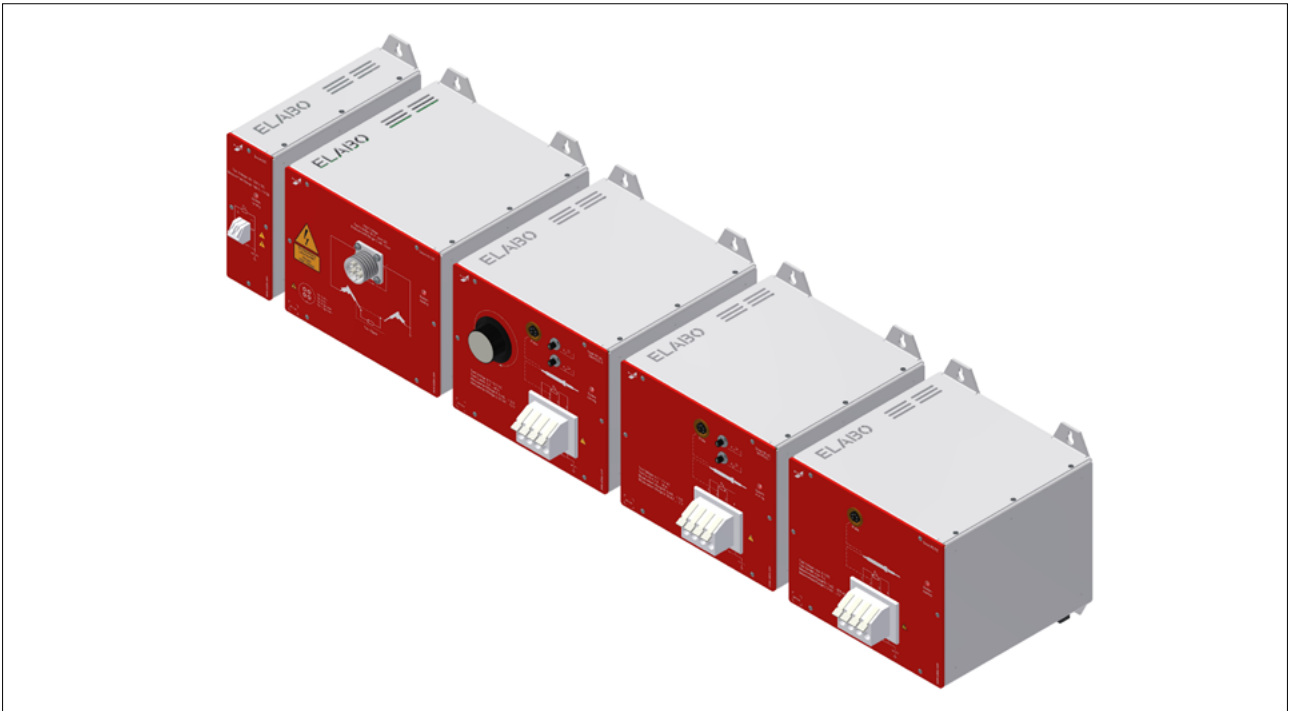


# Smart Testing Series



# ELABO Smart Testing Modules

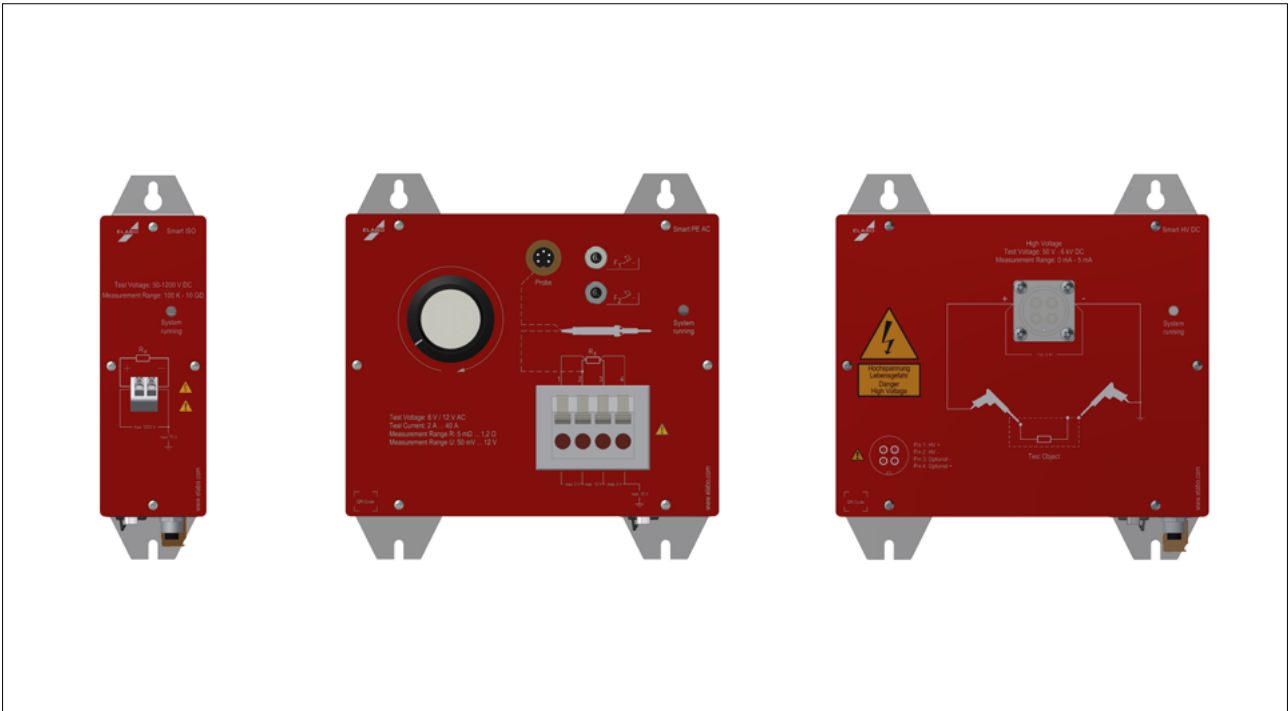


## Available for

- Insulation test module (DC)  
0.05 kV (DC) ... 1.20 kV (DC) / 100 k $\Omega$  ... 10 G $\Omega$
- High Voltage / Insulation Test Module (DC)  
0.05 kV (DC) ... 3.00 kV (DC) / 0 ... 10 mA (DC)  
05 kV (DC) ... 3.00 kV (DC) / 10 k $\Omega$  ... 5 G $\Omega$  5 G $\Omega$
- High voltage / insulation test module (DC)  
0.05 kV (DC) ... 6.00 kV (DC) / 0 ... 5 mA (DC)  
0.05 kV (DC) ... 6.00 kV (DC) / 20 k $\Omega$  ... 5 G $\Omega$
- High voltage / insulation test module (DC)  
0.1 kV (DC) ... 10,00 kV (DC) / 0 ... 3 mA (DC)  
0.1 kV (DC) ... 10.00 kV (DC) / 30 k $\Omega$  ... 5 G $\Omega$
- Protective conductor test module (AC)  
2 A (AC) ... 40A (AC) /  
manually adjustable transformer
- Protective conductor test module (AC)  
2 A (AC) ... 40A (AC) /  
electromechanical variable transformer
- Protective conductor test module (DC)  
5V (DC) / 5A (DC) / 1m $\Omega$  ... 800m $\Omega$
- High voltage measuring instrument  
(U / I, AC / DC)  
 $\pm 1$  V (DC) ...  $\pm 10$  kV (DC) /  
 $\pm 15$   $\mu$ A (DC) ...  $\pm 500$  mA (DC)  
  
2V (AC) ... 7kV (AC) / trms  
15  $\mu$ A (AC) ... 500 mA (AC) / trm



# ELABO Smart Testing Modules



ELABO Smart Testing Modules



ELABO Smart Testing Modules

## Integration options

Fully remote controlled via Ethernet



## Technical features

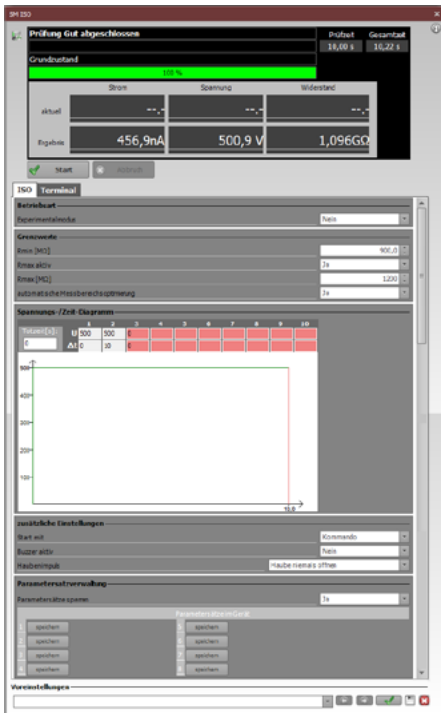
The ELABO Smart Testing Modules have been developed to perform precise and fast safety tests, especially in automation technology. All parameters are via an Ethernet interface programmable. Corresponding driver blocks facilitate integration into existing systems.

- Highly efficient safety testing systems for automated use
- Modular and compact design
- Plug-in test item and supply connections
- Decentralized location for the acquisition of sensitive measured variables possible.
- Start parameter set can be stored in the device
- Digital interface for easy control of the test procedure
- Device drivers available in C # for application programming (.NET Framework 4.6.2)





# Elution<sup>®</sup> software



## PC-Software Elution<sup>®</sup> Device

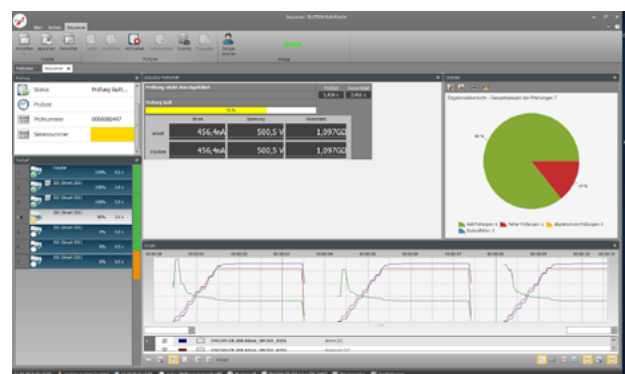
Additional benefit for use in  
Production and quality control

In addition to the test equipment offered, ELABO offers extensive Software packages for computer-controlled testing. The specifically for this developed software suite ELABO Elution<sup>®</sup> offers optimal solutions for typical applications already in the basic version.

ELABO Elution<sup>®</sup> Device simplifies the testing of electrical and electronic components in research and development, Production and quality assurance as well as in the areas Service and repair.

For production and quality assurance

1. With ELABO Elution<sup>®</sup> Device you define a sequenced test run with chronological processing of test steps, which in the following runs semi or fully automatically.
2. If necessary, you integrate test instructions, pictures or waiting steps in the test procedure.
3. Work with product labels such as barcodes etc. and track the values of a product throughout its lifetime.
4. Readings and results are in a SQL Database and are for you at any time reproducible.
5. Manage the program settings, user profiles and restrict access rights.
6. Create custom logs and printouts, or export data for further processing in other programs.



# SM-ISO-0-ZRM

## Insulation test module

0.05 kV (DC) ... 1.20 kV (DC) / 100 kΩ ... 10 GΩ



## Technical features

- Self-sufficient measuring module for universal use in automated systems
- Prepared for integration in control cabinets or test units
- Provided flaps allow easy installation of the modules
- All connections are pluggable
- Device drivers available in C # for Application Programming (.NET Framework 4.6.2)
- Integrated in a high-quality metal housing



# SM-ISO-0-ZRM

## Insulation test module

50 V (DC) ... 1200 V (DC) / 100 kΩ ... 10 GΩ

### Technical data

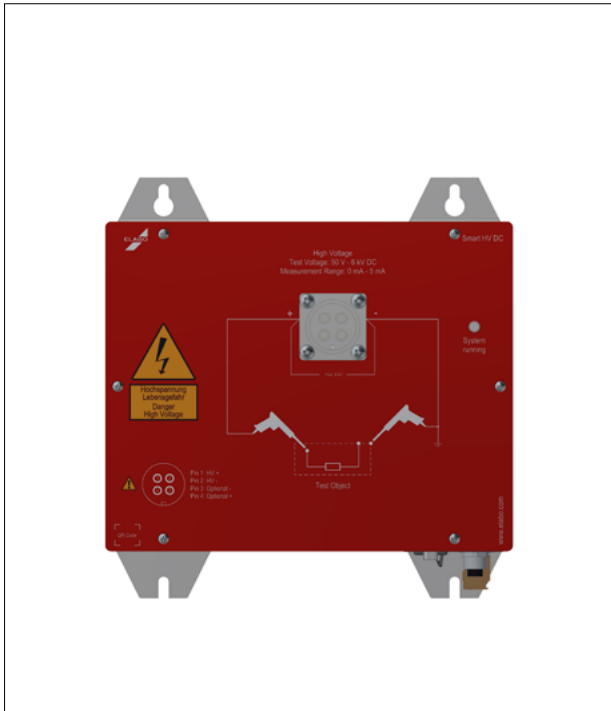
Test	
Limit values	R_min, R_max (contact monitoring)
Monitoring	Test voltage
Test parameters	
Measurement range	100 kΩ ... 10 GΩ (fixed measuring range or automatic adjustment)
Test voltage	50 V (DC) ... 1200 V (DC)
Test voltage progress	Voltage curves with max. 10 bases definable
Output power	max. 1W, max. current 1mA (DC)
General	
Supply	100 V (AC) ... 240 V (AC), 50 Hz / 60 Hz
	+ 24 V (DC) external (SK, DIO, WL, RC)
Equipment	Ethernet interface (TCP / IP)
	Saving of max. 8 different parameter sets (tests)
	Digital interface connection (6 DOs, 4 DIs, for example for standard accessories)
	Connection for warning light set (WL)
	Connection for handheld remote control (RC) with START / STOP button, display, acoustic signaling device and release function (SK)
Two-channel release circuit (analogous to SK, without forced operation)	
Additional options / Alternatively function	E002 - as an alternative to standard DIO, 6 DOs are freely programmable
	E099, ELABO factory calibration
Software	C # - Driver for .NET in Framework 4.6.2
Dimensions	W = 61 mm, D = 235 mm, H = 220 mm
Weight:	appr. 1 kg

Scope of supply	
SM-ISO-0-ZRM Isolation test module	
2 m mains connection cable, with connection plug and open ends	
2-pin connector (WAGO 231-302 / ...) for the supply of 24 V (DC) external	
25-pin SDSUB connector with housing (male)	
3 m network cable CAT6 (patch cable)	
Operating manual	
Software Tools	Driver
	3D-Step Model
	ELABO software package

# SM-HVDC-0-ZRM

## High voltage / insulation test module

0.05 kV (DC) ... 3.00 kV (DC) / 0 ... 10 mA (DC) / 10 kΩ ... 5 GΩ



## Technical features

- Self-sufficient measuring module for universal use in automated systems
- Prepared for integration in control cabinets or test units
- Provided flaps allow easy installation of the modules
- All connections are pluggable
- Device drivers available in C # for Application Programming (.NET Framework 4.6.2)
- Integrated in a high-quality metal housing





# SM-HVDC-0-ZRM

## High voltage / insulation test module

0.05 kV (DC) ... 3.00 kV (DC) / 0 ... 10 mA (DC) / 10 kΩ ... 5 GΩ

### Technical data

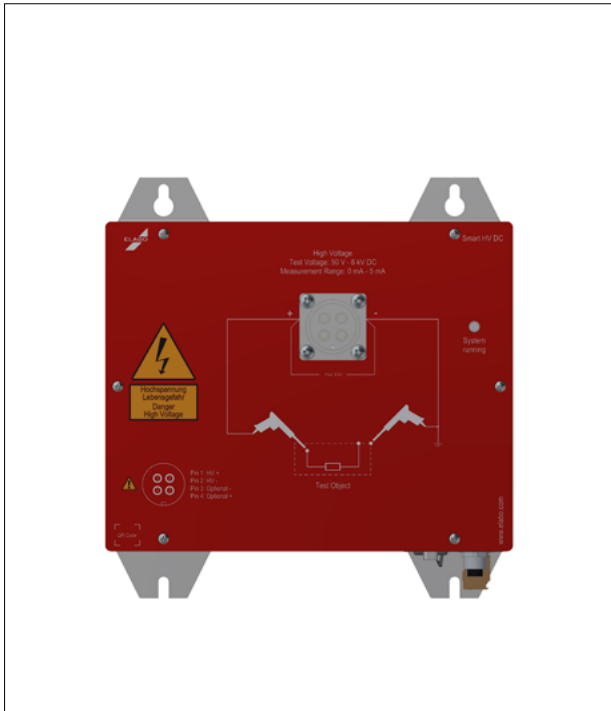
Tests	
Limit values HV- DC	I_max, I_min (contact monitoring), dl_max
Limit values ISO	R_min, R_max (contact monitoring)
Monitoring	Test voltage
Test parameters	
Measurement range HV	0.1 / 1 / 10 mA (fixed measuring range)
Measuring range ISO	10 kΩ ... 5 GΩ (fixed measuring range or automatic adjustment)
Test voltage	50 V (DC) ... 3 kV (DC) (grounded on one side)
Test current:	30 μA (DC) ... 10 mA (DC) / safety current limited, Q <350 mJ
Output power	max. 30 W
Test voltage progress	Voltage curves with max. 10 bases definable
General	
Supply	100 V (AC) ... 240 V (AC), 50 Hz / 60 Hz
	+ 24 V (DC) external (SK, DIO, WL, RC)
Equipment	Ethernet interface (TCP / IP)
	Saving of max. 8 different parameter sets (tests)
	Digital interface connection (6 DOs, 4 DIs, for example for standard accessories)
	Connection for warning light set (WL)
	Connection for handheld remote control (RC) with START / STOP button, display, acoustic signaling device and release function (SK)
Additional options / Alternatively function	Two-channel release circuit (analogous to SK, without forced operation)
	E002 - as an alternative to standard DIO, 6 DOs are freely programmable
	E099, ELABO factory calibration
	E010, Voltage feedback via additional measuring channel
Software	E020, START via HV test guns with integrated START SIGNAL
	C # - Driver for .NET in Framework 4.6.2
Dimensions	B = 214 mm, T = 310 mm, H = 220 mm incl. connector
Weight:	appr. 4.7 kg

Scope of supply	
SM-HVDC0-ZRM High Voltage / Insulation Test Module	
2 m mains connection cable, with connection plug and open ends	
2-pin connector (WAGO 231-302 / ...) for the supply of 24 V (DC) external	
25-pin SDSUB connector with housing (male)	
3 m network cable CAT6 (patch cable)	
Operating manual	
Software Tools	Driver
	3D-Step Model
	ELABO software package

# SM-HVDC-10-ZRM

## High voltage / insulation test module

0.05 kV (DC) ... 6.00 kV (DC) / 0 ... 5 mA (DC) / 20 kΩ ... 5 GΩ



## Technical features

- Self-sufficient measuring module for universal use in automated systems
- Prepared for integration in control cabinets or test units
- Provided flaps allow easy installation of the modules
- All connections are pluggable
- Device drivers available in C # for Application Programming (.NET Framework 4.6.2)
- Integrated in a high-quality metal housing



# SM-HVDC-10-ZRM

## High voltage / insulation test module

0.05 kV (DC) ... 6.00 kV (DC) / 0 ... 5 mA (DC) / 20 kΩ ... 5 GΩ

### Technical data

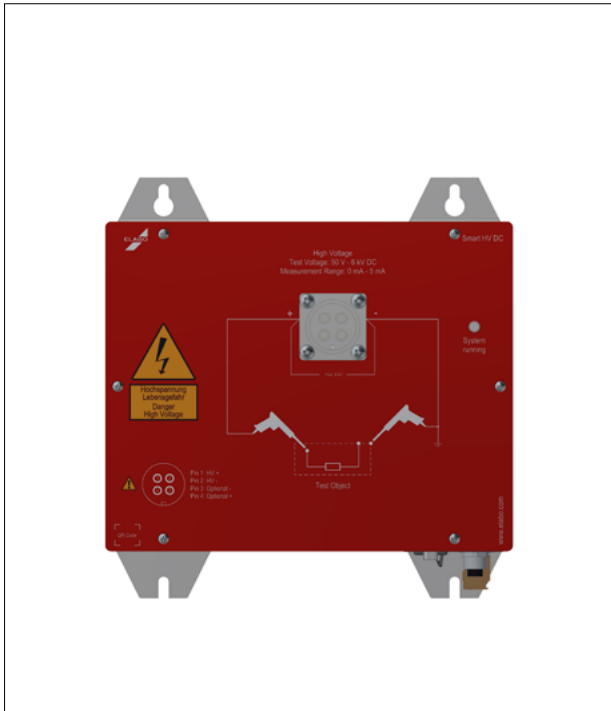
Tests	
Limit values HV DC	limit values I_max, I_min (contact monitoring), dI_max
Limit values ISO	R_min, R_max (contact monitoring)
Monitoring	Test voltage
Test parameters	
Measurement range HV	0.05 / 0.5 / 5 mA (fixed measuring range)
Measuring range ISO	20 kΩ ... 5 GΩ (fixed measuring range or automatic adjustment)
Test voltage	50 V (DC) ... 6 kV (DC) (grounded on one side)
Test current:	20 μA (DC) ... 5 mA (DC) / safety current limited, Q <350 mJ
Output power	max. 30 W
Test voltage progress	Voltage curves with max. 10 bases definable
General	
Supply	100 V (AC) ... 240 V (AC), 50 Hz / 60 Hz
	+ 24 V (DC) external (SK, DIO, WL, RC)
Equipment	Ethernet interface (TCP / IP)
	Saving of max. 8 different parameter sets (tests)
	Digital interface connection (6 DOs, 4 DIs, for example for standard accessories)
	Connection for warning light set (WL)
	Connection for handheld remote control (RC) with START / STOP button, display, acoustic signaling device and release function (SK)
Two-channel release circuit (analogous to SK, without forced operation)	
Additional options / Alternatively function	E002 - as an alternative to standard DIO, 6 DOs are freely programmable
	E099, ELABO factory calibration
	E010, Voltage feedback via additional measuring channel
	E020, START via HV test guns with integrated START SIGNAL
Software	C# - Driver for .NET in Framework 4.6.2
Dimensions	B = 214 mm, T = 310 mm, H = 220 mm incl. connector
Weight:	appr. 4.7 kg

Scope of supply	
SM-HVDC-10-ZRM High Voltage / Insulation Test Module	
2 m mains connection cable, with connection plug and open ends	
2-pin connector (WAGO 231-302 / ...) for the supply of 24 V (DC) external	
25-pin SDSUB connector with housing (male)	
3 m network cable CAT6 (patch cable)	
Operating manual	
Software Tools	Driver
	3D-Step Model
	ELABO software package

# SM-HVDC-20-ZRM

## High voltage / insulation test module

0.10 kV (DC) ... 10.00 kV (DC) / 0 ... 3 mA (DC) / 30 kΩ ... 5 GΩ



## Technical features

- Self-sufficient measuring module for universal use in automated systems
- Prepared for integration in control cabinets or test units
- Provided flaps allow easy installation of the modules
- All connections are pluggable
- Device drivers available in C # for Application Programming (.NET Framework 4.6.2)
- Integrated in a high-quality metal housing



# SM-HVDC-20-ZRM

## High voltage / insulation test module

0.10 kV (DC) ... 10.00 kV (DC) / 0 ... 3 mA (DC) / 30 kΩ ... 5 GΩ

### Technical data

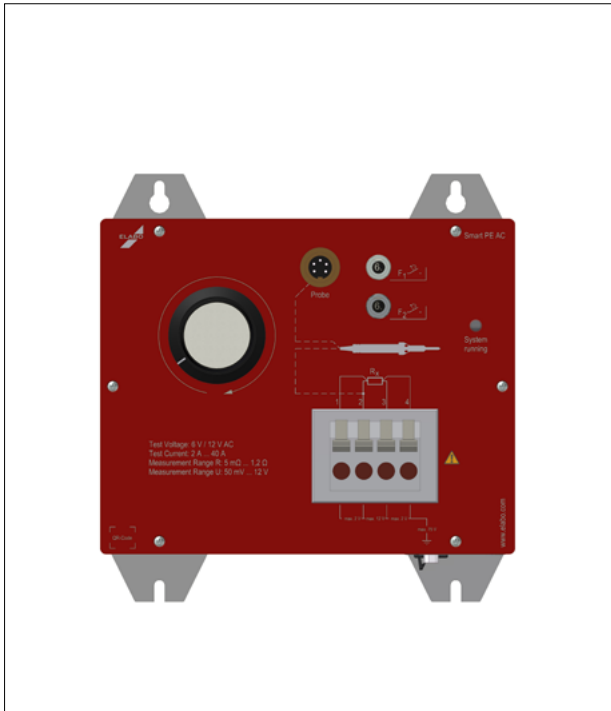
Tests	
Limit values HV DC	I <sub>max</sub> , I <sub>min</sub> (contact monitoring), dl <sub>max</sub>
Limit values ISO	R <sub>min</sub> , R <sub>max</sub> (contact monitoring)
Monitoring	Test voltage
Test parameters	
Measurement range HV	0.03 / 0.3 / 3 mA (fixed measuring range)
Measuring range ISO	30 kΩ ... 5 GΩ (fixed measuring range or automatic adjustment)
Test voltage	100 V (DC) ... 10 kV (DC) (grounded on one side)
Test current:	10 μA (DC) ... 3 mA (DC) / safety current limited, Q <350 mJ
Output power	max. 30 W
Test voltage progress	Voltage curves with max. 10 bases definable
General	
Supply	100 V (AC) ... 240 V (AC), 50 Hz / 60 Hz + 24 V (DC) external (SK, DIO, WL, RC)
Equipment	Ethernet interface (TCP / IP)
	Saving of max. 8 different parameter sets (tests)
	Digital interface connection (6 DOs, 4 DIs, for example for standard accessories)
	Connection for warning light set (WL)
	Connection for handheld remote control (RC) with START / STOP button, display, acoustic signaling device and release function (SK)
Additional options / Alternatively function	E002 - as an alternative to standard DIO, 6 DOs are freely programmable
	E099, ELABO factory calibration
	E010, Voltage feedback via additional measuring channel
Software	C# - Driver for .NET in Framework 4.6.2
Dimensions	B = 214 mm, T = 310 mm, H = 220 mm incl. connector
Weight:	appr. 4.7 kg

Scope of supply	
SM-HVDC-20-ZRM High Voltage / Insulation Test Module	
2 m mains connection cable, with connection plug and open ends	
2-pin connector (WAGO 231-302 / ...) for the supply of 24 V (DC) external	
25-pin SDSUB connector with housing (male)	
3 m network cable CAT6 (patch cable)	
Operating manual	
Software Tools	Driver
	3D-Step Model
	ELABO software package

# SM-PEAC-0-ZRM

## Protective conductor test module

2 A (AC) ... 40 A (AC) / manual adjustable transformer



## Technical features

- Self-sufficient measuring module for universal use in automated systems
- Prepared for integration in control cabinets or test units
- Provided flaps allow easy installation of the modules
- All connections are pluggable
- Device drivers available in C # for Application Programming (.NET Framework 4.6.2)
- Integrated in a high-quality metal housing





# SM-PEAC-0-ZRM

## Protective conductor test module

2 A (AC) ... 40 A (AC) / manual adjustable transformer

### Technical data

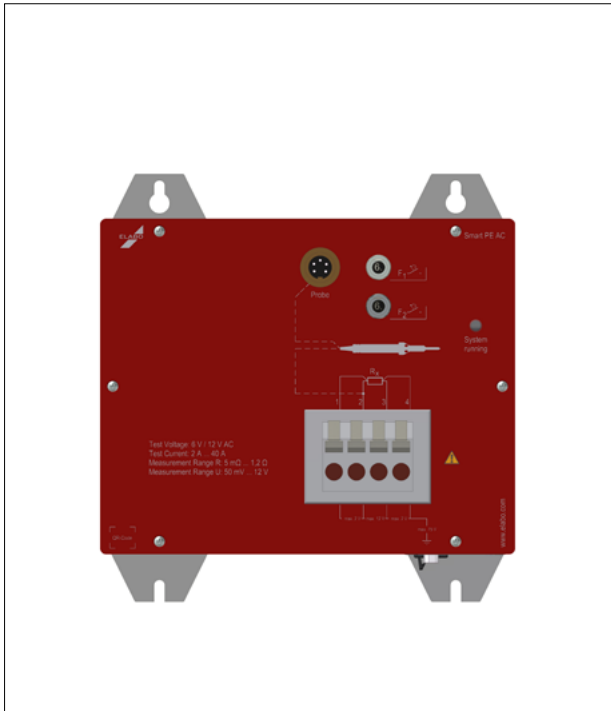
Tests	
Limit values	R_max / U_max
Monitoring	minimum test current I_min
Test parameters	
Test current:	2 ... 40 A (AC) mains-synchronized, adjustable via front panel
Control	Manual adjustment and readjustment
Open circuit voltage	max. 6/12 V (range selectable)
Output power	max. 480 VA
Measurement range R	5 mΩ ... 1.2 Ω
Measuring range U	50 mV (AC) ... 12 V (AC)
Duty cycle	ED 50%, max. Test duration 1 minute
General	
Supply	230 V (AC), 50 Hz / 60 Hz + 24 V (DC) external (DIO, RC)
Equipment	Ethernet interface (TCP / IP)
	Saving of max. 8 different parameter sets (tests)
	Connection for illuminated test probe with START signal
	Digital interface connection (6 DOs, 4 DIs, for example for standard accessories)
Additional options / Alternatively function	E002 - as an alternative to standard DIO, 6 DOs are freely programmable
	E099, ELABO factory calibration
Typical accessories	PE - Test probe with START signal and illumination as status indicator
Software	C # - Driver for .NET in Framework 4.6.2
Dimensions	W = 214 mm, D = 240 mm, H = 220 mm
Weight:	appr. 10.5 kg

Scope of supply	
SM-PEAC-0-ZRM Protective Earth Test Module (AC)	
2 m mains connection cable, with connection plug and open ends	
2-pin connector (WAGO 231-302 / ...) for the supply of 24 V (DC) external	
25-pin SDSUB connector with housing (male)	
3 m network cable CAT6 (patch cable)	
Operating manual	
Software Tools	Driver
	3D-Step Model
	ELABO software package

# SM-PEAC-1-ZRM

## Protective conductor test module

2 A (AC) ... 40 A (AC) / electromechanical variable transformer



## Technical features

- Self-sufficient measuring module for universal use in automated systems
- Prepared for integration in control cabinets or test units
- Provided flaps allow easy installation of the modules
- All connections are pluggable
- Device drivers available in C # for Application Programming (.NET Framework 4.6.2)
- Integrated in a high-quality metal housing



# SM-PEAC-1-ZRM

## Protective conductor test module

2 (AC) ... 40 A (AC) / electromechanical variable transformer

### Technical data

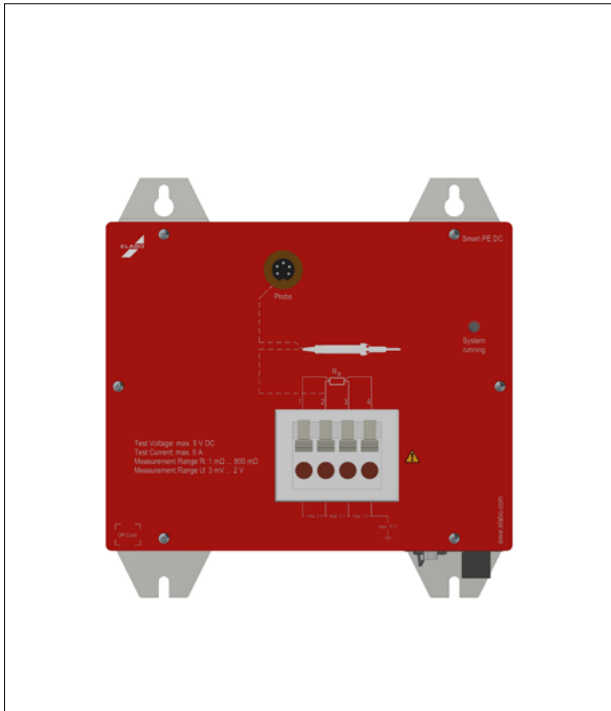
Tests	
Limit values	R_max / U_max
Monitoring	reference test current I_set
Test parameters	
Test current:	2 A (AC) ... 40 A (AC) mains synchronous, specification via setpoint
Control	regulated electromechanically
Open circuit voltage	max. 6/12 V (AC), range selectable
Output power	max. 480 VA
Measurement range R	R 5 mΩ ... 1.2 Ω
Measuring range U	50 mV (AC) ... 12 V (AC)
Duty cycle	ED 50%, max. Test duration 1 minute
General	
Supply	230 V (AC), 50 Hz / 60 Hz
	+ 24 V (DC) external (DIO, RC)
Equipment	Ethernet interface (TCP / IP)
	Saving of max. 8 different parameter sets (tests)
	Connection for illuminated test probe with START signal
	Digital interface connection (6 DOs, 4 DIs, for example for standard accessories)
Additional options / Alternatively function	E002 - as an alternative to standard DIO, 6 DOs are freely programmable
	E099, ELABO factory calibration
Typical accessories	PE - Test probe with START signal and illumination as status indicator
Software	C # - Driver for .NET in Framework 4.6.2
Dimensions	Dimensions W = 214 mm, D = 240 mm, H = 220 mm
Weight:	appr. 10.5 kg

Scope of supply	
SM-PEAC-1-ZRM Protective Earth Test Module (AC)	
2 m mains connection cable, with connection plug and open ends	
2-pin connector (WAGO 231-302 / ...) for the supply of 24 V (DC) external	
25-pin SDSUB connector with housing (male)	
3 m network cable CAT6 (patch cable)	
Operating manual	
Software Tools	Driver
	3D-Step Model
	ELABO software package

# SM-PEDC-0-ZRM

## Protective conductor test module

5V (DC) / 5A (DC) / 1mΩ ... 800mΩ



## Technical features

- Self-sufficient measuring module for universal use in automated systems
- Prepared for integration in control cabinets or test units
- Provided flaps allow easy installation of the modules
- All connections are pluggable
- Device drivers available in C # for Application Programming (.NET Framework 4.6.2)
- Integrated in a high-quality metal housing



# SM-PEDC-0-ZRM

## Protective conductor test module

5V (DC) / 5A (DC) / 1mΩ ... 800mΩ

### Technical data

Tests	
Limit values	R_max / U_max
Monitoring of	minimum test current I_min
Test parameters	
Test current:	max. 5 A (DC) (switching power supply, 5V / 25 W)
Open circuit voltage	max. 5 V (DC)
Output power	max. 6.25 W
Measurement range R	1 mΩ ... 800 mΩ
Measuring range U	3 mV (DC) ... 2 V (DC)
Duty cycle	ED 50%, max. Test duration 1 minute
General	
Supply	100V (AC) ... 230V (AC), 50Hz / 60Hz + 24 V (DC) external (DIO, RC)
Equipment	Ethernet interface (TCP / IP)
	Saving of max. 8 different parameter sets (tests)
	Connection for illuminated test probe with START signal
	Digital interface connection (6 DOs, 4 DIs, for example for standard accessories)
Additional options / Alternatively function	E002 - as an alternative to standard DIO, 6 DOs are freely programmable
	E099, ELABO factory calibration
Typical accessories	PE - Test probe with START signal and illumination as status indicator
Software	C # - Driver for .NET in Framework 4.6.2
Dimensions	W = 214 mm, D = 240 mm, H = 220 mm
Weight:	appr. 3.8 kg

Scope of supply	
SM-PEDC-0-ZRM protective conductor test module (DC)	
2 m mains connection cable, with connection plug and open ends	
2-pin connector (WAGO 231-302 / ...) for the supply of 24 V (DC) external	
25-pin SDSUB connector with housing (male)	
3 m network cable CAT6 (patch cable)	
Operating manual	
Software Tools	Driver
	3D-Step Model
	ELABO software package

## SM-MEAS-0-ZDT

### High Voltage Meter (U/I, AC/DC)

DC  $\pm 1 \text{ V} \dots \pm 10 \text{ kV} / \pm 15 \mu\text{A} \dots \pm 500 \text{ mA}$

AC  $2 \text{ V} \dots 7 \text{ kV} / 15 \mu\text{A} \dots 500 \text{ mA}$



## Technical features

- Self-sufficient measuring instrument for universal use in the laboratory and in automated systems
- Ethernet interface (TCP / IP)
- Integrated bracket allows easy coverage and a better view of the display through individual installation positions
- Robust housing





# SM-MEAS-0-ZDT

## High Voltage Meter (U/I, AC/DC)

DC  $\pm 1$  V ...  $\pm 10$  kV /  $\pm 15$   $\mu$ A ...  $\pm 500$  mA

AC 2 V ... 7 kV / 15  $\mu$ A ... 500 mA

### Technical data

Measurement parameters		
Measurement	DC voltage and current, arithmetic mean	
	AC voltage and current, true rms value, signal frequency typically 50/60 Hz	
Measuring method	24 bit $\Sigma$ - $\Delta$ converter	
Voltage measurement	1 Measuring range	Measuring range 10 kV
	DC $\pm 1$ V ... $\pm 10$ kV AC 2 V ... 7 kV / trms	
Current measurement	4 measuring ranges	Measuring range 1 mA
		Measuring range 10 mA
		Measuring range 100 mA
		Measurement range 500 mA
	DC $\pm 15$ $\mu$ A ... $\pm 500$ mA AC 15 $\mu$ A ... 500 mA / trms	
Potential	internal earth potential reference at the negative input socket	
General		
Supply	100 ... 230 V (AC), 50 Hz / 60 Hz	
Equipment	Ethernet interface (TCP / IP)	
	4-line display	
	3 illuminated buttons for manual settings (measuring range / display / filter)	
	On the front: 2 x 1.8 m high voltage line with TOPAS plug connection	
	On the back: Test item connection via 2 x integrated TOPAS connection sockets	
Dimensions	W = 260 mm, D = 260 mm, H = 160 mm	
Weight:	Appr. 2.5 kg	

Scope of supply
SM-MEAS-0-ZDT High Voltage Meter (U/I, AC/DC)
2.5 m mains cable – Schuko plug – IEC socket
3 m network cable CAT6, (patch cable)
2 x 1.8 m high voltage line with TOPAS plug connection
Operating manual

Accessories
Load resistor network (W = 260 mm, D = 260 mm, H = 70 mm) (Art. No. 94-8R)
ELABO Elution® Software
Factory calibration (Art. No. SM-MEAS-0-E099) or DAkkS calibration (Art. No. 94-8F)

# Accessories



# Accessories

SM-ACC-00		PE test probe 40 A	
Display/ Illumination	color representation of the test procedure and the test results		
	red (test failed), green (test past), red-green alternately flashing (test running)		
START-Signal	integrated START signal by lateral START button or by pressing the probe		
Length connecting cable	4 m (other lengths on request)		

SM-ACC-10		handheld remote control with display		
Display	4-line display	current measured values		
		Test results		
		additional information		
Button	START button			
	STOP / RESET button			
Others	acoustic signal transmitter			
Safety	Release Function for testing ISO, HV / DC			
Standard accessories for the following modules	SM-PEAC-0-ZRM	SM-PEAC-1-ZRM	SM-PEDC-0-ZRM	
	SM-ISO-0-ZRM	SM HVDC 0-ZRM	SM-HVDC-10-ZRM	
	SM-HVDC-20-ZRM			

## Accessories



## Accessories

SM-ACC-20	2 piece HV test guns
Voltage	6 kV
Length connecting cable	4 m (other lengths on request)
Others	Integrated START signals

SM-ACC-30	Warning light set
Colors	Green - Voltage at test connection < 60 V
	Red - Voltage at the test connection $\geq$ 60 V
Connection	M12 connector
Connection length	0.15 m
	Extension cable not included (available in different lengths)



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