Arc-Flash Label Installation
Engineering Services

Instruction Bulletin

0180IB0802

Rev. 02, 05/2016

Retain for future use.

Arc Flash Information

Use this information in accordance with applicable OSHA standards, NFPA 70E-2015 and other required safe electrical work practices.

8 cal/cm² Incident Energy at a Working Distance of 1 ft 6 in.
4 ft 9 in. Arc Flash Boundary

208V Shock hazard when cover is open
3 ft 6 in. Limited Approach
1 ft 0 in. Restricted Approach

Q2C: 12345678
Date: 09/10/14

Values produced by a Schneider Electric engineering analysis. Any system modification, adjustment of protective device settings, or failure to properly maintain equipment will invalidate this label. For more information, contact Schneider Electric at 1-888-778-2733.

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Table of Contents

Safety Precautions

These installation instructions provide suggestions for workers on how and where to install arc-flash labels provided by Schneider Electric Engineering Services. The methods in this document are one way to install these labels and shall in no way violate an owner's safety policy. Custom labels or site-specific PPE labels complying with the owner's electrical safe work practices are allowed per NFPA 70E.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors and covers before turning on power to this equipment.
- The Cleaning Procedures section of this document shall be followed carefully. To avoid risk of electric shock, explosion, or arc-flash, electrical equipment should never be scrubbed using dripping rags, brushes, or sponges with water or any other cleaning solution. The equipment shall never be sprayed, or soaked with water or any other cleaning solution.

Failure to follow these instructions will result in death or serious injury.

Label Application to Electrical Equipment

These installation instructions provide suggestions for workers on how and where to install arc-flash labels provided by Schneider Electric Engineering Services. The methods in this document are one way to install these labels and shall in no way violate an owner's safety policy. Custom labels or site-specific PPE labels complying with the owner's electrical safe work practices are allowed per NFPA 70E.

Arc-flash labels shall always be applied to equipment per the customer's safety policy requirements. If the customer's safety policy does not cover this situation, then these installation instructions constitute Schneider Electric Engineering Service's suggestions.

No matter where the arc-flash labels are affixed on equipment, they shall always be affixed according to the procedures described on page 9.

Understanding the Different Label Types

The Arc-Flash Information Label (Figure 1, on page 4) will report the calculated incident energy and arc-flash boundary for a given piece of equipment, based on the Schneider Electric Engineering Services analysis. Equipment names are present on these labels.

The optional simplified Arc-Flash Information Label will report the maximum incident energy and arc-flash boundary at two levels, 8 & 40 cal/cm^2 for each equipment type, unless voltage is greater than 15 kV, or if incident energy is over 40 cal/cm^2 (refer to Figure 2, on page 4). Generally no equipment name is printed on the label, unless the voltage is greater than 15 kV, or if incident energy is over 40 cal/cm^2. The label information is

Figure 1: **Arc-Flash Information Label**

Typical size is 4" X 6" landscape.
Portrait or 4" X 4" formats can be supplied
per project requirements.

based on the calculations from the Schneider Electric Engineering Services engineering analysis. This type of arc-flash label may reduce the need for customers to replace arc-flash labels due to relatively insignificant changes in the electrical system that change the incident energy and arc-flash boundary values but do not affect the selection of Personal Protective Equipment (PPE).

General Use labels (Figure 3, below) are applied to power distribution equipment to warn of general electrical hazards associated with shock, arc-flash, and explosions, and to instruct workers to turn off power prior to work. The labels remind workers to de-energize equipment prior to work.

Figure 2: **Simplified Arc-Flash Information Label**

Without Equipment Name

With Equipment Name

Typical size is 4" X 6" landscape.
Portrait or 4" X 4" formats can be supplied per project requirements.

Figure 3: **Typical General Use Label for Electrical Equipment (3.6" x 3.6", but sizes vary as well as minor wording adjustments to fit the need of each equipment type—the intent of the labels remain the same).**

Installing General Use Labels to Equipment

Many varieties of the General Use label have been installed on Square D™ equipment since 2006; however the overall intent is the same. For Square D equipment manufactured in 2006, or more recently, General Use labels do not need to be affixed. General Use labels, prior to 2006, lack the words "OR ARC-FLASH" in the warning statement.

For Square D equipment lacking General Use labels with the words "OR ARC Flash" in the warning statement, or for equipment manufactured by others, affix Square D General Use labels (Figure 3, on page 4) as close as possible to the Arc-Flash Information labels—DO NOT REMOVE OR COVER UP EXISTING SAFETY LABELS (ONES HAVING THE WORDS: DANGER, WARNING, OR CAUTION).

Installing Arc-Flash Information Labels to Equipment

Each of the supplied Arc-Flash Information labels (Figure 1, on page 4) has an equipment name printed on it (look on the left side about ¾ of the way down from the top). This equipment name consists of an equipment designation which corresponds to the arc-flash tables and the system one-line drawings associated with the approved arc-flash study. Match the equipment name shown on each label to the equipment in the system. Multiple labels for one piece of equipment are sometimes sent for a variety of reasons which may include, but are not limited to the following: multiple sections of equipment, side/rear accessible equipment, equipment built to low-voltage metal-enclosed switchgear or medium-voltage metal-clad switchgear standards, and so on. Refer to the Arc-Flash Information Label Location, on page 7, for information on where to place the labels on equipment (some equipment may require multiple labels).

Deliverables

NOTE: If the Arc-Flash Information labels are produced without equipment names, then refer to the Deliverables (Simplified Labels), below, regarding installation.

When first produced, the Arc-Flash Information label rolls are secured with rubber bands.

Each piece of equipment has at least 1 unique label. Multiple labels may have been sent for reasons stated in the previous section.

The rolls have labels printed in alphabetical order with approximately 25 labels per roll, unless some other sorting method has been established.

Installing Arc-Flash Information Labels to Equipment (Simplified Version)

Simplified arc-flash information labels have maximum incident energy (IE) and arc-flash boundary at two levels, 8 & 40 cal/cm^2 as described, Understanding the Different Label Types, on page 3. These labels correspond to the reference key table, arc-flash tables, and the system one-line drawings associated with the approved arc-flash study. Match the IE, voltage, and Arc-Flash Boundary shown on each label to the equipment in the system by referring to the reference key table, or arc-flash tables from the study. Refer to Installing—Reference Key Table Example, on page 6, for more information. Multiple labels for one piece of equipment are sometimes sent for a variety of reasons which may include, but are not limited to the following: multiple sections of equipment, side/rear accessible equipment, equipment built to low-voltage metal-enclosed switchgear or medium-voltage metal-clad switchgear standards, and so on. Refer to Arc-Flash Information Label Location, on page 7 for information on where to place the labels on equipment (some equipment may require multiple labels).

Deliverables (Simplified Labels)

When first produced, the Arc-Flash Information label rolls are secured with rubber bands.

To ensure proper label selection, pay particular attention to the variable fields (IE, arc flash boundary, and voltage) on each roll of labels. Different rolls of labels with the same IE may differ in voltage and arc-flash boundary.

Labels where the voltage is greater than 15 kV or incident energy is over 40 cal/cm^2 will have the equipment name printed on them—they will be on separate rolls. Multiple labels may have been sent for reasons stated in the previous section.

Installing—Reference Key Table Example

NOTE: For ANSI rated switchgear, two different label types may be provided. Referring to the Example Reference Key Table, below, "SWGR A1" and "SWGR A1 [LINE]" represent this situation. Using the Example Reference Key Table and Figure 5, on page 8, "SWGR A1 [LINE]" would correspond to label placement marked LINE. Labels corresponding to the table entry for "SWGR A1" would be placed as indicated for LOAD.

The differences with the simplified labels are described in the previous sections. This section focuses on installing Arc-Flash Information labels without equipment names by using a reference key table.

Step 1: Determine the designation (name) of a piece of equipment in the field.

Step 2: Find that equipment name in the Reference Key Table (it should be sorted alphabetically).

Step 3: Find the label(s) that match the incident energy (IE), Voltage, and arc-flash boundary shown in the Reference Key Table. All three fields must match.

Table 1:   Example Reference Key Table

Bus Number	Equipment Name	Voltage	Arc-Flash Boundary	IE (Cal./cm^2)
006	HP-1	480	4 ft 9 in.	8
008	LP-1	208	4 ft 9 in.	8
003	SWGR A1	480	7 ft 3 in.	8
003	SWGR A1 [LINE]	480	21 ft 7 in.	40

Installing Outdoor Clear Overlaminates Over Top of Arc-Flash Information Labels

Outdoor equipment having labels exposed to weathering and UV light will need to have an extra layer of protection. Outdoor clear overlaminates can be applied over top of the Arc-Flash Information labels. Multiple labels for one piece of equipment are sometimes sent for a variety of reasons which may include, but are not limited to the following: multiple sections of equipment, side/rear accessible equipment, equipment built to low-voltage metal-enclosed switchgear or medium-voltage metal-clad switchgear standards, and so on. Refer to the Arc-Flash Information Label Location, on page 7, for information on where to place the labels on equipment (some equipment may require multiple labels).

Deliverables

Figure 4:   Arc-Flash Information Label with Overlaminate

When first produced, outdoor clear overlaminate label rolls are secured with rubber bands; these clear labels are 4.5" x 6.5" and will overlay the Arc-Flash Information label (see Figure 4).

Multiple arc-flash labels may have been sent for reasons stated previously.
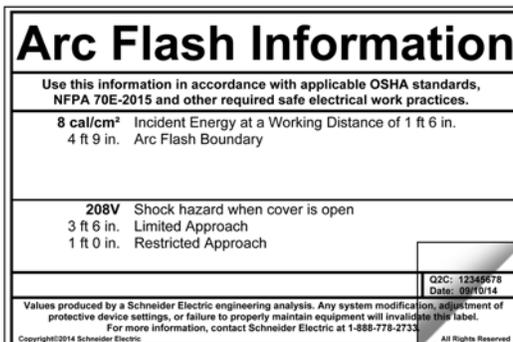
Arc-Flash Information Label Location

Floor-Standing Equipment

- Labels are required on all sections of a lineup in the front of each section.
- Labels should be placed on the sides and rear if the side/rear are accessible and are provided with removable panels or hinged doors.
- Labels should be applied to the exterior of the equipment, with one exception: labels may be installed inside of a hinged door provided the equipment is constructed such that with the door open, a metal barrier covers all of the non-insulated current-carrying parts. One example of this would be equipment with a NEMA type 3R enclosure, which is equipped with an exterior door and an interior door or barrier; the label in this case could be affixed to the interior door/barrier.
- The label should be placed close to the operating handle, cover latch, or in another readily visible location.
- Arc-Flash Information labels should be placed as close as possible to the General Use labels.
- Other equipment safety labels shall not be removed or covered up, unless the label is an Arc-Flash label which is being superseded by these labels.

Wall-Mounted Equipment

- The label should be applied in a consistent location for similar pieces of equipment.
- The label should be placed on or adjacent to the front cover or trim.
- Labels should be applied to the exterior of the equipment, with one exception: labels may be installed inside of a hinged door provided the equipment is constructed such that with the door open there are no exposed current-carrying parts.
- The label should be placed close to the operating handle, cover latch, or in another readily visible location.
- Arc-Flash Information labels should be placed as close as possible to the General Use labels (if mounting inside the cover/door).
- Other equipment safety labels shall not be removed or covered up, unless the label is an Arc-Flash label which is being superseded by these labels.

Multiple Labels with Different Arc-Flash Exposure Values for ANSI Switchgear Equipment

Low-Voltage Metal-Enclosed Switchgear per ANSI/IEEE-C37.20.1

Square D PZ4 switchgear can be ordered and constructed with optional interbay barriers for the cable and bus compartments to isolate the main section.

For switchgear without both optional interbay barriers, labels shall be applied per Figure 5, below.

For switchgear **with both** optional interbay barriers for the cable and bus compartments, labels can be applied per Figure 6, below.

> **NOTE:** Factory equipment drawings can be used to confirm whether the enclosure data includes these optional barriers or not. It will be listed under the Enclosure Data on the drawing indicating both: Interbay Barriers, Cable Compartment and Interbay Barriers, Bus Compartment.

Switchgear having multiple sources of power (double ended), specialized switchgear such as UPS output gear, and so on, will need special consideration and therefore the diagram below does not necessarily apply.

Some switchgear devices may draw power from the line side of the main breaker. Sections containing such devices shall be labeled based on the arc-flash hazard available at the line side of the main breaker.

Figure 5: Low-Voltage Metal-Enclosed Switchgear per ANSI/IEEE C37.20.1 (without both optional interbay barriers for the bus and cable compartments)

Labels on front, back and side of <u>main section</u> based on the arc-flash hazard available at the **line side** of the main breaker.

Labels on back and side of <u>distribution sections</u> based on the arc-flash hazard available at the **line side** of the main breaker.

Main Section   Distribution Sections

Labels on front of <u>distribution sections</u> based on the arc-flash hazard available at the **load side** of the main breaker.
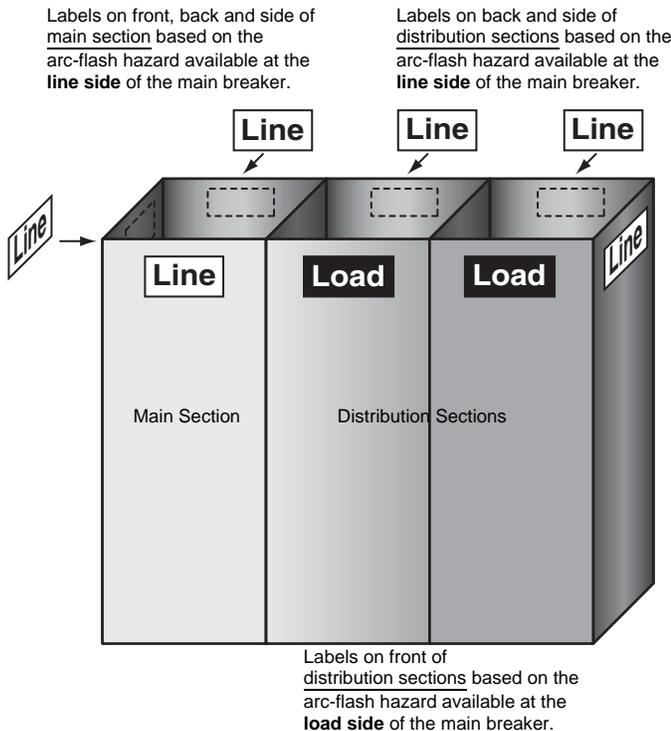
Figure 6: Low-Voltage Metal-Enclosed Switchgear per ANSI/IEEE C37.20.1 (with both optional interbay barriers for the bus and cable compartments)

Labels on front, back and side of <u>main section</u> based on the arc-flash hazard available at the **line side** of the main breaker.

Main Section   Distribution Sections

Labels on back, front and side of <u>distribution sections</u> based on the arc-flash hazard available at the **load side** of the main breaker.
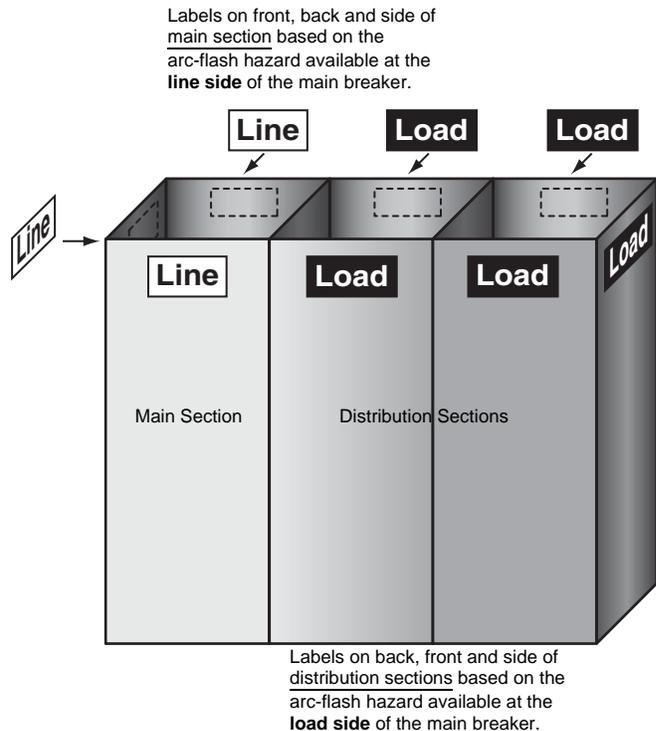
Medium-Voltage Metal-Clad Switchgear per ANSI/IEEE-C37.20.2

Square D Masterclad™ switchgear is an example of equipment with internal barriers to isolate the main section.

Labels shall be applied per Figure 7, below.

Switchgear having multiple sources of power (double ended), specialized switchgear such as UPS output gear, and so on, will need special consideration and therefore the diagram below does not necessarily apply.

Some switchgear devices such as voltage and control power transformers may draw power from the line side of the main circuit breaker. Sections containing such devices shall be labeled based on the arc-flash hazard available at the line side of the main circuit breaker.

Figure 7:   Medium-Voltage Metal-Clad Switchgear per ANSI/IEEE C37.20.2

Labels on front, back and side of main section based on the arc-flash hazard available at the **line side** of the main breaker.

Labels on back, front and side of distribution sections based on the arc-flash hazard available at the **load side** of the main breaker.
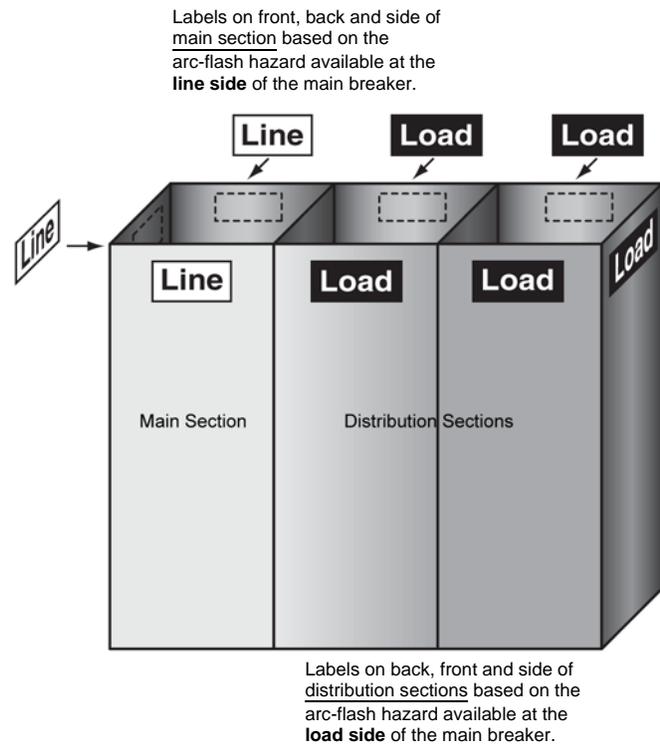
Application Procedures for Labels

It is very important to follow the application procedures outlined in these instructions so that labels will achieve a proper bond to the product surface. Failure to follow these instructions could affect both long and short term label adhesion.

Storage

Labels are usually shipped in cardboard boxes. They should be stored in a cool, dry area where the temperature is maintained between 60°F and 75° F. Because of the importance of these labels, do not store for more than three months prior to application.

Materials Needed

Some customers require a Hazardous Waste Manifest and others, such as automotive plants, may not allow some or all of these chemicals to be brought into the facility. Refer to Material Safety Data Sheets for health and safety information on the products referenced in this bulletin. Most all

chemical cleaners are flammable so read and follow product directions during use.

1. The labels.

2. A clean lint-free dry cloth towel or absorbent paper towel.

3. For relatively clean surfaces, isopropyl alcohol.

4. For contaminated surfaces (see Cleaning Procedures, on page 10), a petroleum distillate based cleaner, detergent, and warm water. If a petroleum distillate based cleaner is needed, any of the following solvents may be used: DuPont® Prep-Sol™ brand solvent cleaner 3916S™, Sherman Williams® R7-K156 Sher-Will-Clean®, xylol, lacquer thinner, VM&P Naptha, or 3M™ General Purpose Adhesive Cleaner 08984 (for removal of adhesive residue, wax, grease, dirt, tar, and oil).

   NOTE: Spot test these solvents prior to use since they may dull some painted surfaces.

Cleaning Procedures

Surfaces should be clean prior to application of the label.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- To avoid risk of electric shock, explosion, or arc-flash, electrical equipment should never be scrubbed using dripping rags, brushes, or sponges with water or any other cleaning solution. The equipment shall never be sprayed, or soaked with water or any other cleaning solution.

- Most chemical cleaners are flammable so read and follow product directions and all safety instructions during use.

Failure to follow these instructions will result in death or serious injury.

⚠ CAUTION

HAZARD OF CUTS AND LACERATIONS OF THE HANDS

Be careful not to get cut on any sharp metal objects.

Failure to follow these instructions can result in severe injury.

For Relatively Clean Surfaces, Follow This Procedure

Wipe the surface with isopropyl alcohol and repeat as necessary. Use clean lint-free rags or absorbent paper towels to dry.

For Cleaning Contaminated Surfaces, Follow This Procedure

For contaminated surfaces (residue of oil, grease, wax, and so on) it is important to note that a petroleum distillate based cleaner must be used (adhere to the list of petroleum distillate based cleaners in the previous section). Isopropyl alcohol evaporates too rapidly and effective cleaning does not take place.

If visible dirt is present, wipe the surface with detergent and water. With a petroleum distillate based cleaner applied to a dampened clean cloth, wipe the surface. Dry the surface with a lint-free cloth before the solvent evaporates from the surface. Repeat as necessary.

Most chemical cleaners are flammable so read and follow product directions and all safety instructions during use.

Application Procedure

Prior to application of a label, the surface and labels should be at least 50°F. Make sure the surface is clean and dry. Determine the correct position for the label. Remove the label and position it on the surface (be careful not to touch the adhesive with your fingers, or to allow the adhesive to become contaminated with dust, dirt, and other debris). Using firm pressure, slowly slide over the label with your hand starting at the center and working toward the outer edges.

Additional Information

For additional information on cleaning specific surfaces (i.e., various metals, plastics, painted surfaces, and so on), obtain a copy of Instruction Bulletin 5.1 printed by 3M.

**Arc-Flash Label Installation
Instruction Bulletin**

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