

CBV-X

CIRCUIT BREAKER TIMING AND
VIBRATION ANALYZER



What is the CBV-X ?

The CBV-X is the only instrument in the world able to perform timing, motion, vibration and dynamic resistance measurements all in a single test. The vibrations produced by circuit breakers, ON or OFF LINE, during open or close operations, contain valuable information on their condition. The CBV-X records these vibrations in order to help you identify mechanical problems.

Example of 12 contacts configuration
CBV-29:



Detected problems	Test methods	CB11		CBA-32P		CBV-X		OTM-XB	
		Online	Offline	Online	Offline	Online	Offline	Online	Offline
Contact timing	Timing test		✓		✓		✓		
Contact bounce	Timing/motion test		✓		✓		✓		
Bad damping	Motion test		✓		✓		✓		
Main contact wear	Micro-ohmmeter test		✓		✓		✓		✓
Arcing contact wear	Dynamic resistance test		✓		✓		✓		✓
Open and close coil assessment	Coil current test	✓	✓	✓	✓	✓	✓	✓	✓
Motor assessment	Current and voltage test	✓	✓	✓	✓	✓	✓	✓	✓
First trip	Measure current over 3 phases	✓		✓		✓	✓	✓	✓
Bad mechanical adjustment	Vibration test					✓	✓	✓	✓
Bad alignment	Vibration test					✓	✓	✓	✓
Bad contact timing	Vibration test					✓	✓	✓	✓



Pioneering the use of vibro-acoustics for circuit breakers !

Developed and used by Zensol for 10 years.

Highlights problems that are undetectable by traditional methods (motion, timing)

Using the vibro-acoustic method.

Performs vibro-acoustic tests while the circuit breaker is ON LINE !

Saves a substantial amount of time and money.

Optimal QUALITY, SPEED and ACCURACY of the tests

Sampling time : 5 μ s

Sampling rate : 200kHz

Ideal for tests in electrical substations

Not affected by noisy environments (up to 800 kV).

Technical specifications

CBV-X

www.zensol.com www.zensol.net

RECORDING CHARACTERISTICS

Sampling time : 5 μ s to 26 ms
Sampling rate : 38 Hz to 200 kHz
Recording time : 10 ms to 30 mins
A/D Conversion : 16 bits

DIGITAL INPUTS FOR DRY CONTACTS (3 states)

Number available: 6, 12 or 18 contacts
Contact power supply: 40 VDC
Model:
500 kV Closed ($r < 30 \Omega$)
Preinsertion ($30 \Omega < r < 4 \text{ k}\Omega$)
Open ($r > 4 \text{ k}\Omega$)
800 kV Closed ($r < 30 \Omega$)
Preinsertion ($30 \Omega < r < 2.4 \text{ k}\Omega$)
Open ($r > 2.4 \text{ k}\Omega$)

Each input contains 2 contacts and detects both main and resistive contacts. Each contact may also be used to measure auxiliary (a/b type) or any other dry contacts.

ANALOG CONTACT INPUTS (16 bits, 32767 states) (internal option)

A preinsertion resistance measurement module able to measure the true ohmic resistance value (0 to 7k Ω , +/- 5%) of preinsertion resistors on any type of circuit breaker during both close and open operations. The close and open connections use the same cables and inputs as the digital contacts.

Note: this module is the equivalent of an ultra-fast ohmmeter.

MULTIFUNCTION ANALOG INPUTS (16 bits)

Number available : 0, 3 or 6
Resolution : 16 bits A/D conversion
Accuracy : +/- 1 mV
Input voltage range : -10 to +10 VDC
It's possible to connect a wide range of transducers (motion, voltage, current, pressure, humidity, temperature...)
Note : 10 VDC is supplied on the Neutrik connector

ACCELEROMETER INPUTS

Number : 3 or 6
Accelerometer type : ICP
Full scale ranges : $\pm 50\text{g}$, $\pm 500\text{g}$, $\pm 1000\text{g}$
Frequency range : 1 to 20 000 Hz

COMMAND OUTPUTS/CURRENT INPUTS

Command outputs: 2 completely independent contactors (close and open, able to break up to 30A and 300V AC/DC)

Current inputs: 2 integrated and independent current transducers (in series with the two contactors)
Four software selectable current ranges: +/-20A +/-10A +/-5A +/-1A
Hall effect current transducer needs no shunt to measure current.

DIGITAL INPUTS FOR OPTICAL ENCODERS (16 bits)

Number available : 0, 3 or 6
Resolution : 8000 pulses/revolution
Type of transducer : Incremental
Automatic reset to zero before each test.

DIGITAL INPUTS FOR WET CONTACTS (2 states)

Number available : 0, 3 or 6
Response time : 5 μ s (turn-on), 40 μ s (turn-off)
Input voltage : 0-300V AC/DC
Switching voltage : 50 V DC

FIRST TRIP DETECTION INPUTS (external option)

AC current clamp which is easily connected to the analog inputs.
Typical input current : 1 to 20 A AC
Number : 0 or 3

GENERAL

Size : 17" x 16.5" x 10" (43 x 42 x 25.4 cm)
Weight : 19.84 lbs (9 kg)
Power supply : 110-240 V AC (50-60 Hz +/- 10%)
Operating temperature range: 0°C to 50°C (32°F to 122°F)
Storage temperature range: -20°C to 70°C (-4°F to 158°F)
Humidity : 0-95% non condensing.

THE SYSTEM INCLUDES

OpenZen software
Complete set of manuals
Calibration certificate and test reports
2 year warranty

ANALOG TRIGGER CAPABILITY

Works on any analog input
AC or DC signals
Rising or falling wavefronts