



## TECHNICAL SUPPLEMENT

ELECTRICAL SAFETY FCX-HS03 | ENERGIZED ELECTRICAL WORK  
RELEASE 07/2018 | VERSION 1

### GENERAL INFORMATION

- Anytime work is performed on electrical equipment and circuits, every effort must be made to de-energize the power in order to perform the necessary tasks. However, there are times when de-energizing the circuit is not possible. In these cases, appropriate justifications are required and must follow the processes and procedures defined in this Technical Supplement.
- When working within the restricted approach boundary or the arc flash boundary of exposed energized electrical conductors or circuit parts that are not placed in an electrically safe work condition, work to be performed shall be considered energized electrical work.
- This policy applies to all qualified electrical personnel.
- Overhead line work is not covered under this policy.
- Only an electrically qualified individual may perform energized work.

#### Personnel

- When permitted energized work is performed, there must be a second person present that is able to maintain visual contact with the person performing the work.
- It is preferable that the second person be a “electrically qualified individual,” however, if this is not possible an attendant may be used.
- The attendant must be trained in methods of release of victims from contact with exposed energized electrical conductors or circuit parts.
- Attendants shall be trained to perform cardiopulmonary resuscitation (CPR) and how to properly use an automated external defibrillator (AED).

#### Apprentice / Interns

- Each apprentice or intern must prove they are capable of recognizing and avoiding the hazards associated with the work and have documented competency. Each must be directly supervised by a journeyman.
- No other personnel are considered qualified to perform energized electrical work under any circumstances.

### ENERGIZED WORK JUSTIFICATION

Prior to performing energized work, an electrical risk assessment must be completed to determine if an energized work permit must be completed.

#### Exposed

Employees need to understand electrical exposure as part of the risk assessment in any task. With electrical equipment, most enclosures provide a barrier from energized conductors. Sites need to protect employees from inadvertently, accidentally, unintentionally touching, or approaching nearer than a safe distance to electrical equipment. For example, working on smaller 480V panels where 480V disconnects or transformers may be placed in a panel with PLCs or other low voltage electronics.

#### Energized Work Permit Requirements

- Any Repair work while energized in the restricted approach boundary, including physical alteration of electrical equipment, such as tightening connections, removing or replacing components will require a permit. **See Energized Work Permit**
- An “Energized Electrical Work Permit” must be completed and signed by the qualified individual(s) doing the energized work and a member of Electrical Supervision.
- A permit is not required for diagnostic testing and troubleshooting. This work is still considered energized work and the appropriate personal protective equipment must be used.

#### Appropriate Justifications

Justification for energized work may include, but is not necessarily limited to, the following:

- Prove that the work is infeasible in a de-energized state due to equipment design or operational limitations.
- Interruption of life support equipment.
- Deactivation of emergency alarm systems, and shutdown of hazardous location ventilation equipment.
- De-energizing the circuit would create additional hazards or increased risks to those performing the work.

Loss of production is not a consideration for justifying the need for energized work. The first priority is the safety of those performing the work and those who are in the affected area.

## ENERGIZED WORK

- Each person working on energized equipment is required to know and understand each of the policies/guidelines that apply to the work being performed.
- The person performing the energized work has total control of the job without exception.

### Each person is responsible for:

- Safety of one's self and safety of fellow employees.
- Protection of all other personnel through the use of barricading, flagging, attendants, signage, etc.
- Protection of company property and the property of others.
- Notification of any unsafe condition. Work cannot proceed without first calling any unsafe condition to the attention of all personnel involved and completely mitigating all risks.

### Procedures for Energized Work

- An "Electrical Risk Assessment" to determine the need for energized work must be completed prior to starting the work.
- When required, an "Energized Electrical Work Permit" must be completed and signed by an appropriate member of electrical supervision.
- When performing energized work, insulated hand tools must be used. These tools will be rated for the appropriate voltage.
- For the proper personal protective clothing for energized work.
- All meters and test equipment must meet a minimum of Category III – 1000V as per ANSI/ISA S82.01 and IEC 61010-1 standards.

## MEDIUM VOLTAGE MCC WORK REQUIREMENTS

- **Performing repair work on Medium Voltage (1001V-34.5KV) while energized is not allowed.**
- Switching of motor starters or circuit breakers is not considered energized work as long as equipment is properly installed, maintained on a three year cycle, and has no evidence of impending failure.
- Racking (insertion or removal from the Bus) of starters or breakers when energized with doors open or closed is energized work. No energized work permit is required. Follow PPE information on the label. PPE should be worn while installing remote racking gear. Recommend "Remote Racking / Switching" be implemented and used on energized gear.
- Inserting or removing of starters / breakers from enclosure on an energized bus is energized work. No energized work permit is required. PPE must be worn per the Arc Flash label when the breaker is being removed and installed in the cubicle. PPE must also be worn per the Arc Flash label if breaker door is open when visually checking the position of the shutter.

## LOW VOLTAGE BUCKET WORK REQUIREMENTS

- Individual starter buckets may only be removed when there are no feasible alternatives due to equipment design or operational limitations and all options have been exhausted.
- Removal of a low voltage bucket from an energized MCC is considered Energized Work and an Energized Work permit is required to perform this task.
- MCCs that are designed with bus insulation protection for arc flash do not require an energized work permit. (See **Low Voltage MCC Work Requirements Table in this document**)

### Replacing major components

- Always remove the MCC bucket when major components are to be replaced, (i.e., overload blocks, starters, fuse holders, breakers, etc.) This is critical when the components are held in place with bolts protruding through the bucket back plane.

### Arc Flash Label

- The arc flash label attached to the bucket will supply employees with the required arc and shock information.
- If there is no arc flash label present then refer to Table 130.7 (C) (15) (a) of NFPA 70E or the corresponding table of the most current version of NFPA 70E. Inform your supervisor of this condition to have an arc flash analysis performed.

### Absence of Voltage Measure

- Test voltmeter on a known live circuit, perform voltage measurement on de-energized circuit, and then re-test meter on a known live circuit. In areas where a known live circuit may not be available a compact portable safety proving voltage tester is an acceptable means of testing the metering device before and after taking a measurement.

### De-energized Bucket and De-energized MCC Bus

- No limits on minor repair work which can be performed once absence of voltage testing is complete. Prior to starting work, employee shall follow de-energizing steps /LOTOTO in the electrical policy.

### LOW VOLTAGE MCC WORK REQUIREMENTS

Work Type	Energy State	PPE Requirement	Energized Work Permit
Performing minor repairs such as making or tightening connections, removing or replacing components such as fuses, heaters, terminal strips, or any other component which are not held in place by bolts protruding through the bucket back plane.	MCC bucket circuits are <b>energized</b> .	Follow the PPE information on the arc flash label	Required
	Breaker in MCC bucket is open, and line side connections to the breaker are energized and accessible.	Follow the PPE information on the arc flash label	Required
	Breaker in MCC bucket is open, and line side connections to the breaker are energized <b>and not</b> accessible	Follow the PPE information on the arc flash label until the circuit is proven to be de-energized by performing an absence of voltage test.	Not Required
Work Type	Energy State	PPE Requirement	Energized Work Permit
Performing diagnostic testing, troubleshooting and voltage measurement.	MCC bucket circuits are <b>energized</b> .	Follow the PPE information on the arc flash label	Not Required
	Breaker in MCC bucket is open, and line side connections to the breaker are energized and accessible.	Follow the PPE information on the arc flash label	Not Required
	Breaker in MCC bucket is open, and line side connections to the breaker are energized <b>and not</b> accessible.	Follow the PPE information on the arc flash label until the circuit is proven to be de-energized by performing an absence of voltage test.	Not Required
Removing bucket to perform major repairs such as replacing overload blocks, starters, fuse holders, breakers, or any other component which are held in place by bolts protruding through the bucket back plane.	MCC bus is <b>energized</b> .	Follow the PPE information on the arc flash label	Required

\*NOTE – MCCs that are designed with bus insulation protection for arc flash do not require an energized work permit.