

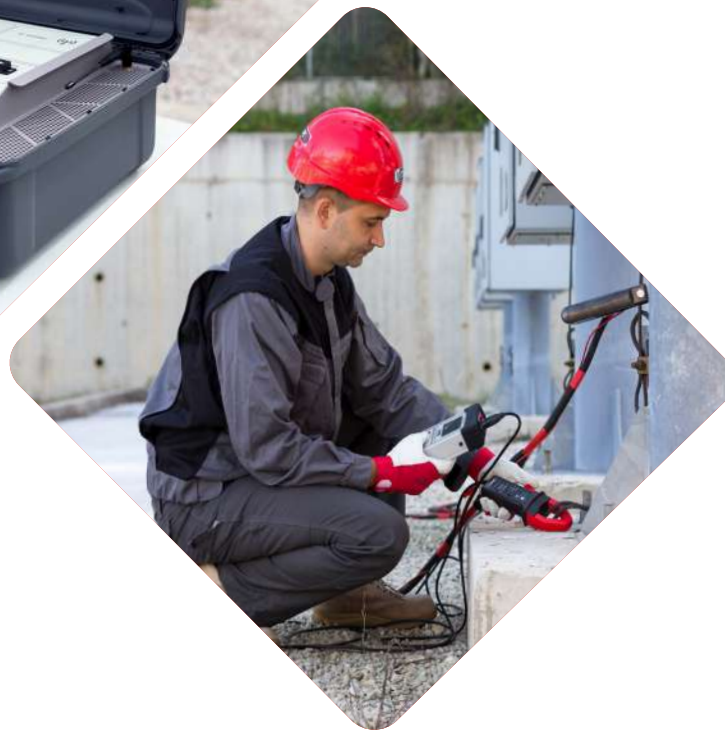
DV/power 

Product Catalog

Smart test devices for reliable
electric power systems



Circuit Breaker Test Equipment



Content

About Us

The brand “DV Power”, with headquarters in Stockholm (Sweden), has since 2000 developed light and ingenious test solutions for transformers, circuit breakers, batteries and electrical safety.

The company was founded by a group of engineers with **extensive** knowledge and experience in the power electronics technology area.

Today our DV Power products are sold all over the world – in over 100 countries.

We are still focusing on extensive research and development. **Thanks to all our customers that provide us with continuous valuable feedback and various case studies**, we are able to design even better products that **meet** the needs of our customers.

Our success is solely based on extensive research, development and fast commercial application.

About Circuit Breaker Test Equipment

Circuit breakers are important part of the protection systems and their reliability is crucial for the reliability of the entire power system.

Failure to trip or reduced tripping speed is an important Circuit Breaker's failure mode and therefore manufacturers recommend their testing at regular intervals. DV Power has released various portable and handheld models for condition assessment of medium and high voltage Circuit Breakers' during the manufacturing, commissioning and maintenance stages.

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All specifications herein are valid at ambient temperature of + 25 °C and standard accessories. Specifications are subject to change without notice.



Circuit Breaker Test Equipment

| Description | CAT03 | CAT31 | CAT34 | CAT35 | CAT36 | CAT61 | CAT64 | CAT64A | CAT65 | CAT66 | CATT24A | CATT25 | CATT26 | CATT100 | CAT250 | CAT500 | CAT-H | CAT-P | DIS-H | POB II | SAT II | RMO-A | RMO-C | RMO-G | RMO-H |
|---|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|---------|--------|--------|---------|--------|--------|-------|-------|-------|--------|--------|-------|-------|-------|-------|
| Timing Measurement of Circuit Breaker Main and PIR Contacts (IEC 62271-100) | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | | | | | | | |
| Contact (Static) Resistance Measurement (IEC 62271-1) | | | | • | • | | | | • | • | | • | • | | • | • | | | | | | • | • | • | • |
| Dynamic Resistance Measurement | | | | • | • | | | | • | • | | • | • | | • | • | | | | | | | | | |
| Motion and Velocity (IEC 62271-100) | | | • | • | • | | • | • | • | • | • | • | • | • | • | • | | | | | | | | | |
| Motor Mechanism Charging Time (IEC 62271-100) | | | • | • | • | | • | • | • | • | • | • | • | • | • | • | • | • | | • | • | | | | |
| Coil Resistance (IEC 62271-100) | | | | • | • | | | • | • | • | • | • | • | • | • | • | • | • | | | • | | | | |
| Coil Current (IEC 62271-100) | | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | | • | • | | | | |
| Minimum Trip Voltage (IEC 56, ANSI C37.09) | | | | | | | | | | | | | | | • | • | | | | • | • | | | | |
| Timing Measurement of Auxiliary Contacts (IEC 62271-100) | | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | | | | | | | |
| “First Trip” Test | | | | • | • | | | • | • | • | • | • | • | | • | • | | • | | | | | | | |
| Vibration Analysis | | | | | | | | | | | | | | | • | • | | | | | | | | | |
| Disconnecter Motor Drive Analysis | | | | | | | | | | | | | | | | | | | • | | | | | | |



Micro-Ohmmeters

RMO-A Series

Applications

- Circuit breaker resistance measurement according to IEC 62271-1
- Dead-tank circuit breakers testing (DTRtest mode)
- Bus bar joints, cable splices, welding joints resistance checking (PASS / FAIL criteria)
- Generator circuit breakers testing (HIGH PRECISION module)
- GIS connections quality check (HIGH PRECISION module)
- Resistance change monitoring (CONTIN mode)

Main Features of RMO600A (RMO600A-N-02)

- Test currents: 5 A – 600 A DC
- Measuring range: $0,1 \mu\Omega - 999,9 \text{ m}\Omega$ (expandable to 6Ω)
- Typical accuracy: $\pm (0,1 \% \text{ rdg} + 0,1 \% \text{ F.S.})$
- Best resolution: $0,1 \mu\Omega$ ($0,01 \mu\Omega$ with built-in High Precision module)
- High output voltage: 5,9 V at 600 A DC
- Built-in thermal printer (optional)
- Standalone / PC-controlled (DV-CB software)



● - Standard ○ - Optional

| Model | RMO100A | RMO200A | RMO300A | RMO400A | RMO500A | RMO600A |
|--------------------------------------|---------|---------|---------|---------|---------|---------|
| Maximum Test Current [A] | 100 | 200 | 300 | 400 | 500 | 600 |
| Output Voltage at I_{max} [V]* | 7,25 | 7,1 | 7,0 | 6,6 | 6,0 | 5,9 |
| Continuous Test | ● | ● | ● | ● | ● | ● |
| Dead Tank Resistance (DTR) test mode | ● | ● | ● | ● | ● | ● |
| R_{max} (Pass/Fail) feature | ● | ● | ● | ● | ● | ● |
| Both Sides Grounded | No | No | No | No | No | No |
| Thermal printer | ○ | ○ | ○ | ○ | ○ | ○ |
| High Precision Module | ○ | ○ | ○ | ○ | ○ | ○ |

*For power supply 230 V AC

Micro-Ohmmeters

Accessories



Current cables with battery clamps B3



Current cables with battery clamps B1



Current cables with alligator clamps A3



Heavy duty sense cables with alligator clamps A2



Sense cables with alligator clamps A2



Extension sense cables



Grounding cable



Heavy duty sense cables with C clamps



Transport bag for instrument in metal housing



Cable bag



Plastic cable case



Bluetooth communication module



Test shunt 250 A / 60 mV

Micro-Ohmmeters

RMO-C Series

Applications

- Circuit breaker resistance measurement according to IEC 62271-1
- Dead-tank circuit breakers testing (DTRtest mode)
- Bus bar joints, cable splices, welding joints resistance checking (PASS / FAIL criteria)
- Generator circuit breakers testing
- GIS connections quality check
- Resistance change monitoring (CONTIN mode)
- Testing in Both Sides Grounded conditions (BSG)

Main Features of RMO500C (RMO500C-N-03)

- Test currents: 5 A – 500 A DC
- Continuous current capability @200 A DC, 10 min @300 A DC
- Measuring range: 0,1 $\mu\Omega$ – 999,9 m Ω (expandable to 6 Ω)
- Typical accuracy: \pm (0,1 % rdg + 0,1 % F.S.)
- Best resolution: 0,01 $\mu\Omega$
- High output voltage: 8,2 V at 300 A DC, 8,6 V @200 A DC
- Standalone / PC-controlled (DV-CB software)



● - Standard ○ - Optional

| Model | RMO200C | RMO300C | RMO500C |
|--------------------------------------|---------|---------|---------|
| Maximum Test Current [A] | 200 | 300 | 500 |
| Output Voltage at I_{max} [V]* | 8,6 | 8,2 | 6,1 |
| Continuous Test | ● | ● | ● |
| Dead Tank Resistance (DTR) test mode | ● | ● | ● |
| R_{max} (Pass / Fail) feature | ● | ● | ● |
| Both Sides Grounded | ○ | ○ | ○ |
| Thermal printer | No | No | No |
| High Precision Module | ○ | ○ | ○ |

* For power supply 230 V AC

Micro-Ohmmeters

Accessories



Current cables with battery clamps B3



Current cables with battery clamps B1



Current cables with alligator clamps A3



Heavy duty sense cables with alligator clamps A2



Sense cables with alligator clamps A2



Extension sense cables



Grounding cable



Heavy duty sense cables with C clamps



Cable bag



Plastic cable case



Current clamp 30 / 300 A power supplied from the instrument with adapter 5 m



Remote control unit



Test shunt 250 A / 60 mV

Micro-Ohmmeters

RMO-G Series

Applications

- Circuit breaker resistance measurement according to IEC 62271-1
- Dead-tank circuit breakers testing (DTRtest mode)
- Bus bar joints, cable splices, welding joints resistance checking (PASS / FAIL criteria)
- Testing in Both Sides Grounded conditions (BSG)
- Generator circuit breakers testing (HIGH PRECISION module)
- GIS connections quality check (HIGH PRECISION module)
- Resistance change monitoring (CONTIN mode)
- Testing from remote locations (REMOTE CONTROL)

Main Features of RMO800G (RMO800G-N-03)

- Test currents: 10 A – 800 A DC
- Measuring range: 0,1 $\mu\Omega$ – 499,9 m Ω
- Typical accuracy: \pm (0,1 % rdg + 0,1 % F.S.)
- Best resolution: 0,1 $\mu\Omega$ (0,01 $\mu\Omega$ with built-in High Precision module)
- Current clamps input for BSG (Both Sides Grounded)
- Remote control input
- Built-in thermal printer (optional)
- Standalone / PC-controlled (DV-CB software)



● - Standard ○ - Optional

| Model | RMO100G | RMO200G | RMO300G | RMO400G | RMO500G | RMO600G | RMO800G |
|--------------------------------------|---------|---------|---------|---------|---------|---------|---------|
| Maximum Test Current [A] | 100 | 200 | 300 | 400 | 500 | 600 | 800 |
| Output Voltage at I_{max} [V]* | 7,15 | 6,8 | 7,0 | 6,7 | 6,0 | 5,9 | 4,7 |
| Continuous Test | ● | ● | ● | ● | ● | ● | ● |
| Dead Tank Resistance (DTR) test mode | ● | ● | ● | ● | ● | ● | ● |
| R_{max} (Pass / Fail) feature | ● | ● | ● | ● | ● | ● | ● |
| Both Sides Grounded | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Thermal printer | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| High Precision Module | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

* For power supply 230 V AC

Micro-Ohmmeters

Accessories



Current cables with battery clamps B3



Current cables with battery clamps B1



Current cables with alligator clamps A3



Heavy duty sense cables with alligator clamps A2



Sense cables with alligator clamps A2



Extension sense cables



Grounding cable



Heavy duty sense cables with C clamps



Cable bag



Plastic cable case



Bluetooth communication module



Current clamp 30/300 A power supplied from the instrument with adapter 5 m



Remote control unit



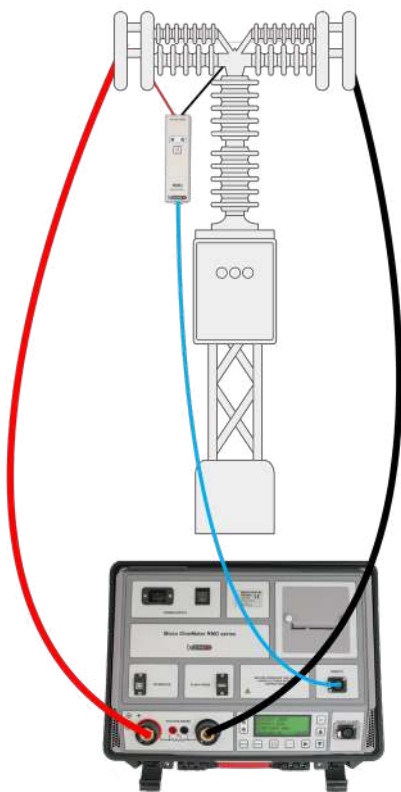
Test shunt 250 A/60 mV

Micro-Ohmmeters

Remote Control Unit and Test Probes

In order to remotely perform the measurements, the RMO-C and RMO-G devices can be provided with the RMO Remote Control Unit or with the RMO Remote Control test probes (with trigger button). This optional feature is used in applications with increased safety requirements. It also significantly speeds up the entire test procedure since operator can start the test by pressing trigger button available on the probes.

Remote control connection principle



High Precision Module (built-in)

The high-precision module is newly developed built-in addition to our RMO-A, RMO-C and RMO-G microohmmeters. It provides an increased precision and offers a highly accurate contact resistance measurement in the range from $1 \mu\Omega$ to $99,99 \mu\Omega$, with $0,01 \mu\Omega$ resolution.

Our RMO-A, RMO-G and RMO-C devices with this built-in High Precision Module may be used for applications on very small resistance measurements of noninductive test objects.

This requirement is usually met at resistance inspections of generator circuit breakers, welding joints, GIS testing, etc.

DTRtest – A New Test Mode for Dead Tank CB Testing

Presence of current transformers (CT) on the dead tank circuit breakers may introduce errors during the contact resistance measurement due to CT magnetizing process. For this reason, it is necessary to saturate a CT prior to starting a measurement.

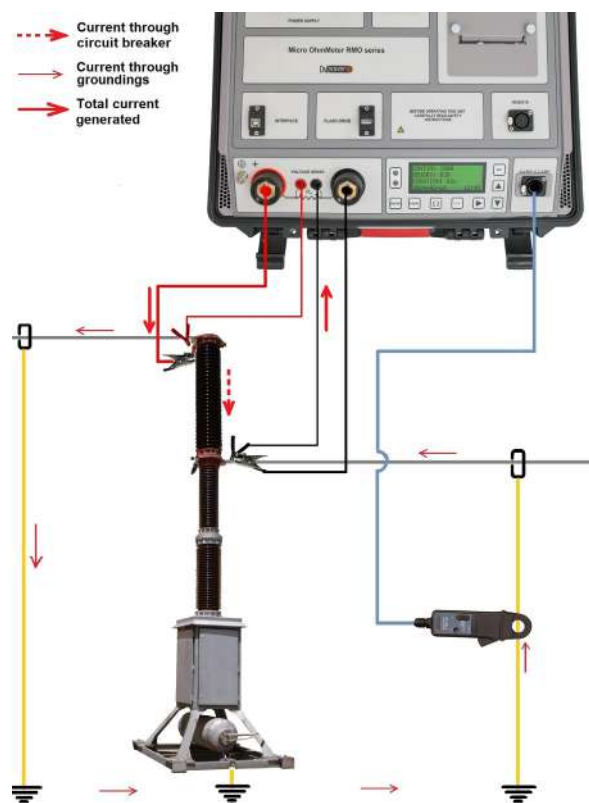
DTRtest menu is specially designed for resistance measurement of the dead tank circuit breakers and it is implemented in all our portable microohmmeters – RMO-A, RMO-G and RMO-C series. All calculations for detecting the saturated condition of CTs are done by internal algorithm. The process of setting the measurement parameters and conducting a test in this mode is very simple and does not differ much from a live tank circuit breaker testing.

Both Sides Grounded Feature

In order to provide a complete protection from the induced voltages during the HV circuit breaker contact resistance measurement, it is necessary to ground the circuit breaker at both sides.

The RMO-H devices as well as the RMO-C and RMO-G series instruments have the possibility to perform measurements with both sides of a test object grounded. This will ensure the operator's safety and protect the instrument as well.

Both Sides Grounded connection principle



Micro-Ohmmeters

RMO-H Series

Applications

- Resistance measurement according to IEC 62271-1
- Medium-voltage circuit breaker testing using Kelvin probes
- Bus bar joints, cable splices, welding joints resistance checking (PASS / FAIL criteria)
- Battery cells connection in the battery string
- 2-way connection for high-voltage circuit breaker testing:
 - Short cables for direct measurement on terminals (from crane basket) - RMO-H1, -H2, -H3 models
 - Long cables for traditional measurement method (from ground) - RMO-H21, -H22, -H23

Main Features of RMO-H Series (RMOH300-N-00)

- Test currents: 1 A – 300 A DC
- Typical accuracy: $\pm (0,1 \% \text{ rdg} + 0,1 \% \text{ F.S.})$
- High-capacity Li-Po battery (2 types available):
 - 8 800 mAh, up to 4,2 V DC (RMO-H1, -H2, -H3)
 - 4 400 mAh, up to 8,4 V DC (RMO-H21, -H22, -H23)
- Measuring range: $0,1 \mu\Omega - 3\ 000 \text{ m}\Omega$
- 10 000 test results storage
- Bluetooth communication with DV-CB software
- Dimensions: 198 x 255 x 380 mm / 8.9 x 4.5 x 1.9 in
- Weight: 0,95 kg / 2.1 lbs



● - Standard ○ - Optional

| Model | RMO-H1 | RMO-H2 | RMO-H3 | RMO-H21 | RMO-H22 | RMO-H23 |
|--|--------|--------|--------|---------|---------|---------|
| Maximum Test Current [A] | 100 | 200 | 300 | 100 | 200 | 300 |
| Continuous Test | No | No | No | No | No | No |
| R _{max} (Pass / Fail) feature | ● | ● | ● | ● | ● | ● |
| Both Sides Grounded | Yes | Yes | Yes | Yes | Yes | Yes |
| Cables length [m] | 1,3 | 1,3 | 1,3 | 5 | 5 | 5 |
| Output voltage [V] | 4,2 | 4,2 | 4,2 | 8,4 | 8,4 | 8,4 |

Micro-Ohmmeters

Accessories



Current and sense cables with TTA clamps



Current & sense cables with Kelvin probes



Power supply adapter



Test shunt 150 A / 150 mV



Test shunt 250 A / 60 mV



Grounding cable



Cable bag



Plastic cable case

Power Supplies & Coil Analyzers

SAT II Series

Applications

- Stable power supply for opening and closing coils and spring-charging motor during circuit breaker and switchgear testing
- Coil current and coil resistance measurement as per IEC 62271-100
- Minimum trip voltage test of the circuit breaker's coils as per IEC 56 & ANSI C37.09
- Motor current and operating mechanism charging time as per IEC 62271-100
- Temperature measurement on auxiliary and control equipment
- Power supply or a temporary battery charger (AC & DC motor outputs)

Main Features of SAT40A II Series (SAT40AX-NX-1)

- Typical accuracy: $\pm (0,25 \% \text{ rdg} + 0,25 \% \text{ F.S.})$
- Two powerful motor outputs 10 V – 250 V DC / AC, up to 40 A inrush current
- Four separate opening and closing coil outputs:
 - 10 V – 300 V DC
 - 10 V – 250 V AC
- Ripple-free DC voltage (ripple less than 1 %)
- Temperature sensor input
- DV-CB software (control of CAT & SAT devices as one test system)
- Compatible with other vendor's circuit breaker analyzers



POB II Series

Applications

- Stable power supply for opening and closing coils and spring-charging motor during circuit breaker and switchgear testing
- Minimum trip voltage test of the circuit breaker's coils as per IEC 56 & ANSI C37.09
- Motor current and operating mechanism charging time as per IEC 62271-100
- Power supply or a temporary battery charger (DC motor outputs)

Main Features of POB40AD II Series (POB40AD-NX-1)

- Typical accuracy: $\pm (0,25 \% \text{ rdg} + 0,25 \% \text{ F.S.})$
- Powerful DC motor output 10 V – 250 V DC, up to 40 A inrush current
- Four separate opening and closing coil outputs:
 - 10 V – 300 V DC
 - 10 V – 250 V AC
- Ripple-free DC voltage (ripple less than 1 %)
- Connector for external triggering
- Compatible with other vendor's circuit breaker analyzers

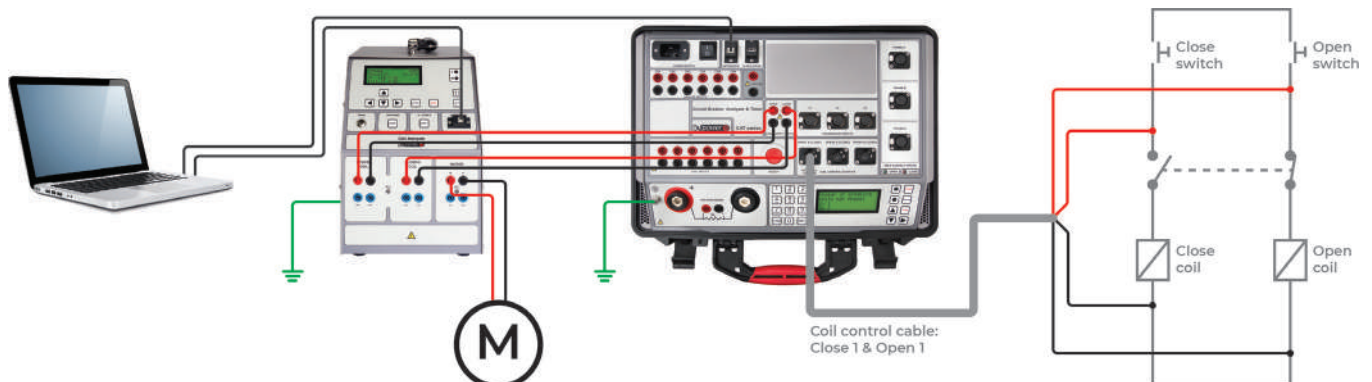


Power Supplies & Coil Analyzers

| Mains Power Supply Voltage [V] | Motor Output Load Voltage [V] | Maximum Current [A] | Maximum Load Interval [s] |
|--------------------------------|-------------------------------|---------------------|---------------------------|
| 230 | 110 DC | 30 | 30 |
| | | 24 | 110 |
| | | 15 | Continuous |
| | 220 DC | 16 | 30 |
| | | 14 | 110 |
| | | 8 | Continuous |
| | 110* AC | 20 | 30 |
| | | 14 | 110 |
| | | 11 | Continuous |
| | 220* AC | 13 | 30 |
| | | 110 | 110 |
| | | 8 | Continuous |
| 115 | 48 DC | 30 | 30 |
| | | 24 | 110 |
| | | 15 | Continuous |
| | 110 DC | 18 | 30 |
| | | 15 | 110 |
| | | 12 | Continuous |
| | 220 DC | 9 | 30 |
| | | 8 | 110 |
| | | 6 | Continuous |
| | 110* AC | 15 | 30 |
| | | 12 | 110 |
| | | 10 | Continuous |
| | 220* AC | 10 | 30 |
| | | 7 | 110 |
| | | 5 | Continuous |

* available for SAT only

CAT and SAT connection principle



Power Supplies & Coil Analyzers

Accessories



Cable set 6 x 2 m with banana plugs



Mains power cable EU 16 A



External trigger cable set



Temperature sensor with cable



Bluetooth communication module



Grounding cable



Transport bag



Cable bag

Circuit Breaker Analyzers & Timers

CAT100 Series

Applications

- Simultaneous timing measurement of up to 6 main (2 breaks per phase) and pre-insertion resistor contacts
- Evaluation of synchronization (simultaneity) between the circuit breaker poles
- Auxiliary contacts timing measurement
- Measurement of displacement, damping time and average velocity of moving parts
- Resistance measurement of the pre-insertion resistors
- Measurement of the coil currents, simultaneously for 2 coils

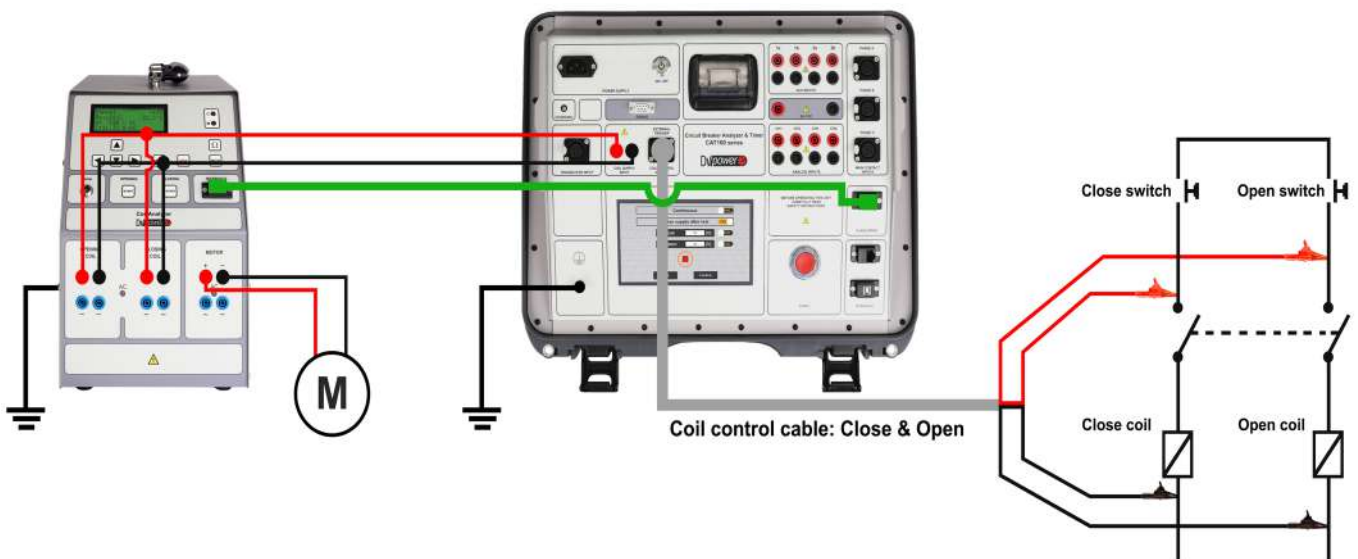
Main Features of CAT100 (CAT100-B6-01)

- Simple and easy to operate
- Robust design for field use
- 6 timing channels (3 x 2) for main and pre-insertion resistor contacts
- 4 timing channels for auxiliary inputs
- 2 coil control and coil current measurement channels
- 4 analog channels for monitoring voltage or current
- Touch-screen color display 7 inch with graphical representation of test results
- Battery operation for up to 8 hours
- DV-CB software for detailed analysis of test results



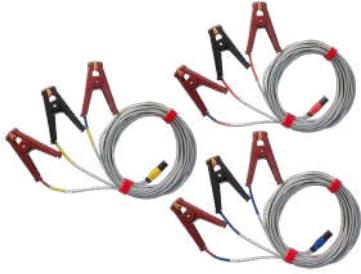
CAT & SAT as a Circuit Breaker Test System

- CAT100 can be coupled with the DV Power Coil Analyzer SAT II Series to create one test system.
- The SAT device can be used as a power supply unit for the measurement of spring-charging motor current and voltage as well as determination of minimum trip voltage of circuit breaker coils.



Circuit Breaker Analyzers & Timers

Accessories



Main contact cables with SCT clamps



Main contact cables extension



Coil control cable with banana plugs



Auxiliary channels cables with banana plugs



Analog channels cables with banana plugs



Coil supply cables with banana plugs



Grounding cable



Plastic transport case



Plastic cable case



Cable bag



Current clamp 30/300 A with internal battery supply and extension 5 m



Universal transducer mounting kit - extended version



Digital rotary transducer with accessories



Linear to rotary transducer converter



Linear analog transducer

Circuit Breaker Analyzers & Timers

Circuit Breaker Analyzers & Timers - CAT250

Applications

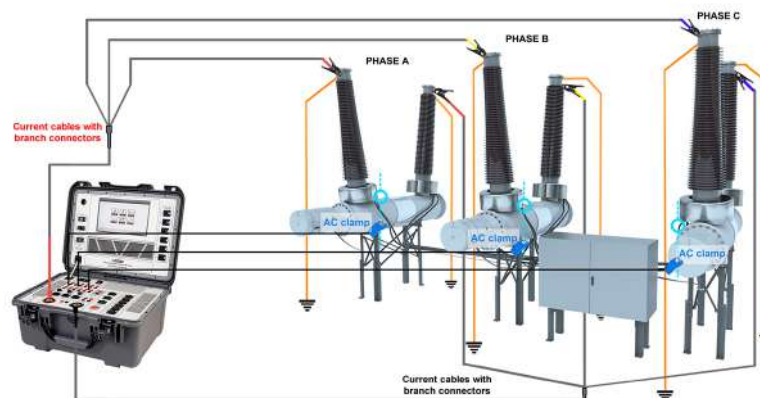
- Simultaneous timing measurement of up to 12 main contacts (4 breaks per phase) including pre-insertion resistors (if present in the circuit breaker) and 6 auxiliary contacts
- Resistance measurement of the pre-insertion resistors (if present in the circuit breaker)
- Evaluation of synchronization between the circuit breaker poles
- Measurement of the coil currents, voltages and resistance (simultaneously for 3 coils – during open or close sequence)
- “First trip” test
- Evaluating the state of substation’s batteries by graphically showing the voltage value
- Measurement of displacement, contact wipe, over-travel, rebound, damping time and average velocity of the breaker’s moving parts
- Static resistance measurement
- Recording of circuit breaker vibration fingerprint
- Dynamic resistance measurement
- Measurement of spring-charging motor time, current and voltage (both DC and AC power supply voltage, when used as CAT & SAT test system)

Main Features of CAT250 (CAT250-12-W3)

- Robust design for field use
- Accurate measurement in high voltage environment
- Touch-screen color display 10.1 inch
- Both Sides Grounded feature for AIS and Dead tank (optional)
- Built-in micro-ohmmeter (up to 500 A) for dynamic and static resistance measurement (optional)
- Minimum trip voltage test
- Built-in printer 112 mm (optional)
- Database of circuit breakers test plans
- DV-CB software for detailed analysis of test results



Timing measurement of Deadt tank CB with both sides grounded using CAT250



Circuit Breaker Analyzers & Timers

Circuit Breaker Analyzers & Timers - CAT500

Applications

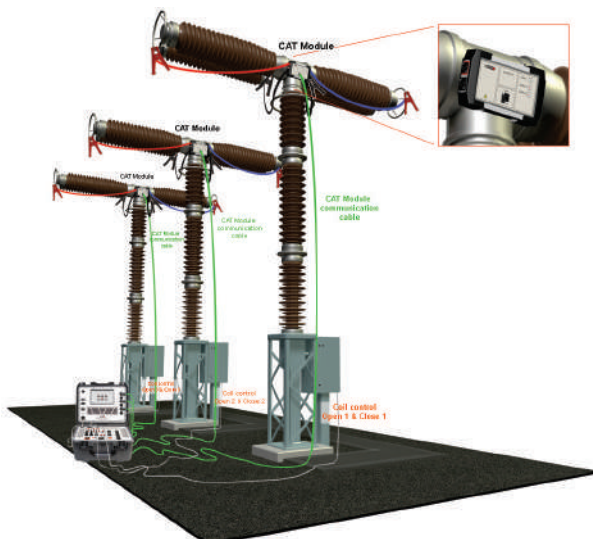
- Simultaneous three-phase timing, dynamic and static resistance measurement test on AIS circuit breakers
- Performing all tests with one cable connection without need for rewiring
- Simultaneous timing measurement of up to 12 main contacts (4 breaks per phase) including pre-insertion resistors and 6 auxiliary contacts
- Resistance measurement of the pre-insertion resistors
- Evaluation of synchronization between the circuit breaker poles
- Measurement of the coil currents, voltages and resistance (simultaneously for 3 coils)
- Evaluating the state of substation's batteries by graphically showing the voltage value
- GIS circuit breaker testing under Both sides grounded condition using GIS Test module (3 independent current sources up to 400 A)
- Recording of circuit breaker vibrations
- 3 channels for measurement of displacement and average velocity of the breaker's moving part
- Timing measurement with minimum standard operating voltage
- Anti-pumping relay test
- Measurement of spring-charging motor time, current and voltage
- Minimum trip voltage test
- "First Trip" test

Main Features of CAT500 (CAT500-12-W3)

- Simultaneous timing, static resistance and dynamic resistance measurement on up to 12 main contacts chambers under BSG conditions by use of CAT modules
- Both Sides Grounded Feature for GIS and Dead Tank (optional)
- Robust design for field use
- Accurate measurement in high voltage environment
- Motion and vibrations measurement
- Built-in micro-ohmmeter (up to 500 A) for dynamic and static resistance measurement (optional)
- Minimum trip voltage test (optional)
- Built-in printer 112 mm (optional)
- Touch-screen color display 10.1"
- Ethernet communication
- Database of circuit breakers test plans



CAT500 connection to Live Tank CB with CAT Modules

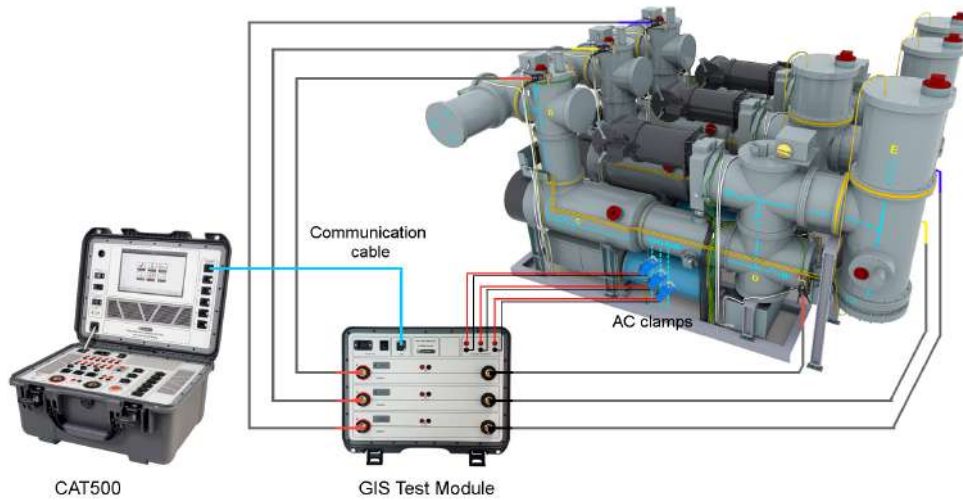


CAT Module

- Number of channels: 2
- Battery Li-Po: 2 200 mAh, 7,4 V
- Max current per channel: 100 A DC
- Static resistance range: 0,1 $\mu\Omega$ – 3 000 m Ω
- Dynamic contact res. range: 10 $\mu\Omega$ – 200 m Ω
- Maximum sample rate: 40 kHz
- Minimum resolution: 25 μs
- Communication: digital

Circuit Breaker Analyzers & Timers

CAT500 connection to GIS (Gas Insulated Substation) under BSG (Both Sides Grounded) conditions with GIS Test Module



Both Sides Grounded (BSG) of GIS (Gas Insulated Substation) feature enables timing measurement of GIS contact time without having to remove detachable shunts for grounding of GIS circuit breaker terminals. Method is based on the DC current generation through the parallel connection of the main circuit and grounding path and measurement voltage or current response on the CT secondary during CB operation

Circuit Breaker Analyzers & Timers - CAT505

Applications

- Simultaneous three-phase timing, dynamic and static resistance measurement test on AIS circuit breakers
- Performing all tests with one cable connection without need for rewiring
- Simultaneous timing measurement of up to 12 main contacts (4 breaks per phase) including pre-insertion resistors and 6 auxiliary contacts
- Evaluation of synchronization between the circuit breaker poles
- 12 timing channel for auxiliary contacts
- Using lightweight cables for all test
- GIS circuit breaker testing under Both sides grounded condition using GIS Test module (3 independent current sources up to 400 A)
- 6 channels for measurement of displacement and average velocity of the breaker's moving part
- "First Trip" test
- Minimum trip voltage test
- Anti-pumping relay test
- Measurement of spring-charging motor time, current and voltage

Main Features of CAT505 (CAT505-12-W3)

- Simultaneous timing, static resistance and dynamic resistance measurement on up to 12 main contacts chambers under BSG conditions by use of CAT modules
- Both Sides Grounded Feature for GIS (optional)
- Robust design for field use
- Accurate measurement in high voltage environment
- 6 channels for measurement of displacement
- Minimum trip voltage test (optional)
- Built-in printer 112 mm (optional)
- Touch-screen color display 10.1 inch
- Database of circuit breakers test plans



Circuit Breaker Analyzers & Timers

CAT Advanced Series

Applications

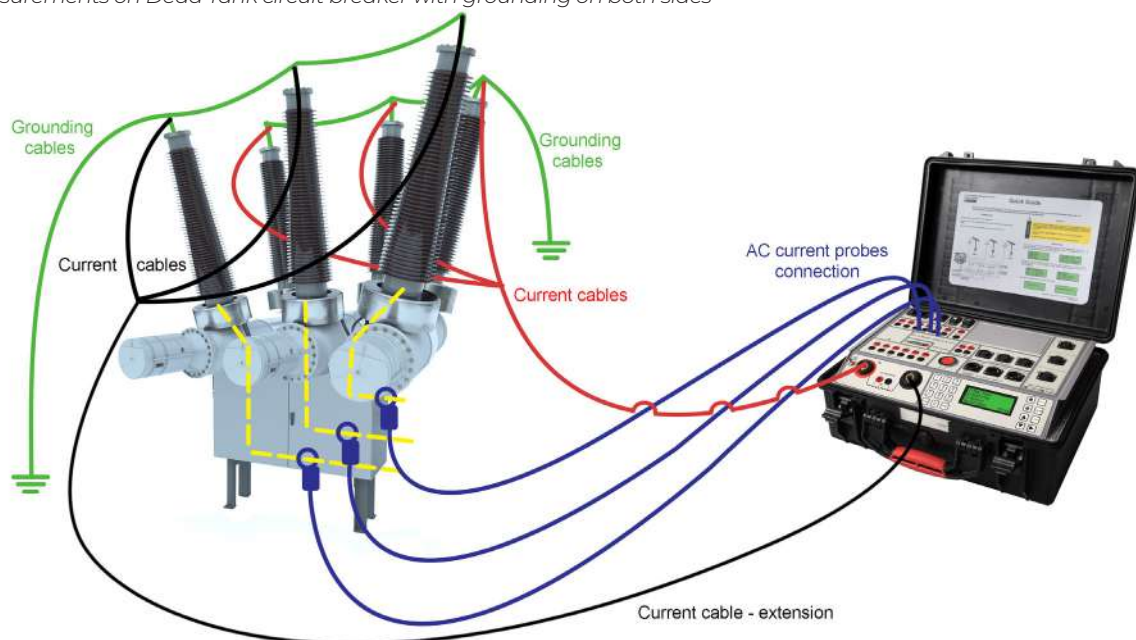
- Simultaneous timing measurement of up to 12 (4 breaks per phase) main and pre-insertion resistor contacts
- Evaluation of synchronization (simultaneity) between the circuit breaker poles
- Auxiliary contacts timing measurement
- "First Trip" test
- Dynamic resistance measurement (single phase)
- Measurement of displacement, damping time and average velocity of moving parts
- Resistance measurement of the pre-insertion resistors
- A measurement of the coil currents, simultaneously for 6 coils
- Contact (static) resistance measurement

Main Features of CAT126 (CAT1260-N-01)

- Robust design for field use
- Accurate measurement in high voltage environment
- Both Sides Grounded Feature for AIS and Dead Tank (optional)
- Built-in micro-ohmmeter (up to 500 A)
- 12 timing channels (3 x 4) for main and pre-insertion resistor contacts
- 6 timing channels for auxiliary contacts
- 6 coil control and coil current measurement channels
- 3 motion transducer inputs for analog and digital transducers
- 6 configurable analog channels



Timing measurements on Dead Tank circuit breaker with grounding on both sides



Both Sides Grounded (BSG) of dead tank circuit breaker feature enables timing measurement of dead tank contact time without having to remove grounding cables from one side of circuit breaker. Method is applicable for any type of maintenance grounding system (P-N or P-P-P-N).

Circuit Breaker Analyzers & Timers

CAT Advanced Models Comparison



● - Standard ○ - Optional

| Model | CAT35 | CAT36 | CAT64A | CAT65 | CAT66 | CAT124A | CAT125 | CAT126 |
|--|-------|-------|--------|-------|-------|---------|--------|--------|
| Main Contacts & Preinsertion Resistors Contacts Timing Channels | 3 | 3 | 6 | 6 | 6 | 12 | 12 | 12 |
| Auxiliary Contacts Timing Channels | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| Coil Control | ● | ● | ● | ● | ● | ● | ● | ● |
| Coil Current Measurement Channels | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| Analog Input Channels | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| Transducer Input Channels | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| BSG for AIS (Live Tank) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| BSG for AIS (Dead Tank) | ○ | ○ | | ○ | ○ | | ○ | ○ |
| “First Trip” Test | ● | ● | ● | ● | ● | ● | ● | ● |
| Micro-Ohmmeter [A] | 200 | 500 | | 200 | 500 | | 200 | 500 |
| High Precision Module | ○ | ○ | | ○ | ○ | | ○ | ○ |
| Dynamic Resistance Measurement | ● | ● | | ● | ● | | ● | ● |
| Built-In Printer | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Weight [kg] | 13,2 | 13,5 | 10,6 | 13,2 | 13,5 | 10,8 | 13,5 | 13,6 |

Circuit Breaker Analyzers & Timers

Accessories



Main contact cables with SCT clamps



Main contact cables extension



Coil control cable with banana plugs



Coil supply cables with banana plugs



Analog channels cables



Current cables with battery clamps B1



Current cables with battery clamps B3



Sense cables with alligator clamps A2



Grounding cable



Current clamp 30/300 A power supplied from the instrument with adapter 5 m



Current clamp 30/300 A with internal battery supply and extension 5 m



AC Current clamp 1 A/1 V and cable 5 m with banana plugs



Transport case for 250 and 500 series



Plastic transport case



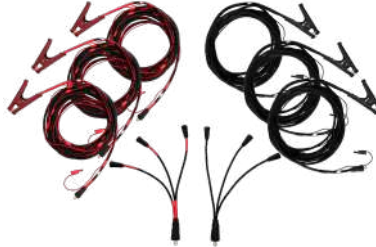
Plastic cable case

Circuit Breaker Analyzers & Timers

Accessories



Cable bag



Current and sense cables with SCT clamps and current cable with branch connectors



Universal transducer mounting kit - extended version



Three-phase rotary transducer kit



Test Shunt 600 A / 60 mV



Analog rotary transducer



Linear analog transducer



Bellow coupling



Doble transducer adapter



Digital rotary transducer with accessories



Current and sense cables (black) with SCT clamps



Current and sense cables (red) with SCT clamps



CAT Module



Communication cable for CAT module

Circuit Breaker Analyzers & Timers

CAT Standard Series

Applications

- Simultaneous timing measurement of up to 6 main (2 breaks per phase) and pre-insertion resistor contacts
- Evaluation of synchronization (simultaneity) between the circuit breaker poles
- Auxiliary contacts timing measurement
- Measurement of displacement, damping time and average velocity of moving parts
- Resistance measurement of the pre-insertion resistors
- Measurement of the coil currents, simultaneously for 2 coils

Main Features of CAT64 (CAT6400-B-03)

- Simple and easy to operate
- Battery operation for up to 8 hours
- 6 timing channels (3 x 2) for main and pre-insertion resistor contacts
- 3 timing channels for auxiliary inputs
- 2 coil control and coil current measurement channels
- Option for external triggering of measurement
- 1 motion transducer inputs for analog and digital transducers
- Internal battery power supply



● - Standard ○ - Optional

| Model | CAT03 | CAT31 | CAT34 | CAT61 | CAT64 |
|--|-------|-------|-------|-------|-------|
| Main and Preinsertion Contacts Timing Channels | 3 | 3 | 3 | 6 | 6 |
| Auxiliary Contacts Timing Channels | | 3 | 3 | 3 | 3 |
| Coil Control | | ● | ● | ● | ● |
| Coil Current Measurement Channels | | 2 | 2 | 2 | 2 |
| External Trigger Channels | 2 | 2 | 2 | 2 | 2 |
| Analog Input Channels | | | 2 | | 2 |
| Transducer Input Channels | | | 1 | | 1 |
| Built-In Thermal Printer | ○ | ○ | ○ | ○ | ○ |
| Built-In Battery | ○ | ○ | ○ | ○ | ○ |
| Weight [kg] | 6,2 | 6,4 | 6,5 | 6,7 | 6,8 |

Circuit Breaker Analyzers & Timers

Accessories



Main contact cables with SCT clamps



Main contact cables extension



Coil control cable with banana plugs



Auxiliary contact cables



Coil supply cables with banana plugs



Analog channels cables



External trigger cable



Grounding cable



Plastic transport case



Plastic cable case



Cable bag



Current clamp 30/300 A with internal battery supply and extension 5 m

Circuit Breaker Analyzers & Timers Accessories

Accessories



Current clamp 30 / 300 A power supplied from the instrument with adapter 5 m



Small current clamp



Analog rotary transducer



Linear analog transducer



Universal adapter for mounting rotary transducer



Linear to rotary transducer converter



Bellow coupling



Universal transducer mounting kit - extended version



Digital rotary transducer with accessories

Circuit Breaker Analyzers & Timers

Handheld Circuit Breaker Analyzer & Timer - CAT-P

Applications

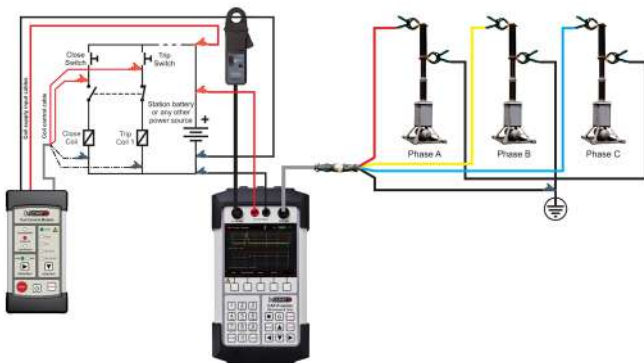
- "First trip" test
- Main contacts timing measurement
- Resistance and timing measurement of the pre-insertion resistors
- Main contacts bounce time measurement
- Pre-trigger time measurement
- OPEN and CLOSE coils current measurement
- Coil resistance measurement
- Auxiliary contact timing measurement
- DC supply voltage measurement
- Actuation of circuit breaker's OPEN and CLOSE coil via Coil Control Module

Main Features of CAT-P (CATP000-N-00)

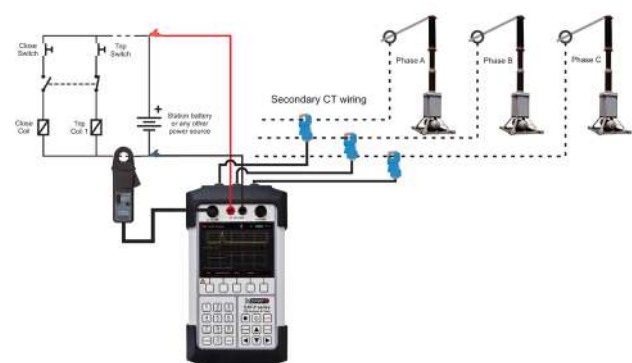
- Compact and ergonomic design
- Graphical test results for quick interpretation
- Offline and online (First trip test) testing of circuit breakers
- Coil control (via external module) for OPEN and CLOSE coil
- Touch-screen color display 145 mm (5.7 inch)
- Over 30 000 test results internal storage
- Internal battery power supply (user-replaceable)
- Battery operation for up to 8 hours
- Dimensions: 310 x 170 x 58 mm / 12.21 x 6.69 x 2.28 in
- Weight: 1,4 kg / 3.1 lbs



Offline testing: CAT-P and Coil Control Module connection to live tank circuit breaker with one breaking element per phase



Online testing: CAT-P connection to live tank circuit breaker with one breaking element per phase



Circuit Breaker Analyzers & Timers

Handheld Circuit Breaker Analyzer & Timer - CAT-H

Applications

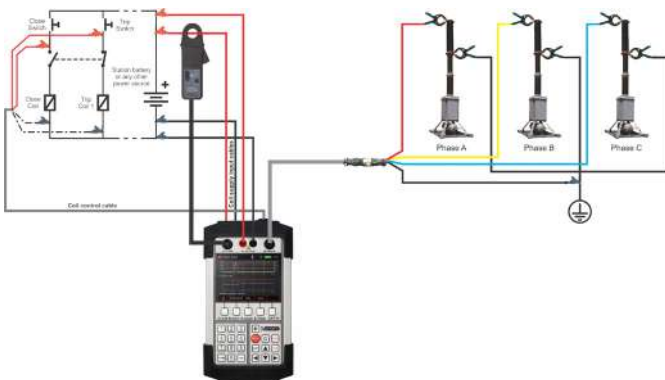
- Main contacts timing measurement
- Resistance and timing measurement of the pre-insertion resistors
- Main contacts bounce time measurement
- OPEN and CLOSE coils current measurement
- Coil resistance measurement
- Auxiliary contact timing measurement
- DC supply voltage measurement
- Actuation of circuit breaker's OPEN and CLOSE coil
- Pre-trigger time measurement

Main Features of CAT-H (CATH000-N-00)

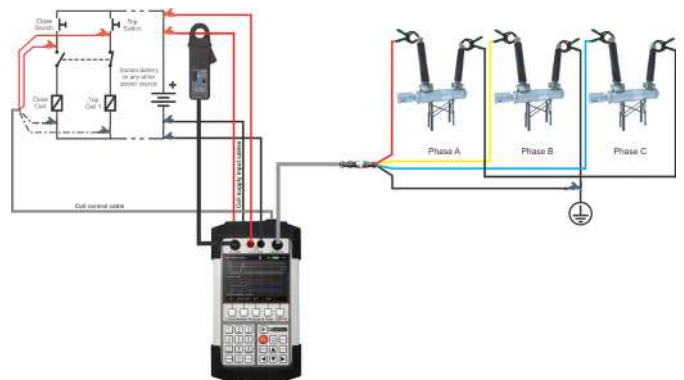
- Compact and ergonomic design
- Graphical test results for quick interpretation
- Offline testing of circuit breakers
- Coil control (built-in) for OPEN and CLOSE coil
- Touch-screen color display 145 mm (5.7 inch)
- Over 30 000 test results internal storage
- Internal battery power supply (user-replaceable)
- Battery operation for up to 8 hours
- Dimensions: 310 x 170 x 58 mm / 12.21 x 6.69 x 2.28 in
- Weight: 1,6 kg / 3.5 lbs



CAT-H connection to live tank circuit breaker with one breaking element per phase



CAT-H connection to dead tank circuit breaker with one breaking element per phase



Circuit Breaker Analyzers & Timers Accessories

Accessories



Main contacts cable set



Coil control cable with banana plugs



Voltage sense cable set



Coil supply cable set



Main contacts connection and ground cable



Dolphin clips



Test probe with grip jaws



Coil control module



AC current clamp



Small current clamp



Resistive touch pen



Plastic transport case



Plastic transport case for accessories



Cable bag



Current clamp 30 / 300 A power supplied from the instrument with adapter 5 m

Handheld Disconnector Analyzer

DIS-H

Applications

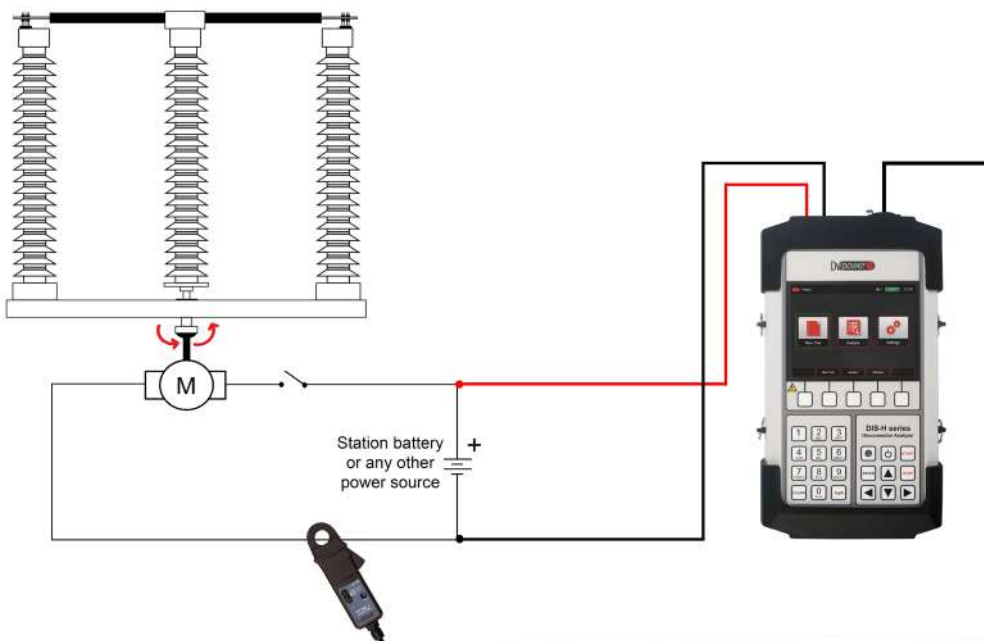
- Offline testing of disconnectors
- Motor current, voltage and power consumption measurement
- Measurement of the motors operating time
- Motor testing of disconnectors and earthing switches
- Graphical and numerical representation of the disconnecting motor drive parameters

Main Features of DIS-H (DISH000-N-00)

- Compact and ergonomic design
- Timing accuracy is 0,05 % of the reading \pm resolution
- Touch-screen color display 145 mm (5.7 inch)
- Easily mountable to the disconnector's cubicle using the included magnets
- Overlay analysis of up to 4 graphical results using the standalone instrument
- Internal battery power supply (user-replaceable)
- Battery operation for up to 8 hours
- Dimensions: 310 x 170 x 58 mm / 12.21 x 6.69 x 2.28 in
- Weight: 1,5 kg / 3.3 lbs



DIS-H connection to the motor drive of the disconnector



Handheld Disconnecter Analyzer

Accessories



Voltage sense cable set



Test probe with grip jaws



Current clamp 30 / 300 A power supplied from the instrument with adapter 5 m



Small current clamp 10 / 100 A with internal battery power supply



Plastic transport case



Resistive touch pen



Cable bag

Ground Grid Tester

GGT Series

Applications

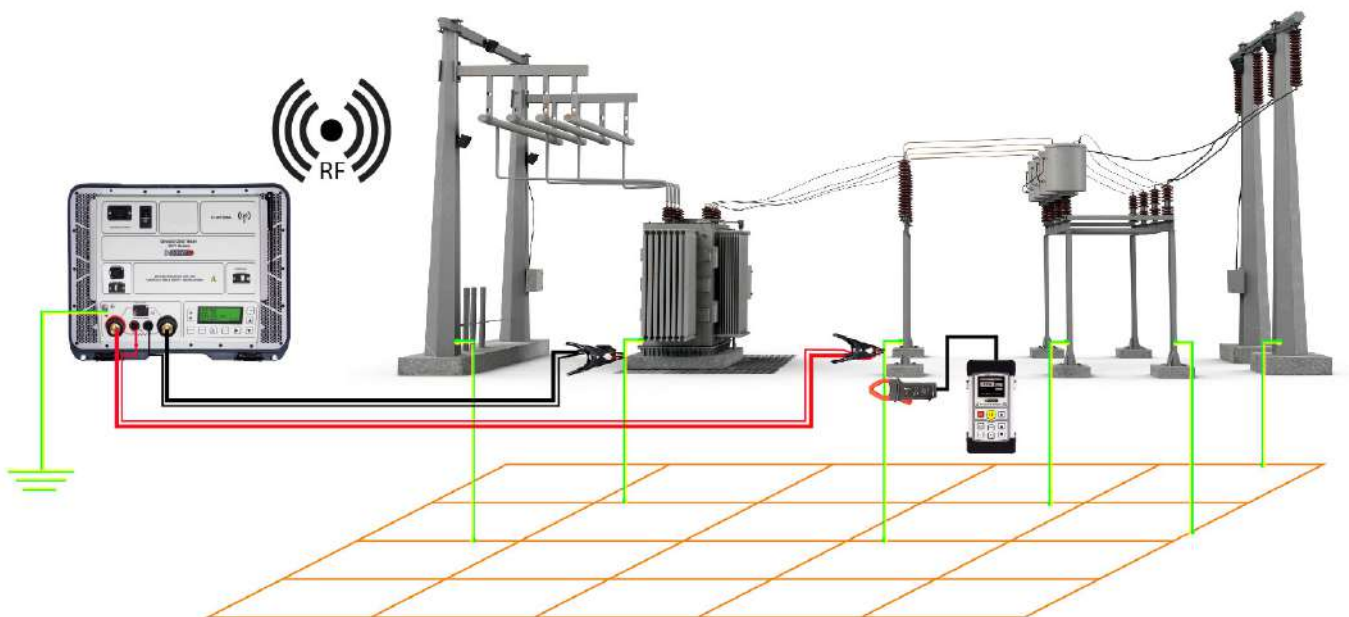
- Ground grid integrity testing according to IEEE Std. 80-2013
- Standalone or wireless control of the test by GGT-M remote module
- Grounding current flow inspection with use of current clamps on GGT-M remote module ("down current" measurement)
- Contact resistance measurement of HV switchgears according to IEC 62271-1:2017 (current up to 300 A DC)
- Testing in both sides grounded (BSG) conditions (separate current clamp input for BSG)
- Contact resistance measurement of dead-tank circuit breakers (DTR test mode)
- Resistance change monitoring for checking quality of connections or welding joints (CONTIN mode)
- Railway joints and aircraft electrical systems bonding tests

Main Features of GGT300 (GGT300-N0-03)

- Test current range: 5 – 300 A DC
- Resistance range: 0,1 $\mu\Omega$ – 999,9 m Ω
- Typical accuracy: \pm (0,1 % rdg + 0,1 % F.S.)
- Wireless communication between GGT series and GGT-M remote module
- Current clamp inputs for grounding current inspection



Ground grid integrity test using a high current DC source



Ground Grid Tester

Accessories



Current cables and heavy duty sense cables



Grounding cable



GGT-M remote module



Plastic cable case



Test shunt



Current clamp 30 / 300 A

Remote control with GGT-M module



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