Instruction Leaflet IL040029EN

Effective December 2017
Supersedes March 2014

# PowerXL DH1 Series VFD

**Instruction Leaflet**
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(en) **Electric Current! Danger to Life!**
Only skilled or instructed persons may carry out the following operations.

(de) **Lebensgefahr durch elektrischen Strom!**
Nur Elektrofachkräfte und elektrotechnisch unterwiesene Personen dürfen die im Folgenden beschriebenen Arbeiten ausführen.

(fr) **Tension électrique dangereuse !**
Seules les personnes qualifiées et averties doivent exécuter les travaux ci-après.

(es) **¡Corriente eléctrica! ¡Peligro de muerte!**
El trabajo a continuación descrito debe ser realizado por personas cualificadas y advertidas.

(it) **Tensione elettrica: Pericolo di morte!**
Solo persone abilitate e qualificate possono eseguire le operazioni di seguito riportate.

(zh) 触电危险！
只允许专业人员和受过专业训练的人员进行 下列工作。

(ru) **Электрический ток! Опасно для жизни!**
Только специалисты или проинструктированные лица могут выполнять следующие операции.

(nl) **Levensgevaar door elektrische stroom!**
Uitsluitelijk deskundigen in elektriciteit en elektrotechnisch geinstrueerde personen is het toegestaan, de navolgend beschrevene werkzaamheden uit te voeren.

(da) **Livsfare på grund af elektrisk strøm!**
Kun uddannede el-installatører og personer der e instruerede i elektrotekniske arbejdsopgaver, må udføre de nedenfor anførte arbejder.

(el) **Προσοχή, κίνδυνος ηλεκτροπληξίας!**
Οι εργασίες που αναφέρονται στη συνέχεια θα πρέπει να εκτελούνται μόνο από ηλεκτρολόγους και ηλεκτροτεχνίτες.

(pt) **Perigo de vida devido a corrente eléctrica!**
Apenas electricistas e pessoas com formação electrotécnica podem executar os trabalhos que a seguir se descrevem.

(sv) **Livsfara genom elektrisk ström!**
Endast utbildade elektriker och personer som undervisats i elektroteknik får utföra de arbeten som beskrivs nedan.

(fi) **Hengenvaarallinen jännite!**
Vain pätevät sähköasentajat ja opastusta saaneet henkilöt saavat suorittaa seuraavat työt.

EATON
*Powering Business Worldwide*

(cs) **Nebezpečí úrazu elektrickým proudem!**
Níže uvedené práce smějí provádět pouze osoby s elektrotechnickým vzděláním.

(et) **Eluohtlik! Elektrilöögioht!**
Järgnevalt kirjeldatud töid tohib teostada ainult elektriala spetsialist või elektrotehnilise instrueerimise läbinud personal.

(hu) **Életveszély az elektromos áram révén!**
Csak elektromos szakemberek és elektrotechnikában képzett személyek végezhetik el a következőkben leírt munkákat.

(lv) **Elektriskā strāva apdraud dzīvību!**
Tālāk aprakstītos darbus drīkst veikt tikaielektrospeciālisti un darbam ar elektrotehniskām ekārtām instruētās personas!

(lt) **Pavojus gyvybei dėl elektros srovės!**
Tik elektrikai ir elektrotechnikos specialistai gali atlikti žemiau aprašytus darbus.

(pl) **Porażenie prądem elektrycznym stanowi zagrożenie dla życia!**

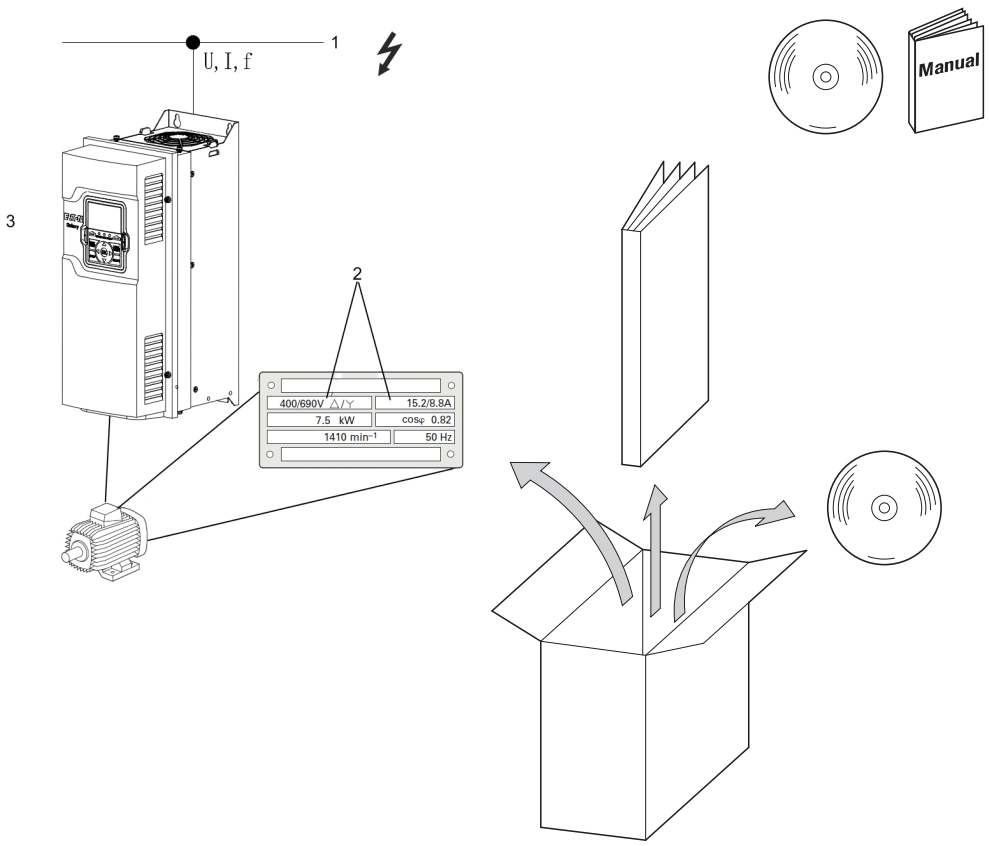
Opisane poniżej prace mogą przeprowadzać tylko wykwalifikowani elektrycy oraz osoby odpowiednio poinstruowane w zakresie elektrotechniki.

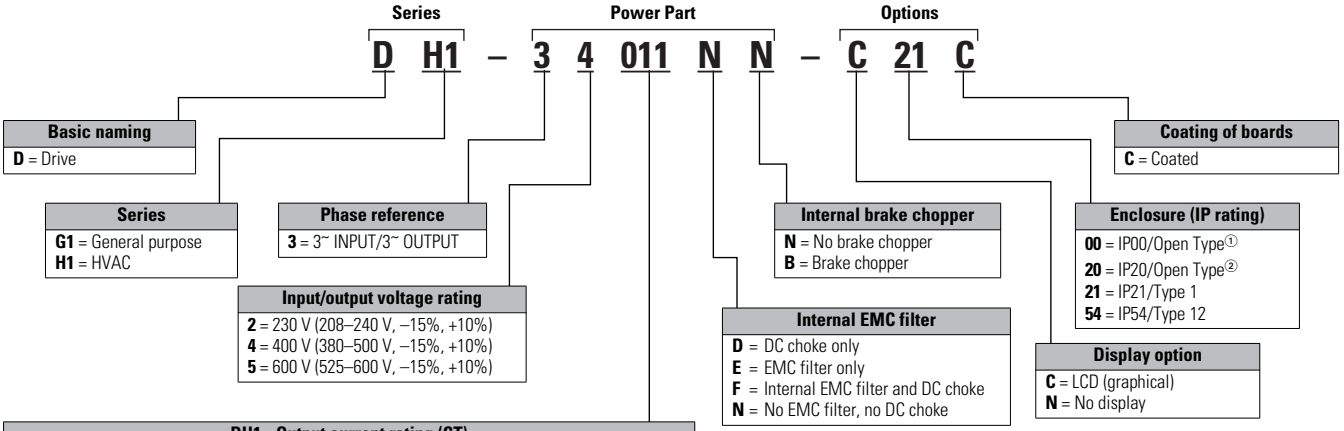
(sl) **Življenjska nevarnost zaradi električnega toka!**
Spodaj opisana dela smejo izvajati samo elektrostrokovnjaki in elektrotehnično poučene osebe.

(sk) **Nebezpečenstvo ohrozenia života elektrickým prúdom!**
Práce, ktoré sú nižšie opísané, smú vykonávať iba elektroodborníci a osoby s elektrotechnickým vzdelaním.

(bg) **Опасност за живота от електрически ток!**
Операциите, описани в следващите раздели, могат да се извършват само от специалисти-електротехници и инструктиран електротехнически персонал.

(ro) **Atenţie! Pericol electric!**
Toate lucrările descrise trebuie efectuate numai de personal de specialitate calificat şi de persoane cu cunoştiinţe profunde în electrotehnică.

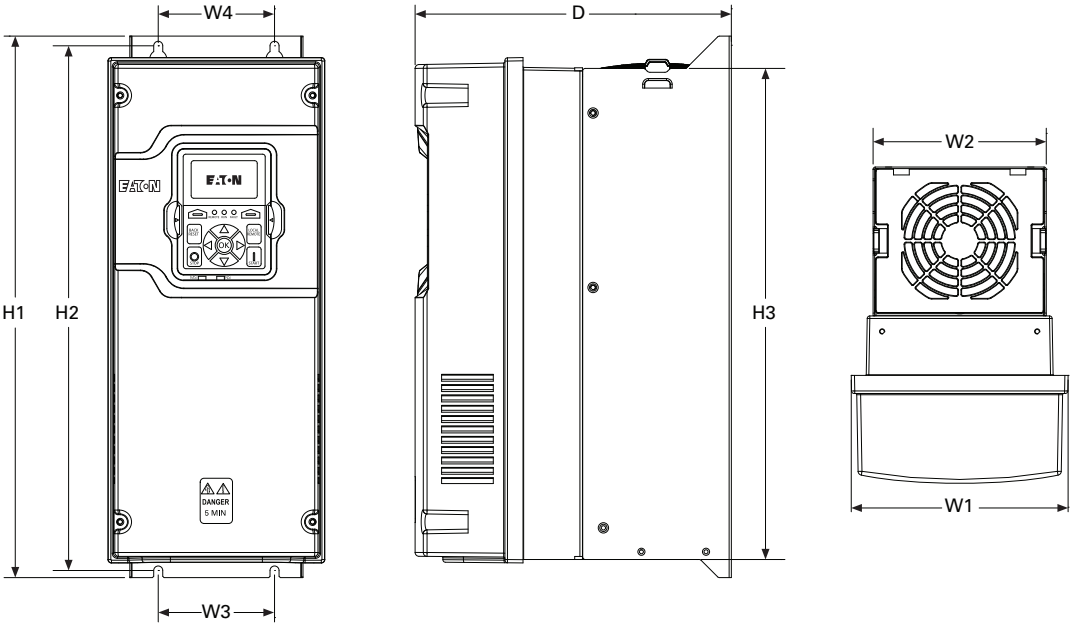





| DH1 - Output current rating (CT) | | |
|---|---|---|
| **208–240 V** | **380–500 V** | **525–600 V** |
| **4D8** = 4.8A, 1.0HP, 0.75KW | **3D3** = 3.3A, 1.5HP, 1.1KW | **4D5** = 4.5A, 3HP, 2.2KW |
| **6D6** = 6.6A, 1.5HP, 1.1KW | **4D3** = 4.3A, 2.0HP, 1.5KW | **7D5** = 7.5A, 5.0HP, 3.7KW |
| **7D8** = 7.8A, 2.0HP, 1.5KW | **5D6** = 5.6, 3.0HP, 2.2KW | **010** = 10A, 7.5HP, 5.5KW |
| **011** = 11A, 3.0HP, 2.2KW | **7D6** = 7.6A, 4.0HP, 3KW | **013** = 13.5A, 10HP, 7.5KW |
| **012** = 12.5A, - HP, 3.0KW | **9D0** = 9A, - HP, 4KW | **018** = 18A, 15HP, 11KW |
| **017** = 17.5A, 5.0HP, 3.7KW | **012** = 12A, 7.5HP, 5.5KW | **022** = 22A, 20HP, 15KW |
| **025** = 25A, 7.5HP, 5.5KW | **016** = 16A, 10HP, 7.5KW | **027** = 27A, 25HP, 18.5KW |
| **031** = 31A, 10HP, 7.5KW | **023** = 23A, 15HP, 11KW | **034** = 34A, 30HP, 22KW |
| **048** = 48A, 15HP, 11KW | **031** = 31A, 20HP, 15KW | **041** = 41A, 40HP, 30KW |
| **061** = 61A, 20HP, 15KW | **038** = 38A, 25HP, 18.5KW | **052** = 52A, 50HP, 37KW |
| **075** = 75A, 25HP, 18.5KW | **046** = 46A, 30HP, 22KW | **062** = 62A, 60HP, 45KW |
| **088** = 88A, 30HP, 22KW | **061** = 61A, 40HP, 30KW | **080** = 80A, 75HP, 55KW |
| **114** = 114A , 40HP, 30KW | **072** = 72A, 50HP, 37KW | **100** = 100A, 100HP, 75KW |
| **143** = 143A, 50HP, 37KW | **087** = 87A, 60HP, 45KW | **125** = 125A, 125HP, 90KW |
| **170** = 170A, 60HP, 45KW | **105** = 105A, 75HP, 55KW | **144** = 144A, 150HP, 110KW |
| **211** = 211A, 75HP, 55KW | **140** = 140A, 100HP, 75KW | **208** = 208A, 200HP, 132KW |
| **261** = 261A, 100HP, 75KW | **170** = 170A, 125HP, 90KW | **250** = 250A, 250HP, 160KW |
| **312** = 312A, 125HP, 90KW | **205** = 205A, 150HP, 110KW | |
| | **261** = 261A, 200HP, 132KW | |
| | **310** = 310A, 250HP, 160KW | |

① IP00 FR7 and FR8 is not avaliable for 230V input product or with the PowerXL DH1 Product
② IP20 FR0 will be avalible in June 2018

**Dimensions and weights—Dimensões e pesos—Encombrements et poids—Abmessungen und Gewichte—Dimensioni e pesi—Afmetingen en gewichten—Dimensioner og vægt—Διαστάσεις και βάρη—Dimensiones y pesos—Mått och vikter—Mitat ja painot—Rozměry a hmotnosti—Mõõdud ja kaalud—Méretek és tömeg—Izmēri un svars—Matmenys ir masė—Wymiary i ciężary—Mere in teže—Rozmery a hmotnosti—Размери и тегло—Dimensiuni şi greutăţi—Размеры и вес—** 尺寸和重量

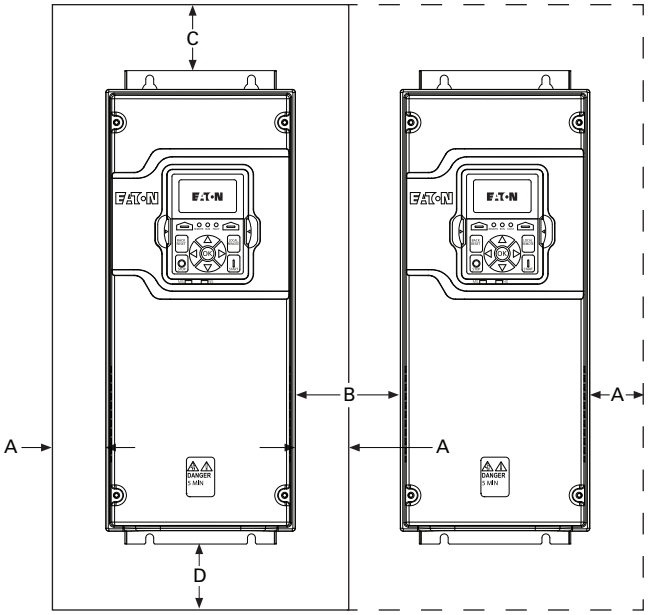



| Frame size | Approximate dimensions in inches (mm) | | | | | | | | | Weight lb (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| | D | H1 | H2 | H3 | W1 | W2 | W3 | W4 | Ø | |
| FR0 ① | 6.83 (173.5) | 10.58 (268.7) | 10.16 (258.0) | 9.54 (242.3) | 5 (127.0) | 4.97 (126.3) | 4.26 (108.3) | 4.26 (108.3) | 0.28 (7.0) | 4.41 (2.0) |
| FR1 | 7.91 (200.9) | 12.87 (327.0) | 12.28 (312.0) | 11.50 (292.0) | 6.02 (153.0) | 4.80 (122.0) | 3.94 (100.0) | 3.94 (100.0) | 0.28 (7.0) | 14.33 (6.5) |
| FR2 | 9.63 (244.7) | 16.50 (419.0) | 15.98 (406.0) | 14.96 (380.0) | 6.61 (167.8) | 5.28 (134.0) | 3.54 (90.0) | 3.54 (90.0) | 0.28 (7.0) | 23.37 (10.6) |
| FR3 | 10.44 (265.1) | 21.97 (558.0) | 21.46 (545.0) | 20.41 (518.5) | 8.06 (204.6) | 7.24 (184.0) | 4.92 (125.0) | 4.92 (125.0) | 0.35 (9.0) | 49.82 (22.6) |
| FR4 | 11.57 (294.0) | 24.80 (630.0) | 24.31 (617.5) | 23.26 (590.7) | 9.36 (237.7) | 9.13 (232.0) | 8.07 (205.0) | 8.07 (205.0) | 0.35 (9.0) | 77.60 (35.2) |
| FR5 | 13.41 (340.7) | 34.98 (888.5) | 29.65 (753.0) | 27.83 (707.0) | 11.34 (288.0) | 11.10 (282.0) | 8.66 (220.0) | 8.66 (220.0) | 0.35 (9.0) | 154.32 (70.0) |
| FR6 | 14.61 (371) | 40.75 (1035) | 33.27 (845) | 31.38 (797) | 19.13 (486) | 18.90 (480) | 15.75 (400) | 15.75 (400) | 0.35 (9) | 246.91 (112) |

**Note**

① FR0 is not available till June 2018.

## Mounting—Montaje—Montage—Montaggio—Montering—Τοποθέτηση—Montagem—Asennus—Montáž—Paigaldamine—Felszerelése—Montāža—Montavimas—Montaż—Montaža—Монтаж—Montarea—Монтаж— 安装




| Frame size | A ② In (mm) | B ② In (mm) | C In (mm) | D In (mm) | Cooling air required CFM ($m^3/h$) ③ |
|---|---|---|---|---|---|
| FR0 ④ | 0 | 0 | 3.94 (100) | 1.97 (50) | 16.5 (28) |
| FR1 | 0.79 (20) | 1.58 (40) | 3.94 (100) | 1.97 (50) | 14 (24) |
| FR2 | 1.18 (30) | 2.36 (60) | 6.30 (160) | 2.36 (60) | 55 (94) |
| FR3 | 0 | 0 | 7.87 (200) | 3.15 (80) | 85 (144) |
| FR4 | 0 | 0 | 11.81 (300) | 3.94 (100) | 153 (260) |
| FR5 | 3.15 (80) | 6.30 (160) | 11.81 (300) | 7.87 (200) | 232 (395) |
| FR6 | 3.15 (80) | 6.30 (160) | 15.75 (400) | 12.99 (330) | 230V: 435 (739)<br>480V/600V: 400 (679) |

**Notes**

① kW ratings are at 400 V / 50 Hz.

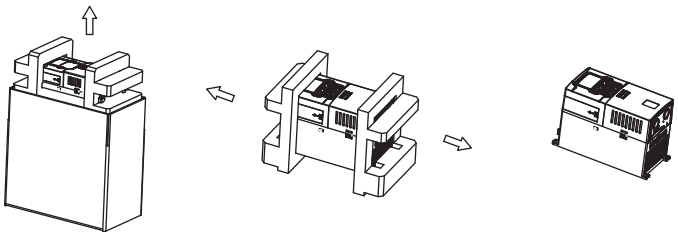
② Minimum clearances A and B for drives with Type 12 (IP54) enclosure is 0 mm (in) for FR1, FR2, FR3, FR4, FR6.

③ The above guidelines apply unless testing has been completed to validate a design outside of these recommendations.

④ FR0 is not available till June 2018.

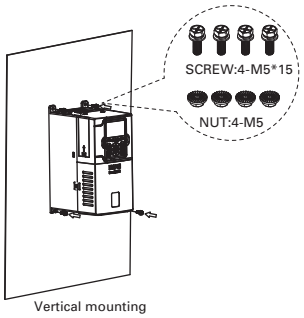
## FR0 mounting instructions

**Step 1:** Lift the drive out from the carton, remove the packaging

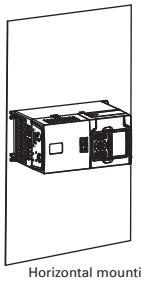


**Step 2:** Attach the drive to the mounting plate with four M5X15 screws and four M5 nuts.The opening dimension on the mounting plate should follow required dimension (refer to the drive mounting template printed on the outside carton)

The drive can be mounted vertically or horizontally according to customer's need.




Vertical mounting

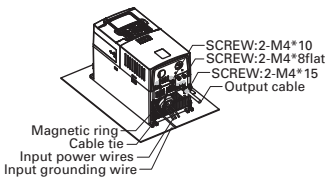


Horizontal mounting

**Step 3:** 1. EN version FR0 or US version FR0 with EMC kit
1)Input wiring: Run the L1,L2, L3 wires through a magnetic ring and wind one lap, fix the L1,L2, L3 wires and magnetic ring with a cable tie, then connect the L1,L2, L3 wires to input terminals. Connect the input grounding wire to the bottom metal plate with a M4*10 screw.)

Output wiring: a ttach a L shape EMC grounding plate to the bottom of drive with two M4*8 flat screws. Connect the output U, V, W wires to output terminals. Connect the output grounding wire to the bottom metal plate with a M4*10 screw. Clamp the output cable shield to the L shape EMC grounding plate with a small rectangular EMC grounding plate and two M4*15 screws.

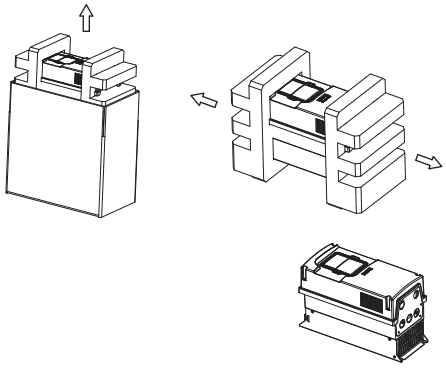
2. US version FR0 without EMC kit, there are no magnetic ring and EMC grounding plates, but it is necessary to connect the output cable shield to the bottom metal surface with a M4*10 screw



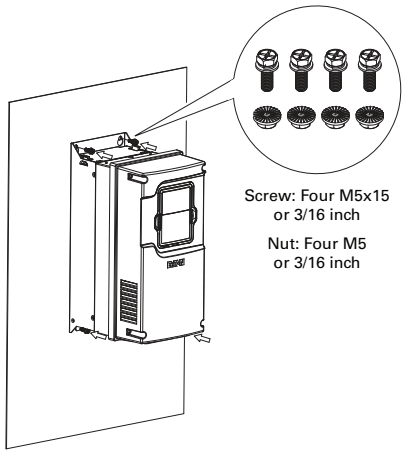

**Note**
FR0 is not available till June 2018.

## FR1 mounting instructions

**Step 1:**

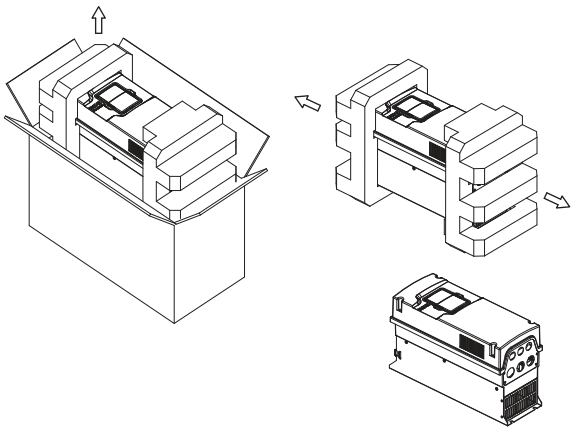


**Step 2:**

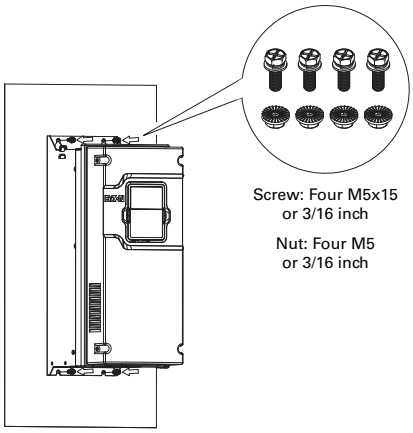


## FR2 mounting instructions

**Step 1:**

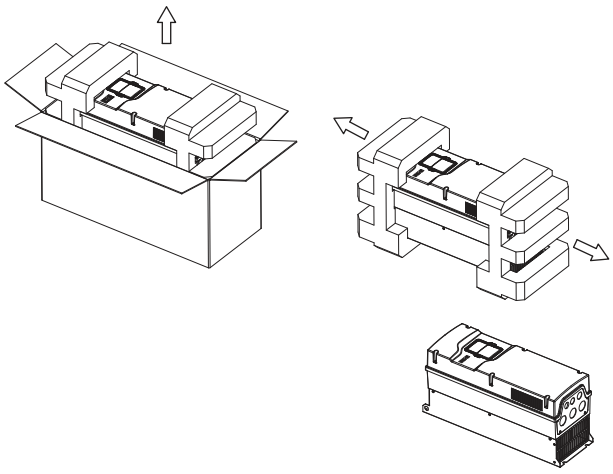


**Step 2:**

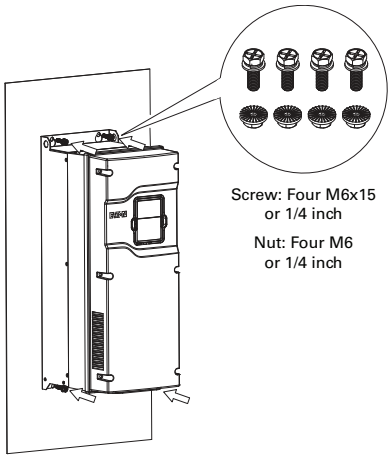



## FR3 mounting instructions

**Step 1:**

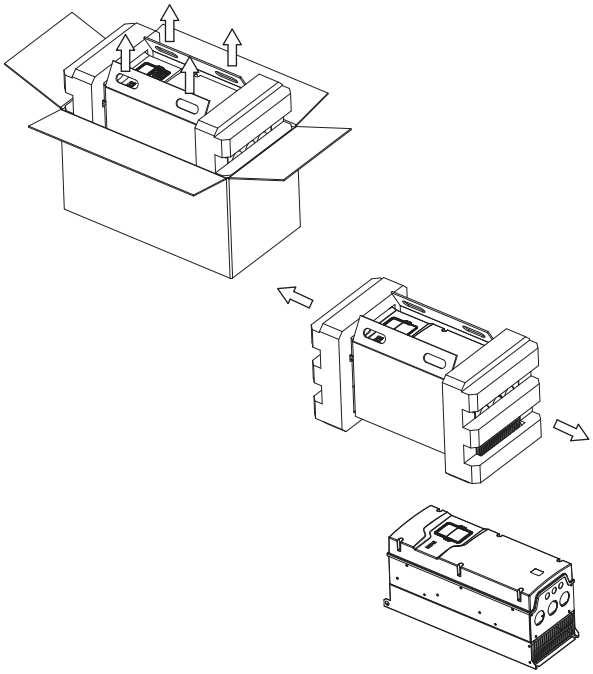


**Step 2:**

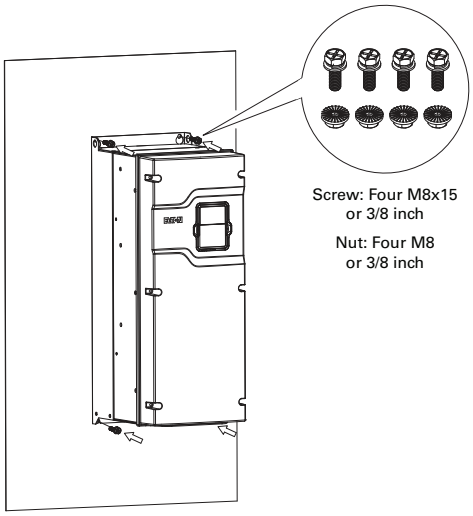


## FR4 mounting instructions

**Step 1:**

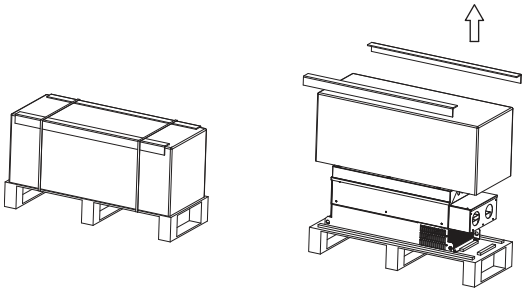


**Step 2:**

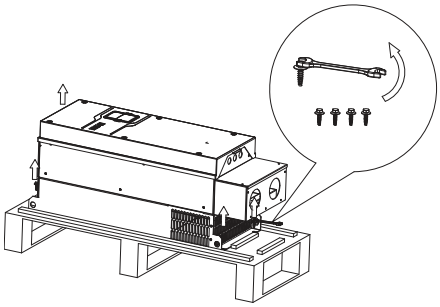


## FR5 mounting instructions

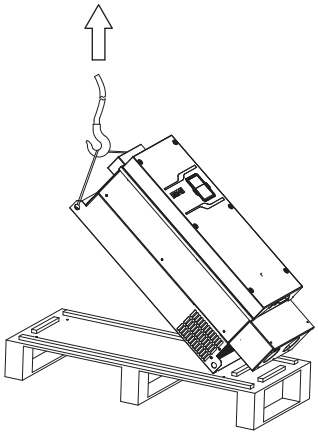
**Step 1:**



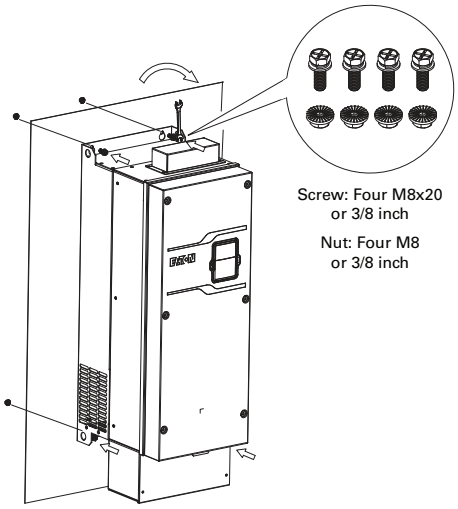
**Step 2:**



**Step 3:**

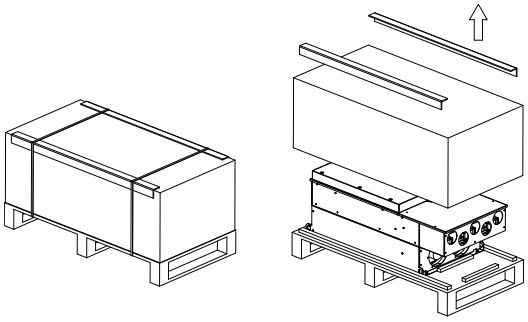


**Step 4:**

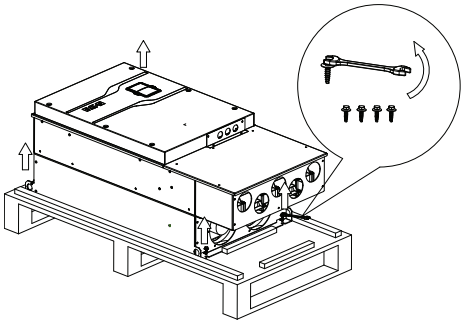


## FR6 mounting instructions

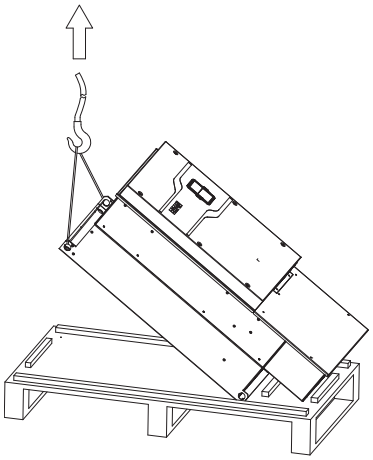
**Step 1:** Remove the carton from the drive.



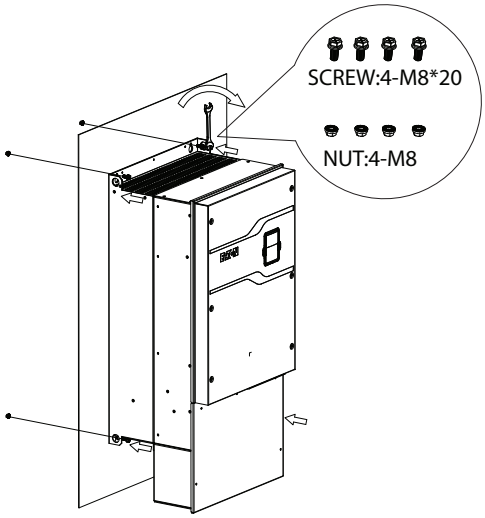
**Step 2:** Remove the four screws (used to fix the drive to the pallet) with an M8 or 3/8-inch wrench.



**Step 3:** Use a hook to lift the drive.



**Step 4:** Attach the drive to the mounting plate with four M8x20 or 3/8-inch screws and four M8 or 3/8-inch nuts with an M8 or 2/8-inch wrench. The opening dimensions on the mounting plate should follow required dimensions (refer to the drive mounting template printed on the outside carton).



(en) **Warning!**
Connect only in voltage-free state!

(es) **¡Advertencia!**
¡Conectar únicamente en estado sin tensión!

(fr) **Avertissement !**
Raccordez l'appareil uniquement hors tension !

(de) **Warnung!**
Nur im spannungsfreien Zustand anschließen!

(it) **Avvertimento!**
Collegare solo in assenza di tensione!

(nl) **Waarschuwing!**
Alleen in spanningsloze toestand aansluiten!

(da) **Advarsel!**
Må kun tilsluttes i spændingsfri tilstand!

(el) **Προειδοποίηση!**
Συνδέστε μόνο όταν δεν επικρατεί τάση!

(pt) **Atenção!**
Ligar apenas com a tensão desligada!

(sv) **Varning!**
Får endast anslutas i spänningsfritt tillstånd!

(fi) **Varoitus!**
Kytke vain jännitteettömässä tilassa!

(cs) **Varování!**
Připojujte jen při zcela odpojeném napájení!

(et) **Hoiatus!**
Ühendada ainult pingevabas olekus!

(hu) **Figyelmeztetés!**
Csak feszültségmentes állapotban csatlakoztassa!

(lv) **Brīdinājums!**
Pieslēgt tikai tad, kad nenotiek sprieguma padeve!

(lt) **Perspėjimas!**
Prijungti tik tada, kai išjungta įtampa!

(pl) **Ostrzeżenie!**
Podłączać zawsze po uprzednim odłączeniu od zasilania elektrycznego!

(sl) **Opozorilo!**
Napravo priključite le, ko ni pod napetostjo!

(sk) **Varovanie!**
Napájat˙ len v stave bez napätia!

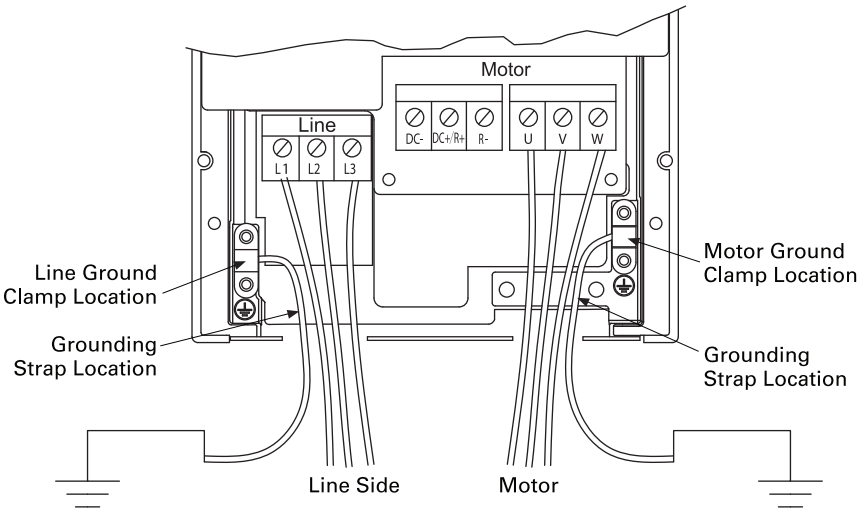
(bg) **Предупреждение!**
Свързвайте само, когато уреда не е под напрежение!

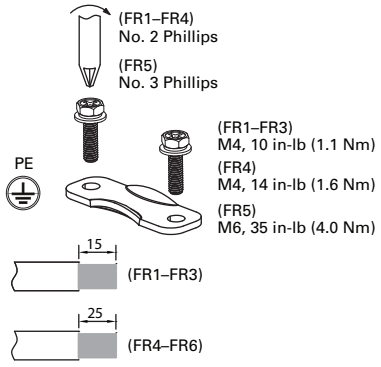
(ro) **Atenţie!**
Conectaţi doar când aparatul nu se află sub tensiune!

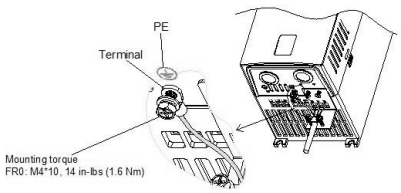
(ru) **Предупреждение!**
Подключать только в обесточенном состоянии!

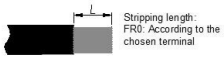
(zh) 警告！
必须在断电状态下进行连接！

**Ground wiring**



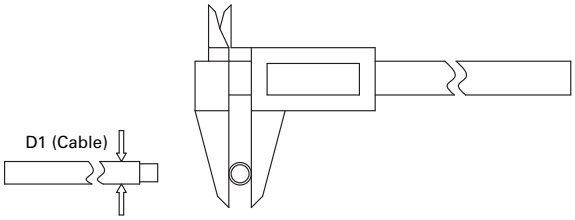



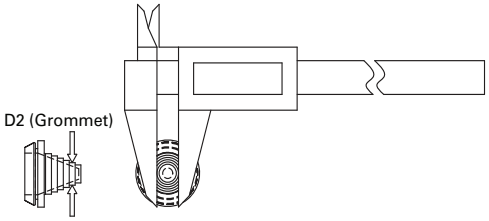



## Rubber grommet installation instructions

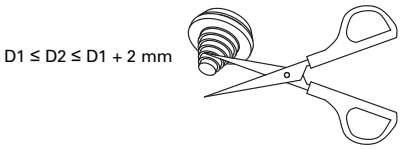
**Step 1:**



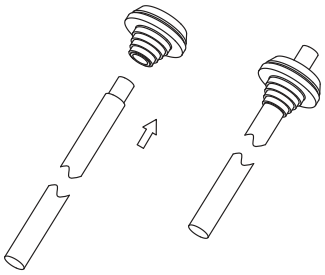

**Step 2:**



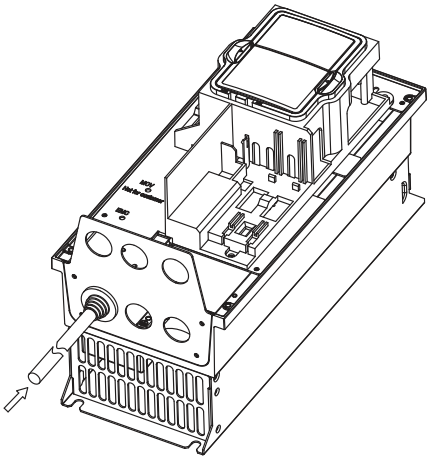

**Step 3:**



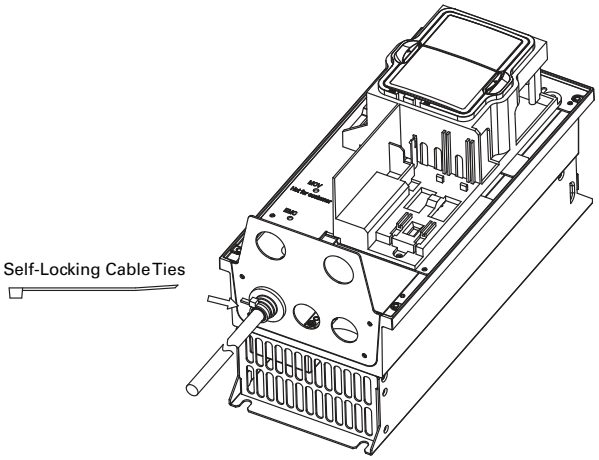

**Step 4:**



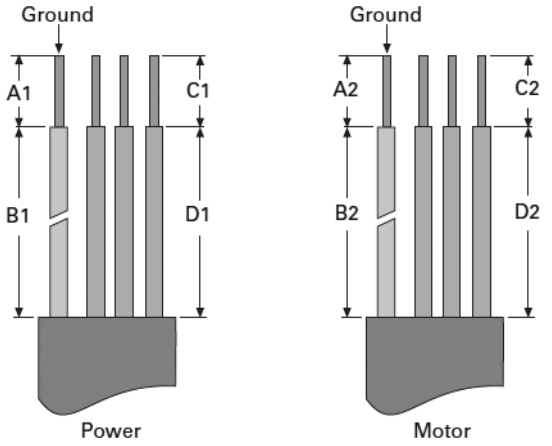
**Step 5:**



**Step 6:**



### Input power and motor cable stripping lengths




| Frame Size | Power Wiring in Inches (mm) | | | | Motor Wiring in Inches (mm) | | | |
|---|---|---|---|---|---|---|---|---|
| | A1 | B1 | C1 | D1 | A2 | B2 | C2 | D2 |
| FR0 ④ | 0.39 (10) | 5.12 (130) | 0.39 (10) | 5.12 (130) | 0.39 (10) | 3.15 (80) | 0.39 (10) | 1.97 (50) |
| FR1 | 0.39 (10) | 1.77 (45) | 0.39 (10) | 1.38 (35) | 0.39 (10) | 1.77 (45) | 0.39 (10) | 1.38 (35) |
| FR2 | 0.59 (15) | 1.77 (45) | 0.59 (15) | 1.77 (45) | 0.59 (15) | 1.57 (40) | 0.59 (15) | 1.57 (40) |
| FR3 | 0.59 (15) | 1.57 (40) | 0.59 (15) | 1.97 (50) | 0.59 (15) | 1.57 (40) | 0.59 (15) | 1.97 (50) |
| FR4 | 0.98 (25) | 2.56 (65) | 0.98 (25) | 4.72 (120) | 0.98 (25) | 2.56 (65) | 0.98 (25) | 4.72 (120) |
| FR5 | 1.10 (28) | 6.10 (155) | 1.10 (28) | 9.45 (240) | 1.10 (28) | 6.10 (155) | 1.10 (28) | 9.45 (240) |
| FR6 | 0.98 (25) | 4.72 (120) | 0.98 (25) | 7.87 (200) | 0.98 (25) | 4.72 (120) | 0.98 (25) | 7.87 (200) |

### Power connection tightening torque ①②

| Frame Size | Power wire in-lb (Nm) | Ground wire in-lb (Nm) | Control wire in-lb (Nm) ③ |
|---|---|---|---|
| FR0 ④ | 5.3 (0.6) | 14 (1.6) | 4.5 (0.5) |
| FR1 | 5.3 (0.6) | 10 (1.1) | 4.5 (0.5) |
| FR2 | 15.6 (1.8) | 10 (1.1) | 4.5 (0.5) |
| FR3 | 40 (4.5) | 10 (1.1) | 4.5 (0.5) |
| FR4 | 95 (10.7) | 14 (1.6) | 4.5 (0.5) |
| FR5 | 354 (40.0) | 35 (4.0) | 4.5 (0.5) |
| FR6 | 480 (54.2) | 35 (4.0) | 4.5 (0.5) |

**Notes**

① Strip the motor and power cables as shown above.
② Both UL® and IEC tools may be used.
③ Applies to strained wire, solid wire, or ferrule installations.
④ FR0 is not available till June 2018.

## Cable and fuse guidelines

### North America cable and fuse sizes—208 Vac to 240 Vac ratings ①②

| Frame size | Amp suffix | 208 V input current ($VT/I_L$) | NEC motor amp rating at 230 V | NEC motor amp rating at 208 V | Current ($VT/I_L$) at 40 °C | Recommended fuse rating ③ | NEC® wire size (AWG) | | Terminal connection size (AWG) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Line and motor | Ground | Line and motor | Ground |
| **FR0** ④ | 4D8 | 5.6 | 4.2 | 4.6 | 4.8 | 10 | 14 | 14 | 26–10 | 18–10 |
| | 6D6 | 7.6 | 6 | 6.6 | 6.6 | 10 | 14 | 14 | 26–10 | 18–10 |
| | 7D8 | 9 | 6.8 | 7.5 | 7.8 | 15 | 14 | 14 | 26–10 | 18–10 |
| **FR1** | 4D8 | 4.4 | 4.2 | 4.6 | 4.8 | 10 | 14 | 14 | 24–10 | 18–10 |
| | 6D6 | 6.1 | 6 | 6.6 | 6.6 | 10 | 14 | 14 | 24–10 | 18–10 |
| | 7D8 | 7.2 | 6.8 | 7.5 | 7.8 | 10 | 14 | 14 | 24–10 | 18–10 |
| | 011 | 10.2 | 9.6 | 10.6 | 11 | 15 | 14 | 14 | 24–10 | 18–10 |
| | 012 | 11.6 | — | — | 12.5 | 15 | 12 | 12 | 24–10 | 18–10 |
| **FR2** | 017 | 16.3 | 15.2 | 16.7 | 17.5 | 20 | 10 | 10 | 20–6 | 12–6 |
| | 025 | 23.2 | 22 | 24.2 | 25 | 30 | 8 | 10 | 20–6 | 12–6 |
| | 031 | 29 | 28 | 30.8 | 31 | 35 | 8 | 10 | 20–6 | 12–6 |
| **FR3** | 048 | 44.2 | 42 | 46.2 | 48 | 60 | 6 | 6 | 6–2 | 14–4 |
| | 061 | 56 | 54 | 59.4 | 61 | 80 | 4 | 6 | 6–2 | 14–4 |
| **FR4** | 075 | 64.6 | 68 | 74.8 | 75 | 100 | 3 | 4 | 6–1/0 | 10–1/0 |
| | 088 | 78 | 80 | 88 | 88 | 110 | 2 | 4 | 6–1/0 | 10–1/0 |
| | 114 | 94.3 | 104 | 114 | 114 | 125 | 1/0 | 3 | 6–1/0 | 10–1/0 |
| **FR5** | 143 | 129 | 130 | 143 | 143 | 175 | 3/0 | 3 | 1/0–350 kcmil | 8–250 kcmil |
| | 170 | 157 | 154 | 169 | 170 | 200 | 4/0 | 3 | 1/0–350 kcmil | 8–250 kcmil |
| | 211 | 189 | 192 | 211 | 211 | 250 | 300 | 3 | 1/0–350 kcmil | 8–250 kcmil |
| **FR6** | 261 | 242.8 | 248 | 273 | 261 | 400 | 2*2/0 | 3 | 2*(1/0–300 kcmil) | 3–300 kcmil |
| | 312 | 290.3 | 312 | 343 | 312 | 400 | 2*4/0 | 3 | 2*(1/0–300 kcmil) | 3–300 kcmil |

**Notes**

① Line and motor cable size is selected according to UL 508C Table 40.3 for copper conductor rated 75 °C. Use only with copper wire rated 75 °C here. Size requirements for other different wire types are defined in the National Electrical Code®, ANSI/NFPA® 70.

② Earthing conductor size is determined by the maximum overcurrent device rating used ahead of the drive according to UL 508C Table 6.4.

③ If power cubes or bypass are used, a UL listed Class RK5, J, T or equivalent fuse is recommended.

④ FR0 is not available till June 2018.

**International cable and fuse sizes—208 Vac to 240 Vac Ratings** ①②

| Frame size | Amp suffix | 208 V input current ($VT/I_L$) | Current ($VT/I_L$) at 40 °C | Fuse rating (gG/gL) ③ | Mains and motor cable Cu ($mm^2$) | Terminal cable size | |
|---|---|---|---|---|---|---|---|
| | | | | | | Main terminal Cu ($mm^2$) | Earth terminal Cu ($mm^2$) |
| **FR0** ④ | 4D8 | 5.6 | 4.8 | 10 | 3*1.5+1.5 | 0.2–6 solid or 0.2–4 stranded | 0.75–6 |
| | 6D6 | 7.6 | 6.6 | 10 | 3*1.5+1.5 | 0.2–6 solid or 0.2–4 stranded | 0.75–6 |
| | 7D8 | 9 | 7.8 | 16 | 3*1.5+1.5 | 0.2–6 solid or 0.2–4 stranded | 0.75–6 |
| **FR1** | 4D8 | 4.4 | 4.8 | 6 | 3*1.5+1.5 | 0.2–6 solid or 0.2–4 stranded | 0.75–6 |
| | 6D6 | 6.1 | 6.6 | 10 | 3*1.5+1.5 | 0.2–6 solid or 0.2–4 stranded | 0.75–6 |
| | 7D8 | 7.2 | 7.8 | 16 | 3*1.5+1.5 | 0.2–6 solid or 0.2–4 stranded | 0.75–6 |
| | 011 | 10.2 | 11 | 16 | 3*1.5+1.5 | 0.2–6 solid or 0.2–4 stranded | 0.75–6 |
| | 012 | 11.6 | 12.5 | 16 | 3*1.5+1.5 | 0.2–6 solid or 0.2–4 stranded | 0.75–6 |
| **FR2** | 017 | 16.3 | 17.5 | 20 | 3*4+4 | 0.5–16 | 4–16 |
| | 025 | 23.2 | 25 | 32 | 3*4+4 | 0.5–16 | 4–16 |
| | 031 | 29 | 31 | 32 | 3*6+6 | 0.5–16 | 4–16 |
| **FR3** | 048 | 44.2 | 48 | 50 | 3*16+16 | 16–35 | 2.5–25 |
| | 061 | 56 | 61 | 63 | 3*16+16 | 16–35 | 2.5–25 |
| **FR4** | 075 | 64.6 | 75 | 80 | 3*25+16 | 16–50 | 6–50 |
| | 088 | 78 | 88 | 100 | 3*35+16 | 16–50 | 6–50 |
| | 114 | 94.3 | 114 | 125 | 3*50+25 | 16–50 | 6–50 |
| **FR5** | 143 | 129 | 143 | 160 | 3*70+35 | 50–185 | 10–120 |
| | 170 | 157 | 170 | 200 | 3*95+50 | 50–185 | 10–120 |
| | 211 | 189 | 211 | 250 | 3*150+95 | 50–185 | 10–120 |
| **FR6** | 261 | 242.8 | 261 | 400 | 2*(3*70+35) | 2*(50–150) | 35–150 |
| | 312 | 290.3 | 312 | 400 | 2*(3*95+50) | 2*(50–150) | 35–150 |

**Notes**

① Line and motor cable size is selected according to IEC 60364-5-52:2009 Table B.52.4 for copper conductor with PVC insulation with a wiring condition of ambient temperature 30 °C in air and an installation method of "B2" (cables in conduit and cable trunking systems). For other wiring conditions, please refer to the standard of IEC 60364-5-52:2009 for suitable cable sizes.

② Earthing conductor size is determined by the cross-sectional area of phase conductors according to IEC/EN 61800-5-1:2007 Table 5. So if phase conductor size is changed, earthing conductor size should also be changed accordingly.

③ If power cubes or bypass are used, a Class gG/gL fuse is recommended.

④ FR0 is not available till June 2018.

**North America cable and fuse sizes—440 Vac to 500 Vac ratings** [1][2]

| Frame size | Amp suffix | Input current ($VT/I_L$) | NEC motor amp rating at 460 V | Current ($VT/I_L$) at 40 °C | Recommended fuse rating [3] | NEC wire size (AWG) | | Terminal connection size (AWG) | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Line and motor | Ground | Line and motor | Ground |
| **FR0** [4] | 3D3 | 3.8 | 3 | 3 | 10 | 14 | 14 | 26–10 | 18–10 |
| | 4D3 | 4.3 | 3.4 | 3.4 | 10 | 14 | 14 | 26–10 | 18–10 |
| | 5D6 | 6 | 4.8 | 4.8 | 10 | 14 | 14 | 26–10 | 18–10 |
| | 7D6 | 9.6 | 7.6 | 7.6 | 15 | 14 | 14 | 26–10 | 18–10 |
| **FR1** | 3D3 | 2.8 | 3 | 3 | 10 | 14 | 14 | 26–10 | 18–10 |
| | 4D3 | 3.2 | 3.4 | 3.4 | 10 | 14 | 14 | 26–10 | 18–10 |
| | 5D6 | 4.5 | 4.8 | 4.8 | 10 | 14 | 14 | 26–10 | 18–10 |
| | 7D6 | 7.1 | 7.6 | 7.6 | 10 | 14 | 14 | 26–10 | 18–10 |
| | 9D0 | 8.4 | — | 7.6 | 15 | 14 | 14 | 26–10 | 18–10 |
| | 012 | 10.2 | 11 | 11 | 15 | 14 | 14 | 26-10 | 18–10 |
| **FR2** | 016 | 13 | 14 | 14 | 20 | 12 | 12 | 20–6 | 12–6 |
| | 023 | 19.6 | 21 | 21 | 30 | 10 | 10 | 20–6 | 12–6 |
| | 031 | 25.2 | 27 | 27 | 35 | 8 | 8 | 20–6 | 12–6 |
| **FR3** | 038 | 31.7 | 34 | 34 | 50 | 6 | 8 | 6–2 | 14–4 |
| | 046 | 37 | 40 | 40 | 60 | 6 | 8 | 6–2 | 14–4 |
| | 061 | 48.1 | 52 | 52 | 80 | 4 | 6 | 6–2 | 14–4 |
| **FR4** | 072 | 59.3 | 65 | 65 | 100 | 4 | 4 | 6–1/0 | 10–1/0 |
| | 087 | 70.3 | 77 | 77 | 110 | 3 | 4 | 6–1/0 | 10–1/0 |
| | 105 | 87.6 | 96 | 96 | 125 | 1 | 3 | 6–1/0 | 10–1/0 |
| **FR5** | 140 | 114.4 | 124 | 124 | 175 | 2/0 | 3 | 1/0–350 kcmil | 8–250 kcmil |
| | 170 | 144 | 156 | 156 | 200 | 3/0 | 3 | 1/0–350 kcmil | 8–250 kcmil |
| | 205 | 166.1 | 180 | 180 | 250 | 250 kcmil | 3 | 1/0–350 kcmil | 8–250 kcmil |
| **FR6** | 261 | 226.4 | 240 | 240 | 400 | 2*2/0 | 3 | 2*(1/0–300 kcmil) | 3–300 kcmil |
| | 310 | 284.9 | 302 | 302 | 400 | 2*4/0 | 3 | 2*(1/0–300 kcmil) | 3–300 kcmil |

**Notes**

[1] Line and motor cable size is selected according to UL 508C Table 40.3 for copper conductor rated 75 °C. Use only with copper wire rated 75 °C here. Size requirements for other different wire types are defined in the National Electrical Code, ANSI/NFPA 70.

[2] Earthing conductor size is determined by the maximum overcurrent device rating used ahead of the drive according to UL 508C Table 6.4.

[3] If power cubes or bypass are used, a UL listed Class RK5, J, T or equivalent fuse is recommended.

[4] FR0 is not available till June 2018.

**International cable and fuse sizes—380 Vac to 440 Vac ratings** ①②

| Frame size | Amp suffix | 400 V input current ($VT/I_L$) | Current ($VT/I_L$) at 40 °C | Fuse rating (gG/gL) ③ | Terminal cable size | | |
|---|---|---|---|---|---|---|---|
| | | | | | Mains and motor cable Cu ($mm^2$) | Main terminal Cu ($mm^2$) | Earth terminal Cu ($mm^2$) |
| **FR0** ④ | 3D3 | 4.3 | 3.3 | 6 | 3*1.5+1.5 | 0.2–6 solid or 0.2–4 stranded | 0.75–6 |
| | 4D3 | 5.5 | 4.3 | 10 | 3*1.5+1.5 | 0.2–6 solid or 0.2–4 stranded | 0.75–6 |
| | 5D6 | 7.1 | 5.6 | 10 | 3*1.5+1.5 | 0.2–6 solid or 0.2–4 stranded | 0.75–6 |
| | 7D6 | 9.6 | 7.6 | 16 | 3*1.5+1.5 | 0.2–6 solid or 0.2–4 stranded | 0.75–6 |
| **FR1** | 3D3 | 3.1 | 3.3 | 6 | 3*1.5+1.5 | 0.2–6 solid or 0.2–4 stranded | 0.75–6 |
| | 4D3 | 4 | 4.3 | 6 | 3*1.5+1.5 | | 0.75–6 |
| | 5D6 | 5.2 | 5.6 | 10 | 3*1.5+1.5 | | 0.75–6 |
| | 7D6 | 7.1 | 7.6 | 16 | 3*1.5+1.5 | | 0.75–6 |
| | 9D0 | 8.4 | 9 | 16 | 3*1.5+1.5 | | 0.75–6 |
| | 012 | 11.2 | 12 | 16 | 3*1.5+1.5 | | 0.75–6 |
| **FR2** | 016 | 15 | 16 | 20 | 3*4+4 | 0.5–16 | 4–16 |
| | 023 | 21.5 | 23 | 25 | 3*4+4 | 0.5–16 | 4–16 |
| | 031 | 29 | 31 | 32 | 3*6+6 | 0.5–16 | 4–16 |
| **FR3** | 038 | 35.2 | 38 | 40 | 3*16+16 | 16–35 | 2.5–25 |
| | 046 | 42.6 | 46 | 50 | 3*16+16 | 16–35 | 2.5–25 |
| | 061 | 55.7 | 61 | 63 | 3*16+16 | 16–35 | 2.5–25 |
| **FR4** | 072 | 65.7 | 72 | 80 | 3*25+16 | 16–50 | 6–50 |
| | 087 | 79.4 | 87 | 100 | 3*35+16 | 16–50 | 6–50 |
| | 105 | 97 | 105 | 125 | 3*50+25 | 16–50 | 6–50 |
| **FR5** | 140 | 129 | 140 | 160 | 3*70+35 | 50–185 | 10–120 |
| | 170 | 157 | 170 | 200 | 3*95+50 | 50–185 | 10–120 |
| | 205 | 189 | 205 | 250 | 3*120+70 | 50–185 | 10–120 |
| **FR6** | 261 | 246.2 | 261 | 400 | 2*(3*70+35) | 2*(50–150) | 35–150 |
| | 310 | 292.4 | 310 | 400 | 2*(3*95+50) | 2*(50–150) | 35–150 |

**Notes**

① Line and motor cable size is selected according to IEC 60364-5-52:2009 Table B.52.4 for copper conductor with PVC insulation with a wiring condition of ambient temperature 30 °C in air and an installation method of "B2" (cables in conduit and cable trunking systems). For other wiring conditions, please refer to the standard of IEC 60364-5-52:2009 for suitable cable sizes.

② Earthing conductor size is determined by the cross-sectional area of phase conductors according to IEC/EN 61800-5-1:2007 Table 5. So if phase conductor size is changed, earthing conductor size should also be changed accordingly.

③ If power cubes or bypass are used, a Class gG/gL fuse is recommended.

④ FR0 is not available till June 2018.

**North America cable and fuse sizes—525 Vac to 600 Vac ratings** ①②

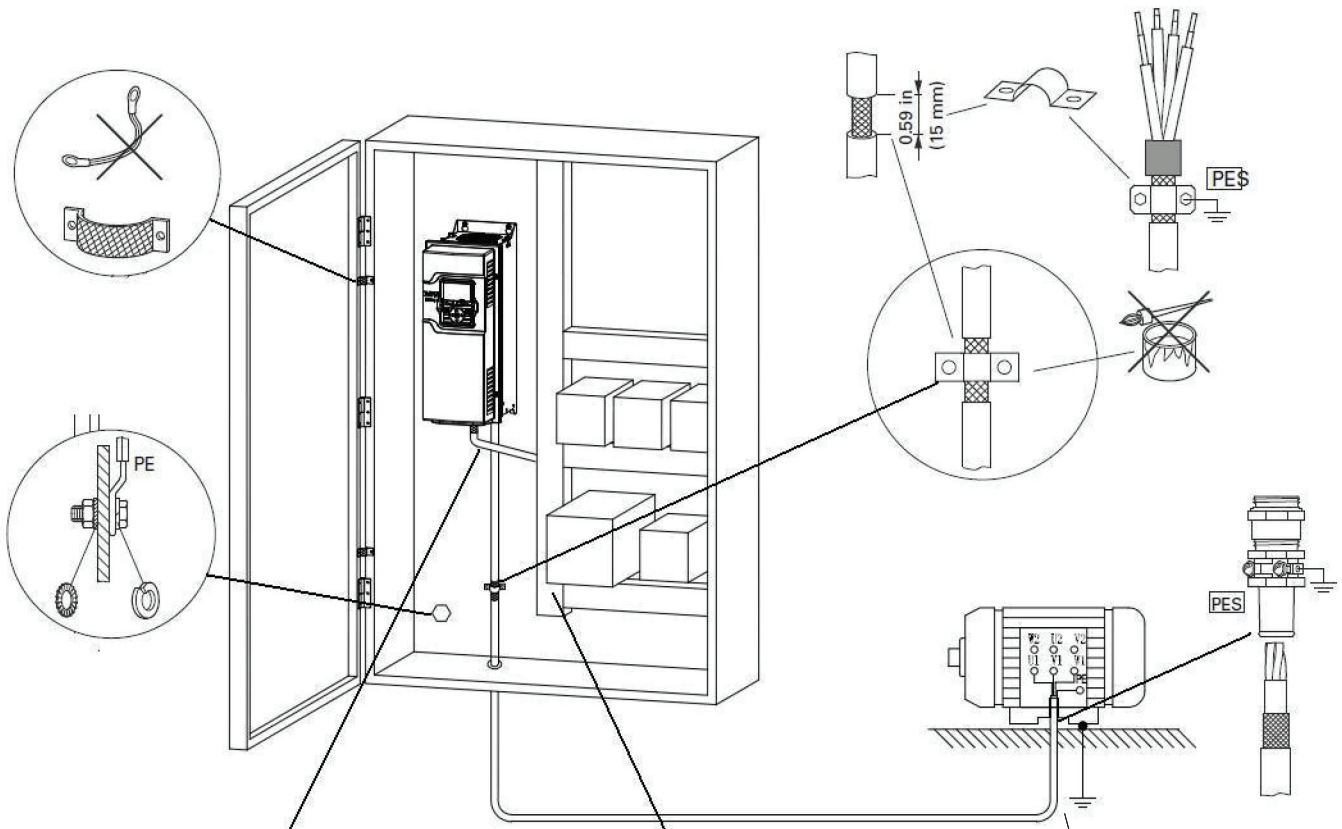
| Frame size | Amp suffix | 575 V input current ($VT/I_L$) | NEC motor amp rating at 575 V | Current ($VT/I_L$) at 40 °C | Recommended fuse rating ③ | NEC wire Size (AWG) | | Terminal connection size (AWG) | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Line and motor | Ground | Line and motor | Ground |
| **FR1** | 4D5 | 4.2 | 3.9 | 4.5 | 10 | 14 | 14 | 26–10 | 18–10 |
| | 7D5 | 7 | 6.1 | 7.5 | 10 | 14 | 12 | 26–10 | 18–10 |
| | 010 | 9.3 | 9 | 10 | 15 | 14 | 10 | 26–10 | 18–10 |
| **FR2** | 013 | 12.5 | 11 | 13.5 | 20 | 12 | 10 | 20–6 | 12–6 |
| | 018 | 16.7 | 17 | 18 | 30 | 10 | 10 | 20–6 | 12–6 |
| | 022 | 20.4 | 22 | 22 | 35 | 10 | 8 | 20–6 | 12–6 |
| **FR3** | 027 | 25.2 | 27 | 27 | 40 | 6 | 8 | 6–2 | 14–4 |
| | 034 | 31.7 | 32 | 34 | 45 | 6 | 8 | 6–2 | 14–4 |
| | 041 | 38.2 | 41 | 41 | 50 | 6 | 6 | 6–2 | 14–4 |
| **FR4** | 052 | 48.1 | 52 | 52 | 70 | 4 | 6 | 6–1/0 | 10–1/0 |
| | 062 | 57.4 | 62 | 62 | 80 | 4 | 6 | 6–1/0 | 10–1/0 |
| | 080 | 73 | 77 | 80 | 125 | 2 | 4 | 6–1/0 | 10–1/0 |
| **FR5** | 100 | 91.3 | 99 | 100 | 150 | 1/0 | 4 | 1/0–350 kcmil | 8–250 kcmil |
| | 125 | 114.1 | 125 | 125 | 175 | 2/0 | 4 | 1/0–350 kcmil | 8–250 kcmil |
| | 144 | 132.9 | 144 | 144 | 200 | 3/0 | 4 | 1/0–350 kcmil | 8–250 kcmil |
| **FR6** | 208 | 202.8 | 192 | 208 | 400 | 2*1/0 | 3 | 2*(1/0–300 kcmil) | 3–300 kcmil |
| | 250 | 243.8 | 242 | 250 | 400 | 2*2/0 | 3 | 2*(1/0–300 kcmil) | 3–300 kcmil |

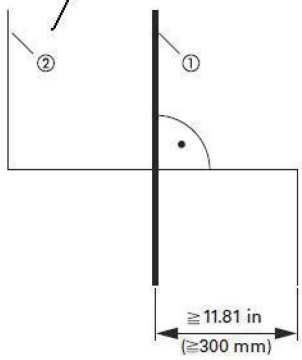
**Notes**

① Line and motor cable size is selected according to UL 508C Table 40.3 for copper conductor rated 75 °C. Use only with copper wire rated 75 °C here. Size requirements for other different wire types are defined in the National Electrical Code, ANSI/NFPA 70.

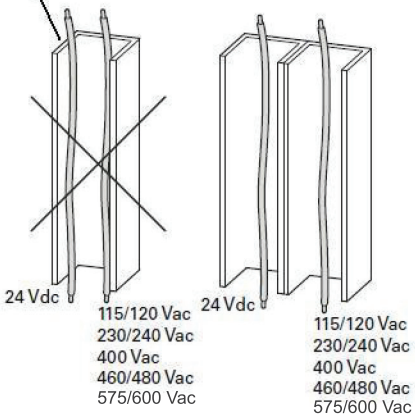
② Earthing conductor size is determined by the maximum overcurrent device rating used ahead of the drive according to UL 508C Table 6.4.

③ If power cubes or bypass are used, a UL listed Class RK5, J, T or equivalent fuse is recommended.

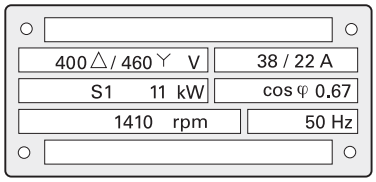


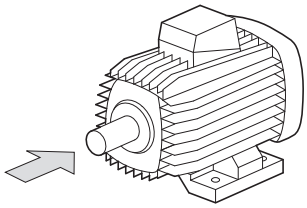



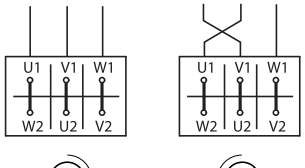

① L1, L2, L3, N, U, V, W, R+. R–
② 1, 2, … 26, A, B

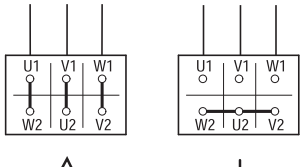



| M-Max | Motor |
|---|---|
| U/T1U1 | U/T1U1 |
| V/T2V1 | V/T2V1 |
| W/T3W1 | W/T3W1 |





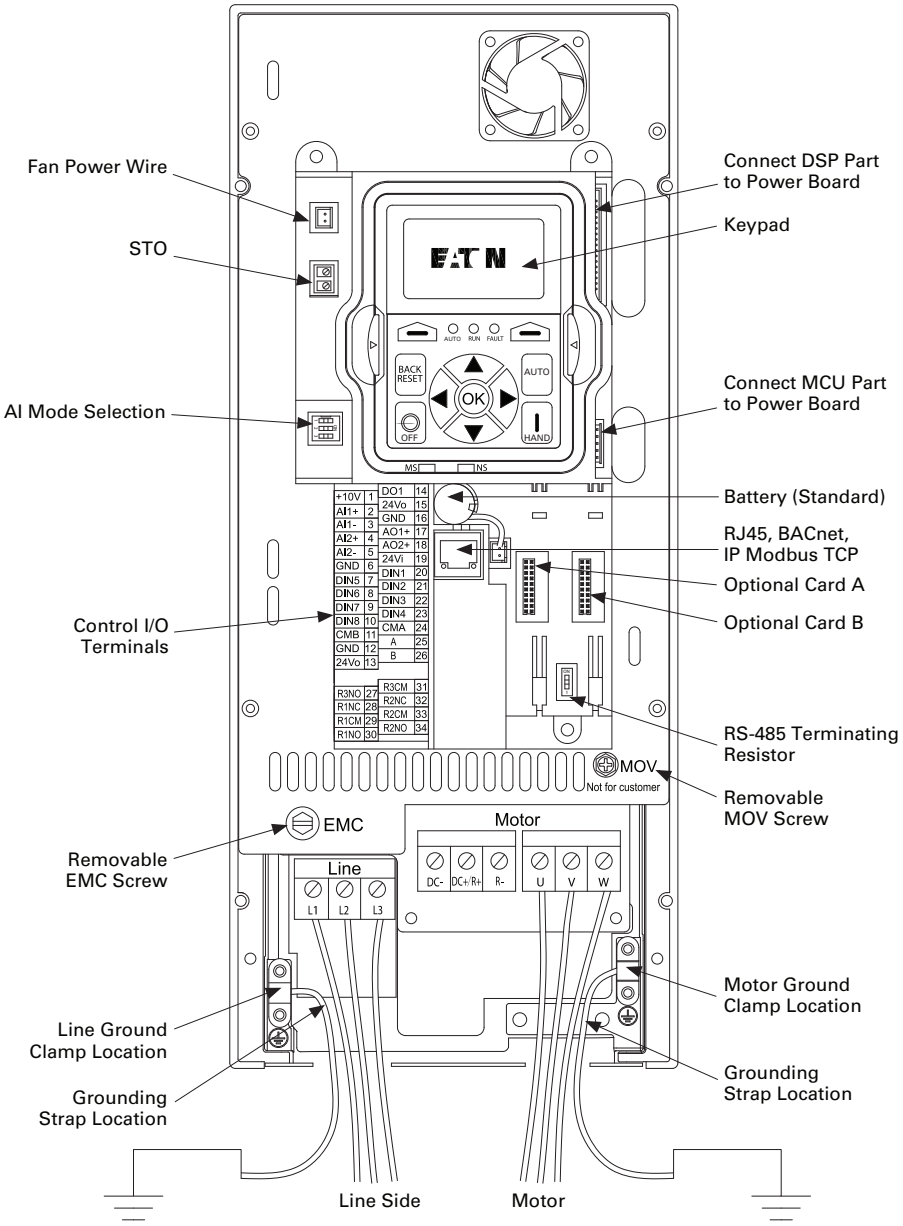




$U_{LN}$ = 230V

($U_{LN}$ = 400 V)

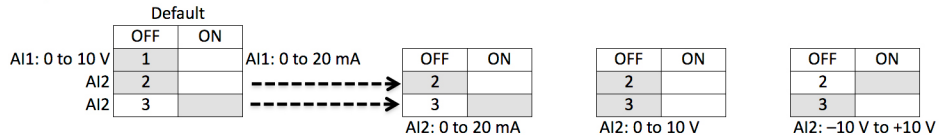
**Control board layout**

| 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | | 31 | 32 | 33 | 34 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DO1 | 24Vo | GND | AO1+ | AO2+ | 24Vi | DIN1 | DIN2 | DIN3 | DIN4 | CMA | A | B | | R3CM | R2NC | R2CM | R2NO |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | | 27 | 28 | 29 | 30 |
| +10V | AI1+ | AI1- | AI2+ | AI2- | GND | DIN5 | DIN6 | DIN7 | DIN8 | CMB | GND | 24Vo | | R3NO | R1NC | R1CM | R1NO |



## Factory-set control terminal functions

### I/O connection




| External wiring | Pin | Signal name | Signal | Default setting | Description |
|---|---|---|---|---|---|
| | 1 | +10 V | Ref. Output Voltage | — | 10 Vdc Supply Source |
| Res | 2 | AI1+① | Analog Input 1 | 0–10 V | Voltage Speed Reference (Programmable to 4 mA to 20 mA) |
| | 3 | AI1– | Analog Input 1 Ground | — | Analog Input 1 Common (Ground) |
| | 4 | AI2+① | Analog Input 2 | 4 mA to 20 mA | Current Speed Reference (Programmable to 0–10 V) |
| | 5 | AI2– | Analog Input 2 Ground | — | Analog Input 2 Common (Ground) |
| | 6 | GND | I/O Signal Ground | — | I/O Ground for Reference and Control |
| | 7 | DIN5 | Digital Input 5 | Preset Speed B0 | Sets frequency output to Preset Speed 1 |
| | 8 | DIN6 | Digital Input 6 | Preset Speed B1 | Sets frequency output to Preset Speed 2 |
| | 9 | DIN7 | Digital Input 7 | Emergency Stop (TI–) | Input forces VFD output to shut off |
| | 10 | DIN8 | Digital Input 8 | Force Remote (TI+) | Input takes VFD from Local to Remote |
| | 11 | CMB | DI5 to DI8 Common | Grounded | Allows source input |
| | 12 | GND | I/O Signal Ground | — | I/O Ground for Reference and Control |
| | 13 | 24 V | +24 Vdc Output | — | Control voltage output (100 mA max.) |
| | 14 | DO1 | Digital Output 1 | Ready | Shows the drive is ready to run |
| | 15 | 24 Vo | +24 Vdc Output | — | Control voltage output (100 mA max.) |
| | 16 | GND | I/O Signal Ground | — | I/O Ground for Reference and Control |
| | 17 | AO1+ | Analog Output 1 | Output Frequency | Shows Output frequency to motor 0–60 Hz (4 mA to 20 mA) |
| | 18 | AO2+ | Analog Output 2 | Motor Current | Shows Motor current of motor 0–FLA (4 mA to 20 mA) |
| | 19 | 24 Vi | +24 Vdc Input | — | External control voltage input |
| | 20 | DIN1 | Digital Input 1 | Run Forward | Input starts drive in forward direction (start enable) |
| | 21 | DIN2 | Digital Input 2 | Run Reverse | Input starts drive in reverse direction (start enable) |
| | 22 | DIN3 | Digital Input 3 | External Fault | Input causes drive to fault |
| | 23 | DIN4 | Digital Input 4 | Fault Reset | Input resets active faults |
| | 24 | CMA | DI1 to DI4 Common | Grounded | Allows source input |
| | 25 | A/+ | RS-485 Signal A | — | Fieldbus Communication (Modbus, BACnet) |
| | 26 | B/- | RS-485 Signal B | — | Fieldbus Communication (Modbus, BACnet) |
| | 27 | R3NO | Relay 3 Normally Open | At Speed | Relay output 3 shows VFD is at Ref. Frequency |
| | 28 | R1NC | Relay 1 Normally Closed | Run | Relay output 1 shows VFD is in a run state |
| | 29 | R1CM | Relay 1 Common | | |
| | 30 | R1NO | Relay 1 Normally Open | | |
| | 31 | R3CM | Relay 3 Common | At Speed | Relay output 3 shows VFD is at Ref. Frequency |
| | 32 | R2NC | Relay 2 Normally Closed | Fault | Relay output 2 shows VFD is in a fault state |
| | 33 | R2CM | Relay 2 Common | | |
| | 34 | R2NO | Relay 2 Normally Open | | |

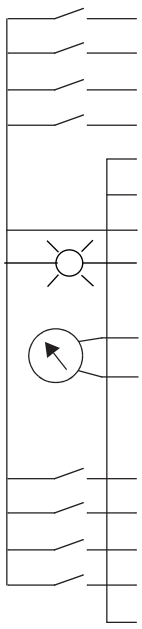
**Notes**

The above wiring demonstrates a SINK configuration. It is important that CMA and CMB are wired to ground (as shown by dashed line). If a SOURCE configuration is desired, wire 24 V to CMA and CMB and close the inputs to ground. When using the +10 V for AI1, it is important to wire AI1—to ground (as shown by dashed line). If using +10 V for AI1 or AI2, terminals 3, 5, and 6 need to be jumpered together.

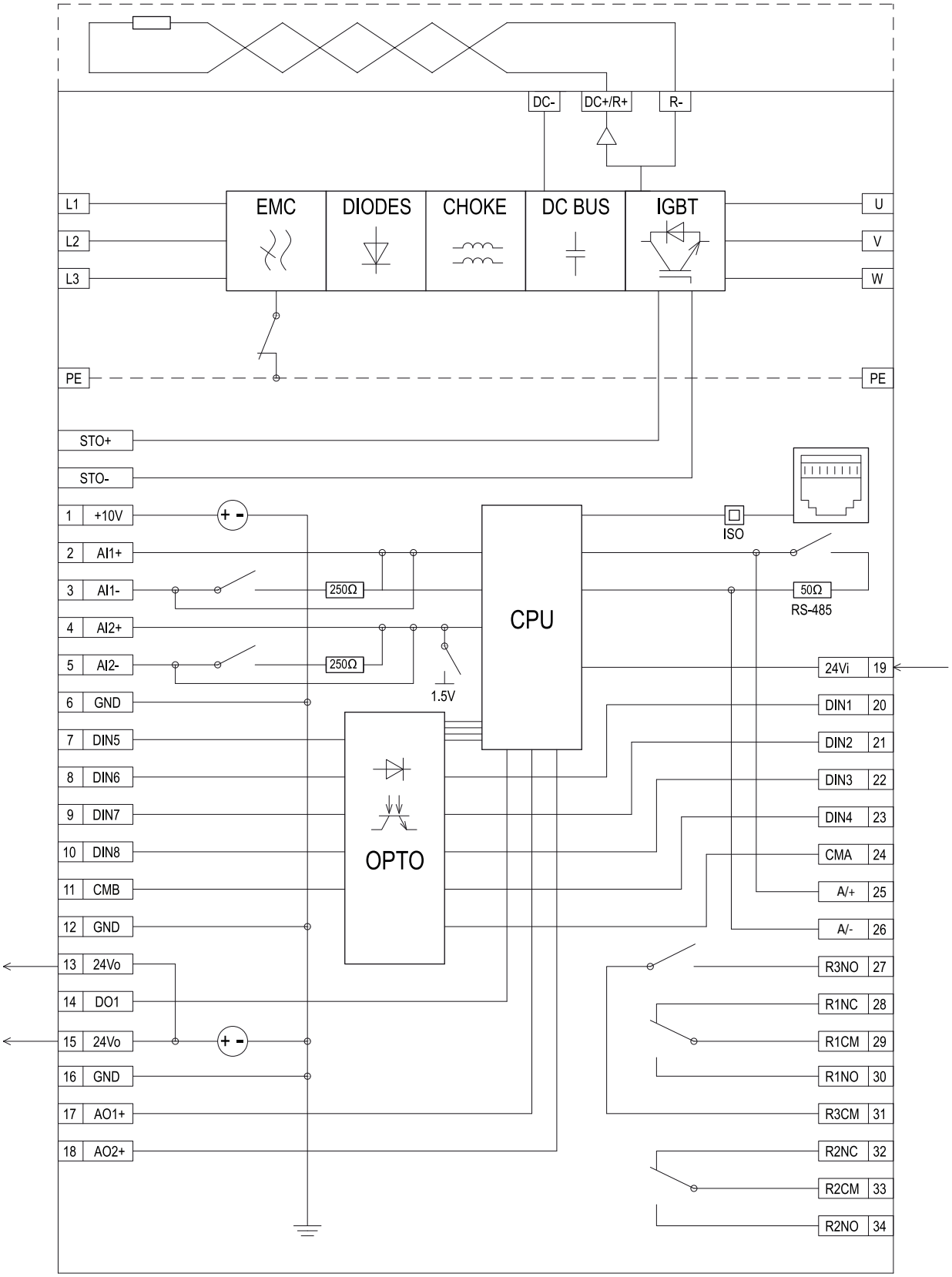
① AI1+ and AI2+ block that it can support 10K potentiometer.

## 接线图

**PowerXL 系列—DH1 控制接线图**




| 引脚 | 信号名称 | 信号 | 出厂默认值 | 产品描述 |
|---|---|---|---|---|
| 1 | +10V | 参考输出电压 | - | 10 Vdc 电源 |
| 2 | AI1+ | 模拟输入1 | 0-10V | 电压速度参考（可编程为4-20mA） |
| 3 | AI1– | 模拟输入1接地 | - | 模拟输入 通用（接地） |
| 4 | AI2+ | 模拟输入2 | 4-20mA | 电流速度参考（可编程为0-10V） |
| 5 | AI2– | 模拟输入2接地 | - | 模拟输入2 通用（接地） |
| 6 | GND | I/O信号接地 | - | I/O 接地，用于参考和控制 |
| 7 | DIN5 | 数字输入5 | 预设速度B0 | 设定频率输出至预设速度1 |
| 8 | DIN6 | 数字输入6 | 预设速度B1 | 设定频率输出至预设速度2 |
| 9 | DIN7 | 数字输入7 | 紧急停车 | 输入强制VFD输出关闭 |
| 10 | DIN8 | 数字输入8 | 强制远程 | 输入将VFD从本地变为远程 |
| 11 | CMB | DI5至DI8通用 | 已接地 | 允许电源输入 |
| 12 | GND | I/O 信号接地 | - | I/O接地，用于参考和控制 |
| 13 | 24V | +24 Vdc 输出 | - | 控制电压输出（最大值100mA） |
| 14 | DO1 | 数字输出1 | 准备就绪 | 显示变频器已准备好运行 |
| 15 | 24Vo | +24Vdc 输出 | - | 控制电源输出 （100mA） |
| 16 | GND | I/O信号接地 | - | I/O接地，用于参考和控制 |
| 17 | AO1+ | 模拟输出1 | 输出频率 | 显示电机的输出频率 0-60Hz （4-20mA） |
| 18 | AO2+ | 模拟输出2 | 电机电流 | 显示电机的电机电流 0-FLA (4-20mA) |
| 19 | 24Vi | +24VDC 输入 | - | 外部控制电压输入 |
| 20 | DIN1 | 数字输入1 | 正向运行 | 输入以正向起动变频器（起动启用） |
| 21 | DIN2 | 数字输入2 | 反向运行 | 输入以反向起动变频器（起动启用） |
| 22 | DIN3 | 数字输入3 | 外部故障 | 输入造成变频器发生故障 |
| 23 | DIN4 | 数字输入4 | 故障复位 | 输入复位有效故障 |
| 24 | CMA | DI1至DI4通用 | 已接地 | 允许电源输入 |
| 25 | A/+ | RS-485 信号A | - | 现场总线通讯（Modbus， BACnet） |
| 26 | B/- | RS-485 信号B | - | 现场总线通讯（Modbus， BACnet） |
| 27 | R3NO | 继电器3 常开 | 加速 | 继电器输出3显示VFD处于参考频率 |
| 28 | R1NC | 继电器1常闭 | 运行 | 继电器输出1显示VFD处于运行状态 |
| 29 | R1CM | 继电器1通用 | | |
| 30 | R1NO | 继电器1常开 | | |
| 31 | R3CM | 继电器3通用 | 加速 | 继电器输出3显示VFD处于参考频率 |
| 32 | R2NC | 继电器2常闭 | 故障 | 继电器输出2显示VFD处于故障状态 |
| 33 | R2CM | 继电器2通用 | | |
| 34 | R2NO | 继电器2常开 | | |


DC-
DC+/R+
R-
L1
L2
L3
EMC
DIODES
CHOKE
DC BUS
IGBT
U
V
W
PE
PE
STO+
STO-
1 +10V
2 AI1+
3 AI1-
4 AI2+
5 AI2-
6 GND
7 DIN5
8 DIN6
9 DIN7
10 DIN8
11 CMB
12 GND
13 24Vo
14 DO1
15 24Vo
16 GND
17 AO1+
18 AO2+
250Ω
250Ω
1.5V
CPU
OPTO
ISO
50Ω
RS-485
24Vi 19
DIN1 20
DIN2 21
DIN3 22
DIN4 23
CMA 24
A/+ 25
A/- 26
R3NO 27
R1NC 28
R1CM 29
R1NO 30
R3CM 31
R2NC 32
R2CM 33
R2NO 34

(en) **Caution!**
In the territory of the EU Directive, the frequency-controlled devices and their accessories must be taken into operation only when the machine has been determined to fulfill the protection requirements of Machinery Safety Directive 89/392/EEC.

Ensure EMC-compliant installation. Lay control and communication cables spatially separated from the motor cable.
Ensure a large contact area connection between p cable screen and PE.

(es) **¡Atención!**
En el campo de aplicación de la normativa CE, los dispositivos controlados por frecuencia y sus correspondientes accesorios sólo deberán ponerse en marcha cuando se asegure que la máquina cumple con las exigencias de seguridad de la normativa de máquinas 89/392/CEE.

El montaje debe cumplir CEM. Los cables de mando y de conexión a red se deben instalar independientemente del cable de conexión al motor. El cable apantallado p se debe conectar a masa utilizando una amplia superficie de contacto.

(fr) **Attention !**
En application des directives européennes, les convertisseurs de fréquence et leurs accessoires ne doivent être mis en service que s'il a été vérifié que la machine répond aux exigences de la directive machines 89/392/CEE.

Montage conforme aux règles de la CEM. Eloigner les câbles de commande et de réseau des câbles puissance. Relier le blindage au PE en assurant de grandes surfaces de contact.

(de) **Vorsicht!**
Im Geltungsbereich der EG-Richtlinien dürfen die frequenzgesteuerten Geräte und deren Zubehör nur dann in Betrieb genommen werden, wenn festgestellt wird, dass die Maschine die Schutzanforderungen der Maschinenrichtlinie 89/392/EWG erfüllt.

EMV-gerechter Aufbau. Steuer- und Netzleitungen räumlich getrennt von der Motorleitung verlegen. p Leitungsschirm großflächig mit PE verbinden.

(it) **Attenzione!**
Nel campo di validità delle direttive CE, gli apparecchi a controllo di frequenza e i loro accessori possono essere messi in esercizio soltanto se si verifica che la macchina soddisfa i requisiti di sicurezza della direttiva macchine 89/392/CEE

Montaggio secondo CEM. Disporre i cavi comandi e di alimentazione separati dal cavo del motore. Collegare lo schermo del cavo p con PE con un'ampia superficie.

(nl) **Voorzichtig!**
Binnen het geldigheidsgebied van de EC-richtlijnen mogen de frequentiegeregelde apparaten en de toebehoren daarvan alleen in bedrijf worden genomen, wanneer wordt vastgesteld, dat de machine aan de veiligheidseisen van de machinerichtlijn 89/392/EWG voldoet.

EMC-conforme constructie. Besturings- en netkabels ruimtelijk gescheiden van de motorkabel leggen. p Kabelafscherming over groot oppervlak met PE verbinden.

(da) **Forsigtig!**
I det område, hvor EF-direktiverne er gældende, må det frekvensstyrede udstyr og dets tilbehør kun tages i anvendelse, hvis det konstateres, at maskinen opfylder beskyttelseskravene i maskindirektivet 89/392/EØF.

EMC-korrekt installation. Træk styre- og netledninger rumligt adskilt fra motorledningen. p Sørg for en stor kontaktflade mellem PES ledningsafskærmning og PE.

(el) **Προσοχή!**
Στο πεδίο εφαρμογής των οδηγιών της ΕΚ, οι ελεγχόμενες μέσω συχνότητας συσκευές και τα παρελκόμενά τους επιτρέπεται να τίθενται σε λειτουργία μόνο εφόσον διαπιστωθεί ότι το μηχάνημα πληροί τις απαιτήσεις προστασίας της οδηγίας της ΕΚ για τα μηχανήματα 89/392/ΕΟΚ.

Κατασκευή σύμφωνα με τις απαιτήσεις ΗΜΣ. Εγκαθιστάτε τους αγωγούς ελέγχου και δικτύου ανεξάρτητα από τον αγωγό του κινητήρα. p Συνδέετε τη θωράκιση των αγωγών σε μεγάλη επιφάνεια με τη γείωση.

(pt) **Cuidado!**
No âmbito das directivas da CE, os aparelhos comandados por frequência e os respectivos acessórios só podem ser postos em operação se for comprovado que a máquina atende às exigências de protecção da directiva de máquinas 89/392/CE.

Estrutura com compatibilidade electromagnética. Dispor os fios de comando e de rede separados do fio do motor. p Ligar uma área grande da blindagem do cabo (PES) com o PE.

(sv) **Se upp!**
I giltighetsområdet för EG-direktiven får de frekvensstyrda apparaterna och deras tillbehör endast tagas i drift när man fastställt att maskinen uppfyller skyddskraven i maskindirektiv 89/392/EEC.

EMC-anpassad uppbyggnad. Styr- och nätledningar dras avskilda från motorledningarna. p Förbind ledningsskärm över ett brett område med PE.

(fi) **Varo!**
EU-direktiivien voimassaoloalueella taajuusohjatut laitteet ja niiden varusteet saa ottaa käyttöön vain silloin, kun todetaan, että kone täyttää konedirektiivin 89/392/ETY suojausvaatimukset.

EMC-mukainen rakenne. Ohjaus- ja verkkojohdot on asennettava tilaulotteisesti erotettuina. Johdonsuoja on liitettävä laajasti maadoitukseen p.

(cs) **Pozor!**
V rozsahu platnosti směrnic ES smí být frekvenčně řízené přístroje a jejich příslušenství uvedeny do provozu jedině tehdy, pokud je zjištěno, že stroj splňuje požadavky ochrany stanovené směrnicí 89/392/EHS o strojních zařízeních.

Nástavba odpovídající směrnici EMC. Řídicí a síťová vedení pokládejte prostorově oddělená od vedení motoru. p Stínění vedení spojte velkoplošně s PE.

(et) **Ettevaatust!**
EÜ-direktiivi kehtivuspiirkonnas võib sagedusjuhitavaid seadmeid ja nende lisaseadmeid kasutusele võtta ainult siis, kui on kindlaks tehtud, et masin vastab masinadirektiivi 89/392/EMÜ kaitsenõuetele.

Elektomagnetilisele ühilduvusele vastav ehitus. Juhtimis- ja võrgukaablid paigaldada mootori toitekaablist ruumiliselt eraldatuna. p Kaabli kaitseekraan ühendada ulatuslikult talitlusmaandusega.

(hu) **Vigyázat!**
Az EK irányelvek hatályossági területén a frekvenciavezérelt készülékeket és azok tartozékait csak akkor szabad üzembe helyezni, ha megállapítást nyert, hogy a gép megfelel a gépek biztonságáról szóló, 89/392/EGK számú irányelv biztonsági követelményeinek.

Elektromágnesesen összeférhető kivitelt biztosítson. A motorvezetékektől térben elkülönítve vezesse vezérlő és hálózati vezetékeket. p Nagy felületen csatlakoztassa a védőföldeléshez a vezetékárnyékolást.

(lv) **Ievērot piesardzību!**
Valstīs, kurās ir spēkā EK direktīvas, ierīču ar frekvenčvadību un to piederumu ekspluatāciju drīkst sākt tikai tad, ja ir konstatēta iekārtas atbilstība Mašīnu direktīvā 89/392/EEK ietvertajām aizsardzības prasībām.

EMS atbilstoša uzbūve. Vadības un tīkla kabeļus izvietot atsevišķi no motora kabeļa p Vada ekrānu plašā virsmā savienot ar PE.

(lt) **Atsargiai!**

EB direktyvų taikymo srityje dažniniu būdu valdomus įrenginius ir jų priedus leidžiama pradėti naudoti tik tada, kai nustatoma, kad įrenginys atitinka Mašinų direktyvos 89/392/EEB keliamus apsaugos reikalavimus.

Montažas turi atitikti EMS reikalavimus. Valdymo ir duomenų tinklo kabelius išdėstyti atokiai nuo variklio kabelio. p Kabelio ekraną dideliu paviršiumi sujungti su įžeminimu.

(pl) **Ostrożnie!**

Na obszarze obowiązywania dyrektyw WE urządzenia sterowane częstotliwościowo wolno wprowadzać do eksploatacji tylko wtedy, gdy zostanie stwierdzone, że maszyna spełnia wymagania ochronne dyrektywy maszynowej 89/392/EWG.

Konstrukcja zgodna z dyrektywą w sprawie kompatybilności elektromagnetycznej (EMC). Przewody sterowania i zasilania elektrycznego należy układać oddzielnie od przewodu silnika.
p Ekranowanie połączyć z przewodem uziemiającym na większej powierzchni.

(sl) **Pozor!**

Na območju veljavnosti direktiv ES je zagon frekvenčno krmiljenih naprav in njihovega pribora dovoljen le tedaj, ko je bilo ugotovljeno, da stroj ustreza varnostnim zagtevam Direktive o strojih 89/392/EGS.

Montaža v skladu z EMZ. Krmilne in omrežne vodnike napeljite ločeno od vodnikov motorja p Oklep vodnika na veliki površini povežite z zaščitnim vodnikom.

(sk) **Pozor!**

V krajinách, ktoré spadajú pod pôsobnosť smerníc ES smú byť rádiovo ovládané zariadenia a ich príslušenstvo uvedené do prevádzky len ak je zabezpečené, že stroj spĺňa ochranné ustanovenia smernice č. 89/392/EHS o strojových zariadeniach.

Montáž v súlade s požiadavkami elektromagnetickej kompatibility. Ovládacie a siet˙ové vedenia uložte v priestore oddelene od vedenia motora. p Zabezpečte veľkú kontaktnú plochu medzi káblovým tienením a PE.

(bg) **Внимание!**

В сферата на действие на изискванията на ЕС устройствата с честотно управление и техните допълнителни устройства могат да бъдат приведени в употреба, само ако се установи, че оборудването съответства на изискванията за безопасност на машинно оборудване спрямо 89/392/EWG.

Монтаж с електромагнитна съвместимост. Полагане на контролните и мрежови проводници пространствено отделно от проводника на двигателя. p Осигурете по-голяма конкактна площ между силовия екран и PE.

(ro) **Precauţie!**

În cadrul sferei de aplicare a directivelor UE dispozitivele controlate prin frecvenţă şi accesoriile acestora au voie să fie puse în funcţiune doar dacă se stabileşte că aparatul îndeplineşte cerinţele Directivei 89/392/CEE privind maşinile.

Montajul trebuie să fie compatibil EMC. Poziţionaţi cablurile de control şi de reţea la distanţă de cablul motorului. p Asiguraţi o suprafaţă de contact mare între izolaţia cablului şi PE.

(ru) **Осторожно!**

В сфере действия директив ЕС устройства с частотным управлением и их оснащение должны вводиться в эксплуатацию только в том случае, если установлено, что данное оборудование соответствует требованиям по защите Директивы о машинном оборудовании 89/392/EWG.

Сборка соответственно электромагнитной совместимости. Линии управления и электросети прокладывать в пространственном отношении отдельно от линии двигателя. p силовой экран соединять с PE по большой площади.

(zh) 注意！

根据欧盟设备一致性规范，安装频率控制设备及其配件时，应确保设备满足机器规范 89/392/EWG 中关于设备保护的要求。

p 按照电磁兼容规范正确安装。应将控制电缆和电源电缆与电机电缆分开。大面积采用 PE 包裹电缆。

## UL cautions, warnings, and instructions

### Wiring warnings for electrical practices and wire sizes

The Cautions, Warnings, and Instructions in this section summarize the procedures necessary to ensure an inverter installation complies with Underwriters Laboratories® guidelines.

en **Warning!**
Use 60/75 °C Cu wire only or equivalent.

en **Warning!**
Open Type Equipment.

en **Warning!**
Suitable for use on a circuit capable of delivering not more than 5,000 rms symmetrical amperes:
- 240 V maximum for DH1-32 models
- 500 V maximum for DH1-34 models
- 600 V maximum for DH1-35 models

### Circuit breaker and fuse sizes

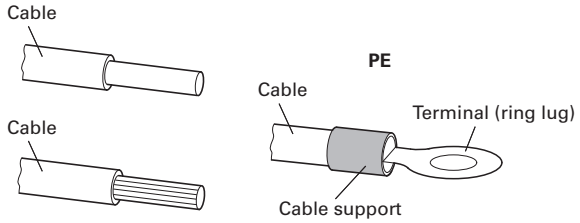
The adjustable frequency drive's connections to input power must include UL listed inverse time circuit breakers with 600V rating, or UL listed fuses.

### Terminal tightening torque and wire size

The wire size range and tightening torque for field wiring terminals are presented.

### Wire connectors

en **Warning!**
Field wiring connections must be made by a UL listed and CSA certified ring lug terminal connector sized for the wire gauge being used. The connector must be fixed using the crimping tool specified by the connector manufacturer.




### Motor overload protection

DH1 adjustable frequency drives provide solid-state motor overload protection, which depends on the proper setting of the following parameter: P7.2 "current limit."

Set the rated current [Amperes] of the motor(s) with the above parameters. The setting range is 0.2 * rated current to 2 * rated current, → manual MN040002EN.

en **Warning!**
When two or more motors are connected to the inverter, they cannot be protected by the electronic overload protection. Install an external thermal relay on each motor.

### Technical support contact information