

2024

EXPRESS CATALOG

Electrical protection in complete Serenity



MICROENER



ELECTRICAL PROTECTION IN COMPLETE SERENITY

MICROENER offers a **comprehensive** range of features and hardware options to meet your needs for protection, automation and control of MV and HV electrical networks. Our **wide range of products** ensures that you get the **optimum solution** for your application. We also offer **customised products** to meet the needs of the most demanding users, providing **flexibility, interoperability** and **security**.

For more than 25 years, **MICROENER** has been offering intelligent electronic relays for the protection and control of medium and high voltage electrical networks. **MICROENER's** product families are based on over 60 years' experience in the field of protection relays.

The A Range relays

These **analogue** relays come in plug-in metal cases that can be flush-mounted on MV cubicle doors or surface-mounted on chassis. This range is ideal for replacing obsolete relays in nuclear power stations or industrial electrical installations. It also provides a simple, effective response to the need to protect excitation circuits in power station alternators.

They are adjusted using **dip-switches** accessible from the front of the relay.

The MC Range relays

These **digital** relays come in enclosures designed for mounting on the doors of LV enclosures in Medium Voltage cubicles. They have been designed to meet the needs of manufacturers operating a MV distribution network and are intended to replace the A range relays used in power distribution applications. Their **plug-in** electronic modules make maintenance easier.

They can be set using **MSCom2** software or from the front panel of the relay.

The ULTRA M Range relays

Like the two previous ranges, these **multifunction digital** relays come in a metal case designed for flush-mounting. On request, they can be surface-mounted or installed in a 19' rack. Their **plug-in** electronic modules make maintenance easier. This range is designed for use in MV, HVB and DC installations, and whenever the integration of functions is important or necessary.

They can be set using the **MSCom2** software or from the front panel of the relay.

The SMARTLINE and PROTECTA Range relays

The M Range and N-DIN Range relays have been discontinued. As described in the rest of this document, they are all being replaced, without exception, by relays from the **SMARTLINE** and **PROTECTA** ranges.

The **multifunction** relays in the **SMARTLINE** range have been designed for use as main or back-up protection in public and industrial electricity networks. The range comprises two families of protection relays: the **S16** and **S24** series. These devices form an optimised range of protection, monitoring and control functions in a **disconnectable** case, designed for flush, semi-flush or DIN rail mounting.



The **multifunction** relays in the **PROTECTA** range are made up of modular components. Thanks to this design, it is possible to obtain a fully customised solution to meet user requirements. The relays in this range are available in 9'1/2 or 19' racks. They are designed for all types of mounting (flush-mounted, cabinet-mounted, front or rear surface-mounted, semi-flush-mounted).

All the relays in the **PROTECTA** and **SMARTLINE** ranges have the unique feature of being made up of the same electronic boards and **Functional Software Blocks** (FSBs). These **FSBs** can be assembled quickly and easily in production to obtain the required functions of the protection relay. The corresponding electronic boards are associated and assembled according to the **FSBs** required for protection. This particulate assembly of FSBs and electronic boards ensures high reliability of the firmware embedded in the protection devices and the electronics, since they are common to all devices and therefore widely distributed.

If required, all relays in these two ranges can be fitted with a colour touch screen. The **PROTECTA** and **S24** ranges come with an integrated **WEB server** as standard.

The predefined factory configuration can be adapted to user specifications using the powerful **EuroCAP** tool.

The **Express Catalog** summarises all the **Equipment and Services** we offer electrical contractors. It provides a quick overview of the range of products and services we offer.

You'll find a brief description of all our protection relays, automation, control and command systems and services. You'll also find a presentation of our measurement, metering, signalling, alarm and protection systems for low voltage.

For each product family, detailed and comprehensive documentation is available on our website: www.microener.com

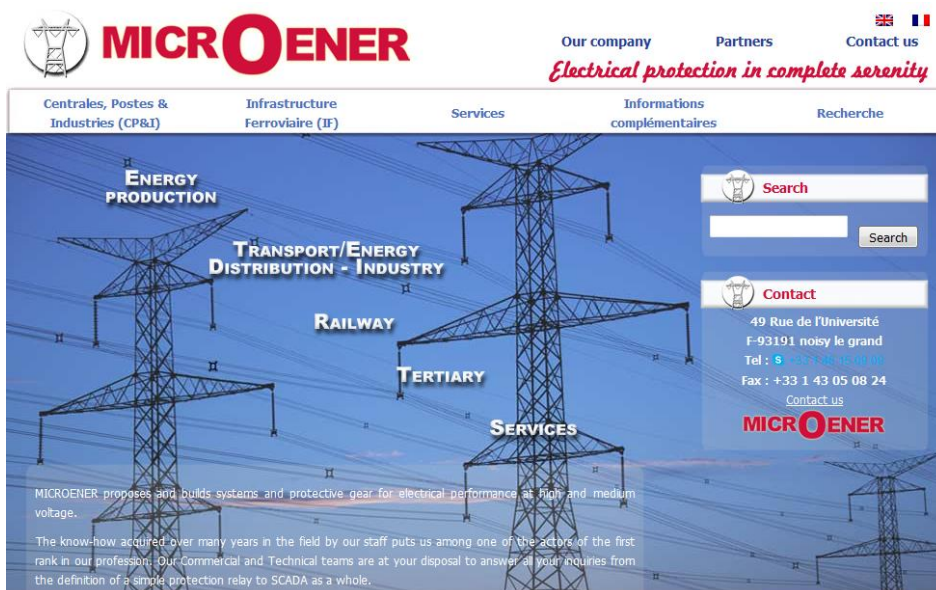




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POWER PLANTS SUBSTATIONS & INDUSTRIES





RELAYS FOR PUBLIC AND INDUSTRIAL DISTRIBUTION

The Analog range

These analogue relays perform simple overcurrent functions. Depending on requirements, users can opt for a three-phase, two-phase, single-phase or zero sequence (residual) solution. This range is used extensively in nuclear power plants, replacing obsolete relays, and in new projects where this technology is still required.

Main functions and features

- Basic three-phase two-way earth overcurrent protection
- Wide dynamic range auxiliary source
- Logic inputs for selectivity Permission/Blocking
- Electronic plug-in module
- Hook operation
- Mask operation on request
- Constant or dependent time delay

The MC, ULTRA M and G Base ranges

These multifunction digital relays are mainly designed for electrical distribution and industry. For some of them, the **MC** range replaces obsolete relays from the Analogue range (identical casing).

The **UMWH** relay is designed for C13-100 substations as general protection for public distribution networks where the neutral is compensated or impedant. It is covered by Temporary Authorisation for Use (TAU) No. 22E201.

UMRAV and **UFMR** relays are multifunctional relays designed to protect lines or cables. They are perfectly suited to the protection of arteries (short or long) or looped substations.

Main functions and features

- Multifunctional three-phase-earth protection, directional or non-directional.
- Possibility of adding a logic input-output card.
- Boolean logic functions.
- Presence of a watchdog
- RS232 port on front panel and RS485 port on rear panel
- Basic communication protocol: Modbus RTU
- Plug-in electronic module

The Smartline and Protecta ranges

The relays in these **two ranges** replace the relays in the M range, which have now been discontinued. The **S24/F** and **DTIVA/F** relays replace relays in the IM30/A series. **S24/Fr** and **DTIVA/Fr** relays replace DM30 and DM33 series relays. The **S24/U** and **DTIVA/U** relays replace relays in the UM and UFD series. The **S16/F** relay replaces the N-DIN/F relay.



DTIVA and **S24** and **S16** relays are configured to protect, control and supervise the elements that make up power distribution and industrial systems, whatever their topology: radial, looped and meshed. They are also used to their full potential on highly impedant networks. In this case, the earth fault current is relatively low. This is the case when there is distributed generation or loop structures. In these conditions, the relay should be chosen for equipment that requires additional voltage measurements and directional functions.

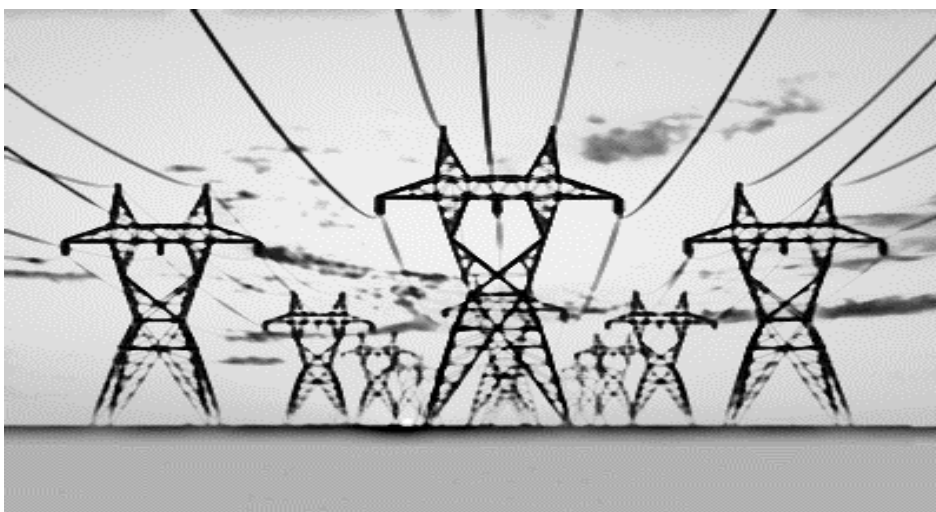
Cable differential protection is also available to protect strategic links. The use of this type of protection also makes it possible to gain one stage of selectivity.

Main functions and features

- Three-phase bi-directional ammeter unit - base earth
- Three-phase directional element, homopolar
- Three-phase voltmetric unit - base earth
- Specific sensitive element for detecting high impedance earth insulation faults
- Element for processing faults with phase separation
- Automatic reclosing function
- "Qualimetry" function with monitoring of voltage variations, voltage imbalances, voltage and current harmonics up to the 19th order (THD and TDD)

Applications

- Protection of radial or loop networks
- Protection of wind or photovoltaic farms
- Main or back-up protection for transmission, distribution, industrial and tertiary networks
- Protection against overvoltage, undervoltage and voltage imbalance.
- Protection against frequency variations
- Basic protection for transformers or busbars
- Automatic reclosing





Selection table for protection against overcurrents and earth insulation faults























BI20	BF3	BF20	PB1
 Two-phase bi-directional earth relay 50/51, 50N/51N, 68, 86	 Three-phase relay circuit-breaker failure 50BF	 Two-phase bi-directional earth relay 50/51, 68, 86	 Single-phase bi-directional relay 50/51, 68, 86
PB2	PB3	MC20	MC20/R
 Bidirectional two-phase relay 50/51, 68, 86	 Three-phase bidirectional relay 50/51, 68, 86	 Two-phase earth relay 50/51, 50N/51N, 51BF, 68	 Two-phase earth relay with recloser 50/51, 50N/51N, 51BF, 68, 79
MC30	UMWH	UMRAV	UFMR
 Three-phase earth relay 50/51, 50N/51N, 51BF, 68	 ENEDIS-qualified zero sequence wattmetric relay 50/51, 50N/51N, 51BF, 32N, 68, 86	 Three-phase earth relay 50/51, 67, 50N/51N, 51BF, 67N, 27, 59, 81, 68, 86	 Three-phase earth relay 50/51, 67, 50N/51N, 51BF, 67N, 27, 59, 81, 79, 68, 86
GBI30	S16/F	S24/F	S24/FR
 Three-phase bi-directional earth relay 50/51, 50N/51N, 68, 46, 49, 74, 50BF	 Three-phase earth relay 50/51, 50N/51N, 51BF, 68	 Three-phase bi-directional earth relay 50/51, 50N/51N, 68, 46, 49, 37, 48, 66, 79, 50BF	 Three-phase directional earth relay 50/51/67, 50N/51N/67N, 51V, 27, 59, 59N, 47, 68, 46, 49, 79, 50BF, 78, 81, df/dt (81R)
DTIVA/F	DTIVA/D	DTIVA/FR	Colour code
 Three-phase bi-directional earth relay 50/51, 50N/51N, 68, 46, 49, 79, 60, 50BF	 Three-phase earth directional relay 50/51, 50N/51N/67N, 27, 59, 59N, 47, 68, 46, 49, 79, 60, 50BF, 32	 Three-phase directional earth relay 50/51/67, 50N/51N/67N, 27, 59, 59N, 47, 68, 46, 49, 79, 60, 50BF, 32, 81, df/dt (81R)	A Range
			M Range
			MC Range
			Ultra M Range
			G_Base Range
			Smartline S16 Range
			Smartline S24 Range
			Protecta Range
			Other



Table for selecting protection against earth insulation faults

UBO/A	UBO/ATR	RBVA	UBO
 <p>Bi-directional homopolar current relay 50N/51N, 51BF, 68, 86</p>	 <p>Restricted earth current relay 87N/87REF/64REF, 51BF; 68, 86</p>	 <p>Directional homopolar current relay 50N/51N, 51BF, 68, 86</p>	 <p>Zero sequence voltmeter relay 59, 68, 86</p>
MCOA			
 <p>Bi-directional homopolar current relay 50N/51N, 51BF, 68</p>			





Selection table for protection against voltage and frequency variations

UBC	UBC	UB1	UB1
 Undervoltage DC relay 80, 86, 68	 Overvoltage DC relays 45, 86, 68	 Single-phase undervoltage relay 27, 86, 68	 Single-phase overvoltage relay 59, 86, 68
UB3	UB1 ou UB3	UBC/2	UB1/2
 Three-phase undervoltage relay 27, 86, 68	 Single or three-phase fuse failure detection relay 60, 86, 68	 DC relay with minimum/maximum voltage 80, 45, 86, 68	 Single-phase relay with minimum/maximum voltage 27, 59, 86, 68
UB3/2	MC1/V	MC3/V	S16/U
 Three-phase undervoltage relay 27, 59, 86, 68	 Single-phase voltage relay 27, 59, 81, 68	 Three-phase voltage relay 27, 59, 81, 68, 59N, 27d, 47	 Voltage relay 27, 59, 59N, 47, 78, 81, df/dt (81R)
S24/Fr	S24/U	DTIVA/U	DTIVA/Fr
 Three-phase earth relay 50/51/67, 50N/51N/67N, 51V, 27, 59, 59N, 47, 68, 46, 49, 79, 60, 50BF, 78, 81, df/dt (81R)	 Voltage - frequency relay 27, 59, 59N, 81, df/dt (81R), 25	 Three-phase ground frequency relay 27, 59, 59N, 81, df/dt,	 Three-phase earth relay 50/51/67, 50N/51N/67N, 27, 59, 59N, 47, 81, df/dt, 68, 46, 49, 79, 60, 50BF, 32



RELAYS FOR RENEWABLE OR TRADITIONAL ENERGY PLANTS

Our relays are used in a wide variety of applications for self-generators operating in parallel with the distribution network, such as **decoupling** protection for generating stations and **limiting the inrush currents** of power transformers in order to limit the voltage drop at the delivery substation.

The M range

The UM30/A relay is the decoupling protection that complies with note PRO-RES_10E issued by ENEDIS. It is covered by Temporary Authorisation for Use (ATE) No. 23B021 for use as type H1, H2, H3SEI, H4, H5, B1 and F1 decoupling protection. Most of our customers opt for pre-wired enclosures.

This and the mini-rack format make it easier to integrate and use the decoupling protection in electrical diagrams.

Main functions and features

- Wind farms
- Micro power stations
- Solar or photovoltaic power plants
- Wood, biogas and biomass plants
- Diesel, gas and oil-fired power stations
- Combined cycle power plants
- Cogeneration plants

The Protecta range

When transformers are switched on, there is always a risk of transient overcurrents. The main consequence of this transient phenomenon is the appearance of a voltage drop at the transformer connection point. The amplitude of this voltage drop will depend on the value of the overcurrent, the source impedance at the moment of power-up, the transformer residual voltage at the same moment and the moment of contact of the transformer supply circuit-breaker poles.

TRIM/POW relays are equipped with two three-phase voltmetric units and an ammetric unit (optional) which measure, via reducers, the voltage and current present on the primary and secondary sides of a HV or MV transformer. Using this equipment, it limits the inrush current, and therefore the voltage drop at the point of delivery, when the transformer at the delivery substation (PDL) or transformer substation (PTR) is energised.










Main functions and features

- Limiting the inrush current of transformers and reactors
- Minimisation of the voltage drop at the supply point

Table of protection choices for self-producers

UM30/A	Mini Racks GTE	GTE boxes	GTE boxes with recloser
 <p>ENEDIS-qualified decoupling protection 27, 59, 81, 59Vo, 68, 86</p>	 <p>Decoupling box compliant with NOI_RES_13^E (GTE2666) and C15-400 27, 59, 81, 59Vo, 68, 86</p>	 <p>Decoupling box compliant with NOI_RES_13^E (GTE2666) and C15-400 27, 59, 81, 59Vo, 68, 86</p>	 <p>Decoupling box compliant with NOI_RES_13^E (GTE2666) and C15-400 27, 59, 81, 59Vo, 68, 86</p>
TRIM/POW			
 <p>Inrush current limiter for power transformers POW, SSC</p>			





RELAYS FOR SYNCHRONOUS MACHINES

The Analog range

A Range relays designed to protect synchronous machines mainly concern their excitation circuit. Others detect stator ground faults at 95% by measuring residual current, or at 100% by measuring a minimum voltage of H3.

Main functions and features

- Protection against stator ground faults (95% and 100%)
- Protection against rotor ground faults
- Protection against rotating diode faults
- Protection against under- and over-excitation
- Wide dynamic range auxiliary source
- Test button
- Electronic plug-in module
- Hook operation
- Mask operation on request



The Smartline and Protecta ranges

The **PROTECTA** and **SMARTLINE** ranges offer generator protection adapted to each application.



Generator protection is a complex task, as many special conditions have to be taken into account during operation. Our protection relays cover all the functionalities of generator, block generator and auxiliary protection.

With their basic and optional features, **PROTECTA** range devices are applicable to small, medium (50-100 MVA) and large (>100 MVA) generators.

Basic functions include standard protection against overcurrent, voltage variation and frequency variation, as well as protection against voltage-controlled overcurrent, loss of excitation and reverse power.

Protection against rotor-ground faults, 100% stator-ground faults and internal machine faults is available as an option.

The **S24/G** relay in the **SMARTLINE** range replaces obsolete MG30; MG30/I, IM30/G and IM3/GV solutions.













Also in this range, the **S24/Fr** relay provides effective protection for small generation sources that do not require a differential function (mainly photovoltaic applications).



Main functions and features

- Earth leakage protection;
- Protection against motor running;
- Protection against unintentional/accidental switching on (false coupling);
- Thermal protection against overcurrent and current imbalance;
- Protection against loss of excitation
- Voltage-dependent overcurrent protection (equivalent to mini-impedance);
- 100% protection against stator ground faults (based on voltage rank 3 harmonic);
- Protection against rotor earth faults (isolated or not);
- Protection against faults between windings (voltage-based for single-winding generators, current-based for double-winding generators).

Table for selecting protection devices for synchronous machines

UBO/100	UBO/A	UBO/CR	BI2C
 Zero sequence voltmeter relay for 100% stator ground detection 64S, 86, 68	 Homopolar current relay for 95% stator ground detection 64S, 51BF, 68, 86	 Rotor ground relay 64R, 86	 Min/max excitation relay 76, 86
RHS	RBW	S24/G	DTRV/G
 Rotating diode fault relay 58, 86	 Single-phase directional power relay 32P/32Q, 68, 86	 Generator protection 50/51/67, 50N/51N/67N, 51V, 27, 59, 59N, 47, 68, 46, 49, 79, 60, 50BF, 78, 81, df/dt (81R), 40	 Complete relay for generator protection: 50/51, 50N/51N, 87G, 78, 46, 49, 59, 27, 59N, 47, 81, 81R, 24, 40, 60, 50BF
DTRV/GS	DTRV/TG	DTRV/TGS	CTT8
 Complete relay for generator protection: 50/51, 50N/51N, 87G, 78, 46, 49, 59, 27, 59N, 47, 81, 81R, 24, 40, 25, 60, 50BF, 25	 Relays for block generator protection: 50/51, 50N/51N, 87T, 78, 46, 49, 59, 27, 59N, 47, 81, 81R, 24, 40, 60, 50BF	 Relays for block generator protection: 50/51, 50N/51N, 87T/G, 78, 46, 49, 59, 27, 59N, 47, 81, 81R, 24, 40, 60, 50BF, 25	 Temperature relay 8 PT100 probes 26



RELAYS FOR PROTECTION, CONTROL AND REGULATION OF TRANSFORMERS AND REACTORS

The Analog range

Analog relays for transformer protection are designed for earth insulation faults only.

Main functions and features

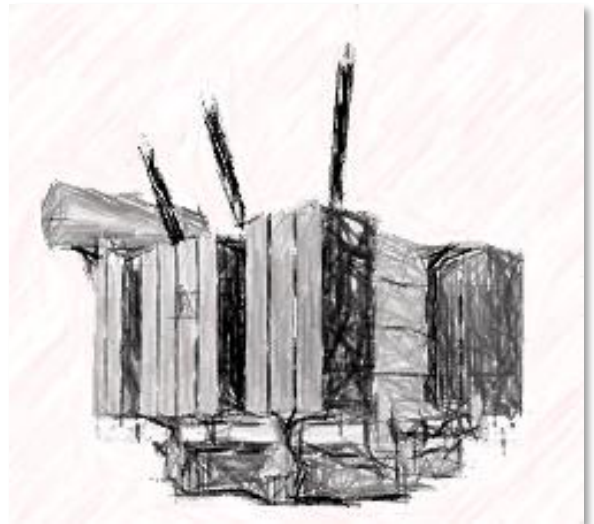
- Residual fault protection (homopolar)
- Protection against earth-tank faults

The ULTRA M range

These multifunctional digital relays are designed exclusively for the differential protection of two- or three-winding transformers and the detection of earth insulation faults. Their logic inputs enable them to manage information from temperature relays, DGPT2 and Buchholz.

Main functions and features

- Multifunctional three-phase-earth, differential protection.
- Possibility of adding logic I/O boards.
- Boolean functions
- Watchdog available
- Front RS232 and rear RS485 ports
- Basic communication protocol: Modbus RTU
- Plug-in electronic module
- Six digital output relays, operating on loss or on emission



The Smartline and Protecta ranges

The **S24/T** relay in the **SMARTLINE** range is a differential protection device for power transformers. It replaces the MD32/T relay. **PROTECTA's DTRV/T3** relays for three-winding transformers replace the MD33/T relay. Finally, the MTR33 voltage regulators are replaced by the **DTRV/TR**.

These specialized devices are designed to be the main protection and control relays for **two and three winding** power transformers, including **autotransformers** and special railway transformers. The relays feature a variety of versatile protection functions in addition to the differential function of the main transformer, such as protection against overcurrents on phases, earth and current imbalances, protection against thermal overloads, protection against restricted earth faults, and so on. They can also be used as back-up protection relays for downstream equipment (e.g. feeders, cables).

The voltage regulator function can be integrated into the protection in a dedicated device.



Main functions and features

Differential protection for three-phase transformers:

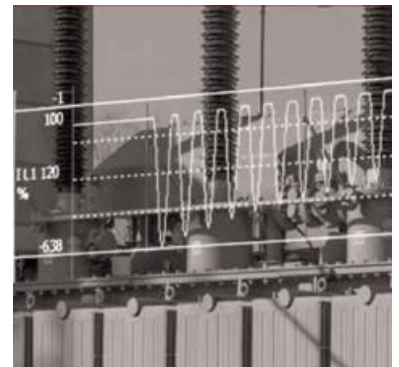
- Automatic compensation of transformer phase shift and transformation ratio;
- Limitation of 2 and 5 harmonics related to transformer inrush current and detection of overexcitation (overvoltage);
- Residual current elimination function if there is an earthed neutral transformer in the protected zone at the transformer's secondary;
- Sensitive and restricted protection against ground faults;

Several voltage-based protection functions are available

- Voltage regulation with automatic tap change controller (integrated in protection relay or voltage regulator): For up to 4 transformers in parallel, depending on transformer type.
- Minimum current or master-slave principles; for up to 4 transformers in parallel, depending on transformer type.
- Binary input coding type: binary, BCD, Gray;
- Optional external units:
 - Tap changer transcoder: 28 inputs / 5 outputs (TRCS);
 - Remote I/O unit (RIO);
 - Optional transducer I/O (RTD/mA);
 - Optional impedance-based protection.

Without our **TRIM/POW** relay, transformer energization is always accompanied by the risk of transient overcurrents. In a transformer, the remanent flux and saturation characteristics of the iron core can further increase transient currents. The resulting overcurrents subject the equipment's insulators and mechanical structures to high stresses, accelerating their ageing. In addition, these transients can induce faults and unintended operation of protective devices in the electrical system.

The most effective way of dealing with these problems is to eliminate the root cause: finding the optimum moment for power-up. The objective of the TRIM/POW relay with its controlled switching function (SSC) is to find this moment and delay the circuit-breaker closing command accordingly. The wave point switching function (POW) is designed, among other things, to manage the energization of transformers and reactors.



Main functions and features

- Limitation of transformer and reactor inrush currents
- Minimizes voltage drop at the point of supply
- Optimizes the service life of power transformers
- Optimizes plant protection selectivity
- Point-of-Wave (POW) switching function can be integrated into transformer protection



Transformer and reactor protection selection table

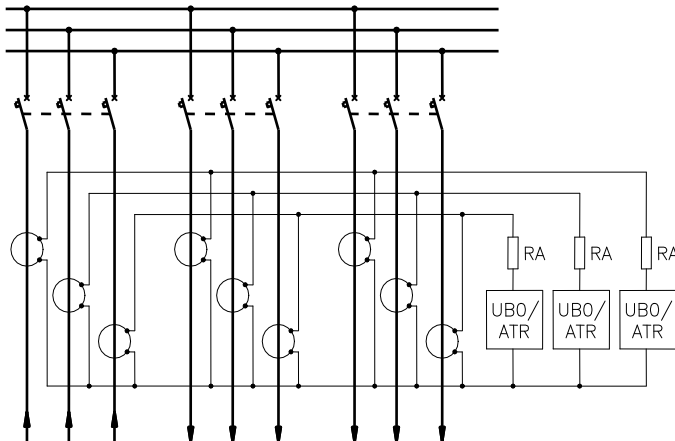
<p>PB1</p>  <p>Earth-tank relay (2 thresholds) 50/51, 68, 86</p>	<p>UBO/51</p>  <p>Earth-tank relay (1 threshold) 50/51, 51BF; 68, 86</p>	<p>DTMR32</p>  <p>Differential relay for two-winding transformers 87T, 87N/87REF/51N, 51BF, 68, 86</p>	<p>DTMR33</p>  <p>Differential relay for three-winding transformers 87T, 87N/87REF/51N, 51BF, 68, 86</p>
<p>S24/T</p>  <p>Transformer protection relay 50/51, 50N/51N, 68, 46, 49, 87T, 50BF</p>	<p>TRIM/POW</p>  <p>Inrush current limiter for power transformers or reactors POW, SSC</p>	<p>DRL</p>  <p>Compensation coil management system (Pertersen coil) 90</p>	<p>DTRV/TZ</p>  <p>Three-phase ground relay for power transformer protection 51, 51N/67N, 21, 46, 87N, 59, 27, 59N, 24, 60</p>
<p>DTRV/T2</p>  <p>Differential relay for protection of two-winding transformers 50/51, 50N/51N, 46, 49, 87T, 87N, 60, 50BF</p>	<p>DTRV/T2V</p>  <p>Complete relay for 2-winding transformer protection: 50/51, 50N/51N, 46, 49, 87T, 87N, 59, 27, 59N, 47, 81, 81R, 24, 60, 50BF</p>	<p>DTRV/T2R</p>  <p>Complete relay and voltage regulator for 2-winding transformer protection: 50/51, 50N/51N, 46, 49, 87T, 87N, 59, 27, 59N, 47, 81, 81R, 24, 60, 50BF, 90</p>	<p>DTRV/T3</p>  <p>Differential relay for protection of 2-winding transformers 50/51, 50N/51N, 46, 49, 87T, 87N, 60, 50BF</p>
<p>DTRV/T3V</p>  <p>Complete relay for protection of 3-winding transformers 50/51, 50N/51N, 46, 49, 87T, 87N, 59, 27, 59N, 47, 81, 81R, 24, 60, 50BF</p>	<p>DTRV/T3R</p>  <p>Complete relay and voltage regulator for 3-winding transformer protection: 50/51, 50N/51N, 46, 49, 87T, 87N, 59, 27, 59N, 47, 81, 81R, 24, 60, 50BF, 90</p>	<p>DTRV/TR</p>  <p>Voltage regulator for protection of two-winding transformers 46, 59, 27, 60, 90, AVR</p>	<p>CTT4</p>  <p>Temperature relay 4 PT100 probes 26</p>



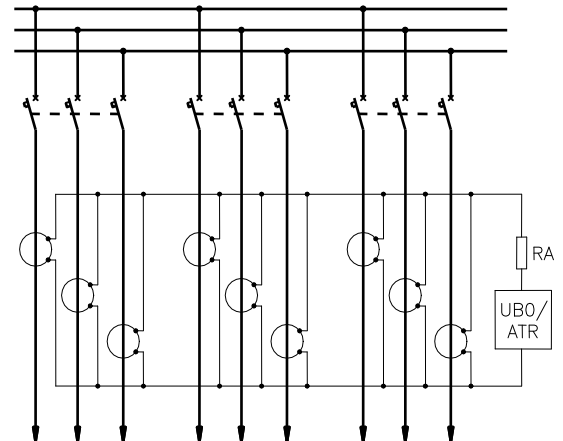
DIFFERENTIAL PROTECTION FOR BUSBARS

The Analog and Smartline range

The number of relays used, the busbar configuration and the auxiliary equipment required depend on the complexity and requirements of the installation. The **Analog** and **SMARTLINE** ranges offer a simple busbar protection solution with **UBO/ATR** and **S24/HZ** relays.



Three-phase differential protection for busbars



Restricted earth protection for busbars

Main functions and features

- High-impedance busbar differential protection
- Earth fault protection (homopolar)

The Protecta range

The **PROTECTA** range offers two types of busbar differential protection, **OGYD** and **DGYD**, whose main difference is their structure. They replace the M-LIB3 busbar differential protection.

Decentralized version (OGYD):

The **OGYD** protection from the **PROTECTA** range is specially designed to be the main unit of a decentralized busbar protection system. Its low-impedance design protects busbar networks of up to 30 bays.

In this version, other individual string protection devices (distance protection, overcurrent protection, etc., or possibly dedicated substation computers) are used in the busbar protection scheme as bay units.

Their location in the substation depends on the structure of the primary system bays. These devices measure currents and have access to all busbar protection information.

This information is transmitted to the central unit via an optical fiber. Calculations and decisions are made by the central unit, and dedicated tripping commands are sent back to the devices, also via fiber-optic links.

**Centralized version (DGYD):**

The **DGYD** protection from the **PROTECTA** range provides fast, stable centralized protection of HV substation busbars. It is also low-impedance, and is mainly used in transmission substations.

If the number of bays connected to the busbar is no more than 6, the tasks associated with the busbar differential protection function are performed by a single device.

If there are more than 6 bays, the tasks are divided between three independent devices. Each is responsible for the differential protection of one phase (L1, L2 or L3) of the busbar. This version can also be considered as a centralized version.





Main functions and features

- Dynamic busbar replication, depending on disconnector status;
- High stability in the event of external faults, even in the event of CT saturation;
- Short tripping time;
- In the event of an internal fault, only the bays connected to the faulty busbar are disconnected. All others remain in operation.
- Easy to expand as the busbar system evolves
- Easy adaptation to any type of substation topology
- Single busbar
- Busbars with transfer bars
- Ring busbars
- Busbars with 1 ½ circuit breakers
- Coupling busbars
- Sectioned busbars with one or two current transformers
- Busbar transfer
- Individual numerical calculations and decisions for each phase;
- Stabilized differential current characteristics;
- Enhanced safety and stability with special software functions;
- Voltage drop condition;
- Check zone condition to increase protection stability;
- Saturated waveform compensation;
- Integrated "circuit-breaker failure" protection using status information processed by the busbar protection to isolate only the section of the busbar with the faulty circuit-breaker.





Busbar protection selection chart

UBO/ATR	S24/HZ	OGYD	DGYD
 <p>High-impedance bar differential protection 87B</p>	 <p>High-impedance bar differential protection 87N</p>	 <p>Decentralized bar differential protection 87B, 50BF</p>	 <p>Centralized bar differential protection 87B, 50BF</p>





PROTECTION OF LINES AND CABLES

The Smartline and Protecta ranges

The protection relays in the **SMARTLINE** range, **S24/L** and **S24/LD**, are ideal for protecting long distribution lines and MV cables. They are used as back-up protection for the **PROTECTA** range of distance protection devices.

The **S24/LD** relay replaces the MFP/5 residual current protection, which is now obsolete.

Main functions and features

- Minimum impedance protection
- Cable/line differential protection
- High impedance earth fault detection
- Directional sensitive earth function for detection of transient faults



The **DTVAs** in the **PROTECTA** range are designed to protect and monitor links between substations on transmission networks, where the latter are generally operated with a neutral directly to earth. In these networks, single-phase earth faults generate a high fault current, similar to that of polyphase faults; consequently, both types of fault require fast protection functions.

Main functions and features

Distance protection with five independent zones with polygon or MHO characteristics:

- Load impingement characteristics;
- Analogue input processing applied to parallel line zero sequence current;
- Complex earth fault compensation factor applied for correct impedance measurement of single-phase earth faults;
- Power variation detection function to block the distance protection function in the event of stable variations, or generate a trip command in the event of loss of synchronism;
- Numerous transfer trip schemes available (PUTT, POTT, DUTT, directional comparison or blocking, etc.).
- Weak infeed processing logic).

Line differential protection with phase selectivity:

- Adaptive restraint features provide stability against current transformer saturation detection;
- Optional redundant communication for two-ended topology;
- Handling of three-ended topologies;
- Optional capacitive load compensation
- The main application is the protection of overhead transmission lines and underground cables (including series-compensated lines);
- Wide range of communication schemes supported: dedicated fibre channel, pilot wire, communication networks using G703.1 (64 kbit/s);



- Transformer included or not in the protected area;
- Single-phase/three-phase tripping and support for substations with two circuit breakers or such as one-and-a-half circuit breaker schemes or substations with a ring architecture;
- Transmits up to 12 logic signals.

Automatic reset for up to four cycles:

- Individually adjustable dead times for each reclosing sequence, separately for single-phase and multi-phase faults.

Applications

- Use on overhead lines or cables (including series compensation)
- Single/three-phase tripping and support for double circuit breakers such as ring or one-and-a-half circuit breaker topologies.
- Emergency protection for transformers, lines and generators, motors, busbars, etc;
- Automation and control of switchgear with the option of synchrocheck control / synchrocheck switching;
- Optional decentralised busbar differential protection module.

Measuring and recording

- High-capacity event recording with 1 ms time stamp (over 10,000 events can be stored);
- Integrated disturbance recorder for up to 32 channels of analogue signals and 64 channels of digital signals (sampling rate: 20 or 40 samples/cycle);
- Integrated fault locator;
- Measurement of currents, simple voltages, homopolar and inverse composite voltages, power, energy (import/export), harmonics (current and voltage), symmetrical components (current and voltage), etc.

Control and supervision functions








- Control of switchgear with user-defined interlock;
- Supervision of current transformer;
- Supervision of voltage transformers;
- Circuit breaker status monitoring;
- Integrated tripping circuit (TCS) supervision.





Switching lines and cables on and off is a real problem on transmission lines and cables, and the **TRIM/POW** relay is dedicated to these operations (see also the Digital Command and Control section later in this catalogue).

Selection table for line and cable protection

S24/L	S24/LD	DTIVA/L	DTIVA/Di
 <p>Line protection relay 21, 50/51/67, 50N/51N/67N, 68, 46, 49, 27, 59, 59N, 47, 81, 81R, 25, 79, 50BF</p>	 <p>Line differential relay 87L, 50/51, 50N/51N, 68, 46, 49, 79, 50BF</p>	 <p>HVA line protection 50/51/67, 50N/51N/67N, 21, 27, 59, 59N, 47, 81, df/dt, 68, 46, 49, 79, 60, 50BF, 32</p>	 <p>HVA line differential protection: 50/51/67, 50N/51N/67N, 87L, 27, 59, 59N, 47, 81, df/dt, 68, 46, 49, 79, 60, 50BF, 32</p>
DTVA/L	DTVA/Di	TRIM/POW	
 <p>HVB line protection (distance) 50/51/67, 50N/51N/67N, 21, 78, 27, 59, 59N, 47, 81, df/dt, 25, 68, 46, 49, 79, 60, 50BF, 32</p>	 <p>HVB line differential protection: 50/51/67, 50N/51N/67N, 21, 87L, 78, 27, 59, 59N, 47, 81, df/dt, 25, 68, 46, 49, 79, 60, 50BF, 32</p>	 <p>Synchronised power-up POW/SCC</p>	



MOTOR PROTECTION RELAYS

The Smartline and Protecta ranges

The solutions offered by the **PROTECTA** and **SMARTLINE** ranges are ideal replacements for N-DIN/MA relay **motor** protectors and the MM30 series of N-DIN and M ranges.






These new protections perform a number of special motor protection and supervision functions. This improves their operation whether they are powered by electronic starters or not.



Main functions and features

- Supervision and control of motor starting
- Locked rotor protection
- Protection against loss of load or running dry (pump splashing)
- Protection against voltage variations to prevent instabilities and motor torque losses during start-ups
- Protection against frequency variations
- Monitoring of the thermal state of the motor via its thermal image and/or temperature probes.
- Machine differential protection.
- Protection of synchronous motors

Motor protection selection table

S16/M	S24/F	DTIVA/M	DTIVA/MF
 <p>Motor protection 50/51, 50N/51N, 68, 46, 49, 37, 48, 66, 50BF</p>	 <p>Three-phase bi-directional earth motor protection 50/51, 50N/51N, 68, 46, 49, 37, 48, 66, 50BF</p>	 <p>Complete three-phase earth relay for asynchronous motors 50/51, 50N/51N, 27, 59, 59N, 47, 27D, 68, 46, 49, 48, 37, 66, 60, 50BF</p>	 <p>Complete three-phase earth relay for synchronous motors 50/51, 50N/51N, 87G, 27, 59, 59N, 47, 27D, 81, 68, 46, 49, 48, 37, 66, 60, 50BF</p>
CTT8			
 <p>Temperature relay with 8 PT100 sensors 26</p>			



RELAYS FOR CAPACITORS

The Smartline and Protecta ranges

With the **PROTECTA** and **SMARTLINE** ranges, we offer solutions that replace the IM30/C relay in the M range for protecting **capacitor** banks.

The **DTIVA/C** relay is designed specifically for the protection and control of power capacitor banks. In addition to the standard current-based protections, this relay is equipped with protection functions specifically designed to protect capacitor banks. The device is capable of managing and protecting different battery configurations, such as single or double isolated star connection, delta connection and "H" configuration.

The relay's voltage measurement provides effective protection against voltage surges on phases or in relation to earth.

Another cost-effective solution for protecting capacitor banks is the **S24/F** relay. This relay provides dedicated functions (in the form of options) for protecting and monitoring the capacitor bank, in addition to its basic functions.




These relays can be combined with the TRIM/POW relay to manage the switching on and off of capacitor banks (see also the Digital Control section in this catalogue).

Main functions and features

- Management of various capacitor bank schemes
- Protection against capacitor unbalance (H-bridge, double star or delta connection)
- Definition of the compensation characteristic inherent in capacitor bank unbalance to prevent misuse and increase sensitivity
- Protection scheme applicable without or with fuses internal or external to the battery
- Simple protection principle with the S24 series
- Voltage measurement available as an option for protection and measurement



Capacitor protection selection table

DTIVA/C	TRIM/POW	DTIVA/P
 <p>Relays for capacitor banks 51, 51N, 60</p>	 <p>Current limiter for capacitor banks POW/SCC</p>	 <p>Three-phase power earth relay 51, 51N, 27, 59, 59N, 81, 60, 50BF, 32</p>



SYNCHRO-COUPLER & SOURCE SWITCHING

The Smartline and Protecta ranges

The **SMARLINE S24/U** relay with **synchrocheck** function replaces the SCM21 relays.



Main functions and features

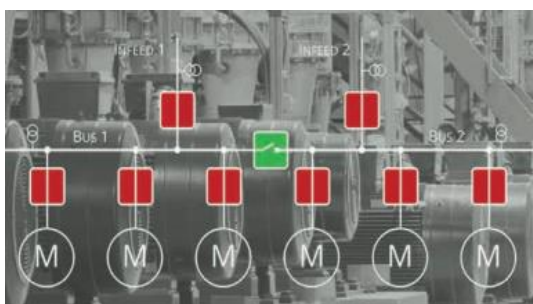
- Enables switching from a normal source to an emergency source
- Ensures transfers according to a Make Before Break or Break Before Make system
- Cost-effective solution for coupling generators to the grid if an external system generates voltage and frequency information for the machine's controllers.
- Real-time monitoring of voltages, frequency and phase shift on either side of the supply circuit breaker
- Source transfer initialised manually or automatically

The **ASZKG** relay in the **PROTECTA** range provides the **automatic synchro-coupler function for generators** with a view to coupling them to the mains or to a dead busbar. It completely replaces the M Range synchro-coupler: SPM21.



Main functions and features

- Synchronisation and coupling of any synchronous machine
- Output information for voltage and speed controllers
- Automatically selectable coupling device (CB or Bars)
- User-configurable on/off conditions



The **HSBT** relay performs the fast source transfer function. Like the SCX systems it replaces. This relay provides source transfers in accordance with ANSI C50-41.

It minimises the switching time between a normal source and its back-up source, while high-power, high-inertia motors are still connected to the busbar. It allows the on-the-fly resumption of asynchronous motor power supply to be taken into account by complying with the standard.

Main functions and features

- Provides reliable, uninterrupted power supply to a set of induction motors
- Suitable for single, double or more complex busbar applications
- Guarantees short and fast transfer times (in correlation with ANSI C50-41)
- Guarantees minimum process downtime
- Real-time monitoring of voltages, frequency and phase shift on either side of the power circuit breaker
- Source transfer initialised manually or automatically



The **METRA** relay is a **busbar power transfer system**. It provides a high level of power supply availability by switching and organising the power supply to the busbar of a high-voltage substation.





This system has been developed to automatically switch over the power supply to high-voltage substations in the event of a failure in one of the network elements. The transfer is initialised by a sequence of events materialised by logic inputs and the position of the substation's switching devices.



Main functions and features

- Automatic transfer in the event of an internal fault or loss of power to primary equipment
- Control and secure switching between power supplies
- Transfer initialised manually

Synchrocheck and synchro-coupler selection table

S24/U	HSBT	ASZKG	METRA
 <p>Synchrocheck 27, 59, 59N, 81, df/dt (81R), 25</p>	 <p>Fast source transfer 25, 27, 27R, 59, 81</p>	 <p>Synchro coupler 25, 27, 27R, 59, 81</p>	 <p>Synchrocheck 25, 27, 27R, 59, 81</p>



RAIL INFRASTRUCTURE





RELAY FOR RAILWAY INFRASTRUCTURE

Traditional and High Speed Train Applications

In addition to applications applicable to distribution networks, the **PROTECTA** range offers a dedicated protection solution for AC-powered catenaries.

The **DRFP** catenary protection relay is designed to monitor single-phase alternating current (16 2/3 Hz; 50 Hz) traction power supply systems.

Main functions and features

- Basic non-directional overcurrent protection;
- Remote protection supplemented by remote protection and fault detection;
- Integrated fault locator;
- Constant-time protection against overvoltage and undervoltage;
- Automatic reclosing



Underground and tramway applications

The **TFPR** relay is a multifunctional digital protection combining measurement, control and protection for DC traction power management.



It is suitable for all traction systems such as trams, trolleybuses, underground trains and power substations for railway infrastructure. It complies with the most stringent international standards. It is equipped with a graphic touch screen and a user-friendly HMI.



Main functions and features

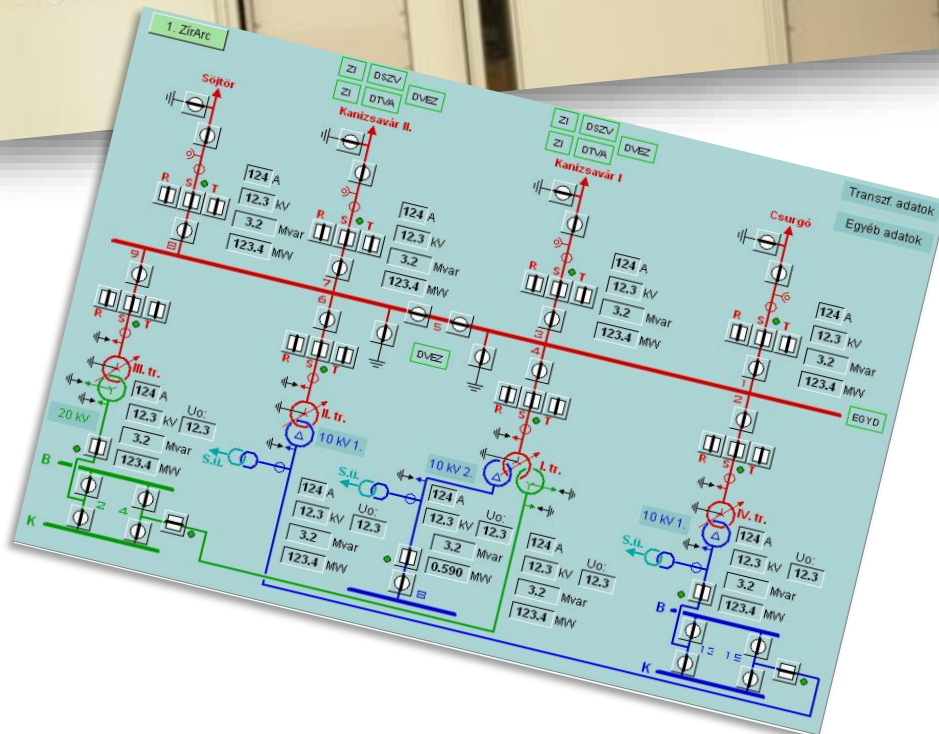
- Measurement transducer linked by fibre optics to the measurement units;
- Detection of distant faults;
- Line test function;
- Numerous opto-isolated logic inputs;
- Ethernet port for HMI or Modbus TCP/IP;
- IEC 61-850 port (optional);

Selection table for rail protection

TFPR	DRFP
 <p>Distant fault detector DDL, d/dt, Di, 45, 76, 49</p>	 <p>HVA catenary protection 21 50/51, 27, 59, 49, 79, 85</p>



CABINETS & SYSTEMS





DIGITAL COMMAND AND CONTROL

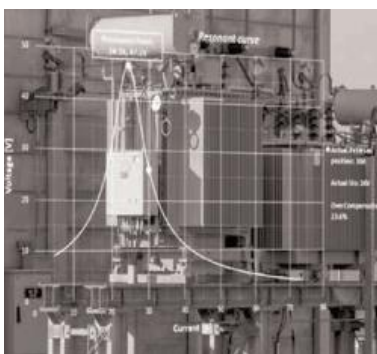
The Protecta range

DVEZ systems are used when substation computers are required to perform automation functions in transmission and distribution substations.

They provide complete control of all types of switchgear, including interlocking functions and other automation required for plant operation.

Main functions and features

- Global measurement solution (U I F P Q, S, energy power factor, etc.)
- Locking of switchgear
- Supports 3-position disconnectors
- Includes "circuit-breaker failure" function
- "Qualimetry" function with monitoring of voltage variations, voltage imbalances, voltage and current harmonics up to the 19th rank (THD and TDD)
- Automatic reclosing function for HVA and HVB networks
- Load shedding operations
- Up to 128 logic inputs and 96 relay outputs
- Analogue inputs (4-20mA or 0-10V) for connection to transducers
- PT100 temperature sensor inputs
- Synchrocheck function (optional)
- Remote signalling and feedback (optional)
- Voltage regulation function (AVR) / Socket change (optional)



The **DRL** system provides complex, automatic control of Petersen coils.

This eliminates arcing associated with compensated neutral systems. It can be used on networks subject to ferroresonance, automatically adjusting to the value of the compensation coil.

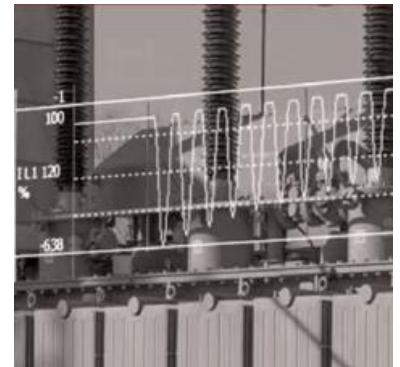
Main functions and features

- Automatic control of arc suppression on neutral-compensated networks
- Use of current injection for measurement
- Measurement of zero sequence voltage to detect the presence of earth insulation faults in the network
- Possibility of controlling several coils in parallel on the same network with communication between DRLs



TRIM/POW provides controlled switching functionality (SSC) to control the switching on and off of lines and cables, capacitor banks, transformers and shunt reactors.

Switching off at a random moment can cause overvoltages and flashovers because the power is cut off or because the distance between the circuit-breaker terminals is too small. The most effective treatment of these problems is to eliminate the root cause: finding the optimum time for closing and opening. The aim of Point-of-Wave (POW) switching is to find this moment and delay the circuit-breaker closing and opening commands accordingly.



Main functions and features

- Uses the principle of point-of-wave switching (POW)
- Works with all types of circuit-breaker (single-pole or three-pole).
- Takes into account the nature of the installation's neutral system in the power-up/down algorithms.

SIRACUS reconfigurator

The **S**ystem for the **A**utomatic **I**solation and **R**esupply of a **N**etwork in the **E**vent of an **A**rterial **B**reak **O**uvert to a **S**atellite Station: **SIRACUS**

SIRACUS is an automatic reconfigurator for an electrical loop operated with a feeder break. **Five** solutions to meet your **budget** and **operating requirements**.

Main functions and features

- **SIRACUS1:** Designed to work with any type of protection relay and fault indicator (even those of our competitors).
- **SIRACUS2:** Designed to be installed on networks equipped with both circuit breakers and switches fitted with our protection relays and fault indicators.
- **SIRACUS2+:** Same as SIRACUS2 with the addition of extended operating and analysis functions
- **SIRACUS3 et 3+:** Spread your budget over time with the 3rd generation decentralised solution.



MYOSOTIS supervision system

The **MYOSOTIS** software enables the supervision and control of a factory electrical network equipped with protection and automation relays supplied by **MICROENER**, which may or may not be combined with equipment from other manufacturers. The whole system communicates using the ModBus RTU, Modbus TCP/IP and IEC 61-850 protocols.

Main functions and features

- Installation of a digital control and command system,
- Renovation or replacement of existing supervision systems,
- Control and supervision of the electrical network from a control centre,
- Monitoring the load profile over time.







Slice cabinets

MICROENER develops and manufactures its own wafer cabinets.





Selection table for control and automation devices

TRIM/POW	DRL	DVEZ	SIRACUS
 <p>Controlled Switching System (SSC/POW) for capacitor banks, shunt reactors and transformers</p>	 <p>Arc suppression controller</p>	 <p>Computer and substation controller for network control and supervision. Protocols: MODBUS RTU, MODBUS TCP/IP, DNP3, IEC 61-850</p>	 <p>HVA Loop Reconfigurator</p>
MYOSOTIS		Cabinets	
 <p>Network supervision and control system under Linux environment. Protocols: MODBUS, IEC61-870, IEC61-850</p>	 <p>Switchgear, Linegear, Transformers, Busbars, Reactance, Alternators, Syncho</p>		



MEASUREMENT AND SIGNALLING AND LOW-VOLTAGE RELAYS











INDICATORS AND MEASUREMENT CENTRES

<p>EMM-μD3VA VOLTMETER / AMMETER MODULAR VERSION - 3 MODULES</p>  <ul style="list-style-type: none"> Voltage and current measures in True RMS Storage of minimum, maximum and average(max demand) values Connection by external CT Measure in medium voltage by programming the voltage transformer (VT) ratio 2 digital outputs 	<p>EMM-μ3VA VOLTMETER / AMMETER FLUSH MOUNT VERSION - DIN 72x72 mm</p>  <ul style="list-style-type: none"> Voltage and current measures in True RMS Storage of minimum, maximum and average(max demand) values Connection by external CT Measure in medium voltage by programming the voltage transformer (VT) ratio 2 digital outputs 	<p>EMM-R3VA VOLTMETER / AMMETER FLUSH MOUNT VERSION - DIN 96x96 mm</p>  <ul style="list-style-type: none"> Voltage and current measures in True RMS Storage of minimum, maximum and average(max demand) values Connection by external CT Measure in medium voltage by programming the voltage transformer (VT) ratio 2 digital outputs 	<p>EMM-4L DIGITAL LCD MULTIMETER FLUSH MOUNT VERSION - DIN 96x96 mm</p>  <ul style="list-style-type: none"> Pulse output Backlight LCD screen Tool-less panel mount TRMS measurements Digital three-phase multimeter Flush-mount, standard 96x96mm housing Built-in RS485 interface (Modbus RTU) Wide selection of electrical measures, including THD voltage and THD current
<p>EMM-4h LED MULTIMETER FLUSH MOUNT VERSION - DIN 96x96 mm</p>  <ul style="list-style-type: none"> 4 LED displays for excellent readability RMS measures (TRMS) 45 measures Active, reactive and apparent energy meters Minimum and maximum values Maximum demand Digital outputs RS485, Ethernet, Profibus DP, LON interface for remote control 	<p>EMM-μ4h LED MULTIMETER FLUSH MOUNT VERSION - DIN 72x72 mm</p>  <ul style="list-style-type: none"> Compact size 3 LED displays for excellent readability RMS measures (TRMS) 45 measures Active, reactive and apparent energy meters Minimum and maximum values Maximum demand RS485 communication interface 	<p>EMM-R4h LED MULTIMETER FLUSH MOUNT VERSION - DIN 96x96 mm</p>  <ul style="list-style-type: none"> Compact size depth 4 LED displays for excellent readability RMS measures (TRMS) 45 measures Active, reactive and apparent energy meters Minimum and maximum values Maximum demand RS485 communication interface 	<p>EMM-4dc LED MULTIMETER FLUSH MOUNT VERSION - DIN 96x96 mm</p>  <ul style="list-style-type: none"> 4 LED displays for excellent readability DC measurement Active energy meter, total and partial Average and maximum values Maximum demand PT100 temperature input Digital outputs RS485, Ethernet, Profibus DP interface for remote control
<p>EMM-D4h LED MULTIMETER MODULAR VERSION - 6 MODULES</p>  <ul style="list-style-type: none"> 4 LED displays for excellent readability RMS measures (TRMS) 45 measures Active, reactive and apparent energy meters Minimum and maximum values Maximum demand Digital output RS485, Ethernet, Profibus DP, LON interface for remote control 	<p>EMM-μD3h LED MULTIMETER MODULAR VERSION - 3 MODULES</p>  <ul style="list-style-type: none"> Compact size 3 LED displays for excellent readability RMS measures (TRMS) 45 measures Active, reactive and apparent energy meters Minimum and maximum values Maximum demand RS485 communication interface 	<p>EMS 96 TFT NETWORK ANALYZER FLUSH MOUNT VERSION - DIN 96x96mm</p>  <ul style="list-style-type: none"> High accuracy Digital power analyzer True RMS measurements TFT color display, 320x240 pixels Reading of more 500 electrical parameters Harmonic analysis of voltage and current up to 21^o order Events storage and management Advanced programmable I/O functions RS485, Ethernet, Profibus DP interface for remote control 	<p>EMA D9 LCD NETWORK ANALYZER MODULAR VERSION - 9 MODULES</p>  <ul style="list-style-type: none"> Digital power analyzer Graphic LCD display, 2x20 characters True RMS measurements Harmonic analysis of voltage and current Events storage and management Advanced programmable I/O functions RS485 communication interface
<p>EMA 11 LCD NETWORK ANALYZER FLUSH MOUNT VERSION DIN 144x144 mm</p>  <ul style="list-style-type: none"> Digital power analyzer Graphic LCD display, 128x128 pixels True RMS measurements Harmonic analysis of voltage and current up to 31^o order Events storage and management Advanced programmable I/O functions RS485, Ethernet, Profibus DP interface for remote control 	<p>EMA 14 LCD NETWORK ANALYZER FLUSH MOUNT VERSION DIN 144x144 mm</p>  <ul style="list-style-type: none"> Digital power analyzer LED display 14 segments True RMS measurements Harmonic analysis of voltage and current up to 31^o order Events storage and management Advanced programmable I/O functions RS485, Ethernet, Profibus DP interface for remote control 	<p>EMA 90 LCD NETWORK ANALYZER FLUSH MOUNT VERSION - DIN 96x96 mm</p>  <ul style="list-style-type: none"> Digital power analyzer Graphic LCD display, 128x128 pixels True RMS measurements Harmonic analysis of voltage and current up to 31^o order Events storage and management Advanced programmable I/O functions RS485, Ethernet, Profibus DP interface for remote control 	



TRANSDUCTEURS – COMPTEURS D'ENERGIE

EML 16	EMC 3b	EMC D3b
<p>CONCENTRATEUR DE DONNEES</p> <p>VERSION MODULAIRE - 6 MODULES</p>  <p>The data concentrator EML-16 provides a function of collected pulses and an interface to supervisory systems. The EML-16 can be applied as a tool for counting of consumption of energy meters, water, gas, heat, etc.. It supports RS485 communication and TCP/IP communication.</p>	<p>THREE PHASE ENERGY METER</p> <p>FLUSH MOUNT VERSION - DIN 96x96 mm</p>  <ul style="list-style-type: none"> • Three phase with or without neutral • Connection by CT /5A or CT /1A • Active energy measurement and accuracy: Class 1 • 2 static outputs • 1 digital input • RS485 communication interface 	<p>THREE PHASE ENERGY METER</p> <p>MODULAR VERSION - 6 MODULES</p>  <ul style="list-style-type: none"> • Three phase with or without neutral • Connection by CT /5A or CT /1A • Active energy measurement and accuracy: Class 1 • 2 static outputs • 1 digital input • RS485 communication interface
DVH DDH MDVH MDDH	WH 6165	EMT-4s
<p>THREE PHASE ENERGY METERS, MID APPROVED</p> <p>MODULAR VERSION - 6 MODULES</p>  <ul style="list-style-type: none"> • MID certified • Three phase with neutral or without • Direct connection or by current transformers • Active energy complies EN 50470 - 3 class C • LCD display • Pulse LED for active energy consumption • Static output for pulse • RS485 communication interface 	<p>SINGLE PHASE ENERGY METER, MID APPROVED</p> <p>MODULAR VERSION - 2 MODULES</p>  <ul style="list-style-type: none"> • Single phase • MID certified • Direct connection • Active energy complies EN 50470• 3 class C • LCD display • Pulse LED for active energy consumption • Static output for pulse 	<p>MEASUREMENT TRANSDUCER</p> <p>MODULAR VERSION - 6 MODULES</p>  <ul style="list-style-type: none"> • Power transducer • Version for panel interior • True RMS measurements • High accuracy • Harmonic analysis of voltage and current • Advanced programmable I/O functions • RS485 communication interface





ALARM SEQUENCES - WARNING GLASSES

COMPALARM A	COMPALARM AP		COMPALARM CM
<p>ALARM ANNUNCIATOR RACK VERSION</p>  <ul style="list-style-type: none"> Alarm card Relay card Timing card Card holder unit Power supply and flashing card Power transformers and Dc/Dc converters Signalling cells, SQ type (with LED on request) 	<p>ALARM ANNUNCIATOR - FLUSH MOUNT VERSION</p>  <ul style="list-style-type: none"> Horn output Alarm cumulative output 1 wire expansion line 12 contact inputs 4 push button inputs (test, horn off, ack, reset) Optoisolated inputs Normally open / closed input contacts Low power consumption No lamp maintenance required Auto-reset power supply fuse 4 pre-selectable sequences: ISA A, ISA M, ISA F1A, ISA F1 		<p>MECHANICAL ALARM ANNUNCIATOR FLUSH MOUNT VERSION - DIN 96x96 mm</p>  <ul style="list-style-type: none"> Up to 6 channels input Mechanical signals 3 keys (ACK, RESET, TEST) 2 output relays
COMPALARM E	COMPALARM C2C	COMPALARM D2	COMPALARM D2m
<p>PROGRAMMABLE ALARM ANNUNCIATOR FLUSH MOUNT VERSION - DIN 96x96 mm</p>  <ul style="list-style-type: none"> Event log Repeat common relays Programmable outputs Make any system size unit Graphic lcd color display Each channel programmable from the front Alarm detection time 20 ms RS485 communication port (modbus-rtu) Ethernet communication (modbus-tcp) 	<p>ALARM ANNUNCIATOR FLUSH MOUNT VERSION - DIN 96x96 mm</p>  <ul style="list-style-type: none"> First-out function 2 output relays Remote keys 12 LED for alarms display 3 keys (ACK, RESET, TEST) Configuring NO or NC alarm inputs ISA alarm sequences: F1M, F3A, F1A, M, R8, M5, A Internal audible device RS485 interface (Modbus RTU) Ethernet interface (MODBUS TCP) 	<p>DISPLAY ALARM ANNUNCIATOR FLUSH MOUNT VERSION - DIN 96x96 mm</p>  <ul style="list-style-type: none"> 16 input channels 2 outputs Each input channel fully programmable User-friendly configuration software Real Time Clock Internal audible device RS485 interface (Modbus RTU) Ethernet interface (MODBUS TCP) 	<p>DISPLAY ALARM ANNUNCIATOR MODULAR VERSION - 6 MODULES</p>  <ul style="list-style-type: none"> 16 input channels Up to 8 outputs Each input channel fully programmable User-friendly configuration software Output relays Real Time Clock Internal audible device RS485 interface (Modbus RTU) Ethernet interface (MODBUS TCP)
COMPALARM GW	COMPALARM C0/sq	COMPALARM C2/sq	COMPALARM C3
<p>GSM-GPRS MODEM - 4 MODULES</p>  <ul style="list-style-type: none"> Up to 12 digital inputs 2 digital outputs SIM card slot Backup battery GSM connection to send and receive text messages Programmable SMS texts SMS command to activate a relay output List of 50 users enabled to send and receive messages <p>Network status details</p>	<p>LUMINOUS INDICATOR FOR FRONT PANEL INSTALLATION FLUSH MOUNT VERSION DIN 48x48 mm</p>  <ul style="list-style-type: none"> Number of LEDs: 3 or 4 Voltage inputs 24 VAC/DC - 48 VAC/DC - 115 VAC - 115 VDC - 230 VAC LED color: Red, Yellow, Green, Blue, White, Orange 	<p>LUMINOUS INDICATOR FOR FRONT PANEL INSTALLATION FLUSH MOUNT VERSION DIN 96x96 mm</p>  <ul style="list-style-type: none"> Number of LEDs: 12 Voltage inputs 24 VAC/DC - 48 VAC/DC - 115 VAC - 115 VDC - 230 VAC LED color: Red, Yellow, Green, Blue, White, Orange TEST lamps Remote test lamps key 	<p>LUMINOUS INDICATOR FOR FRONT PANEL INSTALLATION FLUSH MOUNT VERSION DIN 72x144 mm</p>  <ul style="list-style-type: none"> Number of LEDs: 12 Voltage inputs 24 VAC/DC - 48 VAC/DC - 115 VAC - 115 VDC - 230 VAC LED color: Red, Yellow, Green, Blue, White, Orange Remote test lamps key





EARTH FAULT RELAY (DIFFERENTIAL)

<p>ELR-7</p> <p>FLUSH MOUNT VERSION - DIN 48x48 mm</p>  <ul style="list-style-type: none"> • Earth leakage relay type A • 1 operation threshold • External toroidal transformer • Adjustable tripping IΔn and delay time. • Configurable fail safe operation • Front TEST and RESET buttons • Automatic or manual resetting 	<p>ELR-4 ELR-4m</p> <p>FLUSH MOUNT VERSION - DIN 48x96 mm</p>  <ul style="list-style-type: none"> • Earth leakage relay type A • 1 operation thresholds • External toroidal transformer • Adjustable tripping IΔn and delay time • Front TEST and RESET buttons • Automatic or manual resetting • Flag indicator (ELR-4m type) 	<p>ELR-91 ELR-92</p> <p>FLUSH MOUNT VERSION - DIN 72x72 mm</p>  <ul style="list-style-type: none"> • Earth leakage relay type A • 1 operation thresholds • 2 operation thresholds (ELR-92 type) • External toroidal transformer • Configurable fail safe operation (ELR-92 type) • Adjustable tripping IΔn and delay time. • Prealarm LED indicator (ELR-92 type) 	<p>ELR-1E</p> <p>FLUSH MOUNT VERSION - DIN 96x96 mm</p>  <ul style="list-style-type: none"> • Earth leakage relay type A • 1 operation threshold • External toroidal transformer • Adjustable tripping IΔn and delay time. • Front TEST and RESET buttons • Automatic or manual resetting
<p>ELR-2 ELR-2M</p> <p>FLUSH MOUNT VERSION - DIN 96x96 mm</p>  <ul style="list-style-type: none"> • Earth leakage relay type A • 2 operation thresholds • External toroidal transformer • Configurable fail safe operation • Adjustable tripping IΔn and delay time • Front TEST and RESET buttons • Automatic or manual resetting • Flag indicator (ELR-2M type) 	<p>ELR-8V ELR-8tcs ELR-8mVtcs</p> <p>FLUSH MOUNT VERSION - DIN 96x96 mm</p>  <ul style="list-style-type: none"> • Earth leakage relay type A • 2 operation thresholds • External toroidal transformer • Configurable fail safe operation • Fault current measurement • Digital display • Flag indicator • Adjustable tripping IΔn and delay time. • Shunt tripping circuit operating test (TCS) 	<p>ELR-1D</p> <p>MODULAR VERSION – 1 MODULE</p>  <ul style="list-style-type: none"> • Earth leakage relay type A • 1 operation threshold • External toroidal transformer • Adjustable tripping IΔn and delay time. • Front TEST and RESET buttons • Automatic or manual resetting 	<p>ELR-3B</p> <p>EARTH LEAKAGE RELAY TYPE B MODULAR VERSION – 3 MODULES</p>  <ul style="list-style-type: none"> • Measures in AC, DC or mixed current, type B (IEC 60755) • External toroidal transformer • Parameter programming • Trip current (red display when tripped) • Instantaneous leakage current • 2 independent programmable outputs (alarm and prealarm)
<p>ELR-D2</p> <p>MODULAR VERSION 2 MODULES</p>  <ul style="list-style-type: none"> • Earth leakage relay type A • True RMS • 1 operation threshold • External toroidal transformer • Adjustable tripping IΔn and delay time. • Front TEST and RESET buttons • Automatic or manual resetting • LCD display • RS485 serial interface (Modbus RTU) 	<p>ELR-3C</p> <p>MODULAR VERSION – 3 MODULES</p>  <ul style="list-style-type: none"> • Earth leakage relay type A • 1 operation threshold • External toroidal transformer • Adjustable tripping IΔn and delay time. • Front TEST and RESET buttons • Automatic or manual resetting 	<p>ELR-3F</p> <p>MODULAR VERSION – 3 MODULES</p>  <ul style="list-style-type: none"> • Earth leakage relay type A • 1 operation threshold • External toroidal transformer • Selectable tripping set-point (IΔn): fixed 0.3A or 0.5A • Selectable tripping time: fixed 0.02s or 0.5s • Front TEST and RESET buttons • Automatic or manual resetting 	<p>ELR-3E</p> <p>MODULAR VERSION – 3 MODULES</p>  <ul style="list-style-type: none"> • Earth leakage relay type A • 1 operation threshold • External toroidal transformer • Adjustable tripping IΔn and delay time. • Front TEST and RESET buttons • Manual resetting
<p>ELR-61 ELR-m61 ELR-62 ELR-m62</p> <p>MODULAR VERSION – 6 MODULES</p>  <ul style="list-style-type: none"> • Earth leakage relay type A • 2 operation threshold • External toroidal transformer • Adjustable tripping IΔn and delay time. • Front TEST and RESET buttons • Configurable automatic or manual resetting • Prealarm LED indicator (ELR-62 type) • Flag indicator (ELR-62 type) 	<p>ELRC-B</p> <p>MODULAR VERSION – 6 MODULES</p>  <ul style="list-style-type: none"> • Earth leakage relay type A • 1 operation threshold • Incorporated toroidal transformer • Configurable fail safe operation • Adjustable tripping IΔn and delay time • Front TEST and RESET buttons • Automatic or manual resetting 	<p>ELRC-BL ELRD-L ELRD-L2m</p> <p>PUBLIC LIGHTING MODULAR VERSION – 6 MODULES</p>  <ul style="list-style-type: none"> • Earth leakage relay type A • 2 operation threshold • External toroidal transformer • Adjustable tripping IΔn and delay time. • Front TEST and RESET buttons • Configurable automatic or manual resetting • Prealarm LED indicator (ELR-62 type) • Flag indicator (ELR-62 type) 	<p>ELRC-1</p> <p>COMPACT INTERNAL PANEL VERSION</p>  <ul style="list-style-type: none"> • Earth leakage relay type A • 1 operation threshold • Incorporated toroidal transformer • Adjustable tripping IΔn and delay time • Front test and reset buttons • 35mm to 110 mm diameter









EARTH FAULT RELAY (CPI)

<p>RI-F48 RI-R48 RI-R48N IT NETWORKS INSULATION CONTROL 24-48 VAC/DC MODULAR VERSION - 3 MODULES</p>  <ul style="list-style-type: none"> • Insulation monitoring of IT systems 24-48 VAC/DC • TRIP manual reset • Low insulation LED • Damaged pole LED • TEST pushbutton • TRIP threshold setting 	<p>RI-R11 RI-R11D IT NETWORKS INSULATION CONTROL UP TO 230 VDC MODULAR VERSION - 6 MODULES</p>  <ul style="list-style-type: none"> • Insulation monitoring of IT systems up to 230 VDC • TRIP and ALARM LED • Insulation level • Damaged pole LED • TRIP and ALARM threshold setting • TEST and RESET pushbutton 	<p>RI-R15 IT NETWORKS INSULATION CONTROL UP TO 1000 VDC MODULAR VERSION - 6 MODULES</p>  <ul style="list-style-type: none"> • Insulation monitoring of IT systems up to 1000 VDC • Wide tripping threshold adjustment • Fail safe relay for timely monitoring, even in case of supply failure • TEST and RESET can be remotely operated by a pushbutton • Visual indication of the network status and indication of the faulty polarity
<p>RI-F22 RI-R22 RI-R38 IT NETWORKS INSULATION CONTROL UP TO 440 VAC MODULAR VERSION - 3 MODULES</p>  <ul style="list-style-type: none"> • Insulation monitoring up to 440 VAC • RESET pushbutton (only for RI-R22 and RI-R38) • Indication of functioning instrument • Low insulation LED • TEST pushbutton • TRIP threshold setting (only for RI-R22 and RI-R38) 	<p>RI-R44-485 RI-R44-V-485 IT NETWORKS INSULATION CONTROL UP TO 440 VAC MODULAR VERSION - 2 MODULES</p>  <ul style="list-style-type: none"> • LCD display • TRIP manual reset • Low insulation LED • Insulation monitoring of IT systems up to 440 VAC • TEST pushbutton • TRIP threshold setting • Output relay • RS485 serial interface (Modbus RTU) 	<p>RI-R60 IT NETWORKS INSULATION CONTROL UP TO 1000 VAC MODULAR VERSION - 6 MODULES</p>  <ul style="list-style-type: none"> • Insulation monitoring up to 1000 VAC • Double monitoring threshold for more effective fault prevention • Fail safe double relay for effective system control and timely monitoring, even in case of supply failure • Instant display of insulation level • Test and Reset can be remotely operated by a pushbutton • Visual indication of the network status
<p>RI-SM RI-SM-485 VOLTAGELESS NETWORK INSULATION CONTROL MODULAR VERSION 2-3 MODULES</p>  <ul style="list-style-type: none"> • Indication of functioning instrument • TEST pushbutton • Low insulation LED • FAIL SAFE setting • TRIP threshold setting • Output relay • RS485 serial interface (Modbus RTU) 	<p>HRI-R40 MEDICAL INSULATION MONITORING DEVICE MODULAR VERSION - 6 MODULES</p>  <ul style="list-style-type: none"> • Quality: the recognized standard in hospital insulation control • Specialization: properly designed for hospitals • Completeness: all electrical and thermal parameters controlled by a single device • Flexibility: adjustable intervention thresholds according to all the parameters monitored • Strength: high resistance to network interferences • Integration: able to interact with supervising systems through ModbusRTU protocol via RS485 serial port • Flexibility: alarms sent up to 4 medical locations attended by medical and healthy staff, thanks to remote signalling panels • Reliability: safe monitoring under any operational condition, thanks to the codified signal 	<p>PR-5 REMOTE SIGNALLING PANEL FLUSH MOUNT VERSION</p>  <ul style="list-style-type: none"> • Compact size • Installation in a universal 3 modules flush-mounted box type E503 • Reliability: prompt fault recognition • Simultaneous disconnection of more signalling panels • Both visual and acoustic signaling
<p>HRI-R24 MEDICAL INSULATION MONITORING DEVICE FOR SCIALTIC LAMPS MODULAR VERSION 3 MODULES</p>  <ul style="list-style-type: none"> • Tests the insulation to earth of 24 VAC/DC circuits dedicated to scialtic lamps supply • Flexibility: programmable alarm threshold • Compact size: fits into just 3 module • Practicality: extremely easy to install and use • Integration: ideal complement for HRI-R 	<p>RMS-24 MULTIROOM MONITORING SYSTEM FLUSH MOUNT VERSION - DIN 96x96 mm</p>  <ul style="list-style-type: none"> • Graphic TFT color display • Keep under control electrical parameters of different medical locations • Output relays • Alarm page: summarizes in a screen the real time alarm signalling • Log function • Configure the device language • RS485 serial interface (Modbus RTU) • Ethernet interface (MODBUS TCP) 	

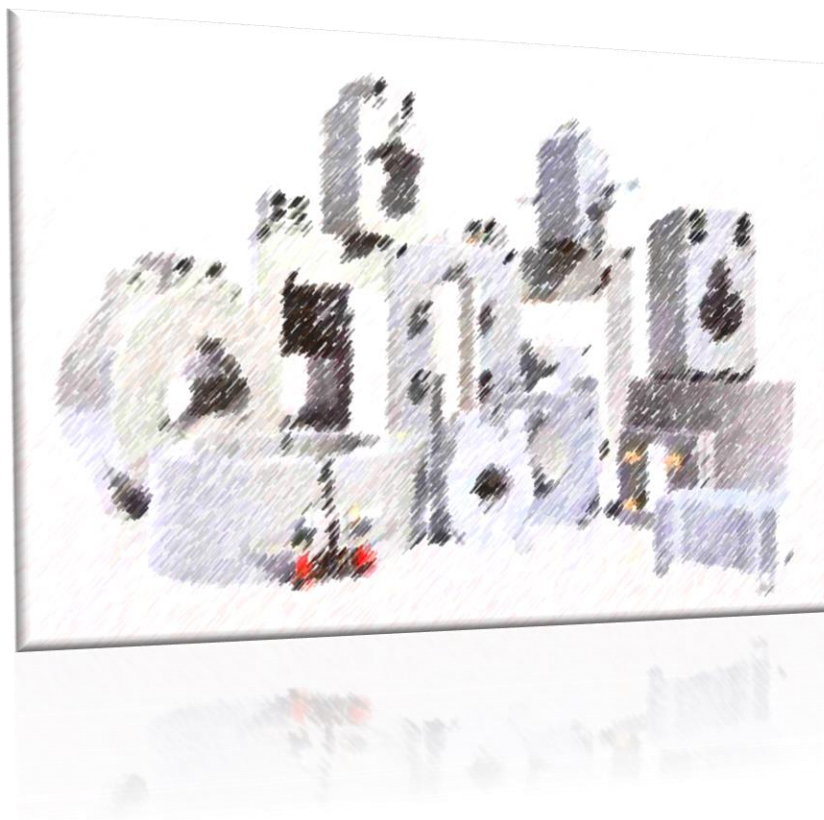


RELAIS DE SUPERVISION ET DE CONTROLE

<p style="text-align: center;">TCS A5 RELAY FOR PERMANENT CONTROL OF THE SAFETY CIRCUIT MODULAR VERSION - 6 MODULES</p>  <ul style="list-style-type: none"> Buttons and normally closed contacts used with low voltage power supply for greater safety and to avoid functional problems with long lines Active control with signaling interruption or short circuit of line buttons Ability to use many buttons (of which 5 with total control) or more buttons which control TCS-A5 Outputs for control switch, output signaling alarm and emergency exit Control of the output line towards the opening coil with continuity check 	<p style="text-align: center;">TCS R6 MULTI-RELEASING DEVICE TO CONTROL OF CONTINUITY AND EFFICIENCY UP TO 5 CIRCUITS, WITH THE POSSIBILITY TO COMMAND SUBSEQUENT DEVICES MODULAR VERSION - 6 MODULES</p>  <ul style="list-style-type: none"> Unaffected by power failures without the use of batteries Selection number buttons or contacts Opening function selection buttons or alarm in case of line failure and / or coil line Isolated Power and stabilized insensitive to microbreaks Checking the presence of auxiliary voltage
<p style="text-align: center;">TCS 1 2 RELAY FOR PERMANENT CONTROL OF THE MCCB'S TRIPPING CIRCUIT MODULAR VERSION - 3 MODULES</p>  <ul style="list-style-type: none"> TCS control protection trips. This protection is used to monitor the trip shunt circuit operation when connected through the current shunt coil Voltage control circuit: 13÷30VAC/DC or 24÷60VAC/DC (TCS 1) 50÷260VAC/DC or 250÷440VAC/DC (TCS 2) 2 changeover outputs 	<p style="text-align: center;">TCS 3 4 RELAY FOR PERMANENT CONTROL OF THE MCCB'S TRIPPING CIRCUIT FLUSH MOUNT VERSION - DIN 96x96 mm</p>  <ul style="list-style-type: none"> TCS control protection trips. This protection is used to monitor the trip shunt circuit operation when connected through the current shunt coil Voltage control circuit: 13÷30VAC/DC or 24÷60VAC/DC (TCS 3) 50÷260VAC/DC or 250÷440VAC/DC (TCS 4) 2 changeover outputs
<p style="text-align: center;">RSR-72 AUTO RESTART MOTORS RELAY FLUSH MOUNT VERSION - DIN 72x72 mm</p>  <ul style="list-style-type: none"> Supply circuit and voltage control Circuit of contactor control and of memory activation with separation by photo-coupler Circuit of motor stop control by pa pushbutton (stop) and quick memory shutdown separated by photo-coupler. Circuit for final relay closing and control circuit are managed by microprocessor 	<p style="text-align: center;">ELM-4 AMMETER FOR CURRENTS LINE OR DIFFERENTIAL CURRENTS FLUSH MOUNT VERSION - DIN 96x96 mm</p>  <ul style="list-style-type: none"> 4 LED displays for excellent readability RMS measures (TRMS) Up to 4 current inputs Measuring differential or residual currents Digital outputs RS485 communication interfac











GEARBOXES & ACCESSORIES





CURRENT AND VOLTAGE TRANSFORMERS

<p>TCB Series MEASURING, PROTECTION AND DOUBLE RATIO TRANSFORMERS</p> 	<p>TCM Series MEASURING AND PROTECTION TRANSFORMERS</p> 
<p>TC Series CURRENT TRANSFORMERS WITH ANALOG OUTPUT</p> 	<p>TCC TCCN Series MEASURING AND PROTECTION TRANSFORMERS</p> 
<p>TCB-A Series SPLIT CORE CURRENT TRANSFORMERS</p> 	<p>TO-CT1 TOROIDAL CURRENT TRANSFORMERS</p> 
<p>ROGOWSKI Coils</p> 	<p>TVB Series VOLTAGE TRANSFORMERS</p> 



ACCESSORIES & PROGRAMMING SOFTWARE

The MC, ULTRA M and G Base ranges

The **MSCom2** software is used to configure protection relays in the M, ultra M, MC and G_Base ranges. It runs under Windows environment.

Main functions and features

- Define or edit settings offline
- View, compare and save protection settings
- View factory pre-configured logic



The Protecta and Smartline S24 ranges



The **EUROCAP** software is a configuration and control tool for PROTECTA and S24 range protection relays. It is used, under Windows environment, in addition to the web server integrated in the protection relays..

Main functions and features

- Definition and configuration of relay hardware
 - View existing hardware
 - Modifying the hardware of certain modules
 - Definition of analogue and digital inputs and outputs
-
- Integration of a logic editor
 - Creation and management of logic pages
 - View factory pre-configured logic
 - Define or edit offline setting parameters
 - View, compare and save protection settings
 - Import protection settings into the graphical editor
 - Import/export settings in Excel format
 - Generate and save parameters in Rio format for laboratory testing of remote protection
 - Communication configuration
 - Generates protection operating files automatically, containing defined connections, on-line measurements, recordings, disturbances, light signal assignment, combinatorial logic pages and communication parameters collected by the protection, as well as control and monitoring parameters
 - Definition of the animated synoptic on the protection's touch screen



The Smartline S16 range



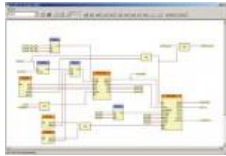

The **S16 Tool** software is designed for setting the parameters of the protection relays in the Smartline S16 range. It is used in a Windows environment.

This software provides a remote interface for relays in the S16 range via a USB connection. When the relay is connected, it is automatically recognised and parameters can be accessed directly via a dedicated interface. This software must first be downloaded onto the operator's PC before it can be used.

Main functions and features

- Define or edit settings offline
- View, compare and save protection settings
- View factory pre-configured logic

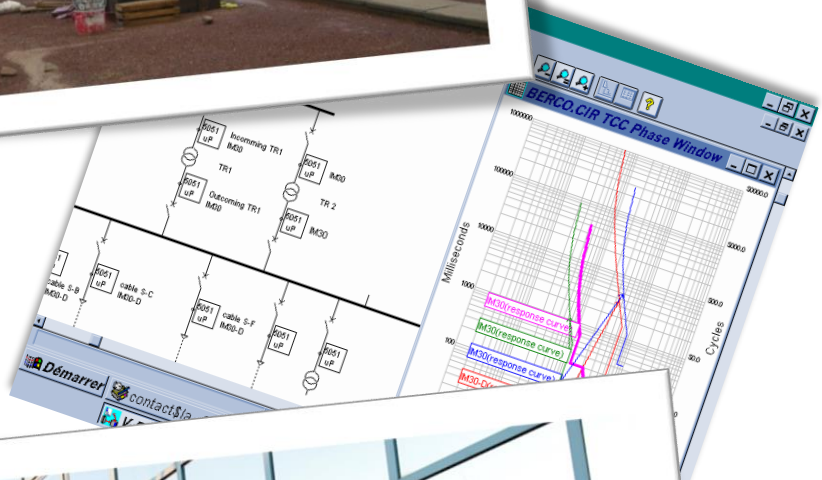
Selection table for configuration software

EMI-1P USB	MSCOM2	EUROCAP	S16 Tool
 <ul style="list-style-type: none"> • USB/RS485 serial converter, galvanically isolated at 25 kV • USB FTDI chip • Uses Windows-certified driver with automatic download • Secure connection to Modbus devices via RS485 serial port 	 <p>Programming and configuration software for relays in the NDIN, M, MC and ULTRA-M ranges</p>	 <p>Programming and configuration software for relays in the PROTECTA and S24 ranges</p>	 <p>Programming and configuration software for S16 range relays</p>





SERVICES, TRAINING AND INFORMATION





ENGINEERING & COMMISSIONING

Selectivity study	Definition of the protection plan	Validation or definition of measurement gearboxes (TC/TP)	Dynamic stability
Cable sizing	Load flow	Impact of engines	On-site services
			 Commissioning, appraisal, protection relay test campaign

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