

TECHNICAL DATA SHEET

Safety and function tester GLP1-g

Revision 6-4 / valid as of September 2025

Standard model GLP1-g

ELECTRICAL SPECIFICATION	
Supply voltage	110 to 250 V AC, 1-phase
Mains frequency	47 to 63 Hz
No load current consumption	0.5 A
Device fuse	T10A
External fuse at customer's site	16A
GENERAL SPECIFICATION	
Touch display	5"-color display, resolution: 480 x 272 pixels
Data input / operation	via touch display
Time & Date	Built-in clock with calendar
Test plan storage	1000 test plans The test steps have a fixed order: PE, IR, HVDC, HVAC, function Individual test steps can be disabled and will thus not be carried out
Test results storage	2000 test results, consisting of specification values, measured values, test result, date and time for each test step; Order details, serial number
Test connections	Test socket ¹⁾ on the front of the test device Test probe connection on the front of the device, Ground connection on the front of the device High-voltage connection sockets on the front of the device High-voltage-resistant industrial socket ^{1,2)} on the back of the device
Safety	Key-switch ³⁾ Password protection for access to the test parameters 2-channel evaluation via built-in safety relay for emergency stop, test cover, light curtain, test cabin, two-hand start, etc. Complies with VDE 0104/EN 50191 CE compliant, complies with VDE 0411-1/ EN 61010-1
Test result indication	Optical and acoustic
Communication interfaces	Switch-over between RS232, USB or LAN (optional) USB on the front for barcode scanner and service
Standard interfaces	Outputs: result light, warning light Inputs: Foot switch on the front, only for high-voltage testers with test probes, optional: two-hand start
SPS-I/O remote control interface	
Outputs for	go, nogo, test in progress, ready, HV-On, $I_{HV} < I_{min}$, $I_{HV} > I_{max}$
Current per output	100 mA It is not permitted to draw current from pin 17 of the control connector for your own control purposes!
Inputs	Start, Stop, foot-switch, 3 x binary test plan selection → Option to select from 7 test plans
Calibration	Adjustment via software, without the need to open the test device
Software-user friendliness	All entries are checked for plausibility. This is intended to prevent incorrect entries The operator can access a detailed help function (explanation) for each entry
Language on the front panel	DE, US
Language of the software	DE, US, IT, FR
Engineering and production	All Made in Germany – Premium Quality – Premium Competence

¹⁾ The design of the test connections can be freely configured when you place your order.

²⁾ When ordering the industrial socket on the rear panel, the test socket and/or the test probe connection are removed.

³⁾ Key-switch switch for enabling test devices with dangerous test voltages and/or dangerous test currents.

Earth / Ground-bond resistance test AC GLP1-g

TEST CURRENT AC

Test current	10 A AC, starting from 1 A, adjustable in steps of 1 A 30 A AC, starting from 1 A, adjustable in steps of 1 A 40 A AC, starting from 1 A, adjustable in steps of 1 A 75 A AC, starting from 1 A, adjustable in steps of 1 A
Output frequency	47 to 63 Hz, dependent on the mains supply
Test current nominal value	Set test current + 0.5 A
Current control	Fully electronic constant current control with minimum current monitoring and current interruption detector
Measurement technology	Fast, high-precision TRMS measurement (real effective value)

VOLTAGE

Test voltage max.	6 or 12 V AC – selectable by operator, with automatic maximum voltage limitation
Measurement technology	Fast, high-precision TRMS measurement (real effective value)

RESISTANCE

Precision	High-precision 4-wire resistance measurement	
Total measuring range	0 to 1200 mΩ Depending on the applied test current and the permissible maximum test voltage	
Resolution	1 mΩ or 100 mV	
Resistance measurement from – to	Test voltage 6 V 0 to 600 mΩ at 10 A 0 to 200 mΩ at 30 A 0 to 150 mΩ at 40 A 0 to 80 mΩ at 75 A	Test voltage 12 V 0 to 1200 mΩ at 10 A 0 to 400 mΩ at 30 A 0 to 300 mΩ at 40 A 0 to 160 mΩ at 75 A
Milliohm offset range	0 to 300 mΩ	
Measurement precision	±0.25 % of final value ±1 mΩ	

EVALUATION RESISTANCE

Number of evaluations	3
Evaluation based on	Ohmic resistance
Measurement unit on the display	mΩ
① Upper resistance value → PE _{Rmax}	0 to 1200 mΩ, user-definable, measured values equal to or below this limit are GO The limit value is specified in the country-specific standards and regulations for electrical engineering
② Lower resistance value → PE _{Rmin}	User-definable, measured values below this limit are NOGO This function is used for contact checking. This function can be deactivated The lower resistance limit is always less than the upper limit
③ Undercurrent → I _{min}	If the test current is lower than the specified value during the test, the test result is NOGO

EVALUATION VOLTAGE

Number of evaluations	3
Evaluation based on	Voltage drop
Measurement unit on the display	V
① Upper voltage limit → PE _{Umax}	0 to 12 V, user-definable, measured values equal to or below this limit are GO The limit value is specified in the country-specific standards and regulations for electrical engineering.
② Lower voltage limit → PE _{Umin}	User-definable, measured values below this limit are NOGO This function is used for contact checking. This function can be deactivated The lower voltage limit is always smaller than the upper limit
③ Undercurrent → I _{min}	If the test current is lower than the specified value during the test, the test result is NOGO

GENERAL

Test timer	0.3 s / 0.4 s / 0.5 s etc., in steps of 0.1 s Test devices with rear test connection: Max. test duration: 1 h Test devices up to 30 A and test probe connection on the front Applies to variants GLP1-g: 120, 130, 620, 630, 1011, 1012, 1021, 1022, 1030, 1031, 1032, 1041, 1042, 1122, 1130, 1221, 1222, 1225, 1226, 1231, 1232, 1320, 1520 and 1720 Max. test duration at test current ≤ 10 A: 1 h Max. test duration at test current > 10 A: 180 s
Measurement points	Note: For details, refer to the technical data for the electrical connections in a separate chapter of the operating manual

Earth / Ground-bond resistance test DC GLP1-g

TEST VOLTAGE DC

Test voltage max.	40 A DC, beginning at 1 A, adjustable in steps of 1 A
Current control	Automatic electronic constant current control with minimum current monitoring and current interruption detector
Setting	Set current + 0.5 A
Measurement technology	High-precision mean value measurement

VOLTAGE

Test voltage max.	6 or 12 V AC – adjustable by operator, with automatic maximum voltage limitation
Measurement technology	High-precision mean value measurement

RESISTANCE

Precision	High-precision 4-wire resistance measurement	
Total measuring range	0 to 6 Ω, dependent on the test current applied	
Resolution	1 mΩ or 10 mV	
Resistance measurement from – to	0 to 600 mΩ at 6 V and 10 A 0 to 300 mΩ at 6 V and 20 A 0 to 150 mΩ at 6 V and 40 A 0 to 6000 mΩ at 6 V and 1 A	0 to 1200 mΩ at 12 V and 10 A 0 to 600 mΩ at 12 V and 20 A 0 to 300 mΩ at 12 V and 40 A 0 to 6000 mΩ at 12 V and 2 A
Milliohm offset range	0 to 300 mΩ	
Measuring accuracy	±0.25 % of final value ±1 mΩ	

EVALUATION RESISTANCE

Number of evaluations	3
Evaluation based on	Ohmic resistance
Measurement unit on the display	mΩ
① Upper resistance value → PE _{Rmax}	0 to ≤ 6 Ω, user-definable, measured values equal to or below this limit are GO The limit value is specified in the country-specific standards and regulations for electrical engineering.
② Lower resistance value → PE _{Rmin}	User-definable, measured values below this limit are NOGO This function is used for contact checking. This function can be deactivated The lower resistance limit is always less than the upper limit
③ Undercurrent → I _{min}	If the test voltage is less than the specified value, the test result is NOGO

EVALUATION VOLTAGE

Number of evaluations	3
Evaluation based on	Voltage drop
Measurement unit on the display	V
① Upper voltage limit → PE _{Umax}	0 to 12 V, user-definable, measured values equal to or below this limit are GO The limit value is specified in the country-specific standards and regulations for electrical engineering.
② Lower voltage limit → PE _{Umin}	User-definable, measured values below this limit are NOGO This function is used for contact checking. This function can be deactivated The lower voltage limit is always smaller than the upper limit
③ Undercurrent → I _{min}	If the test voltage is less than the specified value, the test result is NOGO

GENERAL

Test timer	0.3 s / 0.4 s / 0.5 s etc., in steps of 0.1 s
Measurement points	Note: For details, refer to the technical data for the electrical connections in a separate chapter of the operating manual

Insulation resistance test for devices with max. 1000 V GLP1-g

TEST VOLTAGE

Test voltage	50 to 1000 V DC, adjustable in steps of 10 V
Voltage control	Automatic electronic constant voltage control with undervoltage monitoring
Setting	Set value + 5 V
Measurement technology	High-precision mean value measurement

CURRENT

Test current max.	2 to 3 mA DC, safety current limiting
Output value	Max. 2 W
Measurement technology	High-precision mean value measurement

RESISTANCE

Measuring ranges	500 kΩ to 250 MΩ 500 kΩ to 10 GΩ
Resolution	100 kΩ
Measuring accuracy	Up to 10 MΩ: ±0.5 % of final value ±100 kΩ at a test voltage of at least 500 V Up to 250 MΩ: ±0.75 % of final value ±100 kΩ at a test voltage of at least 500 V Up to 10 GΩ: ±0.5 % of final value ±100 kΩ at a test voltage of at least 500 V

EVALUATION RESISTANCE

Number of evaluations	3
Evaluation based on	Ohmic resistance
Measurement unit on the display	MΩ
① Lower resistance value → IR_{Rmin}	250 kΩ to 10 GΩ user-definable, measured values equal to or above this limit are GO
② Upper resistance value → IR_{Rmax}	250 kΩ to 10 GΩ user-definable, measured values above this limit are NOGO This function is used for contact checking. This function can be deactivated The upper resistance limit is always higher than the lower limit
③ Undervoltage → U_{min}	If the test voltage is lower than the set value, the test result is NOGO

EVALUATION CURRENT

Number of evaluations	3
Evaluation based on	Current
Measurement unit on the display	μA, mA
① Upper current limit → I_{max}	0 to max. test voltage (depending on the device model), measured values equal to or below this limit are GO
② Lower current limit → I_{min}	0 to max. test voltage (depending on the device model), measured values below this limit are NOGO This function is used for contact checking. This function can be deactivated The lower current limit is always less than the upper limit
③ Undervoltage → U_{min}	If the test voltage is lower than the set value, the test result is NOGO

GENERAL

Test timer	0.3 s / 0.4 s / 0.5 s etc., in steps of 0.1 s up to max. 1 h
Ramp timer	0.3 s / 0.4 s / 0.5 s etc., in steps of 0.1 s up to max. 1 h
Discharge	Discharge time for a fully resistive device under test: ca. ≤200 ms Discharge time for a capacitive device under test: ca. $t = 5 \times R \times C$ t = Discharge time [s], R = Discharge resistance [Ω], C = Capacitance of the device under test between the test leads [F] Prerequisite: The test leads must remain connected to the device under test after the test.
Discharge resistance	470 kΩ for IR with max. 1000 V test voltage
Residual voltage monitoring	The test step is regarded as completed only when the output voltage has fallen below 60 V.
Internal resistance	330 kΩ for IR with max. 1000 V test voltage The internal resistance determines the charging time of your device under test. Min. Charging time [s] = $5 \times$ Internal resistance [Ω] x DUT capacitance [F]
Measurement points	Note: For details, refer to the technical data for the electrical connections in a separate chapter of the operating manual

Insulation resistance test for devices HV DC > 1000 V GLP1-g

TEST VOLTAGE

Test voltage	GLP1-g 820: 50 to 4000 V DC, adjustable in steps of 10 V GLP1-g 830: 50 to 6000 V DC, adjustable in steps of 10 V GLP1-g 831: 50 to 6000 V DC, adjustable in steps of 10 V GLP1-g 840: 100 to 10000 V DC, adjustable in steps of 10 V
Voltage control	Automatic electronic constant voltage control with undervoltage monitoring
Setting	Set value + 5 V
Measurement technology	High-precision mean value measurement

CURRENT

Test current max.	GLP1-g 820: 10 mA DC, safety current limiting GLP1-g 830: 10 mA DC, safety current limiting GLP1-g 831: 20 mA DC, no safety current limiting GLP1-g 840: 6 mA DC, safety current limiting
Measurement technology	High-precision mean value measurement

RESISTANCE

Measuring range	500 kΩ to 10 GΩ
Resolution	100 kΩ
Measuring accuracy	Up to 10 MΩ: ±0.5 % of final value, ±100 kΩ at a test voltage of at least 500 V Up to 10 GΩ: ±0.5 % of final value, ±100 kΩ at a test voltage of at least 500 V

EVALUATION RESISTANCE

Number of evaluations	3
Evaluation based on	Ohmic resistance
Measurement unit on the display	MΩ
① Lower resistance value → IR _{Rmin}	500 kΩ to 10 GΩ user-definable, Measured values equal to or above this limit are GO
② Upper resistance value → IR _{Rmax}	500 kΩ to 10 GΩ user-definable, Measured values above this limit are NOGO This function is used for contact checking. This function can be deactivated The upper resistance limit is always higher than the lower limit
③ Undervoltage → U _{min}	If the test voltage is lower than the set value, the test result is NOGO

EVALUATION CURRENT

Number of evaluations	3
Evaluation based on	Current
Measurement unit on the display	μA, mA
① Upper current limit → I _{max}	0 to max. TEST VOLTAGE (depending on the device model), Measured values equal to or below this limit are GO
② Lower current limit → I _{min}	0 to max. TEST VOLTAGE (depending on the device model), Measured values below this limit are NOGO This function is used for contact checking. This function can be deactivated The lower current limit is always less than the upper limit
③ Undervoltage → U _{min}	If the test voltage is lower than the set value, the test result is NOGO

GENERAL

Test timer	0.3 s / 0.4 s / 0.5 s etc., in steps of 0.1 s to max. 100 h
Ramp timer for run-up	0.3 s / 0.4 s / 0.5 s etc., in steps of 0.1 s to max. 100 h
Discharge	Discharge time for a fully resistive device under test: ca. ≤200 ms Discharge time for a capacitive device under test: ca. $t = 5 \times R \times C$ t = Discharge time [s], R = Discharge resistance [Ω], C = Capacitance of the device under test between the test leads [F] Prerequisite: The test leads must remain connected to the device under test after the test.
Discharge resistance	For IR with a test device up to 4 kV: 470 kΩ For IR with a test device up to 6 kV: 33 kΩ For IR with a test device up to 10 kV: 33 kΩ
Residual voltage monitoring	The test step is regarded as completed only when the output voltage has fallen below 60 V.
Measurement points	Note: For details, refer to the technical data for the electrical connections in a separate chapter of the operating manual

High-voltage test AC GLP1-g

TEST VOLTAGE

Test voltage and resolution	GLP1-g 320: 50 to 6000 V AC potential-free @ 3 mA, resolution: 1 V GLP1-g 330: 50 to 6000 V AC potential-free @ 100 mA, resolution: 1 V, ≥500 VA GLP1-g 340: 50 to 6000 V AC potential-free @ 200 mA, resolution: 1 V, 1000 VA GLP1-g 350: 100 to 12000 V AC potential-free @ 100 mA, resolution: 1 V, 1000 VA GLP1-g 360: 125 to 15000 V AC not potential-free @ 50 mA, resolution: 10 V GLP1-g 370: 250 to 30000 V AC not potential-free @ 30 mA, resolution: 50 V GLP1-g 380: 400 to 50000 V AC not potential-free @ 25 mA, resolution: 50 V
Voltage adjustment	Manual adjustment: adjustable in steps of 1 V Automatic selection: adjustable in steps of 10 V
Voltage control	Automatic electronic constant voltage control with undervoltage monitoring
Setting accuracy	Set value + 5 V
Voltage measurement	Real effective value (TRMS) or peak value, selectable by the operator
Measuring accuracy	Devices up to 12 kV: ±0.25 % of final value Devices up to 50 kV: ±1 % of final value
Measurement technology	High-precision effective value or peak value measurement (U_{TRMS} - U_{Peak})
Output frequency	47 to 63 Hz, dependent on the mains supply

CURRENT

Test current and resolution	GLP1-g 320: 3 mA, resolution 10 µA, safety current limiting with redundant overcurrent evaluation! Active safety current limiting – not via resistors! GLP1-g 330: 100 mA, resolution 10 µA $I_{sc} \geq 100$ mA from ≥ 500 V in accordance with VDE, EN, and IEC regulations $I_{sc} \geq 200$ mA from ≥ 900 V, in accordance with VDE, EN, and IEC regulations I_{sc} = short-circuit current GLP1-g 340: 200 mA, resolution 10 µA $I_{sc} \geq 100$ mA from ≥ 250 V in accordance with VDE, EN, and IEC regulations $I_{sc} \geq 200$ mA from ≥ 500 V, in accordance with VDE, EN, and IEC regulations I_{sc} = short-circuit current GLP1-g 350: 100 mA, resolution 10 µA $I_{sc} \geq 100$ mA from ≥ 1100 V in accordance with VDE, EN, and IEC regulations $I_{sc} \geq 200$ mA from ≥ 2050 V, in accordance with VDE, EN, and IEC regulations I_{sc} = short-circuit current GLP1-g 360: 50 mA, resolution 10 µA GLP1-g 370: 30 mA, resolution 10 µA GLP1-g 380: 25 mA, resolution 10 µA
Current measurement and evaluation	Real effective value (TRMS) or peak value, selectable by the operator Total current or active current, selectable by the user
Measuring accuracy	Devices up to 3 mA: ±0.5 % of final value ±0.01 mA Devices from 25 mA to 200 mA: ±0.25 % of final value ±0.1 mA
Measurement technology	Highly accurate true RMS and peak value measurement (selectable: I_{TRMS} or I_{Peak})

EVALUATION CURRENT

Number of evaluations	4
Evaluation based on	Current
Measurement unit on the display	mA
① Upper current limit → I_{max}	0 to max. TEST VOLTAGE (depending on the device model), Measured values equal to or below this limit are GO
② Lower current limit → I_{min}	0 to max. TEST VOLTAGE (depending on the device model), Measured values below this limit are NOGO This function is used for contact checking. This function can be deactivated The lower current limit is always less than the upper limit
③ Excess current with 'burn' function	No shutdown occurs in the event of excess current. The test voltage is electronically limited to max. 100 mA and/or a shutdown occurs for 0.5 s in the event of excess current
④ Undervoltage → U_{min}	If the test voltage is lower than the set value, the test result is NOGO

GENERAL

Test timer	Automatic Mode = Test timer: 0 / 0.3 s / 0.4 s / 0.5 s etc., in steps of 0.1 s to max. 200 h Manual mode = continuous operation for any length of time
Ramp timer - Ramp up	0.2 / 0.3 s / 0.4 s / 0.5 s etc., in steps of 0.1 s to max. 24 h
Ramp timer - Ramp down	0 / 0.3 s / 0.4 s / 0.5 s etc., in steps of 0.1 s to max. 24 h (0 = without ramp-down)
Operating modes	4
<i>Manual</i>	The voltage is set manually by hand on the rotary wheel. The test is performed without a timer Shutdown in case of excess current
<i>Automatic</i>	The voltage is automatically set according to specified values. The test is performed with a timer Shutdown in case of excess current or current outside the min-max window
<i>Burn</i>	The voltage is set manually by hand on the rotary wheel. The test is performed without a timer
<i>only for 6 kV - 20, 100 and 200 mA</i>	No shutdown occurs in the event of excess current. The test voltage is electronically limited to max. 100 mA
<i>Pulse</i>	The voltage is set manually using the rotary wheel. The test is performed without a timer
<i>not for 6 kV - 3 mA</i>	In the event of excess current, the system is shut down for 0.5 s. The test voltage is electronically limited to a maximum of 100 mA
Discharge	0 to 100 ms Prerequisite: The test leads must remain connected to the device under test during discharge after the test
Residual voltage monitoring	None, due to the very short discharge time
Measurement points	Note: For details, refer to the technical data for the electrical connections in a separate chapter of the operating manual

High-voltage test DC GLP1-g

TEST VOLTAGE

Test voltage and resolution	GLP1-g 820: 50 to 4000 V DC, not potential-free @ 10 mA, Resolution 1 V Negative pole to PE (earth - ground) GLP1-g 830: 50 to 6000 V DC, not potential-free @ 10 mA, Resolution 1 V Negative pole to PE (earth - ground) GLP1-g 831: 50 to 6000 V DC, not potential-free @ 20 mA, Resolution 1 V Negative pole to PE (earth - ground) GLP1-g 840: 100 to 10000 V DC, not potential-free @ 6 mA, Resolution 1 V Negative pole to PE (earth - ground)
Residual ripple	GLP1-g 820: $\pm 0.75\%$ U_{out} for 10 mA full load GLP1-g 830: $\pm 0.5\%$ U_{out} for 10 mA full load GLP1-g 831: $\pm 0.5\%$ U_{out} for 10 mA full load GLP1-g 840: $\pm 0.5\%$ U_{out} for 6 mA full load
Voltage adjustment	Manual adjustment: adjustable in increments of 1 V Automatic setting: adjustable in steps of 10 V
Voltage control	Automatic electronic constant voltage control with undervoltage monitoring
Adjustment accuracy	Approx. 5 to 10 V higher than the set value, from no load to full load
Current measurement	Mean value
Measuring accuracy	$\pm 0.25\%$ of final value ± 5 V
Measurement technology	Highly accurate average or peak value measurement (U_{AVG} - U_{Peak})

CURRENT

Test current	GLP1-g 820: 10 mA, safety current limiting GLP1-g 830: 10 mA, safety current limiting GLP1-g 831: 20 mA, safety current limiting GLP1-g 840: 6 mA, safety current limiting
Resolution	1 μ A
Current measurement and evaluation	Mean value
Measuring accuracy	$\pm 0.1\%$ of final value ± 1 μ A
Measurement technology	Highly accurate average or peak value measurement (I_{AVG} - I_{Peak})

INSULATION RESISTANCE

Max. 1 G Ω

EVALUATION CURRENT

Number of evaluations	3
Evaluation based on	Current
Measurement unit on the display	μ A, mA
① Upper current limit $\rightarrow I_{max}$	0 to max. test voltage (depending on the device model), Measured values equal to or below this limit are GO
② Lower current limit $\rightarrow I_{min}$	0 to max. test voltage (depending on the device model), Measured values below this limit are NOGO This function is used for contact checking. This function can be deactivated The lower current limit is always less than the upper limit
③ Undervoltage $\rightarrow U_{min}$	If the test voltage is lower than the set value, the test result is NOGO

EVALUATION RESISTANCE

Number of evaluations	3
Evaluation based on	Ohmic resistance
Measurement unit on the display	M Ω
① Lower resistance value $\rightarrow HV_{Rmin}$	500 k Ω to 10 G Ω user-definable, measured values equal to or above this limit are GO
② Upper resistance value $\rightarrow HV_{Rmax}$	500 k Ω to 10 G Ω user-definable, measured values above this limit are NOGO This function is used for contact checking. This function can be deactivated The upper resistance limit is always higher than the lower limit
③ Undervoltage $\rightarrow U_{min}$	If the test voltage is lower than the set value, the test result is NOGO

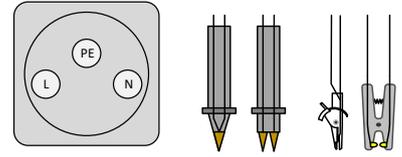
GENERAL

Test timer	Automatic Mode = Test timer: 0 / 0.3 s / 0.4 s / 0.5 s etc., in steps of 0.1 s to max. 100 h Manual mode = continuous operation for any length of time
Ramp timer – ramp-up	0 / 0.3 s / 0.4 s / 0.5 s etc., in steps of 0.1 s to max. 100 h (0 = without ramp-up)
Ramp timer – ramp-down	No timer, ramp-down only with internal discharge resistance This does not correspond to a linear voltage ramp, but rather to an exponential function
Discharge	Discharge time for a fully resistive device under test: ca. ≤ 200 ms Discharge time for a capacitive device under test: ca. $t = 5 \times R \times C$ t = Discharge time [s], R = Discharge resistance [Ω], C = Capacitance of the device under test between the test leads [F] Prerequisite: The test leads must remain connected to the device under test after the test
Discharge resistance	For IR with a test device up to 4 kV: 470 k Ω For IR with a test device up to 6 kV: 33 k Ω For IR with a test device up to 10 kV: 33 k Ω
Residual voltage monitoring	The test step is regarded as completed only when the output voltage has fallen below 60 V.
Measurement points	Note: For details, refer to the technical data for the electrical connections in a separate chapter of the operating manual

Function test, single-phase GLP1-g

TEST VOLTAGE	
	<i>U</i>
Test voltage	12 to 250 V AC single-phase potential-free via built-in isolating transformer @ 5 A single-phase
Resolution	1 V
Voltage adjustment	Adjustable in steps of 1 V
Voltage control	Automatic electronic constant voltage control with under- and overvoltage monitoring
Adjustment accuracy	Set value + 3 V
Current measurement	True RMS value (TRMS)
Measuring accuracy	±0.25 % of final value ±1 V
Measurement technology	High-precision true RMS measurement (U_{TRMS})
Output frequency	47 to 63 Hz, depending on the mains supply
CURRENT	
	<i>I</i>
Test current	Max. 5 A AC continuous current at 230 V Supply voltage at 12 to 230 V test voltage Max. 5 A reduced to 4.6 A continuous current AC at 230 V supply voltage decreasing proportionally to the test voltage from 230 V to 250 V Max. 5 A AC continuous current at 110 V supply voltage and 110 V test voltage Max. 5 A reduced to 2.2 A AC continuous current at 110 V supply voltage decreasing proportionally to the test voltage from 110 V to 250 V
Resolution	Range 1: 10 µA Range 2: 1 mA
Current measurement and evaluation	True RMS value (TRMS)
Measuring accuracy	Current measurement range 1: 100 µA – 70 mA ±0.25 % of final value ± 10 µA Current measurement range 2: 70 mA – 5 A ±0.25 % of final value ± 1 mA Built-in automatic switch-over between the two current measuring ranges
Measurement technology	High-precision true RMS measurement (I_{TRMS})
POWER	
	<i>W, VA, cosφ</i>
Power	1150 VA maximum continuous power at 230 V @ 5 A 550 VA maximum continuous power at 110 V @ 5 A
Resolution	0.1 VA or 0.1 W
Power measurement and evaluation	VA or W
Measuring accuracy	Power measurement range 1: ±0.5 % of final value 16 W ±0.1 VA, resp. ±0.1 W Power measurement range 2: ±0.5 % of final value 1150 W ±1 VA, resp. ±1 W Built-in automatic switch-over between the two power measuring ranges
EVALUATION CURRENT	
Number of evaluations	3
Evaluation based on	Current
Measurement unit on the display	mA
① Upper & lower limit ±tolerance in % of set value	Current: 0 A to 5 A, measured values within the tolerance limits are GO
② Under- and overvoltage	If the test voltage is less than -3 V from the set value, the test result is NOGO If the test voltage is greater than +3 V from the set value, the test result is NOGO
③ Short-circuit detection	Permanent short-circuit proof with automatic electronic current limitation to max. 5 A
EVALUATION POWER	
Number of evaluations	5
Evaluation based on	Power, phase angle
Measurement unit on the display	W, VA, φ
① Upper & lower limit ±Tolerance in % of set value	Apparent power: 0 to 1150 W, measured values within the tolerance limits are GO
② Upper & lower limit ±Tolerance in % of set value	Apparent power: 0 to 1150 VA, measured values within the tolerance limits are GO
③ Upper & lower limit ±Tolerance in % of set value	Power factor / cosφ: 0 to 1, measured values within the tolerance limits are GO
④ Under- and overvoltage	The test voltage is less than -3 V from the set value, the test result is NOGO If the test voltage is greater than +3 V from the set value, the test result is NOGO
⑤ Short-circuit detection	Permanent short-circuit proof with automatic electronic current limitation to max. 5 A
EVALUATION VISUAL	
Number of evaluations	2
① Visual inspection	Visual inspection during the functional test to check that the device under test is OK Manual confirmation of the test result by the operator using the GO/NOGO button after the test timer has expired
② Short-circuit detection	Permanent short-circuit proof with automatic electronic current limitation to max. 5 A
GENERAL	
Start-up delay timer	0 / 0.3 s / 0.4 s / 0.5 s etc., in steps of 0.1 s to max. 99 min, (0 = no start-up delay)
Test timer	0.6 s / 0.7 s / 0.8 s etc., in steps of 0.1 s up to max. 1 h
Residual voltage monitoring	The test step is regarded as completed only when the output voltage has fallen below 60 V.
Measurement points	Note: For details, refer to the technical data for the electrical connections in a separate chapter of the operating manual

- Test socket
- Test probe, alternatively Kelvin clamps or alligator clips



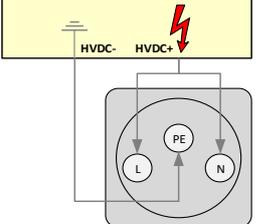
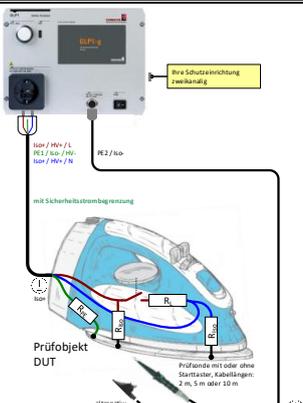
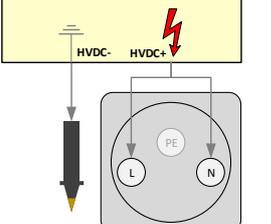
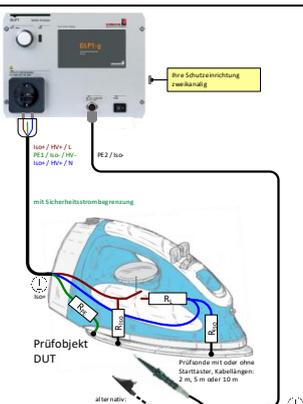
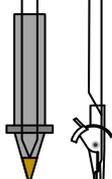
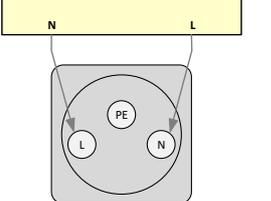
Variants								Technical data	Measurement paths	Fig.*
Test methods			PE							
PE	IR	HV	IR	HV	IR	HV	Fct			
120								PE 10 A AC	Test socket PE ↔ Test probe	1
130								PE 30 A AC	Test socket PE ↔ Test probe	1
	220							IR 1 kV	Test socket PE ↔ Test socket L+N	2
								IR 1 kV	Test socket PE ↔ Test probe	3
			620					PE 10 A AC	Test socket PE ↔ Test probe	1
								IR 1 kV	Test socket PE ↔ Test socket L+N	2
								IR 1 kV	Test socket PE ↔ Test probe	3
			630					PE 30 A AC	Test socket PE ↔ Test probe	1
								IR 1 kV	Test socket PE ↔ Test socket L+N	2
								IR 1 kV	Test socket PE ↔ Test probe	3
					1030			PE 30 A AC	Test socket PE ↔ Test probe	1
								IR 1 kV	Test socket PE ↔ Test socket L+N	2
								IR 1 kV	Test socket PE ↔ Test probe	3
								HVAC 6 kV / 3 mA - safety	Test socket PE ↔ Test socket L+N	4
					1130			PE 30 A AC	Test socket PE ↔ Test probe	1
								IR 4 kV	Test socket PE ↔ Test socket L+N	2
								IR 4 kV	Test socket PE ↔ Test probe	3
								HVDC 4 kV / 10 mA - safety	Test socket PE ↔ Test socket L+N	5
								HVDC 4 kV / 10 mA - safety	Test socket PE ↔ Test probe	6
						1320		PE 30 A AC	Test socket PE ↔ Test probe	1
								IR 1 kV	Test socket PE ↔ Test socket L+N	2
								IR 1 kV	Test socket PE ↔ Test probe	3
								Fct 5 A	Test socket L ↔ Test socket N	7
							1520	PE 30 A AC	Test socket PE ↔ Test probe	1
								IR 1 kV	Test socket PE ↔ Test socket L+N	2
								IR 1 kV	Test socket PE ↔ Test probe	3
								HVAC 6 kV / 3 mA - safety	Test socket PE ↔ Test socket L+N	4
								Fct 5 A	Test socket L ↔ Test socket N	7
							1720	PE 30 A AC	Test socket PE ↔ Test probe	1
								IR 1 kV	Test socket PE ↔ Test socket L+N	2
								IR 1 kV	Test socket PE ↔ Test probe	3
								HVDC 4 kV / 10 mA - safety	Test socket PE ↔ Test socket L+N	5
								HVDC 4 kV / 10 mA - safety	Test socket PE ↔ Test probe	6
								Fct 5 A	Test socket L ↔ Test socket N	7

*See connection figures on the following page.

- Test socket = 3-pole connection on the front of the device
- Test socket L = Connections L in the test socket
- Test socket N = Connections N in the test socket
- Test socket L+N = The test device bridges the L+N connections
- Test probe = Test probe for probing housing parts for both protective earth conductor and insulation resistance testing

- PE = Earth / Ground-bond resistance test
- IR = Insulation resistance test
- HVAC = High-voltage test with alternating current (AC)
- HVDC = High-voltage test with direct current (DC)
- Fct = Function test (current consumption or power measurement)

Fig.	Measurement paths	Illustration	Notes						
1	<p>PE = Schutzleiterwiderstandsprüfung GB = Ground bond resistance test</p>	<p>Prüfobjekt DUT</p> <p>Prüfsonde mit oder ohne Starttasche, Kabellängen: 2 m, 5 m oder 10 m</p> <p>alternativ: Krokodillklemme statt Prüfsonde</p>	<p>Earth / Ground-bond resistance test between the measurement points PE₁ and PE₂.</p> <p>The following probe types can be used:</p> <table border="1"> <thead> <tr> <th>Four-wire connection up to probe</th> <th>Four-wire connection contact</th> </tr> </thead> <tbody> <tr> <td>Standard test probe</td> <td>Four-wire test probe (optional)</td> </tr> <tr> <td>Alligator clip</td> <td>Kelvin clamp (optional)</td> </tr> </tbody> </table> <p>Since protective conductor resistances are very low (typically < 100 mΩ), the measurement must be carried out using the four-wire method. If you have any questions about the four-wire method, please refer to the SCHLEICH test method handbook included in the scope of delivery.</p>	Four-wire connection up to probe	Four-wire connection contact	Standard test probe	Four-wire test probe (optional)	Alligator clip	Kelvin clamp (optional)
Four-wire connection up to probe	Four-wire connection contact								
Standard test probe	Four-wire test probe (optional)								
Alligator clip	Kelvin clamp (optional)								
2	<p>Iso = Isolationswiderstandsprüfung IR = Insulation resistance test</p>	<p>Prüfobjekt DUT</p> <p>Prüfsonde mit oder ohne Starttasche, Kabellängen: 2 m, 5 m oder 10 m</p> <p>alternativ: Krokodillklemme statt Prüfsonde</p>	<p>Insulation resistance test between the measurement points IR+ and IR-.</p> <p>The measurement point IR- is connected to earth.</p>						
3	<p>Iso = Isolationswiderstandsprüfung IR = Insulation resistance test</p>	<p>Prüfobjekt DUT</p> <p>Prüfsonde mit oder ohne Starttasche, Kabellängen: 2 m, 5 m oder 10 m</p> <p>alternativ: Krokodillklemme statt Prüfsonde</p>	<p>Insulation resistance test between the measurement points IR+ and IR-.</p> <p>This type of test is typical for protection class II products, as these are protected by insulation and therefore do not have a PE contact in the connection plug.</p> <p>NOTICE: The measurement point IR- is connected to earth.</p>						
4	<p>HVAC = Hochspannungsprüfung AC HVAC = High voltage test AC</p>	<p>Prüfobjekt DUT</p> <p>Prüfsonde mit oder ohne Starttasche, Kabellängen: 2 m, 5 m oder 10 m</p> <p>alternativ: Krokodillklemme statt Prüfsonde</p> <p>Ihre Schutzrichtung zweckentfremdet</p> <p>Typ / P/N / L P/N / Iso / P/N Typ / P/N / P/N</p> <p>Hochspannung max. 45V mit Schutzstrombegrenzung</p>	<p>High voltage test between the measurement points HVAC₁ and HVAC₂.</p>						

Fig.	Measurement paths	Illustration	Notes
5	<p>HVDC = Hochspannungsprüfung DC HVDC = High voltage test DC</p> 		<p>High-voltage test between the measurement points HVDC+ and HVDC-.</p>
6	<p>HVDC = Hochspannungsprüfung DC HVDC = High voltage test DC</p> 		<p>High-voltage test between the measurement points HVDC+ and HVDC-.</p> <p>This type of test is typical for protection class II products, as these are protected by insulation and therefore do not have a PE contact in the connection plug.</p>  <p>NOTE: The HVDC- measurement point is connected to earth.</p>
7	<p>Fkt = Funktionsprüfung (Strom und Leistung) Fct = Function test (current and power)</p> 		<p>Function test between the measurement points L and N.</p>

- High voltage test via two safety test pistols (1-pole or 2-pole)

Variants								Technical Data	Measurement paths		
Test method											
PE	IR	HV	PE IR	IR HV	PE IR HV	PE IR Fct	PE IR HV Fct				
		320						HVAC 6 kV / 3 mA – safety	test pistol 1	↔	test pistol 2
		321						HVAC 6 kV / 3 mA – safety	test pistol 1s	↔	test pistol 2s
		330						HVAC 6 kV / 100 mA	test pistol 1	↔	test pistol 2
		331						HVAC 6 kV / 100 mA	test pistol 1s	↔	test pistol 2s
		340						HVAC 6 kV / 100 mA	test pistol 1	↔	test pistol 2
		341						HVAC 6 kV / 100 mA	test pistol 1s	↔	test pistol 2s
		350						HVAC 12 kV / 100 mA	test pistol 1	↔	test pistol 2
				720				IR 1 kV	test pistol 1	↔	test pistol 2
								HVAC 6 kV / 3 mA – safety	test pistol 1	↔	test pistol 2
				730				IR 1 kV	test pistol 1	↔	test pistol 2
								HVAC 6 kV / 100 mA	test pistol 1	↔	test pistol 2
				820				IR 4 kV	test pistol 1	↔	test pistol 2
								HVDC 4 kV / 10 mA – safety	test pistol 1	↔	test pistol 2
				830				IR 6 kV	test pistol 1	↔	test pistol 2
								HVDC 6 kV / 10 mA	test pistol 1	↔	test pistol 2
				831				IR 6 kV	test pistol 1	↔	test pistol 2
								HVDC 6 kV / 20 mA	test pistol 1	↔	test pistol 2
				840				IR 10 kV	test pistol 1	↔	test pistol 2
								HVDC 10 kV / 6 mA	test pistol 1	↔	test pistol 2
				920				IR 4 kV	test pistol 1	↔	test pistol 2
								HVDC 4 kV / 10 mA – safety	test pistol 1	↔	test pistol 2
								HVAC 6 kV / 3 mA – safety	test pistol 1	↔	test pistol 2
				930				IR 4 kV	test pistol 1	↔	test pistol 2
								HVDC 4 kV / 10 mA – safety	test pistol 1	↔	test pistol 2
								HVAC 6 kV / 20 mA	test pistol 1	↔	test pistol 2

test pistol 1, 2 = 1-pole test pistols
 test pistol 1s, 2s = 2-pole test pistols with pressure-dependent built-in start button
 IR = Insulation resistance test
 HVAC = High-voltage test with alternating current (AC)
 HVDC = High-voltage test with direct current (DC)

- High voltage test via external high voltage transformer with connection tube

Variants								Technical data	Measurement paths		
Test methods											
PE	IR	HV	PE IR	IR HV	PE IR HV	PE IR Fct	PE IR HV Fct				
		360						HVAC 15 kV / 50 mA	Earth conn.	↔	Tubular bulb ^{*1}
		370						HVAC 30 kV / 30 mA	Earth conn.	↔	Tubular bulb ^{*2}
		380						HVAC 50 kV / 25 mA	Earth conn.	↔	Tubular bulb ^{*3}

HVAC = High-voltage test with alternating current (AC)

*¹) Additional high-voltage transformer: ca. 20 kg, 225 x 265 x 198 mm (W x D x H) + Tube: 150 mm (H)

*²) Additional high-voltage transformer: ca. 25 kg, 250 x 300 x 250 mm (W x D x H) + Tube: 195 mm (H)

*³) Additional high-voltage transformer: ca. 45 kg, 300 x 300 x 400 mm (W x D x H) + Tube: 400 mm (H)

- Typische Anwendung: EN 60204

Variants											
Test methods				Technical data				Measurement paths		Fig.*	
PE	IR	HV	PE IR	IR HV	PE IR HV	PE IR Fct	PE IR HV Fct				
					1011			PE 10 A AC	PE-Ground ↔	Test probe	1
								IR 1 kV	PE-Ground ↔	Test probe	2
								HVAC 6 kV / 3 mA – safety	Test pistol 1 ↔	Test pistol 2	3
					1012			PE 10 A AC	PE-Ground ↔	Test probe	1
								IR 1 kV	PE-Ground ↔	Test probe	2
								HVAC 6 kV / 3 mA – safety	Test pistol 1 ↔	Test pistol 2	4
					1021			PE 10 A AC	PE-Ground ↔	Test probe	1
								IR 1 kV	PE-Ground ↔	Test probe	2
								HVAC 6 kV / 100 mA	Test pistol 1 ↔	Test pistol 2	3
					1022			PE 10 A AC	PE-Ground ↔	Test probe	1
								IR 1 kV	PE-Ground ↔	Test probe	2
								HVAC 6 kV / 100 mA	Test pistol 1 ↔	Test pistol 2	4
					1031			PE 30 A AC	PE-Ground ↔	Test probe	1
								IR 1 kV	PE-Ground ↔	Test probe	2
								HVAC 6 kV / 3 mA – safety	Test pistol 1 ↔	Test pistol 2	3
					1032			PE 30 A AC	PE-Ground ↔	Test probe	1
								IR 1 kV	PE-Ground ↔	Test probe	2
								HVAC 6 kV / 3 mA – safety	Test pistol 1 ↔	Test pistol 2	4
					1041			PE 30 A AC	PE-Ground ↔	Test probe	1
								IR 1 kV	PE-Ground ↔	Test probe	2
								HVAC 4 kV / 100 mA	Test pistol 1 ↔	Test pistol 2	3
					1042			PE 30 A AC	PE-Ground ↔	Test probe	1
								IR 1 kV	PE-Ground ↔	Test probe	2
								HVAC 4 kV / 100 mA	Test pistol 1 ↔	Test pistol 2	4
					1122			PE 30 A AC	PE-Ground ↔	Test pistol 1	5
								IR 4 kV	PE-Ground ↔	Test pistol 2	5
								HVDC 4 kV / 10 mA – safety	PE-Ground ↔	Test pistol 3	5
					1221			PE 30 A AC	PE-Ground ↔	Test probe	1
								IR 1 kV	PE-Ground ↔	Test probe	2
								HVAC 6 kV / 3 mA – safety	Test pistol 1 ↔	Test pistol 2	3
								HVDC 4 kV / 10 mA – safety	Test pistol 1 ↔	Test pistol 2	3
					1222			PE 30 A AC	PE-Ground ↔	Test probe	1
								IR 1 kV	PE-Ground ↔	Test probe	2
								HVAC 6 kV / 3 mA – safety	Test pistol 1 ↔	Test pistol 2	4
								HVDC 4 kV / 10 mA – safety	Test pistol 1 ↔	Test pistol 2	4
					1225			PE 30 A AC	PE-Ground ↔	Test probe	1
								IR 1 kV	PE-Ground ↔	Test probe	2
								HVAC 6 kV / 20 mA	Test pistol 1 ↔	Test pistol 2	3
								HVDC 4 kV / 10 mA	Test pistol 1 ↔	Test pistol 2	3
					1226			PE 30 A AC	PE-Ground ↔	Test probe	1
								IR 1 kV	PE-Ground ↔	Test probe	2
								HVAC 6 kV / 20 mA	Test pistol 1 ↔	Test pistol 2	4
								HVDC 4 kV / 10 mA	Test pistol 1 ↔	Test pistol 2	4
					1231			PE 30 A AC	PE-Ground ↔	Test probe	1
								IR 1 kV	PE-Ground ↔	Test probe	2
								HVAC 6 kV / 100 mA	Test pistol 1 ↔	Test pistol 2	3
								HVDC 4 kV / 10 mA	Test pistol 1 ↔	Test pistol 2	3
					1232			PE 30 A AC	PE-Ground ↔	Test probe	1
								IR 1 kV	PE-Ground ↔	Test probe	2
								HVAC 6 kV / 100 mA	Test pistol 1 ↔	Test pistol 2	4
								HVDC 4 kV / 10 mA	Test pistol 1 ↔	Test pistol 2	4

* See connection figures on previous pages.

Test pistol 1, 2 = 1-pole test pistols

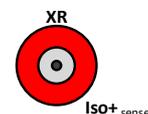
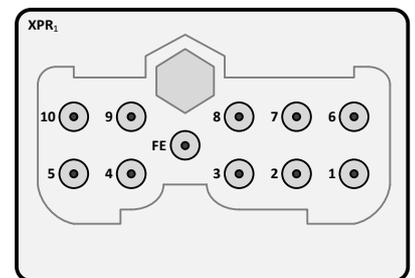
- Test pistol 1s, 2s = 2-pole test pistols with pressure-dependent built-in start button
- PE-Ground = Ground/housing connection terminals to the DUT
- Test probe = Test Probe for testing housing parts for both protective earth conductor and insulation resistance
- PE = Earth / Ground-bond resistance test
- IR = Insulation resistance test
- HVAC = High-voltage test with alternating current (AC)
- HVDC = High-voltage test with direct current (DC)

Fig.	Illustration	Notes
1		<p>Earth / Ground-bond resistance test between the measurement points PE₁ and PE₂.</p> <p>The figure is for illustrative purposes only. Depending on the configuration, the test device may have a wider housing, but the principle remains the same.</p>
2		<p>Insulation resistance test between the measurement points IR- and IR+.</p> <p>The figure is for illustrative purposes only. Depending on the configuration, the test device may have a wider housing, but the principle remains the same.</p>
3		<p>High-voltage test between the measurement points HVAC₁ and HVAC₂.</p> <p>The test is started by pressing a button on the front of the device or by a foot switch.</p> <p>The figure is for illustrative purposes only. Depending on the configuration, the test device may have a wider housing, but the principle remains the same.</p>

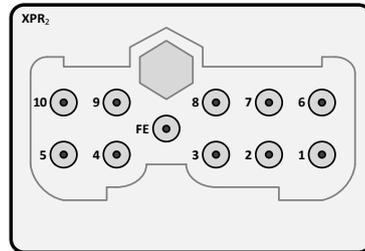
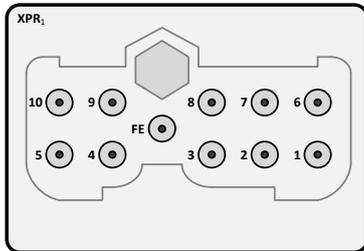
Fig.	Illustration	Notes								
4		<p>High-voltage test between the measurement points HVAC₁ and HVAC₂.</p> <p>The test is started by pressing a button on the front of the device or via the test pistol.</p> <p>For this purpose, the test pistol has a built-in push button that moves a few millimeters into the test pistol when pressed, thereby triggering the start.</p> <p>The figure is for illustrative purposes only. Depending on the configuration, the test device may have a wider housing, but the principle remains the same.</p>								
5		<p>Earth / Ground-bond resistance test between the measurement points PE₁ and PE₂.</p> <p>Insulation resistance test between the measurement points IR+ and IR-.</p> <p>High-voltage test between the measurement points HVAC₁ and HVAC₂.</p> <table border="1" data-bbox="571 703 1233 826"> <thead> <tr> <th>Ground conductor</th> <th>Test pistol</th> </tr> </thead> <tbody> <tr> <td>PE₁</td> <td>PE₂</td> </tr> <tr> <td>IR-</td> <td>IR+</td> </tr> <tr> <td>HVDC-</td> <td>HVDC+</td> </tr> </tbody> </table> <p>The test is started by pressing a button on the front of the device and via the test pistol.</p> <p>For this purpose, the test pistol has a built-in push button that moves a few millimeters into the test pistol when pressed, thereby triggering the start.</p>	Ground conductor	Test pistol	PE₁	PE₂	IR-	IR+	HVDC-	HVDC+
Ground conductor	Test pistol									
PE₁	PE₂									
IR-	IR+									
HVDC-	HVDC+									

Test device types	S* Tests	XPR1 Industrial connection - connection pins											XR		Fig.
		1	2	3	4	5	6	7	8	9	10	FE	IR+sense		
120, 130	PE	-	-	Start ₁	PE ₁	PE ₂	-	-	Start ₂	PE ₁ sense	PE ₂ sense	nc	-	1, 2	
220	IR	IR+	-	Start ₁	IR-	-	-	-	Start ₂	-	-	nc	-	3	
220	● IR	IR+	-	Start ₁	IR-	-	-	-	Start ₂	IR ⁻ sense	-	nc	IR+sense	4	
320, 330, 340	HVAC	HVAC ₁	Interlock ₁	-	HVAC ₂	-	-	Interlock ₂	-	-	-	nc	-	5	
320, 330, 340	● HVAC	HVAC ₁	Interlock ₁	-	HVAC ₂	-	HV ₁ sense	Interlock ₂	-	HV ₂ sense	-	nc	-	6	
620.630	PE	-	-	Start ₁	PE ₁	PE ₂	-	-	Start ₂	PE ₁ sense	PE ₂ sense	nc	-	1	
	IR	IR+	-	Start ₁	IR-	-	-	-	Start ₂	-	-	-	-	3	
620.630	PE	-	-	Start ₁	PE ₁	PE ₂	-	-	Start ₂	PE ₁ sense	PE ₂ sense	nc	-	1	
	● IR	IR+	-	Start ₁	IR-	-	-	-	Start ₂	IR ⁻ sense	-	-	IR+sense	4	
720, 730	IR	-	Interlock ₁	-	IR-	-	-	Interlock ₂	-	-	-	nc	-	3	
	HVAC	-	-	-	HVAC ₂	-	-	-	-	-	-	-	-	5	
720, 730	● IR	IR+	Interlock ₁	-	IR-	-	-	Interlock ₂	-	-	-	nc	-	4	
	● HVAC	HVAC ₁	-	-	HVAC ₂	-	HV ₁ sense	-	-	HV ₂ sense	-	-	-	6	
820, 830, 831, 840	IR	IR+	Interlock ₁	-	IR-	-	-	Interlock ₂	-	-	-	nc	-	3	
	HVDC	HVDC+	-	-	HVDC-	-	-	-	-	-	-	-	-	7	
920, 930	IR	IR+	Interlock ₁	-	IR-	-	-	Interlock ₂	-	-	-	nc	-	3	
	HVAC	HVAC ₁	-	-	HVAC ₂	-	-	-	-	-	-	-	-	5	
	HVDC	HVDC+	-	-	HVDC-	-	-	-	-	-	-	-	-	7	
1020, 1040	PE	-	Interlock ₁	Start ₁	PE ₁	PE ₂	-	Interlock ₂	Start ₂	PE ₁ sense	PE ₂ sense	nc	-	1	
	IR	IR+	-	Start ₁	IR-	-	-	-	Start ₂	-	-	-	-	3	
	HVAC	HVAC ₁	-	-	HVAC ₂	-	-	-	-	-	-	-	-	5	
1130	PE	-	Interlock ₁	Start ₁	PE ₁	PE ₂	-	Interlock ₂	Start ₂	PE ₁ sense	PE ₂ sense	nc	-	1	
	IR	IR+	-	Start ₁	IR-	-	-	-	Start ₂	-	-	-	-	3	
	HVDC	HVDC+	-	-	HVDC-	-	-	-	-	-	-	-	-	7	
1220, 1224, 1230	PE	-	Interlock ₁	Start ₁	PE ₁	PE ₂	-	Interlock ₂	Start ₂	PE ₁ sense	PE ₂ sense	nc	-	1	
	IR	IR+	-	Start ₁	IR-	-	-	-	Start ₂	-	-	-	-	3	
	HVAC	HVAC ₁	-	-	HVAC ₂	-	-	-	-	-	-	-	-	5	
	HVDC	HVDC+	-	-	HVDC-	-	-	-	-	-	-	-	-	7	
1320	PE	-	-	Start ₁	PE ₁	PE ₂	-	-	Start ₂	PE ₁ sense	PE ₂ sense	nc	-	1	
	IR	IR+	-	Start ₁	IR-	-	IR+	-	Start ₂	-	-	-	-	3	
	Fct	L	-	-	-	-	N	-	-	-	-	-	-	9	
1520, 1530	PE	-	Interlock ₁	Start ₁	PE ₁	PE ₂	-	Interlock ₂	Start ₂	PE ₁ sense	PE ₂ sense	nc	-	1	
	IR	IR+	-	Start ₁	IR-	-	IR+	-	Start ₂	-	-	-	-	3	
	HVAC	HVAC ₁	-	-	HVAC ₂	-	HVAC ₁	-	-	-	-	-	-	5	
	Fct	L	-	-	-	-	N	-	-	-	-	-	-	9	
1720	PE	-	Interlock ₁	Start ₁	PE ₁	PE ₂	-	Interlock ₂	Start ₂	PE ₁ sense	PE ₂ sense	nc	-	1	
	IR	IR+	-	Start ₁	IR-	-	IR+	-	Start ₂	-	-	-	-	3	
	HVDC	HVDC+	-	-	HVDC-	-	HVAC ₁	-	-	-	-	-	-	7	
	Fct	L	-	-	-	-	N	-	-	-	-	-	-	9	

- XPR = 10-pin industrial connector on the rear of the device
 XR = 1-pole red connection socket on the rear of the device for measuring back the test voltage via a sense connection
 PE = Earth / Ground-bond resistance test
 IR = Insulation resistance test
 HVAC = High-voltage test with alternating current (AC)
 HVDC = High-voltage test with direct current (DC)
 Fct = Function test (current consumption or power measurement)
 S* = ● with optional feedback of the test voltage via sense lines (four-wire technology)
 Interlock₁ = Bridge in industrial connector so that testing is only possible when the connector is plugged in
 Interlock₂
 Start₁ = Start button in a test probe for starting a PE or IR test
 Start₂
 nc = not connected
 FE = Function Earth (not used)



Test devices		XPR1 Industrial connection 1 - Connection pins										
Variants	Tests	1	2	3	4	5	6	7	8	9	10	FE
140, 141, 160	PE	PE ₁	PE ₁	nc	nc	nc	PE ₁	PE ₁	nc	PE ₁	PE _{1_sense}	nc
		XPR2 Industrial connection 2 - Connection pins										
1	2	3	4	5	6	7	8	9	10	FE		
PE ₂	PE ₂	Start ₁	LED _{gn}	LED _{rd}	PE ₂	PE ₂	Start ₂	PE ₂	PE _{2_sense}	nc		



PE₁ = Pin 1, pin 2, pin 6, pin 7, and pin 9 are connected in parallel to safely transmit the high test voltage in the connector.

PE₂ = Pin 1, pin 2, pin 6, pin 7, and pin 9 are connected in parallel to safely transmit the high test voltage in the connector.

XPR1 = 10-pin industrial connector on the rear of the device for PE₁ and PE test probe

XPR2 = 10-pin industrial connector on the rear of the device for PE₂

PE = Earth / Ground-bond resistance test

Start₁ = Start button in a test probe for starting a PE test

Start₂

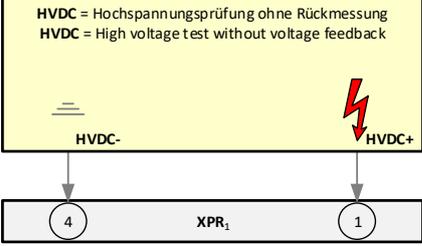
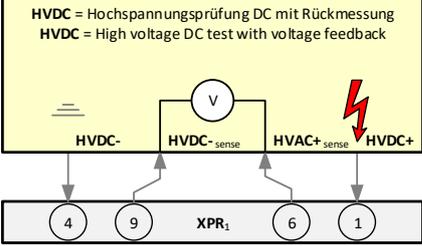
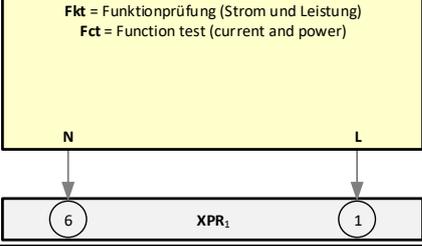
LED_{gn} = green LED in the test probe

LED_{rd} = red LED in the test probe

nc = not conected

FE = Function Earth (not used)

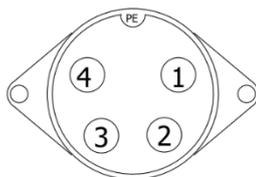
Fig.	Measurement paths	Notes
1	<p>PE = Schutzleiterwiderstandsprüfung ≤ 30 A GB = Ground bond resistance test ≤ 30 A</p>	<p>Earth / Ground-bond resistance test between the measurement points PE₁ and PE₂.</p> <p>A start input for starting the test is also available at terminals 3 and 8.</p> <p>Alternatively, the test can be started using the button on the front of the device or via a command via the communication interface.</p> <p>Since protective conductor resistances are very low (typically < 100 mΩ), the measurement must be performed using the four-wire method.</p> <p>If you have any questions about the four-wire technology, please refer to the SCHLEICH test method handbook included in the scope of delivery.</p>
2	<p>PE = Schutzleiterwiderstandsprüfung > 30 A GB = Ground bond resistance test > 30 A</p>	<p>Earth / Ground-bond resistance test for test devices > 30 A between the measurement points PE₁ and PE₂.</p> <p>Due to the high test voltage, 2 connection plugs are used.</p>
3	<p>Iso = Isolationswiderstandsprüfung ohne Rückmessung IR = Insulation resistance test without voltage feedback</p>	<p>Insulation resistance test between the measurement points IR⁻ and IR⁺.</p> <p>NOTICE: The IR⁻ measurement point is connected to ground.</p>
4	<p>Iso = Isolationswiderstandsprüfung mit Rückmessung IR = Insulation resistance test with voltage feedback</p>	<p>Insulation resistance test between the measurement points IR⁻ and IR⁺.</p> <p>The additional test voltage feedback allows measurement of whether the test voltage is actually applied correctly to the DUT.</p> <p>NOTICE: The IR⁻ measurement point is connected to ground.</p>
5	<p>HVAC = Hochspannungsprüfung ohne Rückmessung HVAC = High voltage test without voltage feedback</p>	<p>High-voltage test between the measurement points HVAC₁ and HVAC₂.</p>
6	<p>HVAC = Hochspannungsprüfung AC mit Rückmessung HVAC = High voltage AC test with voltage feedback</p>	<p>High-voltage test between the measurement points HVAC₁ and HVAC₂.</p> <p>The additional test voltage feedback allows measurement of whether the test voltage is actually applied correctly to the DUT.</p>

Fig.	Measurement paths	Notes
7	<p>HVDC = Hochspannungsprüfung ohne Rückmessung HVDC = High voltage test without voltage feedback</p> 	<p>High-voltage test between the measurement points HVDC- and HVDC+.</p> <p>NOTICE: The HVDC- measurement point is connected to ground.</p>
8	<p>HVDC = Hochspannungsprüfung DC mit Rückmessung HVDC = High voltage DC test with voltage feedback</p> 	<p>High-voltage test between the measurement points HVDC- and HVDC+.</p> <p>The additional test voltage feedback allows measurement of whether the test voltage is actually applied correctly to the DUT.</p> <p>NOTICE: The HVDC- measurement point is connected to ground.</p>
9	<p>Fkt = Funktionprüfung (Strom und Leistung) Fct = Function test (current and power)</p> 	<p>Function test between the measurement points L and N.</p>



Communication connection (pin header <male>) on the rear of the test device (view on the test device from the rear)

Plug designation X1				
Pin	I/O	Signal name	Description	Function
1	In	DCD	Data Carrier Detect	Not used
2	In	RxD	Receive Data	Receive data from ...
3	Out	TxD	Transmit Data	Send data to ...
4	Out	DTR	Data Terminal Ready	Not used
5	-	GND	System Ground	Ground of the two signals TxD and RxD
6	In	DSR	Data Set Ready	Not used
7	Out	RTS	Request To Send	Not used
8	In	CTS	Clear To Send	Not used
9	In	RI	Ring Indicator	Not used

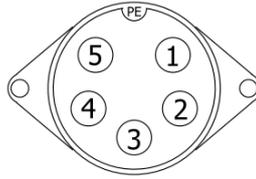


Warning light plug on the rear of the test device (view on the test device from the rear)

Plug designation X12				
Pin	I/O	Signal name	Logic	Function
1	Out	DUT voltage-free	+24 V DC	The test is complete as soon as the device under test is de-energized after the tests have been completed. The residual voltage is then below the extra-low voltage*.
2	Out	DUT not voltage-free	+24 V DC	The test is running and the test voltage is applied to the device under test, or test voltage is flowing.
3		-	-	Not used
4		GND	GND	Ground for the green and red signal lights in the warning light.

* NOTICE - This can only be achieved if the device under test remains connected to the test device until the discharge is complete after the test has ended! The plug is designed for connecting the warning light signal from SCHLEICH.

Plug type: PREH, 4-pin

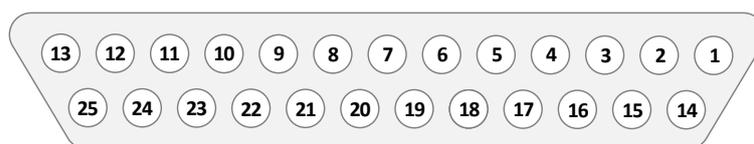


Result light plug on the rear of the test device (viewed from behind)

Plug designation X14				
Pin	I/O	Signal name	Logic	Function
1	Out	Test GO	+24 V DC	The test result is GO
2	Out	HV on	+24 V DC	The high voltage test is active. High voltage is present at the test connections.
3	Out	Test NOGO	+24 V DC	The test result is NOGO
4		GND	GND	Ground for the green and red signal lights in the result light.
5		-	-	Not used

The plug is designed for connecting the result light from SCHLEICH.

Plug type: PREH, 5-pin



Control plug (pin header <male>) on the rear of the test device (View on the test device from the rear)

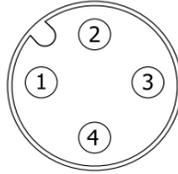
Plug designation X18				
Pin	I/O	Signal name	Logic	Function
1	In	Stop	Impulse min. 50 ms	Switch off/terminate the running test immediately. A GO/NOGO evaluation of the test does not take place during automatic testing.
2	In	IN_AUX_2	Level	Used for digital test plan selection from an external source, e.g. via a PLC. Forms a 3-bit pattern together with IN_AUX_1 and IN_AUX_3. This allows 7 test plans to be selected.
3	In	IN_AUX_3	Level	Used for digital test plan selection from an external source, e.g. via a PLC. Forms a 3-bit pattern together with IN_AUX_1 and IN_AUX_2. This allows 7 test plans to be selected.
4	Out	Ready for operation	+24 V	The test device is ready for operation. There are no errors.
5	Out	GO	+24 V	The overall test result for the completed test plan is GO (OK).
6	-	-	-	Not used
7	In	Start_external	Impulse min. 50 ms	The test or test sequence is started by an external signal.
8	In	Start_Footswitch	Impulse min. 50 ms	The test or test sequence is started by a signal from the foot switch.
9	-	-	-	Not used
10	Out	OUT_AUX_1	+24 V	Feedback of the input status IN_AUX_1 to the external PLC.
11	-	-	-	Not used
12	In	IN_AUX_1	Level	Used for digital test plan selection from an external source, e.g. via a PLC. Forms a 3-bit pattern together with IN_AUX_2 and IN_AUX_3. This allows 7 test plans to be selected.
13	In	OUT_AUX_4	+24 V	Feedback to the external PLC that there is an error in the digital test plan selection. For example, no test plan is assigned to a digital selection in GLP1-g. 0 = OK. 1 = Error.
14	-	-	-	Not used
15	-	-	-	Not used
16	Out	HV_<Imin	+24 V	During the high voltage test, the minimum current is not reached or is too low. This signal can be used by an external PLC as a high voltage connection control.
17	Out	Power_+24 V	+24 V	+ 24 V for power supply to the digital inputs used.
18	Out	niO	+24 V	The overall test result for the completed test plan is NOGO.
19	Out	HV_Breakdown	+24 V	A breakdown occurred during the high voltage test. The maximum test current was exceeded. This signal can be used by an external PLC for evaluation.
20	Out	HV_on	+24 V	The high voltage test is active. High voltage is present at the test connections.
21	Out	Power_GND	GND	GND reference point for the digital outputs.
22	Out	Test is running	+24 V	The test plan that has been started runs through the test steps one by one.
23	Out	OUT_AUX_2	+24 V	Feedback of the input status IN_AUX_2 to the external PLC.
24	In	Enable	Level	A 17 ↔ 24 connection bridge is required to enable the test device. For this purpose, the control plug is supplied with 2 prepared connections that you can connect to each other or to your safety equipment.
25	Out	OUT_AUX_3	+24 V	Feedback of the input status IN_AUX_3 to the external PLC.

Level = 24 Volt

Three bits are available via inputs IN_AUX_1, IN_AUX_2, and IN_AUX_3 to implement external digital program selection.

IN_AUX_1	IN_AUX_2	IN_AUX_3	Decimal no.	Explanation
0	0	0	0	not allowed
1	0	0	1	Test plan 1 selected
0	1	0	2	Test plan 2 selected
1	1	0	3	Test plan 3 selected
0	0	1	4	Test plan 4 selected
1	0	1	5	Test plan 5 selected
0	1	1	6	Test plan 6 selected
1	1	1	7	Test plan 7 selected

0 = 0 V am Eingang
1 = 24 V am Eingang



Safety channel plug on the rear of the test device (View on the test device from the rear)

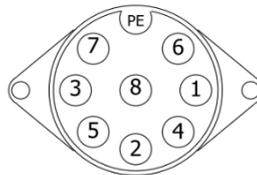
Plug designation XS1				
Pin	I/O	Signal name	Logic	Function
1	In	T1	-	Normally closed 1 – pin 1
2	In	T2	-	Normally closed 2 – pin 1
3	In	R2	-	Normally closed 2 – pin 2
4	In	R1	-	Normally closed 1 – pin 2

The plug is designed for connecting the two-channel safety switch device from SCHLEICH.

Devices with built-in safety circuit/safety switch device meet the requirements of PL e, SIL 3, Cat. 4 and two-hand controls, including Type III C. It is used to monitor emergency stops, safety doors and light curtains and uses safe outputs in the test device.

Normally closed (NC) means that the safety contact is closed in the safe state. If interrupted by an emergency stop or opening of the test cover, etc., the contact is opened. The signal path is thus interrupted. On this basis, a cable break in the supply line to the safety contact is also detected. However, even if a short circuit (connection to other cables) occurs, this is reliably detected by the safety switch device and the test is switched off or no longer switched on.

Plug type: M12, 4-pin

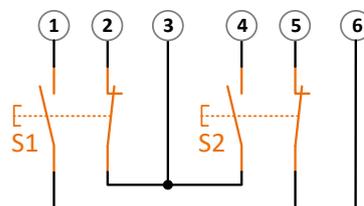


Safety channel plug on the rear of the test device (View on the test device from the rear)

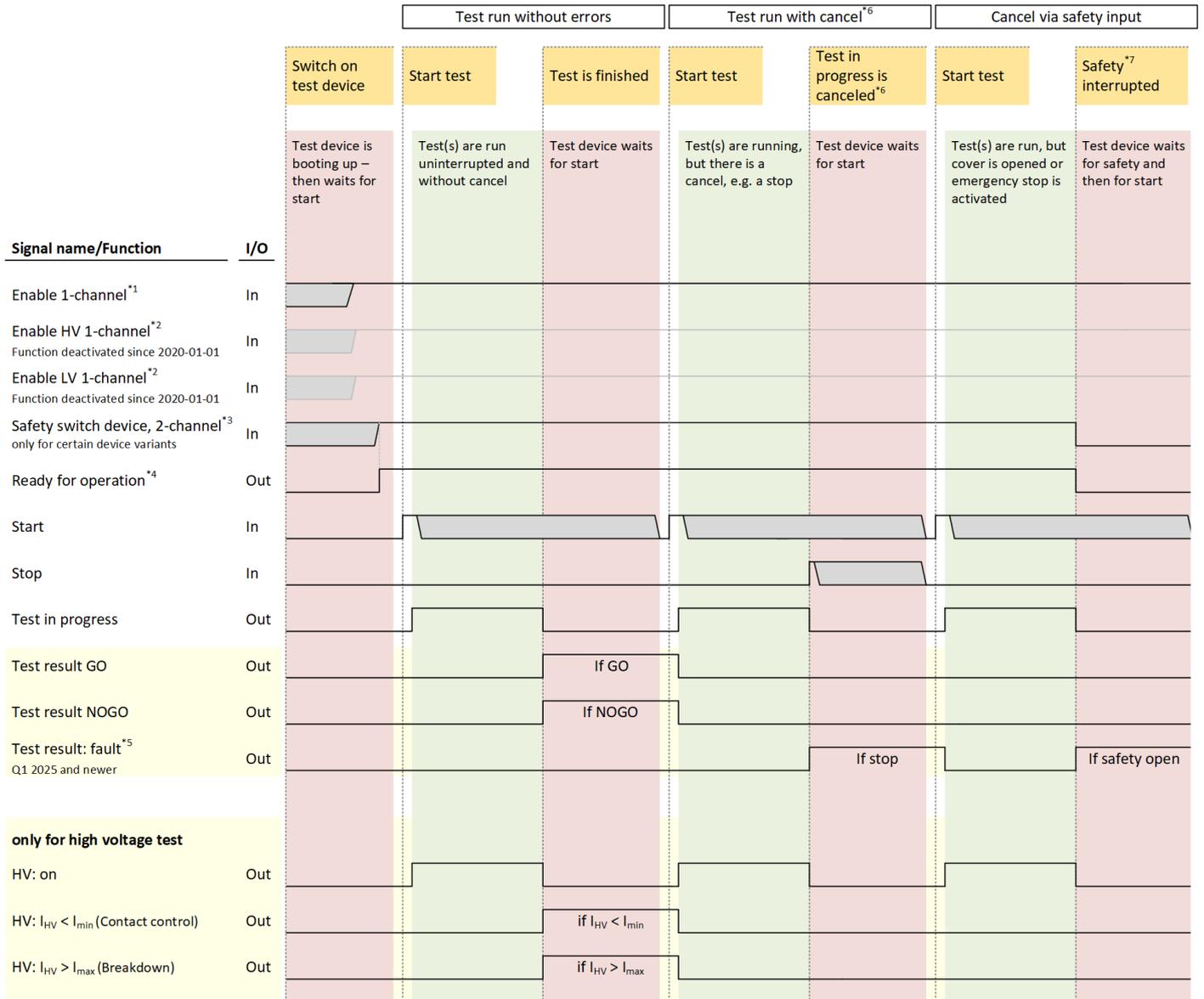
Plug designation XZHS				
Pin	I/O	Signal name	Logic	Function
1	In	Button 1 / CH1	-	First two-hand switch: normally open contact (NO)
2	In	Button 1 / CH2	-	First two-hand switch: normally closed contact (NC)
3	Out	Cycle 1	-	Cycle for first two-hand switch (NC) and second two-hand switch (NO)
4	In	Button 2 / CH1	-	Second two-hand switch: normally open contact (NO)
5	In	Button 2 / CH2	-	Second two-hand switch: Normally closed contact (NC)
6	Out	Cycle 2	-	Cycle for second two-hand switch (NO) and first two-hand switch (NC)
7		-	-	Not used
8		-	-	Not used

The plug is designed for connecting the two-channel two-hand safety switch device from SCHLEICH.

Devices with built-in safety circuit/safety switch meet requirements according to PL e, SIL 3, Cat. 4 and two-hand controls, including Type III C. It is used to monitor emergency stops, safety doors and light curtains and uses safe outputs in the test device.



Plug type: PREH, 8-pin



GLP1_Timing_EN.vsd

*1) Enable must always be activated for testing. To do this, a level of +24 V must be present.

*2) The LV and HV enable were only relevant until January 1, 2020. Since then, they no longer have any function, as a two-channel safety switch device is used for test devices without safety current limitation.

*3) The two-channel safety switch is activated by the two closed external safety channels. An additional requirement is that the connection must have: Enable (see *1) +24 V. For further information, see the next page.

*4) Requirements for "Ready for operation" = 1: → Test device is switched on plus → Test device is booted plus → Test device is NOT in an operating menu plus → Enable = 1 plus → The two safety channels of the test device are NOT interrupted.

*5) Prerequisites for fault = 1 : → The test was canceled using the stop button while it was running, or → one or both external safety channels of the safety relay are interrupted (e.g., test cover or safety device was opened).

*6) see *5 / No GO or NOGO signal is generated when a running automatic test is canceled.

*7) see *5

1 = +24 V
0 = 0 V

Overview of device variants with/without safety switch

Safety switch device	Device variants	With 2-channel safety switch device	Without safety switch device	Additionally with 1-channel enable	Test method(s)
	GLP1-g 120		X	X	PE
	GLP1-g 130		X	X	PE
	GLP1-g 140		X	X	PE
	GLP1-g 141		X	X	PE
	GLP1-g 160		X	X	PE
	GLP1-g 220		X	X	IR
	GLP1-g 320	X		X	
	GLP1-g 321	X		X	
	GLP1-g 330	X		X	
	GLP1-g 331	X		X	
	GLP1-g 340	X		X	
	GLP1-g 341	X		X	
	GLP1-g 350	X		X	
	GLP1-g 360	X		X	
	GLP1-g 370	X		X	
	GLP1-g 380	X		X	
	GLP1-g 620		X	X	PE, IR
	GLP1-g 630		X	X	PE, IR
	GLP1-g 720	X		X	
	GLP1-g 730	X		X	
	GLP1-g 820	X		X	
	GLP1-g 830	X		X	
	GLP1-g 831	X		X	
	GLP1-g 840	X		X	
	GLP1-g 920	X		X	
	GLP1-g 930	X		X	
	GLP1-g 1011		X	X	PE, IR, HVAC
	GLP1-g 1012		X	X	PE, IR, HVAC
	GLP1-g 1020	X		X	
	GLP1-g 1021		X	X	PE, IR, HVAC
	GLP1-g 1022		X	X	PE, IR, HVAC
	GLP1-g 1030	X		X	
	GLP1-g 1031	X		X	
	GLP1-g 1032	X		X	
	GLP1-g 1040	X		X	
	GLP1-g 1041	X		X	
	GLP1-g 1042	X		X	
	GLP1-g 1122		X	X	PE, IR, HVAC
	GLP1-g 1130	X		X	
	GLP1-g 1220	X		X	
	GLP1-g 1221	X		X	
	GLP1-g 1222	X		X	
	GLP1-g 1224	X		X	
	GLP1-g 1225	X		X	
	GLP1-g 1226	X		X	
	GLP1-g 1230	X		X	
	GLP1-g 1231	X		X	
	GLP1-g 1232	X		X	
	GLP1-g 1320	X		X	
	GLP1-g 1520	X		X	
	GLP1-g 1530	X		X	
	GLP1-g 1720	X		X	

Devices with built-in safety circuit/safety switch device meet requirements according to PL e, SIL 3, Cat. 4 and two-hand controls, also type III C.

Devices without a safety switch do not pose any danger. The test methods are safety current limited. For this reason, these devices do not have a built-in safety switch.

MECHANICAL SPECIFICATIONS

Device versions	Tabletop version: incl. solid feet for tilting the test device 19" built-in version: optional mounting kits for installation in a 19" cabinet
Work environment	Operating temperature 0 to 50 °C / 32 to 104 °F, designed for relative humidity of 0 to 80 %RH without condensation!
Storage	Storage temperature -10 to 60 °C / 14 to 140 °F, designed for relative humidity of 0 to 90 %RH without condensation!
Housing color	RAL 7035

Dimensions + Weights	Housing ½ 19"	Housing 19"	Weight / kg
GLP1-g 120	x		7.5
GLP1-g 130	x		11.8
GLP1-g 140		x	14.0
GLP1-g 141		x	7.0
GLP1-g 160		x	17.5
GLP1-g 220	x		6.5
GLP1-g 320	x		9.8
GLP1-g 321	x		9.8
GLP1-g 330	x		15.0
GLP1-g 331	x		15.0
GLP1-g 340		x	27.0
GLP1-g 341		x	27.0
GLP1-g 350		x	24.0
GLP1-g 360	x		5.8 + 20 ^{*1}
GLP1-g 370	x		5.8 + 25 ^{*2}
GLP1-g 380	x		5.8 + 45 ^{*3}
GLP1-g 620	x		6.5
GLP1-g 630	x		11.8
GLP1-g 720	x		9.8
GLP1-g 730	x		15.0
GLP1-g 820	x		6.5
GLP1-g 830	x		6.5
GLP1-g 831		x	7.0
GLP1-g 840		x	7.5
GLP1-g 920	x		10.0
GLP1-g 930	x		11.5
GLP1-g 1011	x		10.8
GLP1-g 1012	x		10.8
GLP1-g 1020		x	17.8
GLP1-g 1021	x		16.0
GLP1-g 1022	x		16.0
GLP1-g 1030		x	16.5
GLP1-g 1031		x	16.5
GLP1-g 1032		x	16.5
GLP1-g 1040		x	22.0
GLP1-g 1041		x	21.0
GLP1-g 1042		x	21.0
GLP1-g 1122	x		11.8
GLP1-g 1130	x		11.8
GLP1-g 1220		x	17.0
GLP1-g 1221		x	15.7
GLP1-g 1222		x	16.0
GLP1-g 1224		x	18.5
GLP1-g 1225		x	17.5
GLP1-g 1226		x	17.5
GLP1-g 1230		x	22.2
GLP1-g 1231		x	21.2
GLP1-g 1232		x	21.2
GLP1-g 1320	x		13.8
GLP1-g 1520		x	18.5
GLP1-g 1530		x	23.9
GLP1-g 1720	x		6.5
Dimensions ½ 19":	236 x 320 x 178 mm (W x D x H)		
Dimensions 19":	448 x 320 x 178 mm (W x D x H)		

*1) Additional high-voltage transformer: ca. 20 kg, 225 x 265 x 198 mm (W x D x H) + Tube: 150 mm (H)

*2) Additional high-voltage transformer: ca. 25 kg, 250 x 300 x 250 mm (W x D x H) + Tube: 195 mm (H)

*3) Additional high-voltage transformer: ca. 45 kg, 300 x 300 x 400 mm (W x D x H) + Tube: 400 mm (H)

More information

For further information please visit our homepage www.schleich.com

RoHS conformity

We declare the conformity of our products with the **RoHS2 directive 2011/65/EU** of the European Parliament and of the Council of June 8, 2011 on the restriction of the use of hazardous substances in electrical and electronic equipment, as well as conformity with the **extended delegated directive 2015/863/EU** from March 31, 2015, effective July 22, 2019.

REACH conformity

As a manufacturer of electronic products, SCHLEICH GmbH is a so-called "downstream user" within the meaning of 'REACH'. SCHLEICH GmbH is not subject to any obligations arising from the manufacture and placing on the market of substances/chemicals for pre-registration or registration (ECHA). Our products supplied to customers are "articles" and therefore not to be defined as "substance" or "preparation" (in accordance with Article 3 Definitions). Furthermore, under normal and reasonably foreseeable conditions of use, no substances should be released from the products purchased by customers. Therefore, SCHLEICH GmbH is neither subject to the registration obligation nor to the obligation to prepare safety data sheets. In order to keep the supply chain secure and in the interest of maximum product safety, we make sure that our suppliers fulfill all requirements for the materials and substances we use.

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