

SIA-B Specific CT's

OC&EF
DUAL & SELF POWERED
PROTECTION RELAY

Secondary Distribution Protection
RMUS, MRMUS, AND SF6 INSULATED SWITCHGEARS



Transformer



Wind Power



Solar Power

PM I

SP 0.4 xIn

CI Spec. CTs

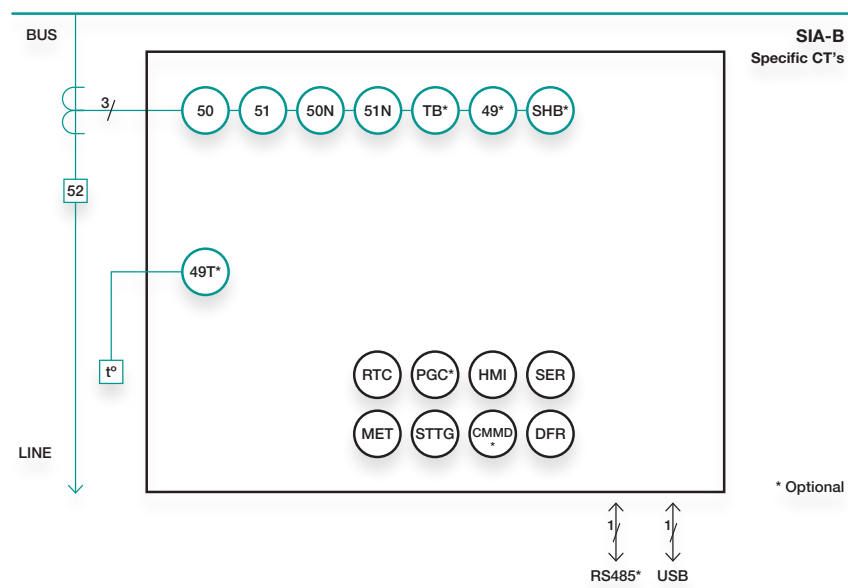


KEMA Labs

- 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 specific 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.
- Internal commissioning battery included (Lithium battery: 20 years lifetime), as optional.
- Metallic box with high electromagnetic compatibility level (EMC) and wide range of operating temperature.
- In self powered mode, SIA-B starts-up from 0.4 times the minimum primary current of the CT (three phase current).
- Test menu allows the trip circuit to be tested before the transformation centre is powered up.
- Bistable magnetic indicator (flag) which indicates the trip condition, maintaining its position even though the relay loses the supply.

- Self-diagnosis of the relay status (WATCHDOG) through a LED.
- 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 protocol) on the rear side.
- The SIA-B is provided with a trip output for low power coil (24 Vdc – 135 mJ) and depending on model, 1 external trip input and 2 configurable outputs.
- The SIA-B is provided with non-volatile RAM memory in order to store up to 100 events and disturbance fault recording (DFR – 4 fault reports in data format), maintaining date & time thanks to its internal RTC (real Time Clock) even without power supply.
- 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



ANSI CODE PROTECTIONS

50	Instantaneous phase overcurrent
51	Inverse time phase overcurrent
50N	Instantaneous calculated neutral overcurrent
51N	Inverse time calculated neutral overcurrent
SHB	Second Harmonic Blocking
49T	External trip
49	Thermal overload
TB	Trip block for switch disconnect
PGC	Programmable logic control

ADDITIONAL FUNCTIONS

RTC	Real Time Clock
PGC	Programmable Logic Control
HMI	Human Machine Interface
SER	Sequential Event Recording
DFR	Disturbance Fault Recording
MET	Metering
STTG	Settings Groups
CMMD	Commands

TECHNICAL PARAMETERS SIA-B

Function 50	Function Enable: Yes/No/SHB ^(*)
	Current Tap: 0.20 to 20.00 xIn (step 0.01 xIn)
	Time Delay: 0.02 to 300.00 s (step 0.01 s)
	Activation level 100%
	Deactivation level 95%
	Instantaneous deactivation
	Timing accuracy: ± 30 ms or $\pm 0.5\%$ (greater of both)
Function 50N	Function Enable: Yes/No/SHB ^(*)
	Current Tap: 0.20 to 20.00 xIn (step 0.01 xIn)
	Time Delay: 0.05 to 300.00 s (step 0.01 s)
	Activation level 100%
	Deactivation level 95%
	Instantaneous deactivation
	Timing accuracy: ± 30 ms or $\pm 0.5\%$ (greater of both)
Function 51	Function Enable: Yes/No/SHB ^(*)
	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): 0.05 to 1.25 (step 0.01)
	Current Tap: 0.20 to 7.00 xIn (step 0.01 xIn)
	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: ± 30 ms or $\pm 5\%$ (greater of both, considering the operating time is influenced by the used CT)
Function 51N	Function Enable: Yes/No/SHB ^(*)
	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: 0.05 to 300.00 s (step 0.01 s)
	Time Dial (TMS): 0.05 to 1.25 (step 0.01)
	Current Tap: 0.20 to 7.00 xIn (step 0.01 xIn)
	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: ± 30 ms or $\pm 5\%$ (greater of both, considering the operating time is influenced by the used CT)

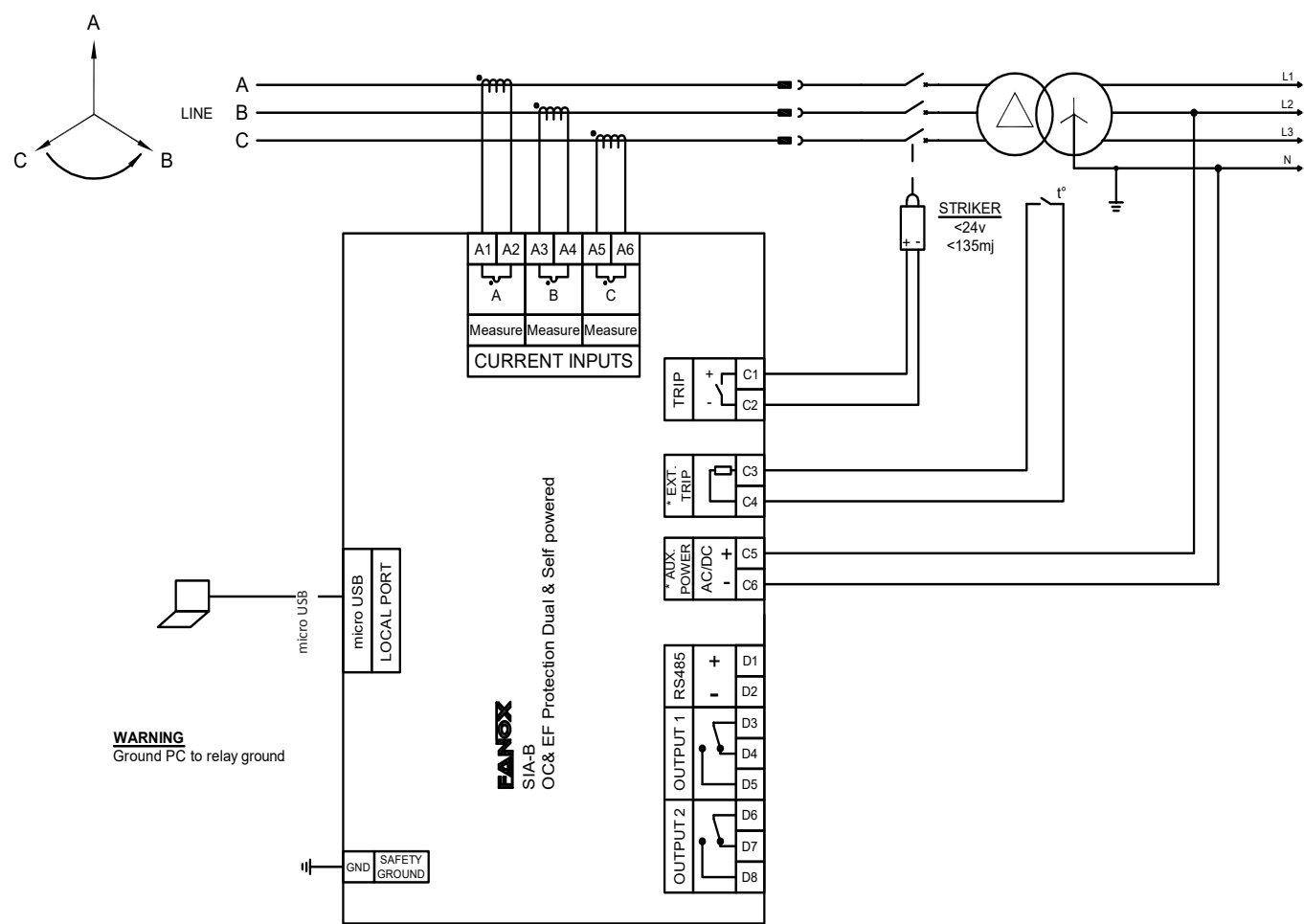
Function 49T (*)	External trip through a specific input. Activated by short circuiting the terminals (without auxiliary voltage)
Function 49 (*)	Function enable: No/Yes
	Current tap: 0.10 to 2.40 In (step 0.01xIn)
	ζ heating: 3 to 600 min (step 1 min)
	ζ cooling: 1 to 6 x ζ heating (step 1)
	Alarm: 20 to 99% (step 1%)
	Trip level: 100%
	Deactivation level: 95% of alarm level
Function TB (*)	Function Enable: Yes/No
	Tap: 1.50 to 20.00 xIn (step 0.01 xIn)
Function SHB (*)	Function enable: No/Yes
	Current Tap: 5 to 50% (step 1%)
	Reset Time: 0.00 to 300.00 (step 0.01 s)
	Block Threshold: 0.20 to 20.00 xIn (step 0.01 xIn)
	Activation level: 100%
Programmable logic control (PGC) (*)	Deactivation level: 95%
	Temporized deactivation
Settings tables	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
	2 settings groups
SER	Selectable by general settings.
	100 events
Disturbance fault recording (DFR)	16 samples/cycle
	4 fault reports, 24 events in each.
Trip output	24 Vdc; 135 mJ (activation of the striker or low powered coil)
Outputs (*)	2 configurable outputs (output 1 and output 2):
	250 Vac – 8 A (62.5 VA max)
	30 Vdc – 8 A (30 W max)
	(*) For the model with UL certification, the maximum current is 4 A
Inputs (*)	External trip input: it is activated by short-circuiting the terminals without external supply.
Current measurements	True RMS
	Sampling: 16 samples/cycle
	Relay accuracy for triphasic current: <2%
	CT Accuracy depending on the used CT: $\leq \pm 5\%$ with CT-5 type and $\leq \pm 10\%$ with CT-10 type.
Communications	Local port (micro USB): Modbus RTU
	RS485 rear port: Modbus RTU (*)
Self powering from current	Three phase self-power level: $I > 0,35 \times I_s$ min
Power supply (*)	24-230 Vac/Vdc -20/+10%

TECHNICAL PARAMETERS SIA-B

Battery Supply (*)	With USB KITCOM adapter or standard powerbank
	Internal Commissioning battery (*)
Transformers	Power supply and measurement through specific CTs
Environmental conditions	Operating temperature: -40 to 70°C
	Storage temperature: -40 to 80°C
	Relative humidity: 95%
Mechanical characteristics	Metallic box
	Panel mounted
	Horizontal assembly:
	Height x Width x Depth:
	Push-in spring plug connector: 102.7x185.8x69.6 (mm)
	Screw type connector: 102.7x185.8x62.2 (mm)
	Vertical assembly:
	Height x Width x Depth:
	Push-in spring plug connector: 167.8x120.65x69.6 (mm)
	Screw type connector: 167.8x120.65x62.2 (mm)
	IP-54 panel mounted

(*) Optional depending on model

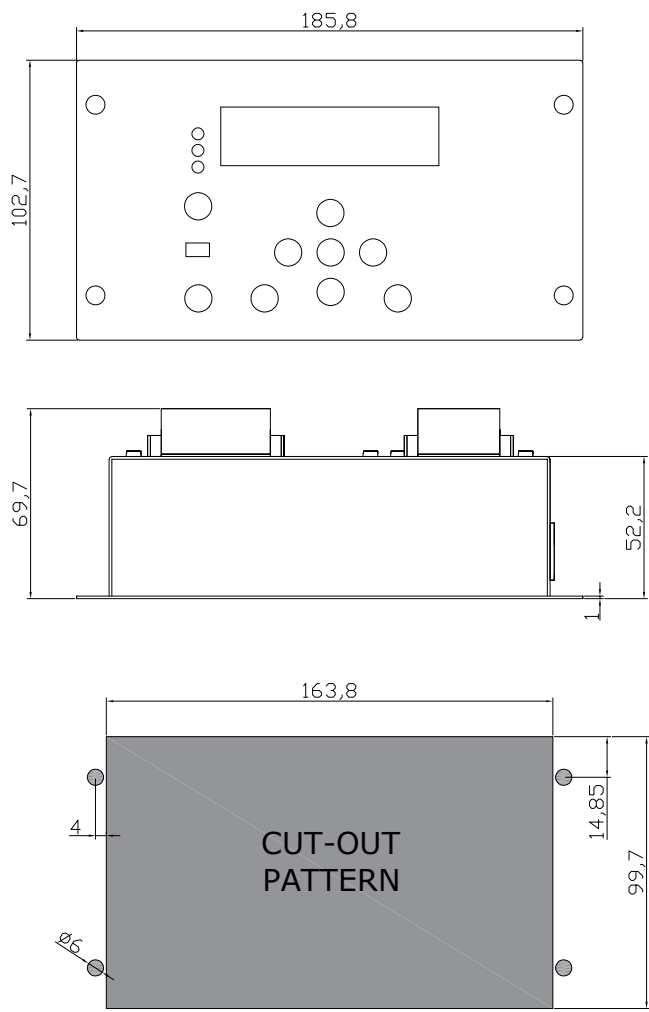
CONNECTIONS DIAGRAM SIA-B



(*) Example of connections diagram

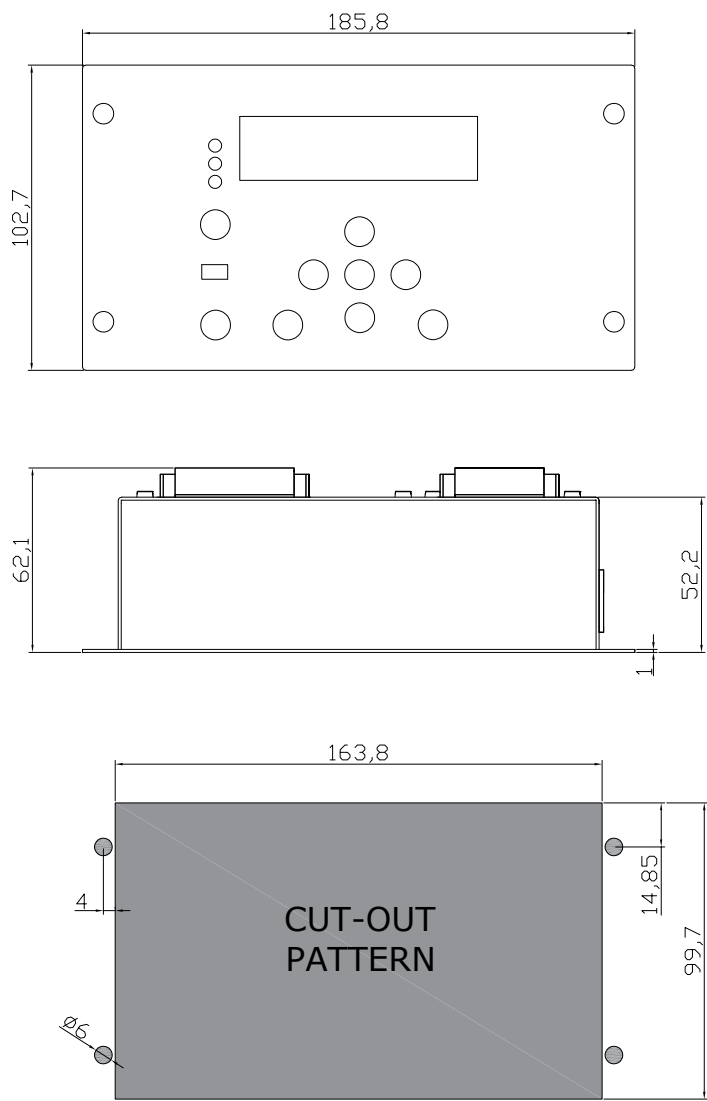
DIMENSIONS AND CUTOUT SIA-B

Horizontal assembly, push-in spring terminals



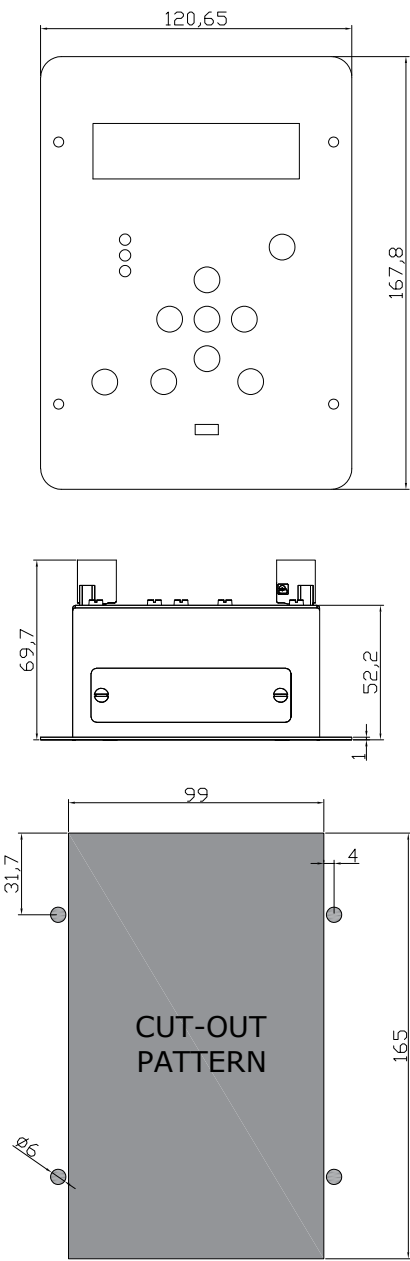
DIMENSIONS AND CUTOUT SIA-B

Horizontal assembly, screw terminals



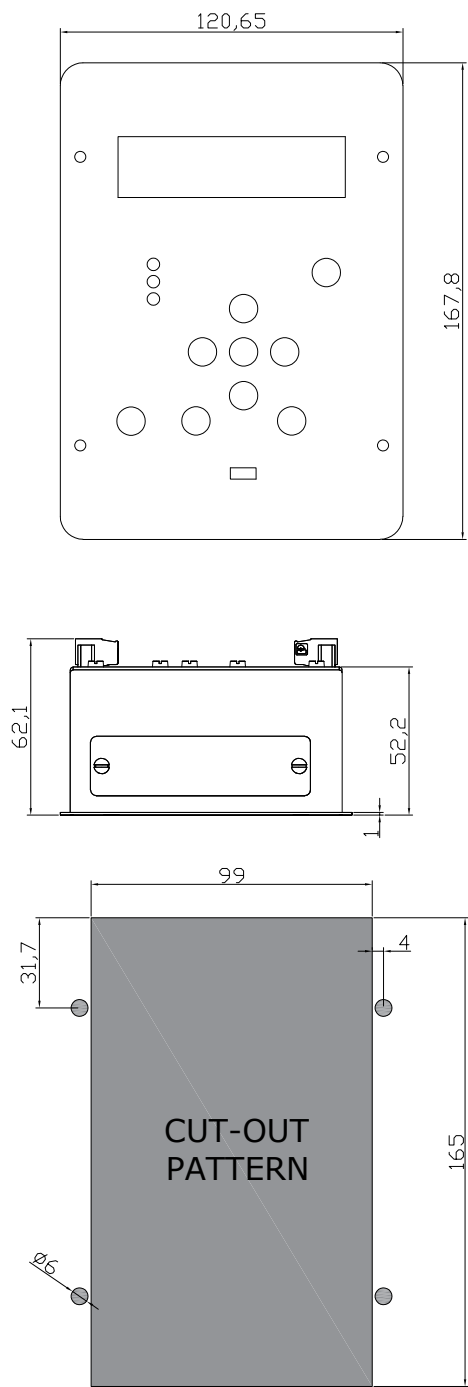
DIMENSIONS AND CUTOUT SIA-B

Vertical assembly, push-in spring terminals



DIMENSIONS AND CUTOUT SIA-B

Vertical assembly, screw terminals



KEMA STANDARDS SIA-B

TEST	TEST STANDARD	LEVEL
1. ELECTROMAGNETIC COMPATIBILITY (EMC) tests		
1.1. EMISSION		
1.1.1. Radiated emission	IEC 60255-26 CISPR11 CISPR22 table 1	class A class A
1.1.2. Conducted emission	IEC 60255-26 CISPR22 table 2 table 2/4	class A
1.2. IMMUNITY		
1.2.1. 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
1.2.2. Electrostatic discharges	IEC 60255-26 (IEC 61000-4-2) Clause 7.2.3	6 kV cont. 8 kV air
1.2.3. 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
1.2.4. Fast transient/burst	IEC 60255-26 (IEC 61000-4-4) Clause 7.2.5	☒ Zone A 4 kV CM 2 kV CM ☐ Zone B 2 kV CM 1 kV CM
1.2.5. Surge	IEC 60255-26 (IEC 61000-4-5) Clause 7.2.7	☒ Zone A to 4 kV LE to 2 kV LL ☐ Zone B to 2 kV LE to 1 kV LL
1.2.6. 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
1.2.7. Power frequency voltage (50 Hz and 60 Hz)	IEC 60255-26 (IEC 61000-4-16) Clause 7.2.9	☒ Zone A 150 V DM 300 V CM ☐ Zone B 100 V DM 300 V CM

1.2.8. Power frequency H- field	IEC 60255-26 (IEC 61000-4-8) Clause 7.2.10	30 A/m cont. 300 A/m 1-3 s
1.2.9. Damped oscillatory magnetic field (100 kHz and 1 MHz)	IEC 61000-4-10	☒ Zone A 100 A/m (peak) ☐ Zone B 30 A/m (peak)
1.2.10. Pulse magnetic field	IEC 61000-4-9	1000 A/m
1.2.11. 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.
1.2.12. A.C. voltage interruptions	IEC 60255-26 (IEC 61000-4-11) Clause 7.2.11	100%; 250/300 c
2. DIELECTRIC TESTS		
2.1. Impulse voltage	IEC60255-27 Clause 10.6.4.2	5 kV 1 kV
2.2. Dielectric voltage	IEC60255-27 Clause 10.6.4.3	2 kV 0,5 kV
2.3. Insulation resistance	IEC60255-27 Clause 10.6.4.4	500 VDC
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
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	-25°C; 72h

KEMA STANDARDS SIA-B

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	-25°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



SELECTION & ORDERING DATA SIA-B

SIA-B Specific CT's

Overcurrent & Earth Fault Protection Relay – Dual & Self-powered									
0									PHASE CURRENT MEASUREMENT Defined by General Settings
	0								NEUTRAL CURRENT MEASUREMENT Internal measurement
		0							NET FREQUENCY Defined by General Settings
			0 A 5 F						POWER SUPPLY Self powered Self powered + Commissioning battery Self powered + 24-230 Vac/dc (Dual) Self powered + 24-230 Vac/dc (Dual) + Commissioning battery
				0 1 2 3 B					ADDITIONAL FUNCTIONS - + 49 + SHB + 49 + SHB + Trip block for switch disconnecter + Trip Block for switch disconnecter
					0 1				COMMUNICATIONS USB (Modbus RTU) USB (Modbus RTU) + RS485 (Modbus RTU)
						0 1 2			INPUTS AND OUTPUTS Trip (striker) Trip (striker) + External trip input (49T) + 1 magnetic indicator Trip (striker) + External trip input (49T) + 1 magnetic indicator + 2 outputs
							A B C D E F G H		MECHANICAL ASSEMBLY Vertical Assembly with screw type plug connector Horizontal Assembly with screw type plug connector Vertical Assembly with screw type plug connector and anticorrosive treatment Horizontal Assembly with screw type plug connector and anticorrosive treatment Vertical Assembly with push-in spring plug connector Horizontal Assembly with push-in spring plug connector Vertical Assembly with push-in spring plug connector and anticorrosive treatment Horizontal Assembly with push-in spring plug connector and anticorrosive treatment
							A B C D		LANGUAGE English, Spanish and German English, Spanish and Turkish English, Spanish and French English, Spanish and Russian
								B T	ADAPTATION 50 + 51 + 50N + 51N + fast SOTF + microUSB port 50 + 51 + 50N + 51N + fast SOTF + microUSB port + UL Certification

Example of ordering code:

0	0	0	F	0	0	1	B	D	B	SIA B 0 0 0 F 0 0 1 B D B
SIA-B										