VA 1 DA

Arc sensor

User Manual

VVA1DA/EN M/E001

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www.schneider-electric.com

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Legal information

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

As standards, specifications and designs change from time to time, please ask for confirmation of the information given in this publication.

Safety information

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 publication or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

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.

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.

⚠ DANGER

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

⚠ WARNING

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

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result in** minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

Please note

Electrical equipment must only be installed, operated, serviced, and maintained by qualified personnel. A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

Protective grounding

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

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. About this manual

1.1. Purpose

This document contains information on the arc flash sensor used with VAMP 125 device and instructions on how to mount, test and maintain the sensors.

This document is intended for persons who are experts on electrical power engineering.

1.2. Abbreviations and terms

This table lists the abbreviations and terms used in this manual.

Table 1 - Abbreviations and terms

Term	Description
Arc flash sensor	VA 1 DA point-type sensor, used with arc flash protection device to detect the light coming from an arc flash incident
dc	Direct current
Device	VAMP 125 arc flash protection device
LED	Light-emitting diode
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.

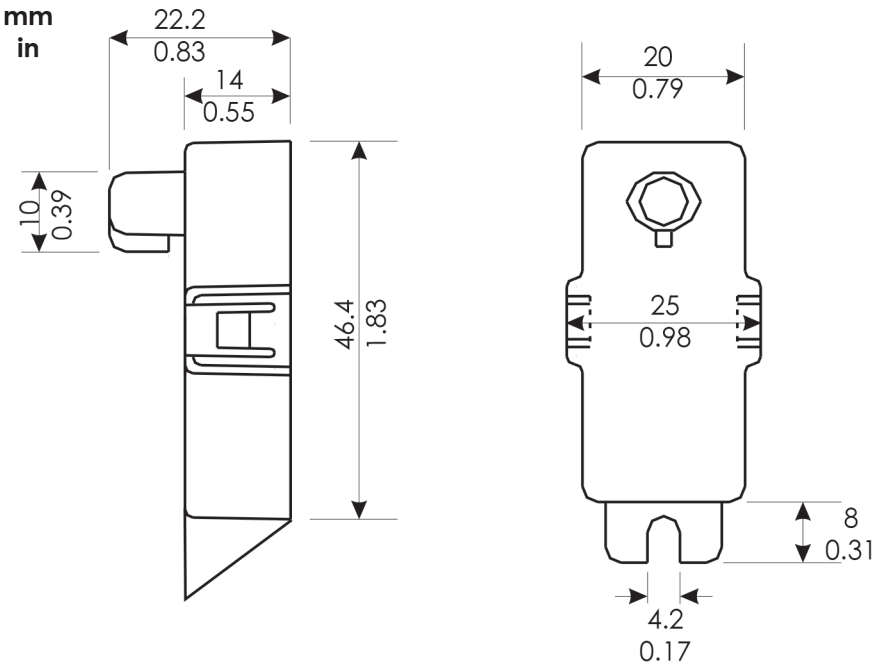
2. Arc flash sensor

The arc flash sensor is used to detect the light coming from an arc flash incident.

NOTICE
HAZARD OF NON-DETECTED LIGHT 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 loss of equipment damage reduction.**

VA 1 DA is a point-type arc flash sensor. The sensor activated by strong light. It transforms the light information into the current signal that is used by the device to detect arc flash light.

Figure 1 - Sensor dimensions



The sensor features include:

- standard 8000–10000 lux visible light sensitivity
- wide area arc flash detection
- typically <1 ms detection time
- standard cable length 6 m (236.22 in) or 20 m (787.40 in) (cut to length on site)
- easy to install (two-wired non-polarity sensitive connection)

NOTICE

HAZARD OF NON-DETECTED LIGHT

Do not extend the cable beyond 20 m (787.40 in).

Failure to follow these instructions can result in loss of equipment damage reduction.

2.1. Technical data

Table 2 - Arc flash sensor

Parameter	Value
Rated voltage U_S	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
Ambient temperature, operation	-40 to +85°C (-40 –to +185°F)
Ambient temperature, storage	-40 to +80°C (-40 to +176°F)
Relative air humidity	<95% non-condensing
Maximum operating altitude	2000 m (6562 ft)
Light spectrum sensitivity area	400–1100 nm

2.2. Sensor sensitivity

NOTICE

UNEXPECTED SYSTEM OPERATION

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

Failure to follow these instructions can result in loss of equipment damage reduction.

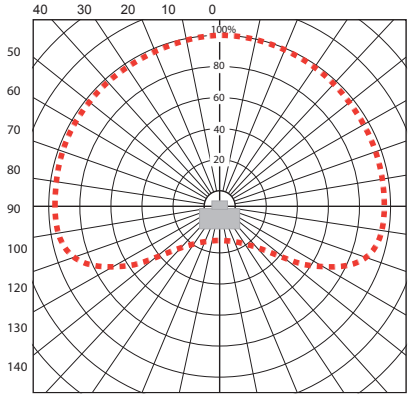
NOTICE

UNINTENDED EQUIPMENT OPERATION

- Do not place light sensors near air break devices (circuit breakers, disconnect switches, etc.) as this may cause the system or device to operate.
- Nuisance activation could be generated by air circuit breaker (ACB) when the breaker is tripping. Before operating the system, proceed with testing to tune the sensor positions to reduce the risk of nuisance detection.

Failure to follow these instructions can result in nuisance tripping.

Figure 2 - Relative sensor sensitivity to angle response



2.3. Mounting the sensors to the switchgear

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, NOM-029-STPS-2011, or CSA Z462.
- The arc fault detection system is not a substitute for proper PPE when working on or near equipment being monitored by the system.
- Do not use the operation of the device in the calculations of the arc flash incident energy. The device must not be used to determine the clearing time for an arcing event in the equipment.
- Only qualified personnel should install and service this equipment. Read this entire set of instructions and check the technical characteristics of the device 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.
- Before performing visual inspections, tests, or maintenance on this equipment, disconnect all sources of electric power. Assume all circuits are live until they are completely de-energized, tested, and tagged. Pay particular attention to the design of the power system. 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 device's protective ground to functional earth according to the connection diagrams presented in this document.
- Do not open the device unless you have taken appropriate PPE measures against ESD. The device contains components that can be damaged if exposed to electrostatic discharge (ESD).
- Install all devices, doors and covers before turning on the power to this device.

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

Install arc flash sensors inside the switchgear. There are two options for mounting the sensors:

- in customer-drilled holes on the switchgear
- on VYX001 Z-shape or VYX002 L-shape mounting plates available from Schneider Electric or locally fabricated from supplied drawings

Figure 3 - VYX 001 mounting plate for sensor

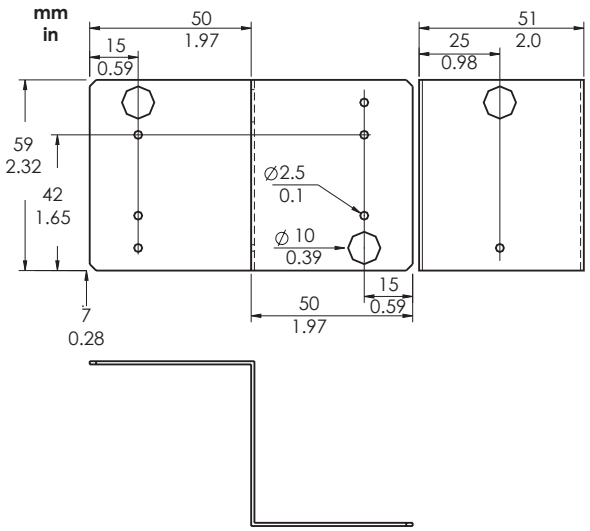


Figure 4 - VYX 002 mounting plate for sensor

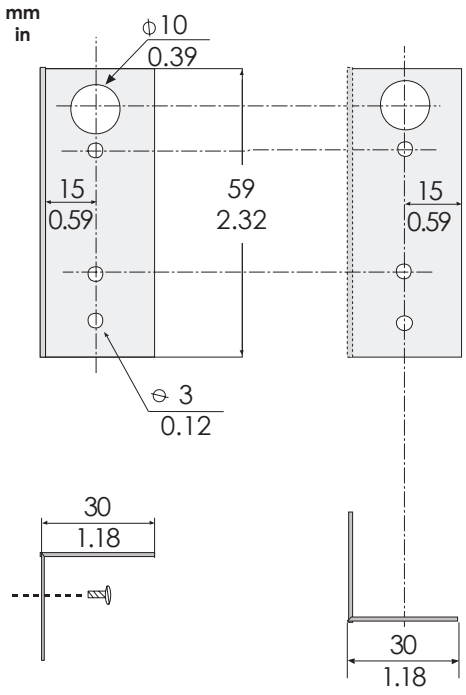
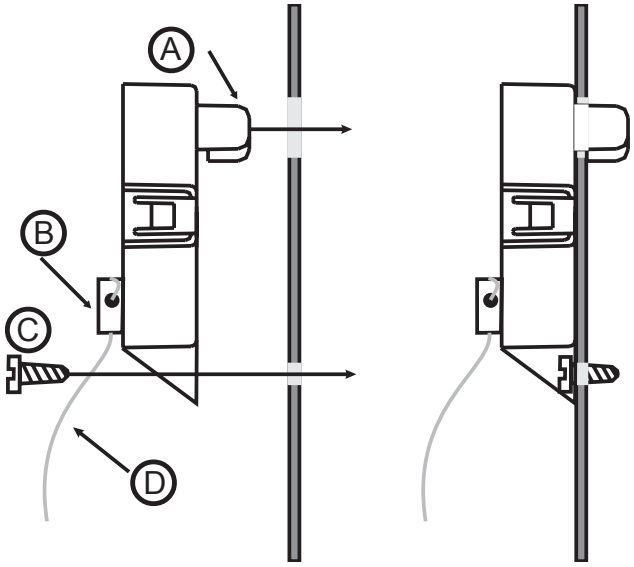


Figure 5 - Mounting the sensor



A.	Active part of the sensor
B.	Cable clamp
C.	Fastening screw 4 x 15 mm
D.	Sensor cable

1. Press the active part of the sensor through the 10 mm hole in the panel surface.
2. Fix it using a 4 mm screw.

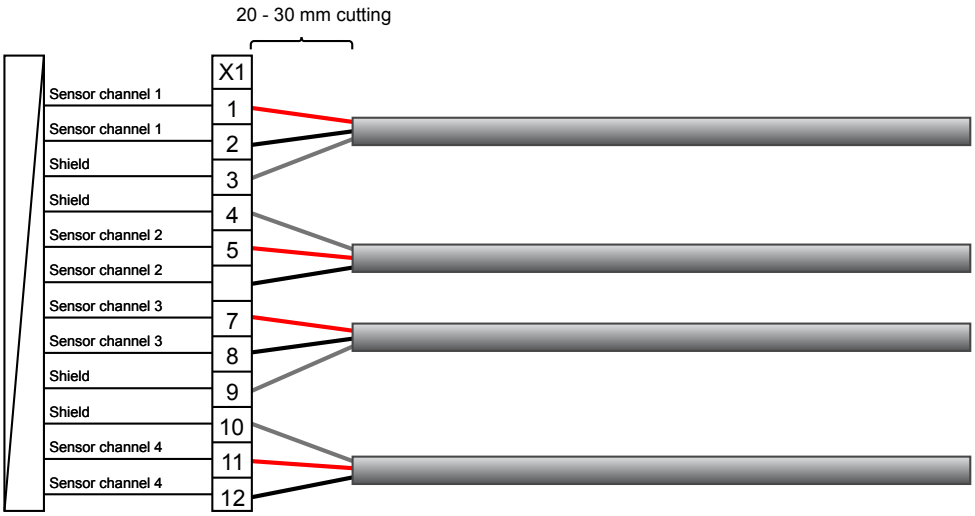
2.4. Connecting the sensors to the device

The sensors are delivered with 6 or 20 m cables.

NOTICE
UNEXPECTED SYSTEM OPERATION Do not splice or extend pre-made nor supplied cables with any type of wires or cables. **Failure to follow these instructions can result in loss of equipment damage reduction.**

After mounting the sensors, connect them to the device.

Figure 6 - Cable landing to V125 X1 connector



1. Route the wire to the nearest device using the shortest route possible.

   Cut the wire to a suitable length.

   Take into account the wiring methods inside the equipment. This should be compliant with local regulations.

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.

3. Testing

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, NOM-029-STPS-2011, or CSA Z462.
- The arc fault detection system is not a substitute for proper PPE when working on or near equipment being monitored by the system.
- Do not use the operation of the device in the calculations of the arc flash incident energy. The device must not be used to determine the clearing time for an arcing event in the equipment.
- Only qualified personnel should install and service this equipment. Read this entire set of instructions and check the technical characteristics of the device 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.
- Before performing visual inspections, tests, or maintenance on this equipment, disconnect all sources of electric power. Assume all circuits are live until they are completely de-energized, tested, and tagged. Pay particular attention to the design of the power system. 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 device's protective ground to functional earth according to the connection diagrams presented in this document.
- Do not open the device unless you have taken appropriate PPE measures against ESD. The device contains components that can be damaged if exposed to electrostatic discharge (ESD).
- Install all devices, doors and covers before turning on the power to this device.

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

Testing the arc flash sensors with the light-only criteria operates the trip outputs of the device or the I/O units for the protected zone.

Testing the arc flash sensors with the light and current criteria, without an injected current, only generates an indication on the unit that protects the zone. The indication of the arc fault is registered by the possible main unit and I/O unit.

NOTE: Testing the arc flash sensors using a light source can trip the neighboring zones.

NOTE: For more information on viewing and resetting indications, see the corresponding user manual or www.schneider-electric.com.

NOTE: Because of their placement, some sensors cannot be tested without dismantling parts of the system. After completing the testing, reassemble the parts and validate the compliance with original mounting. Consult the equipment manufacturer before dismantling any parts.

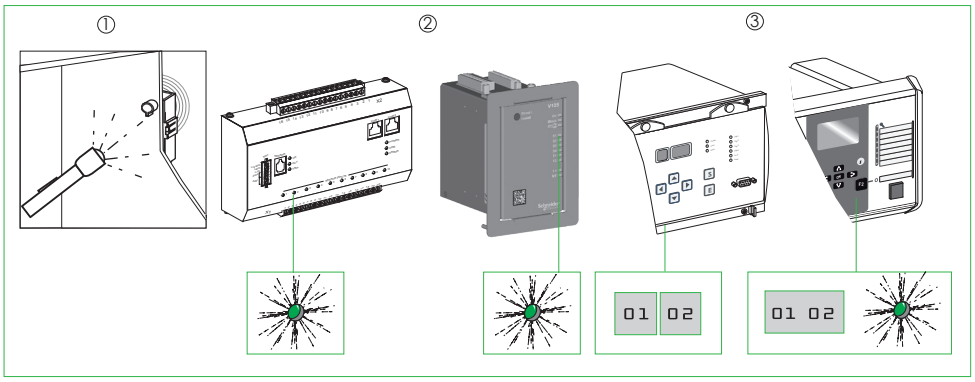
3.1. Testing the sensors

Test the sensors with the main device. See *VAMP 125 Arc Flash Protection Device User Manual.*

Reset the main device before the test.

NOTE: Because of their placement, some sensors cannot be tested without dismantling parts of the system. After completing the testing, reassemble the parts and validate the compliance with original mounting. Consult the equipment manufacturer before dismantling any parts.

Figure 7 - Testing point sensors



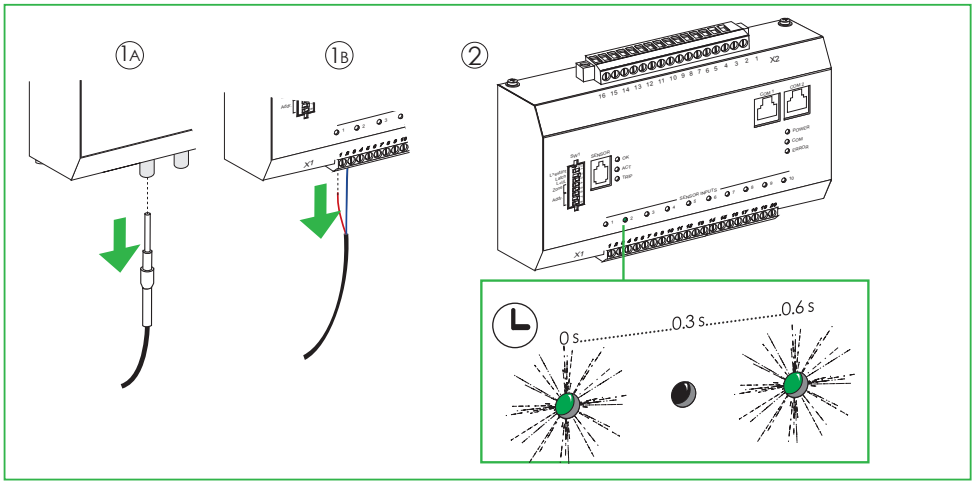
1. Point light to each arc flash sensor, one at a time, with a powerful light source such as camera flash unit or flashlight.
2. Check the light sensor indication from the device.
3. Check the light sensor address from the device.
4. Compare the light sensor address information from the device with the sensor location map.
5. Fill in the test result in the test report.

   See *VAMP Arc Flash Protection Testing Manual*.
6. Reset the device.
7. Repeat the procedure with the next sensor.

3.2. Testing the sensor supervision

Test the sensors with the main device. See *Arc Flash Protection Device User Manual*.

Figure 8 - Testing the sensor's self-supervision



1. Disconnect one wire from one point sensor, one for each unit, to see that the self-supervision system recognizes the fault in the sensor.
2. Wait until the arc fault indication appears.

   Depending on the device, this can take several minutes. See *HMI functions and indications* in the device user manual.
3. Check that the service status output operates.
4. Fill in the test results in the test report.

   See the test report template in *VAMP Arc Flash Protection Testing Manual*.
5. Reconnect the wire and reset the system.
6. Repeat the procedure with the other units.

4. Maintenance

The device requires maintenance to ensure that it works according to the specification.

NOTICE
UNEXPECTED SYSTEM OPERATION Carry out periodic system testing as per the testing recommendation in this manual or if the protection system scheme has been changed. **Failure to follow these instructions can result in loss of equipment damage reduction.**

Keep record of the maintenance actions performed for the system.

The maintenance can include but is not limited to:

- visual inspection
- periodic testing
- hardware cleaning
- sensor condition and positioning check
- checking the obstruction of sensors

4.1. Visual inspection

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

1. De-energize the switchgear.
2. Inspect the device, sensors and cabling.

   Pay attention to:
   - possible dirty arc sensors
   - loose wire connections
   - damaged wiring
   - indicator lights (device start-up)
   - other mechanical connections

4.2. Periodic testing

Test the cabling and sensors periodically according to the end user's safety policy, national safety instructions and law.

The manufacturer recommends functional testing being carried at least every five (5) years.

4.3. Hardware cleaning

Pay special attention to ensure that the device, its extension units and sensors do not become dirty.

NOTICE

UNEXPECTED SYSTEM OPERATION

- Do not use any type of solvents or gasoline to clean the device, sensors or cables.
- When cleaning the sensor, make sure that the cleaning solution does not contact anything other than the sensor.

Failure to follow these instructions can result in loss of equipment damage reduction.

- If cleaning is required, wipe out dirt from the device.
- Use a dry cleaning cloth or equivalent together with mild soapy water to clean any residues from the light sensor.

4.4. 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
- periodic testing

Check for obstruction of the sensors.

4.5. System status messages

If the device'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 Schneider Electric office for further guidance.

4.6. Spare parts

Replace the entire device as a user-serviceable part.

5. Order codes

Table 3 - VA 1 DA sensor order codes

Order code	Description
VA1DA-6	Arc sensor with 6-meter cable
VA1DA-20	Arc sensor with 20-meter cable
VA1DA-6s	Arc sensor with 6-meter shielded cable
VA1DA-20s	Arc sensor with 6-meter shielded cable
VA1DA-6W	Arc sensor with 6-meter cable + earthing connection
VA1DA-20W	Arc sensor with 20-meter cable + earthing connection
VA1DA-6 HF	Arc sensor with 6-meter halogen-free cable
VA1DA-20 HF	Arc sensor with 20-meter halogen-free cable
VA1DA-6 S-HF	Arc sensor with 6-meter shielded, halogen-free cable
VA1DA-20 S-HF	Arc sensor with 20-meter shielded, halogen-free cable
VA1DA-6 W-HF	Arc sensor with 6-meter shielded, halogen-free cable + earthing connection
VA1DA-20 W-HF	Arc sensor with 20-meter shielded, halogen-free cable + earthing connection

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