VAMP 321

Modular solutions for flexible arc flash protection

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 occuring 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.

m.vamp.fi

Life Is On Schneider Electric

VAMP 321

We can supply an arc flash protection system tailored to your application

An arc flash protection relay is a protective device for the most hazardous power system fault situations.

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.

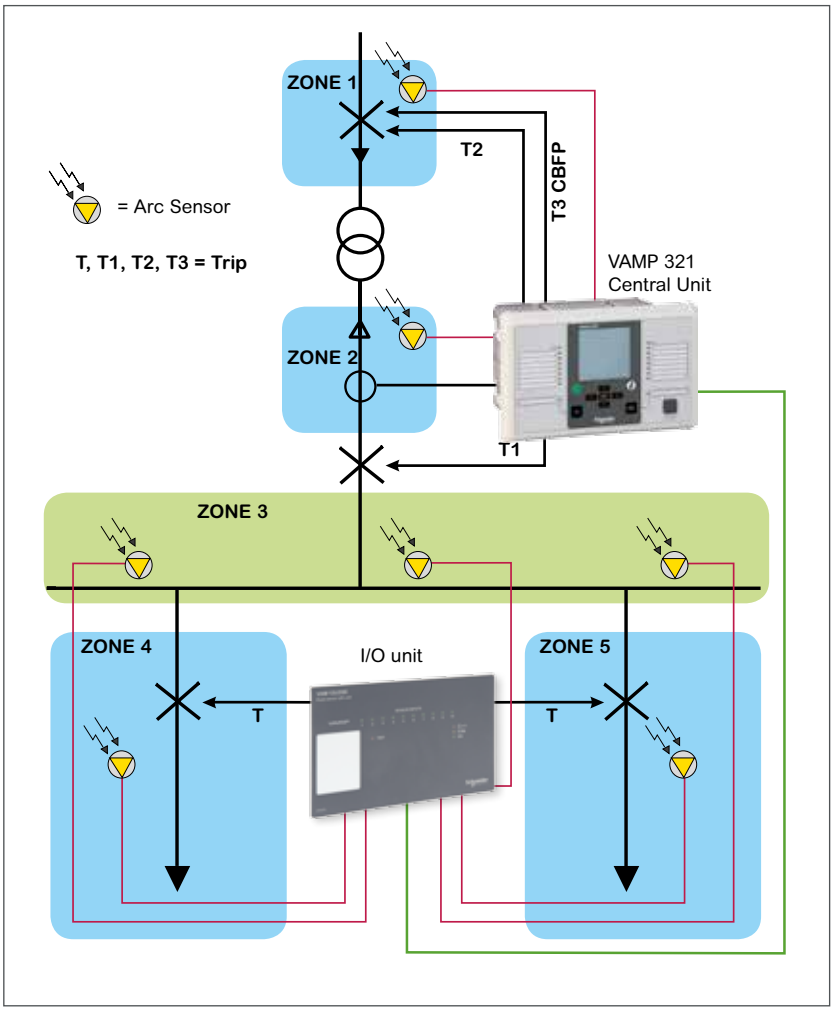
User benefits

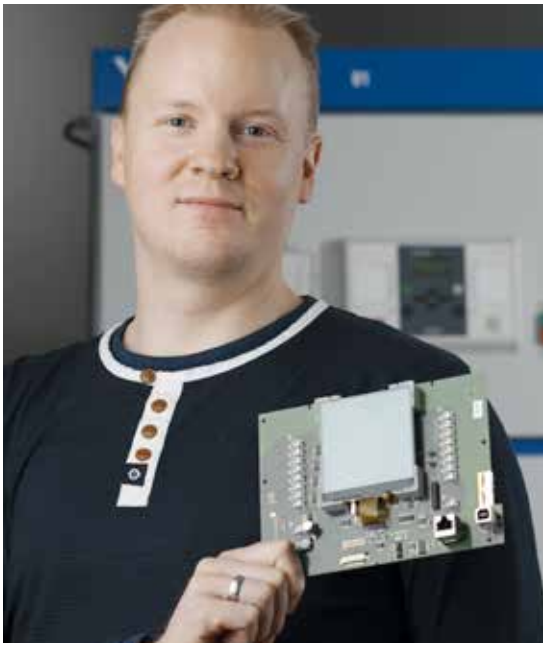
- **Compatible with existing systems**
  The VAMP 321 relies on the same VAM I/O units, cabling and sensors as the company's other renowned arc flash protection system.
- **Engineered for the most demanding environments**
  The new mechanical structure comprises a robust cast aluminium casing. Adjustable 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.

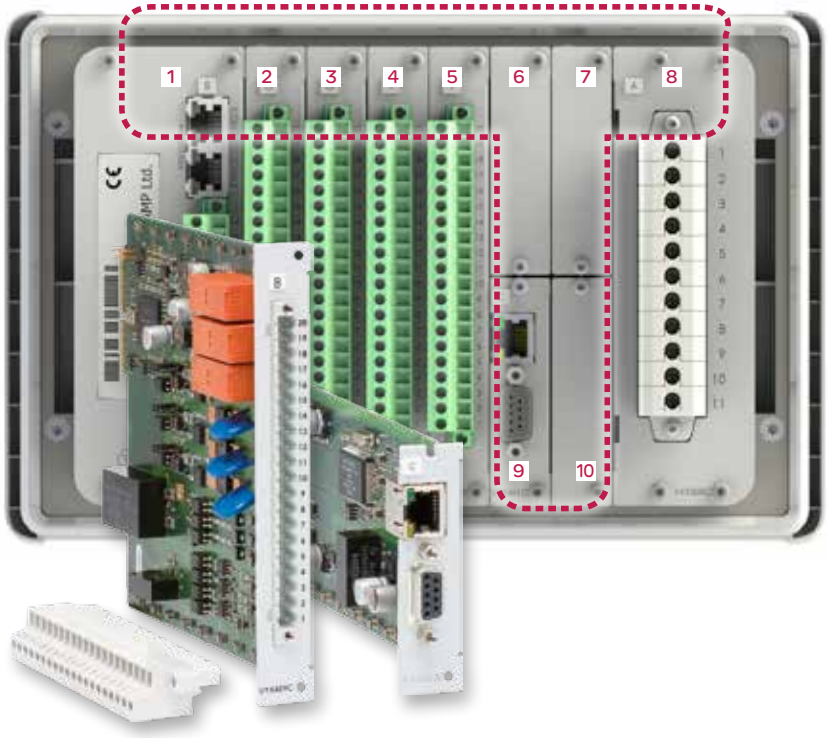
- **Local push buttons for object control:**

  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

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.

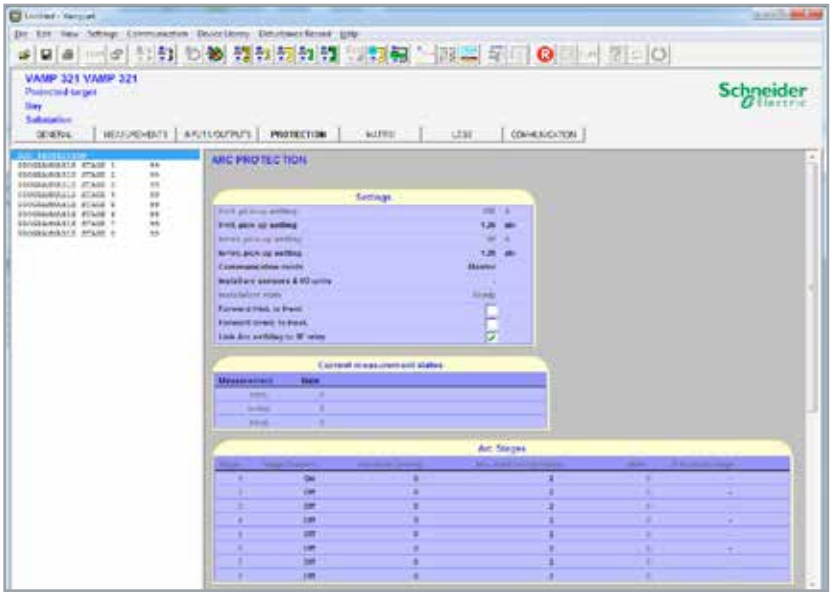
Inputs and outputs combination examples							
DI (pcs)	31	30	26	22	18	16	12
DO (pcs)	14	10	10	14	18	10	14

VAMPSET

Setting and Configuration Tool

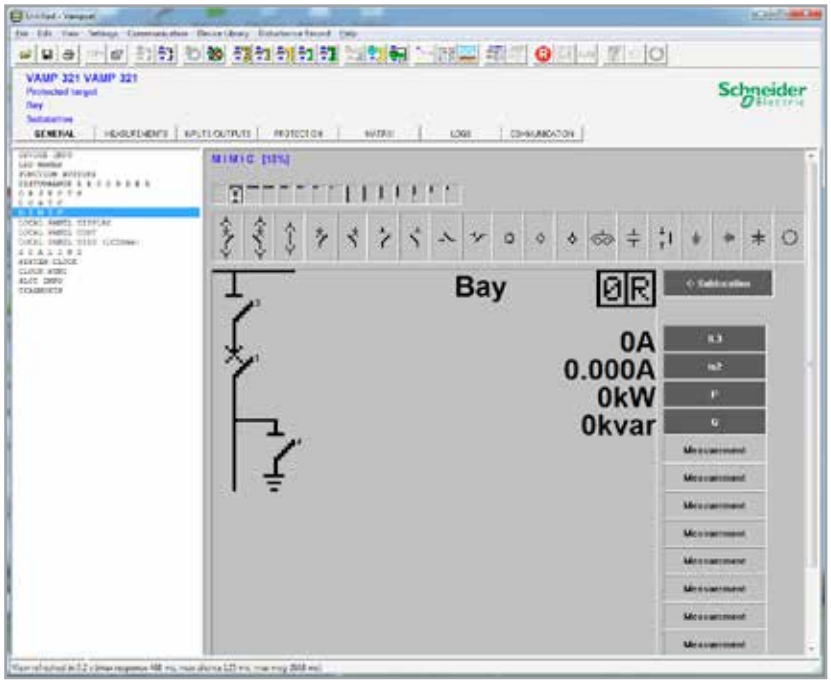
VAMPSET is a user-friendly, free-of-charge relay management software for setting parameters and configuring VAMP relays. Via the VAMPSET software, relay parameters, configurations and recorded data can be exchanged between PC and VAMP relays. Supporting the COMTRADE format, VAMPSET also intcorporates 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 protducts.



HMI can be freely configured to show desired mimic and measure-ments 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.

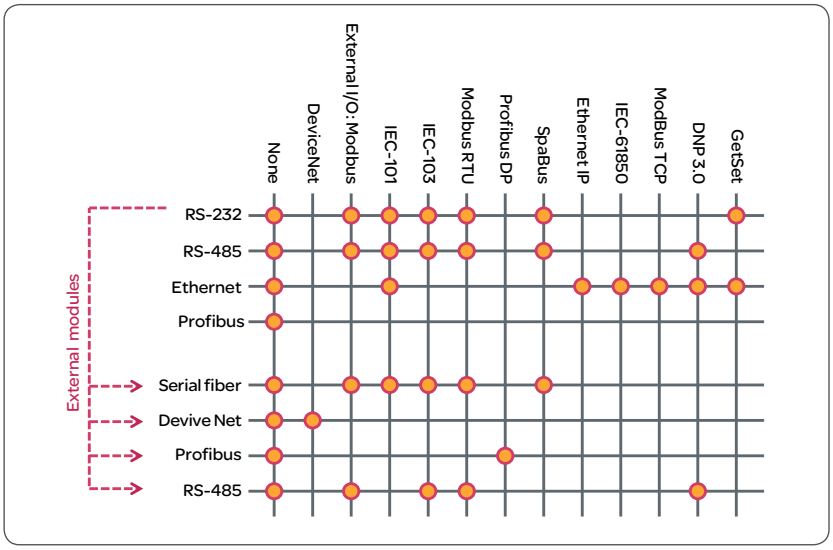
IEC 61850

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

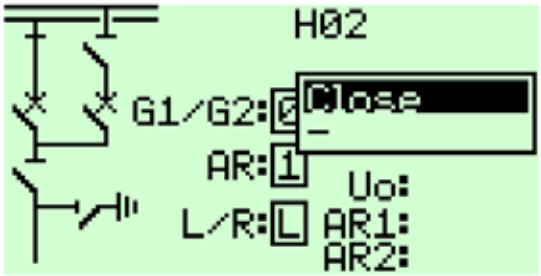
Communication matrix

Communication matrix shows which physical interface matches with supported protocols.



Circuit breaker control with F1 / F2 buttons

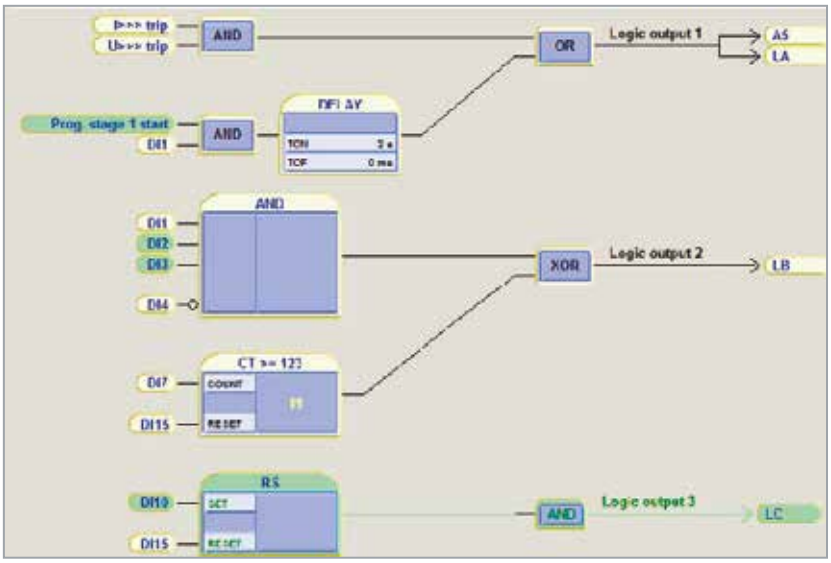
Another way to control circuit breaker or isolators is to program Function button F1 and F2 to execute the control command. Once programmed F1 could be the close and F2 open operand. A dedicated info view appears on the HMI requesting confirmation or de-selection of the action.



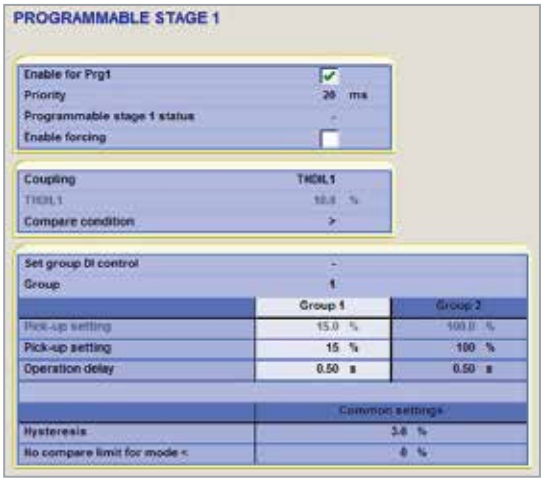
Programmable stages

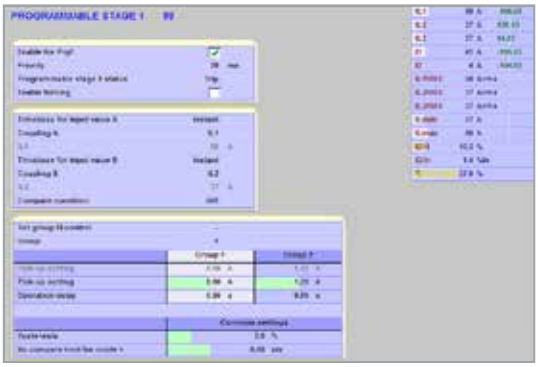
There are eight programmable stages available to use with various applications. Each stage can monitor any analogue (measured or calculated) signal and issue start and trip signals. Programmable stages extend the protection functionality of the manager series to a new level. For example, if four stages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

Mounting options

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.

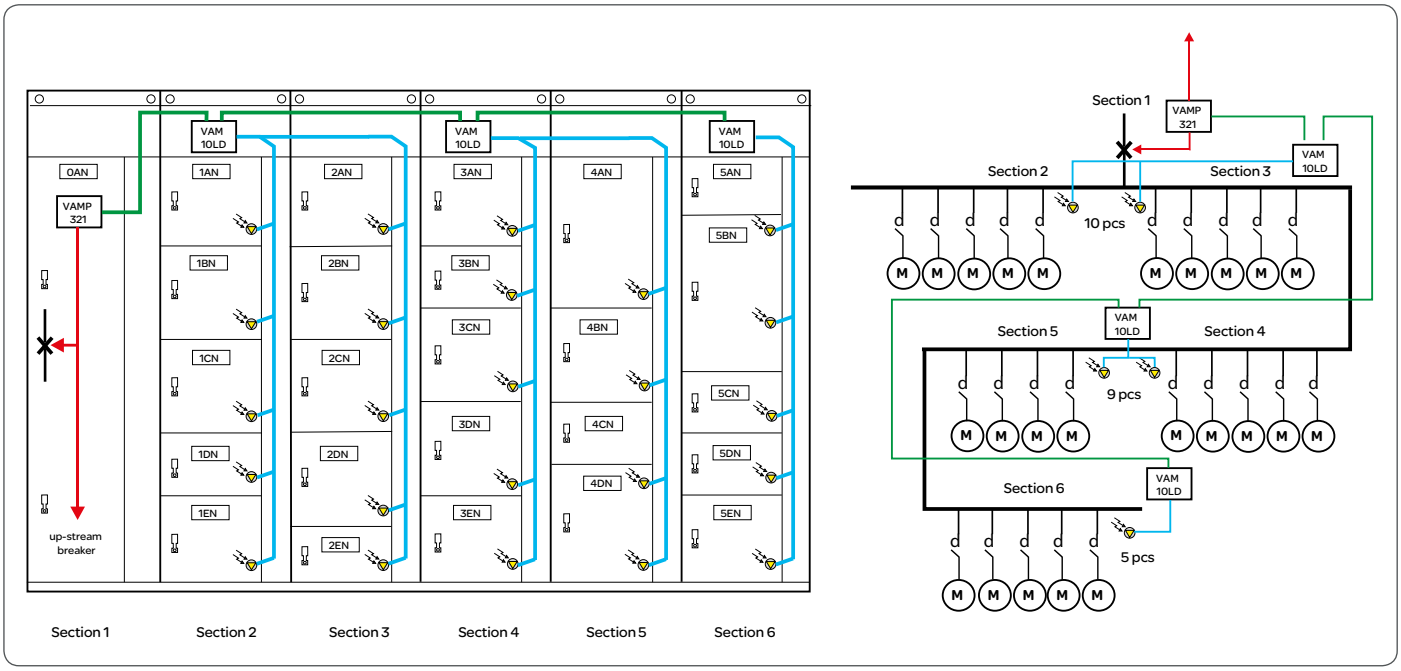
Mounting with detachable HMI: the base unit of the IED and display are connected using VAMP's VX001 cabling.

Selective and flexible arc flash protection solutio

- 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 arc sensor I/O units incorporate a snap-in connector for the portable sensor. The activated arc sensor channel is indicated with a led.

The majority of arc faults occur in the cable compartment hence it is a natural location for the point sensor.

ns for low and medium voltage systems

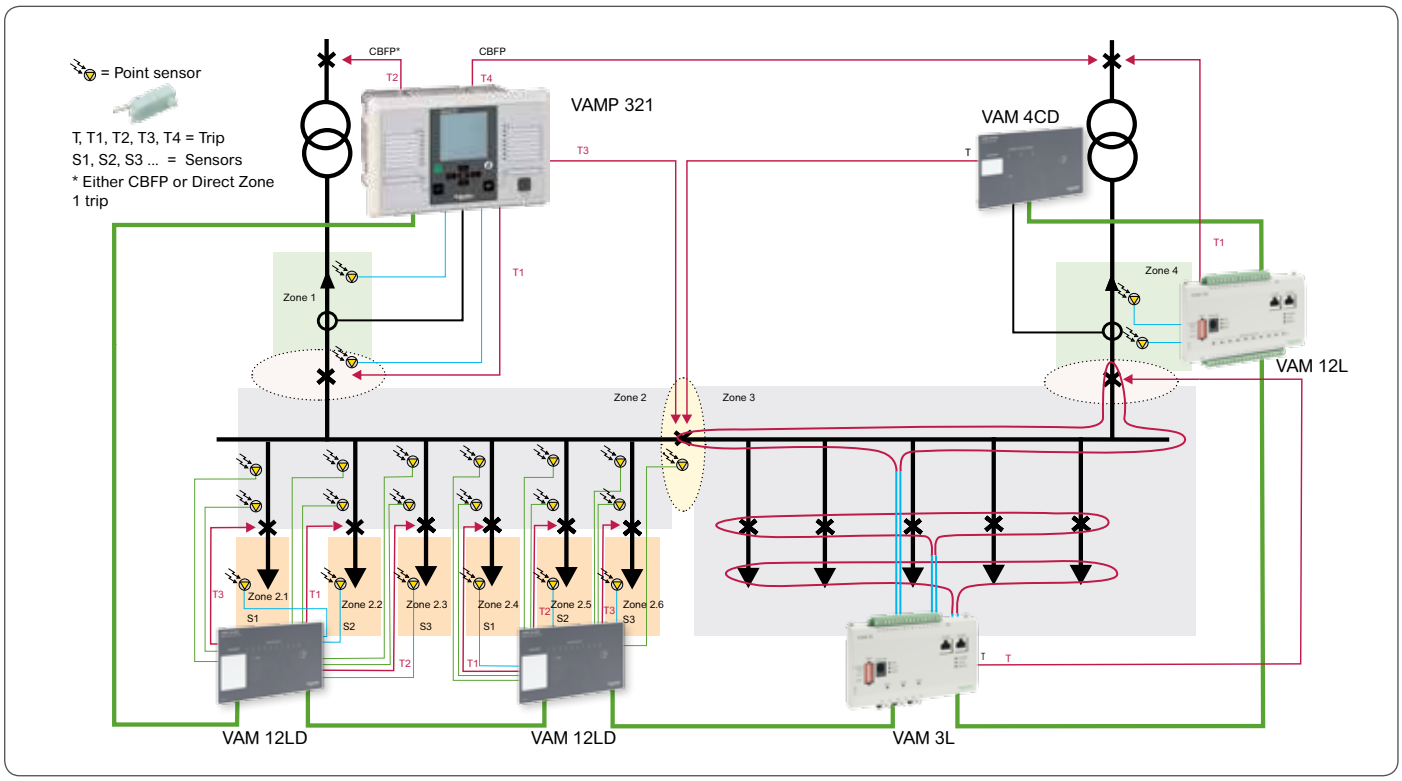
The selectivity requirement of the arc flash protection is dependent on the switchgear construction and the importance of the power distribution. The more important the supplied power, the more selective arc flash protection scheme is implemented.

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.

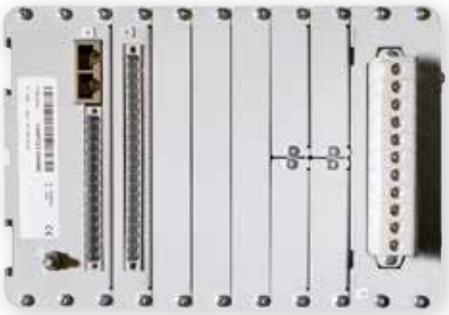
Characteristics and highlights of the VAMP 321

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.

arc protection systems

I/O units for VAMP 321 arc protection system

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 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 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 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

	VAM 3L	VAM 10L	VAM 10LD	VAM 12 L	VAM 12LD	VAM 4C	VAM 4CD
Mounting	DIN rail	DIN rail	Door	DIN rail	Door	DIN rail	Door
No. of point sensors		10	10	10	10		
No. of loop sensors	3						
No. of protection zones supported	1	1	1	4	4		
No. of trip contacts	1	1	1	3	3	1	1
No. of alarm contacts				1	1		
No. of current inputs						3	3
No. of BI (24-48Vdc)*	1	1	1				
No. of BI (24-48Vdc) L>						1	1
No. of BO (24Vdc) trip	1	1	1			1	1
No. of sensor channel indication (LED)	3	10	10	10	10	3	3
Connection for portable sensor	1	1	1	1	1		
Other			(*)		(*)		(*)

* Used for zone shift 1 < -- > 2 and 3 < --- > 4

(*) Text pocket for setting values

DI control for zone shift

	Active zone			
BI channel state	1	2	3	4
Not active	x		x	
Active		x		x

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

Point sensor VA1EH-x [1] (pipe)

Point sensor VA1DA-x [1] (surface)

Fibre ARC-SLm-x [2] 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

Note 1: X = cable length (m)

Note 2: X = fibre length (m)

For more details, see accessories page 19.

Sensor mounting plates

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

Sensor mounting plate VYX001, Z-shaped

Sensor mounting plate VYX002, L-shaped

Modular cable VX001-x

Modular cable VX001-x [1]

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

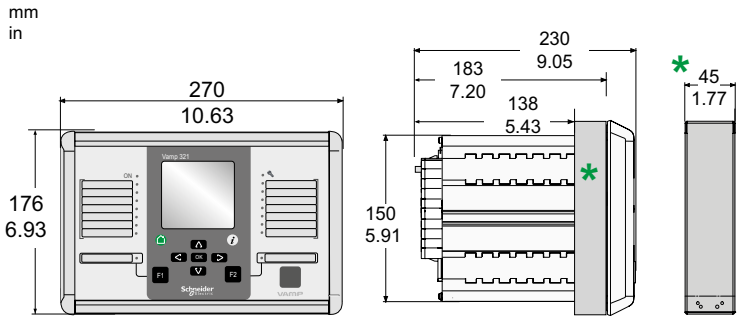
VAMP 4R trip multiplier relay

- 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

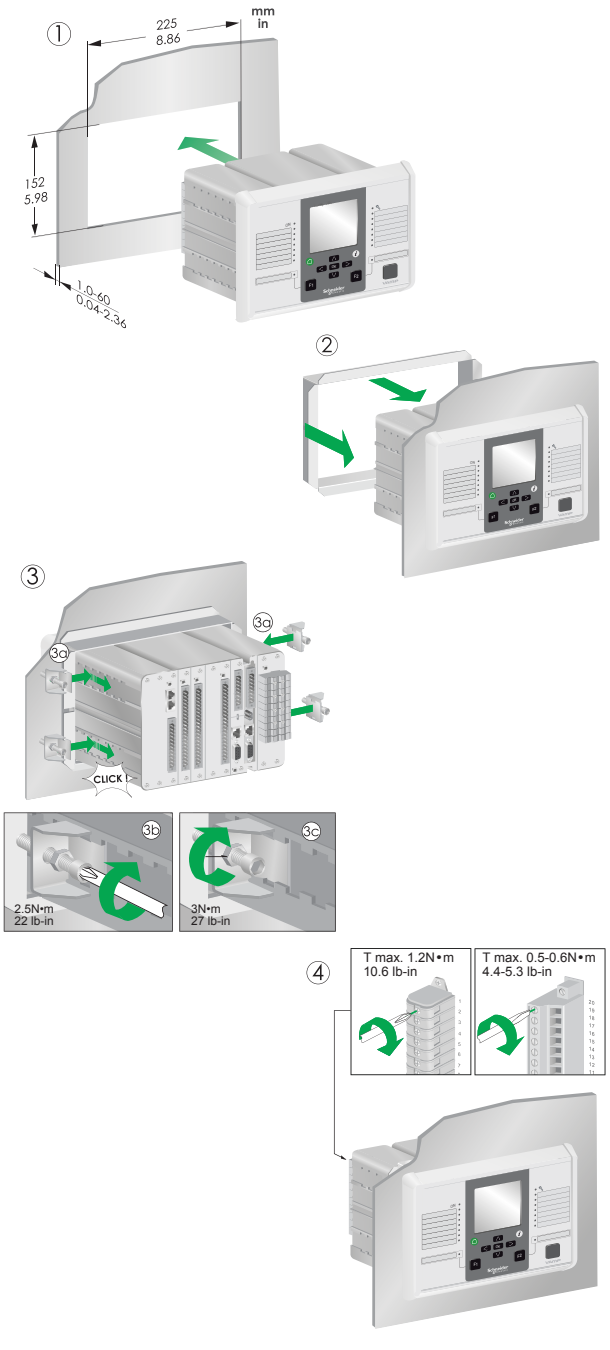
Projection mounting

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.

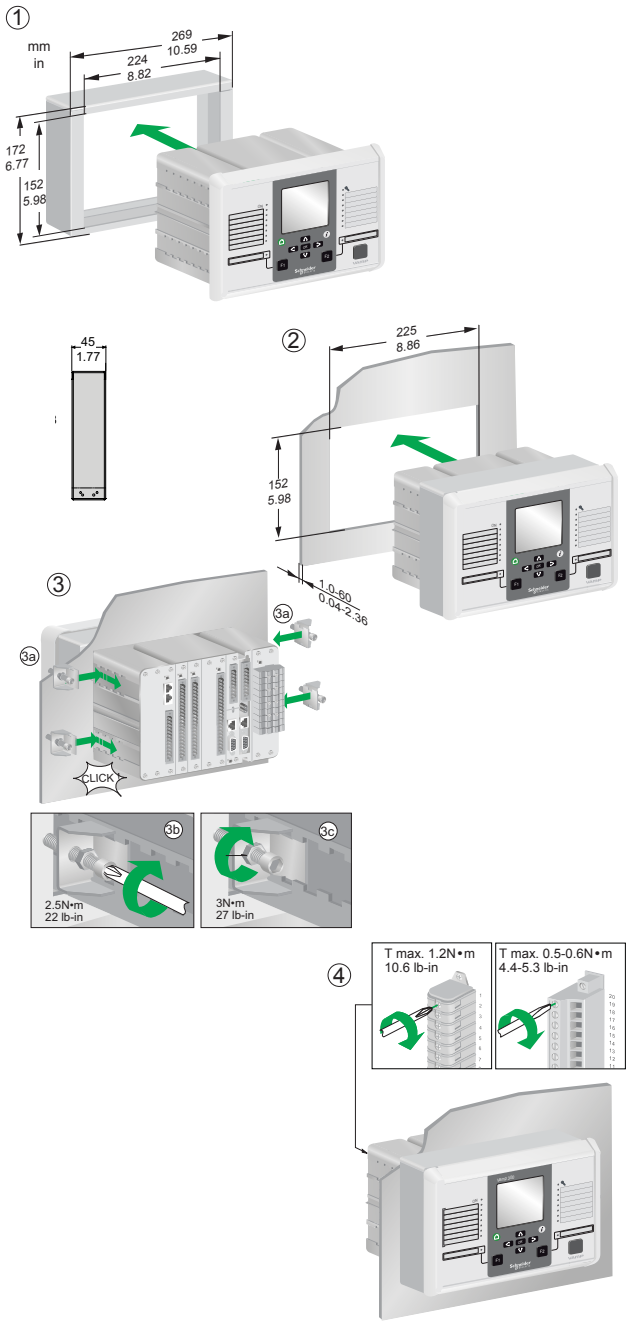
Dimensional drawings



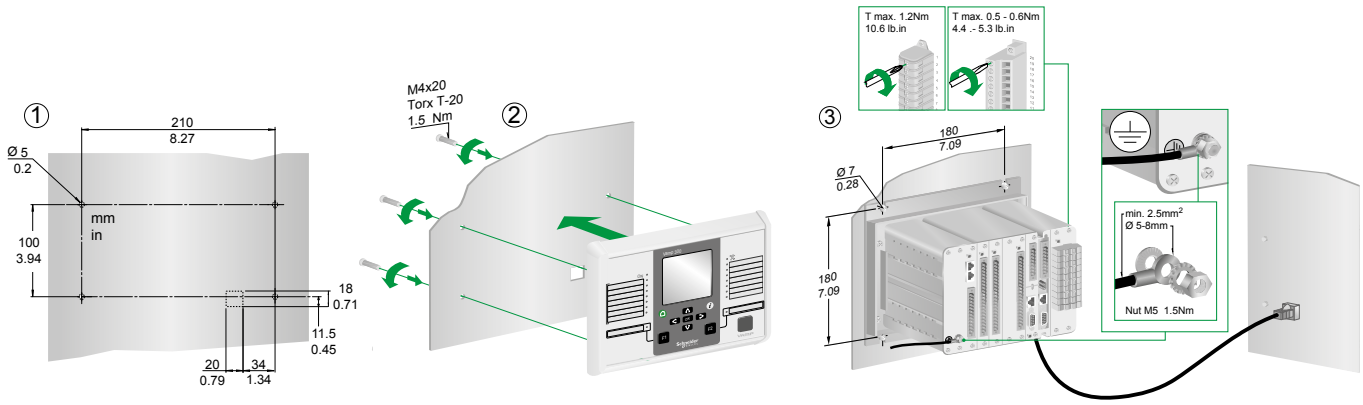
Panel mounting

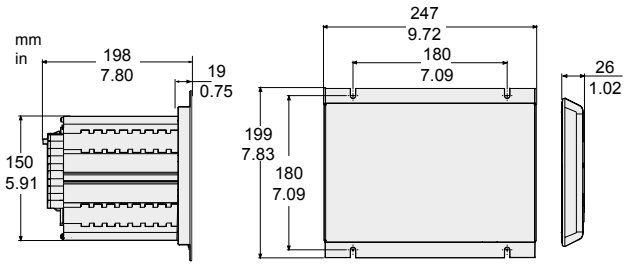


Projection mounting

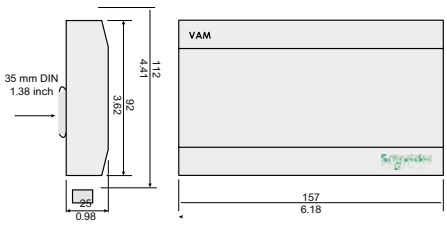


Wall mounting with detachable HMI

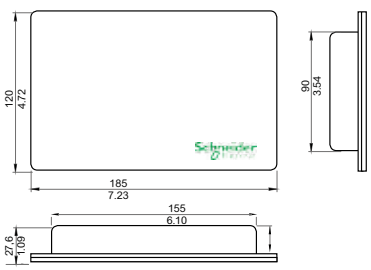




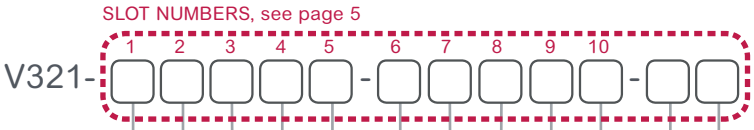
VAM 10L, 3L, 4C and VAMP 4R



VAM 4CD, 10 LD, 12LD flush mounting



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	= 128x128Ext (128 x 128 LCD matrix, detachable) (1
DI treshold voltage	
1	= 24 V dc / 110 V ac
2	= 110 V dc / 220 V ac
3	= 220 V dc
A	= 24Vdc/ac, WITH conformal coating
B	= 110 Vdc/ac, WITH conformal coating
C	= 220 Vdc/ac, WITH conformal coating

Note 1
By default cable lenght is 2 m. In case other leght is needed order separately VX001-1, Vx001-3 or VX001-5 for 1 m, 3 m and 5 m respectively.

Accessories

Order Code	Explanation	Note
VAM 3L	Fiber sensor I/O unit (VAMP 221 & 321)	3 fibre loops, 1 trip relay
VAM 3LX	Fiber sensor I/O unit (VAMP 221 & 321)	3 fiber loops, 1 trip relay, adjustable sensitivity
VAM 4C	Current I/O unit (VAMP 221 & 321)	3 current inputs, 1 trip relay
VAM 4CD	Current I/O unit (VAMP 221 & 321)	3 current inputs, 1 trip relay, flush mounting
VAM 10L	Point sensor I/O unit (VAMP 221 & 321)	10 sensor inputs, 1 trip relay
VAM 10LD	Point sensor I/O unit (VAMP 221 & 321)	10 sensor inputs, 1 trip relay, flush mounting
VAM 12L	Point sensor I/O unit (VAMP 221 & 321)	10 sensor inputs, 3 trip relays
VAM 12LD	Point sensor I/O unit (VAMP 221 & 321)	10 sensor inputs, 3 trip relays, flush mounting
VAMP 4R	Trip multiplier relay	4 x NO, 4 x NC, 2 groups
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-1,5	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 = fibre length [m] (1
SLS-1	Fiber joint SLS-1	Max one joint per fibre
VX001-xx	Modular cable VAM <-> VAM (xx = cable length [m])	Preferred cable lengths (2,
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
VYX 628	Surface Mounting Plate for VA 1 DV Sensor	U-shaped
VYX 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 I_N Burden	5 A (configurable for CT secondaries 1 – 10 A) < 0.2 VA
Rated current I_0 Burden	5 A / 1 A (optionally 1 A / 0.2 A) < 0.2 VA
Rated voltage U_N Burden	100 V (configurable for VT secondaries 50 – 120 V) < 0.5 VA
Rated frequency f_N	45 - 65 Hz
Operating settings	
Phase current stage IL>	0.5 – 8.0 x I_N
Earth-fault current Io>	0.1 – 5.0 x I_N
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

TRIP contacts		
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	
t>	7 ms	
Digital inputs		
Rated voltage	24 V dc	
Rated current	5 mA	
Digital outputs		
Rated voltage	24 V dc	
Rated current	20 mA (max)	
VAM 10L / 10LD / 12L / 12LD		
	VAM 10L / LD	VAM 12L / LD
No. of trip contacts	1	3
No. of digital inputs	1	
No. of digital outputs	1	
No. of arc sensor channels	10 pcs	
Power supply	+24 V dc via modular cable or terminals	
Power consumption, In (stand-by)	45 mA	
Power consumption per activated channel I sensAct	20 mA	
Total power consumption	45 mA + (n* x I sens Act)	
VAM 3L, VAM 3LX		
No. of trip contacts	1	
No. of digital inputs	1	
No. of digital outputs	1	
No. of fibre loops	3 pcs	
Power supply	+24 V dc via modular cable or terminals	
Power consumption, In (stand-by)	45 mA	
Power consumption per activated channel I sensAct	20 mA	
Total power consumption	45 mA + (n* x I sens Act)	

VAM 4C / VAM 4CD	
No. of trip contacts	1
No. of digital inputs	1
No. of digital outputs	1
Measuring circuits	
Rated current In	1 A / 5 A
Rated frequency fn	45 – 65 Hz
Power consumption	≤ 0.3 VA
Thermal withstand	60 x In for 1 s
Operating settings	
Phase current stage IL>	0.5 – 6.0 x I_N
Earth-fault current Io>	0.05 – 5.0 x I_N
Accuracy	± 5 %
Reset ratio	0.95

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

Disturbance tests	Standard & Test class / level	Test value
Emission	EN 61000-6-4 / IEC 60255-26	
- Conducted	EN 55011, Class A / IEC 60255-25	0.15 – 30 MHz
- Emitted	EN 55011, Class A / IEC 60255-25 / CISPR 11	30 – 1 000 MHz
Immunity	EN 61000-6-2 / IEC 60255-26	
- 1Mhz damped oscillatory wave	IEC 60255-22-1	±2.5 kVp CM, ±2.5 kVp DM
- Static discharge (ESD)	EN 61000-4-2 Level 4 / IEC 60255-22-2 Class 4	± 8 kV contact, ± 15 kV air
- Emitted HF field	EN 61000-4-3 Level 3 / IEC 60255-22-3	80 - 2700 MHz, 10 V/m
- Fast transients (EFT)	EN 61000-4-4 Level 4 / IEC 60255-22-4 Class A	± 4 kV 5/50 ns, 5 kHz
- Surge	EN 61000-4-5 Level 4 / IEC 60255-22-5	± 4 kV, 1.2/50 µs, CM 2 kV, 1.2/50 µs, DM
- Conducted HF field	EN 61000-4-6 Level 3 / IEC 60255-22-6	0.15 - 80 MHz, 10 Vemf
- Power-frequency magnetic field	EN 61000-4-8	300 A/m (continuous), 1000 A/m 1–3 s
- Pulse magnetic field	EN 61000-4-9 Level 5	1000 A/m, 1.2/50 µs
- Voltage interruptions	EN 61000-4-29 / IEC 60255-11	30 %/1 s, 60 %/0.1 s, 100 %/0.05 s
- Voltage alternative component	EN 61000-4-17 / IEC 60255-11	12 % of operating voltage (DC) / 10 min
- Voltage dips and short interruptions	EN 61000-4-11	30 %/10 ms, 100 %/10 ms, 60 %/100 ms, >95 %/5000 ms
Electrical safety tests		
- Impulse voltage withstand	EN 60255-5, Class III	5 kV, 1.2/50 µs
- Dielectric test	EN 60255-5, Class III	2 kV, 50 Hz
- Insulation resistance	EN 60255-5	> 100Mohm, 500 V / 100 V
- Protective bonding resistance	EN 60255-27	< 0.1 ohm
- Power supply burden	IEC 60255-1	> 20 W internal
Mechanical tests		
Device in operation		
- Vibrations	IEC 60255-21-1, Class II / IEC 60068-2-6, Fc	1Gn, 10Hz – 150 HZ
- Shocks	IEC 60255-21-2, Class II / IEC 60068-2-27, Ea	10Gn/11 ms
Device de-energized		
- Vibrations	IEC 60255-21-1, Class II / IEC 60068-2-6, Fc	2Gn, 10 Hz – 150 HZ
- Shocks	IEC 60255-21-2, Class II / IEC 60068-2-27, Ea	30Gn/11 ms
- Bump	IEC 60255-21-2, Class II / IEC 60068-2-27, Ea	20 Gn/16 ms
Environmental tests		
Device in operation		
- Dry heat	EN / IEC 60068-2-2, Bd	+70°C
- Cold	EN / IEC 60068-2-1, Ad	-40°C
- Damp heat, cyclic	EN / IEC 60068-2-30, Db	From +25°C to +55°C, From 93% RH to 98% RH, 6 days
- Damp heat, static	EN / IEC 60068-2-78, Cab	+40°C, 93% RH, 10 days
Device in storage		
- Dry heat	EN / IEC 60068-2-2, Bb	+70°C
- Cold	EN / IEC 60068-2-1, Ab	-40°C

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

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.

Schneider Electric Industries SAS
35, rue Joseph Monier
CS 30323
F - 92506 Rueil Malmaison Cedex (France)
Tel.: +33 (0) 1 41 29 70 00
www.schneider-electric.com/vamp-protection

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