

SIA-B

Overcurrent and Earth Fault Protection Relay for Secondary Distribution

Dual & Self Powered



Main characteristics



- The SIA-B is a Dual & Self powered overcurrent protection relay using the operating current through three specific current transformers fitted on the lines. These transformers are also used to obtain current measurements. Optionally, SIAB relay can be used with auxiliary power supply (24 Vdc, 110 Vac or 230 Vac). The equipment can be occasionally supplied by an external battery portable kit (KITCOM).
- Internal commissioning battery as optional.
- 50, 50/51, 50N, 50/51N protection functions.
- Trip block for switch disconnecter + 49T + 49 as optional.
- Its compact size makes SIA-B really easy to install and its light weight helps the customer to save costs in transport.
- High electromagnetic conpocitivity (EMC)
- Low power consumption (0.5 W, 24 Vdc).
- Non-volatile RAM memory in order to store up to 100 events and 4 fault reports, without power supply thanks to its internal RTC (Real Time Clock).
- USB connection on the front (Modbus RTU communication protocol).
- There are bistable magnetic indicators which indicate the trip cause, maintaining their position even though the relay loses the supply (flags).
- In self powered modes, SIA-B starts-up from 0.4 Is of primary three phase current using specific CTs.

Specific CTs for SIA-B Relays



TAPED CTS

Special CTs			
Type	Code	*In Range	Class
CT08-5 Taped	41465	3-33 A	5P80
CT16-5 Taped	41451	6-65 A	5P80

* In is the value of the primary nominal current of the transformer.



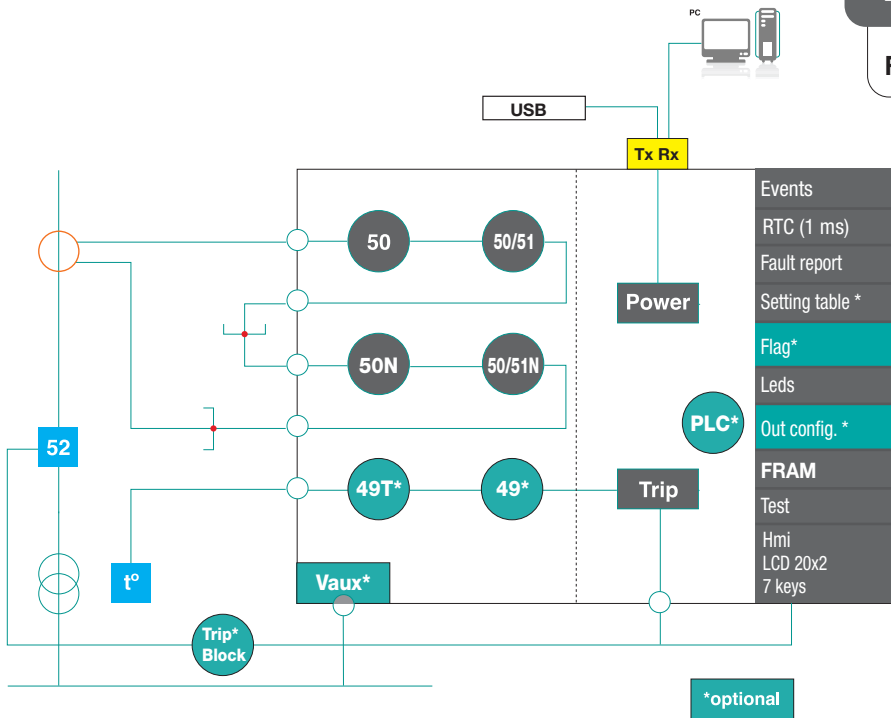
EPOXY RESIN

Special CTs			
Type	Code	*In Range	Class
CT08-5	41450	3-33 A	5P80
CT16-5	41458	6-65 A	5P80
CT16-10	41452	6-65 A	10P80
CT32-5	41453	12-130 A	5P80
CT64-5	41454	25-260 A	5P80
CT128-5	41455	51-520 A	5P80
CT256-5	41456	102-1040 A	5P80

* In is the value of the primary nominal current of the transformer.

Technical specifications SIA-B

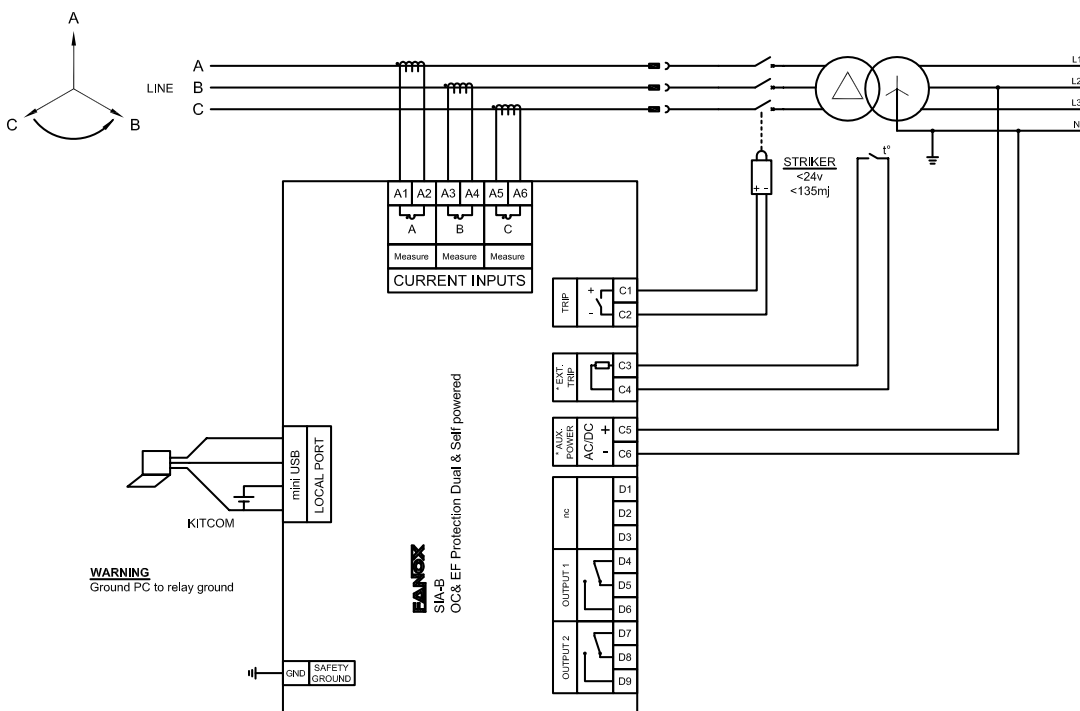
Functions diagram SIA-B



Technical specifications SIA-B

Connections diagram SIA-B

- 3 CT power supply-measurement Striker



Technical parameters SIA-B and Specific CTs

Function 50	Permission: Yes/No
	Operating range: 0.20 to 20 x Is (step 0.01)
	Operating time: 0.02 to 300 s (step 0.01 s)
	Activation level 100%
	Deactivation level 90%
	Instantaneous deactivation
Function 50N	Permission: Yes/No
	Operating range: 0.20 to 20 x Is (step 0.01)
	Operating time: 0.05 to 300 s (step 0.01s)
	Activation level 100%
	Deactivation level 90%
	Instantaneous deactivation
Function 50/51	Permission: Yes/No
	Operating range: 0.20 to 7 x Is (step 0.01)
	Curves: IEC 60255-151 and ANSI-IEEE
	Operating time: IEC Inverse curve, IEC very inverse curve, IEC extremely inverse curve IEC long time inverse, ANSI Inverse curve, ANSI very inverse curve, ANSI extremely inverse curve.
	Defined time: 0.02 to 300 s (step 0.01 s)
	Dial: 0.05 to 1.25 (step 0.01)
	Curve, activation level 110%
	Curve, deactivation level 100%
	Defined time, activation level 100%
	Defined time, deactivation level 90%
	Instantaneous deactivation
	Timing accuracy: ± 40 ms or $\pm 5\%$ (greater of both, considering the operating time is influenced by the used CT)
	Function 50/51N
Operating range: 0.20 to 7 x Is (step 0.01)	
Curves: IEC 60255-151 and ANSI-IEEE	
Operating time: IEC Inverse curve, IEC very inverse curve, IEC extremely inverse curve IEC long time inverse, ANSI Inverse curve, ANSI very inverse curve, ANSI extremely inverse curve.	
Defined time: 0.02 to 300 s (step 0.01 s)	
Dial: 0.05 to 1.25 (step 0.01)	
Curve, activation level 110%	
Curve, deactivation level 100%	
Defined time, activation level 100%	
Defined time, deactivation level 90%	
Instantaneous deactivation	
Timing accuracy: 5% or 40 ms (greater of both, considering the operating time is influenced by the used CT)	

Function 49T (*)	External trip. Charging time 7 seconds
Function 49 (*)	Function permission: yes/no
	Tap: 0.10 a 2.40 Is (step 0.01)
	ζ heating: 3 a 600 minutes (step 1 min)
	ζ cooling: 1 a 6 x ζ heating (step 1)
	Alarm level: 20 a 99% (step 1 %)
	Trip level: 100%
Trip Block (*)	Trip reset: 95% of alarm level
	Timing accuracy: $\pm 5\%$ regarding theoretical value
Programmable logic control (PLC)	Blocking: Yes/no
	Blocking limit: 1.5 to 20 x In (step 0.01)
Trip output	OR4, OR4_LATCH, OR4_PULSES, OR4_TIMERUP, OR4_PULSE, NOR4, NOR4_TIMERUP, NOR4_PULSE, AND4_PULSES, AND4_TIMERUP, AND4_PULSE, AND4_LATCH, NAND4, NAND4_TIMERUP, NAND4_PULSE.
Trip output	24 Vdc; 135 mJ (activation of the striker or low powered coil)
Signalling outputs (*)	2 configurable outputs (output 2andoutput3): 220 Vdc – 8 A (30 W max) 250 Vac – 8 A (62,5 VA max)
Frequency	50/60Hz
Current measure	True RMS
	Sampling: 16 samples/cycle Accuracy depending on the used CT: $<\pm 5\%$ with CT-5 type and $<\pm 10\%$ with CT-10 type
Fault reports	Four fault reports with 24 events per record
Communication	USB port: Modbus RTU
	*USB (Modbus RTU) + RS485 (Modbus RTU)
Auxiliary supply	230 Vac, $\pm 20\%$
	110 Vac, $\pm 20\%$
	24 Vdc, $\pm 10\%$
Battery supply	With USB KITCOM adapter Commissioning internal battery (*)
Self-power from current	Three phase self-power level: $I > 0,4$ x Is min
Environment	Operating temperature: -40 to 70°C
	Storage temperature: -40 to 80 °C
	Humidity: 95%
Transformers	Power supply and measurement specific CTs
Mechanical features	Panel Mounting
	Height x Width Vertical model: 120.65 x 167.80 (mm) Horizontal model: 185.8 x 102.7 (mm)
	Depth Vertical model: 56.2 mm Horizontal model: 59.7 mm
	IP-54 panel mounted

(*) Optional depending on model

Technical parameters EPOXY RESINED CTS

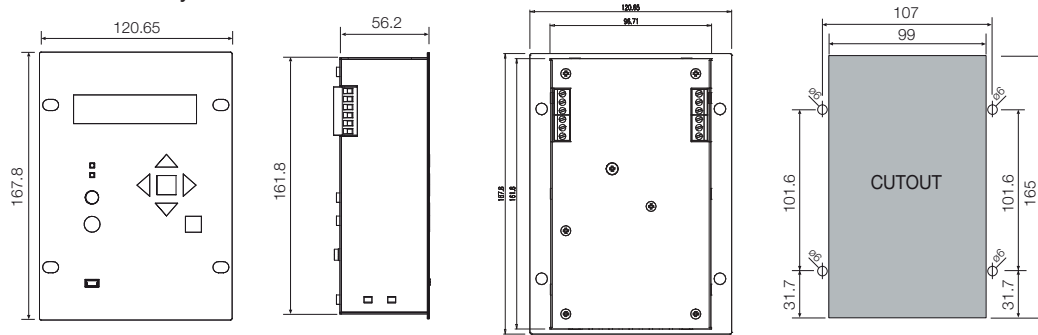
Application	Indoor Use
Class of insulation	Class E
Frequency	50-60 Hz
Ratio	.../ 0,075 A
Primary Conductor	Cable max. \varnothing 50 mm
Sec. wire diameter	Terminal for 6 mm ² solid/ 4 mm ² strand (Wire NOT included)
Test winding	0,288 A Nominal
Burden	0,1 VA
Protection	5P80/10P80
Material	PU & PA6.6

Technical parameters TAPED CTS

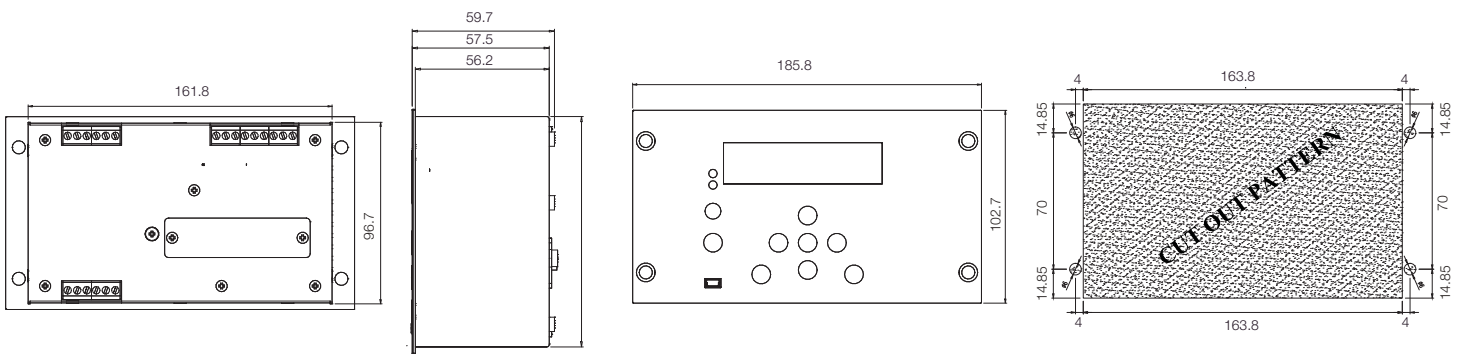
Application	Indoor Use
Class of insulation	Class A
Frequency	50-60 Hz
Ratio	.../ 0,075 A
Primary Conductor	Cable max. \varnothing 75 mm
Sec. wire diameter /length	2,5 mm ² / 3250 mm (Wire included)
Test winding	0,288 A Nominal
Burden	0,05 VA
Protection	5P80

Dimensions and cutout SIA-B

Vertical assembly

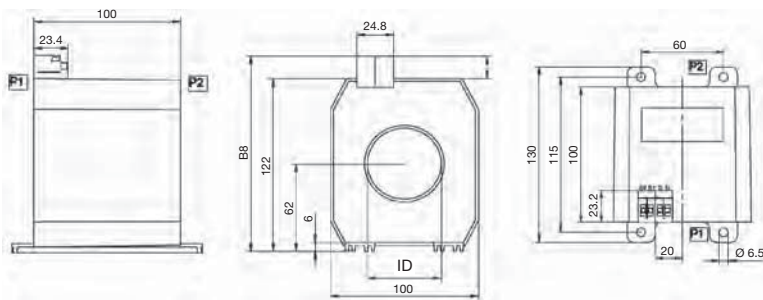


Horizontal assembly



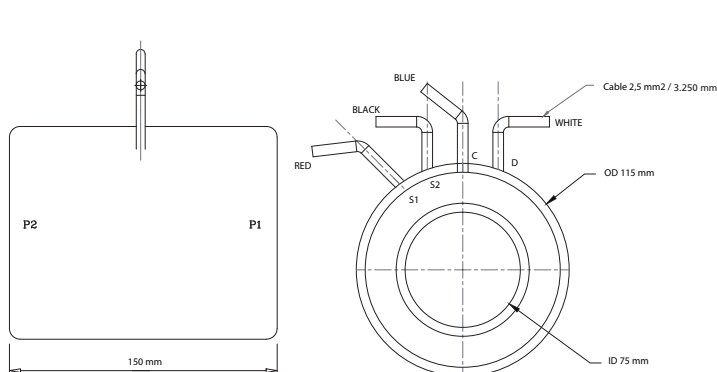
Digital outputs available depending on model.

Epoxy resin CT

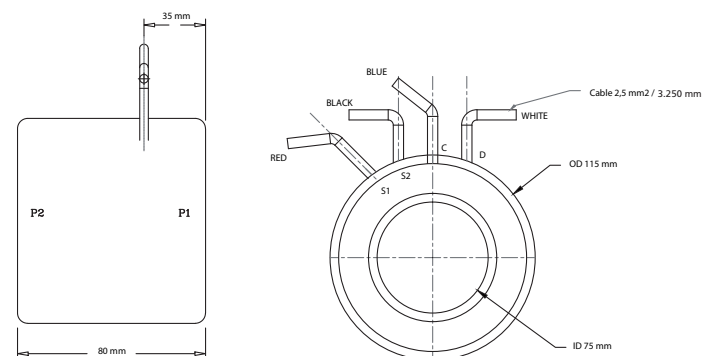


Type	ID (mm)	Code	Range (Is)	Class
CT08-5	45	41450	3-33 A	5P80
CT16-5	50	41458	6-65 A	5P80
CT16-10	50	41452	6-65 A	10P80
CT32-5	50	41453	12-130 A	5P80
CT64-5	50	41454	25-260 A	5P80
CT128-5	50	41455	51-520 A	5P80
CT256-5	50	41456	102-1040 A	5P80

CT08-05 Taped



CT16-05 Taped



Selection & Ordering data
SIA-B

SIA-B	Overcurrent & Earth Fault Protection Relay - Dual & Self Powered										PROTECTION FUNCTIONS
	0										50 + 50/51 + 50N + 50/ 51N
		0									PHASE MEASUREMENT Defined by General Settings
			0								NEUTRAL MEASUREMENT Internal measurement
											NET FREQUENCY Defined by General Settings
				0 1 2 3 A B C D							POWER SUPPLY Self powered Self powered + 230 Vac (Dual) Self powered + 110 Vac (Dual) Self powered + 24 Vdc (Dual) Self powered + Commissioning battery Self powered + 230 Vac (Dual) + Commissioning battery Self powered + 110 Vac (Dual) + Commissioning battery Self powered + 24 Vdc (Dual) + Commissioning battery
					0 1 B						ADDITIONAL FUNCTIONS - + 49 + Trip Block for switch disconnecter
						0 1					COMMUNICATIONS USB (Modbus RTU) USB (Modbus RTU) + RS485 (Modbus RTU)
							0 1 2				INPUTS-OUTPUTS Trip (striker) Trip (striker) + External trip input (49T) + 1 magnetic indicator Trip (striker) + External trip input (49T) + 1 magnetic indicator + 2 outputs
								0 1			MECHANICAL ASSEMBLY Vertical Assembly Horizontal Assembly
									A B C D		LANGUAGE English, Spanish and German English, Spanish and Turkish English , Spanish and French English , Spanish and Russian
										A	ADAPTATION -

Example of ordering code:

SIA B	0	0	0	0	1	0	1	0	B	A	<i>SIAB00001010BA</i>
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Application and installation options for our SIA-B Relay

- **Specific Current Transformers** lay offers a really reduced dimensions, making this relay suitable for RMUs and compact switchgears in those installations where the space is critical.

The current adaptation is carried out by the specific external CTs, that apart from adapting the current to valid values for the relay electronic, allow to work with wider primary ranges than the standard CTs. E.g. With only one model of CT, CT-16, it is possible to protect switchgears from 300 kVAs to 1500 kVAS.

A suitable application is the transformation switchgears in wind turbines. In this case, the space is very reduced and protection for different powers with a unique CT is required.

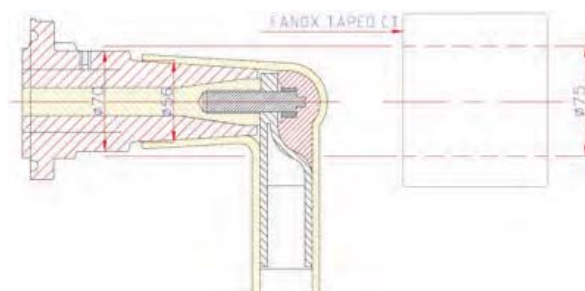
Apart from a complete protection, SIA-B is provided with events and fault reports for an exhaustive analysis of the fault situation, magnetic indicators (flags) to signal the trip maintaining their position even when the power supply is lost and front USB to power the relay and to communicate through a USB cable connected directly to the PC.

Understood these advantages, SIA-B relay becomes an optimum solution for the described applications and therefore, FANOX has developed a complete family of specific CTs for different primary ranges to adapt this solution to different installations.

• Mounting solutions

Installation on the bushings

Many switchgears manufacturers use standard cable connectors (bushings) with some pre-defined dimensions. This fact allows Fanox to design some taped CTs that are mounted on the bushings.



Installation on the cables

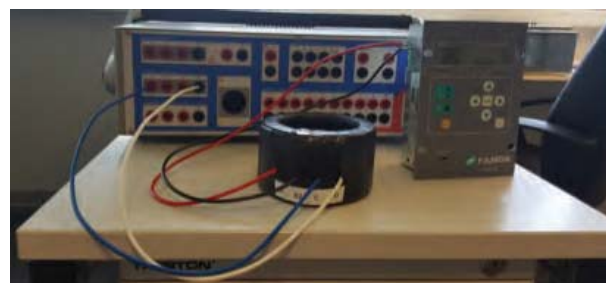
Other switchgears are provided with a gap (drawer) at the bottom part of the switchgear to access to the current cables. In this way, the CTs are mounted directly on the mentioned current cables. To cover this application, Fanox has designed some epoxy resin CTs with special anchors to be fixed at the bottom of the switchgear.



Test Winding

SIA-B relay works with current transformers with secondary different to 1 A or 5 A. For this reason, it is not possible to inject secondary current directly through CT S1-S2 terminals.

In this case, the current transformer, is provided with a second winding (C-D terminals) to inject secondary current. This secondary current will induce a primary current in the relay what facilitates the functional tests performance.



For example, with CT16, if 1A is injected through the test winding terminals, a primary current of 50 A will be read in the relay.

Depending on the used CT, the induced primary current when 1 A is injected is as follows:

CURRENT TRANSFORMER	Injected current	Induced primary current
CT-08	1 A	25 A
CT-16	1 A	50 A
CT-32	1 A	100 A
CT-64	1 A	200 A
CT-128	1 A	400 A
CT-256	1 A	800 A