Modern society heavily depends on an uninterrupted supply of electric power. Prolonged power outages cause loss of business to the power supplier and loss of production to the power consumer. Regardless of how safe a power system is, faults do occur.

An arc flash protection relay is a protective device used to maximise the safety and minimise the damage to the installation in the most hazardous power system fault situations.

Fast arc flash protection increases operator safety in case of an arc fault occurring in switchgear.

The faster the operating time of the protection system, the lesser the damage caused by the arc fault will be.

Schneider Electric’s Vamp range is the pioneer in the field of arc flash protection with close to 15,000 arc flash systems and 300,000 sensors in service worldwide.

VAMP 321

Modular solutions for flexible arc flash protection
VAMP 321
We can supply an arc flash protection system tailored to your application

VAMP 321 at a glance

• Modular structure
  The design of VAMP 321 allows customer selection of new hardware which adds performance and functionality to the system. The unit, as specified in order codes on page 16, has two dedicated arc sensor inputs and is scalable from standard to high-end arc flash protection systems.

• PC configurable
  The system can be configured by the end-user with the VAMPSET software tool. Events and disturbance recordings are easily evaluated using a PC with USB connection.

• Event logs and disturbance recording
  Vamp introduces event and disturbance functionality in an arc protection system to enhance the pre and post fault analysis of the arc phenomena.

• Communication
  The VAMP 321 has five communication ports, four of which are intended for a SCADA interface. Supported protocols are IEC 61850, Profibus DP, Modbus TCP, DNP TCP, Modbus RTU, SPA, IEC 60870-5-101 and IEC 60870-5-103.

User benefits

• Compatible with existing systems
  The VAMP 321 relies on the same VAM I/O units, cabling and sensors as the company’s other renowned arc flash protection system.

• Engineered for the most demanding environments
  The new mechanical structure comprises a robust cast aluminium casing. Adjustable fixtures provide flexible installation to every power system environment. IP54 protection is achieved when flush mounted.

• Proven technology
  Developed in close cooperation with customers, the VAMP 321 combines the reliable technology of Vamp’s 50 and 200 series and that of the VAMP 221 arc flash protection system.
Why arc flash protection?

When traditional time-grading or blocking based protection coordination principle is used, it may not provide fast enough protection of substation faults. Further, high-impedance type earth-faults may cause prolonged operation times of earth-fault relays leading to the significant release of arcing energy.

These facts pose a considerable risk to operation personnel and economical assets.
Flexible solutions

Benefits of modular design

• A modular IED for different applications:
VAMP 321 IED features a modular design that allows user-defined conventional protection and arc flash protection solutions both in new and existing power distribution systems.

• New improved integrated arc protection:
New arc option modules with either two, four or six point sensors or one fibre and four point sensors together with high speed outputs provides faster operation time if an arc fault occurs.

• Local push buttons for object control:
New password protected and easy to use control buttons for breaker controlling.

Build your own protection IED suitable to your application

User may decide the hardware of the unit with the order code. Various I/O modules and communication options bring more flexibility to the protection applications.

EXTENSION SLOTS, see page 18

Inputs and outputs combination examples

<table>
<thead>
<tr>
<th>Inputs and outputs combination examples</th>
<th>31</th>
<th>30</th>
<th>26</th>
<th>22</th>
<th>18</th>
<th>16</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>DI (pcs)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DO (pcs)</td>
<td>14</td>
<td>10</td>
<td>10</td>
<td>14</td>
<td>18</td>
<td>10</td>
<td>14</td>
</tr>
</tbody>
</table>

Inputs and outputs

Modularity ensures a wide range of DI / DO combination as per customer demand. The table shows number of DI / DO for few optional module combinations. Maximum amount of DI can be 40 pcs and DO 22 pcs but not at a same time.
VAMPSET
Setting and Configuration Tool

VAMPSET is a user-friendly, free-of-charge relay management software for setting parameters and configuring VAMP relays. Via the VAMPSET software, relay parameters, configurations and recorded data can be exchanged between PC and VAMP relays. Supporting the COMTRADE format, VAMPSET also incorporates tools for analysing relay events, waveforms and trends from data recorded by the relays, e.g. during a network fault situation.

Using a standard USB communication cable, the PC running VAMPSET connects to the front port of the VAMP relays. The VAMPSET software also supports TCP/IP communication via an optional port. Featuring true multi-language support the software runs on Windows environment without any need for configuration of the PC.

The device’s setting views are organised to several folders in the VAMPSET setting tool views in order to conveniently find right data for parameterisation of the IED. The setting tool displays main menu of the arc protection.

The VAMPSET software is future-proof, supporting future updates and new VAMP products.

HMI can be freely configured to show desired mimic and measurements as well as control functions.
**Communication & control**

VAMP is a communication expert with a wide experience in interfacing with different system integrators’ and SCADA suppliers’ RTUs, PLCs, gateways etc. using many different protocols. Flexible adaptation of the communication protocols together with powerful and easy to use software tools are the key of successful integration.

VAMP 321 and the VAMPSET tool provide access to practically any power system information you may need.

**IEC 61850**

The IEC 61850 protocol can be used to read or write static data or to receive events sent spontaneously from the relay. In addition, the interface allows peer-to-peer communication between the relays, called GOOSE communication. The IEC 61850 interface is configured with familiar, user-friendly VAMPSET software.

The IEC 61850 datamodel, data-sets, report control blocks and the GOOSE communication are configured according to the requirements of the system configuration. VAMPSET is also used to produce ICD files, which may be needed for the substation RTU configuration.

**Communication matrix**

Communication matrix shows which physical interface matches with supported protocols.

**Circuit breaker control with F1 / F2 buttons**

Another way to control circuit breaker or isolators is to program Function button F1 and F2 to execute the control command. Once programmed F1 could be the close and F2 open operand. A dedicated info view appears on the HMI requesting confirmation or de-selection of the action.
Programmable stages

There are eight programmable stages available to use with various applications. Each stage can monitor any analogue (measured or calculated) signal and issue start and trip signals. Programmable stages extend the protection functionality of the manager series to a new level.

For example, if four stages of frequency are not enough, with programmable stages, the maximum of 12 can be reached.

Other examples are using the stages to issue an alarm when there are a lot of harmonics (THD) or indicating reverse power condition.

Programmable logic: The logic editor has colours to enable viewing of active statuses. Furthermore, each input status can be also seen on-line in VAMPSET view.

Programmable stage has a possibility to compare two freely selectable signals between each other. Using this feature the user can create compare function using relay’s own measured or calculated signals. One or both of the signals can be connected to comparison function over GOOSE.
Order options provide two alternative mounting principles to VAMP 321 IED. Both options have its own advantages.

Panel mounting
The conventional mounting technique has always been installing the IED on the secondary compartment’s door. Limitation in this approach could be that the door construction is not strong enough for the IED’s weight and suitability to wire large amount of secondary and communication cabling could be challenging.

Projection mounting
In case the depth dimension behind the compartment door is limited, the IED can be equipped with frame around the collar. This arrangement reduces depth inside compartment by 45 mm.

Wall mounting with detachable HMI brings more flexibility
This mounting technique allows door being lighter as the relays frame is installed in the back of the secondary compartment. Communication, DI and DO cabling cabling is easier, too, as the door movement does not need to be considered. In this case, only the communication between IED base and display has to be wired.
Selective and flexible arc flash protection solutions

- The VAMP arc protection system can be built using various components of the VAMP relay family.
- The system has been designed to cover basic level and demanding applications of the low and medium voltage power distribution system.
- VAMP arc protection system and relay products can be combined to obtain an arc protection scheme for any application.

Modern motor control centers (MCC) equipped with arc flash protection provide ultra-fast arc protection for the switchgear, limiting the possible arc flash fault to a minimum.

The point sensors give an accurate location of the fault thus the required repair for the MCC’s is fast and the power can be restored without fault location time delay. The central unit trips both the incoming LV circuit breaker and the circuit breaker up-stream. The nature for an arc flash fault can be fuse, cable termination, contactor or circuit breaker feeding the motor in the MCC, therefore fast fault location is extremely useful.
The selectivity requirement of the arc flash protection is dependent on the switchgear construction and the importance of the power distribution. The more important the supplied power, the more selective arc flash protection scheme is implemented.

The left side of the medium voltage switchgear, as seen in the picture, has various protection zones. Cable termination has its own zone and is tripped should the fault occur in the cable compartment.

One VAM 12LD unit is able to trip up to three sub-zones selectively.

The circuit breaker and busbar compartments belongs to another zone supervised by the VAM 12LD units. As the distribution system does not have current measurement on the high voltage side of the power transformer, the arc flash protection system uses the current status from low voltage side. In this case the zone 1 selectivity is set up by light only criteria and the zone is fully isolated should the fault occur.

The right side of the switchgear has a universal one zone scheme for the cable, circuit breaker and bus bar compartments using three fibre sensor loops. The incoming cable termination compartment is based on the light only protection principle.

Point sensors are mounted in the switchgear's arc pressure relief compartment in this installation.

Arc protection systems require three phase currents for selective high-speed arc protection. Using the zero-sequence voltage and current in tripping criteria, the arc fault trip can be activated before the fault is completely exposed.
Characteristics and highlights of the VAMP 321

VAMP 321 arc flash protection system

- Auxiliary supply and communication via modular cable
- Continuous supervision of sensors
- Connection of portable arc sensor, except VAM 4C and VAM 4CD
- Indication of arc sensor / current channel and trip relay activation

VAMP 321 arc protection system central unit

- 3-phase current, zero-sequence current and voltage (New! Ringlug connectivity available)
- Event logs, disturbance recording and real-time clock
- High speed output, HSO: 2 ms typically
- Trip contact, T: 7 ms typically
- Operation on simultaneous current and light or on light only
- Informative display
- Communication with SCADA
- Four normally open trip contacts (option)
- One normally open and one change over alarm contact
- Programmable operation zones
- Continuous system self-supervision
- Circuit breaker failure protection (user configurable)

The auxiliary supply, CT wiring, trip and alarm outputs as well as modular cables are connected to the rear side of the central unit.
## Characteristics and Highlights of the VAMP 321 Arc Protection Systems

### VAM 4C, VAM 4CD
- Current I/O unit
- Auxiliary supply and communication via modular cable
- 3-phase current measurement or 2-phase and zero-sequence current measurement
- Adjustable pick-up setting
- Indication of the current channel pick-up, current imbalance and trip relay activation
- One trip relay
- Two communication ports for central unit and I/O unit interconnection

### VAM 4CD - Additional features to VAM 4C
- Labelling for customised arc sensor channel text
- Flush mounting
- HMI indication available on door closed position

### VAM 3L, VAM 3LX
- Fibre sensor I/O unit
- Auxiliary supply and communication via modular cable
- Three supervised fibre loop arc sensor connections
- Connection of portable arc sensor
- Indication of the sensor channel and trip relay activation
- One trip relay
- Two communication ports for central unit and I/O unit interconnection

### VAM 3LX - Additional features to VAM 3L
- Fibre arc sensor sensitivity adjustment

### VAM 10L, VAM 10 LD
- Point sensor I/O unit
- Auxiliary supply and communication via modular cable
- Ten (10) point arc sensor connections
- Continuous supervision of sensors
- Connection of portable arc sensor
- Indication of the sensor channel and trip relay activation
- One trip relay
- Two communication ports for central unit and I/O unit interconnection

### VAM 10LD - Additional features to VAM 10L
- Labelling for customised arc sensor channel text
- Flush mounting
- HMI indication available on door closed position

### VAM 12L, VAM 12LD
- Point sensor I/O unit
- Three selective trip output contacts for dedicated sensors
- Auxiliary supply and communication via modular cable
- 10 point arc sensor connections
- Continuous supervision of sensors
- Connection of portable arc sensor
- Indication of the sensor channel and trip relay activation
- Two communication ports for central unit and I/O unit interconnection

### VAM 12LD - Additional features to VAM 12L
- Flush mounted unit
- HMI indication available on door closed position
- Labelling for customised arc sensor channel text
Selecting VAM I/O units

Selection table for VAM I/O units

<table>
<thead>
<tr>
<th>Mounting</th>
<th>VAM 3L</th>
<th>VAM 10L</th>
<th>VAM 10LD</th>
<th>VAM 12 L</th>
<th>VAM 12LD</th>
<th>VAM 4C</th>
<th>VAM 4CD</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIN rail</td>
<td>DIN rail</td>
<td>Door</td>
<td>DIN rail</td>
<td>Door</td>
<td>DIN rail</td>
<td>Door</td>
<td></td>
</tr>
<tr>
<td>No. of point sensors</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of loop sensors</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of protection zones supported</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of trip contacts</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>No. of alarm contacts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of current inputs</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of BI (24-48Vdc)*</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of BI (24-48Vdc) L&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of BO (24Vdc) trip</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of sensor channel indication (LED)</td>
<td>3</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Connection for portable sensor</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (<em>) (</em>) (<em>) (</em>)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Used for zone shift 1 < -- > 2 and 3 < --- > 4 (*) Text pocket for setting values

**DI control for zone shift**

<table>
<thead>
<tr>
<th>BI channel state</th>
<th>Active zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not active</td>
<td>x</td>
</tr>
<tr>
<td>Active</td>
<td>x</td>
</tr>
</tbody>
</table>

Used for VAM 10L, VAM 3L and VAM 3LX

Door mounted I/O units show arc protection system information without opening the secondary compartment door.

In case the central unit is located close to the I/O units, the I/O units can be placed in the secondary equipment compartment.
Sensors and accessories

Point sensors VA1EH and VA1DA
- Easy installation and replacement
- Enables fault location indication
- Surface mounting
- Tube mounting
- Continuous self-supervision

Fibre ARC-SLm-x sensors
- Standard fibre
- Length from 1 to 70 meters
- Self-supervision
- Cost effective when many compartments
  - Activation 8,000 lx
  - Multicore cable
  - 10 mm bending radius minimum

Sensor mounting plates
- Z- or L-shaped
- Wall mounting to VA1DA-x sensors
  (no extra holes in the switchgear)

Modular cable VX001-x

Portable sensor VA1DP-5
- Snap-in socket connection to sensor I/O unit

Portable sensor VA1DP-5D
- Snap-in socket connection to sensor I/O unit via VX031-5 cable

VAMP 4R trip multiplier relay
- 4 + 4 trip outputs (4 x NO and 4 x NC)
- Two separate tripping groups
- Enables a 7 ms total operation time to a large number of CBs controlled by binary output (BO)
- Requires external auxiliary power supply

In case the depth dimension behind the compartment door is limited, the IED can be equipped with frame around the collar. This arrangement reduces depth inside compartment by 45 mm.
Dimensional drawings

Panel mounting

1. 225 x 8.86 (225 x 3.48 in)
2. 8.93 (0.35 in)
3. 12 (4.72 in)
4. 38 x 7.62 (38 x 0.30 in)

Projection mounting

1. 224 x 8.86 (224 x 3.48 in)
2. 8.93 (0.35 in)
3. 12 (4.72 in)
4. 38 x 7.62 (38 x 0.30 in)
### Order codes

**Nominal supply voltage [V]**
- A = Power A 110 - 240 V (80 - 265 V ac/dc, T1, A1, SF)
- B = Power B 24 - 48 V (18 - 60 V dc, T1, A1, SF)

**I/O Card I**
- A = None
- B = 3BIO+2Arc (3 x BI/BO, 2 x Arc sensor, T2, T3, T4)
- C = F2BIO+1Arc (Fibre 2 x BI/BO, 1 x Arc loop sensor, T2, T3, T4)
- G = 6DI+4DO (6 x DI, 4 x DO)
- H = 6DI+4DO (6 x DI, 4 x DO(NC))
- I = 10DI (10 x DI)

**I/O Card II**
- A = None
- G = 6DI+4DO (6 x DI, 4 x DO)
- H = 6DI+4DO (6 x DI, 4 x DO(NC))
- I = 10DI (10 x DI)

**I/O Card III**
- A = None
- G = 6DI+4DO (6 x DI, 4 x DO)
- H = 6DI+4DO (6 x DI, 4 x DO(NC))
- I = 10DI (10 x DI)

**I/O Card IV**
- A = None
- D = 2IGBT (2 x IGBT High speed outputs), excludes I/O Card III, slot 4
- E = QD (VAM 3QD control card)
- F = 3TD/3ED (VAM 3TD/3ED control interface)
- G = 6DI+4DO (6 x DI, 4 x DO)
- H = 6DI+4DO (6 x DI, 4 x DO(NC))
- I = 10DI (10 x DI)

**Option card I**
- A = None
- D = 4Arc (4 x Arc sensor)

**Option card II**
- A = None
- D = 4Arc (4 x Arc sensor)

**Analog measurement card [A, V]**
- A = 3L+U+Io (5/1A)
- G = 3L + Io (5/1A) + U, Ring lug terminals

**Communication interface I**
- A = None
- B = RS232 (RS232, IRIG-B)
- C = RS232+RJ (RS232, IRIG-B + Ethernet RJ-45 100 Mbs)
- D = RS232+LC (RS232, IRIG-B + Ethernet LC 100 Mbs)
- N = 2xRJ (Ethernet RJ 100 Mbs, RSTP)
- O = 2xLC (Ethernet LC 100 Mbs, RSTP)
- P = PP (Plastic / Plastic serial fibre)
- R = GG (Glass / Glass serial fibre)

**Communication interface II**
- A = None
- B = RS232
- P = PP (Plastic / Plastic serial fibre)
- R = GG (Glass / Glass serial fibre)

**Display type**
- B = 128x128 (128 x 128 LCD matrix)
- C = 128x128BIT (128 x 128 LCD matrix, detachable)

**DI threshold voltage**
- 1 = 24 V dc / 110 V ac
- 2 = 110 V dc / 220 V ac
- 3 = 220 V dc

**Note 1**
By default cable length is 2 m. In case other length is needed order separately VX001-1, VX001-3 or VX001-5 for 1 m, 3 m and 5 m respectively.
## Accessories

<table>
<thead>
<tr>
<th>Order Code</th>
<th>Explanation</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAM 3L</td>
<td>Fiber sensor I/O unit (VAMP 221 &amp; 321)</td>
<td>3 fibre loops, 1 trip relay</td>
</tr>
<tr>
<td>VAM 3LX</td>
<td>Fiber sensor I/O unit (VAMP 221 &amp; 321)</td>
<td>3 fiber loops, 1 trip relay, adjustable sensitivity</td>
</tr>
<tr>
<td>VAM 4C</td>
<td>Current I/O unit (VAMP 221 &amp; 321)</td>
<td>3 current inputs, 1 trip relay</td>
</tr>
<tr>
<td>VAM 4CD</td>
<td>Current I/O unit (VAMP 221 &amp; 321)</td>
<td>3 current inputs, 1 trip relay, flush mounting</td>
</tr>
<tr>
<td>VAM 10L</td>
<td>Point sensor I/O unit (VAMP 221 &amp; 321)</td>
<td>10 sensor inputs, 1 trip relay</td>
</tr>
<tr>
<td>VAM 10LD</td>
<td>Point sensor I/O unit (VAMP 221 &amp; 321)</td>
<td>10 sensor inputs, 1 trip relay, flush mounting</td>
</tr>
<tr>
<td>VAM 12L</td>
<td>Point sensor I/O unit (VAMP 221 &amp; 321)</td>
<td>10 sensor inputs, 3 trip relays</td>
</tr>
<tr>
<td>VAM 12LD</td>
<td>Point sensor I/O unit (VAMP 221 &amp; 321)</td>
<td>10 sensor inputs, 3 trip relays, flush mounting</td>
</tr>
<tr>
<td>VAMP 4R</td>
<td>Trip multiplier relay</td>
<td>4 x NO, 4 x NC, 2 groups</td>
</tr>
</tbody>
</table>

| VA 1 DA-6  | Arc sensor  | Fiber  | Cable length 6 m |
| VA 1 DA-20 | Arc sensor  | Cable length 20 m |
| VA 1 DA-6S | Arc sensor, shielded | Cable length 6 m |
| VA 1 DA-20S| Arc sensor, shielded | Cable length 20 m |
| VA1DA-6-HF| Arc sensor, halogen free | Cable length 6 m |
| VA 1 DA-20-HF| Arc sensor, halogen free | Cable length 20 m |
| VA 1 EH-6  | Arc sensor (pipe type) | Cable length 6 m |
| VA 1 EH-20 | Arc sensor (pipe type) | Cable length 20 m |
| VA 2 DV-5  | Arc Sensor, shielded (metal pipe) | Cable length 5 m |
| VA 2 DV-11 | Arc Sensor, shielded (metal pipe) | Cable length 11 m |
| VA 2 DV-15 | Arc Sensor, shielded (metal pipe) | Cable length 15 m |
| VA 1 DP-5  | Portable arc sensor | Cable length 5 m |
| VA 1 DP-5D | Portable arc sensor | Cable length 5 m |
| VA 1 GIS-1 | Arc Sensor, shielded with GIS adapter | Cable length 1.5 m |
| VA 1 GIS-3 | Arc Sensor, shielded with GIS adapter | Cable length 3 m |
| VA 1 GIS-5 | Arc Sensor, shielded with GIS adapter | Cable length 5 m |
| VA 1 GIS-10| Arc Sensor, shielded with GIS adapter | Cable length 10 m |
| ARC-SLm-x | Fiber sensor, 8 000 lx | \( x = \text{fibre length} \) [m] 11 |
| SLS-1      | Fiber joint SLS-1 | Max one joint per fibre |
| VX001-xx   | Modular cable VAM <-> VAM (xx = cable length [m]) | Preferred cable lengths 12 |
| VX031-5    | Extension cable for VA1DP-5D | Cable length 5m |
| VX052-3    | USB programming cable (VAMPSET) | Cable length 3 m |
| VX072      | VAMP 300/321 profibus cable | Cable length 3 m |

| VYX001     | Surface mounting plate for sensors | Z-shaped |
| VYX002     | Surface mounting Plate for sensors | L-shaped |
| VX 628     | Surface Mounting Plate for VA 1 DV Sensor | U-shaped |
| VX 695     | Projection for 300-series | Height 45 mm |

| VSE001PP   | Fiber optic module (plastic - plastic) | RS-232 mode only |
| VSE002     | RS485 interface module | RS-232 mode only |
| VPA 3CG    | Profibus DP fieldbus option board |

**Note 1:**
Fiber lengths 1, 5, 10, 15, 20, 25, 30, 35, 40, 50, 60 or 70 m

**Note 2:**
Cable lengths 1, 3, 5, 7, 10, 15, 20, 25 & 30 m
Technical data

VAMP 321 system

### Power supply

**Vs**

110 – 240 ± 10% V ac/dc  
110/120/220/240 V ac  
110/125/220 V dc  
or  
24 – 48 ± 20% V dc  
24/48 V dc

### Measuring circuits

**Rated current IN**

- Burden: 5 A (configurable for CT secondaries 1 – 10 A)  
- Burden: < 0.2 VA

**Rated current I0**

- Burden: 5 A / 1 A (optionally 1 A / 0.2 A)  
- Burden: < 0.2 VA

**Rated voltage UN**

- Burden: 100 V (configurable for VT secondaries 50 – 120 V)  
- Burden: < 0.5 VA

**Rated frequency fN**

45 - 65 Hz

### Operating settings

**Phase current stage IL**

0.5 – 8.0 x IN

**Earth-fault current Io**

0.1 – 5.0 x IN

### Tripping outputs

**Number of contacts**

As per order code

**Rated voltage**

250 V ac/dc

**Continuous carry**

5 A

**Make and carry for 0.5 s**

30 A

**Make and carry for 3 s**

15 A

**Contact material**

AgNi 90/10

**Operating time (trip contact)**

7 ms

**Operating time (HSO)**

2 ms

### Signal outputs

**SF output contact**

1 pc change over

**Signal contact**

1 pc NO

**Rated Voltage**

250 V ac/dc

**Continuous carry**

5 A

**Contact material**

AgNi

### BIO inputs/outputs, slot 2 option B

#### Rated output voltage

+30 V dc

#### Rated input voltage

+18 – 265 Vdc

#### Rated current (BO)

20 mA

#### Rated current (BI)

5 mA

**BI line (IN)**

3 pcs

**BO lines (OUT)**

3 pcs

### BIO inputs/outputs, slot 2 option C

**Connector**

ST

**Fibre**

50/125 μm, 62.5/125 μm, 100/140 μm, and 200 μm

**Max link distance**

2 km (62.5/125 μm)

**Max link attenuation**

7 db

**BI line (IN)**

2 pcs

**BO lines (OUT)**

2 pcs

### Arc I/O bus (RJ-45)

**Multi drop**

Max 16 slaves and 3 masters

**Supply to slaves**

Isolated 24 V dc

**Communication (master-slave)**

RS485 information / self supervision

**ARC / OC signal master-slave**

4 zone ARC and 1 zone OC line

### Arc sensor inputs

**Direct inputs**

As per order code

**Supply to sensor**

Isolated 12 V dc

---

The VAMP 321 is designed with user-friendliness in mind.
### VAM I/O units

<table>
<thead>
<tr>
<th>TRIP contacts</th>
<th>VAM 10L / LD</th>
<th>VAM 12L / LD</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of trip contacts</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>No. of digital inputs</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>No. of digital outputs</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>No. of arc sensor channels</td>
<td>10 pcs</td>
<td></td>
</tr>
<tr>
<td>Power supply</td>
<td>+24 V dc via modular cable or terminals</td>
<td></td>
</tr>
<tr>
<td>Power consumption, In (stand-by)</td>
<td>45 mA</td>
<td></td>
</tr>
<tr>
<td>Power consumption per activated channel</td>
<td>20 mA</td>
<td></td>
</tr>
<tr>
<td>Total power consumption</td>
<td>45 mA + ( n* x I sensAct)</td>
<td></td>
</tr>
</tbody>
</table>

### VAM 3L, VAM 3LX

<table>
<thead>
<tr>
<th>TRIP contacts</th>
<th>VAM 3L, VAM 3LX</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of trip contacts</td>
<td>1</td>
</tr>
<tr>
<td>No. of digital inputs</td>
<td>1</td>
</tr>
<tr>
<td>No. of digital outputs</td>
<td>1</td>
</tr>
<tr>
<td>No. of fibre loops</td>
<td>3 pcs</td>
</tr>
<tr>
<td>Power supply</td>
<td>+24 V dc via modular cable or terminals</td>
</tr>
<tr>
<td>Power consumption, In (stand-by)</td>
<td>45 mA</td>
</tr>
<tr>
<td>Power consumption per activated channel</td>
<td>20 mA</td>
</tr>
<tr>
<td>Total power consumption</td>
<td>45 mA + ( n* x I sensAct)</td>
</tr>
</tbody>
</table>

### VAM 4C / VAM 4CD

<table>
<thead>
<tr>
<th>TRIP contacts</th>
<th>VAM 4C / VAM 4CD</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of trip contacts</td>
<td>1</td>
</tr>
<tr>
<td>No. of digital inputs</td>
<td>1</td>
</tr>
<tr>
<td>No. of digital outputs</td>
<td>1</td>
</tr>
<tr>
<td>Measuring circuits</td>
<td></td>
</tr>
<tr>
<td>Rated current Iin</td>
<td>1 A / 5 A</td>
</tr>
<tr>
<td>Rated frequency f in</td>
<td>45 – 65 Hz</td>
</tr>
<tr>
<td>Power consumption</td>
<td>≤ 0.3 VA</td>
</tr>
<tr>
<td>Thermal withstand</td>
<td>60 x In for 1 s</td>
</tr>
<tr>
<td>Operating settings</td>
<td></td>
</tr>
<tr>
<td>Phase current stage IL&gt;</td>
<td>0.5 – 6.0 x In</td>
</tr>
<tr>
<td>Earth-fault current IL&gt;</td>
<td>0.05 – 5.0 x In</td>
</tr>
<tr>
<td>Accuracy</td>
<td>± 5 %</td>
</tr>
<tr>
<td>Reset ratio</td>
<td>0.95</td>
</tr>
</tbody>
</table>

### VAMP 4R trip multiplier relay

| Power supply | 24 V dc |
| Control signal | 18 – 265 V ac/dc |
| Tripping contacts | 4 pcs NO, 4 pcs NC |
| Rated voltage | 250 V ac/dc |
| Continuous carry | 5 A |
| Make and carry for 0.5s | 30 A |
| Make and carry for 3s | 15 A |
| Contact material | AgNi |
| Number of tripping groups | 2 |
### Tests and Enviromental

<table>
<thead>
<tr>
<th>Disturbance Tests</th>
<th>Standard &amp; Test class / level</th>
<th>Test value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emission</td>
<td>EN 61000-6-4 / IEC 60255-26</td>
<td><strong>0.15 – 30 MHz</strong></td>
</tr>
<tr>
<td>- Conducted</td>
<td>EN 55011, Class A / IEC 60255-25</td>
<td><strong>30 – 1 000 MHz</strong></td>
</tr>
<tr>
<td>- Emitted</td>
<td>EN 55011, Class A / IEC 60255-25 / CISPR 11</td>
<td><strong>± 2.5 kVp CM, ± 2.5 kVp DM</strong></td>
</tr>
<tr>
<td>Immunity</td>
<td>EN 61000-6-2 / IEC 60255-26</td>
<td><strong>± 8 kV contact, ± 15 kV air</strong></td>
</tr>
<tr>
<td>- 1Mhz damped oscillatory wave</td>
<td>IEC 60255-22-1</td>
<td><strong>80 - 2700 MHz, 10 V/m</strong></td>
</tr>
<tr>
<td>- Static discharge (ESD)</td>
<td>EN 61000-4-2 Level 4 / IEC 60255-22-2 Class 4</td>
<td><strong>± 4 kV 5/50 ns, 5 kHz</strong></td>
</tr>
<tr>
<td>- Emitted HF field</td>
<td>EN 61000-4-3 Level 3 / IEC 60255-22-3</td>
<td><strong>± 4 kV, 1.2/50 µs, CM</strong></td>
</tr>
<tr>
<td>- Fast transients (EFT)</td>
<td>EN 61000-4-4 Level 4 / IEC 60255-22-4 Class A</td>
<td><strong>2 kV, 1.2/50 µs, DM</strong></td>
</tr>
<tr>
<td>- Surge</td>
<td>EN 61000-4-5 Level 4 / IEC 60255-22-5</td>
<td><strong>± 8 kV, 50 Hz</strong></td>
</tr>
<tr>
<td>- Conducted HF field</td>
<td>EN 61000-4-6 Level 3 / IEC 60255-22-6</td>
<td><strong>&gt; 20 W internal</strong></td>
</tr>
<tr>
<td>- Power-frequency magnetic field</td>
<td>EN 61000-4-8</td>
<td><strong>&gt; 100Mohm, 500 V / 100 V</strong></td>
</tr>
<tr>
<td>- Pulse magnetic field</td>
<td>EN 61000-4-9 Level 5</td>
<td><strong>&lt; 0.1 ohm</strong></td>
</tr>
<tr>
<td>- Voltage interruptions</td>
<td>EN 61000-4-29 / IEC 60255-11</td>
<td><strong>12 % of operating voltage (DC) / 10 min</strong></td>
</tr>
<tr>
<td>- Voltage alternative component</td>
<td>EN 61000-4-17 / IEC 60255-11</td>
<td><strong>30 %/10 ms, 100%/10 ms, 60%/100 ms, &gt;95%/5000 ms</strong></td>
</tr>
<tr>
<td>- Voltage dips and short interruptions</td>
<td>EN 61000-4-11</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical safety tests</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Impulse voltage withstand</td>
<td>EN 60255-5, Class III</td>
<td><strong>5 kV, 1.2/50 µs</strong></td>
</tr>
<tr>
<td>- Dielectric test</td>
<td>EN 60255-5, Class III</td>
<td><strong>2 kV, 50 Hz</strong></td>
</tr>
<tr>
<td>- Insulation resistance</td>
<td>EN 60255-5</td>
<td><strong>&gt; 100Mohm, 500 V / 100 V</strong></td>
</tr>
<tr>
<td>- Protective bonding resistance</td>
<td>EN 60255-27</td>
<td><strong>&lt; 0.1 ohm</strong></td>
</tr>
<tr>
<td>- Power supply burden</td>
<td>IEC 60255-1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mechanical tests</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Device in operation</td>
<td>IEC 60255-21-1, Class II / IEC 60068-2-6, Fc</td>
<td><strong>1Gn, 10Hz – 150 HZ</strong></td>
</tr>
<tr>
<td>- Vibrations</td>
<td>IEC 60255-21-2, Class II / IEC 60068-2-27, Ea</td>
<td><strong>10Gn/11 ms</strong></td>
</tr>
<tr>
<td>Device de-energized</td>
<td>IEC 60255-21-1, Class II / IEC 60068-2-6, Fc</td>
<td><strong>2Gn, 10 Hz – 150 HZ</strong></td>
</tr>
<tr>
<td>- Vibrations</td>
<td>IEC 60255-21-2, Class II / IEC 60068-2-27, Ea</td>
<td><strong>30Gn/11 ms</strong></td>
</tr>
<tr>
<td>- Shocks</td>
<td>IEC 60255-21-2, Class II / IEC 60068-2-27, Ea</td>
<td><strong>20Gn/16 ms</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental tests</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Device in operation</td>
<td>EN / IEC 60068-2-2, Bd</td>
<td><strong>+70°C</strong></td>
</tr>
<tr>
<td>- Dry heat</td>
<td>EN / IEC 60068-2-1, Ad</td>
<td><strong>-40°C</strong></td>
</tr>
<tr>
<td>- Cold</td>
<td>EN / IEC 60068-2-30, Db</td>
<td>From +25°C to +55°C, From 93% RH to 98% RH, 6 days</td>
</tr>
<tr>
<td>- Cold</td>
<td>EN / IEC 60068-2-78, Cab</td>
<td><strong>+40°C, 93% RH, 10 days</strong></td>
</tr>
<tr>
<td>Device in storage</td>
<td>EN / IEC 60068-2-2, Bb</td>
<td></td>
</tr>
<tr>
<td>- Dry heat</td>
<td>EN / IEC 60068-2-1, Ab</td>
<td><strong>+70°C</strong></td>
</tr>
<tr>
<td>- Cold</td>
<td></td>
<td><strong>-40°C</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental conditions</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature, in-service</td>
<td>-40 – +65°C</td>
<td></td>
</tr>
<tr>
<td>Ambient temperature, storage</td>
<td>-40 – +70°C</td>
<td></td>
</tr>
<tr>
<td>Relative humidity</td>
<td>&lt; 95%, no condensation allowed</td>
<td></td>
</tr>
<tr>
<td>Maximum operating altitude</td>
<td>2000 m</td>
<td></td>
</tr>
<tr>
<td>Degree of protection (IEC 60529)</td>
<td>IP54 (from front when panel mounted)</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>3.2 kg or higher (depends of options)</td>
<td></td>
</tr>
<tr>
<td>Dimension (W x H x D)</td>
<td>270 x 176 x 230 mm</td>
<td></td>
</tr>
</tbody>
</table>

### Package

| Dimensions (W x H x D)                | 315 x 210 x 257 mm            |                                                                           |
| Weight (IED, Package and Manual)     | 4.2 kg or higher (depends of options) |                                                                           |
Device track record

- Schneider Electric’s VAMP range specialises in protection relays, arc flash protection and measuring and monitoring units for power systems.
- VAMP’s medium-voltage and sub-transmission protection relays are used in numerous applications, from overhead line feeders and substations to power plants and industrial power system. Their integrated arc flash fault protection functionality enhances both people and property environment of care and has made VAMP a leading range in arc flash protection worldwide. VAMP products meet the updated international standards and regulations.