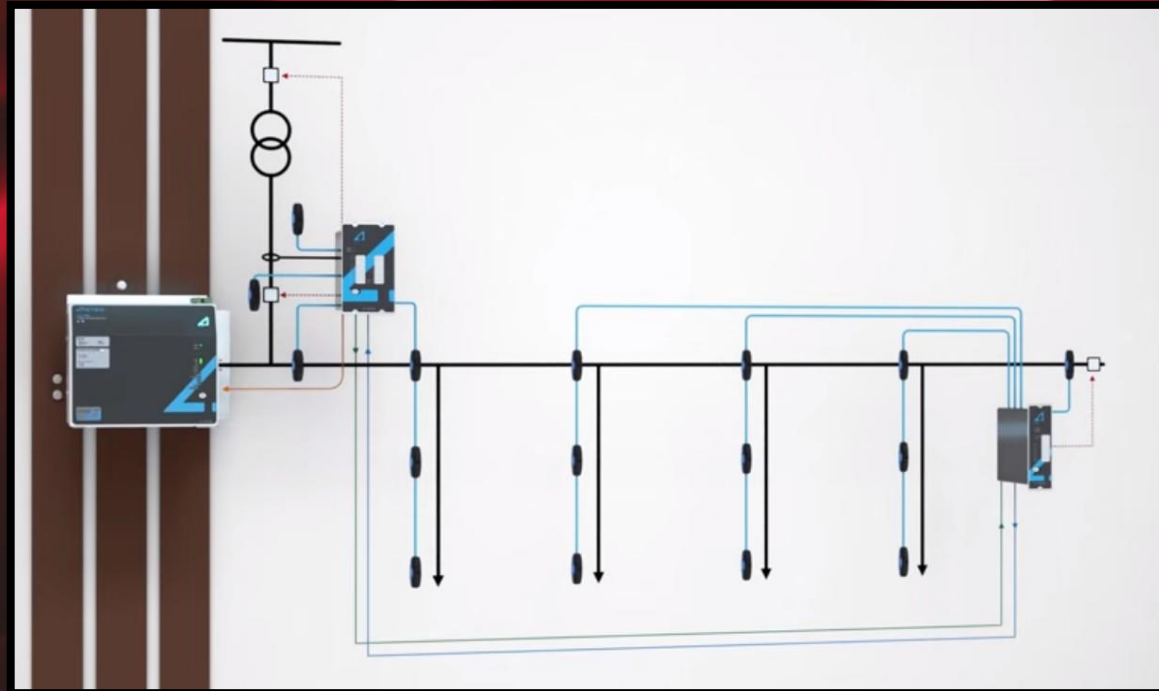


# Testing Procedure - Arc Quencher Systems



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# Tech4 Arc Flash Mitigation system

The system consists of two main sections:

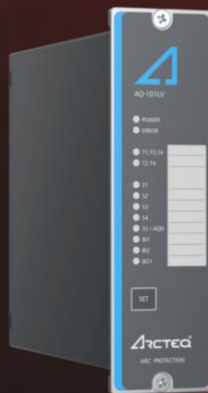
## 1. Arc Flash Detection

a) Arc Flash Protection Relay – AQ110 PLV

b) Arc Flash Light Detection – AQ-01C Point Light Sensor/AQ-07 Fiber Light Sensor in combination with AQ-101 Sensor Relays



AQ-110 PLV



AQ-101 LV

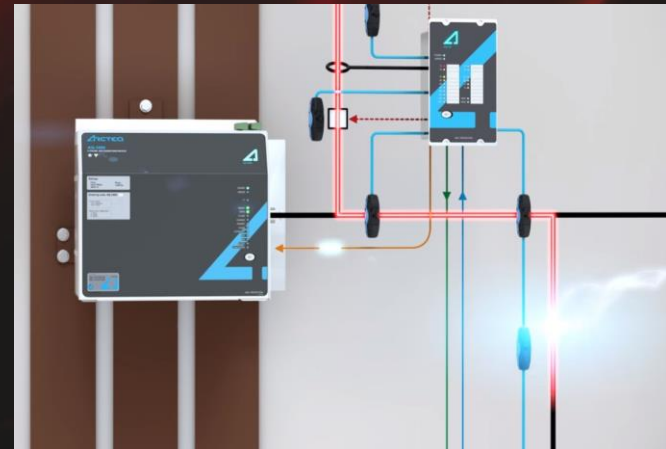


AQ-01 C PLS

# Tech4 Arc Flash Mitigation system

## 2. Arc Quenching System

### a) Arc Quencher Device – AQ1000 (UL2748)



# Arc Quenching Definition – NFPA 70E

NFPA 70E<sup>®</sup> – Annex O.2.3:

(4) Energy-reducing active arc flash mitigation system.

This system can reduce the arcing duration by creating a low impedance current path, located within a controlled compartment, to cause the arcing fault to transfer to the new current path, while the upstream breaker clears the circuit.

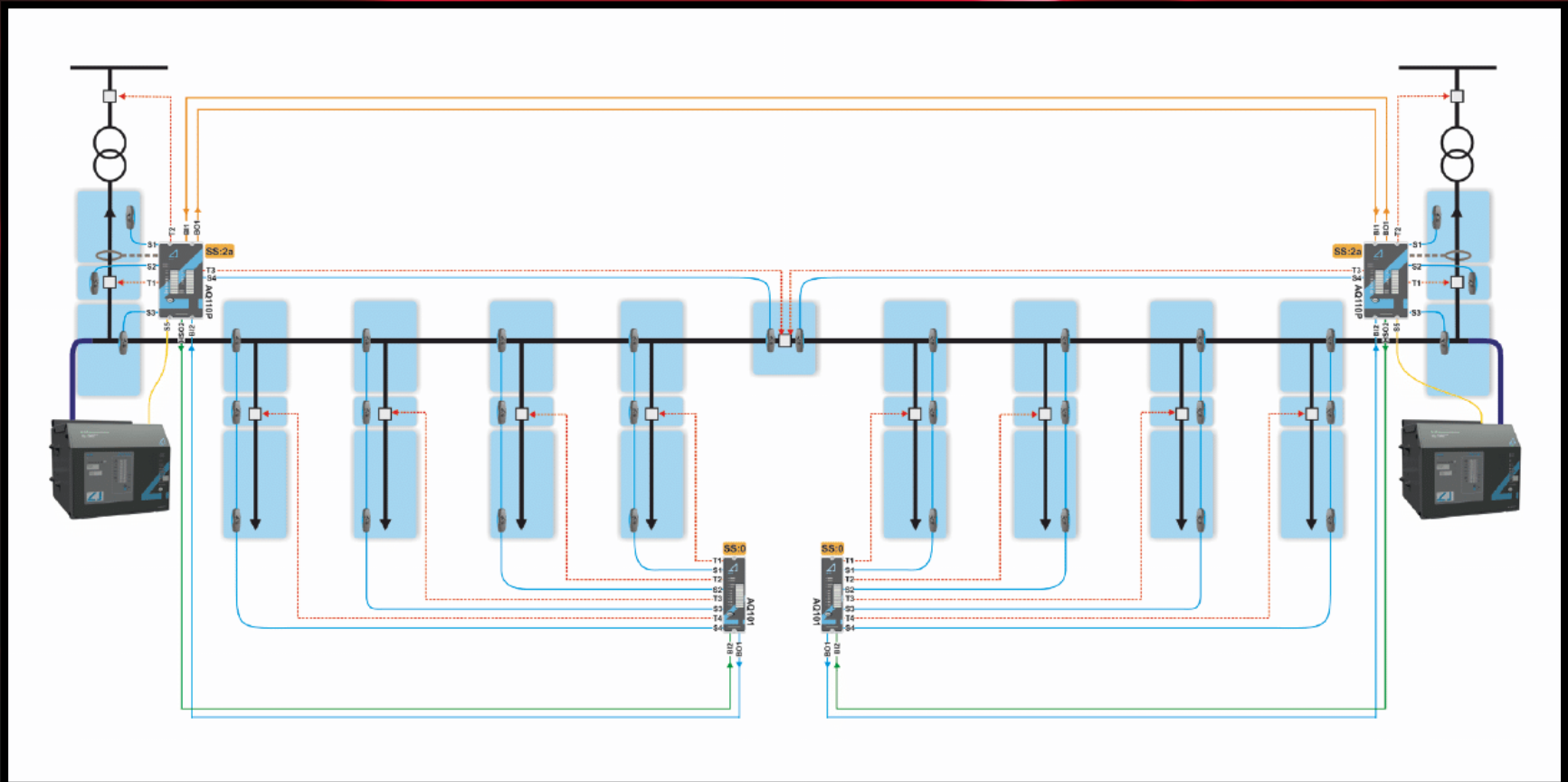
The system works without compromising existing selective coordination in the electrical distribution system.



# Tech4 Arc Quenching Device – AQ1000

- The **Arc Quencher™** is a patented Thompson coil-based system
- The **Arc Quencher™** is the only reusable device in the market:
  - 4 operations @ 65 kA for 500 ms (250 kA transient peak)
  - 2 operations @ 100 kA for 500 ms (250 kA transient peak)
- Mechanical cycle life of 100 operations
- LV Total system clearing time of <4 ms
- MV Total system clearing time of <6 ms

# Arc Quencher System – Single Line Application Drawing



# Testing Procedure – Arc Quencher System

- At Tech4, we perform FAT (factory) & SAT (on-site) for Arc Quencher Systems to ensure proper functioning and to verify the quenching time to be under 4ms.
- Just like a circuit breaker, the Arc Quencher™ system is an electromechanical life-safety device. As such, it must be periodically tested to assure a compliant clearing-time. (Recommended testing every 3 years with the Circuit Breakers)
- For testing an arc quencher system, we should simulate an arc flash event (high current and light simultaneously).
- A arc flash event can be simulated with the help of a universal relay set to inject high current and trigger a camera flash concurrently.

# Testing Procedure – Arc Quencher System

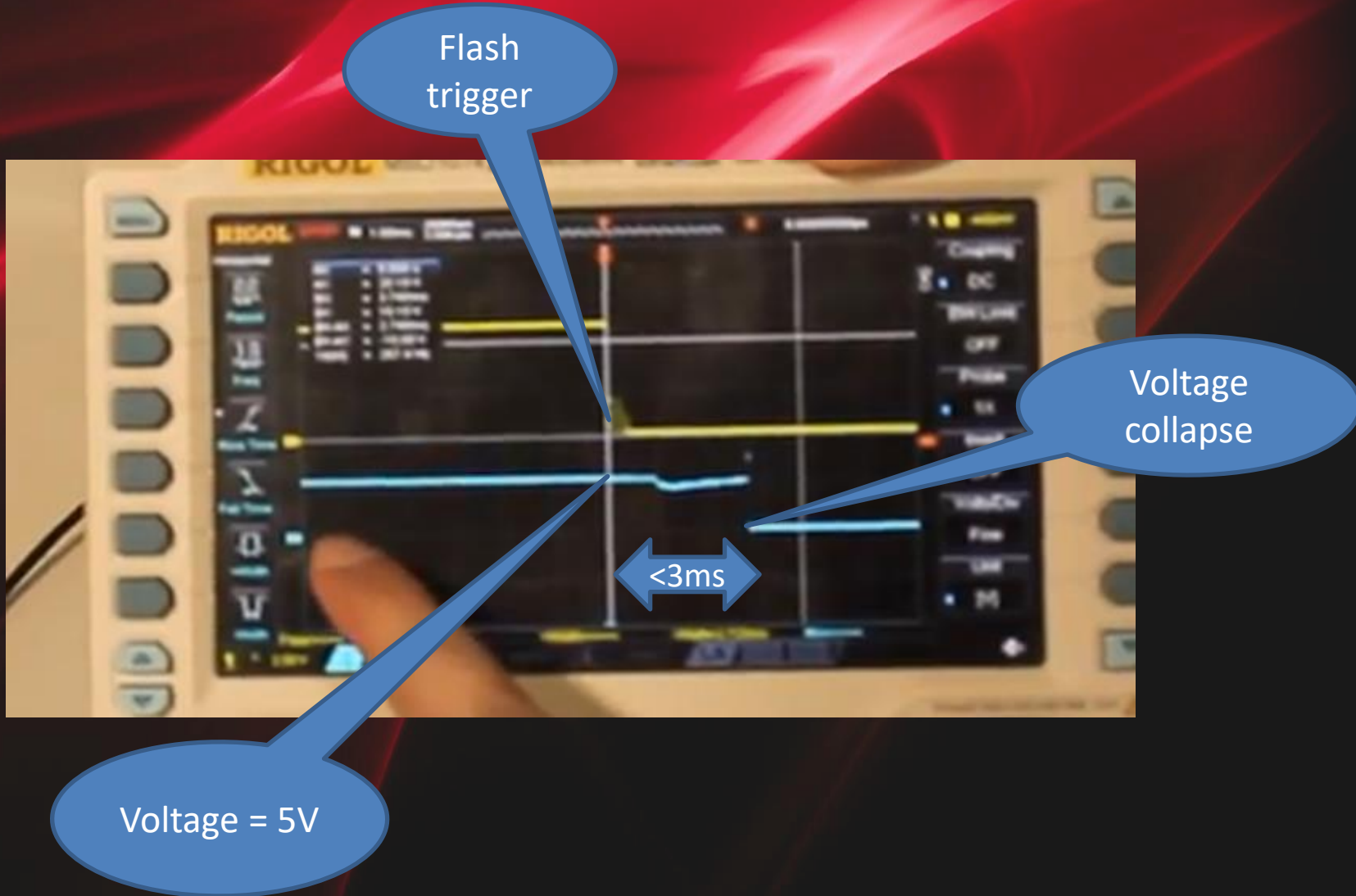
- By injecting current with a relay test set to the AQ-110PLV arc flash protection relay and triggering a camera flash simultaneously in the vicinity of a Point Light Sensor connected to the system, the AQ-110 relay sends a trip signal to the AQ-1000 arc quencher.
- The total reaction time from arc sensing to extinguishing the arc is less than 4ms. This time can be verified using an oscilloscope.
- When the AQ-1000 arc quencher receives a signal from the AQ-110 relay it creates a low impedance path for the fault current to flow by creating a 3 phase short circuit. By doing so, the voltage between phases collapses to zero which eliminates the arc completely.



# Testing Procedure – Arc Quencher System

- The method used to verify clearing time to be less than 4ms can be done with an oscilloscope. Voltage collapse can be seen by applying voltage across one of the phases. Using one of the oscilloscope probe to monitor the voltage and another oscilloscope probe to monitor flash trigger, we can measure the time of the quencher operation.
- When the quencher is quenched, the voltage collapse can be observed on the oscilloscope. The time is measured between the flash trigger to the voltage collapsing to zero. This way we can confirm and verify the arc quenching time is less than 4 ms for low voltage systems.

# Testing Procedure – Arc Quencher System





**Thank you!**

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