Schneider Electric

Multifunction Numerical Relay (IED) Product Portfolio
MiCOM series
MiCOM

- Modular Integrated Communicable Overall Management IED
Micom - Introduction

- The MiCOM range of relays offers varying levels of functionality and hardware options to best suit the protection requirements, and allows the customer to choose the most cost effective solution for their application.

- The 10, 20, 30 and 40 series hardware platforms are the building blocks of the MiCOM protection relay range providing the capability for a wide variety of protection, control, measurement, monitoring and communication functions.

- The versatile hardware allows for application in many installations and a common relay management software (MiCOM S1 Studio) makes for easy configuration and application.

- Numerous integrated communication protocols allow easy interfacing to most substation control or SCADA systems.
MiCOM Comprehensive Protection Solution

- Generation
  Integrated Generator Protection

- Utility
  Distance Protection
  Line Differential
  Transformer Management
  Bus bar Protection
  Stand Alone Breaker Fail Protection
  Directional/Non-Directional Over current
  Feeder Management and One Box Solutions
MiCOM - Pxxx
Protection Solutions

MiCOM P_x1 x = Basic
MiCOM P_x2 x = Standard
MiCOM P_x3 x = Advanced with Bay Control
MiCOM P_x4 x = Advanced
MiCOM Comprehensive Protection Solution

- Industrial
  - Motor Management
  - Interconnection Protection

- Railway
  - Feeder Management
  - Transformer Management
  - Distance Protection
MiCOM Protection portfolio

- P900 Frequency Protection Relays
- P800 Autoreclose Relays
- P700 Busbar Protection Relays
- P600 Transformer Protection Relays
- P500 Line Differential Relays
- P400 Distance Protection Relays
- P300 Generator Protection Relays
- P200 Universal Motor Protection Relay
- P100 Feeder Management Relays
MiCOM Relays
Hardware & Software Platforms

40 Series

30 Series

20 Series

10 Series
P x10 Series

Enhanced version launched – P111Enh

- P11x: Universal Over current protection for main or back-up protection on LV or MV systems
- CT or Dual powered variants available.
- Price vs. technical features
- Wide range of protection function with Auto reclosure option
- Communication: Modbus RTU & IEC 60870-5-103
- Breaker control: HMI & DCS/SCADA
- MiCOM S1 Studio supported.
- Three level password protection
- Front USB Port / Rear RS485
- Good amount of SOE, FR and DR

- P21x – Cost efficient LV motor protection
P x20 Series

- P12x: Universal Over current protection for main or back-up protection on MV and HV systems

- P22x: Motor Protection Series for LV and MV systems

- P52x: 2 terminal Line Differential protection for MV and HV systems with multiple communication options

- P72x: Dedicated high impedance differential protection

- P821: Dedicated Breaker Failure Protection suitable for HV and MV systems

- P92x: Voltage and frequency protection suitable for generators, motors and feeders
MiCOM Px20 Protection

- P920 Voltage / Frequency Relays
- P821 Breaker Fail Relay
- P72x High Imp Bus Diff
- P521 Line Differential and Unit Protection
- P220 Motor Protection Relays
- P120 Overcurrent Relays
P x30 Series

- P13x: Feeder management relays and one box solution for MV and HV systems (including railway feeder)

- P43x: Distance protection for MV and HV systems and rail catenary requirements

- P53x: Line differential protection for MV and HV systems

- P63x: Differential protection for transformers, generators and motors (including railway transformers).
MiCOM Px30 Protection

- P630 Transformer Differential
- P53x Line differential
- P430 Distance Relays
- P139 Feeder Relay
P x40 Series

- P14x: Feeder management relay suitable for MV and HV systems
- P24x: Rotating Machine Management relay for application on a wide range of synchronous and induction machines
- P34x: Generator protection for small to sophisticated generator systems and interconnection protection
- P44x: Full scheme Distance protection relays for MV and HV systems.
- P54x: Line Differential protection relays for HV systems with multiple communication options as well phase comparison protection for use with PLC.
- P64x: Differential protection for transformers.
- P74x: Numerical Bus bar protection suitable for application on MV and HV bus bars
- P84x: Multifunction terminal IED with professional autoreclosing and CB failure functions.
MiCOM Px40 Protection

- P940 Frequency Protection Relays
- P840 Autoreclose Relays
- P740 Busbar Protection Relays
- P640 Transformer Differential Protection
- P540 Line Differential and Unit Protection
- P440 Distance Protection Relays
- P340 Generator Protection Relays
- P240 Universal Motor Protection Relay
- P140 Feeder Management Relays
MiCOM protection covers all areas of the power system

Generation

Transmission

Industry

Home

Distribution

Low Voltage
VAMP series
VAMP

- Vaasa Arc Monitoring and Protection IED.
Vamp ???

- Optimized IEC61850 solution for LV/MV system.
- Optimized one-box
- Stand alone/centralized Arc detection (growing market)
- Arc detection integrated in relays
- Profibus & SPA bus communication
Vamp Product range for Schneider

➢ Feeder / Motor / Capacitor / Arc Solutions

- **Vamp 55:**
  - Full Voltage solution
  - V, F, Synccheck, ROCOF

- **Vamp 52:**
  - (50/51) + 1ph VT
  - Fdr / Mtr

- **Vamp 50 / 51:**
  - Current based

- **Vamp 230/255:**
  - Fdr / Mtr Manager
  - Flexible I/o’s

- **Vamp 257:**
  - Fdr / Mtr Manager
  - Flexible I/o’s
Products for feeder, motor, V&f and Arc protection application

50 Series:
- 50 (non-dir O/C)
- 51 (non-dir. O/C + autoreclose)
- 52 (Motor or Directional feeder protection-67N)
- 55 (Voltage & frequency based protection)

Arc protection devices:
- 120/121 units & 221 System

200 Series:
- 230 (Directional Feeder or Motor)
- 255 (Directional feeder or motor with extended I/O)
- 257 (Dir. Fed or motor with flexible I/O extension, high end complement of 200 feeder/motor)
Vamp 50 Series

- Feeder Protection
- Motor Protection
- IEC 61850 with GOOSE Messaging
- Integrated Arc Protection
Features

- Compact case solution with USB front port.
- Big display with mimic/bay control
- Modbus, IEC101, IEC 103, DNP 3, Spa bus, Profibus, IEC61850, Modbus TCP/IP, DNP3 TCP/IP (10MBps) (100MBps CA June 2010)
- Optional rear ports: RS232, RS485, fibers, RJ45
- In-/outputs: Base 2DI / 4DO.
- Additional card: 4 DI / 1DO.
- Control relays: 1 Alarm, 1 Internal Fault.
- Analog inputs: 4 CTs (50/51), 4CTs / 1VT (52) or 4VTs (55)
- Optional Arc flash protection (2 sensors)
- Optional mA output
- Optional remote RTD box** (up to 12 RTDs)
## Vamp 50

### Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>VAMP 50</th>
<th>VAMP 51</th>
<th>VAMP 52</th>
<th>VAMP 55</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog inputs</td>
<td>3 x I</td>
<td>3 x I</td>
<td>3 x I</td>
<td>4 x U</td>
</tr>
<tr>
<td></td>
<td>1 x Io</td>
<td>1 x Io</td>
<td>1 x U</td>
<td></td>
</tr>
<tr>
<td>Digital inputs</td>
<td>2 (6)</td>
<td>2 (6)</td>
<td>2 (6)</td>
<td>2 (6)</td>
</tr>
<tr>
<td>Trip relays</td>
<td>4 (5)</td>
<td>4 (5)</td>
<td>4 (5)</td>
<td>4 (5)</td>
</tr>
<tr>
<td>Control relays</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>mA output</td>
<td>Option</td>
<td>Option</td>
<td>Option</td>
<td>Option</td>
</tr>
<tr>
<td>Arc protection</td>
<td>Option</td>
<td>Option</td>
<td>Option</td>
<td>Option</td>
</tr>
<tr>
<td>Front port</td>
<td>USB</td>
<td>USB</td>
<td>USB</td>
<td>USB</td>
</tr>
<tr>
<td>Optional rear port</td>
<td>RS 485</td>
<td>RS 485</td>
<td>RS 485</td>
<td>RS 485</td>
</tr>
<tr>
<td></td>
<td>RS 232</td>
<td>RS 232</td>
<td>RS 232</td>
<td>RS 232</td>
</tr>
<tr>
<td></td>
<td>Fibre</td>
<td>Fibre</td>
<td>Fibre</td>
<td>Fibre</td>
</tr>
<tr>
<td></td>
<td>Ethernet</td>
<td>Ethernet</td>
<td>Ethernet</td>
<td>Ethernet</td>
</tr>
<tr>
<td>External RTD input module</td>
<td>Option</td>
<td>Option</td>
<td>Option</td>
<td>Option</td>
</tr>
</tbody>
</table>
Vamp 50

Protection functions
• 3-phase overcurrent: \( I_>, I>>_>, I>>>_> \) (50/51)
• Earth fault: \( I_{0}>_>, I_{0}>>_>, I_{0}>>>>_>, I_{0}>>>>> \) (50N/51N)
• Thermal overload (cable): \( T> \) (49F)
• Broken conductor: \( I_2/I_1 \) (46)
• Circuit breaker failure protection: CBFP (50BF)
• Inrush detection: \( I_{f2} \) (68)
• Latched trip (86)
• Arc protection : \( I_> / I_{0}>_>, L> \) (50ARC/50NARC) (option)
Vamp 51

- Based on VAMP 50 with following complementary functions
  - 3-phase overcurrent: \( I^>, I^{>>}, I^{>>>} \) (50/51)
  - Earth fault: \( I_0^>, I_0^{>>}, I_0^{>>>}, I_0^{>>>>} \) (50N/51N)
  - Thermal overload (cable): \( T^> \) (49F)
  - Broken conductor: \( I_2/I_1 \) (46)
  - Circuit breaker failure protection: CBFP (50BF)
  - Inrush detection: \( I_{f2} \) (68)
  - Latched trip (86)
  - Arc protection: \( I^> / I_0^>, L^> \) (50ARC/50NARC) (option)

- 5 Shot Autoreclosing.
- 8 Programmable stages
Vamp 52

- 3-phase overcurrent: $I_1$, $I_2$, $I_3$ (50/51)
- Earth fault: $I_0$, $I_{01}$, $I_{02}$, $I_{03}$ (50N/51N)
- Thermal overload (cable): $T_1$ (49F)
- Broken conductor: $I_2/I_1$ (46)
- Circuit breaker failure protection: CBFP (50BF)
- Inrush detection: $I_f2$ (68)
- Latched trip (86)
- Arc protection: $I_f/I_0$, $L_1$ (50ARC/50NARC) (option)
- 5 Shot Autoreclosing.
- 8 Programmable stages
  - **Directional earth-fault, $I_0\varphi_1$, $I_0\varphi_2$** (67N)
  - **Residual voltage, $U_o$, $U_o>>$** (59N)
  - **Intermittent earth fault protection (67NT)**
  - **Over- and undervoltage protection (59, 27)**, single phase
# 50 Series – Protection functions

<table>
<thead>
<tr>
<th>IEEE/ANSI code</th>
<th>IEC symbol</th>
<th>Function name</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>50/51</td>
<td>3I&gt;, 3I&gt;&gt;, 3I&gt;&gt;&gt;</td>
<td>Overcurrent protection</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>I&gt;</td>
<td>Current unbalance protection in feeder mode</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>I&gt;</td>
<td>Current unbalance protection in motor mode</td>
<td>Only VAMP 52</td>
</tr>
<tr>
<td>47</td>
<td>I&gt;&gt;&gt;</td>
<td>Phase reversal / incorrect phase sequence protection</td>
<td>Only VAMP32 available when application option is in motor protection mode</td>
</tr>
<tr>
<td>48</td>
<td>I&lt;</td>
<td>Stall protection</td>
<td></td>
</tr>
<tr>
<td>66</td>
<td>N&gt;</td>
<td>Frequent start protection</td>
<td></td>
</tr>
<tr>
<td>49</td>
<td>T&gt;</td>
<td>Thermal overload protection</td>
<td>Only VAMP52</td>
</tr>
<tr>
<td>37</td>
<td>I&lt;</td>
<td>Undercurrent protection</td>
<td>Only VAMP52</td>
</tr>
<tr>
<td>50N/51N</td>
<td>I&gt;, I&gt;, I&gt;, I&gt;&gt;, I&gt;&gt;&gt;&gt;</td>
<td>Earth fault protection</td>
<td></td>
</tr>
<tr>
<td>67NT</td>
<td>I&gt;</td>
<td>Intermittent transient earth fault protection</td>
<td></td>
</tr>
<tr>
<td>67N, 50N/51N</td>
<td>I&gt;, I&gt;, I&gt;, I&gt;&gt;, I&gt;&gt;&gt;&gt;</td>
<td>Directional or non-directional earth-fault, low-set stage, sensitive, definite or inverse time</td>
<td>Only VAMP52 available when measurement option is Up</td>
</tr>
<tr>
<td>50N</td>
<td>U&gt;, U&gt;&gt;&gt;</td>
<td>Zero sequence voltage protection</td>
<td></td>
</tr>
<tr>
<td>59</td>
<td>U&gt;, U&gt;&gt;&gt;</td>
<td>Single-phase overvoltage protection</td>
<td>Only VAMP 52 available when measurement option is 1LL (line-to-line voltage) or 1LN (phase-to-neutral voltage)</td>
</tr>
<tr>
<td>27</td>
<td>U&lt;, U&lt;, U&lt;</td>
<td>Single-phase undervoltage protection</td>
<td></td>
</tr>
<tr>
<td>51F2</td>
<td>I&gt;</td>
<td>Second harmonic O/C stage</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IEEE/ANSI code</th>
<th>IEC symbol</th>
<th>Function name</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>50BF</td>
<td>CBFP</td>
<td>Circuit-breaker failure protection</td>
<td></td>
</tr>
<tr>
<td>99</td>
<td>Prg1...8</td>
<td>Programmable stages</td>
<td>Only VAMP51/52</td>
</tr>
<tr>
<td>50ARC/50NARC</td>
<td>ArcI-, ArcI&lt;</td>
<td>Optional arc fault protection (with an external module)</td>
<td></td>
</tr>
<tr>
<td>99</td>
<td>Prg1...8</td>
<td>Programmable stages</td>
<td>Only VAMP51/52</td>
</tr>
<tr>
<td>50ARC/50NARC</td>
<td>ArcI-, ArcI&lt;</td>
<td>Optional arc fault protection (with an external module)</td>
<td></td>
</tr>
</tbody>
</table>
Vamp 50 – Recorder functions

- Eight (8) fault logs per protection stage
- 200 latest events.
- Disturbance recorder
  - Waveform or trend mode possible
  - 32 Samples/cycle max
  - Comtrade format

![Waveform graph showing inrush current captured in waveform mode (32, 16 or 8 samples/cycle)](image)

Start current of an induction motor (6\*I_N, 13 s) captured in trend mode (e.g. 10 ms, 20 ms, 200 ms)
Vamp 200 Series

• Feeder Protection
• Motor Protection
• Capacitor Protection
• Fault locator
• Power quality
• IEC 61850 Compliant with Goose Messaging

• Integrated Arc Protection
**Features**

- Semi-modular case (~40TE)
- RS232 front port
- Big display with mimic/bay control
- Modbus, IEC101, IEC 103, DNP 3, Spabus, Profibus*, IEC61850, Modbus TCP/IP, DNP3 TCP/IP (10MBps)
- Optional rear ports: RS232, RS485, fibres, RJ45
  - 230/255: Port 1: 232 / Port 2 optional
  - 257: Port 1&2 optional
- In-/outputs – Extensive
- 5CT/3VT
- Disturbance recorder
- Power Quality
- Fault locator
- Optional Arc flash protection (2 sensors)
- 4 Optional mA outputs for 230/255
- Optional remote RTD box (up to 12 RTDs)

*For 257 Profibus via module VPA 3 CG and cable VX007-F3, 230/255 inbuilt solution*
Vamp 200

VAMP 257, VAMP 255 and VAMP 230 are almost the same product.
The only difference is the amount of digital inputs/outputs and analogue inputs!

<table>
<thead>
<tr>
<th></th>
<th>VAMP 257</th>
<th>VAMP 255</th>
<th>VAMP 230</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog measurement</td>
<td>5 x I 3 x U</td>
<td>5 x I 3 x U</td>
<td>5 x I 3 x U</td>
</tr>
<tr>
<td>Digital inputs</td>
<td>18 (+2) 22 (+2) 30 (+2)</td>
<td>18 (+2)</td>
<td>6 (+2)</td>
</tr>
<tr>
<td>Output relays</td>
<td>9</td>
<td>19</td>
<td>13</td>
</tr>
<tr>
<td>Self-supervision contacts</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Memory</td>
<td>Non-volatile</td>
<td>Non-volatile</td>
<td>Non-volatile</td>
</tr>
<tr>
<td>Number of events - default - scalable range</td>
<td>200 50..2000</td>
<td>200 50..2000</td>
<td>200 50..2000</td>
</tr>
<tr>
<td>Native IEC61850</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>
Feeder Mode – Protection Functions
(230, 255, 257)

- Three stages of phase overcurrent (50/51)
- Non-directional ground-fault, 2 stages (50/51N)
- Directional phase overcurrent, 4 stages (67)
- Directional ground-fault, 2 stages (67N)
- Broken conductor, I2/I1 (46)
- Inrush and cold-load pick up (68)
- Thermal overload with memory tracing (49)
- Undercurrent/loss of load (37)
- Reverse power (32)
- Over and under voltage, 3 stages (59,27)
- Residual voltage relays, 2 stages (59N)
- Over and under frequency, 4 stages (81)
- Rate of change of frequency, df/dt
- CBFP (50BF)
- 5-shot auto-reclose (79)
- Synchro-check (25)
- 8 programmable stages
- Arc protection (option)
Motor Mode – Protection Functions (230, 255, 257)

- Overload, short-circuit, mechanical jam (50/51)
- Non-directional ground-fault, 2 stages (50/51N)
- Directional overcurrent, 4 stages (67)
- Directional ground-fault, 2 stages (67N)
- Current unbalance (46)
- Thermal overload with memory tracing (49M)
- Undercurrent/loss of load (37)
- Reverse power (32)
- Phase reversal (47)
- Frequent starts (66)
- Stall/blocked rotor (48)
- Over and under voltage, 3 stages (59, 27)
- Residual voltage relays, 2 stages (59N)
- Over and under frequency, 4 stages (81)
- Speed Switch (14)
- External RTD’s, up to 12 (Trip or alarm, 38, 49)
- CBFP (50BF)
- 8 programmable stages
- Emergency Restart (blocking)
- Arc protection (option)
Disturbance Recorder – 200 Series

- 12 channels
- Waveform or trend – Comtrade format

**Two recording modes available**

**Waveform mode**
- 32 or 16 or 8 samples / power cycle
- Harmonics up to 15th or 7th or 3rd order recorded
- Used when exact transient data and phase angle information is needed

**Average mode**
- 1/10 ms, 1/20 ms, ... 1/1min average RMS value sampling
- Used for outgoing feeders, motors, and any application where slowly varying variable fluctuations are of interest
Power Quality Assessment & Fault Locator

![Image of Power Quality Assessment & Fault Locator](image-url)
Programmable Logic

- Graphical logic
- AND, OR, NOT, XOR, TIMERS, Memory
- Configuration, download and upload to/from relay using VAMPSET
- On-line updating, useful, for example, debugging
Communication

SCADA, DCS or SA system

- Control and status of the process
- Events
- Measurements
- Fault location
- Time synchronizing using GPS

Maintenance Terminal

- Relay settings, configuration
- Fault and disturbance analysis
- Power quality monitoring
- Primary equipment condition monitoring
- Time synchronizing using GPS

Protocols:
- IEC 60870-5-103
- SPA bus
- ModBus RTU
- Modbus/TCP
- ProfBus
- DNP 3.0
- TCP/IP
- IEC 61850 *

Physical Media:
- RS 485
- RS 232
- Fibre optic
- RJ 45

IEC870-5-103, Modbus RTU, Modbus TCP, Profibus, SPA, DNP 3.0 or IEC 61850*.
Sepam protection relays
a range of solutions for all applications

Sepam series 10
Basic solutions for simple applications

Sepam series 20
Simple solutions for standard applications

Sepam series 40
High-performing solutions for demanding applications

Sepam series 60
Intelligent solutions for custom applications

Sepam series 80
High-performing solutions for demanding applications
Sepam protection relays
For your peace of mind

I. Solutions
II. Modularity
III. Performance
IV. Simplicity
# Sepam protection relays

a range of solutions for all applications

<table>
<thead>
<tr>
<th>Sepam range</th>
<th>series 10</th>
<th>series 20</th>
<th>series 40</th>
<th>series 60</th>
<th>series 80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Voltage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase &amp; Earth basic protection</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Directional protection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Synchro-check</td>
<td>Yes</td>
<td></td>
<td></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Differential protection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Display</td>
<td>2 lines of characters</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Basic UMI + remote UMI</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Advanced UMI</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Mimic based UMI</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Removable S/W cartridge</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input / Output (up to)</td>
<td>4/7</td>
<td>10/8</td>
<td>10/8</td>
<td>28/16</td>
<td>42/23</td>
</tr>
<tr>
<td>Temperature sensor (up to)</td>
<td>0/8</td>
<td>0/8/16</td>
<td>0/8/16</td>
<td>0/8/16</td>
<td></td>
</tr>
<tr>
<td>Multiprotocol communication port (up to)</td>
<td>1 rear</td>
<td>1 front / 1 rear</td>
<td>1 front / 1 rear</td>
<td>1 front / 1 rear</td>
<td>1 front / 2 rear</td>
</tr>
<tr>
<td>Communication protocol</td>
<td>Modbus RTU</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>IEC 60870-5-103</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>DNP3</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Modbus TCP/IP</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>IEC 61850</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Ethernet high availability communication</td>
<td></td>
<td>RSTP</td>
<td>RSTP</td>
<td>Standard GOOSE</td>
<td>Customized GOOSE</td>
</tr>
<tr>
<td>Logic equation editor</td>
<td></td>
<td>Yes (100 operators)</td>
<td>Yes (200 operators)</td>
<td>Yes (200 operators)</td>
<td></td>
</tr>
<tr>
<td>Logipam (Ladder language)</td>
<td></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RoHS / Conformal coated - EIA 364-65A IIIA</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Marine / IEC 61508 - SIL2 / ATEX certification</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Yes</td>
</tr>
</tbody>
</table>
Sepam series 20

- Current or voltage metering according to the application
- 10 logic inputs / 8 relay outputs
- 1 communication port
- 8 temperature sensor inputs
Sepam series 40

- Current and voltage metering for all applications:
  - all measurements available
  - directional protection functions

- 10 logic inputs / 8 relay outputs

- Logic equation editor

- 1 communication port

- 16 temperature sensor inputs
Sepam series 60

- Multiple metering:
  - all measurements available
  - directional and REF protection functions
- 28 logic inputs / 16 relay outputs
- Logic equation editor
- 1 communication port
- 16 temperature sensor inputs
- Memory cartridge and backups
- Local control via mimic-based UMI
- Synchro-check
- Automatic transfer
Sepam series 80

- Multiple metering:
  - all measurements available
  - directional and differential protection functions
- 42 logic inputs / 23 relay outputs
- Logic equation editor
- 2 communication port
- 16 temperature sensor inputs
- Memory cartridge and backups
- Local control via mimic-based UMI
- Optional Logipam programming software
- Synchro-check
- Automatic transfer
Sepam protection relays
For your peace of mind

I. Solutions

II. Modularity

III. Performance

IV. Simplicity
Architecture modulaire Sepam

- Functional enhancement by optional modules

- To specifically fit your needs
- To evolve in step with your installation
SEPAM SERIES 20/40 MODULES (LIMITS)

Sepam series 20 / series 40 maximum configuration

- 10 inputs / 8 outputs (1 MES114 module)
- 1 analog output (1 MSA141 module)
- 1 communication ports (1 ACE interface)
- Temperature sensor inputs
  - Series 20: 8 inputs (1 MET148-2 module)
  - Series 40: 16 inputs (2 MET148-2 modules)
SEPAM SERIES 60 MODULES
(LIMITS)

Sepam series 60 maximum configuration

- 28 inputs / 16 outputs (2 MES120 modules)
- 16 temperature sensor inputs (2 MET148-2 modules)
- 1 analog output (1 MSA141 module)
- 1 synchro-check module MCS025
- 1 communication port (1 ACExxx interface)
SEPAM SERIES 80 MODULES (LIMITS)

Sepam series 80 maximum configuration

- 42 inputs / 23 outputs (3 MES120 modules)
- 16 temperature sensor inputs (2 MET148-2 modules)
- 1 analog output (1 MSA141 module)
- 1 synchro-check module MCS025
- 2 communication ports (2 ACE interfaces)
Sepam protection relays
For your peace of mind

I. Solutions

II. Modularity

III. Performance

IV. Simplicity
Sepam range performance

- Reliability & robustness
- Effective protection
  - Suited to each application
  - To specifically fit all the needs, from the simplest to the most comprehensive
- Accurate measurement & detailed diagnosis
  - Measuring all necessary electrical values
  - Network, machine & switchgear diagnosis
- Integral equipment control
  - Pre-defined & customizable control functions
- Remote operation
Sepam series 20 performance

- Phase and earth fault protection
  - Earth fault protection with 2nd harmonic restraint
  - Switching between groups of settings A & B
  - Logic discrimination, for a quick, selective tripping of the protection functions

- RMS thermal overload protection
  - Compensated by ambient temperature
  - Switching between 2 groups of settings according to operating conditions

- Loss of mains protection by ROCOF
Sepam series 40 performance

- Current and voltage metering
- Directional protection functions
  - Dir. earth fault, suited to all neutral earthing systems, impedant, compensated or isolated
  - Dir. phase overcurrent, with voltage memory and frequency tracking
  - Dir. power
- CT / VT supervision
- Logic equation editor, to program specific control functions
Sepam series 80 performance

- Transformer differential protection
  - for two-winding transformers
  - for transformer-machine units

- Comprehension motors and generators protection
  - differential protection
  - filed loss (underimpedance)
  - Pole slip
  - 100% stator earth fault
  - speed monitoring

- Customized tripping curve
- 2 communication ports
- Synchro-check
- Logipam programming software
Sepam protection relays
For your peace of mind

I. Solutions
II. Modularity
III. Performance
IV. Simplicity
Simplicity for all

- **Saving design time**
  - simplified choice in a reduced and consistent range of relays and accessories
  - compatible with various sensor types

- **Easy to install**
  - compact base unit
  - flexible architecture with remote modules

- **Assisted commissioning**
  - ready to use after simple setting procedure
  - user-friendly and powerful setting software

- **User-friendly**
  - comprehensive data displayed on intuitive advanced UMI
  - local control on mimic-based UMI
  - customized UMI in the user’s language
Simplified choice

- A consistent product range, organized by application

- Universal power supply, for Sepam and its logic inputs:
  - series 20/40: 24-250VDC & 110-240VAC
  - series 80: 24 to 250VDC

- Common optional modules and accessories for the whole Sepam range:
  - 1 temperature module compatible with Pt100, Ni120 or Ni100 RTDs
  - 1 analog output module (4-20mA, 0-10mA, 0-20mA)
2 types of sensors may be connected to Sepam via a specific connector:

- 1A or 5A current transformers by CCA 630 or CCA634

or

- LPCT sensors by:
  - CCA 670 for Sepam series 20 or Sepam series 40
  - CCA 671 for Sepam series 80

LPCT (Low Power Current Transducer), developed according to the IEC60044-8 standard
Residual current metering by CT or core balance CT

Residual current is metered by:

- Specific core balance CT, for accurate measurement (CSH120, CSH 200 or GO110)

- Other core balance CT with an ACE990 interface

- 1A/5A CT with an interposing ring CT (CCA630 + CSH30)

- 1A or 5A and residual current transformers in the same sensor (CCA634)

or calculated based on the 3 phase currents
Base unit easy to install

- Reduced installation constraints:
  Sepam is compact, light, with a reduced depth
  - < 100 mm (series 20/40)
  - < 225 mm (series 80)

- Terminal and connector identification

- Disconnectable without any precautions
Addition of optional modules simplified

- Input / output modules mounted on the base unit
- Remote modules
  - assembly on DIN rail
  - connection via prefabricated cords fitted with RJ45 plugs

To use at best the available space!
Two connection modes

Two types of auxiliary supply connectors are offered:

- Screw type
- Ring lug type

To suit your connection habits
Lead - seal accessory

To inhibit modification of parameter and protection settings, one lead-seal accessory is offered:

- AMT 852
- Sepam series 20, series 40 or series 80 with integrated advanced UMI
Simplified maintenance

Removable memory cartridge

- all Sepam characteristics in memory cartridge
- to put back Sepam into service quickly after faulty base unit replacement, without setting operation

For quick and safe maintenance operations!
Sepam protection relay:
to win all across the board!

More solutions
More modularity
More performance
More simplicity
Thank You !