

Freedom Series

2



Product Overview

Freedom Series starters and contactors feature a compact, space-saving design, using state-of-the-art technology and the latest in high strength, impact and temperature resistant insulating materials.

Features, Benefits and Functions

Freedom NEMA

- Adjustable bimetallic ambient compensated overload relays with interchangeable heater packs—available in three basic sizes, covering applications up to 900 hp—reducing the number of different contactor/overload relay combinations that have to be stocked. Fixed heater overloads are optional
- Electronic overload relay (C440) available as a stand-alone unit and assembled with Freedom Contactor
- A full line of snap-on accessories— top and side mounted auxiliary contacts, solid-state and pneumatic timers, and so on
- Straight-through wiring— line lugs at top, load lugs at bottom
- Horizontal or vertical mounting on upright panel for application freedom
- Screw type power terminals have captive, backed-out self-lifting pressure plates with \pm screws—reduced wiring time
- Accessible terminals for easy wiring. Optional fingerproof shields available to prevent electrical shock
- Top located coil terminals convenient and readily accessible. 45 mm contactor magnet coils have three terminals, permitting either top or diagonal wiring—easy to replace European or U.S. style starters or contactors without changing wiring layout
- Designed to meet or exceed NEMA, UL, CSA, VDE, BS and other international standards and listings
- American engineering— built by Eaton, using the latest in statistical process control methods to produce high quality, reliable products
- Sized based on standard NEMA classifications
- Easy coil change and inspectable/replaceable contacts
- Available in open and NEMA Type 1, 3R, 4/4X and 12 enclosures

Contents

| Description | Page |
|---|-----------------|
| Technical Data and Specifications | |
| Standards and Certifications | V5-T2-3 |
| Catalog Number Selection | V5-T2-3 |
| Contactors—Non-Reversing and Reversing | V5-T2-4 |
| Starters—Three-Phase Non-Reversing and Reversing, Full Voltage | V5-T2-10 |
| Starters—Single-Phase Non-Reversing, Full Voltage, Bi-Metallic Overload | V5-T2-15 |
| Accessories. | V5-T2-21 |
| Renewal Parts | V5-T2-30 |
| Technical Data and Specifications. | V5-T2-34 |
| Relays—Thermal Overload | V5-T2-38 |
| C440/ XT Electronic Overload Relay | V5-T2-48 |

Standards and Certifications

- Standard: designed to meet or exceed UL, NEMA, IEC, CSA, VDE and BS
- UL listed: UL File #E1491, Guide #NLDX—Open and NEMA 1, 4, 12 Enclosed
- CSA Certified: CSA File #LR353, Class #321104 Open and NEMA 1 Enclosed



ISO 9000 Certification

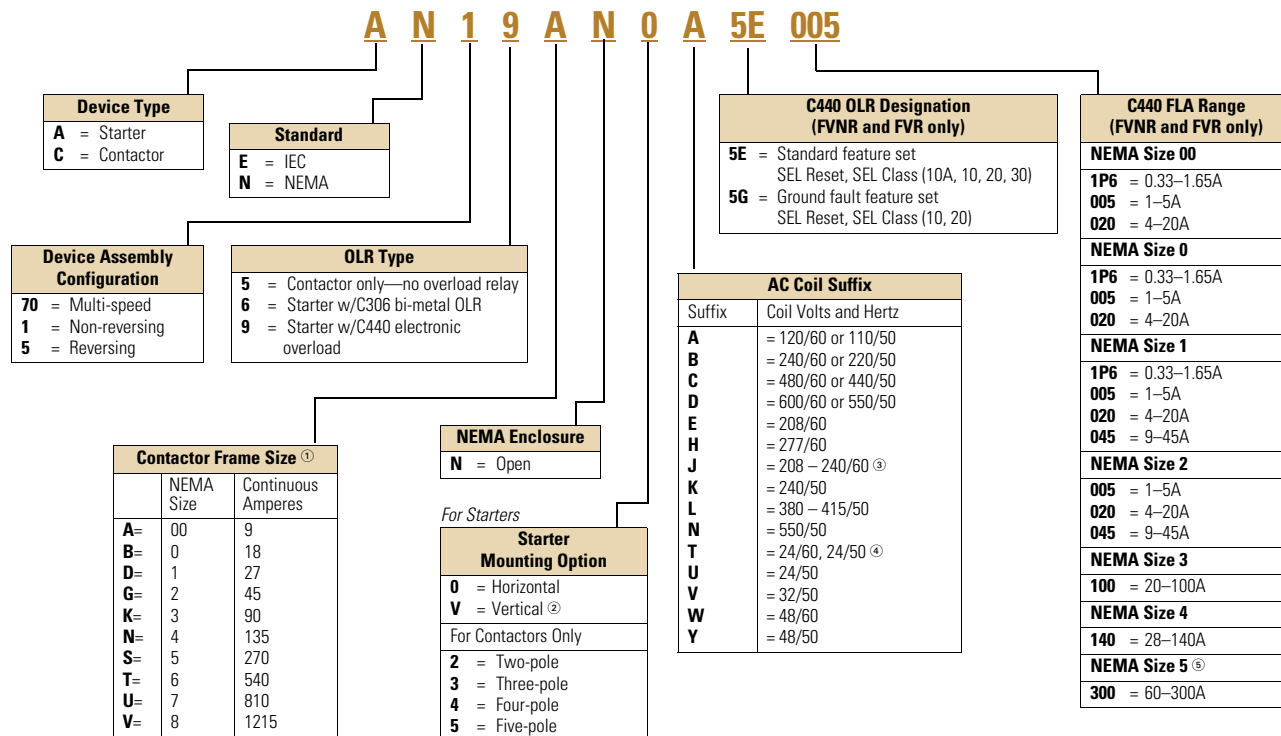
When you turn to Eaton's products, you turn to quality. The International Standards Organization (ISO) has established a series of standards acknowledged by 91 industrialized nations to bring harmony to the international quest for quality. The ISO certification process covers 20 quality system elements in design, production and installation that must conform to achieve registration. This commitment to quality will result in increased product reliability and total customer satisfaction.

Short Circuit Protection

Fuses and Inverse-Time Circuit Breakers may be selected per Article 430, Part D of the National Electrical Code to protect motor branch circuits from fault conditions. If higher ratings or settings are required to start the motor, do **not** exceed the maximum as listed in Exception No. 2, Article 430-52.

Catalog Number Selection

Freedom Series

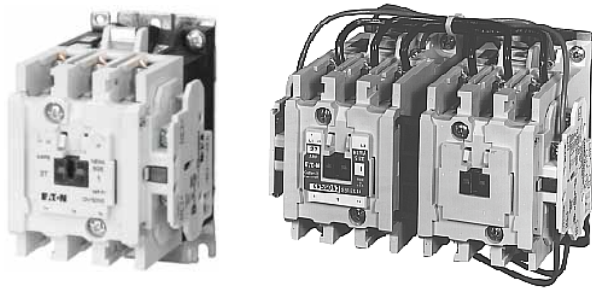


Notes

- For contactor only orders, add **B** to end of catalog number if NEMA Size 00–2, 6.
- Only available on AN56 reversing starters.
- NEMA Sizes 00 and 0 only.
- NEMA Sizes 00 and 0 only. Sizes 1–8 are 24/60 only.
- NEMA Size 5 requires the use of CTs with 1-5A OL relay.

Non-Reversing and Reversing Contactors

2



Contactors—Non-Reversing and Reversing

Product Description

Non-Reversing

Contactors are most commonly used to switch motor loads in applications where running overcurrent protection is either not required or is provided separately. Contactors consist of a magnetically actuated switch which can be remotely operated by a pushbutton station or pilot device such as a proximity switch, limit switch, float switch, auxiliary contacts, and so on.

Reversing

Reversing contactors are used primarily for reversing single- or three-phase motors in applications where running overcurrent protection is either not required or is provided separately. They consist of two contactors mechanically and electrically interlocked to prevent line shorts and energization of both contactors simultaneously.

Contents

Description**Page**

| | |
|---|-----------------|
| Contactors—Non-Reversing and Reversing | |
| Product Selection | V5-T2-5 |
| Kits and Accessories | V5-T2-6 |
| Renewal Parts Publication Numbers | V5-T2-6 |
| Technical Data and Specifications | V5-T2-7 |
| Dimensions | V5-T2-8 |
| Starters—Three-Phase Non-Reversing and Reversing, Full Voltage | V5-T2-10 |
| Starters—Single-Phase Non-Reversing, Full Voltage, Bi-Metallic Overload | V5-T2-15 |
| Accessories | V5-T2-21 |
| Renewal Parts | V5-T2-30 |
| Technical Data and Specifications | V5-T2-34 |
| Relays—Thermal Overload | V5-T2-38 |

Features, Benefits and Functions

- Designed specifically for use in applications requiring NEMA ratings. Contactors meet or exceed NEMA standards ICS 2-1993
- Long life twin break, silver cadmium oxide contacts—provide excellent conductivity and superior resistance to welding and arc erosion
- Designed to 3,000,000 electrical operations at maximum hp ratings up through 25 hp at 600V
- Steel mounting plate standard on all open type contactors

Non-Reversing

- Holding circuit contact(s) supplied as standard:
 - Sizes 00–3 have NO auxiliary contact block mounted on right hand side (on Size 00, contact occupies 4th power pole position—no increase in width)
 - Sizes 4–5 have a NO contact block mounted on left side
 - Sizes 6–7 have a 2NO/2NC contact block on top left
 - Size 8 has a NO/NC contact block on top left back and a NO contact block on top right back

Reversing

- One NO-NC side mounted interlock supplied as standard on each contactor for Sizes 00–8

Product Selection

Three-Pole Contactors

**NEMA Size 00
CN55AN3AB**



**NEMA Size 0
CN15BN3AB**



**NEMA Size 3
CN15KN3A**



Type CN15/CN55 NEMA Contactors—Non-Reversing and Reversing

| NEMA Size | Continuous Ampere Rating | Maximum UL Horsepower ^① | | | | | | Non-Reversing Catalog Number | Reversing Catalog Number |
|----------------|--------------------------|------------------------------------|-------|-------------|-------|------|------|------------------------------|--------------------------|
| | | Single-Phase | | Three-Phase | | 480V | 600V | | |
| | | 115V | 230V | 208V | 240V | | | | |
| 00 | 9 | 1/3 | 1 | 1-1/2 | 1-1/2 | 2 | 2 | CN15AN3_B | CN55AN3_B |
| 0 | 18 | 1 | 2 | 3 | 3 | 5 | 5 | CN15BN3_B | CN55BN3_B |
| 1 | 27 | 2 | 3 | 7-1/2 | 7-1/2 | 10 | 10 | CN15DN3_B | CN55DN3_B |
| 2 | 45 | 3 | 7-1/2 | 10 | 15 | 25 | 25 | CN15GN3_B | CN55GN3_B |
| 3 | 90 | | | 25 | 30 | 50 | 50 | CN15KN3_ | CN55KN3_ |
| 4 | 135 | | | 40 | 50 | 100 | 100 | CN15NN3_ | CN55NN3_ |
| 5 | 270 | | | 75 | 100 | 200 | 200 | CN15SN3_ | CN55SN3_ |
| 6 | 540 | | | 150 | 200 | 400 | 400 | CN15TN3_B | CN55TN3_B |
| 7 | 810 | | | 200 | 300 | 600 | 600 | CN15UN3_ | CN55UN3_ |
| 8 ^② | 1215 | | | 400 | 450 | 900 | 900 | CN15VN3_ | CN55VN3_ |

Magnet Coils—AC and DC

Contactors listed in this section also have a 50 Hz rating as shown in the adjacent table. Select required contactor by catalog number and replace the magnet coil alpha

designation in the catalog number () with the proper code suffix from the table.

For Sizes 00–2, the magnet coil alpha designation will be the next to the last digit of the listed catalog number.

EXAMPLE: For a 380V, 50 Hz coil, change CN15AN3_B to CN15AN3LB. For all other sizes, the magnet coil alpha designation will be the last digit of the listed catalog number.

For **DC Magnet Coils**, see Accessories, **Pages V5-T2-28 and V5-T2-29**.

AC Suffix

| Coil Volts and Hertz | Code Suffix |
|-------------------------|-------------|
| 120/60 or 110/50 | A |
| 240/60 or 220/50 | B |
| 480/60 or 440/50 | C |
| 600/60 or 550/50 | D |
| 208/60 | E |
| 277/60 | H |
| 208–240/60 ^③ | J |
| 240/50 | K |

| Coil Volts and Hertz | Code Suffix |
|---------------------------|-------------|
| 380–415/50 | L |
| 550/50 | N |
| 24/60, 24/50 ^④ | T |
| 24/50 | U |
| 32/50 | V |
| 48/60 | W |
| 48/50 | Y |

Notes

① Maximum horsepower rating of starters for 380V 50 Hz applications:

| NEMA Size | 00 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|------------|-------|---|----|----|----|----|-----|-----|-----|-----|
| Horsepower | 1-1/2 | 5 | 10 | 25 | 50 | 75 | 150 | 300 | 600 | 900 |

② Common control. For separate 120V control, insert letter **D** in 7th position of listed catalog number. Example: CN15VND3C.

③ NEMA Sizes 00 and 0 only.

④ NEMA Sizes 00 and 0 only. Sizes 1–8 are 24/60 only.

Technical Data and Specifications

Wire (75°C) Sizes—AWG or kcmil—Open and Enclosed

| NEMA Size | Power Terminals Line or Load | Control Terminals Cu Only |
|-----------|--|---------------------------|
| 00 | 12–16 stranded; 12–14 solid Cu | 12–16 stranded |
| 0 | 8–16 stranded; 10–14 solid Cu | 12–14 solid |
| 1 | 8–14 stranded or solid Cu | |
| 2 | 3–14 (upper) and/or 6–14 (lower) stranded or solid ^① Cu | |
| 3 | 1/0–14 Cu/Al | |
| 4 | 250 mcm–6 | |
| 5 | 750 kcmil–2, or (2) 250 kcmil–3/0 Cu/Al | |
| 6 | (2) 750 kcmil–3/0 Cu/Al | |
| 7 | (3) 750 kcmil–3/0 Cu/Al | |
| 8 | (4) 750 kcmil–4/0 Cu/Al | |

Plugging and Jogging Service Horsepower Ratings ^②

| NEMA Size | 200V | 230V | 460V | 575V |
|-----------|-------|-------|------|------|
| 00 | — | 1/2 | 1/2 | 1/2 |
| 0 | 1-1/2 | 1-1/2 | 2 | 2 |
| 1 | 3 | 3 | 5 | 5 |
| 2 | 7-1/2 | 10 | 15 | 15 |
| 3 | 15 | 20 | 30 | 30 |
| 4 | 25 | 30 | 60 | 60 |
| 5 | 60 | 75 | 150 | 150 |
| 6 | 125 | 150 | 300 | 300 |

Notes

^① Two compartment box lug.

^② Maximum horsepower where operation is interrupted more than 5 times per minute or more than 10 times in a 10 minute period.
NEMA standard ICS 2-1993 table 2-4-3.

2.1

NEMA Contactors and Starters

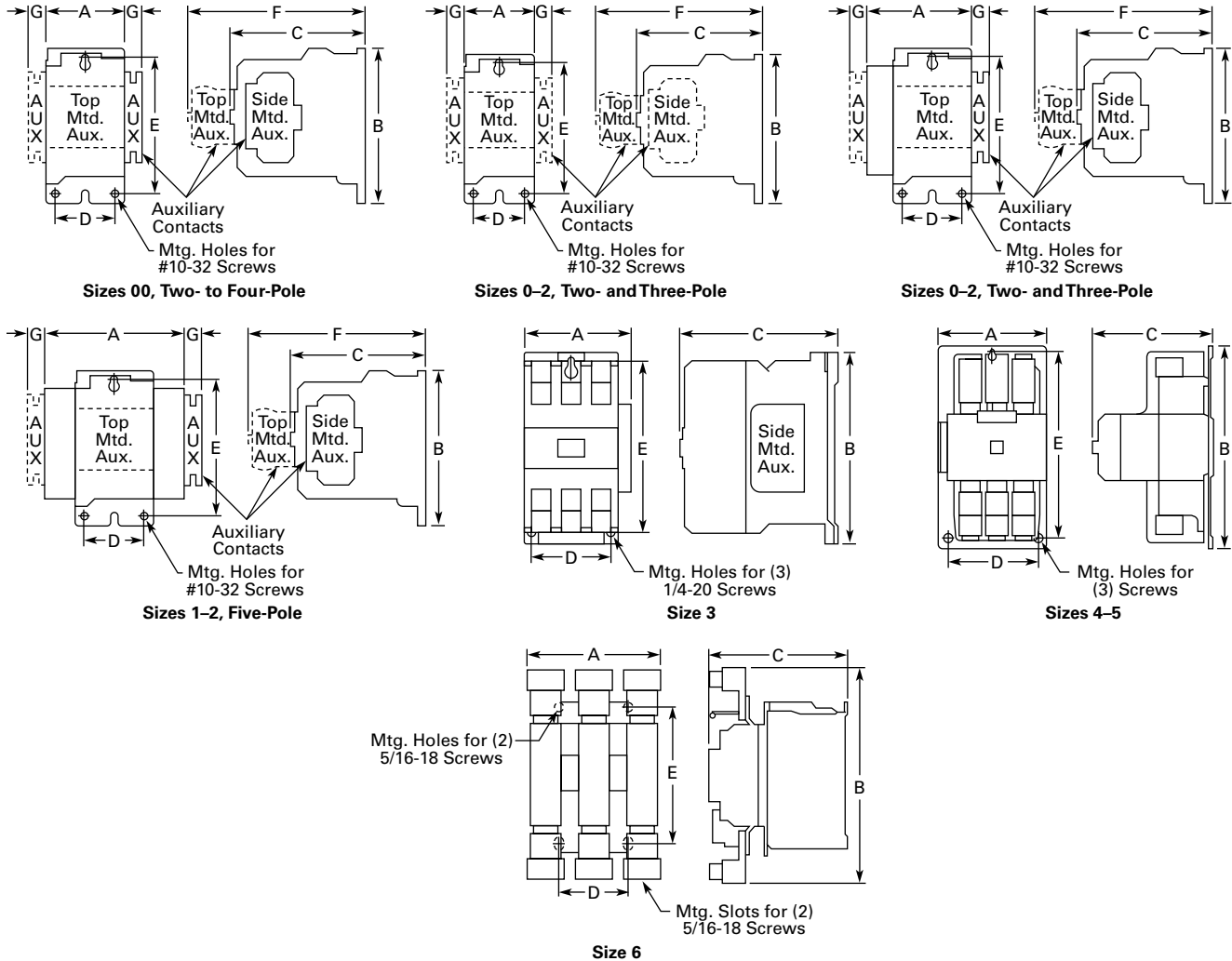
Freedom Series

Dimensions

Approximate Dimensions in Inches (mm)

2

Non-Reversing Contactors—Open Type



Dimensions and Shipping Weights

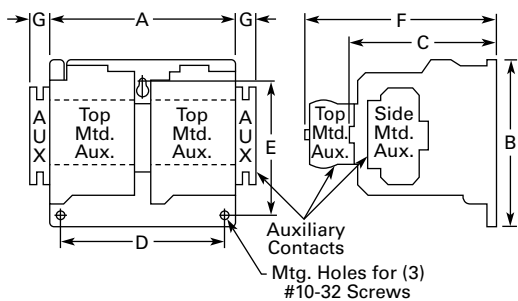
| NEMA Size | Number of Poles | Wide A | High B | Deep C | Mounting D | Mounting E | F | G | Shipping Weight Lbs (kg) |
|-----------|-----------------|---------------|---------------|---------------|--------------------------|---------------|--------------|-------------|--------------------------|
| 00 | 2-4 | 1.75 (44.5) | 3.88 (98.6) | 3.49 (88.6) | 1.50 (38.1) [Ⓢ] | 3.38 (85.9) | 4.62 (117.3) | 0.54 (13.7) | 1.7 (0.7) |
| 0 | 2-3 | 1.75 (44.5) | 3.88 (98.6) | 3.49 (88.6) | 1.50 (38.1) [Ⓢ] | 3.38 (85.9) | 4.62 (117.3) | 0.54 (13.7) | 1.8 (0.8) |
| 1-2 | 2-3 | 2.56 (65.0) | 5.05 (128.3) | 4.44 (112.8) | 2.00 (50.8) [Ⓢ] | 4.50 (114.3) | 5.80 (147.3) | 0.54 (13.7) | 3.1 (1.4) |
| 1-2 | 4 | 3.44 (87.4) | 5.05 (128.3) | 4.44 (112.8) | 2.00 (50.8) [Ⓢ] | 4.50 (114.3) | 5.80 (147.3) | 0.54 (13.7) | 3.6 (1.6) |
| 1-2 | 5 | 4.32 (109.7) | 5.05 (128.3) | 4.44 (112.8) | 2.00 (50.8) [Ⓢ] | 4.50 (114.3) | 5.80 (147.3) | 0.54 (13.7) | 4.0 (1.8) |
| 3 | 2-3 | 4.08 (103.6) | 7.17 (182.1) | 5.94 (150.9) | 3.00 (76.2) | 6.63 (168.4) | — | — | 8.5 (3.9) |
| 4 | 2-3 | 7.05 (179.1) | 9.11 (231.4) | 7.25 (184.2) | 6.00 (152.4) | 8.50 (215.9) | — | — | 20.0 (9.1) |
| 5 | 2-3 | 7.05 (179.1) | 13.12 (333.2) | 7.78 (197.6) | 6.00 (152.4) | 12.50 (317.5) | — | — | 23.0 (10.4) |
| 6 | 3 | 8.63 (219.2) | 13.54 (343.9) | 8.88 (225.6) | 4.33 (110.0) | 8.63 (219.2) | — | — | 35.0 (15.9) |
| 7 | 3 | 11.02 (279.9) | 19.30 (490.2) | 11.46 (291.1) | 6.89 (175.0) | 11.02 (279.9) | — | — | 100.0 (45.4) |
| 8 | 3 | 13.00 (330.2) | 24.50 (622.3) | 13.63 (346.2) | 4.22 (107.2) | 14.86 (377.4) | — | — | 160.0 (72.6) |

Note

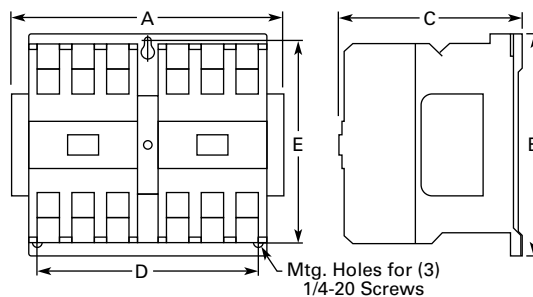
[Ⓢ] Center mounting slot at bottom supplied only on Size 00 and 0 contactors.

Approximate Dimensions in Inches (mm)

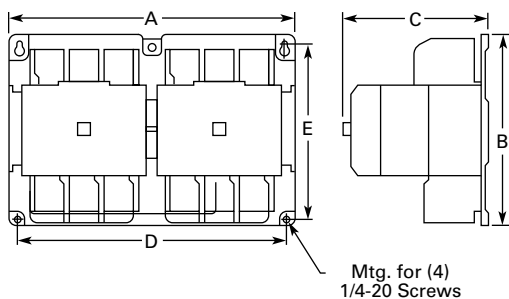
Reversing Contactors—Open Type



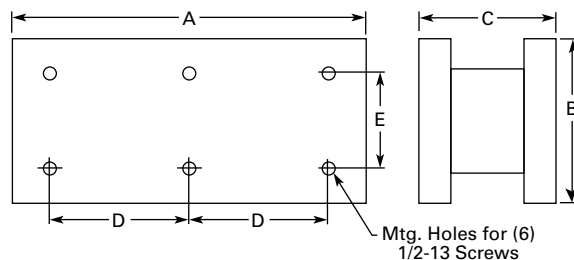
Sizes 00-2



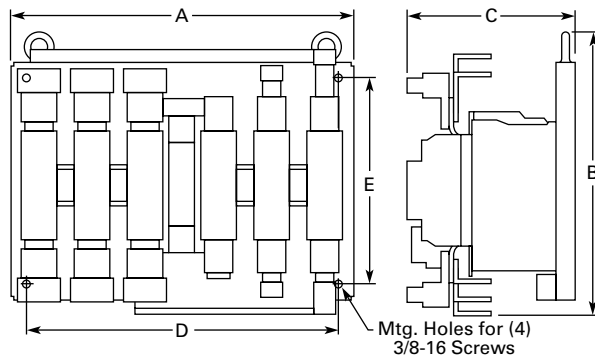
Size 3



Sizes 4-5



Open Type—Sizes 7-8 Horizontal



Size 6

Dimensions and Shipping Weights

| NEMA Size | Wide A | High B | Deep C | Mounting D | Mounting E | F | G | Shipping Weight Lbs (kg) |
|-----------|---------------|-----------------|---------------|---------------|---------------|--------------|-------------|--------------------------|
| 00-0 | 4.20 (106.7) | 4.35 (110.5) | 3.52 (89.4) | 3.50 (88.9) | 3.86 (98.0) | 4.90 (124.5) | 0.54 (13.7) | 3.3 (1.5) |
| 1-2 | 5.71 (145.0) | 5.05 (128.3) | 4.44 (112.8) | 5.25 (133.4) | 3.63 (92.2) | 5.80 (147.3) | 0.54 (13.7) | 7.8 (3.5) |
| 3 | 8.70 (221.0) | 7.17 (182.1) | 5.94 (150.9) | 7.00 (177.8) | 6.63 (168.4) | — | — | 17.0 (7.7) |
| 4 | 14.68 (372.9) | 9.11 (231.4) | 7.25 (184.2) | 13.50 (342.9) | 8.50 (215.9) | — | — | 47.0 (21.3) |
| 5 | 14.50 (368.3) | 12.25 (311.2) | 7.78 (197.6) | 13.50 (342.9) | 11.50 (292.1) | — | — | 63.0 (28.6) |
| 6 | 19.77 (502.2) | 16.61 (421.9) | 9.90 (251.5) | 18.00 (457.2) | 12.00 (304.8) | — | — | 80.0 (36.3) |
| 7 | 28.00 (711.2) | 26.75 (679.5) ① | 12.75 (323.9) | 12.75 (323.9) | 11.00 (279.4) | — | — | 260.0 (118.0) |
| 8 | 30.13 (765.3) | 39.00 (990.6) ① | 14.69 (373.1) | 14.13 (358.9) | 15.00 (381.0) | — | — | 350.0 (158.9) |

Note

① Includes cross wiring.