The Energy Company with the
Best Technology Competitiveness

Arc Protection & Elimination System

VAM 3ED / VAM 3TD

NEW EXCELLENT TECHNOLOGY
신기술인증

NEXPO
www.nexpo.kr

Contents

The Energy Company with the Best Technology Competitiveness

As one to the great

We provide the optimal solutions and services for stable power supply, protection and control.

NEXPO manufactures and supplies products for stable power supply, and protection and control of operating systems for various plants, including power plants and even consumers. NEXPO offers perfect solutions in consideration of system performance, stability and environmental conditions.

Based on our competence in the specialized engineering, we accommodate our customers' developmental requirements from the design stage and provide global solutions that are economical and efficient around the clock.

Arc Protection & Elimination System

Arc Protection System is a protective device used to maximize human safety and minimize equipment damages. This Ultra - high speed arc protection function protects workers even when faults are found in the incoming/distribution panel and activates the protection system more quickly so as to reduce damages caused by arc faults.

Arc Protection & Elimination System," the most safe and innovative system for protection of human lives and power facilities

NEXPO's Arc Protection System instantly detects arc faults that may be generated in the incoming/distribution panels and extinguishes arc within a short time. It is an arc protection and elimination system for human safety and facility protection.


VAM 3TD
C.1
C.2
C.3
NEXPO

Safety Protector for the Incoming/Distribution Panels under High-Pressure and Extreme Heat, NEXPO Arc Protection System

Arc Protection & Elimination System

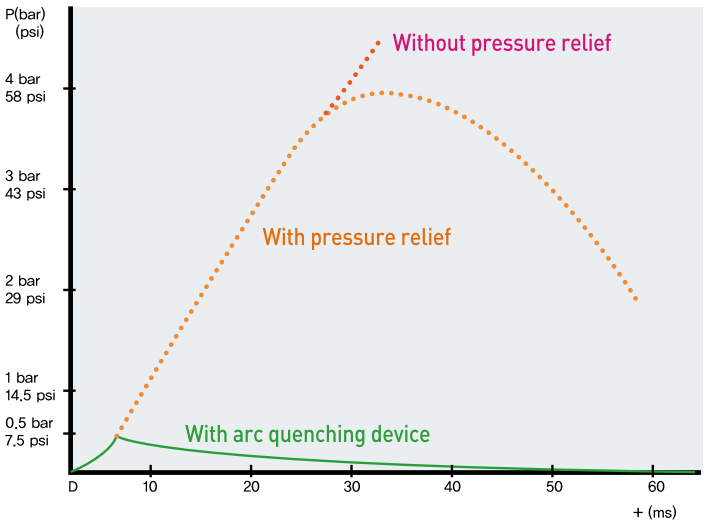
NEXPO's arc quenching device VAM 3ED is an extremely fast acting switch grounding all phases within 4 ms after occurrence of an arc flash in the switchgear.

The very fast operation means not only that the thermal damages by the extreme heat of the arc is totally omitted, but also that the pressure increase due to heating of the air or other insulation gas is drastically reduced.

Nexpo arc quenching device VAM 3ED is operated with VAMP 321 arc protection relay interlocked, which is activated by the light and current from an arc flash fault.

Arc quenching device units increase personnel safety and the reliability for all type of switchgears, including non-arc proof ones in service.

Due to limited in pressure increase, no pressure relief or exhaust channels are necessary, which in turn simplifies the design and reduces the cost for both switchgear and building.



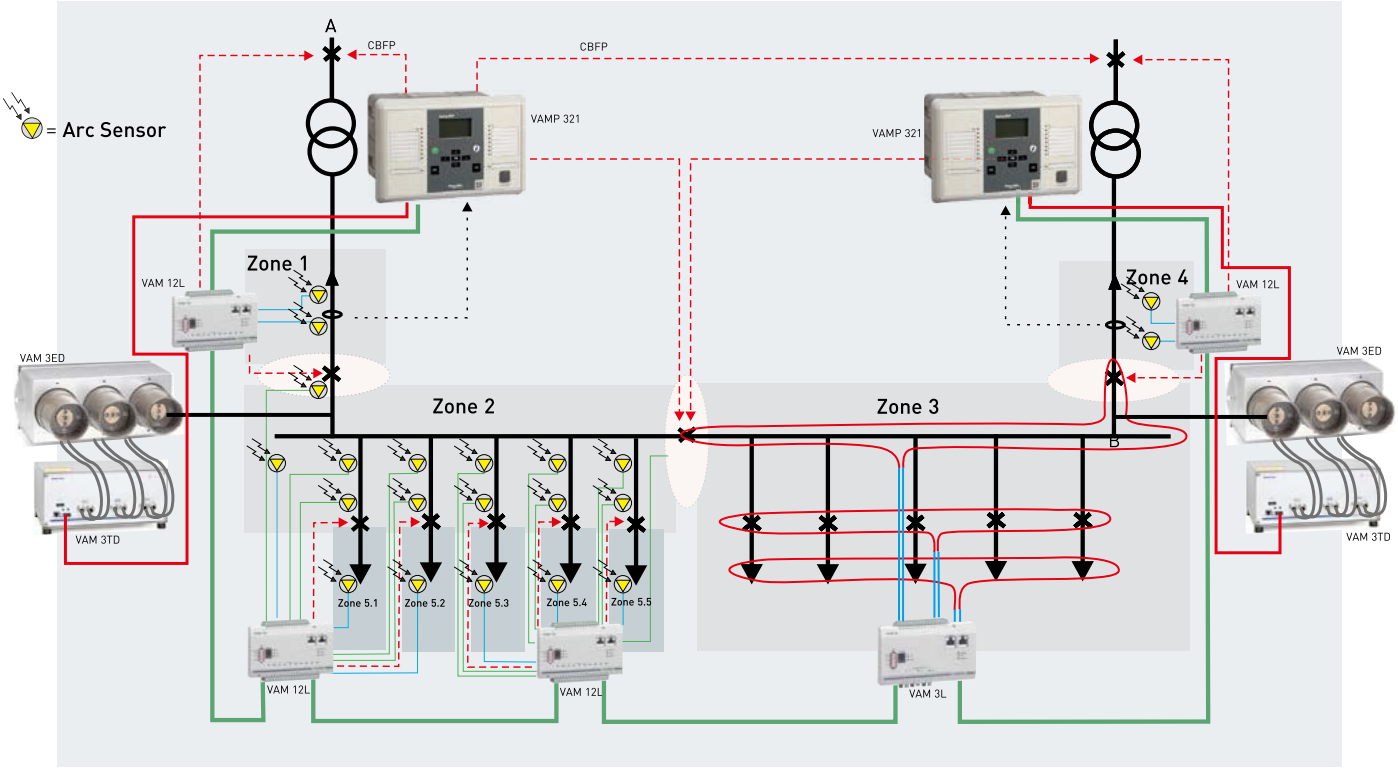
Arc flash occurrence time - pressure graph


Worldwide Standard for
Safety
(주)넥스포
NEXPO

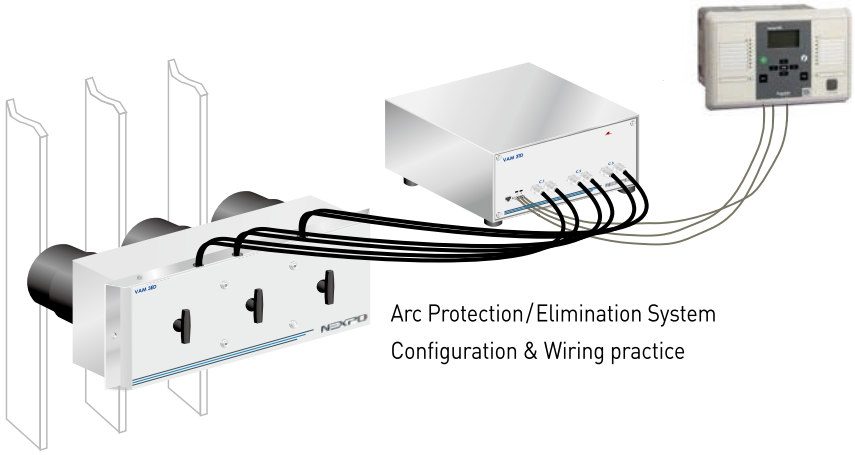
Benefits

- Advanced solution for arc resistant switchgear
- Less than 4 ms total arc flash quenching time
- Applied to new and retrofit installation
- Provides personnel and asset protection
- Minimizes downtime
- Applicable when pressure relief is not possible such as marine & offshore installations

Application



Should the arc flash fault happen in the switchgear, the VAMP 321 system detects simultaneous light and fault current. The VAMP 321 sends an optical triggering command to the VAM 3ED arc quenching device which quenches the arc flash fault by creating a controlled three phase short circuit to ground.



Arc Protection/Elimination System
Configuration & Wiring practice

Product Features & Specifications

VAM 3ED Arc quenching device

- Thomson coil based shorting device
- Less than 4 ms arc flash arc flash Elimination time
- Re-usable
- Self diagnostic function

VAM 3TD Trigger Unit

- Energy stored in a capacitor bank
- Triggers VAM 3ED Arc quenching device
- Controlled by VAMP 321
- Self diagnostic function

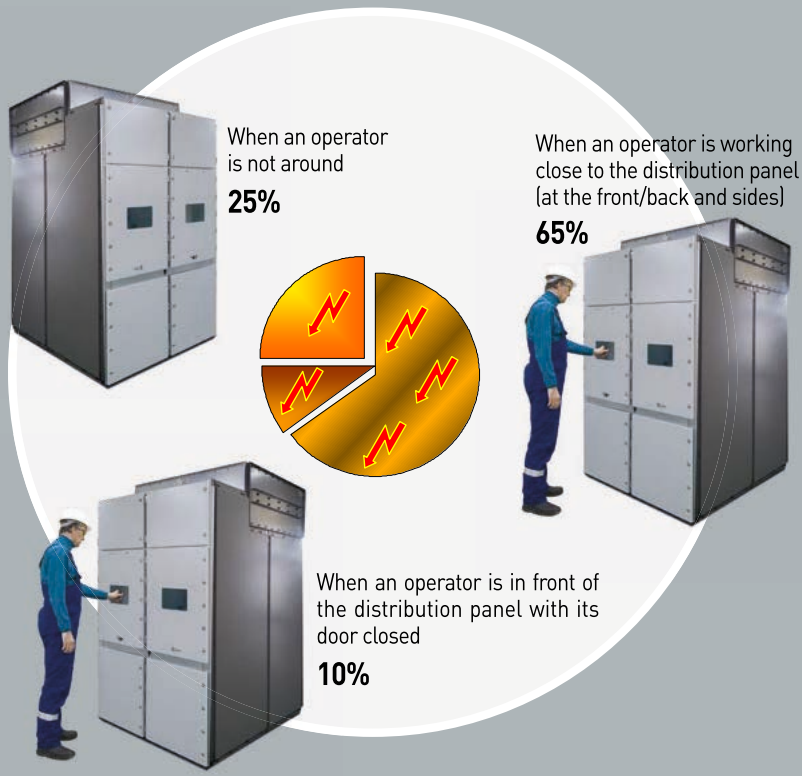
Rating & Specifications

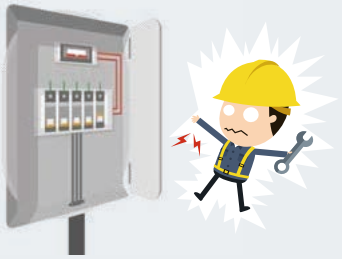
Item	Low -Voltage	Medium Voltage (up to 17.5kV)	Medium Voltage (24kV)
	VAM 3ED LV	VAM 3ED	VAM 3ED HV
Apperance			
Rated Insulation Voltage Ui (kV)	1000(V)	- - -	- - -
Rated Voltage Un (kV)	1000(V)	5, 7.2, 12, 15, 17.5	24
Withstand Voltage Power Frequency (kV/1min)	2.5	38	50
Withstand Voltage Lightning Impulse (1.2 x 50μs) BIL	8	95	95
Reted Peak Current Ipeak(A)	4000		
Rated Shorttime Withstand Current (kA/1s)	40, 50	40, 50	40, 50
Rated Shorttime Withstand Current (kA/0.2s)	65	65	65
Rated Shorttime Withstand Peak Current (kApeak)	104/130/169	104/130/169	104/130/169
Rated Control Volatge (V)	DC24		
From Arc Dectection to Closing (ms)	<4		
No-load Endurance (Times)	20		
According Standard	IEC60947-9-1 Arc quenching devices	SPS-KOEMA 0931-1970:2019 Arc eliminator for switchgear	
Features	Resettable, Manual Reset, Semi-permanent		
Insulation Material	Air Insulation, Eco		

NEXPO's Safety Solution
Arc Protection & Elimination System
is not optional, but essential.

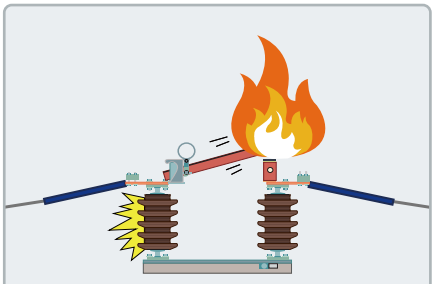
When do arc faults occur?

Arc faults occur when an operator is doing work near the distribution panel (65%); and when an operator is in front of the distribution panel (10%).
Special safety measures are needed because 75% of the arc faults occur when an operator is around the distribution panel.

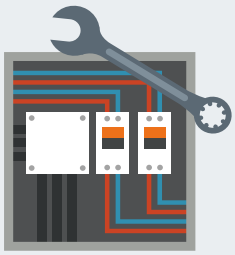




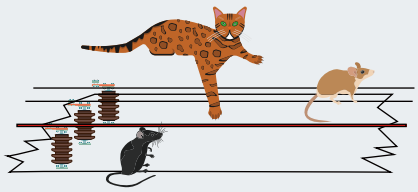
Accident during operation)
[75% of the total accidents]



Poor insulation and abnormal operator



Contact with tools/unremoved (remaining) tools



Animals such as rodents and insects, etc

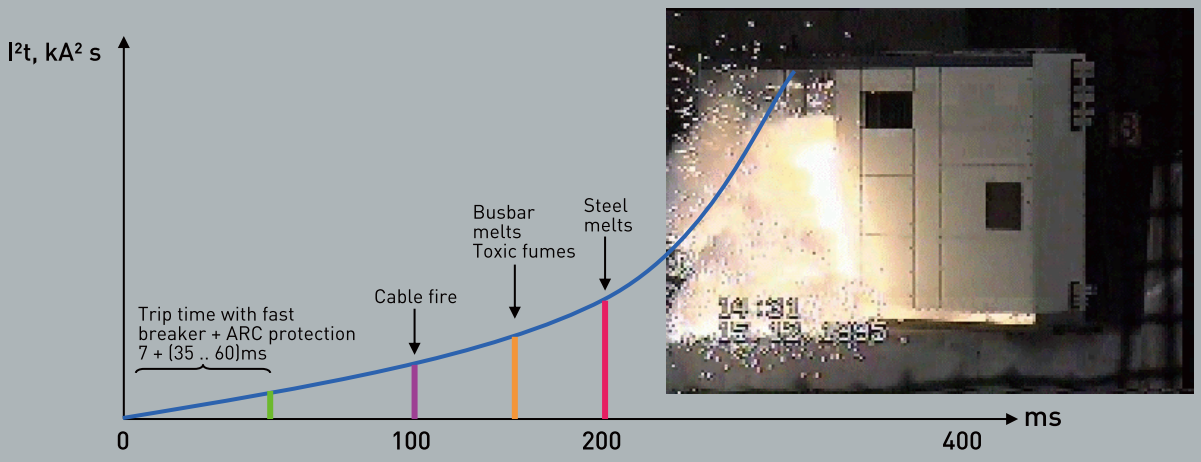
What is an Arc?

- It is the result of sudden energy released by phase to phase or phase to ground insulation breakdown.
- The maximum peak current is emitted.
- It is generated when current passes through the air.
- It shows the intensity of illumination that is 2000 times higher than that of the general office lighting.
- It is up to 5 times the sun's surface temperature. (20,000°C)
- It causes cubical expansion of about 40,000 times.

Correlation between Arc Energy and Extinction Time

The test data on Time-Energy (I^2t) when an arc fault is generated inside the distribution panel are as shown below. Only a slight damage occurs when the arc is extinguished within 100ms of the Arc Burning Time. The best solution is to extinguish the arc within 35ms, which result in almost no human and facility damages.

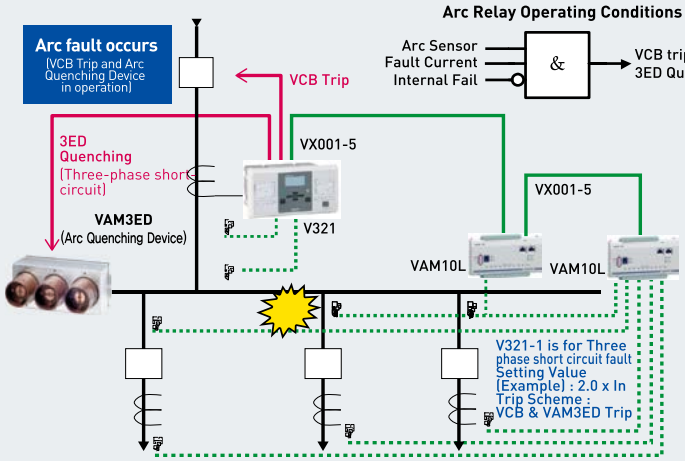
- **Within 35ms:** Almost no damage to the human body and facilities
- **Within 100ms:** Slight damages to the human body and facilities (partial repair needed – cable sheath starts to melt)
- **Within 150ms:** Damages to the human body and facilities (partial replacement needed – Copper starts to melt)
- **Within 300ms:** Severe damages to the human body and facilities (partial or entire replacement needed – Steel starts to melt)
- **Within 500ms:** Fatal damages to the human body and facilities



NEXPO Arc Protection System is divided into Standard Type and Separate-Protection Type for consumers to choose in reflection of their facilities and requirements.

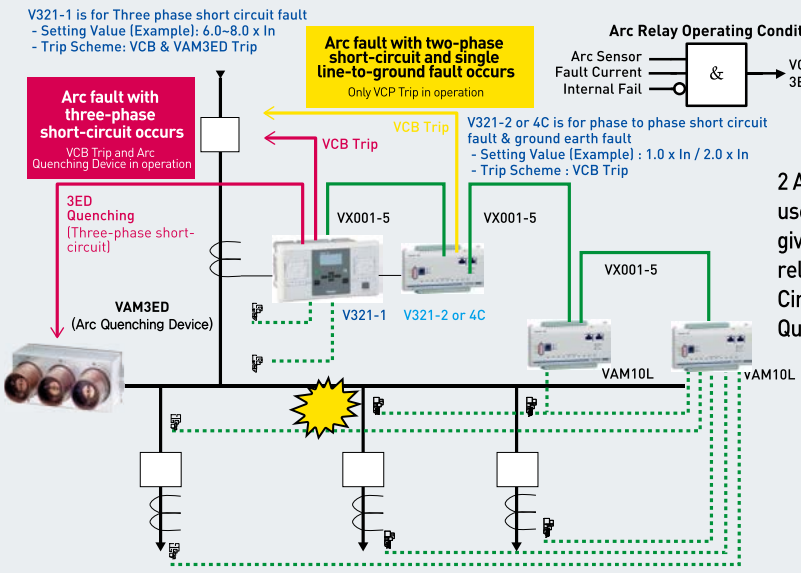
Type

Standard Type



1 Arc Relay is used as Master Unit which simultaneously command a trip to Arc Quenching Device and Circuit Breaker(CB) through detect 'Arc+Ground Fault' and 'Arc+Short Circuit'.

Ground Fault Separate-Protection Type

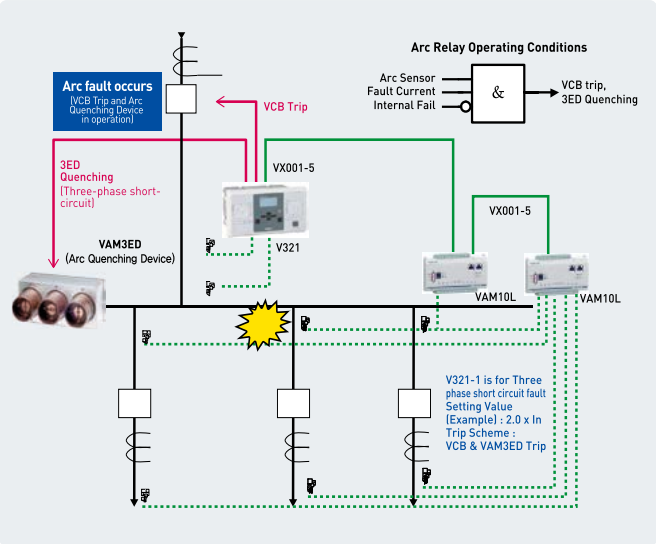


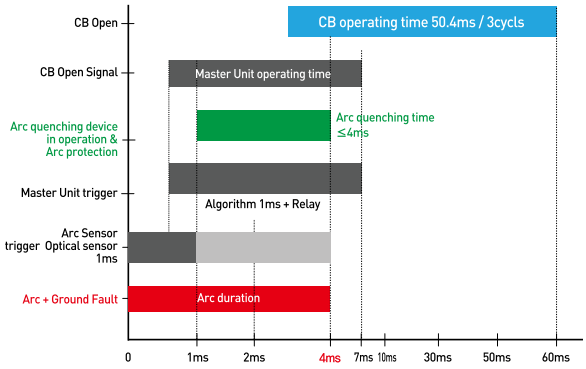
2 Arc relay units are used. One of arc relay is used to detect 'Arc+Ground Fault current' and give a Trip command to CB Only. Another arc relay is used to detect 'Arc+Three-Phase Short Circuit current' and give the command to the Arc Quenching Device and CB simultaneously.

Standard Type

Standard Type Arc Protection System(Arc + Ground Fault, Short Circuit – Simultaneous Protection)

It is a standardized system to protect the incoming/distribution panels from arc faults (flash). It is an arc protection system applied to the power plants with input transformers of 300MW or less, or two-winding. 1 arc protection relay unit is used to give the command to the arc quenching device and Circuit Breaker (CB) and to elimination the detected arc.





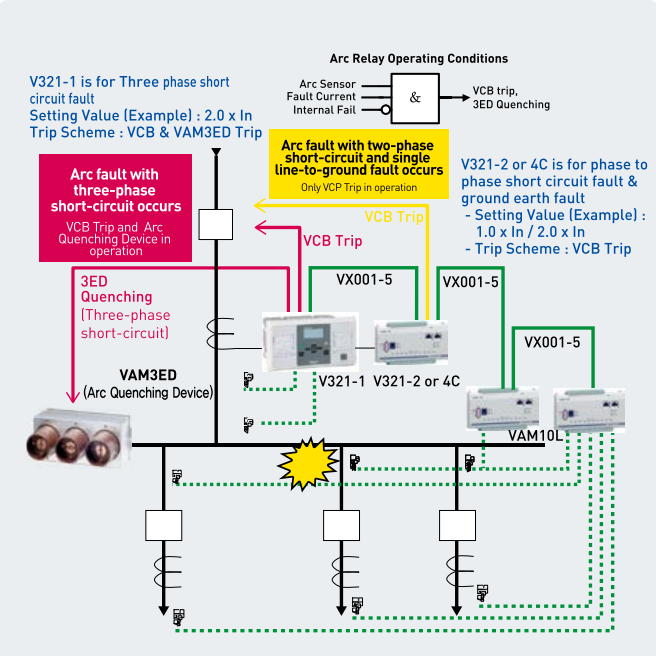
Ground Fault Separate-Protection Type

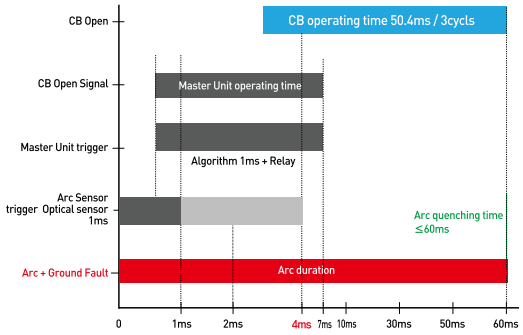
Ground Separate-Protection Type Arc Protection System (Arc + Ground Fault or/and Arc + Short-Circuit)

It is applicable for all power plants, and it is especially adopted in places where three-winding transformers of 500MW or bigger are installed. 2 arc protection relay units are used and each relay divides a role of Master-Master. When arc faults are detected, each relay gives the command to respective arc quenching device and Circuit Breaker.

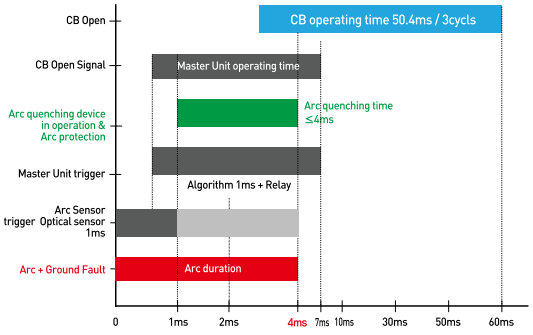
Case 1. Detect the Arc Fault + Three phase Short Circuit (Progress from Ground fault to three-phase short circuit) – Relay V321-1 triggers 3ED operation and sends the Trip signal to CB

Case 2. Detect the Arc Fault + Ground current – 4C sends the Trip signal to CB only (breaking at the minimum 70ms)





Two-Phase Short-Circuit & Single Line-to-Ground Fault)



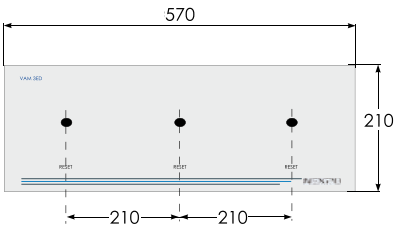
Three-Phase Short-Circuit

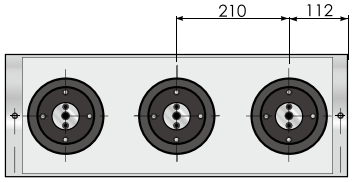
Arc protection & Elimination system instantly and safely protects people and facilities from High-pressure and high-heat arc faults.

NEXPO has the best technologies related to protective relays, arc flash protection, and power system measurement and monitoring systems.
NEXPO's protective relays for Medium Voltage, substation and power transmission/distribution are widely used in various fields ranging from substations to power plants and industrial power systems.
Additionally, this intelligent arc protection system enhances human protection and facility safety.
NEXPO is creating a brand that leads the global arc protection sector.
NEXPO complies with the latest international standards and regulations.
NEXPO has been running a successful business by offering standard products at a competitive price, long-term partnership, flexibility and 24-hour customer services.
Also, our technical team with a wealth of experience offers customer support.
NEXPO complies with the managerial systems specified in ISO 9001/14001.

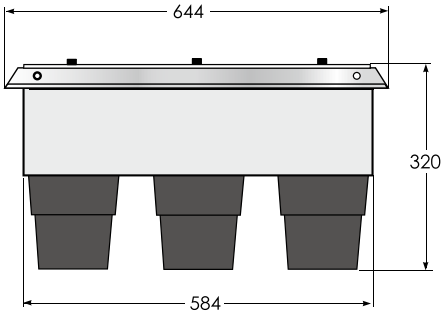
Configuration & Dimension

VAM 3ED

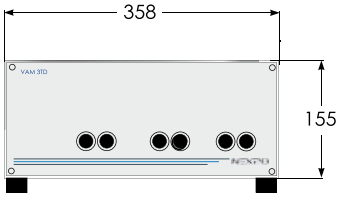


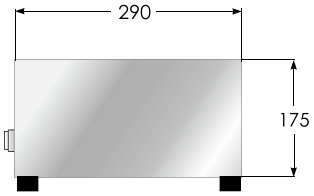


Top View



VAM 3TD





Order Codes

Order Code	Product Name	Remarks
VAM 3ED	Arc quenching device	
VAM 3TD	Trigger unit	
VAMP 321	Central unit	
VAM 3L	Fiber sensor I/O unit	3 fiber loops, 1 trip relay
VAM 3LX	Fiber sensor I/O unit	3 fiber loops, 1 trip relay, adjustable sensitivity
VAM 4C	Current I/O unit	3 current inputs, 1 trip relay
VAM 4CD	Current I/O unit	3 current inputs, 1 trip relay, flash mounting
VAM 10L	Point sensor I/O unit	10 sensor inputs, 1 trip relay
VAM 10LD	Point sensor I/O unit	10 sensor inputs, 1 trip relay, flash mounting
VAM 12L	Point sensor I/O unit	10 sensor inputs, 3 trip relays
VAM 12LD	Point sensor I/O unit	10 sensor inputs, 3 trip relays, flash mounting
VAMP 4R	Interface Unit (use vx002 cable)	4 x NO, 4 × NC, 2 groups
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 EH-6	Arc Sensor (Pipe type)	Cable length 6m
VA 1 EH-20	Arc Sensor (Pipe type)	Cable length 20m
ARC-SLx	Fiber sensor, 16 000 lx, 2,5m blocking cover in both ends	x = fiber lenght [m], see note 1
ARC-SLmx	Fiber sensor, 8 000 lx	x = fiber lenght [m], see note 2
VX001-xx	Modular cable between VAMP 321-VAM & VAM-VAM	xx = Cable length [m], see note 3
VYX001	Surface Mounting Plate for Sensors	Z- shaped
VYX002	Surface Mounting Plate for Sensors	L- shaped
VYX076	Raising Frame	Height 40mm
VYX077	Raising Frame	Height 60mm
VYX223	Raising Frame	Height 100mm

* - C = Conformal coating (option)

Note 1. Cable lengths 10. 15, 20, 25, 30 m

Note 2. Fibre lengths 1 , 5, 10, 15, 20, 25, 30, 35, 40, 50 or 70 m

Note 3. Cable lengths 1, 3, 5, 7, 10, 15, 20, 25 & 30 m

VAMP 321

Modular solutions for flexible arc flash protection

Main characteristics

Modular structure

VAMP 321 designed to possibility to add necessary function in hardware by user firsthand. The basic unit is possible to maximum 10 dedicated arc sensor input terminal to use through additional option, and through this is scalable up to high-end arc protection system.

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

The VAMP has intruduced Event and Disturbance Record function already analysis ability of Arc occurrence phenomenon for the first time in the world which can be improved.

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 systems.

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.

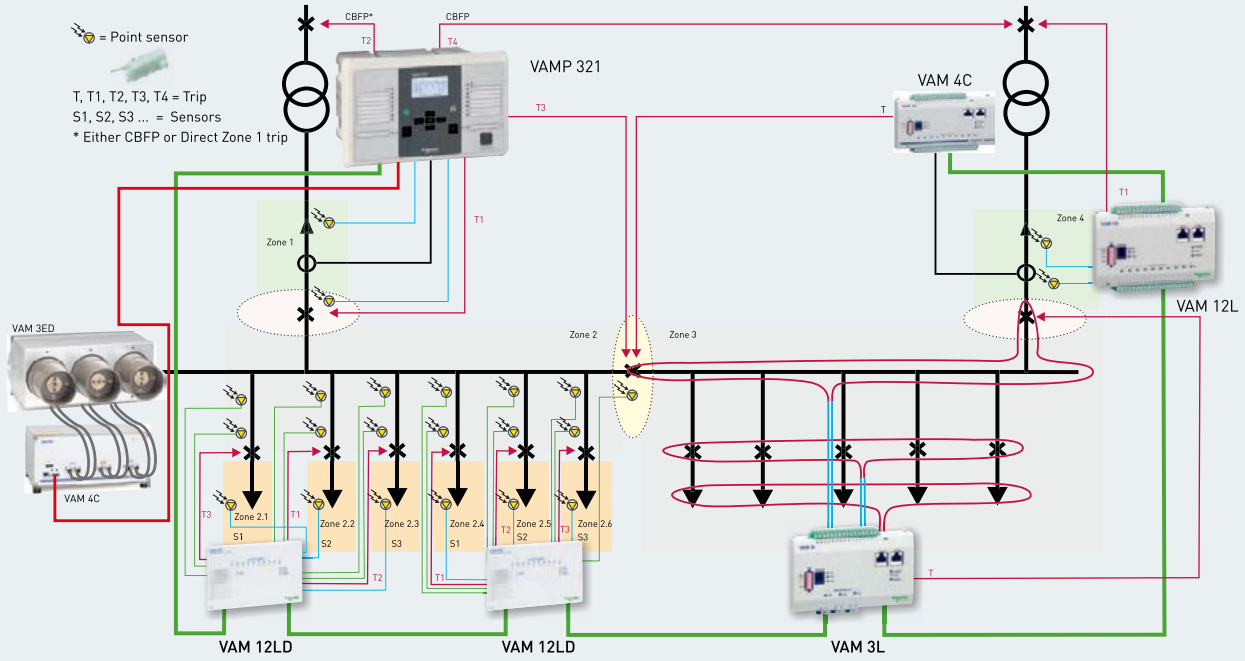
Proven technology

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.

Communication

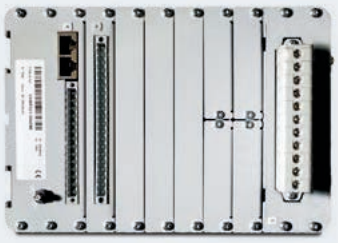
The VAMP 321 has five communication ports, four of which are intended for a SCADA interface. Supported protocols are IEC 61850, Profibus DP, Modbus TCP, DNP TCP, Modbus RTU, SPA, IEC 60870-5-101 and IEC 60870-5-103.

VAMP 321 ARC 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
- Keep a real-time recording of Event logs and DR (Disturbance Record)
- High speed output, HSO: 1ms (typically)
- Operation on simultaneous current and light or on light only
- Informative display
- Communication with SCADA
- Four normally open trip contacts (option)
- 1 normally open and 1 change over alarm contact
- Programmable operation zones
- Continuous system self-supervision
- Circuit breaker failure protection (user configurable)
- IEC61850 Protocol

The auxiliary supply, CT wiring, trip and alarm outputs as well as modular cables are connected to the rear side of the central unit.

Characteristics and Highlights of the VAMP 321 Arc Protection System

VAM 10L, VAM 10 LD POINT SENSOR I/O UNIT

- 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
- 1 trip relay
- Two communication ports for central unit and I/O unit interconnection

VAM 10LD - Additional features to VAM 10L

- Labelling for customised arc sensor channel text
- Flush mounting
- HMI indication available on door closed position

VAM 12L, VAM 12LD POINT SENSOR I/O UNIT

- 3 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 mounting
- HMI indication available on door closed position
- Labelling for customised arc sensor channel text

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
- 1 trip relay
- 2 communication ports for central unit and I/O unit interconnection

VAM 4CD - Additional features to VAM 4C

- Labelling for customised arc sensor channel text
- Flush mounting
- HMI indication available on door closed position

VAM 3L, VAM 3LX FIBRE SENSOR I/O UNIT

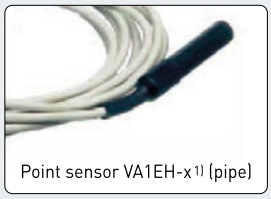
- Auxiliary supply and communication via modular cable
- 3 supervised fibre loop arc sensor connections
- Connection of portable arc sensor
- Indication of the sensor channel and trip relay activation
- 1 trip relay
- Two communication ports for central unit and I/O unit interconnection

VAM 3LX - Additional features to VAM 3L

- Fibre arc sensor sensitivity adjustment

Sensors and Accessories

POINT SENSORS

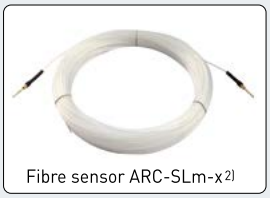

Point sensor VA1EH-x [1] (pipe)


Point sensor VA1DA-x [1] (surface)

- Easy installation and replacement
- Enables fault location indication
- Surface mounting
- Tube mounting
- Continuous self-supervision

FIBRE ARC-SLm SENSORS

- Standard fibre
- Length from 1 to 70 meters
- Self-supervision
- Cost effective when many compartments

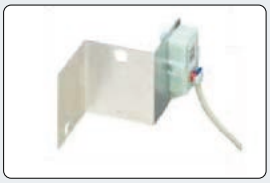

Fibre sensor ARC-SLm-x [2]

ARC-SLm

- Activation 8,000 lx
- Multicore cable
- 10 mm bending radius minimum

SENSOR MOUNTING PLATES

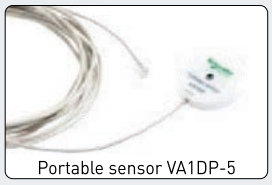
- Z- or L-shaped
- Wall mounting to VA1DA-x sensors (no extra holes in the switchgear)


Sensor mounting plate VYX001, Z-shaped


Sensor mounting plate VYX002, L-shaped

PORTABLE SENSOR VA1DP

- Additional arc flash detection
- Quick connection with snap-in socket


Portable sensor VA1DP-5

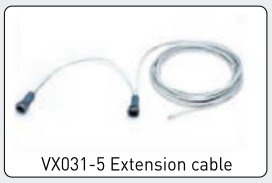
Portable sensor VA1DP-5

- Snap-in socket connection to sensor I/O unit


Portable sensor VA1DP-5D

Portable sensor VA1DP-5D

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


VX031-5 Extension cable

VX031-5 Extension cable

- Extension cable and door socket for VA1DP-5D
- Diplexer for 2 portable sensors


Modular cable VX001-x [1]

Modular cable VX001-x

- Transfers all information and aux. supply be- tween VAMP 321 and I/O unit or between I/O units, simple wiring with RJ 45 connector


Fibre joint SLS-1

Fibre joint SLS-1

- Conveniently connects 2 fibres together
- Used for switchgear shipping splits, maximum 1 joint per fibre

VAMP 4R TRIP MULTIPLIER RELAY

- 4+4 trip outputs (4xNO, 4xNC)
- 2 separate tripping groups
- Enables a 7 ms total operation time to a large number of CBs controlled by binary output (BO) of VAMP 121 unit
- Requires external auxiliary power supply

User Manual

Contents

Description

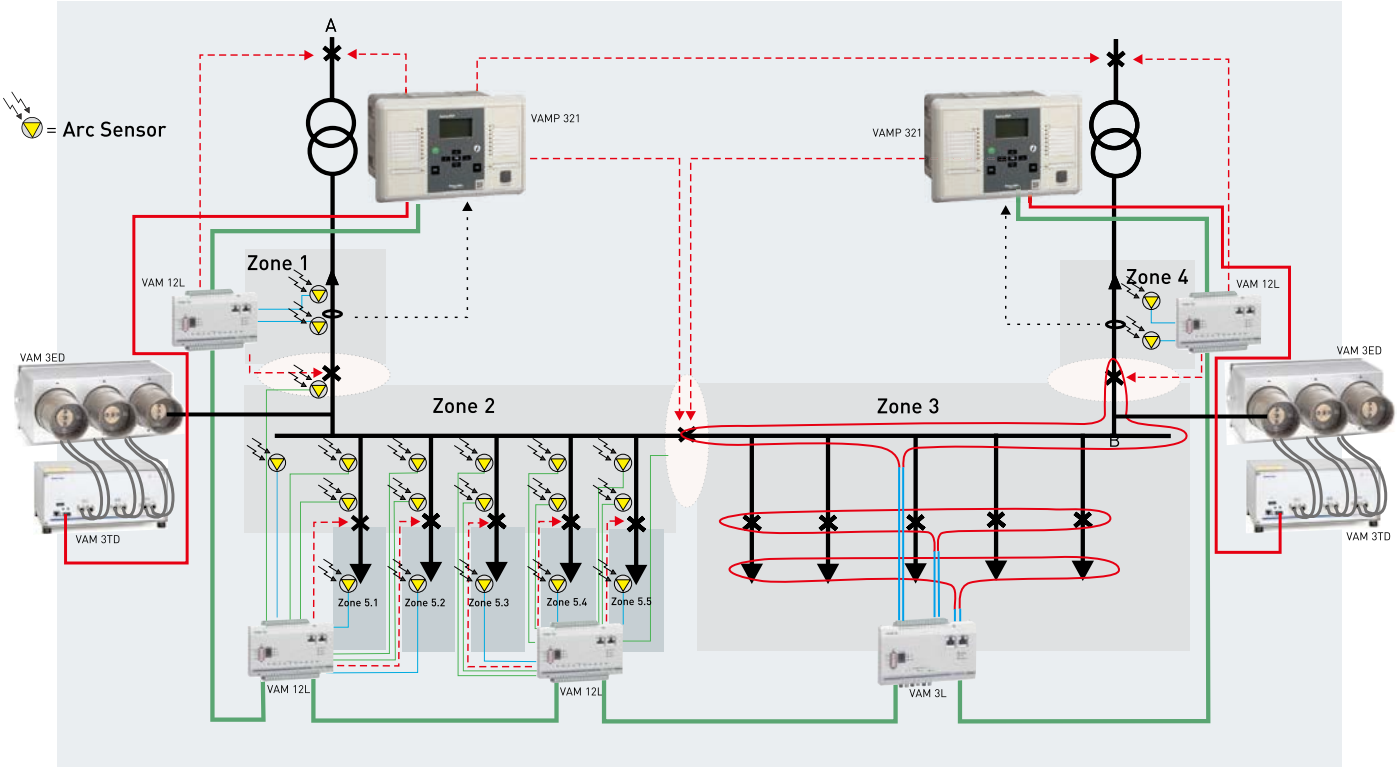


Figure 1 Arc protection system with selective outgoing feeder trip in case of an arc fault in the cable compartment. Selective trip of incomers in case of an arc fault in the busbar or outgoing breaker compartment.

The arc protection system can extend arc protection area by using a high speed arc quenching device.

The arc quenching device configuration comprises 2 separate modules, VAM 3ED, VAM 3TD

In addition to the arc protection system tripping, the breakers selectively, the arc quenching device reduce arc burning time to 4 ms.

Note in application above, the VAM 3ED is configurated to operate for a fault in the busbar and outgoing breaker compartment only.

The arc protection relay(Vamp321 or Arc central unit) controls the VAM 3TD which is the interface between the arc protection system and the arc quenching device (VAM 3ED). See also arc protection relay manual for details of arc protection & Elimination system.

Figure 2 Arc protection relay

Trigger unit type VAM 3TD has stored energy in a capacitor bank which is triggered when an arc fault is detected by arc protection & Elimination system.

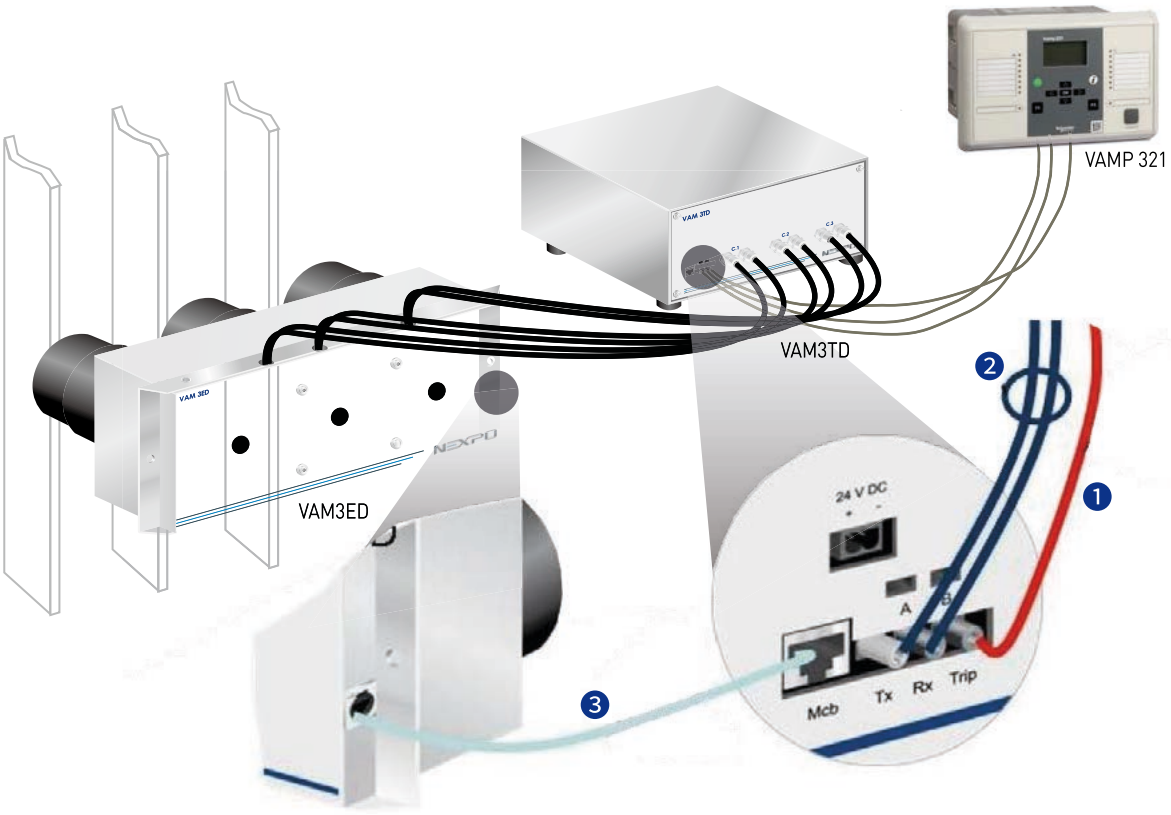


Figure 3 VAM 3ED / VAM 3TD interconnection

No. 1: Trip fiber
No. 2: Fiber connection for trip signal to VAM 3TD and self supervision communication
No. 3: Ethernet cable for actuator position information

Description

Figure 4 X1 is the inter connection between the VAM 3ED and VAM 3TD units.
X1 is a status signal from the VAM 3ED unit.

When the arc fault is occurred, the arc quenching device VAM 3ED is operated by high current emitted from capacitor bank of arc trigger unit VAM 3TD. The arc fault current is induced to earthing in 4ms.
The arc protection relay simultaneously transmits the TRIP signal to the upstream circuit breaker, and the upstream circuit breaker separate the accident section from the power source.
The arc fault persists for only 4 milliseconds and therefore the pressure effect will be minimized.
(From arc detection to closing)

Installation of Arc quenching device VAM3ED

VAM 3ED can be installed inside a switchgear cubicle if space is available. Otherwise it can be installed partly inside a cubicle trough a cut-out in the encapsulation. The unit can be installed in different positions (see below).

- All working with the arc quenching device requires that the involved part of the switchgear is disconnected and earthed
- The VAM 3ED unit ca be installed from the side of the horizontally or vertically.
- The VAM 3ED unit can also be used in the installations roofplace.

Arc quenching device VAM3ED installation example

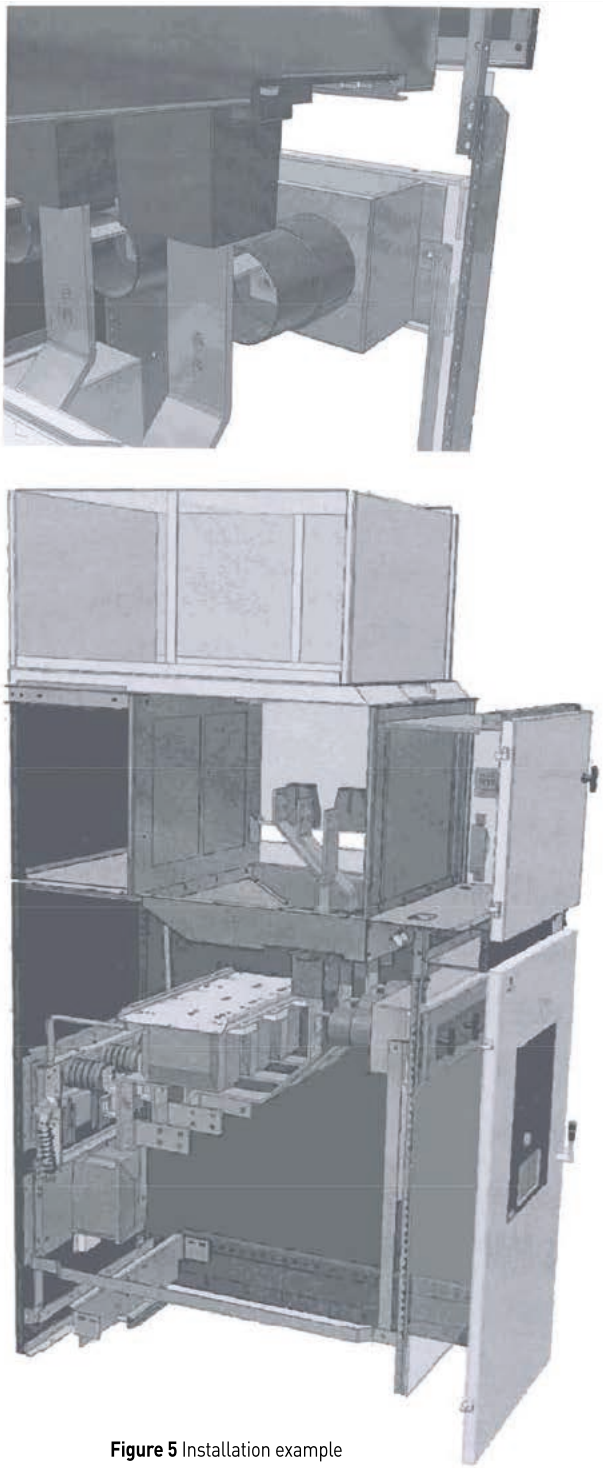
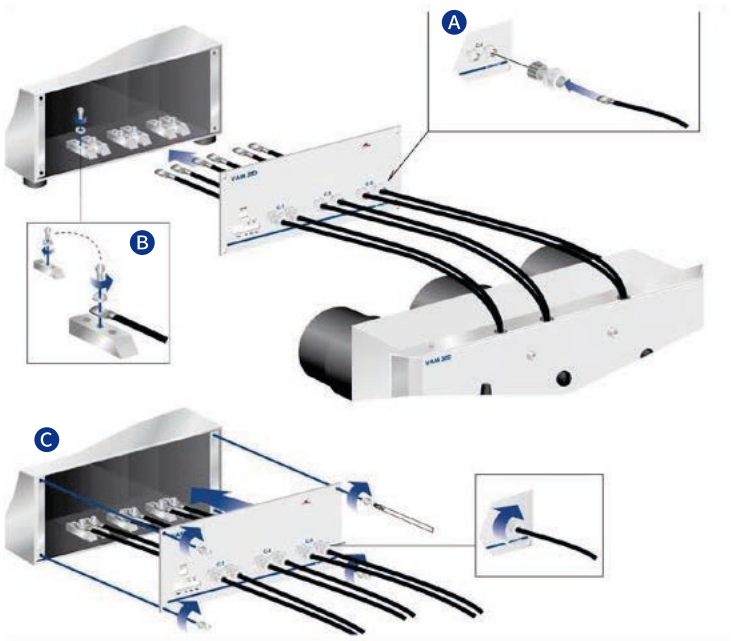


Figure 5 Installation example

- The VAM 3TD unit has to be mounted in horizontal position due to some heavy components on the printed circuit board.
- The 6 trigging cables connected between the VAM 3ED, and the VAM 3TD are connected to the VAM 3ED unit.
- The cable has to be connected to the VAM 3TD unit after both units have been installed.
- The cable connection is done inside the unit with screw connectors.



In order to connect the cable, the cover has to be removed. The trigging cables are arround 0.8m long.

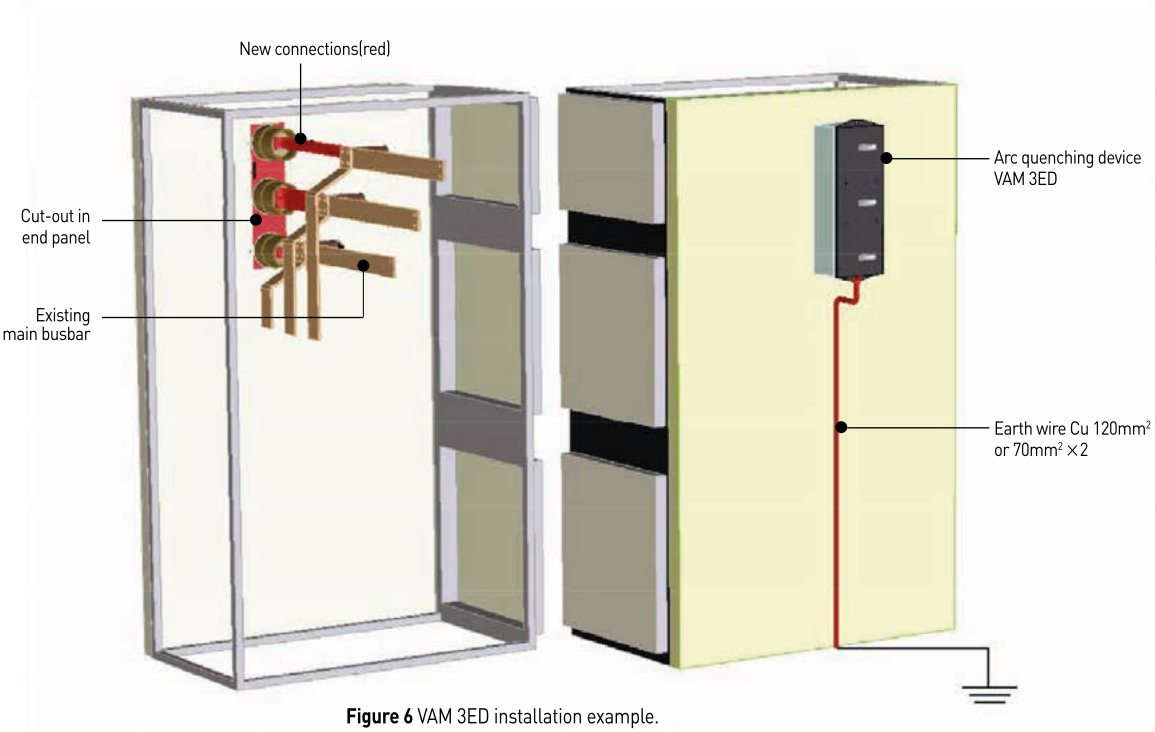


Figure 6 VAM 3ED installation example.
Earth wire should be connected to switchgear earthing point

Arc quenching device VAM3ED installation example

Arc quenching device VAM3ED installation example

- Install the unit in such a way that the reset handles must in a good position for pulling.
- Approx. 250kP is needed to reset the contact system after a closing.
- The connection to the arc quenching device shall be a Busbar min. 200mm^2.
- The arc quenching device shall be earthed by a Cu-wire min. 120mm^2 or 70mm^2 × 2 to switchgear earthing point.

All working with the arc quenching device requires that the involved part of the switchgear is disconnected and earthed.

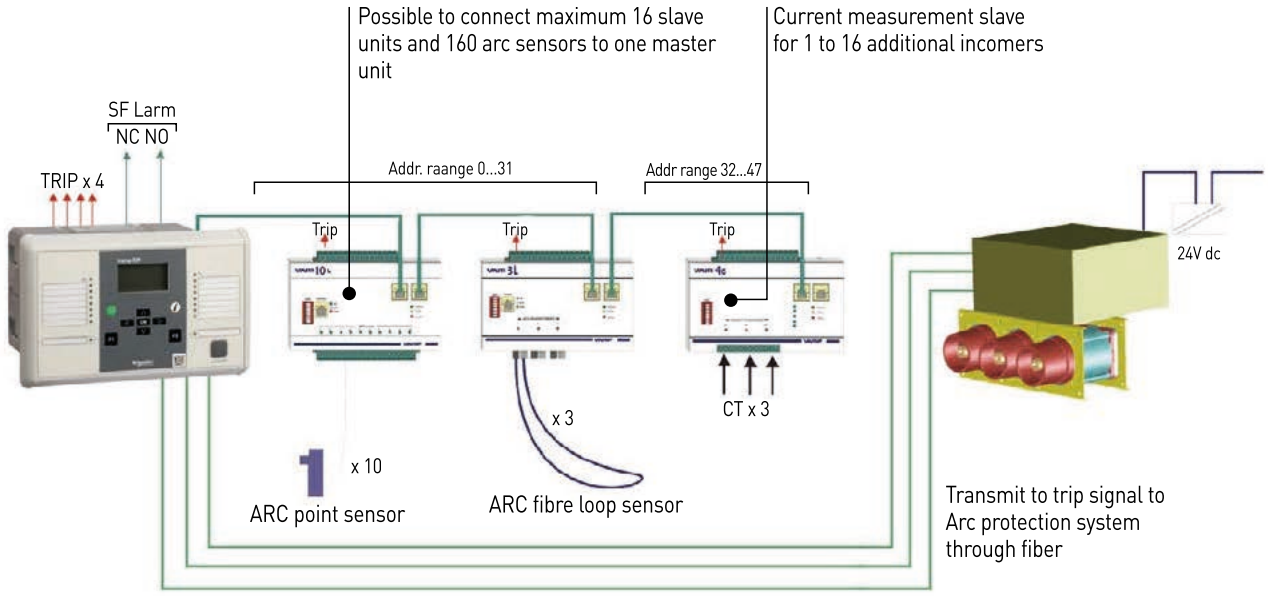


Figure 7 Arc protection system configuration diagram using Arc quenching device: quenching the arc within 4ms

Installation of Trigger unit VAM3TD

- Trigger unit VAM 3TD has to be located maximum 0.8m from the arc eliminator unit VAM 3ED.
- The trigger unit has a two diode signal lamps that show the current status for the equipment.
- The trigger unit shall be placed horizontally.
- The lifetime of the capacitors is approx. 30 years but will be reduced if the ambient temperature is more than 45°C.
- Be warned, don't keep high heat producing object nearby.

1. 24 Vdc power supply from separate source (Not from arc quenching device and protection system)
2. Mcb: RJ 45 connector to be connected to the VAM 3ED unit. Also used to connect a PC for firmware upload in the factory.
3. Red light: Flashing = alarm for fault / Steady = eliminator is closed
4. Green light: trigger unit ready for operation
5. Tx: Fiber connector to arc protection relay (Rx)
6. Rx: Fiber connector to arc protection relay (Tx)
7. Trip: Fiber connector to arc quenching device and protection relay for trip command

The trigger unit VAM 3TD is self supervised and communicates all the time with the central unit (Arc protection relay).
In healthy non-trip conidition, only the green led should be on.

Maintenance and testing / Resetting after an open arc fault

Maintenance and testing

- You can test the operation status of arc Elimination system through putting into motion of camera flash with arc sensor after arc elimination system installed.
- Maximum 10 mechanical operations are allowed (See also manual).

Manual resetting of Arc quenching device VAM 3ED

- If the arc quenching device is operated, the arc quenching device is kept a high voltage ground condition.
- Before the switchgear can be energized, the unit has to be manual reset to regain the insulation state.
- This is done by pulling each 3 phases(R,S,T) powerfully through a reset handle.
- Approx. 25 kP is required. At the end of the pulling a distinct stop with a click sound will occur.
- This indicates that the moving contact inside is located its proper open position.

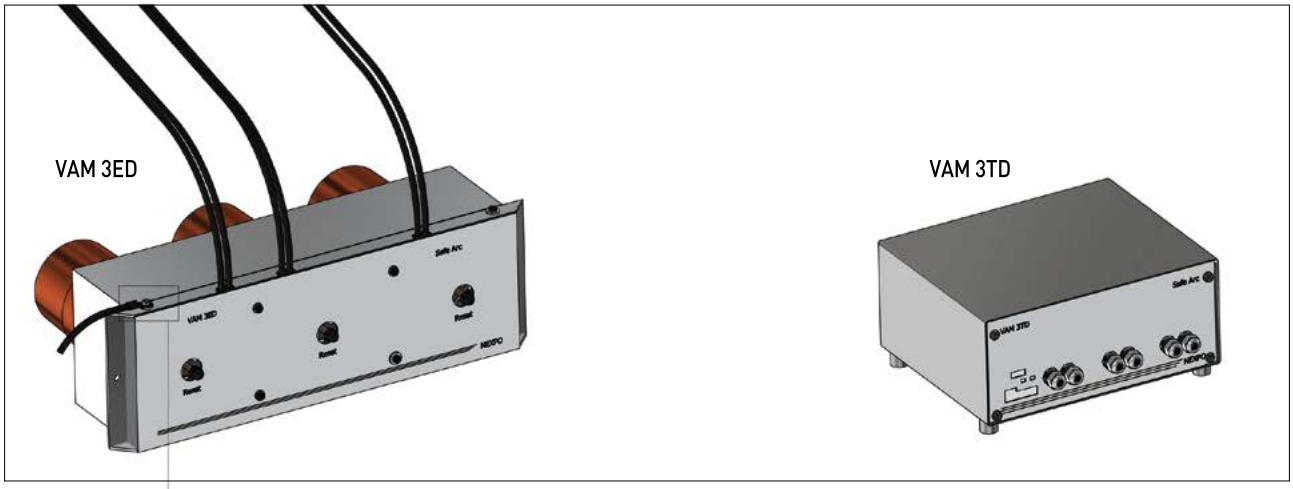
Resetting after an open arc fault

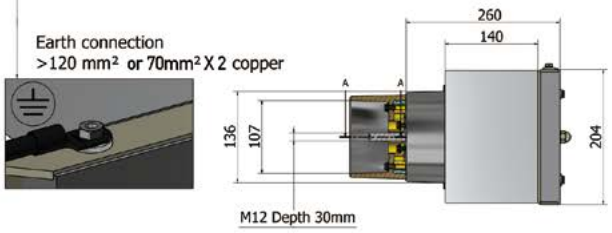
- Work only at earthed and disconnected status of the switchgear.
- When an arc fault the reason for the arc accident has to be identified then processed.
- The arc quenching device should be reset manually.
- This is done by pulling each 3 phases(R,S,T) powerfully through a reset handle approx. 65mm until you feel a distinct end position.
- If it is the first time the Arc quenching device generate a short circuits about arc fault it is possible to re-energize the switchgear after the reason for the fault has been attended to and the system has been reset.
- After a reset, the VAM 3TD needs around 20 minutes to recharge the capacitors.
- During this time, arc quenching device don't operated.
- If the arc quenching device has short circuit twice it should be reset in the same way but the arc quenching device must surely check a performance before use.

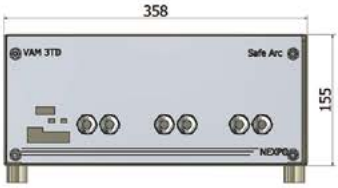
- If the arc eliminator has short circuited 3 times it shall be replaced.
- Never open the VAM 3TD unit when capacitors are charged.

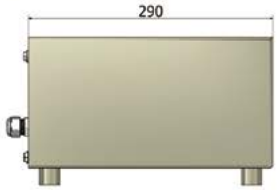
Dimension drawings

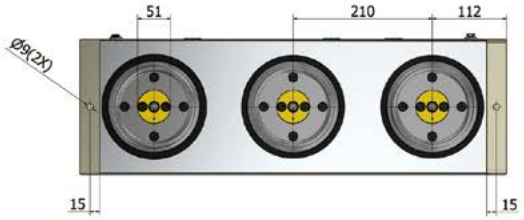
Arc quenching device VAM 3ED phase distance = 210mm

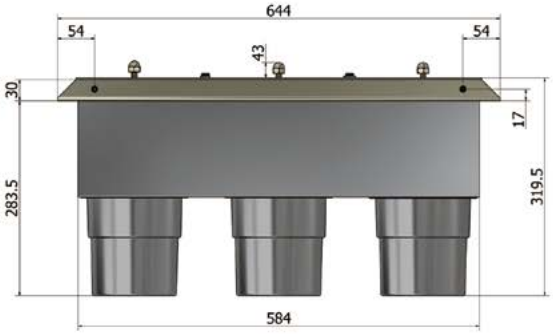


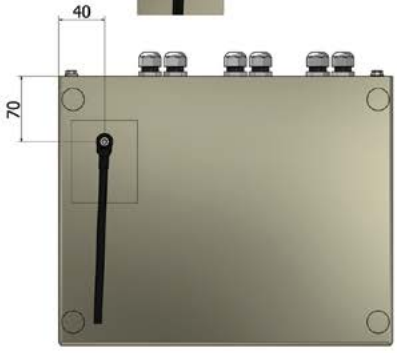


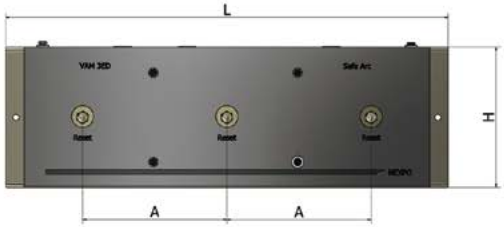












Phase
distance=210
A=210
H=150
L=570

Technical data

Auxiliary power supply

VAM 3ED

Trip voltage	400 V dc
Trip current	4000 A

VAM 3TD

Rated voltage U_{AUX}	24 V dc
Power consumption	< 15 W
Terminal: fixed terminal	Maximum cross-section area of wire 2.5 mm^2 (13-14 AWG)

Tests and environmental conditions

VAM 3ED Ratings

Rated voltage Ue	5 - 17.5 kV	24 kV
Rated insulation level	38 kV/1min, 95 BIL	50 kV/1min, 95 BIL
Rated short-time withstand current	50 kA/1s	
Rated peak withstand current	130 kA	
Operating time	< 4 ms	
Operation without load	20 times	
Operation with 40 kA load	2 times	

Disturbance tests

Emission	IEC 61000-6-4
Conducted transients	IEC 55011
	0.15 – 30 MHz
Emitted transients	IEC 55011
	30 – 1000 MHz
Immunity	IEC 61000-6-2
Static discharges (ESD)	IEC 61000-4-2 class III
	6 kV breaking capacity
	8 kV air discharge
Fast transients (EFT)	IEC 61000-4-4 class III
	2/1 kV 5/50 ns, 5 kHz, +/-
Surge	IEC 61000-4-5, Class III
	2 kV, common mode
	1 kV, differential mode
Conducted high-frequency field	IEC 61000-4-6
	0.15 ... 80 MHz, 10 V
Emitted high-frequency field	IEC 61000-4-3
	80 ... 2000 MHz, 10 V
EMC tests	CE approved

Test voltages

Rated dielectric withstand voltage IEC 60255-5	2 kV, 50 Hz, 1 min
Rated impulse withstand voltage IEC 60255-5	5 kV, 1.2/50 µs, 0.5 J

Environmental conditions

Operating temperature range	-10 ... +55°C
Transport and storage temperature range	
VAMP 321, VAM I/O units	-40 ... +70°C
ARC SLm, VA 1 xx sensors	-40 ... +85°C
Relative air humidity	< 75% (1 year, average)
	95% (30 days per year, condensation not allowed)

VAM 3ED

Housing class (IEC 60529)	IP20
Dimensions (WxHxD)	644 x 204 x 319 mm
Material	1.5 mm steel plate
Weight	27 kg

VAM 3TD

Housing class (IEC 60529)	IP20
Dimensions (WxHxD)	355 x 175 x 290 mm
Material	1.5mm steel plate
Weight	8.5kg
Connection between VAM 3TD and VAM 3ED	6 x 9mm cable (included)

Ordering code

VAM 3ED	Arc quenching device
VAM 3TD	Trigger unit for VAM 3ED
VF 001-1	Optic fiber cables between relay and VAM 3TD
VX001S-X	Communication cable between VAM 3ED and VAM 3TD

Note: X is the length meter.

Test report

20TC200576

시험성적서

제품명	수배전반용 아크제거기
형식명	VAM3ED(아크제거기) VAM3TD(아크제거기 구동장치) 17.5 kV 제어전원: DC 24 V
신청자	주식회사 넥스포 경기도 성남시 중원구 둔촌대로388번길 24(상대원동,성남우림라이온스밸리3차 1106호)
제작자	주식회사 넥스포 경기도 성남시 중원구 둔촌대로388번길 24(상대원동,성남우림라이온스밸리3차 1106호)
시험일자	2019-09-18 ~ 2020-06-18
발행번호	20TC200576

본 시험성적서는 시험품의 도면과 기술 명세를 포함하며, 아래 규격의 시험항목에 따라 항목시험을 수행하였음.

SPS-KOEMA-0931-1970:2019	7.1, 7.2, 7.2.1, 7.2.2, 7.2.3, 7.6, 7.6.1, 7.6.2, 7.6.3, 7.7.4, 7.7.4.1, 7.7.5, 7.7.5.1, 7.7.5.2.1, 7.7.5.2.2, 7.7.5.2.3, 7.7.5.2.4, 7.7.5.2.5, 7.7.5.2.6, 7.7.5.2.7, 7.7.6, 7.7.6.1, 7.7.6.2, 7.7.6.3, 7.7.6.4

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작 성 임성정

승 인 (기술책임자) 안상필

발 행 일 2020-07-03

[DF-HH-7081-04/01]

한국전기연구원장

본

111, Hanggaul-ro, Sangnok-gu, Ansan-si, Gyeonggi-do, 15588 Korea | TEL: (031) 8040-4114

신 기 술 인 증 서

기 술 명 : (공동)톰슨액츄에이터 구조를 이용한 수배전반용 고속 아크제거기술

회 사 명 : 주식회사 넥스포, (주)스마트파워

대 표 자 : 김정배, 김종국 · 박기주

소 재 지 : 경기도 성남시 중원구 둔촌대로388번길 24
경기도 김포시 대곶면 소래로 104

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2020년 9월 22일

산업통상자원부장관

NEXPO Co., Ltd.
No. 1106, Woorim Lions Valley 3, 338-gil 24 Dunchondaero,
Jungwon-gu, Seongnam-si, Gyeonggi-do. R.O.Korea

TEL: +82-31-739-9200 **FAX:** +82-31-739-9299 **Email:** nexpo@nexpo.kr
https: //www.nexpo.kr