



Contents

| <i>Description</i> | <i>Page</i> |
|--|-------------|
| General applications | 6-2 |
| North American fuses and accessories | 6-4 |
| DFJ - high speed Class J fuse | 6-5 |
| Square body fuses and accessories | 6-22 |
| BS 88 fuses and accessories | 6-94 |
| Ferrule fuses and accessories | 6-103 |

High speed fuses

6

High speed fuses

General applications

Rated voltage

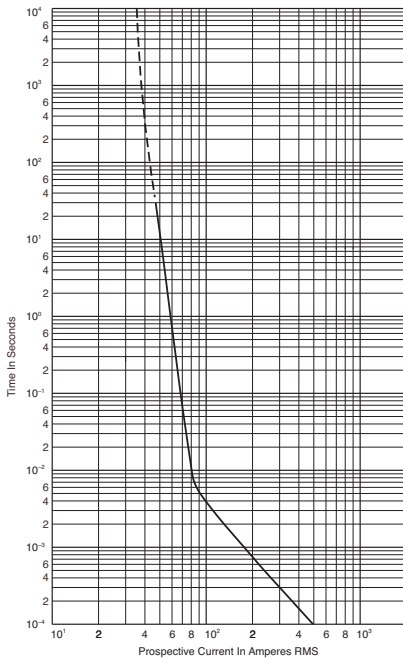
The AC voltage rating of Eaton fuses is given in volts rms. Fuses tested to IEC are tested at 5% above their rated voltage. British Style BS 88 fuses are tested at 10% above its rated voltage. UL recognition tests are performed at the rated voltage.

Rated current

Rated current is given in amps rms. Eaton fuses can continuously carry the rated current.

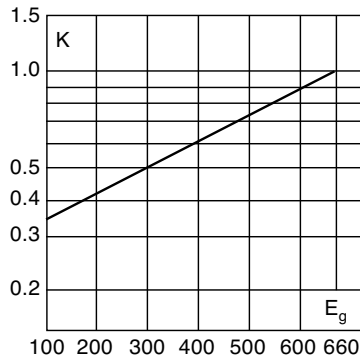
Melting characteristic

The melting characteristic shows the virtual melting time in seconds as a function of the prospective current in amps rms. The fuses are specially constructed for short-circuit protection against high level fault currents. Loading and operation of the fuse in the non-continuous/dashed section of the melt curve must be avoided. The curve can also be read as the real melting time as a function of the RMS value of the pre-arc current.



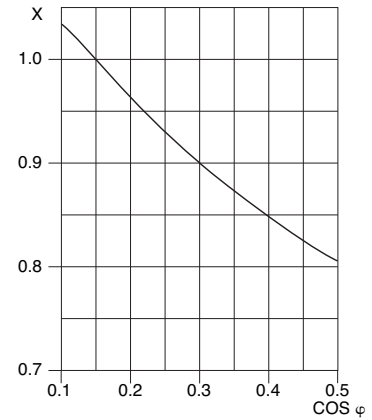
Clearing integrals

The total clearing I^2t at rated voltage and at power factor of 15% are given in the electrical characteristics. For other voltages, the clearing I^2t is found by multiplying by correction factor, K , given as a function of applied working voltage, E_g , (rms).



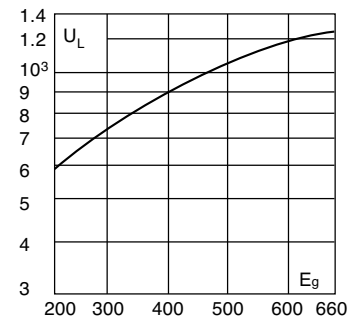
Power factor

For other power factor values, the total clearing integral can be calculated as a multiple of the clearing integrals, the correction factor K and the correction factor X .



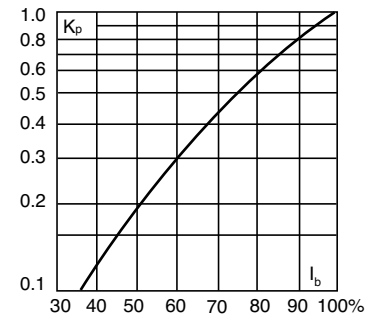
Arc voltage

This curve gives the peak arc voltage, U_L , which may appear across the fuse during its operation as a function of the applied working voltage, E_g , (rms) at a power factor of 15%.



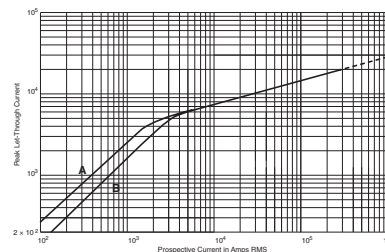
Power losses

Watts loss at rated current is given in the electrical characteristics. The curve allows the calculation of the power losses at load currents lower than the rated current. The correction factor, K_p , is given as a function of the RMS load current, I_b , in % of the rated current.



Cut-off current

A fuse operation relating to short-circuits only. When a fuse operates in its current-limiting range, it will clear a short-



circuit in less than $\frac{1}{2}$ cycle. Also, it will limit the instantaneous peak let-through current to a value substantially less than

that obtainable in the same circuit if that fuse were replaced with a solid conductor of equal impedance.

- A asymmetrical current
- B symmetrical current

Parallel connection

When fuses are connected in parallel it is recommended that the applied voltage does not exceed $0.9 U_N$ (the rated voltage of the fuse). This is due to the fact that the energy released within the fuses may be unevenly shared between the parallel connected barrels.

When fuses are connected in parallel, one must take into account that the current sharing is not necessarily equal. And it must be checked, that the maximum load current is not exceeded.

Series connection

Fuses in series may not equally divide the applied voltage. It is recommended that series connected fuses should only be operated at fault currents that yield melting times less than 10 ms and a recovery voltage per fuse of less than or equal to $0.9 U_N$ (the rated voltage of the fuse).

Mounting guidance

The recommendations below have to be followed when mounting a Bussmann series fuse with end plate threaded holes.

1. Screw in studs: 5 N•m Max, 3 N•m Min
2. Attachment of the fuse to bussbar by means of nut and washer:

| Thread configuration | Torque (N•m)* | |
|---------------------------|---------------|-----|
| | max | min |
| $\frac{5}{16}''$ - 18, M8 | 25 | 20 |
| $\frac{3}{8}''$ - 16, M10 | 45 | 40 |
| $\frac{7}{16}''$ - 24 | 45 | 40 |
| $\frac{1}{2}''$ - 13, M12 | 65 | 50 |
| $\frac{1}{2}''$ - 20 | 65 | 50 |

*1 N•m = 0.7375 lb-ft

Overloads

The design of Eaton fuses is such that they can be operated under rather severe operating conditions imposed by overloads (any load current in excess of the maximum permissible load current).

In applications, there will be a maximum overload current, I_{max} , which can be imposed on the fuse with a corresponding duration and frequency of occurrence.

Time durations fall into two categories:

1. Overloads longer than one second
2. Overloads less than one second termed "impulse" loads.

The following table gives general application guidelines which, in the expression $I_{max} < (\% \text{ factor}) \times I_t$. I_t is the

melting current corresponding to the time "t" of the overload duration as read from the time-current curve of the fuse. The guidelines in the table below determine the acceptability of the selected fuses for a given I_{max} .

| Frequency of Occurrence | Overloads (> 1 sec) | Impulse Loads (< 1 sec) |
|--------------------------|-----------------------------|-----------------------------|
| Less than once per month | $I_{max} < 80\% \times I_t$ | $I_{max} < 70\% \times I_t$ |
| Less than twice per week | $I_{max} < 70\% \times I_t$ | $I_{max} < 60\% \times I_t$ |
| Several times per day | $I_{max} < 60\% \times I_t$ | — |

When impulse loads are an intrinsic/normal parameter of the load current either as single pulse or in trains of pulses or when their level is higher than the melting current at 0.01 seconds (per time-current curve), contact Eaton for application assistance.

In addition to the parameters set forth in the preceding table, the RMS value of the load current as calculated for any period of 10 minutes or more should not exceed the maximum permissible load current.

Furthermore, it is important that a fuse should not be applied in the non-continuous/dashed portion of the associated time-current curve.

Any time-current combination point which falls in the non-continuous/dashed portion of the time-current curve is beyond the capability of the fuse to operate properly.

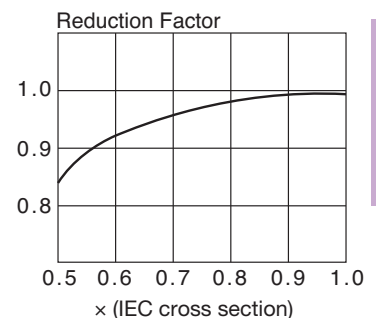
DC operation

Depending upon the short-circuit time constant and the magnitude of the prospective short-circuit current, the dc voltage at which a fuse can be applied may be less than its ac rating. Long time constants require a lower dc voltage. Conversely, however, higher available prospective short-circuit currents result in faster fuse openings and thus permit a fuse to be operated at a higher DC voltage.

Consult Eaton for additional information and application assistance when fuses have to operate under DC conditions.

Load current versus conductor cross section

Reduction of permissible load current when the conductor cross section is less than that given in IEC Publication 269-1 and 4 valid for Bussmann series high speed fuses.



Application assistance

If you have application problems or need a fuse outside our standard program, please contact the nearest Eaton representative.

6

High speed fuses

North American



Introduction

North American contents

| Catalog number | Volts | Amp range | Page |
|----------------|-------|-----------|------|
| DFJ | 600 | 1-600 | 6-5 |
| FWA | 130 | 1000-4000 | 6-6 |
| FWA | 150 | 70-1000 | 6-8 |
| FWX | 250 | 35-2500 | 6-10 |
| FWH | 500 | 35-1600 | 6-12 |
| KAC | 600 | 1-1000 | 6-14 |
| KBC | 600 | 35-800 | 6-15 |
| FWP | 700 | 5-1200 | 6-16 |
| FWJ | 1000 | 35-2000 | 6-19 |

Accessories

Fuse bases 6-21

North American fuse ranges

| Amps | Volts | AC | DC |
|-----------|-------|----|----|
| 1000-4000 | 130 | X | X |
| 70-1000 | 150 | X | X |
| 35-2500 | 250 | X | X |
| 35-1600 | 500 | X | X |
| 1-1000 | 600 | X | — |
| 5-1200 | 700 | X | X |
| 40-600 | 800 | — | X |
| 35-2000 | 1000 | X | — |

General information

Eaton offers a complete range of North American blade and flush-end style fuses and accessories. Their design and construction were optimized to provide:

- Low energy let-through (I^2t)
- Low watts loss
- Superior cycling capability
- Low arc voltage
- Excellent DC performance

North American style fuses provide an excellent solution for medium power applications. While there are currently no published standards for these fuses, the industry has standardized on mounting centers that accept Bussmann series fuses.

Voltage rating

All Eaton North American style fuses are tested at their rated voltage. Eaton should be consulted for applications exceeding those values.

Accessories

External and internal open fuse indication is available for selected portions of the North American line. Fuse blocks are available for most applications.

DFJ Class J

Specifications

Description: High speed, current-limiting fuse. The Bussmann series DFJ drive fuse will provide maximum protection for AC and DC drives and controllers and meet NEC® branch circuit protection requirements. The drive fuse has the lowest I²t of any branch circuit fuse to protect power semiconductor devices that utilize diodes, GTOs, SCRs and SSRs.



Dimensions: See page 1-5 for Class J dimensions.

Construction: Melamine tube with silver fuse element.

Ratings:

Volts — 600Vac (or less), 450Vdc (or less, 15-600A)

Amps — 1-600A

IR — 200kA RMS Sym., 100kA DC

Agency information: CE, UL Listed, Std. 248-8, Class J, Guide JDDZ, File E4273, CSA Certified, Class 1422-02, File 53787.

Features and benefits

- Easily coordinated with existing and new variable speed drives and electric controllers.
- Standard Class J dimensions allowing the use of readily available fuse blocks, holders, and switches.
- Allows the lowest let-thru energy of any branch circuit overcurrent protective device.

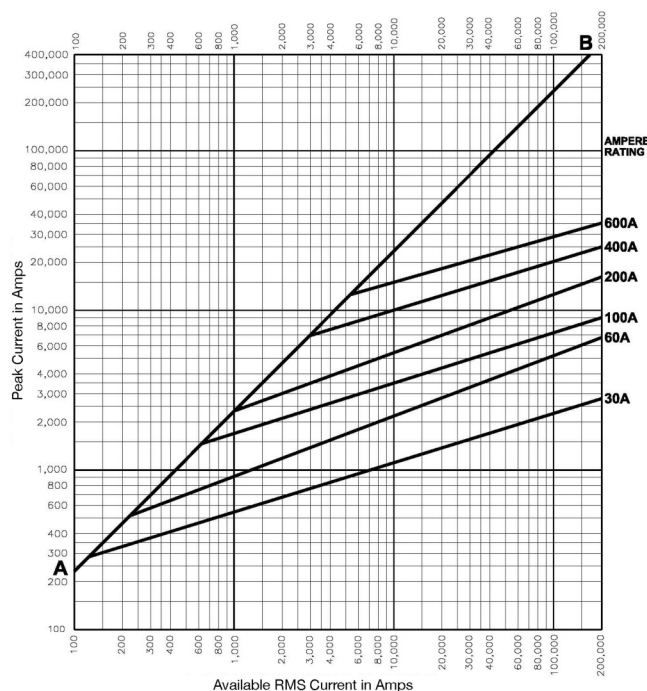
Typical applications

- Protection of AC and DC drives
- Equipment using power semiconductor devices

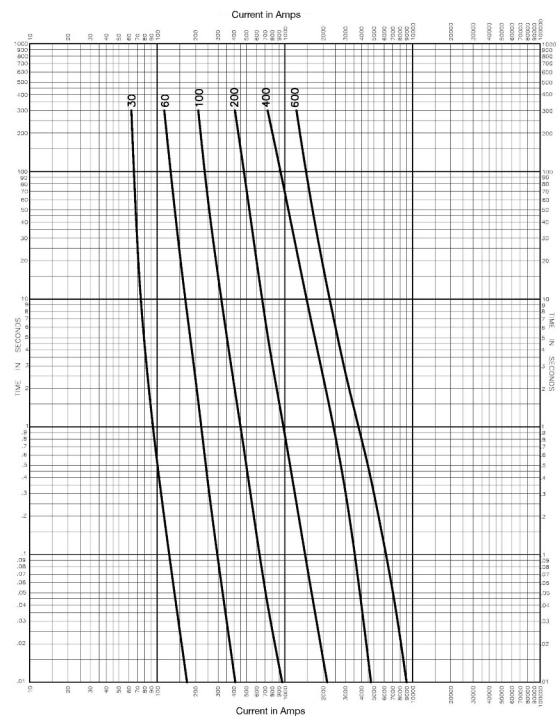
Catalog numbers (amps)

| Catalog number | Rated current RMS amps | I ² t (A ² Sec) @ 600Vac / 100kA | | Watts loss |
|----------------|------------------------|--|----------|------------|
| | | Pre-arc | Clearing | |
| DFJ-1 | 1 | — | — | — |
| DFJ-2 | 2 | — | — | — |
| DFJ-3 | 3 | — | — | — |
| DFJ-4 | 4 | — | — | — |
| DFJ-5 | 5 | — | — | — |
| DFJ-6 | 6 | — | — | — |
| DFJ-8 | 8 | — | — | — |
| DFJ-12 | 12 | — | — | — |
| DFJ-15 | 15 | 4 | 110 | 4.1 |
| DFJ-20 | 20 | 8 | 365 | 4.0 |
| DFJ-25 | 25 | 12 | 610 | 4.9 |
| DFJ-30 | 30 | 20 | 1000 | 5.5 |
| DFJ-35 | 35 | 55 | 1100 | 6.8 |
| DFJ-40 | 40 | 90 | 1900 | 8.6 |
| DFJ-45 | 45 | 90 | 1900 | 8.6 |
| DFJ-50 | 50 | 140 | 2800 | 8.7 |
| DFJ-60 | 60 | 290 | 6000 | 8.5 |
| DFJ-70 | 70 | 450 | 3100 | 12 |
| DFJ-80 | 80 | 650 | 4600 | 13 |
| DFJ-90 | 90 | 1010 | 7200 | 13 |
| DFJ-100 | 100 | 1460 | 10500 | 13 |
| DFJ-110 | 110 | 1710 | 9500 | 17 |
| DFJ-125 | 125 | 3580 | 20000 | 15 |
| DFJ-150 | 150 | 5080 | 28000 | 19 |
| DFJ-175 | 175 | 6310 | 35000 | 23 |
| DFJ-200 | 200 | 9850 | 54500 | 24 |
| DFJ-225 | 225 | 11420 | 51000 | 29 |
| DFJ-250 | 250 | 17000 | 74500 | 30 |
| DFJ-300 | 300 | 23500 | 103000 | 36 |
| DFJ-350 | 350 | 38800 | 170000 | 39 |
| DFJ-400 | 400 | 62200 | 272000 | 40 |
| DFJ-450 | 450 | 44600 | 270000 | 56 |
| DFJ-500 | 500 | 79500 | 480000 | 52 |
| DFJ-600 | 600 | 138000 | 830000 | 57 |

Current limitation curves



Time-current characteristic curves—average melt



High speed fuses

FWA 130V: 1000-4000A

Specifications

Description: North American style flush-end high speed fuses.

Dimensions: See dimensions illustrations.

Ratings:

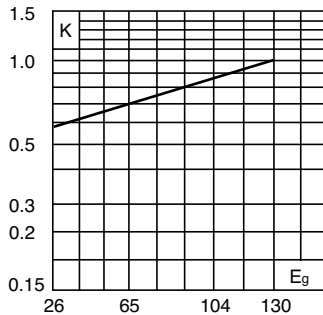
- Volts: — 130Vac
- Amps: — 1000-4000A
- IR: — 200kA RMS Sym.
- 50kA @130Vdc

Agency information: CE, UL Recognized JFHR2.E91958 on 1000-2000A fuses

Electrical characteristics

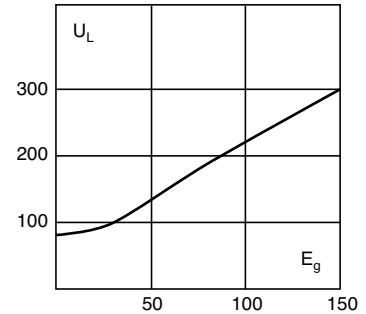
Total Clearing I²t

The total clearing I²t at rated voltage and at power factor of 15% are given in the electrical characteristics. For other voltages, the clearing I²t is found by multiplying by correction factor, K, given as a function of applied working voltage, E_g, (rms).



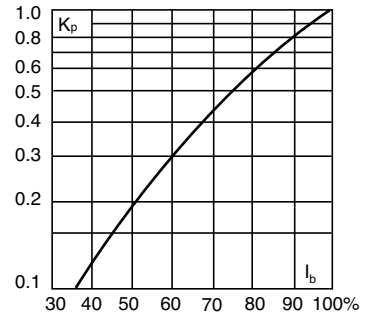
Arc voltage

This curve gives the peak arc voltage, U_L, which may appear across the fuse during its operation as a function of the applied working voltage, E_g, (rms) at a power factor of 15%.



Power losses

Watts loss at rated current is given in the electrical characteristics. The curve allows the calculation of the power losses at load currents lower than the rated current. The correction factor, K_p, is given as a function of the RMS load current, I_b, in % of the rated current.



Catalog numbers

| Catalog numbers | Electrical characteristics | | | |
|-----------------|----------------------------|---------------------------------------|------------------|------------|
| | Rated current RMS-amps | I ² t (A ² Sec) | | Watts loss |
| | | Pre-arc | Clearing at 130V | |
| FWA-1000AH | 1000 | 170000 | 460000 | 60 |
| FWA-1200AH | 1200 | 270000 | 730000 | 70 |
| FWA-1500AH | 1500 | 520000 | 1400000 | 78 |
| FWA-2000AH | 2000 | 860000 | 2400000 | 108 |
| FWA-2500AH | 2500 | 1500000 | 4100000 | 130 |
| FWA-3000AH | 3000 | 2100000 | 5700000 | 150 |
| FWA-4000AH | 4000 | 3400000 | 9200000 | 257 |

• Watts loss provided at rated current.

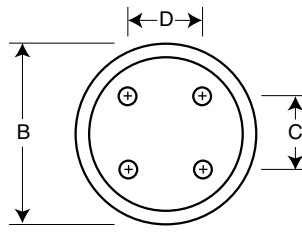
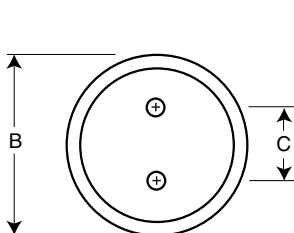
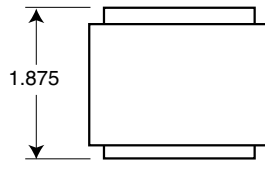
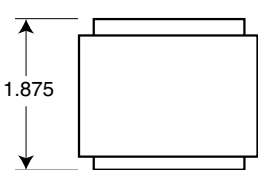
Dimensions - in

| Catalog number | Fig. | B | C | D | Thread depth |
|-------------------|------|-----|-----|-----|-----------------------|
| FWA-1000AH-2000AH | 1 | 2.0 | 1.0 | — | Tapped 3/8"-24 x 1/2" |
| FWA-2500AH-3000AH | 1 | 3.0 | 1.5 | — | Tapped 1/2"-20 x 1/2" |
| FWA-4000AH | 2 | 3.5 | 1.5 | 1.5 | Tapped 1/2"-20 x 1/2" |

1mm = 0.0394" / 1" = 25.4mm

Fig. 1: 1000-3000A

Fig. 2: 4000A



Features and benefits

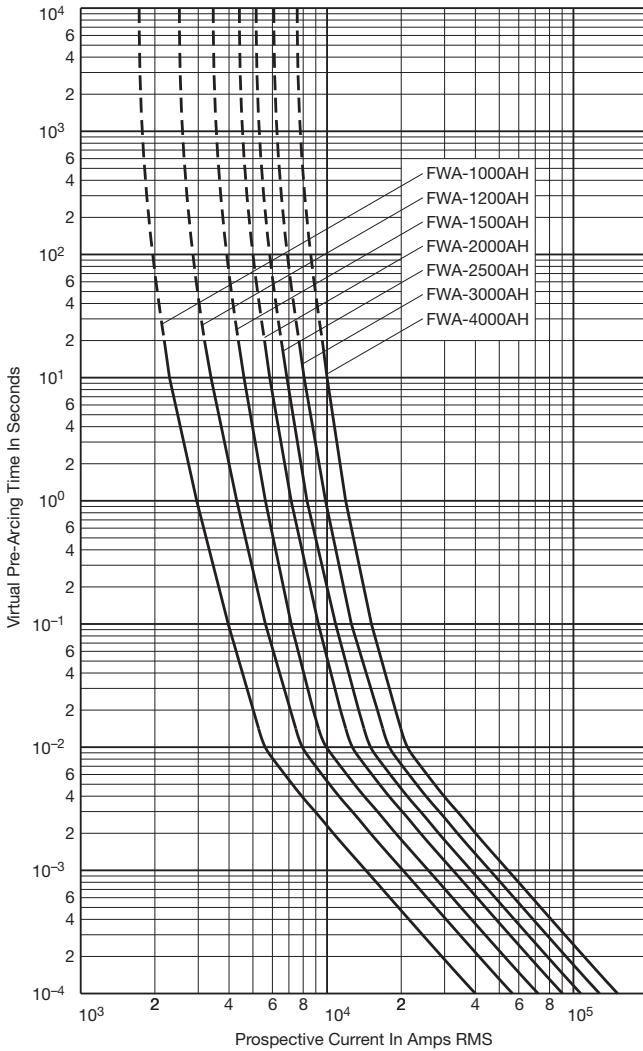
- Excellent DC performance
- Low arc voltage and low energy let-through (I²t)
- Low watts loss
- Superior cycling capability

Typical applications

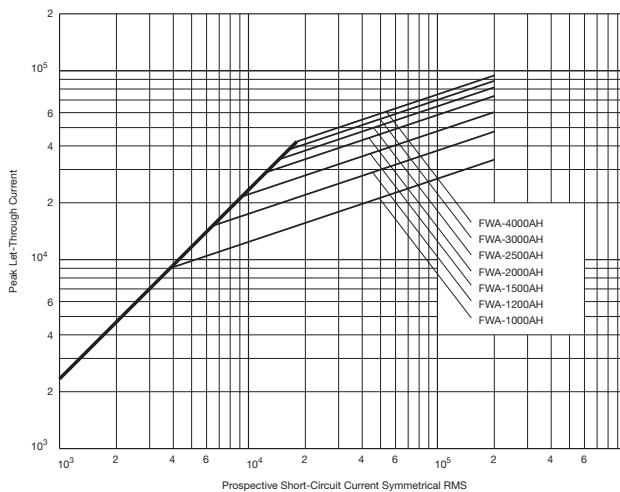
- DC common bus
- DC drives
- Power converters/rectifiers
- Reduced voltage starters

FWA 1000-4000A: 130V

Time-current curve



Peak let-through curve



Data Sheet: 35785301

High speed fuses

FWA 150V: 70-1000A

Specifications

Description: North American style stud-mount fuses.

Dimensions: See dimensions illustrations.

Ratings:

- Volts: — 150Vac/dc*
- Amps: — 70-1000A
- IR: — 100kA Sym. (70-400A)
- 200kA Sym. (450-1000A)
- 20kA @ 150Vdc (70-800A)
- 100kA @ 80Vdc (70-1000A)

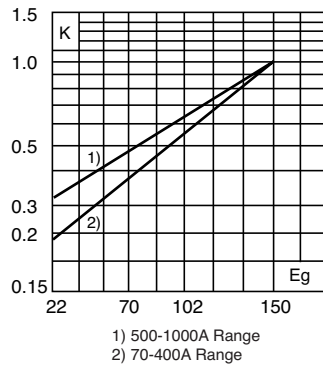
*1000A rated @ 80Vdc.

Agency information: CE, UL Recognized JFHR2.E91958

Electrical characteristics

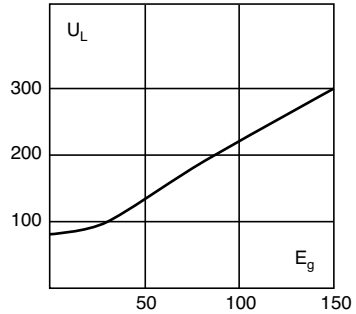
Total clearing I²t

The total clearing I²t at rated voltage and at power factor of 15% are given in the electrical characteristics. For other voltages, the clearing I²t is found by multiplying by correction factor, K, given as a function of applied working voltage, E_g, (rms).



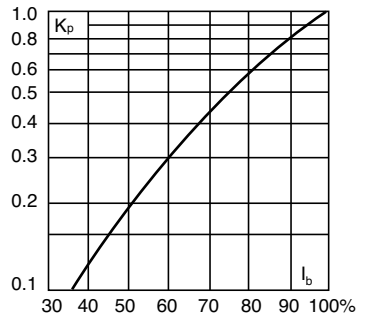
Arc voltage

This curve gives the peak arc voltage, U_L, which may appear across the fuse during its operation as a function of the applied working voltage, E_g, (rms) at a power factor of 15%.



Power losses

Watts loss at rated current is given in the electrical characteristics. The curve allows the calculation of the power losses at load currents lower than the rated current. The correction factor, K_p, is given as a function of the RMS load current, I_b, in % of the rated current.



Catalog numbers

| Catalog number | Rated current RMS-amps | Electrical characteristics | | |
|----------------|------------------------|---------------------------------------|------------------|------------|
| | | I ² t (A ² Sec) | | Watts loss |
| | | Pre-arc | Clearing at 150V | |
| FWA-70B | 70 | 470 | 4000 | 6.9 |
| FWA-80B | 80 | 670 | 6000 | 7.7 |
| FWA-100B | 100 | 1200 | 12000 | 9.0 |
| FWA-125B | 125 | 1870 | 18000 | 11.2 |
| FWA-150B | 150 | 2700 | 26000 | 13.5 |
| FWA-200B | 200 | 4780 | 45000 | 17.6 |
| FWA-250B | 250 | 7470 | 70000 | 22.5 |
| FWA-300B | 300 | 10760 | 100000 | 27.0 |
| FWA-350B | 350 | 15700 | 140000 | 30.6 |
| FWA-400B | 400 | 20300 | 180000 | 35.2 |
| FWA-500A | 500 | 39000 | 120000 | 35.0 |
| FWA-600A | 600 | 46000 | 140000 | 47.0 |
| FWA-700A | 700 | 75000 | 220000 | 49.0 |
| FWA-800A | 800 | 92000 | 280000 | 58.0 |
| FWA-1000A | 1000 | 170000 | 510000 | 60.0 |

• Watts loss provided at rated current.
• See accessories on page 6-21.

Dimensions - in

Fig. 1: 70-400A

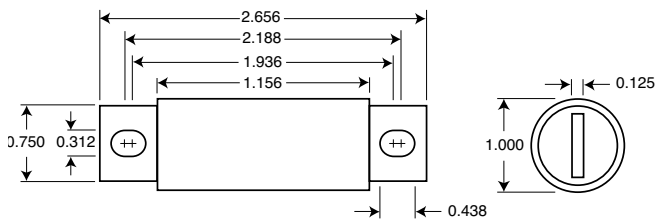
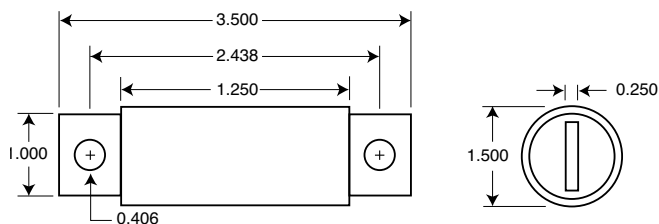


Fig. 2: 500-1000A



1mm = 0.0394" / 1" = 25.4mm

Features and benefits

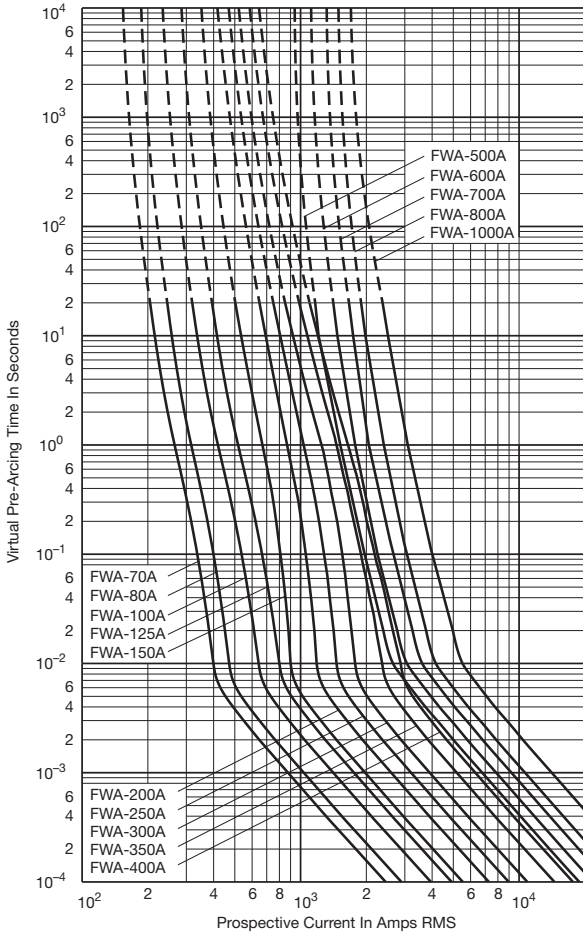
- Excellent DC performance
- Low arc voltage and low energy let-through (I²t)
- Low watts loss
- Superior cycling capability

Typical applications

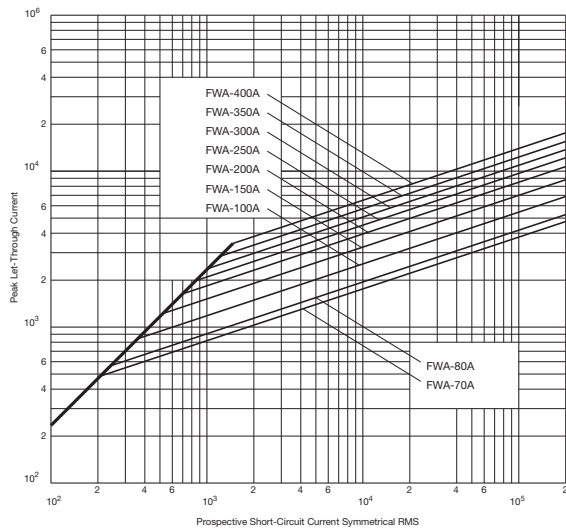
- DC common bus
- DC drives
- Power converters/rectifiers
- Reduced voltage starters

FWA 70-1000A: 150V

Time-current curve



Peak let-through curve



Data Sheet: 35785310

High speed fuses

FWX 250V: 35-2500A

Specifications

Description: North American style stud-mount and flush-end fuses.

Dimensions: See dimensions illustrations.

Ratings:

- Volts: — 250Vac/dc
- Amps: — 35-2500A
- IR: — 200kA RMS Sym.
50kA@250Vdc (35-800A)

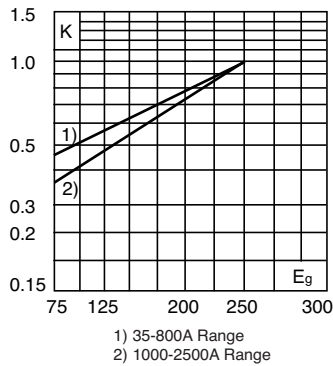


Agency information: CE, UL Recognized JFHR2.E56412 and CSA Component Acceptance file Class 1422-30, (53787) on 35-800A fuses (50kA IR @250Vdc).

Electrical characteristics

Total clearing I²t

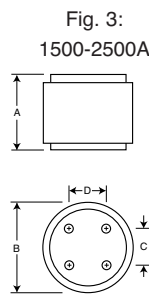
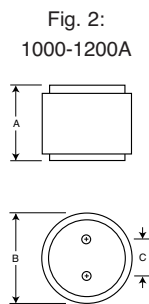
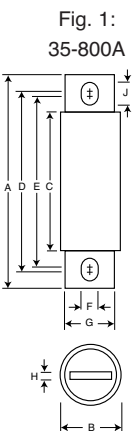
The total clearing I²t at rated voltage and at power factor of 15% are given in the electrical characteristics. For other voltages, the clearing I²t is found by multiplying by correction factor, K, given as a function of applied working voltage, E_g, (rms).



Dimensions - in

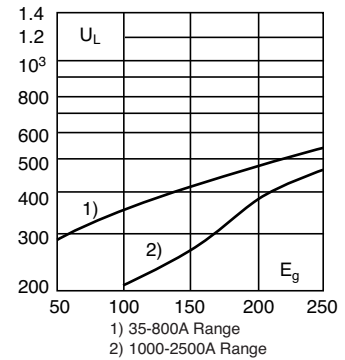
| Amp range | Fig. | A | B | C | D | E | F | G | H | J | Tapped thread depth |
|-----------|------|------|------|------|------|------|------|------|------|------|---------------------|
| 35-60 | 1 | 3.19 | 0.81 | 1.59 | 2.59 | 2.25 | 0.34 | 0.63 | 0.13 | 0.52 | — |
| 70-200 | 1 | 3.13 | 1.22 | 1.59 | 2.44 | 2.19 | 0.34 | 1.00 | 0.19 | 0.47 | — |
| 225-600 | 1 | 3.84 | 1.50 | 1.59 | 2.94 | 2.25 | 0.41 | 1.00 | 0.25 | 0.75 | — |
| 700-800 | 1 | 3.84 | 2.00 | 1.59 | 3.03 | 2.28 | 0.41 | 1.50 | 0.25 | 0.78 | — |
| 1000-1200 | 2 | 2.59 | 3.00 | 1.50 | — | — | — | — | — | — | 3/8"-24 x 1/2" |
| 1500-2500 | 3 | 2.59 | 3.50 | 1.50 | 1.50 | — | — | — | — | — | 3/8"-24 x 1/2" |

1mm = 0.0394" / 1" = 25.4mm



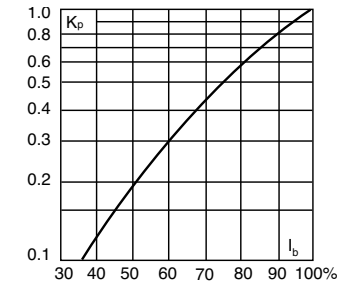
Arc voltage

This curve gives the peak arc voltage, U_L, which may appear across the fuse during its operation as a function of the applied working voltage, E_g, (rms) at a power factor of 15%.



Power losses

Watts loss at rated current is given in the electrical characteristics. The curve allows the calculation of the power losses at load currents lower than the rated current. The correction factor, K_p, is given as a function of the RMS load current, I_b, in % of the rated current.



Catalog numbers

| Catalog number | Electrical characteristics | | | |
|----------------|----------------------------|---------------------------------------|------------------|------------|
| | Rated current RMS-amps | I ² t (A ² Sec) | | |
| | | Pre-arc | Clearing at 250V | Watts loss |
| FWX-35A | 35 | 50 | 230 | 4.2 |
| FWX-40A | 40 | 60 | 310 | 5.2 |
| FWX-45A | 45 | 80 | 390 | 5.7 |
| FWX-50A | 50 | 100 | 520 | 6.0 |
| FWX-60A | 60 | 140 | 740 | 8.1 |
| FWX-70A | 70 | 330 | 1400 | 7.2 |
| FWX-80A | 80 | 430 | 1850 | 8.1 |
| FWX-90A | 90 | 570 | 2450 | 9.0 |
| FWX-100A | 100 | 740 | 3150 | 10.0 |
| FWX-125A | 125 | 1130 | 4850 | 12.5 |
| FWX-150A | 150 | 1620 | 6950 | 15.7 |
| FWX-175A | 175 | 2170 | 9300 | 18.5 |
| FWX-200A | 200 | 2790 | 12000 | 22 |
| FWX-225A | 225 | 3210 | 14700 | 24 |
| FWX-250A | 250 | 3960 | 18100 | 27 |
| FWX-275A | 275 | 4720 | 21600 | 31 |
| FWX-300A | 300 | 6000 | 27300 | 32 |
| FWX-350A | 350 | 10600 | 48600 | 39 |
| FWX-400A | 400 | 14500 | 66100 | 44 |
| FWX-450A | 450 | 22100 | 101000 | 49 |
| FWX-500A | 500 | 28000 | 128000 | 54 |
| FWX-600A | 600 | 41100 | 188000 | 62 |
| FWX-700A | 700 | 48800 | 190000 | 72 |
| FWX-800A | 800 | 59000 | 230000 | 84 |
| FWX-1000AH | 1000 | 44000 | 360000 | 100 |
| FWX-1200AH | 1200 | 92000 | 750000 | 103 |
| FWX-1500AH | 1500 | 120000 | 880000 | 140 |
| FWX-1600AH | 1600 | 160000 | 1200000 | 140 |
| FWX-2000AH | 2000 | 320000 | 2300000 | 151 |
| FWX-2500AH | 2500 | 670000 | 4700000 | 163 |

• Watts loss provided at rated current. • See accessories on page 6-21.

Features and benefits

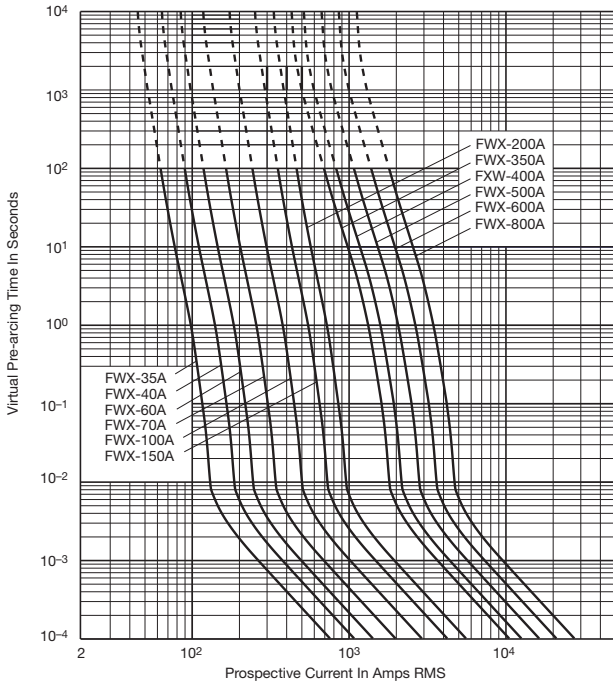
- Excellent DC performance
- Low arc voltage and low energy let-through (I²t)
- Superior cycling capability

Typical applications

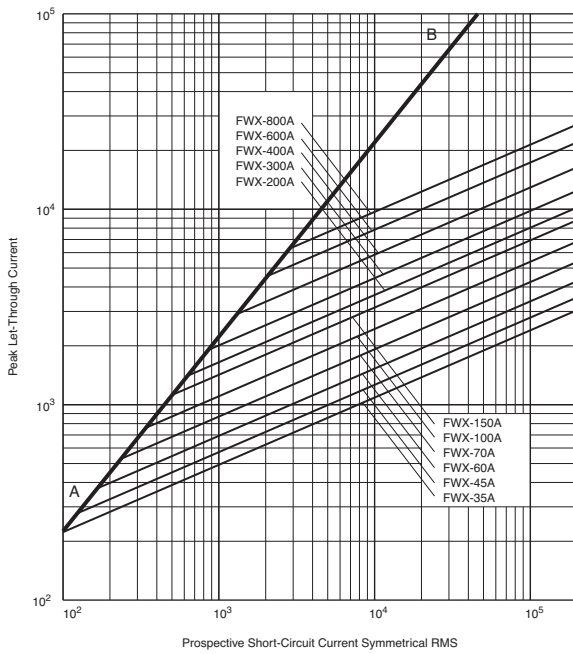
- DC common bus
- DC drives
- Power converters/rectifiers
- Reduced voltage starters

FWX 35-800A: 250V

Time-current curve



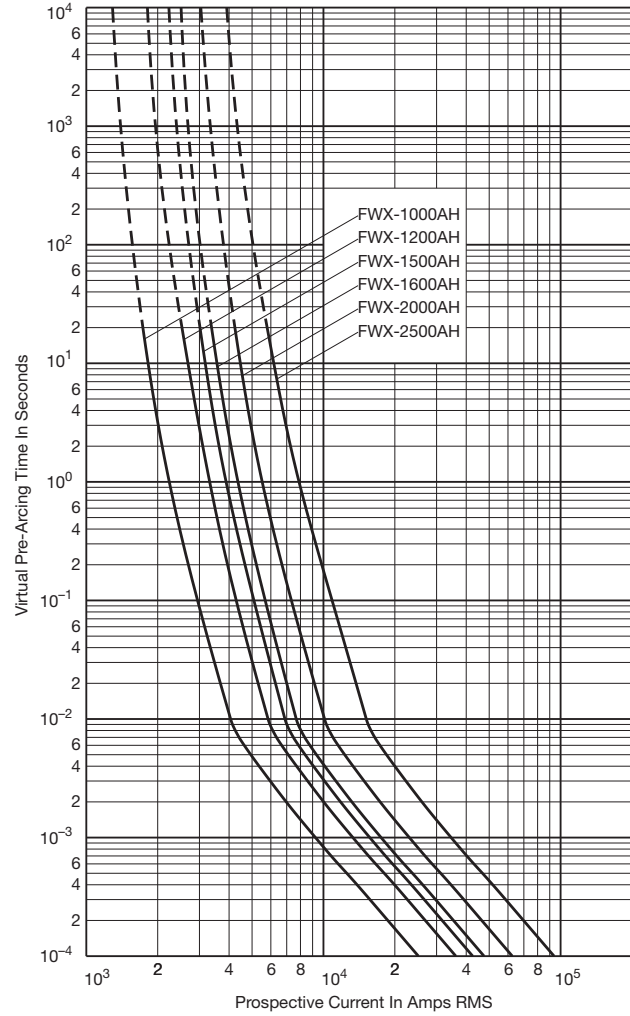
Peak let-through curve



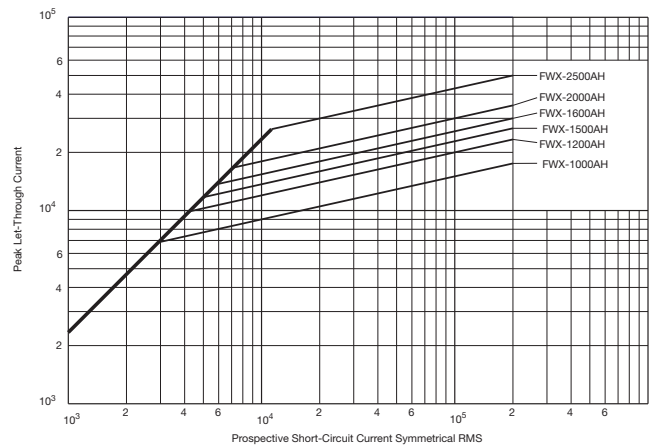
Data Sheet: 359

FWX 1000-2500A(H): 250V

Time-current curve



Peak let-through curve



Data Sheet: 35785299

6

High speed fuses

North American

FWH 500V: 35-1600A

Specifications

Description: North American style stud-mount fuses.

Dimensions: See dimensions illustration.

Ratings:

Volts: — 500Vac/dc (35-800A only)

Amps: — 35-1600A

IR: — 200kA Sym.

— 50kA @ 500Vdc (35-800A)

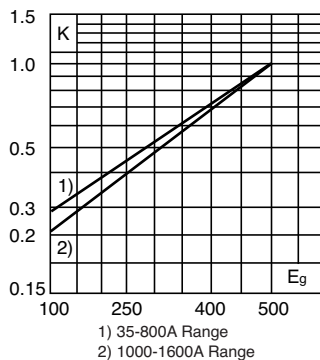


Agency information: CE, UL Recognized JFHR2.E91958 FWH_B (35-200A, 1000-1200A), JFHR2.E56412 FWH_A (225-600A), CSA Component Acceptance Class 1422-30, File 53787 (35-1600A).

Electrical characteristics

Total clearing I²t

The total clearing I²t at rated voltage and at power factor of 15% are given in the electrical characteristics. For other voltages, the clearing I²t is found by multiplying by correction factor, K, given as a function of applied working voltage, E_G, (rms).



Dimensions - in

| Amp Range | Fig. | A | B | C | D | E | F | G | H | J |
|-----------|------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|
| 35-60 | 1 | 3.188 | 0.813 | 1.593 | 2.541 | 2.193 | 0.344 | 0.719 | 0.125 | 0.518 |
| 70-100 | 1 | 3.625 | 0.947 | 1.736 | 2.853 | 2.807 | 0.352 | 0.750 | 0.125 | 0.375 |
| 125-200 | 1 | 3.625 | 1.156 | 1.836 | 2.892 | 2.768 | 0.344 | 1.000 | 0.188 | 0.406 |
| 225-400 | 1 | 4.340 | 1.500 | 2.090 | 3.440 | 2.750 | 0.410 | 1.000 | 0.250 | 0.750 |
| 450-600 | 1 | 4.340 | 2.000 | 2.090 | 3.530 | 2.780 | 0.410 | 1.500 | 0.250 | 0.780 |
| 700-800 | 1 | 6.340 | 2.500 | 2.090 | 4.970 | 3.440 | 0.530 | 2.000 | 0.380 | 1.300 |
| 1000-1200 | 1 | 6.969 | 3.000 | 3.219 | 5.465 | 4.475 | 0.625 | 2.375 | 0.438 | 1.120 |
| 1400-1600 | 2 | See Drawing | | | | | | | | |

1mm = 0.0394" / 1" = 25.4mm

Fig. 1: 35-1200A

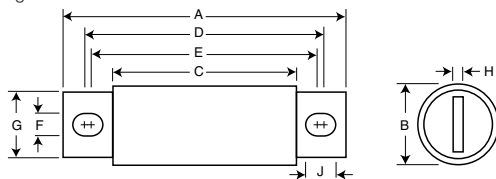
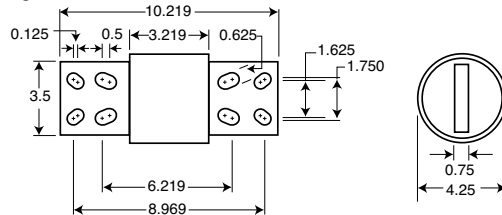
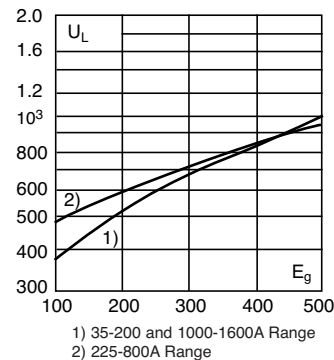


Fig. 2: 1400-1600A



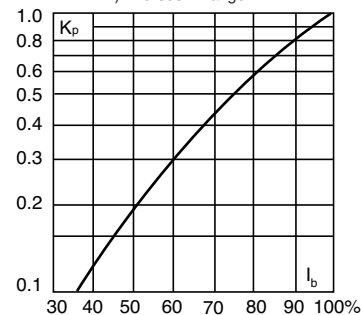
Arc voltage

This curve gives the peak arc voltage, U_L, which may appear across the fuse during its operation as a function of the applied working voltage, E_G, (rms) at a power factor of 15%.



Power losses

Watts loss at rated current is given in the electrical characteristics. The curve allows the calculation of the power losses at load currents lower than the rated current. The correction factor, K_p, is given as a function of the RMS load current, I_b, in % of the rated current.



Catalog numbers

| Catalog numbers | Electrical characteristics | | | |
|-----------------|----------------------------|---------------------------------------|------------------|------------|
| | Rated current RMS-amps | I ² t (A ² Sec) | | Watts loss |
| | | Pre-arc | Clearing at 500V | |
| FWH-35B | 35 | 34 | 150 | 8 |
| FWH-40B | 40 | 76 | 320 | 7.5 |
| FWH-45B | 45 | 105 | 450 | 7.5 |
| FWH-50B | 50 | 135 | 670 | 7.5 |
| FWH-60B | 60 | 210 | 900 | 9.9 |
| FWH-70B | 70 | 210 | 900 | 10.6 |
| FWH-80B | 80 | 305 | 1400 | 12.7 |
| FWH-90B | 90 | 360 | 1600 | 15 |
| FWH-100B | 100 | 475 | 2000 | 17 |
| FWH-125B | 125 | 800 | 3500 | 25 |
| FWH-150B | 150 | 1100 | 4600 | 30 |
| FWH-175B | 175 | 1450 | 6200 | 35 |
| FWH-200B | 200 | 1900 | 8500 | 40 |
| FWH-225A | 225 | 4600 | 23300 | 39 |
| FWH-250A | 250 | 6300 | 32200 | 41 |
| FWH-275A | 275 | 7900 | 40300 | 46 |
| FWH-300A | 300 | 9800 | 49800 | 51 |
| FWH-325A | 325 | 13700 | 63800 | 53 |
| FWH-350A | 350 | 14500 | 72900 | 58 |
| FWH-400A | 400 | 19200 | 96700 | 65 |
| FWH-450A | 450 | 24700 | 127000 | 74 |
| FWH-500A | 500 | 29200 | 149000 | 84 |
| FWH-600A | 600 | 41300 | 206000 | 108 |
| FWH-700A | 700 | 55000 | 298000 | 120 |
| FWH-800A | 800 | 76200 | 409000 | 129 |
| FWH-1000A | 1000 | 92000 | 450000 | 145 |
| FWH-1200A | 1200 | 122000 | 600000 | 180 |
| FWH-1400A | 1400 | 200000 | 1000000 | 210 |
| FWH-1600A | 1600 | 290000 | 1400000 | 230 |

• Watts loss provided at rated current. • See accessories on page 6-21.

Features and benefits

- Excellent DC performance
- Low arc voltage and low energy let-through (I²t)
- Superior cycling capability

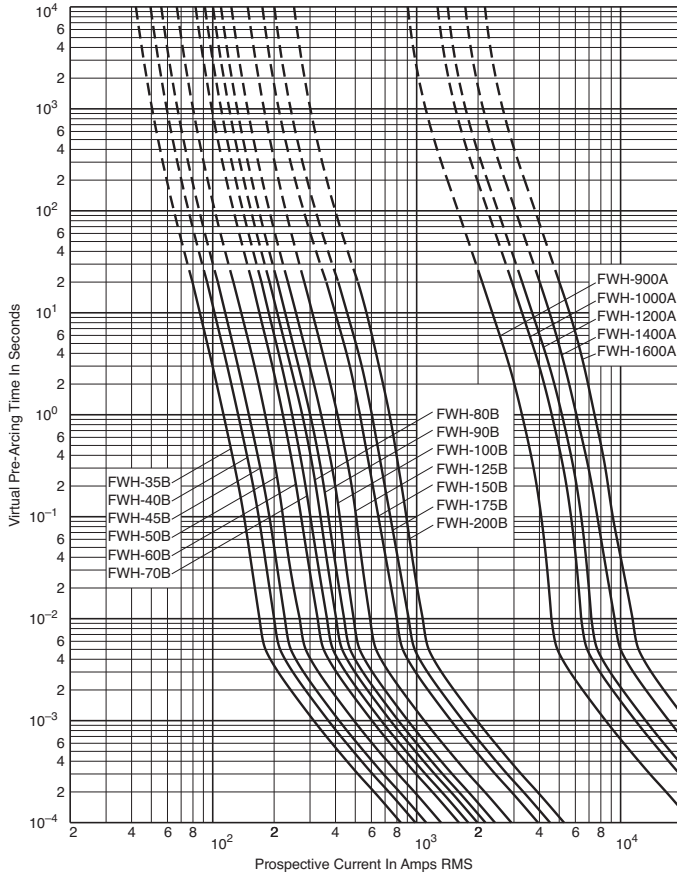
Typical applications

- DC common bus
- DC drives
- Power converters/rectifiers
- Reduced voltage starters

Data Sheet: 720007

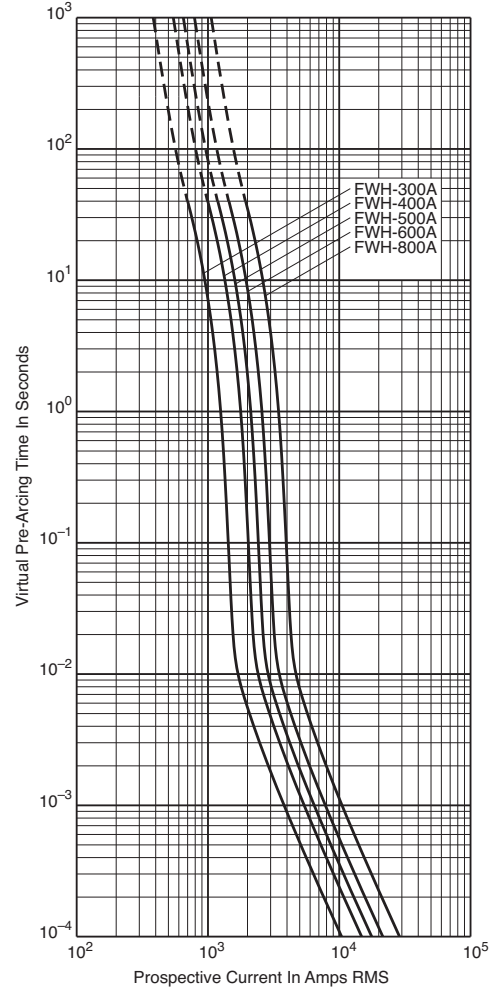
FWH 35-200A(B) and 900-1600A(A): 500V

Time-current curve

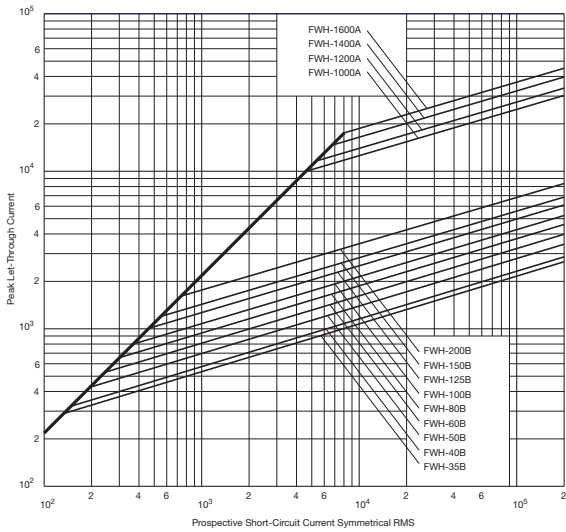


FWH 250-800A: 500V

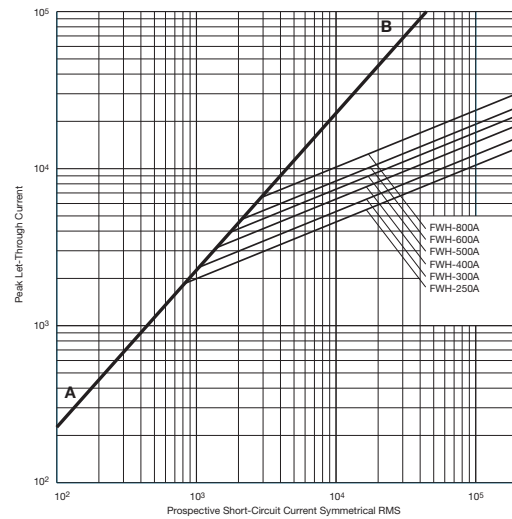
Time-current curve



Peak let-through curve



Peak let-through curve



High speed fuses

6

High speed fuses

North American

KAC 600V: 1-1000A

Specifications

Description: North American style stud-mount fuses. These 600V fuses are supplied as replacements only. For new installations, Eaton recommends the 700V FWP fuse.

Dimensions: See dimensions illustrations.

Ratings:

Volts: — 600Vac

Amps: — 1-1000A

IR: — 200kA RMS Sym.

Agency information: CE, UL Recognized JFHR2.E56413 on 1-600A only.



Catalog numbers (amps)

| | | |
|----------|---------|----------|
| KAC-1 | KAC-25 | KAC-175 |
| KAC-2 | KAC-30 | KAC-200 |
| KAC-3 | KAC-35 | KAC-225 |
| KAC-4 | KAC-40 | KAC-250 |
| KAC-5 | KAC-45 | KAC-300 |
| KAC-6 | KAC-50 | KAC-350 |
| KAC-7 | KAC-60 | KAC-400 |
| KAC-8 | KAC-70 | KAC-450 |
| KAC-9 | KAC-80 | KAC-500 |
| KAC-10 | KAC-90 | KAC-600 |
| KAC-12 | KAC-100 | KAC-700 |
| KAC-15 | KAC-110 | KAC-800 |
| KAC-17.5 | KAC-125 | KAC-1000 |
| KAC-20 | KAC-150 | |

See accessories on page 6-21.

Features and benefits

- Low arc voltage and low energy let-through (I²t)
- Low watts loss
- Superior cycling capability

Typical applications

- Power converters/rectifiers
- Reduced voltage starters

Dimensions - in

| Amp range | Fig. | A | B1 | B2 | B3 | C | D | E | F | G | H |
|-----------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1-30A | 1 | 2.875 | 2.500 | — | — | 1.875 | 0.406 | — | 0.563 | 0.063 | 0.257 |
| 35-60A | 2 | 4.375 | — | 3.750 | 3.500 | 2.750 | 0.625 | 0.343 | 0.813 | 0.094 | 0.468 |
| 70-100A | 2 | 5.000 | — | 4.063 | 3.656 | 2.750 | 0.750 | 0.406 | 1.000 | 0.125 | 0.609 |
| 110-200A | 2 | 5.140 | — | 4.390 | 3.766 | 2.906 | 1.000 | 0.406 | 1.500 | 0.188 | 0.718 |
| 225-400A | 2 | 6.182 | — | 4.815 | 4.565 | 3.000 | 1.625 | 0.562 | 2.000 | 0.250 | 0.687 |
| 450-800A | 1 | 6.250 | 4.750 | — | — | 3.063 | 2.000 | — | 2.500 | 0.250 | 0.563 |
| 1000A | 1 | 7.250 | 4.750 | — | — | 3.063 | 2.750 | — | 3.500 | 0.375 | 0.563 |

1mm = 0.0394" / 1" = 25.4mm

Fig. 1: 1-30 and 450-1000A

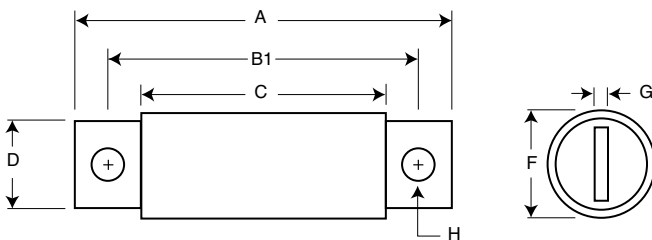
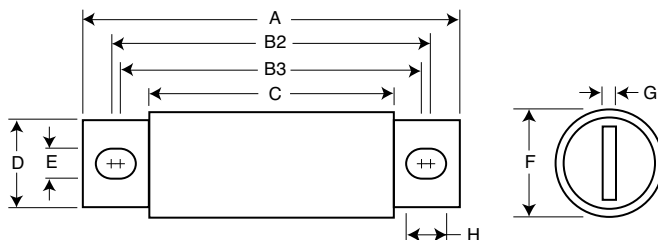


Fig. 2: 35-400A



Data Sheet: 720009

KBC 600V: 35-800A

Specifications

Description: North American style stud-mount and flush-end fuses.

These 600V fuses are supplied as replacements only. For new installations, Eaton recommends the 700V FWP fuse.

Dimensions: See dimensions illustrations.

Ratings:

- Volts: — 600Vac
- Amps: — 35-800A
- IR: — 200kA RMS Sym.

Agency information: CE, UL Recognized JFHR2.E56412 on 35-600A only.



Catalog numbers (amps)

| | | |
|--------|---------|---------|
| KBC-35 | KBC-100 | KBC-300 |
| KBC-40 | KBC-110 | KBC-350 |
| KBC-45 | KBC-125 | KBC-400 |
| KBC-50 | KBC-150 | KBC-450 |
| KBC-60 | KBC-175 | KBC-500 |
| KBC-70 | KBC-200 | KBC-600 |
| KBC-80 | KBC-225 | KBC-800 |
| KBC-90 | KBC-250 | |

Features and benefits

- Low arc voltage and low energy let-through (I²t)
- Low watts loss
- Superior cycling capability

Typical applications

- Power converters/rectifiers
- Reduced voltage starters

Dimensions - in

| Amp range | Fig. | A | B | C | D | E | F | G | H | I | |
|-----------|------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|--|
| 35-60A | 1 | 4.375 | 3.750 | 3.500 | 2.750 | 0.343 | 0.625 | 0.813 | 0.094 | 0.468 | |
| 70-100A | 2 | See Drawing | | | | | | | | | |
| 110-200A | 1 | 4.406 | 3.719 | 3.594 | 2.906 | 0.312 | 0.875 | 1.219 | 0.187 | 0.375 | |
| 225-400A | 1 | 5.125 | 4.188 | 3.563 | 2.906 | 0.406 | 1.000 | 1.500 | 0.250 | 0.719 | |
| 450-600A | 1 | 5.125 | 4.389 | 3.687 | 2.875 | 0.406 | 1.500 | 2.000 | 0.250 | 0.757 | |
| 800A | 3 | See Drawing | | | | | | | | | |

1mm = 0.0394" / 1" = 25.4mm

Fig. 1: 35-60 and 110-600A

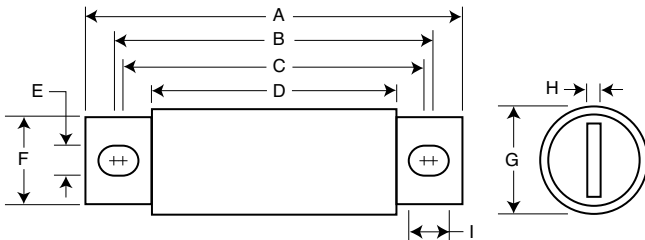


Fig. 2: 70-100A

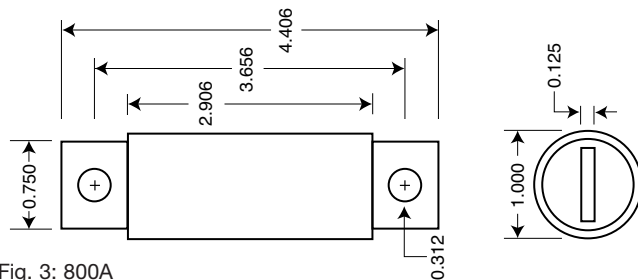
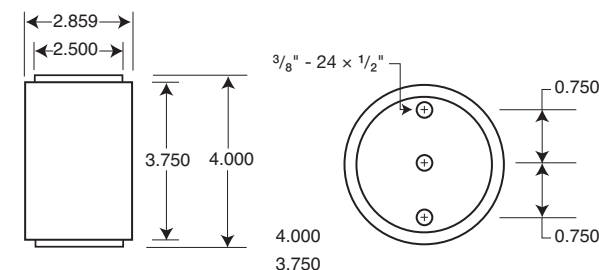


Fig. 3: 800A



Data Sheet: 720010

High speed fuses

FWP 700V: 5-1200A

Specifications

Description: North American style stud-mount fuses.

Dimensions: See dimensions illustrations.

Ratings:

Volts: — 700Vac/dc

Amps: — 5-1200A

IR: — 200kA RMS Sym.

— 50kA @700Vdc

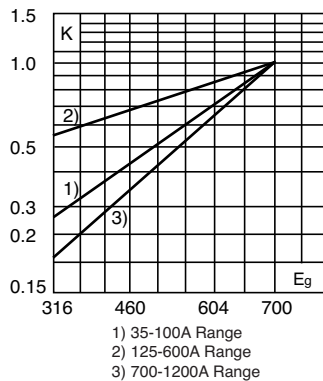
Agency information: CE, UL Recognized JFHR2.E91958 FWP_B (5-100A, 700-1200A), JFHR2.E56412 FWP_A (125-600A) and CSA Component Acceptance file Class 1422-30, (53787) on 5-800A



Electrical characteristics

Total clearing I²t

The total clearing I²t at rated voltage and at power factor of 15% are given in the electrical characteristics. For other voltages, the clearing I²t is found by multiplying by correction factor, K, given as a function of applied working voltage, E_g, (rms).



Dimensions - in

| Amp range | Fig. | A | B | C | D | E | F | G | H | I |
|-----------|------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|
| 5-30 | 1 | 2.870 | 0.563 | 1.855 | 2.477 | 2.477 | 0.250 | 0.405 | 0.063 | 0.250 |
| 35-60 | 1 | 4.375 | 0.813 | 2.750 | 3.708 | 3.312 | 0.344 | 0.725 | 0.125 | 0.542 |
| 70-100 | 1 | 4.406 | 0.947 | 2.594 | 3.625 | 3.563 | 0.344 | 0.750 | 0.125 | 0.375 |
| 125-200 | 1 | 5.090 | 1.500 | 2.840 | 4.190 | 3.500 | 0.410 | 1.000 | 0.250 | 0.750 |
| 225-400 | 1 | 5.090 | 2.000 | 2.840 | 4.280 | 3.530 | 0.410 | 1.500 | 0.250 | 0.780 |
| 450-600 | 1 | 7.090 | 2.500 | 2.840 | 5.720 | 4.190 | 0.530 | 2.000 | 0.380 | 1.300 |
| 700-800 | 1 | 6.630 | 2.000 | 2.844 | 5.562 | 5.062 | 0.625 | 1.500 | 0.250 | 0.875 |
| 900-1000 | 2 | See Drawing | | | | | | | | |
| 1200 | 3 | See Drawing | | | | | | | | |

1mm = 0.0394" / 1" = 25.4mm

Fig. 1: 5-800A

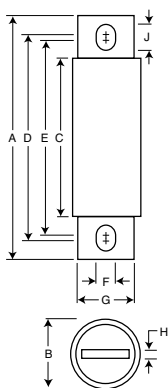


Fig. 2: 900-1000A

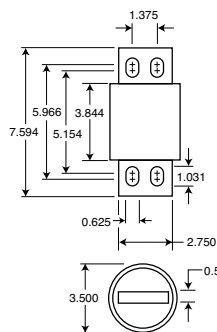
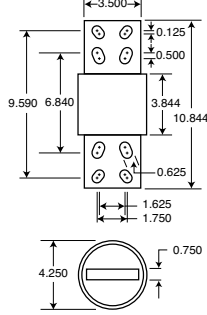
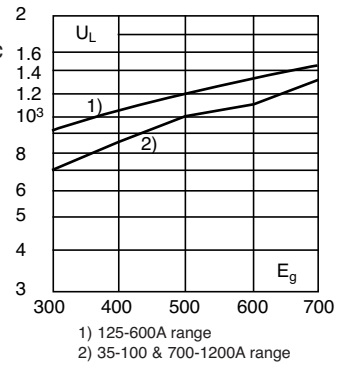


Fig. 3: 1200A



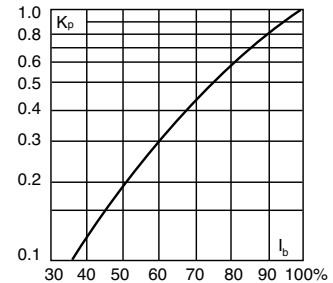
Arc voltage

This curve gives the peak arc voltage, U_L, which may appear across the fuse during its operation as a function of the applied working voltage, E_g, (rms) at a power factor of 15%.



Power losses

Watts loss at rated current is given in the electrical characteristics. The curve allows the calculation of the power losses at load currents lower than the rated current. The correction factor, K_p, is given as a function of the RMS load current, I_b, in % of the rated current.



Catalog numbers

| Catalog numbers | Rated current RMS-amps | Electrical characteristics | | |
|-----------------|------------------------|---------------------------------------|------------------|------------|
| | | I ² t (A ² Sec) | | Watts loss |
| | | Pre-arc | Clearing at 700V | |
| FWP-5B | 5 | 1.6 | 10 | 1.5 |
| FWP-10B | 10 | 3.6 | 20 | 4 |
| FWP-15B | 15 | 10 | 75 | 5.5 |
| FWP-20B | 20 | 26 | 180 | 6 |
| FWP-25B | 25 | 44 | 340 | 7 |
| FWP-30B | 30 | 58 | 450 | 9 |
| FWP-35B | 35 | 34 | 160 | 12 |
| FWP-40B | 40 | 76 | 320 | 12 |
| FWP-50B | 50 | 135 | 600 | 12 |
| FWP-60B | 60 | 210 | 950 | 15.5 |
| FWP-70B | 70 | 305 | 2000 | 18 |
| FWP-80B | 80 | 360 | 2400 | 21 |
| FWP-90B | 90 | 415 | 2700 | 25 |
| FWP-100B | 100 | 540 | 3500 | 27 |
| FWP-125A | 125 | 1800 | 7300 | 28 |
| FWP-150A | 150 | 2900 | 11700 | 32 |
| FWP-175A | 175 | 4200 | 16700 | 35 |
| FWP-200A | 200 | 5500 | 22000 | 43 |
| FWP-225A | 225 | 7700 | 31300 | 45 |
| FWP-250A | 250 | 10500 | 42500 | 48 |
| FWP-300A | 300 | 17600 | 71200 | 58 |
| FWP-350A | 350 | 23700 | 95600 | 65 |
| FWP-400A | 400 | 31000 | 125000 | 78 |
| FWP-450A | 450 | 36400 | 137000 | 94 |
| FWP-500A | 500 | 45200 | 170000 | 107 |
| FWP-600A | 600 | 66700 | 250000 | 122 |
| FWP-700A | 700 | 54000 | 300000 | 125 |
| FWP-800A | 800 | 78000 | 450000 | 140 |
| FWP-900A | 900 | 91500 | 530000 | 150 |
| FWP-1000A | 1000 | 120000 | 600000 | 170 |
| FWP-1200A | 1200 | 195000 | 1100000 | 190 |

• Watts loss provided at rated current. • See accessories on page 6-21.

Features and benefits

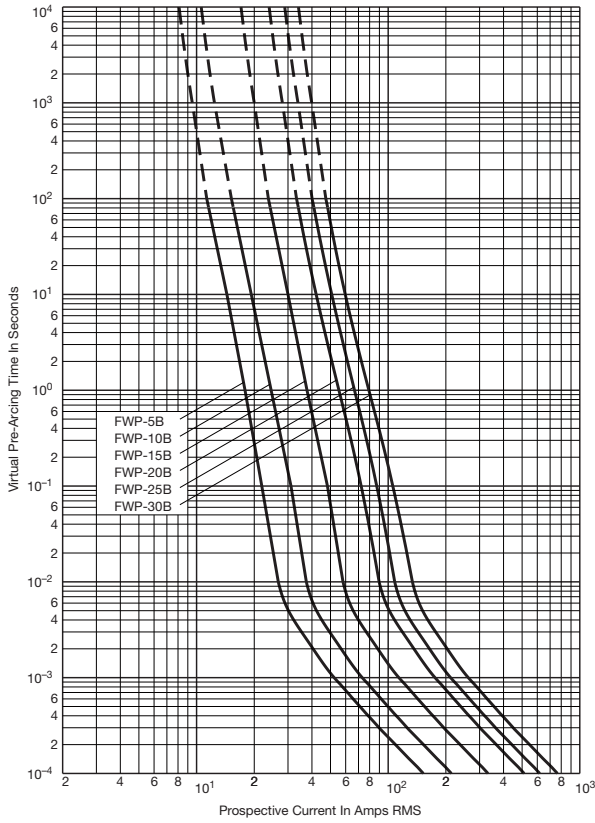
- Excellent DC performance
- Low arc voltage and low energy let-through (I²t)
- Superior cycling capability

Typical applications

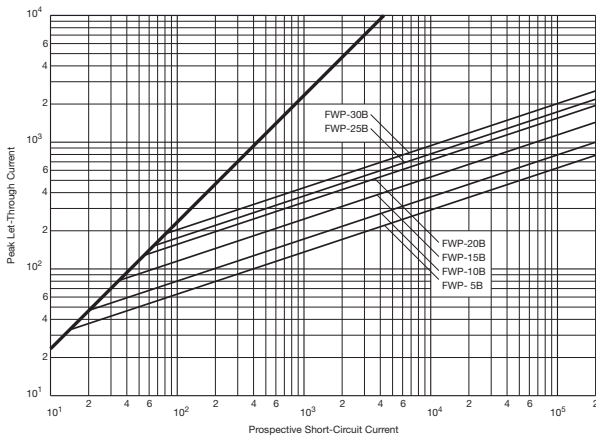
- DC common bus
- DC drives
- Power converters/rectifiers
- Reduced voltage starters

FWP 5-30A(B): 700V

Time-current curve



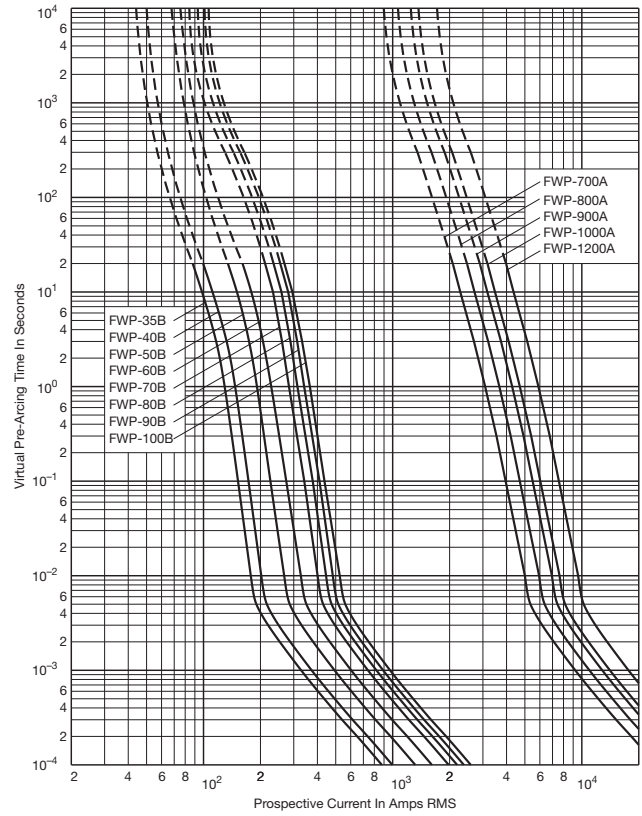
Peak let-through curve



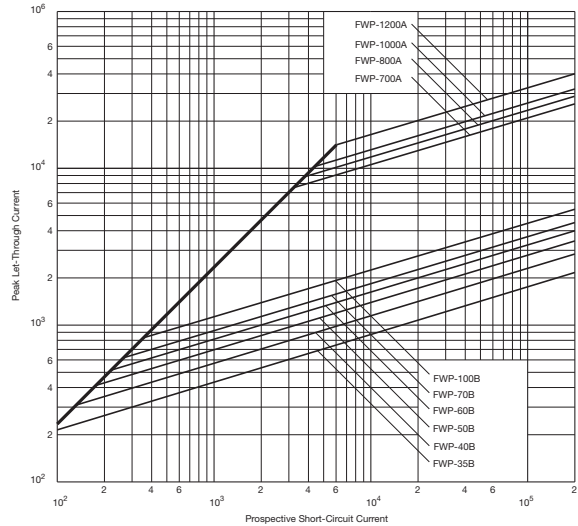
Data Sheet: 35785316

FWP 35-100A(B) and 700-1200A(A): 700V

Time-current curve



Peak let-through curve



Data Sheet: 35785308

High speed fuses

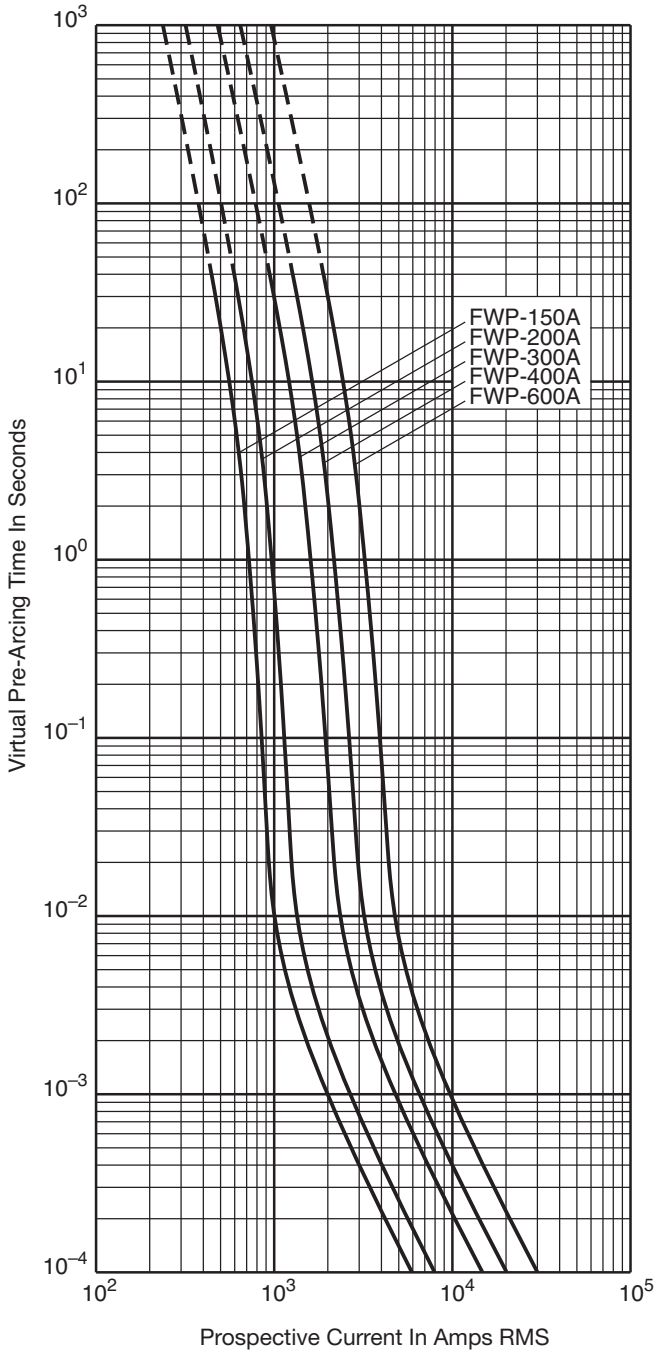
6

High speed fuses

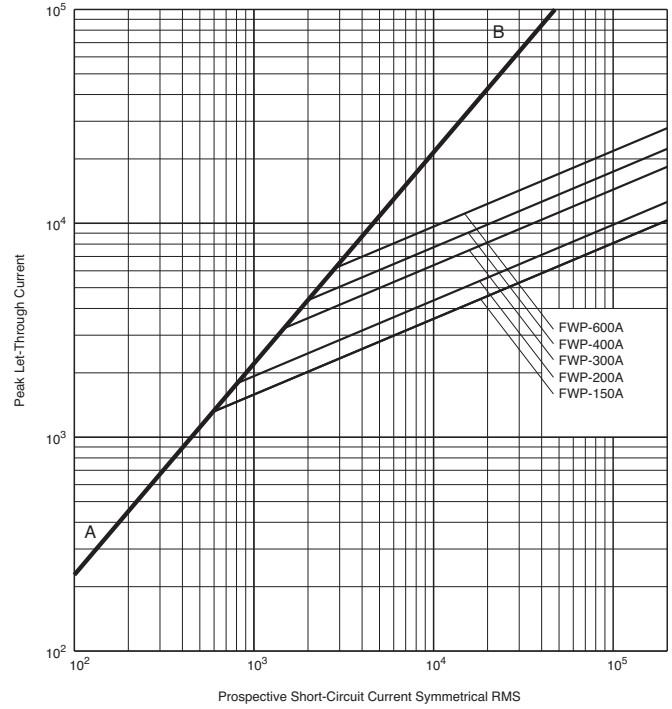
North American

FWP 150-600A: 700V

Time-current curve



Peak let-through curve



FWJ 1000V: 35-2000A

Specifications

Description: North American style stud-mount fuses.

Dimensions: See dimensions illustration.

Ratings:

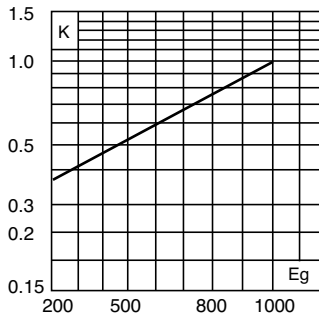
- Volts: — 1000Vac/800Vdc
- Amps: — 35-2000A
 - IR: — 25kA (35-200A)
 - 100kA (250-2000A)
 - 50kA @ 800Vdc (35-200A, 450-600A)

Agency information: CE, UL Recognized JFHR8.E91958 on 35-600A only.

Electrical characteristics

Total clearing I²t

The total clearing I²t at rated voltage and at power factor of 15% are given in the electrical characteristics. For other voltages, the clearing I²t is found by multiplying by correction factor, K, given as a function of applied working voltage, E_g, (rms).

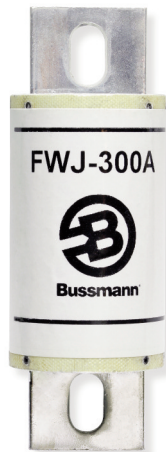
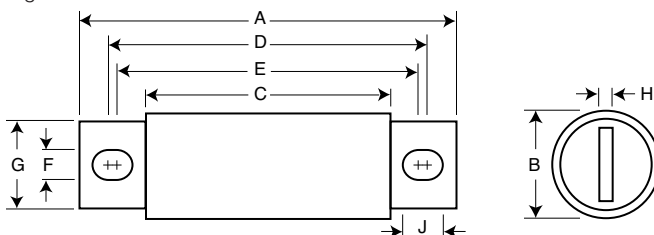


Dimensions - in

| Amp range | Fig. | A | B | C | D | E | F | G | H | I |
|-----------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 35-60 | 1 | 5.000 | 0.940 | 3.110 | 4.235 | 4.180 | 0.352 | 0.750 | 0.125 | 0.380 |
| 70-100 | 1 | 4.932 | 1.125 | 3.085 | 4.266 | 4.156 | 0.352 | 1.000 | 0.188 | 0.407 |
| 125-200 | 1 | 5.685 | 1.526 | 3.261 | 4.803 | 4.055 | 0.445 | 1.000 | 0.250 | 0.819 |
| 250-400 | 1 | 5.768 | 2.000 | 3.500 | 4.811 | 4.150 | 0.433 | 1.500 | 0.250 | 0.764 |
| 500-600 | 1 | 7.201 | 2.500 | 3.465 | 5.984 | 4.706 | 0.562 | 2.000 | 0.375 | 1.201 |
| 800-2000 | 1 | 6.811 | 3.500 | 3.312 | 5.472 | 4.962 | 0.625 | 2.750 | 0.500 | 0.880 |

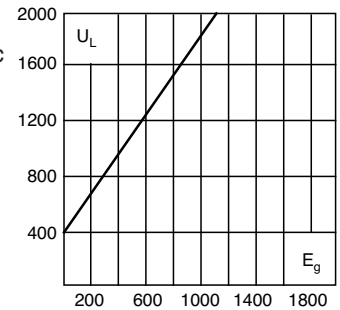
1mm = 0.0394" / 1" = 25.4mm

Fig. 1: 35-2000A



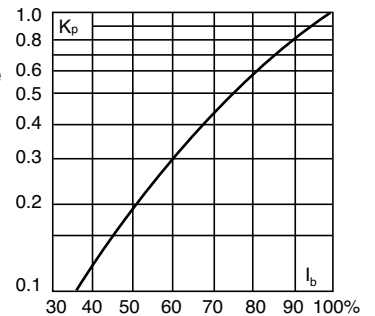
Arc voltage

This curve gives the peak arc voltage, U_L, which may appear across the fuse during its operation as a function of the applied working voltage, E_g, (rms) at a power factor of 15%.



Power losses

Watts loss at rated current is given in the electrical characteristics. The curve allows the calculation of the power losses at load currents lower than the rated current. The correction factor, K_p, is given as a function of the RMS load current, I_b, in % of the rated current.



Catalog numbers

| Catalog numbers | Rated current RMS-amps | Electrical characteristics | | | Watts loss |
|-----------------|------------------------|---------------------------------------|---------|-------------------|------------|
| | | I ² t (A ² Sec) | | Clearing at 1000V | |
| | | Pre-arc | | | |
| FWJ-35A | 35 | 210 | 2000 | 7 | |
| FWJ-40A | 40 | 300 | 2500 | 8 | |
| FWJ-50A | 50 | 470 | 3500 | 10 | |
| FWJ-60A | 60 | 670 | 5000 | 11 | |
| FWJ-70A | 70 | 1100 | 6900 | 12 | |
| FWJ-80A | 80 | 1550 | 9700 | 13 | |
| FWJ-90A | 90 | 1900 | 12000 | 14 | |
| FWJ-100A | 100 | 2800 | 17500 | 15 | |
| FWJ-125A | 125 | 4800 | 35000 | 16 | |
| FWJ-150A | 150 | 6300 | 45000 | 25 | |
| FWJ-175A | 175 | 7500 | 65000 | 30 | |
| FWJ-200A | 200 | 11700 | 80000 | 32 | |
| FWJ-250A | 250 | 16000 | 112000 | 50 | |
| FWJ-300A | 300 | 23500 | 164000 | 56 | |
| FWJ-350A | 350 | 33000 | 231000 | 62 | |
| FWJ-400A | 400 | 47000 | 330000 | 67 | |
| FWJ-500A | 500 | 39500 | 329000 | 95 | |
| FWJ-600A | 600 | 61000 | 520000 | 105 | |
| FWJ-800A | 800 | 87000 | 500000 | 182 | |
| FWJ-1000A | 1000 | 190000 | 1100000 | 206 | |
| FWJ-1200A | 1200 | 370000 | 2100000 | 240 | |
| FWJ-1400A | 1400 | 470000 | 2700000 | 248 | |
| FWJ-1600A | 1600 | 700000 | 4000000 | 267 | |
| FWJ-1800A | 1800 | 925000 | 5300000 | 239 | |
| FWJ-2000A | 2000 | 1330000 | 7600000 | 244 | |

- Watts loss provided at rated current.
- See accessories on page 6-21.

Features and benefits

- Excellent DC performance
- Low arc voltage and low energy let-through (I²t)
- Low watts loss
- Superior cycling capability

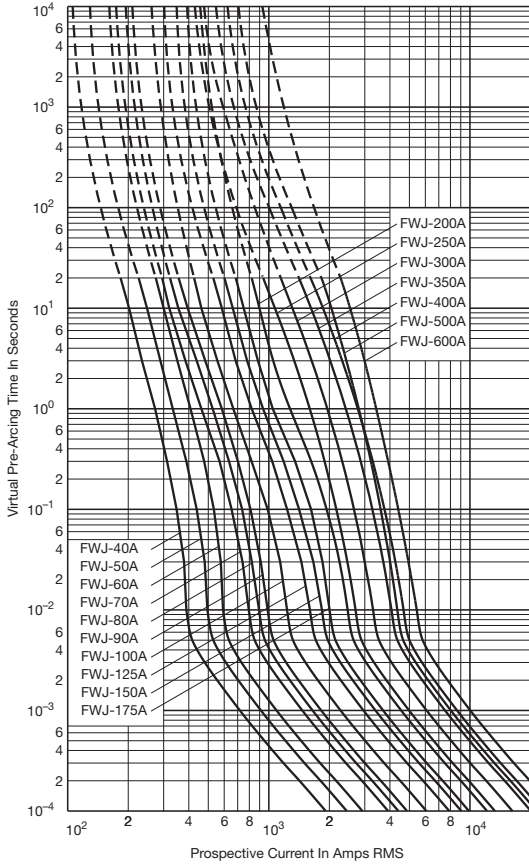
Typical Applications

- DC common bus
- DC drives
- Power converters/rectifiers
- Reduced voltage starters

High speed fuses

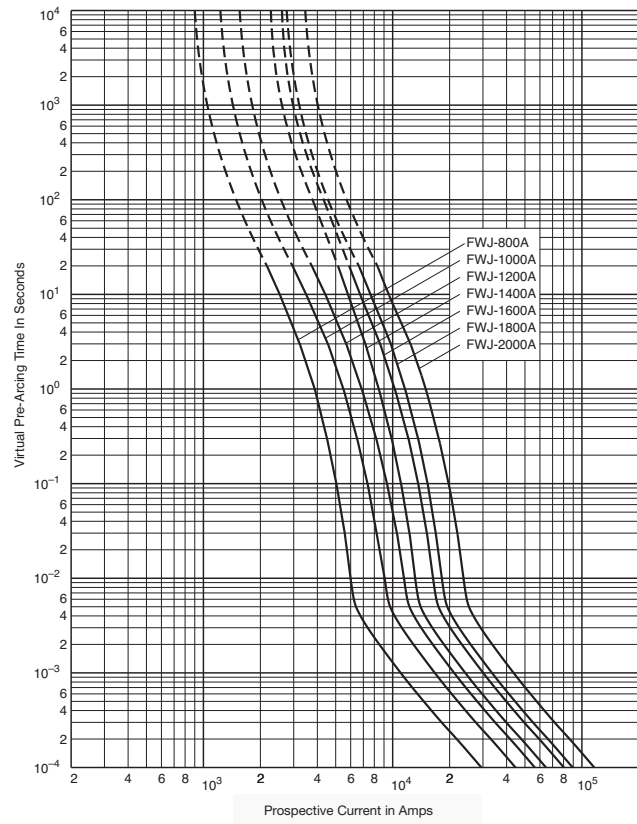
FWJ 35-600A: 1000V

Time-current curve



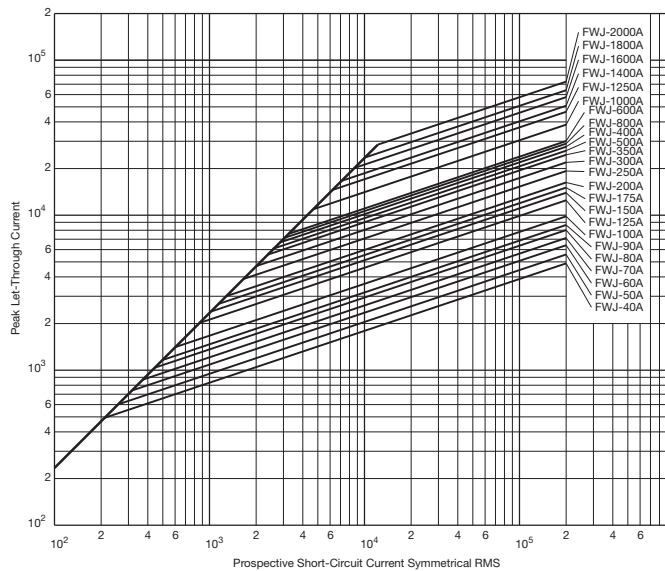
FWJ 800-2000A: 1000V

Time-current Curve



Data Sheet: 35785309

Peak let-through curve



Data Sheet: 35785303

Fuse bases (blocks)

Modular style

Eaton offers a comprehensive line of fuse bases that provide the user with design and manufacturing flexibility. Two identical half bases make up a Bussmann series modular fuse base. These “split” units can be panel mounted any distance apart to accommodate any length fuse.

Stud Type (not sold in pairs)

The simpler design is the C5268 modular fuse base. With this design, the fuse terminal and cable (with termination) are mounted on the same stud, minimizing labor needed for installation. The stud type base is available in the configuration shown in the table below.

| Catalog number | Max fuse amp rating | Stud height (in) | Stud dia. & threads |
|----------------|---------------------|------------------|---------------------|
| C5268-1 | 200 | 1.00 | 5/16"-18 |
| C5268-2 | 200 | 1.75 | 5/16"-18 |
| C5268-3 | 200 | 0.75 | 5/16"-18 |
| C5268-4 | 100 | 1.00 | 1/4"-20 |
| C5268-5 | 100 | 1.75 | 1/4"-20 |

Connector type

Eaton also offers a modular style fuse base that utilizes a tin-plated connector (for wire termination and heat dissipation) and a plated-steel stud (for fuse mounting). The connector type fuse base is available in the configurations shown below. Consult Eaton for additional product details.

| Modular base style | Max voltage | Max fuse amp rating | Data sheet number |
|--------------------|-------------|---------------------|-------------------|
| 1BS101 | 600 | 100 | 1206 |
| 1BS102 | 600 | 400 | 1207 |
| 1BS103 | 600 | 400 | 1208 |
| 1BS104 | 600 | 600 | 1209 |
| BH-0xxx | 700 | 100 | 1200 |
| BH-1xxx | 2500 | 400 | 1201 |
| BH-2xxx | 5000 | 400 | 1202 |
| BH-3xxx | 1250 | 700 | 1203 |

Refer to page 9-41 for BH holders.

