Product Information

PowerFlex 70 AC Drives, Frames A...E

ATTENTION:

- **Before installing, configuring, operating or maintaining this product, read this document and the documents listed in the Additional Resources section for installing, configuring, or operating equipment. Users should familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.**
- Installation, adjustments, putting into service, use, assembly, disassembly, and maintenance shall be carried out by suitably trained personnel in accordance with applicable code of practice.
- If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- Solid state equipment has operational characteristics differing from those of electromechanical equipment. Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls, publication SGI-1.1, available from your local Rockwell Automation® sales office or online at http://www.rockwellautomation.com/literature describes some important differences between solid state equipment and hard-wired electromechanical devices.

ATTENTION: Do not install, configure, operate or maintain this product until you have read the product documentation and the documents in the Additional Resources section for installing, configuring, operating or maintaining equipment. To get the product documentation go to **http://www.rockwellautomation.com/literature** or contact your local sales office or Rockwell Automation representative.

ATTENTION: Ne pas installer, configurer, exploiter ou maintenir ce produit tant que vous n'avez pas lu sa documentation et les documents de la rubrique Documents connexes pour l'installation, la configuration, l'exploitation et la maintenance de l'équipement. Pour obtenir de la documentation, rendez-vous sur le site **http://www.rockwellautomation.com/literature** ou contactez votre agence commerciale Rockwell Automation locale ou son représentant.

ACHTUNG: Für die Installation, Konfiguration, den Betrieb und die Wartung dieses Produkt lesen Sie sich bitte zunächst die Produktdokumentation sowie die Dokumente im Abschnitt „Weitere Informationen" durch. Die entsprechende Produktdokumentation finden Sie unter **http://www.rockwellautomation.com/literature** oder kontaktieren Sie Ihr lokales Vertriebsbüro bzw. einen Rockwell Automation-Mitarbeiter.

ATENCIÓN: No instale, configure, opere ni mantenga este producto hasta que haya leído la documentación del producto y los documentos en la sección Recursos adicionales para la instalación, configuración, operación o mantenimiento de equipo. Para conseguir la documentación, diríjase a **http://www.rockwellautomation.com/literature** o póngase en contacto con su oficina regional de ventas o representante de Rockwell Automation.

ATENÇÃO: Não instale, configure, opere ou mantenha este produto até que você leia a documentação do produto e os documentos na seção Recursos adicionais para a instalação, configuração, operação ou manutenção do equipamento. Para conseguir a documentação, visite **http://www.rockwellautomation.com/literature** ou entre em contato con seu escritório de vendas regional ou representante da Rockwell Automation.

ATTENZIONE: Non installare, configurare, attivare o riparare questo prodotto senza avere prima letto la relativa documentazione nonchè i documenti indicati nella sezione Ulteriori Risore riguardanti l'installazione, la configurazione, l'attivazione o la riparazione dell'apparecchiatura. Per la documentazione sul prodotto visitare il sito **http://www.rockwellautomation.com/literature** o contattare l'ufficio vendite o il rappresentate Rockwell Automation di zona.

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注意： 若未阅读产品文档以及 " 其它资源 " 小节中提及的有关安装、配置、运行或维护设备的相关文档，请勿安装、配置、运行或维护本产品。请访问 **http://www.rockwellautomation.com/literature** 或联系您当地的销售办事处或罗克韦尔自动化代表，以获取产品文档。

注意： 在您完整閱讀本產品相關文件及其他關於安裝、 配置、 操作或維護設備等資料之前， 請勿安裝、 配置、 操作或維護此產品。您可到下列網站下載所有產品相關文件 **http://www.rockwellautomation.com/literature**，或聯繫洛克威爾自動化當地辦公室。

ВНИМАНИЕ: Не устанавливайте, не конфигурируйте, не запускайте в эксплуатацию и не поддерживайте работу продукта до прочтения технической документации по продукту и документации в разделе Дополнительные материалы для инсталлирования, конфигурирования, запуска в эксплуатацию и поддержки работы продукта. Чтобы ознакомиться с документацией по продукту, перейдите по ссылке **http://www.rockwellautomation.com/literature** или свяжитесь с локальным офисом продаж или представителем Rockwell Automation.

UWAGA: Nie instaluj i nie uruchamiaj tego urządzenia dopóki nie zapoznasz się z instrukcją użytkownika produktu. Aby uzyskać dokumentację produktu przejdź do strony internetowej **http://www.rockwellautomation.com/literature** lub skontaktuj się z lokalnym biurem sprzedaży lub przedstawicielstwem firmy Rockwell Automation.

UPOZORŇENÍ: Neprovádějte instalaci, konfiguraci, provoz ani údržbu, pokud jste dosud nepřečetli dokumentaci k produktu a dokumenty obsažené v sekci Doplňující informace pro instalaci, konfiguraci, provoz a údržbu. Tuto dokumentaci můžete získat na **http://www.rockwellautomation.com/literature** nebo od obchodního zástupce společnosti Rockwell Automation.

WAARSCHUWING: Installeer, configureer of onderhoud dit product niet vooraleer u de productdocumentatie en de documenten in de aanvullende informatiesectie voor installatie, werking en onderhoud gelezen hebt. Voor de productinformatie, ga naar **http://www.rockwellautomation.com/literature** of contacteer uw lokaal Rockwell Automation-kantoor.

Additional Resources

These documents contain additional information concerning the installation, programming, and application of the AC drive.

English	The installation instructions are available in multiple languages at http://rockwellautomation.com/literature. Select publication language and type "20A-IN009" in the search field.	Español	Puede encontrar las instrucciones de instalación en varios idiomas en http://rockwellautomation.com/literature. Seleccione el idioma de publicación y escriba "20A-IN009" en el campo de búsqueda.
Deutsch	Die Installationsanweisungen kann in mehreren Sprachen unter http://rockwellautomation.com/literature gelesen werden. Bitte Ihre Sprache anwählen und "20A-IN009" im Suchfeld eintippen.	Português	As instruções de instalação está disponível em várias línguas em http://rockwellautomation.com/literature. Seleccione a língua de publicação e entre com "20A-IN009" no espaço de busca.
Français	Les instructions d'installation sont disponibles dans différentes langues à l'adresse suivante: http://rockwellautomation.com/literature. Sélectionner la langue puis taper << 20A-IN009 >> dans le champ de recherche.	Dutch	De installatie-instructies is beschikbaar in diverse talen op: http://rockwellautomation.com/literature. Kies taal van publicatie en tik "20A-IN009" in het zoekveld.
Italiano	Le istruzioni per l'installazione disponibile in varie lingue sul sito http://rockwellautomation.com/literature. Selezionare la lingua desiderata e digitare "20A-IN009" nel campo di ricerca.	中文（简体）	从以下网页可以获得安装说明多种语言的版本：http://rockwellautomation.com/literature。请选择出版物的语言，并在搜索栏输入 "20A-IN009 印

PowerFlex 70 AC Drives User Manual, publication 20A-UM001: Provides the basic information needed to install, start-up, and troubleshoot the PowerFlex 70 adjustable frequency AC drive.
PowerFlex 70 Technical Data, publication 20A-TD001: Provides technical data regarding the PowerFlex 70 adjustable frequency AC drives for a variety of industrial applications.
Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-IN001: Provides basic information needed to properly wire and ground PWM AC drives.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1: Provides general guidelines for installing a Rockwell Automation industrial system.
Industry Installation Guidelines for Pulse Width Modulated (PWM) AC Drives Application Technique, publication DRIVES-AT003: Provides basic information for different enclosure systems, and power and grounding considerations needed to properly install a PWM AC drive.
Product certification website, http://www.rockwellautomation.com/products/certification/: Provides declarations of conformity, certificates, and other certification details.

ATTENTION: Only qualified personnel familiar with adjustable frequency AC drives and associated machinery should plan or implement the installation, start-up and subsequent maintenance of the system. Failure to comply may result in personal injury and/or equipment damage.

ATTENTION: An incorrectly applied or installed drive can result in component damage or a reduction in product life. Wiring or application errors such as under sizing the motor, incorrect or inadequate AC supply, or excessive surrounding air temperatures may result in malfunction of the system.

ATTENTION: Drive **must not** be installed in an area where the ambient atmosphere contains volatile or corrosive gas, vapors or dust. If the drive is not going to be installed for a period of time, it must be stored in an area where it will not be exposed to a corrosive atmosphere.

Maximum Surrounding Air Temperature

Enclosure Rating	Temperature Range
Open Type, IP 20, NEMA/UL Type 1 & Flange Mount	0…50 °C (32…122 °F)
IP54, IP 66 & NEMA/UL Type 4X/12	0…40 °C (32…104 °F)

Drive Weights

Frame	Weight [1] *kg (lbs.)*
IP20, NEMA/UL Type 1	
A	2.71 (6.0)
B	3.60 (7.9)
C	6.89 (15.2)
D	9.25 (20.4)
E	18.60 (41.0)

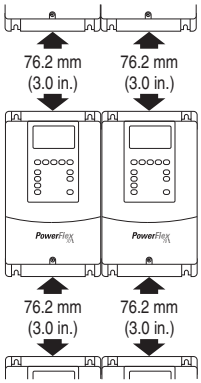
Frame	Weight [1] *kg (lbs.)*
IP66, NEMA/UL Type 4X/12	
B	3.61 (8.0)
D	9.13 (20.1)
E	18.60 (41.0)

Frame	Weight [1] *kg (lbs.)*
Flange Mount	
A	2.71 (6.0)
B	3.60 (7.9)
C	6.89 (15.2)
D	9.25 (20.4)
E	18.60 (41.0)

(1) Weights include HIM and Standard I/O.

Minimum Mounting Clearance

Specified vertical clearance requirements are intended to be from drive to drive. Other objects can occupy this space; however, airflow must not be reduced and inlet air temperature must not exceed the product specification.



IMPORTANT Some drives are equipped with an adhesive label on the top of the chassis. Removing the adhesive label from the drive changes the NEMA/UL enclosure rating from Type 1 Enclosed to Open Type.

Leakage Current

- PowerFlex 70 drives produce leakage current in the protective earthing conductor which exceeds 3.5 mA AC and/or 10 mA DC. The minimum size of the protective earthing (grounding) conductor used in the application must comply with local safety regulations for high protective earthing conductor current equipment.
- PowerFlex 70 drives produce DC current in the protective earthing conductor and may reduce the ability of a residual current device (RCD) or residual current monitor (RCM) of type A or AC to provide protection for the drive and other equipment in the installation.

Motor Overload Protection

Electronic Motor Overload Protection:	Class 10 protection with speed sensitive response. Investigated by U.L. to comply with N.E.C. Article 430. U.L. File E59272, volume 12.

Short Circuit Current Rating

Maximum Short Circuit Rating:	200,000 Amps symmetrical.

Branch Circuit Short Circuit Protection

Integral solid state short circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electric Code (NEC) and any additional local codes, or the equivalent. The tables on the following pages provide drive ratings (including continuous, 1 minute and 3 second) and recommended AC line input fuse and circuit breaker information. Both types of short circuit protection are acceptable for UL and IEC requirements. Sizes listed are the recommended sizes based on 40 °C (104 °F) and the U.S. N.E.C. Other country, state or local codes may require different ratings.

Fusing

If fuses are chosen as the desired protection method, refer to the recommended types listed below. If available amp ratings do not match the tables provided, the closest fuse rating that exceeds the drive rating should be chosen.

- IEC – BS88 (British Standard) Parts 1 & 2[1], EN60269-1, Parts 1 & 2, type gG or equivalent should be used.
- UL – UL Class CC, T, RK1 or J should be used.

Circuit Breakers

The "non-fuse" listings in the following tables include both circuit breakers (inverse time or instantaneous trip). **If one of these is chosen as the desired protection method**, the following requirements apply.

- IEC and UL – Both types of devices are acceptable for IEC and UL installations.

(1) Typical designations include, but may not be limited to the following; Parts 1 & 2: AC, AD, BC, BD, CD, DD, ED, EFS, EF, FF, FG, GF, GG, GH.

208/240 Volt AC Three-Phase Input Drive Ratings and Input Protection Devices (see page 5 for notes)

Drive Catalog Number	Frame (1)	HP Rating		Input Ratings		Output Amps			Dual Element Time Delay Fuse		Non-Time Delay Fuse		Circuit Breaker (4)	Motor Circuit Protector (6)	140M Motor Protector with Adjustable Current Range (7) (8)			
		ND	HD	Amps	kVA	Cont.	1 Min.	3 Sec.	Min. (2)	Max. (3)	Min. (2)	Max. (3)	Max. (5)	Max. (5)	Available Catalog Numbers (9)			
208 Volt AC Input																		
20AB2P2	A	0.5	0.33	2.9	1.1	2.5	2.7	3.7	6	6	6	10	15	7	140M-C2E-B40	140M-D8E-B40	–	–
20AB4P2	A	1	0.75	5.6	2	4.8	5.5	7.4	10	10	10	17.5	15	7	140M-C2E-B63	140M-D8E-B63	–	–
20AB6P8	B	2	1.5	10	3.6	7.8	10.3	13.8	15	15	15	30	30	15	140M-C2E-C10	140M-D8E-C10	140M-F8E-C10	–
20AB9P6	B	3	2	14	5.1	11	12.1	16.5	20	25	20	40	40	30	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	–
20AB015	C	5	3	16	5.8	17.5	19.2	26.6	20	35	20	70	70	30	140M-C2E-C20	140M-D8E-C20	140M-F8E-C20	–
20AB022	D	7.5	5	23.3	8.3	25.3	27.8	37.9	30	50	30	100	100	30	140M-C2E-C25	140M-D8E-C25	140M-F8E-C25	140-CMN-2500
20AB028	D	10	7.5	29.8	10.7	32.2	37.9	50.6	40	70	40	125	125	50	–	–	140M-F8E-C32	140-CMN-4000
20AB042	D	15	10	39.8	14.3	43	55.5	74	60	100	60	175	175	70	–	–	140M-F8E-C45	140-CMN-6300
20AB054	E	20	15	57.5	20.7	62.1	72.4	96.6	80	125	80	200	200	100	–	–	–	140-CMN-6300
20AB070	E	25	20	72.3	26.0	78.2	93.1	124	90	175	90	300	300	100	–	–	–	140-CMN-9000
240 Volt AC Input																		
20AB2P2	A	0.5	0.33	2.5	1.1	2.2	2.4	3.3	3	4.5	3	8	15	3	140M-C2E-B25	140M-D8E-B25	–	–
20AB4P2	A	1	0.75	4.8	2	4.2	4.8	6.4	6	9	6	15	15	7	140M-C2E-B63	140M-D8E-B63	–	–
20AB6P8	B	2	1.5	8.7	3.6	6.8	9	12	15	15	15	25	25	15	140M-C2E-C10	140M-D8E-C10	140M-F8E-C10	–
20AB9P6	B	3	2	12.2	5.1	9.6	10.6	14.4	20	20	20	35	35	15	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	–
20AB015	C	5	3	13.9	5.8	15.3	17.4	23.2	20	30	20	60	60	30	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	–
20AB022	D	7.5	5	19.9	8.3	22	24.4	33	25	45	25	80	80	30	140M-C2E-C25	140M-D8E-C25	140M-F8E-C25	140-CMN-2500
20AB028	D	10	7.5	25.7	10.7	28	33	44	35	60	35	110	110	50	–	–	140M-F8E-C32	140-CMN-4000
20AB042	D	15	10	38.7	16.1	42	46.2	63	50	90	50	150	150	50	–	–	140M-F8E-C45	140-CMN-6300
20AB054	E	20	15	49.8	20.7	54	63	84	60	100	60	200	200	100	–	–	–	140-CMN-6300
20AB070	E	25	20	64.5	26.8	70	81	108	90	150	90	275	275	100	–	–	–	140-CMN-9000

400/480 Volt AC Three-Phase Input Drive Ratings and Input Protection Devices (see page 5 for notes).

Drive Catalog Number	Frame (1)	HP Rating		Input Ratings		Output Amps			Dual Element Time Delay Fuse		Non-Time Delay Fuse		Circuit Breaker (4)	Motor Circuit Protector (6)	140M Motor Protector with Adjustable Current Range (7) (8)			
		ND	HD	Amps	kVA	Cont.	1 Min.	3 Sec.	Min. (2)	Max. (3)	Min. (2)	Max. (3)	Max. (5)	Max. (5)	Available Catalog Numbers (9)			
400 Volt AC Input																		
20AC1P3	A	0.37	0.25	1.6	1.1	1.3	1.4	1.9	3	3	3	5	15	3	140M-C2E-B16	–	–	–
20AC2P1	A	0.75	0.55	2.5	1.8	2.1	2.4	3.2	4	6	4	8	15	7	140M-C2E-B25	140M-D8E-B25	–	–
20AC3P5	A	1.5	1.1	4.3	3	3.5	4.5	6	6	6	6	12	15	7	140M-C2E-B63	140M-D8E-B63	–	–
20AC5P0	B	2.2	1.5	6.5	4.5	5	5.5	7.5	10	10	10	20	20	15	140M-C2E-C10	140M-D8E-C10	140M-F8E-C10	–
20AC8P7	B	4	3	11.3	7.8	8.7	9.9	13.2	15	17.5	15	30	30	15	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	–
20AC011	C	5.5	4	10.5	7.6	11.5	13	17.4	15	25	15	45	40	15	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	–
20AC015	C	7.5	5.5	145.1	10.4	15.4	17.2	23.1	20	30	20	60	60	20	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	–
20AC022	D	11	7.5	21.9	15.2	22	24.2	33	30	45	30	80	80	30	140M-C2E-C25	140M-D8E-C25	140M-F8E-C25	140-CMN-2500
20AC030	D	15	11	30.3	21	30	33	45	40	60	40	120	120	50	–	–	140M-F8E-C32	140-CMN-4000
20AC037	D	18.5	15	35	24.3	37	45	60	50	80	50	125	140	50	–	–	140M-F8E-C45	140-CMN-4000
20AC043	D	22	18.5	40.7	28.2	43	56	74	60	90	60	150	160	70	–	–	–	140-CMN-6300
20AC060	E	30	22	56.8	39.3	60	66	90	80	125	80	225	240	80	–	–	–	140-CMN-6300
20AC072	E	37	30	68.9	47.8	72	90	120	90	150	90	250	280	100	–	–	–	140-CMN-9000
480 Volt AC Input																		
20AD1P1	A	0.5	0.33	1.3	1.1	1.1	1.2	1.6	3	3	3	4	15	3	140M-C2E-B16	–	–	–
20AD2P1	A	1	0.75	2.4	2	2.1	2.4	3.2	3	6	3	8	15	3	140M-C2E-B25	140M-D8E-B25	–	–
20AD3P4	A	2	1.5	3.8	3.2	3.4	4.5	6	6	6	6	12	15	7	140M-C2E-B40	140M-D8E-B40	–	–
20AD5P0	B	3	2	5.6	4.7	5	5.5	7.5	10	10	10	20	20	15	140M-C2E-B63	140M-D8E-B63	–	–
20AD8P0	B	5	3	9.8	8.4	8	8.8	12	15	15	15	30	30	15	140M-C2E-C10	140M-D8E-C10	140M-F8E-C10	–
20AD011	C	7.5	5	9.4	7.9	11	12.1	16.5	15	20	15	40	40	15	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	–
20AD014	C	10	7.5	12.4	10.4	14	16.5	22	20	30	20	50	50	20	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	–
20AD022	D	15	10	19.9	16.6	22	24.2	33	25	45	25	80	80	30	140M-C2E-C25	140M-D8E-C25	140M-F8E-C25	–
20AD027	D	20	15	24.8	20.6	27	33	44	35	60	35	100	100	50	–	–	140M-F8E-C32	140-CMN-2500
20AD034	D	25	20	31.2	25.9	34	40.5	54	40	70	40	125	125	50	–	–	140M-F8E-C45	140-CMN-4000
20AD040	D	30	25	36.7	30.5	40	51	68	50	90	50	150	150	50	–	–	140M-F8E-C45	140-CMN-4000
20AD052	E	40	30	47.7	39.7	52	60	80	60	110	60	200	200	70	–	–	–	140-CMN-6300
20AD065	E	50	40	59.6	49.6	65	78	104	80	125	80	250	250	100	–	–	–	140-CMN-9000

600 Volt AC Three-Phase Input Drive Ratings and Input Protection Devices (see page 5 for notes)

Drive Catalog Number	Frame (1)	HP Rating		Input Ratings		Output Amps			Dual Element Time Delay Fuse		Non-Time Delay Fuse		Circuit Breaker (4)	Motor Circuit Protector (6)	140M Motor Protector with Adjustable Current Range (7) (8)			
		ND	HD	Amps	kVA	Cont.	1 Min.	3 Sec.	Min. (2)	Max. (3)	Min. (2)	Max. (3)	Max. (5)	Max. (5)	Available Catalog Numbers (9)			
600 Volt AC Input																		
20AE0P9	A	0.5	0.33	1.3	1.3	0.9	1.1	1.4	3	3	3	3.5	15	3	140M-C2E-B16	–	–	–
20AE1P7	A	1	0.75	1.9	2	1.7	2	2.6	3	6	3	6	15	3	140M-C2E-B25	140M-D8E-B25	–	–
20AE2P7	A	2	1.5	3	3.1	2.7	3.6	4.8	4	6	4	10	15	7	140M-C2E-B40	140M-D8E-B40	–	–
20AE3P9	B	3	2	4.4	4.5	3.9	4.3	5.9	6	8	6	15	15	7	140M-C2E-B63	140M-D8E-B63	–	–
20AE6P1	B	5	3	7.5	7.8	6.1	6.7	9.2	10	12	10	20	20	15	140M-C2E-C10	140M-D8E-C10	140M-F8E-C10	–
20AE9P0	C	7.5	5	7.7	8	9	9.9	13.5	10	20	10	35	35	15	140M-C2E-C10	140M-D8E-C10	140M-F8E-C10	–
20AE011	C	10	7.5	9.8	10.1	11	13.5	18	15	20	15	40	40	15	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	–
20AE017	D	15	10	15.3	15.9	17	18.7	25.5	20	35	20	60	60	30	140M-C2E-C20	140M-D8E-C20	140M-F8E-C20	–
20AE022	D	20	15	20	20.8	22	25.5	34	25	45	25	80	80	30	140M-C2E-C25	140M-D8E-C25	140M-F8E-C25	140-CMN-2500
20AE027	D	25	20	24.8	25.7	27	33	44	35	60	35	100	100	50	–	–	140M-F8E-C25	140-CMN-2500
20AE032	D	30	25	29.4	30.5	32	40.5	54	40	70	40	125	125	50	–	–	140M-F8E-C32	140-CMN-4000
20AE041	E	40	30	37.6	39.1	41	48	64	50	90	50	150	150	100	–	–	140M-F8E-C45	140-CMN-4000
20AE052	E	50	40	47.7	49.6	52	61.5	82	60	110	60	200	200	100	–	–	–	140-CMN-6300

208/240 Volt AC Single-Phase Input Drive Ratings and Input Protection Devices (see page 5 for notes)

Drive Catalog Number	Frame (1)	HP Rating		Input Ratings		Output Amps			Dual Element Time Delay Fuse		Non-Time Delay Fuse		Circuit Breaker (4)	Motor Circuit Protector (6)	140M Motor Protector with Adjustable Current Range (7) (8)			
		ND	HD	Amps	kVA	Cont.	1 Min.	3 Sec.	Min. (2)	Max. (3)	Min. (2)	Max. (3)	Max. (5)	Max. (5)	Available Catalog Numbers (9)			
208 Volt AC Input																		
20AB2P2	A	0.5	0.33	2.9	0.6	1.3	1.6	1.9	6	6	6	10	15	7	140M-C2E-B40	140M-D8E-B40	–	–
20AB4P2	A	1	0.75	5.6	1	2.4	2.8	3.7	10	10	10	17.5	15	7	140M-C2E-B63	140M-D8E-B63	–	–
20AB6P8	B	2	1.5	10	1.8	3.9	5.2	6.9	15	15	15	30	30	15	140M-C2E-C10	140M-D8E-C10	140M-F8E-C10	–
20AB9P6	B	3	2	14	2.6	5.5	6.1	8.3	20	25	20	40	40	30	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	–
20AB015	C	5	3	16	2.9	8.6	9.6	13.3	20	35	20	70	70	30	140M-C2E-C20	140M-D8E-C20	140M-F8E-C20	–
20AB022	D	7.5	5	23.3	4.2	12.7	13.9	19.0	30	50	30	100	100	30	140M-C2E-C25	140M-D8E-C25	140M-F8E-C25	140-CMN-2500
20AB028	D	10	7.5	29.8	5.4	16.1	19	25.3	40	70	40	125	125	50	–	–	140M-F8E-C32	140-CMN-4000
20AB042	D	15	10	39.8	7.2	21.5	27.8	37	60	100	60	175	175	70	–	–	140M-F8E-C45	140-CMN-6300
20AB054	E	20	15	57.5	10.4	31.1	36.2	48.3	80	125	80	200	200	100	–	–	–	140-CMN-6300
20AB070	E	25	20	72.3	13.0	39.1	46.6	62	90	175	90	300	300	100	–	–	–	140-CMN-9000
240 Volt AC Input																		
20AB2P2	A	0.5	0.33	2.5	0.6	1.1	1.2	1.7	3	4.5	3	8	15	3	140M-C2E-B25	140M-D8E-B25	–	–
20AB4P2	A	1	0.75	4.8	1	2.1	2.4	3.2	6	9	6	15	15	7	140M-C2E-B63	140M-D8E-B63	–	–
20AB6P8	B	2	1.5	8.7	1.8	3.4	4.5	6	15	15	15	25	25	15	140M-C2E-C10	140M-D8E-C10	140M-F8E-C10	–
20AB9P6	B	3	2	12.2	2.6	4.8	5.3	7.2	20	20	20	35	35	15	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	–
20AB015	C	5	3	13.9	2.9	7.7	8.7	11.6	20	30	20	60	60	30	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	–
20AB022	D	7.5	5	19.9	4.2	11	12.2	16.5	25	45	25	80	80	30	140M-C2E-C25	140M-D8E-C25	140M-F8E-C25	140-CMN-2500
20AB028	D	10	7.5	25.7	5.4	14	16.5	22	35	60	35	110	110	50	–	–	140M-F8E-C32	140-CMN-4000
20AB042	D	15	10	38.7	8.1	21	23.1	31.5	50	90	50	150	150	50	–	–	140M-F8E-C45	140-CMN-6300
20AB054	E	20	15	49.8	10.4	27	31.5	42	60	100	60	200	200	100	–	–	–	140-CMN-6300
20AB070	E	25	20	64.5	13.4	35	40.5	54	90	150	90	275	275	100	–	–	–	140-CMN-9000

400 Volt AC Single-Phase Input Drive Ratings and Input Protection Devices (see page 5 for notes).

Drive Catalog Number	Frame (1)	HP Rating		Input Ratings		Output Amps			Dual Element Time Delay Fuse		Non-Time Delay Fuse		Circuit Breaker (4)	Motor Circuit Protector (6)	140M Motor Protector with Adjustable Current Range (7) (8)			
		ND	HD	Amps	kVA	Cont.	1 Min.	3 Sec.	Min. (2)	Max. (3)	Min. (2)	Max. (3)	Max. (5)	Max. (5)	Available Catalog Numbers (9)			
400 Volt AC Input																		
20AC1P3	A	0.37	0.25	1.6	0.6	0.7	0.7	1.0	3	3	3	5	15	3	140M-C2E-B16	–	–	–
20AC2P1	A	0.75	0.55	2.5	0.9	1.1	1.2	1.6	4	6	4	8	15	7	140M-C2E-B25	140M-D8E-B25	–	–
20AC3P5	A	1.5	1.1	4.3	1.5	1.8	2.3	3	6	6	6	12	15	7	140M-C2E-B63	140M-D8E-B63	–	–
20AC5P0	B	2.2	1.5	6.5	2.3	2.5	2.8	3.8	10	10	10	20	20	15	140M-C2E-C10	140M-D8E-C10	140M-F8E-C10	–
20AC8P7	B	4	3	11.3	3.9	4.4	5.0	6.6	15	17.5	15	30	30	15	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	–
20AC011	C	5.5	4	11	3.8	5.8	6.5	8.7	15	25	15	45	40	15	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	–
20AC015	C	7.5	5.5	15.1	5.2	7.7	8.6	11.6	20	30	20	60	60	20	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	–
20AC022	D	11	7.5	21.9	7.6	11	12.1	16.5	30	45	30	80	80	30	140M-C2E-C25	140M-D8E-C25	140M-F8E-C25	140-CMN-2500
20AC030	D	15	11	30.3	10.5	15	16.5	22.5	40	60	40	120	120	50	–	–	140M-F8E-C32	140-CMN-4000
20AC037	D	18.5	15	35	12.2	18.5	22.5	30	50	80	50	125	140	50	–	–	140M-F8E-C45	140-CMN-4000
20AC043	D	22	18.5	40.7	14.1	21.5	28	37	60	90	60	150	160	70	–	–	–	140-CMN-6300
20AC060	E	30	22	56.8	19.7	30	33	45	80	125	80	225	240	80	–	–	–	140-CMN-6300
20AC072	E	37	30	68.9	23.9	36	45	60	90	150	90	250	280	100	–	–	–	140-CMN-9000

480 Volt AC Single-Phase Input Drive Ratings and Input Protection Devices (see page 5 for notes).

Drive Catalog Number	Frame (1)	HP Rating		Input Ratings		Output Amps			Dual Element Time Delay Fuse		Non-Time Delay Fuse		Circuit Breaker (4)	Motor Circuit Protector (6)	140M Motor Protector with Adjustable Current Range (7) (8)			
		ND	HD	Amps	kVA	Cont.	1 Min.	3 Sec.	Min. (2)	Max. (3)	Min. (2)	Max. (3)	Max. (5)	Max. (5)	Available Catalog Numbers (9)			
480 Volt AC Input																		
20AD1P1	A	0.5	0.33	1.3	0.6	0.6	0.6	0.8	3	3	3	4	15	3	140M-C2E-B16	–	–	–
20AD2P1	A	1	0.75	2.4	1	1.1	1.2	1.6	3	6	3	8	15	3	140M-C2E-B25	140M-D8E-B25	–	–
20AD3P4	A	2	1.5	3.8	1.6	1.7	2.3	3	6	6	6	12	15	7	140M-C2E-B40	140M-D8E-B40	–	–
20AD5P0	B	3	2	5.6	2.4	2.5	2.6	3.8	10	10	10	20	20	15	140M-C2E-B63	140M-D8E-B63	–	–
20AD8P0	B	5	3	9.8	4.2	4	4.4	6	15	15	15	30	30	15	140M-C2E-C10	140M-D8E-C10	140M-F8E-C10	–
20AD011	C	7.5	5	9.5	4	5.5	6.1	8.3	15	20	15	40	40	15	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	–
20AD014	C	10	7.5	12.5	5.2	7	8.3	11	20	30	20	50	50	20	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	–
20AD022	D	15	10	19.9	8.3	11	12.1	16.5	25	45	25	80	80	30	140M-C2E-C25	140M-D8E-C25	140M-F8E-C25	–
20AD027	D	20	15	24.8	10.3	13.5	16.5	22	35	60	35	100	100	50	–	–	140M-F8E-C32	140-CMN-2500
20AD034	D	25	20	31.2	13	17	20.3	27	40	70	40	125	125	50	–	–	140M-F8E-C45	140-CMN-4000
20AD040	D	30	25	36.7	19.9	20	25.5	34	50	90	50	150	150	50	–	–	140M-F8E-C45	140-CMN-4000
20AD052	E	40	30	47.7	12.8	26	30	40	60	110	60	200	200	70	–	–	–	140-CMN-6300
20AD065	E	50	40	59.6	24.8	32.5	39	52	80	125	80	250	250	100	–	–	–	140-CMN-9000

600 Volt AC Single-Phase Input Drive Ratings and Input Protection Devices

Drive Catalog Number	Frame (1)	HP Rating		Input Ratings		Output Amps			Dual Element Time Delay Fuse		Non-Time Delay Fuse		Circuit Breaker (4)	Motor Circuit Protector (6)	140M Motor Protector with Adjustable Current Range (7) (8)			
		ND	HD	Amps	kVA	Cont.	1 Min.	3 Sec.	Min. (2)	Max. (3)	Min. (2)	Max. (3)	Max. (5)	Max. (5)	Available Catalog Numbers (9)			
600 Volt AC Input																		
20AE0P9	A	0.5	0.33	1.3	0.7	0.5	0.6	0.7	3	3	3	3.5	15	3	140M-C2E-B16	–	–	–
20AE1P7	A	1	0.75	1.9	1	0.9	1	1.3	3	6	3	6	15	3	140M-C2E-B25	140M-D8E-B25	–	–
20AE2P7	A	2	1.5	3	1.6	1.4	1.8	2.4	4	6	4	10	15	7	140M-C2E-B40	140M-D8E-B40	–	–
20AE3P9	B	3	2	4.4	2.3	2	2.2	3	6	8	6	15	15	7	140M-C2E-B63	140M-D8E-B63	–	–
20AE6P1	B	5	3	7.5	3.9	3.1	3.4	4.6	10	12	10	20	20	15	140M-C2E-C10	140M-D8E-C10	140M-F8E-C10	–
20AE9P0	C	7.5	5	7.7	4	4.5	5	6.8	10	20	10	35	35	15	140M-C2E-C10	140M-D8E-C10	140M-F8E-C10	–
20AE011	C	10	7.5	9.8	5.1	5.5	6.8	9	15	20	15	40	40	15	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	–
20AE017	D	15	10	15.3	8	8.5	9.4	12.8	20	35	20	60	60	30	140M-C2E-C20	140M-D8E-C20	140M-F8E-C20	–
20AE022	D	20	15	20	10.4	11	12.8	17	25	45	25	80	80	30	140M-C2E-C25	140M-D8E-C25	140M-F8E-C25	140-CMN-2500
20AE027	D	25	20	24.8	12.9	13.5	16.5	22	35	60	35	100	100	50	–	–	140M-F8E-C25	140-CMN-2500
20AE032	D	30	25	29.4	15.3	16	20.3	27	40	70	40	125	125	50	–	–	140M-F8E-C32	140-CMN-4000
20AE041	E	40	30	37.6	19.6	20.5	24	32	50	90	50	150	150	100	–	–	140M-F8E-C45	140-CMN-4000
20AE052	E	50	40	47.7	24.8	26	30.8	41	60	110	60	200	200	100	–	–	–	140-CMN-6300

(1) For IP 66 (NEMA/UL Type 4X/12) enclosures, drives listed as Frame A increase to Frame B and drives listed as Frame C increase to Frame D.
(2) Minimum protection device size is the lowest rated device that supplies maximum protection without nuisance tripping.
(3) Maximum protection device size is the highest rated device that supplies drive protection. For US NEC, minimum size is 125% of motor FLA. Ratings shown are maximum.
(4) Circuit Breaker - inverse time breaker. For US NEC, minimum size is 125% of motor FLA. Ratings shown are maximum.
(5) Maximum allowable rating by US NEC. Exact size must be chosen for each installation.
(6) Motor Circuit Protector - instantaneous trip circuit breaker. For US NEC, minimum size is 125% of motor FLA. Ratings shown are maximum.
(7) Bulletin 140M with adjustable current range should have the current trip set to the minimum range that the device will not trip.
(8) Manual Self-Protected (Type E) Combination Motor Controller, UL listed for 208 Wye or Delta, 240 Wye or Delta, 480Y/277 or 600Y/347. Not UL listed for use on 480V or 600V Delta/Delta systems in single motor applications.
(9) The AIC ratings of the Bulletin 140M Motor Protector may vary. See publication 140M-SG001B-EN-P.

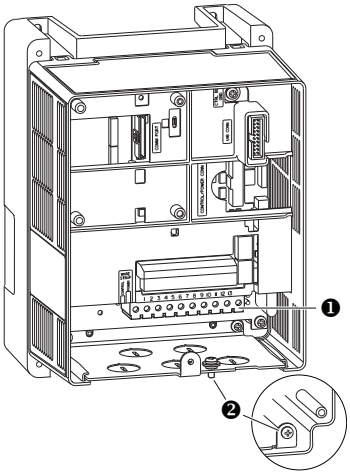
Wire and Terminal Blocks

Wire Recommendations

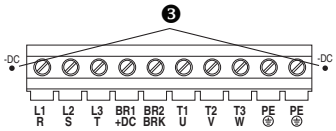
Type		Wire Type(s)	Description
Power (1)(2)	Standard	600V, 90 °C (194 °F) XHHW2/RHW-2 Anixter B209500-B209507, Belden 29501-29507, or equivalent	Four tinned copper conductors with XLPE insulation. Copper braid/aluminum foil combination shield and tinned copper drain wire. PVC jacket.

(1) Control and signal wires should be separated from power wires by at least 0.3 meters (1 foot).
(2) The use of shielded wire for AC input power may not be necessary but is always recommended.

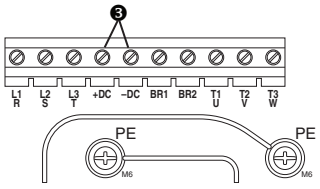
Typical Terminal Block Location



Power Terminal Blocks



Frames A...D



Frame E

Terminal Block Specifications

No.	Name	Description	Frame	Wire Size Range(1)		Torque	
				Maximum	Minimum	Maximum	Recommended
❶	Power Terminal Block	Input power, motor connections, and PE	A, B, & C	3.5 mm^2 (12 AWG)	0.3 mm^2 (22 AWG)	0.66 N-m (5.5 lb.-in.)	0.6 N-m (5 lb.-in.)
			D	8.4 mm^2 (8 AWG)	0.8 mm^2 (18 AWG)	1.7 N-m (15 lb.-in.)	1.4 N-m (12 lb.-in.)
			E	25.0 mm^2 (3 AWG)	2.5 mm^2 (14 AWG)	2.71 N-m (24 lb.-in.)	2.71 N-m (24 lb.-in.)
❷	SHLD terminal	Terminating point for wiring shields	All	—	—	1.6 N-m (14 lb.-in.)	1.6 N-m (14 lb.-in.)

(1) Maximum/minimum sizes that the terminal block will accept - these are not recommendations.

Terminal	Description	Notes
BR1 BR2	DC Brake (+) DC Brake (–)	DB Resistor Connection - **Important:** Do not connect both an internal and external DB resistor at the same time. This may violate the minimum allowed DB resistance and cause drive damage.
+DC –DC	DC Bus (+) DC Bus (–)	❸ Test point on Frames A...D located to the left or right of the Power Terminal Block. Frame E has dedicated terminals.
PE	PE Ground	
U, V, W	U (T1), V (T2), W (T3)	To Motor
R, S, T	R (L1), S (L2), T (L3)	AC Line Input Power

Notes:

Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products. At http://www.rockwellautomation.com/support/, you can find technical manuals, a knowledge base of FAQs, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools.

For an additional level of technical phone support for installation, configuration, and troubleshooting, we offer TechConnect support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit http://www.rockwellautomation.com/support/.

Installation Assistance

If you experience a problem within the first 24 hours of installation, review the information that is contained in the installation instructions. You can contact Customer Support for initial help in getting your product up and running.

United States or Canada	1.440.646.3434
Outside United States or Canada	Use the Worldwide Locator at http://www.rockwellautomation.com/support/americas/phone_en.html, or contact your local Rockwell Automation representative.

New Product Satisfaction Return

Rockwell Automation tests all of its products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

United States	Contact your distributor. You must provide a Customer Support case number (call the phone number above to obtain one) to your distributor to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for the return procedure.

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