

# Bussmann series Fuses Made Simple™ - Control Circuits

The easiest and fastest way  
to select and specify the right  
control circuit fuse



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<b>Supplemental fuses</b>	
13/32" x 1-1/2" fast-acting	BAF (250 V) KTK (600 V) KLM (600 V)
13/32" x 1-1/2" time-delay	FNM (250 V) FNQ (500 V)
13/32" x 1-3/8" fast-acting	BBS (600 V) GBA (125 V) GLD (125 V)
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Fuses	ATR micro ATM ATM_ID ATM-LP
	ATC ATC_ID MAX MAX_ID
In-line fuse holders	HH2 (ATR) ATC-FHID (ATC) HHC (ATC) HHD (ATC) HHF (ATC) HHG (ATC) HHR (ATC) HHS (ATC)
	ATM-FHID (ATM) HHL (ATM) HHM (ATM) HHU (ATM) HHX (MAX) MAX-FHID (MAX)
<b>PCB fuseclips</b>	
ATC	1A5600 1A5780
ATM	1A5778 1A5779

Low voltage, supplemental fuses

## Fuse holder and block selection guide

Catalog pages for the blocks and holders are denoted parenthetically "()" next to their catalog symbol.

Fuse	Catalog symbol	Blocks	DIN-Rail holders	Panel mount holders	In-line holders	PCB fuseclips
Cable limiters	K_	—	—	—	—	—
	UH_	—	—	—	—	—
Welder limiters	64000 68000	RM60_ (8-21)	—	—	—	—
Bolt-on limiters	ANN	4164 (2-4)	—	—	—	—
	ANL	4164-FR (2-4)	—	—	—	—
13/32" x 1-1/2" supplemental fuses	BAF	BMM603_ (8-6) 3743 (8-14) 4421 (8-14) KLM (8-14) KTK	CCP2_ (11-2)	CCPLP <sup>††</sup> (30 A) (11-32) HPC-D (8-43) HPD (8-44) HPF (8-43) HPG (8-44) HPM (8-44) HPM-D (8-44) HPS2 (8-45) HPS (8-45)	HEB (8-51) HEX (8-53)	1A3400_ (3-16) 5960 (3-16)
	FNM		OPM-1038_ (8-12)			
	FNQ		OPM-NG_ (8-13)			
	KLM		CHM (8-8)			
	KTK		NDNF1-WH (8-11)			
13/32" x 1-3/8" supplemental fuses	BBS	BMM603_ (8-6)	—	HPS-L (8-45)	HEH (8-49)	1A3400_ (3-16) 5960 (3-16)
Pin indication fuses and actuator	GBA GLD	—	—	HLD (8-43)	—	1A1119 (3-15) 1A1120 (3-15) 1A1907 (3-15) 1A3398 (3-15) 1A4533 (3-15) 1A4534 (3-15) 5681 (3-16) 5682 (3-16)
	MIC FNA	BMM603_ (8-6) 3839 <sup>†</sup>	—	HPF-C (8-43)	—	1A3400_ (3-16) 5960 (3-16)
	MIS fuse KAZ actuator	2778 <sup>†</sup> 2837 <sup>†</sup> 2838 <sup>†</sup>	—	—	—	1A3400_ (3-16) 5960 (3-16)
	In-line size rejecting fuses	GLQ GMO	—	—	—	HLQ (2-10)
In-line non-rejecting fuses	GLR GMF GRF	—	—	—	HLR (2-11) HLR-2A (2-11)	—
Automotive blade-type fuses	ATC ATC_ID	FB_-ATC* 15600*	—	—	ATC-FHID (2-14) HHC (2-14) HHD (2-14) HHF (2-14) HHG (2-14) HHR (2-14) HHS (2-14)	1A5600 (2-14) 1A5780 (2-14)
	ATM ATM_ID	FB_-ATM* RTMF_-*	—	—	ATM-FHID (2-14) HHL (2-14) HHM (2-14) HHU (2-14)	1A5778 (2-14) 1A5779 (2-14)
	ATM-LP	FB_-ATM* RTMF_-*	—	—	HHV (2-14)	—
	ATR micro	FB_-ATR*	—	—	HH2 (2-14)	—
	MAX MAX_ID	—	—	—	HHX (2-14) MAX-FHID (2-14)	—

\* Not shown in this catalog, for details and available configurations, see Automotive and Home center catalog no. 5084.

† Not shown in this catalog, see data sheet for details.

†† UL 508 Listed disconnect switch, available in 1-, 2- and 3-pole versions.

### K 600 V cable limiters

Cable limiters for protecting 600 V low voltage distribution and service entrance cables against short-circuit currents.

#### Ratings

- Volts 600 Vac
- IR 200 kA RMS Sym. @ 600 Vac

#### Agency information

- UL Listed, File E90818, 600 Vac, 200 kA IR on catalog numbers CDA-W, CDB-W, KCD, KCJ, KCM, KCM-B, KCR, KDD, KDF, KDJ, KDM, KDP, KDR, KDU, KEW, KFM, KFT, KHf, KHJ, KHM, KHR

#### Features

- Sizes and ratings available to meet many applications



### UH 250 V cable limiters

Cable limiters for protecting 250 V low voltage distribution and service entrance cables used in residential applications against short-circuit currents.

#### Ratings

- Volts Up to 250 Vac
- IR 100 kA RMS Sym.

#### Terminals and conductors

- Center bolt-to-offset bolt terminals, Cu or Al conductors
- Cu or Al conductors are permitted per the listed cable size. Select the catalog number for the conductor size. See data sheet 1042 for dimensions.



Low voltage, supplemental fuses

Catalog no.	Cable size (AWG)	Catalog no.	Cable size (AWG)
<b>*Tubular terminals</b>			
KCY	4	KCH	250 kcmil
KCZ	3	KCJ <sup>1,2</sup>	350 kcmil
KCA	2	KCM <sup>1,2,3</sup>	500 kcmil
KCB	1	KCV	600 kcmil
KCC	1/0	KCR <sup>1,2</sup>	750 kcmil
KCD <sup>1,2</sup>	2/0	CDA-W <sup>1,4</sup>	750 kcmil
KCE	3/0	KCS	1000 kcmil
KCF	4/0		
<b>*Tubular and offset bolt-type terminals</b>			
KQV	12	KDE	3/0
KQT	10	KDF <sup>1</sup>	4/0
KFZ	8	KDH	250 kcmil
KIG	6	KDJ <sup>1,3</sup>	350 kcmil
KDY	4	KDM <sup>1,3</sup>	500 kcmil
KDA	2	KDU <sup>1</sup>	600 kcmil
KDB	1	KDR <sup>1,2</sup>	750 kcmil
KDC	1/0	CDB-W <sup>1,4</sup>	750 kcmil
KDD <sup>1</sup>	2/0		
<b>*Compression connector rod and tubular terminals</b>			
KEX	4/0	KQO	350 kcmil
KFH-A	250 kcmil	KDT	500 kcmil
<b>**Center bolt-type and off-set bolt-type terminals</b>			
KPF	4/0	KDP <sup>1</sup>	500 kcmil
KFT <sup>1</sup>	250 kcmil	KFM <sup>1</sup>	750 kcmil
KEW <sup>1</sup>	350 kcmil		
<b>Center bolt-type and tubular terminals</b>			
KHF <sup>1</sup>	4/0	KHM <sup>1</sup>	500 kcmil
KHJ <sup>1</sup>	350 kcmil	KHR <sup>1</sup>	750 kcmil

\* Copper conductors only.

\*\*Copper or aluminum conductors.

1 UL Listed (File E90818), 600 Vac, 200 kA I.R.

2 Available with shrink tube "-V" suffix.

3 Available with molded rubber boots.

4 Aluminum conductor only.

#### Accessory boots (order separately)

Limiter	Boot catalog no.	Limiter	Boot catalog no.
KCM	BOOT-KCM	KDM	BOOT-KDM

Recommended Thomas and Betts crimp tool TBM-14M with die 15506 KDM/15515 KDR for installation.

Catalog no.	Cu cable size (AWG)	Al cable size (AWG)
UHA	3/0	4/0
UHJ-M	3/0	250 kcmil
UHJ-T	350 kcmil	500 kcmil
UHJ-W	600 kcmil	800 kcmil

#### Data sheet no. 1042

### 64000 and 68000 600 V welder limiters

Limiters for use on welder circuits. **Note:** welder limiters have special characteristics and are not suitable for use on other circuit types.

#### Ratings

- Volts 600 Vac (or less)
- IR 200 kA RMS Sym.

#### Features

- Current-limiting devices designed specially for use only on welder circuits
- Time-current characteristics are designed to hold on the intermittent overloading encountered in welder operation, while providing short-circuit protection to the circuit and equipment



Catalog no.	Fuse holder type	Nominal amp rating
68300	Class H	300
68600	Class H	600
64200	Class J	200
64300	Class J	300

Recommended fuse blocks, see page 2-2.

### ANL/ANN limiters

Circuit limiters typically used in fork lifts, marine, aviation and battery charging systems. ANL limiters are fast-acting and ANN limiters are very fast-acting. Both ANL and ANN limiters measure 7/8" x 3-3/16" (22x81mm) with a depth that varies by amp rating.



Fast-acting ANL



Very fast-acting ANN

#### Ratings

- Volts
  - ANL 80 Vdc
  - ANN 125 Vac, 80 Vdc
- Amps
  - ANL 35-750 A
  - ANN 10-800 A
- IR
  - ANL 2700 A @ 80 Vdc
  - ANN 2500 A @ 125 Vac, 2700 A @ 80 Vdc

#### Agency information

- ANL: UL Recognized, CSA Certified, 35-750 A @ 80 Vdc, IR 2700 A, Guide JFHR2, File E56412, Class 1422-30, File 53787, SAE J1171
- ANN: UL Recognized, CSA Certified 35-400 A @ 125 Vac, IR 2500 A and 500 A @ 80 Vdc, IR 2700 A, Guide JFHR2, File E56412, Class 1422-30, File 53787, CE for 35-400 A

### 4164 and 4164-FR limiter blocks

Limiter fuse blocks for ANL and ANN. 4164 is furnished with nylon inserted locknuts and 4164-FR is furnished with standard hex nuts.



4164



4164-FR

#### Dimensions

- L 3.38" x W 0.95" x H 1.62"
- Studs center-to-center 2.43"

#### Ratings

- Volts 125 Vac, 80 Vdc, 32 Vdc (self certified)
- Amps 10-800 A
- Poles single, stud terminal

#### Data sheet no. 2133

#### Catalog no. (amps)

##### Fast-acting ANL

ANL-35	ANL-125	ANL-250	ANL-500
ANL-40	ANL-130	ANL-275	ANL-600
ANL-50	ANL-150	ANL-300	ANL-675
ANL-60	ANL-175	ANL-325	ANL-750
ANL-80	ANL-200	ANL-350	
ANL-100	ANL-225	ANL-400	

##### Very fast-acting ANN

ANN-10	ANN-90	ANN-225	ANN-400
ANN-35	ANN-100	ANN-250	ANN-500
ANN-40	ANN-125	ANN-275	ANN-600
ANN-50	ANN-150	ANN-300	ANN-700
ANN-60	ANN-175	ANN-325	ANN-800
ANN-80	ANN-200	ANN-350	

#### Features

- Fast-acting sizing for inductive circuits (ANL)
- Very fast-acting circuit protection (ANN)
- Element viewing window shows limiter status at a glance

#### Data sheet no. 2023 (ANN), 2024 (ANL)

**BAF fast-acting 13/32" x 1-1/2" supplemental fuse**

Fast-acting, supplemental fuse. Green color code (250 Vac max). For superior protection, Eaton recommends upgrading to Bussmann series Low-Peak Class CC fuses. See data sheet no. 1023.



**Ratings**

Fuse amp range	IR at system voltage		Agency information	
	250 Vac	125 Vac	UL	CSA
1/4 to 1	35 A	10 kA	—	X
1-1/2 to 2-1/2	100 A	10 kA	—	X
3	100 A	10 kA	X	X
4 to 10	200 A	10 kA	X	X
12 to 15	750 A	10 kA	X	X
20 to 30	200 A	10 kA	—	—

**Agency information**

- UL Listed, Std. 248-14, 250 Vac (3 to 15 A) Guide JDYX, File E19180, CSA Certified, 250 Vac (1/4 to 15 A) Class 1422-01, File 53787

Catalog no. (amps)			
BAF-1/4	BAF-1-8/10	BAF-6	BAF-12
BAF-1/2	BAF-2	BAF-6-1/4	BAF-15
BAF-6/10	BAF-2-1/2	BAF-7	BAF-20
BAF-8/10	BAF-3	BAF-8	BAF-25
BAF-1	BAF-4	BAF-9	BAF-30
BAF-1-1/2	BAF-5	BAF-10	

**Features**

- Green color code for maximum 250 Vac rating
- Fiber tube construction with nickel-plated brass endcaps

**Typical applications**

- General purpose circuits
- Lighting circuit protection
- Meter circuits

Recommended blocks and holders for 13/32" x 1-1/2" fuses, see page 2-2.

**KTK fast-acting 13/32" x 1-1/2" supplemental fuse**

Fast-acting supplemental fuse. Black color code (600 Vac max). For superior protection, Eaton recommends upgrading to Bussmann series Low-Peak Class CC fuses. See data sheet no. 1023.



**Ratings**

Fuse amp range	IR at rated voltage	Agency information	
	600 Vac	UL	CSA
1/10 to 30	100 kA	X	X

**Agency information**

- UL Listed, Std. 248-14, Guide JDYX, File E19180, CSA Certified, C22.2 No. 248.14, Class 1422-01, File 53787, HRC-MISC, RoHS compliant, CE

Catalog no. (amps)			
KTK-1/10	KTK-3/4	KTK-4	KTK-12
KTK-1/8	KTK-1	KTK-5	KTK-15
KTK-2/10	KTK-1-1/4	KTK-6	KTK-20
KTK-1/4	KTK-1-1/2	KTK-7	KTK-25
KTK-3/10	KTK-2	KTK-7-1/2	KTK-30
KTK-4/10	KTK-2-1/2	KTK-8	
KTK-1/2	KTK-3	KTK-9	
KTK-6/10	KTK-3-1/2	KTK-10	

**Features**

- Black color code for 600 Vac rating
- Fast-acting for resistive loads
- Melamine tube construction with nickel-plated bronze endcaps

**Typical applications**

- Control circuits
- Lighting circuit protection
- Meter circuits

Recommended blocks and holders for 13/32" x 1-1/2" fuses, see page 2-2.

Low voltage supplemental fuses

### KLM fast-acting 13/32" x 1-1/2" supplemental fuse

Fast-acting supplemental fuse. Color code black (600 Vac/dc max). For superior protection, Eaton recommends upgrading to Bussmann series Low-Peak Class CC fuses. See data sheet no. 1023. For protecting PV systems, use PVM 10x30mm PV fuses. See data sheet no. 10121.



#### Ratings

Fuse amp range	IR at rated voltage		Agency information	
	600 Vac	600 Vdc	UL	CSA
1/10 to 30	100 kA	50 kA	X	X

#### Electrical characteristics

% of amp rating	Opening time
110%	4 hours minimum
135%	AC opens within 1 hour

#### Agency information

- UL Listed, Std. 248-14, Guide JDYX, File E19180, CSA Certified, C22.2 No. 248, 14, Class 1422-01, File 53787, RoHS compliant, CE

Catalog no. (amps)			
KLM-1/10	KLM-1	KLM-5	KLM-15
KLM-1/8	KLM-1-1/4	KLM-6	KLM-20
KLM-2/10	KLM-1-1/2	KLM-7	KLM-25
KLM-1/4	KLM-2	KLM-8	KLM-30
KLM-3/10	KLM-2-1/2	KLM-9	
KLM-1/2	KLM-3	KLM-10	
KLM-3/4	KLM-4	KLM-12	

#### Features

- Color coded for 600 Vac/dc maximum
- A full range DC performance fuse
- Melamine tube construction with nickel-plated brass endcaps

Recommended fuse blocks and holders for 13/32" x 1-1/2" fuses, see page 2-2.

Data sheet no. 2020

### FNM time-delay 13/32" x 1-1/2" supplemental fuse

Time-delay supplemental fuse. Color code green (250 Vac max). For superior protection, Eaton recommends upgrading to Bussmann series Low-Peak Class CC fuses. See data sheet no. 1023.



#### Ratings

Fuse amp range	IR at system voltage		Agency information	
	250 Vac	125 Vac	UL	CSA
1/10 to 1	35 A	10 kA	X	X
1-1/8 to 3-1/2	100 A	10 kA	X	X
4 to 10	200 A	10 kA	X	X
12 to 30	10 kA	—	X	X

#### Agency information

- UL Listed, Std. 248-14, Guide JDYX; File E19180, CSA Certified, Class 1422-01, File 53787, RoHS compliant, CE

Catalog no. (amps)			
FNM-1/10	FNM-8/10	FNM-2-1/2	FNM-6-1/4
FNM-1/8	FNM-1	FNM-2-8/10	FNM-7
FNM-15/100	FNM-1-1/8	FNM-3	FNM-8
FNM-2/10	FNM-1-1/4	FNM-3-2/10	FNM-9
FNM-1/4	FNM-1-4/10	FNM-3-1/2	FNM-10
FNM-3/10	FNM-1-1/2	FNM-4	FNM-12
FNM-4/10	FNM-1-6/10	FNM-4-1/2	FNM-15
FNM-1/2	FNM-1-8/10	FNM-5	FNM-20
FNM-6/10	FNM-2	FNM-5-6/10	FNM-25
FNM-3/4	FNM-2-1/4	FNM-6	FNM-30

#### Features

- Color coded for 250 Vac maximum
- Melamine tube construction with nickel-plated brass endcaps

#### Typical applications

- Circuits with high inrush currents (motor/transformer loads)
- Supplemental protection for 125 Vac and 250 Vac inductive circuits

Recommended fuse blocks and holders for 13/32" x 1-1/2" fuses, see page 2-2.

Data sheet no. 2028

**FNQ time-delay 13/32" x 1-1/2" supplemental fuse**

Time-delay supplemental fuse. Color code orange (500 Vac max). For superior protection, Eaton recommends upgrading to Bussmann series Limitron FNQ-R Class CC fuses. See data sheet no. 1014.



**Ratings**

Fuse amp range	IR at rated voltage		Agency information	
	500 Vac		UL	CSA
1/10 to 30	10 kA		X	X

**Agency information**

- UL Listed, Std. 248-14, Guide JDYX, File E19180, CSA Certified, C22.2 No. 248.14, Class 1422-01, File 53787, HRC-MISC, RoHS compliant, CE

Catalog no. (amps)			
FNQ-1/10	FNQ-8/10	FNQ-3-2/10	FNQ-9
FNQ-1/8*	FNQ-1	FNQ-3-1/2	FNQ-10
FNQ-15/100*	FNQ-1-1/8	FNQ-4	FNQ-12
FNQ-3/16	FNQ-1-1/4	FNQ-4-1/2	FNQ-14
FNQ-2/10	FNQ-1-1/2	FNQ-5	FNQ-15
FNQ-1/4	FNQ-1-6/10	FNQ-5-6/10	FNQ-20
FNQ-3/10	FNQ-2	FNQ-6	FNQ-25
FNQ-4/10	FNQ-2-1/4	FNQ-6-1/4	FNQ-30
FNQ-1/2	FNQ-2-1/2	FNQ-7	
FNQ-6/10	FNQ-3	FNQ-8	

\* Not RoHS compliant.

**Features**

- Color coded for 500 Vac maximum
- Fiber tube construction with nickel-plated brass endcaps

**Typical applications**

- Motor control transformers
- Circuits with in-rush currents

Recommended blocks and holders for 13/32" x 1-1/2" fuses, see page 2-2.

**BBS fast-acting 13/32" x 1-3/8" supplemental fuse**

Fast-acting supplemental fuse. Color codes black (600 Vac max 1/10 to 6 A), green (250 Vac max 7 to 10 A), purple (48 Vac max 12 to 30 A). (For superior protection, Eaton recommends upgrading to Bussmann series Low-Peak Class CC fuses. See data sheet no. 1023.



**Ratings**

Fuse amp range	IR at system voltage			Agency information	
	600 Vac	250 Vac	48 Vac	UL	CSA
1/10 to 6	10 kA	—	—	X	X
7 to 10	—	10 kA	—	X	X
12 to 30*	—	—	—	—	—

\* For interrupting rating, contact factory.

**Agency information**

- UL Listed, Std. 248-14 (1/10-6 A@600 Vac, 7-10 A@250 Vac), Guide JDYX, File E19180, CSA Certified, C22.2 No. 248.14 (1/10-6 A@600 Vac, 7-10 A@250 Vac), Class 1422-01, File 53787, CE

Catalog no. (amps)			
BBS-1/10	BBS-8/10	BBS-4	BBS-15
BBS-2/10	BBS-1	BBS-5	BBS-20
BBS-1/4	BBS-1-1/2	BBS-6	BBS-25
BBS-4/10	BBS-1-6/10	BBS-7	BBS-30
BBS-1/2	BBS-1-8/10	BBS-8	
BBS-6/10	BBS-2	BBS-10	
BBS-3/4	BBS-3	BBS-12	

**Features**

- Color coded for 600 Vac (black) 250 Vac (green) and 48 Vac (purple) for maximum
- Fiber tube construction with nickel-plated brass endcaps

**Typical applications**

- Control circuits
- Gaseous vapor fixtures
- HID ballasts
- Electronic circuits
- Hand-held meters

Recommended blocks and holders for BBS fuses, see page 2-2.

Low voltage, supplemental fuses

### GBA/GLD fast-acting 1/4" x 1-1/4" pin-indicating supplemental fuse

Fast-acting, pin-indicating fuse.

#### Ratings

- Volts — see agency information
- Amps 1/2-15 A
- IR — see agency information



#### Agency information

- UL Listed, Std. 248-14, 0-5 A/125 Vac, 10,000 AIC, Guide JDYX, File E19180
- UL Recognized, 6 A/125 Vac, 1000 AIC 8-15 A/50 Vac/dc, 300 AIC Guide JDYX2, File E19180
- CSA Certified, 0-5 A/125 Vac, 10,000 AIC Class 1422-01, File 53787
- CE

#### Catalog no. (amps)

GBA			
GBA-1/2	GBA-1-1/2	GBA-4	GBA-10
GBA-3/4	GBA-2	GBA-5	GBA-15
GBA-1	GBA-3	GBA-8	
GLD			
GLD-1/2	GLD-1-1/2	GLD-4	GLD-10
GLD-3/4	GLD-2	GLD-5	GLD-12
GLD-1	GLD-3	GLD-6	GLD-15

#### Features

- Type GBA has a "red" pin indicator providing visual identification of failed circuits, resulting in faster troubleshooting (reduced circuit downtime)
- Type GLD has a plated pin to activate transmitting a electrical signal to indicate the location of opened circuits, resulting in reduced downtime

#### Typical applications

- Control circuits
- Electronic circuits

Recommended fuse blocks/fuse holders for 1/4" x 1-1/4" indicating fuses, see page 2-2.

### MIC fast-acting 13/32" x 1-1/2" pin-indicating supplemental fuse

Fast-acting, pin-indicating supplemental fuse. Green color code (250 Vac max 1 to 15 A), gray (32 Vac max 20 to 30 A).



#### Ratings

Fuse amp range	IR at voltage rating		Agency information	
	250 Vac	32 Vac	UL	CSA
1	35 A	—	X	—
2 to 3	100 A	—	X	—
5 to 10	200 A	—	X	—
15	750 A	—	X	—
20 to 30	—	10 kA	—	—

#### Electrical characteristics

% of fuse rating	Opening time
110%	Indefinitely
135%	1 hour max.

#### Agency information

- UL Listed, Std. 248-14, 1-15 A, Guide JDYX, File E19180, CE

#### Catalog no. (amps)

MIC-1	MIC-5	MIC-15	MIC-30
MIC-2	MIC-8	MIC-20	
MIC-3	MIC-10	MIC-25	

#### Features

- Color coded by maximum voltage rating
- Pin indication for visual indication of open fuse condition
- Silver-plated pin for positive, electrical signal activation
- Fiber tube construction with nickel-plated bronze endcaps

#### Typical applications

- Power electronic circuits in which fuse opening must be quickly apparent
- Control circuits
- PLC Circuits

Recommended signal block for, 13/32" x 1-1/2" indicating fuses, see page 2-2.



### FNA time-delay 13/32" x 1-1/2" pin-indicating supplemental fuse

Pin-indicating time-delay supplemental fuse. Color coded green (250 Vac max 1/10 to 6 A), blue (125 Vac max 6-1/4 to 15 A) and gray (32 Vac max 20 to 30 A).



Dual-tube construction 12A and up

#### Ratings

Fuse amp range	IR at system voltage			Agency information	
	250 Vac	125 Vac	32 Vac	UL	CSA
1/10 to 8/10	35 A	10 kA	—	X	X
1 to 6	200 A	10 kA	—	X	X
6-1/4 to 15	—	10 kA	—	X	X
20 to 30	—	—	1 kA	—	—

#### Agency information

- UL Listed, 1/10 to 8/10 A @ 125/250 Vac, 1-15 A @ 125 Vac, Guide JDYX, File E19180, CSA Certified, 1/10 to 10 A @ 125 Vac, Class 1422-01, File 53787, CE

Catalog no. (amps)			
FNA-1/10	FNA-1	FNA-3	FNA-9
FNA-1/8	FNA-1-1/8	FNA-3-2/10	FNA-10
FNA-15/100	FNA-1-1/4	FNA-3-1/2	FNA-12
FNA-2/10	FNA-1-4/10	FNA-4	FNA-15
FNA-1/4	FNA-1-1/2	FNA-4-1/2	FNA-20
FNA-3/10	FNA-1-6/10	FNA-5	FNA-25
FNA-4/10	FNA-1-8/10	FNA-5-6/10	FNA-30
FNA-1/2	FNA-2	FNA-6	
FNA-6/10	FNA-2-1/4	FNA-6-1/4	
FNA-3/4	FNA-2-1/2	FNA-7	
FNA-8/10	FNA-2-8/10	FNA-8	

#### Features

- Color coded by maximum voltage rating
- Pin-indication for visual indication of open fuse condition
- Dual-element, time-delay performance permits close sizing on control transformers and relays
- Silver-plated pin for positive, electrical signal activation
- 12 amp and more versions are dual-tube construction

Recommended signal block for 13/32" x 1-1/2" indicating fuses, see page 2.2.

### MIS non time-delay 13/32" x 2" pin-indicating supplemental fuse and KAZ non-fuse pin-indicating actuator

MIS is a non time-delay pin-indicating fuse.

KAZ is a non-fuse actuator mounted in parallel with fuses having a 50 amp or larger rating to provide blown fuse dropout for shunt-trip fused switches. To order, specify catalog number KAZ.



Low voltage, supplemental fuses

#### Ratings

	MIS fuse	KAZ actuator
Volts	600 Vac	600 Vac
Amps	1-12 A	N/A
IR	200 kA	200 kA

#### MIS fuse electrical characteristics

MIS Fuse	Load	Opening time
All	110%	4 hrs. (min.)
1-5 A	150%	6 min. (max.)
6-12 A	150%	12 min. (max.)

MIS fuse catalog no. (amps)			
MIS-1	MIS-3	MIS-5	MIS-10
MIS-2	MIS-4	MIS-8	MIS-12

#### KAZ agency information

- UL Listed, Guide JDVS, File E58836, CE

#### MIS fuse features

- Pin indicator provides visual identification of failed circuits, resulting in faster troubleshooting (reduced circuit downtime)
- Fuse can be used in circuits rated 600 V or less
- High 200 kA interrupting rating for high fault current circuits

#### MIS fuse typical applications

- 480 V control circuits
- PLC circuits

#### KAZ actuator features

- Convenient means to add open fuse signaling
- Actuator can be used in circuits rated 600 V or less
- High 200 kA interrupting rating for high fault current circuits

#### KAZ actuator typical applications

- Large, shunt-trip fused switches
- Fuse protected circuits rated 50 A or larger with shunt-trip devices

Recommended signal blocks for MIS and KAZ, see page 2-2.

### GLQ fast-acting, size-rejecting supplemental fuse

Fast-acting, size-rejecting in-line fuse. Match fuse and holder amp rating per catalog number table below.



#### Ratings

- Volts 300 Vac (or less)
- Amps 1-10 A
- IR 10 kA

#### Agency information

- UL Listed, Std. 248-14, (Guide JDYX, File E19180), CSA Certified C22.2 No. 248.14, (Class 1422-01, File 53787), CE

### GMO time-delay, size-rejecting supplemental fuse

Time-delay, size-rejecting in-line fuse. Match fuse and holder amp rating per catalog number table below.



#### Ratings

- Volts 300 Vac (or less)
- Amps 1/2 to 6-1/4 A
- IR 10 kA

#### Agency information

- UL Listed, Std. 248-14, (Guide JDYX, File E19180), CSA Certified, (Class 1422-01, File 53787), CE

#### Catalog no. (amps) and holders

Fuse	Holder <sup>1,2</sup>	Fuse	Holder <sup>1,2</sup>
GLQ-1	HLQ-1-6/10	GLQ-3	HLQ-3-2/10
GLQ-1-1/2	HLQ-1-6/10	GLQ-4	HLQ-5
GLQ-1-6/10	HLQ-1-6/10	GLQ-5	HLQ-5
GLQ-2	HLQ-3-2/10	GLQ-9	HLQ-10
GLQ-2-1/2	HLQ-3-2/10	GLQ-10	HLQ-10

1 Carrier is UL Recognized, Guide IZLT2, File E14853 and CSA Certified, Class 6225-01, File 47235 10 A, 300 Vac.

2 Units can be panel-mounted either in a knockout hole with a separate steel clip (BK/A-104) or in a keyhole punch using separate mounting clip NO.6374 for panels of thickness 0.043" to 0.062" or NO.4909 for thickness 0.030" to 0.042".

**Note:** Do not put tension on line (rear) terminal of fuse holder.

#### Features

- In-line, fast-acting circuit protection
- Rejection feature prevents overfusing

#### Typical applications

- In-line lighting ballast protection

#### Catalog no. (amps) and holders

Fuse	Holders <sup>1,2</sup>	Fuse	Holders <sup>1,2</sup>
GMO-1/2	HLQ-1/2	GMO-2-1/2	HLQ-3-2/10
GMO-6/10	HLQ-1-6/10	GMO-3	HLQ-3-2/10
GMO-8/10	HLQ-1-6/10	GMO-3-2/10	HLQ-3-2/10
GMO-1	HLQ-1-6/10	GMO-4	HLQ-5
GMO-1-1/4	HLQ-1-6/10	GMO-5	HLQ-5
GMO-1-6/10	HLQ-1-6/10	GMO-6-1/4	HLQ-8
GMO-2	HLQ-3-2/10		

1 Carrier is UL Recognized, Guide IZLT2, File E14853 and CSA Certified, Class 6225-01, File 47235 10 A, 300 Vac.

2 Units can be panel-mounted either in a knockout hole with a separate steel clip (BK/A-104) or in a keyhole punch using separate mounting clip NO.6374 for panels of thickness 0.043" to 0.062" or NO.4909 for thickness 0.030" to 0.042".

**Note:** Do not put tension on line (rear) terminal of fuse holder.

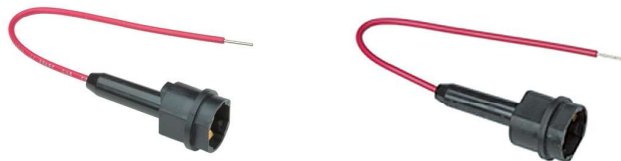
#### Features

- In-line, fast-acting circuit protection
- Rejection feature prevents overfusing

#### Typical applications

- In-line lighting ballast protection

### HLQ fuse holders for both GLQ and GMO fuses



### GLR fast-acting, non size-rejecting supplemental fuse

Fast-acting, non-rejection, in-line fuse. All fuses use the same HLR or HLR-2A holders.



#### Ratings

- Volts 300 Vac (or less)
- Amps 3/16-15 A
- IR 10 kA

#### Agency information

- UL Listed, Std. 248-14, 0-15 A/300 Vac Guide JDYX, File E19180, CSA Certified C22.2, No. 248-14, 0-10 A/300 V Class 1422-01, File 53787, CE

### GMF/GRF time-delay, non size-rejecting supplemental fuses

Time-delay, non-rejection, in-line fuse. All fuses use the same HLR or HLR-2A holders.



#### Ratings

- Volts 300 Vac (or less)
- Amps 3/10-10 A
- IR 10 kA

#### Agency information

- UL Listed, Std. 248-14 0-10 A, Guide JDYX, File E19180, CSA Certified, Class 1422-01, File 53787, CE

Low voltage, supplemental fuses

#### Catalog no. (amps) and holders

Fuse	Holder <sup>1, 2*</sup>	Fuse	Holder <sup>1, 2*</sup>
GLR-1/2	HLR	GLR-6	HLR
GLR-1	HLR	GLR-7	HLR
GLR-1-1/2	HLR	GLR-8	HLR
GLR-1-6/10	HLR	GLR-9	HLR
GLR-2	HLR	GLR-10	HLR
GLR-3	HLR	GLR-12	HLR
GLR-4	HLR	GLR-15	HLR-2A
GLR-5	HLR		

1 Carrier is UL Recognized, Guide IZLT2, File E14853 and CSA Certified, Class 6225-01, File 47235 12 A, 300 Vac.

2 Units can be panel-mounted either in a knockout hole with a separate steel clip (BK/A-104) or in a keyhole punch using separate mounting clip NO.6374 for panels of thickness 0.043" to 0.062" or NO.4909 for thickness 0.030" to 0.042".

\* For two leads (one each for line and loadside) order HLR-2A, 15 A, 300 V

**Note:** Do not put tension on line (rear) terminal of fuse holder.

#### Catalog no. (amps) and holders

Fuse	Holder <sup>1, 2*</sup>	Fuse	Holder <sup>1, 2*</sup>
GMF-3/10	HLR	GMF-3	HLR
GMF-1/2	HLR	GMF-3-2/10	HLR
GMF-6/10	HLR	GMF-4	HLR
GMF-8/10	HLR	GMF-5	HLR
GMF-1	HLR	GMF-6-1/4	HLR
GMF-1-1/4	HLR	GMF-7	HLR
GMF-1-6/10	HLR	GRF-8	HLR
GMF-2	HLR	GMF-10	HLR
GMF-2-1/2	HLR	GRF-10	HLR
GMF-2-8/10	HLR		

1 Carrier is UL Recognized, Guide IZLT2, File E14853 and CSA Certified, Class 6225-01, File 47235 12 A, 300 Vac.

2 Units can be panel-mounted either in a knockout hole with a separate steel clip (BK/A-104) or in a keyhole punch using separate mounting clip NO.6374 for panels of thickness 0.043" to 0.062" or NO.4909 for thickness 0.030" to 0.042".

\* For two leads order HLR-2A, 15 A, 300 V

**Note:** Do not put tension on line (rear) terminal of fuse holder.

#### "A" in-line holder

An alternative to the HLR fuse holder is the "A" fuse holder. The A fuse holder comes WITHOUT leads. The customer inserts NO.18 insulated solid copper wire into the lineside receptacle as well as into the load side receptacle. It has the same body dimensions, utilizes the same mounting hole, and takes the same mounting clips as the HLR. The A fuse holder is UL Recognized, 10 A, 300 Vac, Guide IZLT2, File E14853 and CSA Certified, 10 A, 300 Vac, Class 6225-01, File 47235. Order catalog number A.

#### Features

- In-line, fast-acting circuit protection.

#### Typical applications

- In-line lighting ballast protection



HLR-2A fuse holder

#### "A" in-line holder

An alternative to the HLR fuse holder is the A fuse holder. The A fuse holder comes WITHOUT leads. The customer inserts NO.18 insulated solid copper wire into the line side receptacle as well as into the load side receptacle. It has the same body dimensions, utilizes the same mounting hole, and takes the same mounting clips as the HLR. The A fuse holder is UL Recognized, 10 A, 300 Vac, Guide IZLT2, File E14853 and CSA Certified, 10 A, 300 Vac, Class 6225-01, File 47235. Order catalog number A.

#### Features

- In-line, time-delay circuits protection

#### Typical applications

- In-line lighting ballast protection



HLR fuse holder

### ATR fast-acting micro blade fuse

Fast-acting, color-coded 2-leg micro blade fuse.

#### Ratings

- Volts 32 Vdc
- Amps 5-30 A
- IR 1000 A

#### Agency information

- RoHS compliant



### ATM and ATM-LP fast-acting blade fuses

Fast-acting, color-coded blade fuse available in standard and low-profile versions. Standard version available with indication.

#### Ratings

- Volts 32 Vdc
- Amps 1-30 A
- IR 1000 A

#### Agency information

- UL Listed, Guide FHXT, File AU 169 (2-30 A non-indicating ATM)



Low-profile



Standard

#### Catalog no. (amps)

Fuse	Color code	Fuse	Color code
ATR-5	Tan	ATR-20	Yellow
ATR-7-1/2	Brown	ATR-25	Clear
ATR-10	Red	ATR-30	Green
ATR-15	Blue		

#### Features

- Space-savings size
- Industry standard color coding for easy identification of fuse rating

#### Typical applications

- Automotive

Recommended holder for ATR fuses, see page 2-14.

#### Catalog no. (amps)

Non-indicating	*Indicating	Low-profile	Color code
ATM-1	—	—	Black
ATM-2	—	ATM-2LP	Gray
ATM-3	ATM-3ID	ATM-3LP	Violet
ATM-4	—	ATM-4LP	Pink
ATM-5	ATM-5ID	ATM-5LP	Tan
ATM-7-1/2	ATM-7-1/2ID	ATM-7-1/2LP	Brown
ATM-10	ATM-10ID	ATM-10LP	Red
ATM-15	ATM-15ID	ATM-15LP	Blue
ATM-20	ATM-20ID	ATM-20LP	Yellow
ATM-25	ATM-25ID	ATM-25LP	Clear
ATM-30	ATM-30ID	ATM-30LP	Green

\* Call customer satisfaction for ordering information.

#### Features

- Industry standard color coding for easy identification of fuse rating
- Indicating versions show blown fuse at a glance, speeds troubleshooting

#### Typical applications

- Automotive

Recommended blocks and holders for ATM fuses, see page 2-14.

### ATC fast-acting blade fuse

Fast-acting, color-coded blade fuse for automotive and control circuit applications.

#### Ratings

- Volts 32 Vdc
- Amps 1-40 A
- IR 1000 A

#### Agency information

- UL Recognized, (1-40 A) (Guide JFHR2, File E56412), SAE Standard J1284



Standard

Indicating

Catalog no. (amps)		
Non-indicating	*Indicating	Color code
ATC-1	—	Black
ATC-2	—	Gray
ATC-3	ATC-3ID	Violet
ATC-4	—	Pink
ATC-5	ATC-5ID	Tan
ATC-7-1/2	ATC-7-1/2ID	Brown
ATC-10	ATC-10ID	Red
ATC-15	ATC-15ID	Blue
ATC-20	ATC-20ID	Yellow
ATC-25	ATC-25ID	Clear
ATC-30	ATC-30ID	Green
ATC-35	ATC-35ID	Blue-green
ATC-40	ATC-40ID	Orange

\* Call customer satisfaction for ordering information.

#### Features

- Industry standard color coding for easy identification of fuse rating
- Indicating versions show blown fuse at a glance, speeds troubleshooting

#### Typical applications

- Automotive
- Low voltage control circuits

Recommended blocks and holders for ATC fuses, see page 2-14.

### MAX (MAXI) fast-acting blade fuse

Fast-acting, color-coded, high amp blade fuse. Available with and without indication.

#### Ratings

- Volts 32 Vdc
- Amps
  - 20-80 A (non-indicating)
  - 20-100 A (indicating)
- IR 1000 A



Standard

Indicating

Catalog no. (amps)		
Non-indicating	*Indicating	Color code
MAX-20	MAX-20ID	Yellow
MAX-25	—	Gray
MAX-30	MAX-30ID	Green
MAX-35	—	Brown
MAX-40	MAX-40ID	Orange
MAX-50	MAX-50ID	Red
MAX-60	MAX-60ID	Blue
MAX-70	MAX-70ID	Tan
MAX-80	MAX-80ID	Clear
—	MAX-100ID	Purple

\* Call customer satisfaction for ordering information.

#### Features

- Color coded housing for easy identification of fuse rating
- Indicating versions show blown fuse at a glance, speeds troubleshooting

#### Typical applications

- Automotive

Recommended holders for MAX fuses, see page 2-14.

## In-line fuse holders for ATM, ATC and MAX fuses



easyID LED indicating holders available for ATM, ATC and MAX fuses

### Typical in-line blade fuse holders with leadwires

In-line fuse holders for ATM, ATC and MAX blade fuses. Versions available with and without covers and with open fuse indication.

### Ratings

- Volts 32 Vdc
- Amps 80% continuous of fuse rating. See catalog numbers table for individual holder fuses amp ranges.

Catalog no.	Description	Max amps	Electrical connection
<b>ATR holder</b>			
HH2	Black w/ cover	15	2x4" #16 red leadwire
<b>ATM holders - not for low-profile ATM fuses</b>			
HHL	Black w/ cover	20	2x4" #16 black leadwire
HHM	Black w/ cover	30	2x4" #12 red leadwire
HHU	Black w/ cover	30	2x4" #12 red leadwire
ATM-FHID	Indicating holder, black w/ cover	20	2x4" #16 black leadwire
<b>Low-profile ATM holder</b>			
HHV	Black w/ cover	20	2x4" #12 red leadwire
<b>ATC holders</b>			
HHC	Yellow	20	2x4" #16 black leadwire
HHD	Black	30	2x4" #12 yellow leadwire
HHF	Black w/ cover	20	2x4" #16 yellow leadwire
HHG	Black w/ cover	30	2x4" #12 yellow leadwire
HHR	Black w/ cover	30	2x5" #12 red leadwire
HHS	Blue, self-stripping	20	Accepts #14-18 leadwire
ATC-FHID	Indicating holder, black w/ cover	20	2x6" #16 black leadwire
<b>MAX holders</b>			
HHX	Black w/ cover	60	2x5" #6 red leadwire
MAX-FHID	Indicator, black w/ cover	60	2x5" #6 red leadwire

Fuses must be fully inserted into the holder to provide a solid connection. Poor or improper fuse insertion can result in fuse and holder failure and loss of power and/or circuit protection.

Data sheet no. ATM fuses 2128 (HHM, HHL)  
 ATC fuses 2107 (HHC, HHD, HHF, HHG)  
 Max fuses 2129 (HHX)

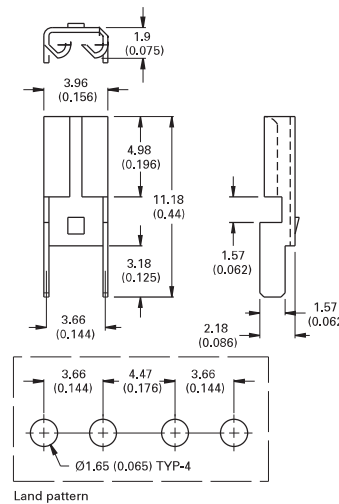
## PCB fuseclips for ATM and ATC fuses

### ATM fuseclips

Catalog no. 1A5778

- 15 A
- Nickel-plated brass

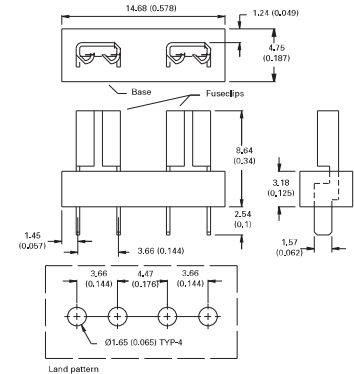
Dimensions — mm (in)



Catalog no. 1A5779

- 15 A
- Nickel-plated brass/glass-filled nylon

Dimensions — mm (in)

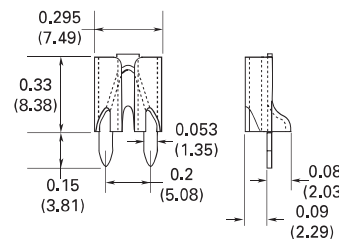


### ATC fuseclips

Catalog no. 1A5600

- 20 A
- Tin-plated cartridge brass

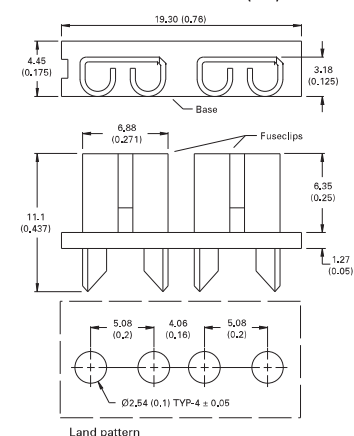
Dimensions — in (mm)



Catalog no. 1A5780

- 15 A
- Nickel-plated brass/glass-filled nylon

Dimensions — mm (in)



Data sheet no. 2131