



## Circuit Breaker Analyzer & Timer CAT33

- Simple & easy to operate
- Timing and motion measurement
- 3 Channels for main contacts
- 3 Channels for auxiliary inputs
- Resistance measurement of pre-insertion resistors
- 4 Analog Inputs + 1 Transducer Input
- Results printed on 80 mm thermal printer
- Detailed analysis of test results using DV-Win software



### Description

Circuit Breaker Analyzer & Timer CAT33 is a standalone or a PC-controlled digital instrument for condition assessment of circuit breakers. The timing channels record closing and opening of main contacts, resistor contacts, and auxiliary contacts. CAT33 records graphs of both Open and Close coil currents and displacements of HV and MV circuit breaker moving parts. Main contact channels can also measure resistance value of pre-insertion resistors (if present in the circuit breaker). Test results are printed on an 80 mm thermal printer in tabulated and graphical form.

An alphanumeric keypad is used for entering Breaker data, Test data and Control functions. CAT33 provides 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 predefined delay time or by sensing breaker's contact position. The breaker can be operated remotely using External trigger.

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

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.

Two additional analog channels, high voltage ( $\pm 60$  V or  $\pm 300$  V AC/DC) and low voltage ( $\pm 1$  V or  $\pm 5$  V AC/DC), are used for monitoring circuit-breaker substation battery voltage, connection of current clamps for "The first trip" monitoring test or any other type of analog signal that may be relevant.

Digital transducer channel is intended for measuring circuit breaker stroke, contact wipe, over-travel, rebound, and average velocity. Unlike other transducer types, the digital transducer does not require calibration or setup.

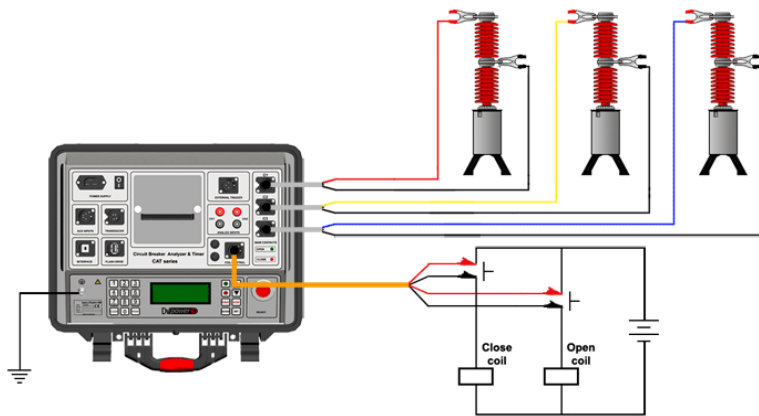
DV-Win software provides full control of all CAT33 functions from a PC, acquisition and analysis of test results. Graphical presentation of variety of measurements and timing test results uses cursors and powerful zoom functions for detailed analysis. Colors, grids, scales and positioning of the test data are all controlled by the user. DV-Win supports automatic unit conversion. (e.g.: cycles to seconds or mm to inches). Test records can be exported in .dwc file format for further analysis.

## Application

Typical application is:

- ✓ Simultaneous measurement of 3 Main contacts and 3 auxiliary contacts, including pre-insertion resistors (if present in the circuit breaker),
- ✓ Resistance measurement of pre-insertion resistors (if present in the circuit breaker),
- ✓ Evaluation of the synchronization between the circuit breaker poles,
- ✓ Measurement of coil currents, simultaneously for both coils,
- ✓ Evaluating the state of the substation's batteries by graphically showing the voltage value,
- ✓ Measurement of contact wipe, over-travel, rebound and average velocity of breaker's moving parts,
- ✓ "First trip" test available
- ✓ Display and print test results, both numerically and graphically.

## Connecting a test object to CAT33



## 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 contact wave form

**External Trigger input**  
Used for remote activation of CAT33

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

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

**Auxiliary inputs**  
Used for timing of dry or wet auxiliary contacts

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

**PC communication**  
USB interface

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

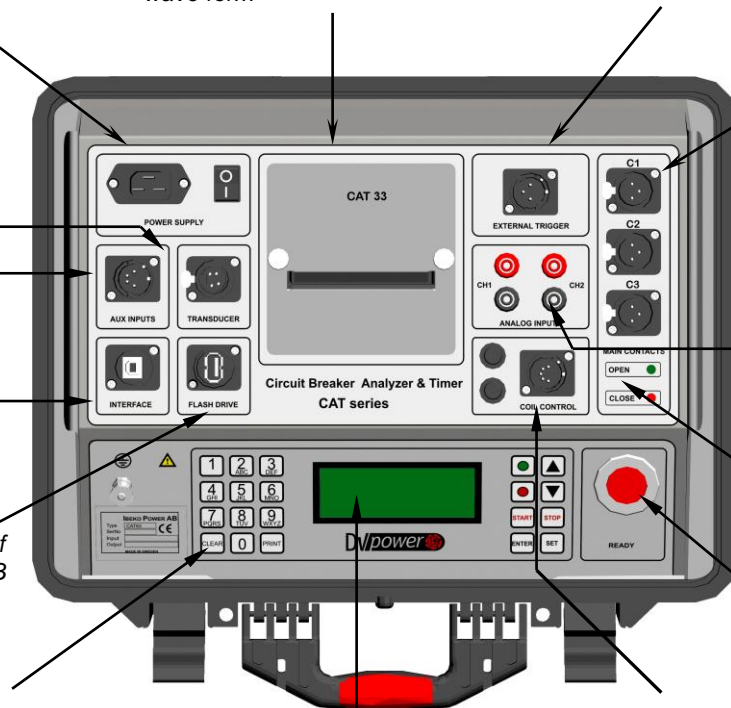
**Breaker state indicator**  
The state of circuit breaker is indicated

**READY button**  
Prepares the instrument for start of the test

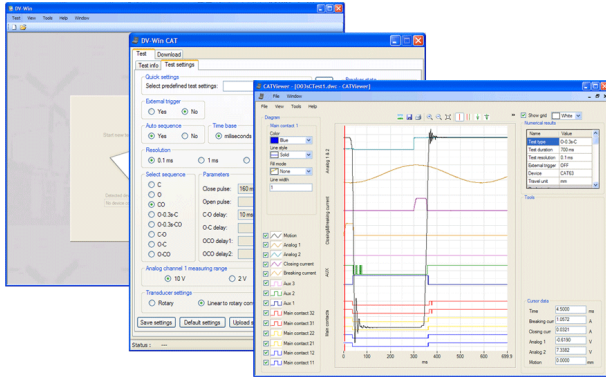
**Alphanumeric keypad**  
Used for entering Breaker data, Test data and Control functions

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

**Coil Control inputs**  
Used for operating of circuit breaker's OPEN and CLOSE coil



## DV-Win software



DV-Win software has the following features:

- Full control of CAT functions from PC.
- Download test results from the instrument
- Acquisition and analysis of test results
- Test results can be viewed, edited, saved, printed and exported.
- Viewing and overlaying several graphs, for an easy test result comparison.
- Two cursors select measurement points and intervals.
- Zoom and pan graph feature.
- Set up your own test sequence
- Customized configuration of test result graphs.
- Measurement by using rotary digital or linear analogue transducers, along with linear to rotary converter accessory.
- Creation of predefined test plans for easy and quick field testing

## Ordering information:

Art.No.	Description
<b>CAT3300-N-00</b>	CAT33 device with ground cable, USB cable and CD with software
<b>CM-05-30C3A2</b>	Main Contacts Cables set 5 m with alligator clamps*
<b>CE-05-00C4B1</b>	External Trigger Cable 5 m with banana plugs*
<b>CO-05-00C5B1</b>	Coil Control Cable 5 m with banana plugs*
<b>CA-05-00C4B1</b>	Auxiliary Contacts Cable 5 m with banana plugs*

Art.No.	Description
<b>DRT-250-C605</b>	Digital rotary transducer with 5 m connection cable
<b>CURR-CLAMPS</b>	Current clamps
<b>SAT30AA-N-00</b>	Coil Analyzer SAT30A
<b>UTM-KIT-0000</b>	Universal transducer mounting kit

\*The above cables are also available in several lengths and terminations. Please contact IBEKO Power for more information.



Main contacts cables set



External trigger cable



Coil control cable



Auxiliary contacts cable



Digital rotary transducer



Current clamps



Coil Analyzer SAT30A

The SAT30A is ideal power supply at test with CAT series circuit breaker analyzers, where substation battery is not connected or available.

SAT30A supplies and measures current and resistance of circuit breaker coils, and can power spring-charging AC or DC motors Weighs only 8kg.

## 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  $10 \Omega$  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
- Each input group is isolated with respect to the others

### 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 Operation

- Number of channels: 2 (Open and Close coil)
- Two separate outputs for coil triggering
- Driver characteristics: 300 V DC max, 35 A DC max

### Breaker Operation

- Close (C),
  - Open (O),
  - Close-Open (C-O),
  - Open-Close (O-C),
  - Open-Close-Open (O-C-O)
- User can select any desired test sequence

### External Trigger

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

### Printer (optional)

- Thermal printer
- Graphic and numeric printout of contact and travel wave form
- Paper width 80 mm

### Mains Power Supply

- Connection according to IEC/EN60320-1; UL498, CSA 22.2
- Mains supply: 90 V - 264 V AC; 50-60 Hz

### Electromagnetic Compatibility (EMC)

- CE conformity: EMC standard 2004/108/EC

### Auxiliary inputs

- Number of channels: 3, galvanically isolated (external trigger input can be used as a third auxiliary input)

- *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  $\pm 10\text{V}$

### Current Measurement

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

### DV-Win software

- User friendly software
- Complete control of CAT33 during the testing
- Complete analysis of tests results
- Internal memory for pre-defined Test plans
- Database for managing and analysis of all testing

### 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

### Dimensions and Weight

- Dimensions: 410 mm x 180 mm x 320 mm  
16,14 in x 7,08 in x 12,59 in
- Weight: 7 kg / 15,4 lb

### Digital Transducer Input

- 1 digital travel transducer channel;
- Digital rotary transducer: 2500ppr.

### Safety Standards

- European standards: EN 61010-1; LVD 2006/95/EC
- International standards: IEC 61010-1;  
UL 3111-1  
CAN/CSA-C22.2 No 1010.1-92

### Environmental conditions

- Operating temperature:  $-10 \text{ }^\circ\text{C}$  -  $+50 \text{ }^\circ\text{C}$  /  $14 \text{ }^\circ\text{F}$  -  $+122 \text{ }^\circ\text{F}$
- 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.