

Circuit Breaker Analyzer & Timer CAT34

- Simple & easy to operate
- Timing and motion measurement
- 3 timing channels for main and resistive contacts
- 3 timing channels for auxiliary inputs
- Resistance measurement of pre-insertion resistors
- 4 Analog Inputs + 1 Transducer Input
- Supports both digital and analog transducers
- Detailed analysis of test results using DV-Win software



Description

Circuit Breaker Analyzer & Timer CAT34 is a standalone or a PC-controlled digital instrument for condition assessment of the circuit breakers. The timing channels record closing and opening of the main, resistor, and auxiliary contacts. CAT34 records graphs of both the open and close coil currents and displacements of the HV and MV circuit breaker moving parts. The main contact channels can also measure the resistance value of the pre-insertion resistors (if present in the circuit breaker). Test results are printed on the 80 mm thermal printer (optional accessory) in tabulated and graphical form.

The alphanumeric keypad is used for entering the breaker data, the test data and the control functions. CAT34 provides an easy selection of different operational modes: Open (O), Close (C), Open-Close (O-C), Close-Open (C-O), and Open-Close-Open (O-C-O). Multiple operations, such as Open-Close and Open-Close-Open, can be initiated by using a predefined delay time or by sensing a breaker's contact position. External trigger is used to start timing of the breaker when sensing a voltage.

The auxiliary inputs are used to monitor the auxiliary (52a and 52b) contacts. The external trigger input can be used as the third auxiliary input.

The two analog channels measure and record the coil currents simultaneously (OPEN and CLOSE), up to 35 A DC. Results are printed in both diagram and table form on a built-in printer.

The two additional analog channels are intended for the high voltage (± 60 V or ± 300 V AC/DC) and the low voltage (± 1 V or ± 5 V AC/DC). They are used for monitoring of:

- circuit-breaker substation battery voltage,
- connection of the current clamps for "The first trip" monitoring test,
- other types of analog signals that may be relevant.

The transducer channel is intended for measuring displacement of the circuit breaker moving parts, contact wipe, over-travel, rebound, damping time and an average velocity. Either an analog or a digital transducer can be connected to this universal channel.

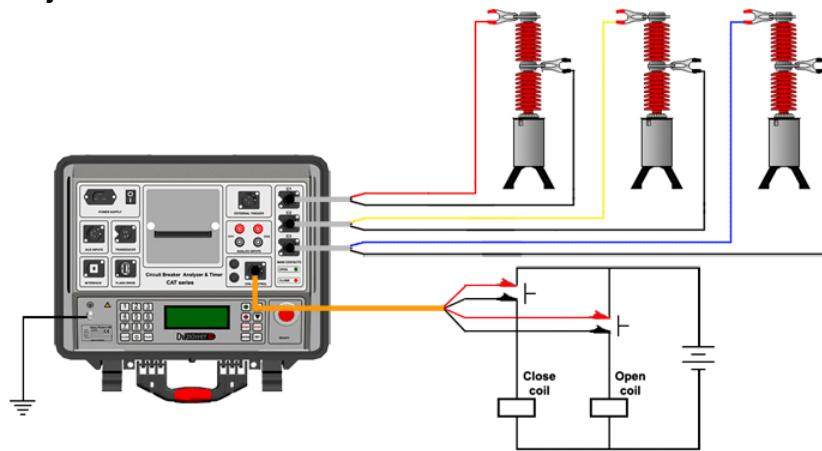
DV-Win software provides acquisition and analysis of the test results, as well as control of all the CAT34 functions from a PC. Graphical presentation of a variety of measurements and timing test results uses cursors and powerful zoom functions for detailed analysis. Colors, grids, scales and positioning of the test data are all controlled by the user. DV-Win supports an automatic unit conversion. (e.g.: cycles to seconds or mm to inches). The test records can be exported in .dwc file format for further analysis.

Application

The list of the instrument application includes:

- A simultaneous measurement of 3 main contacts including pre-insertion resistors (if present in the circuit breaker) and 3 auxiliary contacts,
- A resistance measurement of the pre-insertion resistors (if present in the circuit breaker),
- An evaluation of synchronization between the circuit breaker poles,
- A measurement of the coil currents, simultaneously for both coils,
- Evaluating the state of the substation's batteries by graphically showing the voltage value,
- A measurement of displacement, contact wipe, over-travel, rebound, damping time and average velocity of the breaker's moving parts,
- "First trip" test

Connecting a test object to the CAT34



Features

Mains power supply input
90 V – 264 V AC; 50 Hz – 60 Hz

Thermal printer (built-in 80 mm wide)
Graphic and numeric printout of a contact wave form

External Trigger input
External trigger is used to start timing of the breaker when sensing a voltage.

Transducer input
Intended for measuring a displacement of the circuit breaker's moving parts

Main contacts inputs
Used for timing of the main and pre-insertion resistor contacts, and for the resistance measurement of the pre-insertion resistors

Auxiliary inputs
Used for timing of dry or wet auxiliary contacts

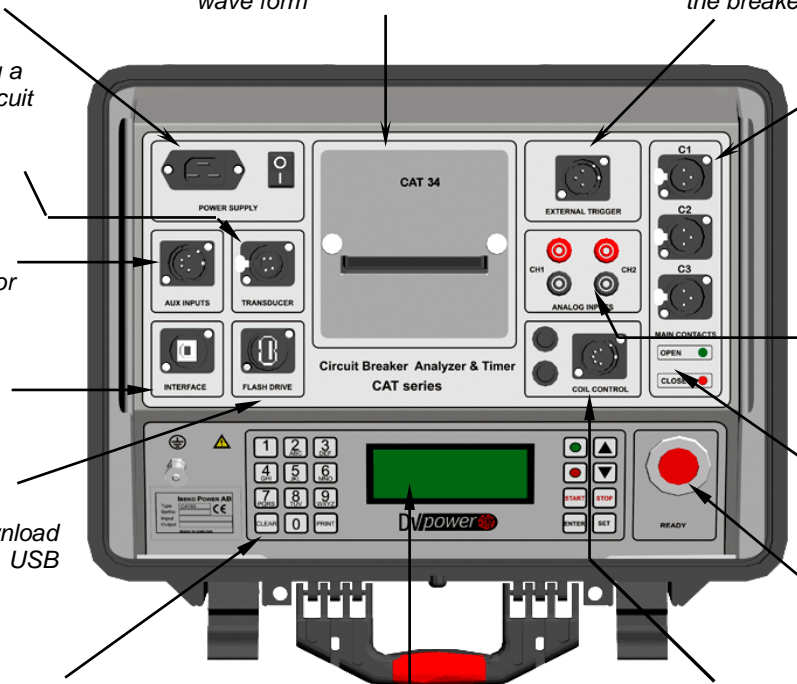
PC communication
USB interface

Flash drive
Used for a direct download of test results on a USB memory stick

Alphanumeric keypad
Used for entering the breaker data, test data and control functions

LCD Screen
20 Characters by 4 Lines; LCD display with backlight, viewable in bright sunlight.

Coil Control inputs
Used for operating the circuit breaker's OPEN and CLOSE coils

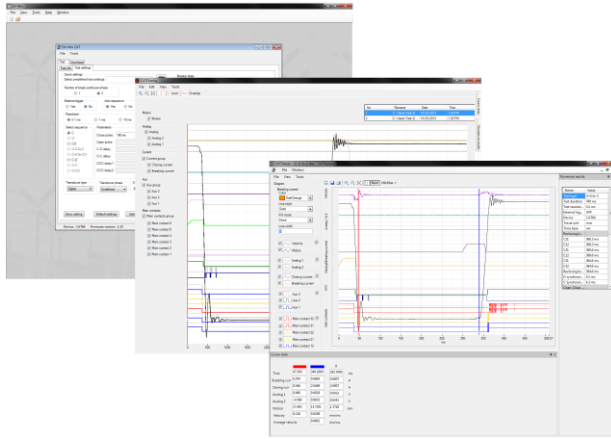


Analog channels inputs
Used for a measurement of any type of an analog signal that may be relevant.

Breaker state indicator
Indicates a state of the circuit breaker

READY button
Prepares the instrument for the start of a test

DV-Win software



DV-Win software provides the following features:

- Full control of the CAT functions from a PC.
- Downloading the test results from the instrument.
- Acquisition and analysis of the test results.
- The test results can be viewed, edited, saved, printed and exported.
- Viewing and overlaying several graphs, for an easy test result comparison.
- Selecting the measurement points and intervals using the two cursors.
- Zoom and pan graph feature.
- Specific test sequence setup.
- Customized configuration of the test result graphs.
- Creation of the predefined test plans for an easy and quick field testing.

Accessories

Included

- DV-Win PC software
- Ground cable
- USB cable

Recommended

- Main contacts cables set 5 m with alligator clamps
- External trigger cable 5 m with banana plugs*
- Coil control cable 5 m with banana plugs*
- Auxiliary contacts cable 5 m with banana plugs*
- Analog channels cable set 4 x 5 m 2,5 mm² with banana plugs
- Cable bag

Optional

- Built-in 80 mm thermal printer
- Thermal paper roll
- Digital rotary transducer with 5 m connection cable
- Linear analog transducer with 5 m connection cable
- Current clamp 30/300A + cable set 5 m
- Main contacts cables set 10 m with alligator clamps
- Coil control cable 10 m with banana plugs
- Auxiliary contact cable 10 m with banana plugs
- External trigger cable 10 m with banana plugs
- Universal transducer mounting kit

Main contacts cables set 5 m with alligator clamps*	External trigger cable 5 m with banana plugs*	Coil control cable 5 m with banana plugs*	Auxiliary contacts cable 5 m with banana plugs*
Analog channels cable set 4 x 5 m 2,5 mm² with banana plugs*	Linear analog transducer with 5 m connection cable*	Digital rotary transducer with 5 m connection cable	Current clamp 30/300A + 5 m cable set

*The above cables are also available in several lengths and terminations.

*The above linear analog transducers are available in several lengths.

Please contact DV Power for more information.

Technical Data

Main contact inputs

- Number of contact inputs: 3
- Each channel detects Main and Pre-insertion resistor contacts.
 - Closed $\leq 10 \Omega$,
 - Resistor contacts range 10Ω to $10 \text{ k}\Omega$,
 - Open $\geq 10 \text{ k}\Omega$
 - Open circuit voltage: 20 V DC
 - Short circuit current 50 mA
- Each channel measures resistance of pre-insertion resistors

Time measurement

Time measurement resolution:

- 0,1 ms for 2 s test duration;
 - 1 ms for 20 s test duration;
 - 10 ms for 200 s test duration;
- Time accuracy 0,05% of the reading \pm resolution

Coil driver

- Number of channels: 2 (Open and Close coil)
- Two separate outputs for coil triggering
- Driver characteristics: 300 V DC max, 35 A DC max
- Electronic drivers provide superior timing control
- Overcurrent and overvoltage protection

Analog inputs

- 2 channels – Coil current measurement
 - 1 channel – Voltage channel: $\pm 1 \text{ V}$ or $\pm 5 \text{ V AC/DC}$
 - 1 channel - Voltage channel: $\pm 60 \text{ V}$ or $\pm 300 \text{ V AC/DC}$
- The analog inputs are isolated with respect to all other circuits

Transducer input

- Digital transducer inputs: 1
- Analogue transducer inputs: 1

Dimensions and Weight

- Dimensions: 405 mm x 170 mm x 335 mm
15,9 in x 6,7 in x 13,1 in
- Weight: 7 kg / 15,4 lb

Applicable Standards

- Installation/overvoltage: category II
- Pollution: degree 2
- Safety: LVD 2006/95/EC (CE Conform)
EN 61010-1
- EMC: Directive 2004/108/EC (CE Conform)
Standard EN 61326-1:2006
- CAN/CSA-C22.2 No. 61010-1, 2nd edition, including Amendment1

Auxiliary inputs

- Number of channels: 3, galvanically isolated (external trigger input can be used as a third auxiliary input)
- User selectable: dry or wet
 - Contact sensing (dry):
Open circuit voltage 24 V DC,
Short circuit current 5 mA
 - Voltage sensing (wet):
Working voltage 300V DC, 250V AC
Low activation mode $\pm 5 \text{ V}$
High activation mode $\pm 10 \text{ V}$
- Overcurrent and overvoltage protection

Breaker operation

- Close (C),
 - Open (O),
 - Close-Open (C-O),
 - Open-Close (O-C),
 - Open-Close-Open (O-C-O)
 - First trip test
- The user can select any desired test sequence

Current measurement

- Current measurement for Open and Close coil, 2 channels, Hall-Effect sensor
- Range $\pm 35 \text{ A DC}$ to 5 kHz
- Accuracy $\pm (0,5 \% \text{ rdg} + 0,1 \% \text{ FS})$
- Graphic presentation: currents waveform is displayed with a resolution of 0,1 ms

Printer (optional)

- Thermal printer
- Graphic and numeric printout
- Paper width 80 mm

External trigger

- Trigger input voltage: 10 V – 300 V AC/DC

Mains Power Supply

- Connection according to IEC/EN60320-1; UL498, CSA 22.2
- Mains supply: 90 V - 264 V AC
- Frequency: 50/60 Hz
- Input power: 250 VA
- Fuse 2 A / 250 V, Fast blow, but not user replaceable

Environmental conditions

- Operating temperature: $-10 \text{ }^\circ\text{C}$ - $+55 \text{ }^\circ\text{C}$ / $14 \text{ }^\circ\text{F}$ - $+131 \text{ }^\circ\text{F}$
- Storage & transportation: $-40 \text{ }^\circ\text{C}$ - $+70 \text{ }^\circ\text{C}$ / $-40 \text{ }^\circ\text{F}$ - $+158 \text{ }^\circ\text{F}$
- Humidity 5 % - 95 % relative humidity, non condensing

*All specifications herein are valid at ambient temperature of $+25 \text{ }^\circ\text{C}$ and recommended accessories.
Specifications are subject to change without notice.*