

Technical Data

Original Instructions



AbN
Allen-Bradley
automation
by ROCKWELL AUTOMATION

PowerFlex 4M Adjustable Frequency AC Drives

Catalog Number 22F

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Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

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Added Inclusive Language Acknowledgment	2
Updated Programming Software	7
Added 140MT motor protectors, 100-E contactors, and DC fuse to table Drive Ratings	11, 12
Updated Approvals	13
Added Additional Resources	20

Rockwell Automation recognizes that some of the terms that are currently used in our industry and in this publication are not in alignment with the movement toward inclusive language in technology. We are proactively collaborating with industry peers to find alternatives to such terms and making changes to our products and content. Please excuse the use of such terms in our content while we implement these changes.

Product Overview

The Allen-Bradley® PowerFlex® family of drives offers you powerful motor speed control in a compact and space saving design. Ideal for machine level speed control, the PowerFlex 4M drive delivers the application versatility to meet the demands of global OEMs and end users who require space savings and easy-to-use AC drives that provide application flexibility, feed-through wiring and ease-of-programming. The PowerFlex 4M AC drive is available in three frame sizes (A, B, and C) and power ratings from 0.2...11 kW (0.25...15 Hp) and in voltage classes of 120 volts, 240 volts, and 480 volts.



Startup, Programming, and Operation

- An **integral keypad** provides out of the box operation using the local potentiometer and control keys.
- The 12 most common application parameters are contained in the **Basic Program Group**, making programming fast and easy.
- The **programming keys** have the same function as all other PowerFlex drives, so if you can program one PowerFlex drive, you can program them all.
- A **4-digit display** with 10 additional LED indicators provides an intuitive display of drive status and information.
- Integral **RS-485 communications** can be used for programming from a PC. It can also be used in a multi-drop network configuration. A serial converter module provides connectivity to any controller with a DFI port.
- A **NEMA/UL Type 4X** remote and **NEMA/UL Type 1 handheld LCD keypad** provide additional programming and control flexibility, both featuring the popular Copycat function.



Packaging and Mounting

- Installation can be a virtual snap using the **DIN rail mounting** feature on A and B frame drives. Panel mounting is also available and provides added flexibility.
- **Zero Stacking** is allowed for ambient temperatures up to 40 °C (104 °F), saving valuable panel space. 50 °C (122 °F) ambient temperatures are permitted with minimal spacing between drives.
- Integral filtering is available on all 240V single-phase and 480V three-phase ratings, providing a cost-effective means of meeting EN 61800-3. External filters for all PowerFlex 4M drive ratings are also available.



Optimized Performance

- A **Removable MOV** to ground ensures reliable operation with ungrounded or resistive distribution systems.
- A **relay precharge** limits inrush current.
- An **Integral brake transistor**, available on Frame C drives, provides dynamic braking capability with simple low cost brake resistors.
- Use the DIP switch to set **24V DC sink or source control** for control wiring flexibility.
- 0.25...150% overload for 60 seconds or 200% overload for 3 seconds provides **robust overload protection**.
- An adjustable PWM frequency up to 10 kHz delivers quiet operation.
- Volts per Hertz Control Performance
- The drive automatically provides auto boost (IR compensation) and slip compensation.
- The drive delivers excellent speed regulation and high levels of torque across the entire speed range of the drive, and improved speed regulation even as loading increases.



Communications

- A **Serial Converter Module** provides connectivity to any controller that has the ability to initiate DFI messaging.
 - Bluetooth - Wireless/DFI to RS-485/DSI
- **Integral RS-485/DSI communications** enable the drives to be used in a multi-drop network configuration.
- Integral communication cards such as **DeviceNet**®, **EtherNet/IP**™, **PROFIBUS DP**, **LonWorks**, **BACnet**, and **ControlNet**® can improve machine performance. These cards are optional and can only be used with an external DSI communications kit.
- The DSI Wireless Interface Module (WIM) provides a wireless communication interface between a Pocket PC, laptop computer, or desktop computer that is equipped with Bluetooth wireless technology, and any Allen-Bradley product that supports the DSI protocol.
- RS-485/DSI = Modbus RTU
 - Directly compatible with PanelView™ products using RTU master capability
 - Direct compatibility with MicroLogix™ RTU master capability
 - Compatible with SLC™ 500 and ControlLogix® controllers, using third-party scanners with RTU Master capability

Feed-through Wiring Design

- Feed-through wiring for simple retrofitting into applications that require variable speed motor control.
- Feed-through wiring design provides simple variable speed motor control with minimal installation and retrofitting time.

PC Programming Software

Connected Components Workbench Software

Connected Components Workbench™ software is a windows-based software packages for programming and configuring Allen-Bradley drives and other Rockwell Automation products.

- Online and offline programming capability.
- Operate the drive via an on-screen Control Bar, which is a tool that allows you to start, stop, and change the speed reference of the drive.
- Save, restore, and print parameter information.
- Edit, upload, and download parameters.
- Immediate visual indication of drive and communication status when viewing online drive.



Catalog Number Explanation

1...3	4	5	6...8	9	10	11	12	13...14
22F	–	D	018	N	1	0	4	AA
a		b	c	d	e	f	g	h

a		
Drive		
Code	Type	
22F	PowerFlex 4M	

b		
Voltage Rating		
Code	Voltage	Phase
V	120V AC	1
A	240V AC	1
B	240V AC	3
D	480V AC	3

c1		
Rating		
100...120V AC, 1-phase Input		
Code	Amps	kW (Hp)
1P6	1.6	0.2 (0.25)
2P5	2.5	0.4 (0.5)
4P5	4.5	0.75 (1.0)
6P0	6.0	1.1 (1.5)

c2		
Rating		
200...240V AC, 1-phase Input		
Code	Amps	kW (Hp)
1P6	1.6	0.2 (0.25)
2P5	2.5	0.4 (0.5)
4P2	4.2	0.75 (1.0)
8P0	8.0	1.5 (2.0)
011	11	2.2 (3.0)

c3		
Rating		
200...240V AC, 3-phase Input		
Code	Amps	kW (Hp)
1P6	1.6	0.2 (0.25)
2P5	2.5	0.4 (0.5)
4P2	4.2	0.75 (1.0)
8P0	8.0	1.5 (2.0)
012	12.0	2.2 (3.0)
017	17.5	3.7 (5.0)
025	25.0	5.5 (7.5)
033	33.0	7.5 (10.0)

c4		
Rating		
380...480V AC, 3-phase Input		
Code	Amps	kW (Hp)
1P5	1.5	0.4 (0.5)
2P5	2.5	0.75 (1.0)
4P2	4.2	1.5 (2.0)
6P0	6.0	2.2 (3.0)
8P7	8.7	3.7 (5.0)
013	13.0	5.5 (7.5)
018	18.0	7.5 (10.0)
024	24.0	10.0 (15.0)

d	
Enclosure	
Code	Enclosure
N	Panel Mount - IP20 (NEMA/UL Type Open)

e	
HIM	
Code	Interface Module
1	Fixed Keypad

f	
Emission Class	
Code	EMC Filter
0	No Filter
1	Filter

g	
Brake	
Code	Description
3	No Brake IGBT
4	Standard

h	
Reserved	
Code	Description
AA...ZZ	Reserved

Product Selection

120V AC, 1-phase Drives (50/60 Hz)

Drive Ratings				IP20, NEMA/UL Open Type
kW	Hp	Output Current, A	Frame Size	Catalog Number
0.2	0.25	1.6	A	22F-V1P6N103
0.4	0.5	2.5	A	22F-V2P5N103
0.75	1	4.5	B	22F-V4P5N103
1.1	1.5	6	B	22F-V6P0N103

240V AC, 1-phase Drives (50/60 Hz)

Drive Ratings				IP20, NEMA/UL Open Type	With Integral "S Type" EMC Filter ⁽¹⁾
kW	Hp	Output Current, A	Frame Size	Catalog Number	Catalog Number
0.2	0.25	1.6	A	22F-A1P6N103	22F-A1P6N113
0.4	0.5	2.5	A	22F-A2P5N103	22F-A2P5N113
0.75	1	4.2	A	22F-A4P2N103	22F-A4P2N113
1.5	2	8	B	22F-A8P0N103	22F-A8P0N113
2.2	3	11	B	22F-A011N103	22F-A011N113

(1) This filter is suitable for use with a cable length of up to 5 m (16.4 ft) for Class A environments and up to 1 m (3.3 ft) for Class B environments.

240V AC, 1-phase Drives (50/60 Hz)

Drive Ratings				IP20, NEMA/UL Open Type
kW	Hp	Output Current, A	Frame Size	Catalog Number
Without Brake				
0.2	0.25	1.6	A	22F-B1P6N103
0.4	0.5	2.5	A	22F-B2P5N103
0.75	1	4.2	A	22F-B4P2N103
1.5	2	8	A	22F-B8P0N103
2.2	3	12	B	22F-B012N103
3.7	5	17.5	B	22F-B017N103
With Brake				
5.5	7.5	25	C	22F-B025N104
7.5	10	33	C	22F-B033N104

480V AC, 1-phase Drives (50/60 Hz)

Drive Ratings				IP20, NEMA/UL Open Type	With Integral "S Type" EMC Filter ⁽¹⁾
kW	Hp	Output Current, A	Frame Size	Catalog Number	Catalog Number
Without Brake					
0.4	0.5	1.5	A	22F-D1P5N103	22F-D1P5N113
0.75	1	2.5	A	22F-D2P5N103	22F-D2P5N113
1.5	2	4.2	B	22F-D4P2N103	22F-D4P2N113
2.2	3	6	B	22F-D6P0N103	22F-D6P0N113
3.7	5	8.7	B	22F-D8P7N103	22F-D8P7N113
With Brake					
5.5	7.5	13	C	22F-D013N104	22F-D013N114
7.5	10	18	C	22F-D018N104	22F-D018N114
11	15	24	C	22F-D024N104	22F-D024N114

(1) This filter is suitable for use with a cable length of up to 10 m (33 ft) for Class A environments.

User Installed Options

Human Interface Module Option Kits and Accessories

Item	Description	Catalog Number
Remote Human Interface Modules (HIMs)	LCD display, remote panel mount, digital speed control, CopyCat capable, IP66 (NEMA Type 4X/12) indoor use only. Includes 2.0 m (6.6 ft) cable.	22-HIM-C2S ⁽¹⁾
	LCD display, remote handheld, digital speed control, full numeric keypad, CopyCat capable, IP30 (NEMA Type 1). Includes 1.0 m (3.3 ft) cable. Can be panel mounted with an optional bezel kit.	22-HIM-A3
Bezel Kit	Panel mount for LCD display, remote handheld unit, IP30 (NEMA Type 1). Includes a 22-RJ45CBL-C20 cable.	22-HIM-B1
DSI HIM Cable	DSI HIM Cable (DSI HIM to RJ45 cable) 1.0 m (3.3 ft) 2.9 m (9.51 ft)	22-HIM-H10 22-HIM-H30

(1) The 22-HIM-C2S is smaller than the 22-HIM-C2 and cannot be used as a direct replacement.

Communication Option Kits

Item	Description	Catalog Number
Universal Serial Bus (USB) Converter	Provides a direct, isolated USB connection for use with Connected Components Workbench software and DriveExecutive™ software. Includes 2.0 m (6.6 ft) USB cable, 20-HIM-H10, and 22-HIM-H10 cables.	1203-USB
DSI Cable	2.0 m (6.6 ft) RJ45 to RJ45 cable, male to male connectors	22-RJ45CBL-C20
Splitter Cable	RJ45 one to two port splitter cable	AK-U0-RJ45-SC1
Terminating Resistors	RJ45 120 Ω resistor (2 pieces)	AK-U0-RJ45-TR1
Terminal Block	RJ45 Two-position terminal block (6 pieces)	AK-U0-RJ45-TB2P
External DSI Communications Kit	External communications kit for 22-COMM communication adapters. Multi-drive capability allows connectivity for up to 5 drives.	22-XCOMM-DC-BASE
External Comms Power Supply	Optional 100...240V AC power supply for external DSI communications kit	20-XCOMM-AC-PS1
Communication Adapters ⁽¹⁾	Embedded communication option for use with the PowerFlex family of drives. Requires a communication adapter cover (ordered separately). - BACnet - ControlNet - DeviceNet - EtherNet/IP - PROFIBUS DP	22-COMM-B 22-COMM-C 22-COMM-D 22-COMM-E 22-COMM-P
Compact I/O™ Module	Provides 3 channels that can be individually configured for Single, Multi-drive, and Modbus RTU modes.	1769-SM2

(1) PowerFlex 4M drives require external DSI communication kits. Communication adapters cannot be drive mounted.

Programming Software

Item	Description
Connected Components Workbench Software	Windows-based software packages for programming and configuring Allen-Bradley drives and other Rockwell Automation products. Compatibility: Microsoft Windows® Server 2012 ⁽¹⁾ , Windows Server 2012 R2, Windows Server 2016 ⁽¹⁾ , Windows Server 2019, Windows 10 IoT Enterprise 2016 LTSB 64-bit, Windows 10 IoT Enterprise 2019 LTSC, Windows 10, and Windows 11 ⁽²⁾ . All supported operating systems require .NET Framework 3.5 SP1 to be installed. You can download Connected Components Workbench Standard Edition software for free at rok.auto/pcdc . To purchase Connected Components Workbench Developer Edition software, visit rok.auto/ccw .
DriveExecutive Software (Download as part of the DriveTools™ SP software package)	Windows-based software package that provides an intuitive means for monitoring or configuring Allen-Bradley drives and communications adapters online and offline. Compatibility: Microsoft Windows 7, Windows 10, and Windows Server 2019. You can download DriveTool SP software package at rok.auto/pcdc .

(1) Requires Connected Components Workbench software version 20.01.00 or earlier.

(2) Requires Connected Components Workbench software version 20.01.00 or later.

Dynamic Brake Resistors

Drive Ratings			Min Resistance, Ω	IP20, NEMA/UL Open Type
Input Voltage	kW	Hp		Catalog Number ⁽¹⁾
240V, 50/60 Hz, 3-phase	5.5	7.5	13	AK-R2-030P1K2
	7.5	10	10	AK-R2-030P1K2
480V, 50/60 Hz, 3-phase	5.5	7.5	55	AK-R2-120P1K2
	7.5	10	39	AK-R2-120P1K2
	11	15	24	AK-R2-120P1K2 ⁽²⁾

(1) Resistors listed in this table are rated 5% duty cycle.

(2) Requires two resistors that are wired in parallel.

Input Line Reactors - 3% Impedance

Input Voltage	kW	Hp	Fundamental Amps, A	Max Continuous Amps, A	Inductance, mh	Watts Loss, W	Catalog Number ⁽¹⁾
240V, 50/60 Hz, 3-phase	0.2	0.25	2.0	3.0	12	7.5	1321-3R2-A
	0.4	0.5	4.0	6.0	6.5	20	1321-3R4-B
	0.75	1	8.0	12	3.0	29	1321-3R8-B
	1.5	2.0	8.0	12	1.5	19.5	1321-3R8-A
	2.2	3.0	12	18	1.25	26	1321-3R12-A
	3.7	5.0	18	27	0.8	36	1321-3R18-A
	5.5	7.5	25	37.5	0.5	48	1321-3R25-A
	7.5	10	35	52.5	0.4	49	1321-3R35-A
480V, 50/60 Hz, 3-phase	0.4	0.5	2.0	3.0	20	11.3	1321-3R2-B
	0.75	1	4.0	6.0	9.0	20	1321-3R4-C
	1.5	2.0	4.0	6.0	6.5	20	1321-3R4-B
	2.2	3.0	8.0	12	5.0	25.3	1321-3R8-C
	4.0	5.0	12	18	2.5	31	1321-3R8-B
	5.5	7.5	12	18	2.5	31	1321-3R12-B
	7.5	10	18	27	1.5	43	1321-3R18-B
	11	15	25	37.5	1.2	52	1321-3R25-B

(1) Catalog numbers listed are for 3% impedance open style units. NEMA/UL Type 1 and 5% impedance reactor types are also available. See the 1321 Power Conditioning Products Technical Data, publication, [1321-TD001](#), for more information.

Terminators

Description ⁽¹⁾	Catalog Number
For use with 3.7 kW (5 Hp) and below drives	1204-TFA1
For use with 1.5 kW (2 Hp) and above drives	1204-TFB2

(1) For selection information, see Appendix A of the Wiring and Grounding for Pulse Width Modulated (PWM) AC Drives Installation Instructions, publication [DRIVES-IN001](#).

Reflected Wave Reduction Modules w/Common Mode Choke

Description ⁽¹⁾	Catalog Number
17 A with common mode choke	1204-RWC-17-A

(1) For selection information, see Appendix A of the Wiring and Grounding for Pulse Width Modulated (PWM) AC Drives Installation Instructions, publication [DRIVES-IN001](#).

Reflected Wave Reduction Modules

Voltage	ND kW	ND Hp	Catalog Number
380...480V AC	2.2...4	3...5	1321-RWR8-DP
	4	5	1321-RWR12-DP
	5.5	7.5	1321-RWR18-DP
	7.5	10	1321-RWR25-DP
	11	15	1321-RWR25-DP

Spare Parts

Item	Description	Catalog Number
Fan Replacement Kits	Fan Replacement Kit - Frame A	SK-U1-FFAN1-A1
	Fan Replacement Kit - Frame B	SK-U1-FFAN1-B1
	Fan Replacement Kit - Frame C	SK-U1-FFAN1-C1
Covers	Frame A Cover	SK-U1-FCVR-A1
	Frame B Cover	SK-U1-FCVR-B1
	Frame C Cover	SK-U1-FCVR-C1

EMC Filters

Drive Ratings			S Type Filter	L Type Filter
Input Voltage	kW	Hp	Catalog Number ⁽¹⁾	Catalog Number ⁽²⁾
120V, 50/60 Hz, 1-phase	0.2	0.25	—	22F-RF010-AL
	0.4	0.5	—	22F-RF010-AL
	0.75	1.0	—	22F-RF025-BL
	1.1	1.5	—	22F-RF025-BL
240V, 50/60 Hz, 1-phase	0.2	0.25	— ⁽³⁾	22F-RF010-AL
	0.4	0.5	— ⁽³⁾	22F-RF010-AL
	0.75	1.0	— ⁽³⁾	22F-RF010-AL
	1.5	2.0	— ⁽³⁾	22F-RF025-BL
	2.2	3.0	— ⁽³⁾	22F-RF025-BL
240V, 50/60 Hz, 3-phase	0.2	0.25	22F-RF9P5-AS	22F-RF9P5-AL
	0.4	0.5	22F-RF9P5-AS	22F-RF9P5-AL
	0.75	1.0	22F-RF9P5-AS	22F-RF9P5-AL
	1.5	2.0	22F-RF9P5-AS	22F-RF9P5-AL
	2.2	3.0	22F-RF021-BS	22F-RF021-BL
	3.7	5.0	22F-RF021-BS	22F-RF021-BL
	5.5	7.5	22F-RF039-CS	22F-RF039-CL
	7.5	10	22F-RF039-CS	22F-RF039-CL
480V, 50/60 Hz, 3-phase ⁽³⁾	0.4	0.5	22F-RF6P0-AS	22F-RF6P0-AL
	0.75	1.0	22F-RF6P0-AS	22F-RF6P0-AL
	1.5	2.0	22F-RF6P0-AS	22F-RF6P0-AL
	2.2	3.0	22F-RF012-BS	22F-RF012-BL
	3.7	5.0	22F-RF012-BS	22F-RF012-BL
	5.5	7.5	22F-RF026-CS	22F-RF026-CL
	7.5	10	22F-RF026-CS	22F-RF026-CL
	11	15	22F-RF026-CS	22F-RF026-CL

(1) This filter is suitable for use with a cable length of up to 5 m (16.4 ft) for Class A and 1 m (3.3 ft) for Class B environments.

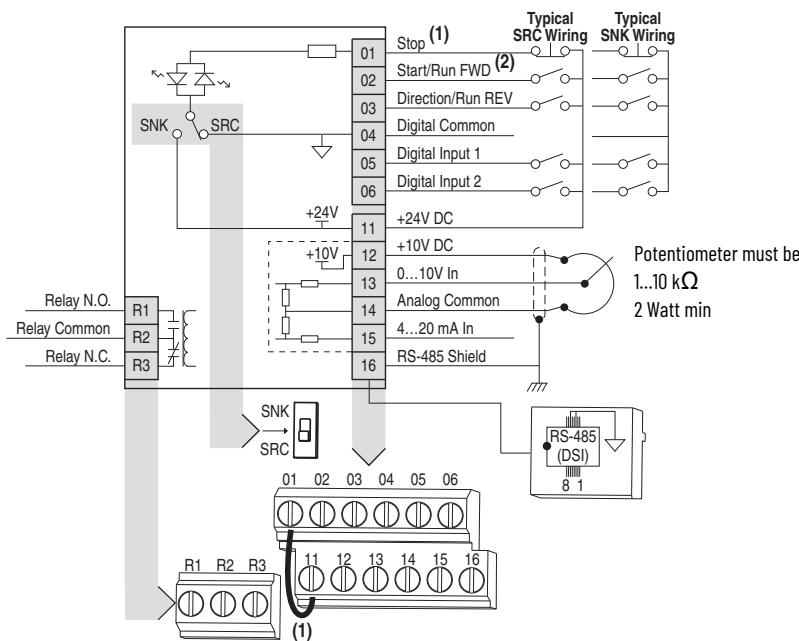
(2) Drives are available in these ratings with internal "S Type" filters.

(3) This filter is suitable for use with a cable length of up to 100 m (328 ft) for Class A and 25 m (82 ft) for Class B environments.

Installation Considerations

Control Wiring

- The control logic is 24V DC and can be set for either Sink or Source control via a DIP switch setting.
- Control terminal screws are sized for a conventional blade screwdriver.
- I/O Terminals 1, 2, and 3 are dedicated for Stop, Start, and Reverse operation respectively. These I/O Terminals can be programmed for 2-wire or 3-wire operation to meet application requirements.
- I/O Terminals 4 and 5 are programmable and provide added flexibility. Programmable functions include:
 - Local Control
 - Preset Frequencies
 - Jog
 - RS-485 Control
 - Second Accel/Decel
 - Auxiliary Fault
 - Clear Fault
- Speed can be controlled via a 0...10V input or 4...20 mA input. Both are electrically isolated from the drive.
- One form C relay can be programmed to provide the status of a wide variety of drive conditions. The drive is shipped with a jumper installed between I/O Terminals 01 and 02...11 to allow out of box operation from the keypad.



Control Wiring

No.	Signal	Default	Description	Parameter
R1	Relay N.O.	Fault	Normally open contact for output relay.	t221
R2	Relay Common	—	Common for output relay.	—
R3	Relay N.C.	Fault	Normally closed contact for output relay.	t221
Sink/Source DIP Switch		Source (SRC)	Inputs can be wired as Sink (SNK) or Source (SRC) via the DIP switch setting.	
01	Stop ⁽¹⁾	Coast	The factory-installed jumper or a normally closed input must be present for the drive to start.	P106 ⁽¹⁾
02	Start/Run FWD ⁽²⁾	Not Active	Command comes from the integral keypad by default. To disable reverse operation, see A095 [Reverse Disable].	P106, P107
03	Direction/Run REV	Not Active		P106, P107, A434
04	Digital Common	—	For digital inputs. Electronically isolated with digital inputs from analog I/O.	—

Control Wiring (Continued)

No.	Signal	Default	Description	Parameter
05	Digital Input 1	Preset Freq	Program with t201 [Digital In1 Sel].	t201
06	Digital Input 2	Preset Freq	Program with t202 [Digital In2 Sel].	t202
11	+24V DC	—	Drive supplied power for digital inputs. Maximum output current is 100 mA.	—
12	+10V DC	—	Drive supplied power for 0...10V external potentiometer. Maximum output current is 15 mA.	P108
13	0...10V In ⁽³⁾	Not Active	For external 0...10V input supply (input impedance = 100 k Ω) or potentiometer wiper.	P108
14	Analog Common	—	For 0...10V In or 4...20 mA In. Electronically isolated with analog inputs from digital I/O.	—
15	4...20 mA In ⁽³⁾	Not Active	For external 4...20 mA input supply (input impedance = 250 Ω).	P108
16	RS-485 (DSI) Shield	—	Terminal should be connected to safety ground - PE when using the RS-485 (DSI) communications port.	—

(1) Stop

(2) Start/Run FWD

(3) Only one analog frequency source may be connected at a time. If multiple reference is connected at the same time, an undetermined frequency reference will result

Specifications

Drive Ratings

Catalog Number	Output Ratings		Input Ratings			Branch Circuit Protection				DC Fuse ⁽¹⁾	
	kW (Hp)	Amps	Voltage Range	kVA	Amps	Fuses	140M/140MT Motor Protectors ⁽²⁾⁽³⁾	Contactor	Min Enclosure Volume ⁽⁴⁾ (in. ³)	BR+/DC+, DC-	BR-
100...120V AC ($\pm 10\%$) - 1-phase Input, 0...230V 3-phase Output											
22F-V1P6N103	0.2 (0.25)	1.6	90...126	0.8	6.4	10	140M-C2E-C10 140MT-C3E-C10	100-C09 100-E09	1655	_(5)	_(5)
22F-V2P5N103	0.4 (0.5)	2.5	90...126	1.1	9.0	15	140M-C2E-C16 140MT-C3E-C16	100-C12 100-E12	1655	_(5)	_(5)
22F-V4P5N103	0.75 (1.0)	4.5	90...126	2.2	18.0	30	140M-D8E-C20 140MT-D9E-C20	100-C23 100-E26	1655	_(5)	_(5)
22F-V6P0N103	1.1 (1.5)	6.0	90...126	2.9	24.0	40	140M-F8E-C32	100-C30 100-E30	1655	_(5)	_(5)
200...240V AC ($\pm 10\%$) - 1-phase Input, 0...230V 3-phase Output											
22F-A1P6N103	0.2 (0.25)	1.6	180...265	0.7	5.3	10	140M-C2E-B63 140MT-C3E-B63	100-C09 100-E09	1655	1000GH-016	_(5)
22F-A2P5N103	0.4 (0.5)	2.5	180...265	1.6	6.5	10	140M-C2E-C10 140MT-C3E-C10	100-C09 100-E09	1655	1000GH-016	_(5)
22F-A4P2N103	0.75 (1.0)	4.2	180...265	2.0	8.2	15	140M-C2E-C16 140MT-C3E-C16	100-C12 100-E12	1655	1000GH-016	_(5)
22F-A8P0N103	1.5 (2.0)	8.0	180...265	5.4	22.3	35	140M-D8E-C25 140MT-D9E-C25	100-C23 100-E26	1655	1000GH-025	_(5)
22F-A011N103	2.2 (3.0)	11.0	180...265	5.9	24.3	40	140M-F8E-C32	100-C30 100-E30	1655	1000GH-025	_(5)
200...240V AC ($\pm 10\%$) - 1-phase Input, 0...230V 3-phase Output, with Filter											
22F-A1P6N113	0.2 (0.25)	1.6	180...265	1.3	5.3	10	140M-C2E-B63 140MT-C3E-B63	100-C09 100-E09	1655	1000GH-016	_(5)
22F-A2P5N113	0.4 (0.5)	2.5	180...265	1.6	6.5	10	140M-C2E-C10 140MT-C3E-C10	100-C09 100-E09	1655	1000GH-016	_(5)
22F-A4P2N113	0.75 (1.0)	4.2	180...265	2.0	8.2	15	140M-C2E-C16 140MT-C3E-C16	100-C12 100-E12	1655	1000GH-016	_(5)
22F-A8P0N113	1.5 (2.0)	8.0	180...265	5.4	22.3	35	140M-D8E-C25 140MT-D9E-C25	100-C23 100-E26	1655	1000GH-025	_(5)
22F-A011N113	2.2 (3.0)	11.0	180...265	5.9	24.3	40	140M-F8E-C32	100-C30 100-E30	1655	1000GH-025	_(5)

Drive Ratings (Continued)

Catalog Number	Output Ratings		Input Ratings			Branch Circuit Protection				DC Fuse ⁽¹⁾	
	kW (Hp)	Amps	Voltage Range	kVA	Amps	Fuses	140M/140MT Motor Protectors ⁽²⁾⁽³⁾	Contactors	Min Enclosure Volume ⁽⁴⁾ (in. ³)	BR+/DC+, DC-	BR-
200...240V AC (±10%) – 3-phase Input, 0...230V 3-phase Output											
22F-B1P6N103	0.2 (0.25)	1.6	180...265	0.8	1.9	3	140M-C2E-B25 140MT-C3E-B25	100-C09 100-E09	1655	1000GH-016	_(5)
22F-B2P5N103	0.4 (0.5)	2.5	180...265	1.2	2.7	6	140M-C2E-B40 140MT-C3E-B40	100-C09 100-E09	1655	1000GH-016	_(5)
22F-B4P2N103	0.75 (1.0)	4.2	180...265	2.1	4.9	10	140M-C2E-B63 140MT-C3E-B63	100-C09 100-E09	1655	1000GH-016	_(5)
22F-B8P0N103	1.5 (2.0)	8.0	180...265	4.0	9.5	15	140M-C2E-C16 140MT-C3E-C16	100-C12 100-E12	1655	1000GH-025	_(5)
22F-B012N103	2.2 (3.0)	12.0	180...265	6.3	15.0	25	140M-D8E-C20 140MT-D9E-C20	100-C23 100-E26	1655	1000GH-025	_(5)
22F-B017N103	3.7 (5.0)	17.5	180...265	8.8	21.1	35	140M-D8E-C25 140MT-D9E-C25	100-C23 100-E26	1655	1000GH-050	1000GH-050
22F-B025N104 ⁽⁶⁾	5.5 (7.5)	25.0	180...265	11.4	27.2	45	140M-F8E-C32	100-C37 100-E38	3441	1000GH-050	1000GH-050
22F-B033N104 ⁽⁴⁾	7.5 (10.0)	33.0	180...265	16.1	38.5	60	140M-F8E-C45	100-C60 100-E52	3441	1000GH-050	1000GH-050
380...480V AC (±10%) – 3-phase Input, 0...460V 3-phase Output											
22F-D1P5N103	0.4 (0.5)	1.5	340...528	1.5	1.8	3	140M-C2E-B25 140MT-C3E-B25	100-C09 100-E09	1655	1000GH-016	_(5)
22F-D2P5N103	0.75 (1.0)	2.5	340...528	3.0	3.5	6	140M-C2E-B40 140MT-C3E-B40	100-C09 100-E09	1655	1000GH-025	_(5)
22F-D4P2N103	1.5 (2.0)	4.2	340...528	5.0	6.0	10	140M-C2E-C10 140MT-C3E-C10	100-C09 100-E09	1655	1000GH-025	_(5)
22F-D6P0N103	2.2 (3.0)	6.0	340...528	5.2	6.2	10	140M-C2E-C10 140MT-C3E-C10	100-C09 100-E09	1655	1000GH-025	_(5)
22F-D8P7N103	3.7 (5.0)	8.7	340...528	7.0	8.3	15	140M-C2E-C16 140MT-C3E-C16	100-C12 100-E12	1655	1000GH-040	_(5)
22F-D013N104 ⁽⁴⁾	5.5 (7.5)	13.0	340...528	12.9	15.4	25	140M-D8E-C20 140MT-D9E-C20	100-C23 100-E26	3441	1000GH-040	1000GH-040
22F-D018N104 ⁽⁴⁾	7.5 (10.0)	18.0	340...528	16.3	19.5	30	140M-F8E-C25	100-C23 100-E26	3441	1000GH-050	1000GH-050
22F-D024N104 ⁽¹⁾	11.0 (15.0)	24.0	340...528	21.7	26.1	40	140M-F8E-C32	100-C30 100-E30	3441	1000GH-050	1000GH-050
380...480V AC (±10%) – 3-phase Input, 0...460V 3-phase Output, with Filter											
22F-D1P5N113	0.4 (0.5)	1.5	340...528	1.5	1.8	3	140M-C2E-B25 140MT-C3E-B25	100-C09 100-E09	1655	1000GH-016	_(5)
22F-D2P5N113	0.75 (1.0)	2.5	340...528	3.0	3.5	6	140M-C2E-B40 140MT-C3E-B40	100-C09 100-E09	1655	1000GH-025	_(5)
22F-D4P2N113	1.5 (2.0)	4.2	340...528	5.0	6.0	10	140M-C2E-C10 140MT-C3E-C10	100-C09 100-E09	1655	1000GH-025	_(5)
22F-D6P0N113	2.2 (3.0)	6.0	340...528	5.2	6.2	10	140M-C2E-C10 140MT-C3E-C10	100-C09 100-E09	1655	1000GH-025	_(5)
22F-D8P7N113	3.7 (5.0)	8.7	340...528	7.0	8.3	15	140M-C2E-C16 140MT-C3E-C16	100-C12 100-E12	1655	1000GH-040	_(5)
22F-D013N114 ⁽¹⁾	5.5 (7.5)	13.0	340...528	12.9	15.4	25	140M-D8E-C20 140MT-D9E-C20	100-C23 100-E26	3441	1000GH-040	1000GH-040
22F-D018N114 ⁽¹⁾	7.5 (10.0)	18.0	340...528	16.3	19.5	30	140M-F8E-C25	100-C23 100-E26	3441	1000GH-050	1000GH-050
22F-D024N114 ⁽¹⁾	11.0 (15.0)	24.0	340...528	21.7	26.1	40	140M-F8E-C32	100-C30 100-E30	3441	1000GH-050	1000GH-050

(1) For IEC applications, a DC fuse is mandatory when these terminals are connected. Connect the fuse close to the terminal. Use the specified part number from Hinode.

(2) The AIC ratings of the Bulletin 140M/140MT Motor Protector Circuit Breakers may vary. See the Motor Protection Circuit Breaker and Motor Circuit Protector Specifications Technical Data, publication [140-TD005](#) or [140M-TD002](#).

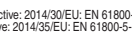
(3) Manual Self-protected (Type E) Combination Motor Controller, UL Listed for 208 Wye or Delta, 240 Wye or Delta, 480Y/277 or 600Y/347. Not UL Listed for use on 480V or 600V Delta/Delta, corner ground, or high-resistance ground systems.

(4) When using a Manual Self-protected (Type E) Combination Motor Controller, the drive must be installed in a ventilated or non-ventilated enclosure with the minimum volume specified in this column. Application specific thermal considerations may require a larger enclosure.

(5) This drive rating does not support this function.

(6) Catalog suffix ending with '4', such as N104 and N114, indicate that an internal brake IGBT is supplied.

Input/Output Ratings

		Approvals
Output Frequency: 0...400 Hz (Programmable) Efficiency: 97.5% (Typical)		 UL 508C  CSA 22.2 No. 14  EN 61800-3  EMC Directive: 2014/30/EU: EN 61800-3  LV Directive: 2014/35/EU: EN 61800-5-1  KCC-REM-RAA-22F
SRC (Source) Mode: 18...24V = ON 0...6V = OFF	SNK (Sink) Mode: 0...6V = ON 18...24V = OFF	4...20 mA Analog: 250 Ω input impedance 0...10V DC Analog: 100 k Ω input impedance External Pot: 1...10 k Ω , 2 W min
Resistive Rating: 3.0 A at 30V DC, 125V AC, and 240V AC		Inductive Rating: 0.5 A at 30V DC, 125V AC, and 240V AC
Fuse: UL Class J, RK1, T, or Type BS88; 600V (550V) or equivalent.		Circuit Breakers: HMCP or Bulletin 140M/140MT or equivalent.
Motor Protection: I^2t overload protection - 150% for 60 s, 200% for 3 s (provides class 10 protection)		
Overcurrent: 200% hardware limit, 300% instantaneous fault		
Over Voltage: 100...120V AC Input - Trip occurs at 405V DC bus voltage (equivalent to 150V AC incoming line) 200...240V AC Input - Trip occurs at 405V DC bus voltage (equivalent to 290V AC incoming line) 380...460V AC Input - Trip occurs at 810V DC bus voltage (equivalent to 575V AC incoming line)		
Under Voltage: 100...120V AC Input - Trip occurs at 210V DC bus voltage (equivalent to 75V AC incoming line) 200...240V AC Input - Trip occurs at 210V DC bus voltage (equivalent to 150V AC incoming line) 380...460V AC Input - Trip occurs at 390V DC bus voltage (equivalent to 275V AC incoming line)		
Control ride-through: Minimum ride-through is 0.5 s - Typical value is 2 s		
Faultless Power ride-through: 100 ms		
Internal brake IGBT included with power ratings 5.5 kW (7.5 Hp) and 7.5 kW (10.0 Hp) for 240V, 3-phase drives, and 5.5 kW (7.5 Hp), 7.5 kW (10.0 Hp), and 11.0 kW (15.0 Hp) for 480V, 3-phase drives. For ordering information, see the PowerFlex 4M Adjustable Frequency AC Drive User Manual, publication 22F-UM001 .		

Specifications

Category	Specification	
Environment	Altitude, max (without derating)	1000 m (3300 ft)
	Maximum Surrounding Air Temperature (without derating) IP20 IP20 Zero Stacking	-10...+50 °C (14...122 °F) -10...+40 °C (14...104 °F)
	Cooling Method Convection	120V, 1-phase, 0.75 kW (1 Hp) and below 240V, 1-phase, 0.4 kW (0.5 Hp) and below 240V, 3-phase, 0.75 kW (1 Hp) and below 480V, 3-phase, 0.75 kW (1 Hp) and below All other drive ratings.
	Fan	
	Storage Temperature	-40...+85 °C (-40...+185 °F)
	Atmosphere	Important: 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.
	Relative Humidity	0...95% noncondensing
	Shock (operating)	15 g peak for 11 ms duration (± 1.0 ms)
	Vibration (operating)	1 g peak, 5...2000 Hz

Specifications (Continued)

Category	Specification	
Control	Carrier Frequency	2...10 kHz. Drive rating based on 4 kHz
	Frequency Accuracy	Within $\pm 0.05\%$ of set output frequency
	Digital Input	Within 0.5% of maximum output frequency
	Analog Input	Within 0.5% of maximum output frequency
	Speed Regulation - Open Loop with Slip Compensation	$\pm 2\%$ of base speed across a 40:1 speed range
	Stop Modes	Multiple programmable stop modes including - Ramp, Coast, DC-Brake, Ramp-to-Hold and S-curve.
	Acceleration/Deceleration	Two independently programmable acceleration and deceleration times. Each time may be programmed from 0...600 s in 0.1 s increments.
	Intermittent Overload	150% Overload capability for up to 1 min 200% Overload capability for up to 3 s
	Electronic Motor Overload Protection	Provides class 10 motor overload protection according to NEC article 430 and motor over temperature protection according to NEC article 430.126 (A) (2). UL 508C File 29572.

Parameter Cross Reference - by Name

Parameter Name	Number	Group	Parameter Name	Number	Group
Accel Time 1	P109	Basic Program	Flying Start En	A435	Advanced Program
Accel Time 2	A401	Advanced Program	Internal Freq	A409	Advanced Program
Analog In 0-10V	d020	Display	Jog Accel/Decel	A405	Advanced Program
Analog In 4-20mA	d021	Display	Jog Frequency	A404	Advanced Program
Anlg In 0-10V Hi	t212	Terminal Block	Language	C301	Communications
Anlg In 0-10V Lo	t211	Terminal Block	Maximum Freq	P105	Basic Program
Anlg In4-20mA Hi	t214	Terminal Block	Maximum Voltage	A457	Advanced Program
Anlg In4-20mA Lo	t213	Terminal Block	Minimum Freq	P104	Basic Program
Auto Rstrt Delay	A452	Advanced Program	Motor NP FLA	A461	Advanced Program
Auto Rstrt Tries	A451	Advanced Program	Motor NP Hertz	P102	Basic Program
Boost Select	A453	Advanced Program	Motor NP Volts	P101	Basic Program
Bus Reg Mode	A441	Advanced Program	Motor OL Current	P103	Basic Program
Comm Data Rate	C302	Communications	Motor OL Ret	P111	Basic Program
Comm Format	C306	Communications	Motor OL Select	A444	Advanced Program
Comm Loss Action	C304	Communications	Output Current	d003	Display
Comm Loss Time	C305	Communications	Output Freq	d001	Display
Comm Node Addr	C303	Communications	Output Voltage	d004	Display
Comm Status	d015	Display	Preset Freq 0	A410	Advanced Program
Comm Write Mode	C307	Communications	Preset Freq 1	A411	Advanced Program
Commanded Freq	d002	Display	Preset Freq 2	A412	Advanced Program
Compensation	A436	Advanced Program	Preset Freq 3	A413	Advanced Program
Contrl In Status	d013	Display	Process Display	d010	Display
Control Source	d012	Display	Process Factor	A440	Advanced Program
Control SW Ver	d016	Display	Process Time Hi	A439	Advanced Program
Current Limit	A441	Advanced Program	Process Time Lo	A438	Advanced Program
DB Duty Cycle	A428	Advanced Program	Program Lock	A458	Advanced Program
DB Resistor Sel	A427	Advanced Program	PWM Frequency	A446	Advanced Program
DC Brake Level	A425	Advanced Program	Relay Out Level	t222	Terminal Block
DC Brake Time	A424	Advanced Program	Relay Out Sel	t221	Terminal Block
DC Bus Voltage	d005	Display	Reset To Defaults	P112	Basic Program
Decel Time 1	P110	Basic Program	Reverse Disable	A434	Advanced Program
Decel Time 2	A402	Advanced Program	S-curve %	A403	Advanced Program

Parameter Cross Reference - by Name (Continued)

Parameter Name	Number	Group	Parameter Name	Number	Group
Dig In Status	d014	Display	Skip Freq Band	A419	Advanced Program
Digital In1 Sel	t201	Terminal Block	Skip Frequency	A418	Advanced Program
Digital In2 Sel	t202	Terminal Block	Slip Hertz @ FLA	A437	Advanced Program
Drive Status	d006	Display	Speed Reference	P108	Basic Program
Drive Temp	d022	Display	Start At power-up	A433	Advanced Program
Drive Type	d017	Display	Start Source	P106	Basic Program
Elapsed Run Time	d018	Display	Stop Mode	P107	Basic Program
Fault 1 Code	d007	Display	SW Current Trip	A448	Advanced Program
Fault 2 Code	d008	Display	Testpoint Data	d019	Display
Fault 3 Code	d009	Display	Testpoint Sel	A459	Advanced Program
Fault Clear	A450	Advanced Program	—	—	—

Product Dimensions

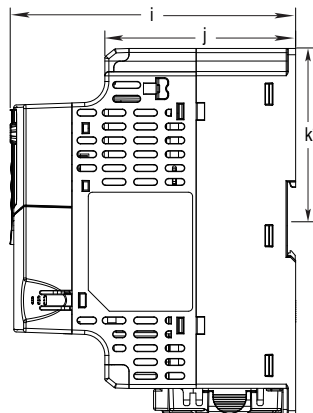
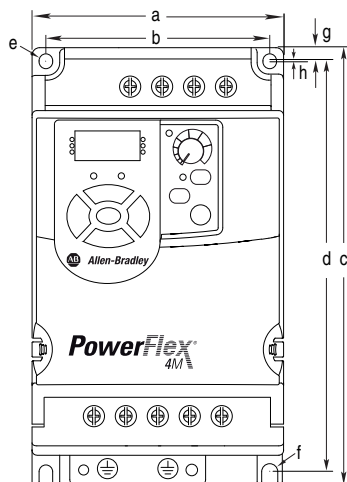
PowerFlex 4M Panel Mount Drives

Ratings are in kW (Hp).

Frame	120V AC - 1-phase	240V AC - 1-phase	240V AC - 3-phase	480V AC - 3-phase
A	0.2 (0.25) 0.4 (0.5)	0.2 (0.25) 0.4 (0.5) 0.75 (1.0)	0.2 (0.25) 0.4 (0.5) 0.75 (1.0) 1.5 (2.0)	0.4 (0.5) 0.75 (1.0) 1.5 (2.0)
B	0.75 (1.0) 1.1 (1.5)	1.5 (2.0) 2.2 (3.0)	2.2 (3.0) 3.7 (5.0)	2.2 (3.0) 3.7 (5.0)
C	—	—	5.5 (7.5) 7.5 (10.0)	5.5 (7.5) 7.5 (10.0) 11.0 (15.0)

PowerFlex 4M Panel Mount Drives

Dimensions are in mm (in.). Weights are in kg (lb.).

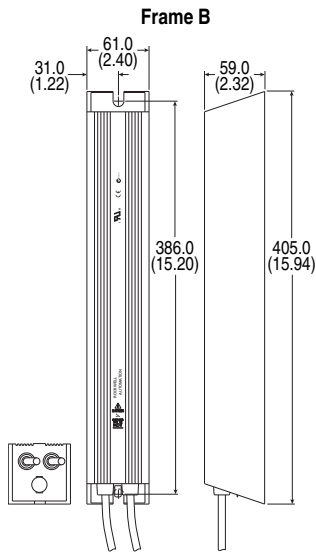


DIN rail mounting is not applicable to Frame C.

Frame	a	b	c	d	e	f	g	h	i	j	k	Shipping Weight
A	72.0 (2.83)	59.0 (2.32)	174.0 (6.85)	151.6 (5.97)	∅ 5.4 (0.21)	∅ 5.4 (0.21)	5.2 (0.20)	—	136.0 (5.35)	90.9 (3.58)	81.3 (3.20)	1.6 (3.5)
B	100.0 (3.94)	89.0 (3.50)	174.0 (6.85)	163.5 (6.44)	∅ 5.4 (0.21)	∅ 5.4 (0.21)	5.2 (0.20)	0.5 (0.02)	136.0 (5.35)	90.9 (3.58)	81.3 (3.20)	2.1 (4.6)
C	130.0 (5.12)	116.0 (4.57)	260.0 (10.24)	247.5 (9.74)	∅ 5.5 (0.22)	∅ 5.5 (0.22)	6.0 (0.24)	1.0 (0.04)	180.0 (7.09)	128.7 (5.07)	—	4.8 (10.6)

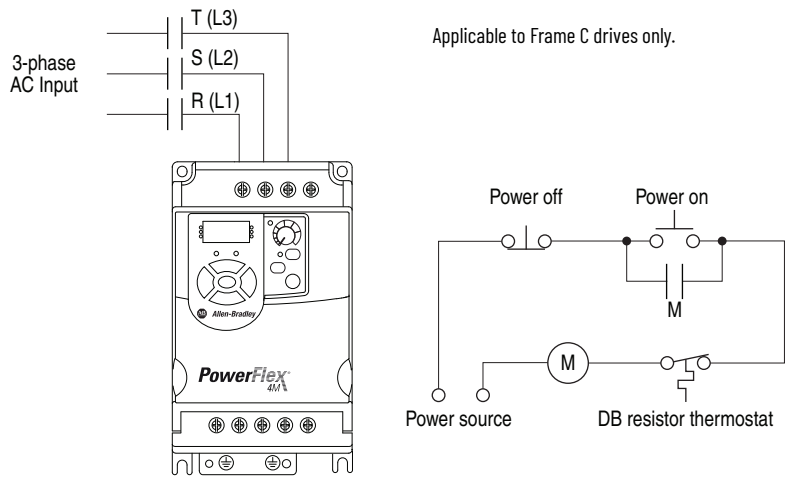
Dynamic Brake Modules

Dimensions are in mm (in.).



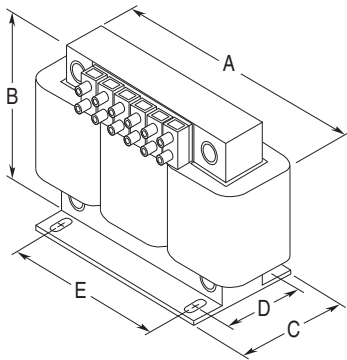
Frame	Catalog Number
B	AK-R2-030P1K2, AK-R2-120P1K2

Recommended External Brake Resistor Circuitry



Bulletin 1321-3R Series Line Reactors

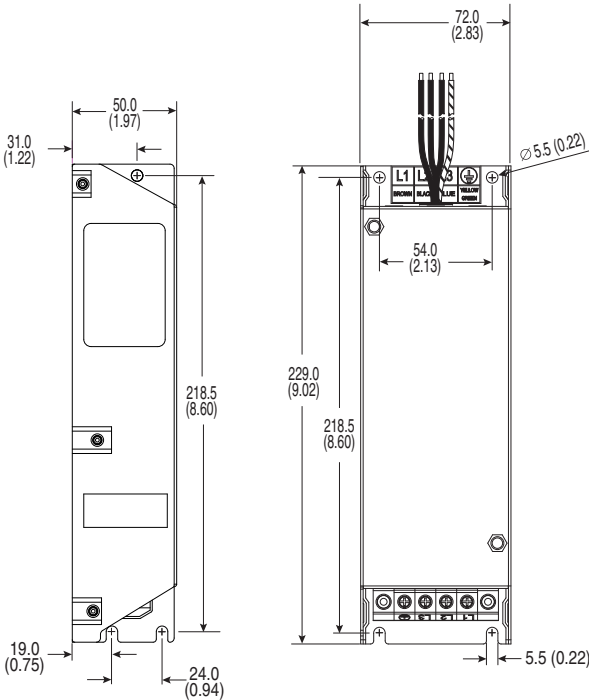
Dimensions are in mm (in.). Weights are in kg (lb).



Catalog Number	A	B	C	D	E	Weight
1321-3R2-A	112 (4.40)	104 (4.10)	70 (2.75)	50 (1.98)	37 (1.44)	1.8 (4)
1321-3R2-B	112 (4.40)	104 (4.10)	70 (2.75)	50 (1.98)	37 (1.44)	1.8 (4)
1321-3R4-B	112 (4.40)	104 (4.10)	76 (3.00)	50 (1.98)	37 (1.44)	1.8 (4)
1321-3R4-C	112 (4.40)	104 (4.10)	86 (3.38)	60 (2.35)	37 (1.44)	2.3 (5)
1321-3R4-D	112 (4.40)	104 (4.10)	92 (3.62)	66 (2.60)	37 (1.44)	2.7 (6)
1321-3R8-A	152 (6.00)	127 (5.00)	76 (3.00)	53 (2.10)	51 (2.00)	3.1 (7)
1321-3R8-B	152 (6.00)	127 (5.00)	76 (3.00)	53 (2.10)	51 (2.00)	3.6 (8)
1321-3R8-C	152 (6.00)	127 (5.00)	85 (3.35)	63 (2.48)	51 (2.00)	4.9 (11)
1321-3R12-A	152 (6.00)	127 (5.00)	76 (3.00)	53 (2.10)	51 (2.00)	4.1 (9)
1321-3R12-B	152 (6.00)	127 (5.00)	76 (3.00)	53 (2.10)	51 (2.00)	4.5 (10)
1321-3R18-A	152 (6.00)	133 (5.25)	79 (3.10)	54 (2.13)	51 (2.00)	4.1 (9)
1321-3R18-B	152 (6.00)	135 (5.30)	89 (3.50)	63 (2.48)	51 (2.00)	5.5 (12)
1321-3R25-A	183 (7.20)	146 (5.76)	85 (3.35)	60 (2.35)	76 (3.00)	4.9 (11)
1321-3R25-B	183 (7.20)	147 (5.80)	89 (3.50)	60 (2.35)	76 (3.00)	6.4 (14)
1321-3R35-A	193 (7.60)	146 (5.76)	91 (3.60)	66 (2.60)	76 (3.00)	6.3 (14)

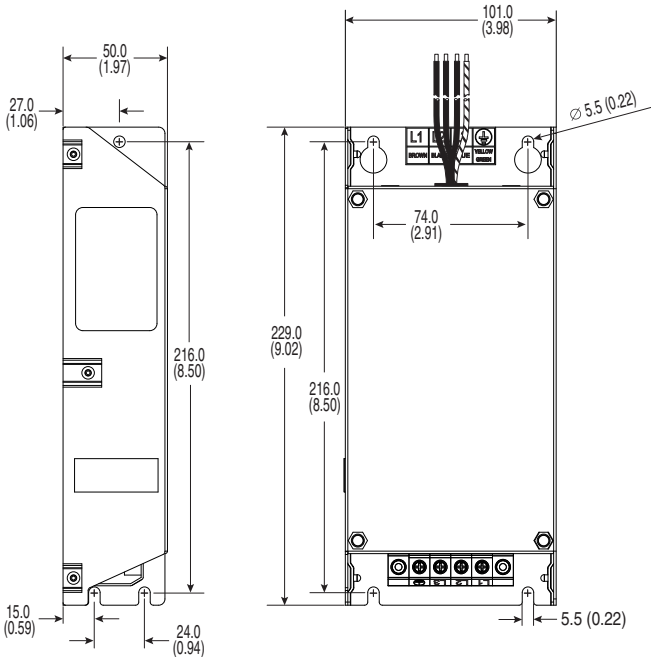
Frame A EMC Line Filters

Dimensions are in mm (in.).
Catalog Numbers: 22F-RF010-AL; 22F-RF9P5-AS, 22F-RF9P5-AL; 22F-RF6P0-AS, 22F-RF6P0-AL



Frame B EMC Line Filters

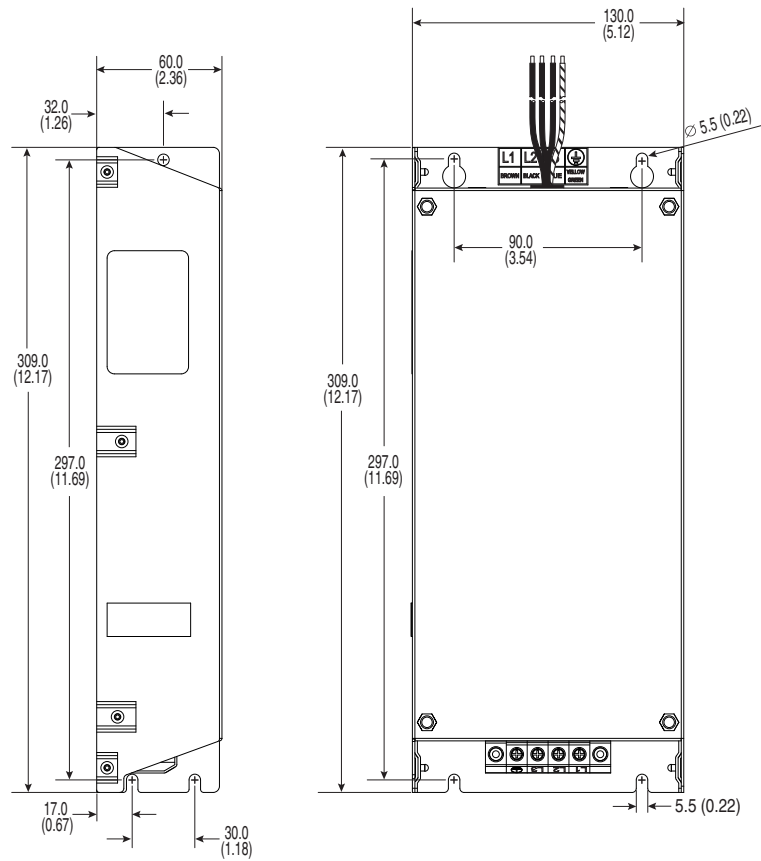
Dimensions are in mm (in.).
Catalog Numbers: 22F-RF018-BL; 22F-RF025-BL; 22F-RF021-BS, 22F-RF021-BL; 22F-RF012-BS, 22F-RF012-BL



Frame C EMC Line Filters

Dimensions are in mm (in.).

Catalog Numbers: 22F-RF039-CS, 22F-RF039-CL; 22F-RF026-CS, 22F-RF026-CL



Additional Resources

These documents contain additional information concerning related products from Rockwell Automation. You can view or download publications at rok.auto/literature.

Resource	Description
PowerFlex 4M Adjustable Frequency AC Drive User Manual, publication 22F-UM001	Describes how to configure, use, and troubleshoot PowerFlex 4M drives.
PowerFlex Dynamic Braking Resistor Calculator Application Technique, publication PFLEX-AT001	Provides information on dynamic braking and how to determine dynamic braking requirements.
PowerFlex AC Drive Performance Specifications per Ecodesign Regulation (EU) 2019/1781 and UK SI 2021 No. 745 Technical Data, publication PFLEX-TD003	Provides specifications per Ecodesign Regulation (EU) 2019/1781 and UK SI 2021 No. 745, including efficiency class.
Drives in Common Bus Configurations Application Technique, publication DRIVES-AT002	Provide the necessary guidelines, considerations, and limitations for the proper application of PowerFlex drives used in common bus configurations.
Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives Installation Instructions, publication DRIVES-IN001	Describes how to install, protect, wire, and ground pulse-width modulated AC drives.
Preventive Maintenance Checklist of Industrial Control and Drive System Equipment Service Bulletin, publication DRIVES-TD001	Provides a checklist and guidelines for performing preventive maintenance.
EtherNet/IP Network Devices User Manual, publication ENET-UM006	Describes how to configure and use EtherNet/IP devices to communicate on the EtherNet/IP network.
Ethernet Reference Manual, publication ENET-RM002	Describes basic Ethernet concepts, infrastructure components, and infrastructure features.
Safety Guidelines for the Application, Installation, and Maintenance of Solid-state Control, publication SGI-1.1	Designed to harmonize with NEMA Standards Publication No. ICS 1.1-1987 and provides general guidelines for the application, installation, and maintenance of solid-state control in the form of individual devices or packaged assemblies incorporating solid-state components.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Selection and Configuration tools, rok.auto/systemtools	Helps configure complete, valid catalog numbers and build complete quotes based on detailed product information.
Rockwell Automation Global Short-circuit Current Ratings (SCCR) Tool, rok.auto/sccr	Provides coordinated high-fault branch circuit solutions for motor starters, soft starters, and component drives.
Product Certifications website, rok.auto/certifications	Provides declarations of conformity, certificates, and other certification details.

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