

## 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**

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### 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.

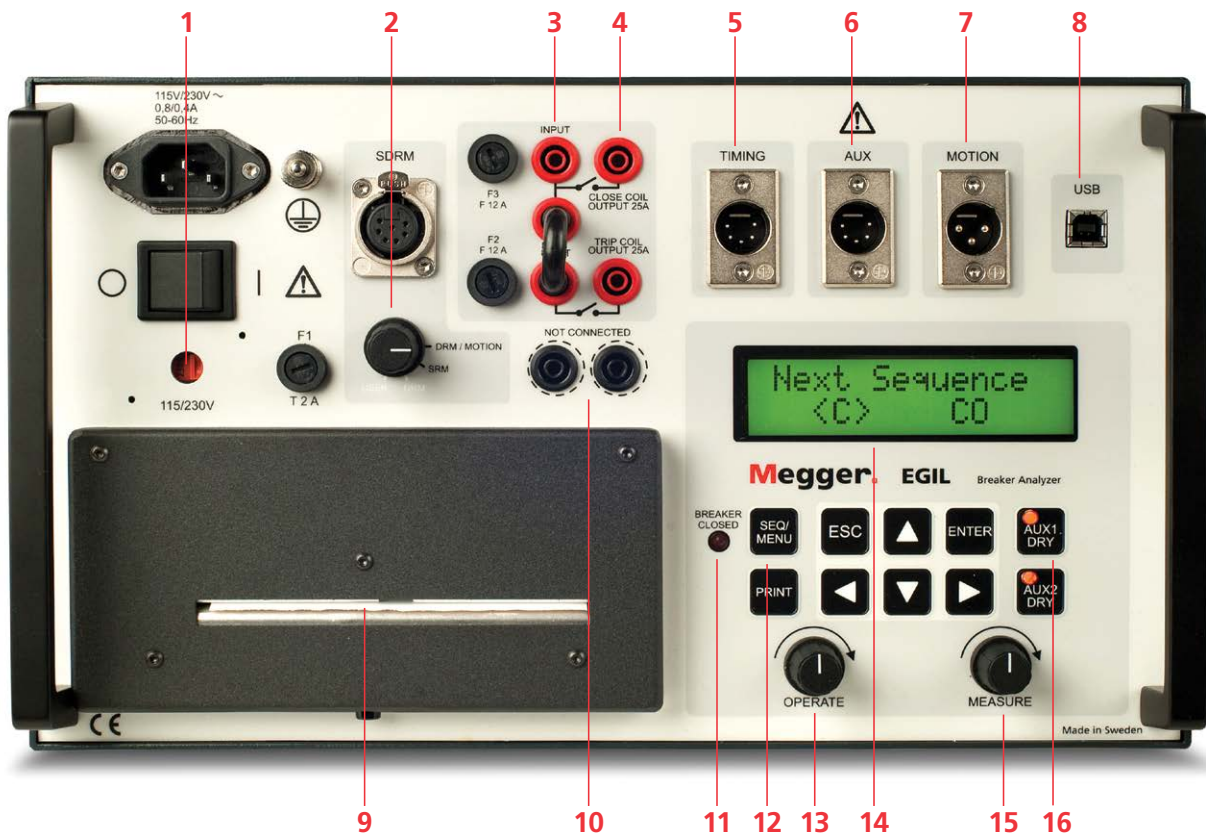
Intended primarily for measuring travel (motion), the optional analog input channel finds many other uses as well. If this channel is not installed, all associated menu commands are hidden.

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 measurement. 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 autoscoping, 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.



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.

Space for your report data

Space for your comments

Parameters you have selected for breaker operation

Parameters you have selected for travel (motion) measurement

Filtering you have selected for time results

Tabular printout of time measurements at main contacts

Tabular printout of time measurements at auxiliary contacts

Tabular printout of travel (motion) calculations

Graphical printout

Auxiliary contact, close circuit

Main contacts

Auxiliary contact, trip circuit

Page: 1 ( )

EGIL  
SR-B1200 R02AR2 V000  
SR-B1210 R02AR2 V000

TEST REPORT  
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: Is	Time base: seconds
Pulse	Length	Delay
Open	0.30s	0.20s
Close	0.14s	
Open		

5. MOTION TEST CONDITIONS

Nominal stroke length: 135.0mm
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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

L1			L2			L3		
123.0ms	Close	251.5ms	125.2ms	Close	249.8ms	124.0ms	Close	249.7ms
180.5ms	Open	278.6ms	133.3ms	Close	250.7ms			

X1		X2	
180.5ms	Open	133.3ms	Close
278.6ms	Close	250.7ms	Open

Timing calculations

Parameter/Phase	L1	L2	L3
Closing Time	123.0ms	125.2ms	124.0ms
Opening Time	251.5ms	249.8ms	249.7ms
Time C-O (On time)	125.3ms		

Difference between phases

Closing Time	1.4ms
Opening Time	1.0ms

7. MOTION RESULTS

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

Page: 2 ( )

8. GRAPH

L1,L2,L3: Phase 1,2 and 3, Main contacts  
X1,X2: Auxiliary contact 1 and 2

I: Current -0.000A Scale:2k/d 16.00A  
M: Motion -20.0mm Scale:20mm/d 220.0mm

Page: 3 ( )

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.

## 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.	Item	Art. No.
<b>EGIL Basic unit</b>	BM-19090	<b>Transducer mounting kits</b>	
Incl:		<b>Universal kits</b>	
Time measurement cables	GA-00160, GA-00170	Rotary transducer mounting kit	
Cable set for sequencer	GA-00082	For transducers XB-31010 and XB-39130	XB-51010
Transport case	GD-00190	Universal transducer mounting kit	
		for linear and rotary transducers	XB-51020
<b>EGIL with USB port</b>	BM-19092	<b>Ready-to-use-kits – Rotary</b>	
Incl:		Incl. transducer XB-31010, mounting kit XB-51010	XB-71010
CABA Win	BL-8206X	<b>Transducer mounting accessories</b>	
Time measurement cables	GA-00160, GA-00170	Universal support	XB-39029
Cable set for sequencer	GA-00082	Switch magnetic base	XB-39013
Transport case	GD-00190	<b>Cables</b>	
<b>EGIL with analog input channel and USB port</b>	BM-19093	<b>Cable reel</b>	
Incl:		20 m (65.5 ft), 4 mm stackable safety plugs	
CABA Win	BL-8206X	Black	GA-00840
Time measurement cables	GA-00160, GA-00170	Red	GA-00842
Cable set for sequencer	GA-00082	Yellow	GA-00844
Transducer cable XLR-open	GA-00041	Green	GA-00845
1 m (3.2 ft)		Blue	GA-00846
Transducer cable XLR-XLR	GA-00042	<b>Cable sets</b>	
7.5 m (24.6 ft)		The cable sets consist of 8 cables with clamps and	
Transport case	GD-00190	4 mm stackable safety plugs	
<b>EGIL with SDRM option and USB port</b>	BM-19095	8 x 5 m, (16.4 ft)	GA-00231
Incl:		8 x 10 m, (32.8 ft)	GA-00241
CABA Win	BL-8206X	8 x 15 m, (49.2 ft)	GA-00251
Time measurement cables	GA-00160, GA-00170	<b>Extension cables, XLR female to male</b>	
Cable set for sequencer	GA-00082	For analog input, 10 m (32.8 ft)	GA-01005
Transducer cable XLR-open	GA-00041	For time measurement of main contacts, 10 m (32.8 ft)	GA-00150
1 m (3.2 ft)		<b>Open analog cable</b>	
Transducer cable XLR-XLR	GA-00042	For customized analog transducer connection	GA-01000
7.5 m (24.6 ft)		<b>XLR to 4 mm safety plugs</b>	
Transport case	GD-00190	For customized analog transducer connection	GA-00040
<b>Upgrade</b>		<b>Other</b>	
Upgrade of EGIL can be done, please contact your nearest distributor for part number and price.		<b>VD401</b>	
<b>Optional accessories</b>		Voltage divider, ratio 400/1	
<b>CABA Win</b>		(for TM1600 and EGIL with analog channel)	BL-90070
Circuit breaker analysis software		<b>Thermopaper, 114 mm, 30 m</b>	GC-00030
Incl. USB cable	BL-8206X	<b>Cable organizer, Hook and loop fastener, 10 pcs</b>	AA-00100
<b>SDRM201</b>	CG-90250		
<b>Extension cables for SDRM201</b>			
10 m (33 ft) extension	GA-12810		
7.5 m (24.6 ft) extension	GA-12815		
<b>Transducers – Linear</b>			
TLH 500	XB-30020		
LWG 225	XB-30117		
TS 150	XB-30030		
TS 25	XB-30033		
<b>Transducers – Rotary</b>			
Novotechnic IP6501	XB-31010		
Flex coupling for IP6501	XB-39030		

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