OMICRON

CIBANO 500

3-in-1 test system for medium- and high-voltage circuit breakers

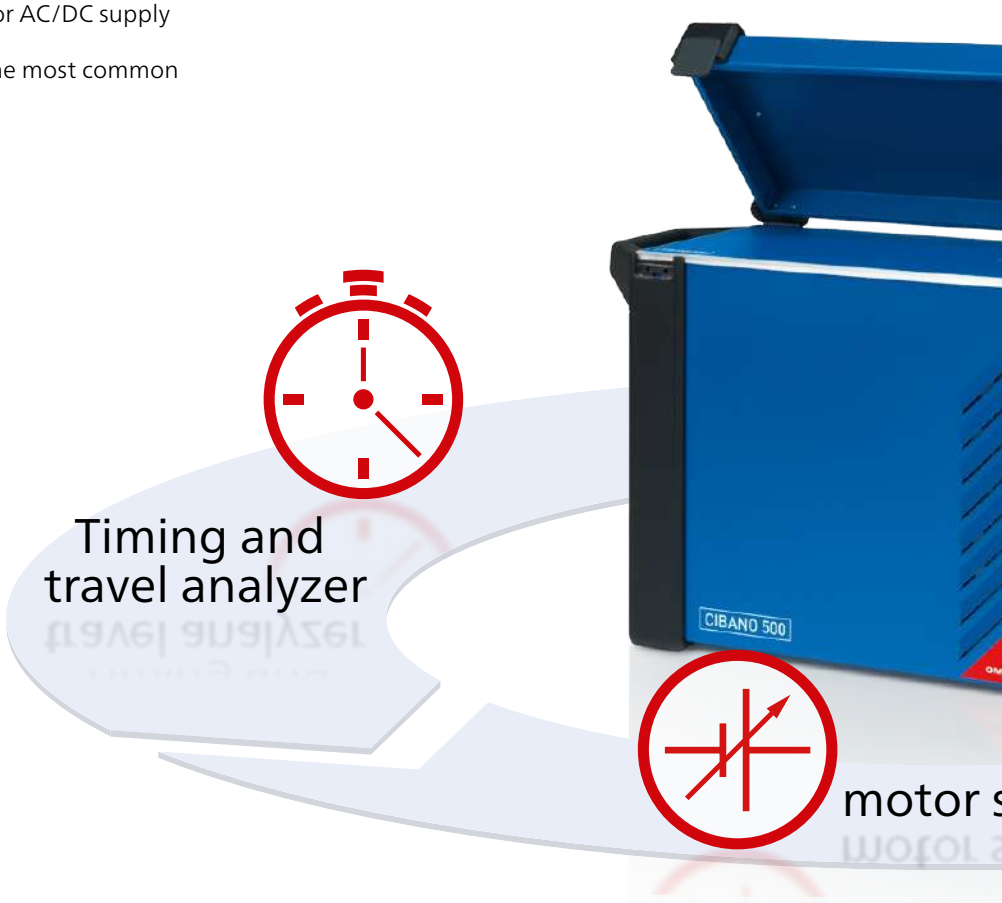
CIBANO 500: the 3-in-1 solution

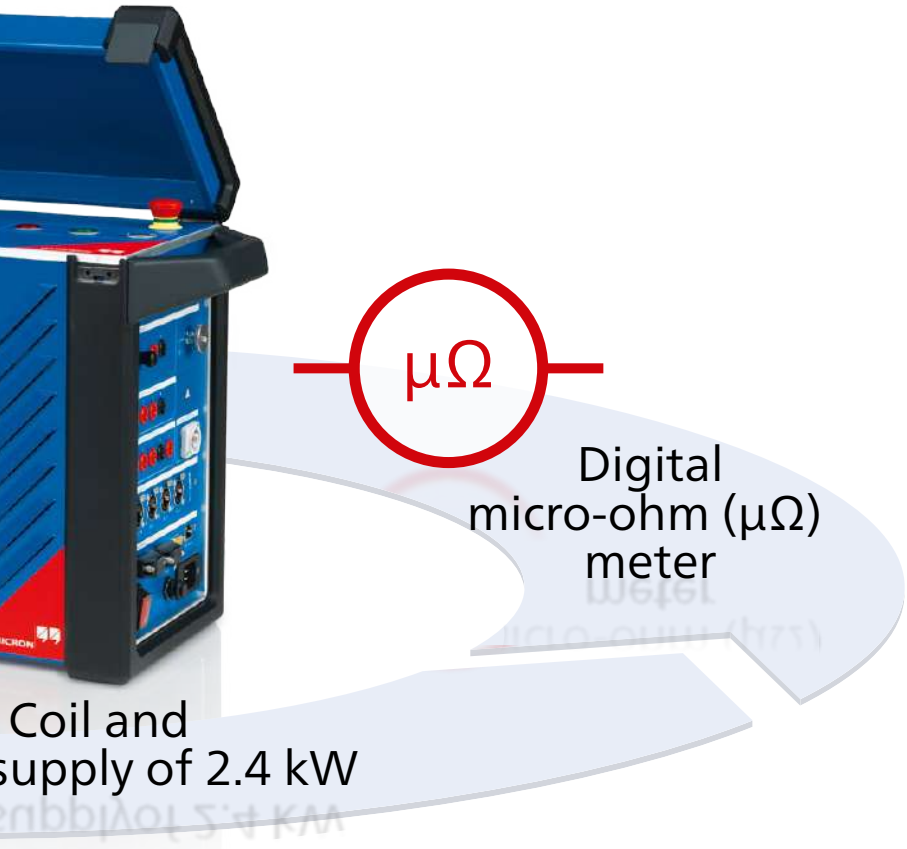
OMICRON's CIBANO 500 is the world's first switchgear test system to combine

- a multi-channel timing and travel analyzer
- a high-accuracy digital micro-ohm (μΩ) meter, and
- a powerful and adjustable coil and motor AC/DC supply

The lightweight test system can perform the most common electrical tests on

- medium-voltage breakers
- high-voltage breakers





Your benefits

- Tests all types of medium- and high-voltage breakers
- Saves testing time by performing measurements simultaneously
- Easy to operate, learn and transport through intelligent design

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Measurement methods

Off-service measurement methods

Timing

Timing measurements according IEC 62271-100 are the most commonly used tests to determine operation time, pole discrepancy or pre-insertion resistor timing.

The test uses a resistance or voltage threshold to measure the timing. The resistance-based method with CB MC2 units allows testing of main contact timing on AIS with grounding on both sides.

Timing with current sensor measurement (CSM)

On both sides grounded GIS, timing can only be measured using the CSM method. It uses a current sensor (Rogowski coil) connected to the breaker's primary parts via a grounding connection.

Static contact resistance

Verifies whether the resistance of the main contacts allows the current to flow with low losses.

Dynamic contact resistance

Records the contact resistance during the operation of the breaker and delivers information about wear-related problems with main and arcing contacts.

Motion/contact travel

Verifies operating mechanism and mechanical linkage and indicates potential mechanical wear.

Coil/motor current

Records the current signature curve of the command coils during breaker operation. Deviations show possible electrical or mechanical defects of the trip or close control components. The motor current analysis records the inrush and steady-state currents as well as the spring charging time.

Minimum pick-up

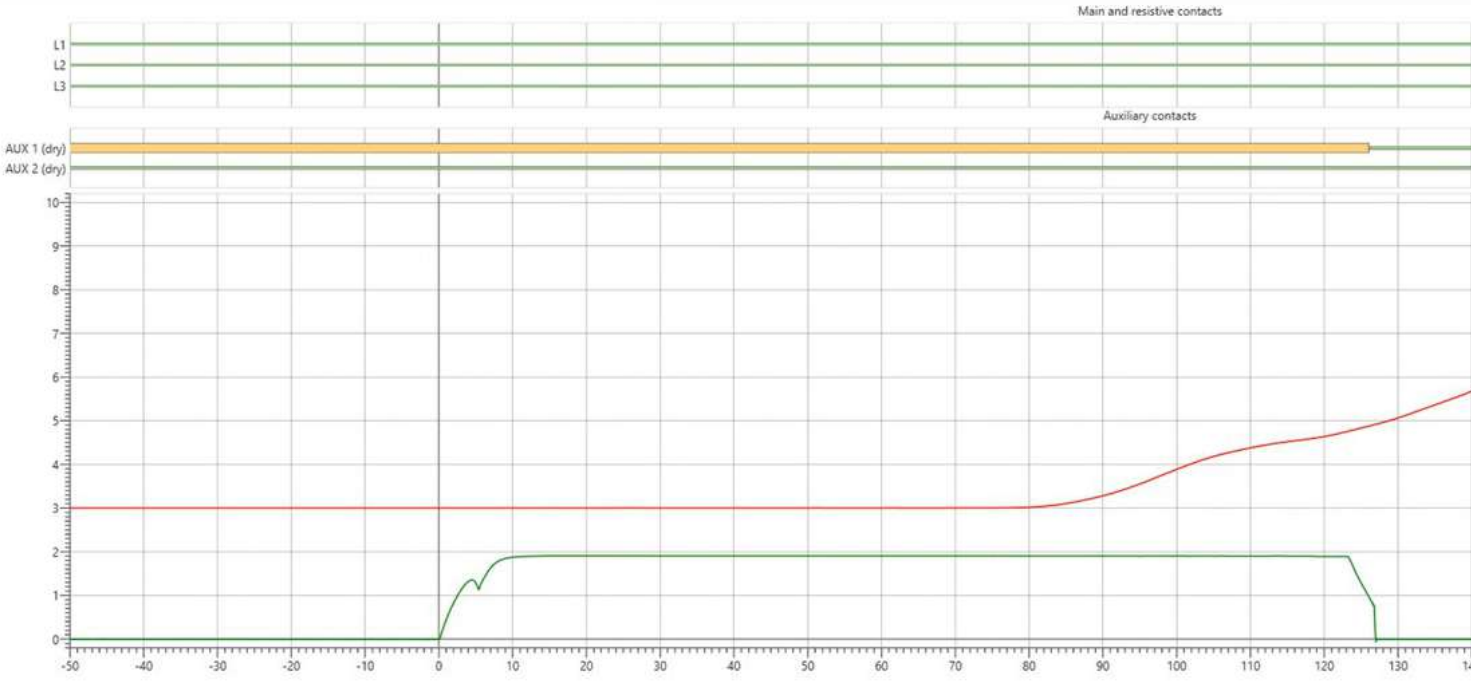
Determines the minimum voltage necessary to trip and close the breaker and verifies whether it can reliably operate in the event of a low DC supply.

Under-voltage condition

Verifies the overall behavior of the breaker during under-voltage conditions. CIBANO 500 delivers an exact under-voltage and measures the breaker's performance.

Release tests

The under-voltage release test determines the trip voltage of the under-voltage coil. The overcurrent release test is used to determine the current which trips the breaker. Overcurrent releases are commonly used together with self-powered overcurrent protection relays.



In-service measurement methods

First-trip test

Off-service testing methods cannot show degradation accumulated during long idle times, such as degraded lubricants, contaminated surfaces or corroded mechanical elements, because the breaker needs to be operated at least once before an off-service test.

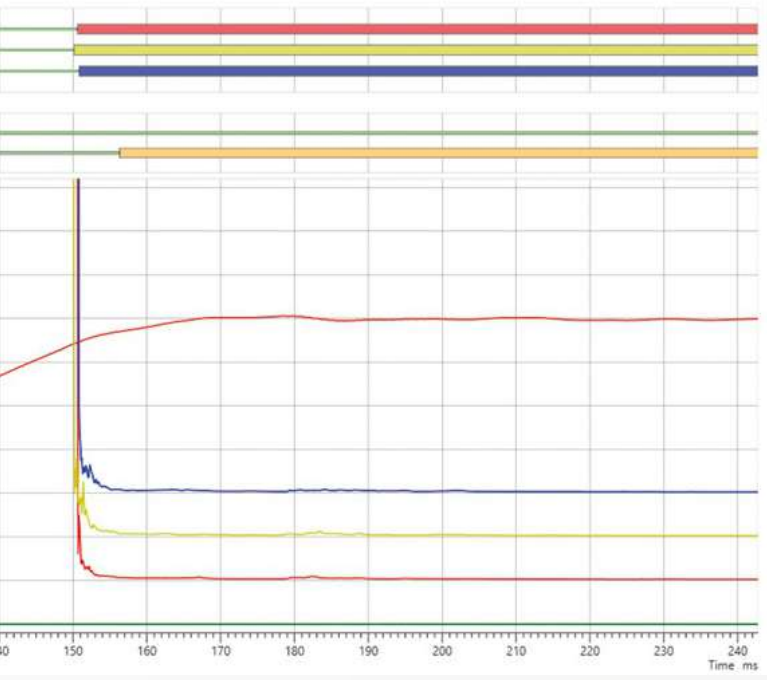
The First trip test is carried out while the breaker is still in service. Connections are made at the trip coils and at the CT's secondary side.

The opening times are measured by monitoring the CTs' secondary current. Please note that the measured time will include the arcing time.

Voltage-based timing measurement (VTM)

VTM is the only measurement method available to measure the timing of a medium-voltage GIS, since the main contacts are sealed and cannot be accessed.

The measurement method can be applied to all circuit breakers with a voltage detection system (VDS) that makes the main voltages accessible. CIBANO 500 uses the trip or close signal as a trigger to determine the trip or close time of the main contacts by measuring the secondary voltage of the circuit breaker's built-in voltage transformers.



If the breaker's main contacts are only grounded on one side, capacitive coupling with voltages of up to several kV may occur due to parallel live parts. These voltages are potentially lethal. With CIBANO 500 and accessories, users can perform all off-service tests while the breaker is safely grounded on both sides.

Your benefits

- Protection against capacitive coupling
- Most advanced test methods
- Identify deterioration from long idle times with a First trip test

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Medium-voltage circuit breaker testing

Safe and independent breaker operation

CIBANO 500's integrated AC/DC power supply enables faster and safer wiring set up. You don't need to perform any connections to live DC circuits of the substation battery. This is especially beneficial when testing medium-voltage breakers which must be completely disconnected and isolated from the substation. The constant output power during all tests guarantees reproducible test results.

Faster and easier testing

With CIBANO 500's 3-in-1 approach you only need to transport one device to the test site and then wire only once to perform all tests.

The results of timing, contact resistance, coil currents, and motion tests are then immediately available as one combined test report.

Voltage-based timing measurement (VTM)

VTM allows in-service timing measurements on MV SF_6 CBs. The tests are performed via the secondary contacts of a built-in inductive or capacitive VT.

Motion as timing trigger

CIBANO 500 can measure the mechanical operation time of a circuit breaker without close coil by using the point in time when the circuit breaker contact begins to move as the starting time for the measurement.

Under-voltage release test

Medium voltage circuit breakers are equipped with an under-voltage (UV) release if the related protection system has no supply voltage backup. The UV release test determines the trip voltage of the under-voltage coil.

Overcurrent release test

Overcurrent releases are used on circuit breakers in substations where self-powered overcurrent protection devices are used. The Overcurrent release test determines the current needed to trip the breaker.

Common tests

- Timing
- Static contact resistance
- Coil current analysis
- Under-voltage condition
- Motion/contact travel
- Under-voltage release
- Overcurrent release

Your benefits

- Extensive selection of sophisticated test methods
- Integrated power supply (2.4 kW) for safe and independent testing
- Lightweight test system (20 kg / 44 lbs) for easy transportation to test site

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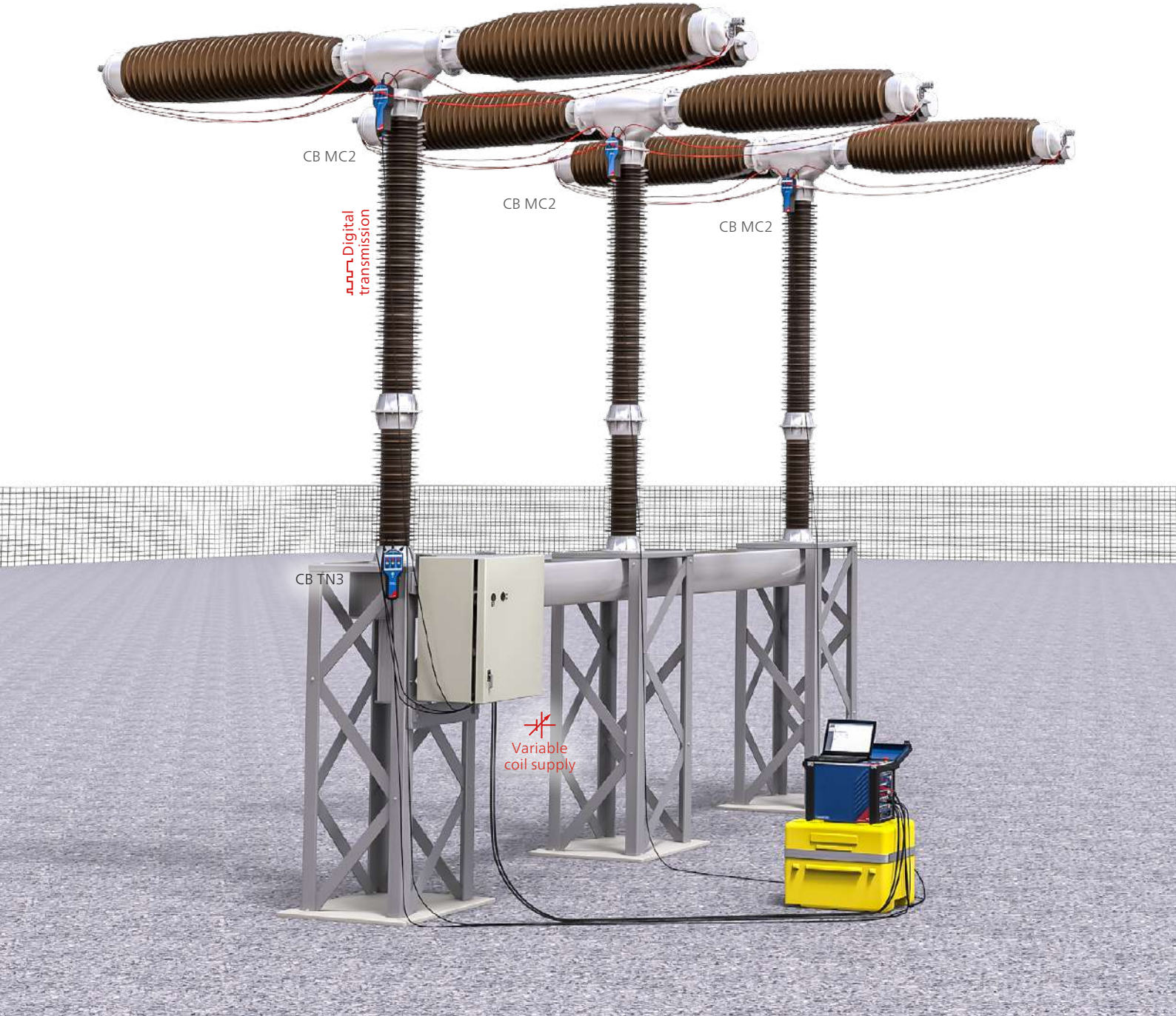
High-voltage live-tank circuit breaker testing

Safe and independent breaker operation

CIBANO 500's integrated AC/DC power supply lets you directly operate the breaker (for example, during commissioning tests). You don't need to perform any connections to live DC circuits of the substation battery which makes wiring safer and faster. The constant output power during all tests guarantees reproducible test results.

Up to 50 % faster

CIBANO 500 can test all performance-, motion-, as well as coil and motor-related parameters of high-voltage live-tank breakers with the same test setup. The connection to the breaker only needs to be done once. With the optional CB MC2 modules, this can save up to 50 % of testing time, as conventional measuring devices require that the wiring is done at least twice.



Measuring large breakers

By using EtherCAT®-communication, the number of measuring channels can be extended to any number needed by very large or specially designed circuit breakers (for example, large breakers with independent pole operation).

Synchronous timing measurement

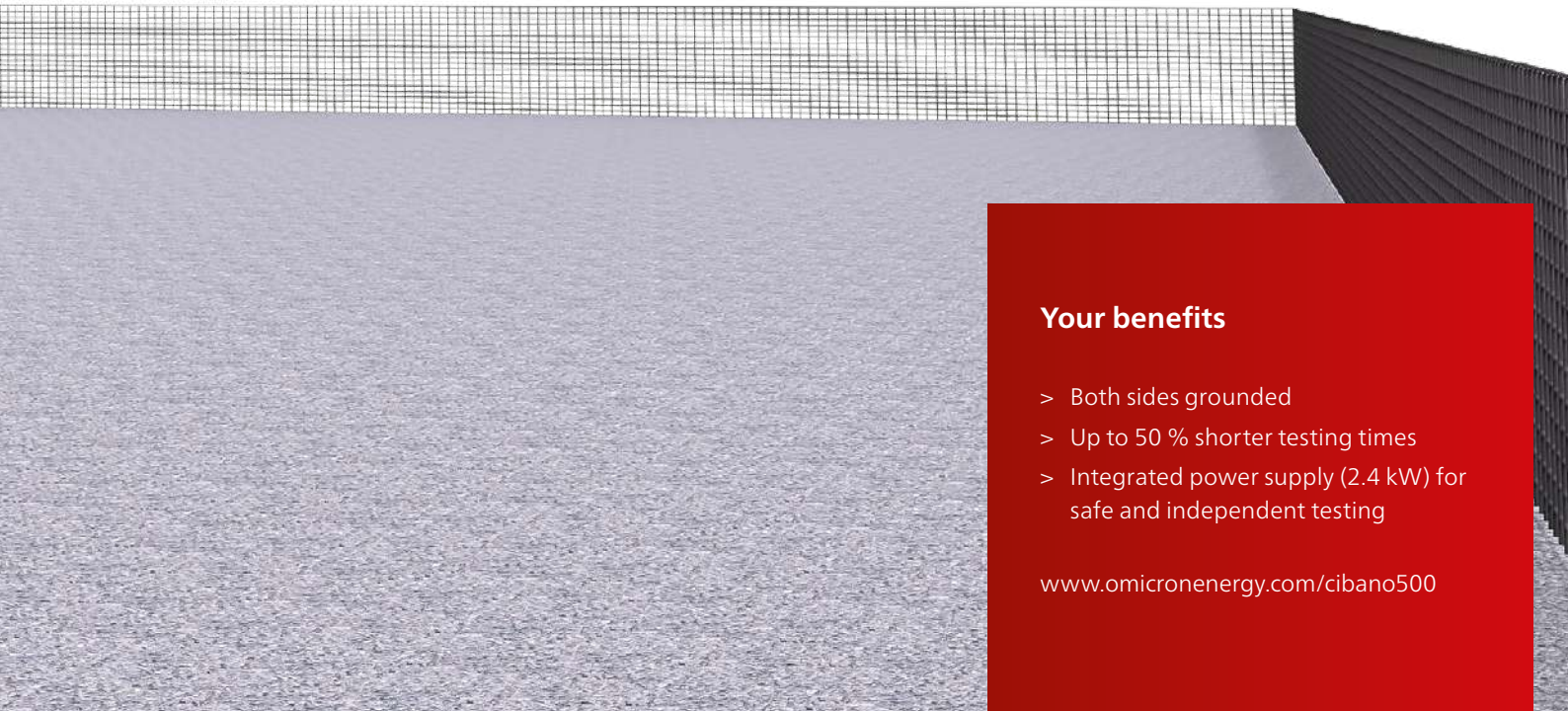
During timing tests on high-voltage live-tank circuit breakers, CIBANO 500 synchronously assesses the timing of all main contacts, auxiliary contacts, and pre-insertion resistors. It measures the differences between the fastest and slowest phase and can detect incorrect mechanical adjustments or wear phenomena of the circuit breakers.

Both sides grounded

All of the tests on high-voltage breakers can be performed while the circuit breaker is grounded on both sides. This results in increased safety levels for operating personnel.

Common tests

- Timing
- Static contact resistance
- Dynamic contact resistance test
- Motion/contact travel
- Coil/motor current analysis
- Under-voltage condition
- Minimum pick-up



Your benefits

- Both sides grounded
- Up to 50 % shorter testing times
- Integrated power supply (2.4 kW) for safe and independent testing

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High-voltage dead-tank circuit breaker testing

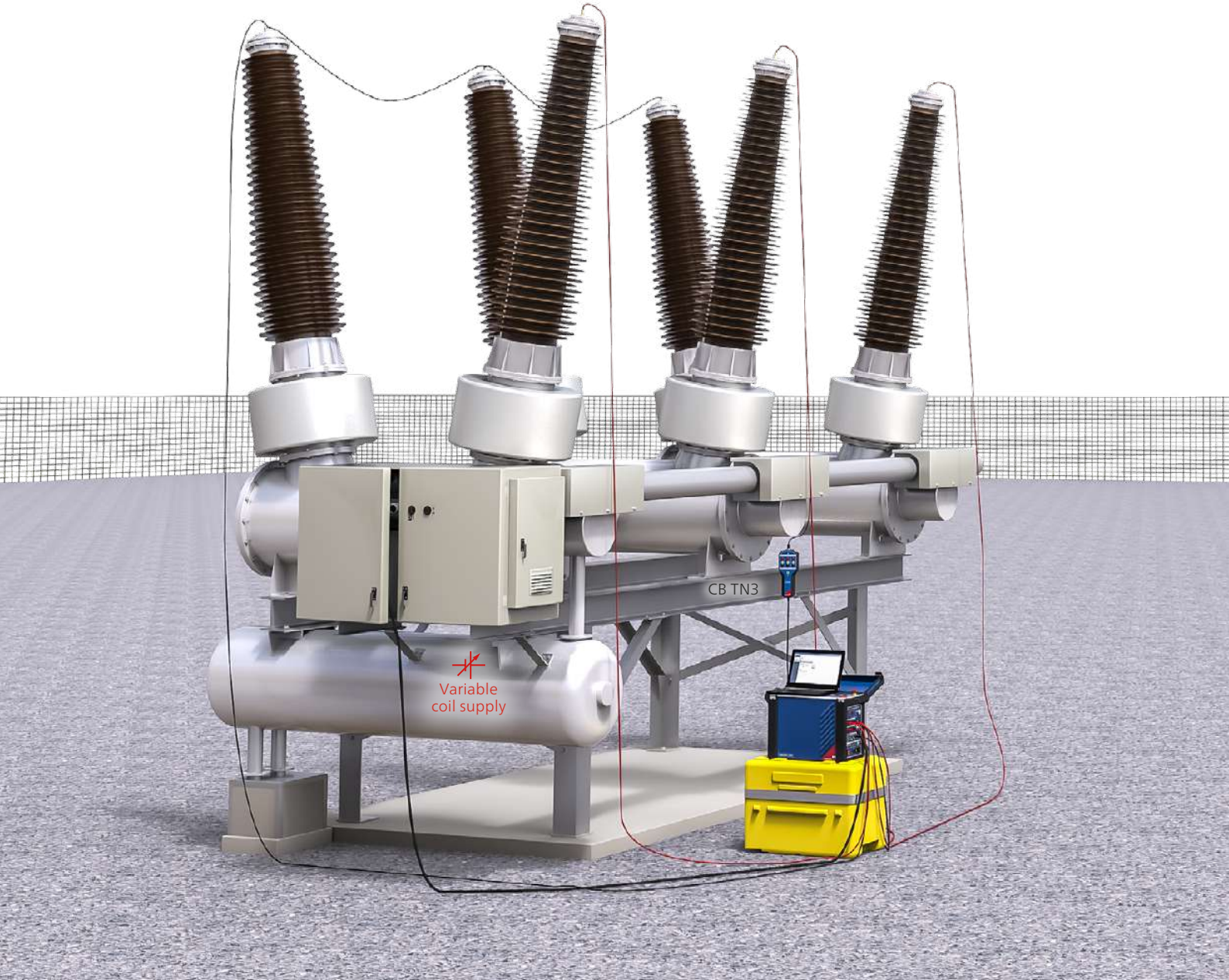
One device for most electrical tests

CIBANO 500's 3-in-1 approach combines a timing and travel analyzer, a micro-ohm (μΩ) meter, and a coil and motor supply within one device.

As a result you can perform timing, first trip, contact resistance, coil/motor current, and motion tests without any additional accessories. The contact resistance tests can be performed with an injection of up to 100 A.

Safe and independent operation

CIBANO 500's integrated AC/DC power supply lets you directly operate the breaker, e.g. during commissioning. You don't need to perform any connections to live DC circuits of the substation battery which makes wiring safer and faster. The constant output power during all tests guarantees reproducible test results.



First-trip test

The First trip test is carried out while the breaker is still in service. The signature of the measured trip coil current gives an indication of the tripping function. The opening times are measured by monitoring the CTs' secondary current.

Dynamic contact resistance test

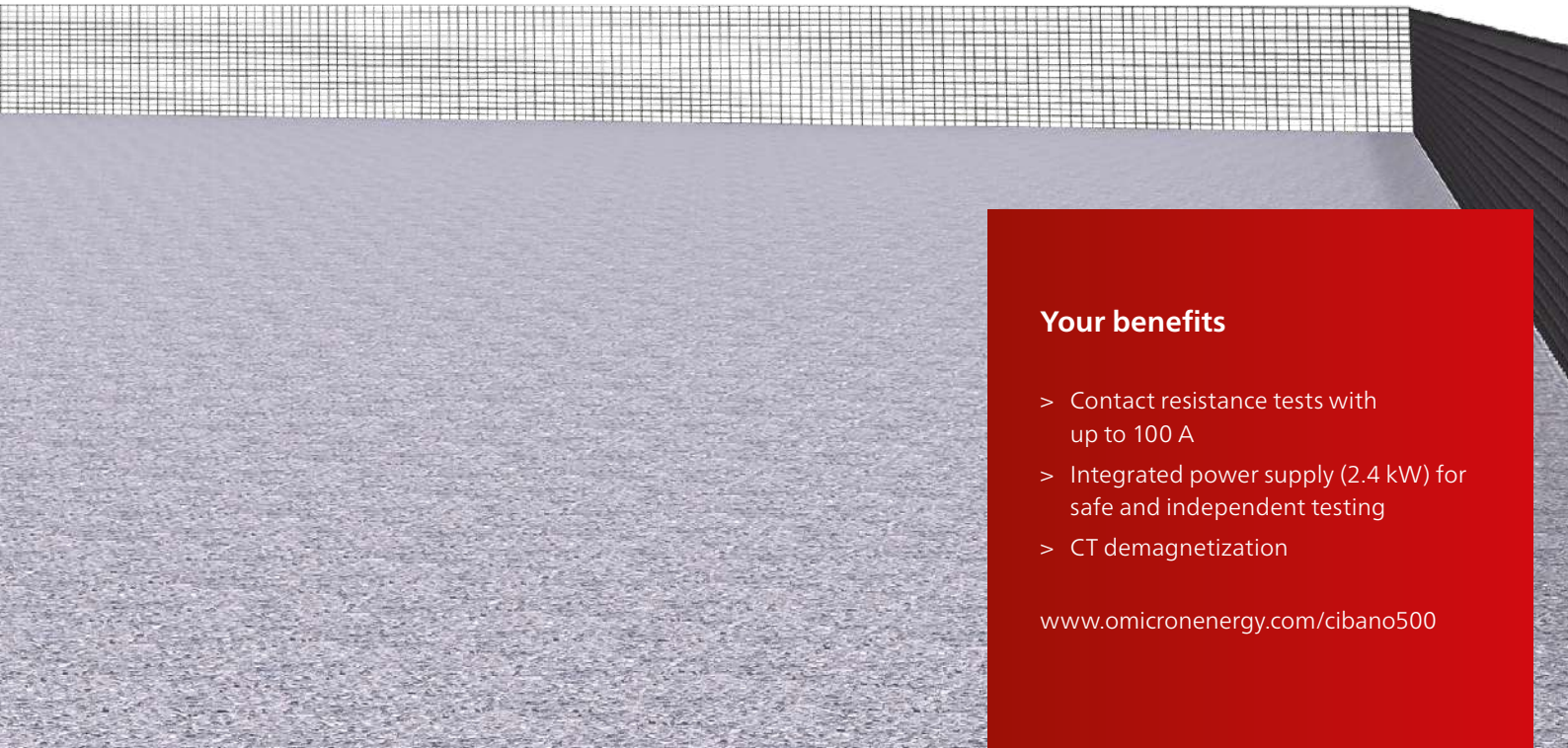
During this test, CIBANO 500 and the optional CB MC2 modules, record the contact resistance value during circuit breaker operation and deliver information about wear-related problems with main and arcing contacts.

CT demagnetization

The optional CT demagnetization function demagnetizes the integrated current transformers of the circuit breaker via the primary side. This makes sure that no residual magnetism affects the correct function of the CTs.

Common tests

- Timing
- First trip
- Static contact resistance
- Motion/contact travel
- Dynamic contact resistance test
- Coil/motor current analysis
- Under-voltage condition
- Minimum pick-up



Your benefits

- Contact resistance tests with up to 100 A
- Integrated power supply (2.4 kW) for safe and independent testing
- CT demagnetization

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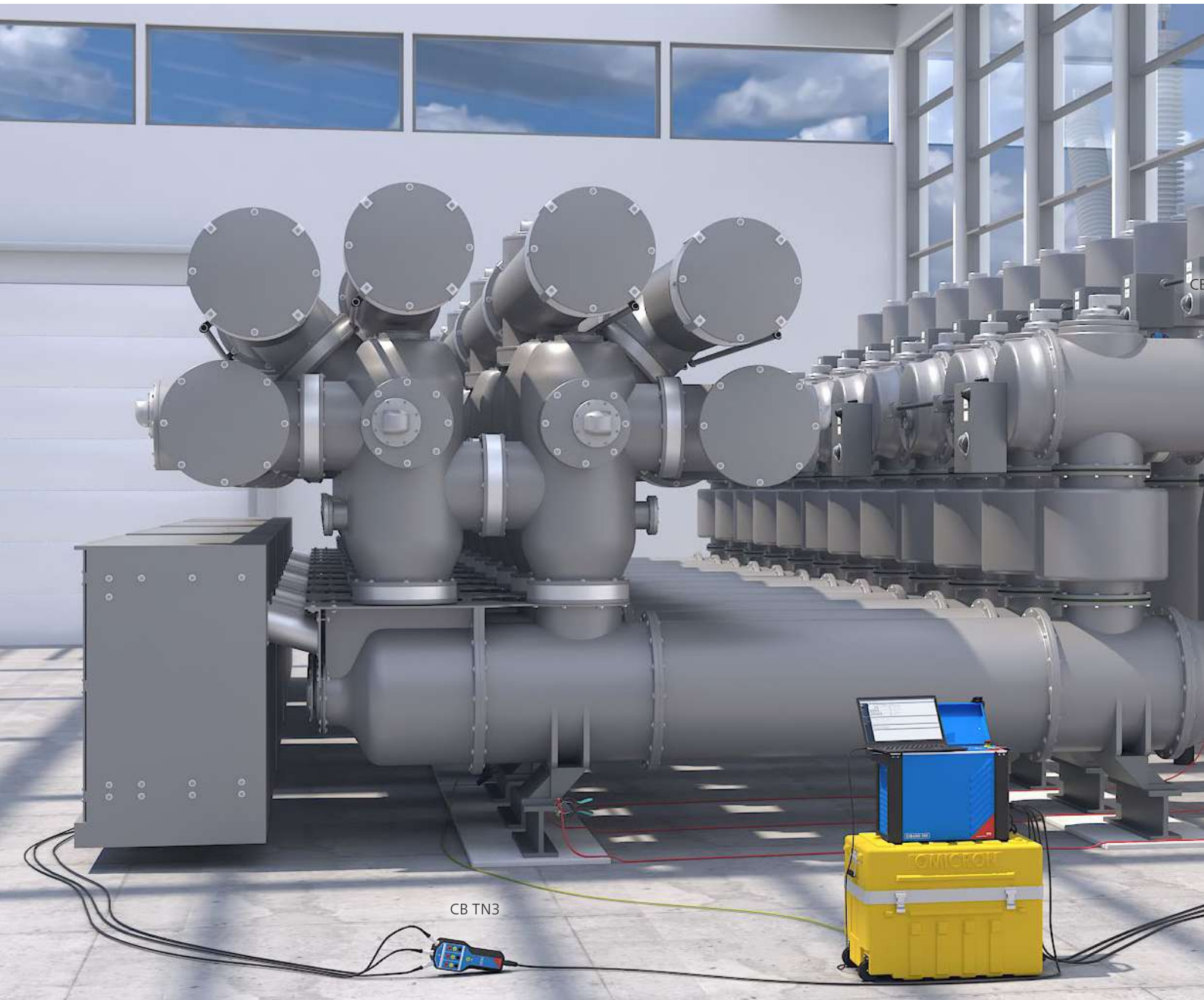
Gas-insulated switchgear (GIS) testing

One test setup for all tests

CIBANO 500 can test all performance-, motion-, as well as coil and motor-related parameters of GIS breakers with the same test setup. The connection to the breaker only needs to be done once. With the optional CB MC2 modules, this can save a lot of testing time, as conventional measuring devices require this wiring to be done at least twice.

Both sides grounded

The current sensor measurement method (CSM) allows timing measurements on a GIS breaker with both sides grounded. CSM measures the operating times of the breaker with an inductive sensor laid round the ground connection of the grounding switch. Nothing else needs to be modified. The adjustable measuring sensor can be easily installed on a multitude of different grounding switches and performs precise timing measurements.



Grounded contact resistance measurement

This method allows measuring the static contact resistance on a both sides grounded GIS, increasing the safety of the operator.

CT demagnetization

The CT demagnetization function demagnetizes the integrated current transformers of the circuit breaker via the primary side. This makes sure that no residual magnetism affects the correct function of the CTs.

Common tests

- Timing
- Static contact resistance
- Motion/contact travel
- Dynamic contact resistance test
- Coil/motor current analysis
- Under-voltage condition
- Minimum pick-up

Your benefits

- Timing test with both sides grounded
- Contact resistance measurement with both sides grounded
- CT demagnetization

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Primary Test Manager™ – Guided testing with easy data management

CIBANO 500 is controlled by the PTM.

PTM is the ideal software tool for the diagnostic testing and condition assessment of your substation equipment.

It supports you in performing measurements and guides you step by step through the entire test procedure, in order to make testing faster, easier, and safer.

It can also operate other OMICRON devices such as CPC 100/80, TESTRANO 600, FRANEO 800 or DIRANA, minimizing the training efforts of your team.

Management of location, asset and test data

PTM provides a well-structured database for managing all circuit breaker-related data to obtain a comprehensive overview of your asset's condition. You can define and manage locations, assets, jobs and reports in a fast and easy way.

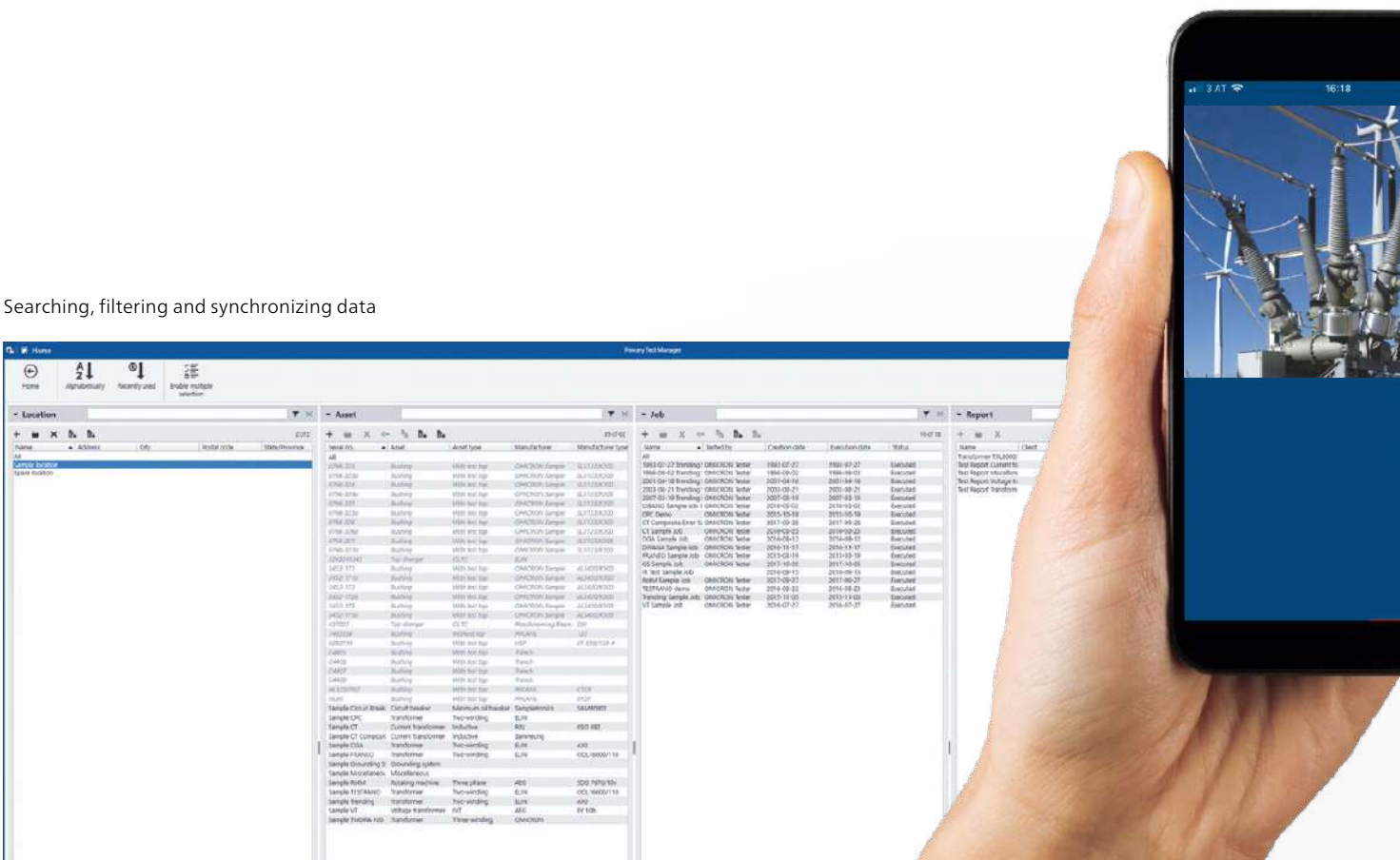
Circuit breaker testing library (CBTL)

The CBTL integrated into PTM makes circuit breaker testing a lot faster. You can load all the CB-specific default data into PTM with just the click of a button. All you need to do is enter the CB's serial number, perform any necessary modifications on the default data, and then you're ready to test.

Data synchronization and back-up

During on-site testing, data is often generated by multiple testing teams. With the 'PTM DataSync' module, you can synchronize all data to a central database hosted on premises or in the cloud. In doing so, data synchronization and storage becomes safer and more convenient. You can select the relevant locations in order to keep the local database small.

Searching, filtering and synchronizing data



and automatic result assessment

Execution of diagnostic tests

PTM enables you to control and operate the connected test set directly from a computer. During testing, PTM helps you define your circuit breaker by entering type-specific parameters.

Customized test templates

By selecting or de-selecting individual tests, you can tailor the test procedure to your specific needs with minimum effort. The resulting test plans can be saved as templates and reused for matching circuit breaker types. This makes circuit breaker testing with PTM fast and effective.

Result analysis and reporting

Results are automatically stored and organized in the database on your PC and are available for analysis and reporting. Each test can be automatically assessed according to manufacturer specifications or based on your individual limit values.

Customized, individual reports

PTM automatically generates reports including all asset-related information and performed tests. This gives you a comprehensive overview of the test object, test results and assessment.

You can easily adapt test reports, incorporate your company logo, photos and other test results. You can also create test job specific report templates with the PTM Report Designer.

PTMate

PTMate app lets you send images directly to PTM, view wiring diagrams and stop ongoing measurements. You can get PTMate app for free in the App Store and the Google Play Store.

Executing tests and analysing measurement results

Configuration options

If you want to test the voltage of the station battery under real load conditions, you can use these inputs for opening/closing the breaker with the station battery instead of the integrated power supply.

A1-A3: Close coil, motor supply, main contact or auxiliary contact
B1: Trip coil or current clamp
B2: Trip coil, close coil or current clamp
B3: Trip coil, continous supply output or current clamp
B4: Motor supply or current clamp

CIBANO 500[1)]

1 x V IN

C1-C3: 3 x auxiliary contacts

EtherCAT® connections

AUXILIARY MODULE [2)]

1 x Ether

1 x EtherCAT®

ETHERCAT ® MODULE[3)]

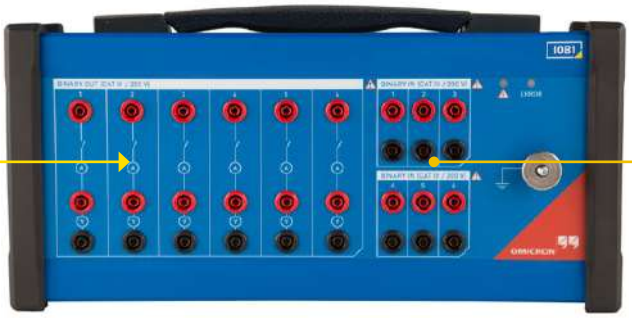
4 x EtherCAT®

1) The standard package includes a CIBANO 500 base unit.
2) The packages Dead tank and Medium voltage include a CIBANO 500 with a built-in Auxiliary module.
3) The Advanced package includes a CIBANO 500 with a built-in EtherCAT®-Module.

Connection example:
three medium-voltage circuit breaker main contacts
one circuit breaker supply
one trip coil
one close coil
one motor supply

Adds three auxiliary contacts

IOB1



CAT®

6 x binary out: trip coil, close coil, motor or auxiliary contact
6 x binary in: auxiliary contacts

Adds twelve completely independent galvanically isolated channels. The outputs can be used for controlling trip coils, close coils and motors, and the inputs can be used for reading auxiliary contacts.

CB MC2

1 x EtherCAT®

2 x current output
2 x voltage input

One CB MC2 can connect up to two high-voltage circuit breaker main contacts. In order to simultaneously measure a three-phase circuit breaker with two breaking chambers per phase, you need three CB MC2 units.

CB TN3

1 x EtherCAT®

3 x digital interface EIA-422
3 x analog interface

One CB TN3 can connect up to three digital or analog rotational or linear motion transducers.

EHB1

1 x EtherCAT®

4 x EtherCAT®

You can connect one or more EtherCAT®-Hubs EHB1 in order to connect a greater number of CB MC2, CB TN3 or IOB1 devices.

Technical specifications

CIBANO 500

Power output of integrated power supply

Frequency	DC / 15 Hz ... 400 Hz		
Power	Vmains	P30s	P2h
	> 100 V	1500 W	1000 W
	> 190 V	3200 W	2400 W

Current / voltage output[1] of integrated power supply

Source	Range	Imax, 30 s1	Imax, 2 h1
DC	0 ... ±300 V	27.5 A	12 A
DC	0 ... ±150 V	55 A	24 A
AC	0 ... 240 V	20 A	12 A
AC	0 ... 120 V	40 A	24 A

Commands for control of trip or close coils

Current per channel[5]	Duty cycle
6 Aeff AC or DC	continuous
15 Aeff AC or DC	20 s on 80 s off
30 Aeff AC or DC	10 s on 190 s off
40 Aeff AC or 55 A DC	200 ms

Commands for motor supply

Current per channel5	Duty cycle
24 Aeff AC or DC	continuous
40 Aeff AC or DC	20 s on 80 s off
55 A DC	10 s on 190 s off

Voltage input from station battery (CAT III[2])

Source	Range	Accuracy[3]
DC	0 ... 420 V	0.5 % rd + 0.5 % fs
AC	0 ... 300 V	0.5 % rd + 0.5 % fs

Voltage measurements (CAT III[4])

Source	Range	Accuracy[3]
DC	0 ... 300 V	0.1 % rd + 0.05 % fs
AC	0 ... 300 V	0.03 % rd + 0.01 % fs
DC	0 ... 3 V	0.1 % rd + 0.05 % fs
DC	0 ... 300 mV	0.1 % rd + 0.1 % fs
DC	0 ... 30 mV	0.1 % rd + 0.1 % fs

Current measurements

Source	Range	Accuracy[3]
DC	0 ... 55 A	0.1 % rd + 0.2 % fs
AC	0 ... 40 A	0.1 % rd + 0.1 % fs

Resistance measurements

Range	Voltage range	Injected current	Accuracy[3]
0.1 µΩ ... 300 µΩ	30 mV	100 A	0.2 % rd + 0.1 µΩ
0.5µΩ...3 mΩ	300 mV	100 A	0.2 % rd + 0.5 µΩ
5 µΩ ... 30 mΩ	3 V	100 A	0.2 % rd + 5 µΩ
50 µΩ ... 300 mΩ	3 V	10 A	0.2 % rd + 50 µΩ

Inputs for auxiliary contacts (CAT III[4])

Auxiliary input type	Toggling with potential-free (dry) contacts or voltages (wet) up to 300 V DC
Maximum sample rate	40 kHz
Minimum resolution	25 µs

Mains supply

Voltage	Nominal: 100 V ... 240 V AC Permitted: 85 V ... 264 V AC
Current	Nominal: 16 A
Frequency	Nominal: 50 Hz / 60 Hz Permitted: 45 Hz ... 65 Hz
Power fuse	Automatic circuit breaker with magnetic overcurrent tripping at I > 16 A
Power consumption	Continuous: < 3.5 kW Peak: < 5.0 kW

Interfaces

Digital	1 × Ethernet, 1 × Serial, 2 × Safety Optional EtherCAT® module: 4 × EtherCAT® Optional auxiliary module: 1 × EtherCAT®
Analog	1 × analog input (V IN) 3 × analog input/ analog output/ binary input (A) 4 × analog input / analog output (B) Optional auxiliary module: 3 × binary input (C)

Environmental conditions

Temperature	Operating: -10 °C ... +55 °C / +14 °F ... +131 °F Storage: -30 °C ... +70 °C / -22 °F ... +158 °F
Relative humidity	5 % ... 95 %, non-condensing
Maximum altitude	Operating: 2000 m / 6550 ft, up to 5000 m / 16400 ft (with limited specifications, according to footnotes 2 and 4) Storage: 12000 m / 40000 ft

Mechanical data

Dimensions (W × H × D)	580 × 386 × 229 mm / 22.9 × 15.2 × 9.0 inch (W = 464 mm / 18.3 inch without handles)
Weight	20 kg / 44.1 lbs (main unit including power supply)

Equipment reliability

Shock	IEC / EN 60068-2-27, 15 g / 11 ms, half-sinusoid, 3 shocks in each axis
Vibration	IEC / EN 60068-2-6, frequency range from 10 Hz to 150 Hz, continuous acceleration 2 g (20 m/s2 / 65 ft/s2), 20 cycles per axis

PC Requirements

Operating system	Windows 10™ 64-bit Windows 8.1™ 64-bit Windows 8™ 64-bit Windows 7™ SP1 64-bit
CPU	Multicore system with 2 GHz Single-core system with 2 GHz
RAM	4 GB
Hard disk	5 GB of available space
Storage device	DVD-ROM drive
Graphics adapter	Super VGA (1280 × 768) or higher-resolution video adapter and monitor
Interface	Ethernet NIC / USB 2.0
Microsoft® software	Microsoft Office® 2016, 2013, 2010, or 2007

[1] Maximum power rating cannot be exceeded. Maximum voltage and current cannot be supplied at the same time
[2] From 2000 m to 5000 m altitude CAT III compliance only with half voltage
[3] Means “typical accuracy”; at typical temperatures of 23 °C, 98 % of all units have an accuracy which is greater than specified
[4] From 2000 m to 5000 m altitude only CAT II compliance or CAT III compliance with half voltage
[5] Valid while using one channel. Thermal derating when 2 or 3 channels are used in parallel

Technical specifications

CB MC2

Current output

Channels	2
Current	0 ... 100 A DC

Static contact resistance measurement

Range	0.1 µΩ ... 1 000 µΩ
Accuracy[2]	0.2 % rd + 0.1 µΩ
Measuring current	100 A

Dynamic contact resistance measurement[1]

Range	10 µΩ ... 200 mΩ
Accuracy[2]	0.2 % rd + 10 µΩ
Maximum sample rate	40 kHz

Pre-insertion resistance (PIR) measurement

Range	0 ... 10 kΩ
Accuracy[2] (< 500 Ω)	0.5 % rd + 10 mΩ
Accuracy[2] (500 Ω ... 10 kΩ)	3 % rd

Timing measurement

Maximum sample rate	40 kHz
Minimum resolution	25 µs

Interface

EtherCAT® interface to CIBANO 500

Environmental conditions

Temperature	Operating: -30 °C ... +70 °C / -22 °F ... +158 °F Storage: -30 °C ... +70 °C / -22 °F ... +158 °F
Relative humidity	5 % ... 95 %, non-condensing
Maximum altitude	Operating: 5 000 m / 16 400 ft Storage: 12 000 m / 40 000 ft

Mechanical data

Dimensions (W × H × D)	109 × 272 × 63 mm / 4.3 × 10.7 × 2.5 inch
Weight	1.2 kg / 2.6 lbs

Equipment reliability

Please see CIBANO 500 parameters.

CB TN3

Analog interface

Output	
Channels[3]	3
Voltage	5 ... 30 V DC
Current	10 ... 50 mA

Voltage Input

Channels	3
Range	30 V
Accuracy[2]	0.1 % rd + 20 mV
Maximum sample rate	40 kHz

Current input

Channels	3
Range	50 mA
Accuracy[2]	0.1 % rd + 20 µA
Maximum sample rate	40 kHz

Digital interface

Output	
Channels[3]	3
Voltage	5 ... 30 V DC
Current	10 ... 200 mA
Maximum power	5 W per channel
Input	
Signal type	2 square-wave signals according to EIA-422/485 standard
Maximum input frequency	10 MHz

Interface

EtherCAT® interface to CIBANO 500

Environmental conditions

Please see CB MC2 parameters

Mechanical data

Dimensions (W × H × D)	109 × 272 × 63 mm / 4.3 × 10.7 × 2.5 inch
Weight	0.76 kg / 1.7 lbs

Equipment reliability

Please see CIBANO 500 parameters.

[1] Valid for test currents ≥10 A
[2] Means “typical accuracy”; at typical temperatures of 23 °C, 98 % of all units have an accuracy which is greater than specified
[3] 3 channels of CB TN3 can be used at a time. They can be freely configured as digital or analog channels
[4] Valid while using one channel. Thermal derating when 2 or 3 channels are used in parallel

IOB1

Voltage measurements

Source	Range	Accuracy[2]
DC	0 ... 300 V	0.05 % rd + 0.05 % fs
AC	0 ... 300 V	0.05 % rd + 0.02 % fs

Current measurements

Source	Range	Accuracy[2]
DC	0 ... 40 A	0.1 % rd + 0.2 % fs
AC	0 ... 40 A	0.1 % rd + 0.05 % fs

Commands for control of trip/close coils or motors

Channels	6 (can alternatively be configured for measuring wet auxiliary contacts)
Voltage per channel[4]	**Duty cycle**
± 300 V DC or AC	continuous
± 500 V	transient peak
Current per channel[4]	**Duty cycle**
24 A_{RMS} AC or DC	continuous
40 A_{RMS} AC or 55 A DC	200 ms on 5s off
± 85 A	transient peak

Timing accuracy

Timing accuracy[2]	± 1 sample interval ± 0.01 % rd

Inputs for auxiliary contacts

Channels	6
Auxiliary input type	Toggling with potential-free (dry) contacts or voltages (wet) up to 300 V DC
Maximum sample rate	40 kHz
Minimum resolution	25 µs

Mechanical data

Dimensions (W × H × D)	381 × 190 × 90 mm / 15 × 7.5 × 3.5 inch
Weight	3.0 kg / 6.6 lbs

Environmental conditions and equipment reliability

Please see CIBANO 500 parameters.

EHB1

Output

Channels	4
Devices per channel	optionally 1 × CB MC2, 1 × CB TN3 or 1 × IOB1
Maximum cable length	100 m / 328 ft

Input

Channels	1

Interface

EtherCAT® interface to CIBANO 500 or to additional EHB1 modules

Mains supply

Voltage	Nominal: Permitted:	100 V ... 240 V AC 85 V ... 264 V AC
Maximum current	2.5 A	
Frequency	Nominal: Permitted:	50 Hz / 60 Hz 45 Hz ... 65 Hz

Mechanical data

Dimensions (W × H × D)	265 × 80 × 180 mm / 10.4 × 3.1 × 7.1 inch
Weight	1.8 kg / 4.0 lbs

Environmental conditions and equipment reliability

Please see CIBANO 500 parameters.

We create customer value through ...

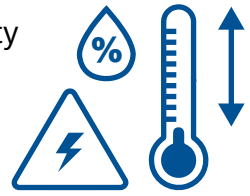
Quality

You can rely on the highest safety and security standards

Superior reliability with up to

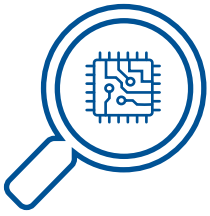
72

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

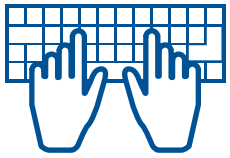
Innovation

... 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

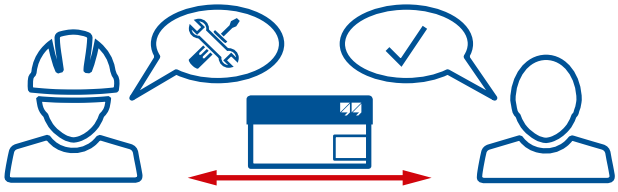
80%

testing time through templates, and automation

Support

Professional technical support at any time

Loaner devices help to reduce downtime



Cost-effective and straight-forward repair and calibration

offices worldwide for local contact and support

Knowledge

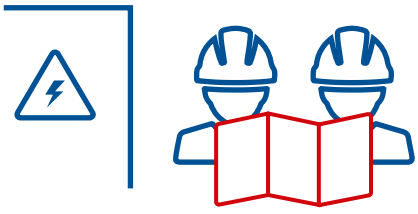
More than

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 900 employees provides solutions with 24/7 support at 25 locations worldwide and serves customers in more than 160 countries.

The following publication provides further information on the Primary Test Manager™:

PTM Brochure

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

www.omicronenergy.com