Molded Case Circuit Breaker Product Family

Contents

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Product Overview

Eaton's molded case circuit breakers are designed to provide circuit protection for low voltage distribution systems. They are described by NEMA as, "... a device for closing and interrupting a circuit between separable contacts under both normal and abnormal conditions," and furthermore as, "... a breaker assembled as an integral unit in a supporting and enclosing housing of insulating material." The National Electrical Code (NEC) describes them as, "A device designed to open and close a circuit by non-automatic means, and to open the circuit automatically on a predetermined overload of current, without injury to itself when properly applied within its rating."

So designed, Eaton circuit breakers protect conductors against overloads and conductors and connected apparatus, such as motors and motor starters, against short circuits.

In low voltage distribution systems, there are many varied applications of molded case circuit breakers.

Eaton offers the most comprehensive family of molded case circuit breakers in the industry.

This section of circuit breakers includes:

- Thermal-magnetic trip breakers
- Electronic rms trip breakers
- Molded case switches
- Motor circuit protectors
- Current limiting breakers
- Special application breakers

Modified Breakers

Eaton breakers can be ordered with internal accessories installed. These modified breakers will be subject to an addition charge.

Special Calibration

Special non-UL-listed calibrations are available for certain ambient temperatures other than 40 °C and for frequencies other than 50/60 Hz or DC. Reduced interrupting ratings will apply for 400 Hz applications.

50 °C Calibration

Add suffix **V** to catalog Number for complete breaker, listed above, when ordering listed ampere ratings for breakers to be used in 50 °C ambients. (No price adder.) (No UL label.)

Moisture-Fungus Treatment

All circuit breaker cases are molded from glass-polyester which does not support the growth of fungus. Any parts which are susceptible to the growth of fungus will require special treatment.

Freeze-Tested Circuit Breakers

The circuit breakers may be ordered with freeze testing. This option uses special lubrication and mechanical operation is verified at –40 °C.

Marine Applications

E- to R-Framed circuit breakers can be supplied to meet the following marine specifications:

- U.S. Coast Guard CFR 46; ABS—American Bureau of Shipping; IEEE 45; DNV; Lloyds; and ABS/NVR

These specifications generally require molded case circuit breakers to be supplied with 50 °C ambient, and plug-in adapter kits. When plug-in adapter kits are used, no terminals need be supplied (switchboard applications).

Circuit breakers can also be supplied to meet UL 489 Supplement SA (Marine use) and UL 489 Supplement SB (Naval Use).

UL 489 Supplement SA applies to vessels over 65 feet (19.8 m) in length. Requirements include 40 °C ambient calibration, special labeling, and no use of aluminum conductors or terminals. (No 50 °C.)

- Suffix H08

Or you can choose to add 50 °C ambient but then there is no "UL" mark.

- Suffix VH08

UL 489 Supplement SB requires partial 50 °C ambient calibration, vibration testing, special nameplating and no use of aluminum conductors or terminals. Eaton chooses to always fully calibrate to 50 °C ambient. ("Naval" labeled per UL, and UL now allows 50 °C label here.)

- Suffix VH09

Certified Test Reports

Eaton breakers can be ordered with certified test reports at the time of order entry. Test report documents the thermal and magnetic or electronic tripping characteristics of the individual breaker. Breaker and test report must be ordered together. Add suffix 12 to breaker catalog number and enter separate line item on order for certified test report.

Standards and Certifications

Molded case circuit breakers are designed to conform with the following standards:

- Underwriters Laboratories Inc., Standard UL 489, molded case circuit breakers and circuit breaker enclosures
- National Electrical Manufacturers Association (NEMA) Standards Publication No. AB1-1993, molded case circuit breakers
- Australian Standard AS 2184, molded case circuit breakers
- British Standards Institution Standard BS 4752: Part 1, switchgear and control gear Part 1: circuit breakers
- Canadian Standards Association (CSA) Standard C22.2 No. 5, service entrance and branch circuit breakers
- International Electrotechnical Commission Recommendations IEC 60947-2, circuit breakers
- Japanese T-Mark Standard molded case circuit breakers
- South African Bureau of Standards, Standard SABS 156, Standard Specification for molded case circuit breakers
- Swiss Electro-Technical Association Standard SEV 157-1, safety regulations for circuit breakers
- Union Technique de l'Electricite Standard NF C 63-120, low voltage switchgear and control gear circuit breaker requirements
- Verband Deutscher Elektrotechniker (Association of German Electrical Engineers) Standard VDE 0660, low voltage switchgear and control gear, circuit breakers

Conformance with these standards satisfies most local and international codes, assuming user acceptability and simplified application.

Molded case circuit breakers equal or exceed Federal Specification Classification W-C-375b requirements for the particular class associated with the circuit breaker frame being considered.

Open breakers do not have service entrance ratings. Service entrance rating is part of the enclosure.

Listed

Typical L-Frame Circuit Breaker

Contents

L-Frame (125–600 Amperes)

Product Description

- All Eaton L-Frame circuit breakers are HACR rated
- L-Frame circuit breakers are available as individual components (frame, trip unit, terminals), or factory assembled complete breakers
- L-Frame circuit breakers with non-interchangeable trip units are suitable for reverse feed use

Standards and Certifications

- CE marked

CE

Catalog Number Selection

This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

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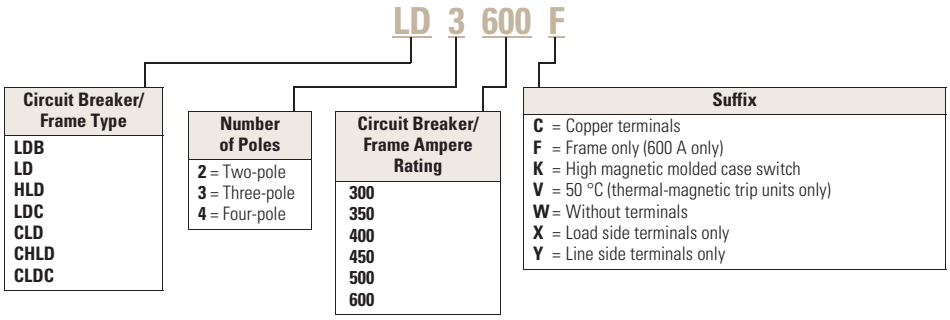
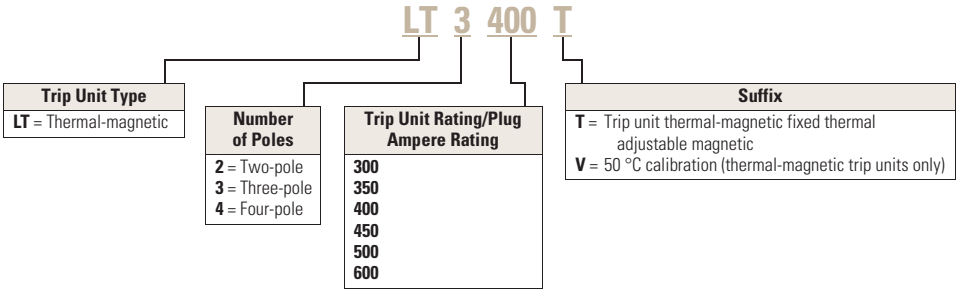
LD-Frame with Thermal-Magnetic Trip Unit Technology

Thermal-Magnetic Breakers and Frame ①



Thermal-Magnetic Trip Unit ①



Note

① Frames are the same for thermal-magnetic or 310+ electronic trip units, e.g., **LD3600F**, **HLD3600F**, etc.

LD-Frame with 310+ Electronic Trip Unit Technology

310+ Circuit Breakers

LDB 3 600 F T36 B22ZG W

Performance at 480 Vac	
LDB	= 35 kAIC
HLDB	= 65 kAIC
LDCB	= 100 kAIC
CLDB	= 35 kAIC, 100% rated
CHLDB	= 65 kAIC, 100% rated
CLDCB	= 100 kAIC, 100% rated

Number of Poles
3 = Three-pole
4 = Four-pole

Amperes
600

Designation
F

Trip Unit	
T33	= 310+ Electronic LS
T32	= 310+ Electronic LSI
T35	= 310+ Electronic LSG ①
T36	= 310+ Electronic LSIG ①
T38	= 310+ Electronic LSI with Maintenance Mode
T39	= 310+ Electronic LSIG with Maintenance Mode ①

Features	
Blank	= No feature
B20	= High load alarm
B21	= Ground fault alarm, with trip ①
B22	= Ground fault alarm, no trip ①
ZG	= Zone selective interlocking

Terminals
W = No terminals

310+ Electronic Trip Units ②

LES 3 600 LSIG B22ZG

Trip Unit Type
LES

Number of Poles
3 = Three-pole
4 = Four-pole

Amperes
600

Trip Unit	
LS	= 310+ Electronic LS
LSI	= 310+ Electronic LSI
LSG	= 310+ Electronic LSG ①
LSIG	= 310+ Electronic LSIG ①
ALSI	= 310+ Electronic LSI with Maintenance Mode
ALSIG	= 310+ Electronic LSIG with Maintenance Mode ①

Features	
Blank	= No feature
B20	= High load alarm
B21	= Ground fault alarm, with trip ①
B22	= Ground fault alarm, no trip ①
ZG	= Zone selective interlocking

LD-Frame with OPTIM Electronic Trip Unit Technology

OPTIM Circuit Breakers

LD 3 125 T5 7 W

Circuit Breaker/ Frame Type
LD
HLD
LDC
CLD
CHLD
CLDC

Number of Poles
3 = Three-pole

Circuit Breaker/ Frame Ampere Rating
125 (Available on Model 1050 only)
250 (Available on Model 1050 only)
400
600

Trip Model
T5 = Model 550
T10 = Model 1050

Trip Type
2 = LSI (550 only)
6 = LSIG
7 = LSIA

Suffix
W = Without terminals

Notes

① Not available in four-pole configurations.

② Frames are the same for thermal-magnetic or 310+ electronic trip units, e.g., **LD3600F**, **HLD3600F**, etc.

Product Selection

Types LD, HLD and LDC Thermal-Magnetic Circuit Breakers with Interchangeable Trip Units

Maximum Continuous Ampere Rating at 40 °C ①	Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals Catalog Number	High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals Catalog Number	Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals Catalog Number	Thermal-Magnetic Trip Unit Only For Use with Standard or High or Ultra High Interrupting Frames Catalog Number	Standard Terminals Only See Page V4-T2-203 for Optional Terminals Catalog Number
Two-Pole					
300	**LD2300**	**HLD2300**	**LDC2300**	**LT2300T**	**TA602LD** ②
350	**LD2350**	**HLD2350**	**LDC2350**	**LT2350T**	**TA602LD** ②
400	**LD2400**	**HLD2400**	**LDC2400**	**LT2400T**	**TA602LD** ②
450	**LD2450**	**HLD2450**	**LDC2450**	**LT2450T**	**TA602LD** ②
500	**LD2500**	**HLD2500**	**LDC2500**	**LT2500T**	**TA602LD** ②
600	**LD2600**	**HLD2600**	**LDC2600**	**LT2600T**	**2TA603LDK** ③
Three-Pole					
300	**LD3300**	**HLD3300**	**LDC3300**	**LT3300T**	**TA602LD** ②
350	**LD3350**	**HLD3350**	**LDC3350**	**LT3350T**	**TA602LD** ②
400	**LD3400**	**HLD3400**	**LDC3400**	**LT3400T**	**TA602LD** ②
450	**LD3450**	**HLD3450**	**LDC3450**	**LT3450T**	**TA602LD** ②
500	**LD3500**	**HLD3500**	**LDC3500**	**LT3500T**	**TA602LD** ②
600	**LD3600**	**HLD3600**	**LDC3600**	**LT3600T**	**3TA603LDK** ③
Four-Pole ④					
300	**LD4300**	**HLD4300**	**LDC4300**	**LT4300T**	**TA602LD** ②
350	**LD4350**	**HLD4350**	**LDC4350**	**LT4350T**	**TA602LD** ②
400	**LD4400**	**HLD4400**	**LDC4400**	**LT4400T**	**TA602LD** ②
450	**LD4450**	**HLD4450**	**LDC4450**	**LT4450T**	**TA602LD** ②
500	**LD4500**	**HLD4500**	**LDC4500**	**LT4500T**	**TA602LD** ②
600	**LD4600**	**HLD4600**	**LDC4600**	**LT4600T**	**4TA603LDK** ③

Types LD, HLD and LDC Thermal-Magnetic Circuit Breakers—Frame Only

Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac Catalog Number	High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac Catalog Number	Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac Catalog Number
Two-Pole		
LD2600F	**HLD2600F**	**LDC2600F**
Three-Pole		
LD3600F	**HLD3600F**	**LDC3600F**
Four-Pole		
LD4600F	**HLD4600F**	**LDC4600F**

Notes

① Magnetic trip range 5–10 times continuous ampere rating.
② Individually packed.
③ Terminal kits contain one terminal for each pole and one terminal cover.
④ Neutral is in right pole.

Dimensions and Weights

Dimensions in Inches (mm)

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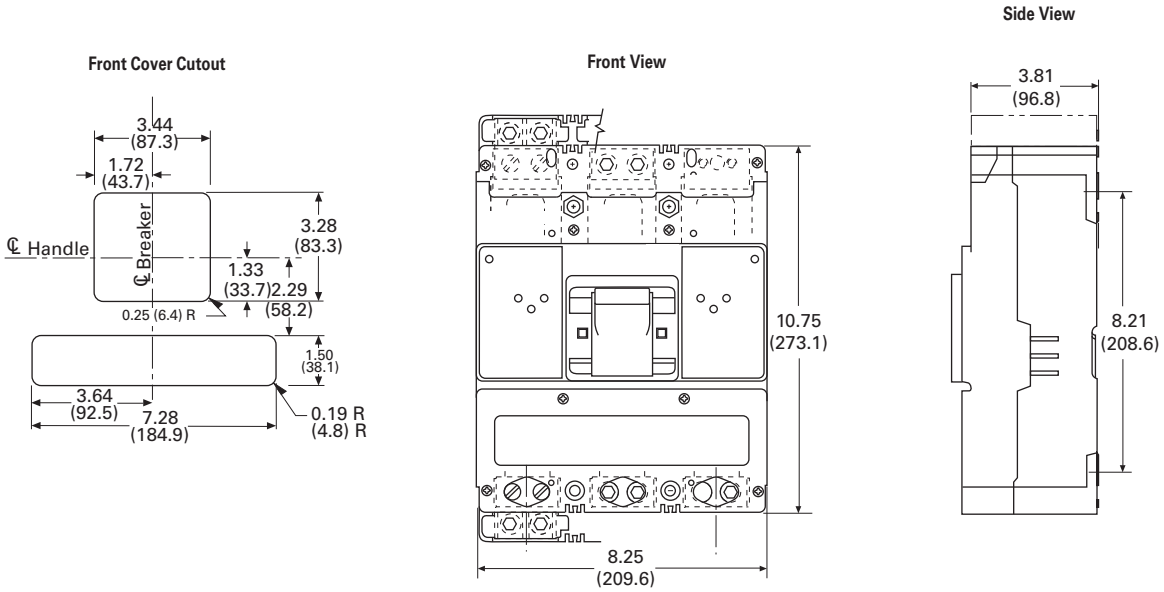
LD Frame

Number of Poles	Width	Height	Depth
2, 3	8.25 (209.6)	10.75 (273.1)	4.06 (103.1)
4	11.00 (279.4)	10.75 (273.1)	4.06 (103.1)

LD-Frame, Two- and Three-Pole



Approximate Shipping Weight, Lbs (kg)

LD Frame

Breaker Type	Complete Breaker			Frame Only			Trip Unit		
	Two-Pole	Three-Pole	Four-Pole	Two-Pole	Three-Pole	Four-Pole	Two-Pole	Three-Pole	Four-Pole
LD, HLD, LDC	18 (8.2)	20 (9.1)	25 (11.3)	14 (6.4)	15 (6.8)	20 (9.1)	3 (1.4)	4 (1.8)	5 (2.3)
LDB	18 (8.2)	20 (9.1)	25 (11.3)	—	—	—	—	—	—