JUNE 2020

Arc flash mitigation with RELT-Ekip Signalling 2K-3

New feature for SACE® Emax 2 and SACE Tmax® XT

What is an arc flash

Arc flash is a dangerous condition that can occur when there is a loss of insulation between two live conductors inside electrical equipment.

Arc Flash numbers per year

400 arc flash deaths

7,000 burn injuries every year

2,000 hospitalizations

30,000 arc flash incidents

The light and heat generated by the electrical arc that can cause substantial damage.

Temperature of 20000°C

Fire

Noise blast up to 160 db

Explosion spray molten metal at speed up to 1600 km/h

The level of Personal Protect Equipment (PPE) needed is determined by a measurement of the potential Arc Flash incident energy: cal/cm2.

https://allumiax.com/blog/2019-statistics-arc-flash-explosions-occur-every-day-arc-flash-accidents

Possible causes of an arc flash

Arc incident sources

Human error	1	Touching live equipment Making other mistakes in general	
Mechanical fault	2	Contact elements misaligned or worn	
Bad connections	3	Poor workmanship Wrong or lower quality hardware	
Pollution	4	Dirty environment with lots of particles in the air	
Animals	5	Small animals nesting in the switchgear	

Arc flash standard regulations

NEC 2017 -ARTICLE 240.87

240.87 Arc Energy Reduction. Where the highest continuous current trip setting for which the actual overcurrent device installed in a circuit breaker is rated or can be adjusted is 1200 A or higher, 240.87(A) and (B) shall apply.

(A)Documentation. Documentation shall be available to those authorized to design, install, operate, or inspect the installation as to the location of the circuit breaker(s).

(B) Method to Reduce Clearing Time. One of the following or approved equivalent means shall be provided:

1. Zone-selective interlocking
2. Differential relaying
3. Energy-reducing maintenance switching with local status indicator
4. Energy-reducing active arc flash mitigation system
5. An instantaneous trip setting that is less than the available arcing current
6. An instantaneous override that is less than the available arcing current
7. An approved equivalent means

Energy-Reducing Maintenance Switching with local status indicator

Energy-reducing maintenance switching with local status indicator is one of the most common technique to reduce the risks when personnel are near the equipment. When activated, this switch decreases the circuit breaker's tripping time and threshold to a safer level.

The local status indicator is typically mounted in front of the cabinet door in order to allow activation of the switch when the door is closed. This switch should include a means to LOTO (Lock Out Tag Out).

This switch should include positive feedback input with indication that confirms the circuit breaker is in the safer condition.

Reduced energy let through feature

How it works

- Prior to approaching the equipment, the maintenance operator activates the Energy Reducing Maintenance Switch
- This switch sends the input to the circuit breaker in order to activate the 2I protection
- Once the protection is activated the circuit breaker closes an output that provides the positive feedback to the operator. This output should be wired to a visual indicator (example selector switch with embedded LED)
- When the maintenance is complete, the switch can be turned OFF ensuring the circuit breaker returns to its normal configuration.

Reduced Energy Let Through

SACE® Emax 2 and SACE Tmax® XT

The ABB low voltage circuit breaker's version of an Energy Reducing Maintenance switch is RELT, or Reduced Energy Let Through.

When enabled, this feature automatically assigns the digital I/O to allow for remote activation and positive feedback. When triggered, the input activates the 2I protection providing faster clearing time and a reduced overcurrent threshold while the output provides the maintenance personnel an indication that the circuit breaker is in its Reduced Energy Let Through mode (RELT).

The "2I" protection, is a temporary protection that is faster than the normal instantaneous protections. Depending on the fault current this function can provide a full clearing time as low as 1.5 cycles at 60Hz!

Shopping List

SACE® Emax 2 or SACE Tmax® XT
with touch trip unit

Switch with led indication
(example: GTURSK or ABB pilot devices)

RELT-Ekip Signalling 2K-3*
I/O module + Ekip Supply module

** The external cartridge module is required for Tmax XT2, XT4 and XT5*

Reduced Energy Let Through

Benefit

Increased safety level

- 2I protection can clear in as little as 1.5 cycles at 60Hz dramatically reducing the impact of an arc flash event. Ensures <8 calories up to 100kA even at 600V * !
- Local mode ensures that this feature cannot be deactivated remotely.
- Positive feedback provides personnel a clear indication that the safety function is working properly.

Cost saving

- Arc flash mitigation with RELT module is a cost effective solution compared to arc flash detection active systems.

Easy installation

- Easy to use, intuitive setup wizard automatically engaged during installation.
- The RELT Module can be set up with just one tap !
- Commissioning can be executed directly on the circuit breaker display.

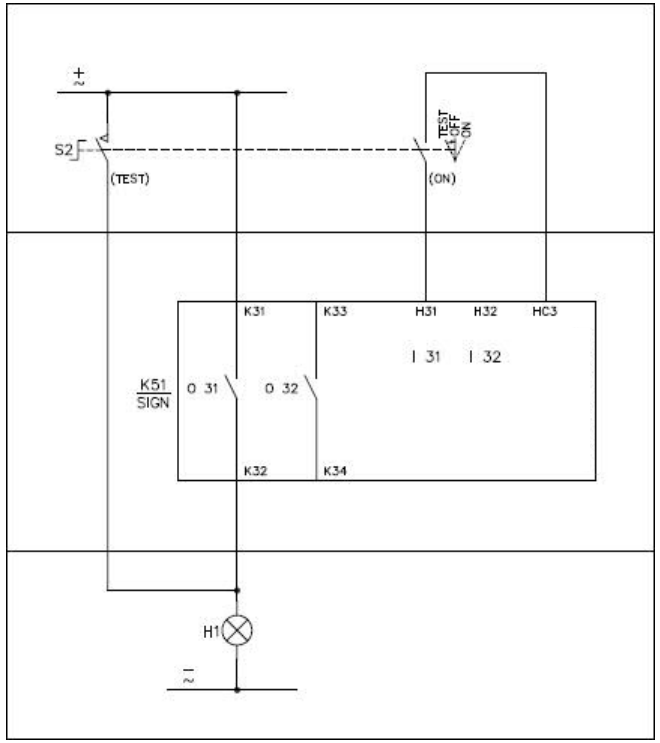
Easy wiring

- Wiring made simple. Two circuits, one for input (activation) and one for output (signalization).

* Taking into account the new 2018 IEEE 1584

Reduced Energy Let Through

Wire



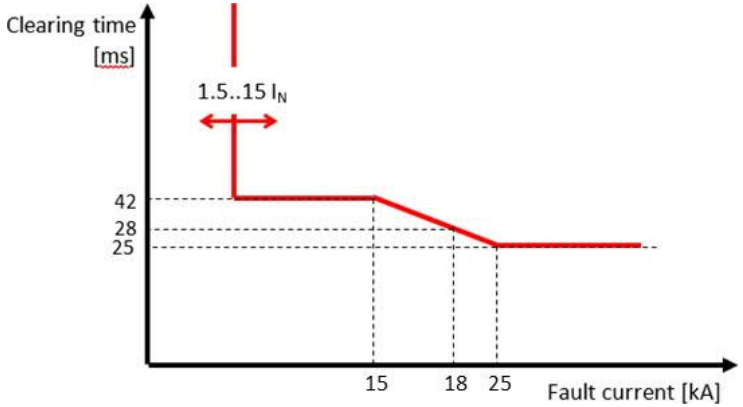
Install

- Install the module and power up with 24V*
- Select the menu Advanced ❼ 2I protection ❼ RELT Wizard
- Press YES on the installation wizard

*RELT Wizard page appear automatically at the first trip unit starting up

Protect

- Less than 28ms clearing time above 18kA at 60Hz



Documentation

SACE Emax 2 IEC Catalogue

LINK

SACE Emax 2 UL catalogue

LINK

SACE Emax 2 Installation Manual

LINK

Instruction sheet RELT Module

LINK

Application wiring diagram

LINK

RELT switch

ABB Pilot Devices

LINK


ABB