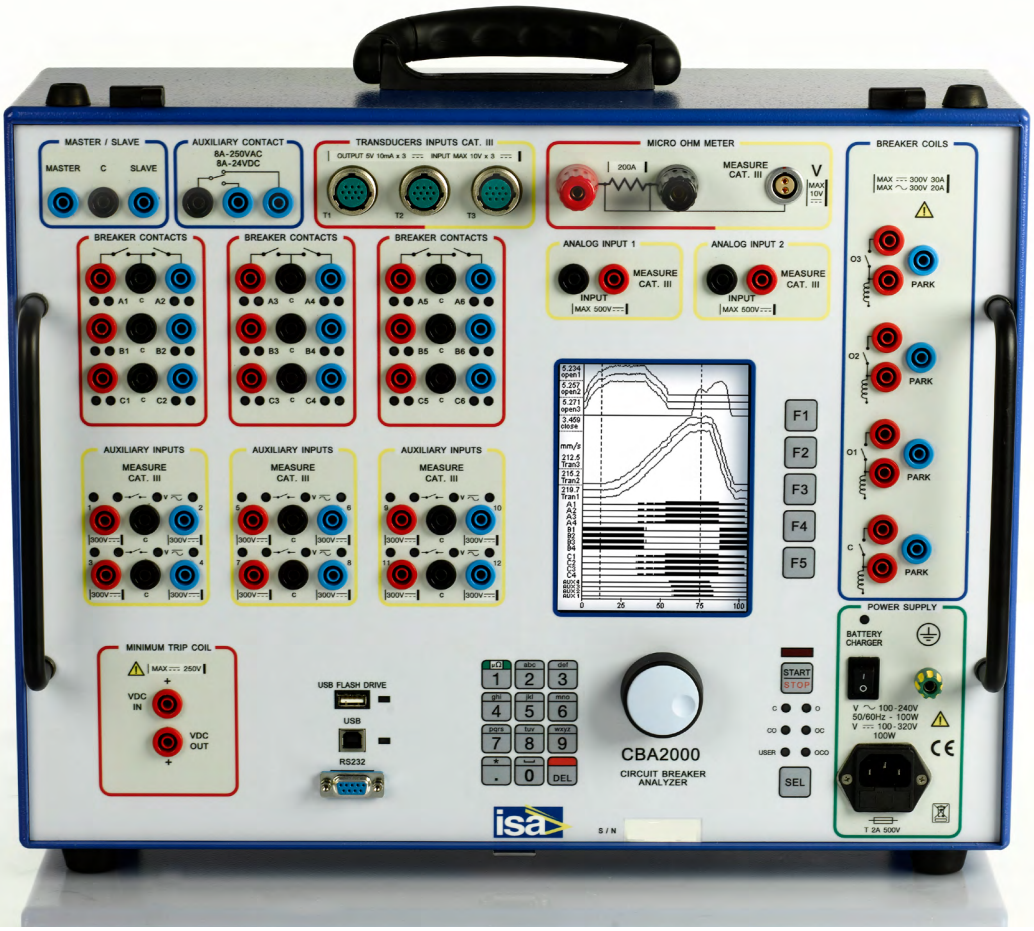
CBA 2000

High Voltage Circuit Breaker Analyzer and Microohmmeter

ALTANOVA GROUP



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GROUP
Advanced testing and monitoring solutions

HV Circuit Breaker Analyzer and Microohmmeter

- Built-in 200 A microhmmeter
- Up to 18 main and 18 resistive contact inputs
- 12 auxiliary timing inputs
- Up to 4 trip/close coils control
- Motion and speed analyzer
- Static and dynamic contact resistance measurement
- Digital transducer for motion analysis
- Minimum trip coil test
- Circuit Breaker test with both sides connected to ground (BSG option)
- Three phase first trip test
- Stand alone functionality - no PC connection is required
- Large graphical high brightness sunlight display
- Analysis and result evaluation directly on the display
- Internal memory for up to 500 test results and 64 pre-defined test plans
- Possibility to synchronize up to four CBA 2000
- TDMS - Test & Data Management Software

Application

The **CBA 2000** is a unique test set for the complete test of all circuit breakers. It is a powerful timing and motion analyzer equipment with built-in 200 A pure DC microhmmeter for static and dynamic contact resistance tests.
The CBA2000 measures CB operation times according with international standards: Open (O), Close (C), Open-Close (O-C), Close-Open (C-O), Open-Close-Open (O-C-O). It is also possible to set up customized operation sequences. In this way is possible to get the circuit breaker spread. In the same time you can measuring the coils currents.
CBA 2000 is a stand alone unit with a large graphical display. The unit is supplied with TDMS analysis software. TDMS performs test results analysis and creates test reports; it allows also to pre-define test plans. TDMS is also a powerful Test and Data Management software compatible with all ISA Test Sets. All CBA 2000 circuits have been designed to ensure safe and reliable operations in the noisy environment of EHV and HV substations.

Characteristics

Coil operation

. Number of circuits: 2 (1 Open and 1 Close coils); optional 4 (3 Open and 1 Close coils)
. Type of driver: electronic; it ensures superior timing control
. Driver characteristic: 300 V DC max; 30 A DC max
. Operating time accuracy: 0.025% of delay ± 50 µs
. Measurement of the coil current: one per channel; the wave form is displayed on the dedicated channels
. Coil current ranges: 2.5; 10; 25 A full scale, user selectable
. The 4 coils option allows the selection of single or multiple phase opening
. Coil current measurement accuracy: 0.5% of the reading ± 0.1% of the selected range
. Output are isolated betwen them

Main contact inputs

. Number of contact inputs: 6 + 6 resistor contacts (2 breaks per phase), divided in 3 groups of 2 each. In option: 12 or 18, divided in 3 groups of 4 or 6 resistor and main contacts
. Resistor contact ranges: from 20 Ohm to 10 kOhm
. Contact test voltage: 24 V. Main contact test current: 50 mA
. Each input group is isolated with respect to the others

Event inputs

. Number of auxiliary event inputs: 4, divided in 2 groups of 2 each
. Optionally: 8 or 12 divided in 4 or 6 groups of 2 each
. Capability of testing dry or wet contacts: 24 V; 20 to 300 V. Test current: 2 mA.

Sample rates

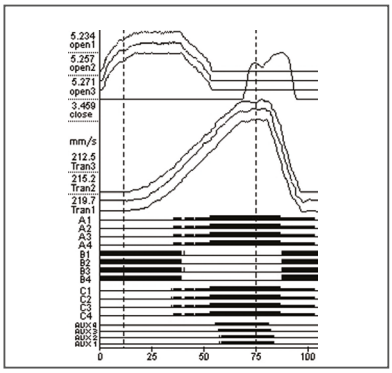
20kHz - 10kHz - 5 kHz - 2kHz - 1kHz - 500Hz - 200Hz - 100Hz, 50 Hz and 20 Hz user selectable.

Timing accuracy

50 µs ± 0.025% of the time reading at 20 kHz.

Maximum record length

1000 s.



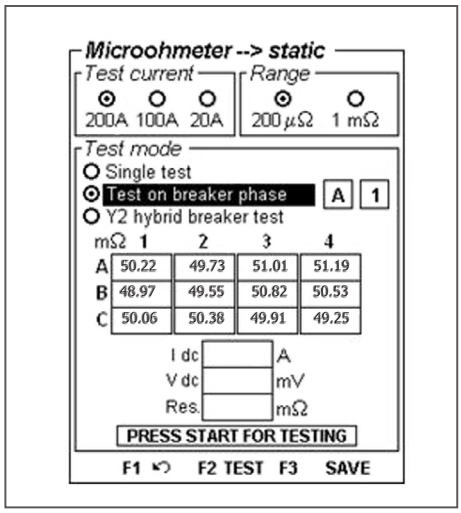
Test result display

Analog inputs

. Number of analog inputs: 8 (10 Optional)
. 2 (4 optional) dedicated to Open and Close coil currents
. 1 dedicated to Dynamic and Static Resistance Measurement
. 3 for travel transducers or analog signals
. Input voltage range: ± 10 V
. 2 general purpose analog input
. Input voltage range: ± 5 V; ± 50 V; ± 500 V user selectable
. The analog inputs are isolated with respect to all other circuits
. Analog input measurement resolution: 16 bit

Programmable sequences

The user can select the following Open and Close sequences: Open; Close; Open-Close; Close-Open; Open-Close-Open.



Microhmmeter display

Microhmmeter - static and dynamic resistance measurement module (option)

. DC Test current: 200 A, 100 A, 25 A
. Contact resistance range: 200 µOhm; 1.000 mOhm; 10.00 mOhm; 100.0 mOhm; user selectable
. Resolution: 1µOhm
. Resistance measurement accuracy (range 100 mOhm): ± 1% of the reading ± 0.2% of the range

Minimum trip Voltage test (Option)

The minimum trip voltage test allows the user to verify the minimum trip voltage threshold and the voltage drop off of a trip coil
. Two options: 250 V - 4 A; 70 V - 10 A
. Maximum voltage adjustement: up to 50% of nominal DC Voltage

Digital transducer

CBA 2000 can perform the motion analysis of the circuit breaker using digital transducers

The characteristics are:
. Up to three digital transducer inputs
. Input type: RS 422 - Single ended for incremental encoders with quadrature signal
. Max input frequency : 50 kHz
. Power supply: 5 V and 12 V supplied by the CBA2000. Possibility to use an external power supply up to 24 V
. Connections: 3 multiple connectors on the CBA 2000 front panel

First trip test (with optional clamps)

Besides the standard off-line timing mode, the CBA 2000 also features an optional three-phase first trip test. In this mode, the CBA 2000 registers the breaker's operation (open or close time, open/close coil current and DC auxiliary voltage) while the breaker is in service. Three AC current to voltage clamps record the secondary currents as the CB opens: the current waveform timing can be mesured on the waveforms. It is also possible to record the open current profile with a DC clamp, and also to monitor the auxiliary contacts. The first time detection is important because, if the CB has been in service for a long period in close position, the (first) trip time can be considerably slow because of friction.
In the normal test conduction, the CB is opened before connecting to the poles; so, the first movement friction is lost.

Test set control

The control is local, via graphical display, keypad and pushbutton for menu selection: no PC control is necessary. It is available the local interface in several languages: English, Spanish, French, Italian, Turkish.

Display

Large graphical high brightness sunlight display (viewing area 122 x 92 mm). Test results are displayed graphically and in table format. Zoom functions and cursors for test data analysis are directly available on the CBA 2000 display.

Interfaces to PC

2 available interface: USB and RS232.

Flash drive interface

It allows to download test results and settings to a commercial flash drive memory - USB 2.0 compliant.

Memory size

256 Mbytes: 500 results.

Mains supply

CBA 2000 can operate both from mains (AC or DC) and from internal rechargeable battery:
. Mains supply:
From 85 to 265 V AC; 50-60 Hz
From 100 to 350 V DC
. Internal battery. Battery characteristics: Type: NiMh

Case

Aluminium case, with hinged removable cover and handle.

Weight and dimensions

Weight: 13 kg basic unit; 15 kg with Microhmmeter module.
Dimensions: 490(W) x 370(D) x 240(H) mm.

Accessories supplied with the unit

The following accessories are always supplied with the unit:
. Mains cable
. Hardware and software user manuals
. Serial cable
. USB cable
. Spare fuses
. TDMS software

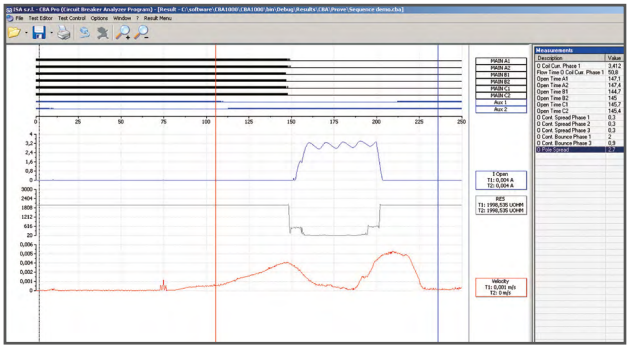
TDMS software

TDMS is a powerful software package providing data management for commissioning and maintenance testing activities. Circuit breaker data and test results are saved in TDMS database for historical results analysis.

TDMS software has the following main features.

. Full control of CBA 2000 functions from PC
. Download of test Plans
. Download of test results
. Test plans and test results can be viewed, edited in the missing descriptions, saved, printed, exported
. Possibility of viewing and overlaying multiple results for easy test result comparison
. Possibility to pre-set test plans and to download them into the test set
. Two cursors select measurement points and intervals
. Zoom in and out feature
. Enhanced measurement features for movement - speed - acceleration control

ISA software updating policy allows all the users to update their software from ISA web site www.isatest.com at no additional cost.



Test result analysis

Optional Accessories

The following options are available upon request:

Test cable kit

The connection cables set includes:

. Two cables with four conductors each for the connection to the Circuit Breaker coils. Cable length: 10 m; section 1.5 mm2
. Three (6 or 9 in option) cables with silicon insulator each for the connection to the main contacts, each with three conductors. Cable length: 16 m; section 1 mm2
. Two cables (4 or 6 in option) with silicon insulators for the connection to the auxiliary inputs, with three conductors each. Cable length: 6 m; section 1 mm2.
. One shielded cable for the low voltage measurement, with two conductors. Cable lenght: 10 m; section 0.5 mm2
. One crocodile clips set (16 clips), with different colors, for the connection to the auxiliary contacts and to the 500 V input measurement
. One set of 12 cables, 2 m long, in different colors, for the connection to other inputs
. One set of 20 adaptors with banana on one side and terminator on the other side, in different colors, for the connection to the event contacts and to the coil inputs
. Optional cables 18 m long
. Three short cables to connect the coils mains
. One cable for the minimum trip voltage test option
. Three cables for the connection to the analog transducers
. Three adaptors for the connection to the analog transducers
. Three cables with 10 poles for the connection to the digital transducers

If microhmmeter option is included, the following cables are supplied:

. Two high current cables, with a conductor. Cable lenght: 10 m; section 25 mm2
. Transport plastic case, with handles. Dimensions: 45 x 55 x 22 cm

Additional 2 open driving coils module

This module increases to 3 the number of Open Coils.

Microhmmeter - built-in 200 A static / dynamic resistance module

With 10 m long test cables, cross section 25 mm2, terminated with high current clamps.

Minimum trip voltage test

This option allows the user to verify the minimum trip voltage threshold and the voltage drop off of a trip coil.

Internal thermal printer

CBA 2000 can be supplied with a built-in thermal printer, 58 mm wide.

External thermal printer Seiko DPV- 414.

Heavy duty transport case with wheels

Plastic soft bag

Digital transducer, model Hegstler RS - 58 - 0 / 5000 AS.41RB, supplied with connection cable 1 m long, terminated with multiple connectors. Other models are available upon request.

Transducers

Linear transducer TLH 150 - 150 mm length (IP40)

Linear transducer LWG 150 - 150 mm length

Linear transducer TLH 225 - 225 mm length (IP40)

Linear transducer LWG 225 - 225 mm length

Linear transducer TLH 300 - 300 mm length (IP40)

Linear transducer TLH 500 - 500 mm length (IP40)

Linear transducer LWG 500 - 500 mm length

Linear transducer LWG750 - 750 mm lenght

Rotary transducer IP 6501 - 355° rotation angle

Pressure transducer PA-21 Y 40 BAR

Universal Transducer mounting kit for TLH, LWG and IP trav transducers

DC current clamp for coil or motor current measurement

AC current clamp three of them allow the three phase first trip test

Applicable Standard

The test set conforms to the EEC directives regarding Electromagnetic Compatibility and Low Voltage instruments.
A) Electromagnetic Compatibility: Directive 2004/108/EC (CE conform). Applicable standard: EN 61326:2006.

B) Low Voltage: Directive 2006/95/EC (CE conform).
. Applicable standards, for a class I instrument, pollution degree 2, Installation category II: CEI EN 61010-1. In particular:
. Inputs/outputs protection: IP 2X - CEI EN 60529
. Operating temperature: -10°C to 55°C; storage: -20°C to 70°C
. Relative humidity: 10 - 95% without condensing

Ordering Information

CODE	MODULE
46169	CBA 2000 - BASIC UNIT 2 breaks per phase - 4 auxiliary inputs - 3 transducer inputs - TDMS software
47169	CBA 2000 - BASIC UNIT 4 breaks per phase - 8 auxiliary inputs - 3 transducer inputs - TDMS software
48169	CBA 2000 - BASIC UNIT 6 breaks per phase - 12 auxiliary inputs - 3 transducer inputs - TDMS software
15169	Test cables kit with case for CBA 2000 (2 breaks per phase)
55169	Test cables kit with case for CBA 2000 (4 breaks per phase)
65169	Test cables kit with case for CBA 2000 (6 breaks per phase)
92169	Additional 2 Open Coils Module*
90169	Additional 2 Breaks per phase expansion kit
91169	Additional 4 Breaks per phase expansion kit
95169	Microhmmeter - 200 A Static / Dynamic Resistance Module (with test cables 10 m terminated with clamps) *
93169	MTC - Minimum Trip Voltage test module *; **
94169	Internal Thermal Printer *; **
14102	External Thermal Printer
18169	Heavy Duty Plastic Transport Case
19169	Soft carry bag
11166	TLH 150 Analog Linear Transducer 150 mm (IP40)
12166	TLH 225 Analog Linear Transducer 225 mm (IP40)
36166	TLH 300 Analog Linear Transducer 300 mm (IP40)
13166	TLH 500 Analog Linear Transducer 500 mm (IP40)
14166	Analog Rotary Transducer: IP 6501 – 355° rotation angle
26166	LWG 150 Analog Linear Transducer 150 mm
27166	LWG 225 Analog Linear Transducer 225 mm
28166	LWG 500 Analog Linear Transducer 500 mm
42166	LWG 750 linear transducer 750 mm
11169	Digital Rotary Transducer Hengstler RSO-550-170

CODE	MODULE
13169	Pressure transducer PA-21 Y 40 BAR
16166	Universal Analog Transducer mounting kit
17169	Universal Digital Transducer mounting kit
29166	DC Current Clamp
86169	AC current clamp 1 A / 0.1 V
44166	Flexible Coupling Shaft

Options with * must be specified at order.
Options with ** are exclusive each other: code 94169
Internal thermal printer cannot be ordered together.



CBA 2000 - Heavy duty plastic transport case



CBA 2000 - Soft bag



Transducer case



Transducer mounting kit



TLH linear transducer



LWG linear transducer



Digital rotary transducer



Analog rotary transducer



Pressure transducer



Current clamp



CBA 2000 - Test cable kit with transport case

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