SWITCH ANALYZER SA5

For Medium Voltage Breakers

www.elcon.se

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SA5

The SA5 unit is fully utilised when connected to a notebook PC, however the fundamental test can be performed and printed in stand-alone mode.

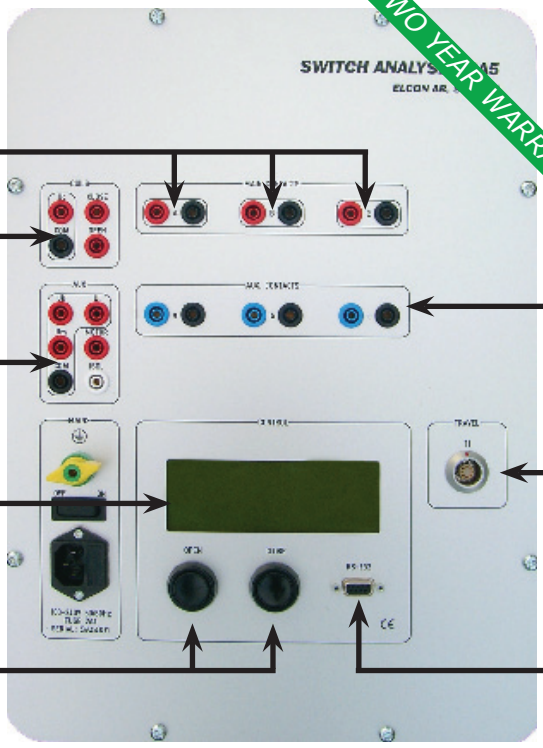
Advantages with the notebook solution are many, versatility, easy to customize and simplicity. Just carry the notebook computer to your office and set up tests, analyse test results, print test reports etc.

Together with the BTS11 software, a notebook computer and a printer this is the most reliable, capable, accurate and easy to use circuit breaker field test equipment available on the market.

Experienced engineers and service personnel have used our breaker analyzers for many years in some of the worlds toughest environments and it is well established on the world market.

Some SA5 features:

- **Built in a small metal carrying case. All necessary cables and accessories will fit in the lid.**
- **Fully compatible with our factory line test equipment.**
- **No panel switches, just two push buttons Open and Close.**
- **Supports both digital and analogue transducers.**
- **Weighs only 8,6 kg/17,6 lbs.**
- **Automatic measurement of coil and motor current/voltage.**
- **Built in printer option for operation with out PC.**



Contact inputs.
One input per/phase.

Coil inputs.
Automatic measurement of coil voltage and coil currents.

Motor and auxiliary inputs.
Automatic measurement of motor voltage and motor currents.

Display.
Shows contact timing, Coil and Motor voltage/current.

Operation buttons.
Used to perform tests in stand-alone mode.

Auxiliary contact inputs
Up to three auxiliary contacts. Can also be used as main contact inputs.

Transducer Input.
Used for analogue and/or digital transducers.

PC Communication.
Standard serial RS232 communication. Bluetooth option also available.

Plug and play.
The panel and the functions of the SA5 are circuit breaker function oriented specially adapted to easily perform your tests on the circuit breaker.

ELCON INTERNATIONAL

"Your No.1 Partner in Breaker Test Equipment"

Contact Timing.

Three contact input modules of SA5 are designated to be used as main contact channels, and three are designated for auxiliary contact use. It is possible however by using BTS11, to dedicate any of the six channels to handle either.

Number of main contact timing channels: **3(6)**
Number of auxiliary contact channels: **3**
(The aux inputs can also be used as main contact inputs)

Motion Measurements.

The SA5 supports both analogue and digital transducers. A wide range of transducer fastenings can also be supplied. Elcon International is the official world wide supplier of transducer fastenings for ABB-Breakers.

Number of digital transducer inputs: **1**
Number of analogue transducer inputs: **1**

Coils and Motor.

Automatic measuring of circuit breaker coil and motor current/voltage. Together with an adjustable power unit it is very easy to perform minimum function voltage test on the coils.
The SA10 uses **1** analogue channel to measure coil voltage and current and **1** channel to measure motor voltage and current.
For the coil 30 A AC/DC is possible for continuous measurement, and for the motor 50A AC/DC. However if necessary higher currents will pass for shorter periods.

Analog inputs.

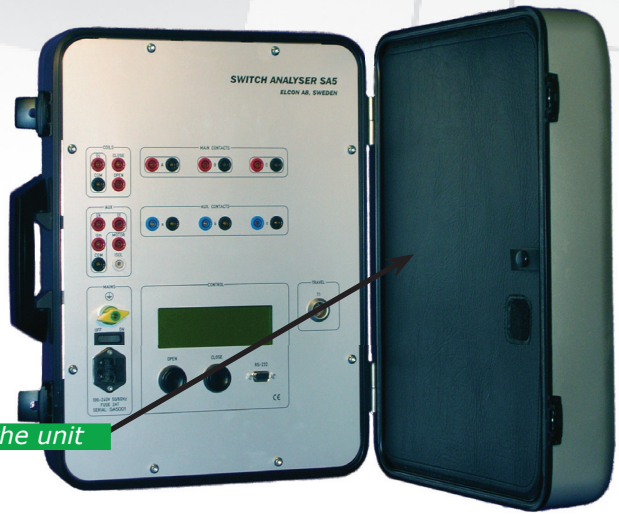
All in all the SA5 has **9** analogue inputs, however since our intension is to provide you with a test equipment that is user friendly and circuit breaker oriented they have been preset to handle specific relevant functions such as coil and motor voltages, currents, analog motion transducers etc.
It is of course possible to set most of the inputs to handle other types of related input signals, such as pressure sensors or temprature sensors or any other type of analogue signal that may be relevant.

Communication.

Standard RS232 communication is default. However, in order to comply with safety regulations a bluetooth communication kit is available which allows the user to take his laptop computer and move up to 100m(328ft) away from the test-object.

Printing

The use of a notebook PC and printers are recomended. However as an option we supply the SA5 with a built in printer for basic results printouts.



All cables and accessories is placed in the lid of the unit

Further functionality

The SA5 is intended to be used together with medium Voltage breakers or if you only wish to perform basic testing on High Voltage breakers. Should you have increased testing requirements we recommend our Field test equipment **SA10.**
Additional features that you get with the SA10:
- Built in static and dynamic resistance measurement capability.
- Two additional digital transducer inputs.
- Two additional analogue transducer inputs.
- 12 contact timing channels specially designed to withstand high induction environments.
- 12 channels to measure pre-insertion resistors.
- 3 additional auxiliary contact channels.
- Possibility to perform Full analysis on breakers with Switch synchronisation relays(switch control).
- Possibility to perform "First Trip" analysis.

Order Information

SA5 Travel & Timing Kit. **S008**

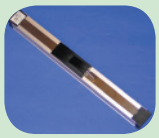
This SA5 kit includes everything you need to perform standard testing on a circuit breaker including motion with digital transducer.

S006	**SA5 unit and Software, Connection accessories kit, Mains cable, Communication cable**
S108-B	**Rotary digital transducer RSI503 2500ppr.**
S205, 3m	**Cable for digital transducer.**
S203, 3m	**Cable for motor 3m**
S204, 3m	**Cable for coils 3m**
S208-B, 3m	**Contact timing cable 3m**
S210	**Grounding cable 3m**
S208, 3m	**Cable for main contact 3m**

SA5 Unit & Kits	Includes		Art No.
SA5 unit	SA5 unit and software BTS11, Connection accessories, Mains cable, communication cable.		**S006**
SA5 Travel & Timing kit	S006, S108-B, S205 3m, S203 3m, S204 3m, S208-B 3m, S210 3m, S208 3m		**S008**
SA5 Timing kit	S006, S203 3m, S204 3m, S208-B 3m, S210 3m, S208 3m		**S007**

Training.

Basic training course. Handles basic software operation and "hands-on" hardware training. SA5/SA10 Certification level 1 is granted after completion of this training course.		**S701**
Advanced training course. Involves more advanced system parameters and in depth breaker testing. SA5/SA10 Certification level 2 is granted after completion of this training course. The user will get the SA10 licence-card.		**S702**

Accessories.		Art No.
Bluetooth communication. The bluetooth comunication kit allows the user to move up 100 meters(328ft) away from the test object and excecute operations comfortable and safe.		**S122**
Transducers and fastenings.		
Digital rotary transducer. This rotary digital transducer allows for very accurate motion testing. Type RSI503 2500ppr.		**S108-B**
Analogue linear transducer. TLH225 mm		**S110**
Universal transducer fastening kit. Use this universal kit to fasten your linear or rotary transducer to the breaker. Can also be used for other various type of breakes. Comes with a practical carrying case.		**S118**
Fastening for AHMA Use this universal kit to fasten your linear transducer to the breaker. Comes with a practical carrying case.		**S119-17**
HPL A/B (ABB). A variety of designated transducer fastenings for the rotary transducer S108-A can be provided for specific breaker types. This bracket is for HPL A/B.		**S119-1**
POB30AD. AC/DC Power supply for coils and motor. Generates up to 35A DC. Weighs only 8kg.		**S141**

Cables.	Art No.	Cables.	Art No.
Mains cable.	**S201**	Cable for digital transducer.	**S205**
Communication cable (RS232).	**S202**	Cable for Analogue transd.	**S206**
Cable for motor supply and measurement.	**S203**	Contact timing cable	**S208-B**
Cable for coils	**S204**	Grounding cable	**S210**

Visit our web page www.elcon.se for complete product range, or contact your local reseller:

System software BTS11

Test program BTS11
For complete testing of the circuit breakers, the analyzing software BTS11 is used. The software is **free** and delivered together with the SA5. This software is used for Elcons field test equipments as well as factory end test equipments. Data between the two different systems can easily be imported/exported. All updates are free and are distributed from our web page.

To test circuit breakers in general, is to operate the breaker and check the contact timing. However in factory testing and at field service some other tests are necessary. For field testing these other tests can also be very useful in diagnostics purpose.
Common operation tests, can be done, with result timing diagrams for up to three phases and one travel curve, up to six contact curves and a common coil current curve. All common tests are performed and evaluated according to established industrial standard. A spring tension motor test, with current timing diagram is also Included.

One of the main intentions with our software is to allow any level of user to be able to test the circuit breaker. This is done by creating a database of your breaker types and allowing the user to just choose his breaker from that database and by doing that everything(test plan, test reports, parameters etc.) is automatically adjusted to comply with that test. **Let's keep it simple**

Some BTS11 features:

- Simple operating control function for all possible tests.

- Quick test. No settings needed.

- Possibility to perform automatic test sequences.

- Test guides for new tests and test objects.
Curve analyzing window with many possibilities and tools.

- Data analyzing function with limit supervision and possibilities to do comparison with a previous test. (reference characteristics IEC62271-100).

- Possibility to customize any operation in order to adapt the software to any type of breaker.

- Statistics analyzing.

- SQL or Access database with several users and user-levels.

- Import and export test data.

- Automatic unit conversion. *(ex: kg to lb or mm to inches)*

- Test against function values (measurement limits).

- Easily set up your own test profile

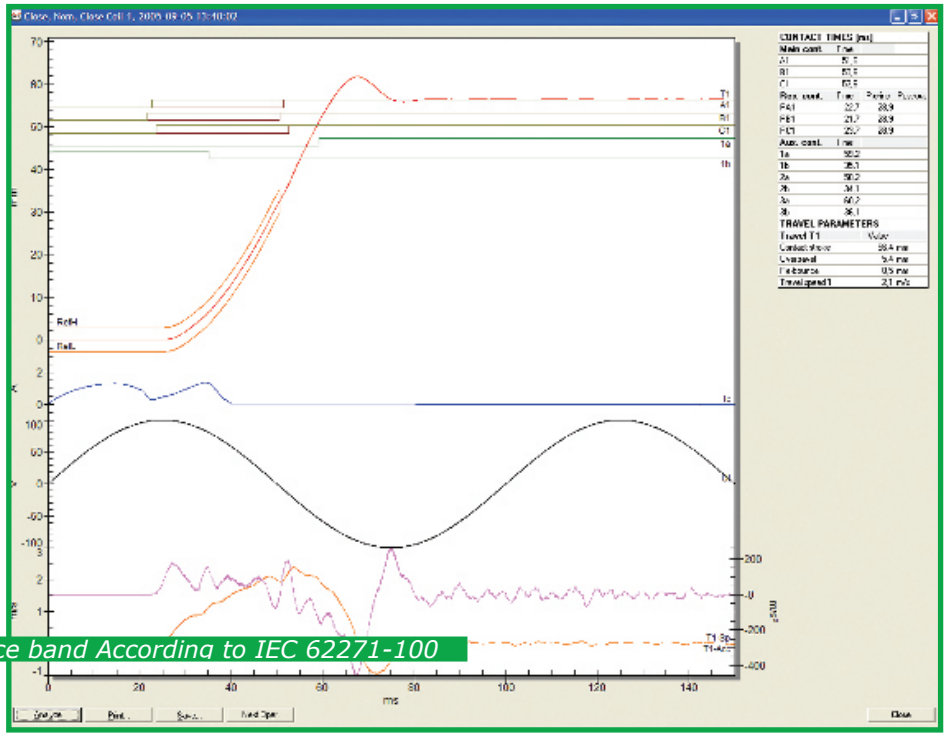
- Attach pictures or reference documents to assist the user.

- Software available in English, German, Portuguese, French and Swedish.

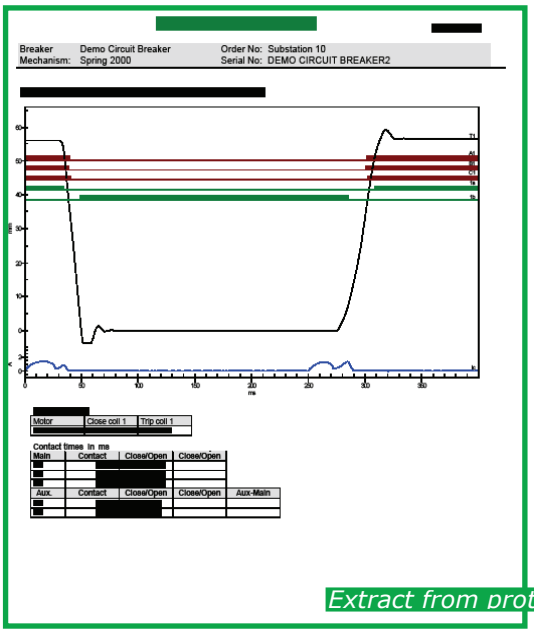
Example of operations

- **Close**
- **Open**
- **O-C, C-O, O-C-O**
- **Any combination of O and C**
- **Min function coil voltage**
- **Spring charge**(motor curent)
- **Slip coupling**
- **Damping curve**
- **Test of Disconnectors**
- **User customized operations**

(ex: for long mid- voltage CB sequences)



Close Operation ex. with reference band According to IEC 62271-100



Extract from protocol

Other testing possibilities and features

- Test one mechanism and up to six contact elements.
- Set up your own test sequence
- Define the trig conditions. Contact, coil, travel or analogue trig.
- Choose sampling rate. Up to 50 kHz.
- Use digital or analogue transducers.
- Complete curve customizability. Colour, visibility, filled or regular, scale etc.
- Easy functions/guides for calibration.
- Speed and acceleration curves.
- Define any number of Speed, Distance or Time measurements.

Test reports

- Create your own test report templates using the dynamics that MS word provides. Multi lingual.
- Extensive protocol functions to meet any customers demands.
- Digital signing options.
- Automatic compressing and preparing protocols for email or web-publishing.
- Built in pdf support.

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Hardware specification SA5 unit

Number of contact timing channels:	6
Closed aux. contact current with internal source:	1 mA
External source contact voltage:	+15 - +400 VDC
Reaction time, any timing channel:	< 20 microsek
Input connectors, any timing channel:	Touch-protected jacks
Protection level, any timing channel:	3
Operating coil source inputs (Uc, COM):	1
Source voltage measuring range DC:	0 – 300 V ±1% or ±1 V
Source voltage measuring range AC:	0 – 300 V ±2% or ±2 V
Number of operating coil outputs (OPEN, CLOSE):	2
Coil current measure range DC:	0 – 30 A ±1% or ±0,1 A
Coil current measure range AC:	0 – 30 A ±2% or ±0,2 A
Coil trig reaction time:	< 20 micrsek
Internal current limit:	30 A
Protection level 1 (external connections and case)	
ESD resistance:	IEC 1000-4-2 L4
Radiated electromagn. field res. (27-1000 MHz):	IEC 1000-4-3 L3
Burst resistance:	IEC 1000-4-4
Pulse resistance:	IEC 1000-4-5
Protection level 2 (full isolation)	
Protection according to:	level 1
Allowed between contact point(s) and earth:	≤±400 VDC, 285 VAC
Protection level 3 (full isolation, full protection)	
Protection according to:	level 2
Allowed between any ind. level 3 contact point:	≤ ±400 VDC, 285 VAC
Number transducer inputs:	2
Digital input receiver type:	RS422
Analogue input measuring range:	0 – 5 V
Analogue input impedance:	200 kohm 30pF
Analogue transducer minimum resistance:	100 ohm
Power supply, both:	5 V, 100 mA
Input connectors, transducer channels:	LEMO Series 2K, 8 p
Protection level any transducer input:	2

Number of aux inputs (Uk, Ul, Um, COM):	3
Input voltage measure range DC:	0 – 300 V ±1% or ±1 V
Input voltage measure range AC:	0 – 300 V ±2% or ±2 V
Input impedance:	1 Mohm 30pF
Number of outputs (MOTOR supplied from Um):	1
Motor current measure range DC:	0 – 50 A ±1% or ±0,1 A
Motor current measure range AC:	0 – 50 A ±2% or ±0,2 A
Input conns, coil and auxiliary inputs/outputs:	Touch-protected jacks
Prot level coil and auxiliary inputs/outputs:	3
Serial communication interface type:	RS232
Serial communication baud rate:	115 kbps
Serial communication connector type:	9 pole female D-sub
Protection level serial communication :	2
Power supply input AC voltage:	85 – 265 V, 50 – 60 Hz
Power supply input DC voltage:	100 – 375 V
Power requirement:	< 50 VA
Main fuse:	2 At
Input connector type:	IEC320
Protection level power input pins:	3
Internal sampling rate(adjustable):	10Hz - 50 kHz
Max sampling time example 1:	at 100Hz 211Sek
Sampling time example 2:	at 50kHz 400ms
Ambient operating temperature range:	-20° - +50° C
Ambient storage temperature range:	-40° - +70° C
Ambient relative humidity (non-condensing):	0% - 97%
Dimensions:	458x331x153 mm (18”x13”x6”)
Weight:	8,6 kg

Acknowledgements: SA5 fulfils the European conformity requirements in (Electromagnetic Compatibility) EMC Direc tive89/336/EEG, 92/31/EEG & the Low Voltage Directive 73/23/EEG and 93/68/EEG including amendments by the CE-marking Directive 93/68/EEG, and is CE-marked.

SA5 & SA10 series is today the only field test equipment, in the market, that can perform circuit breaker analysis accepted by ABB Switchgear.

Warranty: Two years

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Publication SA5_leaflet_rev2 2008-01.