SA100R

dynamic
travel+

Switchgear Analyser

Breaker Testing

Switchgear Analyser

Introduction

Weis is a specialist company with over 40 years of experience in the commissioning, testing & maintenance of switchgear and power network fault monitoring within the Power Utility Industry.

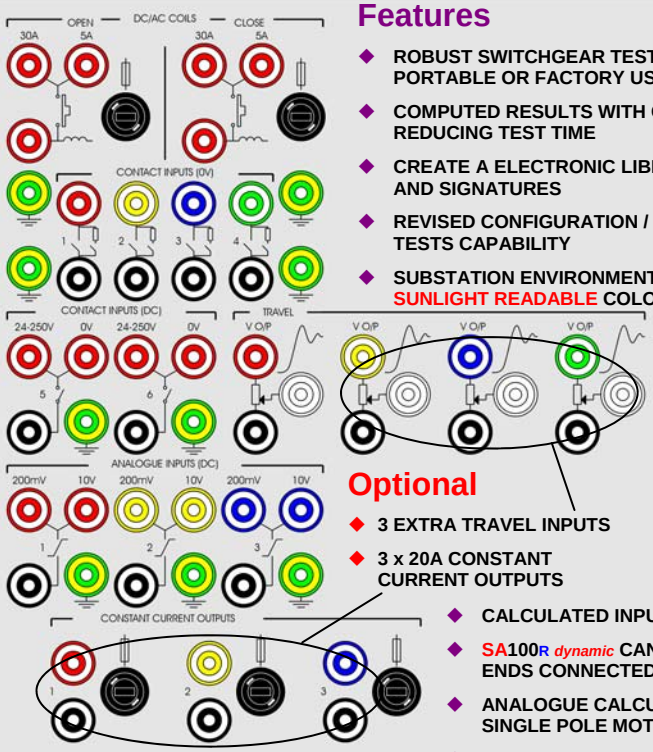
Based on advanced features of its successful SA100 Switchgear Analyser, Weis has enhanced the Reduced version, SA100R, of its robust switchgear test set for performance analysis on high, medium and low voltage circuit breakers with the options ...

SA100R : Standard version.
SA100R *dynamic* : Dynamic Timing of up to 1 break per phase with 3 x 20A constant current outputs.
SA100R *travel+* : 3 additional Travel channels.

Possible test results which can be computed per phase for each breaker operation include:-
Peak Coil Current, Current Pulse Length, Operate Times (Main / Resistive), Operate Time Spread (Main / Resistive), On Time, Dead Time, Contact Separation, Datum Velocity, Velocity at Contact Touch, Stroke, Contact Length (Main / Resistive), Spring Compression on Vacuum Contacts, Travel Overshoot, Rebound, Bounce Time, Mechanism Times (Pre Latch / Latch Period), Acceleration and Fingerprint Comparison on all channels (Grey Zone Checking).

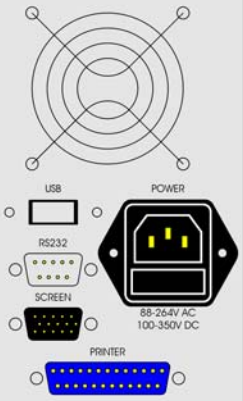
OPTIONAL ITEMS

Cable Sets - A range of standard cable sets & special made cable sets are available on request.
Transducers - A full range of transducers and universal mounting arms are available on request.
Transportation Cases - Robust purpose made transportation cases are available for the complete range of products.



Features

- ROBUST SWITCHGEAR TEST AND ANALYSIS SYSTEM FOR PORTABLE OR FACTORY USE
- COMPUTED RESULTS WITH CUSTOM REPORT FORMAT FEATURE REDUCING TEST TIME
- CREATE A ELECTRONIC LIBRARY OF BREAKER TEST SETTINGS AND SIGNATURES
- REVISED CONFIGURATION / RECALCULATION ON PREVIOUS TESTS CAPABILITY
- SUBSTATION ENVIRONMENT PROVEN WITH A 12.1" HIGH-BRIGHT SUNLIGHT READABLE COLOUR TFT DISPLAY
- INDENPENDENT CONTROL OF TRIP AND CLOSE AC OR DC COILS
- SOFTWARE *WIZARD* TO SIMPLIFY TEST CONFIGURATION
- 6 ANALOGUE INPUTS FOR:
  1 x DUAL RANGE (5 / 30A) TRIP & CLOSE COIL CURRENT
  1 OR OPTIONALLY 4 x TRAVEL , 3 x USER CONFIGURABLE
- 10 DIGITAL INPUTS FOR:
  TIMING OF UP TO 4 MAIN AND 4 RESISTIVE CONTACTS
  2 x TIMING CONTACTS (24-250V DC or 0V)



Optional

- 3 EXTRA TRAVEL INPUTS
- 3 x 20A CONSTANT CURRENT OUTPUTS
- CALCULATED INPUTS FOR: *VELOCITY AND ACCELERATION FROM TRAVEL INPUT*
- SA100R *dynamic* CAN DYNAMICALLY TEST ONE BREAK PER PHASE WITH BOTH ENDS CONNECTED TO EARTH
- ANALOGUE CALCULATIONS PERFORMED ACROSS ALL THREE PHASES AGAINST SINGLE POLE MOTION / TRAVEL SENSING
- MEASUREMENT OF PARALLEL CONTACT (P.I.R.) SWITCHING RESISTORS

Data Management

Breaker Test & Analysis software is an essential 32-bit Windows™ database program that provides an easy to use operator interface for configuring & displaying the SA100R test results in graphical and text report formats.

Features:-

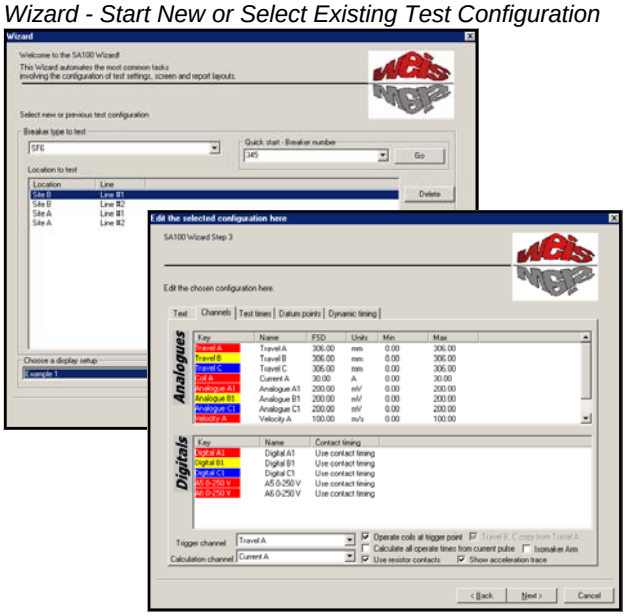
- Operator interface for Regular (via Wizard) or Advanced users
- Results automatically computed with feature to recalculate on configuration change of any existing test record
- Graphical display of captured waveforms with measurement cursors
- Standard or user defined report format
- Archiving of all tests and configurations
- Fingerprint comparison on all channels (grey zone checking)

BTA software runs on a standard IBM compatible PC with a 32-bit Windows™ operating system. This permits the transportation of test records to a regular office based or portable computer.

The display and printing of a report can be fully customised to include logo's, in-house styles, text phrases and results format, thus eliminated the need to manually complete a written form in most cases.

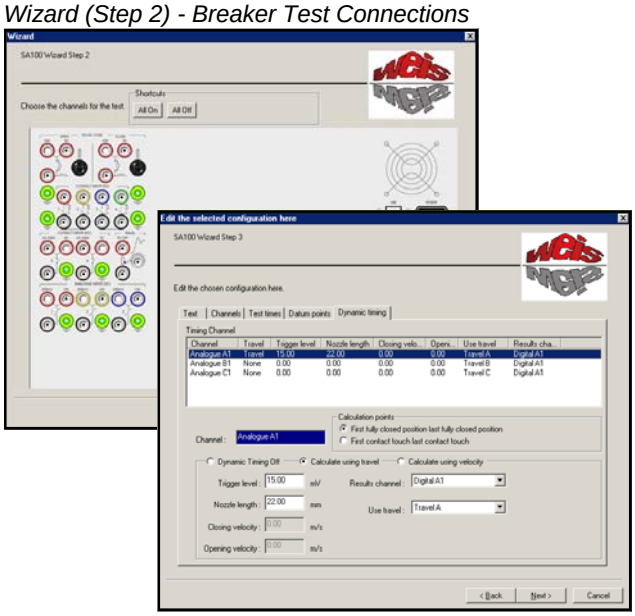
SA100R

Wizard - Start New or Select Existing Test Configuration



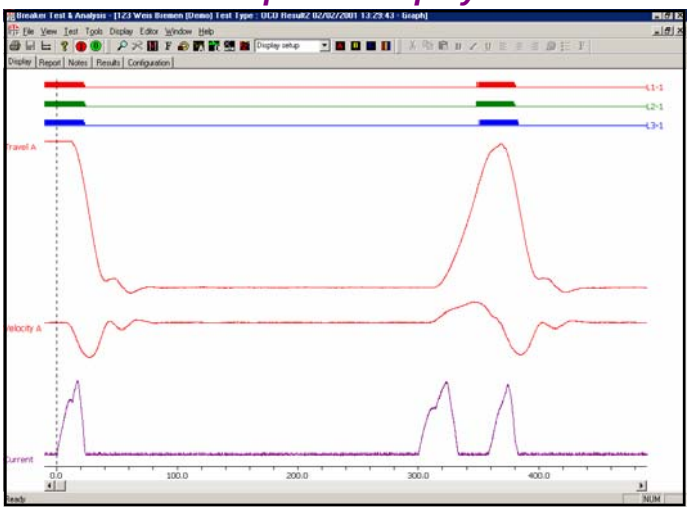
Wizard (Step 3) - Channel Settings

Wizard (Step 2) - Breaker Test Connections



Wizard (Step 3) - Dynamic Test Settings

Graphical Display



Graphical Features

Zoom - Time Base
Zoom - Amplitude
Cursors - Measured Value & Time
Colours - Traces & Background
Font - Text Style & Size
Print - Screen as Displayed
Add Calculated Channels
Combine Test Records - Overlay Traces
Select Pre-defined Display Setups

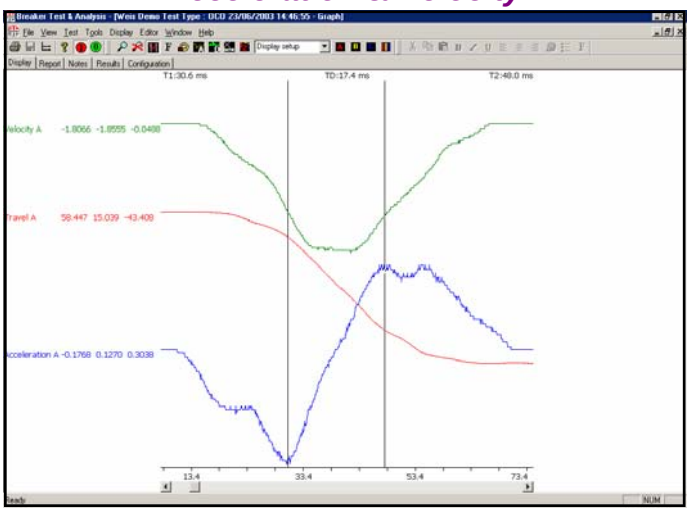
Advanced Analysis

Acceleration Trace Computed from Travel
Velocity Trace computed from Travel
All Graphical View Features Supported

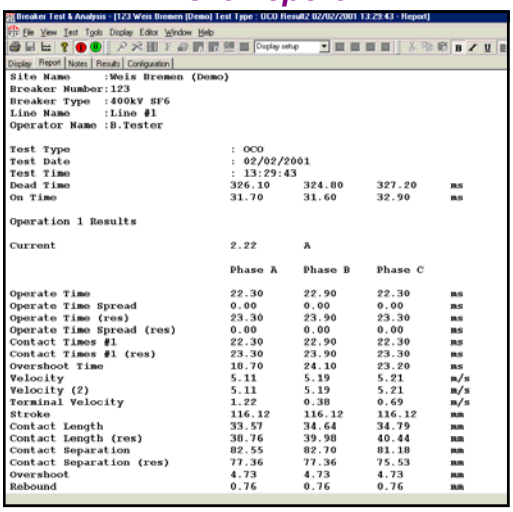
Report Features

Customise which Results are shown
Edit Headings
Change Font - Text Style, Size & Colour
Select Pre-defined Report Setups

Acceleration & Velocity



Text Report



Site Name :Weis Bremen (Demo)
Breaker Number:123
Breaker Type :400kV SF6
Line Name :Line #1
Operator Name :B.Tester

Test Type	: OCO		
Test Date	: 02/02/2001		
Test Time	: 13:29:43		
Dead Time	326.10	324.80	327.20 ms
On Time	31.70	31.60	32.90 ms
Operation 1 Results			
Current	2.22	A	
	Phase A	Phase B	Phase C
Operate Time	22.30	22.90	22.30 ms
Operate Time Spread	0.00	0.00	0.00 ms
Operate Time (res)	23.30	23.90	23.30 ms
Operate Time Spread (res)	0.00	0.00	0.00 ms
Contact Times #1	22.30	22.90	22.30 ms
Contact Times #1 (res)	23.30	23.90	23.30 ms
Overshoot Time	18.70	24.10	23.20 ms
Velocity	5.11	5.19	5.21 m/s
Velocity (2)	5.11	5.19	5.21 m/s
Terminal Velocity	1.22	0.38	0.69 m/s
Stroke	116.12	116.12	116.12 mm
Contact Length	33.57	34.64	34.79 mm
Contact Length (res)	38.76	39.98	40.44 mm
Contact Separation	82.55	82.70	81.18 mm
Contact Separation (res)	77.36	77.36	75.53 mm
Overshoot	4.73	4.73	4.73 mm
Rebound	0.76	0.76	0.76 mm

Specifications

INPUTS

Analogue: 1 x Independently controlled trip (open) and close coil current inputs.
1 x Linear / rotary resistive travel transducer input, will calculate all 3 phases. **3 extra with *travel+* option**.
3 x User configurable 0 - 10V DC or 0 - 200mV DC inputs, selected via input sockets.

Analogue Accuracy: <0.5% of fullscale.

Digital: 8 x Contact status inputs providing timing of up to 4 main contacts and 4 resistive contacts ('dry' contacts).
2 x User configurable inputs for 'wet' or 'dry' contact timing (24 - 250V DC or 0V DC).

Resistive Contact Range: 15 - 10,000 ohms. **Digital Resolution:** 100µSec. **Connectors:** 4mm safety socket.

OUTPUTS

Coil Operation: Solid state outputs for trip (open) and close.

Coil Peak Current: 5A (accuracy 2.5mA) or 30A (accuracy 15mA) AC/DC measurement ranges selectable via input sockets. Other measurement ranges possible via optional external shunt; for example 50A Peak (up to 75mS duration) or 100A Peak (up to 50mS duration).

Coil Max. Voltage: 400V peak.

***dynamic* Option Battery:** 3 x Isolated and floating 20A DC constant current battery sources for dynamic breaker timing.

Battery Characteristics: Charging time from fully discharged state 8 hours. Recharge time for a single discharge 100 seconds.

Battery Accuracy: ±0.5%, 100ppm/ºC. **Battery Drive Capability:** 0.0 to 0.5 ohm load.

RECORDING

Resolution: 12 bit A/D (1:4096) and 10 kHz sampling rate. **Recording Time:** Selectable up to 100 seconds.

Synchronisation: All inputs sampled simultaneously.

Start trigger: Coil current or selectable on any analogue / digital input.

GENERAL SYSTEM

12.1" TFT SVGA (800x600) "High-Bright Sunlight Readable" colour display (600cd). Removable USB Flash-Disk.
EIDE hard disk drive. VGA port for external screen. RS232 serial, parallel printer, RJ45 network and 2 x USB ports.
256MB RAM. Windows™ Operating System. All standard Windows Centronics or USB printers supported.
Safety keyswitch to enable/disable coil operation and constant current battery operation. 2 x PS2 sockets.

REAL-TIME CLOCK

Range: Time, date, leap year and day of the year with internal battery backup. 100mS resolution.

PROGRAMMING - SETTABLE PARAMETERS

User strings: Site name, breaker number, breaker type, line name, operator name and up to 30 user configurable.

Test times: Close, Open, Trip Free, Close-Open, Open Close, Open-Close-Open.

Coil operate times: Initial delay, trip coil "on-time", close coil "on-time", delay time between closing and opening, delay time between opening and closing.

Channels: Analogue - Input name, fullscale value, units. Digital - Input name.

Datum points: 2 sets of velocity calculation points on travel (speed) curve.

COMPUTED RESULTS

Up to a sequence of 3 operations detailing 3-phase information:
Peak coil current, operate times and operate time spread (main/resistive), on time, dead time, datum velocity, velocity at contact touch, acceleration, stroke, contact length (main/resistive), contact separation, spring compression on vacuum contacts, travel overshoot, bounce time and rebound.

Acceleration and velocity:
Graphical trace derived for measured travel input with cursor measurement.

Parallel Contact (P.I.R.) Switching Resistors:
Graphical traces for each with cursor measurement. Measurement of up to 4 PIR's or 6 PIR's with ***travel+*** option.

OPERATING VOLTAGES

Prime Power: 100 to 370V DC, 90 to 264V AC auto-sensing via IEC power connection. Burden <60 VA.

ENVIRONMENTAL

Operating Temp.: -20ºC to +70ºC (-4ºF to +158ºF)

Humidity: 0 to 97% RH non-condensing.

Isolation: 2kV rms for 1 minute (channel to channel, channel to earth).

Surge Withstand: To IEC 801-5. 1.2/50µS.

(Transient) Common Mode: Severity level class 4. Series Mode: Severity level class 3.

Fast Transient Burst: To IEC 801-4 level 3.

RFI Immunity: To IEC801-3 level 3. 10V/m 26-1000MHz.

Emissions: To EN50081-1: 1992.

MECHANICAL DETAILS

Enclosure: 6U steel enclosure suitable for Euro 19" wide rack mounting or free standing (tabletop).

Ventilation: Fan assisted. **Weight:** <9kg. ***dynamic*** version adds <1kg.

Optional Carry Case: Reinforced aluminium with wheels on one end, 710mm(W) x 480mm(H) x 370mm(D).

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