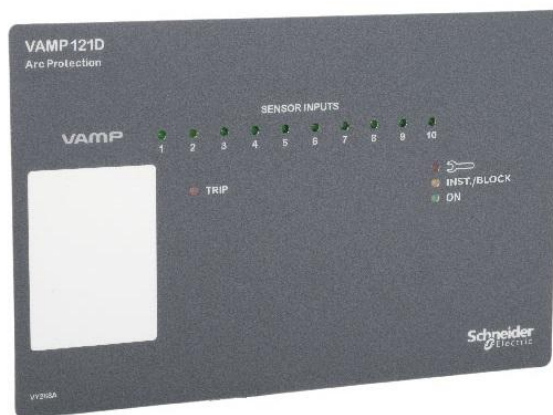


# VAMP 121/VAMP 121D

Arc flash protection unit

Publication version: V121/EN M/A017

User manual





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# 1. General

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

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

VAMP 121(D) 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(D) unit.

The VAMP 121(D) 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(D)

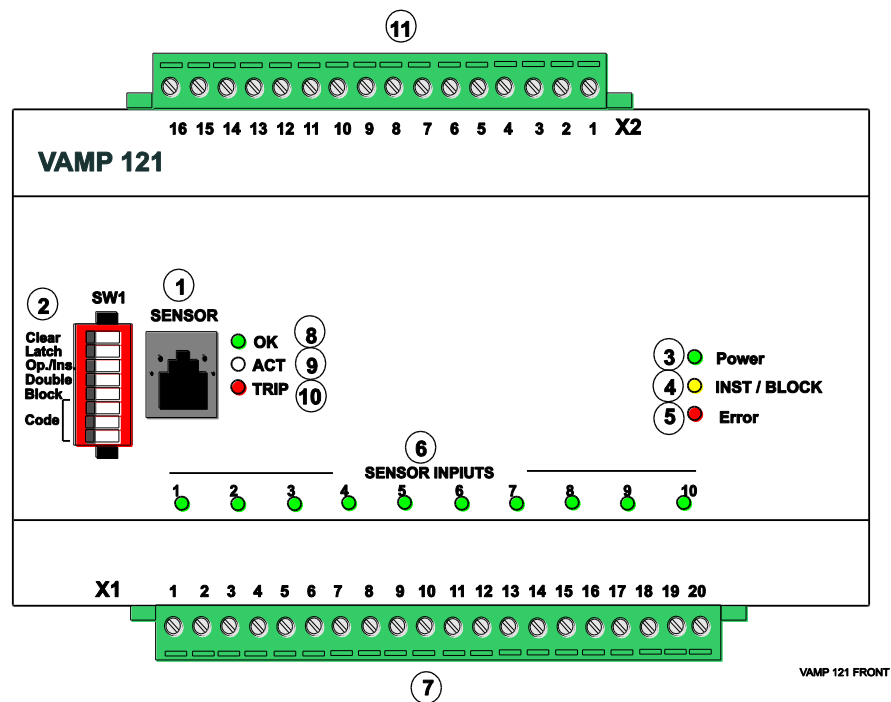


Figure 1.1-1 Arc protection unit VAMP 121

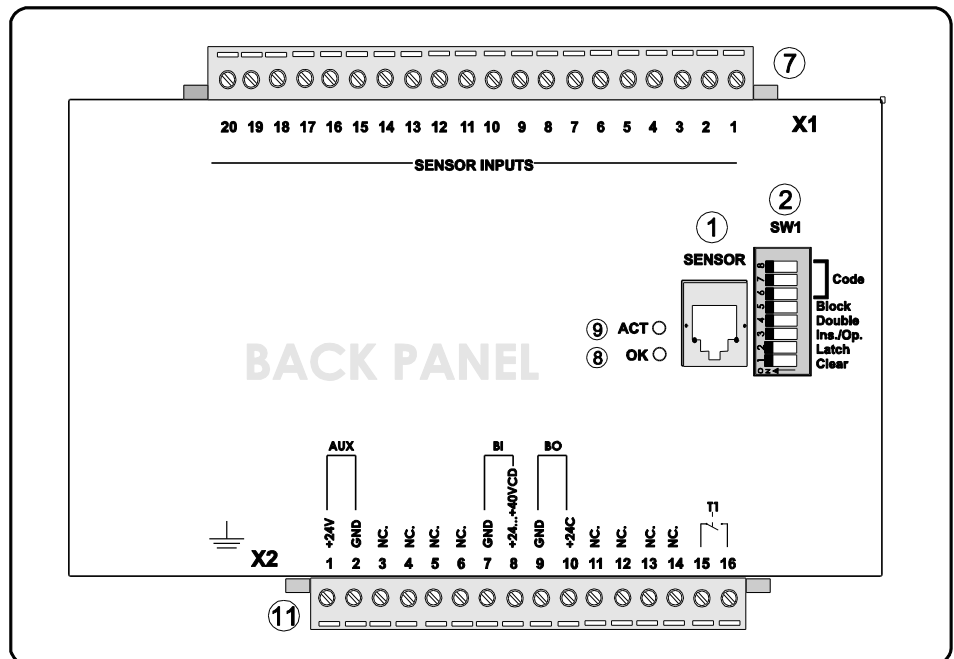
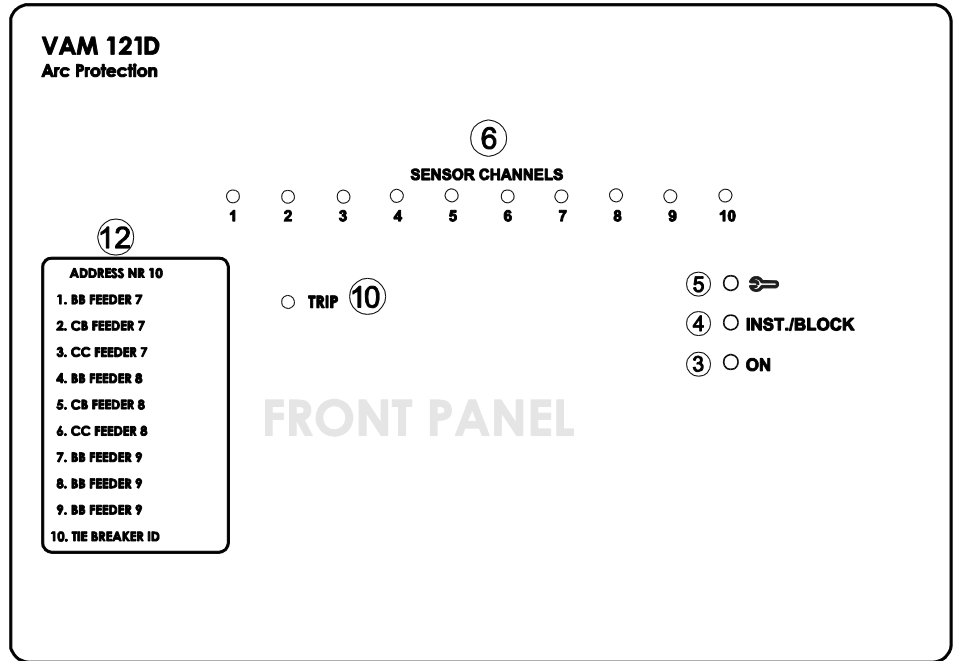


Figure 1.1-2 Arc protection unit VAMP 121D

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
12. Text pocket for sensor specific labels (VAM 121D only)

## 2. Unit configuration

During the configuration stage user has to determine the VAMP 121(D) 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) if switch 8 is “OFF”. When the blocking function is activated, the error led is lit and the SF-relay activated.

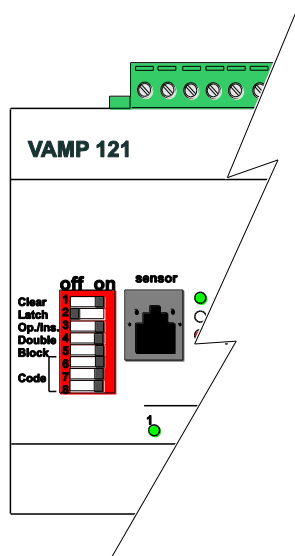
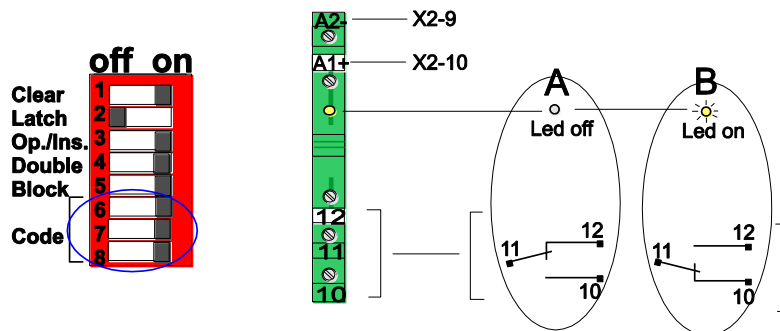


Figure 2-1. VAMP 121(D) dipswitch operations

**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"	-	-	-	-	-



code\_set\_1

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.

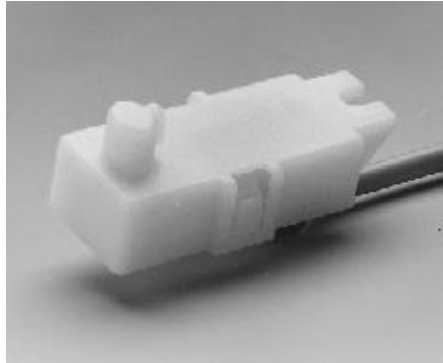


Figure 3.1-1. Arc sensor VA 1 DA

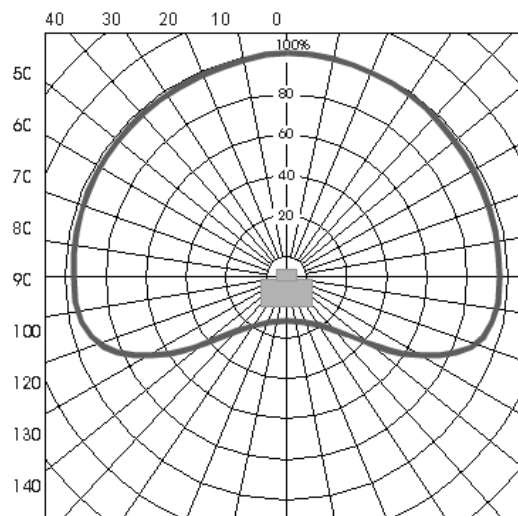


Figure 3.1-2. The sensitivity of the VA1DA arc sensor to light from different directions.

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 8.5-1).

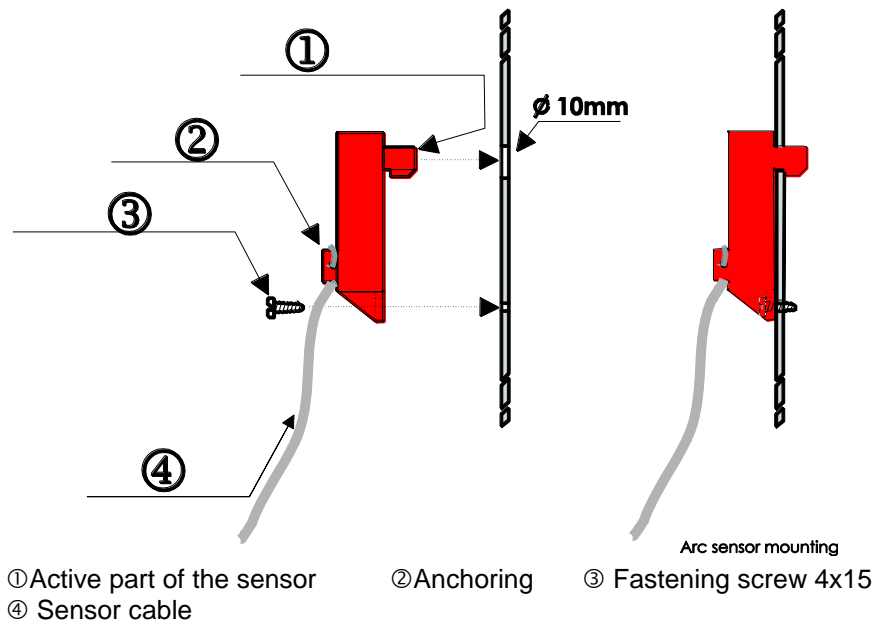


Figure 3.1-3. Arc sensor mounting picture.

## 3.2. Portable arc sensor VA 1 DP

A portable arc sensor (VA1DP) can temporarily be connected to the VAMP121(D) 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(D) includes an extensive self-supervision. The self-supervision includes internal functions as well as all arc sensors.

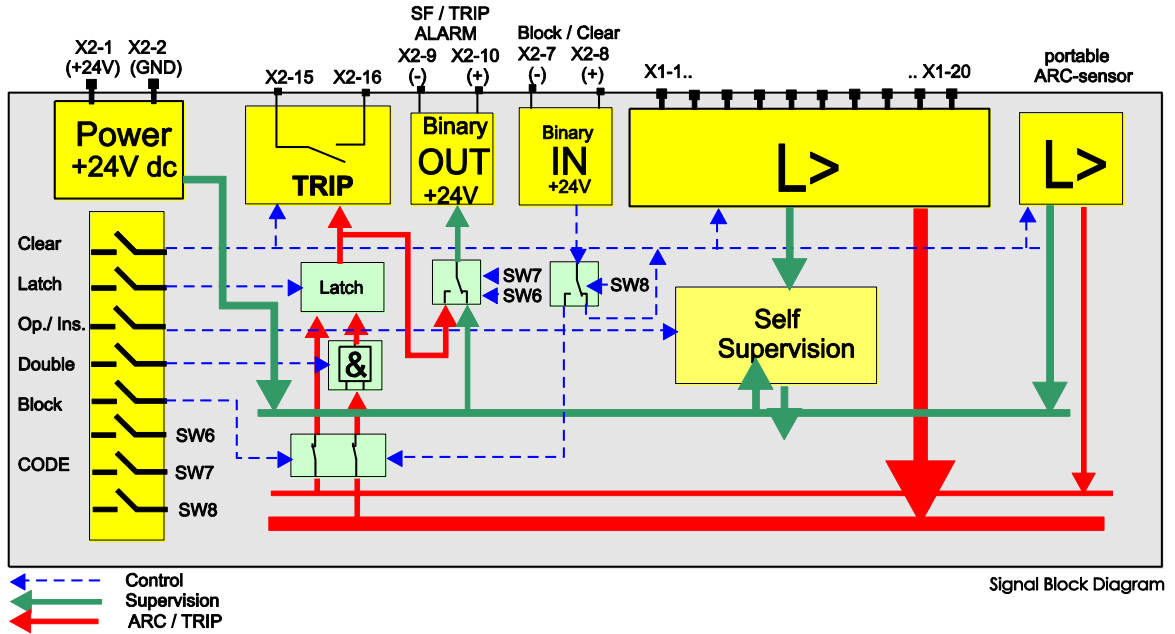


Figure 4-1. Self-supervision block diagram

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 3.

## 5. Switchgear application

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

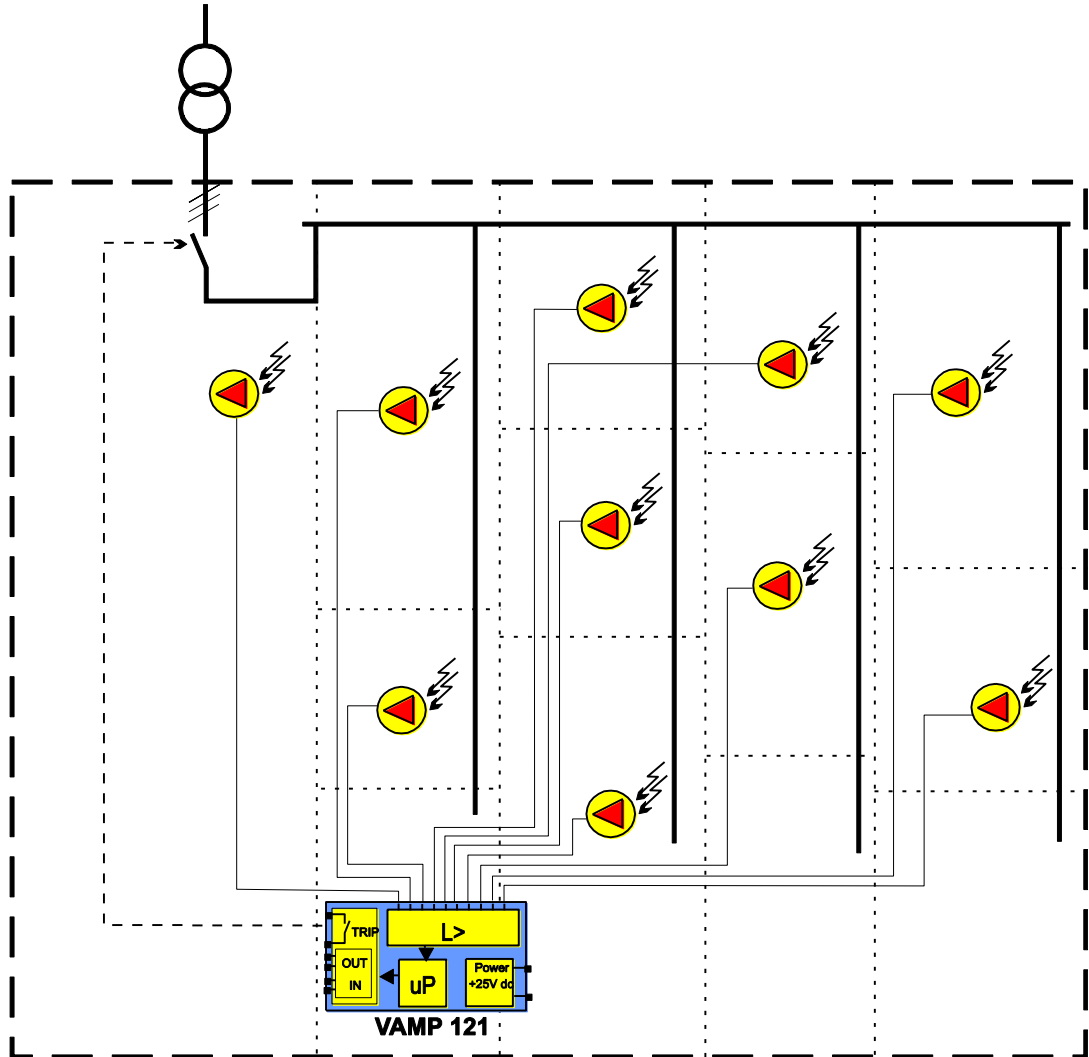


Figure 5-1. Switchgear application example

# 6. Connection examples

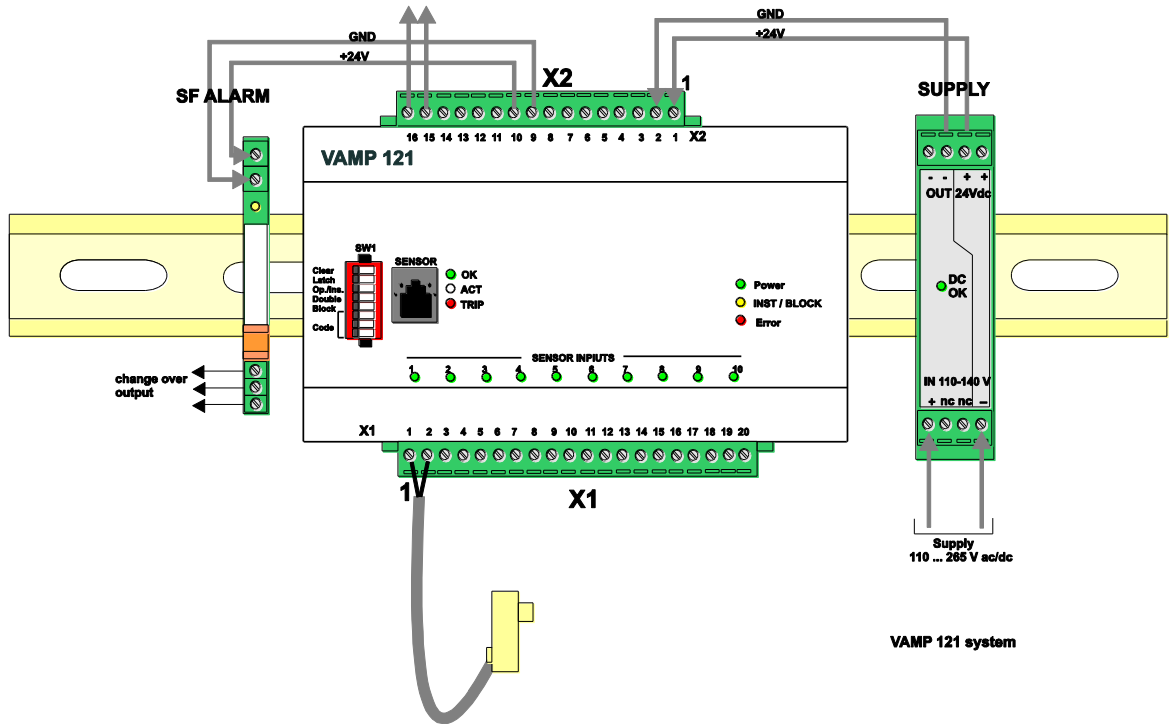


Figure 6-1. Example of VAMP 121 system components

# 6.1. Outputs

The VAMP 121(D) 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 Figure 6.1-1.

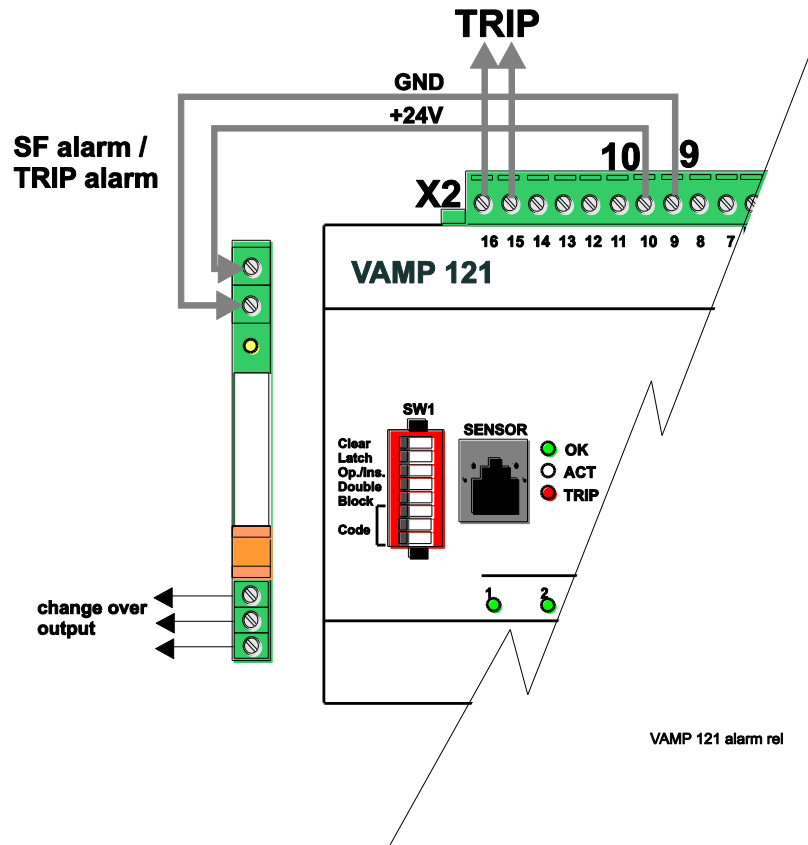


Figure 6.1-1 Output relay connection

## 6.2. Inputs

VAMP 121(D) 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 6.2-1.

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

### Blocking function operation after trip:

When blocking function is activated, the latched trip output is released. The LEDs of trip status and sensor channel activation stay on until blocking function is deactivated. This means that blocking function operates also as clearing function which returns the device to normal operating status.

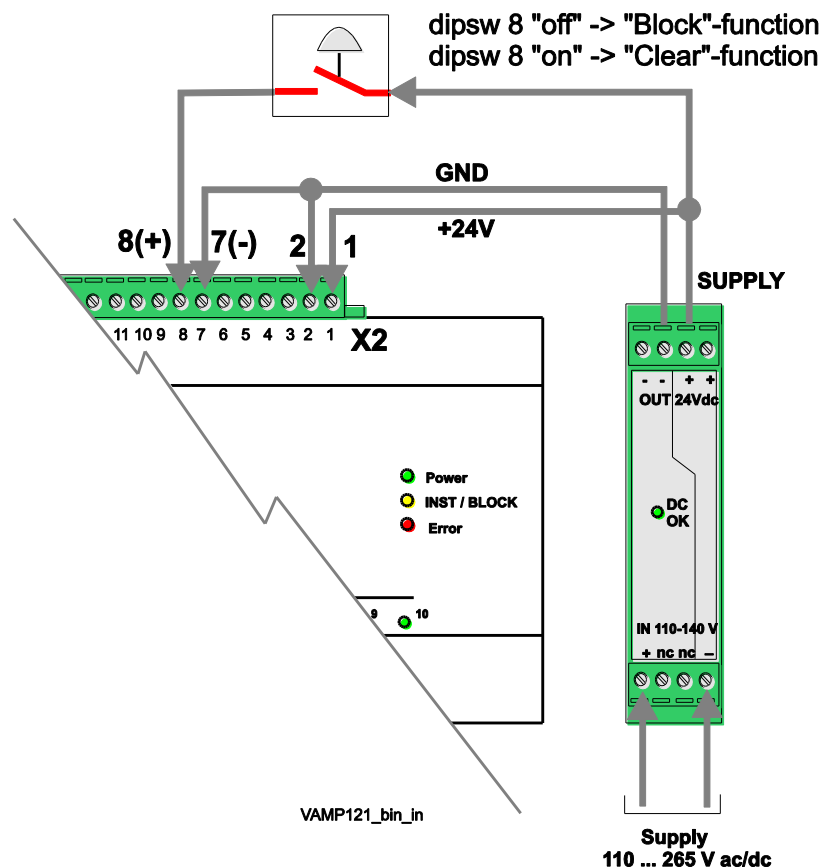


Figure 6.2-1. Binary input

## 6.3. Auxiliary voltage

The auxiliary voltage +24 V dc is supplied from an external voltage module. See Figure 6.3-1.

The voltage module can be supplied with 120 – 230V ac or 90 – 250V dc. The output (+24V dc) on the voltage module MINI-PS is connected directly to the terminals X2-1 (+) and X2-2 (-) on VAMP 121(D). 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(D).

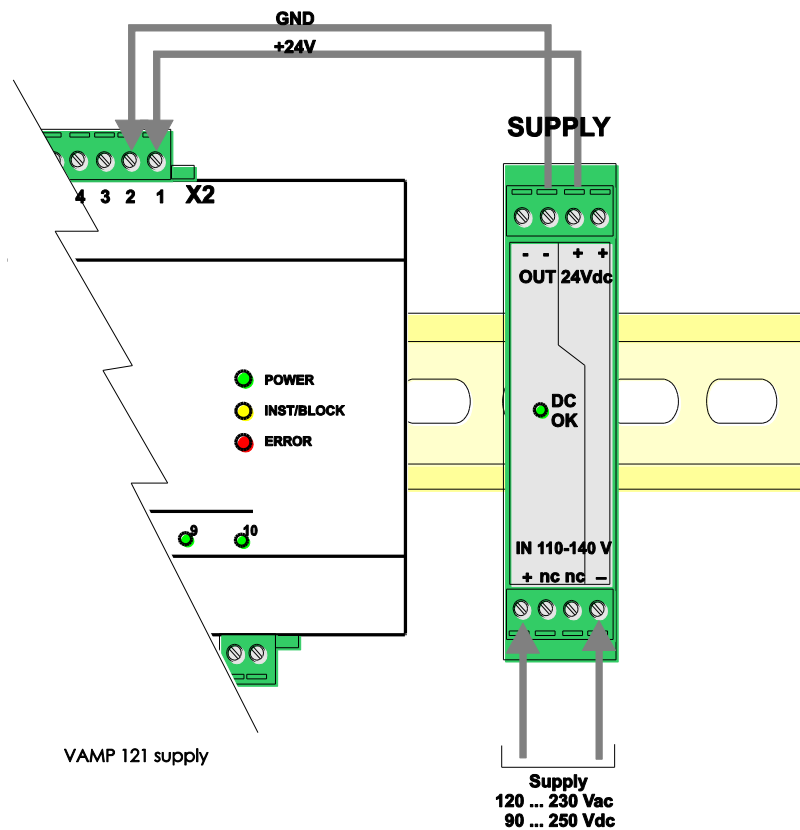


Figure 6.3-1. Auxiliary voltage supply



# 7. Technical data

## Auxiliary voltage

$U_{AUX}$	24V dc from the MINI-PS
$I_n$ (stby)	30mA
$I_{sensAct}$	20mA
$I_{arc}$	$120mA + (I_{sensAct} \times n)$ ; $n$ = number of active sensors

## Tripping contacts

Number	1
Rated voltage	$\leq 250V$ 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	AgCdO <sub>2</sub>
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 / 1.2/50 $\mu$ s Between wire and earth 4 kV / 1.2/50 $\mu$ s  $f = 80 - 1000$ 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 $\pm$ 3.5mm 13.2 – 100Hz, $\pm$ 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(D)
Rated voltage	250V ac/dc

# 8. Dimensions

## 8.1. VAMP 121

### VAM 121 DIN RAIL MOUNTING

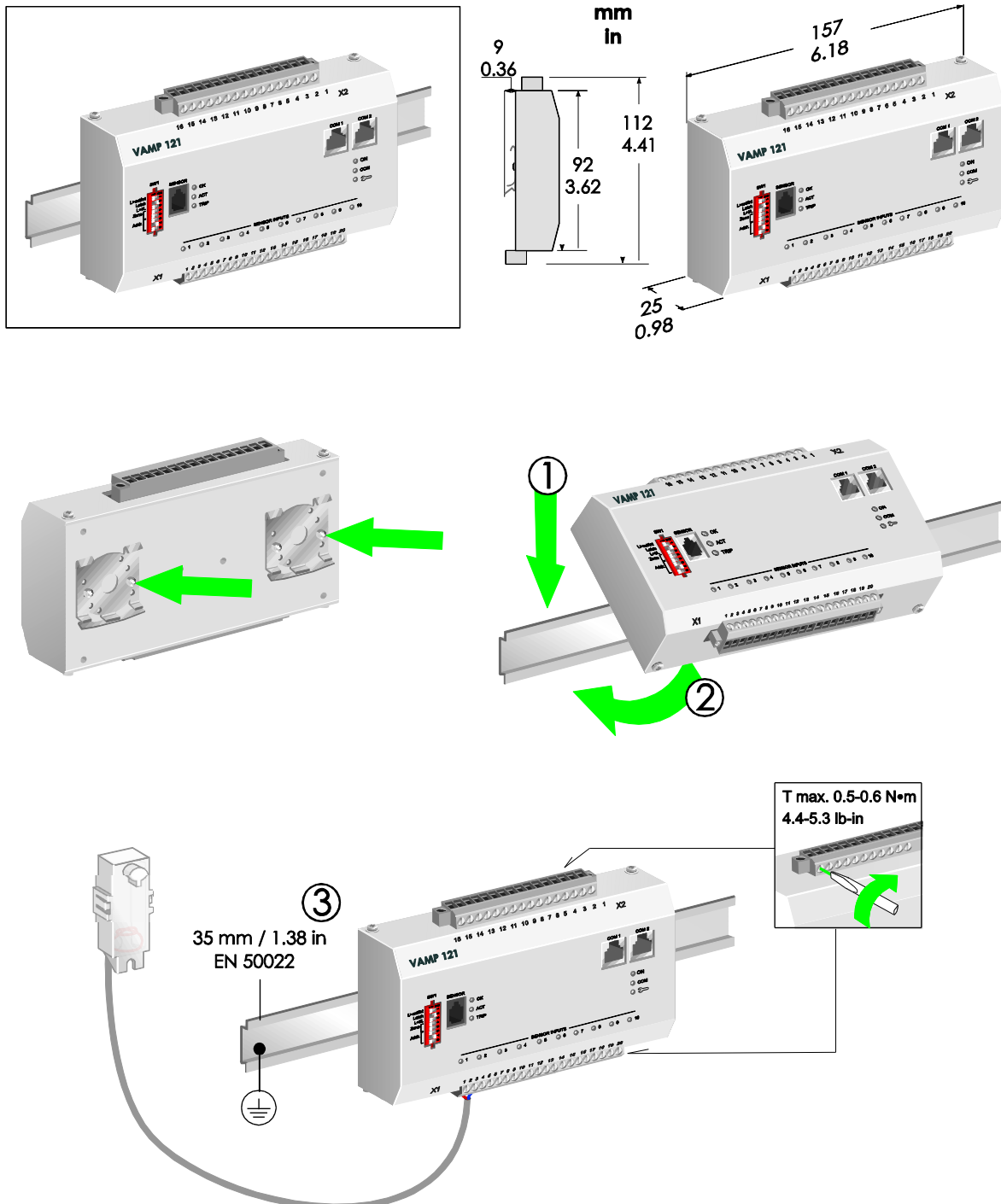


Figure 8.1-1. Arc protection unit VAMP 121 dimensions

# 8.2. VAMP 121D

## VAMP 121D FLUSH MOUNTING

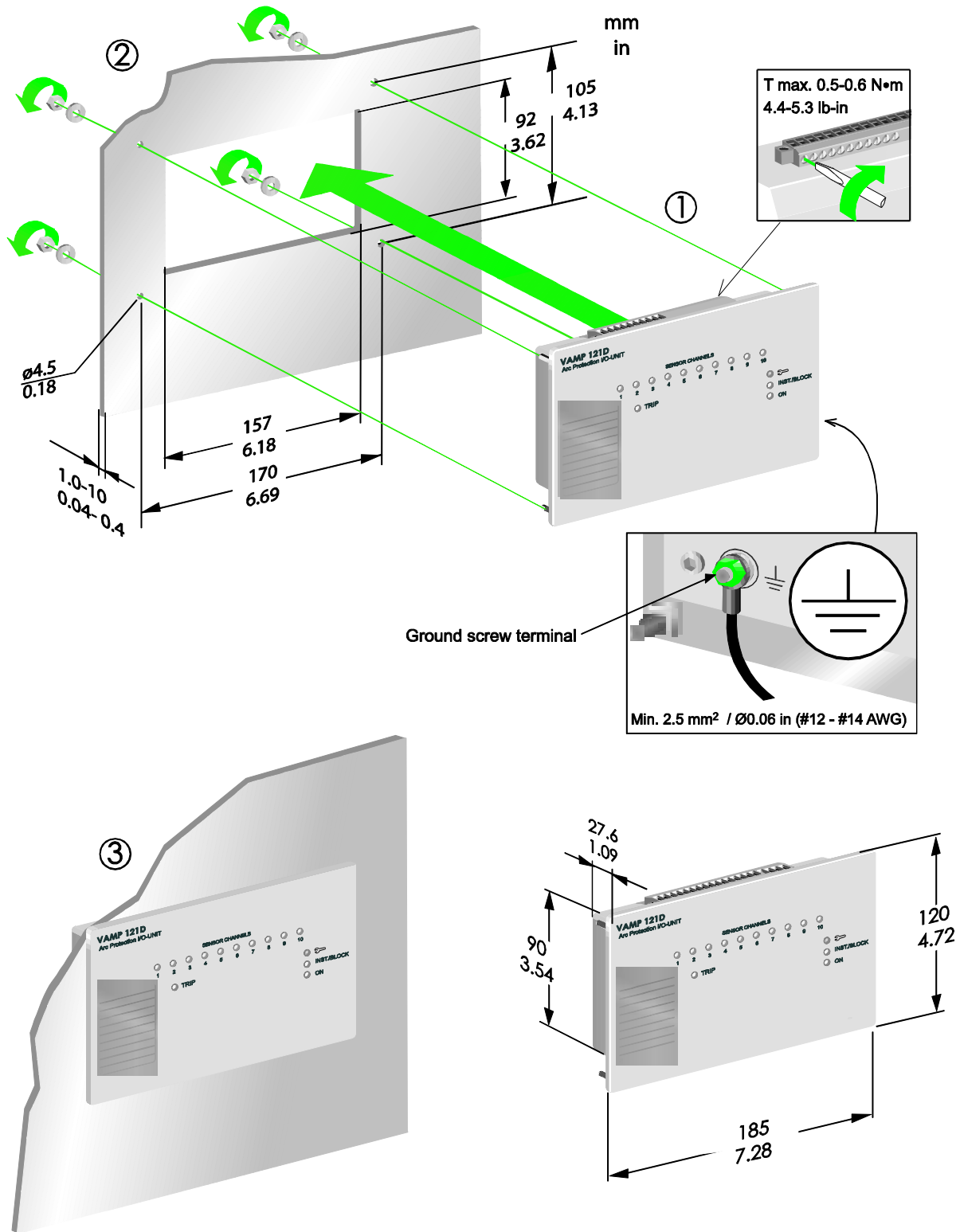


Figure 8.2-1 Arc protection unit VAMP 121D dimensions

### 8.3. External supply unit / Alarm relay

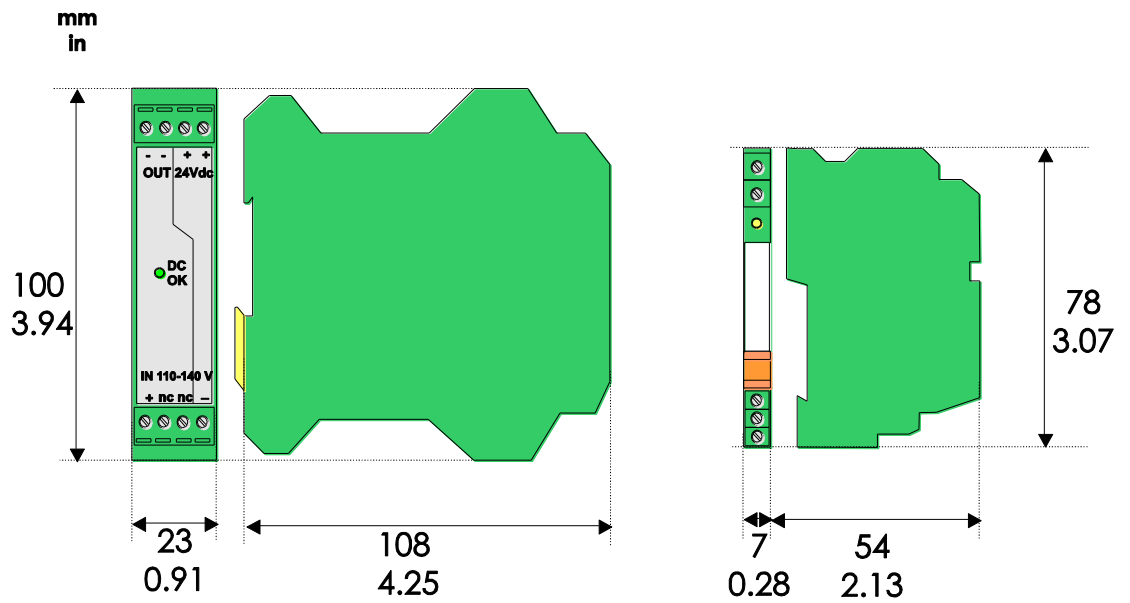


Figure 8.3-1 External supply unit and alarm relay dimensions

### 8.4. VA 1 DA arc sensor

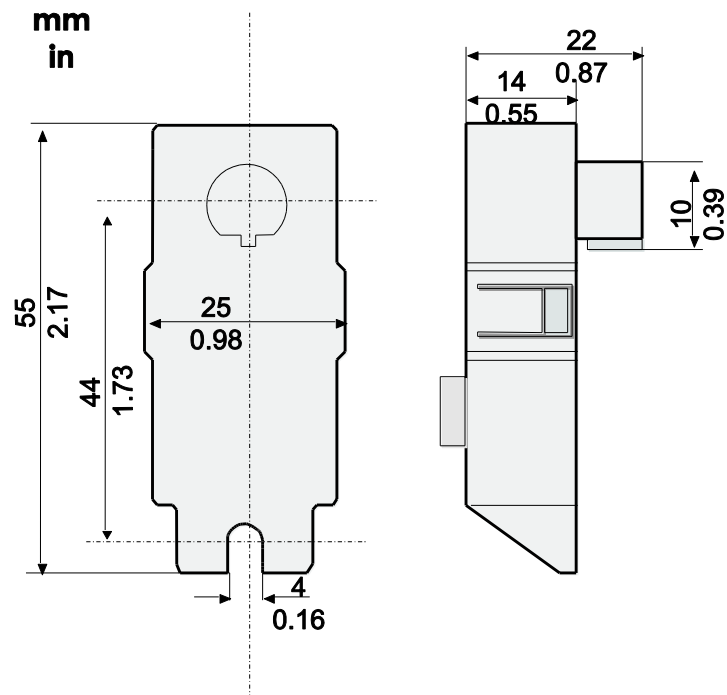


Figure 8.4-1 VA 1 DA arc sensor dimensions

# 8.5. Mounting plates for VA 1 DA

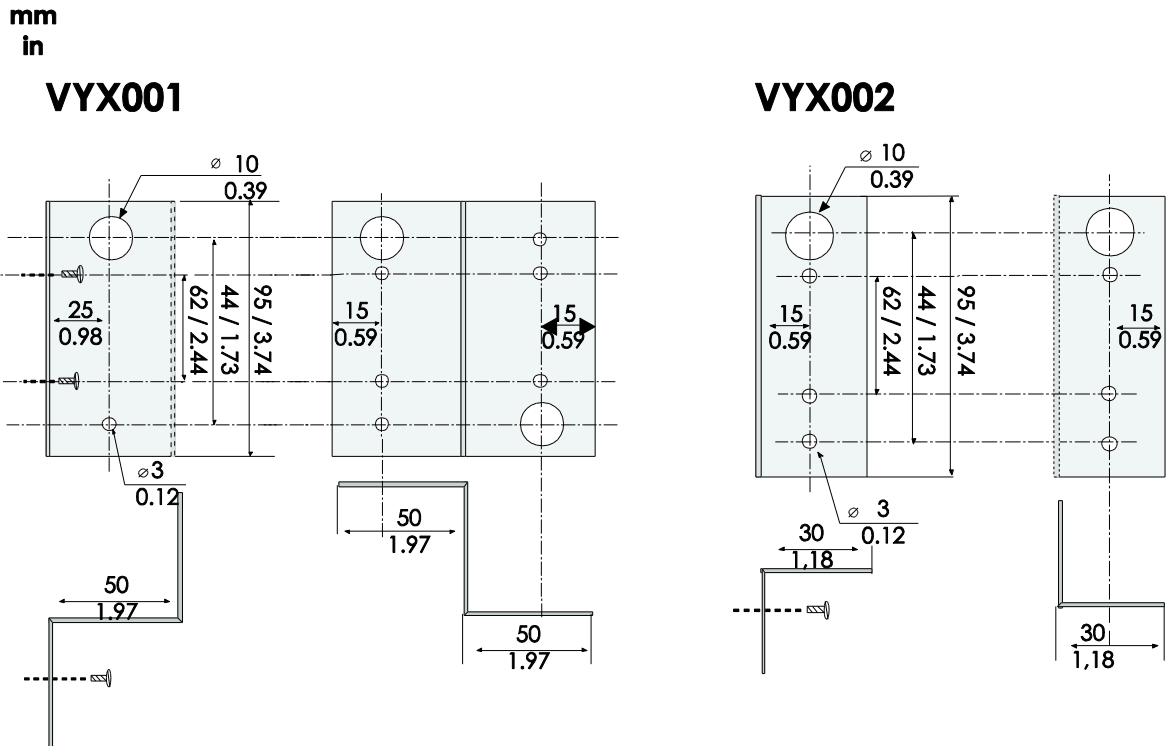


Figure 8.5-1 Mounting plate dimensions.

# 9. Order information

When ordering, please state:

- Type designation: V121 / V121D
- 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 DP-5	Portable Arc Sensor	Cable length 5m
VA 1 DP-5D	Portable Arc Sensor	Cable length 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 length 5m
VYX001	Surface Mounting Plate for Sensors	Z-shaped
VYX002	Surface Mounting Plate for Sensors	L-shaped
3P001	Line amplifier for arc protection BI/O channels	DIN rail mount
3P004	Supply unit, 100-240AC/24DC/1.3A	Supply unit









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