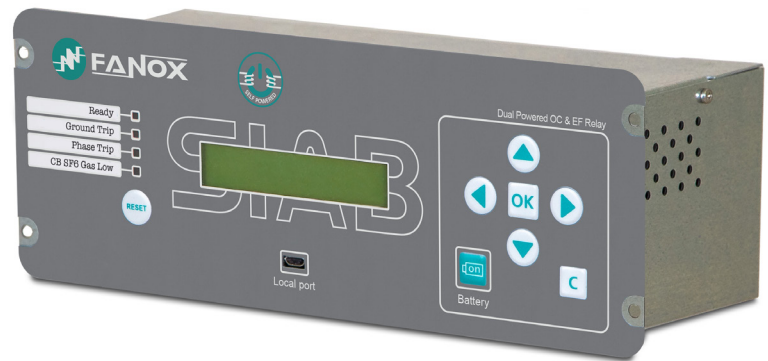


SIA-B Standard CT's

Advanced OC&EF Dual &
Self Powered Protection
Relay



SELF POWERED TECHNOLOGY



Overcurrent & Earth Fault Protection Relay

Secondary Distribution Protection, RMUs, MRMUs, and SF6 insulated Switchgears

- The SIA-B is an OC&EF protection relay with self powered and dual powered (self-powering + auxiliary power) options.

- The relay is self powered using the operating current through three /1 (<2VA) standard current transformers fitted on the lines. These transformers are also used to obtain current measurements. Besides, SIA-B can be used with auxiliary power supply (24-230Vac/dc). The relay can be also supplied by a USB cable connected to the laptop, with the USB KITCOM adapter or a standard power bank.



Multiple options for powering and communication

- Internal commissioning battery included (Lithium battery: 20 years lifetime).

- Metallic box with high electromagnetic compatibility level (EMC) and wide range of operating temperature.

- Really low start-up levels in self powered mode: 75mA in three phase system /160 mA in single phase system.

- Test menu allows the trip circuit to be tested before the transformation centre is powered up.

- There are 4 configurable LEDs. When the relay is switched off, their previous states can be checked by powering the relay up (by self-powering the relay through USB cable, auxiliary voltage or pressing commissioning battery).

ANSI CODE PROTECTIONS	
50	Instantaneous phase overcurrent
51	Inverse time phase overcurrent
50G	Instantaneous measured neutral overcurrent
51G	Inverse time measured neutral overcurrent
SHB	Second Harmonic Blocking
49T	External trip
46	Phase balance current protection
49	Thermal overload
CLP	Cold Load Pickup
52	Breaker wear monitoring
50BF	Circuit Breaker Failure
68	Zone selection interlocking
TB	Trip block for switch disconnect
PGC	Programmable logic control

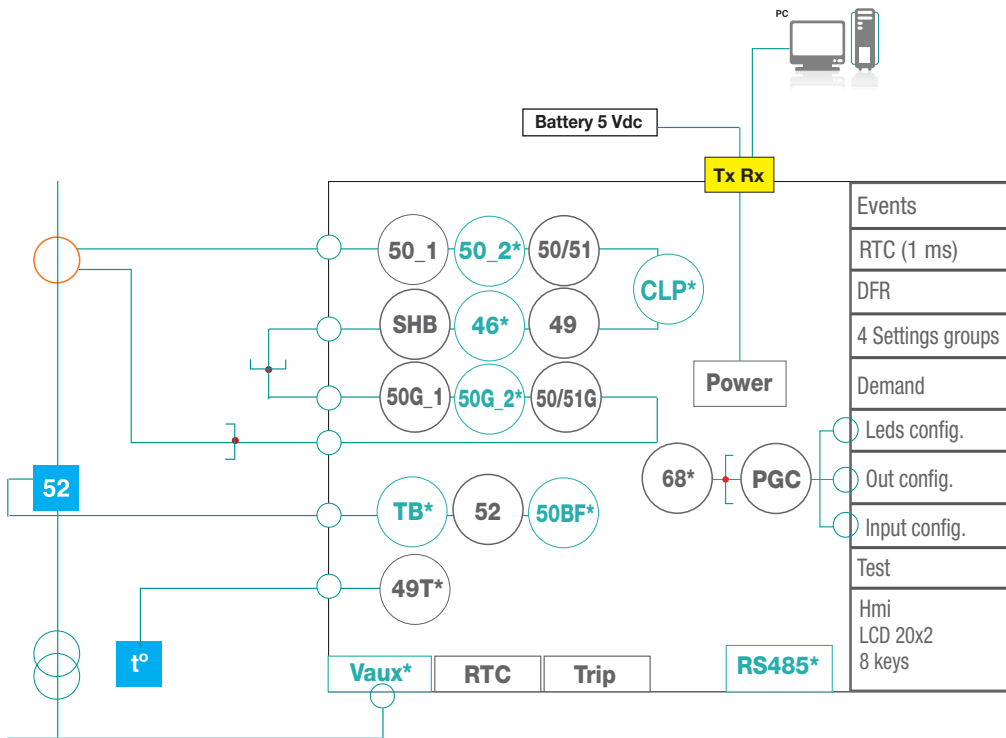


- Self-diagnosis of the relay status (WATCHDOG) through the configurable LEDs and outputs.
- Low power consumption.
- To allow communication, relays are provided with a local micro USB front port and with optional remote communication RS485 port (Modbus RTU or DNP3.0 protocol, selectable by general settings) on the rear side.
- The SIA-B is provided with a trip output for low power coil (24 Vdc – 135 mJ), 3 configurable inputs and 3 configurable outputs.
- The SIA-B is fitted with the demand of current (Load Data Profiling) with the following characteristics:
 - Number of records: 168
 - Recording mode circular
 - Sampling rate (interval): configurable through communications 1-60 min

- The SIA-B is provided with non-volatile RAM memory in order to store up to 1.024 events and disturbance fault recording (DFR-20 fault reports and 10 oscillographic records in COMTRADE format), maintaining date & time thanks to its internal RTC (Real Time Clock) even without power supply.
- The oscillography is downloaded by communications port. The SiCom communications program allows the oscillography record to be downloaded and saved in COMTRADE format (IEEE C37.111-1991).
- The installation and subsequent maintenance of external batteries is eliminated. The operating costs of the centre are reduced.
- Its compact size makes SIA-B easy to install and its light weight helps the customer to save costs in transport.



Functions diagram SIA-B



* optional

*Available through configurable inputs

ANSI CODE PROTECTIONS

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Technical parameters SIA-B

Function 50-1	Function Enable: No/Yes/SHB	Function 51G	Function Enable: No/Yes/SHB
	Current Tap: 0.07 to 20.00 xIn (step 0.01 xIn)		Curve Type: IEC 60255-151 and IEEE curves.
Function 50-2 (*)	Time Delay: 0.02 to 300.00 s (step 0.01 s)		IEC (Definite time, standard inverse, very inverse, extremely inverse, long time inverse, short time inverse) and IEEE (Moderately inverse, very inverse, extremely inverse).
	Activation level: 100%		Time delay: 0.02 to 300.00 s (step 0.01 s)
	Deactivation level: 95%		Time Dial (TMS): 0.01 to 1.50 (step 0.01)
	Instantaneous deactivation		Current Tap: 0.05 to 7.00 xIn (step 0.01 xIn)
	Timing accuracy:		Curve, current activation level: 110%
	Without SHB permitted: ± 30 ms or $\pm 0.5\%$ (greater of both).		Curve, current deactivation level: 100%
	With SHB permitted: ± 50 ms or $\pm 0.5\%$ (greater of both).		Defined time, current activation level: 100%
			Defined time, current deactivation level: 95%
Function 50G-1	Function Enable: No/Yes/SHB	Function SHB	Instantaneous deactivation
	Current Tap: 0.05 to 10.00 xIn (step 0.01 xIn)		Timing accuracy for IEC and IEEE curves selection:
Function 50G-2 (*)	Time Delay: 0.02 to 300.00 s (step 0.01s)		± 30 ms or $\pm 5\%$ (greater of both)
	Activation level: 100%		Timing accuracy for defined time curve selection:
	Deactivation level: 95%		± 35 ms or $\pm 0.5\%$ (greater of both)
	Instantaneous deactivation		Function enable: No/Yes
	Timing accuracy:		Current Tap: 5 to 50% (step 1%)
	Without SHB permitted: ± 30 ms or $\pm 0.5\%$ (greater of both).		Reset Time: 0.00 to 300.00 (step 0.01 s)
	With SHB permitted: ± 50 ms or $\pm 0.5\%$ (greater of both).	Function 49T	Block Threshold: 0.07 to 20.00 xIn (step 0.01 xIn)
			Activation level: 100%
Function 51	Function Enable: No/Yes/SHB		Deactivation level: 95%
	Curve Type: IEC 60255-151 and IEEE curves.		Temporized deactivation
	IEC (Definite time, standard inverse, very inverse, extremely inverse, long time inverse, short time inverse) and IEEE (Moderately inverse, very inverse, extremely inverse).	Function 49	External trip through configurable inputs. Activated by short circuiting the terminals (without auxiliary voltage)
	Time delay: 0.02 to 300.00 s (step 0.01 s)		Function enable: No/Yes
	Time Dial (TMS): 0.01 to 1.50 (step 0.01)		Current tap: 0.10 to 2.40 In (step 0.01xIn)
	Current Tap: 0.07 to 7.00 xIn (step 0.01 xIn)		ζ heating: 3 to 600 min (step 1 min)
	Curve, current activation level: 110%		ζ cooling: 1 to 6 x ζ heating (step 1)
	Curve, current deactivation level: 100%		Alarm: 20 to 99% (step 1%)
	Defined time, current activation level: 100%		Trip level: 100%
	Defined time, current deactivation level: 95%		Deactivation level: 95% of alarm level
	Instantaneous deactivation	Function 52	Timing accuracy: $\pm 5\%$ respect of theoretical value.
	Timing accuracy for IEC and IEEE curve selection:		Maximum number of openings: 1 to 10.000 (step 1)
	Without SHB permitted: ± 30 ms or $\pm 5\%$ (greater of both).		Maximum accumulated amperes: 0 to 100.000 (M(A ²)) (step 1)
	With SHB permitted: ± 50 ms or $\pm 5\%$ (greater of both).		Opening time: 0.02 to 30.00 s (step 0.01 s)
	Timing accuracy for defined time selection:		Closing time: 0.02 to 30.00 s (step 0.01 s)
	Without SHB permitted: ± 30 ms or $\pm 0.5\%$ (greater of both).		Excessive repeated openings: 1 to 10.000 (step 1)
	With SHB permitted: ± 50 ms or $\pm 0.5\%$ (greater of both).	Function TB (*)	Repetitive openings/Time: 1 to 300 min (step 1 min)
			Open circuit breaker activation threshold: 60 mA
			Function Enable: No/Yes
			Tap: 1.50 to 20.00 xIn (step 0.01 xIn)

Technical parameters SIA-B

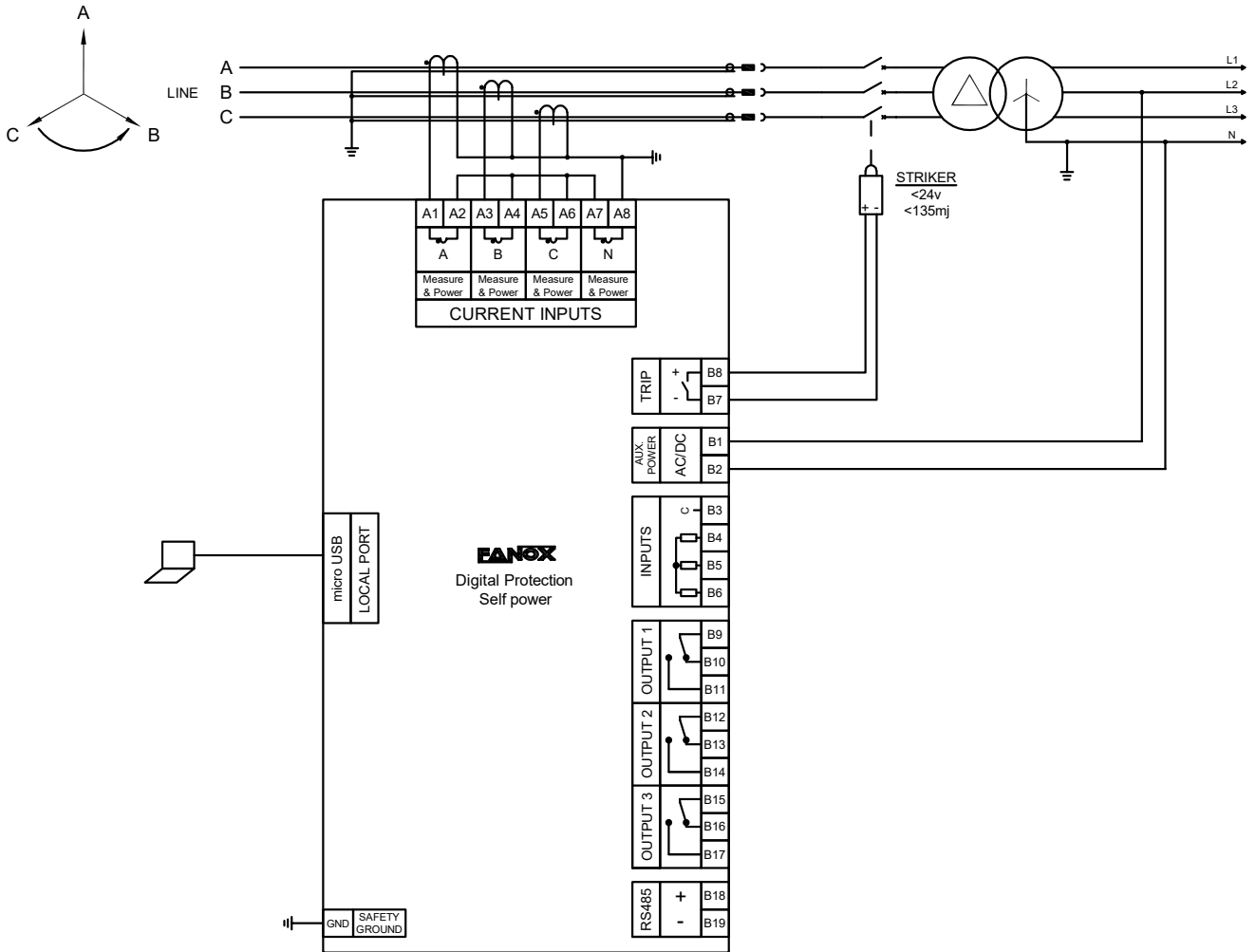
Function 46 (*)	Function enable: No/Yes
	Curve Type: IEC 60255-151 and IEEE curves.
	IEC (Definite time, standard inverse, very inverse, extremely inverse, long time inverse, short time inverse) and IEEE (Moderately inverse, very inverse, extremely inverse).
	Time delay: 0.02 to 300.00 s (step 0.01 s)
	Time Dial (TMS): 0.01 to 1.50 (step 0.01)
	Current tap: 0.10 to 7.00 xIn (step 0.01xIn)
	Curve, current activation level: 110%
	Curve, current deactivation level: 100%
	Defined time, current activation level: 100%
	Defined time, current deactivation level: 95%
	Instantaneous deactivation
	Timing accuracy for IEC and IEEE curve selection: Without SHB permitted: ± 30 ms or $\pm 5\%$ (greater of both). With SHB permitted: ± 50 ms or $\pm 5\%$ (greater of both).
	Timing accuracy for defined time curve selection: Without SHB permitted: ± 30 ms or $\pm 0.5\%$ (greater of both). With SHB permitted: ± 50 ms or $\pm 0.5\%$ (greater of both).
	Function CLP (*)
	Settings groups: 1 to 4 (step 1)
	No load Time: 0.02 to 300.00 s (step 0.01 s)
	Cold load Time: 0.02 to 300.00 s (step 0.01 s)
	CLP activation threshold: 60 mA
	CLP reset threshold: 80 mA
Function 50BF (*)	Function Enable: No/Yes
	Time Delay: 0.02 to 1.00 s (step 0.01 s)
	Open circuit breaker activation threshold: 60 mA
Function 68	Available through configurable inputs and outputs thanks to the programmable logic (PGC).
Programmable logic control (PGC)	OR4, OR4_LATCH, OR4_PULSES, OR4_TIMERUP, OR4_PULSE, NOR4, NOR4_TIMERUP, NOR4_PULSE, NOR4_PULSES, AND4, AND4_PULSES, AND4_TIMERUP, AND4_PULSE, AND4_LATCH, NAND4, NAND4_TIMERUP, NAND4_PULSE
Settings tables	4 settings groups
	Selectable by input or general setting.
SER	1024 events
Disturbance fault recording (DFR)	16 samples/cycle
	20 fault reports, 16 events in each.
	10 disturbance records in COMTRADE format (50 cycles each).
	COMTRADE IEEE C37.111-1991 - 4 analog channels and 32 digital channels

Load Data Profiling (LDP)	Demand of power with the following characteristics:
	- Number of records: 168 - Recording mode circular - Sampling rate (interval): configurable through communications (1-60 min)
Trip output	24 Vdc; 135 mJ (activation of the striker or low powered coil)
Outputs	3 configurable outputs (output 1, output 2 and output 3):
	250 Vac – 8 A 30 Vdc – 8 A
Inputs	3 inputs: they are activated by short-circuiting the terminals without external supply.
Current measurements	Fundamental values (DFT)
	Sampling: 16 samples/cycle $\pm 2\%$ in a band of $\pm 20\%$ the nominal current and $\pm 4\%$ or ± 5 mA in the rest of the band.
Communications	Local port (micro USB): Modbus RTU
	RS485 rear port: Modbus RTU or DNP3.0 Serial (*)
Self powering from current	Three phase self-powering level: $I > 75$ mA
Power supply (*)	24-230 Vac/Vdc -20/+10%
Battery Supply	With USB KITCOM adapter or standard powerbank
	Commissioning internal battery
Transformers	Power supply and measurement standard CTs /1
Environmental conditions	Operating temperature: -40 to 70°C
	Storage temperature: -40 to 80°C
	Relative humidity: 95%
Mechanical characteristics	Metallic box
	Panel mounted
	Height x Width: 90 mm x 245 mm
	Depth: 139.4 mm
	Weight: 3 kg
	IP-54 panel mounted

(*) Optional depending on model

Connections diagram SIA-B

- 3 CT power supply-measurement
- Rigid neutral



(*) Example of connections diagram

Kema Standards SIA-B

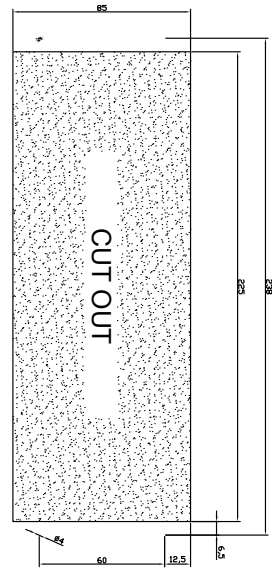
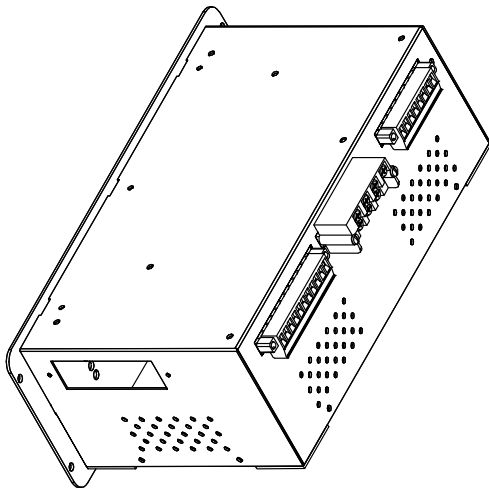
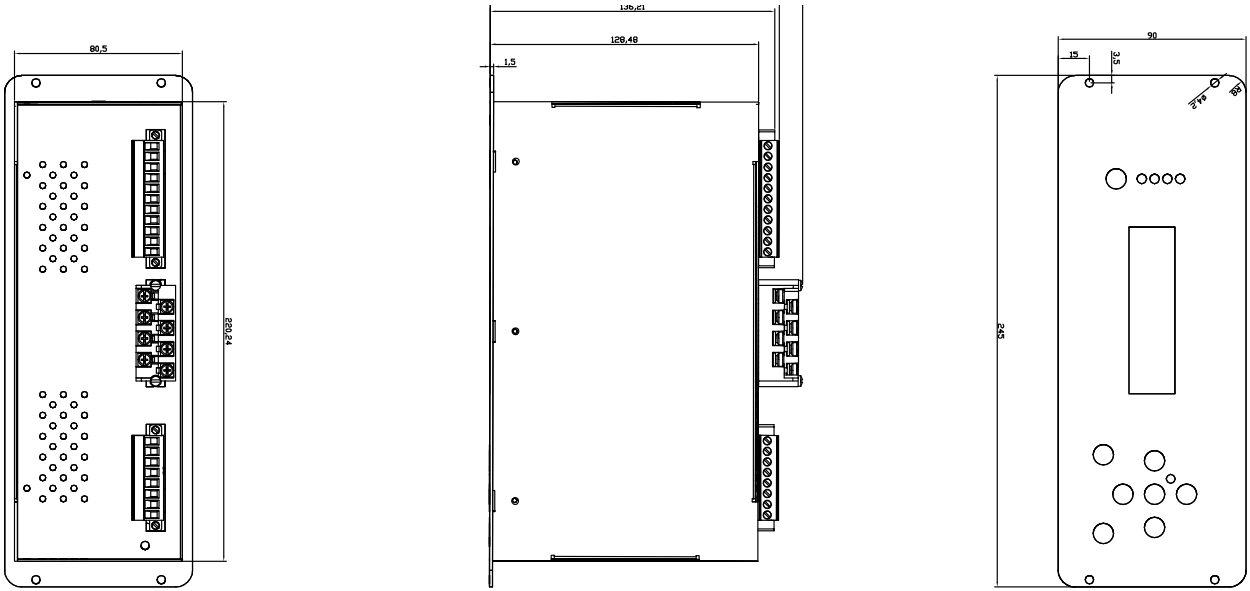
TEST	TEST STANDARD	LEVEL
1. DIELECTRIC TESTS		
1.1. Impulse voltage	IEC60255-27	5 kV
	Clause 10.6.4.2	1 kV
1.2. Dielectric voltage	IEC60255-27	2 kV
	Clause 10.6.4.3	0,5 kV
1.3. Insulation resistance	IEC60255-27 Clause 10.6.4.4	500 VDC
2. ELECTROMAGNETIC COMPATIBILITY (EMC) tests		
2.1. EMISSION		
2.1.1. Radiated emission	IEC 60255-26	class A class A
	CISPR11	
	CISPR22	
	table 1 table 6 table 7	
2.1.2. Conducted emission	IEC 60255-26 CISPR22 table 2 table 2/4	class A
2.2. IMMUNITY		
2.2.1. Slow damped oscillatory wave (1 MHz)	IEC 60255-26 (IEC 61000-4-18) Clause 7.2.6	2,5 kV CM 1,0 kV DM 1 kV CM 0 kV DM
2.2.2. Electrostatic discharges	IEC 60255-26 (IEC 61000-4-2) Clause 7.2.3	6 kV cont. 8 kV air
2.2.3. Radiated radio frequency magnetic field	IEC 60255-26 (IEC 61000-4-3) Clause 7.2.4	80 - 1000 MHz
		10 V/m
		1,4 – 2,7 GHz
		10 V/m
		80, 160, 380, 450, 900, 1850, 2150 MHz
10 V/m		
2.2.4. Fast transient/ burst	IEC 60255-26 (IEC 61000-4-4) Clause 7.2.5	<input checked="" type="checkbox"/> Zone A
		4 kV CM
		2 kV CM
		<input type="checkbox"/> Zone B 2 kV CM 1 kV CM
2.2.5. Surge	IEC 60255-26 (IEC 61000-4-5) Clause 7.2.7	<input checked="" type="checkbox"/> Zone A to 4 kV LE to 2 kV LL
		<input type="checkbox"/> Zone B to 2 kV LE to 1 kV LL

TEST	TEST STANDARD	LEVEL
2.2.6. Conducted disturbance induced by RF fields	IEC 60255-26 (IEC 61000-4-6) Clause 7.2.8	0,15 - 80 MHz
		10 V 27, 68 MHz 10 V
2.2.7. Power frequency voltage (50 Hz)	IEC 60255-26 (IEC 61000-4-16) Clause 7.2.9	<input checked="" type="checkbox"/> Zone A 150 V DM 300 V CM
		<input type="checkbox"/> Zone B 100 V DM 300 V CM
2.2.8. Power frequency H- field (50 Hz)	IEC 60255-26 (IEC 61000-4-8) Clause 7.2.10	30 A/m cont. 300 A/m 1-3 s
2.2.9. D.C. Voltage dips	IEC 60255-26 (IEC 61000-4-29) Clause 7.2.11	100%; 10-1000 ms
		60%; 200 ms 30%; 500 ms
2.2.10. A.C. voltage dips	IEC 60255-26 (IEC 61000-4-11) Clause 7.2.11	100%; 0,5 – 25 c.
		60%; 10/12 c. 30%; 25/30 c.
2.2.11. D.C. voltage interruptions	IEC 60255-26 (IEC 61000-4-29) Clause 7.2.11	100%; 5s
2.2.12. A.C. voltage interruptions	IEC 60255-26 (IEC 61000-4-11) Clause 7.2.11	100%; 250/300 c
2.2.13. D.C. Ripple	IEC 60255-26 (IEC 61000-4-17) Clause 7.2.12	15% Ut_dc 100/120 Hz
2.2.14. D.C gradual shut-down/start-up	IEC 60255-26 Clause 7.2.13	Shut-down ramp 60 s 5 min off Start-up ramp 60 s
2.2.15. Damped oscillatory magnetic field (100 kHz and 1 MHz)	IEC 61000-4-10	<input checked="" type="checkbox"/> Zone A 100 A/m (peak)
		<input type="checkbox"/> Zone B 30 A/m (peak)
2.2.16. Pulse magnetic field	IEC 61000-4-9	1000 A/m
3. MECHANICAL ENVIRONMENTAL CONDITIONS		
3.1. Vibration response	IEC 60255-1 (IEC 60255-21-1) Clause 6.13.1	class 1
3.2. Vibration endurance	IEC 60255-1 (IEC 60255-21-1) Clause 6.13.1	class 1
3.3. Shock response	IEC 60255-1 (IEC 60255-21-2) Clause 6.13.2	class 1

Kema Standards SIA-B

TEST	TEST STANDARD	LEVEL
3.4. Shock withstand	IEC 60255-1 (IEC 60255-21-2) Clause 6.13.2	class 1
3.5. Bump	IEC 60255-1 (IEC 60255-21-2) Clause 6.13.2	class 1
3.6. Seismic (single axis sweep)	IEC 60255-1 (IEC 60255-21-3) Clause 6.13.3	class 1
4. CLIMATIC ENVIRONMENTAL CONDITIONS		
4.1. Dry heat operational	IEC 60255-1 (IEC 60068-2-2, test Bd) Clause 6.12.3.1	+70°C; 72h
4.2. Cold operational	IEC 60255-1 (IEC 60068-2-1, test Ad) Clause 6.12.3.2	-40°C; 72h
4.3. Dry heat storage	IEC 60255-1 (IEC 60068-2-2, test Bb) Clause 6.12.3.3	+80°C; 72h
4.4. Cold storage	IEC 60255-1 (IEC 60068-2-1, test Ab) Clause 6.12.3.4	-40°C; 72h
4.5. Change of temperature	IEC 60255-1 (IEC 60068-2-14, test Nb) Clause 6.12.3.5	-40°C; +70°C 3 hours 5 cycles
4.6. Damp heat, steady state	IEC 60255-1 (IEC 60068-2-78, test Cab) Clause 6.12.3.6	+40°C; 93% 10 days
4.7. Damp heat, cyclic	IEC 60255-1 (IEC 60068-2-30, test Db) Clause 6.12.3.7	+25°C; 40°C 97%; 93% 6 cycles

Dimensions and cutout SIA-B



Selection & Ordering data SIA-B

SIA-B										Overcurrent & Earth Fault Protection Relay – Dual & Self Powered									
1										PHASE CURRENT MEASUREMENT 1 A									
1										NEUTRAL CURRENT MEASUREMENT 1 A									
0										NET FREQUENCY Defined by General Settings									
A F										POWER SUPPLY Self powered + Commissioning battery Self powered + 24-230 Vac/dc (Dual) + Commissioning battery									
C D										ADDITIONAL FUNCTIONS + 49 + SHB + 4 Settings groups + LDP + DFR + 52 + 49 + SHB + 4 Settings groups + LDP + DFR + 52 + 46 + Trip Block + 50_2 + 50G_2 + CLP + 50BF									
0 2										COMMUNICATIONS USB (Modbus RTU) USB (Modbus RTU) + RS485 (Modbus RTU or DNP3.0 Serial)									
3										INPUTS AND OUTPUTS 4 LEDs + Trip (Striker) + 3 Outputs + 3 Inputs									
2 6 7										MECHANICAL ASSEMBLY Extended Horizontal Assembly Extended Horizontal Assembly with anticorrosive treatment Extended Horizontal Assembly with red LED for IRF and ring lug current connector									
A B C D										LANGUAGE English, Spanish and German English, Spanish and Turkish English, Spanish and French English, Spanish and Russian									
C U										ADAPTATION 50_1 + 51 + 50G_1 + 51G + PGC 50_1 + 51 + 50G_1 + 51G + PGC + UL certification									

Example of ordering code:

SIA-B	1	1	0	F	C	0	3	2	A	C	<i>SIA B 1 1 0 F C 0 3 2 A C</i>									
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