



SA200

**Switchgear Analyser
Test System**

Switchgear Analyser Test System

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 its pioneering of analogue timing techniques developed over more than 20 years ago, Weis developed a robust portable switchgear test set the SA100. With a proven track record of supplying portable test equipment, Weis has applied its expertise to develop the SA200, a Factory Test System for production / final test, development and research use.

The SA200 Switchgear Analyser Test System is an important piece of test equipment for switchgear manufacturers with ever increasing demands for lower cost, higher performance circuit breakers.

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
- Datum Velocity
- Velocity at Contact Touch
- Stroke
- Contact Length (Main / Resistive)
- Contact Separation
- Spring Compression on Vacuum Contacts
- Travel Overshoot
- Rebound
- Bounce Time
- Mechanism Times (Pre Latch / Latch Period)
- Acceleration
- Fingerprint Comparison on all channels (Grey Zone Checking)

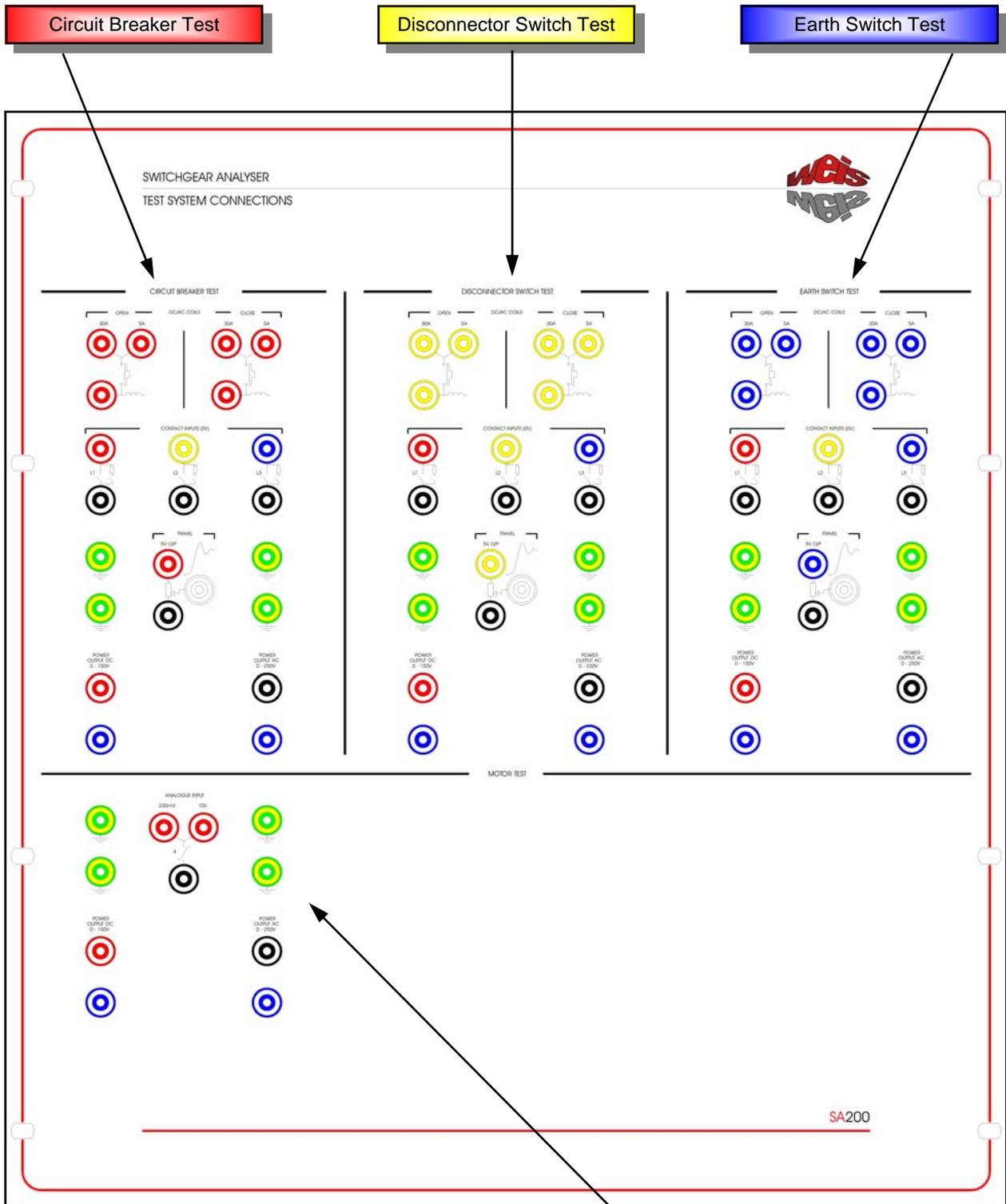
In addition, Dynamic Timing of up to 2 breaks per phase is made available with 6 x 20A constant current outputs.



Features

- ◆ SWITCHGEAR TEST AND ANALYSIS SYSTEM FOR FACTORY, DEVELOPMENT & RESEARCH USE
- ◆ SOFTWARE *WIZARD* TO SIMPLIFY TEST CONFIGURATION
- ◆ 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
- ◆ SOFTWARE CONTROLLED AC POWER SUPPLY - *CUSTOMER SPECIFIED RANGE*
- ◆ SOFTWARE CONTROLLED DC POWER SUPPLY - *CUSTOMER SPECIFIED RANGE*
- ◆ FULLY AUTOMATED OR MANUAL TESTING OF ANY SWITCHGEAR
- ◆ COMPLETE SYSTEM DESIGN TO CUSTOMER SPECIFICATION
- ◆ INDEPENDENT CONTROL OF TRIP AND CLOSE AC OR DC COILS PER PHASE
- ◆ 16 ANALOGUE INPUT FOR: 3 x *DUAL RANGE (5 / 30A) TRIP AND CLOSE COIL CURRENT* , 3 x *TRAVEL*, 9 x *USER CONFIGURABLE DC*, 1 x *USER CONFIGURABLE AC / DC*
- ◆ 32 DIGITAL INPUTS FOR: *TIMING OF UP TO 4 MAIN AND 4 RESISTIVE CONTACTS PER PHASE*, 7 x *TIMING CONTACTS (24-250V DC or 0V DC)*
- ◆ CALCULATED INPUTS FOR: *VELOCITY AND ACCELERATION PER TRAVEL INPUT*
- ◆ SA200 CAN DYNAMICALLY TEST 2 BREAKS PER PHASE
- ◆ FULLY CUSTOMER SPECIFIED TEST REPORT

Connections



Motor Test

Switchgear Analyser Test System

Data Management

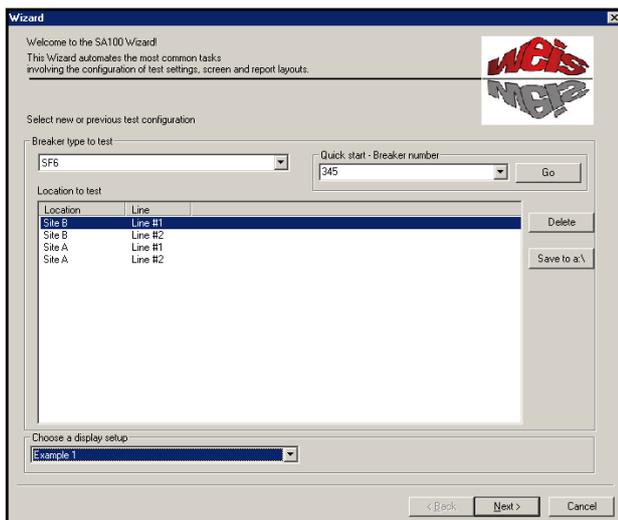
Breaker Test & Analysis software is an essential 32-bit Windows™ database program that provides an easy to use operator interface for configuring & displaying the SA200 test results in graphical and text report formats.

Features:-

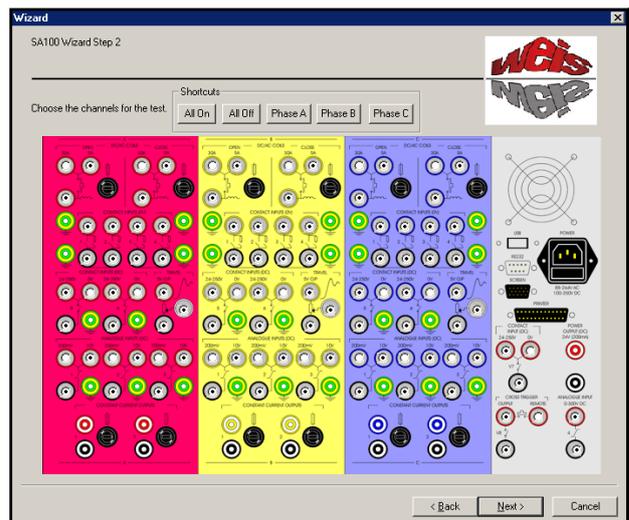
- ◆ Operator interface for Regular (via Wizard) or Advanced users
- ◆ Results automatically computed with feature to recalculate on configuration change of any existing test record
- ◆ Graphical display of captured waveforms with measurement cursors
- ◆ Standard or user defined report format
- ◆ Archiving 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 local panel or remote Ethernet operation & analysis.

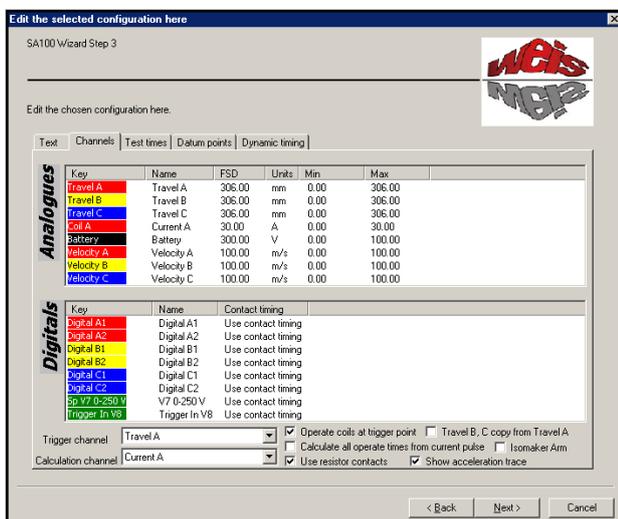
The display and printing of a report can be fully customised to include logo's, in-house styles, text phrases and results format, thus eliminated the need to manually complete a written form in most cases.



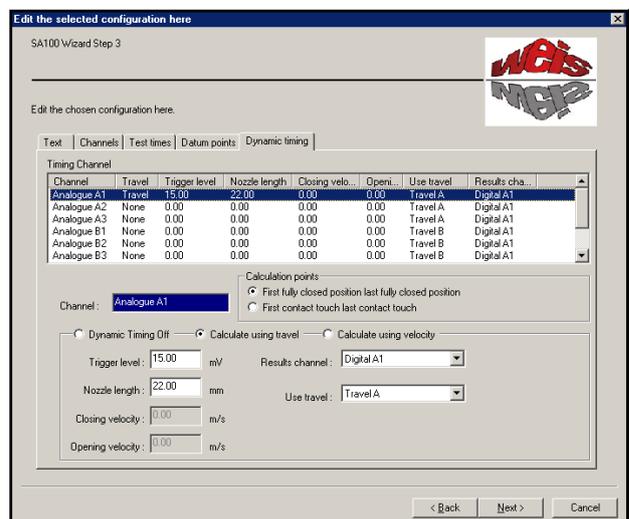
Wizard - Start New or Select Existing Test Configuration



Wizard (Step 2) - Breaker Test Connections



Wizard (Step 3) - Channel Settings



Wizard (Step 3) - Dynamic Test Settings

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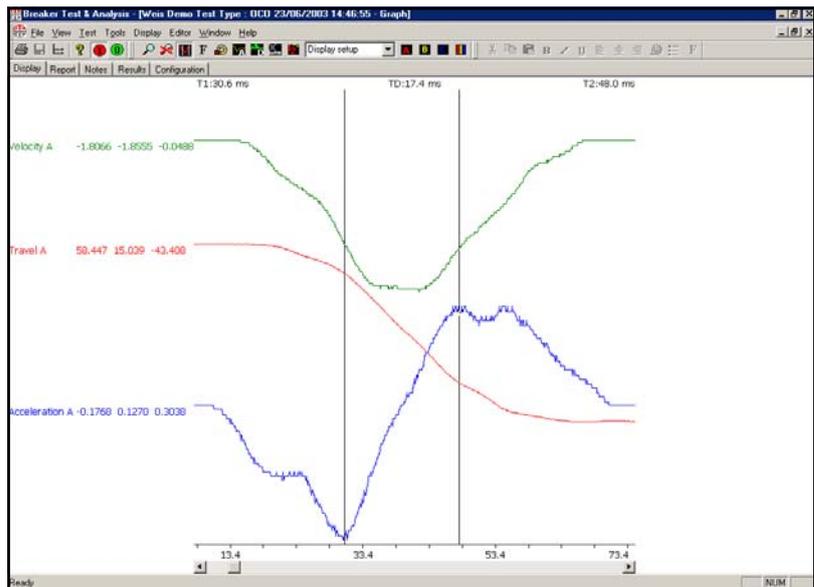


Graphical Display

- 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

Acceleration & Velocity

- Advanced Analysis:
- Acceleration Trace Computed from Travel
 - Velocity Trace computed from Travel
 - All Graphical View Features Supported



Bitc 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

	Phase A	Phase B	Phase C	
Current	2.22	A		
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	117.34	115.97	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	1.98	3.81	mm
Rebound	0.76	0.46	0.46	mm

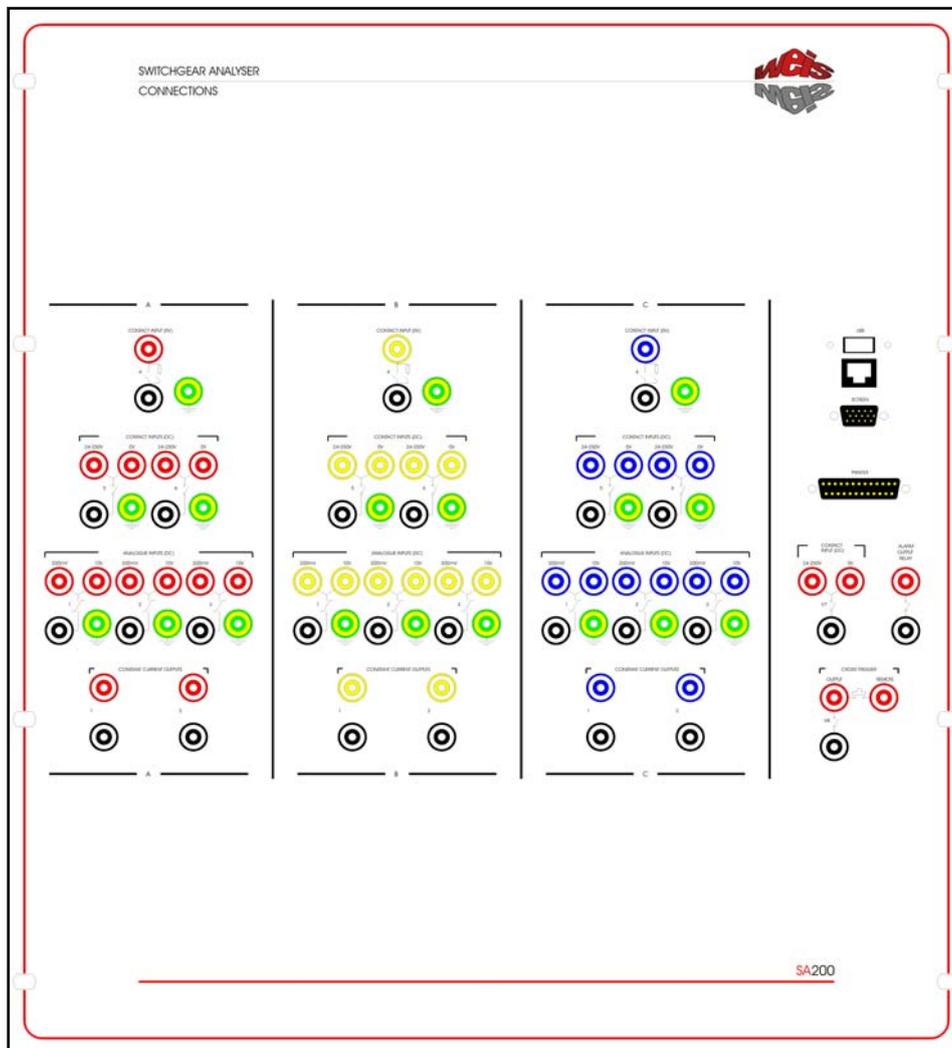
Text Report

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

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Optional Items / Accessories

SA200 Additional Connections



Dynamic Timing

Dynamic Timing is performed with a constant current passed through the breakers contacts with both ends connected to earth, providing the most accurate timing test on modern circuit breakers.

This method of timing is possible on a SA200 Switchgear Analyser, however an optional Dynamic Timing Cable Set is required.

Dynamic Micro-Ohm Testing

Dynamic Micro-Ohm Testing of circuit breakers is an advanced technique that provides more detailed information about its condition.

Performing this type of test requires the combined use of the SA200 Switchgear Analyser with an optionally available MM100 Micro-Ohm Tester with Cable Set.

Cable Sets

A range of standard cable sets & special made cable sets are available on request.

Transducers

A full range of motion transducers, universal mounting arms, pressure transducers and AC / DC clip on current probes are available on request.



Specifications

INPUTS

Analogue:	3 x Independently controlled trip (open) and close coil current inputs. 3 x Resistive (linear or rotary) travel transducer inputs. 9 x User configurable 0 - 10V DC or 0 - 200mV DC inputs (e.g. for pressure transducers, dynamic timing), selected via input sockets. 1 x 0 - 200mV or 0 - 10V (e.g. AC / DC clip on current probe).
Analogue Accuracy:	<0.5% of fullscale.
Digital:	24 x Contact status inputs providing timing of up to 4 main contacts and 4 resistive contacts per phase (dry contacts). 7 x User configurable inputs for 'wet' or 'dry' contact timing (24 - 250V DC or 0V DC). 1 x Dedicated trigger channel for cross-triggerring or remote operation.
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.
AC Voltage Source:	Software controlled AC power supply - Customer specified rating.
DC Voltage Source:	Software controlled DC power supply - Customer specified rating.
Battery:	6 x Isolated and floating 20A DC constant current battery sources for dynamic breaker timing.
Batt. Characteristics:	Charging time from fully discharged state 8 hours. Recharge time for a single discharge 100 seconds.
Batt. Accuracy:	±0.5%, 100ppm/°C.
Batt. Drive Capability:	0.0 to 0.5 ohm load.
Cross-Trigger:	1 x internally wetted relay contact for cross-triggerring or remote operation.
Communication:	Ethernet to optional remote PC.
Alarm:	1 x volt-free relay contact.

RECORDING

Resolution:	12 bit A/D (1:4096).
Sampling Rate:	10 kHz.
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

Removable USB Flash-Disk. Internally housed 3½" 1.44Mbyte floppy disk drive and EIDE hard disk drive. PS2 sockets for external keyboard with built in trackball. VGA port for external screen. Parallel printer port. 1 x Front panel & 1 x rear panel USB ports. RJ45 network port. 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.

REAL-TIME CLOCK

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



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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.
Analogue channels:	Input name, fullscale value, units.
Digital channels:	Input name.
Datum points:	Velocity calculation points on travel (speed) curve.
Test Report:	Fully customer specified content, layout & wording.

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, stroke, contact length (main/resistive), contact separation, travel overshoot and rebound.

Acceleration and velocity:

Graphical traces derived for each measured travel input with cursor measurement.

ENVIRONMENTAL

Operating

Temperature:	-20°C to +70°C (-4°F to +158°F)
Humidity:	0 to 97% RH non-condensing.
Isolation:	2kV rms for 1 minute (channel to channel, channel to earth).

Surge Withstand

Transient:	To IEC 801-5. 1.2/50µS. Common Mode: Severity level class 4. Series Mode: Severity level class 3.
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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: Free standing cubicle on wheels with 34U high 19" panel mounts / fixings.

Dimensions: Height 1652mm (including wheels), Width 553mm, Depth 600mm.

Ventilation: Fan assisted.



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