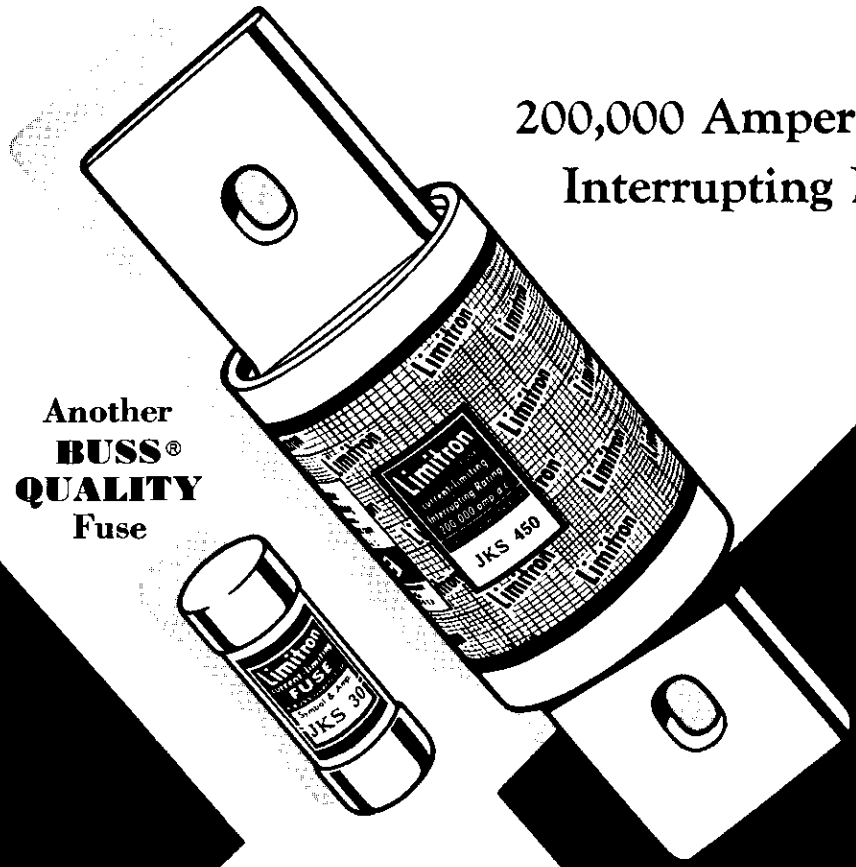


High Interrupting Capacity—Current Limiting

Give Safe Short-Circuit Protection for Circuits and Equipment on systems with available fault currents up to 200,000 amperes at 600 volts or less

Through the ever increasing demand for power and the resulting growth in generating and transmission capacity, serious hazards to personnel and equipment now exist on many electrical systems, by reason of prospective damage from the extremely high available fault currents. High short-circuit currents can generate terrific magnetic forces and heat, which may damage or demolish equipment or distribution facilities unless interrupted quickly.

LIMITRON quick-acting JKS fuses are current-limiting, developed to meet the need for over-current devices which can safely interrupt high fault currents and limit their effect, to protect the circuits and equipment served by such systems. Their design provides high interrupting capacity, plus extremely fast clearing which restricts let-thru current and energy to very low values. They have the Underwriters Laboratories Inc. interrupting rating of 200,000 amperes rms symmetrical, at rated voltages up to 600.

LIMITRON quick-acting JKS fuses are made in 0 to 600 ampere ratings to fit Und. Labs. Inc. Class J dimension fuseholders (where time delay fuses are desirable use HI-CAP® time-delay JHC fuses — see BUSS Bulletin JHCS).

Application

LIMITRON quick-acting JKS fuses are used as back-up short-circuit protection ahead of overload devices of lower interrupting capacity, such as overload relays and circuit breakers. In properly selected sizes, LIMITRON quick-acting JKS fuses are installed to handle interruption of all fault currents above a predetermined value, beyond the interrupting range of the overload devices. The greater clearing speed of JKS fuses restricts the let-thru current and energy of a fault to such a low value that damage by magnetic and thermal stress is prevented. This protection does not interfere in any way with the intended function of the overload devices — they handle the opening of overload currents which are within their rating.

LIMITRON quick-acting JKS fuses are used to protect installations where the construction of the circuit, or the character of the equipment served, may require the great clearing speed and current limitation of LIMITRON quick-acting fuses to prevent damage. The former would include cases where the cable run or bus structure of the circuit may be only moderately braced against the effect of magnetic stress, and let-thru current should thus be held to a minimum. The latter would apply to types of equipment especially susceptible to damage by fault currents. These require that fault currents be restricted to the lowest possible value by a relatively large fuse capable of carrying the total load.

High Interrupting Capacity

The high interrupting capacity of LIMITRON quick-acting JKS fuses is of vital importance in fault current protection of installations served by systems having available short-circuit current capacity up to 200,000 amperes. Such fault currents are far beyond the range of ordinary fuses and circuit breakers, and cannot be safely handled by them.

Ordinary fuses and circuit breakers can be used for the protection of secondary circuits of moderate capacity, but if called upon to open on a high magnitude fault beyond their interrupting rating, they can shatter or explode, demolishing the entire panel or service equipment.

Thus, the use of either ordinary fuses or circuit breakers beyond their interrupting rating and without back-up protection can result in damage requiring replacement of equipment and circuit conductors. The actual cost of reconstruction is often increased by the still higher expense resulting from down time due to the interruption of service.

LIMITRON quick-acting JKS fuses provide the needed back-up protection on such installations to insure safe interruption of high fault currents when installed in the proper size.

For motor circuits, motor controllers and motor control centers, use HI-CAP time-delay JHC fuses — see BUSS BULLETIN JHCS.

(Continued on next page)

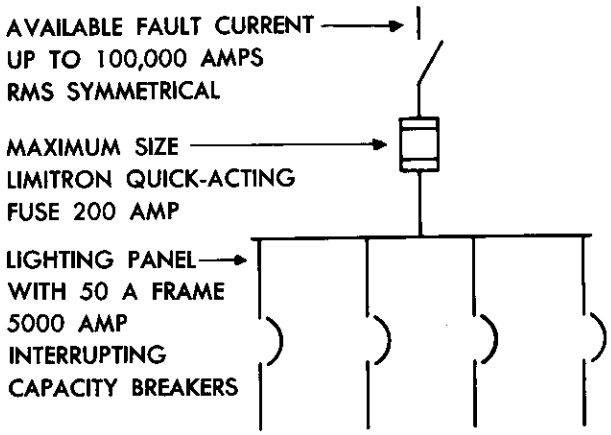
LIMITRON quick-acting Fuses or HI-CAP time-delay Fuses to use in Series with Circuit Breaker

Manufacturers have conducted tests to determine sizes of fuses to use in series with specific breakers, which will insure that the fuse will open on faults above the interrupting capacity of the breaker while limiting let-thru current to a value safe for the breaker, but allow the breaker to handle the interruption of over-currents within its rating.

Minimum Fuse Size — The lowest ampere rating that can be used with the circuit breaker to provide co-ordination. Sizes shown under Instantaneous Trip Lo or Instantaneous Trip Hi, are the lowest ratings that will co-ordinate with the breaker trip set in Lo and Hi positions respectively.

Maximum Fuse Size — The highest ampere rating that can be used with the circuit breaker that will limit the let-thru current to the breaker. Sizes shown under Load Side or Line Side, are the highest ratings that will provide current limitation when the fuses are mounted back of or ahead of the breaker. When fuses are installed on the load side, the breaker is subjected to transient voltages which may cause flashover during fuse operation — hence the fuse rating is lower on this type installation.

EXAMPLE



Fuses to Use

Load: 600 amps or less at 600 volts or less
LIMITRON quick-acting JKS fuses
or
HI-CAP JHC time-delay fuses, BUSS Bulletin JHCS

Load: 601 to 6000 amps at 600 volts or less
LIMITRON KTU fast-acting fuses, BUSS Bulletin HLS
or
HI-CAP KRP-C time-delay fuses, BUSS Bulletin HCS

Circuit Breaker — Fuse Combination

These tables show typical recommended sizes of LIMITRON quick-acting fuses to use in series with molded case breakers, for installations having available fault current up to 100,000 amperes rms symmetrical.

To use HI-CAP time-delay fuses 601 to 6000 amperes, se BUSS Bulletin HCS.

Circuit Breaker Ampere Rating	Minimum Fuse Size	Maximum Fuse Line Side
50 Amp Frame Lighting Breaker		**(5000A I.C.)**
15	50	200
20	50	200
30	100	200
40	100	200
50	100	200

Circuit Breaker Ampere Rating	Minimum Fuse Size	Maximum Fuse Load Side	Maximum Fuse Line Side
100 Amp Frame Breaker			**(7500 — 10,000A I.C.)**
15	70	200	300
20	100	200	300
30	100	200	300
40	100	200	300
50	100	200	300
70	200	200	300
90	200	200	300
100	200	200	300
100 Amp Frame Breaker			**(14,000 — 18,000A I.C.)**
15	70	200	300
20	70	200	300
30	100	200	300
40	100	200	300
50	200	300	300
70	200	300	400
90	200	300	400
100	200	300	400

Circuit Breaker Ampere Rating	Minimum Fuse Instan-taneous Trip Lo	Minimum Fuse Instan-taneous Trip Hi	Maximum Fuse Load Side	Maximum Fuse Line Side
225 Amp Frame Breaker				**(18,000 — 22,000A I.C.)**
70	200	400	600	1000
90	200	400	600	1000
100	300	400	600	1000
125	300	400	600	1000
150	300	400	600	1000
175	300	400	600	1000
200	300	600	600	1000
225	300	600	600	1000
400 Amp Frame Breaker				**(25,000 — 30,000A I.C.)**
125	300	400	800	1000
150	300	400	800	1000
175	300	400	800	1000
200	300	600	800	1200
225	300	600	800	1200
250	400	600	800	1200
300	400	600	800	1200
350	600	800	1000	1200
400	600	800	1000	1200
800 Amp Frame Breaker				**(35,000 — 45,000A I.C.)**
125	300	400	800	1000
150	300	400	800	1200
175	300	400	800	1200
200	300	600	800	1200
225	300	600	800	1200
250	400	600	800	1200
300	400	600	800	1200
350	600	800	800	1200
400	600	800	1200	1200
500	800	1200	1200	1600
600	800	1200	1200	1600
700	1000	1200	1600	1600
800	1000	1200	1600	1600

*For
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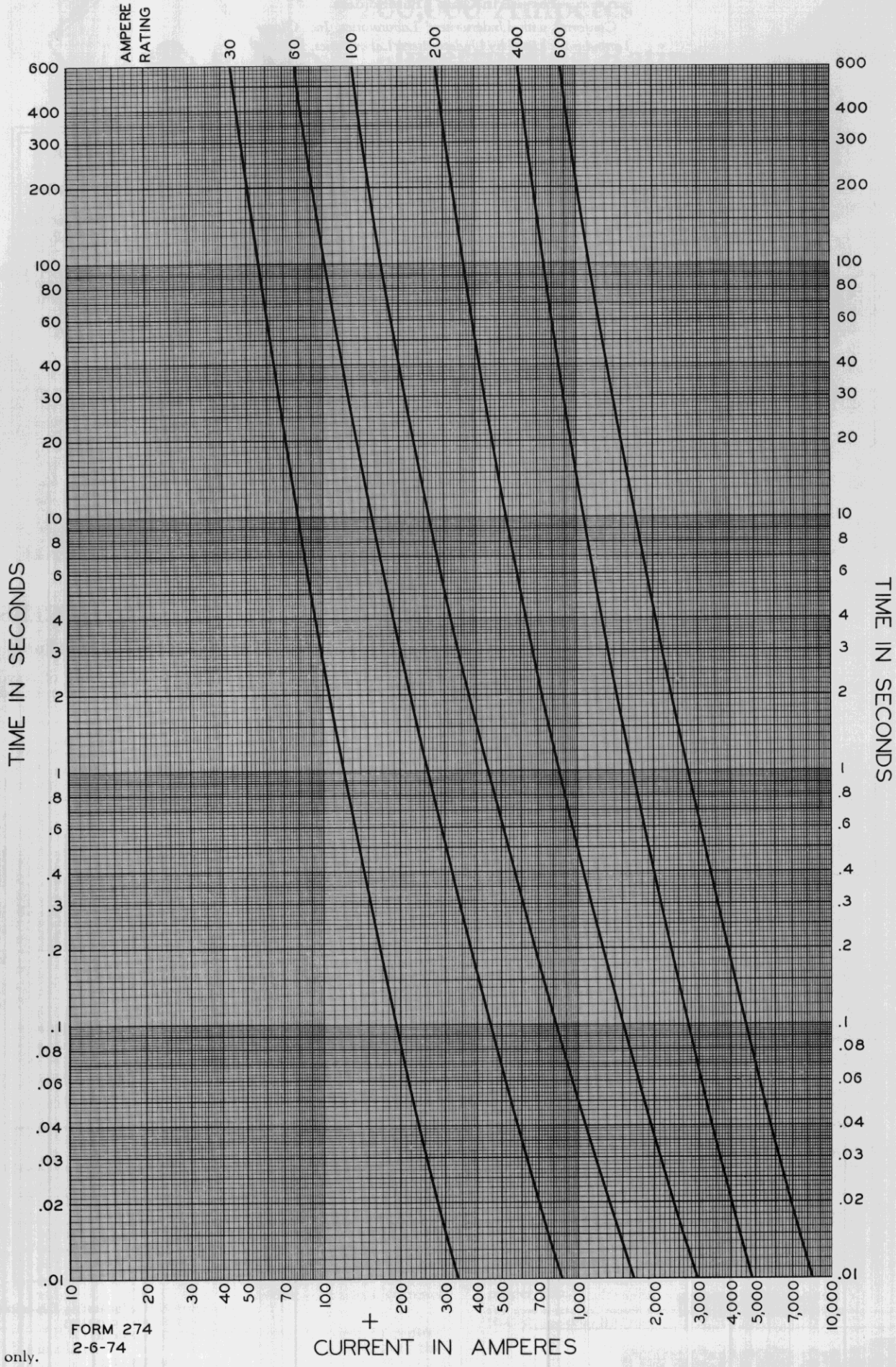
Average Melting Time-Current Characteristics *
JKS LIMITRON quick-acting Fuses—600 volts or less a-c
(Values are Approximate)



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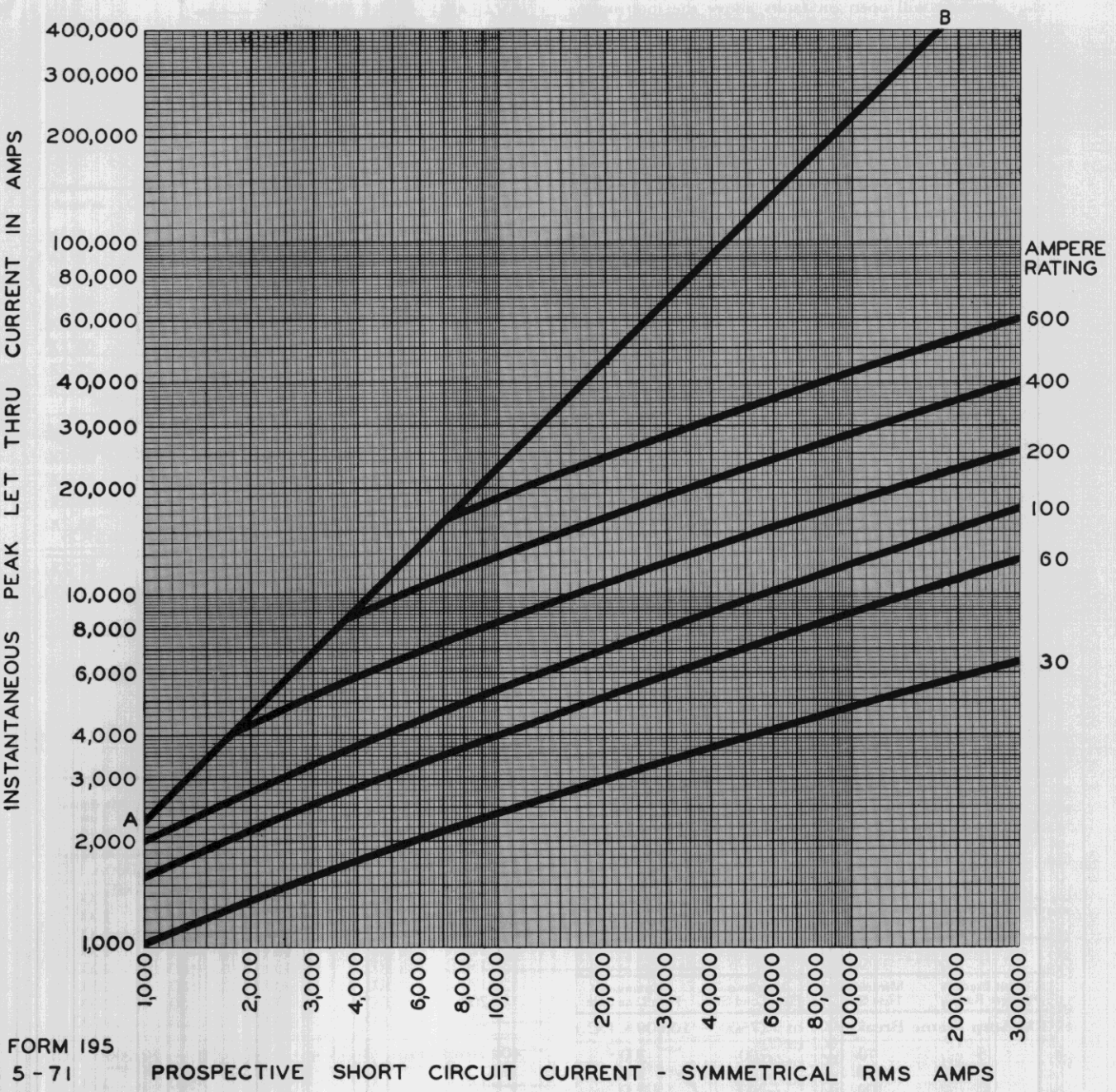
2-6-74

*For reference only.
Contact factory for latest information.

Current Limiting Effect of LIMITRON quick-acting JKS Fuses

600 volts or less a-c



FORM 195
5-71

Prospective current is the symmetrical component of short-circuit current that could flow if not limited by the opening of the fuse. The total value of prospective current consists of the short-circuit current determined from the circuit constants plus any current that motors acting as generators may be able to contribute to the fault.

Low voltage fuses have their interrupting rating expressed in terms of the symmetrical component of short-circuit current. In other words, they are given an rms symmetrical interrupting rating. This means that as long as the symmetrical component of current does not exceed the interrupting rating of the fuse, the fuse can interrupt any asymmetrical current that can accompany the symmetrical component of current even though the maximum theoretical value of the peak asymmetrical current is twice the peak value of the symmetrical current.

The line A-B on the chart shows the relationship of the instantaneous peak current to the prospective short-circuit current. Although the chart shows the prospective current in symmetrical amperes, the line A-B represents the instantaneous peak current of the maximum asymmetrical rms current that could be associated with the symmetrical current. This peak current would be attained if the circuit were not protected by a fuse.

The effect of a fuse in the circuit is to limit the instantaneous peak current to a value less than that represented by line A-B.

The curves below the A-B line show the amount of current which will be let through when fuses of the sizes shown are used.

To illustrate, the rms value of prospective short-circuit current calculated from circuit constants is 100,000 amperes symmetrical. Reading this value on line A-B it is found that the instantaneous peak value is 230,000 amperes. If a 400 ampere JKS LIMITRON quick-acting use is in the circuit, the peak let-thru current would be about 28,000 amperes — or little more than 10% of the current that would flow if the fuse were not protecting the circuit.

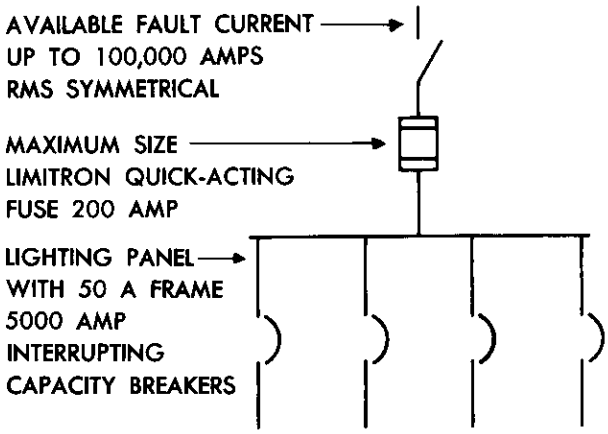
LIMITRON quick-acting Fuses or HI-CAP time-delay Fuses to use in Series with Circuit Breaker

Manufacturers have conducted tests to determine sizes of fuses to use in series with specific breakers, which will insure that the fuse will open on faults above the interrupting capacity of the breaker while limiting let-thru current to a value safe for the breaker, but allow the breaker to handle the interruption of over-currents within its rating.

Minimum Fuse Size — The lowest ampere rating that can be used with the circuit breaker to provide co-ordination. Sizes shown under Instantaneous Trip Lo or Instantaneous Trip Hi, are the lowest ratings that will co-ordinate with the breaker trip set in Lo and Hi positions respectively.

Maximum Fuse Size — The highest ampere rating that can be used with the circuit breaker that will limit the let-thru current to the breaker. Sizes shown under Load Side or Line Side, are the highest ratings that will provide current limitation when the fuses are mounted back of or ahead of the breaker. When fuses are installed on the load side, the breaker is subjected to transient voltages which may cause flashover during fuse operation – hence the fuse rating is lower on this type installation.

EXAMPLE



Fuses to Use

Load: 600 amps or less at 600 volts or less
LIMITRON quick-acting JKS fuses
or
HI-CAP JHC time-delay fuses, BUSS Bulletin JHCS

Load: 601 to 6000 amps at 600 volts or less
LIMITRON KTU fast-acting fuses, BUSS Bulletin HLS
or
HI-CAP KRP-C time-delay fuses, BUSS Bulletin HCS

Circuit Breaker — Fuse Combination

These tables show typical recommended sizes of LIMITRON quick-acting fuses to use in series with molded case breakers, for installations having available fault current up to 100,000 amperes rms symmetrical.

To use HI-CAP time-delay fuses 601 to 6000 amperes, se BUSS Bulletin HCS.

Circuit Breaker Ampere Rating	Minimum Fuse Size	Maximum Fuse Line Side
50 Amp Frame Lighting Breaker		**(5000A I.C.)**
15	50	200
20	50	200
30	100	200
40	100	200
50	100	200

Circuit Breaker Ampere Rating	Minimum Fuse Size	Maximum Fuse Load Side	Maximum Fuse Line Side
100 Amp Frame Breaker			**(7500 — 10,000A I.C.)**
15	70	200	300
20	100	200	300
30	100	200	300
40	100	200	300
50	100	200	300
70	200	200	300
90	200	200	300
100	200	200	300
100 Amp Frame Breaker			**(14,000 — 18,000A I.C.)**
15	70	200	300
20	70	200	300
30	100	200	300
40	100	200	300
50	200	300	300
70	200	300	400
90	200	300	400
100	200	300	400

Circuit Breaker Ampere Rating	Minimum Fuse Instan-taneous Trip Lo	Minimum Fuse Instan-taneous Trip Hi	Maximum Fuse Load Side	Maximum Fuse Line Side
225 Amp Frame Breaker				**(18,000 — 22,000A I.C.)**
70	200	400	600	1000
90	200	400	600	1000
100	300	400	600	1000
125	300	400	600	1000
150	300	400	600	1000
175	300	400	600	1000
200	300	600	600	1000
225	300	600	600	1000
400 Amp Frame Breaker				**(25,000 — 30,000A I.C.)**
125	300	400	800	1000
150	300	400	800	1000
175	300	400	800	1000
200	300	600	800	1200
225	300	600	800	1200
250	400	600	800	1200
300	400	600	800	1200
350	600	800	1000	1200
400	600	800	1000	1200
800 Amp Frame Breaker				**(35,000 — 45,000A I.C.)**
125	300	400	800	1000
150	300	400	800	1200
175	300	400	800	1200
200	300	600	800	1200
225	300	600	800	1200
250	400	600	800	1200
300	400	600	800	1200
350	600	800	800	1200
400	600	800	1200	1200
500	800	1200	1200	1600
600	800	1200	1200	1600
700	1000	1200	1600	1600
800	1000	1200	1600	1600

*For
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LIMITRON quick-acting JKS Fuses

For use in Class J Fuseholders

Conforms with Underwriters' Laboratories, Inc. Class J standards. Listed by Underwriters' Laboratories, Inc. to interrupt 200,000 rms symmetrical amperes at 600 volts or less.
Listed by Canadian Standards Association for HRC Form 1

Type JKS — 600 volts or less a-c

Symbol & Amperes	Carton Quantity	Lbs. per 100	Symbol & Amperes	Carton Quantity	Lbs. per 100
JKS 1			JKS 90		
JKS 3			JKS 100	1	28
JKS 6					
JKS 10	10	9½	JKS 110		
JKS 15			JKS 125		
JKS 20			JKS 150	1	86
JKS 25			JKS 175		
JKS 30			JKS 200		
JKS 35			JKS 225		
JKS 40			JKS 250		
JKS 45	10	11¾	JKS 300	1	178
JKS 50			JKS 350		
JKS 60			JKS 400		
JKS 70			JKS 450		
JKS 80	1	28	JKS 500	1	307
			JKS 600		

Application of LIMITRON quick-acting Class J Fuses

The high speed operating characteristics of LIMITRON quick-acting Class J fuses make them ideally suited to the protection of delicate instruments or circuits or equipment that must be protected from the stresses and thermal effect of heavy fault currents.

LIMITRON quick-acting fuses which are specified for the protection of motor circuits must be sized for branch circuit protection according to Table 430-152 of the National Electrical Code.

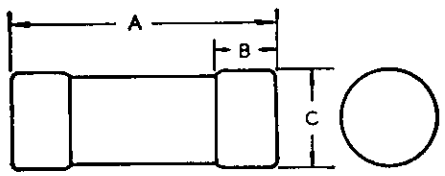
For Protection of Motor Branch Circuits use Hi-Cap Time Delay Class J Fuses

HI-CAP time-delay Fuses made to Class J dimensions have a time delay feature that makes it possible to use them to protect motor branch circuits or circuits where transformer magnetizing currents or other harmless transient currents occur.

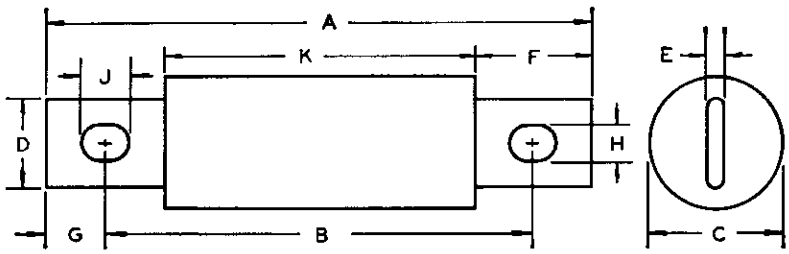
This means that HI-CAP time-delay Class J fuses can be used in sizes close to the normal load on the circuit. Thus safer protection is obtained without the annoyance and often considerable cost of needless shutdowns caused by fast acting fuses opening on harmless overloads.

For more information and current characteristic curves refer to BUSS Bulletin JHCS.

Dimensions of LIMITRON quick-acting JKS Fuses



Symbol	Ampere Rating	Dimensions in Inches A	B	C
JKS	0 to 30	2¼	½	13/16
	35 to 60	2⅜	⅝	1 1/16



Symbol	Ampere Rating	Dimensions in Inches A	B	C	D	E	F	G	H	J	K
JKS	65 to 100	4⅝	3⅝	1⅛	¾	⅛	1	½	9/32	⅜	2⅝
	110 to 200	5¾	4⅜	1½	1⅛	3/16	1⅜	11/16	9/32	⅜	3
	225 to 400	7⅛	5¼	2	1⅝	¼	1⅞	15/16	13/32	17/32	3⅜
	450 to 600	8	6	2½	2	⅜	2⅛	1	17/32	11/16	3¾

BUSS FUSE REDUCERS

For Class J Dimension Fuses

Make it possible to use fuses of a size smaller than the fuse clips are intended to hold. BUSS Reducers are very compact. They will fit into any panel or switch — even the dead front type where space is restricted. Each Reducer is designed so that once properly installed, strong contact pressure will always be maintained.

	No.	Lbs. per 100 pair
60 to 30 amp.	J63	3¾
100 to 30 "	J13	17¼
100 to 60 "	J16	18½
200 to 30 "	J23	32
200 to 60 "	J26	25½
200 to 100 "	J21	13½
400 to 100 "	J41	49
400 to 200 "	J42	27½
600 to 100 "	J61	79
600 to 200 "	J62	59½
600 to 400 "	J64	35½

All Reducers Packed One Pair In Carton — 10 Pairs In Shelf Package

McGRAW-EDISON

Bussmann

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