

PowerXL DH1 Series VFD

Instruction Leaflet
Montageanweisung
Notice d'installation
Instrucciones de montaje
Istruzioni per il montaggio
安装说明

Инструкция по монтажу
Montagehandleiding
Montagevejledning
Οδηγίες εγκατάστασης
Instruções de montagem
Monteringsanvisning

Asennusohje
Návod k montáži
Paigaldusjuhend
Szerelési utasítás
Montážas instrukcija
Montavimo instrukcija

Instrukcja montażu
Navodila za montažo
Návod na montáž
Μονταžни инструкции
Instruções de montaj



(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!**

Uitsluitend deskundigen in elektriciteit en elektrotechnisch geïnstrueerde 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 er 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 ηλεκροτεχνίτες.

(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

Effective December 2017

CS Nebezpečí úrazu elektrickým proudem!

Níže uvedené práce smějí provádět pouze osoby s elektrotechnickým vzděláním.

et Eluohhtlik! Elektrilöögiolt!

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 instruetās personas!

it Pavojus gvybei 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!

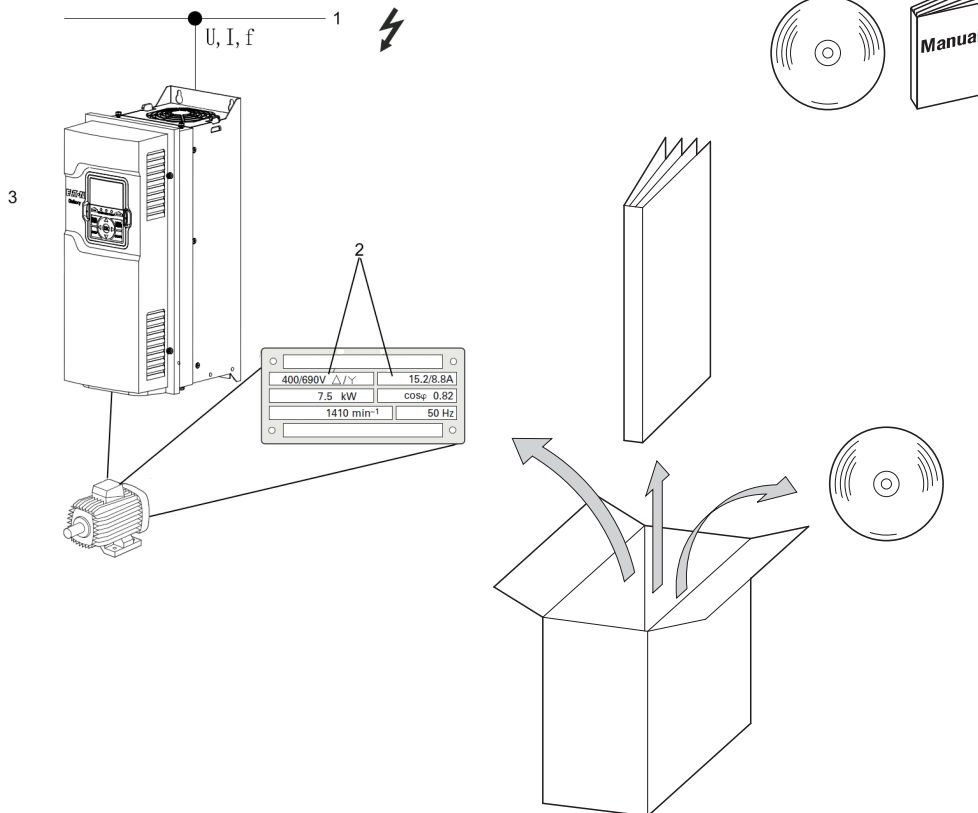
Práce, ktoré sú nižšie opísané, smú vykonávať iba elektroodborníci a osoby s elektrotechnickým vzdelaním.

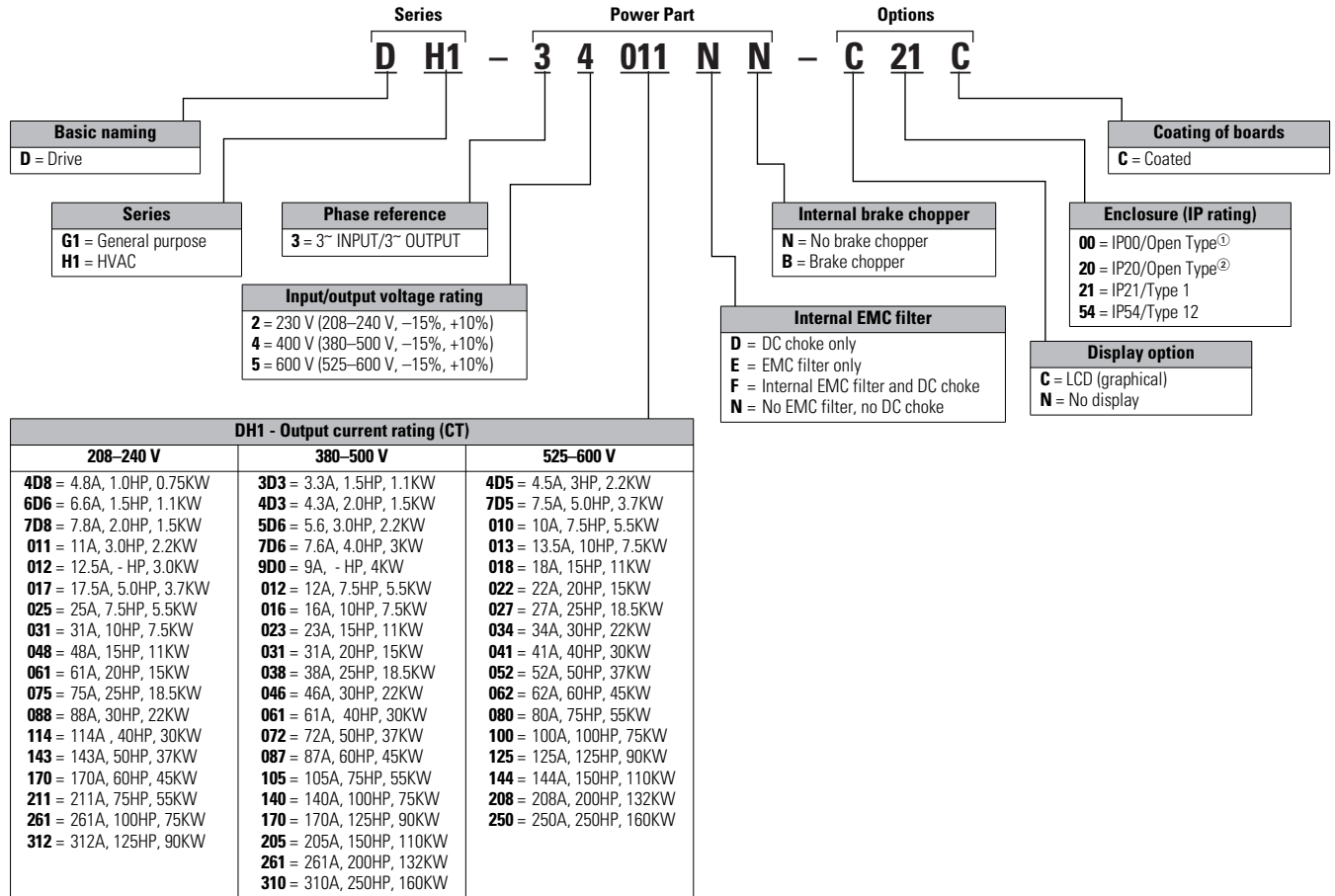
bg Опасност за живота от електрически ток!

Операциите, описани в следващите раздели, могат да се извършват само от специалисти-електротехници и инструктиран електротехнически персонал.

ro Atenție! Pericol electric!

Toate lucrările descrise trebuie efectuate numai de personal de specialitate calificat și de persoane cu cunoștințe profunde în electrotehnică.

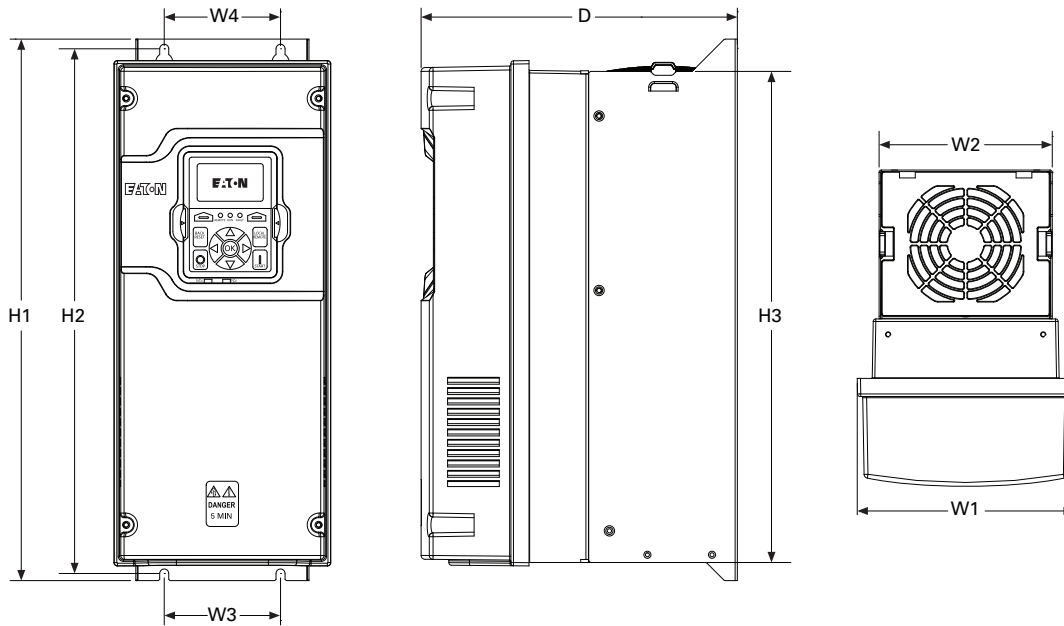




① IP00 FR7 and FR8 is not available for 230V input product or with the PowerXL DH1 Product

② IP20 FR0 will be available in June 2018

Dimensions and weights—Dimensões e pesos—Encombremets 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 masē—Wymiary i ciężary—Mere in teže—Rozměry a hmotnosti—Размеры и тепло—Dimensiuni și greutateți—Размеры и вес—尺寸和重量

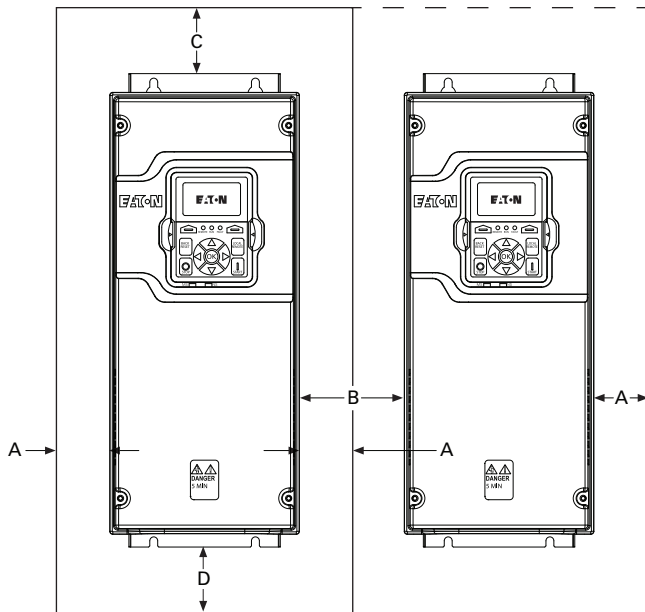


Frame size	Approximate dimensions in inches (mm)									Weight lb (kg)
	D	H1	H2	H3	W1	W2	W3	W4	Ø	
FR0 ^①	6.83 (173.5)	10.58 (268.7)	10.16 (258.0)	9.54 (242.3)	5 (127.0)	4.97 (126.3)	4.26 (108.3)	4.26 (108.3)	0.28 (7.0)	4.41 (2.0)
FR1	7.91 (200.9)	12.87 (327.0)	12.28 (312.0)	11.50 (292.0)	6.02 (153.0)	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 – Monterig – Τοποθέτηση – Montagem – Asennus –
Montáž – Paigaldamine – Felszerelés – Montáža – 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) 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.

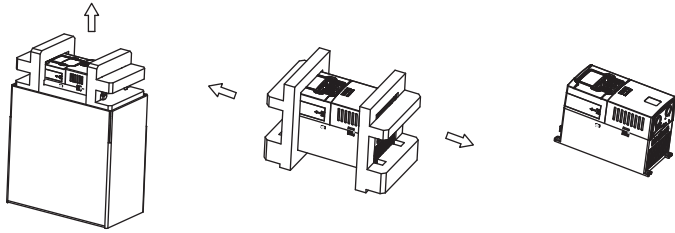
③ The above guidelines apply unless testing has been completed to validate a design outside of these recommendations.

④ FR0 is not available till June 2018.

Effective December 2017

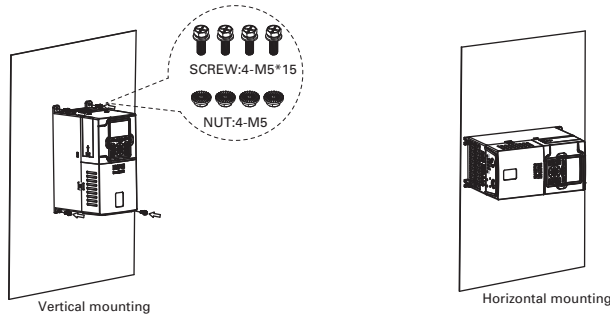
FR0 mounting instructions

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



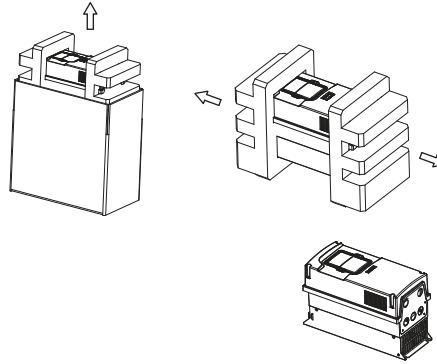
Step 2: Attach the drive to the mounting plate with four M5X15 screws and four M5 nuts. The opening dimension on the mounting plate should follow required dimension (refer to the drive mounting template printed on the outside carton)

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

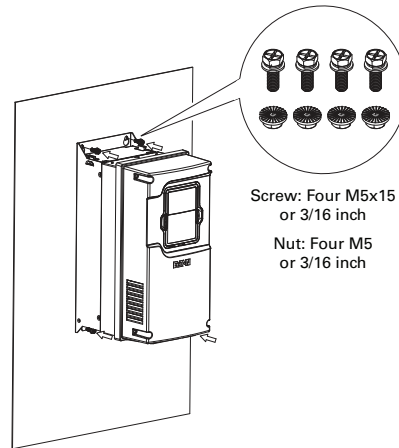


FR1 mounting instructions

Step 1:



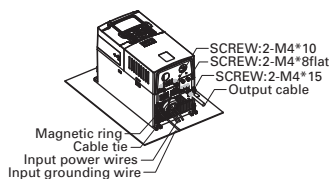
Step 2:



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: attach 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

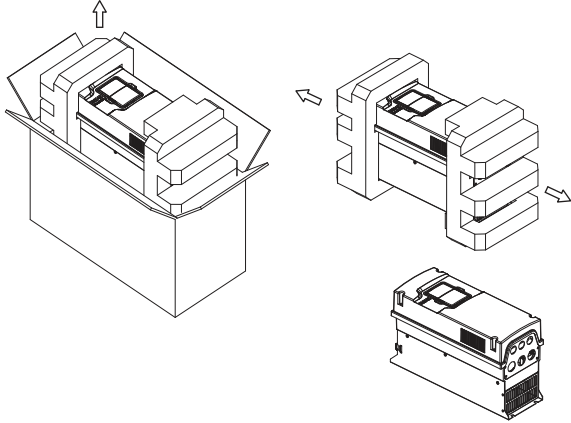


Note

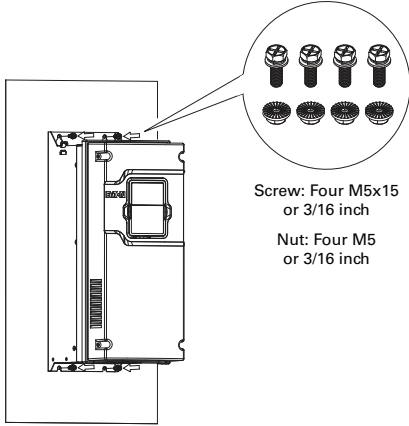
FR0 is not available till June 2018.

FR2 mounting instructions

Step 1:

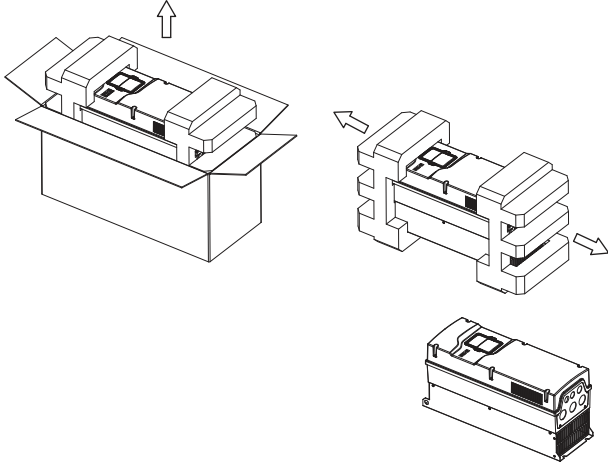


Step 2:

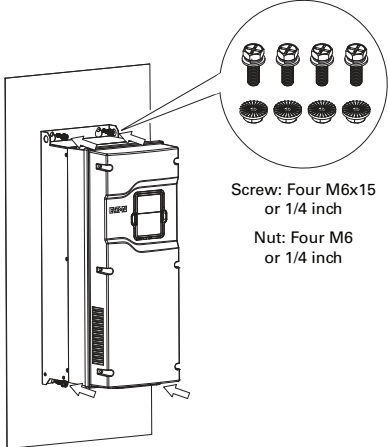


FR3 mounting instructions

Step 1:

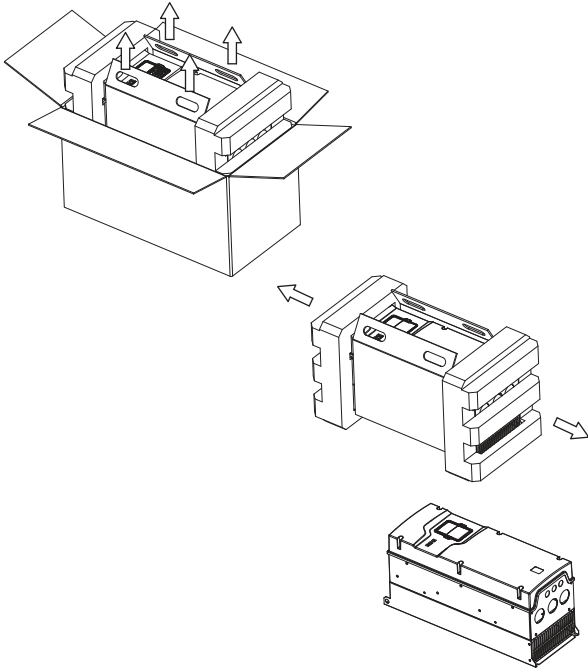


Step 2:

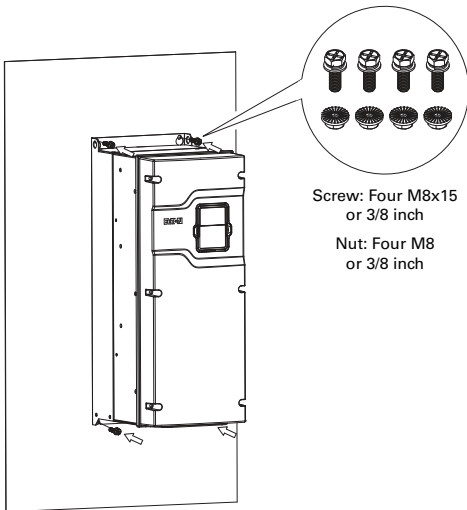


FR4 mounting instructions

Step 1:

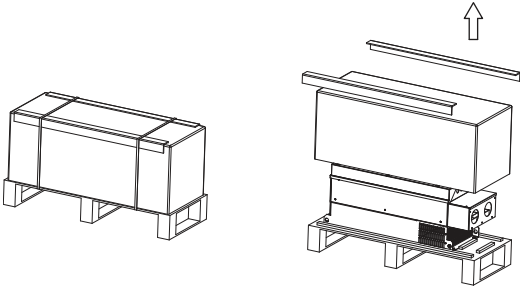


Step 2:

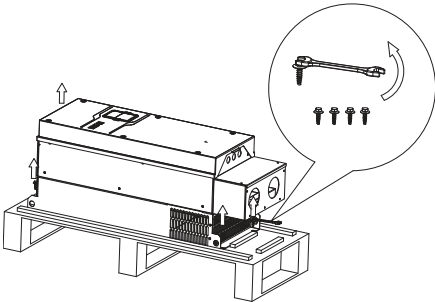


FR5 mounting instructions

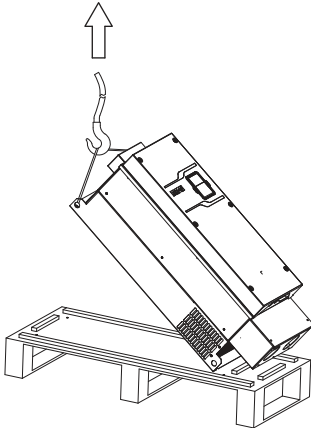
Step 1:



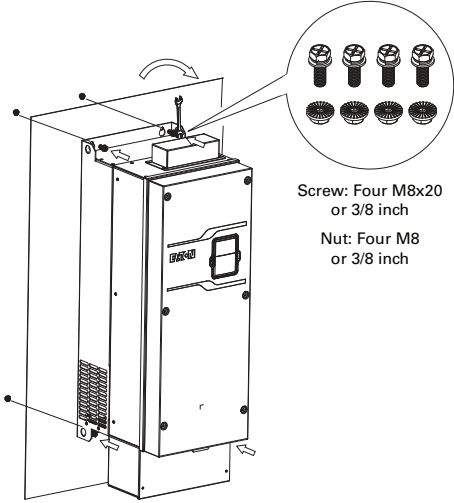
Step 2:



Step 3:

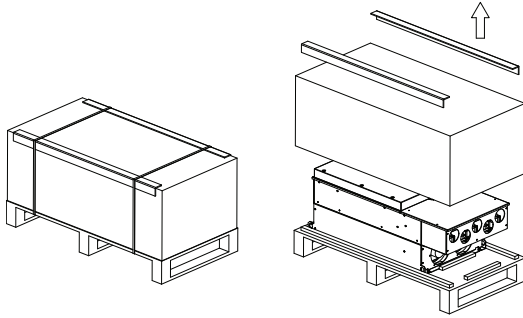


Step 4:

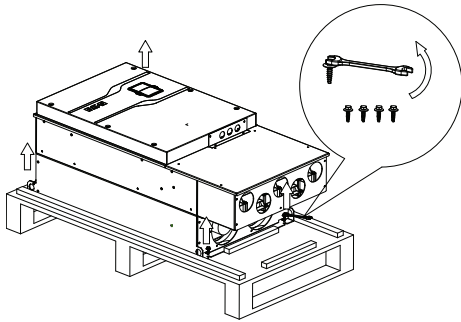


FR6 mounting instructions

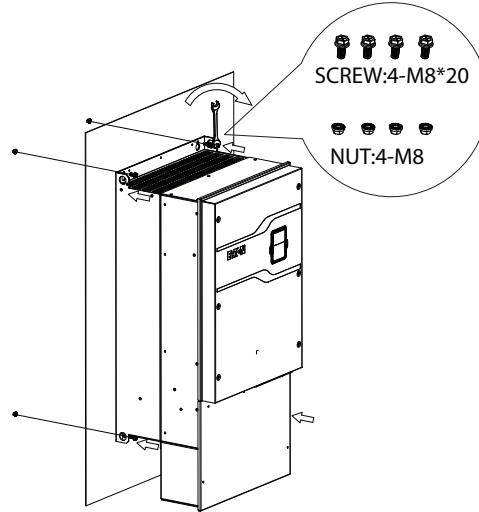
Step 1: Remove the carton from the drive.



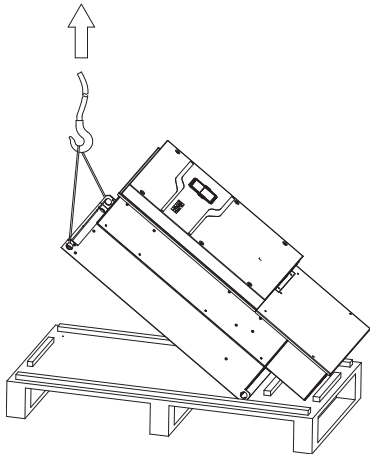
Step 2: Remove the four screws (used to fix the drive to the pallet) with an M8 or 3/8-inch wrench.



Step 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).



Step 3: Use a hook to lift the drive.





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!

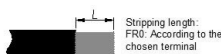
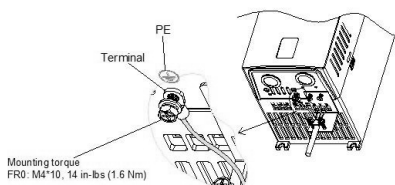
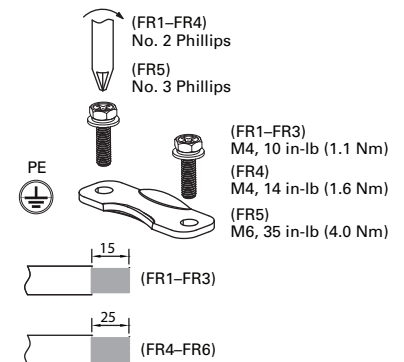
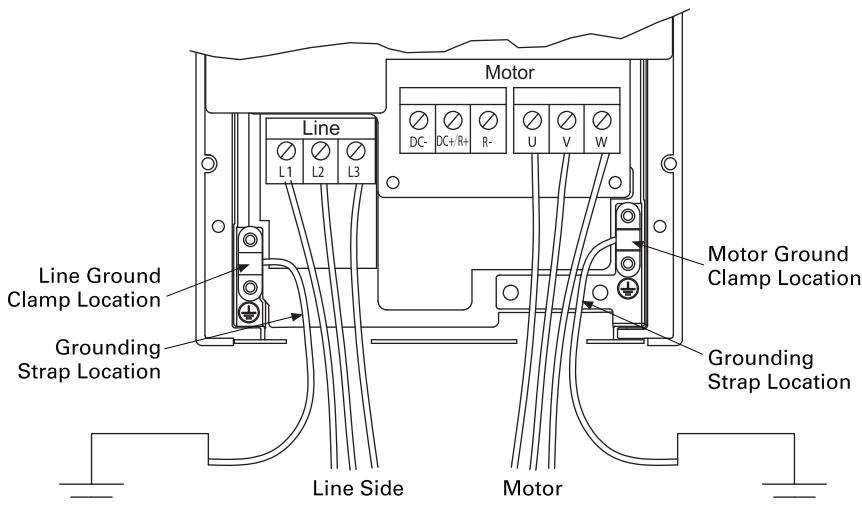
bg Предупреждение!
Свързвайте само, когато уреда не е под напрежение!

ro Atenție!
Conectați doar când aparatul nu se află sub tensiune!

ru Предупреждение!
Подключать только в обесточенном состоянии!

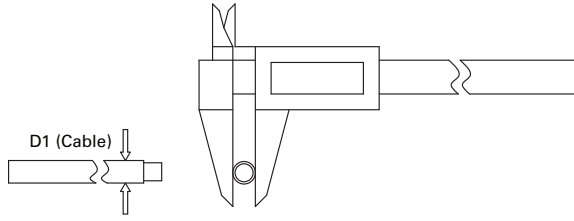
zh 警告!
必须在断电状态下进行连接!

Ground wiring

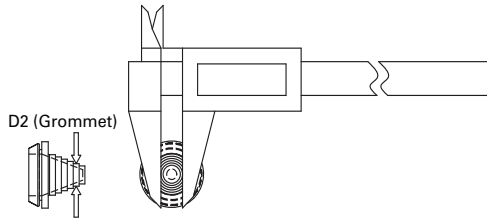


Rubber grommet installation instructions

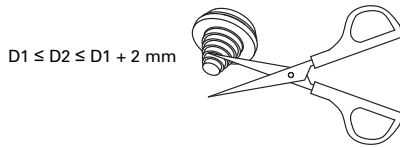
Step 1:



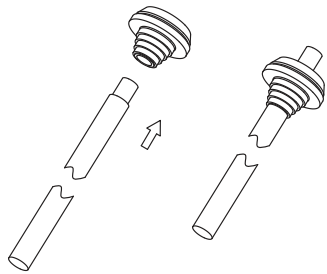
Step 2:



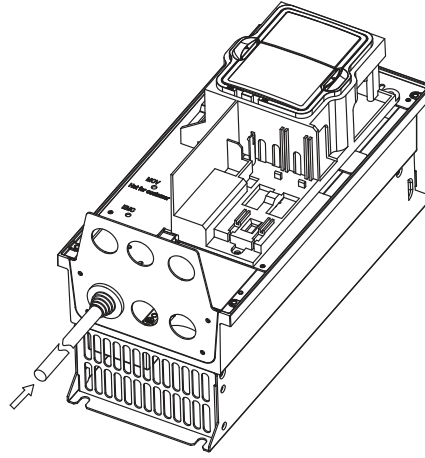
Step 3:



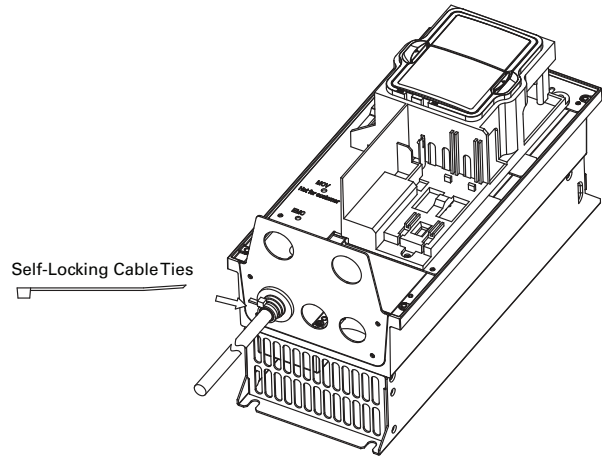
Step 4:



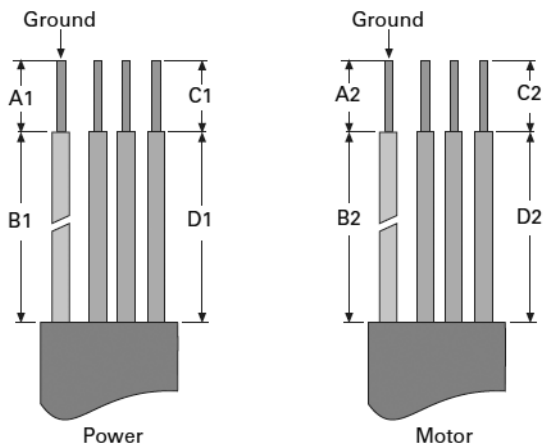
Step 5:



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.

Effective December 2017

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/IL)	Current (VT/IL) 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.

Effective December 2017

North America cable and fuse sizes—440 Vac to 500 Vac ratings ^{①②}

Frame size	Amp suffix	Input current (VT/L)	NEC motor amp rating at 460 V	Current (VT/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/L)	Current (VT/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	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.

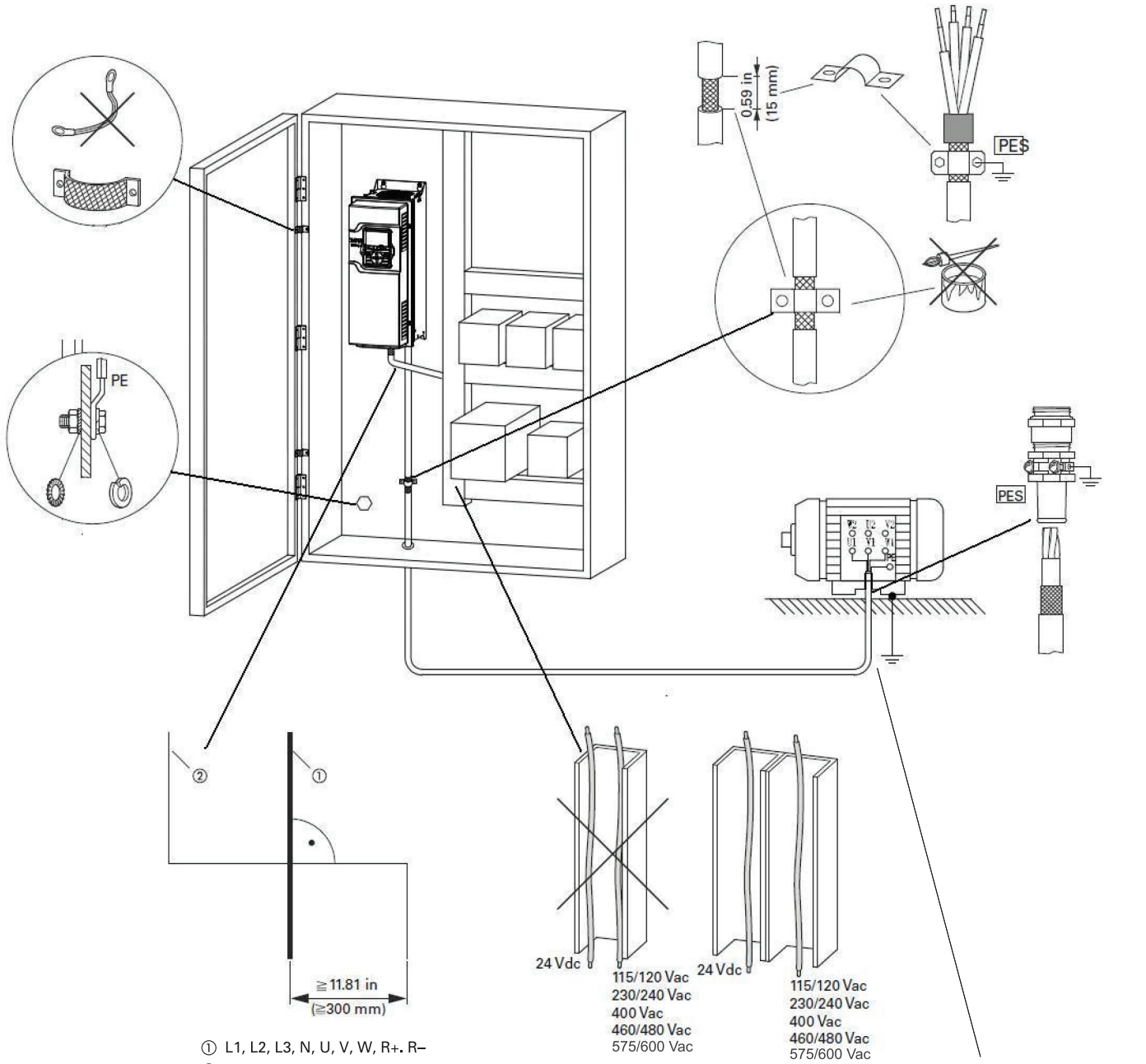
Effective December 2017

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

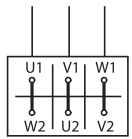
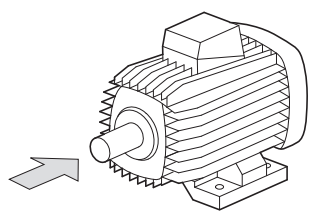
Notes

- 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.

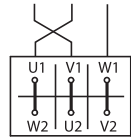


M-Max	Motor
U/T1U1	U/T1U1
V/T2V1	V/T2V1
W/T3W1	W/T3W1

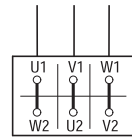
400 Δ / 460 Y V	38 / 22 A
S1 11 kW	cos φ 0.67
1410 rpm	50 Hz



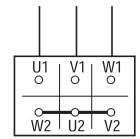
FWD



REV



$U_{LN} = 230V$

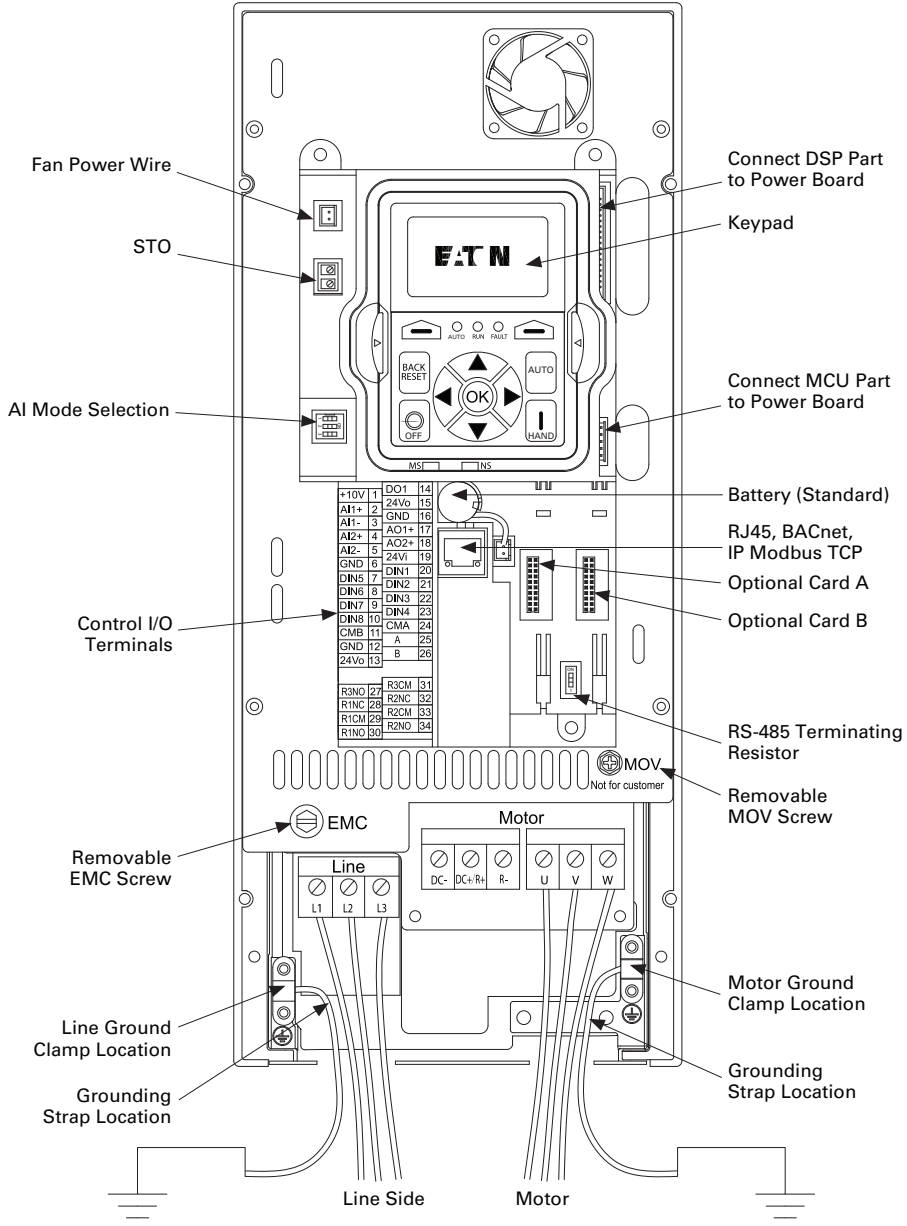


$(U_{LN} = 400V)$

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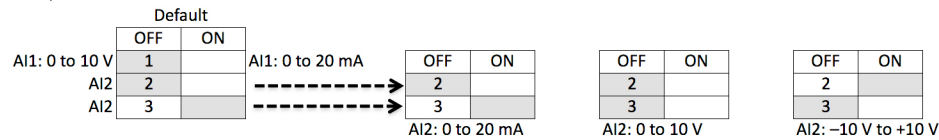
Control board layout

	14	15	16	17	18	19	20	21	22	23	24	25	26					
	DO1	24Vo	GND	AO1+	AO2+	24Vi	DIN1	DIN2	DIN3	DIN4	CMA	A	B		31	32	33	34
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
	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	A01+	Analog Output 1	Output Frequency	Shows Output frequency to motor 0–60 Hz (4 mA to 20 mA)
	18	A02+	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

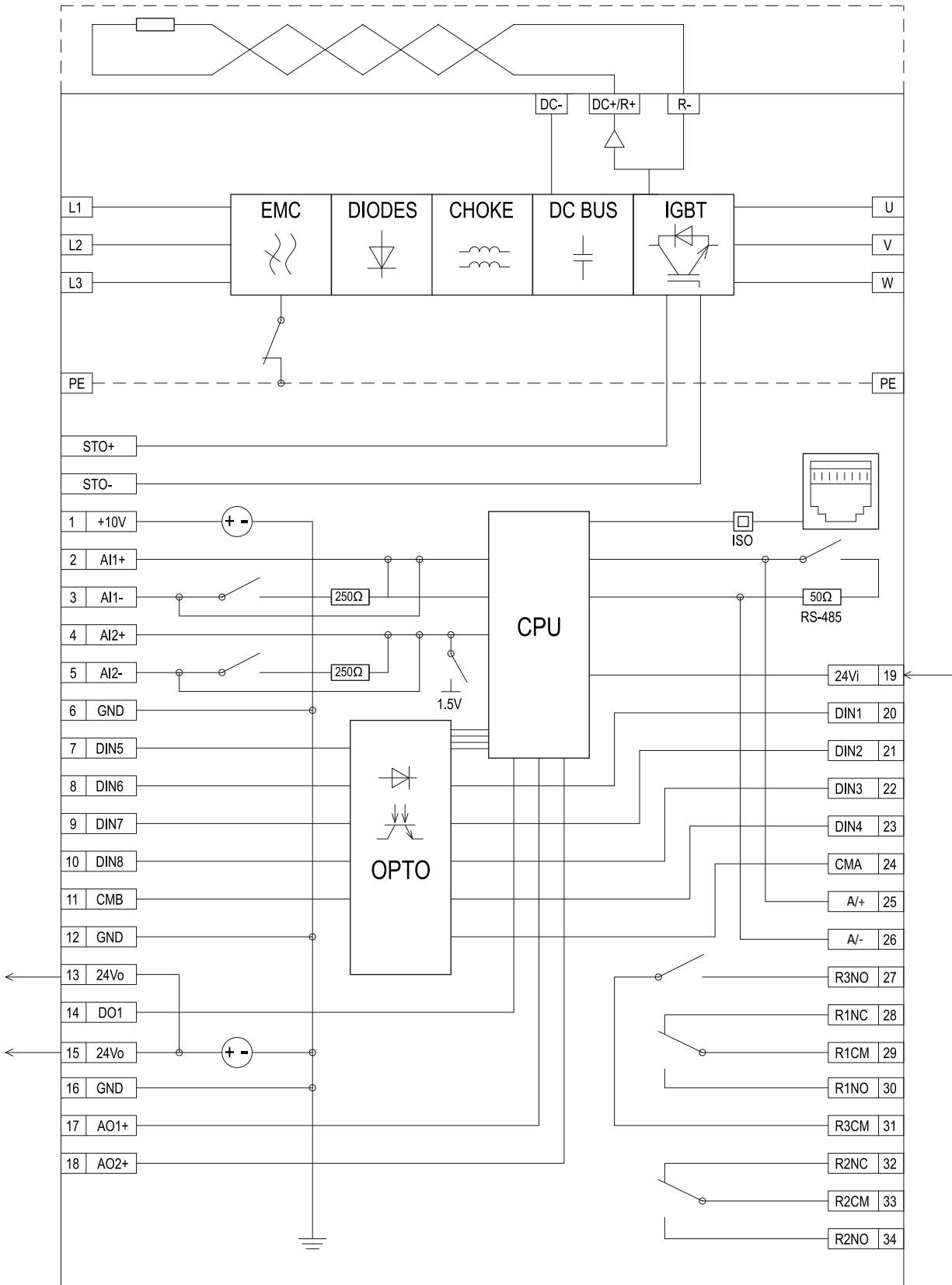
The above wiring demonstrates a SINK configuration. It is important that CMA and CMB are wired to ground (as shown by dashed line). If a SOURCE configuration is desired, wire 24 V to CMA and CMB and close the inputs to ground. When using the +10 V for AI1, it is important to wire AI1– to ground (as shown 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	输入以正向启动变频器 (启动启用)
21	DIN2	数字输入2	反向运行	输入以反向启动变频器 (启动启用)
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		



Effective December 2017



(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 veiligheidsvoorschriften 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 diretivas 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 proteção da diretiva de máquinas 89/392/CE.

Estrutura com compatibilidade eletromagnética. 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 tilalotteisesti erotettuina. Johdonsuoja on liitettävä laajasti maadoitukseen p.

(cs) Pozor!

V rozsahu platnosti směrnice 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. Řídící a síťová vedení pokládájte 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.

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

(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 kivitelű biztosítson. A motorvezetékektől térben elkülönítve vezesse vezérlő és hálózati vezetékeket. p Nagy felületen csatlakoztassa a védőföldeléshez a vezetékkárvédelést.

(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 kabelus izvietot atsevišķi no motora kabeļa p Vada ekrānu plašā virsmā savienot ar PE.

It 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 žeminiu.

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 zahtevam 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 sieťové 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 контактна площ между силовия екран и PE.

ro Precauție!

În cadrul sferei de aplicare a directivelor UE dispozitivele controlate prin frecvență și accesoriile acestora au voie să fie puse în funcțiune doar dacă se stabilește că aparatul îndeplinește cerințele Directivei 89/392/CEE privind mașinile.

Montajul trebuie să fie compatibil EMC. Poziționați cablurile de control și de rețea la distanță de cablul motorului. p Asigurați o suprafață de contact mare între izolația cablului și 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.



Warning!

Use 60/75 °C Cu wire only or equivalent.



Warning!

Open Type Equipment.



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.

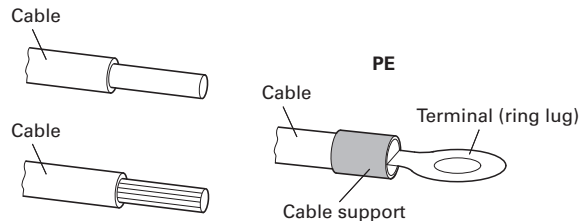
Wire connectors



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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.



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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

	Americas	EMEA	APAC
Website	www.eaton.com/drives	www.eaton.eu/electrical	www.eaton.com.cn/electrical
Email	VFDaftermarketEG@eaton.com	AfterSalesEGBonn@eaton.com	CustomerServicePDCNA@eaton.com
Phone	1-877-386-2273 (8:00 a.m. to 6:00 p.m. Eastern Time U.S. [UTC-5]) 800-543-7038 (6:00 p.m. to 8:00 a.m. Eastern Time U.S. [UTC-5])	+49 (0) 180 5 223822	800 9881203

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