PRODUCTS OVERVIEW

Expertise in Control & Protection Solutions

FANOX

fanox.com

FANOX

Safely protected

At Fanox, we are specialized in the DESIGN and MANUFACTURE of Electronic Relays for Low and Medium Voltage Applications.

Fanox was founded in 1992 with the clear objective of bringing innovation to the electricity sector. As a driver of technology and trends, it is consolidating in the energy market as a powerful manufacturer of many Protection Relays that can be used in any application in Transmission and Distribution Lines.

The energy transition faced by the electricity sector has as one of its objectives the increase of renewable energies within the electricity mix to achieve the levels of decarbonization required by Europe. This fact will lead to a more flexible and decentralized electricity system that is impossible to manage without a digital transformation of the sector. Fanox, for years, has been committed to a product that allows facing this digitalization with guarantees.

All our relays are adapted to the technical specifications and requirements of our customers, obtaining the best technical solution to meet their application and assembly needs.

Fanox has manufactured only in the past year 2023 more than 97.000 medium voltage protection relays, been certified in many of the larges electric utilities worldwide.
Our goal is to make electrical power safer.

CUSTOMERS & APPROVALS WORLDWIDE

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Protection Relays

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SIA-B Standard CT's

OC&EF Dual and Self Powered Protection Relay

PM I | SP 0.075 xIn | CI Std. CTs /1

UL | KEMA Labs

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SIA-B Specific CT's

OC&EF Dual and Self Powered Protection Relay

PM I | SP 0.4 xIn | CI Spec. CTs

UL | KEMA Labs

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SIA-C

OC&EF Dual and Self Powered Protection Relay

PM I | SP 0.075 xIn | CI Std. CTs /1 /5

KEMA Labs

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SIA-F

OC&EF Protection Relay

PM I | CI Std. CTs /1 /5

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SIL-A

OC&EF Feeder Protection Relay

PM I | CI Std. CTs /1 /5 | VI Conv. VTs (neutral)

UL | KEMA Labs

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SIL-G

Line, Feeder & Generator Protection Relay

PM I V f | CI Std. CTs /1 /5 | VI Conv. VTs

KEMA Labs

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SIL-C

Feeder & Generator Protection Relay / Compact Size

PM I V f | CI Std. CTs /1 /5 | VI Conv. VTs

KEMA Labs

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SIL-S

LPIT Feeder Protection Relay

PM I V f | CI Current sensors | VI Voltage sensors

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SIU-C

Voltage & Frequency Protection Relay

PM V f | VI Conv. VTs

KEMA Labs

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SIR-A

Overhead Control / RTU & Feeder Protection Relay

PM I V f | CI Std. CTs /1 /5 | VI Voltage sensors

KEMA Labs

Pag 50

SIR-C

Overhead Control & Feeder Protection Relay / Compact Size

PM I V f | CI Std. CTs /1 /5 | VI Voltage sensors

KEMA Labs

5 YEARS WARRANTY

LEGEND

- PM — PROTECTION & MEASUREMENT FUNCTIONS
  - I — CURRENT
  - V — VOLTAGE
  - f — FREQUENCY
- SP — SELF POWERING LEVEL
- CI — CURRENT INPUT
- VI — VOLTAGE INPUT

Applications

	SIA-B Std.	SIA-B Spec	SIA-C	SIA-F	SIL-A	SIL-G	SIL-C	SIL-S	SIU-C	SIR-A	SIR-C
Feeder	○	○	○	○	●	●	●	●	●	●	●
Transformer	●	●	●	●	●	○	○	○	○	○	○
Capacitor bank	○	○	○	●	●	●	●	●	●	●	●
Arc flash	○	○	○	○	○	●	○	○	○	●	○
Overhead Control	○	○	○	○	○	○	○	○	○	●	●
Wind power	●	●	●	●	●	●	●	●	○	○	○
Solar power	●	●	●	●	●	●	●	●	○	○	○
Grid Interconnection	○	○	○	○	○	●	●	●	●	●	●

Feeder

Transformer

Overhead

Capacitor Bank

Arc Flsh

Wind Power

Solar Power

Grid interconnection

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Other medium voltage products

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CT-MT
Current transformers

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PVS
Resistive Voltage Sensors

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AFS
Arc Flash Sensors

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PRT's
Strikers

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BNS
Coils

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TCM
Trip Capacitors

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KITCOM
Auxiliary Battery Power Supply

SICom SOFTWARE

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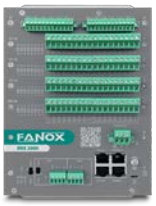
SICOM
Communication Software

Communications & Automation Solutions for Grid Digitalisation



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RNX-2000

Remote Control Unit | RTU

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SIC-A

Redundancy Protocols Gateway (PRP/HSR)

Low Voltage Products

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Protection & Control of Motors, Generators and Pumps

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Control & Measurement

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Earth Leakage Protection

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Protection Against Transient Overvoltage Strikers

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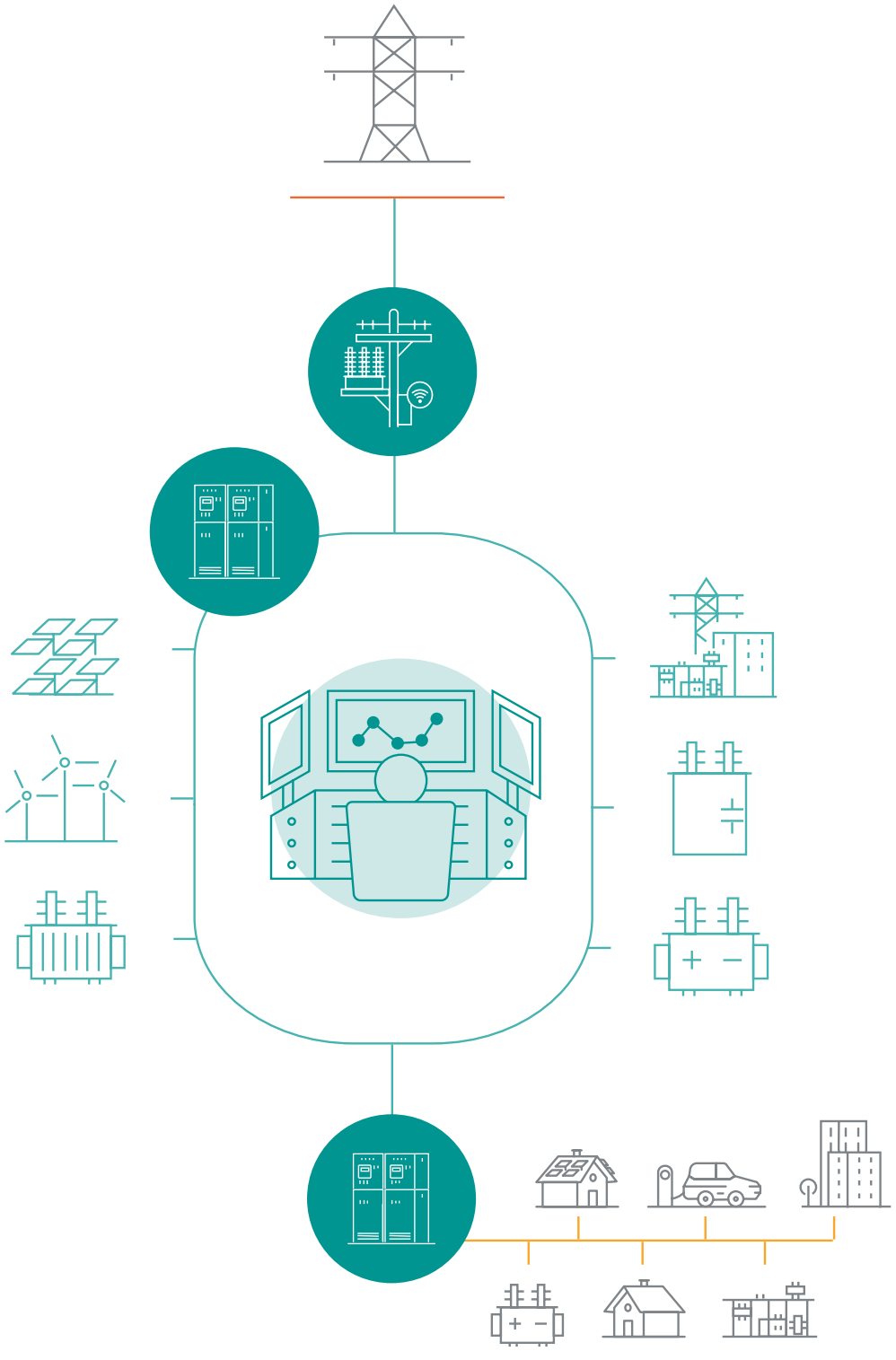
Low Voltage Transformers

DISTRIBUTION GRID



SELF POWERED TECHNOLOGY SOLUTION

INTELLIGENCE APPLIED TO PROTECTION RELAYS

We are a reference as specialists in SELF POWERED Protection Relays designing and manufacturing. Successfully proven experience, thousands of field installed devices operating in top conditions for over 15 years.

Our innovative spirit, the direct care of the market requirements and our extensive expertise in the manufacture of Protection Relays, have made our Self powered Relays a reference worldwide.

Furthermore, our Relays include the latest Technology: LCD, keyboard, event recording, SCADA communication, PC software Utilities worldwide have relied on our technology.

Main advantages over other brands

- ✓ The Relays are Self powered by the current measured by the CTs fitted on the lines. The MAIN ADVANTAGE comparing with other self powered relays in the market is that Fanox Relays do not required internal batteries. This means that the maintenance of transformation centers is heavily reduced.
- ✓ High electromagnetic compatibility makes Fanox Relays the safest in the market. KEMA certification proves it.
- ✓ 5 years warranty.
- ✓ Standard CTs /1A or /5A can be used saving money when specific CTs are not required.
- ✓ Fanox Self powered Relays are able to trip all the strikers in the market. Thanks to a setting that allows the user to select the required voltage by the striker.
- ✓ LOCAL AND REMOTE communication.
- ✓ Very intuitive menu, extremely easy to set.
- ✓ Our flexible design offers solutions for all the applications worldwide: coils, strikers, dual-powered installations...
- ✓ No one in the market gives more quality and specifications with so competitive prices.

SIA-B Standard CT's

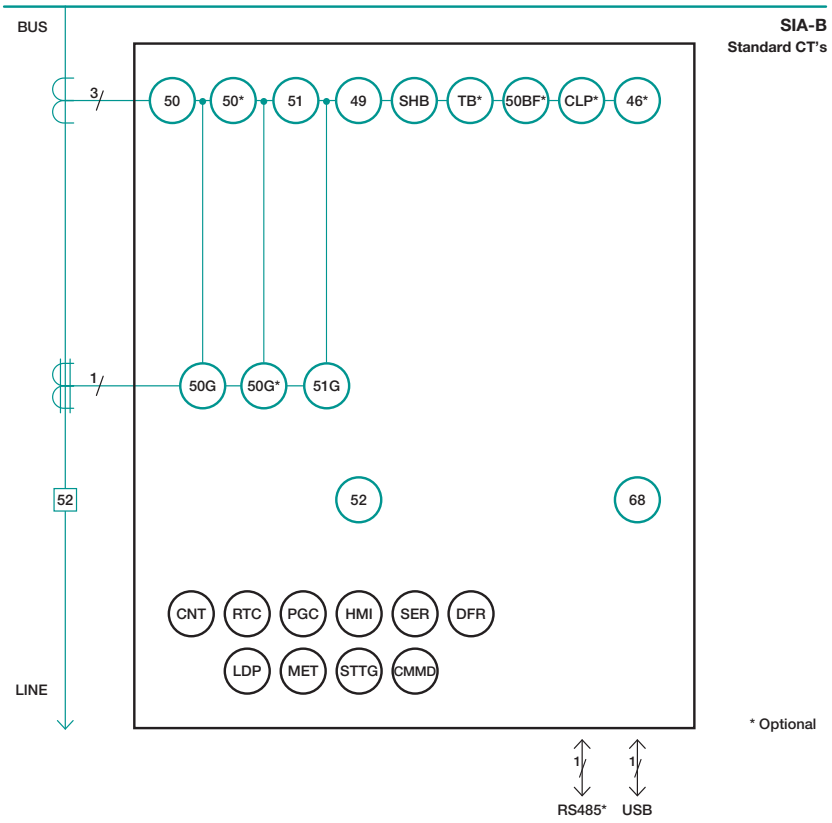
OC&EF DUAL & SELF POWERED PROTECTION RELAY

SELF-POWERED TECHNOLOGY

c UL us

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 /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 also be supplied by a USB cable connected to the laptop or with a standard power bank.
- Internal commissioning battery included as optional (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: 75 mA in a three-phase system /160 mA in a 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, its previous states can be checked by powering the relay up (by self-powering the relay through a USB cable, auxiliary voltage, or pressing the commissioning battery).
- 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.
- Each oscillographic record contains 4 analogue channels and up to 32 digital channels. The oscillography is downloaded by a 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.



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 disconnector
PGC	Programmable logic control

ADDITIONAL FUNCTIONS	
CNT	Counters
RTC	Real Time Clock
PGC	Programmable Logic Control
HMI	Human Machine Interface
SER	Sequential Event Recording
DFR	Disturbance Fault Recording
LDP	Load Data Profiling
MET	Metering
STTG	Settings Groups
CMMD	Commands

SIA-B Standard CT's

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 F		LANGUAGE English, Spanish and German English, Spanish and Turkish English, Spanish and French English, Spanish and Russian English, French and Dutch
									C U	ADAPTATION 50_1 + 51 + 50G_1 + 51G + PGC 50_1 + 51 + 50G_1 + 51G + PGC + UL certification

Example of ordering code:

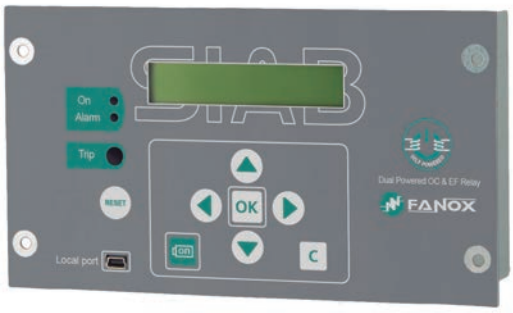
1	1	0	F	C	0	3	2	A	C	SIA B 1 1 0 F C 0 3 2 A C
SIA-B										


FANOX
SIAB


FANOX
Dual Powered OC & EF
Ready
Ground Trip
Phase Trip
CB SF6 Gas Low
RESET
SIAB
Local port
OK
C
Battery
FANOX
Dual Powered OC & EF
Ready
Ground Trip
Phase Trip
CB SF6 Gas Low
RESET
SIAB
Local port
OK
C
Battery

SIA-B Specific CT's

OC&EF DUAL & SELF POWERED PROTECTION RELAY

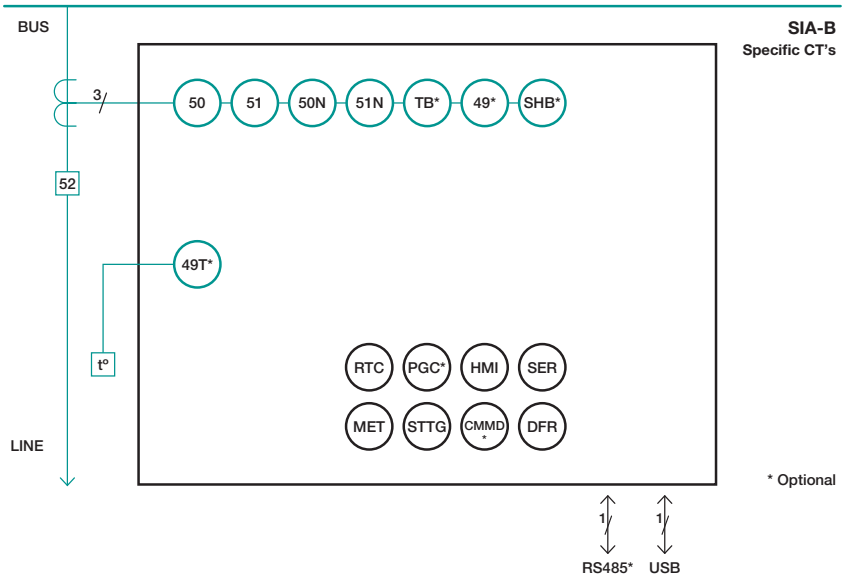


SELF-POWERED TECHNOLOGY

c UL us

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.



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 disconnector
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

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 disconnector + Trip Block for switch disconnector
					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										


SIEMENS
SIAB
FANOX

SIA-C

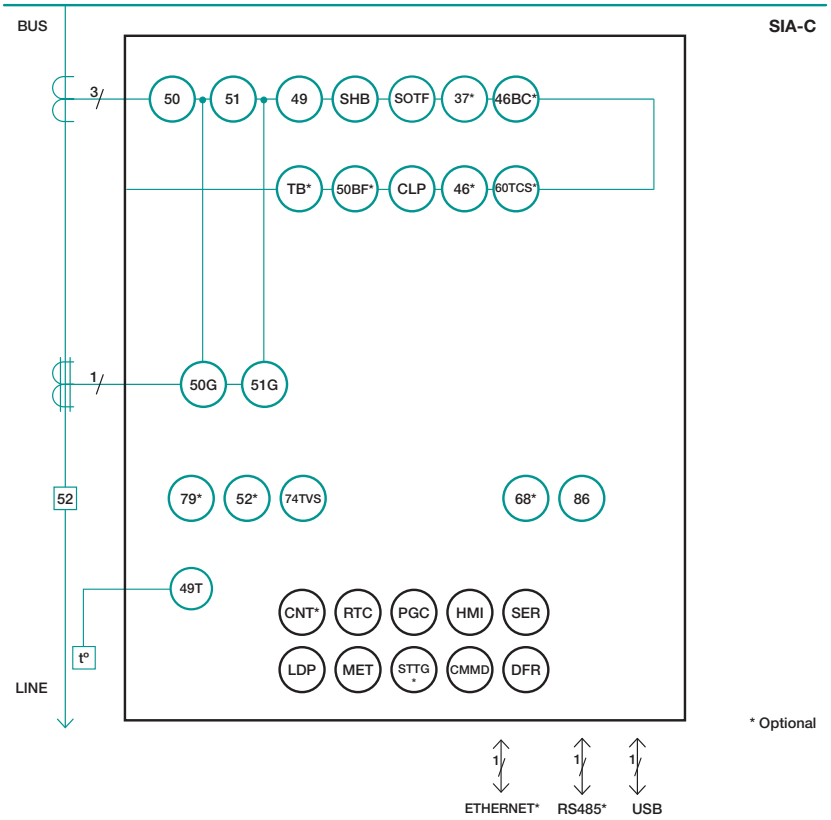
OC&EF DUAL AND SELF-POWERED PROTECTION RELAYS

SELF-POWERED TECHNOLOGY

KEMA Labs

- The SIA-C 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 /5 (5VA) or /1 (2.5VA) The relay is self-powered using the operating current through three /5 or /1 standard current transformers fitted on the lines. These transformers are also used to obtain current measurements. Besides, the SIA-C relay can be used with a universal auxiliary power supply of 24-230 Vac/dc (24-220 Vdc (±20%) / 60-230 Vac (±15%)). The relay can also be supplied by a USB cable connected to the laptop or with a standard power bank.
- Internal Commissioning battery as optional. (Lithium battery: 20 years lifetime).
- Metallic box with high electromagnetic compatibility level (EMC) and wide operating temperature range.
- Really low start-up levels in self-powered mode: 0.075xIn in a three-phase system /0.16xIn in a single-phase system
- Test menu allows the trip circuit to be tested before the transformation center is powered up.
- The front part of the SIA-C relays is provided with a navigation keypad made of 7 keys (including the RESET key) and a hot key to open the CB. Besides, there are up to 7 configurable LEDs and 1 bistable magnetic indicator (flag) which indicates the trip, maintaining their position even though the relay loses the supply.
- Self-diagnosis of the relay status (WATCHDOG) through the configurable LEDs and outputs.
- Low power consumption.
- To allow communication, relays are provided with a front Micro USB Port and with an optional remote communication RS485 port (Modbus RTU) and ethernet RJ45 port (Modbus TCP protocol) on the rear side.
- The SIA-C is provided with trip output for a low-power coil (24 Vdc – 135 mJ). Depending on the model, a single-phase trip or single/triple-phase trip is available by means of a switch.
- The SIA-C is provided with (depending on model):
  - » 2 outputs + 4 inputs
  - » 4 outputs + 4 inputs
  - » 7 outputs + 10 inputs
- The SIA-C 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-C 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 the 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 are eliminated. The operating costs of the center are reduced.
- Withdrawable and non-withdrawable mechanics are available by model list to fulfil all our customers' needs and make the installation easier.



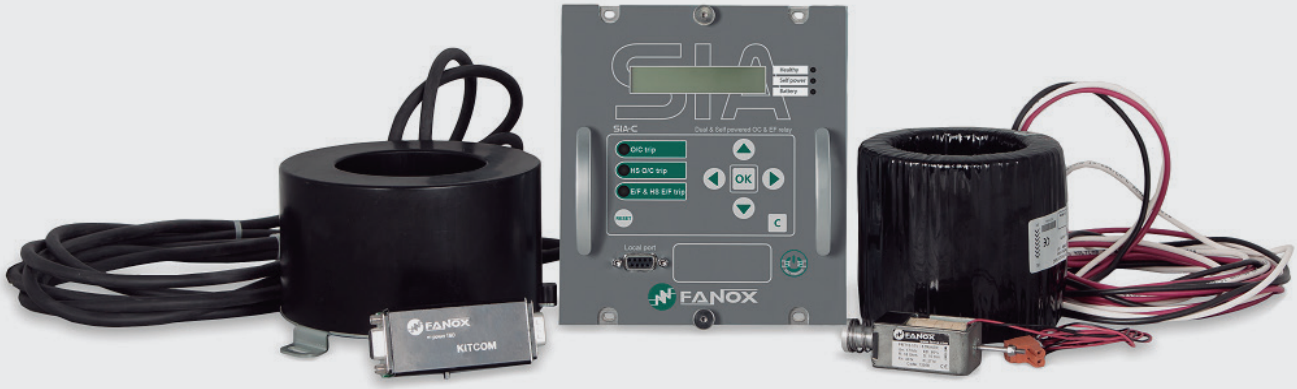
ANSI CODE PROTECTIONS	
50	Instantaneous phase overcurrent
51	Inverse time phase overcurrent
50G	Instantaneous measured neutral overcurrent
51G	Inverse time measured neutral overcurrent
SOTF	Switch on To Fault
SHB	Second Harmonic Blocking
49	Thermal overload
49T	External trip
CLP	Cold Load Pickup
37	Instantaneous phase undercurrent
46	Phase balance current protection
46BC	Broken Conductor Detection
52	Breaker wear monitoring
79	AC Reclosing device
60CTS	Phase CT supervision
74TVS	Trip voltage supervision
50BF	Circuit Breaker Failure
TB	Trip Block
PGC	Programmable logic control

ADDITIONAL FUNCTIONS	
CNT	Counters
RTC	Real Time Clock
PGC	Programmable Logic Control
HMI	Human Machine Interface
SER	Sequential Event Recording
DFR	Disturbance Fault Recording
LDP	Load Data Profiling
MET	Metering
STTG	Settings Groups
CMMD	Commands

SIA-C

Overcurrent & Earth Fault Protection Relay – Dual & Self-powered

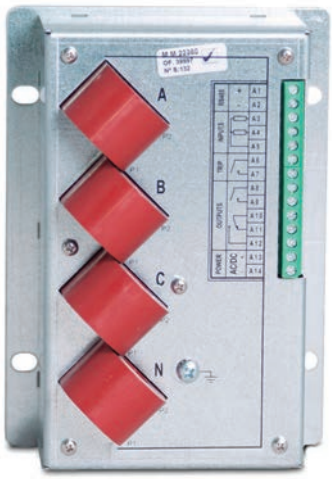
1 5										PHASE CURRENT MEASUREMENT 1 A 5 A (Only for mechanics digit G and H)
	0									NEUTRAL CURRENT MEASUREMENT 1 A or 5 A (Only for phase current measurement digit 5)
		0								NET FREQUENCY 50 Hz or 60 Hz (selectable by general settings)
			5 F							POWER SUPPLY Self-powered + 24-230 Vac/dc (Dual) Self-powered + 24-230 Vac/dc (Dual) + Commissioning battery
				0 1 2						ADDITIONAL FUNCTIONS - + 50-2 + 50G-2 + 37 + 46 + 46BC + 50BF + 60CTS + TB + 79 (Only for “inputs and outputs” digit 2 and 4) + 50-2 + 50G-2 + 37 + 46 + 46BC + 50BF + 60CTS + TB (Only for “inputs and outputs” digit 3)
					0 1 2 3 4					COMMUNICATIONS 0: USB Port (Modbus RTU) 1: USB Port (Modbus RTU) + Rear Serial Port (Modbus RTU) 2: USB Port (Modbus RTU) + Rear Serial Port (Modbus RTU, DNP3.0 or IEC60870-5-103)* 3: USB Port (Modbus RTU) + Rear Serial Port (Modbus RTU) + rear Ethernet Port (RJ45) (Modbus TCP) (Only for “inputs and outputs” digit 4) 4: USB Port (Modbus RTU) + Rear Serial Port (Modbus RTU, DNP3.0 or IEC60870-5-103)* + rear Ethernet Port (RJ45) (Modbus TCP) (Only for “inputs and outputs” digit 4)
						2 3 4				INPUTS AND OUTPUTS 1 Trip output (Striker) + 4 Outputs + 4 Inputs 3 Trip outputs (Striker) + 2 Outputs + 4 Inputs 1 Trip output (Striker) + 7 Outputs + 10 Inputs
							F G H			MECHANICS Withdrawable vertical assembly Non-withdrawable vertical assembly Non-withdrawable front-back welded vertical assembly
								A B C		LANGUAGE English, Spanish, and German English, Spanish, and Turkish English, Spanish, and French
									D	ADAPTATION 50 + 51 + 50G + 51G + SHB + CLP + 49 + 52 + 74TVS + 49T + PGC + SOTF


SIA
SIA-C
Dual & Self powered OC & EF relay
O/C trip
HS O/C trip
E/F & HS E/F trip
OK
C
Local port
FANOX
KITCOM

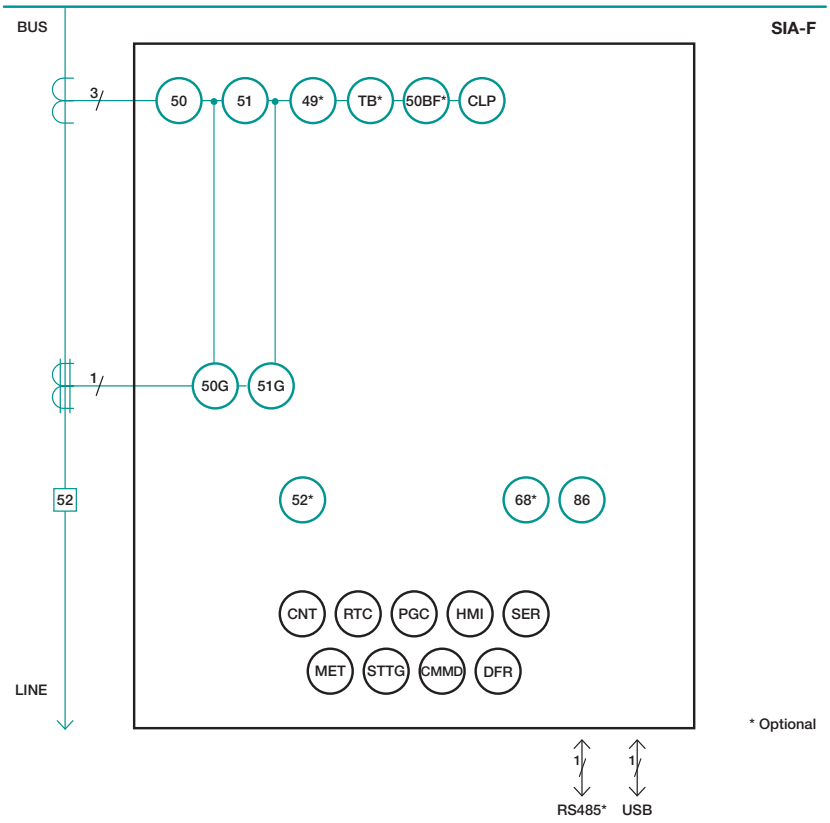

SFA-RM-F/075/10.2018/594
SIA
SIA-C
Dual & Self powered OC & EF relay
Watchdog
Self power
Battery
Trip
OK
C
Local port
FANOX
F1
SIA-C
PROTECTION RELAY
LS 4

SIA-F

OC&EF PROTECTION RELAY



- The SIA-F is an overcurrent and earth fault protection relay for secondary distribution with an auxiliary power supply of 24-230 Vac/dc.
- 4 current channels for conventional /1 and /5 current transformers.
- Metal housing with high electromagnetic compatibility level (EMC) and a wide range of operating temperature.
- Zone selection interlocking - ZSI (68 function) is available through configurable inputs and outputs thanks to the programmable logic (PGC).
- To allow the communication, relays are provided with a local micro-USB front port and with remote communication with different protocols on the rear side:
  - » Rear Serial Port: Modbus RTU or DNP3.0 Serial (depending on model).
- The SIA-F is provided with up to 2 configurable inputs and up to 3 configurable outputs (depending on model).
- The SIA-F is provided with non-volatile RAM memory in order to store up to 200 events and disturbance fault recording (DFR-4 fault reports and 1 oscillographic record in COMTRADE format), maintaining date & time thanks to its internal RTC (Real Time Clock).
- 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).



ANSI CODE PROTECTIONS	
50	Instantaneous phase overcurrent
51	Inverse time phase overcurrent
50G	Instantaneous measured neutral overcurrent
51G	Inverse time measured neutral overcurrent
49	Thermal overload
CLP	Cold Load Pickup
52	Breaker wear monitoring
50BF	Circuit Breaker Failure
86	Trip lockout
68	Zone selection interlocking (ZSI)
TB	Trip block for switch disconnector
PGC	Programmable logic control

ADDITIONAL FUNCTIONS	
CNT	Counters
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

SIA-F

Overcurrent & Earth Fault Protection Relay

1 5										PHASE CURRENT MEASUREMENT 1 A 5 A
	1 5 B									NEUTRAL CURRENT MEASUREMENT 1 A 5 A 0.2 A
		0								NET FREQUENCY Defined by General Settings
			C							POWER SUPPLY 24-230 Vdc/ac
				0 1 B C						ADDITIONAL FUNCTIONS - + 49 + 52 + 50BF + Trip block for switch disconnector + Trip block for switch disconnector + 49 + 52 + 50BF
					0 1 2					COMMUNICATIONS USB (Modbus RTU) USB (Modbus RTU) + RS485 (Modbus RTU) USB (Modbus RTU) + RS485 (DNP3.0 Serial)
						0 1				INPUTS AND OUTPUTS Trip Trip + 2 Inputs + 2 outputs
							0			MECHANICAL ASSEMBLY Vertical Assembly
								A B C D		LANGUAGE English, Spanish and German English, Spanish and Turkish English, Spanish and French English, Spanish and Russian
									A	ADAPTATION 50 + 51 + 50G + 51G + 86 + CLP + PGC

Example of ordering code:

1	**1**	**0**	**C**	**0**	**1**	**1**	**0**	**C**	**A**	SIA F 1 1 0 C 0 1 1 0 C A
SIA-F										

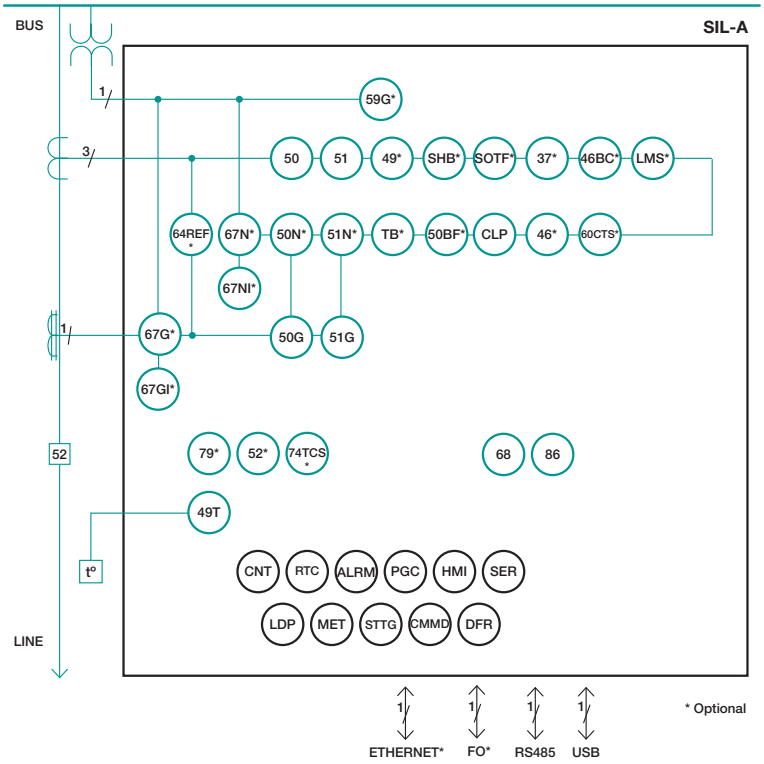

FANOX

SIL-A

OC&EF FEEDER PROTECTION RELAY

IEC 61850 | c UL us | KEMA Labs

- The SIL-A is a feeder relay that includes overcurrent and earth fault protections for primary and secondary distribution fitted with an auxiliary power supply of 24-230 Vac/dc.
- 4 current channels for conventional /1 and /5 current transformers and an optional 1 voltage channel for conventional VTs.
- Metal housing with a high electromagnetic compatibility level (EMC) and a wide range of operating temperature.
- Signaling and control of the circuit breaker (52 function) and the recloser (79 function).
- The front part of the SIL-A relays is provided with a navigation keypad made of 7 keys (including the RESET key), 4 programmable hot keys that are configured by default: two (2) keys to open and close the CB, and two (2) keys to block and unblock the recloser with their associated two (2) configurable control LEDs. Besides, there are six (6) programmable alarm LEDs.
- Zone selection interlocking - ZSI (68 function) is available through configurable inputs and outputs thanks to the programmable logic (PGC).
- In case a CB is manually closed, a switch on to an existing fault may occur. This fault condition is critical if the overcurrent protection function does not clear the fault until the adjusted time delay is finished. It is necessary, in those cases, to clear the fault quickly by means of the SOTF function.
- To allow the communication, relays are provided with a local micro-USB front port and with remote communication with different options (ports and protocols) on the rear side:
  - » Rear Serial Port: IEC60870-5-103, Modbus RTU or DNP3.0 Serial (selectable by general settings).
  - » Rear Ethernet Port (RJ45): Modbus TCP/IP, DNP3.0 TCP/IP, IEC60870-5-104 or IEC61850 (selectable by general settings) + SNTP Protocol + Web Server.
  - » Rear FO-LC Port: Modbus TCP/IP, DNP3.0 TCP/IP, IEC60870-5-104 or IEC61850 (selectable by general settings) + SNTP Protocol + Web Server.
- Alarms panel is available.
- The SIL-A is provided with (depending on the model):
  - » 3 configurable inputs and 3 configurable outputs.
  - » 6 configurable inputs and 4 configurable outputs.
  - » 6 configurable inputs and 6 configurable outputs.
  - » 5 configurable inputs and 7 configurable outputs.
  - » 9 configurable inputs and 5 configurable outputs.
- SIL-A is fitted with the demand of current (LDP - Load Data Profiling) with the following characteristics:
  - » Number of records: 744.
  - » Circular recording mode.
  - » Sampling rate (interval): configurable through communications (1-60 min).
- SIL-A is provided with non-volatile RAM memory in order to store up to 2048 events and the disturbance fault recording (DFR), maintaining date & time thanks to its internal RTC (Real Time Clock). The configurable options are:
  - » 5 records in data and COMTRADE format (300 cycles each record): 1 to 8 pre-fault cycles + 292 to 299 post-fault cycles.
  - » 25 records in data and COMTRADE format (60 cycles each record): 1 to 8 pre-fault cycles + 52 to 59 post-fault cycles.
  - » 50 records in data and COMTRADE format (30 cycles each record): 1 to 8 pre-fault cycles + 22 to 29 post-fault cycles.
  - » 100 records in data and COMTRADE format (15 cycles each record): 1 to 8 pre-fault cycles + 7 to 14 post-fault cycles.
- Each oscillographic record contains 4 analogue channels and up to 96 configurable digital channels. The oscillography is downloaded by a communications port. The SICom communications program allows the oscillography record to be downloaded and saved in COMTRADE format (IEEE C37.111-1991).



ANSI CODE PROTECTIONS

50	Instantaneous phase overcurrent
51	Inverse time phase overcurrent
50N	Instantaneous calculated neutral overcurrent
50G	Instantaneous measured neutral overcurrent
51N	Inverse time calculated neutral overcurrent
51G	Inverse time measured neutral overcurrent
67G/51G	Inverse time directional* measured neutral overcurrent
67NI	Directional isolated calculated neutral overcurrent
67GI	Directional isolated measured neutral overcurrent
SOTF	Switch On To Fault
46	Phase balance current protection
46BC	Broken Conductor Detection
64REF	Restricted Earth Fault
37	Instantaneous phase undercurrent
49	Thermal overload
49T	External trip
SHB	Second Harmonic Blocking
59G	Instantaneous measured neutral overvoltage
CLP	Cold Load Pickup
79	AC Reclosing device
52	Breaker wear monitoring
HLT	Hot Line Tag
50BF	Circuit Breaker Failure
74TCS	Trip Circuit Supervision
60CTS	Phase CT Supervision
86	Trip lockout
68	Zone Selection Interlocking (ZSI)
TB	Trip block for switch disconnector
LMS	Load Management System
PGC	Programmable logic control

* ANSI 67G can be converted into ANSI 51G by setting the "Directionality" parameter to NO.

ADDITIONAL FUNCTIONS

CNT	Counters
RTC	Real Time Clock
ALRM	Alarm panel
PGC	Programmable Logic Control
HMI	Human Machine Interface
SER	Sequential Event Recording
DFR	Disturbance Fault Recording
LDP	Load Data Profiling
MET	Metering
STTG	Settings Groups
CMMD	Commands

SIL-A

Overcurrent & Earth Fault Protection Relay for Primary & Secondary Distribution

0 1										PHASE CURRENT MEASUREMENT 1 A or 5 A 1 A (For short-circuitable terminals: Mechanics options 3 and 5)
	0 1									NEUTRAL CURRENT MEASUREMENT 1 A or 5 A 1 A (For short-circuitable terminals: Mechanics options 3 and 5)
		0								NET FREQUENCY Defined by General Settings
			C							POWER SUPPLY 24-230 Vdc / 100-230Vac
				0 2 4 5 6 8 9						ADDITIONAL FUNCTIONS 0: - 2: + 49 + 60CTS + 37 + 46BC + Trip Block (Only for adaptation “B”) 4: + SHB + 49 + 46BC (Only for adaptation “C”) 5: + 52 + 50BF + Trip Block (Only for adaptation “A”) 6: + 60CTS + 37 + 46BC + Trip block (Only for Adaptation “D”) 8: + 60CTS + 37 + 46BC + Trip block + (2) 59G + (2) 67G/51G + 67GI + 67NI (Only for Adaptation “D”) 9: + 60CTS + 37 + 46BC + Trip block + LMS (Only for Adaptation “D”)
					E F H J					COMMUNICATIONS E: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) F: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (RJ45) (Modbus TCP, DNP3 TCP or IEC 60870-5-104) + Web Server + SNTP protocol H: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (RJ45) (Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server + SNTP protocol J: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear FO-LC Port (Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server + SNTP protocol
						0 1 2 3 4				INPUTS AND OUTPUTS 3 Inputs + 3 Outputs 6 Inputs + 4 Outputs 6 Inputs + 6 Outputs 5 Inputs + 7 Outputs 9 Inputs + 5 Outputs
							2 3 4 5 R T			MECHANICAL ASSEMBLY 2: Vertical Assembly 3: Vertical Assembly and short-circuitable current terminals 4: Vertical Assembly with anticorrosive treatment 5: Vertical Assembly with anticorrosive treatment and short-circuitable current terminals R: Vertical Assembly + UL certification T: Vertical Assembly with anticorrosive treatment + UL certification
								A E F		LANGUAGE English, Spanish, German and French English, Spanish, Turkish and Russian English, Spanish, German and Portuguese
									A B C D	ADAPTATION A: Default Functions: 50 + 50G + 51 + 51G + CLP + SHB + 49 + 86 + 49T B: Default functions: (2) 50 + (2) 50G + 51 + 51G + CLP + SHB + 46 + 52 + 50BF + 79 + 74TCS + 86 + 49T C: Default functions: 50 + 50G + 51 + 51G + CLP + 46 + 52 + 79 + 74TCS + 86 + 49T D: Default functions: (2) 50 + (2) 50N +(2) 50G + (2) 51 + (2) 51N + (2) 51G + SOTF + 64REF + CLP + SHB + 49 + 46 + 52 + 50BF + 79 + 74TCS + 86 + 49T

Example of ordering code:

0	0	0	C	6	F	2	2	A	D	SIL A 0 0 0 C 6 F 2 2 A D
SIL-A										

(*) ANSI 67G can be converted into ANSI 51G by setting the “Directionality” parameter to NO.


OC&EF Relay
Feeder Protection
Ready
Phase Trip
Neutral Trip
Sett Group 1
Sett Group 2
Local Control
OK
Local port
FANOX
DELL


FANOX

SIL-G

LINE, FEEDER & GENERATOR PROTECTION RELAY

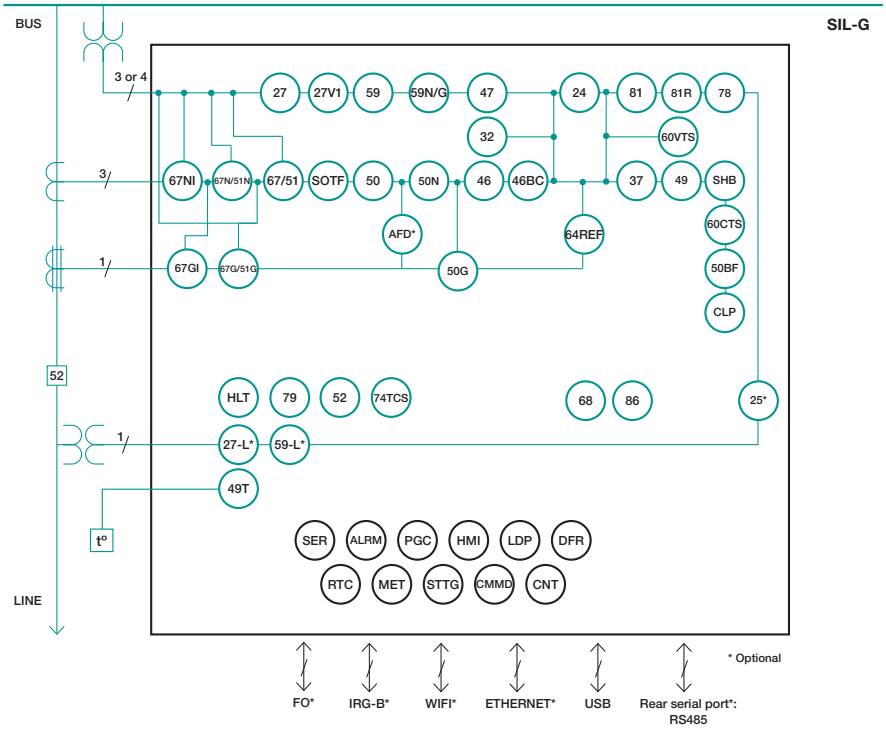
ARC FLASH

IEC 61850

KEMA Labs

G99 Compliant

- The SIL-G is a feeder relay with current, voltage, and frequency functions for primary and secondary distribution with an auxiliary power supply of 24- 230 Vdc/ac, 48-230 Vdc/ac, or 24-48 Vdc (depending on the model).
- 4 current channels for conventional /1 and /5 current transformers and 5 voltage channels for conventional VTs.
- Capability of measuring up to 1.000 volts when it is connected directly to the low voltage line.
- Metal housing with a high electromagnetic compatibility level (EMC) and a wide operating temperature range.
- Protection against decoupling, load shedding, and Loss of Main (islanding). Loss of Main (islanding) occurs when part of the public utility network loses connection with the rest of the system. In case this situation is not detected, a network safety hazard can be present if the generator remains connected since an automatic reconnection of the generator may occur, causing damage to the generator and the network. SIL-G relay detects this hazardous situation thanks to its voltage and frequency functions based on the Rate Of Change Of Frequency (ROCOF) method.
- Signaling and control of the circuit breaker (52 function) and the recloser (79 function).
- The front part of the SIL-G relays is provided with a navigation keypad made of 7 keys (including the RESET key), 6 programmable hot keys that by default are configured: two (2) keys to open and close the CB, two (2) keys to block and unblock the recloser and two (2) keys to put the relay in local or remote mode with their associated three (3) configurable control LEDs. Besides, eight (8) programmable alarm LEDs.
- Arc Flash detection (AFD) with 4 AFD inputs and 4 high-speed outputs available depending on the model. This functionality, along with the possibility of having WIFI communication, allows the users to set and configure the relay through Fanox free software and to operate the relay without being present in the installation, prioritizing security.
- In case a CB is manually closed, a switch on to an existing fault may occur. This fault condition is critical if the overcurrent protection function does not clear the fault until the adjusted time delay is finished. It is necessary, in those cases, to clear the fault quickly through the SOTF function.
- To allow the communication, the SIL-G relays are provided with a local micro-USB front port and with remote communication options (ports and protocols) on the rear side:
  - » Rear Serial Port: Modbus RTU, DNP3.0 Serial or IEC60870-5-103 (selectable by general settings).
  - » Rear Ethernet Port (RJ45 or FO-LC): Modbus TCP/IP, DNP3.0 TCP/IP, IEC60870-5-104 or IEC61850 (selectable by general settings) + SNTP Protocol + Web Server.
- Wireless communication (Wi-Fi) and synchronization through IRIG-B are optional (depending on the model).
- An alarm panel is available.
- The SIL-G is provided with (depending on the model):
  - » 8 configurable inputs and 7 configurable outputs.
  - » 24 configurable inputs and 7 configurable outputs.
  - » 8 configurable inputs and 18 configurable outputs.
  - » 16 configurable inputs and 11 configurable outputs.
  - » 8 configurable inputs, 7 configurable outputs, 4 AFD inputs, and 4 High-Speed outputs.
- SIL-G is fitted with demand of power (LDP - Load Data Profiling) with the following characteristics:
  - » Number of records: 2160.
  - » Circular recording mode.
  - » Sampling rate (interval): configurable through communications (1-60 min).
- SIL-G is provided with non-volatile RAM memory in order to store up to 3072 events and the disturbance fault recording (DFR), maintaining date & time thanks to its internal RTC (Real Time Clock). The configurable options are:
  - » 5 records in data and COMTRADE format (300 cycles each record): 1 to 8 pre-fault cycles + 292 to 299 post-fault cycles.
  - » 25 records in data and COMTRADE format (60 cycles each record): 1 to 8 pre-fault cycles + 52 to 59 post-fault cycles.
  - » 50 records in data and COMTRADE format (30 cycles each record): 1 to 8 pre-fault cycles + 22 to 29 post-fault cycles.
  - » 100 records in data and COMTRADE format (15 cycles each record): 1 to 8 pre-fault cycles + 7 to 14 post-fault cycles.
- Each oscillographic record contains 10 analogue channels and up to 96 configurable digital channels. The oscillography is downloaded by a communications port. The SICom communications program allows the oscillography record to be downloaded and saved in COMTRADE format (IEEE C37.111-1991).



ANSI CODES PROTECTIONS

50	Instantaneous phase overcurrent
67/51	Inverse time directional* phase overcurrent
50N	Instantaneous calculated neutral overcurrent
50G	Instantaneous measured neutral overcurrent
67N/51N	Inverse time directional* calculated neutral overcurrent
67G/51G	Inverse time directional* measured neutral overcurrent
67NI	Directional isolated calculated neutral overcurrent
67GI	Directional isolated measured neutral overcurrent
SOTF	Switch On To Fault
46	Phase balance current protection
46BC	Broken Conductor Detection
64REF	Restricted Earth Fault
37	Instantaneous phase undercurrent
49	Thermal overload
49T	External trip
SHB	Second Harmonic Blocking
59	Instantaneous phase overvoltage (Bus Bar)
59N/G	Instantaneous calculated/measured neutral overvoltage (Bus Bar)
59L	Instantaneous phase overvoltage (Line)
47	Phase balance voltage protection (Bus Bar)
27	Instantaneous phase undervoltage (Bus Bar)
27L	Instantaneous phase undervoltage (Line)
27V1	Instantaneous positive sequence undervoltage (Bus Bar)
32	Directional overpower
81O/U	Under/Overfrequency
81R	Rate of Change of Frequency (ROCOF)
78	Out of Step (Vector Shift)
24	Overfluxing
CLP	Cold Load Pickup
79	AC Reclosing device
52	Breaker wear monitoring
25	Synchro Check
HLT	Hot Line Tag
50BF	Circuit Breaker Failure
74TCS	Trip Circuit Supervision
60CTS	Phase CT Supervision
60VTS	Phase VT Supervision
AFD	Arc Flash Detection
86	Trip lockout
68	Zone Selection Interlocking (ZSI)
PGC	Programmable logic control

* ANSI 67, ANSI 67G and ANSI 67N can be converted into ANSI 51, ANSI 51G and ANSI 51N respectively by setting the “Directionality” parameter to NO.

ANSI 50G, ANSI 67G and ANSI 67GI will be converted into ANSI 50GS, ANSI 67GS and ANSI 67GSI in the model with neutral current measurement digit 1 (IN = 0.1A or 1A)

ADDITIONAL FUNCTIONS

CNT	Counters
RTC	Real Time Clock
ALRM	Alarm panel
PGC	Programmable Logic Control
HMI	Human Machine Interface
SER	Sequential Event Recording
DFR	Disturbance Fault Recording
LDP	Load Data Profiling
MET	Metering
STTG	Settings Groups
CMMD	Commands

SIL-G

Feeder & Generator Protection Relay

0										PHASE CURRENT MEASUREMENT 1 A or 5 A
	0 1									NEUTRAL CURRENT MEASUREMENT 1 A or 5 A 1 A or 0.1 A
		0								VOLTAGE MEASUREMENT Up to 1000 V (direct connection) or 250 V (with VTs)
			A B C							POWER SUPPLY 24-48 Vdc 48-230 Vac/dc 24-230 Vac/dc
				0 1						ADDITIONAL FUNCTIONS - +25 + 27-L + 59-L
					A B G O P Q R					COMMUNICATIONS A: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) B: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (RJ45)(Modbus TCP or DNP3.0 TCP or IEC60870-5-104) + Web Server + SNTP Protocol + IRIG-B G: USB (Modbus RTU) + WiFi + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (RJ45)(Modbus TCP, DNP3.0 TCP or IEC60870-5-104) + Web Server + SNTP Protocol + IRIG-B O: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (RJ45)(Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server + SNTP Protocol + IRIG-B P: USB (Modbus RTU) + WiFi + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (RJ45)(Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server + SNTP Protocol + IRIG-B Q: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (FO-LC)(Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server + SNTP Protocol + IRIG-B R: USB (Modbus RTU) + WiFi + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (FO-LC)(Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server + SNTP Protocol + IRIG-B
						0 5 6 7 A				INPUTS AND OUTPUTS 8 Inputs + 7 Outputs 24 Inputs + 7 Outputs 8 Inputs + 18 Outputs 16 Inputs + 11 Outputs 8 Inputs + 7 Outputs + 4 AFD Inputs + 4 High-speed Outputs
							4 5			MECHANICAL ASSEMBLY Vertical Assembly Vertical Assembly with tropicalization
								A E F		LANGUAGE English, Spanish, German and French English, Spanish, Turkish and Russian English, Spanish, German and Portuguese
									B	ADAPTATION (2) 50 + SOTF + 50G + 50N + (4) 67/51 + (2) 67G/51G + (2) 67N/51N + 67GI + 67NI + 64REF + 46 + 46BC + 49 + 49T + 37 + (2) 27+ 27V1 + (2) 59 + (2) 59N/G + 47 + (4) 32 + (4) 81U/O + (4) 81R + 78 + (2) 24 + 79 + 74TCS + 60CTS + 60VTS + 50BF + SHB + CLP + 52 + 86 + HLT

Example of ordering code:

0	0	0	C	1	F	0	4	A	B	SIL G 0 0 0 C 1 F 04 A B
SIL-G										

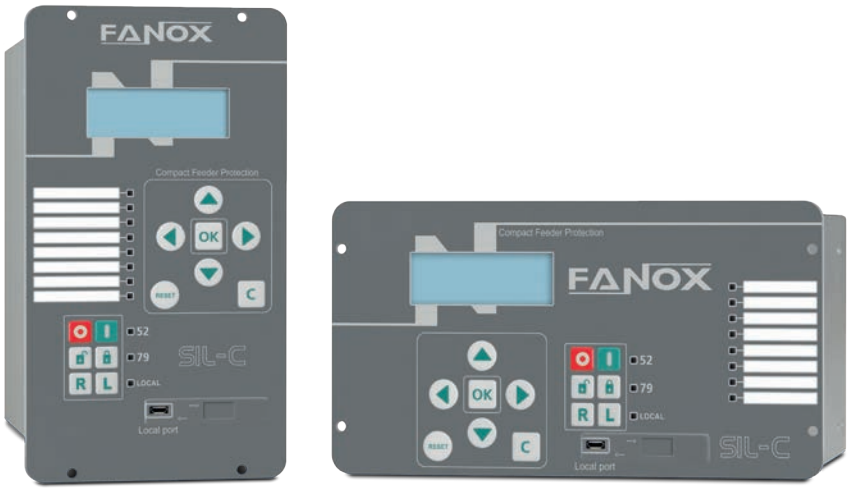
NOTES:

- » ANSI 67, ANSI 67G and ANSI 67N can be converted into ANSI 51, ANSI 51G and ANSI 51N respectively by setting the “Directionality” parameter to NO.
- » ANSI 50G, ANSI 67G and ANSI 67GI will be converted into ANSI 50GS, ANSI 67GS and ANSI 67GSI in the model with neutral current measurement digit 1 (IN = 0.1A or 1A)
- » Not all combinations are possible. Please, confirm with Fanox chosen model.


FANOX
WL

SIL-C

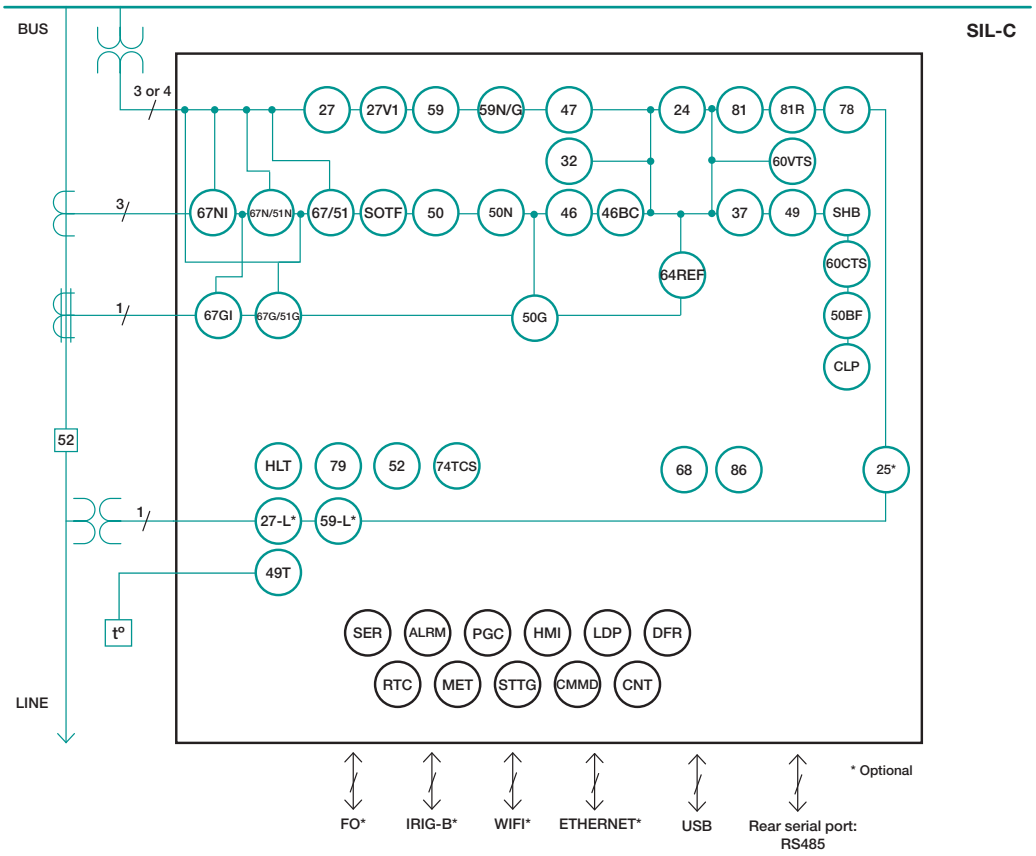
LINE, FEEDER & GENERATOR PROTECTION RELAY



KEMA Labs

G99 Compliant

- The SIL-C is a feeder relay with current, voltage, and frequency functions for primary and secondary distribution with an auxiliary power supply of 24- 230 Vdc/ac.
- 4 current channels for conventional /1 and /5 current transformers and 5 voltage channels for conventional VTs.
- Capability of measuring up to 1.000 volts when it is connected directly to the low voltage line.
- Metal housing with a high electromagnetic compatibility level (EMC) and a wide range of operating temperature.
- Protection against decoupling, load shedding, and Loss of Main (islanding). Loss of Main (islanding) occurs when part of the public utility network loses connection with the rest of the system. In case this situation is not detected, a network safety hazard can be present if the generator remains connected since an automatic reconnection of the generator may occur, causing damage to the generator and the network. SIL-C relay detects this hazardous situation thanks to its voltage and frequency functions based on the Rate Of Change Of Frequency (ROCOF) method.
- Signaling/control of the circuit breaker (52 function) and the recloser (79 function).
- The front part of the SIL-C relays is provided with a navigation keypad made of 7 keys (including the RESET key), 6 programmable hot keys that by default are configured: two (2) keys to open and close the CB, two (2) keys to block and unblock the recloser and two (2) keys to put the relay in local or remote mode with their associated three (3) configurable control LEDs. Besides, eight (8) programmable alarm LEDs.
- In case a CB is manually closed, a switch on to an existing fault may occur. This fault condition is critical if the overcurrent protection function does not clear the fault until the adjusted time delay is finished. In those cases, it is necessary to clear the fault quickly through the SOTF function.
- To allow the communication, the SIL-C relays are provided with a local micro-USB front port and with remote communication options (ports and protocols) on the rear side:
  - » Rear Serial Port: Modbus RTU, DNP3.0 Serial or IEC60870-5-103 (selectable by general settings).
  - » Rear Ethernet Port (RJ45 or FO-LC): Modbus TCP/IP, DNP3.0 TCP/IP, IEC60870-5-104 or IEC61850 (selectable by general settings) + SNTP Protocol + Web Server.
- Wireless communication (Wi-Fi) and synchronization through IRIG-B are optional (depending on the model).
- Alarms panel is available.
- The SIL-C is provided with (depending on the model):
  - » 8 configurable inputs and 7 configurable outputs.
  - » 11 configurable inputs and 5 configurable outputs.
- The SIL-C is fitted with demand of power (LDP - Load Data Profiling) with the following characteristics:
  - » Number of records: 2160.
  - » Circular recording mode.
  - » Sampling rate (interval): configurable through communications (1-60 min).
- SIL-C is provided with non-volatile RAM memory in order to store up to 3072 events and the disturbance fault recording (DFR), maintaining date & time thanks to its internal RTC (Real Time Clock). The configurable options are:
  - » 5 records in data and COMTRADE format (300 cycles each record): 1 to 8 pre-fault cycles + 292 to 299 post-fault cycles.
  - » 25 records in data and COMTRADE format (60 cycles each record): 1 to 8 pre-fault cycles + 52 to 59 post-fault cycles.
  - » 50 records in data and COMTRADE format (30 cycles each record): 1 to 8 pre-fault cycles + 22 to 29 post-fault cycles.
  - » 100 records in data and COMTRADE format (15 cycles each record): 1 to 8 pre-fault cycles + 7 to 14 post-fault cycles.
- Each oscillographic record contains 10 analogue channels and up to 96 configurable digital channels. The oscillography is downloaded by a communications port. The SICom communications program allows the oscillography record to be downloaded and saved in COMTRADE format (IEEE C37.111-1991).



ANSI CODE PROTECTIONS

50	Instantaneous phase overcurrent
67/51	Inverse time directional* phase overcurrent
50N	Instantaneous calculated neutral overcurrent
50G	Instantaneous measured neutral overcurrent
67N/51N	Inverse time directional* calculated neutral overcurrent
67G/51G	Inverse time directional* measured neutral overcurrent
67NI	Directional isolated calculated neutral overcurrent
67GI	Directional isolated measured neutral overcurrent
SOTF	Switch On To Fault
46	Phase balance current protection
46BC	Broken Conductor Detection
64REF	Restricted Earth Fault
37	Instantaneous phase undercurrent
49	Thermal overload
49T	External trip
SHB	Second Harmonic Blocking
59	Instantaneous phase overvoltage (Bus Bar)
59N/G	Instantaneous calculated/measured neutral overvoltage (Bus Bar)
59L	Instantaneous phase overvoltage (Line)
47	Phase balance voltage protection (Bus Bar)
27	Instantaneous phase undervoltage (Bus Bar)
27L	Instantaneous phase undervoltage (Line)

27V1	Instantaneous positive sequence undervoltage (Bus Bar)
32	Directional overpower
81O/U	Under/Overfrequency
81R	Rate of Change of Frequency (ROCOF)
78	Out of Step (Vector Shift)
24	Overfluxing
CLP	Cold Load Pickup
79	AC Reclosing device
52	Breaker wear monitoring
25	Synchro Check
HLT	Hot Line Tag
50BF	Circuit Breaker Failure
74TCS	Trip Circuit Supervision
60CTS	Phase CT Supervision
60VTS	Phase VT Supervision
86	Trip lockout
68	Zone Selection Interlocking (ZSI)
PGC	Programmable logic control

* ANSI 67, ANSI 67G, and ANSI 67N can be converted into ANSI 51, ANSI 51G, and ANSI 51N, respectively, by setting the “Directionality” parameter to NO.

ANSI 50G, ANSI 67G and ANSI 67GI will be converted into ANSI 50GS, ANSI 67GS and ANSI 67GSI in the model with neutral current measurement digit 1 (IN = 0.1A or 1A)

ADDITIONAL FUNCTIONS

CNT	Counters
RTC	Real Time Clock
ALRM	Alarm panel
PGC	Programmable Logic Control
HMI	Human Machine Interface
SER	Sequential Event Recording

DFR	Disturbance Fault Recording
LDP	Load Data Profiling
MET	Metering
STTG	Settings Groups
CMMD	Commands

SIL-C

Feeder & Generator Protection Relay

0										PHASE CURRENT MEASUREMENT 1 A or 5 A
	0 1									NEUTRAL CURRENT MEASUREMENT 1 A or 5 A 1 A or 0.1 A
		0								VOLTAGE MEASUREMENT Up to 1000 V (direct connection) or 250 V (with VTs)
			C							POWER SUPPLY 24-230 Vac/dc
				0 1						ADDITIONAL FUNCTIONS - +25 + 27-L + 59-L
					A B G O P Q R					COMMUNICATIONS A: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) B: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (RJ45)(Modbus TCP or DNP3.0 TCP or IEC60870-5-104) + Web Server + SNTP Protocol + IRIG-B G: USB (Modbus RTU) + WiFi + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (RJ45)(Modbus TCP, DNP3.0 TCP or IEC60870-5-104) + Web Server + SNTP Protocol + IRIG-B O: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (RJ45)(Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server + SNTP Protocol + IRIG-B P: USB (Modbus RTU) + WiFi + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (RJ45)(Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server + SNTP Protocol + IRIG-B Q: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (FO-LC)(Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server + SNTP Protocol + IRIG-B R: USB (Modbus RTU) + WiFi + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (FO-LC)(Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server + SNTP Protocol + IRIG-B
						0 1				INPUTS AND OUTPUTS 8 Inputs + 7 Outputs 11 Inputs + 5 Outputs
							C D E F			MECHANICAL ASSEMBLY Vertical Assembly Horizontal Assembly Vertical Assembly with anticorrosive treatment Horizontal Assembly with anticorrosive treatment
								A E F		LANGUAGE English, Spanish, German and French English, Spanish, Turkish and Russian English, Spanish, German and Portuguese
									B	ADAPTATION (2) 50 + SOTF + 50G + 50N + (4) 67/51 + (2) 67G/51G + (2) 67N/51N + 67GI + 67NI + 64REF + 46 + 46BC + 49 + 49T + 37 + (2) 27+ 27V1 + (2) 59 + (2) 59N/G + 47 + (4) 32 + (4) 81U/O + (4) 81R + 78 + (2) 24 + 79 + 74TCS + 60CTS + 60VTS + 50BF + SHB + CLP + 52 + 86 + HLT

Example of ordering code:

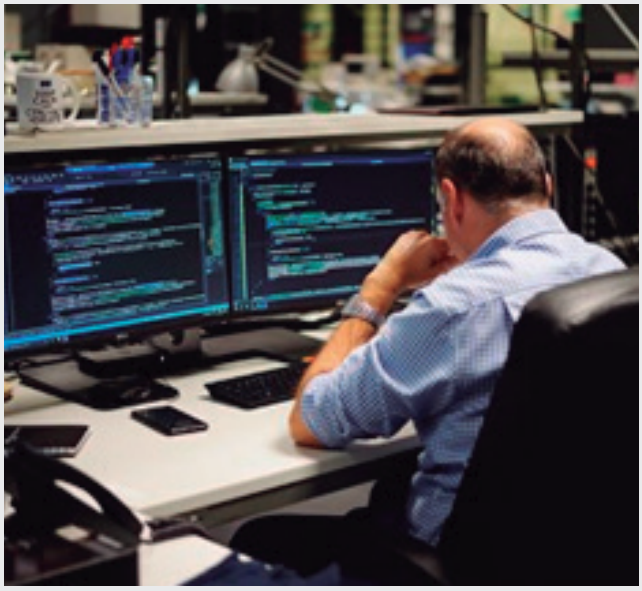
0	**0**	**0**	**C**	**0**	**A**	**1**	**C**	**A**	**B**	SIL C 0 0 0 C 0 A 1 C A B
SIL-C										

(*) ANSI 67, ANSI 67G, and ANSI 67N can be converted into ANSI 51, ANSI 51G, and ANSI 51N, respectively, by setting the “Directionality” parameter to NO.

NOTE: ANSI 50G, ANSI 67G and ANSI 67GI will be converted into ANSI 50GS, ANSI 67GS and ANSI 67GSI in the model with neutral current measurement digit 1 (IN = 0.1A or 1A)

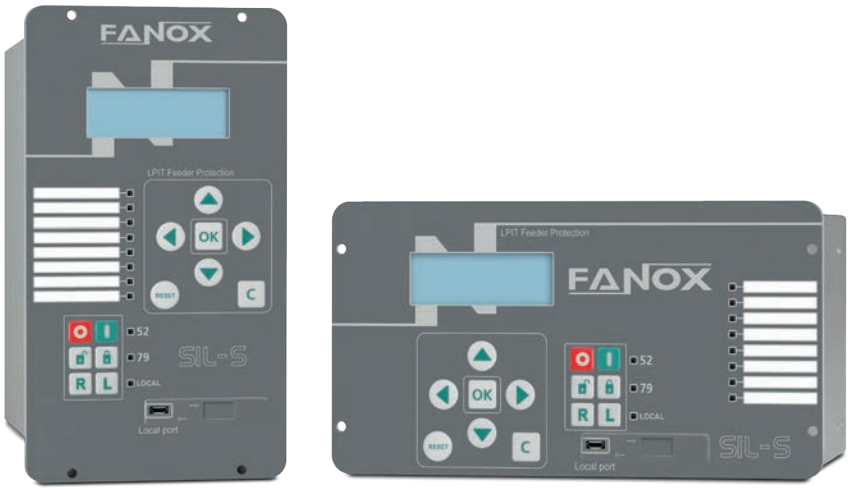
Fanox counts with the latest generation equipment for HW&FW design and validation testing and reinvests more than 15% of sales in R&D every year.

The R&D department represents 1/3 of the staff: highly qualified Hardware, Firmware, Software, and Mechanical engineers. In line with Fanox's commitment to continuous improvement, the production line is equipped with new means for producing Transmission and Distribution devices. These new means are included in the so-called Industry 4.0, with features such as artificial vision and artificial intelligence.



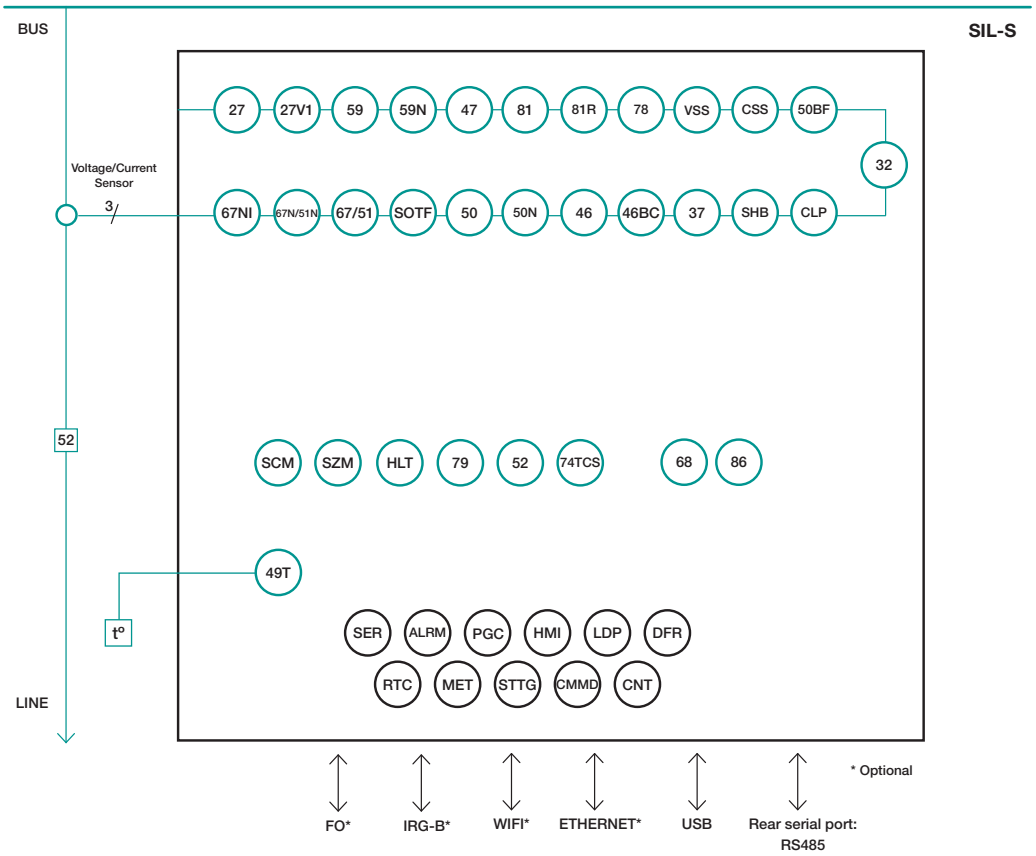
SIL-S

FEEDER PROTECTION RELAY WITH CURRENT & VOLTAGE SENSORS



KEMA Labs

- The SIL-S is a feeder relay with current, voltage, and frequency functions for primary and secondary distribution designed to work with LPIT technology (Low Power Instrument Transformers).
- Auxiliary power supply of 24- 230 Vdc/ac
- 3 combined current/voltage channels for current sensors (LPCT and Rogowski) and capacitive and resistive low power voltage sensors (LEA).
- Metallic box with high electromagnetic compatibility level (EMC) and wide range of operating temperature.
- Protection of decoupling, load shedding, and loss of main (islanding). Loss of Main (islanding) occurs when part of the public utility network loses connection with the rest of the system. If this situation is not detected, then the generator could remain connected, causing a safety hazard within the network. Automatic reconnection of the generator to the network may occur, causing damage to the generator and the network. SIL-S protection relay detects this situation thanks to its voltage and frequency functions focused on the Rate of change of frequency (ROCOF) method.
- Signaling/control of the circuit breaker (52 function) and the recloser (79 function).
- In case a CB is manually closed, a switch on to an existing fault may occur. This fault condition is critical if the overcurrent protection function does not clear the fault until the adjusted time delay is finished. It is necessary, in those cases, to clear the fault quickly by means of the SOTF function.
- To allow the communication, relays are provided with a local micro-USB front port and with remote communication with different options (ports and protocols) on the rear side:
  - » Rear RS485 Port: Modbus RTU, DNP3.0 Serial or IEC60870-5-103(selectable by general settings).
  - » Rear Ethernet Port (RJ45 or FO-LC): Modbus TCP/IP, DNP3.0 TCP/IP, IEC60870-5-104 or IEC61850 (selectable by general settings) + SNTP Protocol + Web Server.
- Synchronization through IRIG-B optional depending on model.
- The SIL-S is provided with (depending on the model):
  - » 8 configurable inputs and 7 configurable outputs.
  - » 11 configurable inputs and 5 configurable outputs.
- The SIL-S is fitted with the demand of power (Load Data Profiling) with the following characteristics:
  - » Number of records: 2160.
  - » Recording mode circular.
  - » Sampling rate (interval): configurable through communications (1-60 min).
- Alarms panel is available.
- The SIL-S is provided with non-volatile RAM memory in order to store up to 3072 events and disturbance fault recording (DFR), maintaining date & time thanks to its internal RTC (real Time Clock).
  - » 5 records in data and COMTRADE format (300 cycles each record): 1 to 8 pre-fault cycles + 292 to 299 post-fault cycles.
  - » 25 records in data and COMTRADE format (60 cycles each record): 1 to 8 pre-fault cycles + 52 to 59 post-fault cycles.
  - » 50 records in data and COMTRADE format (30 cycles each record): 1 to 8 pre-fault cycles + 22 to 29 post-fault cycles.
  - » 100 records in data and COMTRADE format (15 cycles each record): 1 to 8 pre-fault cycles + 7 to 14 post-fault cycles.)
- Each oscillographic record contains 10 analogue channels and up to 96 configurable digital channels. The oscillography is downloaded by a communications port. The SICom Communications Software allows the oscillography record to be downloaded and saved in COMTRADE format (IEEE C37.111-1991).



ANSI CODE PROTECTIONS

50	Instantaneous phase overcurrent
67/51	Inverse Time Directional* Phase Overcurrent
50N	Instantaneous calculated neutral overcurrent
67N/51N	Inverse Time Directional* Calculated Neutral Overcurrent
67NI	Directional isolated calculated neutral overcurrent
SOTF	Switch On To Fault
46	Phase balance current protection
46BC	Broken Conductor Detection
49T	External Trip
37	Instantaneous phase undercurrent
SHB	Second Harmonic Blocking
59	Instantaneous phase overvoltage (Bus bar)
59N	Instantaneous Calculated neutral overvoltage (Bus bar)
47	Phase Balance voltage protection (Bus bar)
27	Instantaneous Phase undervoltage (Bus bar)
27V1	Instantaneous Positive sequence undervoltage (Bus bar)
32	Directional Overpower
81O/U	Under/Overfrequency
81R	Rate of change of Frequency (ROCOF)

78	Out of Step (Vector Shift)
CLP	Cold Load pickup
79	AC Reclosing device
SCM	Sequence Coordination Mode
SZM	Sectionalizer Mode
HLT	Hot Line Tag
52	Breaker Wear monitoring
50BF	Circuit Breaker Failure
74TCS	Trip Circuit Supervision
CSS	Phase Current Sensors Supervision
VSS	Phase Voltage Sensors Supervision
86	Trip lockout
68	Zone selection interlocking (ZSI)
PGC	Programmable logic control

* ANSI 67and ANSI 67N can be converted into ANSI 51 and ANSI 51N respectively by setting the “Directionality” parameter to NO.

ADDITIONAL FUNCTIONS

CNT	Counters
RTC	Real Time Clock
ALRM	Alarm panel
PGC	Programmable Logic Control
HMI	Human Machine Interface
SER	Sequential Event Recording

DFR	Disturbance Fault Recording
LDP	Load Data Profiling
MET	Metering
STTG	Settings Groups
CMMD	Commands

SIL-S

Feeder Protection with voltage and current sensors

1										PHASE CURRENT MEASUREMENT Phase current sensors (22.5 mV)
	0									NEUTRAL CURRENT MEASUREMENT Internally calculated
		1 2 3 4								VOLTAGE MEASUREMENT 8 Vrms LEA maximum, 1 MOhm 5.2 Vrms LEA maximum, 2 MOhms 16 Vrms LEA maximum, 2 MOhms 2.8 Vrms LEA maximum, 20 MOhms
			C							POWER SUPPLY 24-230 Vdc/Vac
				0						ADDITIONAL FUNCTIONS -
					A B G O P Q R					COMMUNICATIONS A: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) B: USB (Modbus RTU) + Rear Serial (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (RJ45) (Modbus TCP or DNP3.0 TCP or IEC60870-5-104) + Web Server + SNTP Protocol + IRIG-B G: USB (Modbus RTU) + WiFi + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (RJ45) (Modbus TCP, DNP3.0 TCP or IEC60870-5-104) + Web Server SNTP Protocol + IRIG-B O: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (RJ45) (Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server SNTP Protocol + IRIG-B P: USB (Modbus RTU) + WiFi + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (RJ45) (Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server SNTP Protocol + IRIG-B Q: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (FO-LC) (Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server SNTP Protocol + IRIG-B R: USB (Modbus RTU) + WiFi + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (FO-LC) (Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server SNTP Protocol + IRIG-B
						0 1				INPUTS AND OUTPUTS 8 Inputs + 7 Outputs 11 Inputs + 5 Outputs
							C D E F			MECHANICAL ASSEMBLY Vertical Assembly Horizontal Assembly Vertical Assembly with anticorrosive treatment Horizontal Assembly with anticorrosive treatment
								A E F		LANGUAGE English, Spanish, German and French English, Spanish, Turkish and Russian English, Spanish, German and Portuguese
									B	ADAPTATION (2) 50 + SOTF + 50N + (4) 67/51 + (2) 67N/51N + 67NI + 46 + 46BC + 49T + 37 + (2) 27 + 27V1 + (2) 59 + (2) 59N + 47 + (4) 32 + (4) 81U/O + (4) 81R + 78 + 79 + 74TCS + CSS + VSS + 50BF + SHB + CLP + 52 + 86 + SCM + SZM + HLT

Example of ordering code:

0	0	2	C	0	A	1	C	A	B	SIL S 0 0 2 C 0 A 1 C A B
SIL-S										

(*) ANSI 67 and ANSI 67N can be converted into ANSI 51 and ANSI 51N respectively by setting the “Directionality” parameter to NO.

Moving towards sustainability Zero emission

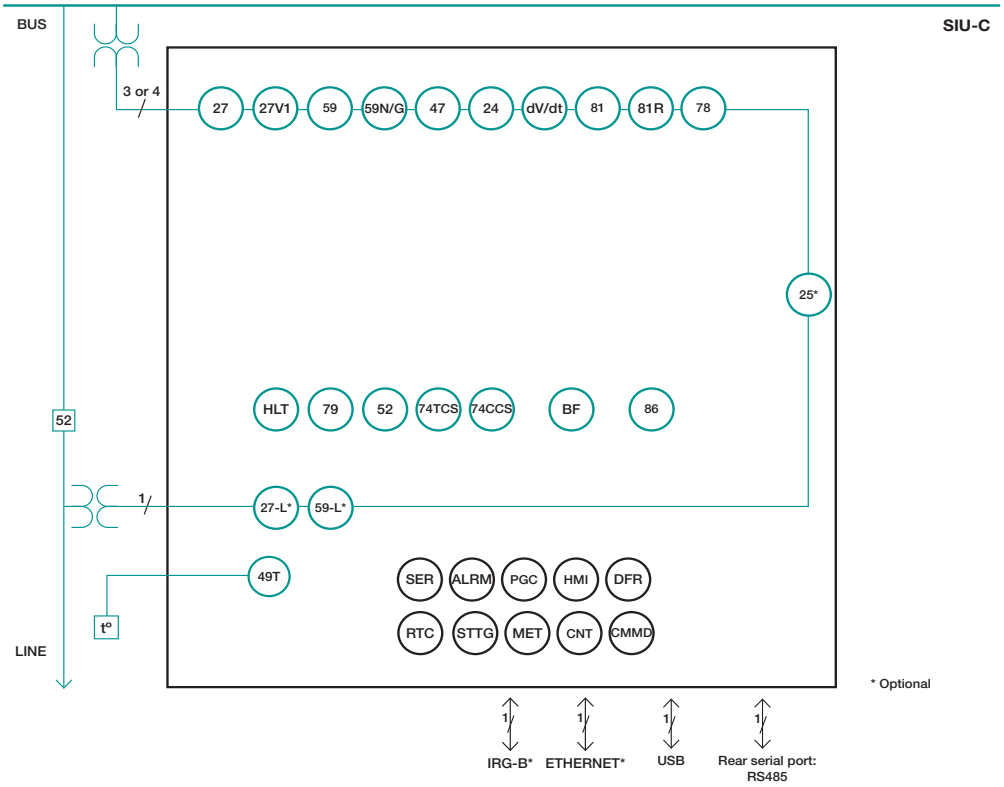
SIU-C

VOLTAGE & FREQUENCY PROTECTION RELAY

KEMA Labs

G99 Compliant

- The SIU-C is a voltage and frequency protection relay for transformers and electrical machines in high, medium, and low voltage distribution systems, fitted with an auxiliary power supply of 24-230 Vdc/ac.
- 5 voltage channels for conventional VTs.
- Capability of measuring up to 1.000 volts when connected directly to the low voltage line.
- Metal housing with high electromagnetic compatibility level (EMC) and a wide range of operating temperature.
- Protection against decoupling, load shedding and Loss of Main (islanding). Loss of Main (islanding) occurs when part of the public utility network loses connection with the rest of the system. If this situation is not detected, a network safety hazard can be present if the generator remains connected, since an automatic reconnection of the generator may occur causing damage to the generator and the network. SIU-C relay detects this hazardous situation thanks to its voltage and frequency functions based on the Rate Of Change Of Frequency (ROCOF) method.
- Signalling and control of the circuit breaker (52 function) and the recloser (79 function).
- The front part of the SIU-C relays is provided with a navigation keypad made of 7 keys (including the RESET key), 6 programmable hoy keys that by default are configured: two (2) keys to open and close the CB, two (2) keys to block and unblock the recloser and two (2) keys to put the relay in local or remote mode with their associated three (3) configurable control LEDs. Besides, eight (8) programmable alarm LEDs.
- To allow the communication, relays are provided with a local micro-USB front port and with remote communication with different options (ports and protocols) on the rear side:
  - » Rear Serial Port: IEC60870-5-103, Modbus RTU or DNP3.0 Serial (selectable by general settings).
  - » Rear Ethernet Port (RJ45): Modbus TCP/IP, DNP3.0 TCP/IP, IEC60870-5-104 or IEC61850 (selectable by general settings) + SNTP Protocol + Web Server.
- Synchronization through IRIG-B is optional (depending on the model).
- Alarms panel is available.
- The SIU-C is provided with (depending on the model):
  - » 8 configurable inputs and 7 configurable outputs.
  - » 11 configurable inputs and 5 configurable outputs.
- SIU-C is provided with non-volatile RAM memory in order to store up to 3072 events and the disturbance fault recording (DFR), maintaining date & time thanks to its internal RTC (Real Time Clock). The configurable options are:
  - » 5 records in data and COMTRADE format (300 cycles each record): 1 to 8 pre-fault cycles + 292 to 299 post-fault cycles.
  - » 25 records in data and COMTRADE format (60 cycles each record): 1 to 8 pre-fault cycles + 52 to 59 post-fault cycles.
  - » 50 records in data and COMTRADE format (30 cycles each record): 1 to 8 pre-fault cycles + 22 to 29 post-fault cycles.
  - » 100 records in data and COMTRADE format (15 cycles each record): 1 to 8 pre-fault cycles + 7 to 14 post-fault cycles.
- Each oscillographic record contains 9 analogue channels and up to 96 configurable digital channels. The oscillography is downloaded by a communications port. The SICom communications program allows the oscillography record to be downloaded and saved in COMTRADE format (IEEE C37.111-1991).



ANSI CODE PROTECTIONS

59	Inverse time phase overvoltage (Bus Bar)
59N/G	Inverse time calculated/measured neutral overvoltage (Bus Bar)
59-L	Inverse time phase overvoltage (Line)
47	Phase balance voltage protection (Bus Bar)
27	Inverse time phase undervoltage (Bus Bar)
27-L	Inverse time phase undervoltage (Line)
27V1	Inverse time positive sequence undervoltage (Bus Bar)
81O/U	Under/Overfrequency
81R	Rate of Change of Frequency (ROCOF)
78	Out of Step (Vector Shift)
24	Overfluxing
dV/dt	Rate of Change of Voltage
49T	External trip
79	AC Reclosing device
52	Breaker wear monitoring
25	Synchro Check
HLT	Hot Line Tag
BF	Circuit Breaker Failure
74TCS	Trip Circuit Supervision
74CCS	Close Circuit Supervision
86	Trip lockout
PGC	Programmable logic control

ADDITIONAL FUNCTIONS

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

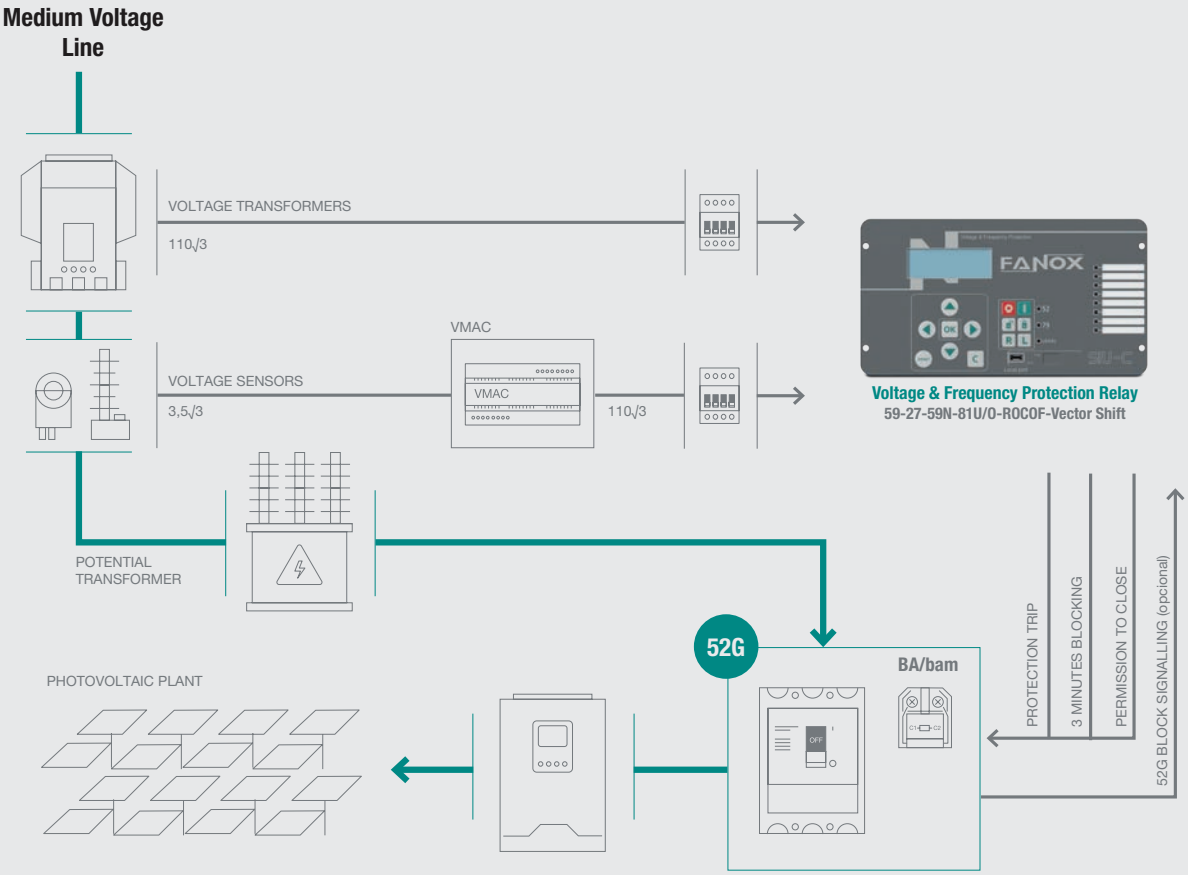
SIU-C

Voltage & Frequency Protection Relay

0										PHASE MEASUREMENT Up to 1000 V (direct connection) or 250 V (with VTs)
	0									NEUTRAL MEASUREMENT Defined by General Settings
		0								NET FREQUENCY Defined by General Settings
			C							POWER SUPPLY 24-230 Vac/dc
				0 1						ADDITIONAL FUNCTIONS - + 25 + 27-L + 59-L
					A B G O P Q R					COMMUNICATIONS A: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) B: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (RJ45) (Modbus TCP or DNP3.0 TCP or IEC60870-5-104) + Web Server + SNTP Protocol + IRIG-B G: USB (Modbus RTU) + WiFi + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (RJ45) (Modbus TCP, DNP3.0 TCP or IEC60870-5-104) + Web Server SNTP Protocol + IRIG-B O: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (RJ45) (Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server SNTP Protocol + IRIG-B P: USB (Modbus RTU) + WiFi + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (RJ45) (Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server SNTP Protocol + IRIG-B Q: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (FO-LC) (Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server SNTP Protocol + IRIG-B R: USB (Modbus RTU) + WiFi + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (FO-LC) (Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server SNTP Protocol + IRIG-B
						0 1				INPUTS AND OUTPUTS 8 Inputs + 7 Outputs 11 Inputs + 5 Outputs
							C D E F			MECHANICAL ASSEMBLY Vertical Assembly Horizontal Assembly Vertical Assembly with anticorrosive treatment Horizontal Assembly with anticorrosive treatment
								A E F		LANGUAGE English, Spanish, German and French English, Spanish, Turkish and Russian English, Spanish, German and Portuguese
									B	ADAPTATION (4) 27 + (2) 27V1 + (4) 59 + (3) 59N/G + (2) 47 + (2) dV/dt + (8) 81U/O + (6) 81R + (2) 78 + (2) 24 + 74TCS + 74CCS + BF + 52 + 79 + 86 + 49T + HLT

Example of ordering code:

0	0	0	C	1	A	1	D	A	B	SIU-C 0 0 0 C 1 A 1 D A B
SIU-C										



Example of smart solution for small PV generation installations for self-consumption with discharge of surplus to the grid

SIR-A

RECLOSER CONTROL & FEEDER PROTECTION RELAY

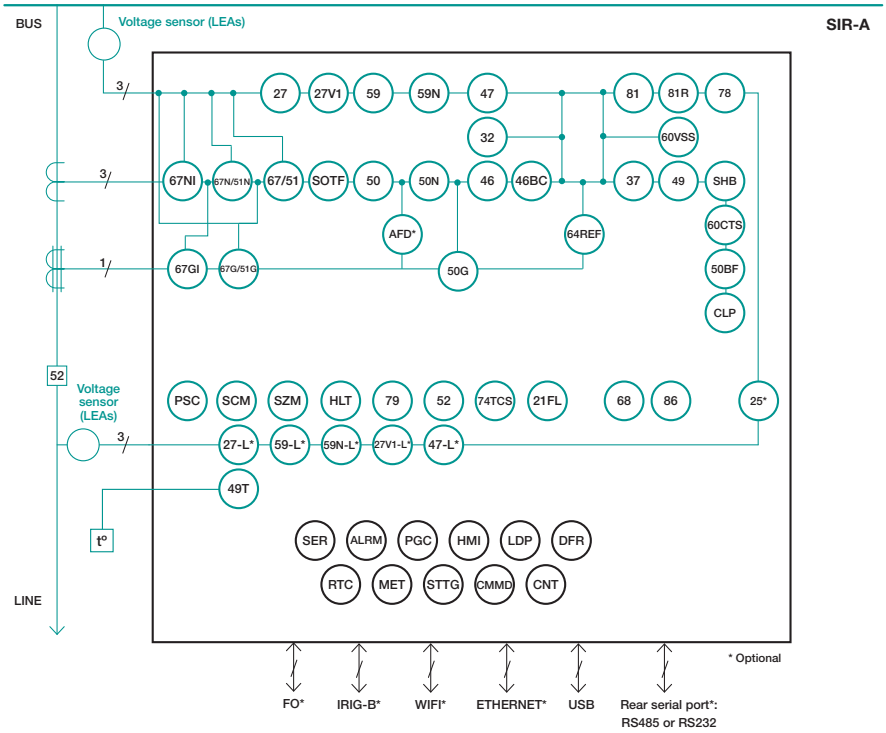
ARC FLASH

IEC 61850

KEMA Labs

G99 Compliant

- The SIR-A is an overhead control and feeder protection relay which includes current, voltage, and frequency functions for primary and secondary distribution, fitted with an auxiliary power supply of 24-230 Vdc/ac, 48-230 Vdc/ac or 24-48 Vdc (depending on model).
- 4 current channels for conventional /1 and /5 current transformers and 6 voltage channels for capacitive and resistive low power voltage sensors (LEAs).
- Metal housing with a high electromagnetic compatibility level (EMC) and a wide range of operating temperature.
- Protection against decoupling, load shedding, and Loss of Main (islanding). Loss of Main (islanding) occurs when a part of the public utility network loses connection with the rest of the system. In case this situation is not detected, a network safety hazard can be present if the generator remains connected since an automatic reconnection of the generator may occur, causing damage to the generator and the network. SIR-A relay detects this hazardous situation thanks to its voltage and frequency functions based on the Rate Of Change Of Frequency (ROCOF) method.
- Signalling and control of the circuit breaker (52 function) and the recloser (79 function).
- The front part of the SIR-A relays is provided with a navigation keypad made of 7 keys (including the RESET key), 6 programmable hot keys that by default are configured: two (2) keys to open and close the CB, two (2) keys to block and unblock the recloser and two (2) keys to put the relay in local or remote mode with their associated three (3) configurable control LEDs. Besides, depending on the model:
  - o Adaptation B: Eight (8) programmable alarm LEDs
  - o Adaptation C: Thirteen (13) programmable alarm LEDs + 8 configurable keys with their associated configurable LED.
- Arc Flash detection (AFD) with 4 AFD inputs and 4 high-speed outputs (available depending on the model). This functionality, in addition to Wi-Fi communication, allows the users to set and configure the relay through the SICom free software of Fanox and operate the relay remotely far away from the installation, thus prioritizing the health and safety of workers.
- In case a CB is manually closed, a switch on to an existing fault may occur. This fault condition is critical if the overcurrent protection function does not clear the fault until the adjusted time delay is finished. It is necessary, in those cases, to clear the fault quickly through the SOTF function.
- To allow the communication, the SIR-A relays are provided with a local micro-USB front port and with remote communication options (ports and protocols) on the rear side:
  - » Rear Serial Port: Modbus RTU, DNP3.0 Serial or IEC60870-5-103 (selectable by general settings).
    - o Adaptation B: Rear RS485 port.
    - o Adaptation C: Rear RS485 or RS232 port (selectable by the user; both ports are not available simultaneously).
  - » Rear Ethernet Port (RJ45 or FO-LC): Modbus TCP/IP, DNP3.0 TCP/IP, IEC60870-5-104 or IEC61850 (selectable by general settings) + SNTP Protocol + Web Server.
- Wireless communication (Wi-Fi) and synchronization through IRIG-B are optional (depending on the model).
- Alarms panel is available.
- The SIR-A is provided with (depending on the model):
  - » 8 configurable inputs and 7 configurable outputs.
  - » 24 configurable inputs and 7 configurable outputs.
  - » 8 configurable inputs and 18 configurable outputs.
  - » 16 configurable inputs and 11 configurable outputs.
  - » 8 configurable inputs, 7 configurable outputs, 4 AFD inputs, and 4 High-Speed outputs.
- SIR-A is fitted with demand of power (LDP – Load Data Profiling) with the following characteristics:
  - » Number of records: 2160.
  - » Circular recording mode.
  - » Sampling rate (interval): configurable through communications (1-60 min).
- SIR-A is provided with non-volatile RAM memory in order to store up to 3072 events and the disturbance fault recording (DFR), maintaining date & time thanks to its internal RTC (Real Time Clock). The configurable options are:
  - » 5 records in data and COMTRADE format (300 cycles each record): 1 to 8 pre-fault cycles + 292 to 299 post-fault cycles.
  - » 25 records in data and COMTRADE format (60 cycles each record): 1 to 8 pre-fault cycles + 52 to 59 post-fault cycles.
  - » 50 records in data and COMTRADE format (30 cycles each record): 1 to 8 pre-fault cycles + 22 to 29 post-fault cycles.
  - » 100 records in data and COMTRADE format (15 cycles each record): 1 to 8 pre-fault cycles + 7 to 14 post-fault cycles.
- Each oscillographic record contains 10 analogue channels and up to 96 configurable digital channels. The oscillography is downloaded by a communications port. The SICom communications program allows the oscillography record to be downloaded and saved in COMTRADE format (IEEE C37.111-1991).



ANSI CODE PROTECTIONS

50	Instantaneous phase overcurrent
67/51	Inverse time directional* phase overcurrent
50N	Instantaneous calculated neutral overcurrent
50G	Instantaneous measured neutral overcurrent
67N/51N	Inverse time directional* calculated neutral overcurrent
67G/51G	Inverse time directional* measured neutral overcurrent
67NI	Directional isolated calculated neutral overcurrent
67GI	Directional isolated measured neutral overcurrent
SOTF	Switch On To Fault
46	Phase balance current protection
46BC	Broken Conductor Detection
64REF	Restricted Earth Fault
37	Instantaneous phase undercurrent
49	Thermal overload
49T	External trip
SHB	Second Harmonic Blocking
59	Instantaneous phase overvoltage (Bus bar)
59N	Instantaneous calculated neutral overvoltage (Bus bar)
59-L	Instantaneous phase overvoltage (Line)
59N-L	Instantaneous calculated neutral overvoltage (Line)
47	Phase balance voltage protection (Bus bar)
47-L	Phase Balance voltage protection (Line)
27	Instantaneous phase undervoltage (Bus bar)
27-L	Instantaneous phase undervoltage (Line)
27V1	Instantaneous positive sequence undervoltage (Bus bar)

27V1-L	Instantaneous positive sequence undervoltage (Line)
32	Directional overpower
81O/U	Under/Overfrequency
81R	Rate of Change of Frequency (ROCOF)
78	Out of Step (Vector Shift)
SCM	Sequence Coordination Mode
SZM	Sectionalizer Mode
CLP	Cold Load Pickup
79	AC Reclosing device
52	Breaker wear monitoring
25	Synchro Check
HLT	Hot Line Tag
50BF	Circuit Breaker Failure
74TCS	Trip Circuit Supervision
60CTS	Phase CT Supervision
60VTS	Phase LPVT Supervision
AFD	Arc Flash Detection
86	Trip lockout
68	Zone Selection Interlocking (ZSI)
PSC	Power Supply Control
PGC	Programmable logic control

* ANSI 67, ANSI 67G, and ANSI 67N can be converted into ANSI 51, ANSI 51G, and ANSI 51N, respectively, by setting the “Directionality” parameter to NO.

ADDITIONAL FUNCTIONS

CNT	Counters
RTC	Real Time Clock
ALRM	Alarm panel
PGC	Programmable Logic Control
HMI	Human Machine Interface
SER	Sequential Event Recording

DFR	Disturbance Fault Recording
LDP	Load Data Profiling
MET	Metering
STTG	Settings Groups
CMMD	Commands

SIR-A

Feeder Protection & Recloser Control

0										PHASE CURRENT MEASUREMENT 1 A or 5 A
	0 1									NEUTRAL CURRENT MEASUREMENT 1 A or 5 A 1 A or 0.1 A
		1 2 3 4								VOLTAGE MEASUREMENT 8 Vrms LEA maximum, 1 MOhm 5.2 Vrms LEA maximum, 2 MOhm 16 Vrms LEA maximum, 2 MOhm 2.8 Vrms LEA maximum, 20 MOhm
			A B C							POWER SUPPLY 24-48 Vdc (Only for Adaptation B) 48-230 Vac/dc (Only for Adaptation B) 24-230 Vdc/Vac
				0 2 3 4						ADDITIONAL FUNCTIONS + (1) 50 + (3) 67/51 + (1) 50 + (3) 67/51 + 25 + 27-L + 59-L + 47-L + 27V1-L + 59N-L + 50P79 + 67P79 + 50P79 + 67P79 + 25 + 27-L + 59-L + 47-L + 27V1-L + 59N-L
					A B G O P Q R					COMMUNICATIONS A: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) (Only for Adaptation B) B: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (RJ45)(Modbus TCP or DNP3.0 TCP or IEC60870-5-104) + Web Server + SNTP Protocol + IRIG-B G: USB (Modbus RTU) + WiFi + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (RJ45)(Modbus TCP, DNP3.0 TCP or IEC60870-5-104) + Web Server SNTP Protocol + IRIG-B O: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (RJ45)(Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server SNTP Protocol + IRIG-B (Only for Adaptation B) P: USB (Modbus RTU) + WiFi + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (RJ45) (Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server SNTP Protocol + IRIG-B (Only for Adaptation B) Q: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (FO-LC)(Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server SNTP Protocol + IRIG-B (Only for Adaptation B) R: USB (Modbus RTU) + WiFi + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (FO-LC) (Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server SNTP Protocol + IRIG-B (Only for Adaptation B)
						0 5 6 7 A				INPUTS AND OUTPUTS 8 Inputs + 7 Outputs (Only for adaptation digit B) 24 Inputs + 7 Outputs (Only for adaptation digit B) 8 Inputs + 18 Outputs (Only for adaptation digit B) 16 Inputs + 11 Outputs 8 Inputs + 7 Outputs + 4 AFD Inputs + 4 High-speed Outputs (Only for adaptation digit B)
							4 5 6 7			MECHANICAL ASSEMBLY Vertical Assembly (Only for adaptation digit B) Vertical Assembly with tropicalization (Only for adaptation digit B) Advanced Vertical Assembly (Only for adaptation digit C) Advanced Vertical Assembly with tropicalization (Only for adaptation digit C)
								A E F		LANGUAGE English, Spanish, German and French English, Spanish, Turkish and Russian English, Spanish, German and Portuguese
									B C	ADAPTATION B: 50 + SOTF + 50G + 50N + 67/51 + (2) 67G/51G + (2) 67N/51N + 67GI + 67NI + 64REF + 46 + 46BC + 49 + 49T + 37 + (2) 27 + 27V1 + (2) 59 + (2) 59N + 47 + (4) 32 + (6) 81U/O + (2) 81R + 78 + 79 + 74TCS + 60CTS + 60VTS + 50BF + SHB + CLP + 52 + 86 + SCM+ SZM + HLT + 21FL + Power Supply Control C: 50 + SOTF + 50G + 50N + 67/51 + (2) 67G/51G + (2) 67N/51N + 67GI + 67NI + 64REF + 46 + 46BC + 49 + 49T + 37 + (2) 27 + 27V1 + (2) 59 + (2) 59N + 47 + (4) 32 + (6) 81U/O + (2) 81R + 78 + 79 + 74TCS + 60CTS + 60VTS + 50BF + SHB + CLP + 52 + 86 + SCM+ SZM + HLT + 21FL + Power Supply Control

Example of ordering code:

0	0	1	B	2	C	0	4	A	B	SIR A 0 0 1 B 2 C 0 4 A B
SIR-A										

NOTES:

- ANSI 67, ANSI 67G and ANSI 67N can be converted into ANSI 51, ANSI 51G and ANSI 51N respectively by setting the “Directionality” parameter to NO.
- ANSI 50G, ANSI 67G and ANSI 67GI will be converted into ANSI 50GS, ANSI 67GS and ANSI 67GSI in the model with neutral current measurement digit 1 (IN = 0.1A or 1A)
- Not all combinations are possible. Please, confirm with Fanox the chosen model.
- Communication digit A is not available for the model with 16 Inputs and 11 Outputs (Inputs and Outputs digit 7).


Forbid Lifting Bushing
R
S
T
UNLOCK
LOCK
FANOX


FANOX
SIR-A
OK

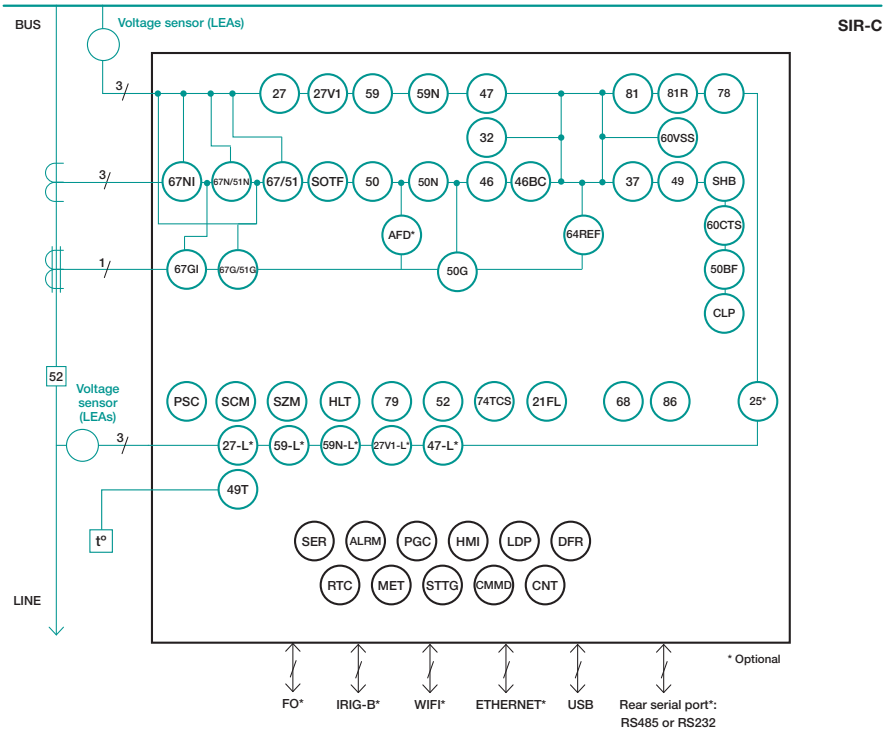
SIR-C

OVERHEAD CONTROL & FEEDER PROTECTION RELAY

KEMA Labs

G99 Compliant

- The SIR-C is an overhead control and feeder protection relay that includes current, voltage, and frequency functions for primary and secondary distribution, fitted with an auxiliary power supply of 24-230 Vdc/ac.
- 4 current channels for conventional /1 and /5 current transformers and 6 voltage channels for capacitive and resistive low power voltage sensors (LEAs).
- Metal housing with a high electromagnetic compatibility level (EMC) and a wide range of operating temperature.
- Protection against decoupling, load shedding, and Loss of Main (islanding). Loss of Main (islanding) occurs when part of the public utility network loses connection with the rest of the system. In case this situation is not detected, a network safety hazard can be present if the generator remains connected since an automatic reconnection of the generator may occur, causing damage to the generator and the network. SIR-C relay detects this hazardous situation thanks to its voltage and frequency functions based on the Rate of change of frequency (ROCOF) method.
- Signalling and control of the circuit breaker (52 function) and the recloser (79 function).
- The front part of the SIR-C relay is provided with a navigation keypad made of 7 keys (including the RESET key), 6 programmable hot keys that by default are configured: two (2) keys to open and close the CB, two (2) keys to block and unblock the recloser and two (2) keys to put the relay in local or remote mode with their associated three (3) configurable control LEDs. Besides, there are eight (8) programmable alarm LEDs.
- In case a CB is manually closed, a switch on to an existing fault may occur. This fault condition is critical if the overcurrent protection function does not clear the fault until the adjusted time delay is finished. It is necessary, in those cases, to clear the fault quickly through the SOTF function.
- To allow the communication, the SIR-C relays are provided with a local micro-USB front port and with remote communication options (ports and protocols) on the rear side:
  - » Rear Serial Port: Modbus RTU, DNP3.0 Serial or IEC60870-5-103 (selectable by general settings).
  - » Rear Ethernet Port (RJ45 or FO-LC): Modbus TCP/IP, DNP3.0 TCP/IP, IEC60870-5-104 or IEC61850 (selectable by general settings) + SNTP Protocol + Web Server.
- Wireless communication (Wi-Fi) and synchronization through IRIG-B are optional (depending on the model).
- Alarms panel is available.
- The SIR-C is provided with (depending on the model):
  - » 8 configurable inputs and 7 configurable outputs.
  - » 11 configurable inputs and 5 configurable outputs.
- The SIR-C is fitted with demand of power (LDP - Load Data Profiling) with the following characteristics:
  - » Number of records: 2160.
  - » Circular recording mode.
  - » Sampling rate (interval): configurable through communications (1-60 min).
- The SIR-C is provided with non-volatile RAM memory in order to store up to 3072 events and the disturbance fault recording (DFR), maintaining date & time thanks to its internal RTC (Real Time Clock). The configurable options are:
  - » 5 records in data and COMTRADE format (300 cycles each record): 1 to 8 pre-fault cycles + 292 to 299 post-fault cycles.
  - » 25 records in data and COMTRADE format (60 cycles each record): 1 to 8 pre-fault cycles + 52 to 59 post-fault cycles.
  - » 50 records in data and COMTRADE format (30 cycles each record): 1 to 8 pre-fault cycles + 22 to 29 post-fault cycles.
  - » 100 records in data and COMTRADE format (15 cycles each record): 1 to 8 pre-fault cycles + 7 to 14 post-fault cycles.
- Each oscillographic record contains 10 analogue channels and up to 96 configurable digital channels. The oscillography is downloaded by a communications port. The SICom communications program allows the oscillography record to be downloaded and saved in COMTRADE format (IEEE C37.111-1991).



ANSI CODE PROTECTIONS

50	Instantaneous phase overcurrent
67/51	Inverse time directional* phase overcurrent
50N	Instantaneous calculated neutral overcurrent
50G	Instantaneous measured neutral overcurrent
67N/51N	Inverse time directional* calculated neutral overcurrent
67G/51G	Inverse time directional* measured neutral overcurrent
67NI	Directional isolated calculated neutral overcurrent
67GI	Directional isolated measured neutral overcurrent
SOTF	Switch On To Fault
46	Phase balance current protection
46BC	Broken Conductor Detection
64REF	Restricted Earth Fault
37	Instantaneous phase undercurrent
49	Thermal overload
49T	External trip
SHB	Second Harmonic Blocking
59	Instantaneous phase overvoltage (Bus bar)
59N	Instantaneous calculated neutral overvoltage (Bus bar)
59-L	Instantaneous phase overvoltage (Line)
59N-L	Instantaneous calculated neutral overvoltage (Line)
47	Phase balance voltage protection (Bus bar)
47-L	Phase Balance voltage protection (Line)
27	Instantaneous phase undervoltage (Bus bar)
27-L	Instantaneous phase undervoltage (Line)
27V1	Instantaneous positive sequence undervoltage (Bus bar)
27V1-L	Instantaneous positive sequence undervoltage (Line)

32	Directional overpower
81O/U	Under/Overfrequency
81R	Rate of Change of Frequency (ROCOF)
78	Out of Step (Vector Shift)
SCM	Sequence Coordination Mode
SZM	Sectionalizer Mode
CLP	Cold Load Pickup
79	AC Reclosing device
52	Breaker wear monitoring
25	Synchro Check
HLT	Hot Line Tag
50BF	Circuit Breaker Failure
74TCS	Trip Circuit Supervision
60CTS	Phase CT Supervision
60VSS	Phase LPVT Supervision
AFD	Arc Flash Detection
21FL	Fault Locator
86	Trip lockout
68	Zone Selection Interlocking (ZSI)
PSC	Power Supply Control
PGC	Programmable logic control

* ANSI 67, ANSI 67G, and ANSI 67N can be converted into ANSI 51, ANSI 51G, and ANSI 51N, respectively, by setting the “Directionality” parameter to NO.

ANSI 50G, ANSI 67G and ANSI 67GI will be converted into ANSI 50GS, ANSI 67GS and ANSI 67GSI in the model with neutral current measurement digit 1 (IN = 0.1A or 1A)

ADDITIONAL FUNCTIONS

CNT	Counters
RTC	Real Time Clock
ALRM	Alarm panel
PGC	Programmable Logic Control
HMI	Human Machine Interface
SER	Sequential Event Recording

DFR	Disturbance Fault Recording
LDP	Load Data Profiling
MET	Metering
STTG	Settings Groups
CMMD	Commands

SIR-C

Feeder & Recloser Control

0										PHASE CURRENT MEASUREMENT 1 A or 5 A
	0 1									NEUTRAL CURRENT MEASUREMENT 1 A or 5 A 1 A or 0.1 A
		1 2 3 4								VOLTAGE MEASUREMENT 8 Vrms LEA maximum, 1 MOhm 5.2 Vrms LEA maximum, 2 MOhms 16 Vrms LEA maximum, 2 MOhms 2.8 Vrms LEA maximum, 20 MOhms
			C							POWER SUPPLY 24-230 Vdc/Vac
				0 2 3 4						ADDITIONAL FUNCTIONS + (1) 50 + (3) 67/51 + (1) 50 + (3) 67/51 + 25 + 27-L + 59-L + 47-L + 27V1-L + 59N-L + 50P79 + 67P79 + 50P79 + 67P79 + 25 + 27-L + 59-L + 47-L + 27V1-L + 59N-L
					A B G O P Q R					COMMUNICATIONS A: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) B: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + RJ45 (Modbus TCP or DNP3.0 TCP or IEC60870-5-104) + Web Server + SNTP Protocol + IRIG-B G: USB (Modbus RTU) + WiFi + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + RJ45 (Modbus TCP, DNP3.0 TCP or IEC60870-5-104) + Web Server SNTP Protocol + IRIG-B O: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + RJ45 (Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server SNTP Protocol + IRIG-B P: USB (Modbus RTU) + WiFi + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + RJ45 (Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server SNTP Protocol + IRIG-B Q: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + FO-LC (Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server SNTP Protocol + IRIG-B R: USB (Modbus RTU) + WiFi + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + FO-LC (Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server SNTP Protocol + IRIG-B
						0 1				INPUTS AND OUTPUTS 8 Inputs + 7 Outputs 11 Inputs + 5 Outputs
							C D E F			MECHANICAL ASSEMBLY Vertical Assembly Horizontal Assembly Vertical Assembly with anticorrosive treatment Horizontal Assembly with anticorrosive treatment
								A E F		LANGUAGE English, Spanish, German and French English, Spanish, Turkish and Russian English, Spanish, German and Portuguese
									B	ADAPTATION 50 + SOTF + 50G + 50N + 67/51 + (2) 67G/51G + (2) 67N/51N + 67GI + 67NI + 64REF + 46 + 46BC + 49 + 49T + 37 + (2) 27 + 27V1 + (2) 59 + (2) 59N + 47 + (4) 32 + (6) 81U/O + (2) 81R + 78 + 79 + 74TCS + 60CTS + 60VTS + 50BF + SHB + CLP + 52 + 86 + SCM+ SZM + HLT + 21 FL + Power Supply Control

Example of ordering code:

0	0	2	C	0	A	0	C	A	B	SIR C 0 0 2 C 0 A 0 C A B
SIR-C										

(*) ANSI 67, ANSI 67G, and ANSI 67N can be converted into ANSI 51, ANSI 51G, and ANSI 51N, respectively, by setting the “Directionality” parameter to NO.

NOTE: ANSI 50G, ANSI 67G, and ANSI 67GI will be converted into ANSI 50GS, ANSI 67GS, and ANSI 67GSI in the model with neutral current measurement digit 1 (IN = 0.1A or 1A)

Current Transformers

STANDARD PROTECTION CT'S FOR AUXILIARY SUPPLIED OR FOR SELF POWERED RELAYS - CT-MTS

- /1 or /5 secondary protection. Taped or epoxy resined (Installation around the wire or on the bushings).
- Wire or terminals at secondary connection. With simple or dual core (Different cores for measurement and power).
- Transformation ratio single or multitap.
- 5P10, 5P20, 10P5 or 10P10 protection class.
- From 0.12 VA to 5 VA or higher.
- Isolation level 0.72 Kv / 3 Kv.

SPECIFIC CT'S FOR SELF POWERED RELAYS - CT-MTB

- Special cores are used to get higher burden and getting anergy in case of sel powered protection relays.
- Taped or epoxy resined (Installation around the wire or on the bushings).
- Wire or terminals at secondary connection.
- Test winding for secondary testing.
- 5P80 and 10P80 protection class.
- Specific dimensions in case installation conditions are really restrictive.

Fanox offers complete solutions providing, not only highest quality electronic protection relays, also required current transformers to get protection and measuring capability. Based on relays, different types of current transformers can be used, adapted to customer requirements, both mechanical and functional.

Regarding technical features, all required values that define a CT, as transformation ratio, burden, accuracy class, protection class, frequency, isolation level, ….are adapted to be completely compatible with Fanox electronic Relays.

Furthermore, in case customer has mechanical limitations or a specific CT Type is required, we can study customized production.

Voltage Sensors

RESISTIVE VOLTAGE SENSORS - PVS

- Voltage sensors apply to voltage measurement of connecting busbar screened cable connector in medium voltage gas insulation switchgear of smart grid.
- Low-power voltage sensors provide a reliable alternative to protecting, measuring and monitoring medium voltage distribution networks. Its high performance and compact size make it ideal for optimal design of medium voltage switches.
- Designed for voltage measurement on MV cabinets and SF6 switchgears up to 24 KV.

Trip Capacitors

TRIP CAPACITORS –TCM FOR SELF POWERED RELAYS

- Connecting trip coil module to the potential-free trip contact of the relay it supplies necessary energy to trip the coil (30J).
- Its main functions is to adapt the relay to installations where the line opening system is activated by a coil, instead of a striker.
- The TCM (Trip Coil Module) is specifically designed to be used with SELF POWERED relays (SIA-C, SIA-B).

Strikers

STRIKER – PRT

- This is a single effect solenoid. The striker is spring operated.
- The striker is activated by low-power polarised electrical signal supplied by the relay in case of a fault.
- The striker is reset to its starting position manually.

Coils

COILS - BNS

- BNS serie electromagnets are simple effect linear solenoids.
- The stroke movement from initial to final position is made byelectromagnetic forces.
- The return to initial position is made by external force or by a spring incorporated to the solenoid.

Arc Flash Sensors

ARC FLASH SENSORS - AFS

- Arc-flash detection technology significantly decreases the time it takes a relay to trip in response to an arc fault, which reduces hazardous arc-flash incident energy. FANOX combination of light-sensing technology with fast overcurrent protection allows high-speed tripping during arc-flash events without overtripping for external faults or adverse light conditions.

Auxiliary Battery

AUXILIARY BATTERY POWER SUPPLY – KITCOM

- The KitCom is an adapter to supply SIA relays through the front communication port, allowing the communication with the computer simultaneously.
- This adapter is very useful in the commissioning processes of the transformation centres, allowing full verification of the centre, without any auxiliary power supply.
- The equipment has a microswitch that feeds the power supply with a LED (ON) when the voltage is adequate.
- In addition to all the necessary to give the power supply, this device has two LED associated with the Rx and Tx lines of communication, and they are used to verify that there is data traffic between the PC and the SIA relay.

Communication Software

SICOM COMMUNICATION SOFTWARE – SICOM

- The SICom program works with the Windows® 2000/XP, Windows 7 and Windows 10 operating system and can be used to gain access to all of the relays information, to modify the settings and to save events using a graphic user interface.

SICom
SOFTWARE

Communications & Automation Solutions for Grid Digitalisation

5 YEARS WARRANTY

RNX-2000

REMOTE CONTROL
UNIT | RTU

- RNX-2000 is a flexible and compact remote-control unit (RTU) for primary and secondary distribution suitable for low and medium voltage switchgears, being an optimal solution for Ring Main Units monitoring and control thanks to its compact size.

- RNX-2000 is provided with 24-48 Vdc power supply.

- Wide variety of interfaces for analogue measurements depending on model, including:
  - » Current:
    - 9 current channels for current sensors (LPCT or Rogowski).
  - » Voltage:
    - 3 voltage channels for resistive or capacitive low voltage sensors (LEAs)

    Upcoming different combinations of current and voltage channels.

- RNX-2000 includes the following communication ports:
  - » Serial Ports:
    - 1x RS485 Port.
    - 1x RS232/RS485 Port selectable by switch.
  - » Ethernet ports:
    - 2x WAN (10/100/1000 Base Tx) Ports (RJ45 connectors).
    - 1x LAN (10/100/1000 Base Tx) Port (RJ45 connector).
    - 1x Service LAN (10/100 Base Tx) Port (RJ45 connector).

- RNX-2000 will support all the standard protocols enhancing cyber security requirements to fulfil IEC62351:
  - » IEC60870-5-104 and Modbus, NTP, SNTP.
  - » Master/Client: IEC60870-5-101/104, IEC60870-5-103, Modbus (TCP/IP and Serial), DNP3 (TCP/IP and Serial), IEC61850. (Upcoming)
  - » Slave/Server: IEC60870-5-101/104, IEC60870-5-103, Modbus (TCP/IP and Serial), DNP3 (TCP/IP and Serial), IEC61850, NTP, SNTP. (Upcoming)

- RNX-2000 includes different modules of I/O available to support:
  - » 32, 48 or 64 inputs.
  - » 8, 16 or and 32 outputs with associated LED indicators.

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

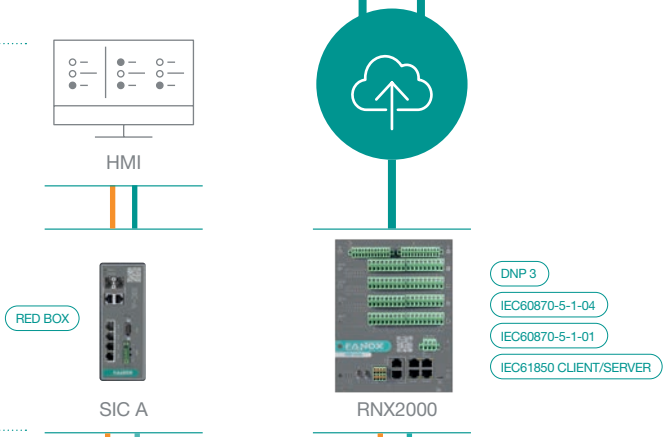
- Advanced logic configuration and automation capability thanks to the programmable logic.

- Sequential Events Recording (SER) in non-volatile RAM memory maintaining the date & time thanks to its internal RTC (Real Time Clock).

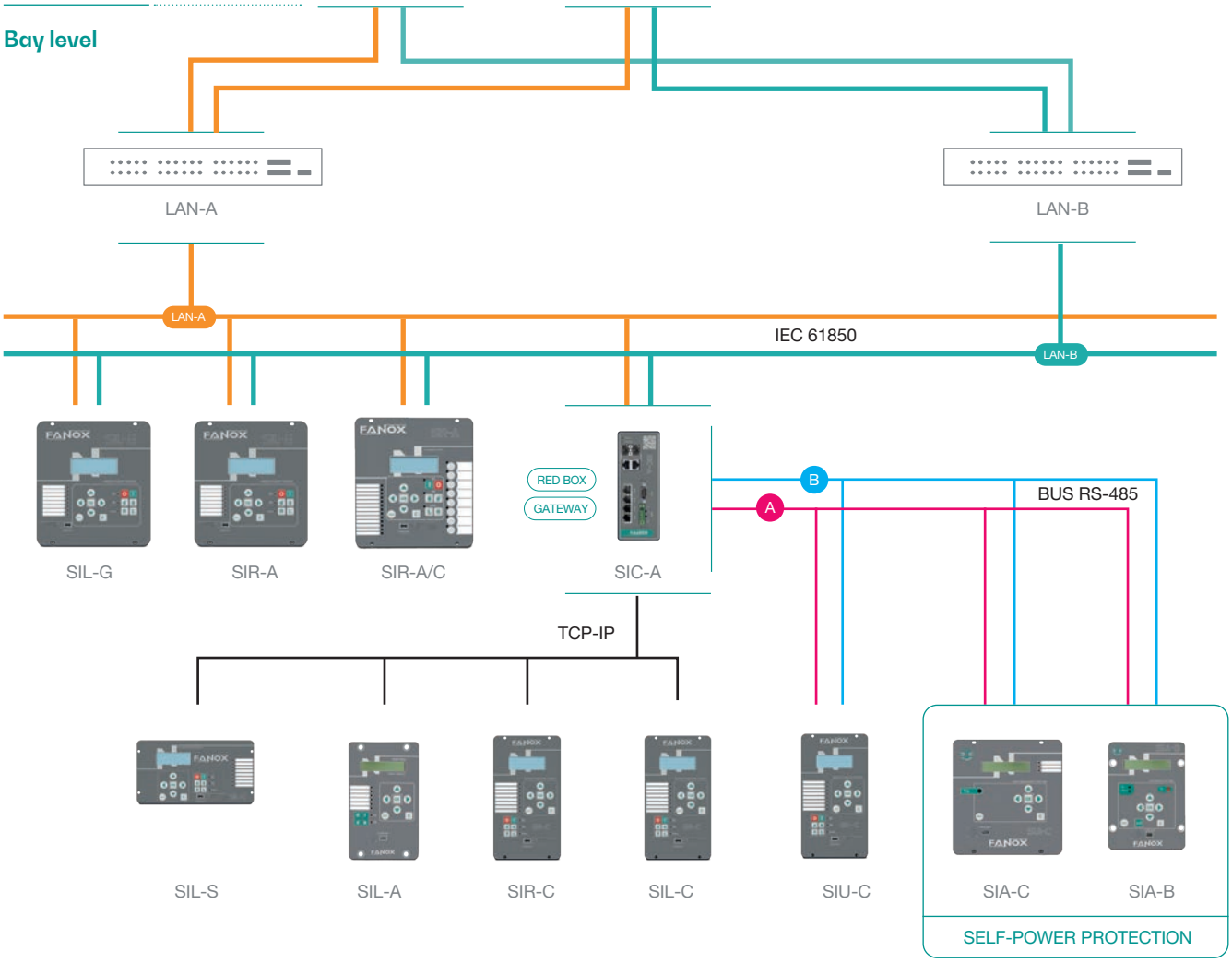
- Integrated Web server for configuration and diagnostics.

Network level

Station level



Bay level

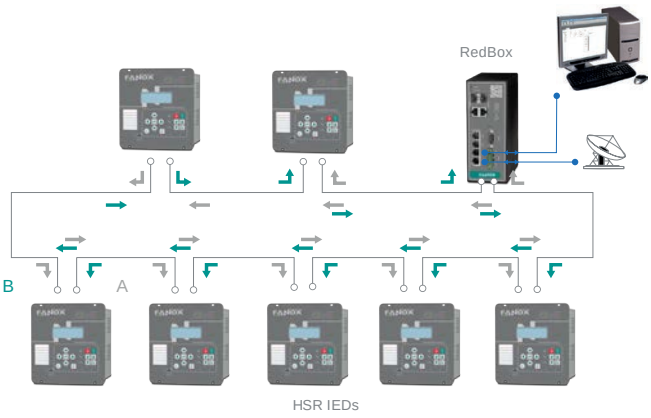


SIC-A

REDUNDANCY PROTOCOLS
GATEWAY (PRP/HSR)

- SIC-A is provided with any-to-any protocol conversion that permits the integration of the device with proprietary and legacy protocols in a modern infrastructure with the most recent protocols and redundant topologies.
- SIC-A can work as a multi-protocol converter, as an unmanaged Redbox, or as a redundant protocol gateway.
- SIC-A can manage up to 3000 data points of the most common protocols (Modbus, IEC 60870, DLMS, DNP3, ...) or up to 800 data points of advanced protocols such as IEC 61850.
- The device is provided with HSR (High-availability Seamless Redundancy) optimal redundancy protocol for the substation automation as per the IEC 61850 standard. This redundancy is the evolution of the existing Parallel Redundancy Protocol (PRP), which is also available in the device.
- SIC-A is provided with 4 digital inputs and 4 digital outputs.
- It is especially suited for applications that demand high availability and very short switchover time because it provides zero recovery time in case of the failure of any component. A good example of an application may be the protection of automatized electrical substations or the control of synchronized drives, for instance.

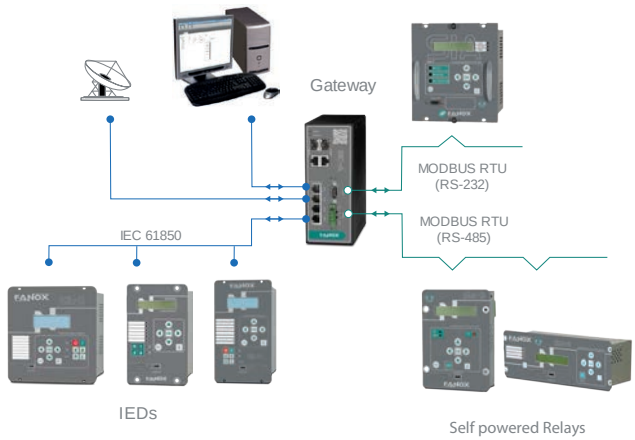
REDBOX



SIC-A Working as a Redbox allows the connection of HSR networks with traditional ones.

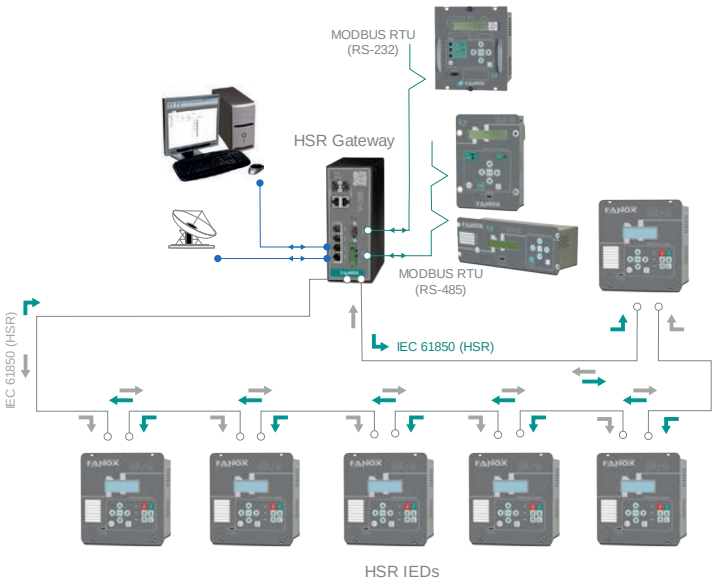
In case of PRP redundancy, SIC-A is not denominated Redbox, it would be a device that allows the integration into 2 independent networks through a 3rd Ethernet port.

PROTOCOL GATEWAY



SIC-A device is able of communicating through serial communication RS-232 or RS-485 with multiple equipment with a Master serial protocol (ModBus, IEC69870-5-101, IEC60870-5-103, DLMS…) and dispose the information into a Ethernet protocol as IEC 61850 or IEC 60870-5-104. This way, devices with conventional protocols can be integrated in Ethernet networks with advanced protocols.

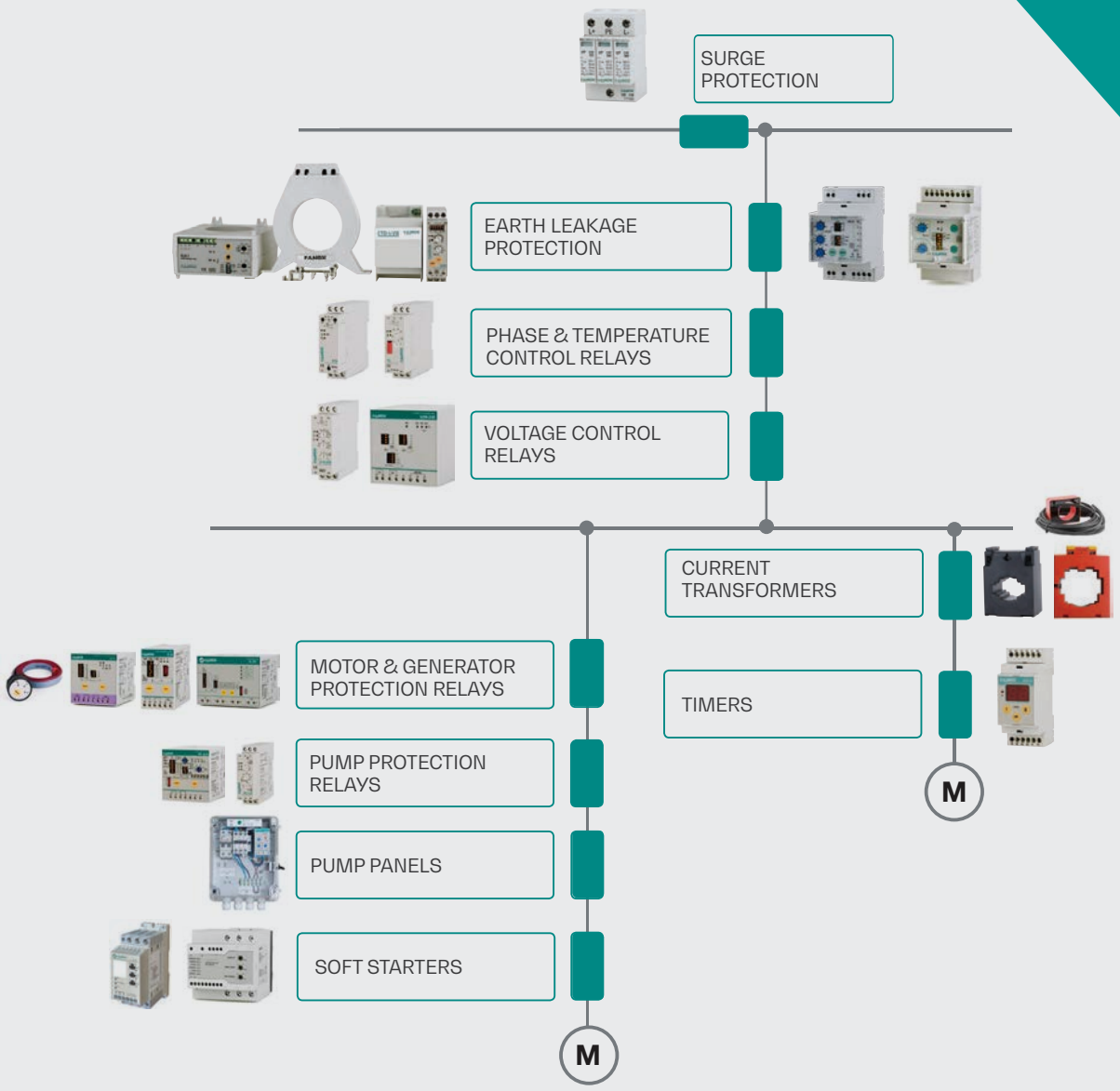
REDUNDANT PROTOCOL GATEWAY



It is the result of the combination of the functionality of a Gateway and the HSR redundancy. With this configuration, SIC-A allows the integration of equipment with serial communications in a HSR redundant network with an advanced protocol as IEC 61850 or IEC 60870-5-104.

Protection & Control

3 YEARS WARRANTY



Protection & Control of Motors, Generators and Pumps

Motor & Generator Protection Relays

C / GL / GEN

- For 3-phase equipment from 1 to 630 A and higher up to 1.000 V.
- Their different trip classes and thermal memory, for modelling heating and cooling cycles of the motor, are ideal for any type of motor starts and long cycle operations.
- The motor or generator cables pass through the relay sensors and integrated CT's.
- Identification and visualisation of trip cause.
- External display module accesory for panel door mounting.
- For EEx e motors and in potentially explosive atmospheres, according to Atex directive.
- Protection of generators with specific trip curves.
- Easy and quick trip test for phase failure.

PROTECTIONS

I>	Overload
	Phase imbalance or phase failure
	Phase sequence
+t°	Overheating protection (PTC sensor)

Pump Protection Relays

PF-R / PS-R/ P

- For 3-phase and 1-phase submersible pumps. Protection against dry running without requiring level sensors.
- With thermal memory, for modelling heating and cooling cycles of the motor.
- Identification and visualisation of trip cause.
- Manual, remote and automatic reset. (Adjustable from 2 to 240 minutes for well filling).
- Easy and quick trip test for phase failure.

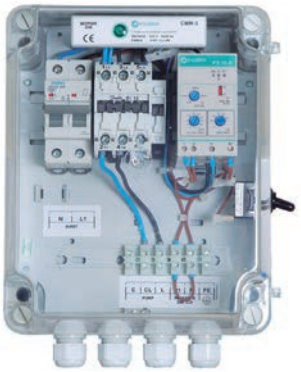
PROTECTIONS

I>	Overload
I<	Underload
cos φ	Underload
U>	Overvoltage
	Phase imbalance or phase failure
	Phase sequence

Panels for Submersible Pumps

CBT / CBM / CBS

- Panels for submersible pumps. Maximum protection without level electrodes or level relay.
- Electronic relay incorporated.
- Quick and easy installation, maintenance free.
- Installation cost are significantly reduced.
- Adaptable to installations already in service, without removing the pump.



PROTECTIONS	
I>	Overload
I<	Underload
cos φ	Underload
U>	Overvoltage
	Phase imbalance or phase failure
	Phase sequence
I>>	Short-circuit
	Soft start
	Soft stop

Soft Starters & Motor Controllers

ES

- They reduce the starting current and eliminate the mechanical blows and pulses when electric motors start and stop.
- They reduce surges.
- Built in heat dissipater and electro-mechanical bypass relay..
- For 3-phase motors from 3 to 45 A (1.1 to 22 kW) / 400 V.
- Substitutes the conventional contactors: One in direct start-up and three in star-delta start-up cycle. Offers greaer life cycle.

PROTECTIONS	
	Soft start
	Soft stop
	Phase imbalance or phase failure
	Overheating protection (PTC sensor)
	Phase sequence

Control & Measurement

Control Relays

S / ST / T / TST-24 / MT2

- 22,5 mm sized relays signalling trip cause. Self powered. DIN rail mounting.
- Phase and/or Temperature. Thermally protected by use of PTC sensors. Temperature control in the electric panels of lifts in accordance with standard EN 81-1 to comply with the European Lift Directive (95/16/CE).

PROTECTIONS	
	Overtemperature
	Phase imbalance or phase failure
	Phase sequence
	Termisor short-circuit
	Temperature variation

U1 / U3-S / U3-N

- Voltage.
- Control for three-phase and single-phase devices. Adjustable minimuma nd maximum thresholds. Adjustable trip time delay.

PROTECTIONS	
U>	Overvoltage
<U	Undervoltage
	Phase imbalance or phase failure
	Phase sequence
N	Loss of neutral

Timers

MTR-10

- Multifunctional digital timer.
- Up to 9 different timings from 0.1s to 99h.
- With built-in battery which allows timer to be programmed without connecting to auxiliary voltage. Complete battery discharge does not affect operation or adjustment settings.
- Programmable parameters: Initial state of output relays, working mode, number of different times per program, time setting range, command contact.

Earth Leakage Protection

Multirange Earth Leakage Relays

D30 / DM30 / DR30 / ELR




- Electronic relays with adjustable delay time and sensitivity. Multirange.
- With or without built-in transformers, combinable with external transformers.
- Suitable for direct pulse current.
- Immune to external disturbances and modular size 45 mm.
- Superinmunized versions size 45 and 22,5 mm, suitable for Motor Control Centres (MCC), electrical distribution boards and control panels in general.
- Model with automatic reclosing up to 3 attempts with defined (1 min) or adjustable time (1 to 60s).

Current Tranformers for Leakage Relays

CT-1 / CTB-1


- The transformer and relay assembly is fixed by the relay.
- Model with DIN rail mounting,

Protection Against Transient Overvoltage

SPD Surge Arresters

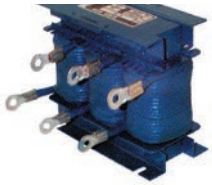
VP

- For Low Voltage distribution networks and electrical equipment against overvoltages caused by lightning strikes, switching manoeuvres or electro-static discharges.
- Models with high, medium and low discharge capacity.
- Visual indication of a fault in the equipment. Remote signalling of the protection status.
- For all kind of electrical systems (L-L, L-N, L-G, N-G).
- For power supply systems and installations, photovoltaic and wind power applications.Type B (Class I), Type VP B+C (Class I+II) and Type C (Class II).
- Ensures maximum protection of criitical facilities, 365 days / 24 hours a day.

Low Voltage Transformers

Current & Potential Transformers

- Protection and measurement transformers up to 5.000A of primary current. Transformer ratio /5. One piece core or split core models.
- Toroidal transformers for earth leakage.
- Electric Energy Measurement transformers for remote management in Low Voltage openable and/or extended range. For INSIDE and OUTSIDE.
- Current limitant input reactor. To absorb line spikes, switching voltage dips, to eliminate harmonics or decrease the di/dt that semiconductors are affected.
- Potential transformer, encapsulated in poliuretane.



More than 400.000 Self powered Relays in the field

FANOX

Safely protected

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MANAGEMENT SYSTEM CERTIFICATION
DNV·GL
ISO 9001 ISO 14001

12/2024/Rev14