

Safety matters with Eaton's Arcflash Reduction Maintenance System™

At Eaton, safety is the No. 1 priority. It is our goal not only to provide innovative solutions for our customers, but also to create products that help ensure the safety of personnel.

Eaton is improving personnel safety with its Arcflash Reduction Maintenance System technology, also called Maintenance Mode, which responds nearly three times faster when an arcing fault is present. Eaton's Maintenance Mode system works on a separate peak-sensing analog circuit to ensure the fastest fault clearing time. Other circuit breaker manufacturers address the danger of arc flash incidents by dialing down pickup settings to the Instantaneous function, so that the circuit breaker responds with no intentional delay at lower levels of arcing current.

This technology, featured in Eaton molded-case circuit breakers equipped with the 310+ electronic trip units, covers applications from 55 A through 2500 A and allows the breaker to respond more quickly to an arcing fault condition. This not only clears the fault faster, but also significantly reduces the release of potentially harmful arc flash energy.

Faster clearing time means less arc energy. Less arc energy exposure means improved worker safety.

Benefits of the Arcflash Reduction Maintenance System unit

- Increased worker safety—when enabled, the Arcflash Reduction Maintenance System trips the breaker 40% to 60% faster than the standard instantaneous trip, resulting in significant arc flash energy reduction. ●
- Reduction in incident energy levels due to an arc flash may allow reduced levels of personal protective equipment (PPE) to be used, increasing worker comfort and mobility.
- Using molded-case circuit breakers with Eaton's 310+ electronic trip units equipped with the Arcflash Reduction Maintenance System, an operator can enable the Maintenance Mode system remotely. When enabled remotely, the system is set at the maximum level of protection. In addition, an on-board switch on some circuit breaker frames allows the operator to manually enable Maintenance Mode and change the instantaneous setting of the trip unit for redundancy and an added level of safety. ● The system also includes local and remote status indications for operator situational awareness.

• Eaton 310+ electronic trip units address the National Electrical Code® Section 240.87 for Arc Energy Reduction. These molded-case circuit breakers provide two approved methods to reduce arc energy: energy-reducing maintenance switching with local status indicator and zone selective interlocking.

● Typical tested values for Eaton molded-case circuit breakers.

● All 310+ trip units with Maintenance Mode include the ability to enable remotely at a fixed setting of 2.5x. Series G LG, NG and RG breakers are also equipped with an on-board manual switch.

310+ Electronic trip unit technology available across molded-case circuit breakers

Integrated adjustable rating

The 310+ ETU offers a range of adjustability of Long (L), Short (S), Instantaneous (I) and Ground (G) settings. The 310+ contains an integrated I₁ switch that allows users to modify the continuous current rating of the breaker as the application demands. The eight-position I₁ switch enables a multitude of continuous current settings. Ordering, stocking and managing various amperages of rating plugs is no longer required.

Adjustable curve shaping

Users of the 310+ ETU will enjoy the protection curve shaping functions enabled by the L, S, I and G adjustability. These settings are particularly useful for applications demanding breaker coordination and circuit customization. The long delay and short delay functions enable the breaker curves to be manipulated for upstream and downstream breaker coordination.

Cause of trip information

If cause of trip is desired, the 310+ ETU can be fitted with a Digiview, a Panelmount Digiview or a Cause of Trip LED indicator. When a fault condition occurs and one of these devices is connected to the ETU's test port, the 310+ processor captures the fault information and transmits to the cause of trip device before the breaker trips and goes offline. While powered via line current when the breaker is closed, the Digiview and Cause of Trip LED indicator are also equipped with a lithium battery that enables them to retain the cause of trip information when the breaker trips/opens. The Digiview is also capable of displaying phase and ground current values when the load is above 20% of rating.

Zone selective interlocking

310+ ETUs can be configured with zone selective interlocking (ZSI). With ZSI enabled, all molded-case circuit breakers from 15 A through 2500 A (and beyond, into Eaton's low-voltage power breaker offering) can communicate when a phase or ground fault is present. The breaker closest to the fault will override any customer-defined delay setting and open instantaneously to clear the fault, allowing line-side breakers to remain closed and online. ZSI is also a proven solution for reducing arc flash incident energy when a fault is present.

Ground fault alarm only, no trip

New to the 310+ family of trip units is the ground fault alarm (GFA), no trip feature. Critical applications may require equipment to stay online when a ground fault is present. ETUs configured with the GFA, no trip feature will notify users that a ground fault is present while keeping the breaker online.

310+ Retrofit kits for Series C

All frames, except FD and NG, have field-installable trip units. These provide an aftermarket solution to replace 310+ trip units when Maintenance Mode, ZSI, cause of trip, or GFA are desired.

Eaton molded-case circuit breakers offer a common electronic trip unit offering from 15 A through 2500 A. The Digitrip™ RMS 310+ and 210+ electronic trip units (ETUs) offer a wide range of selectable settings and optional features to fit your electrical application needs.

www.eaton.com/310plus / www.eaton.com/210plus

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310+ and 210+ Electronic trip units
Molded-case circuit breakers

Faster than Instantaneous

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Technical data



Options/Frames	FD 210+	FD 310+	JG 310+	KD 310+	LG 310+	LD 310+	MDL 310+	NG 310+	RG 310+
Frame break ratings (A)	100 150 225	80 160 225	50 100 160 250	125 250 400	250 400 600	600	800	800 1200 1600 (IEC only)	1600 2000 2500
Continuous current range (A)	40–225	15–225	20–250	55–400	100–600	250–600	320–800	320–1200 1600 (IEC)	800–2500
Ground fault pickup (A) ●	—	16–225	10–250	50–400	50–600	120–600	160–800	160–1200	200–1200
Interrupting capacities at 480 Vac (kAIC)	35 65	35 65 100	25 35 65 100 150 200	35 65 100	35 50 65 100 150 200	35 65 100	50 65	50 65 100 150 (800 A only)	65 100
100% rated Protection	No LI LSI	No LS LSI LSG LSIG	Yes LS LSI LSG LSIG	Yes LS LSI LSG LSIG ALSI ALSIG	Yes LS LSI LSG LSIG ALSI ALSIG	Yes LS LSI LSG LSIG ALSI ALSIG	Yes LS LSI LSG LSIG ALSI ALSIG	Yes LS LSI LSG LSIG ALSI ALSIG	Yes LS LSI LSG LSIG ALSI ALSIG
Short delay I ^t response curve	LSI	LS LSG	LS LSG	LS LSG	LS LSG	LS LSG	LS LSG	LS LSG	LS LSG
Arcflash Reduction Maintenance System (Maintenance Mode) ●	No	No	No	ALSI ALSIG	ALSI ALSIG	ALSI ALSIG	ALSI ALSIG	ALSI ALSIG	ALSI ALSIG
Interchangeable trip unit	No	No	Yes	Yes	Yes	Yes	Yes	No	Yes
High load alarm (suffix B20) ●	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ground fault alarm and trip (suffix B21) or ground fault alarm only (suffix B22) ●●	No	No	LSG LSIG	LSG LSIG ALSIG	LSG LSIG ALSIG	LSG LSIG ALSIG	LSG LSIG ALSIG	LSG LSIG ALSIG	LSG LSIG ALSIG
Zone selective interlocking (suffix ZG) ●	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cause of trip indication (Catalog Nos: DIGIVIEW, DIGIVIEWR06, TRIP-LED)	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Integrated to trip unit
PM3 connectivity	Yes	Yes	Yes	Yes	Yes	No	No	No	No
Thru-cover accessories	No	No	Yes	No	Yes	No	No	No	No
Three-pole frame dimensions W x H x D in inches (mm)	4.13 x 6.00 x 3.38 (105.0 x 152.4 x 86.0)	4.13 x 6.00 x 3.38 (105.0 x 152.4 x 86.0)	4.13 x 7.00 x 3.57 (105.0 x 177.8 x 90.7)	5.50 x 10.13 x 4.10 (149.7 x 257.3 x 104.1)	5.48 x 10.13 x 4.09 (139.2 x 257.3 x 104.0)	8.25 x 10.75 x 4.06 (209.6 x 273.1 x 103.1)	8.25 x 16.00 x 4.06 (209.6 x 406.4 x 103.1)	8.25 x 16.00 x 5.50 (209.6 x 406.4 x 139.7)	15.50 x 16.00 x 9.00 (393.7 x 406.4 x 228.6)
Four-pole frame dimensions W x H x D in inches (mm) ●●	N/A	N/A	5.34 x 7.00 x 3.57 (135.6 x 177.8 x 90.7)	7.22 x 10.13 x 4.10 (183.4 x 257.3 x 104.1)	7.22 x 10.13 x 4.09 (183.4 x 257.3 x 104.0)	11.00 x 10.75 x 4.06 (279.4 x 273.1 x 103.1)	N/A	11.13 x 16.00 x 5.50 (282.7 x 406.4 x 139.7)	20.00 x 16.00 x 9.00 (508.0 x 406.4 x 228.6)
IEC ratings	No	No	Yes	No	Yes	Yes	Yes	Yes	Yes

● B21 and B22 features available only with LSG, LSIG and ALSIG trip units.

● Arcflash Reduction Maintenance System and zone selective interlocking are only available with LSI and LSIG trip units.

● B2x suffixes cannot be combined with other B2x suffixes; however, they may be combined with suffix ZG.

● LSG, LSIG and ALSIG trip units are not available in four-pole breakers with neutral protection.

● Four-pole trip units include fully protected neutral pole; contact Eaton for other four-pole requirements.

For additional information, please refer to the following publications:

	FD 210+	FD 310+	JG 310+	KD 310+	LG 310+	LD 310+	MDL 310+	NG 310+	RG 310+
Product aid	PA012010EN	PA01200006E	PA01200004E	PA012003EN	PA01200004E	PA012006EN	PA012007EN	PA01209001E	PA01209002E
Time current curves	TC01200002E	TC01200002E	TC01204008E	AD29167K	TC01200003E	TD012035EN	TD012036EN	TC01209009E	TC01210019E
Technical document	TD01203013E	TD01203013E	TD01213001E	AD29170K	TD01200001E			TD03801003E	TD01209004E
Instructional leaflet	IL01203001E	IL01203001E	IL01204002E	IL012001E	IL01207006E	IL012043EN	IL012043EN	IL01209005E	IL29C107N

