PRODUCTS OVERVIEW

Expertise in Protection Relays

FANOX

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 2022 more than 90.000 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

index

Protection Relays

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	SIU-C	SIR-A	SIR-C
Feeder					●	●	●	●	●	●
Transformer	●	●	●	●	●					
Motor					●	●	●	●	●	●
Generator						●	●	●	●	●
Capacitor bank			●	●	●	●	●	●	●	●
Arc flash						●				
Recloser / Seccionalizer Control									●	●
Wind power	●	●	●	●	●	●				
Solar power	●	●	●	●	●	●				
Grid Interconnection					●	●	●	●		●

Feeder

Solar Power

Generator (G)

Transformer

Conexión WIFI

Wind Power

Grid interconnection

Motor (M)

Capacitor Bank

5 YEARS WARRANTY

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

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FTB/FTP
Testing Blocks & Plugs

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SICom
SOFTWARE

SICOM
Communication Software

Communication Solutions

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SIC-A
Redundancy Protocols
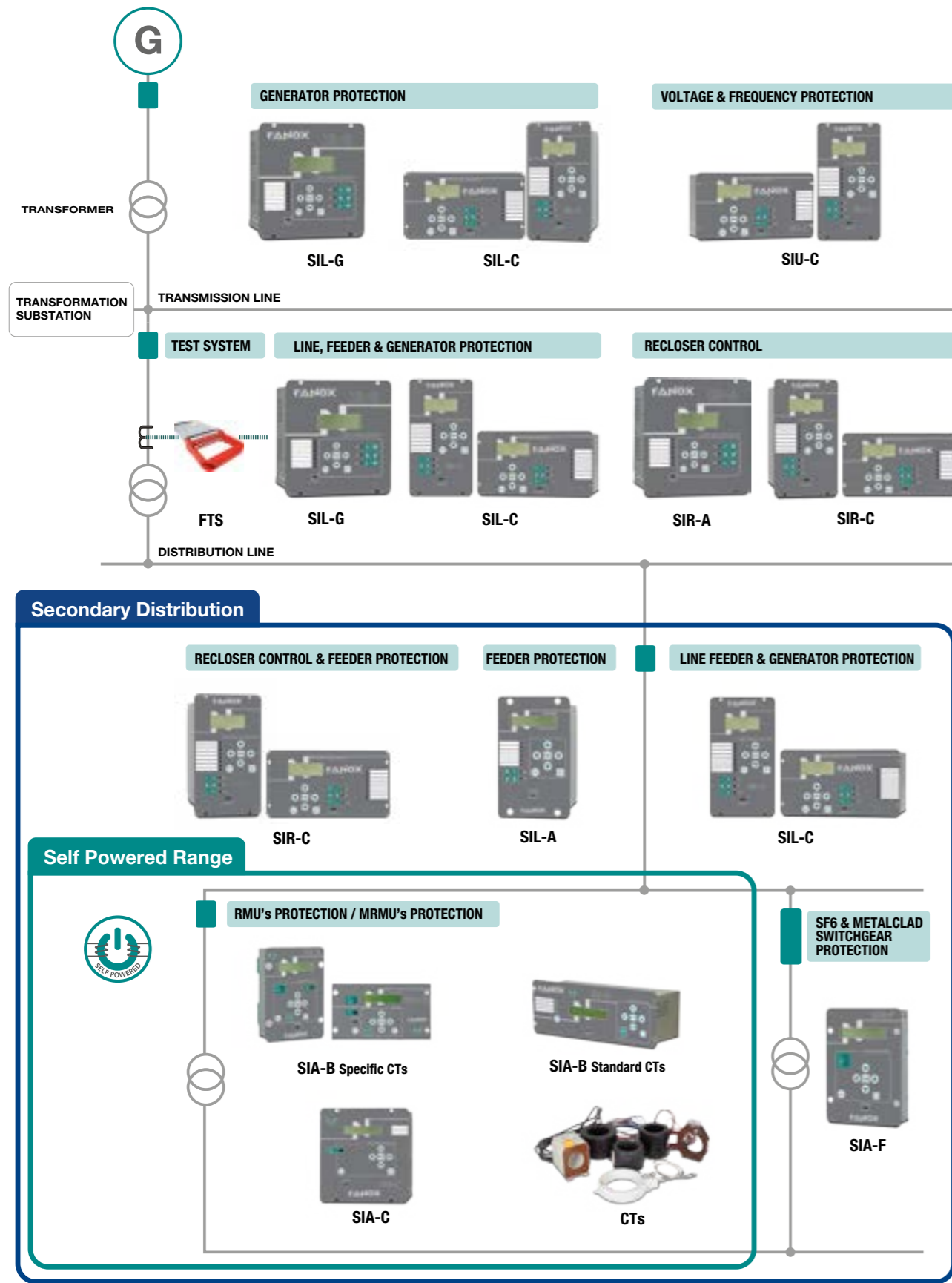Gateway (PRP/HSR)

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SIC-R
Time-aware Redbox
Switch

Pag 56

SIC-E
Industrial Managed
Gigabit Switch

Pag 56

SIC-G
Industrial PoE Unmanaged
Gigabit Ethernet Switch

GENERATOR PROTECTION

SIL-G SIL-C

VOLTAGE & FREQUENCY PROTECTION

SIU-C

TRANSFORMER

TRANSFORMATION SUBSTATION

TRANSMISSION LINE

TEST SYSTEM | LINE, FEEDER & GENERATOR PROTECTION | RECLOSER CONTROL

FTS SIL-G SIL-C SIR-A SIR-C

DISTRIBUTION LINE

Secondary Distribution

RECLOSER CONTROL & FEEDER PROTECTION | FEEDER PROTECTION | LINE FEEDER & GENERATOR PROTECTION

SIR-C SIL-A SIL-C

Self Powered Range

RMU's PROTECTION / MRMU's PROTECTION

SF6 & METALCLAD SWITCHGEAR PROTECTION

SIA-B Specific CTs SIA-B Standard CTs

SIA-F

SIA-C CTs

November 2022

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.

Besides, all models can be powered from an external battery, in order to facilitate the commissioning of the centers (the settings and configuration procedure can be carried out without installing the relay), to manage the incidents that may occur and also to manage the devices in adverse conditions.

SIA-B Standard CT's

OC&EF DUAL & SELF POWERED PROTECTION RELAY

SELF-POWERED TECHNOLOGY

cULus

KEMA Labs
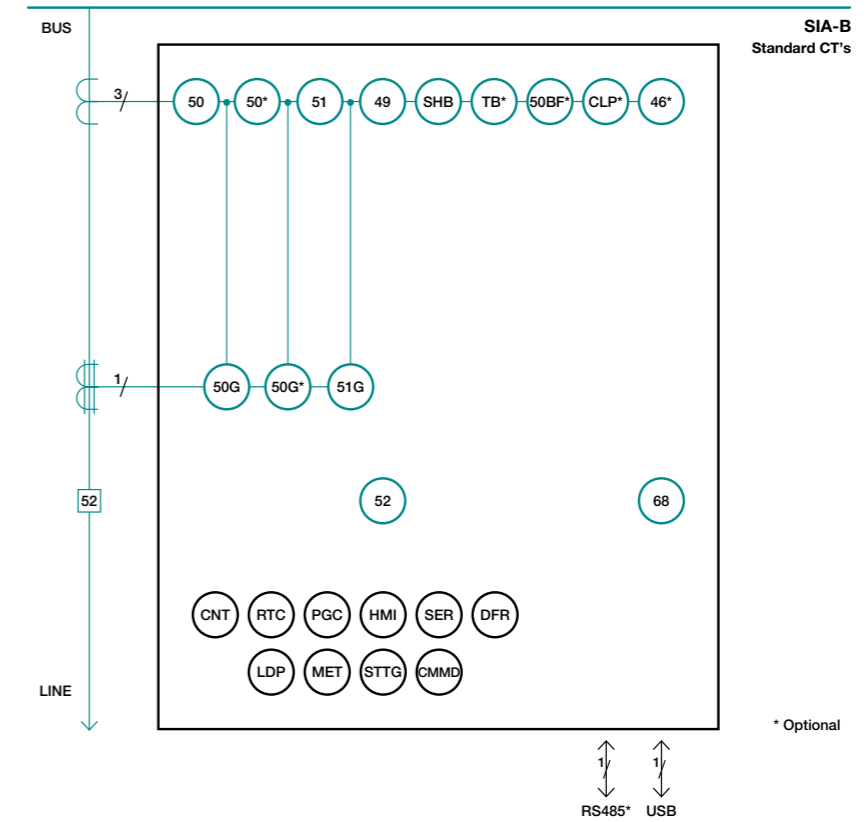
* Optional

- 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 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 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: 75mA in three phase system /160 mA in 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, their previous states can be checked by powering the relay up (by self-powering the relay, through USB cable, auxiliary voltage or pressing 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 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										
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

SIA-B Specific CT's

OC&EF DUAL & SELF POWERED
PROTECTION RELAY

SELF-POWERED
TECHNOLOGY

cULus

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.
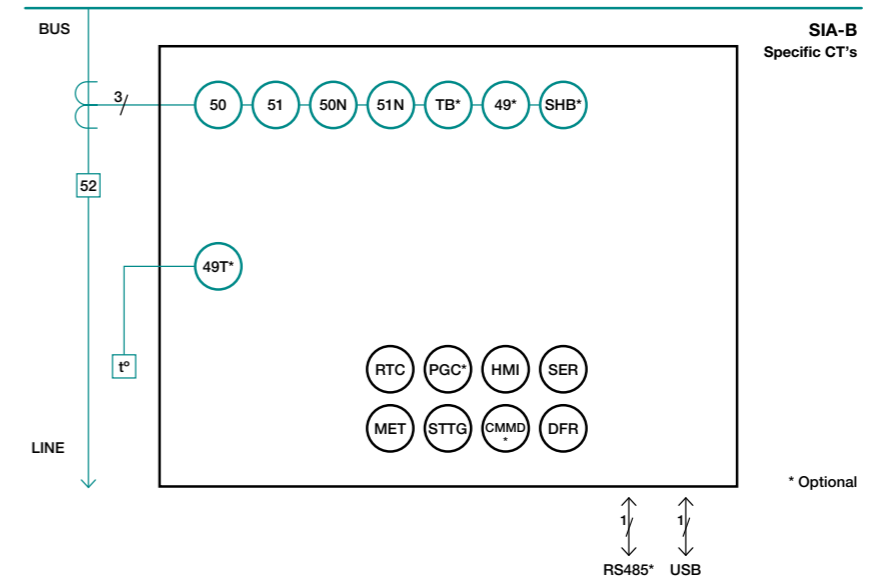
ANSI CODE PROTECTIONS

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

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) standard current transformers fitted on the lines. These transformers are also used to obtain current measurements. Besides, SIAC relay can be used with auxiliary power supply (24 Vdc, 230 Vac, 48 Vdc or 100-230 Vdc/ac). The relay can be occasionally supplied by an external battery portable kit (KITCOM).
- Internal Commissioning battery as optional (Lithium battery: 20 years lifetime).
- Metallic box with high electromagnetic compatibility level (EMC) and wide range of operating temperature.
- Low start-up levels in self powered mode, 0.1 times of the nominal current in three phase system/0.2 times of the nominal current in single phase system.
- Test menu allows the trip circuit to be tested before the transformation centre is powered up.
- There are bistable magnetic indicators (flags) which indicate the trip cause, 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 local port and with optional remote communication RS485 port (Modbus RTU or IEC60870-5-103 protocol, selectable by

general settings) on the rear side.
- The SIA-C is provided with a trip output for low power coil (24 Vdc – 135 mJ) or for standard coil depending on model and, optionally, 1 external trip input, up to 2 configurable inputs and up to 3 configurable outputs.
- 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 depending on model 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 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.
- Different sizes of SIA-C relay available by model list to fulfil all the market needs and to 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
SHB	Second Harmonic Blocking
49T	External trip
46	Phase balance current protection
49	Thermal overload
CLP	Cold Load Pickup
46BC	Broken Conductor Detection
52	Breaker wear monitoring
79	AC Reclosing device
74CT	Phase CT supervision
74TCS	Trip voltage supervision
50BF	Circuit Breaker Failure
68	Zone selection interlocking
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
	1 5 A B										NEUTRAL CURRENT MEASUREMENT 1 A 5 A 0.1 A 0.2 A
		5 6									NET FREQUENCY 50 Hz 60 Hz
			0 1 3 4 5 A B D E F								POWER SUPPLY Self powered Self powered + 230 Vac (Dual) Self powered + 24 Vdc (Dual) Self powered + 48 Vdc (Dual) Self powered + 100-230 Vac/dc (Dual) Self powered + Commissioning battery Self powered + 230 Vac (Dual) + Commissioning battery Self powered + 24 Vdc (Dual) + Commissioning battery Self powered + 48 Vdc (Dual) + Commissioning battery Self powered + 100-230 Vac/dc (Dual) + Commissioning battery
				0 1 2 3 4							ADDITIONAL FUNCTIONS Striker Striker with external trip (49T) Coil Coil with external trip (49T) Striker with external trip adapted at 230 Vac
					0 1 2						COMMUNICATIONS 0: Local port (Modbus RTU) 1: Local port (Modbus RTU) + RS485 (Modbus RTU) 2: Local port (Modbus RTU) + RS485 (Modbus RTU or IEC60870-5-103) ("Only for Adaptation C")
						0 1 2 3					INPUTS AND OUTPUTS Trip Trip + 2 outputs Trip + 2 outputs + 2 inputs Trip + 3 outputs
							1 2				MEMORY Non-volatile RAM memory Non-volatile RAM memory + Fast start-up
								A B C D			LANGUAGE English, Spanish and German English, Spanish and Turkish English, Spanish and French English, Spanish and Russian
									B C D E F G H I J		MECHANICS B: Horizontal assembly with 1 magnetic Flag C: Horizontal assembly with 3 magnetic Flags D: Double rear terminals, Vertical assembly with 1 magnetic Flag E: Vertical, Compact Size with 3 magnetic Flags F: Vertical, Compact Size with 3 Flags, Backlight LCD, Withdrawable G: Vertical Assembly, compact size with 1 magnetic indicator, Backlight LCD H: Double rear terminals, Vertical assembly with 1 magnetic Flag with anticorrosive treatment I: Vertical, Compact Size with 3 magnetic Flags with anticorrosive treatment J: Vertical, Compact Size with 3 magnetic Flags, Backlight LCD. SBEF application
										- A B C	ADAPTATION 50_1 + 51 + 50G_1 + 51G +74TCS + PGC A: 50_1 + 51 + 50G_1 + 51G +74TCS + PGC + 50_2 + 50G_2 + 3 Settings group B: 50_1 + 51 + 50G_1 + 51G +74TCS + PGC + CLP + 4 Settings groups C: 50_1 + 51 + 50G_1 + 51G +74TCS + PGC + 50_2 + 50G_2 + 46 + 50BF+ 49 + 79 + 52 + 74CT + 46BC + SHB + 3 settings groups

Example of ordering code:

1	1	5	0	0	0	3	2	A	F	A	SIA C 1 1 5 0 0 0 3 2 A F A
SIA-C											

SFA-RM-F/075/10.2018/594

SIA-F

OC&EF PROTECTION RELAY

- The SIA-F is an overcurrent and earth fault protection relay for secondary distribution with universal power supply 24-230 Vac/dc. The current measurement is obtained by standard current transformers /1 or /5.
- Metallic box with high electromagnetic compatibility level (EMC) and 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:
  - » 1 RS485 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).
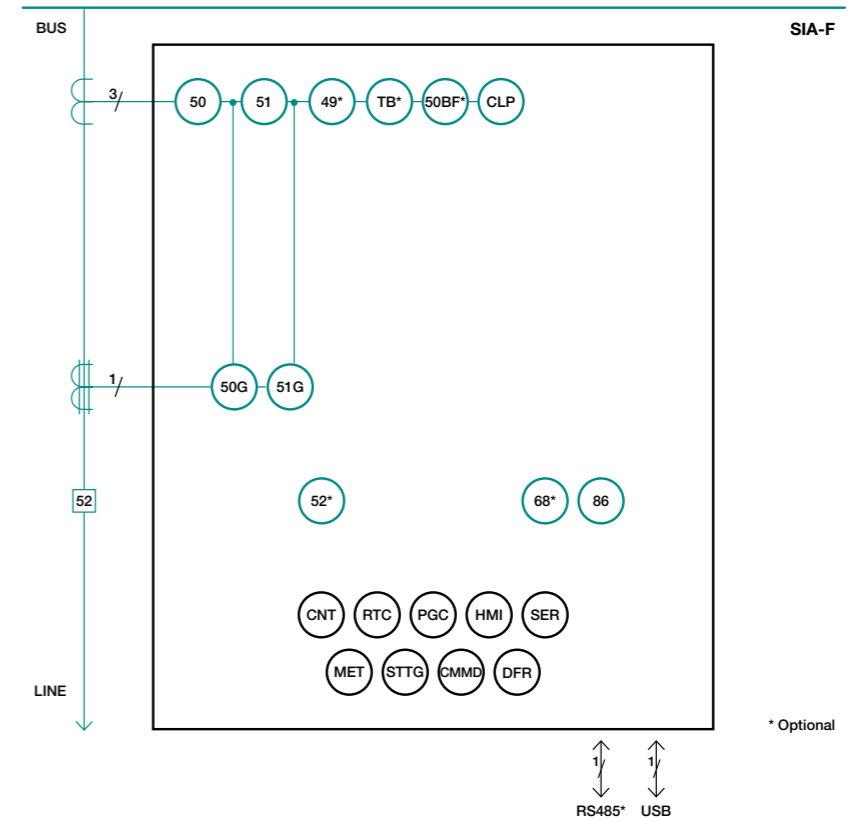
ANSI CODE PROTECTIONS	
50	Instantaneous phase overcurrent
51	Inverse time phase overcurrent
50G	Instantaneous measured neutral overcurrent
51G	Inverse time measured neutral overcurrent
CLP	Cold Load Pickup
49	Thermal overload
52	Breaker wear monitoring
50BF	Circuit Breaker Failure
86	Trip lockout
68	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	1	0	C	0	0	0	0	A	A	
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 | Overview
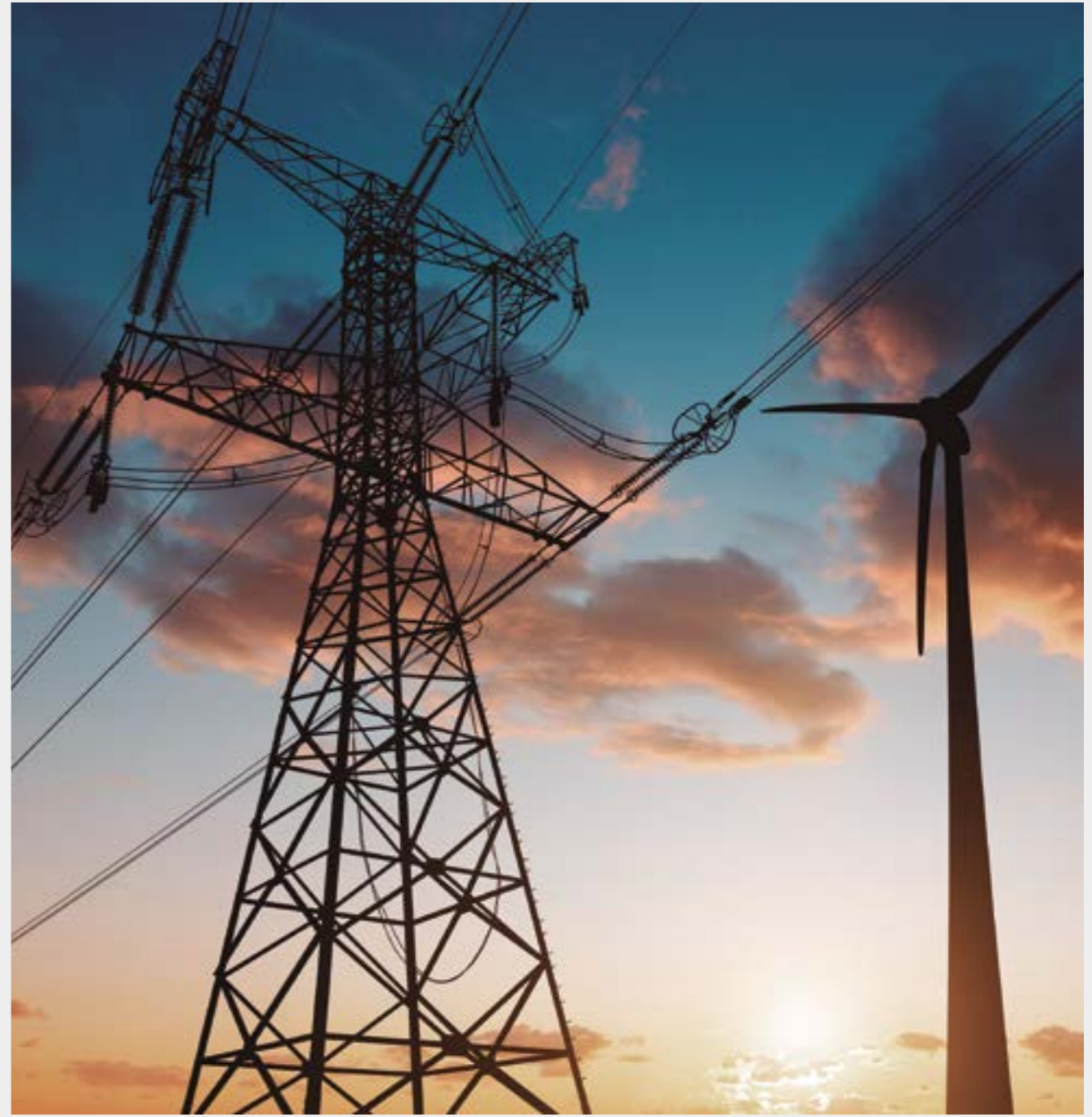
SIL-A

OC&EF FEEDER
PROTECTION RELAY

SIL-A

IEC
61850

cULus

KEMA Labs

- The SIL-A is a feeder relay with overcurrent and earth fault protections for primary and secondary distribution with auxiliary power supply 24-230 Vac/dc.
- 4 current channels and 1 voltage channel with conventional VTs depending on model.
- Metallic box with high electromagnetic compatibility level (EMC) and wide range of operating temperature.
- Signaling/control of the circuit breaker (52 function) and the recloser (79 function).
- 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 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: IEC60870-5-103, Modbus RTU or DNP3.0 Serial (selectable by general settings).
  - » Rear RJ45 Port: Modbus TCP/IP, DNP3.0 TCP/IP, IEC60870-5-104 (selectable by general settings) + SNTP Protocol + Web Server.
  - » Rear RJ45: IEC61850.
- The SIL-A is provided with (depending on 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 (Load Data Profiling) with the following characteristics:
  - » Number of records: 744.
  - » Recording mode circular.
  - » 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 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 postfault cycles.
  - » 25 records in data and COMTRADE format (60 cycles each record): 1 to 8 pre-fault cycles + 52 to 59 postfault cycles.
  - » 50 records in data and COMTRADE format (30 cycles each record): 1 to 8 pre-fault cycles + 22 to 29 postfault cycles.
  - » 100 records in data and COMTRADE format (15 cycles each record): 1 to 8 pre-fault cycles + 7 to 14 postfault cycles.).
- 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).

ETHERNET*   RS485   USB

* Optional

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
52	Breaker wear monitoring
50BF	Circuit Breaker Failure
74TCS	Trip circuit supervision
79	AC Reclosing device
HLT	Hot Line Tag
CLP	Cold Load Pickup
60CTS	Phase CT Supervision
59G	Instantaneous measured neutral overvoltage
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 G H						**COMMUNICATIONS** E: USB (Modbus RTU) + RS485: (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) F: USB (Modbus RTU) + RS485: (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + RJ45 (Modbus TCP, DNP3 TCP or IEC 60870-5-104) + Web Server + SNTP protocol G: USB (Modbus RTU) + RS485: (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + RJ45 (IEC61850) + SNTP Protocol H: USB (Modbus RTU) + RS485: (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + RJ45 (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.

SIL-G

LINE, FEEDER & GENERATOR PROTECTION RELAY

SIL-G

ARC FLASH

IEC 61850

KEMA Labs
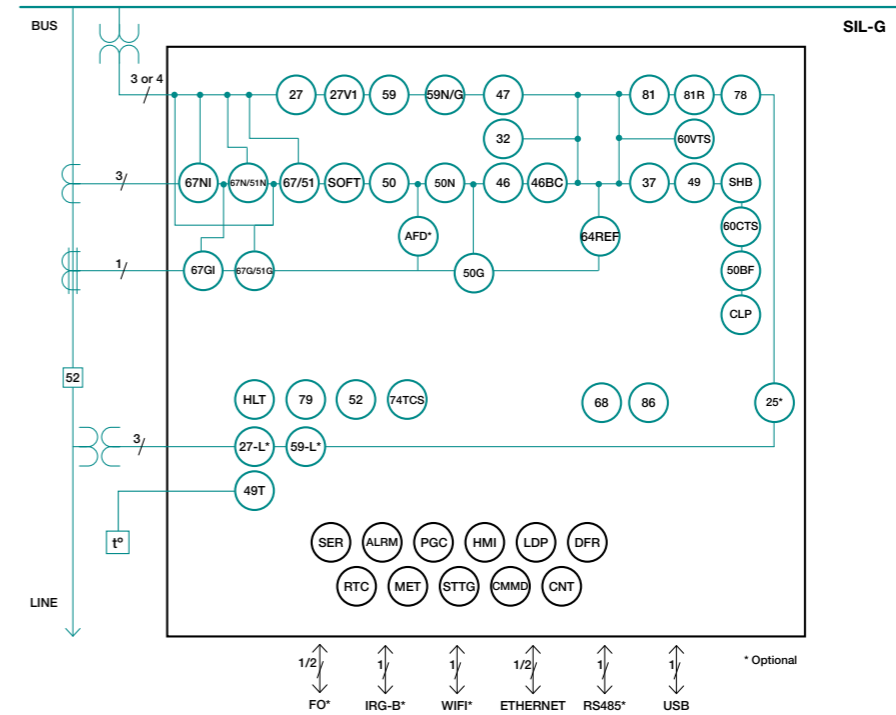
- The SIL-G is a feeder relay with current, voltage and frequency functions for primary and secondary distribution with auxiliary power supply of 24-230 Vdc/ac, 48-230 Vdc/ac or 24-48 Vdc (depending on model).
- 4 current channels and up to 5 voltage channels with conventional VTs.
- Capability of measuring up to 1.000 volts when it is connected directly to the low voltage line.
- 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-G 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).
- Arc Flash detection (AFD) with 4 AFD inputs and 4 high-speed outputs available depending on 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 the 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 by means of 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: IEC60870-5-103, Modbus RTU or DNP3.0 Serial (selectable by general settings).
  - » Rear RJ45 Port: Modbus TCP/IP, DNP3.0 TCP/IP, IEC60870-5-104 (selectable by general settings) + SNTP Protocol + Web Server.
  - » Rear RJ45 or SFP Cage: IEC61850 and Redundancy (PRP or HSR).

- Wireless communication (WiFi) and synchronization through IRIG-B optional depending on the model.
- 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 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.
- SIL-G 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 postfault cycles.
  - » 25 records in data and COMTRADE format (60 cycles each record): 1 to 8 pre-fault cycles + 52 to 59 postfault cycles.
  - » 50 records in data and COMTRADE format (30 cycles each record): 1 to 8 pre-fault cycles + 22 to 29 postfault cycles.
  - » 100 records in data and COMTRADE format (15 cycles each record): 1 to 8 pre-fault cycles + 7 to 14 postfault cycles.)
- Each oscillographic record contains 10 analog channels and up to 96 configurable digital channels. 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).

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
67GI	Directional Isolated Measured Neutral Overcurrent
67NI	Directional Isolated Calculated 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
HLT	Hot Line Tag
52	Breaker wear monitoring
25	Synchro Check
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
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

SIL-G

Feeder & Generator Protection Relay

0											PHASE CURRENT MEASUREMENT
											1 A or 5 A
	0										NEUTRAL CURRENT MEASUREMENT
											1 A or 5 A
		0									VOLTAGE MEASUREMENT
											Up to 1000 V (direct connection) or 250 V (with VTs)
			A								POWER SUPPLY
			B								24-48 Vdc
			C								48-230 Vac/dc
											24-230 Vac/dc (Only for communication models: A, B, F and G)
				0							ADDITIONAL FUNCTIONS
				1							-
											+25 + 27-L + 59-L
					A						COMMUNICATIONS
					B						A: USB (Modbus RTU) + RS485: (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial)
					C						B: USB (Modbus RTU) + RS485 (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
					D						C: USB (Modbus RTU) + RJ45 (IEC 61850) + RJ45 (Modbus TCP, DNP3.0 TCP or IEC60870-5-104) + Web Server SNTP Protocol + IRIG-B
					E						D: USB (Modbus RTU) + HSR – (*) SFP Cage (IEC 61850) + RJ45 (Modbus TCP, DNP3.0 TCP or IEC60870-5-104) + Web Server SNTP Protocol + IRIG-B
					F						E: USB (Modbus RTU) + PRP – (*) SFP Cage (IEC 61850) + RJ45 (Modbus TCP, DNP3.0 TCP or IEC60870-5-104) + Web Server SNTP Protocol + IRIG-B
					G						F: USB (Modbus RTU) + WiFi + RS485 (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial)
					H						G: USB (Modbus RTU) + WiFi + RS485 (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
					I						H: USB (Modbus RTU) + WiFi + RJ45 (IEC 61850) + RJ45 (Modbus TCP, DNP3.0 TCP or IEC60870-5-104) + Web Server SNTP Protocol + IRIG-B
					J						I: USB (Modbus RTU) + WiFi + HSR – (*) SFP Cage (IEC 61850) RJ45 (Modbus TCP, DNP3.0 TCP or IEC60870-5-104) + Web Server SNTP Protocol + IRIG-B
					K						J: USB (Modbus RTU) + WiFi + PRP – (*) SFP Cage (IEC61850) + RJ45 (Modbus TCP, DNP3.0 TCP or IEC60870-5-104) + Web Server SNTP Protocol + IRIG-B
					L						K: USB (Modbus RTU) + (*) SFP Cage (IEC 61850) + RJ45 (Modbus TCP, DNP3.0 TCP or IEC60870-5-104) + Web Server SNTP Protocol + IRIG-B
											L: USB (Modbus RTU) + WiFi + (*) SFP Cage (IEC 61850) + RJ45 (Modbus TCP, DNP3.0 TCP or IEC60870-5-104) + Web Server SNTP Protocol + IRIG-B
						0					INPUTS AND OUTPUTS
						5					8 Inputs + 7 Outputs
						6					24 Inputs + 7 Outputs
						7					8 Inputs + 18 Outputs
						A					16 Inputs + 11 Outputs
											8 Inputs + 7 Outputs + 4 AFD Inputs + 4 High-speed Outputs
							4				MECHANICAL ASSEMBLY
							5				Vertical Assembly
											Vertical Assembly with tropicalization
								A			LANGUAGE
								E			English, Spanish, German and French
								F			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										

(*) The SFPs for the models with optical fiber should be included by the user.

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.
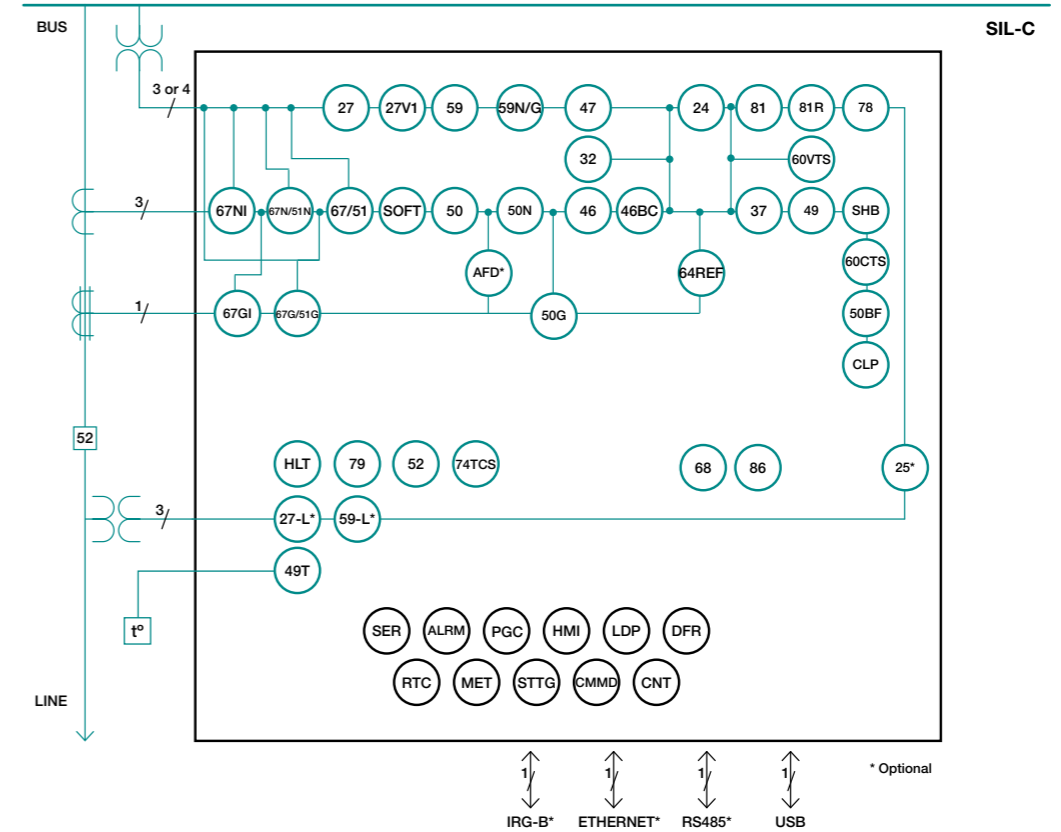» Not all combinations are possible. Please, confirm with Fanox chosen model.

SIL-C

LINE, FEEDER & GENERATOR
PROTECTION RELAY

SIL-C

KEMA Labs

- The SIL-C is a feeder relay with current, voltage and frequency functions for primary and secondary distribution with auxiliary power supply of 24-230 Vdc/ac.
- 4 current channels and up to 5 voltage channels for conventional VTs.
- Capability of measuring up to 1.000 volts when it is connected directly to the low voltage line.
- 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-C 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 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: IEC60870-5-103, Modbus RTU or DNP3.0 Serial (selectable by general settings).
  - » Rear RJ45 Port: Modbus TCP/IP, DNP3.0 TCP/IP or IEC60870-5-104 (selectable by general settings) + SNTP Protocol + Web Server.

- Synchronization through IRIG-B optional depending on model.
- The SIL-C is provided with 11 configurable inputs and 5 configurable outputs.
- The SIL-C 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.
- SIL-C 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 postfault cycles.
  - » 25 records in data and COMTRADE format (60 cycles each record): 1 to 8 pre-fault cycles + 52 to 59 postfault cycles.
  - » 50 records in data and COMTRADE format (30 cycles each record): 1 to 8 pre-fault cycles + 22 to 29 postfault cycles.
  - » 100 records in data and COMTRADE format (15 cycles each record): 1 to 8 pre-fault cycles + 7 to 14 postfault cycles.)
- Each oscillographic record contains 10 analogue channels and up to 96 configurable digital channels. 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
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
HLT	Hot Line Tag
52	Breaker Wear Monitoring
25	Synchro Check
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.

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

FANOX | Overview

FANOX | Overview

SIL-C

Feeder & Generator Protection Relay

0											PHASE CURRENT MEASUREMENT
											1 A or 5 A
	0										NEUTRAL CURRENT MEASUREMENT
											1 A or 5 A
		0									VOLTAGE MEASUREMENT
											Up to 1000 V (direct connection) or 250 V (with VTs)
			C								POWER SUPPLY
											24-230 Vac/dc
				0							ADDITIONAL FUNCTIONS
				1							-
											+25 + 27-L + 59-L
					A						COMMUNICATIONS
											A: USB (Modbus RTU) + RS485: (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial)
					B						B: USB (Modbus RTU) + RS485 (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
						1					INPUTS AND OUTPUTS
											11 Inputs + 5 Outputs
							C				MECHANICAL ASSEMBLY
							D				Vertical Assembly
							E				Horizontal Assembly
							F				Vertical Assembly with anticorrosive treatment
											Horizontal Assembly with anticorrosive treatment
								A			LANGUAGE
								E			English, Spanish, German and French
								F			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.

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.
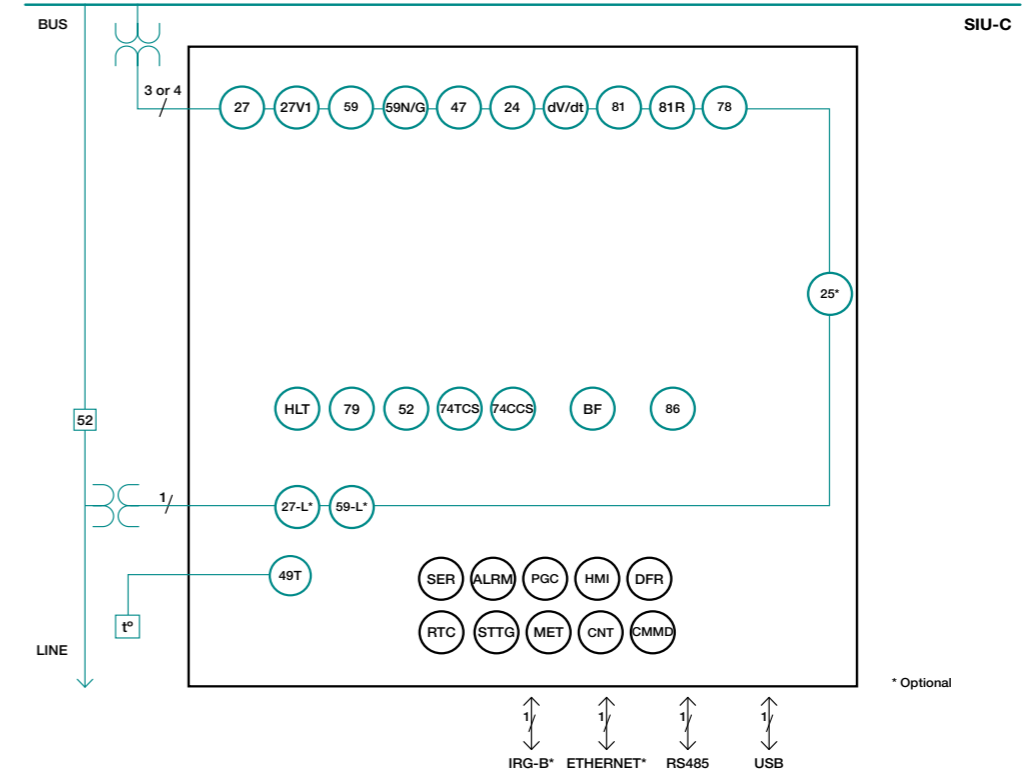
SIU-C

VOLTAGE & FREQUENCY
PROTECTION RELAY

KEMA Labs

* The SIU-C is a voltage and frequency protection relay for transformers and electrical machines, in high, medium, and low voltage distribution systems with universal auxiliary supply of 24-230 Vdc/ac.
* 5 voltage channels for conventional VTs.
* Capability of measuring up to 1.000 volts when it is connected directly to the low voltage line.
* Metallic box with high electromagnetic compatibility level (EMC) and wide range of operating temperatures.
* 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. SIU-C protection relay detects this situation thanks to its voltage and frequency functions focused on the Rate of change of frequency (ROCOF) method.
* Signalling/control of the circuit breaker (52 function) and the recloser (79 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: IEC60870-5-103, Modbus RTU or DNP3.0 Serial (selectable by general settings).
  » Rear RJ45 Port: Modbus TCP/IP, DNP3.0 TCP/IP or IEC60870-5-104 (selectable by general settings) + SNTP Protocol + Web Server.
* Synchronization through IRIG-B optional depending on the model.
* The SIU-C is provided with 11 configurable inputs and 5 configurable outputs.
* Alarms panel is available.

• SIU-C 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 postfault cycles.
  » 25 records in data and COMTRADE format (60 cycles each record): 1 to 8 pre-fault cycles + 52 to 59 postfault cycles.
  » 50 records in data and COMTRADE format (30 cycles each record): 1 to 8 pre-fault cycles + 22 to 29 postfault cycles.
  » 100 records in data and COMTRADE format (15 cycles each record): 1 to 8 pre-fault cycles + 7 to 14 postfault cycles.)
• 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

59	Inverse Time Phase overvoltage (Bus Bar)
59-L	Inverse Time Phase overvoltage (Line)
59N/G	Inverse Time Calculated/Measured neutral overvoltage (Bus Bar)
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)
dV/dt	Rate of change of voltage
81O/U	Under/Overfrequency
81R	Rate of Change of Frequency (ROCOF)
78	Out of Step (Vector Shift)
24	Overfluxing
79	AC Reclosing device
HLT	Hot Line Tag
52	Breaker Wear Monitoring
25	Synchro Check
BF	Circuit Breaker Failure
74TCS	Trip Circuit Supervision
74CCS	Close Circuit Supervision
49T	External Trip
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	0	0	C	0 / 1	A / B	1	C D E F	A E F	B	
0										**PHASE MEASUREMENT** Defined by General Settings
	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					**COMMUNICATIONS** A: USB (Modbus RTU) + RS485: (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) B: USB (Modbus RTU) + RS485 (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
						1				**INPUTS AND 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

SIR-A

RECLOSER CONTROL & FEEDER
PROTECTION RELAY

ARC FLASH

IEC 61850

KEMA Labs
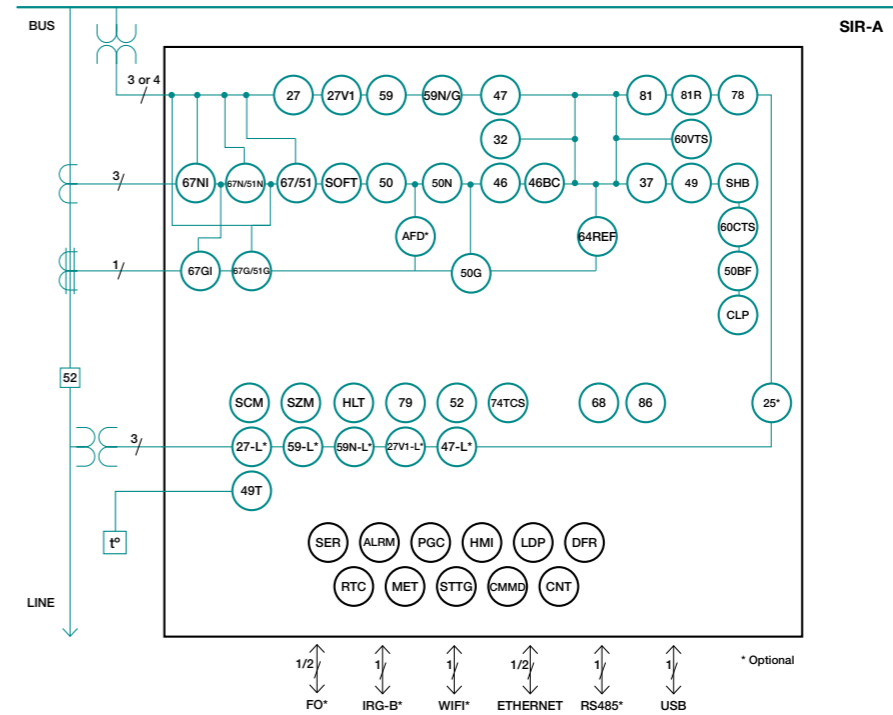
- The SIR-A is a recloser control and feeder protection relay with current, voltage and frequency functions for primary and secondary distribution with auxiliary power supply of 24-230 Vdc/ac, 48-230 Vdc/ac or 24-48 Vdc (depending on model).
- 4 current channels and 6 voltage channels for capacitive 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. SIR-A relay detects this situation thanks to its voltage and frequency functions focused on the Rate of change of frequency (ROCOF) method.
- Signalling/control of the circuit breaker (52 function) and the recloser (79 function).
- Arc Flash detection (AFD) with 4 AFD inputs and 4 high-speed outputs available depending on 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 the 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 by means of 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: IEC60870-5-103, Modbus RTU or DNP3.0 Serial (selectable by general settings).
  - » Rear RJ45 Port: Modbus TCP/IP, DNP3.0 TCP/IP, IEC60870-5-104 (selectable by general settings) + SNTP Protocol + Web Server.

  - » Rear RJ45 or SFP Cage: IEC61850 and Redundancy (PRP or HSR).
- Wireless communication (WiFi) and synchronization through IRIG-B optional depending on model.
- Alarms panel is available.
- The SIR-A is provided with (depending on 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 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.
- SIR-A 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 postfault cycles.
  - » 25 records in data and COMTRADE format (60 cycles each record): 1 to 8 pre-fault cycles + 52 to 59 postfault cycles.
  - » 50 records in data and COMTRADE format (30 cycles each record): 1 to 8 pre-fault cycles + 22 to 29 postfault cycles.
  - » 100 records in data and COMTRADE format (15 cycles each record): 1 to 8 pre-fault cycles + 7 to 14 postfault cycles.)
- Each oscillographic record contains 10 analogue channels and up to 96 configurable digital channels. 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

Code	Description
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
49	Thermal overload
49T	External Trip
37	Instantaneous phase undercurrent
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)

Code	Description
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)
CLP	Cold Load pickup
79	AC Reclosing device
SCM	Sequence Coordination Mode
SZM	Sectionalizer Mode
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
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.

ADDITIONAL FUNCTIONS

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

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

SIR-A

Recloser Control & Feeder Protection Relay

0										**PHASE CURRENT MEASUREMENT** 1 A or 5 A
	0									**NEUTRAL CURRENT MEASUREMENT** 1 A or 5 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
			A B C							**POWER SUPPLY** 24-48 Vdc 48-230 Vac/dc 24-230 Vdc/Vac (Only for communication models: A, B and G)
				0 2						**ADDITIONAL FUNCTIONS** - +25 + 27-L + 59-L + 47-L + 27V1-L + 59N-L
					A B C G H					**COMMUNICATIONS** A: USB (Modbus RTU) + RS485: (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) B: USB (Modbus RTU) + RS485 (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 C: USB (Modbus RTU) + RJ45 (IEC 61850) + RJ45 (Modbus TCP, DNP3.0 TCP or IEC60870-5-104) + Web Server + SNTP Protocol + IRIG-B G: USB (Modbus RTU) + WiFi + RS485 (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 H: USB (Modbus RTU) + WiFi + RJ45 (IEC 61850) + RJ45 (Modbus TCP, DNP3.0 TCP or IEC60870-5-104) + 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 + 47 + (4) 32 + (6) 81U/O + (2) 81R + 78 + 79 + 74TCS + 60CTS + 60VTS + 50BF + SHB + CLP + 52 + 86 + SCM+ SZM + HLT

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										

(*) 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.
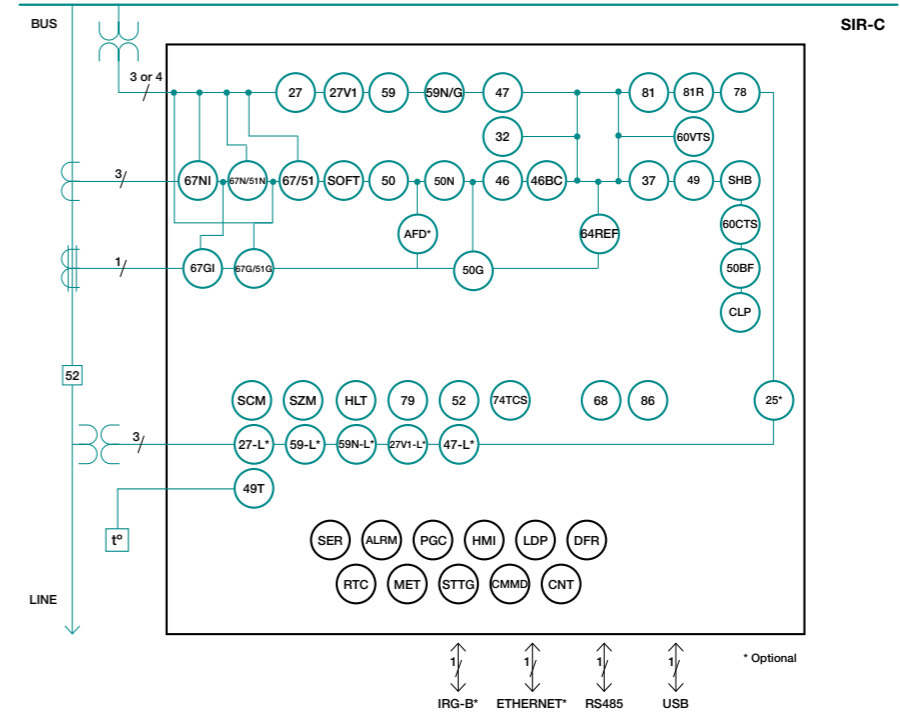
SIR-C

RECLOSER CONTROL & FEEDER
PROTECTION RELAY

KEMA Labs

- The SIR-C is a recloser control and feeder protection relay with current, voltage and frequency functions for primary and secondary distribution with auxiliary power supply of 24-230 Vdc/ac.
- 4 current channels and 6 voltage channels for 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. SIR-C relay detects this situation thanks to its voltage and frequency functions focused on the Rate of change of frequency (ROCOF) method.
- Signalling/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 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: IEC60870-5-103, Modbus RTU or DNP3.0 Serial (selectable by general settings).
  - » Rear RJ45 Port: Modbus TCP/IP, DNP3.0 TCP/IP or IEC60870-5-104 (selectable by general settings) + SNTP Protocol + Web Server.
- Synchronization through IRIG-B optional depending on model.
- The SIR-C is provided with 11 configurable inputs and 5 configurable outputs.

- The SIR-C 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 SIR-C 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 postfault cycles.
  - » 25 records in data and COMTRADE format (60 cycles each record): 1 to 8 pre-fault cycles + 52 to 59 postfault cycles.
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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
49	Thermal overload
49T	External Trip
37	Instantaneous phase undercurrent
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)
CLP	Cold Load pickup
79	AC Reclosing device
SCM	Sequence Coordination Mode
SZM	Sectionalizer Mode
HLT	Hot Line Tag
52	Breaker Wear monitoring
25	Synchro Check
50BF	Circuit Breaker Failure
74TCS	Trip Circuit Supervision
60CTS	Phase CT Supervision
60VTS	Phase LPVT Supervision
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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.

ADDITIONAL FUNCTIONS

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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									**NEUTRAL CURRENT MEASUREMENT** 1 A or 5 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						**ADDITIONAL FUNCTIONS** - +25 + 27-L + 59-L + 47-L + 27V1-L + 59N-L
					A B					**COMMUNICATIONS** A: USB (Modbus RTU) + RS485: (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) B: USB (Modbus RTU) + RS485 (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
						1				**INPUTS AND 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** Default functions: (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 + 47 + (4) 32 + (6) 81U/O + (2) 81R + 78 + 79 + 74TCS + 60CTS + 60VTS + 50BF + SHB + CLP + 52 + 86 + SCM+ SZM + HLT

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.

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.

Testing Blocks & Plugs

TEST BLOCKS – FTB/FTP

FANOX FTB/FTP test block allows testing the protection, control, metering and/or communication device of a facility connected to field switchgear, easily and safely, isolating the circuits fully and eliminating all risks for the user.

- Maximum safety for the user.
- Internal automatic CT short circuiting.
- Single hand fully isolated plug.
- Locking system for safest operation.
- Possibility of horizontal or vertical mounting, respectively.

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.
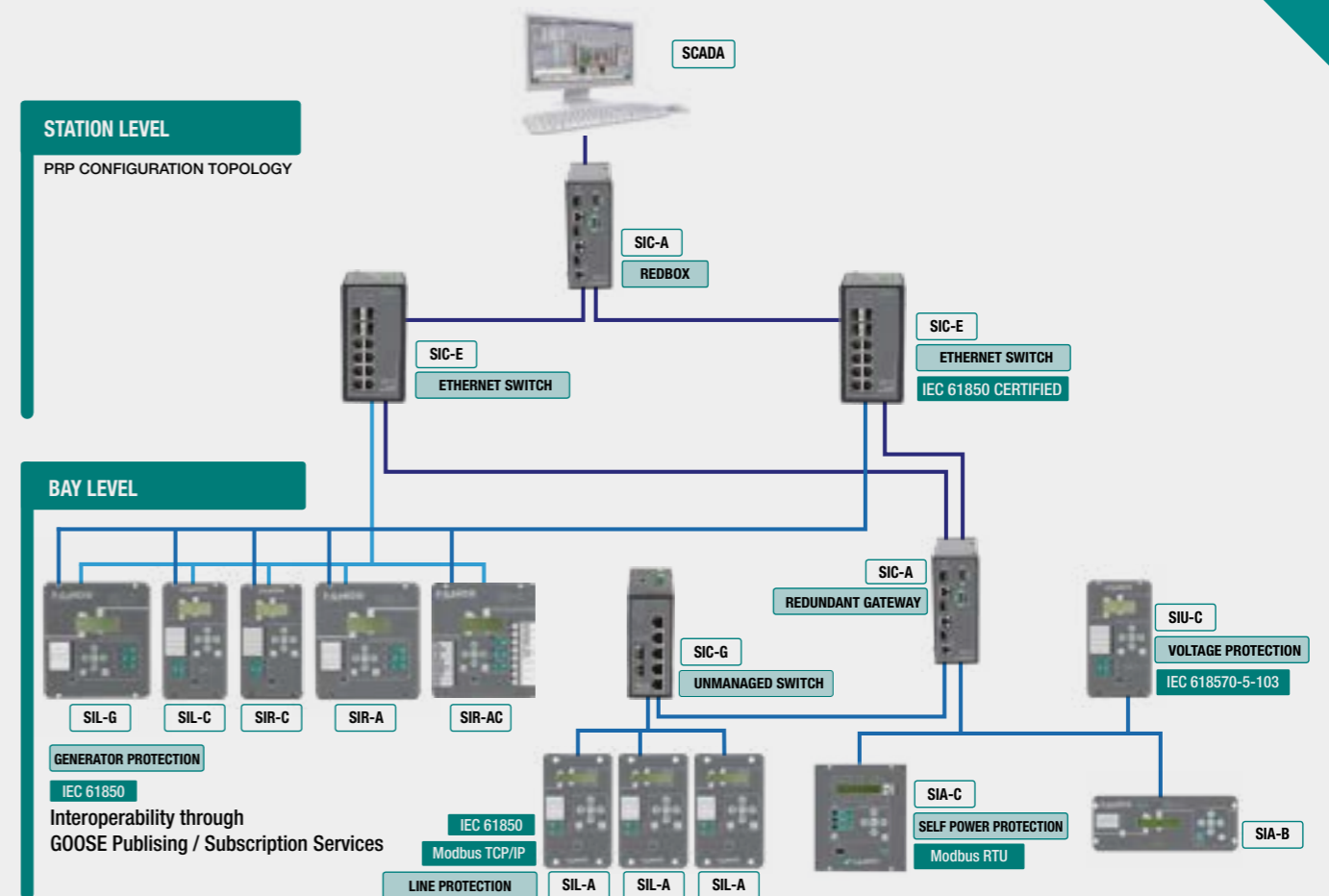
Communication Software

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

Communication Solutions

5 YEARS WARRANTY

STATION LEVEL
PRP CONFIGURATION TOPOLOGY

SCADA

SIC-A
REDBOX

SIC-E
ETHERNET SWITCH

SIC-E
ETHERNET SWITCH
IEC 61850 CERTIFIED

BAY LEVEL

SIC-A
REDUNDANT GATEWAY

SIU-C
VOLTAGE PROTECTION
IEC 618570-5-103

SIC-G
UNMANAGED SWITCH

SIL-G SIL-C SIR-C SIR-A SIR-AC

GENERATOR PROTECTION
IEC 61850
Interoperability through
GOOSE Publising / Subscription Services

IEC 61850
Modbus TCP/IP
LINE PROTECTION

SIL-A SIL-A SIL-A

SIA-C
SELF POWER PROTECTION
Modbus RTU

SIA-B

SMART GRID

SIC-A

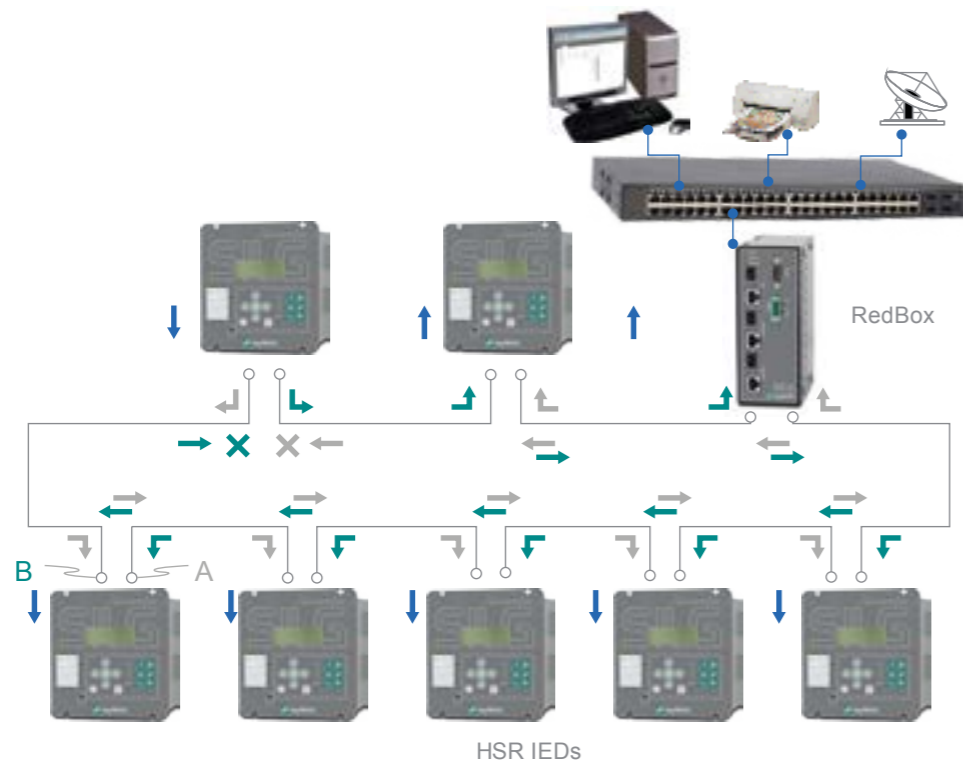## Redundancy Protocols Gateway (PRP/HSR)

MOST COMPLETE TOPOLOGY

SIC-A in its topology of PRP Gateway, would allow to integrate serial devices with conventional protocols in a PRP network with an advanced Ehernet protocol as IEC61850, IEC 60870-5-104, etc..

- Communication Solutions for Smart Grid.
- Supported protocols:
- IEC 61850, IEC 60870-5-101/103/104, DNP3 serial/ TCP, ModBus RTU/ASCII/TCP.
- IEC 62056 - DLMS, IEC 61400.
- Multifunction: Redbox, Protocol Gateway and Redundant Protocol Gateway.

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.


RedBox

HSR IEDs

PROTOCOL GATEWAY

Gateway

MODBUS RTU (RS-232)

Self powered Relays

IEC 61850

MODBUS RTU (RS-485)

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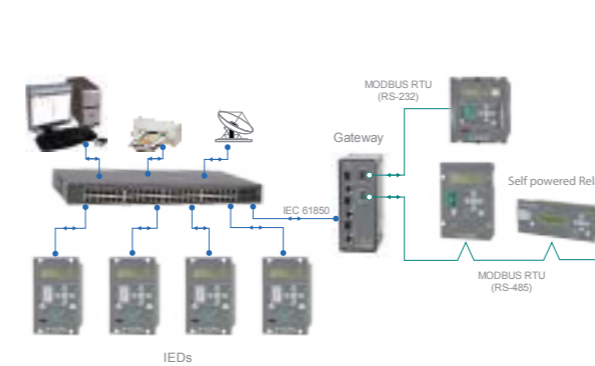
SIC-A device is able of communicating through serial communication RS-232 or RS-485 with multiple equipment with a Master serial protocol (ModBus, IEC69870-5-101, IEC60870-5-103, DLMS…) and dispose the information into a Ethernet protocol as IEC 61850 or IEC 60870-5-104. This way, devices with conventional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

REDUNDANT PROTOCOL GATEWAY

MODBUS RTU (RS-232)

HSR Gateway

IEC 61850 (HSR)

IEC 61850 (HSR)

MODBUS RTU (RS-485)

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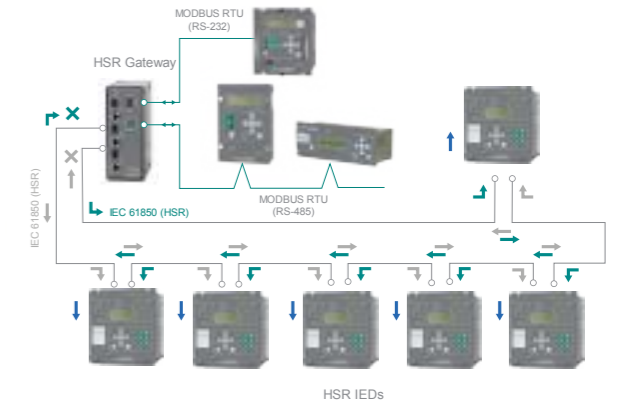
It is the result of the combination of the functionality of a Gateway and the HSR redundancy. With this configuration, SIC-A allows the integration of equipment with serial communications in a HSR redundant network with an advanced protocol as IEC 61850 or IEC 60870-5-104.

SIC-R

Time-aware Redbox Switch

- Intelligent device that integrates advanced field-proven technology for non-packet-loss redundant Ethernet, sub-microsecond synchronization and cybersecurity.
- Able to merge the whole LAN with redundant networks, to interconnect PRP and HSR networks and to extend HSR rings via QuadBox operation.
- In compliance with IEC 61850-3 / IEEE 1613.
- Ports number can be adapted to customer needs.
- Completely secure and reliable infrastructure.

Industrial Managed Gigabit Switch

- The SIC-E Series is a highly reliable Gigabit Managed Ethernet Switch. Its IEC61850-3 compliance allows it to be core part in the IEC 61850 network in power substations and control centers.
- The IEEE1588 Precision Time Protocol capabilities allow the deployment of SIC-E Series in networks with stringent time Synchronization requirements. It can act as hw-assisted End-to-End transparent clock providing nanosecond-accurate correction-field packet-update and as a sw-assisted boundary clock.
- The device equips up to 8 10/100/1000BASE-T(X) RJ-45 ports and up to 4 1000BASE-X SFP ports.
- With its high performance, it provides network redundancy self-recovery mechanisms is less than 20ms on full load that enables the user to build a reliable network through a redundant ring topology. ERPS/STP/MSTP/RSTP/MRP (Client) and many other compatible rings are supported. With a Multifunctional web dashboard, its offers intelligent features such as Quality of service (QoS), Virtual LAN (VLAN), IGMP, IGMP Snooping, Port mirroring and security.
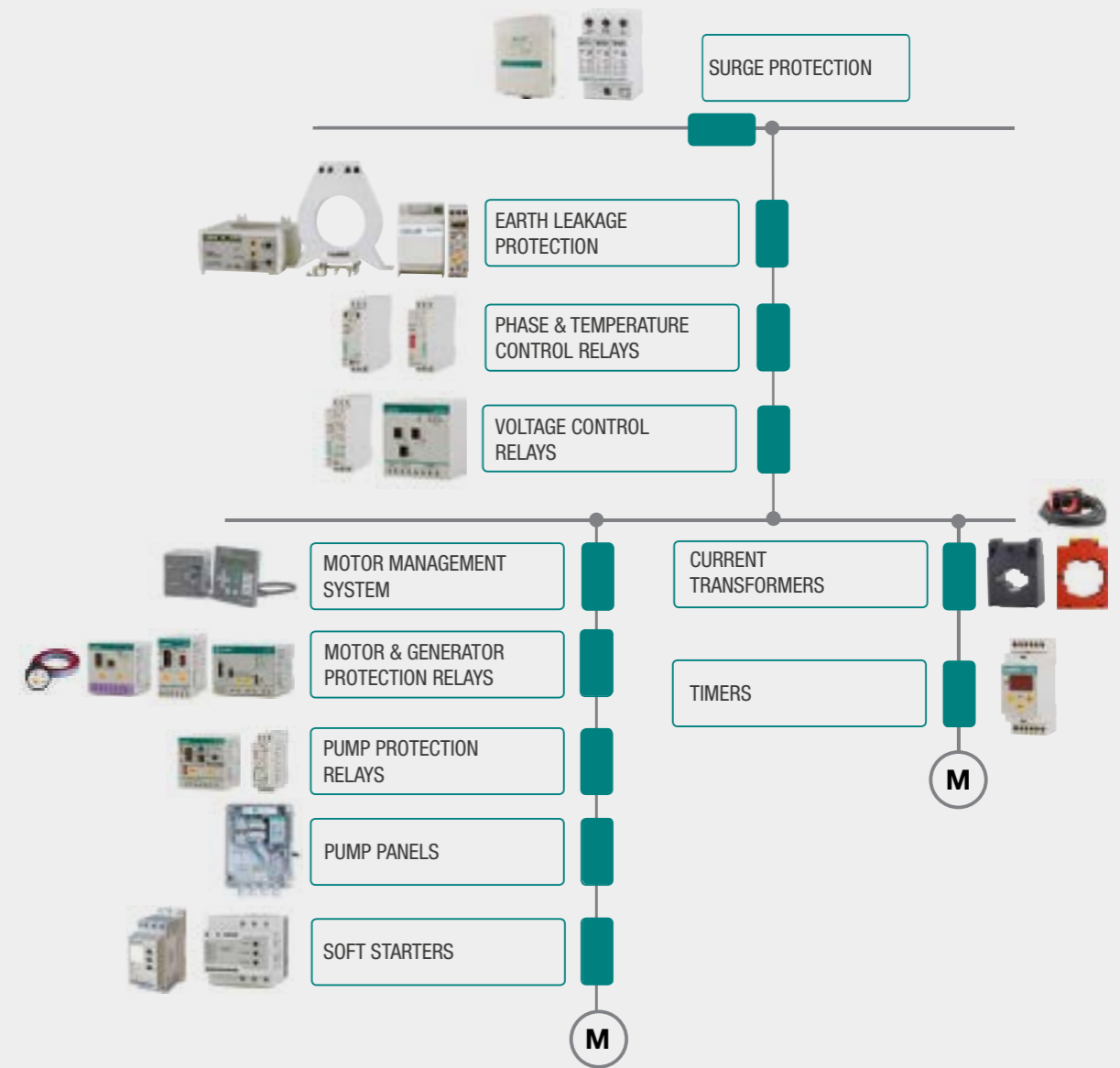
SIC-G

Industrial PoE Unmanaged Gigabit Ethernet Switch

- The SIC-G is 7 Port PoE Unmanaged Gigabit Ethernet Switches designed to work in mission critical environments such as mining and heavy industry.
- It equips up to five 10/100/1000BASE-T(X) RJ-45 ports and up to two 100/1000 BASE-F(X) and 1000 BASE-X SFP ports.
- With its high performance and non-blocking switching capacity, the SIC-G Series is able to fulfill the increasing demand in industrial networking.
- Its PoE capability of 30W per port up to four ports simplifies the wiring in complex fields, where every cable is an added cost.
- The equipped terminal block provide dual redundant power inputs with Reverse Polarity Protection and relay output which allows field engineers to build up a fault alarm system.

Protection & Control

3 YEARS WARRANTY

SURGE PROTECTION

EARTH LEAKAGE PROTECTION

PHASE & TEMPERATURE CONTROL RELAYS

VOLTAGE CONTROL RELAYS

MOTOR MANAGEMENT SYSTEM

CURRENT TRANSFORMERS

MOTOR & GENERATOR PROTECTION RELAYS

TIMERS

PUMP PROTECTION RELAYS

PUMP PANELS

SOFT STARTERS

M

M

Protection & Control of Motors, Generators and Pumps

Motor Management System

PBM

Fanox PBM is a Monitoring, Control and Protection System, which brings an integral solution to Motor Control Centers. Fanox has redesigned PBM providing it with new functionality and improving his operability, which makes him an indispensable resource for CCMs.

The most significant improvement that has taken place is the firmware change that has been made in the PBM-B Base Module. A new version has been developed where new

functionalities are implemented for the use of the devices in a larger number of applications.

- In two or three wire run/stop maneuvers without using additional switches or buttons. En maniobras de marcha/paro a dos hilos o tres hilos sin necesidad de usar interruptores o pulsadores adicionales.

- Possibility of remotely run/stop maneuver improving the processes efficiency and reducing the operating costs. It allows a faster performance in facilities where there are no operators on the factory floor and it makes possible to enable the remote access for the run/stop maneuvers realization through communications.

- It allows to configure outputs, leds and alarm signals which helps the user when it comes to define the system according to his control requirements.Ali tandesse factoracre di ia quem me auciptintem ex nos obsessus, ete, publicavoc, orunte acerfiri tat, dem uncut pulocum suntebefes, novis. Pulis me menihi, Catus et; non Itaben siceperur utur, tilissum.

PROTECTIONS

$\theta >$	Overload with termal image
	Overheating protection (PTC sensor)
	Phase imbalance or phase failure
	Phase sequence
JAM	JAM detection
	Locked rotor detection
$I_g >>$	Instantaneous earth leakage overcurrent
$I_g >$	Instantaneous inverse time overcurrent
$I_o >>$	Instantaneous neutral overcurrent
$I_o >$	Neutral inverse time overcurrent
$I <$	Undercurrent

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
	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
$\cos\varphi$	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 / 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
	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 Protection Relays

D30 / DM30 / DR30

- 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).

Protection Against Transient Overvoltages

SPD & TVSS Surge Arresters

SST / 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 Transformers & Potential Transformers

CT / CLR / PT

- 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 300.000
Self powered Relays in the field

FANOX
Safely protected

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