Accessible version (HTML): amperis.com/en/accesible/cat-p-eng/

CAT-P

1 break per phase · Online first trip test



Offline testing and online first trip test in a 1.4 kg handheld instrument

CAT-P

Handheld circuit breaker analyzer & timer

amperis

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Overview



CAT-P: handheld circuit breaker analyzer & timer.

Offline and online testing

The CAT-P is a digital instrument for circuit breaker condition assessment. It records the timing of the main arcing contacts, the substation DC battery voltage and the Trip and Close coil currents. In online mode, the main contact operating time is calculated from the AC secondary currents of the current transformers.

Operating modes

Trip (O), Close (C), Trip-free (CO), Reclose (O-C), Close-Trip (C-O), Trip-Close-Trip (O-C-O) and First trip.

How online recording starts

Before the test, the current clamp is connected to the auxiliary circuit of the circuit breaker. Recording starts when the coil current reaches the predefined threshold; the DC clamp measures the Trip or Close coil current, depending on the operation.

What it records and analyzes

- Trip and Close coils operation.
- Main arcing contacts operation.
- Auxiliary contact operation.
- DC supply voltage.
- Integrity of control circuit wiring.

It displays numerical and graphical results and overlays up to 4 records. The internal battery is user-replaceable.

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Panel and connections



CAT-P front panel and side connections.

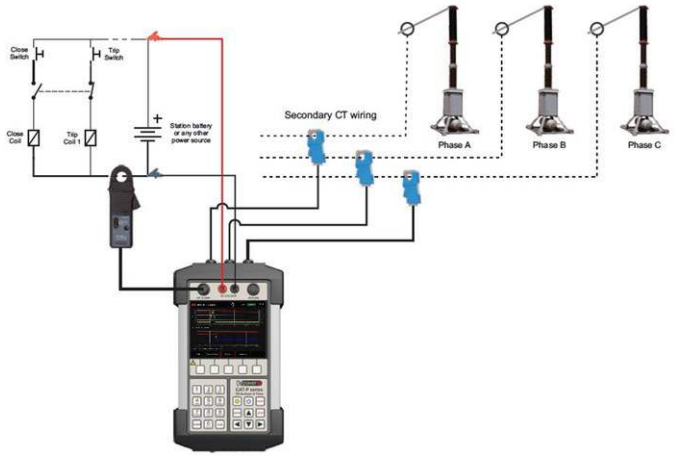
- 1 · AC current clamp inputs: AC current recording in online mode.
- 2 · DC current clamp input: coil current recording and measurement.
- 3 · DC voltage channel input: voltage measurement of an analog signal.
- 4 · Main contacts input (offline measurement): timing of the main and pre-insertion resistor contacts, and pre-insertion resistor resistance.
- 5 · 5.7-inch color touch screen.
- 6 · Soft keys: selection of settings and menus as an alternative to the touch screen.
- 7 · Alphanumeric keypad: breaker data, test data and control functions.
- 8 · Power indicator.
- 9 · Power ON/OFF button.
- 10 · 12 V DC, 5 A power supply, with 85-264 V AC (47-63 Hz) adapter.
- 11 · Flash drive: direct download of test results.
- 12 · USB port for PC communication.

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First trip test (online)



CAT-P connection to a live tank circuit breaker for online testing.

The first trip test shows the condition of the operating mechanism and how the circuit breaker would perform in a real fault. A breaker spends most of its life conducting current without operating; if it has been idle for a long time, latch friction may increase, and the coil current waveform of the first trip reveals it.

With the breaker in service, timing cables across the interrupter cannot be used. AC clamps, DC clamps and voltage sense cables are used instead:

- AC clamps measure the secondary current of each current transformer and indicate when the main current is interrupted, giving the main contact time.
- The DC clamp measures the coil current in the auxiliary circuit and allows analysis of the trip coil and the mechanism.
- Voltage sense cables measure the control voltage and show the condition of the DC battery and its wiring.

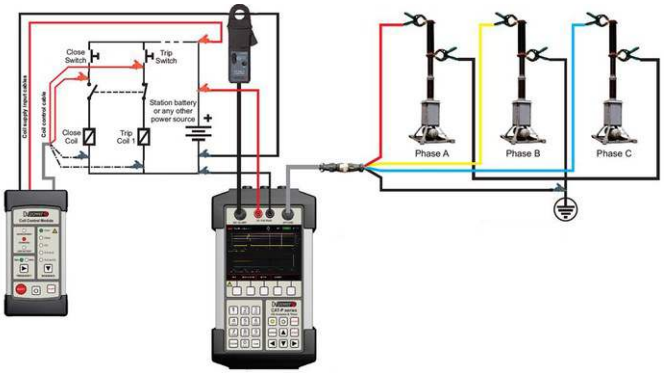
It is a fast test, of around 10 minutes, performed by a single operator with non-invasive connections while the installation is energized.

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Offline testing



CAT-P with the coil control module on a live tank circuit breaker (offline test).

In offline mode, the CAT-P measures main arcing contact timing with the circuit breaker isolated from the power grid, or at the factory or workshop. The breaker must be disconnected on both sides and grounded in accordance with safety regulations. Timing measurement fulfils the requirements of IEC 62271-100 and ANSI C37.09.

The external coil control module (optional, 0.6 kg) is used to operate the Trip and Close coils.

Applications

- Timing of up to 3 main contacts (1 break per phase), including pre-insertion resistors and auxiliary contact.
- Resistance of the pre-insertion resistors.
- Main contacts bounce time and pre-trigger time.
- Measurement and graphical display of coil currents.
- State of the substation battery or another analog signal.

PC software

- Download, viewing, editing, printing and exporting of records.
- Overlay of graphs and comparison with other circuit breaker analyzers of the same range.
- Two cursors, zoom and test sequence configuration.

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CAT-P — TECHNICAL DATA

Main contact inputs	3 (3 × 1), one per phase. Closed ≤ 10 Ω; pre-insertion resistor 10 Ω to 5 kΩ; open ≥ 5 kΩ. Open circuit voltage 20 V DC; short circuit current 50 mA
Time resolution	0.05 ms to 10 ms depending on test duration (sampling rate up to 20 kHz)
Time accuracy	0.05% of reading ± resolution
Operations	Close (C), Trip (O), Close-Trip (C-O), Trip-Close (O-C), Trip-Close-Trip (O-C-O) and First trip
DC current clamps	Nominal 300 A RMS or 450 A DC peak; ranges 30/300 A; DC to 20 kHz (−3 dB)
AC current clamps	0.05 A to 5 A RMS; accuracy ±3% ±1 mV (0.05-0.5 A), ±1.5% ±1 mV (0.5-1 A), ±1% (1-5 A)
DC voltage measurement	±300 V; typical accuracy ±0.5% of reading ±0.5% FS; guaranteed ±1% of reading ±1% FS
External power supply	12 V DC, 5 A; input 90-264 V AC, 50/60 Hz
Internal battery	Li-ion 2 × 3.7 V, 2900 mAh, user-replaceable; 8 h under normal use
Display	145 mm (5.7-inch) color touch screen; graphical and numerical results
Internal memory	Over 30,000 numerical and graphical test results
Standards	Safety: Directive 2014/35/EU, IEC EN 61010-1 (class I, pollution degree 2, installation category II); EMC: Directive 2014/30/EU, EN 61326-1; CAN/CSA-C22.2 No. 61010-1
Environmental conditions	Operating −10 °C to +55 °C; storage and transport −40 °C to +70 °C; humidity 0 to 95% non-condensing
Dimensions	CAT-P: 310 × 170 × 58 mm; coil control module: 228 × 115 × 53 mm
Weight	CAT-P: 1.4 kg; coil control module: 0.6 kg
Ingress protection	IP40
Warranty	3 years

Specifications valid at +25 °C with recommended accessories. Subject to change without notice.

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CAT-P — ACCESSORIES

Instrument with included accessories: CATP000-N-00 (CAT-P with PC software on USB stick, mini USB cable, touch pen, plastic transport case and mains cable with power adapter).

CMP-08-SETA1	Main contacts cable set 8 m with alligator clamps (A1) · standard
MC-CG-0302A1	Main contacts connection 3 × 1 m and ground cable 2 m with clamps (A1) · standard
S2-05-02BPBP	Voltage sense cable set 2 × 5 m, 2.5 mm² · standard
JCR-15-2REBP / JCB-15-2REBP	15 cm jumper cables with retractable-insulation banana plugs, red and black · standard
DOLPIN-CL-B0 / -R0	Dolphin clips, black and red · standard
CACL-0300-09	Current clamp 30/300 A powered from the instrument, with 5 m extension and adapter · standard
CACL-AC00-05	AC current clamp 1 A / 1 V with 5 m cable (3 units) · standard
PLAST-CAS-00	Plastic case for accessories · standard
COCON-MOD-00	Coil control module · optional
CO-05-00C5B1 / CO-10-00C5B1	Coil control cable 5 or 10 m with banana plugs · optional
C2-05-02BPBP / C2-10-02BPBP	Coil supply cable set 2 × 5 m or 2 × 10 m, 2.5 mm² · optional
CACL-0100-00 / CACL-ACE-N10	Current clamp 10/100 A with internal battery, 5 m extension and adapter; 5 m extension for the 1 A / 1 V AC clamp · optional
S2-02-02BPBP / S2-10-02BPBP	Voltage sense cables 2 × 2 m or 2 × 10 m · optional
TESTPR-GJ-B0 / -R0 / TESTPR-SC-B0 / -R0	Test probes with grip jaws, black and red; Test probes with split test clamps, black and red · optional
CMP-10-SETA1 / CMP-08-SETA2 / CMP-10-SETA2	Contact cable sets 8 or 10 m with A1 or A2 clamps · optional
CMP-08-SETST / CMP-10-SETST	Contact cable sets 8 or 10 m with SCT clamps · optional
CMPA-03-SET0 / CMPA-05-SET0	Contact cable set adapter, 3 or 5 m · optional
MC-CG-0302A2 / MC-CG-0302ST	Contacts connection 3 × 1 m and ground 2 m with A2 or SCT clamps · optional
LION-BAT-001 / FIR-RTBBAG-0	Li-ion battery 7.4 V 2900 mAh in fire-retardant bag / fire-retardant bag · optional
RSTCH-PEN-00 / HARD-CASE-PP / CABLE-BAG-00	Touch pen / plastic transport case for CAT-P; Cable bag · optional
PWR-ADP5A-EU / -NA / -UK / -AU	Mains cable with 12 V / 5 A power adapter (EU, North America, UK, Australia) · optional

Cables are available in other lengths and terminations on request.

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