

2020

# EXPRESS CATALOG



**MICROENER**



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*Notes and information:*

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The express catalog presents all our solutions to protect and manage your LV and MV and HV electrical network.

Indeed you will find in this catalog a short description and the commercial reference of our protective relays and SCADA systems and services.

You will find more information about the solution witch interest you on our website:

[www.microener.com](http://www.microener.com)

Or directly contact our commercial service.

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*Electrical protection in complete serenity*

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**MICROENER**

MICROENER proposes and builds systems and protective gear for electrical performance at high and medium voltage.

The know-how acquired over many years in the field by our staff puts us among one of the actors of the first rank in our profession. Our Commercial and Technical teams are at your disposal to answer all your inquiries from the definition of a simple protection relay to SCADA as a whole.



**MICROENER** is a manufacturer and integrator operating in the electrical energy a railway infrastructure fields. MICROENER offers these markets both « catalog products » and « personalized global solutions ». Since 1997, the date of its incorporation, the know-how acquired in these activities by technical teams and partners places MICROENER as one of the players in the vanguard of these markets.

MICROENER's strength lies partly in its reactivity and in the adaptability of its standard solutions, but also in the fact that it listens to and understands its clients' needs. As a result of this characteristic, MICROENER has both a client approach and product approach, thanks to its extremely wide and varied catalog.

Its commercial network therefore offers original and economically interesting solutions within both these fields of activity.

Real-time monitoring of its clients and products allows the technical teams to design and develop or adapt solutions that respond to client or mark requirements at all times. The permanent dialogue that MICROENER holds with its clients creates a climate of trust and thus ensures a calm, friendly and lasting relationship.

During the various design or project completion phases, the involvement of the cabling or manufacturing work-shops as early as possible eases the move into production. This plays a large role in the quality and reliability of the solutions proposed by MICROENER and also eases the factory acceptance phase.

Lastly, the presence of a customer service department, an applications department and a training department highlights MICROENER's professionalism. These departments allow it to assist or guide client or future clients in choosing the most suitable solution for their requirements, providing assistance with commissioning, improving the company's feedback and explaining the originality of the solutions offered.

MICROENER is located in Marne la Vallée east of Paris.

**MICROENER** designs, develops and offers its solutions in the following sectors :

### Energy production

- Protection for all types power station
- Inverters
- Synchro-couplers
- Protection cabinets and medium-voltage panels
- Measurement and signage

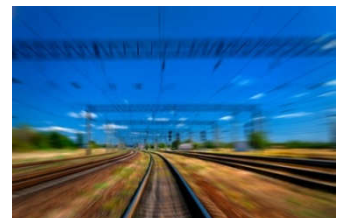


### Transmission / Energy Distribution / Industry

- High/medium/low-voltage electrical protection
- Automatic Controls – digital controlling - monitoring
- Source transfer system
- Voltage regulator for transformers
- Control panel units-medium-voltage cells and panels rectifiers
- Rectifiers
- Measurement and signage
- Earthing resistors

### Railway

- Protection and automatic control for catenaries or overhead contact lines
- Medium-voltage or DC cells and panels
- Rectifiers
- Isolator, switches and contactors
- Measurement and signage



### Tertiary

- Medium-voltage loop protection and reconfiguration systems
- Permanent insulation monitoring devices for hospitals
- Measurement and signage

### Service

- Engineering, expert appraisals, control, maintenance, training
- Complementary products (Data loggers, perturbographs, cores, etc...)





## Index

<b>POWER PLANTS SUBSTATIONS &amp; INDUSTRIES .....</b>	<b>6</b>
Current relays .....	7
Earth fault relays .....	9
Earth fault relays (Différential) .....	10
Earth fault relays (Insulation monitoring devices) .....	11
Voltage and frequency relays .....	12
Decoupling protections .....	13
Generator protections .....	14
Transformer reactances protections .....	15
Voltage regulator and temperature relays for transformers .....	16
Bus bar protections .....	17
Lines and cables protections .....	18
Motor protections .....	19
Capacitor bank protections .....	20
Power relays .....	20
Synchrocheck relays .....	21
Control and supervision relays .....	22
<b>RAILWAY INFRASTRUCTURE .....</b>	<b>23</b>
Relays for railway application .....	24
Switches – Disconnectors – Contactors .....	24
<b>MEASURE &amp; SIGNALIZATION .....</b>	<b>25</b>
Measurement units – Network analyzers .....	26
Transducers – Energy meters .....	27
Annunciators & alarm systems .....	28
<b>CABINETS &amp; SCADA .....</b>	<b>29</b>
<b>MEASUREMENT TRANSFORMERS &amp; ACCESSORIES .....</b>	<b>31</b>
Current and voltage transformers .....	32
Accessories & Configuration softwares .....	33
<b>SERVICES, TRAINING &amp; INFORMATIONS .....</b>	<b>34</b>
Engineering & Set up on site .....	35
Training – Applications .....	35
Abandoned relays .....	36



# POWER PLANTS SUBSTATIONS & INDUSTRIES





### CURRENT RELAYS

<p><b>BI20</b></p>  <p>Two phase + earth fault overcurrent relay 50/51, 50N/51N, 68, 86</p>	<p><b>BF3</b></p>  <p>Three phase breaker failure relay 50BF</p>	<p><b>BF20</b></p>  <p>Two phase and earth fault breaker failure relay 50/51, 68, 86</p>	<p><b>PB1</b></p>  <p>Dual level current relay 50/51, 68, 86</p>
<p><b>PB2</b></p>  <p>Dual level current relay 50/51, 68, 86</p>	<p><b>PB3</b></p>  <p>Dual level current relay 50/51, 68, 86</p>	<p><b>N-DIN/F</b></p>  <p>Feeder Protection Relay 50/51, 50N/51N, 49C, 51BF, 68, 86</p>	<p><b>N-DIN/R</b></p>  <p>Three phase overcurrent selfpowered relay 50/51, 50N/51N, 49C, 51BF, 68, 86</p>
<p><b>MC20</b></p>  <p>Overcurrent and Earth Fault Relay 50/51, 50N/51N, 51BF, 68</p>	<p><b>MC20/R</b></p>  <p>Overcurrent and Earth Fault + Autoreclosing – Relay 50/51, 50N/51N, 51BF, 68, 79</p>	<p><b>MC30</b></p>  <p>Three Phase Overcurrent and Earth Fault Relay 50/51, 50N/51N, 51BF, 68</p>	<p><b>IM30/AP</b></p>  <p>Three-phase overcurrent and earth fault relay 50/51, 50N/51N, 51BF, 68, 86</p>
<p><b>IM30/AB</b></p>  <p>Three-phase overcurrent earth fault relay – dual setting 50/51, 50N/51N, 51BF, 68, 86</p>	<p><b>IM30/SA</b></p>  <p>Three-phase overcurrent, earth fault and sensitive earth fault relay 50/51, 46, 50Ns/51Ns, 51BF, 68, 86</p>	<p><b>IM30/SR</b></p>  <p>Three-phase overcurrent, sensitive earth fault and autoreclose relay 50/51, 50Ns/51Ns, 79, 51BF, 68, 86</p>	<p><b>IM30/DR</b></p>  <p>Three-phase overcurrent with directional earth fault + autoreclose relay 50/51, 50N/51N/67N, 46, 79, 51BF, 68, 86</p>
<p><b>IM30/D</b></p>  <p>Three-phase overcurrent + directional earth fault relay 50/51, 50N/51N/67N, 51BF, 68, 86</p>	<p><b>DM33</b></p>  <p>Three-phase directional &amp; non directional overcurrent and directional earth fault relay 50/51, 50N/51N, 67, 67N, 51BF, 59Uo, 59, 27, 68, 86</p>	<p><b>UMRAV</b></p>  <p>Feeder Manager Relay 67/50/51, 67N/50N/51N, 51BF, 27, 59, 59N, 81, 68, 86</p>	<p><b>UFMR</b></p>  <p>Feeder Manager Relay 67/50/51, 67/50N/51N, 51BF, 27, 59, 59N, 81, 79, 68, 86</p>



### CURRENT RELAYS (CONTINUED)








UMWH	DTIVA/F	DTIVA/FR	DTIVA/D
 <p>Feeder manager relay 50/51, 50N/51N, 51BF, 32N, 68, 86</p>	 <p>Multifunction relay 50/51, 50N/51N, 68, 46, 49, 79, 60, 50BF</p>	 <p>Directional multifunction relay 50/51/67, 50N/51N/67N, 27, 59, 59N, 47, 68, 46, 49, 79, 60, 50BF, 32, 81, df/dt (81R)</p>	 <p>Directional earth fault multifunction relay 50/51, 50N/51N/67N, 27, 59, 59N, 47, 68, 46, 49, 79, 60, 50BF, 32</p>
S16/F	S16/DT	S24/F	S24/FR
 <p>Three phase overcurrent and earth fault 50/51, 50N/51N, 68, 46, 49</p>	 <p>Three phase overcurrent and earth fault 50/51, 50N/51N, 68, 46, 49, 67N, 59N</p>	 <p>Three phase overcurrent and motor protection 50/51, 50N/51N, 68, 46, 49, 37, 48, 66, 79, 50BF</p>	 <p>Directional earth fault multifunction relay 50/51/67, 50N/51N/67N, 51V, 27, 59, 59N, 47, 68, 46, 49, 79, 50BF, 78, 81, df/dt (81R)</p>
GBI/30			
 <p>Three-phase overcurrent and earth fault relay 50/51, 50N/51N, 68, 46, 49, 74, 79, 50BF</p>			







### EARTH FAULT RELAYS

<p><b>UBO/A</b></p>  <p>Earth fault current relay desensitized to the third harmonic 50N/51N, 51BF, 68, 86</p>	<p><b>UBO/ATR</b></p>  <p>High impedance differential relay 87N/87REF/64REF, 51BF, 68, 86</p>	<p><b>RBVA</b></p>  <p>Directional earth fault relay 50N/51N, 51BF, 68, 86</p>	<p><b>UBO</b></p>  <p>Zero sequence voltage relay desensitized to the third harmonic 59, 68, 86</p>
<p><b>MCOA</b></p>  <p>Multifunction zero Sequence over current earth fault / Sensitive Earth Fault Relay 50N/51N, 51BF, 68</p>	<p><b>IM30/B00</b></p>  <p>Earth Fault Relay - Dual Setting 50N/51N, 51BF, 68, 86</p>	<p><b>MBVA</b></p>  <p>Earth fault current relay desensitized to the third harmonic 59N, 51BF, 68, 86</p>	





**EARTH FAULT RELAYS (DIFFERENTIAL)**

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



**EARTH FAULT RELAYS (INSULATION MONITORING DEVICES)**

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







**VOLTAGE AND FREQUENCY RELAYS**

<p><b>UBC</b></p>  <p>DC Under voltage relay 80, 86, 68</p>	<p><b>UBC</b></p>  <p>DC Over voltage relay 45, 86, 68</p>	<p><b>UB1</b></p>  <p>Single phase under voltage relay 27, 86, 68</p>	<p><b>UB1</b></p>  <p>Single phase over voltage relay 59, 86, 68</p>
<p><b>UB3</b></p>  <p>Three phase under voltage relay 27, 86, 68</p>	<p><b>UB1 ou UB3</b></p>  <p>Voltage balance relay 60, 86, 68</p>	<p><b>UBC/2</b></p>  <p>Over + under DC voltage relay 80, 45, 86, 68</p>	<p><b>UB1/2</b></p>  <p>Single phase dual level voltage relay 27, 59, 86, 68</p>
<p><b>UB3/2</b></p>  <p>Three phase dual level voltage relay 27, 59, 86, 68</p>	<p><b>MC1/V</b></p>  <p>Multifunction Single Phase Overvoltage / Under voltage Relay 27, 59, 81, 68</p>	<p><b>MC3/V</b></p>  <p>Multifunction Three Phase Overvoltage / Under voltage Relay 27, 59, 81, 68, 59N, 27d, 47</p>	<p><b>UM30-A</b></p>  <p>Three-phase voltage, frequency, zero sequence voltage relay 27, 59, 81, 59N, 27d/59d, 59s, 68, 86 ATE n° 14E070 /DK - V4.00</p>
<p><b>UM30-SV</b></p>  <p>Three-Phase Voltage, Frequency, Zero Sequence Voltage with Vector Shift Detection: 27, 59, 81, 59/81, 59Vo, 27d/59d, 59s, 68, 86</p>	<p><b>UFD34</b></p>  <p>Three-phase digital 4-stage frequency relay with df/dt, dv/dt 27, 59, 81, df/dt, dv/dt, 68, 86</p>	<p><b>UFD14</b></p>  <p>Digital 4-stage frequency relay with df/dt control 81, df/dt, 68, 86</p>	<p><b>DTIVA/U</b></p>  <p>Multifunction voltage and frequency relay 27, 59, 59N, 81, df/dt,</p>
<p><b>DTIVA/Fr</b></p>  <p>Multifunction relay 50/51/67, 50N/51N/67N, 27, 59, 59N, 47, 81, df/dt, 68, 46, 49, 79, 60, 50BF, 32</p>	<p><b>S16/U</b></p>  <p>Three phase voltage relay 59, 27, 59N, 47, 81o, 81u, df/dt (81R)</p>	<p><b>S24/Fr</b></p>  <p>Multifunction relay 50/51/67, 50N/51N/67N, 51V, 27, 59, 59N, 47, 68, 46, 49, 79, 60, 50BF, 78, 81, df/dt (81R)</p>	<p><b>S24/U</b></p>  <p>Voltage and frequency relay 27, 59, 59N, 81, df/dt (81R), 25</p>



### DECOUPLING PROTECTIONS

UM30/A	GTE Mini Racks	GTE Boxes	GTE Boxes with resetting
			
Three-phase voltage, frequency, zero sequence voltage relay ENEDIS Qualified <b>27, 59, 81, 59Vo, 68, 86</b> <i>ATE n° 14E070 /DK - V4.00</i>	Decoupling box compliant to NOI_RES_13 <sup>E</sup> (GTE2666) et C15-400 <b>27, 59, 81, 59Vo, 68, 86</b>	Decoupling box compliant to NOI_RES_13 <sup>E</sup> (GTE2666) et C15-400 <b>27, 59, 81, 59Vo, 68, 86</b>	Decoupling box compliant to NOI_RES_13 <sup>E</sup> (GTE2666) et C15-400 <b>27, 59, 81, 59Vo, 68, 86</b>















**GENERATOR PROTECTIONS**

<p><b>UBO/100</b></p>  <p>Relay for 100% generator stator earth fault protection 64S, 86, 68</p>	<p><b>UBO/A</b></p>  <p>Earth fault current relay desensitized to the third harmonic 64S, 51BF, 68, 86</p>	<p><b>UBO/CR</b></p>  <p>Rotor earth fault relay 64R, 86</p>	<p><b>BI2C</b></p>  <p>Dual level D.C current relay 76, 86</p>
<p><b>RHS</b></p>  <p>Rotating diode failure detection relay 58, 86</p>	<p><b>RBZ</b></p>  <p>Under impedance relay 21, 86, 68</p>	<p><b>IM30/G</b></p>  <p>Multifunction generator protection relay 46, 50/51, 64S, 32, 40, 51BF, 68, 86</p>	<p><b>IM30/GOS</b></p>  <p>Multifunction Relay for Generator out-of-step Protection 50/51, 78, 51BF, 68, 86</p>
<p><b>MG30</b></p>  <p>Generator protection and management relay : 21, 46, 50V/51V, 49, 27, 59, 81, 60FL, 50/27, 24, 59N/64S, 32, 37, 40, 51BF, 68, 86</p>	<p><b>MG30/I</b></p>  <p>Generator Protection &amp; Management Relay : 21, 46, 50V/51V, 49, 27, 59, 81, 60FL, 50/27, 24, 51N/64S, 32, 37, 40, 51BF, 68, 86</p>	<p><b>MD32-G</b></p>  <p>Percentage biased generator differential relay 87G, 87N/64REF/64S, 50/51, 51BF, 68, 86</p>	<p><b>SPM21</b></p>  <p>Generator synchronizing relay 25, 90, 27, 59, 81</p>
<p><b>DTRV/G</b></p>  <p>Complete protection for generator : 50/51, 50N/51N, 87G, 78, 46, 49, 59, 27, 59N, 47, 81, 81R, 24, 40, 25, 60, 50BF</p>	<p><b>DTRV/TG</b></p>  <p>Protection for generator and transformer : 50/51, 50N/51N, 87T, 78, 46, 49, 59, 27, 59N, 47, 81, 81R, 24, 40, 25, 60, 50BF</p>	<p><b>DTRV/GS</b></p>  <p>Complete protection for generator : 50/51, 50N/51N, 87G, 78, 46, 49, 59, 27, 59N, 47, 81, 81R, 24, 40, 25, 60, 50BF, 25</p>	<p><b>DTRV/TGS</b></p>  <p>Protection for generator and transformer : 50/51, 50N/51N, 87T, 78, 46, 49, 59, 27, 59N, 47, 81, 81R, 24, 40, 25, 60, 50BF, 25, 87G</p>
<p><b>CTT8</b></p>  <p>Programmable thermal control unit up to 8 inputs from PT100 sensors 25</p>			







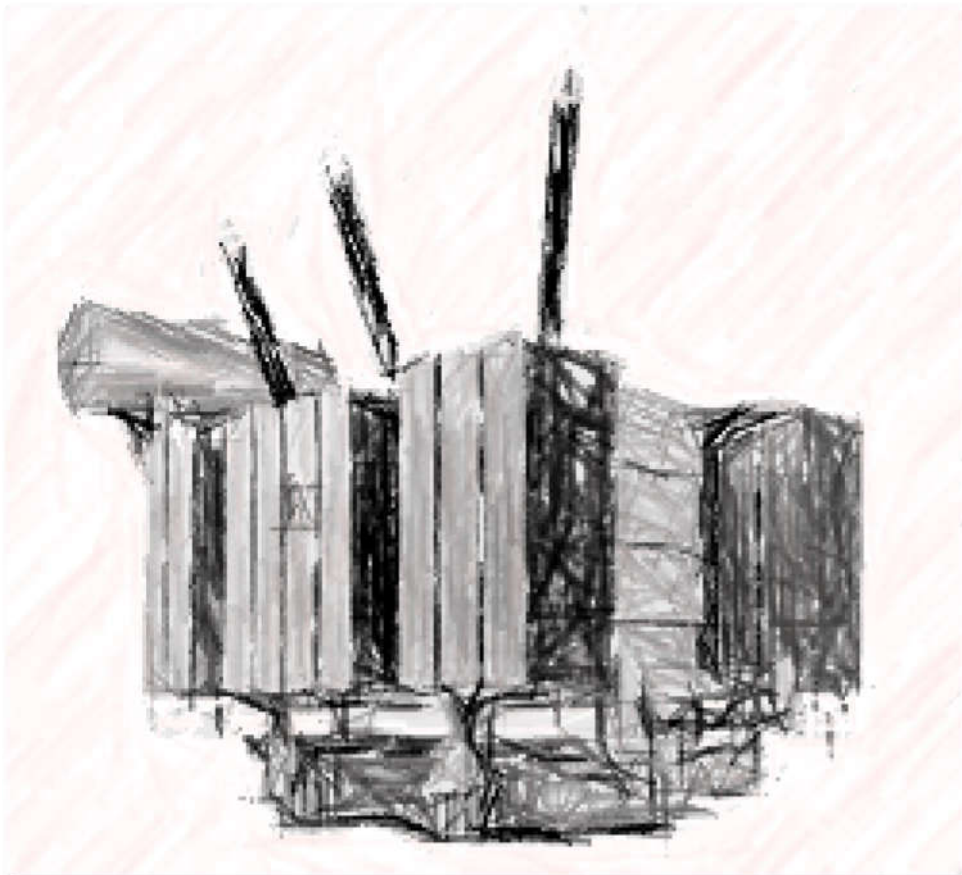
**TRANSFORMER REACTANCES PROTECTIONS**

PB1	UBO/51	NDIN/F	IM30/B00
 <p>Dual level current relay 50/51, 68, 86</p>	 <p>Single phase overcurrent relay 50/51, 51BF; 68, 86</p>	 <p>Two phase and earth fault 50/51, 50N/51N, 49C, 51BF, 68, 86</p>	 <p>Earth Fault Relay - Dual Settings 50/51, 51BF; 68, 86</p>
IM30/T	IM30/TD	MD32-T	MD33-T
 <p>Three-phase thermal + overcurrent + earth fault relay 46, 49, 50/51, 50N/51N, I<sup>2</sup>t, 51BF, 68, 86</p>	 <p>Three-phase thermal + overcurrent + directional earth fault relay 46, 49, 50/51, 67N, I<sup>2</sup>t, 51BF, 68, 86</p>	 <p>Percentage biased transformer differential relay 87T, 87N/87REF/51N, 51BF, 68, 86</p>	 <p>Percentage biased differential relay for 3-winding transformer 87T, 50/51, 51BF, 68, 86</p>
DTMR32	DTMR33	DTRV/T2	DTRV/T2V
 <p>Differential transformer relay for 2 winding transformer 87T, 87N/87REF/51N, 51BF, 68, 86</p>	 <p>Differential Transformer Relay for 3 winding transformer 87T, 87N/87REF/51N, 51BF, 68, 86</p>	 <p>Complete 2 winding transformer current transformer 50/51, 50N/51N, 46, 49, 87T, 87N, 60, 50BF</p>	 <p>Complete 2 winding transformer protection 50/51, 50N/51N, 46, 49, 87T, 87N, 59, 27, 59N, 47, 81, 81R, 24, 60, 50BF</p>
DTRV/T2R	DTRV/T3	DTRV/T3V	DTRV/T3R
 <p>2 winding transformer protection with voltage regulation 50/51, 50N/51N, 46, 49, 87T, 87N, 59, 27, 59N, 47, 81, 81R, 24, 60, 50BF, 90</p>	 <p>Complete 3 winding transformer current transformer 50/51, 50N/51N, 46, 49, 87T, 87N, 60, 50BF</p>	 <p>Relais complet pour la protection des transformateurs à trois enroulements 50/51, 50N/51N, 46, 49, 87T, 87N, 59, 27, 59N, 47, 81, 81R, 24, 60, 50BF</p>	 <p>3 winding transformer protection with voltage regulation 50/51, 50N/51N, 46, 49, 87T, 87N, 59, 27, 59N, 47, 81, 81R, 24, 60, 50BF, 90</p>
DTRV/TZ	TRIM3	DRL	S24/T
 <p>Impedance relay for transformer 51, 51N/67N, 21, 46, 87N, 59, 27, 59N, 24, 60</p>	 <p>Inrush current minimizer relay</p>	 <p>Coil Petersen regulator</p>	 <p>Protection relay for transformer 50/51, 50N/51N, 68, 46, 49, 87T, 50BF</p>



**VOLTAGE REGULATOR AND TEMPERATURE RELAYS FOR TRANSFORMERS**





MTR33	MTR33/P	DTRV/TR	CTT4
 <p>Transformer on-load tap-changer control relay 90, AVR</p>	 <p>Transformer On-Load Tap-Charger Control Relay with current circulation control 90, AVR</p>	 <p>Voltage regulator for transformer 46, 59, 27, 60, 90</p>	 <p>Programmable thermal control unit up to 4 inputs from PT100 sensors 26</p>

















### BUS BAR PROTECTIONS

UBO/ATR	M-LIB3	OGYD	DGYD
			
High impedance differential relay <b>87B</b>	Modular low-impedance bus bar protection <b>87B, 50BF</b>	Decentralized differential bus bar protection <b>87B, 50BF</b>	Centralized differential bus bar protection <b>87B, 50BF</b>





**LINES AND CABLES PROTECTIONS**

<p><b>MFP-5</b></p>  <p>Pilot wire differential relay 50/51, 87C, 68, 50BF</p>	<p><b>M-HIB3</b></p>  <p>Percentage biased differential relay for bus-bar and cable 87C, 50BF</p>	<p><b>DTIVA/L</b></p>  <p>Back up protection for HV lines 50/51/67, 50N/51N/67N, 21, 27, 59, 59N, 47, 81, df/dt, 68, 46, 49, 79, 60, 50BF, 32</p>	<p><b>DTIVA/Di</b></p>  <p>Differential MV line protection 50/51/67, 50N/51N/67N, 87L, 27, 59, 59N, 47, 81, df/dt, 68, 46, 49, 79, 60, 50BF, 32</p>
<p><b>DTVA/L</b></p>  <p>Distance protection 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><b>DTVA/Di</b></p>  <p>Differential HV line 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><b>S24/L</b></p>  <p>Line protection 21, 50/51/67, 50N/51N/67N, 68, 46, 49, 27, 59, 59N, 47, 81, 81R, 25, 79, 50BF</p>	<p><b>S24/LD</b></p>  <p>Differential line protection 87L, 50/51, 50N/51N, 68, 46, 49, 79, 50BF</p>
<p><b>RIA123</b></p>  <p>Programmable sequence up to 3 shots – high resolution electronic timing microprocessor logic 79</p>	<p><b>MAR-513</b></p>  <p>Multi-shot Programmable Single/Three-Phase Autoreclose 79</p>		







**MOTOR PROTECTIONS**

<p style="text-align: center;"><b>DB3</b></p>  <p>Negative sequence voltage sensitive relay 47, 68, 86</p>	<p style="text-align: center;"><b>SB3</b></p>  <p>Negative sequence current protection relay 46, 68, 86</p>	<p style="text-align: center;"><b>NDIN/MA</b></p>  <p>LV motor Protection Relay 37, 46, 47, 48, 49, 50/51, 51LR, 64, 66, 68, 86</p>	<p style="text-align: center;"><b>MM30</b></p>  <p>MV motor protection relay 37, 46, 47, 48, 49, 50/51, 51LR, 64, 66, 68, 86</p>
<p style="text-align: center;"><b>MM30-D</b></p>  <p>MV motor protection with directional earth fault relay 37, 46, 47, 48, 49, 50/51, 51LR, 67N, 66, 68, 86</p>	<p style="text-align: center;"><b>MM30-W</b></p>  <p>MV motor protection relay with voltage &amp; power control 37, 46, 47, 48, 49, 50/51, 51LR, 64, 66, 27/59, 81, 55/78, 14, 68, 86</p>	<p style="text-align: center;"><b>UFMM</b></p>  <p>Complete MV motor protection 50/51, 50N/51N, 27, 59, 59N, 47, 27D, 27S, 68, 46, 49, 48, 37, 66, 50BF</p>	<p style="text-align: center;"><b>DTIVA/M</b></p>  <p>Complete MV motor protection 50/51, 50N/51N, 27, 59, 59N, 47, 27D, 68, 46, 49, 48, 37, 66, 60, 50BF</p>
<p style="text-align: center;"><b>DTIVA/MF</b></p>  <p>Complete synchronous motor protection 50/51, 50N/51N, 87G, 27, 59, 59N, 47, 27D, 81, 68, 46, 49, 48, 37, 66, 60, 50BF</p>	<p style="text-align: center;"><b>S16/M</b></p>  <p>Motor protection 50/51, 50N/51N, 68, 46, 49, 37, 48, 66</p>	<p style="text-align: center;"><b>S16/MDT</b></p>  <p>Motor protection 50/51, 50N/51N, 68, 46, 49, 37, 48, 66, 59N, 67N</p>	<p style="text-align: center;"><b>S24/F</b></p>  <p>Feeder protection 50/51, 50N/51N, 68, 46, 49, 37, 48, 66, 79, 50BF</p>
<p style="text-align: center;"><b>CTT8</b></p>  <p>Programmable thermal control unit up to 8 inputs from PT100 sensors 26</p>	<p style="text-align: center;"><b>GBM30</b></p>  <p>Three-phase earth relay for asynchronous motors 37, 46, 47, 48, 49, 50/51, 51LR, 64, 66, 68, 86</p>		



**CAPACITOR BANK PROTECTIONS**

<b>IM30/C</b>	<b>DTIVA/C</b>
 <p>Capacitor overload and unbalance protection 50/51, 50N/51N, 37, 46N, 51BF, 68, 86</p>	 <p>Capacitor bank protection 51, 51N, 60</p>







**POWER RELAYS**

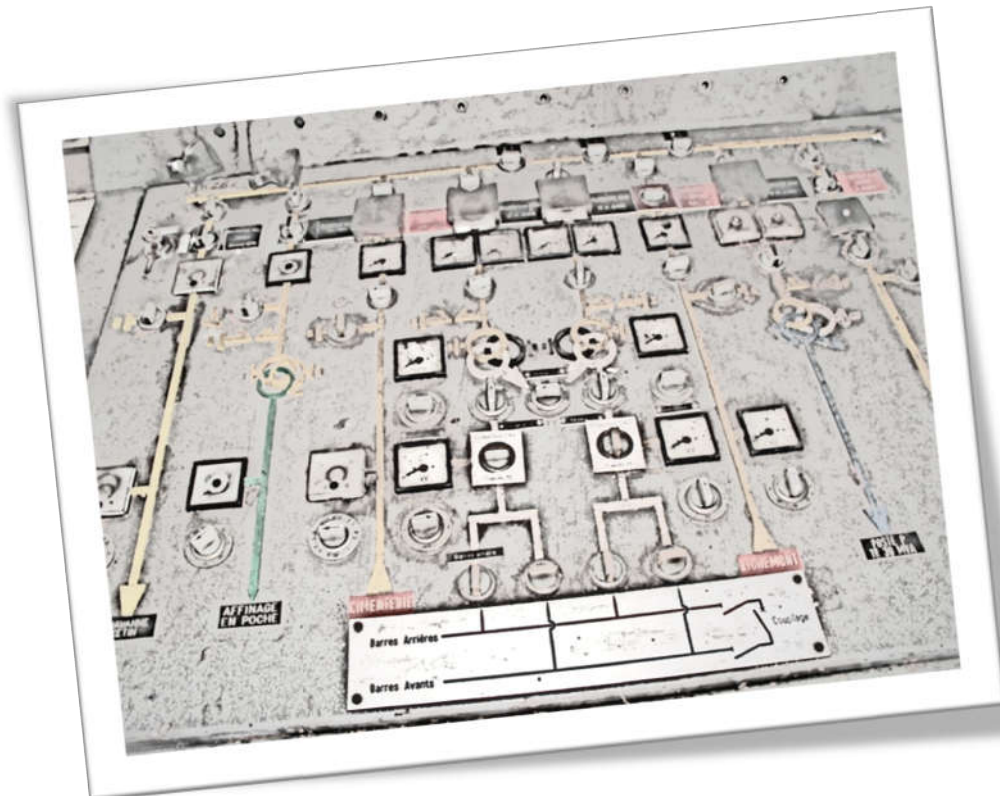
<b>RBW</b>	<b>MW33</b>	<b>DTIVA/P</b>
 <p>Directional overcurrent relay 32P/32Q, 68, 86</p>	 <p>Power management relay 32P, 32Q, 55, 78, 81, 27, 59</p>	 <p>Multifunction power relay 51, 51N, 27, 59, 59N, 81, 60, 50BF, 32</p>















### SYNCHROCHECK RELAYS

SCM11	SCM21	SCX	HSBT
 <p>Synchrocheck (1 input) 25, 27, 59, 81</p>	 <p>Three inputs synchrocheck relay 25, 27, 59, 81</p>	 <p>Fast busbar transfer system 25, 27, 27R, 59, 81</p>	 <p>Fast incoming transfer system 25, 27, 27R, 59, 81</p>
S24/U	SPM21		
 <p>Voltage - frequency relay 27, 59, 59N, 81, df/dt (81R), 25</p>	 <p>Generator synchronizing relay 25, 90, 27, 59, 81</p>		



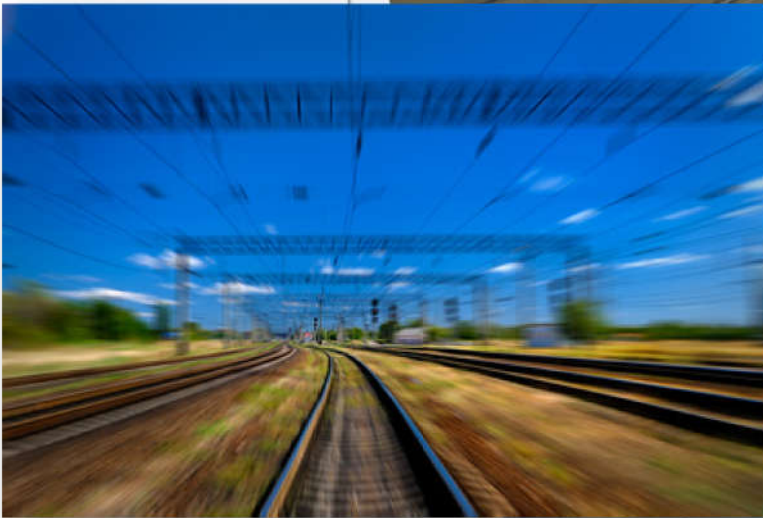


**CONTROL AND SUPERVISION RELAYS**

RCA	RB4	REX-8	MX
 <p>Trip circuit supervision relay 74, TCS</p>	 <p>Lock out relay 86</p>	 <p>Expansion module for M-line relays 74</p>	 <p>Programmable interface and control module (7 or 14 inputs - 5 outputs)</p>
<p><b>TCS A5</b></p> <p><b>RELAY FOR PERMANENT CONTROL OF THE SAFETY CIRCUIT</b> MODULAR VERSION - 6 MODULES</p>  <ul style="list-style-type: none"> <li>Buttons and normally closed contacts used with low voltage power supply for greater safety and to avoid functional problems with long lines</li> <li>Active control with signaling interruption or short circuit of line buttons</li> <li>Ability to use many buttons (of which 5 with total control) or more buttons which control TCS-A5</li> <li>Outputs for control switch, output signaling alarm and emergency exit</li> <li>Control of the output line towards the opening coil with continuity check</li> <li>Unaffected by power failures without the use of batteries</li> <li>Selection number buttons or contacts</li> <li>Opening function selection buttons or alarm in case of line failure and / or coil line</li> <li>Isolated Power and stabilized insensitive to microbreaks</li> <li>Checking the presence of auxiliary voltage</li> </ul>		<p><b>TCS R6</b></p> <p><b>MULTI-RELEASING DEVICE TO CONTROL OF CONTINUITY AND EFFICIENCY UP TO 5 CIRCUITS, WITH THE POSSIBILITY TO COMMAND SUBSEQUENT DEVICES</b> MODULAR VERSION - 6 MODULES</p>  <ul style="list-style-type: none"> <li>Unaffected by power failures without the use of batteries</li> <li>Selection number buttons or contacts</li> <li>Opening function selection buttons or alarm in case of line failure and / or coil line</li> <li>Isolated Power and stabilized insensitive to microbreaks</li> <li>Checking the presence of auxiliary voltage</li> </ul>	
<p><b>TCS 1   2</b></p> <p><b>RELAY FOR PERMANENT CONTROL OF THE MCCB'S TRIPPING CIRCUIT</b> MODULAR VERSION - 3 MODULES</p>  <ul style="list-style-type: none"> <li>TCS control protection trips. This protection is used to monitor the trip shunt circuit operation when connected through the current shunt coil</li> <li>Voltage control circuit: 13÷30VAC/DC or 24÷60VAC/DC (TCS 1) 50÷260VAC/DC or 250÷440VAC/DC (TCS 2)</li> <li>2 changeover outputs</li> </ul>	<p><b>TCS 3   4</b></p> <p><b>RELAY FOR PERMANENT CONTROL OF THE MCCB'S TRIPPING CIRCUIT</b> FLUSH MOUNT VERSION - DIN 96x96 mm</p>  <ul style="list-style-type: none"> <li>TCS control protection trips. This protection is used to monitor the trip shunt circuit operation when connected through the current shunt coil</li> <li>Voltage control circuit: 13÷30VAC/DC or 24÷60VAC/DC (TCS 3) 50÷260VAC/DC or 250÷440VAC/DC (TCS 4)</li> <li>2 changeover outputs</li> </ul>		
<p><b>RSR-72</b></p> <p><b>AUTO RESTART MOTORS RELAY</b> FLUSH MOUNT VERSION - DIN 72x72 mm</p>  <ul style="list-style-type: none"> <li>Supply circuit and voltage control</li> <li>Circuit of contactor control and of memory activation with separation by photo-coupler</li> <li>Circuit of motor stop control by pa pushbutton (stop) and quick memory shutdown separated by photo-coupler.</li> <li>Circuit for final relay closing and control circuit are managed by microprocessor</li> </ul>	<p><b>ELM-4</b></p> <p><b>AMMETER FOR CURRENTS LINE OR DIFFERENTIAL CURRENTS</b> FLUSH MOUNT VERSION - DIN 96x96 mm</p>  <ul style="list-style-type: none"> <li>4 LED displays for excellent readability</li> <li>RMS measures (TRMS)</li> <li>Up to 4 current inputs</li> <li>Measuring differential or residual currents</li> <li>Digital outputs</li> <li>RS485 communication interfac</li> </ul>		



# RAILWAY INFRASTRUCTURE







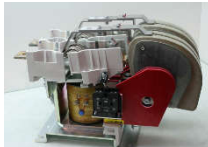




**RELAYS FOR RAILWAY APPLICATION**

RI15	NDIN/MSG	NDIN/TO	MC11
 <p>Isolation relays for DC networks CPI</p>	 <p>Earth fault relay for DC networks CPI</p>	 <p>Earth fault relay for DC switchboard 76, 64</p>	 <p>Multifunction relay for railway applications (AC) di/dt, Di, 51, 21, 59, 27, 49</p>
DRFP	CVT	PV 3000	
 <p>Catenary protection 21 50/51, 27, 59, 49, 79, 85</p>	 <p>DC Voltage relay for indoor using 45, 80</p>	 <p>DC Voltage relay for outdoor using 45, 80</p>	

**SWITCHES – DISCONNECTORS – CONTACTORS**

SFI	LB	DUR cells	Switches cells
 <p>Disconnectors for railway applications</p>	 <p>Switches for railway applications</p>		
Bar type contactors	Compact contactors	Industrial contactors	
 <p>For industrial and power plant applications</p>	 <p>Contactors for low power installations (less than 250kVA)</p>	 <p>AC or DC contactors for industrial applications</p>	
















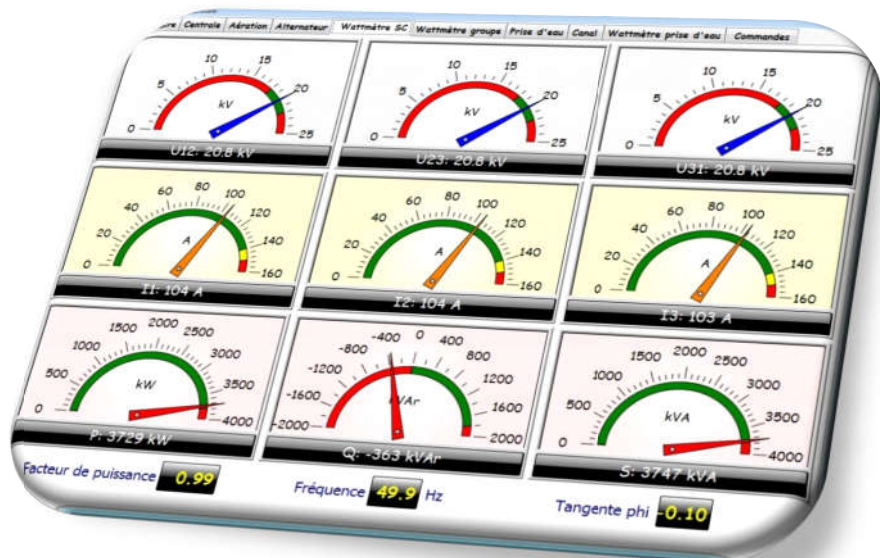
**MEASUREMENT UNITS – NETWORK ANALYZERS**

<p><b>EMM-<math>\mu</math>D3VA</b> <b>VOLTMETER / AMMETER</b> MODULAR VERSION - 3 MODULES</p>  <ul style="list-style-type: none"> <li>Voltage and current measures in True RMS</li> <li>Storage of minimum, maximum and average(max demand) values</li> <li>Connection by external CT</li> <li>Measure in medium voltage by programming the voltage transformer (VT) ratio</li> <li>2 digital outputs</li> </ul>	<p><b>EMM-<math>\mu</math>3VA</b> <b>VOLTMETER / AMMETER</b> FLUSH MOUNT VERSION - DIN 72x72 mm</p>  <ul style="list-style-type: none"> <li>Voltage and current measures in True RMS</li> <li>Storage of minimum, maximum and average(max demand) values</li> <li>Connection by external CT</li> <li>Measure in medium voltage by programming the voltage transformer (VT) ratio</li> <li>2 digital outputs</li> </ul>	<p><b>EMM-R3VA</b> <b>VOLTMETER / AMMETER</b> FLUSH MOUNT VERSION - DIN 96x96 mm</p>  <ul style="list-style-type: none"> <li>Voltage and current measures in True RMS</li> <li>Storage of minimum, maximum and average(max demand) values</li> <li>Connection by external CT</li> <li>Measure in medium voltage by programming the voltage transformer (VT) ratio</li> <li>2 digital outputs</li> </ul>	<p><b>EMM-4L</b> <b>DIGITAL LCD MULTIMETER</b> FLUSH MOUNT VERSION - DIN 96x96 mm</p>  <ul style="list-style-type: none"> <li>Pulse output</li> <li>Backlight LCD screen</li> <li>Tool-less panel mount</li> <li>TRMS measurements</li> <li>Digital three-phase multimeter</li> <li>Flush-mount, standard 96x96mm housing</li> <li>Built-in RS485 interface (Modbus RTU)</li> <li>Wide selection of electrical measures, including THD voltage and THD current</li> </ul>
<p><b>EMM-4h</b> <b>LED MULTIMETER</b> FLUSH MOUNT VERSION - DIN 96x96 mm</p>  <ul style="list-style-type: none"> <li>4 LED displays for excellent readability</li> <li>RMS measures (TRMS)</li> <li>45 measures</li> <li>Active, reactive and apparent energy meters</li> <li>Minimum and maximum values</li> <li>Maximum demand</li> <li>Digital outputs</li> <li>RS485, Ethernet, Profibus DP, LON interface for remote control</li> </ul>	<p><b>EMM-<math>\mu</math>4h</b> <b>LED MULTIMETER</b> FLUSH MOUNT VERSION - DIN 72x72 mm</p>  <ul style="list-style-type: none"> <li>Compact size</li> <li>3 LED displays for excellent readability</li> <li>RMS measures (TRMS)</li> <li>45 measures</li> <li>Active, reactive and apparent energy meters</li> <li>Minimum and maximum values</li> <li>Maximum demand</li> <li>RS485 communication interface</li> </ul>	<p><b>EMM-R4h</b> <b>LED MULTIMETER</b> FLUSH MOUNT VERSION - DIN 96x96 mm</p>  <ul style="list-style-type: none"> <li>Compact size depth</li> <li>4 LED displays for excellent readability</li> <li>RMS measures (TRMS)</li> <li>45 measures</li> <li>Active, reactive and apparent energy meters</li> <li>Minimum and maximum values</li> <li>Maximum demand</li> <li>RS485 communication interface</li> </ul>	<p><b>EMM-4dc</b> <b>LED MULTIMETER</b> FLUSH MOUNT VERSION - DIN 96x96 mm</p>  <ul style="list-style-type: none"> <li>4 LED displays for excellent readability</li> <li>DC measurement</li> <li>Active energy meter, total and partial</li> <li>Average and maximum values</li> <li>Maximum demand</li> <li>PT100 temperature input</li> <li>Digital outputs</li> <li>RS485, Ethernet, Profibus DP interface for remote control</li> </ul>
<p><b>EMM-D4h</b> <b>LED MULTIMETER</b> MODULAR VERSION - 6 MODULES</p>  <ul style="list-style-type: none"> <li>4 LED displays for excellent readability</li> <li>RMS measures (TRMS)</li> <li>45 measures</li> <li>Active, reactive and apparent energy meters</li> <li>Minimum and maximum values</li> <li>Maximum demand</li> <li>Digital output</li> <li>RS485, Ethernet, Profibus DP, LON interface for remote control</li> </ul>	<p><b>EMM-<math>\mu</math>D3h</b> <b>LED MULTIMETER</b> MODULAR VERSION - 3 MODULES</p>  <ul style="list-style-type: none"> <li>Compact size</li> <li>3 LED displays for excellent readability</li> <li>RMS measures (TRMS)</li> <li>45 measures</li> <li>Active, reactive and apparent energy meters</li> <li>Minimum and maximum values</li> <li>Maximum demand</li> <li>RS485 communication interface</li> </ul>	<p><b>EMS 96</b> <b>TFT NETWORK ANALYZER</b> FLUSH MOUNT VERSION - DIN 96x96mm</p>  <ul style="list-style-type: none"> <li>High accuracy</li> <li>Digital power analyzer</li> <li>True RMS measurements</li> <li>TFT color display, 320x240 pixels</li> <li>Reading of more 500 electrical parameters</li> <li>Harmonic analysis of voltage and current up to 21<sup>o</sup> order</li> <li>Events storage and management</li> <li>Advanced programmable I/O functions</li> <li>RS485, Ethernet, Profibus DP interface for remote control</li> </ul>	<p><b>EMA D9</b> <b>LCD NETWORK ANALYZER</b> MODULAR VERSION - 9 MODULES</p>  <ul style="list-style-type: none"> <li>Digital power analyzer</li> <li>Graphic LCD display, 2x20 characters</li> <li>True RMS measurements</li> <li>Harmonic analysis of voltage and current</li> <li>Events storage and management</li> <li>Advanced programmable I/O functions</li> <li>RS485 communication interface</li> </ul>
<p><b>EMA 11</b> <b>LCD NETWORK ANALYZER</b> FLUSH MOUNT VERSION DIN 144x144 mm</p>  <ul style="list-style-type: none"> <li>Digital power analyzer</li> <li>Graphic LCD display, 128x128 pixels</li> <li>True RMS measurements</li> <li>Harmonic analysis of voltage and current up to 31<sup>o</sup> order</li> <li>Events storage and management</li> <li>Advanced programmable I/O functions</li> <li>RS485, Ethernet, Profibus DP interface for remote control</li> </ul>	<p><b>EMA 14</b> <b>LCD NETWORK ANALYZER</b> FLUSH MOUNT VERSION DIN 144x144 mm</p>  <ul style="list-style-type: none"> <li>Digital power analyzer</li> <li>LED display 14 segments</li> <li>True RMS measurements</li> <li>Harmonic analysis of voltage and current up to 31<sup>o</sup> order</li> <li>Events storage and management</li> <li>Advanced programmable I/O functions</li> <li>RS485, Ethernet, Profibus DP interface for remote control</li> </ul>	<p><b>EMA 90</b> <b>LCD NETWORK ANALYZER</b> FLUSH MOUNT VERSION - DIN 96x96 mm</p>  <ul style="list-style-type: none"> <li>Digital power analyzer</li> <li>Graphic LCD display, 128x128 pixels</li> <li>True RMS measurements</li> <li>Harmonic analysis of voltage and current up to 31<sup>o</sup> order</li> <li>Events storage and management</li> <li>Advanced programmable I/O functions</li> <li>RS485, Ethernet, Profibus DP interface for remote control</li> </ul>	<p><b>MU30</b></p>  <p>Multifunction three-phase measuring unit <b>V,I</b></p> <hr/> <p><b>MUCC</b></p>  <p>Multifunction DC multimeter including oscillography – load profile recording – serial communication – 8 adjustable trip levels – event recording : <b>Vcc,Icc</b></p>










### TRANSDUCERS – ENERGY METERS

EMT-1C/50   EMT-1C/300	TTC V-485/50 TTC V-485/300	TTC 1 / 50	EML 16
<p><b>AC/DC - MEASUREMENT TRANSDUCERS</b> ARRANGED FOR MOUNTING INSIDE THE PANEL BOARD</p>  <ul style="list-style-type: none"> <li>• Power transducer</li> <li>• True RMS measurements</li> <li>• Measuring accuracy 0.5%</li> <li>• Total harmonic analysis of voltage and current</li> <li>• Current up to 50A or 400A AC/DC</li> <li>• Voltage up to 800VAC or 1000VDC</li> <li>• RS485 communication interface</li> </ul>	<p><b>AC/DC - CURRENT TRANSDUCERS</b> ARRANGED FORMOUNTING INSIDE THE PANEL BOARD</p>  <ul style="list-style-type: none"> <li>• True RMS measurements</li> <li>• Measuring accuracy 0.5%</li> <li>• Current up to 50A or 300A AC/DC</li> <li>• Analog output 0...10V</li> <li>• RS485 communication interface</li> </ul>	<p><b>AC/DC - CURRENT TRANSDUCERS</b> ARRANGED FORMOUNTING INSIDE THE PANEL BOARD</p>  <ul style="list-style-type: none"> <li>• True RMS measurements</li> <li>• Measuring accuracy 0.5%</li> <li>• Current up to 50A</li> <li>• Analog output 4...20mA</li> </ul>	<p><b>CONCENTRATEUR DE DONNEES</b> 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>
DVH   DDH   MDVH   MDDH	WH 6165	EMC 3b	EMC D3b
<p><b>THREE PHASE ENERGY METERS, MID APPROVED</b> MODULAR VERSION - 6 MODULES</p>  <ul style="list-style-type: none"> <li>• MID certified</li> <li>• Three phase with neutral or without</li> <li>• Direct connection or by current transformers</li> <li>• Active energy complies EN 50470 - 3 class C</li> <li>• LCD display</li> <li>• Pulse LED for active energy consumption</li> <li>• Static output for pulse</li> <li>• RS485 communication interface</li> </ul>	<p><b>SINGLE PHASE ENERGY METER, MID APPROVED</b> MODULAR VERSION - 2 MODULES</p>  <ul style="list-style-type: none"> <li>• Single phase</li> <li>• MID certified</li> <li>• Direct connection</li> <li>• Active energy complies EN 50470 • 3 class C</li> <li>• LCD display</li> <li>• Pulse LED for active energy consumption</li> <li>• Static output for pulse</li> </ul>	<p><b>THREE PHASE ENERGY METER</b> FLUSH MOUNT VERSION - DIN 96x96 mm</p>  <ul style="list-style-type: none"> <li>• Three phase with or without neutral</li> <li>• Connection by CT /5A or CT /1A</li> <li>• Active energy measurement and accuracy: Class 1</li> <li>• 2 static outputs</li> <li>• 1 digital input</li> <li>• RS485 communication interface</li> </ul>	<p><b>THREE PHASE ENERGY METER</b> MODULAR VERSION - 6 MODULES</p>  <ul style="list-style-type: none"> <li>• Three phase with or without neutral</li> <li>• Connection by CT /5A or CT /1A</li> <li>• Active energy measurement and accuracy: Class 1</li> <li>• 2 static outputs</li> <li>• 1 digital input</li> <li>• RS485 communication interface</li> </ul>
EMT-4s			
<p><b>MEASUREMENT TRANSDUCER</b> MODULAR VERSION - 6 MODULES</p>  <ul style="list-style-type: none"> <li>• Power transducer</li> <li>• Version for panel interior</li> <li>• True RMS measurements</li> <li>• High accuracy</li> <li>• Harmonic analysis of voltage and current</li> <li>• Advanced programmable I/O functions</li> <li>• RS485 communication interface</li> </ul>			



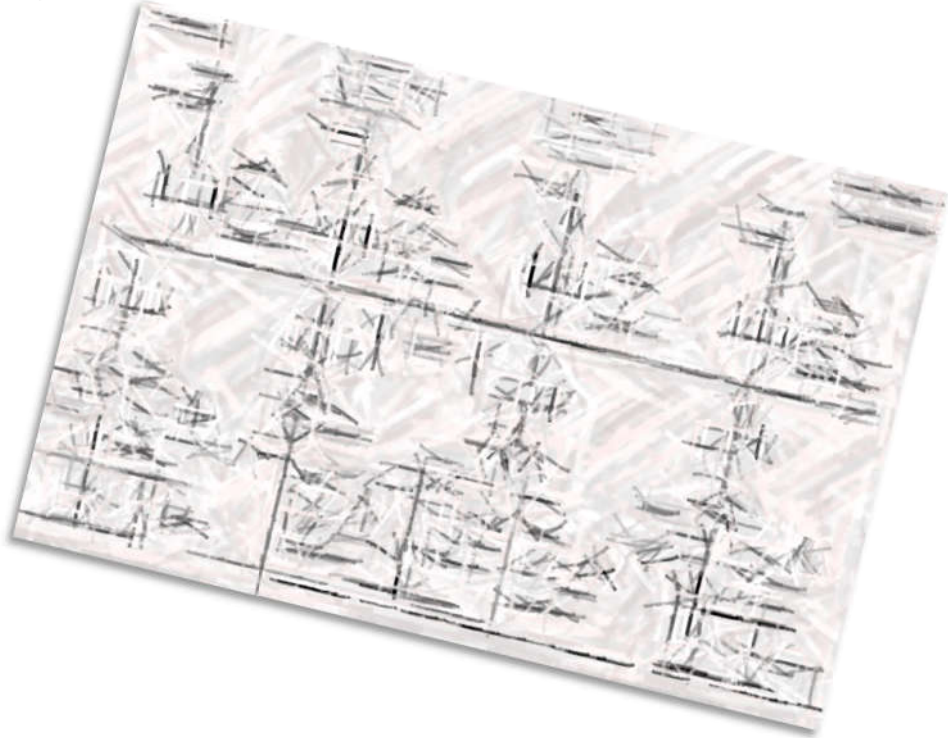


**ANNUNCIATORS & ALARM SYSTEMS**


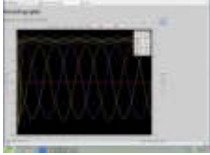



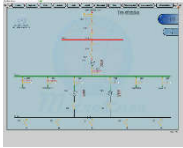
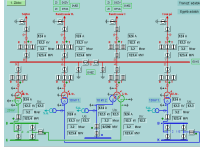



<p><b>COMPALARM A</b> <b>ALARM ANNUNCIATOR</b> RACK VERSION</p>  <ul style="list-style-type: none"> <li>• Alarm card</li> <li>• Relay card</li> <li>• Timing card</li> <li>• Card holder unit</li> <li>• Power supply and flashing card</li> <li>• Power transformers and Dc/Dc converters</li> <li>• Signalling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



**CABINETS & SCADA**

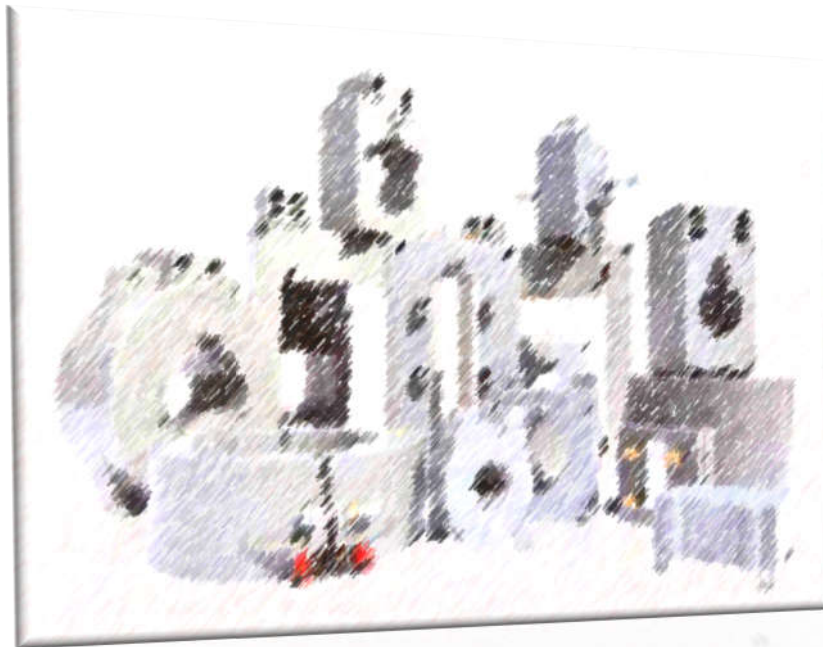




DECADE	SYCEEO	SIRACUS	CMP5 - CP5
 <p data-bbox="209 499 359 521">Events recorder</p>	 <p data-bbox="517 499 734 521">Oscillography recorder</p>	 <p data-bbox="826 499 1107 521">MV loop reconfiguring system</p>	 <p data-bbox="1190 506 1430 577">Bay control unit. Protocol : MODBUS RTU, MODBUS TCP/IP</p>
EUROGATEWAY	MYOSOTIS	EUROSTATION	MX7-5
 <p data-bbox="142 853 427 925">Buy control unit and gateway. Protocol : MODBUS TCP/IP, IEC61-850, IEC61-870</p>	 <p data-bbox="472 857 777 929">Supervision system for industrial substation. Protocol : MODBUS, IEC61-870, IEC61-850</p>	 <p data-bbox="817 857 1118 929">Supervision system for substation. Protocol : MODBUS, IEC61-870, IEC61-850</p>	 <p data-bbox="1176 857 1444 929">Programmable interface and control module (7 inputs-5 outputs)</p>
MX14-5	Cabinets		
 <p data-bbox="150 1211 418 1283">Programmable interface and control module (14 inputs-5 outputs)</p>	 <p data-bbox="612 1285 1321 1308">Slice, Line Cabinets, Transformers, Bus bars, Reactors, Alternators, Syncho</p>		











# MEASUREMENT TRANSFORMERS & ACCESSORIES









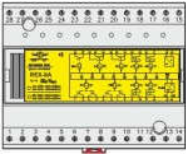


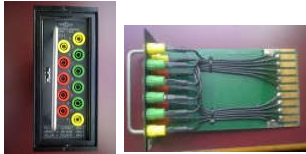


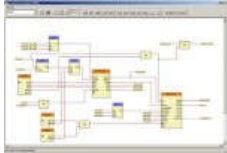

**CURRENT AND VOLTAGE TRANSFORMERS**

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



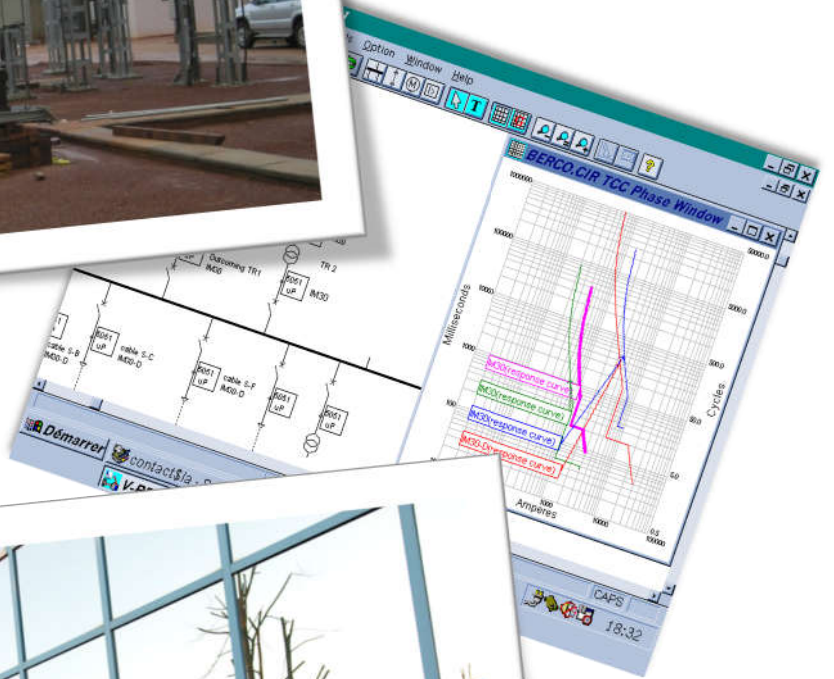


**ACCESSORIES & CONFIGURATION SOFTWARES**

USB-RS485	CFV-BL	CPSC-CFV	EXIO
 <p>Convertor for USB – RS485 line relays NDIN, M, MC and ULTRA-M</p>	 <p>Blocking and intertripping signal transmitter</p>	 <p>Communication Interface Converters (RS485/optical fiber)</p>	 <p>Input/Output Expansion Module for N-DIN relays</p>
REX8	CPB	EXPB	TP11-TT11
 <p>Expansion module for M-line relays</p>	 <p>PROFIBUS Converter Module</p>	 <p>PROFIBUS Converter Module</p>	 <p>Test Panel and Test Sockets</p>
EMI-1P USB	MSCOM2	EUROCAP	S16 Tool
 <ul style="list-style-type: none"> <li>• USB / RS485 serial converter, galvanically isolated at 2.5kV</li> <li>• USB FTDI CHIP</li> <li>• Using Windows certified driver with automatic download</li> <li>• Safe connection to Modbus devices on RS485 serial port.</li> </ul>	 <p>Configuration software for : M, MC, UM, N-DIN relays</p>	 <p>Configuration software for PROTECTA line relays</p>	 <p>Configuration software for S16 line relays</p>

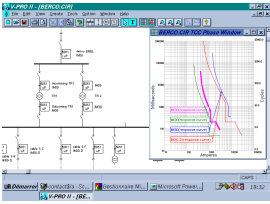
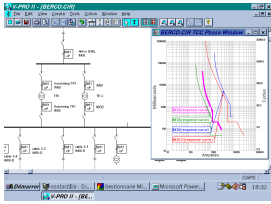
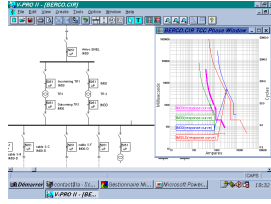
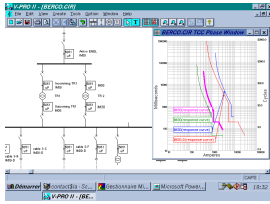
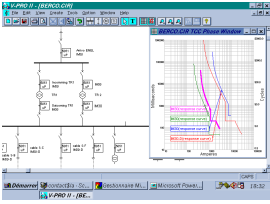
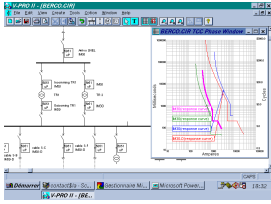
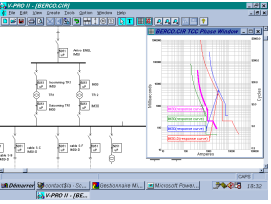



# SERVICES, TRAINING & INFORMATIONS













**ENGINEERING & SET UP ON SITE**



Selectivity study	Definition of the protection plan	Validation or definition of measuring reducers (CT / VT)	Dynamic stability
			
Dimensioning of the cables	Load flow	Impact of motors	On-site interventions
			 <p>Set up on site, Expertise, Protection relays test campaign</p>

**TRAINING – APPLICATIONS**

Introduction to the protection of electricity networks	Protection of power plants	Protection of HV substations connected to the transport network	Protection of industrial networks
 <p>Know how to define and understand the principles of protection relays used in MV or HV electrical networks.</p>	 <p>Know how to define and understand the protection relays necessary for the protection of generators, of the transformers and auxiliaries of the plants.</p>	 <p>Know how to define, use and understand the protection relays needed to protect HV networks and substations.</p>	 <p>Know how to define, use, understand and test protection relays used on MV industrial networks.</p>
Protection of MV tertiary networks	Engineering of MV & HV networks protection	MV loop reconfiguring system	C13-100 and GTE2666 protection relays
 <p>Know how to define and calculate the settings of the electrical protection relays used in tertiary installations (hospitals, military sites, shopping centers, High-rise building, ...).</p>	 <p>Know how to define and understand the principles of protection of HV and MV electrical networks.</p>	 <p>Know how to use and operate our "SIRACUS" loop reconfiguring system.</p>	 <p>Know how to set up and use our relays IM30 / AP, IM30 / AB (impedance neutral), UMWH (neutral compensated) and UM30 / A (decoupling protection).</p>



**ABANDONED RELAYS**

DM30	IM3G/V	GMR	UFM
 <p>Three-phase earth directional relay</p>	 <p>Three-phase earth relay for generator</p>	 <p>Multifunction three-phase earth relay for generator</p>	 <p>Multifunction three-phase feeder protection relay</p>
RDE	RSR	N-DIN/20T	
 <p>Excitation loss relay</p>	 <p>Load distributor</p>	 <p>Analog converter for voltage regulator</p>	



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**MICROENER**

MICROENER proposes and builds systems and protective gear for electrical performance at high and medium voltage.

The know-how acquired over many years in the field by our staff puts us among one of the actors of the first rank in our profession. Our Commercial and Technical teams are at your disposal to answer all your inquiries from the definition of a simple protection relay to SCADA as a whole.

*To directly contact our services, click on « Contact us »*

To find out more about our company and of its Products and Services, we invite you to visit our website:

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