Specifications

Conditions of Sale

STANDARD: The seller's standard conditions of sale set forth in Price Sheet 150 for sales in the United States (Price Sheet 153 for sales outside the United States) apply.

SPECIAL TO THIS PRODUCT:

INCLUSIONS: The VacuFuse II Self-Resetting Interrupter is ideally suited for protecting the primary and secondary side of single-phase overhead distribution transformers from 15 kVA to 167 kVA with primary voltages from 7.2 kV up to 9.0 kV (line-to-neutral voltage on 12.47- to 15.5-kV systems).

Two models of VacuFuse II interrupter are available, fault testing and non-fault testing. Both models protect single-phase overhead distribution transformers from faults. Fault-testing models, if the fault is temporary, will restore power after their initial trip. For persistent faults, they will perform a second trip, and then the interrupter will drop open with the vacuum interrupter open. Non-fault testing models will behave more like a fuse and drop open after detecting and interrupting a fault. More details on the operating sequence can be found on page 2.

The VacuFuse II Self-Resetting Interrupter comes in sizes to accommodate 110-kV BIL and 150-kV BIL cutout mountings.

This self-powered, microprocessor-controlled, single-phase, self-resetting interrupter is available for new installations, or it may be retrofitted into an existing compatible present-production ("-R10" or "-R11") Type XS Fuse Cutout Mounting.

Factory-programmed "K," "KS," "T," "TXP," "ST," "QR," "NK," and "DE" time-current characteristic (TCC) curves are available. One curve can be selected per device, and the settings are permanently configured at the factory. See Table 1 on page 2 for the available TCC curves.

S&C TXP Speed curves for the VacuFuse II Self-Resetting Interrupter are designed specifically for 15-kVA to 167-kVA transformers that comply with IEEE C57.12.20, "IEEE Standard for Overhead-Type Distribution Transformers 500 kVA and Smaller."

Table 1. Protection Curve Speeds

TXP Speed	"K" Speed	"T" Speed	"KS" Speed	"ST" Speed①	"QR" Speed②	"NK" Speed③	"DE" Speed④
2TXP	2K	2T	2KS	2ST	2QR	2NK	2DE
3TXP	3K	3T	3KS	3ST	3QR	3NK	3DE
●	●	●	●	●	●	●	4DE
5TXP	5K	5T	5KS	5ST	5QR	5NK	5DE
6TXP	6K	6T	●	●	●	●	●
7TXP	●	●	7KS	7ST	7QR	●	7DE
8TXP	8K	8T	●	●	8QR	8NK	●
10TXP	10K	10T	10KS	10ST	10QR	10NK	10DE
12TXP	12K	12T	●	●	●	●	●
15TXP	15K	15T	15KS	15ST	15QR	15NK	15DE
20TXP	20K	20T	20KS	20ST	20QR	20NK	20DE

① ST TCC curves emulate S&C Standard speed Positrol® Fuse Links with definite time elements.

② QR TCC curves emulate S&C QR speed Positrol Fuse Links with definite time elements.

③ NK TCC curves emulate Cooper Power™ series Kearney™ N-Speed (Type 200™) Fuse Links, manufactured by the Eaton Corporation, with definite time elements.

④ DE TCC curves emulate Cooper Power™ series Edison™ D-Speed Fuse Links, manufactured by the Eaton Corporation, with definite time elements.

● Not available.

The VacuFuse II Self-Resetting Interrupter comes permanently configured at the factory with the following parameters:

Closing time: 45 ± 10 seconds

Reclosing time (open-interval): 45 ± 10 seconds

TCC Reset Time: 100 milliseconds

The protection sequence reset time, only required on models with fault-testing, is a user-selected value (from 30 seconds to 15 minutes) to be configured at the factory. This is the window of time that starts elapsing after the unit initially operates. Any additional faults within this window will make the unit drop out. After this window has elapsed, any subsequent faults will be timed as new faults.

The VacuFuse II Self-Resetting Interrupter comes ready to install, streamlining the commissioning process and reducing the amount of training required for line crews. The self-resetting interrupter drops open at the end of its operating sequence and shows a highly visible reflective position indicator on its base: green for open and red for closed. (Reversed color indicators are available. See Table 8 on page 10.)

The manual operating lever and the pull-ring provide a convenient means for affixing a tag to the VacuFuse II Self-Resetting Interrupter. Affixing a tag to it in one of these locations does not lock it out.

OPERATIONAL NOTES: If the transformer is to be isolated for maintenance, the vacuum interrupter can be opened using the manual operating lever. The manual operating lever can also be operated from the ground using a Talon™ Handling Tool or a distribution prong attached to an extendostick. After the vacuum interrupter has been opened, it will automatically drop out 1 minute after reaching full charge, creating a visible open gap. If required, Loadbuster®–The S&C Loadbreak Tool, also can be used.

The VacuFuse II Self-Resetting Interrupter must be dropped out from the cutout mounting to be considered open. The VacuFuse II Self-Resetting Interrupter is different from other cutout-mounted devices, including the VacuFuse Self-Resetting Interrupter. The VacuFuse II interrupter has a voltage-harvesting power supply that

allows up to 1 mA of current to go through the device, even when the vacuum interrupter is open. Failure to consider the current through the device when the vacuum interrupter is open may lead to serious injury or death.

Special attention should be paid to how the VacuFuse II Self-Resetting Interrupter behaves when being closed, depending on the position of the manual operating lever.

Under normal conditions, a white LED located on the end cap of the interrupter will start blinking once per second as soon as the VacuFuse II interrupter is closed into the cutout mounting, and between 7.2 kV and 9.0 kV of voltage is present at the cutout mounting.

When these conditions are met and the VacuFuse II interrupter is closed into its mounting with the handle in the **Up** position, the interrupter will automatically close its vacuum interrupter after 45 seconds.

When normal conditions are met and the VacuFuse II interrupter is closed into its mounting with the handle in the **Down** position, the interrupter will charge for 45 ± 10 seconds. At this point, the READY TO CLOSE LED will illuminate in **Steady** mode, indicating the interrupter is fully charged and ready to close. If no action is taken, the interrupter will drop out 1 minute ± 10 seconds after the READY TO CLOSE LED illuminates.

To allow the closing of the vacuum interrupter when the interrupter is pushed into the mounting with the manual operating lever in the **Down** position, the manual operating lever must be pushed up to the **Up** position within 1 minute after the READY TO CLOSE LED is lit.

If the cutout mounting has no voltage present, the VacuFuse II Self-Resetting Interrupter will remain in the cutout mounting until sufficient voltage is present. At that point, it will respond to the position of the manual operating lever. If the lever is in the **Up** position, the interrupter will close the vacuum interrupter after 45 ± 10 seconds. If the lever is in the **Down** position, the interrupter will charge for 45 ± 10 seconds, and drop out 1 minute later.

When supplied complete with a polymer cutout mounting, VacuFuse II Self-Resetting Interrupter models for new installations include two parallel-groove connectors accommodating No. 6 solid (13.3-mm^2) through No. 2 stranded (35-mm^2) copper or aluminum in one groove, and No. 2 solid (35-mm^2) through 250 kcmil (126.7-mm^2) stranded copper or aluminum or 4/0 ASCR (120 mm^2) in the other groove.

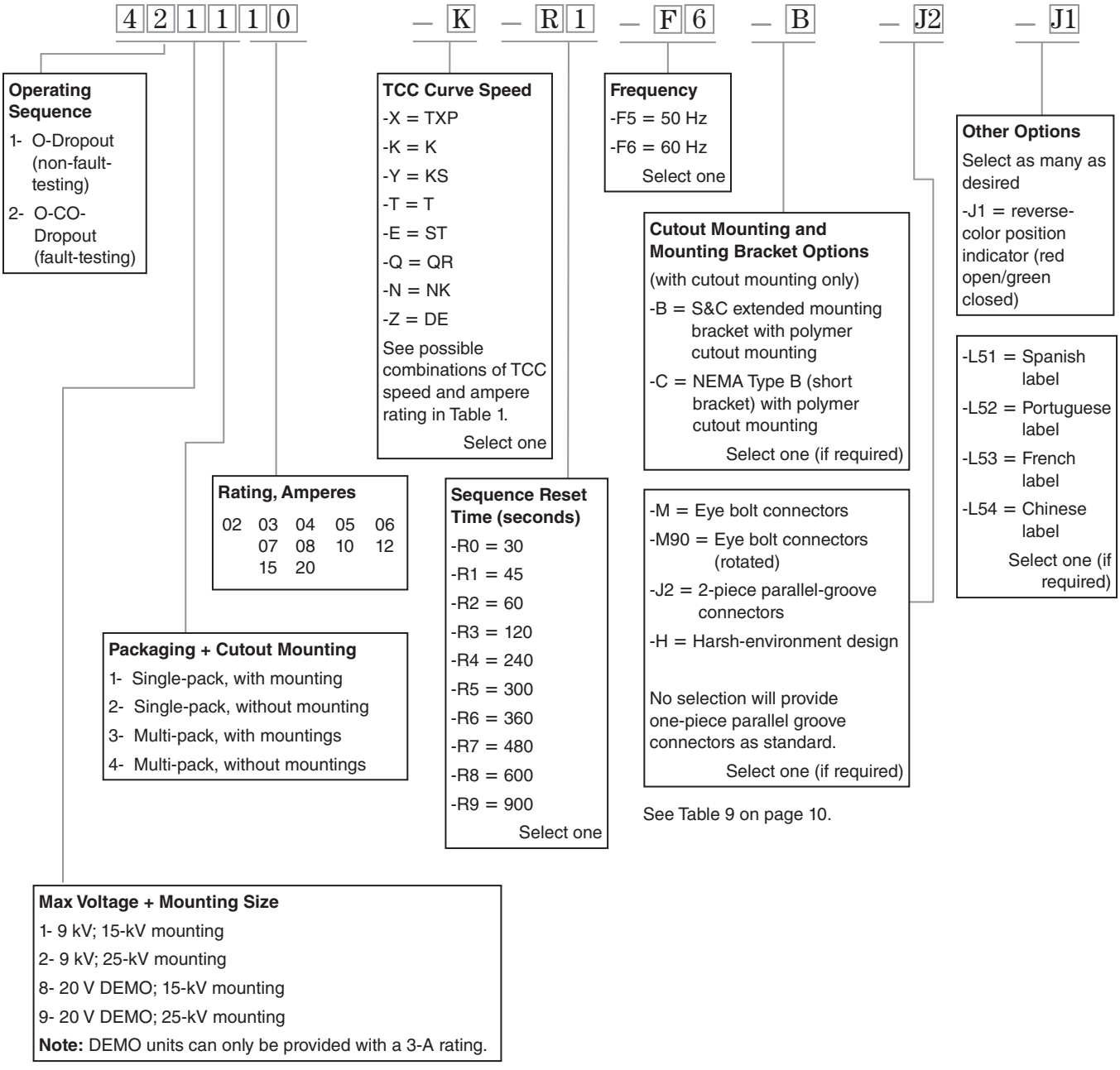
The self-resetting interrupter is manufactured in accordance with a quality system certified to ISO 9001:2000.

APPLICATION NOTE: The VacuFuse II Self-Resetting Interrupter can only be applied to solidly grounded single-phase overhead distribution transformers with a primary voltage of 7.2 kV to 9.0 kV (the corresponding line-to-neutral voltage of single-phase transformers on 12.47- to 15.5-kV systems).

Anatomy of a VacuFuse II Self-Resetting Interrupter Catalog Number

Base Catalog Number Example: 421110-X is a fault-testing unit with a maximum voltage of 9 kV, sized for a 15-kV cutout mounting included with shipment and programmed with a 10TXP TCC curve.

Optional Features Example: If sequence reset time must be 900s, 60 Hz, the cutout mounting must have an S&C extended mounting bracket with the standard one-piece design parallel groove connectors. The suffix string number is "-F6R9B."



See Table 9 on page 10.

Table 2. S&C TXP-Speed Curves Sized by Transformer Primary Voltage and Transformer kVA Size

kVA	Transformer Primary Voltages (kV)					
	7.2	7.62	7.97	8.31	8.66	8.9
15	2	2	2	2	2	2
20	3	3	3	2	2	2
25	3	3	3	3	3	3
37.5	5	5	5	5	5	5
50	7	7	6	6	6	6
67	10	10	8	8	8	7
75	10	10	10	10	10	8
100	15	15	15	12	12	12
125	20	20	20	15	15	15
150	20	20	20	20	20	20
167					20	20

How to Order a VacuFuse II Self-Resetting Interrupter

VacuFuse II Self-Resetting Interrupter TCC curves can be selected for a new transformer or to replace existing fuses. If your company's operating procedures allow for selecting a new TCC curve, consider selecting the S&C TXP Speed curve, sized using the transformer primary voltage and kVA ratings from Table 2 on page 5.

Each VacuFuse II Self-Resetting Interrupter size comes with a color-coded label depicting the ampere rating of the TCC curve and matching the colors represented in Table 2 on page 5.

Complete the following steps to order a VacuFuse II Self-Resetting Interrupter:

STEP 1. Obtain the catalog number of the desired VacuFuse II interrupter from Table 3 on page 7 (for fault-testing models) or Table 4 on page 8 (for non-fault-testing models).

Catalog Number: ☐☐☐☐☐☐

STEP 2. Obtain the desired ampere rating and TCC speed from Table 5 on page 9. The ampere rating becomes digits 5 and 6 of the base catalog number, and the TCC suffix follows the base catalog number. Note that DEMO units are only available with 3-ampere ratings.

Ampere Rating and TCC: ☐☐☐☐☐☐–☐

STEP 3. For fault-testing models, obtain the suffix letters for the desired protection sequence reset time from Table 6 on page 9.

Suffix(es): –☐☐

STEP 4. Select the system frequency from Table 7 on page 9.

Suffix: –☐☐

STEP 5. Select from any desired optional features from Table 8 on page 10.

Suffix(es): –☐☐☐

STEP 6. When ordering with a cutout mounting, add any desired cutout mounting and connector options from Table 9 on page 10. Add these catalog number suffixes to the catalog number selected in Step 1.

Suffix(es): –☐☐☐

STEP 7. Obtain the catalog numbers for any desired handling tools from Table 10 on page 10 and order them as separate line items.

Catalog Number: ☐☐☐☐☐☐

Example: For a fault-testing VacuFuse II Self-Resetting Interrupter in a single-pack with cutout mounting included, sized for a 15-kV cutout mounting, a maximum voltage of 9.0 kV, with a 15T TCC curve, for application on 60-Hz systems and with a 45-second sequence reset time, the catalog number would be:

Catalog Number: 421115–TF6R1

Table 3. Fault-Testing VacuFuse II Self-Resetting Interrupter①

Package + Mounting Included	Cutout Mounting Size, kV	Rating			Base Catalog Number③
		Voltage, kV		Interr., Sym. A	
		Phase-to-Neutral	BIL②		
Single-pack with mounting	15●	7.2–9.0	110	6300	4211xx
	25■		150	6300	4221xx
Single-pack without mounting	15	7.2–9.0	110	6300	4212xx
	25		125/150▲	6300	4222xx
Multi-pack with mountings④	15●	7.2–9.0	110	6300	4213xx
	25■		150	6300	4223xx
Multi-pack without mountings⑤	15	7.2–9.0	110	6300	4214xx
	25		125/150▲	6300	4224xx

① VacuFuse II interrupters in this table have an **O-CO-Dropout** operating sequence.

② BIL is achieved with the VacuFuse II interrupter dropped open.

③ "xx" represents the ampere rating desired; select the ampere rating and TCC suffix from Table 5 on page 9.

④ Multi-pack catalog numbers with cutout mountings included have a minimum order quantity of 12 units.

⑤ Multi-pack catalog numbers without cutout mountings included have a minimum order quantity of 36 units.

● Cutout mountings included with 15-kV sized VacuFuse II interrupters are catalog number 89811R10-P-D.

■ Cutout mountings included with 25-kV sized VacuFuse II interrupters are catalog number 89802R10-P-D.

▲ BIL is dependent on the cutout mounting into which the VacuFuse II interrupter is installed.

Table 4. Non-Fault-Testing VacuFuse II Self-Resetting Interrupter①

Package + Mounting Included	Cutout Mounting Size, kV	Rating			Base Catalog Number③
		Voltage, kV		Interr., Sym. A	
		Phase-to-Neutral	BIL②		
Single-pack with mounting	15●	7.2–9.0	110	6300	4111xx
	25■		150	6300	4121xx
Single-pack without mounting	15	7.2–9.0	110	6300	4112xx
	25		125/150▲	6300	4122xx
Multi-pack with mountings④	15●	7.2–9.0	110	6300	4113xx
	25■		150	6300	4123xx
Multi-pack without mountings⑤	15	7.2–9.0	110	6300	4114xx
	25		125/150▲	6300	4124xx

① VacuFuse II interrupters in this table have an **O-Dropout** operating sequence.

② BIL is achieved with the VacuFuse II interrupter dropped open.

③ "xx" represents the ampere rating desired; select the ampere rating and TCC suffix from Table 5 on page 9.

④ Multi-pack catalog numbers with cutout mountings included have a minimum order quantity of 12 units.

⑤ Multi-pack catalog numbers without cutout mountings included have a minimum order quantity of 36 units.

● Cutout mountings included with 15-kV sized VacuFuse II interrupters are catalog number 89811R10-P-D.

■ Cutout mountings included with 25-kV sized VacuFuse II interrupters are catalog number 89802R10-P-D.

▲ BIL is dependent on the cutout mounting into which the VacuFuse II interrupter is installed.

Table 5. VacuFuse II Self-Resetting Interrupter Ampere Rating and TCC Speed Options—To Be Specified

Ampere Rating	Catalog Number Digits 5 and 6 and TCC Speed Suffixes							
	TXP Speed	K Speed	T Speed	KS Speed	ST Speed	QR Speed	NK Speed	DE Speed
2	02-X	02-K	02-T	02-Y	02-E	02-Q	02-N	02-Z
3	03-X	03-K	03-T	03-Y	03-E	03-Q	03-N	03-Z
4	●	●	●	●	●	●	●	04-Z
5	05-X	05-K	05-T	05-Y	05-E	05-Q	05-N	05-Z
6	06-X	06-K	06-T	●	●	●	●	●
7	07-X	●	●	07-Y	07-E	07-Q	●	07-Z
8	08-X	08-K	08-T	●	●	08-Q	08-N	●
10	10-X	10-K	10-T	10-Y	10-E	10-Q	10-N	10-Z
12	12-X	12-K	12-T	●	●	●	●	●
15	15-X	15-K	15-T	15-Y	15-E	15-Q	15-N	15-Z
20	20-X	20-K	20-T	20-Y	20-E	20-Q	20-N	20-Z

● Not available.

Table 6. Protection Sequence Reset Time—To Be Specified for Fault-Testing Models①

Sequence Reset Time, seconds	Add Catalog Number Suffix
30	-R0
45	-R1
60	-R2
120	-R3
240	-R4
300	-R5
360	-R6
480	-R7
600	-R8
900	-R9

① If the VacuFuse II Self-Resetting Interrupter remains closed after interrupting fault current, and no subsequent fault event occurs within this time setting, the interrupter will reset to its initial TCC curve setting. If another fault event happens during this time, the interrupter will trip, lock open, and drop open.

Table 7. System Frequency—To Be Specified

Item	Add Catalog Number Suffix
For application on 50-Hz systems	-F5
For application on 60-Hz systems	-F6

Table 8. VacuFuse II Self-Resetting Interrupter Options

Item		Add Catalog Number Suffix
Reverse color position indicator (red open/green closed)		-J1
Danger label in other languages	Spanish	-L51
	Portuguese	-L52
	French	-L53
	Chinese	-L54

Table 9. Cutout Mounting and Mounting Bracket Options①②

Item				Add Catalog Number Suffix
S&C extended mounting bracket with polymer cutout mounting, for crossarm, pole, or wall mounting				-B
NEMA Type B mounting bracket with polymer cutout mounting, for crossarm mounting				-C
Harsh environment design. All galvanized steel components and hardware replaced with stainless steel to provide enhanced corrosion resistance in coastal or high-contamination environments				-H
Item	**Accommodating Conductors**		**Position**	**Add Catalog Number Suffix**
	Quantity	**Size and Material**		
Eye bolt connector	One	No. 8 solid (10 mm²) through 250 kcmil (126.7 mm²) stranded copper or aluminum, or 4/0 ASCR (120 mm²)	Standard orientation	-M
Eye bolt connector (rotated)	One	No. 8 solid (10 mm²) through 250 kcmil (126.7 mm²) stranded copper or aluminum, or 4/0 ASCR (120 mm²)	90 degrees	-M90
Parallel-groove connectors	Two	No. 6 solid (16 mm²) through No. 2 stranded (35 mm²) copper or aluminum in on groove; No. 2 solid (35 mm²) through 250 kcmil (126.7 mm²) stranded copper or aluminum or 4/0 ASCR (120 mm²) in the other groove. Two piece design	Standard orientation	-J2

① Only used when VacuFuse II Self-Resetting Interrupter is being ordered for a new installation with cutout mounting included.

② Two standard-orientation parallel-groove connectors, one-piece design, accommodating No. 6 solid (16-mm²) through No. 2 stranded (35-mm²) copper or aluminum in one groove, and No. 2 solid (35-mm²) through 250 kcmil (126.7-mm²) stranded copper or aluminum or 4/0 ASCR (120 mm²) in the other groove come standard when ordering a VacuFuse II interrupter with a cutout mounting.

Table 10. Recommended Handling Tools—For All VacuFuse II Self-Resetting Interrupter Models

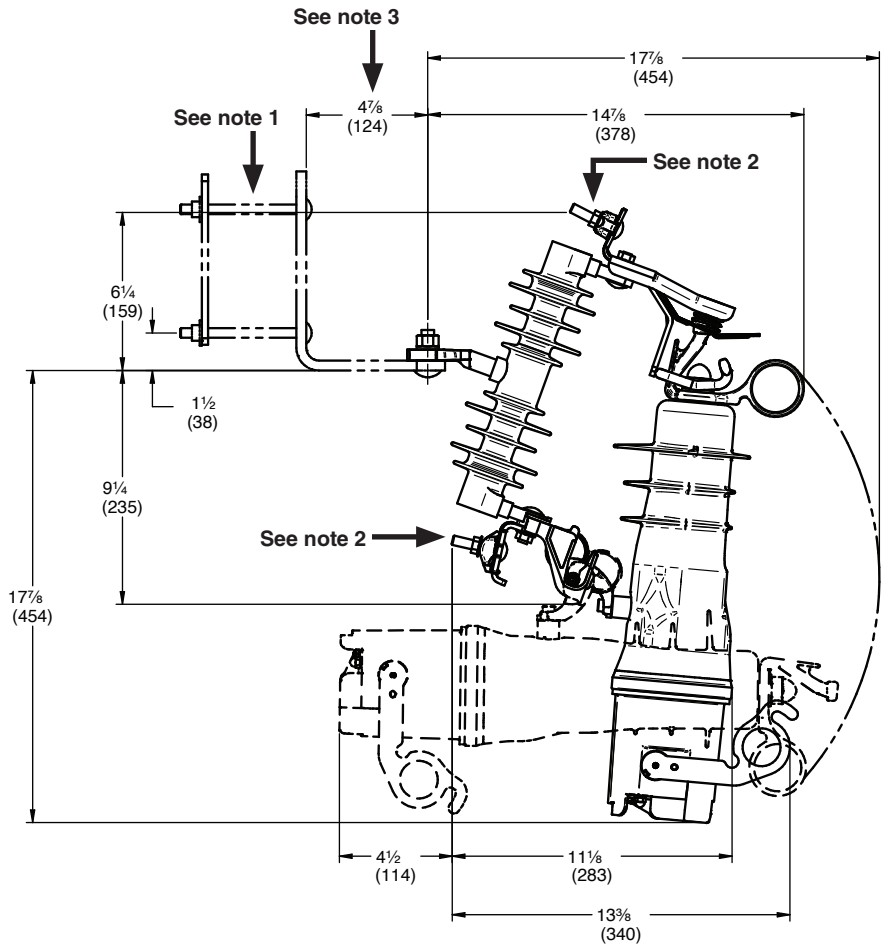
Item	Catalog Number
Station prong	4402R2
Distribution prong	4416
Talon™ Handling Tool	4440
Universal Pole	●

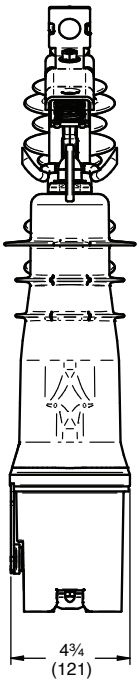
● Select to match height of installation. Refer to S&C Specification Bulletin 851-31.

Overhead—Pole-Top Style

Shown with 15-kV Cutout Mounting

Dimensions in inches to nearest ⅛-inch (3.18 mm)





Front View

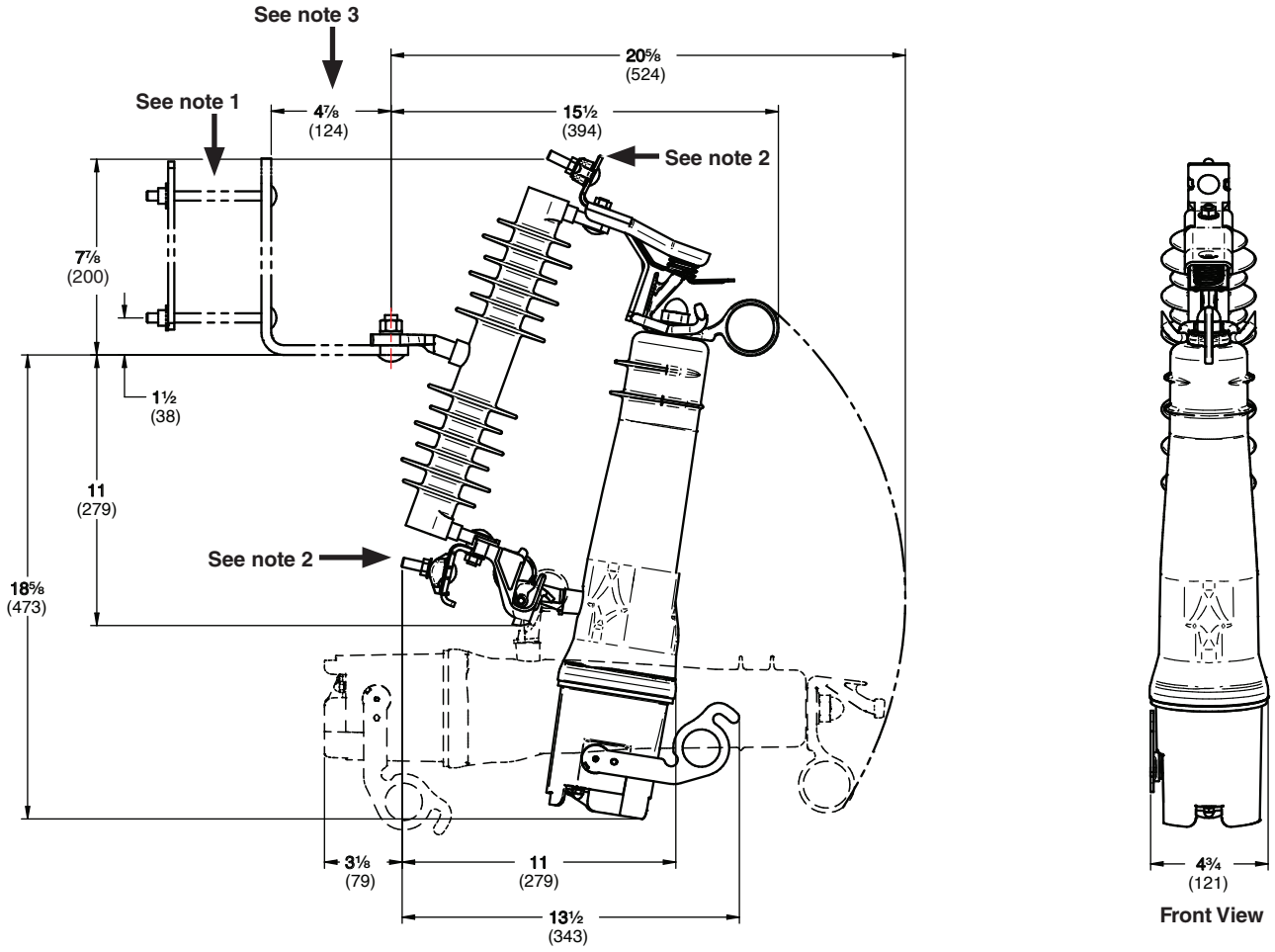
NOTES:

1. Mounting bracket, adjustable for 3-inch × 4-inch (76 mm × 102 mm) to 4-inch × 5-inch (102 mm × 127 mm) crossarm, furnished only when catalog number suffix "-B" or "-C" is specified.
2. Includes two parallel-groove connectors accommodating No. 6 solid (16 mm²) through No. 2 stranded (35 mm²) copper or aluminum in one groove, and No. 2 solid (35 mm²) through 250 kcmil (126.7 mm²) stranded copper or aluminum or 4/0 ACSR (120 mm²) in the other groove.
3. Dimension shown is for catalog number suffix "-B" (S&C extended bracket). Dimension is 2⅝ inches (66.7 mm) for catalog number suffix "-C" (NEMA "B" bracket).
4. Weight of a VacuFuse II Self-Resetting Interrupter is 12 lbs. (5.4 kg) without the mounting.

Overhead—Pole-Top Style

Shown with 25-kV Cutout Mounting

Dimensions in inches to nearest ⅛-inch (3.18 mm)



NOTES:

1. Mounting bracket, adjustable for 3-inch × 4-inch (76 mm × 102 mm) to 4-inch × 5-inch (102 mm × 127 mm) crossarm, furnished only when catalog number suffix "-B" or "-C" is specified.
2. Includes two parallel-groove connectors accommodating No. 6 solid (16 mm²) through No. 2 stranded (35 mm²) copper or aluminum in one groove, and No. 2 solid (35 mm²) through 250 kcmil (126.7 mm²) stranded copper or aluminum or 4/0 ACSR (120 mm²) in the other groove.
3. Dimension shown is for catalog number suffix "-B" (S&C extended bracket). Dimension is 2⅝ inches (66.7 mm) for catalog number suffix "-C" (NEMA "B" bracket).
4. Weight of a VacuFuse II Self-Resetting Interrupter is 12 lbs. (5.4 kg) without the mounting.