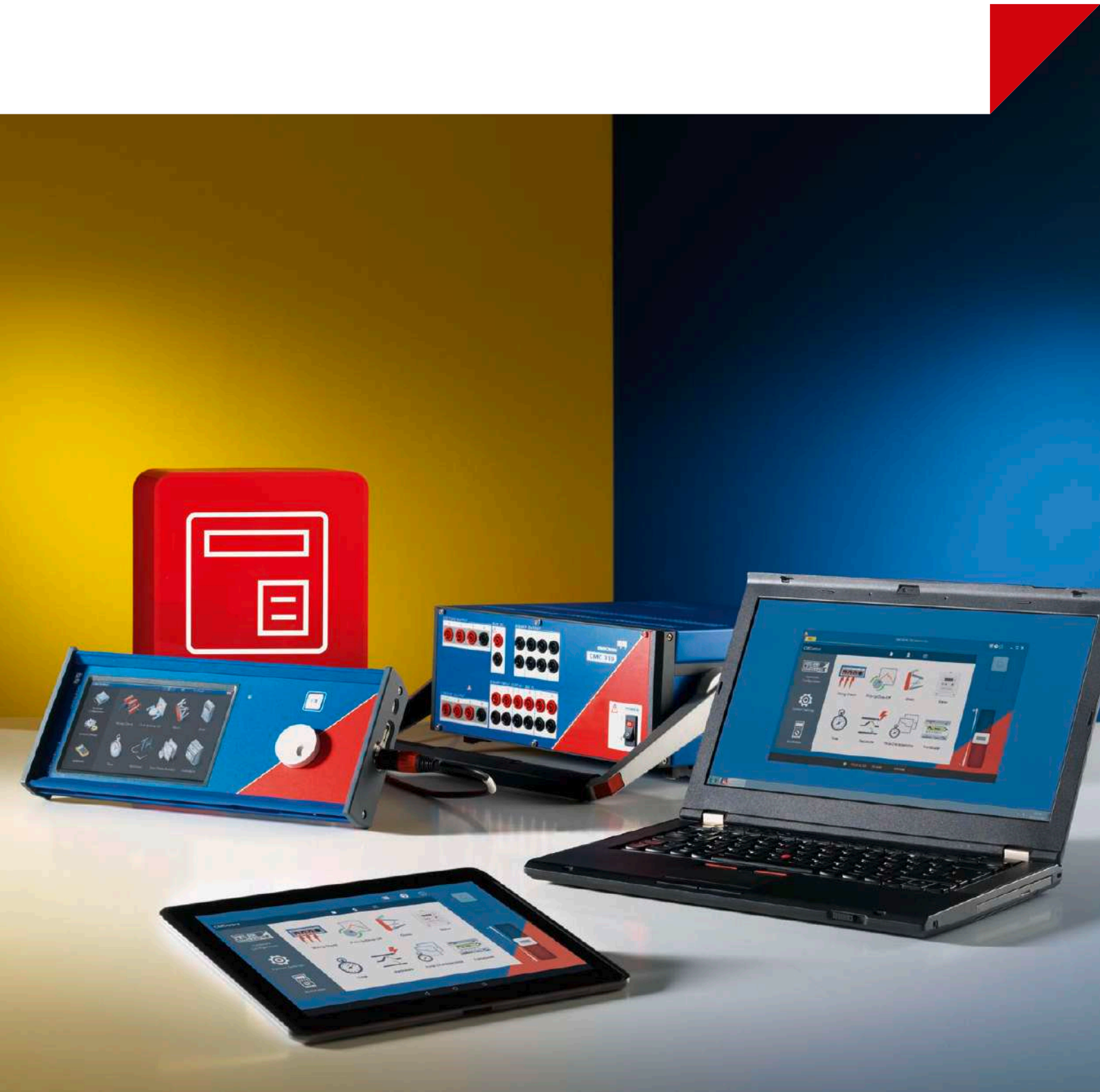
CMC 310

Test Set for Basic Three-phase Testing



Test set for basic three-phase testing

The CMC 310 is specifically designed for basic three-phase testing of protection and measurement devices. It is operated by the CMControl P software with an intuitive user interface and test tools which are optimized for quick manual testing in the field.

The lightweight and compact design makes the CMC 310 particularly suitable for testing distribution and industrial systems.

Safe and future-proof

The three current and voltage output channels of the CMC 310 are continuously and independently adjustable in amplitude, phase and frequency. All outputs are protected against over-temperature, accidental short-circuits, external high-voltage transient signals and are monitored in case of overload.

DC supply:
0 ... 264 V

Voltage outputs:
3 x 300 V or 1 x 600 V

Current outputs:
3 x 32 A / 3 x 430 VA or
1 x 64 A / 1 x 870 VA

Connectivity options

The CMC 310 is designed to work with OMICRON's CMControl P. Users can control the test set using either a Windows PC/tablet or a dedicated front panel control device and connect via Ethernet/USB cable or Wi-Fi (through the optional mini wireless USB adapter).

Organize your tests

For centralized planning, tracking and managing of all engineering, testing and maintenance activities in the power industry, the ADMO software ensures that the workflows of asset and operations managers, testers, and protection engineers are structured and coordinated. Key data will be kept up-to-date and available to all employees at all times.

Your benefits

- Easy manual testing using dedicated test tools and intuitive user interface
- Portable and lightweight testing solution
- Reduced testing effort, increased productivity
- Highly reliable and economic solution

www.omicronenergy.com/CMC310

Manual settings-based testing with CMControl P

"Ideal solution for fast and easy manual testing with low initial effort"

Simple testing in different application areas

CMControl P is specially designed for the quick manual testing of protection and measurement devices.

Due to its intuitive user interface setting up tests is easy and convenient. Output values are adjusted manually while the included test tools with integrated fault models guarantee quick tests and reliable results. The innovative user guidance offers easy operation even without special training.

CMControl P is available as an App for Windows PC or Windows tablet and as a dedicated front panel control device.

CMControl P App

The CMControl P App runs on a standard Windows PC or Windows tablet to control your CMC test set. A dedicated mini wireless USB adapter enables wireless control of CMC test sets.

Benefits

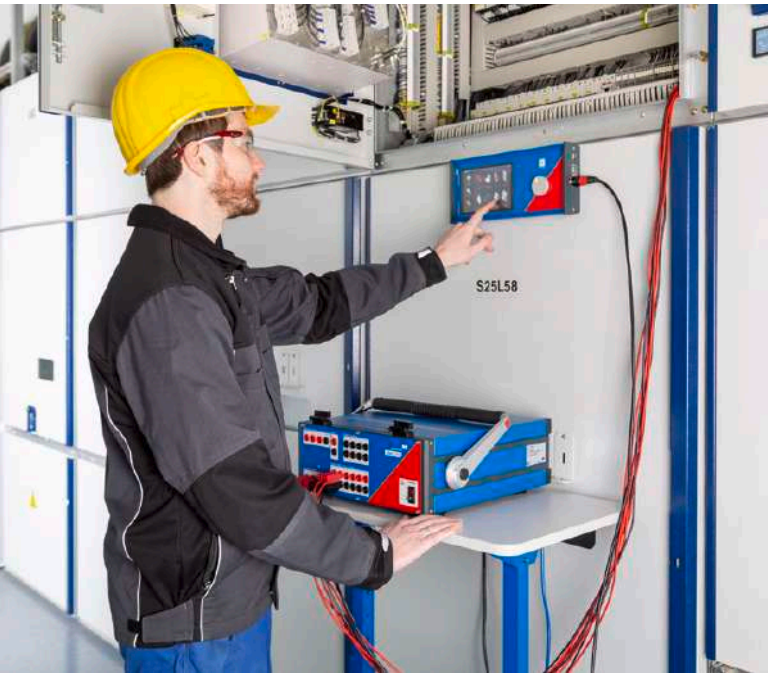
- No cables required through Wi-Fi connection
- Flexible handheld operation
- High versatility with Windows PC
- Integrated user manual
- Save and display test results on device

CMControl P front panel control

The CMControl P front panel control is a specially designed control option for CMC test sets even under rough conditions. It offers instant availability for quick manual testing.

Benefits

- Dedicated and rugged CMC accessory
- Touch screen display with outstanding readability
- Output values easily adjustable using the precision control wheel
- Magnetic rear makes the device attachable to steel surfaces
- Save test results on a USB memory stick



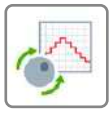
The CMControl P test tools provide a wide range of functions:

Wiring Check is used to verify the wiring between the test set and the device under test

In Direct mode all of the test set's outputs can be controlled individually

Trip times or other timings of a protective relay can be verified with the Time tool

Time Characteristics is designed to test relays with multiple timing stages or particular characteristics



Pick Up/Drop Off allows thresholds of protective relays to be checked

The Meter test tool is used to calibrate electricity meters and to perform start-up and no-load tests

With the Reclosure tool the number of cycles and cycle times of an auto-reclosure function can be checked

Application areas

Protection relay testing

- Overcurrent
- Undervoltage
- All types of directional functions
- Distance
- Differential
- Reclosure
- Circuit breaker simulation

Substation commissioning

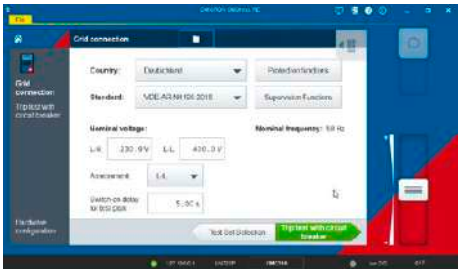
- Checking SCADA annunciations
- Wiring checker
- Plausibility check for CT/VT with primary injection

Measurement device testing

- Meter
- Transducer

Automated testing of anti-islanding protection

CMCheck RE for automated test routines and reporting



CMCheck RE software add-on [1]

Cost-efficient testing of anti-islanding protection in photovoltaic installations with CMC 310 & CMCheck RE [1]. It simplifies testing and offers support in submitting the test report for official certification.

Benefits

- Simple, quick, and cost-efficient
- Fully automated test execution
- Structured test report for certification
- Minimal training effort
- Intuitive and easy to use

Supported protection functions

- Voltage protection
- Frequency protection
- Rate of Change of Frequency (RoCoF)
- Vector shift

Supported standards

- VDE-AR-N 4105 and 4110
- TOR-Erzeuger
- ENA EREC G99 [2]
- IEEE 1547 [2]

[1] CMCheck RE is part of the solar package or available as a dedicated software add-on (Please check the CMC 310 ordering information)
[2] In preparation

CMC 310 accessories

The following accessories are included with the CMC 310 standard delivery but can also be ordered separately.

	Description	Item no.
	> Country-specific power cord with C13 connector, 2.5 m / 8 ft	
	> Ethernet patch cable, 1.5 m / 5 ft, RJ45	E1664300
	> USB connection cable, 2 m / 6.6 ft, A/B	B1021101
	> Test leads with 4 mm / 0.16 in safety plugs (6 x red, 6 x black), 2 m / 6.6 ft	E0201800, E0201900
	> Flexible terminal adapters (12 x black)	E0439201
	> Flexible test lead adapters with retractable sleeve (6 x red, 6 x black), 5 cm / 2.0 in	E0542801, E0542901
	> Grounding cable with battery clamp and cable lug M6 / 0.24 in, 6 m / 20 ft	B0349701
	> Soft bag (for CMC 310 without CMControl P)	E0659401

Optional accessories[1]

	Description	Item no.
	CMC wiring accessory package For connecting test objects to CMC test sets, consisting of: > 12 flexible test lead adapters for connections to narrow terminals > 12 flexible test lead adapters with retractable sleeve for connections to non-safety sockets > 8 flexible jumpers for paralleling current outputs or shorting neutrals of binary inputs > 8 crocodile clips for contacting pins or screw bolts > 12 flexible terminal adapters for screw-type terminals > 12 solid terminal adapters for screw-type terminals > 20 cable lug adapters for M4 (0.15 in) screws > 10 cable lug adapters for M5 (0.2 in) screws > 1 test lead to ground test objects, e.g. in a lab environment > 10 cable ties 150 mm / 6 in long > 1 accessory bag	P0010657
	Mini wireless USB adapter For wireless control of the CMC 310 with the CMControl P App.[2]	E1636800
	Transport case Heavy-duty transport case with wheels and extendable handle.	B0679500
	ARC 256x For testing arc flash protection systems, the ARC 256x simulates an arc flash by means of a xenon flash tube.	P0006279
	CMTAC 1 For installations without battery arrangements, where binary signals use AC voltage. CMTAC 1 converts the AC signals to DC to connect to the binary inputs of a CMC test set.	P0006278
	CPOL3 Polarity and wiring checker For checking a series of terminals for correct wiring. The signal can be injected into the primary side of a CT. Thus, the correct polarity of CT wiring can be included in the test.	P0009398

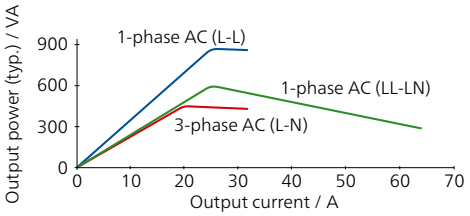
[1] Non-exhaustive list. For the complete list please visit our website: www.omicronenergy.com/cmc310
[2] Requires a CMC test set with NET-2 interface board.
Wi-Fi is subjected to technical and legal constraints. For more information please contact your local OMICRON office or sales partner.

Overview of technical specifications[1]

CMC 310

Current amplifier

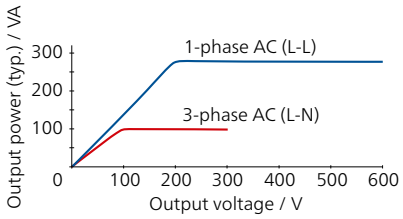
Setting range	3-phase AC (L-N)	3 x 0 ... 32 A
	1-phase AC (L-L)	1 x 0 ... 32 A
	1-phase AC (LL-LN)	1 x 0 ... 64 A
	DC (LL-LN)	1 x 0 ... 64 A
Power	3-phase AC (L-N)	3 x 430 VA typ. at 25 A 3 x 250 W guar. at 20 A
	1-phase AC (L-L)	1 x 870 VA typ. at 25 A 1 x 530 W guar. at 20 A
	1-phase AC ((LL-LN)	1 x 500 VA typ. at 40 A 1 x 350 W guar. at 40 A



Accuracy	Error < 0.05 % rd.[2] + 0.02 % rg.[2] typ. Error < 0.15 % rd. + 0.05 % rg. guar.
Distortion (THD+N)[3]	< 0.05 % typ., < 0.15 % guar.
Resolution	1 mA
Max. compliance voltage (L-N)/(L-L)	35 Vpk / 70 Vpk

Voltage amplifier

Setting range	3-phase AC (L-N)	3 x 0 ... 300 V
	1-phase AC (L-L)	1 x 0 ... 600 V
	DC (L-N)	3 x 0 ... ±300 V
Power	3-phase AC (L-N)	3 x 100 VA typ. at 100 ... 300 V 3 x 85 VA guar. at 85 ... 300 V
	1-phase AC (L-L)	1 x 275 VA typ. at 200 ... 600 V 1 x 250 VA guar. at 200 ... 600 V



Accuracy (at 0 ... 300 V)	Error < 0.03 % rd.[2] + 0.01 % rg.[2] typ. Error < 0.08 % rd. + 0.02 % rg. guar.
Distortion (THD+N)[3]	0.015 % typ., < 0.05 % guar.
Resolution	5 mV / 10 mV in range 150 V / 300 V
Ranges	150 V / 300 V

Amplifiers, general

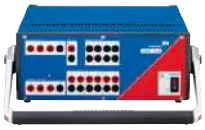
Frequency	Range sine signals[4]	10 ... 599 Hz
	Resolution	< 5 µHz
Phase	Resolution	0.001°
	Error at 50 / 60 Hz	Voltage: 0.02° typ., < 0.1° guar. Current: 0.05° typ., < 0.2° guar.

[1] The full technical specifications are available on request. All data specified are guaranteed, except where indicated otherwise. OMICRON guarantees the specified data for one year after factory calibration, within 23 °C ±5 °C / 73 °F ±10 °F in the frequency range from 10 to 100 Hz and after a warm-up phase > 25 minutes

[2] rd. = reading, rg. = range

[3] THD+N: Values at 50/60 Hz, 20 kHz measurement bandwidth

[4] For current outputs amplitude derating at > 380 Hz



Auxiliary DC supply

Voltage ranges, max. current	0 ... 264 VDC, 0.2 A 0 ... 132 VDC, 0.4 A 0 ... 66 VDC, 0.8 A

Binary inputs

Number	6
Trigger criteria	Toggling of potential-free contacts or DC voltage compared to threshold voltage
Ranges	20 V / 300 V
Sample rate	10 kHz (resolution 100 µs)

Binary outputs

Type	4 relay 4 transistor
Relay breaking capacity	Imax: 8 A / Pmax: 2000 VA at 300 VAC Imax: 8 A / Pmax: 50 W at 300 VDC

Power supply

Nominal input voltage	100 ... 240 VAC, 1-phase (50/60 Hz)

Environmental conditions

Operation temperature [1]	0 ... +50 °C / +32 ... +122 °F
Storage temperature	-25 ... +70 °C / -13 ... +158 °F
Humidity range	Relative humidity 5 ... 95 %, non-condensing

Equipment reliability

Electromagnetic interference (EMI)

International / Europe	IEC/EN 61326-1, IEC/EN 61000-6-4, IEC/EN 61000-3-2/3, CISPR 32 (Class A)/EN 55032 (Class A)
North America	47 CFR 15 Subpart B (Class A) of FCC

Electromagnetic susceptibility (EMS)

International / Europe	IEC/EN 61326-1, IEC/EN 61000-6-2/5, IEC/EN 61000-4-2/3/4/5/6/8/11/16/18

Safety

International / Europe	IEC/EN 61010-1, IEC/EN 61010-2-030
North America	UL 61010-1, UL 61010-2-030, CAN/CSA-C22.2 No. 61010-1, CAN/CSA-C22.2 No. 61010-2-030

Mechanical tests

Vibration	IEC 60068-2-6
Shock	IEC 60068-2-27

Miscellaneous

Weight	13.1 kg / 28.9 lbs
Dimensions (W x H x D, without handle)	343 x 145 x 390 mm / 13.5 x 5.7 x 15.4 in
PC connection	2 PoE (Power over Ethernet) ports USB Type-B port (PC) USB Type-A port (optional Wi-Fi adapter for wireless control)

Certifications

Developed and manufactured under an ISO 9001 registered system

[1] For an operational temperature above +30 °C /+86 °F a duty cycle of down to 50 % may apply

We create customer value through ...

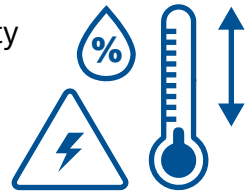
Quality

You can rely on the highest safety and security standards

Superior reliability with up to

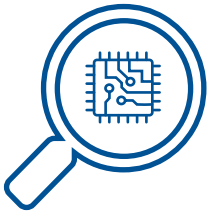
72

hours burn-in tests before delivery



100%

routine testing for all test set components



ISO 9001
TÜV & EMAS
ISO 14001
OHSAS 18001

Compliance with international standards

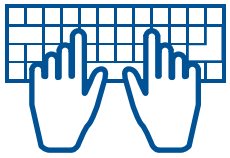
Innovation

... a product portfolio tailored to my needs

More than

200

developers keep our solutions up-to-date



More than

15%

of our annual sales is reinvested in research and development

Save up to

80%

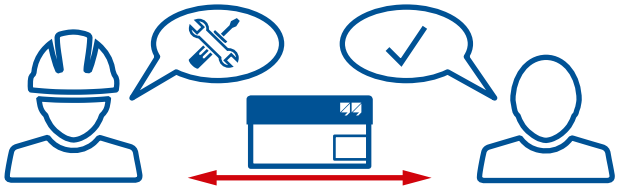
testing time through templates, and automation

Support

24/7

Professional technical support at any time

Loaner devices help to reduce downtime



Cost-effective and straight-forward repair and calibration

22

offices worldwide for local contact and support

Knowledge

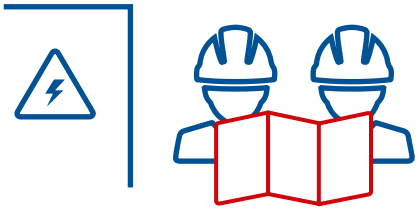
More than

300

Academy and numerous hands-on trainings per year

Frequently OMICRON hosted user meetings, seminars and conferences

to thousands of technical papers and application notes



Extensive expertise in consulting, testing and diagnostics

OMICRON is an international company that works passionately on ideas for making electric power systems safe and reliable. Our pioneering solutions are designed to meet our industry's current and future challenges. We always go the extra mile to empower our customers: we react to their needs, provide extraordinary local support, and share our expertise.

Within the OMICRON group, we research and develop innovative technologies for all fields in electric power systems. When it comes to electrical testing for medium- and high-voltage equipment, protection testing, digital substation testing solutions, and cybersecurity solutions, customers all over the world trust in the accuracy, speed, and quality of our user-friendly solutions.

Founded in 1984, OMICRON draws on their decades of profound expertise in the field of electric power engineering. A dedicated team of more than 1250 employees provides solutions with 24/7 support at 22 locations worldwide and serves customers in more than 170 countries.

The following publications provide further information on the solutions described in this brochure:

Product catalog

For more information, additional literature, and detailed contact information of our worldwide offices please visit our website.

www.omicronenergy.com