

Product Overview

Providing users with powerful motor speed control in a compact, space saving design, the Allen-Bradley® PowerFlex® 4M AC drive is the smallest and most cost effective member of the PowerFlex® family of drives. Ideal for machine level speed control, the PowerFlex 4M drive provides 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 to 11 kW (0.25 to 15 Hp) and in voltage classes of 120, 240 and 480 volts.



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Reference Materials

For additional PowerFlex 4M data and general drive information, refer to the following publications:

Title	Publication	Available Online at . . .
PowerFlex 4M User Manual	22F-UM001...	www.rockwellautomation.com/literature
Wiring and Grounding Guidelines for PWM AC Drives	DRIVES-IN001...	
Preventive Maintenance of Industrial Control and Drive System Equipment	DRIVES-TD001...	
Safety Guidelines for the Application, Installation and Maintenance of Solid State Control	SGI-1.1	

For other information, contact Allen-Bradley Drives Technical Support:

Title	Online at . . .
Allen-Bradley Drives Technical Support	www.ab.com/support/abdrives

Start Up, 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.
- **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 DF1 port.
- A **NEMA/UL Type 4X** remote and **NEMA/UL Type 1 hand-held 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, providing added flexibility.
- **Zero Stacking™** is allowable for ambient temperatures up to 40°C, saving valuable panel space. 50°C 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 EN61800-3. External filters for all PowerFlex 4M drive ratings are also available.



Optimized Performance

- **Removable MOV** to ground ensures reliable operation with ungrounded or resistive distribution systems.
- A **relay pre-charge** limits inrush current.
- **Integral brake transistor**, available on Frame C drives, provides dynamic braking capability with simple low cost brake resistors.
- DIP switch settable **24V DC sink or source control** for control wiring flexibility.
- 150% overload for 60 seconds or 200% overload for 3 seconds provides **robust overload protection**.
- Adjustable PWM frequency up to 10 kHz ensures quiet operation.
- Volts per Hertz Control Performance.
- Drive automatically provides auto boost (IR compensation) and slip compensation.
- Provides 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.
 - 22-SCM-232 – RS232/DF1 to RS 485/DSI
 - Bluetooth® - Wireless/DF1 to RS 485/DSI
- **Integral RS485/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 equipped with Bluetooth® wireless technology, and any Allen-Bradley® product supporting the DSI™ protocol.
- RS485/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, using 3rd-party scanners with RTU Master capability

Feed-through Wiring Design

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

PC Programming Software

- Through the use of a Serial Converter Module and DriveExplorer™ or DriveTools™ SP software, programming can be greatly simplified.

DriveExplorer Software

- View and modify drive and adapter parameters in a method similar to the file management capability of Microsoft Windows Explorer.
- 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.
- Compare current parameters with factory defaults or previously saved parameter values.
- Edit, upload and download parameters.

DriveTools SP Software

- Online and offline programming capability
- In-grid and dialog-based parameter editing
- Immediate visual indication of drive and communication status when viewing online drive
- Integrated HTML Help architecture



Catalog Number Explanation

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

a

Drive	
Code	Type
22F	PowerFlex 4M

b

Voltage Rating		
Code	Voltage	Ph.
V	120V ac	1
A	240V ac	1
B	240V ac	3
D	480V ac	3

c1

Rating		
100...120V ac, Single-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, Single-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)

Position

c3

Rating		
200-240V ac, Three-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, Three-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 through ZZ	Reserved

Product Selection

120V ac, Single-Phase Drives (50/60 Hz)

Drive Ratings				IP20, NEMA/UL Open Type
kW	Hp	Output Current	Frame Size	Cat. No.
		A		
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, Single-Phase Drives (50/60 Hz)

Drive Ratings				IP20, NEMA/UL Open Type	w/Integral "S Type" EMC Filter *
kW	Hp	Output Current	Frame Size	Cat. No.	Cat. No.
		A			
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

* This filter is suitable for use with a cable length of up to 5 meters for class A environments and up to 1 meter for class B environments.

240V ac, Three-Phase Drives (50/60 Hz)

Drive Ratings				IP20, NEMA/UL Open Type
kW	Hp	Output Current	Frame Size	Cat. No.
		A		
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
w/Brake				
5.5	7.5	25	C	22F-B025N104
7.5	10	33	C	22F-B033N104

480V ac, Three-Phase Drives (50/60 Hz)

Drive Ratings				IP20, NEMA/UL Open Type	w/Integral "S Type" EMC Filter *
kW	Hp	Output Current	Frame Size	Cat. No.	Cat. No.
		A			
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
w/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

* This filter is suitable for use with a cable length of up to 10 meters for Class A environments.

User Installed Options

Human Interface Module Option Kits and Accessories

Description	Cat. No.
Remote (Panel Mount) LCD Display, Digital Speed Control, CopyCat Capable. IP66 (NEMA/UL Type 4X/12) Indoor Use Only. Includes 2.0 meter cable.	22-HIM-C2S *
Remote Handheld, LCD Display, Full Numeric Keypad, Digital Speed Control, CopyCat Capable. IP30 (NEMA/UL Type 1). Includes 1.0 meter cable. Panel mount with optional Bezel Kit.	22-HIM-A3
Remote Handheld, Wireless Interface Module with Bluetooth® Technology. IP30 (NEMA/UL Type 1). Panel Mount with optional Bezel Kit.	22-WIM-N1
Remote (Panel Mount), Wireless Interface Module with Bluetooth Technology. IP66 (NEMA/UL Type 4X/12) Indoor Use Only.	22-WIM-N4S
Bezel Kit. Panel Mount for LCD Display, Remote Handheld Unit. IP30 (NEMA/UL Type 1). Includes a 22-RJ45CBL-C20 cable.	22-HIM-B1
DSI HIM Cable (DSI HIM to RJ45 cable)	
1.0 Meter (3.3 Feet)	22-HIM-H10
2.9 Meter (9.51 Feet)	22-HIM-H30

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

PC Programming Software

Description	
DriveTools™ SP Software †	See publication 9303-PL002... for ordering/pricing information.
DriveExplorer™ Software (Lite/Full) †❖	
Pocket DriveExplorer™ Software	

† Set-up wizards are available for use with DriveTools SP and DriveExplorer (Lite/Full) only.

❖ DriveExplorer Lite is available for free download at:
http://www.ab.com/drives/driveexplorer/free_download.html.

Communication Option Kits

Description	Cat. No.
Serial Converter Module (RS485 to RS232) Provides serial communication via DF1 protocol for use with DriveExplorer and DriveExecutive™ software. Includes DSI to RS232 serial converter, 1203-SFC serial cable, 22-RJ45CBL-C20 cable, and DriveExplorer Lite CD.	22-SCM-232
Serial Cable 2.0 meter with a locking low profile connector. Connects the serial converter to a 9-pin sub-miniature D female computer connector.	1203-SFC
Serial Null Modem Adapter Use when connecting the serial converter to DriveExplorer on a handheld PC.	1203-SNM
Universal Serial Bus™ (USB) Converter includes 2m USB, 20-HIM-H10 & 22-HIM-H10 Cables	1203-USB
DSI Cable 2.0 meter 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 120 Ohm resistor embedded in an RJ45 connector (2 pieces).	AK-U0-RJ45-TR1
Terminal Block RJ45 two position terminal block (6 pieces) with two 120 Ohm terminating resistors (loose).	AK-U0-RJ45-TB2P
DSI External Communications Kit External mounting kit for 22-COMM Communication Adapters.	22-XCOMM-DC-BASE
External Comms Power Supply Optional 100...240V ac Power Supply for External DSI Communications Kit.	20-XCOMM-AC-PS1
BACnet® MS/TP RS485 Communication Adapter ‡	22-COMM-B
ControlNet™ Communication Adapter ‡	22-COMM-C
DeviceNet™ Communication Adapter ‡	22-COMM-D
EtherNet/IP™ Communication Adapter ‡	22-COMM-E
PROFIBUS™ DP Communication Adapter ‡	22-COMM-P
Compact I/O Module (3 Channel)	1769-SM2

‡ PowerFlex 4M drives require External DSI Communication Kits. Communication Adapters cannot be drive mounted.

Dynamic Brake Resistors

Drive Ratings			Minimum Resistance	Cat. No.*
Input Voltage	kW	Hp	Ω	
240V, 50/60 Hz, Three-Phase	5.5	7.5	13	AK-R2-030P1K2
	7.5	10	10	AK-R2-030P1K2
480V, 50/60 Hz, Three-Phase	5.5	7.5	55	AK-R2-120P1K2
	7.5	10	39	AK-R2-120P1K2
	11	15	24	AK-R2-120P1K2 ※

* Resistors listed in this table are rated 5% duty cycle.

* Requires two resistors wired in parallel.

Input Line Reactors - 3% Impedance

Input Voltage	kW	Hp	Fundamental Amps	Maximum Continuous Amps	Inductance mh	Watts Loss W	Cat. No.*
			A	A			
240V, 50/60 Hz, Three-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	1.0	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, Three-Phase	0.4	0.5	2.0	3.0	20	11.3	1321-3R2-B
	0.75	1.0	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

* Catalog numbers listed are for 3% impedance open style units. NEMA/UL Type 1 and 5% impedance reactor types are also available. Refer to publication 1321-TD001....

EMC Filters §

Input Voltage	Drive Ratings		S Type Filter	L Type Filter
	kW	Hp	Cat. No. *	Cat. No. ‡
120V, 50/60 Hz, Single-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, Single-Phase	0.2	0.25	※	22F-RF010-AL
	0.4	0.5	※	22F-RF010-AL
	0.75	1.0	※	22F-RF010-AL
	1.5	2.0	※	22F-RF025-BL
	2.2	3.0	※	22F-RF025-BL
240V, 50/60 Hz, Three-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, Three-Phase ※	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

§ EMC Filters not available at time of publication, verify availability before ordering.

* This filter is suitable for use with a cable length of up to 5 meters for Class A and 1 meter for Class B environments.

※ Drives are available in these ratings with internal “S Type” filters.

‡ This filter is suitable for use with a cable length of up to 100 meters for Class A and 25 meters for Class B environments.

Specifications

Drive Ratings									
Catalog Number	Output Ratings		Input Ratings			Branch Circuit Protection			
	kW (HP)	Amps	Voltage Range	kVA	Amps	Fuses	140M Motor Protectors ⁽²⁾ (3)	Contactors	Min. Enclosure Volume ⁽⁴⁾ (in. ³)
100 - 120V AC (±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	100-C09	1655
22F-V2P5N103	0.4 (0.5)	2.5	90-126	1.1	9.0	15	140M-C2E-C16	100-C12	1655
22F-V4P5N103	0.75 (1.0)	4.5	90-126	2.2	18.0	30	140M-D8E-C20	100-C23	1655
22F-V6P0N103	1.1 (1.5)	6.0	90-126	2.9	24.0	40	140M-F8E-C32	100-C30	1655
200 - 240V AC (±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	100-C09	1655
22F-A2P5N103	0.4 (0.5)	2.5	180-265	1.6	6.5	10	140M-C2E-C10	100-C09	1655
22F-A4P2N103	0.75 (1.0)	4.2	180-265	2.0	8.2	15	140M-C2E-C16	100-C12	1655
22F-A8P0N103	1.5 (2.0)	8.0	180-265	5.4	22.3	35	140M-D8E-C25	100-C23	1655
22F-A011N103	2.2 (3.0)	11.0	180-265	5.9	24.3	40	140M-F8E-C32	100-C30	1655
200 - 240V AC (±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	100-C09	1655
22F-A2P5N113	0.4 (0.5)	2.5	180-265	1.6	6.5	10	140M-C2E-C10	100-C09	1655
22F-A4P2N113	0.75 (1.0)	4.2	180-265	2.0	8.2	15	140M-C2E-C16	100-C12	1655
22F-A8P0N113	1.5 (2.0)	8.0	180-265	5.4	22.3	35	140M-D8E-C25	100-C23	1655
22F-A011N113	2.2 (3.0)	11.0	180-265	5.9	24.3	40	140M-F8E-C32	100-C30	1655
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	100-C09	1655
22F-B2P5N103	0.4 (0.5)	2.5	180-265	1.2	2.7	6	140M-C2E-B40	100-C09	1655
22F-B4P2N103	0.75 (1.0)	4.2	180-265	2.1	4.9	10	140M-C2E-B63	100-C09	1655
22F-B8P0N103	1.5 (2.0)	8.0	180-265	4.0	9.5	15	140M-C2E-C16	100-C12	1655
22F-B012N103	2.2 (3.0)	12.0	180-265	6.3	15.0	25	140M-C2E-C20	100-C23	1655
22F-B017N103	3.7 (5.0)	17.5	180-265	8.8	21.1	35	140M-F8E-C25	100-C23	1655
22F-B025N104 ⁽¹⁾	5.5 (7.5)	25.0	180-265	11.4	27.2	45	140M-F8E-C32	100-C37	3441
22F-B033N104 ⁽¹⁾	7.5 (10.0)	33.0	180-265	16.1	38.5	60	140M-F8E-C45	100-C60	3441
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	100-C09	1655
22F-D2P5N103	0.75 (1.0)	2.5	340-528	3.0	3.5	6	140M-C2E-B40	100-C09	1655
22F-D4P2N103	1.5 (2.0)	4.2	340-528	5.0	6.0	10	140M-C2E-C10	100-C09	1655
22F-D6P0N103	2.2 (3.0)	6.0	340-528	5.2	6.2	10	140M-C2E-C10	100-C09	1655
22F-D8P7N103	3.7 (5.0)	8.7	340-528	7.0	8.3	15	140M-C2E-C16	100-C12	1655
22F-D013N104 ⁽¹⁾	5.5 (7.5)	13.0	340-528	12.9	15.4	25	140M-D8E-C20	100-C23	3441
22F-D018N104 ⁽¹⁾	7.5 (10.0)	18.0	340-528	16.3	19.5	30	140M-F8E-C25	100-C23	3441
22F-D024N104 ⁽¹⁾	11.0 (15.0)	24.0	340-528	21.7	26.1	40	140M-F8E-C32	100-C30	3441
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	100-C09	1655
22F-D2P5N113	0.75 (1.0)	2.5	340-528	3.0	3.5	6	140M-C2E-B40	100-C09	1655
22F-D4P2N113	1.5 (2.0)	4.2	340-528	5.0	6.0	10	140M-C2E-C10	100-C09	1655
22F-D6P0N113	2.2 (3.0)	6.0	340-528	5.2	6.2	10	140M-C2E-C10	100-C09	1655
22F-D8P7N113	3.7 (5.0)	8.7	340-528	7.0	8.3	15	140M-C2E-C16	100-C12	1655
22F-D013N114 ⁽¹⁾	5.5 (7.5)	13.0	340-528	12.9	15.4	25	140M-D8E-C20	100-C23	3441
22F-D018N114 ⁽¹⁾	7.5 (10.0)	18.0	340-528	16.3	19.5	30	140M-F8E-C25	100-C23	3441
22F-D024N114 ⁽¹⁾	11.0 (15.0)	24.0	340-528	21.7	26.1	40	140M-F8E-C32	100-C30	3441

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

(2) The AIC ratings of the Bulletin 140M Motor Protector Circuit Breakers may vary. See [Bulletin 140M Motor Protection Circuit Breakers Application Ratings](#).

(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.

Input/Output Ratings		Approvals
Output Frequency: 0-400 Hz (Programmable) Efficiency: 97.5% (Typical)		   EMC Directive 89/336 LV: EN 50178, EN 60204 EMC: EN 61800-3, EN 50081-1, EN 50082-2
Digital Control Inputs (Input Current = 6mA)		Analog Control Inputs
SRC (Source) Mode: 18-24V = ON 0-6V = OFF	SNK (Sink) Mode: 0-6V = ON 18-24V = OFF	4-20mA Analog: 250 ohm input impedance 0-10V DC Analog: 100k ohm input impedance External Pot: 1-10k ohms, 2 Watt minimum
Control Output (Programmable Output, form C relay)		
Resistive Rating: 3.0A at 30V DC, 125V AC and 240V AC Inductive Rating: 0.5A at 30V DC, 125V AC, and 240V AC		
Recommended Fuses and Circuit Breakers		
Fuse: UL Class J, RK1, T or Type BS88; 600V (550V) or equivalent. Circuit Breakers: HMCP or Bulletin 140M or equivalent.		
Protective Features		
Motor Protection: I ² t overload protection - 150% for 60 Secs, 200% for 3 Secs (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) 380-480V AC Input – Trip occurs at 390V DC bus voltage (equivalent to 275V AC incoming line)		
Control Ride Through: Minimum ride through is 0.5 Secs - typical value 2 Secs		
Faultless Power Ride Through: 100 milliseconds		
Dynamic Braking		
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. See the PowerFlex 4M User Manual for ordering information.		

Category	Specification	
Environment	Altitude:	1000 m (3300 ft) max. without derating
	Maximum Surrounding Air Temperature without derating:	
	IP20:	–10 to 50° C (14 to 122° F)
	IP20 zero stacking:	–10 to 40° C (14 to 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 to 85 degrees C (–40 to 185 degrees 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.
Control	Relative Humidity:	0 to 95% non-condensing
	Shock (operating):	15G peak for 11ms duration (±1.0ms)
	Vibration (operating):	1G peak, 5 to 2000 Hz
	Carrier Frequency	2-10 kHz. Drive rating based on 4 kHz.
	Frequency Accuracy	
	Digital Input:	Within ±0.05% of set output frequency.
	Analog Input:	Within 0.5% of maximum output frequency.
	Speed Regulation - Open Loop with Slip Compensation:	±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 seconds in 0.1 second increments.
	Intermittent Overload:	150% Overload capability for up to 1 minute 200% Overload capability for up to 3 seconds
	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.

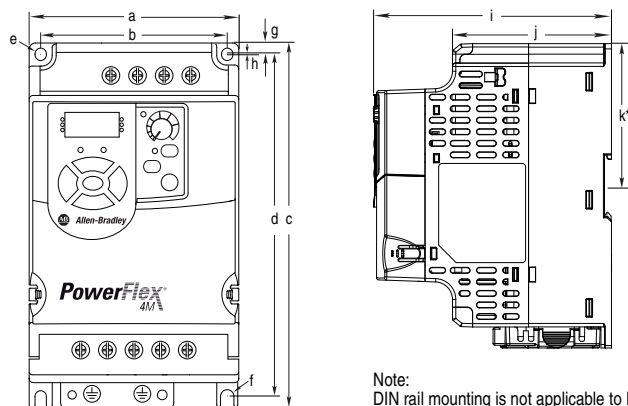
Product Dimensions

PowerFlex 4M Panel Mount Drives – Ratings are in kW and (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)

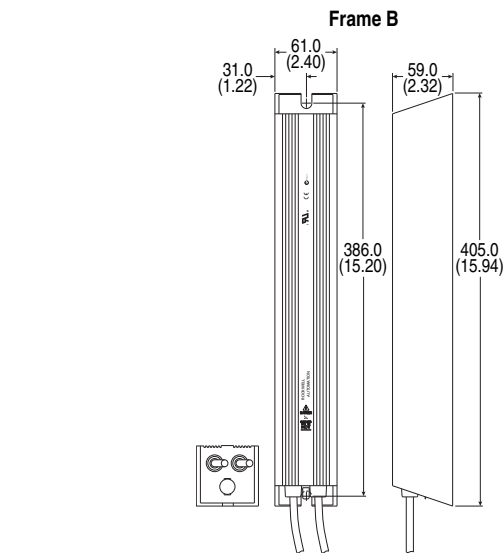
PowerFlex 4M Panel Mount Drives

– Dimensions are in millimeters and (inches). Weights are in kilograms and (pounds).



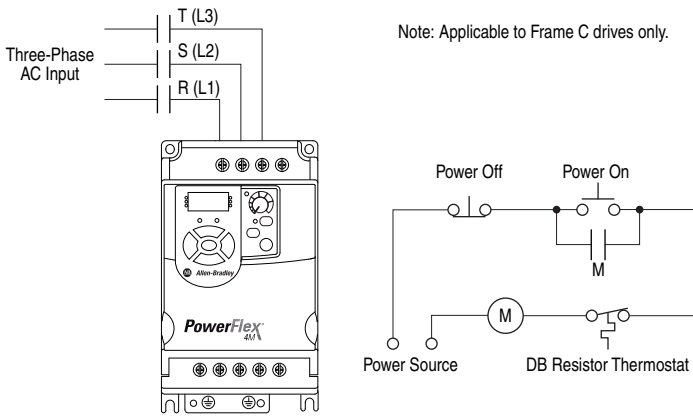
Frame	a	b	c	d	e	f	g	h	i	j	k	Shipping Weight
A	72.0 (2.83)	59.0 (2.32)	174.0 (6.85)	151.6 (5.97)	Ø 5.4 (0.21)	Ø 5.4 (0.21)	5.2 (0.20)	—	136.0 (5.35)	90.9 (3.58)	81.3 (3.20)	1.6 (3.5)
B	100 (3.94)	89.0 (3.50)	174.0 (6.85)	163.5 (6.44)	Ø 5.4 (0.21)	Ø 5.4 (0.21)	5.2 (0.20)	0.5 (0.02)	136.0 (5.35)	90.9 (3.58)	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)	Ø 5.5 (0.22)	Ø 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 millimeters and (inches)



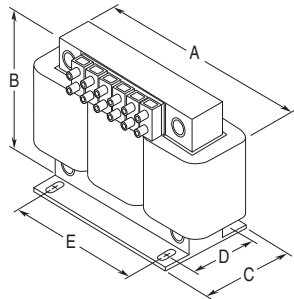
Frame	Catalog Number
B	AK-R2-030P1K2, AK-R2-120P1K2

Recommended External Brake Resistor Circuitry



Bulletin 1321-3R Series Line Reactors

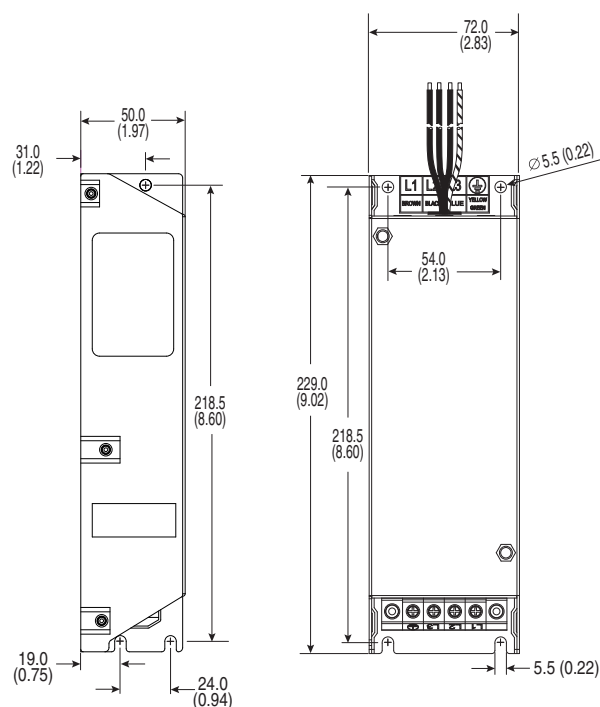
– Dimensions are in millimeters and (inches). Weights are in kilograms and (pounds).



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)

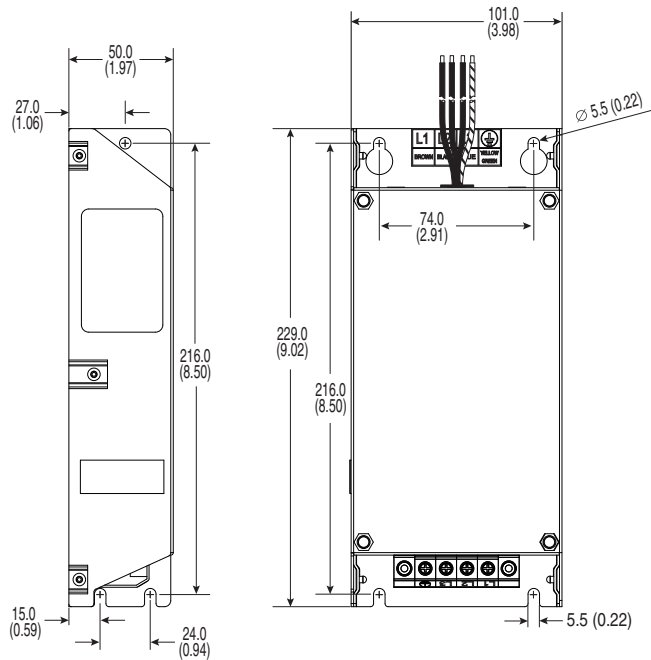
Frame A EMC Line Filters – Dimensions are in millimeters and (inches)

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 millimeters and (inches)

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 millimeters and (inches)

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

