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# LCP Coordination Panel Operations & Maintenance Manual

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# OVERVIEW

The Littelfuse LCP Selective Coordination Panel uses circuit breakers in series with fuses and fuse holders to respond to overloads and short-circuits, respectively, in order to achieve selective coordination. The National Electric Code® (NEC) mandates that certain systems be selectively coordinated (specifics are highlighted on pg. 02), and the LCP Coordination Panel is specifically designed to meet those requirements.

Each unit is custom-built based on an engineering specification, and official technical drawings are carefully reviewed and approved by the specifying engineer before the product is manufactured in order to ensure it meets the requirements. The purpose of this document is to provide technical information about the LCP Coordination Panel and address potential questions end-users may have.

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# NEC® REQUIREMENTS FOR SELECTIVE COORDINATION

## Healthcare Essential Electrical Systems (NEC® 517.26)

References Article 700 Emergency Systems. The following facilities will have essential lighting and power systems for life safety:

- Clinics
- Hospitals
- Nursing homes
- Medical and dental offices
- Outpatient facilities
- Other healthcare facilities

## Elevators (NEC® 620.62)

May include the following circuits per the local agency having jurisdiction:

- Elevators
- Dumbwaitor
- Escalator
- Moving walks
- Platform lifts
- Stairway chair lifts

## Emergency Systems (NEC® 700.27)

May include the following circuits per the local agency having jurisdiction:

- Emergency lighting
- Ventilation
- Fire detection and alarm systems
- Elevators
- Fire pumps
- Industrial processes where interruption would be hazardous

## Legally Required Standby Systems (NEC® 701.18)

May include the following circuits per the local agency having jurisdiction:

- Heating and refrigeration
- Communications systems
- Ventilation and smoke removal
- Sewage disposal

## Critical Operations Power Systems (NEC® 708.54)

High reliability for critical operations during natural disasters and other threats. May include the following circuits per the local agency having jurisdiction:

- Power systems
- HVAC
- Fire alarm
- Security
- Communications

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# LCP DATASHEET

## Description

The Littelfuse® Coordination Panel provides a simple, time-saving solution for circuits that require selective coordination. This UL Listed product saves time and money, and increases safety by minimizing system downtime.

## Applications

- Elevators
- Hospitals
- Hotel and Entertainment Industry
- Amusement Parks and Stadiums

## Code Requirements

Systems required by the NEC® to be selectively coordinated include:

- Health Care Essential Electrical Systems (NEC 517.26)
- Elevators (NEC 620.62)
- Emergency Systems (NEC 700.27)
- Legally Required Standby Systems (NEC 701.18)
- Critical Operations Power Systems (NEC 708.54)

## Features/Benefits

- Meets NEC® requirements
- Class CC and J fuse holders have built-in open-circuit indication
- Fast-acting UL Listed fuses protect against short circuits
- Feed through/sub feed lugs and 84-circuit configuration available
- Ground and neutral bars
- Copper bus standard

## Advanced Design Options

- MLO, Main Circuit Breaker, or Main Fused Pullout device
- Fused Class T branch circuit pullout
- Spare fuse cabinet accessory (holds six spare fuses)
- TVSS overvoltage protection
- Any NEMA enclosure required
- High amperage sub-fed branch breakers (J60A)
- Unique Specifier Tool (see pg. 146) to easily identify panel configurations from tens of thousands of options

## Specifications

| | |
|---|---|
| **Voltage Ratings** | 120/208, 120/240, 277/480 VAC |
| **Main Bus Rating** | 100 A - 400 A Standard |
| **Conductor Terminals** | 6 AWG - 300 kcmil |
| **UL Listed** | UL 67 Panel boards and UL 50 Enclosures |

## Web Resources

For more information, visit:
**littelfuse.com/lcp**

## Customizable Options (select one from each column)

| NUMBER OF CIRCUITS | VOLTAGE | MAIN DEVICES | NEUTRAL RATING | PANEL MOUNTING | PANEL DOOR | FUSE HOLDERS | BRANCH CIRCUIT PROTECTION DEVICES (1-3 POLE)† | PANEL FEED | OPTIONAL LUGS | STANDARD ENCLOSURE RATING |
|---|---|---|---|---|---|---|---|---|---|---|
| 2 - 42 | 120/208 V 3P, 4 W | 125, 225, 400 or 600 A MLO | 100% | Surface | Standard | 30 A Class CC | 10 A-60 A fused circuit breaker | Top | None | NEMA 1 |
| | 120/240 V 1P, 3 W | Up to 600 A MCB or Main Fuse Pullout | 200% | Flush | Door-in-door | 60 A Class J | 60 A-200 A fused pullouts | Bottom | Sub-Fed (MLO panels) | NEMA 3R |
| | 277/480 V 3P, 4 W | | | | | | Sub-fed circuit breakers >60 A (not fused) | | Feed-Through | NEMA 4X |

†Fuses quoted separately to meet panel specifications. Coordination for breakers >60 A depends on upstream and downstream devices. More specialized configurations are also available. Contact factory for more information.

*Note: The Littelfuse LPS and LCP products are custom designed products that fall outside standard specifications.*


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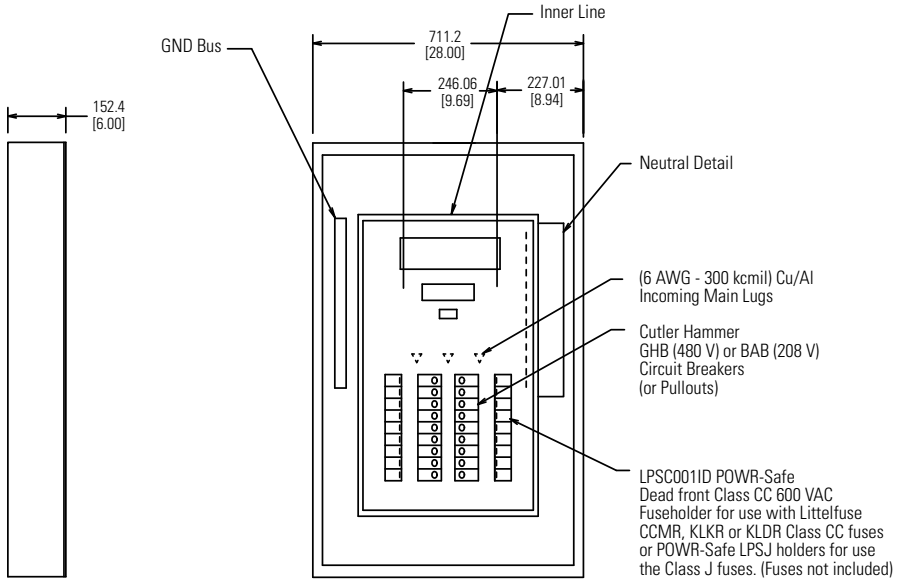
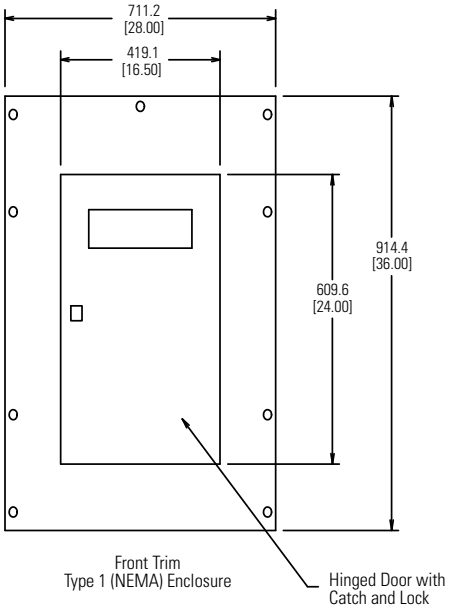
# LCP DATASHEET

## Dimensions mm (inches)

### Standard Coordination Panel Board (up to 30 circuits)

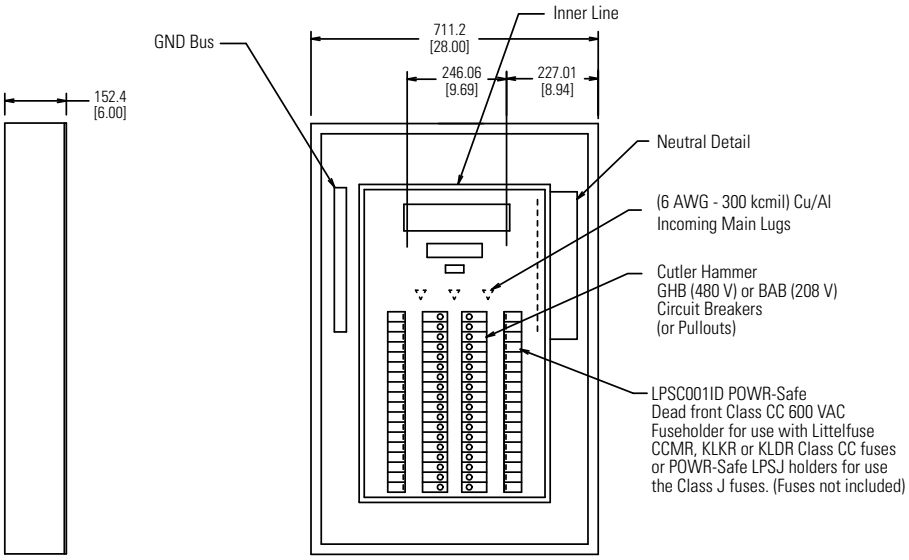



Front View with Front Removed

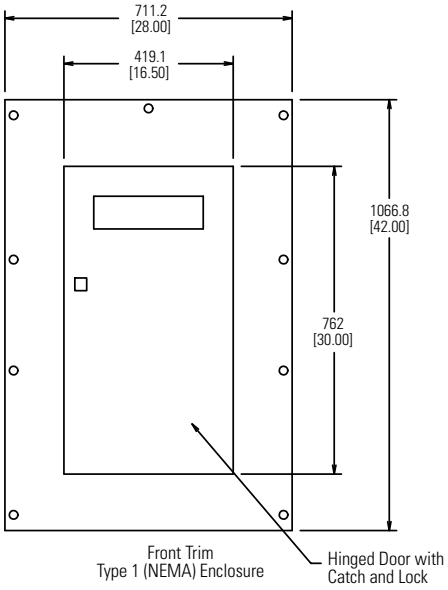



Front Trim
Type 1 (NEMA) Enclosure

### Standard Coordination Panel Board (31-42 circuits)




Front View with Front Removed




Front Trim
Type 1 (NEMA) Enclosure

*Note: The Littelfuse LPS and LCP products are custom designed products that fall outside standard specifications.*

Dimensions may change depending on panel components.
More specialized configurations are also available.
Contact factory for more information.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# CCMR SERIES POWR-PRO® FUSES - DATASHEET

POWR-PRO® 600 Vac • Dual Element • Time-Delay • 2/10-60 A

## Description

The CCMR series is ideal for space saving protection of motors up to 40 hp*. It was designed specifically to withstand sustained starting currents of small motors. The CCMR 60 fuse is the smallest 60 A fuse available rated at 600 V. Compared to other UL Listed fuses, Class CC fuses are the most current-limiting, rating for rating.

## Features/Benefits

- POWR-PRO Performance
- Extremely current-limiting
- Ratings up to 60 Amps
- 300 kA Interrupting Rating (self-certified)

## Applications

- Motor and motor branch circuit protection

## Specifications

| | |
|---|---|
| **Voltage Rating** | AC: 600 V<br>DC: 250 V (CCMR 2/10– 2 A)<br>(CCMR 4 1/2– 10 A)<br>(CCMR 35– 60 A)<br>300 V (CCMR 2 1/4– 4 A)<br>500 V (CCMR 12– 30 A) |
| **Amperage Rating** | 2/10 – 60 A |
| **Interrupting Rating** | AC: 200 kA rms symmetrical<br>300 kA Littelfuse self-certified<br>DC: 20 kA |
| **Approvals** | AC: Standard 248-4, Class CC<br>UL Listed 2/10-30 A (File: E81895)<br>Standard 248, Class CD<br>UL Listed 35-60 A (File: E81895)<br>CSA Certified (File: LR29862)<br>DC: Littelfuse self-certified |
| **Environmental** | RoHS Compliant (except 35-60 A) |
| **Country of Origin** | Mexico |

## Ordering Information

| AMPERAGE RATINGS | | | | | | |
|---|---|---|---|---|---|---|
| 2/10 | 1 | 2 | 3 1/2 | 6 1/4 | 12 | 35 |
| 1/4 | 1 1/4 | 2 1/4 | 4 | 7 | 15 | 40 |
| 3/10 | 1 4/10 | 2 1/2 | 4 1/2 | 7 1/2 | 17 1/2 | 45 |
| 1/2 | 1 1/2 | 2 8/10 | 5 | 8 | 20 | 50 |
| 6/10 | 1 6/10 | 3 | 5 6/10 | 9 | 25 | 60 |
| 8/10 | 1 8/10 | 3 2/10 | 6 | 10 | 30 | |

| SERIES | AMPERAGE | ROHS | CATALOG NUMBER | ORDERING NUMBER |
|---|---|---|---|---|
| CCMR | 10 | • | CCMR010 | CCMR010.TXP |
| CCMR | 45 | | CCMR045 | CCMR045.T |

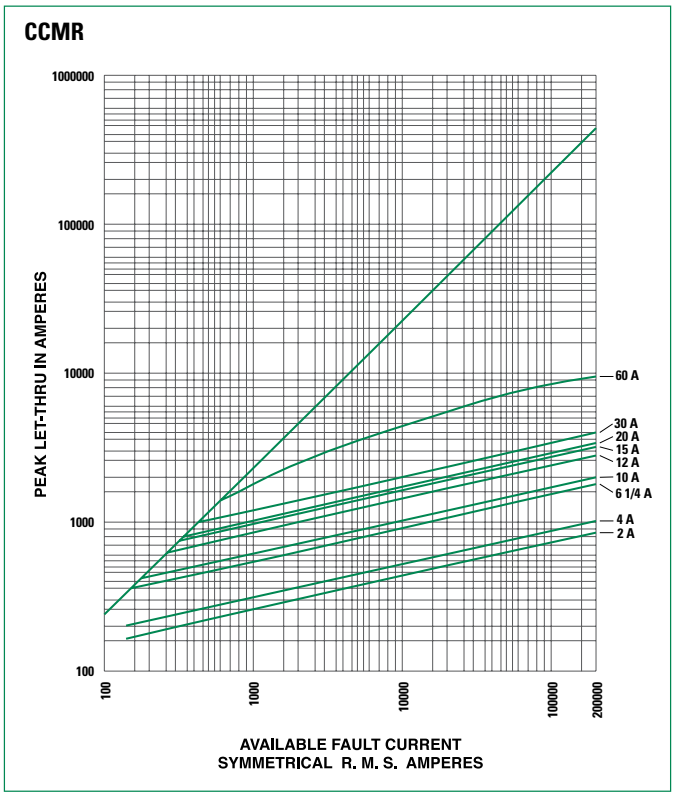
## Web Resources

TC Curves, downloadable CAD drawings and other technical information: **www.littelfuse.com/ccmr**

## Recommended Fuseholders

LFC600 Series
L60030C Series
LFPSC Touch-Safe Series

## Peak Let-Thru Curve





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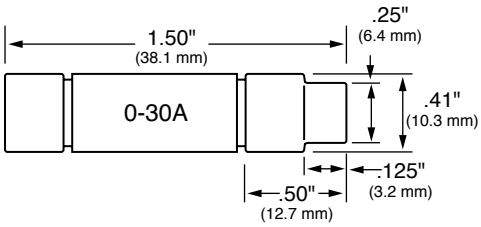
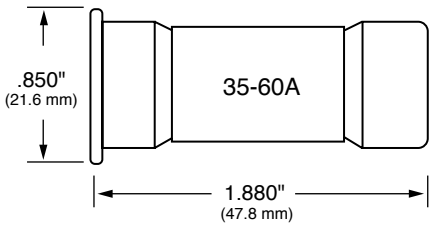
# CCMR SERIES POWR-PRO® FUSES - DATASHEET

## Dimensions in inches (mm)




## Current-Limiting Effects

| SHORT CIRCUIT CURRENT* | APPARENT RMS SYMMETRICAL CURRENT FOR VARIOUS FUSE RATINGS | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2.25A | 2.5A | 3A | 4A | 5A | 6.25A | 7.5A | 8A | 10A | 12A | 15A | 20A | 30A | 35A | 40A | 45A | 50A | 60A |
| 5,000 | 203 | 224 | 287 | 289 | 460 | 472 | 442 | 437 | 359 | 369 | 435 | 355 | 621 | 1,170 | 1,240 | 1,320 | 1,070 | 1,525 |
| 10,000 | 256 | 282 | 361 | 364 | 580 | 595 | 557 | 551 | 452 | 465 | 548 | 447 | 783 | 1,480 | 1,565 | 1,670 | 1,355 | 1,930 |
| 15,000 | 293 | 323 | 413 | 416 | 664 | 681 | 637 | 631 | 517 | 532 | 627 | 512 | 896 | 1,695 | 1,795 | 1,915 | 1,555 | 2,200 |
| 20,000 | 323 | 356 | 455 | 458 | 730 | 750 | 702 | 694 | 569 | 585 | 690 | 563 | 987 | 1,870 | 1,980 | 2,110 | 1,710 | 2,430 |
| 25,000 | 348 | 383 | 490 | 493 | 787 | 808 | 756 | 748 | 613 | 630 | 743 | 607 | 1,063 | 2,015 | 2,135 | 2,275 | 1,845 | 2,620 |
| 30,000 | 370 | 407 | 521 | 524 | 836 | 858 | 803 | 795 | 651 | 670 | 790 | 645 | 1,129 | 2,145 | 2,270 | 2,420 | 1,965 | 2,780 |
| 35,000 | 389 | 429 | 548 | 552 | 880 | 903 | 845 | 837 | 686 | 705 | 832 | 679 | 1,189 | 2,260 | 2,390 | 2,550 | 2,070 | 2,885 |
| 40,000 | 407 | 448 | 573 | 577 | 920 | 944 | 884 | 875 | 717 | 737 | 870 | 709 | 1,243 | 2,360 | 2,500 | 2,665 | 2,165 | 3,025 |
| 50,000 | 438 | 483 | 617 | 622 | 991 | 1,017 | 952 | 942 | 772 | 794 | 937 | 764 | 1,339 | 2,545 | 2,695 | 2,875 | 2,330 | 3,200 |
| 60,000 | 466 | 513 | 656 | 661 | 1,053 | 1,081 | 1,012 | 1,001 | 821 | 844 | 995 | 812 | 1,423 | 2,705 | 2,865 | 3,055 | 2,480 | 3,350 |
| 80,000 | 513 | 564 | 722 | 727 | 1,159 | 1,190 | 1,114 | 1,102 | 903 | 929 | 1,096 | 894 | 1,566 | 2,985 | 3,160 | 3,365 | 2,730 | 3,540 |
| 100,000 | 552 | 608 | 778 | 783 | 1,249 | 1,282 | 1,200 | 1,187 | 973 | 1,001 | 1,180 | 963 | 1,687 | 3,215 | 3,405 | 3,630 | 2,945 | 3,685 |
| 150,000 | 632 | 696 | 890 | 897 | 1,430 | 1,467 | 1,373 | 1,359 | 1,114 | 1,146 | 1,351 | 1,102 | 1,931 | 3,685 | 3,905 | 4,160 | 3,375 | 4,030 |
| 200,000 | 696 | 766 | 980 | 987 | 1,574 | 1,615 | 1,511 | 1,496 | 1,226 | 1,261 | 1,487 | 1,213 | 2,125 | 4,060 | 4,300 | 4,580 | 3,720 | 4,230 |

*Prospective RMS Symmetrical Amperes Short-Circuit Current
*Note: Data Derived from Peak Let-Thru Curves*

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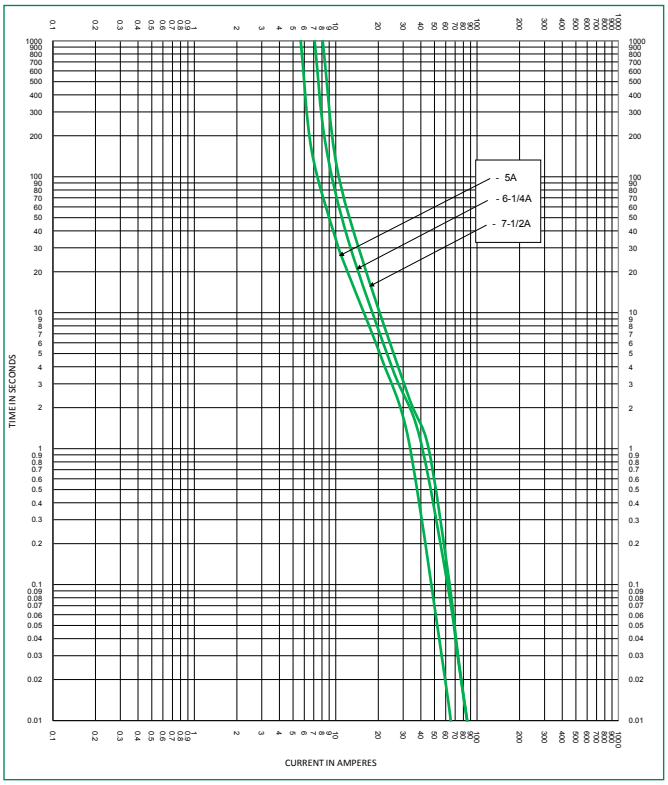
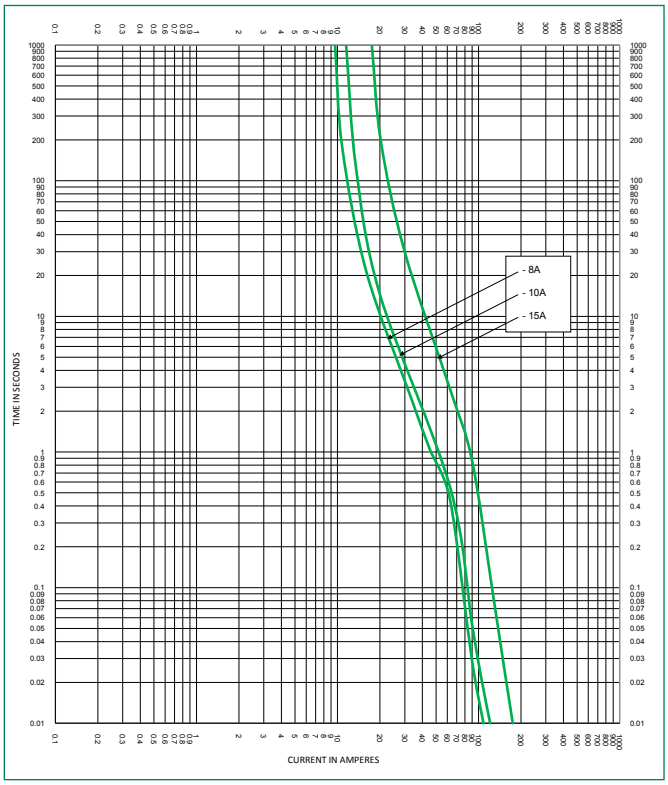
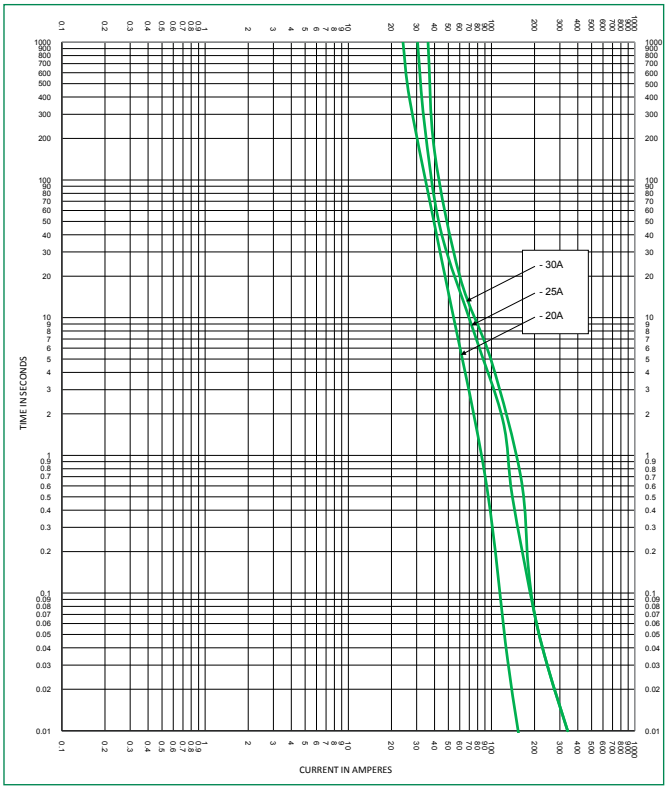
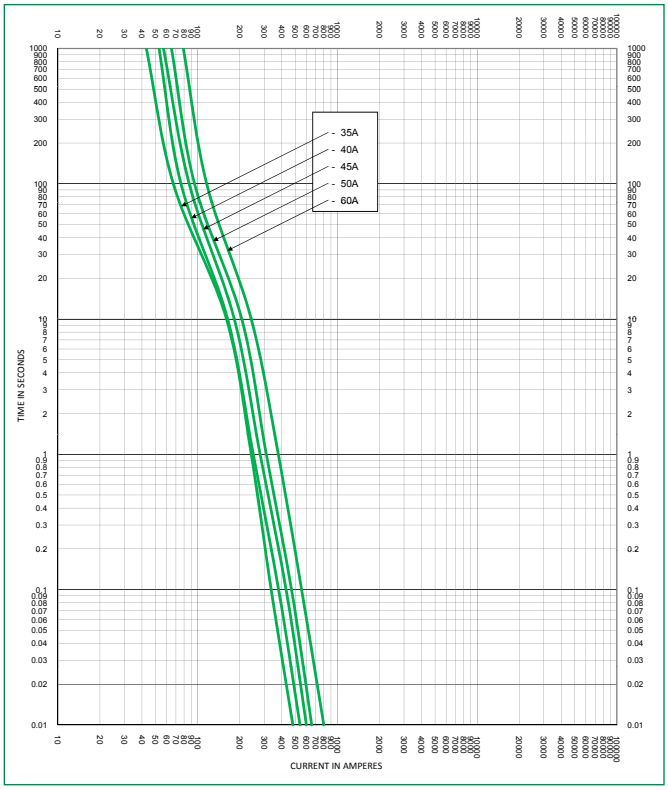
# CCMR SERIES POWR-PRO® FUSES - DATASHEET

## Time Current Curves



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# JTD SERIES INDICATOR POWR-PRO® FUSES - DATASHEET

POWR-PRO® 600 VAC • Time Delay • 8/10 – 600 A

## Specifications

| | |
|---|---|
| **Voltage Ratings** | AC: 600 V<br>DC: 300 V (8/10–100 A)<br>500 V (110–600 A) |
| **Amperage Range** | 8/10–600 A |
| **Interrupting Rating** | AC: 200 kA rms symmetrical<br>300kA rms symmetrical<br>(Littelfuse self-certified)<br>DC: 20 kA |
| **Material** | Body: Melamine<br>Caps: Nickel-plated Bronze (8/10–60 A)<br>Brass (70–200 A)<br>Brass Cap with Copper Blade (225–600 A) |
| **Approvals** | AC: Standard 248-8, Class J<br>UL Listed (File: E81895)<br>CSA Certified (File: LR29862)<br>DC: Littelfuse self-certified |
| **Country of Origin** | Mexico |

## Description

The Littelfuse POWR-PRO® JTD_ID Indicator Class J fuse provides visual blown fuse indication and maximum protection in a compact package. The current-limiting time delay JTD_ID offers a patented design which reduces nuisance fuse openings.

## Features/Benefits

- POWR-PRO® Performance
- Current-Limiting
- IEC Type 2 Protection
- Indication and non-indication version available
- Indicating and DIN mount holders available

## Applications

- Fused combination motor controllers and motor control centers
- Transformer protection
- Protection for series rated molded case circuit-breaker panels
- General purpose circuits

## Ordering Information

| AMPERAGE RATINGS | | | | | | | |
|---|---|---|---|---|---|---|---|
| 8/10 | 2¼ | 4½ | 10 | 35 | 90 | 225 | 600 |
| 1 | 2½ | 5 | 12 | 40 | 100 | 250 | – |
| 1¼ | 2 8/10 | 5 6/10 | 15 | 45 | 110 | 300 | – |
| 1½ | 3 | 6 | 17½ | 50 | 125 | 350 | – |
| 1 6/10 | 3 2/10 | 7 | 20 | 60 | 150 | 400 | – |
| 1 8/10 | 3½ | 8 | 25 | 70 | 175 | 450 | – |
| 2 | 4 | 9 | 30 | 80 | 200 | 500 | – |

| TYPE | SERIES | AMPERAGE | CATALOG NUMBER | ORDERING NUMBER |
|---|---|---|---|---|
| INDICATING | JTD_ID | 60 | JTD60ID | 0JTD060.TXID |
| NON-INDICATING | JTD | 60 | JTD60 | 0JTD060.T |

## Web Resources

Time-current curves, data sheets and additional technical information: **littelfuse.com/jtd**

## Recommended Fuse Holders

LFJ60 Series
LFPSJ Series (8/10–60 A)


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# JTD SERIES INDICATOR POWR-PRO® FUSES - DATASHEET

## Dimensions Inches (mm)

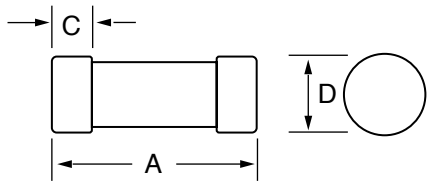


Fig. 1

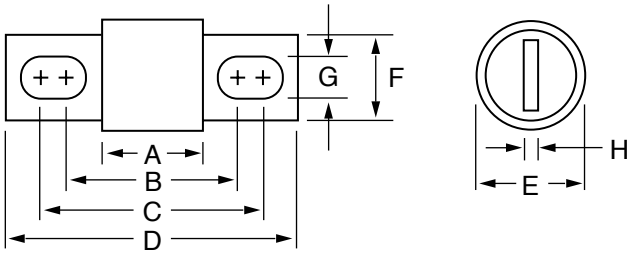


Fig. 2

## Dimensions of JTD_ID & JTD

| AMPERAGE | FIG. NO. | DIMENSIONS INCHES (mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | F | G | H |
| 1 – 30 | 1 | 2¼ (57.2) | — | ½ (12.7) | 13⁄16 (20.6) | — | — | — | — |
| 35 – 60 | 1 | 2⅜ (60.3) | — | ⅝ (15.9) | 1 1⁄16 (27.0) | — | — | — | — |
| 70 – 100 | 2 | 2⅝ (66.7) | 3 17⁄32 (89.7) | 3 23⁄32 (94.5) | 4⅝ (117.5) | 1⅛ (28.6)* | ¾ (19.1) | 9⁄32 (7.1) | ⅛ (3.2) |
| 110 – 200 | 2 | 3 (76.2) | 4 9⁄32 (108.7) | 4 15⁄32 (113.5) | 5¾ (146.1) | 1½ (38.1) | 1⅛ (28.6) | 9⁄32 (7.1) | 3⁄16 (4.8) |
| 225 – 400 | 2 | 3⅜ (85.7) | 5⅛ (130.2) | 5⅜ (136.5) | 7⅛ (181.0) | 2 (50.8) | 1⅝ (41.3) | 13⁄32 (10.3) | ¼ (6.4) |
| 450 – 600 | 2 | 3¾ (95.3) | 5 27⁄32 (148.4) | 6 5⁄32 (156.4) | 8 (203.2) | 2½ (63.5) | 2 (50.8) | 17⁄32 (13.5) | ⅜ (9.5) |

## Electrical Specifications

| ORDERING NUMBER | AMPERAGE RATING | VOLTAGE RATING | | INTERRUPTING RATING | | WATTS LOSS AT 100% RATED CURRENT (W) | WATTS LOSS AT 80% RATED CURRENT (W) | TOTAL CLEARING $I^2T$ ($A^2$ SEC) 200 kA | AGENCY APPROVALS | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | AC | DC | AC | DC | | | | UL | CSA |
| 0JTD003.T | 3 | 600 | 300 | 200 kA | 20 kA | 4.537 | 2.801 | 820 | • | • |
| 0JTD010.T | 10 | 600 | 300 | 200 kA | 20 kA | 4.087 | 2.418 | 1690 | • | • |
| 0JTD030.T | 30 | 600 | 300 | 200 kA | 20 kA | 4.247 | 2.92 | 4754 | • | • |
| 0JTD060.T | 60 | 600 | 300 | 200 kA | 20 kA | 6.447 | 3.83 | 10450 | • | • |
| 0JTD100.V | 100 | 600 | 300 | 200 kA | 20 kA | 7.463 | 4.447 | 68150 | • | • |
| 0JTD200.X | 200 | 600 | 500 | 200 kA | 20 kA | 18.39 | 10.187 | 159000 | • | • |
| 0JTD400.X | 400 | 600 | 500 | 200 kA | 20 kA | 40.037 | 23.463 | 1055000 | • | • |
| 0JTD600.X | 600 | 600 | 500 | 200 kA | 20 kA | 61.187 | 34.983 | 1970000 | • | • |

## Fuse Weight

| AMPERAGE | JTD-ID (POUNDS) | JTD-ID (GRAMS) | JTD (POUNDS) | JTD (GRAMS) |
|---|---|---|---|---|
| 8/10–3 1/2 | 0.088 | 39.92 | 0.084 | 38.10 |
| 4–12 | 0.090 | 40.82 | 0.086 | 39.01 |
| 15–30 | 0.090 | 40.82 | 0.086 | 39.01 |
| 35–60 | 0.180 | 81.65 | 0.176 | 79.83 |
| 70–100 | 0.242 | 109.77 | 0.238 | 107.95 |
| 110–200 | 0.774 | 351.08 | 0.770 | 349.27 |
| 225–400 | 1.704 | 772.92 | 1.700 | 771.11 |
| 450–600 | 3.124 | 1417.02 | 3.120 | 1415.21 |


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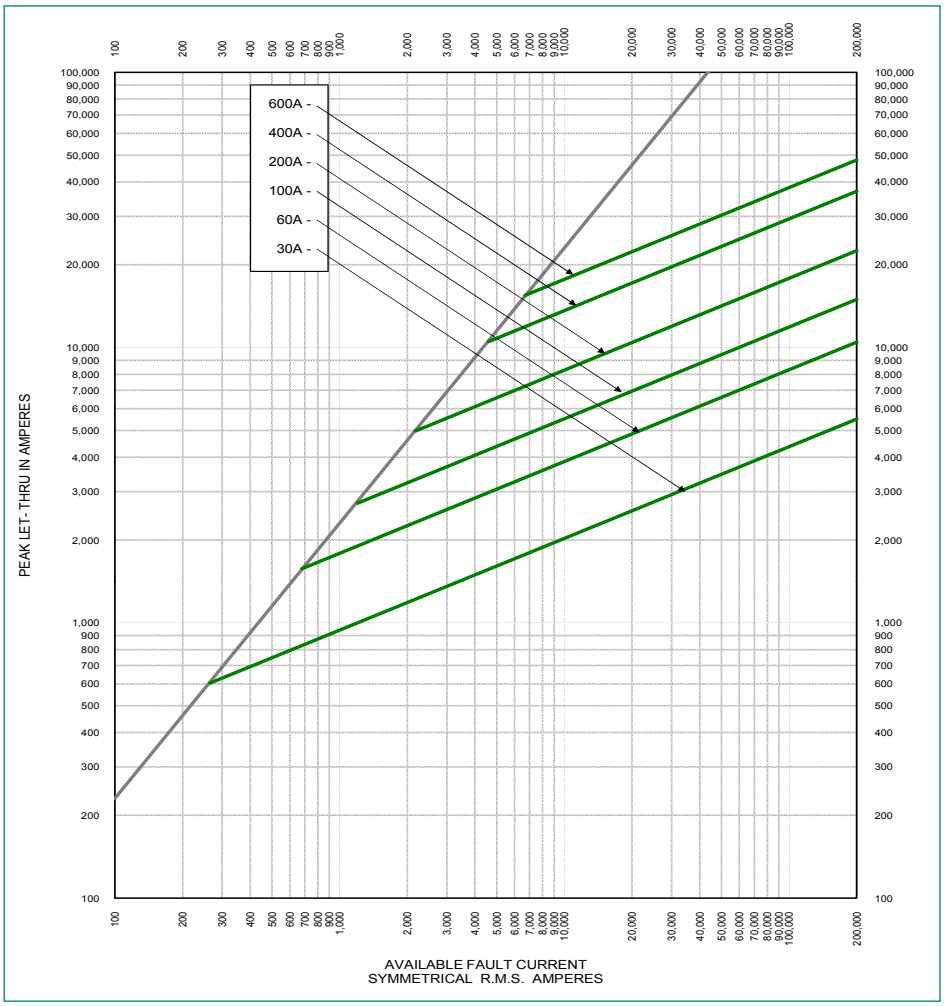
# JTD SERIES INDICATOR POWR-PRO® FUSES - DATASHEET

## Current-Limiting Effects of JTD & JTD_ID (600 V) Fuses

| SHORT CIRCUIT CURRENT† | APPARENT RMS SYMMETRICAL CURRENT FOR VARIOUS FUSE RATINGS | | | | | |
|---|---|---|---|---|---|---|
| | 30 A | 60 A | 100 A | 200 A | 400 A | 600 A |
| 5,000 | 699 | 1,331 | 1,903 | 2,858 | 4,702 | - |
| 10,000 | 881 | 1,676 | 2,397 | 3,601 | 5,925 | 7,689 |
| 15,000 | 1,008 | 1,919 | 2,744 | 4,123 | 6,782 | 8,802 |
| 20,000 | 1,110 | 2,112 | 3,020 | 4,537 | 7,464 | 9,687 |
| 25,000 | 1,196 | 2,275 | 3,254 | 4,888 | 8,041 | 10,436 |
| 30,000 | 1,271 | 2,418 | 3,457 | 5,194 | 8,545 | 11,089 |
| 35,000 | 1,338 | 2,545 | 3,640 | 5,468 | 8,995 | 11,674 |
| 40,000 | 1,398 | 2,661 | 3,805 | 5,717 | 9,405 | 12,205 |
| 50,000 | 1,506 | 2,867 | 4,099 | 6,158 | 10,131 | 13,148 |
| 60,000 | 1,601 | 3,046 | 4,356 | 6,544 | 10,766 | 13,972 |
| 80,000 | 1,762 | 3,353 | 4,795 | 7,203 | 11,849 | 15,378 |
| 100,000 | 1,898 | 3,612 | 5,165 | 7,759 | 12,764 | 16,565 |
| 150,000 | 2,173 | 4,134 | 5,912 | 8,882 | 14,611 | 18,963 |
| 200,000 | 2,391 | 4,551 | 6,507 | 9,776 | 16,082 | 20,871 |

†Prospective RMS Symmetrical Amperes Short-Circuit Current
*Note: Data derived from Peak Let-Thru Curves*

## Peak Let-Thru Curve (JTD & JTD_ID)





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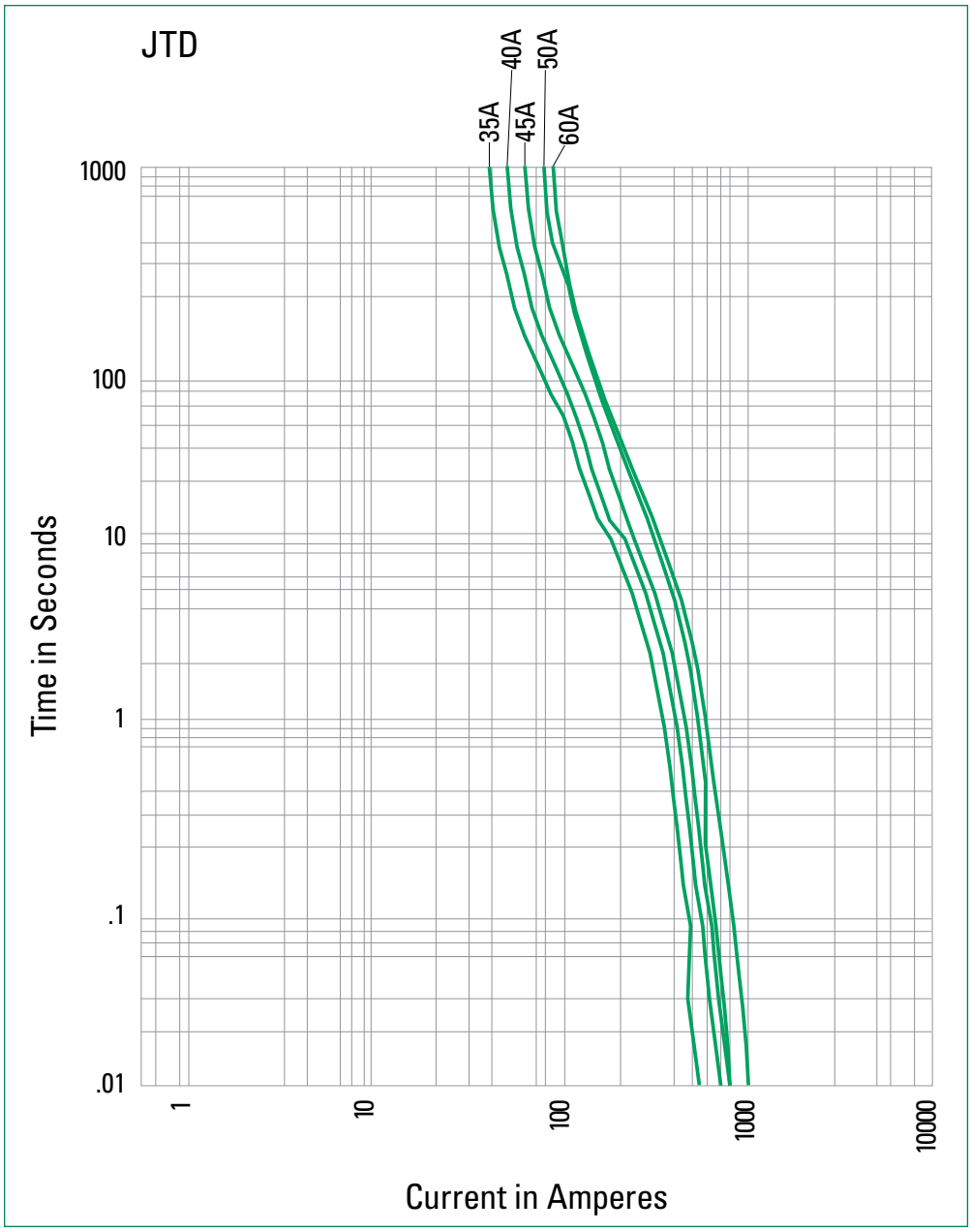
# JTD SERIES INDICATOR POWR-PRO® FUSES - DATASHEET

## Time Current Curves





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# CUTLER-HAMMER - BAB DATASHEET

*excerpts from eaton.com

Cutler-Hammer

March 1999

## Miniature Circuit Breakers
## QUICKLAG® Industrial Circuit Breakers

**QUICKLAG Industrial Circuit Breakers Bolt-on**

## Description

**Built and Listed to UL 489**

**QUICKLAG Circuit Breakers Bolt-on Type**

Type BA: 10-125 Amperes, 10,000 AIC

**Breaker Catalog Numbers**

| Continuous Ampere Rating at 40°C | Catalog Number | | | |
|---|---|---|---|---|
| | 1-Pole①② | 2-Pole①② | | 3-Pole①② |
| | 120/240 Vac | 120/240 Vac | 240 Vac | 240 Vac |
| **QUICKLAG Type: BA 10,000 Ampere I.C. Thermal-Magnetic Breakers** | | | | |
| 10 | BAB1010 | BAB2010 | BAB2010H | BAB3010H |
| 15 | BAB1015③④ | BAB2015 | BAB2015H | BAB3015H |
| 20 | BAB1020③④ | BAB2020 | BAB2020H | BAB3020H |
| 25 | BAB1025 | BAB2025 | BAB2025H | BAB3025H |
| 30 | BAB1030 | BAB2030 | BAB2030H | BAB3030H |
| 35 | BAB1035 | BAB2035 | BAB2035H | BAB3035H |
| 40 | BAB1040 | BAB2040 | BAB2040H | BAB3040H |
| 45 | BAB1045 | BAB2045 | BAB2045H | BAB3045H |
| 50 | BAB1050 | BAB2050 | BAB2050H | BAB3050H |
| 55 | BAB1055 | BAB2055 | BAB2055H | BAB3055H |
| 60 | BAB1060 | BAB2060 | BAB2060H | BAB3060H |
| 70 | BAB1070 | BAB2070 | BAB2070H | BAB3070H |
| 80 | – | BAB2080 | BAB2080H | BAB3080H |
| 90 | – | BAB2090 | BAB2090H | BAB3090H |
| 100 | BAB1100 | BAB2100 | BAB2100H | BAB3100H |
| 110 | – | BAB2110 | – | – |
| 125 | – | BAB2125 | – | – |

*QUICKLAG Type BA 1-Pole*

*QUICKLAG Type BA 2-Pole*

*QUICKLAG Type BA 3-Pole*

① All products UL and CSA listed.
② All products 15-100A are HACR rated.
③ Switching duty rated for 120 Vac fluorescent light applications.
④ For special low-magnetic breaker order BAB1015L1 or BAB1020L1.

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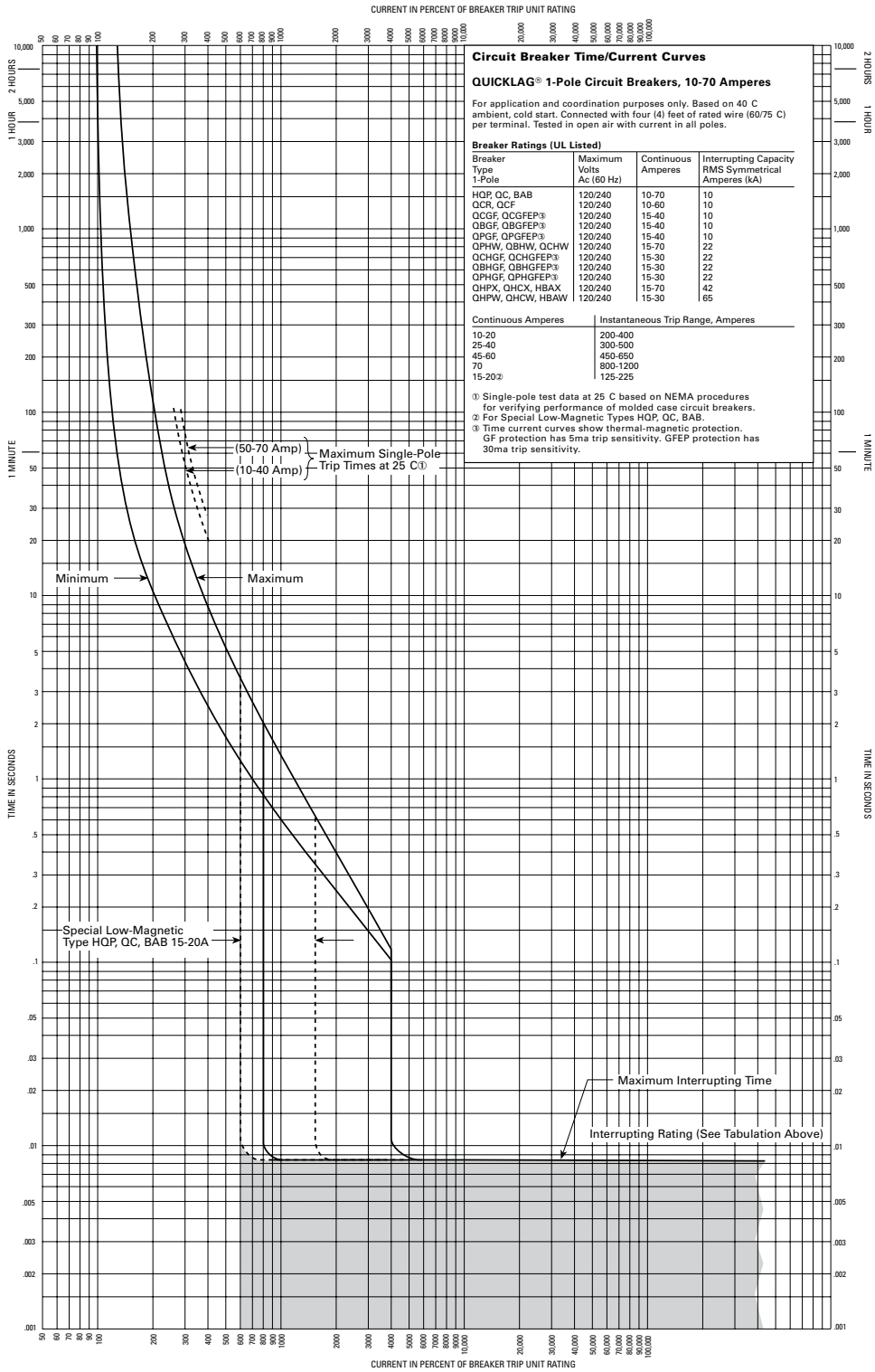
# CUTLER-HAMMER - BAB DATASHEET

*excerpts from eaton.com

## QUICKLAG 1-Pole Circuit Breakers, 10-70 Amperes




**Circuit Breaker Time/Current Curves**

**QUICKLAG® 1-Pole Circuit Breakers, 10-70 Amperes**

For application and coordination purposes only. Based on 40 C ambient, cold start. Connected with four (4) feet of rated wire (60/75 C) per terminal. Tested in open air with current in all poles.

**Breaker Ratings (UL Listed)**

| Breaker Type 1-Pole | Maximum Volts Ac (60 Hz) | Continuous Amperes | Interrupting Capacity RMS Symmetrical Amperes (kA) |
|---|---|---|---|
| HQP, QC, BAB | 120/240 | 10-70 | 10 |
| QCR, QCF | 120/240 | 10-60 | 10 |
| QCGF, QCGFEP③ | 120/240 | 15-40 | 10 |
| QBGF, QBGFEP③ | 120/240 | 15-40 | 10 |
| QPGF, QPGFEP③ | 120/240 | 15-40 | 10 |
| QPHW, QBHW, QCHW | 120/240 | 15-70 | 22 |
| QCHGF, QCHGFEP③ | 120/240 | 15-30 | 22 |
| QBHGF, QBHGFEP③ | 120/240 | 15-30 | 22 |
| QPHGF, QPHGFEP③ | 120/240 | 15-30 | 22 |
| QHPX, QHCX, HBAX | 120/240 | 15-70 | 42 |
| QHPW, QHCW, HBAW | 120/240 | 15-30 | 65 |

| Continuous Amperes | Instantaneous Trip Range, Amperes |
|---|---|
| 10-20 | 200-400 |
| 25-40 | 300-500 |
| 45-60 | 450-650 |
| 70 | 800-1200 |
| 15-20② | 125-225 |

① Single-pole test data at 25 C based on NEMA procedures for verifying performance of molded case circuit breakers.
② For Special Low-Magnetic Types HQP, QC, BAB.
③ Time current curves show thermal-magnetic protection. GF protection has 5ma trip sensitivity. GFEP protection has 30ma trip sensitivity.

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**Curve No. SC-3500-77C**


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# CUTLER-HAMMER - GHB DATASHEET

*excerpts from eaton.com

Cutler-Hammer

March 1999

## Molded Case Circuit Breakers 15-100 Amperes

**Series C® G-Frame**

## Types GB and GHB Bolt-On Panelboard Circuit Breakers

*Typical GB*

These breakers meet the requirements of Federal Specification W-C-375b as follows:

Types GB, GHB, 120 and 240 Volts:
1 Pole: Class 11a.
2, 3 Poles: Classes 10b, 11b, 12b, 14b, 15b

Type GHB, 277 and 480Y/277 Volts:
1 Pole: Classes 12c, 13a
2, 3 Poles: Class 13b

① 15 through 70 ampere circuit breakers only.
② Use (2) outside poles.
③ Uses .190-32 screw type clamp terminals.
④ 480Y/277V, circuit breakers (Type GHB) not suitable for 3-phase Delta (480V).

### Type GB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

| Continuous Ampere Rating @ 40°C | 120 Vac Maximum, 125 Vdc Maximum① | 240 Vac Maximum, 125/250 Vdc Maximum | 240 Vac Maximum, 125/250 Vdc Maximum② |
|---|---|---|---|
| | 1-Pole | 2-Pole | 3-Pole |
| | Catalog Number | | |
| 15 | GB1015③ | GB2015③ | GB3015③ |
| 20 | GB1020③ | GB2020③ | GB3020③ |
| 25 | GB1025 | GB2025 | GB3025 |
| 30 | GB1030 | GB2030 | GB3030 |
| 35 | GB1035 | GB2035 | GB3035 |
| 40 | GB1040 | GB2040 | GB3040 |
| 45 | GB1045 | GB2045 | GB3045 |
| 50 | GB1050 | GB2050 | GB3050 |
| 60 | GB1060 | GB2060 | GB3060 |
| 70 | GB1070 | GB2070 | GB3070 |
| 80 | GB1080 | GB2080 | GB3080 |
| 90 | GB1090 | GB2090 | GB3090 |
| 100 | GB1100 | GB2100 | GB3100 |

### Type GHB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units④

| Continuous Ampere Rating @ 40°C | 277/480 Vac Maximum, 125 Vdc Maximum① | 277/480 Vac Maximum, 125/250 Vdc Maximum | 277/480 Vac Maximum, 125/250 Vdc Maximum② |
|---|---|---|---|
| | 1-Pole | 2-Pole | 3-Pole |
| | Catalog Number | | |
| 15 | GHB1015③ | GHB2015③ | GHB3015③ |
| 20 | GHB1020③ | GHB2020③ | GHB3020③ |
| 25 | GHB1025 | GHB2025 | GHB3025 |
| 30 | GHB1030 | GHB2030 | GHB3030 |
| 35 | GHB1035 | GHB2035 | GHB3035 |
| 40 | GHB1040 | GHB2040 | GHB3040 |
| 45 | GHB1045 | GHB2045 | GHB3045 |
| 50 | GHB1050 | GHB2050 | GHB3050 |
| 60 | GHB1060 | GHB2060 | GHB3060 |
| 70 | GHB1070 | GHB2070 | GHB3070 |
| 80 | GHB1080 | GHB2080 | GHB3080 |
| 90 | GHB1090 | GHB2090 | GHB3090 |
| 100 | GHB1100 | GHB2100 | GHB3100 |

Instruction Leaflet/FRED Number 15547

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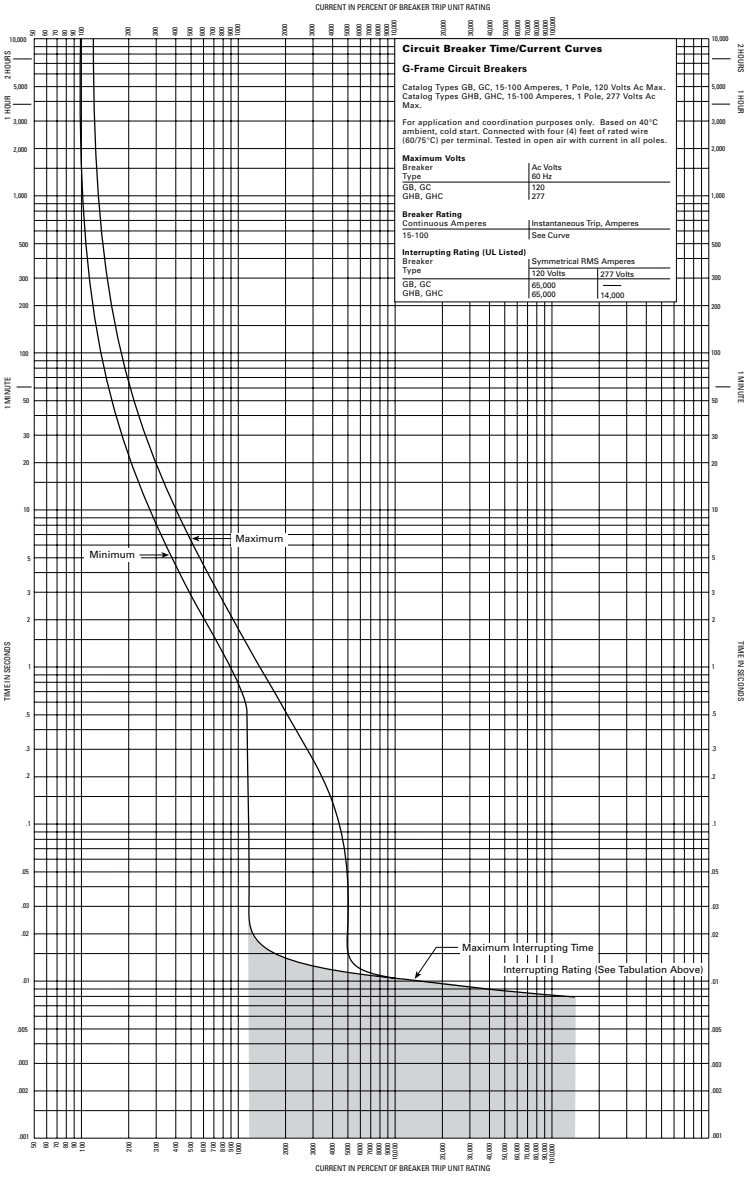
# CUTLER-HAMMER - GHB DATASHEET

*excerpts from eaton.com

## AB DE-ION Circuit Breakers

**Types GHB 15-100 Amperes, 1 Pole**




**Circuit Breaker Time/Current Curves**

**G-Frame Circuit Breakers**

Catalog Types GB, GC, 15-100 Amperes, 1 Pole, 120 Volts Ac Max.
Catalog Types GHB, GHC, 15-100 Amperes, 1 Pole, 277 Volts Ac Max.

For application and coordination purposes only. Based on 40°C ambient, cold start. Connected with four (4) feet of rated wire (60/75°C) per terminal. Tested in open air with current in all poles.

**Maximum Volts**

| Breaker Type | Ac Volts 60 Hz | |
|---|---|---|
| GB, GC | 120 | |
| GHB, GHC | 277 | |

**Breaker Rating**

| Continuous Amperes | Instantaneous Trip, Amperes |
|---|---|
| 15-100 | See Curve |

**Interrupting Rating (UL Listed)**

| Breaker Type | Symmetrical RMS Amperes 120 Volts | 277 Volts |
|---|---|---|
| GB, GC | 65,000 | — |
| GHB, GHC | 65,000 | 14,000 |

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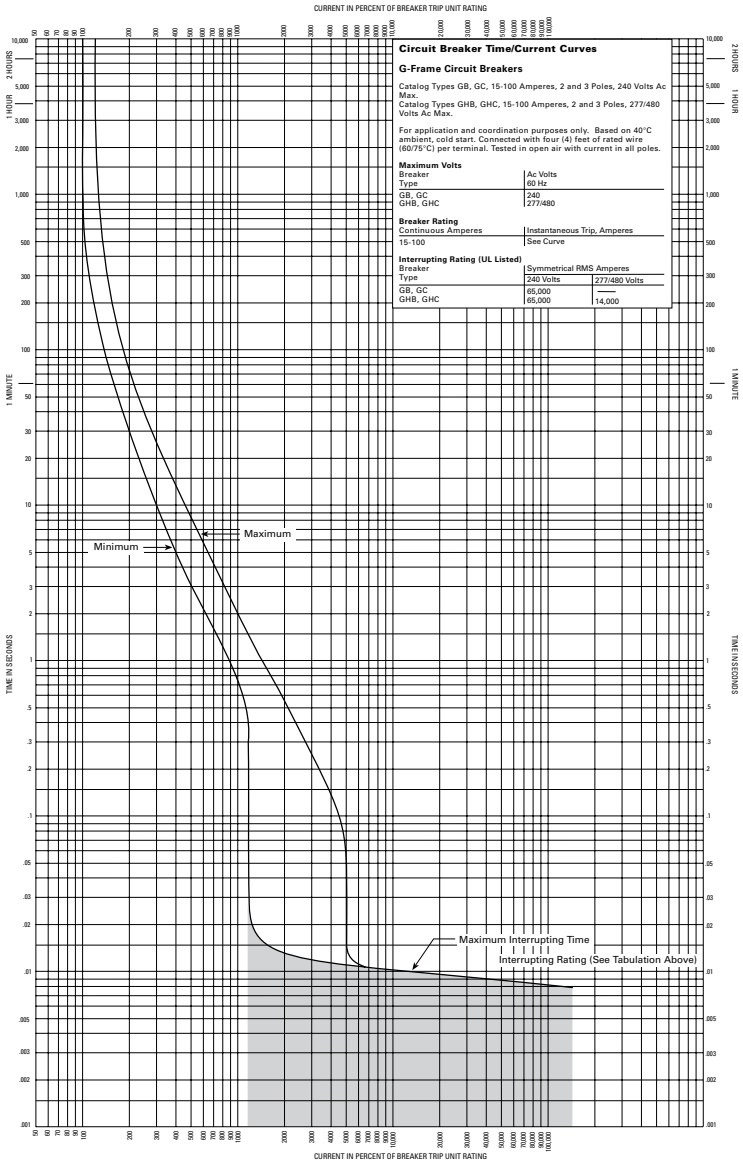
**Curve No. SC-3500-83B**

## AB DE-ION Circuit Breakers

**Types GB, GHB, GC, GHC 15-100 Amperes, 2 and 3 Poles**




**Circuit Breaker Time/Current Curves**

**G-Frame Circuit Breakers**

Catalog Types GB, GC, 15-100 Amperes, 2 and 3 Poles, 240 Volts Ac Max.
Catalog Types GHB, GHC, 15-100 Amperes, 2 and 3 Poles, 277/480 Volts Ac Max.

For application and coordination purposes only. Based on 40°C ambient, cold start. Connected with four (4) feet of rated wire (60/75°C) per terminal. Tested in open air with current in all poles.

**Maximum Volts**

| Breaker Type | Ac Volts 60 Hz | |
|---|---|---|
| GB, GC | 240 | |
| GHB, GHC | 277/480 | |

**Breaker Rating**

| Continuous Amperes | Instantaneous Trip, Amperes |
|---|---|
| 15-100 | See Curve |

**Interrupting Rating (UL Listed)**

| Breaker Type | Symmetrical RMS Amperes 240 Volts | 277/480 Volts |
|---|---|---|
| GB, GC | 65,000 | — |
| GHB, GHC | 65,000 | 14,000 |

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**Curve No. SC-3501-83B**



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# RECOMMENDED MAINTENANCE

- The product should not be in an environments greater than 75 degrees Celsius.
- If the ambient temperature drastically changes, inspect the exterior of the panel and ensure the fuses and breakers are still working correctly.
- Occasionally clean by removing dust and other collective particles that may accumulate.
- Ensure all the fuses are still operational, which can be easily done by looking for the red LED light on the fuseholder. If it is on, it means the fuse has opened and needs to be replaced. In most cases it will be fairly obvious if a breaker has tripped or fuse has opened because that particular circuit would be opened.
- Periodically inspect the panel exterior to ensure the NEMA-Rated enclosure is properly protecting the panel product from the elements.
- An annual review of the panel is recommended to make sure the holders haven't loosened and the breakers are still tightly affixed.

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# FREQUENTLY ASKED QUESTIONS

## 1. Part of my panel was shipped during transit? What should I do?

Please have your distributor contact Littelfuse customer service. Take pictures if possible to help Littelfuse file a claim with the courier.

## 2. How can I change circuit's amperage??

If the desired amperage is less than 30A moving to an amperage less than 30A (or, the desired amperage is greater than 30A moving to an amperage greater than 30A), this is can be replaced in the field by a certified electrician. Order a new breaker from Eaton (see pg. 11 & 13 of this document for reference) and a new fuse from Littelfuse (see pg. 5 & 8 of this document for reference).

If changing the circuit from an amperage less than 30A to an amperage greater than 30A (or vice versa), a new panel lining needs to be constructed and assembly instructions will be sent for field replacement by a certified electrician. Please contact Littelfuse customer service if this is the scenario.

## 3. I realized that I need a flush mount panel after I received it? How can I switch from a surface to a flush?

- This is not a complicated modification. Contact Littelfuse Customer Service to receive a new flush cover with assembly instructions that can be installed in the field by a certified electrician.

## 4. How can I get some extra circuit identifiers for the panel?

Contact Littelfuse customer service

## 5. Can I replace the Littelfuse fuse with another manufacturer's fuse?

While Littelfuse would always prefer you use Littelfuse fuses for both your business and to keep the product solely Littelfuse for a single point of contact, it understands that sometimes you need a quick replacement and might not have a Littelfuse option. Yes, you can use any manufacturers' fuse that is UL-Listed to the same classification as the original Littelfuse product.

## 6. For some reason there is a different manufacturers' fuse in your coordination panel. How can I cross it over to the Littelfuse product?

Call the Littelfuse TEC-LINE for a simple cross, or visit www.littelfuse.com for a simple cross reference tool.

## 7. What style circuit breakers do you use on branch circuits? I need a replacement.

- For 120/208V panels, Eaton BAB style breakers
- For 277/480V panels, Eaton GHB style breakers
- If you're referring to a breaker beyond 60A, please contact Littelfuse customer service. There is a variety of breaker styles chosen from based on specific application requirements. The breakers used on every panel are highlighted on the technical drawings that the specifying engineer signed off on before the job was released, so that is another source for you to reference if that file is still in your possession.

## 8. Why can't I use Square D breakers as replacements?

These coordination panels were designed and built specifically with Eaton-style breakers. To protect UL and ensure the product works correctly, you should use Eaton breakers only for replacement.

## 9. What if I want to order a new coordination panel from you but only want to use Square D breakers?

Please, e-mail techline@littelfuse.com to discuss this request


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# FREQUENTLY ASKED QUESTIONS

## 10. My fuse keeps opening on one of my circuits. Should I increase the amperage?

No, the fuse is opening for a reason and because it's the fuse as opposed to the breaker, there's a good chance that the fuse is preventing short circuit damage, which is especially dangerous and potentially fatal.

Before you change fuse amperage, you should understand why the fuse is opening. Simply increasing the fuse amperage puts expensive equipment and people's safety at risk.

## 11. I need to change my feed-through lugs to sub-feed lugs. How can I do this?

Please contact Littelfuse customer service. This is a relatively challenging modification if the panel has already been installed. If it has not yet been installed, it still requires assembly instructions and a new set of lugs.

## 12. A breaker on one of my circuits keeps tripping. Any idea why?

You can use which device is opening within the coordination panel to give a plausible explanation as to the cause. If the breaker is opening, it's likely due to an overload of that circuit. If the fuse opens, it's likely preventing due to a short circuit.

## 13. I'd like to sub-feed my panel post-installation to another device. How can I do that?

Please e-mail techline@littelfuse.com. This may be a simple modification, depending on the specifics surrounding the application, but it could vary greatly by what device you're feeding, how far away it is, and what types of loads it's required to sustain.

## 14. Are there any technical concerns with replacing my main fuse pullout with main lugs to feed through to an upstream breaker?

The main fuse pullout is most likely the main device because it was needed to achieve selective coordination with the upstream breaker. Before you look to modify anything, consult the building's one-line drawings to ensure what the upstream device is. If it is a circuit breaker, you should not modify the coordination panel. Doing so may violate UL and would remove the selective coordination. Please contact Littelfuse Technical Support to discuss your situation.

## 15. Is there any way to increase the branch breakers' SCCR?

There is not a way to physically change the device's SCCR (10kAIC for BAB breakers & 14kAIC for GHB breakers). But if you feed the branch circuit to a fused disconnect switch instead of a breaker you can use the upstream coordination to protect the circuit.

## 16. I'd like to add a spare fuse cabinet so I can keep replacements inside the panel. How can I do this?

Contact Littelfuse customer service. There are multiple ways to accomplish this, such as a contraption that you can screw into the door assembly similar to the picture below. To find the best option call customer service.

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# GLOSSARY OF LCP COORDINATION PANEL OPTIONS

**The purpose of this section is to explain the different options available for the coordination panel so that as the product is serviced desired changes can be evaluated if necessary.**

## Number of Circuits

12, 18, 24, 30, 36, 42

Those listed are only circuit panel sizes. The customer can use any combination of active and spare circuits he or she wants within the limit of the panel size. For example, a 12-circuit panel can have any combination of active and inactive circuits that add up to 12. So in reality, there are 2-42 circuits available per panel, and Littelfuse can sub-feed panels together using lugs to make "effective" larger circuit panels. NEC ® regulations and practicality prevent us from building any single unit larger than 42 circuits. For instance, an 84-circuit panel would simply be too tall for the average person to service.

## Voltage (AC)

120/208V 3Phase, 4Wire

120/240V 1Phase, 3Wire

277/480V 3Phase, 4Wire

These correlate with the system voltage. 208V, 240V, 480V are phase-to-phase voltages, and the 120V and 277V are phase-to-neutral voltages.

## Main Fuse Device

MLO up to 400A bus is standard, but this can reach as high as 600A

60A-200A Main Circuit Breakers

60A-400A Main Fuse Class T Pullout

These are the options for the panel's main device for the entire panel. In other words, people use the main circuit breaker or main fuse pullout to voluntarily disconnect power to the entire panel.

Main Lug Only specifies that there is no central disconnect for the entire panel internal to it. In other words, a customer chooses either a main circuit breaker, Main Fuse Pullout or MLO. The MLO is where the incoming power is connected to feed the panel.

## Neutral Rating

100%

200%

Under normal loads, 100% is the default. The neutral conducts the return current of the system. 200% rating is used when there is a high percentage of harmonics in the system coming from computer power supplies. This rating essentially allows twice as much return current without heating up.

## Panel Mounting

Surface

Flush

Surface panel mounting is when the panel protrudes from the wall. With flush mounting, the panel is actually placed flush within the wall and does not stick out. Surface is standard.

## Panel Door

Standard

Door-in-door

Standard door is one door offering access to the circuit breakers and fuse holders without exposure to conductors. To get access to the conductors with a standard door, one would have to remove the screws on the front panel base.

Door-in-door offers the same access to circuit breakers and fuse holders but also allows quick access to the conductors by having an outside hinge.

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# GLOSSARY OF LCP COORDINATION PANEL OPTIONS

## Fuse Holders

30A Class CC LPSC Holders

60A Class J LFPSJ Holders

Up to 30A, the LPSC is standard. From 30A – 60A the LFPSJ holder is standard

## Feeder Circuit Breakers

1 Pole: 10A-60A

2 Pole: 10A-60A

3 Pole: 10A-60A

Standard applications call for single pole circuit breakers. Two and three pole breakers allow for other options, which include motors. For each of the options, we offer between a 10 and 60 amp breaker.

If the application calls for something above 60A, a breaker is available, but it cannot be fused. Alternatively, a branch-circuit Class T pullout can be used to ensure coordination

## Panel Feed

Top

Bottom

Top means the feeder conductors are connected through the top, and the bottom means they come in underneath.

## Panel Lugs

None

Sub-feed (MLO)

Feed-through

These lugs allow two panels to be connected to one another. If the customer wanted to "daisy chain" a number of panels, he/she would need these lugs.

## Enclosure Rating

NEMA 1

NEMA 3R

NEMA 4X

NEMA 1 is standard. NEMA 3R is for outside applications. The door is sealed to prevent moisture from leaking in, etc. NEMA 4X is especially preventative against corrosion and is both water- and dust-tight.

If you have any questions, refer to the Frequently Asked Questions in this document. If you still have questions about the panel options or anything else regarding the Littelfuse LCP Coordination Panel, please e-mail techline@littelfuse.com



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