General

One of the more important considerations in planning medium-voltage industrial, commercial, and institutional power systems is the provision of protection for insulated cables. The primary concern in establishing such protection is that the conductor temperature rise under short-circuit conditions not exceed the maximum allowable temperature limits specified for the conductor insulation. This type of protection can be achieved by careful selection of the conductor size and material, as well as the types and characteristics of the upstream protective devices. There is no need for upstream protective devices to provide *overload* protection for medium-voltage cables, since the cable sizes should typically be selected to carry the maximum anticipated level of overload current on a continuous basis. The continuous current-carrying capability for various types and sizes of insulated cables can be determined by reference to the National Electrical Code or the cable manufacturer.

A reasonably good measure of the short-circuit protection provided the cable by an upstream protective device can be obtained using cable time-current curves similar to those published in the IEEE Buff Book† or those distributed by the cable manufacturer. Two such curves for copper and aluminum conductors are illustrated in Figures 1 and 2, respectively. To use these curves, one need only find the intersection of the upstream protective device total operating time and the appropriate available fault-current level. Any cable time-current curves lying above and to the right of this point will be protected by the upstream protective device.

The curves such as those in Figures 1 and 2 are accurate for power fuses having ampere ratings up through 300E. For power fuses rated higher than 300E amperes, the interrupting times may be somewhat longer, particularly at lower levels of fault current, with the result that conductor sizes slightly larger than those shown in Figures 1 and 2 will be required. This is not a problem since, for applications where such large power-fuse ampere ratings are used, the continuous and overload current-carrying requirement will of itself dictate the use of larger conductor sizes. Precise and complete data on the conductor sizes that can be protected by each ampere rating of S&C Power Fuses—Types SM, SML, SME, and SMD-20 for various fault-current levels and cable types are presented in Tables II through IX. Refer to Table I on page 4, which serves as an index for these tables.

Although, as explained above, the curves in Figures 1 and 2 are not entirely accurate, they are very useful in studying the effects that the total operating times of various overcurrent protective devices have on cable protection. For example, using aluminum conductors as shown in Figure 2, and assuming a location where the X/R ratio is 20 and where the available fault current is 25,000 amperes rms symmetrical, it is possible to determine the minimum conductor size that will be protected by power fuses and circuit breakers. Because of the extremely fast operating times of power fuses, the asymmetrical value of the fault current is employed when using the cable time-current curves. The asymmetrical fault-current value is 1.6 times the symmetrical fault-current value of 25,000 amperes, or 40,000 amperes. Because of the longer total operating time for a 5-cycle circuit breaker and associated instantaneous relay, the dc component of the total asymmetrical current will have decayed significantly by the time the current is interrupted. Accordingly, the *rms* value of the fault current over the duration of the fault should be used instead of the asymmetrical fault-current value. For the 5-cycle circuit breaker and relay, the rms value of the fault current is 1.23 times the symmetrical fault-current value of 25,000 amperes, or 30,750 amperes. As shown in Figure 2, with this value of fault current the 5-cycle circuit breaker and relay will only protect conductors 250 kc mil or larger. It is evident, therefore, that using circuit breakers with their longer total operating times may necessitate the use of larger conductors than would be permitted by power fuses—in this example, three sizes larger.

† IEEE Standard 242, Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems.

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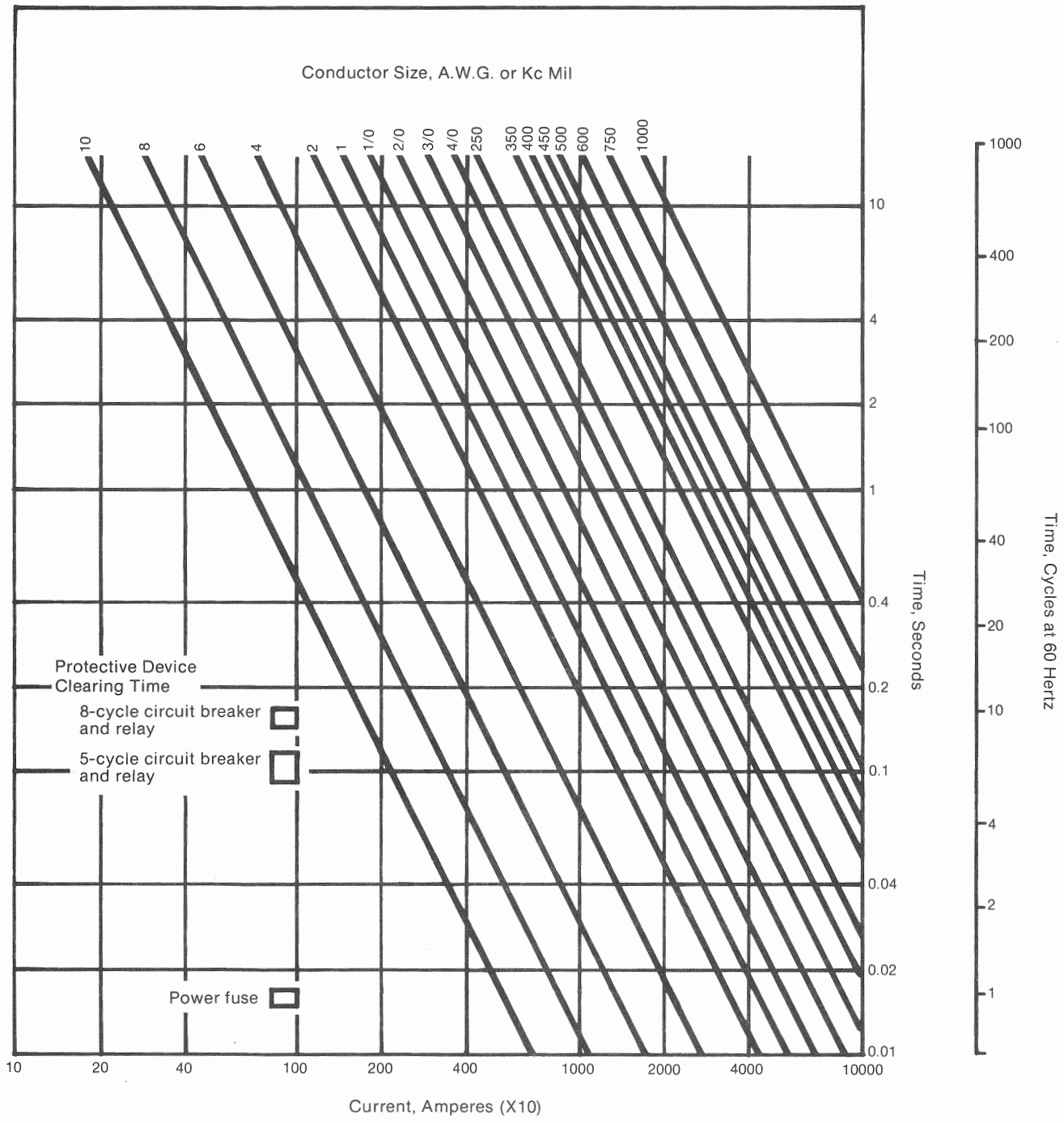

Figure 1. Maximum fault current for insulated copper conductors with initial temperature 75° C and final temperature 200° C.

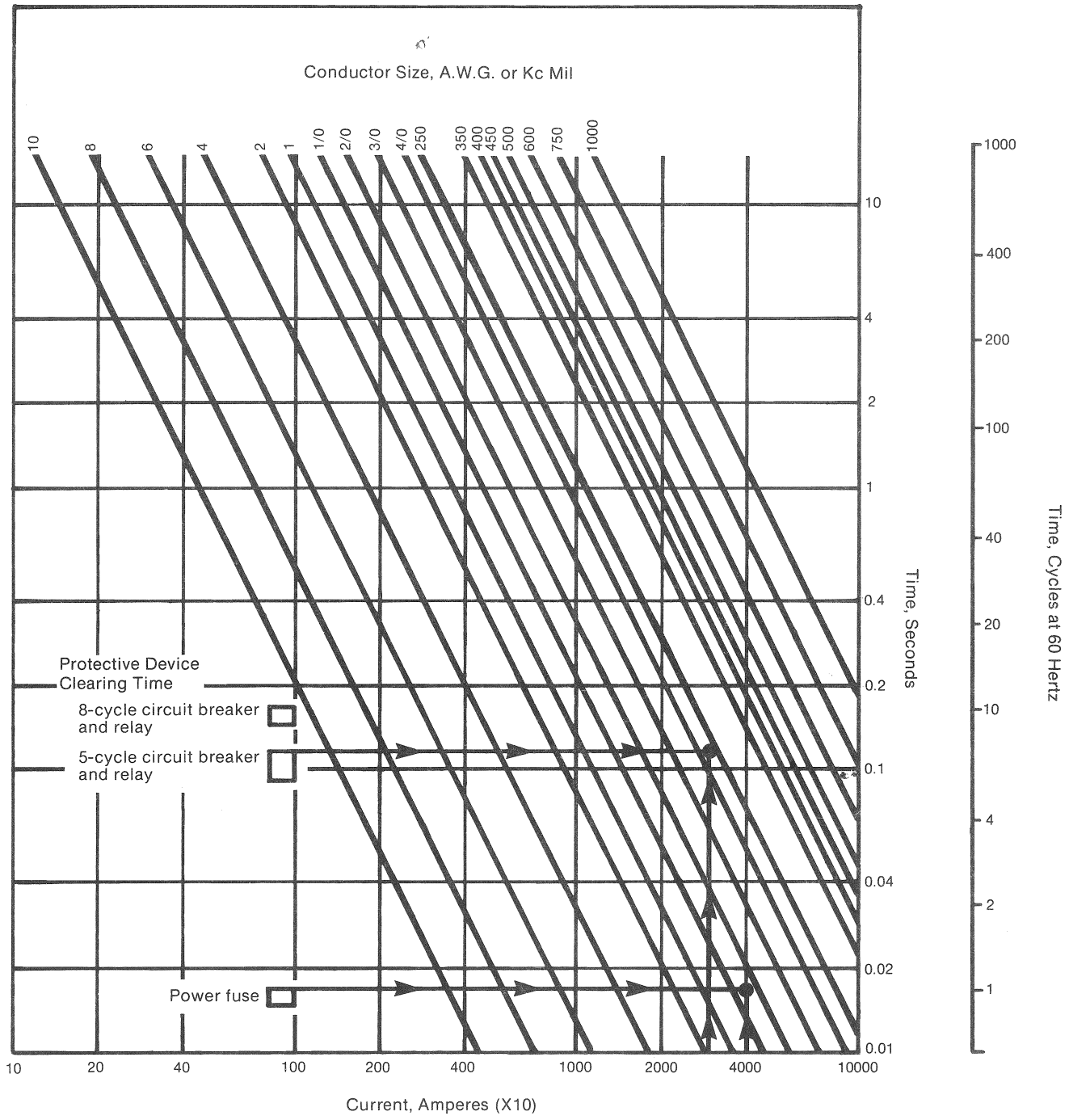

Figure 2. Maximum fault current for insulated aluminum conductors with initial temperature 75° C and final temperature 200° C.

Introduction to Tables II through IX

The tables presented in this publication list the conductor sizes that can be protected by each ampere rating of S&C Power Fuses—Types SM, SML, SME, and SMD-20. The tables were developed using time-current curves for cables with copper and aluminum conductors and with a variety of insulation materials, each with specific initial and final conductor temperature limits. Table I below, which serves as an index to the tables, lists the conductor material, the initial conductor temperature, the final conductor temperature, and the insulation material typically associated with these temperature limits. The insulation materials listed in Table I are not necessarily the only insulation materials applicable to the temperature limits shown; others may apply.

TABLE I—Index to Tables

Table Number	Conductor Material	Initial Temperature, °C	Final Temperature, °C	Insulation Material
II	Copper	75	150	Polyethylene
III	Aluminum	75	150	Polyethylene
IV	Copper	75	200	Rubber
V	Aluminum	75	200	Rubber
VI	Copper	90	200	Rubber
VII	Aluminum	90	200	Rubber
VIII	Copper	90	250	Cross-Linked Polyethylene
IX	Aluminum	90	250	Cross-Linked Polyethylene

The minimum conductor sizes listed in Tables II through IX were determined by comparing the total clearing time of each ampere rating of power fuse with the appropriate cable time-current curves at various assumed levels of fault current. As mentioned before, asymmetrical fault-current values (corresponding to an X/R ratio of 20) were used. For convenience, the tables list the assumed fault-current levels in both symmetrical and asymmetrical amperes.

How to Use Tables II through IX

Step 1. Locate the appropriate table based on the conductor material, initial conductor temperature, and final conductor temperature.

Step 2. Locate the appropriate power-fuse ampere rating and speed characteristic. Read across the table in this line, stopping in the first column containing an available fault-current level greater than that calculated for your particular application. The entry thus located is the minimum conductor size that will be protected by the power-fuse ampere rating and speed selected.

TABLE II—Insulated Copper Conductors, with Initial Temperature 75°C and Final Temperature 150°C

S&C Power Fuse ↓			Minimum Conductor Size Protected by Power Fuse, A.W.G. or Kc Mil									
Maximum Available Fault Current: Amperes Rms Symmetrical → (Amperes Rms Asymmetrical) →			5 000 (8 000)	7 500 (12 000)	10 000 (16 000)	12 500 (20 000)	15 000 (24 000)	20 000 (32 000)	25 000 (40 000)	30 000 (48 000)	35 000 (56 000)	40 000 (64 000)
Rating, Amperes	Time-Current Characteristics											
	Speed	TCC No.										
5E-13E	Std.	153	6	4	4	2	2	1	1/0	2/0	2/0	3/0
15E-65E	Std.	153	6	4	4	2	2	1	1/0	2/0	2/0	3/0
	Slow	119	6	4	4	2	2	1	1/0	2/0	2/0	3/0
80E	Std.	153	6	4	4	2	2	1	1/0	2/0	2/0	3/0
	Slow	119	6	4	4	2	2	1	1/0	2/0	2/0	3/0
100E	Std.	153	6	4	4	2	2	1	1/0	2/0	2/0	3/0
	Slow	119	6	4	4	2	2	1	1/0	2/0	2/0	3/0
125E	Std.	153	6	4	4	2	2	1	1/0	2/0	2/0	3/0
	Slow	119	6	4	2	2	2	1	1/0	2/0	2/0	3/0
150E	Std.	153	6	4	4	2	2	1	1/0	2/0	2/0	3/0
	Slow	119	4	4	2	2	2	1	1/0	2/0	2/0	3/0
175E	Std.	153	6	4	4	2	2	1	1/0	2/0	2/0	3/0
	Slow	119	4	4	2	2	2	1	1/0	2/0	2/0	3/0
200E	Std.	153	4	4	4	2	2	1	1/0	2/0	2/0	3/0
	Slow	119	4	4	2	2	2	1	1/0	2/0	2/0	3/0
250E	Std.	153	4	4	2	2	2	1	1/0	2/0	2/0	3/0
	Slow	119	4	2	2	2	1	1	1/0	2/0	2/0	3/0
300E	Std.	153	4	2	2	2	1	1	1/0	2/0	2/0	3/0
	Slow	119	2	2	2	2	1	1/0	1/0	2/0	2/0	3/0
400E	Std.	153	4	2	2	2	1	1	1/0	2/0	2/0	3/0
	Slow	119	2	2	2	1	1	1/0	2/0	2/0	2/0	3/0
410	Coord.	173	1/0	1/0	1/0	1/0	1/0	2/0	2/0	3/0	4/0	4/0
420	Coord.	173	3/0	3/0	3/0	3/0	3/0	3/0	3/0	4/0	4/0	4/0
2-250E	Std.	153	2	2	2	2	1	1/0	1/0	2/0	2/0	3/0
	Slow	119	1	1	1	1	1/0	1/0	2/0	3/0	4/0	4/0
2-300E	Std.	153	2	1	1	1	1/0	1/0	2/0	3/0	3/0	3/0
	Slow	119	1/0	1/0	1/0	1/0	1/0	2/0	2/0	3/0	4/0	4/0
2-400E	Std.	153	1	1	1	1/0	1/0	1/0	2/0	3/0	4/0	4/0
	Slow	119	2/0	2/0	2/0	2/0	2/0	2/0	3/0	3/0	4/0	4/0

TABLE III—Insulated Aluminum Conductors, with Initial Temperature 75° C and Final Temperature 150° C

S&C Power Fuse ↓			Minimum Conductor Size Protected by Power Fuse, A.W.G. or Kc Mil									
Maximum Available Fault Current: Amperes Rms Symmetrical → (Amperes Rms Asymmetrical) →			5 000 (8 000)	7 500 (12 000)	10 000 (16 000)	12 500 (20 000)	15 000 (24 000)	20 000 (32 000)	25 000 (40 000)	30 000 (48 000)	35 000 (56 000)	40 000 (64 000)
Rating, Amperes	Time-Current Characteristics											
	Speed	TCC No.										
5E-13E	Std.	153	4	2	2	1	1/0	2/0	3/0	4/0	4/0	250
15E-65E	Std.	153	4	2	2	1	1/0	2/0	3/0	4/0	4/0	250
	Slow	119	4	2	2	1	1/0	2/0	3/0	4/0	4/0	250
80E	Std.	153	4	2	2	1	1/0	2/0	3/0	4/0	4/0	250
	Slow	119	4	2	2	1	1/0	2/0	3/0	4/0	4/0	250
100E	Std.	153	4	2	2	1	1/0	2/0	3/0	4/0	4/0	250
	Slow	119	4	2	2	1	1/0	2/0	3/0	4/0	4/0	250
125E	Std.	153	4	2	1	1	1/0	2/0	3/0	4/0	4/0	250
	Slow	119	4	2	1	1	1/0	2/0	3/0	4/0	4/0	250
150E	Std.	153	4	2	1	1	1/0	2/0	3/0	4/0	4/0	250
	Slow	119	2	2	1	1	1/0	2/0	3/0	4/0	4/0	250
175E	Std.	153	4	2	1	1	1/0	2/0	3/0	4/0	4/0	250
	Slow	119	2	2	1	1	1/0	2/0	3/0	4/0	4/0	250
200E	Std.	153	2	2	1	1	1/0	2/0	3/0	4/0	4/0	250
	Slow	119	2	2	1	1/0	1/0	2/0	3/0	4/0	4/0	250
250E	Std.	153	2	2	1	1	1/0	2/0	3/0	4/0	4/0	250
	Slow	119	2	2	1	1/0	2/0	2/0	3/0	4/0	4/0	250
300E	Std.	153	2	2	1	1/0	2/0	2/0	3/0	4/0	4/0	250
	Slow	119	1	1	1/0	1/0	2/0	3/0	3/0	4/0	4/0	250
400E	Std.	153	2	2	1	1/0	2/0	2/0	3/0	4/0	4/0	250
	Slow	119	1/0	1/0	1/0	1/0	2/0	3/0	4/0	4/0	4/0	250
410	Coord.	173	3/0	3/0	3/0	3/0	3/0	4/0	4/0	250	350	350
420	Coord.	173	250	250	250	250	250	250	250	350	350	350
2-250E	Std.	153	1	1	1/0	1/0	2/0	3/0	3/0	4/0	4/0	250
	Slow	119	1/0	2/0	2/0	2/0	2/0	3/0	4/0	250	350	350
2-300E	Std.	153	1/0	1/0	1/0	2/0	2/0	3/0	4/0	250	250	250
	Slow	119	3/0	3/0	3/0	3/0	3/0	4/0	4/0	250	350	350
2-400E	Std.	153	2/0	2/0	2/0	2/0	3/0	4/0	4/0	250	350	350
	Slow	119	3/0	3/0	3/0	4/0	4/0	4/0	4/0	250	350	350

TABLE IV—Insulated Copper Conductors, with Initial Temperature 75°C and Final Temperature 200°C

S&C Power Fuse ↓			Minimum Conductor Size Protected by Power Fuse, A.W.G. or Kc Mil									
Maximum Available Fault Current: Amperes Rms Symmetrical → (Amperes Rms Asymmetrical) →			5 000 (8 000)	7 500 (12 000)	10 000 (16 000)	12 500 (20 000)	15 000 (24 000)	20 000 (32 000)	25 000 (40 000)	30 000 (48 000)	35 000 (56 000)	40 000 (64 000)
Rating, Amperes	Time-Current Characteristics											
	Speed	TCC No.										
5E-13E	Std.	153	8	6	4	4	2	2	1	1/0	2/0	2/0
15E-65E	Std.	153	8	6	4	4	2	2	1	1/0	2/0	2/0
	Slow	119	8	6	4	4	2	2	1	1/0	2/0	2/0
80E	Std.	153	8	6	4	4	2	2	1	1/0	2/0	2/0
	Slow	119	6	6	4	4	2	2	1	1/0	2/0	2/0
100E	Std.	153	8	6	4	4	2	2	1	1/0	2/0	2/0
	Slow	119	6	6	4	4	2	2	1	1/0	2/0	2/0
125E	Std.	153	6	6	4	4	2	2	1	1/0	2/0	2/0
	Slow	119	6	4	4	4	2	2	1	1/0	2/0	2/0
150E	Std.	153	6	4	4	4	2	2	1	1/0	2/0	2/0
	Slow	119	6	4	4	4	2	2	1	1/0	2/0	2/0
175E	Std.	153	6	4	4	4	2	2	1	1/0	2/0	2/0
	Slow	119	6	4	4	4	2	2	1	1/0	2/0	2/0
200E	Std.	153	6	4	4	4	2	2	1	1/0	2/0	2/0
	Slow	119	6	4	4	2	2	2	1	1/0	2/0	2/0
250E	Std.	153	6	4	4	4	2	2	1	1/0	2/0	2/0
	Slow	119	4	4	4	2	2	2	1	1/0	2/0	2/0
300E	Std.	153	4	4	4	2	2	2	1	1/0	2/0	2/0
	Slow	119	2	2	2	2	2	1	1	1/0	2/0	2/0
400E	Std.	153	4	4	4	2	2	2	1	1/0	2/0	2/0
	Slow	119	2	2	2	2	2	1	1	1/0	2/0	2/0
410	Coord.	173	1	1	1	1	1	1/0	1/0	2/0	3/0	3/0
420	Coord.	173	2/0	2/0	2/0	2/0	2/0	2/0	2/0	3/0	3/0	3/0
2-250E	Std.	153	4	2	2	2	2	1	1	1/0	2/0	2/0
	Slow	119	2	2	2	2	1	1	1/0	2/0	3/0	3/0
2-300E	Std.	153	2	2	2	2	1	1	1/0	2/0	2/0	2/0
	Slow	119	1	1	1	1	1	1	1/0	2/0	3/0	3/0
2-400E	Std.	153	2	2	2	2	1	1	1/0	2/0	3/0	3/0
	Slow	119	1/0	1/0	1/0	1/0	1/0	1/0	2/0	2/0	3/0	3/0

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TABLE V—Insulated Aluminum Conductors, with Initial Temperature 75°C and Final Temperature 200°C

S&C Power Fuse ↓			Minimum Conductor Size Protected by Power Fuse, A.W.G. or Kc Mil									
Maximum Available Fault Current: Amperes Rms Symmetrical → (Amperes Rms Asymmetrical) →			5 000 (8 000)	7 500 (12 000)	10 000 (16 000)	12 500 (20 000)	15 000 (24 000)	20 000 (32 000)	25 000 (40 000)	30 000 (48 000)	35 000 (56 000)	40 000 (64 000)
Rating, Amperes	Time-Current Characteristics											
	Speed	TCC No.										
5E-13E	Std.	153	6	4	2	2	1	1/0	2/0	3/0	3/0	4/0
15E-65E	Std.	153	6	4	2	2	1	1/0	2/0	3/0	3/0	4/0
	Slow	119	6	4	2	2	1	1/0	2/0	3/0	3/0	4/0
80E	Std.	153	6	4	2	2	1	1/0	2/0	3/0	3/0	4/0
	Slow	119	4	4	2	2	1	1/0	2/0	3/0	3/0	4/0
100E	Std.	153	6	4	2	2	1	1/0	2/0	3/0	3/0	4/0
	Slow	119	4	4	2	2	1	1/0	2/0	3/0	3/0	4/0
125E	Std.	153	4	4	2	2	1	1/0	2/0	3/0	3/0	4/0
	Slow	119	4	2	2	2	1	1/0	2/0	3/0	3/0	4/0
150E	Std.	153	4	2	2	2	1	1/0	2/0	3/0	3/0	4/0
	Slow	119	4	2	2	2	1	1/0	2/0	3/0	3/0	4/0
175E	Std.	153	4	2	2	2	1	1/0	2/0	3/0	3/0	4/0
	Slow	119	4	2	2	2	1	1/0	2/0	3/0	3/0	4/0
200E	Std.	153	4	2	2	2	1	1/0	2/0	3/0	3/0	4/0
	Slow	119	4	2	2	1	1	1/0	2/0	3/0	3/0	4/0
250E	Std.	153	4	2	2	2	1	1/0	2/0	3/0	3/0	4/0
	Slow	119	2	2	2	1	1/0	1/0	2/0	3/0	3/0	4/0
300E	Std.	153	4	2	2	1	1/0	1/0	2/0	3/0	3/0	4/0
	Slow	119	2	2	2	1	1/0	2/0	2/0	3/0	3/0	4/0
400E	Std.	153	2	2	2	1	1/0	1/0	2/0	3/0	3/0	4/0
	Slow	119	1	1	1	1	1/0	2/0	3/0	3/0	3/0	4/0
410	Coord.	173	2/0	2/0	2/0	2/0	2/0	3/0	3/0	4/0	4/0	250
420	Coord.	173	4/0	4/0	4/0	4/0	4/0	4/0	4/0	250	250	250
2-250E	Std.	153	2	2	1	1	1/0	2/0	2/0	3/0	3/0	4/0
	Slow	119	1	1/0	1/0	1/0	1/0	2/0	3/0	4/0	4/0	4/0
2-300E	Std.	153	1	1	1	1/0	1/0	2/0	3/0	4/0	4/0	4/0
	Slow	119	2/0	2/0	2/0	2/0	2/0	3/0	3/0	4/0	4/0	250
2-400E	Std.	153	1/0	1/0	1/0	1/0	2/0	3/0	3/0	4/0	4/0	250
	Slow	119	2/0	2/0	3/0	3/0	3/0	3/0	3/0	4/0	4/0	250

TABLE VI—Insulated Copper Conductors, with Initial Temperature 90°C and Final Temperature 200°C

S&C Power Fuse ↓			Minimum Conductor Size Protected by Power Fuse, A.W.G. or Kc Mil									
Maximum Available Fault Current: Amperes Rms Symmetrical → (Amperes Rms Asymmetrical) →			5 000 (8 000)	7 500 (12 000)	10 000 (16 000)	12 500 (20 000)	15 000 (24 000)	20 000 (32 000)	25 000 (40 000)	30 000 (48 000)	35 000 (56 000)	40 000 (64 000)
Rating, Amperes	Time-Current Characteristics											
	Speed	TCC No.										
5E-13E	Std.	153	8	6	4	4	2	1	1	1/0	2/0	3/0
15E-65E	Std.	153	8	6	4	4	2	1	1	1/0	2/0	3/0
	Slow	119	8	6	4	4	2	1	1	1/0	2/0	3/0
80E	Std.	153	8	6	4	4	2	1	1	1/0	2/0	3/0
	Slow	119	6	6	4	4	2	1	1	1/0	2/0	3/0
100E	Std.	153	8	6	4	4	2	1	1	1/0	2/0	3/0
	Slow	119	6	6	4	4	2	1	1	1/0	2/0	3/0
125E	Std.	153	6	6	4	4	2	1	1	1/0	2/0	3/0
	Slow	119	6	4	4	4	2	1	1	1/0	2/0	3/0
150E	Std.	153	6	4	4	4	2	1	1	1/0	2/0	3/0
	Slow	119	6	4	4	4	2	1	1	1/0	2/0	3/0
175E	Std.	153	6	4	4	4	2	1	1	1/0	2/0	3/0
	Slow	119	6	4	4	4	2	1	1	1/0	2/0	3/0
200E	Std.	153	6	4	4	4	2	1	1	1/0	2/0	3/0
	Slow	119	4	4	4	2	2	1	1	1/0	2/0	3/0
250E	Std.	153	6	4	4	4	2	1	1	1/0	2/0	3/0
	Slow	119	4	4	4	2	2	1	1	1/0	2/0	3/0
300E	Std.	153	4	4	2	2	2	1	1	1/0	2/0	3/0
	Slow	119	4	2	2	2	2	1	1	1/0	2/0	3/0
400E	Std.	153	4	4	2	2	2	1	1	1/0	2/0	3/0
	Slow	119	2	2	2	2	2	1	1/0	1/0	2/0	3/0
410	Coord.	173	1	1	1	1/0	1/0	1/0	2/0	2/0	3/0	4/0
420	Coord.	173	2/0	2/0	2/0	2/0	3/0	3/0	3/0	3/0	4/0	4/0
2-250E	Std.	153	2	2	2	2	2	1	1	1/0	2/0	3/0
	Slow	119	2	2	2	1	1	1	1/0	2/0	3/0	3/0
2-300E	Std.	153	2	2	2	1	1	1	1/0	2/0	2/0	3/0
	Slow	119	1	1	1	1	1	1/0	2/0	2/0	3/0	4/0
2-400E	Std.	153	1	1	1	1	1	1/0	1/0	2/0	3/0	4/0
	Slow	119	1/0	1/0	1/0	1/0	1/0	2/0	2/0	2/0	3/0	4/0

TABLE VII—Insulated Aluminum Conductors, with Initial Temperature 90° C and Final Temperature 200° C

S&C Power Fuse ↓			Minimum Conductor Size Protected by Power Fuse, A.W.G. or Kc Mil									
Maximum Available Fault Current: Amperes Rms Symmetrical → (Amperes Rms Asymmetrical) →			5 000 (8 000)	7 500 (12 000)	10 000 (16 000)	12 500 (20 000)	15 000 (24 000)	20 000 (32 000)	25 000 (40 000)	30 000 (48 000)	35 000 (56 000)	40 000 (64 000)
Rating, Amperes	Time-Current Characteristics											
	Speed	TCC No.										
5E-13E	Std.	153	6	4	2	2	1	1/0	2/0	3/0	4/0	4/0
15E-65E	Std.	153	6	4	2	2	1	1/0	2/0	3/0	4/0	4/0
	Slow	119	6	4	2	2	1	1/0	2/0	3/0	4/0	4/0
80E	Std.	153	6	4	2	2	1	1/0	2/0	3/0	4/0	4/0
	Slow	119	4	4	2	2	1	1/0	2/0	3/0	4/0	4/0
100E	Std.	153	6	4	2	2	1	1/0	2/0	3/0	4/0	4/0
	Slow	119	4	4	2	2	1	1/0	2/0	3/0	4/0	4/0
125E	Std.	153	4	4	2	2	1	1/0	2/0	3/0	4/0	4/0
	Slow	119	4	2	2	2	1	1/0	2/0	3/0	4/0	4/0
150E	Std.	153	4	2	2	2	1	1/0	2/0	3/0	4/0	4/0
	Slow	119	4	2	2	2	1	1/0	2/0	3/0	4/0	4/0
175E	Std.	153	4	2	2	2	1	1/0	2/0	3/0	4/0	4/0
	Slow	119	4	2	2	2	1	1/0	2/0	3/0	4/0	4/0
200E	Std.	153	4	2	2	2	1	1/0	2/0	3/0	4/0	4/0
	Slow	119	2	2	2	1	1	1/0	2/0	3/0	4/0	4/0
250E	Std.	153	4	2	2	2	1	1/0	2/0	3/0	4/0	4/0
	Slow	119	2	2	2	1	1/0	1/0	2/0	3/0	4/0	4/0
300E	Std.	153	2	2	2	1	1/0	1/0	2/0	3/0	4/0	4/0
	Slow	119	2	2	1	1	1/0	2/0	2/0	3/0	4/0	4/0
400E	Std.	153	2	2	2	1	1/0	1/0	2/0	3/0	4/0	4/0
	Slow	119	1	1	1	1/0	1/0	2/0	3/0	3/0	4/0	4/0
410	Coord.	173	2/0	2/0	2/0	3/0	3/0	3/0	3/0	4/0	250	350
420	Coord.	173	4/0	4/0	4/0	4/0	4/0	4/0	4/0	250	350	350
2-250E	Std.	153	2	1	1	1	1/0	2/0	2/0	3/0	4/0	4/0
	Slow	119	1/0	1/0	1/0	1/0	2/0	2/0	3/0	4/0	250	250
2-300E	Std.	153	1	1/0	1/0	1/0	2/0	2/0	3/0	4/0	4/0	4/0
	Slow	119	2/0	2/0	2/0	2/0	2/0	3/0	3/0	4/0	250	350
2-400E	Std.	153	1/0	1/0	1/0	2/0	2/0	2/0	3/0	4/0	250	350
	Slow	119	3/0	3/0	3/0	3/0	3/0	3/0	4/0	4/0	250	350

TABLE VIII—Insulated Copper Conductors, with Initial Temperature 90° C and Final Temperature 250° C

S&C Power Fuse ↓			Minimum Conductor Size Protected by Power Fuse, A.W.G. or Kc Mil									
Maximum Available Fault Current: Amperes Rms Symmetrical → (Amperes Rms Asymmetrical) →			5 000 (8 000)	7 500 (12 000)	10 000 (16 000)	12 500 (20 000)	15 000 (24 000)	20 000 (32 000)	25 000 (40 000)	30 000 (48 000)	35 000 (56 000)	40 000 (64 000)
Rating, Amperes	Time-Current Characteristics											
	Speed	TCC No.										
5E-13E	Std.	153	8	6	4	4	2	2	1	1/0	1/0	2/0
15E-65E	Std.	153	8	6	4	4	2	2	1	1/0	1/0	2/0
	Slow	119	8	6	4	4	2	2	1	1/0	1/0	2/0
80E	Std.	153	8	6	4	4	2	2	1	1/0	1/0	2/0
	Slow	119	6	6	4	4	2	2	1	1/0	1/0	2/0
100E	Std.	153	8	6	4	4	2	2	1	1/0	1/0	2/0
	Slow	119	6	6	4	4	2	2	1	1/0	1/0	2/0
125E	Std.	153	6	6	4	4	2	2	1	1/0	1/0	2/0
	Slow	119	6	4	4	4	2	2	1	1/0	1/0	2/0
150E	Std.	153	6	4	4	4	2	2	1	1/0	1/0	2/0
	Slow	119	6	4	4	4	2	2	1	1/0	1/0	2/0
175E	Std.	153	6	4	4	4	2	2	1	1/0	1/0	2/0
	Slow	119	6	4	4	4	2	2	1	1/0	1/0	2/0
200E	Std.	153	6	4	4	4	2	2	1	1/0	1/0	2/0
	Slow	119	6	4	4	2	2	2	1	1/0	1/0	2/0
250E	Std.	153	6	4	4	4	2	2	1	1/0	1/0	2/0
	Slow	119	4	4	4	2	2	2	1	1/0	1/0	2/0
300E	Std.	153	6	4	4	2	2	1	1	1/0	1/0	2/0
	Slow	119	4	4	4	2	2	1	1	1/0	1/0	2/0
400E	Std.	153	4	4	4	2	2	1	1	1/0	1/0	2/0
	Slow	119	2	2	2	2	2	1	1/0	1/0	1/0	2/0
410	Coord.	173	1	1	1	1	1	1	1/0	1/0	2/0	3/0
420	Coord.	173	2/0	2/0	2/0	2/0	2/0	2/0	2/0	3/0	3/0	3/0
2-250E	Std.	153	4	4	4	2	2	1	1	1/0	1/0	2/0
	Slow	119	2	2	2	2	2	1	1/0	2/0	2/0	3/0
2-300E	Std.	153	2	2	2	2	2	1	1/0	2/0	2/0	2/0
	Slow	119	2	1	1	1	1	1	1/0	2/0	2/0	3/0
2-400E	Std.	153	2	2	2	1	1	1	1/0	2/0	2/0	3/0
	Slow	119	1	1	1	1/0	1/0	1/0	1/0	2/0	2/0	3/0

TABLE IX—Insulated Aluminum Conductors, with Initial Temperature 90° C and Final Temperature 250° C

S&C Power Fuse ↓			Minimum Conductor Size Protected by Power Fuse, A.W.G. or Kc Mil									
Maximum Available Fault Current: Amperes Rms Symmetrical → (Amperes Rms Asymmetrical) →			5 000 (8 000)	7 500 (12 000)	10 000 (16 000)	12 500 (20 000)	15 000 (24 000)	20 000 (32 000)	25 000 (40 000)	30 000 (48 000)	35 000 (56 000)	40 000 (64 000)
Rating, Amperes	Time-Current Characteristics											
	Speed	TCC No.										
5E-13E	Std.	153	6	4	2	2	2	1/0	2/0	2/0	3/0	4/0
15E-65E	Std.	153	6	4	2	2	2	1/0	2/0	2/0	3/0	4/0
	Slow	119	6	4	2	2	2	1/0	2/0	2/0	3/0	4/0
80E	Std.	153	6	4	2	2	2	1/0	2/0	2/0	3/0	4/0
	Slow	119	4	4	2	2	2	1/0	2/0	2/0	3/0	4/0
100E	Std.	153	6	4	2	2	2	1/0	2/0	2/0	3/0	4/0
	Slow	119	4	4	2	2	2	1/0	2/0	2/0	3/0	4/0
125E	Std.	153	4	4	2	2	2	1/0	2/0	2/0	3/0	4/0
	Slow	119	4	4	2	2	2	1/0	2/0	2/0	3/0	4/0
150E	Std.	153	4	4	2	2	2	1/0	2/0	2/0	3/0	4/0
	Slow	119	4	4	2	2	2	1/0	2/0	2/0	3/0	4/0
175E	Std.	153	4	4	2	2	2	1/0	2/0	2/0	3/0	4/0
	Slow	119	4	4	2	2	2	1/0	2/0	2/0	3/0	4/0
200E	Std.	153	4	4	2	2	2	1/0	2/0	2/0	3/0	4/0
	Slow	119	4	4	2	1	2	1/0	2/0	2/0	3/0	4/0
250E	Std.	153	4	4	2	2	2	1/0	2/0	2/0	3/0	4/0
	Slow	119	2	2	2	1	1/0	1/0	2/0	2/0	3/0	4/0
300E	Std.	153	4	2	2	1	1/0	1/0	2/0	2/0	3/0	4/0
	Slow	119	2	2	2	1	1/0	2/0	2/0	2/0	3/0	4/0
400E	Std.	153	2	2	2	1	1/0	1/0	2/0	2/0	3/0	4/0
	Slow	119	2	2	1	1	1/0	2/0	3/0	3/0	3/0	4/0
410	Coord.	173	2/0	2/0	2/0	2/0	2/0	2/0	3/0	3/0	4/0	250
420	Coord.	173	4/0	4/0	4/0	4/0	4/0	4/0	4/0	4/0	250	250
2-250E	Std.	153	2	2	2	1	1/0	2/0	2/0	2/0	3/0	4/0
	Slow	119	1	1	1/0	1/0	1/0	2/0	3/0	3/0	4/0	4/0
2-300E	Std.	153	1	1	1	1/0	1/0	2/0	3/0	3/0	3/0	4/0
	Slow	119	1/0	1/0	1/0	2/0	2/0	2/0	3/0	3/0	4/0	250
2-400E	Std.	153	1/0	1/0	1/0	1/0	2/0	2/0	3/0	3/0	4/0	250
	Slow	119	2/0	2/0	2/0	2/0	2/0	3/0	3/0	4/0	4/0	250

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