

Specialized in SELF POWERED Relays



PRODUCTS OVERVIEW

Protection, Control and Communication Solutions



Fanox designs and manufactures electronic protection relays for Low and Medium Voltage. Since it was founded in 1992, the main focus has been to help our customers to improve power systems reliability and safety at a reduced cost.

With an in-house R+D+i department always searching for the most suitable technical solution, and thanks to our innovative spirit and successfully proven experience with thousand of field installed devices operating in top conditions for years, our **SELF POWERED Protection Relays** have become a reference in the electrical sector.

Quality is a commitment to all of us in Fanox. We have been certified by DQS as an **ISO 9001:2015** company.

From our headquarters at Bizkaia Technology Park in the north of Spain, we serve customers and utilities worldwide.

R+D+i

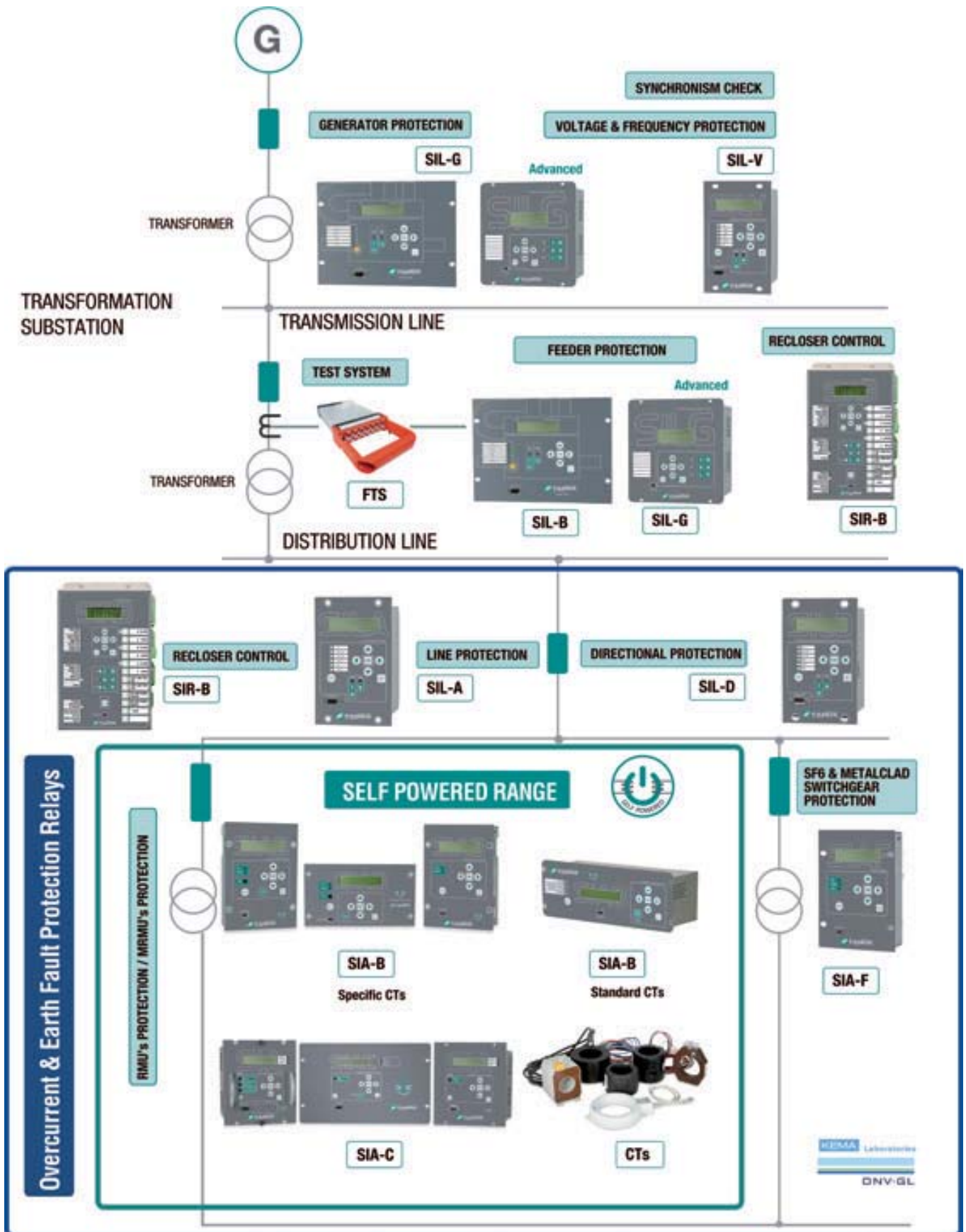


Customers and approvals WORLDWIDE...

Safely protected

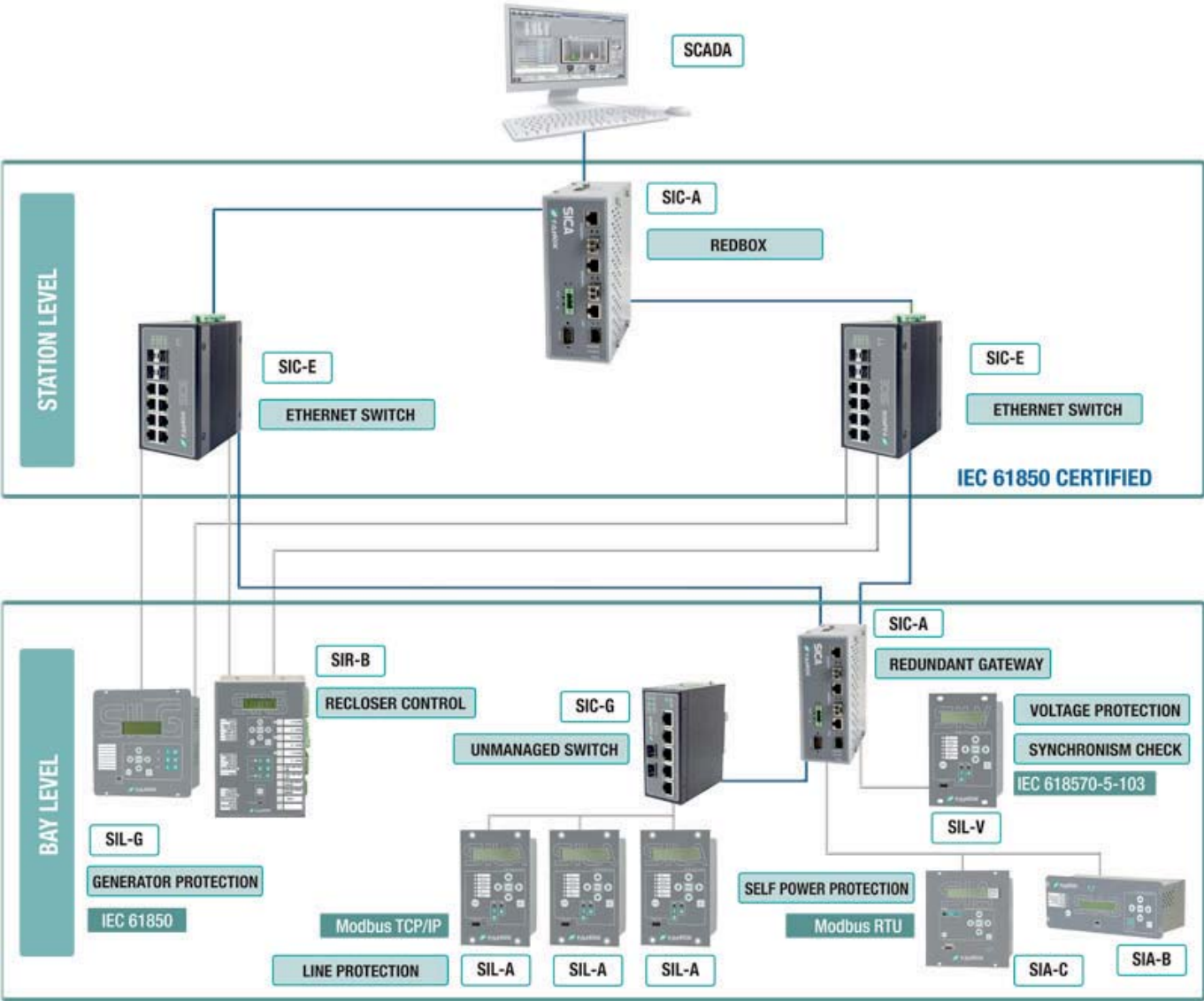


POWER T&D



5
Five year
guarantee

COMMUNICATION SOLUTIONS



¿Why is Fanox the world's leader of SELF POWERED Relays?



Our innovative spirit, the direct care of the market requirements and our extensive experience in the manufacture of protection relays, have made our **Self Powered Relays** a reference worldwide.

The relays include the latest technology: LCD, keyboard, event recording, SCADA communication, PC software ...

Utilities worldwide have relied on our technology for over 25 years.

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 require 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 at least.**
- 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.
- Possibility of **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.



SELF POWERED AND/OR DUAL POWERED (Self + Vaux)

Secondary Distribution Protection, RMUs and SF6 insulated Switchgears



Models with standard CTs /1 or /5

- With LOAD DATA PROFILING (current demand).
- Stores 1024 events and 20 fault reports in non-volatile RAM memory.
- Configurable inputs, outputs and leds thanks to Programmable Logic Control (PGC).
- Test menu allows the trip circuit to be tested before the transformation center is powered up.
- With bistable magnetic indicators (FLAGS).
- Self diagnosis of the status (WATCHDOG) through leds and physical outputs.
- Internal Commissioning battery as optional. (Lithium battery: 20 years lifetime).
- High electromagnetic compatibility.
- In self powered mode, the start-up of the relay from low energy levels, 0.1 times of the nominal current in three phases, ensures capacity to trip.



SIA-C

OVERCURRENT AND EARTH FAULT PROTECTION

PROTECTIONS	
50	Instantaneous phase overcurrent
50/51	Inverse time phase overcurrent
50N/G	Instantaneous neutral overcurrent
50/51N/G	Inverse time neutral overcurrent
49T	External trip
52	Circuit breaker monitoring
79	Recloser
68	Zone selection interlocking
CLP	Cold Load Pickup
46	Negative Sequence instant. overcurrent
49	Thermal image
50BF	Circuit Breaker opening failure
46BC	Broken conductor detection
74CT	Phase CT supervision
74TCS	Trip Supervision
PGC	Programmable Logic Control





SELF POWERED AND/OR DUAL POWERED (Self + Vaux)

Secondary Distribution Protection, RMUs and SF6 insulated Switchgears

OVERCURRENT AND EARTH FAULT PROTECTION

Models with standard CTs /1

- With LOAD DATA PROFILING (current demand).
- Stores 1024 events and 20 fault reports in non-volatile RAM memory.
- Configurable inputs, outputs and leds thanks to Programmable Logic Control (PGC).
- Test menu allows the trip circuit to be tested before the transformation center is powered up.
- Internal Commissioning battery as optional. (Lithium battery: 20 years lifetime).
- High electromagnetic compatibility.
- Really low start-up levels: 75 mA in three phase system /160 mA in single phase system.
- Micro USB front port connection (Modbus RTU protocol) for local communication. Remote communication through rear RTU or DNP 3.0 selectable by general setting) as optional.



SIA-B



Multiple options for powering and communication

PROTECTIONS	
50	Instantaneous phase overcurrent
50/51	Inverse time phase overcurrent
50G	Instantaneous Neutral overcurrent
50/51G	Inverse time neutral overcurrent
46	Negative Sequence instant. overcurrent
49	Thermal image
CLP	Cold Load Pick-up
SHB	Second Harmonic Blocking
50BF	Circuit Breaker opening failure
52	Circuit Breaker monitoring
49T	External trip
TB	Trip Block protection



Models with specific CTs

- Trip block for Switch disconnector.
- Stores up to 100 events and 4 fault reports in non-volatile RAM memory.
- With USB front port for communication with PC and monitoring.
- Test menu allows the trip circuit to be tested before the transformation center is powered up.
- The SIA-B is a Dual & Self powered overcurrent protection relay using the operating current through three specific current transformers fitted on the lines.
- Its compact size makes SIA-B really easy to install and its light weight helps the customer to save costs in transport.
- High electromagnetic compatibility.
- Low power consumption (0.5 W, 24 Vdc).
- Remote communications optional (RS485 Modbus RTU communication protocol).
- There is an optional bistable magnetic indicator which indicates the trip condition, maintaining their position even though the relay loses the supply (flag).
- In self powered modes, SIA-B starts-up from 0.4 Is of primary three phase current.



SIA-B



PROTECTIONS	
50	Instantaneous phase overcurrent
50/51	Inverse time phase overcurrent
50N	Instantaneous neutral overcurrent
50/51N	Inverse time neutral overcurrent
49T	External trip
49	Thermal image
TB	Trip Block for switch disconnector



More than
25 YEARS
in field

RECLOSER
control

SCADA
COMMUNICATIONS

RETROFIT
Applications

INTERNATIONAL APPROVALS
ENA
ADWEA
FEWA & DEWA
SEC
K-ELEKTRIC
EDD, QTE, TNB...

LOAD
Management

Withdrawable
Relays

WITH AUXILIARY POWER SUPPLY

Secondary Distribution Protection, RMUs and SF6 insulated Switchgears

- Overcurrent and earth fault relays from compact and simple models to relays with neutral directional protection.
- With standard CT's.
- Configurable inputs, outputs and leds thanks to Programmable Logic Control (PGC).
- Stores up to 200 events and 4 faults reports in non-volatile RAM memory. Oscillographic records.
- Test menu.
- High electromagnetic compatibility.
- USB connection on the front (Modbus RTU communication protocol).



SIA-F



OVERCURRENT AND EARTH FAULT PROTECTION

PROTECTIONS	
50	Instantaneous phase overcurrent
51	Inverse time phase overcurrent
50N/G	Instantaneous Neutral overcurrent
51N/G	Inverse time neutral overcurrent
52	Circuit Breaker monitoring
49T	External trip
68	Zone selection interlocking
CLP	Cold Load Pickup
PGC	Programable Logic Control
50BF	Circuit Breaker opening failure
67N	Neutral Directional overcurrent
TB	Trip BLock

Line Protection for Primary and Secondary Distribution

- With LOAD DATA PROFILING (current demand).
- Programmable recloser function. Up to 5 attempts.
- Direct signalling/control of circuit breaker (52 function) and recloser (79 function).
- Current measurement with standard transformers /1 o /5 and residual voltage measurement.
- ModBus RTU local communication port on the front.
- Remote communication by rear port on the back with different protocols: IEC 61850, DNP3.0, IEC 60870-103, IEC 60870-104, ModBus RTU.
- Configurable inputs, outputs and leds through programmable logic.
- Stores up to 200 events, 20 falt reports saved in non-volatile RAM memory. Oscillographic records.
- Test Menu.
- **Main applications:** Distribution and transformation substations. RMUs and SF6 insulated Switchgears.



SIL-D



OVERCURRENT AND DIRECTIONAL EARTH FAULT PROTECTION

PROTECTIONS	
50	Phase instantaneous phase overcurrent
50N/G	Neutral instantaneous overcurrent calculated/measured
50/51	Inverse time phase overcurrent
50N/51N /67N	Inverse time directional neutral overcurrent calculated/measured
50BF	Circuit Breaker opening fault
46	Negative sequence instantaneous overcurrent
52	Circuit Breaker monitoring
79	Autorecloser
74TCS	Trip circuit supervision
CLP	Cold Load Pick-up
86	Trip output lockout with PLC
49T	Trip output
67NI	Inverse time directional isolated neutral overcurrent
59N	Instantaneous neutral overvoltage
68	Trip Bus
TB	Trip Block for switch disconnecter

WITH AUXILIARY POWER SUPPLY

Line Protection for Primary and Secondary Distribution

- With LOAD DATA PROFILING (current demand).
- Programmable recloser function. Up to 5 attempts.
- Direct signalling/control of circuit breaker (52 function) and recloser (79 function).
- Zone selection interlocking protection function available through configurables inputs and outputs.
- Current measurement with standar transformers /1 o /5, or low current power transformers (LPCT).
- ModBus RTU local communication port on the front.
- Remote communication by rear port on the back with different protocols: IEC 61850, DNP3.0 (serial or TCP/IP), IEC 60870-103, IEC 60870-104, ModBus (RTU or TCP/IP)
- Configurable inputs, outputs and leds through programmable logic.
- Records up to 200 events, 20 falt reports saved in non volatile RAM memory. Oscillographic records.
- Test Menu.
- Metallic box with high electromagnetic compatibility level (EMC).



SIL-A

OVERCURRENT AND EARTH FAULT PROTECTION

PROTECTIONS	
50	Phase instantaneous phase overcurrent
50N/G	Neutral instantaneous overcurrent calculated/measured
50/51	Inverse time phase overcurrent
50/51N/G	Inverse time directional neutral overcurrent calculated/measured
50BF	Circuit Breaker opening fault
46	Negative sequence instantaneous overcurrent
52	Circuit Breaker monitoring
79	Autorecloser
74TCS	Trip circuit supervision
CLP	Cold Load Pick-up
86	Trip output lockout with PGC
49	Thermal Image
49T	External Trip
74CT	Phase CT supervision
37	Instantaneous phase undercurrent
68	Zone Selection interlocking
TB	Trip Block for switch disconnecter
46BC	Broken conductor detection
SHB	Second Harmonic Blocking

FEEDER Protection for Primary Distribution

- Feeder protection by means of CURRENT and VOLTAGE functions.
- Programmable recloser function. Up to 5 attempts.
- Direct signalling/control of circuit breaker (52 function) and recloser (79 function).
- Synchronism check: Voltage differences, frequency slip, angle difference, DLDB, DLLB, LLLB, LLLB.
- Manifold measurements: currents, phase voltages, thermal image, frequency, phase difference, power...
- ModBus RTU local communication port on the front.
- Remote communication by rear port on the back with simultaneous protocols: IEC 61850, DNP3.0, IEC 60870-103, IEC 60870-104, ModBus RTU.
- Configurable inputs, output and leds through programmable logic.
- Stores up to 1.000 events and 20 fault reports saved in non volatile RAM memory. Oscillographic records.
- Test Menu.



SIL-B

OVERCURRENT, OVERVOLTAGE AND FREQUENCY PROTECTION

PROTECTIONS	
67	Inverse time directional phase overcurrent
67N	Inverse time directional neutral overcurrent
46	Negative sequence inverse time overcurrent
59	Instantaneous phase overvoltage
59N	Instantaneous neutral overvoltage
27	Instantaneous phase undervoltage
32/40	Instantaneous directional overpower
79	Autorecloser
50BF	Circuit Breaker opening fault
52	Circuit Breaker monitoring
49	Thermal image
86	Trip output lockout with PLC
CLP	Cold Load Pick-up
49T	External trip
74TCS	Trip circuit supervision
25	Synchronism

GENERATOR Protection / Primary Distribution

- Generator protection by means of CURRENT, VOLTAGE and FREQUENCY functions.
- Recloser function programmable by the user. Up to 5 attempts.
- Direct signalling/control of circuit breaker (52 function) and recloser (79 function).
- Synchronism check: Voltage differences, frequency slip, angle differences, DLDB, DLLB, LLDB, LLLB.
- Manifold measurements: currents, phase voltages, thermal image, frequency, phase difference, power....
- Local ModBus RTU communication front port.
- Remote communication by rear port on the back with simultaneous protocols: IEC 61850, DNP3.0, IEC 60870-103, IEC 60870-104, ModBus RTU.
- Configurable inputs, outputs and leds through programmable logic.
- Records up to 1.000 events, 20 fault reports saved in non volatile RAM memory. Oscillographic records.
- Test menu.
- **Main applications:** Renewable energy facilities.



SIL-G

OVERCURRENT, OVERVOLTAGE AND FREQUENCY PROTECTION

PROTECTIONS	
81R	Frequency rate of change
78	Out of step (vector shift)
81U/O	Overfrequency and underfrequency
27	Instantaneous phase undervoltage
32/40	Instantaneous directional overpower
59	Instantaneous phase overvoltage
59N	Instantaneous neutral overvoltage
79	Autorecloser
50	Phase instantaneous overcurrent
50N/G	Neutral instantaneous o/c calculated/measured
67	Inverse-time directional phase overcurrent
67N	Inverse-time directional neutral overcurrent
46	Negative sequence inverse time overcurrent
50BF	Circuit Breaker opening fault
52	Circuit breaker monitoring
49	Thermal image
86	Trip output lockout PLC
CLP	Cold Load Pick-up
49T	External Trip
74TCS	Trip circuit supervision
37	Instantaneous phase undercurrent
25	Synchronism

- For transformers or electrical machines.
- High, Medium and Low voltage systems.
- For decoupling, load shedding and loss of main (islanding).
- Recloser function programmable by the user. Up to 5 attempts.
- Synchronism check: Voltage differences, frequency slip, angle difference, DLDB, DLLB, LLDB, LLLB.
- Records up to 200 events, 20 fault reports saved in non volatile RAM memory. Oscillographic records.
- **Main applications:** Renewable energy facilities.



SIL-V

OVERVOLTAGE AND FREQUENCY PROTECTION

PROTECTIONS	
27	Instantaneous phase undervoltage
27V1	Instantaneous positive sequence undervoltage
59	Instantaneous phase overvoltage
47	Instantaneous negative sequence overvoltage
59N	Instantaneous neutral overvoltage
$\Delta V/\Delta T$	Rate of change of voltage
74TCS	Trip circuit supervision
BF	Circuit breaker opening fault
52	Circuit breaker monitoring
79	Autorecloser
81U/O	Overfrequency and underfrequency
81R	Frequency rate of change
86	Trip output lockout PLC
78	Out of step (vector shift)
25	Synchronism

FEEDER/GENERATOR Protection for Primary Distribution

OVERCURRENT, OVERVOLTAGE AND FREQUENCY PROTECTION

- Feeder/Generator protection by means of CURRENT, VOLTAGE and FREQUENCY functions.
- Two power supply options:
 - 3 Universal supply: 24-230Vdc/48-230Vac
 - 3 Self powered through the VT
- Connection: Using VT or direct connection to the low power line measuring up to 1.000 amperes.
- 9 analog channels to measure: 4 for current and 5 for voltage.
- Programmable recloser function. Up to 4 attempts.
- Direct signaling/control of the circuit breaker (Function 52) and recloser (Function 79)
- Optional synchronism check: Voltage difference, phase difference and frequency difference (LLLB, LLLD, DLLB, DLDB).
- 16 Digital Inputs, 11 Digital outputs and 8 LEDS (CONFIGURABLE).
- /1 or /5 current transformers configurable by settings.
- Stores up to 2048 events, DFR (Disturbance Fault Recorder) for 25, 50 or 100 selectable depending on cycles and LDP (Load Data Profiling) in non-volatile RAM memory.
- ModBus RTU local communication port on the front.

- Remote communication by rear ports on the back with protocols: IEC 61850, DNP3.0, IEC 60870-5-103, HSR, ModBus RTU.
- Test menu.
- Arc Flash detection (AFD) with 4 AFD inputs and 4 high-speed outputs.
- Wireless communication via WiFi.



New SIL-G

- **Main applications:** Renewable energy facilities and 36 kV / 66 kV / 132 kV substations.



PROTECTIONS	
50	Phase instantaneous overcurrent
50N	Neutral instantaneous overcurrent
50G	Ground instantaneous overcurrent
67	Inverse time directional phase overcurrent
67N	Inverse time directional neutral overcurrent
67G	Inverse time directional ground overcurrent
46	Phase balance current
46BC	Broken conductor detection
49	Thermal image
37	Phase instantaneous overcurrent
59	Instantaneous phase overvoltage
59N/G	Instantaneous neutral overvoltage (measured/calculated)
59L	Instantaneous line phase L overvoltage
27	Instantaneous phase undervoltage
27L	Instantaneous line phase L undervoltage
27V1	Positive sequence undervoltage
47	Phase balance voltage
32	Directional Power
81U/O	Under/Over frequency
81R	Rate of change of frequency (ROCOF)
78	Vector shift (Out of step)
CLP	Cold Load Pick-up
SHB	Second harmonic blocking
50BF	Breaker failure monitoring
79	Recloser
52	Breaker wear monitoring
86	Trip output lockout with PLC
49T	External trip
74CT	CT Supervision
60	Voltage Circuit supervision
74TCS	Trip circuit supervision
25	Synchro check
24	Overflux
AFD	Arc Flash detection

ACCESSORIES

Battery power supply KITCOM

- Battery that feeds SIA Relays from the front port and allowing the communication with the computer simultaneously locally via RS232 or USB port. Is very useful in the commissioning processes of the transformation centres because allows its verification without any auxiliary power supply.

The power comes from two AA batteries. Voltage: 12 or 5 Vdc. USB or DB9 connector depending on the model



KITCOM DB9 / DB9

SICOM Communication Software

- The SICom program works with the Windows® 2000/XP, Windows 7 and Windows 8 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

Trip Capacitors

- 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).



TCM

Strikers

- 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.



PRT-8



PRT-15

Coils

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



BNS

Test Blocks

- 14 circuits with different possible configurations (trips, current, voltages).
- Safe for the user, who will never have access to live parts during insertion and removal operations.
- Safe sequence of disconnection. The circuits of the trips open first, avoiding undesired operations, and then the voltages and currents, ensuring that the transformer circuits on the field side have been shorted before the separation of the circuits from current (make before break sequence).
- Safe sequential removal of the test plug, connecting first VTs and CTs, and using a braking system allowing the relay to stabilize before connecting the tripping circuits.
- Single Test Plug for all the different variants of Test Blocks.
- During insertion and removal operation there will be no bounces which can cause interruption of the CT circuit.



Multiple options for disconnection and testing



FTB/FTP

CURRENT TRANSFORMERS

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.

Standard CTs for Auxiliary Supplied or Self Powered relays

- /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 CTs for Self Powered relays

- Special cores are used to get higher burden and getting anergy in case of self 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.

COMMUNICATION SOLUTIONS

SMART GRID Communication Solutions

Redundancy Protocols Gateway (PRP/HSR)

- 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

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.

Most complete topology

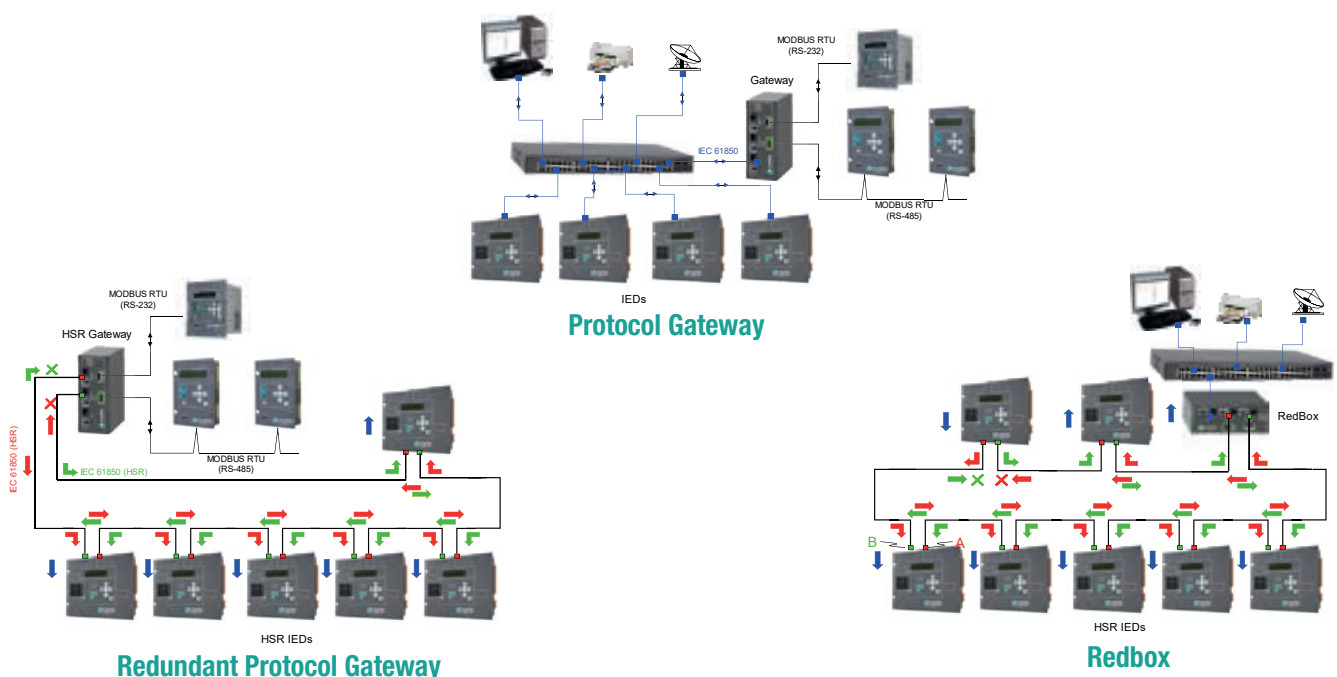
2 SIC-A in their topology of Redbox allow connecting a HSR redundant network with another PRP network.

This is a useful application that permits to coexist new networks with existing ones.

In the same way, SIC-A in its topology of PRP Gateway, would allow to integrate serial equipment with conventional protocols in a PRP network with an advanced Ethernet protocol as IEC61850, IEC 60870-5-104, etc.



SIC-A



Time-aware Redbox Switch

- In compliance with IEC 61850-3
- Critical systems demand time-aware high-availability networking. Moreover, the complexity of the modern network infrastructures in these premises overcomes the traditional concept of “managed” device. SIC-R is a new concept of intelligent device that integrates advanced field-proven technology for non-packet-loss redundant Ethernet, sub-microsecond synchronization and cybersecurity.
- This device is able to merge the whole LAN with redundant networks, to interconnect PRP and HSR networks and to extend HSR rings via QuadBox operation.
- SIC-G family comprises three different models, based on the number and type of communication interfaces available in the equipment.



SIC-R

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.
- The SIC-E is designed to be used in core power utilities. It provides dual redundant power inputs with Reverse Polarity Protection and two sets of relay that allow the user build up a stand-alone fault alarm system. Its wide operating temperature of -40 to 85°C and DIN-Rail mounting capacities make it suitable to be used in remote substations where harsh environment and reliability is an issue.



SIC-E

Industrial PoE Unmanaged Gigabit Ethernet Switch

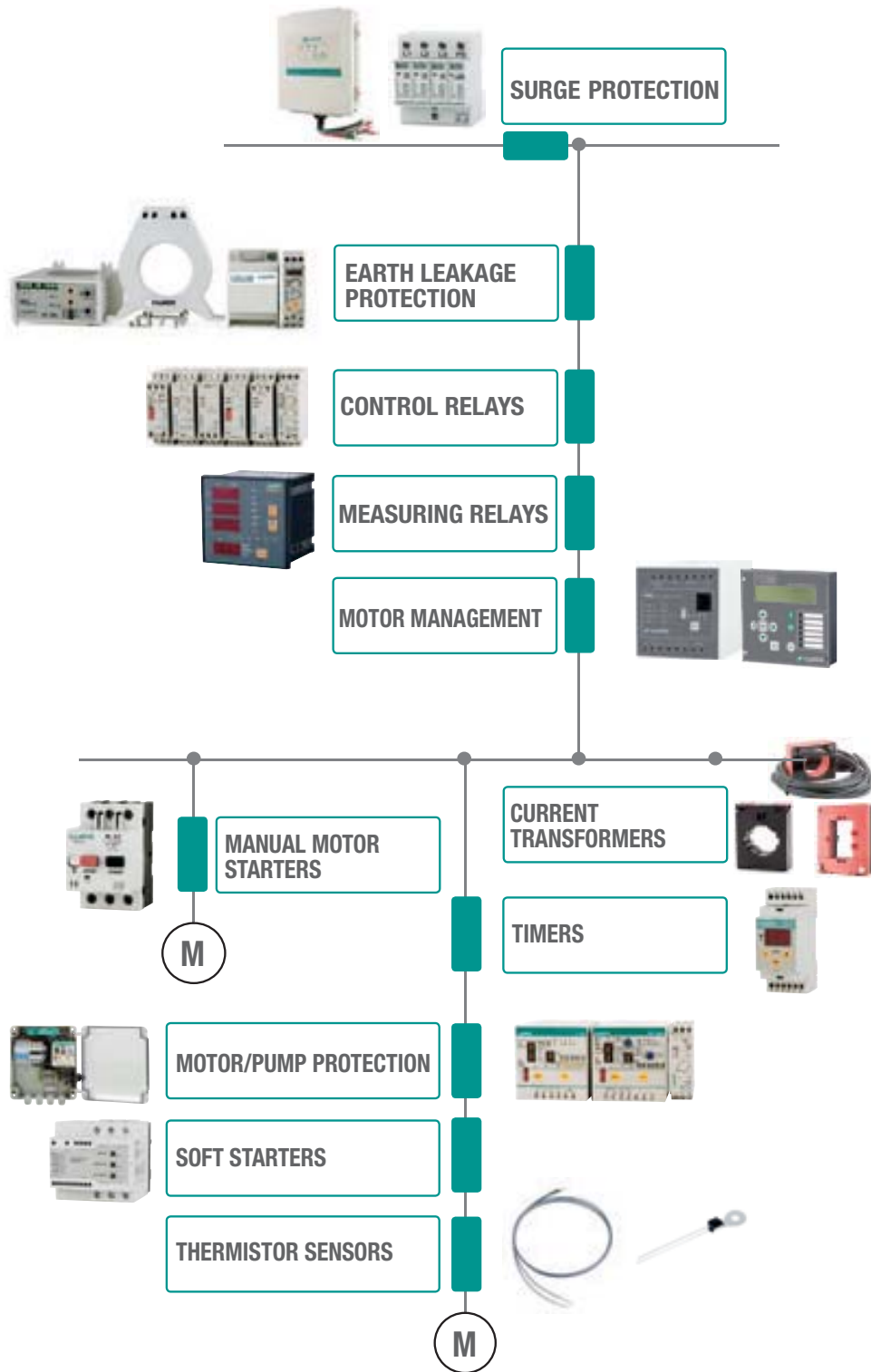
- The SIC-G is 7 Port PoE Unmanaged Gigabit Ethernet Switches designed to work in mission critical environments such as mining and heavy industry.
- It equips up to five 10/100/1000BASE-T(X) RJ-45 ports and up to two 100/1000 BASE-F(X) and 1000 BASE-X SFP ports.
- With its high performance and non-blocking 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.
- Its IP30 housing protection, wide operating temperature of -40 to 70°C and DIN-Rail mounting capacities are liable to do most industrial filed applications.
- The SIC-G Series is fully EN50155-certified to ensure reliable performance under a wide range of power supply conditions, and it complies with essential sections of EN50121-4 for ground equipment.



SIC-G

3
Three year
guarantee

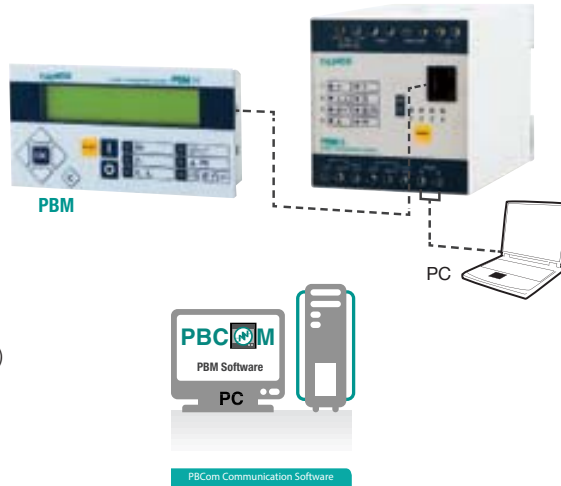
PROTECTION & CONTROL



PROTECTION & CONTROL OF MOTOR, GENERATORS AND PUMPS

Motor Management System

- Multifunctional protection, control and monitoring system.
- From 0.8 up to 25 A with internal transformers.
- Over 25 A with external current transformers.
- Predictive diagnosis to avoid failures and downtime.
- Optional display module with an LCD screen for signalling, control and setting.
- Integral solution for MCCs adaptable to every customer needs.
- Fault reports, test menu, self-diagnosis & statistics.
- Designed for SCADA applications. RS485 and ModBus RTU.
- 3 Inputs:
 - Digital input 24 Vdc
 - Toroidal transformer (external earth fault)
 - PTC temperature sensor conection.
- 2 Changeover outputs for trip and alarm.



PROTECTIONS	
$\theta >$	Overload with thermal image
$\text{---} \text{---} \text{---}$	Overheating protection (PTC sensor)
$\text{---} \text{---} \text{---}$	Phase imbalance or phase failure
$\text{---} \text{---} \text{---}$	Phase sequence
JAM	JAM detection
$\text{---} \text{---} \text{---}$	Locked rotor detection
$I_g >>$	Instantaneous earth leakage overcurrent
$I_g >$	Instantaneous inverse time overcurrent
$I_0 >>$	Instantaneous neutral overcurrent
$I_0 >$	Neutral inverse time overcurrent
$I <$	Undercurrent

Motors & Generators Protection relays

- 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 accessory 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
$\text{---} \text{---} \text{---}$	Phase imbalance or phase failure
$\text{---} \text{---} \text{---}$	Phase sequence
$\text{---} \text{---} \text{---}$	Overtemperature

Relays & Panels for Pumps

- 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
$\text{Cos } \varphi$	Underload
$U >$	Overvoltage
$\text{---} \text{---} \text{---}$	Phase imbalance or phase failure
$\text{---} \text{---} \text{---}$	Phase sequence



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.

$I >$	Overload
$I <$	Underload
$\text{Cos } \varphi$	Underload
$U >$	Overvoltage
$\text{---} \text{---} \text{---}$	Phase imbalance or phase failure
$\text{---} \text{---} \text{---}$	Phase sequence
$I >>$	Short-circuit
$\text{---} \text{---} \text{---}$	Soft start
$\text{---} \text{---} \text{---}$	Soft stop

Soft Starters & Motor Controllers

- 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 greater life cycle.



ES

PROTECTIONS

- Soft start
- Soft stop
- Phase imbalance or phase failure
- Overheating (PTC)
- Phase sequence

CONTROL & MEASUREMENTS

Control Relays

- 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).



S / ST / ST-D



TST-24 / T2 / MT2

PROTECTIONS

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



U1/U3

• Voltage

Control for three-phase and single-phase devices. Adjustable minimum and maximum thresholds. Adjustable trip time delay.

$U >$ 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.
- Superimmunized 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



- 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 B+C (Class I+II) and Type C (Class II).
- Ensures maximum protection of critical facilities, 365 days / 24 hours a day.

LOW VOLTAGE TRANSFORMERS

Current Transformers & Potential Transformers

- **Protection and measurement** transformers up to 3.200A of primary current. Transformer ratio /5. Split core models.
- **Protection and measurement 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 measurement transformers for **amp chart recorders**.
- **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.



CT



CT-ABR



CT-EXT



CT-1



CLR



PT



“Our innovative spirit, the direct care of market requirements and our extensive experience in the manufacture of protection relays, have made our Self Powered Relays a reference worldwide.”



More than 40.000 Self Powered relays on site

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