ARCTEQ

PART OF ENSTO GROUP

AQ 100 SERIES

ARC FLASH PROTECTION

ANSI

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THE PIONEER IN ARC FLASH PROTECTION

Our superior application know-how, continuous research, and decades of experience in product development in this field have all made Arcteq the technology leader that we are today. Our AQ 100 series is ready to provide ultimate safety for both medium-voltage and low-voltage systems with the help of Arcteq's patented technology.

Reliable protection

The reliability of the AQ 100 series is based on our unbeatable experience in the field of arc protection. Our unique Standard Arc Schemes ensure correct operation under all conditions.

When an arc flash occurs, there is no room for mistakes.

THE WIDEST RANGE OF PRODUCTS ON THE MARKET

An arc flash protection system can range from a single device protecting a few switchgear cubicles to a complete multi-incomer configuration with hundreds of arc flash protection devices and sensors. Thanks to the unique design of the AQ 100 system, the number of arc protection units that can be connected to a system is nearly unlimited. The different available sensors support various ways of constructing an arc flash protection system: only using point sensors, only using fiber sensors, or using a mixture of the two. Adding Arcteq's arc quenching device that can be re-activated for multiple operations in the system minimizes the arcing time. The AQ-1000 and AQuench quenching devices operate in less than 4 ms from the detection of an arc flash. When an arc flash occurs in a system with an AQ-1000 or a AQuench device, the source of the arc fault is removed and the power returns in minutes, or even seconds. The quenching device can repeatedly extinguish arc faults up to 100 kA, also reducing the arc flash exposure to less than 1 cal/cm².

Benefits of arc protection

The AQ 100 series is focused on simplicity while maintaining both flexibility and function. The series is built to meet the growing demands in both LV and MV switchgear and controlgear applications, ranging from basic standalone solutions to more complex system solutions. The AQ 100 series is designed and verified to meet the requirements of the latest protection relay standards. This makes it suitable for installations in any environment, from utilities and power plants to heavy industry applications (e.g. offshore, marine, mining) as well as commercial and institutional electrical systems. Its modular design makes the AQ 100 series an excellent candidate for both new and retrofit installations.

AQ-1000 and AQuench arc quenching devices are used to extinguish arcing faults in LV and MV power systems where the breaker's opening time is not fast enough to reduce arc flash incident levels to a safe value. A quenching device operates typically within few milliseconds to minimize the damaging thermal and pressure effects of an arc fault. In most applications this will result in an energy release of 1 cal/cm². Both AQ-1000 and AQuench can be re-activated and can perform several operations with a full short-circuit current. The arc protection systems with these quenching devices can also be fully tested on-site.

The arc quenching devices are installed as a part of the AQ 100 arc protection system. If an arc fault occurs, an AQ 100 series unit detects the fault, triggers the quenching device, and simultaneously trips the fault feeding circuit breaker(s). The quenching device creates a three-phase low impedance parallel path for fault current to flow thus extinguishing the arc fault instantaneously.

MAXIMUM SAFETY AND MINIMUM PROCESS DOWNTIME

- The arc quenching device that can be re-activated operates in less than 4 ms from the detection of an arc flash, which keeps the incident energy low
- Lower category personal protective equipment (PPE) needed

SAVE TIME AND MONEY

- Faster engineering with standard arc schemes
- Faster commissioning, one button configuration, clear LED signals, no software needed
- Full product range → optimal price/functionality ratio for any application

THE MOST RELIABLE PROTECTION

- Design based on unbeatable experience in the field
- Track record of less than 0.1% return rate of products (more than 200 years)
- EMC isolation levels tested according to highest protection relay standards

SECURE OPERATION

- Designed and tested according to protection relay standards
- The quenching device that can be re-activated allows multiple operations in testing and fault conditions
- Optimized standard arc schemes for any type of switchgear
- Individual trip zones based on light and current or light and pressure
- Master trip to prevent back feed
- Built-in circuit breaker failure protection
- Lock-out available as an option

Simplified retrofit projects with Rogowski sensors

Equipping existing and even aged switchgear with an arc flash protection system improves their safety and can significantly extend the lifetime of a switchgear. In most cases this is a very cost-efficient alternative compared to replacing the existing equipment with a completely new switchgear to fulfil the requirements of today's safety standards.

AQ 100 series simplify retrofit projects and minimize downtime needed for installing the arc flash protection system. The arc flash protection system main unit AQ-110x arc support Rogowski sensors. This enables two-criteria based detection (light and current) of an arc flash and allows expanding the arc flash protection to the parts of the switchgear that are not covered by current transformers.

Rogowski sensors are based on air-core design and do not saturate even at extremely high current levels. Therefore, they maintain linearity and accuracy across a wide dynamic range, and can detect high-speed transient events, which makes them ideal for arc flash detection and mitigation.

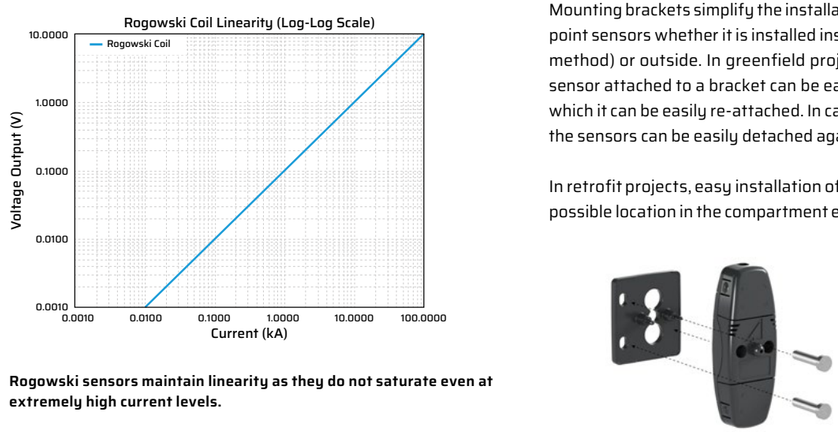
Arcteq Relays has tested Rogowski sensors in a laboratory environment for verifying performance in arc flash protection application.

Rogowski sensors offer superior flexibility and ease of installation. They can be installed with minimum modifications in equipment, such as switchgear, busbars and CTs. They allow, for instance, cost-efficient installation of an arc flash protection system without the need to make changes in existing protection circuits. This eliminates the need for re-testing of the entire protection system resulting in faster deployment and reduced downtime in retrofit and extension projects.

EASIER INSTALLATION OF POINT SENSORS

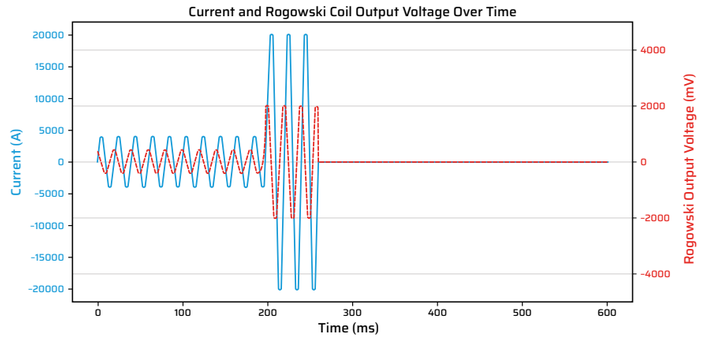
Mounting brackets simplify the installation, wiring and testing of the point sensors whether it is installed inside the compartment (typical method) or outside. In greenfield projects, at the wiring stage the sensor attached to a bracket can be easily removed for wiring after which it can be easily re-attached. In case of the outside installation, the sensors can be easily detached again for flash testing.

In retrofit projects, easy installation of the point sensors in the best possible location in the compartment e.g. using self-tapping screws.



Rogowski sensors maintain linearity as they do not saturate even at extremely high current levels.

Mounting brackets simplify the installation, wiring and testing of the point sensors.



Simulated oscillograph of Rogowski sensor's current-to-voltage ratio from pre-fault state and through the fault to the main incomer trip. The graph shows that Rogowski sensor performs accurately in all conditions as it does not saturate.

Medium-voltage products

AQ-110P ARC FLASH PROTECTION DEVICE (MAIN UNIT)

A flush-mounted current and light sensing main unit. The unit has 4 current inputs (3 phase currents and 1 residual current). Up to 12 point sensors and 1 fiber sensor can be connected to the unit.

AQ-110F ARC FLASH PROTECTION DEVICE (MAIN UNIT)

A flush-mounted current and light sensing main unit. The unit has 4 current inputs (3 phase currents and 1 residual current). Up to 3 fiber sensors can be connected to the unit.

AQ-103 POINT SENSOR UNIT WITH MODBUS

A flush-mounted light sensing unit with optional Modbus communication. Up to 14 point sensors and 1 fiber sensor can be connected to the unit.

AQ-101 POINT SENSOR UNIT

A flush-mounted light sensing unit. The unit can be installed as a sub-unit to an AQ-110P unit or as a standalone unit for light-only systems. Up to 12 point sensors and 1 fiber sensor can be connected to the unit.

AQ-101D POINT SENSOR UNIT

A DIN rail-mounted light sensing unit. The unit can be installed as a sub-unit to an AQ-110P unit or as a standalone unit for light-only systems. Up to 12 point sensors and 1 fiber sensor can be connected to the unit.

AQ-101S POINT SENSOR UNIT WITH EXTENDED I/O

A flush-mounted light sensing unit for double busbar applications. The unit can be installed as a sub-unit to an AQ-110P unit or as a standalone unit for light-only systems. Up to 12 point sensors can be connected to the unit.

AQ-102 FIBER SENSOR UNIT

A flush-mounted light sensing unit. The unit can be installed as a sub-unit to an AQ-110F unit or as a standalone unit for light-only systems. Up to 3 fiber sensors can be connected to the unit.

Arcteq's arc flash protection relays, easy and fast to configure.

Low-voltage products

AQ-110PLV ARC FLASH PROTECTION DEVICE (MAIN UNIT)

A flush-mounted current and light sensing main unit. The unit has 3 phase current inputs. Up to 12 point sensors and 1 fiber sensor can be connected to the unit.

AQ-110PLV ARC FLASH PROTECTION DEVICE (MAIN UNIT)

A flush-mounted current and light sensing main unit. The unit has 3 phase current inputs. Up to 3 fiber sensors can be connected to the unit.

AQ-103LV POINT SENSOR UNIT WITH MODBUS

A flush-mounted light sensing unit with optional Modbus communication. Up to 14 point sensors and 1 fiber sensor can be connected to the unit.

AQ-101LV POINT SENSOR UNIT

A flush-mounted light sensing unit. The unit can be installed as a sub-unit to an AQ-110PLV unit or as a standalone unit for light-only systems. Up to 12 point sensors and 1 fiber sensor can be connected to the unit.

AQ-101DLV POINT SENSOR UNIT

A DIN rail-mounted light sensing unit. The unit can be installed as a sub-unit to an AQ-110PLV unit or as a standalone unit for light-only systems. Up to 12 point sensors and 1 fiber sensor can be connected to the unit.

AQ-102LV FIBER SENSOR UNIT

A flush-mounted light sensing unit. The unit can be installed as a sub-unit to an AQ-110FLV unit or as a standalone unit for light-only systems. Up to 3 fiber sensors can be connected to the unit.

Sensors (for MV and LV)

POINT SENSORS

AQ-01 detects an arc flash based on light activation.

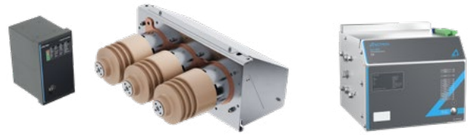
AQ-02 detects an arc flash based on both light and pressure activation.

FIBER SENSORS

AQ-06 is a plastic fiber optic loop sensor that detects light.

AQ-07 and AQ-08 are glass fiber optic loop sensors; AQ-08 sensor withstands high temperatures.

Arc quenching devices



Arcteq's arc quenching devices can be re-activated for multiple operations and testing. They have the following rated voltages:

- AQuench: Up to 17.5 kV or up to 24 kV
- AQ-1000: Up to 690 V.

AQ-1000 has been approved by the US Patent and Trade Office (no. 9,318,294).

Protection for both personnel and equipment

The main purpose of arc flash protection is to protect both substation personnel and the equipment from the consequences of an arc fault. The best protection against arc faults is provided by an arc protection system with a quenching device: it detects an arc fault in 2 ms. When the delay in the breaker operation is included, extinguishing an arc fault normally takes less than 70 ms.

Comparatively, when a switchgear is covered by a protection system without a quencher, the typical clearing time is 50...80 ms. While this cuts the energy levels considerably, an arc fault poses still a notable risk. The lowest form of protection is a situation where a switchgear is only covered by a typical selective overcurrent protection. With operating times as high as 500 ms, an arc fault has time to develop into a dangerous, high-energy incident which has a high risk of severe injuries to personnel.

Using the quenching device typically reduces the energy release to the lowest level according to IEEE 1584 (2018) and NFPA 70E (2018).

Arc quenching

Typical protective equipment (PPE)

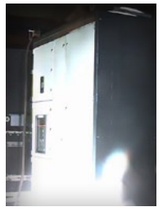
Level of damage

Arc quenching	
Quenching device operation time	< 4 ms from the detection of an arc flash
Energy level in a typical worst-case incident	>1.2...4.0 cal/cm2
Level of typical personal protective equipment (PPE)	Category 1
Typical outage and repair time	60 min
Recommended	Fault current >20 kA and all important loads
Level of protection	**ULTIMATE**

Arc flash relay

Typical protective equipment (PPE)

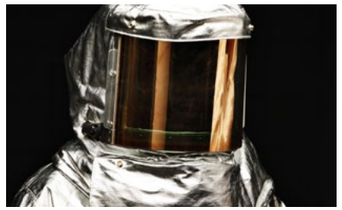
Level of damage



Arc flash relay	
Typical clearing time	50...80 ms
Energy level in a typical worst-case incident	4.0...8.0 cal/cm2
Level of typical personal protective equipment (PPE)	Category 2
Typical outage and repair time	Hours
Recommended	Fault current <10 kA and non-important loads
Level of protection	**HIGH**

Conventional relay

Typical protective equipment (PPE)



Level of damage

Conventional relay	
Typical clearing time	>500 ms
Energy level in a typical worst-case incident	>25.0 cal/cm2
Level of typical personal protective equipment (PPE)	Category 4
Typical outage and repair time	Days or weeks
Recommended	Not recommended
Level of protection	**LOW**

Arc quenching device that can be re-activated for multiple trips and testing

ARC FLASH INCIDENTS

Arc flash faults are the most devastating types of faults known in power distribution systems. Arc flash incidents in MV and LV air-insulated switchgear and controlgear are known to cause several injuries and fatalities every year, mainly by causing burns in the second and higher degrees. Arc flash faults also cause severe equipment damage, leading to time-consuming repairs and extended power outages.

Arc flash has been the subject of intense study in the past decade. Standards (such as IEEE 1584 and NFPA 70E) have quantified that the incident energy of an arc flash is directly proportional to the system voltage, the fault current as well as -most critically- how long the fault persists.

LIMITING THE ARCING TIME

Arc flash protection relays based on light and current detection have been applied to both MV and LV systems since the 1980s. Combining a fast-acting circuit breaker and arc flash protection relay typically clears the fault within 50-80 milliseconds. This significantly reduces the amount of incident energy when compared to traditional overcurrent-based protection with up to 500 milliseconds clearing time.

To overcome the limitations caused by a circuit breaker's opening time Arcteq has developed arc quenching devices for both MV and LV systems. Arcteq's arc quenching devices are an excellent addition to the well-proven AQ 100 arc flash protection relay system.

ULTRAFAST AND MULTIPLE TRIPS

Arcteq arc quenching devices can be re-actived, which allows the system to be fully tested the system can be tested (and its operation time verified) both at the factory and on-site. The operation time less than 4 ms from the detection of an arc flash keeps the energy levels below 1..2 cal/cm^2 in LV systems. This ultrafast protection reduces system repair time from days and weeks to hours. The quenching devices are designed and built for heavy-duty use, and they are rated for fault currents of up to 100 kA to suite every application.

FOR LOW- AND MEDIUM-VOLTAGE SYSTEMS, FOR RETROFIT AND NEW INSTALLATIONS

Arcteq offers arc quenching solutions for both low- and medium-voltage applications. AQ-1000 is rated up to 690 V and can withstand 100 kA fault currents, whereas two AQuench variants rate up to 24 kV and can withstand 50 kA fault currents.

A quenching device can be installed in either new or existing panels. Retrofitting the quenching device in an existing lineup is often an efficient way to prolong the switchgear's lifetime. Each busbar section requires one device, which is mounted in the most practical location within the switchgear. Typical locations include the voltage transformer compartments in medium-voltage applications and the incoming sections in low-voltage applications. When installing an arc quenching device, it is essential to ensure that the operation happens within the power system ratings.

COMPLIANT WITH ARC FLASH MITIGATION STANDARDS

Arcteq's AQ-1000 arc quenching device has been successfully tested in accordance with the **UL 2748** standard ("Standard for Arcing Fault Quenching Equipment"). Additionally, AQ-1000 also complies with the **IEC 60947-9-1:2018** arc quenching device standard.

As AQ-1000 can be re-activated for multiple trips and testing, it is compliant with the **NEC 240.87** standard (2024 update). The standard requires energy-reducing active arc flash mitigation systems to be tested on site to verify that the system operates correctly and that energy level is reduced as specified.

Arcteq products are also an easy way to fully meet the **IEC TS 63107** standard on the integration of internal arc fault mitigation systems in power switchgear and controlgear (PSC) assemblies. As a pioneer in arc flash systems, we provide products which can be integrated with any PSC assembly according to the latest standards and regulations.

AQ-1000 arc quenching device

Dedicated and dependable protection with Standard Arc Schemes

ARC FLASH PROTECTION – THE NEW NORMAL IN POWER GRID PROTECTION

During the last decade, the application of arc flash protection based on light sensing has become the new normal in power protection. Arc flash protection provides clear benefits, such as improved speed, selectivity, and cost-effectiveness. Arc flash protection can be found around the globe and it has been applied to all types of electrical power distribution systems ranging from electrical utility to traditional and renewable power generation, as well as industrial, marine, off-shore, institutional and commercial applications in both LV and MV switchgear and controlgear.

Protection relay manufacturers have incorporated arc flash protection features in multifunction protection relays. Because of this development, arc flash protection is often considered just as an additional protection function. This approach has clear shortcomings as it does not appreciate the critical and complex nature of arc flash protection. Selective and tailored tripping scenarios must be designed in such a way that protection operates flawlessly in every scenario and with any network topology, but at the same time systems must be designed with total selectivity which in turn limits the effected zone to a minimum in case an arc fault occurs. Therefore, arc flash protection should not be considered as a protection function but as a protection system in its own rights.

BENEFITS OF DEDICATED ARC FLASH PROTECTION RELAYS

Dedicated arc flash protection relays are designed for the sole purpose of protecting against arc faults. They operate in parallel with the numerous multifunction protection relay models that provide the classic overcurrent-based protection schemes. This approach provides redundant protection which then increases protection dependability.

Arcteq's dedicated arc flash relays require little to no customer settings. This is essential as studies confirm that up to 85 % of the maloperations in arc protection is due on incorrect settings.

The development of Arcteq's arc flash relays takes a system-wide approach. The protection's operation time is 7 milliseconds for any number of circuit breakers under any operational scenario. There are no inherent delays due to communication bus operating times, which is of the outmost importance when calculating incident energy levels.

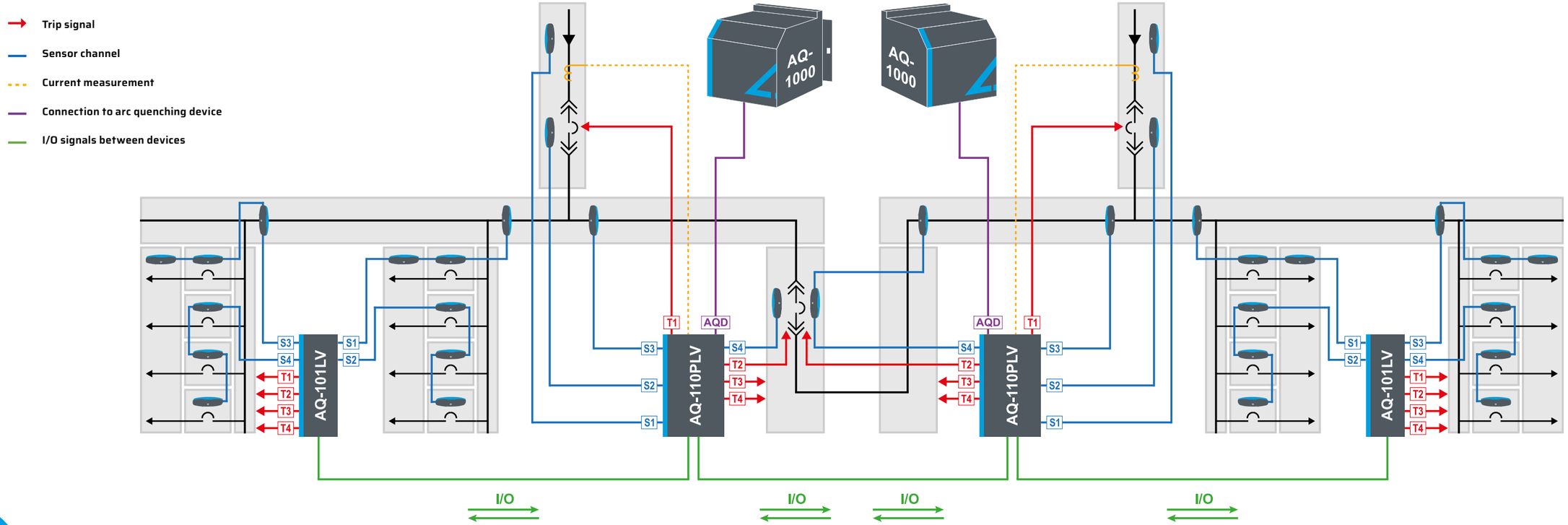
ARCTEQ'S UNIQUE STANDARD ARC SCHEMES – IMPROVED SECURITY THROUGH SIMPLICITY

Standard Arc Schemes provide pre-engineered, fully tested, and fully documented arc flash protection systems for various common switchgear layouts. The added flexibility in arc detection and protection systems has led to situations where manufacturers have not been able to test all possible combinations of the protection scheme they have designed, which has caused complexions when the systems have been set up, wired, and commissioned. Using Standard Arc Schemes guarantees a fully tested protection scheme with standard wiring and settings.

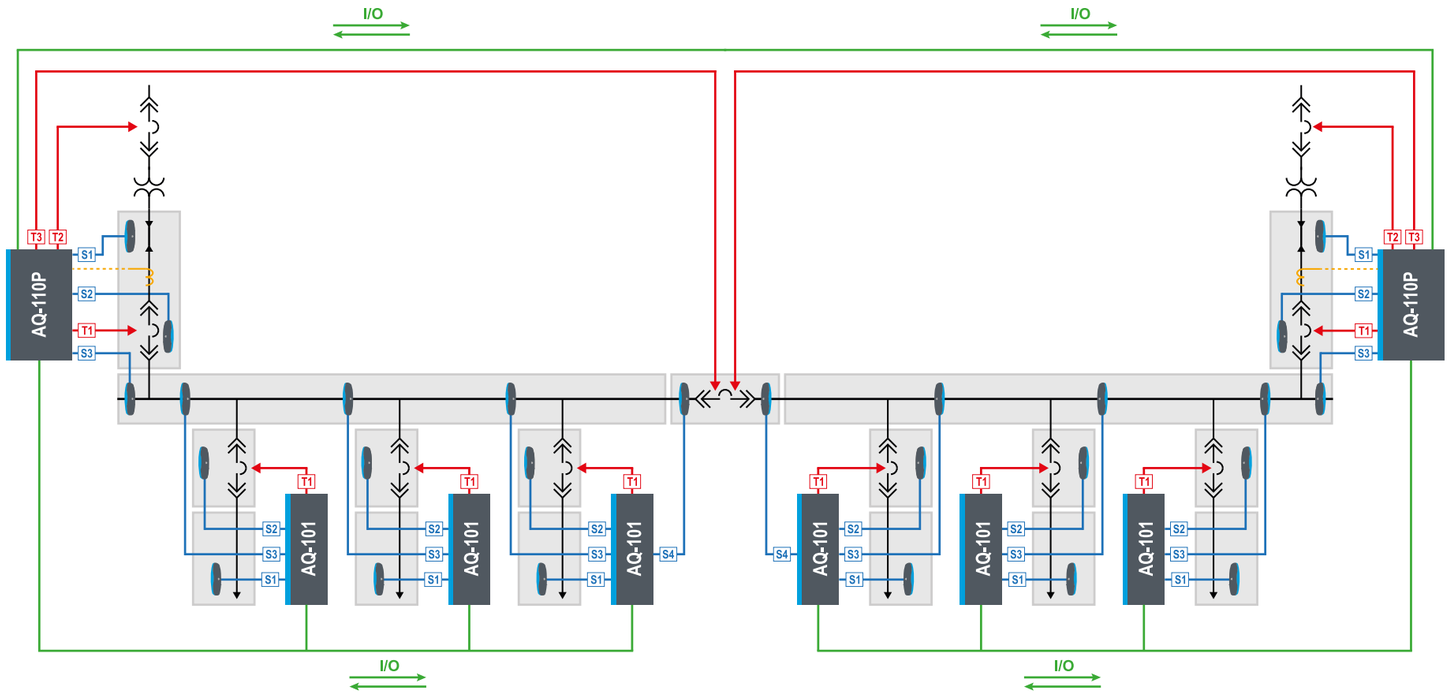
The benefits of Standard Arc Schemes include faster engineering, easier commissioning phase, as well as dependable operation with minimal after-sales and life-cycle costs.

Standard Arc Schemes provide pre-engineered, fully tested, and fully documented arc flash protection systems for various common switchgear layouts.

Typical standard arc scheme (LV)



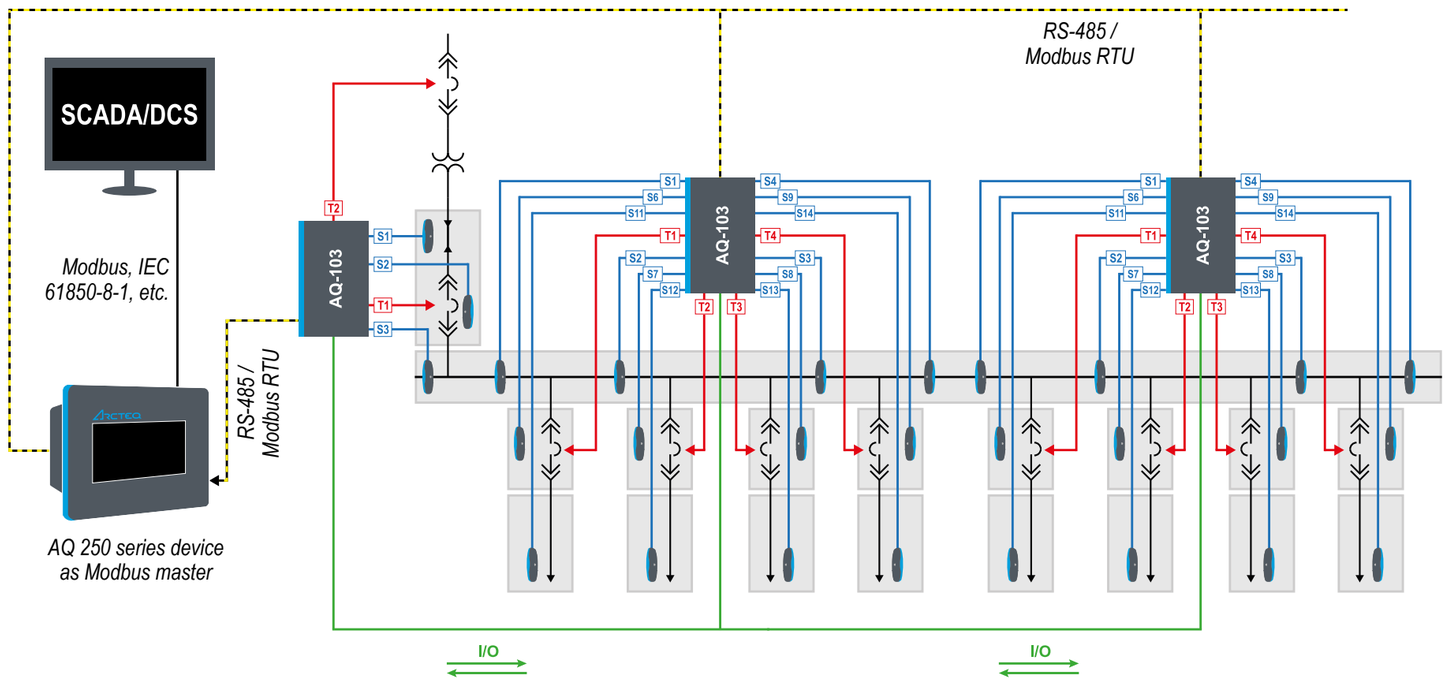
Standard arc scheme layout for low-voltage switchgear with two incoming circuit breakers and a tie breaker.



Typical standard arc scheme (MV)

Standard arc scheme layout for medium-voltage switchgear with two incoming circuit breakers and a tie breaker.

- Trip signal
- Sensor channel
- Current measurement
- Connection to arc quenching device
- I/O signals between devices



Typical standard arc scheme for AQ-103

A single AQ-103 provides fully feeder selective arc flash protection for up to four feeders, and the with additional AQ-103 devices the system can be easily expanded to include up to 64 feeders. When combined with e.g. the AQ-S254 alarm and indication device, AQ-103 equipped with Modbus communication also allows for a unique way of displaying arc flash fault related data, such as fault location, on the HMI of AQ-S254 or other AQ 250 series device.

Adding the pressure criterion to arc flash protection

BACKGROUND

The first generations of arc flash protection relays only used light-sensitive arc sensors as the criterion for tripping the device. When arc light and current sensing were combined in the so-called dual sensing method, it further increased the reliability of the protection system. However, traditional dual sensing systems based on current and light can overtrip when installed in any equipment that also includes air magnetic circuit breakers. In some cases (especially in LV systems) the current criterion is nearly impossible to apply since there are no current transformers. Additionally, the incoming cable compartments in an MV switchgear cannot be protected with light and current when the overcurrent is measured from the protected switchgear.

APPLYING A LIGHT AND PRESSURE SENSOR TO A SYSTEM WITH AN AIR CIRCUIT BREAKER

It is a truth universally acknowledged that low-voltage air circuit breakers create strong light emissions when a breaking sequence occurs under load. Furthermore, when a low-voltage or magnetic air circuit breaker operates on a downstream fault, its arc chutes create an arcing that may activate any arc light sensors installed nearby. Since a downstream fault condition typically leads to exceeding the set overcurrent trip threshold, both light and current conditions may be fulfilled simultaneously. This may result in a nuisance trip of the incoming feeder's circuit breaker in the dual sensing arc flash protection system based on light and overcurrent.

Adding an arc flash pressure sensor into schemes which include air circuit breakers provides an additional trip criterion that will not be fulfilled by normal circuit breaker operations, making it easy to prevent potential nuisance trips. Using Arcteq's AQ-02 point sensor, which combines arc light and pressure sensing within a single enclosure, provides a convenient solution to dual sensing that is also easy to install. If needed, you can also apply overcurrent sensing to the system and make a triple sensing system with current, light and pressure trip criteria.

SENSOR AND SCHEME TESTING

Testing the full arc flash protection scheme is the most important part of every project execution. A typical testing situation includes the activation of each sensor and then monitoring the correct feedback from all relays involved in the scheme. All primary equipment (such as current transformers, circuit breakers and arc quenching devices) must also be tested to secure correct operation throughout the chain.

Arcteq's new arc light and pressure sensor testing device AST-02 is designed to facilitate system testing either in the factory or on-site. The tester provides three different light threshold levels to secure the correct operation of any light sensor regardless of the sensor's own sensitivity level. The pressure element can be triggered at the same time as light to test the AQ-02 light and pressure point sensor. Additionally, the tester can be connected to any third-party relay tester to simulate the overcurrent condition and to record the total operation time of the arc flash protection system. A circuit breaker failure scheme can be also simulated with the AST-02 tester.

CONCLUSIONS

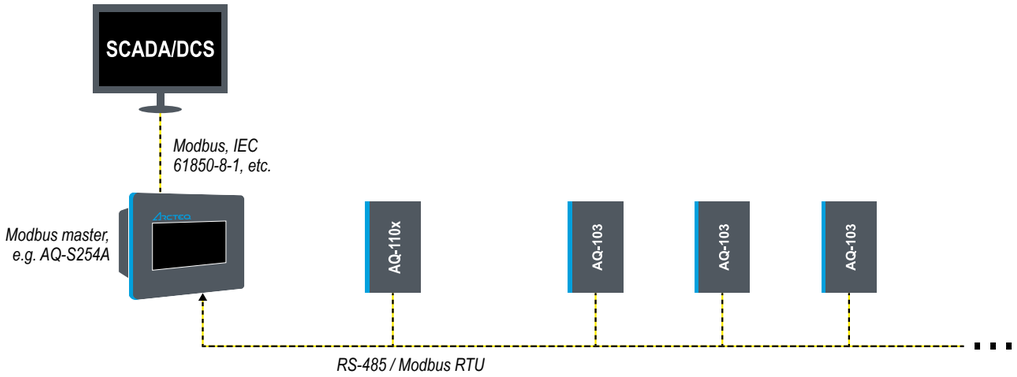
Applying a light and pressure point sensor to the system addresses the shortcomings of light and current criteria. When a pressure sensor is applied to an arc flash protection system, it provides increased system reliability without compromising the desired dual sensing criteria. Adding the pressure criterion is especially encouraged for systems that include magnetic air circuit breakers. Also, pressure sensing should be considered when there are no current transformers within the protected zone. A pressure and light sensor such as AQ-02 can be applied as a standalone solution with light and pressure being the only two tripping criteria, or it can be used in combination with overcurrent tripping to create triple sensing system.

A light and pressure point sensor can be used to eliminate nuisance trips with air circuit breakers.

AST-02 tester can be used for light and pressure testing

AQ-02 light and pressure sensor

Making data from the arc flash protection system visible for taking further actions



The Modbus RTU communication in AQ 100 series devices enables the integration of the arc flash protection system into an overall system. This allows all data about alarms, sensors, and input/output signals available locally in the arc protection device to be transferred to a SCADA or distributed control system (DCS). Connection to a SCADA/DCS in an IEC 61850-system is accomplished via an AQ 250 protection and control device. The AQ 250 device also functions as a Modbus master in larger systems with several arc flash protection sub-units.

Incorporating an AQ 250 series device, such as the AQ-S254A alarm annunciator device, into the arc protection system also enhances the arc flash protection system with a large, freely programmable multicolor local HMI display. This additional display can be used for self-supervision, light sensor and current channel status indication, and managing trip alarms with event logs from all AQ 100 series devices in the system.

A single line diagram (SLD) on the display of an AQ 250 series protection and control device. The faulty compartment is shown on the SLD based on an alarm from arc flash protection system.

MEDIUM-VOLTAGE

HIGHLIGHTS:

- Supports both current and light sensing.
- AQ-110P connects to up to 12 point sensors and AQ-110F to 3 fiber sensors.
- Supports also Rogowski sensors, offering superior flexibility and ease of installation, especially for retrofit projects.
- Connects to Arcteq's arc quenching devices for ultra-fast arc flash mitigation.
- Features Modbus RTU communication allowing integration of the arc flash protection system into SCADA/DCS.
- Has a superior isolation level against external disturbances – tested at the highest EMC classes.
- Has complete system self-supervision covering all internal system functions and external connections.

AQ-110x Arc Flash Protection Device (Main unit)

READ MORE

The AQ-110x arc flash protection device supports both current and light sensing. Acting as the main unit of the arc flash protection system, the AQ-110x detects overcurrent in the incoming feeder and a light signal from a sub-unit, or from a light detection sensor connected to the device itself. It then trips the circuit breaker that is the source of the fault current, thereby significantly reducing the damage caused by an arcing fault (arc flash).

The AQ-110x devices also support Rogowski sensors, offering superior flexibility and ease of installation, especially for retrofit projects. This feature also enables the expansion of arc flash protection to parts of the switchgear that are not covered by current transformers.

This multipurpose arc flash protection device is suitable for a variety of applications, from stand-alone devices to a main unit of a more complex arc protection system. The Modbus RTU communication enables integration of the arc flash protection system into a SCADA/DCS system directly, or via an AQ 250 protection and control device. This enables transferring all data about the alarms, sensors and input/output signals available locally on the HMI of the arc protection device to the SCADA/DCS system e.g. according to IEC 61850 standard.

PROTECTION
- Overcurrent and light (50Arc)
- Earth fault and light (50NArc)
- Light only
- Light and pressure (AQ-110P only)
- Circuit breaker failure protection (50BF/52BF)
- Total trip time: 7 ms

APPLICABLE SENSORS
- AQ-01 light point sensor (AQ-110P only)
- AQ-02 light and pressure point sensor (AQ-110P only)
- AQ-06 plastic fiber sensor (9.8...131.2 ft)
- AQ-07 glass fiber sensor (9.8...164.0 ft)
- AQ-08 high-temperature glass fiber sensor (9.8...49.2 ft)
- Rogowski sensor support

I/O
Trip relays (T1, T2, T3, T4)
- Number: 3 NO + 1 NC or 4 NO
- Rated voltage: 250 V AC/DC
- Continuous carry: 5 A
- Make-and-carry for 3 s: 16 A
- Make-and-carry for 0.5 s: 30 A

Binary output (BO1)
- Number of outputs: 1
- Rated voltage: +24 V DC

Binary inputs (BI1, BI2)
- Number of inputs: 2
- Threshold voltage: 24 V DC
- Rated voltage: 250 V

Power supply
- Auxiliary power supply: 92...265 V AC/DC
- Auxiliary power supply: 18...72 V DC (optional)

HMI
- 20 indication LEDs (AQ-110P)
- 19 indication LEDs (AQ-110F)
- Multifunction push button (SET)
  - Autoconfiguration
  - Indication reset
  - System check

SELF-SUPERVISION
- Complete system self-supervision:
  - Internal functions (configurations and device health)
  - External connections (binary inputs and arc sensors)

ORDER CODE AQ-110P- X X X A X

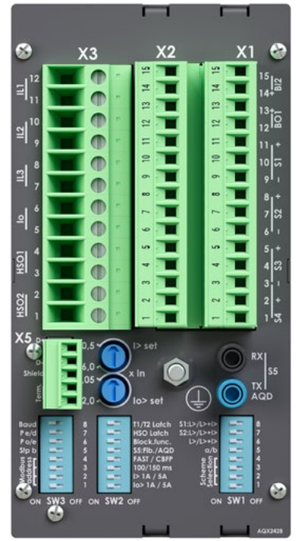
Auxiliary power supply
A 92...265 V AC/DC
B 18...72 V DC

T3 trip relay setting
A Normally open (NO)
B Normally closed (NC) or electronic lock-out

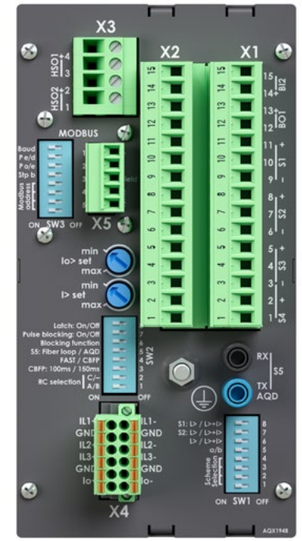
S5 sensor channel setting
A None
B Fiber optic sensor channel / AQD control

Binary input threshold voltage
A 24 V DC

Current inputs / Communication
A Standard inputs
B Standard inputs + Modbus
C Rogowski inputs
D Rogowski inputs + Modbus



Rear of AQ-110P with CT inputs and Modbus connector.



Rear of AQ-110P with Rogowski inputs and Modbus connector.

ORDER CODE AQ-110F- X X X A X

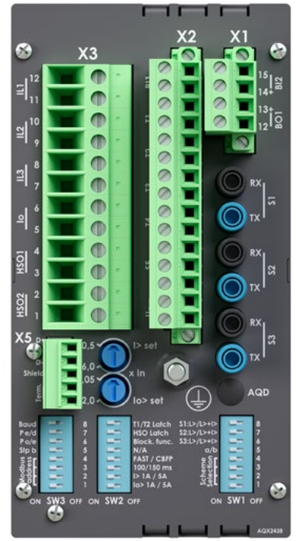
Auxiliary power supply
A 92...265 V AC/DC
B 18...72 V DC

T3 trip relay setting
A Normally open (NO)
B Normally closed (NC) or electronic lock-out

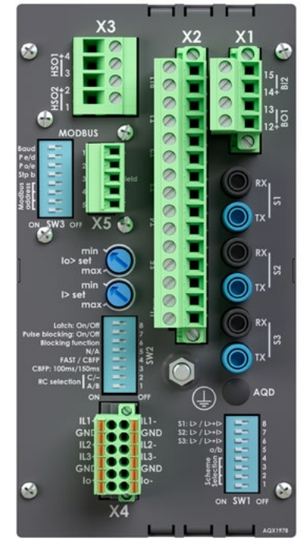
Additional channel settings
A None
B AQD control
C Low fiber input sensitivity (S1–S3) + AQD control

Binary input threshold voltage
A 24 V DC

Current inputs / Communication
A Standard inputs
B Standard inputs + Modbus
C Rogowski inputs
D Rogowski inputs + Modbus



Rear of AQ-110F with CT inputs and Modbus connector.



Rear of AQ-110F with Rogowski inputs and Modbus connector.

ORDER CODE AQ-103- X X X A X

Auxiliary power supply
A 92...265 V AC/DC
B 18...72 V DC

T3 trip relay setting
A Normally open (NO)
B Normally closed (NC) or electronic lock-out

S5 sensor channel setting
A None
B Fiber optic sensor channel / AQD control

Binary input threshold voltage
A 24 V DC

Communication
A None
B RS-485 Modbus

AQ-103 Point sensor unit with Modbus

READ MORE

AQ-103 is a sophisticated microprocessor-based arc flash protection unit with arc light detection. It acts as a sub-unit to an AQ-110P unit in an AQ 100 arc protection system. It can also function as a standalone unit in light-only systems. AQ-103 is designed to minimize the damage caused by an arcing fault (arc flash) by tripping the circuit breaker that sources the fault current. The complete system self-supervision function of AQ-103 provides the highest level of dependability by continuously monitoring all internal system functions as well as external connections. AQ-103 provides communication through Modbus protocol.

HIGHLIGHTS:

- Connects to a maximum of 14 point sensors and 1 fiber sensor.
- A variant with Modbus communication is also available.

PROTECTION

- Light only
- Light and pressure
- Circuit breaker failure protection (50BF/52BF)
- Total trip time: 7 ms

APPLICABLE SENSORS

- AQ-01 light point sensor
- AQ-02 light and pressure point sensor
- AQ-06 plastic fiber sensor (9.8...131.2 ft)
- AQ-07 glass fiber sensor (9.8...164.0 ft)
- AQ-08 high-temperature glass fiber sensor (9.8...49.2 ft)

I/O

Trip relays (T1, T2, T3, T4)
- Number: 3 NO + 1 NC or 4 NO
- Rated voltage: 250 V AC/DC
- Continuous carry: 5 A
- Make-and-carry for 3 s: 16 A
- Make-and-carry for 0.5 s: 30 A

Binary output (BO1)
- Number of outputs: 1
- Rated voltage: +24 V DC

Binary inputs (BI1, BI2)
- Number of inputs: 2
- Threshold voltage: 24 V DC
- Rated voltage: 250 V

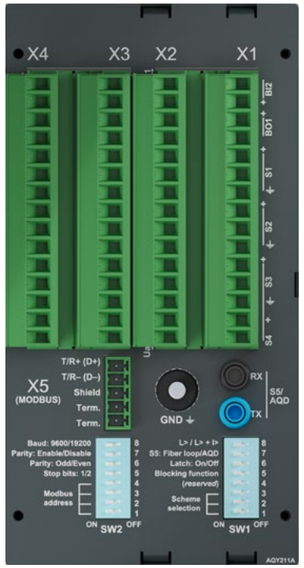
Power supply
- Auxiliary power supply: 92...265 V AC/DC
- Auxiliary power supply: 18...72 V DC (optional)

HMI

- 25 indication LEDs
- Multifunction push button (SET)
  - Autoconfiguration
  - Indication reset
  - System check

SELF-SUPERVISION

- Complete system self-supervision:
  - Internal functions (configurations and device health)
  - External connections (binary inputs and arc sensors)



AQ-103 rear view, Modbus variant

ORDER CODE AQ-101- X X X X

Auxiliary power supply
A 92...265 V AC/DC
B 18...72 V DC

T3 trip relay setting
A Normally open (NO)
B Normally closed (NC) or electronic lock-out

S5 sensor channel setting
A None
B Fiber optic sensor channel

Binary input threshold voltage
A 24 V DC
B 110 V DC
C 220 V DC

AQ-101 Point sensor unit

READ MORE

AQ-101 is a sophisticated microprocessor-based arc flash protection unit for arc light detection. It is designed to minimize the damage caused by an arcing fault (arc flash) by tripping the circuit breaker that sources the fault current. AQ-101 acts as a sub-unit to an AQ-110P unit in an AQ 100 arc protection system. It can also function as a standalone unit in light-only systems. The complete system self-supervision function of AQ-101 provides the highest level of dependability by continuously monitoring all internal system functions as well as external connections.

HIGHLIGHTS:

- A practically unlimited number of units can be interconnected in one system.
- Standard Arc Schemes allow for fast engineering and simple setting.
- Connects to a maximum of 12 point sensors and 1 fiber sensor (optional).

PROTECTION

- Light only
- Light and pressure
- Circuit breaker failure protection (50BF/52BF)
- Total trip time: 7 ms

APPLICABLE SENSORS

- AQ-01 light point sensor
- AQ-02 light and pressure point sensor
- AQ-06 plastic fiber sensor (9.8...131.2 ft)
- AQ-07 glass fiber sensor (9.8...164.0 ft)
- AQ-08 high-temperature glass fiber sensor (9.8...49.2 ft)

I/O

Trip relays (T1, T2, T3, T4)
- Number: 3 NO + 1 NC or 4 NO
- Rated voltage: 250 V AC/DC
- Continuous carry: 5 A
- Make-and-carry for 3 s: 16 A
- Make-and-carry for 0.5 s: 30 A

Binary output (BO1)
- Number of outputs: 1
- Rated voltage: +24 V DC

Binary inputs (BI1, BI2)
- Number of inputs: 2
- Threshold voltage: 24 V DC
- Rated voltage: 250 V

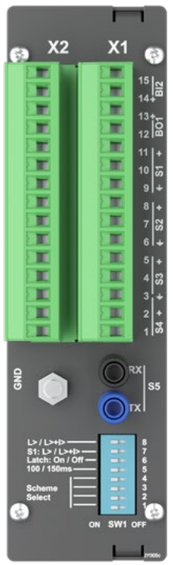
Power supply
- Auxiliary power supply: 92...265 V AC/DC
- Auxiliary power supply: 18...72 V DC (optional)

HMI

- 12 indication LEDs
- Multifunction push button (SET)
  - Autoconfiguration
  - Indication reset
  - System check

SELF-SUPERVISION

- Complete system self-supervision:
  - Internal functions (configurations and device health)
  - External connections (binary inputs and arc sensors)



AQ-101 rear view

ORDER CODE **AQ-101D- X X X X**

Auxiliary power supply
A 92...265 V AC/DC
B 18...72 V DC

T3 trip relay setting
A Normally open (NO)
B Normally closed (NC) or electronic lock-out

S5 sensor channel setting
A None
B Fiber optic sensor channel

Binary input threshold voltage
A 24 V DC
B 110 V DC
C 220 V DC

AQ-101D Point sensor unit (DIN rail)

READ MORE

AQ-101D is a sophisticated microprocessor-based arc flash protection unit for arc light detection. It is designed to minimize the damage caused by an arcing fault (arc flash) by tripping the circuit breaker that sources the fault current. AQ-101D acts as a sub-unit to an AQ-110P unit in an AQ 100 arc protection system. It can also function as a standalone unit in light-only systems. The complete system self-supervision function of AQ-101D provides the highest level of dependability by continuously monitoring all internal system functions as well as external connections.

HIGHLIGHTS:
- Allows for easy DIN rail installation.
- Has 12 indication LEDs for fault analysis.

PROTECTION
- Light only
- Light and pressure
- Circuit breaker failure protection (50BF/52BF)
- Total trip time: 7 ms

APPLICABLE SENSORS
- AQ-01 light point sensor
- AQ-02 light and pressure point sensor
- AQ-06 plastic fiber sensor (9.8...131.2 ft)
- AQ-07 glass fiber sensor (9.8...164.0 ft)
- AQ-08 high-temperature glass fiber sensor (9.8...49.2 ft)

I/O
Trip relays (T1, T2, T3, T4)
- Number: 3 NO + 1 NC or 4 NO
- Rated voltage: 250 V AC/DC
- Continuous carry: 5 A
- Make-and-carry for 3 s: 16 A
- Make-and-carry for 0.5 s: 30 A

Binary output (BO1)
- Number of outputs: 1
- Rated voltage: +24 V DC

Binary inputs (BI1, BI2)
- Number of inputs: 2
- Threshold voltage: 24 V DC
- Rated voltage: 250 V

Power supply
- Auxiliary power supply: 92...265 V AC/DC
- Auxiliary power supply: 18...72 V DC (optional)

HMI
- 12 indication LEDs
- Multifunction push button (SET)
  - - Autoconfiguration
  - - Indication reset
  - - System check

SELF-SUPERVISION
- Complete system self-supervision:
  - Internal functions (configurations and device health)
  - External connections (binary inputs and arc sensors)

ORDER CODE **AQ-101S- X A A A**

Auxiliary power supply
A 92...265 V AC/DC
B 18...72 V DC

T3 trip relay setting
A Normally open (NO)

S5 sensor channel setting
A None

Binary input threshold voltage
A 24 V DC

AQ-101S Point sensor unit with extended I/O

READ MORE

AQ-101S is a sophisticated microprocessor-based arc flash protection unit for arc light detection. It is designed to minimize the damage caused by an arcing fault (arc flash) by tripping the circuit breaker that sources the fault current. AQ-101S acts as a sub-unit to an AQ-110P unit in an AQ 100 arc protection system. It can also function as a standalone unit in light-only systems.

AQ-101S has an extended I/O ability to receive status information from a bay disconnector switch, which the special arc scheme for double busbar installation requires. The complete system self-supervision function of AQ-101S provides the highest level of dependability by continuously monitoring all internal system functions as well as external connections.

HIGHLIGHTS:
- Has an extended I/O for double busbar installation.
- Supports standard hardwiring practices for communication between units.
- Has a superior isolation level against external disturbances
  - tested at the highest EMC classes.

PROTECTION
- Light only
- Light and pressure
- Circuit breaker failure protection (50BF/52BF)
- Total trip time: 7 ms

APPLICABLE SENSORS
- AQ-01 light point sensor
- AQ-02 light and pressure point sensor

I/O
Trip relays (T1, T2, T3)
- Number: 2 NO + 1 NC or 3 NO
- Rated voltage: 250 V AC/DC
- Continuous carry: 5 A
- Make-and-carry for 3 s: 16 A
- Make-and-carry for 0.5 s: 30 A

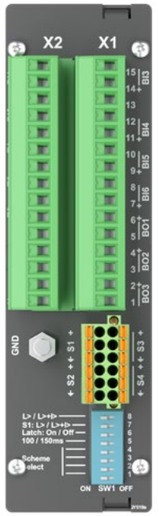
Binary outputs (BO1, BO2, BO3)
- Number of outputs: 3
- Rated voltage: +24 V DC

Binary inputs (BI1, BI2, BI3, BI4, BI5, BI6)
- Number of inputs: 6
- Threshold voltage: 24 V DC
- Rated voltage: 250 V

Power supply
- Auxiliary power supply: 92...265 V AC/DC
- Auxiliary power supply: 18...72 V DC (optional)

HMI
- 17 indication LEDs
- Multifunction push button (SET)
  - Autoconfiguration
  - Indication reset
  - System check

SELF-SUPERVISION
- Complete system self-supervision:
  - Internal functions (configurations and device health)
  - External connections (binary inputs and arc sensors)



AQ-101S rear view

ORDER CODE **AQ-102- X X X X**

Auxiliary power supply
- A 92...265 V AC/DC
- B 18...72 V DC

T3 trip relay setting
- A Normally open (NO)
- B Normally closed (NC) or electronic lock-out

Additional channel settings
- A None
- B AQD control
- C Low fiber input sensitivity (S1–S3) + AQD control

Binary input threshold voltage
- A 24 V DC
- B 110 V DC
- C 220 V DC

AQ-102 Fiber sensor unit

READ MORE

AQ-102 is a sophisticated microprocessor-based arc flash protection unit for arc light detection. It has connectors for up to three fiber sensors. AQ-102 is designed to minimize the damage caused by an arcing fault (arc flash) by tripping the circuit breaker that sources the fault current. AQ-102 acts as a sub-unit to an AQ-110x unit in an AQ 100 arc protection system. It can also function as a standalone unit in light-only systems. The complete system self-supervision function of AQ-102 provides the highest level of dependability by continuously monitoring all internal system functions as well as external connections.

HIGHLIGHTS:
- Connects to a maximum of 3 fiber sensors.
- Has full self-supervision of all system components and interconnections.
- Adapts easily to any switchgear and trip scheme.

PROTECTION
- Light only
- Circuit breaker failure protection (50BF/52BF)
- Total trip time: 7 ms

APPLICABLE SENSORS
- AQ-06 plastic fiber sensor (9.8...131.2 ft)
- AQ-07 glass fiber sensor (9.8...164.0 ft)
- AQ-08 high-temperature glass fiber sensor (9.8...49.2 ft)

I/O

Trip relays (T1, T2, T3, T4)
- Number: 3 NO + 1 NC or 4 NO
- Rated voltage: 250 V AC/DC
- Continuous carry: 5 A
- Make-and-carry for 3 s: 16 A
- Make-and-carry for 0.5 s: 30 A

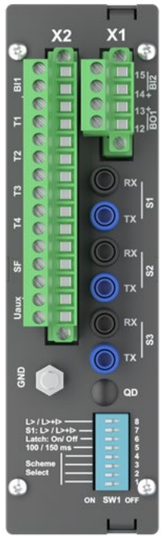
Binary output (BO1)
- Number of outputs: 1
- Rated voltage: +24 V DC

Binary inputs (BI1, BI2)
- Number of inputs: 2
- Threshold voltage: 24 V DC
- Rated voltage: 250 V

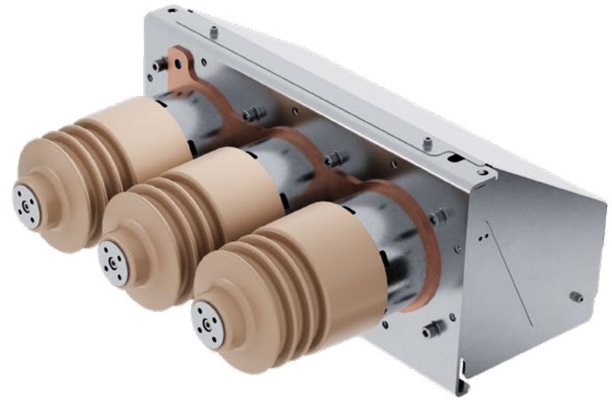
Power supply
- Auxiliary power supply: 92...265 V AC/DC
- Auxiliary power supply: 18...72 V DC (optional)

HMI
- 11 indication LEDs
- Multifunction push button (SET)
  - Autoconfiguration
  - Indication reset
  - System check

SELF-SUPERVISION
- Complete system self-supervision:
  - Internal functions (configurations and device health)
  - External connections (binary inputs and arc sensors)



AQ-102 rear view



AQuench Arc quenching device

READ MORE

AQuench arc quenching device operates in less than 4 ms from the detection of an arc flash to minimize the risk of personnel injuries and damage to equipment. When an AQ 100 series unit detects an arc fault, it triggers the AQuench arc quenching system and trips the circuit breaker(s) feeding the fault, both at the same time. Then AQuench creates a low-impedance parallel path for the fault current to flow through.

HIGHLIGHTS:
- Mitigates the risk of injury during operations and maintenance.
- Minimizes damage to equipment.
- Is applicable to both new and retrofit installations.

TECHNICAL DATA

AQ-17500
- Arc quenching device with rated voltage up to 17.5 kV
- 31.5 kA (3 s)
- BIL: 95 kV
- Can be re-activated
- Mechanical life: 30 operations
- Electrical life: 5 operations
- Auxiliary supply: 110...250 V AC/DC
- Phase conductor displacement: 170 mm / 6.69 in (total width 580 mm / 22.83 in)
- Including:
  - controller unit
  - connection cables
  - reset tool

AQ-24000
- Arc quenching device with rated voltage up to 24 kV
- 50 kA (3 s)
- BIL: 125 kV
- Can be re-activated
- Mechanical life: 30 operations
- Electrical life: 5 operations
- Auxiliary supply: 110...250 V AC/DC
- Phase conductor displacement: 210 mm / 8.27 in (total width 740 mm / 29.13 in)
- Including:
  - controller unit
  - connection cables
  - reset tool

ORDER CODE

AQ-17500

Arc quenching device (max. rated voltage 17.5 kV)
Reset tool for the arc quenching device
Controller unit
Connection cables

ORDER CODE

AQ-24000

Arc quenching device (max. rated voltage 24 kV)
Reset tool for the arc quenching device
Controller unit
Connection cables

HIGHLIGHTS:

- Supports both current and light sensing.
- AQ-110PLV connects to up to 12 point sensors and AQ-110FLV to 3 fiber sensors.
- Supports also Rogowski sensors, offering superior flexibility and ease of installation, especially for retrofit projects.
- Connects to Arcteq's arc quenching devices for ultra-fast arc flash mitigation.
- Features Modbus RTU communication allowing integration of the arc flash protection system into SCADA/DCS.
- Has a superior isolation level against external disturbances – tested at the highest EMC classes.
- Has complete system self-supervision covering all internal system functions and external connections.

AQ-110xLV Arc Flash Protection Device (Main unit)

READ MORE

The AQ-100xLV arc flash protection device supports both current and light sensing. Acting as the main unit of the arc flash protection system, the AQ-100xLV detects overcurrent in the incoming feeder and a light signal from a sub-unit, or from a light detection sensor connected to the device itself. It then trips the circuit breaker that is the source of the fault current, thereby significantly reducing the damage caused by an arcing fault (arc flash).

The AQ-100xLV devices also support Rogowski sensors, offering superior flexibility and ease of installation, especially for retrofit projects. This feature also enables the expansion of arc flash protection to parts of the switchgear that are not covered by current transformers.

This multipurpose arc flash protection device is suitable for a variety of applications, from stand-alone devices to a main unit of a more complex arc protection system. The Modbus RTU communication enables integration of the arc flash protection system into a SCADA/DCS system directly, or via an AQ 250 protection and control device. This enables transferring all data about the alarms, sensors and input/output signals available locally on the HMI of the arc protection device to the SCADA/DCS system e.g. according to IEC 61850 standard.

PROTECTION

- Overcurrent and light (50Arc)
- Earth fault and light (50NArc)
- Light only
- Light and pressure (AQ-110PLV only)
- Circuit breaker failure protection (50BF/52BF)
- Total trip time: 7 ms

APPLICABLE SENSORS

- AQ-01 light point sensor (AQ-110PLV only)
- AQ-02 light and pressure point sensor (AQ-110PLV only)
- AQ-06 plastic fiber sensor (9.8…131.2 ft)
- AQ-07 glass fiber sensor (9.8…164.0 ft)
- AQ-08 high-temperature glass fiber sensor (9.8…49.2 ft)
- Rogowski sensor support

I/O

Trip relays (T1, T2, T3, T4)

- Number: 3 NO + 1 NC or 4 NO
- Rated voltage: 250 V AC/DC
- Continuous carry: 5 A
- Make-and-carry for 3 s: 16 A
- Make-and-carry for 0.5 s: 30 A

Binary output (BO1)

- Number of outputs: 1
- Rated voltage: +24 V DC

Binary inputs (BI1, BI2)

- Number of inputs: 2
- Threshold voltage: 24 V DC
- Rated voltage: 250 V

Power supply

- Auxiliary power supply: 92…265 V AC/DC
- Auxiliary power supply: 18…72 V DC (optional)

HMI

- 19 indication LEDs (AQ-110PLV)
- 18 indication LEDs (AQ-110FLV)
- Multifunction push button (SET)
  - Autoconfiguration
  - Indication reset
  - System check

SELF-SUPERVISION

- Complete system self-supervision:
  - Internal functions (configurations and device health)
  - External connections (binary inputs and arc sensors)

ORDER CODE AQ-110PLV- X X X A X

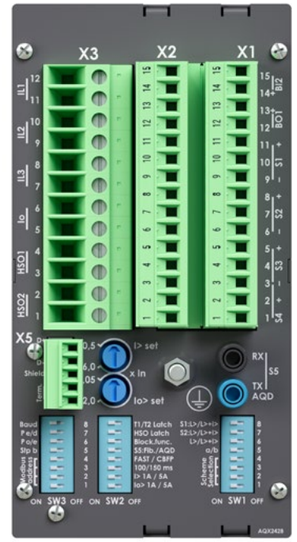
Auxiliary power supply
A 92…265 V AC/DC
B 18…72 V DC

T3 trip relay setting
A Normally open (NO)
B Normally closed (NC) or electronic lock-out

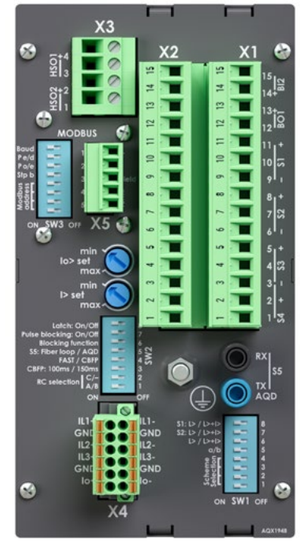
S5 sensor channel setting
A None
B Fiber optic sensor channel / AQD control

Binary input threshold voltage
A 24 V DC

Current inputs / Communication
A Standard inputs
B Standard inputs + Modbus
C Rogowski inputs
D Rogowski inputs + Modbus



Rear of AQ-110PLV with CT inputs and Modbus connector.



Rear of AQ-110PLV with Rogowski inputs and Modbus connector.

ORDER CODE AQ-110FLV- X X X A X

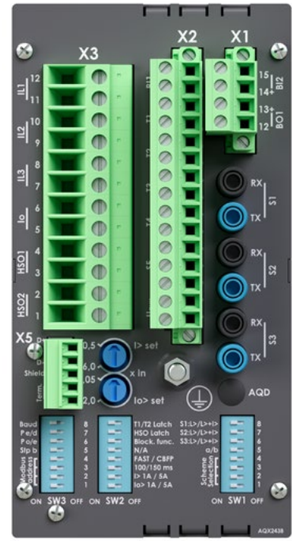
Auxiliary power supply
A 92…265 V AC/DC
B 18…72 V DC

T3 trip relay setting
A Normally open (NO)
B Normally closed (NC) or electronic lock-out

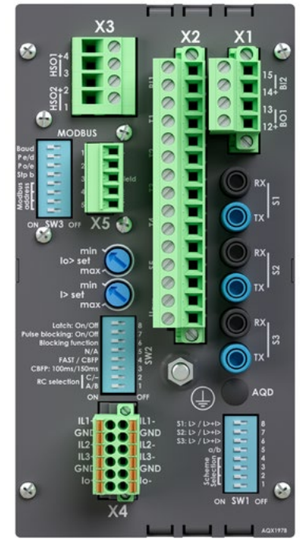
Additional channel settings
A None
B AQD control
C Low fiber input sensitivity (S1–S3) + AQD control

Binary input threshold voltage
A 24 V DC

Current inputs / Communication
A Standard inputs
B Standard inputs + Modbus
C Rogowski inputs
D Rogowski inputs + Modbus



Rear of AQ-110FLV with CT inputs and Modbus connector.



Rear of AQ-110FLV with Rogowski inputs and Modbus connector.

ORDER CODE AQ-103LV- X X X A X

Auxiliary power supply
- A 92...265 V AC/DC
- B 18...72 V DC

T3 trip relay setting
- A Normally open (NO)
- B Normally closed (NC) or electronic lock-out

S5 sensor channel setting
- A None
- B Fiber optic sensor channel / AQD control

Binary input threshold voltage
- A 24 V DC

Current inputs / Communication
- A None
- B RS-485 Modbus

AQ-103LV Point sensor unit with Modbus

READ MORE

AQ-103LV is a sophisticated microprocessor-based arc flash protection unit with arc light detection. It acts as a sub-unit to an AQ-110PLV unit in an AQ 100 arc protection system. It can also function as a standalone unit in light-only systems. AQ-103LV is designed to minimize the damage caused by an arcing fault (arc flash) by tripping the circuit breaker that sources the fault current. The complete system self-supervision function of AQ-103LV provides the highest level of dependability by continuously monitoring all internal system functions as well as external connections. AQ-103LV provides communication through Modbus protocol.

HIGHLIGHTS:
- Connects to a maximum of 14 point sensors and 1 fiber sensor.
- A variant with Modbus communication is also available.

PROTECTION
- Light only
- Light and pressure
- Circuit breaker failure protection (50BF/52BF)
- Total trip time: 7 ms

APPLICABLE SENSORS
- AQ-01 light point sensor
- AQ-02 light and pressure point sensor
- AQ-06 plastic fiber sensor (9.8...131.2 ft)
- AQ-07 glass fiber sensor (9.8...164.0 ft)
- AQ-08 high-temperature glass fiber sensor (9.8...49.2 ft)

I/O

Trip relays (T1, T2, T3, T4)
- Number: 3 NO + 1 NC or 4 NO
- Rated voltage: 250 V AC/DC
- Continuous carry: 5 A
- Make-and-carry for 3 s: 16 A
- Make-and-carry for 0.5 s: 30 A

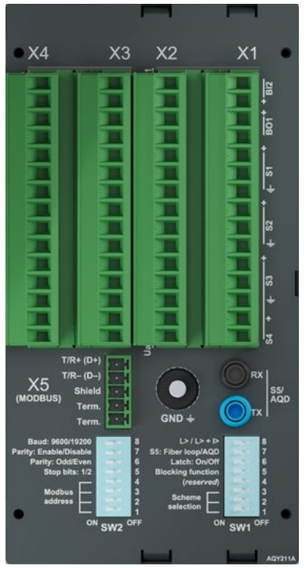
Binary output (BO1)
- Number of outputs: 1
- Rated voltage: +24 V DC

Binary inputs (BI1, BI2)
- Number of inputs: 2
- Threshold voltage: 24 V DC
- Rated voltage: 250 V

Power supply
- Auxiliary power supply: 92...265 V AC/DC
- Auxiliary power supply: 18...72 V DC (optional)

HMI
- 25 indication LEDs
- Multifunction push button (SET)
  - Autoconfiguration
  - Indication reset
  - System check

SELF-SUPERVISION
- Complete system self-supervision:
  - Internal functions (configurations and device health)
  - External connections (binary inputs and arc sensors)



AQ-103LV rear view, Modbus variant

ORDER CODE AQ-101LV- X X X A

Auxiliary power supply
- A 92...265 V AC/DC
- B 18...72 V DC

T3 trip relay setting
- A Normally open (NO)
- B Normally closed (NC) or electronic lock-out

S5 sensor channel setting
- A None
- B Fiber optic sensor channel

Binary input threshold voltage
- A 24 V DC

AQ-101LV Point sensor unit

READ MORE

AQ-101LV is a sophisticated microprocessor-based arc flash protection unit for arc light detection. It is designed to minimize the damage caused by an arcing fault (arc flash) by tripping the circuit breaker that sources the fault current. AQ-101LV acts as a sub-unit to an AQ-110PLV unit in an AQ 100 arc protection system. It can also function as a standalone unit in light-only systems. The complete system self-supervision function of AQ-101LV provides the highest level of dependability by continuously monitoring all internal system functions as well as external connections.

HIGHLIGHTS:
- An unlimited number of units can be interconnected in one system.
- Standard Arc Schemes allow for fast engineering and simple setting.
- Connects to a maximum of 12 point sensors and 1 fiber sensor (optional).

PROTECTION
- Light only
- Light and pressure
- Circuit breaker failure protection (50BF/52BF)
- Total trip time: 7 ms

APPLICABLE SENSORS
- AQ-01 light point sensor
- AQ-02 light and pressure point sensor
- AQ-06 plastic fiber sensor (9.8...131.2 ft)
- AQ-07 glass fiber sensor (9.8...164.0 ft)
- AQ-08 high-temperature glass fiber sensor (9.8...49.2 ft)

I/O

Trip relays (T1, T2, T3, T4)
- Number: 3 NO + 1 NC or 4 NO
- Rated voltage: 250 V AC/DC
- Continuous carry: 5 A
- Make-and-carry for 3 s: 16 A
- Make-and-carry for 0.5 s: 30 A

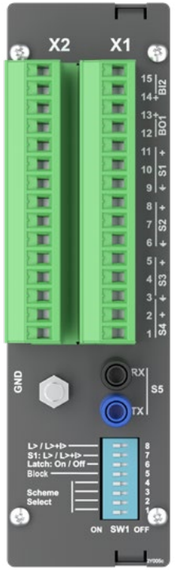
Binary output (BO1)
- Number of outputs: 1
- Rated voltage: +24 V DC

Binary inputs (BI1, BI2)
- Number of inputs: 2
- Threshold voltage: 24 V DC
- Rated voltage: 250 V

Power supply
- Auxiliary power supply: 92...265 V AC/DC
- Auxiliary power supply: 18...72 V DC (optional)

HMI
- 12 indication LEDs
- Multifunction push button (SET)
  - Autoconfiguration
  - Indication reset
  - System check

SELF-SUPERVISION
- Complete system self-supervision:
  - Internal functions (configurations and device health)
  - External connections (binary inputs and arc sensors)



AQ-101LV rear view

ORDER CODE AQ-101DLV- X X X X

Auxiliary power supply
- A 92...265 V AC/DC
- B 18...72 V DC

T3 trip relay setting
- A Normally open (NO)
- B Normally closed (NC) or electronic lock-out

S5 sensor channel setting
- A None
- B Fiber optic sensor channel

Binary input threshold voltage
- A 24 V DC
- B 110 V DC
- C 220 V DC

AQ-101DLV Point sensor unit (DIN rail)

READ MORE

AQ-101DLV is a sophisticated microprocessor-based arc flash protection unit for arc light detection. It is designed to minimize the damage caused by an arcing fault (arc flash) by tripping the circuit breaker that sources the fault current. AQ-101DLV acts as a sub-unit to an AQ-110PLV unit in an AQ 100 arc protection system. It can also function as a standalone unit in light-only systems. The complete system self-supervision function of AQ-101DLV provides the highest level of dependability by continuously monitoring all internal system functions as well as external connections.

HIGHLIGHTS:
- Allows for easy DIN rail installation.
- Has 12 indication LEDs for fault analysis.

PROTECTION
- Light only
- Light and pressure
- Circuit breaker failure protection (50BF/52BF)
- Total trip time: 7 ms

APPLICABLE SENSORS
- AQ-01 light point sensor
- AQ-02 light and pressure point sensor
- AQ-06 plastic fiber sensor (9.8...131.2 ft)
- AQ-07 glass fiber sensor (9.8...164.0 ft)
- AQ-08 high-temperature glass fiber sensor (9.8...49.2 ft)

I/O

Trip relays (T1, T2, T3, T4)
- Number: 3 NO + 1 NC or 4 NO
- Rated voltage: 250 V AC/DC
- Continuous carry: 5 A
- Make-and-carry for 3 s: 16 A
- Make-and-carry for 0.5 s: 30 A

Binary output (BO1)
- Number of outputs: 1
- Rated voltage: +24 V DC

Binary inputs (BI1, BI2)
- Number of inputs: 2
- Threshold voltage: 24 V DC
- Rated voltage: 250 V

Power supply
- Auxiliary power supply: 92...265 V AC/DC
- Auxiliary power supply: 18...72 V DC (optional)

HMI
- 12 indication LEDs
- Multifunction push button (SET)
  - Autoconfiguration
  - Indication reset
  - System check

SELF-SUPERVISION
- Complete system self-supervision:
  - Internal functions (configurations and device health)
  - External connections (binary inputs and arc sensors)

ORDER CODE AQ-102LV- X X X A

Auxiliary power supply
- A 92...265 V AC/DC
- B 18...72 V DC

T3 trip relay setting
- A Normally open (NO)
- B Normally closed (NC) or electronic lock-out

Additional channel settings
- A None
- B AQD control
- C Low fiber input sensitivity (S1–S3) + AQD control

Binary input threshold voltage
- A 24 V DC

AQ-102LV Fiber sensor unit

READ MORE

AQ-102LV is a sophisticated microprocessor-based arc flash protection unit for arc light detection. It has connectors for up to three fiber sensors. AQ-102LV is designed to minimize the damage caused by an arcing fault (arc flash) by tripping the circuit breaker that sources the fault current. AQ-102LV acts as a sub-unit to an AQ-110xLV unit in an AQ 100 arc protection system. It can also function as a standalone unit in light-only systems. The complete system self-supervision function of AQ-102LV provides the highest level of dependability by continuously monitoring all internal system functions as well as external connections.

HIGHLIGHTS:
- Connects to a maximum of 3 fiber sensors.
- Has full self-supervision of all system components and interconnections.
- Adapts easily to any switchgear and trip scheme.

PROTECTION
- Light only
- Circuit breaker failure protection (50BF/52BF)
- Total trip time: 7 ms

APPLICABLE SENSORS
- AQ-06 plastic fiber sensor (9.8...131.2 ft)
- AQ-07 glass fiber sensor (9.8...164.0 ft)
- AQ-08 high-temperature glass fiber sensor (9.8...49.2 ft)

I/O

Trip relays (T1, T2, T3, T4)
- Number: 3 NO + 1 NC or 4 NO
- Rated voltage: 250 V AC/DC
- Continuous carry: 5 A
- Make-and-carry for 3 s: 16 A
- Make-and-carry for 0.5 s: 30 A

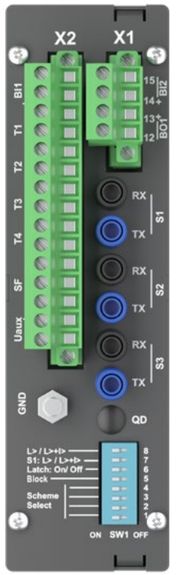
Binary output (BO1)
- Number of outputs: 1
- Rated voltage: +24 V DC

Binary inputs (BI1, BI2)
- Number of inputs: 2
- Threshold voltage: 24 V DC
- Rated voltage: 250 V

Power supply
- Auxiliary power supply: 92...265 V AC/DC
- Auxiliary power supply: 18...72 V DC (optional)

HMI
- 11 indication LEDs
- Multifunction push button (SET)
  - Autoconfiguration
  - Indication reset
  - System check

SELF-SUPERVISION
- Complete system self-supervision:
  - Internal functions (configurations and device health)
  - External connections (binary inputs and arc sensors)



AQ-102LV rear view

ORDER CODE AQ-1000- X A

Auxiliary power supply
Arc quenching device (690 V)
Reset tool

Auxiliary power supply
A 92...265 V AC/DC
B 18...72 V DC

Binary input threshold voltage
A 24 V DC

AQ-1000 Arc quenching device

READ MORE

The AQ-1000 arc quenching device extinguishes arcing faults in systems with a rated voltage of below 690 V. AQ-1000 operates in less than 4 ms from the detection of an arc flash to minimize the damaging effects caused by the arc fault's temperature and pressure. In most applications this will result in an energy release of less than 1.2 cal/cm². AQ-1000 can be re-activated, which allows for full system testing on-site.

The AQ-1000 arc quenching device is used in conjunction with an AQ 100 arc protection system. When an AQ 100 series unit detects a fault, it triggers the AQ-1000 arc quenching system and, at the same time, trips the circuit breaker(s) feeding the fault. Then AQ-1000 creates a three-phase, low-impedance parallel path for the fault current to flow through, thus extinguishing the arc fault.

HIGHLIGHTS:

- Mitigates the risk of injury during operations and maintenance.
- Minimizes damage to equipment.
- Is applicable to both new and retrofit installations.

TECHNICAL DATA

- Maximum rated voltage: 690 V (IEC 60947-9-1) / 508 V (UL 2748)
- Short-circuit withstand (IEC 60947-9-1/UL 2748): 100 kA for 200 ms, 50 kA for 1 s
- BIL: 12 kV
- Electric life: 2 operations at 100 kA, 200 ms each
- Mechanical life: 100 operations
- Operation time: less than 4 ms from the detection of an arc flash

PATENTED
US 9,318,294

Point sensors

READ MORE

Arcteq offers a variety of different arc sensor types to be used with different units and switchgear types, according to specific application requirements. The available point sensor types include a light-only point sensor as well as a point sensor that combines pressure and light detection. Additionally, Arcteq offers the AST-02 point sensor tester for field testing and commissioning purposes.

HIGHLIGHTS:

- Has a selectable light intensity threshold.
- Offers a unique combination of arc light and pressure.
- Allows for easy installation and full supervision.

AQ-01 – ARC LIGHT POINT SENSOR

- Three options for light intensity thresholds:
  - 8,000 lx
  - 25,000 lx
  - 50,000 lx
- Pick-up time: <1 ms
- Detection radius: 180 degrees
- Mechanical protection class: IP20
- A maximum of three sensors connected in series (except in AQ-103LV and AQ-103)
- Wiring arrangement: standard shielded twisted pair 0.75 mm² (AWG 19 or 20)
- Operating temperature: -20...+85 °C

AQ-02 – ARC LIGHT AND PRESSURE POINT SENSOR

- Light intensity threshold: 8,000 lx
- Pressure threshold: 0.2 bar above ambient pressure
- Pick-up time: <1 ms
- Detection radius: 180 degrees
- Mechanical protection class: IP20
- A maximum of three sensors connected in series (except in AQ-103LV and AQ-103)
- Wiring arrangement: standard shielded twisted pair 0.75 mm² (AWG 19 or 20)
- Operating temperature: -20...+85 °C

ORDER CODE AQ-0 1 X

Sensor function
1 Light point sensor

Light activation level
A 8,000 lx
B 25,000 lx
C 50,000 lx

ORDER CODE AQ-0 2 A

Sensor function
2 Light and pressure point sensor

Light activation level
A 8,000 lx

AST-02 POINT SENSOR TESTER

- Arc sensor tester
- Local and remote control
- Auxiliary power supply: 80...265 V AC/DC
- Pressure input: 0.03...0.15 MPa (0.3...1.5 bar, 5...20 psi)
- Light intensity selection: 8/25/50 klx
- Activation time setting: 50/120/170 ms

ORDER CODE AQ-AST- X

Arc sensor tester unit
02 Tester for current, light, and pressure systems

Fiber sensors

READ MORE

Fiber sensors make sure that each compartment in the switchgear has full light supervision. The fiber can be made of plastic or multithread glass fiber. Furthermore, the glass fiber can be specifically made to tolerate higher temperatures. All fiber sensors have a light intensity threshold of 8,000 lux.

HIGHLIGHTS:

- A detection radius of 360°.
- Glass fiber sensors have a bending radius of 1 cm. (0.39 in)
- The maximum fiber length is 50 meters (164 ft).

AQ-06 – ARC LIGHT FIBER SENSOR (PLASTIC)
- Material: plastic fiber
- Light intensity threshold: 8,000 lx
- Detection radius: 360 degrees
- Bending radius: 5 cm (1.97 in)
- Maximum fiber length: 40 m (131.2 ft)
- Operating temperature: -40...+85 °C

AQ-07 – ARC LIGHT FIBER SENSOR (GLASS)
- Material: covered glass fiber
- Light intensity threshold: 8,000 lx
- Detection radius: 360 degrees
- Bending radius: 1 cm (0.39 in)
- Maximum fiber length: 50 m (164.0 ft)
- Operating temperature: -40...+85 °C

AQ-08 – ARC LIGHT FIBER SENSOR (GLASS, HIGH TEMPERATURE)
- Material: covered glass fiber
- Light intensity threshold: 8,000 lx
- Detection radius: 360 degrees
- Bending radius: 1 cm (0.39 in)
- Maximum fiber length: 15 m (49.2 ft)
- Operating temperature: -40...+125 °C

ORDER CODE AQ- 0X-X-X-X

Sensor function
6 Plastic fiber optic sensor
7 Glass fiber optic sensor
8 Glass fiber optic sensor (high temperatures)

Cable length
(see the available options on the Arcteq website)

(AQ-07) End 1 covering length
9 None
1 1 meter (3.28 ft)
2 2 meters (6.56 ft)
(for other end covering lengths please consult Arcteq sales at sales@arcteq.com)

(AQ-07) End 2 covering length
0 None
1 1 meter (3.28 ft)
2 2 meters (6.56 ft)
(for other end covering lengths please consult Arcteq sales at sales@arcteq.com)

Raising frame

When using a raising frame for installing an AQ 100 series protection device to a cabinet door, it leaves additional room for other installation equipment in the space behind the door. We offer raising frames of 40 mm (1.57 in) to both AQ-110x devices (AX018) and AQ-101, AQ-101S, and AQ-102 devices (AX019).

40 mm (1.57 in) raising frame for AQ-110x products.

40 mm (1.57 in) raising frame for AQ-10x products.

Sensor mounting bracket

The sensor mounting bracket (AX033) can be mounted in the required position of the sensor. After that it is easy to snap in the sensor, facing either direction.

Front view

Back view

TYPE TESTS

DISTURBANCE TESTS	
Electomagnetic compatibility (EMC) test (EN 60255-26)	CE-tested and approved
Emission tests:	
Conducted (EN 55011 class A / CISPR22)	0.15...30 MHz
Emitted (EN 55011 class A / CISPR11)	30...1,000 MHz
Immunity tests:	
Static discharge (ESD) test (EN 60255-22-2 and EN 61000-4-2, severity class 4)	Air discharge: 15 kV Contact discharge: 8 kV
Fast transients (EFT) test (EN 61000-4-4, class III & EN 60255-22-4, level 4)	Power supply input: 4 kV, 5/50 ns Other inputs and outputs: 4 kV, 5/50 ns
Surge test (EN 61000-4-5, level 4 & EN 60255-22-5)	Between wires: 2 kV/ 1.2/50 µs Between wire and earth: 4 kV/ 1.2/50 µs
RF electromagnetic field test (EN 61000-4-3, class III)	f = 80...1,000 MHz, 10 V/m
Conducted RF field test (EN 61000-4-6, class III)	f = 150 kHz...80 MHz, 10 V

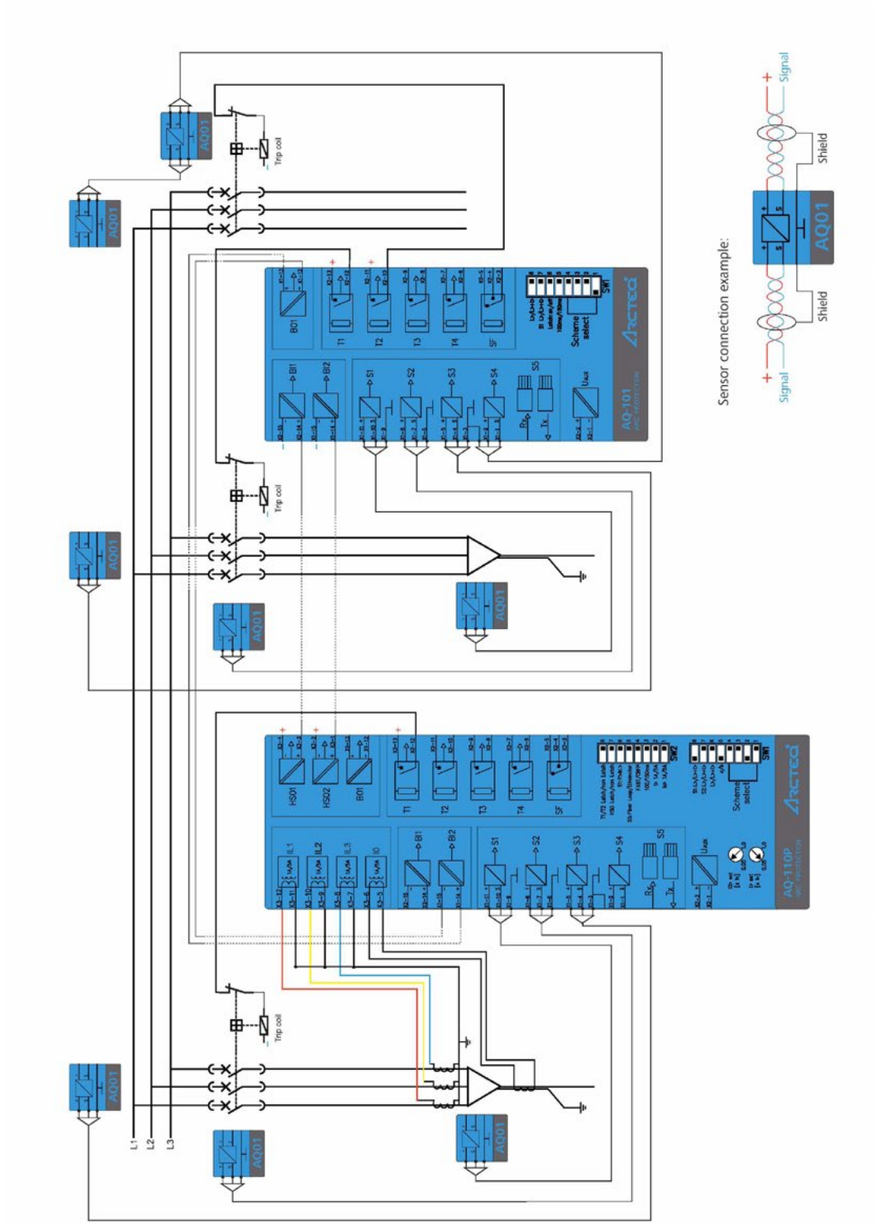
VOLTAGE TESTS	
Insulation test voltage (IEC 60255-5)	2 kV, 50 Hz, 1 min
Impulse test voltage (EN 60255-5)	5 kV, 1.2/50 µs, 0.5 J

MECHANICAL TESTS	
Vibration test (IEC 60255-21-1)	2...13.2 Hz (±3.5 mm) 13.2...100 Hz (±1.0 g)
Shock/bump test (IEC 60255-21-2)	20 g, 1,000 bumps/dir.

ENVIRONMENTAL CONDITIONS	
Specified ambient service temperature range	-35...+70°C
Transport and storage temp. range	-40...+70°C
Relative humidity	Up to 97%
Altitude	Up to 2,000 m above sea level

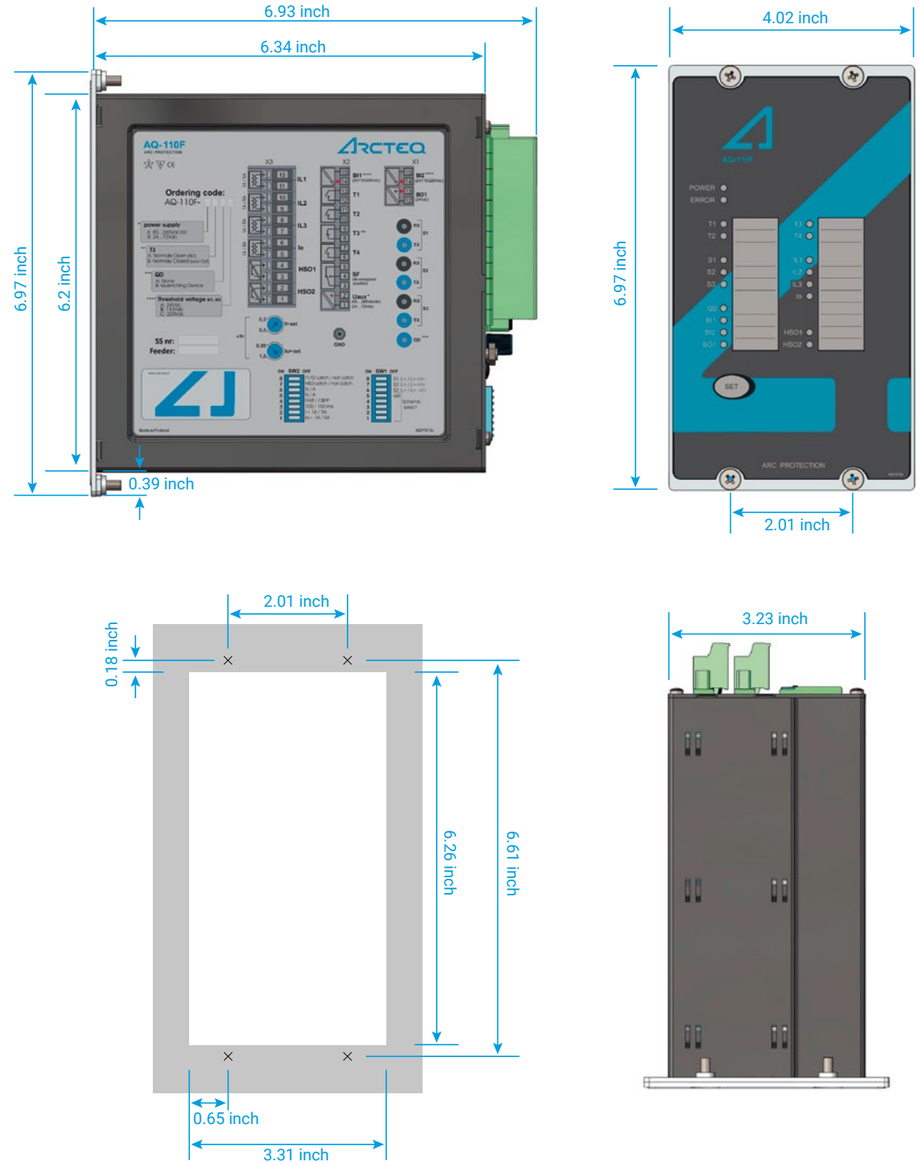
Certifications

Wiring diagram example



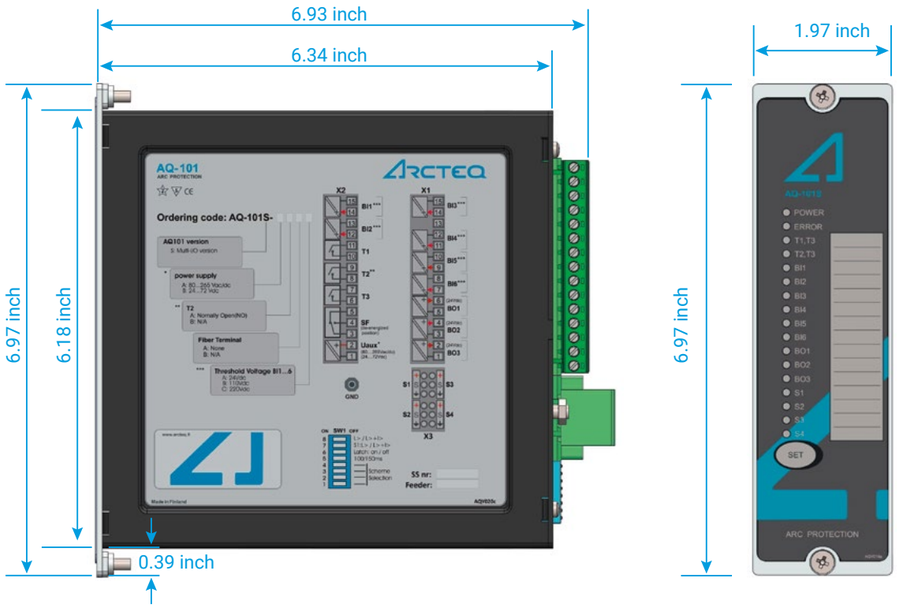
This typical AQ 100 series wiring diagram illustrates the wiring of an AQ-110x main unit and an AQ-101 sub-unit, with measurements of the three phase currents and the residual current.

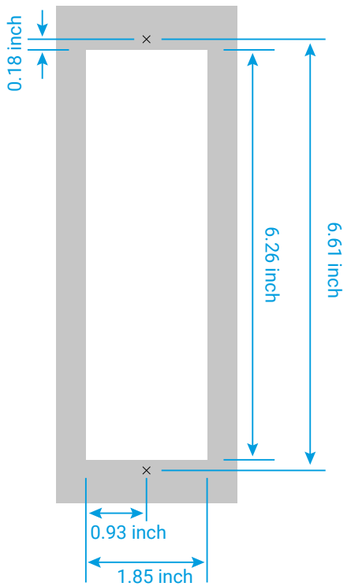
AQ-103 & AQ-110X



The dimensions of AQ-103 and AQ-110x units (both MV and LV variants): side view (top left), front view (top right), top view (bottom right); the panel cut-out and its dimensions (bottom left).

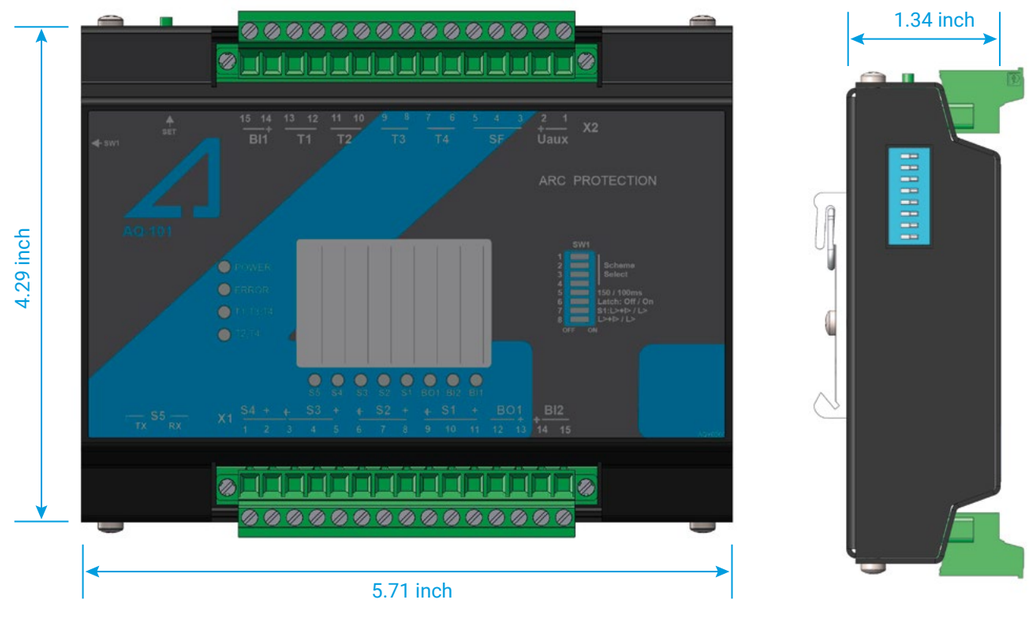
AQ-101, AQ-101S & AQ-102





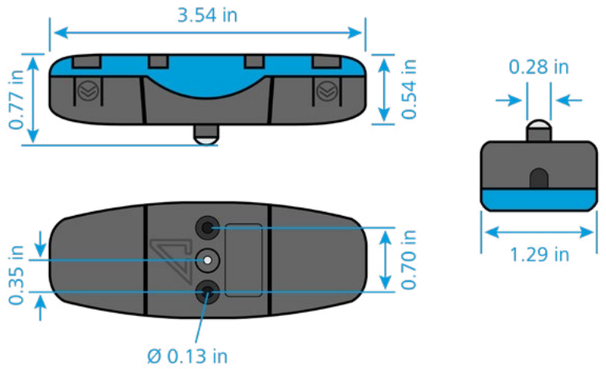
The dimensions of AQ-101, AQ-101S and AQ-102 units (both MV and LV variants): side view (top left), front view (top right), top view (bottom right); the panel cut-out and its dimensions (bottom left).

AQ-101D



The dimensions of AQ-101D (both MV and LV variants): front view (left), side view (right).

AQ-01 and AQ-02 point sensors



The dimensions of AQ-101D (both MV and LV variants): front view (left), side view (right).

AQ 100 series product catalog 2.10 EN (MM00006) October 2025

ARCTEQ
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