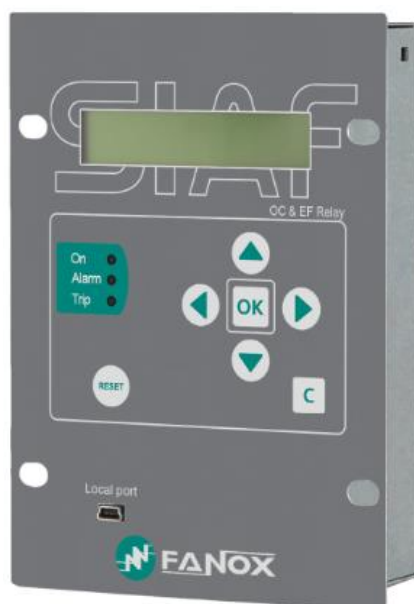




SIA-F

O/C & E/F Protection
Relay



INSTALLATION & COMMISSIONING GENERIC GUIDE

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1. RECEPTION & INSTALLATION

1.1 Relay unpacking

Previously to any handling action, confirm that relay carton box is in good conditions, no broken or damaged due to external manipulation or during storing or moving process. If packing is correct, proceed to unpack and you should find following element:

- SIAF Electronic protection relay.
- User Guide.
- Testing protocol.



Testing protocol is a certificate that relay has passed all factory testing process with correct results.

In case some fault is detected, consider putting into quarantine period the relay and contact Fanox for further instructions.

1.2 Relay verification

When relay is unpacked, please, take your time to confirm following checking list to be sure that everything is ok:

- Metallic case not damaged and well assembled. No loose screws due to transport or movement conditions



- LCD and front cover not damaged or scratched.



- Quality sticker and terminal sticker correctly stuck.



- Rear terminals in good state, being able to do a good wiring connection.



1.3 Powering the relay up with kitcom

Thanks to the external battery KITCOM the powering and adjusting process of the relay is very easy and it allows the user to test the relay.

The power comes from two AA batteries (IEC LR06) of 1.5 Volts placed at the bottom of the kitcom. The equipment has a small Dc/Dc power supply that raises the voltage till the required 5 volts to operate the equipment and that is plugged into the front USB communications port (KITCOM).

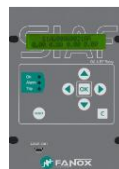
Once the KITCom is connected, the relay will be switched on and a led on the left of the relay (led on) will blink indicating the relay is powered on through an external battery (KITCOM).

The relay is totally maintenance free. This is, there is no need of batteries to log events and fault reports and there is no need of batteries to maintain date and time.

NOTE: Date and time must be correctly set the first time the relay is operative, and energy must be kept at least “1 hour” to maintain the RTC for 72 hours once the energy is lost.

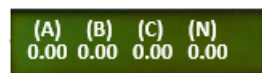
Besides, the possibility of using external battery power, together with the possibility of activating the trip contact from the test menu, allows the trip circuit to be tested before the transformation center is powered up. So, the KITCOM is useful for cases like commissioning operations, discharges and repairs to the transformation center.

Using battery power does not block the USB communications port, as it can be used simultaneously.



Once the relay is powered through the Kitcom, it is recommended to check:

- Model → Directly, complete model on top line and phases/neutral current measurement on bottom line are displayed. Once “C” key is pressed the name of phase and neutral currents (instead the complete model) is displayed on the top of LCD Standby screen.



- Serial Number → In “General Settings” menu serial number of 8 digits can be checked (OK - ▼ - ▼ - ◀ - ▼ - ▼)



- Firmware version → HOLD ▲

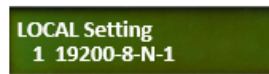


1.1.1. Keypad & LCD

- Use the KEYPAD, ensure that all the push-buttons work correctly (no difficulties while pushing them, check out if the relay reacts by pushing each of the buttons).



- Use the KEYPAD to enter in the relay's menu and make sure that no text is lost while going from one menu to another.
- Follow the sequence: Left ◀, Down ▼, Right ▶, Up ▲, OK, C and RESET and the following screen should be displayed:



- If the contrast of the LCD is not the correct one, enter to "CONTRAST" menu by holding "◀" for 3 seconds. Then, change it by using up or down buttons to increase or decrease the contrast.



1.1.2. Test menu

NOTE: When performing test menu, protection won't be available and it will be possible to open circuit breaker. Only authorized personnel can do this job.

Press ◀, ▼, ▶ sequentially and hold OK. The relay will ask for the password "5555" to enter to the test menu (or customer password if default "5555" has been modified).

It will be checked that the LEDs, Magnetic indicator flags and Outputs are activated if OK key is pressed and it will be deactivated if OK key is pressed again. LEDs, Magnetic indicator and outputs will be checked to verify the hardware is OK:

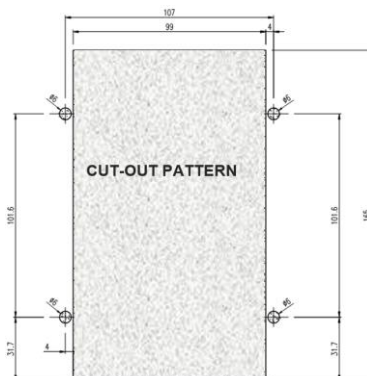


	Action	Checking
OK, OK	ON-Led	ON-Led activated
▼, OK	ALARM-Led	ALARM-Led activated
▼, OK	TRIP-Led	TRIP-Led activated
▼, OK	TripOutput	Trip output activated
▼, OK	Output 2	Output 2 activated (*)
▼, OK	Output 3	Output 3 activated (*)
C	Skip from test menu	

(*) Depending on model

1.4 Relay installation

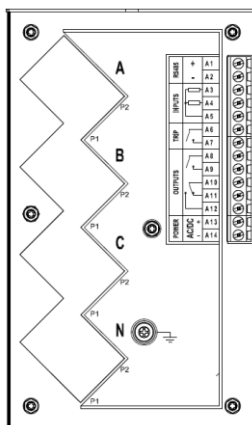
To fix the relay to the switchgear, use default holes in front of relay with appropriate fixing system. Do not manipulate relay to fix it on the switchgear.



Failure to follow these instructions can result in death, serious injury, or equipment damage.

1.5 Relay rear part

Consider the wiring of the switchgear and connect relay properly:

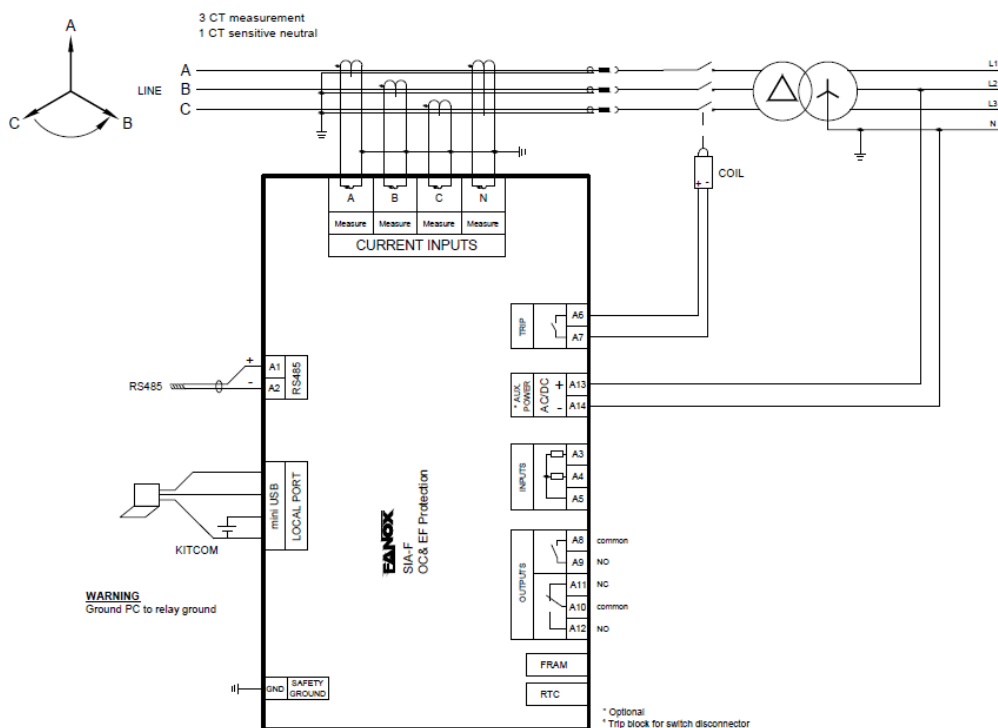


A	P1: Phase A current input for Measurement
	P2: Phase A current output for Measurement
B	P1: Phase B current input for Measurement
	P2: Phase B current output for Measurement
C	P1: Phase C current input for Measurement
	P2: Phase C current output for Measurement
N	P1: Phase N current input for Measurement
	P2: Phase N current output for Measurement
A1	RS485 + (*)
A2	RS485 - (*)
A3	Input 1 (*)

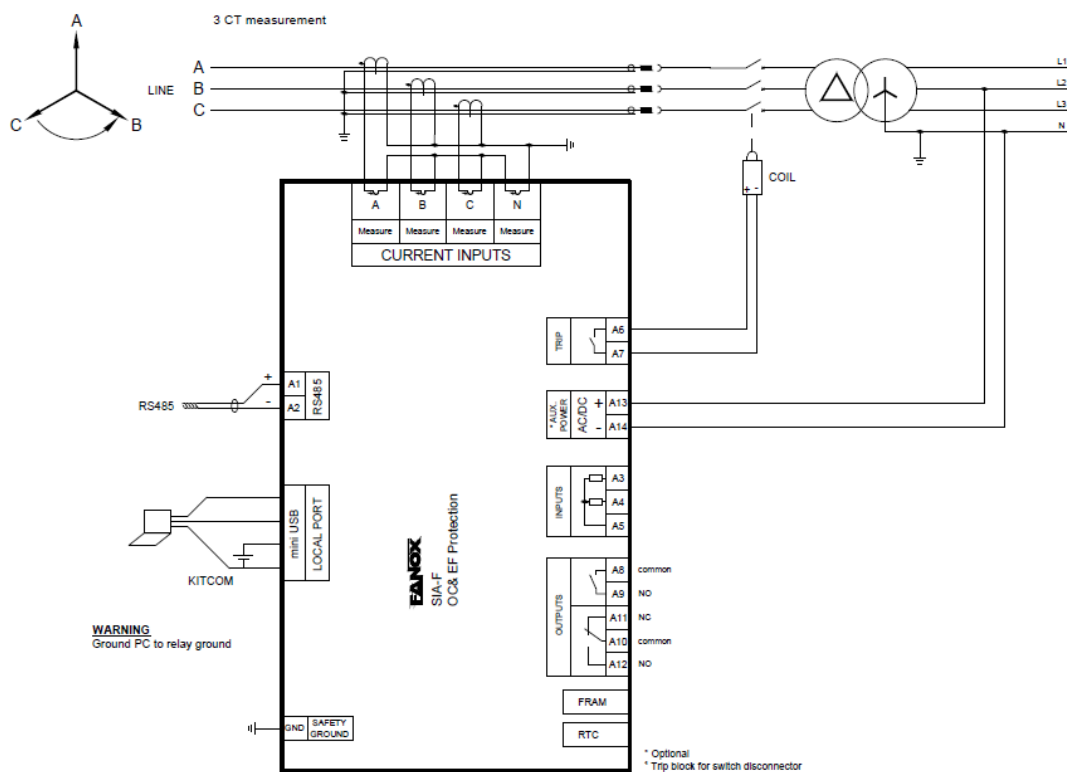
A4	Input 2 (*)
A5	Common inputs (*)
A6	Trip output
A7	Trip output
A8	Output 1 (*)
A9	Output 1 (*)
A10	Common Output 2 (*)
A11	Output 2 NC (*)
A12	Output 2 NO (*)
A13	V. Aux + (*)
A14	V. Aux - (*)

(*) Optional depending on model.

1.6 Connection diagrams



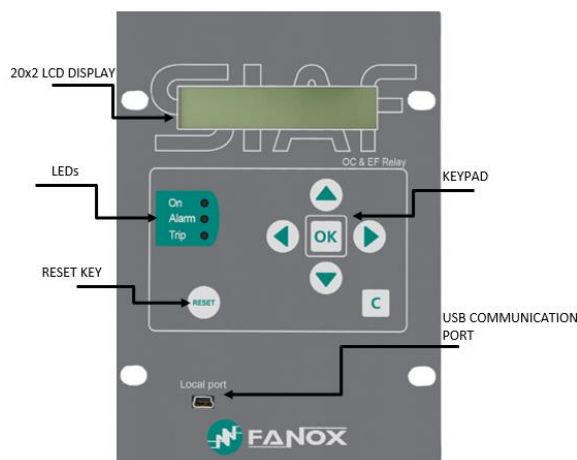
3 Phase CT and neutral CT connection



3 Phase CT and residual neutral connection.

2. USER INTERFACE

2.1 Relay front part



2.2 LED Indicators

The SIA-F front panel has three LEDs. The operation of the LED indicators can be checked from the test menu.

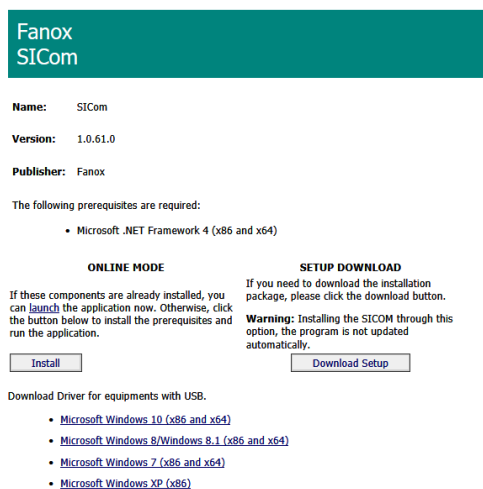
The user can change the configuration of the LEDs depending on its requirements.

2.3 How to install SICOM Software

To install the SICom it is necessary the following link:

<http://fanox.blob.core.windows.net/sicom/publish.htm>

The link will open the next screen, where key “install” must be pressed:



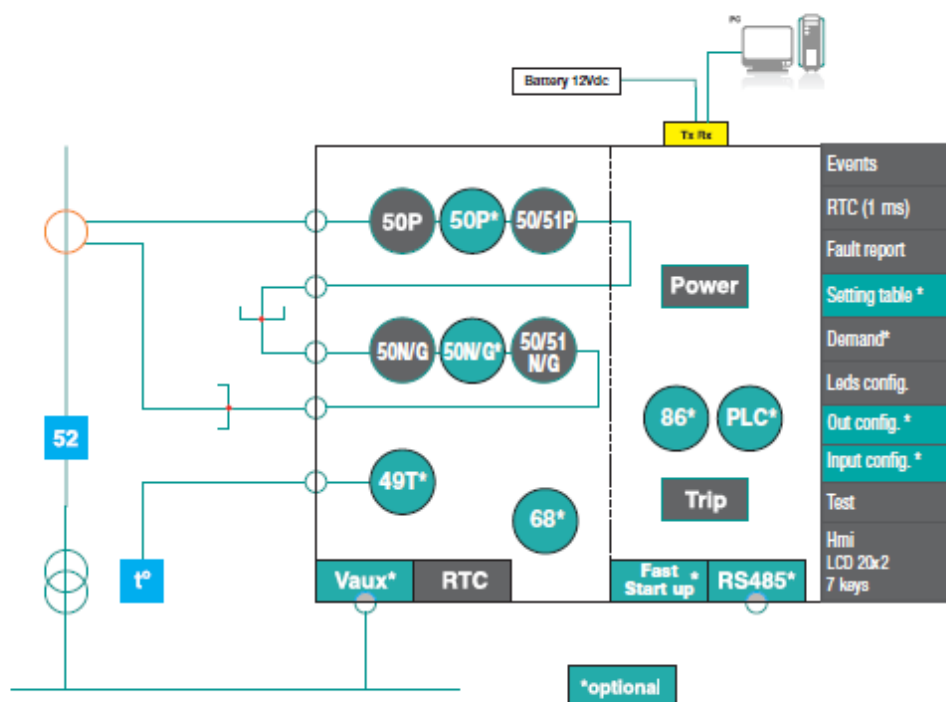
The necessary drivers depending on the operative system can be downloaded from this page. The update of the software does not require any user's action, this is, if the computer is connected to Internet, SICom updates itself when it is started.

2.4 Setting-up the session: Password and access levels

Users must identify themselves with a password to start communications and to change the equipment settings or configuration using the HMI.

By default, the password is 5555 and it can be changed from general settings menu.

3. FUNCTIONAL DIAGRAM



4. SELECTION & ORDERING CODES

SIA F											Protection functions 50 + 50/51 + 50N/G + 50/51N/G + 86 + PLC + Cold Load Pick-up
1	5										Phase Measurement In = 1 A; (0.10 – 30.00 A) In = 5 A; (0.50 – 150.00 A)
		1									Neutral Measurement In = 1 A; (0.10 – 30.00 A) In = 5 A; (0.50 – 150.00 A) In = 0.2 A; (0.02 – 6.00 A)
			0								Net Frequency Defined by General Setting
				C							Power Supply 24–220 Vdc / 48-230 Vac
					0						Additional Functions - + 52 + 50BF + 49 + Trip block + Trip block + 52 + 50BF + 49
						0					Communications USB (Modbus RTU) USB (Modbus RTU) + RS485 (Modbus RTU) USB (Modbus RTU) + RS485 (DNP3.0 Serial)
							0				Inputs and Outputs Trip Trip + 2 Inputs + 2 Outputs
								0			Mechanics Vertical Assembly
									A		Languages English, Spanish and German English, Spanish and Turkish English, Spanish and French English, Spanish and Russian
										A	Adaptation -

5. TECHNICAL SPECIFICATION

Function 50	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 $\pm 0.5\%$ (whichever is greater)
Function 50N/G	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 $\pm 0.5\%$ (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 IEEE
	Operating time: IEC Inverse curve, IEC very inverse curve, IEC extremely inverse curve IEC long time inverse, IEEE Inverse curve, IEEE very inverse curve, IEEE 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: ± 30 ms or $\pm 0.5\%$ (whichever is greater)
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 -IEEE

	Operating time: IEC Inverse curve, IEC very inverse curve, IEC extremely inverse curve IEC long time inverse, IEEE Inverse curve, IEEE very inverse curve, IEEE 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
CLP (Cold Load Pickup) (*)	Timing accuracy: ± 30 ms or $\pm 0.5\%$ (whichever is greater)
	Permission: yes/no
	Setting group 1 to 3 (step 1)
	No Load Time: 0.02-300 s (step 0.01 s)
Trip block for the switchgear (*)	Cold Load Time: 0.02-300 s (step 0.01 s)
	Blocking: Yes/No
Circuit Breaker monitoring 52 (*)	Blocking limit: 1.5 to 20 x In (step 0.01)
	Excessive number of openings: 1 to 10000 (step 1)
	Maximum accumulated amps: 0 to 100000 (M(A) ²) (step 1)
	Opening time: 0.02 to 30 s (step 0.01 s)
	Closing time: 0.02 to 30 s (step 0.01 s)
	Excessive repeated openings: 1 to 10000 (step 1)
Function 50BF (*)	Time Excessive repeated openings: 1 to 300 min (step 1 min)
	Permission: Yes/No
	Opening failure time: 0.02 to 1.00 s (step 0.01 s)
	Open breaker activation threshold: 8% In
	Open breaker reset threshold: 10% In
Function 49 (*)	Function start: Device trip, opening failure input activation, breaker opening command activation
	Permission: Yes/No
	Tap: 0.10 to 2.40 In (step 0.01)
	ζ heating: 3 to 600 minutes (step 1 min)
	ζ cooling: 1 to 6 x ζ heating (step 1)
	Alarm level: 20 to 99% (step 1 %)
	Trip level: 100%

	Trip reset: 95% of alarm level
	Timing accuracy: $\pm 5\%$ or ± 2 s (greater of both)
Function 68 (*)	Available through configurable inputs 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 trip due to programmable logic (PLC).
Function 49T (*)	Available through configurable inputs
Setting Tables	3 Setting Tables
	Activated by general settings or by inputs
RTC	Capacitor charge time: 10 minutes
	Operation without auxiliary voltage: 72 hours
Trip output (configurable)	Potential free contact
Configurable Outputs (*)	2 configurable outputs: 250 Vac – 8 A 30 Vdc – 5 A
Frequency	50/60 Hz
Current measurement	True RMS
	Sampling: 16 amplitudes/cycle
	Accuracy of $\pm 2\%$ in a band of $\pm 20\%$ over the rated current and $\pm 4\%$ for the rest of measurement range
	Saturation limit: 30 times rated current
Events	200 events
Fault reports	4 fault reports, 16 events in each
Oscillography	16 samples/cycle
	Oscillo starting configuration
	1 record: 3 cycles pre-fault and 19 post-fault
	COMTRADE IEEE C37.111-1991
	4 analogue channels and 32 digital channels
Communications (*)	USB port (connector mini SUB type A): Modbus RTU
	RS485 port: Modbus RTU or DNP3.0 Serial
Auxiliary power supply (*)	24-220 Vdc / 48-220 Vac $\pm 20\%$
Battery supply	With KITCOM adapter to USB (connector USB type B) or directly through the front USB port with a USB cable connected to the PC.

Environment	Operating temperature: -10 to 70°C
	Storage temperature: -20 to 80 °C
	Humidity: 95%
Transformers (*)	3 or 4 CT /5, /1 or /0.2
Mechanical features	Metallic box
	Panel Mounting
	Height x Width: 167.8 x 120.65 (mm)
	Depth: 74.6 mm
	Weight: 1.05 kg.
	IP-54

(*) Optional depending on model

5.1 IEC60255-151 Curves

The SIA-C relay complies with the curves shown in standard IEC60255-151:

- Inverse Curve.
- Very Inverse Curve.
- Extremely Inverse Curve.
- Long-time inverse.

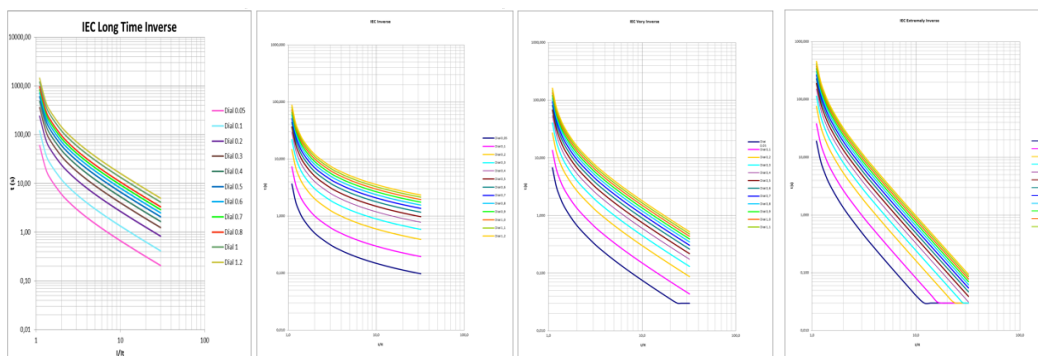
There is a general mathematical equation that defines the time in seconds as a function of the current:

$$t = \frac{A \times D}{V^P - Q} + B \times D + K \quad V = \frac{I}{I_{adjusted}}$$

Parameters	A	P	Q	B	K
Long Time Inverse	120	1	1	0	0
Ext. Inverse	80	2	1	0	0
Very Inverse	13,5	1	1	0	0
Inverse	0,14	0,02	1	0	0

The curve can mode from its axis using the D time selection device, which the user can adjust.

I_{adjusted} is the initial operating current, set by the user.



6. PROGRAMMABLE LOGIC CONTROL (*)

The SIA-F has up to 3 physical outputs (trip output, output 2 and output 3). The outputs can be configured from the HMI or through the SiCom program.

Physical inputs are the real inputs of the device. SIA-F device has two physical inputs (Input 1 and Input 2). These inputs are translated to two internal binary states which later, can be assigned to logical signal to get a specific operation.

For each output, there is a LOGICAL GATE. It can perform a logical operation up to 4 binary states to obtain other binary result. In V3 of the PLC the LOGICAL GATES that are supported by SIAF are:

LEDs	LED 1
	LED 2
	LED 3
PHYSICAL OUTPUTS	Trip Output
	Output 2 (*)
	Output 3(*)
LOGICAL SIGNALS (*)	52a contactt logical signal
	52b contact logical signal
	External Trip logical signal
	50BF start logical signal
	Fault start logical signal
	50 block logical signal
	50N/G block logical signal
	Reset logical signal
	Active group 1 logical signal
	Active group 2 logical signal

LOGICAL GATE	HMI SYMBOL
OR4	+
NOR4	τ
OR4_LACTH	c
NOR4_LACTH	Φ
OR4_PULSES	J
AND4	&
NAND4	§
AND4_PULSES	\$
OR_TIMER_UP	O
NOR_TIMER_UP	P
AND_TIMER_UP	Q
NAND_TIMER_UP	R
OR_PULSE	o
NOR_PULSE	p
AND_PULSE	q
NAND_PULSE	r
NOR_PULSES	t

(*) Optional depending on model

By default, outputs configuration is:

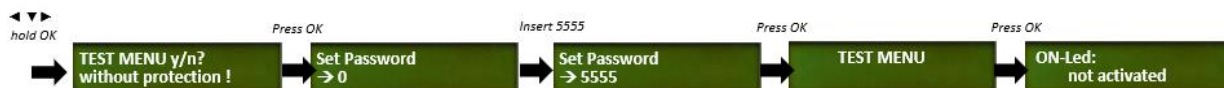
	OUTPUT	LOGICAL GATE	BINARY STATES
LEDs	LED 1	OR4_PULSES	Ready
	LED 2	NOR4	Ready
	LED 3	OR4_LACTH	General trip
PHYSICAL OUTPUTS	Trip output	OR4	- Local opening - General trip
	Output 2(*)	OR4	Local closing
	Output 3 (*)	No configured	-
LOGICAL SIGNALS (*)	52a contactt logical signal	No configured	-
	52b contact logical signal	OR4	Input-2
	External Trip logical signal	OR4	Input-1
	50BF start logical signal	OR4	- Local opening - Remote opening - General trip
	Fault start logical signal	OR4_LACTH	General trip
	50 block logical signal	Not configured	-
	50N/G block logical signa	Not configured	-
	Reset logical signal	Not configured	-
	Active group 1 logical signal	Not configured	-
	Active group 2 logical signal	Not configured	-

(*) Optional depending on model

7. FLOWCHART (EXAMPLE)

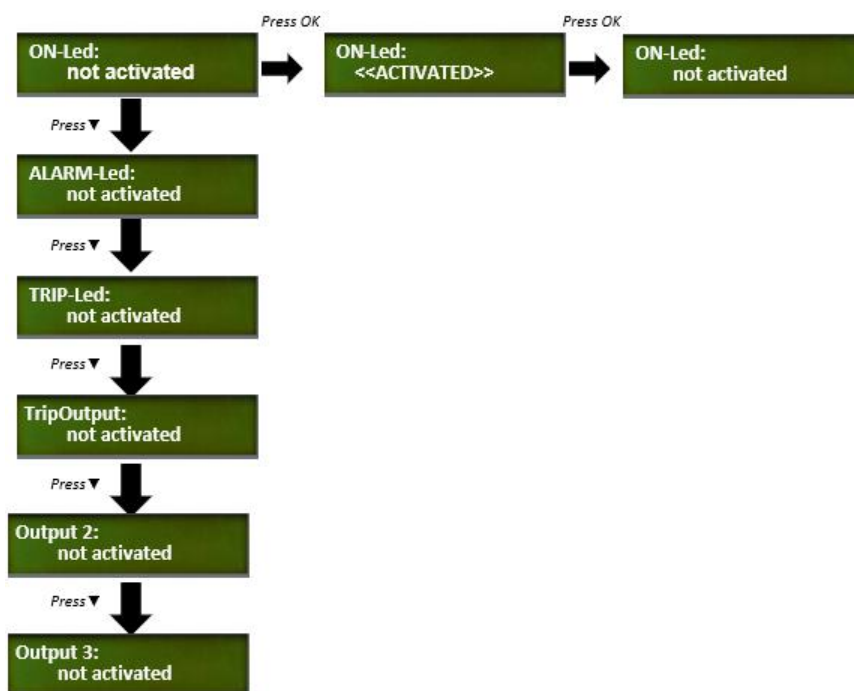
7.1 Test menu

From the main menu, press the keys “◀”, “▼”, and “▶” in sequence and then press and hold the “OK” key until the “Test menu” appears on the display. The test menu is accessed by pressing the “OK” key again, and the “▲” and “▼” keys can be used to navigate through the different menu items. Each item can be activated or deactivated by pressing “OK” on it (if the item is deactivated, it is activated by pressing OK; if the item is activated, it is deactivated by pressing “OK”). Press the “C” key to exit the test menu.



Once “ON-Led” appears, pressing “OK” the led is activated and pressing “OK” again, it is deactivated.

To go through all options, press “▼”. To activate and deactivate the options follow the same steps as in case of ON-Led.

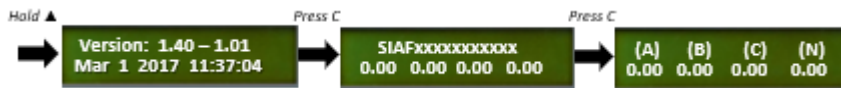


7.2 Direct Access

Version

The equipment versions menu can be accessed from the standby mode screen by holding “▲” key.

Press the “C” key to return to the standby mode screen.



Date and time

Press the “▶” key from the standby mode screen to access to date and time menu

Press the “OK” key to access the date-time modification screen. Use the “▶” and “◀” keys to position the cursor over the digit that you want to change and assign a value to this digit using the “▲” and “▼” keys. Once the date-time has been entered, press “OK” to change the equipment date.

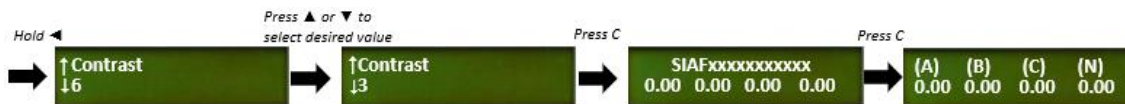
Press the “C” key to return to the standby mode screen.



Contrast

Hold “◀” key from standby menu to access to Contrast menu. Use the “▲” and “▼” keys to select the desired value.

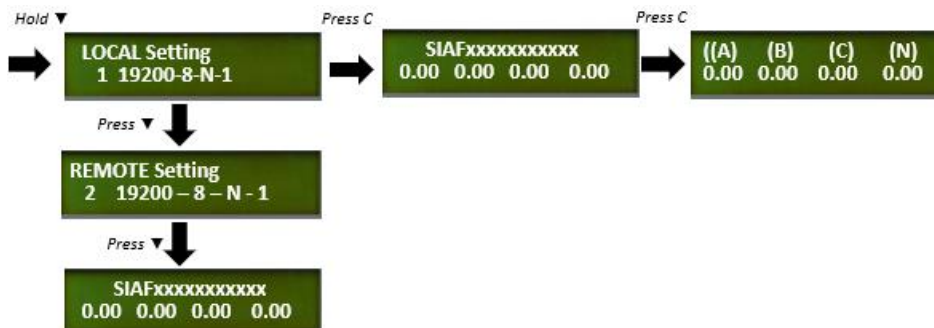
Press the “C” key to return to the standby mode screen.



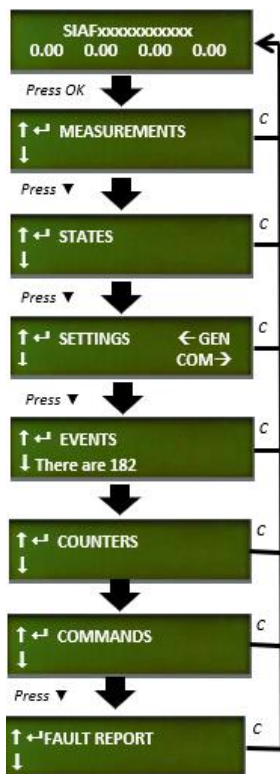
Communication parameters

Hold “▼” key from standby menu to access to communication parameters menu.

Press the “C” key to return to the standby mode screen.



7.3 Menus



The information in SIAC relay is organized through the following menus:

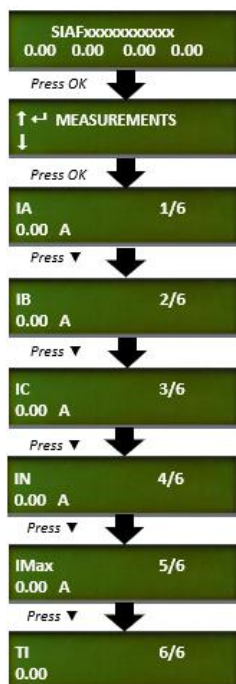
- Measurements
- States
- Settings
- Events
- Counters
- Commands
- Fault Report

From standby screen press “OK” key to access to the first menu “MEASUREMENTS” and press “▼” key to overview the rest of the menus in the relay

To return to standby screen, press “C” key.

It is also possible to access to Fault reports by pressing “◀” key.

7.3.1 Measurements menu



From the standby mode screen, press the “OK” key to access the first line of menus.

Use the “▲” and “▼” keys to position the cursor over the “MEASUREMENTS” screen and press “OK”.

Use the “▲” and “▼” keys to position the cursor over the measurement and to see its value.

Press the “C” key to return to the standby mode screen.

If “OK” key is pressed in any of the current measurements, the current is displayed in secondary instead of in primary.

7.3.2 States menu



States menu indicates the stuses of the relay (activated or deactivated) at real time.

From the standby mode screen, press the “OK” key to access the first line of menus.

Use the “▲” and “▼” keys to position the cursor over the “STATES” screen and press “OK”. This takes you to the status groups’ line.

Move the cursor over a group of statuses and press the “OK” key to access the statuses that belong to this group. Use the “▲” and “▼” keys to browse through the different statuses.

The information shows whether each status is active. The message “>Activated” appears under the name of the group in the status group menus if any of the statuses in that group are active.

Press the “C” key to return to the standby mode screen.

7.3.3 Settings menu



From the standby mode screen, press the “OK” key to access the first line of menus.

Use the “▲” and “▼” keys to position the cursor over the “SETTINGS” screen and press “OK”. This takes you to the settings groups’ line.

Use the “▲” and “▼” keys to position the cursor over a settings group, and press the “OK” key to access the settings that belong to this group.

Use the “▲” and “▼” keys to move through the different settings. The information that appears underneath the setting name is its value.

50 protection function

The parameters to adjust are:

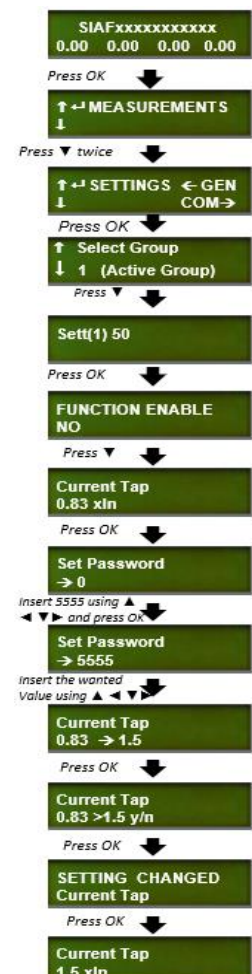
- **Permission:** The function is available to trip only if the permission is “YES”. While this permission is “NO” the function will never BE ACTIVATED AND THE RELAY WILL NOT TRIP.
- **Tap:** It is the threshold. Once it is exceeded the function picks-up.
- **Time Delay:** If the function is picked-up during the adjusted value the relay will trip

Pressing “OK” key from the standby screen it is displayed MEASUREMENT menu.

Use “▼” key till SETTINGS menu appears. Press “OK” to access to the different functions.

Use “▼” key to choose the wanted option (Permission, Tap or Time delay) and press “OK” to access to its settings parameters.

After inserting the password 5555 it will be possible to adjust the wanted value.



51P protection function

The parameters to adjust are:

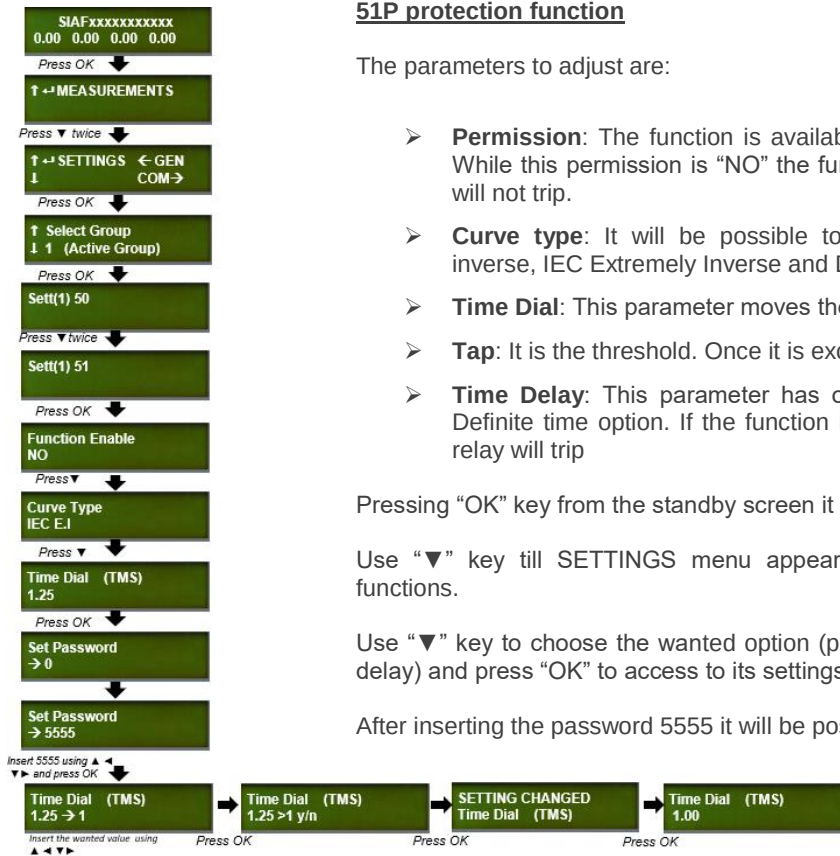
- **Permission:** The function is available to work only if the permission is "YES". While this permission is "NO" the function will never be activated, and the relay will not trip.
- **Curve type:** It will be possible to choose between IEC Inverse, IEC Very inverse, IEC Extremely Inverse and Definite time
- **Time Dial:** This parameter moves the previous curves along the "Y" axis.
- **Tap:** It is the threshold. Once it is exceeded the function picks-up.
- **Time Delay:** This parameter has only sense if in "Curve type" it is selected Definite time option. If the function is picked-up during this adjusted value, the relay will trip

Pressing "OK" key from the standby screen it is displayed MEASUREMENT menu.

Use "▼" key till SETTINGS menu appears. Press "OK" to access to the different functions.

Use "▼" key to choose the wanted option (permission, curve type, time dial, tap or time delay) and press "OK" to access to its settings parameters.

After inserting the password 5555 it will be possible to adjust the wanted value.



General settings



From the standby mode screen, press the "OK" key to access the first line of menus. Use the "▲" and "▼" keys to position the cursor over the "SETTINGS" screen. Press the "◀" key to access the general settings from the "SETTINGS" screen.

The general setting "Equipment name" can be viewed from the HMI, but it can only be modified by using the SCom program.

The value of the "CT Phase ratio" and "TI Neutral ratio" general settings, is the result given by dividing the number of turns on the primary winding by the number on the secondary winding. For example: With TI 500/5, the setting would be 100.

The frequency is selected for each model. The value is read only.

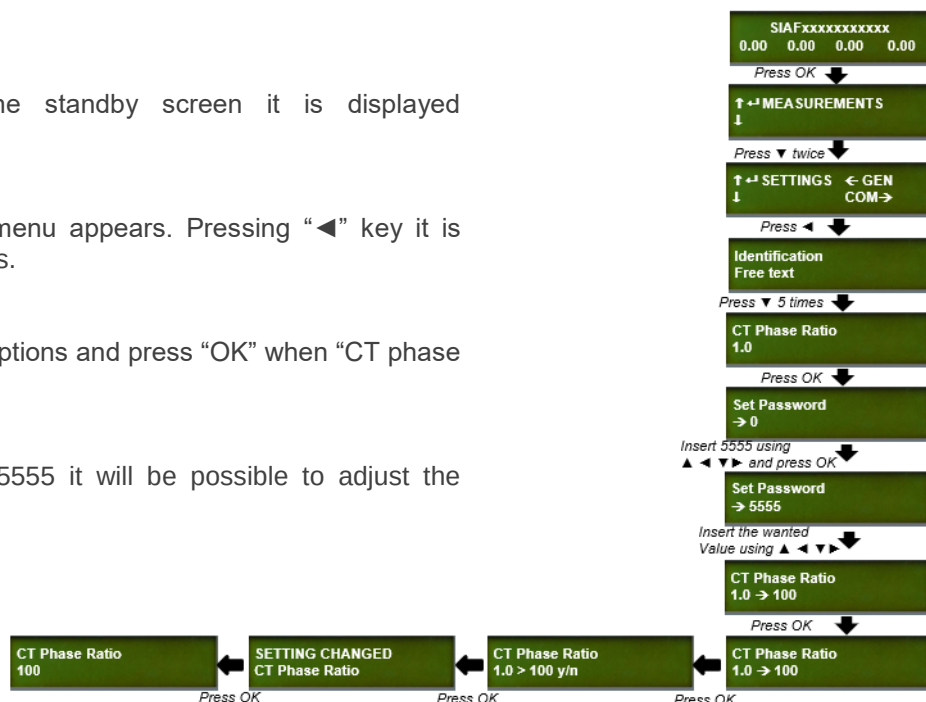
How to set CT Phase ratio

Pressing “OK” key from the standby screen it is displayed MEASUREMENT menu.

Use “▼” key till SETTINGS menu appears. Pressing “◀” key it is accessed to GENERAL settings.

Use “▼” key to overview the options and press “OK” when “CT phase ratio” option appears.

After inserting the password 5555 it will be possible to adjust the wanted value.



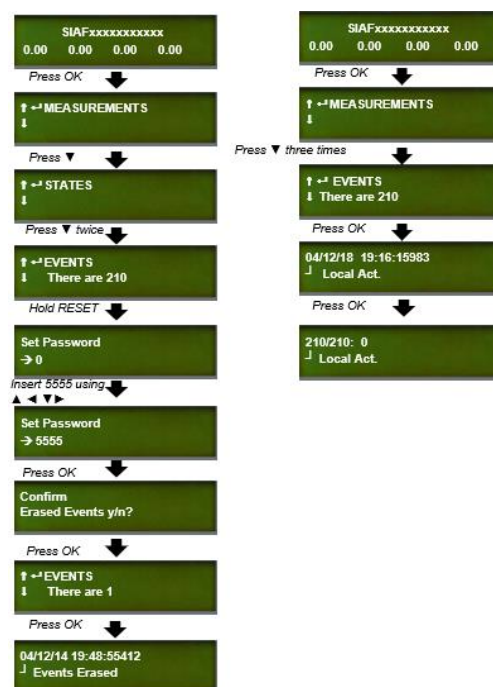
7.3.4 Events menu

From the standby mode screen, press the “OK” key to access the first line of menus. Use the “▲” and “▼” keys to position the cursor over the “EVENTS” screen and the number of events in the buffer will be displayed. Press “OK” and use the “▲” and “▼” keys to position the cursor over the events.

The “J” and “_” shows the event has been caused by the activation or reset.

Each event contains the following information:

- Date-time
- Description of the event
- Size of the events buffer
- Position of the event within the list
- Caused by activation or reset
- Associated measurement



How to delete the events

To delete the events from the relay it is necessary to insert the password 5555 from the events menu. After the erasing of the events it will appear there is 1 event corresponding to “Events erased”

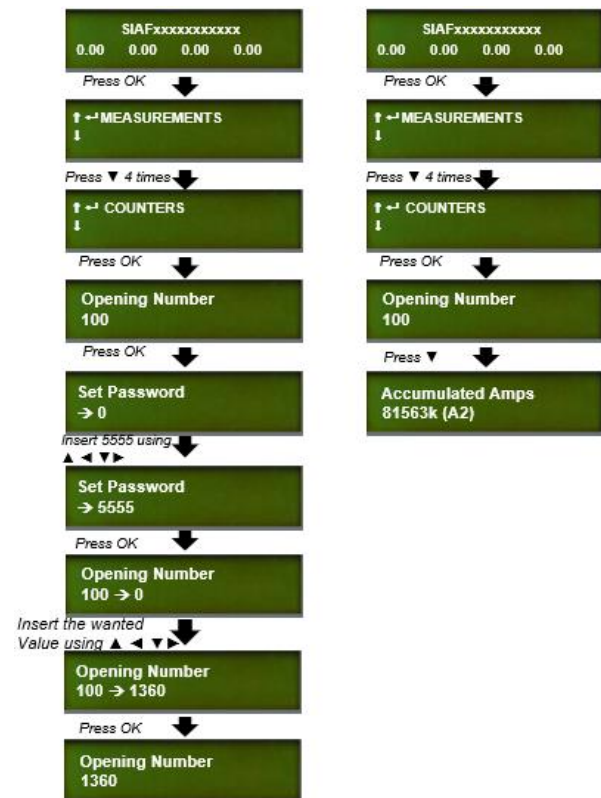
NOTE: When the events are deleted, the fault reports persist in the relay to analyze the fault situation until these faults reports are deleted consciously by the user.

7.3.5 Counters menu

From the standby mode screen, press the “OK” key to access the first line of menus. Use the “▲” and “▼” keys to position the cursor over the “COUNTERS” screen. Press "OK" and use the “▲” and “▼” keys to position the cursor over the counters.

The SIA-F has the following counters:

- Opening Number
- Accumulated Amps

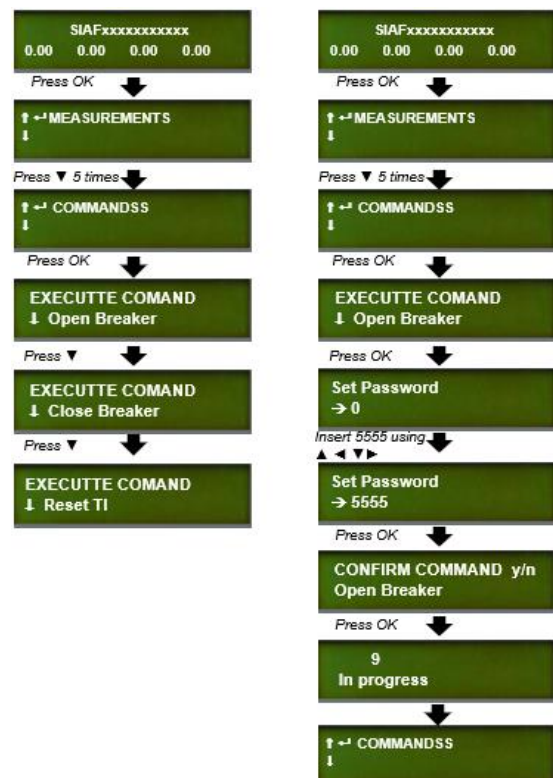


7.3.6 Commands menu

From the standby mode screen, press the “OK” key to access the first line of menus. Use the “▲” and “▼” keys to position the cursor over the “COMMANDS” screen. Press "OK" and use the “▲” and “▼” keys to position the cursor over the counters.

The SIA-F has the following counters:

- Open Breaker
- Close Breaker
- Reset TI



7.3.7 Fault reports menu

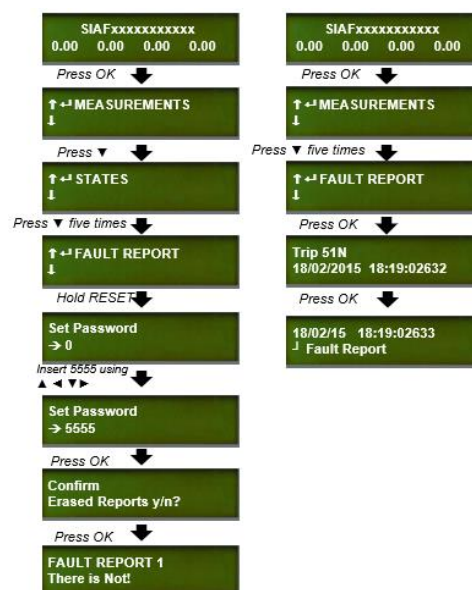
From the standby mode screen, press the “OK” key to access the first line of menus. Use the “▲” and “▼” keys to position the cursor over the “FAULT REPORT” screen. Press “OK” and use the “▲” and “▼” keys to position the cursor over the faults.

Once it is accessed to a fault report, press “OK”, to visualize the cause which has originated the fault report.

Pressing “OK” again it is accessed to the registered events that are related with that fault reports. The first event is the activation of the fault report. To visualize the rest events, use “▼” key.

How to delete the fault reports

To delete the fault reports from the relay it is necessary to insert the password 5555 from the fault report menu.



8. COMMISSIONING

8.1 Thermal resistance

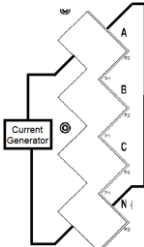
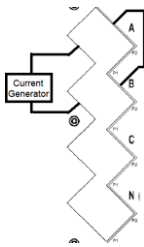
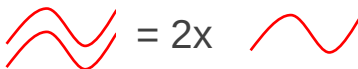
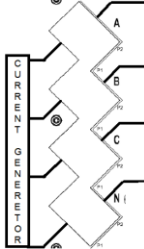
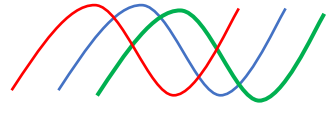
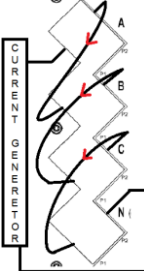
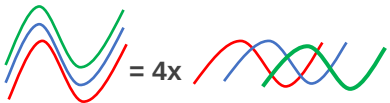
The relay can support, with 3-phase balanced injection, the following values according to International Standards:

4xI_n continuously

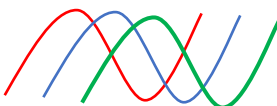
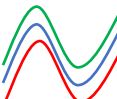
20xI_n during 10 seconds

80xI_n during 1 seconds

In the following table the different injection modes are described:

CURRENT GENERATION	INJECTION MODE	INJECTION SYSTEM	RELAY CONNECTION REAR	RELAY WITHSTAND ENERGY WAVEFORM
Single phase	Phase-Neutral	NOT APPLY	P-N: 	
	Phase-Phase		P-P: 	 = 2x
Three phase	Phase-Neutral	Balanced (120°) Un balanced (0°)	P-N Balanced: 	
			P-N Unbalanced: 	 = 4x

Considering this description, the real thermal image that will support the relay depending on the injection mode and injection system is shown below:

WAVE FORM	INJECTION MODE	THERMAL RESISTANCE
	SINGLE PHASE P-N	4xIn continuously 20xIn during 10 seconds 70xIn during 1 seconds
	3-PHASE BALANCED	4xIn continuously 20xIn during 10 seconds 70xIn during 1 seconds
	3-PHASE UNBALANCED	1xIn continuously 6.5xIn during 10 seconds 26xIn during 1 seconds

NOTE: It is checked that thermal image values are re-defined not to exceed the declared value in the International Standard.

Commissioning recommendation:

- It is recommended to use Kitcom accessory for relay protection functions settings. Connect it for setting and disconnect it for testing purpose.
- Adjust manually current generation value without injecting current to relay, for not stressing it during adjustment process.
- Be sure that relay output contact is connected to generator tripping input in order to stop the generator, hence the current injection, after reaching adjusted tripping time. This way, relay will only withstand rated injected current during adjusted time at protection function settings, not maintaining current injection constantly, which could become a damaging situation for relay, as in other case, the internally handle energy will be higher than rated one.
- Not to perform repetitive trips continuously as the stress of the relay will be increased drastically, especially when high current is being injected on the relay.

By following these recommendations, relay should pass commissioning test successfully. If commissioning test is performed not following these recommendations, manufacturer won't be responsible for relay failure.



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