SIA-C

Overcurrent and Earth Fault Protection Relay for Secondary Distribution

Dual & Self Powered

Main characteristics

- The SIA-C is a overcurrent protection relay with self powered and dual powered (self + auxiliary) models.
- The relay is self powered using the operating current through three /5 (5VA) or /1 (2.5VA) standard current transformers fitted on the lines. These transformers are also used to obtain current measurements. Optionally, SIAC relay can be used with auxiliary power supply (24 Vdc, 230 Vac, 48 Vdc or 85-265 Vdc/ac). The equipment can be occasionally supplied by an external battery portable kit (KITCOM).
- Internal Commissioning battery as optional.
- 50, 50/51, 50N/G, 50/51 N/G, 86, PLC protection functions.
- 49T,CLP and 68 as optional protection functions.
- Specific test menu is provided.
- High electromagnetic compatibility.
- The installation and subsequent maintenance of batteries is eliminated. The operating costs of the centre are reduced.
- In self powered modes, the start-up of the relay from 0.1 times of the nominal current in three phases ensures capacity to trip at low energy levels.
- The line opening mechanism is activated either by means of a striker PRT, operated by the energy supplied by the relay itself, or by a coil using the TCM trip adapter in case it is necessary.
- There are bistable magnetic indicators which indicate the trip cause, maintaining their position even though the relay loses the supply (flags).
- Different sizes of SIA-C relay available by model list to fulfil all the needs of our customers and make the installation easier.
- SIA-C is fitted with the demand of current with the following characteristics:

  Number of records: 168

  Recording mode circular

  Sampling rate (interval): configurable through communications: 1 – 60 min
- Non-volatile RAM memory in order to store up to 1.024 events and 20 fault report, without power supply thanks to its internal RTC (Real time clock).

Suitable CTs for SIA-C Relays

Epoxy resin CT

Primary .../ 1A	Code	Protection	Self power	Class	Type
30	13510	0,12 VA	2,5 VA	5P10	Epoxy resin CT
150	13515	2,9 VA		5P10	Epoxy resin CT
200	13516	2,9 VA		5P10	Epoxy resin CT
25 & 100	41740	2,5 VA		5P10	Taped

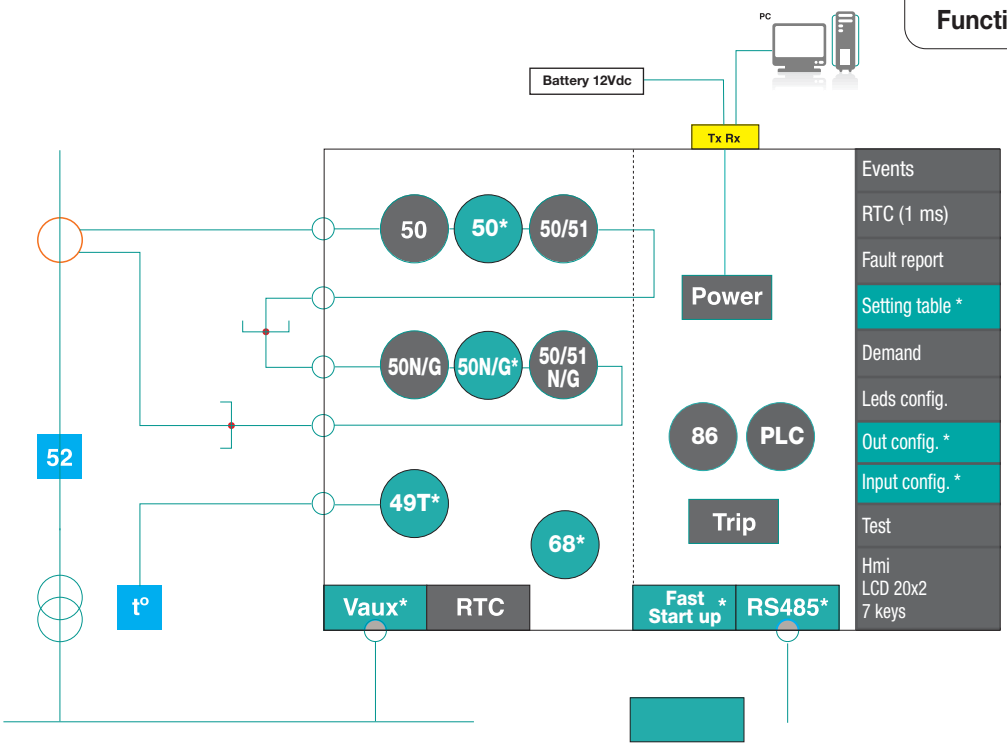
Taped CT

Primary .../ 5A	Code	Protection /Self power	Class	Type
200	13517	4,5 VA	5P10	Epoxy resin CT
300	13518	4,5 VA	5P10	Epoxy resin CT

For other transformation ratios please consult.

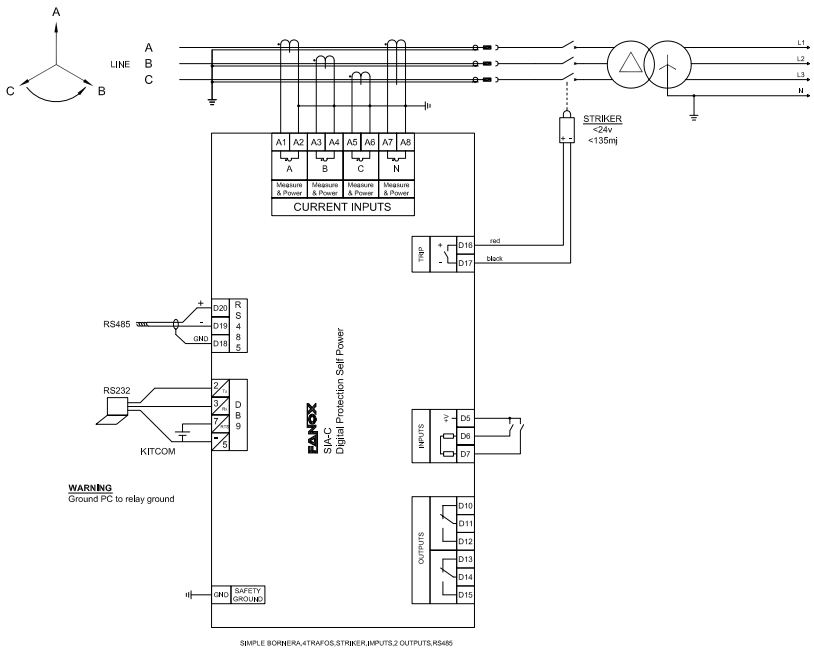
Technical specifications SIA-C

Functions diagram SIA-C

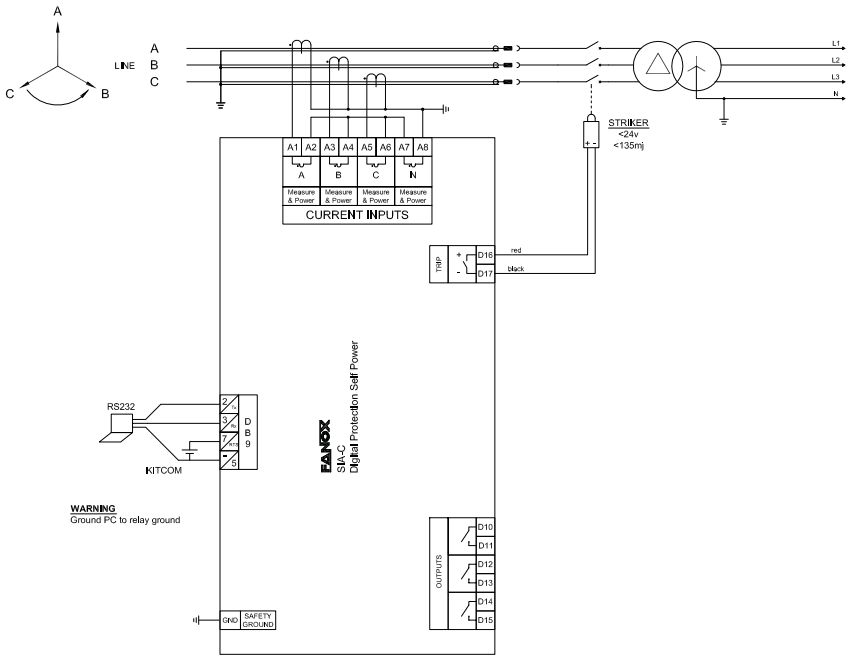


Connections diagram SIA-C

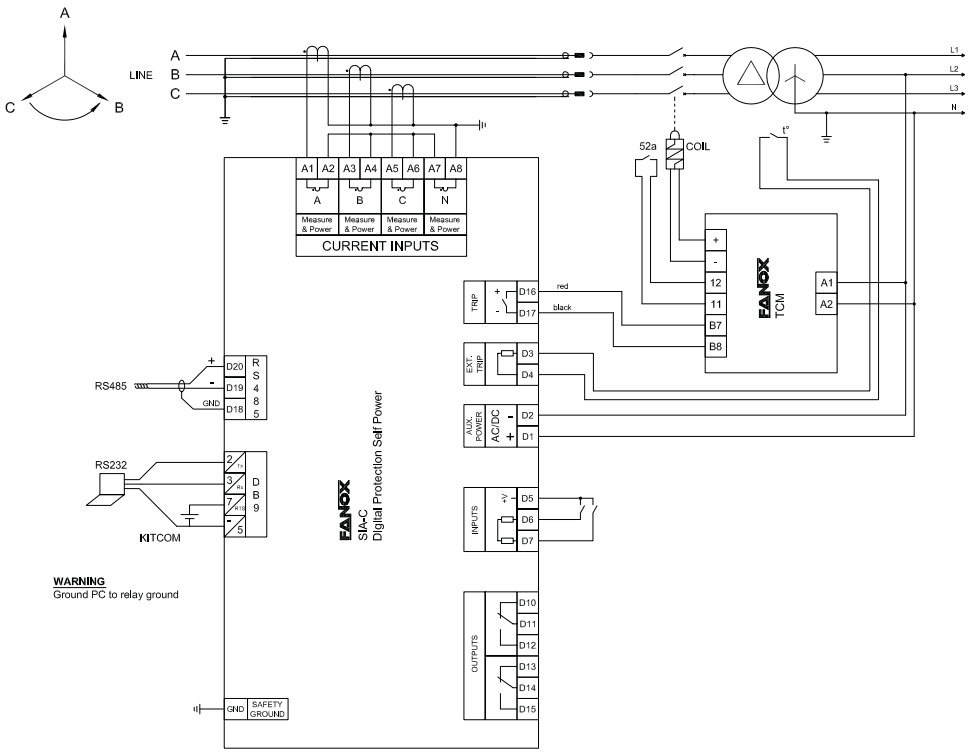
- 3 CT power supply-measurement
  1 CT neutral CT
  Striker



- 3 CT power supply-measurement
  Rigid neutral
  Striker
  Withdrawable model



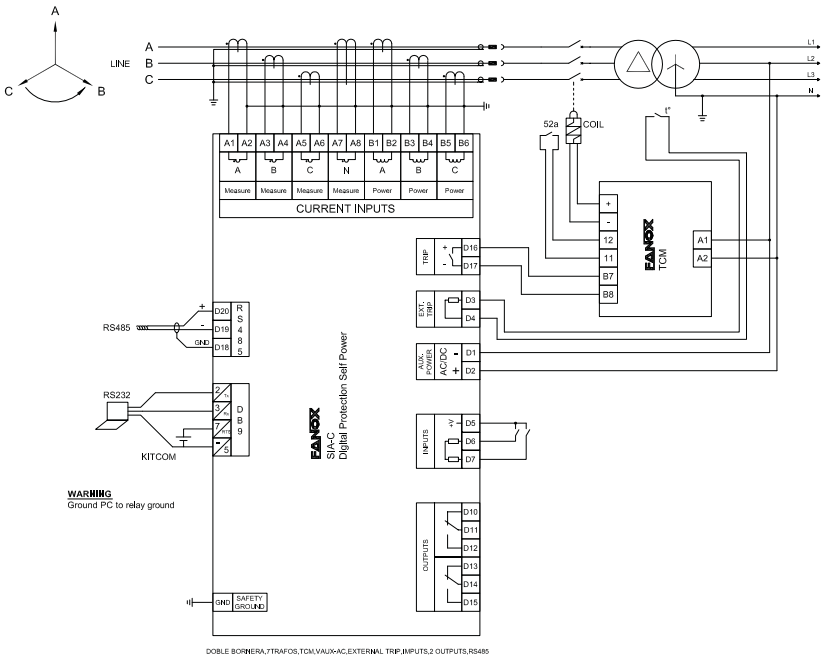
- 3 CT power supply-measurement
  Rigid neutral
  Potential free + TCM



Technical specifications SIA-C

- 3 CT measurement + 3 CT self power
  1 neutral CT
  Potential free + TCM

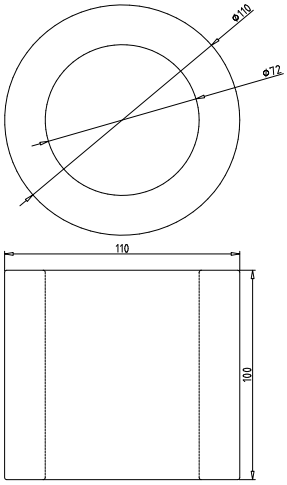
Connections diagram SIA-C



CTs Technical parameters and dimensions

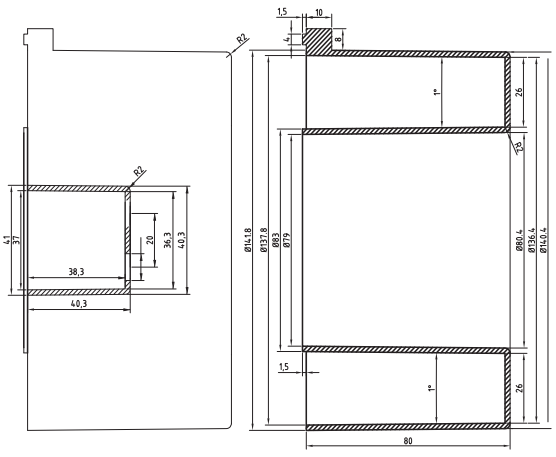
TAPED CT / CT-multitap 100-25

TECHNICAL PARAMETERS	CT-MULTITAP 100-25
Type	Taped
Maximum voltage Um	0,72 kV
Isolation voltage	3 kV
Isolation class	Class B
Short-circuit thermal intensity Ith	20 kA – 1s
Short-circuit dynamic intensity Idyn	50 kA
Enclosure	Plastic enclosure and internal resin, self-extinguishing, halogen-free UL94-VO
Standard	IEC 60044-1
Aprox. weight	3,5 Kgs
Secondary connection cables	3 PVC covered cables, halogen-free, 3x2,5 mm2 (length depending on the model). S1- Red, S2-Black, S3-White



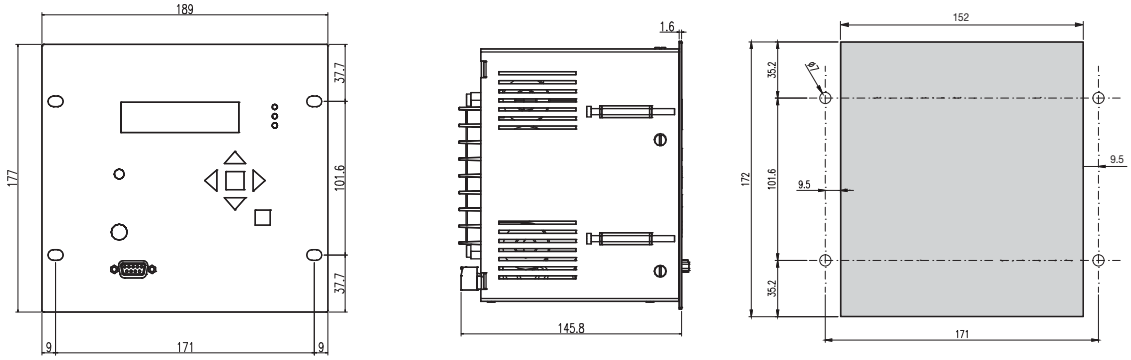
Epoxy resin CT

See technical parameters of epoxy resin CTs at page 70.



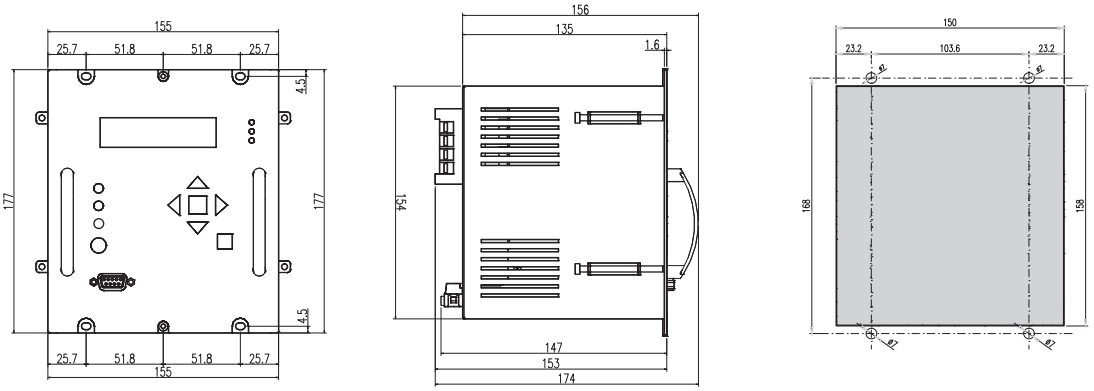
Vertical assembly

Mechanical assembly: D



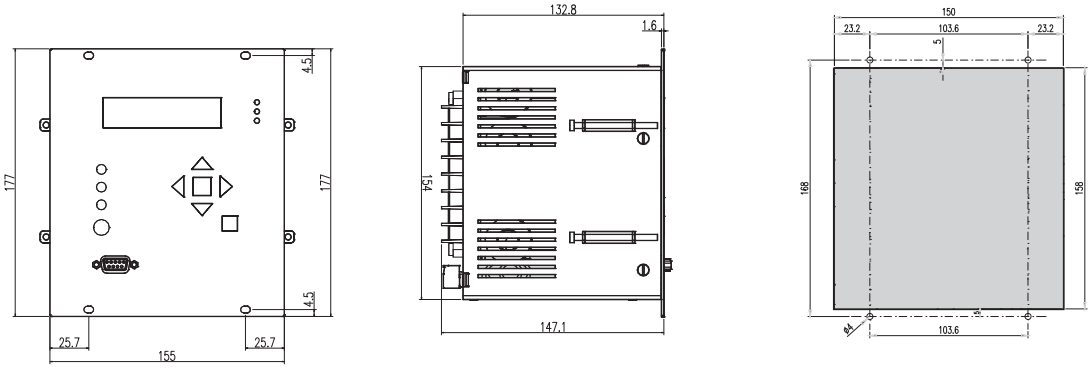
Withwadrable Vertical assembly Compact size

Mechanical assembly: F



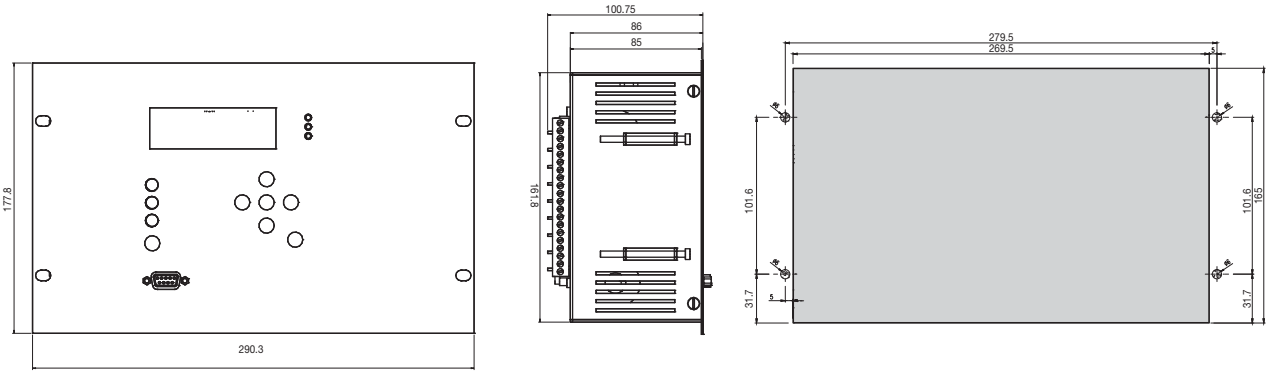
Vertical assembly Compact size

Mechanical assembly: E, G



Horizontal assembly

Mechanical assembly: B, C



Technical parameters SIA-C

Function 50_1 **Function 50_2 (*)**	Permission: yes/no
	Operating range: 0.10 to 30 x In (step 0.01 x In)
	Operating time: 0.02 to 300 s (step 0.01 s)
	Activation level 100%
	Deactivation level 95%
	Instantaneous deactivation
	Timing accuracy:± 30 ms or ± 0.5% (greater of both)
Function 50N/G_1 **Function 50N/G_2 (*)**	Permission: yes/no
	Operating range: 0.10 to 30 x In (step 0.01 x In)
	Operating time: 0.02 to 300 s (step 0.01 s)
	Activation level 100%
	Deactivation level 95%
	Instantaneous deactivation
	Timing accuracy: ± 20 ms or ± 0.5% (whichever is greater)
Function 50/51	Permission: yes/no
	Operating range: 0.10 to 7 x In (step 0.01 x In)
	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: 0.02 to 1.25 (step 0.01)
	Curve, activation level 110%
	Curve, deactivation level 100%
	Defined time, activation level 100%
	Defined time, deactivation level 95%
	Instantaneous deactivation
	Timing accuracy: ± 5% or ±30 ms (whichever is greater) when the protection works with inverse time and ± 20 ms or ± 0.5% (whichever is greater) when it works with definite time
Function 50/51N/G	Permission: yes/no
	Operating range: 0.10 to 7 x In (step 0.01 x In)
	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: 0.02 to 1.25 (step 0.01)
	Curve, activation level 110%
	Curve, deactivation level 100%
	Defined time, activation level 100%
	Defined time, deactivation level 95%
	Instantaneous deactivation
	Timing accuracy: ± 5% or ±30 ms (whichever is greater) when the protection works with inverse time and ± 20 ms or ± 0.5% (whichever is greater) when it works with definite time

Function CLP (*)	Permission: yes/no
	Settings group: 1 to 4 (step 1)
	No load Time: 0.02 to 300 s (step 0.01 s)
	Cold load Time: 0.02 to 300 s (step 0.01 s)
	CLP activation threshold: 8% In
	CLP reset threshold: 10% In
Function 49T (*)	Charging time 10 s
Function 68 (*)	Available through configurable inputs and outputs thanks to programmable logic
Programmable logic control (PLC)	OR4, OR4_LATCH, OR4_PULSES, OR4_TIMERUP, OR4_PULSE, NOR4, NOR4_LATCH, NOR4_ TIMERUP, NOR4_PULSE, AND4, AND4_PULSES, AND4_TIMERUP, AND4_PULSE, NAND4, NAND4_ TIMERUP, NAND4_PULSE
Function 86	Allows to latch (lock out) the contact configured like trip due to programmable logic (PLC).
Settings tables (*)	Adaptation A: 3 settings tables Activated by inputs or by general settings. Adaptation B: 4 settings tables Activated by inputs or by general settings
Fault reports	20 fault reports, 16 events in each
Demand of current	Demand of current with the following characteristics • Number of records: 168 • Recording mode circular • Sampling rate (interval): configurable through communications: 1 – 60 min • Record format: Date/Time IMAX (in interval) IMAX (actual) IA - IC - IN
Trip output	For Striker: 24 Vdc-135 mJ For coil (optionally with TCM adapter): 250 Vac – 8A 30 Vdc – 8A Resistive load (cos φ = 1)
Signalling outputs (*)	Up to 3 outputs (output 2, output 3 and output 4): 220 Vdc – 1 A (30 W max) 250 Vac – 1 A (62,5 VA max)
Signalling inputs (*)	2 inputs: 5-24 Vdc – 0,25 VA
Frequency	50/60Hz
Current measure	RMS
	Sampling: 16 samples/cycle
	Accuracy of 2% on a band of ±20% over the nominal current and 4% over the rest of the range.
Communication	RS232 port: Modbus RTU
	RS485 port: Modbus RTU (*)
Auxiliary supply (*)	230 Vac, ±20 % - 24 Vdc ±10 % 48 Vdc ±10 % - 85-265 Vdc/Vac ±20 %
Battery supply	Externally, with adapter (Kitcom) port DB9 Internal commissioning battery (*)
Self-power from current	One phase self-power level: I > 0,2 x In
Environment	Operating temperature: -40 to 70ºC
	Storage temperature: -40 to 80 ºC
	Humidity: 95%
Transformers	Power supply and measurement CT /5 or /1
Mechanical features	Metallic box
	Panel Mounting
	Vertical compact: 177 x 155 mm Vertical standard: 177 x 189 mm Horizontal: 177,80 x 290,3 mm
	IP-54

(*) Optional depending on model

SIA-C	Overcurrent & Earth Fault Protection Relay - Dual & Self Powered											PROTECTION FUNCTIONS 50 + 50/51 + 50N/G + 50/51N/G + 86 + PLC
	1 5											**PHASE MEASUREMENT** In = 1 A; (0,10 – 30,00 A) In = 5 A; (0,50 – 150,00 A)
		1 5 A B										**NEUTRAL MEASUREMENT** In = 1 A; (0,10 – 30,00 A) In = 5 A; (0,50 – 150,00 A) In = 0,1 A; (0,01 – 3,00 A) In = 0,2 A; (0,02 – 6,00 A)
			5 6									**NET FREQUENCY** 50 Hz 60 Hz
				0 1 3 4 5 A B D E F								**POWER SUPPLY** Self powered Self powered + 230 Vac (Dual) Self powered + 24 Vdc (Dual) Self powered + 48 Vdc (Dual) Self powered + 85-265 Vac-dc (Dual) Self powered + Commissioning battery Self powered + 230 Vac (Dual) + Commissioning battery Self powered + 24 Vdc (Dual) + Commissioning battery Self powered + 48 Vdc (Dual) + Commissioning battery Self powered + 85-265 Vac-dc (Dual) + Commissioning battery
					0 1 2 3 4							**ADDITIONAL FUNCTIONS** Striker Striker and with external trip (49T) Coil Coil and with external trip (49T) Striker and 230 Vac adapted external trip
						0 1						**COMMUNICATIONS** Local ModBus port (RS 232) + Remote ModBus port (RS485)
							0 1 2 3					**INPUTS-OUTPUTS** Trip Trip + 2 outputs Trip + 2 outputs + 2 inputs Trip + 3 outputs
								1 2				**FAST START-UP** Non-volatile RAM memory Non-volatile RAM memory + Fast start-up
									A B C D			**LANGUAGE** English, Spanish and German English, Spanish and Turkish English, Spanish and French English , Spanish and Russian
										B C D E F G		**MECHANICS** Horizontal assembly with 1 magnetic Flag Horizontal assembly with 3 magnetic Flag Vertical assembly with 1 magnetic Flag Vertical, Compact Size with 3 magnetic Flag Vertical, Compact Size, 2 Flags, Backlight LCD, withdrawable Vertical, Compact Size, 1 Flag, Backlight LCD
											- A B	**ADAPTATION** 50 + 50/51 + 50N/G + 50/51N/G + 86 +PLC + 50P_2 + 50N/G_2 + 3 Setting groups + CLP + 4 Setting groups

Example of ordering code:

SIA C	1	5	5	0	0	0	2	2	A	F	A	*SIAC 1 5 5 0 0 0 2 2 AFA*

Some success applications for our SIA-C Relay

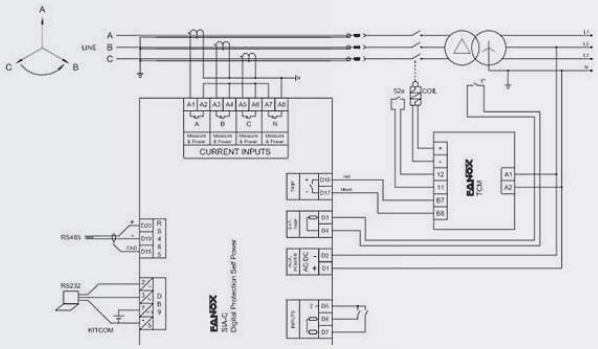
- **Withdrawable** Self powered model with a very compact size makes the installation and maintenance much easier.

- **Standby Earth Fault Relay** model designed as a backup protection to clear a remote earth fault on the downstream network. This relay performs 50P + 50/51P + 50N/G + 50/51N/G functions and shows 3 magnetic flags in its front indicating the tripping reason.

- Perfect solution for **RETROFIT applications.** Combined with TCM adapter this application is performed in these RMUs where the existing protection relay is replaced with a new generation digital relay like FANOX SIA-C.

  The auxiliary power of the RMU energizes the TCM that activates the coil when the relay detects a fault condition.

  RMU manufacturer do not require changing the existing circuit breaker and coil, SIA-C along with TCM adapter work as one supplying the energy needed to trip the coil. TCM provides the most common variety of auxiliary voltages that coils require: 48Vdc, 110Vdc or 220Vdc.



- **Ring Main Unit used for Metering (MRMU)** for MV applications (13.8kV, 36kV and 38kV) in a busbar rating up to 630A.

  In this application a protection relay is included to protect the line by tripping the circuit breaker of the position, apart from voltage and current meter or energy analyzer.

  Many MRMU manufacturers provide a 24 Vdc auxiliary power supply so the SIA-C Self and Dual Powered Relay at 24Vdc is the appropriate solution.