

Coil Analyzers

SAT40A II series

- Lightweight – only 11 kg / 24.3 lbs
- Powerful AC & DC motor outputs – up to 40 A
- Separate opening and closing coil outputs:
10 V – 300 V DC, 10 V – 250 V AC
- Coil current and resistance measurement
- Minimum trip voltage test (fully automatic)
- Temperature sensor input
- DV Win software



Description

The Coil Analyzer SAT40A II series is a powerful tool for testing circuit breakers where a substation battery is not available. It is unique device in the market due to its dual purpose:

- It can be used as a stable power supply for coils and spring-charging motors (both DC and AC power supply voltage) during commissioning and maintenance testing.
- It is powerful analysis tool for assessing conditions of circuit breaker auxiliary circuit and coils.

The Coil Analyzer SAT40A II series has separate DC and AC coil outputs for power supply of opening and closing coils. The output voltage is selectable in the ranges from 10 V to 300 V DC or from 10 V to 250 V AC. The Coils outputs can withstand up to 15 A current.

The DC and AC motor outputs can generate from 10 V to 300 V DC and 250 V AC voltage. The motor outputs can withstand starting (inrush) currents up to 40 A. These outputs can also be used as continuous power supply outputs.

The SAT40A II series is equipped with thermal and overcurrent protection. Thanks to a proprietary hardware and software design solution, it is capable to decrease influence of electrostatic and electromagnetic interference in HV electric fields.

Communication between the SAT and a PC is through an USB (as standard) or an RS232 cable (as an option). Bluetooth communication interface is also available as an option. The SAT40A II series instrument can store internally up to 100 measurements. All measurements are time and date stamped.

The SAT40A II series is easy to use and has accessory cable-set with touch-proof contacts. It can work as a standalone, as well as PC controlled unit (DV-Win software). The software enables use of SAT and CAT Circuit Breaker Analyzers & Timers as one test system (control and reporting done with the same software).

The SAT40A II series can be used as a power supply unit with other vendor's circuit breaker timers & analyzers also.

Applications

The Coil Analyzer SAT40A II series is primarily designed for LV, MV and HV circuit breakers testing during manufacturing, commissioning and maintenance stages.

The testing process may encompass any or all of the following:

- Power supply for coils and motor while testing with circuit breaker analyzers from different vendors:
 - AC/DC power supply for circuit breaker breaking and closing coils actuation
 - AC/DC voltage for supplying the spring-charging motors
- Full range testing of circuit breakers with CAT & SAT test system (joint software for test preparation, control and reporting).
- Coils resistance measurement as per IEC 62271-100
- Coils current value measurement
- Minimum trip voltage-test of the circuit breaker's coils (IEC 56, ANSI C37.09).
- Motor current and operating mechanism charging time (IEC 62271-100)
- Temperature rise test of the auxiliary and control equipment

Coil Analyzer SAT40A II series can be used in factories and laboratories, but also in high induction switchyards, power and industrial environments.

The motor outputs on SAT can also be used as a general power supply unit or a temporary battery charger.

Using SAT as a power supply for coils and motor during switchgears testing

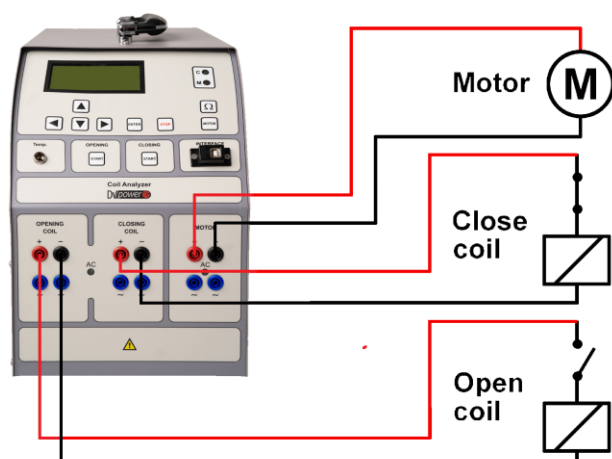
Coil Analyzer SAT40A II series can be used as a stable power supply for coils and spring-charging motors (both DC and AC power supply voltage) during switchgears and circuit breakers testing. This application is significant in all situation when substation battery is not available.

SAT enables testing in under-voltage and over-voltage conditions, which is often required during circuit breaker testing. In addition, stable outputs enable analysis of the coil current graphs recorded with circuit breaker analyzers.

SAT coil outputs are not intended for continuous voltage generating. SAT's motor outputs capabilities are presented in the table below:

Mains Voltage	Motor Output Load Voltage	Max Current	Max Load Interval
230 V	110 V DC	30 A 24 A 15 A	30 s 110 s Continuous
	220 V DC	16 A 14 A 8 A	30 s 110 s Continuous
	110 V AC	20 A 14 A 11 A	30 s 110 s Continuous
	220 V AC	13 A 10 A 8 A	30 s 110 s Continuous
115 V	48 V DC	30 A 24 A 15 A	30 s 110 s Continuous
	110 V DC	18 A 15 A 12 A	30 s 110 s Continuous
	220 V DC	9 A 8 A 6 A	30 s 110 s Continuous
	110 V AC	15 A 12 A 10 A	30 s 110 s Continuous
	220 V AC	10 A 7 A 5 A	30 s 110 s Continuous

Connecting SAT device to a test object



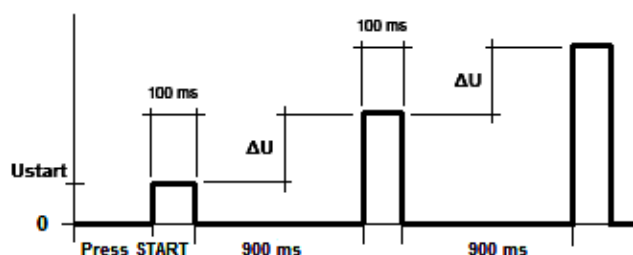
Coil resistance measurement

The experience from field tests shows that a measurement of the circuit breaker coil resistance is a very important task for circuit breaker condition monitoring. Availability of this feature makes the Coil Analyzer SAT40A II series one of the most versatile and useful devices in the market.

Lower than specified resistance may indicate a short circuit condition between the coil turns due to damaged or burned insulation. The higher resistance value indicates damaged wire of the coil winding due to overheating, contact corrosion, or other reasons.

Minimum trip voltage

To ensure that a circuit breaker operation is guaranteed under the most severe conditions placed upon the substation tripping supply, the circuit breaker trip coils are required to work with a minimum tripping voltage much below the nominal battery voltage. The SAT series have built-in capability to perform automatic test of minimum trip voltage according to international standards (IEC 62271-100, ANSI C37.09 etc.)



Benefits and features

The main benefits and features of SAT devices are listed below:

- Dual purpose device for circuit breaker testing:
 - As a stable power supply for coils and spring-charging motors
 - As coils and auxiliary circuit analyzer
- Lightweight and portable (2x lighter from competitor devices). SAT40A II series have the best output power vs. weight ratio in market.
- The DC output voltage is filtered and has a ripple of less than 1 %. This enables analysis of the coil current graphs recorded with circuit breaker analyzers.
- Separate outputs for open & close coils (2 x DC and 2 x AC coil outputs available)
- Separate DC and AC motor outputs available (AC motor output is unique feature in the market. It can withstand up to 40 A inrush current).
- Compatible with circuit breaker analyzers from different vendors.
- Enables testing in under-voltage and over-voltage conditions when used as a power supply unit for testing with circuit breaker analyzers.
- Coil resistance measurement in accordance to IEC 62271-1
- One test system with DV Power's Circuit Breaker Analyzers & Timers CAT devices (joint software for test preparation, control and reporting).

DV-Win software

DV-Win software provides acquisition and analysis of the test results, as well as control of all the SAT functions from a PC. The DV-Win also provides several advanced features as a supplement to multiple functions of SAT devices. When working with CAT Circuit Breaker Analyzers & Timers, DV-Win software is used as a joint software, enabling test control and report generating for both devices, as it is one test system.

DV-Win Main Features

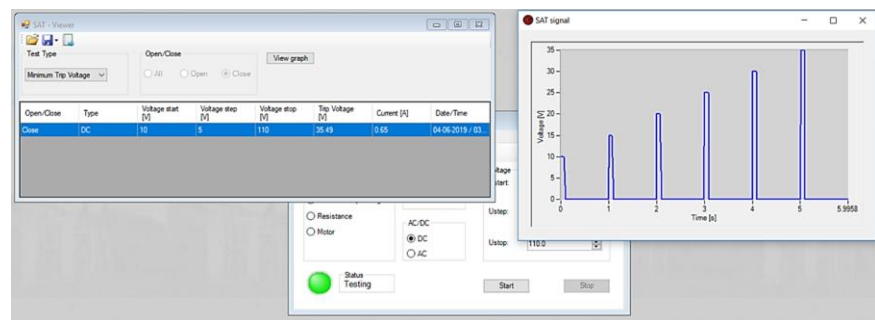
- Full control of the device in test
- Test reports available in several formats
- Several filters for results download to PC
- Test plans
- Working with CAT device as one test system

Minimum trip voltage test is upgraded with a voltage vs. time graph. After performed measurements results can be saved in a various formats and test report can be generated and saved or printed. Result can also be downloaded from the device to the PC by use of several different search filters.

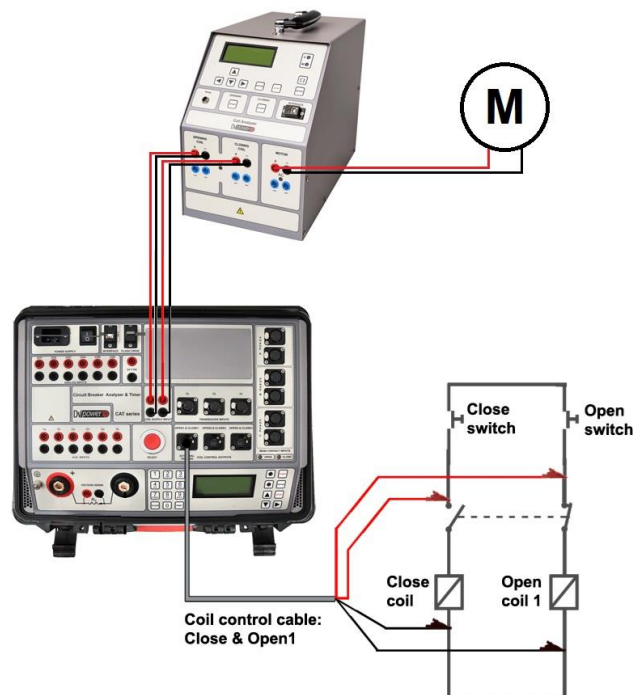
Test plan report

GENERAL DATA

Circuit breaker data		Location data	
Manufacturer	ASEA	Test plan name	ASEA_test_ALG1250_Lidingo,
Model	ALG 1250	Test purpose	
Operating mechanism	spring-charged	Sequence	O
Breaker type	air	Company name	DV Power
Breaks per phase	1	Operator	
Voltage level	600 V	Supervisor	
Serial number	09873456	Date and time	8/21/2015 12:57:24 PM
Breaker ID	74185	Device	CAT66
Circuit breaker location		Environment conditions	
Station name	Lidingo	Temperature	
	Stockholm	Humidity	



SAT and CAT devices as one test system



Technical Data

Mains Power Supply

- Connection: according to IEC/EN60320-1; UL498, CSA 22.2
- Voltage 90 V – 264 V AC, 50/60 Hz, Single phase
- Power consumption: 4000 VA

Output data

- Coils output DC Voltage 10 V to 300 V DC
- Coils output AC Voltage 10 V to 250 V AC; 50 Hz; true RMS
- Motor output DC and AC Voltage 10 V to 250 V DC/AC
- Output current: max 40 A (motor output)

Measurement

- Voltage: 10 V – 300 V DC or 10 V – 250 V AC
- Current: 1 A – 50 A
- Accuracy: $\pm (0,25\% \text{ rdg} + 0,25\% \text{ FS})$

Coil resistance measurement

- Measuring range / Resolution
1 Ω - 99,9 Ω / 0,1 Ω
100 Ω – 999 Ω / 1 Ω
- Typical accuracy: $\pm (0,5\% \text{ rdg.} + 0,5 \text{ F.S.})$

Interface

- SAT40A II series is equipped with an USB port
- optional: RS232 (connection to an external computer)
- optional: Bluetooth communication interface

Test Result Storage

- SAT40A II series can store up to 100 measurements

Environment conditions

- Operating temperature:
–10°C - +55°C / 14°F – 131°F
- Storage and transportation
–40°C - +70°C / -40°F – 158°F
- Humidity Maximum relative humidity 95%, non-condensing

Dimensions and Weight

- Dimensions (W x H x D) with handle down
216 mm x 380 mm x 396 mm
8.5 in x 14.9 in x 15.59 in
- Weight 11 kg / 24.3 lbs

Mechanical protection

- IP50

Warranty

- 3 years

Applicable Standards

- Low Voltage Directive:
Directive 2014/35/EU (CE conform).
- Applicable standards, for a class I instrument, pollution degree 2,
Installation category II: IEC EN 61010-1

All specifications herein are valid at ambient temperature of + 25 °C and recommended accessories. Specifications are subject to change without notice.

Accessories



Transport case

Cable set 6 x 2 m with banana plugs

Cable bag

Order info

Instrument	Art. No.
Coil Analyzer SAT40A II series	SAT40AX-NX-1

Included set of accessories
DV-Win software
Mains power cable (EU 16 A / NA 20 A / UK 16A /AU 16 A plugs)
Ground cable
USB cable
Transport case

Recommended set of accessories	Art. No.
Cable set 6 x 2 m 2,5 mm ²	C6-02-02BPBP

Optional accessories	Art. No.
Cable set 6 x 5 m 2,5 mm ² with banana plugs	C6-05-02BPBP
Cable set 2 x 2 m 2,5 mm ² with banana plugs	C2-02-02BPBP
Cable set 2 x 5 m 2,5 mm ² with banana plugs	C2-05-02BPBP
Temperature sensor 1 x 50 mm + 5 m cables	TEMP1-050-05
Temperature sensor 1 x 50 mm + 10 m cables	TEMP1-050-10
Bluetooth communication module	BLUET-MOD-00
Device bag	DEVIC-BAG-00
Cable bag	CABLE-BAG-00
Cable plastic case - small size	CABLE-CAS-01

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