ArcBlok 2500

- Arc Flash Analysis - white paper (Dec '22)
- IEEE 1584 vs UL 2986 - white paper (Sept '22 - PCIC)
- ETAP recorded webinar (June 2023)
- Sept ’23 PCIC Low Voltage Arc Res vs Line Side Isolation

- eGuide - NEW Feb 2023

- Product Page
- Model 6 (LV MCC) Specification
- QED2 (SWBD) Specification

- YouTube (NFPA – NEW!)
- YouTube (Side-by-Side explosion)
- YouTube (Continuous Thermal Monitoring)
- YouTube (Digital Connectivity)

- Blog 1 – Benefits beyond the obvious
- Blog 2 – Reduce arc flash for cost-effectiveness
- Blog 3 – Reduce downtime, protect revenue stream
- Blog 4 – Safety revolution for contractors

- Arc Flash page with assets

Life Is On Schneider Electric

ArcBlok 2500 – line side arc flash protection

Game-changing innovation in MCCs and SWBDs – retrofill and productized

Presented by: Kyle Kocarek
Critical Applications

Arc Flash - Definition

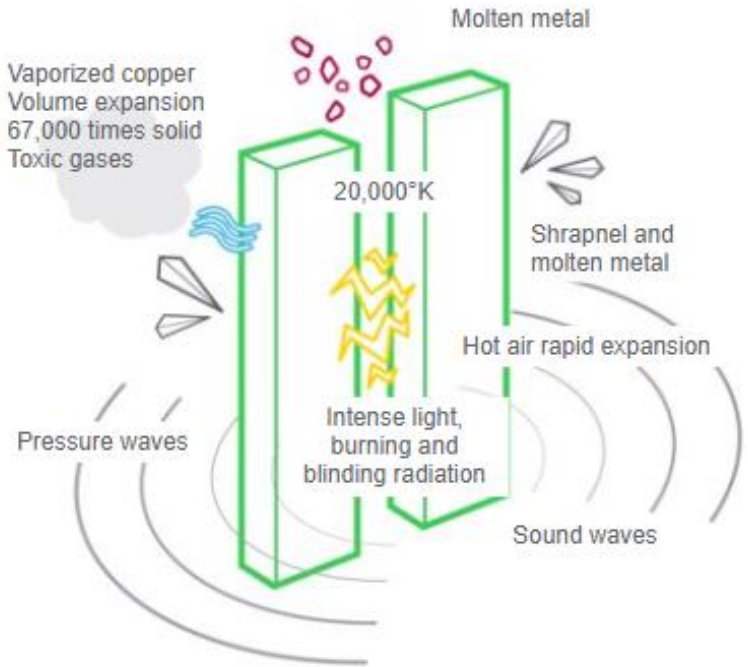
An arc flash is a phenomenon where a flashover of electric current, leaves its intended path and travels through the air, from one conductor to another, or to ground.

Arc Flash hazard is measured in terms of **Incident Energy level**.

Incident energy is a measure of the amount of energy available at a given distance from the arc during an arc flash event.

Incident energy measured in cal/cm²

Arc flash can occur *regardless of voltage*



Arc Flash Is a Real Risk

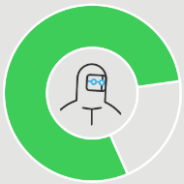
Customers are experiencing the pain today

Lives are at stake

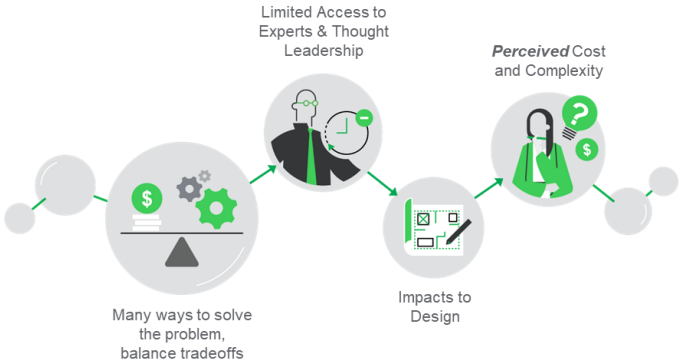
Disruptive to business operations

Costly expenses

80%
accidents come from human error[1]



5-10
incidents/day USA[2]



Arc flash solutions are perceived as **resource-intensive**

[1] *Human performance best practices in the electrical workplace: ESW2019-59*
[2] *Occupational Injuries From Electrical Shock and Arc Flash Events, NFPA 2015*

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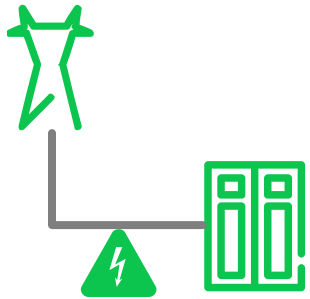
Why does line side arc flash isolation matter?

1

Addressing the Arc Flash hazard of the **incoming power** to the electrical equipment is a **top NFPA 70E pain point.**



2

Reducing arc flash hazards and **protecting workers** from higher incident energy levels.

3

Reduce down time from an Arc Flash event, **electrical equipment is not damaged** and can quickly be placed back into service.

Arc Flash Hazard Mitigation

Various agencies, codes and standards to provide guidance and / or mandates on arc flash hazard mitigation

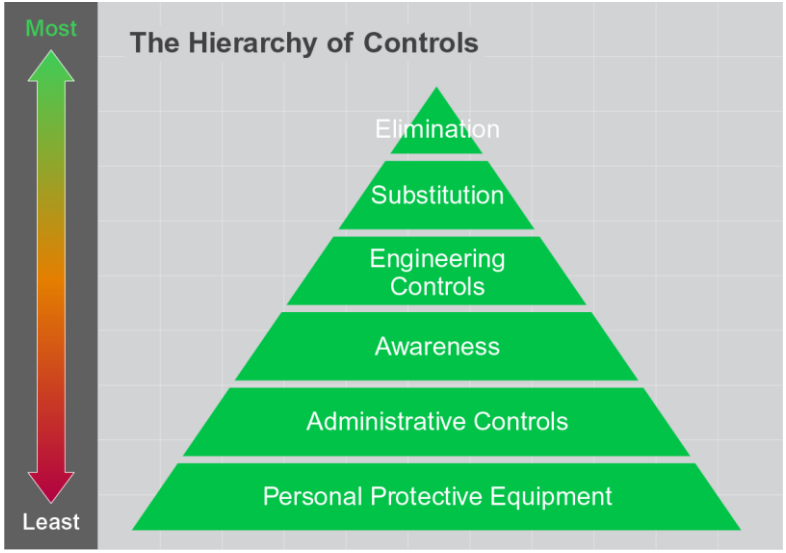
OSHA is the “shall”

- OSHA regulations are a federal law and shall be followed. It is written in performance-based language.

NFPA 70E is the “how”

- NFPA 70E is recognized as the tool that illustrates how an employer might accomplish the objectives defined by the OSHA performance-oriented language.

IEEE 1584 technical guide on how to calculate the arc energy levels



Arc flash mitigation is complex

- First line – overcurrent protection (breaker)
- Next – fault detection (breaker, fuse, relay,)
- Issues with Coordination? Maintenance Switch.
- Need faster tripping? Optical detection.
- Need to protect other stuff while we're at it? Bus or Transformer differential.
- Challenging Layout? Virtual Main configuration.
- Others…Arc Resistant construction, IEC 61850, etc.

- Optimization
- Differential Protection
- Maintenance Switch (ERMS, RELT, etc)
- Zone-selective Interlocking (ZSI)
- Virtual Mains
- Optical Detection (Schweitzer, VAMP, etc)
- Arc Resistant Switchgear

NFPA 70E Significant Changes

Line-side arc flash isolation – Annex O.2.3(5)

NEW

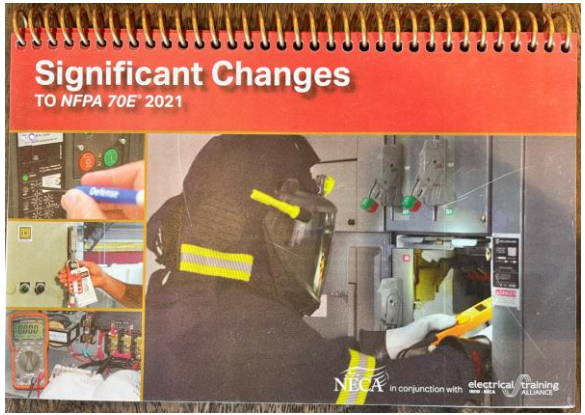
Informative Annex O

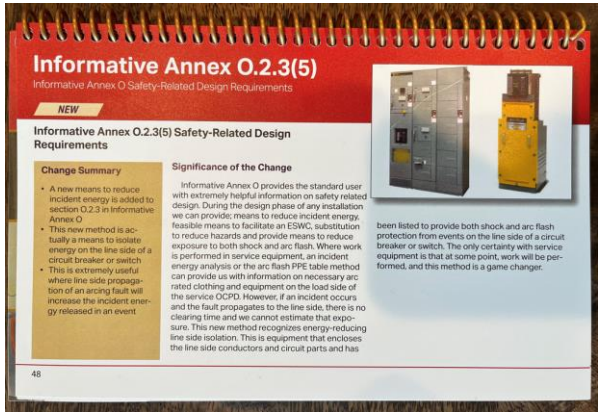
Informative Annex O.2.3(5) Safety-Related Design Requirements

Change Summary

- A new means to reduce incident energy is added to section O.2.3 in Informative Annex O.
- This new method is actually a means to isolate energy on the line side of a circuit breaker or switch.
- This is extremely useful where line side propagation of an arcing fault will increase the incident energy released in an event.

2022 NECA SAFETY PROFESSIONALS CONFERENCE





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Line side arc flash mitigation is <u>not</u>…

- Quenching
- Sensing
- A maintenance mode/switch
- Arc Resistant

ArcBlok implementation achieves incident energy reduction of 144 cal/cm² at national food processor.

The world's 2nd-largest processor and marketer of chicken, beef and pork, headquartered in Arkansas. They have >500 food processing plants, and employ > 100,00 people in the United States. It supplies Yum! Brands chains that use chicken, including KFC, Taco Bell, McDonald's, Burger King, Wendy's, Wal-Mart, Kroger & IGA.

Customer Challenge:

- Line Side of main breaker without ArcBlok is 146 cal/cm²
- Without ArcBlok solution they would need to implement an outdoor switchboard before the indoor lineup

Goal: Reduce AFIE to 8 cal/cm²

Services Solutions:

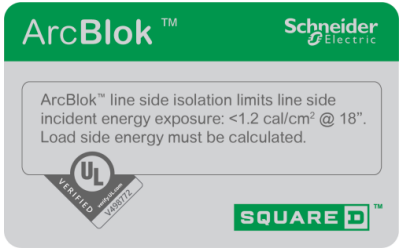
- ArcBlok 2500 in Model 6 & QED2
- **Consulting Studies:** Arc Flash, Short Circuit Coordination & Labels **($ 40k)**

Customer Benefits:

- Incident Energy of **Line Side** of main breaker reduced from 146 cal/cm² down to 1.2 cal/cm²
- Incident Energy of **Load Side** calculated at 1.9cal/cm² –
  - Per IEEE 1584, "an integral "main" overcurrent protective device may be considered in the calculation if it is adequately isolated from the bus to prevent escalation to a line-side fault."
- Major impact on electrical safety in the workplace environment
- Cost savings on future projects now that they can eliminate the need of using an outdoor switchboard (and instead use Service Rated SWBD w/Main Breaker + ArcBlok 2500)
- If room allows, retrofitting of existing MLO MCCs with a new section including main breaker and ArcBlok would further reduce incident energy levels

Enhanced Safety

- ArcBlok limits line side incident energy to <1.2 cal/cm² – UL verified
- ArcBlok protects personnel with minimal PPE requirements
- ArcBlok prevents load to line side arc flash propagation



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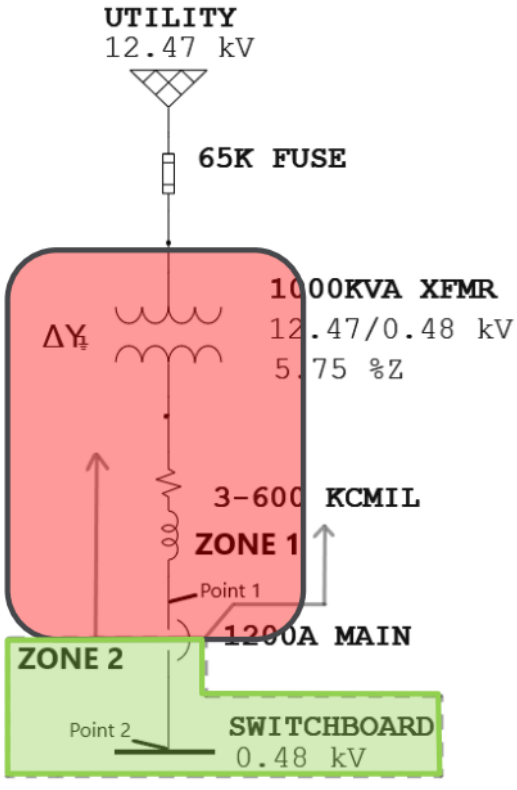
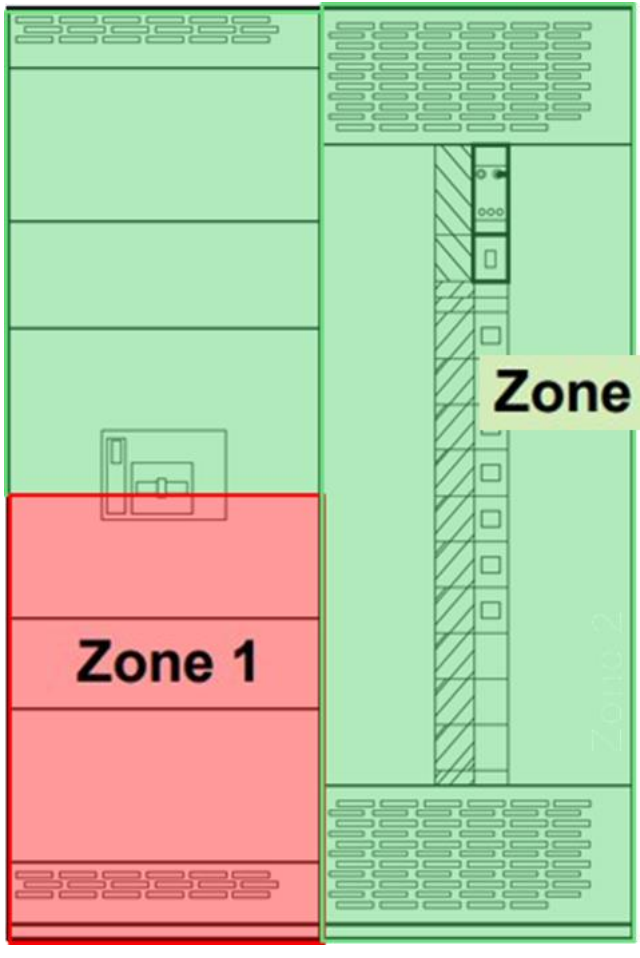
Low-Voltage Switchboard





Calculations with "typical" parameters per IEEE 1584-2018:

Zone 1 IE = 15.6 cal/cm²

Zone 2 IE = 1.6 cal/cm²

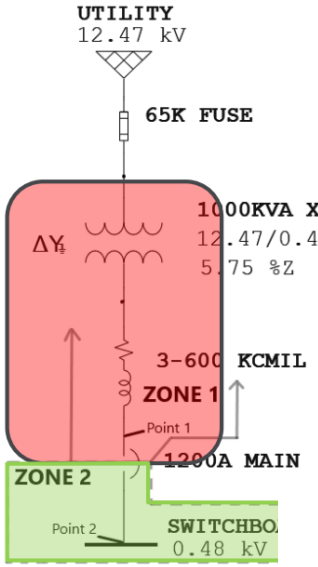
Per IEEE 1584 paragraph 6.10

"An integral "main" overcurrent protective device may be considered in the calculation if it is adequately isolated from the bus to prevent escalation to a line-side fault."

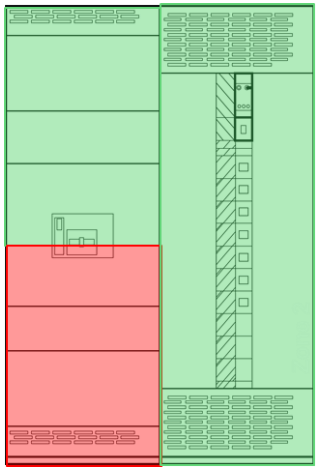
Service Entrance Case: Total Reduced IE

Per IEEE 1584 paragraph 6.10

"An integral "main" overcurrent protective device may be considered in the calculation if it is adequately isolated from the bus to prevent escalation to a line-side fault."



Calculations with "typical" parameters (per IEEE 1548-2018)	
Zone 1	Zone 2
IE = 15.6 cal/cm²	IE = 1.6 cal/cm²



Electrical Equipment Level

Arc Flash Information

Use this information in accordance with applicable OSHA standards, NFPA 70E and other required safe electrical work practices.

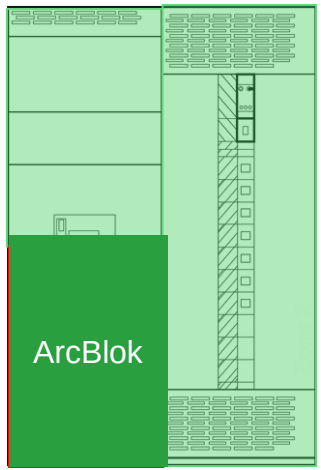
15.6 cal/cm² — Max Incident Energy at a Working Distance of 1 ft 6 in.
ft in. — Arc Flash Boundary

480V — Shock hazard when cover is open
3 ft 6 in. — Limited Approach
1 ft 0 in. — Restricted Approach

Eqpt Name: UPS-80kW
Job: 34926396 Date: 02/26/15

Values produced by a Schneider Electric engineering analysis. Any system modification, adjustment of protective device settings, or failure to properly maintain equipment will invalidate this label. For more information, contact Schneider Electric at 1-888-778-2733.

Calculations with "typical" parameters (per IEEE 1548-2018)	
Zone 1	Zone 2
IE = 1.2 cal/cm	IE = 1.6 cal/cm²



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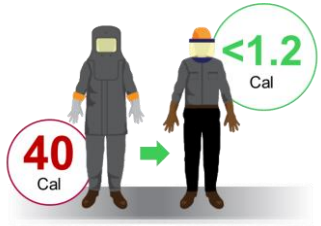
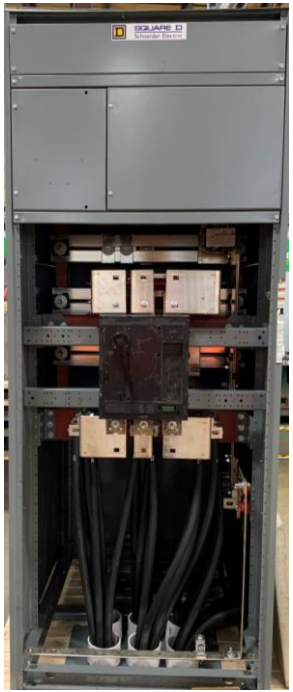
ArcBlok modernization

Modernize existing brownfield equipment – even 3rd party gear



Before (Legacy P-Frame QED2)



After (Retrofill R-Frame with ArcBlok 2500)

Enhanced Safety

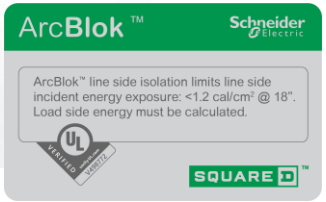
- Line side incident energy exposure < 1.2 $cal\ /cm^2$
- Minimal PPE Requirements
- No load to line side propagation

Maximized Uptime

- “NO trip” of the breaker
- Fast recovery for multiple arc fault events
- Continuous Thermal Monitoring and EcoStruxure™ compatibility

Always Protected

- Piece of mind during operation and maintenance
- NO special commissioning, testing, or operator intervention
- No damage to electrical equipment



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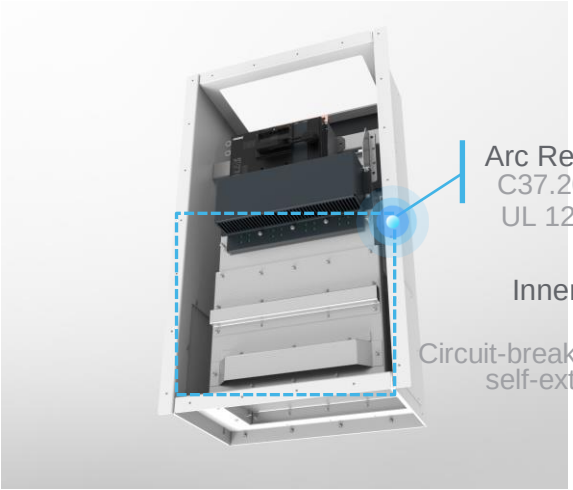
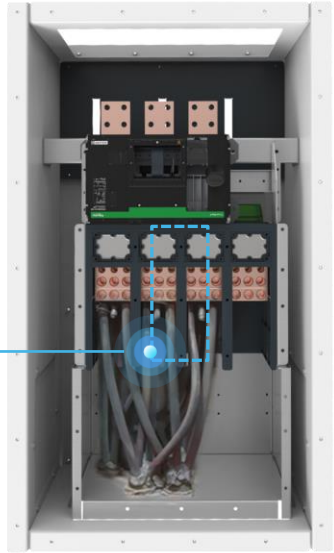
ArcBlok 2500 Design Principals



Arc Resistant shell
C37.20.7 principles
UL 1203 principles

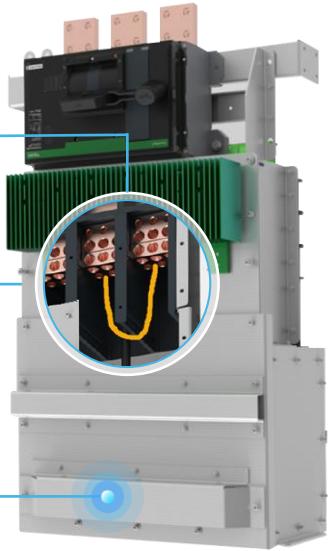
Inner Terminal Barriers
Circuit-breaker design, self-extinguishing



Stretch & cool the arc

Principle 1
Use circuit breaker techniques to interrupt arc

Principle 2
Contain energy and cool exhaust to below restrike temperature, <1.2 cal/cm^2

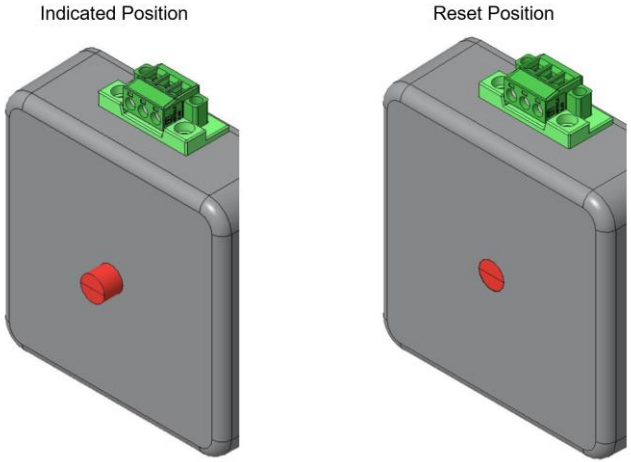


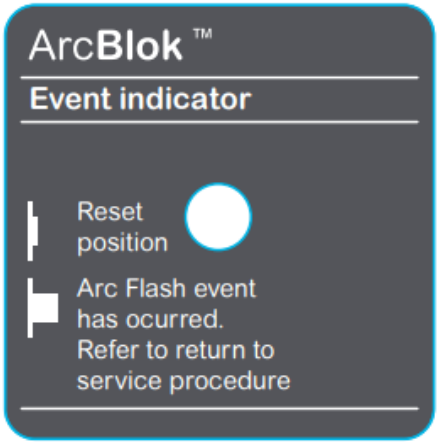
"Arc Resistant" Shell + Arc "Free" Module + Self-Clearing – Circuit Breaker Design

ArcBlok Design

R-Frame

- Event Detection
  - Plunger type indicator
  - Actuated by the pressure pulse
  - Microswitch contact output for remote indication





Event Indicator

ArcBlok Design

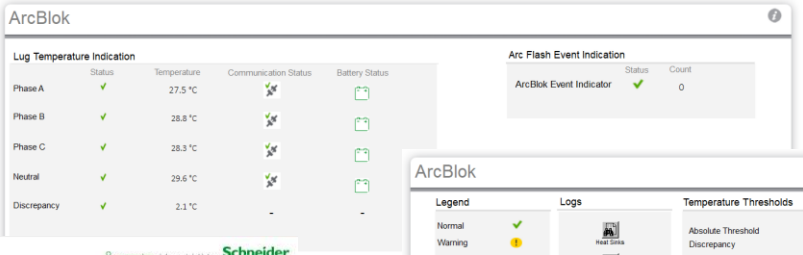
Connectivity and Digitization

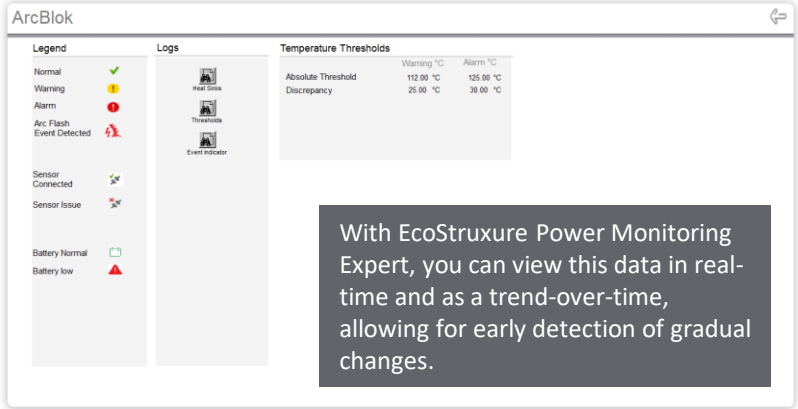
- Battery powered sensors (CL110s) clip in underneath each heat sink
- CL110 operates wireless via Zigbee and sends data through U-Pas to EcoStruxure network (or other SCADA system)
- Provides continuous temperature readings, trends, discrepancies phase-to-phase
- Eliminates need for IR scan

Thermal monitoring

Wireless thermal sensors located on the bottom of each ArcBlok heat sink continuously measure the temperature of the line-side lugs.

Phase temperatures and phase to phase temperature discrepancy are continuously compared to pre-alarm and alarm thresholds, notifying users of an abnormal temperature rise.





With EcoStruxure Power Monitoring Expert, you can view this data in real-time and as a trend-over-time, allowing for early detection of gradual changes.

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New white papers

ArcBlok 2500 – Available now QED2 & Model 6

1) PCIC Sept 2022

- Arc Flash Exposure Outside Enclosed Equipment: IEEE1584 calculations are for fully-opened lineup, whereas ArcBlok is fully sealed

2) Arc Flash Analysis – (ETAP, SKM, EasyPower) - Dec 2022

3) Sept ’23 PCIC Low Voltage Arc Res vs Line Side Isolation

- Construction Comparison of LV Arc Resistant Equipment Vs LV Equipment with Energy-Reducing Line Side Isolation

4) **ETAP recorded webinar (June 2023)**

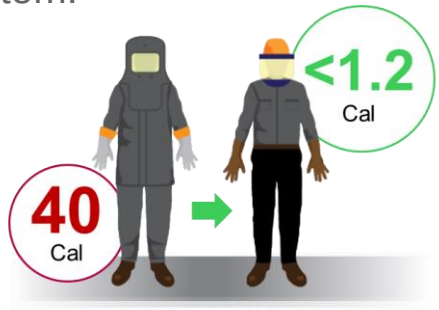
ArcBlok™ 2500

LINE SIDE PROTECTION – GREENFIELD OR RETROFIL BROWNFIELD

ArcBlok provides enhanced safety for people and equipment by **reducing the likelihood** of an arc flash event and **limiting the incident energy** exposure for your electrical system.

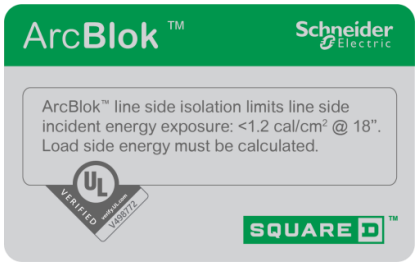
Enhanced Safety

- Line side incident energy exposure < 1.2 $cal\ /cm^2$
- Minimal PPE Requirements
- No load to line side propagation



Maximized Uptime

- "NO trip" of the breaker
- Fast recovery for multiple arc fault events
- Continuous Thermal Monitoring and EcoStruxure™ compatibility



Always Protected

- Piece of mind during operation and maintenance
- NO special commissioning, testing, or operator intervention
- No damage to electrical equipment

Line side arc flash mitigation is not…

- Quenching
- Sensing
- A maintenance mode/switch
- Arc Resistant

ArcBlok 2500 available now

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- IEEE 1584 vs UL 2986 - white paper (Sept '22 - PCIC)
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Sept ’23 PCIC Low Voltage Arc Res vs Line Side Isolation

- eGuide - NEW Feb 2023

Product Page

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- QED2 (SWBD) Specification

YouTube (NFPA – NEW!)

- YouTube (Side-by-Side explosion)
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- YouTube (Digital Connectivity)

- Blog 1 – Benefits beyond the obvious
- Blog 2 – Reduce arc flash for cost-effectiveness
- Blog 3 – Reduce downtime, protect revenue stream
- Blog 4 – Safety revolution for contractors

- Arc Flash page with assets

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Additional resources

Arc flash mitigation part 1 introduction and containment

Guides & Brochures

- ★ **Arc Flash Mitigation Guide: Know and Weigh Your Options: Five Key Questions in Developing an Arc Flash Mitigation Strategy (available from our Electrical Safety portal page)**
- Arc Flash Protection & Safety webpage
- Switchgear Virtual Main Arc Flash Mitigation System Brochure
- ArcBlok Brochure

White Papers

- Knowledge Makes All the Difference in Arc Flash Mitigation
- Mitigating Arc Flash Hazards

Data Bulletin

- Arc Flash Mitigation Application Guide
- Arc Flash Reduction Systems - Are They Always a Good Idea?
- Comparison of Circuit Breakers and Fuses for LV Applications

Blogs

- NEC Section 240.87 – Acceptable Methods for Arc Energy Reduction
- Arc Flash Protection Advances Improve Electrical Design for Safety
- Arc Flash Mitigation: Removing Workers From Harm's Way
- Reduce Risk with Arc Flash Mitigation Strategies
- How a "Safety by Design" Approach Lowers Arc Flash Risks

Blogs (continued)

- Protecting Against Arc Flash
- GAME CHANGING TECH! – Arc Flash Energy Reduction for Safety and Resiliency
- Meeting the Spirit – And Not Just the Letter – of Arc Flash Energy Reduction Requirements

Training

- Arc Flash Training on Engineering portal

Videos and Animation

- ArcBlok Animation
- ArcBlok vs Traditional MCC - Arc Flash Testing Side-by-Side Event

Construction Specification (Guide Specs)

- Engineering Portal Specification Library

Related Offers

- Electrical Distribution Modernization
- Protection Relays
- MV Switchgear
- Power-Zone 4 Arc Resistant
- Model 6 AR MCC
- MCC ArcBlok
- MCC Closed Door Racking
- EcoStruxure Asset Advisor

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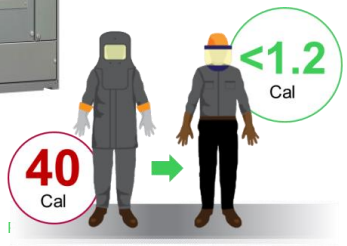
ArcBlok 2500 – *line side arc flash mitigation; 1.2 cal/cm² line side*

Available now QED2 & Model 6

ArcBlok 1200

ArcBlok 1200

- MCC productized only
- P Frame PowerPacT
  - 1200A
- Thermal monitoring
- Not available for brownfield retrofill



ArcBlok 2500

ArcBlok 2500

ArcBlok™ Schneider Electric

ArcBlok™ line side isolation limits line side incident energy exposure: <1.2 cal/cm² @ 18". Load side energy must be calculated.

UL VERIFIED V455172

SQUARE D™

ArcBlok 2500

- MCC Model 6 & SWBD QED2
- **Greenfield or Brownfield (Services retrofill)**
- **R Frame PowerPacT 2500A**
- Digital, connected thermal monitoring
- Event detection indicator

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How ArcBlok operates

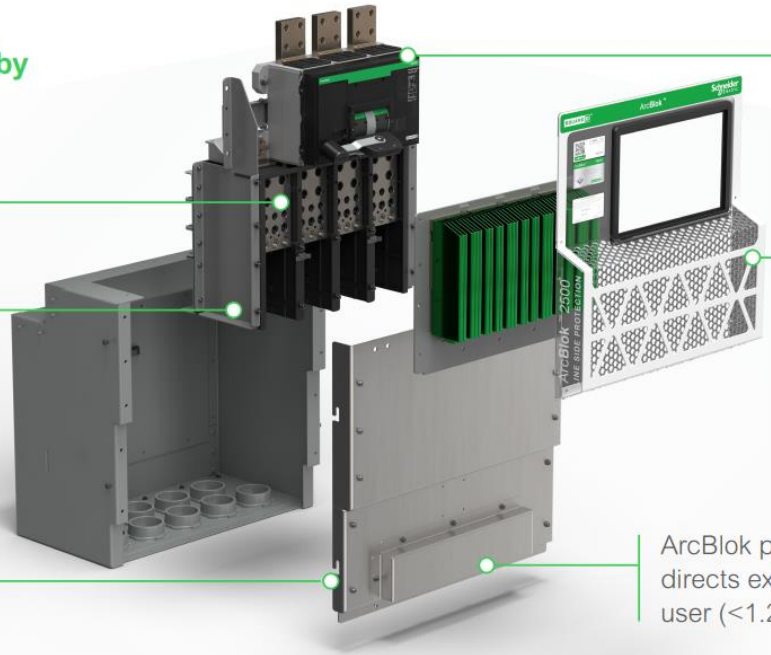
A passive system – no detection – no moving parts – clears every arc

Design is influenced by several principles

Arc free module (IEC 61641)

Explosion proof enclosures (UL 1203)
Overlap joints

Arc resistant shell (C37.20.7)



Circuit breaker design
Self-extinguishing features

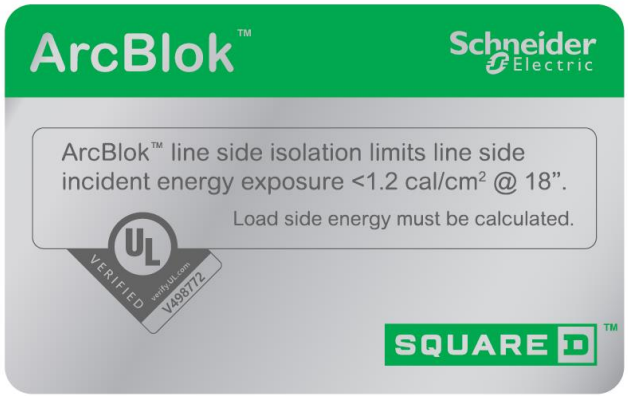
ArcBlok controls where the arc can exist and interrupts the arc using circuit breaker techniques

ArcBlok contains the arc flash energy and cools leakage to below restrike temperature

ArcBlok purposefully directs exhaust away from user (<1.2 cal/cm²)

How is ArcBlok incident energy exposure calculated?

- *While most people know IEEE 1584, there's another method to measure the incident energy, UL 2986*
- IEEE 1584 calculates assuming the worker is directly exposed to the arc; but ArcBlok is a fully sealed system so this measurement method does not apply
- UL 2986 is UL's method for measuring incident energy exposure using a calorimeter
- ArcBlok is verified per UL 2986 to reduce your line side IE down to < 1.2 cal/cm^2 at 18 inches when ArcBlok is fully assembled



- UL RP2986 (Incident energy level verification by UL)
- Allows us to apply the UL verified label to the product.
- Calorimeter measurement of the incident energy
- Ignition wire to initiate the arc

ArcBlok – Arc Flash Label Placement

Two different arc flash label markings

Arc Flash Information

Use this information in accordance with applicable OSHA standards, NFPA 70E and other required safe electrical work practices.

1.6 cal/cm² — Max Incident Energy at a Working Distance of 1 ft 6 in.

1 ft 6 in. — Arc Flash Boundary

480V — Shock hazard when cover is open

3 ft 6 in. — Limited Approach

1 ft 0 in. — Restricted Approach

Eqpt Name: UPS-80kW

Job: 34926396 Date: 02/26/15

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Any system modification, adjustment of protective device settings,
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Load Side Energy of Main

Arc Flash Information

Use this information in accordance with applicable OSHA standards, NFPA 70E and other required safe electrical work practices.

15.6 cal/cm² — Max Incident Energy at a Working Distance of 1 ft 6 in.

10 ft 6 in. — Arc Flash Boundary

480V — Shock hazard when cover is open

3 ft 6 in. — Limited Approach

1 ft 0 in. — Restricted Approach

Eqpt Name: UPS-80kW

Job: 34926396 Date: 02/26/15

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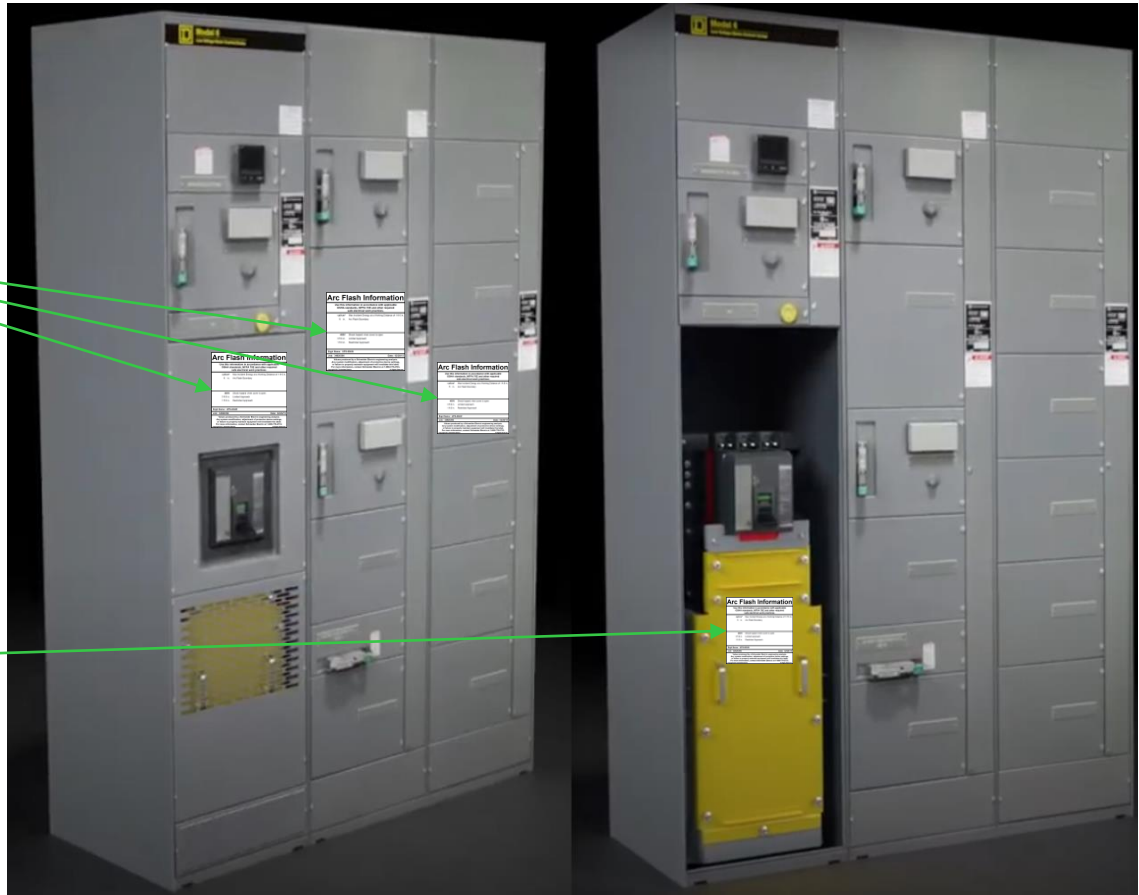
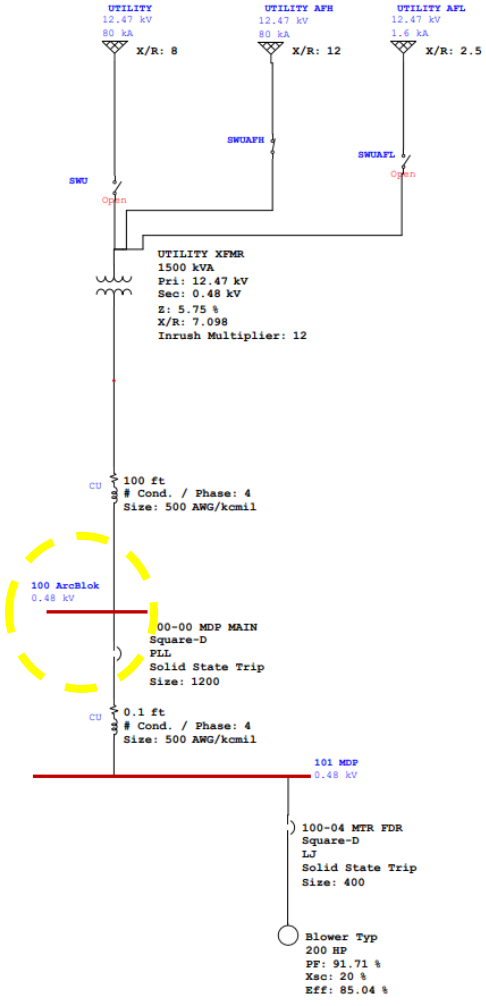
For more information, contact Schneider Electric at 1-888-778-2733.

Line Side Energy of Main





Schneider Electric

POWER SYSTEM ENGINEERING

1601 MERCER ROAD
LEXINGTON, KY 40511

NOTES:

ALL LOW-VOLTAGE CABLES WERE CONSIDERED TO BE TYPE RHH, SINGLE CONDUCTOR COPPER, RUN IN STEEL CONDUIT, UNLESS OTHERWISE NOTED.

ALL DEVICES WERE CONSIDERED TO BE THREE-POLE UNLESS NOTED OTHERWISE.

* - DENOTES THE VALUE WAS ASSUMED

KVAm - CONNECTED MOTOR KVA USED FOR FAULT CALCULATIONS.

AF - AMPERE FRAME RATING

AS - AMPERE SENSOR RATING

AP - AMPERE PLUG RATING

AT - AMPERE TRIP RATING

L - LONG TIME FUNCTION

S - SHORT TIME FUNCTION

I - INSTANTANEOUS FUNCTION

G - GROUND FUNCTION

REVISIONS

REV	DATE	DESCRIPTION	DRAWN BY
8			
7			
6			
5			
4			
3			
2			
1	3/15/23	Initial	Gavin M

Power System Study

DRAWN BY:	Gavin M
DATE:	3/15/23
SCALE:	NTS

PROJECT NO.

ArcBlok comparison to an adjacent switchboard

Adjacent switchboard

- Isolates MCC from line side arc flash energy
- Requires additional space for switchboard
- Requires additional labor for installation and cable connect
- Does not reduce risk of arc flash during normal and maintenance operations
- Thermal monitoring is an optional adder

ArcBlok

- Isolates MCC bus from line side arc flash energy
- Integral to the MCC; no additional switchboard equipment or added installation complexity
- Reduces likelihood of event and contains line side arc faults, eliminating risk to personnel
- Wireless thermal monitoring of lugs is standard and continuous

1.4.2 Arc Flash

Equipment was analyzed to determine the level of arc flash incident energy to which a worker might be exposed during an arc flash event. The graph below shows the number of pieces of equipment for each IE level denoted in the key. It is not recommended to perform work on energized equipment.

The customer's goal for the arc flash study is to reduce AFIE to 8 cal/cm² or less at the load side of MCC MDP.

Regardless of which IE calorie breakpoint levels are favored, or which NFPA 70E PPE selection table is used in this facility, a common approach is to use a clothing system with protection at 8 cal/cm² and 40 cal/cm². This method simplifies what workers must select/wear as well as what companies must issue to their employees and most importantly, will comply with NFPA 70E.

The requirements of NEC 240.87, to demonstrate that the method chosen to reduce clearing time is set to operate at a value below the available arcing current, are satisfied per the following method listed in 240.87(B). Refer to the AF Hazard Analysis Results section regarding arc propagation or restrike in certain low-voltage equipment. This system employs the following methods:

1. Energy-reducing maintenance switching with local status indicator
2. Energy-reducing active arc flash mitigation system (ArcBlok)

The maintenance mode switch(s) for this project provides a manual means to potentially lower AFIE when it is turned ON that should be incorporated into a facility's Electrical Safe Work Practices (ESWP), which includes Lock Out / Tag Out, per NFPA 70E. These switches can be used with indicator lights at the desired equipment location which is often remotely located downstream of the actual maintenance switch(s). Refer to the Instruction Bulletins for AMS (80298-171-01) and ERMS (NHA67346) for more information on the safety, application, and use of maintenance switches. For remote switch options, additional hazard labels are included with the instruction bulletin.

The MCC Model 6 ArcBlok "line isolation module", or "isolation cable vault", is an enclosed barrier around the main breaker and line-side cable connections that contains internal barriers intended to reduce the chances that arcing faults occur on the line side conductors and helps to extinguish them quickly should an arc ignite. With all covers/barriers in place, the isolation module is UL Verified to emphasize the ArcBlok benefits (dramatic AFIE reductions). The clearing time for internal faults will be less than one cycle with all covers in place (again, per UL Verification). The highest incident energy exposure will occur when the ArcBlok cover/barrier is removed and shall be calculated based on the line side of the main circuit breaker. For normal operation, when the ArcBlok assembly is complete and the yellow cover is in place, line side

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Power System Engineering

incident energy exposure is limited to 1.2 cal/cm2 (maximum) at 18" working distance. Load side energy may be higher or lower based on the load sideof the main circuit breaker clearing time.

Four Arc Flash study cases were considered as detailed in section 4.3 (utility high/low, with and without ERMS), all with assumed utility fault currents. Negligible differences occur in the four cases, as the arcing current is in the instantaneous region of 100-00 MDP MAIN in all cases. The cases result in a load side Incident Energy of 1.26 cal/ cm² to 1.9 cal/ cm². ERMS has little impact on the load side Arc Flash rating at Bus 101, as the arcing current is solidly within the instantaneous region in either case – ERMS ON or OFF.

The line side rating of the MCC is 146 cal/cm², however, the ArcBlok device reduces the rating to a value of 1.2 cal/cm². Should the ArcBlok barriers be removed, the line side rating would revert to 146 cal/cm².

The low (1.9cal/cm²) secondary side Incident Energy values present in this system rely on an adequate amount of fault current being available in the system, such that arcing current is within the instantaneous region of 100-00 MDP Main. Should utility values be lower than expected or cable size and length be significantly different than this model, re-evaluation should be considered.

Common Q&A *(cont.)*

Q **Where is fault place inside ArcBlok?**

A Seed wire connect 3 line side terminals together

Q **Are the line side cables okay for use after an event?**

A Yes. Light surface pollution present.

(Note: foreign objects can sometimes break insulation on cables, ie ignition wire)

Q **Can ArcBlok be used on main lug?**

A Today, No. Identified as a need on roadmap.

ArcBlok 2500 – Post 5 interruptions Surface pollution on conductors

ArcBlok 1200 and 2500 Line Side Protection

ArcBlok is a line side arc isolation and prevention technology for low voltage motor control centers and switchboards.

It's an innovative technology that protects people and equipment from the effects of arc flash incidents.

ArcBlok reduces line side incident energy (IE) to less than 1.2 cal/cm^2 at 18 inches, verified per UL 2986.

ArcBlok 1200

ArcBlok 2500

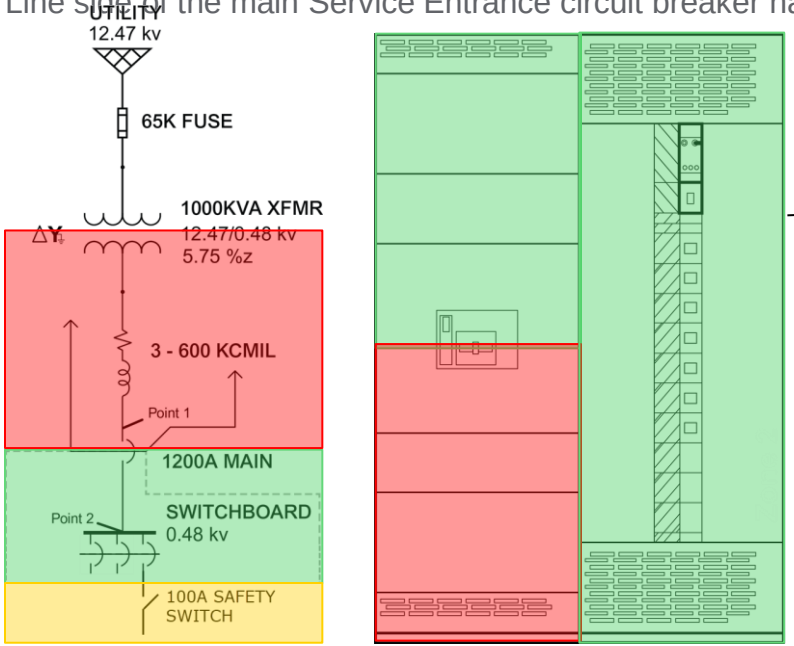
Customer Use Case: Facts

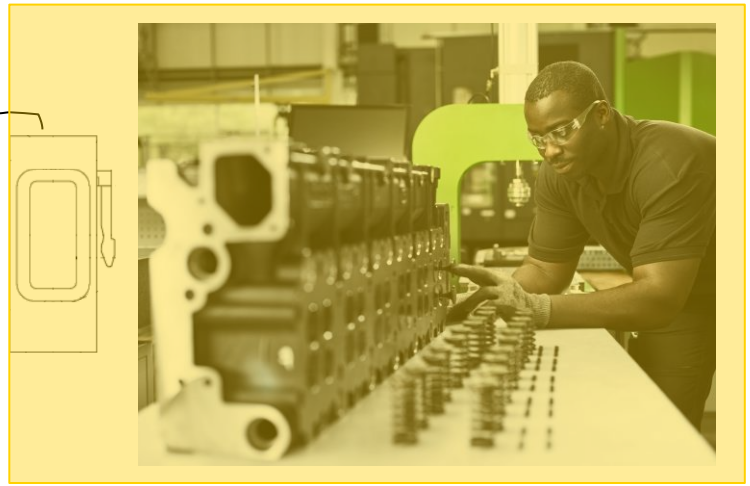
~70% of Schneider Electric customers are direct fed from the utility

ex. MCC at pump station fed from utility pole, switchboard fed by transformer with primary fuses

Do not own the transformer or any medium voltage protection devices (fused switches or circuit breakers) ➔ Zone 1 energy out of End Users Control

Line side of the main Service Entrance circuit breaker has high incident energy risk: Sites +300 cal/cm^2





Zone 1
“Line Side”

Zone 2
“Feeder”

Zone 3
“Branch”

Principles of ArcBlok technology

Passive – Always protecting

Summary: Passive, always on

- Passive system – no detection, no moving parts, clears every arc every time
- Always protecting – no boot time
- Arc Resistant like shell – similar to C37.20.7 Arc Resistant Gear
- Uses circuit breaker design principals – self-extinguishing features
- Uses overlapped joints similar to those used in explosion-proof enclosures (UL 1203)
- Contains the arc flash energy and cools vented gases to below restrike temperature
- ArcBlok purposefully directs exhaust away from user. The arc is contained inside the cable vault (more in IEEE 1584 later)
- < 16.6 ms clearing time (less than 1 cycle)
- UL 2986 verified incident energy < 1.2 cal/cm^2 at 18 inches on the line side
- No nuisance tripping; good for multiple events – no re-arming

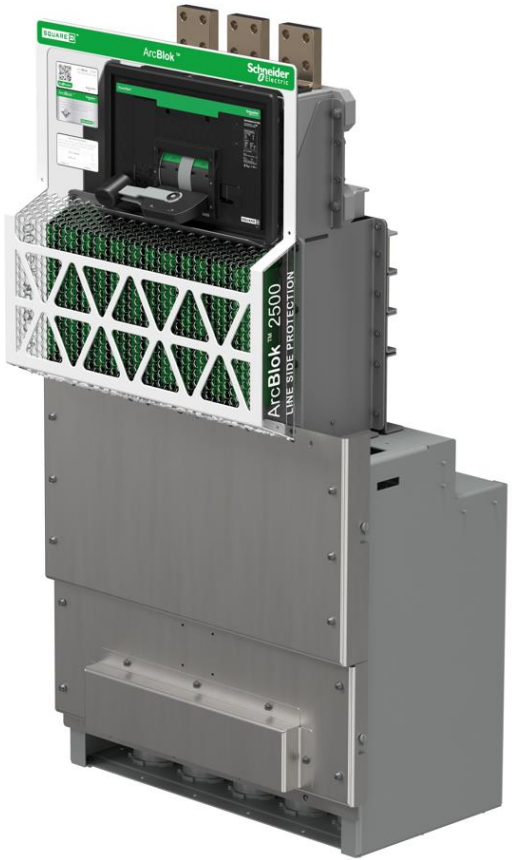
ArcBlok 2500 offer specs

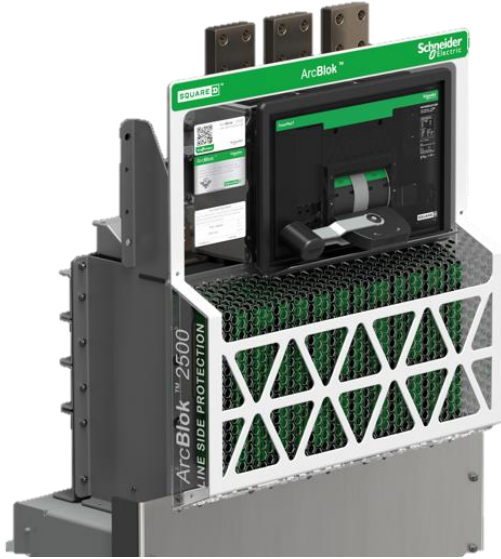
Applications	Single Main, Multiple Source
Incoming Type	Cable fed (Aluminum Mechanical lugs only) --- bottom incoming
Utility metering	Utility metering compartments currently not supported
System	QED2: 3P4W, 3P3W, 1P3W Model 6: 3P3W
Breaker and Rating	PowerPact R Frame molded case circuit breaker (MCCB) up to 2500A QED2: rated 80% or 100% up to 2500A MCC: rated 100% up to 1600A, 80% or 100% up to 2000A, 80% up to 2500A
Interrupting Ratings	RG 65kA @ 240V, RJ 100kA @ 240V, RK 65kA @ 240V RG 35kA @ 480V, RJ 65kA @ 480V, RK 65kA @ 480V, RL 100kA @ 480V RG 18 kA @ 600V, RJ 25kA @ 600V, RK 65kA @ 600V, RL 50kA @ 600V
System Voltage	QED2: 120V 3W, 208V 3W, 240V 4W, 480V, 600V 3W MCC: 240V 3W, 480V 3W, 600V 3W
Line up dimensions	QED2: 36” wide x 24” deep (need 36” deep for main-tie-main applications) MCC: 25” wide
NEMA ratings	QED2: NEMA 1, 3R MCC: NEMA 1, NEMA with gaskets (1a)
UL Certification	UL 489 certification as an accessory to the circuit breaker UL Verified IE Label per UL RP 2986 (method for measuring IE exposure)
Connectivity	Continuous thermal monitoring capable and compatible with EcoStruxure™ (or other SCADA system) CL110 sensors located underneath each heat sink Arc Flash Event Indicator with Microswitch contact Advanced monitoring and predictive analytics capable

ArcBlok™ 2500

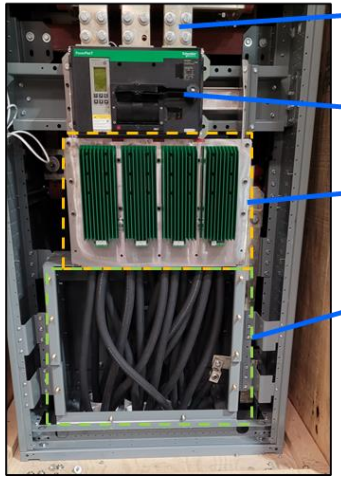
Peace of mind with the ArcBlok **Performance Guarantee**

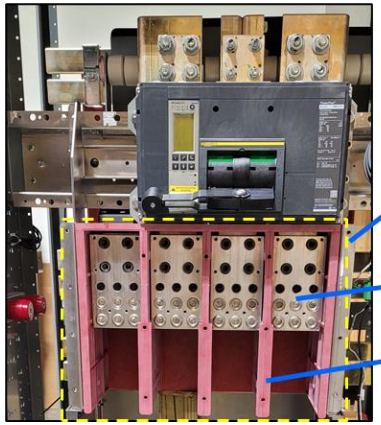
- ✓ Protects equipment that contains the ArcBlok 2500 product
- ✓ Covers labor expenses and additional costs to shorten repair time attributable to an arc flash repair event
- ✓ Warranty period is 3 years from the date of the ArcBlok installation
- ✓ Up to 3 claims during the warranty period
- ✓ Prompt notice (withing 30 days) is required
- ✓ Equipment becomes protected once ArcBlok is installed, commissioned and the ArcBlok Event Indicator is connected to EcoStruxure™



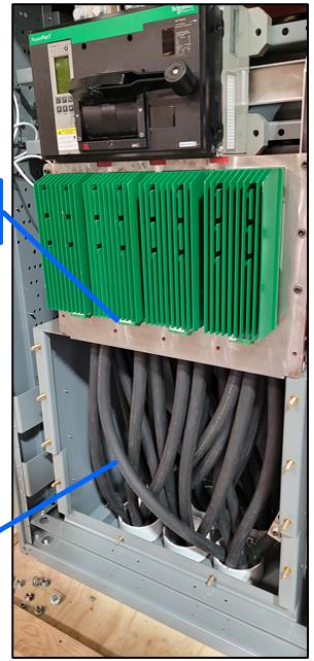


Life Is On Schneider Electric


Existing Loadside Bussing
PowerPact R
ArcBlok Module
ArcBlok Cable Vault


ArcBlok Module
Lineside Lugs
Phase Separating Barriers


Cable Vault Asy
Event Detector Asy


CL100 Thermal sensors
Lineside Cables Bottom Entry

Common Q&A

Q **Does it really extinguish & clear the arc – no trip?**

A Yes, AB employs arc interruption technology that limits the arcing current

Q **How do you know when there's an event?**

A AB 2500 has Event Detection Sensor.

Q **How do you know ArcBlok works?**

A AB was tested to UL 2986 (method for measuring IE) and Verified by UL.

Q **How many arc flash events is AB good for?**

A Cedar Rapids team has tested successfully 9 events with the same AB unit

Q **Why line side protection?**

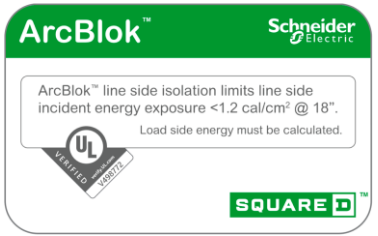
A Line side is commonly the most dangerous and highest incident energy potential. If you don't reduce line side, then you are keeping the highest risk of the lineup still in play

Q **Can we make claims for the load side? Is the whole lineup now 1.2 cal/cm2?**

A No, an arc flash study still needs to be done to calculate arc flash risk on load side

Q **Why can't I just put ERMS on upstream breaker?**

A Majority of the time you will not have access to upstream



Common Q&A *(cont.)*

Q **Will ArcBlok work with different cable configurations in an existing equipment?**

A Due to the design there are some limitations. Currently ArcBlok will work with cable fed for bottom incoming only.

Q **Are there any other limitations for brownfield?**

A There are limitations with regards to the enclosure size. The existing section has to be 30” (25” still under review).

Q **Does the UL certification cover an existing / brownfield line up?**

A For Greenfield projects ArcBlok 2500 will carry a UL verified label. For Brownfield projects it would require a field evaluation for the equipment to carry a UL label (~10k USD).

Q **If brownfield installs ArcBlok in a MCC model 6 or QED2 section, is the field evaluation still required.**

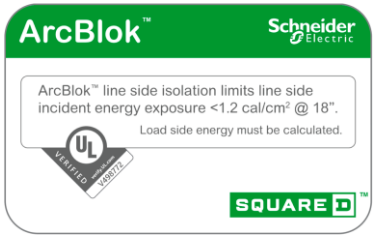
A Yes (for now, under review)

Q **Does ArcBlok satisfy 240.87 Arc Energy Reduction (NFPA 70)?** NEW

A No. ArcBlok addresses the line side of the main. 240.87 concerns the load side. There are multiple ways the load side would be addressed, ERMS is one way (240.87 provides an example list).

Q **What material is the arc resistant shell?**

A Sheet metal



Arc Flash PPE Categories

Note: At 1.2 cal/cm^2 2nd degree burn is likely

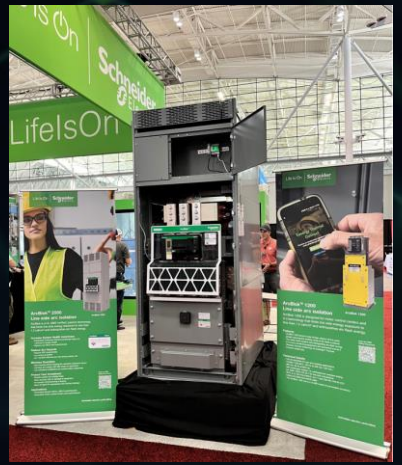
PPE CATEGORY 1	PPE CATEGORY 2	PPE CATEGORY 3	PPE CATEGORY 4
Minimum Arc Rating of **4 cal/cm²** 	Minimum Arc Rating of **8 cal/cm²** 	Minimum Arc Rating of **25 cal/cm²** 	Minimum Arc Rating of **40 cal/cm²** 
Arc Rated Clothing: • AR long-sleeve shirt and pants, or AR coverall • AR face shield, or AR flash suit hood • AR jacket, parka, rainwear, or hard hat liner (as needed)	**Arc Rated Clothing:** • AR long-sleeve shirt and pants, or AR coverall • AR flash suit hood, or AR face shield and AR balaclava • AR jacket, parka, rainwear, or hard hat liner (as needed)	**Arc Rated Clothing:** • As required: AR long-sleeve shirt, AR pants, AR coverall, AR flash suit jacket, and/or AR flash suit pants • AR flash suit hood • AR gloves • AR jacket, parka, rainwear, or hard hat liner (as needed)	**Arc Rated Clothing:** • As required: AR long-sleeve shirt, AR pants, AR coverall, AR flash suit jacket, and/or AR flash suit pants • AR flash suit hood • AR gloves • AR jacket, parka, rainwear, or hard hat liner (as needed)
Protective Equipment: • Hard hat • Safety glasses or safety goggles • Hearing protection (with inserts) • Heavy-duty leather gloves • Leather footwear (as needed)	**Protective Equipment:** • Hard hat • Safety glasses or safety goggles • Hearing protection (with inserts) • Heavy-duty leather gloves • Leather footwear	**Protective Equipment:** • Hard hat • Safety glasses or safety goggles • Hearing protection (with inserts) • Leather footwear (as needed)	**Protective Equipment:** • Hard hat • Safety glasses or safety goggles • Hearing protection (with inserts) • Leather footwear (as needed)

Greenfield and brownfield applications

ArcBlok: game-changing safety innovation in MCCs & SWBDs

- 2019: **ArcBlok 1200**
- LV MCC only

- 2023: **ArcBlok 2500**
- LV MCC & SWBD
- Greenfield & Brownfield



- 2020 CSE Magazine Gold Product of the Year
- 2022 Electro Expo
  - Most Innovative Technology
  - Best Overall Product

Service Entrance In Equipment

- ArcBlok allows ESWC to be established at the Service Entrance Equipment
- ESWC Process:
  - Turn of main circuit breaker
  - Live-Dead-Live test
  - Load side conductor deenergized
- Possible to work inside main section and adjacent sections safely (per ESWC) without utility turning off power
- Benefits
  - No coordination with Utility
  - No utility fees for disconnection
  - No risk for Utility to reenergize during maintenance

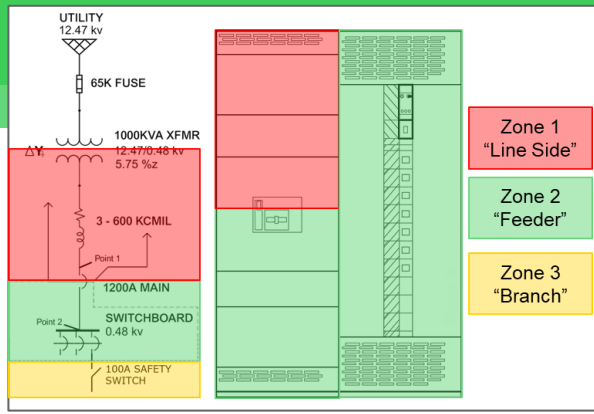
Only remaining energized conductors are protected by the ArcBlok

Customer Use Case: Downstream Equipment

- Lock Out Tag Out – Difficult
  - Upstream device physically far away
    - LOTO not in line of sight of workers
  - Upstream device restricted access

Why line side arc flash protection?

Protecting the highest risk zone when you don't have protection or access upstream



Does your customer have access upstream? (or does the utility own it?)

- ex. Pump station fed by Utility pole (MCC)
- ex. Switchboard fed by transformer…high risk…primary fuses
- Service entrances
- Unit substation entrances
- Modernize/retrofill existing equipment (MCCs or SWBDs)!!! (any manufacturer's gear)
- Eliminates need for separating the main from distribution

What else protects line side? Can't do ZSI to primary side. Virtual main?

Restrictions

- Cable-fed only (no busbar or close coupling)
- No hot sequencing
- No MLO, needs main breaker