

# Application Paper for Arc Fault and Ground Fault Miniature Circuit Breakers

## Definition

Many of today's residential, commercial and industrial applications require miniature circuit breakers which include electronic circuit boards to provide additional protection. These circuit breakers include Ground Fault Circuit Interrupters and Arc Fault Circuit Interrupters.

To be sure these breakers work correctly in the intended application, considerations must be made to the environmental conditions the breakers encounter. This document outlines the design environmental limits in accordance with UL® standards and NEMA application standards. Failure to adhere to the application guidance may alter the performance of the electronic miniature circuit breaker.

**Should your application fall outside the prescribed environmental conditions, please contact Eaton to determine if the breaker is suitable for use in the application.**

**Table 1. Application and Reference**

<b>Temperature</b>	The expected ambient air temperature immediately surrounding the circuit breaker should fall between -5°C (23°F) and 40°C (104°F).	
<b>Humidity</b>	Electronic circuit breakers are designed to operate in environments with maximum relative humidity of 93% at 32°C (90°F).	
<b>Corrosion / Dust</b>	Application of electronic breakers in extremely corrosive or dusty conditions is not recommended without the use of proper enclosures.	
<b>Altitude</b>	Breaker performance may be affected at altitudes over 2000m (6600ft).	
<b>Vibration</b>	Consult Eaton application engineers for installations where vibration or mechanical shock are present.	
<b>Power Quality</b>	Electronic miniature breakers are designed to operate at 120VAC +10/-15% per pole at 60Hz. The presence of harmonic distortion, voltage variation, changes in frequency and excessive conducted or radiated emissions may interfere with the operation of the electronic breaker. Excessive voltage variation and transients may damage sensitive electronic circuits.	
<b>Reverse Feed Applications</b>	Reverse feeding of an electronic breaker is not permitted as it will damage the electronic circuit board.	
<b>Additional Information</b>	The following documentation is available from Eaton for further assistance in specifying equipment for your application.	
	CA08104001E	Consulting Application Guide
	CA08101001E	Distribution and Control Products - U.S. Catalog
<b>Reference Documents</b>	NEMA AB 3-2006	Molded Case Circuit Breakers and their Application
	UL 489, CSA 22.2 No.5	Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures
	UL 943, CSA 22.2 No. 144	Ground Fault Circuit Interrupters
	UL 1053, CSA 22.2 No. 14, 5, 144	Ground Fault Sensing and Relaying Equipment
	UL 1699, CSA T.I.L No. M-02A	Arc Fault Circuit Interrupters



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