

# Molded case circuit breakers providing higher levels of selective coordination



Eaton's electrical business introduces new high-magnetic withstand molded case circuit breakers, specifically designed for critical operations and selective coordination requirements. The high-magnetic withstand LHH and NHH frames continue the legacy of circuit breaker innovation for which Eaton is recognized throughout the world. The LHH and NHH breakers are equipped with 125 to 400 ampere trip units with high-magnetic capability. This design enables the breakers to withstand up to 90 times rated current before opening under short circuit conditions.

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Powering Business Worldwide

### Introduction

The LHH and NHH circuit breakers incorporate a higher level of instantaneous pickup, thus allowing for higher current levels of selective coordination. Standard molded case circuit breakers typically are furnished with a magnetic pickup or electronic instantaneous adjustment or instantaneous override set at 10 times (10x) the continuous trip rating. Eaton's new LHH and NHH molded case circuit breakers are furnished with a higher level of magnetic pickup or electronic instantaneous settings as indicated in **Table 1**. These higher levels of magnetic pickup and electronic instantaneous values in turn allow the system designer to obtain selective coordination at fault current levels up to these higher ratings. Greater values of selective coordination are available based on manufacturer tested combinations using the LHH and NHH as line-side breakers and standard breakers as load-side devices. Refer to IA01200002E to determine the maximum fault values that selective coordination achieves. When the line-side and load-side molded case circuit breaker trip ratings are chosen to coordinate in the overload range, they also can be selectively coordinated in the fault range up to the values listed in **Table 1** or IA01200002E. For overcurrents protected by circuit breakers on the load-side of the LHH or NHH, only the effected load-side circuit breaker will open, while the line-side LHH and/or NHH circuit breakers remain closed, thus providing continuity of power to the other critical loads supplied by the LHH or NHH circuit breakers.

### Benefits of using the LHH and NHH molded case circuit breakers

Customer expectations and codes are driving product development to protect customers' critical operations. NEC® 2005 and 2008 requires circuits with elevators, emergency systems, legally required standby systems, health care essential systems and critical operation power systems to be selectively coordinated. Simply stated, only the closest protective device directly protecting the circuit having an overcurrent (overload or fault) condition should open. All other overcurrent protective devices within these systems shall remain closed. Similarly, backup power system designs of a critical nature that are not code mandated may also require overcurrent protective devices to be selectively coordinated as much as practicable to provide a higher level of uptime.

### Proven technology and performance

The LHH is based on the Series Gt L-Frame circuit breaker, sharing the same small footprint and field-fit accessories as the L-Frame breaker. The NHH is based on the Series G N-Frame circuit breaker and shares the same footprint and accessories as the N-Frame breaker. NHH accessories must be factory installed.

The LHH incorporates a thermal-magnetic trip unit with fixed thermal and fixed magnetic settings. The NHH has an OPTIM™-electronic trip unit with LSI adjustment capabilities. The instantaneous setting is adjustable from 1000–4000A or may be turned off to default to the frame override of 14,000A. A hand-held OPTIMizer must be used with the NHH to adjust short-time delay and instantaneous, however, the long delay pickup is fixed and cannot be adjusted.

The LHH and NHH breakers are available in Eaton's panelboards and switchboards.



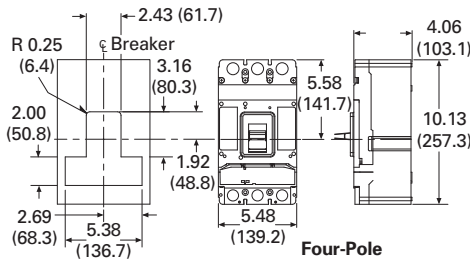
**Table 1. LHH and NHH Electrical Characteristics**

Description	Specifications				
<b>Breaker Type</b>	LHH		NHH		
<b>Max. Rated Current (Amperes)</b>	400		350		
<b>Short Circuit Current Ratings (kA rms) AC 50–60 Hz</b>					
<b>NEMA® UL® 489</b>					
240 Vac	100		100		
480 Vac	65		65		
600 Vac	35		35		
250 Vac	42		—		
<b>IEC 60947-2</b>					
220 Vac	100		100		
415 Vac	70		70		
690 Vac	25		25		
125/250 Vdc	22		—		
<b>Number of Poles</b>	3		3		
<b>Ampere Range</b>	125–400A		150–350A		
	<b>Magnetic Trip Point</b>	<b>Continuous Current Multiplier</b>	<b>Instantaneous Trip Point</b>	<b>Continuous Current Multiplier</b>	<b>Short Delay Pickup</b>
<b>Continuous Current Rating (I<sub>c</sub>)</b>					
125A	2500A	20x	—	—	—
150A	2500A	16x	14,000A	93x	225–1200A
175A	4000A	22x	14,000A	80x	260–1400A
200A	4000A	20x	14,000A	70x	300–1600A
225A	6000A	26x	14,000A	62x	338–1800A
250A	6000A	24x	14,000A	56x	375–2000A
300A	6000A	20x	14,000A	47x	450–2400A
350A	6000A	17x	14,000A	40x	525–2800A
400A	6000A	15x	—	—	—
<b>Dimensions in Inches (mm)</b>					
Height	10.13 (257.3)		16.00 (406.4)		
Width	5.48 (139.2)		8.25 (209.5)		
Depth	4.09 (103.9)		5.50 (139.7)		
<b>Weight Approximate Lbs (kg)</b>	12.36 (5.6)		46.80 (21.2)		

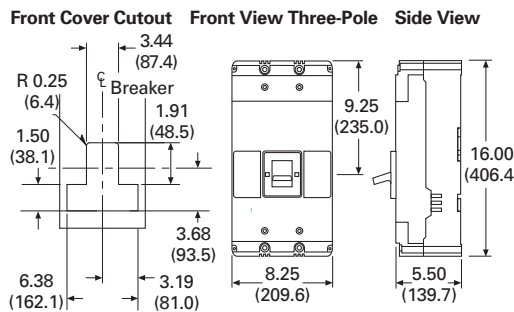
**Design specifications**

- Three-pole
- 65 kAIC at 480 Vac
- 125–400 ampere LHH
- 150–350 ampere NHH
- UL, CSA®
- Trip units:
  - LHH—Thermal-magnetic
  - NHH—LSI electronic trip unit
- No rating plugs required
- Factory-sealed breakers
- LHH uses same internal and external accessories as standard Series G L-Frame circuit breaker
- NHH uses same internal and external accessories as standard Series G N-Frame circuit breaker

**Dimensions**



L-Frame—Dimensions in Inches (mm)



N-Frame—Dimensions in Inches (mm)

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**Table 2. LHH and NHH Catalog Numbers**

Ampere Rating	Catalog Number	
	Thermal-Magnetic Trip Unit	LSI Electronic Trip Unit
125	LHH3125FFG	—
150	LHH3150FFG	NHH3150T52X15
175	LHH3175FFG	NHH3175T52X15
200	LHH3200FFG	NHH3200T52X15
225	LHH3225FFG	NHH3225T52X15
250	LHH3250FFG	NHH3250T52X15
300	LHH3300FFG	NHH3300T52X15
350	LHH3350FFG	NHH3350T52X15
400	LHH3400FFG	—



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