

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

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 breaker control unit sets the instrument automatically for the next sequential breaker operation.

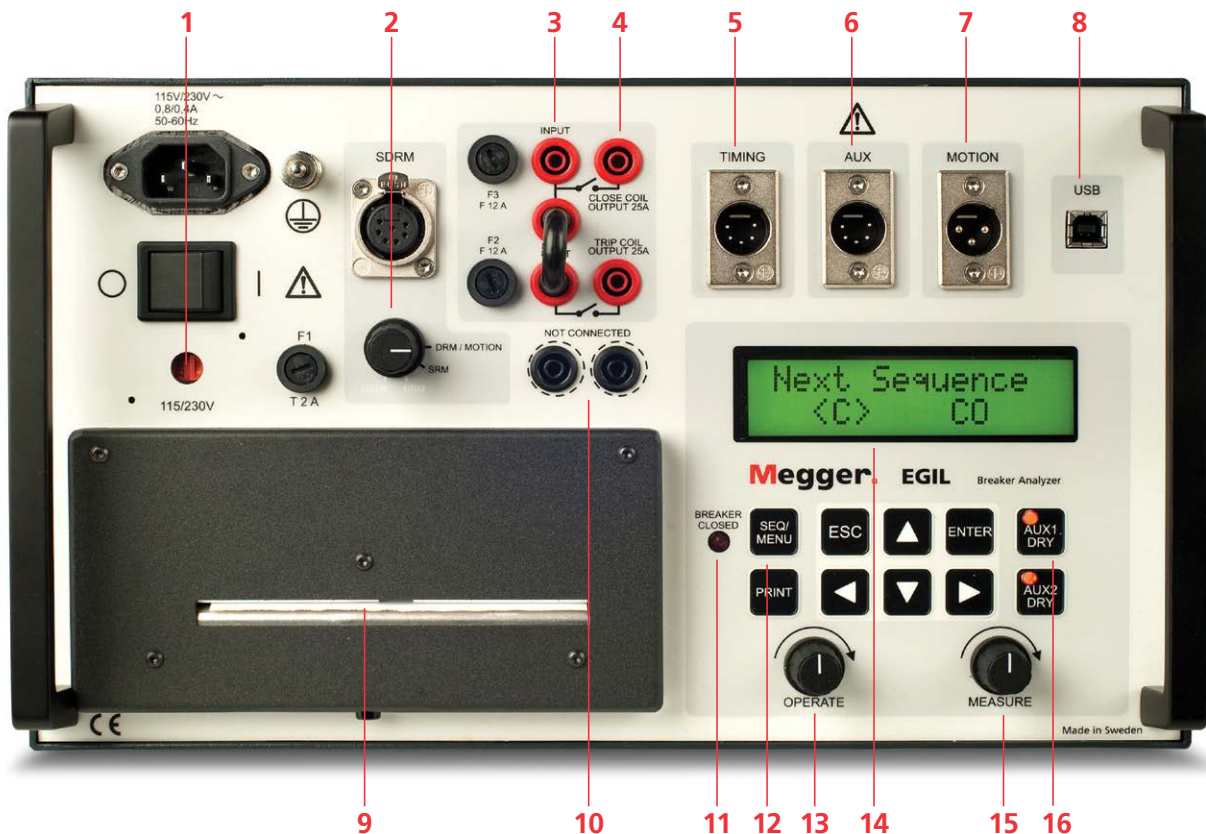
Intended primarily for measuring travel (motion), the optional analog input channel finds many other uses as well. If this channel is not installed, all associated menu commands are hidden.

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. **Breaker control unit 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 breaker control unit 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.



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

EGIL TEST REPORT Page: 1 ()
 SA-01200 R02AR2 V000
 SA-01210 R02AR2 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: Is	Length	Delay
Open	0.38s	0.28s
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: 18.0ms before upper point

Opening speed calculation points

Upper point: at open of main contact
Lower point: 18.0ms 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
123.8ms Close	125.2ms Close	124.8ms Close	
251.5ms Open	249.8ms Open	249.7ms Open	

	X1	X2
188.5ms Open	133.3ms Close	
278.6ms Close	250.7ms Open	

Timing calculations

Parameter/Phase	L1	L2	L3
Closing Time	123.8ms	125.2ms	124.8ms
Opening Time	251.5ms	249.8ms	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		

8. GRAPH

L1,L2,L3: Phase 1, 2 and 3, Main contacts
 X1,X2: Auxiliary contact 1 and 2
 I: Current -0.000kA Scale:2k/d 15.00kA
 M: Motion -28.0mm Scale:28mm/d 228.0mm

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 breaker control unit 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

LVD 2006/95/EC
EMC 2014/30/EU
RoHS 2011/65/EU

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")

ACCESSORIES



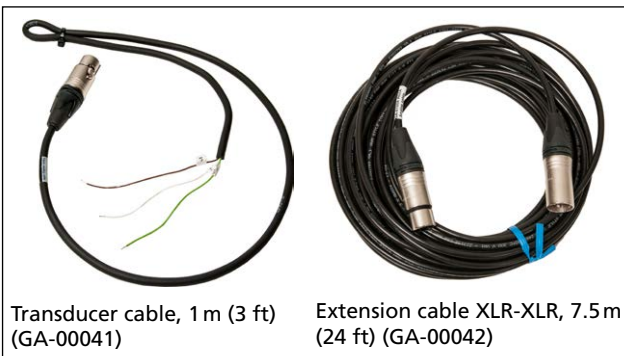
Time measurement cables, 5 m (16 ft) (GA-00160)



Time measurement cables, 2 m (6.5 ft) (GA-00170)

Cable set for breaker control unit (GA-00082)

Cables included in items: BM-19090, BM-19092, BM-19093 and BM-19095



Transducer cable, 1 m (3 ft) (GA-00041)

Extension cable XLR-XLR, 7.5 m (24 ft) (GA-00042)

Cables included in items: BM-19093 and BM-19095

OPTIONAL ACCESSORIES



Extension cable, 10 m (33 ft) (GA-00150)



Transducer cable, 1 m (3.3 ft) (GA-00040)



SDRM201 main unit (CG-90273)

SDRM Cable (GB-03431)



Current cables
Red cable 3.0 m (9.8 ft) (GA-12820)
Black cable 0.5 m (1.6 ft) (GA-12830)

The SDRM201 kit (CG-90250), is intended to use for both static and dynamic resistance measurements (SRM and DRM) on high voltage circuit breakers or other low resistive devices.



Linear transducer, TLH 225 (XB-30017)



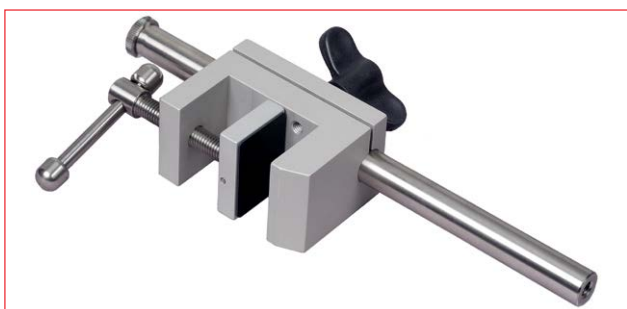
Linear transducer, LWG 225 (XB-30117)



Linear transducer, TS 25 (XB-30033)



Rotary transducer, Novotechnic IP6501 (XB-31010)



Universal support (XB-39029)



Switch magnetic base (XB-39013)



Rotary transducer mounting kit (XB-51010)



Voltage divider, VD401 (BL-90070)



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

ORDERING INFORMATION

Item	Order No.	Item	Order No.
EGIL Basic unit	BM-19090	Transducers – Linear	
Incl:		TLH 225	XB-30017
Cables timing measurement	GA-00160, GA-00170	LWG 225	XB-30117
Extension cable timing	GA-00150	TS 150	XB-30030
Cable set for breaker control unit	GA-00082	TS 25	XB-30033
Transport case	GD-00190		
EGIL with USB port	BM-19092	Transducers – Rotary	
Incl:		Novotechnic IP6501, analog	XB-31010
CABA Win	BL-8206X	Flex coupling for IP6501	XB-39030
Cables timing measurement	GA-00160, GA-00170		
Extension cable timing	GA-00150	Transducer mounting kits	
Cable set for breaker control unit	GA-00082	Universal kits	
Transport case	GD-00190	Rotary transducer mounting kit	
		For transducers XB-31010 and XB-39130	XB-51010
Egil with analog input channel and USB port	BM-19093	Universal transducer mounting kit for linear and rotary transducers	XB-51020
Incl:			
CABA Win	BL-8206X	Ready-to-use-kits – Rotary	
Cables timing measurement	GA-00160, GA-00170	Incl. transducer XB-31010, mounting kit XB-51010	XB-71010
Extension cable timing	GA-00150		
Cable set for breaker control unit	GA-00082	Transducer mounting accessories	
Transducer cable XLR-open	GA-00041	Universal support	XB-39029
Transducer cable XLR-XLR	GA-00042	Switch magnetic base	XB-39013
Transport case	GD-00190		
Egil with SDRM option and USB port	BM-19095	Cables	
Incl:		Cable reel	
CABA Win	BL-8206X	20 m (65.5 ft), 4 mm stackable safety plugs	
Cables timing measurement	GA-00160, GA-00170	Black	GA-00840
Extension cable timing	GA-00150	Red	GA-00842
Cable set for breaker control unit	GA-00082	Yellow	GA-00844
Transducer cable XLR-open	GA-00041	Green	GA-00845
Transducer cable XLR-XLR	GA-00042	Blue	GA-00846
Transport case	GD-00190		
Upgrade		Cable sets	
Upgrade of EGIL can be done, please contact your nearest distributor for part number and price.		The cable sets consist of 8 cables with clamps and 4 mm stackable safety plugs	
Optional accessories		8 x 5 m, (16.4 ft)	GA-00231
Here is a selection of accessories. For a more complete presentation of available accessories see our catalog: Circuit breaker testing accessories.		8 x 10 m, (32.8 ft)	GA-00241
		8 x 15 m, (49.2 ft)	GA-00251
CABA Win		Extension cables, XLR female to male	
Circuit breaker analysis software		For analog input, 10 m (32.8 ft)	GA-01005
Incl. USB cable	BL-8206X	For time measurement of main contacts, 10 m (32.8 ft)	GA-00150
SDRM201	CG-90250		
Incl:		Open analog cable	
SDRM201 unit		For customized analog transducer connection	GA-01000
SDRM Cable		XLR to 4 mm safety plugs	
Current cables	GA-12820, GA-12830	For customized analog transducer connection	GA-00040
Extension cables for SDRM201		VD401	
10 m (33 ft) extension	GA-12812	Voltage divider, ratio 400/1 (for TM1600 and EGIL with analog channel)	BL-90070
		Thermopaper	
		14 mm, 30 m	GC-00030
		Cable organizer	
		Hook and loop fastener, 10 pcs	AA-00100