VAMP 125

Arc Flash Protection Unit

Publication version: V125/en M/A002

User manual

Schneider Electric

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Table of Contents

1 Important information

1.1 Hazard categories and special symbols

Important Information

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service or maintain it. The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of either symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **can result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **can result in** minor or moderate injury or equipment damage.

NOTICE

NOTICE is used to address practices not related to physical injury or equipment damage.

Protective grounding

The user is responsible for compliance with all the existing international and national electrical codes concerning protective grounding of any device.

Please Note

Use the device's password protection feature to prevent untrained persons from interacting with this device.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Electrical equipment should be installed, operated, serviced, and maintained only by trained and qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

Failure to follow this instruction will result in death or serious injury.

⚠ DANGER

WORKING ON ENERGIZED EQUIPMENT

Use the required personal protection equipment (PPE) when working on energized equipment.

Failure to follow these instructions will result in death or serious injury.

1.2 Legal notice

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Disclaimer

No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this document. This document is not intended as an instruction manual for untrained persons. This document gives instructions on device installation, commissioning and operation. However, the manual cannot cover all conceivable circumstances or include detailed information on all topics. In the event of questions or specific problems, do not take any action without proper authorization. Contact Schneider Electric and request the necessary information.

Contact information

35 rue Joseph Monier
92500 Rueil-Malmaison
FRANCE
Phone: +33 (0) 1 41 29 70 00
Fax: +33 (0) 1 41 29 71 00
www.schneider-electric.com

1.3 Purpose

NOTE: For applications in the US, Canada and Mexico, use specific documents reviewed in line with the requirements of the relevant regulatory authorities. Please contact our local Schneider Electric office for assistance.

This document contains instructions on the installation, commissioning and operation of VAMP 125. This guide also contains an application example of configuring an arc flash protection system.

This document is intended for persons who are experts on electrical power engineering, and it covers the relay models as described by the order code in Chapter 9 Order code.

Related documents

Document	Identification*)
VAMP 125 Setup and Wiring Instructions	V125/EN AB/xxxx

*) *xxxx = revision number*

Download the latest manual at www.schneider-electric.com/vamp-protection or m.vamp.fi.

1.4 EU directive compliance

EMC compliance

CE 2014/30/EU

Compliance with the European Commission's EMC Directive. Product Specific Standard was used to establish conformity:

- EN 60255-26 2013

Product safety

CE 2014/35/EU

Compliance with the European Commission's Low Voltage Directive. Product Specific Safety Standard was used to establish conformity:

- EN 60255-27 2014

1.5 Abbreviations and terms

ac	Alternating current
AWG	American wire gauge
CB	Circuit breaker
CM	Common mode
dc	Direct current
DM	Differential mode
HMI	Human-machine interface
HSO	High-speed output
LED	Light-emitting diode
MT	Master trip
RELxxxxx	Short order code
SF	Alarm duty watchdog output is energized when the auxiliary power supply is on and the product status is operative. This output is referenced as "service status output" in the setting tool.
SPST	Single pole single throw
Unit	Arc flash protection unit
VAMP 221	Central unit for VAMP 221 arc flash protection
VAMP 321	Central unit for VAMP 321 arc flash protection
VAM 4C	Current I/O unit for VAMP 221 and VAMP 321 arc flash protection

2 Introduction

2.1 VAMP 125

Figure 2.1: Arc flash protection unit VAMP 125

The VAMP 125 arc flash protection unit is a versatile and independently operating device for bay-based protection.

VAMP 125 has a fixed one-type design and is optimized for use in arc protection as a stand-alone device or as a part of a system. It can be used in various arc protection applications in low- or medium-voltage power distribution systems.

- external input for overcurrent measurement via the I> I_N input
- event memory, LED indication memory in case of mains loss
- operation on simultaneous current and light or on light only mode (I> & L>, or L>)
- typically a 7 ms operation time with a mechanical output contact: with HSO the operation time is typically 1 ms in the light only mode
- two programmable operation zones
- full system self-supervision
- up to two normally-open trip contacts for fast arc flash detection: T1 (HSO) and T2 (SPST)
- one change-over signal contact: SF
- LED indications of status, fault and trip indications
- binary input/output (BI/O) bus for light and overcurrent information and master trip

2.2 Unit features

VAMP 125 is a state of the art arc protection unit for electrical power distribution systems. By using VAMP 125 in switchgears, considerable safety improvements are obtained in the form of minimized injury and damage in case of an arc fault. VAMP 125 is a stand alone device, which provides a compact solution when the application does not require overcurrent measurement or when the overcurrent information is available from the incomer protection relay or any other arc protection unit (VAMP 221, 321 / VAM 4C). It is possible to connect four arc sensors of the VA1DA, VA1EH or VA2DV type to the VAMP 125 unit.

2.3 DIP switch settings on the unit

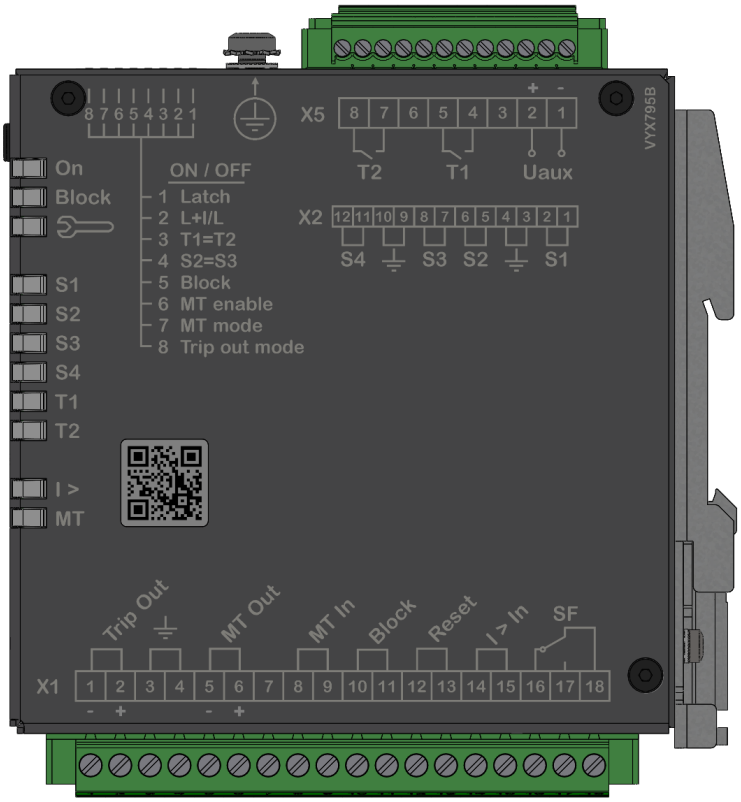


Figure 2.2: VAMP 125 DIP switch operations and sensor connection

The unit is configured using DIP switches that are located on top of the unit.

NOTICE
LOSS OF PROTECTION OR RISK OF NUISENCE TRIPPING Do not operate the power system if the service LED is lit. The reason may be that protection settings have been changed or the number of installed sensors has changed. **Failure to follow these instructions can result in unwanted shutdown of the electrical installation.**

Table 2.1: DIP switches 1–8

SW No.	Description
1 Latch	The Latch switch enables latching of the trip relays. If set to the ‘ON’ position, the latching function is activated. If set to the ‘OFF’ position, the output contacts follow the state of the sensors and output control pulse with minimum length of 20 ms is generated.
2 L+I/L	The L+I/L switch selects the operation mode. If set to the ‘ON’ position, the unit operates in the L+I mode (requires both I> input activation and light + external I> I_N signal). If set to the ‘OFF’ position, the unit operates in the L> mode (light only mode).
3 T1=T2	The T1=T2 mode is for setting the system selectivity. If set to the ‘OFF’ position, sensors nr. 1 and 2 trip relay T1. Accordingly, sensors no. 3 and 4 trip relay T2. If set to the ‘ON’ position, all four sensor channels activate both trip outputs.
4 S2=S3	If the configuration switch for sensor inputs 2 and 3 is in the ‘ON’ position, the activation of sensor 2 or 3 results in a common trip of both T1 and T2. If the switch is in the ‘OFF’ position, sensor 2 is linked to T1, sensor 3 is linked to T2 and both individually trip their dedicated trip relays.
5 Block	The Block switch enables blocking function to unit outputs.
6 MT enable	The MT enable switch enables the master trip function.
7 MT mode	If the configuration switch is set to the ‘OFF’ position, the MT output follows T1. If the configuration switch is set to the ‘ON’ position, the MT output follows T1 and T2. Note! The operation applies also to the L+I/L function.
8 Trip output mode	If the configuration switch is set to the ‘OFF’ position, the Trip out follows the state of T1. If the switch is set to the ‘ON’ position, the Trip out follows the state of T2.

2.4 Connecting the supply voltage

- Before connecting the supply voltage, ensure that the device connections, protective grounding and configurations are in order. If the unit settings need to be changed, disconnect the supply voltage before changing the settings.
- Connect the auxiliary supply voltage to the unit's terminal block.

⚠ DANGER

HAZARD OF ELECTRICAL SHOCK

Always connect the protective grounding before connecting the power supply.

Failure to follow these instructions will result in death or serious injury.

2.5 Disconnecting the supply voltage

Disconnect the auxiliary supply power from the unit if the following service actions are required:

- Replacement, add-on or removal of unit, cabling or sensors
- Changing of unit settings

3 Functions

3.1 Arc flash protection, general principle

The arc flash protection contains two protection zones that may be used to trip for example the incomer and outgoing circuit breakers. Arc protection zones are activated with external overcurrent status and light signals (or light signal alone). The allocation of different light signals to arc zones is defined in the sensor channel mapping of the unit.

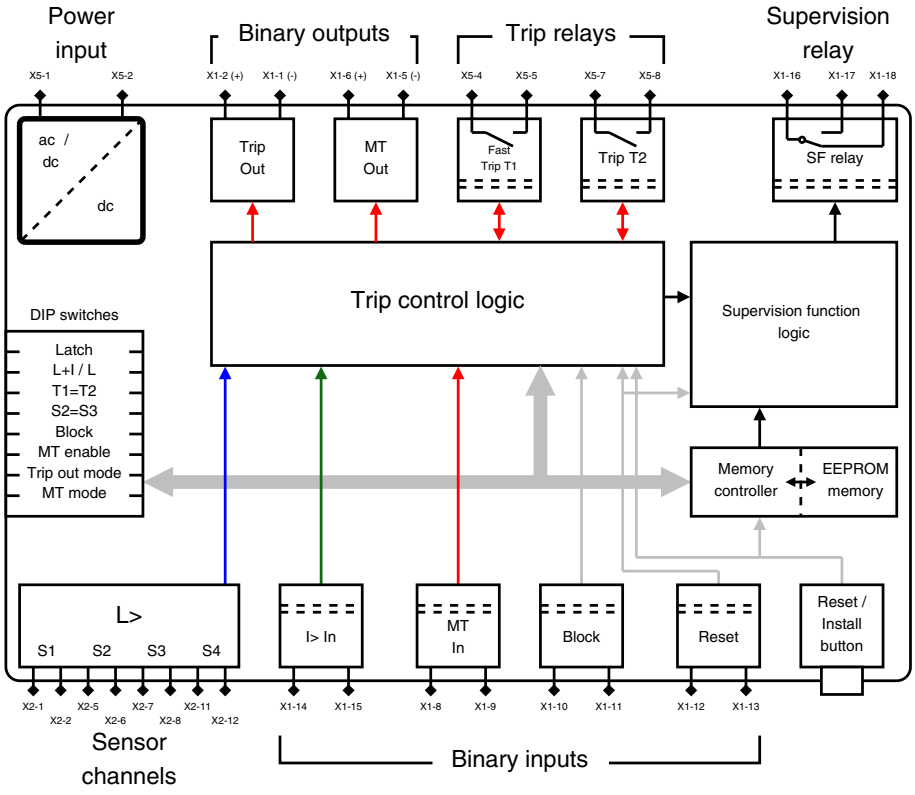


Figure 3.1: VAMP 125 block diagram

3.2 Self-supervision

The electronics and operation of the VAMP 125 unit are supervised by means of a separate self-supervision logic. The arc flash sensors are also self-supervised. If the self-supervision detects a permanent fault within the VAMP 125 unit or the arc sensors connected, the self-supervision output and system status indication LED are activated.

3.3 Binary inputs and outputs

Information from the arc protection function can be transmitted and received through binary inputs (BI) and outputs (BO). The rated voltage of these signals is 24 V dc when active. The input signal voltage range is 18–250 V dc.

Binary inputs

The binary inputs ‘BI’ (MT In, Block, Reset or I> I_N) can be used to receive the master trip, blocking, reset or current indication from another device to build selective arc protection schemes. BI is a dry type input for a 18–250 V dc signal. The function of BI signals is configured with the DIP switch.

Binary output

The binary outputs ‘BO’ (Trip Out or MT Out) can be used to send the trip indication/information signal to another device's binary input to build selective arc protection systems. BO is an internally driven (wetted) 24 Vdc signal. The function of BO signals is configured with the DIP switch.

3.4 Output contacts

Trip contacts can be controlled only by the corresponding arc flash sensors. The activated contact is indicated by the T1 and T2 LEDs.

An output contact can be configured as latched or non-latched using DIP switch 1. Latched relay contacts can be set free by pressing the unit's “Reset / Install” key.

The difference between the trip contacts and signal contacts is the DC breaking capacity. The contacts are single pole single throw (SPST) normal open type (NO), except for the signal relay SF which has a change-over contact single pole double throw (SPDT).

3.5 HMI functions and indications

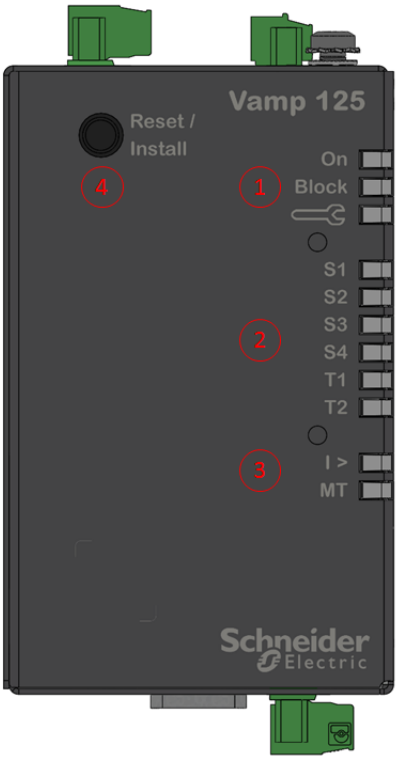


Figure 3.2: VAMP 125 DIP switch operations and sensor connection

1. **Operating status indication lights**
   - on: green, steady when the device is powered
   - block: yellow, lit when the block is active, either from DIP or block input
   - tool: red, steady when the device is in the error state or blocked
2. **Sensor and trip output indications**
   - S1: yellow, steady when sensor 1 is activated, flashing in the unhealthy state
   - S2: yellow, steady when sensor 2 is activated, flashing in the unhealthy state
   - S3: yellow, steady when sensor 3 is activated, flashing in the unhealthy state
   - S4: yellow, steady when sensor 4 is activated, flashing in the unhealthy state
   - T1: red, steady when trip 1 is activated, flashing in the unhealthy state
   - T2: red, steady when trip 2 is activated, flashing in the unhealthy state

3. **Binary input indications**
   - I>: red, steady when I> input is energized
   - MT: red, steady when external master trip is received from MT In
4. **Reset / Install**
   - Push button on the front: “Reset / Install"
     - 0.5 s press to reset and clear indications / latch
     - 5 s to press to install sensors
   - When pressing "Install", the unit flashes all LEDs at the end of the installation routine to perform the LED function test.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

Configure the output contact to latching mode to disable closing the circuit breaker after an arc flash fault.

Do not reset the latched output until the system has been inspected.

Failure to follow this instruction will result in death or serious injury.

4 Application

Every switchgear or assembly compartment is equipped with an arc flash point sensor. Up to four sensors can be connected to the unit. The trip relays are electromechanical and hybrid type of outputs. Relays can be connected directly to control the circuit breakers.

VAMP 125 is an arc flash protection relay for small MV and LV power distribution applications used in power generation, industry and utilities where the light only operation mode with full selectivity is required.

If overcurrent criteria are required simultaneously with light activation, a binary current signal has to be connected to X1-14/15. This I> I_N signal can for example be taken from the VAM 4C or VAMP 221, 321 units.

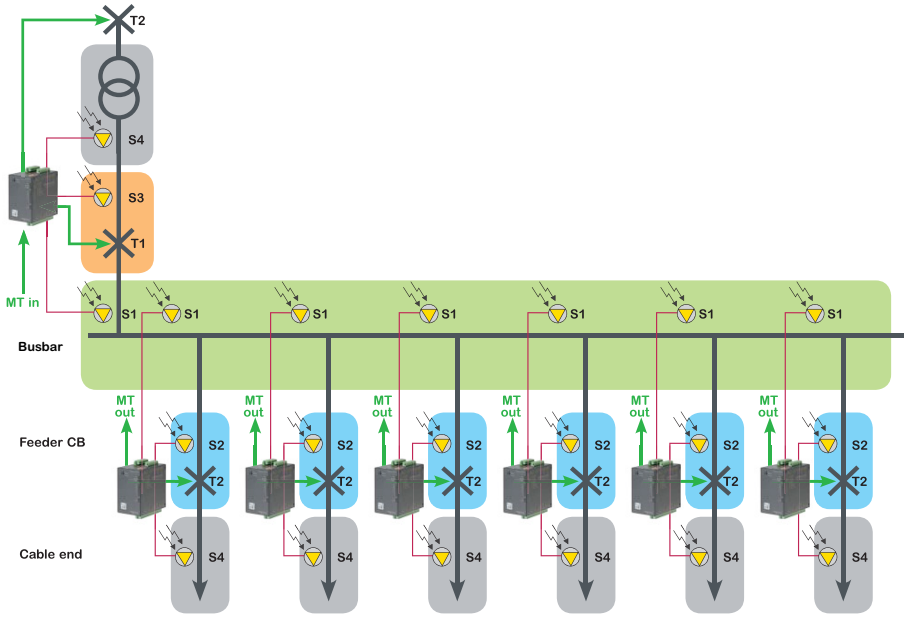


Figure 4.1: One main application on MV switchgear

Fault in cable end

- S4 sensor activates trip contact ”T2”. Busbar remains operational.

Fault in busbar and feeder CB

- S1 sensor in busbar or S2 sensor in feeder CB activates the master trip.
- MT Out is connected to the incomer VAMP 125 unit.
- When the VAMP 125 unit located in the incomer receives MT to input, the incomer unit activates the trip contact ”T1”.

Fault in incomer CB or cable end

- Sensors S3 and S4 activate contact “T2”.

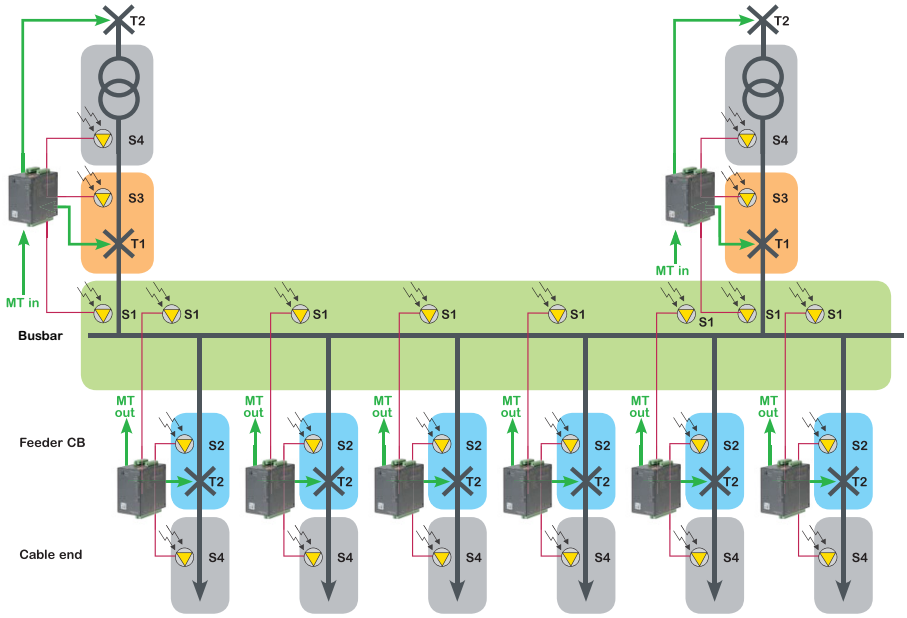


Figure 4.2: Two main application on MV switchgear

DIP switch settings for one main and two main applications. These settings are identical for the incomer and feeder VAMP 125 unit.

	ON	OFF
Latch	X	
L+I/L		X
T1=T2		X
S2=S3		X
Block		X
MT enable	X	
MT mode		X
Trip out mode		X

See "VAMP 125, Setup and Wiring Instructions" for more application examples.

5 Arc flash sensor

⚠ WARNING

HAZARD OF NON-OPERATION

Clean the arc sensor periodically as instructed in this user manual and after an arc flash fault.

Failure to follow these instructions can result in death or serious injury.

VA 1 xx is a point-type arc flash sensor. Arc flash light is transformed to a current signal in the sensor.

- standard 8000–10000 lux visible light sensitivity
- wide area arc flash detection
- typically <1 ms detection time
- standard cable length of 6 m or 20 m (cut to length on site). Do not extend the cable beyond 20 m.
- easy to install (2-wired non-polarity sensitive connection)
- can be mounted on switchgear surface, in customer drilled holes in switchgear or on VYX001 Z shape or VYX002 L shape mounting plates available from VAMP, or locally fabricated from supplied drawings

The sensor is used by an arc flash protection device or system to detect the light coming from the arc flash incident.

5.1 VA 1 DA

The arc sensor VA 1 DA is activated by strong light. The sensor transforms the light information into the current signal that is used by the unit to detect arc flash light.

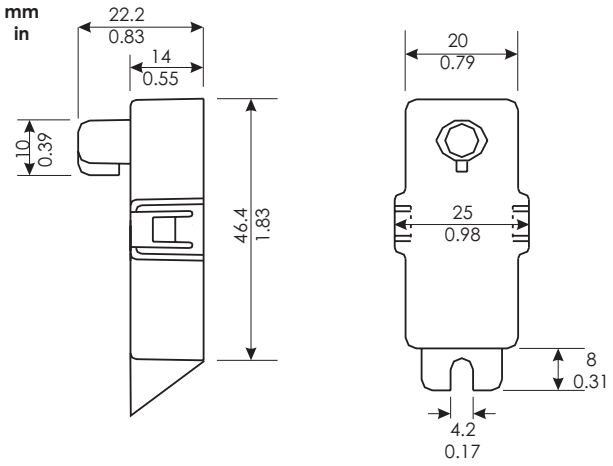
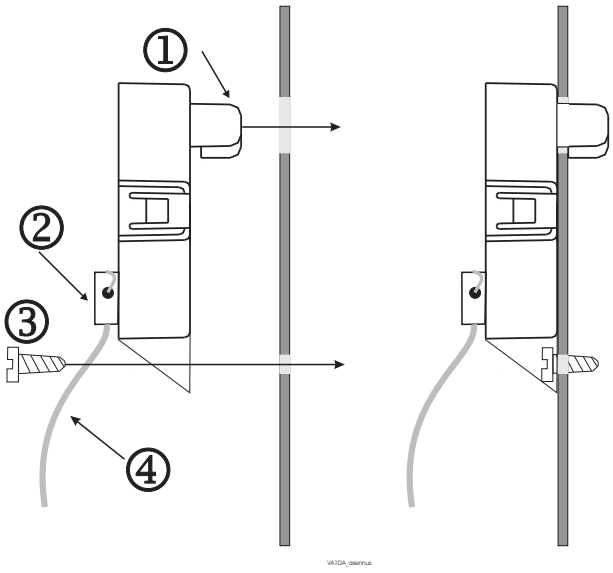


Figure 5.1: VA 1 DA dimensions

You can install the arc sensor onto the switchgear wall from the outside. Press the active part of the sensor through the 10 mm hole in the wall and fix it using a 4 mm screw.



1	Active part of the sensor	2	Cable clamp
3	Fastening screw 4 x 15 mm	4	Sensor cable

Figure 5.2: VA 1 DA mounting

5.2 Connecting the unit

The sensors are delivered with 6 or 20 m cables. After mounting the sensors, connect them to the unit as follows:

1. Draw the wire to the nearest unit using the shortest route possible and cut it to a suitable length.
2. Connect the arc sensors to the screw terminals. The polarity of the arc sensor cables is not critical.
3. Connect the cable shield to the corresponding connector on X2 terminal when using shielded cable on the sensors.

NOTICE
LOSS OF PROTECTION OR RISK OF NUISENCE TRIPPING Do not splice or extend pre-made/supplied cables with any type of wires or cables. **Failure to follow these instructions can result in unwanted shutdown of the electrical installation.**

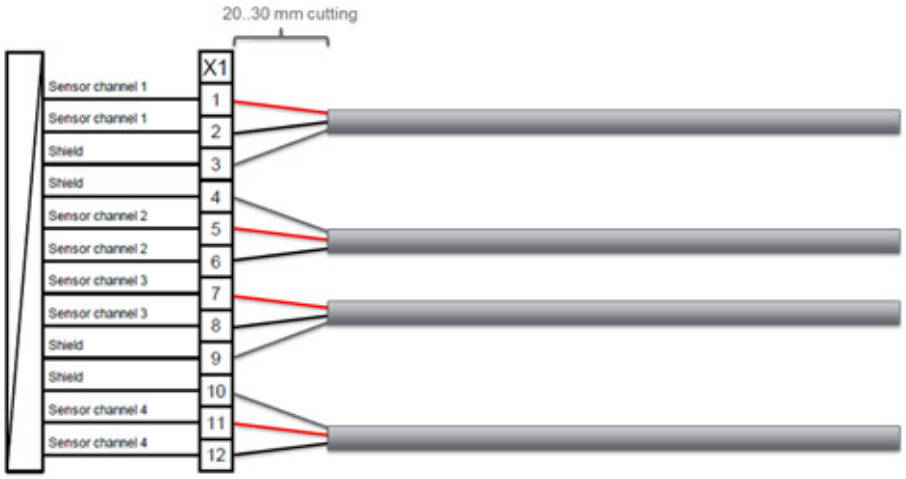


Figure 5.3: Cable landing to VAMP 125 X1 connector

5.3 Sensitivity

NOTICE

LOSS OF PROTECTION OR RISK OF NUISENCE TRIPPING

The sensor must not be exposed to direct sunlight or other strong light sources. Do not mount the sensor directly under a light source.

Failure to follow these instructions can result in unwanted shutdown of the electrical installation.

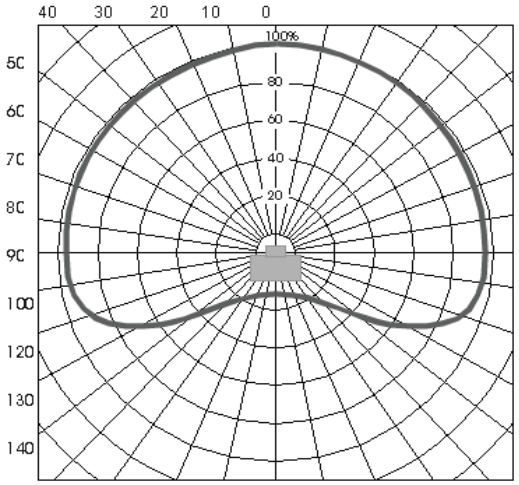


Figure 5.4: Sensitivity of the arc sensor VA 1 DA

6 Preventive maintenance

NOTICE
LOSS OF PROTECTION OR RISK OF NUISENCE TRIPPING • If the arc flash protection unit is no longer supplied with power or is in permanent fault state, the protection functions are no longer active and all the output contacts are dropped out. • To detech a power-off or permanent fault state, connect the SF output to a monitoring device. **Failure to follow these instructions can result in equipment damage and unwanted shutdown of the electrical installation.**

The unit requires maintenance to ensure that it works according to the specification. Keep record of the maintenance actions performed for the system. The maintenance can include, but is not limited to, the following actions.

6.1 Maintenance

The VAMP arc products, sensors and cabling must be visually checked when the switchgear is de-energized. During such inspection, pay attention to:

- possible dirty arc sensors
- loose wire connections
- damaged wiring
- indicator lights (unit start-up)
- other mechanical connections

Do visual inspection once every three (3) years minimum.

⚠ CAUTION
EQUIPMENT OPERATION HAZARD Carry out periodical system testing as per the manufacturer's recommendation or if the protection system scheme has been changed. **Failure to follow these instructions can result in injury or equipment damage.**

6.2 Hardware cleaning

Pay special attention to ensure that the unit, its extension units and sensors do not become dirty. If cleaning is required, wipe out dirt from the unit.

Use a dry cleaning cloth or equivalent together with mild soapy water to clean any residues from the sensor.

⚠ CAUTION

EQUIPMENT OPERATION HAZARD

Do not use any type of solvents or gasoline to clean the unit, sensors or cables.

Failure to follow these instructions can result in injury or equipment damage.

6.3 Sensor condition and positioning check

Always check that the sensor positioning remains as it was originally designed after:

- commissioning
- sensor replacement
- modification procedure
- cleaning
- arc flash fault
- periodical testing

6.4 System status messages

If the unit's self-checking detects any unintended system status, it provides an alarm by activating the service LED (⊂⊃) and indication status notification on the SF output. Should this happen, contact your local office for further guidance.

6.5 Spare parts

Use the entire unit as a spare for the device to be replaced.

7 Technical data

7.1 VAMP 125

Table 7.1: Auxiliary power supply

U_{AUX}	24 – 240 (-20% +10%) V ac/dc
Power consumption	8 W

Table 7.2: Hybrid output, T1

Number of contacts	1, NO
Rated voltage	24 – 240 V ac/dc
Continuous carry	5 A
Minimum making current	-
Typical operation time (light only)	≤1 ms
Make and carry, 0.5 s Make and carry, 3 s	30 A 15 A
Breaking capacity, ac	2 000 VA
Breaking capacity, dc (L/R = 40ms)	
at 48 V dc:	5 A
at 110 V dc:	3 A
at 220 V dc:	1 A
Contact material	AgNi 90/10
Terminal block: - MSTB2.5 - 5.08	Wire dimension: Maximum 2.5 mm^2 (13–14 AWG) Minimum 1.5 mm^2 (15–16 AWG)
Wire size	Minimum 1.5 mm^2 (16 AWG)

Table 7.3: Trip contact, T2

Number of contacts	1, NO
Rated voltage	250 V ac/dc
Continuous carry	5 A
Minimum making current	100 mA at 24 Vdc
Typical operation time (light only)	≤8 ms
Make and carry, 0.5 s Make and carry, 3 s	30 A 15 A
Breaking capacity, ac	2 000 VA
Breaking capacity, dc (L/R = 40ms)	
at 48 V dc:	1.15 A
at 110 V dc:	0.5 A
at 220 V dc:	0.25 A
Contact material	AgNi 90/10
Terminal block: - MSTB2.5 - 5.08	Wire cross section: Maximum 2.5 mm^2 (13 – 14 AWG) Minimum 1.5 mm^2 (15 – 16 AWG) Wire type: single strand or stranded with insulated crimp terminal
Wire size	Minimum 1.5 mm^2 (16 AWG)

Table 7.4: Self-supervision contact; SF

Number of contacts:	2, NC/NO
Rated voltage	250 V ac/dc
Continuous carry	5 A
Minimum making current	100 mA at 24 V ac/dc
Make and carry, 0.5 s Make and carry, 3 s	30 A 15 A
Breaking capacity, ac	2 000 VA
Breaking capacity, dc (L/R = 40ms)	
at 48 V dc:	1.15 A
at 110 V dc:	0.5 A
at 220 V dc:	0.25 A
Contact material	AgNi 90 / 10
Terminal block - MSTB2.5 - 5.08	Wire cross section Maximum 2.5 mm^2 (13 – 14 AWG) Minimum 1.5 mm^2 (15 – 16 AWG)
Wire size	Minimum 1.5 mm^2 (16 AWG)

Table 7.5: Binary outputs; Trip Out, MT Out

Number of outputs	2
Rated output voltage	+24 V dc (max +32 V dc unloaded)
Rated output current	20 mA
Terminal block: - MSTB 2.5–5.08	Wire dimension: Maximum 2.5 mm^2 (13–14 AWG) Minimum 1.5 mm^2 (15–16 AWG)
Connection cable	Twisted pair, with shield. Shield shall be grounded to the appropiarty connector.
Wire size	Minimum 0.5 mm^2 (20 AWG) and maximum length 100 meters (328 ft)

Table 7.6: Binary inputs; MT In, Block, Reset, I> I_N

Number of inputs	4
Voltage withstand	250 V ac/dc
Nominal operation voltage	24 – 240 V ac/dc (max. 250 V ac/dc)
Typical switching threshold	12 V dc ±5 %
Current drain	approx. 3 mA
Terminal block: - MSTB 2.5–5.08	Wire dimension: Maximum 2.5 mm^2 (13–14 AWG) Minimum 1.5 mm^2 (15–16 AWG)
Connection cable	Twisted pair, with shield. Shield shall be grounded to the appropiarty connector.
Wire size	Minimum 0.5 mm^2 (20 AWG) and maximum length 100 meters (328 ft)

Table 7.7: Arc sensor inputs; S1 – S4

Number of inputs	4
Supply to sensors	8 V dc
Grounding	4 pcs ground termination on connector
Terminal block: - MC 1.5–3.5	Wire dimension: Maximum 1.5 mm^2 (15–16 AWG) Minimum 0.14 mm^2 (25–26 AWG)
Connection cable	Twisted pair, with shield. Shield shall be grounded to the appropiarty connector.

Table 7.8: Disturbance tests

Test	Standard & Test class / level	Test value
Emission	**IEC/EN 60255-26 (ed3)**	
Conducted	EN 55022, Class A & CISPR 22	0.15 – 80 MHz
Emitted	EN 55011, Class A / IEC 60255-25 / CISPR 11 EN 55011, Class A & CISPR 11	30 – 1000 MHz
Immunity	**IEC/EN 60255-26 (ed3) Zone A**	
1 Mhz damped oscillatory wave	IEC/EN 61000-4-18	±2.5 kVp CM, ±2.5 kVp DM
Static discharge (ESD)	IEC/EN 61000-4-2 Level 4	±8 kV contact, ±15 kV air
Emitted HF field	IEC/EN 61000-4-3 Level 3	80 – 2700 MHz, 10 V/m
Fast transients (EFT)	IEC/EN 61000-4-4 Level 4	±4 kV, 5/50 ns, 5 kHz
Surge	IEC/EN 61000-4-5 Level 3	±4 kV, 1.2/50 µs, CM ±2 kV, 1.2/50 µs, DM
Conducted HF field	IEC/EN 61000-4-6 Level 3	0.15 – 80 MHz, 10 Vrms
Power-frequency magnetic field	IEC/EN 61000-4-8	300 A/m (continuous), 1000 A/m 1 – 3 s
Pulse magnetic field	IEC/EN 61000-4-9 Level 5	1000 A/m, 1.2/50 µs
ac and dc voltage dips	IEC/EN 61000-4-29, IEC/EN 61000-4-11	0% of rated voltage • ac: ≥ 0.5 cycle • dc: ≥ 10 ms
		40% of rated voltage • ac: 10 cycles • dc: 200 ms
		70% of rated voltage • ac: 25 cycles • dc: 500 ms
ac and dc voltage interruptions	IEC/EN 61000-4-29, IEC/EN 61000-4-11	100% interruption • ac: 250 cycles • dc: 5 s
Voltage alternative component	IEC/EN 61000-4-17	15% of operating voltage (dc) / 10 min

Table 7.9: Electrical safety tests

Test	Standard & Test class / level	Test value
Impulse voltage withstand	IEC/EN 60255-27	5 kV, 1.2/50 µs, 0.5 J
Dielectric test	IEC/EN 60255-27	2 kV, 50 Hz
Insulation resistance	IEC/EN 60255-27	
Protective bonding resistance	IEC/EN 60255-27	
Power supply burden	IEC 60255-1	

Table 7.10: Mechanical tests

Test	Standard & Test class / level	Test value
Device in operation		
Vibrations	IEC 60255-21-1, Class II / IEC 60068-2-6, Fc	1 Gn, 10 – 150 HZ
Shocks	IEC 60255-21-2, Class II / IEC 60068-2-27, Ea	10 Gn / 11 ms
Seismic	IEC 60255-21-3 Method A, Class II	2G horizontal / 1G vertical , 1–35 Hz
Device de-energized		
Vibrations	IEC 60255-21-1, Class II / IEC 60068-2-6, Fc	2 Gn, 10 – 150 HZ
Shocks	IEC 60255-21-2, Class II / IEC 60068-2-27, Ea Panel mounting	30 Gn / 11 ms
	IEC 60255-21-2, Class I / IEC 60068-2-27, Ea DIN rail mounting	15 Gn / 11 ms
Bump	IEC 60255-21-2, Class II / IEC 60068-2-27, Ea Panel mounting	20 Gn / 16 ms
	IEC 60255-21-2, Class I / IEC 60068-2-27, Ea DIN rail mounting	10 Gn / 16 ms

Table 7.11: Environmental tests

Test	Standard & Test class / level	Test value
Device in operation		
Dry heat	EN / IEC 60068-2-2, Bd	70°C (158°F)
Cold	EN / IEC 60068-2-1, Ad	-40°C (-40°F)
Damp heat, cyclic	EN / IEC 60068-2-30, Db	From 25°C (77°F) to 55°C (131°F) From 93% RH to 98% RH Testing duration: 6 days
Damp heat, static	EN / IEC 60068-2-78, Cab	40°C (104°F) 93% RH Testing duration: 10 days
Change of temperature	IEC / EN 60068-2-14, Nb	• Lower temp -40°C • Upper temp 70°C • 5 cycles
Device in storage		
Dry heat	EN / IEC 60068-2-2, Bb	80°C (176°F)
Cold	EN / IEC 60068-2-1, Ab	-40°C (-40°F)

Table 7.12: Environmental conditions

Ambient temperature, in-service (UL)	-40 – 55°C (-40 – 131°F)
Ambient temperature, in-service (CE)	-40 – 65°C (-40 – 149°F)
Ambient temperature, storage	-40 – 80°C (-40 – 176°F)
Relative air humidity	<95%
Maximum operating altitude	2000 m (6561.68 ft)

Table 7.13: Casing

Degree of protection (IEC 60529)	IP20
Dimensions (W x H x D)	70 x 135 x 123 mm / 2.76 x 5.31 x 4.84 in
Weight	0.9 kg (1.987 lb)

7.2 Arc flash sensor

U_{AUX}	8, 12 or 15 V dc (from the unit)
Current consumption	<2 – 4 mA (in normal mode) <18 – 29 mA (activated)
Housing class (IEC 60529)	IP20
Dimensions (W x H x D)	25 x 55 x 14 mm / 0.98 x 2.17 x 0.55 in
Material	Plastic
Weight (with 6 m / 236.22 in cable)	0.3 kg (0.662 lb)
Cable length	6 m (236.22 in) or 20 m (787.40 in)
Environment	Pollution Degree 2
Operation temperature	-40 – 85°C (-40 – 185°F)
Light spectrum sensitivity area	400 – 1100 nm

8 Installation

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Wear your personal protective equipment (PPE) and comply with the safe electrical work practices. See NFPA 70E and CSA Z462.
- The VAMP 125 arc fault detection system is not a substitute for proper PPE when working on or near equipment being monitored by the system.
- Only qualified personnel should install and service this equipment. Read this entire set of instructions and check the technical characteristics of the unit before performing such work.
- Perform wiring according to national standards (NEC) and any requirements specified by the customer.
- Observe any separately marked notes and warnings.
- NEVER work alone.
- Turn off all power supplying this equipment before working on or inside it. Consider all sources of power, including the possibility of backfeeding.
- Always use a properly rated voltage sensing relay to ensure that all power is off.
- The equipment must be grounded.
- Connect the unit's protective ground to functional earth according to the connection diagrams presented in this document.
- The unit contains components that can be damaged if exposed to electrostatic discharge (ESD). Do not open the unit unless you have taken appropriate PPE measures against ESD.
- Install all devices, doors and covers before turning on the power to this unit.

Failure to follow this instruction will result in death or serious injury.

⚠ WARNING

HIGH OPERATING TEMPERATURE

The maximum operating temperature of the installation must not exceed +55° Celcius (+131° Fahrenheit) when UL-rated installation is required.

Failure to follow these instructions can result in death or serious injury.

8.1 Product identification

Each unit is delivered in a separate package containing:

- the arc flash protection unit with the necessary terminal connectors
- production testing certificate
- Quick Start manual

Serial number label

- **P:** power consumption
- **Uaux:** power supply operating range
- **Type:** type designation
- **S/N:** serial number
- **VID:** production identification
- **Mfg. Date:** manufacturing date

8.2 Storage

Store the unit in its original packaging in a closed, sheltered location with the following ambient conditions:

- ambient temperature: -40 °C to +70 °C (or -40 °F to +158 °F)
- humidity < 90 %.

Check the ambient conditions and the packaging yearly.

8.3 Mounting

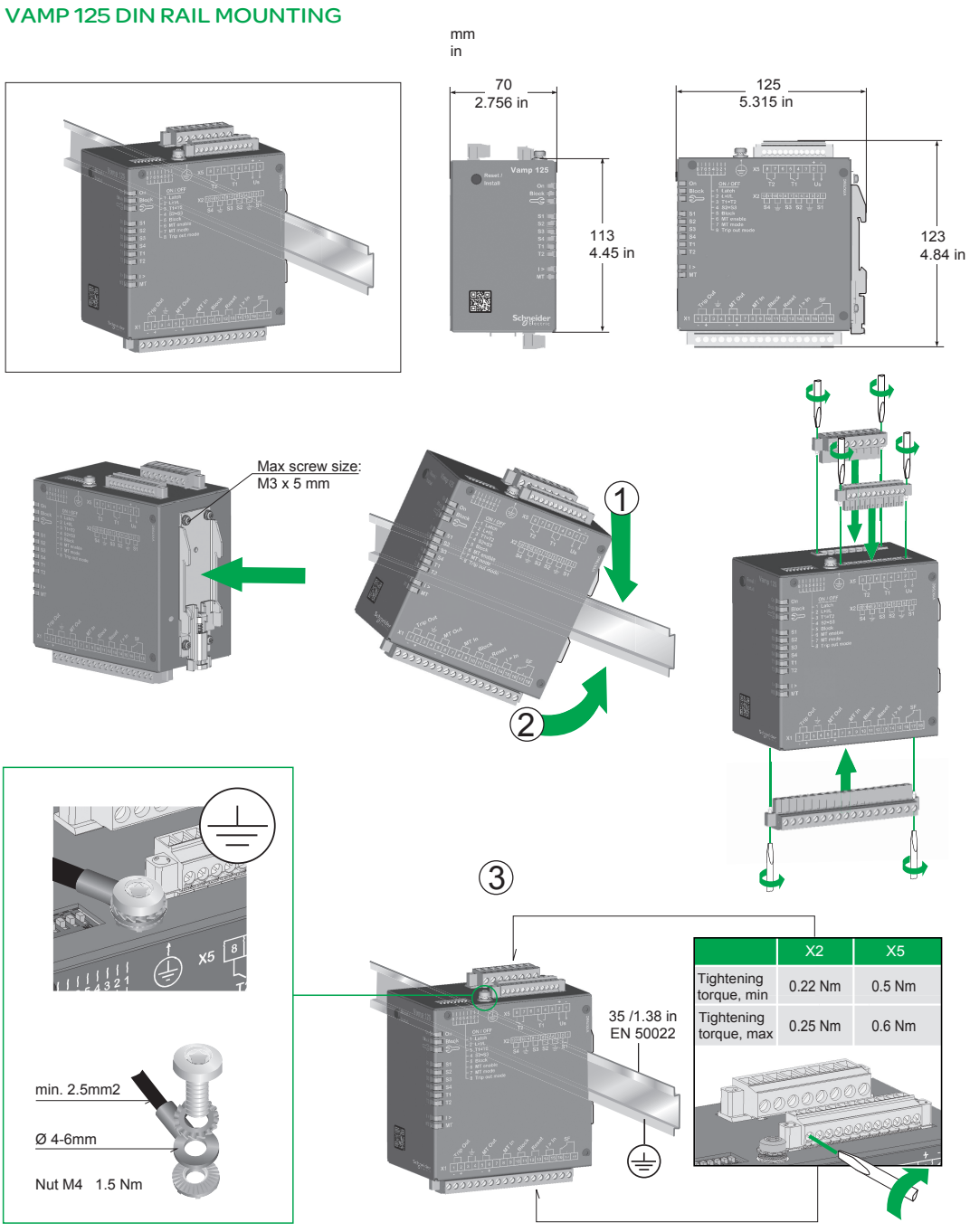


Figure 8.1: DIN rail mounting

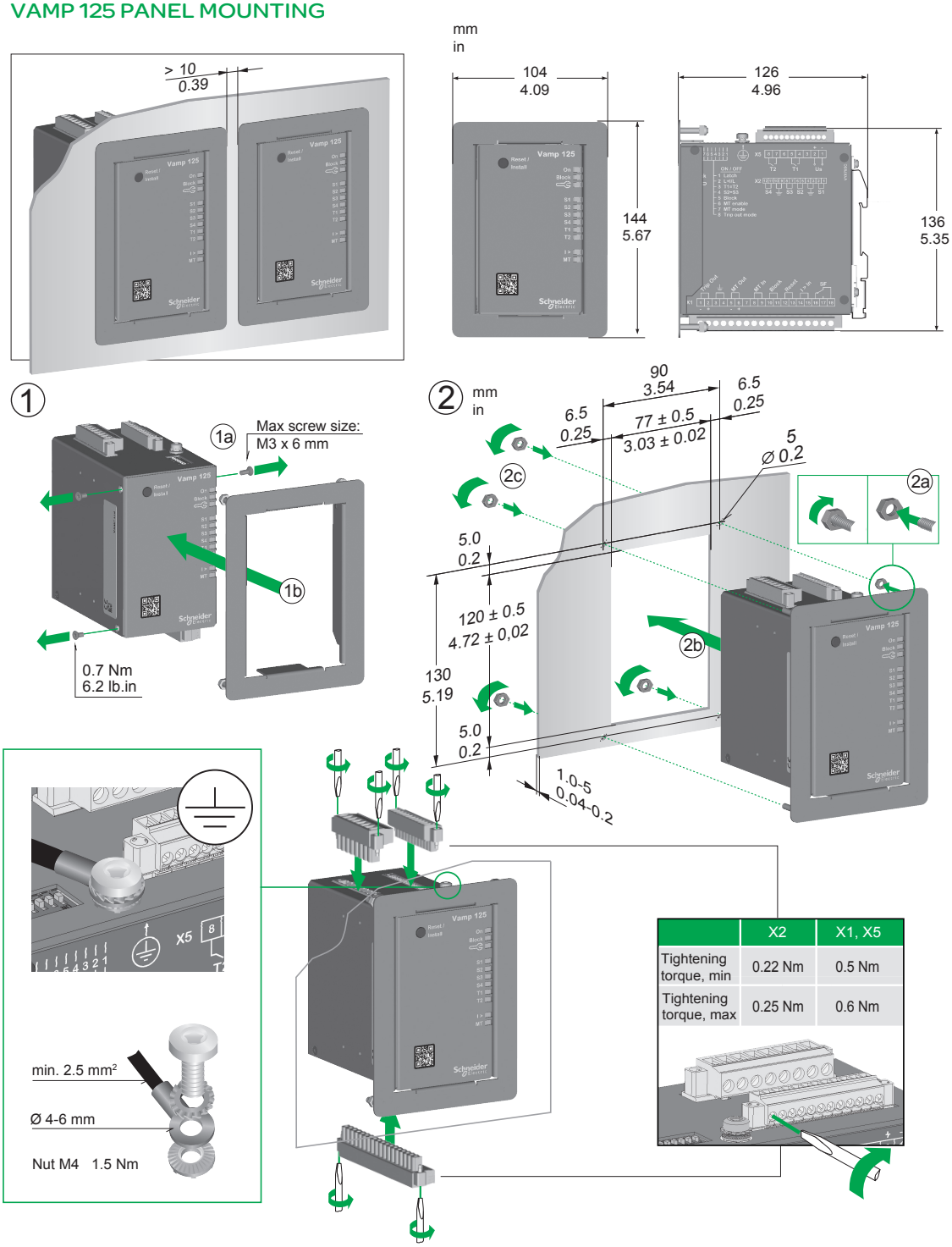


Figure 8.2: Panel mounting

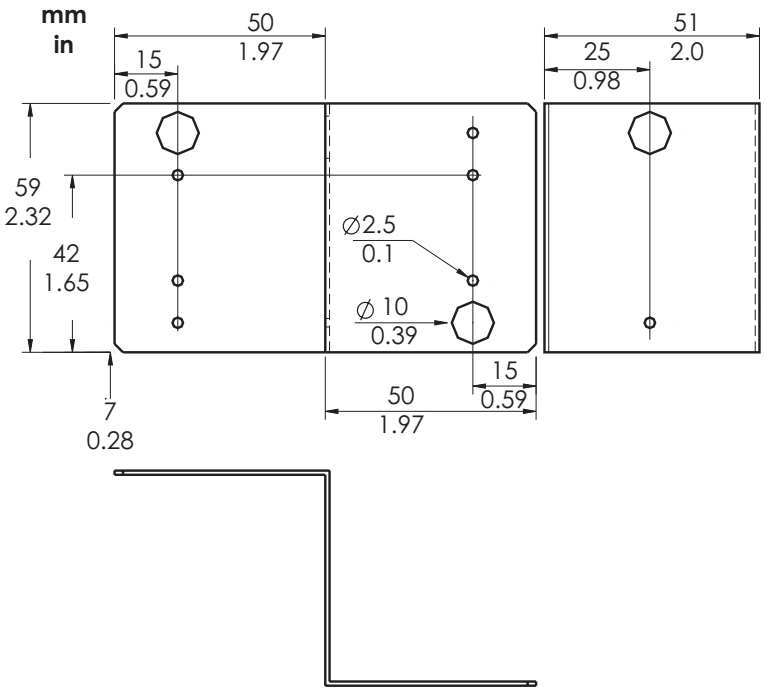


Figure 8.3: VYX 001 mounting plate for sensors

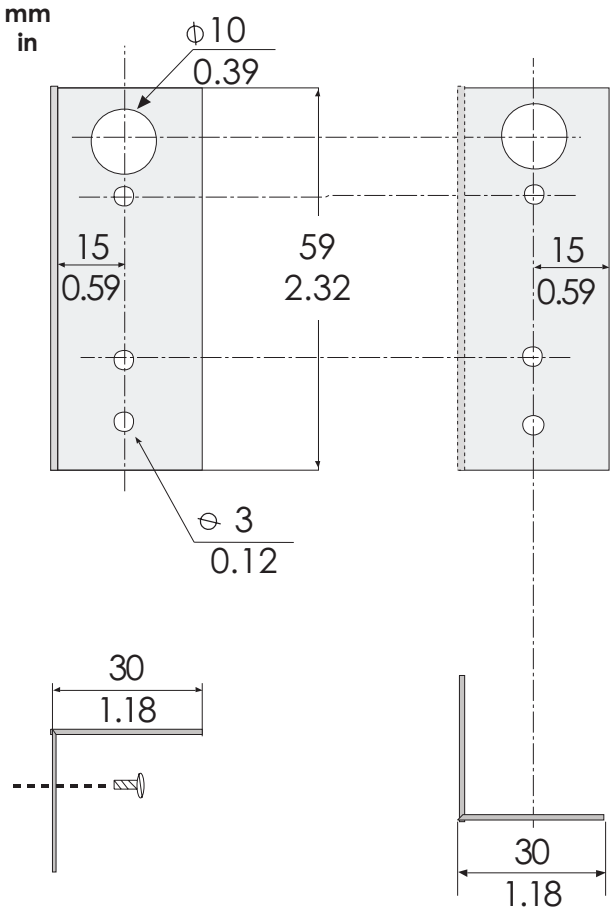


Figure 8.4: VYX 002 mounting plate for sensors

8.4 Connections

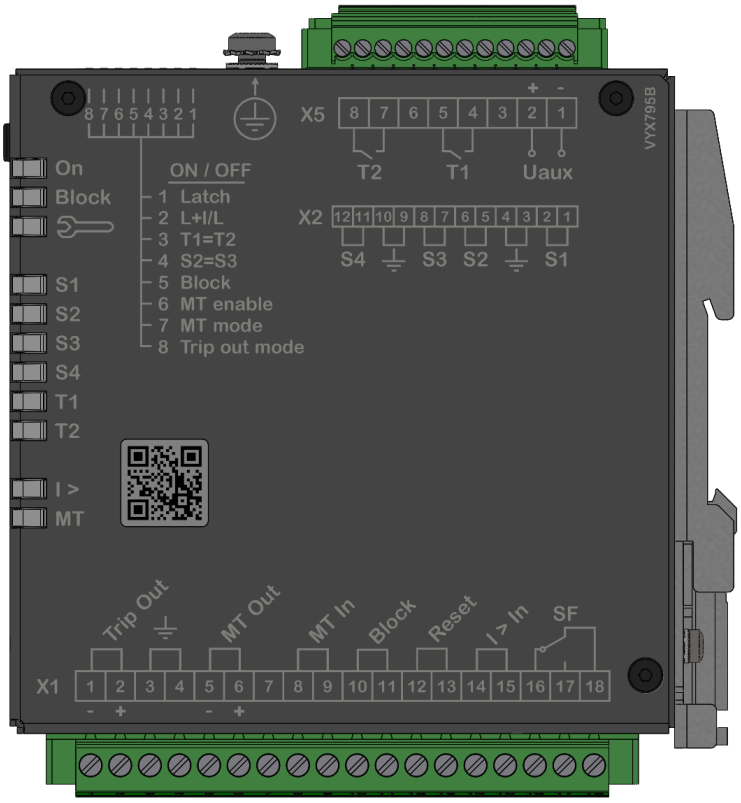


Figure 8.5: VAMP 125 connections

The VAMP 125 unit comprises two independent arc protection zones. Both zones have their own trip relay, trip 1 and trip 2. Trip 1 is controlled by sensor inputs 1 and 2. Trip 2 is controlled by sensors 3 and 4.

Trip out is activated if either or both the trip relays trip.

- If the Trip out mode switch is in the "OFF" position, the output follows the state of T1.
- If the Trip out mode switch is in the "ON" position, the output follows the state of T2.

If the “T1=T2” DIP switch is in the “ON” position, both trip outputs work in parallel for any sensor activation.

If the “S2=S3” DIP switch is in the “ON” position, activation of sensor 2 or 3 cause both T1 and T2 to trip. This is for example used for CB compartment supervision where two zones overlap each other.

If the overcurrent criteria are required simultaneously with light activation, a binary current signal has to be connected to X1-14/15. This I> signal can be taken for example from VAM 4C or VAMP 221or 321 units. External reset is possible by energizing the Reset input in X1-12/13 by auxiliary voltage.

The auxiliary voltage is connected to X5-1 and X5-2. VAMP 125 has a wide power supply range.

⚠ DANGER

HAZARD OF ELECTRICAL SHOCK

Always connect the protective grounding before connecting the power supply.

Failure to follow these instructions will result in death or serious injury.

8.4.1 X1 connector

Table 8.1: Type: Phoenix contact MSTB 2.5 – 5.06

Pin No.	Symbol	Description
1*	Trip Out	Trip Out, negative terminal
2*	Trip Out	Trip Out, positive terminal, +24 V dc
3	GND	Binary output GND
4	GND	Binary output GND
5	MT Out	MT Out, negative terminal
6	MT Out	MT Out, positive terminal, +24 V dc
7	NC	No connection
8*	MT In	External master trip input
9*	MT In	External master trip input
10*	Block	External block input
11*	Block	External block input
12*	Reset	External reset input
13*	Reset	External reset input
14*	I> In	External current input
15*	I> In	External current input
16	SF COMMON	Service status output, common
17	SF NO	Service status output, normal open
18	SF NC	Service status output, normal close

*) Binary inputs are polarity-free, which means that you can freely choose "-" and "+" terminals for each binary input.

8.4.2 X2 connector

Table 8.2: Type: Phoenix contact MC 1.5 – 3.5

Pin No.	Symbol	Description
1	S1	Arc sensor channel 1, positive terminal
2	S1	Arc sensor channel 1, negative terminal
3	GND	Arc sensor channel 1 Ground
4	GND	Arc sensor channel 2 Ground
5	S2	Arc sensor channel 2, positive terminal
6	S2	Arc sensor channel 2, negative terminal
7	S3	Arc sensor channel 3, positive terminal
8	S3	Arc sensor channel 3, negative terminal
9	GND	Arc sensor channel 3 Ground
10	GND	Arc sensor channel 4 Ground
11	S4	Arc sensor channel 4, positive terminal
12	S4	Arc sensor channel 4, negative terminal

8.4.3 X5 connector

Table 8.3: Type: Phoenix contact MSTB 2.5 – 5.06

Pin No.	Symbol	Description
1	L / - / ~	Supply voltage, positive terminal
2	N / + / ~	Supply voltage, negative terminal
3	NC	No connection
4	T1	Trip relay 1, HSO type
5	T1	Trip relay 1, HSO type
6	NC	No connection
7	T2	Trip relay 2, electromechanical type
8	T2	Trip relay 2, electromechanical type

8.4.4 Generating alarm circuits

Alarm circuits (self-supervision and trip alarms) generated by the arc fault detection system can be forwarded to higher-level enclosure supervision and control systems through the output contacts.

Connecting the self-supervision alarms, the VAMP 125 arc fault detection system monitors the FPGA and related circuit operation and program execution with a separate supervision circuit.

Whenever the supervision circuit detects a permanent inoperative stage in any system component, it ignores activation signals coming from that component (for example, from a detected inoperative arc sensor).

The supervision circuit also monitors the internal operating voltage. For instance, if operating voltage in the central unit is lost, the system automatically gives an SF alarm since the SF output contact operates on steady-state current.

In other words, the SF relay is actuated when the operating voltage is on and within the permitted limits. The self-supervision system also issues a self-supervision alarm when it detects an incorrect number of sensors. It is advised to connect the SF output to an appropriate annunciating unit in the substation.

Connect the self-supervision alarm output to an SF change-over contact using the following pins:

Pin no.	Symbol	Description
X1:16, X1:18	SF(NC)	Self-supervision relay (Closed when relay is energized)
X1:16, X1:17	SF(NO)	Self-supervision relay (Open when relay is energized)

During normal system operation (no internal inoperative stage) and with the auxiliary power supply connected, pin X1:16 or X1:18 is closed, and pin X1:16 or X1:17 is open.

9 Order code

When ordering, state:

- Type designation: V125
- Quantity
- Accessories (see the order codes in section Accessories)

Accessories

Order code	Description	Note
VA 1 DA-6	Arc sensor	Cable length 6 m (19.69 ft)
VA 1 DA-20	Arc sensor	Cable length 20 m (65.62 ft)
VA 1 DA-6s	Arc Sensor, shielded	Cable length 6 m (19.69 ft)
VA 1 DA-20s	Arc Sensor, shielded	Cable length 20 m (65.62 ft)
VA 1 DA-6-HF	Arc Sensor, halogen free	Cable length 6 m (19.69 ft)
VA 1 DA-20-HF	Arc Sensor, halogen free	Cable length 20 m (65.62 ft)
VA 1 EH-6	Arc Sensor (Pipe type)	Cable length 6 m (19.69 ft)
VA 1 EH-20	Arc Sensor (Pipe type)	Cable length 20 m (65.62 ft)
VA 1 GIS-1,5	Arc Sensor, shielded with GIS adapter	Cable length 1.5 m (4.93 ft)
VA 1 GIS-3	Arc Sensor, shielded with GIS adapter	Cable length 3 m (9.85 ft) Cable length 9.85 ft (3 m)
VA 1 GIS-5	Arc Sensor, shielded with GIS adapter	Cable length 5 m (16.41 ft)
VA 1 GIS-10	Arc Sensor, shielded with GIS adapter	Cable length 10 m (32.81 ft)
VYX 001	Surface Mounting Plate for Sensors	Z-shaped
VYX 002	Surface Mounting Plate for Sensors	L-shaped
VYX 328	Surface Mounting Plate for VA 1 DV Sensor	U-shaped
REL52901	Door mount bracket	For VAMP 125, IP 20

Customer Care Centre

http://www.schneider-electric.com/CCC

Schneider Electric

35 rue Joseph Monier
92500 Rueil-Malmaison
FRANCE

Phone: +33 (0) 1 41 29 70 00
Fax: +33 (0) 1 41 29 71 00

www.schneider-electric.com

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