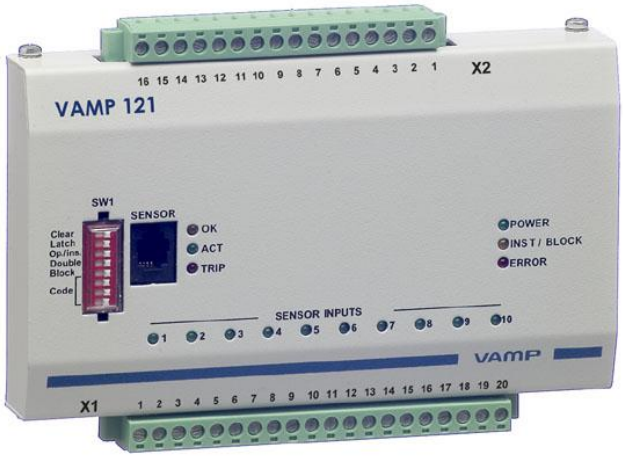
VAMP 121

Arc protection unit

User manual



VAMP

Table of contents

1. General

This manual describes the general functions of the arc protection unit, it also includes mounting and configuration instructions.

VAMP 121 is a state of the art arc protection unit for electrical power distribution systems.

By using VAMP 121 in switchgears considerable safety improvements are obtained in the form of minimized injury and damage in case of an arc fault.

VAMP 121 is a “stand alone” system, which gives a compact solution when the application doesn’t require overcurrent measurement. It is possible to connect 10 arc sensors, of the type VA 1 DA, to the VAMP 121 unit.

The VAMP 121 arc protection unit has default settings when delivered from the factory. The unit must be configured as described later in this document.

1.1. Arc protection unit VAMP 121

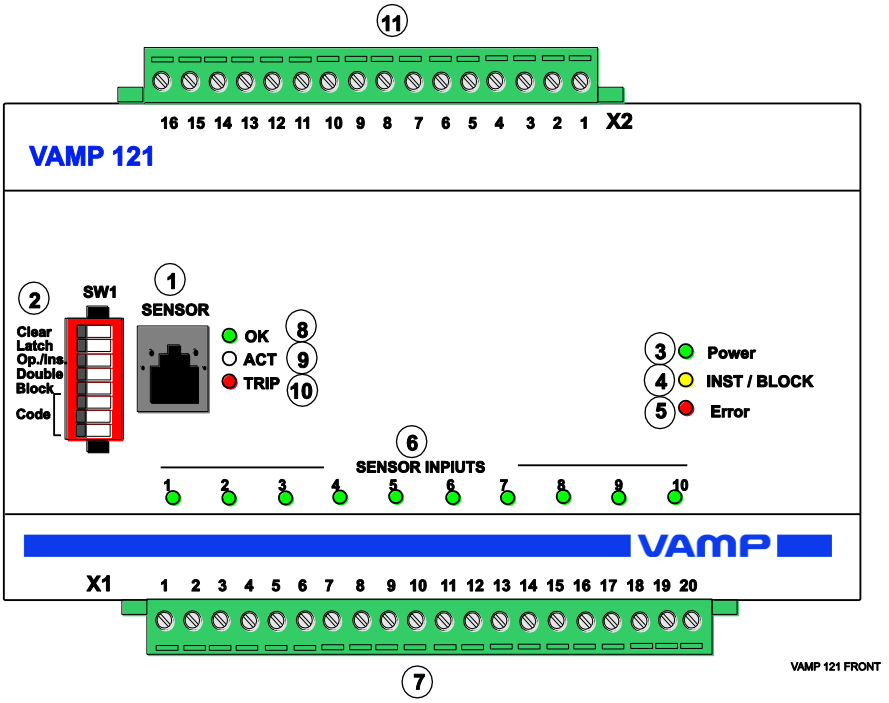


Figure 1.1-1. Arc protection unit VAMP 121

1. Connection for portable arc sensor (VA 1 DP)
2. Programming switches
3. POWER indicator light, indicates that the supply voltages of each component are in order.
4. INST/BLOCK indicator light, lit when the unit is in a installation or blocked mode.
5. ERROR indicator light, indicates an internal fault detected by the component's self-diagnostics. Such faults include faulty arc sensor or changes in the amount of sensors.
6. LED lights indicating sensor activation
7. Terminal block for ten arc sensors
8. Portable arc sensor VA 1 DP connected and operational
9. Portable arc sensor activated
10. I/O unit trip relays activated
11. Terminal block for output relay

2. Unit configuration

During the configuration stage user has to determine the VAMP 121 functionality.

The amount of used arc sensors is configured by moving the install dipswitches to "ON" position.

During the configuration stage the user must configure all the following dipswitches.

The unit is configured using the dipswitches:

Dipswitches 1-5 (see Figure 2-1):

- The **Clear** switch (nr 1 in Figure 2-1) is moved to the ON position to reset unit activation- and trip-information, as well as the trip relay, if latched. This switch is also used to clear any fault messages. When the system is in use, this switch must always be in the OFF position.
- The **Latch** switch (nr 2 in Figure 2-1) enables latching of the trip relay. When it is in ON position the latching function is activated.
- The **Operate/ Install** switch (nr 3 in Figure 2-1) is used to read in the configuration (number of connected arc sensors) to the unit eeprom-memory. When the desired number of sensors has been connected, the switch is briefly moved to ON position, to allow the unit register the number of connected arc sensors. When the system is in use, the switch must be in the Operate (OFF) position for the self-supervision to function.
- The **Double** switch (nr 4 in Figure 2-1) enables the choice of trip criteria's. In the "ON" position, two sensor inputs must be activated at the same time for the unit to trip. In the OFF position (normal) the unit trips if any of the sensor inputs become active.
- The **Block** switch (nr 5 in Figure 2-1) temporarily blocks the trip relay (in the ON position) when e.g. testing the unit. The switch must always be in OFF position when the system is in use. As long as the switch is in ON position the System Fault alarm is activated. The same function is attained by activating the binary input on connector X2-7, X2-8 (see also inputs). When the blocking function is activated, the error led is lit and the SF-relay activated.

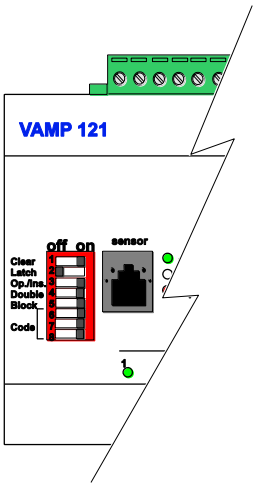


Figure 2-1. VAMP 121 dipswitch operations

Dipswitches 6-8 (Code switches, see Figure 2-1):

- When switch nr 8 is OFF, the binary input (X2:7(-), X2:8(+)) has a blocking function, see switch nr 5. In the ON position the binary input has a reset function, see switch nr 1.
- Switches nr 7 and 6 have the following effect on the binary output.

  SW7 off, SW6 off → Alarm for internal fault (active when the unit is OK).

  SW7 on, SW6 off → Trip alarm (active when tripping)

  SW7 off, SW6 on → Combined internal fault and trip alarm (active either at internal fault or at tripping).

SW 7	SW 6	Alarm relay function	No FAULT	FAULT	No TRIP	TRIP
"off"	"off"	SF alarm (IRF)	**B**	A	-	-
"on"	"off"	Trip alarm	-	-	A	B
"off"	"on"	SF+Trip alarm	A	B	A	B
"on"	"on"	-	-	-	-	-

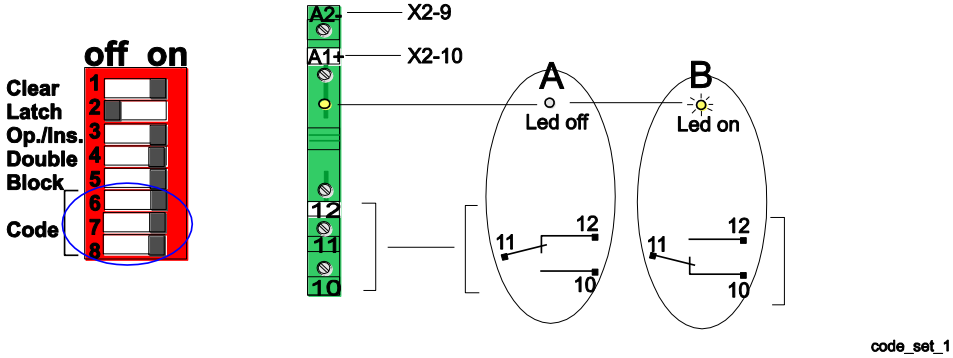


Figure 2-2. Alarm relay function table.

3. Sensors

3.1. Arc sensor VA 1 DA

The arc sensor is a light sensitive element, which is activated by strong light. Arc sensors should be mounted in the switch-gear cubicles, in such a way that the light sensitive part (see Figure 3.1-2) covers the protected area as completely as possible.

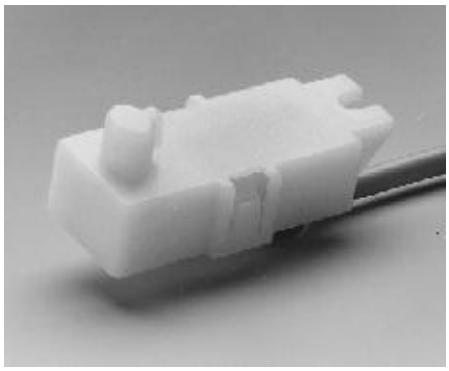


Figure 3.1-1. Arc sensor VA 1 DA

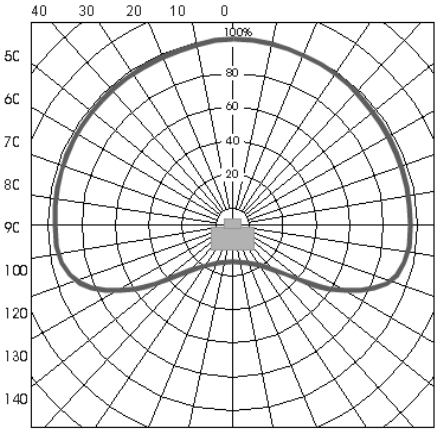


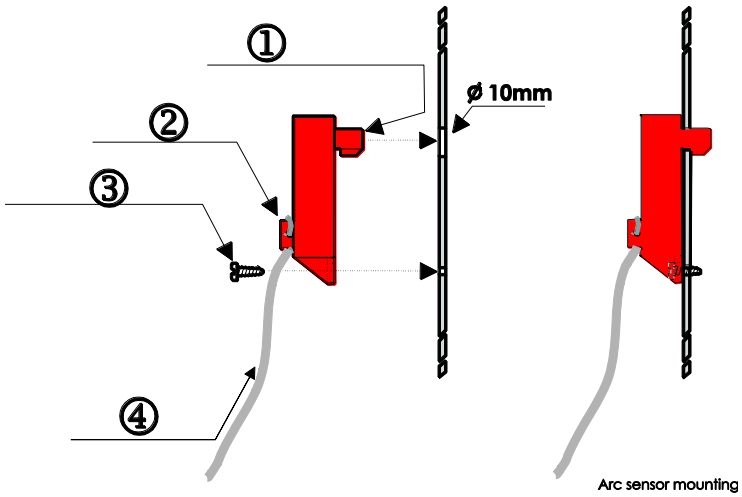
Figure 3.1-2. The sensitivity of the VA1DA arc sensor to light from different directions.

In open spaces, such as the bus bar section, arc sensors should be mounted max. four meters apart.

The light sensitivity of the arc sensor is 8000 LUX

The arc sensor can be mounted from the outside on partition wall of the switchgear. The active part of the sensor is mounted in a 10 mm hole, to the area in the switchgear that should be protected, and fastened with a 4 mm self-tapping screw (see Figure 3.1-3).

The arc sensor can alternatively be mounted completely in the protected area with the help of a mounting plate VYX 01 (Z-shaped) or VYX 02 (L-shaped). (See Figure 9.4-1)



①Active part of the sensor ②Anchoring ③ Fastening screw 4x15
④ Sensor cable

Figure 3.1-3. Arc sensor mounting picture.

3.2. Portable arc sensor VA 1 DP

A portable arc sensor (VA1DP) can temporarily be connected to the VAMP121 unit, via a plug-in connector (sensor).

It is used to further enhance the safety during maintenance on an operational power distribution system.

The sensor should be located close to the place where the maintenance is done. It can, for instance, be attached to the breast pocket of the service man's shirt or suit.

The function of the portable arc sensor equals that of the fix-mounted arc sensors (VA1 DA).

Figure 3.2-1. Portable arc sensor VA 1 DP

NOTE! To avoid false activations, the portable sensor must be disconnected from the unit immediately after use.

4. Functions

VAMP 121 includes an extensive self-supervision. The self-supervision includes internal functions as well as all arc sensors.

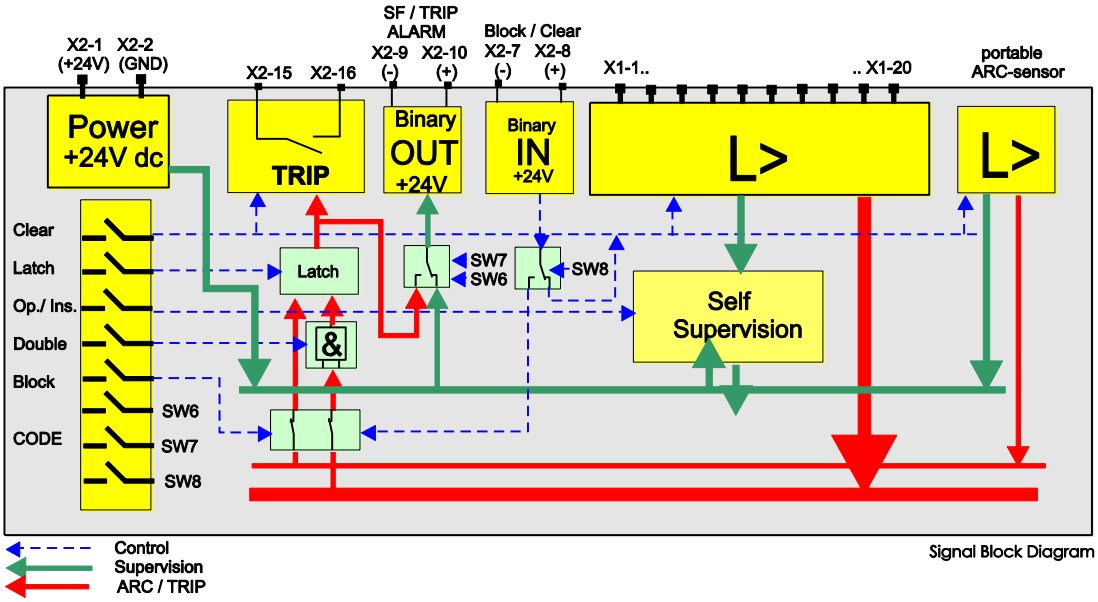


Figure 4-1. Self-supervision block diagram

When an internal fault occurs the self-supervision relay is activated and the ERROR-led is lit.

The function at the binary in- and output can be chosen with the dip switches 8, 7 and 6 (CODE). See chapter 1 on page 4.

5. Change of DIP-switch in VAMP 121

In VAMP 121 unit delivered before 11 March 2005, the DIP-switch is in an order opposite to the order shown in the photos in this manual.

Units delivered before this date can be identified from the following external details.

1. The VAMP 121 unit has a serial number smaller than 10,000.
2. The numbering of the VAMP 121 unit terminal block is not embossed on the front panel.
3. The DIP-switch is in reverse order.

On request we can deliver following stickers which are recommended to be to be attached on the VAMP 121 units manufactured before 11th March 2005.

Figure 5-1 Stickers for VAMP 121 which is manufactured before 11th March 2005

6. Switchgear application

Every compartment is equipped with an arc sensor. Up to ten sensors can be connected to the VAMP 121 unit. The trip relay is electromechanical and can be connected directly to control the circuit-breaker (see specifications).

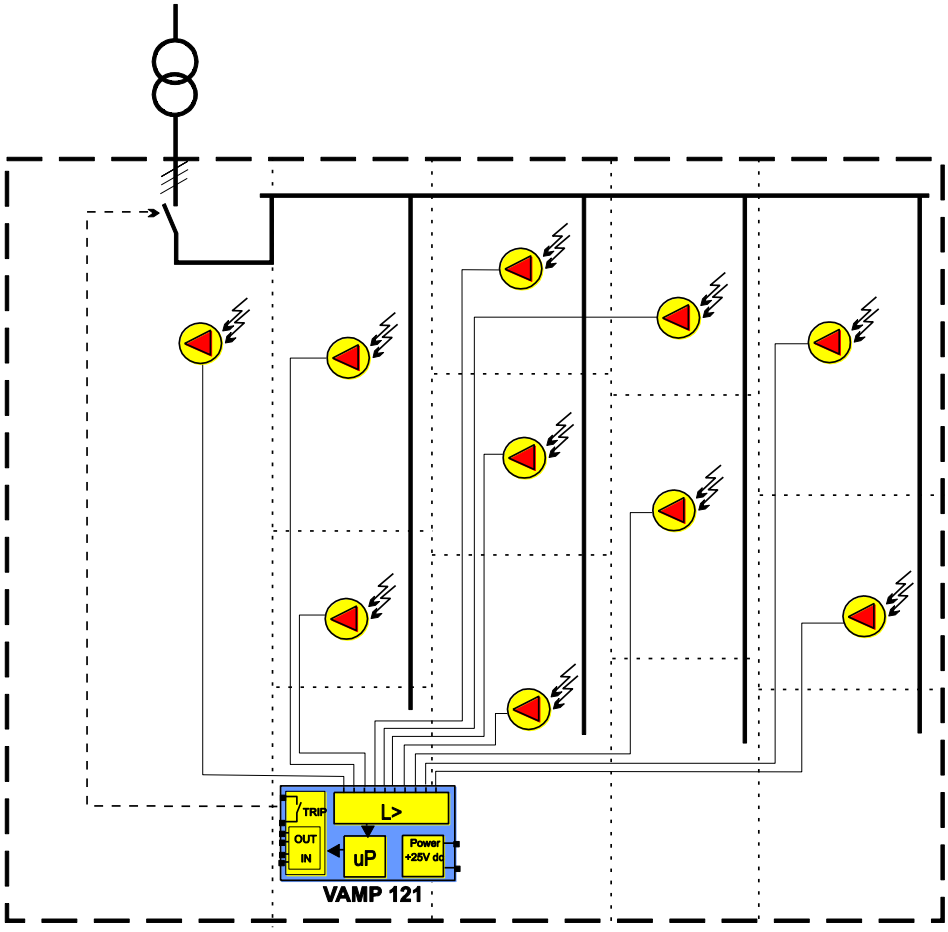


Figure 6-1. Switchgear application example

7. Connections

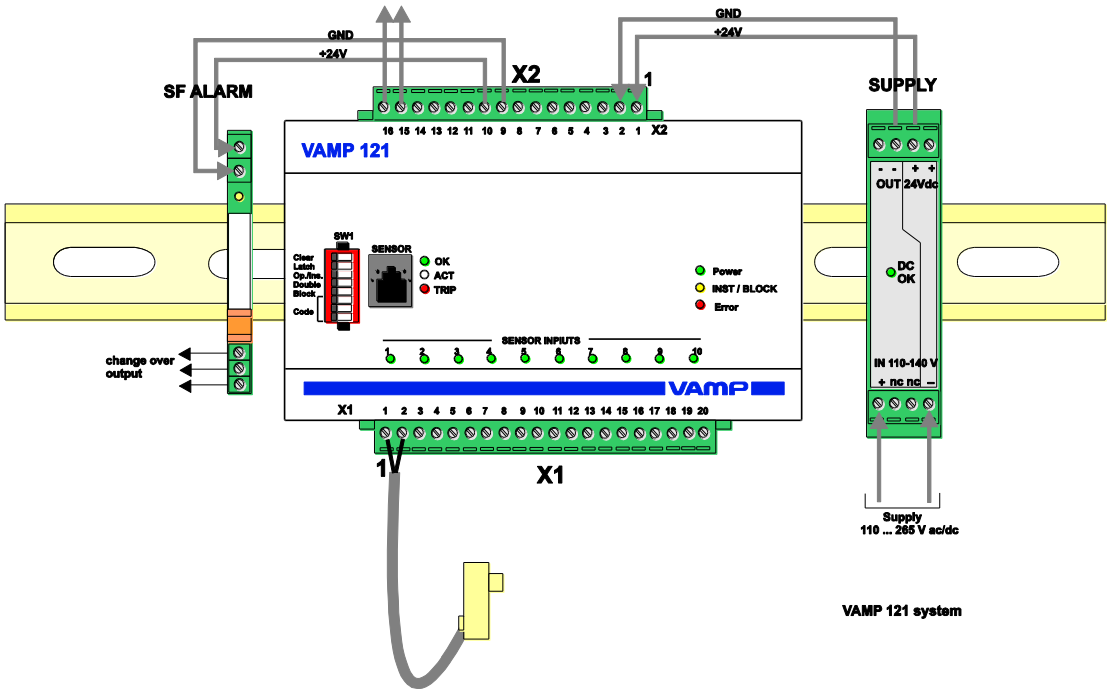


Figure 7-1. VAMP 121 system components

7.1. Outputs

The VAMP 121 unit has an integrated relay output (X2-15,X2-16) for tripping of the circuit-breaker.

Furthermore, one binary output is available (+24V dc) X2-9 (-) X2-10(+), which becomes inactive (0V) on internal fault (SF) and / or on tripping (configurable). This output can control an external relay. See chapter 1.

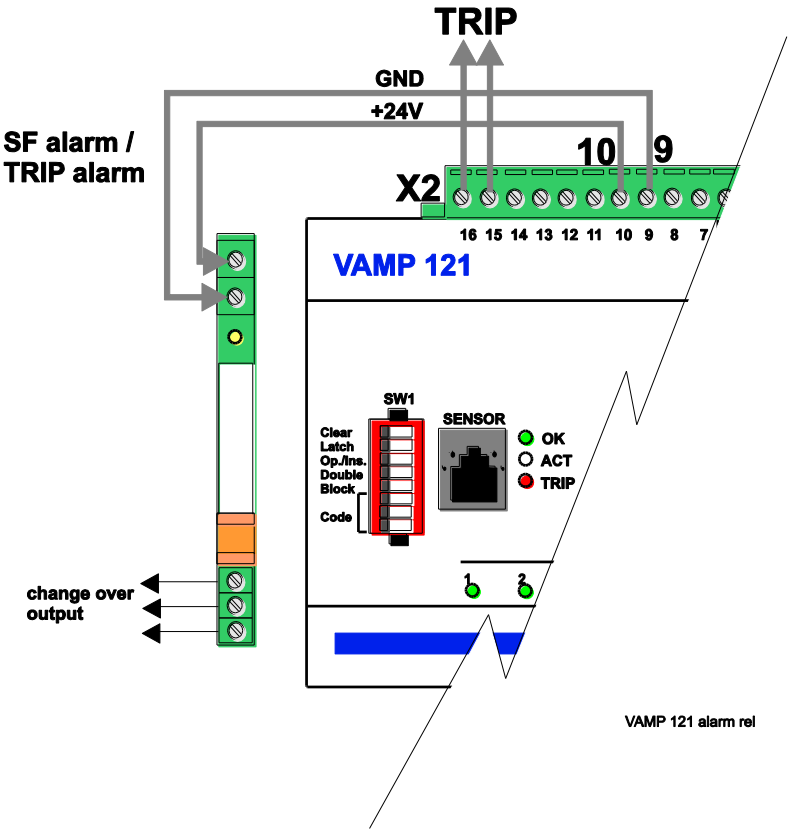


Figure 7.1-1. Output relay connection

7.2. Inputs

VAMP 121 has 10 arc sensor inputs X1:1-20, and one connection for a portable arc sensor (VA 1 DP). All these inputs have continuous self-supervision.

Furthermore, one binary input is available for blocking of the output relay e.g. when testing the unit. The input can also be configured to function as a resetting input (see chapter 1). The blocking / resetting function is activated by connecting 24V dc to the input X2:7 (-), X2:8 (+). The auxiliary voltage can be used. See Figure 7.2-1.

When the blocking function is activated, the SF-alarm activates as well.

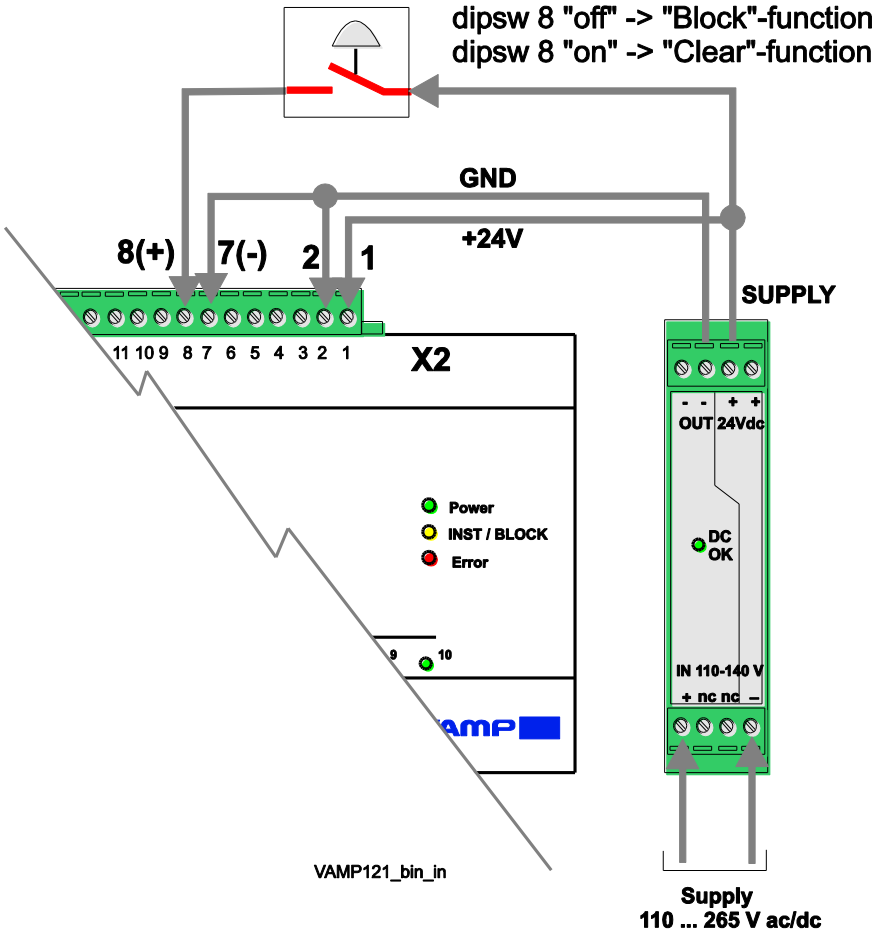


Figure 7.2-1. Binary input

7.3. Auxiliary voltage

The auxiliary voltage +24 V dc is supplied from an external voltage module. See Figure 7.3-1.

The voltage module can be supplied with 120…230V ac or 90...250V dc. The output (+24V dc) on the voltage module is connected directly to the terminals X2-1 (+) and X2-2 (-) on VAMP 121. If the auxiliary voltage in the switchgear is 24V dc it can be directly connected to the terminals X2-1 (+) and X2-2 (-) on VAMP 121.

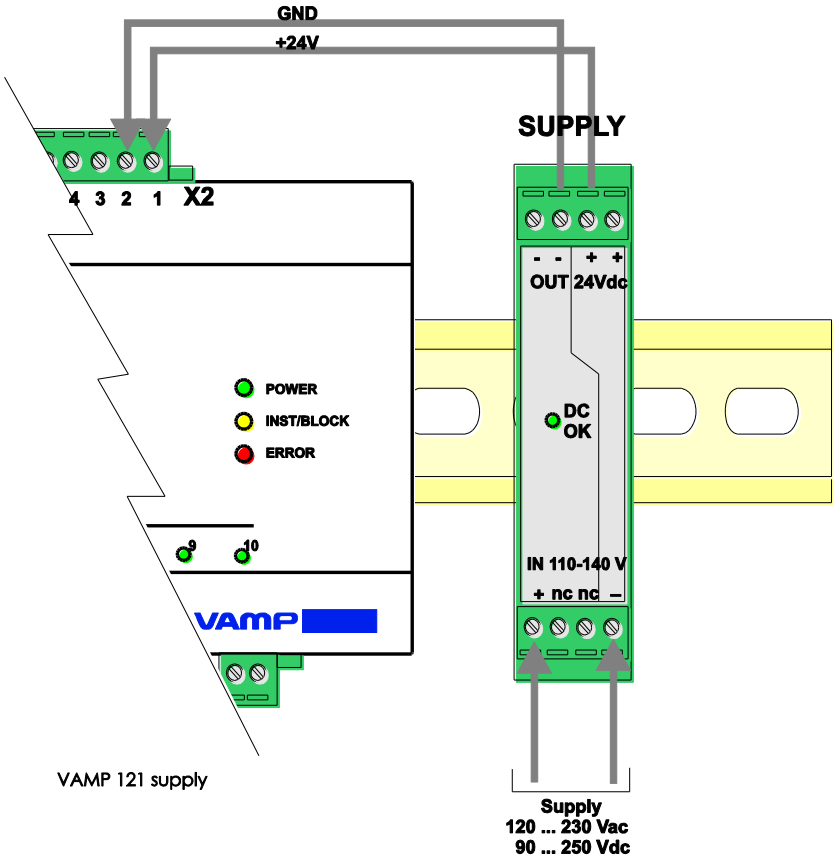


Figure 7.3-1. Auxiliary voltage supply

8. Technical data

Auxiliary voltage

Us	24V dc from the external power supply unit
In (stby)	30mA
IsensAct	20mA
Iarc	120mA + (IsensAct x n); n = number of active sensors

Tripping contacts

Number	1
Rated voltage	≤250V ac/dc
Continuous carry	5A
Make and carry for 0.5s	30A
Make and carry for 3s	15A
Breaking capacity DC, when time constant L/R=40ms	50W
Contact material	AgCdO2
Operating time	9ms

BIO Input / Output

Rated voltage	+24V dc
Rated current / output	20mA (max)
Rated current / input	5 mA
Number of inputs	1
Number of outputs	1

Disturbance tests

EMC test	CE approved and tested according to EN 50081-2, EN 50082-2
Emission - Conducted (EN 55011 class A) - Emitted (EN 55011 class A)	 0.15 - 30 MHz 30 - 1 000 MHz
Immunity - Static discharge (ESD) (According to IEC244-22-2 and EN61000-4-2, class III) - Fast transients (EFT) (According to EN61000-4-4, class III and IEC801-4, level 4) - Surge (According to EN61000-4-5 [09/96], level 4) - RF electromagnetic field test (According. to EN 61000-4-3, class III) - Conducted RF field (According. to EN 61000-4-6, class III)	 Air discharge 8 kV Contact discharge 6 kV Power supply input 2kV, 5/50ns other inputs 2 kV, 5/50ns Between wires 2 kV / 1.2/50µs Between wire and earth 4 kV / 1.2/50µs f = 80….1000 MHz 10V /m f = 150 kHz….80 MHz 10V

Voltage tests

Insulation test voltage acc- to IEC 60255-5	2 kV, 50Hz, 1min
Impulse test voltage acc- to IEC 60255-5	5 kV, 1.2/50us, 0.5J

Mechanical tests

Vibration test	2 ... 13.2 Hz ±3.5mm 13.2 ... 100Hz, ±1.0g
Shock/Bump test acc. to IEC 60255-21-2	20g, 1000 bumps/dir.

Environmental conditions

Specified ambient service temp. range	-35…+70°C
Transport and storage temp. range	-40…+70°C

External supply unit

IN	120...230V ac, 90...250V dc
OUT	24V dc

Alarm relay

Control	24V dc from VAMP121
Rated voltage	250V ac/dc

9. Dimensions

9.1. VAMP 121

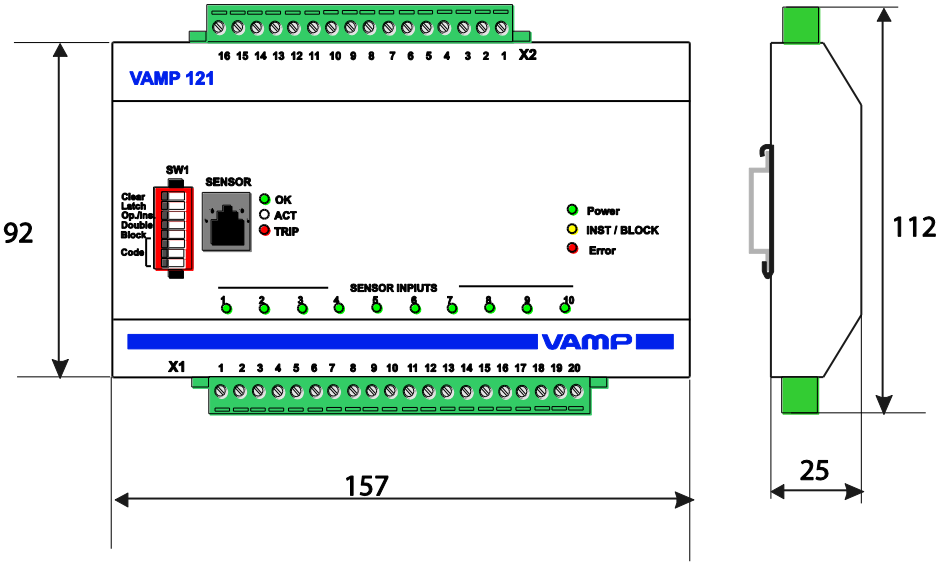


Figure 9.1-1. Arc protection unit VAMP 121 dimensions

9.2. External supply unit / Alarm relay

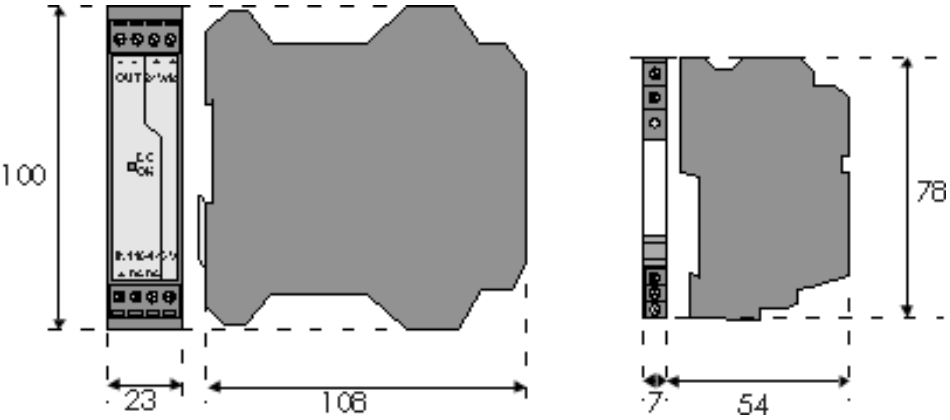


Figure 9.2-1. External supply unit and alarm relay dimensions

9.3. VA 1 DA arc sensor

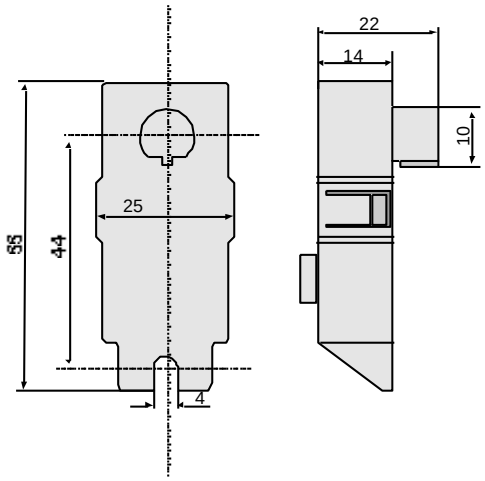


Figure 9.3-1. VA 1 DA arc sensor dimensions

9.4. Mounting plates for VA 1 DA

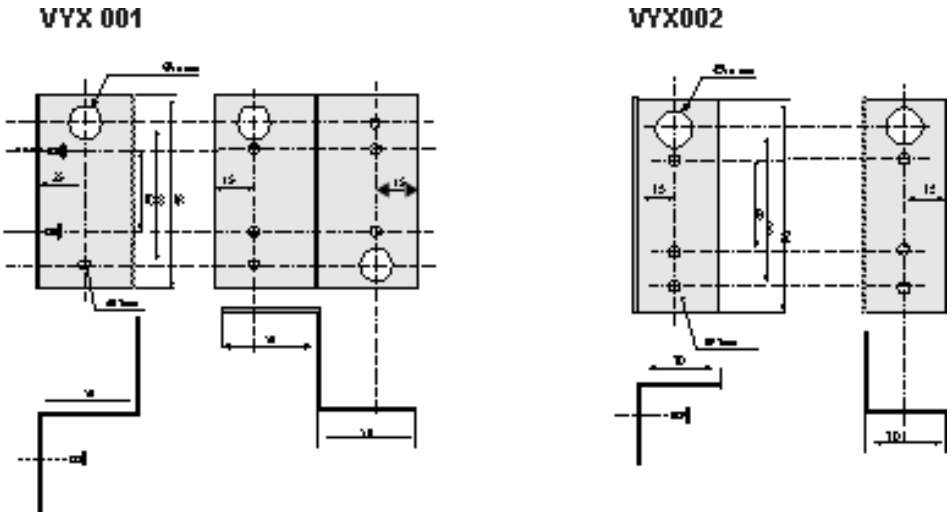


Figure 9.4-1. Mounting plate dimensions.

10. Order information

When ordering, please state:

- Type designation: VAMP 121
- Quantity:
- Options (see respective ordering code):

Accessories :

Order Code	Explanation	Note
VA 1 DA-6	Arc Sensor	Cable length 6m
VA 1 DA-20	Arc Sensor	Cable length 20m
VA 1 DT-6	Temperature Sensor	Cable length 6m
VA 1 DP-5	Portable Arc Sensor	Cable length 5m
VA 1 DP-5D	Portable Arc Sensor	Cable lenght 5m
VA 1 EH-6	Arc Sensor (Pipe type)	Cable length 6m
VA 1 EH-20	Arc Sensor (Pipe type)	Cable length 20m
VX031-5	Extension cable for VA1DP-5D	Cable lenght 5m
VYX001	Surface Mounting Plate for Sensors	Z-shaped
VYX002	Surface Mounting Plate for Sensors	L-shaped
3P004	Supply unit, 100-240AC/24DC/1.3A	Supply unit

11. Reference information

Manufacturer data:
VAMP Ltd
P.O.Box 810
FIN-65101 Vaasa, Finland
Visiting address: Yrittäjänkatu 15
Phone: +358 (0)20 753 3200
Fax: +358 (0)20 753 3205

Service:
VAMP Ltd
P.O.Box 810
FIN-65101 Vaasa, Finland
Visiting address: Yrittäjänkatu 15
Phone: +358 (0)20 753 3200
Fax: +358 (0)20 753 3205

24h support phone:
Tel . +358 (0)20 753 3264
Email: vampsupport@vamp.fi

We reserve the rights to changes without prior notice

VAMP Ltd

Street address: Yrittäjänkatu 15
Post address:
Box 810, FIN 65101 Vaasa,
Finland

Phone: +358 20 753 3200
Fax: +358 20 753 3205
Internet: www.vamp.fi
Email: vamp@vamp.fi