Technical Data **TD00801005E**

Effective May 2022
Supersedes June 2011

Combination short-circuit current ratings for non-fusible safety switches

Safety first: protecting people and equipment

NFPA® safety requirements for energized equipment

Updates to NFPA 70E®, Standard for Electrical Safety in the Workplace®, recommend that industrial users and building owners conduct an arc-flash hazard analysis at their facilities.

This includes a short-circuit, coordination, and arc-flash system evaluation that measures available arc-flash energy for electrical equipment throughout the facility. When completed, a label is affixed to the equipment. It warns service personnel of available arc-flash energy present while the equipment is energized and what personal protective equipment is required.

Meeting UL® 98 requirements to comply with NFPA 70E

The UL 98 Standard for Safety Enclosed and Dead-Front Switches permits non-fusible switches to have a maximum short-circuit interrupting rating of 10 kA. UL permits higher series-connected fault current ratings if specific products are tested together. These UL Listed combination ratings must be printed on the safety switch label on the door and specify which upstream devices may be used at higher fault current levels. However, UL does not permit series combination ratings with motor circuit protectors. The analysis for the system shown in **Figure 1** proved that the available short-circuit current of the safety switch applied as a local motor disconnect was 13.5 kA—3.5 kA higher than allowed.

The Eaton tested solution

Eaton completed testing as defined by the UL 98 standard for heavy-duty non-fusible safety switches connected in series. We were able to achieve a higher level of series combination ratings using upstream Eaton molded case circuit breakers (MCCBs) and other fuse types.

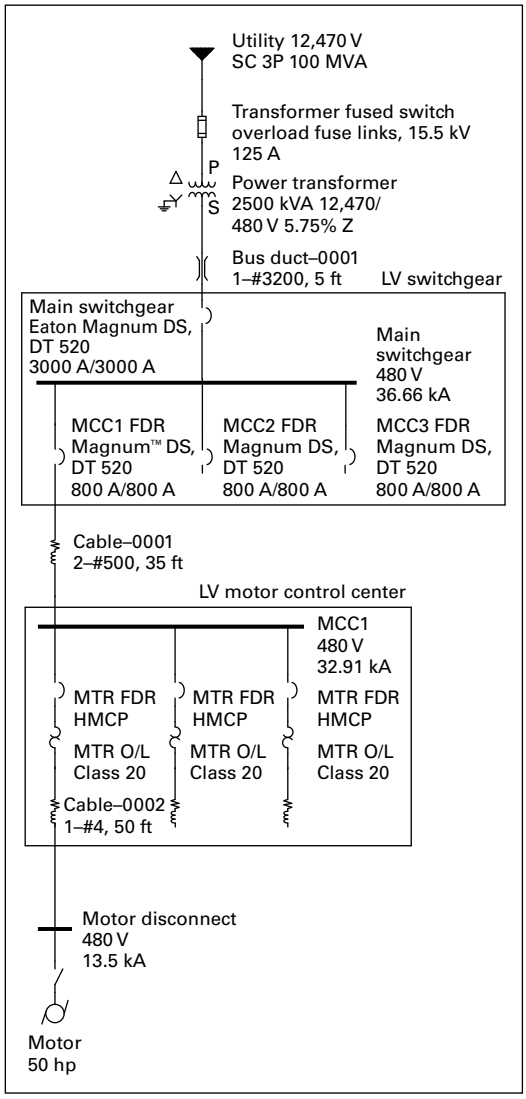

Figure 1. System one-line diagram

Powering Business Worldwide

Combination short-circuit current ratings for non-fusible safety switches

Product enhancement

In **Table 1**, Eaton non-fusible safety switches, within the noted ampere ratings, carry series combination short-circuit ratings as shown when combined with the identified MCCB or fuse type. With this listed rating, the safety switch shown in the **Figure 1** one-line diagram can be correctly applied when the motor feeder, Eaton HMCP circuit breaker, is replaced with an Eaton MCCB properly sized for the motor horsepower rating. This is a significant enhancement to the product's performance rating. To achieve these ratings, the switches have been tested in combination with all of the overcurrent devices shown. Furthermore, the applicable combination ratings are marked on the inside of the switch door, ensuring inspector approval.

Information and application

The circuit breaker or fuse rating is not to exceed the ampere rating of the non-fusible switch. When used on systems with greater than 10 kA short-circuit rating available, the UL Listed short-circuit rating of the non-fusible switch is based upon the switch being used in combination with fuses or MCCBs identified in **Table 1**.

Table 1. Non-fusible safety switches

Eaton non-fusible safety switch ampere rating ①	Maximum system voltage AC	Maximum short-circuit rating	Upstream device ②	
			Fuse class	Breaker frame
30 and 60	600	10,000	H, K	Any circuit breaker
		14,000		FDB
		18,000		FD, EGE
		25,000		FDC, HFD, HFDE, EGH
		200,000	R, T, J, L	
100	480	10,000	H, K	Any circuit breaker
		35,000		EGH, EGS
		200,000	R, T, J, L	
	600	10,000	H, K	Any circuit breaker
		14,000		FDB
		18,000		FD, EGE
		25,000		FDC, HFD, HFDE, EGH
		200,000 ③	R, T, J, L	
200	480	10,000	H, K	Any circuit breaker
		65,000		HFD, HFDE, HJD, JGH
		200,000	R, T, J, L	
	600	10,000	H, K	Any circuit breaker
		14,000		FDB
		18,000		FD, JD, JGE
		25,000		FDC, HFD, HFDE, HJD, JGH
		200,000	R, T, J, L	
400	480	200,000	R, T, J	
	600	10,000	H, K	Any circuit breaker
		100,000	R, T, J	
600	480	200,000	R, T, J	
	600	10,000	H, K	Any circuit breaker
		100,000	R, T, J	
800	480	200,000	L, T	
	600	10,000		Any circuit breaker
		100,000	L, T	
1200	480	200,000	L, T	
	600	10,000		Any circuit breaker
		100,000	L, T	

① For use on NEMA® 1, 3R, 12/3R, and 4X switches.

② Fuse or circuit breaker rating is not to exceed switch rating.

③ NEMA 12, 4/4X only. NEMA 1, 3R are 100 kAIC at 600 Vac.

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

Printed in USA
Publication No. TD00801005E / Z26212
May 2022

Powering Business Worldwide