

CIRCUIT BREAKER ANALYZERS

CBA-32P – CBA-32D – MICRO CBA-32P

CBA WIN[©] SOFTWARE TECHNICAL DESCRIPTION

A simple "click"  to perform your tests

The Windows version makes your job easier!

CBA Win© commands and executes the entire test. A single program does all the tests, in the lab or in the field, on all **ZENSOL** instruments, and analyzes the data on the spot or at the user's convenience. No need to manage multiple programs!

CBA Win© works with test plans configured by the user. A number of predefined test plans, including a default test plan, are supplied with the software and fill most of the user's needs. These test plans are easily adaptable to special requirements.

CBA Win© also imports files recorded with CBA Soft, the DOS version of the software. Your data will still be available!

System requirements

Operating system:	Windows 95, 98, 2000, XP or NT
Recommended microprocessor:	Pentium
Recommended memory:	32 Mo
Graphics resolution:	VGA or better

Features

Basic features:

1. Defining test conditions
2. Test information
3. Instant color graphics reports for viewing and analysis
4. Export of recorded and calculated data
5. Tabular reports results
6. Typical calculation parameters
7. Pass/fail comparison

Advanced features:

1. User-configurable tabular reports
2. Reports generated in any language
3. User-configurable graphics reports
4. Calculation functions (speed, travel, overtravel, rebound, etc.)
5. Repetitive testing capability (*Batch testing*)
6. Mathematical processing of the results (i.e. viewing the derivative of a displacement signal)

Test functions:

- Line test (test link): tests the quality of the RS-232/fiber optic communication link
- Cable test: test the continuity of the contact cables
- Breaker status: allows the verification of the state of the breaker's contacts following a test

Capabilities

Number of tests	30
Graphics reports	Instantaneous
Graphic pages per test	10
Viewable signals per graphic page	30
Calculation functions	More than 40
Dynamic variables per test plan	8640
Static variables	2500
Sampling time	32 to 32,000 μ s
Output pulse durations	1 to 999 ms, in 1 ms steps
Available graphic tools	Zoom, Examine, Scale
Graphic tools use	Easy
Viewing of contact rebound	Easy
Graphic printing	Color*
Graphics export	BMP format
Tabular report export	Text and HTML
Data export	Raw and scaled
Reports copied to Windows Clipboard	Graphic and tabular
Languages available in the software	English, French, Spanish
Languages available in the tabular reports	All
Help and manual	Online and printed
Keyboard	Yes
Mouse	Yes
Monitoring	Projected
External Trig	Projected
Self-powered RS-232 fiber optic module	Yes
Repetitive (Batch) testing	Yes

* on color printers

Simple Graphic Environment

The Windows work environment makes the software more user-friendly. Thus, the most-used features are available with a simple click in the button bar.



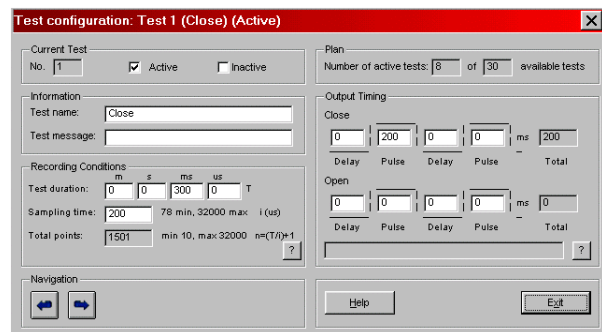
The execution of tests becomes a simple procedure in four easy steps:

1. Loading or creation of a test plan file appropriate for the breaker under test;
2. Execution of up to 30 types of tests, including Close, Open, C-O, O-C-O, etc.;
3. Observation of results on screen or in hard copy;
4. Immediate analysis on the color graphics screen or recording of data in a file for later analysis.

Defining test conditions

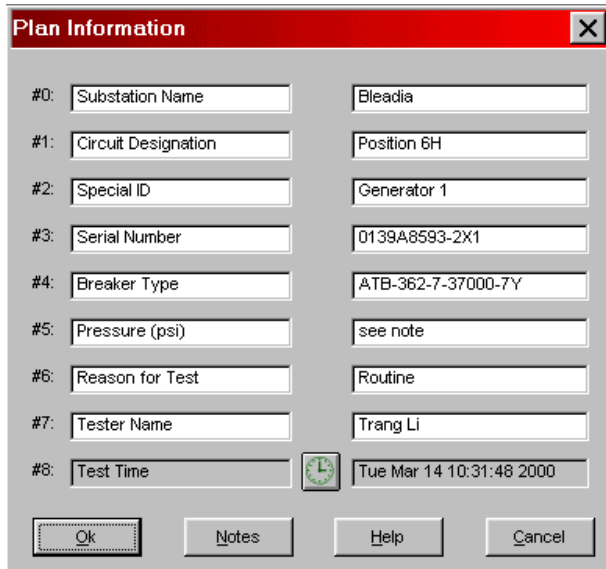
To have a test plan, one may either use the default test plan, loaded on software startup, or one may load an existing, predefined test plan, or create a custom test plan that fills the particular needs of the task at hand.

The process of defining a test with CBA Win© is both simple and complete. All the conditions of all the tests may be defined in a single screen: sampling time, number of points, sequence and duration of the command output pulses, test name, etc.



With CBA Win© and the CBA-32P™, the sampling time and the test duration are adaptable to the needs of the tests, and are not fixed at arbitrary values. The duration of the pulses and delays of the outputs are completely definable between 1 and 999 milliseconds, with millisecond precision.

Test Plan Information



The screenshot shows a dialog box titled "Plan Information" with a close button (X) in the top right corner. It contains eight numbered input fields arranged in two columns. The first column fields are: #0: Substation Name, #1: Circuit Designation, #2: Special ID, #3: Serial Number, #4: Breaker Type, #5: Pressure (psi), #6: Reason for Test, #7: Tester Name, and #8: Test Time. The second column fields are: Bleadia, Position 6H, Generator 1, ATB-362-7-37000-7Y, see note, Routine, Trang Li, and Tue Mar 14 10:31:48 2000. At the bottom of the dialog are four buttons: Ok, Notes, Help, and Cancel.

The entire test plan may be annotated with comments and descriptive titles, in any language, in order to help understand the nature of the tests, identify the breaker tested, identify the operator, the location of the breaker, etc.

Also, a single click adds the date and time to the test, improving test data management and consequently helping the long term analysis of the breaker's performance.

If the fields of the Plan Information screen are not sufficient, a handy notepad is available to add any remark to the plan, in any language.

Executing the test

CBA Win© enables you to start testing with a **simple click**. As soon as a the operator clicks on the test execution button, everything is done automatically and quickly. Commands are sent to the instrument, which manages the recording of the data. The test is triggered, and then the data are sent to CBA Win© via the high-speed fiber optic link. A progression indicator shows the status and progress of the data transfer.

Once the data transfer is finished, the results are *immediately* shown on screen by CBA Win©.

Graphics analysis tools

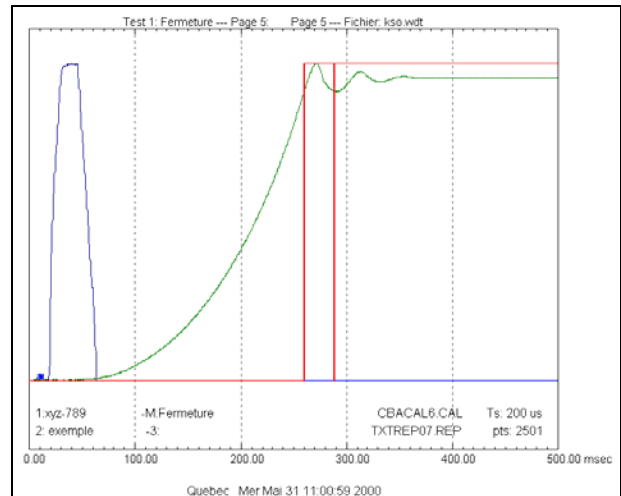
CBA Win© produces instant reports after a test; once the data are received from the analyzer, the graphic report is generated and displayed immediately, in color. These reports may be analyzed on the spot with simple yet powerful analysis tools.

The graphic reports are completely configurable, and it is possible to display up to 30 signals on each of the ten graphic pages, as well as the possibility of defining, for each graphic page, the interval shown, superimposed signals, the number of signals displayed, the page's title, etc. The signals may be displayed in any order, to better view the relationship between the currents, the displacements, the contacts, etc.

Superimposed signals:

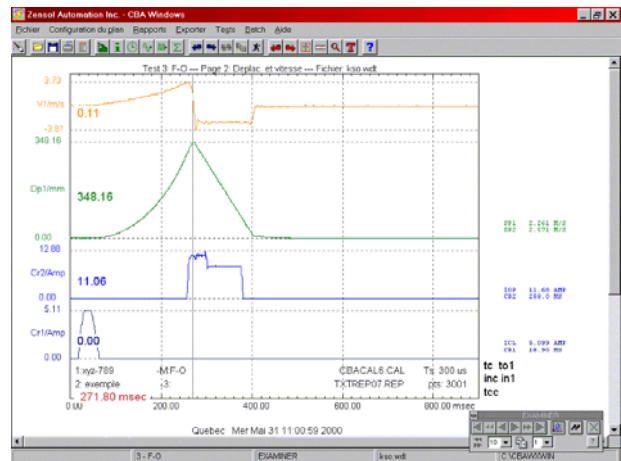
CBA Win© enables the user to superimpose signals to allow a quick visual analysis of the synchronization of the events. The relationship between the displayed signals becomes very clear.

It becomes very practical if one superimposes all the contacts to view their synchronization.



Examining signal values:

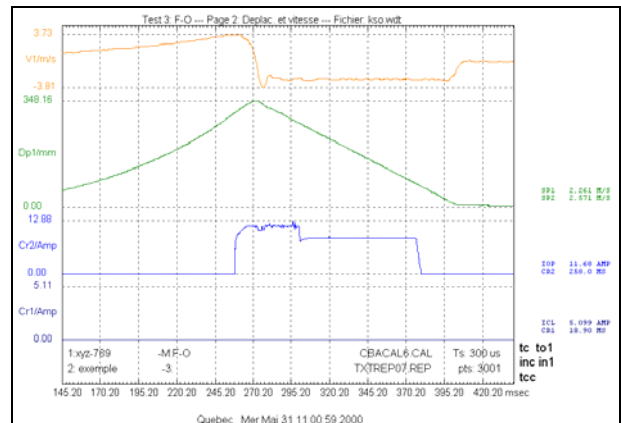
With the Examine tool, it is possible to follow the evolution of a signal, sample by sample, and to make very precise timing measurements. Also, it is possible to measure values relative to a reference point chosen by the user. Usage of the Examine tool is made easy with a handy toolbar.



Scale expansion:

This tool enables the expansion of a selected time interval over the entire width of the graphics area. Thus, finer details in the signal are visible, and the performance of the breaker tested may be better judged.

Combined with signal superimposition, and one plainly sees **ZENSOL** precision!

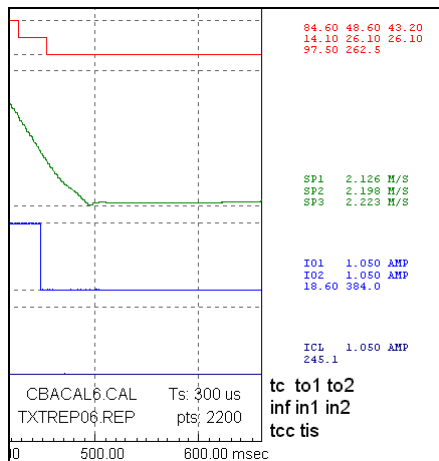


Mathematical analysis tools

The highly sophisticated calculation module allows the *instant* calculation and display of up to nine calculated values for each signal, with or without a text legend or units. The user decides what values are to be calculated and displayed for each test, and may or may not add text labels, according to his or her wishes.

Of the over 40 available calculation functions, the main ones are:

- Closing or opening time
- Damping time
- Average closing or opening velocity
- Instantaneous velocity at certain reference points
- Short-circuit time
- Insertion time during open and close operations
- Overtravel
- Rebound
- Total travel
- Minimum and maximum displacement values
- Comparison between phases
- Tolerance comparison with failure indicator



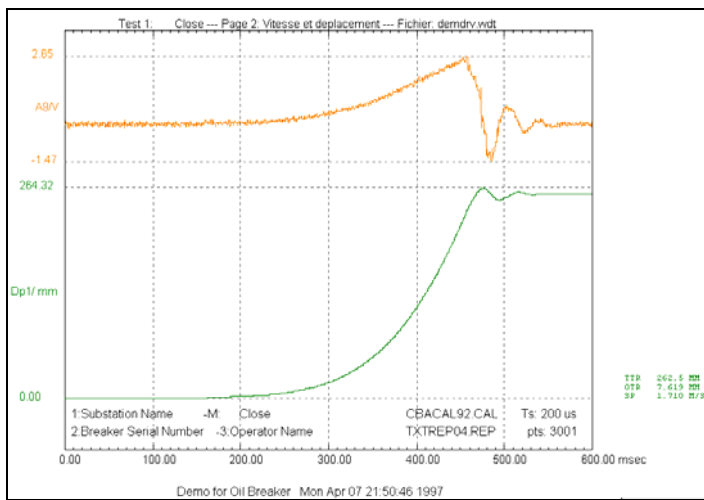
In the example at left, an O-C-O, are the intensities of the two open current pulses, and the associated times. The legends of the calculations, IO1 and IO2, indicate what value it is, and are entirely configurable by the user.

Above that, the three visible contacts each have eight calculated times, the text legends being displayed near the lower right hand corner of the graphic, in black. The calculated values may be defined separately for each test.

The example here shows the calculations for a Close operation, and the calculated values for the contacts are accompanied by text labels and the units of measurement. The close coil current is clearly 1.055 amperes, and the starting moment of the current pulse is 30 milliseconds after the beginning of the test. The closing time and the insertion time, TC and INC, are well labelled.

All you want to know about a breaker, visible at a glance!

TC	89.40 MS
INC	22.80 MS
TC	86.80 MS
INC	21.40 MS
TC	84.40 MS
INC	14.20 MS
ICL	1.055 AMP
CRI	30.00 MS
AL	Ts: 200 us
EP	pts: 1501
250.00 300.00 msec	



In addition to the eight analog signals directly measured by the instrument, the software may display up to eight signals that are calculated using a given analog signal.

Here's an example of a displacement signal (in green) and its calculated derivative, a velocity curve (in yellow).

The power of the calculation module is complemented by the *freedom of the user* to decide what he or she wants to know!

Producing tabular reports

The calculations combine with the powerful tabular report module to create text reports that conform to the user's needs.

All the aspects of the tabular report are entirely definable by the user: the layout, the labels, the values, etc. So, in combination with a complete calculus file, the tabular report module can generate printable or exportable (in text or HTML for the Web) reports which clearly show, at a glance, the strong or weak points of a circuit breaker.

Test Report		SP6 or Air Blast			

Identification File					

Identification No	:demo for cb6 2 currents				
Exploitation No	:8 contacts				
Installation	:capteur resistif lineaire				
Counter	:				
Component	:				
Serial Number	:				
Manufacturer	:				
Type	:				
=====					
Close					

Contacts	1	2	3	4	
tc (ms)	84.400	86.800	89.400	84.400	
inc (ms)	14.200	21.400	22.800	15.400	

Contacts	5	6	7	8	
tc (ms)	87.000	84.600	84.200	87.000	
inc (ms)	16.600	15.400	18.800	20.400	

Main	min	84.200			
Chbers.	max	89.400			
(ms)	diff.	5.200			

The flexibility in defining tabular reports also allows the user to produce tabular reports in any language!

Pass/fail comparison

Open				
Contacts	to	(ms) Opening Time	Min (ms)	Max (ms)
PhA		43.400	43.000	45.000
PhB		43.200	43.000	45.000
PhC	F/	42.800	← 43.000	45.000
min		42.800 ms		
max		43.400 ms		
diff.		0.600 ms		

If a circuit breaker does not meet the required specifications, and if the tolerance parameters are defined, it is possible, with the tabular report, to signal any discrepancy outside of the norm with a failure symbol, "F/", near the value in question.

Printing reports

CBA Win© prints graphic and tabular reports, and the plan notes. The graphic reports are printed as they are seen on the screen, in color (on color printers), along with all the text labels and the calculation cells.

The printing of the tabular report is done according to the defined template, and the printed report is clear and readable.

The plan notes may also be printed, if desired, to add some complementary information to the printed reports. Since CBA Win© uses a standard printer, there is no need for an integrated printer, no need for expensive and limited-life thermal paper!

Export and interface with other applications

CBA Win© can export all the interesting aspects of a test plan, and even communicate the data to other applications.

The displayed graphic reports may be exported in standard BMP format, opened with most image editing and processing software, and imported directly into Word and other software that allow the import of image files.

Also, it is possible to copy the displayed graphic report into the Windows Clipboard, and thus "paste" the graphic report directly into any image editing or processing software, and into word processors that allow pasting of images.

The tabular reports may be exported in their original text format, in an ordinary text file which may be opened with simple text editors, such as Notepad, or in HTML format, for Web publishing on your Intranet or on the Internet.

As with the graphic report, the tabular report may be copied to the Windows Clipboard, and directly pasted into any text editor or word processor.

The numerical data of a test may be exported as a text file, in either raw or scaled values, in distinct columns, for easy import into spreadsheet applications such as Lotus, Excel, etc., and even certain database applications.

Repetitive testing

The repetitive testing module is powerful test feature of the CBA software. With this feature, it is possible to define custom sequences of tests which will be executed once or any number of times. A set of macro instructions is used to define a complete program of tests in up to 30 different modes, collecting all the data recorded with the CBA-32P, viewing them, printing them and analyzing them if required by the operator. This "*Batch Test*" may be run unattended and with the possibility of placing control points. The results of the tests may be automatically saved to the hard disk. This ability makes the CBA-32P a unique instrument on the market, and the ideal instrument for repetitive and long-duration tests.

Online Help and Manuals

The CBA Win© software features an online help facility for all the screens and tools that require explanation, as well as online manuals containing all that is necessary to connect the computer to the instrument, the instrument to the breaker, with connection examples, test results, etc. Simply clicking on the help button in the current window will bring up the explanation of all the fields and controls in that screen.

The online help also contains a section explaining breaker synchronization theory, with a glossary of the terms used, and graphics visually indicating what each term means.

It is possible to print the help topics in order to have a hard copy reference.



Additional tools for the test designer

1. Test condition designer

This feature allows the user to define the recording time and the precision of the measurement.

- total recording time: from 1 millisecond to 17 minutes.
- sampling time: from 32 to 32,000 microseconds.

2. Close and Open command designer

This feature allows the user to predefine specific tests or test plans for different breaker types.

⇒ Up to 30 test modes may be created by the user, including the following common tests:

- C (Close)
- O (Open)
- O-C-O (Open-Close-Open)
- Trip free
- Reclose
- etc.

The recording time of these test modes is defined via a user-friendly graphic interface. All the times are programmable by the user and saved in a configuration file. A certain number of these files may be saved, each assigned to a specific type of circuit breaker (such as KSO). Additionally, using the same configuration file, it is possible to design a whole family of standard tests which may be selected by only loading the appropriate configuration file.

3. Graphic report designer

This feature allows the user to design his or her own graphics reports. The following parameters may be defined:

- What modes will be viewed
- Units of measurement used by the sensors
- Viewing of superimposed or separate signals
- Labels for each curve's axis
- Names for each signal
- Minimum and maximum scaling values
- etc.

4. Tabular report designer

This feature allows the user to design his or her own tabular reports, in any language (english, french, spanish, german, etc.).

5. Calculation designer

This powerful tool, specific to Zensol, allows the user to calculate whatever values are desired, and to place the results in any location, and using any recorded signal. The calculated data appear in both the graphic and tabular reports, in the location that the designer selected.

6. Batch test designer

This feature allows the user to easily perform repetitive tests (10, 100 or 10,000 times, if desired!). The user may define the test in a Batch file, when the following parameters are defined:

- Types of tests (Close, Open, Close-Open, etc.)
- Precision of measurement
- Total recording time
- Printing of tests or not
- Waiting time between tests
- Viewing of graphic reports
- Automated saving of test data
- Calculation methods
- Comparison of recorded values with typical values
- Number of tests to perform
- Repetition of batch test, if necessary.

This software is supplied with the CBA-32PTM and MICRO CBA-32PTM instruments.

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