

# S&C Power Fuses Types SM, SML, and SMD-20

Indoor and Outdoor Distribution  
(4.16 kv through 34.5 kv)

Supplement to Selection Guide for S&C Transformer-Primary Fuses in Medium-Voltage Industrial, Commercial, and Institutional Power Systems: **Transformers with Medium-Voltage Secondaries Using Secondary-Side S&C Power Fuses**

## GENERAL

The selection tables presented in this data bulletin supplement the selection tables contained in S&C Data Bulletin 240-110, "Selection Guide for Transformer-Primary Fuses in Medium-Voltage Industrial, Commercial, and Institutional Power Systems." The tables presented herein are for use in selecting S&C Power Fuses—Types SM, SML, and SMD-20 when applied on the primary side of transformers with medium-voltage secondaries, using S&C Power Fuses—Types SM, SML, and SMD-20 on the secondary side. Before proceeding with the primary-fuse selection process, the user may wish to review the text portion of S&C Data Bulletin 240-110 under the heading, "Application Principles," beginning on page 5.

Since the secondary-side protective devices featured in this data bulletin differ from those covered in S&C Data Bulletin 240-110, some of the assumptions and conditions used in preparing these selection tables are different from those used in preparing the selection tables in S&C Data Bulletin 240-110. Accordingly, the basis for listings for these fuse selection tables is set forth below. This discussion is followed by instructions on how to use the fuse selection tables on page 3, followed by an example which illustrates the steps used in selecting a transformer-primary fuse on page 5.

## THE FUSE SELECTION TABLES

### Basis for Listings in the Fuse Selection Tables

The various decisions and assumptions used in developing the fuse selection tables presented in this data bulletin are outlined in detail below. For easy access to this information, it is arranged in the following sections in the same order as it appears in the fuse selection tables.

**Transformer self-cooled ratings.** Table I on page 4 serves as an index to the fuse selection tables applicable to transformers having primary voltage ratings between 12.0 kv and 34.5 kv, with medium-voltage (2.4 kv, 4.16 kv, or 13.8 kv) secondaries. The transformer ratings in Table I are listed on a self-cooled basis. The fuse selection tables are applicable to all transformers with the listed ratings even if they are equipped with cooling fans, if they have increased temperature capability (e.g., 65°C temperature rise instead of 55°C temperature rise), or if they have both cooling fans *and* increased temperature capability.

The standard transformer impedances listed in Table I were used in preparing the fuse selection tables. Transformers with special impedances are not within the scope of this publication, and thus have not been considered. In the secondary-side fuse ampere rating columns, the Transformer Protection Index columns, and the loading capability columns, actual values may differ slightly from the listed values for different voltages where multiple voltages are involved. In each situation, the "worst-case" values are shown in the fuse selection tables. That is, slightly larger or smaller secondary-side fuse ampere

ratings, Transformer Protection Indexes, and loading capability values could apply. The advantages represented by these small differences are so slight that they can be ignored.

**Prefault load.** The minimum melting time-current characteristic curves for medium-voltage power fuses are determined in accordance with ANSI Standards,<sup>†</sup> which specify testing of fuses at an ambient temperature of 25°C, and with no initial load. In practice, every fuse is carrying some load which, in addition to ambient temperatures in excess of 25°C, raises the temperature of the fusible element, and hence reduces the melting time for a given value of current. This is of importance in determining coordination between the transformer-primary fuse and the S&C medium-voltage secondary-side fuse as well as in calculating the hot-load pickup capability of the primary fuse.

For the purpose of the fuse selection tables, a prefault load was assumed for the transformer-primary fuse based solely on the fusing ratio (the ratio of the primary fuse ampere rating to the transformer full-load current). Specifically, for a fusing ratio less than 1.0, the transformer is assumed to be loaded to 80% of its full-load current. For a fusing ratio between 1.0 and 2.0 inclusive, the transformer is assumed to be loaded to 100% of its full-load current. Finally, for a fusing ratio greater than 2.0, the transformer is assumed to be loaded to 133% of its full-load current.

<sup>†</sup> ANSI Standard C37.46, Specifications for Power Fuses and Fuse Disconnecting Switches.



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**Coordination with S&C medium-voltage secondary-side fuses.** Coordination between the transformer-primary fuse and the S&C medium-voltage secondary-side fuse involves comparing the minimum melting time-current characteristic curve of the primary fuse (adjusted to reflect the assumed prefault load as described on page 1) with the total clearing time-current characteristic curve of the secondary-side fuse.

The maximum three-phase secondary fault-current level used in determining coordination between the transformer-primary fuse and the S&C medium-voltage secondary-side fuse is based on consideration of the source impedance, as well as the more dominant transformer impedance. For the purpose of the fuse selection tables, the source impedance is based on the following levels of available fault current: 34,600 amperes rms symmetrical at 12.0 kv or 12.47 kv, and 13.2 kv or 13.8 kv; 20,000 amperes rms symmetrical at 22.9 kv or 24.9 kv; and 17,500 amperes rms symmetrical at 33.0 kv or 34.5 kv. Additional fault-current contribution by motors or other secondary-side devices has not been considered, thus assuring that coordination between the transformer-primary fuse and the secondary-side fuse will be realized under all circumstances.

The values listed in the fuse selection tables for S&C medium-voltage secondary-side fuses, in the column corresponding to the delta grounded-wye connected transformer, reflect the use of a 15% current margin between the minimum melting time-current characteristic curve of the transformer-primary fuse (adjusted to reflect the assumed prefault load as described on page 1) and the total clearing time-current characteristic curve of the secondary-side fuse, to compensate for the line-current differential resulting from a phase-to-phase secondary fault not involving ground. For a complete discussion of the 15% current margin, refer to S&C Data Bulletin 240-110, pages 20 through 25.

**The Transformer Protection Index.** The Transformer Protection Index is provided in the fuse selection tables to allow you to evaluate the degree of transformer protection provided by the transformer-primary fuse ampere rating selected. As explained in the section entitled, "Protect Transformer Against Damaging Overcurrents . . ." beginning on page 9 of S&C Data Bulletin 240-110, there are two objectives that must be achieved in order to obtain a comprehensive level of protection for the transformer. First, the total clearing time-current characteristic curve of the primary fuse should pass below and to the left of the ANSI Point of the appropriate transformer short-time characteristic curve, and

second, the point at which the two curves intersect should be at as low a multiple of the transformer primary full-load current as possible. The Transformer Protection Index indicates how well these two objectives are achieved. The presence of an index indicates that the first objective was achieved, whereas the absence of an index signifies that the primary fuse does not provide protection for the transformer, since the total clearing time-current curve of the primary fuse passes above and to the right of the ANSI Point. Accordingly, a smaller primary-fuse ampere rating should be selected. The indexes indicate the percentage of the transformer primary full-load current down to which the primary fuse will operate to protect the transformer in accordance with the transformer short-time characteristic curve.

The indexes are listed in the fuse selection tables for commonly used transformer connections. For delta grounded-wye connected transformers, the indexes are based on a phase-to-ground secondary fault, which is the most demanding type of fault for this transformer connection from a protection standpoint. For delta delta connected transformers, the indexes are based on a phase-to-phase secondary fault, which is the most demanding type of fault for this transformer connection from a protection standpoint. Similarly, for grounded-wye grounded-wye connected transformers, and for delta wye connected transformers with the neutral grounded through an impedance, the indexes should be based on a three-phase secondary fault. However, since the indexes for these transformer connections (based on a three-phase secondary fault) are only slightly smaller (better) than the indexes determined for delta delta connected transformers, for simplicity, indexes for the delta delta connected transformer have been listed in the fuse selection tables.

**Loading capability.** In general, loading capability refers to the amount of load the transformer-primary fuse can pick up (even after a momentary loss of source voltage) without operating, and carry on a continuous basis. The values listed in the fuse selection tables were determined to be the *minimum* of continuous peak-load, hot-load, and cold-load pickup capabilities for each fuse ampere rating. These three capabilities are discussed below:

1. **Continuous peak-load capability . . .** ability of the transformer-primary fuse to carry on a continuous basis, daily or repetitive peak loads regardless of duration. Continuous peak-load values for S&C Type



SM, SML, and SMD-20 Power Fuses can be determined by referring to S&C Data Bulletin 240-190.

2. **Hot-load pickup capability** . . . ability of the transformer-primary fuse that is carrying load, to withstand the combined magnetizing- and load-inrush currents associated with the re-energizing of the transformer following a momentary loss of source voltage. Specifically, hot-load pickup capability is the maximum transformer load current which, when used as the pre-outage load current in adjusting the minimum melting time-current characteristic curve of the primary fuse, results in a fuse curve that passes above and to the right of the point representing the magnitude and duration of the combined magnetizing- and load-inrush currents.
3. **Cold-load pickup capability** . . . ability of the transformer-primary fuse to withstand the combined magnetizing- and load-inrush currents associated with the re-energizing of the transformer following an extended outage (30 minutes or more). Cold-load pickup capability is typically associated with utility distribution transformer loading practices, where the transformers are often sized for the average peak load rather than the maximum expected peak load, thereby exposing the transformers to overcurrent of up to 30 minutes duration following re-energization. In contrast, transformers applied in industrial, commercial, and institutional power systems (including those in high-rise apartment complexes) are usually sized to accommodate maximum peak-load conditions without being overloaded. For this reason, the combined magnetizing- and load-inrush current associated with the energizing of a transformer following an extended outage is no more severe than the inrush current encountered under hot-load pickup conditions—where the primary fuse is loaded to the peak-load capability listed in the fuse selection tables. As a consequence, cold-load pickup capability considerations impose no separate influence on the peak-load capability values listed in the tables.

**Ampere ratings.** For each transformer kva rating, the fuse selection tables list a choice of transformer-primary fuse ampere ratings in each of two speed characteristics: S&C Standard Speed, TCC No. 153; and S&C Slow Speed, TCC No. 119. The lowest primary-fuse ampere rating listed for each transformer kva rating and for each speed characteristic is the lowest practical ampere rating,

based on consideration of the anticipated transformer loading level, transformer magnetizing- and load-inrush currents, and coordination with downstream overcurrent protective devices. The highest primary-fuse ampere rating listed for each transformer kva rating and for each speed characteristic is the highest ampere rating less than or equal to three times the transformer primary full-load current, and thus is within the upper limit specified by the National Electrical Code for transformers provided with secondary-side overcurrent protective devices.

**Elevated ambient temperature.** An ambient operating temperature not exceeding 45°C is considered to be typical for medium-voltage power fuse installations. The required adjustment (reduction) in melting time for an ambient temperature of 45°C would be very small—on the order of 2% in terms of time, or 1% in terms of current—and thus can be ignored.

### How to Use the Fuse Selection Tables

In using these tables, it is recommended that the transformer-primary fuse be coordinated with the largest feeder fuse, rather than the main secondary-side protective device (if any). This will provide superior protection for the transformer while maintaining the same degree of service continuity. Accordingly, you should follow the steps below as they apply to your largest feeder fuse. The example on page 5 illustrates the use of these steps in selecting a transformer-primary fuse.

**Step 1.** Locate the appropriate selection table. Refer to Table I on page 4.

**Step 2.** Enter the table in the “S&C Medium-Voltage Secondary-Side Fuse . . .” column corresponding to the appropriate transformer connection and secondary-side fuse time-current characteristic. Select the first line containing an entry equal to or larger than the largest feeder-fuse ampere rating.† For this purpose, a parallel-fuse combination (e.g., 2-250E) represents a larger ampere rating than any single fuse (e.g., 400E).

**Step 3.** In the line selected in Step 2, and in the “Transformer Protection Index . . .” column corresponding to the transformer connection, determine the Transformer

† Alternately, the main secondary-side fuse can be used in this step if it is deemed necessary for the transformer-primary fuse to coordinate with the main secondary-side fuse instead of the largest feeder fuse.



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Protection Index (TPI). Compare the TPI to the entries listed in Table II, at right, corresponding to the transformer connection and impedance. Entries greater than or equal to the TPI indicate the fault types for which transformer protection is provided in accordance with the transformer short-time characteristic curve. If there is no TPI entry in the line selected in the fuse selection table, or if protection is not provided for one or more of the fault types listed, you may wish to select a smaller primary fuse ampere rating by using a secondary-side fuse having a lower ampere rating or a different time-current characteristic.

**Step 4.** In the line selected in Step 3, and in the column headed "Loading Capability, Percent of Transformer Primary Full-Load Current," verify that the listed value is sufficient for your application. If not, read down the table in this column, stopping in the first line containing an adequate loading capability value. Verify that the entries in the "S&C Medium-Voltage Secondary-Side Fuse . . ." and the "Transformer Protection Index . . ." columns are still acceptable. If not, try the next line down in this column, or you may wish to consider reducing your loading requirement.

**Step 5.** The primary-fuse ampere rating and time-current characteristic shown in the line selected above are those recommended for your application.

**Step 6.** Verify that the primary fuse selected in Step 5 coordinates with the upstream protective device. Refer to S&C Data Bulletin 240-110, page 27.

TABLE II—Secondary Fault Currents<sup>①</sup>

Transformer Connection	Impedance	Maximum Primary-Side Line Current, for Various Types of Secondary Faults, Percent of Transformer Full-Load Current		
		φ-Grd	φ-φ	3φ
	4%	2500%	2180%	2500%
	5.5%	1820	1580	1820
	5.75%	1740	1510	1740
	6.5%	1540	1340	1540
	8%	1250	1090	1250
	4%	Not Applicable	2180	2500
	5.5%		1580	1820
	5.75%		1510	1740
	6.5%		1340	1540
	8%		1090	1250
	4%	1450	2500	2500
	5.5%	1050	1820	1820
	5.75%	1010	1740	1740
	6.5%	890	1540	1540
	8%	730	1250	1250

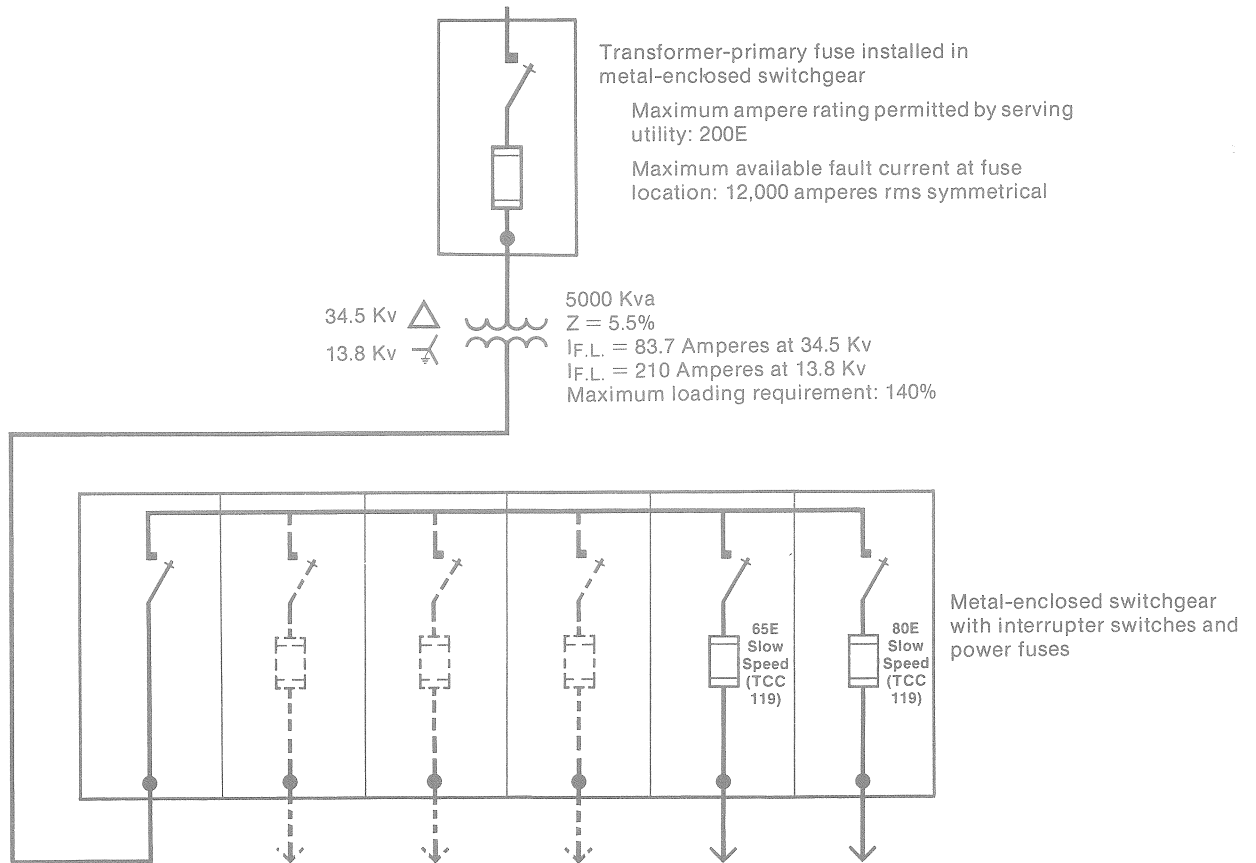
<sup>①</sup> Reflected to primary lines.

**Step 7.** To select the type of primary fuse (i.e., SM-4, SM-4Z, SM-5, SM-5S, SMD-20, SM-20, etc.), refer to Table VII on page 12. Based on the fuse location (i.e., indoor or outdoor), system voltage, interrupting duty, and maximum continuous current, note the power fuse types that can be used. Your local S&C Sales Office will help you make the most economical selection.

TABLE I—Index to Selection Tables for Transformers with S&C Medium-Voltage Secondary-Side Fuses

Kv	Transformer Rating (self cooled)		Table Number	Page Number
	Kva, Three Phase	Impedance		
12.0-12.47	2500	5.5% thru 6.5%	III	6
	3750	5.5% thru 6.5%		
	5000	5.5% thru 6.5%		
13.2-13.8	2500	5.5% thru 6.5%	IV	7
	3750	5.5% thru 6.5%		
	5000	5.5% thru 6.5%		
22.9-24.9	2500	5.5% thru 6.5%	V	8 and 9
	3750	5.5% thru 6.5%		
	5000	5.5% thru 6.5%		
	7500	5.5% thru 6.5%		
	10000	5.5% thru 6.5%		
33.0-34.5	2500	5.5% thru 7%	VI	10 and 11
	3750	5.5% thru 7%		
	5000	5.5% thru 7%		
	7500	5.5% thru 7%		
	10000	5.5% thru 7%		





**Step 1.** The index on page 4 lists Table VI as applying to transformers rated 34.5 kv three-phase, 5000 kva, 5.5% impedance, with S&C medium-voltage secondary-side fuses.

**Step 2.** The appropriate entry in the column corresponding to a delta grounded-wye connected transformer, in the rows applicable to the secondary voltage of 13.8 kv is 100E.

**Step 3.** The Transformer Protection Index (TPI) for the transformer in this example is 220%. A comparison of this value with the values listed in Table II indicates that the primary fuse associated with this TPI will protect the transformer in accordance with the transformer short-time characteristic curve against all types of secondary faults.

**Step 4.** The primary fuse has a loading capability of 125% of the transformer full-load current. Since this is

less than the required loading capability of 140%, the first higher value listed in this column, or 155%, should be selected. The primary fuse associated with this higher loading capability still coordinates with the 80E ampere secondary-side fuse, and the new TPI for the transformer in this example is 390%.

**Step 5.** A primary fuse rated 125E amperes, Standard Speed, TCC No. 153, is recommended.

**Step 6.** The recommended primary-fuse ampere rating (125E) complies with the serving utility's requirement that the fuse rating not exceed 200E amperes.

**Step 7.** From Table VII on page 12, an S&C Power Fuse—Type SM-5S is available in the voltage rating (34.5 kv nominal), maximum ampere rating (300E), and interrupting rating (17,500 amperes rms symmetrical), sufficient for the application in this example.







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TABLE III—Transformers Rated 12.0 Kv or 12.47 Kv Three-Phase—with Secondary-Side S&C Power Fuses

Transformer Data (Self Cooled)					S&C Medium-Voltage Secondary-Side Fuse— Upper Limit for Ampere Rating						S&C Primary Fuse						
Transformer Connection											Transformer Protection Index, Percent of Transformer Full-Load Current (see text, page 2)		Loading Capability, Percent of Transformer Primary Full-Load Current	Rating, Amperes	Time-Current Characteristic		
Secondary-Fuse Time-Current Characteristic:					Std. (153)	Slow (119)	Coord. (173)	Std. (153)	Slow (119)	Coord. (173)					Speed	TCC No.	
Kva, Three-Phase	Impedance	Secondary Voltage	Full-Load Current, Amperes														
Speed (TCC No.)			Primary	Secondary													
2500	5.5% thru 6.5%	2400	120.3 at 12.0 kv or 115.7 at 12.47 kv	600	400E	300E		400E	250E		190	190	95	100E	Slow	119	
					400E	300E		400E	250E		260	270		110	125E	Std.	153
					2-300E	400E		2-250E	400E		260	270		110	125E	Slow	119
					2-300E	400E		2-250E	300E		310	330		130	150E	Std.	153
					2-400E	2-250E		2-400E	2-250E		320	340		130	150E	Slow	119
					2-300E	400E		2-250E	400E		360	380		150	175E	Std.	153
					2-400E	2-300E	410	2-400E	2-250E		370	390		150	175E	Slow	119
					2-400E	2-250E	—	2-300E	400E		420	430		165	200E	Std.	153
					2-400E	2-400E	410	2-400E	2-300E	410	440	470		165	200E	Slow	119
					2-400E	2-300E	410	2-400E	2-250E	—	540	590		205	250E	Std.	153
					2-400E	2-400E	420	2-400E	2-400E	410	580	640		205	250E	Slow	119
					2-400E	2-400E	410	2-400E	2-400E	410	640	740		245	300E	Std.	153
2-400E	2-400E	420	2-400E	2-400E	420	760	—		245	300E	Slow	119					
2500	5.5% thru 6.5%	4160	120.3 at 12.0 kv or 115.7 at 12.47 kv	350	250E	175E		200E	150E		190	190	95	100E	Slow	119	
					250E	175E		200E	150E		260	270		110	125E	Std.	153
					300E	250E		300E	200E		260	270		110	125E	Slow	119
					300E	250E		300E	200E		310	330		130	150E	Std.	153
					2-250E	300E		400E	250E		320	340		130	150E	Slow	119
					400E	250E		300E	200E		360	380		150	175E	Std.	153
					2-250E	400E		2-250E	300E		370	390		150	175E	Slow	119
					400E	300E		400E	250E		420	430		165	200E	Std.	153
					2-300E	400E		2-250E	400E		440	470		165	200E	Slow	119
					2-250E	400E		2-250E	300E		540	590		205	250E	Std.	153
					2-400E	2-250E		2-300E	2-250E		580	640		205	250E	Slow	119
					2-400E	2-250E		2-300E	400E		640	740		245	300E	Std.	153
2-400E	2-300E	410	2-400E	2-300E	410	760	—		245	300E	Slow	119					
3750	5.5% thru 6.5%	4160	180.4 at 12.0 kv or 173.6 at 12.47 kv	520	300E	200E		250E	200E		240	240	100	175E	Std.	153	
					2-250E	300E		400E	300E		250	250		100	175E	Slow	119
					400E	250E		300E	200E		270	280		110	200E	Std.	153
					2-250E	400E		2-250E	300E		280	290		110	200E	Slow	119
					2-250E	400E		400E	300E		340	360		135	250E	Std.	153
					2-400E	2-250E		2-300E	2-250E		350	370		135	250E	Slow	119
					2-300E	2-250E		2-300E	400E		400	420		165	300E	Std.	153
					2-400E	2-300E	410	2-400E	2-300E	410	440	520		165	300E	Slow	119
					2-400E	2-300E	—	2-400E	2-250E		560	610		220	400E	Std.	153
					2-400E	2-400E	410	2-400E	2-400E	410	690	850		220	400E	Slow	119
					2-400E	2-300E	410	2-400E	2-300E	410	750	960♦		245	2-250E	Std.	153
					2-400E	2-400E	420	2-400E	2-400E	410	850	—		245	2-250E	Slow	119
2-400E	2-400E	410	2-400E	2-400E	410	910	—		295	2-300E	Std.	153					
5000	5.5% thru 6.5%	4160	240.6 at 12.0 kv or 231.5 at 12.47 kv	690	400E	300E		400E	250E		260	260	100	250E	Std.	153	
					2-400E	2-250E		2-300E	400E		260	270		100	250E	Slow	119
					2-300E	400E		2-250E	400E		310	320		125	300E	Std.	153
					2-400E	2-300E	410	2-400E	2-300E		310	340		125	300E	Slow	119
					2-400E	2-300E	—	2-400E	2-250E		420	440		165	400E	Std.	153
					2-400E	2-400E	410	2-400E	2-400E	410	470	540		165	400E	Slow	119
					2-400E	2-300E	410	2-400E	2-300E	410	550	590		185	2-250E	Std.	153
					2-400E	2-400E	420	2-400E	2-400E	410	560	740		185	2-250E	Slow	119
					2-400E	2-400E	410	2-400E	2-400E	410	670	750		220	2-300E	Std.	153
					2-400E	2-400E	420	2-400E	2-400E	420	800	—		220	2-300E	Slow	119
					2-400E	2-400E	420	2-400E	2-400E	420	920	—		295	2-400E	Std.	153
					2-400E	2-400E	420	2-400E	2-400E	420	1400♦	—		295	2-400E	Slow	119

① For delta grounded-wye connected transformers with the neutral grounded through an impedance, the values in the "delta delta" column apply.

♦ Applicable to transformers through 5.5% impedance.



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TABLE IV—Transformers Rated 13.2 Kv or 13.8 Kv Three-Phase—with Secondary-Side S&C Power Fuses

Transformer Data (Self Cooled)					S&C Medium-Voltage Secondary-Side Fuse— Upper Limit for Ampere Rating						S&C Primary Fuse					
Transformer Connection											Transformer Protection Index, Percent of Transformer Full-Load Current (see text, page 2)		Loading Capability, Percent of Transformer Primary Full-Load Current	Rating, Amperes	Time-Current Character- istic	
Secondary-Fuse Time-Current Characteristic:					Std. (153)	Slow (119)	Coord. (173)	Std. (153)	Slow (119)	Coord. (173)					Speed	TCC No.
Kva, Three- Phase	Impedance	Secondary Voltage	Full-Load Current, Amperes													
			Primary	Sec- ondary												
2500	5.5% thru 6.5%	2400	109.3 at 13.2 kv or 104.6 at 13.8 kv	600	2-250E	300E		400E	300E		210	210	105	100E	Slow	119
					2-250E	300E		400E	300E		290	290	125	125E	Std.	153
					2-300E	2-250E		2-300E	400E		290	300	125	125E	Slow	119
					2-300E	400E		2-300E	400E		350	370	140	150E	Std.	153
					2-400E	2-300E	410	2-400E	2-250E		350	390	140	150E	Slow	119
					2-400E	2-250E	—	2-300E	400E		410	430	165	175E	Std.	153
					2-400E	2-300E	410	2-400E	2-300E	410	410	440	165	175E	Slow	119
					2-400E	2-250E	—	2-400E	2-250E	—	470	500	180	200E	Std.	153
					2-400E	2-400E	410	2-400E	2-300E	410	480	560	180	200E	Slow	119
					2-400E	2-400E	410	2-400E	2-300E	410	600	660	225	250E	Std.	153
					2-400E	2-400E	420	2-400E	2-400E	410	630	880	225	250E	Slow	119
					2-400E	2-400E	410	2-400E	2-400E	410	720	960♦	270	300E	Std.	153
					2-400E	2-400E	420	2-400E	2-400E	420	930	—	270	300E	Slow	119
					2500	5.5% thru 6.5%	4160	109.3 at 13.2 kv or 104.6 at 13.8 kv	350	250E	200E		250E	175E		210
250E	200E		250E	175E							290	290	125	125E	Std.	153
400E	250E		300E	250E							290	300	125	125E	Slow	119
400E	250E		300E	200E							350	370	140	150E	Std.	153
2-250E	400E		2-250E	300E							350	390	140	150E	Slow	119
400E	300E		400E	250E							410	430	165	175E	Std.	153
2-300E	400E		2-250E	400E							410	440	165	175E	Slow	119
2-250E	300E		400E	250E							470	500	180	200E	Std.	153
2-300E	2-250E		2-300E	400E							480	560	180	200E	Slow	119
2-300E	400E		2-250E	400E							600	660	225	250E	Std.	153
2-400E	2-300E	410	2-400E	2-250E							630	880	225	250E	Slow	119
2-400E	2-250E	—	2-300E	2-250E							720	960♦	270	300E	Std.	153
2-400E	2-400E	410	2-400E	2-300E						410	930	—	270	300E	Slow	119
3750	5.5% thru 6.5%	4160	164.0 at 13.2 kv or 156.9 at 13.8 kv	520						300E	200E		250E	200E		230
					2-250E	300E		400E	300E		230	240	95	150E	Slow	119
					300E	250E		300E	200E		270	270	110	175E	Std.	153
					2-250E	400E		2-250E	300E		270	280	110	175E	Slow	119
					400E	250E		400E	250E		310	320	120	200E	Std.	153
					2-300E	400E		2-250E	400E		310	320	120	200E	Slow	119
					2-300E	400E		2-250E	300E		380	400	150	250E	Std.	153
					2-400E	2-300E		2-400E	2-250E		390	420	150	250E	Slow	119
					2-400E	2-250E		2-300E	2-250E		460	480	180	300E	Std.	153
					2-400E	2-400E	410	2-400E	2-300E	410	500	620	180	300E	Slow	119
					2-400E	2-300E	410	2-400E	2-250E	—	640	700	240	400E	Std.	153
					2-400E	2-400E	420	2-400E	2-400E	410	780	—	240	400E	Slow	119
					2-400E	2-400E	410	2-400E	2-300E	410	850	—	270	2-250E	Std.	153
					2-400E	2-400E	420	2-400E	2-400E	420	1020	—	270	2-250E	Slow	119
5000	5.5% thru 6.5%	4160	218.7 at 13.2 kv or 209.2 at 13.8 kv	690	2-300E	400E		2-250E	400E		230	230	90	200E	Slow	119
					2-250E	400E		2-250E	300E		280	290	110	250E	Std.	153
					2-400E	2-250E		2-300E	2-250E		290	300	110	250E	Slow	119
					2-400E	2-250E		2-300E	400E		350	350	135	300E	Std.	153
					2-400E	2-400E	410	2-400E	2-300E	410	350	390	135	300E	Slow	119
					2-400E	2-300E	410	2-400E	2-250E	—	470	500	180	400E	Std.	153
					2-400E	2-400E	420	2-400E	2-400E	410	520	630	180	400E	Slow	119
					2-400E	2-400E	410	2-400E	2-300E	410	610	680	205	2-250E	Std.	153
					2-400E	2-400E	420	2-400E	2-400E	420	620	900♦	205	2-250E	Slow	119
					2-400E	2-400E	420	2-400E	2-400E	410	750	940♦	245	2-300E	Std.	153
					2-400E	2-400E	420	2-400E	2-400E	420	930	—	245	2-300E	Slow	119

① For delta grounded-wye connected transformers with the neutral grounded through an impedance, the values in the "delta delta" column apply.

♦ Applicable to transformers through 5.5% impedance.





# S&C Power Fuses Types SM, SML, and SMD-20

Indoor and Outdoor Distribution  
(4.16 kv through 34.5 kv)

Supplement to Selection Guide for S&C Transformer-  
Primary Fuses in Medium-Voltage Industrial, Commercial, and  
Institutional Power Systems: **Transformers with Medium-  
Voltage Secondaries Using Secondary-Side S&C Power Fuses**

## THE FUSE SELECTION TABLES

TABLE V—Transformers Rated 22.9 Kv or 24.9 Kv Three-Phase—with Secondary-Side S&C Power Fuses

Transformer Data (Self Cooled)					S&C Medium-Voltage Secondary-Side Fuse— Upper Limit for Ampere Rating						S&C Primary Fuse										
Transformer Connection											Transformer Protection Index, Percent of Transformer Full-Load Current (see text, page 2)		Loading Capability, Percent of Transformer Primary Full-Load Current	Rating, Amperes	Time-Current Characteristic						
Secondary-Fuse Time-Current Characteristic: Speed (TCC No.)					Std. (153)	Slow (119)	Coord. (173)	Std. (153)	Slow (119)	Coord. (173)					Speed	TCC No.					
Kva, Three-Phase	Impedance	Secondary Voltage	Full-Load Current, Amperes																		
			Primary	Secondary																	
2500	5.5% thru 6.5%	2400	63.0 at 22.9 kv or 58.0 at 24.9 kv	600	400E	300E		400E	250E		190	190	105	50E	Slow	119					
					400E	250E		300E	250E		250	250		120	65E	Std.	153				
					2-250E	400E		2-250E	300E		250	250		140	65E	Slow	119				
					2-250E	400E		2-250E	300E		300	310		175	80E	Std.	153				
					2-400E	2-250E		2-300E	2-250E		310	330		175	80E	Slow	119				
					2-400E	2-250E		2-300E	400E		370	400		185	100E	Std.	153				
					2-400E	2-300E	410	2-400E	2-300E	410	400	420		185	100E	Slow	119				
					2-400E	2-300E	410	2-400E	2-300E	410	550	600		215	125E	Std.	153				
					2-400E	2-400E	420	2-400E	2-400E	410	560	730		215	125E	Slow	119				
					2-400E	2-400E	410	2-400E	2-400E	410	700	760		250	150E	Std.	153				
					2-400E	2-400E	420	2-400E	2-400E	420	720	—		250	150E	Slow	119				
					2-400E	2-400E	410	2-400E	2-400E	410	800	950♦		285	175E	Std.	153				
					2-400E	2-400E	420	2-400E	2-400E	420	880	—		285	175E	Slow	119				
					2500	5.5% thru 6.5%	4160	63.0 at 22.9 kv or 58.0 at 24.9 kv	350	250E	175E		200E	150E		190	190	105	50E	Slow	119
										250E	175E		250E	125E		250	250		120	65E	Std.
300E	200E		250E	200E							250	250		140	65E	Slow	119				
300E	200E		250E	200E							300	310		175	80E	Std.	153				
400E	300E		400E	250E							310	330		175	80E	Slow	119				
400E	300E		400E	250E							370	400		185	100E	Std.	153				
2-300E	400E		2-250E	300E							400	420		185	100E	Slow	119				
2-300E	400E		2-250E	300E							550	600		215	125E	Std.	153				
2-400E	2-250E		2-300E	2-250E							560	730		215	125E	Slow	119				
2-400E	2-250E		2-300E	400E							700	760		250	150E	Std.	153				
2-400E	2-300E	410	2-400E	2-300E							720	—		250	150E	Slow	119				
2-400E	2-250E	—	2-300E	2-250E							800	950♦		285	175E	Std.	153				
2-400E	2-400E	410	2-400E	2-300E						410	880	—		285	175E	Slow	119				
2500	5.5% thru 6.5%	13800	63.0 at 22.9 kv or 58.0 at 24.9 kv	100						65E	50E		50E	40E		190	190	105	50E	Slow	119
										65E	40E		50E	40E		250	250		120	65E	Std.
					80E	65E		80E	65E		250	250		140	65E	Slow	119				
					80E	65E		80E	65E		300	310		175	80E	Std.	153				
					125E	100E		100E	80E		310	330		175	80E	Slow	119				
					125E	80E		100E	80E		370	400		185	100E	Std.	153				
					175E	125E		150E	100E		400	420		185	100E	Slow	119				
					175E	125E		150E	100E		550	600		215	125E	Std.	153				
					250E	175E		200E	150E		560	730		215	125E	Slow	119				
					200E	150E		200E	125E		700	760		250	150E	Std.	153				
					300E	200E		250E	175E		720	—		250	150E	Slow	119				
					250E	175E		200E	125E		800	950♦		285	175E	Std.	153				
					300E	250E		250E	200E		880	—		285	175E	Slow	119				
					3750	5.5% thru 6.5%	4160	94.5 at 22.9 kv or 87.0 at 24.9 kv	520	400E	250E		300E	250E		210	210	110	80E	Slow	119
										400E	250E		300E	200E		250	250		120	100E	Std.
2-250E	400E		2-250E	300E							260	260		125	100E	Slow	119				
2-250E	400E		2-250E	300E							360	370		145	125E	Std.	153				
2-400E	2-250E		2-300E	400E							360	380		145	125E	Slow	119				
2-400E	2-250E		2-300E	400E							430	460		165	150E	Std.	153				
2-400E	2-300E	410	2-400E	2-250E							440	500		165	150E	Slow	119				
2-400E	2-250E	—	2-300E	2-250E							510	540		190	175E	Std.	153				
2-400E	2-400E	410	2-400E	2-300E						410	510	620		190	175E	Slow	119				
2-400E	2-250E	—	2-400E	2-250E						—	580	630		210	200E	Std.	153				
2-400E	2-400E	410	2-400E	2-400E						410	610	860		210	200E	Slow	119				
2-400E	2-400E	410	2-400E	2-300E						410	750	870		260	250E	Std.	153				
2-400E	2-400E	420	2-400E	2-400E						410	840	—		260	250E	Slow	119				

① For delta grounded-wye connected transformers with the neutral grounded through an impedance, the values in the "delta delta" column apply.

♦ Applicable to transformers through 5.5% impedance.





TABLE CONTINUED →





THE FUSE SELECTION TABLES

TABLE V—Transformers Rated 22.9 Kv or 24.9 Kv Three-Phase—with Secondary-Side S&C Power Fuses—Continued

Transformer Data (Self Cooled)					S&C Medium-Voltage Secondary-Side Fuse—Upper Limit for Ampere Rating						S&C Primary Fuse										
Transformer Connection											Transformer Protection Index, Percent of Transformer Full-Load Current (see text, page 2)		Loading Capability, Percent of Transformer Primary Full-Load Current	Rating, Amperes	Time-Current Characteristic						
Secondary-Fuse Time-Current Characteristic:					Std. (153)	Slow (119)	Coord. (173)	Std. (153)	Slow (119)	Coord. (173)					Speed	TCC No.					
Kva, Three-Phase	Impedance	Secondary Voltage	Full-Load Current, Amperes																		
			Primary	Secondary																	
3750	5.5% thru 6.5%	13800	94.5 at 22.9 kv or 87.0 at 24.9 kv	160	100E	80E		100E	65E		210	210	110	80E	Slow	119					
					100E	80E		80E	65E		250	250	120	100E	Std.	153					
					150E	100E		125E	100E		260	260	125	100E	Slow	119					
					150E	100E		125E	100E		360	370	145	125E	Std.	153					
					200E	150E		200E	125E		360	380	145	125E	Slow	119					
					200E	150E		200E	125E		430	460	165	150E	Std.	153					
					300E	200E		250E	175E		440	500	165	150E	Slow	119					
					250E	175E		200E	125E		510	540	190	175E	Std.	153					
					300E	200E		250E	200E		510	620	190	175E	Slow	119					
					250E	175E		200E	150E		580	630	210	200E	Std.	153					
					400E	250E		300E	200E		610	860	210	200E	Slow	119					
					300E	250E		250E	200E		750	870	260	250E	Std.	153					
					2-250E	300E		400E	250E		840	—	260	250E	Slow	119					
					5000	5.5% thru 6.5%	4160	126.1 at 22.9 kv or 115.9 at 24.9 kv	690	2-250E	300E		400E	250E		190	190	90	100E	Slow	119
										2-250E	300E		400E	300E		260	270	105	125E	Std.	153
										2-300E	2-250E		2-300E	400E		260	270	105	125E	Slow	119
2-300E	400E		2-250E	400E							320	340	125	150E	Std.	153					
2-400E	2-300E	410	2-400E	2-250E							320	340	125	150E	Slow	119					
2-400E	2-250E	—	2-300E	400E							370	390	140	175E	Std.	153					
2-400E	2-300E	410	2-400E	2-300E						410	370	390	140	175E	Slow	119					
2-400E	2-250E	—	2-400E	2-250E						—	420	450	155	200E	Std.	153					
2-400E	2-400E	410	2-400E	2-300E						410	430	480	155	200E	Slow	119					
2-400E	2-400E	410	2-400E	2-300E						410	540	590	195	250E	Std.	153					
2-400E	2-400E	420	2-400E	2-400E						410	560	740	195	250E	Slow	119					
2-400E	2-400E	420	2-400E	2-400E						410	660	750	235	300E	Std.	153					
2-400E	2-400E	420	2-400E	2-400E						420	800	—	235	300E	Slow	119					
5000	5.5% thru 6.5%	13800	126.1 at 22.9 kv or 115.9 at 24.9 kv	210						125E	100E		100E	80E		190	190	90	100E	Slow	119
										125E	100E		125E	80E		260	270	105	125E	Std.	153
										200E	125E		200E	125E		260	270	105	125E	Slow	119
					200E	125E		175E	100E		320	340	125	150E	Std.	153					
					250E	200E		250E	175E		320	340	125	150E	Slow	119					
					200E	150E		200E	125E		370	390	140	175E	Std.	153					
					300E	200E		250E	200E		370	390	140	175E	Slow	119					
					250E	175E		200E	150E		420	450	155	200E	Std.	153					
					400E	250E		300E	200E		430	480	155	200E	Slow	119					
					300E	200E		250E	200E		540	590	195	250E	Std.	153					
					2-250E	300E		400E	250E		560	740	195	250E	Slow	119					
					400E	250E		400E	250E		660	750	235	300E	Std.	153					
					2-300E	400E		2-250E	300E		800	—	235	300E	Slow	119					
					7500	5.5% thru 6.5%	13800	189.1 at 22.9 kv or 173.9 at 24.9 kv	310	250E	200E		250E	175E		240	250	95	175E	Slow	119
										200E	125E		175E	125E		280	280	105	200E	Std.	153
										300E	200E		250E	200E		280	280	105	200E	Slow	119
300E	200E		250E	175E							350	370	130	250E	Std.	153					
400E	300E		400E	250E							350	370	130	250E	Slow	119					
400E	250E		300E	250E							420	450	155	300E	Std.	153					
2-300E	400E		2-250E	300E							440	520	155	300E	Slow	119					
10000	5.5% thru 6.5%	13800	252.1 at 22.9 kv or 231.9 at 24.9 kv	420						250E	200E		250E	175E		260	260	95	250E	Std.	153
										400E	300E		400E	250E		260	270	95	250E	Slow	119
										400E	250E		300E	200E		310	320	115	300E	Std.	153
					2-250E	400E		2-250E	300E		310	340	115	300E	Slow	119					

① For delta grounded-wye connected transformers with the neutral grounded through an impedance, the values in the "delta delta" column apply.









# S&C Power Fuses Types SM, SML, and SMD-20

Indoor and Outdoor Distribution  
(4.16 kv through 34.5 kv)

Supplement to Selection Guide for S&C Transformer-  
Primary Fuses in Medium-Voltage Industrial, Commercial, and  
Institutional Power Systems: **Transformers with Medium-  
Voltage Secondaries Using Secondary-Side S&C Power Fuses**

## THE FUSE SELECTION TABLES

TABLE VI—Transformers Rated 33.0 Kv or 34.5 Kv Three-Phase—with Secondary-Side S&C Power Fuses

Transformer Data (Self Cooled)				S&C Medium-Voltage Secondary-Side Fuse— Upper Limit for Ampere Rating							S&C Primary Fuse					
Transformer Connection											Transformer Protection Index, Percent of Transformer Full-Load Current (see text, page 2)		Loading Capability, Percent of Transformer Primary Full-Load Current	Rating, Amperes	Time-Current Character- istic	
Secondary-Fuse Time-Current Characteristic: Speed (TCC No.)				Std. (153)	Slow (119)	Coord. (173)	Std. (153)	Slow (119)	Coord. (173)			Speed			TCC No.	
Kva, Three- Phase	Impedance	Secondary Voltage	Full-Load Current, Amperes							Primary	Sec- ondary					
2500	5.5% thru 7%	2400	43.7 at 33.0 kv or 41.8 at 34.5 kv	600	2-250E	300E		2-250E	300E		210	210	130	40E	Slow	119
					400E	300E		400E	250E		260	260	140	50E	Std.	153
					2-300E	2-250E		2-300E	400E		260	270	160	50E	Slow	119
					2-300E	2-250E		2-300E	400E		340	350	205	65E	Std.	153
					2-400E	2-300E	410	2-400E	2-250E		340	360	205	65E	Slow	119
					2-400E	2-300E	—	2-400E	2-250E		420	470	250	80E	Std.	153
					2-400E	2-400E	410	2-400E	2-400E	410	440	490	250	80E	Slow	119
					2-400E	2-400E	410	2-400E	2-300E	410	540	610	270	100E	Std.	153
					2-400E	2-400E	420	2-400E	2-400E	410	570	770	270	100E	Slow	119
					2-400E	2-400E	420	2-400E	2-400E	410	800	920▲	310	125E	Std.	153
					2-400E	2-400E	420	2-400E	2-400E	420	950	—	310	125E	Slow	119
					2500	5.5% thru 7%	4160	43.7 at 33.0 kv or 41.8 at 34.5 kv	350	300E	200E		250E	175E		210
250E	175E		200E	150E							260	260	140	50E	Std.	153
400E	250E		300E	250E							260	270	160	50E	Slow	119
400E	250E		300E	250E							340	350	205	65E	Std.	153
2-250E	300E		400E	300E							340	360	205	65E	Slow	119
2-250E	300E		400E	300E							420	470	250	80E	Std.	153
2-300E	400E		2-300E	400E							440	490	250	80E	Slow	119
2-300E	400E		250E	400E							540	610	270	100E	Std.	153
2-400E	2-250E		2-400E	2-250E							570	770	270	100E	Slow	119
2-400E	2-250E		2-400E	2-250E							800	920▲	310	125E	Std.	153
2-400E	2-400E	410	2-400E	2-300E						410	950	—	310	125E	Slow	119
2500	5.5% thru 7%	13800	43.7 at 33.0 kv or 41.8 at 34.5 kv	100						80E	65E		65E	50E		210
					65E	50E		65E	40E		260	260	140	50E	Std.	153
					100E	80E		100E	65E		260	270	160	50E	Slow	119
					100E	80E		100E	65E		340	350	205	65E	Std.	153
					150E	100E		125E	100E		340	360	205	65E	Slow	119
					125E	100E		125E	80E		420	470	250	80E	Std.	153
					200E	125E		175E	125E		440	490	250	80E	Slow	119
					200E	125E		175E	100E		540	610	270	100E	Std.	153
					250E	175E		200E	150E		570	770	270	100E	Slow	119
					250E	175E		200E	150E		800	920▲	310	125E	Std.	153
					300E	250E		300E	200E		950	—	310	125E	Slow	119
					3750	5.5% thru 7%	4160	65.6 at 33.0 kv or 62.8 at 34.5 kv	520	300E	250E		300E	200E		180
300E	250E		300E	200E							230	230	105	65E	Std.	153
2-250E	300E		400E	250E							230	230	135	65E	Slow	119
400E	300E		400E	250E							280	280	165	80E	Std.	153
2-300E	400E		2-250E	400E							280	300	165	80E	Slow	119
2-300E	400E		2-250E	400E							350	360	180	100E	Std.	153
2-400E	2-250E		2-400E	2-250E							360	380	180	100E	Slow	119
2-400E	2-250E		2-400E	2-250E							500	540	205	125E	Std.	153
2-400E	2-400E	410	2-400E	2-300E						410	510	630	205	125E	Slow	119
2-400E	2-300E	410	2-400E	2-300E						410	640	690	240	150E	Std.	153
2-400E	2-400E	410	2-400E	2-400E						410	660	—	240	150E	Slow	119
2-400E	2-400E	410	2-400E	2-300E						410	720	830	270	175E	Std.	153
2-400E	2-400E	420	2-400E	2-400E	410	780	—	270	175E	Slow	119					
3750	5.5% thru 7%	13800	65.6 at 33.0 kv or 62.8 at 34.5 kv	160	100E	65E		80E	65E		180	180	95	50E	Slow	119
					100E	65E		80E	65E		230	230	105	65E	Std.	153
					125E	100E		100E	80E		230	230	135	65E	Slow	119
					125E	100E		100E	80E		280	280	165	80E	Std.	153
					200E	125E		150E	100E		280	300	165	80E	Slow	119
					175E	125E		150E	100E		350	360	180	100E	Std.	153
					250E	175E		200E	150E		360	380	180	100E	Slow	119
					250E	175E		200E	150E		500	540	205	125E	Std.	153
					300E	250E		300E	200E		510	630	205	125E	Slow	119
					300E	200E		250E	200E		640	690	240	150E	Std.	153
					400E	250E		400E	250E		660	—	240	150E	Slow	119
					300E	250E		300E	200E		720	830	270	175E	Std.	153
2-250E	300E		400E	250E		780	—	270	175E	Slow	119					

Ⓛ For delta grounded-wye connected transformers with the neutral grounded through an impedance, the values in the "delta delta" column apply.  
▲ Applicable to transformers through 6% impedance.

TABLE CONTINUED →



# THE FUSE SELECTION TABLES

TABLE VI—Transformers Rated 33.0 Kv or 34.5 Kv Three-Phase—with Secondary-Side S&C Power Fuses—Continued

Transformer Data (Self Cooled)				S&C Medium-Voltage Secondary-Side Fuse— Upper Limit for Ampere Rating						S&C Primary Fuse											
Transformer Connection										Transformer Protection Index, Percent of Transformer Full-Load Current (see text, page 2)		Loading Capability, Percent of Transformer Primary Full-Load Current	Rating, Amperes	Time-Current Characteristic							
Secondary-Fuse Time-Current Characteristic: Speed (TCC No.)				Std. (153)	Slow (119)	Coord. (173)	Std. (153)	Slow (119)	Coord. (173)					Speed	TCC No.						
Kva, Three-Phase	Impedance	Secondary Voltage	Full-Load Current, Amperes																		
			Primary	Secondary																	
5000	5.5% thru 7%	4160	87.5 at 33.0 kv or 83.7 at 34.5 kv	690	2-300E	400E		2-250E	300E		210	220	125	80E	Slow	119					
					2-250E	400E		2-250E	300E		260	260		135	100E	Std.	153				
					2-400E	2-250E		2-300E	2-250E		260	280		135	100E	Slow	119				
					2-400E	2-250E		2-300E	2-250E		360	390		155	125E	Std.	153				
					2-400E	2-400E	410	2-400E	2-300E	410	370	390	155	125E	Slow	119					
					2-400E	2-300E	410	2-400E	2-300E	410	450	500	180	150E	Std.	153					
					2-400E	2-400E	410	2-400E	2-400E	410	460	530	180	150E	Slow	119					
					2-400E	2-400E	410	2-400E	2-300E	410	520	570	205	175E	Std.	153					
					2-400E	2-400E	420	2-400E	2-400E	410	530	680	205	175E	Slow	119					
					2-400E	2-400E	410	2-400E	2-300E	410	610	680	225	200E	Std.	153					
					2-400E	2-400E	420	2-400E	2-400E	420	630	960▲	225	200E	Slow	119					
					2-400E	2-400E	420	2-400E	2-400E	410	800	970▲	285	250E	Std.	153					
					2-400E	2-400E	420	2-400E	2-400E	420	900	—	285	250E	Slow	119					
					5000	5.5% thru 7%	13800	87.5 at 33.0 kv or 83.7 at 34.5 kv	210	175E	125E		125E	100E		210	220	125	80E	Slow	119
150E	100E		125E	100E							260	260		135	100E	Std.	153				
250E	175E		200E	125E							260	280		135	100E	Slow	119				
250E	175E		200E	125E							360	390		155	125E	Std.	153				
300E	200E		250E	200E							370	390		155	125E	Slow	119				
300E	200E		250E	175E							450	500		180	150E	Std.	153				
400E	250E		400E	250E							460	530		180	150E	Slow	119				
300E	200E		250E	200E							520	570		205	175E	Std.	153				
2-250E	300E		400E	250E							530	680		205	175E	Slow	119				
400E	250E		300E	200E							610	680		225	200E	Std.	153				
2-250E	300E		2-250E	300E							630	960▲		225	200E	Slow	119				
2-250E	300E		400E	250E							800	970▲		285	250E	Std.	153				
2-300E	2-250E		2-300E	400E							900	—		285	250E	Slow	119				
7500	5.5% thru 7%	13800	131.2 at 33.0 kv or 125.5 at 34.5 kv	310						200E	125E		175E	125E		240	240	100	125E	Std.	153
					300E	200E		250E	175E		240	250		100	125E	Slow	119				
					250E	200E		200E	150E		290	300		120	150E	Std.	153				
					400E	250E		300E	200E		300	310		120	150E	Slow	119				
					300E	200E		250E	175E		340	350		135	175E	Std.	153				
					400E	300E		400E	250E		350	360		135	175E	Slow	119				
					300E	250E		300E	200E		390	410		150	200E	Std.	153				
					2-250E	300E		400E	300E		390	420		150	200E	Slow	119				
					400E	300E		400E	250E		500	530		190	250E	Std.	153				
					2-300E	400E		2-250E	400E		500	610		190	250E	Slow	119				
					2-250E	400E		2-250E	300E		610	680		225	300E	Std.	153				
					2-400E	2-300E		2-400E	2-250E		680	—		225	300E	Slow	119				
					10000	5.5% thru 7%	13800	175.0 at 33.0 kv or 167.3 at 34.5 kv	420	250E	175E		200E	150E		250	260	100	175E	Std.	153
										400E	250E		300E	250E		260	260		100	175E	Slow
300E	200E		250E	200E							290	300		110	200E	Std.	153				
2-250E	300E		400E	250E							290	300		110	200E	Slow	119				
400E	300E		400E	250E							360	380		140	250E	Std.	153				
2-300E	400E		2-250E	400E							370	390		140	250E	Slow	119				
2-250E	400E		2-250E	300E							440	460		170	300E	Std.	153				
2-400E	2-250E		2-400E	2-250E							460	550		170	300E	Slow	119				

① For delta grounded-wye connected transformers with the neutral grounded through an impedance, the values in the "delta delta" column apply.

▲ Applicable to transformers through 6% impedance.



# S&C Power Fuses Types SM, SML, and SMD-20

Indoor and Outdoor Distribution  
(4.16 kv through 34.5 kv)

Supplement to Selection Guide for S&C Transformer-  
Primary Fuses in Medium-Voltage Industrial, Commercial, and  
Institutional Power Systems: **Transformers with Medium-  
Voltage Secondaries Using Secondary-Side S&C Power Fuses**

## THE FUSE SELECTION TABLES

TABLE VII—Primary Fuse Ratings (with SM Refill Units or SMU-20 Fuse Units)

Fuse Unit or Refill Unit Type		SM-4			SMU-20						SM-5								
Power Fuse Type	Indoor	SM-4Z and SML-4Z with Silencer			SM-20 and SML-20 with Silencer						SM-5S with Snuffler		SM-5SS with Super Snuffler						
	Outdoor	SM-4						SMD-20							SM-5				
Kv, Nominal		Amperes, Rms																	
Fuse	System	Max	Interrupting <sup>①</sup>		Max	Interrupting <sup>①</sup>		Max	Interrupting <sup>①</sup>		Max	Interrupting <sup>①</sup>		Max	Interrupting <sup>①</sup>		Max	Interrupting <sup>①</sup>	
			Sym.②	Asym.		Sym.②	Asym.		Sym.②	Asym.		Sym.②	Asym.		Sym.②	Asym.		Sym.②	Asym.
14.4 <sup>⊕</sup>	12	200E	12 500	20 000	200E	14 000	22 400	200E	14 000	22 400	720E●	25 000	40 000	400E	34 600	55 000	400E	34 600	55 000
	7.2/12.47Y	200E	12 500	20 000	200E	14 000	22 400	200E	14 000	22 400	720E●	25 000	40 000	400E	34 600	55 000	400E	34 600	55 000
	7.62/13.2Y	200E	12 500	20 000	200E	14 000	22 400	200E	14 000	22 400	720E●	25 000	40 000	400E	34 000	54 000	400E	34 000	54 000
	13.8	200E	12 500	20 000	200E	14 000	22 400	200E	14 000	22 400	720E●	25 000	40 000	400E	34 000	54 000	400E	34 000	54 000
25	7.2/12.47Y	200E	12 500	20 000	200E	12 500	20 000	200E	12 500	20 000	300E	20 000	32 000				300E	20 000	32 000
	7.62/13.2Y	200E	12 500	20 000	200E	12 500	20 000	200E	12 500	20 000	300E	20 000	32 000				300E	20 000	32 000
	13.8	200E	12 500	20 000	200E	12 500	20 000	200E	12 500	20 000	300E	20 000	32 000				300E	20 000	32 000
	23	200E	9 400	15 000	200E	12 500	20 000	200E	12 500	20 000	300E	20 000	32 000				300E	20 000	32 000
	14.4/24.9Y	200E	9 400	15 000	200E	12 500	20 000	200E	12 500	20 000	300E	20 000	32 000				300E	20 000	32 000
	14.4/24.9Y◆ 20/34.5Y§	200E	12 500	20 000				200E	12 500	20 000									
34.5†	23	200E	9 400	15 000	200E	8 450	13 500	200E	10 000	16 000	300E	17 500	28 000				300E	17 500	28 000
	14.4/24.9Y	200E	8 700	13 900	200E	8 450	13 500	200E	10 000	16 000	300E	17 500	28 000				300E	17 500	28 000
	20/34.5Y	200E	6 250	10 000	200E	8 450	13 500	200E	10 000	16 000	300E	17 500	28 000				300E	17 500	28 000
	34.5	200E	6 250	10 000	200E	8 450	13 500	200E	10 000	16 000	300E	17 500	28 000				300E	17 500	28 000

① 60-hertz ratings. For 50-hertz ratings, refer to the nearest S&C Sales Office.

② Symmetrical ratings assigned are based on available symmetrical short-circuit current at locations where the X/R ratio is 15. Higher symmetrical ratings have been determined for these fuses where X/R = 10 and X/R = 5. These higher ratings are set forth in the following S&C descriptive bulletins:

Power Fuse Type	Descriptive Bulletin No.
SM-4 SM-5	242-30
SMD-20	242-32
SM-4Z and SML-4Z SM-5S and SM-5SS SM-20 and SML-20	252-30

⊕ Interrupting ratings shown for SM-4Z, SML-4Z, SM-5S, and SM-5SS Power Fuses are applicable to 14.4-kv refill units installed in 14.4-kv holders for use in 13.8-kv mountings. Interrupting ratings shown for SM-20 and SML-20 Power Fuses are applicable to 14.4-kv fuse units installed in 13.8-kv mountings.

† SML-4Z and SML-20 Power Fuses are not available at 34.5 kv.

◆ Applicable to solidly-grounded-neutral system only with fuses connected by a single concentric-neutral cable (or directly coupled) to a transformer or transformers, each with a wye-grounded-neutral primary connection.

§ Applicable to 25-kv Overhead—Pole-Top Style only, for protection of single-phase-to-neutral circuits (lines or transformers) only.

● Parallel-fuse arrangements.

