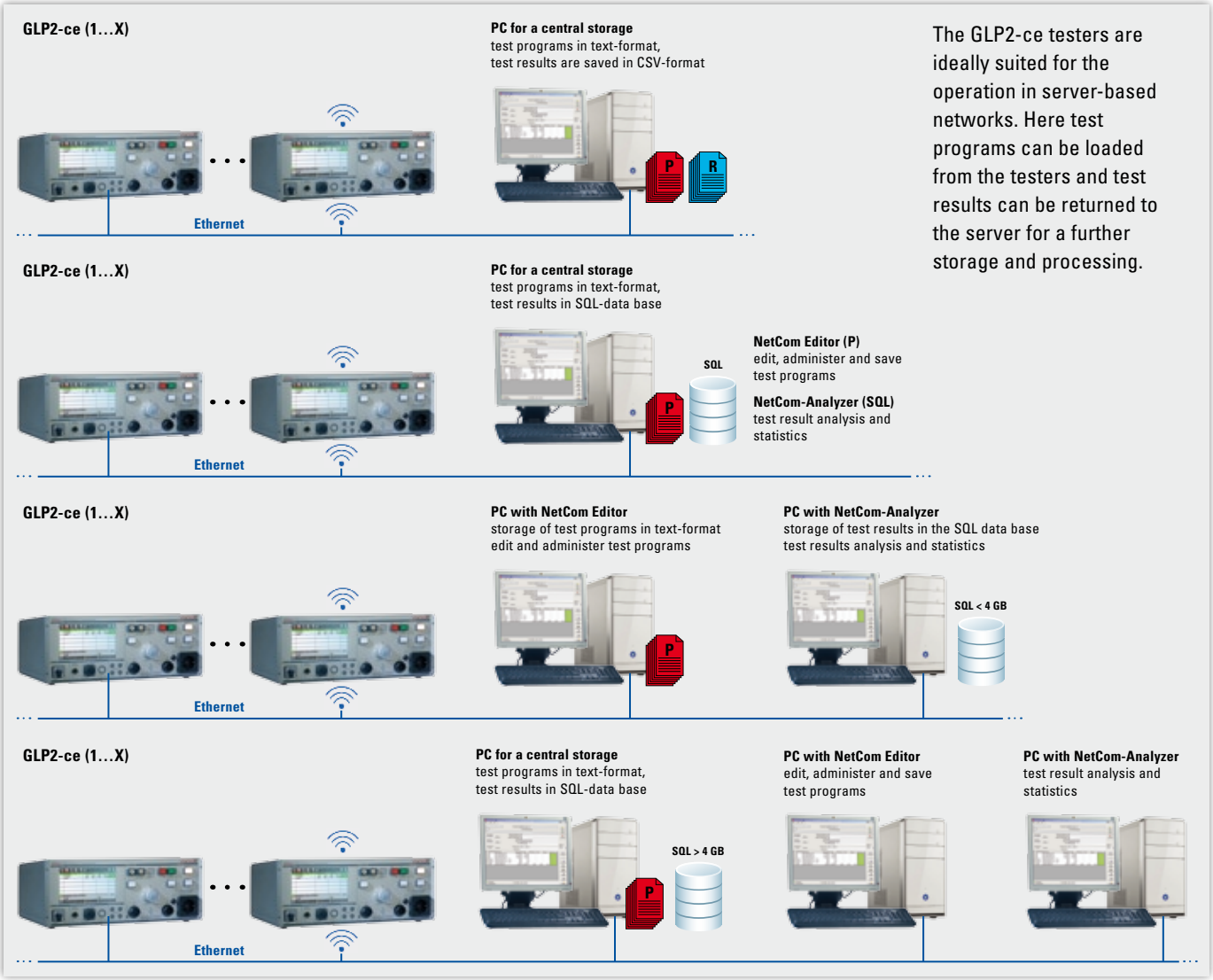
For general technical data of the testers as well as of standard single and combination testers please look on page 144







Owing to innovative operation via the integrated high-resolution TFT display with touch-function that also allows the entry of numbers and characters the GLP2-ce testers belong to the user-friendliest all-rounder testers in the market. The testers can of course also be controlled via an external standard PC keyboard, a mouse and/or a barcode scanner.



The GLP2-ce testers are ideally suited for the operation in server-based networks. Here test programs can be loaded from the testers and test results can be returned to the server for a further storage and processing.

The GLP2-Class

GLP2-e | Basic Model

RS232
CAN
Ethernet
LabView®
Profibus
PC
PLC
I/O
Analog
Print

Highlights

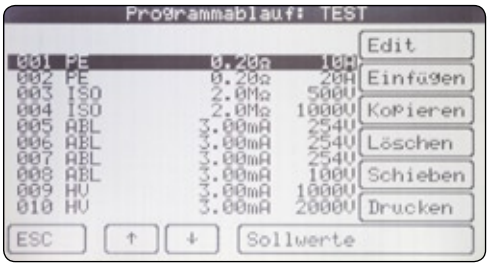
- tester for all safety tests
- automatic switchover between high- and low-voltage tests
- one- and three-phase functional test with apparent and active power measurement
- test methods can be combined according to the SCHLEICH-MODULAR-CONCEPT
- single tests with a large display of the measuring values – ideal for manual tests
- additional analog inputs and outputs
- additional digital inputs and outputs
- freely programmable additional processes for digital inputs and outputs
- large very well readable graphic LCD with 256 x 128 pixel and touch screen
- test program data bank and result storage
- integrated statistics
- PC standard printer connection
- thermo transfer print for labels
- standard PC keyboard or bar code reader connection
- Windows® software for the remote control, the administration of data bases for test programs and test results and for printing test protocols
- network (via cable or radio) with testers and a central PC
- optimum OEM preconditions

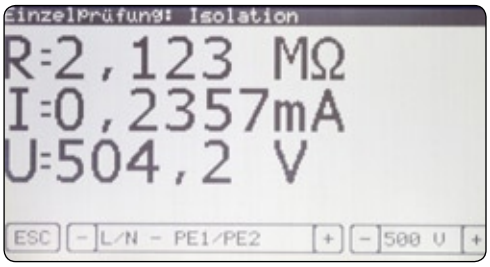
The testers of the GLP2-e Class are the basis for all types of single and combination testers. They offer a multitude of test methods with intelligent test processes at a very compact structure.

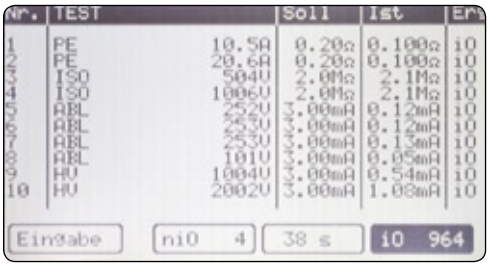
A special characteristic of GLP2-e testers is the integrated switchover between all low- and high-voltage tests. Thus the test object can be automatically tested in one test process without re-clamping the test connections. GLP2-e testers can therefore be ideally used in the series production regardless whether the test results are to be documented or not. The testers can of course also be used in laboratories for type and material tests.

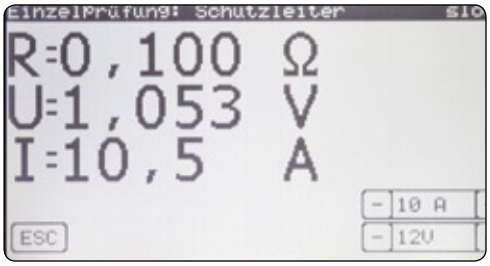
Due to the intuitional operation via the integrated display with touch function GLP2 testers are very user-friendly all-rounder testers. They can of course also be controlled via an additional external standard PC keyboard, a mouse and/or a bar code scanner.

For general technical data of the testers as well as of standard single and combination testers please look on page 144



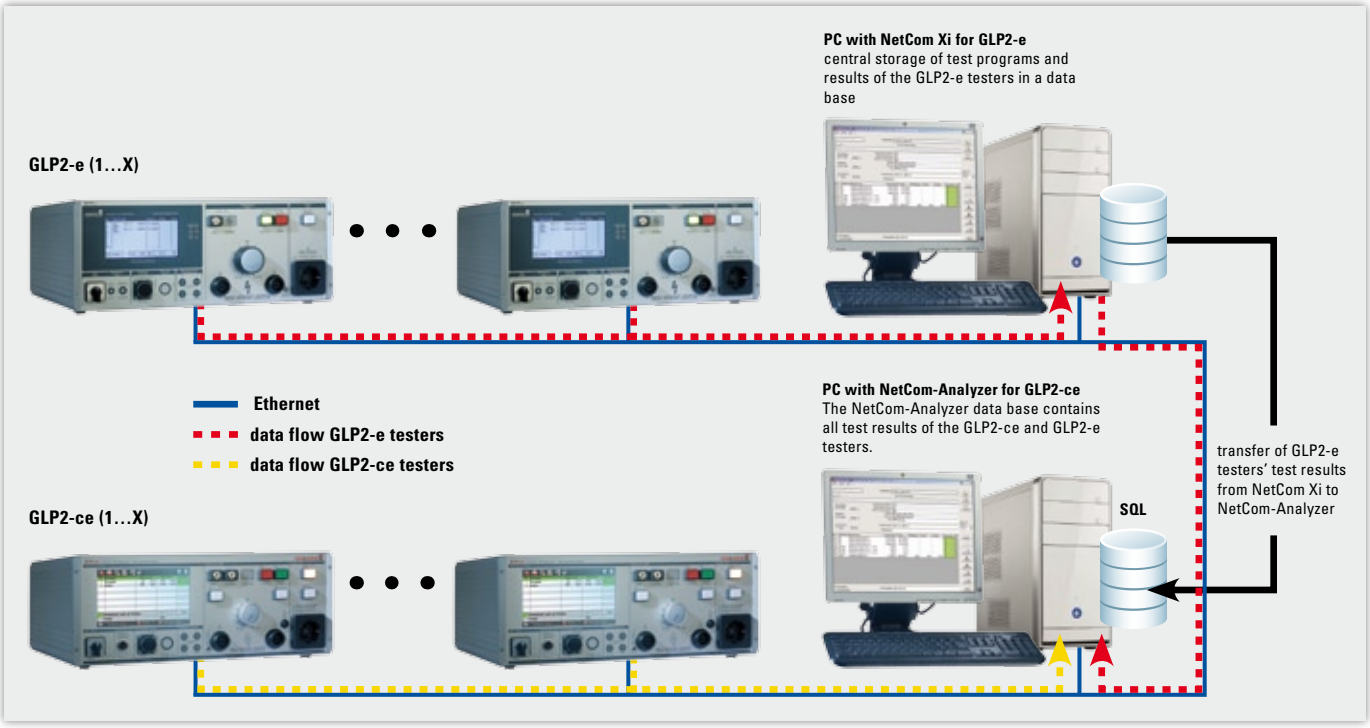






The integrated test program data base is able to save more than 200 different test programs. A separate result data base saves test results and provides data for a printer or a PC. In order to furnish your products with type plates directly after the test the GLP2-e is able to trigger a thermo transfer printer.

The testers' operation within a server-based network is unique. With this application you are able to transfer test programs to the testers as well as return test results to the PC to save and process them. The complete data traffic is organized by our PC software NetCom Xi.



GLP2-ce HV | High-Voltage Testers 1KV - 100KV

RS232
CAN
Ethernet
USB
LabView®
Profibus
PC
PLC
I/O
Analog
Print

Highlights

- high-voltage testers AC
- high-voltage testers AC and DC
- high-voltage testers DC
- extremely low residual ripple at the DC high-voltage
- insulation resistances at DC high-voltage up to 10TΩ
- high-voltage with up / down ramp
- high-voltage with voltage cycle profile
- step voltage measurement
- fast switch-off at disruptive breakdown
- display of the measuring values in a graphic
- three HV-modes: manual, automatic with time lapse and burning
- voltage check and cable break monitoring (4-wire-technology) respectively
- minimum current monitoring
- voltage-free contacting with special test pistols
- zero voltage switch-on to protect the test object
- manual high-voltage setting via the rotary button
- automatic high-voltage setting via the actuator
- automatic fully electronic high-voltage setting
- electronic high-voltage control with very fast ramps
- long-term measurement for hours, days and weeks
- storage of the single long-term values
- high-voltage matrix to switch over between different test points
- matrix from 1KV to 50KV AC
- two-circuit safety inputs, two-hand start
- safety circuits with restraint-guided safety relay
- VDE 0104 compliant start-up sequence

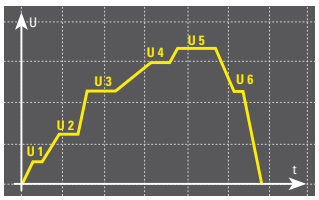
The GLP2-ce series offers the widest range of high-voltage testers that is currently in the market, regardless whether AC, AC with rectifier, DC with high-tensile output power or AC plus DC are to be combined in one tester.

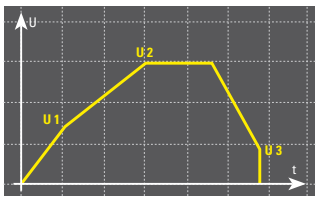
The high-voltage testers are designed for testing the electrical insulating property and electric strength (clearance and leakage paths) of all kinds of electrical parts and components.

The testers are perfectly suited for fast and uncomplicated tests in production and laboratories. Tests can be performed either manually by means of safety pistols or automatically.

The testers can be operated in 3 modes.

- manual test without time lapse. A switch-off only occurs in case of overcurrent, which for example is generated by a disruptive breakdown.
- test with programmed time lapses and additional different monitoring functions
- location of insulating failures due to “burning”





high-voltage test with voltage profiles

There are three types of high-voltage settings

- manual voltage setting
  The manual voltage is set with the rotary button at the front. This rotary button directly affects the adjusting transformer within the tester. In the automatic mode the voltage is set manually to the requested value.

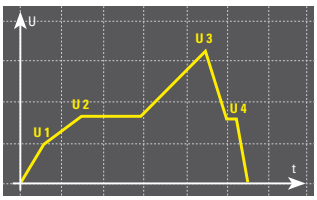
- automatic voltage setting with actuator
  In the manual mode the voltage is set with the rotary button at the front. The rotary button affects an electronic which adjusts the adjusting transformer via an actuator. In the automatic mode the tester automatically sets the voltage to the requested value or automatically generates a ramp profile independently from the rotary button.

- fully electronic voltage source
  In the manual mode the voltage is set with the rotary button at the front. The rotary button directly sets the electronic voltage source. In the automatic mode the tester automatically sets the voltage to the requested value or automatically generates a ramp profile independently from the rotary button.

Depending on the ordered tester model, one of the three voltage settings is installed.

Compliant to your application, we offer several different test pistols. For the tester's use in laboratories, automatic production lines or test setups we also offer the matching high-voltage cables and contactings, of course.

The safest way to perform a high-voltage test is in a test cage. We offer test cages for different tasks in different designs and sizes. In case our standard cages do not cover your requirement we are pleased to design a test cage especially for you.



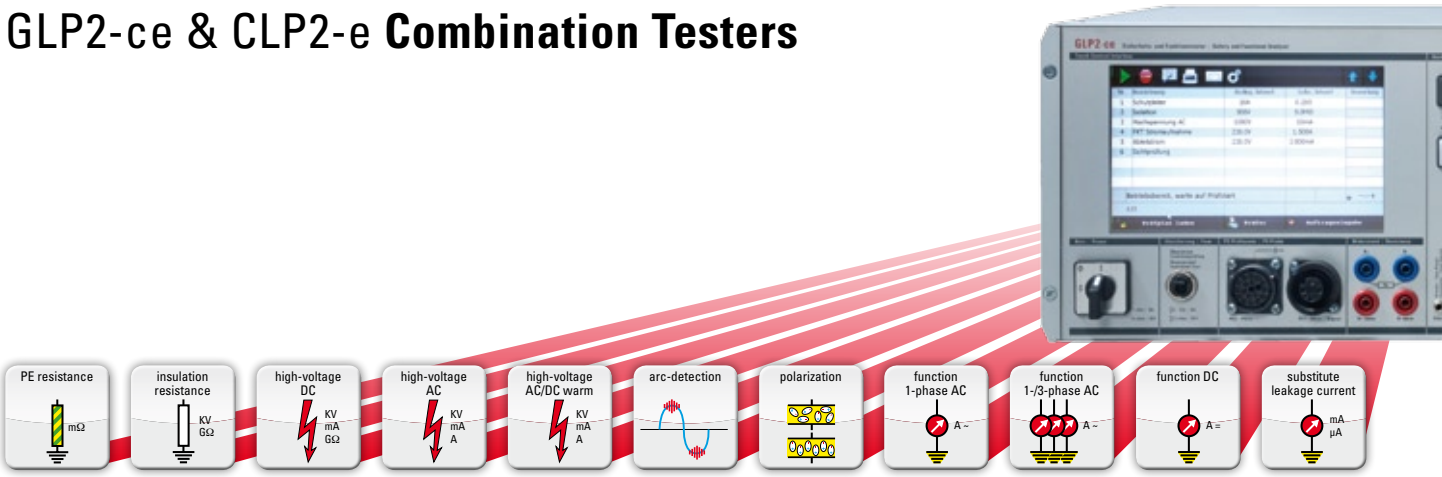
For general technical data of the testers as well as of standard single and combination testers please look on page 144

GLP2-e HV with 20KV AC

GLP2-e HV with 50KV AC

GLP2-e HV with 100KV AC

SCHLEICH-MODULAR-CONCEPT
GLP2-ce & CLP2-e **Combination Testers**



Configure your tester on your own – the SCHLEICH-MODULAR-CONCEPT makes this possible

The testers of the GLP2-Class are based on the basic models GLP2-ce and GLP2-e. Both basic models include the microcomputer control, the measuring technology, the graphic-LCD display with touch operation, intuitional operating and measuring software, the data bases and several interfaces.

Based on the SCHLEICH-MODULAR-CONCEPT the GLP2-testers offer almost unlimited possibilities to combine and integrate different safety and functional test methods. You can select the test method, necessary for your test task out of a large pool of test possibilities.

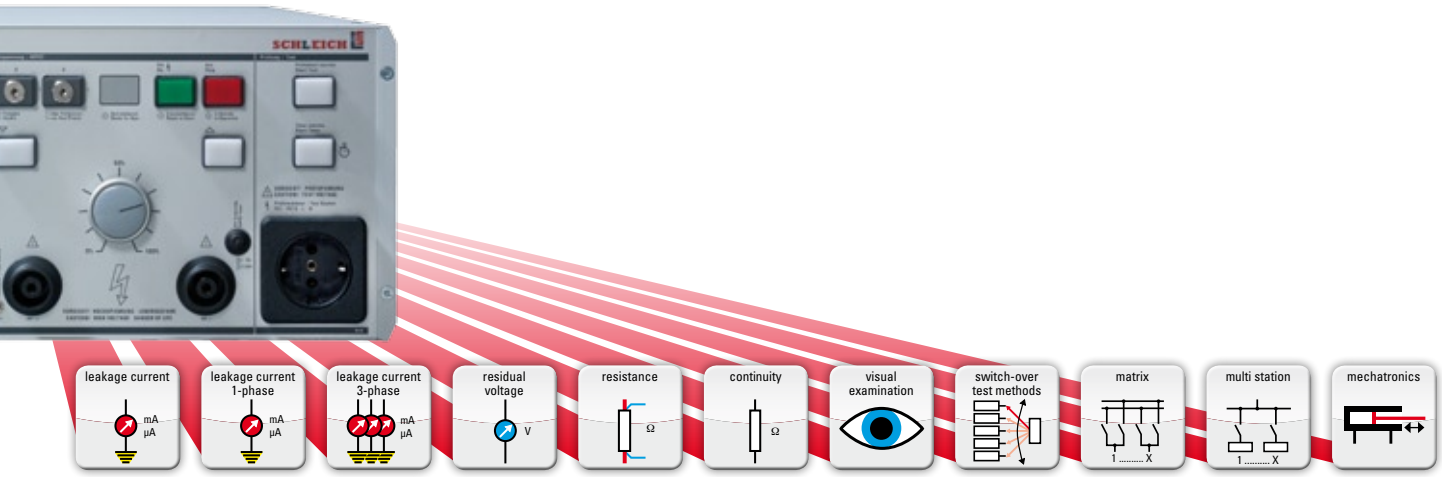
S-M-C
SCHLEICH MODULAR CONCEPT

Whether one or several test methods – you determine the configuration. Your GLP2 can be configured as high-voltage and PE resistance tester. For a more complex test task you might require a combination of all test methods. The SCHLEICH-MODULAR-CONCEPT of the GLP2-Class allows configuring the tester that corresponds to all your tasks. This is not done by integrating several single testers into one very big test rack but by integrating all tests into one compact modular enclosure concept. The enclosure's size is related to the design and size of the different tests.

This impressive flexibility gives you a considerable functional and economic advantage. Each tester comprises the experience of thousands of installations. At SCHLEICH this experience is realized consequently, with passion and without any compromises for you.

This is "customer based technology".

For details regarding the individual test methods please look on page 157 and at our website www.schleich.com.



PE resistance

test current ranges	1…100A AC or DC
restistance ranges	1mΩ…10Ω
four-wire-technology	yes

Insulation resistance

test voltage ranges	500V…50000V
test current ranges	1mA…500mA
resistance ranges	100KΩ…1TΩ
polarization index	available

High-voltage AC

test voltage ranges	3000V…100000V
test current ranges	3mA…10A
ARC-detection	available
high-voltage & function at the same time	available

High-voltage DC

test voltage ranges	500V…50000V
test current ranges	1mA…500mA
resistance ranges	100KΩ…1TΩ
polarization index	available
high-voltage & function at the same time	available

Function 1-phase | 3-phase

test voltage ranges	0…300V / 0…750V
test current ranges	1mA…100A
total current, active current, cosφ	yes
apparent & effective power measurement	yes

Function DC

test voltage ranges	0…400V
test current ranges	1mA…100A

Leakage current 1-phase | 3-phase

test current ranges	1µA…30mA
test voltage ranges	0…300V / 0…750V

Resistance measurement

restistance ranges	<1µΩ…100KΩ
test current ranges	2A…200A
four-wire-technology	yes
temperature compensation	available

Continuity | short-circuit

restistance ranges	1Ω…500Ω

Analog measurement

test voltage ranges	50mV…50V AC – auto range
channels	1…10 – depending on the model

Visual test

visual test with confirmation	standard
number of test steps	arbitrary
with picture	yes – only GLP2-ce

Mechatronics

digital inputs	4, 32, 64, 96, 128 – depending on the model
digital outputs	32, 64, 96, 128 – depending on the model

Enclosure Versions

The testers of the GLP2-Class offer several test possibilities in only one compact enclosure. The combination of the test methods according to the SCHLEICH-MODULAR-CONCEPT requires a modular enclosure concept.

Your applications can be installed in a compact tabletop unit, in a 19"-built-in unit or in a compact cabinet – according to your requirements. To install the test technology professionally and safely we use especially for us tailor-made enclosure components of well-known German manufacturers as well as components of our own production. On this basis the modular enclosure concept guarantees a favorably-priced and professional package solution.

The modularity can be found not only in the enclosure but also in the arrangement of the tester's connections. The measuring connections can be installed either at the front or at the rear panel.

Our target is to realize the most economic and most flexible solution for your task and effective workflow.

GLP2-standard 4HU

enclosure 19"	4HU
height	178 mm
length	430 mm
length (alternative)	530 mm
width	448 mm
integrable in a rack	optional

This solid Aluminum enclosure is the basis for all single and combination testers. It is often used for testers with a few test methods and low currents. Fixing flanges can be installed at the sides of the enclosure as an option to be able to install it in a 19"-cabinet. These enclosures can be ideally put on test covers or rolling tables.

GLP2 8HU

enclosure 19"	8HU
height	355 mm
length	430 mm
length (alternative)	530 mm
width	448 mm
integrable in a rack	optional

Typical enclosure for combination testers with several test methods and increased test currents.

GLP2 12HU

enclosure 19"	12HU
height	535 mm
length	430 mm
length (alternative)	530 mm
width	448 mm
integrable in a rack	optional

Typical enclosure for combination testers with several test methods, high test currents or integrated high-voltage matrices.

GLP2-tabletop enclosure 12HU

enclosure 19"	12HU
height	635 mm
length	600 mm
width	550 mm
integrable in a rack	no

This solid Aluminum 19" industrial rack is the basis for all single and combination testers with high test currents and many switchovers. This enclosure version is used when large and heavy transformations are installed in the tester. At the sides there are ideally positioned recessed grips.

GLP2 rolling container 16HU

enclosure 19"	16HU
height	845 mm
length	600 mm
length (alternative)	780 mm
width	550 mm
integrable in a rack	no
rollers	yes

This enclosure version is used when exceptionally large and heavy transformations are installed in the tester. Typically it stands on the floor. To achieve optimum mobility it is equipped with solid rollers.

GLP2 rolling container 25HU

enclosure 19"	25HU
height	1170 mm
length	780 mm
width	550 mm
integrable in a rack	no
rollers	yes

This enclosure version is used for high-performance high-voltage testers. It is designed for exceptionally large and heavy transformations. To achieve optimum mobility it is equipped with solid rollers. The GLP2's display is in a well-readable operating position.

GLP2 rolling container 34HU

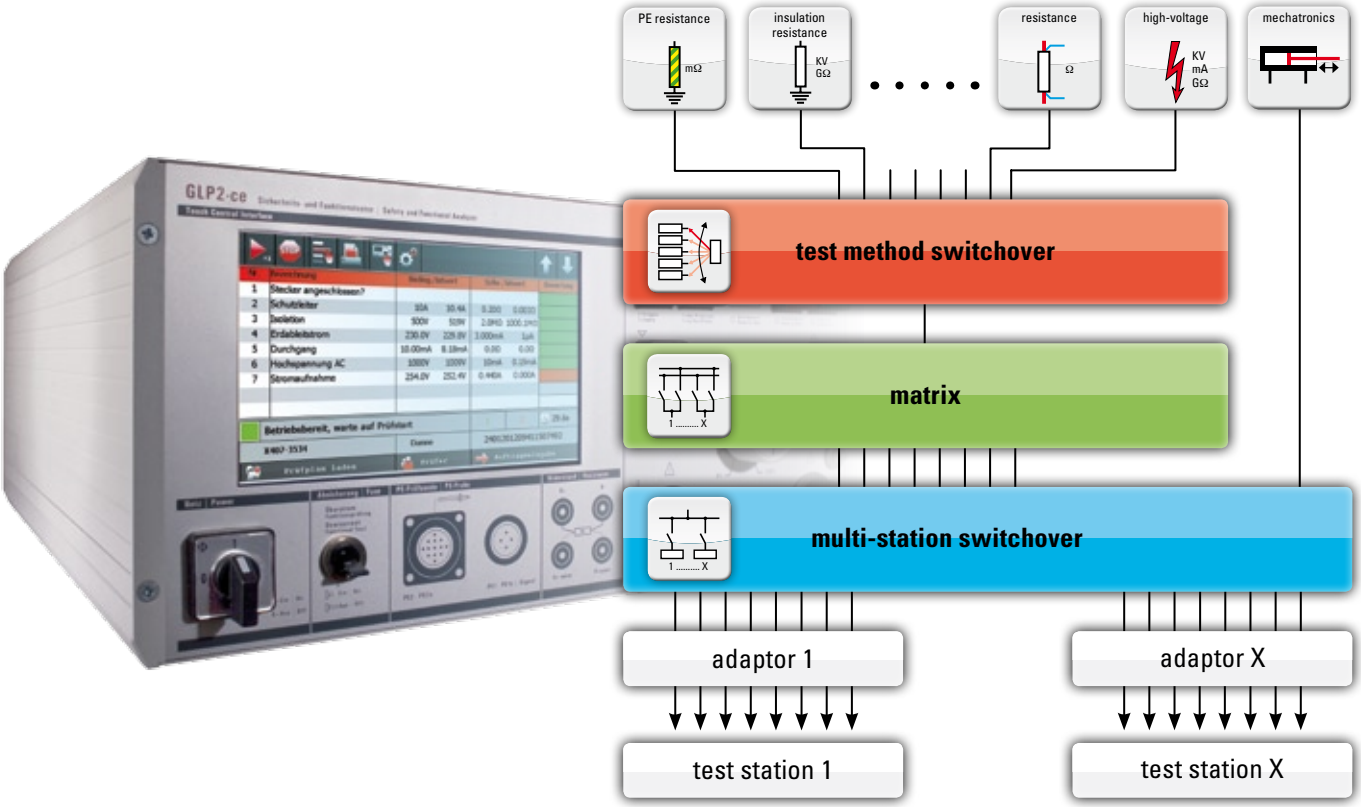
enclosure 19"	34HU
height	1570 mm
length	780 mm
width	550 mm
integrable in a rack	no
rollers	yes

This enclosure version is used for high-performance high-voltage testers. It is designed for extremely large and heavy transformations. To achieve optimum mobility it is equipped with solid heavy-duty rollers. The GLP2's display is in a well-readable operating position.

Test Method Switchover, Matrices, Multi-Station Switchover and Mechatronics

SCHLEICH test technology proves itself in the daily operation. The aim has to be to perform a test as fast and efficient as possible. Only this creates a high utility.

In order to save time, the operator connects all connections of the test object by means of a contacting adaptor. Afterwards the tester automatically performs all tests between all connections. The operator does not have to re-clamp any leads. This is realized by the automatic test method switchover that is typical for SCHLEICH.



Complex test objects often have more than three connections. You only have to think of a building site main cabinet with several sockets for example. Here it makes sense and it is economic to connect all test objects' connections with the tester. For the building site main cabinet example, this means that the operator connects all sockets via the corresponding connecting leads to the tester. Afterwards the tester automatically performs all tests between all connecting points. For the building site main cabinet that is considerably more effective than performing partial tests at each individual socket. The switchover between the different connections is realized by flexible switchover matrices.

It is obvious that test objects with several connections require more time for the re-clamping than test objects with only one connecting cable. In order to gain time in such cases we often realize double or multi-station systems. At one station it is charged and discharged and at the other stations it is tested simultaneously. In this way very economic results can be achieved also at complex and comprehensive tests.

Test method switchover

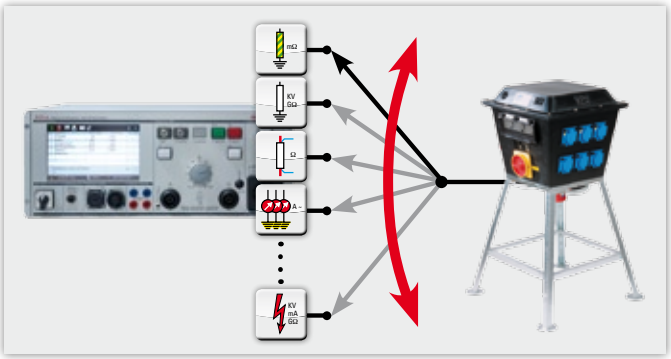
Compliant to type and extent of the test methods we provide a number of switchovers. They guarantee a fast and automatic change between the different test methods.

As the voltage differences between the test methods might be very high the safety has top priority when dealing with switchovers. A PE resistance test with 12V has to be switched to the test object as reliably as a high-voltage test with 6000V – to protect the test object and, of course, the operator as well. There are no compromises. For switchovers and matrices we only use umpteen thousands of times proven, top-quality parts of our own production or from well-known German manufacturers.

Station switchover

Instead of using two or more testers a station switchover is sometimes an economic alternative.

High safety demands are made for station switchovers. Simultaneously to a running test at one station the other station is discharged and charged again. During this process the operator inevitably touches the clamps and connecting leads. An electrical hazard of the operator has of course to be avoided in any case. For this the measuring leads to the stations in which no test runs at this moment have to be safely separated. Furthermore it is recommended to ground the connections to the test object additionally.



Matrices

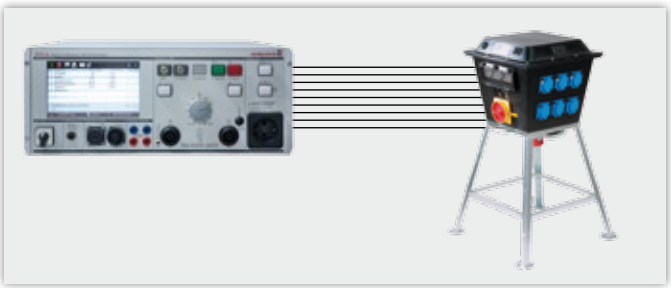
For almost every task we offer the corresponding relay matrix. Matrices vary in the number of connections and the height of the test voltage that is to be switched. A matrix has to switch and separate 6000V as reliably as millivolt signals. Our engineers have developed the matrices exactly for this situation.

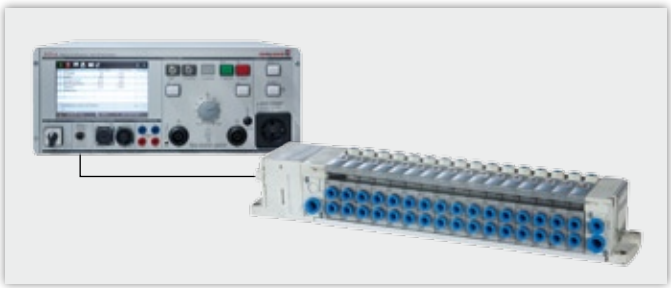
Matrices are designed for two- and four-wire-applications. They can be strung together to arbitrarily increase the quantity of connections. Matrices with more than 100 connecting points are no rarity. Also, at the test method switchover only the best quality is used for matrices.

Mechatronics | Script control

Besides the hardware, the software also offers an enormous flexibility. Owing to the integrated script commands additional PLC functions can be realized in the tester. Entries can be queried, outputs be set and logical links be generated – just like with a PLC.

The huge advantage is the direct control of mechatronic functional processes. You can switch valves, query final switches, evaluate measuring values yourself and much more. Thus the tester is able to generate additional functional processes before, during and after the test. This is perfect for own test setups or also for the integration in an automatic production.





NetCom-Editor | GLP2-ce Software

USB

Ethernet

Print

Highlights

- editing of test programs at the PC instead at the GLP2-ce
- test program editing software under Windows®
- test program editing for individual GLP2-ce testers
- test program editing for networked GLP2-ce testers
- manual data transfer via USB flash drive
- automatic data transfer in your computer network
- easy installation without expert knowledge
- archiving print of individual test programs
- test program revision administration
- integrated operator management
- test program generation and additional test program release

Generally the test programs are generated directly at the tester. For this the touch display or a PC keyboard that is connected to the tester can be used.

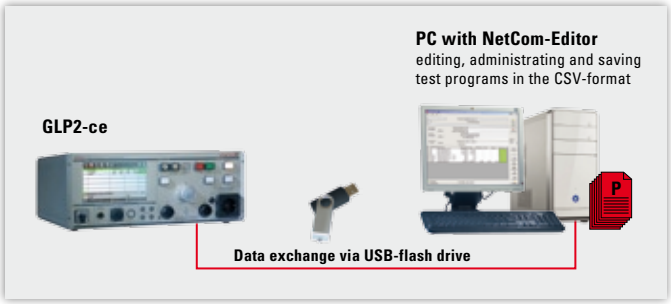
In addition you can also edit test programs directly on your PC with the software NetCom-Editor.

Generating test programs on the PC has the important advantage that you do not disturb the operator during testing. The software is displayed on the PC in the same way as on the GLP2-ce. Thus the handling is very similar and can be easily learnt.

The NetCom-Editor is used for two different working conditions:

- data exchange via USB-flash drive / offline operation
- data exchange via network/ online operation

Data exchange via USB-flash drive | offline operation



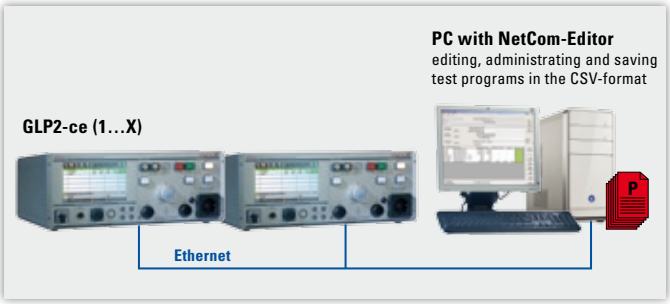
With the NetCom-Editor you can administer, edit and save test programs on the PC. After finishing the editing the NetCom-Editor transfers the test programs to a USB flash drive. Afterwards the flash drive has to be connected to the tester. The tester downloads the test programs and automatically saves them in the internal data base. After this the test programs are available as usual.

If you operate several identical testers you should update the new test programs in all testers. There is nothing worse than having different test programs for the same test tasks on different testers.

It is recommended to consequently edit the test programs always on the PC and then transfer the edited test programs to the tester.

Alternatively, you can also edit test programs at the tester. But in order to have the same test programs as in the NetCom-Editor you immediately should transfer these test programs from the GLP2-ce to the PC via an USB flash drive. Thus you avoid having different data bases.

Data exchange via network | online operation



At optimum preconditions the testers are connected in one computer network. But a network only makes sense when there is a central storage. For a central storage you have to determine a central storage location for all test programs. The central storage can be on any PC within the network. This PC does not have to have a special software.

The PC with the NetCom-Editor installation has to be within this network. With the NetCom-Editor you can administer, edit and save the test programs. The data are of course saved in a central location within the network.

When a tester requires a test program the tester loads it from the central storage location via the network. This is ideal because by means of this all testers of the same type always use the same test programs. Among the testers there are never different test programs.

The network operation provides you with the conditions for an optimum ISO 9000-fulfilling production.

Of course you are also able to edit the test program directly at the tester. Afterwards the tester automatically saves the updated program in the central storage location via the network. After this the other testers and the NetCom-Editor can automatically access the updated program.

NetCom-Analyzer | GLP2-ce Software

USB

Ethernet

Print

Highlights

- storage of test results on a PC
- fast effective Microsoft® SQL-express data base
- data base for one individual GLP2-ce tester
- data base for several networked testers
- analysis software under Windows®
- statistical evaluation with graphic displays
- easy integration of your logo into printouts
- print of the test results into adaptable protocol samples
- print of the test results into EXCEL® protocol samples
- print of the statistics values into adaptable protocol samples
- print of the statistics values into EXCEL® protocol samples
- NetCom Xi can send test results to the data base
- easy installation without expert knowledge

GLP2-ce testers either save test results internally in the tester or externally in a central storage location within the network. The storage format corresponds to the well-known CSV-format. You can open and analyze the test results in the CSV-format with EXCEL®.

However, it is easier and smarter to display and evaluate the test results with the NetCom-Analyzer software.

In its core the NetCom-Analyzer is a quick SQL data base. The program imports the test results saved by the testers in the CSV-format in this data base. Afterwards you can analyze and visualize the data according to various criteria. The documentation of the analysis is not missed out.

Besides a reliable storage you require the following things regarding a test result data base:

- you specifically look for an individual test result
- you would like to analyze test results statistically

Our software NetCom-Analyzer offers the solution for both.

The result search

The precondition for a result search is that the test results were saved together with the serial number of your test object. Only if the test results can be clearly identified in the data base a search is possible.

You enter the serial number that is to be searched into the NetCom-Analyzer and owing to the high-performance SQL data base you quickly receive the test results. The set values corresponding to the individual test results are also shown.

They can be either printed in the classical way on paper or electronically as PDF. For printing we provide you with printing samples. You surely would like to have your individual print including your company's data and your logo. No problem. By exchanging the print head and logo you can easily adapt the printing samples to your corporate identity.

The statistical analysis

For the analysis several test results are combined in a way that you get a survey regarding the quality of your production.

To limit the quantity of the test results to be checked the following filters are available:

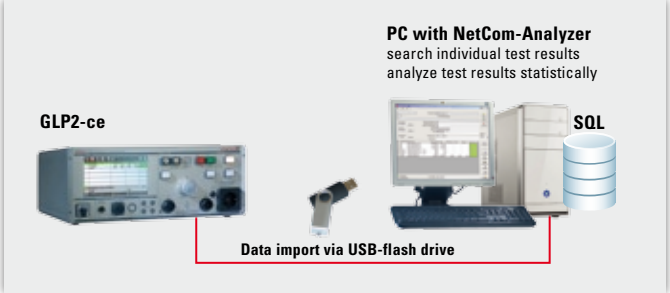
- period parameter regarding date from…to
- period parameter regarding time from…to
- period parameter regarding calendar week from…to
- serial number circle from…to
- test program identification
- order data
- parameter of individual testers
- parameter of tester groups

After entering the filter values you quickly receive the statistical analysis owing to the high-performance SQL data base.

You can comfortably save the configuration of various filter combinations as template using a freely definable identification. Upon opening a filter template and entering filter values the analysis of test results is automatically generated.

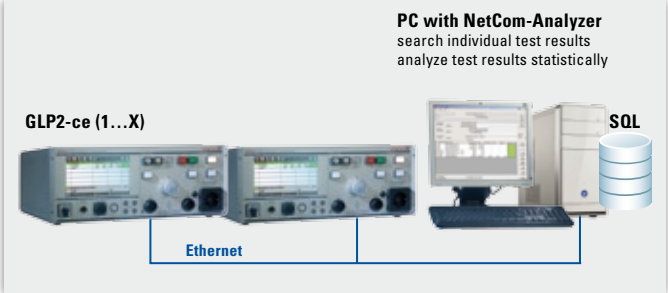
The statistical evaluations can be either printed in the classical way on paper or electronically as PDF. For printing we provide you with printing samples. By exchanging the print head and logo you can easily individualize the printing samples.

Data import via USB flash drive | offline operation



At non-networked testers you export test results from the individual testers to an USB flash drive. For this the GLP2 has a command available. On the PC the NetCom-Analyzer imports the data from the USB flash drive and saves them in the data base. Afterwards you can perform the requested evaluations.

Data import via network / online operation



At optimum preconditions the testers are within a computer network. But a network only makes sense when a central storage takes place. For a central storage you define a central storage location for all test results. The central storage can take place on any PC within the network.

The PC with the NetCom-Analyzer installation is also within the network. The NetCom-Analyzer permanently checks whether new test results are available at the central storage location. These new test results are saved by the individual testers in the CSV-format there. In case new results are saved NetCom-Analyzer automatically imports these data into the data base.

In the online operation the NetCom-Analyzer can continuously identify and display the statistic results of the running production. You are permanently informed on the production's quality. Thus you are always well informed on GOs, NO GOs and quantities at the individual testers, groups of testers and your complete production.

This is perfect online-monitoring!

PrintCom | GLP2-e Software

RS232
Ethernet
USB
Print

Highlights

- importing test results during the test and out of the intermediate storage of the tester
- storage of test results in the Excel® format during the production
- print of test results in Excel® via protocol samples
- several ready-made protocol samples included in the delivery extent
- freely configurable Excel® protocol samples to print test results
- different storage modes (single or collection results)
- OpenOffice®-/MS Excel® compatible software
- Windows 7® compliant

Archive and print test results in Excel®

PrintCom – the quickest and most comfortable way to protocol and save the test results of GLP1 testers.

Importing

The software lists imported test results well-arranged on your computer screen.

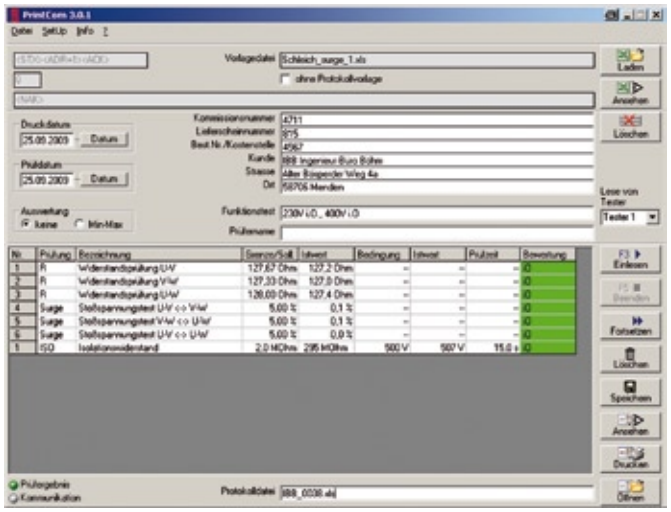
Storing

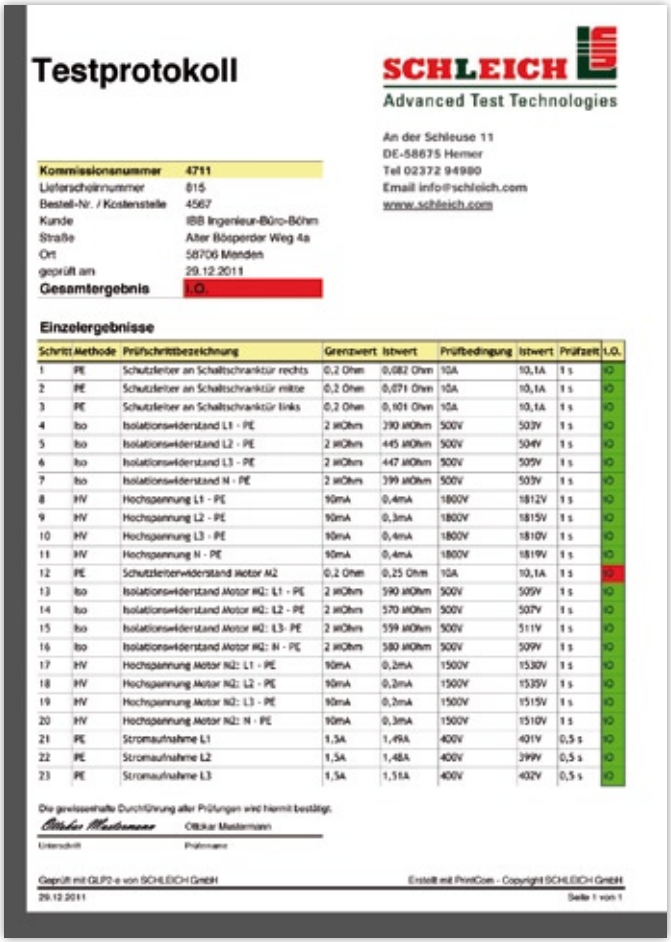
The test results are user-friendly saved in the Excel® format. The basis are Excel® protocol samples preconfigured by us.

PrintCom offers you to adapt the protocol to you requirements by adding additional information or by means of an individual protocol layout, for example with your logo. In the delivery extent you will already find a large variety of easily adaptable samples. Of course, you can also create completely new protocols.

Printing

Owing to the integration of the test results in an Excel® file you are able to print your test results directly. Thus you can impressively document the tested quality to your customer.





Testprotokoll

SCHLEICH
Advanced Test Technologies

An der Schleuse 11
DE-58675 Hemer
Tel 02372 94980
Email info@schleich.com
www.schleich.com

Kommissionsnummer	**4711**
Lieferschein-nummer	815
Bestell-Nr. / Kostenstelle	4567
Kunde	IBB Ingenieur-Büro-Böhm
Straße	Alter Bösperder Weg 4a
Ort	58706 Menden
geprüft am	29.12.2011
Gesamtergebnis	I.O.

Einzelergebnisse

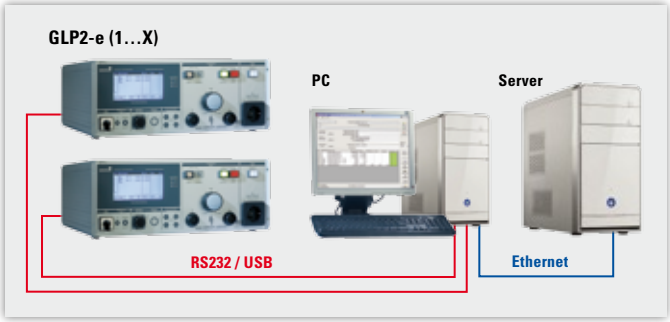
Schritt	Methode	Prüfschrittbezeichnung	Grenzwert	Istwert	Prüfbedingung	Istwert	Prüfzeit	I.O.
1	PE	Schutzleiter an Schaltschranktür rechts	0,2 Ohm	0,082 Ohm	10A	10,1A	1 s	IO
2	PE	Schutzleiter an Schaltschranktür mitte	0,2 Ohm	0,071 Ohm	10A	10,1A	1 s	IO
3	PE	Schutzleiter an Schaltschranktür links	0,2 Ohm	0,101 Ohm	10A	10,1A	1 s	IO
4	Iso	Isolationswiderstand L1 - PE	2 MOhm	390 MOhm	500V	503V	1 s	IO
5	Iso	Isolationswiderstand L2 - PE	2 MOhm	445 MOhm	500V	504V	1 s	IO
6	Iso	Isolationswiderstand L3 - PE	2 MOhm	447 MOhm	500V	505V	1 s	IO
7	Iso	Isolationswiderstand N - PE	2 MOhm	399 MOhm	500V	503V	1 s	IO
8	HV	Hochspannung L1 - PE	90mA	0,4mA	1800V	1812V	1 s	IO
9	HV	Hochspannung L2 - PE	90mA	0,3mA	1800V	1815V	1 s	IO
10	HV	Hochspannung L3 - PE	90mA	0,4mA	1800V	1810V	1 s	IO
11	HV	Hochspannung N - PE	90mA	0,4mA	1800V	1819V	1 s	IO
12	PE	Schutzleiterwiderstand Motor M2	0,2 Ohm	0,25 Ohm	10A	10,1A	1 s	IO
13	Iso	Isolationswiderstand Motor M2: L1 - PE	2 MOhm	590 MOhm	500V	505V	1 s	IO
14	Iso	Isolationswiderstand Motor M2: L2 - PE	2 MOhm	570 MOhm	500V	507V	1 s	IO
15	Iso	Isolationswiderstand Motor M2: L3- PE	2 MOhm	559 MOhm	500V	511V	1 s	IO
16	Iso	Isolationswiderstand Motor M2: N - PE	2 MOhm	580 MOhm	500V	509V	1 s	IO
17	HV	Hochspannung Motor M2: L1 - PE	90mA	0,2mA	1500V	1530V	1 s	IO
18	HV	Hochspannung Motor M2: L2 - PE	90mA	0,2mA	1500V	1535V	1 s	IO
19	HV	Hochspannung Motor M2: L3 - PE	90mA	0,2mA	1500V	1515V	1 s	IO
20	HV	Hochspannung Motor M2: N - PE	90mA	0,3mA	1500V	1510V	1 s	IO
21	PE	Stromaufnahme L1	1,5A	1,49A	400V	401V	0,5 s	IO
22	PE	Stromaufnahme L2	1,5A	1,48A	400V	399V	0,5 s	IO
23	PE	Stromaufnahme L3	1,5A	1,51A	400V	402V	0,5 s	IO

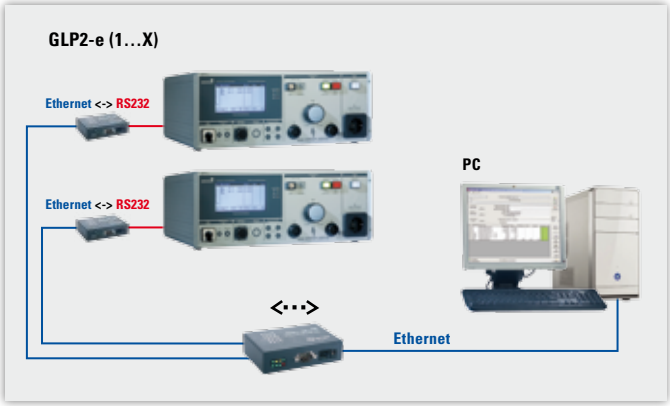
Die gewissenhafte Durchführung aller Prüfungen wird hiermit bestätigt.

Oliver Mustermann
Unterschrift Prüfmann

Geprüft mit GLP2-e von SCHLEICH GmbH
Erstellt mit PrintCom - Copyright SCHLEICH GmbH
29.12.2011
Seite 1 von 1

Connection options





NetCom Xi | GLP2-e Software

RS232
Ethernet
USB
Print

Highlights

- Windows® software with data base for individual GLP2-e testers and GLP2-e networks
- editing test programs on a PC for all connected GLP2-e testers
- saving test results on a central PC
- printing test results in adaptable protocol samples
- printing test results via Excel® in various protocol samples
- easy installation without expert knowledge

Remote control for GLP2-testers via PC

NetCom Xi is our solution for efficient data management of test programs and results for GLP2-testers. The software sets a data connection between a PC and one or several testers.

NetCom Xi can reliably process the large amount of upcoming test results, especially within a network operation. High-performance search filters facilitate to relocate test results and generate significant statistics. Particularly with regard to the manufacturer's liability you can prove your product's quality.

NetCom Xi has three different application areas:

1. One single GLP2-e in connection with NetCom Xi

The tester receives the test program from NetCom Xi and returns the test results again to NetCom Xi. There are two operating modes:

- The complete test program is sent to the tester and saved there. The individual test steps run one after another in the tester. Only at the end of the test all results are sent to NetCom Xi in one package. If required the results can be intermediately saved in the tester until NetCom Xi imports them at a time defined by you.

- The test steps of a test program are individually sent to the tester. Directly after the transfer of one single test step the test is performed. The measuring values can be imported directly on the PC screen during the test. At the end of a test step the result is immediately returned to the NetCom Xi and displayed on the

screen. Afterwards the next test step of the test program is sent to the tester. The operator can see the test program running step by step on the PC-screen.

A label printer can be connected either directly to the tester or to the PC. After the end of a test the label is printed automatically.

2. GLP2-e network with NetCom Xi

NetCom Xi is the ideal tool to administer test programs and test results in a network of GLP2-e testers. All testers in the network access to the same test programs. A change in the test program in a PC affects that all testers work with the same updated test program afterwards. This facilitates the test program maintenance considerably. Errors due to different test programs in testers with the same test task can be excluded reliably.

Owing to the central administration of test results protocols can be edited directly on the PC without having to interrupt the production.

The most important search criterion is the serial number of a product. This is either generated by the tester or imported via a barcode scanner from the product. In addition to the serial number up to ten freely configurable order data fields can be entered for the search.

Three network versions can be used for the data exchange between the testers and the NetCom PC:

2.1 RS232 or USB connection from each tester to the PC
2.2 RS485 network with wiring from tester to tester
2.3 Ethernet-computer-network (LAN)

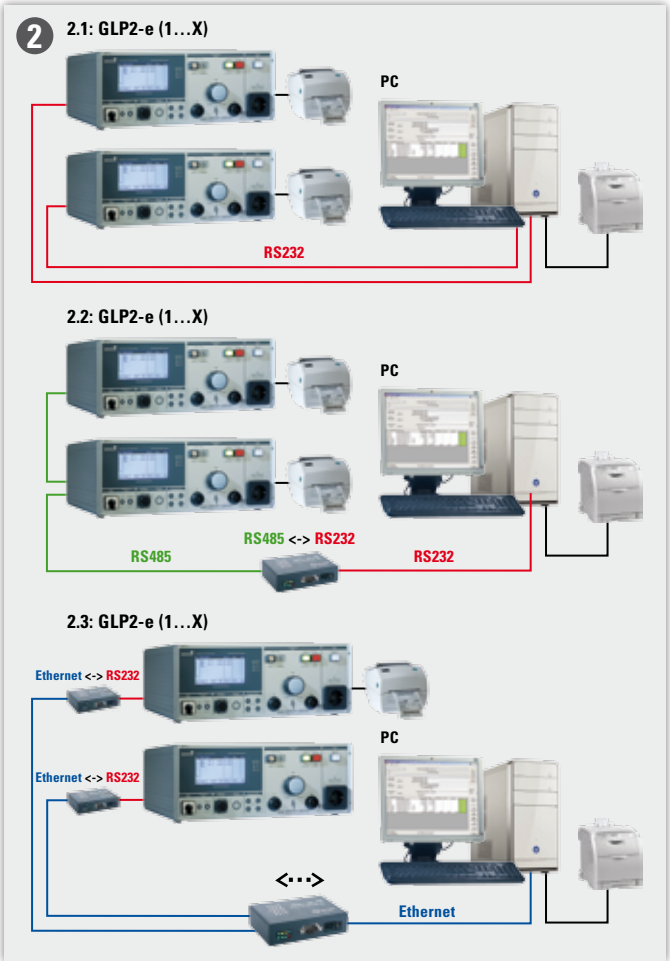
The big advantage of the Ethernet connection is that the company's computer network can be used. In contrast to GLP2-ce testers GLP2-e testers do not have their own Ethernet connection. Thus each tester requires a RS232-Ethernet converter for this.

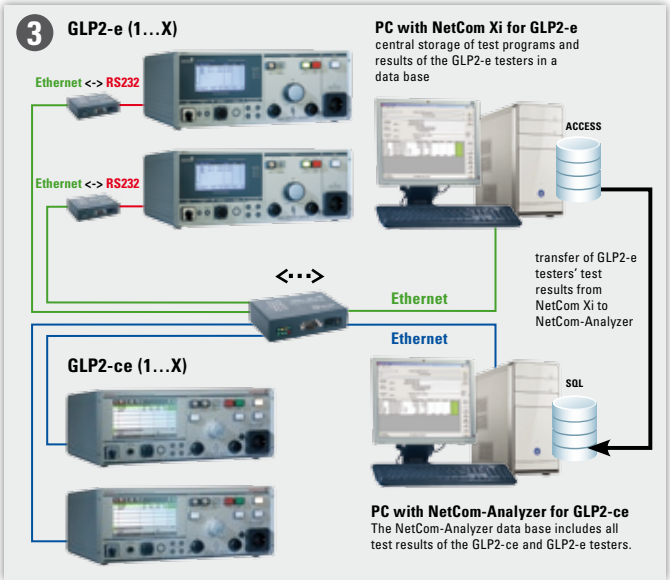
3. Connection between GLP2-ce and GLP2-e networks

This gateway version is used when GLP2-e and GLP2-ce testers shall save test results in a central data base in a mutual network.

NetCom Xi transfers the GLP2-e test results to the NetCom-Analyzer software. The NetCom-Analyzer saves all GLP2-ce and GLP2-e test results in a mutual data base.

For further details regarding the software NetCom-Analyzer please look on page 62.





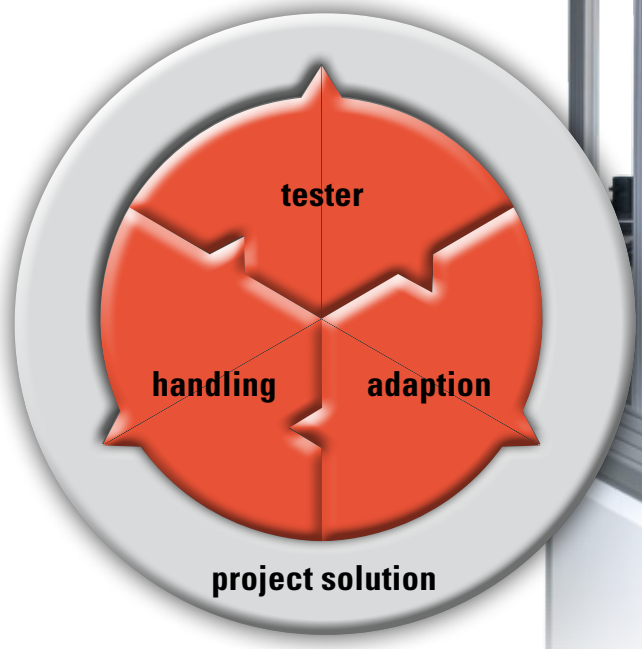
Customized **Project Solutions**

The testers of the GLP2-class offer conditions to be ideally integrated in your production process as project solution combined with the corresponding mechanics.

The project solutions can consist of a tester and test cell with adaption, as part of a production line or also as a complete production line. For production lines we use market-standard automation components that are equipped with corresponding process and test stations. As line control either a GLP2 tester or a PLC can be used whose control software is prepared by us. We also design and manufacture the component adapters on the pallets of a production line.

Especially complex project solutions require a corresponding concept for the data storage. Different testers can perform tests from test step to test step in a comprehensive production process with various test stations. Providing the product or pallet can be clearly identified with a serial number the individual test results are saved with this serial number at each station in the central Net-Com-Analyzer data base. At the end of the production all individual test results of the product are available for a further processing.

From the tester to the system, from the project planning to the commissioning – we care for the processing and adapt the project to your requirements including all details.

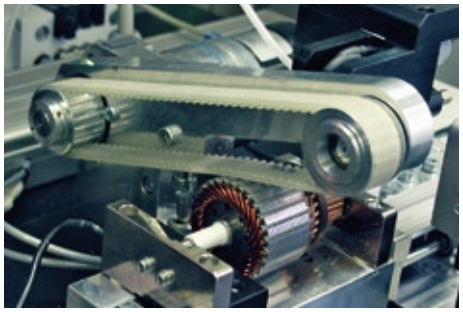


Project solution label print with barcode

- labels with variable contents e.g. serial number, date, and so on
- freely definable barcode scanner software
- manual PE resistance test
- high-voltage test
- insulation resistance test
- functional test

Project solution test of armatures

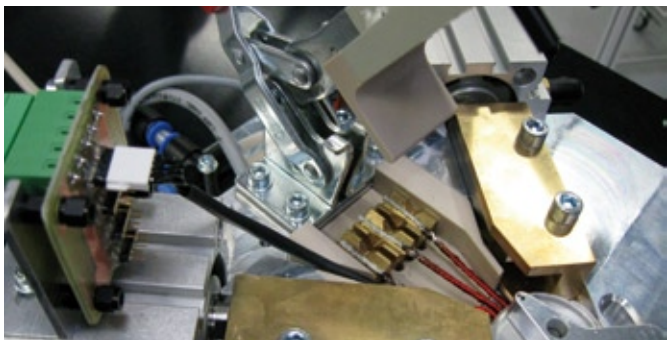
- contactless induction test
- turn-to-turn-fault test analysis
- commutator short-circuit test
- automatic armature rotation
- automatic armature positioning at the fault position
- results storage in the network



Project solution BLDC commutation transmitter adjustment

- automatic position adjustment of 3 transmitter signals
- device for fixing the adjusted position
- control via BLDC electronics
- graphic oscilloscope-like display of the 3 signals
- graphic oscilloscope-like display of the 3 phase voltages
- storage and documentation
- high-current contacting

(BLDC = Brushless DC Motor)



Customized **Project Solutions**

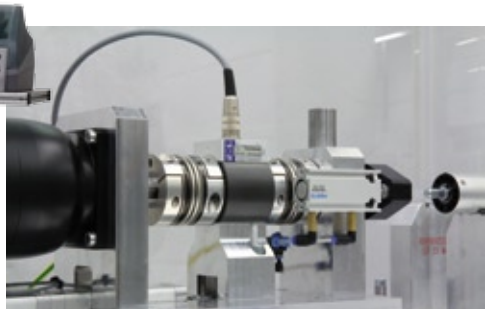
Project solution starter relay for cars

- force / path measurements
- automatic evaluation of the force / path cycle
- contact measurement at the relay switches
- voltage supply with adjustable voltages
- simulation of different battery conditions
- high-current supply including contacting
- magnetic force adjustment via impressed test current
- mechanical stability test
- carriage with stepper motor
- storage and documentation
- special protocols

Project solution defibrillator

- safety tests
- medical leakage current tests up to 1MHz
- patient leakage current test
- patient auxiliary current test at the test connections
- switchover matrix for all connections and electrodes
- functional test
- EN 60601

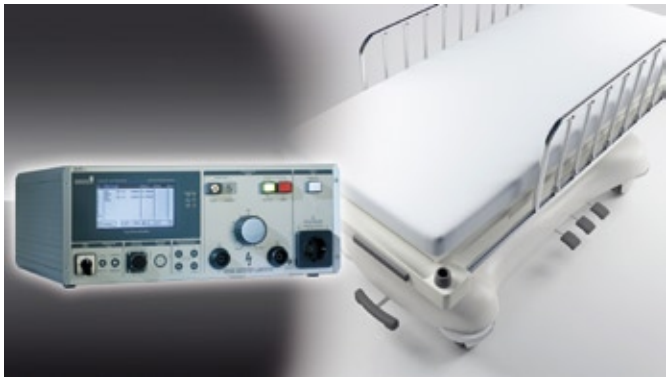
Project solution tubular motors



- torque test
- safety clutch test
- charging rate measurement
- variable voltage supply
- label printer for type plate with serial number and so on
- light curtain

Project solution hospital beds

- PE resistance
- insulation resistance
- leakage current
- medical leakage current
- functional test
- documentation
- label print
- traceability
- EN 60601
- project at wissner-bosserhoff in Wickede (Germany)



Project solution cable reels

- PE resistance
- insulation resistance
- high-voltage
- torsion – transposition
- FI-test
- FI-release current test
- FI-release time test
- matrix test of all sockets
- EN 60309-1, VDE 0623-1 or EN 60309, VDE 0623-3 for industrial applications of plugs, sockets and socket-outlets
- VDE 0620-1 or EN 60302-2-2, VDE 0625-2-2 for plugs, sockets and tester connectors for the domestic use and similar applications

Project solution mixing machine

- PE resistance
- insulation resistance
- high-voltage
- current consumption and output
- various rotational speeds with current steps
- FI-test
- reverse function
- EN 60204-1, VDE 0113-1
- project at ATIKA in Ahlen (Germany)

Customized **Project Solutions**

Project solution heating systems

- PE resistance test
- insulation resistance test
- high-voltage test
- functional test
- large test cover that opens to the top
- special contacting
- integration in a production line

Project solution pumps

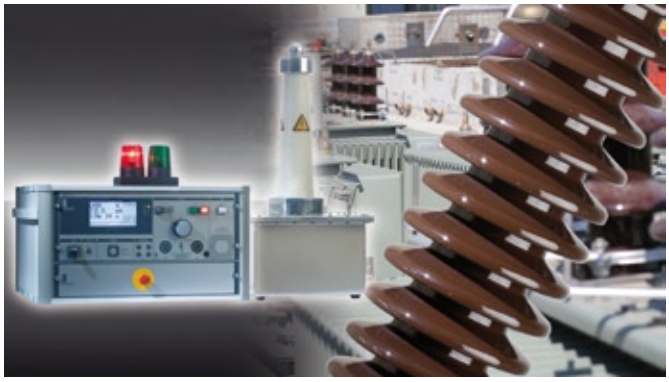
- PE resistance test
- insulation resistance test
- functional test
- float switch test
- mechanics to move the float switch
- triggering of the marking laser
- complete test setup by SCHLEICH
- special contacting
- drawer to move the test object in/out
- light curtain for the operator's protection
- communication with NetCom Xi

Project solution welding resistance test

- resistance measurement <1µΩ
- test current up to 200A
- high-precise four-wire-measurement
- compensation of the thermo voltages
- integration in a production line

Project solution high-volt components test

- insulation test
- high-voltage test AC
- high-voltage test DC
- partial discharge

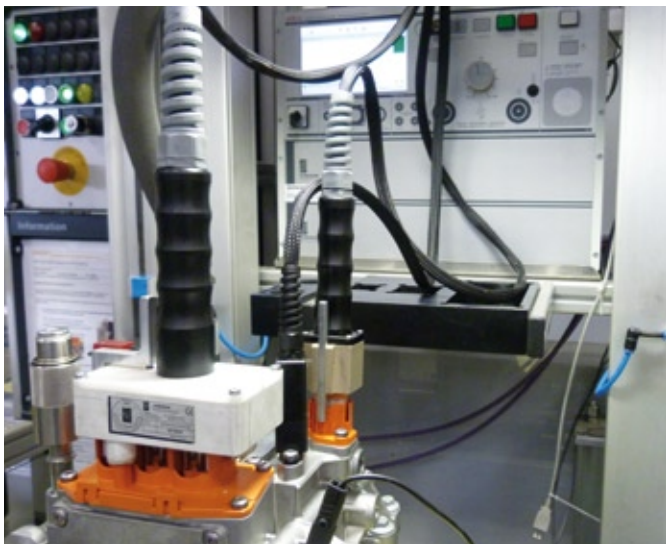


Project solution refrigerator

- series and individual tests
- incoming goods inspection
- „End Of Line“ test
- all electric safety tests
- functional tests 1- or 3-phase
- different test adapters
- project at Severin in Sundern (Germany)

Project solution hybrid motor

- insulation resistance test
- resistance test in four-wire-technology
- sensor test
- discharge at the end of the test
- complete test setup by SCHLEICH
- integration in a production line
- integration in a network
- traceability
- profibus-communication for the band-control
- contacting by SCHLEICH



The GLP 3-Class

Test technology without any limit

The GLP3-Class

GLP3 | All-Purpose Windows® Testers

- RS232
- USB
- CAN
- GPIB
- Ethernet
- DeviceNet
- Profibus
- I/O
- PLC
- Print

The GLP3-Windows® testers are our luxury class for testing various complex products. They are preferably used for testing electric motors, electronic components, Run-In-test stations, power supply units, transformers, cables, washing machines and many more.

After clamping all test objects' connections, the tests automatically run via an internal switchover of the connections and test methods. The test steps are automatically evaluated one by one. At the end of the complete test cycle you receive a clear reproducible pass/fail assessment.

As one of the first tester manufacturers, SCHLEICH focused successfully and extremely reliably on the integration of a PC in its GLP3 testers to measure, control and save. Our long-time engineering experience provides the operator with a well-engineered test system with comprehensive software. Many reasonable software tools are included in our standard delivery extent.

SCHLEICH develops and produces its own hardware and software. Proven systems are continuously improved in order to always be in the first position regarding measuring technology. The software and data base are on the latest level of well-proven Microsoft® technology. Our various innovations always set technological standards for modern test stations operated with Windows®. The system offers the operator a clear, well-arranged display of the test. For the set-up person, comprehensive entry and configuration possibilities are available.

Our quality control is one of the best in the industry. For the control, a comprehensive statistical analysis is integrated in the tester that leaves very little to be desired. The most important issue is that you are able to document the tested quality with a number of different protocol printouts towards your customer at the end of the test.

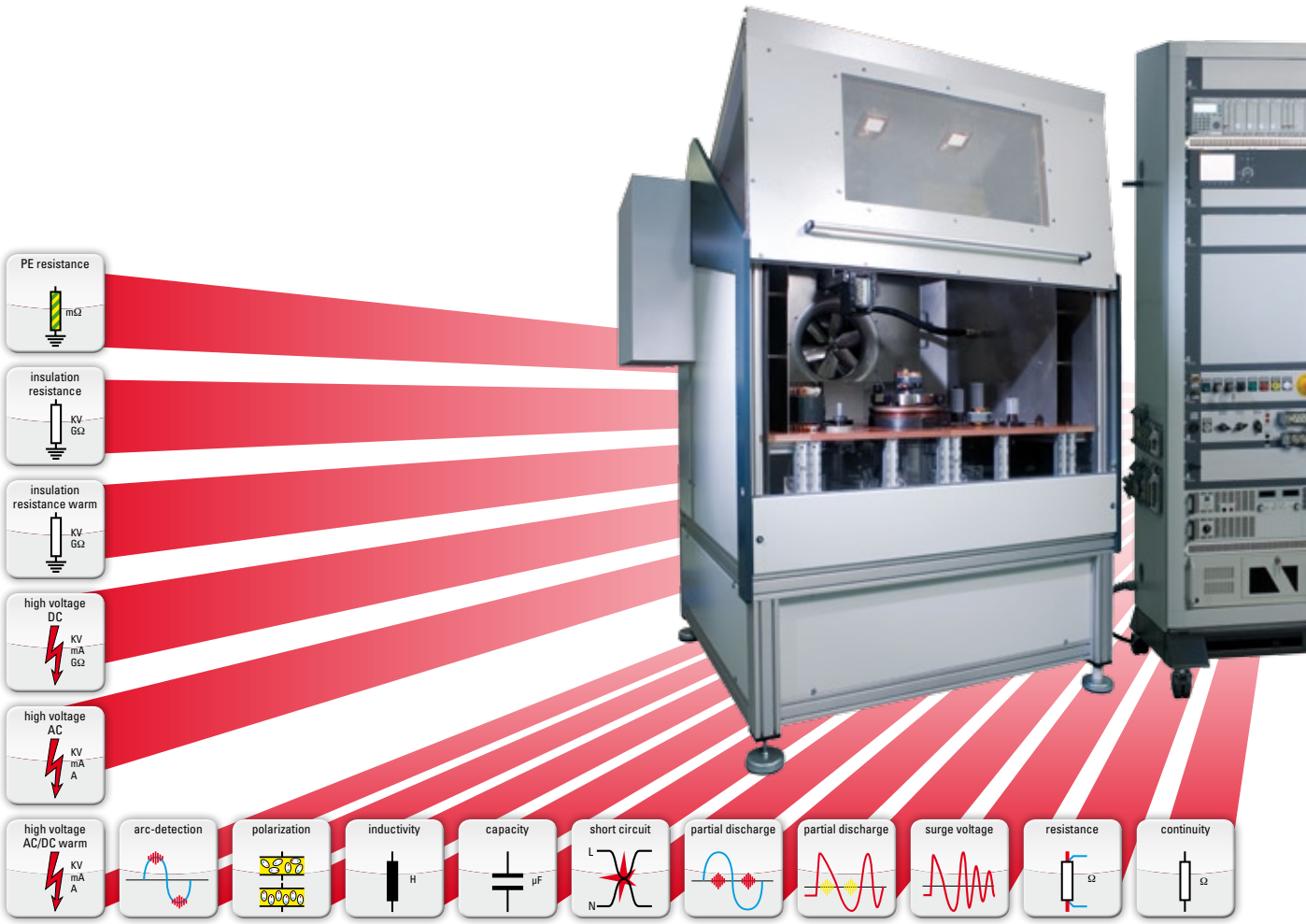
Based on the SCHLEICH-MODULAR-CONCEPT, we manufacture testers according to your requirements. The required various test methods can be assembled tailor-made out of the pool of possible test methods.

Whether manual or automatic single, double or multi-test station, with or without test cover or test table, or test in automatic production lines; the GLP3 is the best solution. The GLP3's application variety does not have any limits. Especially due to the huge flexibility of hardware and software the tester is manufactured favorably priced and exactly adapted to your tasks.

Highlights

- all kinds of safety tests
- functional test one- and three-phase up to 500A
- ideal for complex test stations
- extension by automatic switchable PE and high-voltage matrix points to setup complex testers with 2…200 and more connections
- multi-stations with up to 50 test stations
- fast, high-precision measurements and evaluations via DSP (digital signal processor)
- integrated PC with Windows® XP or Windows® 7
- data base for millions of test programs and results
- comprehensive statistical evaluations
- configurable test protocol printout
- freely configurable label printout on thermo transfer printers
- bar code readers and automatic generation of labels
- operation of the GLP3 in complex global PC-networks
- data exchange with ERP systems
- optimum OEM preconditions for an easy integration in automatic lines
- possibility for a remote control and remote calibration

SCHLEICH-MODULAR-CONCEPT
GLP3 **Combination Testers**



SCHLEICH-MODULAR-CONCEPT
makes it possible to configure
your tester.

S-M-C
SCHLEICH MODULAR CONCEPT

Based on the SCHLEICH-MODULAR-CONCEPT the GLP3 testers offer almost unlimited possibilities to combine and integrate different safety and functional test methods. You can select the test method necessary for your test task from the large pool of test options.

Whether only one or several of test methods – you determine the configuration. Your GLP3 can for example be configured as high-voltage and PE resistance tester. For a more complex test task you might need a combination of all test methods. The SCHLEICH-MODULAR-CONCEPT enables you to configure the tester specifically adapted to your test tasks. This is not realized by installing different single testers into one huge test rack but by integrating all tests into one compact modular enclosure concept. The enclosure size depends on the type and extent of the different tests.

The flexibility gives you considerable functional and economic preference. Each tester includes the experience of thousands installations. At SCHLEICH this experience is realized with passion and without any compromise for you.

This is “customer based technology”.

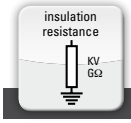
For details regarding the individual test methods please look on page 157 and at our website www.schleich.com.

The GLP3-Class

Technical Data

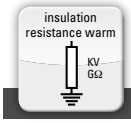
PE resistance testers

test current AC	1A…200A – depending on the model
current steps	1A
resistance measuring range	0.01…1.2Ω – R_{max} depending on the current
resistance resolution	1m
measuring technology	4-wire-measurement / Kelvin measuring method
voltage range	6V, 12V, 18V, 24V – depending on the model
upper resistance limit	adjustable from 0.01…1.2Ω
upper voltage limit	adjustable from 0.1…12V
pass | fail assessment	automatic – resistance or voltage
test period	adj. from 0.1s…24h – depending on the model



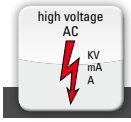
Insulation resistance testers

test voltage DC	0...1000V; 50000V – depending on the model
voltage setting	fully electronic
residual ripple	< 0.05...1% – depending on the modell
test current	1mA…500mA – depending on the model
resistance measuring range	100KΩ…1GΩ; 500MΩ – depending on the model
measuring range extension	100GΩ…10TΩ – depending on the model
lower resistance limit	adjustable from 100KΩ…990MΩ
pass | fail assessment	automatic
test period	adjustable from 0.1s…1h
safety current limit	all models up to max. 12mA!



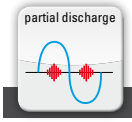
Insulation resistance testers warm

test voltage	up to 6000V
functional test	one-/three-phase – depending on the model
functional test current	1…200A – depending on the model



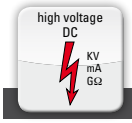
High-voltage testers AC

test voltage AC	3000V…100000V – depending on the model
voltage setting	actuator, fully electronic
voltage ramp / profile	yes
test current	3mA…50A – depending on the model
current measurement	total current, active current, cos φ
measurement	effective value, peak value
safety current limit	only models up to max. 3mA
upper current limit	adjustable – range depends on the model
pass | fail assessment	automatic
test period	adjustable from 0.1s…1 week
manual operation	yes – without time control
automatic operation	yes – with automatic time lapse
burning	yes – depending on the model
safety current limit	all models up to max. 3mA !
partial discharge measurement	yes – optionally extendable



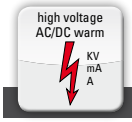
Partial discharge testers HV AC

test voltage	3000V…30000V – depending on the model
voltage setting	actuator, fully electronic
partial discharge test	yes – partial discharge detector
start-stop voltage	yes – automatic measurement
application	measurement at electric motors



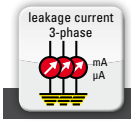
High-voltage testers DC

test voltage DC	500V…50000V – depending on the model
voltage setting	fully electronic
residual ripple	< 0.05…1% – depending on the model
test current	1mA…500mA – depending on the model
safety current limit	all models up to max. 12mA!
voltage ramp	yes – electronic
upper voltage limit	adjustable – range depends on the model
insulation resistance measurement	yes
resistance measuring range	potential-free – 100KΩ…500MΩ
resistance measuring range	non potential-free – 100KΩ…1GΩ
lower resistance limit	adjustable from 100KΩ…990MΩ
pass | fail assessment	automatic
test period	adjustable from 0.1s…1 week



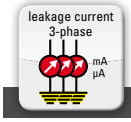
High-voltage testers AC warm / DC warm

test voltage	up to 6000V
functional test	one-three-phase – depending on the model
functional test current	1…200A – depending on the model



Leakage current testers

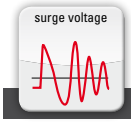
test voltage	one-phase / three-phase – depending on the model
test currents of the test object	5A, 16A, 32A, 63A, 200A – depending on the model
operating types	A1 | A2 | B
standards	EN & UL – depending on the model
measuring circuits EN 60990	3
measuring circuits EN 60601	1
measuring circuits UL 1026 & UL 1283	1
leakage current	1µA…30mA – 5 measuring range / auto range
resolution	1µA
measurement	effective value, peak value, DC-/AC-percentage
1MHz measurement	yes – depending on the model
ground leakage current measurement	yes
touch current measurement	yes – via test probe
1 MHz peak value detector	yes – depending on the model
with N-break (S1)	yes
with L/N pole reversal (S5)	yes
upper current limit	adjustable from 10µA…30mA
pass | fail assessment	automatic
test period	adjustable from 0.1s…100h



Leakage current testers medical

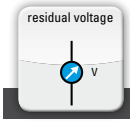
patient leakage current measurement	yes
patient auxiliary current measurement	yes
touch current measurement	yes – between 2 test probes
patient connections	8 – extendable upon request
FE-connections	1
test probe connections	2
potential-free contacts S2 & S3	yes

Additional details regarding leakage current testers medical on page 158.



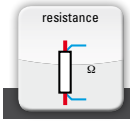
Surge testers

test voltage	6000V…30000V – depending on the model
voltage setting	fully electronic
evaluation	automatic with various methods
with partial discharge test	yes – optional
start voltage with PD	yes – automatic measurement



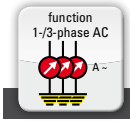
Residual voltage testers

voltage range	1V…500V – depending on the model
one-phase / three-phase	depending on the model



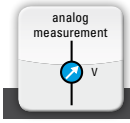
Ohmic resistance testers

test voltage	3V…24V –depending on the model
residual ripple	high-tensile – ideal for measuring at inductances
test current	2A…200A – depending on the model
resistance measuring range	1µΩ…100KΩ –depending on the model
resistance resolution	0.1µΩ – depending on the model
measuring technology	4-wire-measurement / Kelvin measuring method
temperature compensation	yes – optional



Functional testers

test voltage AC/DC	yes – depending on the model
test voltage	1~ 0…300V / 3~ 0…1000V – depending on the model
one-phase / three-phase	depending on the model
voltage setting	fixed, steps, motor-driven, fully electronic
test current AC	2A, 400A – depending on the model
test current resolution	1mA
upper voltage limit	adjustable from 1mA…400A
pass | fail assessment	automatic – current within the tolerance
test period	adjustable from 0.1s…1h



Analog testers

voltage range	5mV…1000V – depending on the model
channels	1…100

For details regarding the individual test methods please look on page 157 and at our website www.schleich.com.

The GLP3-Class

Enclosure Versions

The testers of the GLP3-Class offer several test options and switchovers in only one enclosure. The combination of the test methods according to the SCHLEICH-MODULAR-CONCEPT also requires a modular enclosure concept.

Your applications can be installed in a compact tabletop unit, in a 19"-container or in a 19" industrial cabinet, according to your requirements. To install the test technology professionally and safely, we use a tailor-made enclosure components of well-known German manufacturers, as well as components of our own production. On this basis the modular enclosure concept guarantees a favorably-priced and professional package solution.

The modularity can be found not only in the enclosure but also in the arrangement of the tester's connections. The measuring connections can be installed either at the front, the right and/or left side or at the rear panel.

Our target is to realize the most economic and most flexible solution for your task and effective workflow.

GLP3 19" tabletop enclosure and rolling container

Solid industrial enclosures and rolling containers made of Aluminum are used for small- and medium-sized testers.

GLP3 compact tester

This enclosure is the basis for all single and combination testers. It is often used for testers with a few test methods and low currents.

GLP3 19" tabletop tester

This robust rack is used for heavier and larger parts.

GLP3 rolling container

This rolling container is used for medium-sized applications. Stable rollers guarantee good mobility.

GLP3 rolling container | setup

This rolling container can be extended with single and double test covers to be a completely independent test station. The contactings and adaptors are integrated in the test covers.

GLP3 19" cabinets

For larger test setups with several test methods, switchovers and also a frequent high current solid Rittal® extension cabinets are used.

They are designed for heavy applications with a weight of several 100 kg. Robust heavy duty rollers guarantee a good mobility.

GLP3 19"-cabinet | 80 cm

Available with an extension to one side (left or right).
Dimensions
80 x 60 x 210 cm (w x l x h)

GLP3 19"-cabinet | 100 cm

Cabinet with an extension to both sides.
Dimensions
100 x 60 x 210 cm (w x l x h)

GLP3 19"-cabinet | 180 cm

These cabinets can be extended in steps of 60 cm.
The typical width dimension is
60, 80, 140, 200, 260, 320 and 380 cm.

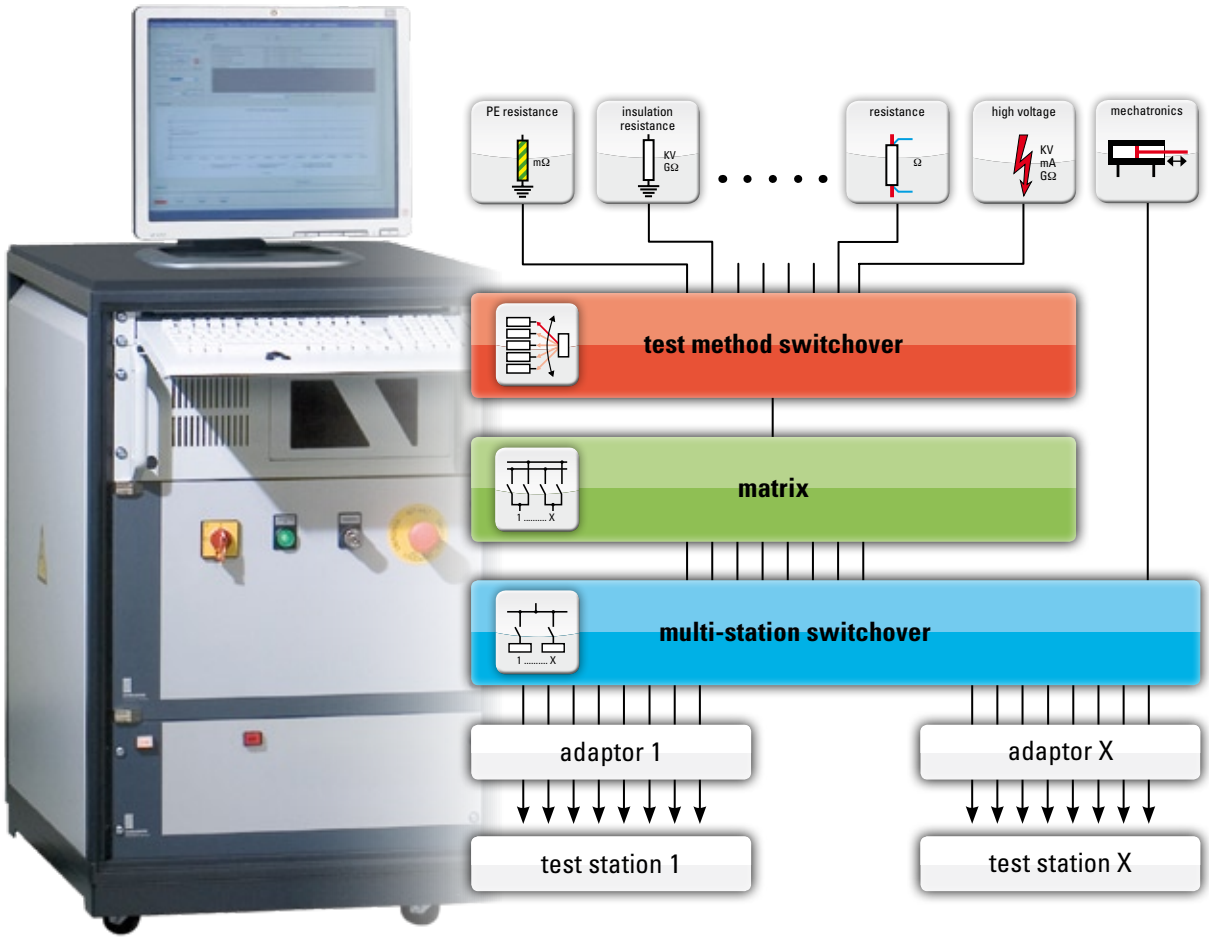
GLP3 19"-cabinet | 320 cm

Special large applications are assembled in cabinets with a length of up to 4 m. In case heavy weights are installed within the cabinet we additionally install steel girders within the cabinet.

Test Method Switchover, Matrices, Multi-Station Switchover and Mechatronics

SCHLEICH test technology proves itself in the daily operation. The aim has to be to perform a test as fast and efficient as possible. Only this creates a high utility.

In order to save time, the operator connects all connections of the test object by means of a contacting adaptor. Afterwards the tester automatically performs all tests between all connections. The operator does not have to re-clamp any leads. This is realized by the automatic test method switchover that is typical for SCHLEICH.



Complex test objects often have more than three connections. You only have to think of a building site main cabinet with several sockets for example. Here it makes sense and it is economic to connect all test objects' connections with the tester. For the building site main cabinet example, this means that the operator connects all sockets via the corresponding connecting leads to the tester. Afterwards the tester automatically performs all tests between all connecting points. For the building site main cabinet that is considerably more effective than performing partial tests at each individual socket. The switchover between the different connections is realized by flexible switchover matrices.

It is obvious that test objects with several connections require more time for the re-clamping than test objects with only one connecting cable. In order to gain time in such cases we often realize double or multi-station systems. At one station it is charged and discharged and at the other stations it is tested simultaneously. In this way very economic results can be achieved also at complex and comprehensive tests.

Test method switchover

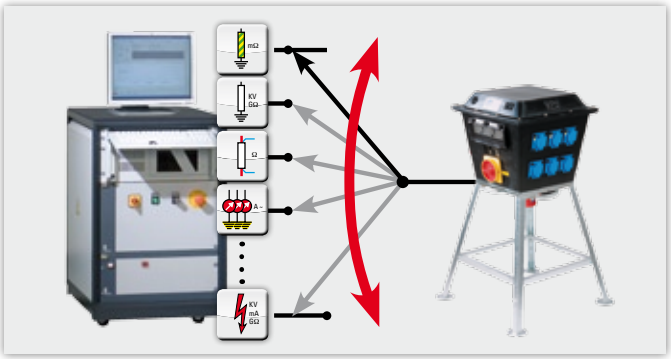
Compliant to type and extent of the test methods we provide a number of switchovers. They guarantee a fast and automatic change between the different test methods.

As the voltage differences between the test methods might be very high the safety has top priority when dealing with switchovers. A PE resistance test with 12V has to be switched to the test object as reliably as a high-voltage test with 6000V – to protect the test object and, of course, the operator as well. There are no compromises. For switchovers and matrices we only use umpteen thousands of times proven, top-quality parts of our own production or from well-known German manufacturers.

Station switchover

Instead of using two or more testers a station switchover is sometimes an economic alternative.

High safety demands are made for station switchovers. Simultaneously to a running test at one station the other station is discharged and charged again. During this process the operator inevitably touches the clamps and connecting leads. An electrical hazard of the operator has of course to be avoided in any case. For this the measuring leads to the stations in which no test runs at this moment have to be safely separated. Furthermore it is recommended to ground the connections to the test object additionally.



Matrices

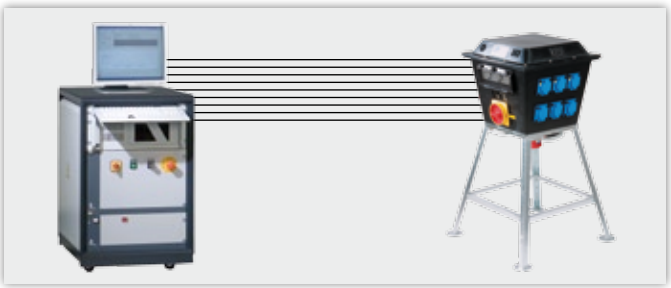
For almost every task we offer the corresponding relay matrix. Matrices vary in the number of connections and the height of the test voltage that is to be switched. A matrix has to switch and separate 6000V as reliably as millivolt signals. Our engineers have developed the matrices exactly for this situation.

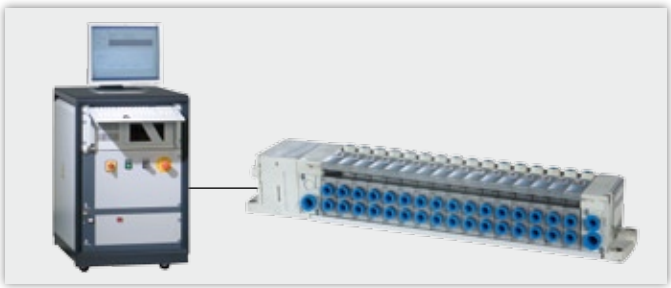
Matrices are designed for two- and four-wire-applications. They can be strung together to arbitrarily increase the quantity of connections. Matrices with more than 100 connecting points are no rarity. Also, at the test method switchover only the best quality is used for matrices.

Mechatronics | Script control

Besides the hardware, the software also offers an enormous flexibility. Owing to the integrated script commands additional PLC functions can be realized in the tester. Entries can be queried, outputs be set and logical links be generated – just like with a PLC.

The huge advantage is the direct control of mechatronic functional processes. You can switch valves, query final switches, evaluate measuring values yourself and much more. Thus the tester is able to generate additional functional processes before, during and after the test. This is perfect for own test setups or also for the integration in an automatic production.

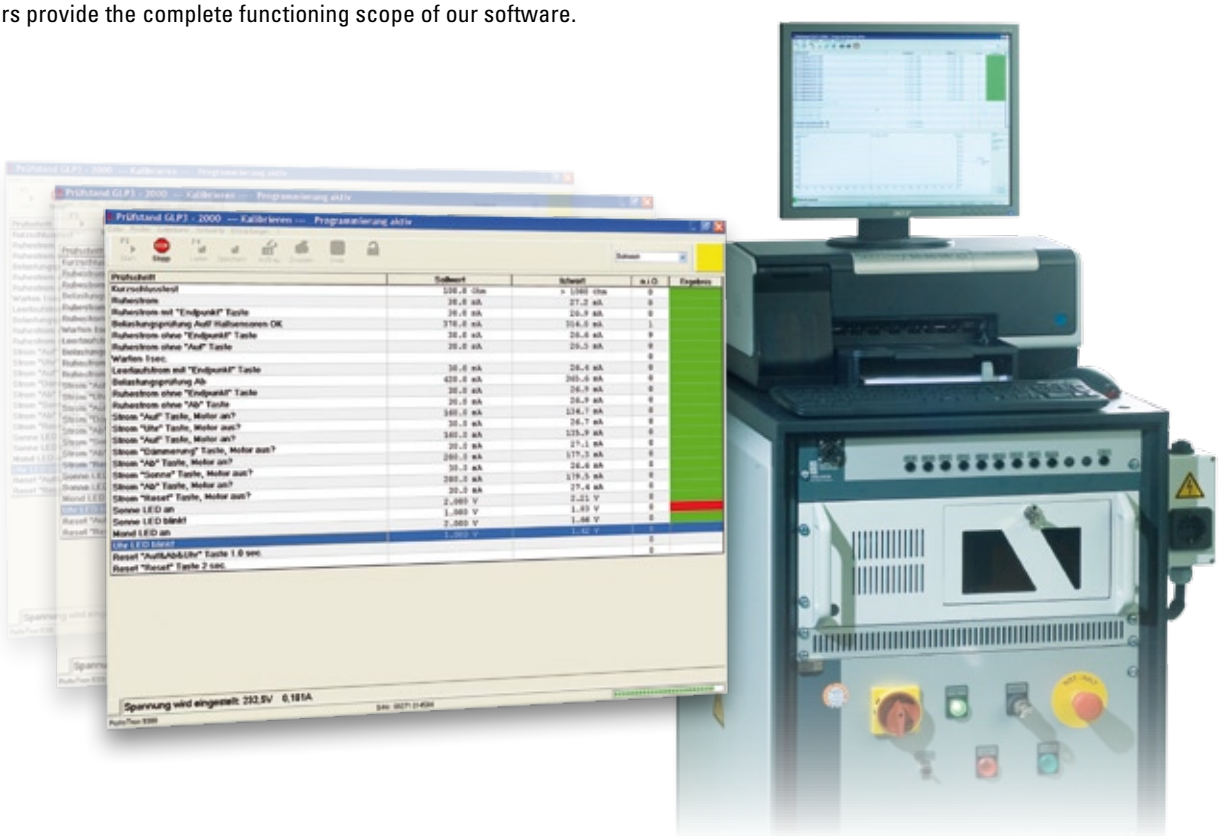




The GLP3-Class

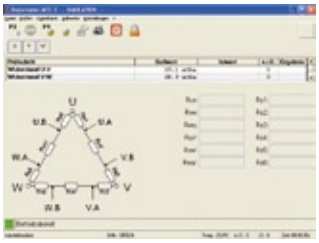
Test Software for Windows® Testers

Our test software can be operated under Windows® in the same way as you expect it. The user-friendly operating software facilitates the control of test processes, the test plan editing, the protocol printing, the statistics evaluation as well as the data recording to document results. Each of our Windows® based testers provide the complete functioning scope of our software.



Highlights

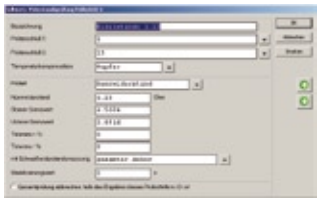
- intuitional operation
- well-arranged presentation
- testing without special knowledge
- integrated operation and setup information
- direct input of test parameter
- well-arranged input of test parameter
- based on Windows XP® and Windows 7®
- ideal for networks
- high data safety and long-term storage of data
- connection to CAQ- and/or ERP-systems
- comprehensive configuration possibilities



The test process

The test process is presented clearly and well-arranged. In the status line at the bottom of the window the software directly informs the operator on pass / fail assessments and realizes the product quality's evaluation already during the test process.

In case additional inputs by the operator are necessary they can be entered intuitionally and fast. In order to guarantee a fast and error-free testing all test steps can for example be supplemented with additional pictures. Integrated working instructions make the tester an ISO 9001-compliant testing medium.



The input

The test program editor does not have to be opened to edit test steps. One mouse click on the test step is enough to change the parameter and adapt the tests. An integrated user management makes sure that only authorized persons are able to change parameters.

The data

The GLP3 saves test programs and results either locally on the hard disk or on a central network server. The networking of testers offers many advantages. All testers in the same network access the same joint data base for test programs and results. Thus all testers test according to the same parameters which is not always the case at single station solutions.

A central data base for all test systems in a global network facilitates to guarantee your product's quality worldwide at different sites by means of identical test programs. At the same time you have a central insight in all test results – independently from the location.

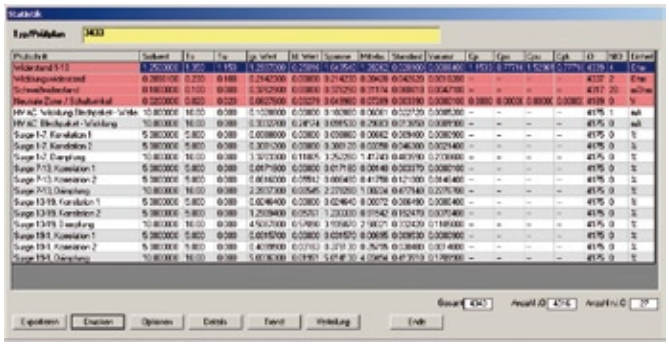
Testers of the GLP3-Class can be ideally integrated in your production planning and control via the easy connection to ERP-, PPS or CAQ-systems.

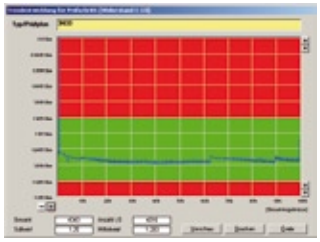
www.schleich.com

Labels and test protocols

Labels and test protocols are often needed directly after the test. Comfortable print programs guarantee an optimum configuration. Previously designed labels, e.g. with programs like cablabel®, BarOne®, BarTender®, Codesoft®, EasyLabel®, can be automatically extended with previously defined, test related information by the test software after the test. Afterwards they can be printed with one or more thermo transfer printers.

Additional printouts and test protocols might be generated of the data base at a later stage. This can be done at the tester as well as in a network via a connected work station. Adaptations to customer layouts are possible without any problems.





The data base

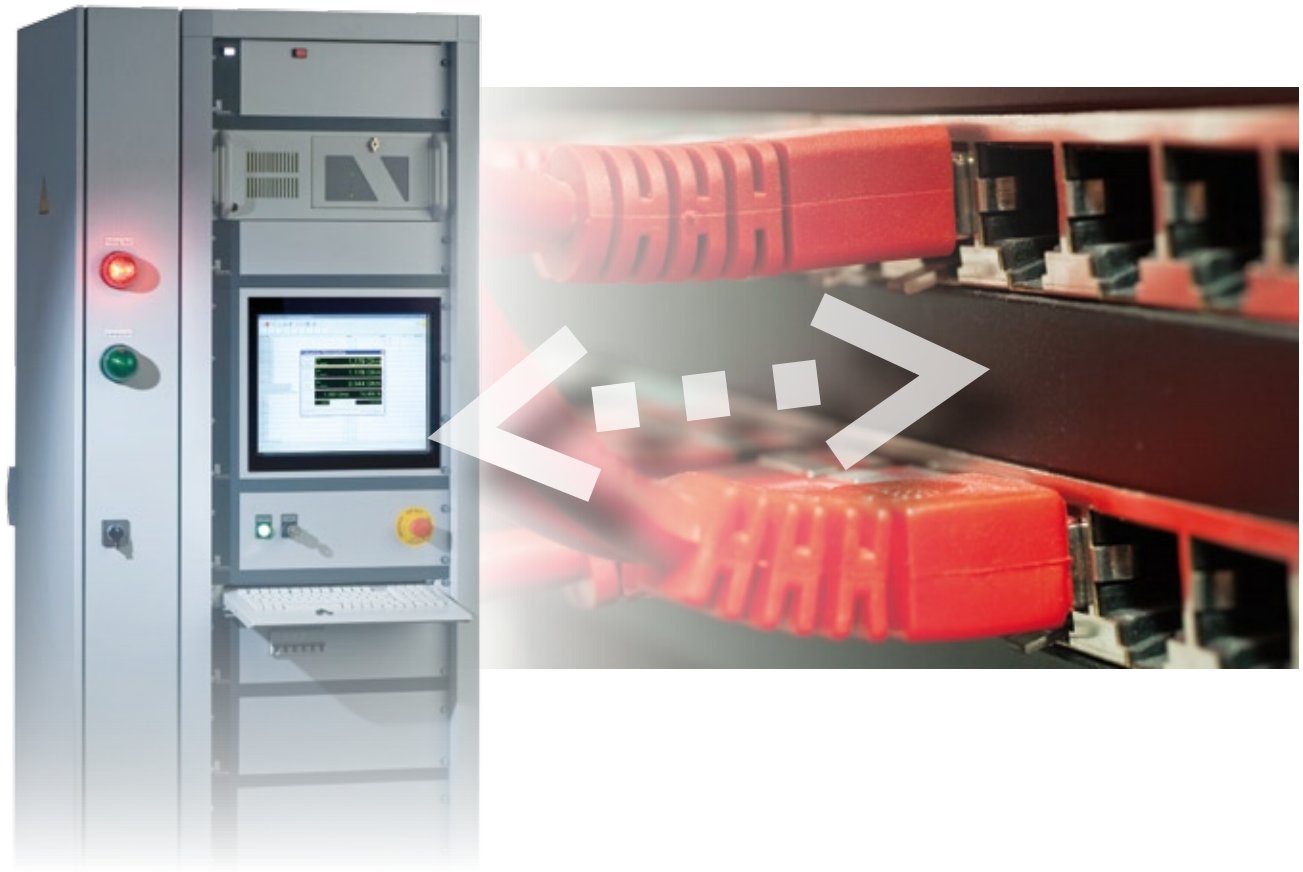
Significant statistics can only be calculated out of a large basis of test results. This is why we set a high value on a reasonable and sophisticated storage of the test results for a long period when developing our Windows® based testers. Freely configurable search filters enable each operator to find the relevant data easily and fast in the data base. In the second step either a single evaluation or a summary of all results over a longer, freely determinable period with subsequent statistical evaluation is possible. Trend displays and Gaussian distributions clearly inform on the quality status of the production. Our testers are able to save your data on a daily, weekly or monthly basis. They can also evaluate and display the data in relation to the order or lot.

With the integrated export function the operator can easily extract data from the data base in order to add them in other data bases or to process them in Excel®. A separate own evaluation is also possible.

The data base can be based on Access® or SQL. At larger data volumes or when using networks we recommend to work with Microsoft® SQL.

The GLP3-Class

Networks with Windows® Testers



Highlights

- central storage of test programs
- local editing of test programs
- central storage of test results
- local evaluation of test results
- working in global networks
- storage in Access®, Microsoft SQL®, Oracle®, etc.
- in case of mains failure it is automatically saved locally
- automatic data comparison at the end of a mains failure
- fast statistic calculations on the server
- ideal possibilities for remote control

SCHLEICH Windows® testers can be immediately operated in a network. Test programs and results can be either saved locally on the tester or on a central server. This guarantees a high safety of your data as well as an optimum data exchange between different systems. They can be ideally integrated into your server infrastructure and are the optimum platform to collect, administer, analyze and distribute your information.

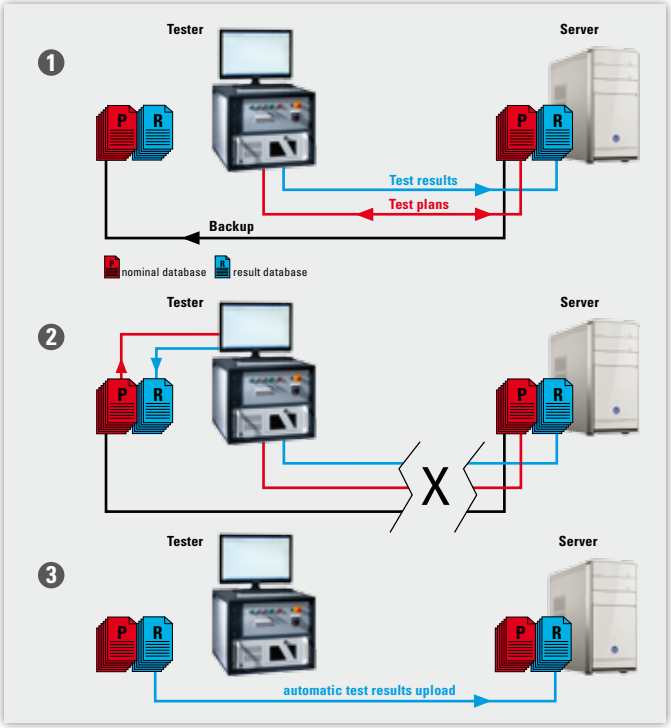
Well-engineered and popular technologies of Microsoft® or other well-known manufacturers serve as data base.

Microsoft Office Access

Microsoft SQL Server

ORACLE

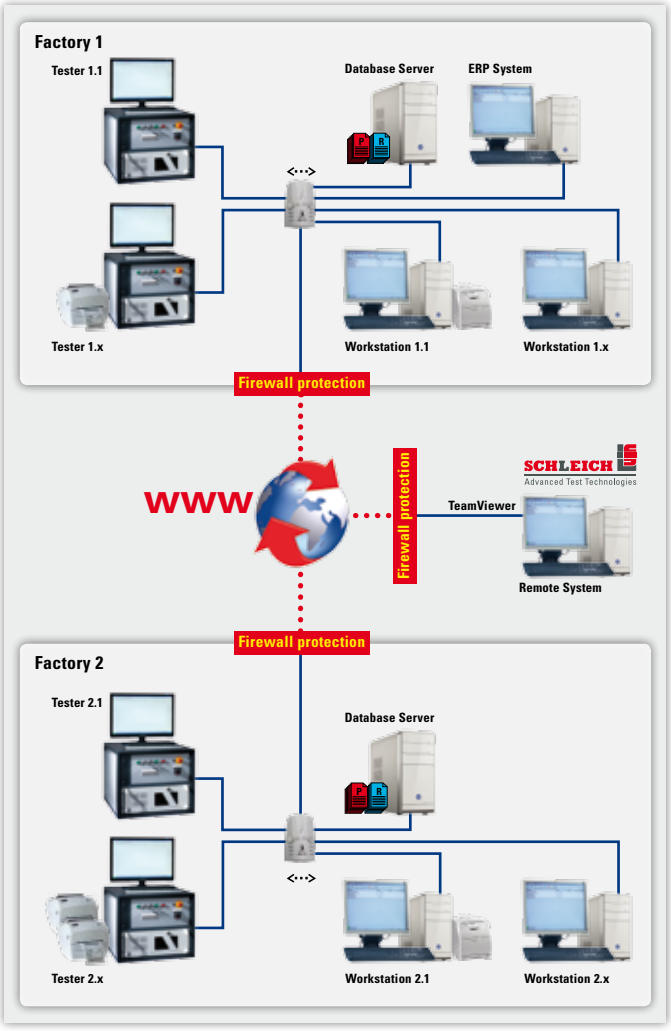
The testers can also be linked with ERP-, PPS- and CAQ-systems. For all applications we offer customer-optimized standard solutions.



❶ Each tester automatically saves local copies of the current server test program data base, to be able to continue operating in case of a possible network failure.

❷ In case of a network failure the local test programs are used and the test results are locally saved on the tester.

❸ After recovering of the network, the tester automatically transfers the test results to the server so that the server data base is always on the updated status.



Complex global network system

Our Windows® based testers can be operated in arbitrary complex network topologies. You can install an arbitrary number of testers at different locations worldwide that all work with a central server data base for test programs and test results. Our wide experience with the global networking of our testers guarantees you to offer the same product quality independently from the production location.

All test programs, printing, label and statistics works can of course be performed also at the individual testers. But in order not to disturb the production cycle it is recommended to use separate work stations in networked systems for this. These stations work with the same software like the tester to achieve a high user-friendly operation.

Labels can also be centrally saved on a server. Corresponding to each test program the tester loads the respective label and transfers the data to the thermo transfer printer after the test. The labels can be designed according to your requirements as well.

In case of a remote control (via remote access) we are able – if needed – to temporary dial in your network and directly switch on the individual tester. In this procedure we see your tester's screen content at our site. Upon your confirmation we can also access your mouse and keyboard. These works are of course done only with your agreement and require your separate confirmation for the connection.

Data Exchange with Windows® Testers

Highlights

- data exchange possible with different ERP systems
- configurable data import tools
- configurable data export tools
- data import and export via XML
- data export to CAQ-systems
- data export in CSV-files
- data export in Excel®
- data export into data bases of your choice

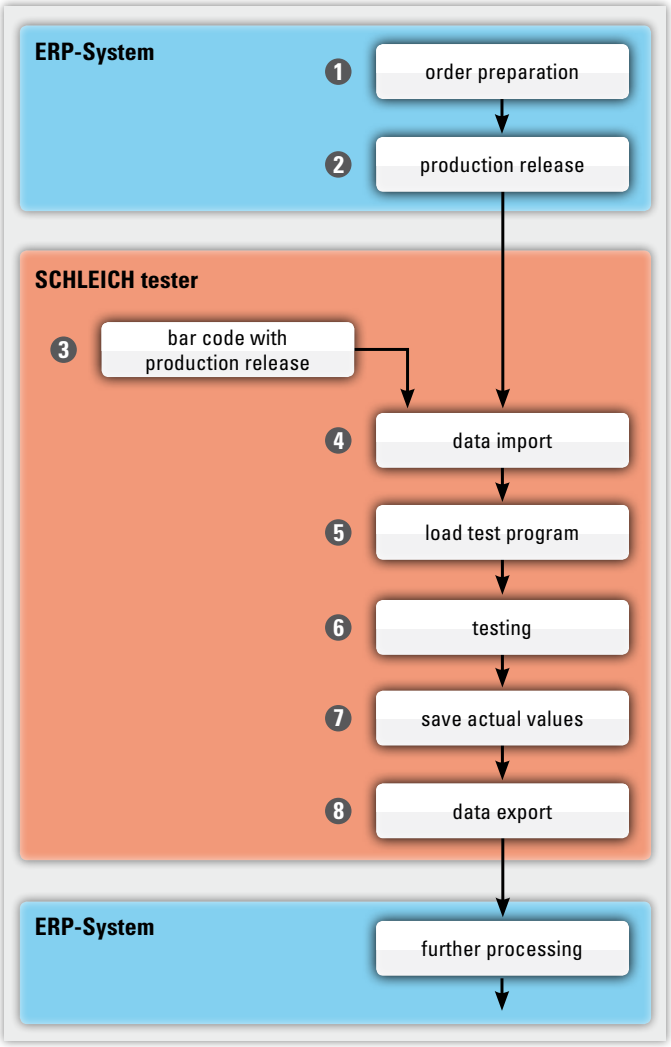
Data interfaces to other systems are often required at testers. We have the corresponding solutions for various requirements.

Typical requirements

- import of production orders out of ERP-systems
- automatic derivation of test programs out of the production orders' data
- automatic generation of serial numbers out of the production orders' data
- return information of results and counts at ERP-systems
- traceability of the complete production chain
- receipt of label data for the label print
- filtering and transfer of data to statistic evaluation systems
- transfer of safety tests' results for the product liability to the long-time archiving systems
- communication with other test systems and line controls
- communication with special systems in the automotive industry

To meet the requirements we have developed configurable standard software modules. This reduces the expenditure of integrating the tester in your IT system to a minimum.

A typical ERP-system controlled application



1. By means of the ERP-system the sales order is scheduled in the order preparation.

2. Based on this information the ERP-system generates a production release and supplements it with the data required by the tester for the test, e.g. the type and/or test program identification, serial number, quantities, label information and also part's lists. These are either saved in a data base or in a file format for the tester within the network.

3. Before the test can be started the operator imports with e.g. a bar code the number of the production release (return information number) written on the working paper at a manual test station. At an automatic test station within a production line this information can also be provided by the line control or mobile data carrier.

4. Afterwards the tester's data import software evaluates the received data. It imports all necessary information regarding the test process from the data generated by the ERP-system.

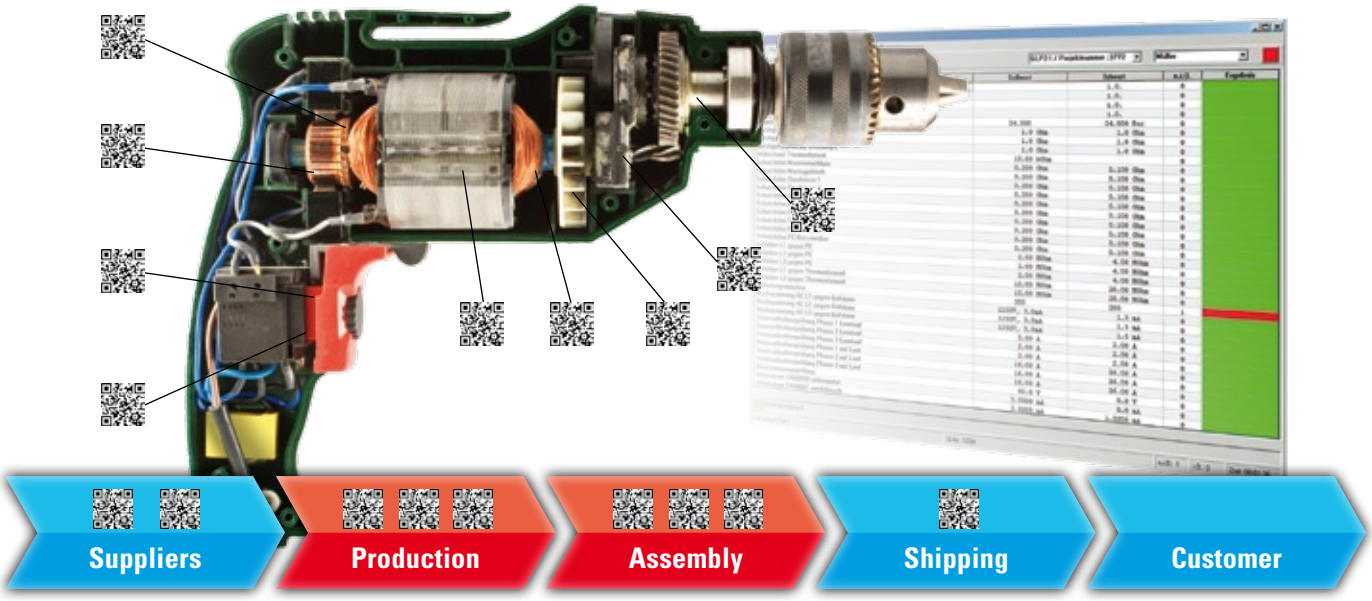
5. The test program that fits the production order is automatically loaded from the tester's data base. This can also be composed of several partial test programs providing the ERP-system has also transferred part's lists information for the partial tests. In addition the ERP-system can also transfer set values and tolerances which are entered at the corresponding points within the test program. Then a test program is generated that corresponds to the production release without entering or selecting values by the operator.

6. The test is performed according to the generated test program.

7. The tester saves the evaluated actual values either locally or in a data base within the network. The data can be either given out as protocol and/or additionally as label, if requested also extended by additional data from your ERP-system.

8. Afterwards the ready signals, results, date/time, operator's name and quantities are returned to the ERP-system again. Test results can also be made available for CAQ-systems in addition to generate further evaluations and analysis.

Windows®-Traceability | Traceability of the production chain



The traceability enables you to receive clear and complete information regarding the total manufacturing process, also in hindsight. In case of quality problems during the manufacturing process or after delivery the traceability offers you to react systematically. We give the answers to the following questions:

- Which final products, part units or components are affected?
- Which customers do the final products, part units and components have?
- Which part units and components are installed in the final product?
- When and where were the corresponding parts processed, in which production process and who did it?
- Who manufactured or delivered the part units and components?
- How are the test results at the single part units and the final production?

The precondition for answering these questions is the clear identification of each part, each part unit and each final product with a number or a code respectively. Additional information like customer number, supplier number, load number and so on can be necessary for a better traceability and search.

SCHLEICH testers are able to collect these identifications and additional information for example via bar code inputs and to save them afterwards together with the test results, the test date and the operator's name in the data base of the tester or the network. Based on this information it can be traced at a later stage, where and when the components were processed or supplied within the manufacturing process and who did it.

Concept

To guarantee the traceability all components have to be clearly marked and identifiable. Here the bar code is typically used. If several information are to be coded a 2-dimensional bar code should be used. At the SCHLEICH tester the operator scans the bar codes and assigns them to the individual components.

The bar code can include one or several information in series. By means of a corresponding tester configuration the SCHLEICH software cuts the necessary partial information out of the complete code. In case the bar code also includes the type the tester automatically loads the test program based on the type identification.

At the end of the complete manufacturing process is the finished final product. By means of the final product's serial number all components of the suppliers and the individual test results can be searched, found and documented.

But it can also be searched based on individual components. Then you are able to find out in which products for example the ball bearing with the serial number from … to is installed.

Network

Comprehensive manufacturing processes are normally separated into individual manufacturing steps. The armature and stator manufacturing are for example two manufacturing processes that are performed separately from each other. At the end of each manufacturing process there is one own test in each case.

The test results of the individual manufacturing steps are centrally saved in a mutual data base. In order to find and distinguish the test results the armature test results are marked with the armature's serial number and the stator test results are marked with the stator's serial number.

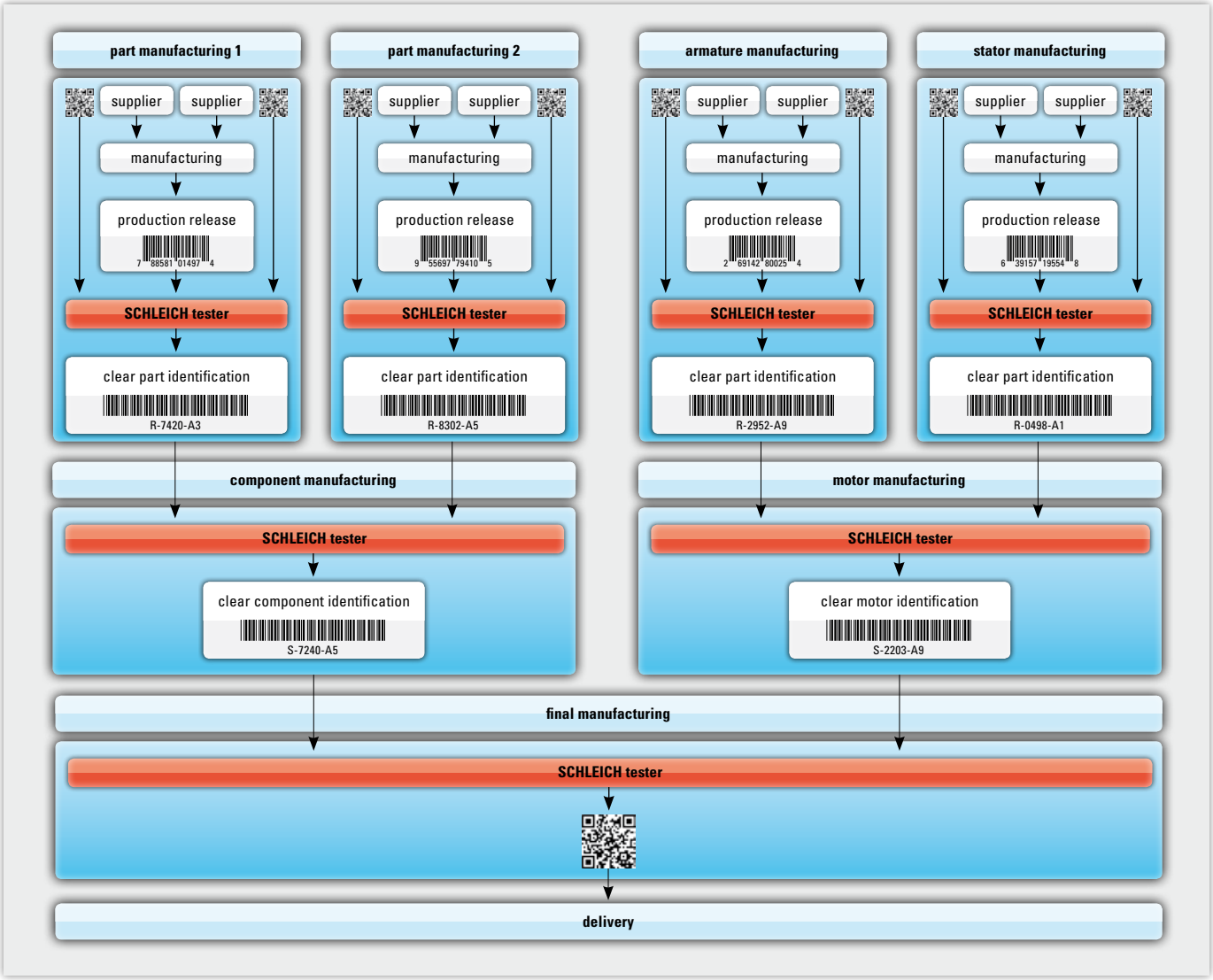
In the following manufacturing step the armature and stator are assembled to a complete motor. For this the tester has to be informed on the serial number of the armature and the stator. Only then it is possible for the final product's traceability to find the corresponding individual test results of both the armature and the stator test.

This is the principle for the traceability of the complete manufacturing process. The serial number of the individual manufacturing steps includes the numbers of the previous respective manufacturing step and possibly the supplier information and so on.

Evaluation

- traceability without ERP-system
  The traceability can be performed at the testers as well as at tester-independent work stations.

- traceability with ERP-system
  The data is transferred to the ERP-system at the end of the various manufacturing steps and/or at the end of the manufacturing. Therefore the complete evaluation or traceability respectively is directly possible with your ERP-system.



The GLP3-Class

Lamp Simulator | Luminaire Test Without Lamps

EN 60598 VDE 0711

RS232
USB
CAN
GPIB
Ethernet
DeviceNet
Profibus
I/O
PLC
Print

Highlights

- modular lamp simulator for one, two, three and four lighting lamps
- simulation of the coil and gas path resistance via resistor cascade
- test according to EN 60598
- no lamps necessary for the test anymore
- applicable for luminaires with conventional ballast, low-loss ballast and electric ballast
- special solution for HQI ignitor
- complete wiring test
- check of the ignition performance and ignition voltage
- high-voltage and/or insulation resistance test at the complete wiring
- dimming input test at EBs for all established dimming interfaces

For luminaire testers of the GLP3-Class we offer a lamp simulator. It serves for the simulation of fluorescent tubes through resistances. In addition to the simulation of lamps, the lamp simulator also provides further test methods. The high-efficient wiring fault detection, the ignition voltage test and the switching of high-voltage or the insulation resistance test between EB and lamp provide enormous advantages. Depending on the design it can either be integrated within the GLP3 or installed as separate unit at the test table.

Principle of the lamp simulator

The lamp simulator simulates fluorescent lamps. To test the luminaire no lamps are put in the lamp-holders. Instead, the lamp simulator is connected to the luminaire to be tested via the lamp-holder adaptor. The simulation per lamp consists of three resistor groups: two coil resistors and one lamp resistor. The coil resistors simulate the two heating coils in the lamp, the lamp resistor simulates the resistance of the gas path.

As the resistances for different lamp types and powers have to have different levels, an automatic program-controlled switchover is integrated to adjust the required resistance value in the lamp simulator. The lamp resistance is a resistance cascade which can be switched in precise steps. The same also applies to the coil resistances. Owing to the comprehensive resistance ranges all lamp types can be simulated.

Wiring test

The lamp simulator is able to check the proper wiring between lamp connections and the control gear. Missing connections, open contact points or wiring errors (twists, etc.) are automatically detected and displayed graphically on the screen. Wiring errors are detected at luminaires with conventional ballast, low-loss ballast as well as electric ballast.

Ignition voltage test

The lamp simulator can be used to measure the ignition voltage level. The ignition voltage is measured and automatically evaluated per simulated lamp.

High-voltage and insulation resistance test

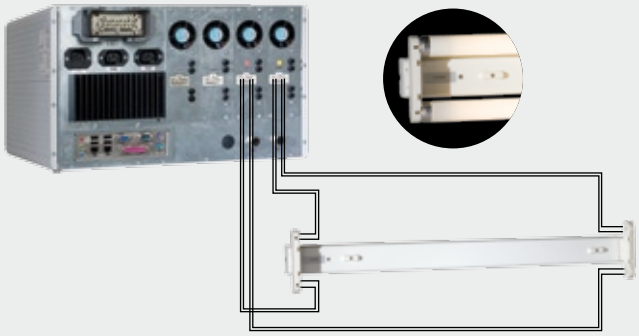
If these test methods are additionally integrated within the tester the lamp simulator is also able to connect all leads of the EB's output side to the high-voltage. Thus it is guaranteed that the insulation of the complete wiring before and behind the EB against ground is tested reliably.

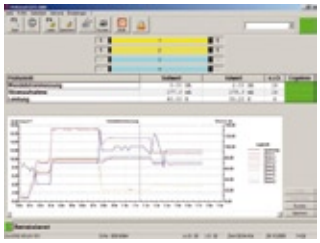
Dimming test of EB

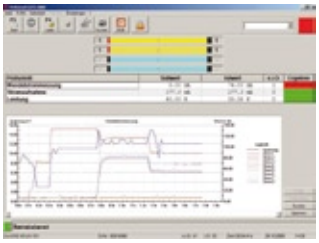
If EBs with dimming input are used the complete dimming function can also be tested. Four different dimming control types can be tested:

- analog dimmer
- touch dimmer (key dimmer via light button)
- DSI-interface (digital interface)
- DALI-interface (digital interface)
- DMX-interface (digital interface)

Wiring scheme of a 2-lighting luminaire







The GLP3-Class

Lamp Heating Test EN 60598 | VDE 0711

EN 60598 VDE 0711

RS232
USB
CAN
Ethernet
GPIB
I/O
Print

Highlights

- functional test
- optional current measurement at EB-luminaires with power meter for a high frequency response
- resistance test in four-wire-technology
- temperature measurement
- fast, high-precision measurements and evaluations via DSP
- integrated PC with Windows XP® or Windows 7®
- large data base for test programs and test results
- standard-compliant logging according to VDE-standard

Based on our Windows® based GLP3 testers we have developed a solution to test and document the heating behavior of all kinds of luminaires according to EN 60598.

This system can be used for the following luminaires:

- bulb-based luminaires
- inductive fluorescent luminaires
- capacitive fluorescent luminaires
- low-volt luminaires with conventional transformer
- low-volt luminaires with electronic transformer
- luminaires with EBs
- mercury vapor luminaires
- sodium vapor luminaires
- LED luminaires

The tester consists of individual measuring boxes which include the complete measuring technology for an electric test of maximum four luminaires. In addition, they also include the temperature measuring modules.

The measuring boxes are connected via the safe CAN-Bus with a central PC from which they are controlled. The CAN-Bus realizes the remote control of the measuring boxes and ensures a fast data transfer. In addition, it enables the simultaneous operation of several measuring boxes.

One measuring box is designed for the measuring at max. four luminaires. It includes the following tests:

- ohmic resistance test
- current and power consumption measurement
- temperature measurement

At the front of the measuring box, the measuring leads are contacted to the luminaires at the luminaire and temperature sensor connect on fields.

Luminaire-connection field

The luminaire to be tested can be connected via max. ten terminal sockets. Up to max. 4 luminaire-connection fields can be installed in one measuring box, arbitrary assignments of luminaires to the individual luminaire-connection fields are possible.

When using several measuring boxes the individual lamps of one luminaire can also be connected via shared luminaire-connection fields of different measuring boxes. Thus the maximum utilization of all luminaire-connection fields is guaranteed.

Functional test

For the lamp heat test voltages of a determined level are fed in the luminaire's mains connection.

- U1: 0.9-times of U_{set}
- U2: 1.0-times of U_{set}
- U3: 1.06-times of U_{set}
- U4: 1.1-times of U_{set}
- U5: arbitrary free voltage

The four factory-provided test voltages are controlled either within or outside of the measuring box, stabilized and provided to the measuring box via industrial plug connectors. A switchover within the measuring box automatically switches the voltage required for the respective test step to the luminaire-connection field.

The following electrical quantities are measured:

- voltage
- current
- power / apparent, active and reactive power
- cos φ / capacitive and inductive

As many electronic components are meanwhile used in luminaires like e.g. EBs, the 50/60Hz fundamental wave of the flowing current is often overlapped by high elementary frequencies in these cases. In order to receive significant measuring values under these conditions, it is necessary to use a measuring system with a very high frequency. In such cases our measuring boxes can be optionally extended by a one-phase power meter from DC to 500KHz.

Resistance test

The resistance test is only performed at the inductive control gear or transformer of the luminaire and serves for the indirect determination of the winding temperature of the control gear or the transformer. The winding temperature is automatically calculated considering the ambient temperature, the cold resistance measured at the beginning of the test as well as the current warm resistance.

Temperature test

Max. 3 x 30 temperature sensors can be connected to the measuring box. All sensors are potential-free. Thus they can directly contact the parts being under voltage like conductors.

Parallel operation

After the end of a luminaire's heat test the luminaire-connection field is available for new measurements. During a still running operation a new luminaire can be connected to free fields and prepared for the test. Afterwards, the test is automatically started at the new configured luminaire.

configuration menu

running test

finished test

The GLP3-Class

All-Purpose Motor Testers

EN 60034 VDE 0530

RS232
USB
CAN
GPIB
Ethernet
DeviceNet
Profibus
I/O
PLC
Print

Highlights

- no load and load test stations
- test stations for pump wet tests
- quick, high-precision measurements and evaluation via DSP
- extension of the tester with power meter
- functional test one- and three-phase up to 500A
- integrated PC with Windows XP® and Windows 7®
- data base for millions of test programs and test results
- numerous possibilities for a statistical evaluation
- test protocol and label printer on thermo transfer printers
- bar code reader
- automatic label generation
- GLP3 operation in complex PC networks
- data exchange with ERP-systems
- optimum preconditions for an easy integration into automatic lines
- possibility for a remote maintenance and remote calibration

Beside an electric part motor, test stations often consist of comprehensive mechanical components.

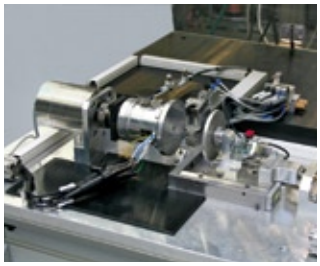
Our GLP3-Class testers with which we can achieve a maximum quantity of different test methods and solutions, are the basis for the electric part at motor test stations.

As a system manufacturer, we also supply the mechanical components and the complete test setup in addition to the test electronics. This is possible due to our modular designed product range that we adapt and extend correspondingly to your requests.

When designing motor testers we distinguish between these two applications:

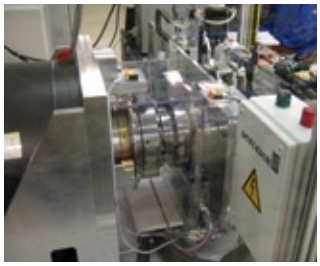
- motor testers for manufacturing
- motor testers for development

motor test station for door drives



test setup for a motor with up to 25000 RPM and contactless brake

detail of the measuring technology of a laboratory test station



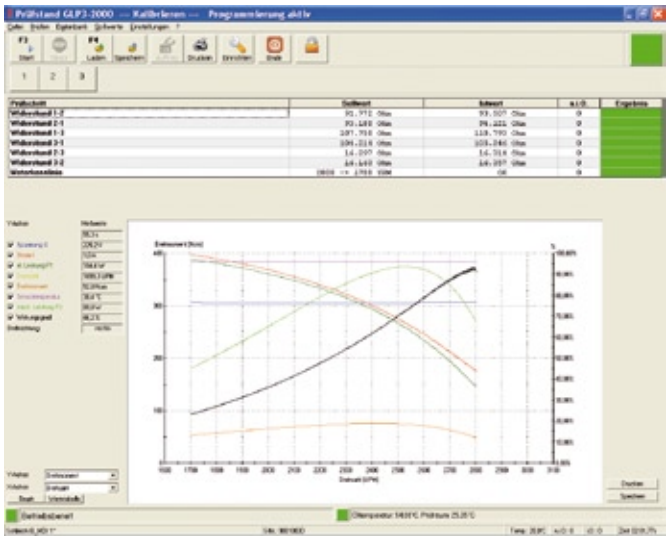
motor test station for high torques

At manufacturing test stations it is essential to combine exact measurement results with a quick handling. During the manufacturing process it has to be guaranteed that the change to different motor types as well as the adaption from motor to motor is done within a very short time. The use of corresponding adapters and contactings makes it possible. As system supplier we also have the development and manufacturing of these components in our hands.

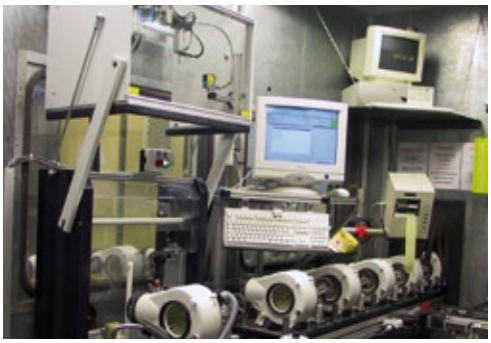
However, our development testers are able to achieve high-precision test results but naturally they need a slightly longer preparation time for setup.

To measure torques we rely on first-class torque transducers made in Germany.

Additional heat devices can also heat the motor to the test temperature, if needed, in order to receive even more realistic results.



test cabin for washing machine motors



test cabin for vacuum cleaner motors

motor test station for gear motors with torques up to 1000Nm

The GLP3-Class

Harness Testers

VDE 0472

RS232
USB
CAN
Ethernet
DeviceNet
Profibus
I/O
PLC
Print

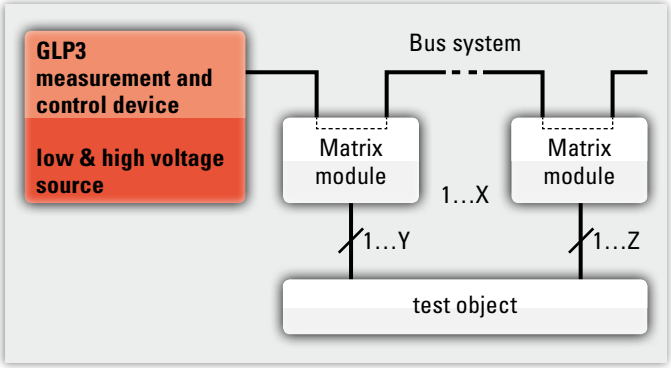
Highlights

- high-voltage AC and DC up to 6KV
- automatic discharge of all leads among each other and against ground
- resistance test in four-wire-technology
- functional and current consumption test
- stimuli functions
- cascadable bus system for a flexible clamp extension
- one-, two- or four-pole matrix modules
- integrated PC with Windows XP® or Windows 7®
- data import of cable plans
- data base for millions of test programs and test results
- statistic evaluation
- test protocol print and label print on thermo transfer printers
- bar code reader and automatic generation of labels
- operation of the tester in PC networks

Our harness testers serve for the testing of all kinds of wirings. They are designed based on a PC controlled GLP3 tester that is connected with the matrix modules via a bus system.

The basic device includes the voltage sources, the analog or digital measuring technology respectively and the bus controller. The very safe industrial CAN-Bus is used. Commands are transferred in the CAN-open-protocol. Not only the relay matrices in the matrix modules can be controlled, but also other systems i.e. pneumatic control modules.

The matrix modules include different relay matrix boards in one, two and/or four-wire technology with a different quantity of output pins. There are modules for different test voltages, test currents and measuring tasks, with passive relay as well as with active stimuli functions. Via them activities can be stimulated in the test object on request, so that the functions can be switched within the test object.



Basic tester

The basic tester can be configured for the following test methods:

- digital or analog continuity test / resistance test in one-wire-technology with resistance measurement from approx. 5kΩ
- analog continuity test / resistance test in two-wire-technology with resistance measurement from approx. 1Ω
- analog continuity test / resistance test in four-wire-technology with resistance measurement from approx. 1mΩ
- high-voltage test AC up to 6000V
  principle 1: teethed comb technology, everything freely programmable
  principle 2: each against each, everything freely programmable
- high-voltage test DC up to 8000V
  principle 1: teethed comb technology, everything freely programmable
  principle 2: each against each, everything freely programmable
- insulation resistance test DC up to 8000V
  principle 1: teethed comb technology, everything freely programmable
  principle 2: each against each, everything freely programmable
  measuring range up to 1GΩ
- functional test up to 300V AC with automatic discharge of all leads against each other and against ground incl. residual voltage measurement to monitor the discharge process

Bus system

The bus is lead via solid industrial plugs from the basic tester to the individual matrix modules. The first matrix module is directly connected to the basic tester, all other modules are connected to their respective predecessor. By means of this series connection principle a chain of matrix modules is performed at which the individual modules can be wired quickly and easily. A test setup consisting of mobile matrix modules can then be adapted easily and flexibly to new circumstances.

Matrix modules

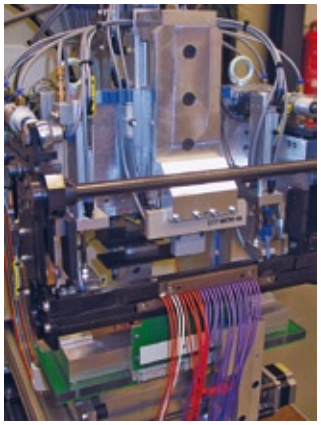
The matrix modules can be assembled either mobile or stationary within a test cabinet. Mobile matrix modules simplify the test setup at site. This can be of advantage when testing for example wirings of railways, ships or planes.

The matrix modules are configured for one, two or four-wire test tasks. Depending on the test voltage they can be equipped with a different quantity of relay cards. The relay cards have a different quantity of output pins depending on the test voltage. All matrix modules have a discharge at each connection pin that can be activated.

To guarantee the reliability also under hard operation conditions output pins are lead to solid industrial plugs at the rear of the matrix modules. Normally the adaptor wires are lead from there directly to the test object. But they can also be lead in an electric/mechanical test setup and lead via an adaptor at first to the test object.

matrix	pole	voltage
1-wire	24	6KV AC | 7.5KV DC
2-wire	12	6KV AC | 7.5KV DC
4-wire	6	6KV AC | 7.5KV DC
2-wire	16	1.5KV AC | 2.5KV DC
4-wire	8	1.5KV AC | 2.5KV DC

tester for testing cable drums



tester for testing harnesses for household appliances

tester for testing extension leads

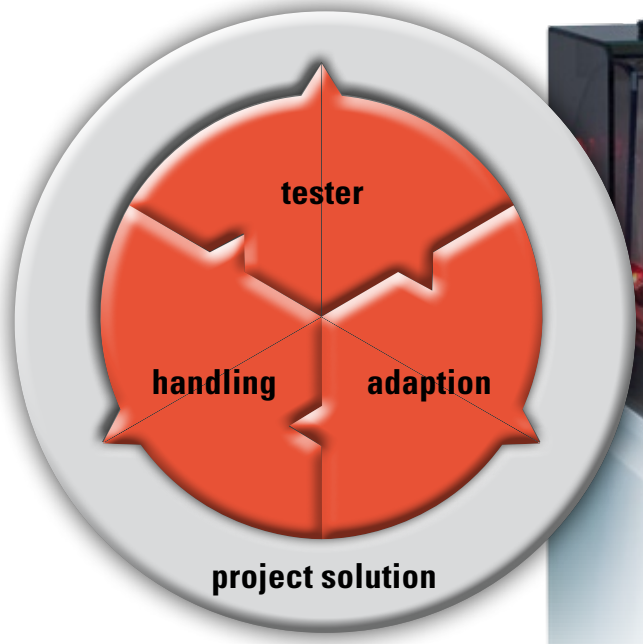
Customized **Project Solutions**

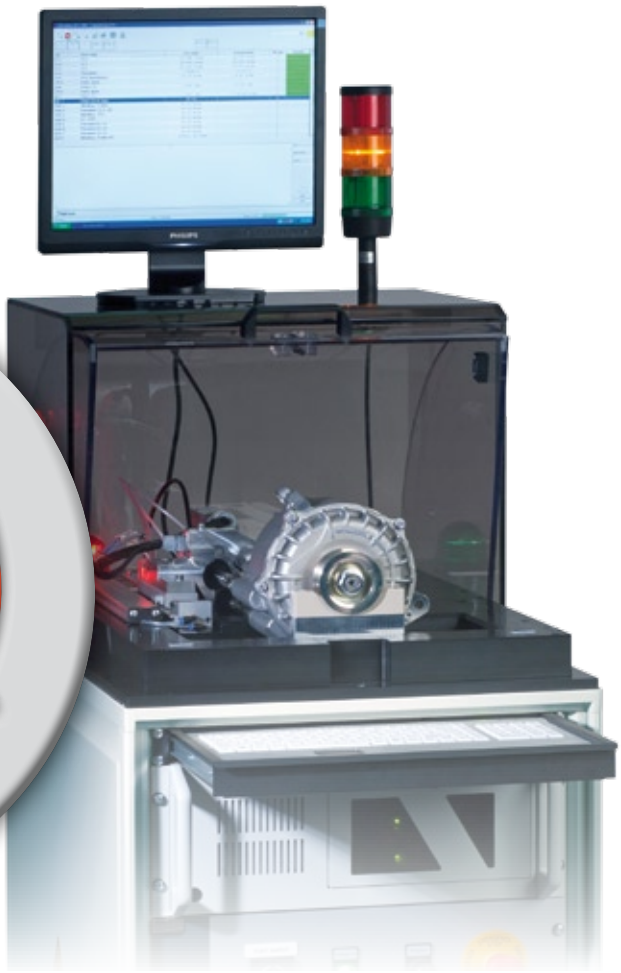
The testers of the GLP3-Class offer conditions to be ideally integrated in your production process as project solution combined with the corresponding mechanics.

The project solutions can consist of a tester and test cell with adaption, as part of a production line or also as a complete production line. For production lines we use market-standard automation components that are equipped with corresponding process and test stations. As line control either a GLP3 tester or a PLC can be used whose control software is prepared by us. We also design and manufacture the component adapters on the pallets of a production line.

Especially complex project solutions require a corresponding concept for data storage. Different testers can perform tests from test step to test step in a comprehensive production process with various test stations. Providing the product or pallet can be clearly identified with a serial number the individual test results are saved with this serial number at each station in the central NetCom-Analyzer data base. At the end of the production all individual test results of the product are available for a further processing.

From the tester to the system, from the project planning to the commissioning – we care for the processing and adapt the project to your requirements including all details.





Project solution harness

- insulation resistance
- continuity resistance in four-wire-technology
- exchanging of leads and clamps
- high-voltage test up to 6KV
- PE resistance test up to 30A

Project solution refrigerator

- safety and functional test
- functional test AC and DC with battery simulation
- measurement of the standby-lead
- contacting via pneumatic clamps
- light curtain
- EN 60335

Project solution cabinet air conditionings

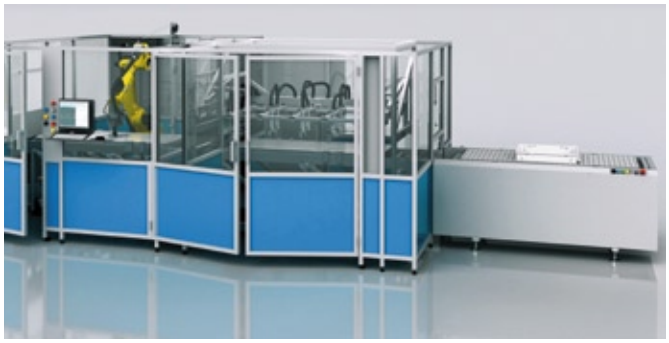
- automatic production line
- safety and functional test
- simulation of the air heating via heating circuit
- characteristic test of the cooling power
- check of the control CPU
- interface communication
- simultaneous test at 4 air conditionings
- import and save process data of a refrigerant station
- type and serial number administration via bar code
- communication with a central PC
- continuous result documentation
- traceability

Customized **Project Solutions**

Project solution luminaire test

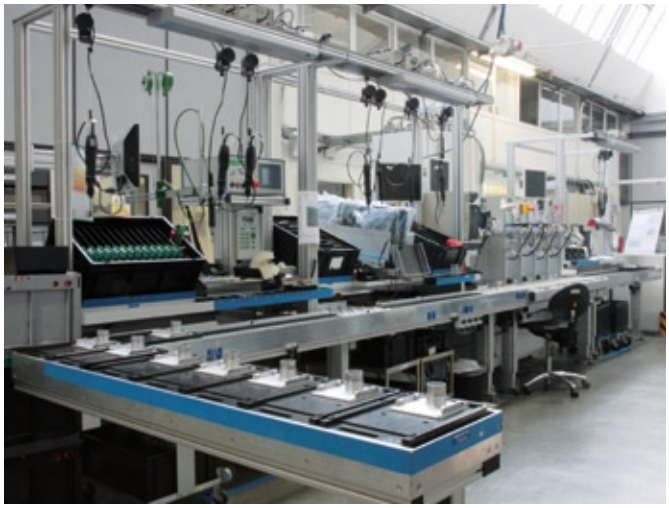
- safety and functional test up to 6000V
- lamp simulator next to the luminaire below the table
- thermo transfer label print for the test object's identification
- print of packaging stickers
- SQL data base within the network
- "pick by light" adaptor selection
- pneumatic control of automatic adaptors
- freely programmable mechatronics functions
- light curtain for the operator's protection
- EN 60598
- project at ERCO in Lüdenscheid (Germany)

Project solution luminaire test



- automatic luminaire wiring (customer's device)
- lamp simulator
- fully automatic luminaire wiring test
- luminaire safety test including high-voltage test
- automatic adaptor control
- communication with wiring robot
- project at BJB in Arnsberg (Germany)

Project solution frequency converter



- safety and functional test up to 6000V
- converter load test
- vibrating test in the running operation
- test of the operating points with load simulation
- infrared interface for the data exchange
- adjustment and programming of the frequency converters
- set and import test bits within the test object
- version and serial number storage in the test object
- complete line system from SCHLEICH
- pallets including test stations from SCHLEICH
- contactings from SCHLEICH
- lifting table for ergonomic working station height
- project at WILO

Project solution blind control

- electric safety tests
- comprehensive functional test with load simulation
- display test of the LCD with camera
- radio test DCF77
- radio test building installation
- LED-check
- visual sunlight sensor test
- miniature cylinder to activate operating buttons
- exchange adaptor for a quick type exchange
- exchange adaptor coding
- network operation

Project solution power unit x-ray system

- safety test with 6000V
- PE test with 30A
- functional test with rotating current
- stimuli signals to activate functions at the test object
- 140 clamp matrix for arbitrary functions
- 140 clamps lead to the test object
- adaptor to contact test object's parts
- height adjustable screen (movement in X, Y and Z)
- display of videos to repair the test object

Project solution pump control

- continuous test of electric modules
- power consumption measurement
- power discharge measurement
- interface test
- heat test
- pressure and flow tests within a water circuit
- slide control within the water circuit
- simulation of different load points
- adaptor for different contact versions
- 30 station system with data matrix bar code scanner

Customized **Project Solutions**

Project solution vacuum cleaner

- safety test at a vacuum cleaner
- functional test
- low-pressure measurement (vacuum test)
- noise measurement and evaluation
- automatic line
- communication with a line control

Project solution high-current heating system

- test current up to 85A
- comprehensive high-current step switchovers
- power measurement
- high-voltage test
- insulation resistance test
- PE resistance test
- leakage current test
- energy efficiency measurement
- standby-power measurement

Project solution washing machine

- electric safety tests
- high-voltage test
- electric functional test
- overspeed test
- heating test with functional test and leakage current
- control panel test
- complete test with water
- automatic adaption of water inlet and outlet
- central data storage on SQL-server
- EN 60335

Project solution run-in-test bench for electronic components

- test bench for 6 electronic test objects
- height adjustable test table
- thermal load of the test object
- each chamber with its individual heating and cooling
- frequency and amplitude adjustable vibration intensity
- continuous test for many hours per test object
- adaptor for the connection clamps of the test objects
- bar code scanner to identify test stations and test objects

Project solution motor of forklift trucks

- fully automatic process
- high-voltage test with automatic switchover
- battery simulation of the forklift truck net
- frequency converter to control the motor in different working points
- temperature sensor measurements
- complete transmitter analysis with one rotation
- locking current measurement with 100A
- leakage measurement
- brake test
- contacting via high-voltage clamps
- test cover model 10 with a lot of space for working

Project solution hybrid motor

- automatic process
- high-voltage up to 6000V
- insulation resistance measurement up to 100GΩ
- variable supply voltage
- high test current
- frequency converter to control the motor
- type dependent parameter of the frequency converter
- measurement of the magnet wheel voltage
- E.M.F.-measurement
- additional leakage test
- rolling container with test cover
- automatic contacting

Customized **Project Solutions**

Project solution multiple socket outlet

- electric safety test
- wiring test: continuity, interruption and interchange
- current consumption measurement of built-in parts
- automatic contacting of sockets
- central data storage on SQL-servers
- VDE 0620
- IEC 884-1
- EN 60664-1
- project at schulte elektrotechnik in Lüdenscheid (Germany)

Project solution electric motor

- variable supply voltage
- 50 - 60Hz supply
- one- and three-phase
- condenser cascade for one-phase motors
- automatic rotating direction detection
- double station consisting of two separate test covers
- central storage on SQL-servers

Project solution magnet test at armatures

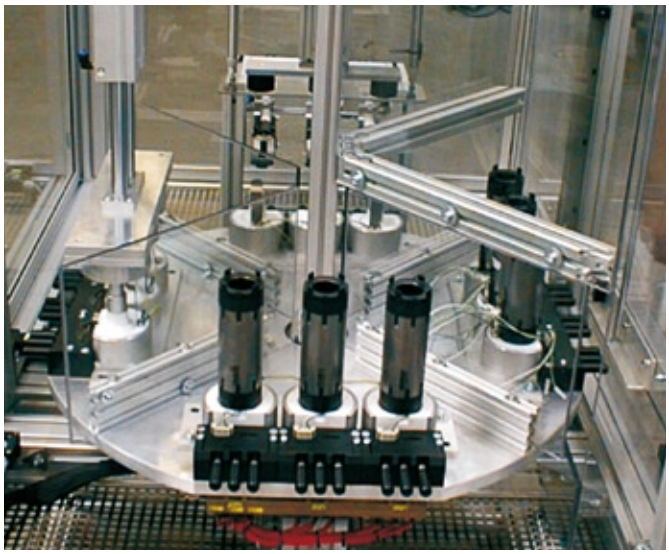
- fully automatic field strength analysis with flux meter
- high-precision shaft collet chuck
- automatic tightening and releasing of the shaft
- exchangeable magnet flow sensors
- integration in a production line
- rolling container with test cover, opens automatically

Project solution electric tools

- safety test
- electric and mechanic functional test
- rotary table made by SCHLEICH
- linear slide and grabber made by SCHLEICH
- loading of material boxes
- complete solution by SCHLEICH
- safety light curtain

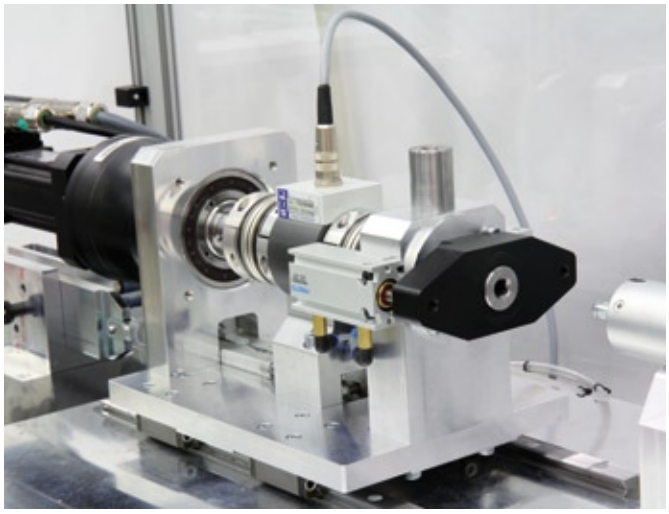
Project solution motor manufacturing

- rotary table made by SCHLEICH
- triple station system
- winding heating
- precision resistance measurement and winding test



Project solution torque

- torque and rotation speed measurement
- current consumption test
- tubular motor load test
- test of the blockade
- test of the safety clutch
- electric safety test
- automatic docking to the square of the tubular motor



Customized **Project Solutions**

Project solution stator impregnating system

- completing winding test
- fully automatic impregnating processes
- paint hardening according to the current heat process
- paint hardening with ultraviolet light
- accompanying high-current contacting in four-wire-technology
- integration in a production line with roller belt

Project solution tap fittings

- leakage tests at mixed water fittings
- mixed temperature measurement
- cold and warm water conditioning
- flow volume measurement
- adjustment and assembly of the temperature rotary button
- data reception from SAP®
- data transfer to SAP®

Project solution fitting in the Airbus A380

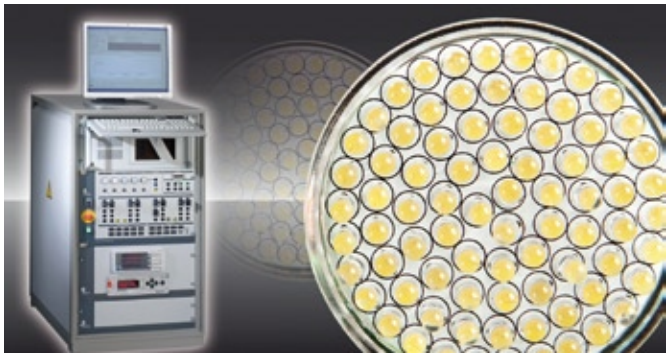
- electronically controlled water fitting
- CAN-Bus interface test
- communication test with the airplane's central computer
- mixed water temperature test
- leakage test
- flow volume test
- pressure difference test
- check of the proximity sensor with different skin colors
- including complete water conditioning

Project solution wet pump test station

- safety test
- current consumption and power
- speed level control
- electronic voltage control 50/60Hz
- effectiveness
- delivery height
- storage water pressure
- flow rate
- graphic evaluation of the pump parameter
- test protocols

Project solution LED-luminaires

- LED-luminaire test
- current consumption
- dimming function
- RGB-control
- brightness
- safety test
- insulation resistance



Project solution electronic components

- safety test up to 6000V
- flashing of the CPU
- visual controls with camera – AOI
- functional tests
- adjustment of the measuring technology
- stimuli signals
- radio transmission
- USB-interface

Project solution high-voltage battery in cars

- electric safety test
- insulation resistance test
- power-capacity test
- central data storage
- traceability
- CAN-bus communication

Customized **Project Solutions**

Project solution washing machines

- electric safety tests
- high-voltage test
- electric functional test
- overspeed test
- vibration and noise
- heating test with functional test and leakage current
- operating panel test
- visual evaluation via camera
- complete test with water
- leak tightness of all water leads
- automatic adaption of water inlet and outlet
- water conditioning and pressure simulation
- grabber to rotate the operating button
- central data storage on SQL-server
- EN 60335

Project solution lead and luminaire tester

- PE resistance test up to 30A
- insulation resistance test
- leakage current test
- continuity- and ohmic resistance test
- torsion test
- charging rate test
- connecting field with various plugs – socket combinations
- flexible switchover-matrix

Project solution charge column for electric cars

- PE resistance test
- insulation resistance test
- continuity- and ohmic resistance test
- torsion test
- tests typical for the automotive industry
- special tests upon request

Project solution luminaire test

- safety and functional test
- lamp simulator
- thermo transfer label print to identify the test object
- print of packing labels
- SQL-data base in a network
- pneumatic control of automatic adaptors
- freely programmable mechatronic functions
- light curtain for the operator's protection
- EN 60598

Project solution vacuum cleaner

- safety test at vacuum cleaners
- functional test
- low-pressure (vacuum test)
- noise measurement and evaluation
- automatic line
- label print
- communication with a line control
- Profibus

Project solution motors in household appliances

- all electric safety tests
- functional test
- sense of rotation test
- noise test
- label print
- Profibus interface for the line control Simatic-S7®
- WT-control with pre- and main stopper
- lifting station
- contacting
- project at Miele


STYLE UL 3239 VW-1

Accessories

Test Covers and **Test Cages**

EN 50191 VDE 0104

Our test covers and cages ensure the operator's safety. According to the valid standards we protect the operator either via an inevitable protection against contact or via a light curtain. The test covers are standard-compliant and equipped with two-circuit safety switches according to the latest state of the art technology.

The basic setup consists of a solid dimensionally stable Aluminum frame which can also easily take up heavier weights. Within the frame there is enough space for plug connectors or special parts. The transparent cover parts consist of fracture-proof Lexan.

The test cages are taken from our standard product range in accordance to your test task or can be especially developed and manufactured at our site. We supply the standard single and double covers as pure tabletop models or with underframes. However, they can also be assembled directly on a rolling container tester.

Single covers

Single cover model 0

- up to 6KV HV AC
- dimensions (w x l x h): 260 x 400 x 280 mm
- small and compact

Single cover model 1

- up to 12KV HV AC
- dimensions (w x l x h): 546 x 775 x 520 mm
- integrated result-LED-strips
- options: automatic opening and closing, locking, widening

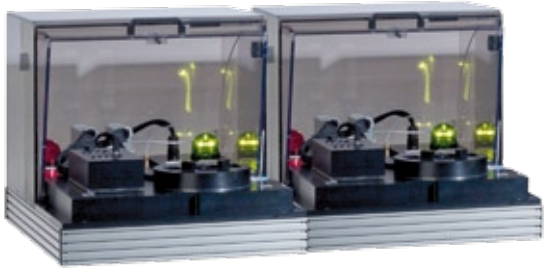
Single cover model 10

- up to 12KV HV AC
- dimensions (w x l x h): 935 x 880 x 585 mm
- options: automatic opening and closing, locking, widening

Test desk with sliding cover

- up to 6KV HV AC
- dimensions (w x l x h):
  desk small 1200 x 800 x 920 mm
  cover small 495 x 700 x 500 mm
  desk large 2000 x 800 x 920 mm
  cover large 895 x 700 x 650 mm
- option: locking

Double covers



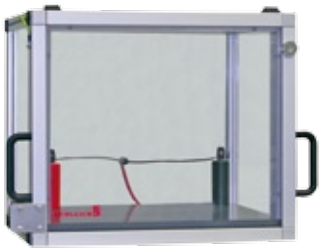
double cover model 1

- up to 12KV HV AC
- dimensions (w x l x h): 546 x 775 x 520 mm
- integrated result-LED-strips
- options: automatic opening, locking, widening

double cover model 3

- up to 6KV HV AC
- dimensions (w x l x h): 800 x 588 x 445 mm
- perfect ball bearing guide
- with locking
- 2 integrated result lights
- option: widening

High-voltage test cages



test cage 30KV

test cage for material tests
up to 40KV

high-voltage test station up to
40KV with GLP2

high-voltage test station up to
20KV for electronic components
integrated in a 19" cabinet

Customized project solutions

test cage with light curtain in one
project solution

single test cover model 1 and working table
with lateral depositing rack

double test cover assembled at a
19" cabinet

large test cage with front door and
extending table

large test cage with conveyor belt, light curtain,
and pneumatic controlled doors at the side

large test cage with light curtain

Rolling Tables

Highlights

- solid structure made of Aluminum profiles
- continuously height adjustable table plates and bottoms
- horizontal or diagonal table plate designs
- diagonal table plate with horizontal front e.g. to deposit a keyboard
- continuously height adjustable drawers with full extension
- continuously height adjustable holder for test probe
- continuously height adjustable windings for measuring leads
- integrated LED-warning light in the side rails
- delivery of assembled, directly usable rolling tables
- rolling tables and carriages of the company hera

Rolling tables facilitate the transport of testers that can also be combined with a test cover between the test objects. A high level usability is achieved by the large, high-resistant and lockable rubber guide rollers as well as an optional push handle at the table's front.

The rolling tables can additionally be equipped with self-closing drawer runners, in which e.g. adaptors, tools, or documentations can be stored.

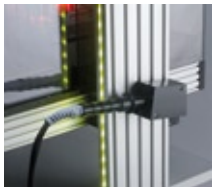
rolling table with horizontal work plate and push handle

rolling table with horizontal work plate, push handle and a LED warning light integrated in the bars

rolling table with diagonal work plate and integrated high-voltage test

rolling table with diagonal work plate and drawer element

rolling table with diagonal work plate, drawer element and cable holders



rolling table with integrated test cover, push handle, LED-warning light in the bars and holders for cables, test pistols, and test probes

rolling table with integrated test cover, drawer element and cable holders

Test Pistols | Test Probes | Safety Accessories

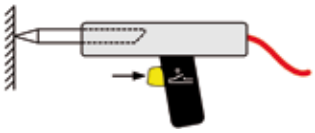
EN 50191 VDE 0104

High-voltage

Safety pistols are required for a safe manual high-voltage test. Depending on the test voltage level there are different models.

To achieve a particular high usability we provide test pistols with an integrated start button. Here the high-voltage test only starts after activating the button.

high-voltage test pistol without start button



high-voltage test pistol with start button

high-voltage test pistol with start through mechanical press button

high-voltage test pistol up to 8KV AC/10KV DC

high-voltage test pistol up to 12KV AC/15KV DC

adaptor between test object and test pistol

high-voltage test probe up to 1500V safety current limited

high-voltage connection lead

Resistance test probe

The resistance to be measured is scanned with the probes for the resistance test in four-wire-technology.

resistance test probe in 4-wire-technology with protection cap

test probes for the armature test

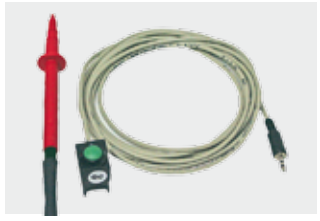
PE test probes

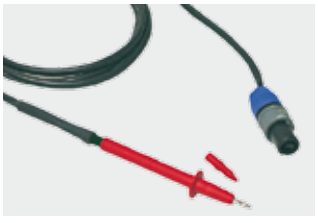
PE test probes are designed for the manual scan of the PE connections to be tested. Test probes with integrated start button and multi-colored LED light can be used for starting a PE test, for starting the complete test process and for confirming visual test steps as well as information messages.

large PE test probe with start button

small PE test probe

test probe with limit value and test method switchover





test probes with clickable start button

Warning – result lights

Warning lights show whether the test object is under voltage or voltage-free.

Result lights show the total test result of the test process. Customized special displays, which can also be controlled by the tester, are also within our product range.

warning or result light, horizontal

warning or result light, vertical

Safety

Due to safety reasons a two-hand start is used at the high-voltage test without protection cover and safety test pistols. When operating test stations the corresponding standards have to be considered.

two-hand start

two-hand start support with warning light and emergency stop

safety barrier with warning message

barrier post with warning light and emergency stop

Mains Adaptor

Highlights

- various standard contactings
- mechanical solid persistent design
- universal sockets
- various kinds of mains terminal adaptors
- lamp adaptor
- fast exchange of consumables

Many test objects can be contacted via a mains adaptor.

The operator plugs the main plug into the test socket of the mains adaptor. The sockets can be either national and international standard sockets for the one- or three-phase operation or also standard special sockets.

Mains adaptors can be equipped with more than one standard socket so that the adaptor can be used for various mains plugs.

To contact free lead ends the mains adaptors can be equipped with fast-pressure clamps only or with these clamps in addition.

The mains adaptors are designed according to your requirements based on our modular model kit.

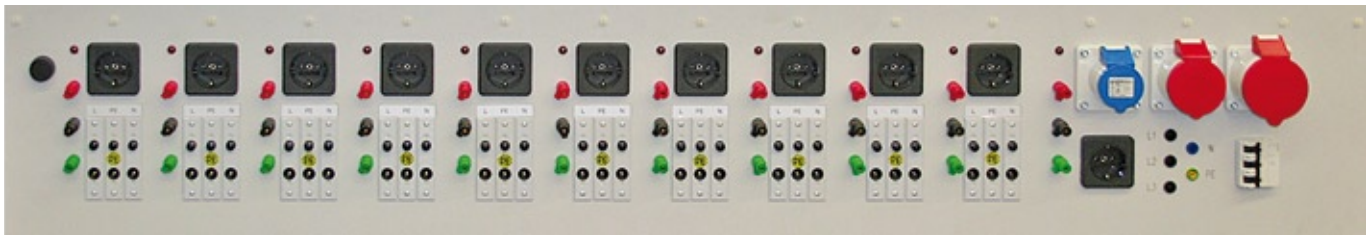
In case terminal strips or luster terminals are to be contacted we provide you with the corresponding solution as well.

In the luminaire industry lamp holder clamps are also required besides the mains clamp. We can of course provide the corresponding adaptors as well.

3-phase terminal box

1-phase terminal box with quick-release clamps

terminal box for shock-proof plug



mains adaptor for 13 test objects

universal socket for automatic clamping

adaptor between test object and high-voltage test pistol

lamp adaptor

lamp adaptor

clamp adaptor

Lead Contactings

Highlights

- various standard contactings
- mechanical solid and persistent design
- four-wire contactings – Kelvin clamps
- customized solutions based on our standard solutions
- fast exchange of consumables

A typical task is the contacting of stripped line ends because test objects are often only equipped with line ends without a plug connection.

For contacting free line ends we can provide a wide range of clamp devices, for example for the application of stators' winding connections. They can be equipped in two- as well as four-wire-technology.

When low resistances are to be exactly measured Kelvin clamps are used for the four-wire-measurement. The four-wire-technology compensates the transition resistances within the clamping points.

Our Kelvin clamps' special design guarantees high contact reliability, solid clamping, and a low wear and tear in the rough testing operation. Less exacting contactings are operated with our multi-purpose clamping levers.

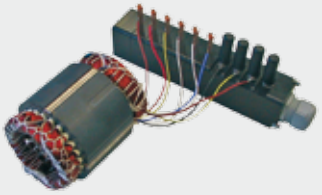
The contactings can be supplied as loose single contacting or integrated within a clamp block. The clamp blocks can either be assembled in a fixed position within the test cover or can be moved flexibly within the testing space to always have the optimum position for being clamped to the lines.

Examples for Kelvin clamps, clamping levers and modular contact blocks

clamp block in modular design

clamp block in modular design

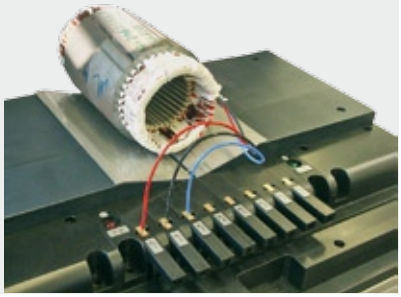
11-times clamping lever block



6-times four-wire-contacting guide and 4-times clamping lever block

Kelvin clamps in small-, medium- and large-sized design

8-times Kelvin clamps block



Kelvin contacting in one test cage with prism

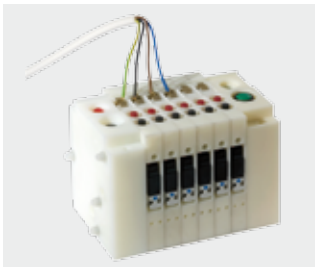
Pneumatic contactings

Pneumatic terminal blocks are also simple and quick contacting possibilities. The line ends are put in the hole of the terminal block as deep as possible until a clamping mechanism automatically clamps the line end. At the end of the test the terminal blocks can be automatically released so that the lines are immediately free.

The contactings can be supplied either as loose single contacting or integrated within a clamp block.

combination of pneumatic clamps with socket and start button in one control unit

single loose pneumatic clamp in two-wire-technology



stackable pneumatic clamps in four-wire-technology for a modular setup

connection box with pneumatic clamps in two-wire-technology

Special Contactings

Highlights

- mechanical solid and persistent design
- two- or four-wire-contactings
- high-current contactings
- special solutions for the manual contacting
- special solutions for automatic production lines
- contactings for handling systems
- swingingly installed Kelvin clamps for a position-tolerant automatic contacting
- springy contact pins in two- and four-wire-technology
- motor terminal board plugs in two- and four-wire-technology
- quick change of consumables

contacting of contact pins via Kelvin clamps

contacting with pneumatic Kelvin clamps

Special contactings

One of SCHLEICH's special strength lies in the mechanical adaption of test objects and their special contactings. The tester and the mechanics are manufactured according to your test task's requirements. For this we often use very small, pneumatically controlled Kelvin clamps or springy contactings of our modular kit.

The contactings are directly designed at our 3D-CAD-working stations at our site. Modern CNC-machines in our mechanics department guarantee the production of professional and favorably-priced components.

simple contacting on a pallet

special solution of a lead contacting

Motor terminal board plugs

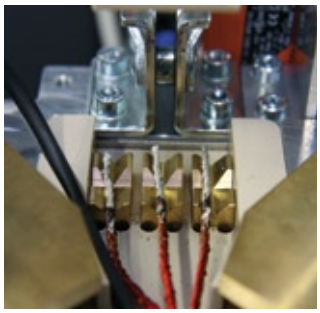
Every motor manufacturer knows the problem of the time-consuming contacting of a motor terminal board. But the motor cannot be tested without a corresponding contacting. In order to save a lot of time here SCHLEICH has different contacting methods in its product range.

To achieve a more user-friendly and time-consuming contacting of the motor terminal board we developed a special motor terminal board plug which spans each threaded pin of the motor terminal board with collet chucks and thus contacts it safely. After having connected the plug to the bolts of the terminal board a clamping lever locks the collet chucks. The enclosure contactings are also integrated in our motor terminal board plugs.

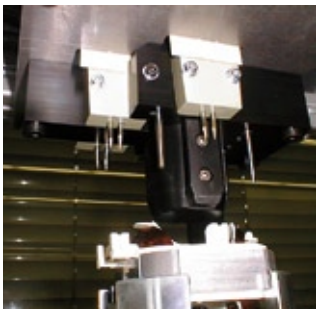
We manufacture our terminal board plugs for any quantity of connecting bolts as well as for different dimensions. For the exact measurement of very low resistances we provide motor terminal board plugs also in four-wire-technology which is unique in the world.

loose motor terminal board
Kelvin clamps

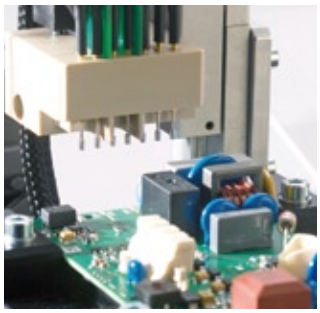
motor terminal board plug in
two- or four-wire-technology



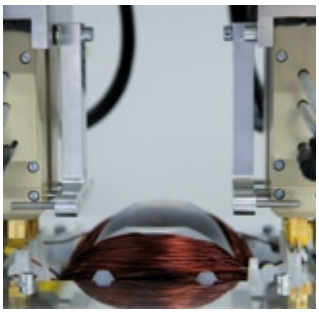
contacting of motor connecting strands with centering prisms



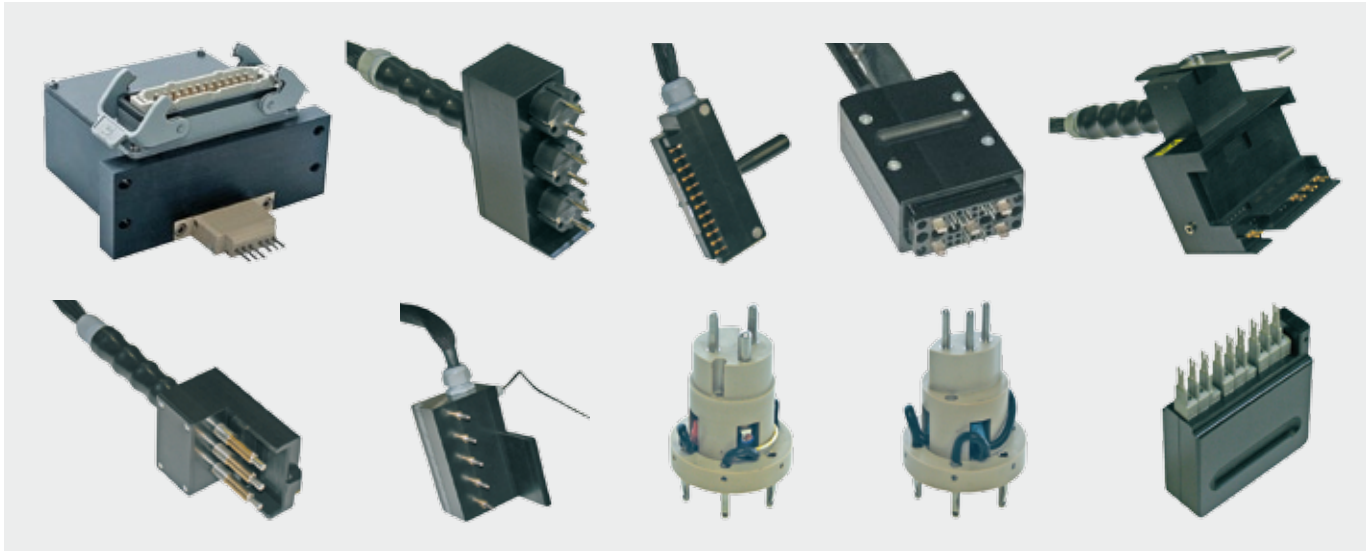
contacting of a test object from above



contacting of a PCB with springy contact pins



contacting of contact pins with Kelvin clamps



contactings of different kinds of clamps and plugs

High-Voltage Components

For the setup of matrices (switchover fields) we offer all necessary high-voltage components to equipment manufacturers and OEM-customers.

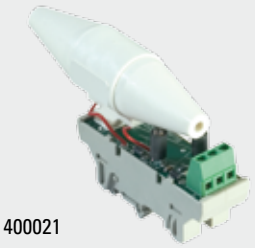
The high-voltage components are designed for different voltages and currents.

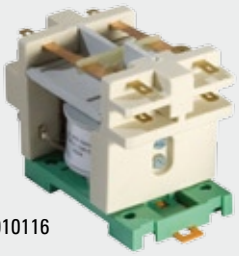
We also supply high-voltage switchover fields as turn-key solution together with our testers.

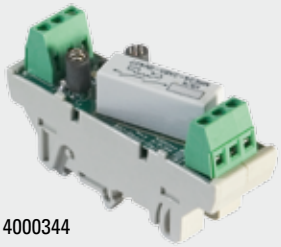
Our comprehensive product range includes:

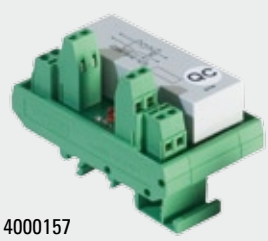
- high-voltage cables
- high-voltage plugs
- high-voltage connectors
- high-voltage relays
- high-voltage condensers upon request

High-voltage relays


400021


4010116


4000344

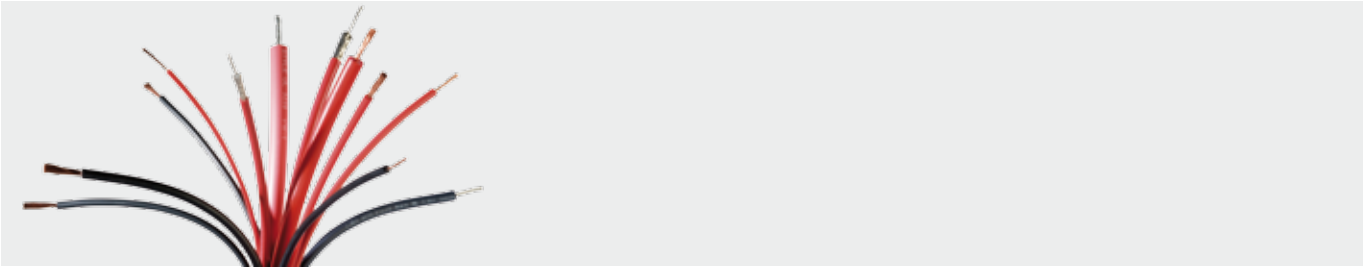

4000157

model	400021	4010116	4000344	4000157
contact voltage	10KV DC	6KV AC	1.5KV AC	0.8 KV AC
contact current switching	3A	30A	2,5A	3A
contact current continuous	3A	10A	1A	3A
contact type	Reed	Standard	Standard	Reed
contact quantity	1 x normally open	2 x changeover	1 x normally open	2 x normally open
coil voltage	24V DC	24V DC	24V DC	24V DC
incl. free-wheeling diode	•	•	•	•

High-voltage plugs and sockets

model	4000123	4000509	4000510	4000513	4000809	4000514	40001008	4000515	40001009
type	plug	socket	socket	plug	socket	plug	socket	plug	socket
voltage	3KV AC	3KV AC	8KV AC	35KV DC	35KV DC	65KV DC	65KV DC	100KV DC	100KV DC
current	20A	20A	1A	5A	5A	5A	5A	5A	5A
contact quantity	1	1	1	1	1	1	1	1	1

High-voltage cables



model	400002	4000504	4000508	4000505	4000506	4000419	4000300	4000416	40001010
voltage	6KV AC	6KV AC	6KV AC	6KV AC	6KV AC	10KV AC	10KV AC	10KV AC	20KV DC
cross section	1 mm^2	1.5 mm^2	1.5 mm^2	2.5 mm^2	4 mm^2	0.5 mm^2	1.5 mm^2	2.5 mm^2	1.2 mm^2
external diameter	4 mm	4 mm	2 x 4 mm	5 mm	5 mm	3 mm	4.5 mm	4.5 mm	3.9 mm
color	black	black	black	black	black	red	red	red	red
insulation	silicone	silicone	silicone	silicone	silicone	–	–	–	silicone

model	40001011	40001012	4000507	40001013	40001014	4000496	4000497	4000498	4000499
voltage	30KV DC	30KV DC	30KV AC	60KV DC	60KV DC	10KV DC	30KV DC	65KV DC	100KV DC
cross section	2.1 mm^2	2.1 mm^2	2.5 mm^2	3.3 mm^2	3.3 mm^2	–	–	–	–
inner conductor's diameter	–	–	–	–	–	0.8 mm	1 mm	0.9 mm	2.2 mm
shed's diameter	–	–	–	–	–	3.8 mm	4.2 mm	7.5 mm	12 mm
external diameter	5.7 mm	5.7 mm	9 mm	10.2 mm	10.2 mm	5 mm	6 mm	10 mm	14 mm
color	red	black	red	red	black	red	red	red	red
insulation	silicone	silicone	silicone	silicone	silicone	–	–	–	–
shielding	–	–	–	–	–	•	•	•	•

Black Boxes

black box for PE

black box for PE / IR / HV

back box HV for test pistols

calibration resistor in
four-wire-technology

high-current calibration resistor
in four-wire-technology

calibration resistor
high-voltage proof

Black boxes

For a regular daily check of your tester a black box is used that is connected to the tester. It is tested whether the emerging measuring values correspond to the values in the black box. If this is not the case the tester is locked. The tester can only be used again when a black box test with a proper result is performed. As we only supply digital evaluating testers this test is normally not performed with a “pass-fail-black box”. We only use one single black box and evaluate the emerging measuring values within tight tolerance limits.

Each black box consists of one connection possibility to the tester and one or several resistors and/or inductances. They can either be configured for one test method or for a combination of several test methods.

Each black box is delivered with the information on the resistance values and a calibration certificate so that the operator can set the tests properly.

Calibration resistors

For the calibration of testers precise calibration resistors are required as well. They make sure that certain test currents flow at different test methods and voltages.

The calibration resistors have a high precision as well as a high temperature and long-term stability. In order to conduct the heat that occurs at high currents or long measurements, reliably, we supply all calibration resistors for high test currents in special heat sink enclosures. In addition to these characteristics the resistors are designed low capacitively and low inductively.

All resistors for high test currents and low test voltages are designed in four-wire-technology.

All resistors are supplied with the information on the resistance values in the calibration certificate so that the corresponding conversions of the measuring values considering the resistance value are possible.

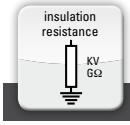

Restspannung
V
Polarisation
Arc-Detection
Hochspannung AC
KV
mA
A
Hochspannung DC
KV
mA
GΩ
Isolations-widerstand
KV
GΩ
Schutzleiter-widerstand
mΩ
Mehrfach-station
1 X
Matrix
1 X
Durchgang
Ω
Widerstand
Ω
Ableitstrom 3-phasig
mA
µA
Ableitstrom 1-phasig
mA
µA
Funktion 1-/3-phasig AC
A ~
Betriebsbereit, warte auf Prüfstart
Menu
Escape

Annex

GLP1-g | Technical Data

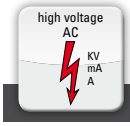
PE resistance testers

test current AC	1A…30A – depending on the model
current steps	1A
resistance measuring range	0.01…1.2Ω
resistance resolution	1mΩ
measuring technology	4-wire measurement / Kelvin measuring method
voltage range	6V, 12V, 18V – depending on the model
upper resistance limit	adjustable from 0.01…1.1Ω
upper voltage limit	adjustable from 0.1…12V
pass | fail assessment	automatic – resistance or voltage
test period	adjustable from 0.1s…1h



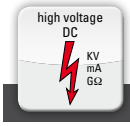
Insulation resistance testers

test voltage DC	1000V…6000V – depending on the model
potential-free	no
test current	3mA…20mA – depending on the model
resistance measuring range	200KΩ…250MΩ
lower resistance limit	adjustable from 500KΩ…240MΩ
pass | fail assessment	automatic
test period	adjustable from 0.1s…1h



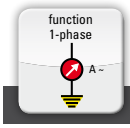
High-voltage testers AC

test voltage AC	3000V…30000V – depending on the model
voltage setting	fully electronic
voltage ramp | profile	yes
test current	3mA…100mA – depending on the model
safety current limit	only models up to max. 3mA
upper current limit	adjustable – range depends on the model
pass | fail assessment	automatic
test period	adjustable from 0.1s…100h
manual operation	yes – without time control
automatic operation	yes – with automatic time lapse
burning	yes – with electronic control



High-voltage testers DC

test voltage DC	1000V…6000V – depending on the model
voltage testing	full electronic
residual ripple	< 0.2…1% – depending on the model
potential-free	no
test current	3mA…20mA – depending on the model
safety current limit	only models up to max. 10mA
voltage ramp	yes – electronic
upper current limit	adjustable – range depends on the model
lower resistance limit	adjustable from 500KΩ…490MΩ
pass | fail assessment	automatic
test period	adjustable from 0.1s…1h



Functional testers

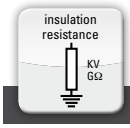
test voltage AC	10V…250V – electronically controlled
voltage setting	fully electronic
test current AC	2A, 5A – depending on the model
test current resolution	1mA
upper current limit	adjustable from 10mA…5A
pass | fail assessment	automatic – current within the tolerance
test period	adjustable from 0.1s…1h

For details to the individual test methods please look on page 157 and on our website at www.schleich.com.

GLP1-g | Single Testers

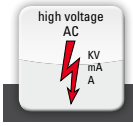
PE resistance

current	resistance	voltage	model
1…10A	1.2Ω	6V, 12V	40189500
1…10A	1.2Ω	6V, 12V, 18V	40189501
1…30A	1.2Ω	12V	40189502
1…30A	1.2Ω	6V, 12V, 18V	40189503



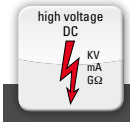
Insulation resistance

voltage	resistance	current	model
50…1000V	250MΩ	3mA	40189525
0…1000V	250MΩ	20mA	40189526
0…2000V	250MΩ	15mA	40189527
0…6000V	250MΩ	3mA	40189528
0…6000V	250MΩ	5mA	40189529
0…6000V	250MΩ	10mA	40189530
0…6000V	250MΩ	20mA	40189531



High-voltage AC

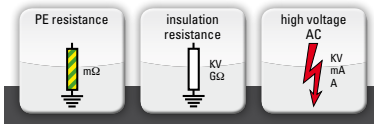
voltage	setting	current	potential-free	model
0…3000V	electronic	3mA	yes	40189550
0…3000V	electronic	100mA	yes	40189551
0…6000V	electronic	3mA	yes	40189552
0…6000V	electronic	100mA	yes	40189553
0…6000V	electronic	200mA	yes	40189554
0…12000V	electronic	50mA	yes	40189555
0…15000V	electronic	50mA	no	40189556
0…30000V	electronic	30mA	no	40189557
0…50000V	electronic	20mA	no	40189558



High-voltage DC

voltage	current	model
0…1000V	20mA	40189575
0…2000V	15mA	40189576
0…6000V	3mA	40189577
0…6000V	5mA	40189578
0…6000V	10mA	40189579
0…6000V	20mA	40189580

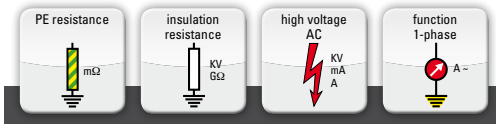
GLP1-g | Combination Testers



Safety

PE	range	IR	range	HV AC	setting	model
1…10A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	–		40189600
1…10A	10mΩ…1.2Ω	–		0…3000V / 3mA	electronic	40189601
1…10A	10mΩ…1.2Ω	–		0…3000V / 100mA	electronic	40189602
1…10A	10mΩ…1.2Ω	–		0…6000V / 3mA	electronic	40189603
1…10A	10mΩ…1.2Ω	–		0…6000V / 100mA	electronic	40189604
1…10A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…3000V / 3mA	electronic	40189605
1…10A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…3000V / 100mA	electronic	40189606
1…10A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…6000V / 3mA	electronic	40189607
1…10A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…6000V / 100mA	electronic	40189608
–		50…1000V	200KΩ…250MΩ	0…3000V / 3mA	electronic	40189609
–		50…1000V	200KΩ…250MΩ	0…3000V / 100mA	electronic	40189610
–		50…1000V	200KΩ…250MΩ	0…6000V / 3mA	electronic	40189611
–		50…1000V	200KΩ…250MΩ	0…6000V / 100mA	electronic	40189612
1…30A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	–		40189613
1…30A	10mΩ…1.2Ω	–		0…3000V / 3mA	electronic	40189614
1…30A	10mΩ…1.2Ω	–		0…3000V / 100mA	electronic	40189615
1…30A	10mΩ…1.2Ω	–		0…6000V / 3mA	electronic	40189616
1…30A	10mΩ…1.2Ω	–		0…6000V / 100mA	electronic	40189617
1…30A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…3000V / 3mA	electronic	40189618
1…30A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…3000V / 100mA	electronic	40189619
1…30A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…6000V / 3mA	electronic	40189620
1…30A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…6000V / 100mA	electronic	40189621

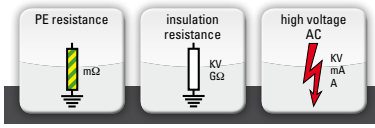
For general technical data of the testers please look on page 134.
Several additional combinations are available upon request.



Safety and function

PE	range	IR	range	HV AC	setting	function	model
1…10A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	–		10…250V / 2A	40189650
1…10A	10mΩ…1.2Ω	–		0…3000V / 3mA	electronic	10…250V / 2A	40189651
1…10A	10mΩ…1.2Ω	–		0…3000V / 100mA	electronic	10…250V / 2A	40189652
1…10A	10mΩ…1.2Ω	–		0…6000V / 3mA	electronic	10…250V / 2A	40189653
1…10A	10mΩ…1.2Ω	–		0…6000V / 100mA	electronic	10…250V / 2A	40189654
1…10A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…3000V / 3mA	electronic	10…250V / 2A	40189655
1…10A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…3000V / 100mA	electronic	10…250V / 2A	40189656
1…10A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…6000V / 3mA	electronic	10…250V / 2A	40189657
1…10A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…6000V / 100mA	electronic	10…250V / 2A	40189658
–		50…1000V	200KΩ…250MΩ	0…3000V / 3mA	electronic	10…250V / 2A	40189659
–		50…1000V	200KΩ…250MΩ	0…3000V / 100mA	electronic	10…250V / 2A	40189660
–		50…1000V	200KΩ…250MΩ	0…6000V / 3mA	electronic	10…250V / 2A	40189661
–		50…1000V	200KΩ…250MΩ	0…6000V / 100mA	electronic	10…250V / 2A	40189662
1…30A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	–		10…250V / 2A	40189663
1…30A	10mΩ…1.2Ω	–		0…3000V / 3mA	electronic	10…250V / 2A	40189664
1…30A	10mΩ…1.2Ω	–		0…3000V / 100mA	electronic	10…250V / 2A	40189665
1…30A	10mΩ…1.2Ω	–		0…6000V / 3mA	electronic	10…250V / 2A	40189666
1…30A	10mΩ…1.2Ω	–		0…6000V / 100mA	electronic	10…250V / 2A	40189667
1…30A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…3000V / 3mA	electronic	10…250V / 2A	40189668
1…30A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…3000V / 100mA	electronic	10…250V / 2A	40189669
1…30A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…6000V / 3mA	electronic	10…250V / 2A	40189670
1…30A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…6000V / 100mA	electronic	10…250V / 2A	40189671
1…10A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	–		10…250V / 5A	40189672
1…10A	10mΩ…1.2Ω	–		0…3000V / 3mA	electronic	10…250V / 5A	40189673
1…10A	10mΩ…1.2Ω	–		0…3000V / 100mA	electronic	10…250V / 5A	40189674
1…10A	10mΩ…1.2Ω	–		0…6000V / 3mA	electronic	10…250V / 5A	40189675
1…10A	10mΩ…1.2Ω	–		0…6000V / 100mA	electronic	10…250V / 5A	40189676
1…10A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…3000V / 3mA	electronic	10…250V / 5A	40189677
1…10A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…3000V / 100mA	electronic	10…250V / 5A	40189678
1…10A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…6000V / 3mA	electronic	10…250V / 5A	40189679
1…10A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…6000V / 100mA	electronic	10…250V / 5A	40189680
–		50…1000V	200KΩ…250MΩ	0…3000V / 3mA	electronic	10…250V / 5A	40189681
–		50…1000V	200KΩ…250MΩ	0…3000V / 100mA	electronic	10…250V / 5A	40189682
–		50…1000V	200KΩ…250MΩ	0…6000V / 3mA	electronic	10…250V / 5A	40189683
–		50…1000V	200KΩ…250MΩ	0…6000V / 100mA	electronic	10…250V / 5A	40189684
1…30A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	–		10…250V / 5A	40189685
1…30A	10mΩ…1.2Ω	–		0…3000V / 3mA	electronic	10…250V / 5A	40189686
1…30A	10mΩ…1.2Ω	–		0…3000V / 100mA	electronic	10…250V / 5A	40189687
1…30A	10mΩ…1.2Ω	–		0…6000V / 3mA	electronic	10…250V / 5A	40189688
1…30A	10mΩ…1.2Ω	–		0…6000V / 100mA	electronic	10…250V / 5A	40189689
1…30A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…3000V / 3mA	electronic	10…250V / 5A	40189690
1…30A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…3000V / 100mA	electronic	10…250V / 5A	40189691
1…30A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…6000V / 3mA	electronic	10…250V / 5A	40189692
1…30A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…6000V / 100mA	electronic	10…250V / 5A	40189693

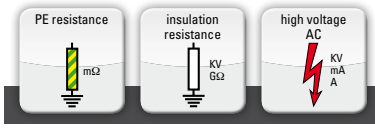
Product Overview Standard Testers



Safety EN 60204-V1

EN 60204

PE	range	IR	range	HV AC	setting	U residual	model
1…10A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…3000V / 3mA	electronic	–	40189700
1…10A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…3000V / 100mA	electronic	–	40189701
1…10A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…6000V / 3mA	electronic	–	40189702
1…10A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…6000V / 100mA	electronic	–	40189703
1…10A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…3000V / 3mA	electronic	yes	40189704
1…10A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…3000V / 100mA	electronic	yes	40189705
1…10A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…6000V / 3mA	electronic	yes	40189706
1…10A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…6000V / 100mA	electronic	yes	40189707
1…30A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…3000V / 3mA	electronic	–	40189708
1…30A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…3000V / 100mA	electronic	–	40189709
1…30A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…6000V / 3mA	electronic	–	40189710
1…30A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…6000V / 100mA	electronic	–	40189711
1…30A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…3000V / 3mA	electronic	yes	40189712
1…30A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…3000V / 100mA	electronic	yes	40189713
1…30A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…6000V / 3mA	electronic	yes	40189714
1…30A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…6000V / 100mA	electronic	yes	40189715



Safety EN 60204-V2

EN 60204

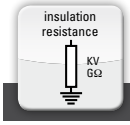
PE	range	IR	range	HV AC	setting	U residual	model
1…10A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…3000V / 3mA	electronic	–	40189750
1…10A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…3000V / 100mA	electronic	–	40189751
1…10A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…3000V / 3mA	electronic	yes	40189752
1…10A	10mΩ…1.2Ω	50…1000V	200KΩ…250MΩ	0…3000V / 100mA	electronic	yes	40189753

For general technical data of the testers please look on page 134.
Several additional combinations are available upon request.

GLP1-e | Technical Data

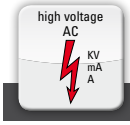
PE resistance testers

test current AC	10A…30A – depending on the model
current steps	10A, 10/30A – depending on the model
resistance measuring range	0.01…0.7Ω
resistance resolution	1mΩ
measuring technology	4-wire measurement / Kelvin measuring method
upper resistance limit	adjustable from 0.01…0.7Ω
upper voltage limit	adjustable from 0.1…7V
pass | fail assessment	automatic – resistance or voltage
test period	adjustable from 0.1s…10s



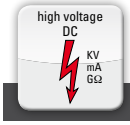
Insulation resistance testers

test current DC	1000V…6000V – depending on the model
potential-free	no
test current	3mA…20mA – depending on the model
resistance measuring range	200KΩ…30MΩ
lower resistance limit	adjustable from 500KΩ…29MΩ
pass | fail assessment	automatic
test period	adjustable from 0.1s…600s



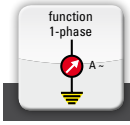
High-voltage testers AC

test voltage AC	3000V…30000V – depending on the model
voltage ramp	yes – at motor-driven stting
test current	3mA…100mA – depending on the model
safety current limit	only models up to max. 3mA
upper current limit	adjustable – range depends on the model
pass | fail assessment	automatic
test period	adjustable from 0.1s…600s
manual operation	yes – without time control
automatic operation	yes – with automatic time lapse
burning	yes



High-voltage testers DC

test voltage DC	1000V…6000V – depending on the model
voltage setting	fully electronic
residual ripple	< 0.2…1% – depending on the model
potential-free	no
test current	3mA…20mA – depending on the model
safety current limit	only models up to max. 10mA
voltage ramp	yes – electronic
upper current limit	adjustable – range depends on the model
lower resistance limit	adjustable from 500KΩ…29MΩ
pass | fail assessment	automatic
test period	adjustable from 0.1s…600s



Functional testers

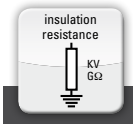
test voltage AC	110V, 230V – depending on the model
test current AC	2A, 5A – depending on the model
test current resolution	10mA
upper current limit	adjustable from 10mA…5A
pass | fail assessment	automatic – current within the tolerance
test period	adjustable from 0.1s…10s

For details to the individual test methods please look on page 157 and on our website at www.schleich.com.

GLP1-e | Single Testers

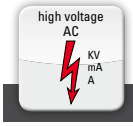
PE resistance

current	resistance	voltage	model
10A	0.7Ω	12V	40189200
10A / 30A	0.7Ω / 0.3Ω	12V	40189202



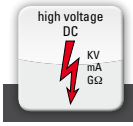
Insulation resistance

voltage	resistance	current	model
50…1000V	30MΩ	3mA	40189225
50…1000V	30MΩ	20mA	40189226
50…2000V	30MΩ	15mA	40189227
50…6000V	30MΩ	3mA	40189228
50…6000V	30MΩ	5mA	40189229
50…6000V	30MΩ	10mA	40189230
50…6000V	30MΩ	20mA	40189231



High-voltage AC

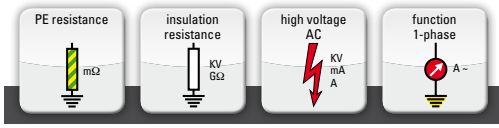
voltage	setting	current	potential-free	model
0…3000V	manual	3mA	yes	40189250
0…3000V	motor-driven	3mA	yes	40189251
0…3000V	manual	100mA	yes	40189252
0…3000V	motor-driven	100mA	yes	40189253
0…6000V	manual	3mA	yes	40189254
0…6000V	motor-driven	3mA	yes	40189255
0…6000V	manual	100mA	yes	40189256
0…6000V	motor-driven	100mA	yes	40189257
0…12000V	manual	50mA	yes	40189258
0…12000V	motor-driven	50mA	yes	40189259
0…15000V	manual	50mA	no	40189260
0…15000V	motor-driven	50mA	no	40189261
0…30000V	manual	30mA	no	40189262
0…30000V	motor-driven	30mA	no	40189263



High-voltage DC

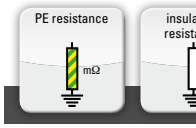
voltage	current	model
50…1000V	20mA	40189275
50…2000V	15mA	40189276
50…6000V	3mA	40189277
50…6000V	5mA	40189278
50…6000V	10mA	40189279
50…6000V	20mA	40189280

GLP1-e | Combination Testers



Safety and function

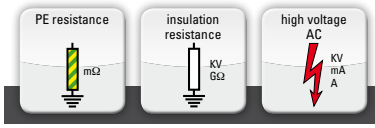
PE	range	IR	range	HV AC	setting	function	model
10A	10mΩ…0.7Ω	50…1000V	200KΩ…30MΩ	–		–	40189300
10/30A	10mΩ…0.7Ω	50…1000V	200KΩ…30MΩ	–		–	40189301
10A	10mΩ…0.7Ω	50…1000V	200KΩ…30MΩ	3000V / 100mA	manual	–	40189302
10A	10mΩ…0.7Ω	50…1000V	200KΩ…30MΩ	3000V / 100mA	motor-driven	–	40189303
10A	10mΩ…0.7Ω	50…1000V	200KΩ…30MΩ	–		230V / 2A	40189304
10A	10mΩ…0.7Ω	50…1000V	200KΩ…30MΩ	–		230V / 5A	40189305
10A	10mΩ…0.7Ω	50…1000V	200KΩ…30MΩ	1500V / 3mA	fixed value	230V / 2A	40189306
10A	10mΩ…0.7Ω	50…1000V	200KΩ…30MΩ	1500V & 4000V / 3mA	fixed value	230V / 2A	40189307
10A	10mΩ…0.7Ω	50…1000V	200KΩ…30MΩ	1500V / 3mA	fixed value	230V / 5A	40189308
10A	10mΩ…0.7Ω	50…1000V	200KΩ…30MΩ	1500V & 4000V / 3mA	fixed value	230V / 5A	40189309



Safety EN 60204-V1

EN 60204

PE	range	IR	range	HV AC	setting	U residual	model
10A	10mΩ…0,7Ω	50…1000V	200KΩ…30MΩ	1500V / 10mA	fixed value	–	40189350
10A	10mΩ…0,7Ω	50…1000V	200KΩ…30MΩ	3000V / 25mA	fixed value	–	40189351
10A	10mΩ…0,7Ω	50…1000V	200KΩ…30MΩ	0…6000V / 3mA	manual	–	40189352
10A	10mΩ…0,7Ω	50…1000V	200KΩ…30MΩ	0…6000V / 100mA	manual	–	40189353
10A	10mΩ…0,7Ω	50…1000V	200KΩ…30MΩ	0…6000V / 100mA	motor-driven	–	40189354
10A	10mΩ…0,7Ω	50…1000V	200KΩ…30MΩ	1500V / 10mA	fixed value	yes	40189355
10A	10mΩ…0,7Ω	50…1000V	200KΩ…30MΩ	3000V / 25mA	fixed value	yes	40189356
10A	10mΩ…0,7Ω	50…1000V	200KΩ…30MΩ	0…6000V / 3mA	manual	yes	40189357
10A	10mΩ…0,7Ω	50…1000V	200KΩ…30MΩ	0…6000V / 100mA	manual	yes	40189358
10A	10mΩ…0,7Ω	50…1000V	200KΩ…30MΩ	0…6000V / 100mA	motor-driven	yes	40189359
10/30A	10mΩ…0,7Ω	50…1000V	200KΩ…30MΩ	1500V / 10mA	fixed value	–	40189360
10/30A	10mΩ…0,7Ω	50…1000V	200KΩ…30MΩ	3000V / 25mA	fixed value	–	40189361
10/30A	10mΩ…0,7Ω	50…1000V	200KΩ…30MΩ	0…6000V / 3mA	manual	–	40189362
10/30A	10mΩ…0,7Ω	50…1000V	200KΩ…30MΩ	0…6000V / 100mA	manual	–	40189363
10/30A	10mΩ…0,7Ω	50…1000V	200KΩ…30MΩ	0…6000V / 100mA	motor-driven	–	40189364
10/30A	10mΩ…0,7Ω	50…1000V	200KΩ…30MΩ	1500V / 10mA	fixed value	yes	40189365
10/30A	10mΩ…0,7Ω	50…1000V	200KΩ…30MΩ	3000V / 25mA	fixed value	yes	40189366
10/30A	10mΩ…0,7Ω	50…1000V	200KΩ…30MΩ	0…6000V / 3mA	manual	yes	40189367
10/30A	10mΩ…0,7Ω	50…1000V	200KΩ…30MΩ	0…6000V / 100mA	manual	yes	40189368
10/30A	10mΩ…0,7Ω	50…1000V	200KΩ…30MΩ	0…6000V / 100mA	motor-driven	yes	40189369



Safety EN 60204-V2

EN 60204

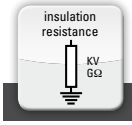
PE	range	IR	range	HV AC	setting	U residual	model
10A	10mΩ…0.7Ω	50…1000V	200KΩ…30MΩ	1500V / 10mA	fixed value	–	40189400
10A	10mΩ…0.7Ω	50…1000V	200KΩ…30MΩ	3000V / 25mA	fixed value	–	40189401
10A	10mΩ…0.7Ω	50…1000V	200KΩ…30MΩ	0…3000V / 3mA	manual	–	40189402
10A	10mΩ…0.7Ω	50…1000V	200KΩ…30MΩ	0…3000V / 100mA	manual	–	40189403
10A	10mΩ…0.7Ω	50…1000V	200KΩ…30MΩ	1500V / 10mA	fixed value	yes	40189404
10A	10mΩ…0.7Ω	50…1000V	200KΩ…30MΩ	3000V / 25mA	fixed value	yes	40189405
10A	10mΩ…0.7Ω	50…1000V	200KΩ…30MΩ	0…3000V / 3mA	manual	yes	40189406
10A	10mΩ…0.7Ω	50…1000V	200KΩ…30MΩ	0…3000V / 100mA	manual	yes	40189407

For general technical data of the testers please look on page 140.
Several additional combinations are available upon request.

GLP2-ce & **GLP2-e** | Technical Data

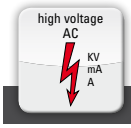
PE resistance testers

test current AC	1A…100A – depending on the model
current levels	1A
resistance measuring range	0.01…1,2Ω – Rmax depending on the current
resistance resolution	1mΩ
measuring technology	4-wire-technology / Kelvin measuring method
voltage range	6V, 12V, 18V, 24V – depending on the mode
upper resistance limit	adjustable from 0.01…1.1Ω
upper voltage limit	adjustable from 0.1…12V
pass | fail assessment	automatic – resistance or voltage
test period	adjustable from 0.1s…1h – depending on the model



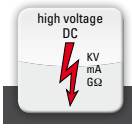
Insulation resistance testers

test voltage DC	500V…6000V – depending on the model
voltage setting	fully electronic
residual ripple	< 0.05…1% –depending on the model
test current	1mA…500mA – depending on the model
resistance measuring range	100KΩ…1GΩ; 500MΩ – depending on the model
measuring range extension	100GΩ…1TΩ –depending on the model
lower resistance limit	adjustable from 100KΩ…990MΩ
pass | fail assessment	automatic
test period	adjustable from 0.1s…1h
safety current limit	all models up to max. 12mA!



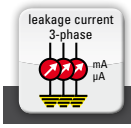
High-voltage testers AC

test voltage AC	3000V…30000V – depending on the model
voltage setting	manual, actuator, fully electronic
voltage ramp / profile	yes
test current	3mA…100mA – depending on the model
current measurement	total current, active current, cos φ
measurement	effective value, peak value
safety current limit	only models up to max. 3mA
upper current limit	adjustable – range depending on the model
pass | fail assessment	automatic
test period	adjustable from 0.1s…1 week
manual operation	yes – without time control
automatic operation	yes – with automatic time lapse
burning	yes – depending on the model
safety current limit	all models up to max. 3mA!



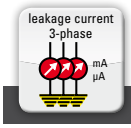
High-voltage testers DC

test voltage DC	0…1000V; 50000V – depending on the model
voltage setting	fully electronic
residual ripple	< 0.05…1% –depending on the model
test current	1mA…500mA – depending on the model
safety current limit	all models up to max. 12mA!
voltage ramp	yes – electronic
upper voltage limit	adjustable – range depends on the model
insulation resistance measurement	yes
resistance measuring range	potential-free – 100KΩ…500MΩ
resistance measuring range	not potential-free – 100KΩ…1GΩ
lower resistance limit	adjustable from 100KΩ…990MΩ
pass | fail assessment	automatic
test period	adjustable from 0.1s…1 week



Leakage current testers

test voltage	one- / three-phase – depending on the model
test currents of the test object	5A, 16A, 32A, 63A, 100A – depending on the model
operating types	A1 | A2 | B
standards	EN & UL –depending on the model
measuring circuits EN 60990	3
measuring circuits EN 60601	1
measuring circuits UL1026 & UL1283	1
leakage current	1µA…30mA – 5 measuring ranges / auto range
resolution	1µA
measurement	effective value, peak value, DC-/AC-percentage
1MHz measurement	yes – depending on the model
ground leakage current measurement	yes
touch current measurement	yes – via test probe
1MHz peak value detector	yes – depending on the model
with N-discontinuity (S1)	yes
with L/N pole-reversal (S5)	yes
upper current limit	adjustable from 10µA…30mA
pass / fail assessment	automatic
test period	adjustable from 0.1s…100h



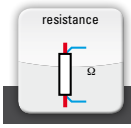
Leakage current testers medical

patient leakage current measurement	yes
patient auxiliary current measurement	yes
touch current measurement	yes – between 2 test probes
patient connections	8
FE connections	1
test probe connections	2
potential-free contacts S2 & S3	yes

For any additional data please look at “leakage current testers”
Additional details regarding current leakage testers medical on page 158.

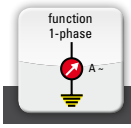
Visual test

visual test with confirmation	standard
quantity of test steps	arbitrary
with picture	yes – only GLP2-ce



Ohmic resistance testers

test voltage	3V…24V – depending on the model
residual ripple	high-tensile – ideal for measurement at inductances
test current	2A…200A –depending on the model
resistance measuring range	1µΩ…100KΩ –depending on the model
resistance resolution	1µΩ –depending on the model
test technology	4-wire-measurement / Kelvin measuring method
temperature compensation	yes – optional



Functional testers

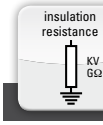
test voltage AC/DC	yes – depending on the model
test voltage	1~ 0…260V | 3~ 0…750V – depending on the model
one-phase / three-phase	depending on the model
voltage setting	fixed, steps, motor-driven, fully electronic
test current AC	2A, 100A – depending on the model
test current resolution	1mA
upper current limit	adjustable from 1mA…100A
pass | fail evaluation	automatic – current within the tolerance
test period	adjustable from 0.1s…1h

For details to the individual test methods please look on page 157 and on our website at www.schleich.com.

GLP2-ce & **GLP2-e** | Single Testers

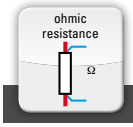
PE resistance

current	resistance	voltage	model-ce	model-e
1...10A AC	1.2Ω	6V, 12V	401090000	401090020
1...10A AC	1.2Ω	6V, 12V, 18V	401090001	401090021
1…30A AC	1.2Ω	6V, 12V	401090002	401090022
1…30A AC	1.2Ω	6V, 12V, 18V	401090003	401090023
1…50A AC	1.2Ω	6V, 12V, 18V	401090004	401090024
1…75A AC	1.2Ω	6V, 12V, 18V	401090005	401090025
1…100A AC	1.2Ω	6V, 12V	401090006	401090026
1…10A DC	2.8Ω	28V	401090007	401090027
1…25A DC	1.2Ω	15V	401090008	401090028
1…60A DC	1.2Ω	12V	401090009	401090029



Insulation resistance

voltage	potential-free	resistance	current	model-ce	model-e
30…1000V	yes	1GΩ	2mA	401090050	401090100
0…1000V	yes	500MΩ	20mA	401090051	401090101
0…1000V	no	1GΩ	20mA	401090052	401090102
0…1000V	yes	500MΩ	250mA	401090053	401090103
0…1000V	no	1GΩ	250mA	401090054	401090104
0…2000V	yes	500MΩ	2mA	401090055	401090105
0…2000V	no	1GΩ	2mA	401090056	401090106
0…2000V	yes	500MΩ	125mA	401090057	401090107
0…2000V	no	1GΩ	125mA	401090058	401090108
0…4000V	yes	500MΩ	1mA	401090059	401090109
0…4000V	no	1GΩ	1mA	401090060	401090110
0…4000V	yes	500MΩ	60mA	401090061	401090111
0…4000V	no	1GΩ	60mA	401090062	401090112
0…6000V	yes	500MΩ	0.65mA	401090063	401090113
0…6000V	no	1GΩ	0.65mA	401090064	401090114
0…6000V	yes	500MΩ	40mA	401090065	401090115
0…6000V	no	1GΩ	40mA	401090066	401090116

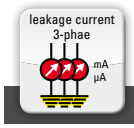


Ohmic resistance

voltage	current	resistance	model-ce	model-e
3V	2A	10mΩ…100KΩ	401090600	401090610
3V	3A	10mΩ…100KΩ	401090601	401090611
3V	5A	5mΩ…100KΩ	401090602	401090612
20V	20A	1mΩ…100KΩ	401090603	401090613
5V	200A	1µΩ…100KΩ	401090604	401090614

Further models upon request.

For general technical data of the testers please look on page 144.

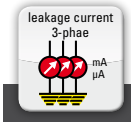


Leakage current

voltage	standard	current	1MHz	model-ce	model-e
230V | 1~	EN 60990	5A	–	–	401090450
230V | 1~	EN 60990	16A	–	–	401090451
230V | 1~	EN 60990	32A	–	–	401090452
230V | 1~	EN 60990	63A	–	–	401090453
230V | 1~	EN 60601	5A	–	–	401090454
230V | 1~	EN 60601	16A	–	–	401090455
230V | 1~	EN 60601	32A	–	–	401090456
230V | 1~	EN 60601	63A	–	–	401090457
230V | 1~	EN 60990 & EN 60601	5A	–	401090400	401090458
230V | 1~	EN 60990 & EN 60602	16A	–	401090401	401090459
230V | 1~	EN 60990 & EN 60603	32A	–	401090402	401090460
230V | 1~	EN 60990 & EN 60604	63A	–	401090403	401090461
230V | 1~	UL 1026 & UL 1283	5A	–	–	401090462
230V | 1~	UL 1026 & UL 1283	16A	–	–	401090463
230V | 1~	UL 1026 & UL 1283	32A	–	–	401090464
230V | 1~	UL 1026 & UL 1283	63A	–	–	401090465
230V | 1~	EN 60990 & UL 1026 & UL 1283	5A	–	401090404	401090466
230V | 1~	EN 60990 & UL 1026 & UL 1284	16A	–	401090405	401090467
230V | 1~	EN 60990 & UL 1026 & UL 1285	32A	–	401090406	401090468
230V | 1~	EN 60990 & UL 1026 & UL 1286	63A	–	401090407	401090469
400V | 3~	EN 60990	5A	–	–	401090470
400V | 3~	EN 60990	16A	–	–	401090471
400V | 3~	EN 60990	32A	–	–	401090472
400V | 3~	EN 60990	63A	–	–	401090473
400V | 3~	EN 60601	5A	–	–	401090474
400V | 3~	EN 60601	16A	–	–	401090475
400V | 3~	EN 60601	32A	–	–	401090476
400V | 3~	EN 60601	63A	–	–	401090477
400V | 3~	EN 60990 & EN 60601	5A	–	401090408	401090478
400V | 3~	EN 60990 & EN 60602	16A	–	401090409	401090479
400V | 3~	EN 60990 & EN 60603	32A	–	401090410	401090480
400V | 3~	EN 60990 & EN 60604	63A	–	401090411	401090481
400V | 3~	UL 1026 & UL 1283	5A	–	–	401090482
400V | 3~	UL 1026 & UL 1283	16A	–	–	401090483
400V | 3~	UL 1026 & UL 1283	32A	–	–	401090484
400V | 3~	UL 1026 & UL 1283	63A	–	–	401090485
400V | 3~	EN 60990 & UL 1026 & UL 1283	5A	–	401090412	401090486
400V | 3~	EN 60990 & UL 1026 & UL 1284	16A	–	401090413	401090487
400V | 3~	EN 60990 & UL 1026 & UL 1285	32A	–	401090414	401090488
400V | 3~	EN 60990 & UL 1026 & UL 1286	63A	–	401090415	401090489
230V | 1~	EN 60990	5A	yes	–	401090490
230V | 1~	EN 60990	16A	yes	–	401090491
230V | 1~	EN 60990	32A	yes	–	401090492
230V | 1~	EN 60990	63A	yes	–	401090493
230V | 1~	EN 60601	5A	yes	–	401090494
230V | 1~	EN 60601	16A	yes	–	401090495
230V | 1~	EN 60601	32A	yes	–	401090496
230V | 1~	EN 60601	63A	yes	–	401090497

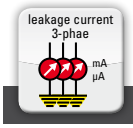
continue next page »

Product Overview Standard Testers



Continuation leakage current

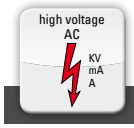
voltage	standard	current	1MHz	model-ce	model-e
230V | 1~	EN 60990 & EN 60601	5A	yes	401090416	401090498
230V | 1~	EN 60990 & EN 60602	16A	yes	401090417	401090499
230V | 1~	EN 60990 & EN 60603	32A	yes	401090418	401090500
230V | 1~	EN 60990 & EN 60604	63A	yes	401090419	401090501
230V | 1~	UL 1026 & UL 1283	5A	yes	–	401090502
230V | 1~	UL 1026 & UL 1283	16A	yes	–	401090503
230V | 1~	UL 1026 & UL 1283	32A	yes	–	401090504
230V | 1~	UL 1026 & UL 1283	63A	yes	–	401090505
230V | 1~	EN 60990 & UL 1026 & UL 1283	5A	yes	401090420	401090506
230V | 1~	EN 60990 & UL 1026 & UL 1284	16A	yes	401090421	401090507
230V | 1~	EN 60990 & UL 1026 & UL 1285	32A	yes	401090422	401090508
230V | 1~	EN 60990 & UL 1026 & UL 1286	63A	yes	401090423	401090509
400V | 3~	EN 60990	5A	yes	–	401090510
400V | 3~	EN 60990	16A	yes	–	401090511
400V | 3~	EN 60990	32A	yes	–	401090512
400V | 3~	EN 60990	63A	yes	–	401090513
400V | 3~	EN 60601	5A	yes	–	401090514
400V | 3~	EN 60601	16A	yes	–	401090515
400V | 3~	EN 60601	32A	yes	–	401090516
400V | 3~	EN 60601	63A	yes	–	401090517
400V | 3~	EN 60990 & EN 60601	5A	yes	401090424	401090518
400V | 3~	EN 60990 & EN 60602	16A	yes	401090425	401090519
400V | 3~	EN 60990 & EN 60603	32A	yes	401090426	401090520
400V | 3~	EN 60990 & EN 60604	63A	yes	401090427	401090521
400V | 3~	UL 1026 & UL 1283	5A	yes	–	401090522
400V | 3~	UL 1026 & UL 1283	16A	yes	–	401090523
400V | 3~	UL 1026 & UL 1283	32A	yes	–	401090524
400V | 3~	UL 1026 & UL 1283	63A	yes	–	401090525
400V | 3~	EN 60990 & UL 1026 & UL 1283	5A	yes	401090428	401090526
400V | 3~	EN 60990 & UL 1026 & UL 1284	16A	yes	401090429	401090527
400V | 3~	EN 60990 & UL 1026 & UL 1285	32A	yes	401090430	401090528
400V | 3~	EN 60990 & UL 1026 & UL 1286	63A	yes	401090431	401090529



Medical leakage current

voltage	standard	1MHz	model-ce	model-e
230V | 1~	EN 60990 & EN 60601	–	401090550	401090560
400V | 3~	EN 60990 & EN 60601	–	401090551	401090561
230V | 1~	EN 60990 & EN 60601	yes	401090552	401090562
400V | 3~	EN 60990 & EN 60601	yes	401090553	401090563

For general technical data of the testers please look on page 144.



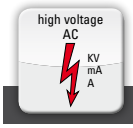
High-voltage AC

voltage	setting	current	potential-free	model-ce	model-e
0…3000V	manual	3mA	yes	401090700	401090850
0…3000V	actuator	3mA	yes	401090701	401090851
0…3000V	electronic	3mA	yes	401090702	401090852
0…3000V	manual	25mA	yes	401090703	401090853
0…3000V	actuator	25mA	yes	401090704	401090854
0…3000V	electronic	25mA	yes	401090705	401090855
0…3000V	manual	100mA	yes	401090706	401090856
0…3000V	actuator	100mA	yes	401090707	401090857
0…3000V	electronic	100mA	yes	401090708	401090858
0…3000V	manual	500mA	yes	401090709	401090859
0…3000V	actuator	500mA	yes	401090710	401090860
0…3000V	electronic	500mA	yes	401090711	401090861
0…3000V	manual	1A	yes	401090712	401090862
0…3000V	actuator	1A	yes	401090713	401090863
0…3000V	electronic	1A	yes	401090714	401090864
0…6000V	manual	3mA	yes	401090715	401090865
0…6000V	actuator	3mA	yes	401090716	401090866
0…6000V	electronic	3mA	yes	401090717	401090867
0…6000V	manual	25mA	yes	401090718	401090868
0…6000V	actuator	25mA	yes	401090719	401090869
0…6000V	electronic	25mA	yes	401090720	401090870
0…6000V	manual	100mA	yes	401090721	401090871
0…6000V	actuator	100mA	yes	401090722	401090872
0…6000V	electronic	100mA	yes	401090723	401090873
0…6000V	manual	150mA	yes	401090724	401090874
0…6000V	actuator	150mA	yes	401090725	401090875
0…6000V	electronic	150mA	yes	401090726	401090876
0…6000V	manual	200mA	yes	401090727	401090877
0…6000V	actuator	200mA	yes	401090728	401090878
0…6000V	electronic	200mA	yes	401090729	401090879
0…6000V	manual	250mA	yes	401090730	401090880
0…6000V	actuator	250mA	yes	401090731	401090881
0…6000V	electronic	250mA	yes	401090732	401090882
0…6000V	manual	500mA	yes	401090733	401090883
0…6000V	actuator	500mA	yes	401090734	401090884
0…6000V	electronic	500mA	yes	401090735	401090885
0…6000V	manual	1A	yes	401090736	401090886
0…6000V	actuator	1A	yes	401090737	401090887
0…6000V	manual	1.5A	yes	401090738	401090888
0…6000V	actuator	1.5A	yes	401090739	401090889
0…7000V	actuator	1A	no	401090740	401090890
0…7500V	manual	100mA	yes	401090741	401090891
0…7500V	actuator	100mA	yes	401090742	401090892
0…7500V	electronic	100mA	yes	401090743	401090893
0…8000V	manual	100mA	yes	401090744	401090894
0…8000V	actuator	100mA	yes	401090745	401090895

voltage	setting	current	potential-free	model-ce	model-e
0…8000V	electronic	100mA	yes	401090746	401090896
0…10000V	manual	5mA	yes	401090747	401090897
0…10000V	actuator	5mA	yes	401090748	401090898
0…10000V	electronic	5mA	yes	401090749	401090899
0…10000V	manual	50mA	yes	401090750	401090900
0…10000V	actuator	50mA	yes	401090751	401090901
0…10000V	electronic	50mA	yes	401090752	401090902
0…10000V	actuator	100mA	no	401090753	401090903
0…10000V	electronic	100mA	no	401090754	401090904
0…10000V	actuator	200mA	no	401090755	401090905
0…10000V	electronic	200mA	no	401090756	401090906
0…10000V	actuator	500mA	no	401090757	401090907
0…10000V	actuator	1A	no	401090758	401090908
0…12000V	manual	50mA	yes	401090759	401090909
0…12000V	actuator	250mA	no	401090760	401090910
0…12000V	actuator	500mA	no	401090761	401090911
0…12000V	actuator	1A	no	401090762	401090912
0…15000V	actuator	50mA	no	401090763	401090913
0…15000V	actuator	150mA	no	401090764	401090914
0…15000V	actuator	250mA	no	401090765	401090915
0…15000V	actuator	500mA	no	401090766	401090916
0…15000V	actuator	1A	no	401090767	401090917
0…20000V	actuator	15mA	no	401090768	401090918
0…20000V	actuator	40mA	no	401090769	401090919
0…20000V	actuator	100mA	no	401090770	401090920
0…20000V	actuator	150mA	no	401090771	401090921
0…20000V	actuator	200mA	no	401090772	401090922
0…20000V	actuator	300mA	no	401090773	401090923
0…20000V	actuator	500mA	no	401090774	401090924
0…20000V	actuator	1A	no	401090775	401090925
0…21000V	actuator	150mA	no	401090776	401090926
0…22000V	actuator	750mA	no	401090777	401090927
0…22000V	actuator	1A	no	401090778	401090928
0…25000V	actuator	20mA	no	401090779	401090929
0…25000V	actuator	100mA	no	401090780	401090930
0…25000V	actuator	300mA	no	401090781	401090931
0…25000V	actuator	500mA	no	401090782	401090932
0…30000V	actuator	17mA	no	401090783	401090933
0…30000V	actuator	30mA	no	401090784	401090934
0…30000V	actuator	50mA	no	401090785	401090935
0…30000V	actuator	100mA	no	401090786	401090936
0…30000V	actuator	200mA	no	401090787	401090937
0…30000V	actuator	300mA	no	401090788	401090938
0…30000V	actuator	500mA	no	401090789	401090939
0…35000V	actuator	25mA	no	401090790	401090940
0…35000V	actuator	50mA	no	401090791	401090941

continue next page »

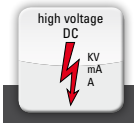
Product Overview Standard Testers



Continuation high-voltage AC

voltage	setting	current	potential-free	model-ce	model-e
0…35000V	actuator	100mA	no	401090792	401090942
0…35000V	actuator	200mA	no	401090793	401090943
0…35000V	actuator	500mA	no	401090794	401090944
0…35000V	actuator	1A	no	401090795	401090945
0…40000V	actuator	15mA	no	401090796	401090946
0…40000V	actuator	25mA	no	401090797	401090947
0…40000V	actuator	50mA	no	401090798	401090948
0…40000V	actuator	100mA	no	401090799	401090949
0…40000V	actuator	200mA	no	401090800	401090950
0…50000V	actuator	15mA	no	401090801	401090951
0…50000V	actuator	25mA	no	401090802	401090952
0…50000V	actuator	40mA	no	401090803	401090953
0…50000V	actuator	125mA	no	401090804	401090954
0…50000V	actuator	200mA	no	401090805	401090955
0…60000V	actuator	20mA	no	401090806	401090956
0…60000V	actuator	40mA	no	401090807	401090957

voltage	setting	current	potential-free	model-ce	model-e
0…60000V	actuator	80mA	no	401090808	401090958
0…60000V	actuator	200mA	no	401090809	401090959
0…60000V	actuator	300mA	no	401090810	401090960
0…75000V	actuator	25mA	no	401090811	401090961
0…75000V	actuator	50mA	no	401090812	401090962
0…75000V	actuator	100mA	no	401090813	401090963
0…75000V	actuator	150mA	no	401090814	401090964
0…80000V	actuator	25mA	no	401090815	401090965
0…80000V	actuator	50mA	no	401090816	401090966
0…80000V	actuator	100mA	no	401090817	401090967
0…80000V	actuator	200mA	no	401090818	401090968
0…100000V	actuator	25mA	no	401090819	401090969
0…100000V	actuator	50mA	no	401090820	401090970
0…100000V	actuator	100mA	no	401090821	401090971
0…100000V	actuator	150mA	no	401090822	401090972

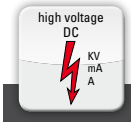


High-voltage DC

voltage	residual ripple	potential-free	current	model-ce	model-e
0…500V	± 0.1V	no	40mA	401090200	401090300
0…500V	± 0.5V	no	60mA	401090201	401090301
0…500V	± 0.5V	no	120mA	401090202	401090302
0…500V	± 0.5V	no	250mA	401090203	401090303
0…500V	± 0.5V	no	500mA	401090204	401090304
0…1000V	± 0.05V	no	4mA	401090205	401090305
0…1000V	± 0.2V	no	4mA	401090206	401090306
0…1000V	± 0.5V	no	20mA	401090207	401090307
0…1000V	± 0.5V	no	30mA	401090208	401090308
0…1000V	± 0.5V	no	60mA	401090209	401090309
0…1000V	± 0.5V	no	125mA	401090210	401090310
0…1000V	± 0.5V	no	250mA	401090211	401090311
0…2000V	± 0.1V	no	2mA	401090212	401090312
0…2000V	± 0.5V	no	2mA	401090213	401090313
0…2000V	± 1V	no	10mA	401090214	401090314
0…2000V	± 1V	no	15mA	401090215	401090315
0…2000V	± 1V	no	30mA	401090216	401090316
0…2000V	± 1V	no	60mA	401090217	401090317
0…2000V	± 1V	no	125mA	401090218	401090318
0…4000V	± 0,1V	no	1mA	401090219	401090319
0…4000V	± 1V	no	7.5mA	401090220	401090320

voltage	residual ripple	potential-free	current	model-ce	model-e
0…4000V	± 1V	no	15mA	401090221	401090321
0…4000V	± 1V	no	30mA	401090222	401090322
0…4000V	± 1V	no	60mA	401090223	401090323
0…6000V	± 1V	no	0.65mA	401090224	401090324
0…6000V	± 40V	no	3mA	401090225	401090325
0…6000V	± 3V	no	3mA	401090226	401090326
0…6000V	± 4V	no	5mA	401090227	401090327
0…6000V	± 1V	no	10mA	401090228	401090328
0…6000V	± 1V	no	20mA	401090229	401090329
0…6000V	± 1V	no	40mA	401090230	401090330
0…8000V	± 2V	no	7.5mA	401090231	401090331
0…8000V	± 2V	no	15mA	401090232	401090332
0…10000V	± 0.2V	no	0.2mA	401090233	401090333
0…10000V	± 0.2V	no	1,5mA	401090234	401090334
0…10000V	± 5V	no	3mA	401090235	401090335
0…10000V	± 2V	no	6mA	401090236	401090336
0…10000V	± 2V	no	12mA	401090237	401090337
0…15000V	± 0.5V	no	0.25mA	401090238	401090338
0…15000V	± 5V	no	1mA	401090239	401090339
0…15000V	± 10V	no	2mA	401090240	401090340
0…20000V	± 5V	no	0.75mA	401090241	401090341

continue next page »



Continuation high-voltage DC

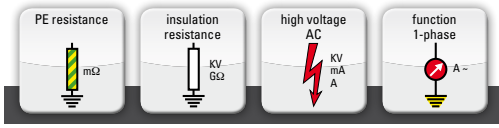
voltage	residual ripple	potential-free	current	model-ce	model-e
0…20000V	± 10V	no	1.5mA	401090242	401090342
0…20000V	± 2V	no	3mA	401090243	401090343
0…20000V	± 2V	no	6.25mA	401090244	401090344
0…25000V	± 15V	no	0,6mA	401090245	401090345
0…25000V	± 10V	no	1,2mA	401090246	401090346
0…25000V	± 2V	no	2.4mA	401090247	401090347
0…30000V	± 10V	no	0,13mA	401090248	401090348
0…30000V	± 15V	no	0,5mA	401090249	401090349
0…30000V	± 15V	no	1mA	401090250	401090350
0…30000V	± 2V	no	2mA	401090251	401090351
0…30000V	± 4V	no	4mA	401090252	401090352
0…35000V	± 15V	no	0.4mA	401090253	401090353
0…40000V	± 15V	no	0,35mA	401090254	401090354
0…40000V	± 15V	no	0,75mA	401090255	401090355
0…40000V	± 15V	no	2.5mA	401090256	401090356
0…500V	± 0.1V	yes	40mA	401090260	401090360
0…500V	± 0.5V	yes	60mA	401090261	401090361
0…500V	± 0.5V	yes	120mA	401090262	401090362
0…500V	± 0.5V	yes	250mA	401090263	401090363
0…500V	± 0.5V	yes	500mA	401090264	401090364
0…1000V	± 0.05V	yes	4mA	401090265	401090365
0…1000V	± 0.2V	yes	4mA	401090266	401090366
0…1000V	± 0.5V	yes	20mA	401090267	401090367
0…1000V	± 0.5V	yes	30mA	401090268	401090368
0…1000V	± 0.5V	yes	60mA	401090269	401090369
0…1000V	± 0.5V	yes	125mA	401090270	401090370

voltage	residual ripple	potential-free	current	model-ce	model-e
0…1000V	± 0.5V	yes	250mA	401090271	401090371
0…2000V	± 0.1V	yes	2mA	401090272	401090372
0…2000V	± 0,5V	yes	2mA	401090273	401090373
0…2000V	± 1V	yes	10mA	401090274	401090374
0…2000V	± 1V	yes	15mA	401090275	401090375
0…2000V	± 1V	yes	30mA	401090276	401090376
0…2000V	± 1V	yes	60mA	401090277	401090377
0…2000V	± 1V	yes	125mA	401090278	401090378
0…4000V	± 0.1V	yes	1mA	401090279	401090379
0…4000V	± 1V	yes	7.5mA	401090280	401090380
0…4000V	± 1V	yes	15mA	401090281	401090381
0…4000V	± 1V	yes	30mA	401090282	401090382
0…4000V	± 1V	yes	60mA	401090283	401090383
0…6000V	± 40V	yes	3mA	401090284	401090384
0…6000V	± 3V	yes	3mA	401090285	401090385
0…6000V	± 4V	yes	5mA	401090286	401090386
0…6000V	± 1V	yes	10mA	401090287	401090387
0…6000V	± 1V	yes	20mA	401090288	401090388
0…6000V	± 1V	yes	40mA	401090289	401090389
0…8000V	± 2V	yes	7.5mA	401090290	401090390
0…8000V	± 2V	yes	15mA	401090291	401090391
0…10000V	± 0.2V	yes	0.2mA	401090292	401090392
0…10000V	± 0.2V	yes	1.5mA	401090293	401090393
0…10000V	± 5V	yes	3mA	401090294	401090394
0…10000V	± 2V	yes	6mA	401090295	401090395
0…10000V	± 2V	yes	12mA	401090296	401090396

For general technical data of the testers please look on page 144.

Product Overview Standard Testers

GLP2-ce | Combination Testers



Safety and function

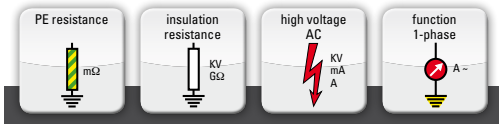
safety tests						functional tests	
PE	**range**	**IR**	**range**	**HV AC**	**setting**	**one-phase**	**model-5Amp**
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	–		230V	401092000
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	–		0…260V	401092001
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 3mA	electronic	230V	401092002
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 3mA	electronic	0…260V	401092003
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 100mA	manual	230V	401092004
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 100mA	manual	0…260V	401092005
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 100mA	actuator	230V	401092006
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 100mA	actuator	0…260V	401092007
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 100mA	electronic	230V	401092008
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 100mA	electronic	0…260V	401092009
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 3mA	electronic	230V	401092010
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 3mA	electronic	0…260V	401092011
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	manual	230V	401092012
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	manual	0…260V	401092013
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	actuator	230V	401092014
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	actuator	0…260V	401092015
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	electronic	230V	401092016
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	electronic	0…260V	401092017
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	–		230V	401092018
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	–		0…260V	401092019
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 3mA	electronic	230V	401092020
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 3mA	electronic	0…260V	401092021
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 100mA	manual	230V	401092022
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 100mA	manual	0…260V	401092023
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 100mA	actuator	230V	401092024
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 100mA	actuator	0…260V	401092025
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 100mA	electronic	230V	401092026
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 100mA	electronic	0…260V	401092027
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 3mA	electronic	230V	401092028
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 3mA	electronic	0…260V	401092029
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	manual	230V	401092030
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	manual	0…260V	401092031
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	actuator	230V	401092032
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	actuator	0…260V	401092033
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	electronic	230V	401092034
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	electronic	0…260V	401092035

model-16Amp	model-32Amp	model-63Amp	three-phase current	model-5Am	model-16Amp	model-32Amp	model-63Amp
401092100	401092200	401092300	400V	401092500	401092600	401092700	401092800
401092101	401092201	401092301	0…450V	401092501	401092601	401092701	401092801
401092102	401092202	401092302	400V	401092502	401092602	401092702	401092802
401092103	401092203	401092303	0…450V	401092503	401092603	401092703	401092803
401092104	401092204	401092304	400V	401092504	401092604	401092704	401092804
401092105	401092205	401092305	0…450V	401092505	401092605	401092705	401092805
401092106	401092206	401092306	400V	401092506	401092606	401092706	401092806
401092107	401092207	401092307	0…450V	401092507	401092607	401092707	401092807
401092108	401092208	401092308	400V	401092508	401092608	401092708	401092808
401092109	401092209	401092309	0…450V	401092509	401092609	401092709	401092809
401092110	401092210	401092310	400V	401092510	401092610	401092710	401092810
401092111	401092211	401092311	0…450V	401092511	401092611	401092711	401092811
401092112	401092212	401092312	400V	401092512	401092612	401092712	401092812
401092113	401092213	401092313	0…450V	401092513	401092613	401092713	401092813
401092114	401092214	401092314	400V	401092514	401092614	401092714	401092814
401092115	401092215	401092315	0…450V	401092515	401092615	401092715	401092815
401092116	401092216	401092316	400V	401092516	401092616	401092716	401092816
401092117	401092217	401092317	0…450V	401092517	401092617	401092717	401092817
401092118	401092218	401092318	400V	401092518	401092618	401092718	401092818
401092119	401092219	401092319	0…450V	401092519	401092619	401092719	401092819
401092120	401092220	401092320	400V	401092520	401092620	401092720	401092820
401092121	401092221	401092321	0…450V	401092521	401092621	401092721	401092821
401092122	401092222	401092322	400V	401092522	401092622	401092722	401092822
401092123	401092223	401092323	0…450V	401092523	401092623	401092723	401092823
401092124	401092224	401092324	400V	401092524	401092624	401092724	401092824
401092125	401092225	401092325	0…450V	401092525	401092625	401092725	401092825
401092126	401092226	401092326	400V	401092526	401092626	401092726	401092826
401092127	401092227	401092327	0…450V	401092527	401092627	401092727	401092827
401092128	401092228	401092328	400V	401092528	401092628	401092728	401092828
401092129	401092229	401092329	0…450V	401092529	401092629	401092729	401092829
401092130	401092230	401092330	400V	401092530	401092630	401092730	401092830
401092131	401092231	401092331	0…450V	401092531	401092631	401092731	401092831
401092132	401092232	401092332	400V	401092532	401092632	401092732	401092832
401092133	401092233	401092333	0…450V	401092533	401092633	401092733	401092833
401092134	401092234	401092334	400V	401092534	401092634	401092734	401092834
401092135	401092235	401092335	0…450V	401092535	401092635	401092735	401092835

For general technical data of the testers please look on page 144.
Several additional combinations are available upon request –
see SCHLEICH-MODULAR-CONCEPT on page 54.

Product Overview Standard Testers

GLP2-e | Combination Testers



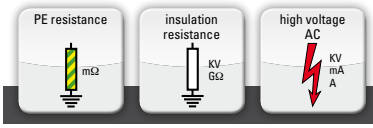
Safety and function

safety tests						functional tests	
PE	**range**	**IR**	**range**	**HV AC**	**setting**	**one-phase**	**model-5Amp**
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	–		230V	401093000
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	–		0…260V	401093001
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 3mA	electronic	230V	401093002
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 3mA	electronic	0…260V	401093003
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 100mA	manual	230V	401093004
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 100mA	manual	0…260V	401093005
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 100mA	actuator	230V	401093006
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 100mA	actuator	0…260V	401093007
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 100mA	electronic	230V	401093008
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 100mA	electronic	0…260V	401093009
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 3mA	electronic	230V	401093010
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 3mA	electronic	0…260V	401093011
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	manual	230V	401093012
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	manual	0…260V	401093013
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	actuator	230V	401093014
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	actuator	0…260V	401093015
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	electronic	230V	401093016
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	electronic	0…260V	401093017
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	–		230V	401093018
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	–		0…260V	401093019
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 3mA	electronic	230V	401093020
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 3mA	electronic	0…260V	401093021
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 100mA	manual	230V	401093022
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 100mA	manual	0…260V	401093023
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 100mA	actuator	230V	401093024
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 100mA	actuator	0…260V	401093025
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 100mA	electronic	230V	401093026
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 100mA	electronic	0…260V	401093027
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 3mA	electronic	230V	401093028
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 3mA	electronic	0…260V	401093029
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	manual	230V	401093030
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	manual	0…260V	401093031
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	actuator	230V	401093032
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	actuator	0…260V	401093033
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	electronic	230V	401093034
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	electronic	0…260V	401093035

model-16Amp	model-32Amp	model-63Amp	three-phase current	model-5Am	model-16Amp	model-32Amp	model-63Amp
401093100	401093200	401093300	400V	401093500	401093600	401093700	401093800
401093101	401093201	401093301	0…450V	401093501	401093601	401093701	401093801
401093102	401093202	401093302	400V	401093502	401093602	401093702	401093802
401093103	401093203	401093303	0…450V	401093503	401093603	401093703	401093803
401093104	401093204	401093304	400V	401093504	401093604	401093704	401093804
401093105	401093205	401093305	0…450V	401093505	401093605	401093705	401093805
401093106	401093206	401093306	400V	401093506	401093606	401093706	401093806
401093107	401093207	401093307	0…450V	401093507	401093607	401093707	401093807
401093108	401093208	401093308	400V	401093508	401093608	401093708	401093808
401093109	401093209	401093309	0…450V	401093509	401093609	401093709	401093809
401093110	401093210	401093310	400V	401093510	401093610	401093710	401093810
401093111	401093211	401093311	0…450V	401093511	401093611	401093711	401093811
401093112	401093212	401093312	400V	401093512	401093612	401093712	401093812
401093113	401093213	401093313	0…450V	401093513	401093613	401093713	401093813
401093114	401093214	401093314	400V	401093514	401093614	401093714	401093814
401093115	401093215	401093315	0…450V	401093515	401093615	401093715	401093815
401093116	401093216	401093316	400V	401093516	401093616	401093716	401093816
401093117	401093217	401093317	0…450V	401093517	401093617	401093717	401093817
401093118	401093218	401093318	400V	401093518	401093618	401093718	401093818
401093119	401093219	401093319	0…450V	401093519	401093619	401093719	401093819
401093120	401093220	401093320	400V	401093520	401093620	401093720	401093820
401093121	401093221	401093321	0…450V	401093521	401093621	401093721	401093821
401093122	401093222	401093322	400V	401093522	401093622	401093722	401093822
401093123	401093223	401093323	0…450V	401093523	401093623	401093723	401093823
401093124	401093224	401093324	400V	401093524	401093624	401093724	401093824
401093125	401093225	401093325	0…450V	401093525	401093625	401093725	401093825
401093126	401093226	401093326	400V	401093526	401093626	401093726	401093826
401093127	401093227	401093327	0…450V	401093527	401093627	401093727	401093827
401093128	401093228	401093328	400V	401093528	401093628	401093728	401093828
401093129	401093229	401093329	0…450V	401093529	401093629	401093729	401093829
401093130	401093230	401093330	400V	401093530	401093630	401093730	401093830
401093131	401093231	401093331	0…450V	401093531	401093631	401093731	401093831
401093132	401093232	401093332	400V	401093532	401093632	401093732	401093832
401093133	401093233	401093333	0…450V	401093533	401093633	401093733	401093833
401093134	401093234	401093334	400V	401093534	401093634	401093734	401093834
401093135	401093235	401093335	0…450V	401093535	401093635	401093735	401093835

For general technical data of the testers please look on page 144.
Several additional combinations are available upon request –
see SCHLEICH-MODULAR-CONCEPT on page 54.

GLP2-ce & **GLP2-e** | Combination Testers



Safety

PE	range	IR	range	HV AC	setting	model-ce	model-e
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	–		401091000	401091100
1…10A	10mΩ…1.2Ω	–		0…3000V / 3mA	electronic	401091001	401091101
1…10A	10mΩ…1.2Ω	–		0…3000V / 100mA	manual	401091002	401091102
1…10A	10mΩ…1.2Ω	–		0…3000V / 100mA	actuator	401091003	401091103
1…10A	10mΩ…1.2Ω	–		0…6000V / 3mA	electronic	401091004	401091104
1…10A	10mΩ…1.2Ω	–		0…6000V / 100mA	manual	401091005	401091105
1…10A	10mΩ…1.2Ω	–		0…6000V / 100mA	actuator	401091006	401091106
1…10A	10mΩ…1.2Ω	–		0…6000V / 100mA	electronic	401091007	401091107
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 3mA	electronic	401091008	401091108
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 100mA	manual	401091009	401091109
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 100mA	actuator	401091010	401091110
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 3mA	electronic	401091011	401091111
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	manual	401091012	401091112
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	actuator	401091013	401091113
1…10A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	electronic	401091014	401091114
–		50…1000V	100KΩ…1GΩ	0…3000V / 3mA	electronic	401091015	401091115
–		50…1000V	100KΩ…1GΩ	0…3000V / 100mA	manual	401091016	401091116
–		50…1000V	100KΩ…1GΩ	0…3000V / 100mA	actuator	401091017	401091117
–		50…1000V	100KΩ…1GΩ	0…6000V / 3mA	electronic	401091018	401091118
–		50…1000V	100KΩ…1GΩ	0…6000V / 100mA	manual	401091019	401091119
–		50…1000V	100KΩ…1GΩ	0…6000V / 100mA	actuator	401091020	401091120
–		50…1000V	100KΩ…1GΩ	0…6000V / 100mA	electronic	401091021	401091121
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	–		401091022	401091122
1…30A	10mΩ…1.2Ω	–		0…3000V / 3mA	electronic	401091023	401091123
1…30A	10mΩ…1.2Ω	–		0…3000V / 100mA	manual	401091024	401091124
1…30A	10mΩ…1.2Ω	–		0…3000V / 100mA	actuator	401091025	401091125
1…30A	10mΩ…1.2Ω	–		0…6000V / 3mA	electronic	401091026	401091126
1…30A	10mΩ…1.2Ω	–		0…6000V / 100mA	manual	401091027	401091127
1…30A	10mΩ…1.2Ω	–		0…6000V / 100mA	actuator	401091028	401091128
1…30A	10mΩ…1.2Ω	–		0…6000V / 100mA	electronic	401091029	401091129
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 3mA	electronic	401091030	401091130
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 100mA	manual	401091031	401091131
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…3000V / 100mA	actuator	401091032	401091132
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 3mA	electronic	401091033	401091133
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	manual	401091034	401091134
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	actuator	401091035	401091135
1…30A	10mΩ…1.2Ω	50…1000V	100KΩ…1GΩ	0…6000V / 100mA	electronic	401091036	401091136
–		50…1000V	100KΩ…1GΩ	0…3000V / 3mA	electronic	401091037	401091137
–		50…1000V	100KΩ…1GΩ	0…3000V / 100mA	manual	401091038	401091138
–		50…1000V	100KΩ…1GΩ	0…3000V / 100mA	actuator	401091039	401091139
–		50…1000V	100KΩ…1GΩ	0…6000V / 3mA	electronic	401091040	401091140
–		50…1000V	100KΩ…1GΩ	0…6000V / 100mA	manual	401091041	401091141
–		50…1000V	100KΩ…1GΩ	0…6000V / 100mA	actuator	401091042	401091142
–		50…1000V	100KΩ…1GΩ	0…6000V / 100mA	electronic	401091043	401091143

For general technical data of the testers please look on page 144. Several additional combinations are available upon request – see SCHLEICH-MODULAR-CONCEPT on page 54.

PE resistance

The PE test is performed at testers of protection class I. The test is to detect whether the PE resistance is below the normal limit value.

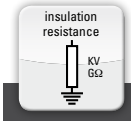
The test is to check whether leakage currents that might occur within the test object are properly conducted to the ground. If the PE connection is not proper there would be a high voltage at accessible metallic parts of your tester.

To detect the PE resistance, a preferably high alternating test current stipulated by the respective standard (typically 10A or 25A/30A AC) is lead through the PE. The tester calculates the PE resistance via the voltage drop measurement at the PE resistor and the test current measurement.

The PE test is performed in the precise four-wire-technology (also called Kelvin measurement). At this method the output resistance of the input leads to the test probe is automatically compensated.

PE tests are often performed via a manual scanning of the PE connection points to be tested with a PE test probe.

We supply testers with up to 100A test current.



Insulation resistance

The insulation resistance test is performed at testers of protection class I and II. It is checked whether the ohmic insulation resistance is above the normative limit value.

The test is to check whether a too high leakage current might occur in the test object. If the insulation resistance is too low or a PE error might occur this could lead to a high voltage at accessible metallic parts of the tester.

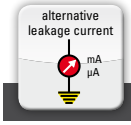
To detect the insulation resistance a preferably high test voltage stipulated by the respective standard (typically 500V DC) is connected to the conducting wires L+N of the tester against PE. The tester calculates the insulation resistance via the conducting current and the connected test voltage.

At testers of protection class II the test is performed via a probe against the accessible metallic enclosure parts of the test object.

In addition a test between the conducting wires (L against N) can also be performed.

If required the insulation resistance test is performed with a safety current limit to max. 3mA. Thus it protects the operator against an accidental touching of the test voltage.

We supply testers with a test voltage of up to 40KV DC.



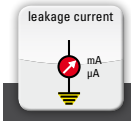
Alternative leakage current

The insulation resistance test and the alternative leakage current test are both performed between the conducting wires L+N against PE. But contrary to the insulation resistance test the alternative leakage test is performed with alternating voltage (AC).

The test is called alternative leakage current test because the test is not performed with the test object's nominal current between L+N against PE but with reduced test voltage.

The test voltage and the leakage current are measured. Afterwards the current is grossed up to the leakage current that would flow at nominal voltage. It is checked if this leakage current is below the normative limit value.

It is tested with a low voltage and how the test object would react under nominal voltage.



Leakage current EN 60990 | VDE 0106

The leakage current test can be performed at testers of protection class I and II. It is checked if the leakage current is below the normative limit value through the insulation.

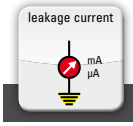
To evaluate the leakage current the test object is normally operated with a test voltage of "nominal voltage + 10%" in function. The tester selects the standard-compliant measuring circuit correspondingly to the required test standard.

The ground leakage current can be measured at testers of the protection class I in the PE. At testers of the protection class I and II the enclosure leakage current can be measured at the different accessible parts via a test probe.

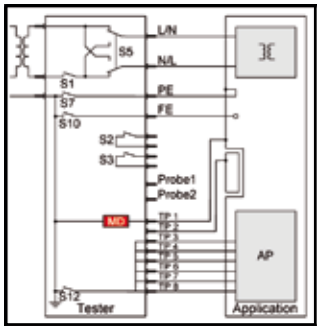
All necessary tests of the standard EN 60601 and further international standards can be performed at electro medical products.

Test methods

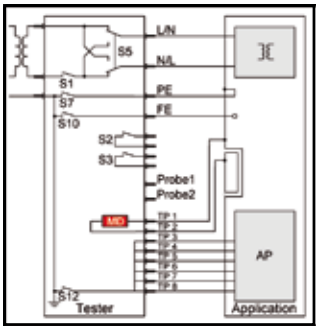
More and more electric products work with electronic modules and switch-mode power supplies. Thus leakage currents with the fundamental wave's frequency (50Hz or 60Hz) and additionally with the elementary frequency of electronic components and several harmonic waves flow at this. To measure these high frequency leakage currents we additionally provide a standard-compliant leakage current test up to 1MHz.



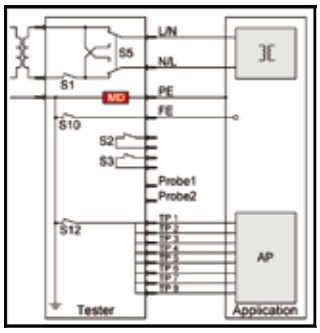
Leakage current medical EN 60601 | VDE 0750



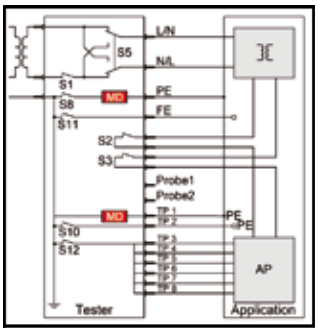
enclosure leakage current without test probe



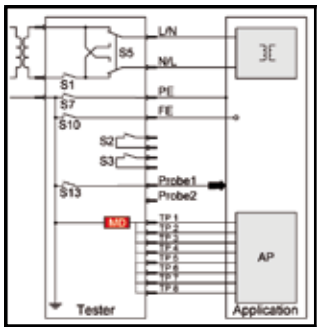
enclosure leakage current without test probe



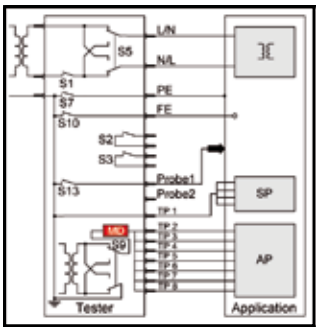
ground leakage current | tester with integrated voltage supply



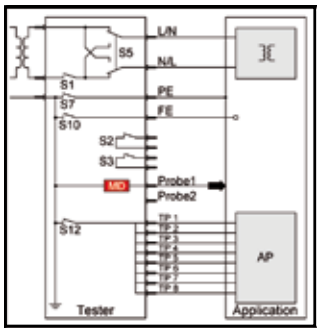
ground leakage current | tester with separate voltage supply



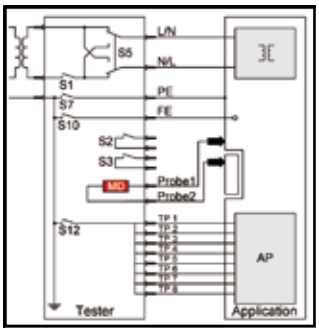
patient leakage current



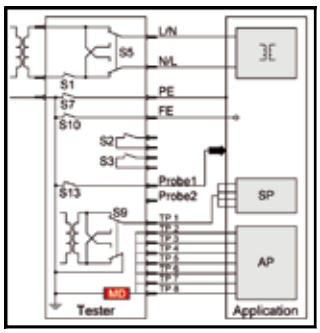
patient leakage current | application part type F



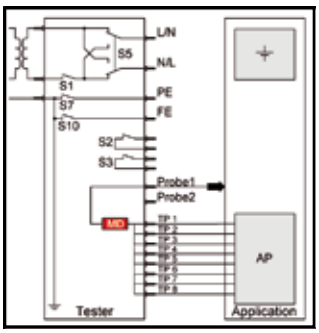
enclosure leakage current with one test probe



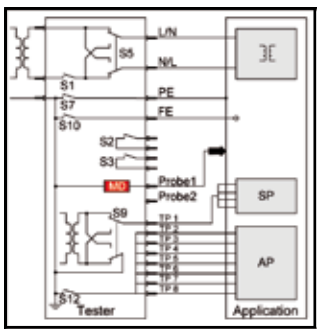
enclosure leakage current between two test probes



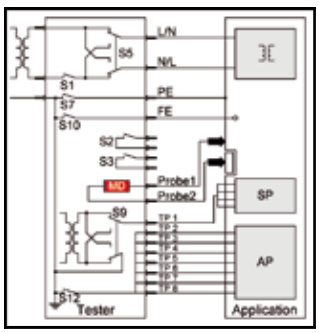
patient leakage current | signal parts switched to voltage



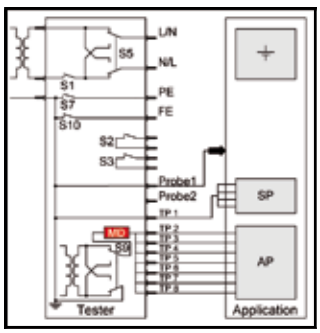
patient leakage current | internal current supply



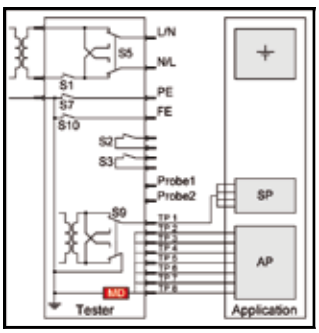
enclosure leakage current with one test probe | signal parts switched to voltage



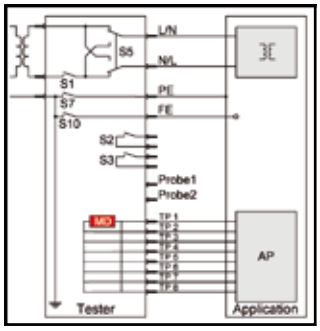
enclosure leakage current between two test probes | signal parts switched to voltage



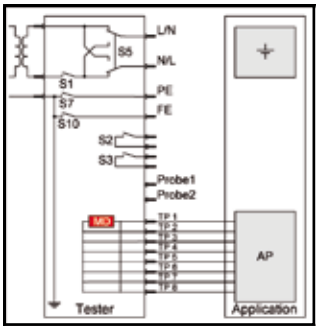
patient leakage current | application part type F | internal current supply



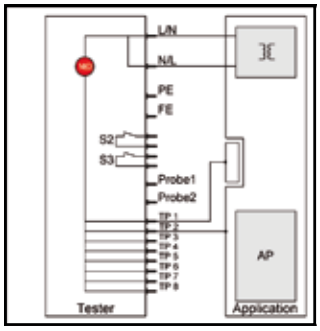
patient leakage current | signal parts switched to voltage | internal current supply 15 patient auxiliary current



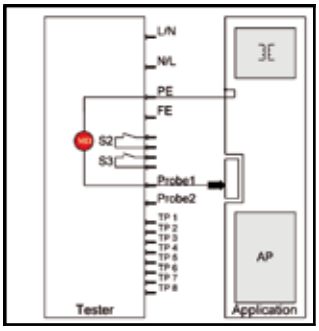
patient auxiliary current



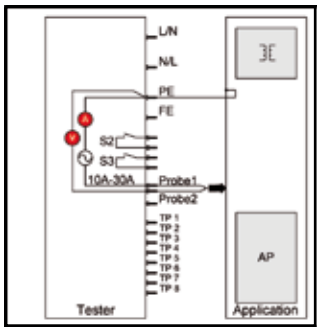
patient auxiliary current | internal current supply



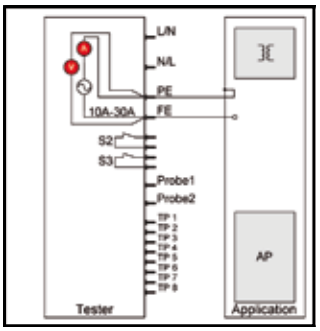
insulation resistance test L+N enclosure part



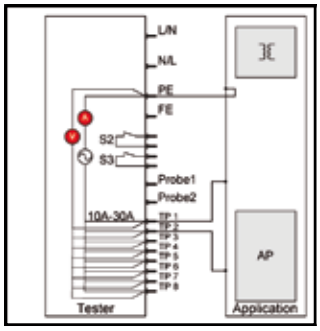
insulation resistance test PE-enclosure part



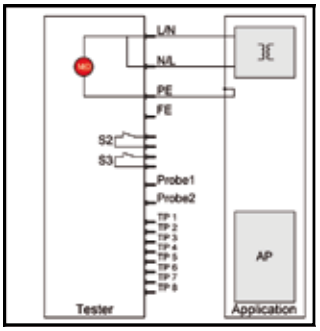
PE resistance test PE probe



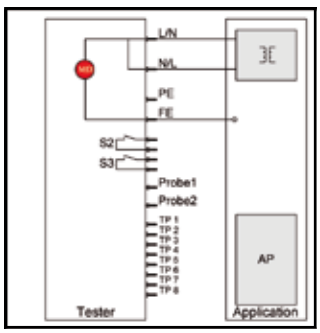
PE resistance test PE-FE



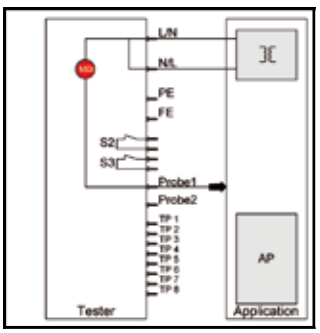
PE resistance test PE-TP 1 to TP 8



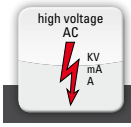
insulation resistance test L+N-PE



insulation resistance test L+N-FE



insulation resistance test L+N-test probe



High-voltage HV-AC

The high-voltage test with alternating current (AC) serves for detecting insulation faults at all kinds of electric products.

The test voltage level for the different electric products is stipulated in the corresponding standard.

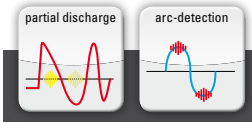
The test with alternating voltage is the most popular method of the high-voltage test. However, the high-voltage test with alternating voltage also has disadvantages. Test objects with a capacitive part in the insulation path allow a capacitive current flow due to the alternating voltage. This capacitive discharge current is often much higher than the leakage current due to the ohmic insulation resistance R_{Iso}, this is usually a very high ohmic. The result is that the discharge current flowing through the condenser during the test overlaps the actually to be determined fault current due to the resistor to a great extent. The discharge current often additionally stresses the test object.

The capacitive discharge current is no fault current due to poor insulation but an inevitable leakage current caused by physical laws. Thus a high-voltage test with AC is rather a disruptive discharge test at which it is tested if the test object resists the connected high-voltage.

In addition it has to be considered that currents higher than 3mA can be life threatening upon touching through the operator. That is why testers that operate with more than 3mA test current absolutely have to be operated with the appropriate protection measurements. These are safety test pistols or in the best case test covers or test cages. High-voltage testers that do not operate with more than 3mA AC current are called safety current limited (also see VDE 0104 – EN 50191).

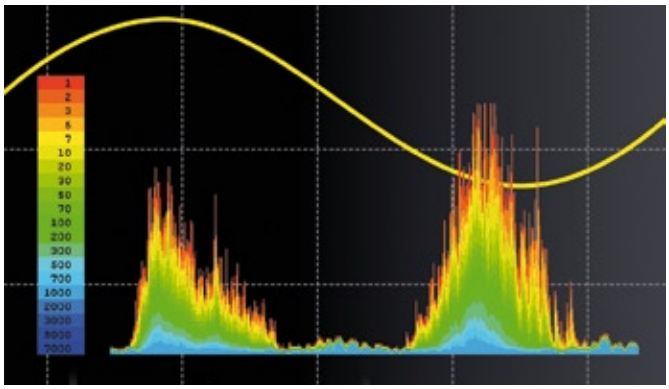
We supply testers with a test voltage of up to 100KV test voltage and high test currents.

Test methods

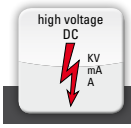


Partial discharge / arc-detection with HV-AC

Partial discharge refers to the discharges at insulations that are not indicated by means of a complete disruptive breakdown directly after connecting the high-voltage. Only a regional partial path of the insulator shows a defect. The strength at this defect is so big that it leads to a partial discharge (PD). The remaining good insulation still resists the connected test voltage. By means of arc-detection or special partial discharge measuring technology this kind of fault at the isolator is detected. Especially in the electric motor manufacturing this test is important to locate production faults in the form of defects within the winding.



It is often tried to distinguish between “internal PD” and “external PD”. External PD occurs on surfaces, often between bare defect wires. On the contrary the internal PD is discharged within the insulation material, e.g. in impregnating resin of motors.



High-voltage HV-DC

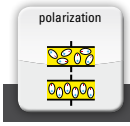
The high-voltage test with direct voltage (DC) serves to detect insulation faults at all kinds of electric products. The test with direct voltage can often be used as alternative to the test with alternating current. In principle it is a classic insulation resistance test but usually with much higher test voltages. Thus a tester either evaluates the current or the insulation resistance.

The capacitive discharge current flowing during the test with alternating current does not flow with the high-voltage test with DC. The capacities in the test object are only charged once. After this only a leakage current flows through the ohmic resistance R_{ISO}. Thus definitely more precise statements regarding the insulation’s quality can be made with the high-voltage test with DC then it is possible with AC. As no permanent capacitive discharge takes place the test object is not stressed that much.

But it has to be considered that test currents larger than 12mA are life threatening for the operator. Testers that can operate with more than 12mA test current definitely have to be operated with appropriate safety measurements. These can be safety pistols or in the best case test covers or test cages. High-voltage testers that do not operate with more than 12mA DC current are called safety current limited

The test voltage level for the different electric products is stipulated in the corresponding standard. However, as a rule you can say that the DC test voltage should be the approx. 1.5 time of the AC test voltage (also see VDE 0104 – EN 50191).

We supply testers with a test voltage of up to 50KV.



Polarization index

At electric machines, the polarization index is a very important measuring indicator to determine the insulation’s quality and deterioration that occurs with the increasing age of the motor.

Polarization means the ability of the charge carriers that are within the isolator to rotate and arrange at the electric field – i.e. to polarize. The older the insulation the worse is the movability of the charge carriers. As a result the electric insulation ability decreases and with increasingly probability this could lead to a serious damage of the motor.

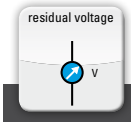
The energy required for rotating the load carrier within the isolator can be measured in form of a low current at the high-voltage test DC.

The polarization of the load carrier is not performed promptly after connecting the test voltage but can take up to 10 minutes. It is assumed that the polarization is still under process after one minute after the charging of the test object’s capacities. Thus the load carriers’ movability can be determined based on the current ratio at a strong rotation at the beginning and the reduced current at the end of the rotations.

$$PI = \frac{current_{1minute}}{current_{10minutes}} \quad \text{or as well} \quad \frac{insulation\ resistance_{10minutes}}{insulation\ resistance_{1minute}}$$

At a good isolator the current is reduced by 4 to 5 times after 10 minutes as all load carriers are polarized then. This leads to a good PI – e.g. of four or five. At a bad isolator the current has hardly changed after 10 minutes as the immobile load carriers are not able to polarize properly. This results in a low bad PI, e.g. of 1,5. Such a tester should urgently be maintained.

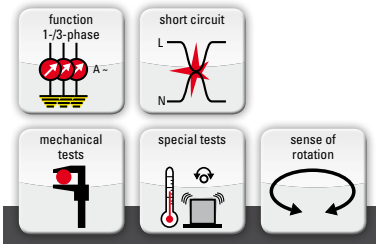
As a consequence of this the real current is only measured after the end of the polarization by means of the insulation resistance. If the insulation resistance at motors is determined too fast a too low resistance is shown, as the charging of the test object's capacity and afterwards also the polarization is measured.



Residual voltage

At the residual voltage test it is checked whether a test object still shows a dangerous residual voltage at the connecting leads or the mains plug after switching the supply voltage off.

The residual voltage can occur due to internal charges in the test object. To exclude any dangers these charges have to be reduced within a time stipulated in the standard.



Functioning

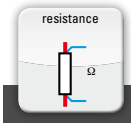
After the safety tests a functional test is performed. Providing the test object shows not short circuit the requested test voltage is switched to the test object during the functional test.

The most frequently used criterion for the functioning assessment is the charging rate. But also other electric variables like output or phase shifting can be used for the assessment. In addition also further physical parameter can be measured and evaluated, for example:

- rotation speed
- sense of rotation
- torque
- temperature
- pressure
- measuring paths
- vibration
- sounds
- mechanical movements
- flow rate
- visual measurements and more

The modular test concept of our testers allows the simple electric functional test as well as very complex functional tests, e.g. at vehicle drives.

We supply testers with functional tests up to 1000A.



Resistance

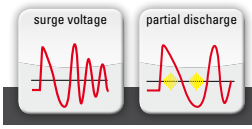
The ohmic resistance test is performed either in two- or four-wire-technology. At the two-wire-technology the resistances of the measuring leads, the relay switchovers, and the contacting points are included in the measuring result. Thus this version is only used at resistances higher than 10Ω as this fault does not have such a large percentage at the measuring value then.

At low-ohmic test objects the four-wire-technology is always to be used for the automatic compensation of the transition resistances in the measuring leads and the contacting points.

For an optimum four-wire-contacting we recommend the so-called Kelvin clamps and four-wire-test probes.

If temperature dependent resistances for example motor coils made of copper wire are to be measured the temperature also has to be considered. For this either the ambient temperature or the object temperature of the test object is measured to standardize the measured temperature dependent resistances to normally 20°C.

We supply testers with measuring ranges of 1µΩ up to 1MΩ.



Surge voltage & partial discharge

For the surge voltage test, the tester loads a so-called surge condenser to the requested test voltage. The tester switches the loaded condenser "abruptly" to the coil to be tested. This happens in less than 100 nanoseconds. The surge condenser and the coil to be tested form a LC resonator afterwards. A surge vibration is adjusted in the resonator that is typical for this coil like a fingerprint.

High voltage differences are formed within the coil from winding to winding for spit seconds. They might lead to local flashovers at defect points. In this way coil faults can be detected already visually due to the flashes.

The surge graphs a digitalized in the tester and displayed on the screen.

Test methods

The evaluation can either be done visually by the operator or fully automatic by the tester. The automatic evaluation is based on a comparison of one stator's coils among each other or to a saved reference test object.

Via different automatic analysis methods precise statements regarding the equality of coils can be made. Winding and phase leakages within a coil lead to imbalances in the surge graphs which are detected by the software and automatically evaluated as pass or fail. This is done very reliably and does not require any special knowledge of the operator.

We supply testers with up to 50KV test voltage.

Visual examination

At a visual examination the operator performs and evaluates visual examinations of the test object. The result is entered manually at the testers.

To support the test digital pictures can be shown on the screen depending on the tester.

The individual visual tests are individual test steps or accumulative test steps within a test process. The result of the visual test is saved as well and documented in the protocol.

CONTACT

address:	Schleich GmbH An der Schleuse 11 58675 Hemer | Germany
phone:	+49 (0) 23 72-94 98-0
fax:	+49 (0) 23 72-94 98-99
e-mail:	welcome@schleich.com
service & support:	service@schleich.com
calibration:	calibration@schleich.com
sales:	+49 (0) 23 72-94 98-0 sales@schleich.com
sales partners:	www.schleich.com/de/vertrieb.php www.schleich.com/en/vertrieb.php

SCHLEICH
Advanced Test Technologies

Made in Germany

Schleich GmbH
An der Schleuse 11
58675 Hemer | Germany
Phone +49 (0) 23 72-94 98-0
Fax +49 (0) 23 72-94 98-99
info@schleich.com
www.schleich.com

www.schleich.com