



Bulletin 194R Next Generation Global Fused and Non-Fused Disconnects
• 20 A...63 A Sizes
• Fused switch versions:
- BS88 - DIN
- CSA HRCII-C - CSA HRCI-MISC
- UL Class J - UL Class CC
- NFC
• Non-fused switches
• Operating handle ingress ratings:
- IP42 (Type 1)
- IP66 (Type 3R, 3, 12, 4, 4X)
• Handle with or without test mode
• Padlockable handle for up to three padlocks
• Up to 6 auxiliary contacts can be added per switch
• Suitable as service entrance disconnecting means (UL 98)
• Suitable as at-motor disconnecting means (UL 508)
Certifications
UL Listed (File No. E 14841, Guide NLRV; File No. E 47426, Guide WHTY)
CSA Certified (File No. LR1234)
CE

Table of Contents
Product Selection —
Open Switches ..... this page
NFPA 79 Operating
Shaft/Handle Kits..... 2-461
Specifications..... 2-463
Proper Selection of
Disconnect Switches 2-473
Fuse Description ..... 2-474
Standards Compliance
IEC 60947/EN60947-3
BS EN60947-3
VDE 0660
CSA 22.2 No. 4
NEMA KS-1
UL 98
UL 508

The Bulletin 194R line of fused and non-fused global disconnect switches provides the flexibility to meet worldwide applications. These rod-operated disconnect switches incorporate removable fuse carriers that have high short circuit protection ratings. The disconnect switches are UL Listed and CSA Certified and are designed to meet IEC 60947-3, VDE, DIN, BS and applicable NEMA requirements.

Product Selection — Open Switches
Catalog Number Explanation



Cat. No. 194R-J30-1753

194R - J 30 -1753 S
a b c d

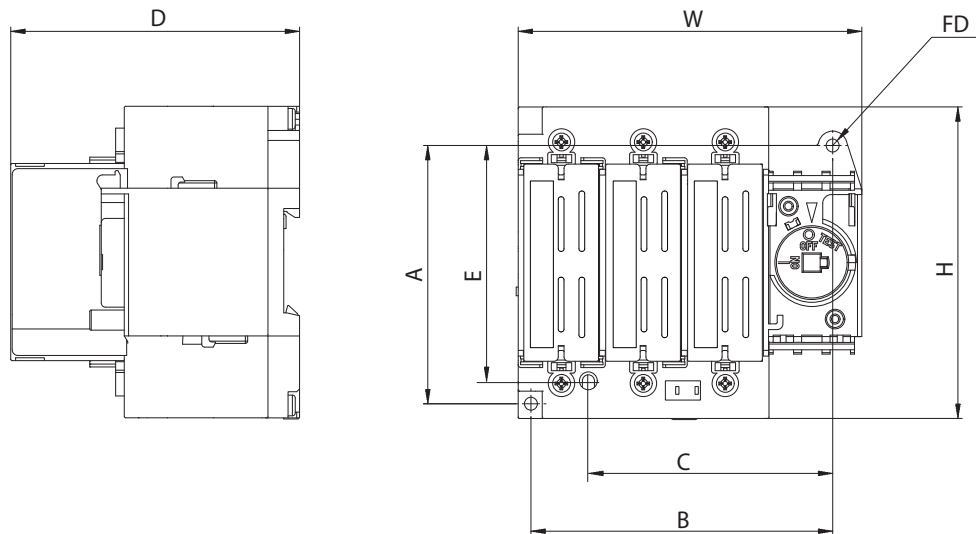
Table with 4 main sections: Fuse Type (a), Load Size (b), No. of Poles (c), and Fuse Indication (d). Each section contains a table with codes and descriptions.

\* See page 2-469 for dimensional reference data.
\* Non-fused disconnect switches must use separately installed fuses for upstream short-circuit protection

Fourth pole, additional auxiliary contacts and handle options available in accessory section.
Limit of 6 total auxiliary contact blocks total for test and standard positions.

Dimensions in millimeters (inches). Dimensions are not intended to be used for manufacturing purposes.

**Disconnect Switch Dimension References A1, A2, B1, and B2 (30 A and 60 A)**

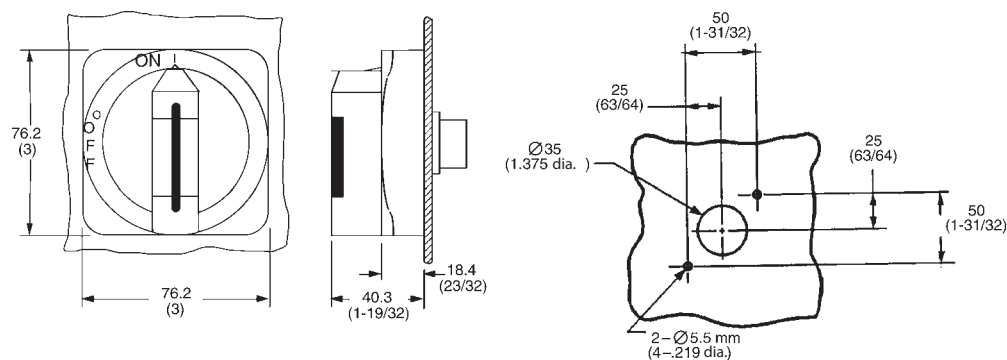


2

| Disconnect Switch<br>Dimension Reference | Approximate Dimensions mm (in) |               |               |               |               |              |              |            |
|------------------------------------------|--------------------------------|---------------|---------------|---------------|---------------|--------------|--------------|------------|
|                                          | H                              | W             | D             | A             | B             | C*           | E*           | FD         |
| A1                                       | 108 (4-1/4)                    | 120 (4-3/4)   | 101 (4)       | 90 (3-9/16)   | 105 (4-1/8)   | 85 (3-11/32) | 82 (3-15/64) | 2-M4, 2-#8 |
| A2                                       | 108 (4-1/4)                    | 120 (4-3/4)   | 80 (3-1/8)    | 90 (3-9/16)   | 105 (4-1/8)   | 85 (3-11/32) | 82 (3-15/64) | 2-M4, 2-#8 |
| B1                                       | 113 (4-29/64)                  | 142 (5-19/32) | 114 (4-31/64) | 100 (3-15/16) | 120 (4-23/32) | N/A          | N/A          | 4-M4, 4-#8 |
| B2                                       | 113 (4-29/64)                  | 142 (5-19/32) | 93 (3-43/64)  | 100 (3-15/16) | 120 (4-23/32) | N/A          | N/A          | 4-M4, 4-#8 |

\* Mounting holes for backward compatibility with Bulletin 194R legacy switches.

**Operating Handles — Cat. No. 194R-HS.../HST**



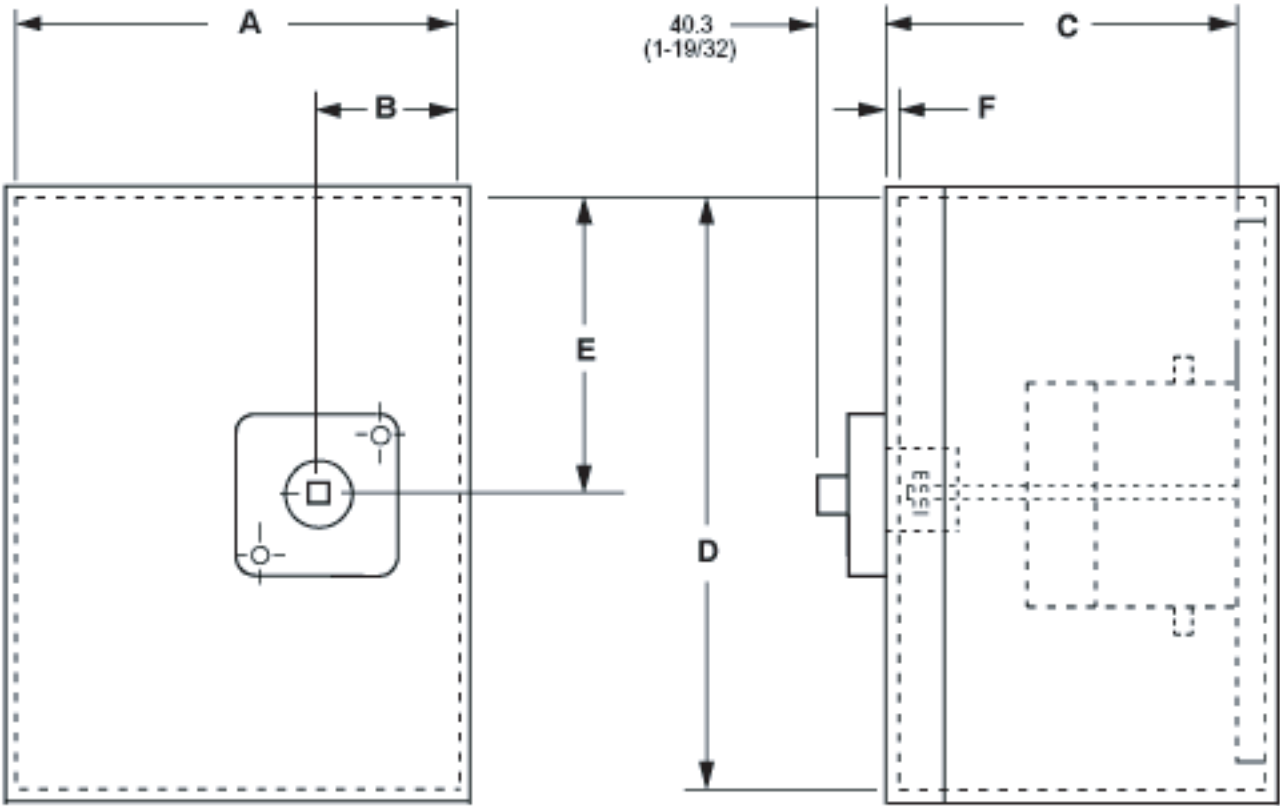
Bulletin 194R

IEC Fused and Non-Fused Disconnects, 30 & 60 A

Approximate Dimensions

Dimensions in millimeters (inches). Dimensions are not intended to be used for manufacturing purposes.

Disconnect Switch Dim. Ref.: A1, A2, B1, B2 (30 A and 60 A) Enclosure and Operating Handle

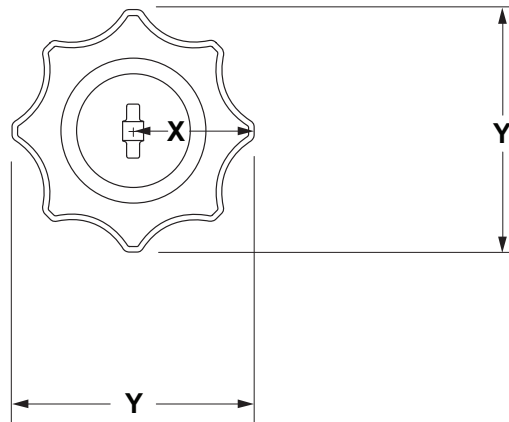
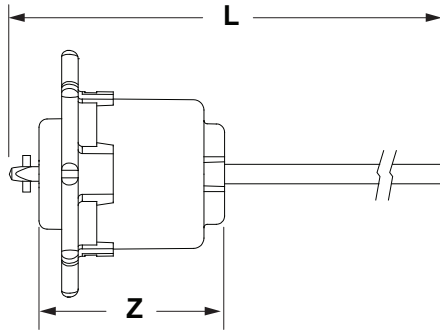


Enclosure Installation Dimensions

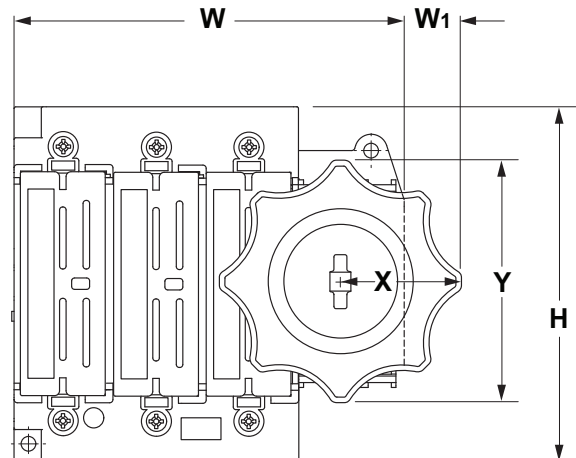
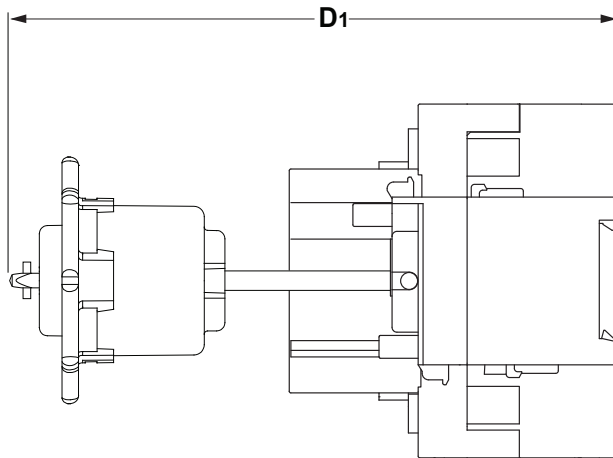
| Cat. No.             | Dimension Reference | A           | B            | C               |              | D           | E            | F          |             |
|----------------------|---------------------|-------------|--------------|-----------------|--------------|-------------|--------------|------------|-------------|
|                      |                     | Maximum     | Minimum      | Minimum         | Maximum      | Minimum     | Minimum      | Minimum    | Maximum     |
| 194R-B20-1753        | A1                  | 171 (6-3/4) | 45 (1-49/64) | 147.6 (5-13/16) | 454 (17-7/8) | 248 (9-3/4) | 89 (3-1/2)   | 1.4 (1/16) | 4/78 (3/16) |
| 194R-B32-1753        |                     |             |              |                 |              |             |              |            |             |
| <b>194R-C30-1753</b> |                     |             |              |                 |              |             |              |            |             |
| 194R-F32-1753        |                     |             |              |                 |              |             |              |            |             |
| <b>194R-J30-1753</b> | A2                  | 171 (6-3/4) | 45 (1-49/64) | 111 (4-3/8)     | 454 (17-7/8) | 248 (9-3/4) | 89 (3-1/2)   | 1.4 (1/16) | 4/78 (3/16) |
| <b>194R-N30-1753</b> |                     |             |              |                 |              |             |              |            |             |
| 194R-B63-1753        | B1                  | 197 (7-3/4) | 45 (1-49/64) | 147.6 (5-13/16) | 454 (17-7/8) | 248 (9-3/4) | 105 (4-9/64) | 1.4 (1/16) | 4/78 (3/16) |
| 194R-D32-1753        |                     |             |              |                 |              |             |              |            |             |
| 194R-D63-1753        |                     |             |              |                 |              |             |              |            |             |
| 194R-F63-1753        |                     |             |              |                 |              |             |              |            |             |
| <b>194R-H30-1753</b> |                     |             |              |                 |              |             |              |            |             |
| 194R-H60-1753        |                     |             |              |                 |              |             |              |            |             |
| <b>194R-J60-1753</b> | B2                  | 197 (7-3/4) | 45 (1-49/64) | 111 (4-3/8)     | 454 (17-7/8) | 248 (9-3/4) | 105 (4-9/64) | 1.4 (1/16) | 4/78 (3/16) |
| <b>194R-N60-1753</b> |                     |             |              |                 |              |             |              |            |             |

Dimensions in millimeters (inches). Dimensions are not intended to be used for manufacturing purposes.

### Universal Internal Handle Dimensions



| Catalog No. |             | L<br>(max)  | X             | Y         | Z             |
|-------------|-------------|-------------|---------------|-----------|---------------|
| 194R -NHR1  | mm<br>(in.) | 305<br>(12) | 38<br>(1-1/2) | 76<br>(3) | 57<br>(2-1/4) |
| 194R -NHR2  | mm<br>(in.) | 533<br>(21) | 38<br>(1-1/2) | 76<br>(3) | 57<br>(2-1/4) |



| Catalog No.                                                                           | Dim.<br>Ref. |             | H                | W                | W <sub>1</sub> | D <sub>1</sub><br>(min) | X             | Y         |
|---------------------------------------------------------------------------------------|--------------|-------------|------------------|------------------|----------------|-------------------------|---------------|-----------|
| 194R-B20-* 194R-F25-*<br>194R-B32-* 194R-F32-*<br>194R-C30-* 194R-J30-*               | <b>A1</b>    | mm<br>(in.) | 108<br>(4-1/4)   | 120<br>(4-3/4)   | 19<br>(3/4)    | 184<br>(7-1/4)          | 38<br>(1-1/2) | 76<br>(3) |
| 194R-N30-*                                                                            | <b>A2</b>    | mm<br>(in.) | 108<br>(4-1/4)   | 120<br>(4-3/4)   | 19<br>(3/4)    | 160<br>(6-5/16)         | 38<br>(1-1/2) | 76<br>(3) |
| 194R-B63-* 194R-H30-*<br>194R-D32-* 194R-H60-*<br>194R-D63-* 194R-J60-*<br>194R-F63-* | <b>B1</b>    | mm<br>(in.) | 113<br>(4-29/64) | 142<br>(5-19/32) | 19<br>(3/4)    | 196<br>(7-49/64)        | 38<br>(1-1/2) | 76<br>(3) |
| 194R-N60-*                                                                            | <b>B2</b>    | mm<br>(in.) | 113<br>(4-29/64) | 142<br>(5-19/32) | 19<br>(3/4)    | 176<br>(6-59/64)        | 38<br>(1-1/2) | 76<br>(3) |

Bulletin 194R

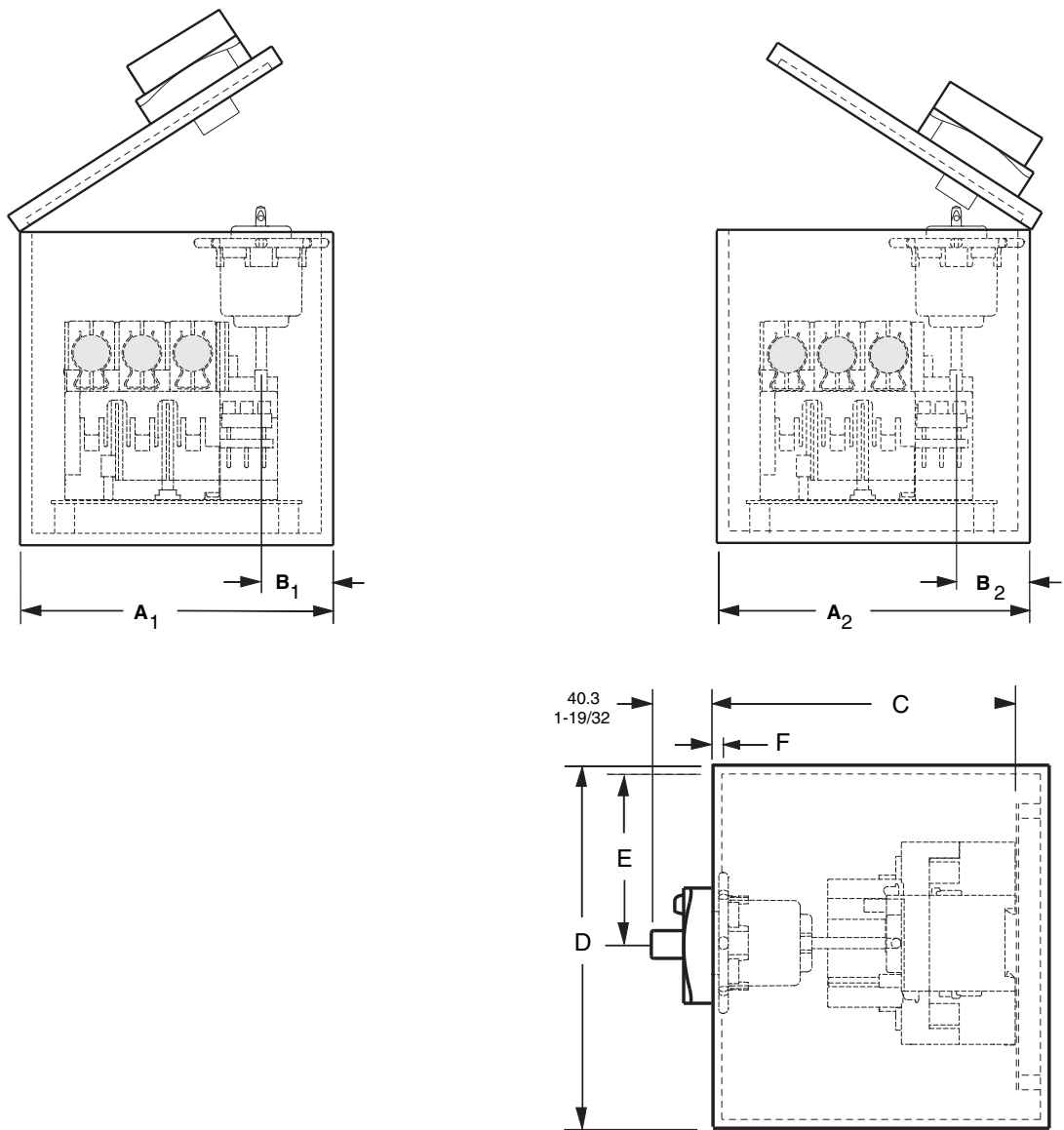
IEC Fused and Non-Fused Disconnects, 30 & 60 A

Approximate Dimensions

Dimensions in millimeters (inches). Dimensions are not intended to be used for manufacturing purposes.

Enclosure Installation Dimensions

2



ENCLOSURE INSTALLATION DIMENSIONS

| CAT.                             | DIM. REF. |     | A <sub>1</sub> <sup>12</sup> | A <sub>2</sub> | B       | B       | C       |         | D       | E       | F       |         |
|----------------------------------|-----------|-----|------------------------------|----------------|---------|---------|---------|---------|---------|---------|---------|---------|
|                                  |           |     | MINIMUM                      | MINIMUM        | MINIMUM | MINIMUM | MINIMUM | MAXIMUM | MINIMUM | MINIMUM | MINIMUM | MAXIMUM |
| 194R-B20-* 194R-C30-* 194R-J30-* | A1        | mm  | 171                          | 203            | 45      | 76      | 178     | 454     | 248     | 89      | 1.4     | 4.78    |
| 194R-F25-* 194R-B32-* 194R-F32-* |           | in. | 6-3/4                        | 7-63/64        | 1-49/64 | 3       | 7       | 17-7/8  | 9-3/4   | 3-1/2   | 1/16    | 3/16    |
| 194R-N30-*                       | A2        | mm  | 171                          | 203            | 45      | 76      | 178     | 454     | 248     | 89      | 1.4     | 4.78    |
|                                  |           | in. | 6-3/4                        | 7-63/64        | 1-49/64 | 3       | 7       | 17-7/8  | 9-3/4   | 3-1/2   | 1/16    | 3/16    |
| 194R-D32-* 194R-H60-* 194R-J60-* | B1        | mm  | 197                          | 228            | 45      | 76      | 178     | 454     | 248     | 105     | 1.4     | 4.78    |
| 194R-B63-* 194R-D63-* 194R-F63-* |           | in. | 7-3/4                        | 8-63/64        | 1-49/64 | 3       | 7       | 17-7/8  | 9-3/4   | 4-9/64  | 1/16    | 3/16    |
| 194R-N60-*                       | B2        | mm  | 197                          | 228            | 45      | 76      | 178     | 454     | 248     | 105     | 1.4     | 4.78    |
|                                  |           | in. | 7-3/4                        | 8-63/64        | 1-49/64 | 3       | 7       | 17-7/8  | 9-3/4   | 4-9/64  | 1/16    | 3/16    |

\*Dimensions common for R1 or R2 shaft lengths

## Proper Selection of Disconnect Switches

### Applications Within Canada and the United States

#### General

The requirements for disconnect switches used in motor branch circuits rated 600V and less are defined in Article 430, Part J of the U.S. National Electrical Code (NEC), NFPA70. Canadian Electrical Code (CEC) requirements are very similar in the area of motor branch circuit disconnect requirements. For simplicity, we will treat the NEC and CEC requirements as being the same — and reference specific sections of the U.S. National Electrical Code.

The requirements for properly sizing a disconnect switch are dependent on the type of application. The NEC refers to two types of applications: single motor and combination loads. A combination load consists of an application where two or more motors are used together or where one or more motors are used in combination with other loads, such as resistance heaters.

#### Single Motor Applications

Section 430-110 Paragraph (a) states that the disconnect switch must have an ampere rating of at least 115% of the full-load current rating of the motor.

**Example 1:** For a motor with a full-load current of 22 A, the disconnect switch must be rated at least 25.3 A ( $22 \times 1.15$ ). If the disconnecting means under evaluation is rated in horsepower, the selection of the disconnect switch is even more straightforward; a disconnect switch must have a horsepower rating equal to, or greater than the horsepower rating of the motor at the applicable voltage.

**Example 2:** For a motor with a 10 Hp rating at 460V AC, the disconnect switch must be rated at least 10 Hp at 460V AC. If the disconnect switch is rated in horsepower, and UL Listed, UL Component Recognized, or CSA Certified, it will meet the requirements for the 115% full load current rating stipulated by the NEC.

#### Combination Load Applications

Section 430-110 Paragraph (c) addresses the rating of the disconnecting means for combination loads. This paragraph essentially requires that the loads that “may be simultaneous on a single disconnecting means” be combined to provide equivalent full-load and locked-rotor currents for what is then to be considered as a single motor for the purpose of selecting the appropriate disconnecting means. This means that it is necessary to identify the particular combination of connected loads which can be operating simultaneously and will result in the maximum full-load and locked-rotor current sums.

The individual full-load current values are to be selected from Tables 430-148, 430-149, or 430-150 and the locked-rotor values are to be from Table 430-151.

The equivalent single motor full-load current is the sum of the simultaneously operating motor full-load currents and the rating in amperes of other loads operating at the same time. The equivalent locked-rotor current is the sum of the simultaneously started motors’ locked-rotor currents and the full-load currents of the remaining operating motor and non-motor loads.

The disconnecting means shall have a current rating equal to or greater than 115% of the equivalent single motor full-load current and have a horsepower rating equal to or greater than the horsepower rating determined from the equivalent locked-rotor summation.

Consider the following 460V application:

| Load             | Hp | Full-Load Current [A] |
|------------------|----|-----------------------|
| Motor 1          | 5  | 7.6 (simultaneous)    |
| Motor 2          | 10 | 14.0 (not included)*  |
| Motor 3          | 15 | 21.0 (simultaneous)   |
| Motor 4          | 20 | 27.0 (simultaneous)   |
| Other            |    | 7.0 (simultaneous)    |
| Total Equivalent |    | 62.6 (simultaneous)   |

\* Motor 2 is not included in the total since it cannot operate simultaneously with the other motors, therefore, the disconnect switch must be rated at least 72 A ( $1.15 \times 62.6$ ).

Consider now the locked-rotor current analysis for the same application:

| Load             | Hp | Full-Load Current [A]        |
|------------------|----|------------------------------|
| Motor 1          | 5  | (7.6FLA) 45.6 (simultaneous) |
| Motor 2          | 10 | 84.0 (not included)*         |
| Motor 3          | 15 | 126.0 (simultaneous)*        |
| Motor 4          | 20 | 162.0 (simultaneous)*        |
| Other            |    | 7.0 (simultaneous)           |
| Total Equivalent |    | 302.6 (simultaneous)         |

\* Note again that Motor 2 cannot operate simultaneously with the other loads.

\* The largest equivalent locked-rotor current occurs when motors 3 and 4 start together while the other loads marked “simultaneous” are already operating. Since Motor 1 is not starting with Motors 3 and 4, its full-load current will be added to the total instead of its locked-rotor current.

Table 430-151, which provides the correlation between locked-rotor currents and Hp ratings, shows that a 40 Hp rating is the equivalent for 302.6 locked-rotor amperes.

Therefore, the disconnect selected for this application must have a current rating of at least 72 A and a Hp rating of at least 40 Hp. In this case a Bulletin 194R rated for 100 A and 60 Hp at 460V would be an appropriate choice. What can be seen from this analysis is that, depending upon the number of motors that can start simultaneously, the actual size of the required disconnect is sometimes determined by the equivalent full load current (72 A) and other times by the equivalent horsepower determined from the locked rotor analysis (40 Hp).

### Applications Outside the United States and Canada

#### General

Disconnect switches designed to IEC Standards and used in applications outside of North America are selected based on the ampere, horsepower, or kilowatt rating of the disconnect switch, under various utilization categories. Utilization categories for disconnect switches are as follows:

| Nature of Current | Utilization Category |                      | Typical Applications                                                           |
|-------------------|----------------------|----------------------|--------------------------------------------------------------------------------|
|                   | Frequent Operation   | Infrequent Operation |                                                                                |
| AC                | AC-20A*              | AC-20B*              | Connecting and disconnecting under no load conditions                          |
|                   | AC-21A               | AC-21B               | Switching of resistive loads including moderate overloads                      |
|                   | AC-22A               | AC-22B               | Switching of mixed resistive and inductive loads, including moderate overloads |
|                   | AC-23A               | AC-23B               | Switching of motor loads or other highly inductive loads                       |

\* The use of these utilization categories is not permitted in the U.S.

For any application, the disconnect switch rating (A, Hp, or kW) must be greater than or equal to the application full-load current or power (Hp or kW), in the appropriate utilization category.

**Example 1:** For a 380V 50 Hz distribution application (AC-22A), with a 63 A full load current, the disconnect switch must be rated at least 63 A at 380V 50 Hz for use in AC-22A applications.

**Example 2:** For a 415V 50 Hz motor application (AC-23A), with a 75 kW rating, the disconnect switch must be rated at least 75 kW at 415V 50 Hz for use in AC-23A applications.

Bulletin 194R

# IEC Fused and Non-Fused Disconnects, 30 & 60 A

Fuse Description

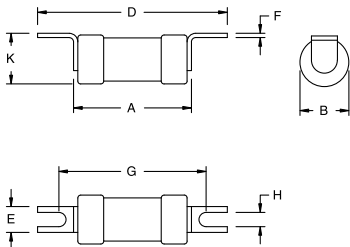
Fuse Description

With Bulletin 194R Fused Disconnect Switches

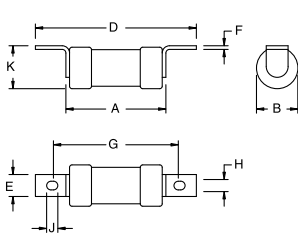
Bulletin 194R Fused Disconnect Switches have been designed to accept a variety of fuses for worldwide application flexibility. Following is a brief summary of typical fuse specifications, where the fuses are typically used, and which Bulletin 194R disconnect switches will accommodate each fuse type. Fuse manufacturers should be contacted for more specific information about each fuse type. **Fuses are not available from Rockwell Automation. BS88 Fuses (63 A shown)**

Dimensions in millimeters (inches). Dimensions are not intended to be used for manufacturing purposes.

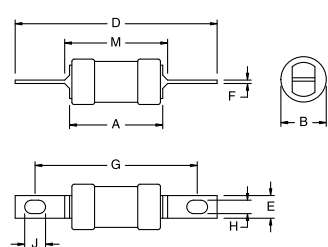
- IEC fuse type: Fuse-link for bolted connection
- Voltage rating: 660/690V AC
- Interrupting rating: 80 kA
- Standard cartridge sizes: A1, A2, A3, A4, B1, B2, B3, B4
- Typical ampere ratings: 2...400 A
- Construction: Blade type for bolted connection
- Can be installed on Bulletin 194R disconnect switch
- **Cat. Nos: 194RNA100P3, NA200P3, NA300P3, NA380P3, NA400P3, NB200P3, NB300P3**
- Where used: United Kingdom, Australia, New Zealand, Asia



Standard cartridge size A1



Standard cartridge sizes A2, A3, A4



Standard cartridge sizes B1, B2, B3, B4

| Dim. Ref. | Ampere Range [A] | A              | B             | D              | E            | F           | G            | H            | K            |
|-----------|------------------|----------------|---------------|----------------|--------------|-------------|--------------|--------------|--------------|
| A1        | 2...20           | 36.50 (1-7/16) | 13.90 (35/64) | 55.60 (2-3/16) | 11.10 (7/16) | 0.80 (1/32) | 4.50 (1-3/4) | 4.40 (11/64) | 14.30 (9/16) |

| Dim. Ref. | Ampere Range [A] | A              | B             | D              | E            | F           | G               | H            | J             | K             |
|-----------|------------------|----------------|---------------|----------------|--------------|-------------|-----------------|--------------|---------------|---------------|
| A2        | 2...20           | 56.40 (2-7/32) | 23.80 (15/16) | 85.80 (3-3/8)  | 8.70 (11/32) | 1.20 (3/64) | 73.00 (2-7/8)   | 5.20 (13/64) | 7.10 (9/32)   | 23.80 (15/16) |
| A3        | 35...63          | 56.40 (2-7/32) | 23.80 (15/16) | 85.80 (3-3/8)  | 8.70 (11/32) | 1.20 (3/64) | 73.00 (2-7/8)   | 5.20 (13/64) | 7.10 (9/32)   | 23.80 (15/16) |
| A4        | 80...100         | 70.00 (2-3/4)  | 34.90 (1-3/8) | 111.00 (4-3/8) | 19.10 (3/4)  | 2.40 (3/32) | 93.70 (3-11/16) | 8.70 (11/32) | 10.30 (13/32) | 34.90 (1-3/8) |

| Dim. Ref. | Ampere Range [A] | A              | B               | D              | E           | F          | G              | H            | J             | M             |
|-----------|------------------|----------------|-----------------|----------------|-------------|------------|----------------|--------------|---------------|---------------|
| B1        | 2...20           | 70.00 (2-3/4)  | 34.90 (1-3/8)   | 136.50 (5-3/8) | 19.10 (3/4) | 3.20 (1/8) | 111.00 (4-3/8) | 8.70 (11/32) | 11.90 (15/32) | 79.40 (3-1/8) |
| B2        | 125...200        | 77.00 (3-1/32) | 41.30 (1-5/8)   | 136.50 (5-3/8) | 19.10 (3/4) | 3.20 (1/8) | 111.00 (4-3/8) | 8.70 (11/32) | 11.90 (15/32) | 79.40 (3-1/8) |
| B3        | 250...315        | 83.00 (3-9/32) | 54.00 (2-1/8)   | 136.50 (5-3/8) | 25.40 (1)   | 3.20 (1/8) | 111.00 (4-3/8) | 8.70 (11/32) | 11.90 (15/32) | 82.00 (3-1/4) |
| B4        | 355...400        | 70.00 (2-3/4)  | 61.10 (2-13/32) | 136.50 (5-3/8) | 25.40 (1)   | 6.30 (1/4) | 111.00 (4-3/8) | 8.70 (11/32) | 11.90 (15/32) | 85.80 (3-3/8) |