Application Paper **AP019002EN** Effective August 2017

Cable lashing in low-voltage switchgear

Introduction

This application note describes the details, function, and need for cable lashing in low-voltage switchgear.

Application

During a fault, there is high-magnitude current going through all three sets of phase cables. The high current generates a magnetic force between the phase cables. Cable lashing is the procedure used to stabilize the phase cables during high-current events to minimize cable movement and reduce damage to the switchgear and cables themselves.

Physical phenomenon

Current through a cable will generate a magnetic field. The strength of the field is dependent on the magnitude of current and the radial distance between the cables. It will increase as the magnitude of current increases and as the radial distance between the cables decreases. As a result of the current generated magnetic field, a magnetic force develops. This force will increase as the strength of the magnetic field increases.

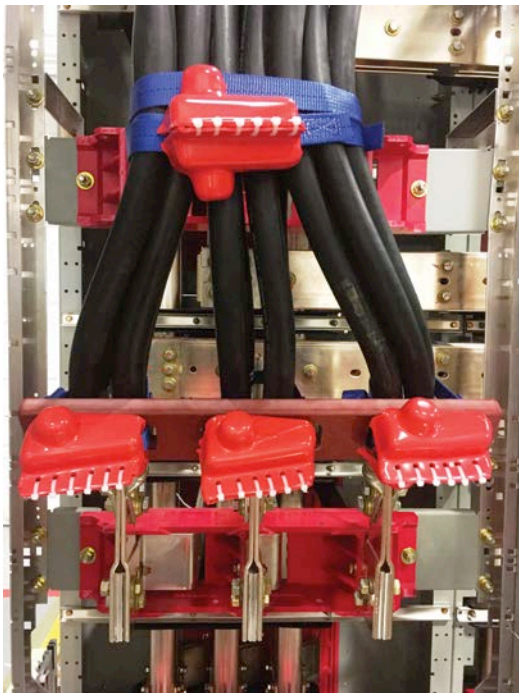

Figure 1. Cable lashing device

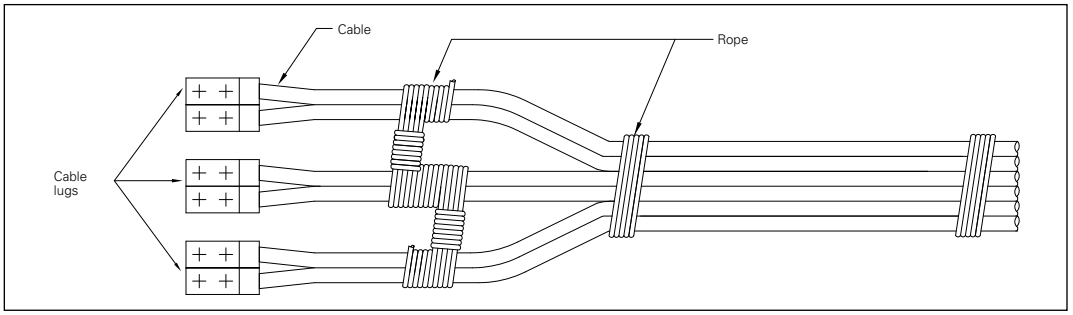

Figure 2. Traditional cable lashing

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Resulting issues from unlashed cables

If the phase cables are not properly supported during a high-current event, they may move violently around the gear. With this rapid movement, equipment failure can occur. Equipment failures include, but are not limited to, the following:

- Cables pulling out of lugs
- Bending of cable lug adapters
- Breaking of bus support materials
- Damaging cable insulation

Equipment damage can cause the gear to be inoperable and result in safety concerns such as arc flash.

Determining when cable lashing is needed

The lashing of cables is required for the following conditions:

- All 800 A frame breakers, regardless of system interrupting current
- All breaker frames in systems with short-circuit ratings above 65 kA
- When lugs described in (A) or (B) below are not used

To ensure proper fault protection, the following cable lugs are to be used for power cables:

A. Compression crimp lugs
   1. Two mounting holes.
   2. Minimum of double crimp.
   3. Must be crimped with hydraulic crimper with minimum of 12 tons (11 metric tons) compression.

B. Mechanical screw lugs
   1. Aluminum body lug with two mounting holes.
   2. One 1/2-inch hex cable holding a screw torqued to 500 in-lb (56.5 N•m)

Additional help

In the U.S. or Canada, please contact the Technical Resource Center at
1-877-ETN-CARE

All other supporting documentation is located on the Eaton website at
Eaton.com/lva

Eaton
1000 Eaton Boulevard
Cleveland, OH 44122
United States
Eaton.com

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