

# Installation

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## Qualified Persons

### **WARNING**

Only Qualified Persons who are knowledgeable in the installation, operation, and maintenance of overhead electric power transmission equipment and distribution substation equipment, along with all associated hazards, may install, operate, and maintain the equipment covered by this publication. A Qualified Person is someone who is trained and competent in:

- The skills and techniques necessary to distinguish exposed live parts from nonlive parts of electrical equipment
- The skills and techniques necessary to determine the proper approach distances corresponding to the voltages to which the Qualified Person will be exposed
- The proper use of special precautionary techniques, personal protective equipment, insulated and shielding materials, and insulated tools for working on or near exposed energized parts of electrical equipment

These instructions are intended **ONLY** for such Qualified Persons. They are not intended to be a substitute for adequate training and experience in safety procedures for this type of equipment.

## Read this Instruction Sheet

### **NOTICE**

Thoroughly and carefully read this instruction sheet and all materials included in the product's S&C Instruction Handbook before installing or operating your S&C Airflow Test Instrument or Power Fuse. Familiarize yourself with the Safety Information and Safety Precautions on pages 3 through 5.

## Retain this Instruction Sheet

This instruction sheet is a permanent part of your S&C Airflow Test Instrument. Designate a location where you can easily retrieve and refer to this publication. The latest version is available online in PDF format at [sandc.com/en/Support/Product-Literature/](http://sandc.com/en/Support/Product-Literature/).

## Proper Application

### **WARNING**

This airflow test instrument is designed for SMD-1A, SMD-2B, and SMD-2C Fuse Units rated 34.5 kV through 138 kV. Power fuse ratings are listed on a ratings label attached to the fuse.

## Warranty

The warranty and/or obligations described in S&C's Price Sheet 150 "Standard Conditions of Sale – Immediate Purchasers in the United States" (or Price Sheet 153, "Standard Conditions of Sale – Immediate Purchasers Outside the United States") plus any special warranty provisions, as set forth in the applicable product-line specification bulletin, are exclusive. The remedies provided in the former for breach of these warranties shall constitute the immediate purchaser's or end user's exclusive remedy and a fulfillment of the seller's entire liability. In no event shall the seller's liability to the immediate purchaser or end user exceed the price of the specific product that gives rise to the immediate purchaser's or end user's claim. All other warranties, whether express or implied or arising by operation of law, course of dealing, usage of trade or otherwise, are excluded. The only warranties are those stated in Price Sheet 150 (or Price Sheet 153), and THERE ARE NO EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ANY EXPRESS WARRANTY OR OTHER OBLIGATION PROVIDED IN PRICE SHEET 150 (OR PRICE SHEET 153) IS GRANTED ONLY TO THE IMMEDIATE PURCHASER AND END USER, AS DEFINED THEREIN. OTHER THAN AN END USER, NO REMOTE PURCHASER MAY RELY ON ANY AFFIRMATION OF FACT OR PROMISE THAT RELATES TO THE GOODS DESCRIBED HEREIN, ANY DESCRIPTION THAT RELATES TO THE GOODS, OR ANY REMEDIAL PROMISE INCLUDED IN PRICE SHEET 150 (or PRICE SHEET 153.)

**Understanding Safety-Alert Messages**

Several types of safety-alert messages may appear throughout this instruction sheet and on labels and tags attached to your S&C Airflow Test Instrument or Power Fuse. Familiarize yourself with these messages and the importance of these signal words:

<b>⚠ DANGER</b>
<p>“DANGER” identifies the most serious and immediate hazards that will likely result in serious personal injury or death if instructions, including recommended precautions, are not followed.</p>


<b>⚠ WARNING</b>
<p>“WARNING” identifies hazards or unsafe practices that can result in serious personal injury or death if instructions, including recommended precautions, are not followed.</p>

<b>⚠ CAUTION</b>
<p>“CAUTION” identifies hazards or unsafe practices that can result in minor personal injury if instructions, including recommended precautions, are not followed.</p>

<b>NOTICE</b>
<p>“NOTICE” identifies important procedures or requirements that can result in product or property damage if instructions are not followed.”</p>

**Following Safety Instructions**

If you do not understand any portion of this instruction sheet and need assistance, contact your nearest S&C Sales Office or S&C Authorized Distributor. Their telephone numbers are listed on S&C’s website sandc.com, or call the S&C Global Monitoring and Support Center at 1-888-762-1100.

<b>NOTICE</b>	
<p>Read this instruction sheet thoroughly and carefully before operating your S&amp;C Airflow Test Instrument.</p>	

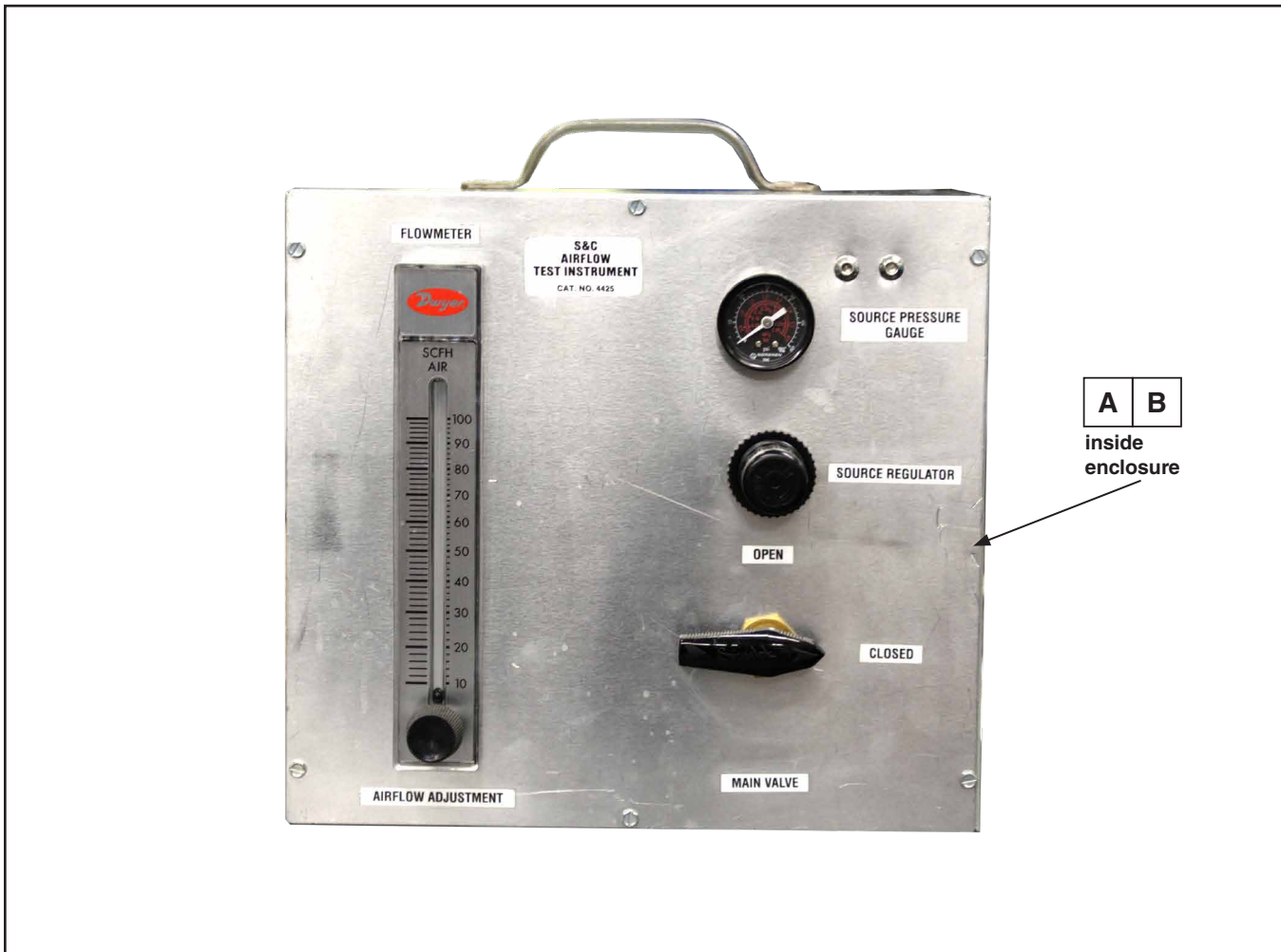
**Replacement Instructions and Labels**

If you need additional copies of this instruction sheet, contact your nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

It is important that any missing, damaged, or faded labels on the equipment be replaced immediately. Replacement labels are available by contacting your nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

# Safety Information

## Location of Safety Labels



### Reorder Information for Safety Information

Location	Safety Alert Message	Description	Part Number
<b>A</b>	<b>Instruction</b>	Operating instructions...	G-5143R7
<b>B</b>	<b>Information Card</b>	Airflow value information card...	G-5144R3★

★ This detachable laminated card is included with the airflow test instrument for your convenience. The information is also included in this instruction sheet.

**⚠ DANGER**



**SMD-1A, SMD-2B, and SMD-2C Fuse Units operate at high voltage. Failure to observe the precautions below will result in serious personal injury or death.**

Some of these precautions may differ from your company's operating procedures and rules. Where a discrepancy exists, follow your company's operating procedures and rules.

1. **QUALIFIED PERSONS.** Access to the SMD-1A, SMD-2B, and SMD-2C Fuse Unit must be restricted only to Qualified Persons.
2. **SAFETY PROCEDURES.** Always follow safe operating procedures and rules. Always maintain proper clearance from energized components.
3. **PERSONAL PROTECTIVE EQUIPMENT.** Always use suitable protective equipment, such as rubber gloves, rubber mats, hard hats, safety glasses, arc-flash clothing, and fall protection, in accordance with safe operating procedures and rules.
4. **SAFETY LABELS AND TAGS.** Do not remove or obscure any of the "DANGER," "WARNING," "CAUTION," or "NOTICE" labels and tags. Remove tags ONLY if instructed to do so.
5. **ENERGIZED COMPONENTS.** Always consider all parts live until de-energized, tested, and grounded.
6. **MAINTAINING PROPER CLEARANCE.** Always maintain proper clearance from energized components.
7. **DO NOT LEAVE fuse units installed in their mountings hanging open.** When closed in, the fuse units will not be damaged by rain or high humidity. However, water resistance of the exhaust end of the fuse units cannot be guaranteed. Any rain or snow that might enter could affect the solid-materials lining.
8. **When in storage, fuse units should be protected from excessive moisture.**
9. **DO NOT remove the fuse unit from its carton until ready to use.** Handle fuse units with care—do not drop or throw.
10. **De-energize and ground the mounting.** The fuse unit must be removed from its mounting before airflow testing can be performed. Before removing the fuse unit for airflow testing, all incoming and outgoing leads to the fuse mountings must be de-energized and properly grounded.

## NOTICE

Before connecting the pressurized air source to the airflow test instrument, understand the following guidelines:

- Customer-furnished source of air pressure must not exceed 150 PSIG.
- Source air pressure can be furnished from an air compressor, bottled air, or bottled nitrogen.
- Before testing fuse units, check for condensation in the water-filter bulb located inside the airflow test instrument. Remove any liquid by depressing the pin at the bottom of the water-filter while source air pressure is connected.

Follow these steps to operate the airflow test equipment:

- STEP 1.** Close the main valve located on the front of the airflow test instrument. See Figure 1. Then, connect the external-source air supply line to the male speed coupler at the rear of the test instrument and reopen the main valve. See Figure 2. Adjust the source regulator to obtain a source pressure gauge reading of 25 PSI. See Figure 3.



Figure 1. Close the main valve.

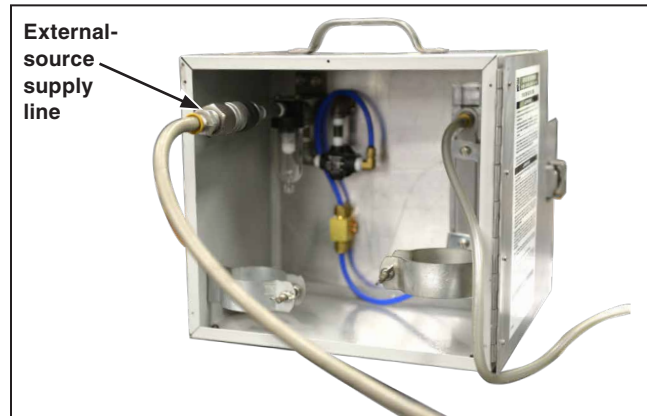


Figure 2. Connect the external-source air supply.

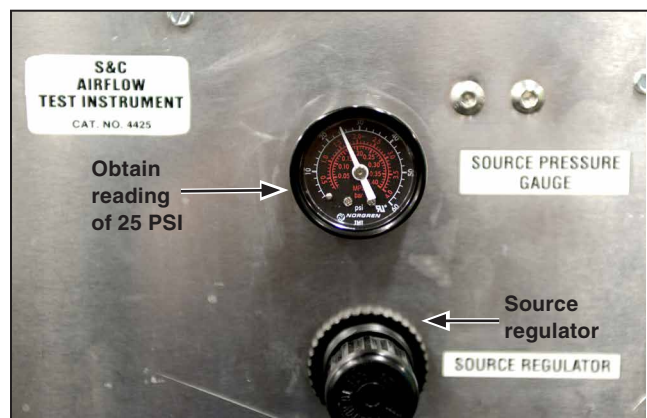


Figure 3. Adjust the source regulator to obtain a source pressure gauge reading of 25 PSI.

**STEP 2.** Adjust the airflow adjustment valve located on the front of the instrument to obtain an airflow of 90 SCFH. Airflow is determined by reading the value on the flowmeter scale at the center of the float. See Figure 4. Then, close the main valve.

**⚠ CAUTION**

DO NOT alter the position of the airflow adjustment valve after attaining an airflow of 90 SCFH.

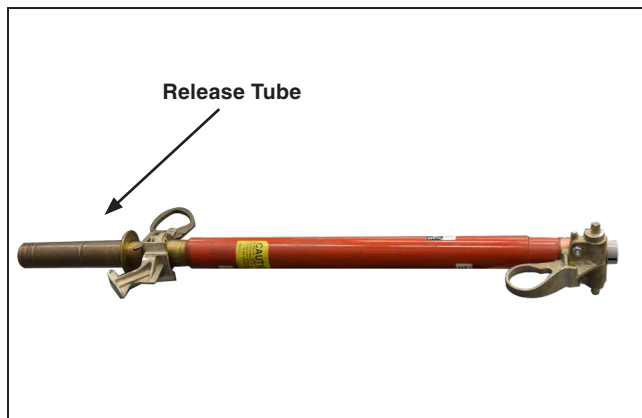
**STEP 3.** Remove the release tube from the fuse unit to be tested. See Figure 5.

*For SMD-2B and SMD-2C Fuse Units,* use the appropriate black hose coupler (two sizes are provided) to connect to the release tube-end of the fuse unit using the hose clamp provided. SMD-2B Fuse Units rated 115 kV and 138 kV include a removable yellow vinyl seal at the exhaust end of the fuse unit. The vinyl seal should be temporarily removed before airflow testing and then reinstalled upon completion of the testing.

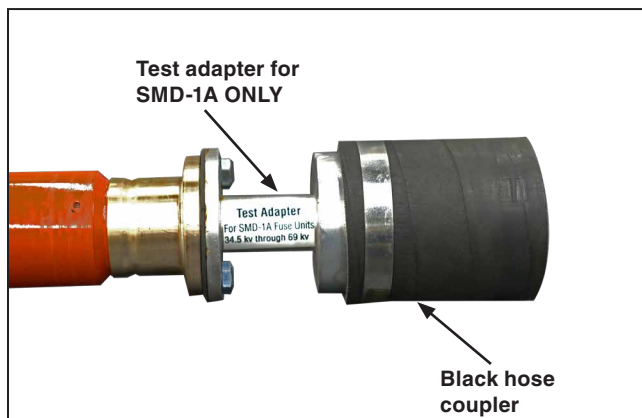
*For SMD-1A Fuse Units,* first attach the aluminum test adapter (included with the airflow test instrument) to the SMD-1A Fuse Unit using the hardware provided. See Figure 6. Then, connect the smaller-diameter black hose coupler using the hose clamp provided.



**Figure 4.** Adjust the airflow adjustment valve to obtain an airflow of 90 SCFH.



**Figure 5.** Remove the release tube from the fuse.



**Figure 6.** For SMD-1A Fuse Units, attach the aluminum adapter and then use the smaller-diameter hose coupler (shown). For SMD-2B and SMD-2C Fuse Units, use the appropriate black hose coupler to attach directly to the release-tube end of the fuse (not shown).

## Operation

**STEP 4.** Clamp the other end of the black hose coupler to the multiple adapter using the hose clamp provided. See Figure 7. Be sure all hose clamps are tightened securely. Lay the fuse unit on its side and make certain there are no obstructions blocking the flow of air out of the breather cap at the lower end of the fuse unit.

### NOTICE

Superseded-design SMD-1A Fuse Units rated 34.5 kV through 138 kV and SMD-2B and SMD-2C Fuse Units rated 34.5 kV through 69 kV manufactured before April 1971 (as indicated by the date stamp on the lower ferrule) include a brown Bakelite or yellow vinyl seal at the exhaust end of the fuse unit. Remove the seal and replace it with a present-production rain cap before commencing airflow testing.

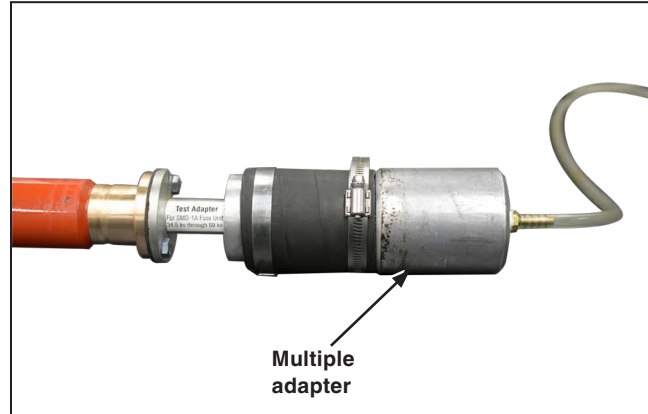
**STEP 5.** Slowly open the main valve. Allow approximately 30 seconds for the flowmeter float to stabilize. Then, read and record the airflow value on the flowmeter scale. See Figure 8.

**STEP 6.** Close the main valve and remove the fuse unit from the adapter.

**STEP 7.** Refer to the tables in the “Recommended Minimum Airflow Values” section starting on page 9.

Fuse units testing 10 SCFH (or less) below the applicable listed airflow value exhibit some closing of the fuse bore but are still operational. These fuses should be tested approximately every five years to ensure airflow rates remain stable.

Fuse units testing more than 10 SCFH below the applicable listed airflow value should be removed from stock or service and replaced.



**Figure 7.** Clamp the other end of the hose coupler to the multiple adapter.



**Figure 8.** Read and record the airflow value on the flowmeter scale.

### Recommended Minimum Airflow Values

The airflow values listed in Tables 1 through 3 on pages 10 - 12 are recommended minimum airflow values for SMD-1A, SMD-2B, and SMD-2C Fuse Units when tested using the S&C Airflow Test Instrument. Fuse units tested in the field should reflect the same or slightly higher airflow values, provided the fuse units have been stored and applied in accordance with the manufacturer's recommendations. (i.e. stored in a dry place and applied without leaving fuse units in the open (disconnect) position for an extended period of time).

The recommended minimum airflow values listed in Tables 1 through 3 are applicable to current- and superseded-design SMD-1A, SMD-2B, and SMD-2C Fuse Units and to superseded design SMD-1, SMD-2, and SMD-2A Fuse Units with the following exceptions:

- SMD-2 Fuse Units rated 30 amperes and below
- SMD-2A Fuse Units rated 30 amperes and below
- SMD-2B Fuse Units rated 30 amperes and below having an "R2" or lower catalog number supplement

The design of the above listed SMD-2, SMD-2A, and SMD-2B Fuse Units include components that are restrictive to free passage of air through the fuse units.

# Recommended Minimum Airflow Values

**Table 1. SMD-1A Fuse Units, Recommended Minimum Airflow Values**

Rating, kV →	34.5			46			69			115/138	
Speed →	S&C Std. TCC 115-1 & 153-1	S&C Slow TCC 119-1	S&C Very Slow TCC 176-1	S&C Std. TCC 115-1 & 153-1	S&C Slow TCC 119-1	S&C Very Slow TCC 176-1	S&C Std. TCC 115-1 & 153-1	S&C Slow TCC 119-1	S&C Very Slow TCC 176-1	S&C Std. TCC 153-1	S&C Slow TCC 119-1
Catalog Number → ●	444XXX	454XXX	564XXX	445XXX	455XXX	565XXX	446XXX	456XXX	566XXX	529XXX	539XXX
Rating, Amperes ↓	Recommended Minimum Airflow Value, SCFH ▲			Recommended Minimum Airflow Value, SCFH ▲			Recommended Minimum Airflow Value, SCFH ▲			Recommended Minimum Airflow Value, SCFH ▲	
1	75	N/A	N/A	75	N/A	N/A	74	N/A	N/A	71	71
3E											
5E											
7E											
10E											
13E											
15E											
20E											
25E											
30E											
40E											
50E											
65E											
80E											
100E	79	79	79	78	78	78	76	76	76	N/A	N/A
125E											
150E											
175E											
200E											

● The last three digits of the catalog number are determined by the ampere rating (e.g., “005” for a 5E-ampere fuse, “025” for a 25E-ampere fuse, “175” for a 175E-ampere fuse).

▲ Recommended minimum airflow values are 2 SCFH lower for fuse units with the year labeled “86” or higher, or fuse units that have been outfitted with replacement rain caps.

Table 2. SMD-2C Fuse Units, Recommended Minimum Airflow Values.

Rating, kV →	34.5			46		
Speed →	S&C Slow TCC 115-1 & 153-1	S&C Slow TCC 119-1	S&C Very Slow TCC 176-1	S&C Std. TCC 115-1 & 153-1	S&C Slow TCC 119-1	S&C Very Slow TCC 176-1
Catalog Number → ●	464XXX	484XXX	574XXX	465XXX	485XXX	575XXX
Rating, Amperes ↓	Recommended Minimum Airflow Value, SCFH ▲			Recommended Minimum Airflow Value, SCFH ▲		
1	76	N/A	N/A	75	N/A	N/A
3E						
5E						
7E						
10E						
13E		76			75	
15E						
20E						
25E						
30E						
40E	78	78	78	78	78	
50E						
65E						
80E						
100E						
125E		80		80		
150E						
175E						
200E						
250E						80
300E	N/A	N/A				

● The last three digits of the catalog number are determined by the ampere rating (e.g., "005" for a 5E-ampere fuse, "025" for a 25E-ampere fuse, "175" for a 175E-ampere fuse).

▲ Recommended minimum airflow values are 2 SCFH lower for fuse units with the year labeled "86" or higher, or fuse units that have been outfitted with replacement rain caps.

# Recommended Minimum Airflow Values

**Table 3. SMD-2B Fuse Units, Recommended Minimum Airflow Values.**

Rating, kV →	69			115			138	
Speed →	S&C Std. TCC 115-1 & 153-1	S&C Slow TCC 119-1	S&C Very Slow TCC 176-1	S&C Std. TCC 115-1 & 153-1	S&C Slow TCC 119-1	S&C Very Slow TCC 176-1	S&C Std. TCC 115-1 & 153-1	S&C Slow TCC 119-1
Catalog Number → ●	466XXX	486XXX	576XXX	468XXX	488XXX	578XXX	469XXX	489XXX
Rating, Amperes ↓	Recommended Minimum Airflow Value, SCFH ▲			Recommended Minimum Airflow Value, SCFH ▲			Recommended Minimum Airflow Value, SCFH ▲	
1	75	N/A	N/A	73	N/A	N/A	72	72
3E								
5E								
7E								
10E								
13E								
15E								
20E								
25E								
30E								
40E								
50E								
65E								
80E								
100E	78	78	78	77	77	77	77	77
125E	80	80	80	80	80	80	79	79
150E								
175E								
200E								
250E	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
300E			N/A	N/A	N/A	N/A	N/A	N/A

● The last three digits of the catalog number are determined by the ampere rating (e.g., “005” for a 5E-ampere fuse, “025” for a 25E-ampere fuse, “175” for a 175E-ampere fuse).

▲ Recommended minimum airflow values are 2 SCFH lower for fuse units with the year labeled “86” or higher, or fuse units that have been outfitted with replacement rain caps.

