EGIL
Circuit breaker analyzer

- **Suitable for testing timing and travel on all circuit breakers with single interrupter per phase**
- **Extremely easy-to-use and reliable**
- **Two separate timing channels for measurement of auxiliary contacts**
- **Analog measurement channels for travel transducers or general voltage/current measurements**
- **Static and dynamic resistance measurements along with the SDRM201 optional accessory**

Description

EGIL™, which incorporates benefits gained from experience with our larger instrument, is intended for circuit breakers with one contact per phase. Smaller and simpler, EGIL is equally versatile – and EGIL's price makes it attractive to small power plants. Moreover, it provides an ideal supplementary instrument for maintenance departments at large power companies.

EGIL is designed to test circuit breakers having one main contact per phase. Its three time channels are connected together on one side. Events at parallel contacts equipped with pre-insertion resistors are recorded and displayed simultaneously. There are two separate time channels for measurement of auxiliary contacts. To simplify on-site hookup, EGIL comes with ready-made multi-cable sets for both main and auxiliary contacts.

Coil currents are measured automatically and presented together with other readings immediately after testing on the display window or via the built-in printer. EGIL is easy to use – a built-in sequencer (program unit) sets the instrument automatically for the next sequential breaker operation.

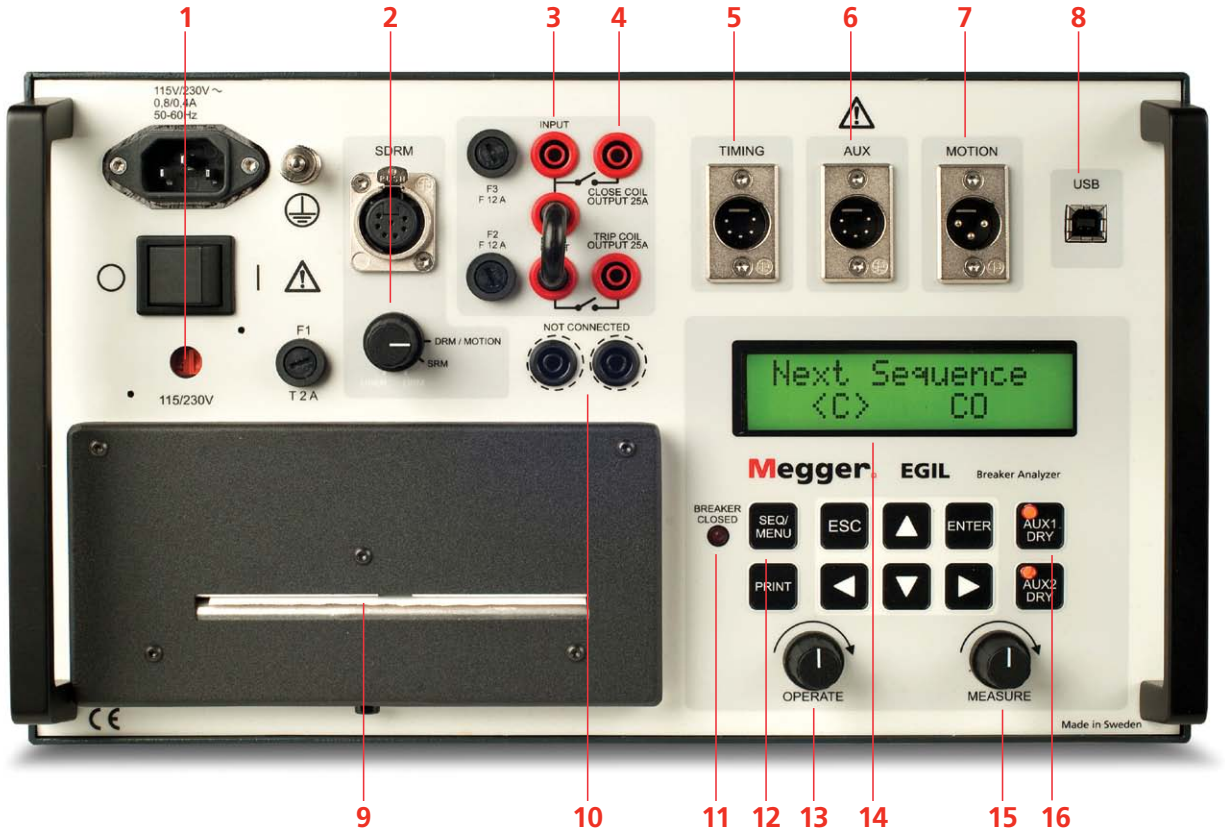
Intended primarily for measuring travel (motion), the optional analog input channel finds many other uses as well. If this channel is not installed, all associated menu commands are hidden.

EGIL with the SDRM option together with the SDRM accessory enables static and dynamic resistance measurements.

EGIL can also be equipped with an optional USB interface for communication with a PC and the CABA Win™ Circuit Breaker Analysis Software.

Features and benefits

1. **Mains voltage changeover switch,** 115/230 V AC.
2. **SDRM (optional)** Static and dynamic resistance mesurement. Interface for the SDRM201 accessory.
3. **Built-in coil current measurement**. Readings are presented on autoscaled graphs.
4. **Sequencer for coil signals** permits delays to be introduced for coil impulses that differ relative to each other.
5. **Three timing channels**. Both main contacts and pre-insertion resistor contacts can be timed on the same channel. Results are presented both graphically and numerically.
6. **Two galvanically isolated timing channels.** Can be used for timing of dry or wet auxiliary contacts.
7. **Optional analog input channel,** intended for measuring travel (motion) or any other analog voltage.
8. **USB (optional)** interface for PC. Supports communication with the CABA breaker analysis software.
9. **Built-in printer** features autoscaling, 114 mm (4,5") wide paper can be changed quickly and easily.
10. **Galvanically isolated sockets** ensure safe, reliable disconnection of operating coil cables before working in or on the breaker.
11. **Breaker state indicator**. Egil measures the state (open or closed) of the breaker, whereupon the sequencer sets the instrument automatically for the next sequential operation.
12. **Buttons for sequence** (C, O, C-O, O-C or O-C-O) settings and to run a print out of measurement results.
13. **Switch used to set the breaker** to the desired state without activating the measurement channels.
14. **Menu-driven procedures** automatically invoke default settings to eliminate time consuming presetting. All menu lines associated with uninstalled optional equipment are hidden to enhance simplicity. For the basic egil unit you simply connect the multi-cable sets and turn the MEASURE knob.
15. **MEASURE knob**. Runs a breaker operation sequence, measuring and recording the results.
16. **AUX 1 & 2 buttons** used for time channels that measure timing of auxiliary contacts. Contact sensing or voltage sensing can be selected.



Megger

EGIL
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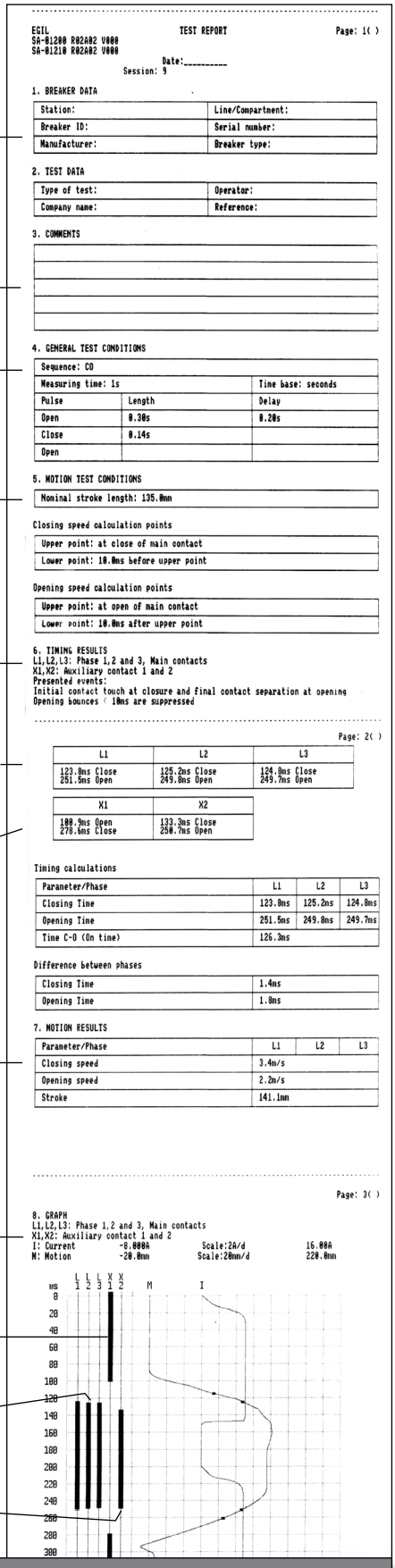

EGIL TEST REPORT Page: 1( )
SA-81200 R02A02 V000
SA-81210 R02A02 V000
Date:_____
Session: 9

1. BREAKER DATA

Station:	Line/Compartment:
Breaker ID:	Serial number:
Manufacturer:	Breaker type:

2. TEST DATA

Type of test:	Operator:
Company name:	Reference:

3. COMMENTS

4. GENERAL TEST CONDITIONS

Sequence: CO		
Measuring time: 1s		Time base: seconds
Pulse	Length	Delay
Open	0.30s	0.20s
Close	0.14s	
Open		

5. MOTION TEST CONDITIONS

Nominal stroke length: 135.0mm

Closing speed calculation points

Upper point: at close of main contact
Lower point: 10.0ms before upper point

Opening speed calculation points

Upper point: at open of main contact
Lower point: 10.0ms after upper point

6. TIMING RESULTS
L1,L2,L3: Phase 1,2 and 3, Main contacts
X1,X2: Auxiliary contact 1 and 2
Presented events:
Initial contact touch at closure and final contact separation at opening
Opening bounces < 10ms are suppressed

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L1	L2	L3
123.0ms Close 251.5ms Open	125.2ms Close 249.0ms Open	124.9ms Close 249.7ms Open

X1	X2
100.9ms Open 270.6ms Close	133.3ms Close 250.7ms Open

Timing calculations

Parameter/Phase	L1	L2	L3
Closing Time	123.0ms	125.2ms	124.0ms
Opening Time	251.5ms	249.0ms	249.7ms
Time C-O (On time)	126.3ms		

Difference between phases

Closing Time	1.4ms
Opening Time	1.8ms

7. MOTION RESULTS

Parameter/Phase	L1	L2	L3
Closing speed	3.4m/s		
Opening speed	2.2m/s		
Stroke	141.1mm		

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8. GRAPH
L1,L2,L3: Phase 1,2 and 3, Main contacts
X1,X2: Auxiliary contact 1 and 2
I: Current -8.000A Scale:2A/d 16.00A
M: Motion -20.0mm Scale:20mm/d 220.0mm

Example of report printed out on the built-in printer. Close-Open operation. Time, coil currents and travel (motion) were measured. (Travel measurement is optional.) The above example is 50% of actual size.

Application

EGIL is intended primarily for testing high-voltage circuit breakers at medium-level voltages. There must not, however, be more than one break per phase since the time channels are not galvanically isolated. Contact times are recorded for main contacts, pre-insertion resistor contacts and auxiliary contacts. Coil currents are also recorded.

Besides the actual measurement values several parameters according to IEC standards are calculated and shown in the report, e.g. closing and opening time, difference between phases, over-travel, CO and OC time (and others).

Application example

IMPORTANT
Read the User's manual before using the instrument.

1. Ground EGIL using the included ground cable. Make certain that the circuit breaker is closed and grounded on both sides.
2. Connect the main contact cable set to EGIL and the circuit breaker.
3. Connect the auxiliary contact cable set to the a- and b-contacts on the operating mechanism.
4. Connect the EGIL sequencer to the close- and trip-coils and to the auxiliary voltage.
5. Remove the breaker's ground connection on one side.
6. You are now ready to proceed with the test. Simply turn the MEASURE rotary switch and read the results.

Specifications

Specifications are valid at nominal input voltage and an ambient temperature of +25°C, (77°F). Specifications are subject to change without notice.

Environment

Application field	The instrument is intended for use in medium-voltage substations and industrial environments.
Temperature	
Operating	0°C to +50°C (32°F to +122°F)
Storage & transport	-40°C to +70°C (-40°F to +158°F)
Humidity	5% – 95% RH, non-condensing

CE-marking

EMC	2004/108/EC
LVD	2006/95/EC

General

Mains voltage	115/230 V AC (switchable), 50/60 Hz
Power consumption	100 VA (max)
Dimensions	
Instrument	360 x 210 x 190 mm (14.2" x 8.3" x 7.5")
Transport case	420 x 300 x 230 mm (16.5" x 11.8" x 9.0")
Weight	6.3 kg (14 lbs). 10 kg (22 lbs) with accessories and transport case
Display	LCD
Available languages	English, German, French, Spanish, Swedish

Measurement section

Time measurement

Measurement time	1 to 100 s
Resolution	0.1 to 10 ms
Number of channels	3 with common ground
Time base inaccuracy	0.05% of the reading ± resolution
Status thresholds	
Closed	< 10 Ω ±20%
Resistor	10 Ω ±20% to 3 kΩ ±20%
Open	> 3 kΩ ±20%
Open circuit voltage	24 V ±20%
Short circuit current	100 mA ±20%

AUX 1&2

Number of channels	2, galvanically isolated

Contact-sensing (Dry)

Status thresholds	
Closed	< 600 Ω ±30%
Open	> 600 Ω ±30%
Open circuit voltage	20 V ±20% DC
Short circuit current	25 mA ±20%

Voltage sensing (Wet)

Status thresholds	
Open indication	< 8 V (polarity insensitive)
Close indication	> 13 V (polarity insensitive)
Working voltage	250 V AC/DC

Current measurement

Range	±25 A per channel
Resolution	25 mA
Inaccuracy	1% of the reading ±100 mA
Working voltage	250 V AC/DC

Breaker operation

Sequences	C, O, C-O, O-C, O-C-O
Continuous current	5 A
Max current	25 A during 300 ms, rest time 1 min
Contact function	Two independent control functions
Contact characteristics	Non bouncing, closing time max. 0.1 ms
Make/Break capacity	25 A, 250 V (AC or DC) per contact function
Start breaker operation	By rotary switch
Pulse length	Adjustable in steps of 10 ms
Pulse delay	Adjustable in steps of 10 ms
Working voltage	250 V AC/DC

Motion (optional)

Number of channels	1 independent
Max cable length	10 m (33 ft)

Input

Range	-4 V to +4 V
Resolution	2 mV
Inaccuracy	1% of the measurement range
Transducer resistance	1 kΩ to 5 kΩ
Input impedance	150 kΩ

Output

Open circuit voltage	4,095 V ±4 mV
Short circuit current	115 mA

Printout

Type of printout	Graphic and numeric
Printer	Thermal printer with fixed print head
Graphic resolution	8 dots/mm – 203 dpi
Paper width	114 mm (4.5")

Optional Accessories

The SDRM201 is intended to use for both static and dynamic resistance measurements (SRM and DRM) on high voltage circuit breakers or other low resistive devices

Cable reels, 20 m (65.5 ft), 4 mm stack-able safety plugs

Multicable sets GA-00160 and GA-00170 and cable set GA-00082

The SDRM Cable

Transducer cables GA-00041 and GA-00042

Current cables for SDRM201, the red cable is 3.0 m (9.8 ft) and the black one is 0.5 m (1.6 ft)

Extension cable XLR, GA-01005

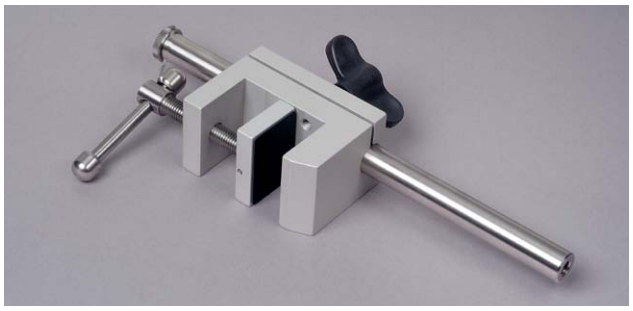
Extension cable XL, GA-00150

Linear transducer, TLH 225

Linear transducer, TS 25

Linear transducer, LWG 150

Rotary transducer, Novotechnic IP6501 (analog)



Universal support

Switch magnetic base

Rotary transducer mounting kit

Voltage divider, VD401

Ordering information

Item		Art. No.
EGIL Basic unit		BM-19090
Incl:		
Time measurement cables	GA-00160, GA-00170	
Cable set for sequencer	GA-00082	
Transport case	GD-00190	
Egil with analog input channel and USB port		BM-19093
Incl:		
CABA Win	BL-8206X	
Time measurement cables	GA-00160, GA-00170	
Cable set for sequencer	GA-00082	
Transducer cable XLR-open 1 m (3.2 ft)	GA-00041	
Transducer cable XLR-XLR 7.5 m (24.6 ft)	GA-00042	
Transport case	GD-00190	
Egil with SDRM option and USB port		BM-19095
Incl:		
CABA Win	BL-8206X	
Time measurement cables	GA-00160, GA-00170	
Cable set for sequencer	GA-00082	
Transducer cable XLR-open 1 m (3.2 ft)	GA-00041	
Transducer cable XLR-XLR 7.5 m (24.6 ft)	GA-00042	
Transport case	GD-00190	

Upgrade

Upgrade of EGIL can be done, please contact your nearest distributor for part number and price.

Optional accessories

CABA Win Circuit breaker analysis software Incl. USB cable	BL-8206X
SDRM201	CG-90250
Extension cables for SDRM201	
10 m (33 ft) extension	GA-12810
7.5 m (24.6 ft) extension	GA-12815
Transducers – Linear	
TLH 500	XB-30020
LWG 225	XB-30117
TS 150	XB-30030
TS 25	XB-30033
Transducers – Rotary	
Novotechnic IP6501	XB-31010
Flex coupling for IP6501	XB-39030
Transducer mounting kits	
Universal kits	
Rotary transducer mounting kit For transducers XB-31010 and XB-39130	XB-51010
Universal transducer mounting kit for linear and rotary transducers	XB-51020

Item	Art. No.
Ready-to-use-kits – Rotary	
Incl. transducer XB-31010, mounting kit XB-51010	XB-71010
Transducer mounting accessories	
Universal support	XB-39029
Switch magnetic base	XB-39013
Cables	
Cable reel 20 m (65.5 ft), 4 mm stackable safety plugs	
Black	GA-00840
Red	GA-00842
Yellow	GA-00844
Green	GA-00845
Blue	GA-00846
Cable sets The cable sets consist of 8 cables with clamps and 4 mm stackable safety plugs	
8 x 5 m, (16.4 ft)	GA-00231
8 x 10 m, (32.8 ft)	GA-00241
8 x 15 m, (49.2 ft)	GA-00251
Extension cables, XLR female to male	
For analog input, 10 m (32.8 ft)	GA-01005
For time measurement of main contacts, 10 m (32.8 ft)	GA-00150
Open analog cable For customized analog transducer connection	GA-01000
XLR to 4 mm safety plugs For customized analog transducer connection	GA-00040

Other

VD401 Voltage divider, ratio 400/1 (for TM1600 and EGIL with analog channel)	BL-90070
Thermopaper, 114 mm, 30 m	GC-00030
Cable organizer, Hook and loop fastener, 10 pcs	AA-00100

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