Eaton Bussmann Series

Industrial fuses - North American standard

CHS controls

Contents

Class J fuses

1-600 A, time delay/fast acting/high speed

Technical data

Applications	Branch circuit protection (NEC 240), motor protection (NEC 430), current limiting
Material	Glass fibre body, copper ferrules/contact blade
Design	Time delay: dual element separate elements for overload/short circuit prot. Fast acting: single element
Rated voltage	LPJ: 600 VAC/300 VDC, JKS 600 VAC, DFJ 600 VAC/450 VDC
Breaking capacity	LPJ: 300 kA (CSA 200 kA), other 200 kA at 600 VAC, 100 kA at 450/300 VDC
Standard	JKS/DJF: UL 248-8, LPJ: Special Purpose/UL 248-8, CSA 22.2 No. 248.8
Approvals	UL listed guide JDDZ, file E4273, CSA class 1422-02 file E53787
Certificate	CE, RoHS (LPJ without indicator and DFJ)

Catalogue numbers - Class J fuses

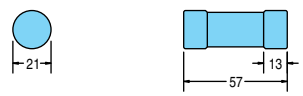
Rated current, A	Catalogue number LPJ - time delay fuses	LPJ - time delay fuses with visual indication	JKS - fast acting fuses	DJF - high speed fuses	Weight each, g	Packing size
1	CBLPJ-1SP		CBJKS-1	CBDFJ-1	43	10
1,25	CBLPJ-1-1-4SP				43	10
1,6	CBLPJ-1-6-10SP				43	10
1,8	CBLPJ-1-8-10SP				43	10
2	CBLPJ-2SP		CBJKS-2	CBDFJ-2	43	10
2,25	CBLPJ-2-1-4SP				43	10
2,5	CBLPJ-2-1-2SP				43	10
2,8	CBLPJ-2-1-8SP				43	10
3	CBLPJ-3SP		CBJKS-3	CBDFJ-3	43	10
3,2	CBLPJ-3-2-10SP				43	10
3,5	CBLPJ-3-1-2SP				43	10
4	CBLPJ-4SP		CBJKS-4	CBDFJ-4	43	10
4,5	CBLPJ-4-1-2SP				43	10
5	CBLPJ-5SP		CBJKS-5	CBDFJ-5	43	10
5,6	CBLPJ-5-6-10SP				43	10
6	CBLPJ-6SP	CBLPJ-6SPI	CBJKS-6	CBDFJ-6	43	10
7	CBLPJ-7SP	CBLPJ-7SPI			43	10
8	CBLPJ-8SP	CBLPJ-8SPI	CBJKS-8	CBDFJ-8	43	10
9	CBLPJ-9SP	CBLPJ-9SPI			43	10
10	CBLPJ-10SP	CBLPJ-10SPI	CBJKS-10	CBDFJ-10	43	10

Catalogue numbers - Class J fuses

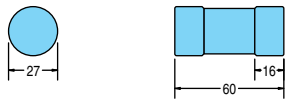
Rated current, A	Catalogue number LPJ - time delay fuses	LPJ - time delay fuses with visual indication	JKS - fast acting fuses	DJF - high speed fuses	Weight each, g	Packing size
12	CBLPJ-12SP	CBLPJ-12SPI	CBJKS-12	CBDFJ-12	43	10
15	CBLPJ-15SP	CBLPJ-15SPI	CBJKS-15	CBDFJ-15	43	10
17,5	CBLPJ-17-1-2SP	CBLPJ-17-1-2SPI			43	10
20	CBLPJ-20SP	CBLPJ-20SPI	CBJKS-20	CBDFJ-20	43	10
25	CBLPJ-25SP	CBLPJ-25SPI	CBJKS-25	CBDFJ-25	43	10
30	CBLPJ-30SP	CBLPJ-30SPI	CBJKS-30	CBDFJ-30	43	10
35	CBLPJ-35SP	CBLPJ-35SPI	CBJKS-35	CBDFJ-35	53	10
40	CBLPJ-40SP	CBLPJ-40SPI	CBJKS-40	CBDFJ-40	53	10
45	CBLPJ-45SP	CBLPJ-45SPI	CBJKS-45	CBDFJ-45	53	10
50	CBLPJ-50SP	CBLPJ-50SPI	CBJKS-50	CBDFJ-50	53	10
60	CBLPJ-60SP	CBLPJ-60SPI	CBJKS-60	CBDFJ-60	53	10
70	CBLPJ-70SP	CBLPJ-70SPI	CBJKS-70	CBDFJ-70	76	1
80	CBLPJ-80SP	CBLPJ-80SPI	CBJKS-80	CBDFJ-80	76	1
90	CBLPJ-90SP	CBLPJ-90SPI	CBJKS-90	CBDFJ-90	76	1
100	CBLPJ-100SP	CBLPJ-100SPI	CBJKS-100	CBDFJ-100	76	1
110	CBLPJ-110SP	CBLPJ-110SPI	CBJKS-110	CBDFJ-110	390	1
125	CBLPJ-125SP	CBLPJ-125SPI	CBJKS-125	CBDFJ-125	390	1
150	CBLPJ-150SP	CBLPJ-150SPI	CBJKS-150	CBDFJ-150	390	1
175	CBLPJ-175SP	CBLPJ-175SPI	CBJKS-175	CBDFJ-175	390	1
200	CBLPJ-200SP	CBLPJ-200SPI	CBJKS-200	CBDFJ-200	390	1
225	CBLPJ-225SP	CBLPJ-225SPI	CBJKS-225	CBDFJ-225	810	1
250	CBLPJ-250SP	CBLPJ-250SPI	CBJKS-250	CBDFJ-250	810	1
300	CBLPJ-300SP	CBLPJ-300SPI	CBJKS-300	CBDFJ-300	810	1
350	CBLPJ-350SP	CBLPJ-350SPI	CBJKS-350	CBDFJ-350	810	1
400	CBLPJ-400SP	CBLPJ-400SPI	CBJKS-400	CBDFJ-400	810	1
450	CBLPJ-450SP	CBLPJ-450SPI	CBJKS-450	CBDFJ-450	1390	1
500	CBLPJ-500SP	CBLPJ-500SPI	CBJKS-500	CBDFJ-500	1390	1
600	CBLPJ-600SP	CBLPJ-600SPI	CBJKS-600	CBDFJ-600	1390	1

Dimensions, mm

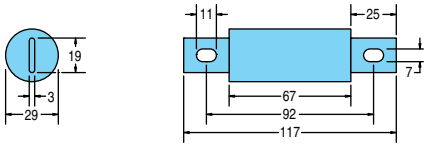
0,1-30 A



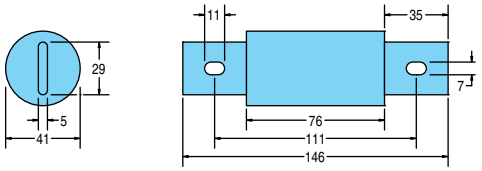
35-60 A



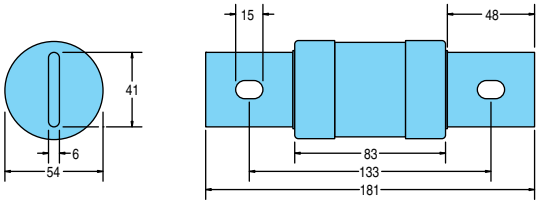
65-100 A



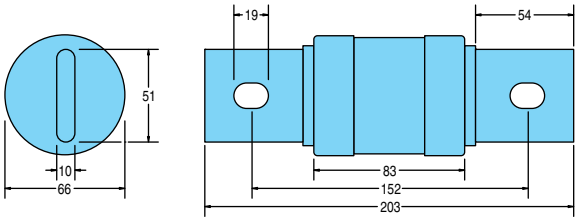
125-200 A



250-400 A



450-600 A



Class J off-load fuse disconnectors, fuse holders
30-600 A

Technical data

Material	Termoplastic, flammability rating according to UL 94V0, covers UL 98HB
Rated voltage	600 V
Short circuit current, SCCR	200 kA
Indicator, tripped fuse	Lamp indicator, neon lamp 90-600 VAC/115-600 VDC
Ingress protection, IEC 60529	IP00, IP20
Standard	UL 4248-8, CSA 22.2 No 4248
Approvals	UL listed guide IZLT file E14853, CSA class 6225-01 file 47235 Covers UL file JDVS2 file E58836, CSA class 6225-01 file 47235
Certificate	CE, RoHS

Catalogue numbers - Off-load fuse disconnectors 30-60 A, IP 20, DIN rail mounting/panel mounting

Fuse size/Type	Rated current, A	Terminal type	Wire range AWG/kcmil	Catalogue number 1 pole	2 pole	3 pole	Weight g/pole	Packing size
1-30 A	30	Box terminal	18-1	CBCH30J1	CBCH30J2	CBCH30J3	205	1
1-30 A, lamp indicator	30	Box terminal	18-1	CBCH30J1I	CBCH30J2I	CBCH30J3I	205	1
35-60 A	60	Box terminal	18-1	CBCH60J1	CBCH60J2	CBCH60J3	257	1
35-60 A, lamp indicator	60	Box terminal	18-1	CBCH60J1I	CBCH60J2I	CBCH60J3I	257	1

Catalogue numbers - Modular fuse holders 30-60 A, IP 20, DIN rail mounting/panel mounting

1-30 A	30	Box terminal	2x18-8	CBJT60030		100	12
1-30 A, lamp indicator	30	Box terminal	2x18-8	CBJTN60030		100	12
35-60 A	60	Box terminal	14-4	CBJT60060		100	12
35-60 A, lamp indicator	60	Box terminal	14-4	CBJTN60060		100	12

Catalogue numbers - Fuse holders 100-600 A, IP 00, panel mounting

70-100 A	100	Box terminal	14-1/0	CBJM60100-1CR	CBJM60100-3CR	147	1
110-200 A	200	Box terminal	6-250	CBJM60200-1CR	CBJM60200-3CR	260	1
225-400 A	400	Box terminal	4-600	CBJM60400-1CR	CBJM60400-3CR	510	1
225-400 A	400	Box terminal	2x6-350	CBJM60400-1MW22	CBJM60400-3MW22	550	1
450-600 A	600	Box terminal	2x4-500	CBJM60600-1CR	CBJM60600-3CR	1150	1

Catalogue numbers - Fuse holders with distribution terminals 100-400 A, IP 00, panel mounting

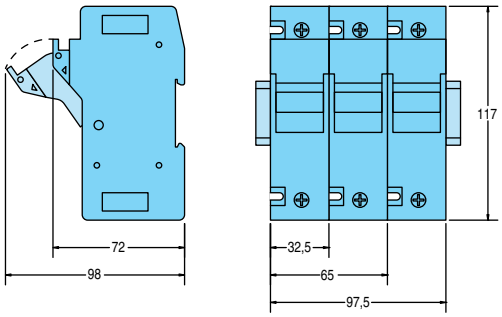
Fuse size	Rated current, A	Terminal type	Wire range AWG/kcmil Load side	Line side	Catalogue number 1 pole	Vikt each/g	Packing size
70-100 A	100	Box terminal	14-1/0	4x4-14	CBJM60100-1MW14	155	1
110-200 A	200	Box terminal	6-250	6x4-14	CBJM60200-1MW16	275	1
225-400 A	400	Box terminal	4-600	6x2-14	CBJM60400-1MW16	530	1
225-400 A	400	Box terminal	2x6-350	6x2-14	CBJM60400-1MW26	590	1

Catalogue numbers - Covers for fuse holders 100-600 A, IP 20

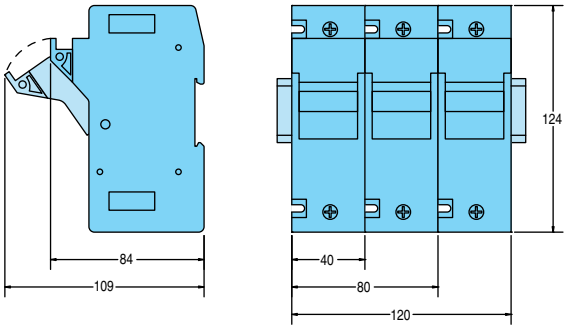
Rated current, A fuse holder, fuse holder with distribution terminals	Catalogue number - cover, 1 pole without lamp indicator	with lamp indicator	Weight each, g	Packing size
100	CBCVR-J-60100-M	CBCVRI-J-60100-M	55	1
200	CBCVR-J-60200-M	CBCVRI-J-60200-M	83	1
400	CBCVR-J-60400-M	CBCVRI-J-60400-M	140	1
600	CBCVR-J-60600-M	CBCVRI-J-60600-M	200	1

Dimensions, mm

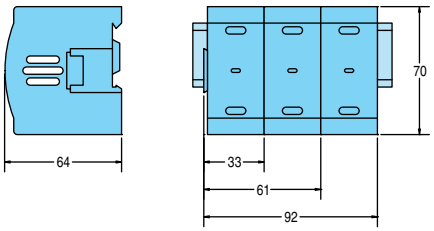
30 A, 1-3 pole off-load fuse disconnectors



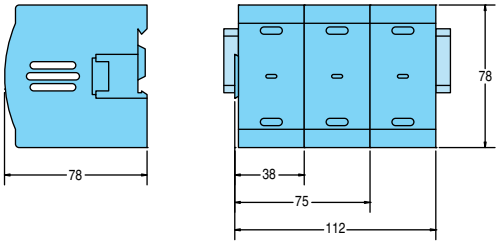
60 A, 1-3 pole off load fuse disconnectors



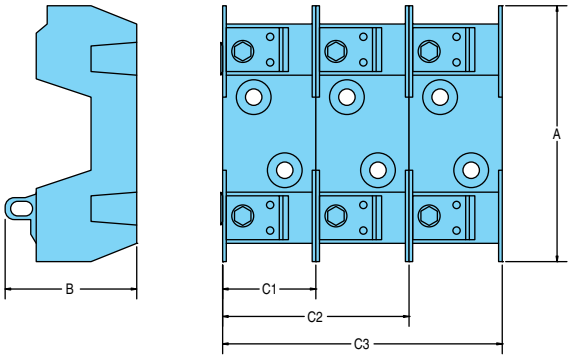
30 A, 1 pole fuse modular holder



60 A, 1 pole modular fuse holder

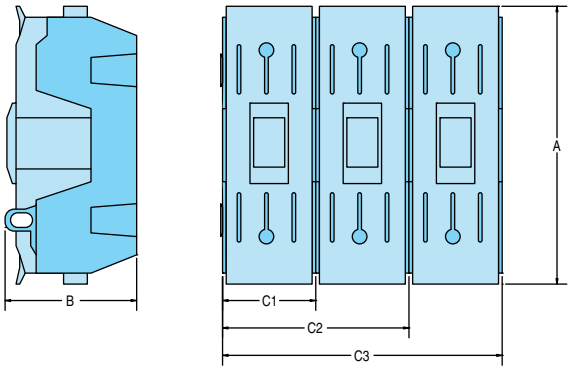


100-600 A, 1-3 pole fuse holders, IP 00



Fuse holders	A	B	C1	C2	C3
Fuse holders, IP00					
100 A	138	77	51	104	155
200 A	172	97	69	136	203
400 A	201	125	91	179	268
600 A	234	151	123	244	365
Fuse holders with cover, IP 20					
100 A	152	77	51	104	155
200 A	186	97	69	136	203
400 A	216	125	91	179	268
600 A	253	151	123	244	365

100-600 A, 1-3 pole fuse holders, IP 20



Class CC fuses

0,1-30 A, time delay/fast acting

Technical data

Applications	Branch circuit protection (NEC 240), motor protection (NEC 430), current limiting
Material	Melamine body, nickel plated brass ferrules, rejection type
Design	Single element
Rated voltage	600 VAC, LP-CC 300 VDC (3-15 A 150 VDC). FNQ-R 15-20 A 300 VDC
Breaking capacity	200 kA at 600 VAC, 20 kA at 150/300 VDC
Standard	UL 248-4, CSA 22.2 No. 248.4
Approvals	UL listed guide JDDZ, file E4273, CSA class 1422-02 file 53787
Certificate	CE, RoHS: LP-CC (20-30A), FNQ-R (except CBFNQ-R-1-4), KTK-R

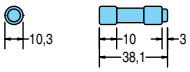
Catalogue numbers - Class CC fuses

Rated current, A	Catalogue number - class CC fuses LP-CC, time delay general protection	FNQ-R, time delay transformer protection	KTK-R fast acting	Weight each, g	Packing size
0,1			CBKTK-R-1/10	9	10
0,125			CBKTK-R-1-8	9	10
0,2			CBKTK-R-2/10	9	10
0,25		CBFNQ-R-1-4	CBKTK-R-1-4	9	10
0,3		CBFNQ-R-3-10	CBKTK-R-3-10	9	10
0,4		CBFNQ-R-4-10	CBKTK-R-4-10	9	10
0,5	CBLP-CC-1-2	CBFNQ-R-1-2	CBKTK-R-1-2	9	10
0,6	CBLP-CC-6-10	CBFNQ-R-6-10	CBKTK-R-6-10	9	10
0,75		CBFNQ-R-3-4	CBKTK-R-3-4	9	10
0,8	CBLP-CC-8-10	CBFNQ-R-8-10		9	10
1	CBLP-CC-1	CBFNQ-R-1	CBKTK-R-1	9	10
1,125	CBLP-CC-1-1-8	CBFNQ-R-1-1-8		9	10
1,25	CBLP-CC-1-1-4	CBFNQ-R-1-1-4	CBKTK-R-1-1-4	9	10
1,3		CBFNQ-R-1-3-10		9	10
1,4	CBLP-CC-1-4-10	CBFNQ-R-1-4-10		9	10
1,5	CBLP-CC-1-1-2	CBFNQ-R-1-1-2	CBKTK-R-1-1-2	9	10
1,6	CBLP-CC-1-6-10	CBFNQ-R-1-6-10		9	10
1,8	CBLP-CC-1-8-10	CBFNQ-R-1-8-10		9	10
2	CBLP-CC-2	CBFNQ-R-2	CBKTK-R-2	9	10
2,25	CBLP-CC-2-1-4	CBFNQ-R-2-1-4		9	10
2,5	CBLP-CC-2-1-2	CBFNQ-R-2-1-2	CBKTK-R-2-1-2	9	10
2,8	CBLP-CC-2-8-10	CBFNQ-R-2-8-10		9	10
3	CBLP-CC-3	CBFNQ-R-3	CBKTK-R-3	9	10
3,2	CBLP-CC-3-2-10	CBFNQ-R-3-2-10		9	10
3,5	CBLP-CC-3-1-2	CBFNQ-R-3-1-2	CBKTK-R-3-1-2	9	10
4	CBLP-CC-4	CBFNQ-R-4	CBKTK-R-4	9	10
4,5	CBLP-CC-4-1-2	CBFNQ-R-4-1-2		9	10
5	CBLP-CC-5	CBFNQ-R-5	CBKTK-R-5	9	10
5,6	CBLP-CC-5-6-10	CBFNQ-R-5-6-10		9	10
6	CBLP-CC-6	CBFNQ-R-6	CBKTK-R-6	9	10
6,25	CBLP-CC-6-1-4	CBFNQ-R-6-1-4		9	10
7	CBLP-CC-7	CBFNQ-R-7	CBKTK-R-7	9	10
7,5	CBLP-CC-7-1-2	CBFNQ-R-7-1-2		9	10
8	CBLP-CC-8	CBFNQ-R-8	CBKTK-R-8	9	10

Catalogue numbers - Class CC fuses

Rated current, A	Catalogue number - class CC fuses LP-CC, time delay general protection	FNQ-R, time delay transformer protection	KTK-R fast acting	Weight each, g	Packing size
9	CBLP-CC-9	CBFNQ-R-9	CBKTK-R-9	9	10
10	CBLP-CC-10	CBFNQ-R-10	CBKTK-R-10	9	10
12	CBLP-CC-12	CBFNQ-R-12	CBKTK-R-12	9	10
15	CBLP-CC-15	CBFNQ-R-15	CBKTK-R-15	9	10
17,5		CBFNQ-R-17-1-2		9	10
20	CBLP-CC-20	CBFNQ-R-20	CBKTK-R-20	9	10
25	CBLP-CC-25	CBFNQ-R-25	CBKTK-R-25	9	10
30	CBLP-CC-30	CBFNQ-R-30	CBKTK-R-30	9	10

Dimensions, mm



Class CC off-load fuse disconnectors

30 A

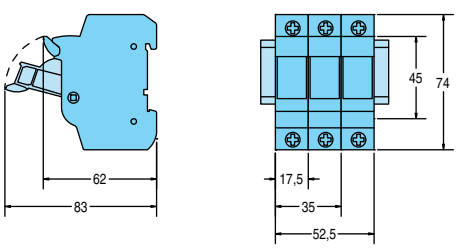
Technical data

Material	Polyester UL 94V0
Rated voltage	600 V
Short circuit current, SCCR	200 kA
Indicator, tripped fuse	Lamp indicator, neon lamp, 90-600 V
Ingress prot., IEC 60529	IP 20
Standard	UL 4248-4, CSA 22.2 No 4248
Approvals	UL listed guide IZLT file E14853, CSA class 6225-01 file 47235
Certificate	CE, RoHS

Catalogue numbers - Off-load fuse disconnector, DIN rail mounting, IP 20

Description	Rated current, A	Terminal type, wire range	Catalogue number - off load fuse disconnector without indicator	with lamp indicator	Weight each, g	Packing size
1-pole	30	Box terminal, AWG 18-4	CBCHCC1DU	CBCHCC1DIU	53	1
2-pole	30	Box terminal, AWG 18-4	CBCHCC2DU	CBCHCC3DIU	106	1
3-pole	30	Box terminal, AWG 18-4	CBCHCC3DU	CBCHCC3DIU	159	1

Dimensions, mm



Class CF fuse system

CUBEFuse, 6-100 A, time delay/fast acting

Technical data

Applications	Branch circuit protection (NEC 240), motor protection (NEC 430), current limiting
Material	Fuse: Thermoplastic type PES, fuse holder polymer type PTB, tinned copper term.
Design	Time delay: dual element, separate elements for overload/short circuit protection Fast acting: single element
Rated voltage	600 VAC/VDC, time delay 300 VDC
Breaking capacity	600 VAC: UL 300 kA (fast acting 70-100 A & CSA 200 kA); 600/300 VDC: 50/100 kA
SCCR, fuse holder	UL: 300 kA, CSA: 200 kA, DC: 100 kA
Standard	UL 248-17, CSA 1422-02
Approvals	Fuse: UL listed guide JDDZ, file E4273, CSA class 1422-02 file 53787 Fuse holder: UL listed guide IZND, file E214079, CSA class 6225-01 file 47235
Certificate	CE, RoHS

Catalogue numbers - Class CF fuses, CUBEFuse

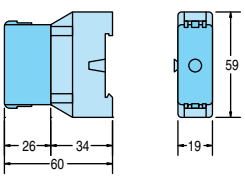
Rated current, A	Catalogue number Time delay	Time delay with visual ind.	Fast acting	Weight each, g	Packing size
1	CBTCF1RN		CBFCF1RN	53	12
3	CBTCF3RN		CBFCF3RN	53	12
6	CBTCF6RN	CBTCF6	CBFCF6RN	53	12
10	CBTCF10RN	CBTCF10	CBFCF10RN	53	12
15	CBTCF15RN	CBTCF15	CBFCF15RN	53	12
17,5	CBTCF17-1-2RN	CBTCF17-1-2	CBFCF17-1-2RN	53	12
20	CBTCF20RN	CBTCF20	CBFCF20RN	53	12
25	CBTCF25RN	CBTCF25	CBFCF25RN	53	12
30	CBTCF30RN	CBTCF30	CBFCF30RN	53	12
35	CBTCF35RN	CBTCF35	CBFCF35RN	55	12
40	CBTCF40RN	CBTCF40	CBFCF40RN	55	12
45	CBTCF45RN	CBTCF45	CBFCF45RN	55	12
50	CBTCF50RN	CBTCF50	CBFCF50RN	55	12
60	CBTCF60RN	CBTCF60	CBFCF60RN	55	12
70	CBTCF70RN	CBTCF70	CBFCF70RN	132	6
80	CBTCF80RN	CBTCF80	CBFCF80RN	132	6
90	CBTCF90RN	CBTCF90	CBFCF90RN	132	6
100	CBTCF100RN	CBTCF100	CBFCF100RN	132	6

Catalogue number - Class CF fuse holders, CUBEFuse, DIN rail mounting, IP20

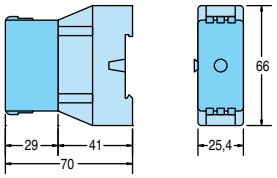
Rated current, A	Terminal type	Wire range AWG	Catalogue number 1-pole fuse holder	Weight each, g	Packing size
1-30	Skruv, tryckplatta	18-8 eller 2x18-10	CBTCFH30N	93	12
1-60	Skruv, tryckplatta	18-4 eller 2x18-6	CBTCFH60N	97	12
1-100	Skruv, tryckplatta	18-1 eller 2x6	CBTCFT100N	105	6

Dimensions, mm

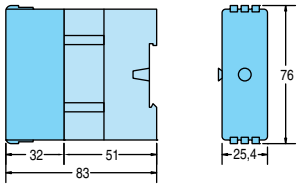
1-30 A fuse and fuse holder



35-60 A fuse and fuse holder



70-100 A fuse and fuse holder



Multimeter protection fuses

0,1-30 A, fast acting

Technical data

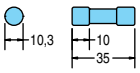
Applications	Multimeter protection
Material	Melamine/glass fible body, nickel plated brass ferrules
Design	Single element
Rated voltage	BBS: 48-600 VAC, see catalogue numbers DMM-B: 1000 VAC/VDC
Breaking capacity	BBS: 10 kA (contact CHS Controls for 12-30 A) DMM-B 0,44 A: 10 kA, DMM-B 11 A: 20 kA
Approvals	BBS 0,1-10 A: UL listed guide JDYX, file E19180, CSA class 1422-01 file 53787 DDM-B: UR file E19180
Certificate	CE, RoHS: DMM-B

Catalogue numbers - multimeter protection fuses

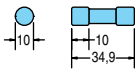
Rated current, A	BBS - fast acting fuses Rated voltage, VAC	Catalogue number	DMM-B - fast acting, 1000 VAC/VDC Catalogue number	Weight each, g	Packing size
0,1	600	CBBBS-1-10		9	10
0,2	600	CBBBS-2-10		9	10
0,25	600	CBBBS-1-4		9	10
0,4	600	CBBBS-4-10		9	10
0,44			CBDMM-B-44-100	9	10
0,5	600	CBBBS-1-2		9	10
0,6	600	CBBBS-6-10		9	10
0,75	600	CBBBS-3-4		9	10
0,8	600	CBBBS-8-10		9	10
1		CBBBS-1		9	10
1,5	600	CBBBS-1-1-2		9	10
1,6	600	CBBBS-1-6-10		9	10
1,8	600	CBBBS-1-8-10		9	10
2	600	CBBBS-2		9	10
3	600	CBBBS-3		9	10
4	600	CBBBS-4		9	10
5	600	CBBBS-5		9	10
6	600	CBBBS-6		9	10
7	250	CBBBS-7		9	10
8	250	CBBBS-8		9	10
10	250	CBBBS-10		9	10
11			CBDMM-B-11A	9	10
12	48	CBBBS-12		9	10
15	48	CBBBS-15		9	10
20	48	CBBBS-20		9	10
25	48	CBBBS-25		9	10
30	48	CBBBS-30		9	10

Dimensions, mm

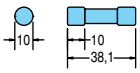
BBS fuses



CBDMM-B-44-100



CBDMM-B-11



Midget fuses

0,1-30 A, time dealy/fast acting

Technical data

Applications	Supplementary protection (NEC 240)
Material	Melamine body nickel plated brass ferrules
Design	Single element, type FNM dual element, separate elements for overload/short circuit protection
Rated voltage	600-250 VAC/VDC, see catalogue numbers
Breaking capacity	KTK - 100 kA KLM - 600 VAC: 100 kA, 600 VDC: 50 kA BAF - 125 VAC: 10 kA, contact CHS Controls for breaking capacity at 250 VAC FNQ - 10 kA FNM - 125 VAC: 10 kA, contact CHS Controls for breaking capacity at 250 VAC
Standard	UL 248-14, CSA 22.2 No. 248.14
Approvals	UL listed guide JDYX, file E19180 (BAF only 1-15 A) CSA class 1422-01 file 53787 (BAF only 0,25-15 A)
Certificate	CE, RoHS except BAF and CBFNQ-1-8

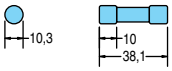
Catalogue numbers - Midget fuses

Rated current, A	Catalogue number Fast acting fuses 600 VAC - KTK	600 VAC/VDC - KLM	250 VAC - BAF	Time delay fuses 500 VAC - FNQ	250 VAC - FNM	Weight each, g	Packing size
0,1	CBKTK-1-10	CBKLM-1-10		CBFNQ-1-10	CBFNM-1-10	9	10
0,125	CBKTK-1-8	CBKLM-1-8		CBFNQ-1-8	CBFNM-1-8	9	10
0,15				CBFNQ-15-100	CBFNM-15-100	9	10
0,1875				CBFNQ-3-16		9	10
0,2	CBKTK-2-10	CBKLM-2-10		CBFNQ-2-10	CBFNM-2-10	9	10
0,25	CBKTK-1-4	CBKLM-1-4	CBBAF-1-4	CBFNQ-1-4	CBFNM-1-4	9	10
0,3	CBKTK-3-10	CBKLM-3-10		CBFNQ-3-10	CBFNM-3-10	9	10
0,4	CBKTK-4-10			CBFNQ-4-10	CBFNM-4-10	9	10
0,5	CBKTK-1-2	CBKLM-1-2	CBBAF-1-2	CBFNQ-1-2	CBFNM-1-2	9	10
0,6	CBKTK-6-10		CBBAF-6-10	CBFNQ-6-10	CBFNM-6-10	9	10
0,75	CBKTK-3-4	CBKLM-3-4			CBFNM-3-4	9	10
0,8			CBBAF-8-10	CBFNQ-8-10	CBFNM-8-10	9	10
1	CBKTK-1	CBKLM-1	CBBAF-1	CBFNQ-1	CBFNM-1	9	10
1,125				CBFNQ-1-1-8	CBFNM-1-1-8	9	10
1,25	CBKTK-1-1-4	CBKLM-1-1-4		CBFNQ-1-1-4	CBFNM-1-1-4	9	10
1,4					CBFNM-1-4-10	9	10
1,5	CBKTK-1-1-2	CBKLM-1-1-2	CBBAF-1-1-2	CBFNQ-1-1-2	CBFNM-1-1-2	9	10
1,6				CBFNQ-1-6-10	CBFNM-1-6-10	9	10
1,8			CBBAF-1-8-10		CBFNM-1-8-10	9	10
2	CBKTK-2	CBKLM-2	CBBAF-2	CBFNQ-2	CBFNM-2	9	10
2,25				CBFNQ-2-1-4	CBFNM-2-1-4	9	10
2,5	CBKTK-2-1-2	CBKLM-2-1-2	CBBAF-2-1-2	CBFNQ-2-1-2	CBFNM-2-1-2	9	10
2,8					CBFNM-2-8-10	9	10
3	CBKTK-3	CBKLM-3	CBBAF-3	CBFNQ-3	CBFNM-3	9	10
3,2				CBFNQ-3-2-10	CBFNM-3-2-10	9	10
3,5	CBKTK-3-1-2			CBFNQ-3-1-2	CBFNM-3-1-2	9	10
4	CBKTK-4	CBKLM-4	CBBAF-4	CBFNQ-4	CBFNM-4	9	10
4,5				CBFNQ-4-1-2	CBFNM-4-1-2	9	10
5	CBKTK-5	CBKLM-5	CBBAF-5	CBFNQ-5	CBFNM-5	9	10
5,6				CBFNQ-5-6-10	CBFNM-5-6-10	9	10

Catalogue numbers - Midget fuses

Rated current, A	Catalogue number Fast acting fuses 600 VAC - KTK	600 VAC/VDC - KLM	250 VAC - BAF	Time delay fuses 500 VAC - FNQ	250 VAC - FNM	Weight each, g	Packing size
6	CBKTK-6	CBKLM-6	CBBAF-6	CBFNQ-6	CBFNM-6	9	10
6,25			CBBAF-6-1-4	CBFNQ-6-1-4	CBFNM-6-1-4	9	10
7	CBKTK-7	CBKLM-7	CBBAF-7	CBFNQ-7	CBFNM-7	9	10
7,5	CBKTK-7-1-2					9	10
8	CBKTK-8	CBKLM-8	CBBAF-8	CBFNQ-8	CBFNM-8	9	10
9	CBKTK-9	CBKLM-9	CBBAF-9	CBFNQ-9	CBFNM-9	9	10
10	CBKTK-10	CBKLM-10	CBBAF-10	CBFNQ-10	CBFNM-10	9	10
12	CBKTK-12	CBKLM-12	CBBAF-12	CBFNQ-12	CBFNM-12	9	10
14				CBFNQ-14		9	10
15	CBKTK-15	CBKLM-15	CBBAF-15	CBFNQ-15	CBFNM-15	9	10
20	CBKTK-20	CBKLM-20	CBBAF-20	CBFNQ-20	CBFNM-20	9	10
25	CBKTK-25	CBKLM-25	CBBAF-25	CBFNQ-25	CBFNM-25	9	10
30	CBKTK-30	CBKLM-30	CBBAF-30	CBFNQ-30	CBFNM-30	9	10

Dimensions, mm



Off-load fuse disconnectors for Midget fuses

30 A

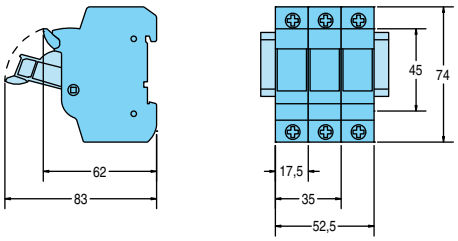
Technical data

Material	Polyester UL 94V0
Rated voltage	600 V
Short circuit current, SCCR	100 kA, depending on installed fuse
Indication, tripped fuse	Lamp indication, neon lamp, 90-600 V
Ingress protection, IEC 60529	IP 20
Standard	UL 4248, CSA 22.2 No 4248
Approvals	cUR guide IZLT2 file E14853
Certificate	CE, RoHS

Catalogue numbers - Off-load fuse disconnectors, DIN rail mount, IP 20

Description	Rated current. A	Terminal type, wire range	Catalogue number - off-load fuse disconnector without indication	with lamp indication	Weight each, g	Packing size
1-pole	30	Box terminal, AWG 18-4	CBCHM1DU	CBCHM1DIU	53	1
2-pole	30	Box terminal, AWG 18-4	CBCHM2DU	CBCHM3DIU	106	1
3-pole	30	Box terminal ,AWG 18-4	CBCHM3DU	CBCHM3DIU	159	1

Dimensions, mm



Class RK1 fuses

0,1-600 A, time delay

Technical data

Applications	Branch circuit protection (NEC 240), motor protection (NEC 430), current limiting
Material	Glass fibre body, copper ferrules/blades, rejected type
Design	Dual element, separate element for overload/short circuit protection
Rated voltage	250 VAC/VDC, 0-60 A: 125VDC 600 VAC/300 VDC
Breaking capacity	250/600 VAC: 300 kA, 125/250/300 VDC: 100 kA
Standard	UL 248-12, CSA 22.2 No. 248.12
Approvals	UL listed guide JDDZ, file E4273, CSA class 1422-02 file E53787
Certificate	CE

Catalogue numbers - Class RK1 fuses

Rated current, A	250 V fuses Catalogue number LPN-RK - time delay	Weight each, g	Packing size	600 V fuses Catalogue number LPS-RK - time delay	Weight each, g	Packing size
0,1	CBLPN-RK-1-10SP	22	10	CBLPS-RK-1-10SP	73	10
0,15	CBLPN-RK-15-100SP	22	10			
0,2	CBLPN-RK-2-10SP	22	10	CBLPS-RK-2-10SP	73	10
0,3	CBLPN-RK-3-10SP	22	10	CBLPS-RK-3-10SP	73	10
0,4	CBLPN-RK-4-10SP	22	10	CBLPS-RK-4-10SP	73	10
0,5	CBLPN-RK-1-2SP	22	10	CBLPS-RK-1-2SP	73	10
0,6	CBLPN-RK-6-10SP	22	10	CBLPS-RK-6-10SP	73	10
0,8	CBLPN-RK-8-10SP	22	10	CBLPS-RK-8-10SP	73	10
1	CBLPN-RK-1SP	22	10	CBLPS-RK-1SP	73	10
1,125	CBLPN-RK-1-1-8SP	22	10	CBLPS-RK-1-1-8SP	73	10
1,25	CBLPN-RK-1-1-4SP	22	10	CBLPS-RK-1-1-4SP	73	10
1,4	CBLPN-RK-4-10SP	22	10	CBLPS-RK-4-10SP	73	10
1,5				CBLPS-RK-1-1-2SP	73	10
1,6	CBLPN-RK-6-10-SP	22	10	CBLPS-RK-1-6-10SP	73	10
1,8	CBLPN-RK-8-10-SP	22	10	CBLPS-RK-1-8-10SP	73	10
2	CBLPN-RK-2SP	22	10	CBLPS-RK-2SP	73	10
2,25	CBLPN-RK-2-1-4SP	22	10	CBLPS-RK-2-1-4SP	73	10
2,5	CBLPN-RK-2-1-2SP	22	10	CBLPS-RK-2-1-2SP	73	10
2,8	CBLPN-RK-2-8-10SP	22	10	CBLPS-RK-2-8-10SP	73	10
3	CBLPN-RK-3SP	22	10	CBLPS-RK-3SP	73	10
3,2	CBLPN-RK-3-2-10SP	22	10	CBLPS-RK-3-2-10SP	73	10
3,5	CBLPN-RK-3-1-2SP	22	10	CBLPS-RK-3-1-2SP	73	10
4	CBLPN-RK-4SP	22	10	CBLPS-RK-4SP	73	10
4,5	CBLPN-RK-4-1-2SP	22	10	CBLPS-RK-4-1-2SP	73	10
5	CBLPN-RK-5SP	22	10	CBLPS-RK-5SP	73	10
5,6	CBLPN-RK-5-6-10SP	22	10	CBLPS-RK-5-6-10SP	73	10
6	CBLPN-RK-6SP	22	10	CBLPS-RK-6SP[1)]	73	10
6,25	CBLPN-RK-6-1-4SP	22	10	CBLPS-RK-6-1-4SP[1)]	73	10
7				CBLPS-RK-7SP[1)]	73	10
8	CBLPN-RK-8SP	22	10	CBLPS-RK-8SP[1)]	73	10

Catalogue numbers - Class RK1 fuses

Rated current, A	250 V fuses Catalogue number LPN-RK - time delay	Weight each, g	Packing size	600 V fuses Catalogue number LPS-RK - time delay	Weight each, g	Packing size
9	CBLPN-RK-9SP	22	10	CBLPS-RK-9SP[1)]	73	10
10	CBLPN-RK-10SP	22	10	CBLPS-RK-10SP[1)]	73	10
12	CBLPN-RK-12SP	22	10	CBLPS-RK-12SP[1)]	73	10
15	CBLPN-RK-15SP	22	10	CBLPS-RK-15SP[1)]	73	10
17,5	CBLPN-RK-17-1-2SP	22	10	CBLPS-RK-17-1-2SP[1)]	73	10
20	CBLPN-RK-20SP	22	10	CBLPS-RK-20SP[1)]	73	10
25	CBLPN-RK-25SP	22	10	CBLPS-RK-25SP[1)]	73	10
30	CBLPN-RK-30SP	22	10	CBLPS-RK-30SP[1)]	73	10
35	CBLPN-RK-35SP[1)]	54	10	CBLPS-RK-35SP[1)]	118	10
40	CBLPN-RK-40SP[1)]	54	10	CBLPS-RK-40SP[1)]	118	10
45	CBLPN-RK-45SP[1)]	54	10	CBLPS-RK-45SP[1)]	118	10
50	CBLPN-RK-50SP[1)]	54	10	CBLPS-RK-50SP[1)]	118	10
60	CBLPN-RK-60SP[1)]	180	5	CBLPS-RK-60SP[1)]	118	10
70	CBLPN-RK-70SP[1)]	180	5	CBLPS-RK-70SP[1)]	220	1
80	CBLPN-RK-80SP[1)]	180	5	CBLPS-RK-80SP[1)]	220	1
90	CBLPN-RK-90SP[1)]	180	5	CBLPS-RK-90SP[1)]	220	1
100	CBLPN-RK-100SP[1)]	180	5	CBLPS-RK-100SP[1)]	220	1
110	CBLPN-RK-110SP[1)]	400	1	CBLPS-RK-110SP[1)]	500	1
125	CBLPN-RK-125SP[1)]	400	1	CBLPS-RK-125SP[1)]	500	1
150	CBLPN-RK-150SP[1)]	400	1	CBLPS-RK-150SP[1)]	500	1
175	CBLPN-RK-175SP[1)]	400	1	CBLPS-RK-175SP[1)]	500	1
200	CBLPN-RK-200SP[1)]	900	1	CBLPS-RK-200SP[1)]	500	1
225	CBLPN-RK-225SP[1)]	900	1	CBLPS-RK-225SP[1)]	1100	1
250	CBLPN-RK-250SP[1)]	900	1	CBLPS-RK-250SP[1)]	1100	1
300	CBLPN-RK-300SP[1)]	900	1	CBLPS-RK-300SP[1)]	1100	1
350	CBLPN-RK-350SP[1)]	900	1	CBLPS-RK-350SP[1)]	1100	1
400	CBLPN-RK-400SP[1)]	900	1	CBLPS-RK-400SP[1)]	1100	1
450	CBLPN-RK-450SP[1)]	1400	1	CBLPS-RK-450SP[1)]	1500	1
500	CBLPN-RK-500SP[1)]	1400	1	CBLPS-RK-500SP[1)]	1500	1
600	CBLPN-RK-600SP[1)]	1400	1	CBLPS-RK-600SP[1)]	1500	1

[1)] Also availabe in version with visual indicator, add **"I"** at the end of the catalogue number. Example CBLPS-RK-30SP will be CBLPS-RK30SP**I**.

Class RK5 fuses

0,1-600 A, time delay

Technical data

Applications	Branch circuit protection (NEC 240), motor protection (NEC 430), current limiting
Material	Glass fibre body, copper ferrules/blades, rejected type
Design	Dual element, separate element for overload/short circuit protection
Rated voltage	250 VAC/VDC, 0,1-60 and 110-200 A: 125 VDC 600 VAC/300 VDC, 35-60 A 250 VDC
Breaking capacity	250/600 VAC: 200 kA, 125/250/300 VDC: 20 kA
Standard	UL 248-12, CSA 22.2 No. 248.12
Approvals	UL listed guide JDDZ, file E4273, CSA class 1422-01 file 53787
Certificate	CE

Catalogue numbers - Class RK5 fuses

Rated current, A	250 V fuses Catalogue number FRN-R - time delay	Weight each, g	Packing size	600 V fuses Catalogue number FRS-R - time delay	Weight each, g	Packing size
0,1	CBFRN-R-1-10	22	10	CBFRS-R-1-10	73	10
0,125	CBFRN-R-1-8	22	10	CBFRS-R-1-8	73	10
0,15	CBFRN-R-15-100	22	10	CBFRS-R-15-100	73	10
0,2	CBFRN-R-2-10	22	10	CBFRS-R-2-10	73	10
0,25	CBFRN-R-1-4	22	10	CBFRS-R-1-4	73	10
0,3	CBFRN-R-3-10	22	10	CBFRS-R-3-10	73	10
0,4	CBFRN-R-4-10	22	10	CBFRS-R-4-10	73	10
0,5	CBFRN-R-1-2	22	10	CBFRS-R-1-2	73	10
0,6	CBFRN-R-6-10	22	10	CBFRS-R-6-10	73	10
0,8	CBFRN-R-8-10	22	10	CBFRS-R-8-10	73	10
1	CBFRN-R-1	22	10	CBFRS-R-1	73	10
1,125	CBFRN-R-1-1-8	22	10	CBFRS-R-1-1-8	73	10
1,25	CBFRN-R-1-1-4	22	10	CBFRS-R-1-1-4	73	10
1,4	CBFRN-R-1-4-10	22	10	CBFRS-R-1-4-10	73	10
1,5	CBFRN-R-1-1-2	22	10	CBFRS-R-1-1-2	73	10
1,6	CBFRN-R-1-6-10	22	10	CBFRS-R-1-6-10	73	10
1,8	CBFRN-R-1-8-10	22	10	CBFRS-R-1-8-10	73	10
2	CBFRN-R-2	22	10	CBFRS-R-2	73	10
2,25	CBFRN-R-2-1-4	22	10	CBFRS-R-2-1-4	73	10
2,5	CBFRN-R-2-1-2	22	10	CBFRS-R-2-1-2	73	10
2,8	CBFRN-R-2-8-10	22	10	CBFRS-R-2-8-10	73	10
3	CBFRN-R-3	22	10	CBFRS-R-3	73	10
3,2	CBFRN-R-3-2-10	22	10	CBFRS-R-3-2-10	73	10
3,5	CBFRN-R-3-1-2	22	10	CBFRS-R-3-1-2	73	10
4	CBFRN-R-4	22	10	CBFRS-R-4	73	10
4,5	CBFRN-R-4-1-2	22	10	CBFRS-R-4-1-2	73	10
5	CBFRN-R-5	22	10	CBFRS-R-5	73	10
5,6	CBFRN-R-5-6-10	22	10	CBFRS-R-5-6-10	73	10
6	CBFRN-R-6	22	10	CBFRS-R-6	73	10
6,25	CBFRN-R-6-1-4	22	10	CBFRS-R-6-1-4	73	10
7	CBFRN-R-7	22	10	CBFRS-R-7	73	10
7,5	CBFRN-R-7-1-2	22	10	CBFRS-R-7-1-2	73	10
8	CBFRN-R-8	22	10	CBFRS-R-8	73	10
9	CBFRN-R-9	22	10	CBFRS-R-9	73	10
10	CBFRN-R-10	22	10	CBFRS-R-10	73	10
12	CBFRN-R-12	22	10	CBFRS-R-12	73	10
15	CBFRN-R-15	22	10	CBFRS-R-15	73	10
17,5	CBFRN-R-17-1-2	22	10	CBFRS-R-17-1-2	73	10
20	CBFRN-R-20	22	10	CBFRS-R-20	73	10
25	CBFRN-R-25	22	10	CBFRS-R-25	73	10
30	CBFRN-R-30	22	10	CBFRS-R-30	73	10
35	CBFRN-R-35	54	10	CBFRS-R-35	118	10
40	CBFRN-R-40	54	10	CBFRS-R-40	118	10
45	CBFRN-R-45	54	10	CBFRS-R-45	118	10
50	CBFRN-R-50	54	10	CBFRS-R-50	118	10
60	CBFRN-R-60	180	10	CBFRS-R-60	118	10
65				CBFRS-R-65	220	5
70	CBFRN-R-70	180	5	CBFRS-R-70	220	5
75	CBFRN-R-75	180	5	CBFRS-R-75	220	5
80	CBFRN-R-80	180	5	CBFRS-R-80	220	5

Catalogue numbers - Class RK5 fuses

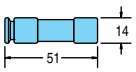
Rated current, A	250 V fuses Catalogue number FRN-R - time delay	Weight each, g	Packing size	600 V fuses Catalogue number FRS-R - time delay	Weight each, g	Packing size
90	CBFRN-R-90	180	5	CBFRS-R-90	220	5
100	CBFRN-R-100	180	1	CBFRS-R-100	220	5
110	CBFRN-R-110	400	1	CBFRS-R-110	500	1
125	CBFRN-R-125	400	1	CBFRS-R-125	500	1
150	CBFRN-R-150	400	1	CBFRS-R-150	500	1
175	CBFRN-R-175	400	1	CBFRS-R-175	500	1
200	CBFRN-R-200	900	1	CBFRS-R-200	500	1
225	CBFRN-R-225	900	1	CBFRS-R-225	1100	1
250	CBFRN-R-250	900	1	CBFRS-R-250	1100	1
300	CBFRN-R-300	900	1	CBFRS-R-300	1100	1
350	CBFRN-R-350	900	1	CBFRS-R-350	1100	1
400	CBFRN-R-400	900	1	CBFRS-R-400	1100	1
450	CBFRN-R-450	1400	1	CBFRS-R-450	1500	1
500	CBFRN-R-500	1400	1	CBFRS-R-500	1500	1
600	CBFRN-R-600	1400	1	CBFRS-R-600	1500	1

Class RK1 and RK5 fuses

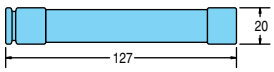
0,1-600 A, time delay

Dimensions, mm

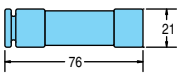
250 V - 0,1-30 A



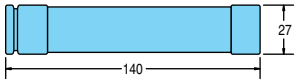
600 V - 0,1-30 A



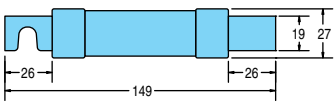
250 V - 35-60 A



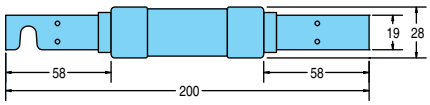
600 V - 35-80 A



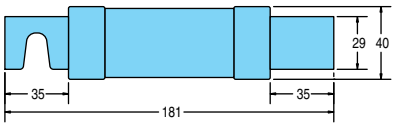
250 V - 65-100 A



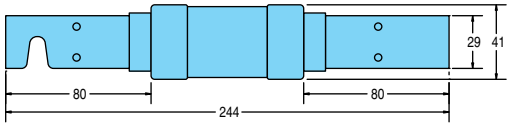
600 V - 65-100 A



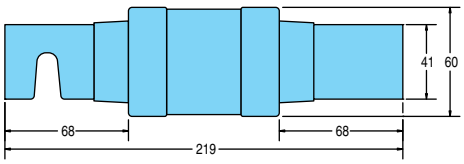
250 V - 110-200 A



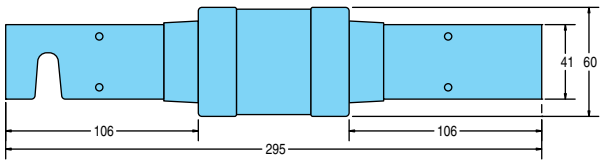
600 V - 110-200 A



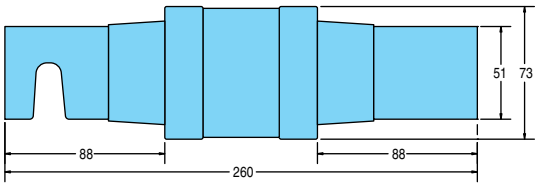
250 V - 225-400 A



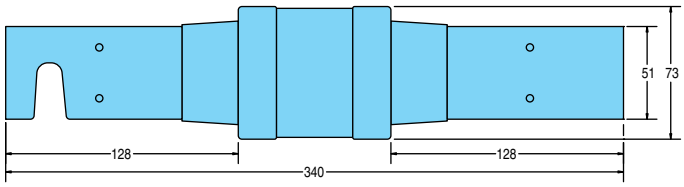
600 V - 225-400 A



250 V - 450-600 A



600 V - 450-600 A



Class H/K5 fuses

0,1-600 A, fast acting

Technical data

Applications	Branch circuit protection (NEC 240), motor protection (NEC 430), Not approved for installation in industrial machines according to NFPA 79
Material	Glass fibre body, copper ferrules/contact blades
Design	Single element
Rated voltage	250 VAC, 0,125-100 A: 125 VDC 600 VAC
Breaking capacity	0,125-60 A: 50 kA, other 10 kA
Standard	0,125-60 A: class K5, UL 248-9, CSA 22.2 No. 248.9 65-600 A: class H, UL 248-6, CSA 22.2 No. 248.6
Approvals	UL listed guide JDDZ, file E4273 CSA class 1422-01 file 53787(NON 15-60 A are not CSA approved)
Certificate	CE

Catalogue numbers - Class H/K5 fuses

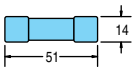
Rated current, A	250 V fuses Catalogue number NON - fast acting	Weight each, g	Packing size	600 V fuses Catalogue number NOS - fast acting	Weight each, g	Packing size
0,125	CBNON-1-8	22	10			
0,5	CBNON-1-2	22	10			
0,75	CBNON-3-4	22	10			
0,8	CBNON-8-10	22	10			
1	CBNON-1	22	10	CBNOS-1	73	10
1,25	CBNON-1-1-4	22	10			
1,5	CBNON-1-1-2	22	10			
1,6	CBNON-6-10	22	10			
2	CBNON-2	22	10	CBNOS-2	73	10
2,5	CBNON-2-1-2	22	10			
3	CBNON-3	22	10	CBNOS-3	73	10
3,2	CBNON-3-2-10	22	10			
4	CBNON-4	22	10	CBNOS-4	73	10
5	CBNON-5	22	10	CBNOS-5	73	10
6	CBNON-6	22	10	CBNOS-6	73	10
6,25	CBNON-6-1-4	22	10			
7	CBNON-7	22	10	CBNOS-7	73	10
8	CBNON-8	22	10	CBNOS-8	73	10
9	CBNON-9	22	10	CBNOS-9	73	10
10	CBNON-10	22	10	CBNOS-10	73	10
12	CBNON-12	22	10	CBNOS-12	73	10
15	CBNON-15	22	10	CBNOS-15	73	10
20	CBNON-20	22	10	CBNOS-20	73	10
25	CBNON-25	22	10	CBNOS-25	73	10
30	CBNON-30	22	10	CBNOS-30	73	10
35	CBNON-35	54	10	CBNOS-35	118	10
40	CBNON-40	54	10	CBNOS-40	118	10
45	CBNON-45	54	10	CBNOS-45	118	10
50	CBNON-50	54	10	CBNOS-50	118	10
60	CBNON-60s	180	5	CBNOS-60	118	10

Catalogue numbers - Class H/K5 fuses

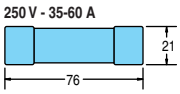
Rated current, A	250 V fuses Catalogue number NON - fast acting	Weight each, g	Packing size	600 V fuses Catalogue number NOS - fast acting	Weight each, g	Packing size
65	CBNON-65	180	5			
70	CBNON-70	180	5	CBNOS-70	220	5
75	CBNON-75	180	5	CBNOS-75	220	5
80	CBNON-80	180	5	CBNOS-80	220	5
90	CBNON-90	180	5	CBNOS-90	220	5
100	CBNON-100	180	5	CBNOS-100	220	5
110	CBNON-110	400	1	CBNOS-110	500	1
125	CBNON-125	400	1	CBNOS-125	500	1
150	CBNON-150	400	1	CBNOS-150	500	1
175	CBNON-175	400	1	CBNOS-175	500	1
200	CBNON-200	900	1	CBNOS-200	500	1
225	CBNON-225	900	1	CBNOS-225	1100	1
250	CBNON-250	900	1	CBNOS-250	1100	1
300	CBNON-300	900	1	CBNOS-300	1100	1
350	CBNON-350	900	1	CBNOS-350	1100	1
400	CBNON-400	900	1	CBNOS-400	1100	1
450	CBNON-450	1400	1	CBNOS-450	1500	1
500	CBNON-500	1400	1	CBNOS-500	1500	1
600	CBNON-600	1400	1	CBNOS-600	1500	1

Dimensions, mm

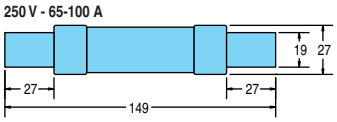
250 V - 0,125-30 A



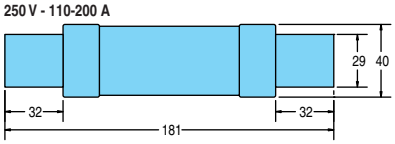
250 V - 35-60 A



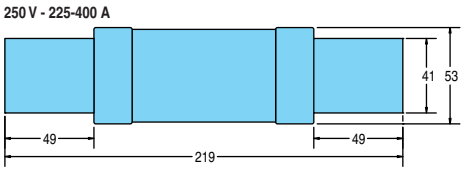
250 V - 65-100 A



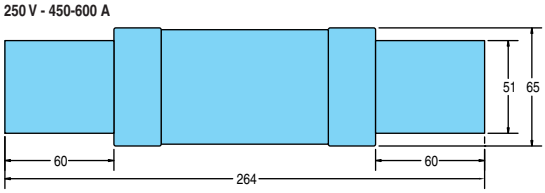
250 V - 110-200 A



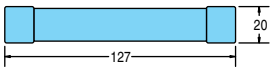
250 V - 225-400 A



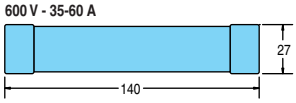
250 V - 450-600 A



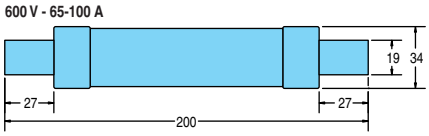
600 V - 1-30 A



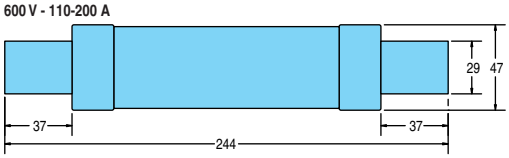
600 V - 35-60 A



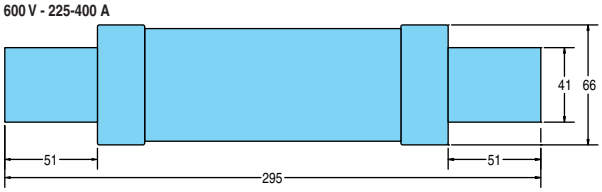
600 V - 65-100 A



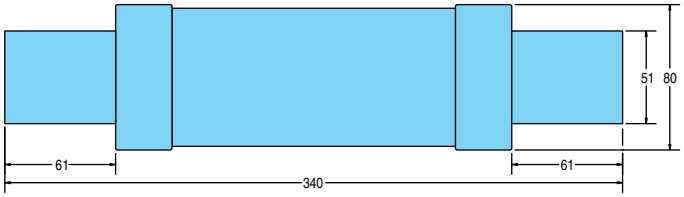
600 V - 110-200 A



600 V - 225-400 A



600 V - 450-600 A



Class RK1/RK5 fuse holders
30-600 A

Technical data

Material	Thermoplastic, flammability rating according to UL 94V0, covers to UL 98HB
Rated voltage	250/600 V
Short circuit current, SCCR	200 kA
Indicator, tripped fuse	Lamp indicator, neon lamp on cover 90-600 VAC/115-600 VDC
Ingress protection, IEC 60529	IP00, IP20
Installation	30-60 A: DIN rail mounting/panel mounting, other panel mounting
Standard	UL 4248-12, CSA 22.2 No 4248
Approvals	UL listed guide IZLT file E14853, CSA class 6225-01 file 47235 Cover UL file JDVS2 file E58836, CSA class 6225-01 file 47235
Certificate	CE, RoHS

Catalogue numbers - Fuse holders, IP 00

Fuse size	Rated current, A	Terminal type	Wire range AWG/kcmil	Catalogue number 1 pole	2 pole	3 pole	Weight g/pole	Packing size
Fuse holders for 250 V fuses								
0,1-30 A	30	Box terminal	2-14	CBRM25030-1CR	CBRM25030-1CR	CBRM25030-1CR	40	1
35-60 A	60	Box terminal	2-14	CBRM25060-1CR	CBRM25060-1CR	CBRM25060-1CR	70	1
65-100 A	100	Box terminal	14-1/0	CBRM25100-1CR	CBRM25100-1CR	CBRM25100-1CR	265	1
110-200 A	200	Box terminal	6-250	CBRM25200-1CR	CBRM25200-1CR	CBRM25200-1CR	395	1
225-400A	400	Box terminal	4-600	CBRM25400-1CR	CBRM25400-1CR	CBRM25400-1CR	1040	1
450-600 A	600	Box terminal	2x4-500	CBRM25600-1CR	CBRM25600-1CR	CBRM25600-1CR	1818	1
Fuse holders for 600 V fuses								
0,1-30 A	30	Box terminal	2-14	CBRM60030-1CR	CBRM60030-1CR	CBRM60030-1CR	70	1
35-60 A	60	Box terminal	2-14	CBRM60060-1CR	CBRM60060-1CR	CBRM60060-1CR	100	1
65-100 A	100	Box terminal	14-1/0	CBRM60100-1CR	CBRM60100-1CR	CBRM60100-1CR	400	1
110-200 A	200	Box terminal	6-250	CBRM60200-1CR	CBRM60200-1CR	CBRM60200-1CR	420	1
225-400A	400	Box terminal	4-600	CBRM60400-1CR	CBRM60400-1CR	CBRM60400-1CR	1080	1
450-600 A	600	Box terminal	2x4-500	CBRM60600-1CR	CBRM60600-1CR	CBRM60600-1CR	1860	1

Catalogue numbers - Covers for fuse holders, IP 20

Rated current, fuse holder, A	Catalogue number - cover ,1 pole without lamp indicator	with lamp indicator	Weight each, g	Packing size
Covers for 250 V fuse holders				
30	CBCVR-RH-25030	CBCVRI-RH-25030	37	1
60	CBCVR-RH-25060	CBCVRI-RH-25060	45	1
100	CBCVR-RH-25100	CBCVRI-RH-25100	68	1
200	CBCVR-RH-25200	CBCVRI-RH-25200	90	1
400	CBCVR-RH-25400	CBCVRI-RH-25400	160	1
600	CBCVR-RH-25600	CBCVRI-RH-25600	420	1
Covers for 600 V fuse holders				
30	CBCVR-RH-60030	CBCVRI-RH-60030	45	1
60	CBCVR-RH-60060	CBCVRI-RH-60060	60	1
100	CBCVR-RH-60100	CBCVRI-RH-60100	90	1
200	CBCVR-RH-60200	CBCVRI-RH-60200	115	1
400	CBCVR-RH-60400	CBCVRI-RH-60400	320	1
600	CBCVR-RH-60600	CBCVRI-RH-60600	695	1

Class H/K5 fuse holders
30-600 A

Technical data

Material	Thermoplastic, flammability rating according to UL 94V0, covers to UL 98HB
Rated voltage	250/600 V
Short circuit current, SCCR	10 kA
Indicator, tripped fuse	Lamp indicator, neon lamp on cover 90-600 VAC/115-600 VDC
Ingress protection, IEC 60529	IP00, IP20
Installation	30-60 A: DIN rail mounting/panel mounting, other panel mounting
Standard	UL 4248-12, CSA 22.2 No 4248
Approvals	UL listed guide IZLT file E14853, CSA class 6225-01 file 47235 Cover UL file JDVS2 file E58836, CSA class 6225-01 file 47235
Certificate	CE, RoHS

Catalogue numbers - Fuse holders, IP 00

Fuse size	Rated current, A	Terminal type	Wire range AWG/kcmil	Catalogue number 1 pole	2 pole	3 pole	Weight g/pole	Packing size
Fuse holders for 250 V fuses								
0,1-30 A	30	Box terminal	2-14	CBHM25030-1CR	CBHM25030-1CR	CBHM25030-1CR	40	1
35-60 A	60	Box terminal	2-14	CBHM25060-1CR	CBHM25060-1CR	CBHM25060-1CR	70	1
65-100 A	100	Box terminal	14-1/0	CBHM25100-1CR	CBHM25100-1CR	CBHM25100-1CR	265	1
110-200 A	200	Box terminal	6-250	CBHM25200-1CR	CBHM25200-1CR	CBHM25200-1CR	395	1
225-400A	400	Box terminal	4-600	CBHM25400-1CR	CBHM25400-1CR	CBHM25400-1CR	1040	1
450-600 A	600	Box terminal	2x4-500	CBHM25600-1CR	CBHM25600-1CR	CBHM25600-1CR	1818	1
Fuse holders for 600 V fuses								
0,1-30 A	30	Box terminal	2-14	CBHM60030-1CR	CBHM60030-1CR	CBHM60030-1CR	70	1
35-60 A	60	Box terminal	2-14	CBHM60060-1CR	CBHM60060-1CR	CBHM60060-1CR	100	1
65-100 A	100	Box terminal	14-1/0	CBHM60100-1CR	CBHM60100-1CR	CBHM60100-1CR	400	1
110-200 A	200	Box terminal	6-250	CBHM60200-1CR	CBHM60200-1CR	CBHM60200-1CR	420	1
225-400A	400	Box terminal	4-600	CBHM60400-1CR	CBHM60400-1CR	CBHM60400-1CR	1080	1
450-600 A	600	Box terminal	2x4-500	CBHM60600-1CR	CBHM60600-1CR	CBHM60600-1CR	1860	1

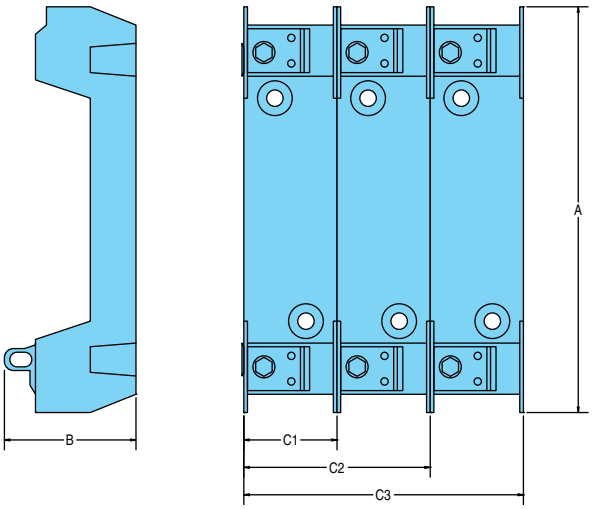
Catalogue numbers - Covers for fuse holders, IP 20

Rated current, fuse holder, A	Catalogue number - cover ,1 pole without lamp indicator	with lamp indicator	Weight each, g	Packing size
Covers for 250 V fuse holders				
30	CBCVR-RH-25030	CBCVRI-RH-25030	37	1
60	CBCVR-RH-25060	CBCVRI-RH-25060	45	1
100	CBCVR-RH-25100	CBCVRI-RH-25100	68	1
200	CBCVR-RH-25200	CBCVRI-RH-25200	90	1
400	CBCVR-RH-25400	CBCVRI-RH-25400	160	1
600	CBCVR-RH-25600	CBCVRI-RH-25600	420	1
Covers for 600 V fuse holders				
30	CBCVR-RH-60030	CBCVRI-RH-60030	45	1
60	CBCVR-RH-60060	CBCVRI-RH-60060	60	1
100	CBCVR-RH-60100	CBCVRI-RH-60100	90	1
200	CBCVR-RH-60200	CBCVRI-RH-60200	115	1
400	CBCVR-RH-60400	CBCVRI-RH-60400	320	1
600	CBCVR-RH-60600	CBCVRI-RH-60600	695	1

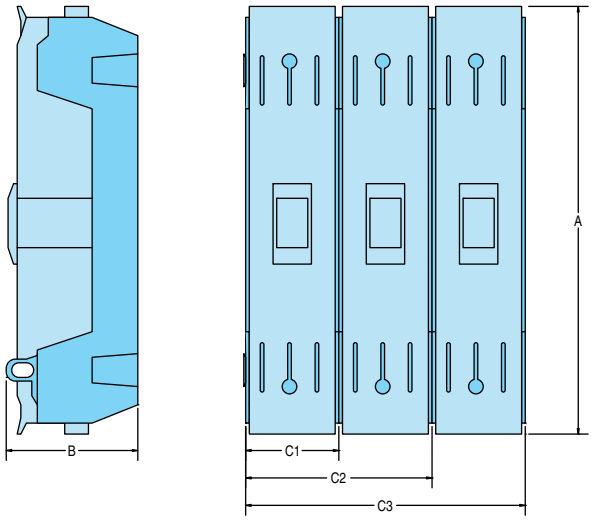
Class RK1/RK5/K5/H fuse holders
30-600 A

Dimensions, mm

Fuse holders IP 00



Fuse holders IP 20



Fuse holders	A	B	C1	C2	C3
250 V fuse holders IP 00					
30 A	80	50	25	49	74
60 A	108	58	34	68	102
100 A	171	72	51	102	153
200 A	207	96	68	136	203
400 A	241	121	92	185	277
600 A	289	151	125	250	375
600 V fuse holders IP 00					
30 A	159	58	30	60	90
60 A	172	66	38	77	115
100 A	222	72	51	102	153
200 A	271	96	67	134	200
400 A	317	121	92	185	277
600 A	366	151	125	250	375
250 V fuse holders IP 20					
30 A	99	50	25	49	50
60 A	135	58	34	68	102
100 A	182	72	51	102	153
200 A	220	96	68	136	203
400 A	258	121	92	185	277
600 A	307	151	125	250	375
600 V fuse holders IP 20					
30 A	183	50	25	49	74
60 A	202	58	34	68	102
100 A	233	72	51	102	153
200 A	284	96	68	136	203
400 A	334	121	92	185	277
600 A	383	151	125	250	375

Fuse reducers

Class RK1/RK5, J and H/K5

Technical data

Material	Copper
Rated voltage	250/600 V
Standard	UL 248
Approvals	UL listed guide IZZR, file E12853: class RK1/RK5 and H/K5
	CSA class 6225-01 file 47235: class RK1/RK5 and H/K5

Catalogue numbers - Fuse reducers for class RK1/RK5/J fuses

Description	Catalogue number - kit for one fuse Class RK1/RK5 250 V	Class RK1/RK5 600 V	Class J 600 V	Weight each, g	Packing size
For installation of 1-30 A fuse in 60 A fuse holder	CBNO263-R	CBNO663-R	CBJ-63	40	1
For installation of 1-30 A fuse in 100 A fuse holder	CBNO213-R	CBNO613-R	CBJ-13	50	1
For installation of 35-60 A fuse in 100 A fuse holder	CBNO216-R	CBNO616-R	CBJ-16	50	1
For installation of 35-60 A fuse in 200 A fuse holder	CBNO226-R	CBNO626-R	CBJ-26[1)]	70	1
For installation of 70-100 A fuse in 200 A fuse holder	CBNO2621-R[3)]	CBNO2621-R[3)]	CBJ-21[1)]	65	1
For installation of 70-100 A fuse in 400 A fuse holder	CBNO2641-R[3)]	CBNO2641-R[3)]	CBJ-41[1)]	80	1
For installation of 70-100 A fuse in 600 A fuse holder	CBNO2661-R[3)]	CBNO2661-R[3)]		150	1
For installation of 110-200 A fuse in 400 A fuse holder	CBNO242-R[3)]	CBNO642-R[3)]	CBJ-42[1)]	75	1
For installation of 110-200 A fuse in 600 A fuse holder	CBNO2662-R[3)]	CBNO2662-R[3)]	CBJ-62[1)]	150	1
For installation of 225-400 A fuse in 600 A fuse holder	CBNO2664-R[2,3)]	CBNO2664-R[2,3)]	CBJ-64[1)]	150	1

Catalogue numbers - Fuse reducers for class H/K5 fuse

Description	Catalogue number - kit for one fuse 250 V	600 V	Weight each, g	Packing size
For installation of 1-30 A fuse in 60 A fuse holder	CBNO263	CBNO663	40	1
For installation of 1-30 A fuse in 100 A fuse holder	CBNO213	CBNO613	50	1
For installation of 35-60 A fuse in 100 A fuse holder	CBNO216	CBNO616	50	1
For installation of 35-60 A fuse in 200 A fuse holder	CBNO226	CBNO626	70	1
For installation of 70-100 A fuse in 200 A fuse holder	CBNO2621	CBNO2621	65	1
For installation of 70-100 A fuse in 400 A fuse holder	CBNO2641[3)]	CBNO2641	80	1
For installation of 70-100 A fuse in 600 A fuse holder	CBNO2661[3)]	CBNO2661	100	1
For installation of 110-200 A fuse in 400 A fuse holder	CBNO242	CBNO642	75	1
For installation of 110-200 A fuse in 600 A fuse holder	CBNO2662[3)]	CBNO2662[3)]	150	1
For installation of 225-400 A fuse in 600 A fuse holder	CBNO2664[3)]	CBNO2664[3)]	150	1

1) Not to be used in installations there the fuse is bolted on, only for installation in fuse holders.
2) The kit konists of on reducer, pair is not required.
3) The fuse reducer is not CSA approved.

Class T fuses

1-600 A, fast acting

Technical data

Applications	Branch circuit protection (NEC 240), motor protection (NEC 430) current limiting
Material	Glass fibre body, silver plated copper ferrules/contact blades
Design	Single element
Rated voltage	300 VAC/160 VDC 600 VAC
Breaking capacity	300/600 VAC: 200 kA, 160 VDC: 20 kA
Standard	UL 248-15, CSA 22.2 No. 248.15
Approvals	UL listed guide JDDZ, file E4273 CSA class 1422-02 file 53787
Certificate	CE, RoHS

Catalogue - Class T fuses

Rated current, A	300 V fuses Catalogue number[1] JJN - fast acting	Weight each, g	Packing size	600 V fuses Catalogue number[2] JJS - fast acting	Weight each, g	Packing size
1	CBJJN-1	6	10	CBJJS-1	15	10
2	CBJJN-2	6	10	CBJJS-2	15	10
3	CBJJN-3	6	10	CBJJS-3	15	10
6	CBJJN-6	6	10	CBJJS-6	15	10
10	CBJJN-10	6	10	CBJJS-10	15	10
15	CBJJN-15	6	10	CBJJS-15	15	10
20	CBJJN-20	6	10	CBJJS-20	15	10
25	CBJJN-25	6	10	CBJJS-25	15	10
30	CBJJN-30	6	10	CBJJS-30	15	10
35	CBJJN-35	11	10	CBJJS-35	37	10
40	CBJJN-40	11	10	CBJJS-40	37	10
45	CBJJN-45	11	10	CBJJS-45	37	10
50	CBJJN-50	11	10	CBJJS-50	37	10
60	CBJJN-60	11	10	CBJJS-60	37	10
70	CBJJN-70	33	5	CBJJS-70	46	5
80	CBJJN-80	33	5	CBJJS-80	46	5
90	CBJJN-90	33	5	CBJJS-90	46	5
100	CBJJN-100	33	5	CBJJS-100	46	5
110	CBJJN-110	63	1	CBJJS-110	87	1
125	CBJJN-125	63	1	CBJJS-125	87	1
150	CBJJN-150	63	1	CBJJS-150	87	1
175	CBJJN-175	63	1	CBJJS-175	87	1
200	CBJJN-200	63	1	CBJJS-200	87	1
225	CBJJN-225	113	1	CBJJS-225	87	1
250	CBJJN-250	113	1	CBJJS-250	208	1
300	CBJJN-300	113	1	CBJJS-300	208	1
350	CBJJN-350	113	1	CBJJS-350	208	1
400	CBJJN-400	113	1	CBJJS-400	208	1
450	CBJJN-450	200	1	CBJJS-450	385	1
500	CBJJN-500	200	1	CBJJS-500	385	1
600	CBJJN-600	200	1	CBJJS-600	385	1

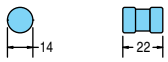
[1] Contact CHS Controls for 700-1200 A fuses
[2] Contact CHS Controls for 800 A fuse

Dimensions, mm

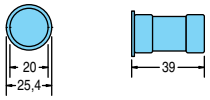
300 V - 1-30 A

600 V - 1-30 A

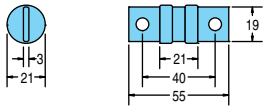
300 V - 35-60 A



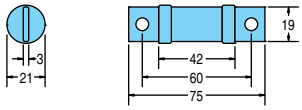
600 V - 35-60 A



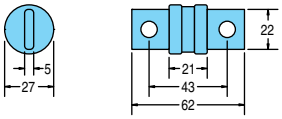
300 V - 65-100 A



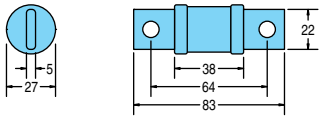
600 V - 65-100 A



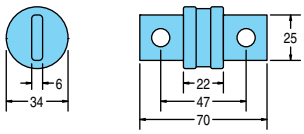
300 V - 110-200 A



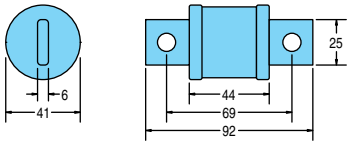
600 V - 110-200 A



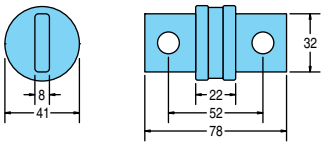
300 V - 225-400 A



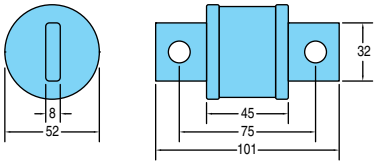
600 V - 225-400 A



300 V - 450-600 A



600 V - 450-600 A



Fuse cover

600 V class T fuses - 30 A

Technical data

Material	Thermoplastic, flammability rating according to UL 94V2
Rated voltage	600 V
Indicator, fuse trip	Version with lamp indicator, neon lamp, 90-600 VAC/115-600 VDC
Approval	UL listed guide JDVS file E58836, CSA certified Class 6225-01, file LR47235
Certificate	CE, RoHS

Catalogue numbers - Fuse cover for 600 V class T fuses - fitted on the fuse

Description	Catalogue number Fuse cover	Fuse cover with lamp indicator	Weight each, g	Packing size
Fuse cover for one fuse, 600 V, 1-30 A	CBSAMI-9N	CBSAMI-9I	60	3

Class T fuse holders
1-600 A

Technical data

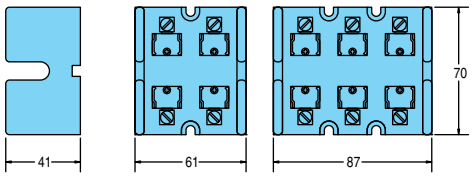
Material	Thermoplastic, flammability rating according to UL 94V0
Rated current	300/600 V
Short circuit current (SCCR)	200 kA
Standard	UL 4248-15, CSA 22.2 No 4248
Approvals	UL listed guide IZLT file E14853, CSA class 6225-01 file 47235
Certificate	CE, RoHS

Catalogue numbers - Class T fuse holders, panel mounting, IP 00

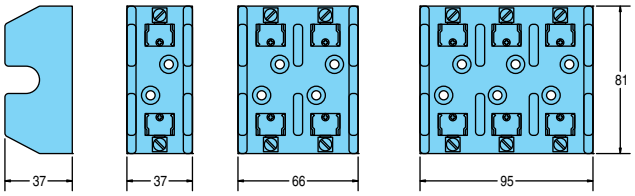
Fuse size	Rated current, A	Terminal type	Wire range AWG/kcmil	Catalogue number 1 pole	2 pole	3 pole	Weight g/pole	Packing size
Fuse holders for 300 V fuses								
1-30 A	30	Box terminal	14-6		CBT30030-2CR	CBT30030-3CR	75	1
35-60 A	60	Box terminal	14-2		CBT30060-2CR	CBT30060-3CR	75	1
70-100 A	100	Box terminal	8-1/0	CBT30100-1CR	CBT30100-2CR	CBT30100-3CR	322	1
110-200 A	200	Box terminal	6-250	CBT30200-1CR		CBT30200-3CR	454	1
225-400 A	400	Box terminal	2/0-600	CBT30400-1CR			545	1
450-600 A	600	Box terminal	2x4/0-600	CBT30600-1CR			1200	1
Fuse holders for 600 V fuses								
0,1-30 A	30	Box terminal	14-2	CBT60060-1CR	CBT60030-2CR	CBT60030-3CR	91	1
35-60 A	60	Box terminal	14-2	CBT60060-1CR	CBT60060-2CR	CBT60060-3CR	141	1
70-100 A	100	Box terminal	14-2/0	CBT60100-1C	CBT60100-2C	CBT60100-3C	322	1
110-200 A	200	Box terminal	6-250	CBT60200-1C			454	1
225-400 A	400	Box terminal	2/0-600	CBT60400-1C			545	1
450-600 A	600	Box terminal	2x4/0-600	CBT60600-1C			1200	1

Dimensions, mm

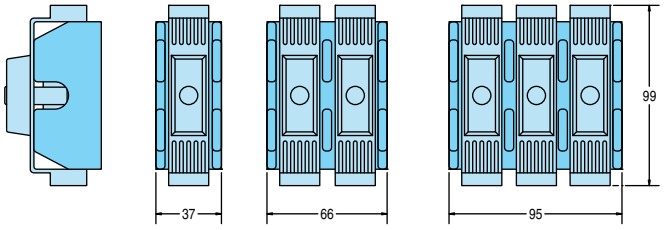
300 V - 30 A, 2-3 pole fuse holders



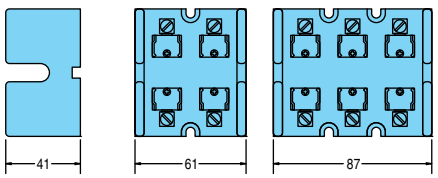
600 V - 30 A, 1-3 pole fuse holders



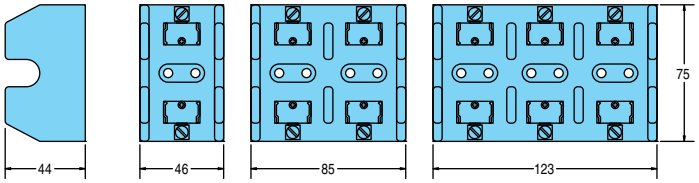
600 V - 30 A, 1-3 pole fuse holders, installed fuse equipped with fuse cover



300 V - 60 A, 1-3 pole fuse holder

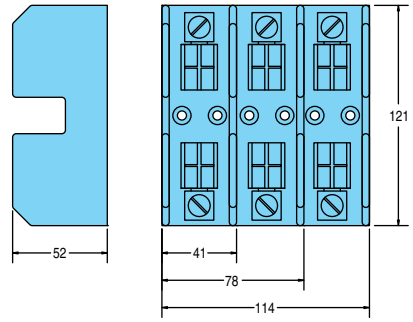


600 V - 60 A, 1-3 pole fuse holder

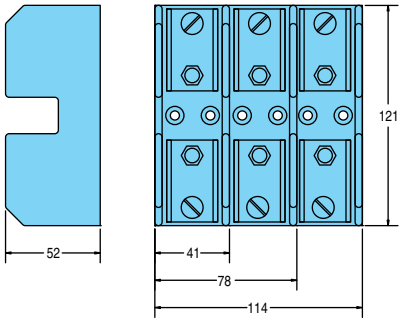


Dimensions, mm

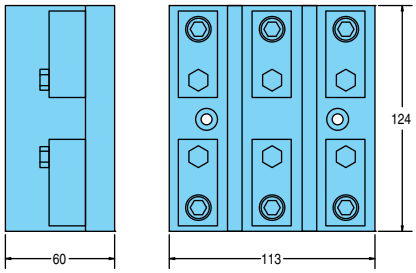
300 V - 100 A, 1-3 pole fuse holders



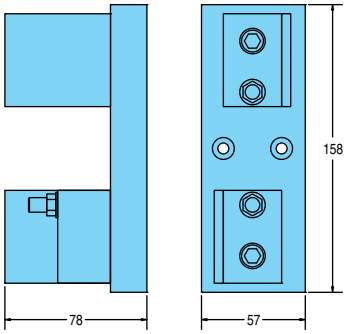
600 V - 100 A, 1-3 pole fuse holders



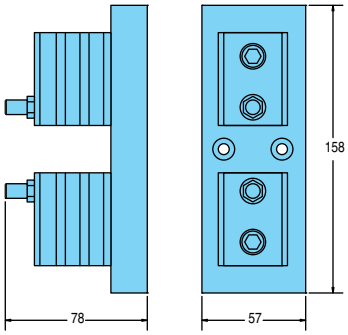
300 V - 200 A, 3 pole fuse holder



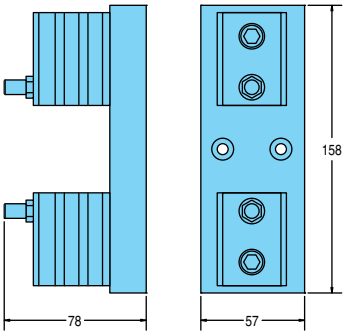
300/600 V - 200 A, 1 pole fuse holder



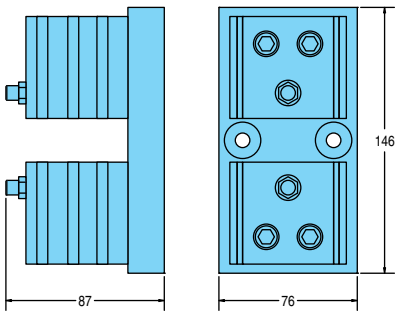
300 V - 400 A, 1 pole fuse holder



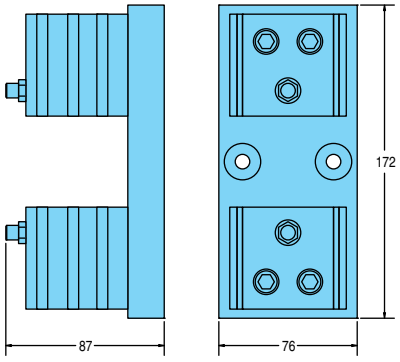
600 V - 400 A, 1 pole fuse holder



300 V - 600 A, 1 pole fuse holder



600 V - 600 A, 1 pole fuse holder



Class G fuses

0,5-60 A, time delay/fast acting

Technical data

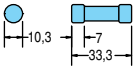
Applications	Branch circuit protection (NEC 240), motor protection (NEC 430), current limiting
Material	Glasfiberkropp, nickel plated brass ferrules
Design	Single element
Rated voltage	480/600 VAC, 170/300 VDC, see catalogue numbers
Breaking capacity	480/600 VAC: 100 kA, 170/300 VDC: 10 kA
Standard	UL 248-5, CSA 22.2 No. 248.5
Approvals	UL listed guide JDDZ, file E4273, CSA class 1422-01 file 53787
Certificate	CE, RoHS

Catalogue numbers - Class G fuses

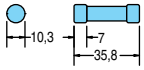
Rated current, A	Rated voltage VAC	VDC	Catalogue number Fast acting	Time delay	Weight each, g	Packing size
0,5	600	170	CBSC-1-2		5	10
1	600	170	CBSC-1		5	10
1,5	600	170	CBSC-1-1-2		5	10
2	600	170	CBSC-2		5	10
2,5	600	170	CBSC-2-1-2		5	10
3	600	170	CBSC-3		5	10
4	600	170	CBSC-4		5	10
5	600	170	CBSC-5		5	10
6	600	170	CBSC-6		5	10
7				CBSC-7	5	10
8	600	170		CBSC-8	5	10
10	600	170		CBSC-10	5	10
12	600	170		CBSC-12	5	10
15	600	170		CBSC-15	5	10
20	600	170		CBSC-20	8	10
25	480	300		CBSC-25	12	10
30	480	300		CBSC-30	12	10
35	480	300		CBSC-35	17	10
40	480	300		CBSC-40	17	10
45	480	300		CBSC-45	17	10
50	480	300		CBSC-50	17	10
60	480	300		CBSC-60	17	10

Dimensions, mm

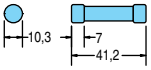
0,5-15 A



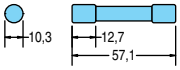
20 A



25-30 A



35-60 A



Class G fuse holders
20-60 A

Technical data

Material	Thermoplastic, flammability rating according to UL 94V0
Rated voltage	0,5-20 A: 600 V, 25-60 A: 480 V
Short circuit current (SCCR)	100 kA
Ingress protection, IEC 60529	IP 00
Standard	UL 4248-5, CSA 22.2 No 39
Approvals	0,5-30 A: UR guide IZLT2 file E14853, 35-60 A: UL listed guide IZLT file E14853 CSA class 6225-01 file 47235
Certificate	CE, RoHS

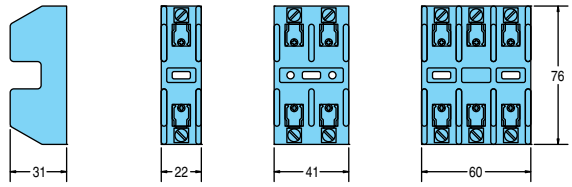
Catalogue numbers - Class G fuse holders, panel mount, IP 00

Fuse size	Rated current, A	Terminal type	Wire range AWG/kcmil	Catalogue number 1 pole	2 pole	3 pole	Weight g/pole	Packing size[1)]
0,5-15 A	20	Box terminal	14-6	CBBG3011B	CBBG3012B	CBBG3013B	35	10/8/6
20 A	20	Box terminal	14-6	CBBG3021B	CBBG3022B	CBBG3023B	35	10/8/6
25-30 A	30	Box terminal	14-6	CBBG3031B	CBBG3032B	CBBG3033B	35	10/8/6
35-60 A	60	Box terminal	14-2	CBG30060-1CR	CBG30060-2CR	CBG30060-3CR	91	1

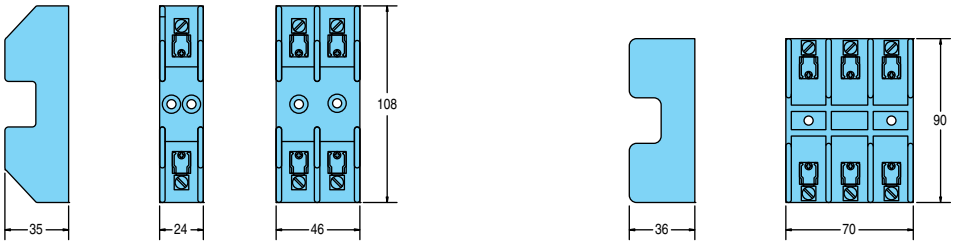
[1)] Packing size, first value refers to 1 pole, second value to 2 pole and third value to 3 pole fuse holders.

Dimensions, mm

600 V - 0,1-20 A, 1-3 pole fuse holders



480 V - 35-60 A, 1-3 pole fuseholders



Application guide

Fuses according to North American standard

Deliveries to North America require compliance with National Electrical Code (NEC) and Canadian Electrical Code (CEC) and/or equivalent local legislation. Fuse standard in North America differs considerably from the fuse types that are commonly used in Europe, the dimensions and characteristics differ considerably. Eaton Bussmann Series offers a complete range of fuses and accessories according to North American standards.

Fuse construction

North American fuses differ from corresponding European types in several respects.

- The fuse body is normally manufactured of glass fibre/melamine, not of ceramic, which is most common for European fuses.
- The fuse element design is partly different, there are two main designs, "Single Element" fuses and "Dual Element" fuses.
- Dimensions and shape differ.
- Standard current ratings differ.

Single Element fuses

A similar design compared to European fuses, one or more fuse elements (the name single element is partially misleading, it is based on that the fuse has one element in series) is provided with a number of restrictions - shape, size and location determine the fuse characteristics. The element is also provided with a metal restriction with lower melting point - the M-effect and therefore protects both overload and short circuit conditions. The short circuit/overload increases the temperature and the fuse element is melting - the circuit is interrupted, see Figure 1. This type of fuses is normally fast acting.

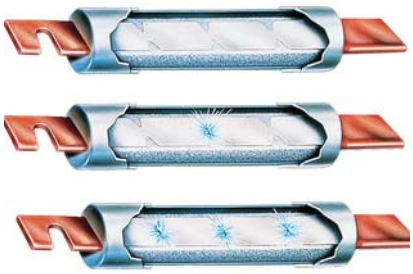


Fig 1. Single element fuse. Top illustration shows a cutaway view of the fuse, middle illustration shows the fuse during overload conditions, bottom illustration shows the fuse during short circuit conditions.

Dual Element, Time Delay Fuses

A dual element fuse has separate series connected elements protecting for overload respectively short circuit conditions. The short circuit protection element has a similar design as for single element fuses but the M-effect melting point is missing. The overload protection element is spring loaded and fixed to the short circuit element by a special calibrated melting alloy. The melting alloy fractures during overload condition, the spring is released and separates the overload protection element from the short circuit protection element, the circuit is interrupted. A dual element fuse works at the same way as a single element fuse during short circuit condition, see figure 2. Dual element fuses are time delay fuses.

Dual element fuse design is more sophisticated compared to traditional fuse designs and offers several benefits.

- Higher degree of time delay in the overload current range, can be sized closer to the operating current.
- More exact time/current characteristic, less sensitive to aging.
- Lower power losses.

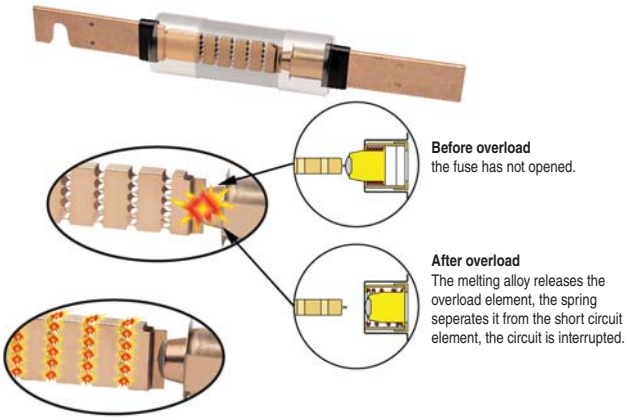


Fig 2. Dual element fuse. Top illustration shows the element design - the real fuse has no transparent body and is sand filled. Middle illustration shows the fuse during overload condition, bottom illustration shows the fuse during short circuit condition.

UL 248 and CSA C22.2 No 248 - Low Voltage Fuses

UL 248 and CSA C22.2 No. 248 is the main standard for low voltage fuses in North America. The standard is to a big extent based on the requirements of the National Electrical Code (NEC) and Canadian Electrical Code (CEC). The fuses are divided into different classes, each class has usually two voltage levels 600/250 or 600/300 VAC. The physical dimensions differ between the classes and the respective voltage level - all to prevent wrong type of fuse to be installed in the circuit. Also time/current characteristics are partly different between the classes.

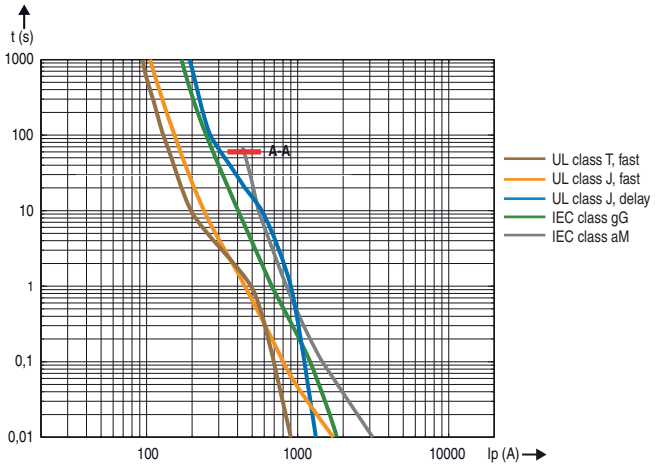


Fig 3. Time/current characteristics for 100 A fuses, from left UL class T fast acting, UL class J fast acting, IEC class gG, UL class J time delay and IEC class aM. IEC class aM is a partial range protection fuse and will not protect for faults above A-A line.

Overcurrent Protective Device (OCPD) according to NEC

NEC defines different types of overcurrent protective devices - OCPD.

- Branch circuit OCPD - general use according to NEC.
- Application limited - the device is suitable for specific branch circuit applications under limited conditions, specified in NEC. Examples are high speed fuses and motor protection products.
- Supplementary protective device - limited use according to NEC, for example to protect a certain device. A supplementary protective device can never replace a branch circuit OCPD.

Branch circuit OCPD
Fuses class J, CF, RK1, RK5, T, CC, L, G, K and H5 are UL listed according to UL 248 and suitable for general use. The fuses are available as fast acting and as time delay. Class K and H5 are older types, have lower breaking capacity, 10 kA, and are not recommended for new design, not approved for use in industrial machinery according to NFPA 79. Branch circuit OCPD can be used to protect mains, feeders and branch circuits.

Class CC fuses are available in current ratings up to 30 A, class G up to 60 A, class CF up to 100 A, class J/RK1/RK5 up to 600 A while class T fuses are available in current ratings up to 1200/800 A. Class L fuses are normally used as main fuses for currents above 600 A and are available in current ratings up to 6000 A. Contact CHS Controls for information about class L fuses.

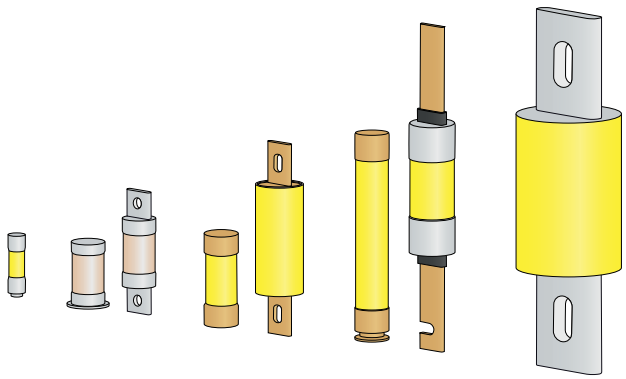


Fig 4. Current limiting fuses approved for Branch Circuit Protection. From the left class CC, class T, class J, class RK1 and class L.

Application limited OCPD
This type of fuses is generally not approved for branch circuit protection, but permitted for some specific applications. One example is that high speed fuses are permitted for short circuit protection in motor circuits using electronic starters (softstarters, adjustable frequency drives), see NEC 430.52(C)(5).

Supplementary protective device
Midget fuses are intended for supplementary protection. This type of fuse has limited use in accordance with NEC 240.10. Supplementary protective device can only be used as additional protection on the load side of a branch circuit OCPD. Midget fuses can be used for example to protect the individual luminaries, on the secondary side of a control circuit transformer and to give additional protection for sensitive equipment type PLC.

Note, Midget fuses can never replace a branch circuit OCPD.

Fig 5. Left side fuse is rejection type class CC, right side fuse is a Midget fuse. The dimensions are the same for both types, 10,3x38,1 mm. One of the contact ferrules on the class CC fuse is equipped with with a rejection key, in this case a tap. The design prevents installation of a Midget fuse in a fuseholder inteded for class CC fuses.

Standard current ratings
NEC 240.6 defines the following standard current ratings for fuses: 1, 3, 6,10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1600, 2000, 2500, 3000, 4000 ,5000 and 6000 A. Fuses with other rated currents are also permitted.

Current limiting
All modern fuses are more or less current limiting. Some fuse types are specifically marked “current limiting”. These fuses satisfy certain requirements in UL 248 regarding energy let through (I^2t) and peak current. Fuses class J, CF, CC, T, L, RK1, RK5 and G are marked ”Current limiting” while fuses class H and K5 are not considered to be current limiting.

Current limiting fuses class J, CF, G and T have specific dimensions and cannot be installed in a fuse holder not designed for respectively fuse type.

A current limiting class CC fuse has the same dimensions as many Midget fuses. To prevent installation of incorrect fuse, one of the ferrules is keyed - rejected type, see figure 5. It is not possible to install a Midget fuse in a class CC fuse holder. However it is possible to upgrade the protection by installing a class CC fuse in a fuse holder designed for 10,3x38,1 mm Midget fuses.

The same applies for current limiting class RK1/RK5 fuses versus class H/K5 fuses, same dimensions but class RK1/RK5 has keyed ferrule/contact blade - rejected type.

Discrimination

Discrimination in a distribution system means that fuses installed in series are coordinated in a way that only the fuse immediately upstream the fault trips. The condition for discrimination is that clearing time (melting+arcing time) of the smaller fuse is shorter compared to the melting time of the larger fuse further upstream.

Table 1 shows discrimination ratio between Eaton Bussmann Series fuses for 480/600 V applications. The ratio 2:1, like for LPJ-SP, means that upstream fuse must be 2 times larger compared to the downstream fuse. Contact CHS Controls for discrimination ratios for other types of fuses.

Table 1, Discrimination ratio guide

Downstream fuse class/fuse type	Upstream fuse, class/ fuse type J LPJ-SP	CF TCF	RK1 LPS-RK	RK5 FRS-R	T JJS	CC LP-CC
Class J/LPJ-SP	2:1	2:1	2:1	1,5:1	3:1	
Class RK1/LPS-RK	2:1	2:1	2:1	1,5:1	3:1	
Class RK5/FRS-R	8:1	8:1	8:1	2:1	8:1	
Class CF/TCF	2:1	2:1	2:1	1,5:1	3:1	
Class T/JJS	3:1	3:1	3:1	1,5:1	3:1	
Class CC/LP-CC	2:1	2:1	2:1	2:1		2:1

Short Circuit Current Rating, SCCR

Assembly short-circuit current rating (SCCR) is required for industrial control panels. The requirement is included in UL 508A and was clarified in NEC 2008.

The assembly short circuit current rating should not be confused with the breaking capacity of the overcurrent protective device - the fuse. The breaking capacity is the maximum overcurrent the fuse can break during applicable standard test conditions. The short circuit current rating is the max overcurrent the complete assembly can withstand without damage. The assembly short-circuit current rating is dependent on all installed

Table 2, Recommended fuse size for 460 VAC 3 phase motor protection - short circuit protection

Motor data, NEC table 430.250			Recommended rated current, time dealy fuses, A					Max rated current, A, NEC 430.52(C)(1)			
Rated power		Full load	Class CC	Class J	Class CF	Class RK1	Class RK5	Generic start		Heavy start	
Hp	kW	current, A	LP-CC	LPJ-SP	TCF	LPS-RK	FRS-R	Class CC	Other	Class CC	Other
0,5	0,37	1,1	2,25	1,8	3	1,5	1,4	6	3	6	3
0,75	0,55	1,6	3,2	2,5	3	2,25	2	6	3	6,25	3
1	0,75	2,1	4,5	3,2	6	2,8	2,8	10	6	10	6
1,5	1,1	3	6	4,5	6	4	4	10	6	12	6
2	1,5	3,4	7	5,6	6	4,5	4,5	15	6	15	6
3	2,2	4,8	10	8	10	6,25	6	15	10	15	10
5	4	7,6	25	12	15	10	10	25	15	30	15
7,5	5,5	11		17,5	17,5	15	15		20		20
10	7,5	14		25	25	20	17,5		25		30
15	11	21		35	35	30	30		40		45
20	15	27		45	40	40	35		50		60
25	18,5	34		60	60	45	45		60		70
30	22,5	40		60	60	60	50		70		90
40	30	52		80	80	70	70		100		110
50	37	65		100	100	90	90		125		125
60	45	77		125		110	100		150		150
75	55	96		150		125	125		175		200
100	75	124		200		175	175		225		250
125	90	156		250		225	200		300		350
150	110	180		300		250	225		350		400
200	150	240		400		350	300		450		500
250	185	302		500		400	400		600		
300	225	361		600		500	500		600		

Table 3, Recommended fuse size for 575 VAC 3 phase motor protection - short circuit protection

0,5	0,37	0,9	1,8	1,4	3	1,25	1,125	3	3	3,5	3
0,75	0,55	1,3	2,8	2	3	1,8	1,8	6	3	6	3
1	0,75	1,7	3,5	2,8	3	2,25	2,25	6	3	6,25	3,5
1,5	1,1	2,4	5	4	6	3,2	3	10	6	10	6
2	1,5	2,7	5,6	4,5	6	4	3,5	10	6	10	6
3	2,2	3,9	8	6	6	5,6	5	15	10	15	10
5	4	6,1	15	10	10	8	8	20	15	20	15
7,5	5,5	9	30	15	15	12	12	30	20	30	20
10	7,5	11		17,5	17,5	15	15		20		20
15	11	17		30	30	25	25		30		35
20	15	22		35	35	30	30		40		45
25	18,5	27		45	45	40	35		50		60
30	22,5	32		50	50	45	40		60		70
40	30	41		70	70	60	60		80		90
50	37	52		80	80	70	70		100		110
60	45	62		100		90	80		110		125
75	55	77		125		110	100		150		150
100	75	99		150		150	125		175		200
125	90	125		200		175	175		225		250
150	110	144		225		200	200		300		300
200	150	192		300		250	250		350		400
250	185	242		400		350	350		450		500
300	225	289		450		400	400		600		600

components. Generally, the short circuit current rating for the assembly cannot be higher than that of the device with the lowest breaking capacity/ short circuit current rating.

Modern fuses like class J/CC/CF/RK1/T are very current limiting and also have high breaking capacity 200/300 kA at 600 VAC according to UL. The levels are significantly higher compared to most circuit breakers/miniature circuit breakers.

Most manufacturers have combination ratings for contactors, overload relays and short circuit protective devices - circuit breakers/fuses. Short circuit current rating for combinations with current limiting fuses, class CC/J/CF/RK1 usually gives a short circuit current rating of 100 kA at 600 VAC. Contact CHS Controls for more information.

Fuses for cable protection - sizing

NEC Article 240.4 states that overcurrent protective device - the fuse should be sized so that the rated current is not higher than the current carrying capacity of the conductor. Next higher standard current rating can be used up to a maximum of 800 A during specific conditions specified in NEC 240.4 (B). The fuse should not be continuously loaded to more than 80% of the full load current according to UL 248.

Small conductors

Minimum conductor size for power circuits is normally AWG 14 (2,1 mm^2). Smaller conductors, AWG 16 (1,3 mm^2) and AWG 18 (0,81 mm^2) can be used for some specific applications, see NEC 240.4(D) to 240.4(E). The overcurrent protective device - the fuse is sized as follows

- AWG 18: 7 A, continuous load not exceeding 5,6 A, approved fuses are class CC, J or T.
- AWG 16: 10 A, continuous load not exceeding 8 A, approved fuses are class CC, J or T.
- AWG 14: copper conductor 15 A.
- AWG 12: copper conductor 20 A, aluminium conductor 15 A.
- AWG 10: copper conductor 30 A, aluminium conductor 25 A.

Fuses for motor protection - sizing

Both overload and short circuit protection shall be provided for motor circuits. NEC Article 430.52 and 430.53 covers motor protection, including sizing of fuses.

Motor protection

Time delay fuses are most commonly used for motor circuit short circuit protection. Traditionally, class RK5/RK1 have been most commonly used but class CC and J gain in popularity since they are considerable smaller, the equipment will be more compact.

NEC Table 430.52 specifies a maximum fuse size. For standard three-phase motors protected by time delay fuses, maximum fuse size is 175% of motor full load current. For heavy starts, the fuse size can be increased to max 225% of the motor full load current. Note, time delay class CC fuses can be sized up to 300% of full load current, 400% for heavy starts.

Some types, for example class RK1/RK5/J can be sized so close to the motor full load current that they also provide overload protection, a separate overload relay is not required. The method is approved but not common, in most cases the fuses are sized only to provide short circuit protection.

Time delay fuses, only intended to provide short circuit protection, are normally sized to 125-130% of the full load current for normal starting conditions. Table 2 and 3 on page 34 shows recommended fuse size for three phase motors, 460 respectively 575 VAC. The fuses are only intended for short circuit protection, the values are based on the assumption that separate overload protection is provided. Recommended fuse size is lower compared to max permitted values according to NEC table 430.52 and are based on normal starting conditions. A larger fuse may be required for heavy starts.

Starter protection

Also starters may already at a moderate short circuit be seriously damaged. Overload relays is especially sensitive, check the rating plate regarding max fuse size.

IEC 60947-4-1 has for a long time differed between Type 1 and Type 2 coordination, this difference is now also introduced in UL 508E. For Type 1 coordination shall the fuse protect against injury and equipment damage, but the starter may have to be replaced. For Type 2 coordination no damage is allowed on the starter, light contact welding is allowed. In most cases, class CC/J/CF/RK1 provide sufficient current limiting to achieve Type 2 coordination. Eaton Bussmann Series have performed coordination tests, to verify Type 2 coordination compliance with several manufacturer's starters, including Eaton, General Electric, Rockwell Automation/Allen-Bradley, Schneider Electric/Square D and Siemens. Contact CHS Controls for fuse sizing.

Electronic starters

Adjustable frequency drives and softstarters may have special requirements on fuses, check with the manufacturer. High speed class J fuses may be an alternative, contact CHS Controls for more information.

Several motors using the same short circuit protective device

NEC 450.53 permits that several motors can be connected to the same short circuit protective device under certain conditions, contact CHS Controls for more information.

Fig 6. Eaton control power transformer with built-on fuseholders. The transformer is protected by Eaton Bussmann Series fuses, primary by class CC type FNQ-R, and secondary by Midget Type FNM. Protective cover for fuses and terminals are available as accessories.

Fuses for transformer protection - sizing

NEC Article 450 deals with transformers, including the sizing of over current protection. In practice, compliance with other parts of NEC is also required, such as NEC 240, conductor protection.

Three phase transformer protection

Max fuse size for 600 V three phase transformers and below are covered by NEC table 450.3(B). Normally time delay fuses class RK1/RK5/J are used.

Table 4, Three phase transformer protection NEC 450.3(B), % of full load current

Full load current, A	Max primary fuse	Max secondary fuse
Primary fuse only		
9 A or more	125% or next higher standard current rating	
2 - 9 A	167%	
< 2 A	300%	
Primary and secondary fuse		
9 A or more	250%	125% or next standard rating
< 9 A	250%	167%

Protection of single phase control power transformers
The transformer is normally protected by two primary fuses and one secondary fuse. Several control power transformer manufacturer provides them with installed fuse holders for class CC fuses on the primary side and Midget fuse on the secondary side, see Figure 6.

Smaller transformers have a very high inrush current, 25-40 times of the full load current. It is recommended that the primary fuses can withstand 40 times of the full load current during 0,01 s. For full load currents below 9 A, the secondary fuse is sized to max 167% of the full load current. For full load currents, 9 A and above, the secondary fuse is sized to max 125% of the full load current or to closets larger standard rating. Table 5 shows the recommended primary and secondary fuses the NEC 430.72 (C) and 450.3 (B).

Table 5, control power transformer protection

Power VA	Primary fuse, time delay Type FNQ-R, rated current, A 240 VAC	480 VAC	600 VAC	Sec. fuse, time delay Type FNM, current, A 24 VAC	120 VAC
Sizing according to NEC 430.72(C) - part of motor circuit					
50	1	0,5	0,4	2,5	0,5
100	2	1	0,8	5	1
150	3	1,5	1,25	7,5	1,5
200	4	2	1,6	10	2
Sizing according to NEC 450.3(B) - general					
50	0,5	0,25	0,25	3,2	0,6
100	1	0,5	0,4	6,25	1,25
200	2	1	0,75	12	2,5
500	5	2,5	2	40	10
750	7,5	3,5	3		10
1000	10	5	4		12
2000	20	10	8		25

Control power transformers that are part of a motor control circuit, the transformer is connected at the load side motor circuit short circuit protective device can be sized according to NEC 430.72(C). Main difference compared to NEC 450.3(B) is that the primary fuses that protect the transformers with full load current less than 2 A can be sized up to 500% of full load current. NEC 430.72(C) allows Supplementary Protection under certain conditions. We always recommend that fuses approved for Branch Circuit Protection are used.

If the transformer is connected at the load side of the main switch, fuses should be approved for Branch Circuit Protection, such as time delay class CC, and sized in accordance with NEC 450.3(B). The secondary fuse can however in most cases be of Supplementary Protection type. If the control power transformer is feeding a circuit external of the equipment, for example a receptacle, the secondary fuse must be approve for Branch Circuit Protection.

Fuses for capacitor protection - sizing
NEC Article 460 covers capacitors and requires that each capacitor shall be provided with individual overcurrent protection. NEC states that overcurrent protective device must be set as low as practicable. Normally time delay fuses class RK1/RK5/J/CC/CF are used and sized between 150-175% of the capacitor rated current.

For capacitors connected on the load side of a motor short circuit protective device, separate capacitor protection is not required but most often recommended, check with equipment manufacturer.

DC circuits
Compared to AC circuits, the absence of natural voltage zero in a DC circuit makes it more difficult for a fuse to interrupt the current at fault. It is especially notable in circuits with high time constant. Several fuse types are also approved for DC circuit protection, see technical data. Contact CHS Controls for application assistance.

Environmental factors
High ambient temperature, above 30°C, altitudes above 2000 m, cyclical loading, temporary overloads etc must be taken into consideration, contact CHS Controls for correction factors.

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