

**Warning**

This equipment contains dangerous voltages and controls potentially dangerous rotating mechanical parts.
The terminals can carry hazardous voltages even after the inverter has been switched off. After disconnecting the line supply, wait at least 5 minutes until the drive unit has discharged itself. Only then, carry out any installation work.
Read the instructions in the associated manuals under:
<http://support.automation.siemens.com>. Non-compliance or failure to follow the instructions can result in loss of life, severe personal injury or serious damage to property.
Only suitable qualified personnel should work on this equipment. Qualified persons are defined as persons who are authorized to commission, ground and label systems and circuits in accordance with established safety practices and standards.
The successful and safe operation of this equipment is dependent upon its proper handling, installation, operation and maintenance.

**Warnung**

Das vorliegende Gerät führt gefährliche Spannungen und steuert rotierende mechanische Teile, die gegebenenfalls gefährlich sind.
Die Klemmen können auch dann gefährliche Spannungen führen, wenn der Umrichter außer Betrieb ist. Warten Sie nach dem Unterbrechen der Netzversorgung mindestens 5 Minuten, bis sich das Gerät entladen hat. Führen Sie erst dann Montagearbeiten aus. Beachten Sie die Hinweise in den zugehörigen Betriebsanleitungen unter:
<http://support.automation.siemens.com>. Bei Missachtung oder Nichtbefolgen der Hinweise können Tod, schwere Körperverletzungen oder erheblicher Sachschaden eintreten.
Inbetriebsetzung und Betrieb dieses Geräts dürfen nur von qualifiziertem Personal vorgenommen werden. Qualifiziertes Personal sind Personen, welche die Berechtigung haben, Systeme und Stromkreise gemäß den Standards der Sicherheitstechnik in Betrieb zu nehmen, zu erden und zu kennzeichnen.
Der einwandfreie und sichere Betrieb des Gerätes setzt sachgemäßen Transport, ordnungsgemäße Installation, Bedienung und Instandhaltung voraus.

**Attention**

L' appareil présente des tensions dangereuses et contrôle des pièces mécaniques rotation potentiellement dangereuses.
Les bornes peuvent présenter des tensions dangereuses, même lorsque le variateur est à l'arrêt. Après coupure de la tension du réseau, il convient d'attendre au moins 5 minutes pour permettre la décharge de l'appareil. Procéder à une intervention seulement après écoulement de ce délai.
Respecter les consignes figurant dans les instructions de service correspondantes et disponibles sous le lien suivant : <http://support.automation.siemens.com>. Le non-respect des consignes peut entraîner la mort, des blessures graves ou des dégâts matériels importants.
La mise en service et l'utilisation de cette machine ne doivent être effectuées que par des personnes qualifiées. Par personnes qualifiées on entend des personnes autorisées à mettre en service, mettre à la terre et repérer les systèmes et les circuits électriques dans le respect des règles de l'art en matière de sécurité.
L'exploitation sûre et sans défaut de l'appareil suppose un transport, un entreposage, une installation, une conduite et une maintenance dans les règles de l'art.

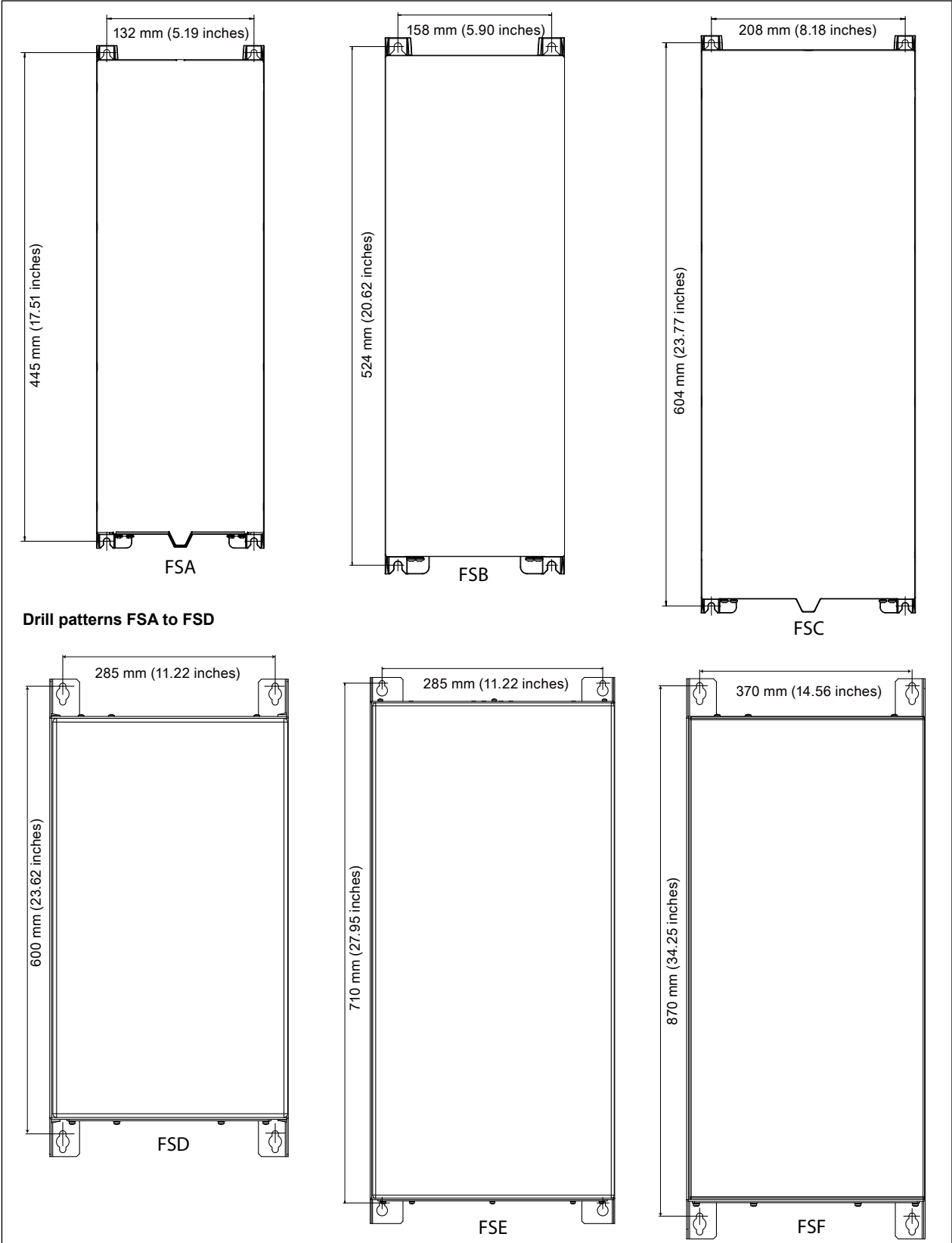
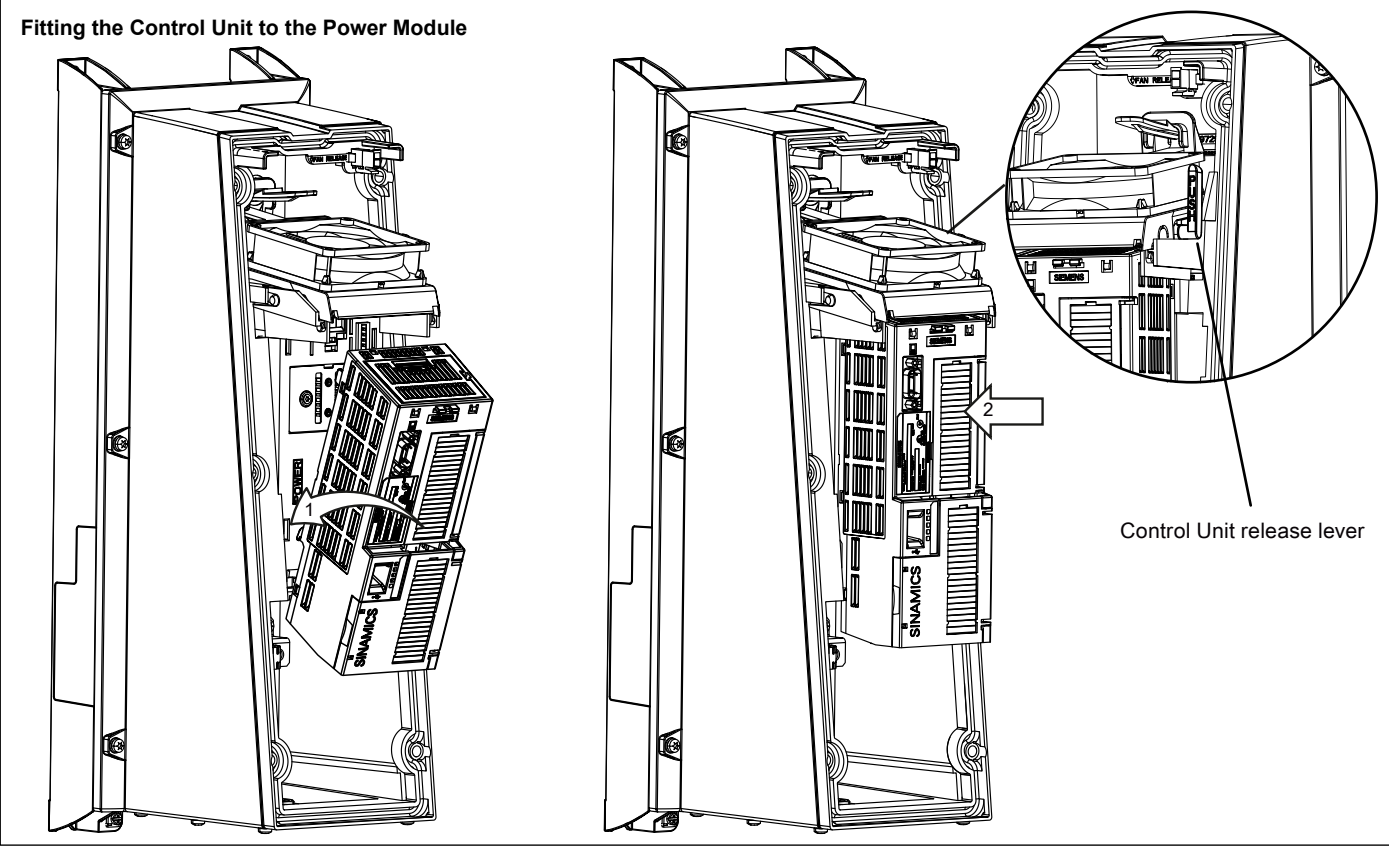
**Avvertenza**

Questo apparecchio conduce tensioni pericolose ed aziona parti meccaniche rotanti potenzialmente pericolose.
I morsetti possono condurre tensioni pericolose anche quando il convertitore è stato spento. Dopo avere interrotto l'alimentazione di rete, attendere almeno 5 minuti finché l'apparecchio non si è scaricato. Solo allora si possono eseguire interventi sull'apparecchio.
Leggere le istruzioni riportate nei rispettivi manuali all'indirizzo:
<http://support.automation.siemens.com>. In caso di non osservanza o di mancata applicazione delle istruzioni sussiste la possibilità di morte, gravi lesioni fisiche o ingenti danni materiali.
Solo personale qualificato può essere addetto alla messa in servizio e al funzionamento di questo apparecchio. Per personale qualificato si intendono persone autorizzate a mettere in servizio, mettere a terra e contrassegnare sistemi e circuiti elettrici in conformità agli standard della tecnica di sicurezza.
Il funzionamento corretto e sicuro dell'apparecchio presuppone un trasporto, un'installazione, un utilizzo e una manutenzione appropriati.

**Advertencia**

El presente equipo está sometido a tensiones peligrosas y controla piezas mecánicas rotación que también pueden ser peligrosas.
Los bornes o terminales de conexión pueden estar también bajo tensión eléctrica peligrosa incluso aunque el convertidor o variador no esté funcionando. Tras desconectar la alimentación de red, espere al menos 5 minutos para que el equipo pueda descargarse. Sólo entonces proceda a realizar los trabajos de montaje.
Respete las indicaciones que se especifican en las instrucciones de servicio asociadas, y que pueden consultarse en: <http://support.automation.siemens.com>. Si no se observan las advertencias o no se siguen las indicaciones de las instrucciones, existe peligro de muerte, graves lesiones corporales o considerables daños materiales.
La puesta en marcha y el funcionamiento de este equipo debe encomendarse exclusivamente a personal cualificado. Personal cualificado son personas autorizadas para poner en servicio, conectar a tierra e identificar sistemas y circuitos eléctricos conforme a las normas en materia de seguridad.
El funcionamiento correcto y seguro del equipo presupone un transporte, instalación, montaje y puesta en marcha adecuados, así como un manejo y un mantenimiento rigurosos.

Dimensions and tightening torques of SINAMICS PM230 Power Modules					
Frame size	Dimensions, height x width x depth			Fixing method	Tightening torques
		with IOP	without IOP		
A	mm	460 x 154 x 264	460 x 154 x 249	4 x M4 bolts 4 x M4 nuts 4 x M4 washers	2.5 Nm (22 lbf.in)
	inch	18.11 x 6.06 x 10.39	18.11 x 6.06 x 9.80		
B	mm	540 x 180 x 264	540 x 180 x 249	4 x M5 bolts 4 x M5 nuts 4 x M5 washers	13.0 Nm (115 lbf.in)
	inch	21.25 x 7.09 x 10.39	21.25 x 7.09 x 9.80		
C	mm	620 x 230 x 264	620 X 230 X 249	4 x M8 bolts 4 x M8 nuts 4 x M8 washers	
	inch	24.40 x 9.05 x 10.39	24.40 x 9.05 x 9.80		
D	mm	640 x 320 x 344	640 x 320 x 329		
	inch	25.19 x 12.59 x 13.54	25.19 x 12.59 x 12.95		
E	mm	751 x 320 x 344	751 x 320 x 329		
	inch	29.56 x 12.59 x 13.54	29.56 x 12.59 x 12.95		
F	mm	915 x 410 x 431	915 x 410 x 416		
	inch	36.02 x 16.14 x 16.96	36.02 x 16.14 x 16.37		





Standards
European Low Voltage Directive
Europäische Niederspannungsrichtlinie
Directive européenne basse tension
Directiva europea "Baja tension"
Direttiva europea sulla bassa tensione



Underwriters Laboratories
UL Type 12 Enclosure
(UL in preparation for Frame Sizes D ... F)



ISO 9001
Siemens plc operates a quality management system, which complies with the requirements of ISO 9001



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Detachable power connector

Connector release catch

Detachable motor connector

Connector release catch

Caution!

The SINAMICS PM230 Power Modules have integrated Class A and Class B filters and therefore can only be used in conjunction with TN power systems.

Motor and power terminal torques

FSA: 0.5 Nm (4.4 lbf.in)
FSB: 0.6 Nm (5.3 lbf.in)
FSC: 1.5 Nm (13.3 lbf.in)

Supply voltage connection

Motor connection

Note:

In the case of unstable power-networks it is highly recommended that you set active "Speed Control" in the Control Operating Mode (P1300 = 20). If this change is made to the Control Operating Mode, then quick commissioning should be performed for optimum results.

Supply voltage connection

Motor connection

FSA - FSC

FSD - FSF

① Line power input
② Motor cable
③ Metal back plate
④ Clips to fix motor and power cable screen securely
⑤ Screened cables
⑥ Cable glands (not supplied)

WARNING

Do not remove Inverter cover or open Inverter door during operation

The power supply, DC and motor terminals and thermistor cables can carry dangerous voltages even if the inverter is inoperative. The Control Unit can be powered from an external 230 V supply, if this is the case, then the external power supply must also be disconnected. Wait at least five minutes to allow the unit to discharge after switching off the line supply before carrying out any installation work.

CAUTION

FSD to FSF Terminal screen

On the PM230 FSD to FSF the motor and power terminals are covered by a metal screen. This must be removed to access the motor and power terminals which is not shown in the diagram on the left.

Fitting ferrite rings to the motor and mains supply cables

Motor cable blue ferrite ring

It is necessary to fit the blue ferrite ring to the motor power cable on the PM230 frame sizes A to C (0.37 kW ... 15.0 kW) with an integrated B class filters to ensure it fulfills the EMI C1 standard for conducted emissions.

The blue ferrite ring must be fitted between the motor power cable terminals and the screening plate of the power module.

The blue ferrite ring should not be used on cable lengths greater than 25 m (80 ft).

Mains supply cable ferrite rings

It is necessary to fit the gray ferrite rings to the mains supply cable of the PM230 frame size B (4.0 kW ... 7.5 kW) and frame size C (11.00 kW ... 15.0 kW) with an integrated B class filter to ensure it fulfills the EMI standard for radiated emissions.

The gray ferrite rings must be fitted between the terminals and the screening plate on the mains supply cable.

The correct fitting of the ferrite rings is shown in the figure below.

Cable specifications to comply with EMC compatibility (FSA to FSC only)

PM230	Cable type	EMC Installation	Max. cable length
Filter A	Screened	C2	25 m (80 ft)
	Screened	C3	50 m (164 ft)
Filter B	Screened	C1 (conducted only)	25 m (80 ft) *see note
	Screened	C2	50 m (164 ft)
Unfiltered	Unscreened	None	100 m (330 ft)

Note:

Power Modules with Class B integrated filters, frame sizes A to C, must be fitted with a ferrite ring on the motor cable between the Power Module power terminals and the screening plate of the Power Module to fulfill EMI category C1 conditions. Use Class 1 75°C copper wire only (for UL compliance). Power Modules with Class B integrated filters, frame sizes B and C must be fitted with a ferrite ring on the mains supply input cable in addition to the ferrite ring on the motor cable.

Gland plate dimensions information

Frame size	Power range (LO)	Power cable gland diameter	Control cable gland diameter	Cable gland manufacturers
A	0.37 ... 3.0 kW (0.5 ... 4.0 hp)	20.5 mm (0.80 inches)	20.5 mm (0.80 inches)	Schlemmer / Pflitsch
B	4.0 ... 7.5 kW (5.0 ... 10.0 hp)	25.5 mm (1.0 inches)	20.5 mm (0.80 inches)	Schlemmer / Pflitsch
C	11.0 ... 18.5 kW (14.0 ... 24.0 hp)	32.5 mm (1.27 inches)	20.5 mm (0.80 inches)	Schlemmer / Pflitsch
D	22.0 ... 30.0 kW (29.0 ... 40.0 hp)	40.5 mm (1.59 inches)	20.5 mm (0.80 inches)	Schlemmer / Pflitsch / Hummel
E	37.0 ... 45.0 kW (50.0 ... 60.0 hp)	50.5 mm (1.98 inches)	20.5 mm (0.80 inches)	Schlemmer / Pflitsch / Hummel
F	55.0 ... 90.0 kW (73.0 ... 120.0 hp)	63.5 mm (2.5 inches)	20.5 mm (0.80 inches)	Schlemmer / Pflitsch / Hummel / Lappkabel

FSA - FSC

FSD - FSF

Caution!

1. An operator panel or blanking plate, the appropriate gland plates, cable glands and grommets must be fitted to achieve the IP55 (UL Type 12) level of protection.
2. To ensure compliance with the necessary EMC standards, it is recommended that all communications and I/O cables from the Control Unit are fitted through the gland plate using EMC compliant cable glands. The PM230 Frame Sizes A to F inclusive, MUST use an EMC cable gland on the motor cable to comply with radiated emissions standards. It is also recommended that the I/O control cable from the Control Unit is fed through the left-hand hole of the gland plate.

2.0 Nm (17.7 lbf.in)

2.0 Nm (17.7 lbf.in)

2.5 Nm (22.12 lbf.in)

Gland plate

Cable glands

Grommets

2.0 Nm (17.7 lbf.in)

2.5 Nm (22.12 lbf.in)

Gland plate

Cable glands

Grommets

Suitable for use on a circuit capable of delivering not more than 40000 rms Symmetrical Amperes, 600 V ac, when protected by the following Fuses only; Listed Cartridge Fuses, Non-renewable (JDDZ), Class J, Current Limiting, Non-time Delay Fuse, rated max 600 Vac, and the current ratings for the specific drive models or equivalent.

Only for Canadian installation; the drive shall be installed with any external recommended suppressor, not metal oxide varistor, R/C Surge-protective Devices - Component (VZCA2), rated nominal 320 Vac, clamping voltage 1200 Vac, Type 1 or Type 2 SPD application.

Blue ferrite ring

FSA (0.37 kW ... 3.0 kW)

Gray ferrite ring
1 x ferrite ring
1 x large cable clamp

Blue ferrite ring

FSB (4.0 kW ... 7.5 kW)

Blue ferrite ring

FSC (11.0 kW ... 15.0 kW)

Gray ferrite rings
2 x ferrite rings
3 x cable ties

Motor Connections

To ensure the correct motor connections, refer to the rating label and the inside of the motor's top cover.

V

400

690

460

Δ

50

50

60

Hz

SIEMENS

D-91055 Erlangen

3-Mot. 1LE1 002-1DB43-4AA0

IEC/EN 60034 160L IMB3

73 kg

Th.Cl. 155(F)

Bearing

DE 6209-2ZC3

NE 6209-2ZC3

CE

E0605/0496382 02 001

IP55

Delta configuration

Star configuration

U1

V1

W1

U2

V2

W2

A 5 E 0 2 9 2 3 6 3 4 A

- 2 -